

STM Series

Oil Heaters

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1. General Description



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

The STM series standard oil heaters are used to heat up the mould and maintain this temperature, although they can be used in other similar applications. High temperature oil from the mould is returned to the cooling tank and cooled by indirect cooling. It is then pressurised by the high-pressure pump, sent to the heating tank and finally to the mould with a constant temperature. With our optimised design, oil can reach a maximum of 200°C and the HANYOUNG temperature controller can maintain an accuracy of $\pm 1^\circ\text{C}$.

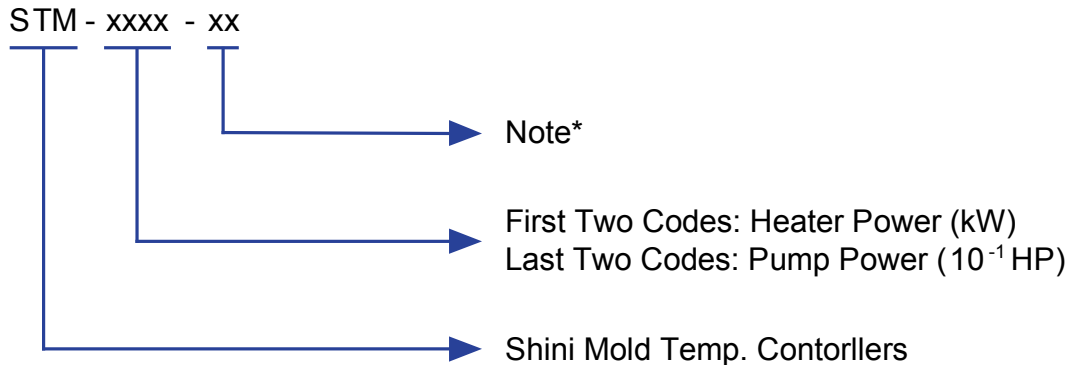


Model: STM-910



Model: STM-910-D

1.1 Coding Principle



Note*:

D=Dual-heating Zones CE=CE Conformity

1.2 Feature

Standard configuration

- 1) Controller adopts 3.2" LCD for easy operation.
- 2) 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 °F and °C.
- 3) P.I.D. multi-stage temperature control system can maintain a mould temperature with accuracy of $\pm 0.5^{\circ}\text{C}$.
- 4) Adopts high efficiency high temperature 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.
- 5) 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.
- 6) Pipe heaters are made of stainless steel.
- 7) For standard STM, the heating temperature can reach 200°C .

Accessory option

- 1) Water manifolds, Teflon hose and Transfer oil are optional.

- 2) Among the Standard Oil Mould Controllers STM, all models can opt for magnetic pump. (except STM-3650 series)
- 3) 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.	Pipe Heater (kW)	Pump Power (kW) (50 / 60Hz)	Max. pump Flow (L / min) (50 / 60Hz)	Max. pump Pressure (bar) (50 / 60Hz)	Heating Tank Number	Main / Sub. Oil Tank (L)	Cooling Method	Mould Coupling* (inch)	Inlet/Outlet (inch)	Dimensions (mm) (H×W×D)	Weight (kg)
STM-607	200°C	6	0.55 / 0.65	27 / 30	3.8 / 5	1	6 / 3.2	Indirect	3/8" (2×2)	3/4 / 3/4	635x280x740	65
STM-607-D		6×2	0.55×2 / 0.65×2	27×2 / 30×2	3.8 / 5	2	6×2 / 3.2×2		3/8" (4×2)	3/4 / 3/4	655x560x740	130
STM-910		9	0.75 / 0.92	42 / 50	5.0 / 6.4	1	6 / 3.2		3/8" (2×2)	3/4 / 3/4	635x280x740	70
STM-910-D		9×2	0.75×2 / 0.95×2	42×2 / 50×2	5.0 / 6.4	2	6×2 / 3.2×2		3/8" (4×2)	3/4 / 3/4	655x560x740	140
STM-1220		12	1.5 / 1.9	74 / 84	6.2 / 7.2	1	6.8 / 11.8		3/8" (4×2)	1 / 1	795x340x845	100
STM-2440		24	2.8 / 3.4	130 / 130	8.0 / 10.2	2	11 / 16		1" (1×2)	1 / 1	900x390x935	145
STM-3650		36	4.0 / 4.0	170 / 170	8.0 / 8.0	3	14 / 16		1 1/4" (1×2)	1 1/4 / 1 1/4	900x385x980	155

Note: 1) "D" stands for dual-heating zones.

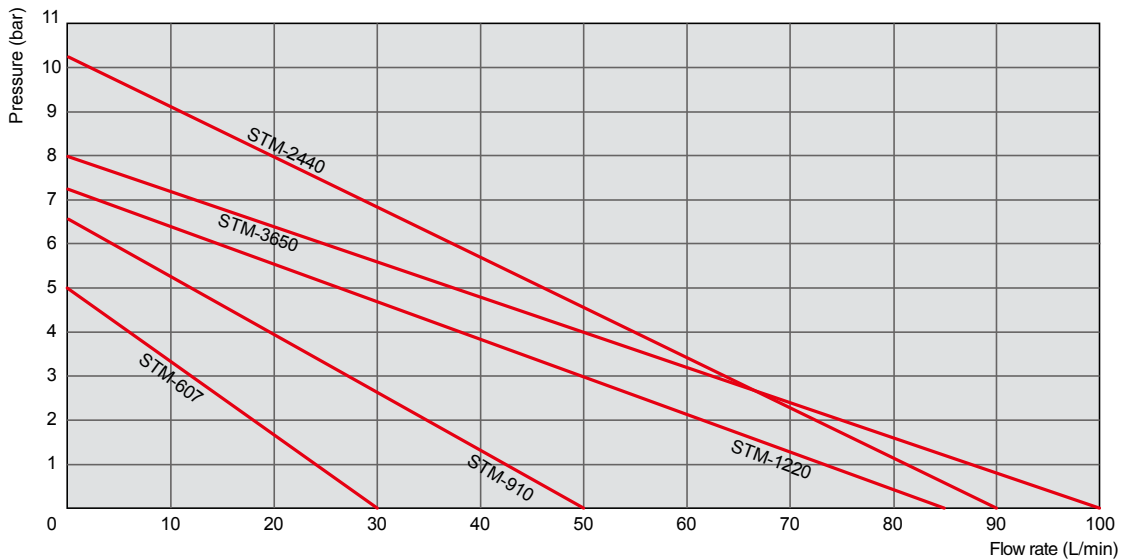
2) Pump testing standard: Power of 50 / 60Hz, purified water at 20°C. (There is ±10% tolerance for either max. flowrate or max. pressure).

3) "*" Stands for options.

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

We reserve the right to change specifications without prior notice.

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°C) × temperature difference between mould and environment (°C) × 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°C) × heating medium density (kg/L) × in/outlet temperature difference (°C) × time (60)]

Note: Water specific heat = 1kcal/kg°C

Heating medium oil specific heat = 0.49kcal/kg°C

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

<p>N6125000</p>	<p>Clean the filter screen of Y type strainer timely to avoid obstruction which may affect machine performance.</p>
	<p>It is used for oil heaters. Max. temperature setting of this unit is 200°C.</p>
<p>(Attached on motor cover)</p>	<p>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.</p>
	<p>High voltage! Electrical shock may happen. Carefulness is required from the operator.</p>
	<p>Attentions! This is general warnings which operators should pay attention to.</p>

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°C.
- 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 below 50°C. Or the life of the unit would be affected.

1.4.4 Transportation and Storage of the Machine

Transportation

- 1) STM series standard oil heaters 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°C to +55°C for long distance transportation and for a short distance, it can be transported with temperature under +70°C.

