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WATER MANAGEMENT SYSTEMS


**Shah Pneumatics**

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IOM BOOSTER PUMP SYSTEMS - HORIZONTAL TYPE - PP-TS




Publication Reference : **Flowmatics 251/2010 Rev.00**


Flowmatics™

WATER MANAGEMENT SYSTEMS

# PP - TS
# H - PACK
# SERIES

## HORIZONTAL BOOSTER PUMP SYSTEM
## SINGLE INVERTER PRESSURE SENSOR

# INSTALLATION OPERATION & MAINTENANCE MANUAL

**DEALER: This manual must be given to the user of the pump**
**USER: Before using this pump, read this entire manual and save for future reference**

energy saving

**For more information regarding Flowmatics products, parts & services, please visit www.shah-pneumatics.com**

WARNING:
1. Periodic inspection and maintenance of pumps is essential
2. Transfer of toxic, dangerous, flammable or explosive substances using Flowmatics products is at user's risk
3. Inspection, maintenance & installation of pumps must be made only by experienced, trained & qualified personnel
4. Use of strainer in the suction of the pump is a must for ensuring longer life of pump

## Preface

Thank you for your purchasing the PP-TS Series.
This Inverter Booster Pump is produced to best serve your purposes when using a Booster Pump System.
For proper setup, you are requested to read through this User's manual.

The PP-TS which installed PID Control function inside has Variable speed control and Booster Pump Control function together. And you will be provided the features and operations of the PP-TS through this User's manual.

Please read and have thorough knowledge about this manual before operating and always leave it closely to product.



## Contents

## Warning and caution for safety

### Warning and caution

Before use, thoroughly read “Warning and caution for safety.” The warning and caution described below must be complied with in order to ensure proper and safe use of the product.

CAUTION — Caution: If ignored, injury or physical damage may be caused.

WARNING — Warning: If ignored, fatality or severe injury may be caused.

**– Risk of not complying with safety guidelines**

Calamity or damage caused by ignoring the contents of this manual may not be covered by the warranty of our company.

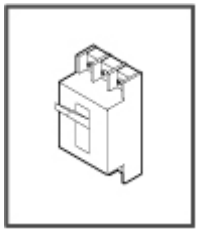
☞ Damage or irreversible break down of the product caused by the unauthorized disassembly or improper operation condition.

☞ Injury caused by electric/mechanical reasons

☞ Environmental pollution caused by the leakage of hazardous liquid

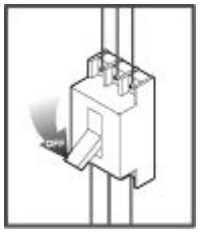
If there is severe vibration, noise, heat or odor during initial operation, turn the power off immediately and contact the retail store or our service center.

## Caution during transport / installation



△ Warning

To prevent electric shock, install a circuit breaker with less than 30mA of rating sensitivity

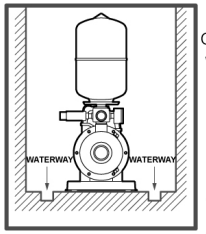


△ Warning

To prevent electric shock, cut the power from the pump during installation, removal and repair.





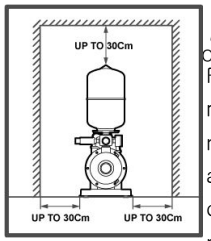



CAUTION Caution

When installing the pump, drainage facility must be secured to prevent damages caused by leakage during installation, exchange and repair.

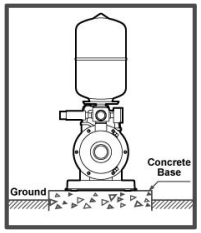
CAUTION Caution

Do not place the product on outdoor areas directly exposed to rain or sunlight. Deformation of parts or electric shock might occur.




CAUTION Caution

For a convenient repair/check up, do not install in confined areas. Minimum space described in the picture is required.

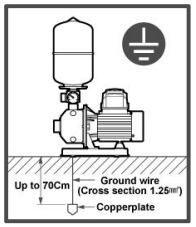



CAUTION Caution

Perform ground concrete work to make sure the pump doesn't tilt over time.

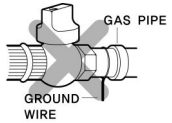
CAUTION Caution

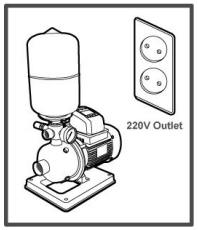
When the pump is directly installed on ground, the rotation of the pump may cause vibration. Install anti-vibration devices.




