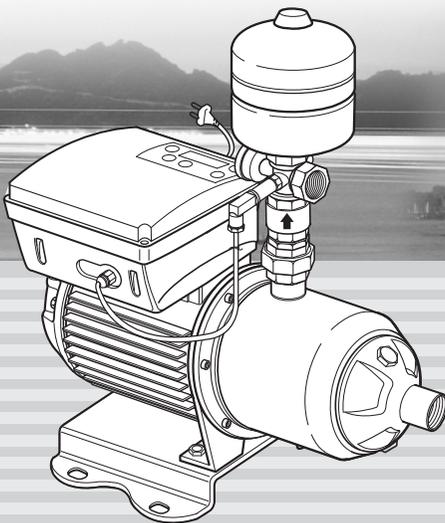


# wilo

## INVERTER PUMP

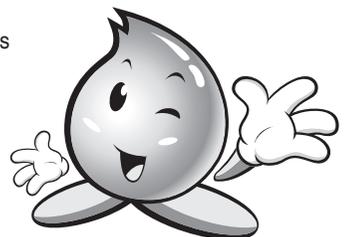
### Installation, Operation, and Maintenance Manual



#### Models

PBI-L203MA  
PBI-L205MA  
PBI-L404MA  
PBI-L405MA  
PBI-L802MA  
PBI-L803MA

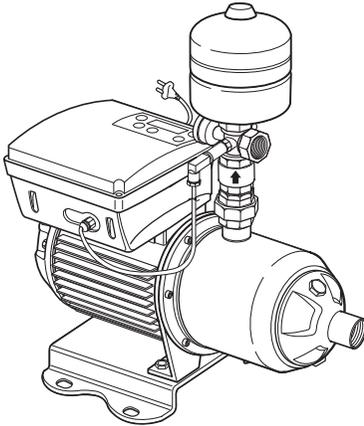
- ♣ Before installing and operating the pump, the Safety Instructions must be thoroughly read for the proper use of the pump.
- ♣ Before installation, this manual should be completely studied. / Read this manual completely before any work on your unit.
- ♣ Keep this manual handy for future reference.
- ♣ 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.

# INVERTER PUMP

<PBI-L>



- ▶ This manual includes installation and operation instructions for PBI-L 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

- ▶ **Constant Pressure:** The inverter equipped with PID Controller and high-speed digital filter guarantee constant pressure.
- ▶ **Energy cost saving:** AVR(automatic voltage regulator) embedded in the hybrid inverter allows customers to save energy cost.
- ▶ **Absorption of water hammer shock:** The inverter designed to control revolution count absorbs water hammer shock.
- ▶ **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.
- ▶ **Sophisticated design:** The plastic case of the inverter has a sophisticated design.

# APPLICATION OF THE PUMP

- ▶ The pump is suitable for boosting low water pressure in apartment houses, apartments, weekend cottages, inns, houses, small sprinklers, school buildings, dormitories, and other buildings, providing constant water pressure.

# SPECIFICATIONS OF THE PUMP

- ▶ The embedded converter for constant pressure enables control of the operating pressure depending on the height of a building.
- ▶ Pressure gauge is engaged to show pump pressure.
- ▶ Pressure tank is attached to prevent rapid change of pressure in piping.
- ▶ The stainless steel pump and brass piping will remain free of rust stains.

※ Water flow rate, water pressure(head), voltage, motor output are referred to on the nameplate.  
Basic conditions are:

|                     |   |                   |  |
|---------------------|---|-------------------|--|
| Ambient temperature | 0~40°C (32~104°F)                               | Location          | Indoors  |
| Ambient humidity    | A relative humidity under 90% (no condensation) | Suction condition | Pressurized condition  |
|                     |   | Inverter control  | VVVF   |
| Power consumption   | Single phase<br>220V 60Hz                       | Pump              | centrifugal pump (horizontal multi-stage stainless steel pump) |
| Liquid Temperature  | Up to 80°C                                      |                   |  |

# FEATURES

- ▶ Adjusting pressure setting
- ▶ Overpressure protection
- ▶ Auto restart after electricity failure
- ▶ Auto restart after correcting errors
- ▶ Dry running protection and zero flow detection
- ▶ Optional operating modes: Pressure regulation mode, Constant speed mode, External signal control
- ▶ Information and alarm signs are indicated on the display, helping easy search

# 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 .....            | 2     | Changing Operating Mode .....            | 18    |
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| Application .....                                  | 3     | Keypad and Display .....                 | 19    |
| Contents .....                                     | 4     | Indicators · .....                       | 20    |
| Safety Instructions .....                          | 5     | Set Value .....                          | 21~22 |
| Transportation and Installation instructions ..... | 5~9   | Notifying Errors .....                   | 23    |
| Operating instructions .....                       | 10~12 | Default Value for Inverter · .....       | 23    |
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# 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.

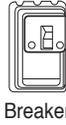
- **Unauthorized operating methods**

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.

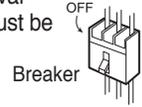
# TRANSPORTATION AND INSTALLATION

## ⚠ WARNING!

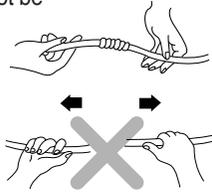
- Install a breaker of electric leakage of under 30mA of rated sensitivity to prevent electric shock.



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



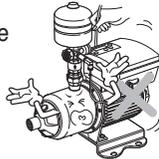
- The power cord must not be bent, tied, pulled or twisted by force. Electric leakage, electric shock, or fire can occur.



