

OPERATING & MAINTENANCE INSTRUCTIONS
FOR
ROTOLOK ROTARY VALVES



Contents

	Page
Contents	1
Important Notice	2
Health and Safety at Work	2
Check List Before Running	2
General Instructions	2
Rotor	3
Bearings	3
Shaft Seals	3
Drive	3
Installation	3
Start Up	4
General Maintenance	4
Motor Drive Sprockets and Chain	5
Special Remarks	5
Rotor Centralization	6
Air Purged Glands (Optional)	6
Body Purging (Optional)	7
Stainless Steel Open Type Rotor and Quick Release Typical	7
Rotor Removal	8
Quick Release Rotor System	8
Typical Valve Assemblies	9
Inspection Door	10
Easy Release Rotor Removal	11
Problem Awareness	11
Motor Problems	12
Airlock Problems	12
Operational Problems	12
Air Loss Across Rotary Valves	12
Recommended Spare Parts	13
Ordering Process	13
Other Products Offered by ROTOLOK	13
ROTOLOK Worldwide	14
Blank page for your own notes	15



OPERATING & MAINTENANCE INSTRUCTIONS FOR ROTOLOK ROTARY VALVES



IMPORTANT NOTICE

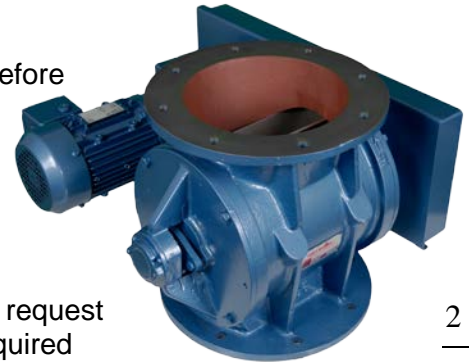
ONLY QUALIFIED AND/OR APPROVED PERSONNEL SHOULD UNDERTAKE THE INSTALLATION, START UP, PUTTING INTO SERVICE AND PERIODIC MAINTENANCE OF THE VALVE AND SAFETY ASPECTS CANNOT BE OVEREMPHASISED

THE SUPPLIED SAFETY LEAFLET* HIGHLIGHTS THE MAJOR PRECAUTIONARY STEPS THAT SHOULD BE STRICTLY FOLLOWED (*ALSO AVAILABLE ON OUR WEBSITE)

Health and Safety at Work

In the interest of health and safety at work, it is essential that before installation such matters as application, mounting position, support and other similar matters should be thoroughly investigated.

Technical details relating to this equipment are shown in our relevant catalogues, which are available on line at www.rotolok.com/products and www.rotolok.com/toolbox or on request from our sales office. In the event that any further advice is required please do not hesitate to contact Rotolok.



2

Check List Before Running

- A. Observe fully all Rotary Valve and gearmotor operating instructions provided and study the SAFETY LEAFLETS.
- B. Ensure that the inlets and outlets are protected by the feed and discharge ducting/trunking or other handling equipment so that it is not possible for operators or maintenance personnel to get their hands/fingers or any part of their body close to the point where the rotor is moving.
- C. If attention to the rotor for inspection, cleaning or other purpose is necessary, the supply to the gearmotor drive must be isolated and "locked out" to prevent accidental motor start up.

General Instructions

The Rotolok valve is of all metric construction with fasteners of metric threads.

The body is of robust proportions and of cast iron, stainless steel or aluminium material.

The end covers are of similar metal and are spigot located into the valve body to ensure concentricity.



Rotor

Are fully fabricated precision machined with again the choice of material construction and are offered in four main types:

- A. Fixed vane closed type rotors (shrouded) where the material is held in pockets with closed ends.
- B. Fixed vane open type of 6 or 8 vane construction.
- C. Adjustable, replaceable blade open type 6 or 8 vane construction.
- D. Open or closed type with pocket scallops. A large radius at the pocket base gives better product discharge, primarily for the food industry. Other variations include: reduced volume rotors; replaceable tips on closed rotors; Teflon coating; etc.

Bearings

Sealed for life, ball type rigged outboard on a raised boss off the end cover, and positioned against a shoulder.

Shaft Seals

Aluminium, cast iron or M.S. gland followers, that pressurizes the PTFE packing.

Drive

The valve is chain driven from a geared motor side wall mounted to valve body. The chain drive consisting of taperlock sprockets and roller chain are generally supplied in a completely enclosed guard. Other variations include variable speed drives (AC Thyristor or mechanical), flameproof motors, etc.

All units are tested prior to despatch and are ready for installation. It is important that should the valve be held in store, machined shafts and flanges should be given a light coat of mineral oil to prevent the formation of rust and/or preferably kept in a clean dry atmosphere.

