

# Instruction Manual for MDP Magnetic Drive Pump



**Important!**

**Read and understand this manual prior to operating this product!**

Thank you for having selected the SIKOPUMP MDP Series magnetic drive pump. This instruction manual deals with the correct handling, maintenance, inspection and troubleshooting procedures for the MDP magnetic drive pump. Please read through it carefully to ensure the optimum performance, safety and long service of your pump.

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# 1. SAFETY INSTRUCTIONS



- **Turn off the power supply**

Working without disconnecting the power supply may cause an electrical shock. Before performing any assembly or maintenance procedures involving the pump, make sure to turn the power supply switch off and to stop the pump and other related devices.

- **Terminate operation**

When you detect any signs of abnormal operation, terminate pump operation immediately

- **Modification**

Never modify the pump. SIKO PUMP will not be responsible for any accident or damage of any kind caused by the user remodeling the pump without first obtaining permission or instructions from SIKO PUMP.

- **Protective clothing**

If application involves the handling of hazardous liquids, protective gear(gloves, glasses, clothing, etc) must be worn before performing any maintenance on the pump. Please follow safety guidelines established for such applications.

- **Operation**

Operation of the pump and related system must be by experienced or knowledgeable persona. The pump operator or pump operation supervisor must not allow any personal who have little or no knowledge of the pump to operate the unit.

- **Power**

Do not operate the pump at a different voltage than specified on the nameplate. This may result in damage to the unit or fire. Only the specified voltage must be used.

- **Spill accident**

Protective measures should be taken against any accidental spill or leakage of any hazardous liquids as a result of unexpected damage to the pump or the related piping. Please follow safety guidelines established for such occurrences.

- **Operating site must be free of water and humidity**

The pump is not designed to be water-proof or dust-proof. The use of the pump in places with splashing water or humidity above 90% may result in an electrical shock or short circuit.

- **Do not damage power cord**

Do not cut, abrade or forcibly pull the power cord. Excessive heat or heavy load applied to the cable may damage the cable and finally result in a fire or an electrical shock.

- **Do not cover the motor**

Covering the motor during operation may result in an accumulation heat inside the motor and cause a fire or a mechanical failure. Proper ventilation is necessary for the motor.

- **Grounding**

Do not operate the pump without proper grounding; otherwise an electrical shock may result. Follow all local, state and government regulations for the installation and wiring of the pump.

- **Location and storage**

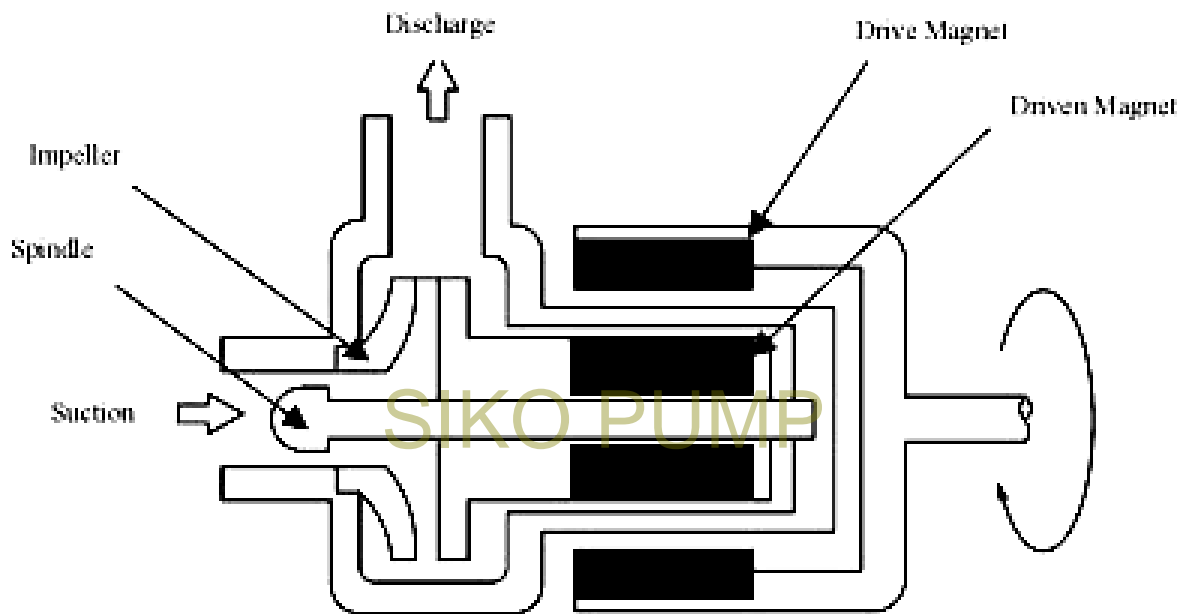
Do not install or store the pump in the following places:

---Places where a flammable gas or material is used or stored.