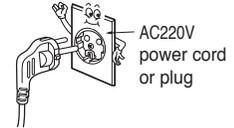
- Pay special attention to extensions of the power cord. Any electric leakage or disconnection in the extension may cause electric shock.
- How to extend the power cord.
  - ① Peel off the rubber/plastic insulation of the cable as long as the connection terminal is.
  - ② Insulate the connection and 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.

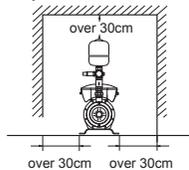


- Use a rated outlet with voltage (220V) fluctuation of less than  $\pm 10\%$ .
- To prevent electric shock, never plug in a power cord under wet conditions.

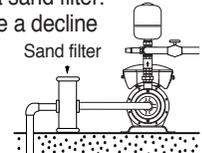


## ⚠ CAUTION!

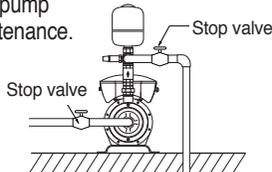
- Install the pump where the pump can be conveniently checked or repaired after installation. If the space for the pump is narrow, make the room as described on the figure.



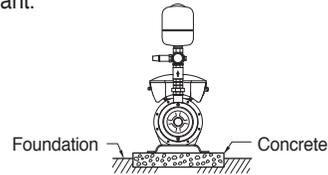
- When the pump is highly likely to suck in dust or foreign material, install a sand filter. Failure to do so may cause a decline in pressure and quantity of pumped water, and malfunction of the inverter.



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

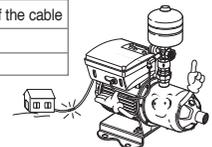


- Concrete the foundation with cement to avoid pump slant.



- 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.

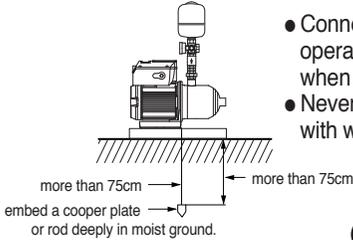
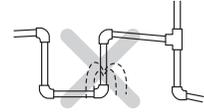
| Length of power cable | nominal dimension of the cable  |
|-----------------------|---------------------------------|
| shorter than 10 m     | larger than 1.5 mm <sup>2</sup> |
| shorter than 200 m    | larger than 2.0 mm <sup>2</sup> |



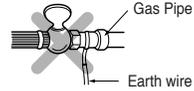
# TRANSPORTATION AND INSTALLATION

## ⚠ 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.

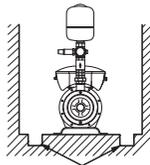


### ※ NOTE!

- 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.



waterway

- 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.

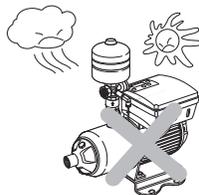


- Set an alarm system to notify the malfunction of the pump.

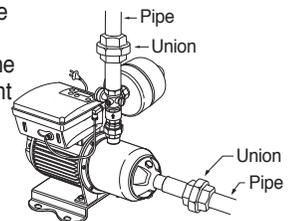


- The permitted voltage fluctuation is within 10% of the rated voltage. Otherwise contact a power company.
- The pump should not be connected directly to public waterworks. Permission from the authority should be granted. This could shorten the life of the pump.

- 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.
- The pump should be in pressurized condition. (Recommended suction pressure: 0.2kgf/cm<sup>2</sup>)

### ATTENTION!

To prevent dry running, the water tank should always be higher than the suction port of the pump. Keep the minimum suction pressure at all times.

Vent air out from the suction side tank after cleaning it.

Even in a pressurized condition, running the pump with air in the tank or with suction condition, the mechanical seal may be worn and consequently the rotational part may fall down upon the stationary part.

## Piping

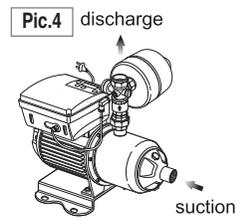
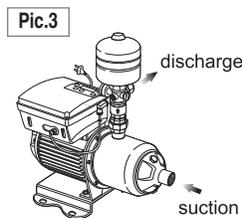
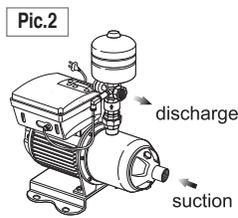
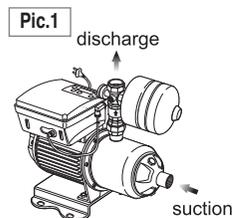
### ATTENTION!

- Even in a pressurized condition, if an elbow is used, the suction piping should never be of smaller diameter than the pump suction.

- 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.
- When the pressure tank is damaged, the discharge pressure can fluctuate or the piping can leak.
- To minimize noise of the pump, install a flexible joint on the suction piping and the discharge piping, and use an anti-vibration rubber.

## Piping direction

- Piping direction can vary depending on circumstances.
- Piping direction can be adjusted by loosening the union on discharge side.
- Tank is separately packed in shipping.



# INSTALLATION

## 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 wiring of major parts including the motor and the pressure sensor is already finished. Wiring of earth and other optional parts should be conducted according to the wiring diagram.
- 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).