Installation

The wiring of the electric motor to power the valve should follow the instructions laid down in accordance with the information supplied in or on the conduit box. However do not perform any work on the valve whilst power is connected.

It is important that the valve mating flanges are perfectly flat and level, as any distortions or stresses imposed on the valve could, because of the close tolerances within the body (.10 to .15mm, .004/.006"), jam the rotor.

After reassembling the valve ensure the rotor is free to rotate. It is not customary for Rotolok to supply gaskets however we recommend a liquid seal on the flanges.

Check chain tension and adjust as necessary (see Page 5). Varying models of gearboxes are despatched; therefore every unit should be checked and filled if required with the appropriate grade of oil as per gearbox details. Eg: mineral oils or the longer life synthetic oil equivalent.

Before running the valve the approach equipment e.g. hopper, ducting, screw feeder etc should be thoroughly cleansed and checked to be free of foreign matter as serious damage can be done to the valve internals. Weld spatter, weld rod ends, bolts, wood etc., are regular problems.



Start Up

With guard cover still off and valve inlet and outlets fully protected to ensure safety, power should be now supplied to the drive motor and the motor jogged to ensure clockwise rotation looking at the drive gearmotor output shaft.

With chain tension having previously been checked and adjusted the guard cover must now be re-fitted.

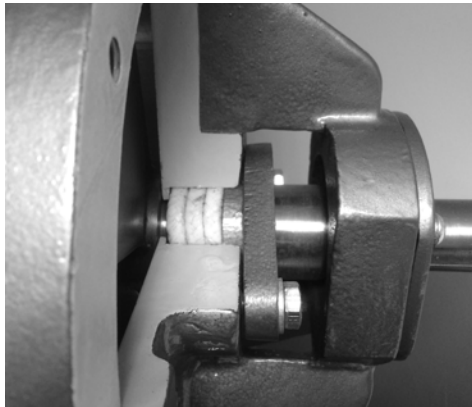
Remember never run the valve with chain cover removed.

Tighten gland followers where Rotor shaft protrudes from the end covers and, if air purge facilities are provided to the glands, a supply of clean dry air 1-2 PSI above the valve internal pressure should be applied.

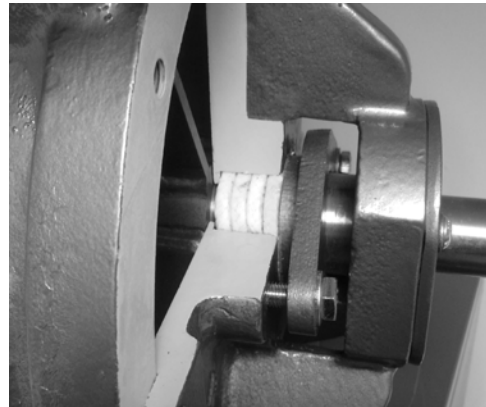
With the chain cover on, inlets and outlets shielded or unexposed, the valve should be run for approximately 15 minutes.

Isolate the power, check the tension of the gland followers, adjust if required or add additional packing to maintain a good seal. Remember to misalign the packing joints to avoid leaks.

Before (note the tight gland gap)



After (note extra 4th layer of packing added)



Valve is now ready for production.

General Maintenance

ALWAYS ISOLATE POWER BEFORE COMMENCING WORK ON THE VALVE

Maintenance, apart from planned overhaul, should be adequately covered by regular and frequent attention to the rotor shaft glands, reduction gear lubrication, adjustment and lubrication of the motor drive chain and chain sprockets.

It is recommended that the complete Rotary Valve is dismantled for cleaning, inspection and overhaul as necessary at regular intervals.

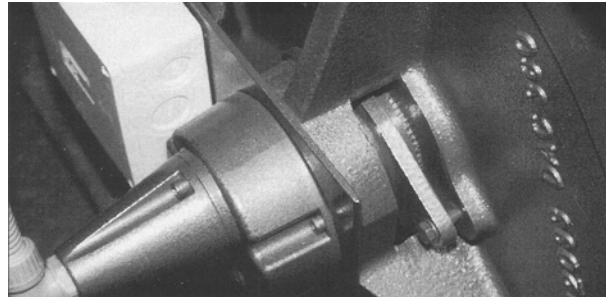
The interval between such routine overhauls will vary between the product being handled and total operating time. To a large degree the rate of wear for a particular application would be assessed by practical experience.



Adjustment to the rotor shaft glands should be made with the unit in a stationary position with the power "off" taking care to ensure that the gland is pulled up evenly and to no greater extent than the amount necessary to prevent leakage.

