Operating and Maintenance Instructions

PNEUMATICALLY OPERATED SLIDE VALVES TYPE LP

Including

ATEX Zoned Areas

Britton Procol Valves
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HEALTH & SAFETY NOTES

This partly completed machine requires to be installed with corresponding equipment to enable correct operation and must not be run as a standalone piece of machinery and must be properly installed and guarded by a suitably qualified and experienced personnel only.
The valve contains moving parts which can cause injuries. It is the responsibility of the system installer and user to ensure the safe installation and operation of the valve. The valve must be adequately guarded in compliance with local Health and Safety Regulations. The motor must be isolated before any maintenance or adjustment is carried out. Do not operate the valve with the link guard or access hatches removed. Only competent persons must be allowed to maintain the valve.

It is the purchaser's responsibility to ensure that these health and safety instructions are passed to those persons deemed to be at risk.

Only qualified or approved personnel should undertake the installation, commissioning and maintenance of Britton Procol slide valves.

Health and Safety aspects cannot be over-emphasised. The following notes highlight the major precautionary steps which must be adhered to.

In the interest of Health and Safety at Work it is essential that, before installation, all aspects relating to installation, mounting position, support and all other related matters should be thoroughly investigated. Technical details relating to this equipment are either shown in the relevant leaflets or are freely available on demand from our technical department. If further advice is required, do not hesitate to contact us.

CHECK LIST BEFORE RUNNING

1) Observe fully all slide valve and actuator operating and safety leaflets supplied with the slide valve.

2) Ensure that the valve inlet and outlet are protected by the feed and discharge ducting or other equipment so that it is impossible for operatives or maintenance personnel to insert fingers, hands or any part of their bodies into the slide valve.

3) Where the valve outlet is not connected to other equipment or ducting a mesh grille must be securely fastened to the exposed flange. The grille should be sufficiently small to prevent the insertion of fingers.

4) Always isolate and lock-off all power supplies to the valve before attempting any maintenance or other work.

VALVE SPECIFICATION

Britton Procol Slide Valves are designed to metric standards and all fasteners or threads are metric.

Body: Machined LM25 cast aluminium.

Slide Plate: Stainless steel.

Plate Supports: Moulded nylon plate supports on individually adjustable stainless steel pins.

Actuation: Heavy duty double acting air cylinder with stainless steel piston rod.

Indicators: Standard 2off magnetically operated indicator switches positioned on air cylinder to indicate valve open and closed positions.

Customer specified sensors can be fitted as an alternative.

Air Valve: Fitted as standard is a single 5/2 solenoid operated spring return air control valve piped to the cylinder in flexible nylon tube.

Customer specified solenoid valves can be fitted as an alternative or supplied less solenoid valve.

Finish: Painted air drying semi-gloss Blue RAL5022 or customer specified colour.

Option of inflatable seal:

- Optional inflatable seal to provide an air tight seal against the plate surface when in the closed position.
- The seal is deflated automatically before opening the valve to allow unobstructed full bore flow of material.
- This action ensures that the seal does not come into contact with the moving parts, minimising wear.
- Designed for use where an effective seal against a pressure up to 1 bar g or partial vacuum of 50m bar abs is required.
- Supplied complete with pneumatic control.

All units are works tested prior to despatch and are ready for installation.

It is important that if the valve is to be stored before installation adequate precautions should be taken to prevent the formation of rust. The valve must be stored in a clean and dry environment.

OPERATION

Britton Procol pneumatically operated slide valves are operated by a double acting air cylinder direct coupled to the slide plate. The cylinder pulls the slide plate out of the body to open the valve and pushes it back into the body to close.

A solenoid operated spring return air control valve piped to the cylinder in flexible nylon pipe controls the slide valve. When the air valve solenoid is actuated the cylinder in-strokes and pulls the slide plate out of the body to open the valve. The electrical supply to the solenoid must be maintained in order to keep the valve open. When the solenoid is de-energised the cylinder out-strokes pushing the plate into the body to close the valve. This method of operation ensures that in the event of electrical failure the slide valve fails to the closed position (if fitted with optional inflatable seal, the seal will remain inflated in this position).

The magnetic wear strip around the cylinder piston operates the indicator switches mounted on the cylinder. The switches are designed for remote indication of the fully open and fully closed slide plate positions. They are set to these positions in our works before despatch but may require adjustment during installation/commissioning to ensure correct operation.

INSTALLATION

Ensure mating flanges are flat.
A soft gasket such as rubber should be used to take up irregularities in flanges with uneven surfaces.
The slide plate is nearest the top flange of the valve.
Important: Flanges are tapped DIN PN10 as standard (ANSI 150lb to order). Securing screws should not protrude through the top flange. Do not overtighten fixing screws.
Valve must be mounted in the horizontal plane (i.e. flanges horizontal).
Valves are tested at the works, where the slide plate/insert clearance is set. If this clearance is to be adjusted to suit product size and/or type, the following procedure should be followed:

- The nuts securing the eccentric nylon supports should be slackened.
- The supports can then be adjusted to increase or decrease the clearance by turning the pin using a hexagon key.
- The locknuts are then re-tightened while holding the pin stationary.

