STM-PW Series

Hi-Temp. Water Heater

Date: Sep. 2013

Version: Ver.B (English)

SHINI

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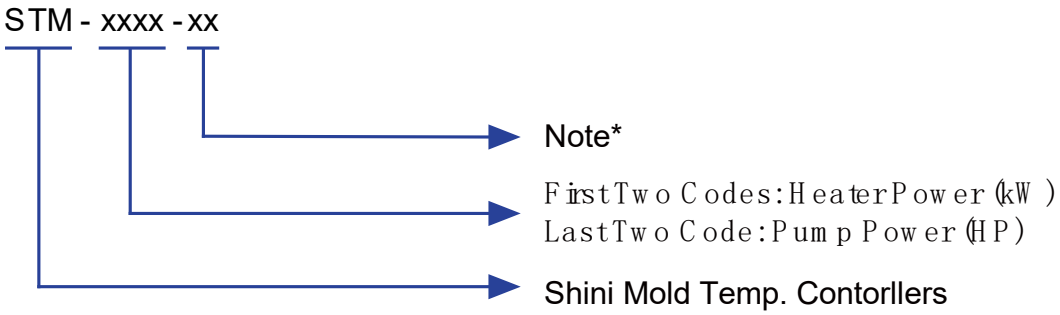
1. General Description

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



Note*:

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

HPW=Medium is Waterwith High Temp. and High Pressure　　CE=CE Conformity

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 ºF 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.

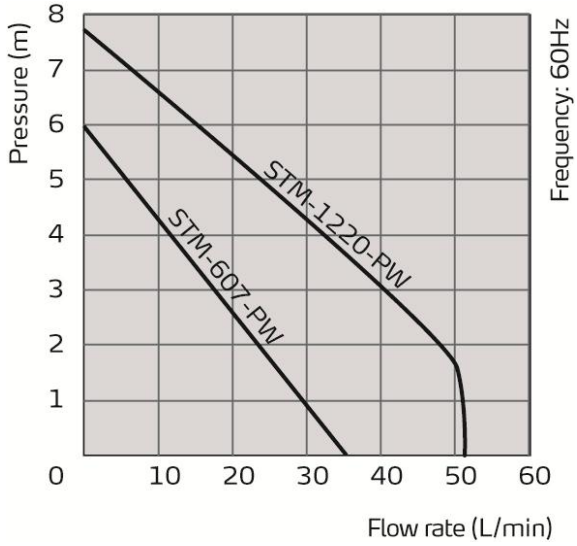
We reserve the right to change specifications without prior notice.

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.

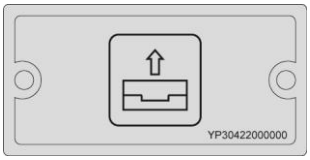
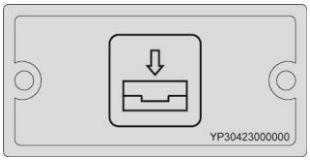
Warning!

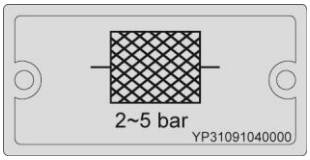
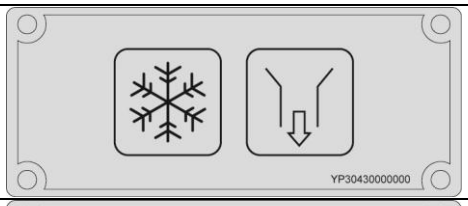
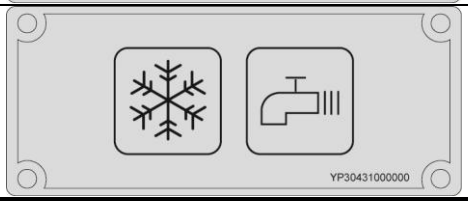
Do not touch the switch with wet object or hands.
Do not use the machine before fully aware of its performance.
Be careful not to touch or hit the switch or sensor.
Please keep enough operation space, and keep away obstacles.
To avoid producing statics, clean the floor from oil or water to keep a dry 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.
 (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. 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! 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. 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

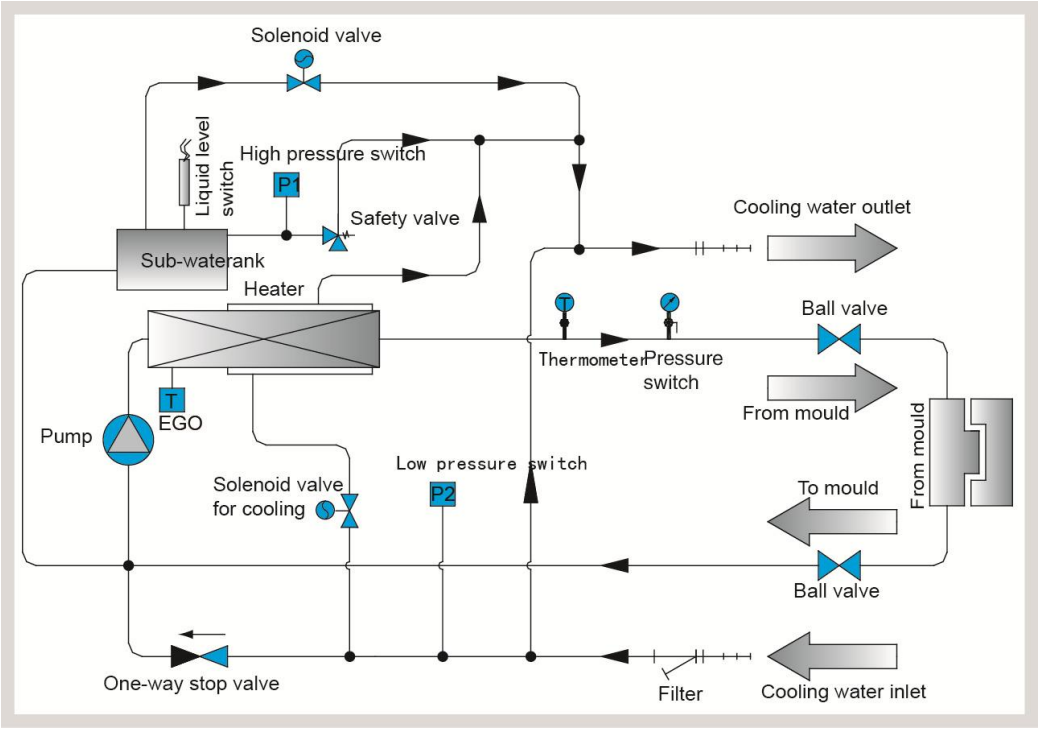
The following statements clarify the responsibilities and regulations born by any buyer or user who purchases products and accessories from Shini (including employees and agents).

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



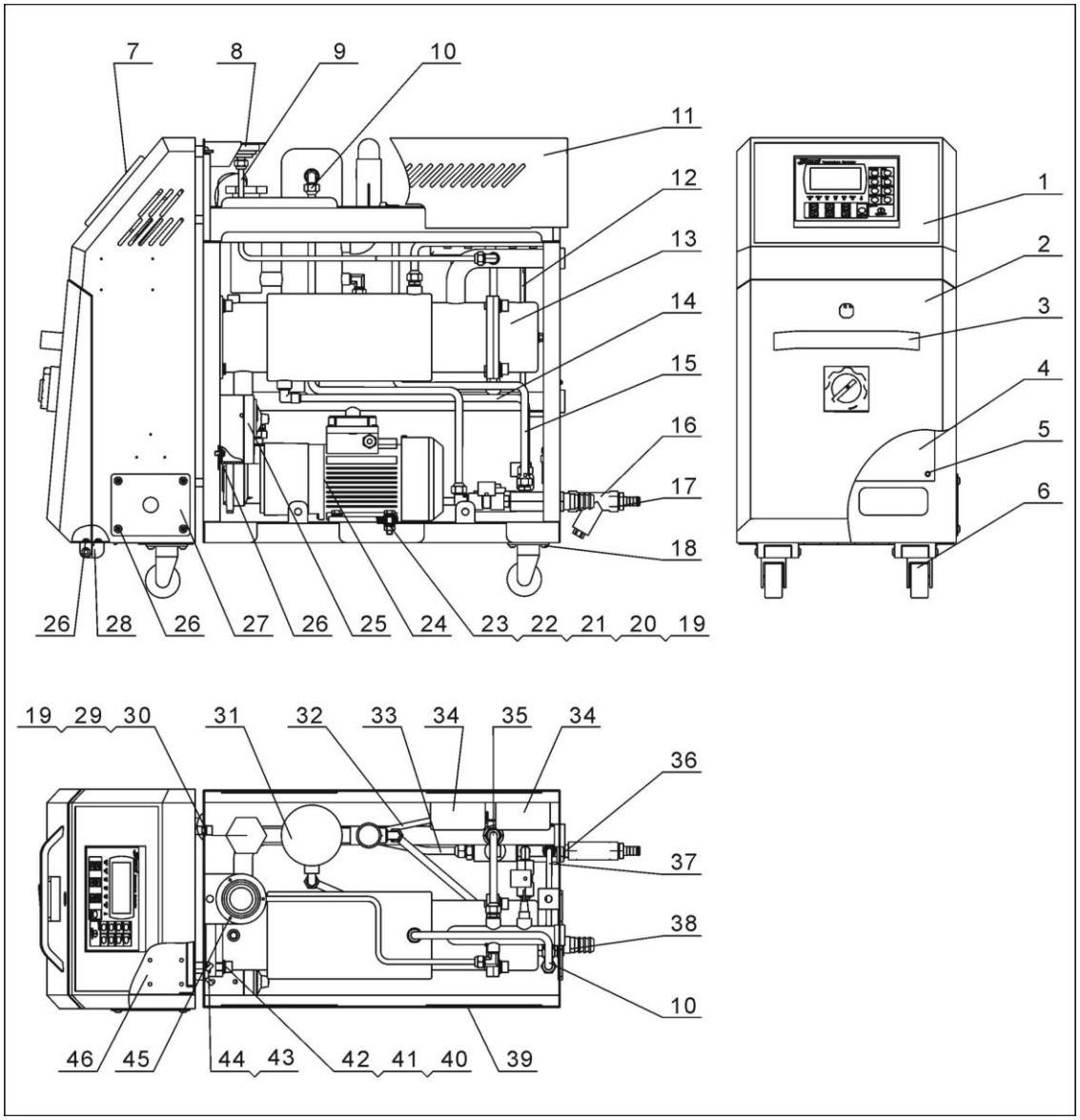
Picture 2-1： STM-PW Working Principle

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)