---Places where the ambient temperature is extremely high (104. F or higher) or extremely low (32. F or lower).

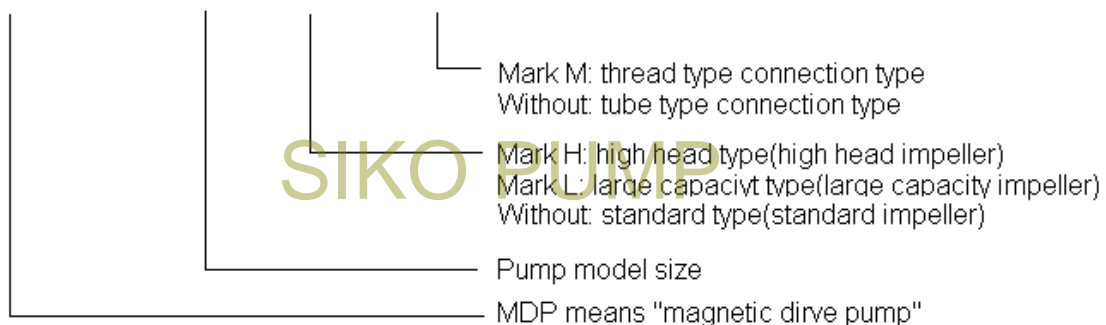
## 2. OPERATING PRINCIPLE

A seal-less magnet drive pump uses magnet torque to transmit energy from the motor to the impeller. A magnet coupling is formed using an inner, or driven magnet, attached to the impeller and an outer, or drive magnet, attached to the motor shaft. This design eliminates mechanical shaft seals or packing, since there is no direct connection between the motor shaft and the impeller. The front and rear casings, sealed with a static o-ring, form the pump or liquid end. The magnetic field is transmitted from the drive magnet through the rear casing to the driven magnet that is attached to the impeller. The combined coupling torque of the drive magnet and impeller magnet provides the driving power to the fluid being pumped.



## 3. MODEL IDENTIFICATION GUIDE

MDP - 30 H (M)



