



# **Fluid Control Equipment**

**Installation  
Operation  
and  
Maintenance  
Manual**

**-Short Version-**

# Fluid Control **Installation Operation and Maintenance Manual – Short Version.**

# 1

## Introduction

The information contained in these instructions/this manual is intended for the use of persons engaged in the transporting, off-loading, handling, storage, installation, operation and maintenance of the equipment supplied. Also included is guidance on decommissioning, removal and disposal of the equipment at the end of its useful life.

The customer or his representative must ensure that this document is readily accessible and available for use by any person who will be engaged in any of the above activities.

These instructions are intended to cover all types of fluid control equipment supplied by Ham Baker Adams Ltd, although certain sections will only be relevant to particular types of fluid control equipment in which case this is made clear within the section. Sections which do not specifically state the equipment type are applicable to all equipment types.

If there are any instructions which are not clear, or which do not cover your requirements, please do not hesitate to contact Ham Baker Adams Ltd for clarification or further information (see Section 10 for contact details).

Ham Baker Adams Ltd reserve the right to alter designs and amend associated instructions without notice, in line with continuing product development. In order to assist in this development process and in support of our continuous improvement initiatives, Ham Baker Adams Ltd welcomes and values feedback from customers. Please use the Customer Feedback FaxBack Form in Section 9 to record your views on the quality of the products, services and instructions provided, and inform us of any improvements you would like to see.

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### Health and Safety

#### PLEASE READ BEFORE CARRYING OUT ANY WORK/ACTIVITY ON THE EQUIPMENT SUPPLIED.

The equipment has been designed and constructed to be safe for its intended purpose in compliance with relevant Health and Safety legislation. All persons concerned with the off-loading, handling, storing, installation, operation, maintenance, removal or disposal of the equipment must however comply with relevant statutory Health and Safety legislation and any regulations or requirements specific to the particular site.

It is essential that, before any work activity is carried out, that a risk assessment is made by the responsible person to identify the safety measures needed to minimise the health and safety risks. The site conditions and location of the equipment could give rise to additional hazards (eg confined spaces), which must also be considered. These activities must be managed, supervised and carried out by competent persons who have had appropriate experience, training and instruction. Work personnel must be equipped with the necessary work equipment and monitors.

Workers must be provided with appropriate personal protective equipment such as protective clothing, safety boots, helmets and eye protection, although the risk assessment may identify the need for other types of safety equipment. A 'Permit to Work' should be obtained and authorised from the site supervisor/plant manager detailing how the work is to be carried out, identifying risks present in the work location and giving details of emergency procedures. A 'Method Statement' may also be required.

Certain maintenance activities may require that the equipment is appropriately isolated (and locked off) at source to prevent inadvertent start up or electric shock.

Where workers are likely to come into contact with sewage contaminated equipment, then they should be appropriately vaccinated.

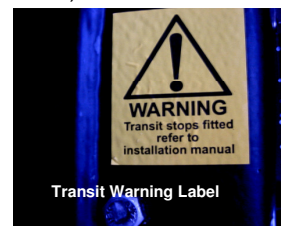
Your attention is drawn to the following hazards, although there may be additional hazards arising from the equipment location or site conditions.

#### **IMPORTANT - TRANSIT DEVICES:**

On penstocks and flap valves there is the potential for hazardous movement of door on handling or lifting. Where required units will have a factory fitted transit device to restrain the door from moving. Transit devices will be one of the following types:

- (1) Bolted transit stop bracket (painted red), or alternatively a transit bolt (bolt head painted red)
- (2) Transit banding strap(s)

Transit devices should also carry an adjacent yellow transit warning label (also shown below).



It is essential that before any handling or lifting operations take place that the responsible/competent person examines the transit device to ensure it is free from damage and secure. Transit devices should remain in position until the unit is securely fixed to the wall/pipe and with operating gear fully fitted. Transit devices should be retained and refitted for any subsequent removal and handling of the unit. (Note: Transit banding straps on Coplastix flap valve units should only be removed after the unit has been secured to the wall but prior to grouting behind the frame).

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Note that transit devices have been designed to restrain the movement of the door during handling operations and are not designed as a means to facilitate lifting of the entire unit weight from the door. Lifting tackle should be attached to the main frame to facilitate lifting of the entire unit (see below).

### **IMPORTANT-LIFTING EQUIPMENT:**

It is the customer’s responsibility to ensure that a competent person thoroughly examines any lifting equipment supplied by Ham Baker Adams Ltd (including lifting eyes and lifting beams) at regular intervals and prior to use. This includes the requirement for any statutory examinations and test certification, subsequent to the date of supply. Any safe working loads indicated on the lifting eyes or lifting beams should not be exceeded. Lifting equipment may have been designed/sized for the particular unit(s) supplied, and should not be used on units for which they were not intended. Where lifting equipment has been supplied by Ham Baker Adams Ltd alternative lifting equipment should not be used. Lifting equipment should be appropriately stored and protected from damage when not in use.

Lifting apparatus provided by the customer (or installer) which engages with the lifting eyes, lifting beams or product supplied by Ham Baker Adams Ltd should be suitable for the lift to be undertaken, of appropriate lifting capacity, be tested in accordance with statutory requirements, and should be thoroughly examined by a competent person prior to use.

### **IMPORTANT - LIFTING POINTS AND VERTICAL LIFTING OPERATIONS:**

Wherever possible equipment is palletised/crated for handling horizontally by fork lift truck. However, for lifting operations into situ units have to be lifted vertically. For this type of operation always use designated/marked lifting points.



Some units may indicate points from where the unit must not be lifted which must be observed. Units should be lifted as indicated in the photographs below.



For lifting the unit vertically the lifting tackle should be attached to the main frame (or in the case of bellmouths to the outer tube). Always attach to the frame by means of suitable lifting eyes/shackles and never use hooks directly onto the unit. Never lift the entire unit from the door or nut pocket (or in the case of bellmouths never lift from the inner tube or stem connector). Units must never be lifted inverted. The approximate weight of the unit (less any associated operating gear), should be indicated on the rating plate (or CE plate), and used as a guide for the selection of suitable lifting equipment of adequate safe working load (SWL) capacity.

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## **IMPORTANT-WORK ACTIVITY UNDER RAISED DOORS:**

Penstocks and flap valve doors must be adequately physically secured before any work is carried out directly adjacent, or underneath, or when anyone is required to pass under or through the unit aperture.

Reliance should not be placed on the operating gear/spindle arrangement or solely on the transit stop to secure the penstock doors or flap valve, and wherever possible this type of work should be avoided.

Spindle nuts can be subject to wear, particularly those immersed in the liquid where grit and debris can cause rapid or excessive wear. This can result in the threads being unable to support the weight of the door.



