Magnetic drive pumps
MDF-L series
MDF-L magnetic drive pumps for chemical processing

Already one of our best selling pump ranges they have proved their reliability over many years in many countries. Our continuous development ensures the highest possible efficiency in a chemical processing pump, whilst retaining high levels of corrosion resistance durability and safety.

High corrosion resistance
Ethylene-Tetrafluoroethylene copolymer (ETFE) is used in the main material of the wet end parts. This material is known for its high resistance to corrosion among the fluororesins in injection molding and it almost equals PTFE in chemical resistance particularly against hot concentrated sulphuric acids, fuming sulphuric acid, concentrated nitric acid, hot chromic acid, and strong alkaline liquids. We use the latest anti-corrosion materials in the manufacture of the spindle, bearing and mouth ring, which combined with leak-free seal-less structures, ensure the safe transfer of strong acids and strong alkaline liquids.

Dry running is not a problem with our pin-point contact system. In conventional magnetic drive pumps, the inner parts of the pump are often melted due to heat and lubrication problems between the rear bearing surface and the rear casing, caused by dry running.

Solid construction with excellent durability
ETFE, the main material, is filled with carbon fiber to increase its mechanical strength. The exterior of the pump is entirely covered by cast iron. Reliability is assured for continued operation under adverse conditions.

High-efficiency/energy-saving design
The maximum pump efficiency reaches 50-55%, the highest level for resin pumps. In designing the pump, energy-saving was taken into full consideration.

The patented pin-point contact
system is making the magnetic drive pumps tough for dry running. Iwaki’s pump technology has produced an innovative magnetic drive pump which incorporates an extremely high resistance to dry running. By employing the newly developed pin-point contact system, dry running which was unavailable with previous models is now a feature on the new magnetic drive pump series.

**Pin-point contact system**

In a no-thrust condition due to dry run, only the impeller thrust surface and spindle fore edge come in contact. The magnet capsule never touches the rear casing. This “pin-point” contact between impeller and spindle thrust surfaces significantly minimizes friction, and therefore heat generation.

Patents
Europe / Japan / Taiwan / U.S.A. / Korea
Construction and materials

<table>
<thead>
<tr>
<th>Part</th>
<th>Material code</th>
<th>CF -D</th>
<th>AA -E</th>
<th>KK -E</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front casing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rear casing</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Impeller</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magnet capsule</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bearing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spindle</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liner ring</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mouth ring</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impeller thrust</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mouth ring</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impeller thrust</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>O ring</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PKM/EPDM/AFLAS®</td>
</tr>
</tbody>
</table>

Note: MDF-L401”KK” type is not available.

Materials:
- High-purity alumina ceramic
- High-density carbon
- High-purity alumina ceramic
- CFRETFE (Carbon fiber-reinforced ETFE)
- SiC
- PTFE
Impeller thrust
When dry running happens, the impeller thrust and the spindle front part come into contact.

Impeller
The impeller is a closed type designed for maximum efficiency. Different impeller sizes are available as standard, which adds greater latitude in handling liquids of high specific gravity.

Bearing
The bearing is a one-piece and press-fit type. Replacement is possible when required.

Magnet capsule
High-power magnets are thoroughly molded in the resin to provide sufficient corrosion resistance and torque. (Rare earth magnet is used in the 422, 423 and 425 type.)

Spindle
The spindle is integrally molded with the rear casing to form a cantilever structure. Without any supporting boss in the suction port, the pump efficiency is increased and the NPSHr is reduced.

Pump identification

Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Nominal bore size</th>
<th>Impeller size</th>
<th>50Hz Head</th>
<th>Capacity L/min</th>
<th>Motor Output kW</th>
<th>Mass (Less motor) kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDF-L250</td>
<td>25 x 25</td>
<td>K T V W</td>
<td>12.2</td>
<td>50</td>
<td>0.37</td>
<td>23(14)</td>
</tr>
<tr>
<td>MDF-L401</td>
<td>40 x 40</td>
<td>K T V W</td>
<td>16.8</td>
<td>100</td>
<td>0.75</td>
<td>38(22)</td>
</tr>
<tr>
<td>MDF-L422</td>
<td>50 x 40</td>
<td>K T V W</td>
<td>20</td>
<td>200</td>
<td>1.5</td>
<td>41(26)</td>
</tr>
<tr>
<td>MDF-L423</td>
<td>50 x 40</td>
<td>K L T V W</td>
<td>28.5</td>
<td>150</td>
<td>2.2</td>
<td>43(26)</td>
</tr>
<tr>
<td>MDF-L425</td>
<td>50 x 40</td>
<td>T V W</td>
<td>25.5</td>
<td>400</td>
<td>4.0</td>
<td>54(28)</td>
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</tbody>
</table>
Performance curves

