

IWAKI
MAGNETIC
DRIVE
PUMPS

MX-F



Patent

JAPAN / U.S.A. / EU / CHINA / TAIWAN

Solution for chemical handling applications

Chemically resistant magnetic drive pumps which can tolerate abnormal operation

The MX-F series development was based on the concept of optimum reliability under severe operating conditions and features our unique self radiation structure (PAT.) as well as our well-established non contact system.

The MX-F retains excellent durability under abnormal operation such as dry running, cavitation and closed-discharge operation.

High grade materials including ETFE, are utilized as the main wetted materials.

The MX-F series is an excellent choice for reliably handling a wide range of chemicals in various manufacturing processes.

- An improved mechanical strength design allows operation under abnormal conditions and results in reduction of running cost and maintenance cost.
- The adoption of a volute casing divided into two raises efficiency. (PAT.)
- Simply constructed, it is robust and facilitates maintenance.
- Fluororesin, excellent resistance to chemicals.
- Lap joint construction



MX-F403



MX-F401



MX-F250

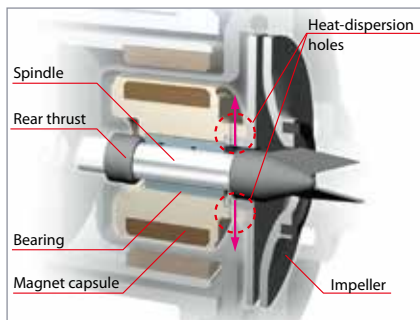


MX-F100

Self-radiating structure (PAT.)

Through heat-dispersion holes provided in the fixed portions of the impeller and the magnet capsule, liquid is circulated under pressure between the spindle and bearing to reduce friction heat transmission and prevent thermal deformation.

(Except MX-F100)



Non-contact structure

The drive magnet and driven magnet are carefully positioned so that their strong magnetic field limits rear thrust contact of the magnet capsule parts, even during dry running. As a result, heat generation is greatly reduced and liquid circulation is maintained.

(Except MX-F100)

Volute casing divided into two sections (PAT.)

The MX-F series is the first resin magnet pump which uses the pump casing divided into the front casing and the rear casing to form a vortex chamber as an ideal form. Therefore, internal leakage is kept to a minimum and overall hydraulic efficiency is enhanced.

(Except MX-F400)



Front casing

Rear casing

Robust structure

All stress bearing portions, such as the front and rear casings, are reinforced by means of ribs to improve the pressure resistance and the mechanical strength of the pump.

The bearing is not only fixed by conventional press fit but is also sandwiched between the abutting portion in the depth of the magnet capsule and the rear end of the impeller to improve its reliability under high temperature.

(Except MX-F100)

MX-F402 and F403 models: an unplugging preventive lock pin is adopted for ensuring more steady securing.



Front casing of type MX-F100 and MX-F402/403

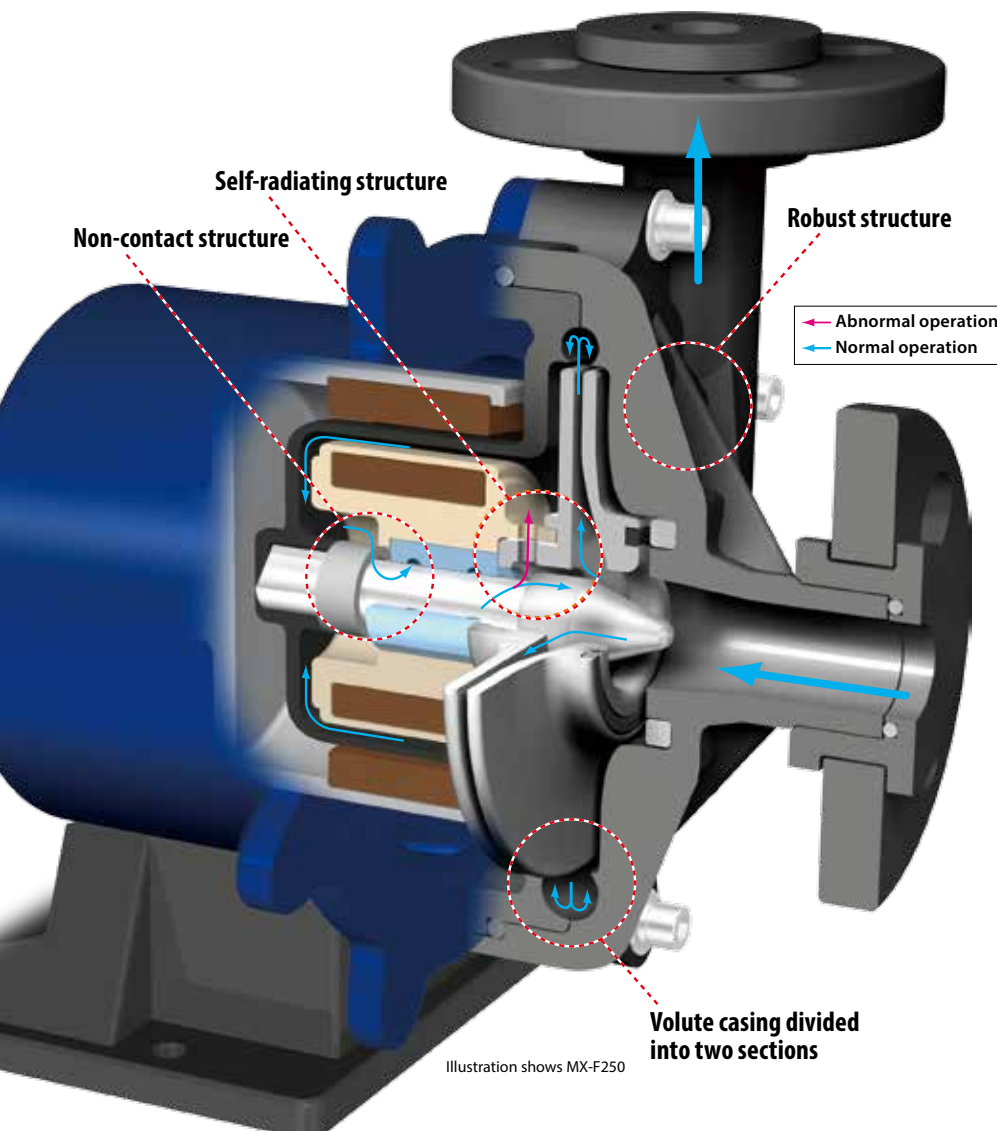
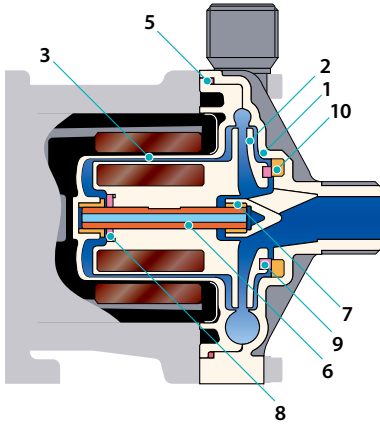


