IWAKI PUMPS

IWAKI Magnetic Drive Gear Pump

MDG-H15 (built-in type)

Instruction Manual

⚠Read this manual before use of product

Thank you for selecting an Iwaki MDG series magnetic drive gear pump. Please read through this manual carefully to ensure the optimum performance, safety and service of your pump.

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This instruction manual should be kept on hand by the end user for quick reference.

Contact us or your nearest dealer if you have any questions.

Safety Section

For the Safe and Correct Handling of the Pump

- "Safety Instruction" section deals with important details about handling of the pump. Before use, read this section carefully for the prevention of personal injury or property damage.
- Observe the instructions accompanied with "WARNING" or "CAUTION" in this manual. These instructions are very important for protecting users from dangerous situations.
- The symbols on this instruction manual have the following meanings:

⚠ **WARNING**	**Nonobservance or misapplication of "Warning" sections could lead to a serious accident which may result in death.**
⚠ **CAUTION**	**Nonobservance or misapplication of "Caution" sections could lead to personal injury or property damage.**

Types of Symbols



Indicates a prohibited action or procedure. Inside or near this circle, a concrete and practical image of the activity to be avoided is depicted.



Indicates an important action or procedure which must be performed or carried out without fail. Failure to follow the instructions herein can lead to malfunction or damage to the pump.

⚠ Export Restrictions

Technical information contained in this instruction manual might be treated as controlled technology in your countries, due to agreements in international regime for export control. Please be reminded that export license/permission could be required when this manual is provided, due to export control regulations of your country.

Safety Section

⚠ WARNING

- **Turn off power before service**
  Risk of electrical shock. Be sure to turn off power to stop the pump and related devices before service is performed.



- **Stop operation**
  If you notice any abnormal or dangerous conditions, suspend operation immediately and inspect/solve problems.



- **Do not use the pump in any condition other than its intended purpose**
  The use of the pump in any conditions other than those clearly specified may result in failure or injury. Use this product in specified conditions only.



- **Do not modify the pump**
  Alterations to the pump carries a high degree of risk. It is not the manufacturer's responsibility for any failure or injury resulting from alterations to the pump.



- **Wear protective clothing**
  Always wear protective clothing such as an eye protection, chemical resistant gloves, a mask and a face shield during disassembly, assembly or maintenance work.



⚠ CAUTION

- **Qualified personnel only**
  This pump should be handled or operated by qualified personnel with a full understanding. Any person not familiar with the product should not take part in the operation or maintenance of the pump.



- **Use specified power only**
  Do not apply power other than that specified on the nameplate. Otherwise, failure or fire may result. Ensure the pump is properly grounded.



- **Keep electric parts and wiring dry**
  Risk of fire or electric shock. Install the pump where it can be kept dry.



- **Ventilation**
  Fumes or vapours can be hazardous with certain solutions. Ensure proper ventilation at the operation site.



- **Spill precautions**
  Ensure protection and containment of solution in the event of plumbing or pump damage (secondary containment).



Safety Section

⚠ CAUTION

- **Do not use a damaged pump**
  Use of a damaged pump could lead to an electric shock or death.


Prohibition

- **Do not use the pump in a wet location**
  The pump is not waterproof. Use of the pump in wet or extremely humid locations could lead to electric shock or short circuit.


Prohibition

- **Do not damage a power cable**
  Do not pull, knot, or crush the power cable. Damage to the power cable could lead to a fire or electrical shock if cut or broken.


Prohibition

- **Do not cover the pump with cloth**
  The motor temperature may build up and a fire or an electric/mechanical failure may result.


Prohibition

- **Grounding**
  Risk of electrical shock! Always properly ground the pump. Conform to local electric codes.


Earthing

- **Install a GFCI (earth leakage breaker)**
  An electrical failure of the pump may adversely affect other devices on the same line. Purchase and install a GFCI (earth leakage breaker) separately.


Electrical shock

- **Damaged power cable**
  Do not use any damaged power cable for the prevention of a fire or electrical shock. The cable is not replaceable, so that the whole pump unit needs to be replaced when the cable is damaged.


