Magnetically Coupled Internal Gear Pump

ED series

DESMI Pumps
integrate
knowledge & technology
DESMI ROTAN®
One of the world’s leading manufacturers of internal gear pumps

The internal gear pump principle was developed in 1915 by a Danish American. In 1921 he licensed a Danish company to manufacture the pumps, which have been continuously marketed worldwide under the ROTAN® name. The unique, modular concept of ROTAN® pumps is generally recognized as the most advanced internal gear pump design available today.

Magnetically Coupled Internal Gear Pump - ED range
One of the distinguished features of the ROTAN® ED range is that the pumped medium is hermetically contained in the system since the magnetic coupling eliminates the need for a shaft and mechanical seal, which could allow gaseous exchange between the pumped medium and the atmosphere.

Unlike centrifugal pumps, the ROTAN® ED pump offers gentle liquid handling and a high priming vacuum as well as the pumping of highly viscous liquids.

ROTAN® ED pumps offer the following additional advantages:

- Dynamic axial balancing system, minimizing axial loads, saving energy and increasing life.
- Patented cooling system, based on an integral pump, eliminating the need of external cooling.
- Maximum protection against leakage by increased safety, provided by a completely enclosed magnetic coupling housing.
- Optimal for outdoor installation, the completely enclosed magnetic coupling housing protects the external magnets from contact with the surrounding atmosphere.
- Wide choice of slide bearing materials available as standard, e.g. cast iron, bronze, carbon and tungsten carbide.
- Standard magnet material is neodymium-iron-boron. Optional samarium cobalt permanent magnets permit operating temperatures up to 250°C.
- Pumping in either direction
- External heating jackets for both front cover and magnetic coupling housing available as standard optional features.
- Genuine back-pullout design
- Standard as close-coupled, optional with bare shaft end
- Both internal and external canister protection
The ROTAN® ED pump can be used where leakage would be costly, e.g. highly refined, expensive chemicals, or where long overhaul intervals are required. This reduces maintenance labour costs and loss of process time, where atmospheric air would harm the pumped medium.

Typical construction materials of the ED pump are cast iron, stainless steel or carbon steel. For standard applications the ED pump is usually delivered with slide bearings in bronze/steel. As alternative the pump can be delivered with bearings in cast iron/steel for light applications, in carbon/steel for media with poor lubricating properties or in tungsten carbide/tungsten carbide for abrasive media, particularly with low wear rate.

The magnetic coupling is provided with the number of magnets required for the power to be transmitted. The material is neodymium-iron-boron for operating temperatures up to 150°C or samarium-cobalt for operating temperatures higher than 150°C. Both magnetic materials are rare earth types which can be magnetized approx. 10 times more than iron.

The ROTAN® pump is provided with a patented principle of circulation of the pump medium around the magnetic coupling. Simple “centrifugal pump” shaped channels in shaft/rotor ensure continual replacement of the liquid in the magnetic coupling which has been heated by friction and re-circulation. This also ensures efficient lubrication and heat transfer from the slide bearings.

Typical Applications:
- Isocyanate
- Solvents
- Hazardous organic liquids
- Printing ink
- Resin
- Pitch
- Alkyd resin
- Soyabean oil
- Linseed oil
- Monomers
- Polyol
- Corn syrup
**ROTAN ED® part names**

- **QK Thrust bearing, stationary part**
- **QL Thrust bearing, rotating part**
- **CQ Coupling housing**
- **BV Shaft**
- **PS Main bearing bush**
- **MK Inner magnet rotor**
- **MJ Can**
- **MU Inertia hub**
- **QR Base plate**

**Benefits:**
- Long life time
- No leakage
- Environmental safety
- Lower operating costs
- Easy servicing

**Materials:** Cast iron, carbon steel or stainless steel

**Capacity range:** Up to 90 m³/h

**Speed:** Up to 1750 rpm

**Differential pressure:** Up to 16 bar

**Suction lift:** Up to 0.5 bar vacuum while priming, up to 0.8 bar vacuum while priming

**Viscosity range:** Up to 10,000 cSt

**Temperature:** Up to 250°C
The ROTAN® ED pump is designed as a monobloc unit, i.e. directly coupled with an IEC-motor, gearmotor or gearbox with an IEC-motor. As an alternative, a free shaft end unit can be assembled with a drive unit by means of a flexible coupling.