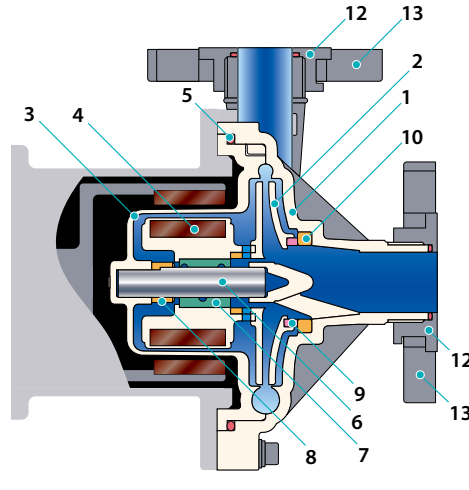
Illustration shows MX-F250

Wet end materials

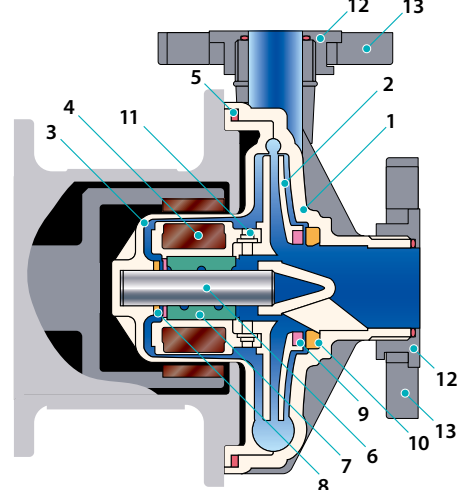
■MX-F100



■MX-F250 to F401



■MX-F402 to F403



| Model | MX-F100 | | MX-F250 to F401 | | | MX-F402 to F403 | | |
|--------------------------------|-----------------------------|-------------------|-----------------------------|-------------------|-----------------------------|---------------------|-----------------------------|-----|
| | RV | KV | CFV | RFV | KKV | CFV | RFV | KKV |
| 1 Front casing | CFRETFE | | CFRETFE | | | CFRETFE | | |
| 2 Impeller | CFRETFE | | CFRETFE | | | CFRETFE | | |
| 3 Rear casing | CFRETFE | | CFRETFE | | | CFRETFE | | |
| 4 Magnet capsule | CFRETFE | | CFRETFE | | | CFRETFE | | |
| 5 O ring <small>Note 1</small> | FKM | | FKM | | | FKM | | |
| 6 Spindle | High purity alumina ceramic | SiC | High purity alumina ceramic | SiC | High purity alumina ceramic | SiC | High purity alumina ceramic | SiC |
| 7 Bearing | PTFE(with filler) | SiC | High density carbon | PTFE(with filler) | SiC | High density carbon | PTFE | SiC |
| 8 Rear thrust | High purity alumina ceramic | SiC(Front & Rear) | CFRETFE | | | CFRPFA | | |
| 9 Mouth ring | PTFE(with filler) | - | PTFE(with filler) | SiC | PTFE(with filler) | SiC | PTFE(with filler) | SiC |
| 10 Thrust/Liner ring | High purity alumina ceramic | - | High purity alumina ceramic | SiC | High purity alumina ceramic | SiC | High purity alumina ceramic | SiC |
| 11 Lock pin | - | | - | | | CFRETFE | | |
| 12 Inner flange | - | | CFRETFE | | | CFRETFE | | |
| 13 Outer flange | - | | GFRPP | | | GFRPP | | |