Storage

- 1) STM series standard oil heaters should be stored indoors with temperature kept from 5°C to 40°C 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 max. temperature +45°C and humidity no 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, Co₂ 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

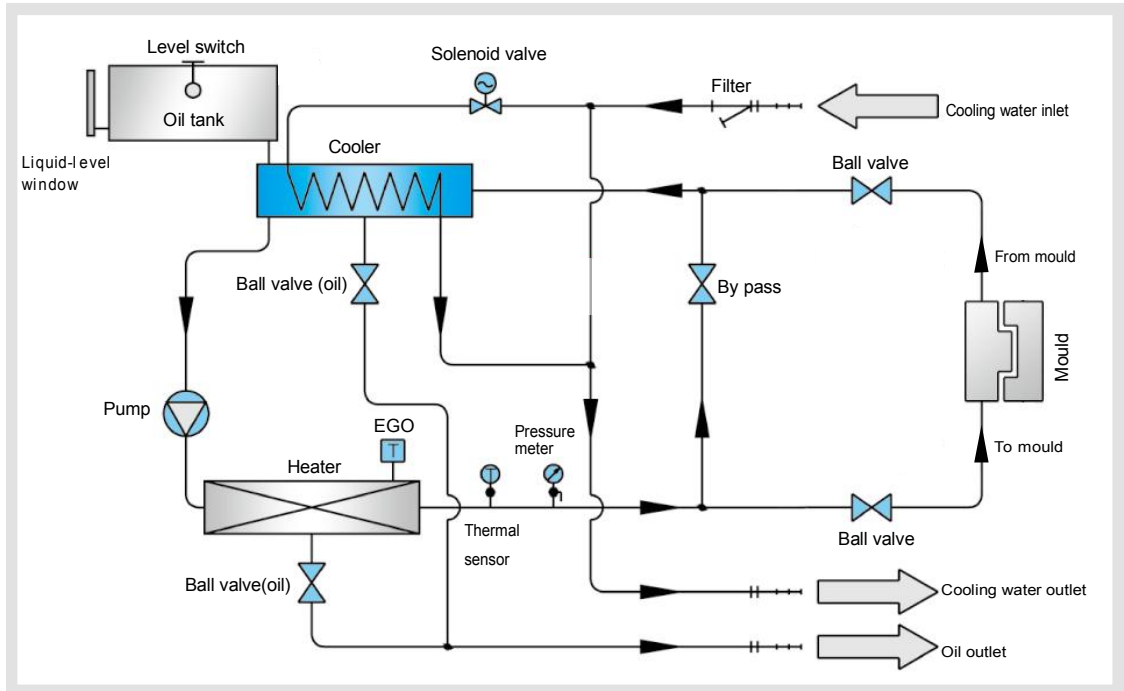
The following statements clarify the responsibilities and regulations born by any buyer or user who purchases products and accessories from Shini (including employees and agents).

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

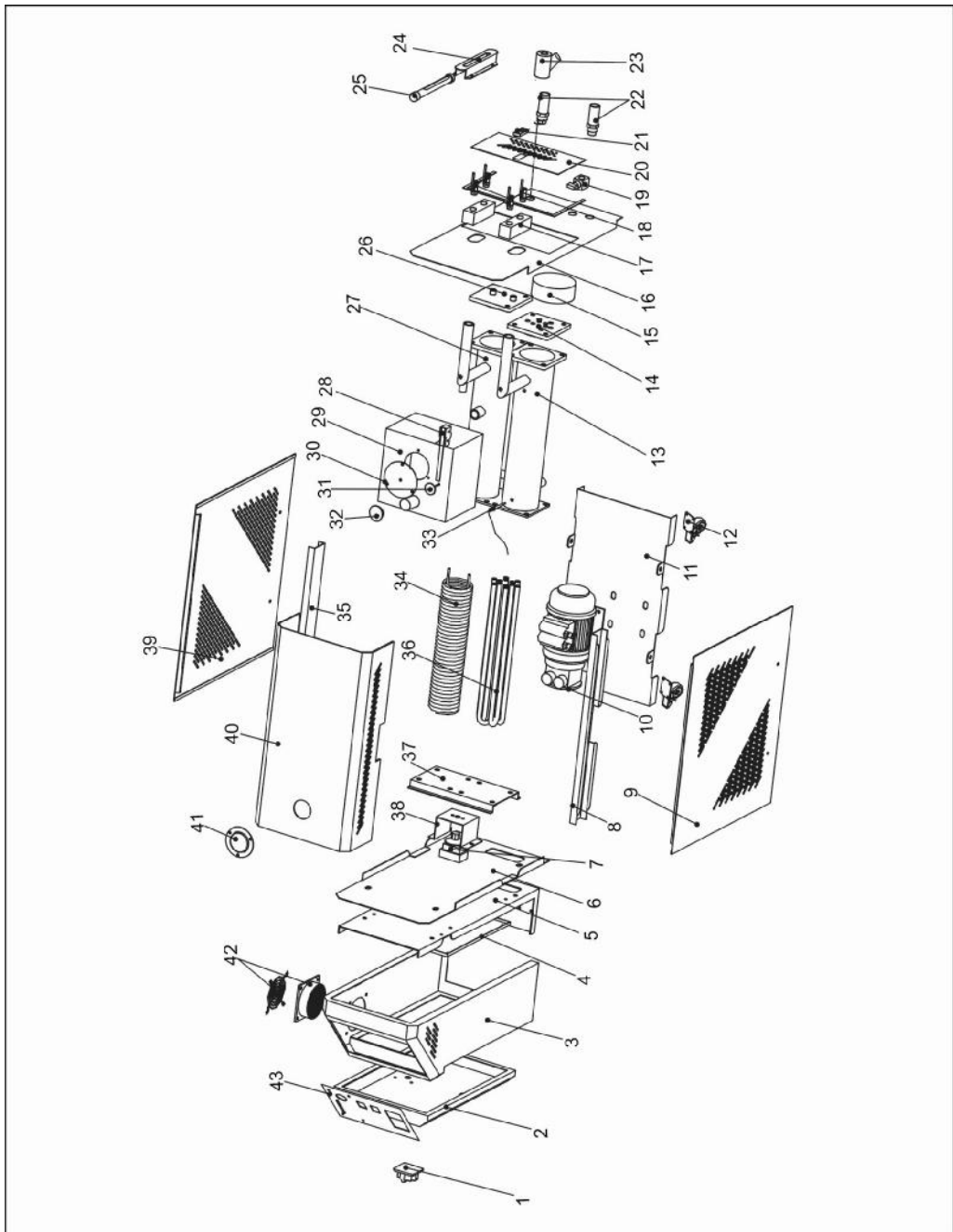


Picture 2-1: Working Principle

The high temperature oil returns to the machine and then be pressured by pump to the heaters. After being heated, oil will be forced to the mould and continue the circle. In the process, if the oil temperature is too high, system will activate the solenoid valve to let cooling water cool down high temperature oil indirectly until the temperature is down to the system requirement. If the temperature keeps increasing and reaches to the set point of EGO, the system will sound alarm and stop operation. The system will have low level alarm and stop working if oil level falls down below the set point.

2.2 Assembly Drawing

2.2.1 Assembly Drawing (STM-607~1220)



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-607~1220)

2.2.2 Parts List (STM-607~STM-1220)

Table 2-1: Parts List (STM-607/STM-607-D)

No.	Name	Part No.	
		STM-607	STM-607-D
1	Main switch*	YE10200300000	YE10220300000
2	Door plate	BL40060700920	BL40691040720
3	Control box	BL40060702520	BL40060740220
4	Electrical components board	BL40060701920	BL40060704020-
5	Control box rear plate	BL40060702120	BL40691041120
6	Middle plate	BL40060701420-	BL40691040120
7	EGO*	YE21503000000	YE21503000000
8	Right beam	-	-
9	Right side plate	BL40060703720	-
10	Pump*	BM20005500250	BM20005500250
11	Bottom plate	BL40060740320	BL40060740120
12	Castor	YW03000200000	YW03000300200 YW03000300000
13	Heating tank	BK40060700320	BK40060700320
14	Heating tank flange	BL40060702320	BL40060702320
15	Pipe heater cover	BL80091000120	BL80091000120
16	Rear plate	BL42060703820	BL40691040220-
17	Water flow distributor	-	-
18	Ball valve	YW50030800100	YW50030800100
19	Solenoid valve**	YE32213100000	YE32213100000
20	Rear cover	-	-
21	Plastic handle	YR40523000000	YR40523000000
22	Copper joint	BH12030801310	BH12030801310
23	Y type strainer*	YW57010200000	YW57010200000
24	Level indicator cover	-	-
25	Level indicator*	BH12060700210	BH12060700210
26	Cooling tank flange	BL42691049420	BL42691049420
27	Cooling tank	BL49060730020	BL49060730020
28	Microswitch	YE14152400000	YE14152400000
29	Oil tank	BL42060700321	BL42060700321
30	Floating ball chamber cover*	BL40060703220	BL40060703220
31	Floating ball	BL40060702620	BL40060702620
32	Oxidxed aluminum oil lap	BH12030403040	BH12030403040
33	Thermocouple	BE90100000150	BE90100000150
34	Cooling pipes	BL49060710020	BL49060710020
35	Left beam	-	-

No.	Name	Part No.	
		STM-607	STM-607-D
36	Pipe heater*	BH70060700050	BH70060700050
37	Heating tank mounting plate	-	-
38	EGO mounting plate	-	-
39	Left side plate	-	-
40	Top cover	-	-
41	Pressure meter	YW85001000100	YW85001000100
42	Cooling fan + fan guard*	YM60922500100	YM60922500100
43	Manufacturer's plate	YR01004000000	YR01004000000

* 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 2-2: Parts List (STM-910/STM-910-D)