The importance of gland maintenance cannot be overstressed, since a leak-proof gland allows no flow through of dust particles and consequently wear due to erosion is largely eliminated.

If normal running adjustment is insufficient to prevent leakage, or gives rise to continual overheating, the gland packing should be completely renewed.



Packing Gland Detail

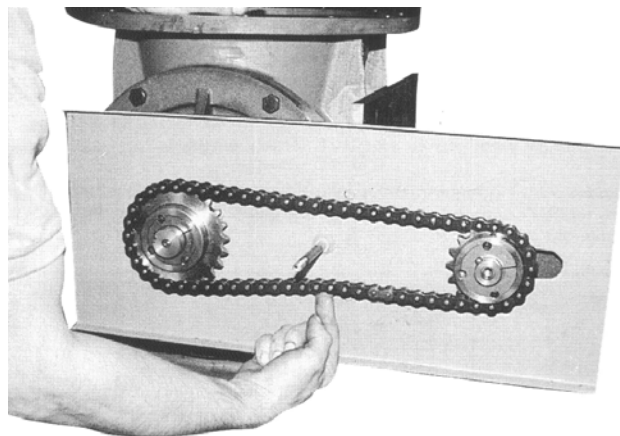
Motor Drive Sprockets and Chain

Every week with the power off remove the chain cover and inspect the rotor and rotor shaft sprockets, examine the sprocket teeth for signs of wear and renew if necessary.

When replacing the sprockets and drive chain, ensure that the sprockets are correctly aligned and that the chain tension is correct.

With one straight length of chain reasonably taut, it should be possible to manually flex the trailing length a total 12-15mm (1/2" – 5/8").

Adjustment, to vary the distance between sprockets centres and therefore the chain tension, is provided for, in the motor mounting arrangement, where nuts can be adjusted on studs and in effect jacking the gearmotor, in/out.



5

Special Remarks

On stainless steel valves it is vitally important that rotor/body/end covers do not rub or come into contact, as shortly during running pick up will occur causing screeching and eventually lead to valve seizure.

On closed (shrouded) rotors this effect is eliminated in machining allowing the rotor to float.

However on all other types of rotors, special setting-up procedures must be adopted to ensure that rotor clearances are maintained and held, details of which follow.



Rotor Centralization

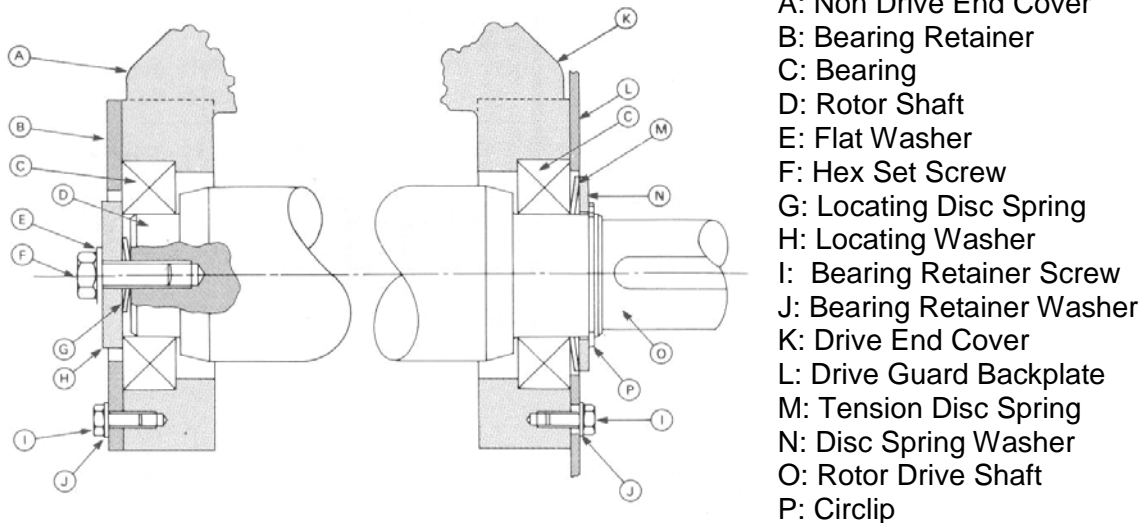
REMEMBER "POWER OFF"

Adjustment of Open Type Rotor (Not Stainless Steel). See diagram.

On Rotary Valves fitted with open type rotors, a system of rotor centralization by means of disc springs has been adopted to simplify adjustment.

At the drive end of the rotor shaft, disc springs are fitted between the bearing and a circlip on the rotor shaft. This has the effect of pulling the rotor towards the drive end of the valve.