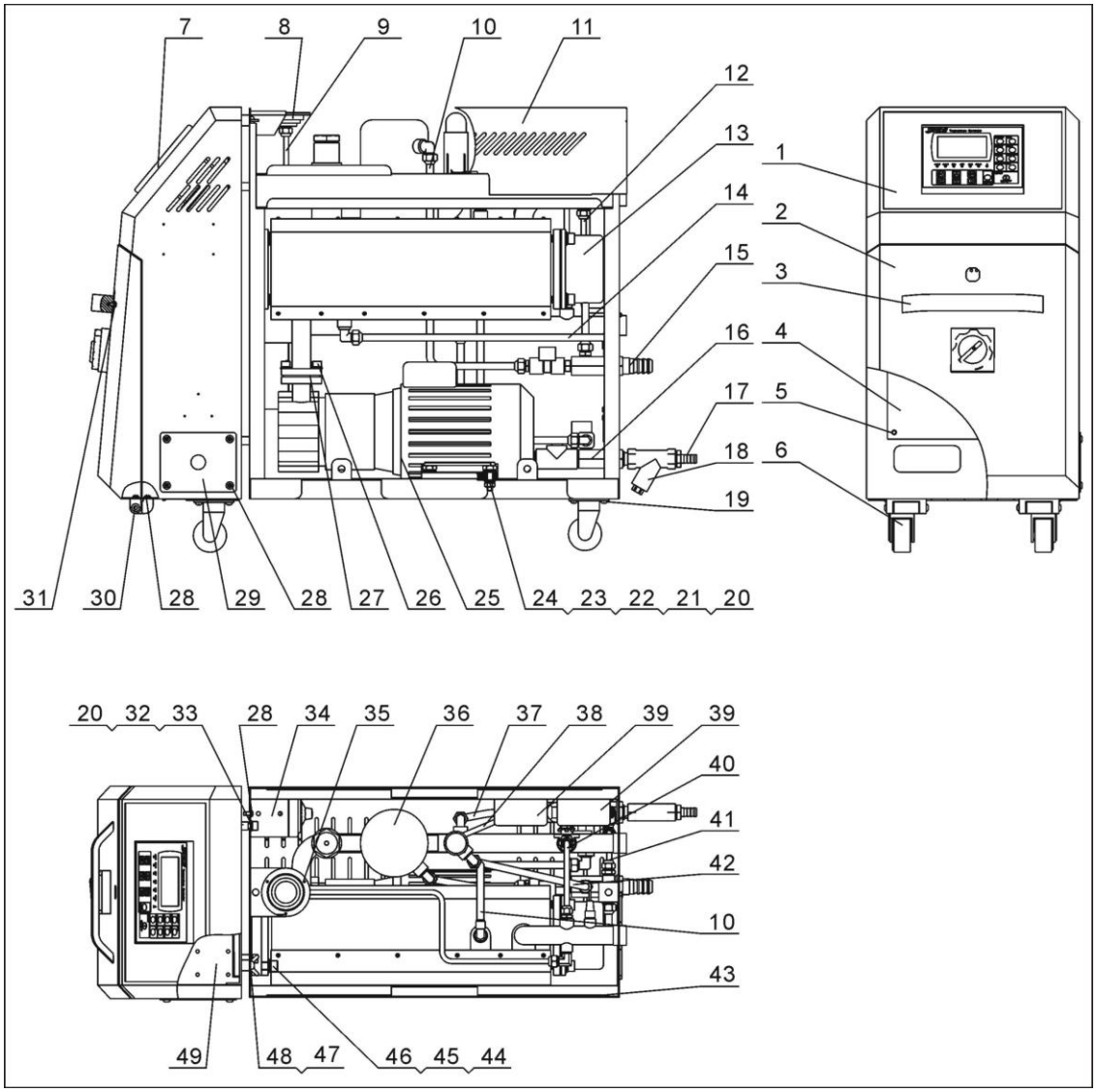
2.2.2 Parts List (STM-607-PW)

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)

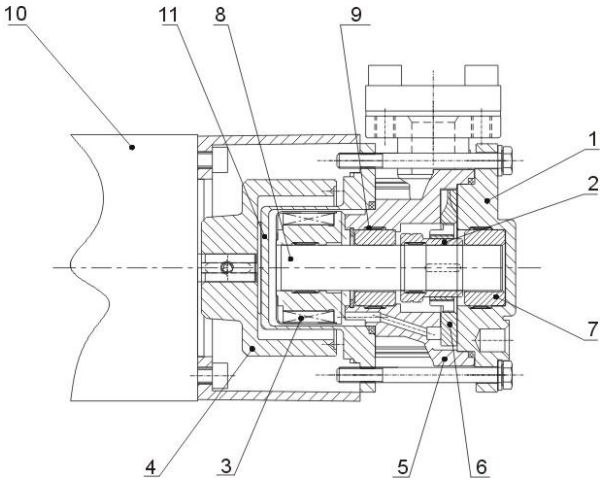
2.2.4 Parts List (STM-1220-PW)

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



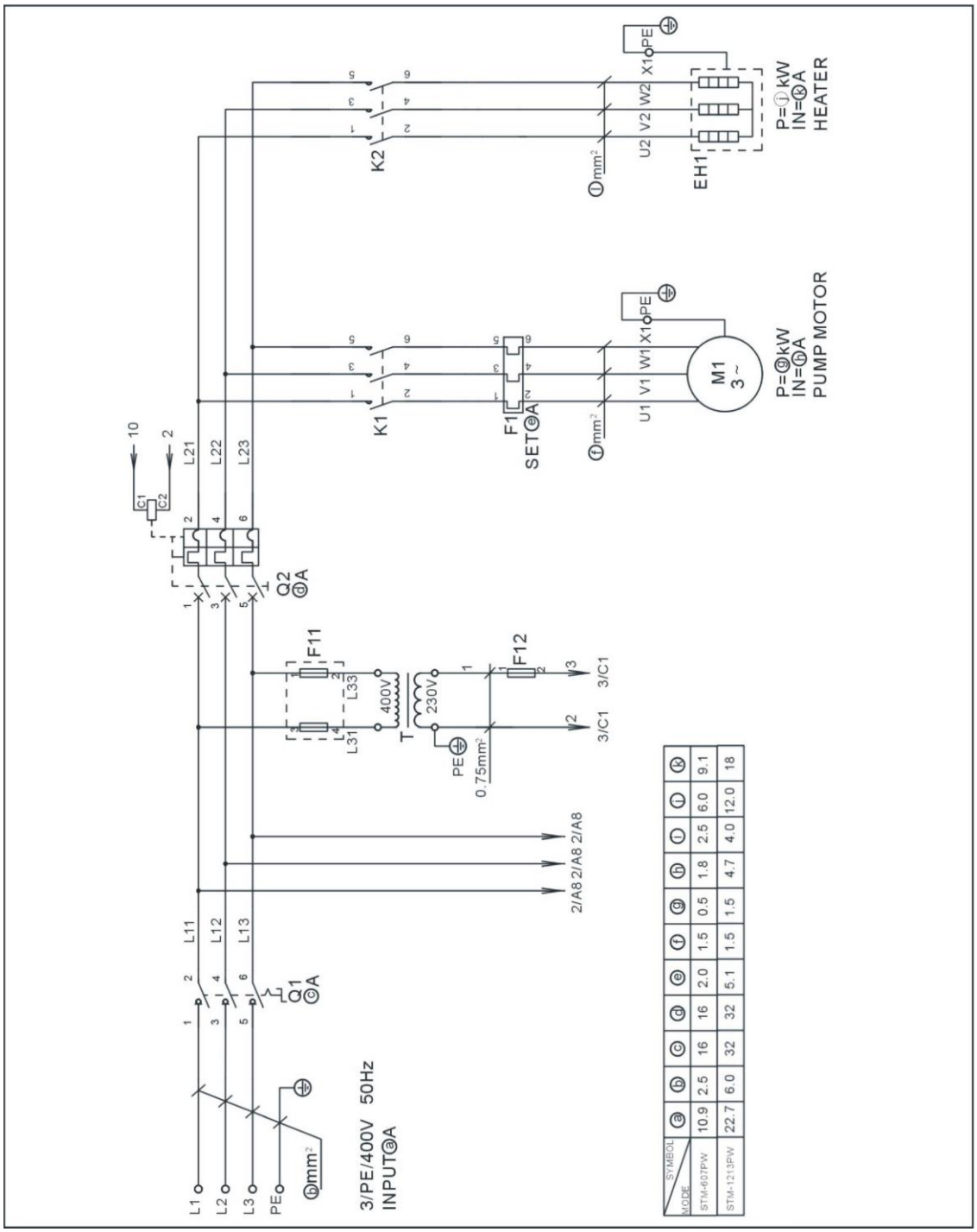
Names of Parts:

