CAT-E 0012-05

IWAKI

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



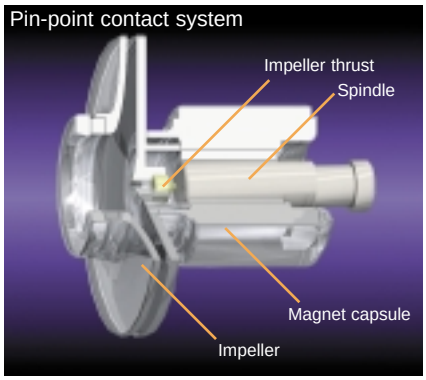
MDF-L401-D

MDF-L250-D

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.

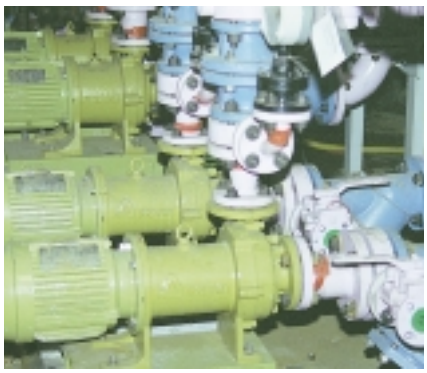
Pin-point contact system

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.



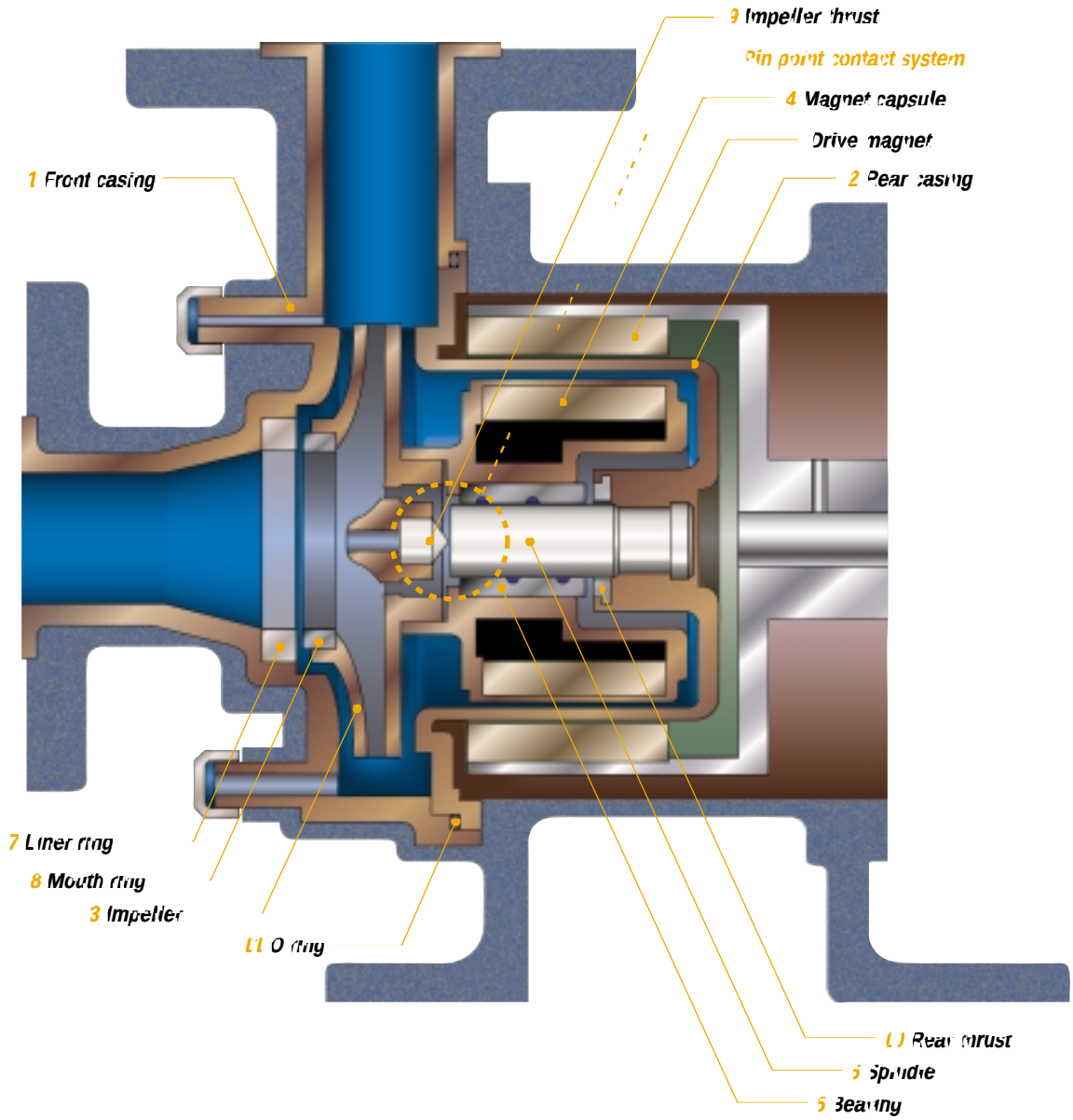
Patents
Europe / Japan / Taiwan / U.S.A. / Korea







