An Overview of Iwaki's World Leading Magnetic Drive Pumps

Magnetic drive technology is fast becoming the pump choice for corrosive applications. Iwaki offers a wide range of magnetic drive pumps from fractional horsepower for OEM applications to large pumps for chemical processing. No other manufacturer can offer such a wide breadth of technology.

This brochure is an overview of Iwaki’s large chemical process pumps. For information on our smaller pump technology please contact Iwaki or visit www.iwakipumps.jp
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**Unique design prevents dry running**

*Non contact system (PAT. PEND.)*

High powered rare earth magnets prevent the magnet capsule from coming in contact with the rear casing, thus preventing heat generation. This improves the dry running resistance and increases pump life in comparison to other fluororesin pumps.

**ETFE and PFA available in standard models**

Carbon fiber reinforced CFRETFE and PFA liners are available for varying applications. The unfilled PFA liners are ideal for high purity chemical applications.

**Modular design and low maintenance cost**

The pumps modular design leads to easy maintenance. There is no need to check clearances or align any liquid end parts. All wetted parts can be replaced individually reducing maintenance costs.

**Highly durable structure**

The ductile cast iron body of the pump provides strength and durability. The rear casing utilizes a secondary pressure containment cover made of fiber reinforced plastic. This allows for higher pressures as well as temperatures without the efficiency loss of eddy current generation. Should the drive magnet come in contact with the rear casing cover its non-metallic design will not generate sparks.
**Self-radiating structure** (PAT.)
Heat dispersion holes in the magnet capsule and impeller allow liquid circulation that cools the radial bearing and spindle. This design prevents melting due to excessive friction. (Except MX-F100)

**Non-contact structure**
Precise alignment of the drive magnet and magnet capsule creates a non-contact system that prevents friction during dry running.

**Fast self-priming**
The SMX-F requires no external self-priming chambers or valves. The gas-liquid separation design ensures fast self-priming of up to 4 meters in under 90 seconds.

**Volute casing divided into two sections** (PAT.)
The first non-metallic magnetic drive pump to incorporate a vortex chamber in the front and rear casings to increase pump efficiencies. (Except MX-F400)
Large Magnetic Drive Pumps
(MDW, MDM)

The world’s largest fluoroplastic magnetic drive pump
The MDW series are the largest fluoroplastic magnetic drive pumps in the world, offering high efficiency and durability for chemical process applications. Using larger motors for even higher output, the MDW series opens up performance potential in previously unexplored areas.

Back pullout system
The back pullout system allows easy maintenance and inspection without removing the pump from the piping. Integrated components and a sealed rear casing support structure allow motor removal without chemical leakage.

Compliant with ISO
The performance and dimensions standards of the pumps are in compliance with the international standard (ISO2858, 3661, 5199*). They are interchangeable with general-purpose centrifugal pumps.

Robust structure
The ductile cast iron body of the pump provides strength and durability. The rear casing utilizes a patented triple layer structure for high pressure resistance. A metal shaft is incorporated in the MDW & MDE design to withstand high radial forces and allow continuous operation even under difficult service conditions.

*MDW is ISO2858, 3661 only
+ Model MDE 125-250 is excluded
Performance Comparison for Iwaki Magnetic Drive Pumps

Materials: Fluoroplastic (ETFE/CFRETFE/PFA)
### Liquid end Materials

**Fluoroplastic (ETFE/CFRETFE/PFA)**

**Materials**

<table>
<thead>
<tr>
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<th>Molded</th>
<th>Bearing system</th>
<th>Static sealing parts</th>
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<td>SMX-F</td>
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<tr>
<td>MX-F</td>
<td>CFRETFE</td>
<td>CFRETFE</td>
<td>CFRETFE</td>
</tr>
</tbody>
</table>

**Material index**

- **Plastic materials**
  - PFA: Tetrafluoroethylene/perfluoroalkoxy vinyl ether copolymer
  - ETFE: Ethylenetetrafluoroethylene copolymer ("Fluon®", etc.)
  - CFRETFE: Carbon fiber-reinforced ETFE
  - PTFE: Polytetrafluoroethylene ("Teflon®", etc.)