Prohibition

- **Do not install/store the pump:**
  - In a flammable/explosive/corrosive atmosphere.
  - In a dusty/humid environment.
  - Where ambient temperature can exceed 0-40ºC.
  - In direct sunlight or wind & rain.


Prohibition

- **Use of hazardous chemicals**
  Risk of personal injury or fire. Check/monitor plumbing system for a leak before or in operation when handling a flammable, corrosive or harmful liquid.


Caution

- **Disposal of a used pump**
  Dispose of any used or damaged pump in accordance with local rules and regulations. See page 14 to comply with the European Directive 2012/19/EU on waste electrical and electronic equipment.


Requirement

FOREWORD

This publication is a reference for the new operator and a refresher for the experienced one. Read - study - and keep it in handy.

> WARNING
>
> When dealing with hazardous material it is the responsibility of the equipment user to obtain and follow all safety precautions recommended by the material manufacturer/supplier.

PRECAUTIONS

- Do not shut the discharge or suction line off and do not run pump dry. Lack of liquid lubrication may cause excessive wear and tear of the gears or bearings.
- Do not exceed the range of permissible liquid temperature:
  0-45ºC for Type T
  0-90ºC for Type K
  Discharge amount varies according to the liquid temperature.
- Do not install the pump outdoors. Permissible ambient temperature and humidity are max. 40ºC and max. 85% RH respectively.
- Liquid containing slurry should be prohibited, especially ferric or nickel powder because strong magnets are built in the pump.
- A viscous fluid with more than 30mPa•S cannot be handled.
- Do not allow crystals to form in the pump.
- Splashing on the motor may cause electric leak or burning. Provide ground wiring and a ground leakage circuit breaker.
- Never place inflammable articles near the pump.
- Selected type R or B for holoid solvent such as flon etc. PTFE gears are swelled for such a liquid.

MODEL IDENTIFICATION

M D G - H 15 T A 220
a b c d e

a. Pump model

b. Pump size
15: 5.5mL/rev.

c. Pumped liquid temp. limit
T: 0-45°C
K: 0-95°C

d. Motor
A: AC

e. Power supply voltage
220: 220V (single phase)

SPECIFICATIONS

Pump model	Inlet/Outlet	Max. capacity L/min		Max. pressure (MPa)	Max. vacuum kPa (abs.)	Liquid viscosity limit (mPa•s)	Motor output (W)	
		50Hz	60Hz				50Hz	60Hz
MDG-H15TA	Rc3/8	14.0	17	0.3	5.33	30	150	180
MDG-H15KA	Rc3/8	12.5	15	0.3	8.00	30	150	180

Note: Maximum operating noise is 65dB(A) or below (1m away from the front of the pump, A scale)

UNPACKING

Upon receiving the goods, check the nameplate to see if the information such as model codes, discharge capacity and discharge pressure are as ordered. Inspect for external damage and check no bolts have become loose during shipment.



Spec label (pump unit) for the European market



Spec label (pump unit) for any area other than the European market



Spec label (pump with no motor) for the European market



Spec label (pump with no motor) for any area other than the European market

*The CE marking on our product(s) is for us to market the product(s) into the European market, however, the CE marking does not ensure any safety or conformity of the product(s) outside the European market.
When the pump is incorporated into the equipment marketed in the European market, such equipment must meet all the requirements of applicable directives. In such a case, any person who places the equipment on the market must carry a CE mark on the equipment as a manufacturer.

INSTALLATION

1. Install the pump as near to a suction tank as possible and be sure it is readily accessible for inspection and maintenance. The ambient temperature should be between 0ºC and 40ºC. Permissible humidity is max. 85%RH.

> ATTENTION
>
> Before installing the pump, install tube connectors on the pump. Refer to piping.

2. The pump should be installed lower than the liquid level of a suction tank when using open piping system.

   [Note] Only types T and R can be installed lower than the liquid level, provided the liquid temperature is low. Permissible height is 0.3m while pumping water of 25ºC. When installing in this manner, confirm before every start up that the pump interior is wet. If suction line is filled with water. The pump can suck up to 5m when the temperature is lower than 25ºC.

3. Firmly fix the pump with screws on a foundation. Facing in any direction is permitted for installation. It is recommended that an padded sheet be placed between the pump base and the foundation to absorb vibration of the pump.