CAUTION Caution

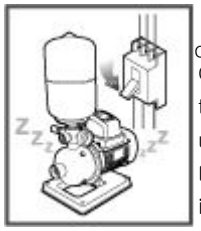
Turn off the power before grounding. Since there is a risk of explosion, do not ground on gas pipes.




WARNING Warning

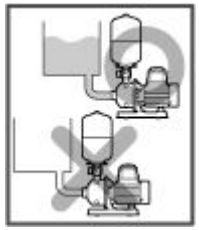
Voltage of power shall be within ±10% of the rated voltage (220V). Make sure to exclusively use a grounded outlet.



CAUTION Caution

Cut the power when the product is not in use for a long time. Deterioration of insulation may cause electric shock or fire.

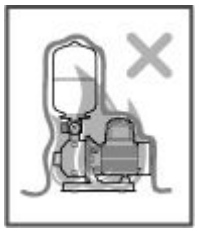
## Thank your for purchasing our product



Caution

CAUTION

Never operate when there is no water in the tank/pump (idling), or when the outlet valve is closed.



Warning

WARNING

Do not cover the pump with clothing, vinyl, wrapper etc to protect the pump against the cold. Fire may be caused due to overheat.

Caution

CAUTION

Keep the inverter and motor away from water/moist. Electric leakage or malfunctioning may occur.

Warning

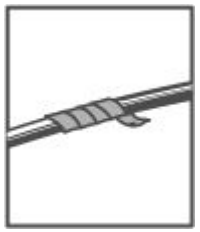
WARNING

Never use the power cord as a handle during transport/installation. Damage on the power cord may cause electric leakage/shock.

Caution

CAUTION

Keep the pump shock-free. Shock may cause damage or malfunctioning.



Warning

WARNING

When extending the power cord, make sure that the copper wire is not damaged. Wrap the connecting part with adhesive rubber tape, and finish with electric tape.


Caution

CAUTION

Use clear water only.

Caution

CAUTION

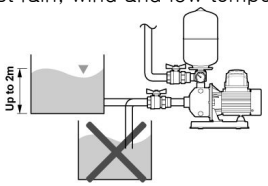
Never touch the pump with bare hands during operation. The heat of the pump may cause burns.



## Installation / test-operation of the product

### How to install

. This product is designed for indoor use. If you want to install the product on outdoor areas, prepare facilities that can provide the product with protection against rain, wind and low temperature.



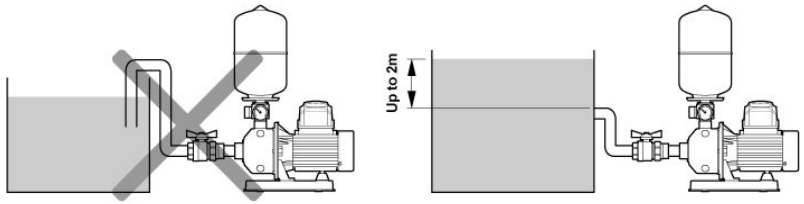

. As shown in Figure 1, the inlet condition shall follow the pressing condition. The inlet water level shall be higher than 2m from the center of the pump. If the inside of the pump is filled with air, the pump may overheat by friction during operation to damage the internal parts. After cleaning the tank, make sure to extract air.

. The diameter of inlet pipe must be the same or larger than the diameter of the pump inlet. If the diameter of the inlet pipe is small, column separation may occur to create air inside the pump.

. When using the product in a downward-type design, as shown in Figure 2, install a device that can discharge air automatically on the top part of the outlet pipe.

### How to operate

. When operating this product, please follow the directions below.




. Make sure that the water level of the tank is at least 2m higher than the center of the pump.

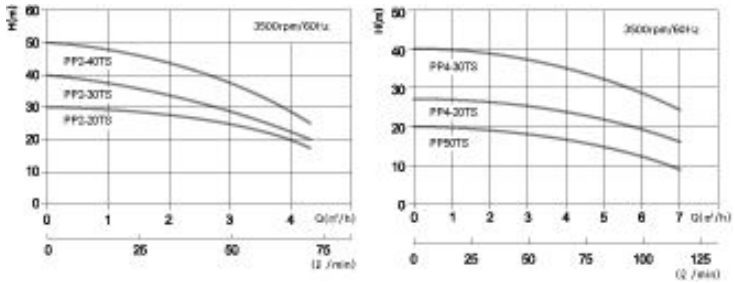
. Close the outlet valve (1) and open the air-vent plug (2).