## **THE DOOR COULD FALL/DROP WITHOUT WARNING**

Modulating penstocks have a greater risk of door nut thread wear. Wear should be minimised by the use of recommended lubricants (see maintenance section) and by carrying out inspection and maintenance at appropriate intervals. Your attention is drawn to the important note above prior to conducting any inspection or maintenance activities.

It is also important when carrying out work on bellmouths, with the sliding bellmouth draw-off pipe in the extended position, that this pipe is securely and independently supported.

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### Handling and Storage

**BEFORE COMMENCING ANY HANDLING ACTIVITY PLEASE ENSURE YOU HAVE FULLY READ THE SAFETY RECOMMENDATIONS (SECTION 2) AND THE HANDLING AND STORAGE INSTRUCTIONS BELOW (SECTION 3).**

Transportation of fluid control equipment, both on and off the installation site premises needs to be conducted in a safe manner. The supplied equipment will be loaded at our works in such a manner so as to minimise transportation costs, but ensuring the safety and stability of the load in transit. This may involve, for oversize loads, an element of disassembly to enable safe transportation, and typically operating gear will be supplied separate from the unit, especially in the case of remote operating equipment involving extension spindles. Where possible units and associated components will be palletised, with components positioned horizontally, and appropriately banded or shrink wrapped to avoid the load shifting in transit. The haulier will be responsible for ensuring that the load does not exceed the safe load capacity of delivery vehicle and for ensuring that it is suitably protected and secured to the vehicle such that the stability of the load is maintained in transit. Any deliveries organised by Ham Baker Adams Ltd by the use of 'hiab' (vehicle mounted crane), will be organised with an approved Ham Baker Adams Ltd supplier who's vehicle driver/operator is trained in the use of the associated lifting equipment. Ham Baker Adams Ltd cannot accept any responsibility for damage or injury caused by a haulier organised by the customer.

It is the responsibility of the person supervising the off-loading or lifting operation to carry out a risk assessment and to provide a safe system of work for the lifting operation to be undertaken. Prior to offloading the load should be re-checked for stability to ensure that no goods or components have become detached, unstable, or liable to slide or drop on offloading. Appropriate action should be taken to re-secure the load prior to off-loading if any movement has occurred in transit.

The same basic safety measures apply equally to despatches made for export shipment in packaging boxes, cases or containers.

If chains or slings are used for handling purposes the unit should be protected with cloth sacking or similar material. Any paint damage resulting from handling should be immediately rectified using the same paint system applied to the unit. Use slings to handle any operating spindles, paying particular attention to protection of the threaded portion. Handle and store in a manner which will prevent the spindles from bending and avoid spindles protruding into gangways/roadways where they may present a hazard.

Never use hooks unless eye bolts are specifically fitted to the frame for handling purposes. Do not under any circumstances use eye bolts or lifting brackets fitted to the door for lifting the entire unit.

Store horizontal wherever possible, supporting the frame on suitably sized timbers to spread the load evenly, avoiding point loading or twisting of the frame. If temporary vertical storage is unavoidable during installation ensure the unit is prevented from toppling by suitably restraining, and avoid any adjacent work activity that could cause the stored unit to become unstable. The unit should be secured to the wall and fully installed as soon as possible.

Protect the units and in particular operating spindles by covering with polythene to avoid contamination from dust/contaminants which are often present on construction sites. Store actuators and gearboxes undercover until ready for assembly/installation.

Check the equipment on delivery and report back in writing to Ham Baker Adams Ltd any missing components within 3 days from receipt of equipment. Ham Baker Adams Ltd will not accept responsibility for loss or damage to any equipment which has occurred following delivery. Ensure all stored items are secure from theft, particularly stainless steel and brass components.

Please ensure the safety and stability of the load of any supplied equipment needed to be subsequently transported at the installation site, by transporting palletised/horizontally and by observing the same basic safety precautions identified earlier in this section.

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### Installation & Commissioning

**BEFORE COMMENCING ANY INSTALLATION ACTIVITY PLEASE ENSURE YOU HAVE FULLY READ THE SAFETY RECOMMENDATIONS (SECTION 2), AND THE HANDLING AND STORAGE INSTRUCTIONS (SECTION 3), AND THE INSTALLATION INSTRUCTIONS BELOW (SECTION 4).**

#### **4.1 GENERAL INSTALLATION GUIDELINES**

These installation guidelines apply to all types of standard penstock and flap valve units and assume that the work will be carried out by competent, trained personnel working with suitable equipment under safe site conditions. Care has been taken to ensure that the information contained in these instructions is reliable. However Ham Baker Adams Ltd cannot accept any responsibility for damage or leakage as a result of poor installation, unless installation forms part of the contract.

The supplied equipment and associated operating gear may have been selected/sized/designed to suit a particular operating head/condition specific to the site location. It is important to ensure that the unit is installed in the correct location, and that it operates under the conditions it was intended for. This includes correct orientation relative to flows and head conditions. This can normally be established by reference to any supplied Building in Drawings, or if in doubt contact Ham Baker Adams Ltd. Note that the rating plate will indicate the operating heads for which the unit and associated operating gear has been designed/configured. Customers supplying their own operating gear must ensure that it is correctly sized to fit the equipment supplied and the operating heads/conditions present.

Electrically operated penstocks have a CE plate fixed to the unit, and a Certificate of Conformity supplied to confirm that the equipment meets the requirements of the Machinery Directive.

Where the penstock is not installed by Ham Baker Adams Ltd, the CE designation is conditional on the correct installation and assembly of the penstock and operating gear in accordance with the manufacturers instructions together with current regulations and best practice.

Under no circumstances should the operating head pressures (for which the unit has been designed/configured) be exceeded at any time. These same points must also be considered if the unit is subsequently removed for re-use at another location.

It is the customer's responsibility to ensure that the design of the surrounding civil structure provides for the necessary safety of the operator during operation and maintenance of the unit, including provision of handrailing, platforms or decking. In the case of stoplogs in particular, the use of lifting beams and davits/cranage should be used in preference to manual lifting, where the safety of the operator cannot be safeguarded by provision of handrailing, platforms or decking.

Flap valves to be utilised for sea outfall applications may be subject to turbulent flows across the face of the valve, which may cause lifting of the door and hence leakage. Consideration should be given to siting the valve in a shielded position or enclosing the valve in a baffle to minimise these effects. Note that flexible type valves should be specified and utilised for valves subject directly to wave action.

Customers supplying their own anchor bolts must ensure that the appropriate size and type of bolt are selected to suit the equipment supplied and operating pressures present. Ham Baker Adams Ltd do not accept any responsibility for damage or injury due to the customer's incorrect or inappropriate selection of anchor bolts. Anchor/foundation bolts should be tightened in accordance with the supplier's recommended tightening torques.