PIPING

1. Prepare two Rc3/8 tube connectors. Tape them with PTFE seal tapes.

2. Screw the connectors into the inlet and outlet ports. When screwing, hold the pump head up to prevent the mounting plate (5) from undergoing excessive force. Do not press down on the pump.

3. Prepare corrosion - and pressure - resistant tubes.

   A polyethylene, PTFE or spring - reinforced PVC tube is recommended for flexible tubing. Do not use a soft vinyl hose for the suction line because if may become deformed, when pumping hot water especially. To absorb vibration of the pump, flexible tubing is always recommended.

4. Firmly fix the tubes with the tube connectors.
   If the suction line is incompletely connected, the pumping performance will deteriorate due to air leakage.

5. The best piping arrangement for minimum loss is based on straight runs with as few bends and fittings as possible.

WIRING

1. After the power voltage is checked, install wiring in accordance with the job standard for indoor wiring.

2. Connect a ground wire securely.

OPERATION

1. Fully open the discharge valve after confirming that a suction tank is filled with a liquid.

2. Fully open the suction valve and fill the pump with the liquid. If the pump is installed higher than the liquid level, pour the liquid into the pump from the discharge line.

3. Turn on the power. The liquid flows out instantly. Should no liquid be discharged, turn off the power immediately. Check piping system. If it is in order, disassemble the pump head and clean its interior with fresh water an remove foreign matter.

4. Close the discharge valve gradually to adjust the flow rate.

CAUTION

* Always operate the valve gradually. Rapid operation may cause disengagement of magnet coupling.
* Turn off the power immediately when the magnet coupling is disengaged or the gears are locked with foreign matter. Do not turn on the power again while the rotor of motor still rotates by inertia after turning off the power.
* Avoid controlling flow rate by closing the suction valve. Closing of the suction valve makes the operation noise louder and shortens the life of bearings due to cavitation.

MAINTENANCE

1. Periodically check flow rate, suction/discharge pressure, amperage, vibration and noise.

2. Replace the gears (12 &15) and the bearings (11) when the pump performance is excessively lowered or noise becomes louder. The seal (14) should be replaced with every disassembling.

[Reference] When pumping water of 25ºC temperature at 2kgf/cm² pressure, the decrease in performance is less than 20% after 5,000 hours of operation.

3. The SPARE KIT is provided as an option. It consists of drive gear, driven gear bearing and seal.

DISASSEMBLING

WARNING

Protect yourself by using protective equipment such as chemical gloves, face shield, chemical apron, etc. when disassembling a pump which has handled any hazardous liquid. Close all valves and turn off the power before disassembly.

1. Drain the pump by disconnecting tubing.

2. Remove six screws (19) and disconnect the pump unit from motor (1)

3. Remove six screws (17) and disconnect mounting plate (5) and rear casing (7) from the pump unit.

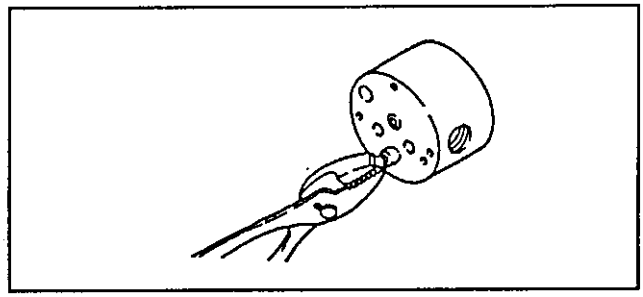
4. Remove a screw (6) and remove a magnet capsule (8) from driving gear shaft (15). Keep magnet capsule (8) in a clean place free from iron powder.

5. Loosen four screws (18) with a hexagon key, and remove end-disk (16), gear case (13), mounting disk (10), four straight pins (20), two seals (14), driving gear (15), and driven gear (12).