- **Rubber**
  - FKM: Fluorine rubber
  - EPDM: Ethylene propylene rubber

- **Materials for sliding parts/bearings**
  - High density carbon
  - Hard carbon
  - Highly pure ceramics: Alumina ceramic with a purity of 99.5% or more
  - SiC: Silicon carbide ceramic
• High discharge capacity, high head and high efficiency
• Excellent chemical resistance
• Robust structure
• Back pullout design

Specifications
Max. discharge capacity ..........300 m³/hr
Max. discharge head ..........98 m
Materials .......................................ETFE, CFRETFE, PFA
Power range .........................11 to 75 kW
Pump size (Discharge) ..........50 to 100 A
Liquid temp. range ..........MDW80/100: -10 to 100°C*
 ...........................................MDW50: -10 to 120°C*
Specific-gravity limit ..........3.0
(For details, please contact Iwaki.)
Sealing method .....................Seal-less construction
*Fluid dependent.

Liquid end materials
ETFE/CFRETFE/PFA

Max. discharge capacity 300 m³/hr and
Max. discharge head of 98 m. The world's
largest fluoroplastic magnetic drive pump
Performance curves (50Hz)

- Pump size (Suction×Discharge) MDW50: 80A×50A, MDW80: 125A×80A, MDW100: 125A×100A
- 2P: 2P poles motor, 4P: 4P poles motor
**Specifications**

- Max. discharge capacity: 240 m³/hr
- Max. discharge head: 55 m
- Materials: ETFE, CFRETTE, PFA
- Power range: 11 to 37 kW
- Pump size (Discharge): 50 to 125 A
- Liquid temp. range: 0 to 100°C*
- Specific-gravity limit: 3.0

*For details, please contact Iwaki.*

Sealing method: Seal-less construction

**Liquid end materials**

1. Front casing: ETFE
2. Rear casing: PFA
3. Impeller: CFRETTE
4. Split plate: PFA
5. Magnet capsule: PFA
6. Bearing: SiC
7. Gasket: PTFE
8. O ring: Kalrez®, FKM, EPDM

**Liquid end materials**

ETFE/CFRETTE/PFA

**MDE series**

- Strong corrosion resistance
- High durability
- Compliant with ISO standards
- Back pullout design

**The world's Largest-class non-metallic magnetic drive pumps for chemical processing**
Pump size (Suction×Discharge) MDE50: 80A×50A, MDE65: 100A×65A, MDE125: 150A×125A

Performance curves (50Hz)

Capacity (L/min) vs. Head (m)
CFRETFE/PFA

MDM series

- CFRETFE and PFA available in standard models
- Durable design
- High head models available
- Back pullout design

**Specifications**

- Max. discharge capacity .......84 m³/hr
- Max. discharge head ............74 m
- Materials .........................CFRETFE, PFA
- Power range .......................1.5 to 15kW
- Pump size (Discharge) ..........25 to 50 A
- Liquid temp. range ...............CFRETFE: -20 to 100°C*
  PFA: -20 to 150°C*
- Specific-gravity limit ..........2.0
  (*Fluid dependent.)
- Sealing method ..................Seal-less construction

**Liquid end materials**

1. Front casing ................. CERETFE, PFA
2. Rear casing .................. CFRETFE, PFA
3. Impeller ....................... CFRETFE, PFA
4. Magnet capsule .............. CFRETFE, PFA
5. Bearing ......................... High density carbon, SiC
6. Spindle ......................... High purity alumina ceramic, SiC
7. Liner ring ...................... High purity alumina ceramic, SiC
8. Mouth ring ..................... PTFE (with filler), SiC
9. Rear thrust ..................... PTFE (with filler), SiC, PTFE
10. Gasket ......................... PTFE

**Dry run capable**

magnetic drive process pump design
Performance curves (50Hz)

- 2P: 2P poles motor, 4P: 4P poles motor

![Performance curve diagram](image-url)
- Withstands difficult operation
- Superior corrosion resistance
- Robust structure
- Enhanced safety