Construction and materials



Wetend materials

Part / Material code	CF -D	AA -E	KK -E	Note
1 Front casing	CFRETFE (Carbon fiber-reinforced ETFE)			
2 Rear casing				
3 Impeller				
4 Magnet capsule				
5 Bearing	High-density carbon	High-purity alumina ceramic	SiC	
6 Spindle	High-purity alumina ceramic			
7 Liner ring				
8 Mouth ring	PTFE			
9 Impeller thrust	High-purity alumina ceramic			
10 Rear thrust	High-purity alumina ceramic			
11 O ring	FKM/EPDM/AFLAS®			

Note: MDF-40LKK type is not available.

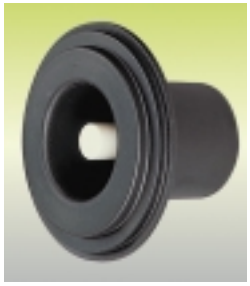
Impeller thrust
When dry running happens, the impeller thrust and the spindle front part come into contact.



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



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.



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.



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.)



Pump identification

MDF-L 42 2 CF V K - D

Pump size
Shows discharge port diameter
(42 is 40)

Motor output
0 0.37kW
0.75kW
2 1.5kW
3 2.2kW
5 4.0kW

Material of Bearing/Spindle
CF High-density carbon /High-purity alumina ceramic
AA High-purity alumina ceramic /High-purity alumina ceramic
KK SiC/SiC

Material of O-ring
V FKM
E EPDM
A AFLAS®

Code of Impeller
K L T V W for 50Hz
S Non-standard impeller

Special code
D Pin-point contact system (Dry run is available)
E Pin-point contact system (Dry run is not available)
S Special specifications
H For high liquid temperature (Max. 100°C for MDF-L250,401)