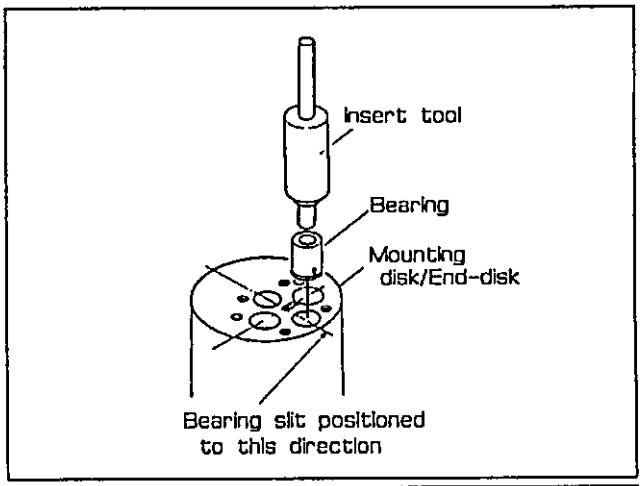
6. Be careful not to bruise the seal surface of any part. Keep every part in a clean place free from dust after cleaning.

REPLACEMENT OF BEARING

1. Remove six bearings (11) from mounting disk (10) and end disk (16). To draw them out easily, screw an M8 bolt into each worn bearing by about 5mm and pull it out together with the bearing.

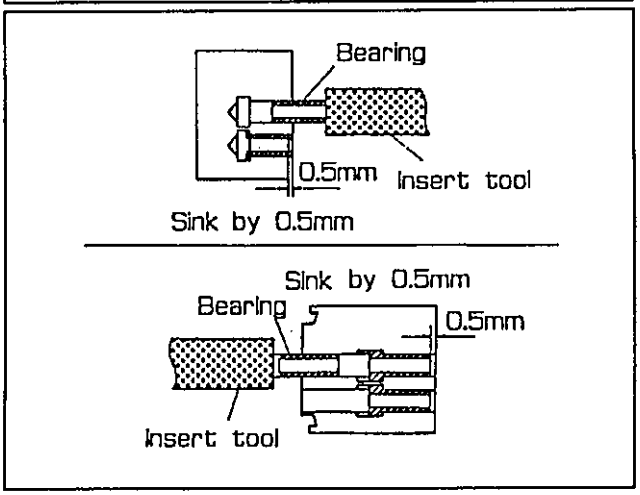


2. Insert a new bearing into mounting disk (10) and end-disk (16). In this case, position the slit of bearing as shown on the fig. right and insert the bearing in the manner that the slit is pressed by fingers. The bearing end is sunk by 0.5mm from the disk end. Care to be taken that the bearing goes straight into bearing hole.



3. The bearings are inserted on the mounting-disk (10) from both sides.

4. After new six bearings are mounted, the reamer of 7.15mm dia. is inserted into bearing to make bearing surface smooth.

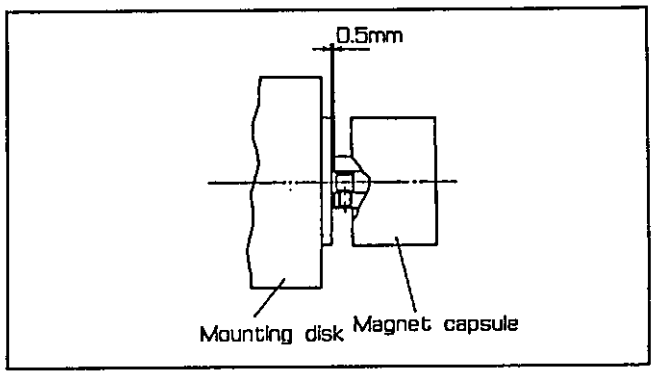


ASSEMBLING

1. Insert driving gear (15) and driven gear (12) into the mounting disk (10).

2. Stand two straight pins (20) on the mounting disk (10), and put a piece of seal (14) and gear case (13) on it. Stand two straight pins (20) on gear case (13) and put a piece of seal (14) and end-disk. And these end-disk, seal and gear case are put and tightened on mounting disk by the screws (18).

3. Magnet capsule (8) is fixed to the shaft of driving gear (15) by screw (6). In this case, the magnet capsule should be apart from the mounting disk by 0.5mm. (the screw hole of magnet capsule is positioned to the groove of the shaft.)