Note 1: O-ring made of AFLAS® and EPDM are also available

Pump identification

■ MX-F100

MX-F 100 RV M Y - 32

- Pump size**
100 : G1X G1 260W
- Series symbol**
MX-F : Material of Casing/CFRETFE
- Materials**
MX-F : PTFE(with filler)/FKM (Bearing/O-ring)
RV : SiC/FKM (Bearing/O-ring)
- Connection**
M : Thread connection
Not for Lap joint type
- Connection**
MX-F Y : 50Hz/60Hz
Z : 60Hz only
- Motor**
No mark : 1 phase 100V
11 : 1 phase 110V
13 : 1 phase 220V/240V
32 : 3 phase 200V/220V
34 : 3 phase 400/440V

■ MX-F250 to F403

MX-F 400 CFV T C - L 2 S

- Pump size**
250 : 25A X 25A 0.4kW
251 : 25A X 25A 0.75kW
400 : 40A X 40A 0.4kW
401 : 40A X 40A 0.75kW
402 : 50A X 40A 1.5kW
403 : 50A X 40A 2.2kW
- Series symbol**
MX-F : Material of Casing/CFRETFE
- Impeller mark**
MX-F T,V,W 5 : 50Hz only
X,Y,Z 6 : 60Hz only
- Motor specification**
No mark : TEFC indoor
C : TEFC outdoor
A : Increased safety type (Except 2.2kW type)
- Material of Bearing/Spindle/O-ring**
MX-F CFV : High density carbon/High purity alumina ceramic/FKM
CFE : High density carbon/High purity alumina ceramic/EPDM
RFV : PTFE(with filler)/High purity alumina ceramic/FKM
RFE : PTFE(with filler)/High purity alumina ceramic/EPDM
KKV : SiC/SiC/FKM
KKE : SiC/SiC/EPDM
- Flange type**
No mark : Flange type
L : Lap joint type
- Special specification:**
No mark : Standard
S : Order-made specification
- Motor**
2 : 3phase 200/200/220V
3 : 3phase 220/380V (Only 250, 251, 400, 401)^{Note1}
4 : 3phase 380 to 440V^{Note2} (Only 250, 251, 400, 401)^{Note1}
6 : 3phase 380V (Only 402, 403)
7 : 3phase 400/400/440V (Only 402, 403)
8 : 3phase 415V (Only 402, 403)
9 : 3phase 460V
Note1: 3 and 4 are reserved for a dedicated motor, while a general-purpose motor is assigned an ID number from among 6 through 8.
Note2: Frequency 380: 50/60Hz, 400: 50/60Hz, 415: 50Hz, 440: 60Hz

Specifications

50/60Hz

| Model | Connection Suction X Discharge | Limit of specific gravity ^{Note1} | Standard capacity L/min - m | Maximum capacity L/min | Motor kW | Mass kg |
|-------------|--------------------------------|--|-----------------------------|------------------------|----------|---------|
| MX-F100 Y | G1 x G1 ^{Note2} | 1.9 / 1.2 | 70 - 5.8 / 9.0 | 110 / 125 | 0.26 | 8.5 |
| MX-F100 Z | | - / 1.8 | 70 - - / 5.8 | - / 110 | | |
| MX-F250 T/X | 25A x 25A | 1.2 | 50 - 11.7 / 11.8 | 150/160 | 0.4 | 13.5 |
| MX-F250 V/Y | | 1.5 | 50 - 9.1 / 9.5 | 145/150 | | |
| MX-F250 W/Z | | 1.8 to 2.0 | 50 - 6.4 / 7.5 | 126/132 | | |
| MX-F251 T/X | 25A x 25A | 1.2 | 80 - 15.7 / 17.7 | 150 | 0.75 | 22 |
| MX-F251 V/Y | | 1.5 | 80 - 12.2 / 14.1 | 150 | | |
| MX-F251 W/Z | | 1.8 to 2.0 | 80 - 9.4 / 11.5 | 120 / 140 | | |
| MX-F400 T/X | 40A x 40A | 1.2 | 100 - 10.1 / 9.3 | 250 | 0.4 | 13.5 |
| MX-F400 V/Y | | 1.5 | 100 - 8.1 / 7.6 | 230 | | |
| MX-F400 W/Z | | 1.8 to 2.0 | 100 - 5.5 / 6.3 | 210 | | |
| MX-F401 T/X | 40A x 40A | 1.2 | 150 - 12.8 / 12.6 | 270/280 | 0.75 | 22 |
| MX-F401 V/Y | | 1.5 | 150 - 10.8 / 10.4 | 260 | | |
| MX-F401 W/Z | | 1.8 to 2.0 | 150 - 8.1 / 6.9 | 240/230 | | |
| MX-F402 T/X | 50A x 40A | 1.2 | 200 - 18.3 / 18.5 | 440 | 1.5 | 38 |
| MX-F402 V/Y | | 1.5 | 200 - 16 / 15.2 | 430 | | |
| MX-F402 W/Z | | 1.8 to 2.0 | 200 - 12.5 / 11.7 | 410/400 | | |
| MX-F403 T/X | 50A x 40A | 1.2 | 250 - 22.8 / 23.1 | 510 | 2.2 | 43 |
| MX-F403 V/Y | | 1.5 | 250 - 19.4 / 19.2 | 500 | | |
| MX-F403 W/Z | | 1.8 to 2.0 | 250 - 15.3 / 14.7 | 470/480 | | |