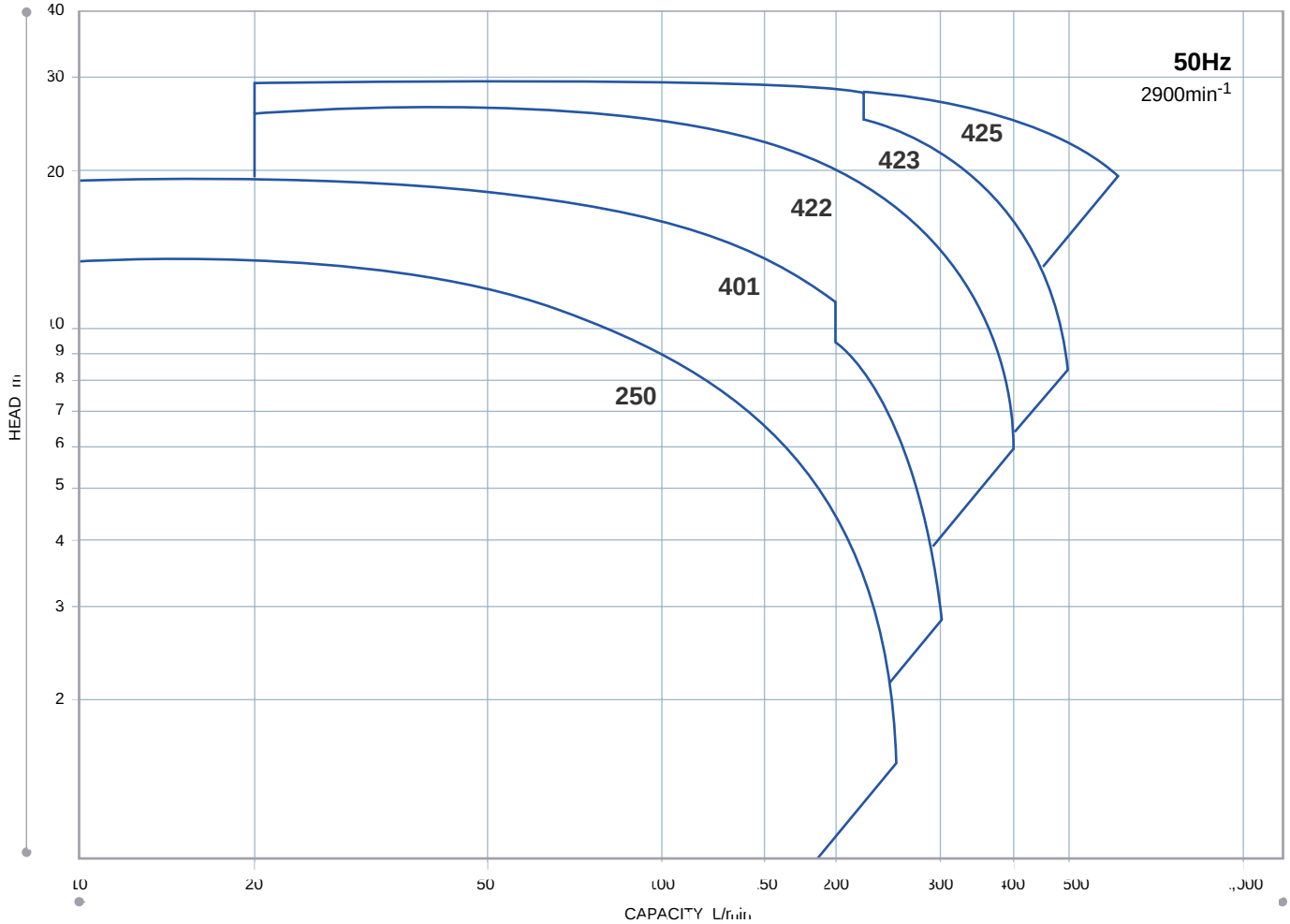
Specifications

50Hz

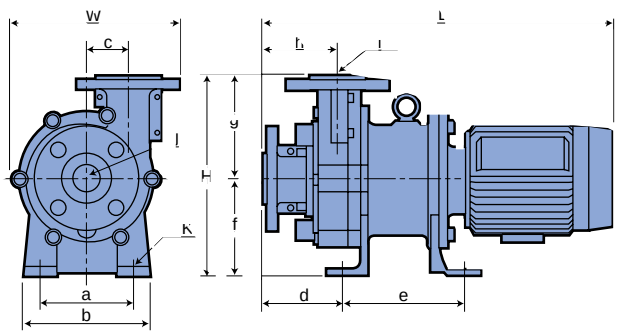
Model	Nominal bore size Suction X Discharge mm	50Hz			Motor Output kW	* Mass (Less motor) kg
		Impeller size	Head m	Capacity L/min		
MDF-L250	25 X 25	K T V W	12.2 7.3 5.6 3.0	50 150	0.37	23(14)
MDF-L401	40 X 40	K T V W	16.8 9.5 8.3 4.8	100 200	0.75	38(22)
MDF-L422	50 X 40	K T V W	20 18 14 10.5	200	1.5	41(26)
MDF-L423	50 X 40	K L T V W	28.5 21.5 19.5 15 11.5	150 300	2.2	43(26)
MDF-L425	50 X 40	T V W	25.5 21 12	400	4.0	54(28)

Temperature range of liquid handled (MDF-L250/401) : 0 to 90°C, -10 to 90°C with AFLAS® O-ring is used. (0 to 100°C possible on special order)
Temperature range of liquid handled (MDF-L422-425) : 0 to 100°C, -10 to 100°C with AFLAS® O-ring is used.
Allowable slurry (A type and K type) : Hardness: Below 80HrS, Particle size: Below 50μm (Concentration up to 5wt%)
Casing cover : Cast Iron FC200
*Mass (Weight with motor) vary depending on motor installed.

