Magnetically Coupled Internal Gear Pump

ROTAN® ED series
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
Typical Applications:

- Isocyanate
- Solvents
- Hazardous organic liquids
- Printing ink
- Resin
- Pitch
- Alkyd resin
- Soyabean oil
- Linseed oil
- Monomers
- Polyol
- Corn syrup

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 the 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.

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.
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
Technical Information, Pump Codes and Materials

By choosing the options in order from 1-10, and adding the codes found, the complete ED pump specification is determined.

1) Pump series
ED Environmental Duty pump, magnetically coupled, cast iron, carbon steel or stainless steel

2) Pump sizes**
- 26 DN 25 - 1”
- 33 DN 32 - 1 1/4”
- 41 DN 40 - 1 1/2”
- 51 DN 50 - 2”
- 66 DN 65 - 2 1/2
- 81 DN 80 - 3”
- 101 DN 100 - 4”
- 126 DN 125 - 5”

Available with flanges** or female connections, dependent on size and material. ** Flange connections according to: ISO 2084 DIN 2501 BS 4504 1969 ANSI B 16.1/B 16.5

3) Configurations
- E Suction/discharge connections in-line
- B Suction/discharge connections at 90° angle (not standard)
- R Relief valve
- D Heating jacket on the front cover
- K Heating jacket on the rear cover
- T Special clearances
- F Flanges

4) - Hyphen

5) Material codes for main parts

<table>
<thead>
<tr>
<th>Code</th>
<th>Casing/Covers</th>
<th>Rotor/Idler</th>
<th>Shaft</th>
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<tbody>
<tr>
<td>1</td>
<td>GG-25</td>
<td>GG-25</td>
<td>St.60.2</td>
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<tr>
<td>3</td>
<td>G-X 6 CrNiMo 18 10</td>
<td>X 8 CrNiMo 27 5</td>
<td>X 8 CrNiMo 27 5</td>
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<td>4</td>
<td>GS-52.3</td>
<td>GG-25</td>
<td>St.60</td>
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</table>

6) Lubrication
- U Idler bearing and main bearing lubricated by pump medium
- M Externally lubricated idler bearing and main bearing

7) Material codes for idler bearing

<table>
<thead>
<tr>
<th>Code</th>
<th>Idler Bush</th>
<th>Idler Pin</th>
<th>Idler Pin: CD</th>
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<tbody>
<tr>
<td>1</td>
<td>Cast iron</td>
<td>Hardened 16 MnCr 5</td>
<td>X 8 CrNiMo 27 5</td>
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<tr>
<td>2</td>
<td>Bronze</td>
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<td>X 8 CrNiMo 27 5</td>
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<tr>
<td>3</td>
<td>Carbon</td>
<td>Hardened 16 MnCr 5</td>
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<tr>
<td>8</td>
<td>Tungsten carbide</td>
<td>Tungsten carbide</td>
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8) Material codes for main bearing

<table>
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<td>St.60.2</td>
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<td>Carbon</td>
<td>St.60.2</td>
<td>X 8 CrNiMo 27 5</td>
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<tr>
<td>8</td>
<td>Tungsten carbide</td>
<td>Tungsten carbide</td>
<td>Coated X 8 CrNiMo 27 5</td>
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</tbody>
</table>

9) Magnet coupling
/xx Magnet length: xx cm
N Magnet material: NdFeB
C Magnet material: SmCo

10) Special configurations
S All special configurations are marked with S

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.
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, 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 isocyanates contain additives, which do not go well with bronze. In that case carbon bearings should be used.

If there are crystals in the isocyanate, carbon bearings cannot be used. Here tungsten carbide bearings would be the only safe solution.

All isocyanates are hazardous and the vapours should not be inhaled. Contact with skin and prolonged contact may result in allergic reactions. Here a magnetically coupled pump is the only solution as this pump is leak and vapour free.

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 flowmeter 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 huge implications. 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.
## DESMI ROTAN®

### Type Motor

- **Alle udførelser / All configurations / Alle Ausführungen**

#### ER Type
- 26-101
- 2084-NP16
- 2501-ND16
- 4504-1969
- NP16
- B 16.5 Class 150

#### EDK Type
- 126-201
- 2084-NP10
- 2501-ND10
- 4504-1969
- NP10
- B 16.5 Class 150

### Flange / Flanges / Flanschen

<table>
<thead>
<tr>
<th>Type</th>
<th>ISO</th>
<th>DIN</th>
<th>BS</th>
<th>ANSI</th>
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### Type Motor

<table>
<thead>
<tr>
<th>Type</th>
<th>Gear</th>
<th>Motor Type</th>
<th>1&quot; WPT female or 4/3&quot; female</th>
<th>Pressure gauge connection</th>
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<tbody>
<tr>
<td>ED 26</td>
<td>IEC 80/90</td>
<td>Gearmotor</td>
<td>209.249 459.499</td>
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### Notes

- Precise measures on request
- Andere dimensioner ved ANSI / Other dimensions by ANSI / Andere Dimensionen bei ANSI
You can read more about our pump solutions at www.desmi.com