STM-PW Series

High Temp. Water Heater

Date: Apr. 2013

Version: Ver.B (English)

SHINI

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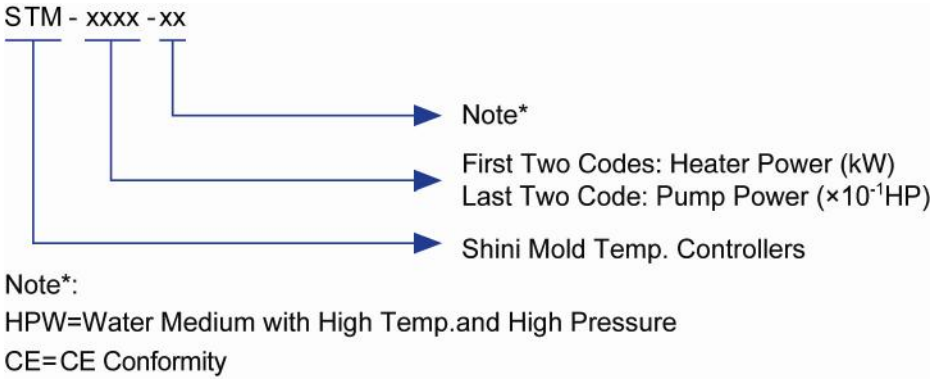
1. General Description

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

STM-HPW series water heater have both standard and high temperature models, which are used to heat up the mould and maintain temperature, they can be used in other similar applications as well. High temperature water from the mould is returned to the cooling tank and cooled by either indirect cooling (For high temperature and high temperature plus pressure 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 OMRON temperature controller can ensure an accuracy of ±0.5℃.

Model: STM-940HPW

1.1 Coding Principle



Note*:
HPW=Water Medium with High Temp.and High Pressure
CE=CE Conformity

1.2 Feature

1) Standard configuration

- P.I.D. multi-stage temperature control system can maintain an mould temperature with accuracy of ±0.5℃.
- Adopts high efficiency water cycle pump, with which precise moulds and mould loop with minor diameter can 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.
- For standard STM-HPW, the heating temperature can reach 180℃.
- Equipped with high pressure protection, safety pressure relieving, automatic water supplying and air exhausting.
- STM-HPW adopts indirect cooling, which makes temperature control more precise. The low viscosity of water realizes fast heat exchange.
- Adopt magnetic pump with no leakage.

2) Accessory option

- Water manifolds and Teflon hose are optional.
- RS485 communication function 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-607-HPW	180℃	6	0.55 / 1.63	25.5 / 28	12 / 15.8	1	3.4	1	Indirect	3/8 (2×2)	3/4 / 3/4	750×320×770	80
STM-913-HPW		9	1.0 / 1.2	50 / 60	12 / 15.8	1	3.4	1		3/8 (2×2)	3/4 / 3/4	750×320×770	85
STM-1213-HPW		12	1.0 / 1.2	50 / 60	12 / 15.8	1	3.4	1		1 (1×2)	3/4 / 3/4	750×320×810	95
STM-940HPW		9	2.8	150	12	1	3.4	4.6		1 (1×2)	1/1	960×465×900	140

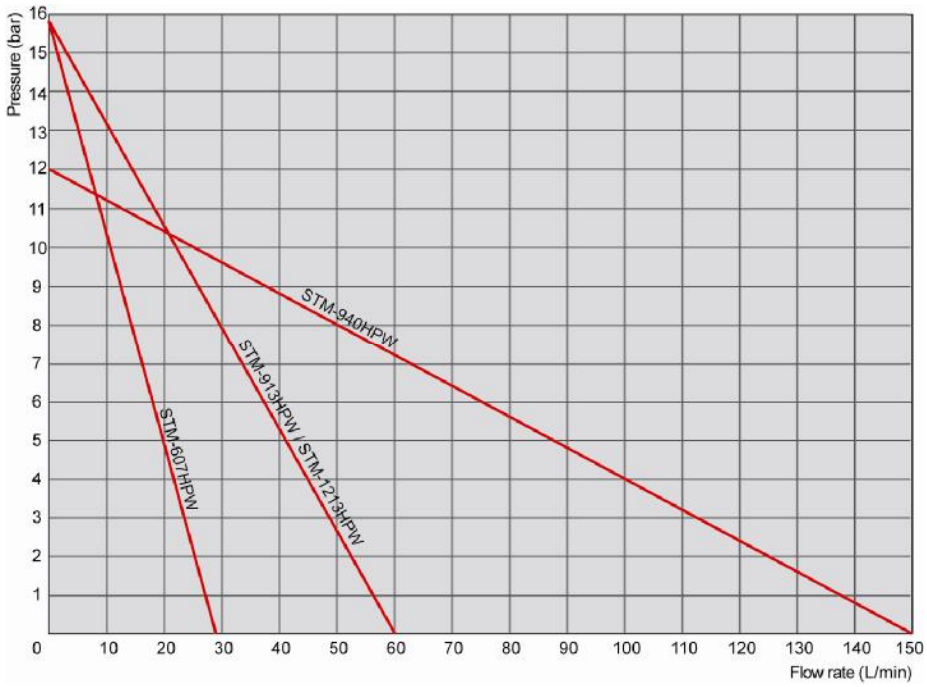
Note: 1) "HPW" stands for water medium with high temp. and high pressure. We reserve the right to change specifications without prior notice.
"*" stands for options.

2) To ensure stable water temperature, cooling water pressure should not be less than 2kgf/cm^2, but also no more than 5kgf/cm2.

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.

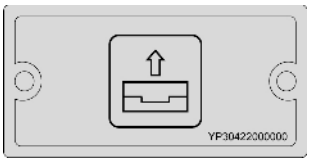
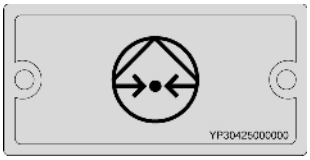
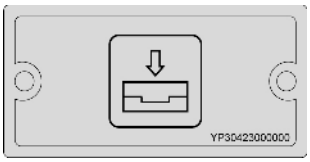
Warning!

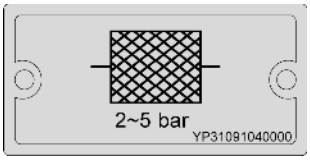
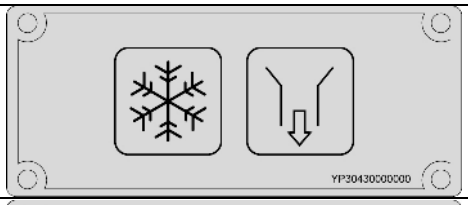
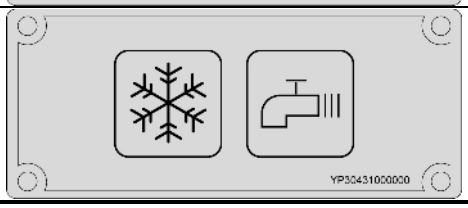
Do not touch the switch with wet object or hands.
Do not use the machine before fully aware of its performance.
Be careful not to touch or hit the switch or sensor.
Please keep enough operation space, and keep away obstacles.
To avoid producing statics, clean the floor from oil or water to keep a dry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

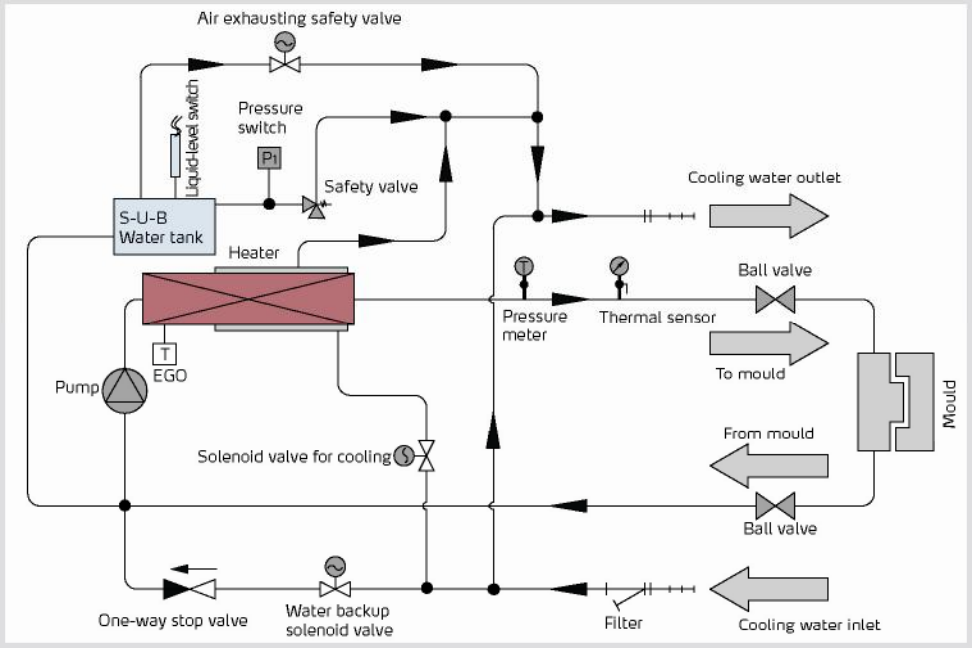
The following statements clarify the responsibilities and regulations born by any buyer or user who purchases products and accessories from Shini (including employees and agents).