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

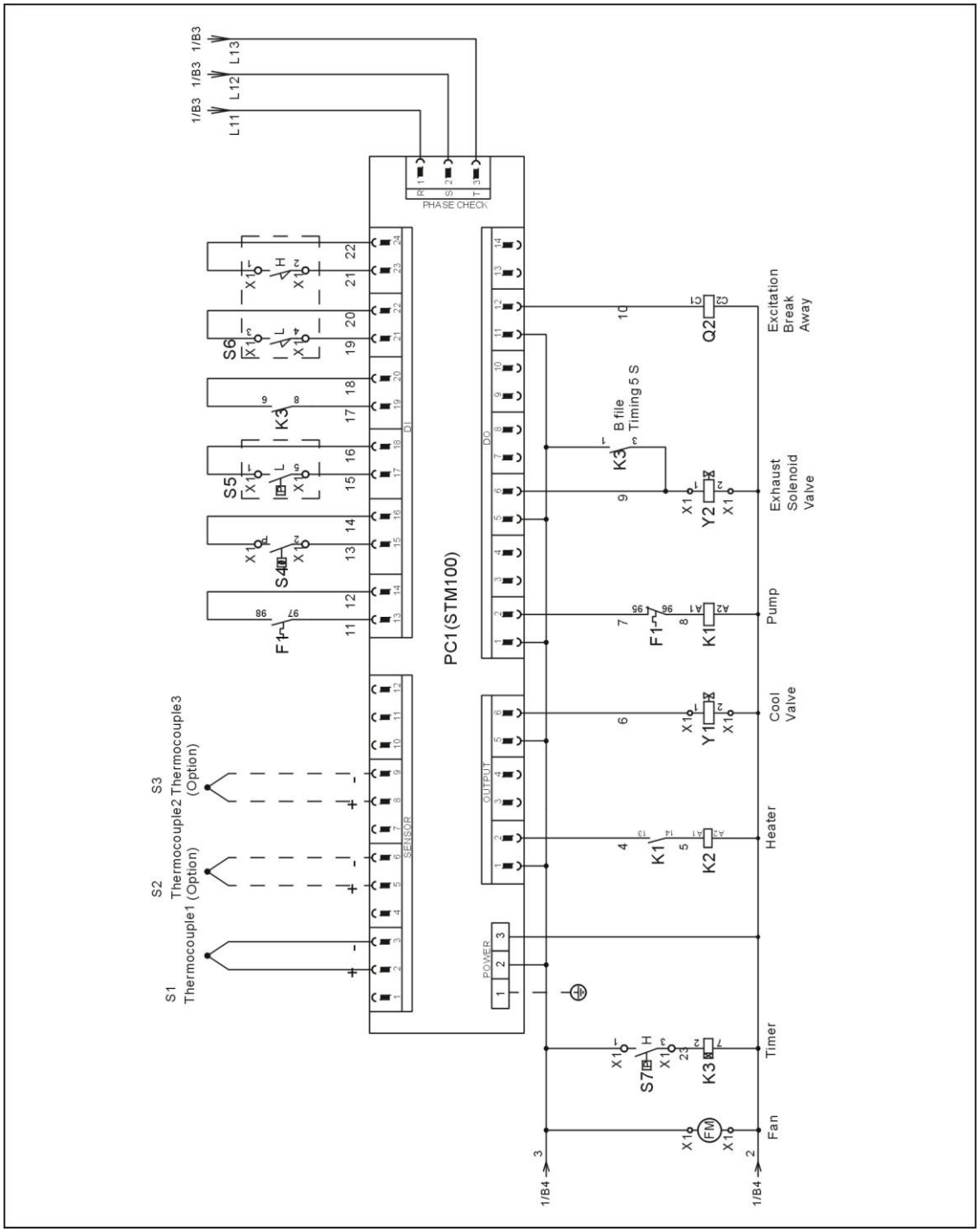
2.3 Electrical Diagram

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



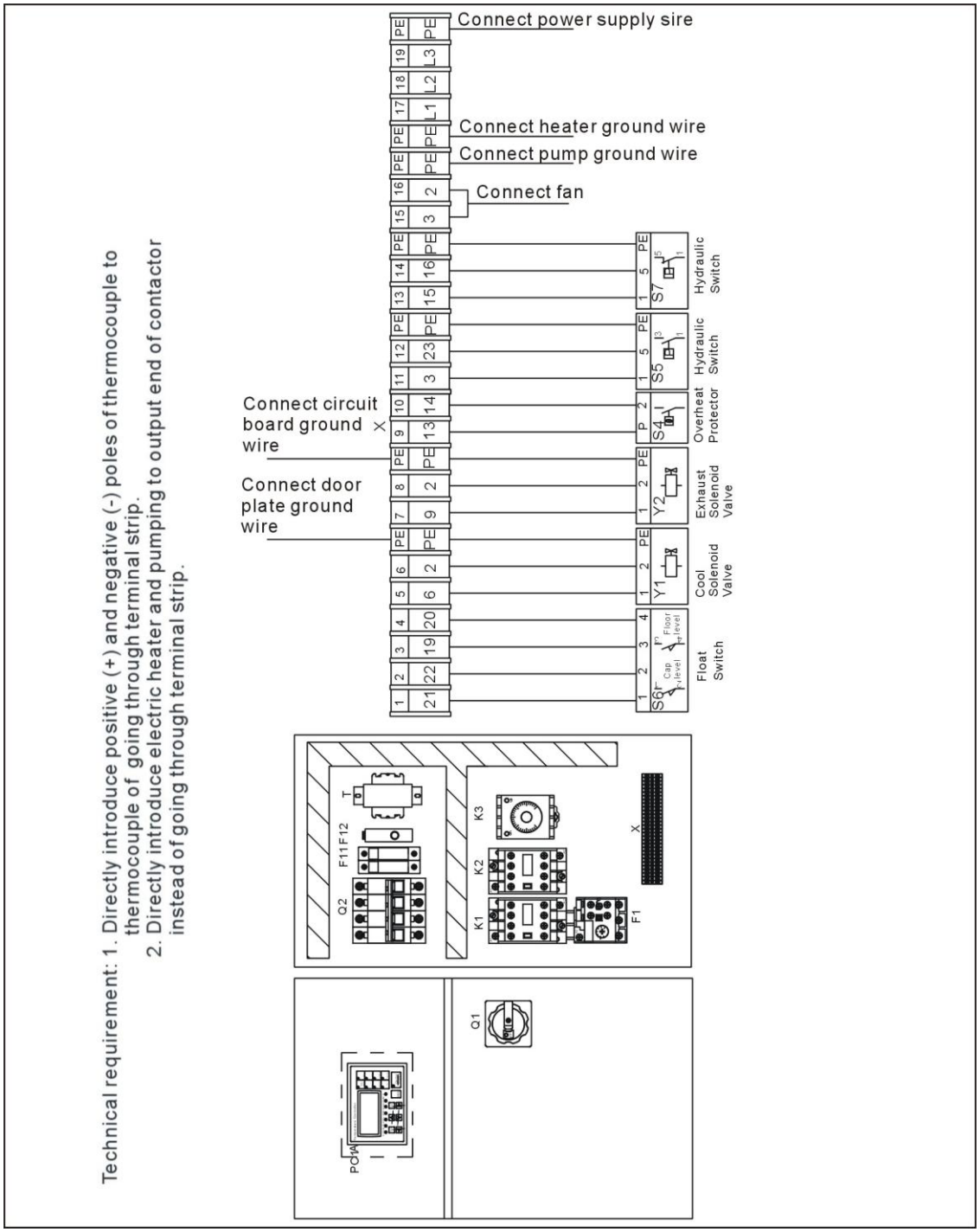
Picture 2-5：Main Circuit (STM-PW) (400V)

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	-

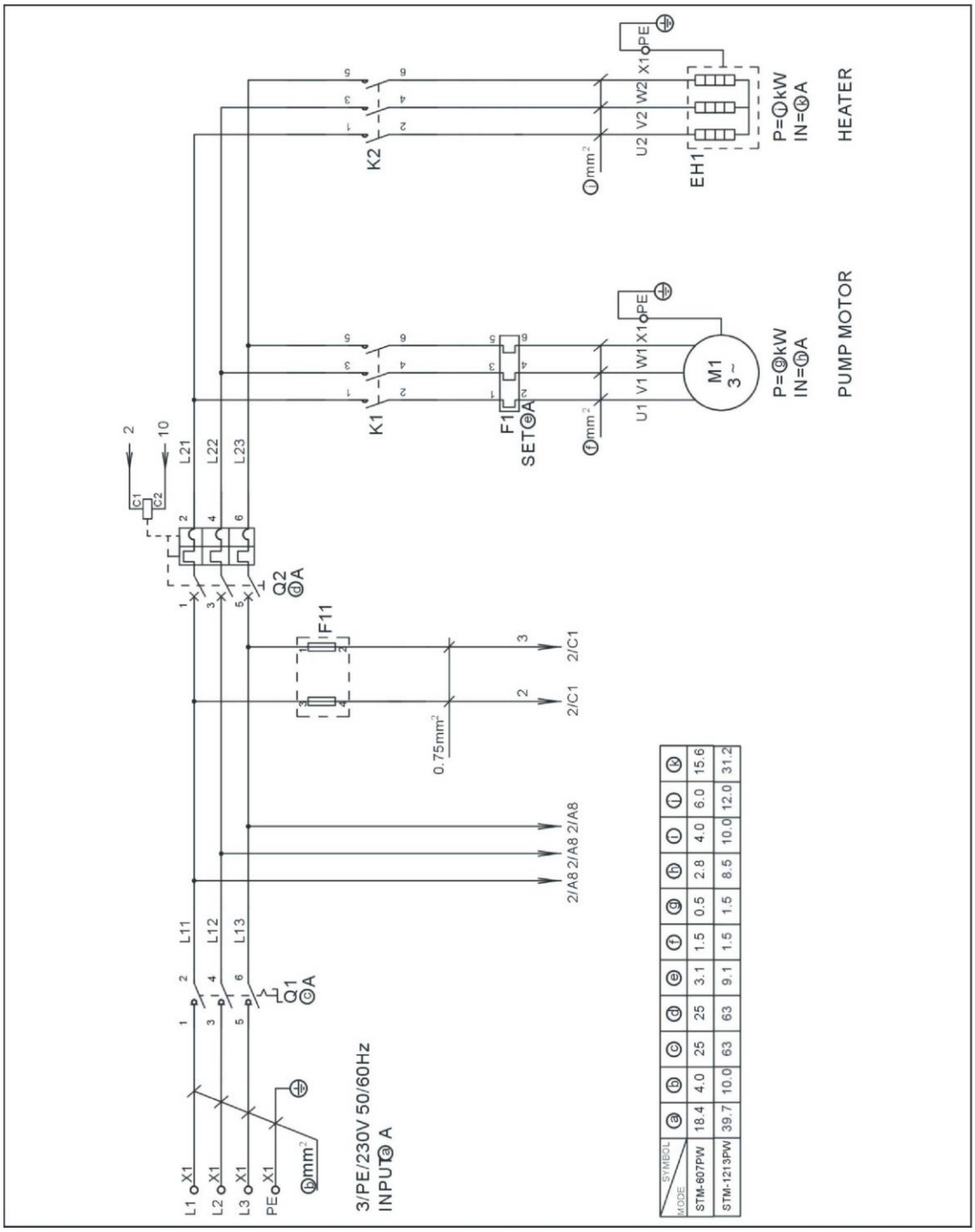
* means possible broken parts.
** means easy broken part. and spare backup is suggested.
Please confirm the version of manual before placing the purchase order to guarantee that the item number of the spare part is in accordance with the real object.

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	-

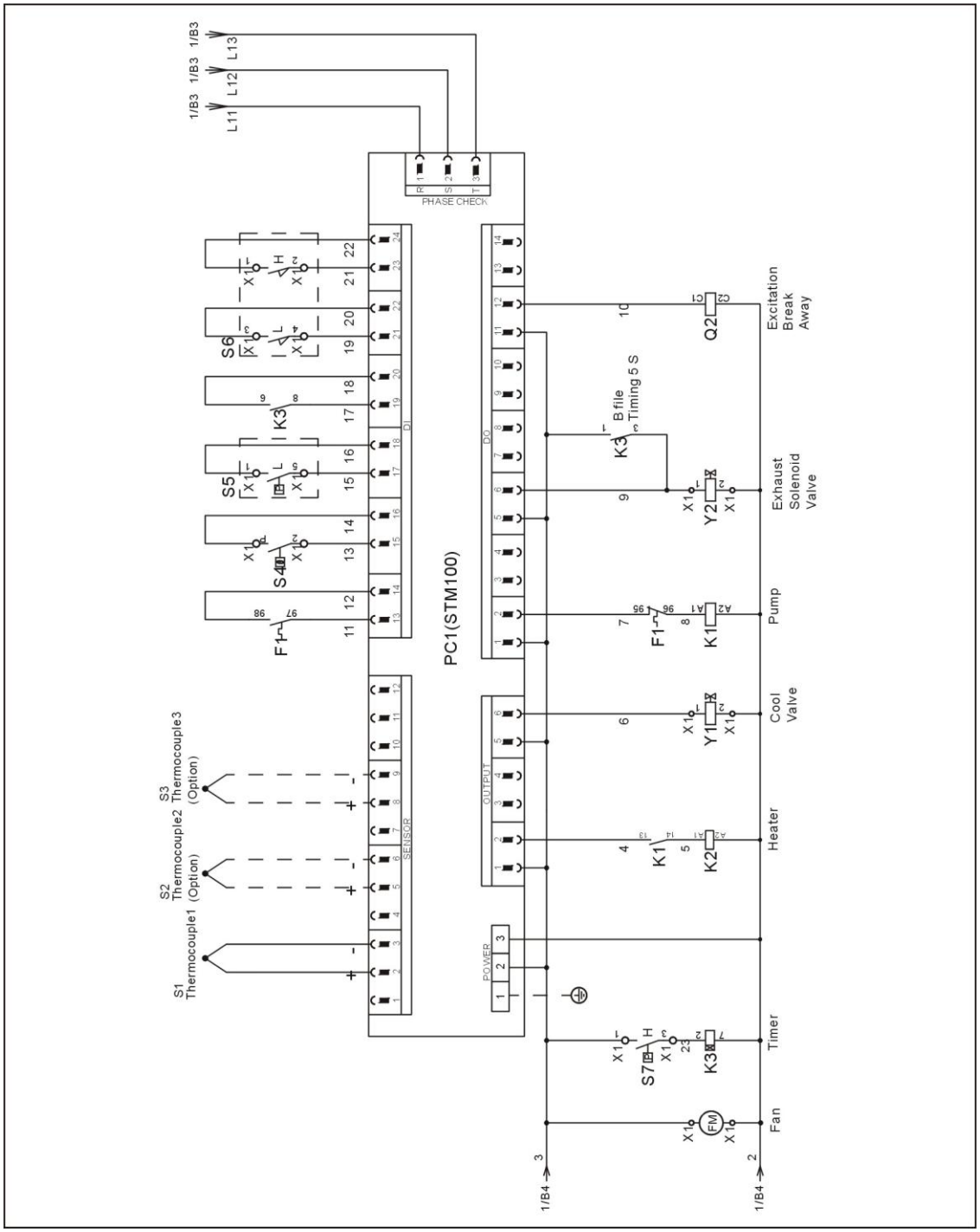
* means possible broken parts. ** means easy broken part. and spare backup is suggested. Please confirm the version of manual before placing the purchase order to guarantee that the item number of the spare part is in accordance with the real object.

