

Lubrication

Linear ball bearings are now used in high speed operation in the 40m/min range, reflecting the small and high-speed machine construction which has gained momentum recently. Lubrication for the bearings has become one of the most important factors in extending the life and reliability of the host machine during these high-speed operations. The object of the lubrication along with increasing the service life of the bearings, is to reduce internal friction and abrasion of the bearings and to prevent bearing seizure. Service life will lengthen when the proper oil film is in use, yet it will shorten, when the film used, is not adequate for the job.

Either grease or oil is the lubricant in common use for linear motion ball bearings. Lithium grease, the 2nd ~ 3rd grade, are suitable for grease lubrication. Use the grease with extreme-pressure additives for bearings under heavily loaded or impact load-prone conditions. Do not mix together several kinds of grease manufactured by different manufacturers. For oil lubrication, use either spindle oil, the 1st ~ 2nd grade, or turbine oil, 1st ~ 3rd grade. Use low viscosity oil (spindle oil 1st grade, etc.) for bearings used in high speed operations, use the high viscosity oil (turbine oil 3rd grade, etc.) for heavily loaded conditions. Once the linear ball bearings are lubricated, (the U and UU types with sealing), additional lubrication is not required for a long time, because of the adequate space that has been provided to keep grease or oil in the ball circuit grooves of the retainer. The standard bearings, however, require either the drip feed-lubrication or oil bath method of lubrication.

Essential Check Points during OZAK Linear Ball Bearing Installation

The following list is made to assure effective use of the OZAK products. Use the list as a check sheet during the design of host machines or in the installation of the linear bearings.

- ✓ In case a moment load is applied, use the proper bearings with the maximum space that the design allows between the two bearings. Use the tight clearance for fitting with the shaft. Also, grease lubrication is a prerequisite.
- ✓ For the vertical shafts, use either two bearings for one shaft or the PF series. Use the tight clearance for the fitting with the shaft.
- ✓ Improved service life and operational performance can be obtained by means of uniformly distributed rows of balls against the direction of the acting load.
- ✓ Revolve the shaft manually in the rotating direction, then make sure that the condition, either C₁ or C₂ in Table 2, exists. This is done to prevent the service life and operational performance of the bearings from being adversely affected by either the excessive pre-loading (more than -10μm) between the bearings and shaft, or to avoid excessive center deviation among the bearings.
- ✓ Use the setter, as shown in Fig. 7, and slowly drive the linear motion ball bearings into the housing. Avoid directly hitting the snap rings that are attached on both ends of the bearing. A direct impact on the rings will cause damage to the bearing's complicated construction which has a thinner outer sleeve as compared with ordinary rolling bearings.
- ✓ For shaft installation, align the center and then insert into the bearings. Do not hit the retainer or the snap rings of the bearings with the end of the shaft.
- ✓ Use OZAK genuine shafts with OZAK linear motion ball bearings to meet the many requirements needed for the best possible performance of the bearings. The shaft of the linear motion ball bearings serves as an inner ring of rolling bearings already in use.

Linear Motion Ball Bearing's Operating Temperature, Operating Speed and Recommended Lubrication

Oper. Temp. °C	Oper. Speed m/sec	Recommended Lubricating Oil		Grease
		Normal Load	Heavy Load or Impact Load	
-30 ~ 0	~ 5	Refrigerant Machine Oil 1st ~ 3rd Grade	—	Lithium Soap Group Grease, Consistency 0 ~ 1st Grade
0 ~ 60	~ 1	Turbine Oil 2nd Grade C Machine Oil Land Engine Oil 2nd Grade	Turbine Oil 3rd Grade B Machine Oil Land Engine Oil 3rd Grade	Lithium Soap Group Grease, Consistency 1st ~ 2nd Grade
	1 ~ 5	Turbine Oil 1st Grade	Turbine Oil 2nd Grade Turbine Oil 3rd Grade	
	5 ~	Spindle Oil 1st Grade Spindle Oil 2nd Grade	Turbine Oil 1st Grade	
60 ~ 100	~ 1	Turbine Oil 1st Grade Turbine Oil 2nd Grade	Turbine Oil 3rd Grade Land Engine Oil 3rd Grade	Lithium Soap Group Grease, Consistency 2nd & 3rd Grade
	1 ~ 5	Turbine Oil 1st Grade Turbine Oil 2nd Grade	Turbine Oil 2nd Grade Turbine Oil 3rd Grade Land Engine Oil 3rd Grade	Barium Soap Group Grease, Consistency 2nd & 3rd Grade
	5 ~	Spindle Oil 2nd Grade Turbine Oil 1st Grade	—	