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

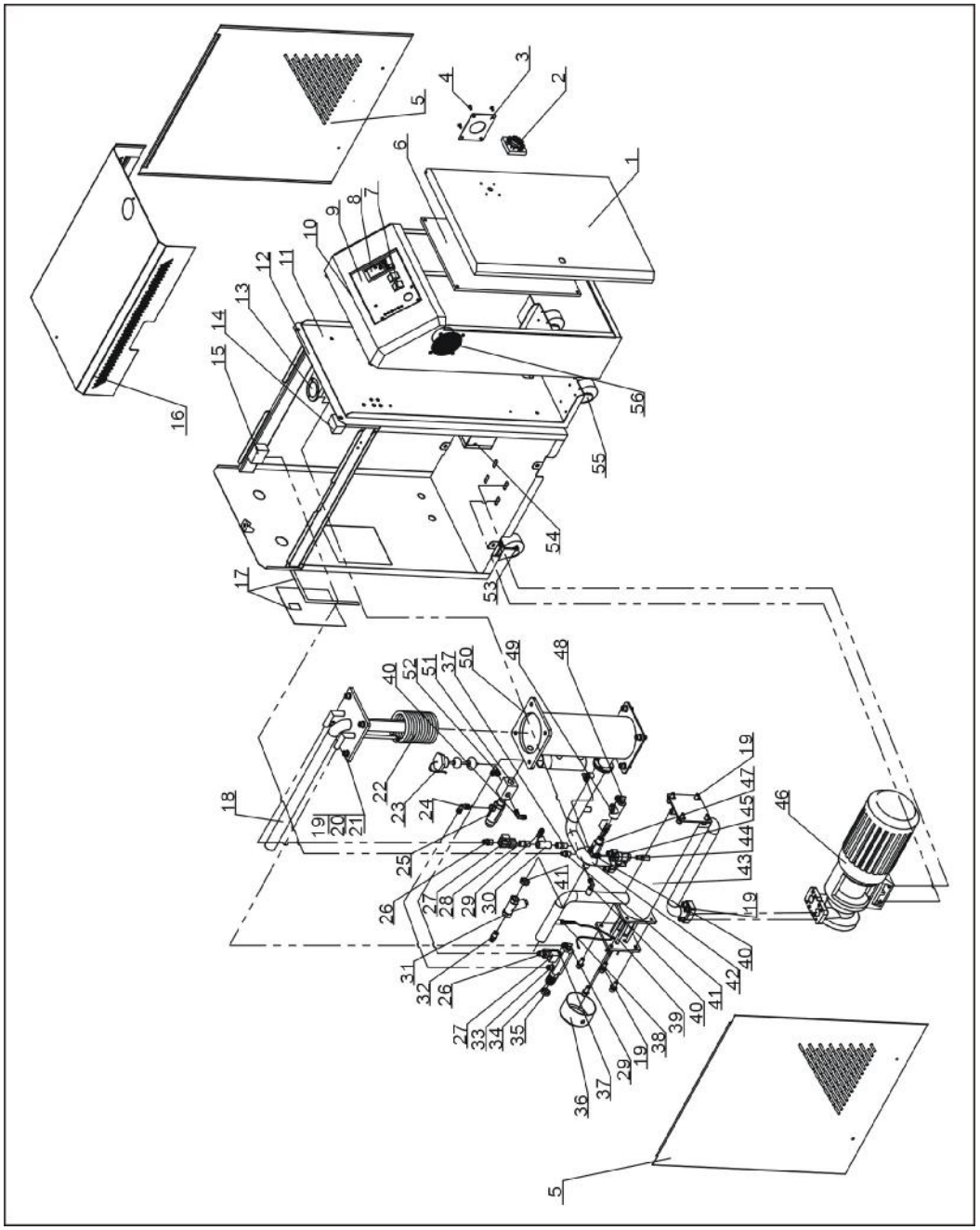


Picture 2-1: STM-HPW Working Principle

The high temperature water from the mould returns to pump and then flows to heater after being pressurized. Then it will be heated and flow to the mould again. The process circulates like this. In this process, machine will stop and give an alarm when liquid level switch detects that the liquid level has dropped down to the set point. However, if the temperature of that water is too high, the system will activate the solenoid valve for cooling to let cooling water come into the system and cools down the water, thus constant temperature can be maintained. System will activate its over temperature alarm and stop working when that water temperature is still higher than EGO set point. Safety valve will be opened for pressure release when system pressure has reached set point of pressure switch. If the system pressure keeps beyond the set point of the safety valve, machine will sounds alarm and halts.

2.2 Assembly Drawing

2.2.1 Assembly Drawing (STM-940-HPW)



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-940-HPW)

2.2.2 Parts List (STM-940-HPW)

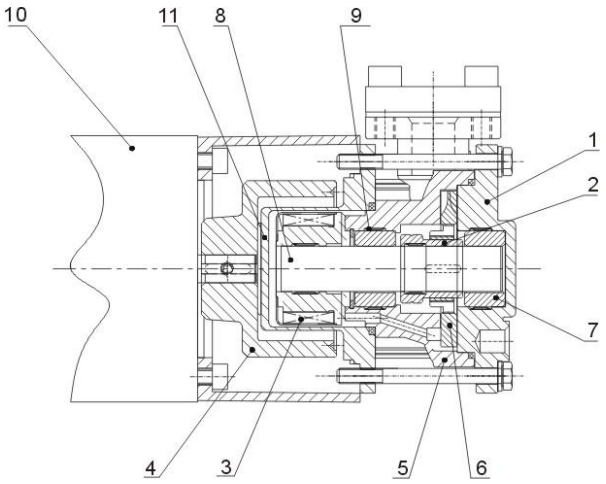
Table 2-4: Parts List (STM-940-HPW)

No.	Name	Part No.	No.	Name	Part No.
1	Door plate	-	26	Copper Teflon pipe male elbow 3/8PT×3/8HL	BH12030800610
2	Main power switch*	YE10200300000	27	Solemoid valve *3/8”	YE32331000000
3	Fixed plate of cable clamp	-	28	Copper pipe coupler 3/8PT×3/8PT	BH12030800110
4	Screw M6	YW62061000000	29	Copper Teflon pipe contactor 3/8PT×3/8HL	YW04030800300
5	Side plate	-	30	Stainless steel T-joint 3/8”	YW52030800000
6	Control cabinet base plate	-	31	Y –type filter 1/2PT	YW57010200000
7	Rocker switch	YE10210400000	32	Copper inserted core	BH12131200010
8	Temperature controller	YE85005000000	33	Copper Teflon pipe contactor 1/4PT×3/8H	BH12010400510
9	Control panel	-	34	Copper contactor unit 8	BH12060704810
10	Electric cabinet	-	35	General copper contactor for unit fron 1 to 4.	-
11	Rear plate of electric cabinet	-	36	Pipe shield	BL80091000120
12	Rack	-	37	Copper pipe coupler 1/4PT×3/8PT	BH12010400310
13	Pressure guage 0~15kG	YW85015000000	38	Thermocouple	BE90342500050
14	High pressure switch controller	YE90002000000	39	Heater 9kW	BH70091000150
15	Low pressure switch controller	YE90000800000	40	Copper Teflon pipe contactor 1/4PT×1/4HL	YW04010400400
16	Cover plate	-	41	Copper Teflon pipe contactor 1/4PT×1/4H	BH12010400410
17	Cover plate and supporting plate of rear plate	-	42	Pump inlet	-
18	Cooling tank cover	-	43	Heating tank	-
19	M10×25 socket haed cap screw	YW61102500000	44	Copper pipe coupler 1/4PT×1/4PT	BH12010400110
20	Flat washer 10×25	YW66102500000	45	Bufferfly damper 1/4”	YW50220000000
21	Spring washer 10	YW65010000000	46	Magnetic pump MP-280	BM20283300050
22	Cooling pipe	-	47	Copper contactor unit 7	BH12091000010
23	Electrical floating ball	YE13001500000	48	Copper Teflon pipe contactor 1/2PT×3/8HL	YW04010200200
24	Copper Teflon pipe contactor 1/2PT×3/8HL	YW04010200200	49	Non-return valve 1/2”	YW59010200100
25	Safety valve14kg open	-	50	Cooling tank	-