## Specification & Performance

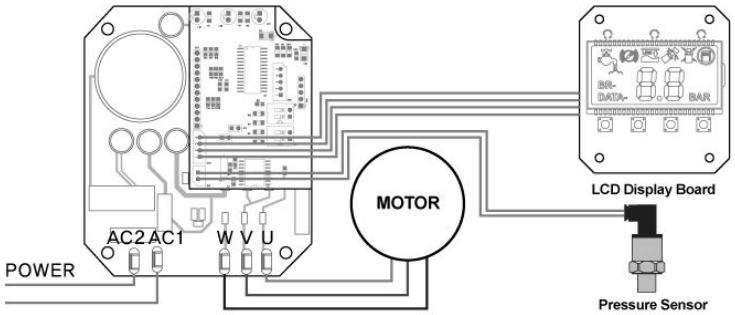
### Specification

| SPEC. \ MODEL | PP50TS | PP2-20TS | PP2-30TS | PP2-40TS | PP4-20TS | PP4-30TS |
|---|---|---|---|---|---|---|
| Power | INPUT: Single Phase 220V/60Hz, OUTPUT: Three Phase 220V/60Hz | | | | | |
| Input (W) | 490 | 690 | 1050 | 1050 | 1050 | 1200 |
| Output (W) | 370 | 550 | 750 | 750 | 750 | 900 |
| Current (A) | 1.65 | 2.06 | 3.12 | 3.12 | 3.12 | 3.67 |
| Head (m) | 20~10 | 32~20 | 39~22 | 50~28 | 26~16 | 40~25 |
| Flow(㎥/hr) | 1~7 | 0.5~4 | 0.5~4 | 0.5~4 | 1~7 | 1~7 |
| Bore (mm) | 32Ax25A | 25Ax25A | 25Ax25A | 25Ax25A | 32Ax25A | 32Ax25A |