Dimensions

<table>
<thead>
<tr>
<th>Model</th>
<th>W</th>
<th>H</th>
<th>L</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
<th>f</th>
<th>g</th>
<th>h</th>
<th>i</th>
<th>j</th>
<th>K</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDF-L250</td>
<td>205</td>
<td>237</td>
<td>439</td>
<td>110</td>
<td>51</td>
<td>95</td>
<td>143</td>
<td>115</td>
<td>122</td>
<td>88</td>
<td>25</td>
<td>25</td>
<td>4-ø12</td>
<td></td>
</tr>
<tr>
<td>MDF-L401</td>
<td>233</td>
<td>275</td>
<td>519</td>
<td>130</td>
<td>76</td>
<td>111</td>
<td>250</td>
<td>135</td>
<td>122</td>
<td>102</td>
<td>40</td>
<td>40</td>
<td>4-ø14</td>
<td></td>
</tr>
<tr>
<td>MDF-L422</td>
<td>251</td>
<td>295</td>
<td>557</td>
<td>140</td>
<td>85</td>
<td>140</td>
<td>275</td>
<td>155</td>
<td>140</td>
<td>140</td>
<td>87</td>
<td>87</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>MDF-L425</td>
<td>251</td>
<td>295</td>
<td>625</td>
<td>140</td>
<td>85</td>
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<td>275</td>
<td>155</td>
<td>140</td>
<td>140</td>
<td>87</td>
<td>87</td>
<td>50</td>
<td></td>
</tr>
</tbody>
</table>
Magnetic drive pumps

Care to be taken in selecting type of pump

1) The performance curves show when pumping clear water at room temperature.

2) An impeller size suitable for the specific gravity of the liquid to be handled should be selected. When selecting, add a 5-10% allowance to the motor output.

   \[
   \text{Pump shaft power} = \text{Specific gravity of liquid} \times 0.15 \times \text{Motor output}
   \]

   (Note: Motor shaft power Sp rises in proportion to the specific gravity of liquid. Also, if the impeller size increases, required shaft power increases with pump discharge capacity and head increase. For correction of pump performance, consult the output of pump shaft power.)

3) Continuous operation with a closed discharge is not permissible with magnetic drive pumps. A minimum flow rate must be maintained, as given below:

   \[
   \text{NPSH} = \frac{\text{P} - \text{P}_v - \text{h}_s + \text{h}_f}{g}
   \]

   \[
   \text{P} = \text{Liquid density} \times \text{g} \times (\text{Hmax} + \text{hs})
   \]

   \[
   \text{P}_v = \text{Vapor pressure of liquid} \times \text{g}
   \]

   \[
   \text{g} = \text{Acceleration due to gravity} \times \text{m/s}^2
   \]

   \[
   \text{hs} = \text{Height of suction} \times \text{m}
   \]

   \[
   \text{hf} = \text{Suction pipe resistance} \times \text{m}
   \]

   \[
   \text{P} = \text{Internal pressure of pump} \times \text{g} \times \text{mPa}
   \]

   \[
   \text{P}_v = \text{Vapor pressure} \times \text{g} \times \text{mPa}
   \]

   \[
   \text{g} = \text{Acceleration due to gravity} \times \text{m/s}^2
   \]

   \[
   \text{P} = \text{Liquid density} \times \text{g} \times (\text{Hmax} + \text{hs})
   \]

   (Note: Model DR is performance curve type dry running protector. It detects the decreased load current (lower limit) to stop the pump when it runs dry or runs with air sucking in. It can detect over-load, too.

   **Specification**

<table>
<thead>
<tr>
<th>Model</th>
<th>DR-20</th>
<th>DR-21</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor power</td>
<td>380 to 440V</td>
<td>380 to 440V</td>
</tr>
<tr>
<td>Applied motor</td>
<td>0.75 to 15kW</td>
<td>18.5 to 75kW</td>
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<tr>
<td>Power</td>
<td>45-65Hz</td>
<td>200 to 240V ±10% single phase</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.5W</td>
</tr>
<tr>
<td>Detective current</td>
<td>0.5 to 32.0A</td>
<td>20 to 200A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.5W</td>
</tr>
<tr>
<td>Current transformer (CT)</td>
<td>Built-in</td>
<td>External</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0 to 200A</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>0 to 40°C</td>
<td>0 to 85%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>40°C</td>
</tr>
<tr>
<td>Outer dimension</td>
<td>D80 X W153 X H110</td>
<td>D80 X W153 X H110</td>
</tr>
</tbody>
</table>

   **Current transformer 200AT**

   (For DR-21)
Magnetic drive pumps

**MDM SERIES**
Magnetic drive process pumps with dry running capability

Specifications
- Max. discharge capacity: 1.4 m³/min
- Max. head: 53 m
- Main materials: CFRETFE/PFA
- Liquid temp. range: 0 to 105°C (CFRETFE), 0 to 120°C (PFA)

**MDE SERIES**
The world's largest-class non-metallic magnetic drive pumps

Specifications
- Max. discharge capacity: 4.0 m³/min
- Max. head: 55 m
- Main materials: ETFE/PFA/PVDF
- Liquid temp. range: 0 to 100°C (ETFE), 0 to 120°C (PFA), 0 to 90°C (PVDF)

**YMD SERIES**
Stainless steel magnet pumps with compact size and simple structure

Specifications
- Max. discharge capacity: 670 L/min
- Max. head: 65 m
- Main materials: SUS316
- Liquid temp. range: 0 to 120°C

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Caution for safety use: Before use of pump, read instruction manual carefully to use the product correctly.