No.	Name	Part No.	No.	Name	Part No.
51	Safety valve contactor	BH13060702110	54	EGO units	BH90115000050
52	Copper Teflon pipe contactor 1/4PT×3/8HL	BH12010400510	55	Braking caster	YW03000300000
53	Movable caster	YW03000300200	56	Exhaust fan+air mesh	YM60922500100

* 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 Pump



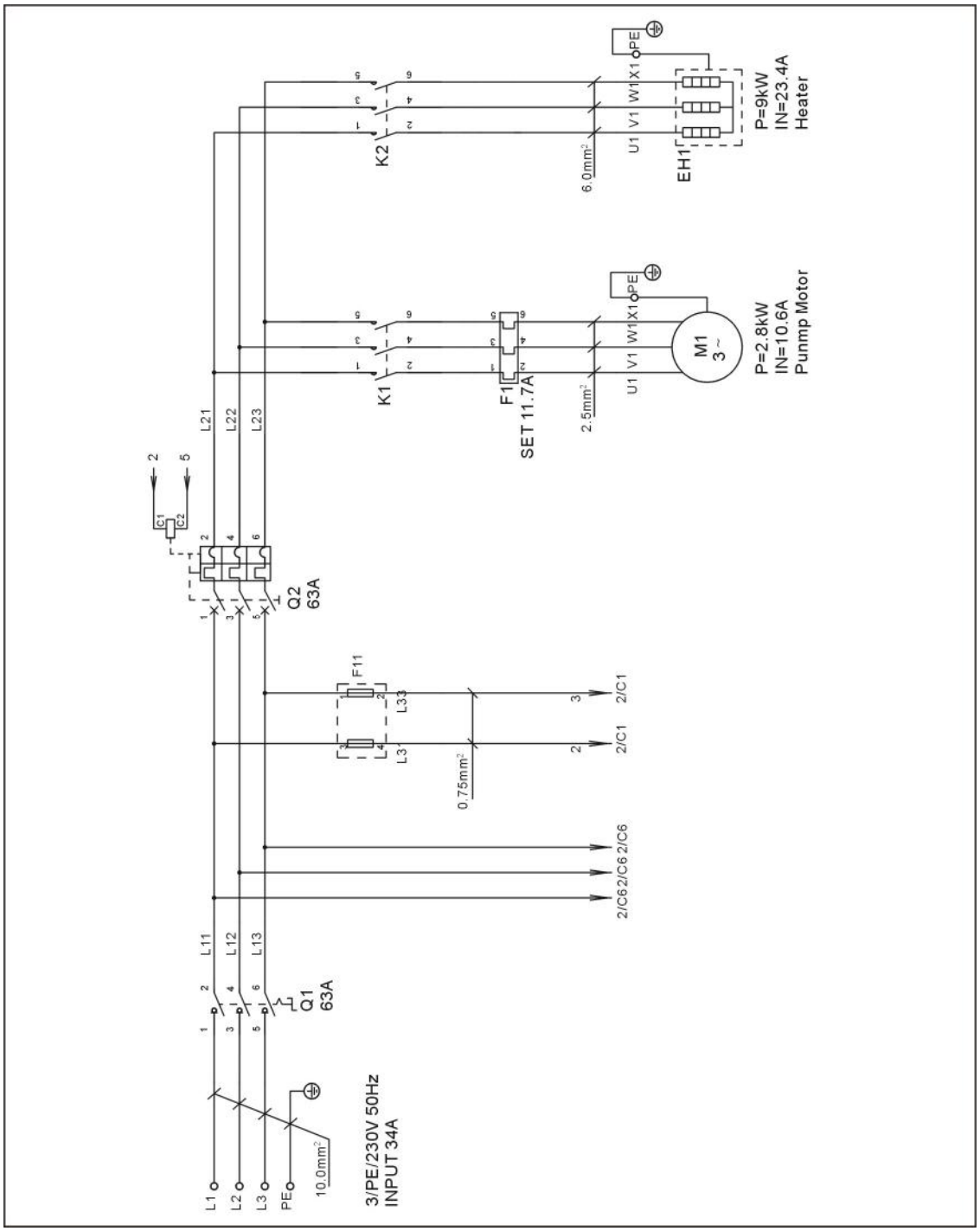
Names of Parts:

