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MINIATURISED MAGNETIC COUPLING

The patent pending miniature magnetic coupling is capable of transmitting torque over a hermetically separated distance like a radial acting magnetic coupling but at smaller dimensions like an axial acting magnetic coupling. For applications in medical devices in which a propulsion system and blood-wetted parts have to be hermetically separated, the maximum dimensions are important and also a strong limiting factor.

BACKGROUND

Torque transmission in a miniaturized environment over hermetically separated functional units is limited when using conventional magnetic couplings. To meet higher demands a design with sufficient torque transmission capabilities needs to be implemented. By combining the advantages of an axial and a radial magnetic coupling, a new prototype was developed. The improvement of this magnetic coupling leads to a higher transmission reliability through a significant increase of power transmission.
The key element of this new and improved design is a simple but effective bimetallic and partly ferromagnetic guiding element arranged around two permanent magnets. Further advantages of this design are smaller moments of inertia, an easier design of parts compared to radial acting magnetic couplings, and reduced axial loading of bearings compared to axial acting magnetic couplings.
The miniaturised magnetic coupling is already implemented for torque transmission in the pneumatically driven heart catheter pump "Assistocor" or the minimal invasive liquid lung "MILL", a membrane catheter for reduction of CO_2 in the Vena Cava.

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In the presented technology we combine:

- The simplicity and the frame size of an axial acting magnetic coupling with
- the efficiency and functionality of a radial acting magnetic coupling without any compromise

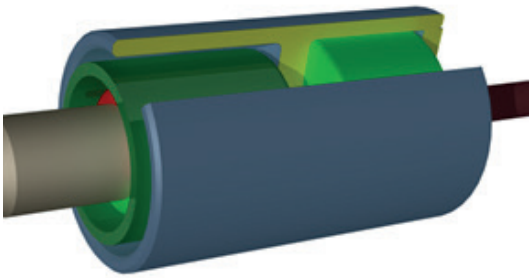

Fig 1: cross-sectional-view of the miniature magnetic coupling

ADVANTAGES

- Enables high torque transmission for miniaturized applications
- Only standard permanent magnets are required
- Up to 40% higher torque transmission compared to an axial acting magnetic coupling
- Smaller moments of inertia than radial acting magnetic coupling
- Easier design of parts than a radial acting magnetic coupling
- Reduced axial loading of bearings compared to an axial acting magnetic coupling
- axial and radial acting forces are continuously variable

REFERENCE:
M002/2014

APPLICATION:
The invention is applicable where torque transmission over hermetically separated distances at minimized dimensions is required. For example, in a blood pump.

DEVELOPMENT STATUS:
Prototype available

KEYWORDS:
magnetic coupling,
miniaturised,
highly efficient,
easy construction

IPR:
AT (AT515555), CH, DE, ES, FR, GB, IT, NL; patents filed: US and JP

OPTIONS:
- R&D - Cooperation
- License Agreement

INVENTORS:
Christoph JANECZEK
Markus HINTEREGGER

CONTACT:

Angelika Valenta
TU Wien
Vienna, Austria
T: +43.1.58801.41538
angelika.valenta@tuwien.ac.at
www.rt.tuwien.ac.at

TU WIEN TECHNISCHE UNIVERSITÄT WIEN