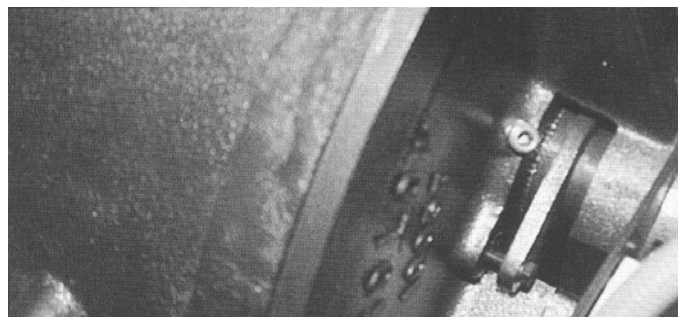
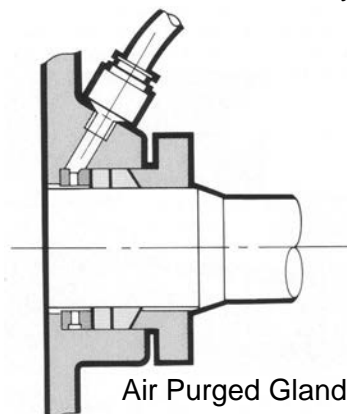
The non-drive end of the rotor shaft is fitted with an adjustment bolt and washer against the bearing. By turning the bolt clockwise the rotor shaft is drawn towards the non drive end against the spring load, hence fine adjustment can be made to centralize the rotor within the valve body assembly.



Air Purged Glands (Optional)

To prevent dust laden air penetrating the packing gland thereby breaking down both packing and rotor shaft, air purging can be a distinct advantage. This is especially true on abrasive products and on pneumatic conveying applications.

To satisfy this requirement a phosphor bronze lantern ring is used and replaces one ring of packing. The end cover is drilled and tapped to accommodate a 1/8" BSP connection to which dry air supply 1-2 PSI above pneumatic conveying line pressure is applied. This allows air to bleed inwardly into the valve thereby eliminating contamination.



Packing Gland detail with Air Purge Facility



Body Purging (Optional)

This is used to fluidise the product and allow the rotor pockets to empty.

The body is tapped 1/8" BSP with airline fitted to accept an 8mm tube or plugged when not in use.



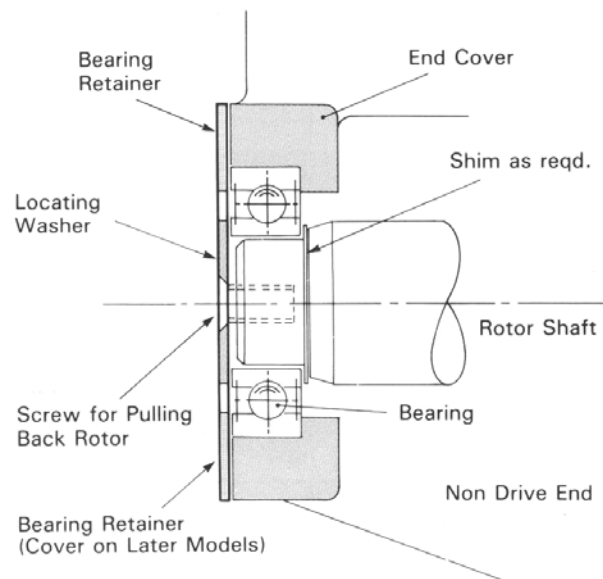
Stainless Steel Open Type Rotor and Quick Release Typical

On Stainless Steel Open Rotors the rotors are machined and accurate control is held on the distance between the bearings and the shoulder of the shaft.

Inadequate care or attention to this matter will, shortly after running, cause "pick-up" resulting initially in rubbing, then screeching and eventually lead the valve to seizure.

Special "setting-up" procedures must be adopted to ensure that rotor clearances are maintained and held.

This is achieved by shimming the rotor to centralize as per detail under 'Rotor Centralization'. By inserting a shim at the non-drive end of the rotor, between the bearing and the shoulder of the shaft, a gap between the rotor blades and the end plate can be maintained. After placement of the correct shim, the rotor should be pulled back by the set screw and washer against the bearing inner ring. The outer ring is already positioned by means of the Bearing Retainer and the shoulder within the raised boss of the end cover. This in effect locks the relative position of the rotor blades in conjunction with the end plate.



7

Any temperature effects due to linear expansion must be compensated for at the drive end. Diameter clearances should not need any compensation.

The tolerances on the spigot location of the end covers into the body ensure that the rotor is self-centralized.