It is important prior to completion of installation that the door is not moved within the frame (with the exception of cast iron penstocks-see final paragraph Section 4.1). All penstocks are set in the correct closed position at our works, and these settings must be preserved. A check should be made to ensure no fixings have vibrated loose during transportation and where applicable tighten, ensuring that the correct seal tolerance is maintained (or reinstated). The leakage performance from an installed unit is critically dependent upon the quality of installation. For applications which require minimum leakage performance it is strongly recommended that installation is carried out by Ham Baker Adams Ltd installers.

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Ham Baker Adams Ltd cannot accept any responsibility for poor leakage performance resulting from incorrect installation by the customer or his representative.

For wall and channel mounting, due to civil work tolerances, care must be taken to ensure that the unit seats on the layer of grout avoiding any direct contact between the frame and civils which could lead to distortion. Do not attempt to seal the frame to the wall by the means of mastic or other sealing compounds. It is assumed that installation will take place to new concrete of minimum strength 25 N/mm<sup>2</sup> (or sound existing concrete of similar minimum strength).

The pressure from any locating jacks must be spread evenly using timber. Avoid point loading to any part of the frame, and never apply jacking pressure to the door.

Door transit stops/devices must not be removed until the frame is securely wedged into a channel or bolted onto a wall/pipe and until the operating gear is in place to support the door. Should it be necessary to subsequently remove the penstock, the door transit stops/devices are to be refitted.

Anchor bolts can be of stainless steel or zinc plated steel construction. If zinc plated steel construction bolts are used then the exposed portion should be coated in sealer paint immediately after installation.

Before grouting it is recommended that a feeler gauge non-acceptance test of 0.1mm for cast iron and 0.0mm for Coplastix/Fabricated units be carried out on all sealing faces. If necessary adjust the packing sufficient to close the gap, until non-acceptance of the feeler gauge is achieved.

After anchoring but before grouting it is recommended that all cast iron penstock units are opened 100mm then closed back onto the seals to make sure that the frame is not distorted.

## **4.2 ALIGNMENT AND LOCATION**

### **4.2.1 Channel Mounted - Penstocks, Handstops and Stoplogs**

1. Present the unit (or frame sections in the case of stop logs) into the prepared recess, making sure that the invert of the frame is flush with the invert of the channel, and ensuring that the unit is the correct way round relative to the flow.
2. Locate the unit in its final position by setting the frame in the recess using jacks and packing pieces (to the recommended grouting thickness). (Note that stoplogs supplied with separate frame sections should be located positioning the invert section first, then position the side members vertically to engage the location tabs, ensuring sides remain parallel throughout height of frame).
3. Carefully check that the unit is positioned square and perpendicular in all planes/directions.
4. For penstocks check the sealing faces for non-acceptance of the feeler gauge (as stated in 4.1) around the full perimeter of the aperture. Adjust the packing locally only where the tolerance is exceeded, sufficient only to close the gap.
5. For stoplogs, after ensuring the frame is secure from any possible movement, check the setting by lowering the logs to the invert of the frame. Logs should remain in position as this reduces the possibility of frame distortion and contamination of the seal surface during grouting.

### **4.2.2 Wall Mounted with Expanding Anchor Bolts - Penstocks, Flap Valves, Handstops and Stoplogs**

1. Present the unit (or frame in the case of stop logs) to its required position taking care to ensure that the invert of the frame is flush with the civils. Whilst in this position check the 'invert to coping' dimension. When the correct location is achieved support the frame along the whole of the bottom cross member. (Note that stoplogs supplied with separate frame sections should be located positioning and bolting the invert section first, then position the side members vertically to engage the location tabs, ensuring sides remain parallel throughout height of frame).
2. Using the frame as a template, drill all holes to accept the anchor bolts specified. Note that the protective coating inside the fixing holes may be damaged during drilling and should be immediately repaired (in accordance with the paint specification).

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3. Insert anchor bolts in the top positions of the frame each side and place behind the frame packing pieces to the recommended grouting thickness, as close to each bolt as possible. Tighten the bolts sufficient only to nip and hold the packing pieces in position.
4. Insert the remaining anchor bolts using the same procedure, checking that the unit is square and perpendicular in all planes/directions.
5. For penstocks and flap valves check the sealing faces for non-acceptance of the feeler gauge (as stated in 4.1) around the full perimeter of the aperture. Adjust the packing locally only where the tolerance is exceeded, sufficient only to close the gap.
6. Finally tighten all anchor bolts securely to ensure no movement of the frame during grouting.
7. Recheck with feeler gauge to ensure no movement has occurred prior to grouting.
8. For stoplogs, after ensuring the frame is securely fixed, check the setting by lowering the logs to the invert of the frame. Logs should remain in position as this reduces the possibility of frame distortion and contamination of the seal surface during grouting.

### 4.2.3 Wall Mounted with Chemical Anchor Bolts - Penstocks, Flap Valves, Handstops and Stoplogs

1. Present the unit (or frame in the case of stop logs) to its required position taking care to ensure that the invert of the frame is flush with the civils. Whilst in this position check the 'invert to coping' dimension. When the correct location is achieved support the frame along the whole of the bottom cross member. (Note that stoplogs supplied with separate frame sections should be located positioning and bolting the invert section first, then position the side members vertically to engage the location tabs, ensuring sides remain parallel throughout height of frame).
2. Using the frame as a template, mark out or pilot drill all holes. Remove the unit. Note that the protective coating inside the fixing holes may be damaged during drilling and should be immediately repaired (in accordance with the paint specification). Drill or open out the holes to accept the chemical anchor capsules specified.
3. Ensure holes drilled are clean and dry and follow the instructions supplied separately with the chemical anchor bolts, inserting a chemical capsule into each hole. Reposition the unit as stated in section 1 above, and following carefully the manufacturer's instructions for breaking the capsule, mixing of chemicals and depth of insertion etc. Immediately support the studs in the centre of each mounting hole, perpendicular to the mounting face until fully cured in accordance with manufacturer's curing instructions.
4. Assemble the washers and nuts over the studs protruding through the frame. Place behind the frame packing pieces to the recommended grouting thickness, as close as possible to each bolt. Tighten the nuts sufficient only to nip and hold the packing pieces in position.
5. Check that the unit is square and perpendicular in all planes/directions, and adjust packing where necessary.
6. For penstocks and flap valves check the sealing faces for non-acceptance of the feeler gauge (as stated in 4.1) around the accessible perimeter of the aperture. Adjust the packing locally only where the tolerance is exceeded, sufficient only to close the gap.
7. Finally tighten all nuts securely to ensure no movement of the frame during grouting.
8. Recheck with feeler gauge to ensure no movement has occurred prior to grouting.
9. For stoplogs, after ensuring the frame is secure, check the setting by lowering the logs to the invert of the frame. Logs should remain in position as this reduces the possibility of frame distortion and contamination of the seal surface during grouting.