Note1: The specific gravity limit varies with the discharge. For details, please contact us.
 Note2: 26mm tube connection option available on the MX-F100.

Common specifications

• Range of liquid temperature : 0 to 80°C (10 to 80°C in case AFLAS[®] O-rings are used.) • Range of ambient temperature : 0 to 40°C.

Precautions for pump selection

1. The performance curves on this catalogue are based on clean water of 20 °C. Keep a margin (3% of curves) when selecting the pump.

2. For the MX-F250, select a proper impeller size according to specific gravity. Always keep 10% allowance to motor output.

$$Sp \times S.G \times (1.1) \leq \text{Motor output} \\ \text{Allowance}$$

3. The magnetic drive pump is not durable for a long time in closed-discharge operation. Always keep the minimum flow.

Minimum flow
 MX-F100, 250, 251, 400, 401: 10 L/min
 MX-F402, 403: 20 L/min

4. NPSH validation
 Observe the following for the prevention of cavitation.

$$NPSHa \geq NPSHr + 0.5 \text{ m} \\ \text{Allowance}$$

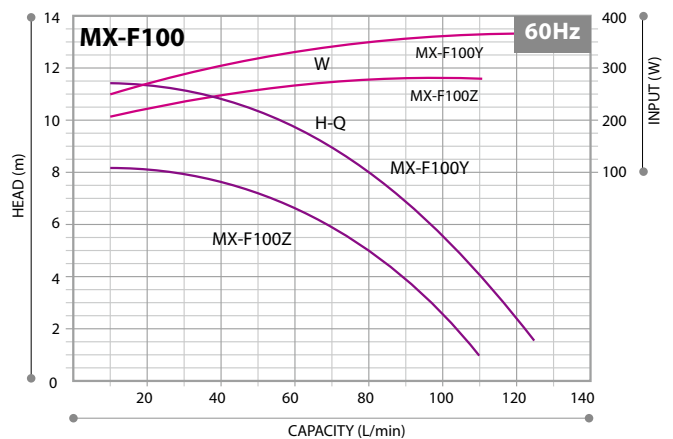
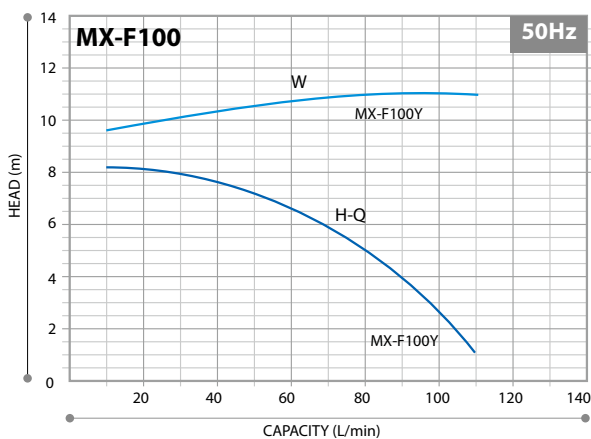
$$NPSHa = 10^6 \times (Pa - Pv) \pm hs - hfs \\ \rho g$$