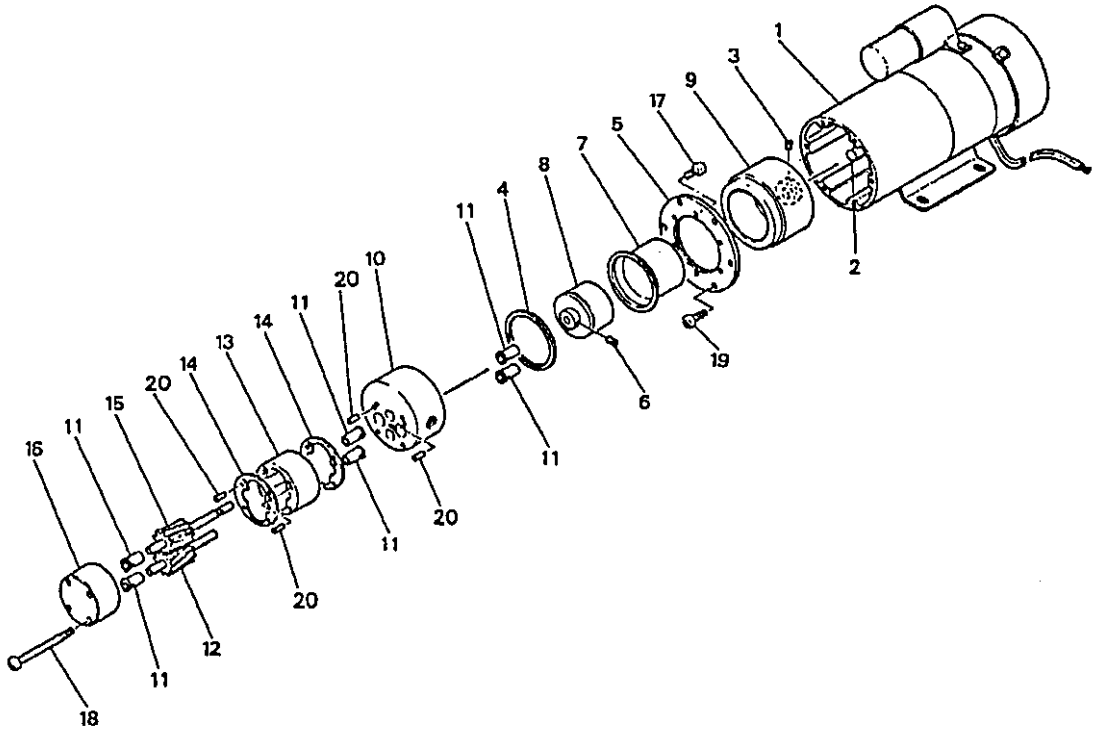


4. Rear casing (7) and mounting plate (5) are mounted on the so far assembled pump head by six screws (2). In this case, chamfered side of mounting plate is faced to mounting disk. When the screws are tightened, take care of the concentricity of each part. Mount the pump end on the motor (1) with drive magnet (9) by six screws (19).

TROUBLESHOOTING

Trouble	Cause	Remedy
Motor does not start	* Plug is disconnected from plug receptacle. * Break of wire of motor. * Electric leakage or too small capacity of breaker.	* Plug in receptacle. * Repair or change motor. * Check the cause and restart.
Motor starts but speed does not increase and overloaded	* Too high liquid viscosity * Completely closed valve *Too high friction loss of piping	 * Open valve * Improve piping system
Motor stops during operation	* Disconnected wiring * Thermal overload protection operated due to over load. * Breaker operated due to leakage	* Check wiring * Lower liquid viscosity or discharge pressure * Check wiring & motor
No pumping up or in-sufficient pumping up	* Short of liquid in suction tank. * Air enters suction line * Suction hose is deformed. * Suction pressure is lower than saturated vapour pressure of liquid * Gears worn	* Fill suction tank. * Check suction line piping and upgrade. * Replace with hose that cannot be deformed. * Lower liquid temperature and/or friction loss in suction piping. * Replace gear unit.
Magnet coupling is disconnected.	* Foreign matter sticks to gear. * Magnet capsule contacts rear casing due to excessive wear of bearing and/or drive gear shaft. * Gear is damaged due to dry running etc.	* Remove foreign matter * Replace gear with bearing and/ or drive gear shaft * Replace gear
Loud noise or vibration	* Pump runs dry. * Foreign matter sticks to gear. * Driven magnet contacts rear casing due to wear of drive shaft. * Gear is damaged.	* Check that pump is filled with liquid. * Remove foreign matter. * Change drive shaft. * Replace gear.
Leakage from pump body	* O-ring is deformed. * Screw is loose.	* Replace O-ring. * Tighten screw.