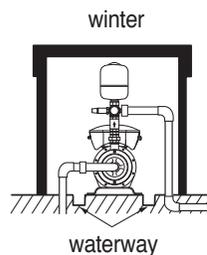
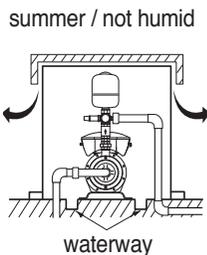
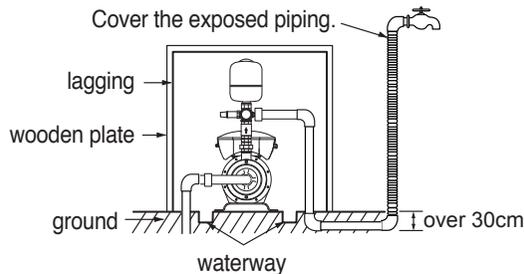


### CAUTION!

#### 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

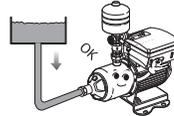
## WARNING!

- 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.

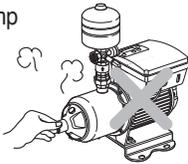


## CAUTION!

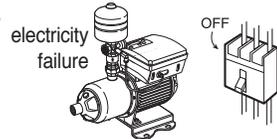
- Never conduct a shut-off operating under dry running condition and delivering no water. The life of the parts may be shortened and explosion may occur.



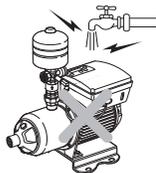
- Never touch the pump with a bare hand when the pump is operating or just stops operating.



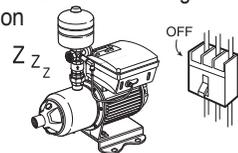
- In electricity failure, disconnect the pump with the power supply. Sudden start up may cause physical damage.



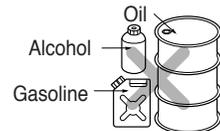
- If water penetrates into the motor, malfunction or electric leakage may occur.



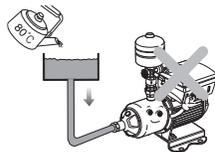
- Disconnect the pump if it is unused for a long time. Otherwise old insulation may cause electric shock or fire.



- 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.

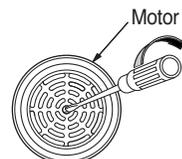


- Never use hot water over 80°C in the pump. Rubber parts and packing may be deformed, and motor may be damaged.



- 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

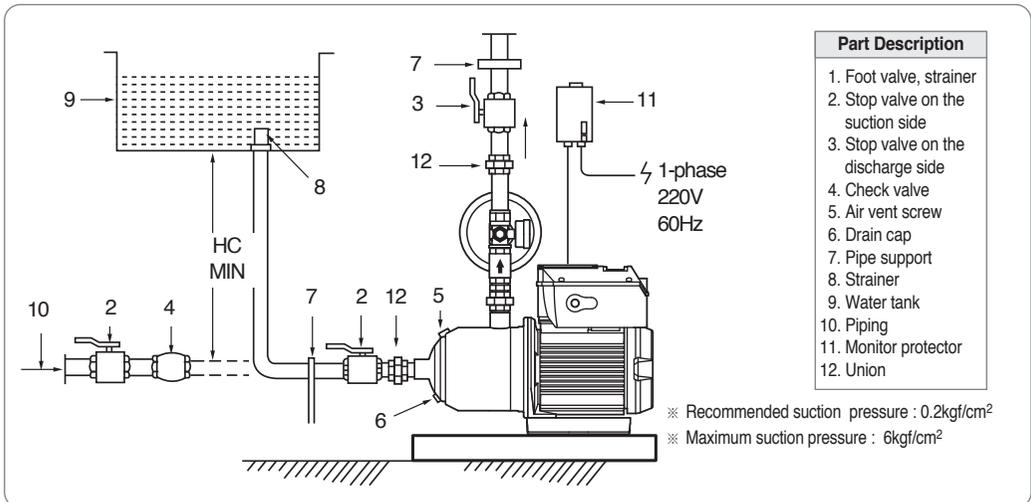
## Piping

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.
  - Check the pressure gauge to confirm stable suction and discharge pressure. If the pressure fluctuates, Reprime the pump.
  - Verify the electronic current flow doesn't exceed the rated value marked on the nameplate.

# MAINTENANCE



## WARNING!

- At first running, if you notice abnormal vibration, noise, or strange smell, turn off and disconnect the pump from its source and contact the dealer or service center. Continuous operating in this case may cause fire or electric shock.
- Don't ever disassemble or alter the product.
  - Fire, electric shock, or physical injury may occur.
  - The pump must not be dismantled and repaired except by qualified skilled personnel.
  - Contact our service center or dealer to have the pump repaired.
- When the power cord is broken, the replacement should be carried out by our dealer or other qualified personnel.



## CAUTION!

- After assembled, the pump should be put to test running.  
Incorrect assembly may cause malfunction, electric leakage, or water leakage.

# MAINTENANCE

## Refilling Pressure Tank

**WARNING!** - The pressure in the tank must not exceed the rated maximum.

- Regularly check pre-charged gas pressure in the pressure tank.

When checking the pressure, stop the pump and drain the tank. Otherwise the pre-charged gas pressure cannot be accurately measured.

- Check the pre-charged gas pressure every six months when using proper tank. When refilling the tank, follow the instructions below:

Completely drain the tank and open the cap. Refill the tank with an injector or a compressor.

The injected pressure should be 90% of operating pressure or lower by 0.5 kgf/cm<sup>2</sup> than the pressure.

