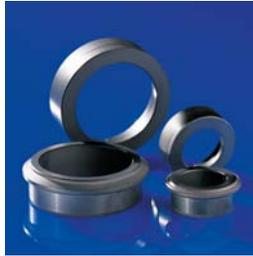


KRAL Pumps With Magnetic Coupling
for Booster Modules



Booster Module Pumps With Leak-free Sealing Technology



KRAL Pumps in Booster Modules

The booster module is the heart of a ship's fuel supply. This is where the fuel is filtered and set to the correct pressure and viscosity. The characteristics of the fuels used put high demands on the booster module pumps. Heavy fuel oil must be transported at high temperatures. The fuel can contain foreign substances. Abrasive particles are not fully held back despite extensive filtration.

KRAL screw pumps are self-priming positive displacement pumps. They feed the fuel over a large pressure and viscosity range with high efficiency.

Reliable Sealing Technology

Booster module pump failure is often caused by the seal. Conventional seals create friction exactly where they are supposed to seal: inside the sealing clearance. Fluid is required to dissipate the frictional heat. During start-up and outgassing of the fluid, dangerous dry running can occur.



The magnetic coupling operates exclusively with static sealing elements. It is as reliable and long-lasting as the pump itself.



Maintenance-free due to Magnetic Coupling

To ensure dissipation of the frictional heat, some conventional sealing systems work with a liquid seal, which must be continuously monitored.

KRAL pumps with magnetic coupling do not require monitoring.

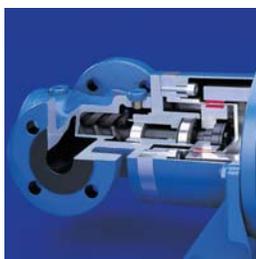


Leakage-free and Clean

With booster module pumps the single-acting seal must be lubricated by the fed fuel, which emerges into the atmosphere as leakage and contaminates the engine room.

KRAL pumps with magnetic coupling operate completely without leakage, and the environment remains clean.

KRAL Pumps With Magnetic Coupling Reduce Life-Cycle Costs



Reduced Down-Times

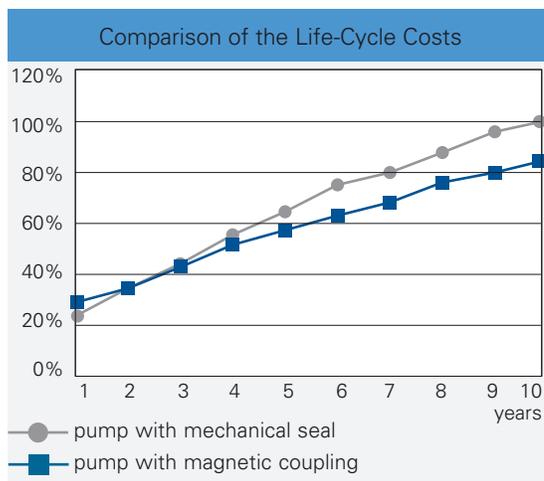
KRAL pumps with magnetic coupling are used when high reliability is demanded. Instead of a conventional seal, a hermetically sealed stainless steel containment can seals the pump from the atmosphere. Permanent magnets with high energy density transmit the torque from the motor to the pump shaft.

Magnetic couplings operate more reliably than conventional sealing systems because they do not contain movable sealing elements which are subject to friction.

KRAL Pumps in the Long-term Comparison

KRAL pumps with magnetic coupling clearly prove out to be more economical. The long-term comparison with systems featuring conventionally sealed pumps demonstrates this clearly. The lower purchase price of conventional

sealed pumps is quickly cancelled out by higher maintenance costs for the continuous renewal of the seal. Consequential costs, such as down times are also eliminated by KRAL pumps with magnetic coupling.



