IWAKI

Magnetic Drive Pumps

Product Guide

The Heart of Industry

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 in 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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Magnetic Drive Pumps

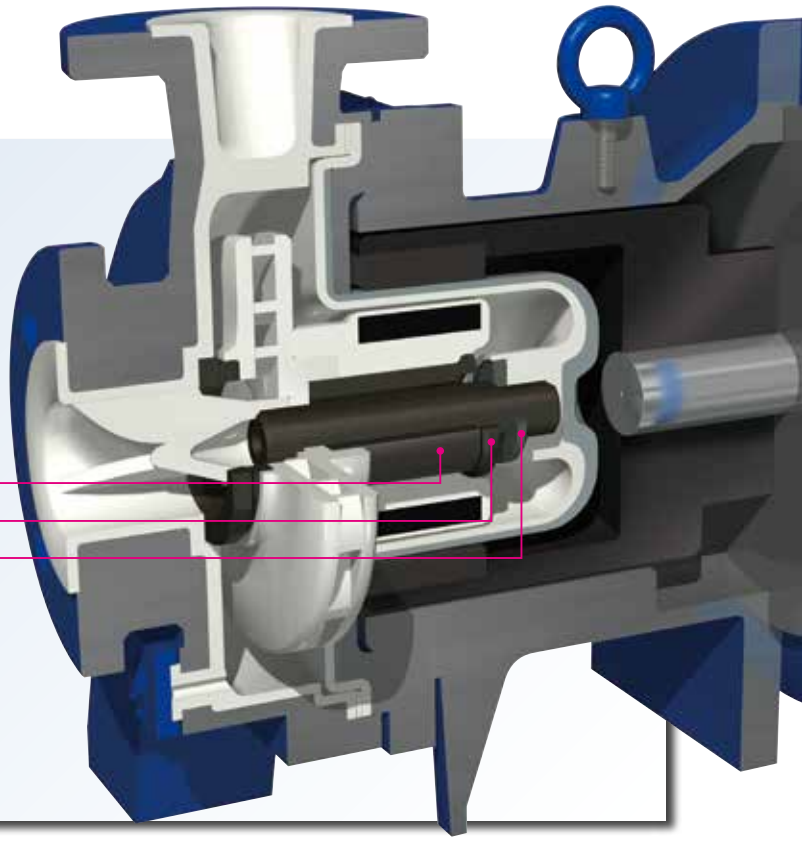
(MDM, MXM, SMX-F, MX-F)

Unique design prevents dry running Non contact system

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.

(MDM50-2J / 65-2J has an integrated bearing and rear ring)

MDM



MDM

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.

MDM

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.

MDM AMP

MXM

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.

MDM MXM AMP

SMX-F

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 4 meters in under 90 seconds.

SMX-F SMX

Self-radiating structure

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.

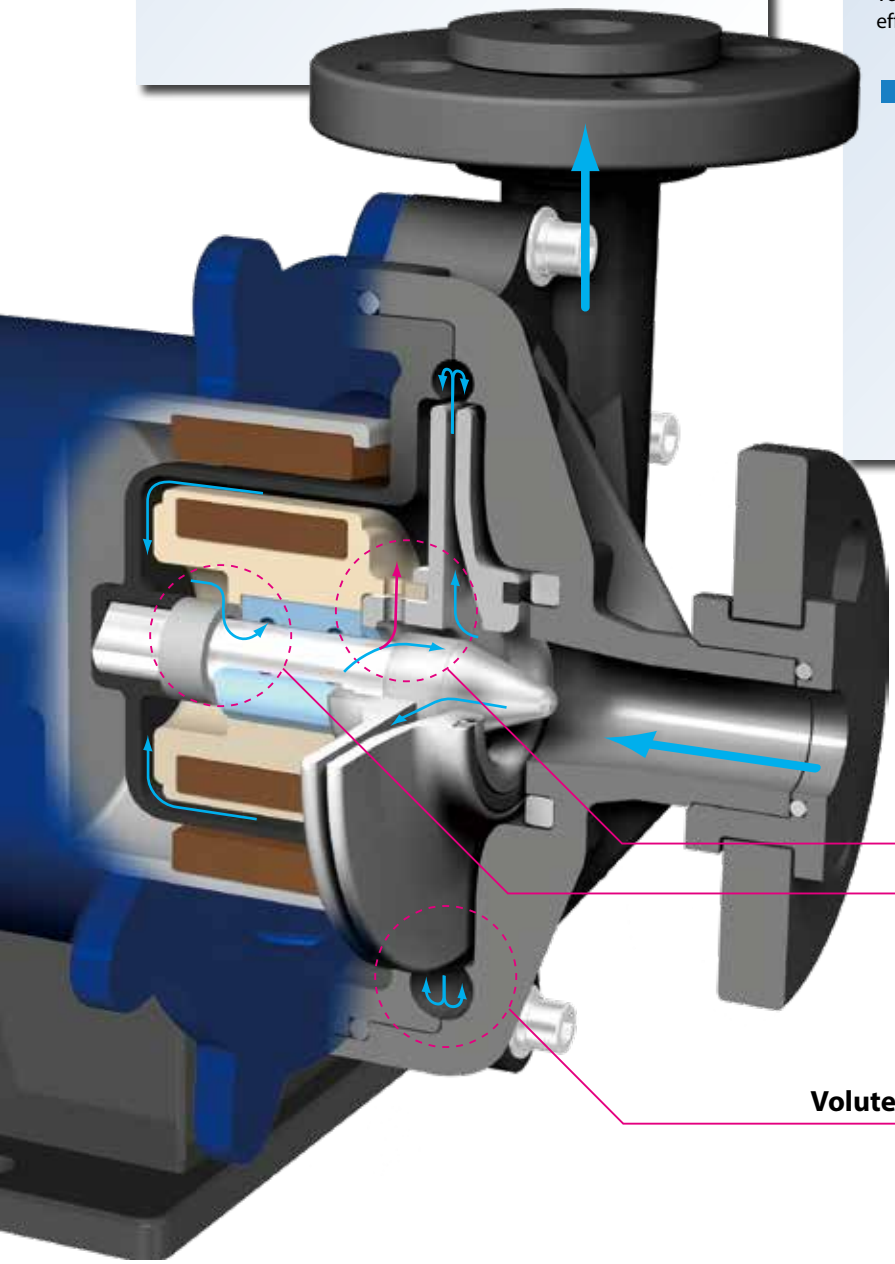
MXM SMX-F MX-F SMX MX

Volute casing divided into two sections

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)

MX-F MX

MX-F



Self-radiating structure

Non-contact design

Volute casing divided into two sections

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. Larger motors create higher outputs taking the MDW series into new high flow applications.

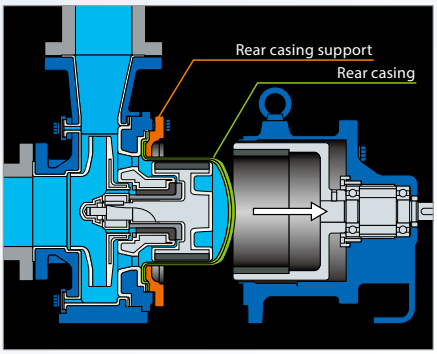
MDW

MDW

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.

MDW MDE



MDE

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.

*MDW is ISO2858, 3661 only
• Model MDE 125-250 is excluded

MDW MDE

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.

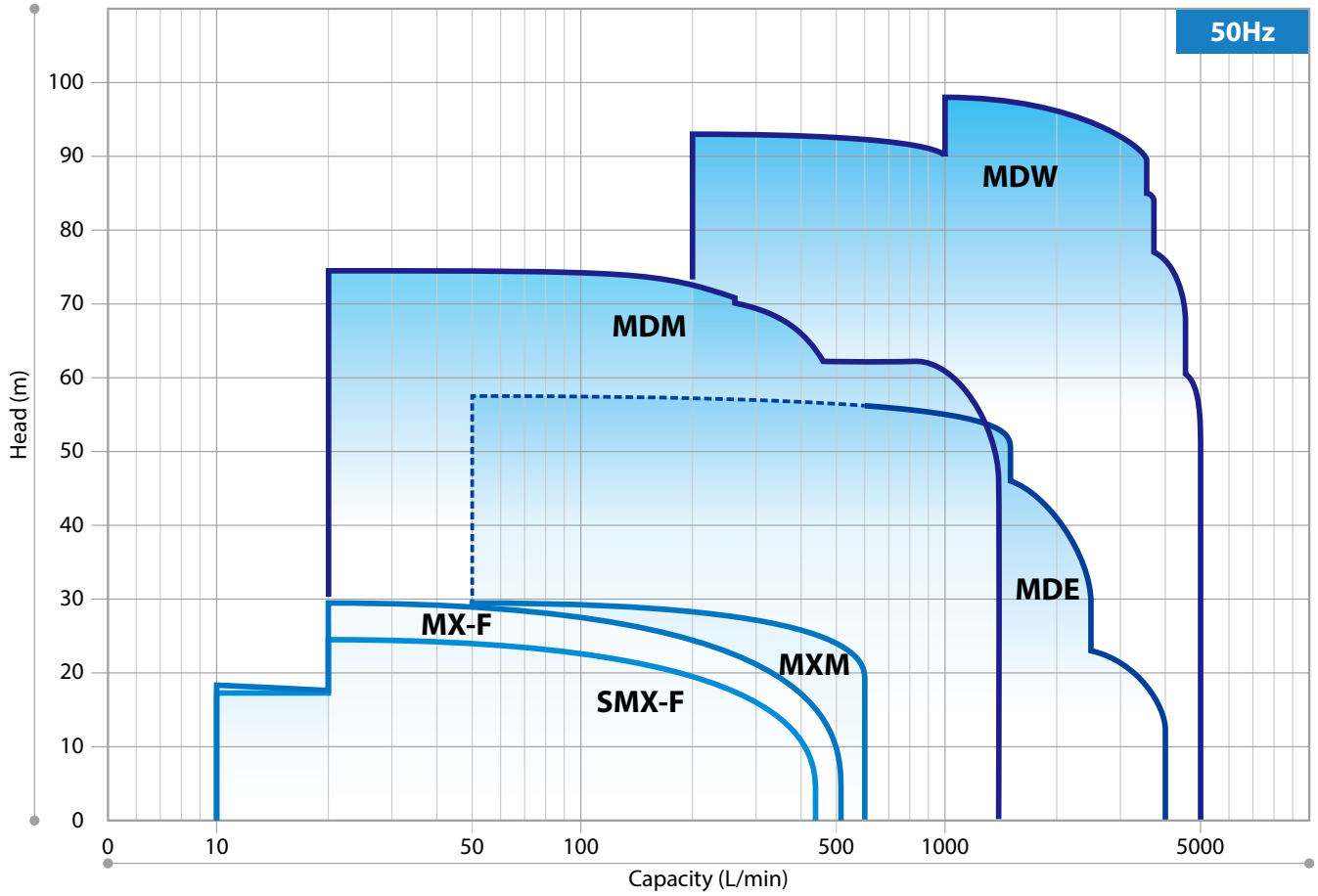
MDW MDE

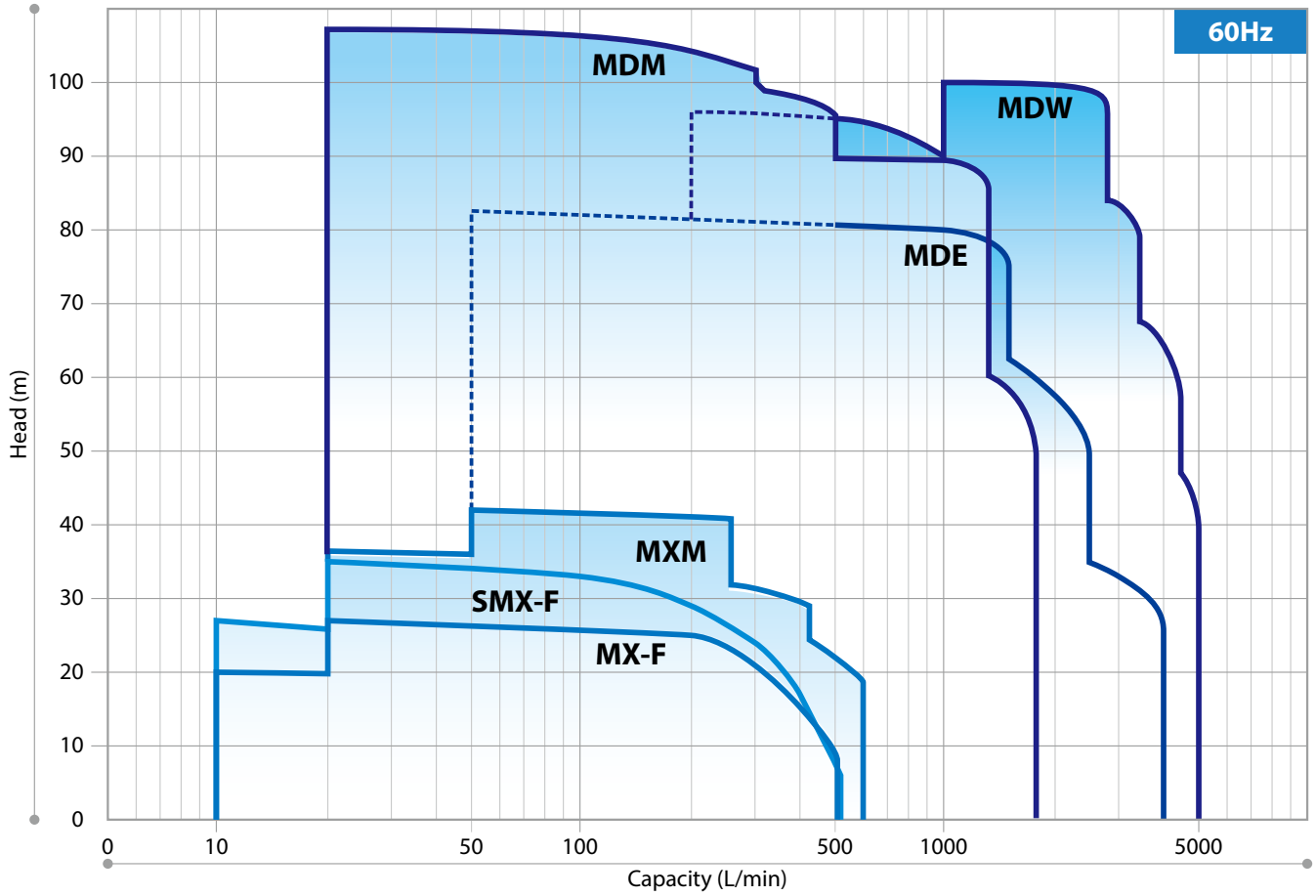
Liquid end materials

ETFE
CFRETFE
P F A

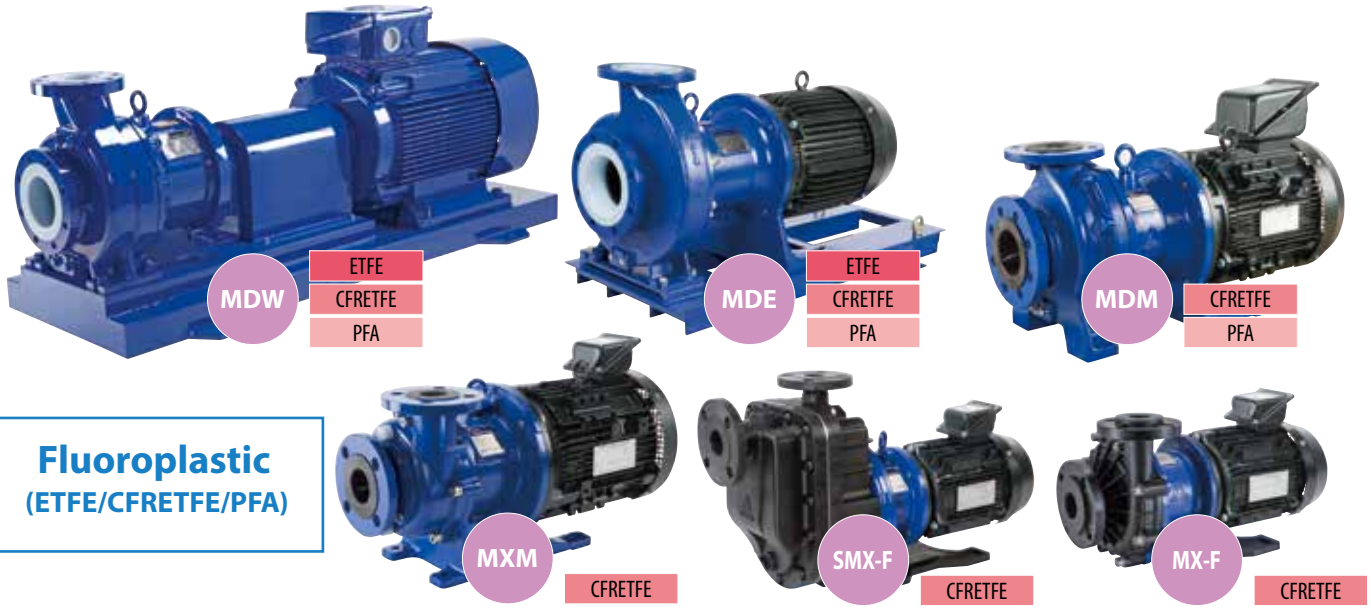
Performance Comparison for Iwaki Magnetic Drive Pumps

Materials: Fluoroplastic (ETFE/CFRETFE/PFA)





Liquid end Materials



Fluoroplastic
(ETFE/CFRETFE/PFA)

Materials

Model	Molded				Bearing system		Static sealing parts	
	Front casing	Rear casing	Impeller	Magnet capsule	Bearing	Spindle	Gasket	O ring
MDW	ETFE PFA	PFA	CFRETFE PFA	PFA	SiC	—	PTFE	Kalrez®
MDE	ETFE	PFA	CFRETFE	PFA	SiC	—	PTFE	Kalrez® FKM EPDM
MDM	CFRETFE PFA	CFRETFE PFA	CFRETFE PFA	CFRETFE PFA	High density carbon SiC	High purity alumina ceramic SiC	PTFE	—
MXM	CFRETFE	CFRETFE	CFRETFE	CFRETFE	High density carbon High purity alumina ceramic SiC	High purity alumina ceramic SiC	AFLAS® DAI-EL PERFLUORO® FKM EPDM	AFLAS® DAI-EL PERFLUORO® FKM EPDM
SMX-F	CFRETFE	CFRETFE	CFRETFE	CFRETFE	High density carbon PTFE (with filler) SiC	High purity alumina ceramic	FKM EPDM	FKM EPDM
MX-F	CFRETFE	CFRETFE	CFRETFE	CFRETFE	High density carbon PTFE (with filler) SiC	High purity alumina ceramic SiC	—	FKM EPDM AFLAS®Notes

Notes: A special order.