If it is difficult to drain the tank, stop the pump and start refilling the pressure when pre-charged gas pressure is far less than needed.

- If the refilled pressure is much lower than operating pressure, the pressure tank may work abnormally.

- If the refilled pressure is much higher than operating pressure, the pump may shutdown and restart frequently.

## Checking Inverter

**WARNING!** The wiring and setting of the inverter is already finished before delivery.

Never change any setting except data related to the operation.

The inverter is a semiconductor device that can be damaged by ambient temperature, humidity, and vibration.

To prevent malfunctions, pay attention to following:

① If there is any problem in wiring connections      ② If there is abnormal vibrations or noise

③ If there is overheating, discoloration, or abnormal smell

- To prevent destruction of IC components, do not perform a voltage test or insulation resistance(mega test).

- The electronic circuit is embedded in the inverter, so any contact with the inverter may cause static electricity that can damage parts of the inverter.

Never touch the electronic circuit when repairing and checking the inverter. Otherwise use a ground connection and earth Chassis when touching it.

- If the bolts and nuts are loosened or rusted, disconnect the power supply, and tighten or replace them.

- If there is a connection defect in the electromagnetic switch or abnormal noise, replace the part.

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

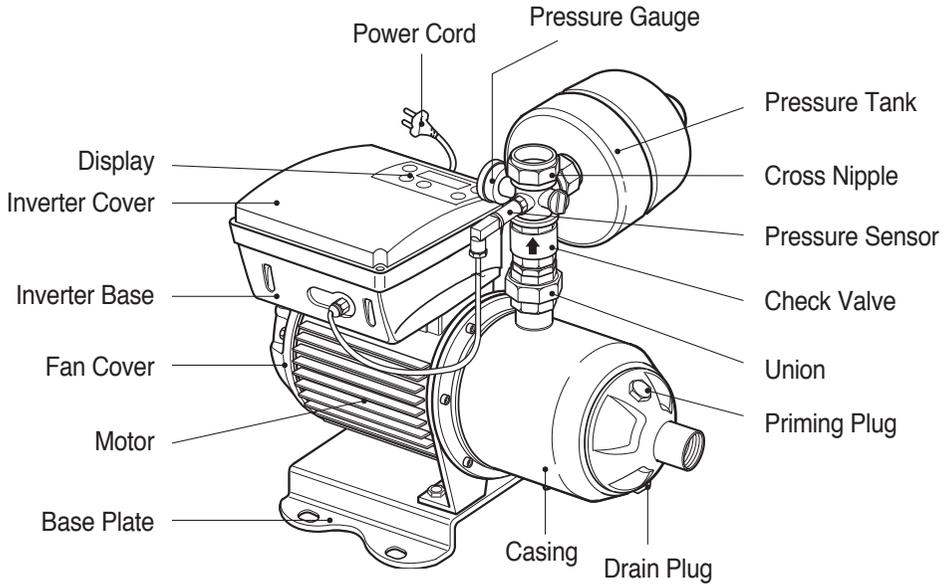
## Maintenance time table

|               | 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.   |
| Machinery     | Input transmitter | Every three years | discrepancy between pressure values occurs, or value is uncertain. |
|               | Pressure tank     | Every three years | operation is not certain.  |
| Control panel | Relays            | Every three years | connection is critically damaged or malfunction occurs.            |
|               | PCBs              | Every three years | operation is not certain.  |

**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.

Disposal of PCB or electronic parts must be carried out in accordance with related laws and regulations. This product includes PCB, so never dispose it in a general waste collection.