5. Maximum withstand pressure

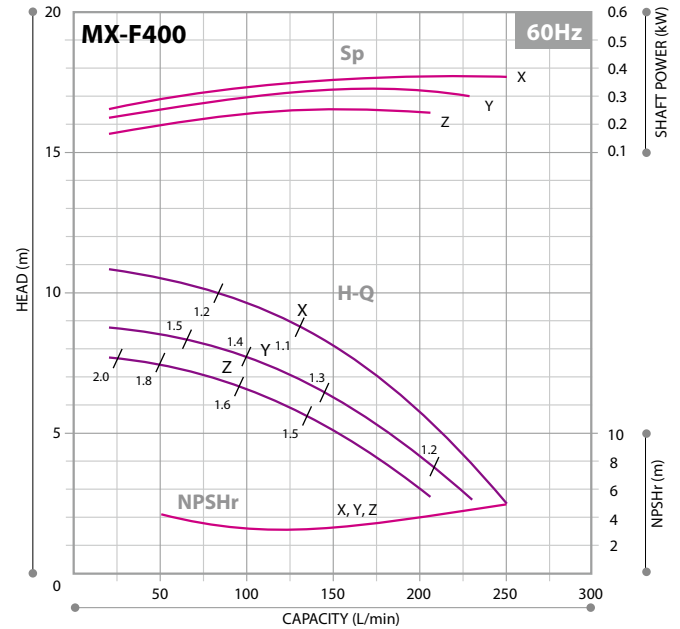
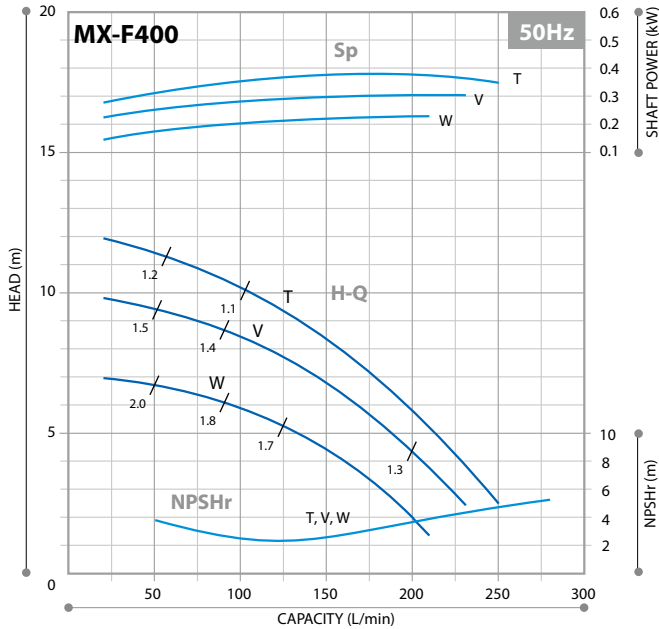
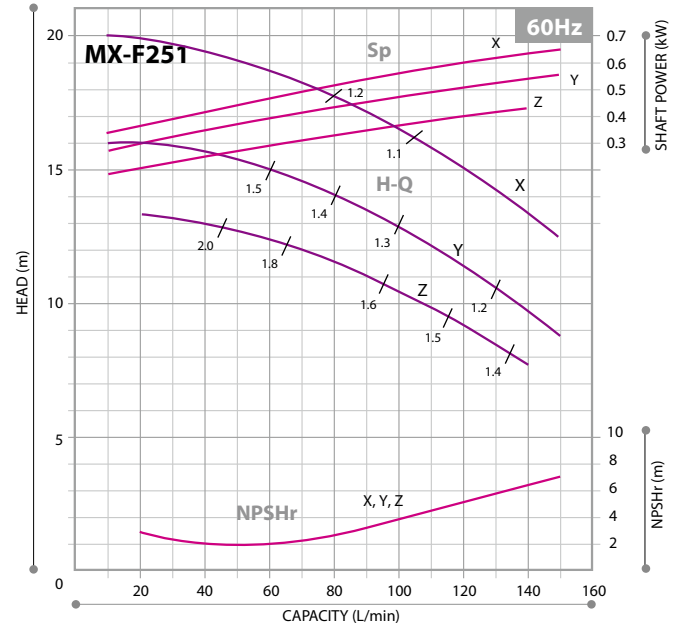
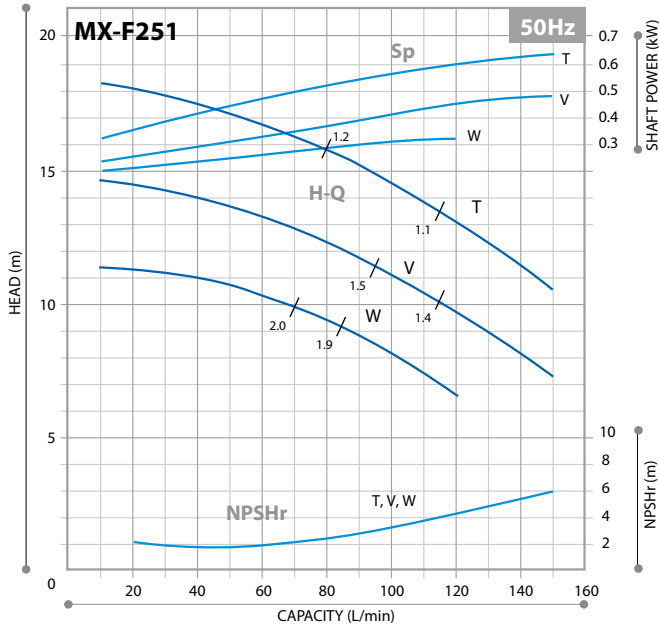
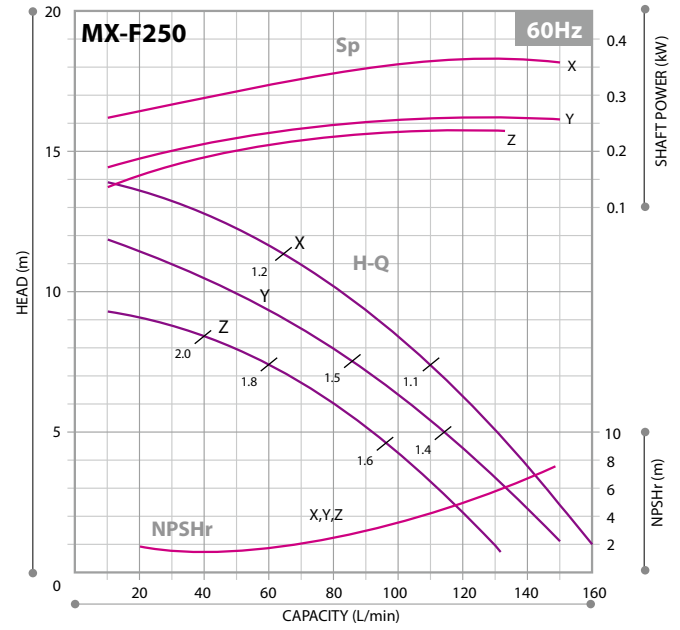
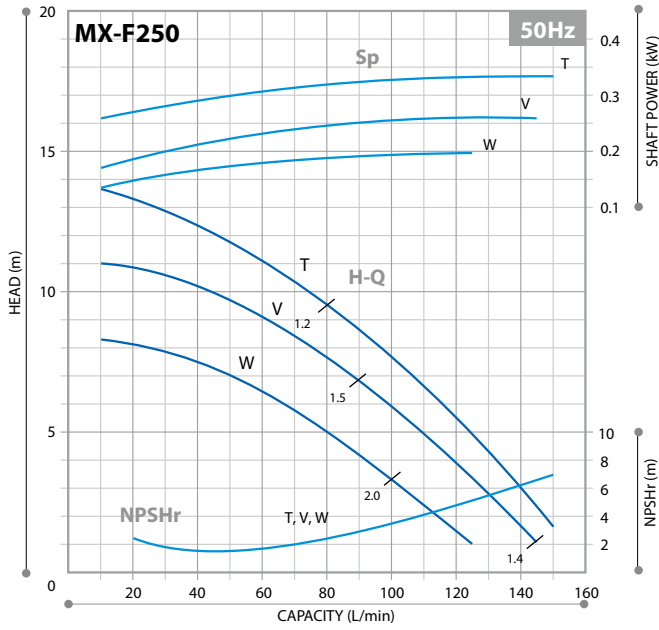
MX-F100: 0.19MPa MX-F400: 0.22MPa
 MX-F250: 0.25MPa MX-F401: 0.28MPa
 MX-F251: 0.33MPa MX-F402: 0.43MPa
 MX-F403: 0.43MPa

