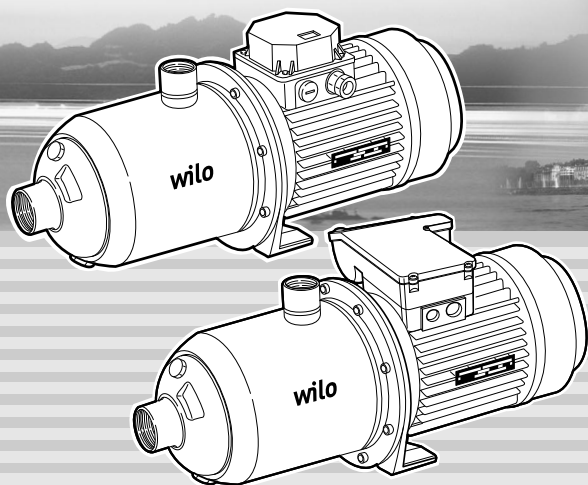


# wilo

## STAINLESS HORIZONTAL MULTI-STAGE PUMP(MHI)

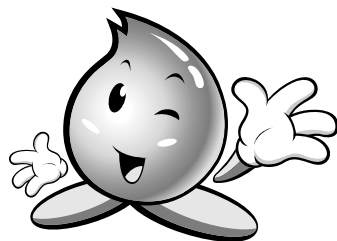
### Installation, Operation, and Maintenance Manual



#### Models

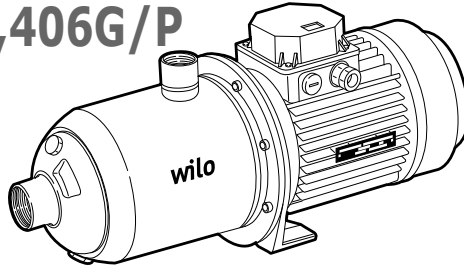
MHI202E	MHI405I/P
MHI203M, E, I/P	MHI406G/P
MHI205M, E	MHI802M, I/P
MHI206M, E	MHI803I/P
MHI402M, E, I/P	MHI805I/P
MHI403M, E, I/P	MHI1602I/P
MHI404M, E	

- ♣ Before installing and operating the pump, the Safety Instructions must be thoroughly read for the proper use of the pump.
- ♣ Before installation, this manual should be completely studied. / Read this manual completely before any work on your unit.
- ♣ Keep this manual handy for future reference.
- ♣ Product warranty is attached to this manual.
- ♣ **ATTENTION:** To keep the pump at top efficiency, this manual should be thoroughly studied.

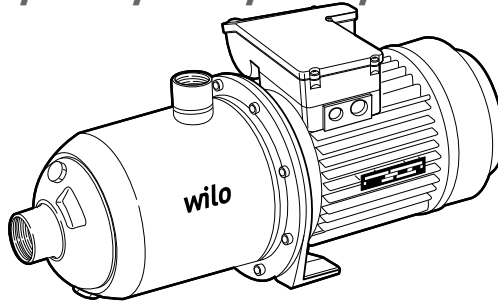


# THANK YOU FOR PURCHASING THIS PUMP

MHI203/402/403/405/802/803/805/  
1602I/P,406G/P



MHI202/203/205/206/403/402/404E,  
203/205/402/403/404/802M



- ▶ This manual includes installation and operation instructions for MHi model of WILO Pumps.
- ▶ To keep the pump at top efficiency, follow the recommended instructions in this manual.
- ▶ In case of lending the pump, this manual should be attached.
- ▶ Improper operation not outlined in this manual may cause defects or physical damage that users are liable for.
- ▶ The WILO Pumps Customer Service Department is available for customers to ask any questions and to give an advice on errors on this manual. Call our dealers or headquarter.
- ▶ Keep this manual handy for future reference.

## FEATURES OF THE PUMP

- ▶ **User-friendly handling:** Optimized input value reduces customer's input values.
- ▶ **Low-noise, low-vibration:** The pump makes low-noise and low-vibration.
- ▶ **Stainless steel pump:** The pump guarantees supply of clean water due to its material, ALL STS304.
- ▶ **Easy installation and maintenance:** Package of accessories including piping helps customers easily install and maintain the pump.
- ▶ **Light weight:** Lighter net weight makes installation and transportation easy.