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
High purity alumina ceramic	Alumina ceramic with a purity of 99.5% or more
SiC	Silicon carbide ceramic

Liquid end materials
ETFE/CFRETFE/PFA

MDW series

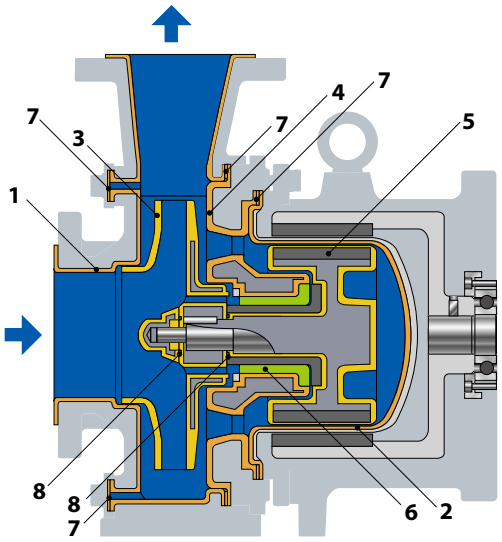
- High discharge capacity, high head and high efficiency
- Excellent chemical resistance
- Robust structure
- Back pullout design

Specifications (50/60Hz)

Max. discharge capacity	300 m³/hr
Max. discharge head	98 m
Materials	ETFE, CFRETFE, PFA
Power range	11 to 75kW
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

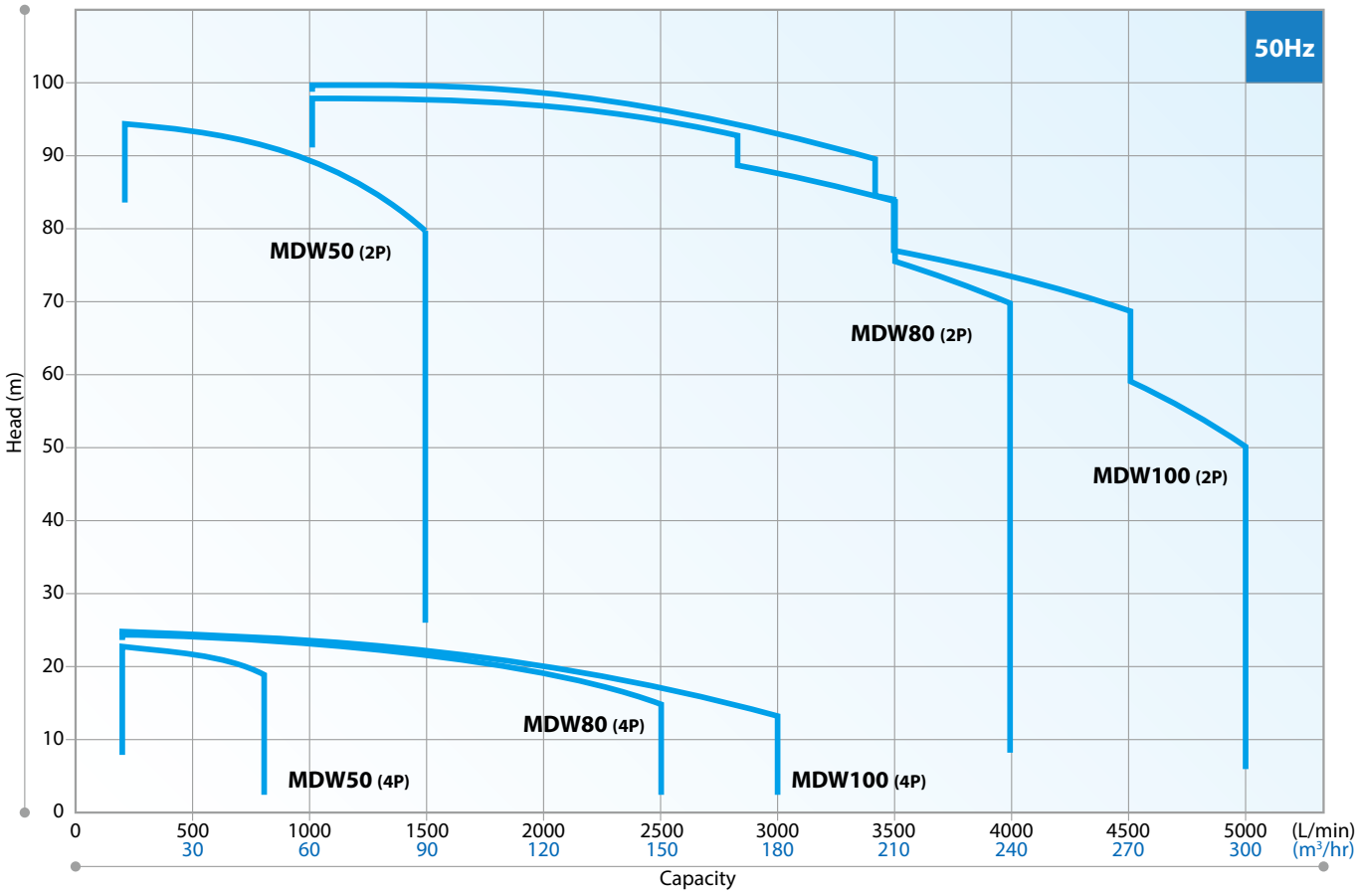


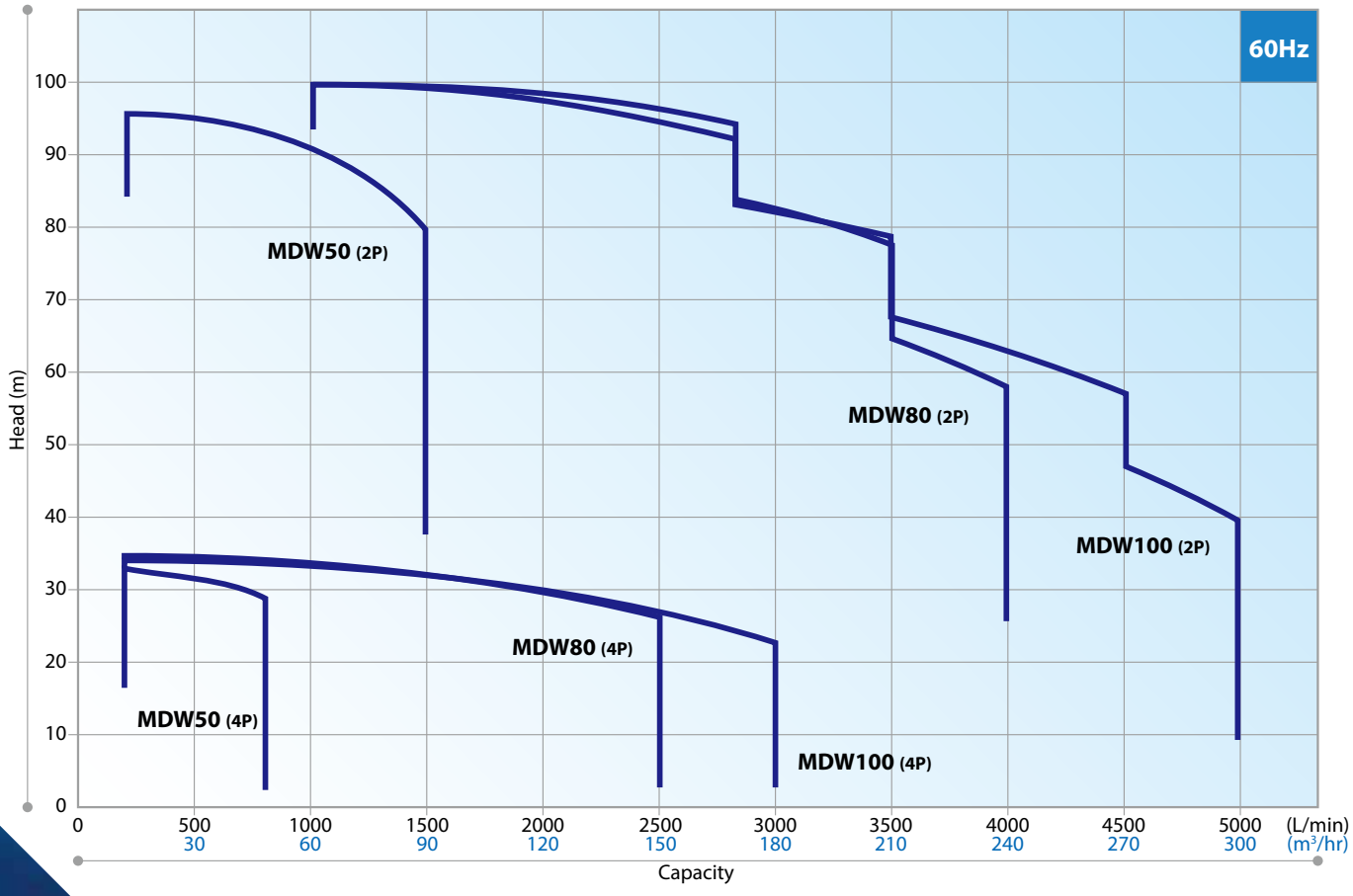
1	Front casing	ETFE, PFA
2	Rear casing	PFA
3	Impeller	CFRETFE, PFA
4	Split plate	PFA
5	Magnet capsule	PFA
6	Bearing	SiC
7	Gasket	PTFE
8	O ring	Kalrez®

Max. discharge capacity 300 m³/hr and Max. discharge head of 98 m. The world's largest fluoroplastic magnetic drive pump

Performance curves

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





Liquid end materials
ETFE/CFRETFE/PFA

MDE series

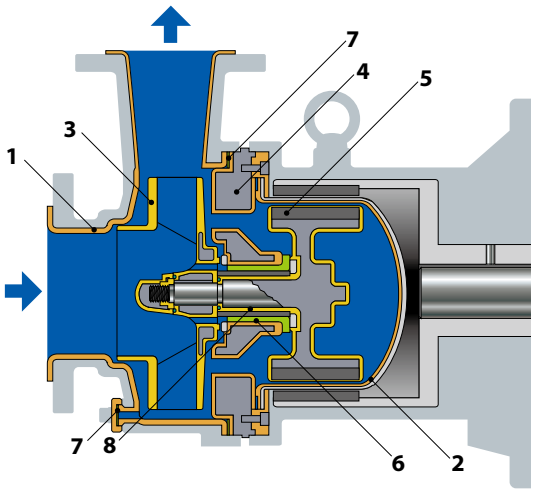
- Strong corrosion resistance
- High durability
- Compliant with ISO standards
- Back pullout design

Specifications (50/60Hz)

Max. discharge capacity.....240 m^3/hr
Max. discharge head .....63.7/91.1 m
Materials .....ETFE, CFRETFE, PFA
Power range .....11 to 45(60Hz)kW
Pump size (Discharge) .....65 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

*Fluid dependent.

Liquid end materials

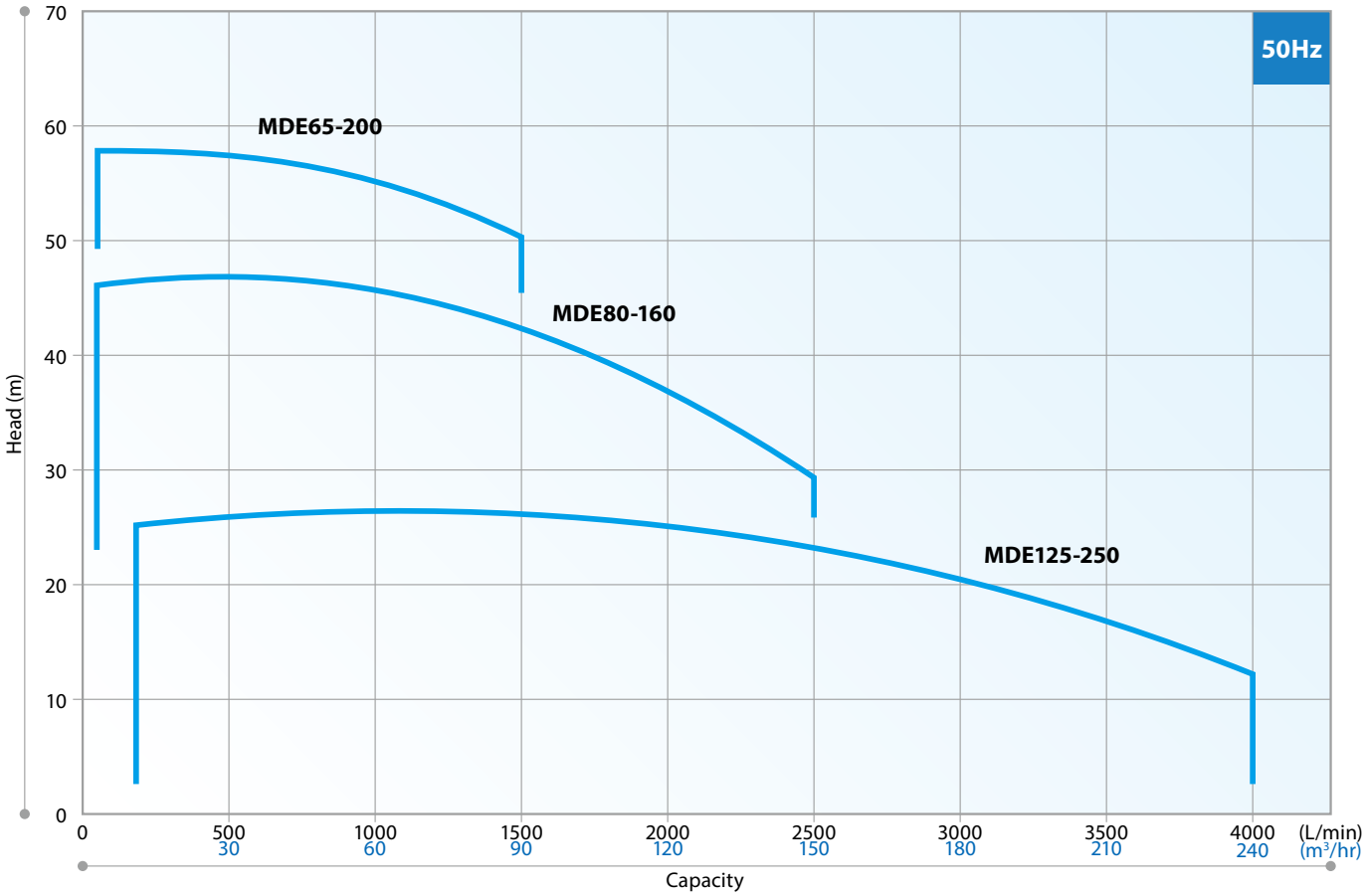


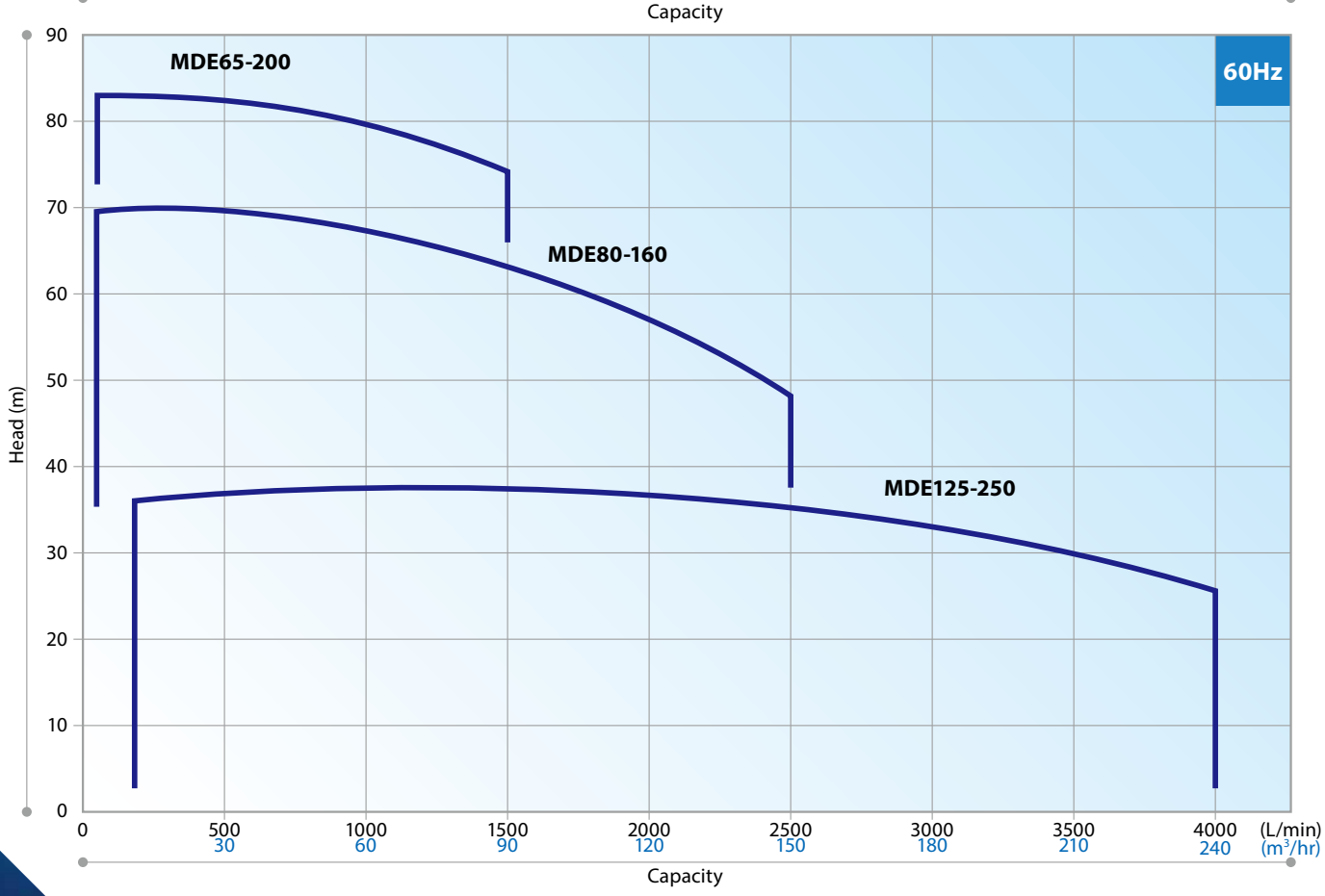
1 Front casing ..... ETFE
2 Rear casing ..... PFA
3 Impeller ..... CFRETFE
4 Split plate..... PFA
5 Magnet capsule..... PFA
6 Bearing ..... SiC
7 Gasket ..... PTFE
8 O ring..... Kalrez®, FKM, EPDM

The world's largest non-metallic magnetic drive pumps for chemical processing

Performance curves

• Pump size (Suction×Discharge) MDE65: 80A×65A, MDE80: 100A×80A, MDE125: 150A×125A





Liquid end materials
CFRETFE/PFA

MDM series

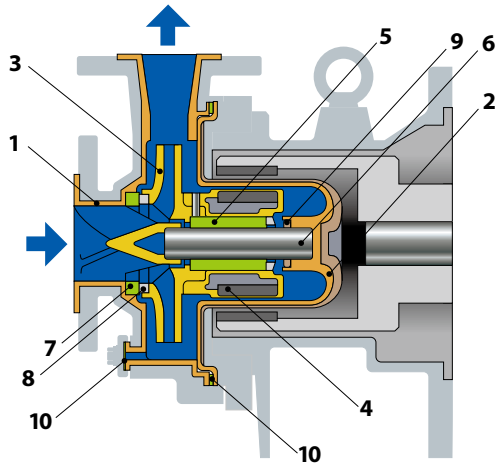
- CFRETFE and PFA available in standard models
- Durable design
- High head models available
- Back pullout design

Specifications (50/60Hz)

Max. discharge capacity	108 m^3/hr
Max. discharge head	74/107 m
Materials	CFRETFE, PFA
Power range	1.5 to 30kW
Pump size (Discharge)	25 to 65 A
Liquid temp. range	CFRETFE: -20 to 105°C* PFA: -20 to 150°C*
Specific-gravity limit	2.0 (For details, please contact Iwaki.)
Sealing method	Seal-less construction

*Fluid dependent.