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



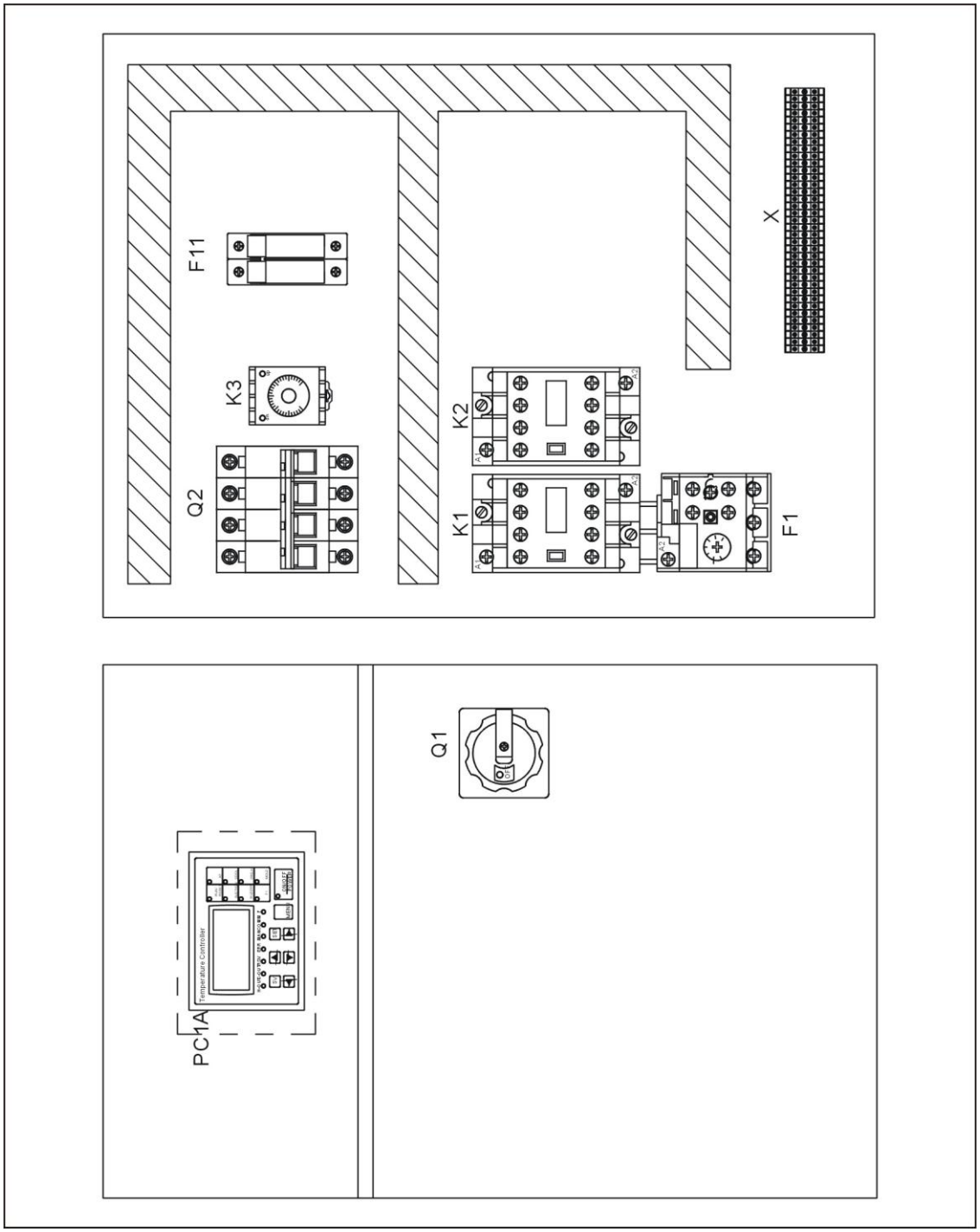
Picture 2-8: Main Circuit (STM-PW) (230V)

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



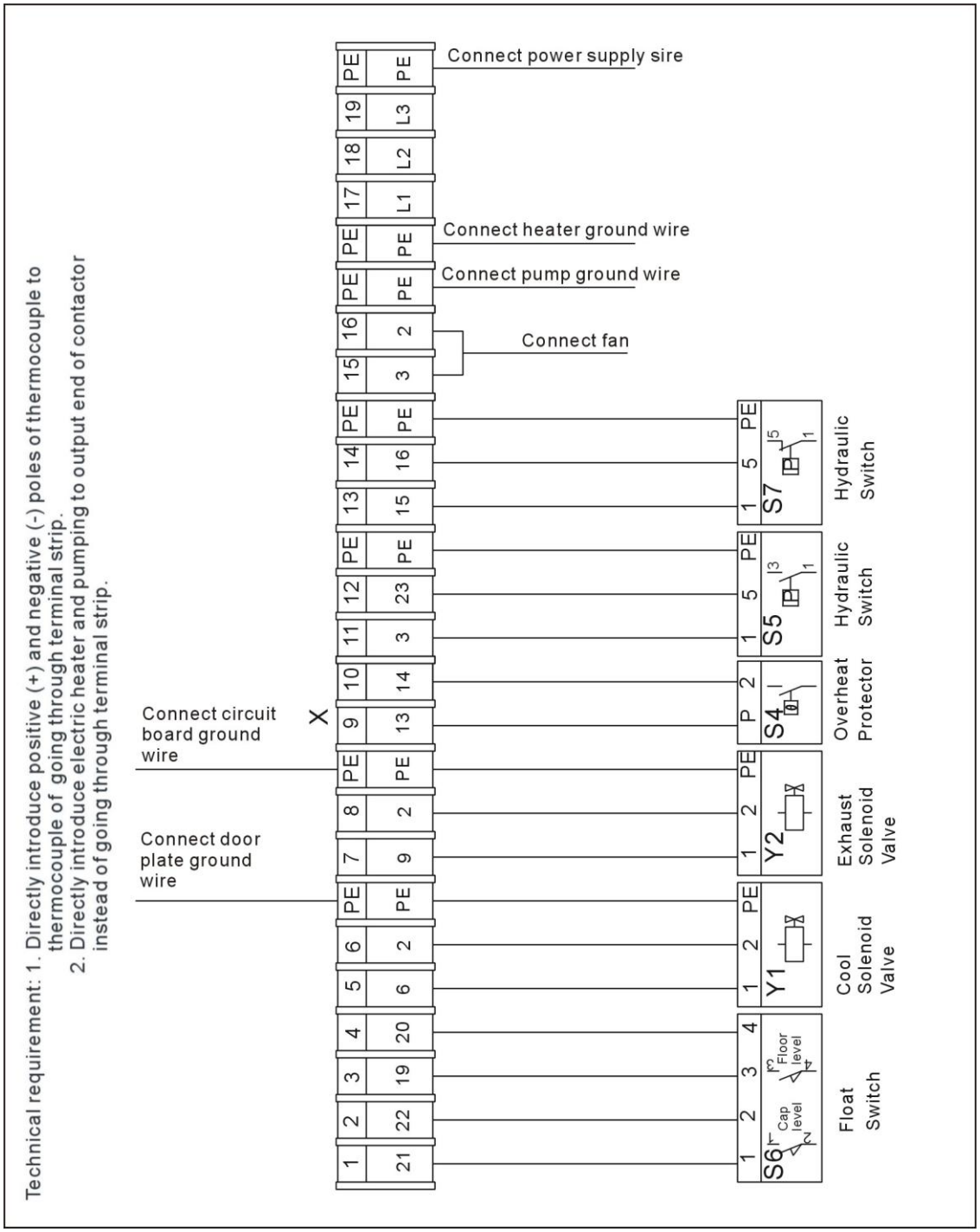
Picture 2-9: Control Circuit (STM-PW) (230V)

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)

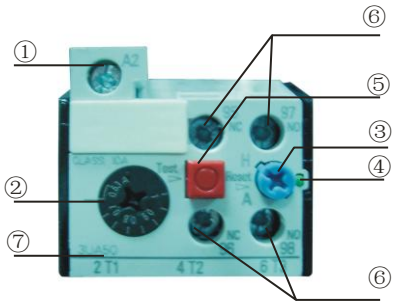
NO.	Symbol	Name	Specification	Part NO.
1	Q1	Main switch	63A	YE10636300000
2	Q2	Circuit breakers*	63A	YE40606000000
3	-	Excitation break away	-	YE40023560000
4	K1	Contactors*	220V 50/60Hz	YE00601621000
5	K2	Contactors*	220V 50/60Hz	YE00503500000
6	K3	Timer	220V 50/60Hz	YE86300600000
7	F1	Overload relays*	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).

