# STM-PW Series

## Hi-Temp. Water Heater

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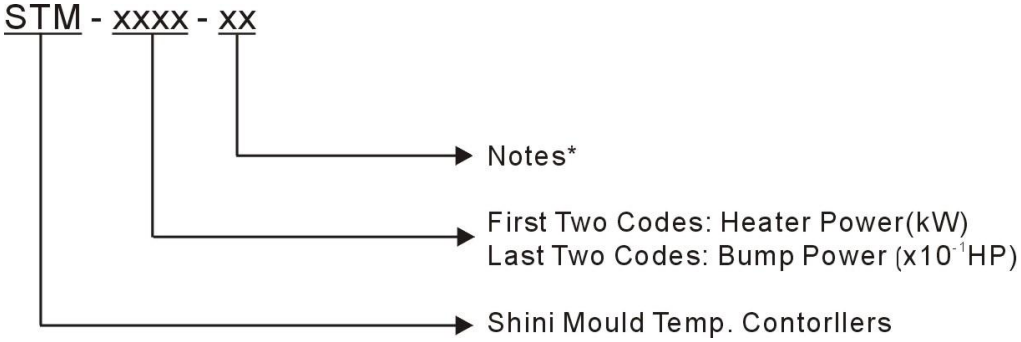
# 1. General Description

Read this manual carefully before operation to prevent damage of the machine or personal injuries.

STM- PW/HPW series high temperature water heater are used to heat up the mould and maintain temperature, although they can be used in other similar applications. High temperature water from the mould is returned to the cooling tank and cooled by either indirect cooling ( For high temperature models ) or direct cooling ( for standard models ). It is then pressurised by the high-pressure pump, sent to the heating tank and finally to the mould with a constant temperature. The HANYOUNG temperature controller can maintain an accuracy of ±0.5℃.

Model: STM-607PW

## 1.1 Coding Principle




Notes*

D=Dual-heating Zones PW=Medium is Water with High Temp.

HPW=Medium is Water with High Temperature and High Pressure

CE=CE Conformity B=Buzzer

## 1.2 Feature

1) Standard configuration

- Controller adopts 3.2" LCD for easy operation.
- Equipped with the design of 7-day automatic start/stop timer. LCD screen can be converted between Chinese and English. The unit of temperature can be converted between $^{o}$F and ℃.
- P.I.D. multi-stage temperature control system can maintain a mould temperature with accuracy of ±0.5℃.
- Adopts high efficiency water cycle pump, which can meet the demands of temperature control for precise moulds and mould loop with minor diameter to achieve precise temperature control and high efficient heat exchange. Pump inside adopts stainless steel to avoid explosion.
- Multiple safety devices including power reverse phase protection, pump overload protection, overheat protection and low level protection that can automatically detect abnormal performance and indicate this via visible alarm.
- While for STM-PW, it can reach 160℃.
- Equipped with high pressure protection, safety pressure relieving, automatic water supplying and air exhausting.

- STM-PW adopts indirect cooling, which makes temperature control more precise. The low viscosity of water realizes fast heat exchange.
- STM-PW series adopts magnetic pump with stable performance and no leakage, suitable for applications which need long time heating and temperature maintaining.

2) Accessory option

- Water manifolds and Teflon hose are optional.
- RS485 communication function is optional.
- Display of mould temperature and mould return water temperature is optional.

All service work should be carried out by a person with technical training or corresponding professional experience. The manual contains instructions for both handling and servicing. Chapter 6, which contains service instructions intended for service engineers. Other chapters contain instructions for the daily operator.

Any modifications of the machine must be approved by SHINI in order to avoid personal injury and damage to machine. We shall not be liable for any damage caused by unauthorized change of the machine.

Our company provides excellent after-sales service. Should you have any problem during using the machine, please contact the company or the local vendor.

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# 1.3 Technical Specifications

## 1.3.1 Specification

Table 1-1: Specification

| Model | Max. temp. | Heater (kw) | Pump (kw) (50/60Hz) | Max. pump flow (L/min) (50/60Hz) | Max. pump pressure (bar) (50/60Hz) | Heating chamber number | Tank(L) | | Coonling method | Mould coupling* (inch) | Inlet / Outlet (inch) | Dimensions (mm) (H×W×D) | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Heating | Cooling | | | | | |
| STM-607PW | 160℃ | 6 | 0.55 / 0.63 | 27 / 30 | 4.25 / 5.9 | 1 | 3.0 | 0.8 | Indirect | 3/8 (2×2) | $^{3}/_{4}$ / $^{3}/_{4}$ | 670×320×750 | 75 |
| STM-1220PW | | 12 | 1.0 / 1.0 | 50 / 50.8 | 5.8 / 7.77 | 1 | 3.2 | 0.8 | | | | 670×320×900 | 80 |

Note: 1) "PW" stands for high temp. water heater, "HPW" stand for water heater with high temperature and high pressure, "*" stands for options.

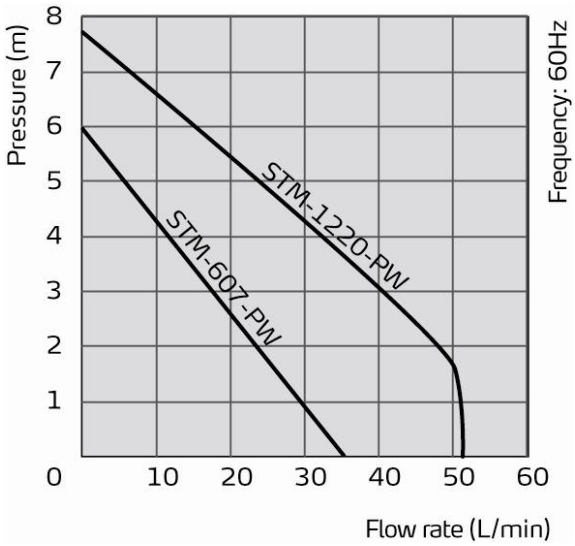
We reserve the right to change specifications without prior notice.

2) To ensure stable water temperature, cooling water pressure should not be less than 2kgf/cm$^2$, but also no more than 5kgf/cm$^2$.

3) Pump testing standard: Power of 50 / 60Hz, purified water at 20℃.
( There is ±10% tolerance for either max. flowrate or max. pressure ).

4) Power supply: 3Φ, 230/400/460/575VAC, 50/60Hz.

### 1.3.2 Pump Performance




Picture 1-1: Pump Performance

### 1.3.3 Reference Formula of Mould Controllers Model Selection

Heater Power (kW) = mould weight (kg) × mould specific heat (kcal/kg℃) × temperature difference between mould and environment (℃) × safety coefficient / heating duration / 860

Note: safety coefficient can select a value from 1.3 to 1.5.

Flow Rate (L/min) = heater power (kw) × 860 / [heating medium specific (kcal/kg℃) × heating medium density (kg/L)×in/outlet temperature difference (℃)× time (60)]

Note: Water specific heat =1kcal/kg℃

Heating medium oil specific heat =0.49kcal/kg℃

Water density =1kg/L

Heating medium oil density =0.842kg/L

## 1.4 Safety Regulations

Strictly abide by the following safety regulations to prevent damage of the machine or personal injuries.

### 1.4.1 Safety Signs and Labels

Danger!

The unit is designed to endure high temp, and high pressure. For safe operation, do not remove the covers or switches.

Attention!

The unit should be operated by qualified personnel only.
During operation, avoid wearing gloves or clothes that may cause danger.
Turn off main switch when power supply is off.
Stop the unit when there may be power supply problems caused by static electricity.
Put on safety gloves and shoes during installation or relocation.
Components from our company can only be used for replacement.

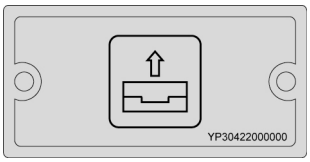
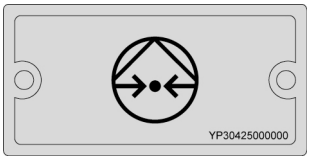
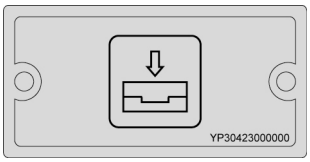
Warning!

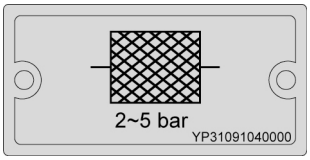
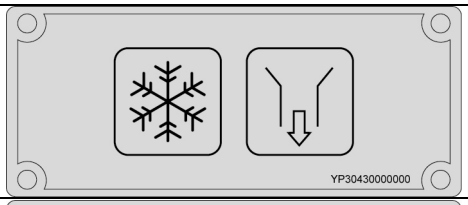
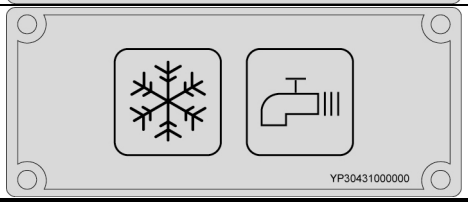
Do not touch the switch with wet object or hands.
Do not use the machine before fully aware of its performance.
Be careful not to touch or hit the switch or sensor.
Please keep enough operation space, and keep away obstacles.
To avoid producing statics, clean the floor from oil or water to keep a dry environment.
Protect the machine against severe vibration or collision.
Do not remove safety signs or make it dirty.
Drunken, medicine-taking, or men without proper judgement should not operate the machine.

Warning!

High temperature, take care of hands! This label is attached on the surface of heating parts.

## 1.4.2 Signs and Labels

| | |
|---|---|
| | Regularly clean the filter screen in the copper screw to avoid blockage and as well ensure an excellent working performance. |
| <br>(Attached on motor cover) | This is to indicate motor rotating direction. When phase reversal happens, the alarm sounds and indicator on control panel will indicate.<br>Please exchange the place of two of the electrical wires to solve this problem. |
| | High voltage! Electrical shock may happen. Carefulness is required from the operator. |
| | Attentions!<br>This is general warnings which operators should pay attention to. |
|  | From mould: connector for circulating water/oil coming from mould. |
|  | Pump pressure meter: indicating actual pressure of system. |
|  | To mold: connector for circulating water/ oil to go to mould. |

| | |
|---|---|
|  | 1. To maintain temperature consistency, cooling water pressure must be higher than 2 bar at all time, but should never exceed 5 bar in any case.<br>2. Clean Y-shape Cooling Water Strainer periodically to ensure perfect cooling capacity. |
|  | Water inlet: inlet for replenishing water and cooling water. |
|  | Water outlet: drainage outlet. |

Please abide by the safety guide when you operate the machine so as to prevent damage of the machine and personal injuries.

All electrical components should be installed by qualified electricians. Turn off main switch and control switch during repair and maintenance.

Warning! High voltage!

This mark is attached on the cover of the control box.

Warning! Be careful!

Be more careful when this mark appears.

### 1.4.3 Operation Regulations

1) Before operation, make sure that cooling water is clean soft water without pollutants.
   ※ Low quality water brings limescales, which may cause problems.
2) If problems of drainage or bad temperature control are noted, please clean solenoid valve and cooling water inlet and outlet.
3) Do not move the unit when it is in operation.
4) When in need of repairing, wait until oil temperature falls below 30℃.
5) Motor overload may be caused by phase shortage, pipe obstruction, broken

bearing, etc. Motor overload relay will trip off to stop the machine when this happens. Fixing the problems, press RESET on overload relay to clear the alarm.

6) Before turn off the pump, wait until oil temperature falls blow 50℃. Or the life of the unit would be affected.
7) If the setting temperature is below 100℃, then the pressure switch setting value should be 1.5-2 bar; If the setting temperature sets between 100℃ and 200℃, then the recommendable pressure switch setting value should be 2.8 bar. If the cooling water pressure is too low, then the pressure switch setting value can be adjusted properly to ensure normal running. However, it may affect the limitation of setting temperature or cause unstable temperature control.
8) Please connect the coolng water outlet with high temperature resistant pipe when temperature is above 100℃.

1.4.4 Transportation and Storage of the Machine

Transportation

1) STM-PW series standard oil heater are packed in crates or plywood cases with wooden pallet at the bottom, suitable for quick positioning by fork lift.
2) After unpacked, castors equipped on the machine can be used for ease of movement.
3) Do not rotate the machine and avoid collision with other objects during transportation to prevent improper functioning.
4) The structure of the machine is well-balanced, although it should also be handled with care when lifting the machine for fear of falling down.
5) The machine and its attached parts can be kept at a temperature from -25℃ to +55℃ for long distance transportation and for a short distance, it can be transported with temperature under +70℃.

Storage

1) STM-PW series standard oil heater should be stored indoors with temperature kept from 5℃ to 40℃ and humidity below 80%.
2) Disconnect all power supply and turn off main switch and control switch.
3) Keep the whole machine, especially the electrical components away from

water to avoid potential troubles caused by the water.

4) Plastic film should be used to protect the machine from dust and rains.

Working environment

The machine should be operated:

1) Indoors in a dry environment with maximum temperature +45℃ and humidity not more than 80%.

Do not use the machine:

1) If it is with a damaged cord.
2) On a wet floor or when it is exposed to rain to avoid electrical shock.
3) If it has been dropped or damaged until it is checked or fixed by a qualified serviceman.
4) This equipment works normally in the environment with altitude within 3000m.
5) At least a clearance of 1m surrounding the equipment is required during operation. Keep this equipment away from flammable sources at least two meters.
6) Avoid vibration, magnetic disturbance at the operation area.

Rejected parts disposal

When the equipment has run out its life time and can not be used any more, unplug the power supply and dispose of it properly according to local code.

Fire Hazard

In case of fire, $Co_2$ dry powder fire extinguisher should be applied.

Please abide by the safety guide when you operate the machine so as to prevent damage of the machine and personal injuries.

All electrical components should be installed by qualified electricians. Turn off main switch and control switch during repair and maintenance.

Warning! High voltage!

This mark is attached on the cover of the control box.

Warning! Be careful!

Be more careful when this mark appears.

Warning!

High temperature, take care of hands! This label is attached on the surface of heating parts.

## 1.5 Exemption Clause

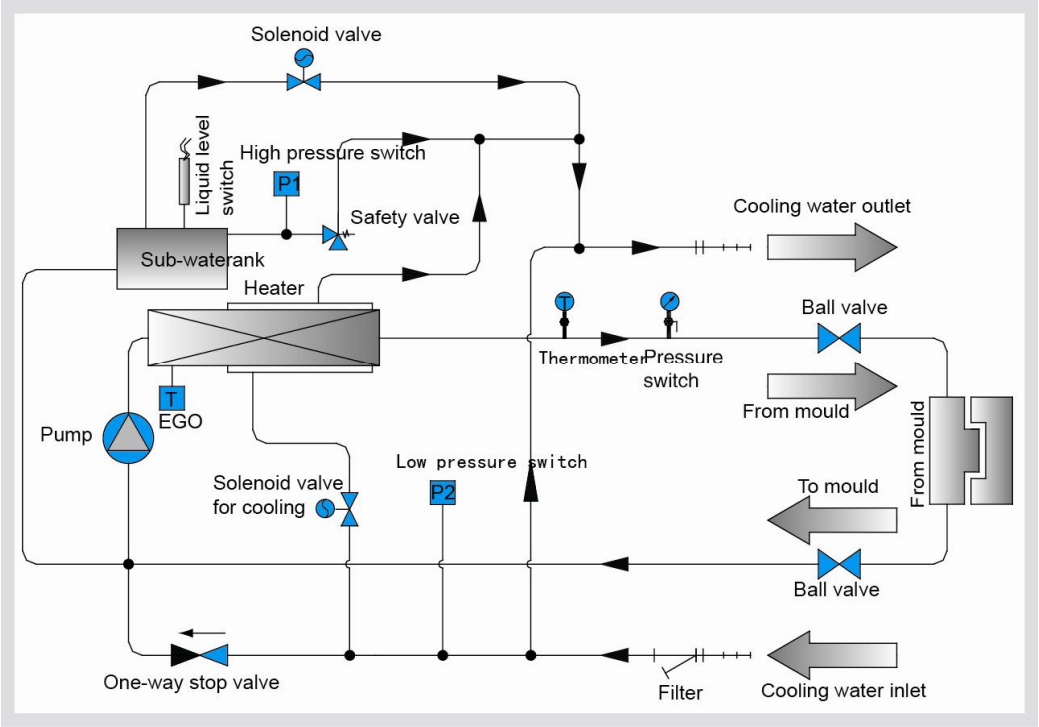
The following statements clarify the responsibilities and regulations born by any buyer or user who purchases products and accessories from Shini (including employees and agents).

