

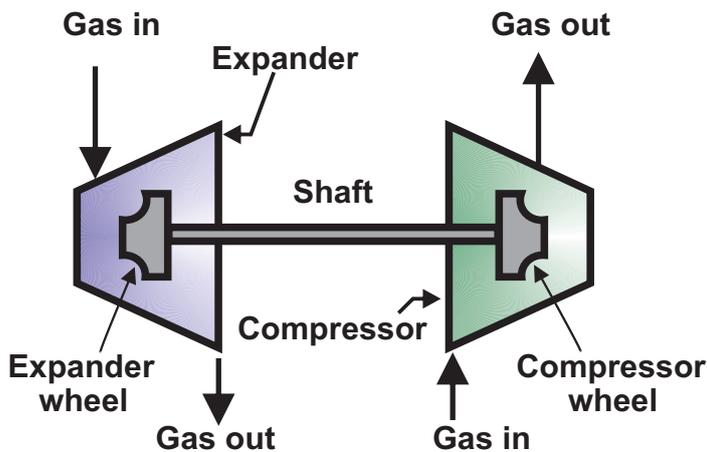


MANGAN INDUSTRIAL GROUP

TURBOEXPANDER-COMPRESSORS

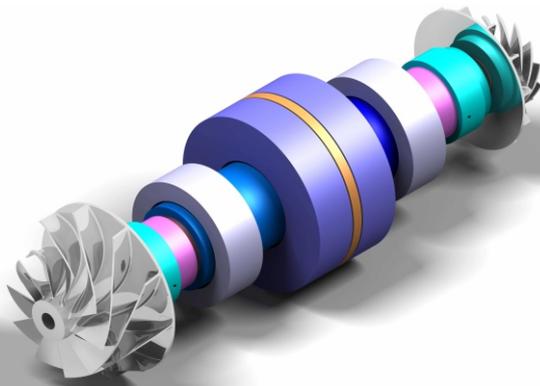
Cryogenic Turboexpander application

- Ethylene Plants
- Refineries
- Gas processing Plants
- Air Separation Facilities

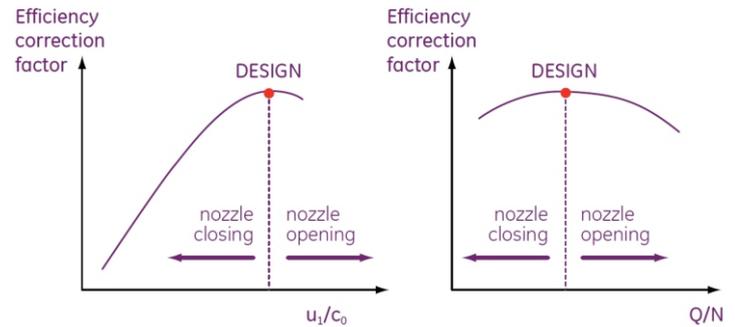


Typical MANGAN Cryogenic Turboexpander Configurations

- Power up to 10 MW
- Wheel diameter up to 1,800 mm
- Design temperature from -150°C to $+200^{\circ}\text{C}$
- Mechanical design in accordance with **API 617**
- Lube oil system in accordance with **API 614**
- Active Magnetic Bearings systems according **API 614**
- Turbine operability in accordance with **API 612**



An important parameter to consider is the U_1 / C_0 factor. This is a non-dimensional parameter where U_1 is the tip speed of the wheel and C_0 is the spouting velocity



High-Efficiency Impellers

High efficiency is a fundamental requirement for all processes involving Turboexpanders. We achieve this performance through the use of the latest technology tools and a vast experience base



MANGAN has a great deal of experience working with Hirth Couplings.

This type of coupling provides a superior moment transfer and yields excellent results for balancing. It is especially adapted for high power and high tip speed applications.