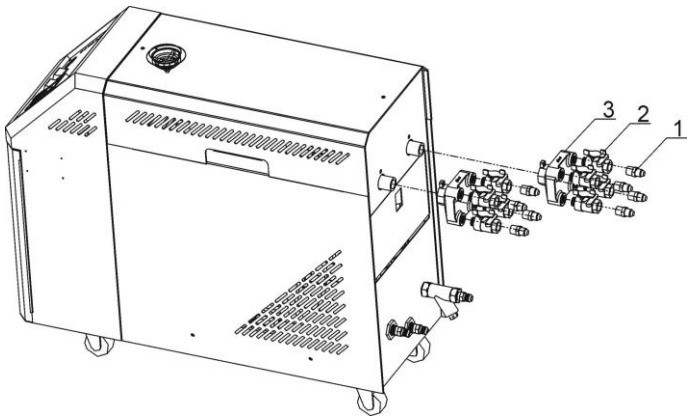


Picture 2-12：Overload Relay

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)

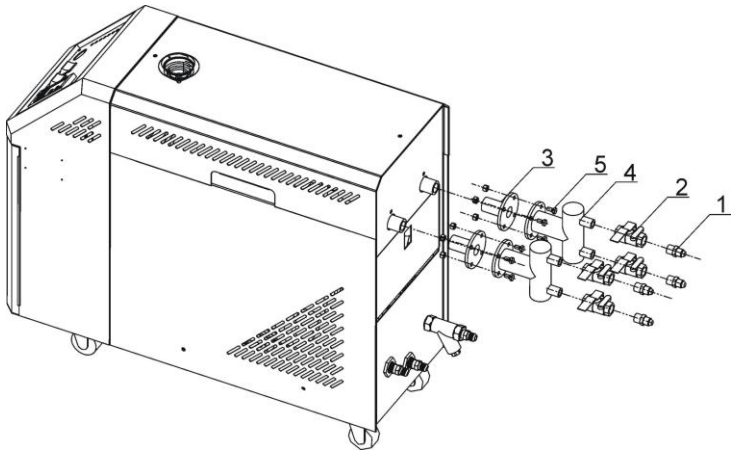


1) Install copper joint to the level valve.
2) Install level valve with copper joint to the dewaxing water manifold.
3) Install water manifold to the machine.
4) Install Teflon to copper joint.

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.

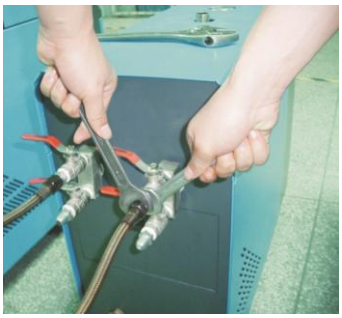
Do not sit on the machine.

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.



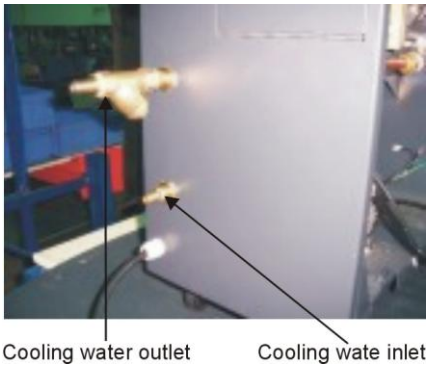
Picture 3-2：Mould and Water Couplings 1

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. Auto-tuning cannot work

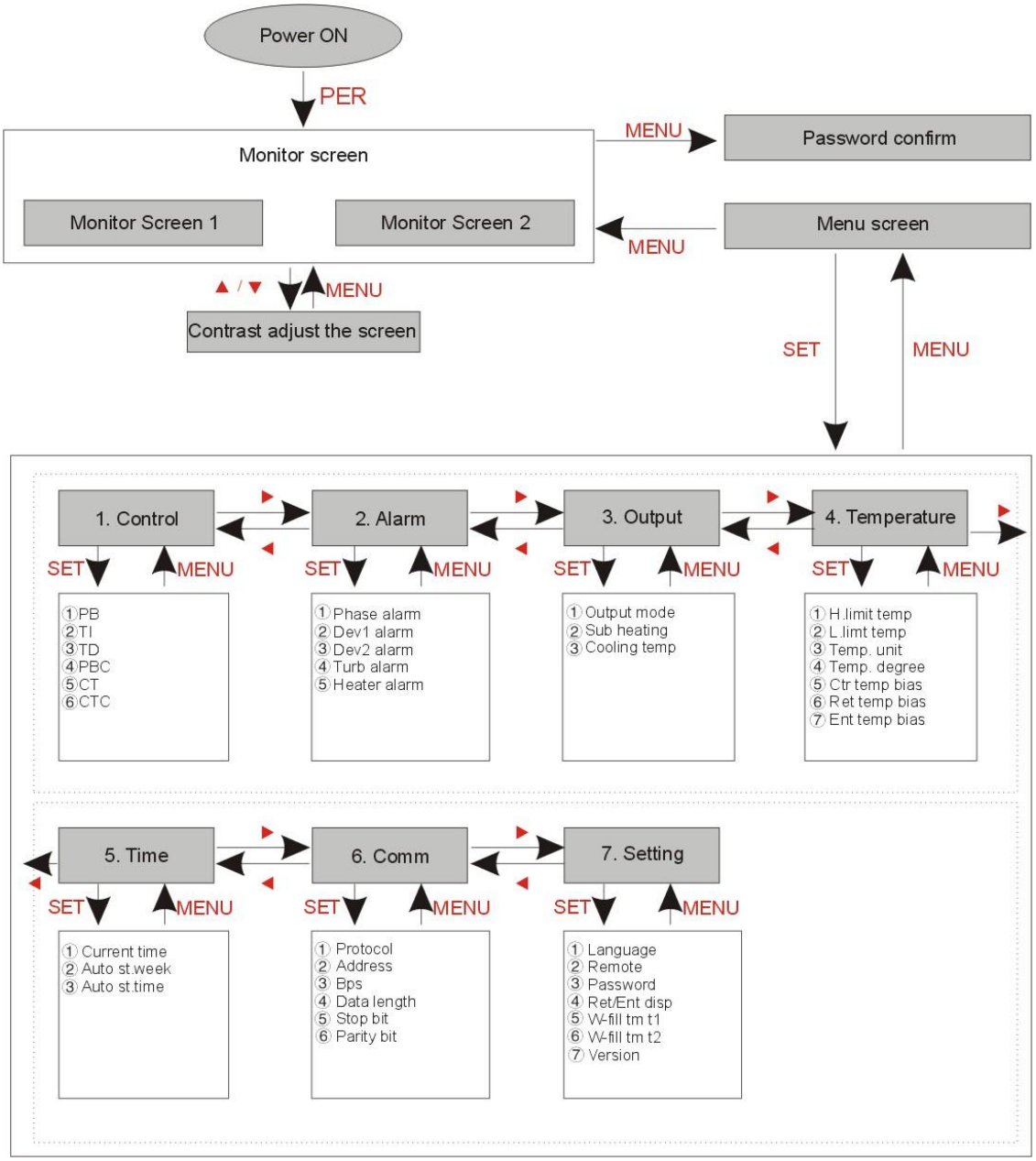
			under SUCTION and COOL operation.
No.	**Name**	**Functions**	**Remarks**
10	SUCTION	SUCTION switch start and stop	SUCTION is to remove medium (watre/oil) from molds. Can not start during operation or cooling. After SUCTION turns on, “SUCTION relay” and “pump inverse run relay” will turn on.
11	COOL	Forced 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

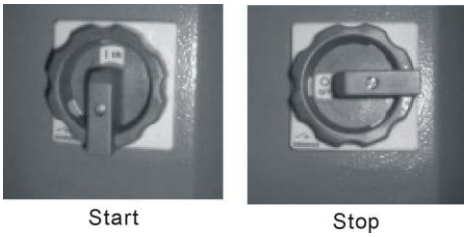
4.3 Machine Startup

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)

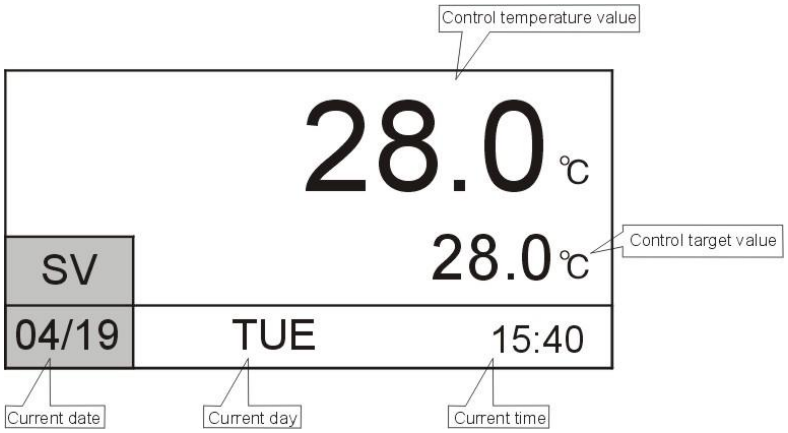
3) Open all the globa valves.

4) Switch on main power.



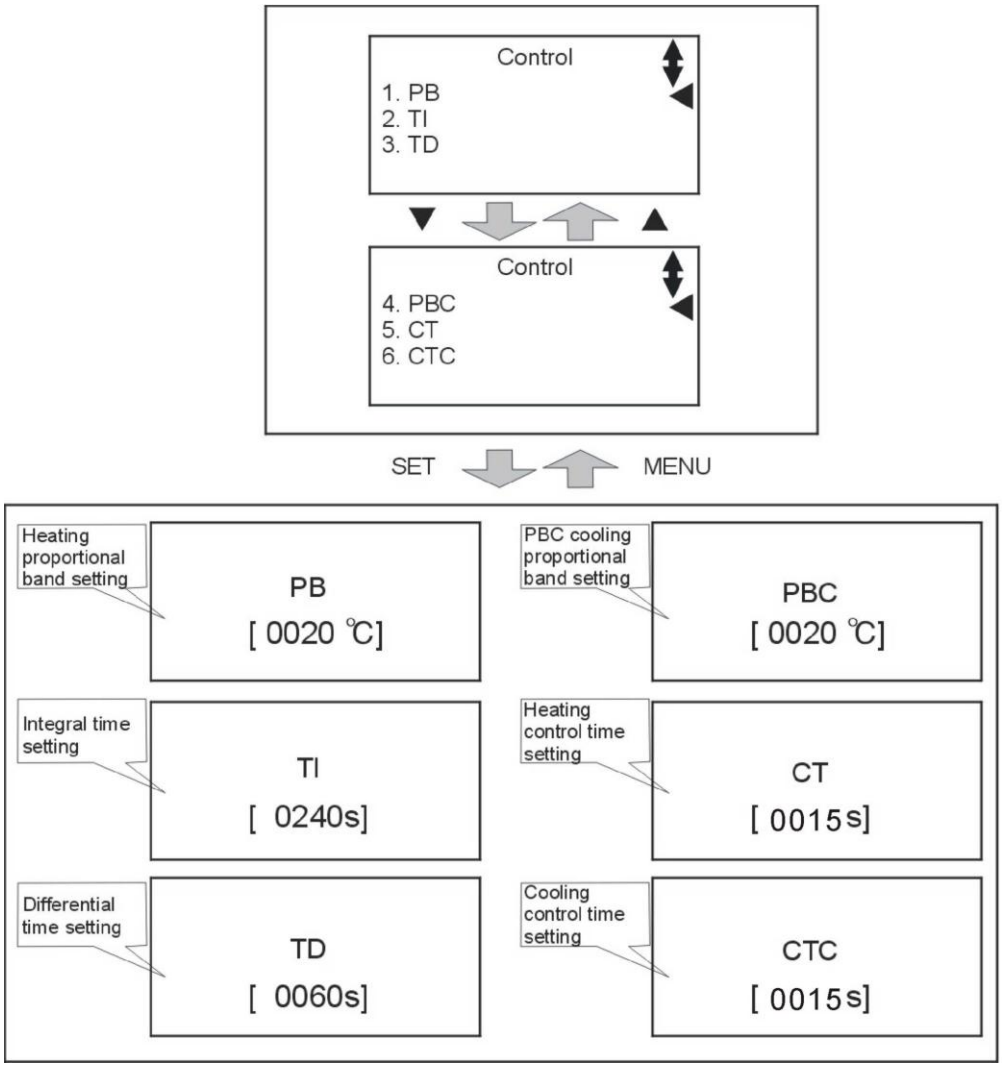
Picture 4-3: Main Power Switch

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)