Reversible pumping capability allows changing flow direction of the pump simply by reversing the motor direction. The ED pump is increasingly cost effective in the most severe operation conditions including high pressures, high viscosities, high temperatures, corrosive and high flow applications.

Abrasion resistant shafts, bearings, and thrust washers are available when abrasive materials are to be pumped. The ROTAN® ED pump is proven in most difficult applications including coal tar slurries and filled polyols. Other magnetically driven pumps with balanced rotor designs allow the rotor to make contact with balance plates and are not designed for abrasive service.

External jacketing of the pump head and magnet area are standard options when material in the pump and magnet area requires heat transfer.
**Foam/polyurethane isocyanate**

Isocyanate is one of the components in broadly all foam products such as foam mattresses, inner linings in cars, cushioning in car seats, chairs and sofas. The hard qualities are used for insulation of houses, machines, tubes, etc.

There are various types of isocyanate, but common to all of them is that they react to the humidity of the air by forming very hard crystals, which wear out the pumps and mechanical seals, if any. Therefore the systems pumping isocyanate should be provided with a filter or a strainer so as to avoid crystals to circulate in the system constantly. To avoid humidity of the air ultra-dry air can be used instead of nitrogen. Air-dryers that remove the humidity totally are also an option.

As to bearings, the first selection should be bronze. However, some isosyanates contain additives, which do not go well with bronze. In that case carbon bearings should used.

**Tar/pitch**

ROTAN® pumps for pitch are used several places in the production of electrodes in the aluminium industry. Tar is often transported in ships. The pumps are pumping from the harbour to the storage tanks if the factory is not placed so close to the harbour that the ship can pump the pitch directly to the storage tank in the factory. The pumps are normally 5 or 6” mag-driven pumps with bearings in tungsten carbide. In the mass factory the pumps are normally 2½ or 3”. Here the pumps are used to circulate in a ringmain and dose through a mass flow meter into the mixers (these pumps are frequency converter controlled).

All pumps running in pitch are with tungsten carbide bearings and heating jackets on front and rear covers. The pumps should be equipped with max. number of samarium cobalt magnets (just to allow some small errors in the pipe system). The heating connections should be flanged as it is impossible to make a tight thread. The advantage of the mag-driven ROTAN® pumps is the long time between overhaul and the fact that a leaking mechanical seal has a huge leak. Furthermore the vapour from pitch is considered to be cancer-causing and in some countries the users have to check how many ppm there is in the air close to the seal. A mag-driven ROTAN® pump is leak and vapour free.
### IEC - DIN Motors

<table>
<thead>
<tr>
<th>IEC Type</th>
<th>Gearmotor Type</th>
<th>Manometer Connection</th>
<th>Weight Kg</th>
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<tbody>
<tr>
<td>IEC 100/112</td>
<td>Large B14</td>
<td>1/4&quot; RG</td>
<td>26-66</td>
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<tr>
<td>All other motors</td>
<td>B5</td>
<td>3/8&quot; RG</td>
<td>81-201</td>
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### Type Motor Gear

<table>
<thead>
<tr>
<th>Type</th>
<th>Motor Type</th>
<th>Pressure Gauge Connection</th>
<th>Weight Kg</th>
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<tr>
<td>ED</td>
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<td>ED</td>
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<tr>
<td>ED</td>
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<td>Gearmotor</td>
<td>B5</td>
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**Note:** Precise measures on request. **Andere dimensioner ved ANSI**. Other dimensions by ANSI. Andere Dimensionen bei ANSI.
DESMI is a dynamic company with many years of experience and a product range, recognized by businesses all over the world. DESMI develops, manufactures and sells centrifugal pumps, internal gear pumps, sewage pumps and environmental equipment for the recovery of oil spills. Our customers rely on the quality of our products and our quality system is in accordance with the requirements of ISO 9001:2000.