### 4.2.4 Wall Mounted with Indented Type Pocket Anchor Bolts – Penstock and Flap Valves Only

1. The civil contractor is responsible for creating the anchor bolt pockets in accordance with the recommended dimensions. These must be appropriately back-tapered to resist pull-out forces.
2. Physically measure the bolt hole centre in the unit and compare positions with the anchor bolt pockets. The two must coincide relative to the invert level.
3. Construct a template with clearance holes positioned to suit the mounting holes in the frame and with centre lines of the aperture clearly marked. Note that the template must be rigid and well braced. Mount the indented bolts to the template using nuts and washers each side of the template to hold the bolts square, ensuring that the bolts protrude the correct distance (to suit the pocket in the civils and to allow for the recommended grouting thickness).

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4. Fill the pockets with stiff non-shrink grout and immediately offer the template in the correct position relative to the aperture centre lines. Carefully push the template so that the indented foundation bolts enter the grout filled pockets. Ensure that all bolts enter the grout to the correct depth (allowing for the recommended grouting thickness). Check for plumb and level in all directions. Clamp the template in position and leave undisturbed until full cure of the grout, after which the template can be removed.
5. Position the unit over the protruding bolts. Place behind the frame packing pieces to the recommended grouting thickness, as close to each bolt as possible. Tighten the nuts sufficient only to nip and hold the packing pieces in position.
6. Check for the unit is square and perpendicular in all planes/directions, and adjust packing where necessary.
7. Check the sealing faces for non-acceptance of the feeler gauge (as stated in 4.1) around the accessible perimeter of the aperture. Adjust the packing locally only where the tolerance is exceeded, sufficient only to close the gap.
8. Finally tighten all nuts securely to ensure no movement of the frame during grouting.
9. Recheck with feeler gauge to ensure no movement has occurred prior to grouting.

### 4.2.5 Thimble Mounted - Cast Iron Penstocks Only

1. The civil contractor is responsible for casting in thimbles to the civil structure. Care must be taken to ensure that:
  - a. ensure that vent holes in the thimble are positioned at the invert/bottom
  - b. the top and bottom centre lines are aligned square/perpendicular
  - c. the mounting face is true to the vertical plane
  - d. the inside of the thimble is braced to prevent the risk of distortion
  - e. concrete is prevented from entering any fixing holes or onto the machined mounting face
  - f. the alignment of the thimble is rechecked after casting, and that all machined surfaces are protected with a rust inhibitor if there is a delay before the penstock is to be fitted.
2. Ensure that the machined mounting face of the thimble and the machined back of the penstock are thoroughly cleaned.
3. Place cleaned studs into the tapped fixing holes of the thimble.
4. Prime as necessary and apply two continuous beads of mastic (such as butyl rubber compound or black asphaltic compound), one around the outer and one around the inner of the fixing positions on the thimble, following the mastic manufacturer's instructions. Note mastic for potable water applications must be WRC/DWI approved.
5. Mount the assembled penstock unit onto the thimble. Place nuts on the studs and tighten in a uniform manner until metal to metal contact is achieved, removing any excess mastic.
6. Check sealing faces for non- acceptance of a 0.1mm feeler gauge. In the unlikely event of any errors, re-check that the mounting face has not been distorted during the pouring operation. Adjustment of the wedges locally may be required to remove any minor errors. Please seek advice/instructions from Ham Baker Adams Ltd prior to adjusting the factory set wedges.

### 4.2.6 Pipe Mounted - Circular Cast Iron Penstocks and Circular Flap Valves Only

1. Pipe mounted units require a separate gasket between the valve and the pipe flange, (except Coplastix Uniflaps which have an integral gasket).
2. Ensure that pipe mounting flange is flat, vertical and thoroughly cleaned.
3. Support the valve vertically and offer up to the flange, positioning the gasket between, such that the bolts will engage. Apply fixing washers and nuts and lightly tighten, ensuring the valve is centrally located. Note that the lifting/handling equipment should remain in position until the unit is securely fixed.
4. Tighten the fixings in sequence at bolt positions diagonally or diametrically opposite. (Do not use excessive force in tightening, particularly on Coplastix units where this may crack the flange on the unit).

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## 4.2.7 Bellmouths Only

1. The civil contractor/customer is responsible for supply and positioning of the pipe flange/gasket onto which the bellmouth is to be fitted. Care must be taken to ensure that:
  - a. the pipe flange is flat and thoroughly cleaned
  - b. the pipework/flange is correctly positioned and fixed and lies in a true horizontal plane
  - c. that a gasket is provided between the pipe flange and unit.
2. Check that the mounting holes in the foot of the standpipe match that of the flange.
3. Side lift units must be installed such that the orientation of the standpipe is correct with the mounting flange to correctly position the operating spindle.
4. Suspend the valve such that the base flange of the standpipe is positioned just above the pipework flange with gasket between. Insert fixing bolts through the standpipe flange such that they engage the corresponding holes in the pipe flange. Apply fixing washers and nuts and lightly tighten, ensuring the unit is centrally located. Note that the lifting/handling equipment should remain in position until the unit is securely fixed.
5. Tighten the fixings in sequence at bolt positions diagonally or diametrically opposite. (Do not use excessive force in tightening, as this may crack the flange on the unit).
6. Check the axis of the unit is vertical. If errors are noted it is likely that fixing were not tightened uniformly, or the pipe flange is not truly horizontal, either will require correction.
7. If guide rods have been removed to facilitate transportation these should be refitted, prior to installation of the operating equipment.

## **4.3 SHUTTERING AND GROUTING**

Not applicable for thimble or flange mounted base units.

1. Shutter up around the external profile of the frame and the internal aperture using timber faced with a thin neoprene type sponge material to ensure a good, clean seal without undue pressure.
2. Recheck finally that the unit is positioned square and perpendicular in all planes/directions, and for non-acceptance of the feeler gauge as indicated in section 4.1.
3. If correct, mix and pour appropriate fluid grout around the frame (in accordance with the manufacturer's data sheet and health and safety precautions). Do not attempt to use vibrating equipment as this may disturb the setting of the unit (in particular the wedges on penstocks). Immediately remove any grout excess or spillage from the unit.
4. Once the void behind the unit is completely filled, leave the unit undisturbed for the curing time indicated on the grout manufacturer's data sheet.
5. When fully cured check that mounting fixings remain tight. Do this in sequence at bolt positions diagonally or diametrically opposite.
6. If all bolts are tight, remove the shuttering, and clean up to removing any remaining excess grout or debris from the unit. Pay particular attention to any debris which may have fallen between the door and frame, as this could affect or damage the sealing surfaces. If excessive tightening is required on any of the fixings, then recheck seal faces as outlined in section 4.1.

