



Touch-down bearings



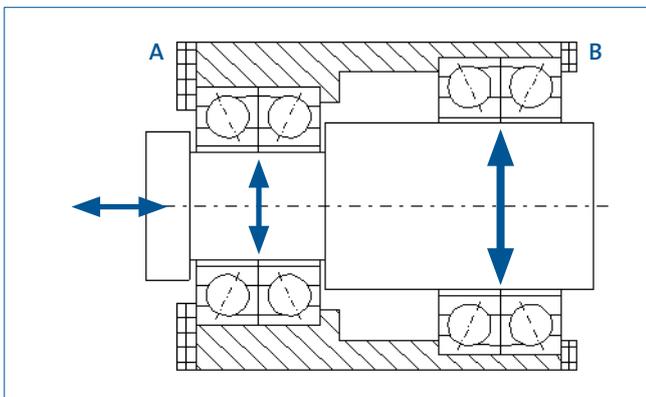
GMN offers a large selection of spindle ball bearings (angular contact ball bearings) in various sizes (ID: 5 mm to 120 mm), series (618.., 619.., 60.., 62..) and designs (S, SM, KH) as well as other different designs. From these and from a large number of deep groove ball bearings, GMN develops and manufactures safety bearings with, for example, a bearing pair or a single bearing at the shaft end.

GMN safety bearings, so called touch-down bearings (TDB), support and protect a shaft which is levitated in a magnetic field by active magnetic bearings (AMB). If the magnetic bearings fail, the shaft is picked up by the safety bearings and damage to the high-quality magnetic bearing system can be prevented.

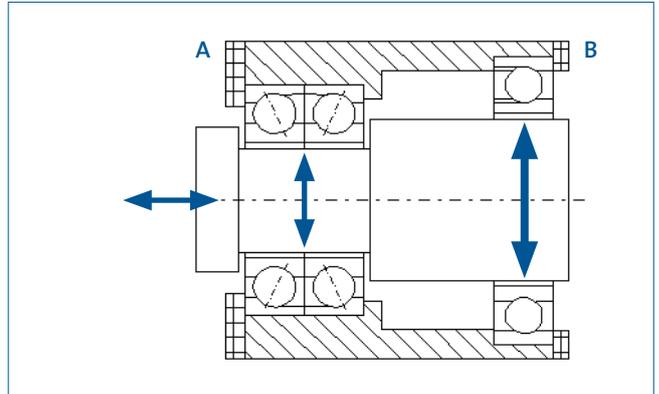
In general, a touch-down bearing system is designed by GMN to carry radial and axial loads at one shaft end A and radial loads at the other shaft end B.

Features

- A TDB system can be designed with a bearing pair (angular contact ball bearings) at each shaft end or



- with one bearing pair on one shaft end and one single bearing (deep groove ball bearing) on the other shaft end.



- The bearing pair (A) can be rigid or spring preloaded.
- The bearing size and design depend on the speeds and loads occurring at touch down (TD) with maximum speed. With regard to the extreme acceleration of the inner ring at TD GMN touch down bearings do not have a cage and therefore usually are full ball complement with ceramic balls (Si3N4).
- Taking into account the external loads, the temperature level at shaft and housing, the speeds, the boundary dimensions, the application-specific ambient conditions etc. GMN calculates and elaborates a proposal of a specific bearing system including bearing internal geometry, preload, width tolerance, lubricant etc., which can withstand a complete run-out of the shaft if the active magnetic bearings (AMB) broke down. This also includes the selection of suitable materials for balls (e.g. Si3N4) and rings (100Cr6, HNS etc.).
- GMN TDBs are accelerated in fractions of a second from speed 0 up to a speed parameter (speed x pitch circle diameter) of approx. 3.0 million mm/min or even higher.
- Typical applications for GMN TDBs are high speed compressors, turbo molecular pumps, blowers, turbo expanders etc.