NPSHa: Net Positive Suction Head Available (m)
 NPSHr: Net Positive Suction Head Required (m)
 Pa: Pressure on the suction liquid level (MPa) (Absolute pressure)
 Pv: Pressure of saturated vapor (MPa)
 hs: Static suction head (m)
 hfs: Suction pipe resistance (m)
 ρ: Liquid density (kg/m³)
 g: G-force (9.8m/sec²)

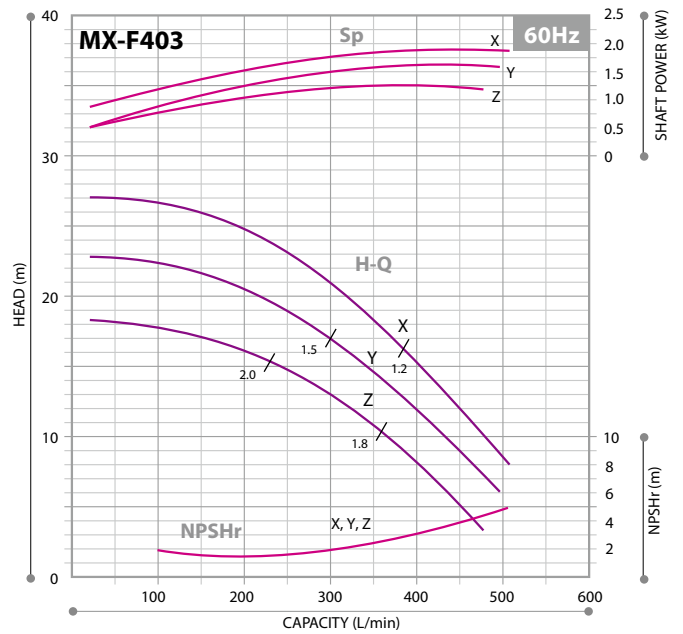
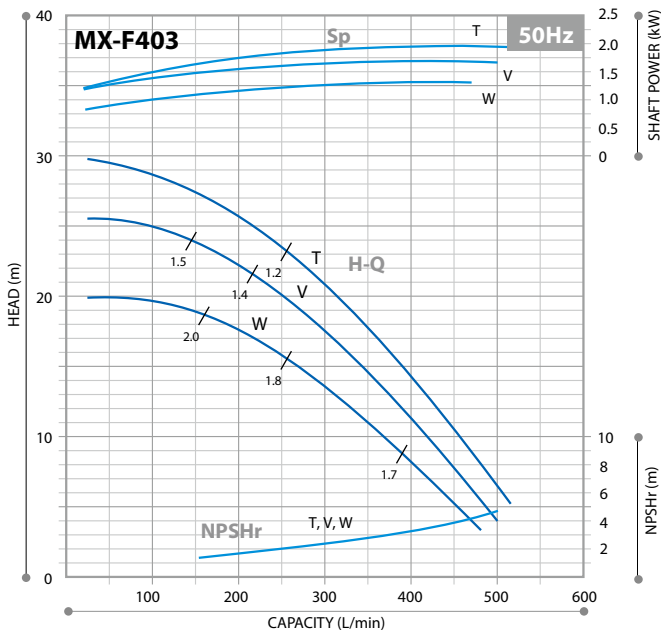
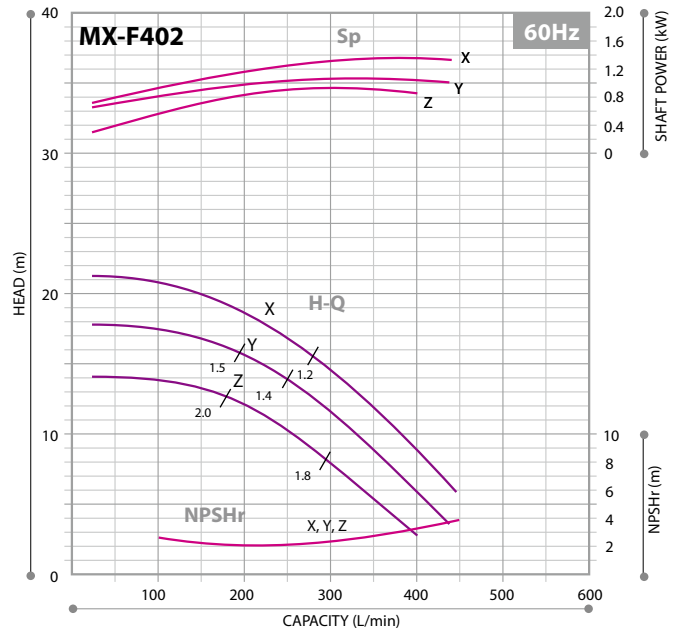
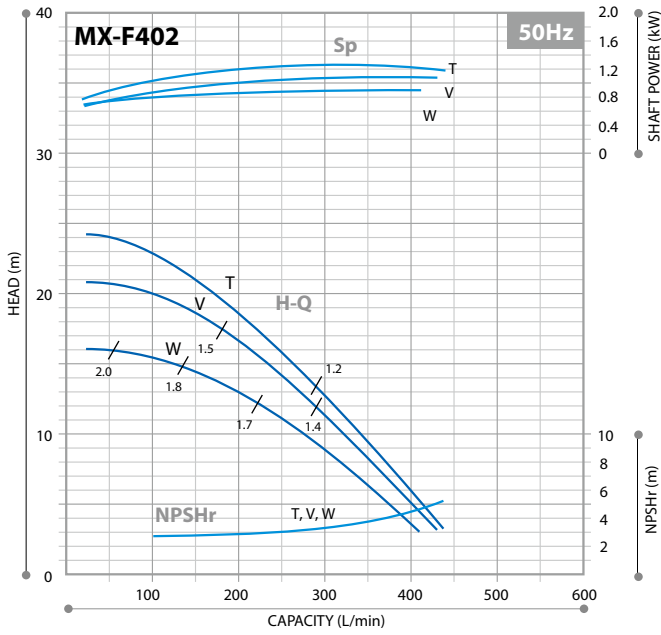
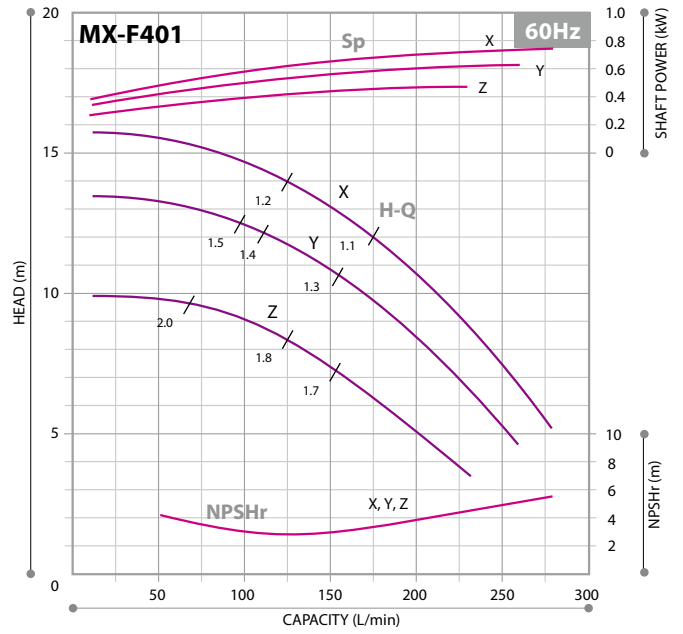
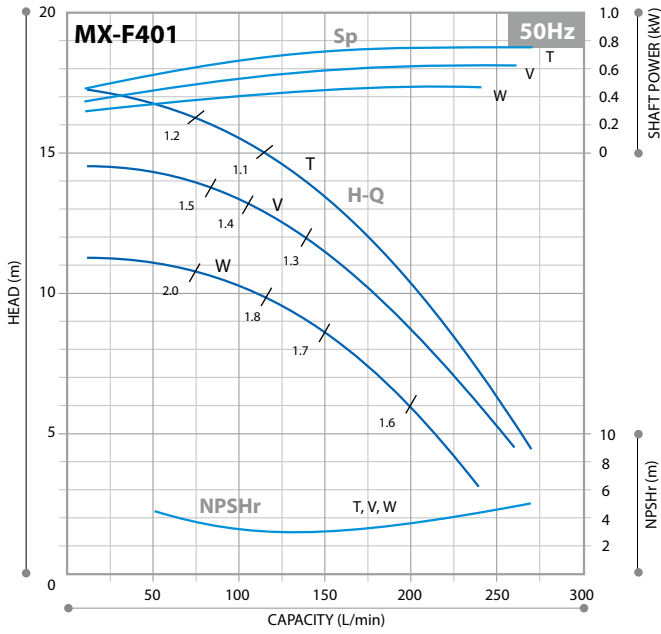
Performance curves