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## **4.4 OPERATING EQUIPMENT**

Penstocks, Weirs and Bellmouths only.

Ham Baker Adams Ltd recommend that all penstocks which incorporate electric, hydraulic or pneumatic actuators are installed and commissioned by Ham Baker Adams Ltd or an Installation Supplier approved by Ham Baker Adams Ltd. If customers choose to arrange installation themselves, then they are responsible for correctly setting limit switches, torque switches, valves etc. Ham Baker Adams Ltd will not accept any responsibility for damage caused by operating the unit with incorrect settings. Penstocks and actuators can be damaged as a result of incorrect setting.

The following instructions cover the installation of spindles, guide brackets, coping brackets pillars etc. Care must be taken not to bend or damage threads on handling and installing spindles.

1. Where possible penstocks are delivered in a fully assembled state. Where this is not possible (ie where the operator is to be positioned remotely) the operating components/sections will be separate but will be identified to enable assembly to the correct unit.
2. If the spindle has been removed for transportation, insert the spindle nut into the door pocket and lower the spindle to engage the nut. Screw the spindle into the nut. (For rising spindles, screw in the spindle until the end of the spindle is flush with the bottom of the nut, then pin the spindle to the nut).
3. Attach any required extension spindles and support the spindle vertically and in line with the centre of the nut pocket.
4. Use the spindle as a guide to mark the positions of any required guide brackets, coping brackets etc at height positions indicated on the building in drawings. Where no building in drawings have been supplied, ensure that the full number of guide brackets supplied with each unit are fitted at equal distances to evenly support the spindle. However this spacing must be adjusted to avoid possible collision with spindle couplings in the case of rising spindle applications.
5. Bolt and grout required spindle guide brackets or coping brackets in the same manner to that described for the penstock unit for the type of anchor bolt specified.
6. When fitting a pillar, it should be set to provide correct vertical alignment of the spindle at the support at the top of the pillar before fitting and tightening the fasteners through the pillar baseplate flange. (This is to avoid clearances in the baseplate holes from causing any potential misalignment of the spindle).
7. Upon completion check again to ensure that all operating equipment is in perfect vertical alignment, then the handle, gearbox arrangement or powered actuator may then be fitted. (Refer to the gearbox or actuator manufacturer's instructions for fitting).
8. It is only when all operating gear parts have been fully fitted, and the weight of the door will be supported by the operating gear, that the transit stop devices or physical supports propping doors can be removed. Ensure that the Health and Safety recommendations in section 2 have been read and understood prior to commencing.

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## 5

### Operation

**BEFORE COMMENCING ANY OPERATION ACTIVITY PLEASE ENSURE YOU HAVE FULLY READ THE SAFETY RECOMMENDATIONS (SECTION 2) AND THE OPERATION GUIDELINES BELOW (SECTION 5).**

#### **5.1 GENERAL OPERATION GUIDELINES**

Where there is a requirement to gain access to the unit (or operator) by removal of decking, manhole covers or surface box lids, care should be taken to ensure that these do not present a hazard while in the open or removed position, and that they are correctly replaced after use. (Your attention is drawn to the requirements in Section 2 for entry into confined spaces).

Where units may be subject to mis-use or where site security is poor, provision for locking should be provided to prevent un-authorized use. Provision for locking can be provided within the design of penstock, weir and bellmouth units, if specified as a requirement by the customer at the time of enquiry/ordering.

Units fitted with rising spindles should only be operated with spindle protection tubes fitted. Likewise units provided with guarding, should only be operated with guarding in place. (Note that guards should be specified as a requirement by the customer at the time of enquiry/ordering for any powered actuation applications where human access can be gained to the revolving spindle or door motion to eliminate any possibility of entrapment in moving parts).

Fluid Control equipment is not normally designed to be drop tight and therefore a leakage tolerance has to be applied. The maximum leakage rate (in accordance with BS 7775), under normal operating conditions is:

On seating condition = 1.25 litres per min per metre of seal periphery.

Off seating condition = 2.50 litres per min per metre of seal periphery.

Note that for stoplogs this means individual log periphery.

Seals (except metal to metal seals on cast iron penstocks) are flexible and after being put into service, may take up an initial compression set. This will not detract from the operation of the unit.

##### 5.1.1 Penstocks, Weirs and Bellmouths

**BEFORE OPERATING ANY UNIT FITTED WITH AN ACTUATOR OR CYLINDER PLEASE ENSURE YOU HAVE FULLY READ THE RELEVANT SUPPLIER'S OPERATING INSTRUCTIONS/MANUAL AND SECTION 5.1.5 BELOW.**

#### ***To Open/Close a Penstock or Adjust a Weir/Bellmouth:***

1. Where handwheels are fitted, the direction of closing is clearly marked either on the handwheel or label attached to the protection tube. For power actuation both opening and closing directions will be marked on the control panel.
2. Where operation is by a square cap the direction of closing is clearly marked on the cap. Only tee keys with the appropriate sized socket (or as supplied with the unit) should be used. Tee keys should be removed from the unit when not in use and stored in a safe location which avoids possible hazard, loss or damage.
3. If any tight spots should be encountered when opening or closing, do not try to overcome these by exerting an abnormally high force, because this could cause damage to the spindle or nut. In such cases the first priority should be to determine and clear the cause of any obstruction. (Note that the risk of this potential problem will be minimised if the maintenance recommendations are carried out).
4. The life of a penstock unit will be prolonged if minimum force to achieve the leakage requirements is utilised at the fully closed position. Handwheel diameters are sized appropriately, and should not be changed for larger diameter handwheels. Under no circumstances should a lever bar be used to exert additional pressure as this is

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likely to result in damage to the unit or operating gear. Similarly, for powered actuation it is not advisable to alter settings of torque limiters, pressure relief valves or limit switches (after these have been correctly set on commissioning).

5. Weir penstocks/bellmouths are designed to control the level of water and for draw-off/draw-down purposes. This is achieved by positioning the door/bellmouth to the required level. Once positioned, the door/bellmouth will automatically retain its desired position.

### 5.1.2 Flap Valves

Flap valves are designed to operate automatically. The door must not be restrained or obstructed in any way. Flap valves are designed to operate at a very low differential head, and due to this may not always seal perfectly at in a low closing head situation or under ebb and flow conditions.