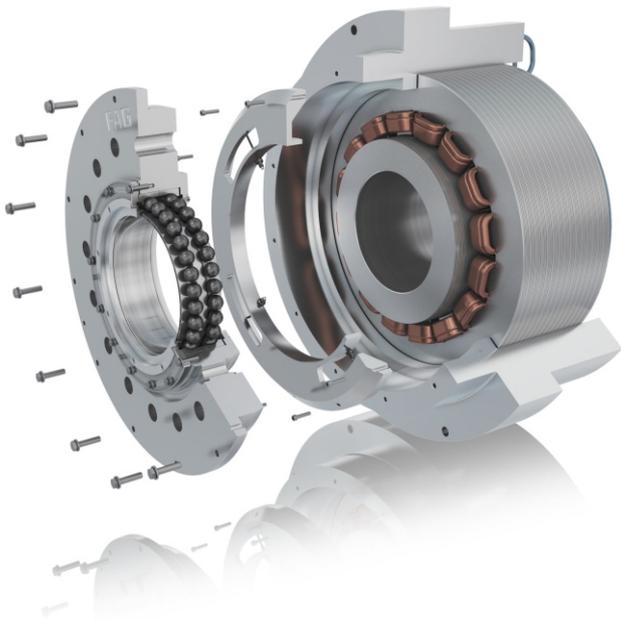


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Active Magnetic Bearings

MANGAN offers designs using active magnetic bearings. Active Magnetic Bearings generate a magnetic field to align the shaft in its centerline. This eliminates friction and the need of lubrication. The electromagnets of Active Magnetic Bearings are controlled with rotor position sensors by a digital control cabinet. The resulting combination of lower maintenance, higher reliability, and increased durability boosts equipment performance.

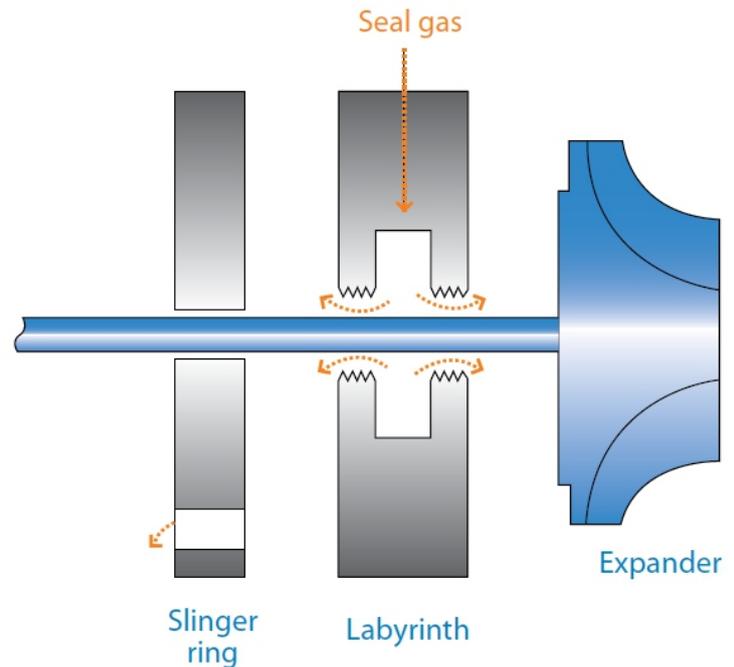


Oil Bearings

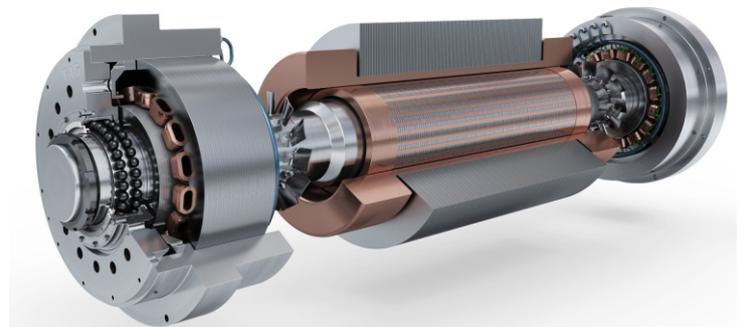
We offer horizontally-split, high-speed pinion bearings featuring five self-centering pads that ensure stable rotation. Horizontally-split bearings are especially easy to inspect and maintain.

Tilting-pad bearings, which are used on high-speed shafts and sleeve bearings, used on low-speed shafts, ensure reliable performance, efficiency, and optimal speeds for each process.

Seals are used in Turboexpanders to protect parts from the cold gas of the expander. MANGAN can provide different types of shaft seal arrangement depending on the application.



MANGAN provide aftermarket field service, equipment repair and redesign, and spare parts production for all brands and configurations of turboexpanders and bearing systems.



Our dedicated service team supports customers at every step, before and after installation.

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ECX-XXX-CAT-01