# APPLICATION OF THE PUMP

- ▶ The pump is suitable for drinking water, heating water, industrial water, condensate, water/glycol mixtures up to a ratio of 20% glycol as well as other liquids free mineral oil and without abrasives or long-fibred substances. The main areas of use are in water supply installations, as booster pump, as a boiler feed pump, in industrial circulation systems, in process technology, in cooling water systems, in fire extinguishers and in Approval from the manufacturer must be obtained beforehand if corrosive chemicals are to be pumped.

# TECHNICAL DESCRIPTION

Model	AC Voltage	Motor Power	Max.Current
MHI203I/P	3Ph, 220/380V, 60Hz	0.75kW	3.1/1.8A
MHI402I/P	3Ph, 220/380V, 60Hz	0.75kW	3.1/1.8A
MHI403I/P	3Ph, 220/380V, 60Hz	1.1kW	5.2/3.0A
MHI405I/P	3Ph, 220/380V, 60Hz	1.8kW	6.5/3.8A
MHI802I/P	3Ph, 220/380V, 60Hz	1.5kW	5.7/3.3A
MHI803I/P	3Ph, 220/380V, 60Hz	2.0kW	7.1/4.1A
MHI805I/P	3Ph, 220/380V, 60Hz	2.9kW	10.4/6.0A
MHI1602I/P	3Ph, 220/380V, 60Hz	2.5kW	9.3/5.4A
MHI406G/P	3Ph, 220/380V, 50Hz	2.2kW	8.3/4.8A
MHI203M	1Ph, 220V, 60Hz	0.75kW	4.6A
MHI205M	1Ph, 220V, 60Hz	1.1kW	8.4A
MHI206M	1Ph, 220V, 60Hz	1.5kW	10.8A
MHI802M	1Ph, 220V, 60Hz	1.5kW	10.8A
MHI402M	1Ph, 220V, 60Hz	0.75kW	4.6A
MHI403M	1Ph, 220V, 60Hz	1.1kW	8.4A
MHI404M	1Ph, 220V, 60Hz	1.5kW	10.8A
MHI202E	1Ph, 230V, 50Hz	0.55kW	3A
MHI203E	1Ph, 230V, 50Hz	0.55kW	3A
MHI205E	1Ph, 220V, 50Hz	1.1kW	5.8A
MHI206E	1Ph, 220/230V, 50Hz	1.1kW	5.5A
MHI402E	1Ph, 220/230V, 50Hz	0.55kW	3A
MHI403E	1Ph, 230V, 50Hz	0.75kW	4.3A
MHI404E	1Ph, 220V, 50Hz	1.1kW	5.8A

- ▶ Fluid temperature : ~15°C to 80°C with Gasket –EPDM  
~15°C to 110°C with Gasket –VITON
- ▶ Max. permissible working pressure : 10bar
- ▶ Max. permissible inlet pressure : 6bar
- ▶ Max. ambient temperature : 40°C
- ▶ Protective system : IPX4
- ▶ Other voltages/frequencies and material properties are optional and/or available on request.  
When pumping viscous fluids (e.g. water/glycol mixtures) adjust the pump data to allow for the higher viscosity. Only use branded glycol mixtures with corrosion inhibitors and follow the manufacturers instructions.

# STAINLESS HORIZONTAL MULTI-STAGE PUMP

- ▶ The pump forms block-typed structure and every pump parts in contact with water is corrosion resistant. (Approved by KTW and WRC)
- ▶ The pump is equipped with Mono-Shaft, general-purpose mechanical seal, and plugs for suction and discharge.

# CONTENTS

Thank you for purchasing our pump.  
Follow the recommended instructions in this manual.

Thank you for	
purchasing our pump / Features .....	2
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Installation .....	8~9
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Maintenance .....	12
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Specification / Performance curv .....	14
Trouble shooting .....	15

# SAFETY INSTRUCTIONS

These instructions contain important information which must be followed when installing and operating the pump. These operating instructions must therefore be read before assembly and commissioning by the installer and the responsible operator. Both the general safety instructions in the "Safety precautions" section and those in subsequent sections indicated with danger symbols should be carefully observed.