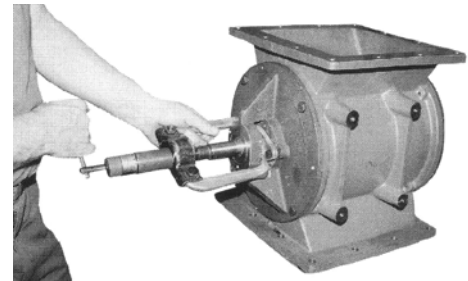
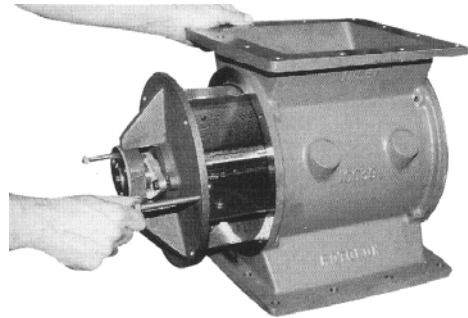
Rotor Removal

Non – Quick Release System

WITH POWER OFF

To remove rotor from body the following procedure should be adopted.

- A) Remove chain guard cover by undoing the hex head bolt, and disconnect the chain drive and remove both sprockets.
- B) Working on the non-drive end valve end cover, undo the setscrews holding the cover to the body. With two of these setscrews, insert in jacking holes and jack off the end cover. The rotor may come out also. (On open types, rotor will always come out).
- C) If Action 'B' above does not remove rotor, remove back plate of guard by unscrewing the five M6 setscrews holding the plate to the baseplate and drive end cover then carry out the same procedure on drive end valve end cover or, with "pullers", push rotor through bearing and release.
- D) The rotor can then be checked, repaired or replaced.



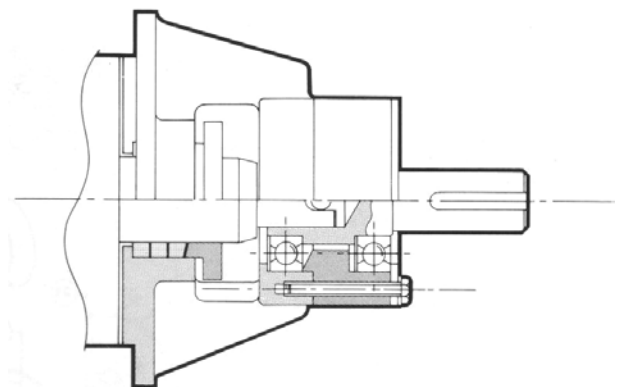
Quick Release Rotor System

To Remove Rotor: (reference Sectional View overleaf, page 9)

- A) Working on the non-drive end valve end cover undo the setscrews (S) which hold the cover to the body. With two of these setscrews, insert in the threaded jacking holes and jack off the end cover. The rotor will draw out of the body as the end cover is withdrawn.

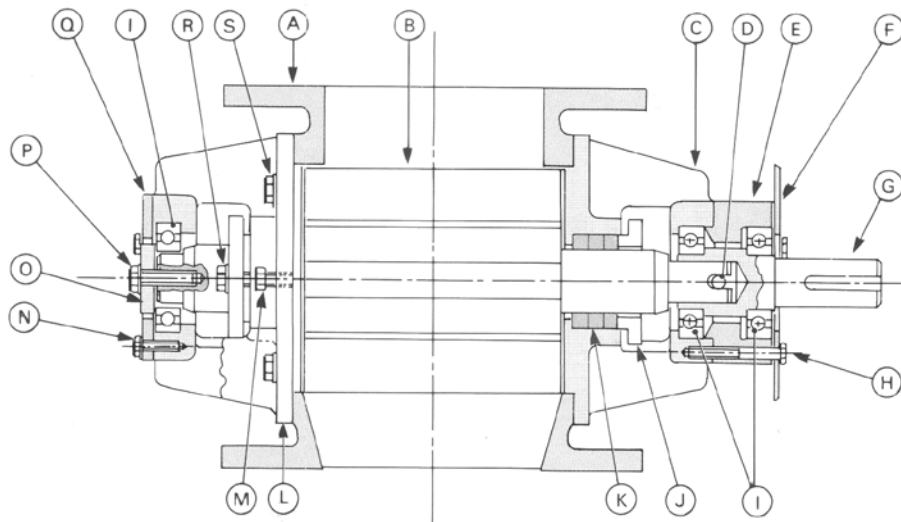
To Refit Rotor:

- B) Slide the rotor into the valve body with the slot of the rotor shaft inline with the peg on the drive shaft (D), ease the shaft through the drive side gland and rotate the rotor slightly until you feel the slot engage the peg. Refit the end cover retaining setscrews and check the drive end cover gland. Tighten as necessary. Similarly check the non-drive end cover gland.