## 4. SPECIFICATIONS (50Hz)

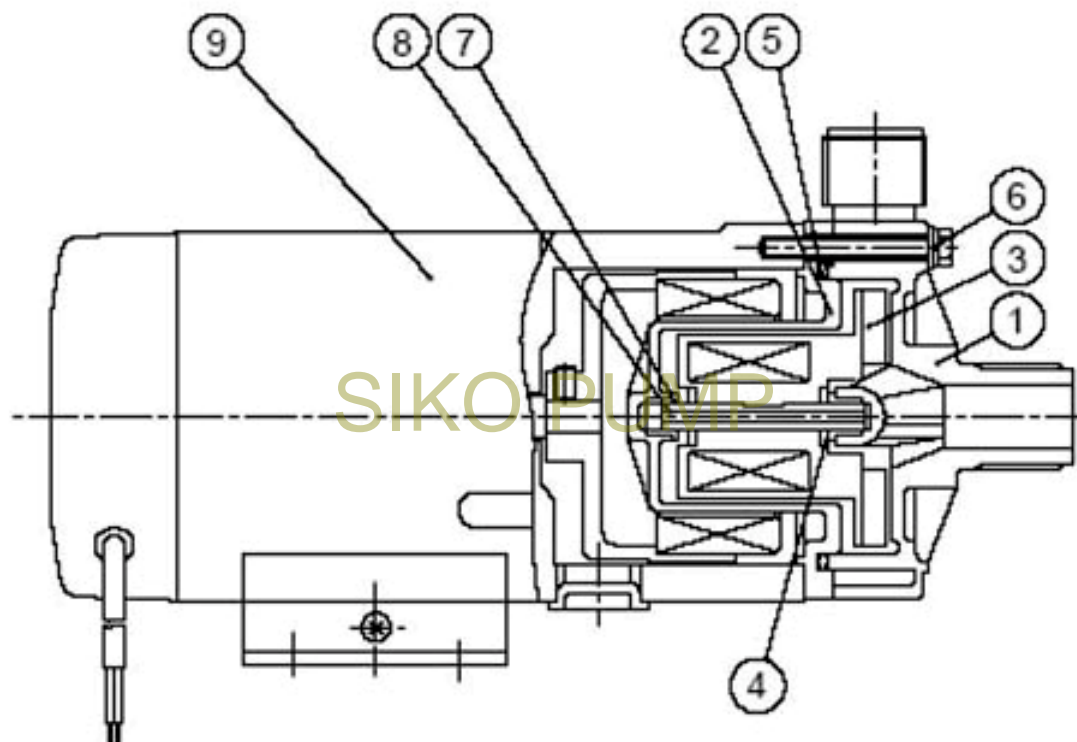


| Model    | Tube type |      | Thread type |    | Max. Cap    | Max Head    | S.G | Power<br>W | Phase  |
|----------|-----------|------|-------------|----|-------------|-------------|-----|------------|--------|
|          | (mm)      | (mm) | inch        | mm | L/min(GPM)  | M(FT)       |     |            |        |
| MDP-6    | 14        | 14   |             |    | 8(2.11)     | 1(3.28)     | 1.2 | 3          | 1      |
| MDP-6H   | 14        | 14   |             |    | 5.5(1.45)   | 2.1(6.89)   | 1.1 | 3          | 1      |
| MDP-10   | 14        | 14   |             |    | 11(2.91)    | 1.5(4.92)   | 1.1 | 6          | 1      |
| MDP-15   | 16        | 16   |             |    | 16(4.23)    | 2.7(8.86)   | 1.3 | 10         | 1      |
| MDP-15M  |           |      | 0.75        | 13 | 16(4.23)    | 2.4(7.87)   | 1.3 | 10         | 1      |
| MDP-20   | 18        | 18   |             |    | 27(7.13)    | 3.1(10.17)  | 1.2 | 20         | 1      |
| MDP-20M  |           |      | 0.75        | 16 | 27(7.13)    | 3.1(10.17)  | 1.2 | 20         | 1      |
| MDP-20L  | 26        | 26   |             |    | 46(12.15)   | 1.8(5.91)   | 1.3 | 20         | 1      |
| MDP-20LM |           |      | 1           | 20 | 46(12.15)   | 1.8(5.91)   | 1.3 | 20         | 1      |
| MDP-20H  | 18        | 18   |             |    | 10(2.64)    | 4.6(15.09)  | 1.1 | 20         | 1      |
| MDP-20HM |           |      | 0.75        | 13 | 10(2.64)    | 4.6(15.09)  | 1.1 | 20         | 1      |
| MDP-30   | 20        | 20   |             |    | 33(8.72)    | 3.8(12.47)  | 1.3 | 45         | 1      |
| MDP-30M  |           |      | 0.75        | 16 | 33(8.72)    | 3.8(12.47)  | 1.3 | 45         | 1      |
| MDP-30L  | 26        | 26   |             |    | 62(16.38)   | 2.9(9.51)   | 1.1 | 45         | 1      |
| MDP-30LM |           |      | 1           | 20 | 62(16.38)   | 2.9(9.51)   | 1.1 | 45         | 1      |
| MDP-30H  | 18        | 18   |             |    | 15(3.96)    | 8(26.25)    | 1.1 | 45         | 1      |
| MDP-30HM |           |      | 0.75        | 13 | 15(3.96)    | 8(26.25)    | 1.1 | 45         | 1      |
| MDP-40   | 20        | 20   |             |    | 45(11.89)   | 4.6(15.09)  | 1.1 | 65         | 1      |
| MDP-40M  |           |      | 0.75        | 16 | 45(11.89)   | 4.6(15.09)  | 1.1 | 65         | 1      |
| MDP-40L  | 28        | 26   |             |    | 75(19.81)   | 3.3(10.83)  | 1.1 | 65         | 1      |
| MDP-40LM |           |      | 1           | 20 | 75(19.81)   | 3.3(10.83)  | 1.1 | 65         | 1      |
| MDP-55   | 26        | 26   |             |    | 60(15.85)   | 5.6(18.37)  | 1.2 | 90         | 1 or 3 |
| MDP-55M  |           |      | 1           | 20 | 60(15.85)   | 5.6(18.37)  | 1.2 | 90         | 1 or 3 |
| MDP-55H  | 26        | 26   |             |    | 25(6.60)    | 10(32.81)   | 1.1 | 90         | 1 or 3 |
| MDP-55HM |           |      | 1           | 20 | 25(6.60)    | 10(32.81)   | 1.1 | 90         | 1 or 3 |
| MDP-70   | 26        | 26   |             |    | 86(22.72)   | 6.7(21.98)  | 1.1 | 150        | 1 or 3 |
| MDP-70M  |           |      | 1           | 20 | 86(22.72)   | 6.7(21.98)  | 1.1 | 150        | 1 or 3 |
| MDP-100  | 26        | 26   |             |    | 120(31.70)  | 8.6(28.21)  | 1.3 | 150        | 1 or 3 |
| MDP-100M |           |      | 1           | 20 | 120(31.70)  | 8.6(28.21)  | 1.3 | 250        | 1 or 3 |
| MDP-100L |           |      | 1.25        | 32 | 170(44.91)  | 9(29.53)    | 1.3 | 250        | 1 or 3 |
| MDP-120M |           |      | 1.5         | 36 | 220(58.12)  | 10.5(34.45) | 1.3 | 370        | 1 or 3 |
| MDP-400  |           |      | 1.5         | 36 | 220(58.12)  | 12.5(41.01) | 1.3 | 400        | 3      |
| MDP-401  |           |      | 1.5         | 36 | 260(68.68)  | 18(59.05)   | 1.3 | 750        | 3      |
| MDP-422  |           |      | 2           |    | 320(84.54)  | 21(68.90)   | 1.3 | 2200       | 1 or 3 |
| MDP-423  |           |      | 2           |    | 380(100.39) | 22(72.18)   | 1.3 | 2200       | 1 or 3 |