Liquid end materials

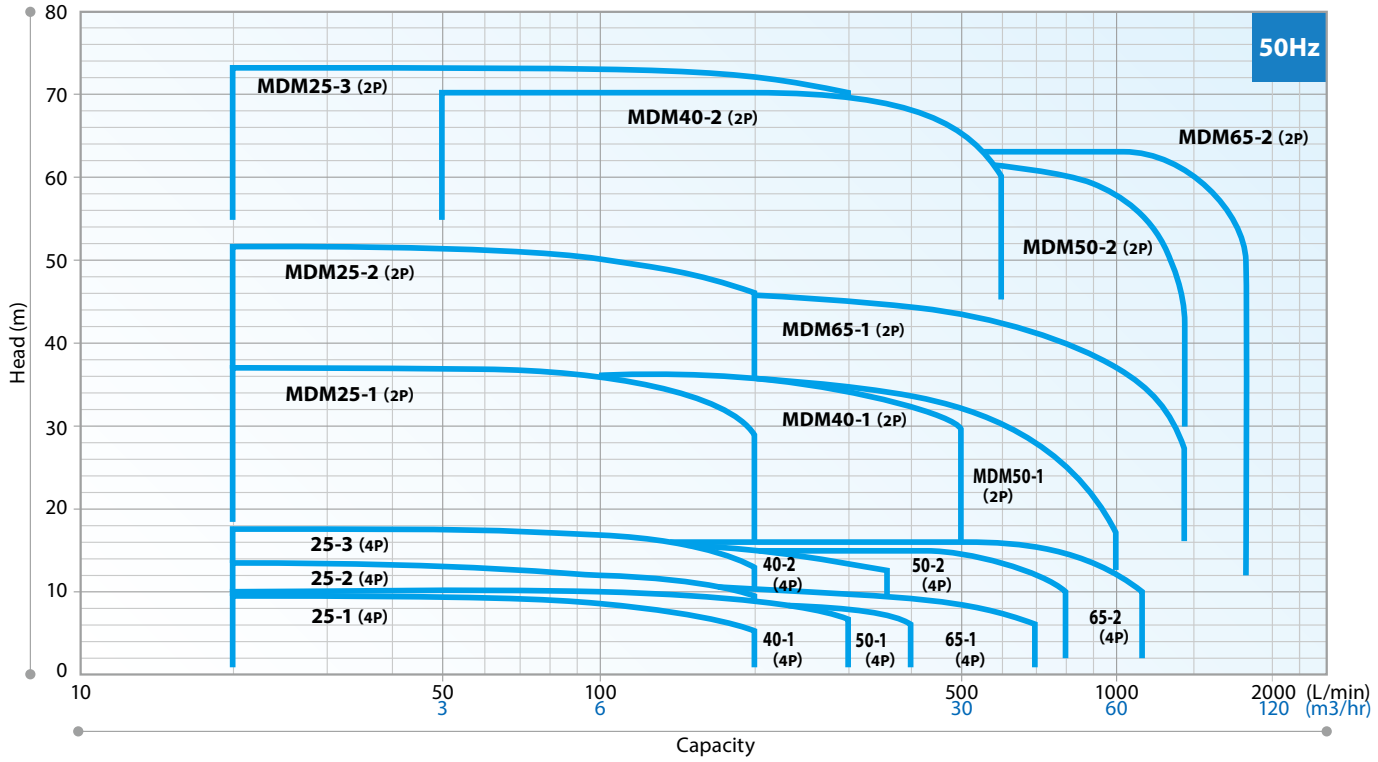


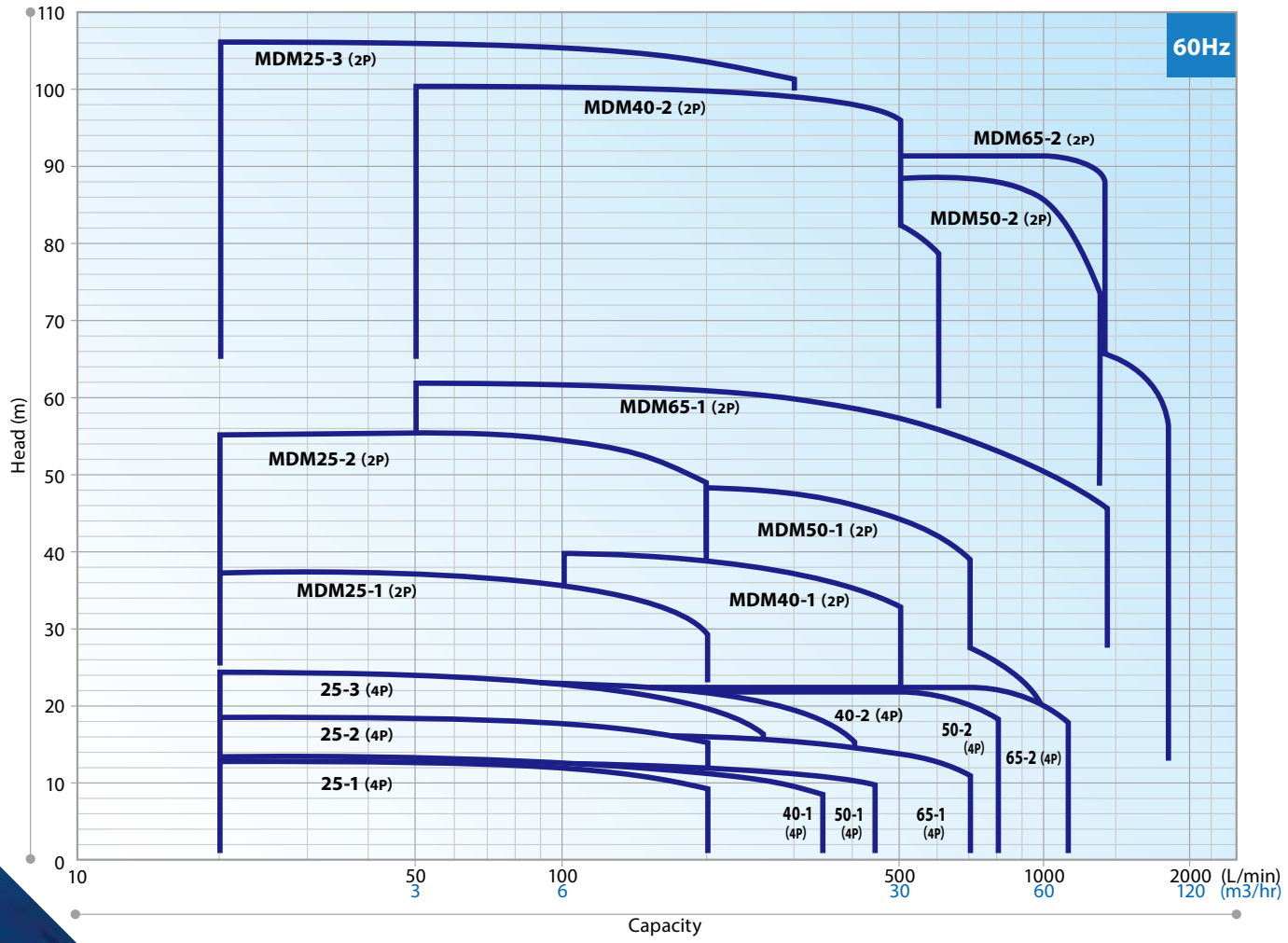
1	Front casing	CERETFE, PFA
2	Rear casing	CFRETFE, PFA
3	Impeller	CFRETFE, PFA
4	Magnet capsule	CFRETFE, PFA
5	Bearing	High density carbon, SiC
6	Spindle	High purity alumina ceramic, SiC
7	Liner ring	High purity alumina ceramic, SiC
8	Mouth ring	PTFE (with filler), SiC
9	Rear thrust	PTFE (with filler),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

Magnetic drive process pump resistant to dry run damage

Performance curves

- Pump size (Suction×Discharge) MDM25: 40A×25A, MDM40: 50A×40A, MDM50: 65A×50A, MDM65: 80A×65A
- 2P: 2P poles motor, 4P: 4P poles motor





Liquid end material
CFRETFE

MXM series

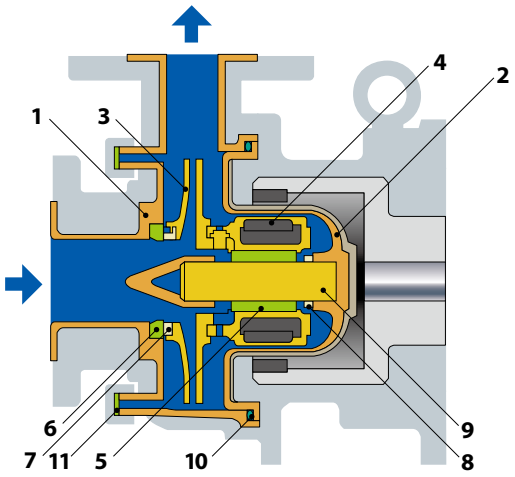
- Withstands difficult operation
- Superior corrosion resistance
- Robust structure
- Enhanced safety

Specifications (50/60Hz)

Max. discharge capacity.....600 L/min
Max. discharge head .....29/42 m
Material .....CFRETFE
Power range .....0.4 to 3.7kW
Pump size (Discharge) 25A, 40A
Liquid temp. range*1 .....-10 to 90°C*2
Specific-gravity limit 2.0
(For details, please contact Iwaki.)
Sealing method.....Seal-less construction

*1: Operating temperature for the pumps with an Aflas® O-ring should be 10°C or more. Fluid dependent.
*2: -10 to 105°C for high temperature type

Liquid end materials

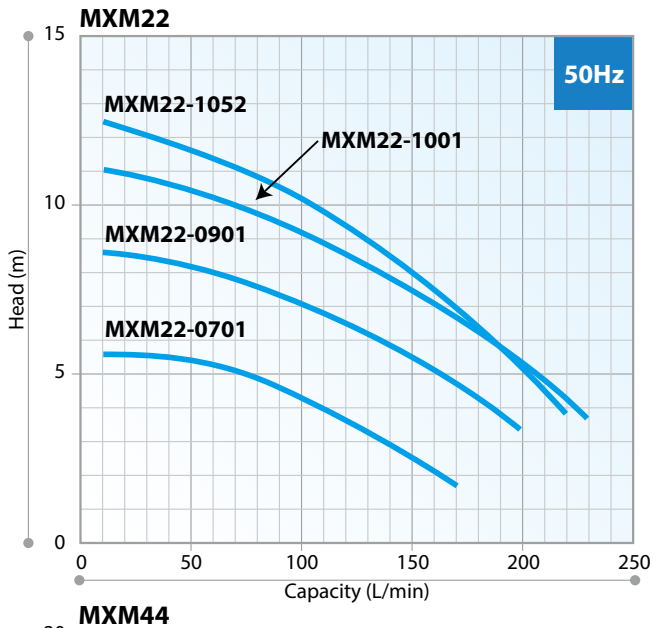


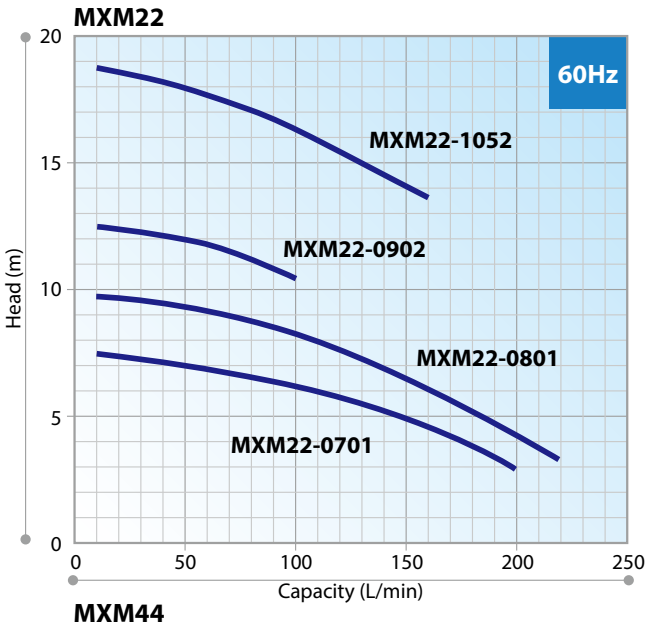
1	Front casing	CFRETFE
2	Rear casing	CFRETFE
3	Impeller	CFRETFE
4	Magnet capsule	CFRETFE
5	Bearing	High density carbon, High purity alumina ceramic, SiC
6	Liner ring	High purity alumina ceramic, SiC
7	Mouth ring	PTFE (with filler), SiC
8	Rear thrust	CFRETFE
9	Spindle	High purity alumina ceramic, SiC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

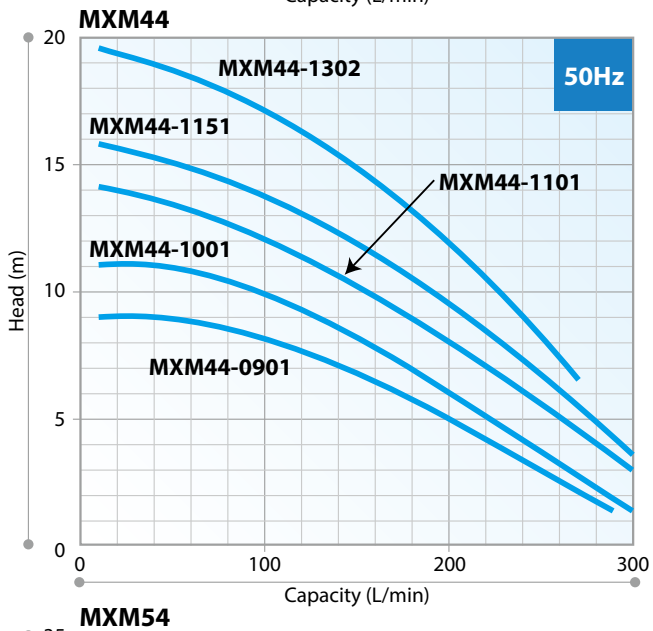
Magnetic drive pumps with an excellent balance of features and performance

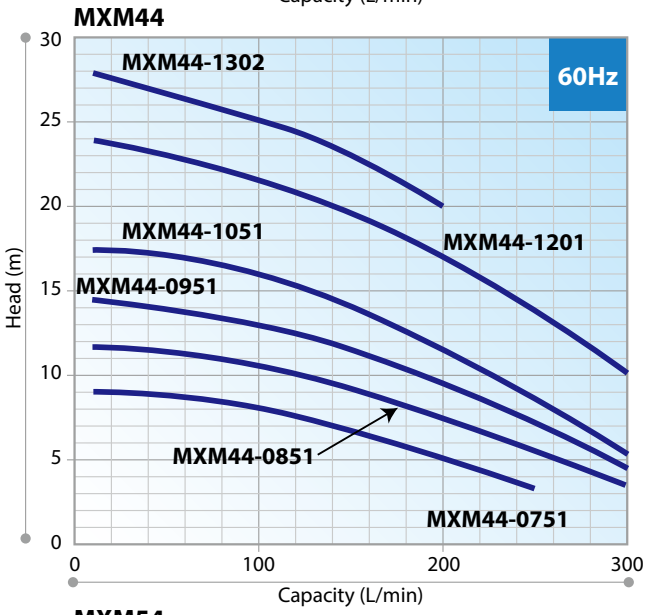
Performance curves

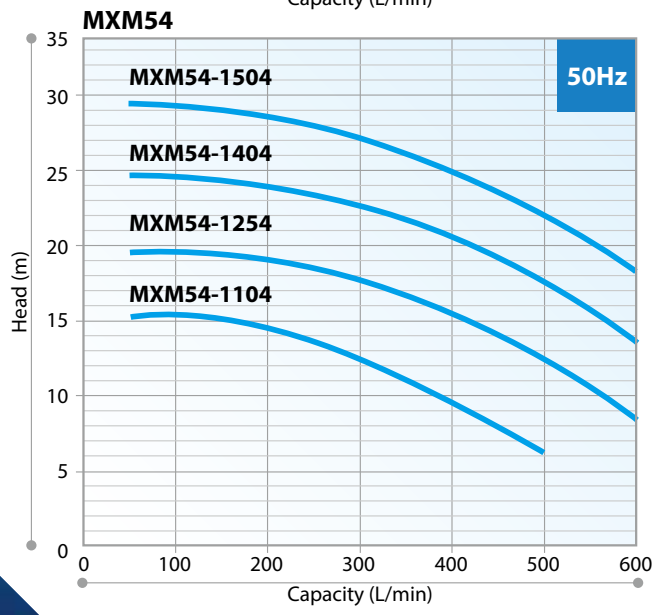
• Pump size (Suction×Discharge) MXM22: 25A×25A, MXM44: 40A×40A, MXM54: 50A×40A

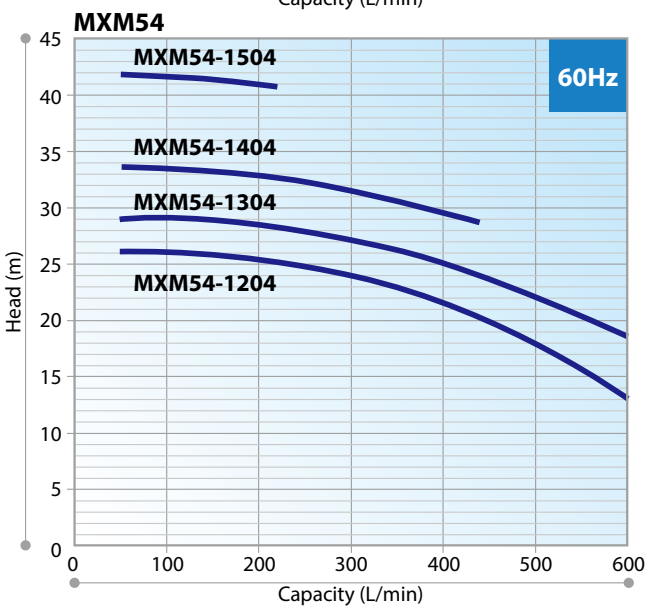












• High-lift/small-flow impellers are also available. Please contact us for more information.