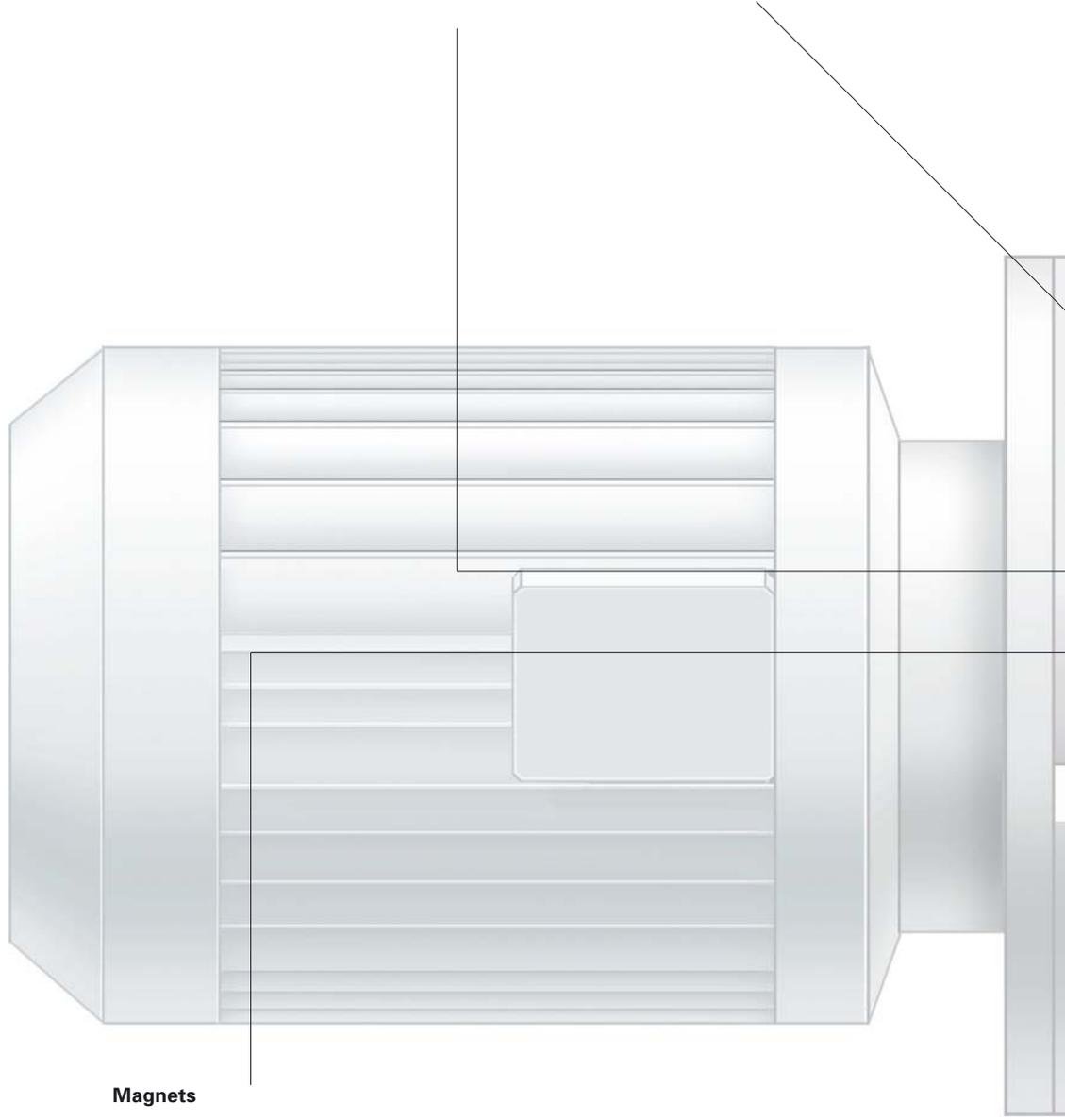
**This is how KRAL
Pumps With
Magnetic Coupling
are Constructed**

Internal Cooling

To dissipate the heat generated hydraulically and due to eddy currents, we equip our magnetic couplings with an internal cooling circuit.

External Rotor

The external rotor is made of steel and simultaneously forms the magnetic circuit. It drives the internal rotor contact-free.



Magnets

The magnets selected by us feature an extremely high magnetic energy density in a small design volume. This allows us to provide particularly compact designs. The magnets distinguish themselves by excellent temperature resistance, and therefore perform

well for high operating temperatures. The length of the magnets will be individually determined for every coupling in accordance with the required torque; as a result you will obtain an economical pumping solution for your service conditions.