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 2-3: Pump

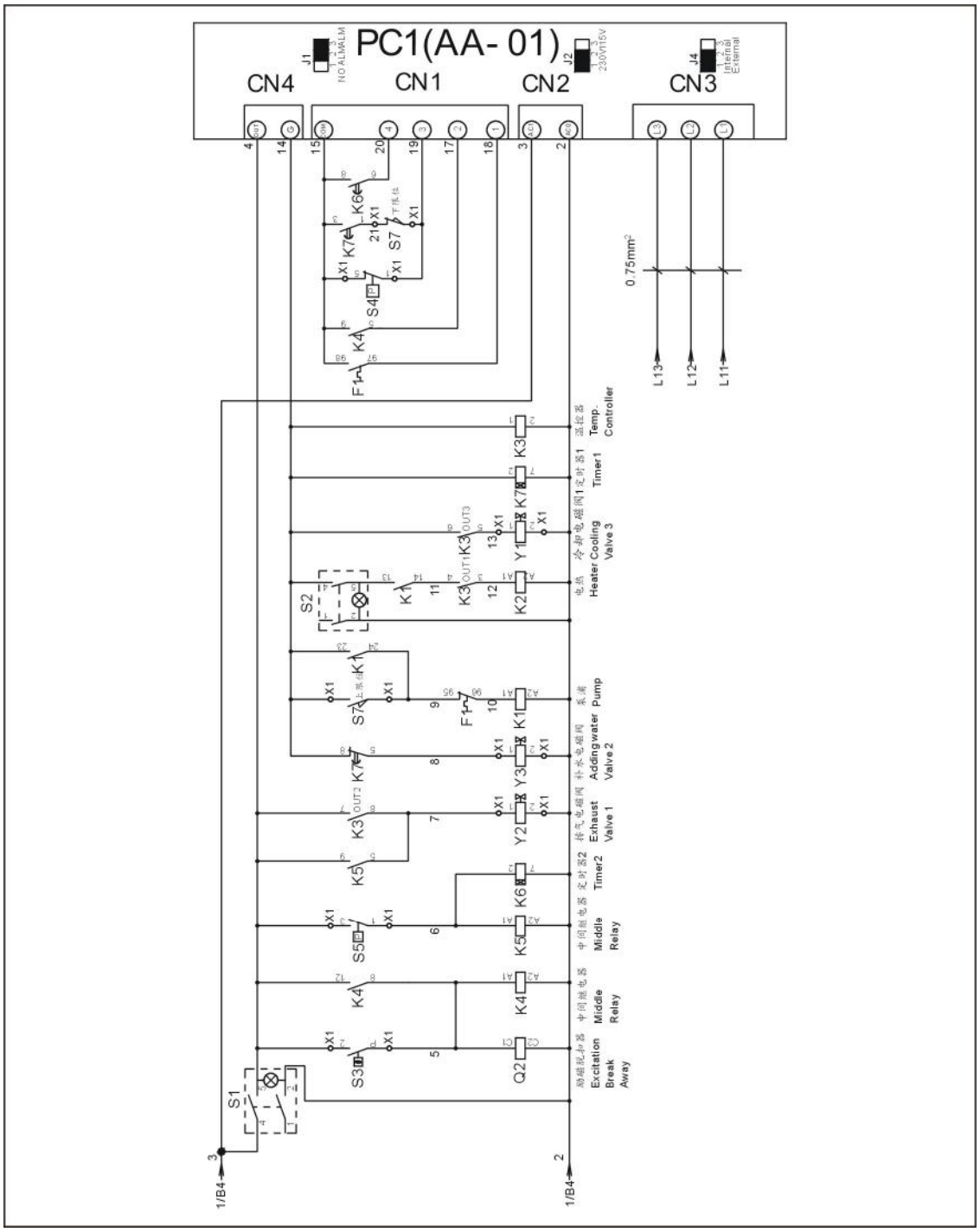
2.3 Electrical Diagram

2.3.1 Main Circuit (STM-940HPW 230V)



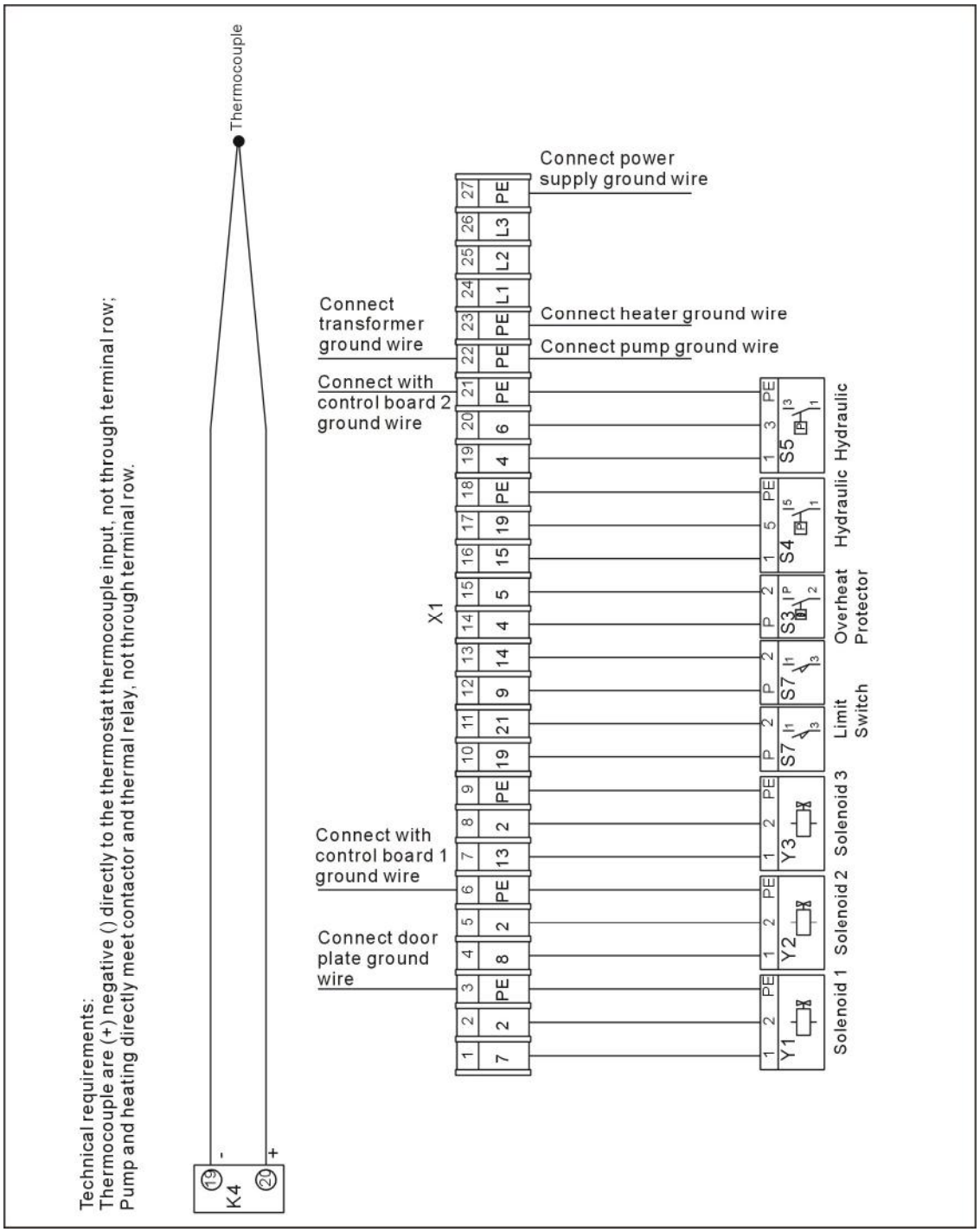
Picture 2-4: Main Circuit (STM-940HPW 230V)

2.3.2 Control Circuit (STM-940HPW 230V)



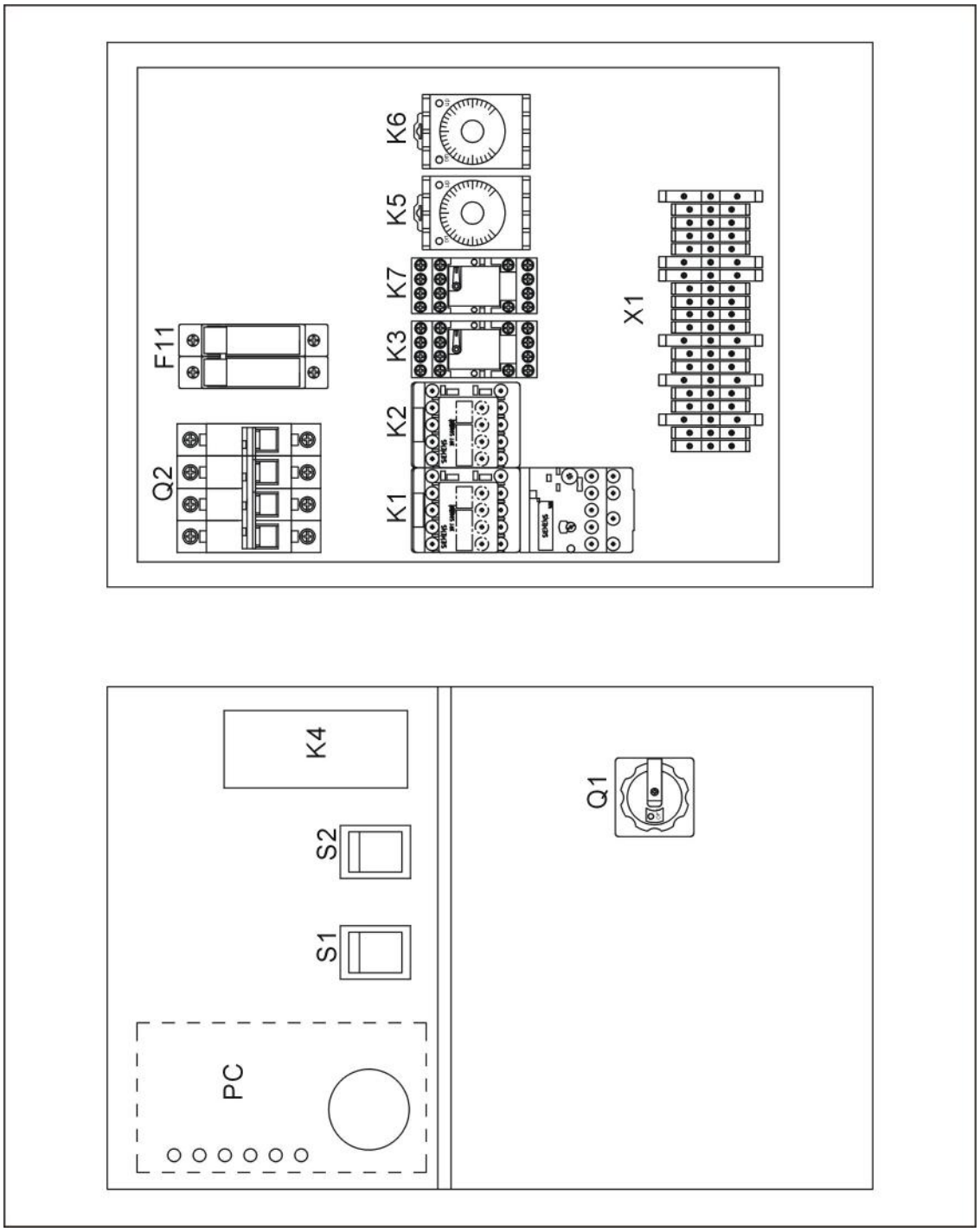
Picture 2-5: Control Circuit (STM-HPW 230V)

2.3.3 Thermocouple and Terminal Layout (STM-940HPW 230V)



Picture 2-6: Thermocouple and Terminal Layout (STM-HPW 230V)

2.3.4 Electrical Components Layout (STM-940HPW 230V)



Picture 2-7: Electrical Components Layout (STM-HPW 230V)