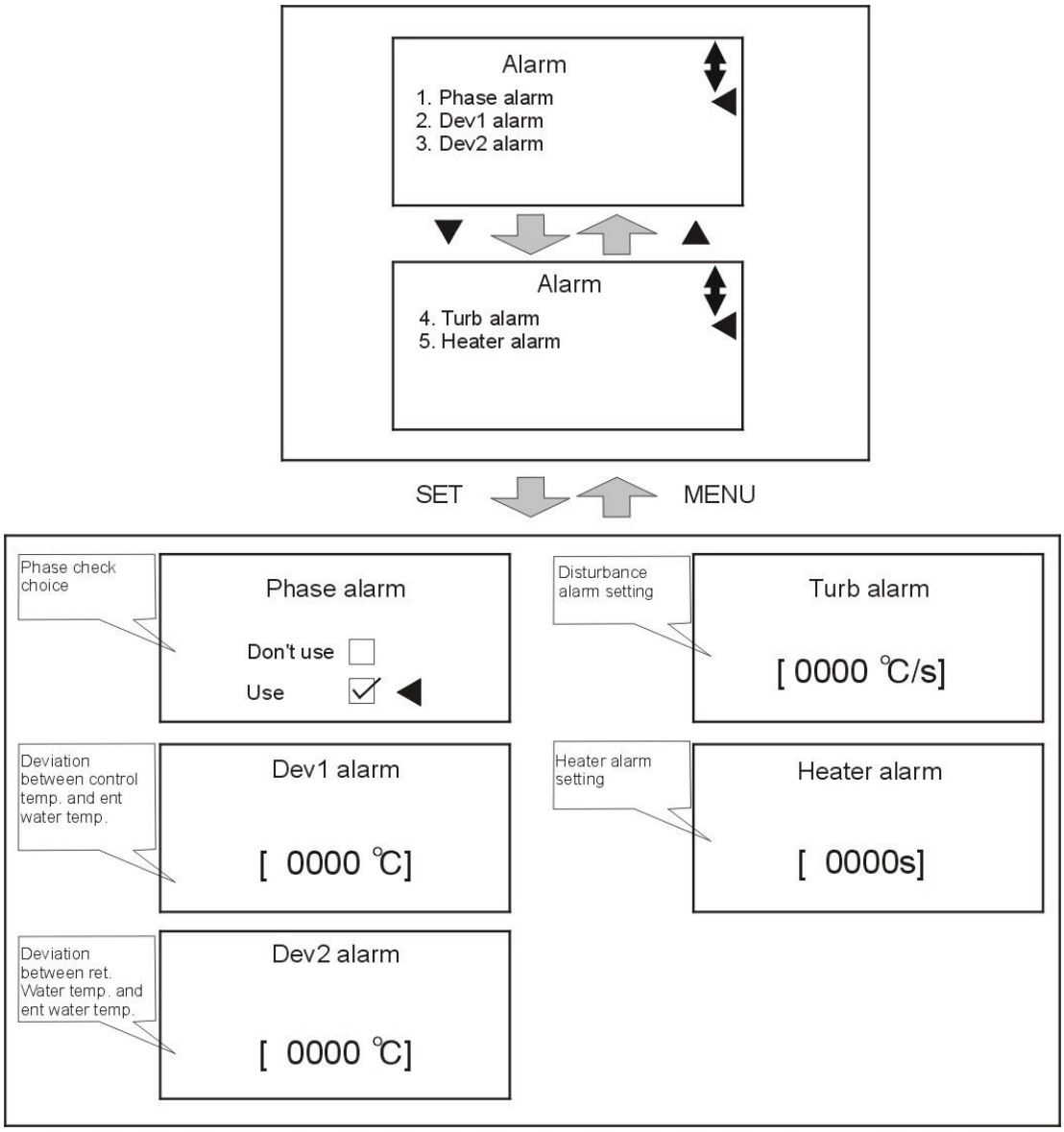
5 (opt for temp. sensor, increase it suitably if frequent alarms)

- 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.

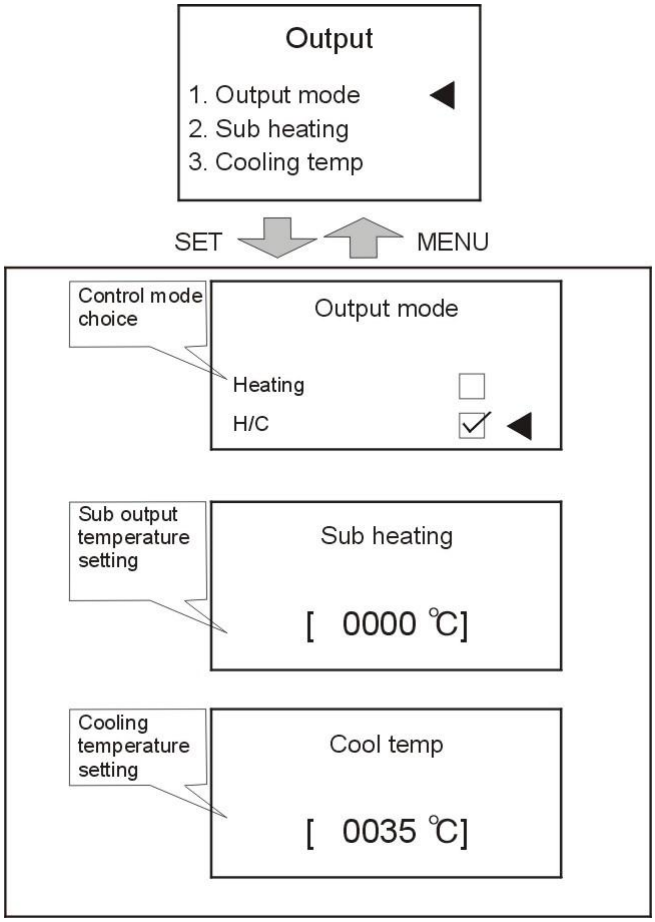


Picture 4-6: Alarm Setting

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

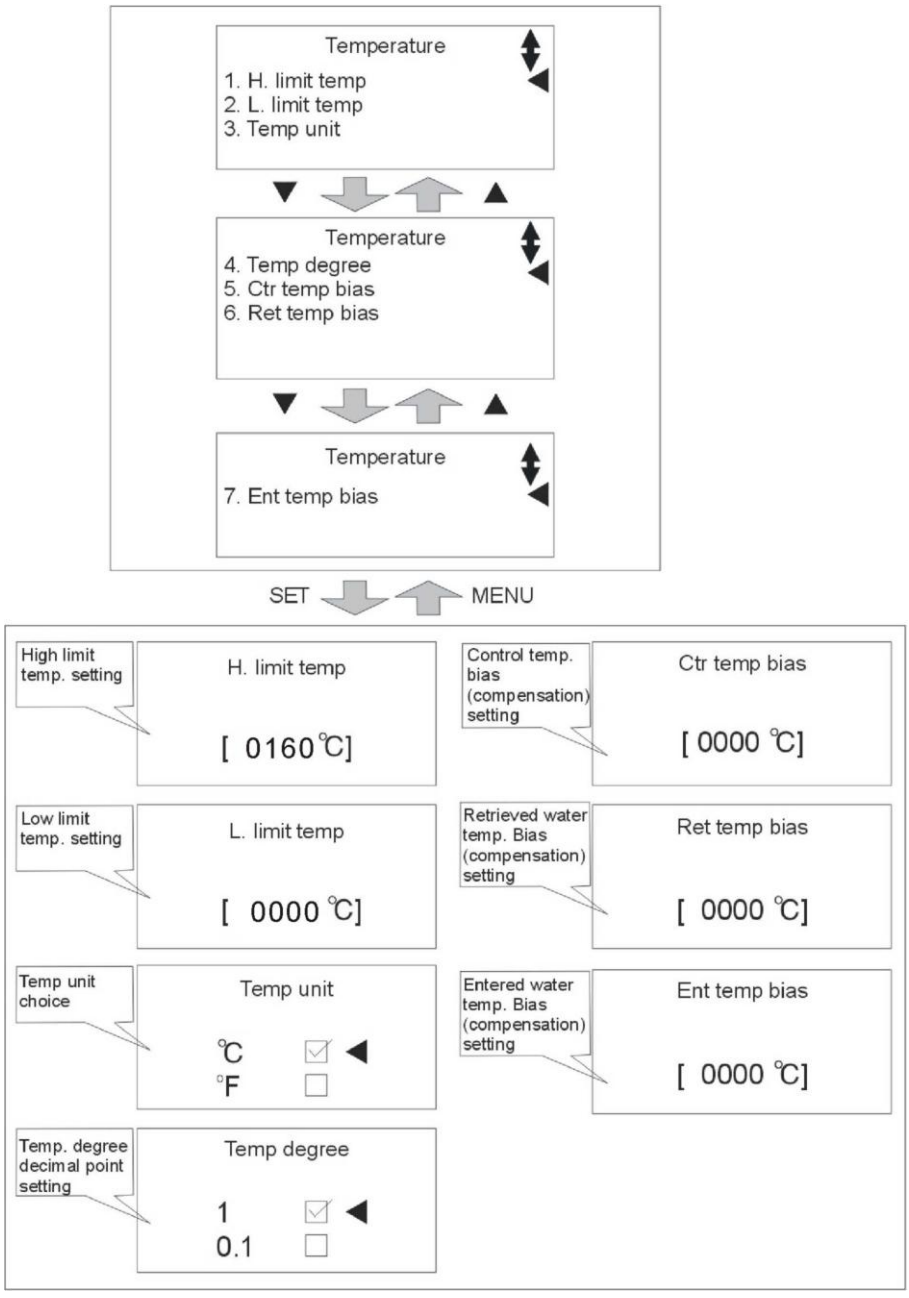


Picture 4-7: Output Setting

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.