CFRETFE
SMX-F

Liquid end material
CFRETFE

SMX-F series

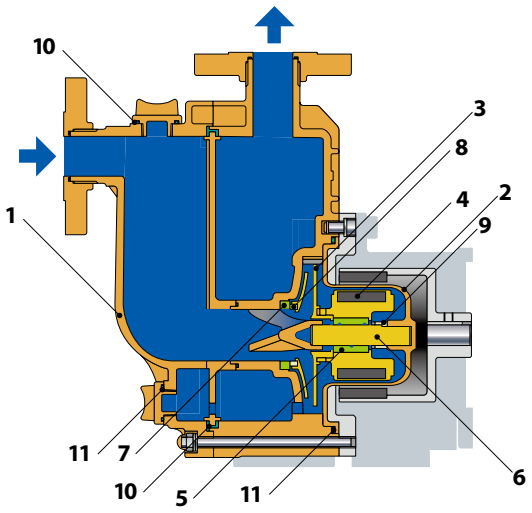
- Excellent corrosion resistance
- Expanded versatility
- Easy maintenance
- Able to withstand abnormal operation
- Fast self-priming

Specifications (50/60Hz)

Max. discharge capacity.....440/520 L/min
Max. discharge head .....24.5/35 m
Rated self-priming height 4m
Material .....CFRETFE
Power range .....0.4 to 3.7kW
Pump size (Discharge) 25A, 40A
Liquid temp. range.....0 to 80°C*
Specific-gravity limit 2.0
(For details, please contact Iwaki.)
Sealing method.....Seal-less construction

*Fluid dependent.

Liquid end materials

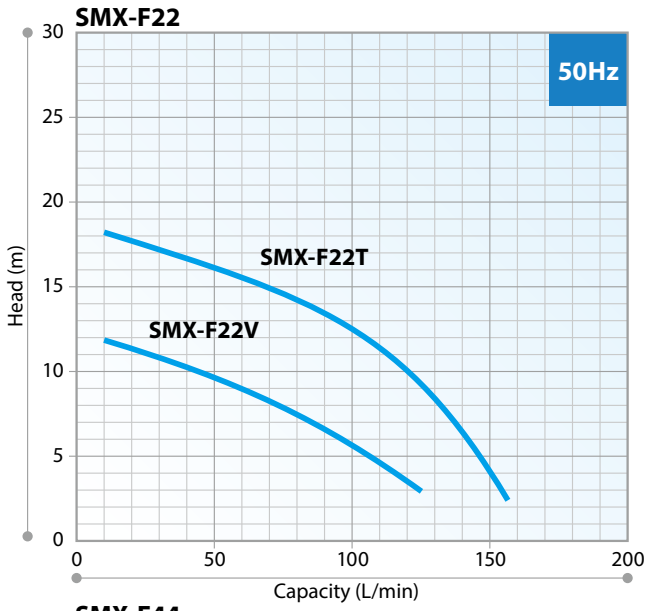


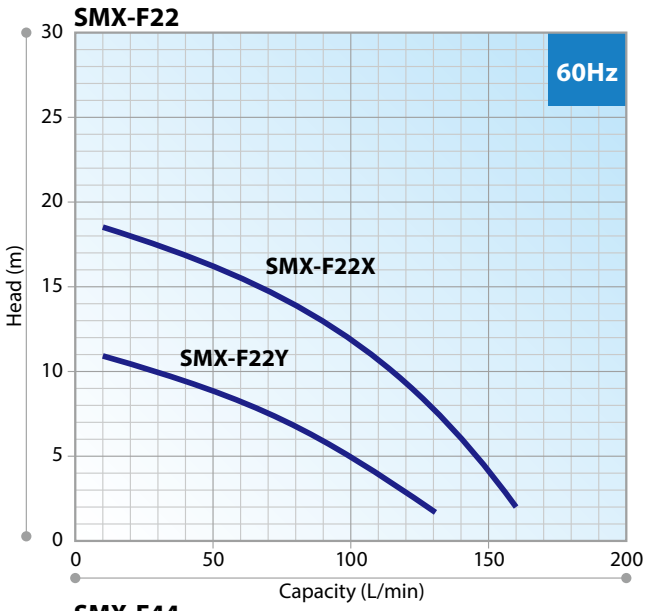
1 Front / Rear case..... CFRETFE
2 Rear casing ..... CFRETFE
3 Impeller ..... CFRETFE
4 Magnet capsule..... CFRETFE
5 Bearing ..... High density carbon, SiC, PTFE (with filler)
6 Spindle..... High purity alumina ceramic, SiC
7 Liner ring..... High purity alumina ceramic, SiC
8 Mouth ring ..... PTFE (with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

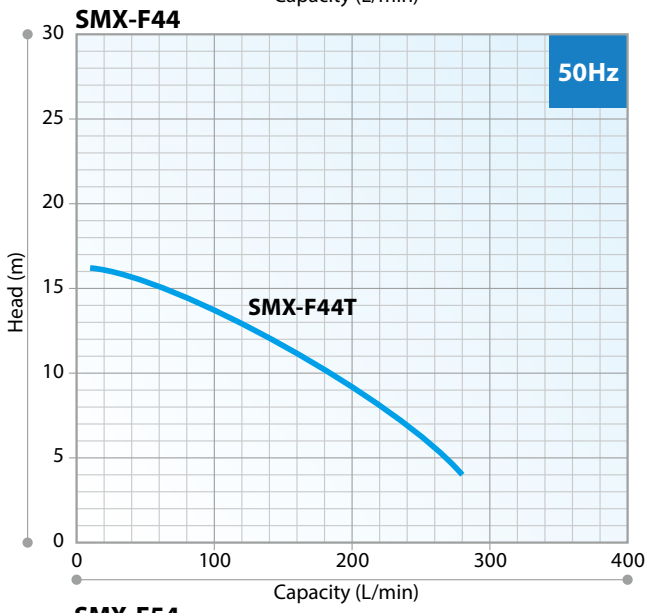
Chemically resistant self-priming magnetic drive pumps built to withstand abnormal operation

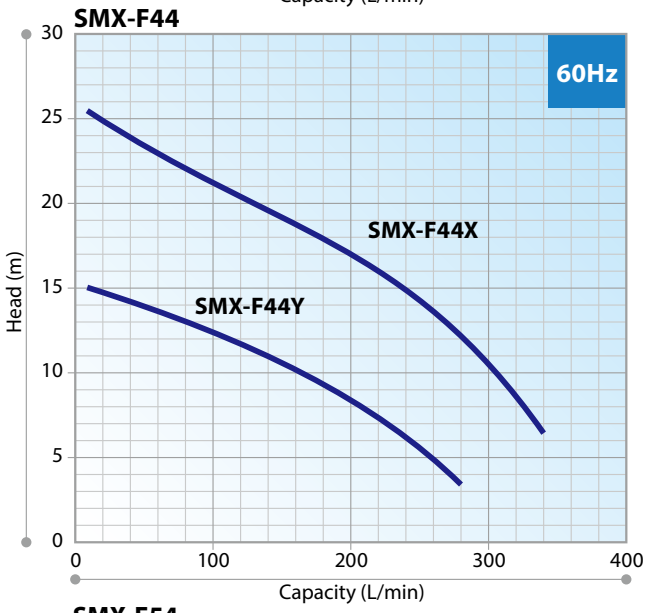
Performance curves

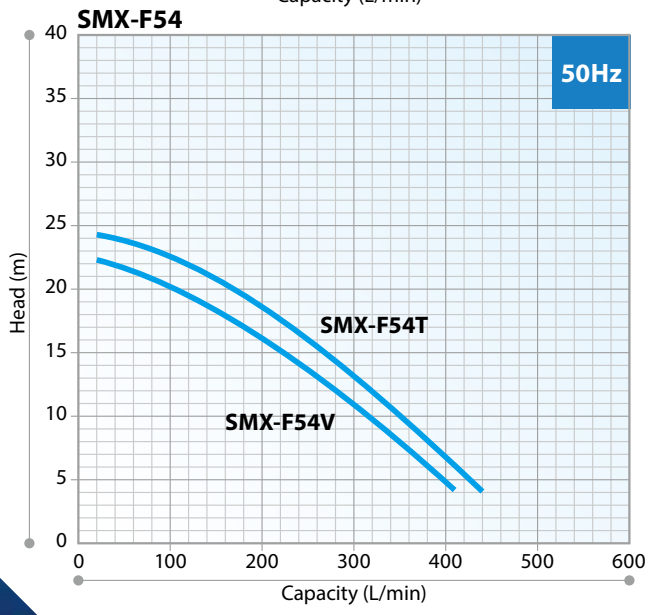
• Pump size (Suction×Discharge) SMX-F22: 25A×25A, SMX-F44: 40A×40A, SMX-F54: 50A×40A

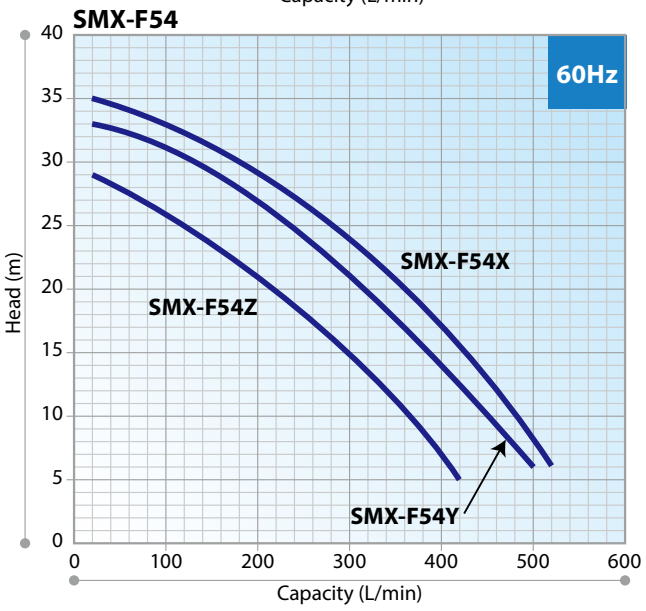












Liquid end material
CFRETFE

MX-F series

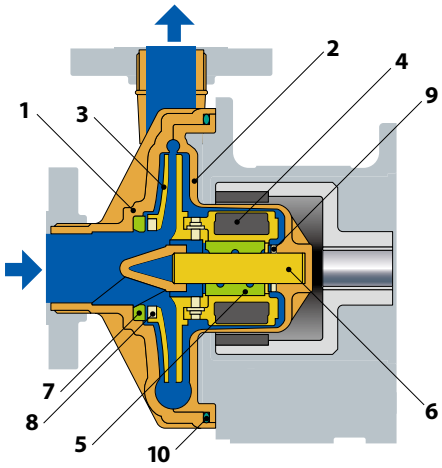
- Self-radiating structure
- Dual section volute casing
- Robust structure
- Excellent chemical resistance

Specifications (50/60Hz)

Max. discharge capacity	510 L/min
Max. discharge head	29.5/27 m
Material	CFRETFE
Power range	0.26 to 2.2kW
Pump size (Discharge)	G1, 25A to 40A
Liquid temp. range	0 to 80°C*
Specific-gravity limit	2.0 (For details, please contact Iwaki.)
Sealing method	Seal-less construction

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

Liquid end materials

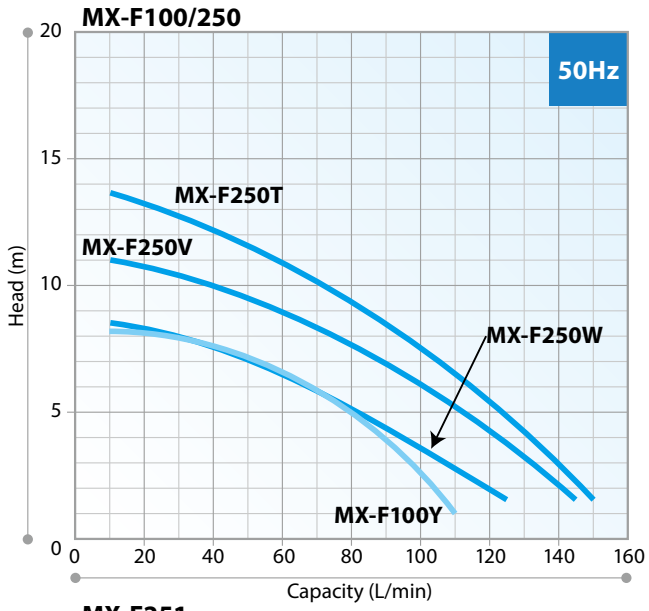


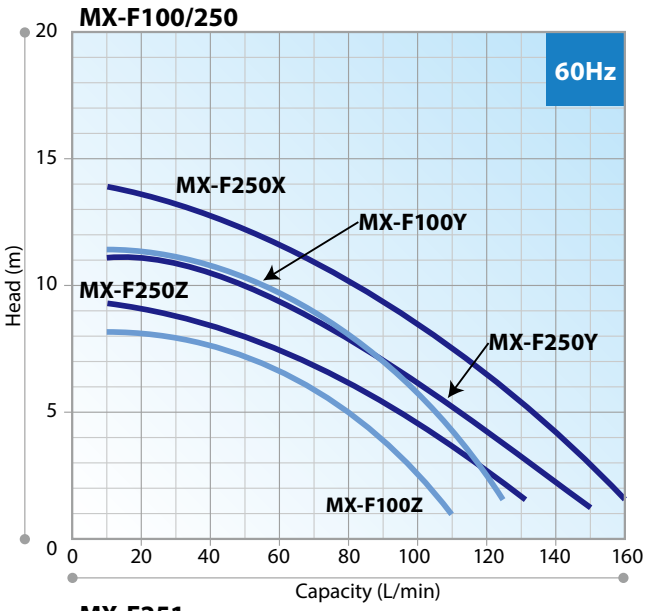
1	Front casing	CFRETFE
2	Rear casing	CFRETFE
3	Impeller	CFRETFE
4	Magnet capsule	CFRETFE
5	Bearing	PTFE (with filler), High density carbon, SiC
6	Spindle	High purity alumina ceramic, SiC
7	Liner ring	High purity alumina ceramic, SiC
8	Mouth ring	PTFE (with filler), SiC
9	Rear thrust	CFRETFE
10	O ring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

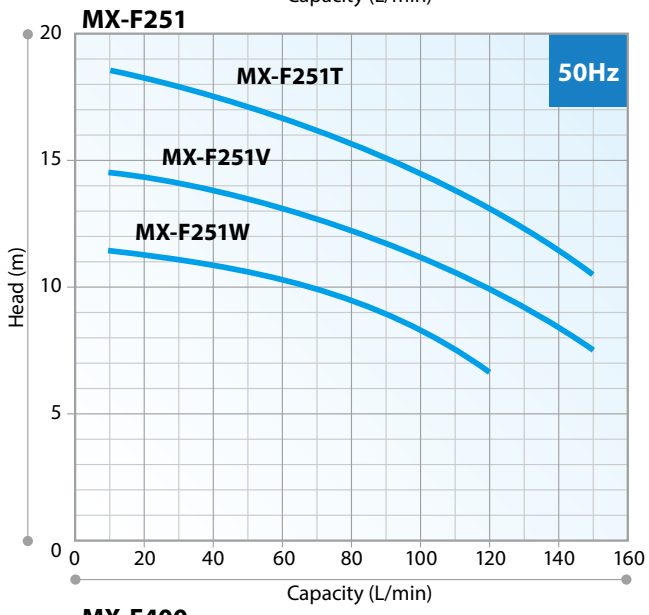
Chemically resistant magnetic drive pumps built to withstand abnormal operation

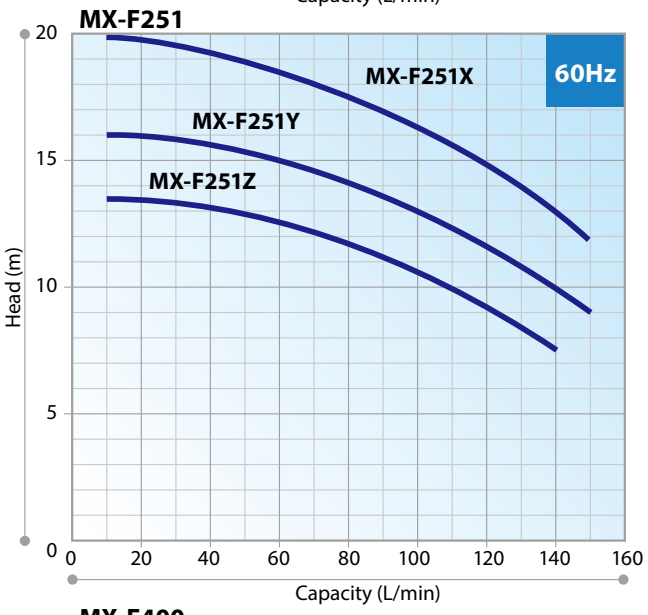
Performance curves

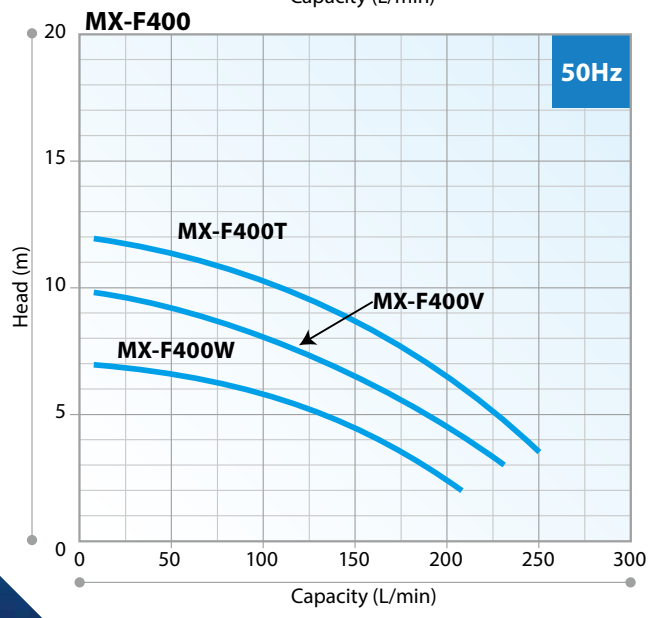
• Pump size (Suction×Discharge) MX-F100: G1×G1, MX-F250/251: 25A×25A, MX-F400: 40A×40A