## ● Indication of instructions in the Operating instructions

Safety precautions in these operating instructions which if not followed could cause personal injury are indicated by the symbol:



electrical warnings are indicated with:



The following symbol is used to indicate that by ignoring the relevant safety instructions, damage could be caused to the pump/machinery and its functions:

**ATTENTION!**

## ● Staff training

The personnel installing the pump must have the appropriate qualifications.

## ● Risks incurred by failure to comply with the safety precautions

Failure to comply with the safety precautions could result in personal injury, damage to the pump, or damage to the installation. Failure to comply with the safety precautions could also invalidate any claim for damages. In particular, lack of care may lead to problems such as:

- Failure of important pump or machinery functions,
- Personal injury due to electrical, mechanical and bacteriological causes.

## ● Safety precautions for the operator

Existing regulations for accident prevention must be followed. Dangers caused by electrical energy are to be excluded. Directives issued by the VDE German Association of Electrical Engineers and the local electricity supply companies are to be observed.

## ● Safety information for inspection and assembly

The operator must ensure that all inspection and installation work is carried out by authorized and qualified specialists who have carefully studied these instructions. Work on the pump/machinery should only be carried out when the machine has been brought to a standstill.

## ● Unauthorized modification and manufacture of spare parts

Alterations to the pump or installation may only be carried out with the manufacturer's consent. The use of original spare parts and accessories authorized by the manufacturer will ensure safety. The use of any other parts may invalidate claims invoking the liability of the manufacturer for any consequences.

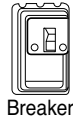
## ● Unauthorized operating methods

The operating safety of the pump or installation supplied can only be guaranteed if it is used in accordance with paragraph 1 of the operating instructions. The limiting values given in the catalogue or data sheet must neither be exceeded nor allowed to fall below those specified.

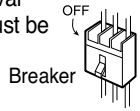
# TRANSPORTATION AND INSTALLATION

## ⚠ WARNING!

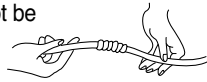
- Install a breaker of electric leakage of under 30mA of rated sensitivity to prevent electric shock.



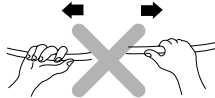
- Before installation, repair or removal of the pump, the power supply must be disconnected.



- The power cord must not be bent, tied, pulled or twisted by force.



Electric leakage, electric shock, or fire can occur.



- Pay special attention to extensions of the power cord. Any electric leakage or disconnection in the extension may cause electric shock.

- How to extend the power cord.

- ① Peel off the rubber/plastic insulation of the cable as long as the connection terminal is.
- ② Insulate the connection and cover it with rubber tape. Then tightly cover it over four times with friction tape.

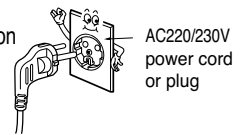


- Don't clasp the power cord in transportation and installation. The damaged cord may cause electric leakage or shock.



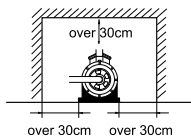
- Use a rated outlet with voltage (220/230V) fluctuation of less than  $\pm 10\%$ .

- To prevent electric shock, never plug in a power cord under wet conditions.

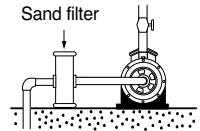


## ⚠ CAUTION!

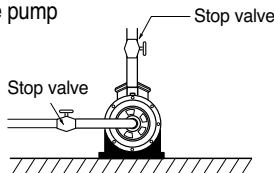
- Install the pump where the pump can be conveniently checked or repaired after installation. If the space for the pump is narrow, make the room as described on the figure.



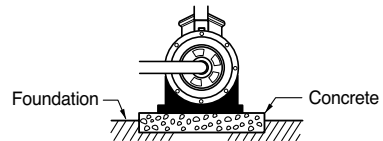
- When the pump is highly likely to suck in dust or foreign material, install a sand filter. Failure to do so may cause a decline in pressure and quantity of pumped water, and malfunction of the inverter.



- Install a stop valve on the suction side and the discharge side of the pump for easier pump maintenance.

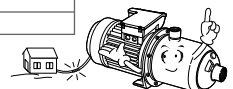


- Concrete the foundation with cement to avoid pump slant.