Shini is exempted from liability for any costs, fees, claims and losses caused by reasons below:

1. Any careless or man-made installations, operation and maintenances upon machines without referring to the Manual prior to machine using.
2. Any incidents beyond human reasonable controls, which include man-made vicious or deliberate damages or abnormal power, and machine faults caused by irresistible natural disasters including fire, flood, storm and earthquake.
3. Any operational actions that are not authorized by Shini upon machine, including adding or replacing accessories, dismantling, delivering or repairing.
4. Employing consumables or oil media that are not appointed by Shini.

# 2. Structure Characteristics and Working Principle

## 2.1 Working Principle

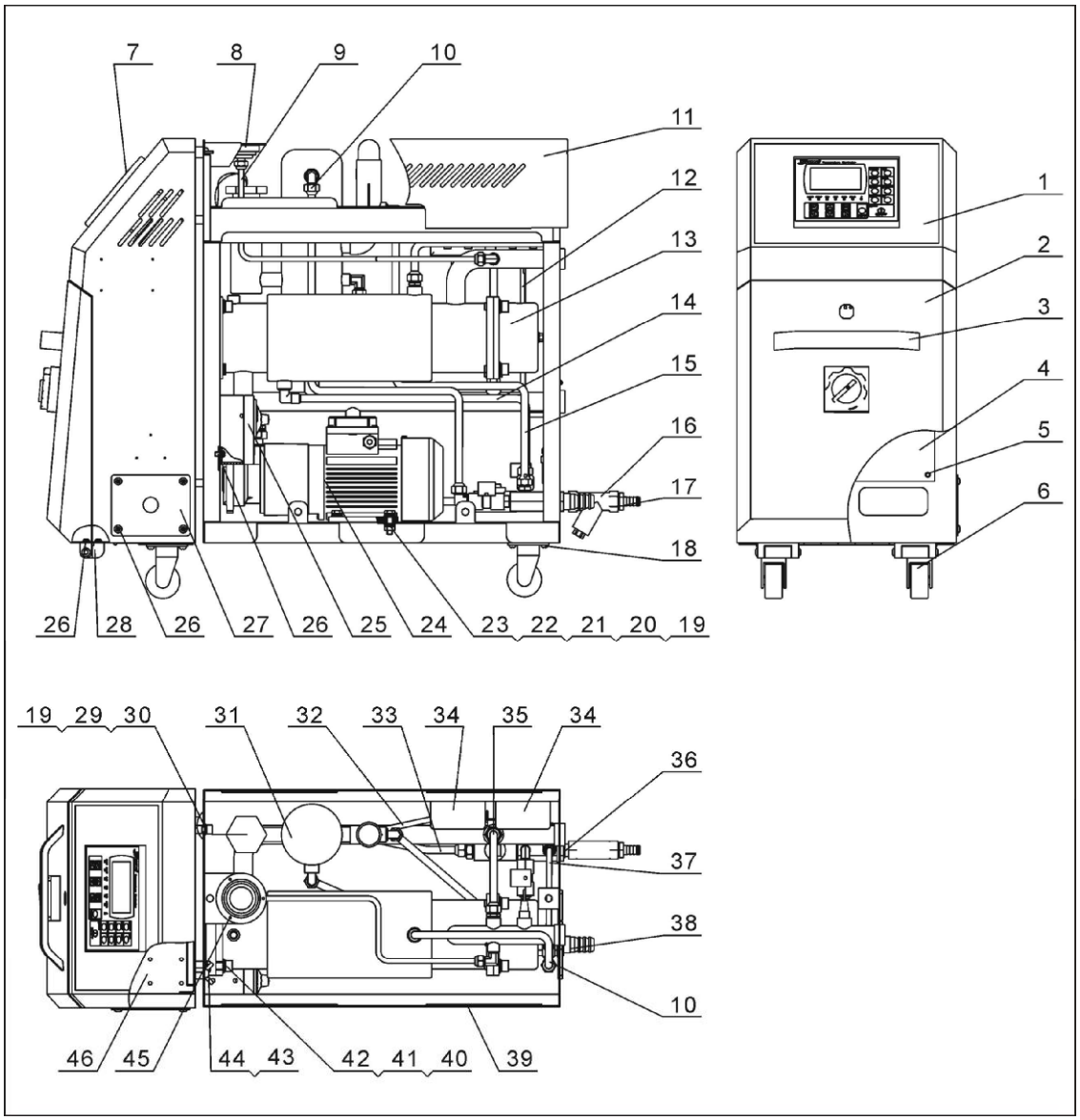



Picture 2-1: STM-PW Working Principle

The high temperature water from the mold returns to the pump inlet from the pipeline, then be pressurized by the pump and conveyed to the heater and again be heated and returns to the mold. The loop repeats. In this process, when liquid level switch detects the liquid level lowers to the set value and the machine will sound an alarm and halt. If the temperature of the water exceeds the set value, the system will automatically start the solenoid valve to let the cooling water come into the double pipes structure of the heating tank and cool down the water, then a constant temperature can be maintained. If the temperature still maintains high to the EGO set value,the system will sound an alarm and halt; when system pressure exceeds set valvue of high pressure switch, machine halts and sound an alarm. If the pressure continues rising to the set value of the safety valve, the safety valve starts to decompress the system.

## 2.2 Assembly Drawing

### 2.2.1 Assembly Drawing (STM-607-PW)




Remarks: Please refer to material list 2.2.2 for specific explanation of the Arabic numbers in parts drawing.

Picture 2-2: Assembly Drawing (STM-607-PW)

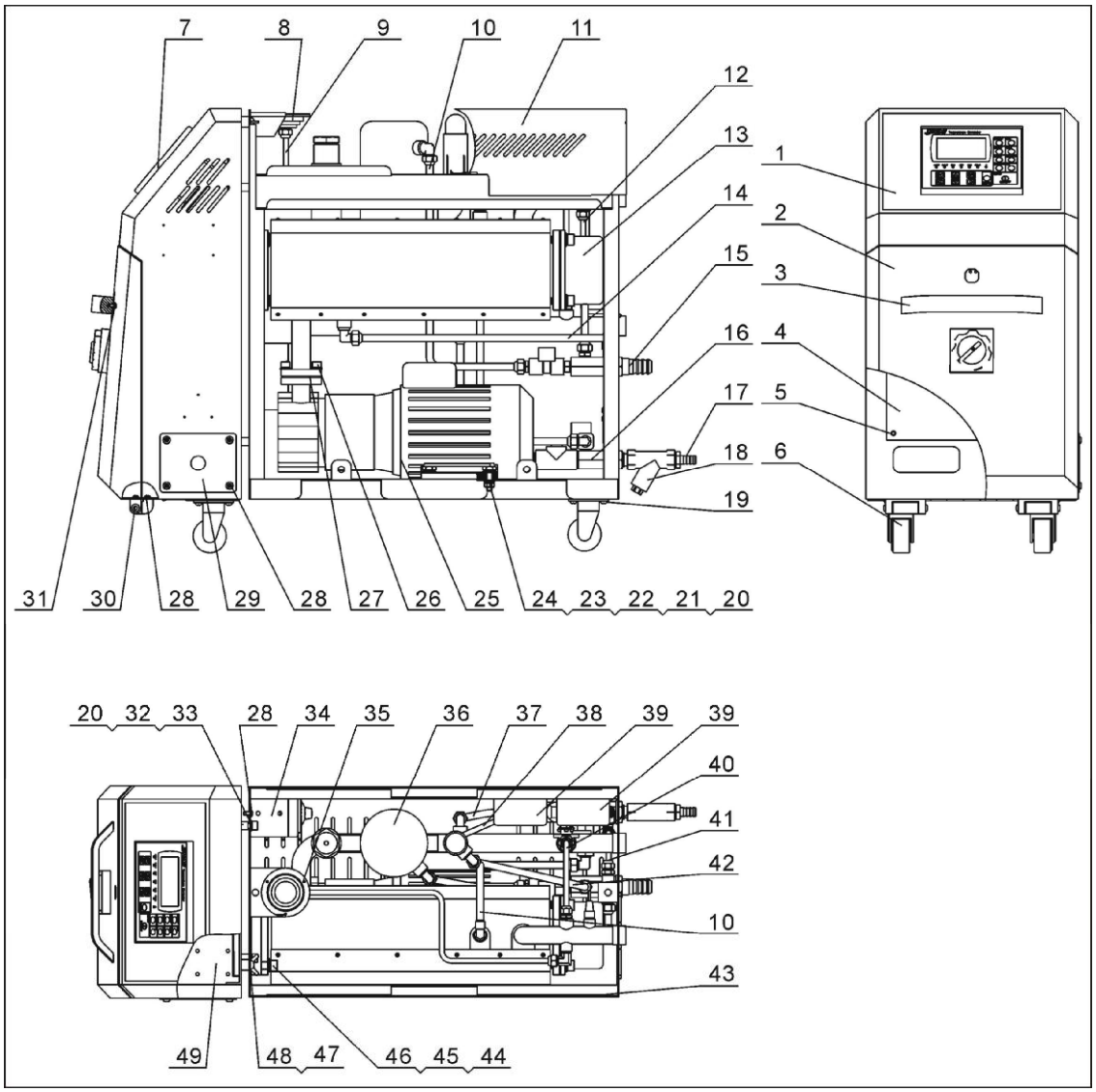
## 2.2.2 Parts List (STM-607-PW)

Table 2-1: Parts List (STM-607-PW)

| No. | Name | Part No. | No. | Name | Part No. |
|---|---|---|---|---|---|
| 1 | Control box | - | 24 | Pump MP-55 | YW64080600000 |
| 2 | Door plate | - | 25 | EGO assembly | BH90115000050 |
| 3 | Door plate aluminum handle 6609 | YW20660900100 | 26 | Lentil-headed screw M5×10 | YW62051000100 |
| 4 | Base plate of control box | - | 27 | Line clamp fixing plate | - |
| 5 | Thick head screw M6×20 | YW63062000000 | 28 | Big hinge CL219-1 | YW06219100000 |
| 6 | Caster 2" | YW03000200000 | 29 | Inner hexagon screw M8×20 | YW61082000200 |
| 7 | HAN YOUNG controller MT100-01 | YE81100010000 | 30 | Spring gasket 8mm | YW65008000100 |
| 8 | Pressure gauge 0-15kg | YW85015000000 | 31 | Return pipe parts | - |
| 9 | Pressure gauge pipe | - | 32 | High pressure pipe | - |
| 10 | Teflon pipe with connector 3/8"×60cm | YW59386000000 | 33 | Filling water pipe | - |
| 11 | Cover plate | - | 34 | Low pressure on-off controller 0-0.8MPa | YE90000800000 |
| 12 | Low pressure pipe | - | 35 | Hot water by-pass pipe | - |
| 13 | Heating tank parts | - | 36 | Filling pipe connector parts | - |
| 14 | Cooling water inlet pipe | - | 37 | Cooling water by-pass pipe | - |
| 15 | Water drainage pipe | - | 38 | Water drainage pipe parts | - |
| 16 | Y type filtering water valve 1/2" | YW57010200000 | 39 | Side plate | - |
| 17 | Copper core M13×1/2PT | BH12131200010 | 40 | Inner hexagon screw M10×30 | YW61103000100 |
| 18 | Lentil-headed screw M6*10 | YW62061000000 | 41 | Spring gasket 10 | YW65010000000 |
| 19 | Flat gasket 8×22×1.5mm | YW66082200000 | 42 | Flat gasket 10.5×20×2mm | YW66102000100 |
| 20 | Spring gasket 6 | YW65006000100 | 43 | Butterfly screw M8×15 | YW69081500000 |
| 21 | Flat gasket 6×18×1.0 | YW66061800000 | 44 | Spring gasket 8×16×1.5mm | YW66081600000 |

* means possible broken parts. ** means easy broken part. and spare backup is suggested. Please confirm the version of manual before placing the purchase order to guarantee that the item number of the spare part is in accordance with the real object.

## 2.2.3 Assembly Drawing (STM-1220-PW)




Remarks: Please refer to material list 2.2.4 for specific explanation of the Arabic numbers in parts drawing.

Picture 2-3: Assembly Drawing (STM-1220-PW)

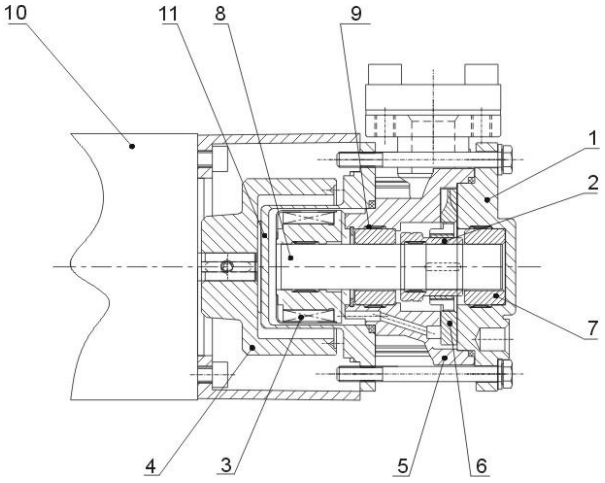
## 2.2.4 Parts List (STM-1220-PW)

Table 2-2: Parts List (STM-1220-PW)

| No. | Name | Part No. | No. | Name | Part No. |
|---|---|---|---|---|---|
| 1 | Control box | - | 26 | Inner hexagon screw M10×25 | YW61102500000 |
| 2 | Door plate | - | 27 | Flange gasket | - |
| 3 | Door plate aluminum handle 6609 | YW20660900100 | 28 | Lentil-headed screw M5×10 | YW62051000100 |
| 4 | Base plate of control box | - | 29 | Line clamp fixing plate | - |
| 5 | Thick head screw M6×20 | YW63062000000 | 30 | Big hinge CL219-1 | YW06219100000 |
| 6 | Caster 2" | YW03000200000 | 31 | Thick head screw M4×6 | YW63040600000 |
| 7 | HAN YOUNG controller MT100-01 | YE81100010000 | 32 | Inner hexagon screw M8×20 | YW61082000200 |
| 8 | Pressure gauge 0-15kg | YW85015000000 | 33 | Spring gasket 8mm | YW65008000100 |
| 9 | Pressure gauge pipe | - | 34 | EGO assembly | BH90115000050 |
| 10 | Teflon pipe with connector 3/8"×50cm | YW59385000000 | 35 | Thick head screw M3×6 | YW63030600000 |
| 11 | Cover plate | - | 36 | Return pipe parts | - |
| 12 | Low pressure pipe | - | 37 | Filling water pipe | - |
| 13 | Heating tank parts | - | 38 | High pressure pipe | - |
| 14 | Cooling water inlet pipe | - | 39 | Low pressure on-off controller 0-0.8MPa | YE90000800000 |
| 15 | Water drainage connector parts | - | 40 | Hot water by-pass pipe | - |
| 16 | Filling pipe connector parts | - | 41 | Cooling water by-pass pipe | - |
| 17 | Copper core M13×1/2PT | BH12131200010 | 42 | Water drainage pipe | - |
| 18 | Y type filtering water valve 1/2" | YW57010200000 | 43 | Side plate | - |
| 19 | Lentil-headed screw M6×10 | YW62061000000 | 44 | Spring gasket 10 | YW65010000000 |
| 20 | Flat gasket 8×22×1.5mm | YW66082200000 | 45 | Inner hexagon screw M10×30 | YW61103000100 |
| 21 | Spring gasket 6 | YW65006000100 | 46 | Flat gasket 10.5×20×2mm | YW66102000100 |
| 22 | Flat gasket 6×18×1.0 | YW66061800000 | 47 | Butterfly screw M8×15 | YW69081500000 |
| 23 | Hexagon screw M6×25 | YW60062500000 | 48 | Spring gasket 8×16×1.5mm | YW66081600000 |
| 24 | Screw M6 | YW64080600000 | 49 | Rear plate of control box | - |
| 25 | Pump MP-100 | BM20123400000 | | | |

* means possible broken parts. ** means easy broken part. and spare backup is suggested. Please confirm the version of manual before placing the purchase order to guarantee that the item number of the spare part is in accordance with the real object.