### 5.1.3 Handstops

1. Large doors may require two man operation and the maximum lifting weight defined in the Manual Handling Regulations should not be exceeded. Note that the force of water on the door can affect the manual effort required to lower and raise the door.
2. **To close:** Hold the door by the lifting handle(s) or handhole(s)/fingerhole(s) provided. Insert the bottom edge of the door into the frame engaging the seals and lower the door down to the invert to the closed position.
3. **To open:** Hold the door by the lifting handle(s) or handhole(s)/fingerhole(s) provided. Raise the door, removing it from the frame or retaining it in the frame in the open position.
4. Store doors not in use in a safe location which avoids possible hazard, loss or damage. It is advisable to identify the doors to their correct frame/location where more than one handstop unit is installed.

### 5.1.4 Stoplogs

1. Manually lifted logs require two man operation and the maximum lifting weight defined in the Manual Handling Regulations should not be exceeded. Note that the force of water on the log can affect the manual effort required to lower and raise the log.
2. Raise or lower the log evenly, maintaining it horizontally to avoid crabbing against the side of the frame.
3. Lifting apparatus should be thoroughly examined by a competent person before use and periodically. Safe working loads must not be exceeded and lifting beams should only be used for lifting the logs of the unit they have been designed for, and not for any other purpose. This is the customer's responsibility once the equipment has been supplied.
4. As logs emerge from the water be prepared to anticipate any difference in weight ie a Coplastix/Plastigate log are solid and heavier than water, whereas an Aluminium log is lighter than water.
5. **To Insert using Lifting Beam:** Attach the beam to a lifting device (of suitable lifting capacity/SWL) by means of suitably sized and certified lifting equipment. Attach the beam to the stoplog ensuring that all four hooks are engaged onto the lifting pins. Lift the log ensuring that no personnel stand beneath at any time during the lifting operations. Lower the beam and log into the frame, using banksmen to ensure that the ends of the log engage the frame seals. Note ensure fingers/hands/arms are clear to avoid entrapment as the log engages the frame. Continue lowering until the log comes to rest at the invert or on top of the previously inserted log. Disengage the hooks by pulling on the disengagement rope and lift the beam clear.
6. **To Remove using Lifting Beam:** Attach the beam to a lifting device (of suitable lifting capacity/SWL) by means of suitably sized and certified lifting equipment. Lift the beam ensuring that no personnel stand beneath at any time during the lifting operations. Lower the beam into the frame using banksmen to ensure that the ends of the log engage the frame seals. Note ensure fingers/hands/arms are clear to avoid entrapment as the lifting beam engages the frame. Continue lower until the beam comes to rest on top of the uppermost log. The lifting hooks should automatically engage onto the lifting pins in the log. Lift the beam and log and remove to a safe storage location ensuring the log is safely supported on an even surface and disengage the hooks by pulling on the disengagement rope.
7. **To Insert using Manual Lifting Poles:** Ensure logs are stored/positioned in a location which avoids any excessive manual handling. Ensure ground surface adjacent to frame installation is sound and free from obstruction. Using two operators, one positioned at each end of the log engage the lifting pole hooks under the

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lifting pins in the log. Lift the log, bending at the knees and maintaining a straight back. Lower the log into the frame ensuring that the ends of the log engage the frame seals. Note ensure all parts of the body are clear to avoid entrapment as the log engages the frame. Continue lowering until the log comes to rest at the invert or on top of the previously inserted log. Disengage lifting pole hooks.

8. **To Remove using Manual Lifting Poles:** Ensure ground surface adjacent to frame installation is sound and free from obstruction. Using two operators, one positioned at each side of the frame engage the lifting pole hooks under the lifting pins in the uppermost log. Lift the log, maintaining a straight back, using the arms/hands sequentially down the length of the pole to raise the log. Lower the log into the frame ensuring that the ends of the log engage the frame seals. Continue lowering until the log comes to rest at the invert or on top of the previously inserted log. Disengage lifting pole hooks.
9. Store logs, lifting beams/poles when not in use in a safe location which avoids possible hazard, loss or damage. (Note that special log storage frames can be provided to store logs safely and using minimum floor area). It is advisable to identify the logs and lifting beam/poles to their correct frame/location(s) where more than one stoplog unit is installed.

### 5.1.5 Powered Actuator Operating Equipment

**BEFORE OPERATING ANY UNIT FITTED WITH AN ACTUATOR OR CYLINDER PLEASE ENSURE YOU HAVE FULLY READ THE RELEVANT SUPPLIER'S OPERATING INSTRUCTIONS/MANUAL.**

Note that if the units supplied are fitted with powered actuator the actuator supplier's instructions will be provided separately in the full manual.

Operation of a powered actuator is simple and straightforward providing that installation and commissioning instructions have been carried out correctly.

1. An electric actuator can be operated directly on the unit either manually or by powered operation.
2. Units may have been installed to additionally provide remote operation either by direct connection and/or by control signal.
3. Follow the operating instructions in accordance with the actuator manufacturer's instructions.

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### Troubleshooting

SYMPTOM	CAUSE	REMEDIAL ACTION
<b>LEAKAGE</b>  (Most Fluid Control is not designed to be drop tight, the maximum leakage rate, under normal operating conditions (upto 6 m on seat head) is 1.25 litres per minute per metre of seal periphery).	Paint/mastic/concrete or foreign matter on seal face.	Carefully remove with fine emery cloth.
	Loose or unevenly adjusted wedges.	Wedges are factory set, but can loosen in transit. Seek advice/instructions from S-H on wedge adjustment in order to re-instate seal tolerance as outlined in 4.1.
	Fixing bolts loose.	Re-tighten bolts.
	Frame distortion/poor installation/leakage through grout behind frame.	Complete re-installation may be necessary.

SYMPTOM	CAUSE	REMEDIAL ACTION
<b>NOISE – Bang on opening</b> (cast iron penstocks only).	Withdrawal of door from tightly wedged condition.	Normal – No action required.
<b>NOISE – High pitched squeal</b> (penstocks, weirs and bellmouths only).	Spindle thread not lubricated.	Check threads, clean and lubricate.
	Spindle guides out of alignment and rubbing as spindle rotates.	Check spindle guides for correct alignment and re-align.

SYMPTOM	CAUSE	REMEDIAL ACTION
<b>WON'T OPEN</b>	Transit stop/device still in position.	Remove transit stop (after reading Section 2).
<b>WON'T OPEN – Spindle turns but won't raise</b> (penstocks, weirs and bellmouths only).	Operating nut is missing or stripped threads. Or drive dogs in actuators/gearboxes have not engaged.	Replace nut in the case of missing nut or stripped threads. Check thrust housing is correctly assembled and drive dogs/keys are correctly engaged.
<b>WON'T OPEN – Excessive force required to open</b> (penstocks, weirs and bellmouths only).	Spindle thread not lubricated, misaligned spindle, guides, footplate or pillar. Or on bellmouths the gland packing may have been overtightened causing binding on the sliding bellmouth tube.	Clean and lubricate threads. Re-align spindle, guides, footplate, pillar.