- When the power cord is extended, a voltage drop that keeps the pump from operation may be caused. Refer to the table for extended power cord.

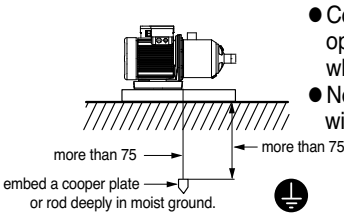
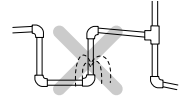
Length of power cable	nominal dimension of the cable
shorter than 50m	larger than 1.5mm <sup>2</sup>
shorter than 200m	larger than 2.0mm <sup>2</sup>



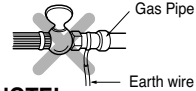
# TRANSPORTATION AND INSTALLATION

## ⚠ CAUTION!

- Minimize the number of elbows to prevent water leakages in the piping and to decrease water resistance.



- Connect the earth wire before operation to prevent electric shock when the electric insulation is faulty.
- Never get the power plug strained with water, to prevent electric shock.



### ※ NOTE!

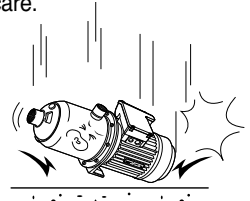
- Disconnect the power supply before connecting the earth wire.
- Gas pipe must not be connected with earth wire. Otherwise an explosion may occur.

- When installing the pump, make waterways to prevent damage caused by water leakage. Pay special attention to a basement, kitchen, and attic.



- Handle the pump with care. Do not drop.

Damage may occur.



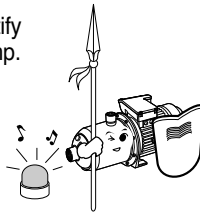
- When the pump is used for drinking water, a water purifier must be installed. ※The pump has no purification ability.



- Set an anti-vibration plate to absorb the vibration of the pump.

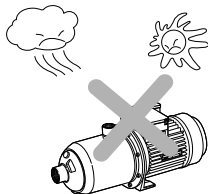


- Set an alarm system to notify the malfunction of the pump.

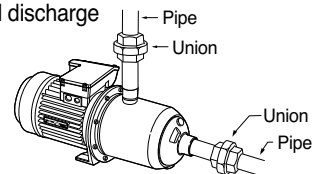


- The permitted voltage fluctuation is within 10% of the rated voltage. Otherwise contact a power company.
- The pump should not be connected directly to public waterworks. Permission from the authority should be granted. This could shorten the life of the pump.

- Don't expose the pump to direct sunrays or to rain, otherwise faulty parts or an electric shock may be caused.



- Install unions on the suction side and discharge side of the pump for convenient maintenance and repair.



# INSTALLATION

## Installation process

- The pump should be installed indoors. In case of installing outdoors, set eaves to avoid exposure to wind and rain, and prevent the pump from freezing.

## Piping

### ATTENTION!

- An elbow close to the pump suction flange should be avoided. Abnormal noise and vibration may occur.
- The piping should be adequately supported on both sides to reduce mechanical stress on the pump
- Make the piping run as short as possible and minimize the number of elbows
- Attach a strainer for filtering foreign objects to the end of the suction piping.
- Install a stop valve on the suction side and the discharge side of the pump to make pump maintenance easier.
- Install the bypass on the discharge side to make pump maintenance easier.
- To minimize noise of the pump, install a flexible joint on the suction piping and the discharge piping, and use an anti-vibration rubber.

## Wiring

### ATTENTION!

Only a qualified electrician should connect cables. Install a circuit breaker and connect earth wire to prevent any electrical accidents including electric shock.

- The power supply should be in accordance with the rated value marked on the nameplate.
- Before supplying power, check the following:
  - ① if the circuit breaker at power is suitable (under 30mA of rated sensitivity).
  - ② if the wiring is correct (connection and wire size).
  - ③ If the connections with motor terminal are tightened (No operation with missing phase).