No.	Name	Part No.	
		STM-910	STM-910-D
1	Main switch*	YE10210300000	YE1025040000
2	Door plate	BL40060700920	BL40691040720
3	Control box	BL40060700920	BL40691040720
4	Electrical components board	BL40060702520	BL40060740220
5	Control box rear plate	BL40060701920	BL40060704020-
6	Middle plate	BL40060702120	BL42091001320
7	EGO*	YE21503000000	YE21503000000
8	Right beam	-	BL42091001220
9	Right side plate	BL42091000520	BL42091002020
10	Pump*	BM20007500050	BM20007500050
11	Bottom plate	BL41091045820	BL40122040120
12	Castor	YW03000200000-	YW03000300200 YW03000300000
13	Heating tank	BL40091000321	BL40091000321
14	Heating tank flange	BL42091000220	BL42091000220
15	Pipe heater cover	BL80091000120	BL80091000120
16	Rear plate	BL42091002120	BL41091005620
17	Water flow distributor	-	-
18	Ball valve	YW50030800100	YW50030800100
19	Solenoid valve**	YE32213100000	YE32213100000
20	Rear cover	-	-
21	Plastic handle	YR40523000000	YR40523000000
22	Copper joint	BH12131200010	BH12030801110
23	Y type strainer*	YW57010200000	YW57010200000
24	Level indicator cover	BL41091001321	BL41091001321
25	Level indicator*	BH12060700210	BH12060700210
26	Cooling tank flange	BL42691049420	BL42691049420
27	Cooling tank	BL49091000420	-BL49091000420
28	Microswitch	YE14152400000	YE14152400000
29	Oil tank	BL40091000521	BL40091000521
30	Floating ball chamber cover*	BL42091000420	BL42091001620
31	Floating ball	BL40060702620	BL40060702620
32	Oxidxed aluminum oil lap	BH12030403040	BH12030403040
33	Thermocouple	BE90100000150	BE90100000150
34	Cooling pipes	BW88091000020	BW88091000020
35	Left beam	-	BL42091001220
36	Main Switch*	BH70091000050	BH70091000050

No.	Name	Part No.	
		STM-910	STM-910-D
37	Pipe heater*	BL42091002320	BL42091002320
38	Heating tank mounting plate	YR40000400300	YR40000400300
39	EGO mounting plate	BL42091000520	BL42091002020
40	Left side plate	BL40060700520	BL41091005720
41	Top cover	YW85001000100	YW85001000100
42	Pressure meter	YM60922500100	YM60922500100
43	Cooling fan + fan guard*	YR01004000000	YR01004000000

* 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 2-3: Parts List (STM-1220)

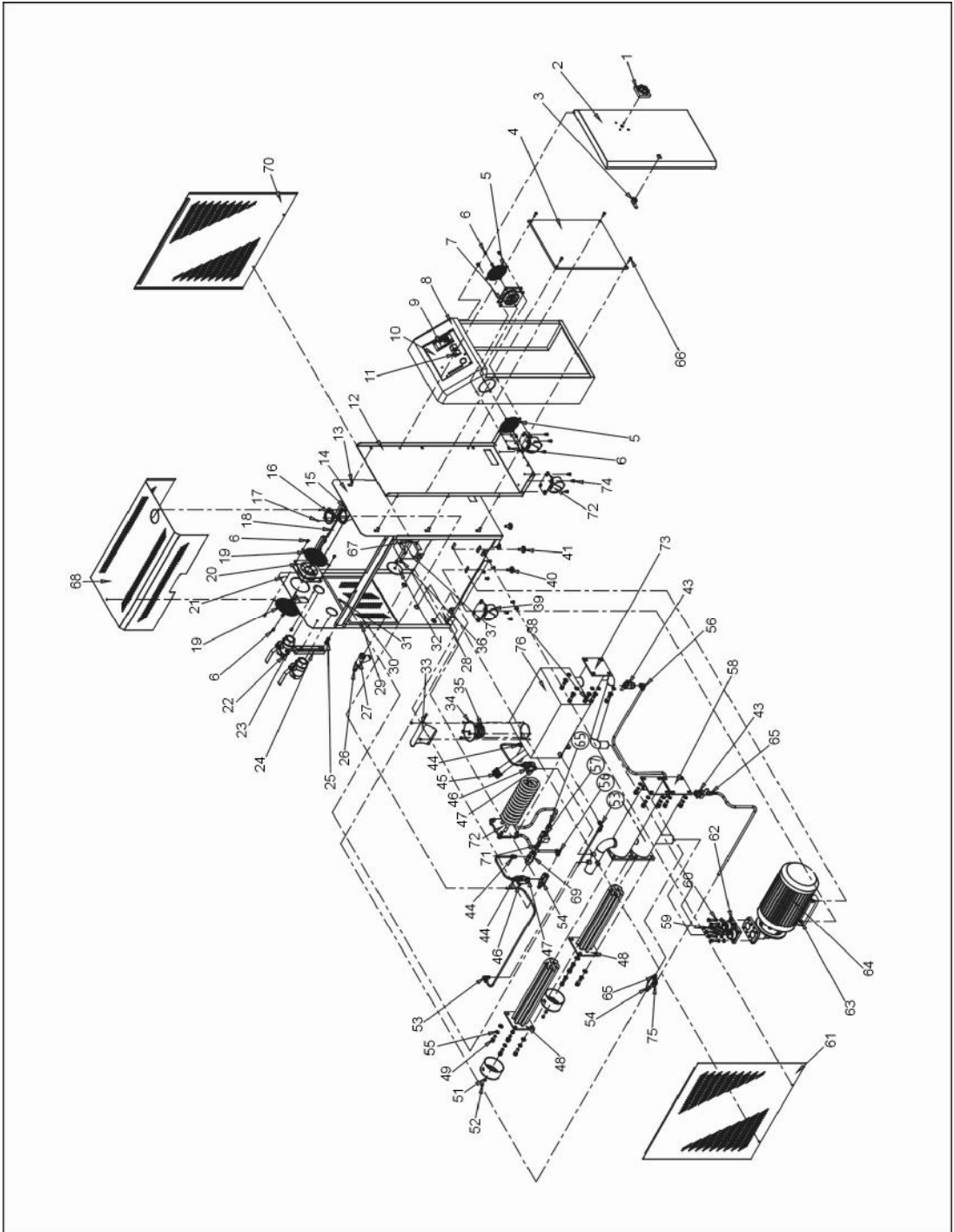
No.	Name	Part No.	No.	Name	Part No.
1	Main switch*	YE10220300000	23	Y type strainer*	YW57010200000
2	Door plate	BL40122041120	24	Level indicator cover	-
3	Control box	BL40122041020	25	Level indicator*	BH12060700210
4	Electrical components board	BL40122041220	26	Cooling tank flange	-
5	Control box rear plate	BL40122041420	27	Cooling tank	BL42012000020
6	Middle plate	BL40122040620	28	Microswitch	YE14152400000
7	EGO*	YE21503000000	29	Oil tank	BL40122041620
8	Right beam	-	30	Floating ball chamber cover*	BL42091001620
9	Right side plate	BL40122040220	31	Floating ball	BL40060702620
10	Pump*	BM20015000050	32	Oxidxed aluminum oil lap	BH12030403040
11	Bottom plate	BL40122040720	33	Thermocouple	BE90100000150
12	Castor	YW03002500000	34	Cooling pipes	BW88122000020
13	Heating tank	-	35	Left beam	-
14	Heating tank flange	-	36	Main Switch*	BH70122000050
15	Pipe heater cover	BL80091000120	37	Pipe heater*	-
16	Rear plate	BL40122040820	38	Heating tank mounting plate	YR40000400300
17	Water flow distributor	-	39	EGO mounting plate	BL40122040220-
18	Ball valve	YW50030400000	40	Left side plate	BL40122040520
19	Solenoid valve**	YE32213100000	41	Top cover	YW85001000100
20	Rear cover	-	42	Pressure meter	YM60922500100
21	Plastic handle	YR40523000000	43	Cooling fan + fan guard*	YR01004000000
22	Copper joint	BH12131200010			

* 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-2440)



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-2440)

2.2.4 Parts List (STM-2440)

Table 2-4: Parts List (STM-2440)

