

TM 282

Journal Bearing Friction Apparatus



- * **Learning the fundamentals of hydrodynamic lubrication by experimentation**
- * **Journal bearing friction**
- * **Control unit with electronic speed control and digital display of speed and lubricant temperature**

Technical Description

The basic tribological phenomena of journal bearings can be investigated using this unit. The journal bearing to be investigated consists of a stainless steel bearing journal and the free-moving gunmetal bearing housing. A three-phase AC motor with a frequency converter for speed control serves as the drive. A lever with a sliding weight attached to it is connected to the bearing housing. This enables an external moment to be set corresponding to the friction moment generated in the bearing. Another lever, combined with a set of weights, applies the defined load to the bearing. It is possible to view the bearing journal and the lubrication gap through the transparent cover. Lubricant is supplied by a drip-feed lubricator that feeds oil to the shaft via two lubrication channels. A drip tray collects the oil that leaks out. The continuously adjustable speed, as well as the temperature of the lubricant, is indicated digitally on the control unit.

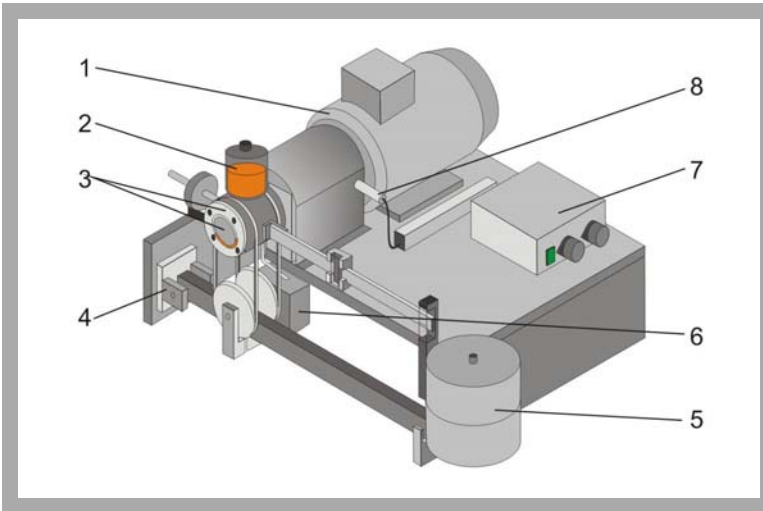
The well-structured instructional material sets out the fundamentals and provides a step-by-step guide through the experiments.

Learning Objectives / Experiments

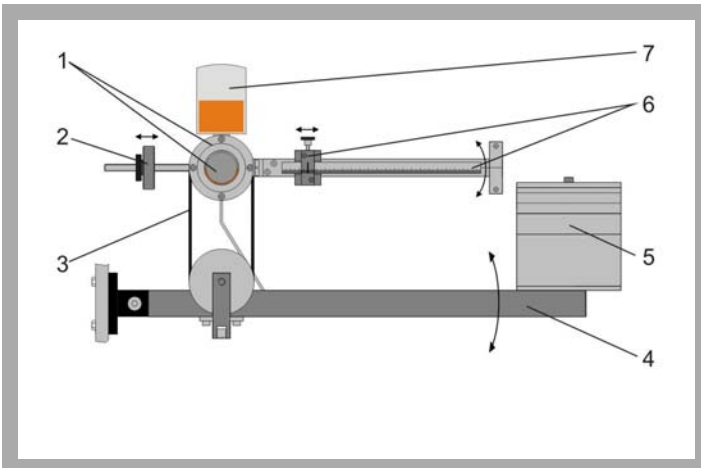
- Learning the technological correlations involved in hydrodynamic lubrication by experimentation
- Frictional force in a journal bearing dependent on
 - * speed
 - * bearing load
 - * lubricant and lubricant temperature

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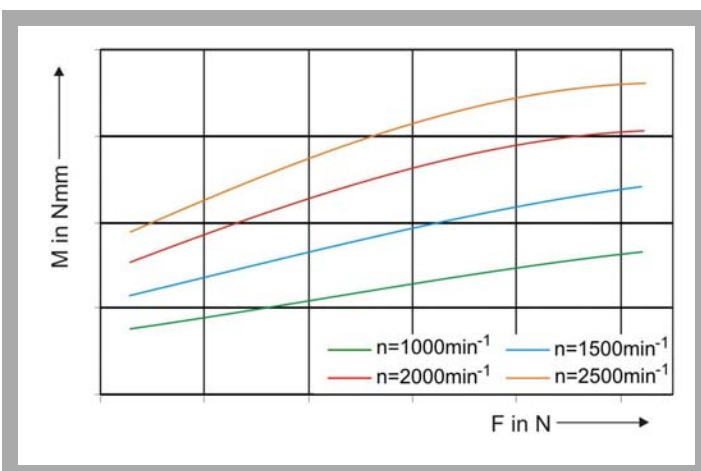
Journal Bearing Friction Apparatus



1 motor, 2 drip-feed lubricator, 3 journal bearing housing with shaft, 4 fixed bearing for load lever, 5 load weights, 6 leakage oil tank, 7 switch box, 8 speed sensor



1 journal bearing housing with shaft, 2 balance weight, 3 belt for force transmission to bearing housing, 4 load lever, 5 weights, 6 measuring lever with scale and sliding weight, 7 drip-feed lubricator



Influence of load F and speed n on friction moment M

Specification

- [1] Unit to investigate basic tribological topics
- [2] Radial journal bearing with stainless steel shaft journal and free-moving bronze bearing shells
- [3] Three-phase AC motor with frequency converter for speed control
- [4] Load applied to journal bearing using a mechanical lever, transmission ratio 5:1
- [5] Measurement of friction moment achieved through the use of a lever with sliding weight
- [6] Balance weight to compensate for the intrinsic weight of the measuring set-up
- [7] Drip-feed lubrication for continuous lubricant supply (drip-feed lubricator)
- [8] Drip tray for leakage oil
- [9] Inductive speed sensor
- [10] Thermocouple for oil temperature measurement
- [11] Control housing with digital displays for oil temperature and speed, also allows speed to be varied

Technical Data

- Journal bearing
- bearing journal diameter: d=30mm
 - bearing width: 45mm
 - friction pairing: steel / bronze
 - bearing load: max. 525N
 - friction moment: max. 295Nmm
- Three-phase AC motor
- power output: 0,37kW
- Oil viscosity class: ISO VG 100
- Measuring ranges
- temperature: -50...200°C
 - speed: 0...3000min⁻¹
- Weights
- 1x 50N, 1x 20N, 2x 10N, 2x 5N;
 - 1x 25N intrinsic weight of load unit
 - 1x 1N sliding weight

Dimensions and Weight

- l x w x h: 600x440x360mm (experimental unit)
- l x w x h: 360x310x160mm (control unit)
- Weight: approx. 40kg

Connections

- 230V, 50/60Hz, 1 phase or 120V, 60Hz, 1 phase

Scope of Delivery

- 1 experimental unit
- 1 set of weights
- 1 control unit
- 1 set of instructional material

Order Details

040.28200 TM 282 Journal Bearing Friction Apparatus