# DIMENSION AND PARTS



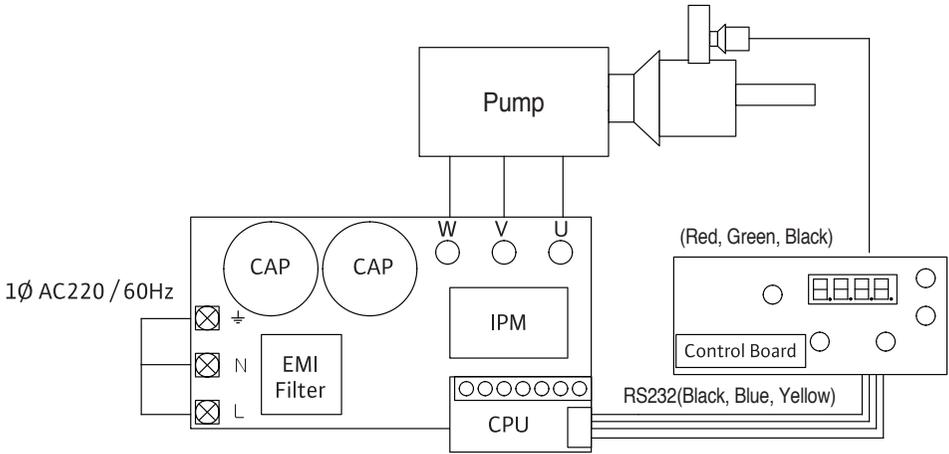
# SPECIFICATIONS

| PBI Model  | Pump    | Impeller stage | Motor output | Inverter specifications |                 | Pipe demension |           | Operation Pressure   |
|------------|---------|----------------|--------------|-------------------------|-----------------|----------------|-----------|----------------------|
|            |         |                |              | Rating output           | Rating capacity | Suction        | Discharge |                      |
| PBI-L203MA | MHI203i | 3              | 0.75kW       | 1.1kW                   | 3.0KVA          | 25A            | 25A       | 2kgf/cm <sup>2</sup> |
| PBI-L205MA | MHI205i | 5              | 1.1kW        | 1.1kW                   | 3.0KVA          | 25A            | 25A       | 4kgf/cm <sup>2</sup> |
| PBI-L404MA | MHI404i | 4              | 1.5kW        | 1.85kW                  | 4.5KVA          | 32A            | 25A       | 4kgf/cm <sup>2</sup> |
| PBI-L405MA | MHI405i | 5              | 1.85kW       | 1.85kW                  | 4.5KVA          | 32A            | 25A       | 4kgf/cm <sup>2</sup> |
| PBI-L802MA | MHI802i | 2              | 1.5kW        | 1.85kW                  | 4.5KVA          | 40A            | 32A       | 2kgf/cm <sup>2</sup> |
| PBI-L803MA | MHI803i | 3              | 1.85kW       | 1.85kW                  | 4.5KVA          | 40A            | 32A       | 2kgf/cm <sup>2</sup> |

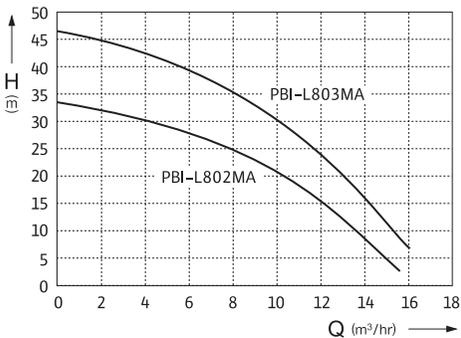
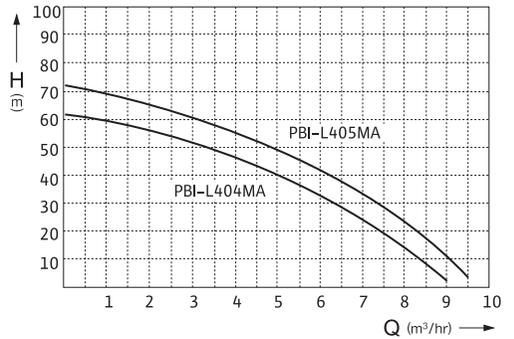
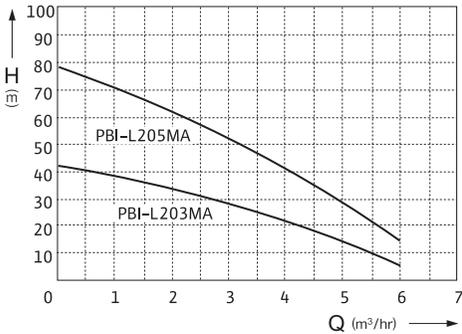
※ Pressure transmitter (pressure sensor): rated pressure 16bar, input voltage 5 Vdc, output 0~5VCD(Voltage)

※ The volume of pressure tank : 2ℓ

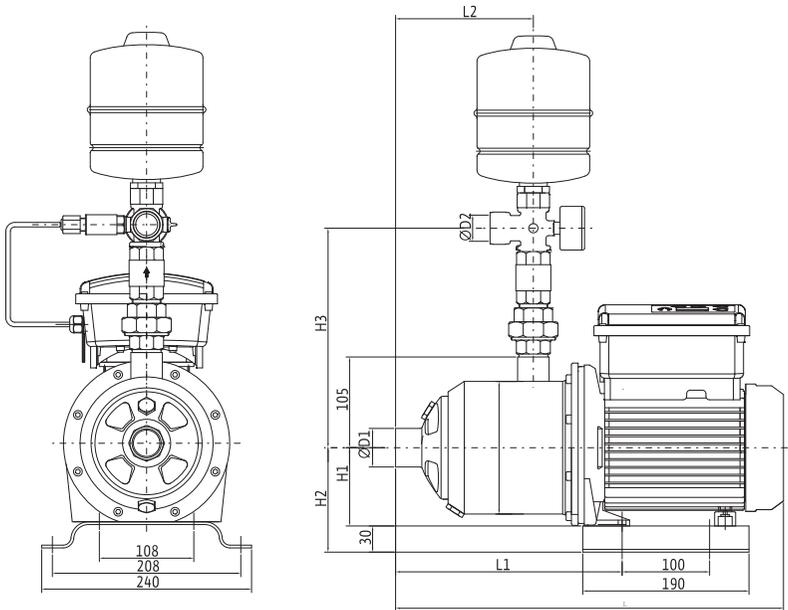
# WIRING DIAGRAM



# PERFORMANCE CURVE



# DIMENSIONS



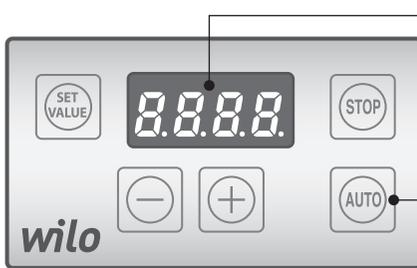
Unit(mm)