No.	Name	Part No.	No.	Name	Part No.
1	Main switch*	YE1025040000	28	Ground plate	BL42244001620
2	Door plate	BL41244010220	29	Mini cover board of backboard planker	BL42244000920
3	long door lock	YW00000000100	30	Mini cover board of backboard	BL42244000920
4	Electric-controlled ground plate	BL40244040920	31	M6×15 butterfly screw	YW69061500000
5	Fan web	YM60922500100	32	EGO revolving button	YE21503000000
6	M6×10 lentilheaded screw	YW62061000000	33	Microswitch cover	-
7	Fan	YM60922500100	34	Cover board of floating ball	-
8	Electric controlled cabinet	BH49243000150	35	Floater	BL42244000521
9	Temperature control meter*	YE85005000000	36	M4×5 lentil headed screw	YW62040500000
10	Operation panel	YR01004000000	37	EGO installation board	YR40000400300
11	Full form switch	YE14152400000	38	M10×20 inner hexagon screw	YW61102000000
12	Backboard of electric controlled cabinet	-	39	Braking plastic core-rubber-tires	YW03000300000
13	M8×15 inner hexagon screw	YW60081600100	40	M8×30 inner hexagon screw	YW60083000200
14	Clapboard	BL40244040720	41	D8 flap gasket	YW66081600000
15	Installation board of pressure gauge	-	42	Movable truckle	YW03000300200
16	Pressure gauge	YW85001000100	43	3 Branches ball valve	YW50030800100
17	M3×5 lentil heatedb	YW63030600000	44	1/4"PT×1/4"H Teflon pipe connection	BH12010400410
18	Beam	BL40244040620	45	3/4" Oil cap	BH12030403040
19	Fan net	YM60922500100	46	2 Branches ball valve	YW50010400000
20	Fan	YM60922500100	47	1/4" Copper connection with external teeth at the two ends	BH12010400110
21	Backboard	BL42244001020	48	Electric heat tube unit*	BH70244000050
22	1 1/4 ball valve	YW50012500000	49	M10×25 Inner hexagon screw	YW61102500000
23	M12 fastening screw	YW68121000000	50	Electric heat tube shield	BL80122000120
24	Fluid level glass**	BH12060700210	51	D6 Flat gasket	YW66061300000
25	1/4H connector	YW04030800500	52	M6 Nut	YW64000600300
26	Core	BH12030801110	53	1/4"PT×1/4"H Teflon pipe connection(L-type)	YW04010400400
27	Water filter valve**	YW57010200000	54	Copper connection 2	BH12060702010

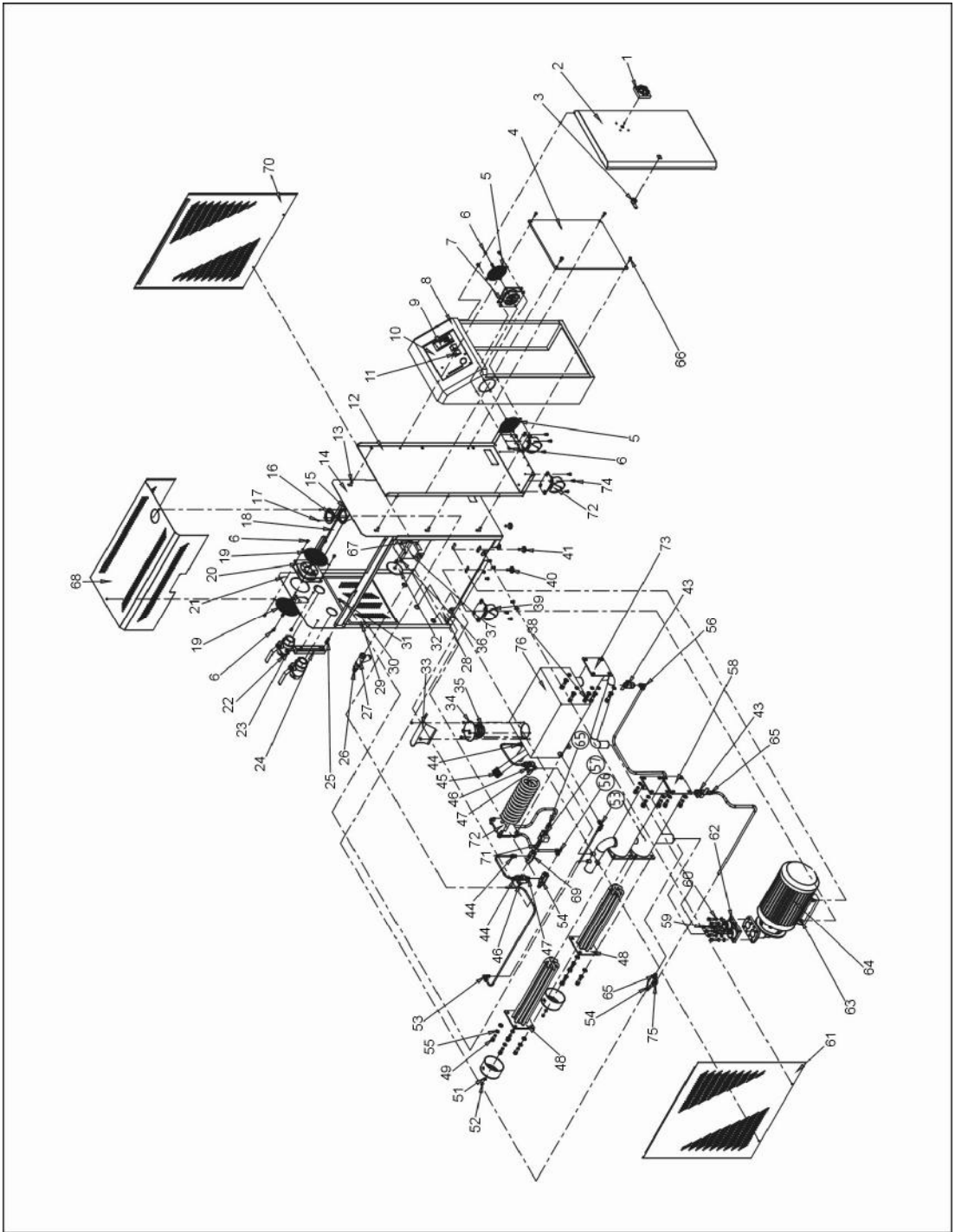
No.	Name	Part No.	No.	Name	Part No.
55	D10 Elastic washer	YW65010000000	66	M6×15 lentil heated screw	YW63061500000
56	3/8"PT×3/8"H Teflon pipe connection (L-type)	YW04030800300	67	EGO*	YE21503000000
57	Solenoid valve**	YE32213100000	68	Cover	BL40244040220
58	Heating bucket	BL42244000221	69	Copper connection 1	BH12030800010
59	M8×25 Inner hexagon screw	YW6108250010	70	Side plate (right)	BL42244001720
60	D8 Elastic washer	YW65008000100	71	3/8" Copper connection with external teeth at the two ends	BH12030800110
61	Side plate (left)	BL42244001720	72	Condensation pipe	BW88244030020
62	Pump flange	BW31015000010	73	Cooler bucket	BL42244000121
63	M8 Nut	YW65008000100	74	M6×10 Inner hexagon screw	YW60061000000
64	Water pump	BM20028000050	75	1/4"PT×3/8"H Teflon pipe connection(L-type)	YW04030800200
65	3/8"PT×3/8"H Teflon pipe connection	BH12030800610	76	Droppable fuel tank	BL42244000421

* 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 Assembly Drawing (STM-3650)



Remarks: Please refer to material list 2.2.6 for specific explanation of the Arabic numbers in parts drawing.

Picture 2-4: Assembly Drawing (STM-3650)

2.2.6 Parts List (STM-3650)

Table 2-5: Parts List (STM-3650)

No.	Name	Part No.	No.	Name	Part No.
1	Main switch*	YE10010000000	28	Ground plate	BL42365001720
2	Door plate	BL40365041320	29	Mini cover board of backboard planker	BL42365000420-
3	long door lock	YW00000000100	30	Mini cover board of backboard	BL42365000520-
4	Electric-controlled ground plate	BL40365041420	31	M6×15 butterfly screw	YW69061500000
5	Fan web	YM60922500100	32	EGO revolving button	YE21503000000
6	M6×10 lentiheaded screw	YW62061000000	33	Microswitch cover	-
7	Fan	YM60121200400	34	Cover board of floating ball	-
8	Electric controlled cabinet	BH49365000250	35	Floater	-
9	Temperature control meter*	YE85005000000	36	M4×5 lenti headed screw	YW62040500000
10	Operation panel	YR01004000000	37	EGO installation board	YR40000400300
11	Full form switch	YE14152400000	38	M10×20 inner hexagon screw	YW61102000000
12	Backboard of electric controlled cabinet	BL42365001520	39	Braking plastic core-rubber-tires	YW03000300000
13	M8×15 inner hexagon screw	YW60081600100	40	M8×30 inner hexagon screw	YW60083000200
14	Clapboard	BL40365040620	41	D8 flap gasket	YW66081600000
15	Installation board of pressure gauge	-	42	Movable truckle	YW03000300200
16	Pressure gauge	YW85001000100	43	3 Branches ball valve	YW50030800100
17	M3×5 lenti heatedb	YW63030600000	44	1/4"PT×1/4"H Teflon pipe connection	BH12010400410
18	Beam	BL40365040520	45	3/4" Oil cap	BH12030403040
19	Fan net	YM60423000000	46	2 Branches ball valve	YW50010400000
20	Fan	YM60423000000	47	1/4" Copper connection with external teeth at the two ends	BH12010400110
21	Backboard	BL40365040720	48	Electric heat tube unit*	BH70365000050
22	1 1/4 ball valve	YW50012500000	49	M10×25 Inner hexagon screw	YW61102500000
23	M12 fastening screw	YW68121000000	50	Electric heat tube shield	BL80122000120
24	Fluid level glass**	BH12060700210	51	D6 Flat gasket	YW66061300000
25	1/4H connector	YW04030800500	52	M6 Nut	YW64000600300
26	Core	BH12030801110	53	1/4"PT×1/4"H Teflon pipe connection(L-type)	YW04010400400
27	Water filter valve**	YW57010200000	54	Copper connection 2	BH12060702010

