

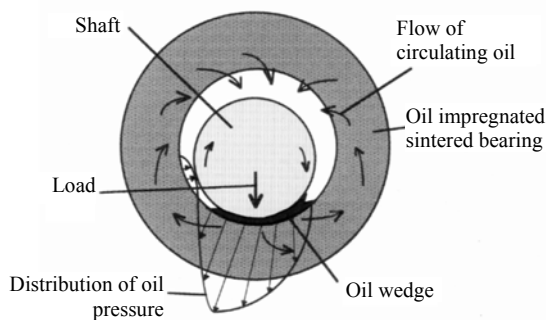
## Dynamic Pressure Bearing for Polygonal Mirror Scanner Motor

### Technical background

This product is a dynamic pressure bearing that enables ultra-high speed rotation (up to 40,000rpm) with high rotational accuracy, which could not be achieved with conventional cylindrical bearings and ball bearings. This bearing can be used in polygonal mirror scanner motors in copying machines, printers, and other devices which require the above-mentioned features. Lubrication with special oil enables use in a horizontal position, which was difficult with conventional bearings.

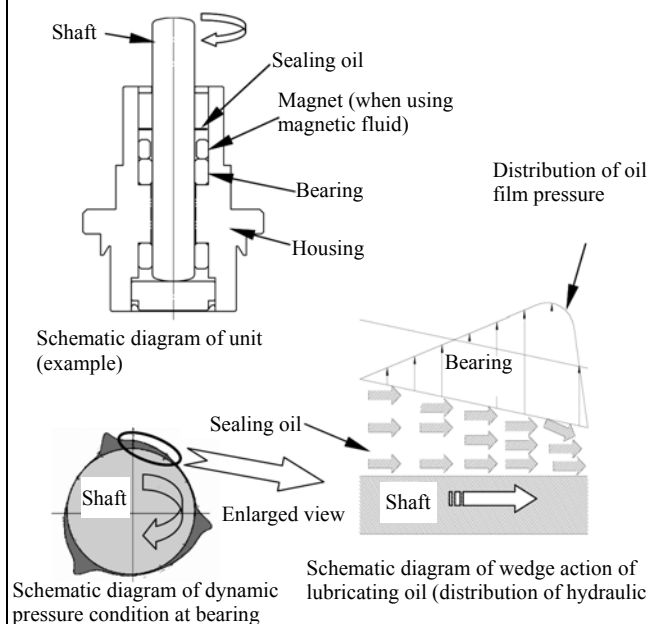
### Conventional technology

The shaft and bearing are in direct contact, and the oil impregnated in the bearing seeps out as a result of frictional heat. Hydraulic pressure is generated via the oil between the shaft and bearing. Because the bearing is cylindrical, hydraulic pressure is generated in only one area. As a result, the shaft center tends to deviate as shown below. Furthermore, because the shaft and bearing are in direct contact, shaft loss is large; consequently, application is considered difficult in products which require high accuracy and high rotational speed, such as polygonal mirror scanner motors.



### New technology

Dynamic pressure (multi-lobe) bearings generate high oil film pressure at the sliding surface due to the wedge action of the lubricating oil using the rotation of the shaft (at 3 locations in the example shown below). This oil film pressure supports the shaft at the center position with good accuracy, contributing to improved rotational accuracy of the motor. Because the pressure of the oil film acts toward the center of the shaft, preventing metal-to-metal contact between the shaft and the bearing, ultra-high speed rotation (up to 40,000rpm) is possible. Use of a magnetic fluid as the sealing oil in combination with a seal magnet enables use of the bearing in a horizontal position.



### Features of the new technology

- (1) Because a dynamic pressure configuration is adopted at the bearing inner diameter, the bearing is not in direct contact with the shaft, and as a result, high speed rotation is possible.
- (2) Adoption of a dynamic pressure configuration secures excellent rotational accuracy with minimal shaft deflection because the oil film pressure acts toward the shaft center.
- (3) Because the dynamic pressure configuration of the bearing inner diameter is manufactured by the powder metallurgy process (die), mass production is possible.
- (4) With multi-lobe dynamic pressure bearings, more compact and thinner products can be manufactured in comparison with herringbone bearings due to the features of the manufacturing process.

### Examples of applicable products

- Polygonal mirror scanner motors
- HDD spindle motors
- Fan motors

### Applied products

- Polygonal mirror scanner motors