

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.



MDF-L401-D

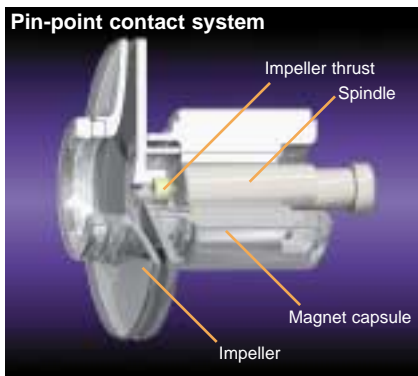
MDF-L250-D

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

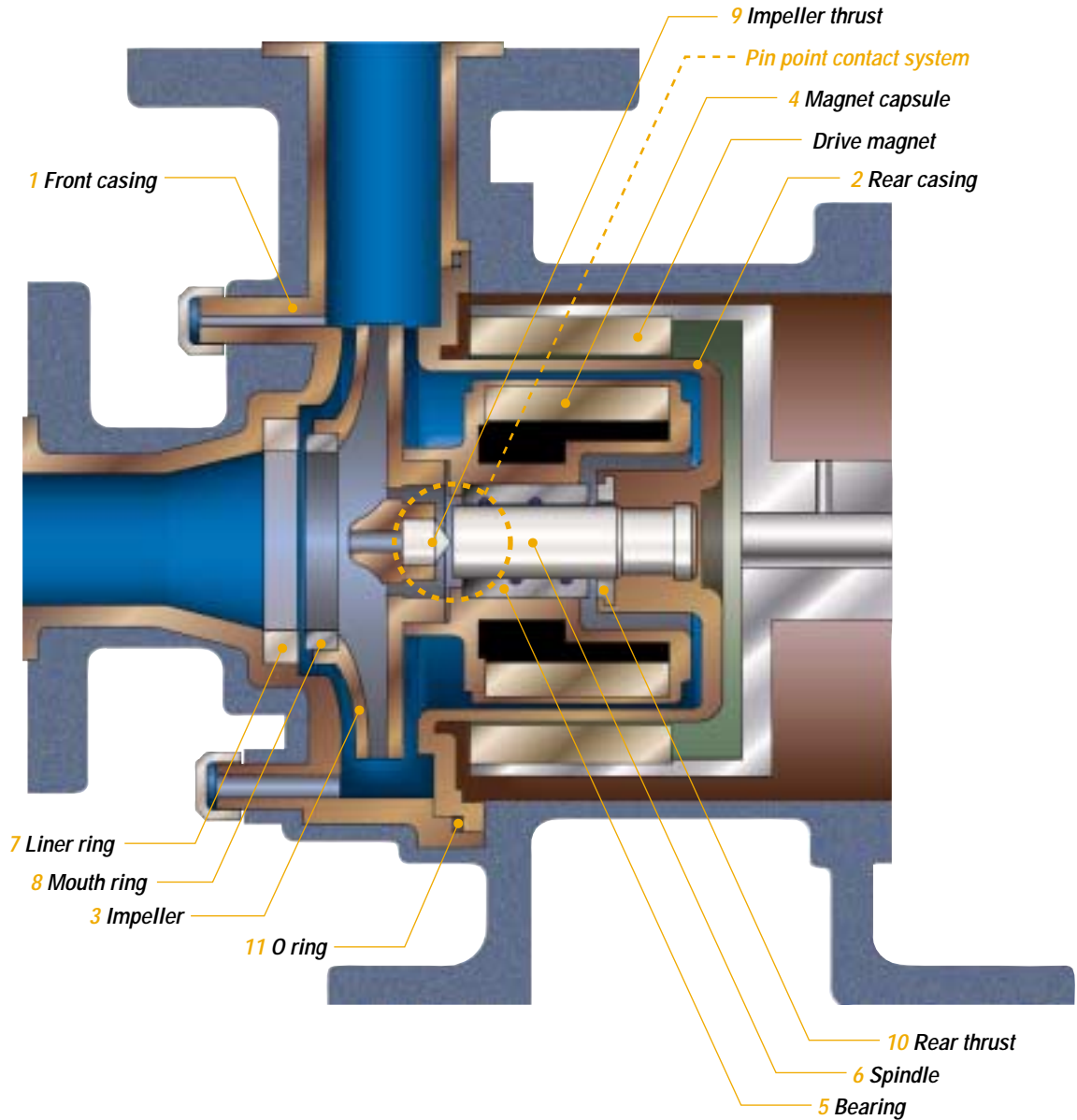
In a no-thrust condition due to dry run, only the impeller thrust surface and spindle fore edge come in contact. The magnet capsule never touches the rear casing. This "pin-point" contact between impeller and spindle thrust surfaces significantly minimizes friction, and therefore heat generation.