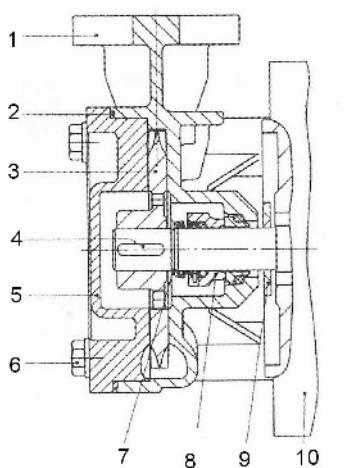
No.	Name	Part No.	No.	Name	Part No.
55	D10 Elastic washer	YW65010000000	66	M6×15 lentil heated screw	YW63061500000
56	3/8"PT×3/8"H Teflon pipe connection(L-type)	YW04030800300	67	EGO*	YE21503000000
57	Solenoid valve**	YE32213100000	68	Cover	BL40365040320
58	Heating bucket	BL42365000221-	69	Copper connection 1	BH12030800010
59	M8×25 Inner hexagon screw	YW6108250010	70	Side plate (right)	BL40365040120
60	D8 Elastic washer	YW65008000100	71	3/8" Copper connection with external teeth at the two ends	BH12030800110
61	Side plate (left)	BL40365040220	72	Condensation pipe	-
62	Pump flange	BW31015000010	73	Cooler bucket	BL42365000121
63	M8 Nut	YW64080600000	74	M6×10 Inner hexagon screw	YW60061000000
64	Water pump	YM20609100100	75	1/4"PT*3/8"H Teflon pipe connection(L-type)	YW04030800200
65	3/8"PT×3/8"H Teflon pipe connection	BH12030800610			

* 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.

2.2.7 Pump



Picture 2-5: Pump

Table 2-4: Pump Parts List

No.	Name	Part No.				
		STM-607/607D	STM-910/910D	STM-1220	STM-2440	STM-3650
1	Pump body					
2	O-shape ring					
3	Impeller					
4	Key					
5	Pump lid					
6	Hexagonal head screw					
7	Snap ring					
8	Mechanical shaft seal *	YR80901000000	YR80901200000	YR80901600000	YR80902240000	YR80902240000
9	Rotary ring					
10	Motor					

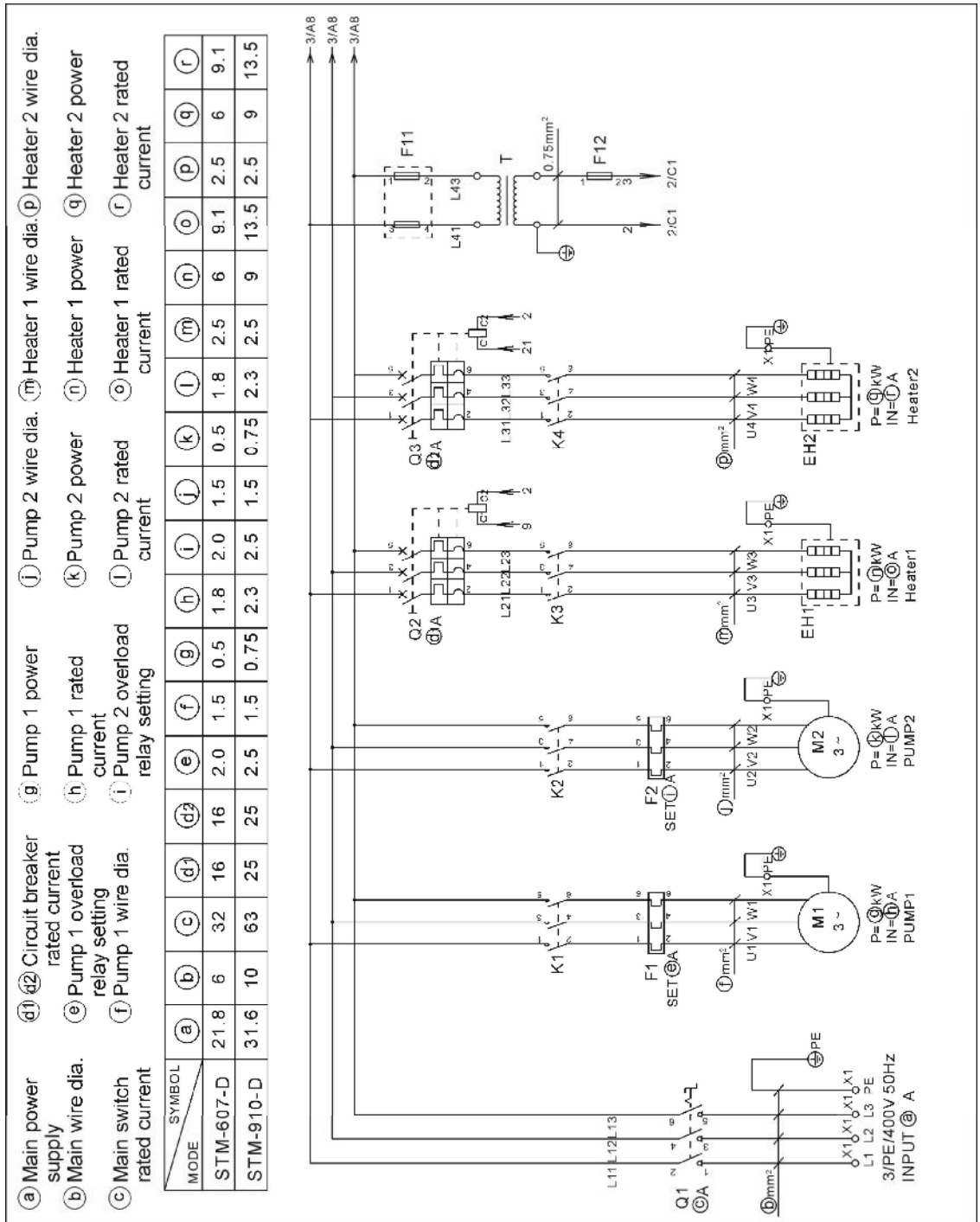
* means possible broken parts.