## 2.2.5 Pump



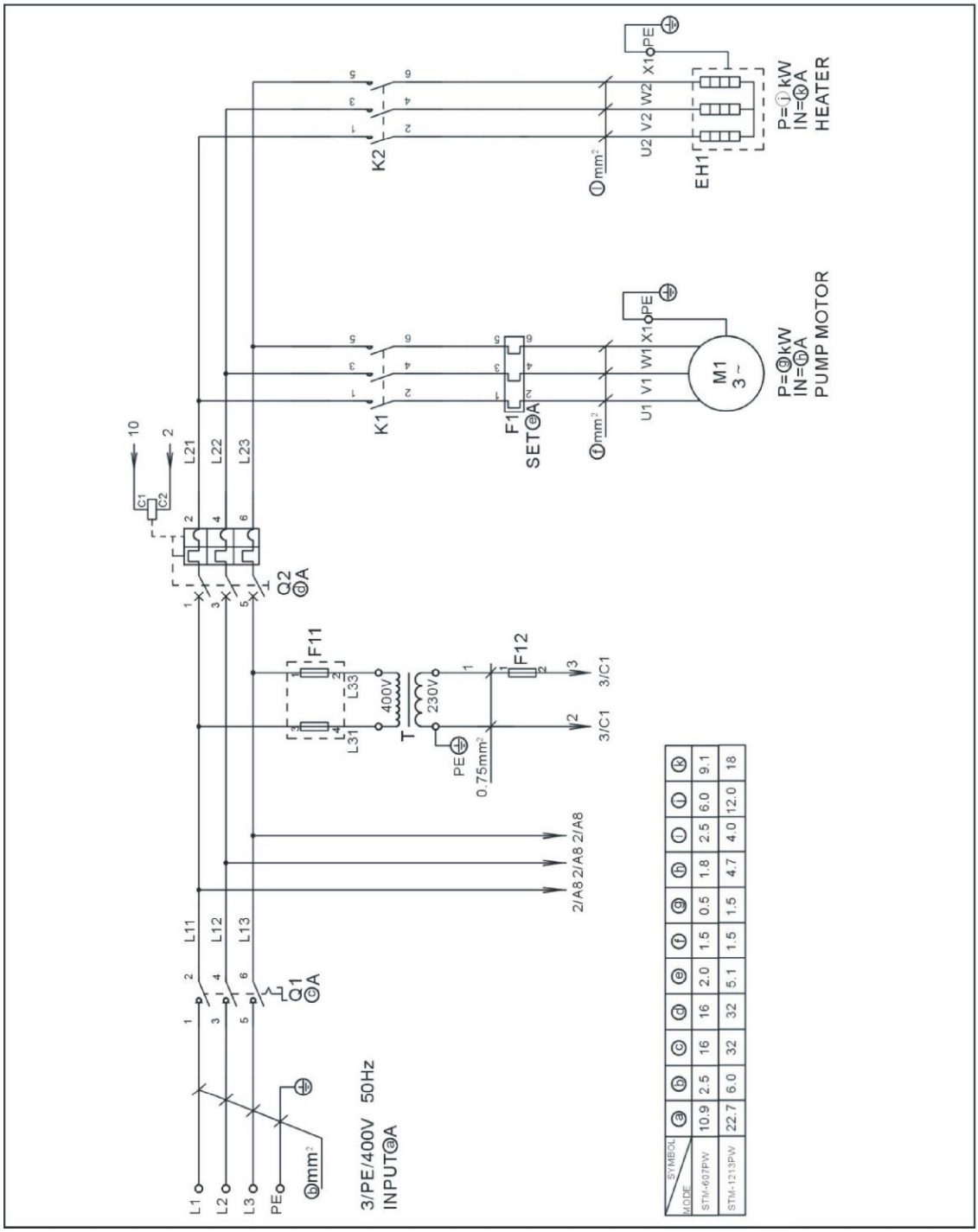

Names of Parts:

| | | |
|---|---|---|
| 1. Pump cover | 2. Shaft sleeve | 3. Inner magnetic coupler |
| 4. Out magnetic coupler | 5. Pump body | 6. Paddle wheel |
| 7. Carbonated silcon bearing | | 8. Ceramic stick |
| 9. Lockup parts | 10. Motor | 11. Magnetic cover |

Picture 2-4: Pump

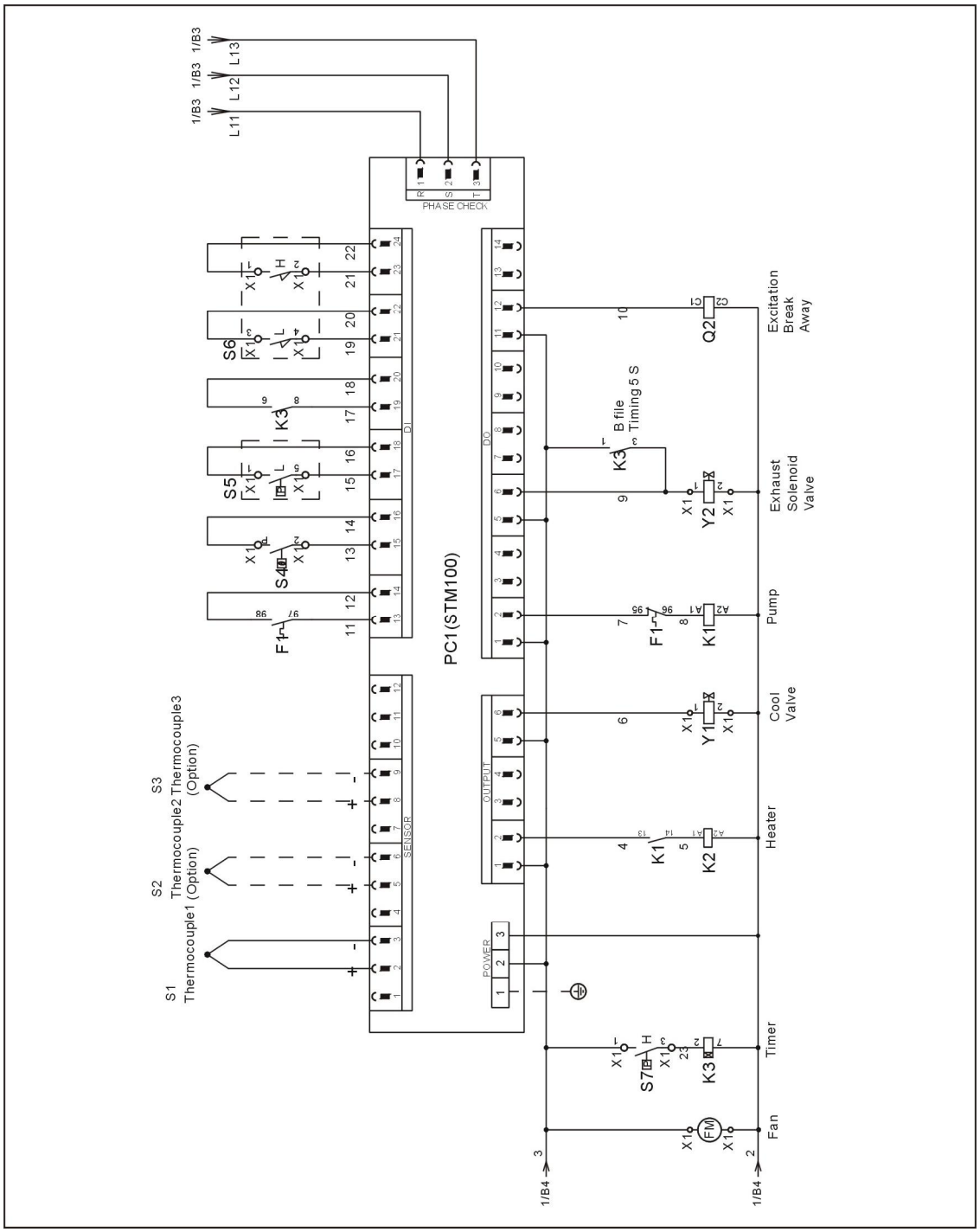
# 2.3 Electrical Diagram

## 2.3.1 Main Circuit (STM-PW)(400V)



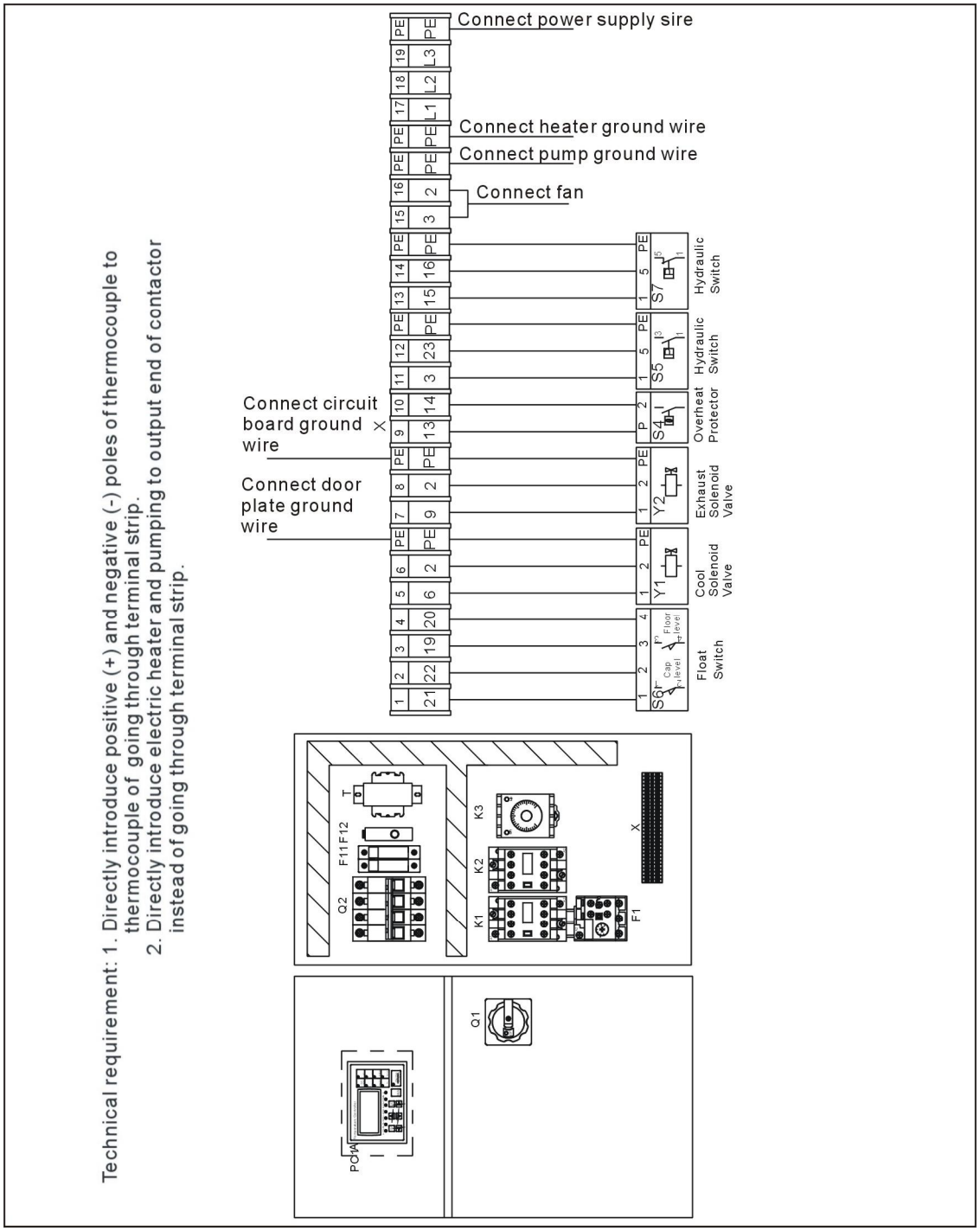

Picture 2-5: Main Circuit (STM-PW) (400V)

## 2.3.2 Control Circuit (STM-PW) (400V)




Picture 2-6: Control Circuit (STM-PW) (400V)

## 2.3.3 Electrical Components Layout (STM-PW) (400V)




Picture 2-7: Thermocouple and Terminal Layout (STM-PW) (400V)

## 2.3.4 Electrical Components List (STM-PW) (400V)

Table 2-3: Electrical Components List (STM-607-PW) (400V)

| NO. | Symbol | Name | Specification | Part NO. |
|---|---|---|---|---|
| 1 | Q1 | Main switch | 16A | YE10021160000 |
| 2 | Q2 | Circuit breakers* | 16A | YE40601500000 |
| 3 | - | Excitation break away | - | YE40023560000 |
| 4 | K1 | Contactors* | 220V 50/60Hz | YE00601521000 |
| 5 | K2 | Contactors* | 220V 50/60Hz | YE00601800000 |
| 6 | K3 | Timer | 220V 50/60Hz | YE86300600000 |
| 7 | F1 | Overload relays* | 1.8~2.5A | YE01160180000 |
| 8 | F11 | Fuse box* | 32A 2P | YE41032200000 |
| 9 | - | Fuse** | 2A | YE46002000100 |
| 10 | F12 | Fuse** | 2A | YE41001000000 |
| 11 | T | Transformer | IN=400V OUT=230V 500mA | YE70402300800 |
| 12 | S1 | Thermocouple | - | - |
| 13 | S2 S3 | Thermocouple | - | - |
| 14 | S4 | Overheat protector* | - | - |
| 15 | S5 S7 | Pressure switch | 0~8bar | YE90000800000 |
| 16 | S6 | Float switch | - | YE59100000000 |
| 17 | PC1 A | Circuit board* | 100~240VAC 50/60Hz | YE81100010000 |
| 18 | Y1 Y2 | Solenoid valve | 230VAC 50/60Hz | - |
| 19 | X1 | Terminal board | - | YE61250040000 |
| 20 | - | Terminal board | - | YE61253500000 |
| 21 | M1 | Motor | 400V 50Hz 0.5kW | - |
| 22 | EH | Heater** | 400V 50Hz 6kW | - |
| 23 | FM | Fan* | 230V 50/60Hz | - |

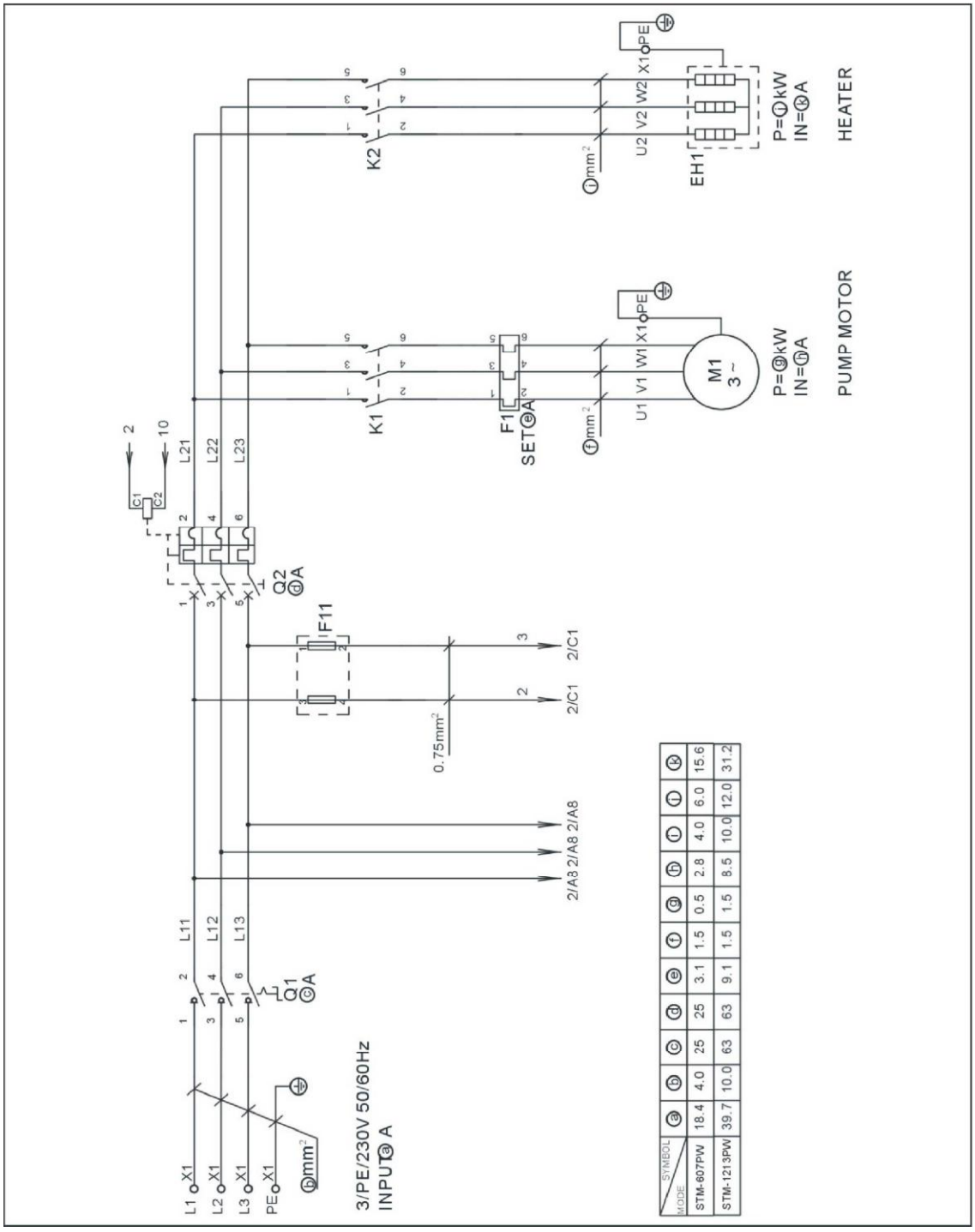
* means possible broken parts.
** means easy broken part. and spare backup is suggested.
Please confirm the version of manual before placing the purchase order to guarantee that the item number of the spare part is in accordance with the real object.