Internal Rotor

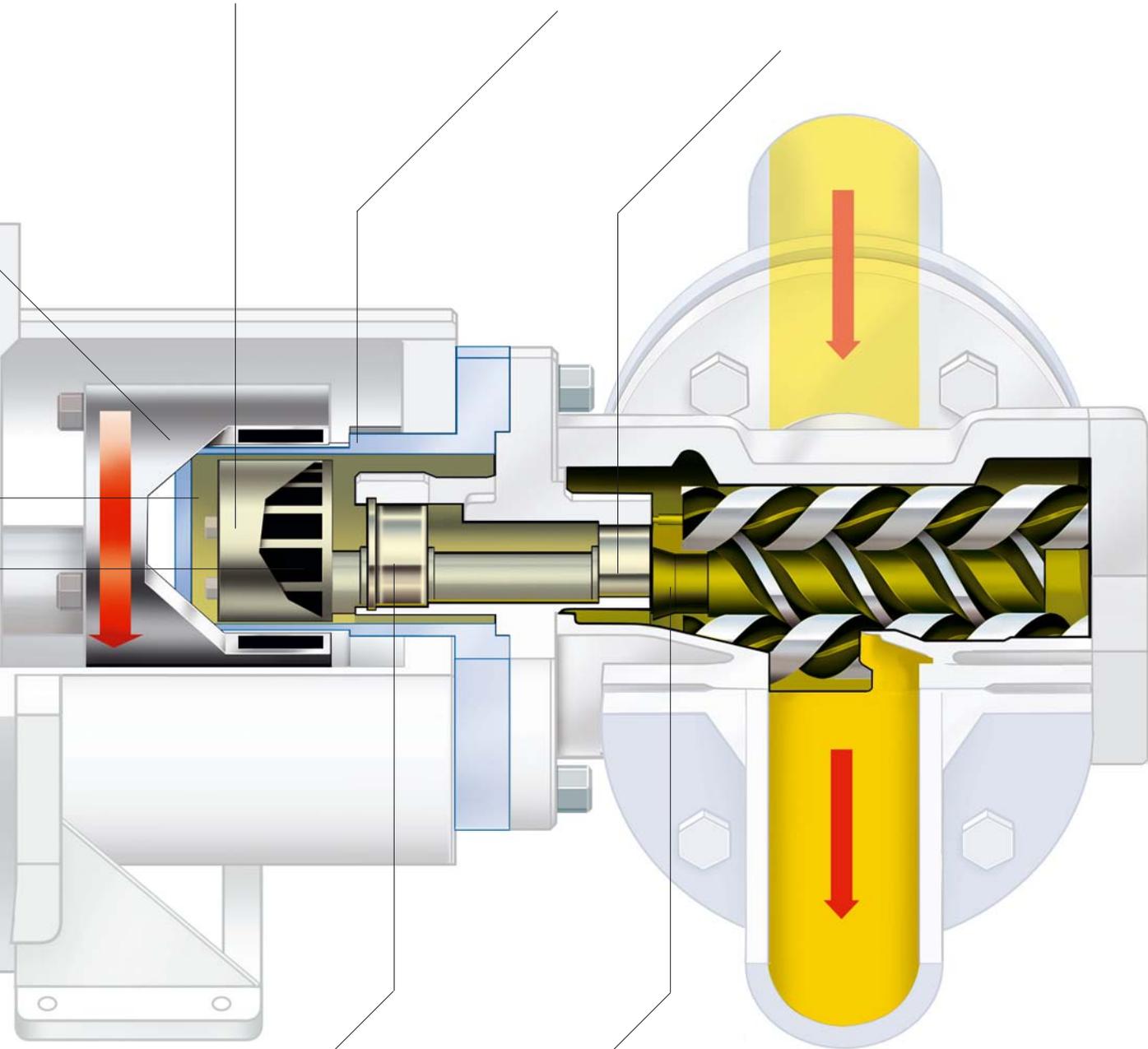
The magnets of the internal rotor are hermetically sealed towards the medium with a stainless steel jacket.

Can

The can is the actual sealing element of the KRAL pump with magnetic coupling. It is manufactured from stainless steel.

Compensation Cylinder

The axial load acting on the main spindle is compensated using an exactly dimensioned compensation cylinder. The bearing load is reduced.



Bearing

We use a high grade deep groove ball bearing for the main screw spindle.