** 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.

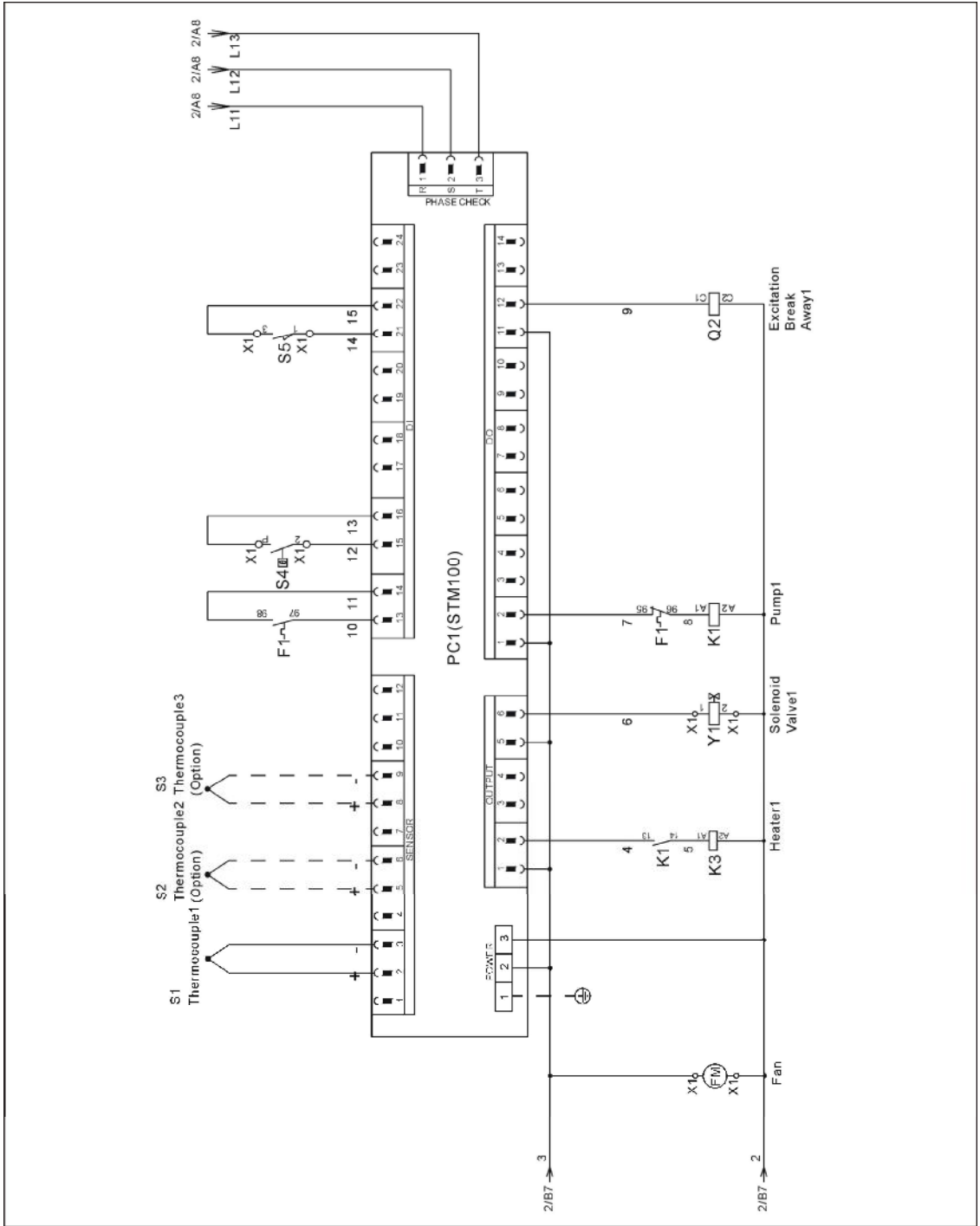
2.3 Electrical Diagram

2.3.1 Main Circuit (STM-607/910-D)(400V)

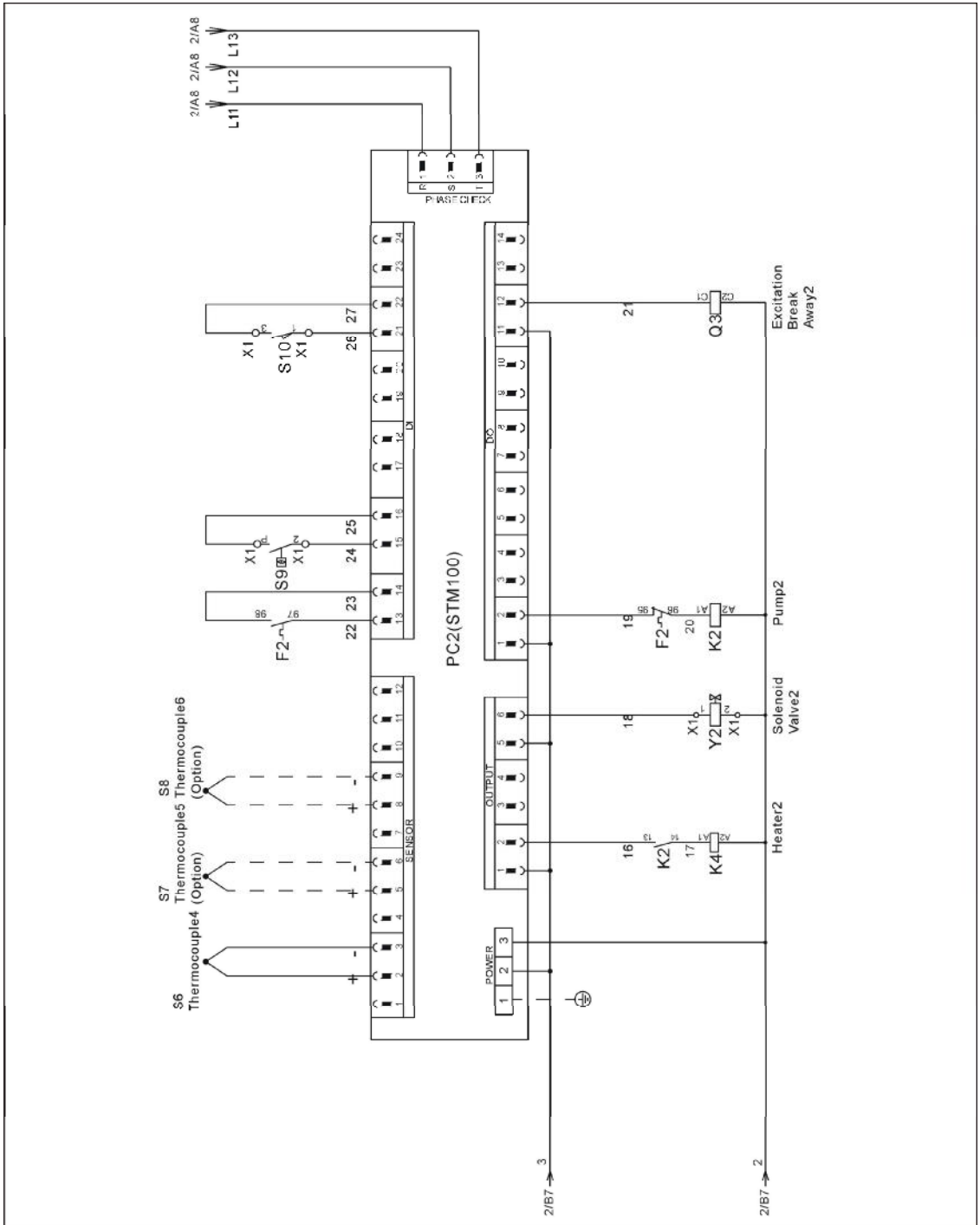


Picture 2-6: Main Circuit (STM-607/910-D) (400V)

2.3.2 Control Circuit (STM-607/910-D) (400V)

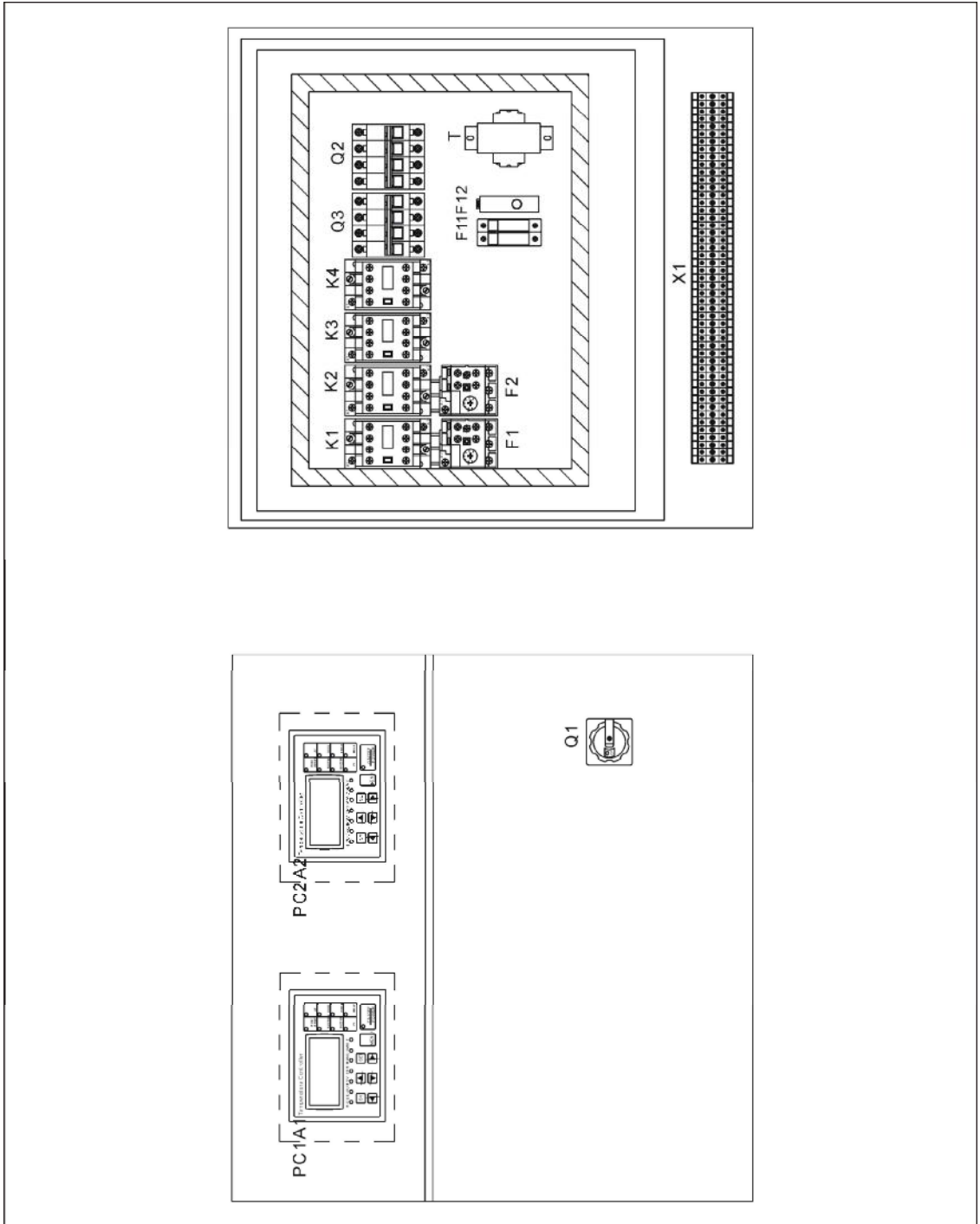


Picture 2-7: Control Circuit 1 (STM-607/910-D) (400V)



