

## Tilting Pad Radial Bearings

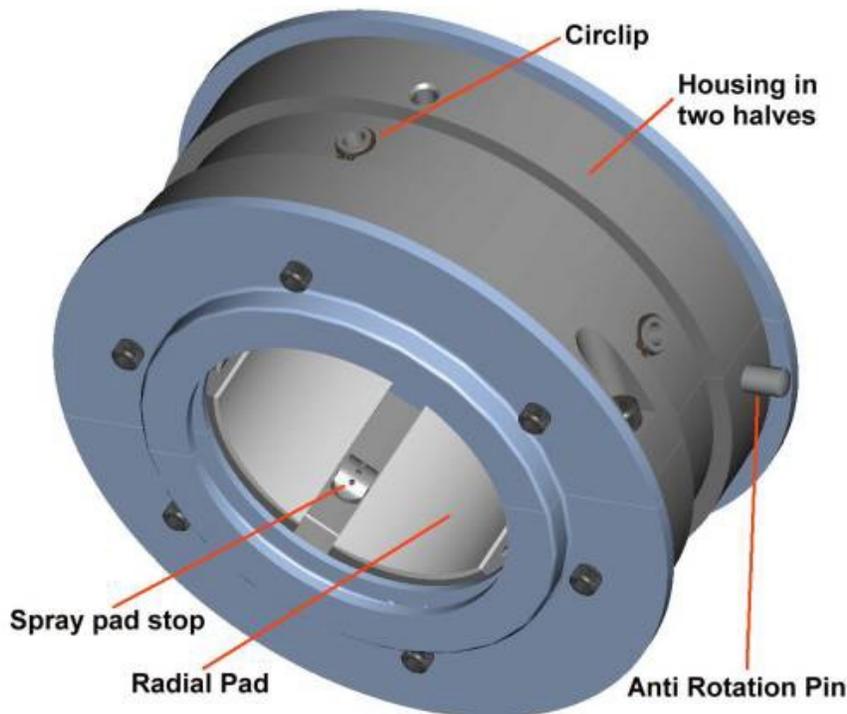
### Installation and Maintenance Instructions

#### 1 Introduction

The following notes provide installation and assembly instructions for RPB tilting pad radial bearings which are now provided with Directed Lubrication as standard, with a simple and trouble free construction and no end seals. Reference should be made to the specific contract drawing for operational information and any special features which may be provided.

#### 2 General Description

The standard RPB tilting pad radial bearing consists of a housing with 5 radial pads located both circumferentially and radially by combined pad stops/oil sprays and axially by an end plate or an integral housing flange. The standard radial pads are centre pivoted and are suitable for either direction of rotation. The general construction of the bearing is shown in Fig 1 and reference to this figure is made in the following comments.



The bearings are designed to be lubricated by a pressurised oil system with oil reaching the pads via the spray pad stops. The oil exits from the bearing through the end baffles. The radial pads are manufactured from steel lined with tin based whitmetal. They can tilt in the direction of shaft movement to generate a hydrodynamic film. They are also capable of movement in the axial direction to accommodate limited shaft misalignment.

The radial pads and spray pad stops are located in a housing which may be supplied either in halves or as a one piece ring. The spray pad stops are held by circlips on the outside which can be removed to allow inward, radial withdrawal of the stops. Rotation of the housing is prevented by the anti-rotation pin. In the case of split housings the two halves are fastened together by dowels and bolts.

### **3. Installation**

#### **3.1 Cleanliness**

To obtain the most reliable performance from these bearings it is necessary to observe high engineering cleanliness standards. The interior of the casing and all oil passages and pipes, especially on the supply side, must be perfectly clean and free from foundry sand, scale, welding spatter etc. Any unmachined surfaces should be shot blasted down to a clean metal surface.

#### **3.2 Alignment**

It is most important that the bearings should be accurately aligned to their journal and this alignment should be carefully checked during assembly. The required alignment should be achieved by shimming the housing pedestals; the bearing bore must not be scraped.

#### **3.3 Assembly**

In the following instructions it is assumed that the bearings will be assembled when the rest of the machine is already in a partially assembled state with the shaft in position. If this is the case, the shaft should be suitably supported over the bearing housings, leaving sufficient room to rotate each bearing half between the shaft and the bearing support housing.

##### **3.3.1 Bearings in halves (Code /2D and /2DF)**

This type of bearing is normally installed by wheeling it into position around the shaft which is assumed to be in a horizontal position. Before installation it is necessary to separate the two bearing halves by removing the screws which hold the halves together. It should be noted that the two outer radial pads at the bearing housing joint are loose when the bearing is split and they should be removed before assembly commences.

Installation of the bearing commences by wheeling the bottom bearing half between the shaft and the bearing support housing until the anti-rotation pin is located in the recess which should be provided in this housing. The joint face of the bearing should now be horizontal and facing up. The two loose radial pads should now be placed in position in the lower bearing half. Finally, the top bearing half is placed on the bottom bearing half and the retaining screws fitted and tightened to keep the halves together. The machine housing top cover may now be placed in position.

### **3.3.2 One piece (Code /0D)**

This type of bearing is normally installed by threading the complete bearing over the end of the shaft, taking care not to damage the whitemetal surfaces of the radial pads on any shaft abutment etc. The bearing is finally secured by installing the flange retaining screws.

**Note:** When either a one piece or a split bearing has a loose end plate, the radial pads can be removed or installed without removing the complete bearing from its installation. This can be done by removing the loose end plate which allows the pads to be removed axially, providing the shaft weight has been removed from the bearing.

### **3.4 Clearance**

It is essential that the clearance of the tilting pad radial bearing on the shaft should be within the design figures which are stated on the contract drawing. On no account should the bearing be allowed to operate with the assembled diametral clearance less than the recommended minimum value which is given on the drawing since damage could occur if this is done.

If it is wished to check the diametral clearance of the bearing, it is suggested that the following procedure should be adopted. The thickness of the radial pads at the crown centreline should be measured and twice the mean value subtracted from the measured pad housing bore. By subtracting the measured shaft size from the figure thus obtained, the bearing nominal diametral clearance is ascertained, which should be within the min/max figures on the relevant contract drawing.

On no account should feeler gauges be inserted between the whitemetal surface and the periphery of the shaft in order to attempt to measure clearance.

### **3.5 Lubrication**

Unless otherwise indicated on the contract drawing, the oil supply passage to the bearing should lead into the annulus provided around the bearing periphery. The oil exit from the bearing is through the end baffles. The contract drawing will specify the design flow, pressure, temperature and viscosity of the lubricant.

## **4 Bearing Wear**

If the bearing is installed in accordance with these instructions and it is operated within the design conditions specified on the contract drawing, no measurable wear should occur during prolonged service. The only change will be a dulling of the whitemetal surface. It is recommended that, when this dulling has spread to more than one half of the pad surface, the radial pads should be replaced.

The minimum whitemetal thickness on radial pads is of the order of 1-2 mm depending on size but it must be emphasised that any measurable increase in shaft movement (say 0.05 mm or more) indicates that the bearing is not functioning correctly and an inspection should be made immediately. This is particularly important if the increase in radial movement occurs over a short period of time.

Ref. TPRB/2000

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