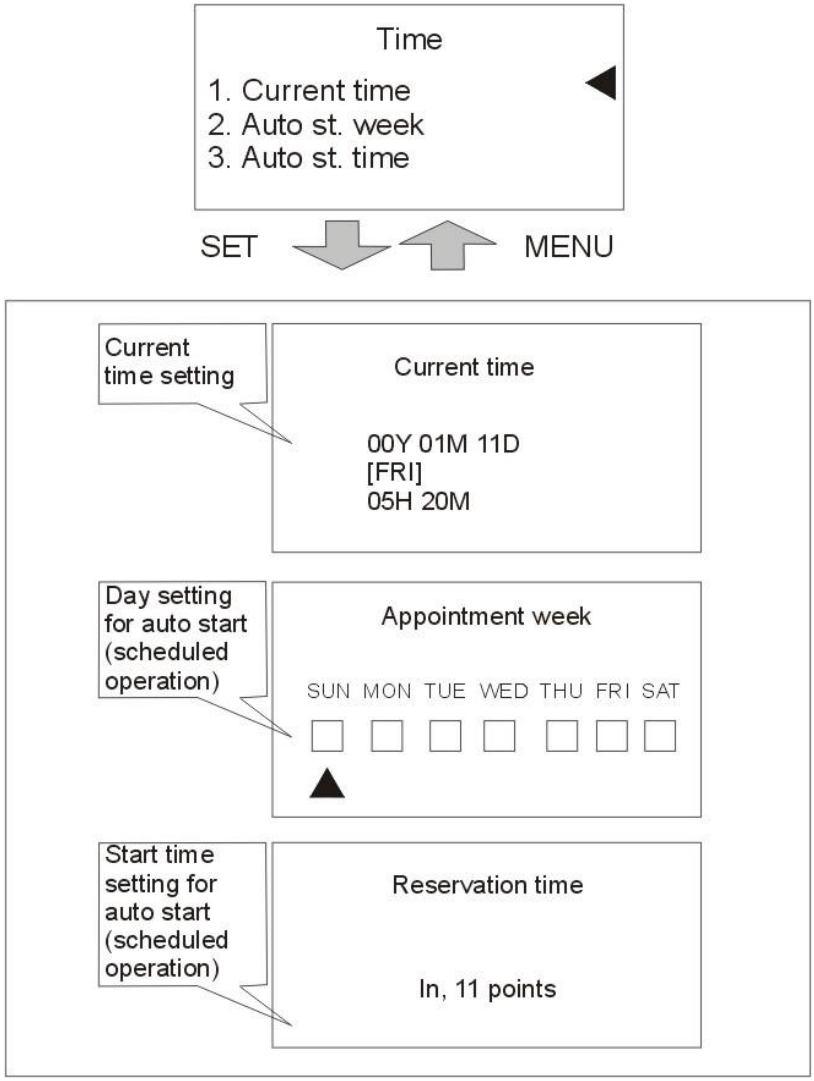
- H. LIMIT TEMP.——based on actual operation.
- L. LIMIT TEMP.——based on actual operation.
- TEMP. UNIT——℃ (Celsius and Fahrenheit)
- TEMP. DEGREE——0.1

- CTR TEMP BIAS——based on actual operation.
- RET TEMP BIAS——based on actual operation
- ENT TEMP BIAS——based on actual operation



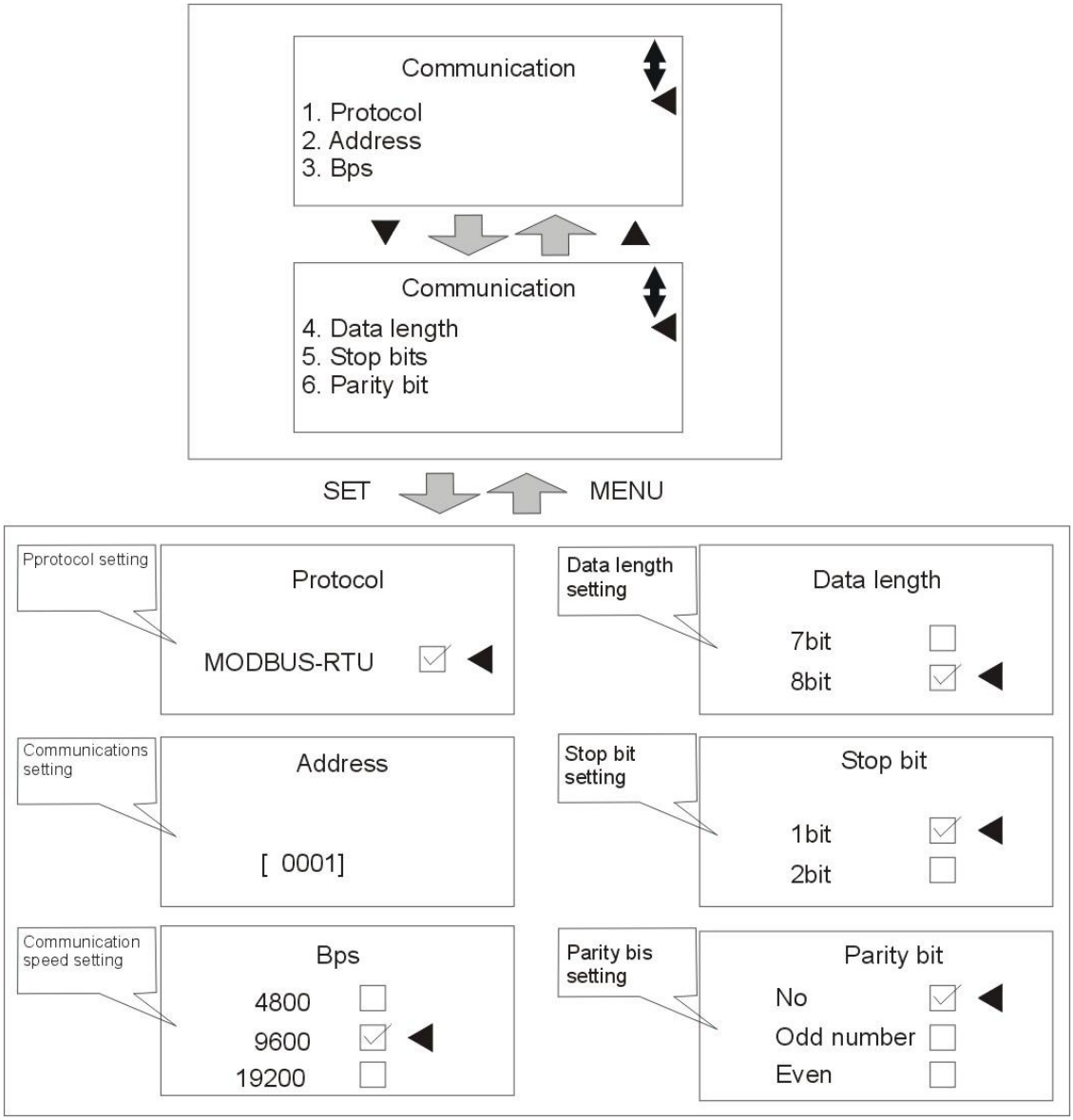
Picture 4-8: Temperature Setting

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.



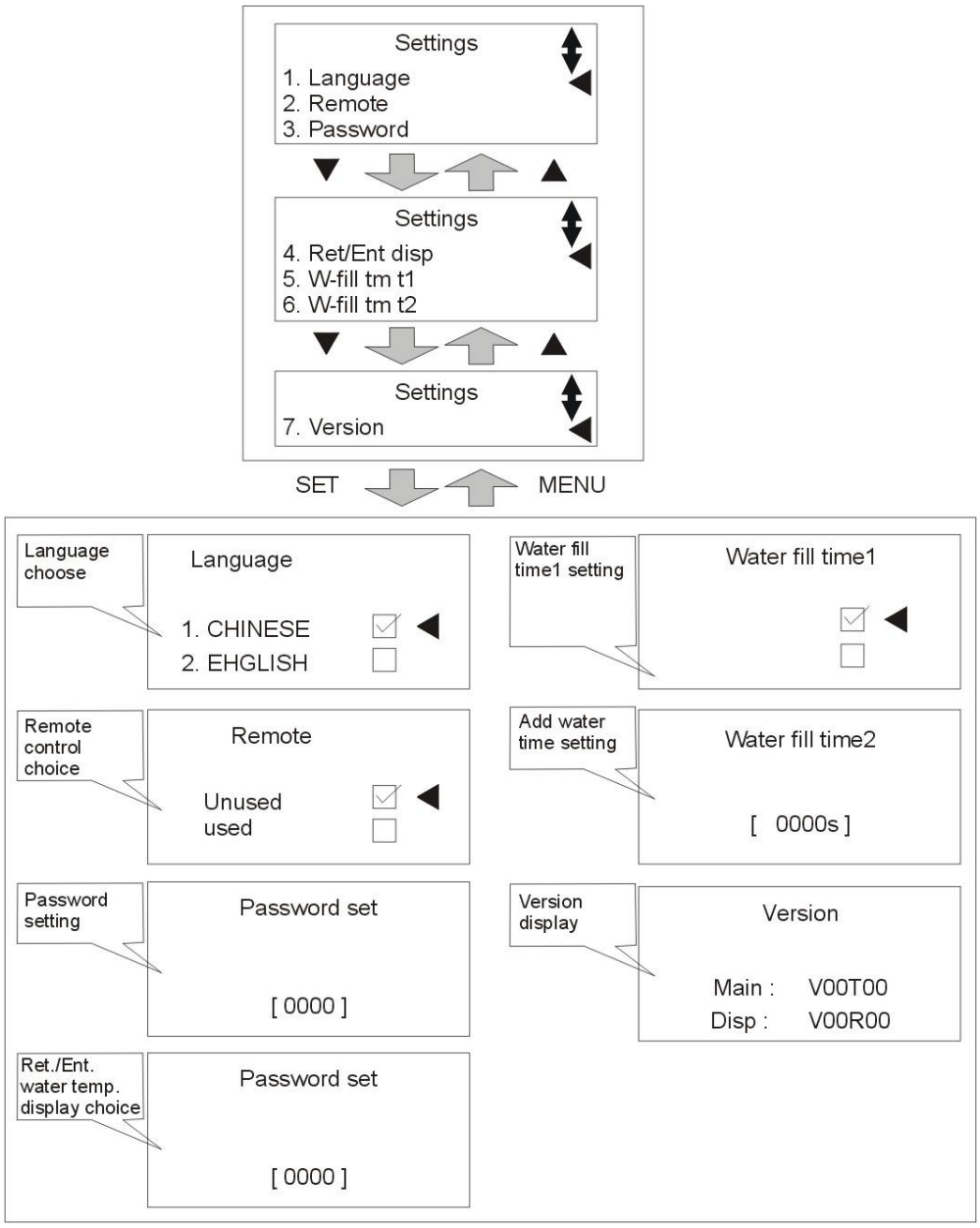
Picture 4-9: Time Setting

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

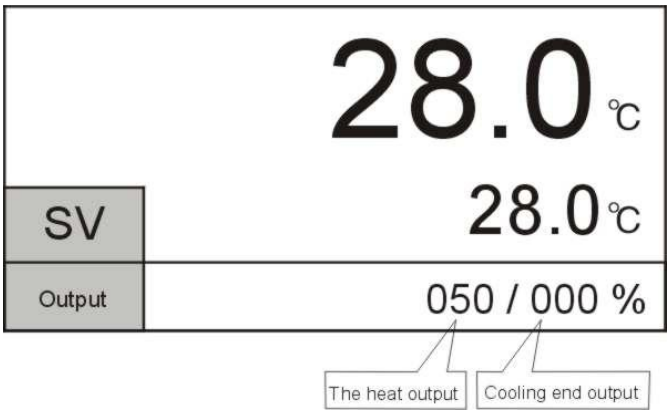
12) Press MENU key to return to menu screen, press ◄/► key to select device setting, press SET key to enter setting screen, see picture below. Before delivery, parameters have been set and customers can modify them based on actual needs.