### Performance Curve




### Pump Connection

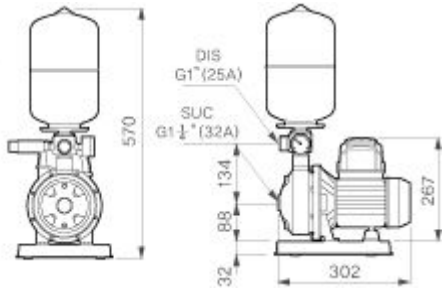




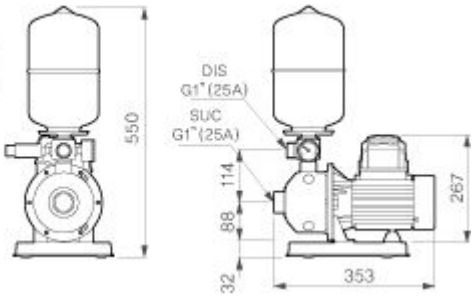

## Specification & Performance

### Outline Dimension

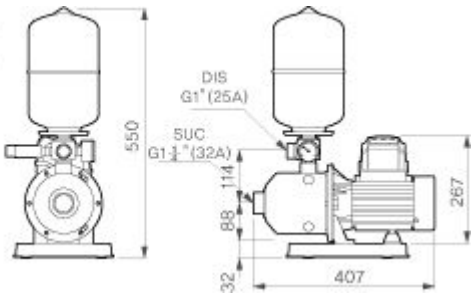
**PP50TS**




**PP2-20TS**
**PP2-30TS**
**PP4-20TS**



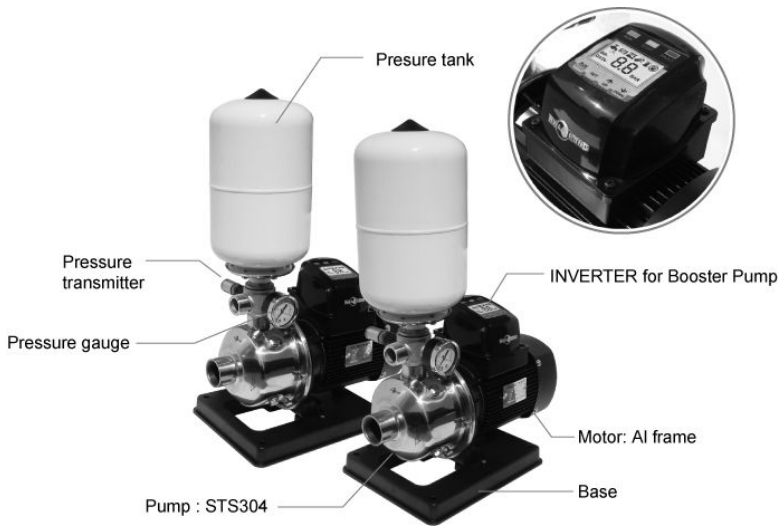

**PP2-40TS**
**PP4-30TS**



## Components of the product

### Exterior description of the product

• Components




### Inverter screen


1. Status LED
Shows the operation status of the pump

2. LCD display
Briefly displays information related to the system

3. Control key board
Used when setting/checking information related to the system



## Specification/performance of the product

### LED

| | |
|---|---|
| RUN | Shows that the pump is operating<br>When the LED lamp is on, the pump is in a standby mode<br>When the LED lamp blinks, the pump is currently operating |
| STOP | Shows that the system is stopped |
| FAULT | Shows that abnormality is detected from the product<br>Please refer to troubleshooting and error information |

### LCD


Shows that the pump is operating

Shows the setup mode for parameters

Shows the data value of each parameter

Shows the type of abnormality

Shows the current pressure & parameter setup value during operation

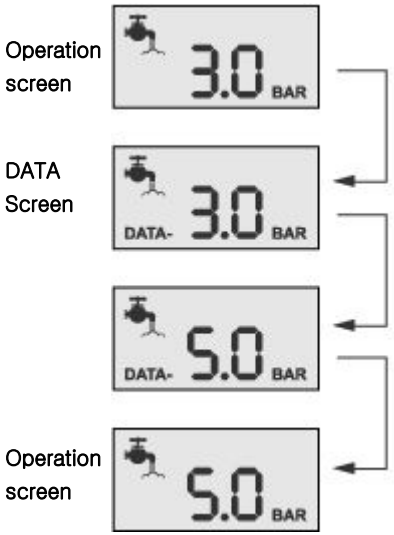
### Keys

| | |
|---|---|
| RUN/STOP | Used when starting/stopping the operation of the pump<br>Used when exiting the parameter |
| SET | Used when changing the setup pressure<br>Used when setting the data in parameter setup |
| UP / DOWN | Used when entering the parameter (BR MODE)<br>Used when changing the data value of parameter |

## Components of the product

### How to set pressure

• To change the set pressure from 3.0 bar to 5.0 bar




Press the 'Set' button for 3 seconds until the word 'Data' appears. Now, the set pressure can be changed.

Change the set pressure by pressing the 'Up/Down' button.

Press the 'Set' button again for 3 seconds. The set pressure blinks twice, and then the data disappears.

* Caution

1. Pressure shall be set lower than the segment pressure of the pump. When pressure is set higher than the segment pressure of the pump, the pump continues to operate even though the user doesn't use water, causing damage to the pump.
2. Pressure shall be set lower than the high-pressure alarm and higher than the low-pressure alarm.



## Specification/performance of the product

### How to setup the parameter

• To change BR-02 from 60 to 40


Press the 'Up/Down' button for 3 seconds until 'BR-01' appears. Now, the parameter can be changed.

Press the 'Up/Down' button to move to the BR article wanted.

Press the 'Set' button, and the word 'Data' will appear. Now, the data of BR-02 can be changed.

Change the data using the 'Up/Down' button.

Press the 'Set' button, and the data value will blink twice. Afterwards, BR mode will be displayed.

Press the 'Run/Stop' button to exit the BR mode. The system will operate under the set value.

* Caution

1. Before setting the parameter, please refer to the parameter table to check the articles that can't be changed during operation for protection of the pump.

## Parameter Summary

• Parameter table

| NO | Content of parameter | Min value | Max value | Initial value | Unit | Remarks | Change during operation |
|---|---|---|---|---|---|---|---|
| BR-01 | Base frequency | 50 | 60 | 60 | Hz | | X |
| BR-02 | Maximum output frequency | 00 | 80 | 60 | Hz | | X |
| BR-03 | Minimum output frequency | 00 | 50 | 30 | Hz | | O |
| BR-04 | Rotating direction | 00 | 01 | 00 | | 00 : Forward<br>01 : Reverse | X |
| BR-05 | Sensor value setup | 0.0 | 25 | 10 | Bar | | X |
| BR-06 | Sensor adjustment | -.9 | 0.9 | 0.0 | Bar | | O |
| BR-07 | Operation deviation | 0.1 | 1.0 | 0.3 | Bar | | O |
| BR-08 | High-pressure alarm | 0.0 | 25 | 7.5 | Bar | | O |
| BR-09 | Low-pressure alarm | 0.0 | 10 | 0.5 | Bar | | O |
| BR-10 | Anti-frost damage | 00 | 99 | 30 | Min | | O |
| BR-11 | Program initialization | 0 | 2 | 0 | | 0:Change available<br>1:Change N/A<br>2: Initialization | X |
| BR-12 | Program version | | | 1 | | | |
| BR-13 | Alarm information | 01 | 10 | | EA | Initialized when set | |