Table 2-4: Electrical Components List (STM-1220-PW) (400V)

| NO. | Symbol | Name | Specification | Part NO. |
|---|---|---|---|---|
| 1 | Q1 | Main switch | 32A | YE10132320000 |
| 2 | Q2 | Circuit breakers* | 32A | YE40603200000 |
| 3 | - | Excitation break away | - | YE40023560000 |
| 4 | K1 | Contactors* | 220V 50/60Hz | YE00601521000 |
| 5 | K2 | Contactors* | 220V 50/60Hz | YE00602622000 |
| 6 | K3 | Timer | 220V 50/60Hz | YE86300600000 |
| 7 | F1 | Overload relays* | 4.5~6.3A | YE01160450000 |
| 8 | F11 | Fuse box* | 32A 2P | YE41032200000 |
| 9 | - | Fuse** | 2A | YE46002000100 |
| 10 | F12 | Fuse** | 2A | YE41001000000 |
| 11 | T | Transformer | IN=400V OUT=230V 500mA | YE70402300800 |
| 12 | S1 | Thermocouple | - | - |
| 13 | S2 S3 | Thermocouple | - | - |
| 14 | S4 | Overheat protector* | - | - |
| 15 | S5 S7 | Pressure switch | 0~8bar | YE90000800000 |
| 16 | S6 | Float switch | - | YE59100000000 |
| 17 | PC1 A | Circuit board* | 100~240VAC 50/60Hz | YE81100010000 |
| 18 | Y1 Y2 | Solenoid valve | 230VAC 50/60Hz | - |
| 19 | X1 | Terminal board | - | YE61250040000 |
| 20 | - | Terminal board | - | YE61253500000 |
| 21 | - | Terminal board | - | YE61043500000 |
| 22 | - | Terminal board | - | YE61040000000 |
| 23 | - | Terminal board | - | YE61043500000 |
| 24 | M1 | Motor | 400V 50Hz 1.5kW | - |
| 25 | EH | Heater** | 400V 50Hz 12kW | - |
| 26 | FM | Motor | 230V 50/60Hz | - |

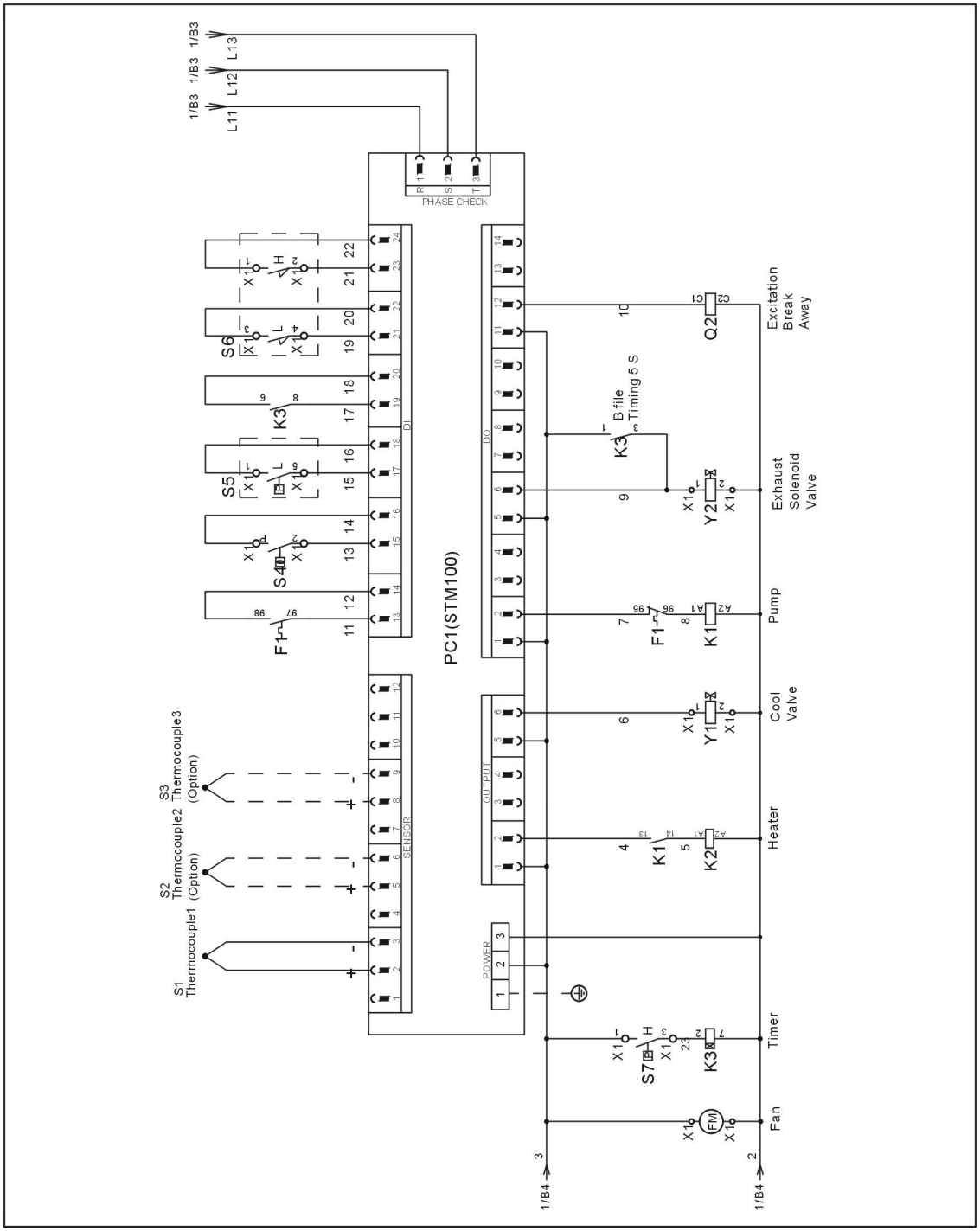
* means possible broken parts. ** means easy broken part. and spare backup is suggested. Please confirm the version of manual before placing the purchase order to guarantee that the item number of the spare part is in accordance with the real object.

## 2.3.5 Main Circuit (STM-PW)(230V)



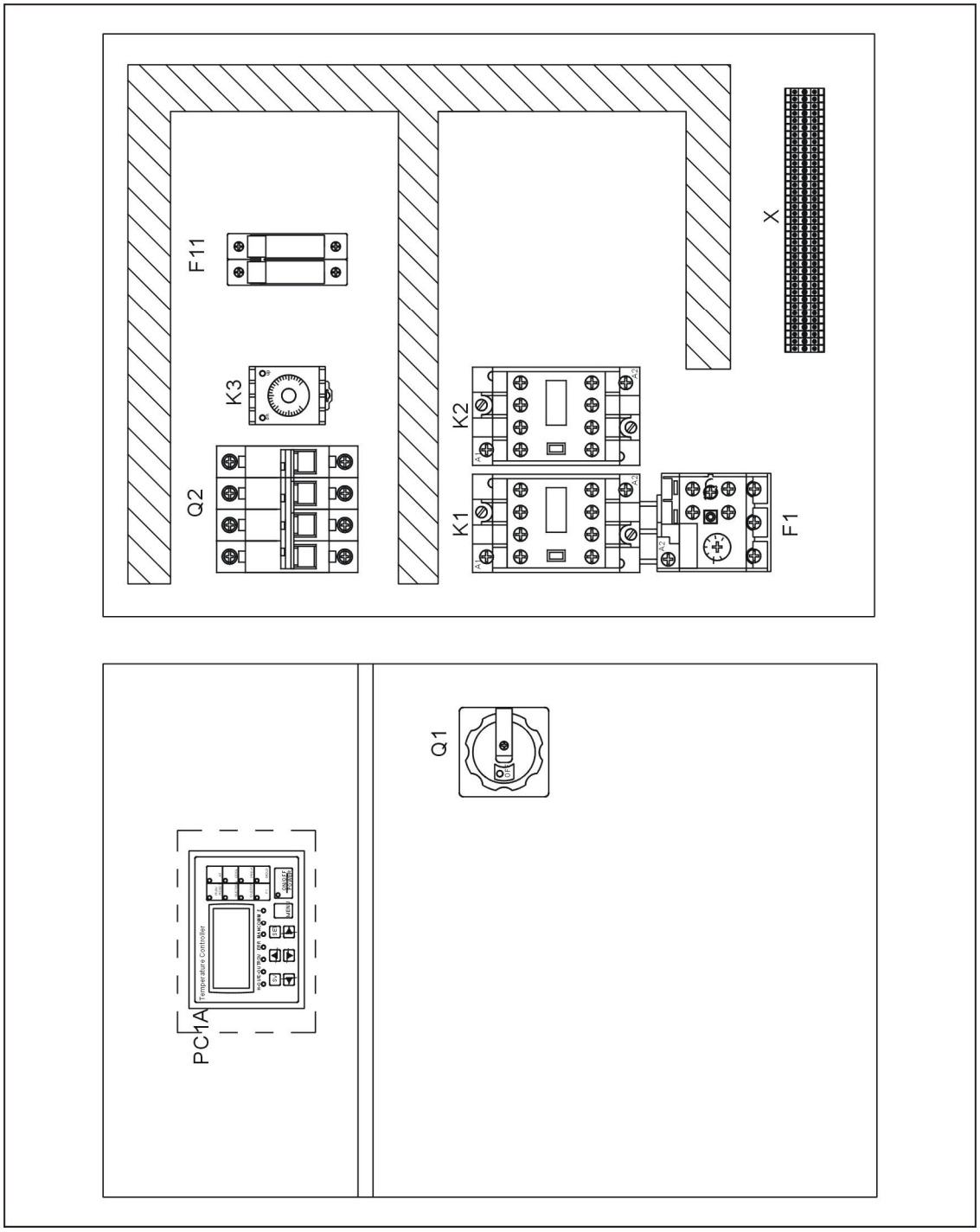

Picture 2-8: Main Circuit (STM-PW) (230V)

## 2.3.6 Control Circuit (STM-PW) (230V)



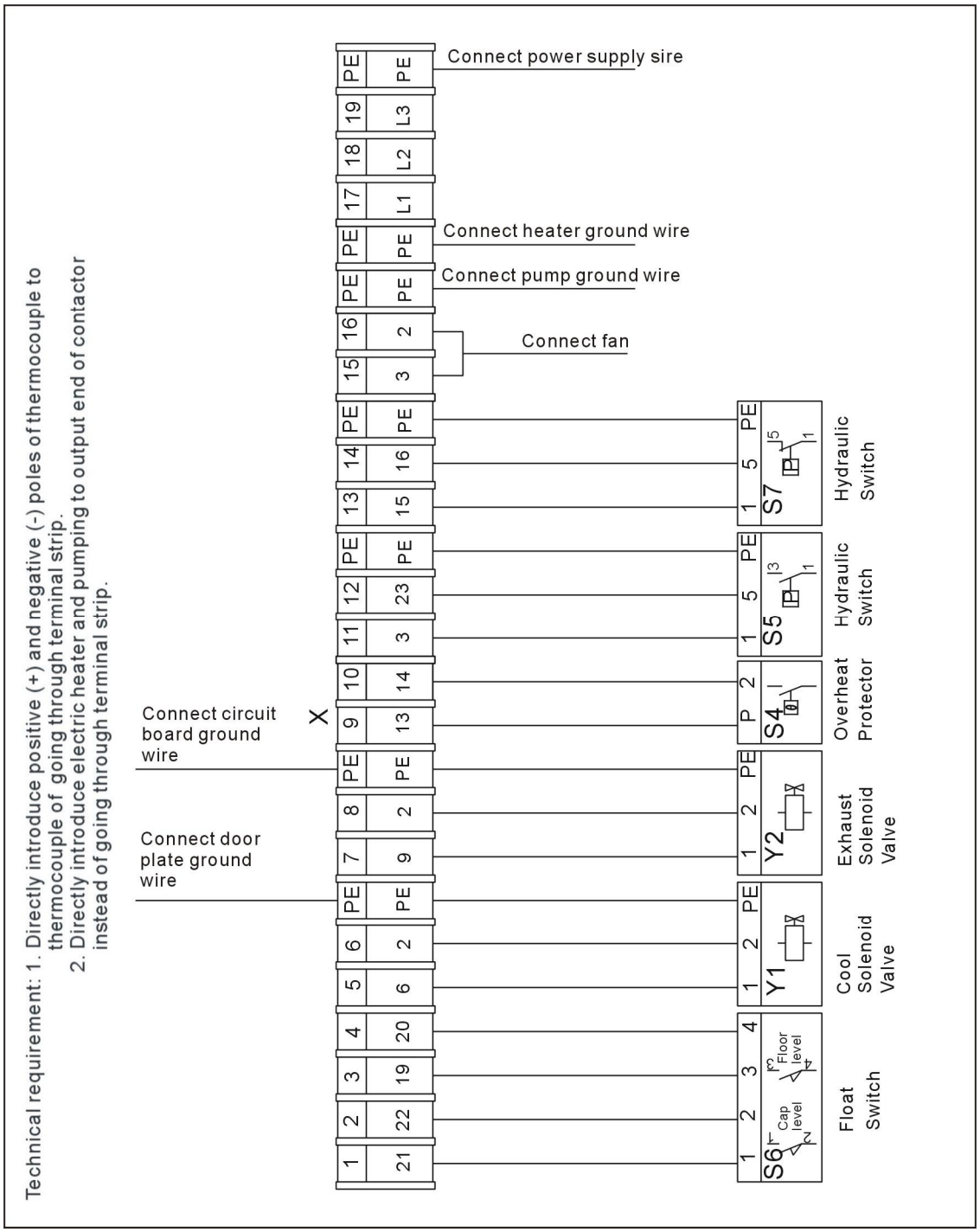

Picture 2-9: Control Circuit (STM-PW) (230V)

## 2.3.7 Electrical Components Layout (STM-PW) (230V)




Picture 2-10: Electrical Components Layout (STM-PW) (230V)

## 2.3.8 Thermocouple and Terminal Layout (STM-PW) (230V)




Picture 2-11: Thermocouple and Terminal Layout (STM-PW) (230V)

## 2.3.9 Electrical Components List (STM-PW) (230V)

Table 2-5: Electrical Components List (STM-607-PW) (230V)

| NO. | Symbol | Name | Specification | Part NO. |
|---|---|---|---|---|
| 1 | Q1 | Main switch | 25A | YE10125250000 |
| 2 | Q2 | Circuit breakers* | 25A | YE40602500000 |
| 3 | - | Excitation break away | - | YE40023560000 |
| 4 | K1 | Contactors* | 220V 50/60Hz | YE00601521000 |
| 5 | K2 | Contactors* | 220V 50/60Hz | YE00602522000 |
| 6 | K3 | Timer | 220V 50/60Hz | YE86300600000 |
| 7 | F1 | Overload relays* | 2.8~4A | YE01160280000 |
| 8 | F11 | Fuse box* | 32A 2P | YE41032200000 |
| 9 | - | Fuse** | 2A | YE46002000100 |
| 10 | S1 | Thermocouple | - | - |
| 11 | S2 S3 | Thermocouple | - | - |
| 12 | S4 | Overheat protector* | - | - |
| 13 | S5 S7 | Pressure switch | 0~8bar | YE90000800000 |
| 14 | S6 | Float switch | - | YE59100000000 |
| 15 | PC1 A | Circuit board* | 100~240VAC 50/60Hz | YE81100010000 |
| 16 | Y1 Y2 | Solenoid valve | 230VAC 50/60Hz | - |
| 17 | X1 | Terminal board | - | YE61250040000 |
| 18 | - | Terminal board | - | YE61253500000 |
| 19 | - | Terminal board | - | YE61040000000 |
| 20 | - | Terminal board | - | YE61043500000 |
| 21 | M1 | Motor | 230V 50Hz 0.5kW | - |
| 22 | EH1 | Heater** | 230V 50Hz 6kW | - |
| 23 | FM | Fan* | 230V 50/60Hz | - |

* means possible broken parts.
** means easy broken part. and spare backup is suggested.
Please confirm the version of manual before placing the purchase order to guarantee that the item number of the spare part is in accordance with the real object.