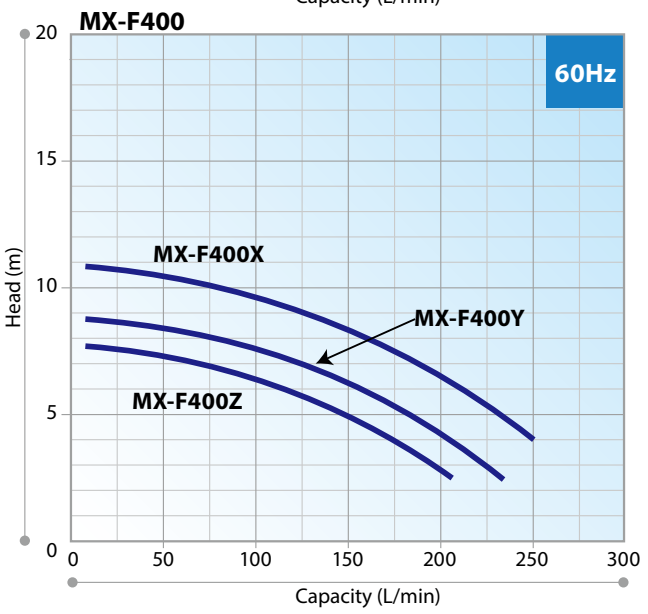








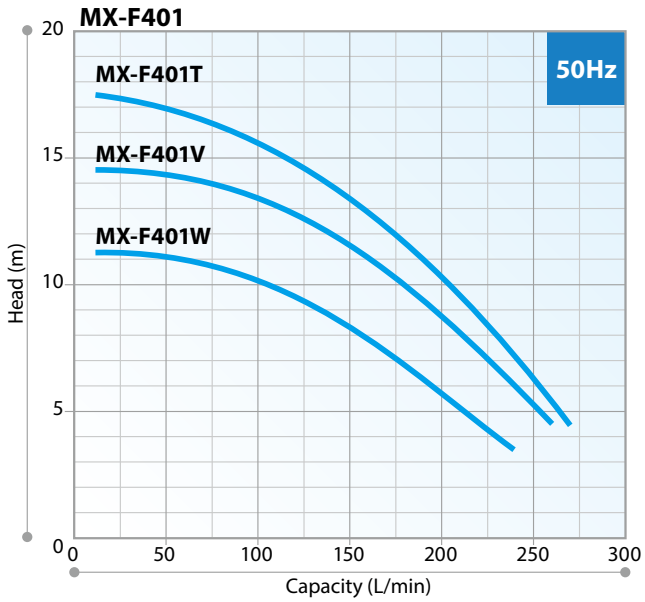


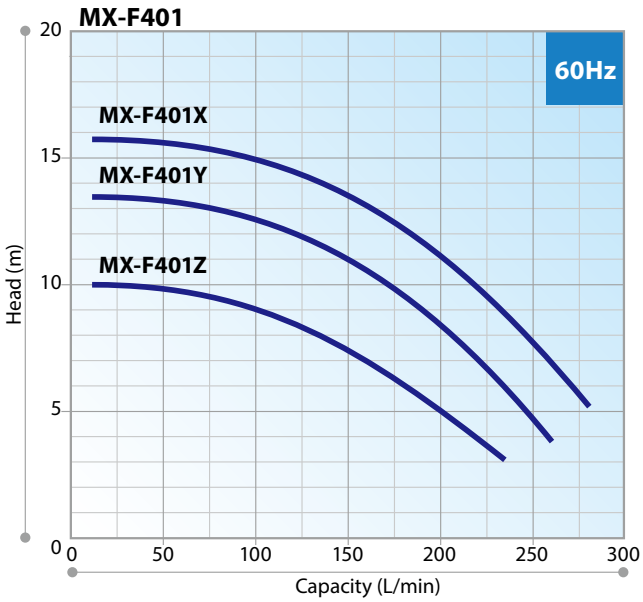


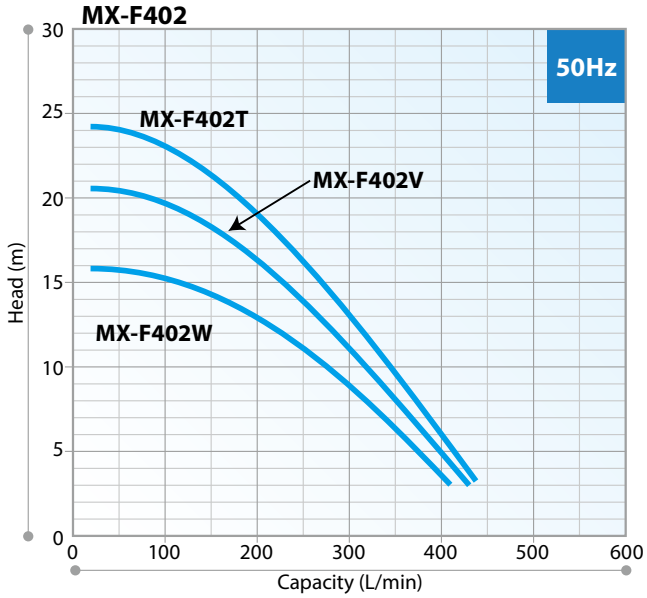
Continued

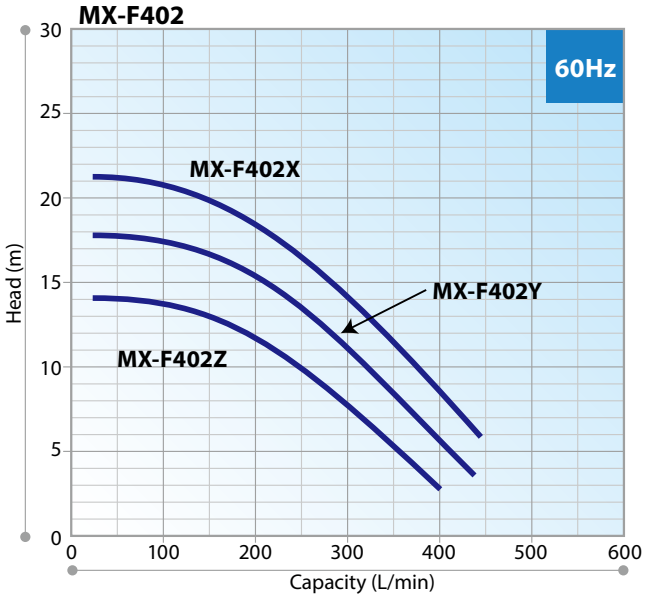
Performance curves

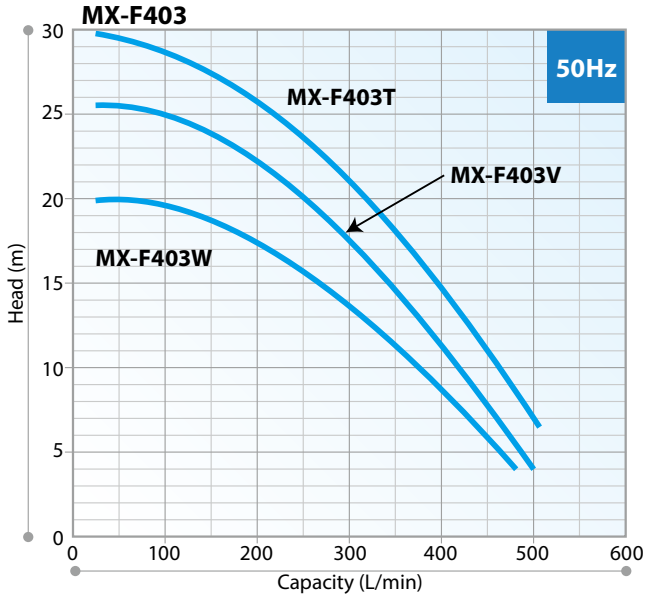
• Pump size (Suction×Discharge)MX-F401: 40A×40A, MX-F402/403: 50A×40A

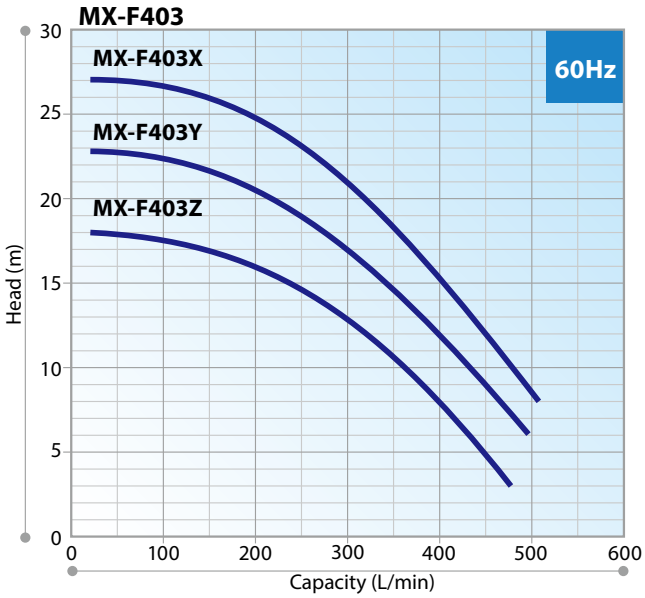








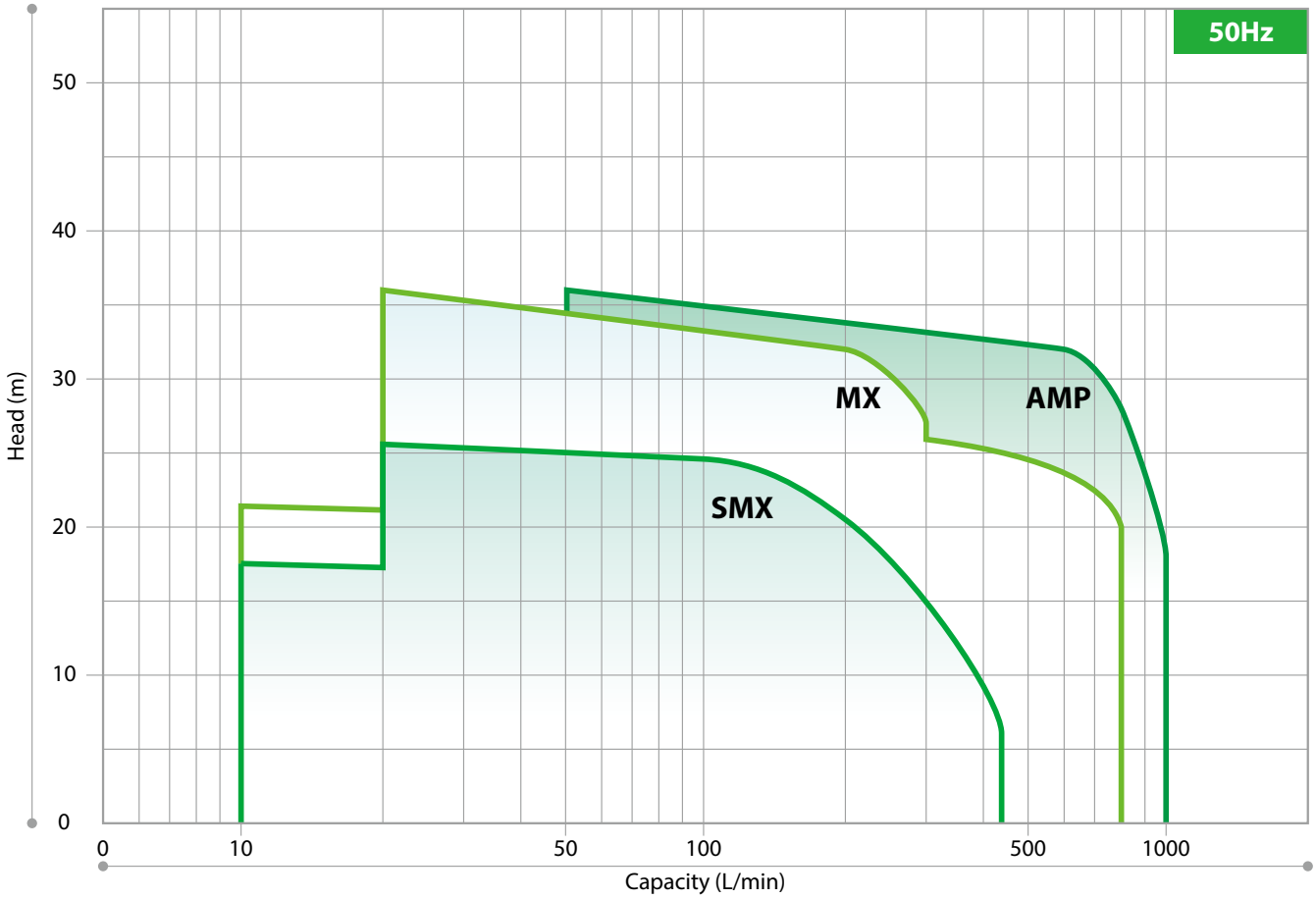


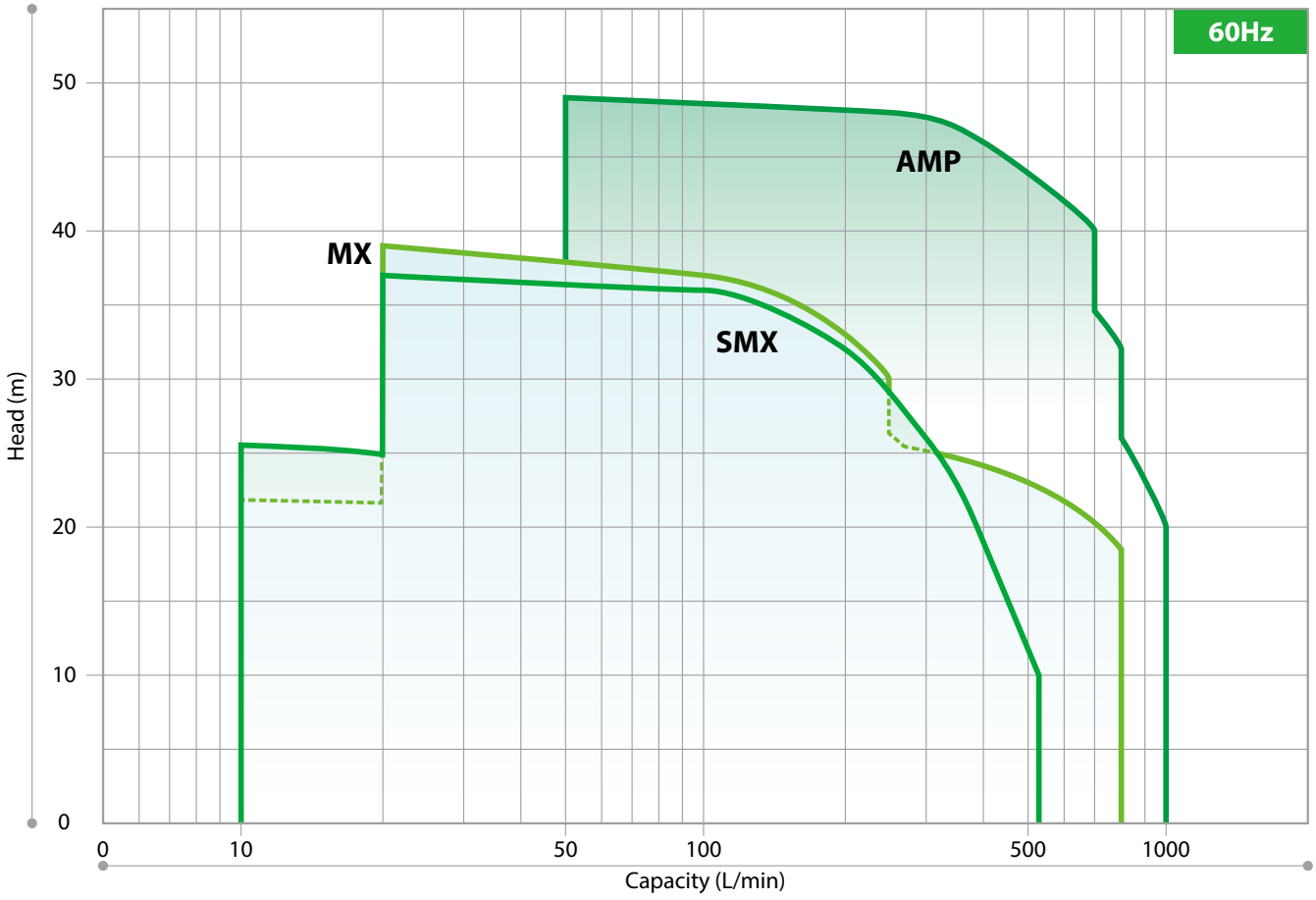


CFRPP
GFRPP

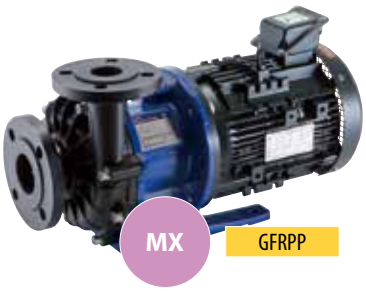
Performance Comparison for Iwaki Magnetic Drive Pumps

Materials: Polypropylene (CFRPP/GFRPP)





Liquid end Materials



Polypropylene
(CFRPP/GFRPP)

Materials

Model	Resin parts				Sliding parts		Sealing parts	
	Front casing	Rear casing	Impeller	Magnet capsule	Bearing	Spindle	Gasket	O ring
AMP	CFRPP	CFRPP	CFRPP	CFRETFE	High density carbon	High purity alumina ceramic	PTFE	—
					SiC	SiC		
SMX	GFRPP	GFRPP	GFRPP	PP	Carbon	High purity alumina ceramic	FKM	FKM
					PTFE		EPDM	EPDM
					SiC	SiC		
MX	GFRPP	GFRPP	GFRPP	PP	PPS	Alumina ceramic	—	FKM
					PTFE			
					Carbon	High purity alumina ceramic		EPDM
					Alumina ceramic			AFLAS®[Notes]

Notes: A special order.

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	Carbon
High-density carbon	Hard carbon
Alumina ceramic	Alumina ceramic
Highly purity alumina ceramic	Alumina ceramic with a purity of 99.5% or more
SiC	Silicon carbide ceramic

Liquid end material
CFRPP

AMP series

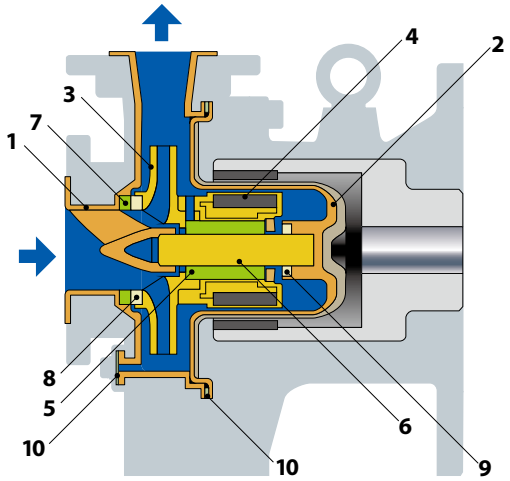
- Highly durable structure
- Unique design prevents abnormal operation
- Back pullout design
- Modular design and low maintenance costs

Specifications (50/60Hz)

Max. discharge capacity.....1000 L/min
Max. discharge head .....36/49 m
Material .....CFRPP
Power range .....3.7 to 7.5kW
Pump size (Discharge) 40A, 50A
Liquid temp. range.....0 to 80°C*
Specific-gravity limit 2.0
(For details, please contact Iwaki.)
Sealing method.....Seal-less construction

*Fluid dependent.