Quick Release Rotor Detail

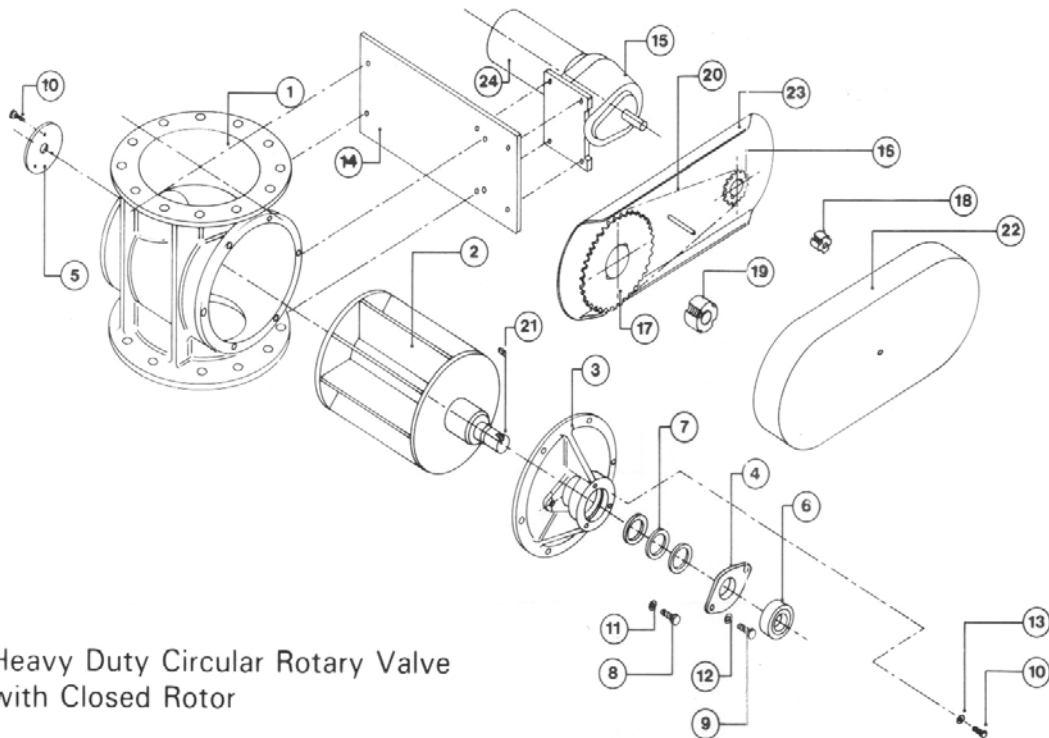




- A Body
- B Rotor
- C Quick Release Endcover
- D Drive Peg
- E Stub Shaft Support Housing
- F Drive Guard Backplate
- G Stub Shaft
- H Stub Shaft Housing Retaining Bolts
- I Ball Bearings
- J Gland Follower
- K Gland Packing
- L Standard Endcover
- M Jacking Screw
- N Bearing Retainer Bolts
- O Locating Washer
- P Locating Bolt
- Q Bearing Retainer Bolt
- R Gland Tensioning Bolt
- S Setscrews