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



Construction and materials



Wet-end materials

Part	Material code	CA -D	Note1	CC -E	Note1	CF -D	AA -E	KK -E	Note2	
1 Front casing		CFRETPE (Carbon fiber-reinforced ETFE)								
2 Rear casing										
3 Impeller										
4 Magnet capsule										
5 Bearing		High-density carbon		Alumina ceramic		High-density carbon	High-purity alumina ceramic	SiC		
6 Spindle		Alumina ceramic		High-purity alumina ceramic						
7 Liner ring		PTFE								
8 Mouth ring		High-purity alumina ceramic								
9 Impeller thrust		High-purity alumina ceramic								
10 Rear thrust		High-purity alumina ceramic								
11 O ring		FKM/EPDM/AFLAS®								

Note1 : Available materials of "CA-D" and "CC-E" type for MDF-L250/MDF-L401 are only.

Note2 : MDF-L401"KK" type is not available.

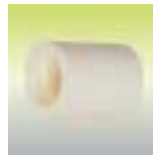
Impeller thrust

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: 0.4kW
1: 0.75kW
2: 1.5kW
3: 2.2kW
5: 3.7kW

Material of Bearing/Spindle

CA: High-density carbon/Alumina ceramic
CC: Alumina ceramic/Alumina ceramic
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
P,Q,X,Y,Z: for 60Hz
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
H1: For high liquid temperature (Max. 100°C for MDF-L250,401)

Specifications

Model	Nominal bore size Suction X Discharge mm	50Hz			60Hz			Motor Output kW	Mass ^{Note1} (Less motor) kg
		Impeller size	Head m	Capacity L/min	Impeller size	Head m	Capacity L/min		
MDF-L250	25 X 25	K	12.2	50	P	12.2	50	0.4	23(14)
		T	7.3	150	X	6.4	150		
		V	5.6		Y	4.6			
		W	3.0		Z	2.4			
MDF-L401	40 X 40	K	16.8	100	P	16.2	100	0.75	38(22)
		T	9.6	200	X	9.0	200		
		V	8.3		Y	6.6			
		W	4.8		Z	4.8			
MDF-L422	50 X 40	K	20	200	P	26	100	1.5	41(26)
		T	18	200	X	17.5	200		
		V	14		Y	14			
		W	10.4		Z	9.3			
MDF-L423	50 X 40	K	28.5	150	P	30	150	2.2	43(26)
		L	21.5	300	Q	26.5	300		
		T	19.5		X	19.5			
		V	15		Y	14.5			
		W	11.5	Z	10.5				
MDF-L425	50 X 40	-	-	-	P	39.8	200	3.7	54(28)
		T	25.5	400	X	26.5	400		
		V	21		Y	18.5			
		W	8.5		Z	13.0			

Temperature range of liquid handled (MDF-L250/401) : 0 to 90°C. 10 to 90°C when AFLAS® O ring is used. (Up to 100°C possible on special order)