SYMPTOM	CAUSE	REMEDIAL ACTION
<b>WON'T CLOSE – (penstocks only)</b>	Obstruction in the invert (or possibly between wedge faces on penstocks).	Raise door and remove obstruction.
	Wedges/adjusters not correctly adjusted.	Re-adjust/reset wedges/adjusters.
<b>WON'T CLOSE – Actuator cuts out on torque whilst closing</b> (penstocks and weirs only).	Obstruction in the invert (or possibly between wedge faces on penstocks). Wedges/adjusters not correctly adjusted.	Raise door and remove obstruction. Re-adjust/reset wedges/adjusters.
	Limits/Torque switches incorrectly set.	Re-set switches correctly and re-test.

SYMPTOM	CAUSE	REMEDIAL ACTION
<b>SPINDLE FLEX– (penstock, weirs and bellmouths only)</b>	Loose spindle guides/guide caps.	Ensure spindle guides are correctly aligned and tighten fixings.
	Spindle guides/guide caps out of alignment or missing or incorrectly spaced.	Check spindle guides for correct alignment and positioning. Re-position/re-align. If BID drawings have been supplied these will normally define the positioning of guides.
	Excessive effort applied on closing.	Reset actuator limit and torque switches.

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### Maintenance

**BEFORE COMMENCING ANY MAINTENANCE ACTIVITY PLEASE ENSURE YOU HAVE FULLY READ THE SAFETY RECOMMENDATIONS (SECTION 2). YOUR ATTENTION IS DRAWN TO THE WARNING WITH REGARD TO WORKING ADJACENT TO OR UNDER RAISED DOORS. REFER TO THE RELEVANT SUPPLIER'S MAINTENANCE INSTRUCTIONS/MANUAL FOR MAINTENANCE REQUIREMENTS OF POWERED ACTUATORS AND GEARBOXES.**

All types of Fluid Control units supplied by Ham Baker Adams Ltd should give years of trouble free operation providing that the following simple maintenance procedures are adopted. Frequency of required maintenance activity will be dependent upon the frequency of operation of the unit, and on the operating conditions present. The following recommendations should therefore be taken as minimum requirements, except for modulating (flow control) penstocks where special and more frequent maintenance requirements are needed as indicated.

#### **EVERY 3 MONTHS:**

1. Clean the unit by hosing down with clean water to remove any grit or debris.
2. Check for any leakage between the unit and concrete wall (or pipe) and the general soundness of the surrounding civil structure. Make good any faults.
3. Check tightness of all fixing bolts/nuts including foundation bolts.
4. It is recommended that all units are operated through a full cycle.
5. Whilst in the fully open/extended position check that there is no damage or excessive wear to the sealing surfaces. Consult Ham Baker Adams Ltd for advice on repair to damaged seals.
6. Normal wear on the seals on penstock units may be overcome by adjustment of the wedges or adjusters. Seek advice from Ham Baker Adams Ltd on the adjustment of the factory set wedges or adjusters.
7. Metal sealing surfaces and metal wedge faces should be greased, (ensuring where necessary for potable water applications that the grease has WRC/DWI approval as required).
8. Check all components for corrosion damage. Painted units should be checked for signs of corrosion or damage to the paint system and repaired in accordance with the repair scheme for the original paint system (in accordance with the paint manufacturer's instructions). Seek advice from Ham Baker Adams Ltd regarding any components which show any signs of excessive corrosion.
9. Check any operating gear for damage, wear and freedom of movement. Clean the spindle threads by hosing down with clean water. Apply grease to the spindle, and to any grease nipples present in accordance with the recommended lubricant below.
10. Check any lifting beam hooks for freedom of movement. Check the disengagement ropes for wear and tear and replace with the same specification rope as necessary. Moving parts should be lightly oiled/greased. (Note that it is advisable to hose down lifting beams after every time used, especially around the hook pivots and disengagement rope assembly). Note also the requirement in the Health and Safety Recommendations (Section 2), with regard to the requirement for a thorough examination prior to use by a competent person. Customers/end users are reminded that it is their responsibility to ensure that the lifting beams and associated slings are re-tested in accordance with legal requirements at the required frequency.
11. Check that guarding originally supplied with the unit remains in position and is securely fixed, including any fixed guards or protection tubes.
12. All other moving parts should be lightly oiled or greased as appropriate.

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## **EVERY 12 MONTHS:**

1. Remove the door threaded door nut (for non-rising spindles) or threaded yoke sleeve (for rising spindles) and thoroughly check for signs of wear. These components must be replaced if excessive wear is evident (because if threads shear the door may fall/unit may fail without warning).
2. Non-rising spindles require special consideration for maintenance, particularly if the liquid level creates regular grit and debris contamination of the threads and nut.

## **MODULATING (FLOW CONTROL) PENSTOCKS ONLY:**

This type of application causes the penstock to operate much more frequently than with conventional operation, and may significantly accelerate the wear process in the threads of the nut. If the threads shear the door may fall/unit may fail without warning. The above maintenance recommendations should be amended as follows for this type of unit.

1. The spindle thread and nut should be cleaned and lubricated in accordance with the lubrication recommendations below for modulating applications.
2. Remove the door threaded door nut (for non-rising spindles) or threaded yoke sleeve (for rising spindles) and thoroughly check for signs of wear every 6 months. These components must be replaced if excessive wear is evident

## **RECOMMENDED LUBRICANTS:**

For general lubrication under normal operating conditions it is recommended that Rocol Sapphire 2 (or equivalent) is used for greasing spindle threads, door nuts (or yoke sleeves) and thrust housings.

For high duty or modulating applications in sewage, or for aggressive sewage applications it is recommended that Rocol Sapphire Extreme grease (or equivalent) is used.

For seawater applications or modulating applications in seawater, it is recommended that Rocol Tuffgear Universal (or equivalent) is used.

For potable water applications or modulating applications in potable water, use Rocol Sapphire Aqua-Sil or Sapphire Aqua-Sil High Load (or equivalent WRC/DWI compliant lubricant).

## **SPARE PARTS:**

Ham Baker Adams Ltd Fluid Control equipment is designed and manufactured for long life and trouble free operation, and experience has shown that if maintenance schedules are adhered to there is usually little need for spare parts. However should spare parts be required at some time in the future, then these can be ordered through Ham Baker Adams Ltd's Spares and Services Division by quoting our Contract/Sales Order number and the relevant order line suffix number. For all non-Fastrack type orders this should also be present on the rating plate (or CE plate) as the unit's serial number. (See Section 10 for Spares and Service Contact Details)

## **MAINTENANCE/SERVICE VISITS:**

For customers and end users not wishing to conduct maintenance activities themselves, maintenance contracts can be organised through Ham Baker Adams Ltd's Spares and Services Division.