Liquid end materials

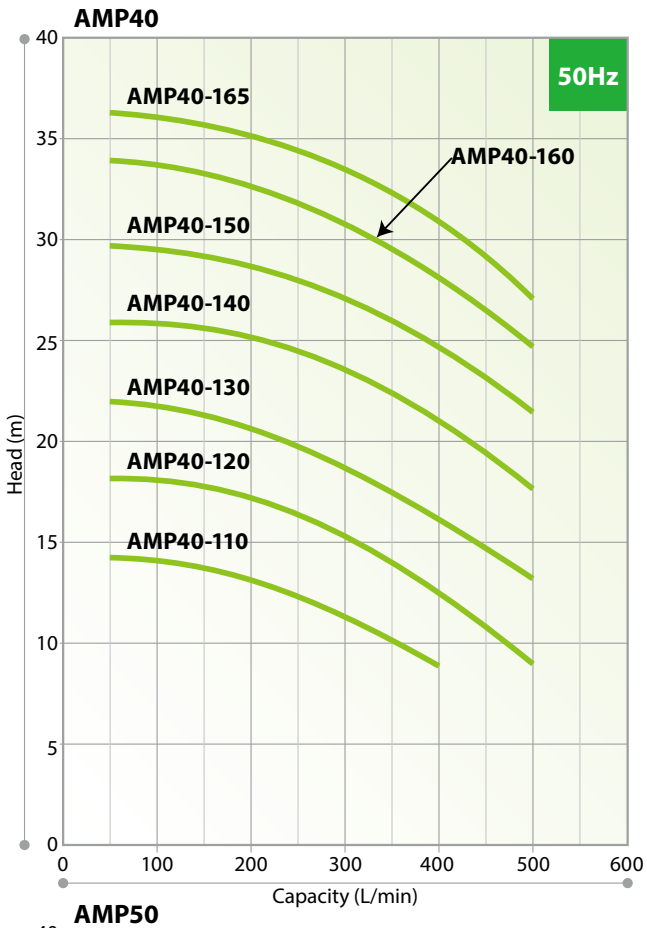


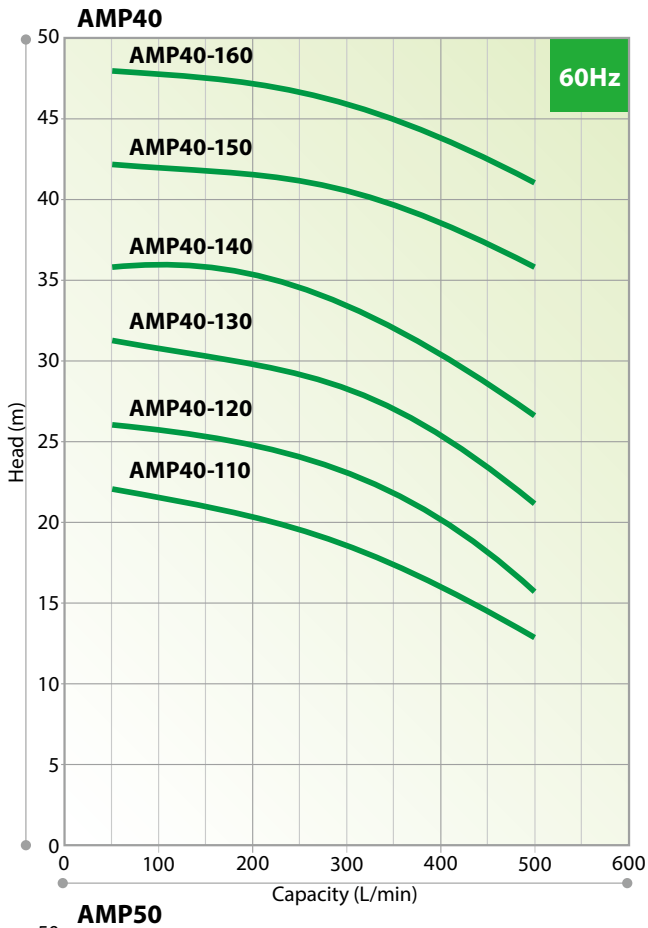
1	Front casing	CFRPP
2	Rear casing	CFRPP
3	Impeller	CFRPP
4	Magnet capsule	CFRETFE
5	Bearing	High density carbon, SiC
6	Spindle	High purity alumina ceramic, SiC
7	Liner ring	High purity alumina ceramic, SiC
8	Mouth ring	PTFE (with filler), SiC
9	Rear thrust	PTFE
10	Gasket	PTFE

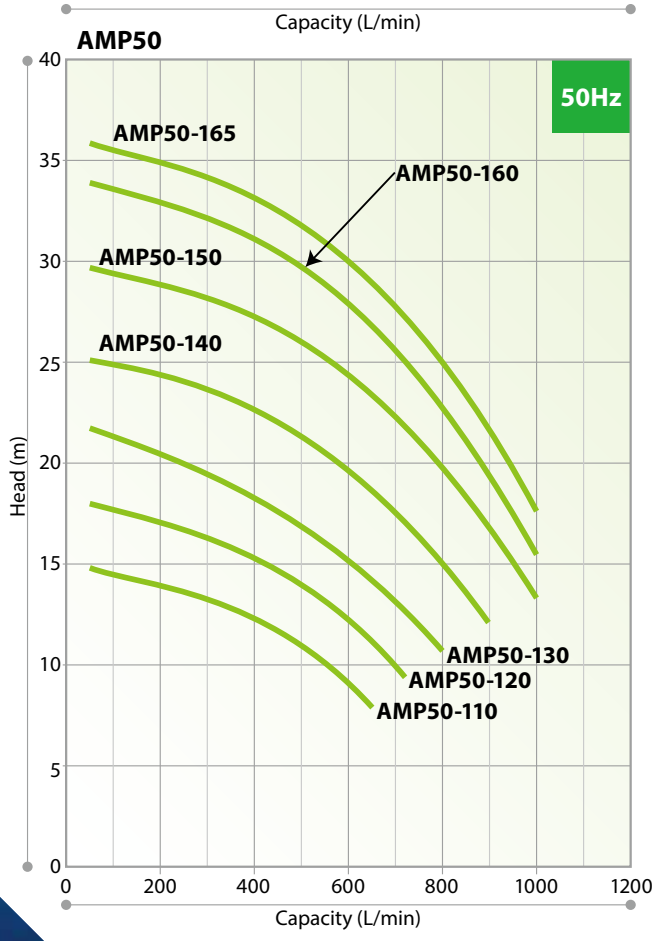
Polypropylene magnetic drive process pumps

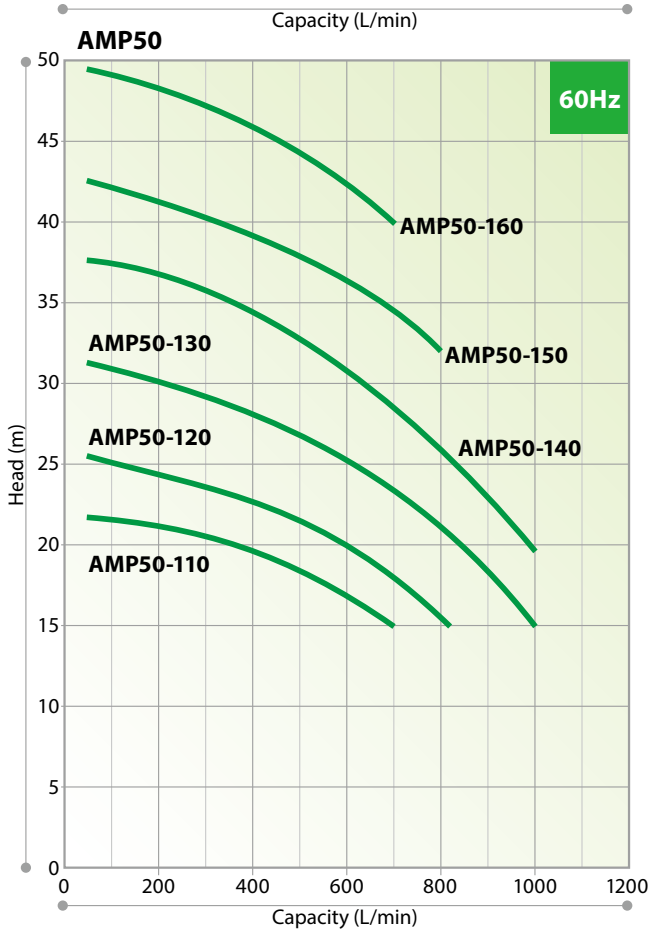
Performance curves

• Pump size (Suction×Discharge) AMP40: 50A×40A, AMP50: 65A×50A









Liquid end material
GFRPP

SMX series

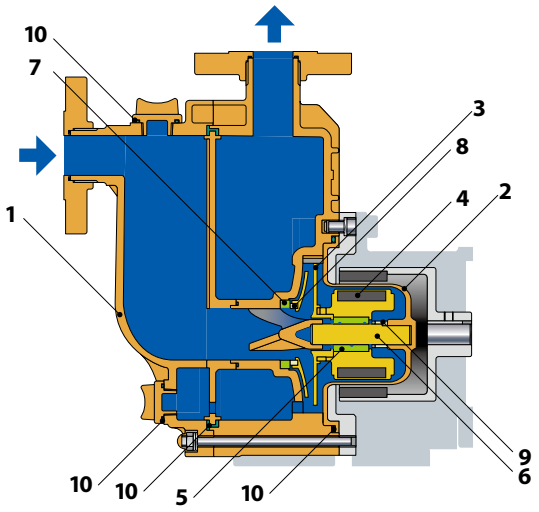
- Expanded versatility
- Easy maintenance
- Able to withstand abnormal operation
- Fast self-priming

Specifications (50/60Hz)

Max. discharge capacity	440/520 L/min
Max. discharge head	25.5/37.5 m
Rated self-priming height	4m
Material	GFRPP
Power range	0.4 to 3.7kW
Pump size (Discharge)	25A, 40A
Liquid temp. range	0 to 80°C*
Specific-gravity limit	2.0 (For details, please contact Iwaki.)
Sealing method	Seal-less construction

*Fluid dependent.

Liquid end materials

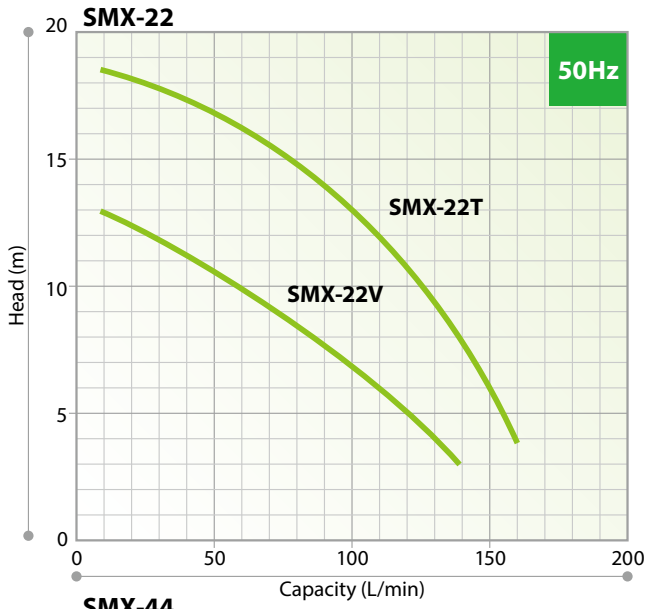


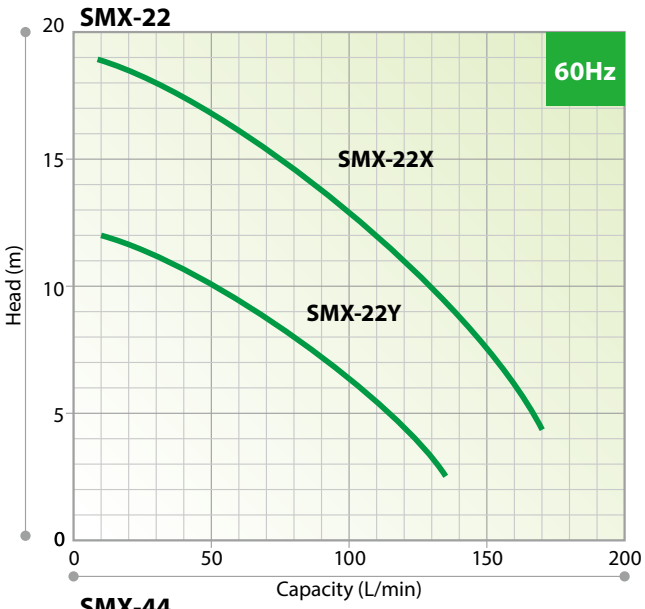
1	Front / Rear case	GFRPP
2	Rear casing	GFRPP
3	Impeller	GFRPP
4	Magnet capsule	PP
5	Bearing	Carbon, SiC, PTFE (with filler)
6	Spindle	High purity alumina ceramic, SiC
7	Liner ring	Alumina ceramic
8	Mouth ring	PTFE (with filler)
9	Rear thrust	High purity alumina ceramic, SiC, CFRETFE
10	O ring	FKM, EPDM

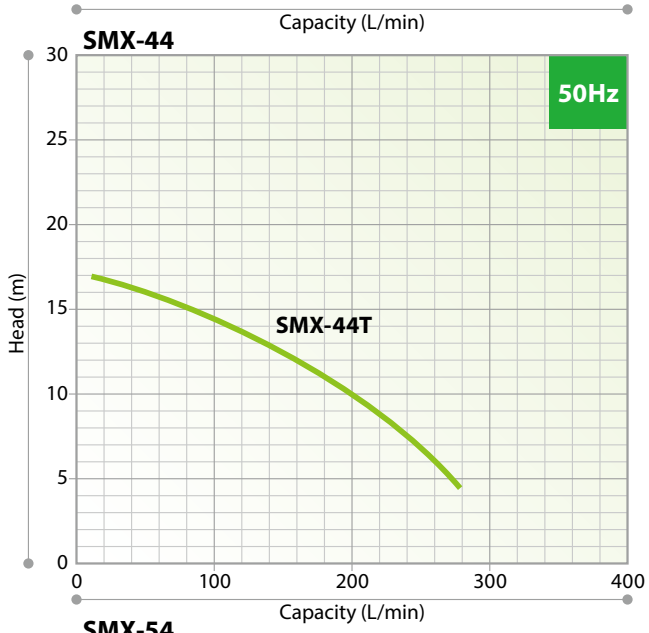
Versatile self-priming magnetic drive pumps built to withstand abnormal operation

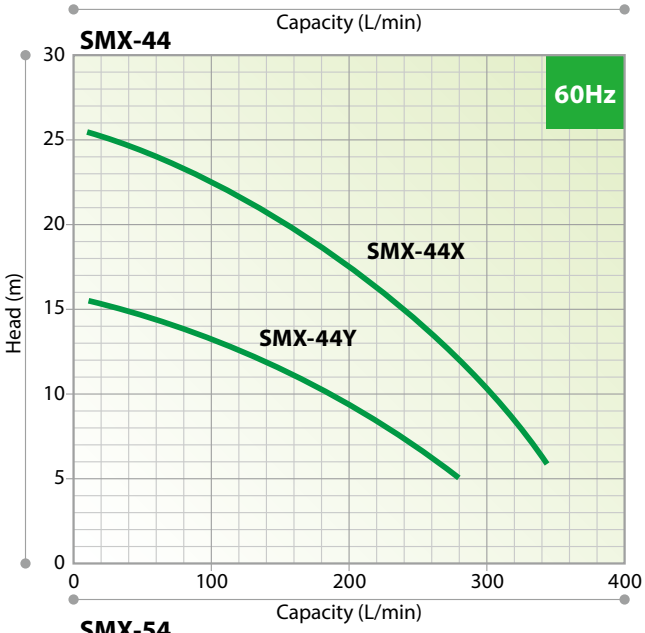
Performance curves

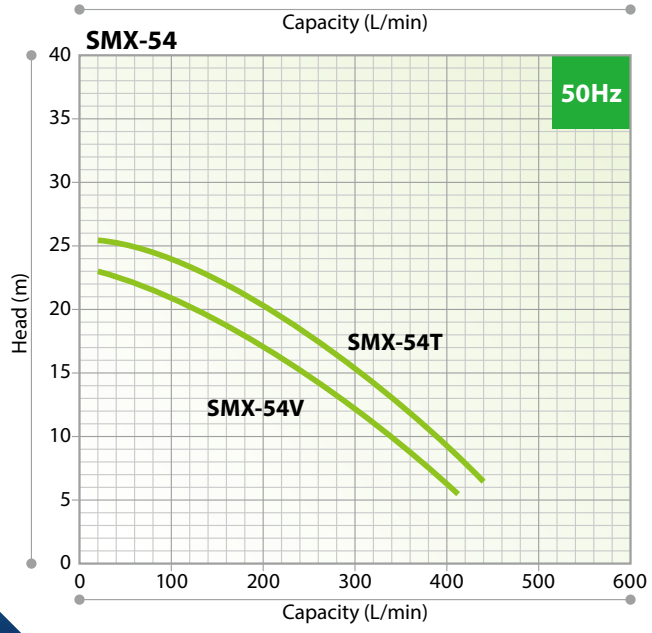
• Pump size (Suction×Discharge) SMX22: 25A×25A, SMX44: 40A×40A, SMX54: 50A×40A

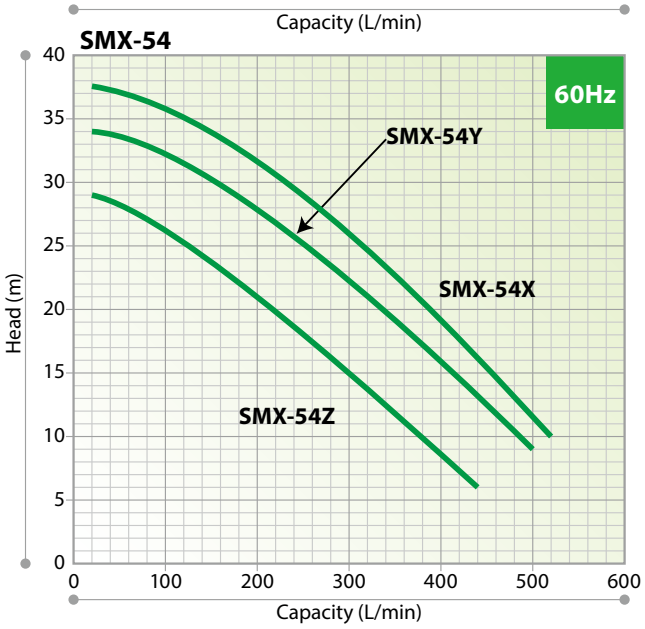












Liquid end material
GFRPP

MX series

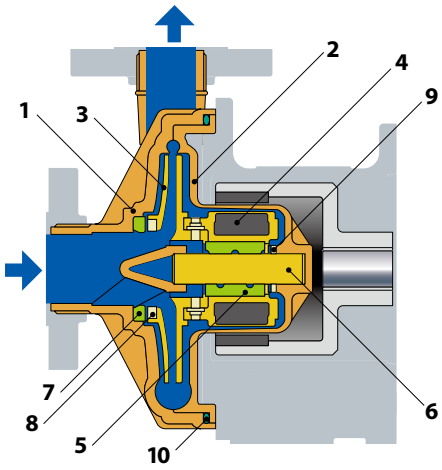
- Self-radiating structure
- Non-contact structure
- Dual section volute casing
- Robust structure