Air supply should be approximately 5 bar g and free from moisture. Ensure the nylon piping is not kinked.

START UP PROCEDURE

Before material is passed through the valve it should be operated several times to ensure the slide plate moves freely and travels to the fully open and fully closed positions.

Indicator switches should be checked for correct operation and that the correct signal is given when the switches are operated.

SAFETY PRECAUTIONS

Before attempting any repair or maintenance work on the slide valve obey the following rules:-

ISOLATE AND LOCK OFF ALL POWER SUPPLIES TO THE VALVE

Isolate and lock off the electrical supply.

Ensure air pressure at the cylinder is zero.

Isolate and lock off the air supply.

DO NOT work on the slide valve if material is over the valve. Ensure all hoppers and chutes above the valve are empty.

DO NOT insert any body parts into the valve even if the power is switched off.

Never operate the valve without covers, grids and safety devices in place.

Never loosen pneumatic piping whilst it is pressurised.

Always remove extraneous materials from around the slide valve.

MAINTENANCE

Britton Procol slide valves are designed to give a long trouble free life and virtually no maintenance is required. However the following checks are recommended.

After 1 week's operation:
Check:
a) Piston rod nut for tightness.
b) Air cylinder mounting bolts for tightness.

At 12 monthly intervals:
a) Inspect the slide plate supports and adjust or replace as required.
b) Inspect the slide plate for wear and replace as required.

GENERAL MAINTENANCE

After prolonged periods, wear will take place and cause the slide plate/insert clearance to increase. This is reduced by adjustment as described previously.

Replacements:

a) The seals in the pneumatic cylinder can be replaced when worn. These are supplied in kit form.
b) The slide plate supports can be replaced by removing the valve from position, undoing the pin, retaining nut and washer, and replacing as described above.
c) Should the optional inflatable seal need replacing, remove valve from situ and remove seal by pulling from its groove. Remove any sealant in bottom of groove and drilled hole for connector. Apply small and continuous amount of sealant in bottom of groove and connector hole. Press new seal into position and reconnect connector to tubing from 3/2 pilot valve.

FAULT FINDING

Slide valve does not operate
Check:
Air pressure- minimum pressure 4 bar g.
Air valve correctly piped to cylinder.
Exhaust ports on air valve clear.
Air valve operates correctly.
Slide plate not jammed.

Grinding noise during operation
Check:
Slide plate supports worn.
Material trapped beneath inlet.

Indicator switches not operating
Check:
Position of switches on air cylinder.
Wiring of switch.
Switch is operating correctly.

Air valve not operating
Check:
Solenoid is operating.
Air pressure.
Electrical wiring and controls.

SPARES

Recommended Spares:

1off Set of Slide Plate Supports

Optional Spares:

2off Indicator Reed Switches
1off Air Control Valve
1off Air Cylinder

OPERATIONAL SEQUENCE OF INFLATION OF SEAL (OPTIONAL)

To close:

(Assuming slide valve open and seal deflated)

1) With the system pressurised with compressed air and no electrical signal on the main solenoid valve, air passes from port 1 to port 2 on the solenoid valve, which will extend the cylinder and close the slide valve.
2) As the cylinder is extending, the exhausting air from the front end will maintain a signal on port 1 of the NOT element – thus preventing any output from the NOT element until the cylinder has stopped moving and all the air is exhausted.
3) When the cylinder is fully extended, the magnetic piston activates the pneumatic proximity valve attached to the cylinder barrel. Air is then passed to port 2 of the NOT element.
4) With the air at port 2 and no signal at port 1, the NOT element will output a signal to the 3/2 pilot valve which then inflates the main slide valve seal.

This condition will remain until an electrical signal is applied to the main solenoid valve.

To open:

(A maintained electrical signal is required for the solenoid valve)

1) When the solenoid coil is energised, mains air passes from port 1 to port 4. This air signal is connected to port 1 of the NOT element, which immediately shuts down output from port 3 and exhausts the 3/2 pilot valve, which in turn deflates the main seal.
2) Air is also present at the front end of the cylinder, pushing the slide valve open. The speed of opening is controlled by the flow regulator in the exhausting cylinder line (the cylinder can only move as fast as the escaping air).

NB. The flow regulator serves a dual role:
- i) To control the cylinder speed
- ii) To allow the seal to deflated before the slide valve opens (delay).

Once the flow control regulator is set it should be locked off, as incorrect adjustment will cause scuffing and accelerated wear to the main slide valve seal if the cylinder is allowed to move before the seal deflates.

ATEX

Britton Procol slide valves are available for use in ATEX Zoned areas and are “CE” marked and certified accordingly. They are assessed and designed to comply with BS EN 13463-5 Protection by Constructional safety “c”.

If the valve is to be installed in an ATEX area, all electrical and mechanical equipment on the slide

valve is suitable for use in the designated ATEX Zone.

During installation care must be taken to ensure the slide valve body is properly earthed to ensure no static build up occurs.