



# Operating and Maintenance Instructions

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## DRV ROTARY VALVES

Including

**ATEX Zoned Areas**

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### Britton Procol Valves

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## GENERAL

Britton Procol Rotary Valves are designed to control the flow of dry free flowing powders and granules in solids handling systems operating under gravity, pressure or vacuum conditions.

The valves are precision machined with close manufacturing tolerances and are supplied for use in a particular application. The valve should not be used for other applications without reference to our technical department.

**Always refer to the valve serial number if further information or spare parts are required.**

## RESIDUAL HAZARDS

Rotary Valves are for use in fully enclosed systems with feed and discharge equipment connected to the valve inlet and outlet ports to prevent access to the moving rotor. The valve must not be used if either port remains uncovered.

Wear in the shaft seals can allow material to leak along the shaft.

Product may be retained within the valve when the rotor or endplates are removed. Provision must be made for safely removing this product.

## NOISE

Under normal circumstances the valve generates little noise. If the valve becomes noisy it indicates product build up, mechanical failure or trapped particles within the valve.

## OPERATION & COMMISSIONING

The rotor speed is factory set to suit the required feed rate. The gear unit must be changed if a different rotor speed is required.

If the valve does not deliver the specified feed rate, the following causes should be investigated:-

- a) Rotor pockets not filling. Usually caused by product hang up above the valve due to increased pressure differential, excessive product aeration gas flow, worn rotor blade tips or poorly designed hopper outlets.

- b) Rotor pockets do not empty. This may be caused by moist product or an inherently "sticky" product.
- c) Loss of rotor speed.

Excessive noise is usually caused by:

- a) Product build up in the valve bore.
- b) Product trapped between the rotor end disc and the body endplate or around the rotor vanes.
- c) Bearing or other mechanical failure.

## STANDARD SPECIFICATION

### RS ROTARY VALVE

Rotary Valves are designed to metric standards and all fasteners or threads are metric.

**Body:** Cast iron precision machined. Supplied with connecting flanges drilled to Britton Procol square or round pattern.

**Endplates:** Cast iron precision machined and spigot located within the valve body to ensure concentricity.

**Rotor:** Fabricated 8 blade closed end rotor with fixed blades machined to give a close clearance with the valve body.

**Bearings:** Sealed ball bearings mounted within the endplates.

**Shaft seals:** Nitrile rubber lip type shaft seals mounted within the endplates.

**Drive:** Worm geared motor TEFC IP55 suitable for 415-3-50 supply. The geared motor will be flange mounted from the drive endplate and direct coupled to the rotor shaft.

**Paint Finish:** Air-drying semi-gloss Blue RAL5022 or customer specified colour.

All valves are Works tested before despatch and are ready for installation. The valves should be stored in a clean, dry environment.

If the Rotary Valve is to be stored, it is important that machined surfaces and shafts are coated with rust inhibitor to prevent the formation of rust.

## GENERAL HEALTH & SAFETY

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.

Only qualified or approved personnel should undertake the installation, commissioning and maintenance of Britton Procol Rotary 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 are 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) Fully observe all operating and safety instructions supplied with the Rotary Valve and geared motor.
- 2) Ensure that the valve is correctly guarded to comply with all local Health and Safety Regulations to ensure it is impossible to insert fingers, hands or any body part into the valve. A guide to guarding Britton Procol Rotary Valves is included in the next section of these notes.
- 3) Do not operate the valve without the body vent ports plugged or connected to a suitable venting system. Do not remove these plugs from the valve and insert fingers – they will be amputated.
- 4) Isolate and lock-off all the electrical power supply to the geared motor before attempting any maintenance or other work on the valve.
- 5) Only competent persons must be allowed to install and maintain the valve.

- 6) Ensure that Health and Safety instructions are made known to all personnel liable to be at risk. This is the responsibility of the Purchaser/User of the valve.

## ROTARY VALVE GUARDING

Rotary Valves designed and manufactured by Britton Procol Valves are guarded to prevent access to all external rotating components. However the inlet and outlet of the valves must be guarded in situ to prevent anyone inserting fingers, hands etc. into the rotating valve. This guarding cannot be incorporated into the valve assembly and is not supplied by Britton Procol Valves. It must therefore be supplied by the installation contractor and fitted as separate guarding during plant assembly.

