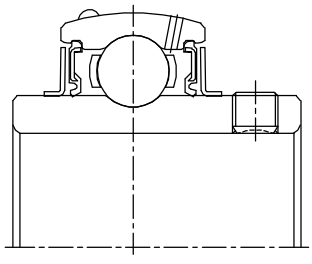
12. Bearing seal methods

12.1 Bearing seal methods

The bearing can be quickly destroyed if contaminants enter the internal moving parts of the bearing or if the lubricanting grease is allowed to leak out of the bearing. The bearing seal method is therefore developed to prevent entrance of contaminants and at the same time prevent grease from leaking out of the bearing to enhance the life of the bearing. The bearing seal method is divided into contact and non-contact types. The non-contact seal has low frictional resistance but the sealing capability is not as good as the contact type seal. Normally, JIB uses a combination of both sealing methods, the oil seal and the slinger, to protect the bearing. In the bear- ing seal method, the frictional resistance caused by the seal and the protection capability of the seal are oppositely related. In other words, improving the protection capability reduces the low friction capability and conversely, improving the low friction capability reduces the protection capability. Therefore, the seal method for the bearing unit should be carefully chosen to match the purpose and the operating condition.

(1) Oil seal and shield method (SL)

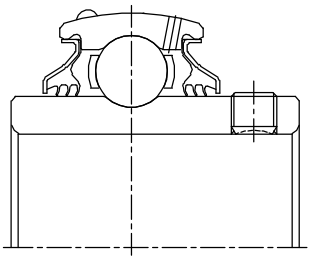
The most commonly used representative seal method at JIB is the oil seal and shield protection method. The oil seal is fixed to the outer race and the shield is press fitted to the inner race of the bearing unit to rotate with the inner race. Ther rotation of the bearing thus rotates the shield at the same time to create a fanning effect which creates an ideal labyrinth structure between the two seal types to increase the overall protection capability of seal.



[FIGURE 12.1] SL TYPE

(2) Triple seal method (L3)

The slinger and the oil seal are fitted together to produce a single piece seal with a triple lipped system. During operation, the spaces between the lips are filled by grease to provide lubrication and protection at the same time. This method provides an excellent protection against dust, moisture and gas as shown in Figure 12.5 and 12.6

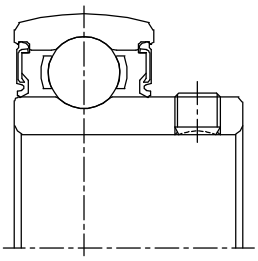


[FIGURE 12.2] L3 TYPE

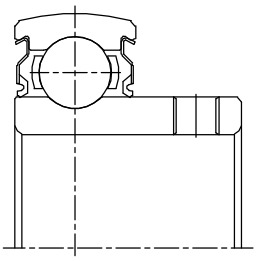
(3) Simple seal method (L , LZ)

The special synthetic rubber seal is fixed to a stamped steel shield which is attached to the outer race. The lip of the rubber seal makes an appropriate contact seal with the face of the inner race to provide low frictional resistance against rotation while protecting the bearing. The stamped steel shield provides mechanical support for the rubber seal. This method can provide safe operation for extended periods in normal operating conditions (SA2, SB2, SC2), LZ type is applied for SA2, SB2, SC2 and UC2. (UC2 : applied for UC204~UC212)