Refer to more specification in the pump catalogue.

"M"—thread type (without is tube type), "L"—large capacity, type, "H"—high head type.

## 5. Construction and Material



| NO. | Part Name    | Qty   | Material                                |
|-----|--------------|-------|---|
| 1   | Front Casing | 1     | GFRPP(Or PTFE)                          |
| 2   | Rear Casing  | 1     |   |
| 3   | Impeller     | 1     |   |
| 4   | Thrust       | 2     | Alumina Ceramic                         |
| 5   | O-ring       | 1     | FKM or EPDM, or others                  |
| 6   | Screw        | 4 - 6 | Stainless steel                         |
| 7   | Bearing      | 2     | Fluorouracil containing filler material |
| 8   | Spindle      | 1     | Alumina ceramic                         |
| 9   | Motor        | 1     |   |

## 6. HANDLING INSTRUCTIONS

### **6.1) Handle the pump carefully**

Strong impact to the pump assembly may result in damage or reduced performance.

### **6.2) Starting**

Before priming, the pump should be sure the power is turned off then proceed with filling the pump end with water.



#### **Note**

**The pump must be fully primed before starting.**

Next close the valve on the outlet or discharge side of pump. Turn on power to the pump,

when full speed is reached gradually open the discharge valve until specified flow rate is achieved.



**Caution**

**Operating the pump dry (without liquid) may cause severe damage.**

**6.3) Stopping**

When stopping the pump, first close the discharge valve gradually. When it is completely closed, turn off the power switch so that the pump stops. Never stop the pump suddenly by quickly closing a valve (i.e., solenoid or hydraulic valves).



**Caution**

**Quick valve closure may cause water hammer that can cause severe damage to the pump.**

**6.4) Temperature**

# SIKO PUMP

The pump itself may not suffer a change in performance due to temperature fluctuation. However, the liquid may change in terms of viscosity, vapor pressure, and corrosive properties. Pay special attention to changes in liquid characteristics as a result of temperature fluctuation.

Liquid temperature range: 32 – 176°F (0 – 80°C)

Ambient temperature range: 32 – 104°F (0 – 40°C)

**6.5) Metallic substances**

As there is a powerful magnet inside the pump unit, do not use any liquid that contains metallic substances such as iron, nickel, etc.

**6.6) Do not operate the pump in the following places:**

- Places exposed to rain and/or wind.
- Places where the temperature falls below **32°F (0°C)**.
- Places where **corrosive gas (such as chlorine)** is present.
- Places exposed to splashing of water or fluid being pumped.
- Places where the ambient temperature is **104°F (40°C) or above**.
- Places where explosive or combustible materials/gases are present.
- 

**6.7) Do not operate the pump with the following liquids:**

- Liquids that significantly swell polypropylene
- Paraffin hydrocarbons such as gasoline and kerosene
- Halogenated hydrocarbons such as trichloroethylene and carbon tetrachloride
- Ether and low-grade ester
- Slurry

(Please kindly refer to the chemical resistance sheet in our web)

**6.8) To prevent fire and explosions, do not place dangerous or flammable substances near the pump.**

**6.9) Be sure unit is properly ground**

**6.10) Avoid direct physical contact with the motor or pump during operation, as surface temperatures may be extremely high due to operating condition**

## 7. INSTALLATION, WIRING AND CONNECTIONS



### **7.1 Installation**

#### **7.1.1) Installation site**

Installation site must have an **ambient temperature of 32-104°F (0-40°C)** and a **relative humidity lower than 90%**. Install the pump where maintenance and inspection work can be done easily.