Normally on a closed system equipment to which the Rotary Valve is attached will form an adequate guard to prevent access to the rotating rotor.

This may be the incoming and outgoing chutes or the feed hopper and adjacent take away equipment i.e. screw conveyor.

Where the Rotary Valve is the final piece of equipment and there are no chutes preventing access to the rotor, a mesh guard fitted to the exposed access is mandatory in order to comply with Health and Safety legislation. The mesh must be small enough to prevent insertion of fingers into the valve and must be securely attached to the valve flange to prevent easy removal. Britton Procol Valves recommend an interlock switch should be incorporated into the guard design to prevent operation of the valve if the guard is removed.

All Britton Procol Rotary Valves have a vent port in the side of the body. This port is fitted with a threaded plug which should only be removed when the valve is isolated from the electrical supply and the vent port is piped to a venting system. **DO NOT REMOVE THIS PLUG** and insert a finger, stick, metal bar etc. Permanent damage will be caused to the valve and a finger **WILL BE AMPUTATED.**

Data Sheet RV.30.11.03 shows typical applications, which require guards fitting to the inlet and outlet of Rotary Valves. They do not form, nor should they be seen as, a comprehensive guide to guarding Rotary Valves and each application must be considered separately. Our technical department may be consulted for further advice if required.

**FINGERS AND HANDS WILL BE AMPUTATED IF THEY ARE INSERTED INTO A ROTATING VALVE.**

**INLET AND OUTLET GUARDING IS MANDATORY.**

**HANDLING**

DRV Rotary Valves are normally delivered shrink wrapped onto a pallet and should remain in this packaging until ready for installation. They may be moved in this condition by suitable equipment i.e. forklift, pallet truck etc.

After the valve has been removed from the pallet it may be lifted by using eyebolts through the flange holes or slings through the bearing housings. Do not lift by slings around the rotor shaft or geared motor.

Valve Size	Weight in Kg			
	With Drive	Bare Shaft	Rotor	Endplate
DRV150	53	46	12	10
DRV200	81	74	15	14
DRV250	113	103	28	25
DRV300	162	152	35	30

**INSTALLATION**

Check the valve for external damage and remove foreign bodies from inside the valve. Install the

valve with the inlet flange uppermost i.e. the square inlet uppermost.

The valve flanges are supplied flat and it is important, in order to prevent distortion or stress within the valve body, that the mating flanges are also flat and level.

A soft gasket or mastic should be inserted between the valve and the mating flange. This will ensure a dust and weather-tight seal and will help to prevent valve body distortion.

Tighten the fixing bolts evenly and check that the rotor rotates freely.

Valve bodies are supplied with venting ports fitted with plugs. The ports must be connected to a suitable venting system (preferably a suction system) or remain plugged. Do not operate the valve with these vent ports open.

Most geared motors are supplied grease packed or oil filled and do not require lubrication, however every unit must be checked and filled with the appropriate grade of oil or grease as stated in the manufacturer’s instructions.

Connect the motor to a suitable electrical supply as shown on the motor plate. Check that the valve rotates in the direction shown by the arrow on the valve body. Before running the valve the approach equipment should be thoroughly cleaned and free from foreign matter. Serious damage will be caused to the Rotary Valve by weld spatter, nuts, bolts etc. if they are allowed to enter it.

**ATEX REGULATIONS**

Where Rotary 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.

## START-UP PROCEDURE

### Check the following:

- 1) All safety equipment, i.e. guards, cut-out flaps and inspection flaps and lids are closed, and that the valve is empty.
- 2) Where the valve is part of a material handling system, a check should be made to ensure that the valve controls are correctly interlocked with those of other units in the system.
- 3) Check for correct rotation of the valve by reference to the direction of the rotation arrow on the valve body.
- 4) With all guards securely fitted, run the valve for 45 minutes to bed-in the shaft seals.
- 5) Isolate the power and check all retaining bolts for tightness.

If the above are satisfactory, the valve is ready to use.