Specifications (50/60Hz)

Max. discharge capacity	800 L/min
Max. discharge head	35/37 m
Material	GFRPP
Power range	0.15 to 2.2kW
Pump size (Discharge)	G1, 25A to 50A
Liquid temp. range	0 to 80°C*
Specific-gravity limit	2.0 (For details, please contact Iwaki.)
Sealing method	Seal-less construction

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

Liquid end materials

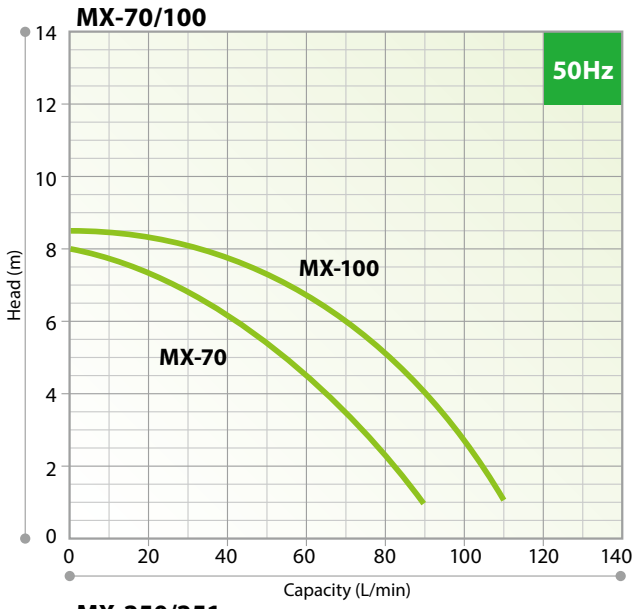


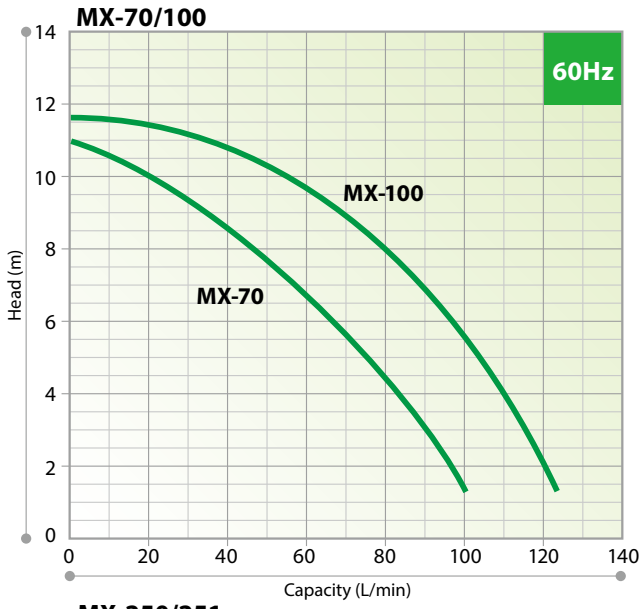
1	Front casing	GFRPP
2	Rear casing	GFRPP
3	Impeller	GFRPP
4	Magnet capsule	PP
5	Bearing	PPS, PTFE (with filler), Carbon, High purity alumina ceramic
6	Spindle	High purity alumina ceramic
7	Liner ring	High purity alumina ceramic
8	Mouth ring	PTFE (with filler)
9	Rear thrust	CFRETFE
10	O ring	FKM, EPDM,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

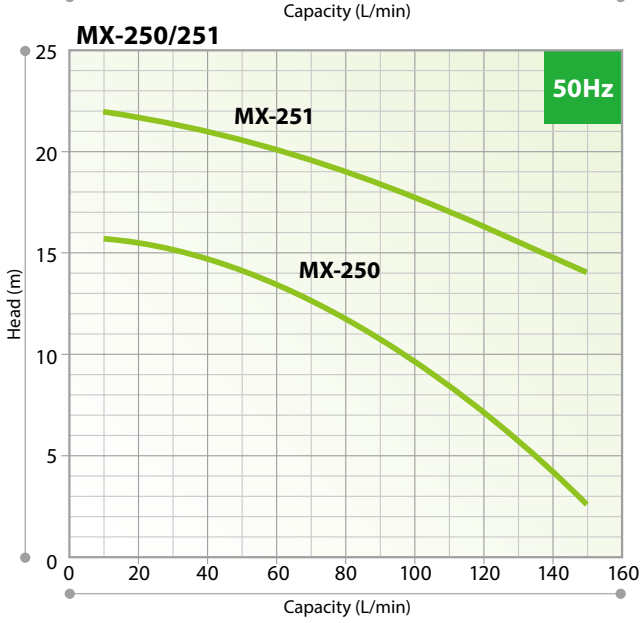
Built to withstand abnormal operation and provide high efficiency

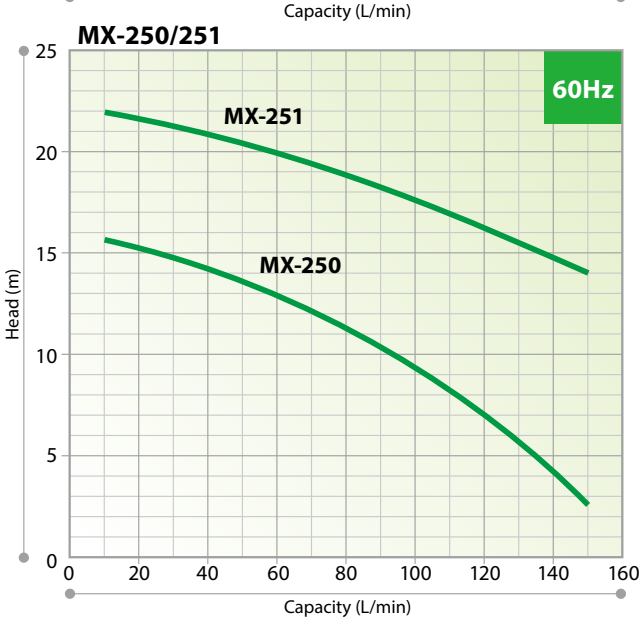
Performance curves

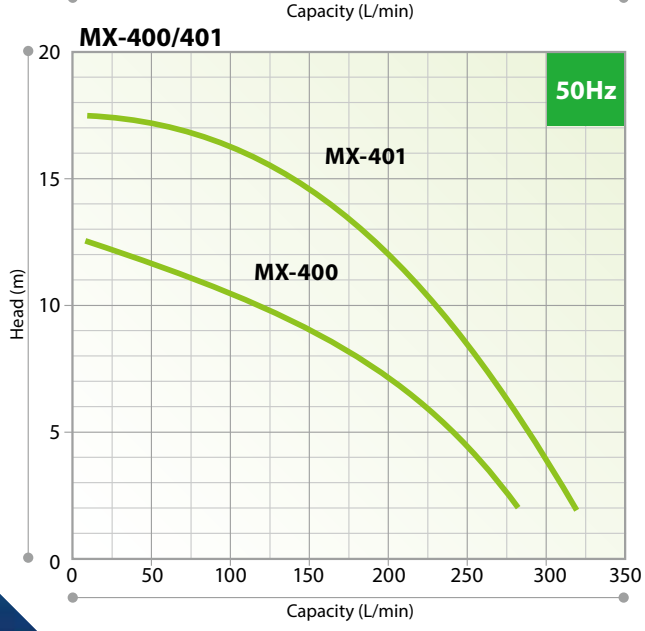
• Pump size (Suction×Discharge) MX-70/100: G1×G1, MX250/251: 25A×25A, MX400/401: 40A×40A

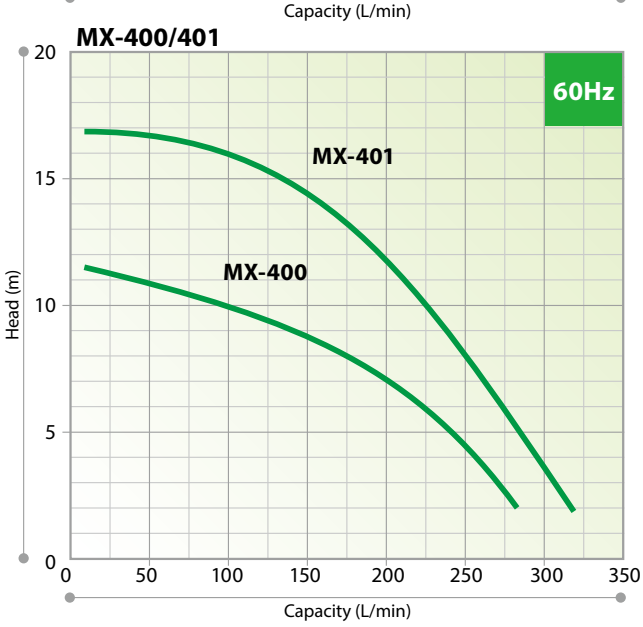












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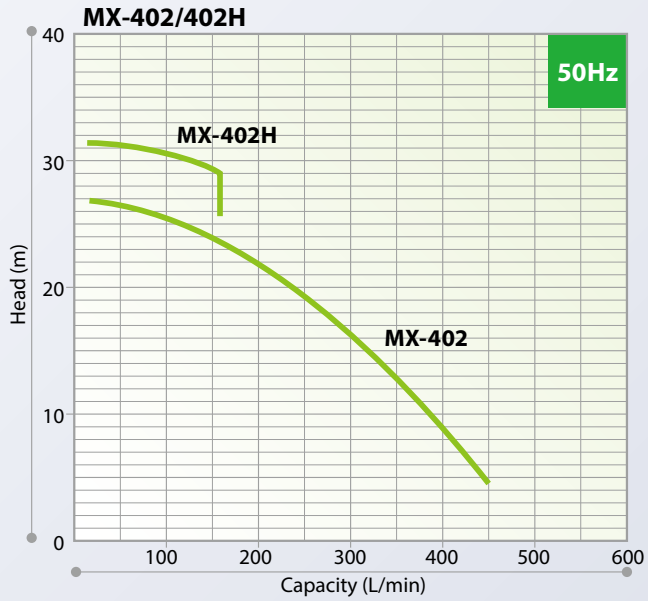
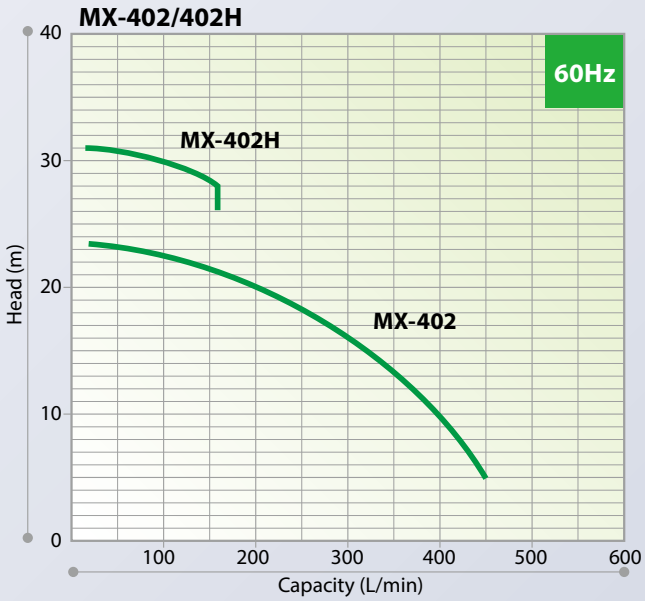
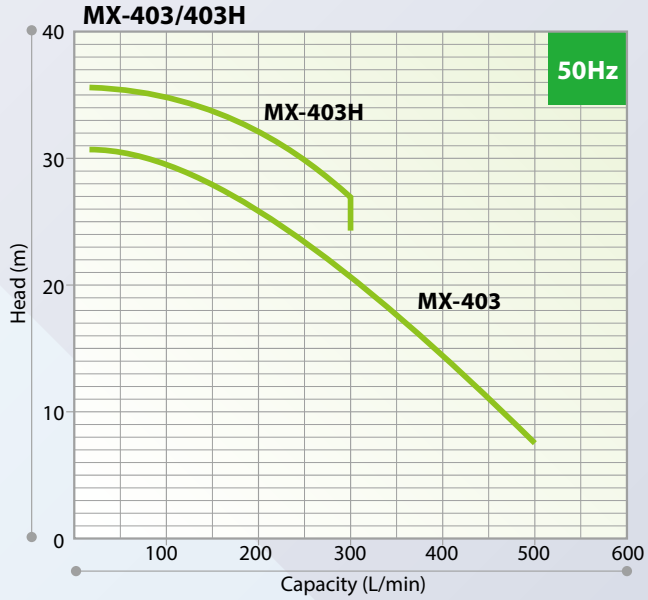
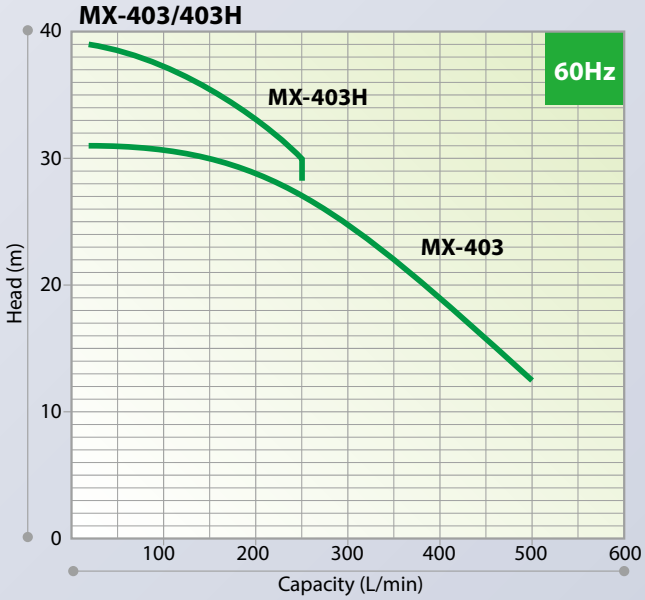
Performance curves

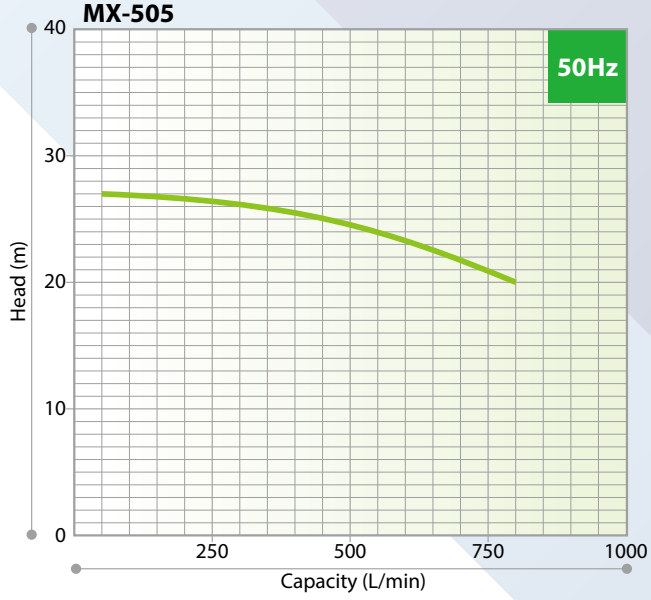
• Pump size (Suction×Discharge) MX402/402H/403/403H: 50A×40A, MX505: 65A×50A

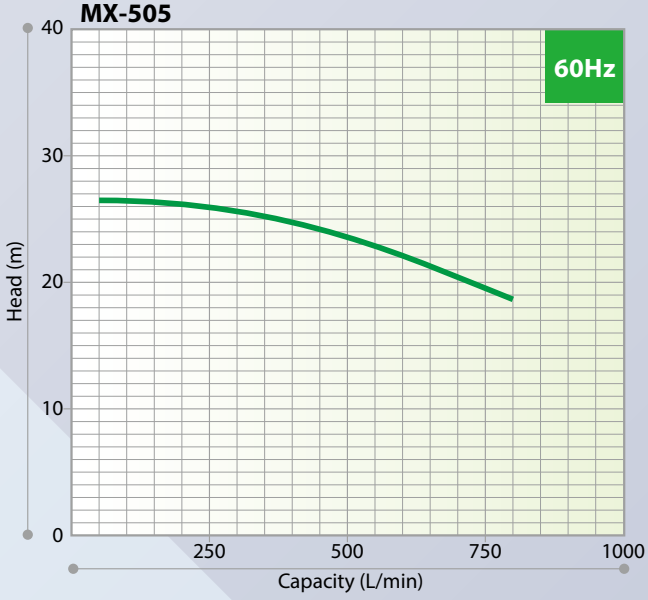












Precautions in piping planning

To safely use the full capability of a pump, observe the precautions below when performing installation.

MDW/MDE/MDM/MXM/AMP/MX/MX-F series

1. Suction tank

1. Capacity
   Make sure the tank has enough capacity. Even if the liquid level fluctuates by operating the pump, make sure that no gas is involved. If gas entrainment operation is performed, lubrication of the sliding parts will be insufficient, causing damage to the pump.
2. Prevention of convection
   Install a rectifying plate in the suction tank to prevent convection. If there is a flow at the part where the suction pipe is taken out, it may cause suction failure.
3. Foreign matter prevention
   Install a screen in the suction tank to prevent foreign matter from entering the pump. In addition, it is important to prevent foreign matter from entering the suction tank from the supply side. Note that installing a strainer in the suction pipe creates resistance and may cause damage to the pump.

