TECHNOLOGY OFFER

Highly accurate, adjustable and overload-capable torque measurement device

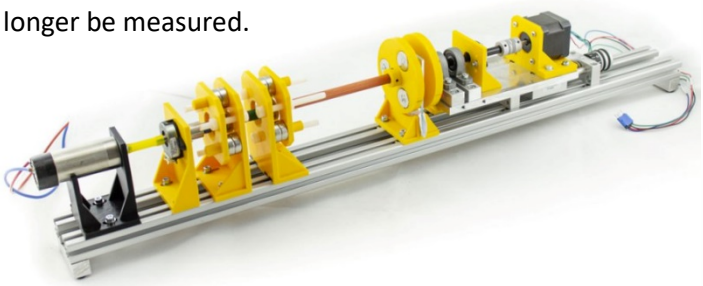
Graz University of Technology

High-precision torque measurement plays a central role in many modern technical disciplines such as production science, energy and transportation engineering. Increased striving for energy efficiency requires the reduction of the torque loss of rotating assemblies and elements. (These can be rolling bearings, electric motors, plain bearings, friction wheels, etc.) In order to further reduce these torque losses, precise knowledge of them is necessary. However, small assemblies in particular, e.g. bearings in small, high-speed drive systems, place extremely high demands on measurement accuracy in the course of determining the friction loss.

BACKGROUND

The industry standard for measuring torque is the so-called torque measuring shaft, which - as the name suggests - consists of a shaft that acts as a deformation body. However, this solution has some significant disadvantages:

- In order to be able to measure small torques (in the Nmm range), fragile, micromechanical structures are required.
- These structures are susceptible to mechanical damage as soon as the measuring range is exceeded.
- The measuring range is defined by the mechanical design and cannot be adjusted.
- Particularly small torques are principle due to manufacturing
- technical limitations can no longer be measured.



TECHNOLOGY

The invention presented here is a highly accurate, adjustable and overload-capable system for torque measurement. The torque, which is applied between the input and output side of the measuring system, is transmitted via two magnetic coupling halves (which have no mechanical connection). Depending on the distance between the magnetic coupling halves and the torque applied, a torsion angle is set between the input and output sides. This angle can be determined contactless (e.g. optically) and is proportional to the torque to be measured. In order to accommodate or minimize the influence of internal friction, the output side has a magnetic bearing.

The sensitivity and measuring range of the system can be adjusted by setting the distance between the magnetic coupling halves. As the “weakest link” in the torque transmission is the magnetic field, the system is not damaged in the event of mechanical overload, but merely “slips through” without consequences such as damage or wear.

ADVANTAGES

The system has the following unprecedented advantages over the state of the art:

- Adjustable torque measuring range (even during operation!)
- Wear-free and completely consequence-free mechanical overload capability
- Measurement of extremely low torques

Ref.no.: E_1075

KEYWORDS:
Torque sensor
Magnetic coupling
Measuring shaft
Optical torsion angle measurement
Magnetic bearing

INVENTORS:
Dr. Armin Buchroithner

COOPERATION OPTIONS:
Licensing, Sale

DEVELOPMENT STATUS:
Lab feasibility study

STATUS OF PATENTS:
AT patent application filed

CONTACT:

Andreas Ruplitsch
Graz University of Technology
Research & Technology House
Mandellstraße 9/II
8010 Graz
T: +43 873 6928
andreas.ruplitsch@tugraz.at