Britton Procol
VALVES

Operating and Maintenance Instructions

PNEUMATIC CONVEYING DIVERTER VALVE

Including

ATEX Zoned Areas

Britton Procol Valves
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HEALTH AND 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.

Britton Procol Pneumatic Conveying Diverters are designed to direct the flow of dry, non-abrasive powders and granules in pneumatic conveying systems operating under positive pressure up to 1 bar g (15psig) or vacuum up to -0.3 bar g (-4.5psig). Maximum pressure differential against which the vane will operate is 0.3 bar g (4.5psig).
Maximum operating temperature for standard Diverters: 90°C.

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 are thoroughly considered. 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.

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

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

Check list before running:

1) Observe fully all diverter and actuator operating instructions and safety leaflets provided.
2) Always isolate and lock off the electrical and pneumatic power supplies before attempting any maintenance or other work on the valve.
3) Ensure that the conveying pipes or other equipment protects the valve inlet and outlets so that it is impossible for operatives or maintenance personnel to insert fingers, hands or any part of their bodies into the valve. Where the valve outlet is not connected to conveying pipes a mesh grille must be securely fastened over the exposed valve connection. The mesh must be small enough to prevent the insertion of fingers into the valve.

RESIDUAL HAZARDS

Britton Procol PC Diverters are intended for use in a fully enclosed system and must not be used with any of the connecting pipes unconnected.

Wear in the shaft seals or bearings may lead to product leakage around the shaft.

Product may be retained within the valve when it is dismantled for maintenance.

Provision must be made for safely removing this product.

NOISE

The Diverters have a maximum operating noise level of approximately 85 dBA.

HANDLING

Keep the Diverter in its packaging until ready for installation. It may be lifted using suitable handling equipment by positioning slings around the connecting pipes. DO NOT lift using the actuator or actuator mounting bracket.

COMPLETE VALVE WEIGHTS (Kg)			
Valve Size	CI	AL	SS
50mm	25	10	25
75mm	26	15	26
100mm	40	20	40
125mm	85	25	85
150mm	98	31	98
200mm	138	45	138

STANDARD SPECIFICATION

Britton Procol Conveying Diverters are designed to metric standards and all fasteners or threads are metric.

Body: Cast iron, stainless steel, or heat treated aluminium alloy. All internal sealing surfaces precision machined to ensure a tight seal.

Connecting Tubes: Bolt on connecting tubes to suit NB or OD pipes. Plain ends for "Morris" type couplings or flanged.

Vane Assembly: Fabricated in grade 316 stainless steel.

Vane Seals: Polyurethane – Shore Hardness 70 – 75A.

Shaft Bearings: Phosphor bronze bearings.

Shaft Seals: Nitrile rubber 'O' rings.

Actuator: Kinetrol quarter turn double acting pneumatic actuator.
Electric quarter turn actuators.
Hand lever with spring loaded locking peg.

Controls: Solenoid operated spring return air control valve direct mounted via a NAMUR interface block to the Kinetrol actuator.
Vane position indicator limit switches.

Finish: Air-drying semi-gloss Blue RAL5022 or customer specified colour.
Stainless steel valves glass bead blast finish.
Mild steel mounting brackets bright zinc plated.

SERVICES

Compressed Air
Max working pressure – 100 psi (7 Bar)
Max overload pressure – 150 psi (10 Bar)

Electricity
Solenoid coils (air valves) – see rating plate on solenoid coil.
Indicator switches – Max voltage 250v AC/DC (see also separate sheet)

Max working pressure for Diverter Valve 15 psig (1 bar g)
Max overload pressure for Diverter Valve 30 psig (2 bar g)

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

INSTALLATION

The Diverters are supplied with plain tube or flanged pipe connections. They may be installed in any position and the conveying pipes connected to the valve using slip-on pipe couplings or mating flanges.

An oil free air supply is required, filtered and regulated to a pressure of between 60 psig (4 bar g) and 100 psig (7 bar g). This should be connected to the inlet port on the valve sub-base and a porous silencer/filter into the sub-base exhaust port.

The indicator limit switches and the air control solenoid should be wired by competent personnel in accordance with the control system designer's instructions.

The valve body is provided with four tapped holes on the opposite side to the actuator for supporting the valve. Brackets or other means of mounting the valve should only be attached via these holes. Do not support the valve from the connecting tubes as this may tend to loosen the tubes in the cast body. Similarly, do not support the conveying tubes from the valve. Always ensure that tube supports are adjacent to the valve.

START-UP PROCEDURE

Before material is allowed through the valve, operate it several times and check that the vane moves freely.

Check the pneumatic fittings for air leakages and rectify as required.

Check that the indicator limit switches operate correctly and adjust the switch operating cams if necessary.

If the above tests are carried out and the valve operates satisfactorily, it is ready for production use.

GENERAL MAINTENANCE

Diverter Valves require no maintenance apart from planned overhauls. The intervals between such routine overhauls will vary with the product being handled and total operating time. To a large degree the rate of wear for a particular application would be assessed by practical experience.