#### **7.1.2) Pump installation method**

This pump is **not self-priming**. It is recommended that the pump shall be installed in a position lower than the liquid level of the suction tank by **at least 12 inches (30 cm)**. If this distance is too short, air may enter the pump, causing damage

#### **7.1.3) Direction of pump discharge port**

The discharge port can be directed as desired. However, for efficient elimination of air in the pump end, it is recommended that the discharge port be positioned in the horizontal direction.

#### **7.1.4) Anchoring of base**

The base of the pump must be anchored firmly. The pump **must not be mounted in a vertical position**.

### **7.2 Piping instructions**

#### **7.2.1) minimizing frictional resistance**

To minimize frictional resistance, the shortest piping possible with a minimum number of bends should be utilized on the inlet or suction side of the pump.

#### **7.2.2) Hose type**

Use a corrosion-resistant vinyl hose that is rated at or above the pressure rating of the pump

#### **7.2.3) Hose size (for hose-barb style pumps)**

Select hose size in accordance with the diameter of the pump connections. As the hose tends to be crushed under the force, the use of a braided reinforced hose is recommended. Note, if the connection on the suction side is loose air may be mixed in with pumped fluid.

#### **Caution**



**In the case of high temperature liquids, special attention must be paid to the selection of a hose.**

#### **7.2.4) Hose connection**

Be sure to cut the ends of the hose straight. Press the hose end firmly against the discharge or suction port until it reaches the bottom of the port. Use a fastener (such as a hose clamp) to make the connection tight and leak free.

#### **Caution**



**Do not over tighten the connection ports (suction and discharge) excessively as they are made of plastic resin and are could be damaged.**

#### **7.2.5) Valve installation**

Install valves close to the suction and discharge ports.

- Suction side valve, for easy liquid removal and pump maintenance
- Discharge side valve, for adjustment of the discharge rate or head and for easy removal and pump maintenance.

### **7.3 Wiring**

1. Prior to wiring the pump, confirm the voltage indicated on the nameplate is correct for your installation. (Observe all local and national regulations regarding electrical work.)
2. The pump does not have an external switch. It starts when power is supplied to the pump wires.

## **8. ASSEMBLY**

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1. Place the motor on end vertically so that the shaft is pointed upward.
2. Install the drive magnet on the motor shaft and position the shaft flush with the inside of the magnet.
3. Insert the rear casing into the magnet/motor bracket.
4. Install the impeller and O-ring into the rear casing.
5. Place the front casing over the pump, making sure that the volute casing is aligned.
6. Using a hex head driver, fasten the liquid end to the bracket using six screws. Tighten in a star pattern.

## **9. OPERATION**

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### **Caution**

- Before operating the pump, confirm that connections to the discharge and suction ports are secure.
- Dry run operation (operation without liquid in the pump) damages the pump. Be sure to fill the pump with liquid prior to startup.
- Do not operate the pump with closed, or almost entirely closed, suction and/or discharge side valve(s). A closed suction valve will cause dry-run operation.
- Do not open or close the suction or discharge side valve suddenly, this may result in decoupling and damage to the pump end. (Under such circumstances, turn off the power supply immediately. When the motor stops rotating, the magnetic coupling will be reconnected automatically.)

### **9.1 Pump Starting Procedure**

#### **9.1.1) Check piping, wiring and voltage**

Check connections to confirm they are secure and leak-free. Check the power supply voltage by referring to the information on the nameplate.

#### **9.1.2) Open and close valves.**

Fully open suction side valve. Fully close discharge side valve.

#### **9.1.3) Check that pump chamber is filled with liquid.**

Fill pump chamber with priming liquid. Be sure suction line is completely filled, this is



especially important if pump is above liquid level.

#### **9.1.4) Supply power to pump**

After steps 1 to 3 above, connect power supply to start pump.

#### **9.1.5) Adjust discharge capacity & head to desired values.**

Adjust discharge side valve gradually till desired discharge capacity and head are obtained. Do not open or close valves suddenly.