2. Suction pipe

1. Flooded suction
   Establish a flooded suction system. A suction lift system is much less efficient and so it is not recommended. In the case a suction lift system, a foot valve is always required.
2. Pipe resistance
   Establish the shortest line length and the minimum number of bends so the pipe resistance is minimized.
3. Piping diameter
   The pipe diameter should be larger than the suction diameter of the pump. As a guideline for selection, select a pipe diameter that allows the flow velocity in the pipe to be 1.5m/s or less. If the flow velocity is too high, it will be affected by air accumulation, etc., and suction failure will easily occur.
   Example : For a flow rate of 1,200L/min ($1.2m^3$/min)

$$d = \sqrt{\frac{4 \times Q}{V \times \pi}}$$

$$= \sqrt{\frac{4 \times (1.2/60)}{1.5 \times \pi}}$$

$$= 0.13(m)$$

d : Pipe diameter (m)
Q : Flow rate (m^3/s)
V : Flow speed (m/s)

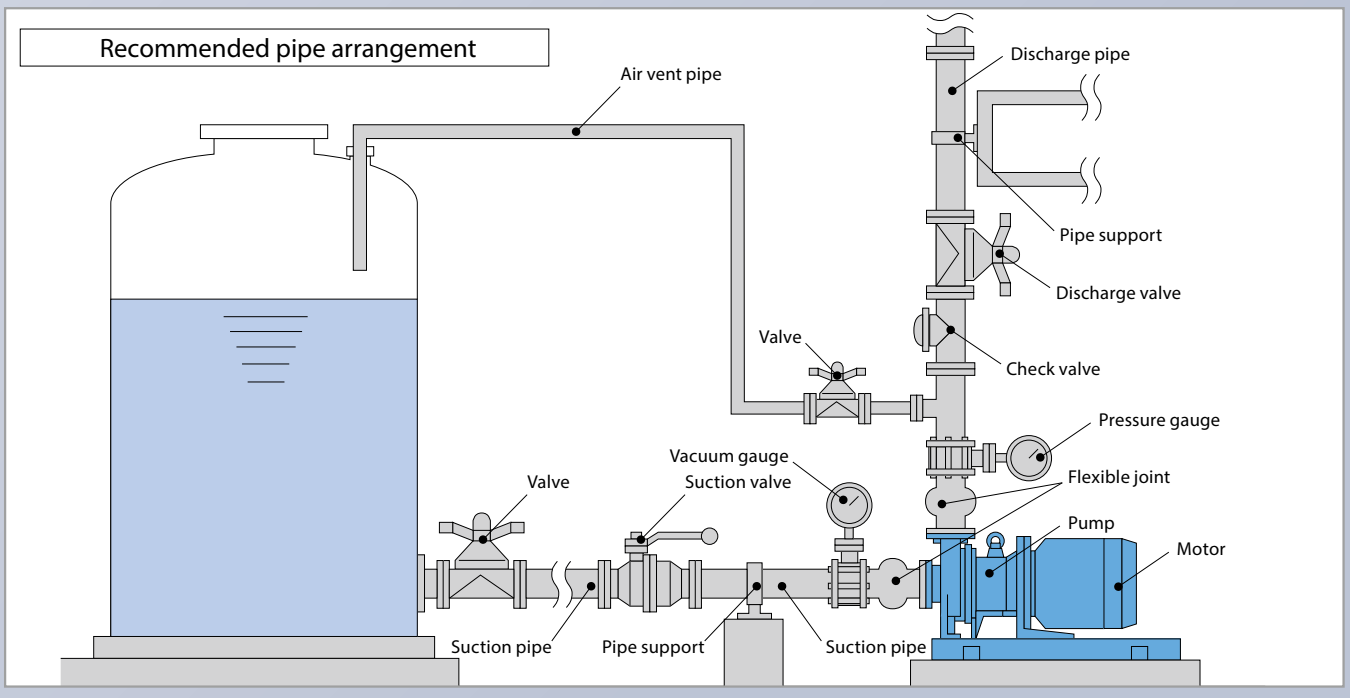
Appropriate pipe diameter is 150A

4. Independent piping
   Provide an independent suction pipe for each pump. Collective piping is affected by the flow of each pump, and suction failure may occur. In the unlikely event that independent piping is difficult and should be used as a collective pipe, select a pipe diameter that allows the flow velocity of the collective pipe to be 0.5m/s or less.
5. Shut off valve
   In the case of the push-in type, a shut off valve is required when disassembling and inspecting the pump, so be sure to install it.
6. Tip of suction line
   Always submerge at least 500 mm above the liquid surface to prevent air from being sucked in.
7. Straight section
   Be sure to provide a straight pipe section immediately before the suction port of the pump. If there is a bend in the pipe just before the pump and the liquid flow is uneven, the pump will become unstable and cause failure.
   50A (2B) or smaller: 500mm
   65A (2½B) or wider: 8 times longer than the pump inlet I.D.
   In addition, install a removable short pipe of about 300 mm in the straight pipe section for disassembly and inspection of the pump.
8. No air/gas entrapment
   In general, do not allow any arched line where air may be trapped. In a flooded suction system, lay a suction line in the down-slope (from the tank outlet to the pump inlet) of 1:100 or steeper. In a suction lift system; however, lay it in the up-slope to the pump inlet. If plumbing latitude is limited in your facility and you can not avoid an arched suction line in the system, mount an air vent device.
9. Use of reduced diameter pipe
   If the suction pipe has a diameter different from that of the pump, use an eccentric single drop pipe. The single drop pipe is laid so that the upper part is horizontal so that air does not accumulate.
10. Joint
    Minimize the number of joints in the suction pipe as much as possible. When installing joints, make sure they are properly sealed. If the seal is defective, air will be sucked into the pump, making it impossible to pump liquid, or the lubrication inside the pump will be insufficient, resulting in pump failure.
11. NPSH
    After designing the piping, check the NPSH. Observe the following conditions to prevent cavitation.
    NPSHa ≧ NPSHr + 0.5m
    NPSHa : (Available NPSH) Value determined by piping and transferred liquid
    NPSHr : (Required NPSH) Value determined by pump model

3. Discharge pipe

1. Shut off valve
   Install a shut off valve near the pump discharge port (within 1m) to prevent overload at startup and to adjust the discharge rate.
2. Air vent pipe
   Install an air vent pipe between the pump and the shut off valve (check valve) near the pump, and be sure to release the air before operation. If the air in the pump is not sufficiently vented, the liquid may not be pumped or the temperature inside the pump may rise abnormally, resulting in malfunction. Also, if air remains between the pump and the valve close to the pump, the magnetic coupling may go out of step at startup. Air stagnation also has a harmful effect on the discharge piping downstream of the gate valve, so provide an air vent piping as necessary.
3. Check valve
   Install a check valve in the following cases.
   • Discharge line is longer than 15m.
   • A delivery head is higher than 15m.
   • The top end of a discharge line is 9m or higher than the tank liquid level.
   • Several pumps run in parallel.
   If a check valve is installed, air may accumulate on the upstream side, so install an air vent pipe. Especially for liquids that generate gas, it is necessary to remove the generated gas before starting the pump.

Before using the pump, be sure to read the instruction manual and use it correctly.



SMX/SMX-F series

1. Suction tank

1. Capacity
   Make sure the tank has enough capacity. Even if the liquid level fluctuates by operating the pump, make sure that no gas is involved. If gas entrainment operation is performed, lubrication of the sliding parts will be insufficient, causing damage to the pump.
2. Prevention of convection
   Install a rectifying plate in the suction tank to prevent convection. If there is a flow at the part where the suction pipe is taken out, it may cause suction failure.
3. Foreign matter prevention
   Install a screen in the suction tank to prevent foreign matter from entering the pump. In addition, it is important to prevent foreign matter from entering the suction tank from the supply side. Note that installing a strainer in the suction pipe creates resistance and may cause damage to the pump.

2. Suction pipe

1. Suction lift system
   Before operating the pump, be sure to prime it and fill the pump chamber with the liquid to be handled before starting. The self-priming limit height (4m) is the value for liquids equivalent to water and 20°C. Self-priming performance varies depending on liquid temperature, liquid quality, piping conditions, etc. Use the following formula to find the approximate height of specific gravity that allows self-priming.

   Self-suction height of specific gravity liquid (reference) [m] = Self-suction height of water [m]/liquid specific gravity

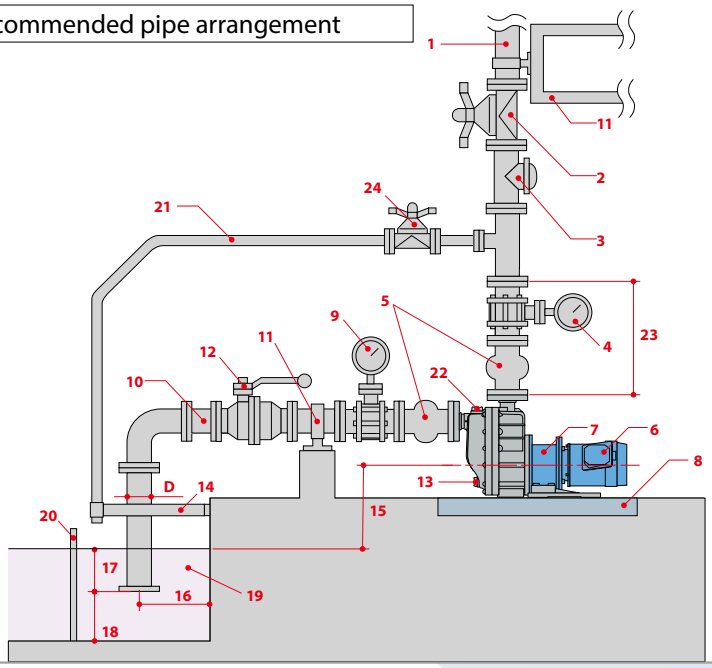
   Also, if there is something that acts as a suction resistance (such as a foot valve) in the suction pipe, it may cause a decrease in self-priming capability or impossibility of self-priming. In addition, there is no particular problem even if it is used in Flooded suction. When using the push-in method, please take the same piping considerations as with magnet drive pumps (MX type, etc.).
2. Pipe resistance
   Keep the length of the pipe within 4.7m, and make it as short as possible with fewer bends. If it is longer than 4.7m, it will not self-suction because the air volume in the suction pipe will be large.
3. Piping diameter
   The pipe diameter should be larger than the suction diameter of the pump. If the diameter is larger than the suction of the pump, the volume of air in the suction pipe will increase, so the pump will not self-suction.
4. Independent piping
   Provide an independent suction pipe for each pump. Collective piping is affected by the flow of each pump, and suction failure may occur.
5. Shut off valve
   In the case of the push-in type, a shut off valve is required when disassembling and inspecting the pump, so be sure to install it.
6. Tip of suction line
   Always submerge at least 500 mm above the liquid surface to prevent air from being sucked in.
7. Straight section
   Be sure to provide a straight pipe section of 500 mm or more immediately before the suction port of the pump. In addition, install a removable short pipe of about 300 mm in the straight pipe section for disassembly and inspection of the pump.
8. No air/gas entrapment
   In general, do not allow any arched line where air may be trapped. In a flooded suction system, lay a suction line in the down-slope (from the tank outlet to the pump inlet) of 1:100 or steeper. In a suction lift system; however, lay it in the up-slope to the pump inlet. If plumbing latitude is limited in your facility and you can not avoid an arched suction line in the system, mount an air vent device.
9. Joint
   Minimize the number of joints in the suction pipe as much as possible. When installing joints, make sure they are properly sealed. If the seal is defective, air will be sucked into the pump, making it impossible to pump liquid, or the lubrication inside the pump will be insufficient, resulting in pump failure.
10. Pipe support
    If piping weight loads the pump, any plastic part is deformed. Be sure to install a pipe support.

3. Discharge pipe

1. Shut off valve
   Install a shut off valve near the pump discharge port (within 1m) to prevent overload at startup and to adjust the discharge rate. Also, during self-priming operation, open either the discharge pipe or the air release pipe to the atmosphere.
2. Air vent line
   An air vent line should be arranged in the following cases
   • An horizontal discharge line is 10m or more.
   • A check valve is installed. Otherwise self-priming can not be performed.
   • A discharge line is not at atmospheric pressure.
   Otherwise self-priming can not be performed.
3. Check valve
   When selecting a check valve, check its maximum operating pressure to make sure it tolerates a possible pressure rise due to water hammer or back flow.
   • Discharge line is longer than 15m.
   • A delivery head is higher than 15m.
   • The top end of a discharge line is 9m or higher than the tank liquid level.
   • Several pumps run in parallel.
4. Straight section
   Provide a vertical straight pipe section of 500 mm or more immediately after the pump to release air during self-priming operation.
5. Pipe support
   If piping weight loads the pump, any plastic part is deformed. Be sure to install a pipe support.

Before using the pump, be sure to read the instruction manual and use it correctly.

Recommended pipe arrangement



1 Discharge line
2 Shut off valve
3 Check valve
4 Pressure gauge
5 Flexible joint
6 Motor
7 Pump
8 Drain channel
9 Vacuum gauge
10 Suction pipe (Pipe diameter : D)
11 Pipe support
12 Suction valve
13 Drain cap
14 Pipe support
15 Suction lift (4m or less)
16 1.5D or wider
17 500 mm or higher
18 1.5D or wider
(500mm or wider if scale could build up in the supply tank)
19 Supply tank
20 Screen
21 Air vent line
22 Priming water cap
23 500mm or longer straight pipe
24 Shutoff valve

Optional Accessories

Pump protector **DRN** series

Detects unusual pump operating conditions including dry-running and overload

The DRN model protects equipment (including pumps) from damage!
Minimizes production downtime.
Identifies possible causes of alarms so they can be investigated and addressed.

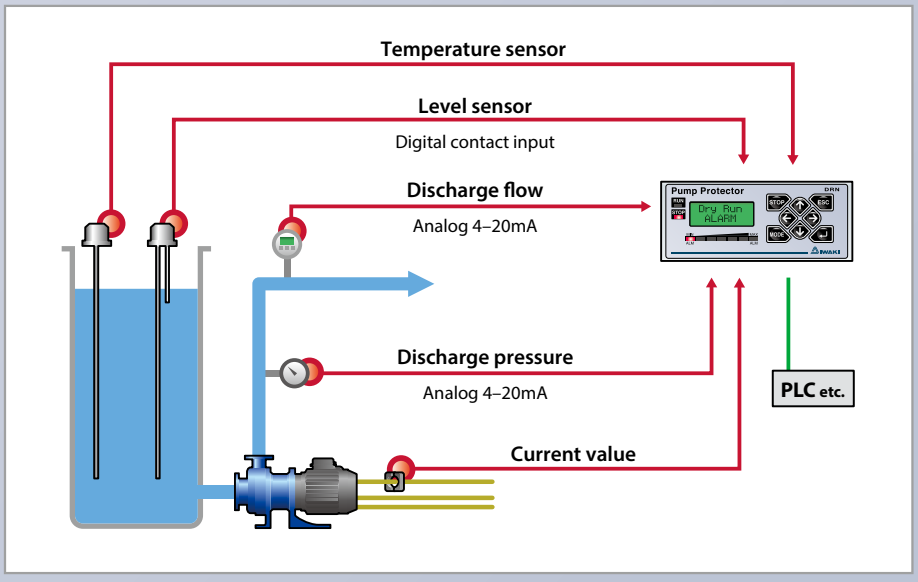
Multiple Input	Two analog, one digital, one temperature input and one current input
Easy operation	Equipped with EASY setup mode to remember the operation status and set the lower/upper limit values, as well as AUTO setup mode
Bar graph	Visible indication of current operating status
Logging capability	Data log feature for preventative maintenance scheduling
Communication	RS485 external communication capability

Specifications

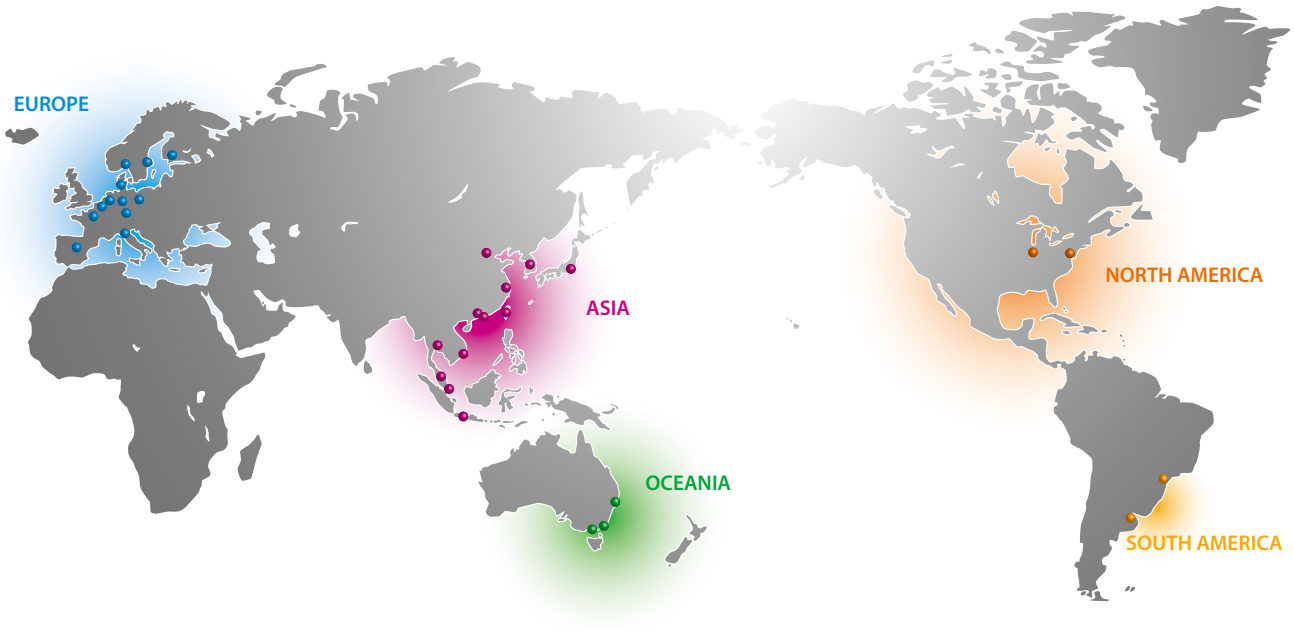
Model	DRN-01	DRN-02
Current measurement range	0.5–30.00A	5.0–200.0A
Unit's source voltage	AC100–240V 50/60Hz 10VA	
Operating temperature	0–40ºC	
Operating humidity	35–85%RH	
Current sensor	JS10FL	JS24FL
Analog input 1	4–20mA or 1–5V	
Analog input 2	4–20mA or 1–5V	
Temperature range	-50 – 200ºC (Pt100, K thermocouple)	
Digital contact input	No-voltage contact signal (also for external reset)	
Contact output	For pre-alarm: AC250V 8A (load resistance) 1c For pump-stopping: AC250V 8A (load resistance) 1a	
Logging capability	Past records (with the calendar)	
Communication	RS485 incorporated	
Supported models	MX, SMX, MXM, MDM, MDE, MDW	
External dimension in mm	D71 x W108 x H90	

* Not used as an inverter.
* Safety: UL 61010-1
  CAN/CSA-C22.2 No. 61010-1-12
  EN61010-1 EN61326-1, EN50581
* EMC: EN61326-1
* RoHS: EN50581

Example



IWAKI World-wide Network



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( )Country codes

IWAKI Saitama plant

ISO 14001 JQA-EM4848 ISO 9001 JQA-1173

IWAKI Miharu plant

ISO 14001 JQA-EM4848 ISO 9001 JQA-1173

www.iwakipumps.jp

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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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