VANE SEAL REPLACEMENT

Switch off and isolate the electrical supply to the diverter.
Turn off and isolate the air supply to the diverter valve.
Remove the diverter from the conveying line and dismantle as follows: -

1) Remove the 4 actuator mounting retaining screws and remove the actuator.
2) Remove the screws from the main body flange, split the diverter body and remove the vane assembly.
3) Remove the circlips, bearings, spacers and O-rings from the vane assembly.
4) Remove the vane seal retaining screws from the vane and remove the vane seal.
5) Remove the shaft back seal from the front body.

Reassemble the diverter as follows:

6) Inspect the vane shaft and seal for wear or damage. Replace as required.
7) Inspect the bearings and spacers for wear or damage. Replace as required.
8) Replace circlips, O-rings and back seal.
9) Ensure all surfaces are clean and free from accidental damage.
10) Assemble the new vane seal to the vane assembly. Peen over the screw ends after assembly.
11) Assemble the spacers, bearings, O-rings and circlips to the vane shaft.
12) Apply a small bead of silicon sealant into the bottom of the housing in front body and fit the new back seal.
13) Apply a thin film of grease to the back seal. Always use grease compatible with the material passing through the diverter. Place the vane shaft into the groove in the front body and fit the rear body over the vane assembly. Align the flange holes and insert the body retaining screws. Check that the vane is centrally located within the cone part of the valve body and tighten the body retaining screws.
14) Reassemble the actuator onto the vane shaft.
15) Set the actuator stops so that the vane seal seals on both sides and the vane plates just touch the body on each side of the body cone.
16) Test the diverter operates correctly. Reinstall into the conveying line.

FAULT FINDING

1. INDICATOR LIGHTS DO NOT OPERATE

i) Check limit switch operating cam. Adjust as necessary.
ii) Check the wiring in both the switch housing and the control cabinet. Rectify as required.
iii) Check the limit switches for correct operation. Replace as required.

2. ACTUATOR DOES NOT OPERATE

i) Check air supply pressure (4.5 bar minimum : 7 bar maximum).
ii) Check the electrical supply to the air valve solenoid.
iii) Check the air valve for correct operation. Replace as necessary.
iv) Check the actuator is not already at

the end of its travel in the direction the vane is to move i.e. if the vane has to move anti-clockwise, check by operating the vane manually (with power and air supply isolated) that the vane will travel anti-clockwise. If the actuator is at the end of travel, remove it from the diverter, manually operate it until the female square in the adaptor matches the square on the vane shaft and refit the actuator to the diverter.

v) Inspect the actuator vane seals and replace as required.

3. VANE LEAKS

i) Inspect vane seal and replace if necessary.

ii) Check the vane seal is fully against the valve body in the diverting positions. It may be restrained from full movement by material build-up in the valve or by the actuator end stops being incorrectly set.

iii) Check that the vane body is not worn.

The above checks are a general guide to faults that may occur with a conveying diverter. If further information or technical advice is required, please contact our Technical Department.

RECOMMENDED SPARES

1off Vane Seal Kit
1off Bearing Kit
1off Actuator Seal Kit
1off Limit Switch Assembly

Optional Spares

1off Actuator/Switch Assembly
1off Indicator Switch Assembly
1off Air Valve Complete

ATEX REGULATIONS

Where diverter valves are installed in potentially explosive atmospheres they will be certified for use in Zone 21 or Zone 22 areas. The installer must ensure that the valves are adequately earthed to prevent static discharges caused by non-conductive media.

PARTS IDENTIFICATION LIST

PNEUMATIC CONVEYING DIVERTERS					
ITEM	DESCRIPTION	MATERIALS			QUANTITY
		CAST IRON	ALUMINIUM	STAINLESS STEEL	
1	REAR BODY	BS1452 GD 220	BS1490 LM25TF	BS3100 316	1
2	FRONT BODY	BS1452 GD 220	BS1490 LM25TF	BS3100 316	1
3	VANE ASSEMBLY	BS970 316 S11	BS970 316 S11	BS970 316 S11	1
4	VANE SEAL	WHITE POLYURETHANE			1
5	BEARING O-RING	NITRILE RUBBER			2
6	BEARING	PHOSPHOR BRONZE BS1400 PB1			2
7	SHAFT O-RING	NITRILE RUBBER			2
8	SPACER BEARING	PHOSPHOR BRONZE BS1400 PB1			2
9	CIRCLIP	MANUFACTURER'S STANDARD			2
10	BACK SEAL	NITRILE RUBBER			1
11	AIR CONTROL VALVE	MANUFACTURER'S STANDARD			1
12	NAMUR BASE	MANUFACTURER'S STANDARD			1
13	ACTUATOR	MANUFACTURER'S STANDARD			1
14	ACTUATOR MOUNTING	STAINLESS STEEL BS3100 316			1