Spindles

The screw spindles are manufactured from nitride-hardened steel. Due to their special profile design, the rotating spindles generate continuously sealed chambers and feed the medium without squeezing and turbulence

from suction side to pressure side. This results in a fluid output that is low in pulsation and free of eddies. The KRAL pump with magnetic coupling operates at extremely low noise levels.

The KRAL Pump With Magnetic Coupling for Your Booster Module

KRAL screw pumps are designed to handle all marine fuels. The performance field shows for which pressures and capacities KRAL pumps with magnetic coupling are available. Please contact KRAL for service limits beyond those shown.

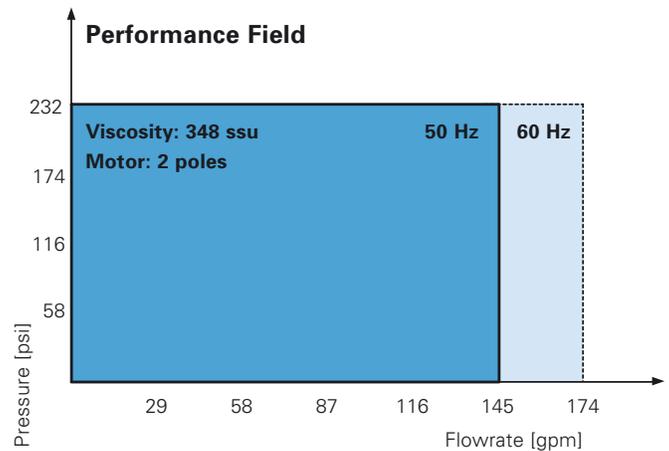
The KRAL pump with magnetic coupling is delivered as a complete,



fully assembled device. This means that there is only one point of contact for all your inquiries.

Limits of Application for Marine Fuels

<input type="checkbox"/> Temperature:	356 °F
<input type="checkbox"/> Viscosity:	36 to 3500 ssu
<input type="checkbox"/> Discharge pressure:	230 psig
<input type="checkbox"/> Revolutions:	2900 rpm (50 Hz) 3500 rpm (60 Hz)



KRAL pumps prove themselves with great success for rough ship operating conditions.

Booster module, equipped with KRAL KF 55 pump with magnetic coupling.

Operational data:

- Medium: Heavy fuel oil
- Flowrate: 35 gpm
- Discharge pressure: 73 psig
- Viscosity: 123 to 1205 ssu
- Temperature: 302 °F
- Revolutions: 3500 rpm



To Dimension the Pump Please Provide the Following Information:

- Pumped medium:.....
- Flowrate capacity:..... gpm
- Suction pressure:..... psia
- Discharge pressure:..... psig
- Viscosity of the medium:..... ssu
- Temperature of the medium:..... °F

- Motor: Voltage:..... V
Frequency:..... Hz
Protection class:.....
Explosion protection:.....

KRAL - Your Partner for Perfect Solutions



The Perfect Cooperation

Our customers have a high level of technical competence and carry out much of their own development. Some sub-tasks however require very profound specialist knowledge. KRAL contributes this know-how in all areas of fluid handling. This cooperation generates partnerships which are profitable for everyone involved. KRAL continuously extends its knowledge of the industry and offers to its customers the crucial input for cost effective solutions. For all customers the solution fits like the key fits the lock. Such an example are KRAL pumps with magnetic coupling for booster modules.

High Quality and Worldwide Service

More than 30% of KRAL staff hold a post graduate degree. The precision of our products demands this high level of professional training and demonstrates our commitment to the best possible solution for our customers.

Our ISO 9001-certified production guarantees maximum product quality and reliable delivery. KRAL is represented worldwide by highly qualified partners. Service and spare parts are readily available.

Equipped for the Future

Kräutler GmbH & Co. is a medium-sized family business, which has grown continuously since its founding in 1950. The KRAL brand is known worldwide for the high quality of its screw pumps.

Innovation, quality and reliability are the basis of our products. With our own research and development as well as regular staff training we continuously expand our know-how. In our own application laboratory we test our pumps with original pumped media.

Joint Projects

Our business friends particularly appreciate the cooperative interaction with KRAL. The best possible support up to the successful conclusion of a project results in friendly business relationships over and over again.



To our customers we offer close technical cooperation. You can rely on KRAL.



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