Table 2-6: Electrical Components List (STM-1220-PW) (230V)

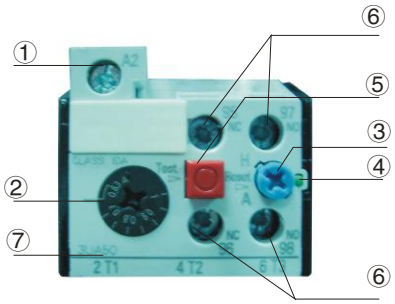
| NO. | Symbol | Name | Specification | Part NO. |
|---|---|---|---|---|
| 1 | Q1 | Main switch | 63A | YE10636300000 |
| 2 | Q2 | Circuit breakers* | 63A | YE40606000000 |
| 3 | - | Excitation break away | - | YE40023560000 |
| 4 | K1 | Contactors* | 220V 50/60Hz | YE00601621000 |
| 5 | K2 | Contactors* | 220V 50/60Hz | YE00503500000 |
| 6 | K3 | Timer | 220V 50/60Hz | YE86300600000 |
| 7 | F1 | Overload relays* | 7~10A | YE01167100000 |
| 8 | F11 | Fuse box* | 32A 2P | YE41032200000 |
| 9 | - | Fuse** | 2A | YE46002000100 |
| 10 | S1 | Thermocouple | - | - |
| 11 | S2 S3 | Thermocouple | - | - |
| 12 | S4 | Overheat protector* | - | - |
| 13 | S5 S7 | Pressure switch | 0~8bar | YE90000800000 |
| 14 | S6 | Float switch | - | YE59100000000 |
| 15 | PC1 A | Circuit board* | 100~240VAC 50/60Hz | YE81100010000 |
| 16 | Y1 Y2 | Solenoid valve | 230VAC 50/60Hz | - |
| 17 | X1 | Terminal board | - | YE61250040000 |
| 18 | - | Terminal board | - | YE61253500000 |
| 19 | - | Terminal board | - | YE61060000000 |
| 20 | - | Terminal board | - | YE61063500000 |
| 21 | M1 | Motor | 230V 50Hz 1.5kW | - |
| 22 | EH1 | Heater** | 230V 50Hz 12kW | - |
| 23 | FM | Fan* | 230V 50/60Hz | - |

* means possible broken parts. ** means easy broken part. and spare backup is suggested. Please confirm the version of manual before placing the purchase order to guarantee that the item number of the spare part is in accordance with the real object.

## 2.4 Main Electrical Components Description

### 2.4.1 Overload Relay

At delivery, the overload relay is set for mannual reset. (the reset button pointing to H). Manually reset the relay at the tripping of the switch. When motor overload occurs, stop the machine, then check and solve the problem. After that open the door of control box, press down the reset button of overload relay (if you can not press down the reset button, wait for one minute).




Picture 2-12: Overload Relay

1) Terminal for contact coil A2.
2) Setting current adjusting scale.
3) Reset (blue).

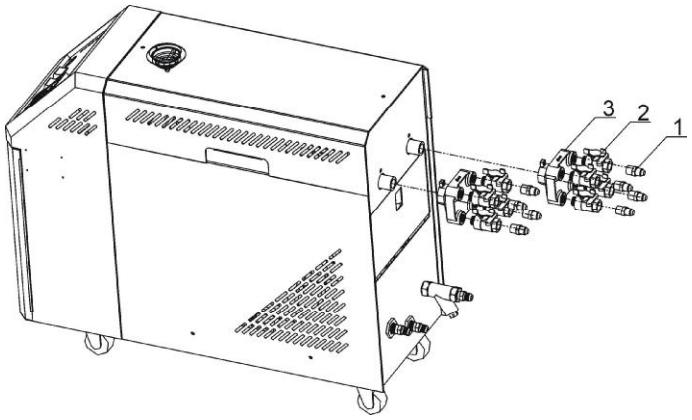
H: manual reset

A: automatic reset

4) Switch position indication (green).
   Tripping of a manual-resetting is indicated by a pin projecting from the front plate.
5) Test button (red).
6) Auxiliary contact terminals shown in 95.96.97.98. NC and NO contacts are shown in position 95.96. and 97.98. repectively.
7) Main circuit connection No. must be correspond with terminal Number of contactor.

## 2.5 Operation Procedures

### 2.5.1 Installation steps for options water manifold (dewaxing)

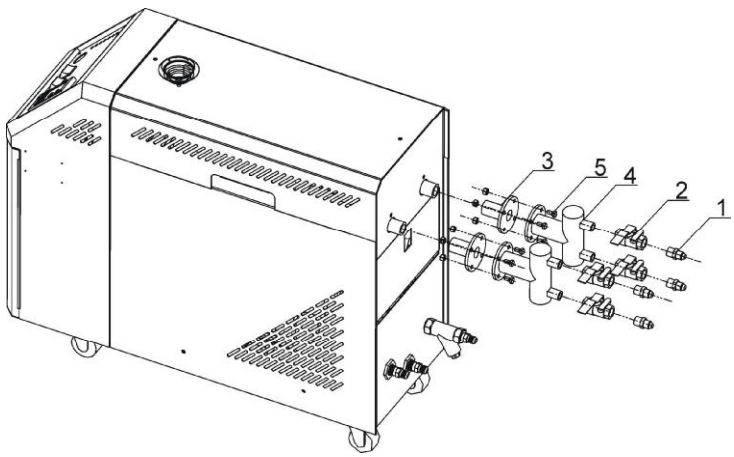



1) Install copper joint to the level valve.
2) Install level valve with copper joint to the dewaxing water manifold.
3) Install water manifold to the machine.
4) Install Teflon to copper joint.

Note!

For the operating temperature not higher than 200℃, Teflon with temperature resistance 200℃ is usable; for the operating temperature from 200 to 300℃, must use Teflon with temperature resistance 300℃.

### 2.5.2 Installation steps for options water manifold (welding)



1) Install copper joint to the level valve.
2) Install level valve with copper joint to the welding water manifold.
3) Install water manifold to the machine.
4) Connect water manifold with manifold joint via screws.
5) Install Teflon to copper joint.

Note!

For the operating temperature not higher than 200℃, Teflon with temperature resistance 200℃ is usable; for the operating temperature from 200 to 300℃, must use Teflon with temperature resistance 300℃.

# 3. Installation and Debugging

## 3.1 Installation Space

During installation of the machine, keep at least 500mm installation space around the machine as shown by the picture. Do not install the machine in a position crowded with other objects. This would cause inconvenience to operation, maintenance and repair.

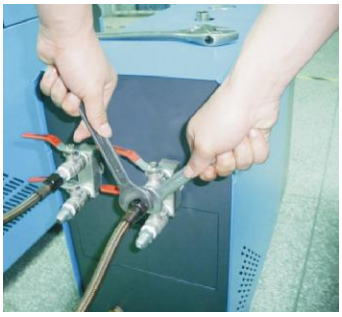
Do not sit on the machine.

Keep away flammable and explosive goods.

Picture 3-1: Installation Space

## 3.2 Mould and Water Coupling

1) It is necessary, while connecting from the access to mould, to use two spanners to fix the switching connection and ball valve before screw tightly the horn nut of the connection pipe, otherwise water might leaks from the machine.



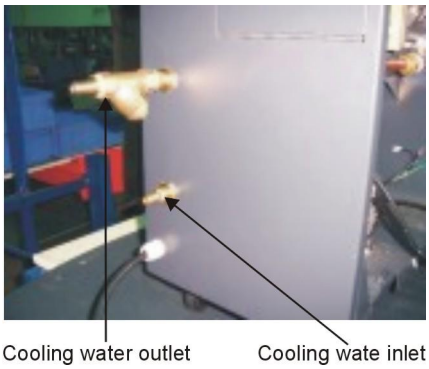
Picture 3-2: Mould and Water Couplings 1

2) Unused mould couplings can be connected with each other by a teflon pipe, as shown in.

Picture 3-3: Mould and Water Couplings 2

Note!

Cooling water inlet and outlet as shown by the Figure. Please do not connect reversely. Please connect the coolng water outlet with high temperature resistant pipe when temperature is above 100℃.




Picture 3-4: Mould and Water Couplings 3

3) Connect cooling water inlet with water supply and cooling water outlet with a drainage pipe. After that, turn on water supply.

## 3.3 Power Supply

Make sure that power supply is the same as required before installation.

Mould heater are generally set to be used with 3Φ400V power supply or other specifications according to customers' requirement.

# 4. Operation Guide

## 4.1 Control Panel

Picture 4-1: Control Panel

Table 4-1: Control Panel

| No. | Name | Functions | Remarks |
|---|---|---|---|
| 1 | LCD | Display showing LCD | |
| 2 | ON/OFF POWER | Power ON, OFF shift key | After connect power, press “POWER ON/OFF”, initial screen is displayed and starts. Pls note that even if regulator is idle, electrci shock may happen if power is on. |
| 3 | MENU | LCD menu shift key | Initial password: 3588 |
| 4 | SET | Parameters setting | Confirm paramerters |
| 5 | SV | Change set value | Modify setting temp. |
| 6 | ▲/▼ | Change parameters | |
| 7 | ◀/▶ | Cursor movement | |
| 8 | RUN/RESET | Control start and stop | |
| 9 | AT | AUTO-TUNING switch start and stop | Auto-tuning can run during operation.<br>Auto-tuning cannot work under SUCTION and COOL operation. |
| **No.** | **Name** | **Functions** | **Remarks** |

| | | | |
|---|---|---|---|
| 10 | SUCTION | SUCTION switch start and stop | SUCTION is to remove medium (watre/oil) from molds. Can not start during operation or cooling. After SUCTION turns on, “SUCTION relay” and “pump inverse run relay” will turn on. |
| 11 | COOL | Forced cooling switch start and stop | Press it for 2 secs for forcedcooling, then stop heating output while output 100% cooling control. If control temp. is below Cooling Temp, forced cooling will be auto stopped then control turns off. |
| 12 | BUZZER | Turn off buzzer | Press “BUZZER” key and “BUZZER” LED lightens; buzzer and alarm relay are idle even error occurs. |
| 13 | AUTO START | Start and stop key | |
| 14 | SUCTION OFF | SUCTION relay switch start and stop | Under SUCTION is on, this key is to turn on or off SUCTION relay. |
| 15 | F | Not used (for extension) | |
| 16 | HEAT | Heating output (MAIN) display LED | |
| 17 | SUB | Heating output (SUB) display LED | |
| 18 | COOL | Cooling output display LED | |
| 19 | PUMP_D | Display pump running LED | |
| 20 | PUMP_R | Display pump inverse running LED | |
| 21 | WATER | Display water filling LED | |
| 22 | ALARM | Give the alarm LED | Refer to table 4-2 for errors type |

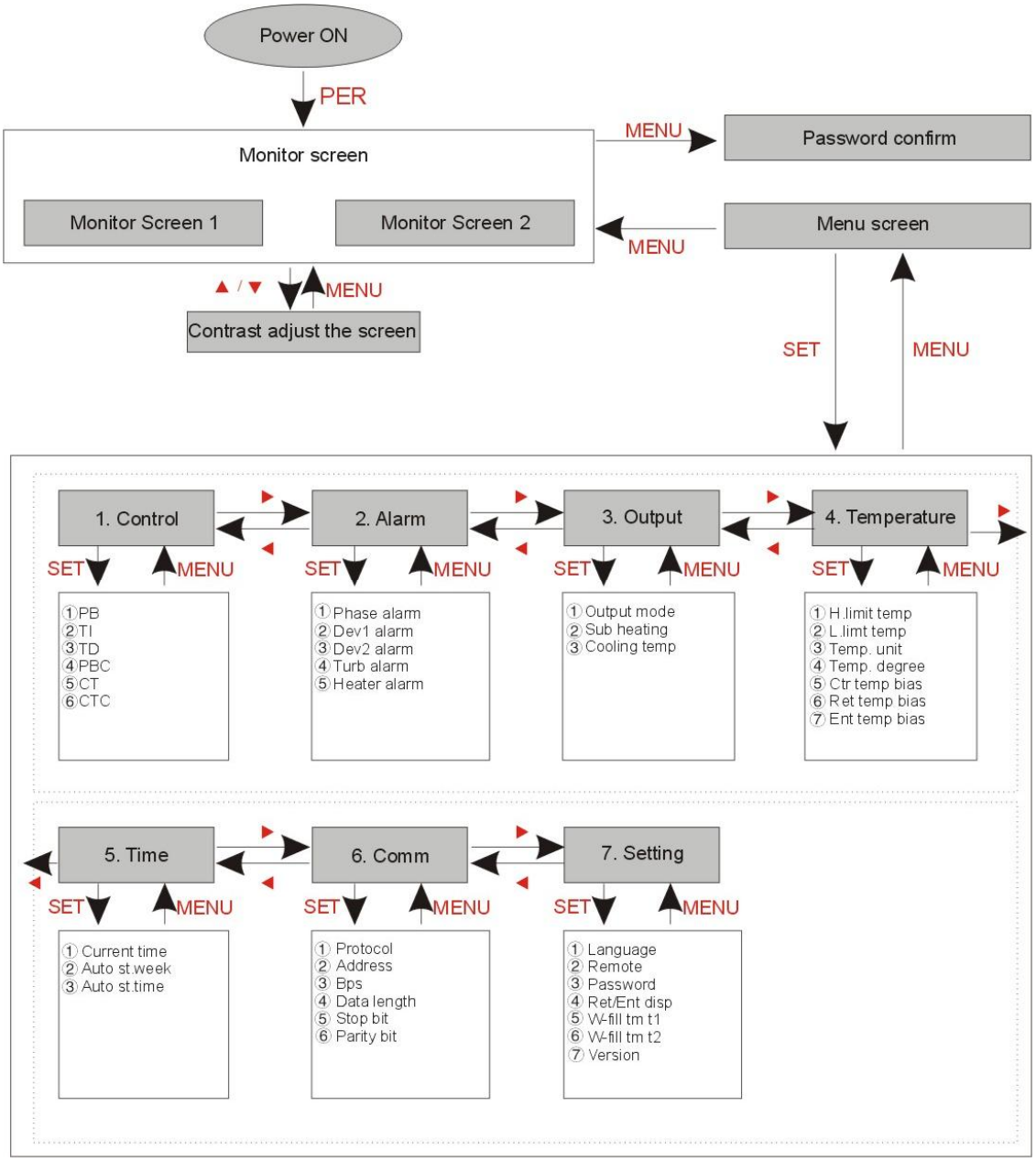
Table 4-2: Error Type

| Error display | Reasons | Alarm | Temp. control |
|---|---|---|---|
| Board error | Controller error | Activated | Stop |
| Calib error | | Activated | Stop |
| Adc error | | Activated | Stop |
| Rjc error | | Activated | Stop |
| Eeprom error | | Activated | Maintain its status |

| | | | |
|---|---|---|---|
| Phase error | Phase disconnect or phase reverse | Activated | Stop |
| Over temp. ego | Contact input for ego temp. check | Activated | Stop |
| Over pump | Contact input for pumper overload check | Activated | Stop |
| Low press | Contact input for low pressure check | Activated | Stop |
| High press | Contact input for high pressure check | Activated | Stop |
| L. level water | Contact input for low water level check | Activated | Stop |
| Appear “-----“ on temperature display | Sensor abnormality | Activated | Stop |
| Dve1 alarm | Deviation between control temp. and entered temp. | Activated | Maintain its status |
| Dev2 alarm | Deviation between control temp. and retrieved temp. | Activated | Maintain its status |
| Turb. Alarm | Control temp. is suddenly dropped | Activated | Maintain its status |
| Heater alarm | Control temp. does not rise | Activated | Maintain its status |

Notes: When alarm sounds, controller will automaticlly start the protective function and stop the machine. Press "ON" to restart the machine.