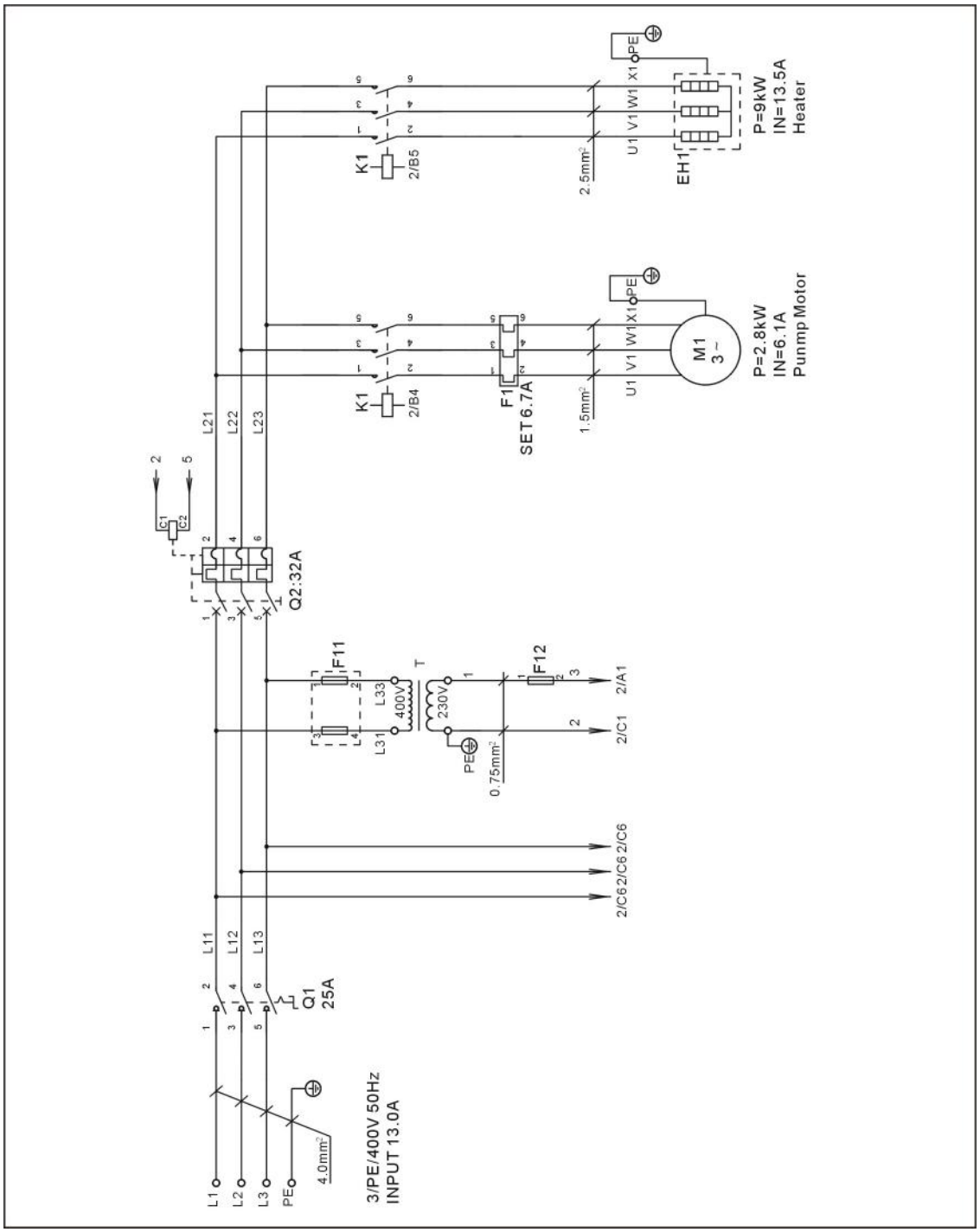
2.3.5 Electrical Components List (STM-940HPW 230V)

Table 2-1: Electrical Components List (STM-940HPW 230V)

NO.	Symbol	Name	Specification	Part NO.
1	Q1	Main switch	63A	YE10250400000
2	Q2	Circuit_breakers*	63A	YE40606000000
3	-	Excitation break away	-	YE40023560000
4	K1	Contactors*	230V 50/60Hz	YE00601721000
5	-	Auxiliary contact terminal	1NO	YE00691110000
6	K2	Contactors*	230V 50/60Hz	YE00602722000
7	F1	Overload relays*	11~16A	YE01611640000
8	F11	Fuse box	32A 2P	YE41032200000
9	-	Fuse**	2A	YE46002000100
10	S1 S2	Control switch	4P(WH)	YE10210400000
11	K3 K7	Middle relay	230VAC 50/60Hz	YE03270700000
12	K4	Temperature controller	230VAC 50/60Hz	YE85005000000
13	K5	Timer	230VAC 50/60Hz	YE86301000000
14	K6	Timer	230VAC 50/60Hz	YE86300600000
15	S3	Overheat protector	250V 5(4)A	YE21503000000
16	S4	Hydraulic switch	AC 230V 12A	YE90000800000
17	S5	Hydraulic switch	AC 230V 12A	-
18	S7	Limit switch	250V 5(4)	YE14152400000
19	PC	Circuit board*	230VAC 50/60Hz	YE80000100000
20	Y1	Solenoid valve	230VAC 50/60Hz	-
21	X1	Terminal board	-	YE61100000000
22	-	Terminal board	-	YE61103500000
23	-	Terminal board	-	YE61063500000
24	-	Terminal board	-	YE61250040000
25	-	Terminal board	-	YE61253500000
26	M1	Motor	230V 50Hz 2.8kW	-
27	EH1	Heater**	230V 50Hz 9kW	-
28	FM	Fan*	230V 50/60Hz	-

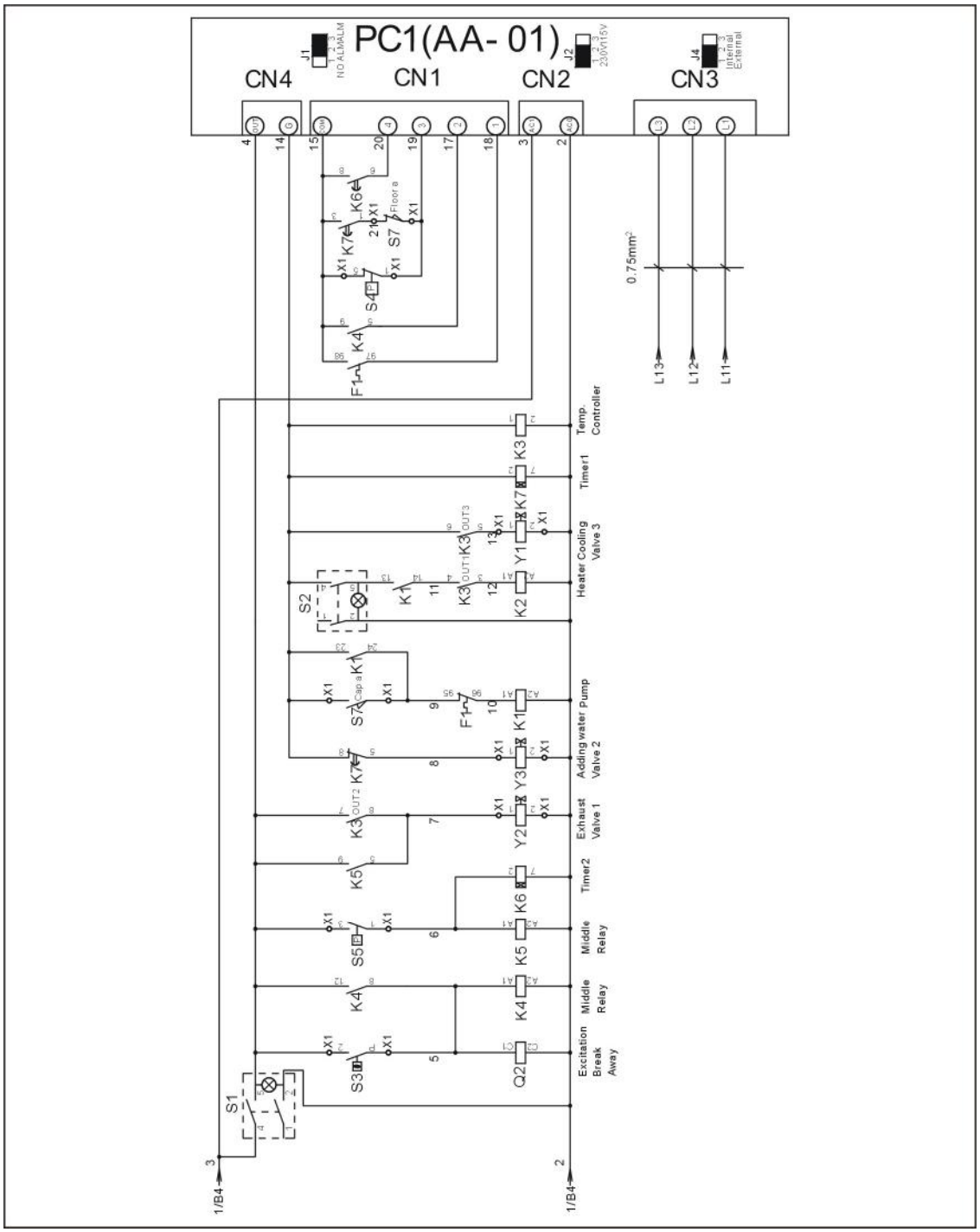
* means possible broken parts.
** means easy broken part. and spare backup is suggested.
Please confirm the version of manual before placing the purchase order to guarantee that the item number of the spare part is in accordance with the real object.

