



Bulk Solids Handling Equipment

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INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS TYPE CP PLUG DIVERTER VALVE

Rota Val Ltd CP Plug diverter valves are designed to divert the flow of dry solids in pneumatic conveying systems in the diverging mode, operating under positive pressure differentials of 2 barg (30 psig) and vacuum systems. Compressed air requirement to operate pneumatic cylinder minimum 5 barg (70psig). Temperature limitation 110°C but with modifications up to 500°C. The valve should not be used for any other duty **WITHOUT CONSULTING OUR TECHNICAL SALES DEPARTMENT.**

HEALTH AND SAFETY

The valve contains moving parts that can be injurious: it is the responsibility of the system installer / user to ensure the safe installation and operation of the valve. In particular it must be adequately protected and guarded, in compliance with local Health and Safety Regulations. The solenoid must be isolated before any maintenance or adjustment is carried out: do not operate the valve with the guard, or any other part of the valve, removed. Only competent persons must be used to maintain the valve.

**IT IS THE RESPONSIBILITY OF THE PURCHASER/USER OF THIS EQUIPMENT
TO ENSURE THAT THESE HEALTH AND SAFETY INSTRUCTIONS ARE PASSED
ON TO THOSE PERSONS LIKELY TO BE AT RISK**

**IMPORTANT:
ALWAYS QUOTE VALVE SERIAL No. IF FURTHER INFORMATION OR SPARE PARTS
ARE REQUIRED.**

INSTALLATION

- 1.1 Check the valve externally for damage and internally for foreign objects. Install the valve using compressible gaskets on all flanges.
- 1.2 The single solenoid valve is normally connected to the cylinder or actuator so the plug will return to the inline position in the event of electrical power failure. If the plug is required to return to the divert position in the event of power failure, the air pipes to the cylinder should be interchanged at the solenoid valve.
- 1.3 A double solenoid valve (when fitted) may be pneumatically connected either way and valve position is determined by solenoid wiring. The fitting of a double solenoid valve ensures no change in valve position in the event of power failure. The energising signal to the solenoids may be either continuous or a short pulse.
- 1.4 The solenoid valve must be connected to the appropriate electrical supply: check the coil voltage label before wiring. Connect mains air at 5 barg (72.5 psig) to the solenoid valve Port 1 using the 8mm OD tube push-fix fitting.
- 1.5 Connect the limit switches or reed switches to the users system. The valve is now ready for use.

OPERATION

Satisfactory operation of the diverter should continue without attention, and indication from reed, see 2.2 (b), or limit switches normally demonstrates correct movement. Possible deterioration in performance can arise for a number of reasons and evidence itself in various ways.

- 2.1 **APPEARANCE OF PRODUCT IN THE UNUSED LINE.** May be due to:
 - a) Misalignment of plug
 - b) Wear on plug or body seal faces
 - c) Accumulation of product in valve body over a long period
 - d) Residence of product in plug passage due to failure of conveying system to clear
- 2.2 **NIL OR PARTIAL MOVEMENT OF PLUG AND LINKAGE AS INDICATED BY SWITCHES.**
Possible causes:
 - a) Seizure of plug in body
 - b) Movement of operating arm clamp bush on plug spindle. In this case the cylinder reed switches could continue but would in fact be proving piston stroke only
 - c) Wear on bearings
 - d) Electrical failure
 - e) Compressed air failure
- 2.3 **APPEARANCE OF DUST EXTERNALLY.** Possible causes:
 - a) Leakage through shaft lip-seals
 - b) Body-cover joint failure
 - c) Flanged pipe connection joint failure

FOR ACTION TO RECTIFY THE ABOVE SEE SECTION 3

MAINTENANCE

No routine maintenance is necessary on the type CP Plug Diverter Valve. To deal with symptoms described under Section 2 'Operation' proceed as shown in the related sections following.

NOTE:

WITH A RIGHT HAND DIVERTER, THE PLUG MOVES CLOCKWISE VIEWED FROM ABOVE THE CHANGE FROM INLINE TO DIVERT POSITION AND THE CYLINDER PISTON RETRACTS.

WITH A LEFT HAND DIVERTER, THE PLUG MOVES ANTI CLOCKWISE VIEWED FROM ABOVE TO CHANGE FROM INLNE TO DIVERT AND CYLINDER PISTON EXTENDS.