Picture 2-8: Control Circuit 2 (STM-607/910-D) (400V)

2.3.3 Electrical Components Layout (STM-607/910-D) (400V)



Picture 2-9: Electrical Components Layout (STM-607/910-D) (400V)

2.3.5 Electrical Components List (STM-607/910-D) (400V)

Table 2-6: Electrical Components List (STM-607-D) (400V)

No.	Symbol	Name	Specification	Part No.
1	Q1	Main switch*	32A	YE10323200000
2	Q2 Q3	Circuit_breakers*	16A	YE40601500000
3	-	Excitation break away*	230V 50/60Hz	YE40023560000
4	K1 K2	Contactors*	220V 50/60Hz	YE00601521000
5	K3 K4	Contactors**	220V 50/60Hz	YE00601800000
6	F1 F2	Overload relays	1.8~2.5A	YE01160180000
7	F11	Fuse box**	32A 2P	YE41032200000
8	-	Fuse**	2A	YE46002000100
9	F12	Fuse**	2A	YE41001000000
10	T	Transformer**	500mA	YE70402300800
11	S1 S6	Thermocouple	-	-
12	S2 S3 S7 S8	Thermocouple	-	-
13	S4 S9	Overheat protector *	-	-
14	S5 S10	Hydraulic switch	-	YE14152400000
15	PC1 PC2	Circuit board**	100~240VAC 50/60Hz	YE80000100000
16	A1 A2	Control panel	-	
17	Y1 Y2	Solenoid valve*	230VAC 50/60Hz	-
18	X1	Terminal board	-	YE61250040000
19	-	Terminal board	-	YE61253500000
20	-	Terminal board	-	YE61060000000
21	-	Terminal board	-	YE61063500000
22	M1 M2	Motor**	400V 50Hz 0.5kW	-
23	EH1 EH2	Heater**	400V 50Hz 6kW	-
24	FM	Fan*	230VAC 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 2-7: Electrical Components List (STM-910-D) (400V)

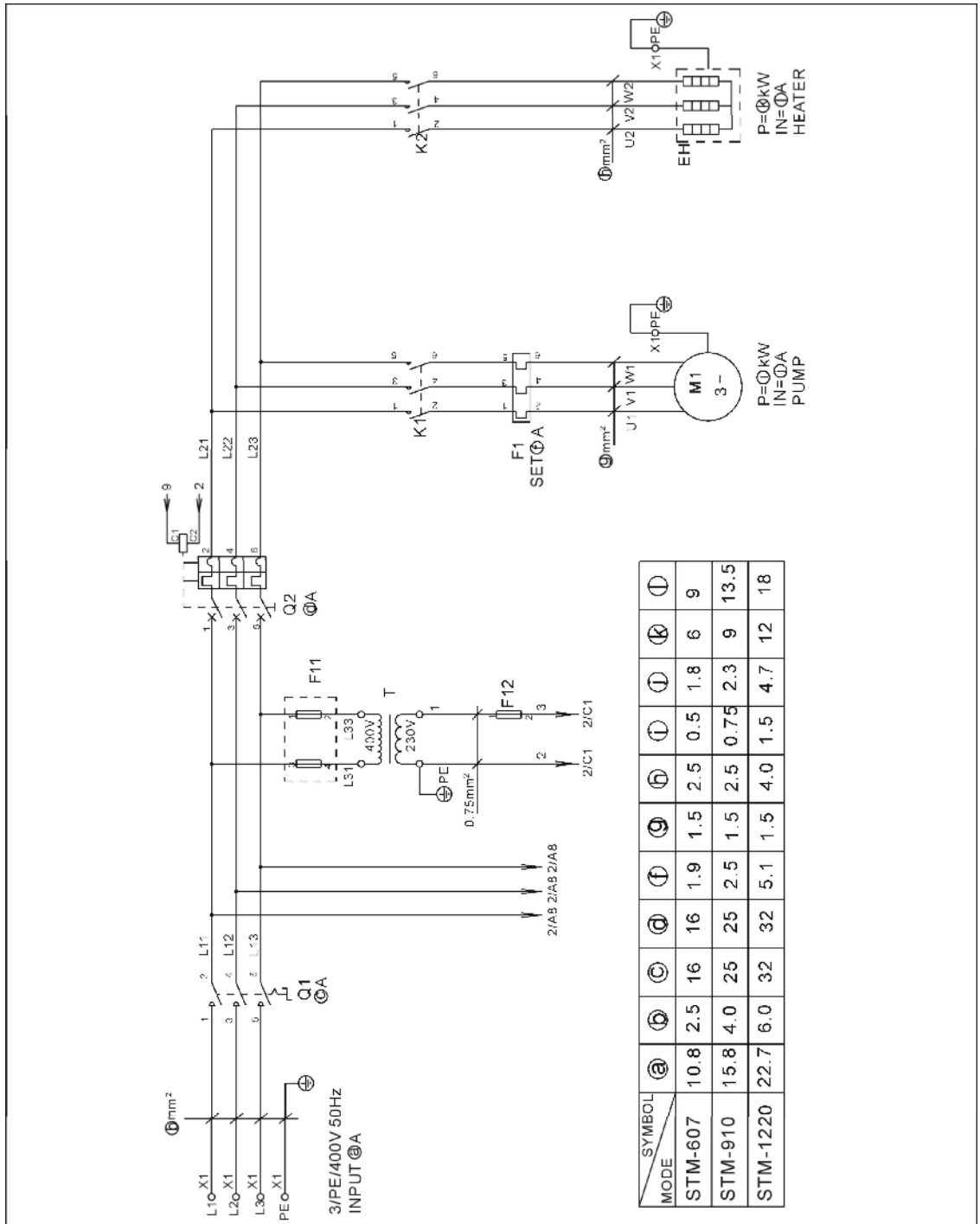
No.	Symbol	Name	Specification	Part No.
1	Q1	Main switch*	63A	YE10636300000
2	Q2 Q3	Circuit_breakers*	25A	YE40602500000
3	-	Excitation break away*	230V 50/60Hz	YE40023560000
4	K1 K2	Contactors*	220V 50/60Hz	YE00601521000
5	K3 K4	Contactors**	220V 50/60Hz	YE00602522000
6	F1 F2	Overload relays	2.2~3.2A	YE01160220000
7	F11	Fuse box**	32A 2P	YE41032200000
8	-	Fuse**	2A	YE46002000100
9	F12	Fuse**	2A	YE41001000000
10	T	Transformer**	500mA	YE70402300800
11	S1 S6	Thermocouple	-	-
12	S2 S3 S7 S8	Thermocouple	-	-
13	S4 S9	Overheat protector *	-	-
14	S5 S10	Hydraulic switch	-	YE14152400000
15	PC1 PC2	Circuit board**	100~240VAC 50/60Hz	YE80000100000
16	A1 A2	Control panel	-	
17	Y1 Y2	Solenoid valve*	230VAC 50/60Hz	-
18	X1	Terminal board	-	YE61250040000
19	-	Terminal board	-	YE61253500000
20	-	Terminal board	-	YE61100000000
21	-	Terminal board	-	YE61103500000
22	M1 M2	Motor**	400V 50Hz 0.75kW	-
23	EH1 EH2	Heater**	400V 50Hz 9kW	-
24	FM	Fan*	230VAC 50/60Hz	-

* means possible broken parts.