**Specifications**

Max. discharge capacity .......... 600 L/min  
Max. discharge head .......... 29 m  
Material ..................... CFRETFE  
Power range .................. 0.4 to 3.7kW  
Pump size (Discharge) ........... 25A, 40A  
Liquid temp. range* .......... -10 to 100°C  
Specific-gravity limit ......... 2.0  
*(For details, please contact Iwaki)*  
Sealing method ................ Seal-less construction  

**Liquid end materials**

1. Front casing ................ CFRETFE  
2. Rear casing ................. CFRETFE  
3. Impeller ....................... CFRETFE  
4. Magnet capsule ............ CFRETFE  
5. Bearing ....................... High density carbon,  
High purity alumina ceramic, SiC  
6. Liner ring .................... High purity alumina ceramic, SiC  
7. Mouth ring .................. PTFE (with filler), SiC  
8. Rear thrust .................. CFRETFE, CFRPFA  
9. Spindle ....................... High purity alumina ceramic, SiC  
10. O ring ....................... FKM, EPDM, AFLAS*,  
DAI-EL PERFLUORO®  
11. Gasket ....................... FKM, EPDM, AFLAS*,  
DAI-EL PERFLUORO®  

*Magnetic drive pumps with an excellent balance of features and performance*
Performance curves (50Hz)

- Pump size (Suction×Discharge)  
  MXM22: 25A×25A, MXM44: 40A×40A, MXM54: 50A×40A

- High-lift/small-flow impellers are also available. Please contact us for more information.
CFRETFE
SMX-F

- Excellent corrosion resistance
- Expanded versatility
- Easy maintenance
- Able to withstand abnormal operation
- Fast self-priming

Specifications
Max. discharge capacity .......... 440 L/min
Max. discharge head .......... 24.5 m
Rated self-priming height .......... 4 m
Material ......................... CFRETFE
Power range .................... 0.4 to 3.7 kW
Pump size (Discharge) ............ 25A, 40A
Liquid temp. range ............. 0 to 80°C*
Specific-gravity limit .......... 2.0
Sealing method ................. Seal-less construction

*Fluid dependent.

Liquid end materials

1 Front / Rear case .......... CFRETFE
2 Rear casing ................. CFRETFE
3 Impeller ..................... CFRETFE
4 Magnet capsule .......... CFRETFE
5 Bearing ..................... High density carbon, SiC, PTFE
6 Spindle .................. High purity alumina ceramic, SiC
7 Liner ring ............... High purity alumina ceramic, SiC
8 Mouth ring ............... PTFE (with fillers), SiC
9 Rear thrust .............. High purity alumina ceramic, SiC, CFRETFE
10 Gasket .................. FKM, EPDM

Chemically resistant self-priming magnetic drive pumps built to withstand abnormal operation
Performance curves (50Hz)

- Pump size (Suction×Discharge) SMX-F22: 25A×25A, SMX-F44: 40A×40A, SMX-F54: 50A×40A
Liquid end material
CFRETFE

**MX-F series**

- Self-radiating structure (PAT.)
- Dual section volute casing (PAT.)
- Robust structure
- Excellent chemical resistance

**Specifications**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
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</thead>
<tbody>
<tr>
<td>Max. discharge capacity</td>
<td>510 L/min</td>
</tr>
<tr>
<td>Max. discharge head</td>
<td>29.5 m</td>
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<tr>
<td>Material</td>
<td>CFRETFE</td>
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<tr>
<td>Power range</td>
<td>0.26 to 2.2kW</td>
</tr>
<tr>
<td>Pump size (Discharge)</td>
<td>G1 to 40A</td>
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<tr>
<td>Liquid temp. range</td>
<td>0 to 80°C*</td>
</tr>
<tr>
<td>Specific-gravity limit</td>
<td>2.0</td>
</tr>
<tr>
<td>Sealing method</td>
<td>Seal-less construction</td>
</tr>
</tbody>
</table>

*An AFLAS® O-ring is 10 to 80°C Fluid dependent.