**Note: Do not keep discharge side valve closed for more than 1 minute.**

**Note: Check that pump is operating normally. If not, turn off power immediately and eliminate cause referring to 'Causes of Trouble and Troubleshooting' section**

#### **9.1.6) Checkpoints during operation**

Be careful to prevent solids from entering the pump. Solids in the pump may cause impeller to be locked stopping liquid circulation. The motor continues to rotate even if impeller is locked. In such a case, turn off power supply at once.

### **9.2 Pump Stopping Procedure**

#### **9.2.1) Close discharge side valve**

Close discharge side valve gradually. Do not use electromagnetic valve for quick closing.

#### **9.2.2) Switch power off**

Check that motor stops smoothly after power supply is disconnected. If not, pump should be inspected.

### **9.3 How to store pump when it is out of use for a long time**

Remove the liquid from the pump if it is to be stored for a long period of time. In addition, run it with water for about 5 minutes every 3 months to prevent rust on the motor bearing.



#### **Caution**

- Before draining the pump, turn off the power supply.
- Be sure to wear proper safety gear (gloves, protective shoes, etc.) when handling pump end for draining purposes, especially when a hazardous chemical is being pumped.
- Note that residual liquid may run from the discharge and suction ports when the housing is removed. Do not allow any electric parts to come in contact with the liquid.
- Never discharge hazardous or chemical liquid over the ground or floor in the plant. Instead, use a draining pan (or container). Observe each applicable local law or regulation for the handling or disposal of hazardous liquids.

### **9.4 Draining procedure**

9.4.1) Turn off the power supply.(Make sure no other operator will turn the power supply on accidentally.)

9.4.2) Close the discharge and suction side's valves fully.

9.4.3) Remove the hoses piping attached to the pump.

9.4.4) Remove the screws on the pump base to detach the pump from its mounting location.

9.4.5) Rotate the pump.

9.4.6) Discharge hazardous liquids appropriately

## 10. MAINTENANCE/INSPECTION



### **10. 1) Tightening screws**

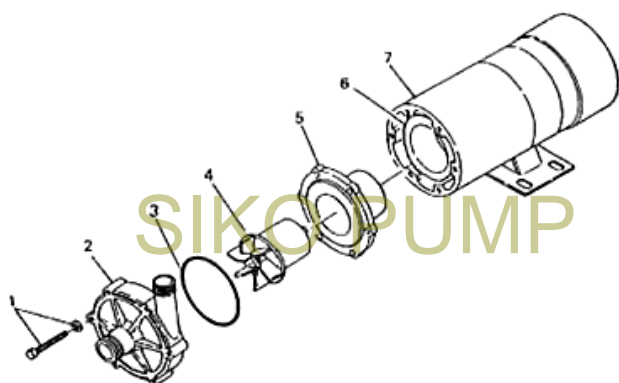
When the pump has been used for a long time, the front casing screws attaching the pump head to the motor bracket may loosen. Tighten screws periodically taking care not to deform the plastic parts. Also, after pump has been stored for a long time, tighten screws before pump is used again.

### **10.2) Daily inspection**

Check operating conditions (vibration, noise) as well as electric current value and pump discharge capacity. As soon as you find any abnormality, turn off power and refer to "Troubleshooting"