Performance curves

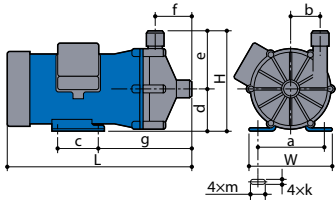


Performance curves

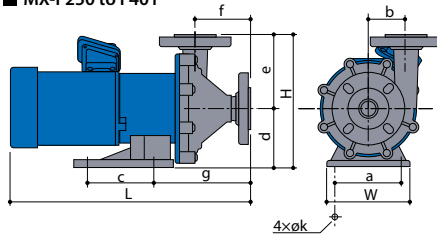


Dimensions

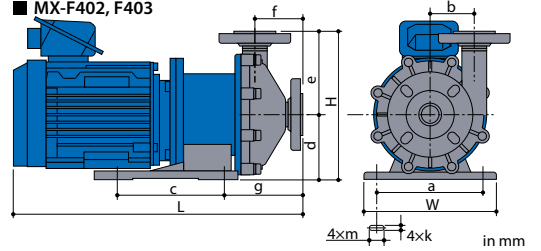
■ MX-F100



■ MX-F250 to F401



■ MX-F402, F403



| Models | W | H | L | a | b | c | d | e | f | g | k | m |
|---------|-----|-----|-------|-----|----|-----|-----|-----|-----|-----|----|----|
| MX-F100 | 150 | 175 | 319.5 | 110 | 51 | 70 | 75 | 100 | 65 | 162 | 9 | 27 |
| MX-F250 | 160 | 255 | 411 | 130 | 65 | 130 | 115 | 140 | 90 | 163 | 12 | — |
| MX-F251 | 160 | 255 | 446 | 130 | 65 | 130 | 115 | 140 | 90 | 171 | 12 | — |
| MX-F400 | 140 | 225 | 411 | 110 | 54 | 98 | 95 | 130 | 87 | 150 | 12 | — |
| MX-F401 | 160 | 255 | 459 | 130 | 72 | 130 | 115 | 140 | 103 | 184 | 12 | — |
| MX-F402 | 260 | 280 | 514 | 208 | 80 | 200 | 120 | 160 | 89 | 157 | 14 | 36 |
| MX-F403 | 260 | 280 | 543 | 208 | 80 | 200 | 120 | 160 | 89 | 157 | 14 | 36 |

Note: The dimensions may differ with the type of motor installed.

Optional accessories

Iwaki 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 |
|-----------------------|-------------------------|------------|
| Amperometric range | 0.5-30.00A | 5.0-200.0A |
| Unit's source voltage | AC100-240V 50/60Hz 10VA | |
| Operating temperature | 0-40°C | |
| Operating humidity | 35-85%RH | |

Union joint

Special purpose union joints are available. Material : PVC/Heat resistant PVC



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⚠ Caution for safety use: Before use of pump, read instruction manual carefully to use the product correctly.

⚠ Legal attention related to export.

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