※ LZ type is produced on demand

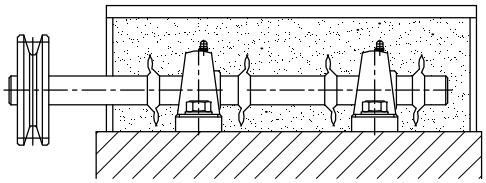


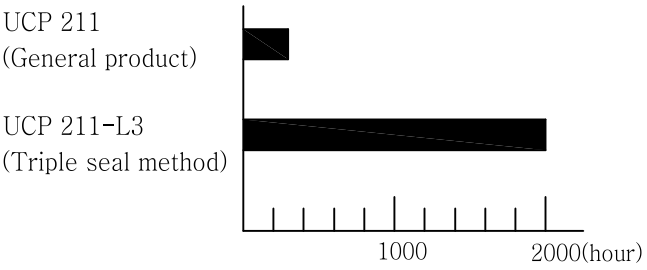
[FIGURE 12.3] L TYPE



[FIGURE 12.4] LZ TYPE

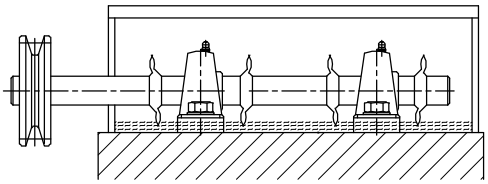
Shaft speed : 700rpm
Test condition : 400mesh GC flour powder
Carrying load : belt tension

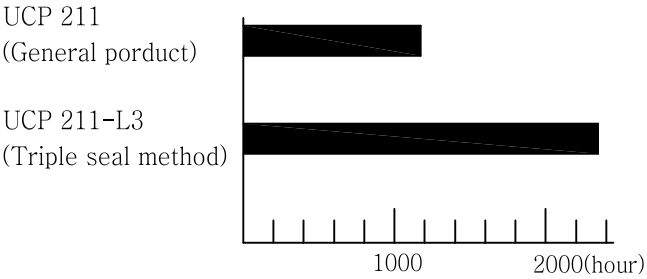




[FIGURE 12.5] Particulate test

Shaft speed : 400rpm
Test of water : tap
Carrying load : belt tension





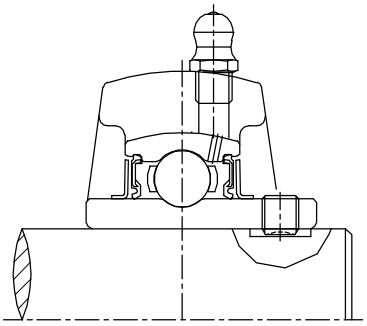
[FIGURE 12.6] Moisture test

In the particulate test, the general product can last for 250 hours without producing any abnormal sound cause by the intrusion of contaminants into the bearing. The triple seal method and the double protection method can last for 2000 hours without any strangeness. In the moisture test, general products can last for 1200 hour without forming rust and the triple seal and the double protection method can last for 2400 hours without forming rust.

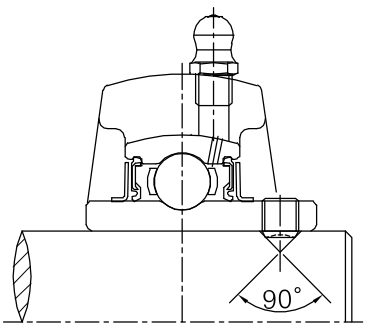
13. Bearing Locking method

13.1 Bolt Locking

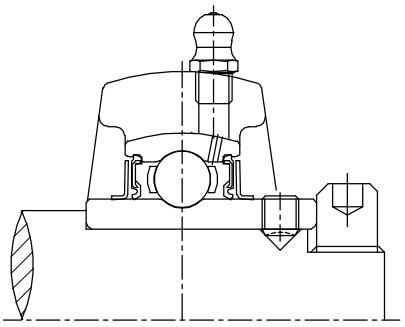
The shaft mounting by bolt method is a simple way of fixing the shaft to the bearing with two hexagonal screws located 120 apart on the inner race of the bearing. In conditions where there are vibrations, repeated reverse shaft direction operation, frequent start and stop operation, or in high axial load condition with high speed rotation, the following locking methods, shown in Figure 13.1 should be used.



Groove is made on the shaft surface.



Pilot drill hole is made on the shaft surface.



Where there is high axial loading, machine a column on the shaft and secure with a nut.

[FIGURE 13.1] Bolt locking methods