## 4.2 Menu Introduction



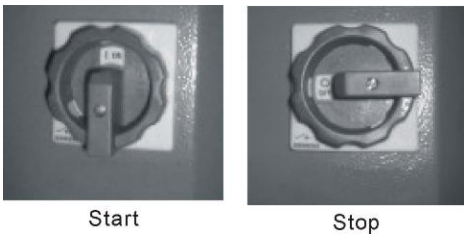

Pictute 4-2: Menu Outline

## 4.3 Machine Startup

1) Conenct pipeline from STM water in/outlet to the mold. (refer to chapter 3.2 for pipeline connection)
2) Connect chilled water port and water backup port. (refer to chapter 3.2 for pipeline connection)

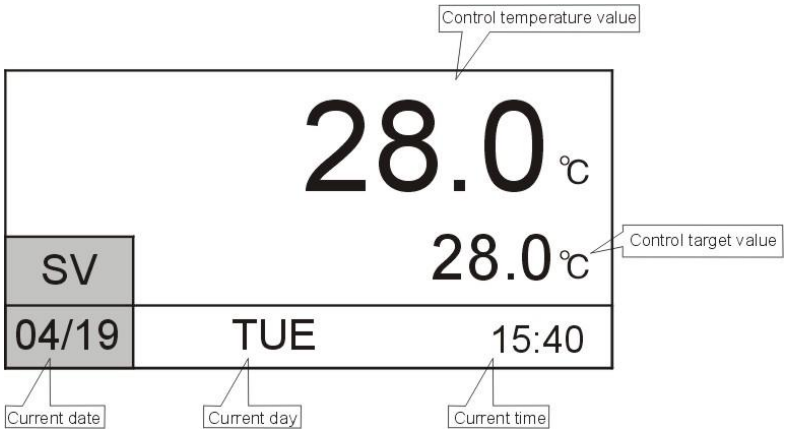
3) Open all the globa valves.

4) Switch on main power.



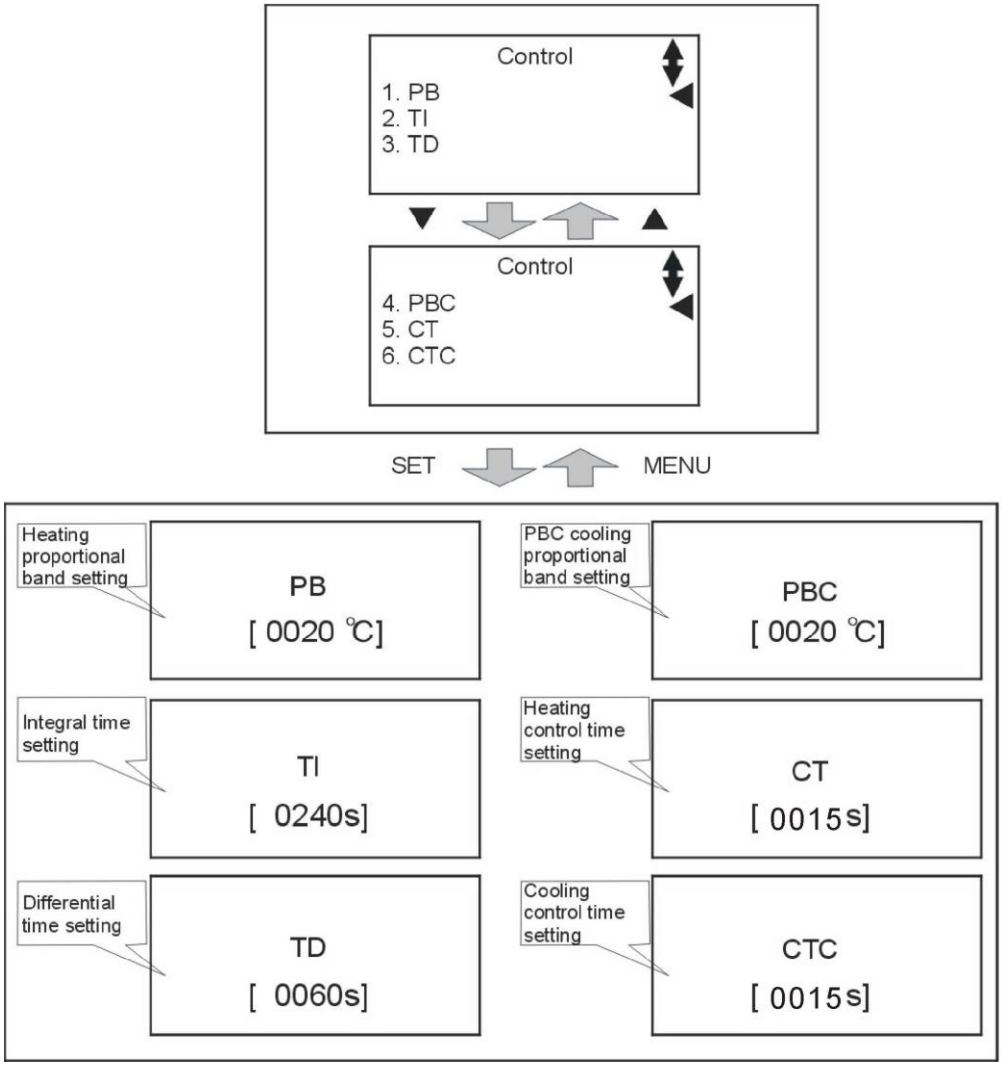

Picture 4-3: Main Power Switch

5) Press ON/OFF POWER key to enter menu screen.




Picture 4-4: Initial Menu

6) Press MENU key to enter menu selection, press ◄/► keys to select control setting, press SET key to enter setting nemu, see picture below. Parameter setting is based on AT auto-tuning. Never change it privately.



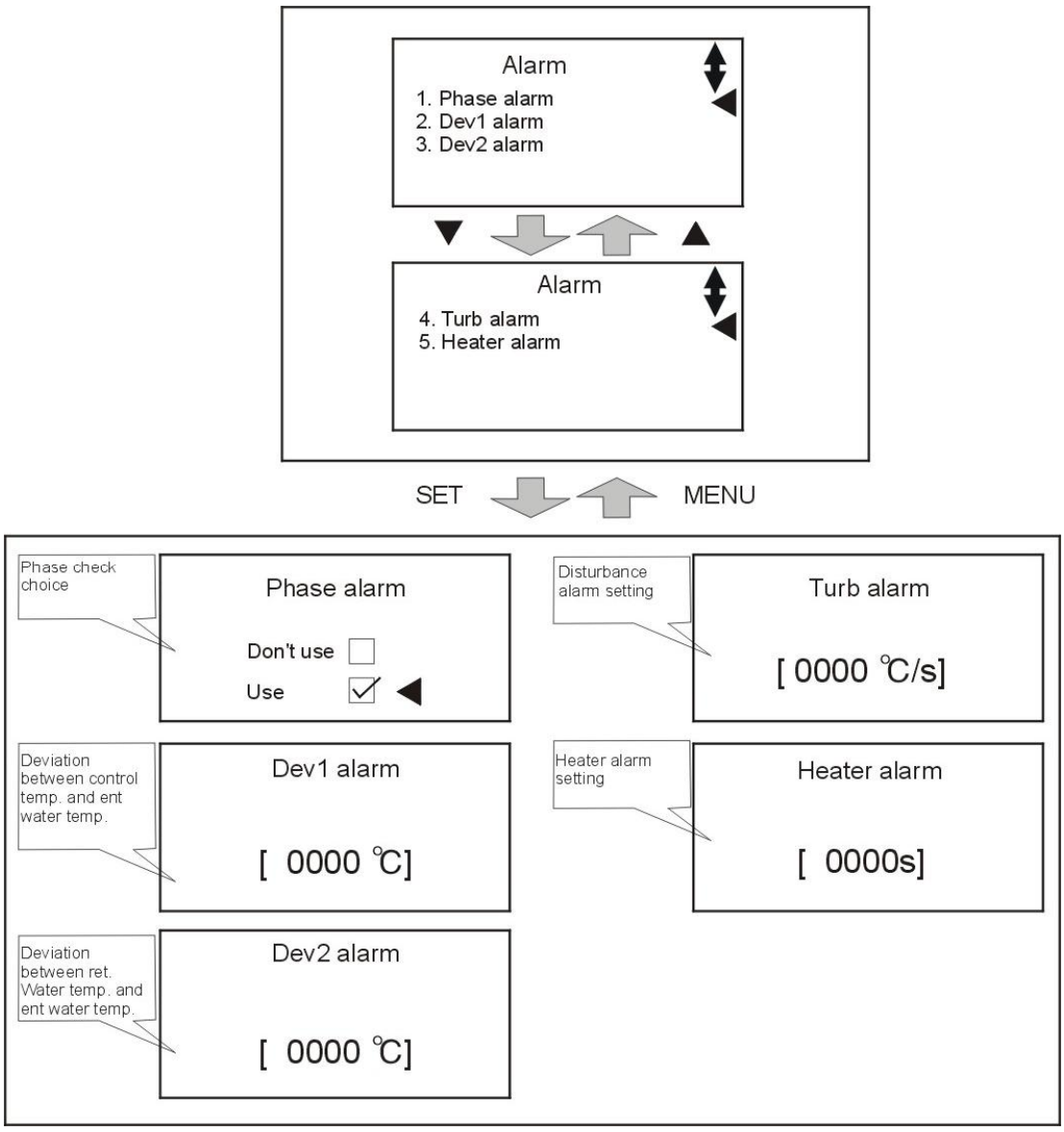

Picture 4-5: Control Setting

7) Press MENU key to retuen to menu screen, press ◄/► key to select alarm setting then press SET to enter setting menu, see picture below. Here is parameter setting:

- PHASE——used
- Water out temp. deviation——0 (not opt for temp. sensor)
  5 (opt for temp. sensor, increase it suitably if frequent alarms)
- Return water deviation——0 (ont opt for temp. sensor)

10 (opt for temp. sensor, increase it suitably if frequent alarms)

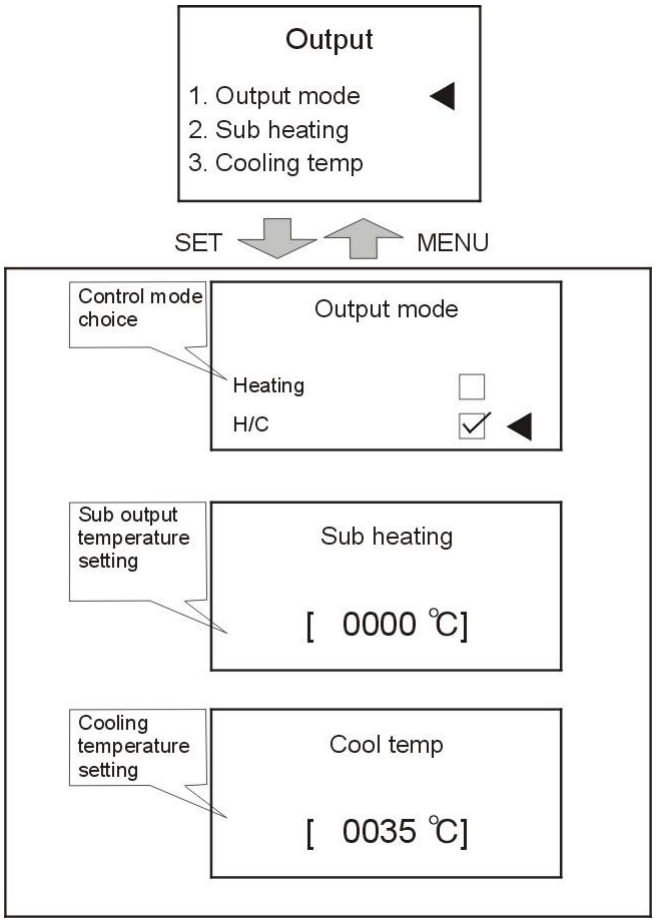
- Interfere alarm——control temp.-10
- Heater alarm——depending on auctual setpoint, default setting is 0 upon delivery to make it out of service.




Picture 4-6: Alarm Setting

8) Press MENU key to return to menu screen, then press ◄/► key to select output setting and press SET key to enter setting screen, see picture below. Here is parameter setting:

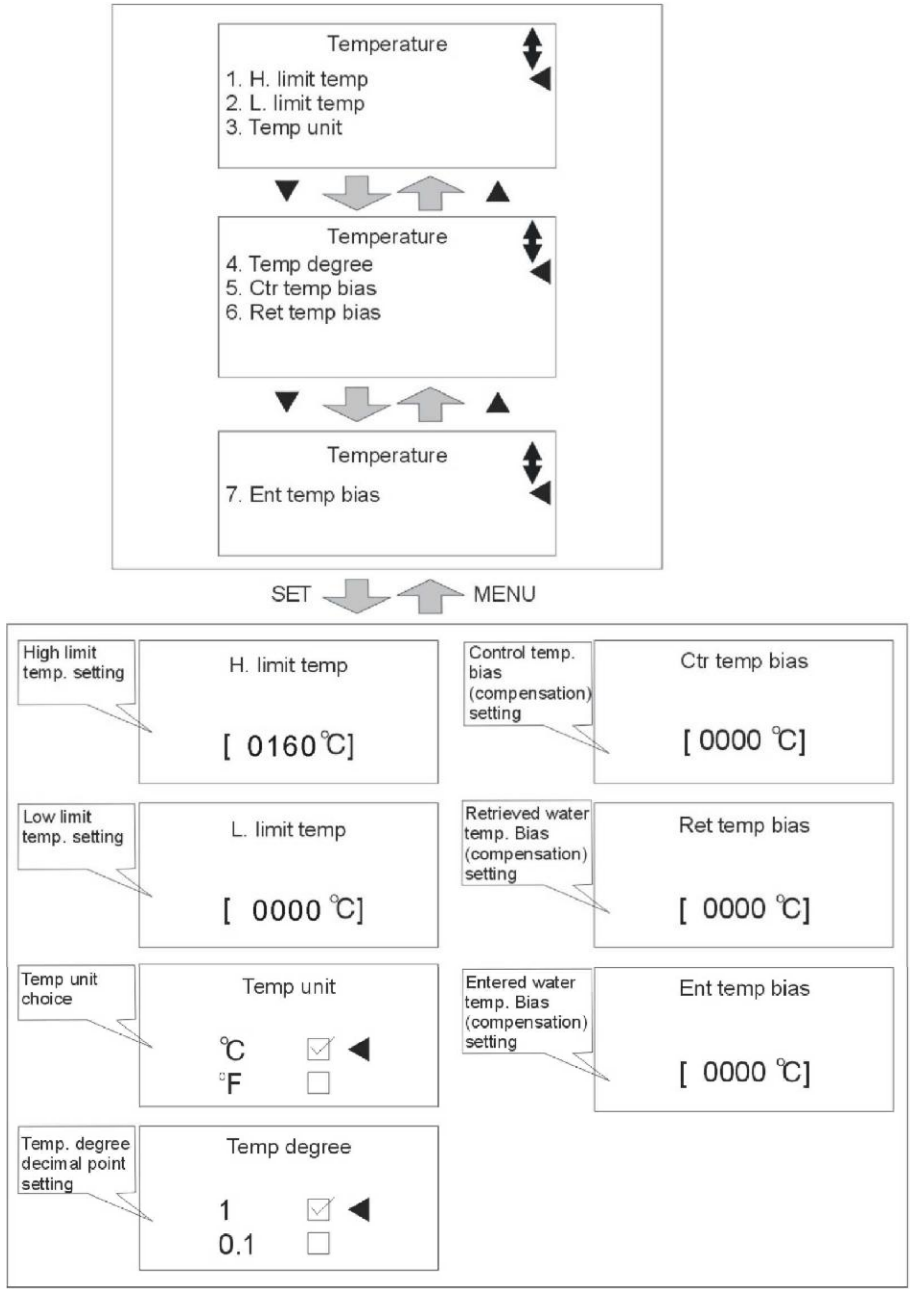
- OUTPUT MODE——heating or cooling control
- SUB HEATING——0 (only 1 group of heater)
- 5 (two or more groups of heater)
- COOLING TEMP.——35




Picture 4-7: Output Setting

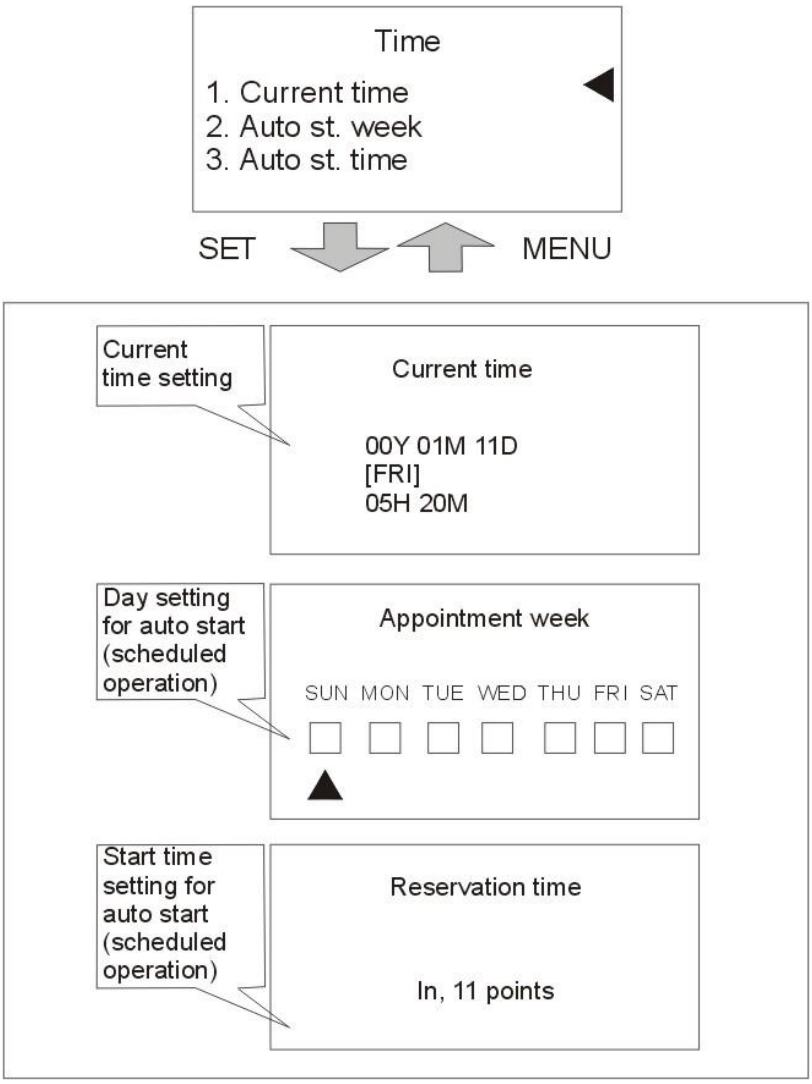
9) Press MENU key to return to menu screen, then press◄/► keys to select temp.setting, press SET key to enter setting screen, see picture below.