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 Heating/cooling	Heating/cooling
Sub heating	Set “off temperature” in sub heating output	0~550℃ (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 ℃/ ºF	℃/ ºF	℃
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!

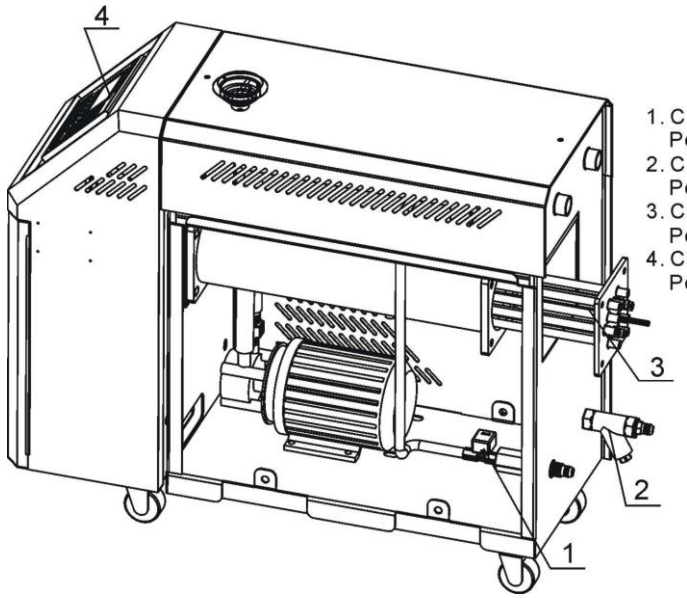
In order to prolong machine lifespan, please do as above steps to turn on and off the machine.

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. Main switch broken. Power supply wires problems. Control circuit fuse melt. Transformer broken.	Connect through power supply. Replace main switch. Check electrical wires. Fix the fuse. Replace the transformer.
Phase alarm.	Power supply low voltage. Phase shortage. Phase reversal. PCB problems.	Check power supply. Check power supply. Exchange two of the wires of power supply. Replace the PCB.
Pump overload.	Abnormal fluctuations of power supply. Pump blocked. Pump motor problems. Overload relay (F1) setting value error.	Check power supply. Check the pump. Check pump motor. 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. Reset overload relay: Wait for one minute, then press the blue button to reset.
EGO overheat.	EGO temperature setting mistakes. EGO poor temperature detecting. Heater contactor K1 and K2 problems.	Correctly set EGO temperature. (EGO temperature setting value= temperature setting value+10℃) Replace EGO. 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. Electrical circuit problems.	Check or replace the PCB. Check electrical circuit.
Differences between setting temperature and actual temperature is too big.	Too short time after machine startup. Temperature parameter setting error. Cooling water valve problems.	Wait for a while. Check temperature parameters. Please refer to the standard manual of setting parameters. Replace solenoid valve.
Temperature can't rise up.	Heater contactor problems. Heater problems. Thermocouple problems. PCB output point problems.	Replace the contactor. Replace pipe heater. Replace thermocouple. Check and repair PCB.

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

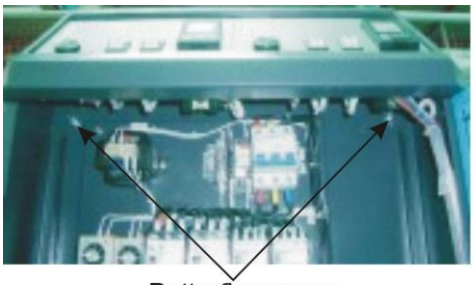
1) Open the top covers of the unit. (Refer to the pictures below)

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

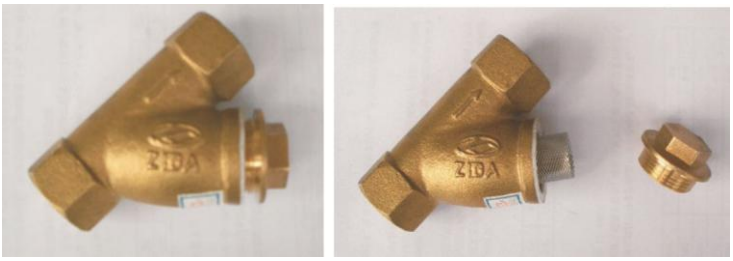
3) Open the cover of control box. Screw off two butterfly screws to unlock the cover. (Refer to the pictures below)



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

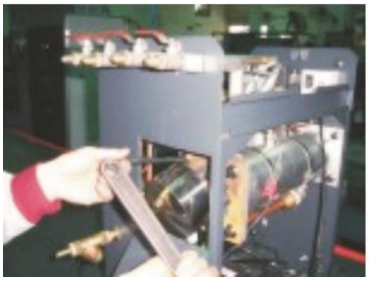
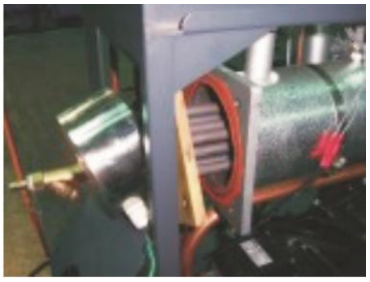
1) Open machine rear cover door. (Refer to pictures below)

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

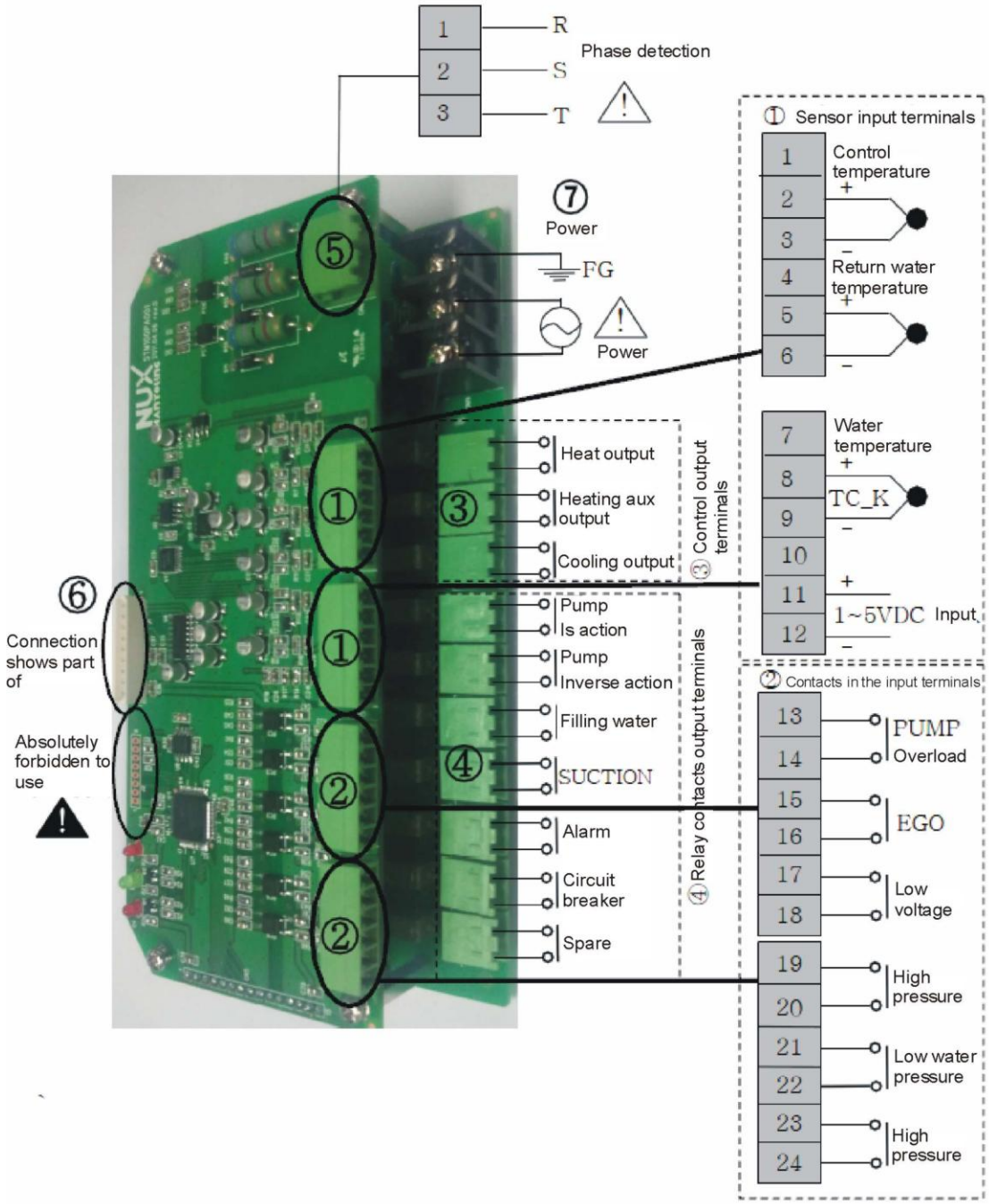
⑥ DISPLAY CN (connect terminal for dispaly)

Connect stub cable with STM100.

⑦ POWER TERMINAL (power supply terminal)

1 : FG terminal

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



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

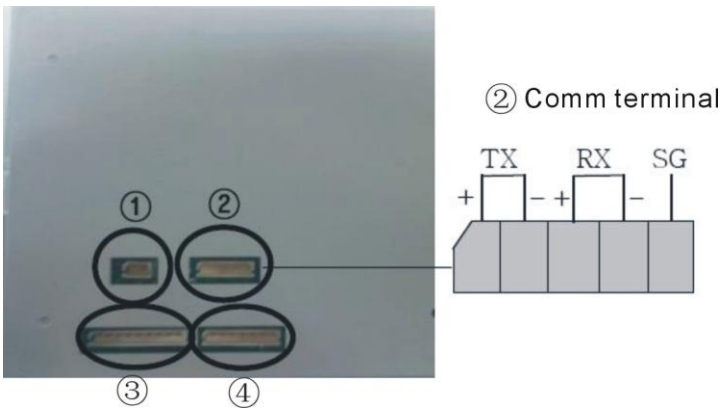
5：Earth terminal

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.