# INSTALLATION

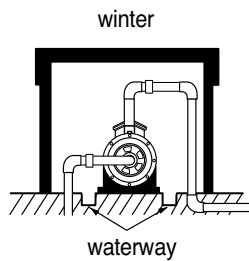
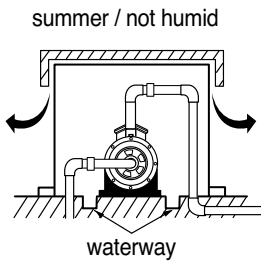
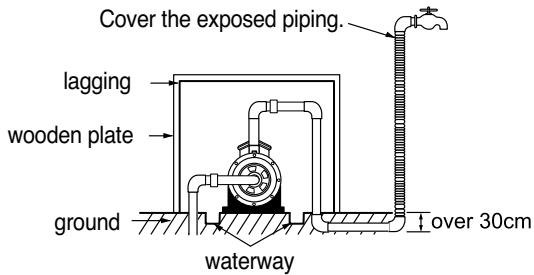


## CAUTION!

### In winter, install protections against cold weather.

- When the pump remains inactive for a long time at temperatures lower than 0°C, the pump body must be completely empty through the drain valve to prevent possible cracking of the hydraulic components.
- Bury the horizontal piping at least 30cm under ground.

**CAUTION!** To prevent a fire, don't cover the motor or pump with a blanket.



# USAGE

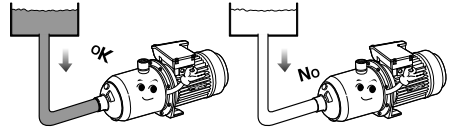
## WARNING!

- To prevent a fire, never wrap the motor of the pump head in a blanket or a cloth to prevent freezing in cold weather. The customers are liable for any damage caused by improper wrapping.

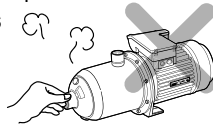


## CAUTION!

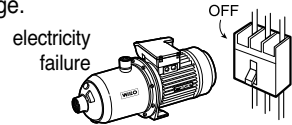
- Never conduct a shut-off operating under dry running condition and delivering no water. The life of the parts may be shortened and explosion may occur.



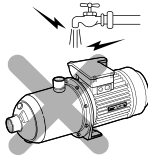
- Never touch the pump with a bare hand when the pump is operating or just stops operating.



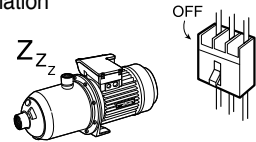
- In electricity failure, disconnect the pump with the power supply. Sudden start up may cause physical damage.



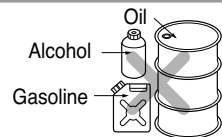
- If water penetrates into the motor, malfunction or electric leakage may occur.



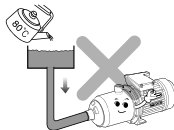
- Disconnect the pump if it is unused for a long time. Otherwise old insulation may cause electric shock or fire.



- Never use the pump with liquids other than water. A fire may be caused when chemicals or flammable liquids including petroleum, alcohol, or gasoline are used. In addition, the service life of the pump may be shortened and malfunctions are highly likely to occur.

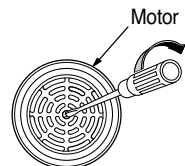


- Never use hot water over 80°C in the pump. Rubber parts and packing may be deformed, and motor may be damaged.



- Never alter an automatic item into non-automatic one. Reconstruction of the pump is prohibited.
- Any physical damage and property losses cannot be compensated in this case.

- When starting up the pump after a long time of inactivity, check if the rotating parts turn freely. Turn off the power and insert a screwdriver in the notch on the motor shaft from the fan side.



# USAGE

## Piping

The suction pipe should be larger than the discharge pipe.