- H. LIMIT TEMP.——based on actual operation.
- L. LIMIT TEMP.——based on actual operation.
- TEMP. UNIT——℃ (Celsius and Fahrenheit)
- TEMP. DEGREE——0.1
- CTR TEMP BIAS——based on actual operation.
- RET TEMP BIAS——based on actual operation
- ENT TEMP BIAS——based on actual operation



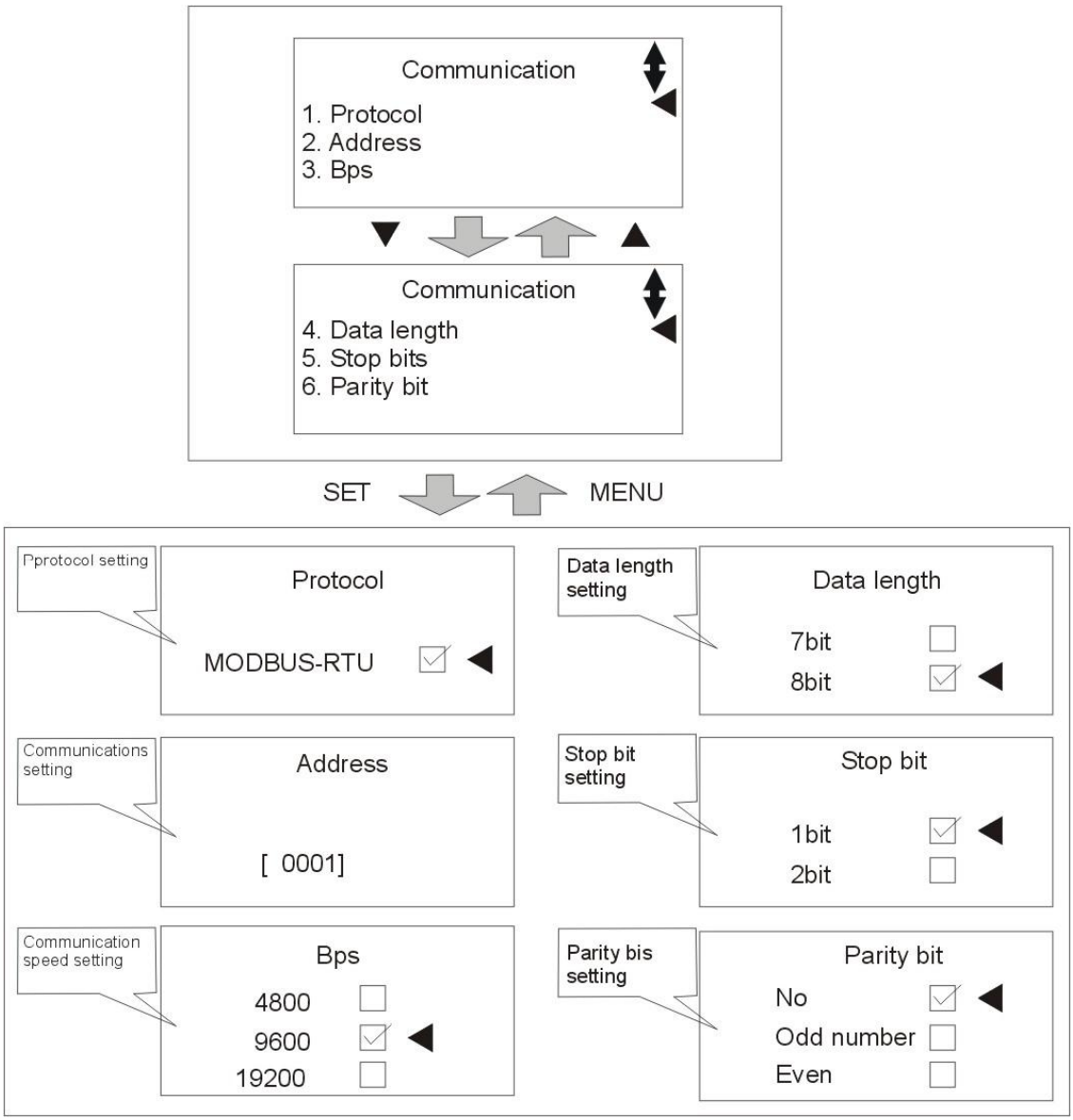

Picture 4-8: Temperature Setting

10) Press MENU key to return to menu screen, press ◄/► key to select time setting, press SET key to enter setting screen, see picture below. Time has been set before delivery; customers can set appointment time based on actual needs.



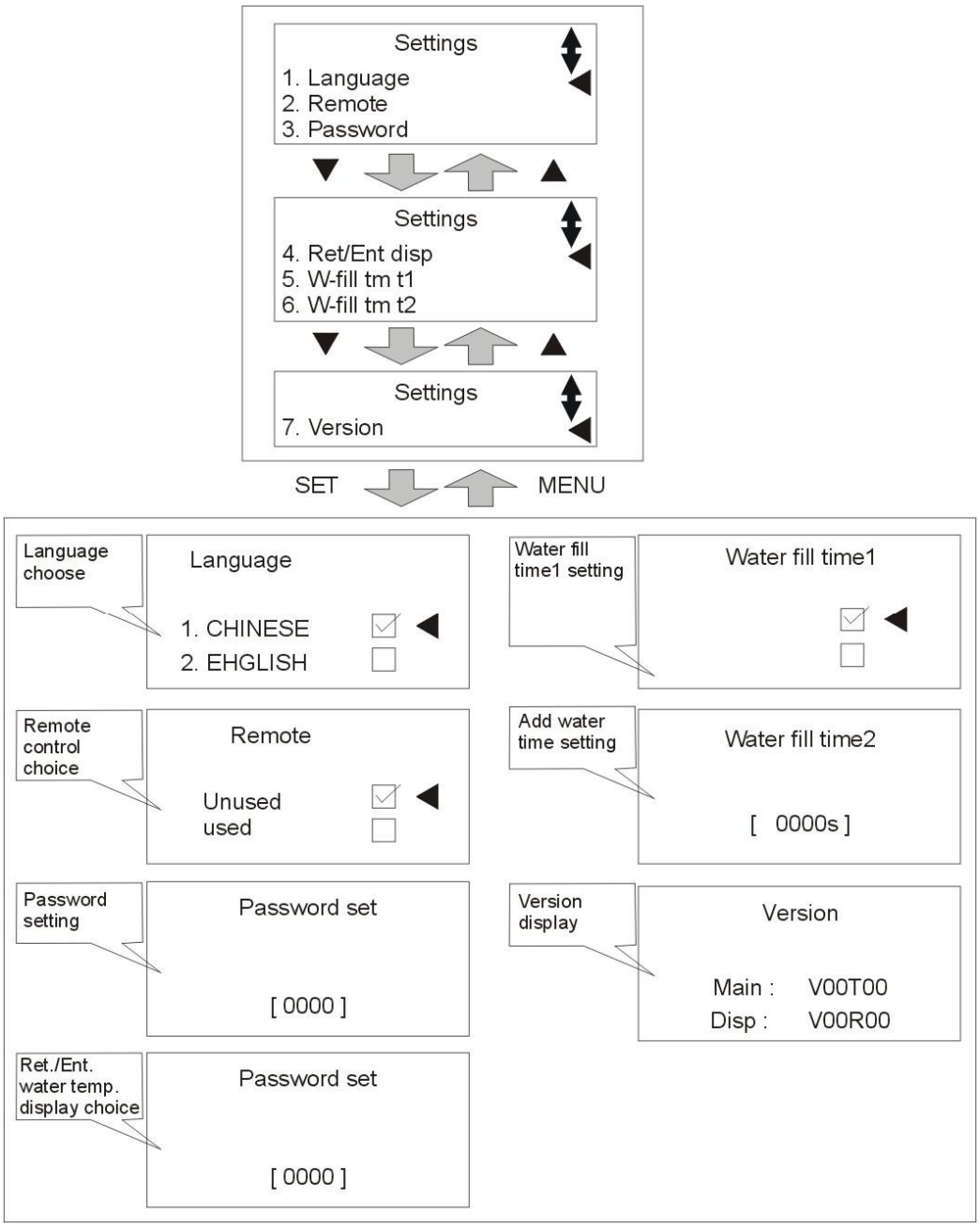

Picture 4-9: Time Setting

11) Press MENU key to return to menu screen, press ◄/► key to select communication setting, press SET key to enter setting screen, see picture below. If communication function is selected as an option, customers should set communication parameters based on actual needs.




Picture 4-10: Communication Setting

12) Press MENU key to return to menu screen, press ◄/► key to select device setting, press SET key to enter setting screen, see picture below. Before delivery, parameters have been set and customers can modify them based on actual needs.

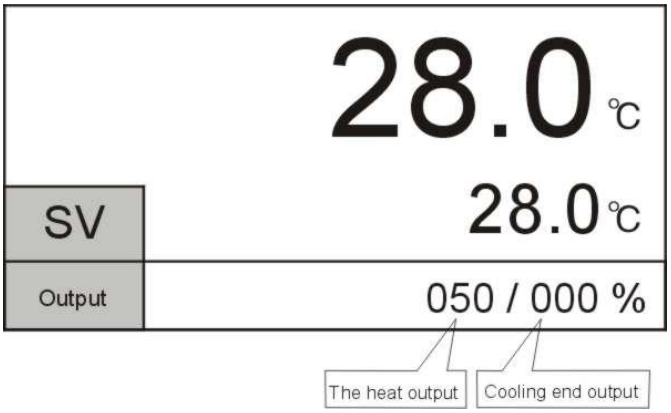



Picture 4-11: Equipment Setting

13) Setting mold temperature (if temp. has been set, this step can be omitted). Press SV key and control value column would be flashing, press ◄/► key to move cursor then press ▲/▼ key to change values. Finally press SET key to confirm them. Maximum setting temperature of STM is 160℃.

14) After setting desired value, press RUN/RESET key to begin temperature

control, Auto-tuning is needed if deviation of control is a little bit large. Press AT key and LED light begins flashing to enter Auto-tuning. When flashing is ended, Auto-tuning finished and parameters will auto saved. During Auto-tuning, press AT key will exit Auto-tuning process, controller will conduct temperature control based on parameters beforeAuto-tuning.




Picture 4-12: Operation Screen

## 4.4 Parameter Reference Table

| English Name | Description | Range | Default |
|---|---|---|---|
| Control pv | Control temp. | -50~500℃ | - |
| Ret pv | Retrieved water temp. | -50~500℃ | - |
| Ent pv | Entered water temp. | -50~500℃ | - |
| Sv | Control taget temp. | -50~500℃ | -50℃ |
| Hout | Amount of heating output | 0~100% | 0% |
| Cout | Amount of cooling output | 0~100% | 0% |
| Pb | Heating proportional band | 0~550℃ | 20℃ |
| Ti | Integral time | 1~3600s | 240s |
| Td | Derivative time | 1~3600s | 60s |
| Pbc | Derivative time | 0~550℃ | 20℃ |
| Ct | Time for heating output | 1~100s | 15s |
| Ctc | Time for cooling output | 1~100s | 15s |
| Phase alarm | Use for phase check | ON/OFF | OFF |
| Dev1 alarm | Alarm for deviation between control temp. and entered water temp. | 0~550℃(0=off) | 0=off |
| Dev2 alarm | Alarm for deviation between entered water temp. and retrieved water temp. | 0~550℃(0=off) | 0=off |
| Turb. Alarm | Alarm for sudden temp. drop | 0~550℃/s (0=off) | 0=off |

| English Name | Description | Range | Default |
|---|---|---|---|
| Heater alarm | Alarm for not reaching to the setting temp. | 0~3600s(0=off) | 0=off |
| Output mode | Select between heating and heating/cooling control | Heating<br>Heating/cooling | Heating/cooling |
| Sub heating | Set “off temperature” in sub heating output | 0~550℃<br>(0=off) | 0=off |
| Cooling temp | Set compulsory cooling | -50~500℃ | 35℃ |
| H.limit temp | High(upper) limit temp. | -50~500.0℃ | 500℃ |
| L.limit temp | Low(lower) limit temp. | 50~500.0℃ | -50℃ |
| Temp unit | Swlect ℃/ $^{o}$F | ℃/ $^{o}$F | ℃ |
| Temp. degreen | Select the decimal point position 0.1/1 | 0.1, 1 | 1 |
| Ctl temp bias | Control temp. bias (compensation) | -550~550.0℃ | 0℃ |
| Ret temp bias | Retrieved water temp. bias (compensation) | -550~550.0℃ | 0℃ |
| Ent temp bias | Entered water temp. bias (compensation) | -550~550.0℃ | 0℃ |
| Current time | Year/month/date/day/hour/minute | 99/12/31/mo~su/24/59 | - |
| Auto st. week | Mon/tue/wed/thur/fri/sat/sun | Mo~Su | - |
| Auto st. time | Hour/minute | 24/59 | 0 |
| Protocol | Proto col | Modbus-rtu | Modbus-rtu |
| Address | Communication address | 0~99 | 1 |
| Bps | Communication speed | 4800, 9600, 19200 | 9600 |
| Data length | Data length | 7, 8 | 8 |
| Stop bit | Stop bit | 1, 2 | 1 |
| Parity bit | Parity bit | None, even, odd | None |
| Language | Selsct language | Chinese, English | Chinese |
| Remote | Remote control | Use, unused | Unused |
| Password | Password setting | 0~9999 | 0 |
| Ret/ent disp | Display ret/ent water temp. | Off, on | Off |
| w-fill tm t1 | Water fill time t1 | 0~6000sec | 0 |
| w-fill tm t2 | Water fill time t2 | 0~60sec | 0 |
| version | Display its version | - | - |

## 4.5 Stop the Machine

1) Press COOL key to shut down heating output, and open cooling process.
2) Await until temp. drops to 50℃ below, press COOL key to shut down forcedcooling, then press RUN/RESET key to stop operation.

3) Switch mian power to OFF position.

Warning!

When main switch is turned on, be careful of electrical shock.

Note!

Pump motor rotating direction should be the same as indicated.

Note!

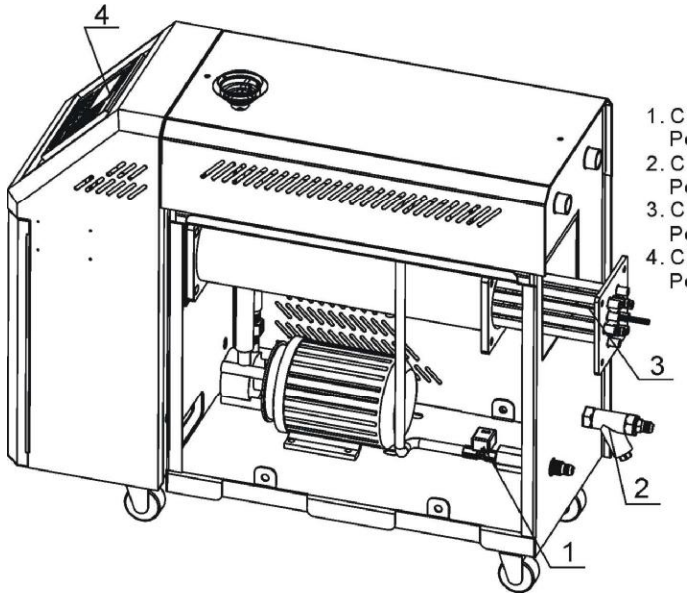
In order to prolong machine lifespan, please do as above steps to turn on and off the machine.