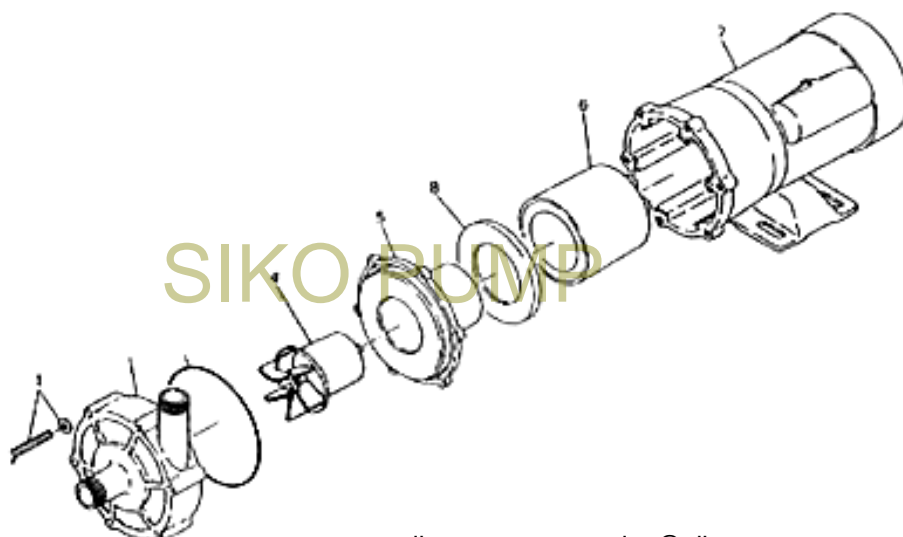
## 11. PARTS DESCRIPTION AND EXPLODED VIEW

### **Model MDP-6 through 40**

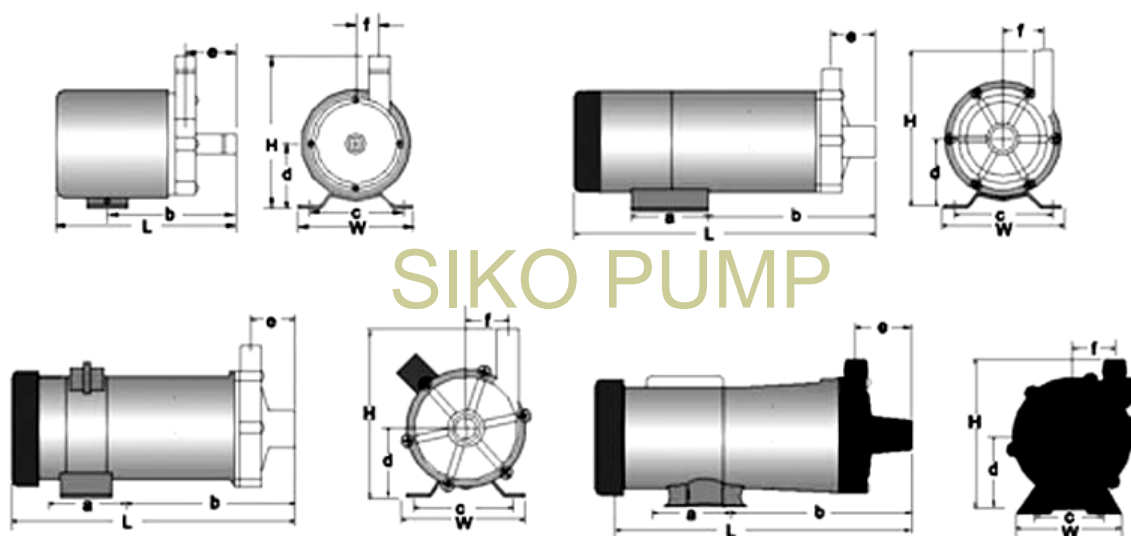


| No. | Description            |
|-----|------------------------|
| 1   | Screw                  |
| 2   | Front casing           |
| 3   | O-ring                 |
| 4   | Impeller               |
| 5   | Rear casing            |
| 6   | Drive magnet           |
| 7   | Motor assembly         |
| 8   | Retainer(MDP-100 only) |
| 9   | Bracket                |