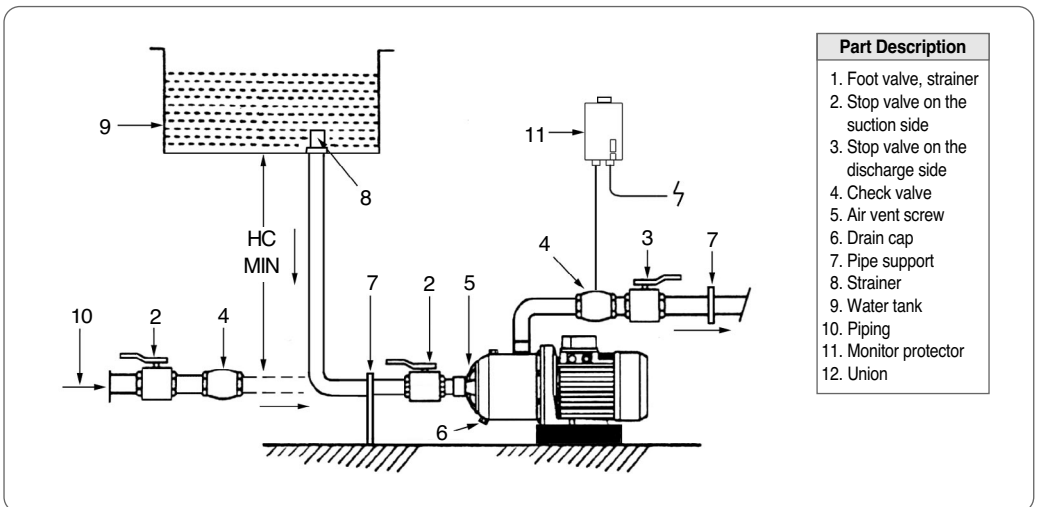
Make the piping run as short as possible and minimize the number of elbows.

The piping should be adequately supported on both sides to reduce mechanical stress on the pump.

• Install a stop valve on the suction side and the discharge side of the pump.

## Test running

① **Priming the pump:** The pump must not be run dry.



- Close the discharge valve (3) and open the air vent screw (5).
- Open the suction valve (2) to fill the pump with water.
- Close the suction valve when water comes out from the air vent screw.
- Close the air vent screw.

② **Start-up of the pump**

1. Make sure the pump has been primed and open the discharge valve.
2. Switch on the power and verify that the motor rotates in right direction. Then turn on the power to pump up water.
3. If water is not primed up, power off and reprime the pump.
4. Make sure that the pump operates without any problem. Then open and close the water tap to verify no leakage.

● Verify the electronic current flow doesn't exceed the rated value marked on the nameplate.

# MAINTENANCE

- The Pump is almost maintenance free
- During the running-in period, there may be some dripping from the axial face seal. Should a more significant leak occur as a result of substantial wear, have the axial face seal replaced by a specialist.
- Increased bearing noise and unusual vibrations indicate a worn bearing. In this case, have the bearing replaced by a specialist.
- Before carrying out any maintenance work, switch off the pump and ensure that it cannot be switched on again by unauthorized people. Never carry out work on a running pump.
- When the pump is exposed to frost or is out of service for a long period, the pump and pipework must be emptied in the cold season. Empty the pump by releasing the drain valve, the inlet pipe by releasing the vent screw, and the outlet pipe by opening the bleeding point.

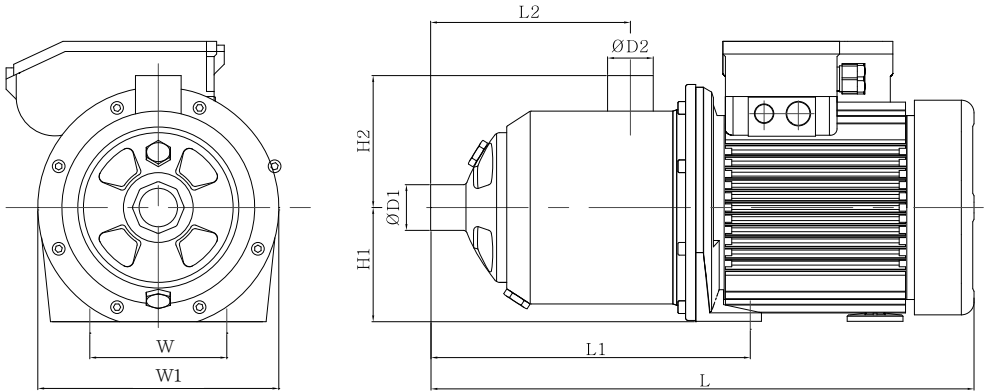
The timetable below shows how often a part should be replaced.

## Maintenance time table

	What to replace	How often replace	Whenever
Pump/ Motor	Mechanical seal	Every one year	it leaks
	O-ring/ Casket	–	it is checked
	Motor bearing	Every three years	abnormal noise occurs.