| Model      | Dimension(mm) |                |                |                |     |                |                |                 |                 | Weight (kg) |
|------------|---------------|----------------|----------------|----------------|-----|----------------|----------------|-----------------|-----------------|-------------|
|            | H             | H <sub>1</sub> | H <sub>2</sub> | H <sub>3</sub> | L   | L <sub>1</sub> | L <sub>2</sub> | ØD <sub>1</sub> | ØD <sub>2</sub> |             |
| PBI-L203MA | 580           | 90             | 120            | 435            | 360 | 204            | 109.5          | 1"              | 1"              | 13          |
| PBI-L205MA | 580           | 90             | 120            | 435            | 425 | 252            | 157.5          | 1"              | 1"              | 14          |
| PBI-L404MA | 580           | 90             | 120            | 435            | 425 | 252            | 157.5          | 1 1/4"          | 1"              | 19.5        |
| PBI-L405MA | 580           | 90             | 120            | 435            | 425 | 252            | 157.5          | 1 1/4"          | 1"              | 20          |
| PBI-L802MA | 580           | 90             | 120            | 435            | 360 | 204            | 109.5          | 1 1/2"          | 1 1/4"          | 18          |
| PBI-L803MA | 580           | 90             | 120            | 435            | 360 | 204            | 109.5          | 1 1/2"          | 1 1/4"          | 19          |

# INVERTER DISPLAY



For avoiding electric accidents by high voltage and hazards caused by the leakage of inverter and condensers, please pull-out the power cord and wait more than 5 minutes. Every connections (include with potential-free connections) check the poles.



1. Display  
Easy display for user

2. Control Button  
Use to change the system information or check.

# SENSOR CONNECTION OF INVERTER PUMP

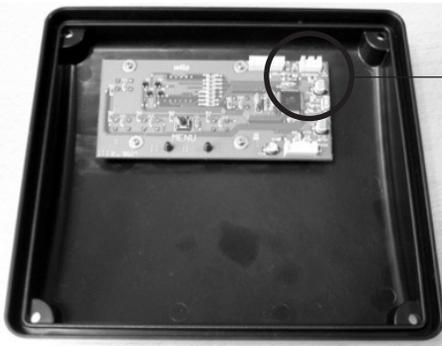


Keep the power off before connection

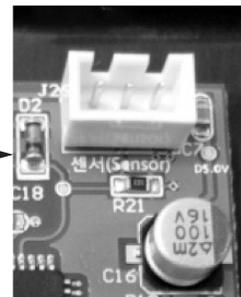
## - Sensor connection

Pressure auto control mode : Should connect sensor for pressure control

Pressure manual control mode : Sensor is assist function of checking pressure and display



Sensor input



## 1. Sensor input

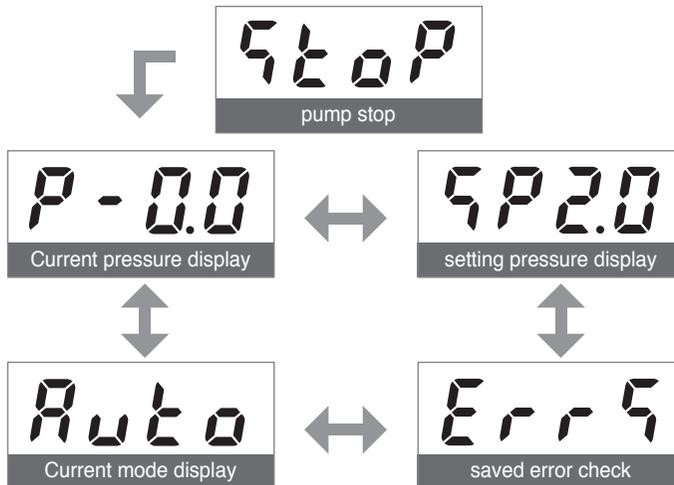
Need the qualified person's help to install the relative pressure for measure the pressure of suction and discharge pipes

# INVERTER CONTROL BUTTEN EXPLANATION

|   |  |
|---|--|
|  | Set the pressure in a auto control mode, change the motor frequency in a manual mode |
|  | Pump run, parameter save in a setting mode   |
|  | Pump stop, parameter cancel in a setting mode  |
|  | parameter increase in a setting mode, change the status in a status display menu     |
|  | parameter decrease in a setting mode, change the status in a status display menu     |

# STATUS DISPLAY EXPLANATION

## Status display when pump stop

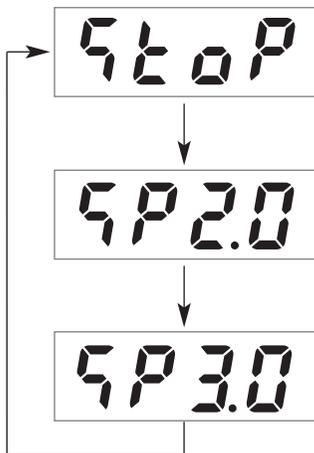


## Status display when pump running



# AUTO CONTROL MODE PRESSURE SETTING

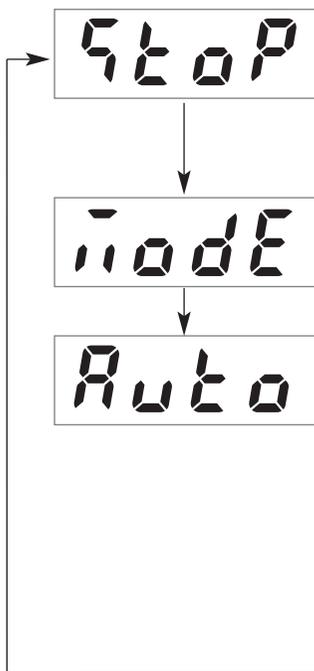
**Warning!** Stop the pump before pressure setting



-  Press the stop button and pump stop
-  Press the "P" button, display will change the pressure setting menu.
-   Press the + or - , change the setting.
-  Press the Auto button and save.
-  Press the stop button and display will change initial screen.