2.3.6 Main Circuit (STM-940HPW 400V)



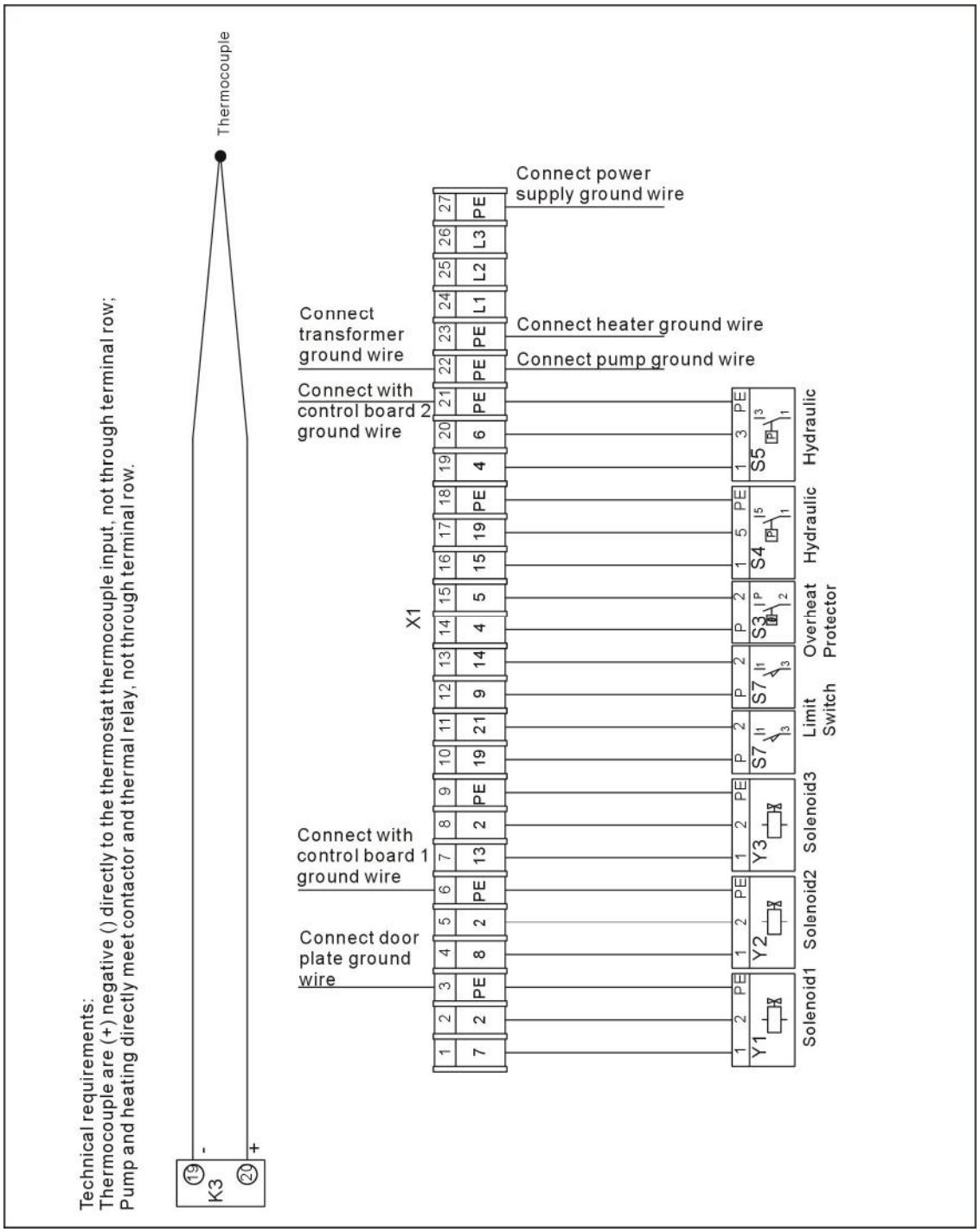
Picture 2-8: Main Circuit (STM-940HPW 400V)

2.3.7 Control Circuit (STM-940HPW 400V)



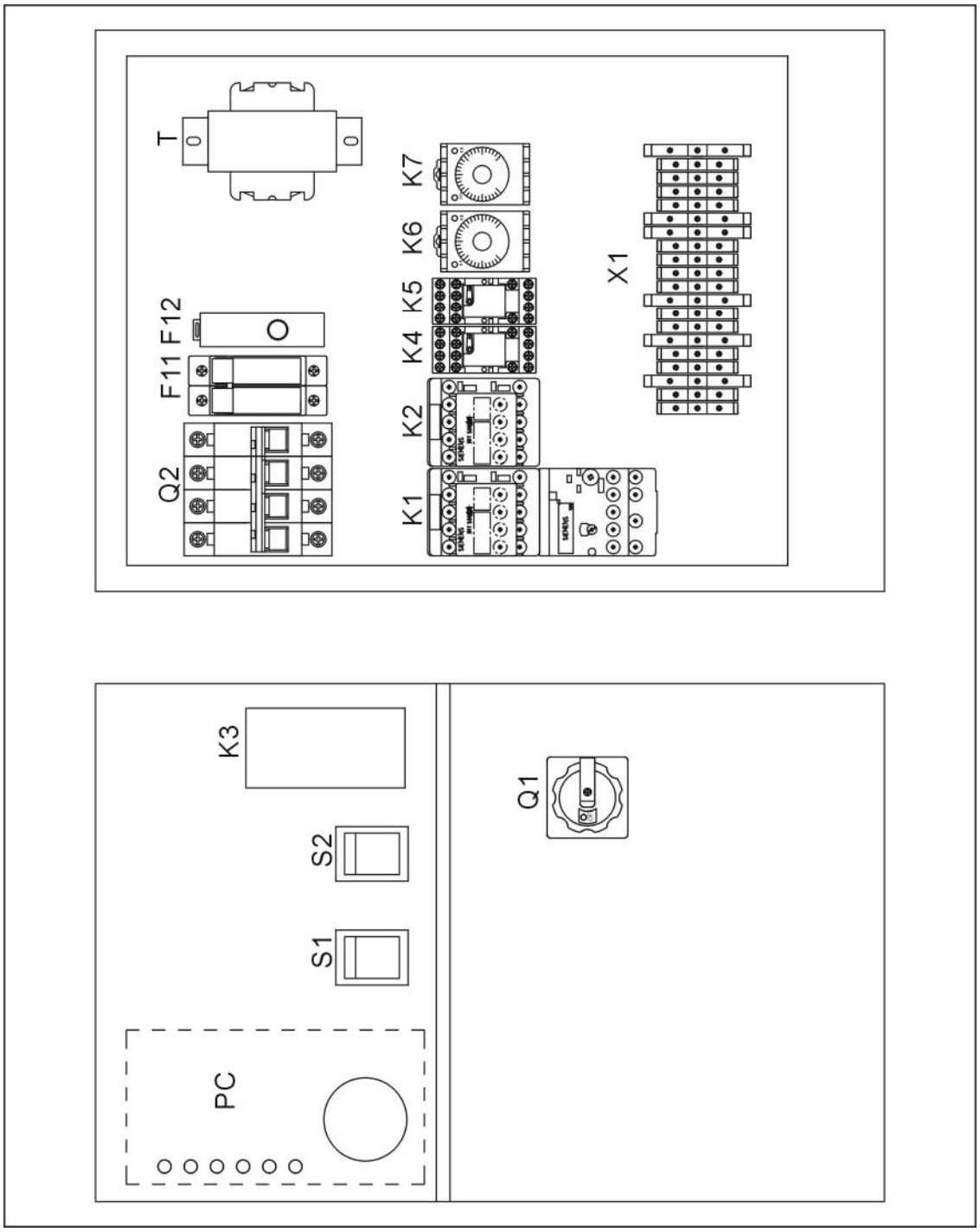
Picture 2-9: Control Circuit (STM-HPW 400V)

2.3.8 Thermocouple and Terminal Layout (STM-940HPW 230V)



Picture 2-10: Thermocouple and Terminal Layout (STM-HPW 400V)

2.3.9 Electrical Components Layout (STM-940HPW 400V)



Picture 2-11: Electrical Components Layout (STM-HPW 400V)

2.3.10 Electrical Components List (STM-940HPW 400V)

Table 2-2: Electrical Components List (STM-940HPW 400V)

