

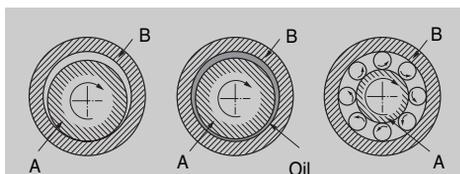
# 1. Bearing types

## 1-1 Sliding Bearing and Rolling Bearing

Bearings are used as a mechanical component to transfer the power and to move a certain part, and this is done by utilizing the small frictional force of the bearings, which makes them rotate easily (or move in one direction easily), all the while withstanding the force and weight load acting against them.

Bearings can be classified into two major groups, namely, sliding bearings and rolling bearings, depending on their friction type.

Three types of bearings are shown in Fig. 1-1, and (a) Sliding Bearings represent both the self-lubricating bearings made of special material that requires no lubricants between Shaft A and Bearing B and the ones made of porous material to be soaked with lubricants, and (b) Sliding Bearing represents both the hydrodynamic lubrication bearings requiring lubricants that automatically form the oil film in the space between Shaft A and Bearing B by way of rotating the shaft and the hydrostatic lubrication bearings requiring lubricants that elevate the rotating shaft by providing the pressurized lubricant from outside. Recently, magnetic bearings that elevate the rotating shaft by using both attraction and repulsion forces of the magnet have been introduced, and the air bearings that use the air as lubricant instead of oil are also the newest development.



a) Sliding Bearing b) Sliding Bearing c) Rolling Bearing

Fig. 1-1 Sliding and Rolling Bearings

There are two types of Rolling Bearings. (c) Ball Bearing has balls between Inner Ring A and Outer Ring B, and Roller Bearing has rollers instead of balls. Either balls or rollers of rolling bearings serve the same purpose as the lubricating oil in the sliding bearings. However rolling bearings still require some help from lubricating oil. Although the movement of rolling bearing consists mainly of rolling action, it still involves some sliding action in reality. That is why some lubricant is needed for reduction of friction, and also for withstanding the high speed rotation.

Rolling bearings have some advantages as listed below, compared with the sliding bearings.

- Because bearing specifications are standardized internationally, most rolling bearings are interchangeable, and could be replaced easily with the ones made by different manufacturers.
- Surrounding structures of a bearing could be simplified.
- Easy to diagnose and maintain
- Has small starting torque, and the difference between starting torque and operating torque is very small.
- Generally, both radial and axial loads can be applied to the rolling bearings at the same time.
- Comparatively easy to be used even under the high or low temperatures.
- The rigidity of bearings could be increased by applying preload.

Because this Catalogue contains description only on the rolling bearings, the words, "rolling bearings", in the rest of this Catalogue have been simply written down as the "bearings", unless it is necessary to compare them with sliding bearings.

## 1-2 Classification of Bearings

Bearings can be classified into Ball Bearings and Roller Bearings depending on the types of rolling elements, or into Radial Bearings and Thrust Bearings depending on the directions of the loads that could be mainly supported by them.

Radial and Thrust Bearings are generally classified depending on the ring shapes, contact angles, or shape of rolling elements, as shown in the Table 1-1 below, and they can be also classified depending on their various specific purpose and usage.

Table 1-1 Classification of Bearings (Items written in bold characters are the ones currently produced by KBC)

Radial Bearing	Ball Bearing	Single-Row	Deep Groove Ball Bearing			
			Single-Row Angular Contact Ball Bearing			
			Unit Bearing			
		Double-Row	Double-Row Angular Contact Ball Bearing			
			Self-Aligning Ball Bearing			
	Roller Bearing	Single-Row	Cylindrical Roller Bearing			
			Tapered Roller Bearing			
			Needle Roller Bearing			
			Double-Row	Double-Row Cylindrical Roller Bearing		
				Spherical Roller Bearing		
Thrust Bearing	Ball Bearing	Single-Row	Flat Washer Thrust Ball Bearing (One Way, Two Ways)			
			Self-Aligning Housing Washer Thrust Ball Bearing (One Way, Two Ways)			
			Thrust Angular Contact Ball Bearing (One Way, Two Ways)			
	Roller Bearing	Single-Row	Thrust Cylindrical Roller Bearing			
			Thrust Needle Roller Bearing			
			Thrust Spherical Roller Bearing			
			Thrust Spherical Roller Bearing			