### **Model MDP-55/70/100**



## 12. DIMENSIONS



| Model       | Connection |               | W    | H    | L     | a    | b    | C    | d    | e    | f    |
|-------------|------------|---------------|------|------|-------|------|------|------|------|------|------|
|             | Hose (mm)  | Thread (inch) |      |      |       |      |      |      |      |      |      |
| MDP-6       | 14         |               | 2.91 | 3.62 | 4.09  | 1.18 | 2.87 | 2.36 | 1.77 | 1.22 | 0.67 |
| MDP-6H      | 14         |               | 2.95 | 3.62 | 4.12  | 1.2  | 2.87 | 2.36 | 1.77 | 1.22 | 0.67 |
| MDP-10      | 14         |               | 2.91 | 3.62 | 4.09  | 1.18 | 2.87 | 2.36 | 1.77 | 1.22 | 0.67 |
| MDP-15(M)   | 16         | 0.75          | 3.74 | 4.39 | 7.05  | 1.97 | 4.59 | 3.35 | 2.17 | 1.52 | 0.85 |
| MDP-20(M)   | 18         | 0.75          | 4.17 | 4.19 | 7.99  | 1.73 | 4.06 | 3.54 | 1.77 | 1.3  | 1.12 |
| MDP-20L(M)  | 26         | 1             | 4.17 | 4.75 | 8.66  | 1.73 | 4.45 | 3.54 | 1.74 | 1.83 | 40+  |
| MDP-20H(M)  | 18         | 0.75          | 4.17 | 4.92 | 8.31  | 1.73 | 4.17 | 3.54 | 2.17 | 1.56 | 1.52 |
| MDP-30(M)   | 20         | 0.75          | 4.72 | 5.12 | 9.76  | 1.57 | 5.87 | 3.94 | 2.36 | 1.89 | 1.22 |
| MDP-30L(M)  | 26         | 1             | 4.72 | 5.51 | 10    | 1.57 | 6.1  | 3.94 | 2.36 | 1.97 | 40+  |
| MDP-30H(M)  | 18         | 0.75          | 4.72 | 5.12 | 9.05  | 1.57 | 5.16 | 3.94 | 2.36 | 1.56 | 1.53 |
| MDP-40(M)   | 20         | 0.75          | 4.72 | 5.12 | 9.85  | 1.57 | 5.87 | 3.94 | 2.36 | 1.89 | 1.22 |
| MDP-40L(M)  | 26         | 1             | 4.72 | 5.51 | 10.08 | 1.57 | 6.1  | 3.94 | 2.36 | 1.97 | 43+  |
| MDP-55(M)   | 26         | 1             | 4.72 | 6.1  | 10.77 | 1.57 | 7.05 | 3.94 | 2.56 | 2.42 | 1.57 |
| MDP-55H(M)  | 26         | 1             | 4.7  | 6.11 | 10.75 | 1.57 | 7.05 | 3.94 | 2.56 | 2.42 | 1.57 |
| MDP-70(M)   | 26         | 1             | 5.63 | 6.11 | 10.18 | 2.76 | 5.71 | 4.25 | 2.56 | 2.07 | 1.7  |
| MDP-100(M)  | 26         | 1             | 6.14 | 6.89 | 12.67 | 2.76 | 6.38 | 4.33 | 2.95 | 2.55 | 1.71 |
| MDP-100L(M) |            | 1.25          | 6.14 | 6.9  | 12.67 | 2.78 | 6.38 | 4.33 | 2.95 | 2.55 | 1.7  |
| MDP-120M    |            | 1.5           | 6.5  | 7.12 | 13.5  | 2.8  | 6.4  | 4.35 | 2.95 | 3    | 1.8  |

Refer to more size information in our pump catalogue.

### 13. TROUBLESHOOTING

|  | Pump does not start.  | Pump is not pumping or flow is insufficient. | Electric current is high. | Excessive noise or vibration. | Liquid leaks.         |   |
|--|-----------------------|--|---------------------------|-------------------------------|-----------------------|---|
| Power is not supplied or wiring is faulty.                   | <input type="radio"/> |  | <input type="radio"/>     |                               |                       | Check power connections                       |
| Motor is out of order (short coil or capacitor failure).     | <input type="radio"/> |  | <input type="radio"/>     |                               |                       | Eliminate air from pump end completely.       |
| There is residual air in the pump.                           |                       | <input type="radio"/>                        |                           | <input type="radio"/>         |                       | Check suction connection.                     |
| Air is sucked in via suction port.                           |                       | <input type="radio"/>                        |                           | <input type="radio"/>         |                       | Supply priming water to pump.                 |
| Pump is running dry.   |                       | <input type="radio"/>                        |                           | <input type="radio"/>         |                       | Confirm application with pump specifications. |
| Specific gravity/viscosity of liquid is too high.            | <input type="radio"/> | <input type="radio"/>                        | <input type="radio"/>     |                               |                       | Confirm application with pump specifications. |
| Periphery of impeller magnet is in contact with rear casing. | <input type="radio"/> | <input type="radio"/>                        | <input type="radio"/>     | <input type="radio"/>         |                       |   |
| Impeller is damaged.   | <input type="radio"/> | <input type="radio"/>                        | <input type="radio"/>     | <input type="radio"/>         |                       |   |
| Foreign matter is stuck to impeller.                         |                       | <input type="radio"/>                        | <input type="radio"/>     | <input type="radio"/>         |                       |   |
| O-ring is damaged.   |                       |  |                           |                               | <input type="radio"/> |   |
| Loose front casing bolts.                                    |                       | <input type="radio"/>                        |                           |                               | <input type="radio"/> | Tighten bolts.                                |

# SIKOPUMP

Chemical Handling Pump Solutions



SIKO PUMP, specialized chemical handing pump manufacturer.

Metering pump, magnetic driving pump, diaphragm pump, bellows pump, rotary pump and so on ... ..

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**As we are constantly endeavoring to improve the performance of our equipment,**

**The company reserves the right to make alteration from time to time and equipment will maybe differ from that detailed in this brochure.**