## INITIAL MAINTENANCE

### BEFORE WORKING ON THE VALVE, ISOLATE AND LOCK OFF THE ELECTRIC SUPPLY.

After the first 100 hours of operation the following should be checked and adjusted as necessary:

- 1) Shaft Seals: Inspect for signs of product leakage. Replace as required.
- 2) Geared Motor: Inspect the geared motor for lubricant leaks. If a leak occurs at the motor/gear interface it may be possible to stop it by tightening the flange bolts. If this does not stop the leak, the geared motor should be removed from the valve and the relevant joint re-sealed using a commercial gasket compound.
- 3) Retaining Bolts: Check all retaining bolts for tightness and adjust necessary.

## GENERAL MAINTENANCE

Maintenance, apart from planned overhaul, should be adequately covered by regular and frequent inspection of the shaft seals and the reduction gear lubrication.

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 with the product being handled and the operating time. To a large degree, the rate of wear for a particular application would be assessed by practical experience.

### Shaft Seals

Shaft Seals fitted to DRV Rotary Valves are not adjustable. If leakage occurs from the shaft seals, they must be replaced.

### Bearings

Standard bearings are grease packed, sealed for life and maintenance free. They should be checked every 3 months and replaced as required.

### Geared Motors

Maintain the geared motor as described in the manufacturer's instructions.

## ROTOR REMOVAL

This procedure assumes the valve has been removed from production and is on a workshop bench. It is possible to remove the rotor of small valves whilst they are installed but because of the weight of the rotor we do not recommend this for valves larger than the 250mm size.

To remove the rotor from the valve body, the following procedure should be adopted:

- 1) Remove the shaft cover from the gear unit.
- 2) Remove the rotor retaining bolt and washer.
- 3) Remove the retaining screws from the gear mounting flange and pull the geared motor off the rotor shaft.
- 4) Remove the key from the rotor shaft.
- 5) Remove all the retaining screws from the drive side endplate.
- 6) Insert 2 of these screws into the tapped jacking holes in the endplate. Tighten the screws and remove the endplate.
- 7) Withdraw the rotor from the valve body.
- 8) Remove the non-drive side endplate as (5) and (6) above.

To re-build the valve, the following procedure should be adopted: -

- a) Re-fit the non-drive side endplate.
- b) Insert the rotor (plain end of shaft first) into the valve body and push the shaft through the non-drive side endplate until the rotor end disc touches the endplate.
- c) Re-fit the drive side endplate.
- d) Re-fit the key into the rotor shaft keyway.
- e) Re-fit the geared motor onto the drive side endplate.
- f) Re-fit the rotor retaining screw and washer into the rotor and fully tighten the screw. This will draw the rotor shaft into the gear unit until the shoulder on the rotor shaft touches the gear output shaft.
- g) Re-fit the gear unit cover.

## **FAULT FINDING CHECKS**

### **1. Rotary Valve motor fails to start.**

#### **Check:**

- a) Electrical supply (phase and voltage).
- b) All isolators, fuses, overloads and re-set switches.
- c) Is motor burnt out? Check motor windings of motor.
- d) Is gear unit seized?
- e) Valve has not jammed.

### **2. Rotary Valve motor functions but valve fails to deliver material.**

#### **Check:**

- a) Material is being fed into the valve.
- b) Blockages are occurring inside equipment upstream of valve.
- c) Non-drive end of the rotor shaft is rotating – this indicates that rotor shaft is not broken.

### **3. Rotary Valve produces excessive noise.**

#### **Check:**

- a) Foreign bodies inside valve.
- b) Bearings worn or in need of lubrication.
- c) Gear box malfunctioning.
- d) Bearings malfunctioning.

### **4. Rotary Valve produces excessive vibration.**

#### **Check:**

- a) Faulty components i.e. rotor blade broken away from main rotor.
- b) Material build up in valve.
- c) Worn bearings.

### **5. Bearing Failure.**

#### **Check:**

- a) Seal failure allowing material into bearings.
- b) Lubrication not carried out frequently.
- c) Securing bolts

## **VALVE SPARES**

### **a) RECOMMENDED SPARES:**

3off Lip Type Shaft Seals

2off Bearings

### **b) OPTIONAL SPARES:**

1off Geared Motor Unit