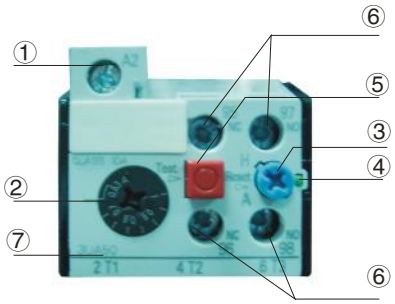
NO.	Symbol	Name	Specification	Part NO.
1	Q1	Main switch	25A	YE10125250000
2	Q2	Circuit_breakers*	32A	YE40603200000
3	-	Excitation break away	-	YE40023560000
4	K1	Contactors*	230V 50/60Hz	YE00601521000
5	-	Auxiliary contact terminal	1NO	YE00691110000
6	K2	Contactors*	230V 50/60Hz	YE00602522000
7	F1	Overload relays*	5.8~8A	YE01160550000
8	T	Transformer	IN=400V OUT=230V 300mA	YE70402300700
9	F11	Fuse box	32A 2P	YE41032200000
10	-	Fuse**	2A	YE46002000100
11	F12	Fuse**	2A	YE41001000000
12	K3	Temperature controller	230VAC 50/60Hz	YE85005000000
13	K4 K5	Middle relay	230VAC 50/60Hz	YE03270700000
14	K6	Timer	230VAC 50/60Hz	YE86300600000
15	K5	Timer	230VAC 50/60Hz	YE86301000100
16	S1 S2	Control switch	4P(WH)	YE10210400000
17	S3	Overheat protector	250V 5(4)A	YE21503000000
18	S4	Hydraulic switch	AC 230V 12A	YE90000800000
19	S5	Hydraulic switch	AC 230V 12A	-
20	S7	Limit switch	250V 5(4)	YE14152400000
21	PC	Circuit board*	230VAC 50/60Hz	YE80000100000
22	Y1	Solenoid valve	230VAC 50/60Hz	-
23	X1	Terminal board	-	YE61040000000
24	-	Terminal board	-	YE61043500000
25	FM	Fan*	230V 50/60Hz	-
26	-	Terminal board	-	YE61250040000
27	-	Terminal board	-	YE61253500000
28	M1	Motor	400V 50Hz 2.8kW	-
29	EH1	Heater**	400V 50Hz 9kW	-

* 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).

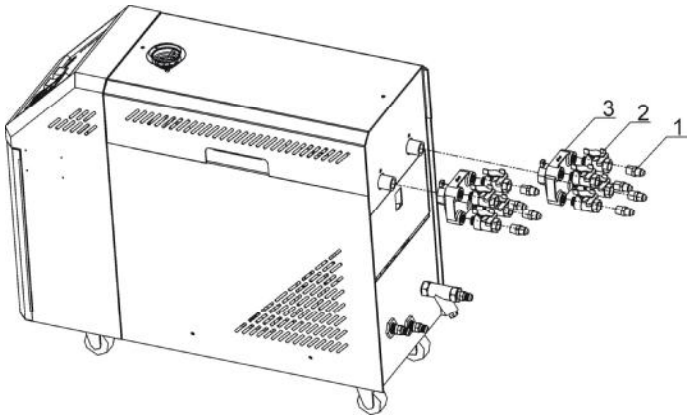
H: manual reset

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)

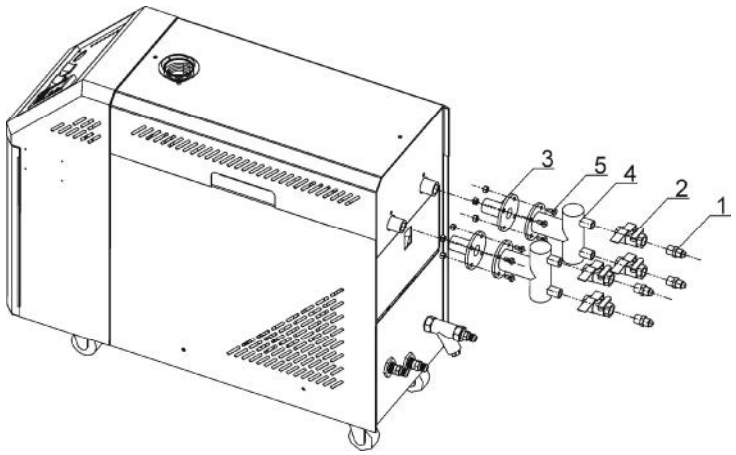


1) Install copper joint to the level valve.
2) Install level valve with copper joint to the dewaxing water manifold.
3) Install water manifold to the machine.
4) Install Teflon to copper joint.

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.

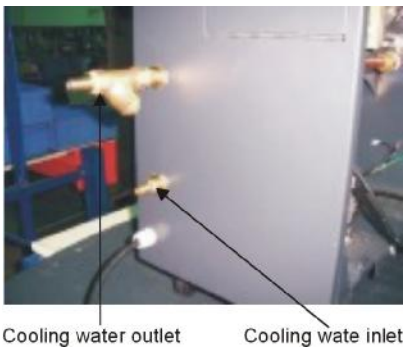
Picture 3-2: Mould and Water Couplings 1

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.

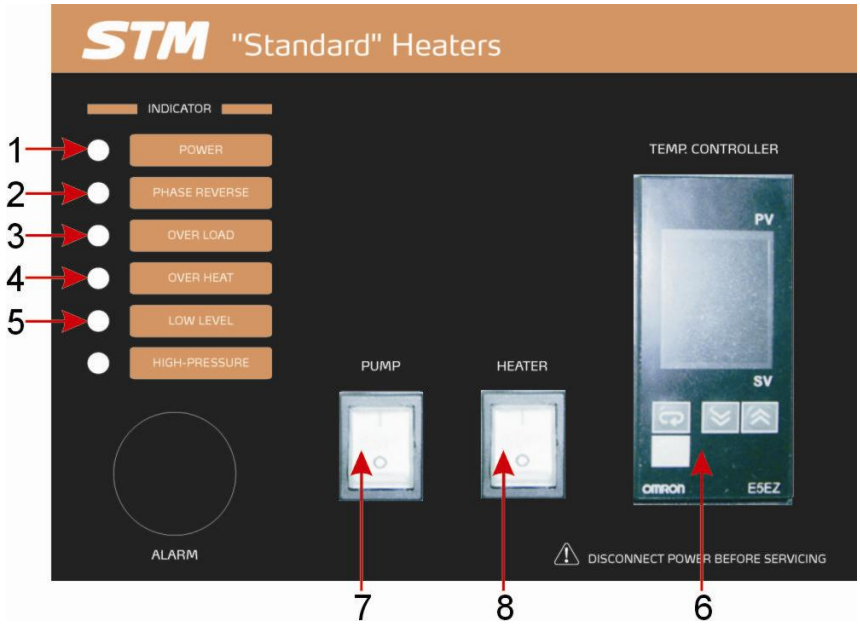
3.3 Power Supply

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

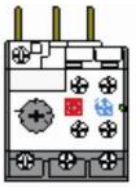
4.1 Control Panel



Picture 4-1: Control Panel

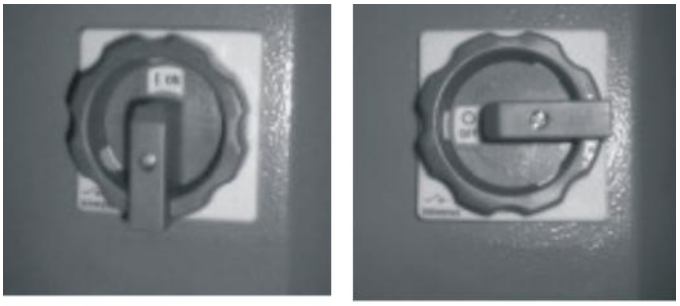
Table 4-1: Control Panel

No.	Name	Functions	Remarks
1	Power supply indicator	Connect the machine with power supply and turn on main switch. This indicator turns green.	Note! Do not remove any electrical parts or terminals after the power is on.
2	Phase reversal alarm	When phase reversal or phase shortage occurs, it becomes red. The buzzer sounds, and system stop working.	Turn off the machine. Exchange the place of two of the electrical wires of main power supply.

No.	Name	Functions	Remarks
3	Motor overload alarm	When motor current exceeds the limits, the buzzer sounds. Motor overload alarm is red and system stops working.	Check that if motor shaft is blocked or the bearing is broken or setting current of overload relay is too low. After the problems solved, wait for one minute and then press the blue RESET button to reset the overload relay and clear the alarm. 
4	Overheat alarm	When oil temperature is higher than EGO (temperature sensor) setting value, this indicator becomes red. The buzzer sounds and system stops working.	EGO setting value should be higher than temperature settings of temperature controller. Check if there are problems of temperature detecting probe.
5	Low level alarm	When there is circulating water shortage, the alarm light will become red. The buzzer sounds and system stops working.	Ensure smooth water supply.
6	Temp. controller	Temperature setting and control.	-
7	Pump switch	Turn on and off the pump.	Note: motor rotating direction should be correct.
8	Heater switch	Turn on and off the heater.	Heater switch is applicable only after pump is turned on.

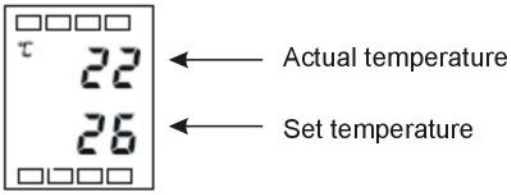
4.2 Machine Startup

1) Pipe connect the inlet and outlet of the standard water heater to the pipe of mould (refer to chapter 3.2 for details).
2) Connect the cooling water inlet /backup water inlet (refer chapter 3.2 for details).
3) Turn all the ball valves on.
4) Turn on the main power switch.