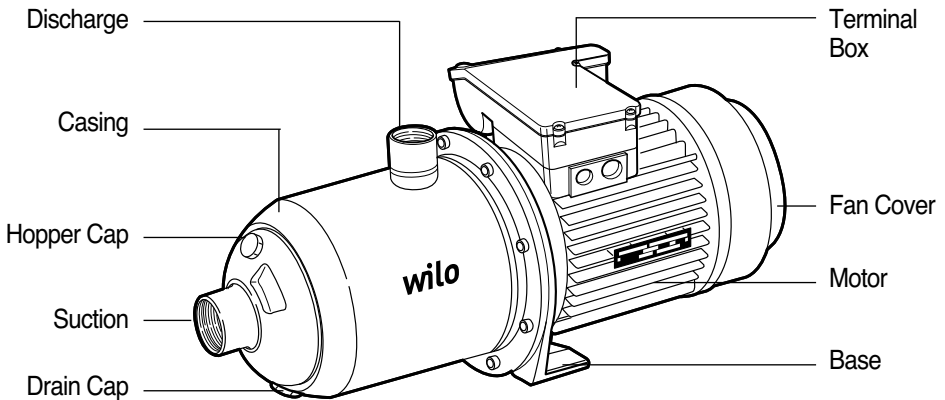
**NOTE:** The timetable is based on the assumption that after startup, the unit has been operated at rated load. So the schedule can be adjusted in accordance with circumstance and operating conditions.

# DIMENSION



Model	DIMENSION (mm)								
	H1	H2	W	W1	L	L1	L2	ØD1	ØD2
MHI202	90	104	108	190	354	204	109.5	1"	1"
MHI203	90	104	108	190	354	204	109.5	1"	1"
MHI205	90	104	108	190	428	252	157.5	1"	1"
MHI205	90	104	108	190	428	252	157.5	1"	1"
MHI206	90	104	108	190	452	276	181.5	1"	1"
MHI402	90	104	108	190	354	204	109.5	1 1/4"	1"
MHI403	90	104	108	190	380	204	109.5	1 1/4"	1"
MHI404	90	104	108	190	428	252	157.5	1 1/4"	1"
MHI405	90	104	108	190	428	252	157.5	1 1/4"	1"
MHI406	100	104	108	190	484	276	181.5	1 1/4"	1"
MHI802	90	104	108	190	392	216	121.5	1 1/2"	1 1/4"
MHI803	90	104	108	190	392	216	121.5	1 1/2"	1 1/4"
MHI805	100	104	108	190	484	276	181.5	1 1/2"	1 1/4"
MHI1602	100	104	108	190	443	236	138	2"	1 1/2"