• Contents of parameter function

### BR-01 Base frequency

• Base frequency is the frequency that the rated voltage of the inverter can output.

• Set according to the rated frequency of the motor.

### BR-02 Maximum output frequency

• Maximum output frequency is the maximum frequency that the inverter can operate.

• Set value shall not exceed the frequency allowed by the motor.





## Parameter Description

### BR-03 Minimum output frequency

• When the set pressure is reached and the pump stops, the pump operates under the minimum output frequency for a certain time and then stops. When the stoppage frequency is too high, the stoppage frequency will elevate. On the other hand, when the stoppage frequency is too low, operation might continue. Initial value is recommended for this setup.

### BR-04 Rotating direction

• When the wire connection of the motor is improper, the pump rotates reversely. Reverse rotation may lower pressure, stop water pumping and cause noise/vibration. In such case, change the setup for the rotating direction instead of changing the wire connection.

•00 : Forward rotation 01 : Reverse rotation

### BR-05 Sensor value setup

• To detect the pipe pressure, a pressure sensor is installed on the outlet part. This parameter sets the usage pressure for the sensor. The pressure sensor must have an output option of 4~20mA

### BR-06 Sensor adjustment

• In case pressure deviation occurs in the sensor, or the pressure of the gauge is different from the pressure on the screen, this parameter adjusts such difference. Before change this parameter, check the condition of the pressure gauge.

### BR-07 Operation deviation

• When the pipe pressure falls lower than the set pressure, the pump operates. This parameter sets such pressure of operation. If the operation deviation is set too small, the frequency of repeated operation increases. On the other hand, if the operation deviation is set too high, the pressure deviation increases to cause inconvenience.

### BR-08 High-pressure alarm

• If the current pressure is higher than the high-pressure alarm, a ( ) icon is shown on screen and the pump stops immediately. If the current pressure drops lower than the high-pressure alarm, the icon disappears and the pump operates normally again.

## Components of the product

### Parameter table

**BR-09 Low pressure alarm**

• If operation lasts for more than 30 seconds with the current pressure lower than the low pressure alarm set, the pump stops and a ( ) icon appears on the screen. The pump automatically restarts after 10 seconds. However, if the low pressure alarm is activated for more than 10 times, it is considered that the system has a problem, and the pump doesn't restart again.

**BR-10 Anti-frost damage**

• Anti-frost damage function protects the pump against the cold weather during winter time. When the set time is elapsed, the pump operates under the maximum frequency for 5 seconds, and then stops.

**BR-11 Program initialization**

• This function locks/initializes the program
• 0 : Change of parameters is available.
1 : Change of parameters is not available.
2 : Initializes the parameters to their default value.

**BR-12 Program version**

• Shows the version of the program
• To improve the performance of the product or solve technical problems, version is subject to change without prior notice.

**BR-13 Alarm information**

• The history of 10 recent alarms is recorded and saved. Check the alarm information by using the 'Up/Down' button.



## Causes of malfunctioning / Troubleshooting

### Countermeasures for errors

| LCD Display | Name of error | Description | Countermeasure |
|---|---|---|---|
|  | HIGH/LOW PRESSURE | High/Low pressure alarm has been activated | Check the System |
|  | LEVEL ALARM | Low water level alarm | Check the water-supply pipe |
|  | SENSOR OPEN | Sensor is not connected | Check the connection part of the sensor |
|  | SENSOR SHORT | Sensor has a short circuit | Sensor is not operating normally. Replace the sensor |
|  | INVERTER ERROR | Inverter error | Inverter is malfunctioning. Cut off the power and contact the manufacturer |

• The system stores up to 20 information related to the detection of abnormalities
• To initialize the information of abnormalities saved, press the 'Set' button for more than 1 second.

### Causes of malfunctioning / Troubleshooting