Picture 4-2: Machine Startup 1

5) Turn on the pump switch to start the pump.
6) Turn on the heater switch.
7) Set mould temperature (if it is already set, neglect this step.) Press ▲ ▼ to set the temperature.



Picture 4-3: Machine Startup 2

8) Overtemperature setup for system cooling: set as +1℃ before delivery, which means that whenever actual temperature exceeds setting value by 1℃, cooling system will be automatically activated.

4.3 Stop the Machine

1) Switch off heater power.
2) Wait until oil temperature falls below 50℃, turn off pump switch.
3) Turn off main switch.

Warning!

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

Note!

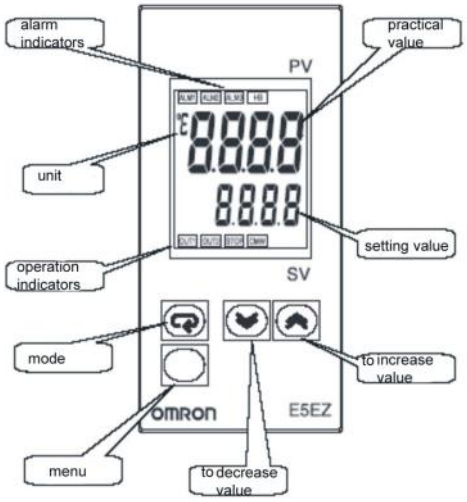
Note! Pump motor rotating direction should be the same as indicated.

Note!

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

4.4 Temperature Controller

Temperature controller control panel



Picture 4-4: Temperature Controller Panel

4.4.1 Temperature Controller Display

- Practical value: Display practical temperaure value or parameter code of temperature controller.

- Setting value: Display set temperature value or parameter value, or display input value when you set parameters.

- Operation indicator

  1. ALM1 (alarm 1)
     This indicator becomes bright to indicate that heater 2 has stopped working. Alarm 1 function is used to control pipe heater 2. When actual temperaure is 5℃ less than setting value, heater 2 will be cut off. (Only for machine with dual-heating zone）
  2. ALM2 (alarm 2)
     Alarm 2 function is not used on this unit.
  3. ALM3 (alarm 3)
     Alarm 3 function is not used on this unit.
  4. HB (heater break)
     When heater break is detected, this indicator will become bright.
  5. OUT1 (output control 1)
     OUT1 is used for heating control. When it is bright, it means that pipe heater is working.
  6. OUT2 (output control 2)
     OUT2 is used for cooling control. When it is bright, cooling water valve is open and cooling function is in process.
  7. STOP (stop)
     When stop indicator is bright, it means that temperature controller is not working. Temperature controller operation mode is set to STOP.

  Note! Do not set operation mode to stop, which will force temperaure controller to stop working.

4.4.2 Keys on Control Panel

: (Menu) press this key to show the items you want to reset.

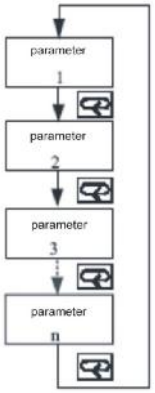
: (Mode) press this key to choose a parameter.

: (Increase value) press this key to increase setting value.

: (Decrease value) press this key to decrease setting value.

4.4.3 Choose a Parameter

Press [↵] to choose a parameter or switch to next parameter.



Picture 4-5: Choose a Parameter

4.4.4 Comfirm Your Setting

1) Press [↵] to come back to the first parameter if current screen shows the last parameter.
2) Press [▲] and [▼] to adjust the value of parameters. Keep the parameter unchanged for at least 2 seconds or press [↵] to confirm your setting.
3) Confirm your setting when changing to another menu.
4) Before power supply is cut off, press [↵] to confirm your setting.

Attention!

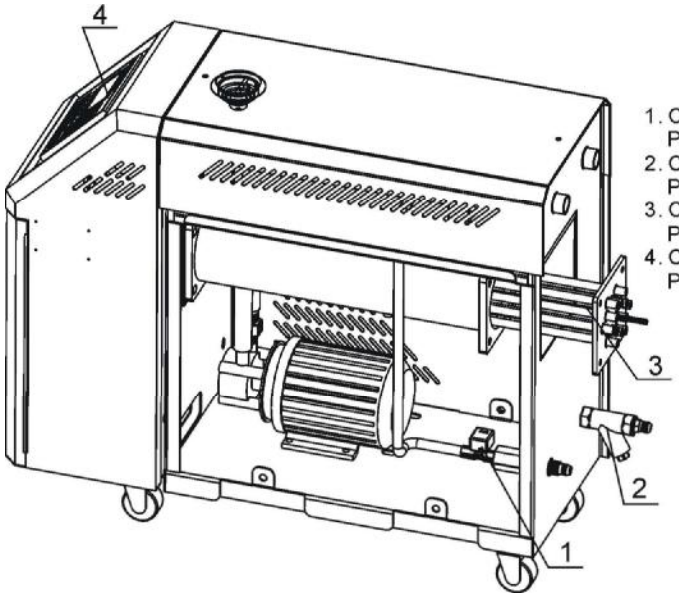
Before delivery, the parameters of temp. Controller are set already. Do ot reset the parameters unless it is necessary.

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

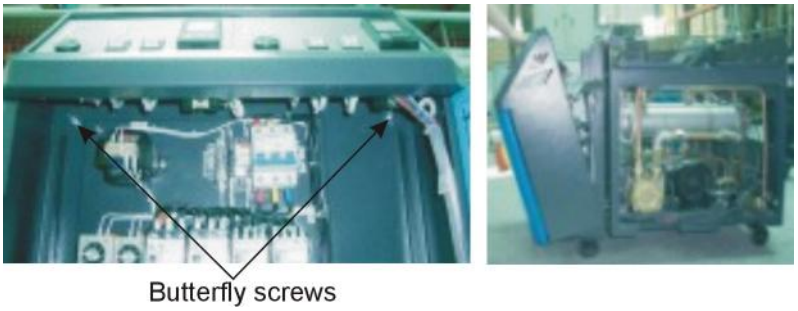
1) Open the top covers of the unit. (Refer to the pictures below)

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

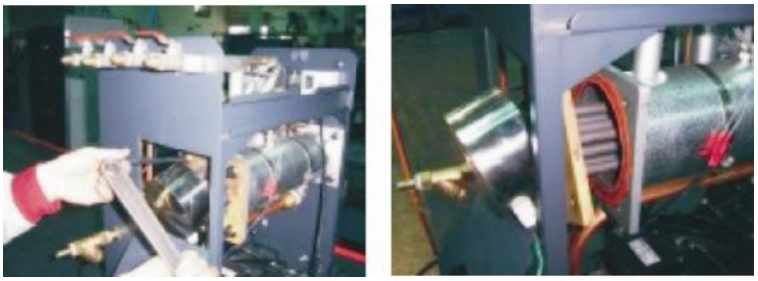
1) Open machine rear cover door. (Refer to pictures below)

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 Displayer Terminal Connecting Diagram

① DI TERMINAL

1, 2: Run/stop di terminal

② COMM TERMINAL

1, 2, 3, 4: rs485 Comm terminal

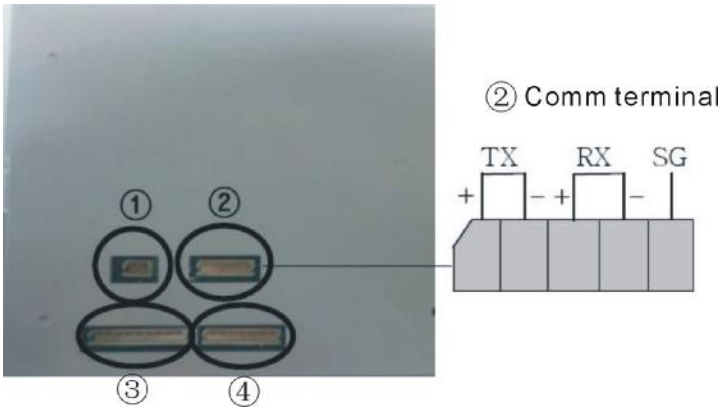
5: Earth terminal

③ MAIN CN

Connet to the electric cables which also connected with stm100

④ TEST PIN

Test pin No connection



6.6 Maintenance Schedule

6.6.1 About the Machine

Model _____ SN _____ Manufacture date _____

Voltage_____Φ_____V Frequency _____ Hz Power _____ kW

6.6.2 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.

6.6.3 Daily Checking

☐Check machine startup function.

☐Check all the electrical wires.

6.6.4 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.

6.6.5 Trimonthly Checking

☐Check level switch.

☐Check the contactor [2].

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

6.6.6 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].

6.6.7 Yearly Checking

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

6.6.8 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.