# PARTS NAME

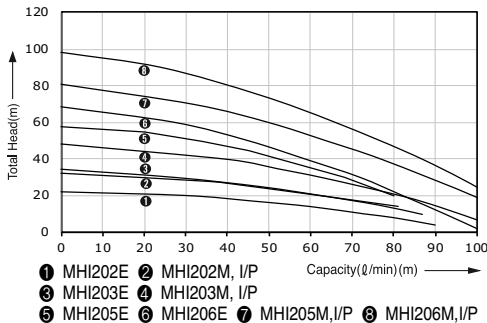


# SPECIFICATIONS

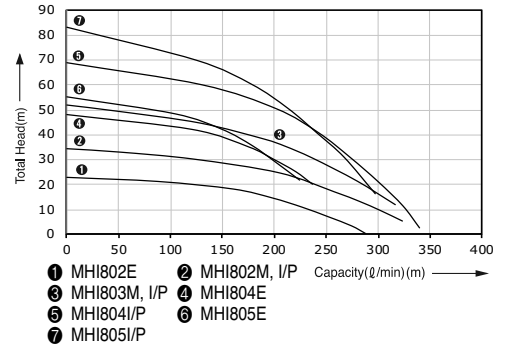
Model	Impeller Stage	P2(kW)	Current(A)	Total Head(m)	Max. Capacity (m <sup>3</sup> /hr)	Piping(mm)	
						Suc.	Dis.
MHI202E	2	0.55	3.0	22	5.4	25A	25A
MHI203E	3	0.55	3.0	32	5.7	25A	25A
MHI203M	3	0.75	4.6	47	6	25A	25A
MHI203I/P	3	0.75	3.1 / 1.8	47	6	25A	25A
MHI205E	5	1.1	5.8	53	5.7	25A	25A
MHI205M	5	1.1	8.4	80	6	25A	25A
MHI206E	6	1.1	5.5	67	5.7	25A	25A
MHI206M	6	1.5	10.8	95	6	25A	25A
MHI402E	2	0.55	3.0	20	9	32A	25A
MHI402M	2	0.75	4.6	30	10	32A	25A
MHI402I/P	2	0.75	3.1 / 1.8	30	10	32A	25A
MHI403E	3	0.75	4.3	32	9	32A	25A
MHI403M	3	1.1	8.4	46	10	32A	25A
MHI403I/P	3	1.1	5.2 / 3.0	46	10	32A	25A
MHI404E	4	1.1	5.8	42	9	32A	25A
MHI404M	4	1.5	10.8	62	10	32A	25A
MHI405I/P	5	1.8	6.5 / 3.8	80	10	32A	25A
MHI406G/P	6	2.2	8.3 / 4.8	68	9	32A	25A
MHI802M	2	1.5	10.8	30	18	40A	32A
MHI802I/P	2	1.5	7.1 / 4.0	30	18	40A	32A
MHI803I/P	3	2.0	7.1 / 4.1	48	18	40A	32A
MHI805I/P	5	2.9	10.4 / 6.0	80	18	40A	32A
MHI1602I/P	2	2.5	9.3 / 5.4	30	30	50A	40A

# PERFORMANCE CURVE

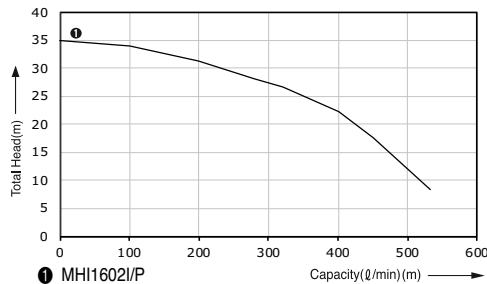
## MHI-2 Series



## MHI-8 Series



## MHI-16 Series



# TROUBLE SHOOTING (PUMP)

Trouble	Cause	Trouble shooting
The motor does not run.	Connections are faulty.	Tighten loose terminals and repair damaged wire.
	Broken power cord	Replace the cord.
	Motor malfunction	Fix or change the motor.
	Low voltage	In case of lower than regulated voltage, contact an electric power company
The pump runs, but doesn't deliver water. Or the suction and discharge pressure is too low.	The suction piping leaks.	Check the connections of piping and completely cover them up.
	The mechanical seal leaks.	Replace the mechanical seal.
	Foreign material clogged the pump parts.	Disassemble the pump and clean it.
	The suction piping is clogged.	Clean the piping.
	The pump is not primed.	Reprime the pump. Check the check valve and tighten it.
	Low suction pressure and cavitation	Compare the piping losses with NPSHa.
Water delivery is unstable	The suction piping leaks.	Check the connections of piping and completely cover them up.
	Loosened anchor.	Check anchor bolt / nut and tighten them.
The pump abnormally vibrates	Foreign material clogged the pump.	Disassemble the pump and clean it.
	The pump doesn't smoothly run.	Clean the sticking around the pump.
	Power connection failure	Check the power of the pump.
	Power supply is too low.	Check the voltage of the motor terminal. Make sure that the voltage varies less than 10%.
	Overheating of the pump	Foreign material clogged the pump.
	The ambient temperature is over 40°C.	The ambient temperature for the motor should be lower than 40°C.
Motor stopped due to overload	The input value of the temperature relay is too low.	Check the input current and regulate the value as plated.
	Input voltage is too low.	Check the power cable and replace it if needed.
	Missing phase	Check the power cable and replace it if needed. Check the terminal of power switch.
	Temperature relay malfunction of circuit breaker.	Replace it.
	The diameter of suction piping is smaller than that of suction plug.	The diameter of suction piping should be equal to that of suction plug.
	Strainer or suction piping is partly clogged.	Disassemble the pump and clean it.

***wilo***