Ex) How to change setting pressure 2.0 to 3.0 bar

# PARAMETER SETTING



- Open the cover and press the "menu" button in a back of PCB when change the parameter setting



-   Press the + or - move "Mode", and press the auto button.
- 
-   Press the + or - move "Manu", and press the auto button.
- 
-   Press the + or - change the frequency and press auto button(save).
-  Press the stop button, display will change initial screen.
- 

# PARAMETER MENU

stop

PoWE

Pump power

ndrt

Rotation of motor

1EE

Warming up time

SEnS

Sensor offset

dry

Dry run pressure setting

mode

Running mode setting

CHET

Stop flow time setting

HI - P

Hi-pressure setting



Move the menu by + or -

\* MENU button is not in front interface. Open the inverter cover, menu button is located in back of interface PCB.



Press the "stop" button, move to stop status in each menu

# PARAMETER FUNTOIN MENU

## 1. Pump power

PoWE

|               |            |
|---------------|------------|
| Display Range | 750W~1.8KW |
|---------------|------------|

|                       |       |
|-----------------------|-------|
| Initial setting value | 1.1KW |
|-----------------------|-------|

How to check pump power status.

PoWE



Press auto is move.

750W ~ 1.8kW

“750W” or “1.8kW” Blinking.



Press “+” or “-” can change status.



Press “Auto” is save and stop blinking.



Press “Stop” is move to stop status.

## 2. Motor rotation change

nDrE

|               |           |
|---------------|-----------|
| Display Range | CCW or CW |
|---------------|-----------|

|                       |    |
|-----------------------|----|
| Initial setting value | CW |
|-----------------------|----|

How to change motor rotation.

nDrE



Press auto is move.

CW ~ CCW

“CW” or “CCW” Blinking.



Press “+” or “-” can change status.



Press “Auto” is save and stop blinking.



Press “Stop” is move to stop status.

# PARAMETER FUNTOIN MENU

## 3. Warming-up time change



|                       |         |
|-----------------------|---------|
| Display Range         | 000~999 |
| Initial setting value | 60      |
| Time unit             | minute  |

How to change warming-up time.



 Press auto is move.



"0" Blinking.

  Press "+" or "-" can change status.

 Press "Auto" is save and stop blinking.

 Press "Stop" is move to stop status.

## 4. Sensor Offset change



|                       |            |
|-----------------------|------------|
| Display Range         | -0.9 ~ 0.9 |
| Initial setting value | 0          |
| Pressure unit         | bar        |

How to change sensor offset.



 Press auto is move.



"0" Blinking.

  Press "+" or "-" can change status.

 Press "Auto" is save and stop blinking.

 Press "Stop" is move to stop status.

# PARAMETER FUNTOIN MENU

## 5. Dry-run protection pressure change

|                       |         |
|-----------------------|---------|
| Display Range         | 0 ~ 9.9 |
| Initial setting value | 0.5     |
| Pressure unit         | bar     |

How to change dry-run protection pressure.

Press auto is move.

"0.5" Blinking.

Press "+" or "-" can change status.

Press "Auto" is save and stop blinking.

Press "Stop" is move to stop status.

## 6. Running mode change

|                       |              |
|-----------------------|--------------|
| Display Range         | Auto or Manu |
| Initial setting value | Auto         |

How to change running mode.

Press auto is move.

"Auto" or "Manu" Blinking.

Press "+" or "-" can change status.

Press "Auto" is save and stop blinking.

Press "Stop" is move to stop status.

# PARAMETER FUNTOIN MENU

## 7. Stop flow time change

CHFC

|                       |        |
|-----------------------|--------|
| Display Range         | 0 ~ 99 |
| Initial setting value | 10     |
| Time unit             | second |

How to change stop flow time.

CHFC

 Press auto is move.

25 10

"0" Blinking.

  Press "+" or "-" can change status.

 Press "Auto" is save and stop blinking.

 Press "Stop" is move to stop status.

## 8. Abnormal high pressure change

HI - P

|                       |             |
|-----------------------|-------------|
| Display Range         | 설정값+ 1.0~15 |
| Initial setting value | 10.0        |
| Pressure unit         | bar         |

How to change abnormal high pressure.

HI - P

 Press auto is move.

HP 4.0

"0" Blinking.

  Press "+" or "-" can change status.

 Press "Auto" is save and stop blinking.

 Press "Stop" is move to stop status.