CONSTRUCTION



Item	Part name	Q'ty
1	Motor	1
2	Motor shaft	1
3	Hex. hole screw	1
4	Gasket	1
5	Mounting plate	1
6	Hex. hole screw	1
7	Rear casing	1
8	Magnet capsule	1
9	Drive magnet	1
10	Mounting disk	1

Item	Part name	Q'ty
11	Bearing	6
12	Driven gear	1
13	Gear case	1
14	Seal	2
15	Drive gear	1
16	End disk	1
17	Screw M4×8	6
18	Screw M4×55	4
19	Screw M5×12	6
20	Straight pin	4

EC DECLARATION OF CONFORMITY

A copy of the original Declaration of Conformity

(SUPPLIER'S NAME)

WE

IWAKI CO.,LTD.

(ADDRESS)

6-6 2-CHOME KANDA-SUDACHO CHIYODA-KU TOKYO JAPAN

(PRODUCT)

DECLARE UNDER OUR SOLE RESPONSIBILITY THAT THE PRODUCTS

MAGNETIC DRIVE GEAR PUMP

(MODEL NAME)

MDG SERIES

TO WHICH THIS DECLARATION RELATES ARE IN CONFORMITY WITH THE FOLLOWING STANDARDS OR DIRECTIVES AS FAR AS APPLICABLE

(DIRECTIVES)

MACHINERY DIRECTIVE 2006/42/EC (ANNEX IIA)
RoHS DIRECTIVE 2011/65/EU

NOTE: THIS PRODUCT IS INTENDED FOR FITTING INTO ANOTHER MACHINE OR INSTALLATION. CONFORMITY WITH THE DIRECTIVE 2014/30/EU SHOULD BE ESTABLISHED BY THE END PRODUCT.

(STANDARDS)

EN ISO12100: 2010 EN809: 1998 + A1: 2009 EN IEC63000: 2018

(A PERSON WHO IS AUTHORISED TO COMPILE THE TECHNICAL FILE IN THE COMMUNITY)

IWAKI EUROPE GMBH
SIEMENSRING 115 D-47877 WILLICH GERMANY

NOTE: THIS DECLARATION BECOMES INVALID IF TECHNICAL OR OPERATIONAL MODIFICATIONS ARE INTRODUCED WITHOUT THE MANUFACTURER'S CONSENT.

T. Sawada.

TSUTOMU SAWADA
SENIOR GENERAL MANAGER,
QUALITY ASSURANCE HEAD OFFICE

Tokyo, Dec. 18, 2023

(PLACE AND DATE OF ISSUE) **(NAME AND SIGNATURE OR EQUIVALENT MARKING OF AUTHORIZED PERSON)**

DOCUMENT NO. IS-51K-527-4

CE conformity

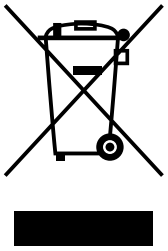
■ **Information on CE conformity of pump units when the motor is fitted by the customer (dealer/operator)**

We hereby confirm the CE conformity of our pump unit provided that the following criteria about intended use are satisfied as described in this instruction manual:

- Motor conformity in accordance with any relevant EC directives which are currently effective.
- The dimensions of a required motor flange and shaft must fit the specified pump.
- The motor must be installed to the pump according to this instruction manual.
- Guaranteed grounding
- The pump must not be repainted over our original upper coating.

Any reseller or dealer who connects the pump with a motor and markets it as a complete unit must conform to all relevant EC directives. In such cases, the reseller or dealer then becomes the manufacturer.

Waste Electrical and Electronic Equipment (WEEE)



In accordance with the European Directive 2012/19/EU on waste electrical and electronic equipment, this product features the crossed-out wheelie bin symbol. When this product is disposed of in household wastes, toxic components included in it can cause major environmental and human health problems. Use appropriate waste collection systems for recovery and recycling. Contact your local distributor or nearest Iwaki company for the detailed collection systems.

IWAKI

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