**Liquid end materials**

1. Front casing .......... CFRETFE
2. Rear casing .......... CFRETFE
3. Impeller ............... CFRETFE
4. Magnet capsule .......... CFRETFE
5. Bearing ............... PTFE, High density carbon, SiC
6. Spindle ............... High purity alumina ceramic, SiC
7. Liner ring ........... High purity alumina ceramic, SiC
8. Mouth ring ............ PTFE (with filler), SiC
9. Rear thrust .......... High purity alumina ceramic, SiC, CFRETFE, CFRPFA
10. O ring ............... FKM, EPDM, AFLAS®

**Chemically resistant magnetic drive pumps built to withstand abnormal operation**
Performance curves (50Hz)

- Pump size (Suction×Discharge)
  - MX-F100: G1×G1, MX-F250/251: 25A×25A, MX-F400: 40A×40A
  - MX-F401: 40A×40A, MX-F402/403: 50A×40A
Precautions for pump selection

• **MXM**
  (1) The performance curves in this catalogue represent the data measured using clear water at 20 °C.
  (2) Choose the pump model suited to the liquid gravity.
    Make sure that the motor output is at least ten percent higher than theoretically required.
    \[ \text{Shaft power (Sp)} \times \text{liquid gravity} \times 1.1 < \text{Motor output} \]
    (Note) The shaft power (Sp) increases in proportion to the liquid gravity.
    As the viscosity rises, the shaft power is higher while the head and the discharge are lower.
    The power and the performance need to be adjusted.
  (3) No magnetic drive pump supports continuous closed running. Be sure to ensure the minimum flow volume.
    - Minimum flow volume
      \[
      \begin{align*}
      & \text{MXM22/44} \quad \text{10 L/min.} \\
      & \text{MXM4} \quad \text{Impeller range 1 and 3} \quad \text{20 L/min.} \\
      & \text{Impeller range 4} \quad \text{50 L/min.}
      \end{align*}
      \]
  (4) FF material models
    - Liquid should be 1m Pa (cP) or more.
    - HQ performance is somewhat different from CF/KK models. If you need to know the detail, please contact us.
  (5) Deliberate prolonged dry running or entrained air operation is not recommended.
    - The CF type has a degree of tolerance to dry running and operation with entrained air in the liquid.
    - The KK type has the same degree of tolerance as the CF type under operation with entrained air in the liquid, but not allowed to run dry.
    - The FF type is not allowed to run dry or operation with entrained air.

• **SMX-F**
  (1) The performance curves on this catalogue are based on the operation with 20 °C clean water in flooded suction. Keep a margin (3%) of the curves when selecting the pump.
  (2) The magnetic pump cannot run continuously with a closed-discharge. Be sure to observe the minimum flow rate.
    - The minimum flow rate
      \[
      \begin{align*}
      & \text{SMX-F22} \quad 10 \text{L/min.} \\
      & \text{SMX-F44} \quad 10 \text{L/min.} \\
      & \text{SMX-F54} \quad 20 \text{L/min.}
      \end{align*}
      \]
  (3) Select a pump model according to liquid specific gravity. Keep a margin (5% or more) for motor output.
    - Pump shaft power \( Sp \times \text{Specific gravity} \times 1.05 \text{ or more (margin)} \times \text{Motor output}
  (4) The self-priming performance (4m in 90 seconds) is based on the operation with 20 °C clean water on the right piping condition. Self-priming performance varies with liquid temperature, characteristics and piping conditions. Obtain a rough guide of the highest possible self-priming height at each liquid specific gravity by the following formula.
    - The highest possible self-priming height (m) = Self-priming height (with clean) / Liquid specific gravity

Self-priming considerations
(1) The diameter of the piping on the suction side should be the same as that of the pump's inlet port (22: 25mm, 44: 40mm, 54: 50mm), and the length of the piping should be limited to less than 4.7m. A larger pipe diameter or longer piping could adversely affect the self-priming performance, or could even hinder the self-priming process itself.
(2) In cases where the liquid level fluctuates, take the height from the lowest liquid level as the maximum self-priming height.
(3) Always perform priming before first operation, and start the pump only after the pump chamber has been filled with the handled liquid.
(4) To prevent early deterioration, avoid frequent start/stop of the pump.
(5) If a foot valve is installed on the suction pipe, pipe resistance may increase so that the pump cannot suck liquid enough.