STROKE IS LIMITED BY THE CYLINDER WHEN RETRACTED AND BY AN EXTERNAL STOP WHEN EXTENDED.

- 3.1 THE REASON FOR PRODUCT APPEARING IN THE UNUSED LINE can only be diagnosed by removal the valve from the pipe line.
- 3.1 a) Check the alignment of the plug at the discharge ports in both inline and divert position. If mis-alignment has occurred as follows:
- R.H. Diverter. Release the clamp screws securing the cylinder lever compression bush to the plug spindle. Manually align the plug the divert position and push the cylinder piston to the fully retracted position. Reclamp the compression bush to the plug shaft whilst maintaining plug and piston positions. Now extend the piston in the cylinder until the lever engages the adjustable external stop. The plug should now be in-line but trimming of the position is effected by the adjustable stop.
- L.H. Diverter. Proceed as above but manually align the plug to the inline position before pushing the piston to fully retracted.
- 3.1 b) Wear on plug or body faces may be checked using feeler gauges. The plug body gap is normally .004”-.006” (0.1-0.15mm) for cast iron components but is increased to .006”-.008” (0.15-0.2mm) for aluminium and stainless steel. Higher clearances apply if high temperature product is entrained; check with Rota Val Ltd (giving valve Serial No). Excessive wear can only be rectified by plug or body replacement or possibly by metal build-up on one or both components.
- 3.1 c) Accumulation of product in valve body is a result of 2.1 a) or 2.1 b) and is not itself a maintenance matter. Simply clean out. Some plug valve bodies are fitted with inlet/outlet ports to enable dust or powder to be blown out. This can of course be done with the valve in situ.
- 3.1 d) If when removing valve it is noticed that product is resident in the plug bore, this is indicative of insufficient conveying air velocity and requires an increase in volume from the blower/compressor/fan.
- 3.2 NIL OR PARTIAL MOVEMENT OF PLUG may require valve removal but first check integrity of electric supply to solenoid and compressed air to the supply port of the solenoid air valve. If correct next disconnect the piston rod from the lever and swing the cylinder to a position allowing free operation of the piston. Use the manual override on the solenoid air valve to operate the cylinder in both directions to prove freedom of movement. If satisfactory, suspicion moves to the plug. If this cannot be moved manually using the lever, the valve should be taken out of the conveying line.
- 3.2 a) Seizure of plug in the body obviously requires investigation as to whether cause is product accumulation or metal contact. If the former, clean the valve thoroughly. If the latter, the bearings are suspect or damage has occurred to the plug or body.
- 3.2 b) Relative movement between the operating arm clamp bush and the plug shaft results in plug misalignment and must be dealt with as in 3.1 a).

- 3.2 c) Worn bearings must be replaced. Remove body cover castings and plates and drive out the old bearings. Press in replacements. It may be advisable to replace the lip seals at the same time.

DUST LEAKAGE

- 3.3 a) If leakage is evident from shaft lip seals, these must be replaced, which necessitates removal of the valve from the line. Remove body cover castings and bearing cover plates. It is necessary to remove the bearings before driving out the old lip seals and care should be exercised in trying to preserve the bearings. Press in new lip seals and replace bearings.
- 3.3 b) In the unlikely event of dust leakage from the body-cover joining, tightening of cover set screws may suffice otherwise the joint must be examined for damage, corrected and re-made possibly using a sealant, e.g. silicone.
- 3.3 c) Check gasket integrity and bolt tightness of diverter valve pipe flange connections. Pipe flanges must align with the valve without strain.

Item No.	Description	No. Off
1	BODY	1
2	PLUG	1
3	END COVER	2
4	BOLT	16
5	WASHER	16
6	LIP SEAL	2
7	BEARING	2
8	BEARING RETAINER	2
9	BOLT	8
10	WASHER	6
11	FOOT MOUNTING	2
12	BOLT	4
13	WASHER	4
14	ACTUATOR MOUNTING PLATE	1
15	STUD	1
16	NUT	1
17	SCREW	4
18	WASHER	4
19	OPERATING ARM C/W BUSHES	1
20	SCREW	1
21	NUT	1
22	CYLINDER PIVOT	1
23	UPPER PIN	1
24	LOWER PIN	1
25	SCREW	1
26	SCREW	2
27	COVER	2
28	SCREW	1
29	CYLINDER COMPLETE	1
30	SOLENOID VALVE	1
31	SCREW	2
32	LIMIT SWITCH	2
33	SCREW	4