## **REFURBISHMENT:**

Ham Baker Adams Ltd offer a Fluid Control refurbishment capability through Ham Baker Adams Ltd's Spares and Services Division.

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### Decommissioning and Disposal

**BEFORE COMMENCING ANY DECOMMISSIONING OR DISPOSAL ACTIVITY PLEASE ENSURE YOU HAVE FULLY READ THE SAFETY RECOMMENDATIONS (SECTION 2) AND THE HANDLING AND STORAGE INSTRUCTIONS (SECTION 3).**

At the end of the product useful life, it is the responsibility of the person supervising the decommissioning and disposal activity to carry out a risk assessment and to provide a safe system of work for the removal of the units and any associated lifting operations to be undertaken. This type of work is best undertaken by contractors with experience of disassembly, removal and handling of Fluid Control equipment. Contact Ham Baker Adams Ltd for details.

Transit devices should be refitted prior to removal of any operating gear components and prior to removal of the unit and should remain in position for all subsequent handling operations. Care must be taken to ensure units are adequately supported during the removal process and prevented from toppling or falling as they are freed from the civil structure. It is also important to check the structural integrity of the unit being removed to ensure that it has not suffered excessive corrosion, which could lead to break-up of the unit on lifting/handling. Care must also be taken with regard to the use of flame cutting equipment, as certain materials of construction may be flammable.

Prior to removal from site for disposal or recycling purposes it may be necessary to decontaminate the equipment, particularly if the equipment has been used in sewage or industrial effluent applications. This should be done in accordance with statutory and local authority requirements and regulations.

Certain materials used within the construction of Fluid Control equipment are potentially recyclable. In particular stainless steel components (spindles, certain fabrications, fasteners and fixing bolts), and to a lesser extent cast iron, and mild steel fabricated components. These will have some scrap metal value for recycling purposes, making this a better mode of disposal and so helping to preserve our environment. Plastic components or door fabrications clad in Coplastix material are likely to have little or no recyclable value and are best disposed of by landfill in accordance with local authority requirements and regulations. Any lubricants should be removed or drained down to suitable safe storage containers for disposal in accordance with local authority requirements.

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**Customer Feedback**  
**FaxBack Form – Fax No. :+44 (0) 1782 203639 F.A.O. Ham Baker Adams Ltd Quality Manager**

Ham Baker Adams Ltd values customer feedback. Your views and comments help toward achieving our aim of continual improvement in the products and services that we provide. Please use the FaxBack form below to record your views and level of satisfaction and return the completed form to the above fax number. Thank you for taking the time to complete and return this form.

**KEY TO RATING SCORES:**    **3 = EXCELLENT (Exceeded expectation)**  
    **2 = SATISFACTORY (Equalled expectation)**  
    **1 = UNSATISFACTORY (Below expectation)**  
    **X = UNABLE TO COMMENT or NOT APPLICABLE**

**Please Enter Score**



Section 1	QUALITY ASPECT	SCORE
<b>PRODUCT QUALITY</b>	Product(s) delivered suitably identified, packaged, protected and undamaged.	<input type="checkbox"/>
	Product(s) delivered accurate and correct to your order requirements.	<input type="checkbox"/>
	Quality of design, build and workmanship.	<input type="checkbox"/>
	Performance of product in relation to specified requirements.	<input type="checkbox"/>
	Content, clarity and ease of use of Installation, Operation and Maintenance Instructions.	<input type="checkbox"/>
	COMMENTS / AREAS FOR IMPROVEMENT: <div style="border-bottom: 1px solid black; width: 90%; margin-bottom: 2px;"></div> <div style="border-bottom: 1px solid black; width: 90%; margin-bottom: 2px;"></div> <div style="border-bottom: 1px solid black; width: 90%;"></div>	

Section 2	QUALITY ASPECT	SCORE
<b>SERVICE</b>	Responsiveness and professionalism demonstrated in dealings with Ham Baker Adams Ltd staff.	<input type="checkbox"/>
	Product delivered to timescale required/advised.	<input type="checkbox"/>
	Competence demonstrated by Installation Sub-Contractor (where installation supplied by S-H).	<input type="checkbox"/>
	COMMENTS / AREAS FOR IMPROVEMENT: <div style="border-bottom: 1px solid black; width: 90%; margin-bottom: 2px;"></div> <div style="border-bottom: 1px solid black; width: 90%; margin-bottom: 2px;"></div> <div style="border-bottom: 1px solid black; width: 90%;"></div>	

Section 3	QUALITY ASPECT	SCORE
<b>VALUE</b>	Overall satisfaction that product(s) and services supplied by Ham Baker Adams Ltd provided value.	<input type="checkbox"/>
	COMMENTS / AREAS FOR IMPROVEMENT: <div style="border-bottom: 1px solid black; width: 90%; margin-bottom: 2px;"></div> <div style="border-bottom: 1px solid black; width: 90%; margin-bottom: 2px;"></div> <div style="border-bottom: 1px solid black; width: 90%;"></div>	

FOR OFFICE USE ONLY:

**OVERALL SCORE (AVERAGED)**

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### Contacting Ham Baker Adams Ltd

Ham Baker Adams Ltd main office and works address:

**Ham Baker Adams Ltd**  
Etruria  
Stoke on Trent  
Staffordshire,  
England  
ST4 7BH  
Tel: +44 (0) 1782 202300  
Fax: +44 (0) 1782 203639  
Web Site: [www.hambaker.co.uk](http://www.hambaker.co.uk)  
Email: [enquiries@hambaker.co.uk](mailto:enquiries@hambaker.co.uk)

Ancillary Equipment suppliers:-

**Rotork PLC**  
Brassmill Lane  
Bath  
BA1 3JQ  
UK  
Telephone: +44 1225 733200  
Fax: +44 1225 333467  
Web Site: [www.rotork.co.uk](http://www.rotork.co.uk)

**Exeeco Ltd (Rotork Gears)**  
Regina House  
Ring Road  
Bramley  
Leeds  
West Yorkshire  
LS13 4ET  
Tel: +44 (0)113 2057237  
Fax: +44 (0)113 2363310  
Web Site: [www.exeeco.co.uk](http://www.exeeco.co.uk)

**Auma Actuators Ltd.**  
Britannia Way  
Clevedon  
North Somerset  
BS21 6QH  
Tel: +44 1275 871141  
Fax: +44 1275 875492  
Web Site: [www.auma.co.uk](http://www.auma.co.uk)

THANK YOU FOR CHOOSING  
**HAM BAKER ADAMS LTD**  
FOR YOUR  
FLUID CONTROL REQUIREMENTS.