Sectional View of Quick Release Rotary Valve

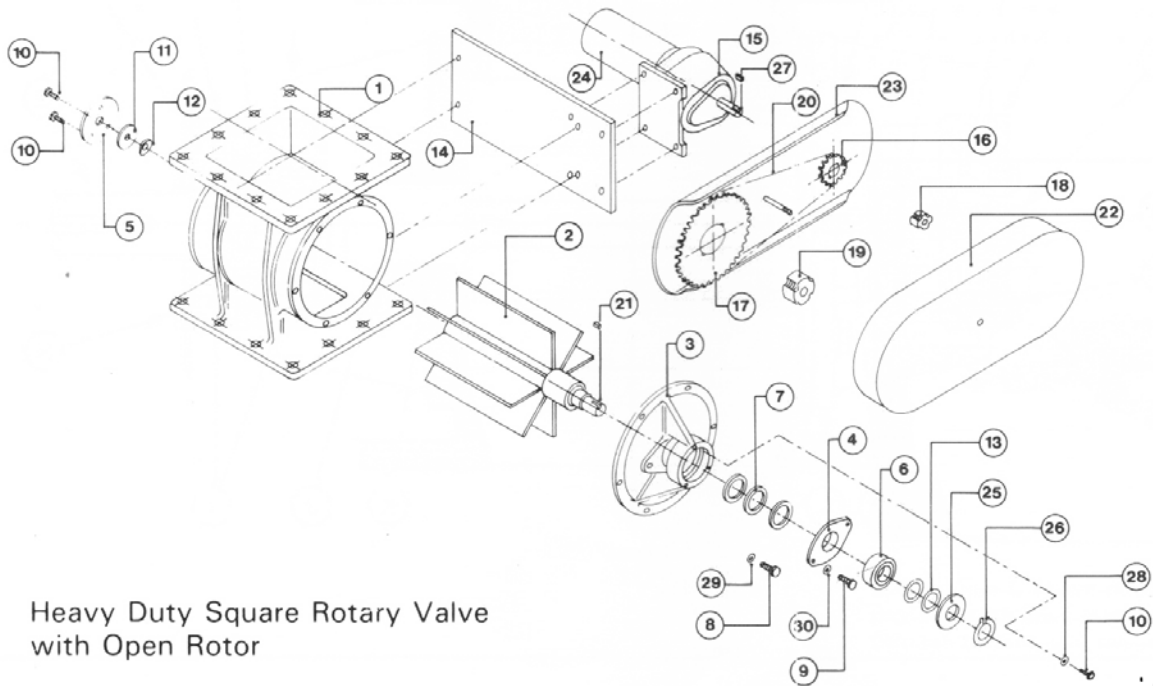
Typical Valve Assemblies



Heavy Duty Circular Rotary Valve with Closed Rotor

- | | |
|-------------------------------------|--------------------------|
| 1: Body | 13: Washer |
| 2: Closed Rotor | 14: Motor Plate |
| 3: End Cover | 15: Gearbox |
| 4: Gland Follower | 16: Drive Sprocket |
| 5: Bearing Locating Washer or Cover | 17: Valve Sprocket |
| 6: Ball Bearing | 18: Drive Taperlock Bush |
| 7: Gland Packing | 19: Valve Taperlock Bush |
| 8: End Cover Screw | 20: Chain |
| 9: Gland Tensioner Screw | 21: Key |
| 10: Backplate Screw | 22: Guard |
| 11: Washer | 23: Backplate |
| 12: Washer | 24: Motor |





Heavy Duty Square Rotary Valve
with Open Rotor

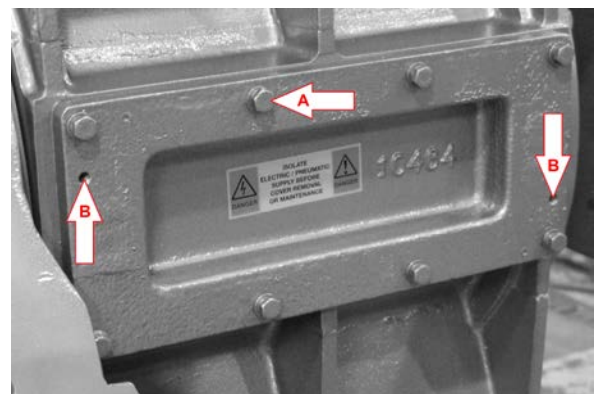
- | | | |
|--|---------------------------|----------------------------|
| 1: Body | 11: Rotor Locating Washer | 22: Guard |
| 2: Open Rotor | 12: Disc Spring | 23: Backplate |
| 3: End Cover | 13: Disc Spring | 24: Motor |
| 4: Gland Follower | 14: Motor Plate | 25: Disc Spring Washer |
| 5: Bearing Locating Washer
or Cover | 15: Gearbox | 26: Circlip |
| 6: Ball Bearing | 16: Drive Sprocket | 27: Key to page 9 assembly |
| 7: Gland Packing | 17: Valve Sprocket | 28: Washer |
| 8: End Cover Screw | 18: Drive Taperlock Bush | 29: Washer |
| 9: Gland Tensioner Screw | 19: Valve Taperlock Bush | 30: Washer |
| 10: Backplate Screw | 20: Chain | |
| | 21: Key | |

Inspection Door (Optional)

WITH POWER OFF

At client's specific request, an inspection door can be fitted in the valve body. The inspection door is a facility provided for access and surveying of the valve internals to check for wear etc.

The inspection door is accessed by removing all of the hex head screws 'A' shown on the right. Using two of the hex head screws removed, insert into jacking points 'B', applying even pressure. Continue until dowel pins are cleared; the inspection port can now be accessed. The inspection cover can be replaced by engaging both dowel pins then gently pushing the door back using the hex head screws.



It is vitally important that safety regulations are followed and under no circumstances should the inspection door be removed whilst the valve is under power. If the inspection door is frequently removed we recommend an interlock switch is fitted which will automatically disengage the motor. Rotolok will provide typical details on request.