# TROUBLE SHOOTING(INVERTER)

| Type                   | Error description   | detecting delay time | delay time for re-run              | repetition time | Code |
|------------------------|---|----------------------|------------------------------------|-----------------|------|
| abnormal high pressure | Make an error for protect valve or pipe. When discharge pressure is higher than abnormal pressure, inverter make an error.  | 4m sec               | 10sec after normal pressure return | -               | E-02 |
| Inverter Error         | Make an error for protect inverter. When inverter hardware alarm is occur(short, earth leakage, or hard fault), inverter make an error.   | 4m sec               | 10sec after normal status return   | -               | E-24 |
| Over current           | Make an error for protect inverter and prevent from fire by over-current. When impeller bound, overload are occur, inverter make an error.  | 4m sec               | -                                  | -               | E-23 |
| Inverter overload      | Make an error for protect inverter. When alarm is occur(software trip, pump rated load 130% over), inverter make an error.  | 60m Sec              | 10sec after normal status return   | -               | E-22 |
| High voltage           | Make an error for safe. When high voltage occur in DC-Link, inverter make an error.   | 4m sec               | 10sec after normal voltage return  | -               | E-05 |
| Low voltage            | Make an error for safe and protect inverter. When low voltage is occur in DC-Link(or AC power voltage), inverter can't make control power source and over current can flow. Inverter make an error. | 4m sec               | 10sec after normal status return   | -               | E-04 |
| Dry-run                | Make an error for protect pump. When dry-running is occur, inverter make an error.  | 30 Sec               | -                                  | 10              | E-00 |
| Bad suction            | Make an error only auto running mode. When bad suction is occur, inverter make an error.  | 10 min               | -                                  | 3               | E-06 |
| Sensor fault           | Make an error only auto running mode. When no-signal or abnormal pressure is occur, inverter make an error.   | 4m sec               | 10sec after normal status return   | -               | E-42 |
| Communication fault    | When bad communication is occur(control board to power board), inverter make an error.  | 1 Sce                | 10sec after normal status return   | -               | E-49 |

# 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.<br>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   | Power supply doesn't reach to the motor.                             | Measure the voltage of the motor terminal or the size of cable wire.                         |
|  | The suction piping leaks.  | Check the connections of piping and completely cover them up.                                |
| The pump abnormally vibrates   | Loosened anchor.   | Check anchor bolt / nut and tighten them.  |
|  | 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.<br>Make sure that the voltage varies less than 10%. |
| Overheating of the pump  | Foreign material clogged the pump.                                   | Disassemble the pump and clean it.   |
|  | 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.<br>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.   |

# SWITCHING-OF TROUBLE SHOOTING (PUMP)

| Trouble   | Cause  | Trouble shooting   |
|---|--|--|
| <p>The pump does not deliver water even when the water tap is opened.</p>   | <ul style="list-style-type: none"> <li>• Main valve is closed.</li> <li>• Air is in the pump or piping.</li> <li>• Pump or motor malfunction</li> <li>• The motor reverses.</li> <li>• Water tank is too low.</li> <li>• Pressure sensor malfunction.</li> <li>• No power supply.</li> <li>• The pump is in "STOP" mode.</li> <li>• Main power, motor, sensors, or connections are faulty or disconnected.</li> <li>• Missing phase</li> <li>• Operating pressure is too low.</li> </ul> | <ul style="list-style-type: none"> <li>• Open the main valve.</li> <li>• Extract air out from the pump or piping.</li> <li>• Check and repair the pump.</li> <li>• In case of three wire connections, exchange the connection of two wires each other.</li> <li>• Fill the tank.</li> <li>• Move to Pressure regulation mode.</li> <li>• Check and repair the pump.</li> <li>• Remove the cause of missing phase.</li> <li>• Adjust the operating pressure.</li> </ul> |
| <p>The pump does not stop when the tap is turned off.</p>                   | <ul style="list-style-type: none"> <li>• Input switching off pressure is too high.</li> <li>• Pressure sensors or switches malfunction.</li> <li>• Control board malfunction.</li> <li>• The piping leaks.</li> <li>• Worn pump or pump backlash</li> </ul>  | <ul style="list-style-type: none"> <li>• Adjust the input switching-off pressure.</li> <li>• Check and repair the pump.</li> </ul>   |
| <p>The pump runs even when water is not flowing</p>                         | <ul style="list-style-type: none"> <li>• The piping leaks.</li> <li>• The check valve leaks.</li> </ul>  | <ul style="list-style-type: none"> <li>• Check and repair the pump.</li> <li>• Check and repair the pump.</li> </ul>   |
| <p>The pump vibrates irregularly (The pump stops and starts too often.)</p> | <ul style="list-style-type: none"> <li>• The range between the working pressure and the switching off pressure is too narrow.</li> <li>• Pressure tank malfunction or low pressure</li> <li>• DFR(Dynamic Flow Range) by piping</li> </ul>   | <ul style="list-style-type: none"> <li>• Adjust the working pressure and switching off pressure.</li> <li>• Check and repair the pump. Fill air into pressure tank up to rated value.</li> <li>• Repair the piping (remove the airpocket).</li> </ul>  |
| <p>The pump runs but does not deliver expected flow.</p>                    | <ul style="list-style-type: none"> <li>• Input pressure is too low</li> <li>• Capacity lack of the pump</li> <li>• Worn pump</li> </ul>  | <ul style="list-style-type: none"> <li>• Adjust the working pressure.</li> <li>• Check the specifications of the pump.</li> <li>• Check and repair the pump.</li> </ul>  |
| <p>The pump does not run in Pressure regulation mode.</p>                   | <ul style="list-style-type: none"> <li>• The pump is in Constant speed mode.</li> <li>• Control board malfunction.</li> <li>• Pressure sensors or switches malfunction.</li> <li>• Pump or motor malfunction.</li> </ul>   | <ul style="list-style-type: none"> <li>• Move to Pressure regulation mode.</li> <li>• Check and repair the pump.</li> <li>• Check and repair the pump.</li> <li>• Check and repair the pump.</li> </ul>  |
| <p>The circuit breakers trip.</p>   | <ul style="list-style-type: none"> <li>• Electrical wiring short</li> <li>• Circuit short or breaker short</li> <li>• Power short</li> </ul>   | <ul style="list-style-type: none"> <li>• Check and repair the pump.</li> <li>• Check and repair the pump.</li> <li>• Check and repair the pump.</li> </ul>   |

# MEMO

# MEMO

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***wilo***