Performance curves



Dimensions



Model	W	H	L	a	b	c	d	e	f	g	h	i	j	K
MDF-L250	205	237	439	110	150	51	95	143	115	122	88	25	25	4-ø12
MDF-L401	233	275	519	130	170	58	111	250	135	140	102	40	40	4-ø14
MDF-L422	251	295	557	140	180	65	106	275	155		87		50	
MDF-L423														
MDF-L425			625											

Note: Dimensions vary depending on motor installed.

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.
Pump shaft power SP x Specific gravity of liquid X 1.05 to 1.5 as allowance ≦ Motor output

(Note: Motor shaft power SP rises in proportion to the specific gravity of liquid. Also if the liquid viscosity increases, required shaft power increases while pump discharge capacity and head decrease. Therefore the correction of pump performance must be done together with the correction of pump shaft power.)

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

Model	250•401	422•423	425
Maximum flow rate	10L/min	20L/min	50L/min

4) How to determine suction conditions (NPSH)---Prevention of cavitation

Select an NPSHa value so that NPSHa-NPSHr ≧{0.5(m) Allowance}

$$NPSHa = \frac{10^{6}(Pa - Pv)}{\rho g} \pm hs - hf$$

Pa: Pressure applied to surface of supply liquid MPa
Pv: Vapor pressure of liquid MPa
ρ: Liquid density kg/m3
hs: Height of suction m
hf: Suction pipe resistance m
g: Acceleration due to gravity 9.8m/s²
γ: Specific gravity of
NPSHa: Available NPSH m
NPSHr: Required NPSH m

(Note: Refer to the performance curve for the selection of NPSHr.)

(5) Pump casing pressure limit.
The pumps have the following casing pressure limits:

Model	250	401	422 423	425
Maximum pressure rating MPa	0.16	0.24	0.4	0.45

$$P = \frac{\rho g(Hmax \pm hs)}{10^{6}} \cdots MPa$$

P: Internal pressure of pump MPa
ρ: Liquid density kg/m³
g: Acceleration due to gravity 9.8m/s²
Hmax: Pump maximum discharge head m
hs: Suction head m

(6) In case of pump performance curve where max. head does not occur at shut off point. For example MDF-1.423 with "W" impeller)
For the pump model of which the performance curve shows ascending line in the small flow range, it is recommended the pump is not used at ascending range of performance curve. If the pump is obliged to be used in this range, piping must be done paying attention to the following points.

(1) No air trap should be in discharge piping.
(2) Flow rate adjustment should be done by means of the valve located just after the pump.

Iwaki dry running protector
DR series (Option)

Model DR is electric current sensing 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.

- Current figure to be set is indicated on LCD.
- Both top/bottom figures can be set.
  Top:Over-load
  Bottom:Dry running, air sucking-in operation, operation with suction side closed
- Built-in current transformer (DR-20)
- DIN rail mounting



DR-20

Specification

Model		DR-20	DR-21
Motor power		380 to 440V	
Applied motor		0.75 to 15kW	18.5 to 75kW
Power 45-65Hz	V	200 to 240V ±10% shingle phase	
	Input	3.5W	
Detective current		0.5 to 32.0A	20 to 200A
Current transformar(CT)		Built-in	External
Current range		Auto : 4.4/17.6/32A	0 to 200A
		Manual : 2.2/4.4/8.8/11/17.6/26.4/32A	
Ambient		Temperature:0 to 40°C Humidity:RH40 to 85%	
Outer dimension		D80 X W153 X H110	



Current transformer 200AT(For DR-21)

Iwaki process magnetic drive pump series

MDM SERIES

Magnetic drive process pumps with dry running capability



Specifications
- Max.discharge capacity :1.4m^3/min
- Max.head : 53m
- 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 :4.0m^3/min
- Max.head : 55m
- 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 :670L/min
- Max.head : 65m
- Main materials : SUS316
- Liquid temp. range : 0 to 120˚C

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Thailand	IWAKI (Thailand) Co.,Ltd.	TEL	(66)2 322 2471	FAX	2 322 2477

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

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