• **MX-F**
  (1) The performance curves on this catalogue are based on clean water at 20 °C.
  (2) For the MX-F250 or larger models, select a proper impeller size according to specific gravity. Always keep 5 - 10% allowance to motor output.
    \[ \text{Applicable motor output} \]
    \[ \text{Sp} \times \text{S.G} \times (1.05 - 1.1) < \text{Motor output} \]
  (3) The magnetic drive pump is not durable for a long time in closed-discharge operation. Always keep the minimum flow.
    - Minimum flow
      \[
      \begin{align*}
      & \text{MX-F100, 250, 251, 400, 401} \quad \text{10 L/min.} \\
      & \text{MX-F402, 403} \quad \text{20 L/min.}
      \end{align*}
      \]
  (4) NPSH validation
    - **NPSH Available (m)**
      \[ \text{NPSH}_{a} = 10 \times (P_{a} - P_{v}) + h_{s} - h_{fs} \]
    - **NPSH Required (m)**
      \[ \text{NPSH}_{r} = (P_{a} - P_{v}) + h_{s} - h_{fs} \]
    - **Pressure on the suction liquid level (MPa)**
      \[ P_{a} \]
    - **Static suction head (m)**
      \[ h_{s} \]
    - **Suction pipe resistance (m)**
      \[ h_{fs} \]
    - **Liquid density (kg/m³)**
      \[ \rho \]
    - **G-force (9.8m/sec²)**
      \[ g \]
  (5) Maximum withstand pressure
    \[
    \begin{align*}
    & \text{MX-F100: 0.19MPa} \\
    & \text{MX-F250: 0.25MPa} \\
    & \text{MX-F400: 0.28MPa} \\
    & \text{MX-F401: 0.43MPa} \\
    & \text{MX-F402: 0.43MPa} \\
    & \text{MX-F403: 0.43MPa}
    \end{align*}
    \]
Materials: Polypropylene (CFRPP/GFRPP)
Liquid end Materials

Polypropylene (GFRPP)

Materials

<table>
<thead>
<tr>
<th>Model</th>
<th>Resin parts</th>
<th>Sliding parts</th>
<th>Sealing parts</th>
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<tr>
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<tr>
<td>SMX</td>
<td>GFRPP</td>
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</tbody>
</table>

Material index

Plastic materials
- PP: Polypropylene
- CFRPP: Carbon fiber-reinforced PP
- GFRPP: Fiberglass-reinforced PP

Rubber
- FKM: Fluorine rubber
- EPDM: Ethylene propylene rubber

Materials for sliding parts/bearings
- Carbon
- High density carbon
- Ceramic
- Highly pure ceramic
- SiC: Silicon carbide ceramic

Carbon
High purity alumina ceramic
Carbon
High purity alumina ceramic
Alumina ceramic with a purity of 99.5% or more
Alumina ceramic
SMX series

- Expanded versatility
- Easy maintenance
- Able to withstand abnormal operation
- Fast self-priming

Specifications

Max. discharge capacity .......... 440 L/min
Max. discharge head ............... 25.5 m
Rated self-priming height ....... 4m
Material .................................. GFRPP
Power range ......................... 0.4 to 3.7 kW
Pump size (Discharge) .............. 25A, 40A
Liquid temp. range ............... 0 to 80°C*
Specific-gravity limit ............. 2.0
Sealing method ................. Seal-less construction

*Fluid dependent.

Liquid end materials

1 Front / Rear case ............. GFRPP
2 Rear casing .................... GFRPP
3 Impeller ......................... GFRPP
4 Magnet capsule ............... PP
5 Bearing ......................... High density carbon, SiC, PTFE
6 Spindle ......................... High purity alumina ceramic, SiC
7 Liner ring ....................... High purity alumina ceramic
8 Mouth ring ...................... PTFE (with filler)
9 Rear thrust ...................... High purity alumina ceramic, SiC, CFRPPS
10 O ring ......................... FKM, EPDM

Liquid end material
GFRPP

Versatile self-priming magnetic drive pumps built to withstand abnormal operation
Performance curves (50Hz)

- Pump size (Suction×Discharge)  
  SMX22: 25A×25A, SMX44: 40A×40A, SMX54: 50A×40A