# 5. Trouble-shooting

| Failures | Possible reasons | Solutions |
|---|---|---|
| LCD displays nothing after switch on power and press ON/OFF key. | Did not connect through power supply.<br>Main switch broken.<br>Power supply wires problems.<br>Control circuit fuse melt.<br>Transformer broken. | Connect through power supply.<br>Replace main switch.<br>Check electrical wires.<br>Fix the fuse.<br>Replace the transformer. |
| Phase alarm. | Power supply low voltage.<br>Phase shortage.<br>Phase reversal.<br>PCB problems. | Check power supply.<br>Check power supply.<br>Exchange two of the wires of power supply.<br>Replace the PCB. |
| Pump overload. | Abnormal fluctuations of power supply.<br>Pump blocked.<br>Pump motor problems.<br>Overload relay (F1) setting value error. | Check power supply.<br>Check the pump.<br>Check pump motor.<br>Set the setting current of overload relay to equal to 1.1 times of motor rated current. Please refer to Mian Components for detailed description of overload relaly.<br>Reset overload relay:<br>Wait for one minute, then press the blue button to reset. |
| EGO overheat. | EGO temperature setting mistakes.<br>EGO poor temperature detecting.<br>Heater contactor K1 and K2 problems. | Correctly set EGO temperature. (EGO temperature setting value= temperature setting value+10℃)<br>Replace EGO.<br>Replace the contactor. |
| Low liquid level. | Oil shortage.0 | Fill high temp. oil. |
| Temp. window displays "----" | Abnormal sensor. | Check and repair sensor. |
| Once running, pump output indicator lightens but pump cannot start. Afetr a while pump still fails to run. | PCB output relay problems.<br>Electrical circuit problems. | Check or replace the PCB.<br>Check electrical circuit. |
| Differences between setting temperature and actual temperature is too big. | Too short time after machine startup.<br>Temperature parameter setting error.<br>Cooling water valve problems. | Wait for a while.<br>Check temperature parameters.<br>Please refer to the standard manual of setting parameters.<br>Replace solenoid valve. |
| Temperature can't rise up. | Heater contactor problems.<br>Heater problems.<br>Thermocouple problems.<br>PCB output point problems. | Replace the contactor.<br>Replace pipe heater.<br>Replace thermocouple.<br>Check and repair PCB. |

| Failures | Possible reasons | Solutions |
|---|---|---|
| Circuit breaker tripping off at turning on main switch. | Short circuit of main circuit.<br>Transformer short circuit or connected with earth wire.<br>Problems of circuit breaker. | Check electrical wire.<br>Replace circuit breaker. |
| Circuit breaker tripping off at turning on pump switch. | Pump motor coil short circuit.<br>Problems of circuit breaker. | Check pump motor.<br>Replace circuit breaker. |
| Circuit breaker trippingoff after short heater output. | Heater tube short circuit or shell contact.<br>Problems of circuit breaker. | Replace heater tube.<br>Replace circuit breaker. |

# 6. Maintenance and Repair




1. Clean solenoid valve
   Period: Trimonthly
2. Clean Y-type filter
   Period: Monthly
3. Clean process heater/Cooler
   Period: Half yearly
4. Check contactor
   Period: Trimonthly

Pay attention to the following rules during maintenance:

1) Please reduce the temperature to room temperature (below50℃), cut off power supply and drain oil and water first while inspecting the machine; carry out operations with safety gloves on after complete confirmation of spaces for inspection and maintenance.

2) It is necessary to carry out periodic inspections in order to prolong service life of the system and prevent from safety accidents.

(Please note that it is dangerous to check or tear down the machine during operation.)

## 6.1 Open the Covers

1) Open the top covers of the unit. (Refer to the pictures below)

Picture 6-1: Open the Covers 1

2) Take down the side covers. (Refer to the pictures below)

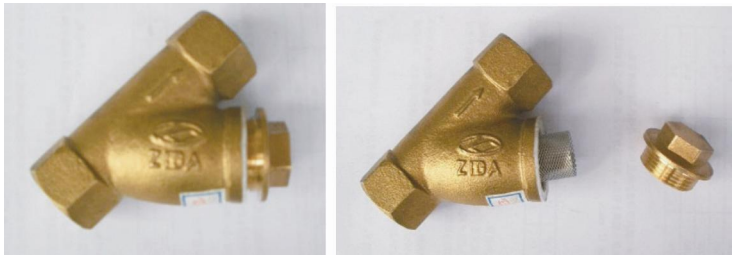
Picture 6-2: Open the Covers 2

3) Open the cover of control box. Screw off two butterfly screws to unlock the cover. (Refer to the pictures below)

Picture 6-3: Open the Covers 3

## 6.2 Y Type Strainer

1) Clean soft water should be used as cooling water. Filter screen is used in the strainer to stop impurities and pollutants to enter into water pipe.
2) Impurities or pollutants may cause errors and bad temperature control. Clean filter screen of the strainer periodically.
3) Cleaning steps: turn off power and cooling water supply. Open the top cover of filter screen to clean the filter.



Picture 6-4: Y Type Strainer

## 6.3 Solenoid Valve

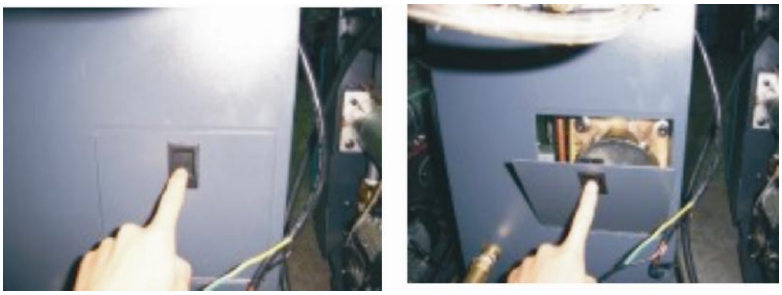
Replace solenoid valve:

1) Open machine top cover.
2) Take down right side cover.
3) Unfix the solenoid valve for replacement.
4) Install the covers in a reverse order.

Picture 6-5: Solenoid Valve

## 6.4 Pipe Heater

1) Open machine rear cover door. (Refer to pictures below)



Picture 6-6: Pipe Heater 1

2) Unlock heater cap. (Refer to pictures below)

Picture 6-7: Pipe Heater 2

3) Unlock the screws of pipe heater to take it out. (Refer to the pictures below.)

Picture 6-8: Pipe Heater 3

4) Install the pipe heater in a reverse order.

## 6.5 Printed Circuit Board

MAIN terminal board drawing (refer to next page for terminal position and number).

① SENSOR TERMINAL1 (sensor terminal)
2, 3 : control temp. sensor termnal
5, 6 : retuen water temp. sensor terminal
8, 9 : water out temp. sensor terminal
11, 12 : 1~5V input terminal

② DI TERMINAL (contactor input terminal)
13, 14 : pump overload contactor input terminal
15, 16 : EGO overheat contactor input terminal
17, 18 : underpressure contactor input terminal
19, 20 : overpressure contactor input terminal
21, 22 : lower water limit contactor input terminal
23, 24 : upper water limit contactor input terminal

③ OUTPUT TERMINAL (output terminal for controlling)
1, 2 : heating control output MAIN (RELAY output)
3, 4 : heating control output SUB (RELAY output)
5, 6 : coling control output (RELAY output)

④ DO TERMINAL (relay contactor output terminal)
1, 2 : pump running contactor output terminal
3, 4 : pump inverse running contactor output terminal
5, 6 : backup water contactor output terminal
7, 8 : SUCTION contactor output terminal

9, 10 : alarm contactor output terminal

11, 12 : relay contactor output terminal

13, 14 : reserve

⑤ PHASE CHECK TERMINAL (phase detect terminal)

1 : R phase connect terminal

2 : S phase connect terminal

3 : T phase connect terminal

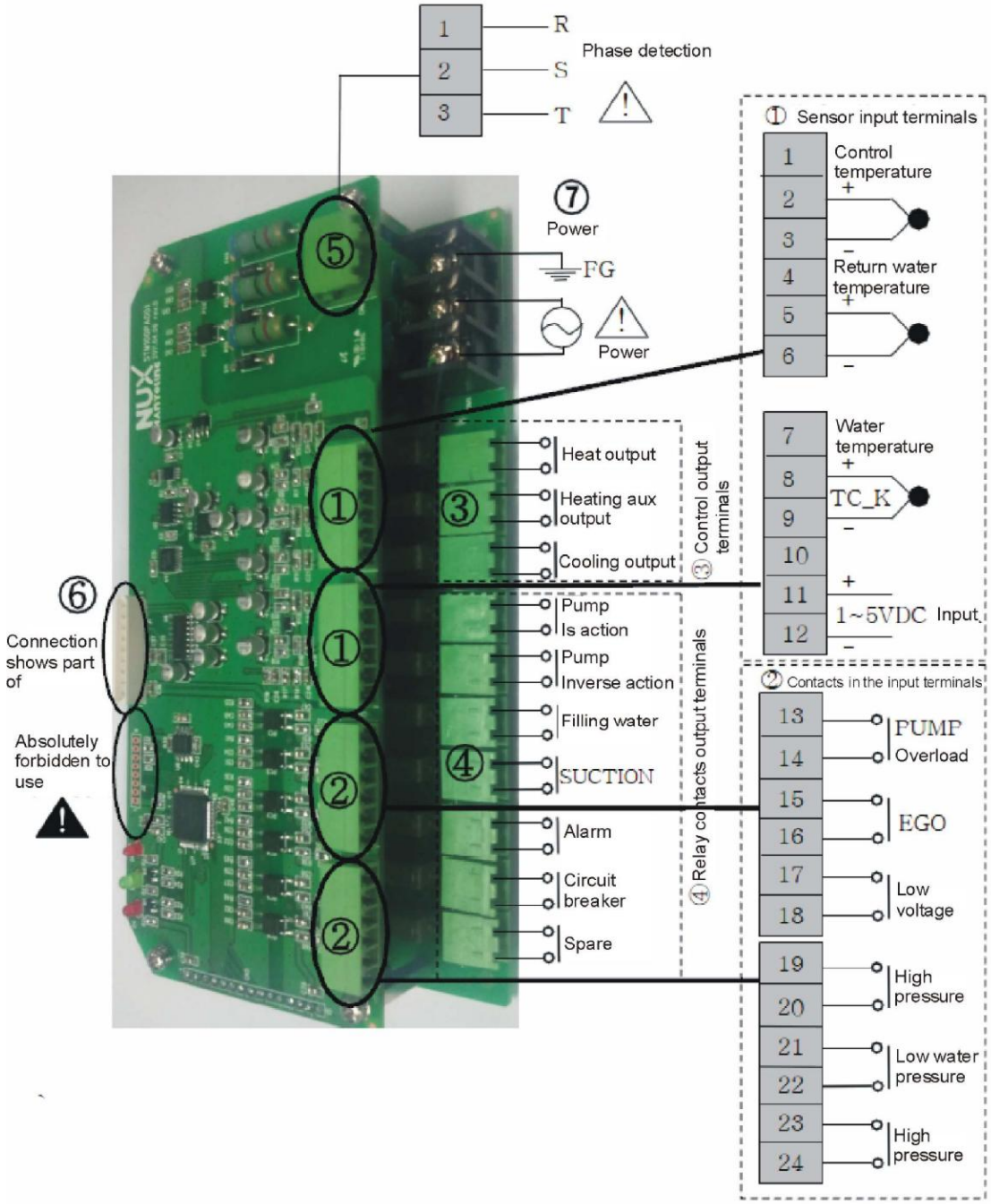
⑥ DISPLAY CN (connect terminal for dispaly)

Connect stub cable with STM100.

⑦ POWER TERMINAL (power supply terminal)

1 : FG terminal

2, 3 : power supply terminal (100~240VAC)


1
2
3
R
S
T
Phase detection
⑦
Power
FG
Power
⑤
①
③
Heat output
Heating aux output
Cooling output
③ Control output terminals
⑥
Connection shows part of
Absolutely forbidden to use
①
Pump Is action
Pump Inverse action
Filling water
④
SUCTION
Alarm
Circuit breaker
Spare
④ Relay contacts output terminals
②
②
① Sensor input terminals
1
2
3
4
5
6
Control temperature
+
–
Return water temperature
+
–
7
8
9
10
11
12
Water temperature
+
TC_K
–
+
1~5VDC Input
–
② Contacts in the input terminals
13
14
PUMP
Overload
15
16
EGO
17
18
Low voltage
19
20
High pressure
21
22
Low water pressure
23
24
High pressure

## 6.6 Displayer Terminal Connecting Diagram

① DI TERMINAL

1, 2: Run/stop di terminal

② COMM TERMINAL

1, 2, 3, 4: rs485 Comm terminal

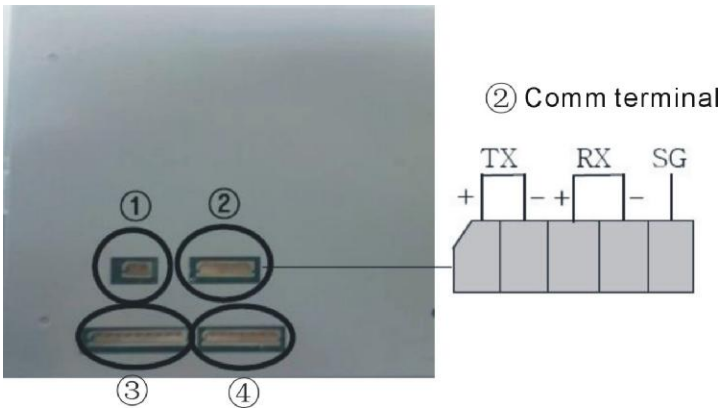
5: Earth terminal

③ MAIN CN

Connet to the electric cables which also connected with stm100

④ TEST PIN

Test pin No connection



## 6.7 Maintenance Schedule

### 6.7.1 About the Machine

Model _____ SN _____ Manufacture date _____

Voltage_____Φ_____V Frequency _____ Hz Power _____ kW

### 6.7.2 Installation & Inspection

☐Check the installation space is enough as required.

☐Check the pipes are correctly connected.

#### Electrical installation

☐Voltage: _____ V _____ Hz

☐Fuse melting current: 1 Phase _____A 3 Phase _____A

☐Check phase sequence of power supply.

### 6.7.3 Daily Checking

☐Check machine startup function.

☐Check all the electrical wires.

### 6.7.4 Weekly Checking

☐Check loose eletrical connections.

☐Check and clean Y type filter [1].

☐Check solenoid valve.

☐Check motor overload and phase reversal alarm function.

☐Check whether pipeline joints are under looseness.

☐Check the sensitivity of EGO.

### 6.7.5 Trimonthly Checking

☐Check level switch.

☐Check the contactor [2].

☐Replace the hot kerosene with a using temperature above 160 degree [3].

### 6.7.6 Half-yearly Checking

☐Check damaged pipes.

☐Clean process heater/cooler.

☐Check indicator and buzzer.

☐Replace the hot kerosene with a using temperature above 120~160 degree [4].

### 6.7.7 Yearly Checking

☐Replace the hot kerosene with a using temperature above 120 degree [5].

### 6.7.8 3 year Checking

☐PC board renewal.
☐No fuse breaker renewal.

Note: 1. Y-type filter has the function of filling water cooling protection effect, be sure the waterway are clear to avoid cooling failure.
2. Manufacturer laboratory data for AC contactor is two million times in life. we suggest service life for one million four hundred thousand times, if work eight hours per day, recommended replacing frequency is 1.5 years, if work day and night, replacement is suggested to be done every six months.
3. Hot kerosene coke will influence the detection accuracy of internal temperature probe and the efficiency of heat elements, three months replacing frequency is suggested.
4. Hot kerosene coke will influence the detection accuracy of internal temperature probe and the efficiency of heat elements, six months replacing frequency is suggested.
5. Hot kerosene coke will influence the detection accuracy of internal temperature probe and the efficiency of heat elements, suggested replacing frequency is one year.