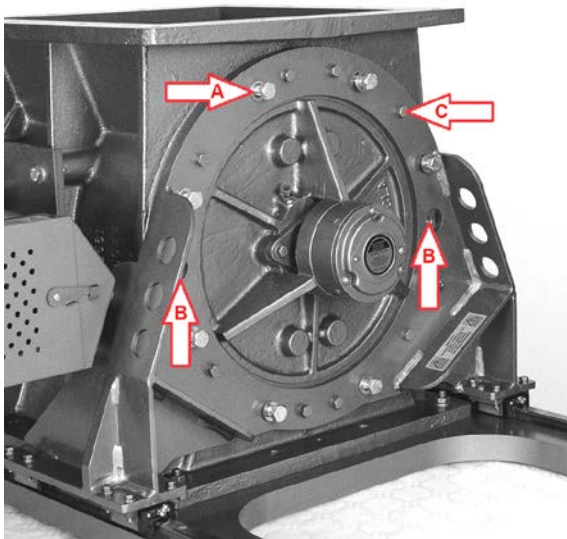


Easy Release Rotor Removal

WITH POWER OFF

To remove rotor from body the following procedure should be adopted.

1. Remove all of the screws typically identified as 'A' in the picture below.
2. The screws marked with red paint should not be released as they secure the end cover to the mounting bracket 'C'.
3. Place two screws in the tapped holes labelled 'B' and jack the end cover away from the body dis-engaging the safety interlock and the spigot on the body. This will then allow the end cover and rotor to slide away on the rails.



Optional

Hand wheel to aid re-alignment of rotor.

4. To replace the rotor after cleaning, the drive must be re-aligned and then the assembly pushed back together; if an optional handwheel is fitted to the geared motor it can be used to accurately position the drive components.



Problem Awareness

DISCONNECT ALL POWER BEFORE UNDERTAKING ANY WORK ON THE VALVE OR DRIVE.





Motor Problems

1. If motor fails to run check to see if the power supply is available and sufficient at the motor against that specified on the nameplate. Check the wiring connector, fuses, overloads etc. and reset or replace as necessary.
2. Motor fails to run, may be burnt out and will need rewinding or renewing.
3. Motor failure could be caused by no oil in gearbox, if so gear/or gearbox may need replacing.
4. Valve rotor may have seized and if so the valve will need stripping and cleaning.
5. Motor may be using greater amperage than nameplate. Disconnect chain drive and run gearmotor to assess whether additional loading is from the gearbox. If it is from the valve, the clearance or product requires investigating. If the gearbox is suspect refer to Rotolok.
6. Motor or drive noise, check oil in gearbox and lubrication on chain. Check chain alignment and chain clearance within guard. If the noise is from gearbox refer to Rotolok.

Airlock Problems

1. If noise is from valve, check clearances and centralise or clean valve internals.
2. Valve direction must be clockwise. (Viewed on Drive shaft)
3. Valve screeching due to type of product being handled, which although environmentally troublesome, is not detrimental to valve function.
4. Leaking glands due to lack of maintenance causing dust escapement, take out existing packing, thoroughly clean housing and re-pack as per manual. (Page 4)

12

Operational Problems

Throughput not being maintained – check valve speed, valve clearances and adjust or renew as required. If problem persists check rotor pockets are being emptied and clean the rotor.

Air Loss Across Rotary Valves

By design, it is not possible to provide a Rotary Airlock Valve that does not pass some air. This is (a) because there needs to be a running clearance of approximately 0.1mm feeler gauge clearance on radial, and where applicable on length of rotor; and (b) the returning empty rotor pockets will contain air at the outlet pressure which will be returned up to the inlet.

The air passed due to (a) is the most significant on dust filter duty, and similar applications.

If a soft plastic sack is connected direct to the valve outlet, air will be drawn out from it causing the bag to be drawn into the valve. To prevent this occurrence it is necessary to support the sack internally and to provide air inlet vent holes around the collar to maintain the sack at atmospheric pressure.



Recommended Spare Parts

PARTS	PART NUMBER	QUANTITY
Rotor		
Blades/Tips		
End Covers		
Bearings		
Seals		
Gland followers		
Other		

Ordering Process

Please contact us or email your purchase order (contract number) or product serial number to obtain the correct parts number and quantity.

Other Products Offered By ROTOLOK

- Rotary Valves / Airlocks
- Conveying Diverters
- Blowing Seals
- Double Dumps
- Fabricated Slides
- Slim Slides
- Rotoslides
- Rotoflex Valves
- Slimflex Valves
- Butterfly Dampers
- Weigh Valves
- Plug Diverters
- Screw Conveyors
- Gravity Diverters
- Rotospeed Switch
- Pipe Couplings
- Ni Hard Bends
- Vibrating Bin Discharger / Activators
- Rigid IBC Systems
- Volumetric / Weighing Feeder Systems
- Mixers
- Roundhead Valve
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