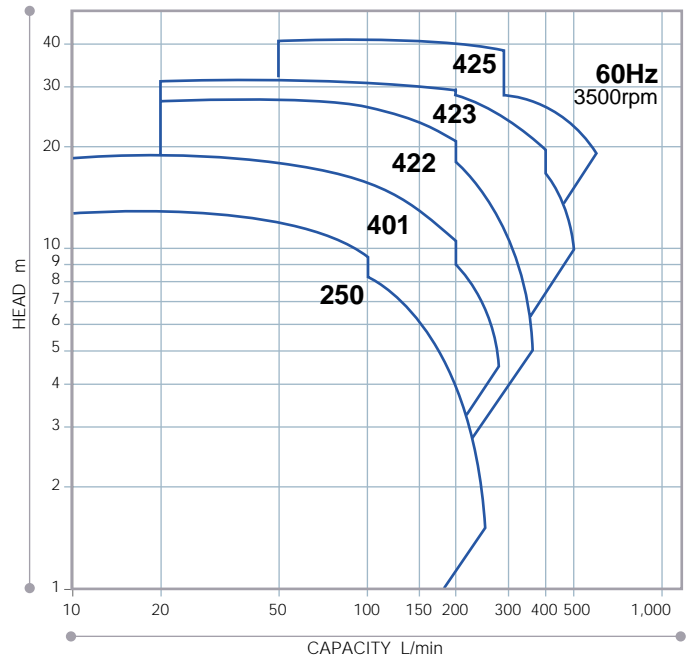
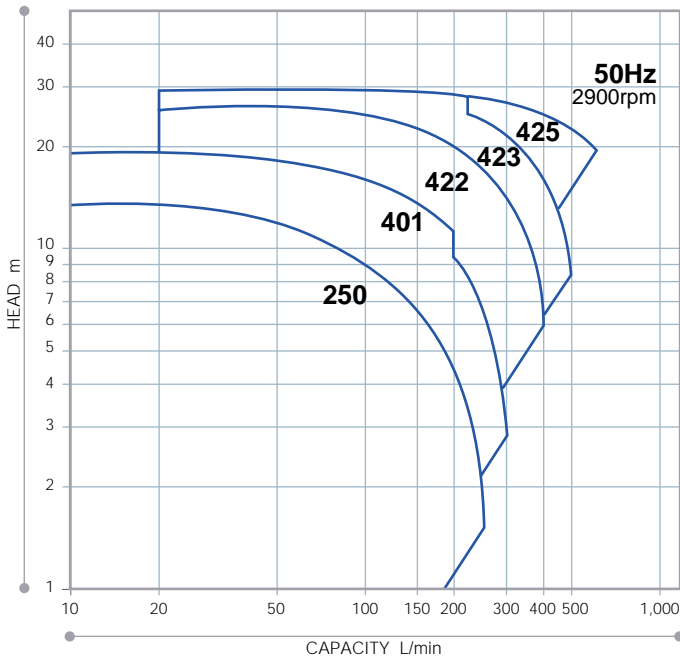
Temperature range of liquid handled (MDF-L422-425) : 0 to 100°C. 10 to 100°C when AFLAS® O ring is used.

Allowable slurry (AA and KK type) : Hardness: Below 80HS, Particle size: Below 50µm (Concentration up to 5wt%)

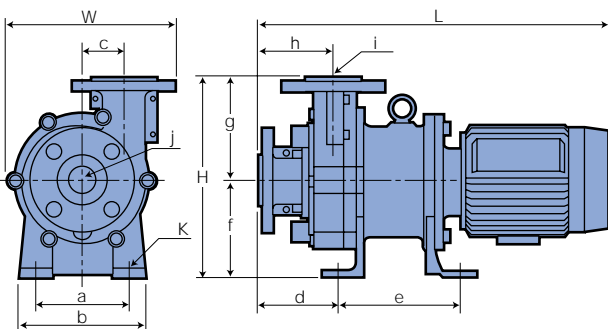
Casing cover : Cast iron FC200

Note1 : Mass (weight with motor) vary depending on motor installed.

Performance curves



Dimensions in mm



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		102		40	
MDF-L422			557							140		40		
MDF-L423	251	295		140	180	65	106	275	155		87		50	4-ø14
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 1.1 as allowance \leq 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 below:

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 $NPSHa \geq \{0.5(m) / \text{Allowance}\}$

$$NPSHa = \frac{10^5(Pa - Pv)}{\rho g} \pm hs - hf$$

- 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 liquid
- 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

$$P = \frac{\rho g(H_{max} \pm h_s)}{10^6} \dots \text{MPa}$$

- 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-L423 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	200 to 440V	
Applied motor	0.4 to 7.5kW	11 to 37kW
Power 45-65Hz	V	200 to 240V \pm 10% shingle phase
	Input	3.5W
Detective current	0.0 to 32.0A	
Current transformer(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 (50/60Hz)

- Max. discharge capacity: 1.4m³/min
- Max. head: 72/102m
- 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 (50/60Hz)

- Max. discharge capacity: 4.0m³/min
- Max. head: 55/79m
- 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 (50/60Hz)

- Max. discharge capacity: 330/320L/min
- Max. head: 20.5/22m
- Main materials: SUS316
- Liquid temp. range: 0 to 120°C