---

Performance curves for SMX pumps with capacities and heads plotted. The curves are labeled as SMX-22T, SMX-44T, SMX-54T, SMX-22V, and SMX-54V.
Specifications

Max. discharge capacity ........... 500 L/min
Max. discharge head ............... 35 m
Material ............................................. GFRPP
Power range ..................................... 0.15 to 2.2kW
Pump size (Discharge) ............... G1 to 40A
Liquid temp. range ..................... 0 to 80°C*
Specific-gravity limit .............. 2.0

Sealing method ......................... Seal-less construction
(For details, please contact Iwaki.)

*An Aflas® O-ring is 10 to 80°C.
Fluid dependent.

Liquid end materials

1 Front casing .......... GFRPP
2 Rear casing .......... GFRPP
3 Impeller .......... GFRPP
4 Magnet capsule ....... PP
5 Bearing ............... CFRPPS, PTFE, High density carbon,
High purity alumina ceramic
6 Spindle ............... High purity alumina ceramic
7 Liner ring ............ High purity alumina ceramic
8 Mouth ring .......... PTFE [with filler]
9 Rear thrust ........... CFRPPS*
10 O ring ............... FKM, EPDM, AFLAS*

*MX-402, 402H, 403, 403H is CFRPEEK.

• Self-radiating structure (PAT.)
• Non-contact structure
• Dual section volute casing (PAT.)
• Robust structure

Built to withstand abnormal operation and provide high efficiency
Performance curves (50Hz)

- Pump size (Suction x Discharge)
  - MX-70/100: G1 x G1, MX250/251: 25A x 25A, MX400: 40A x 40A
  - MX-401: 40A x 40A, MX402/402H/403/403H: 50A x 40A
To safely use the full capability of a pump, observe the precautions below when performing installation. Note that there are restrictions on pipe arrangements for the SMX and SMX-F models, as they are self-suction pumps. Please contact us for each product individually.

**Installation Precautions**

**Suction Piping**

1. The suction pipe should employ the flooded suction method if possible. The shortest pipe possible, with the minimum number of bends, should be designed. Arrange a proper support on the suction pipe so that load and the thermal stress of the pipe itself are not applied to the pump.

2. Attach the coupling on the suction pipe carefully, so that no air enters the line. The presence of air in the suction pipe may prevent priming of the pump.

3. Avoid installations with poor suction conditions (e.g. vacuum in suction tank, large suction head or long suction piping). NPSHa should always be at least 2 feet greater than NPSHr. For NPSHr values, refer to the standard performance curve for your pump model or contact Iwaki or Your distributor.

4. When using a bend on the suction side, install a straight pipe which is more than 20 inches long or 10 times as long as the suction port diameter before the suction port of the pump. Use the largest possible radius of curvature for the bend.

5. Do not allow any projection where air may be trapped along the suction pipe. The suction pipe should have an ascending gradient toward the pump.

6. If the diameters of the pump suction port and suction pipe are different, use an eccentric reducer pipe. Connect the eccentric reducer pipe such that the upper part of it is level. Never use a suction pipe with a diameter smaller than that of the pump’s suction port.

7. When using the flooded suction method, the suction pipe should be given a slight ascending gradient toward the pump so that no air pocket is created on the suction side.

8. The end of the suction pipe should be located 24 inches or more below the surface of the liquid.

9. A screen should be provided at the inlet of the suction tank to prevent the entrance of foreign matter into the suction pipe. Foreign matter may cause malfunctioning of and/or damage to the pump. The end of the suction pipe should be at least 1-1.5D from the bottom of the suction tank. (D=Diameter of suction pipe).

10. When employing the suction lift method, install a foot valve on the suction pipe.

11. When using the flooded suction method, it is recommended that a gate valve be installed on the suction pipe for easier overhaul inspection of the pump. Since this valve is used only in the overhaul inspection of the pump, keep it fully opened during normal pump operation.

12. Pay close attention to the lowest level of the liquid in the suction tank to avoid vortexing, air entrapment and associated suction piping concerns. The inflow pipe into the suction tank should be distanced from the suction pipe and positioned below the liquid surface as a means of preventing air entrapment to the suction pipe. If air bubbles are generated in the suction tank, install a baffle.

