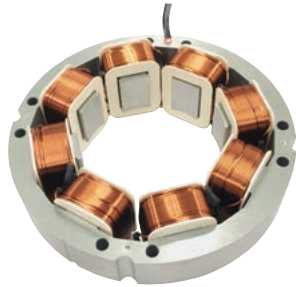


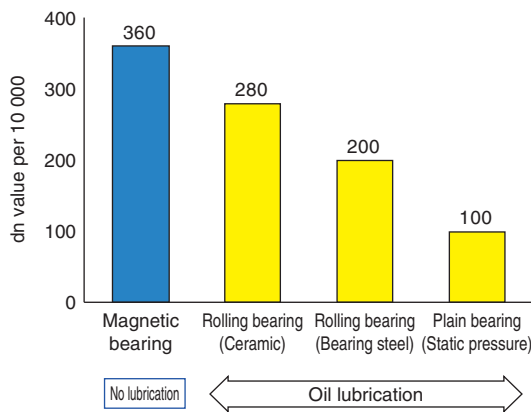
Active Magnetic Bearing



In 2018, JTEKT Corporation and MUTECS Inc. jointly established Koyo Magnetic Bearing Co., Ltd. to design, manufacture, and sell magnetic bearings. An active magnetic bearing is a bearing that uses electromagnetic force to enable full non-contact support for a rotating shaft, and it features ultra-high-speed rotation with an oil-free, maintenance-free, particle-free, and energy-saving. This paper presents the features and configuration of active magnetic bearings.

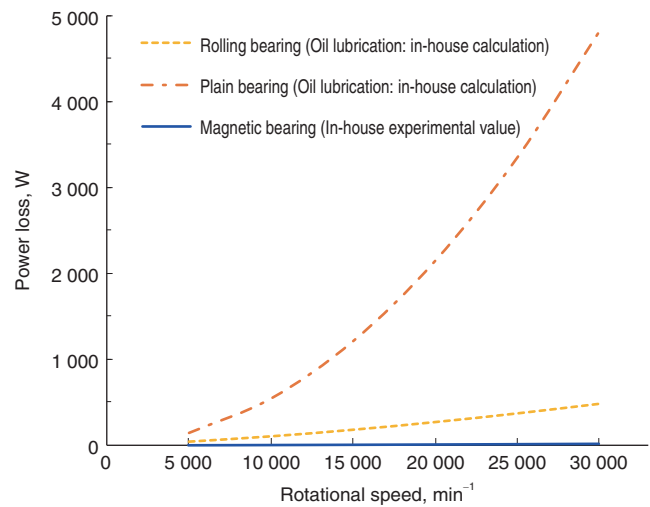
Features

- (1) Ultra-high-speed rotation: dn value* : 3 600 000 * dn value = shaft diameter (mm) \times rotational speed (min^{-1})
- (2) Clean : No lubricant and seal required, no wear parts
- (3) Energy-saving : No friction loss
- (4) Maintenance-free : No need for bearing replacement and lubricating device
- (5) Low vibration, low noise : No physical contact parts



dn value comparison

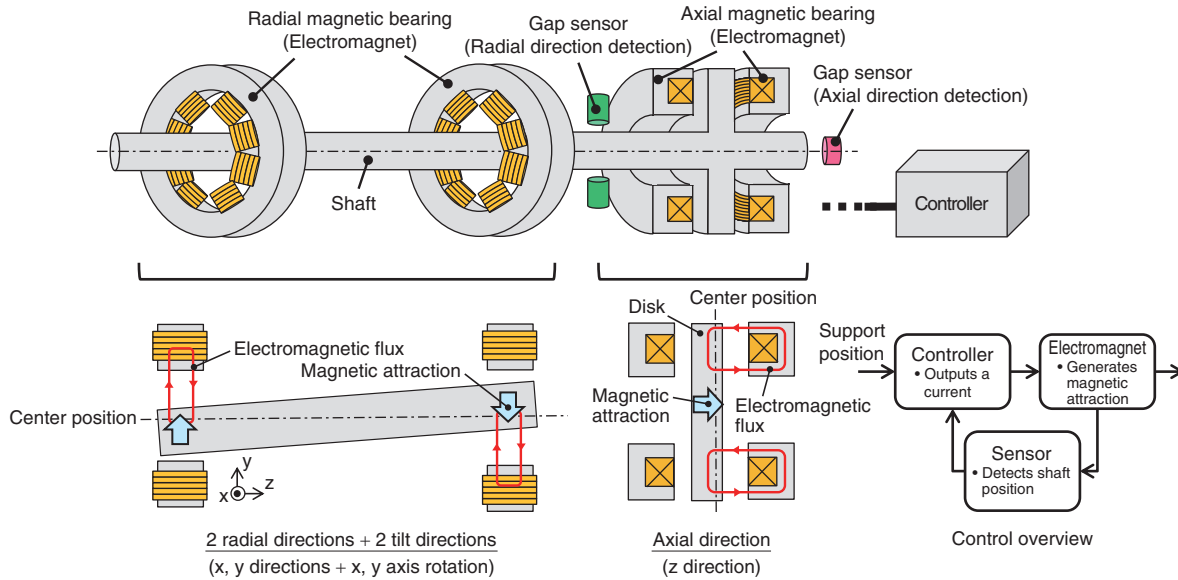
For rolling bearings,
 $d_m n$ value = Bearing P.C.D. (mm)
 \times Rotational speed (min^{-1})



Power loss comparison

Basic Configuration and Support Principle

The magnetic attraction force is controlled to provide full non-contact support for five degrees of freedom (two radial directions + two tilt directions + axial direction).

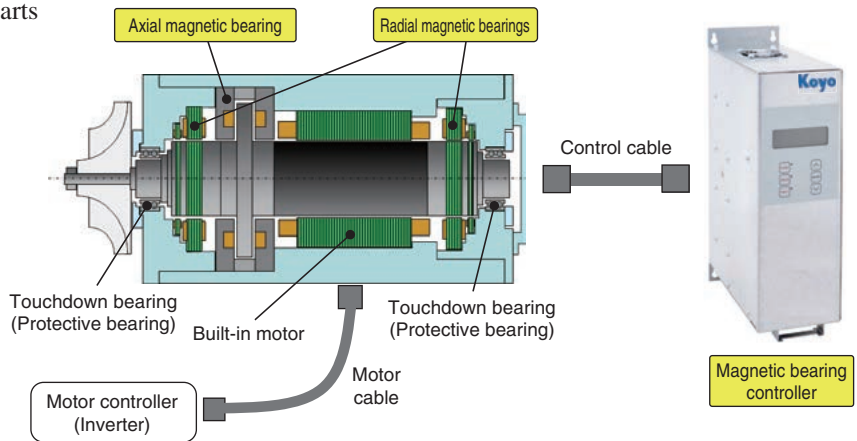


Basic configuration and support principle

Examples of Effects

Usage of magnetic bearings in rotating equipment that required oil lubrication is expected to bring the following benefits by eliminating oil lubricating devices

- (1) More compact design
- (2) Improvement of reliability (no oil system failure)
- (3) No need to replace oil, filters, or worn parts
- (4) Reduction of running costs



Example of magnetic bearing system configuration

Examples of Applications

Vacuum pumps, blowers, compressors/expanders, heating and cooling equipment, refrigerators, power generators, etc.

(Product Engineering)

Koyo Magnetic Bearing Co., Ltd.