13. It is recommended that a vacuum/pressure gauge be installed on the suction piping approximately 6 pipe diameters from the pump suction port.

**Discharge Piping**

1. Use proper pipe supports so that the weight of the piping does not load the pump nozzle.

2. If a method other than flooded suction is used, install a special pipe for priming.

3. If the piping is very long, its diameter should be determined by calculating the piping resistance. Otherwise, the specified performance may not be obtained due to increased piping resistance.

4. A check valve should be installed if any of the following conditions exists in the piping:

   - The discharge piping is very long.
   - The discharge head is 50 feet or more.
   - The end of the discharge pipe is located 30 feet higher than the surface of the suction tank.
   - Several pumps are connected in parallel with the same piping.

5. The installation of a gate valve on the discharge pipe is recommended for the adjustment of discharge quantity and for the prevention of motor overload. When installing both a check valve and a gate valve, the check valve should be positioned between the pump and the gate valve.

6. A pressure gauge must be installed on the discharge piping, prior to the gate valve.

7. An air bleeding valve should be installed if the discharge pipe is very long in the horizontal direction.

8. A drain valve should be installed for the drainage of liquid if there is a chance that the liquid in the discharge pipe will freeze.
**Magnetic Drive Pumps Applications**

**Pump Control System Examples**

**Etching system**
- Maintains a constant spray pressure by controlling the pump discharge pressure

**System for diluting sulfuric acid**
- 98% sulfuric acid
- Flow sensor
- One-way valve
- Electric valve
- Magnetic drive pump
- Flow sensor
- Temperature sensor
- Pressure sensor
- Control panel (for chemical process)
- Process

**System for diluting sodium hydroxide**
- Sodium hydroxide 25%
- Flow sensor
- Temperature sensor
- Conductivity meter
- Control panel
- Ratio setting
- Magnetic drive pump
- Warm water line
- Water discharge
- Permanent circuit boards
- Etching machine
- Magnetic drive pump
- Pressure test/pressure control system
- Magnetic valve
- Pressure sensor
- Test target
- Magnetic valve
- Pressure sensor
- Bypass
- Tank
- Control panel
- Pressure sensor
- Magnetic valve
- Magnetic valve
- Magnetic drive pump
- To point of use

**Blending System Examples**

**System for diluting sulfuric acid**
- Production volume/dilute concentration settings
- Pressure/temperature alarms
- Process

**System for diluting sodium hydroxide**
- Temperature sensor
- Ratio setting
- Process
Optional Accessories

**DR**

**Iwaki dry run protection**

The DR series is a dry run protection device that monitors the electric current of the motor. This device will automatically stop the pump when the motor’s current draw falls below a set lower limit, runs dry or is overloaded.

- Displays current set value
- Allow upper and lower current control settings
- Upper limit: Overload
- Lower limit: Dry running and cavitation
- Built-in current transformer
- DIN rail mounting

**Model**

<table>
<thead>
<tr>
<th>Model</th>
<th>Motor power</th>
<th>Applied power</th>
<th>Control power</th>
<th>Power</th>
<th>Input</th>
<th>Detective current</th>
<th>Current transformer (CT)</th>
<th>Dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td>DR-10</td>
<td>200 to 240V 3-phase</td>
<td>4 to 7.5kW</td>
<td>100V to 240V single-phase</td>
<td>V</td>
<td>3.5W</td>
<td>0.5 to 32A</td>
<td>Built-in</td>
<td>D80 x W153 x H122</td>
</tr>
<tr>
<td>DR-20</td>
<td>380 to 440V 3-phase</td>
<td>0.75 to 15kW</td>
<td>11 to 37kW</td>
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<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>DR-11</td>
<td>380 to 440V 3-phase</td>
<td>18.5 to 75kW</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

*Motor output depends on the motor specification. A Both the DR and an inverter cannot be used in the same system.*

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**Caution:** Before use of pump, read instruction manual carefully.
Actual pumps may differ from the photos. Specifications and dimensions are subject to change without prior notice. For further details please contact Iwaki.

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