** means easy broken part. and spare backup is suggested.

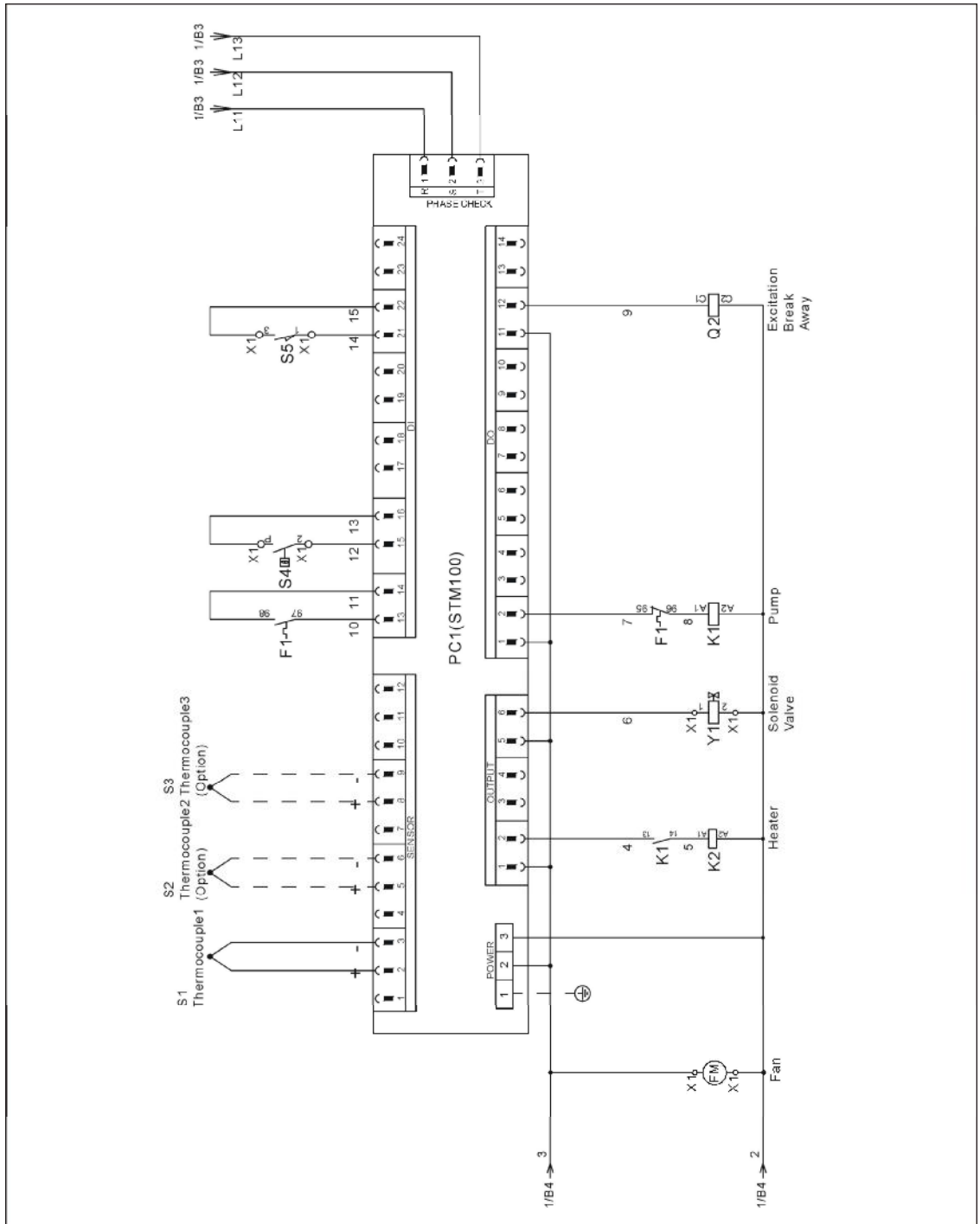
Please confirm the version of manual before placing the purchase order to guarantee that the item number of the spare part is in accordance with the real object.

2.3.6 Main Circuit (STM-607~1220) (400V)



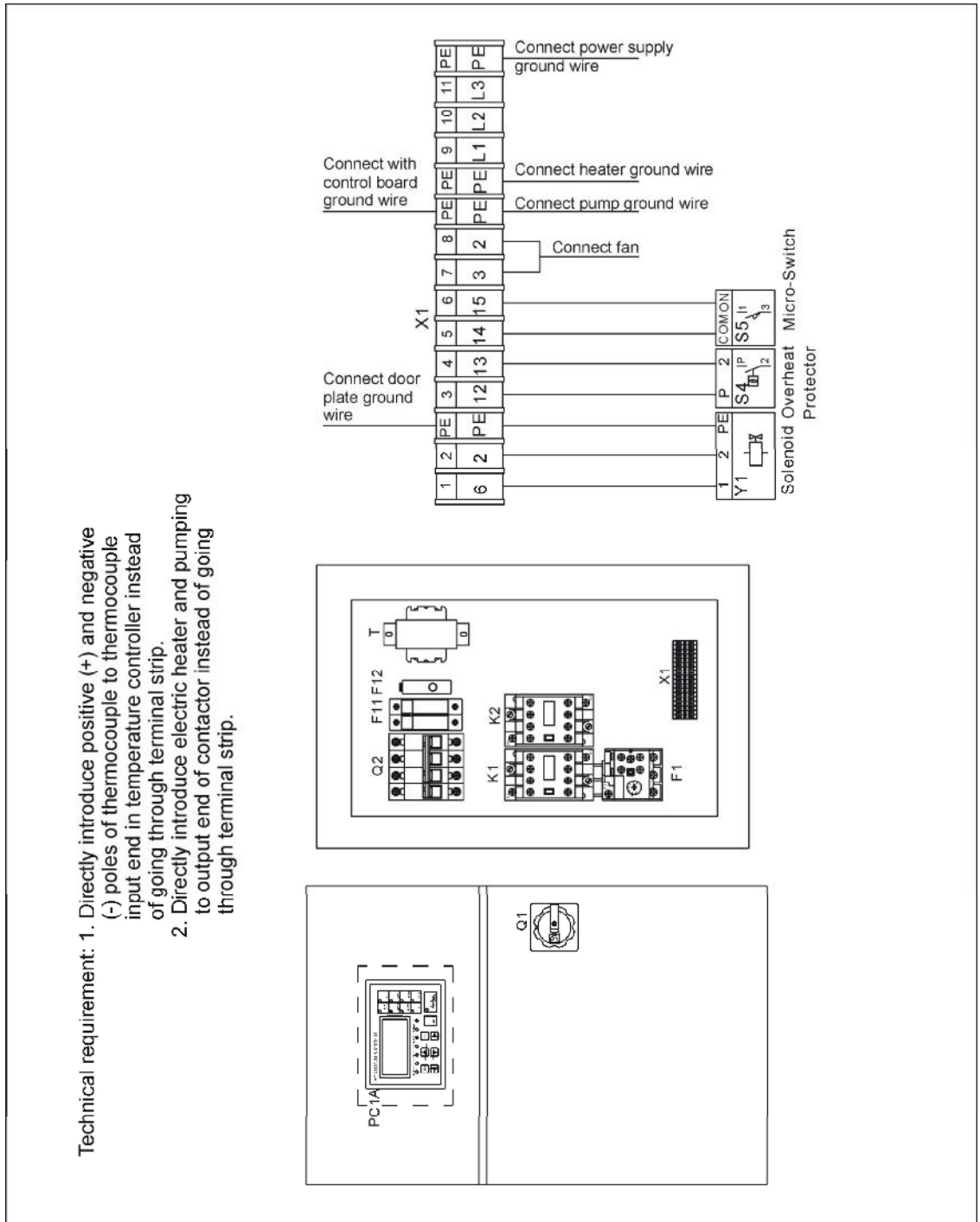
Picture 2-11: Main Circuit (STM-607~1220)(400V)

2.3.7 Control Circuit (STM-607~1220)(400V)



Picture 2-12: Control Circuit (STM-607~1220) (400V)

2.3.8 Electrical Components Layout (STM-607~1220) (400V)



Picture 2-13: Electrical Components Layout (STM-607~1220) (400V)

2.3.9 Electrical Components List (STM-607~1220) (400V)

Table 2-8: Electrical Components List (STM-607) (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	F1	Overload relays	1.8~2.5A	YE01160180000
7	F11	Fuse box**	32A 2P	YE41032200000
8	-	Fuse**	2A	YE46002000100
9	F12	Fuse**	2A	YE41001000000
10	T	Transformer	500mA	YE70402300800
11	S1	Thermocouple	-	-
12	S2 S3	Thermocouple	-	-
13	S4	Overheat protector*	-	-
14	S5	Limit switch	250V 5(4)	YE14152400000
15	PC1	Circuit board**	100~240VAC 50/60Hz	YE81100010000
16	A	Control panel	-	
17	X1	Terminal board	-	YE61250040000
18	-	Terminal board	-	YE61253500000
19	M1	Motor**	400V 50Hz 0.5kW	-
20	EH	Heater**	400V 50Hz 6kW	-
21	FM	Fan*	230VAC 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 2-9: Electrical Components List (STM-910) (400V)

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	F1	Overload relays	2.2~3.2A	YE01160220000
7	F11	Fuse box**	32A 2P	YE41032200000
8	-	Fuse**	2A	YE46002000100
9	F12	Fuse**	2A	YE41001000000
10	T	Transformer	500mA	YE70402300800
11	S1	Thermocouple	-	-
12	S2 S3	Thermocouple	-	-
13	S4	Overheat protector*	-	-
14	S5	Limit switch	250V 5(4)	YE14152400000
15	PC1	Circuit board**	100~240VAC 50/60Hz	YE81100010000
16	A	Control panel	-	
17	X1	Terminal board	-	YE61250040000
18	-	Terminal board	-	YE61253500000
19	-	Terminal board	-	YE61040000000
20	-	Terminal board	-	YE61043500000
21	M1	Motor**	400V 50Hz 0.75kW	-
21	EH	Heater**	400V 50Hz 9kW	-
23	FM	Fan*	230VAC 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 2-10: Electrical Components List (STM-1220) (400V)

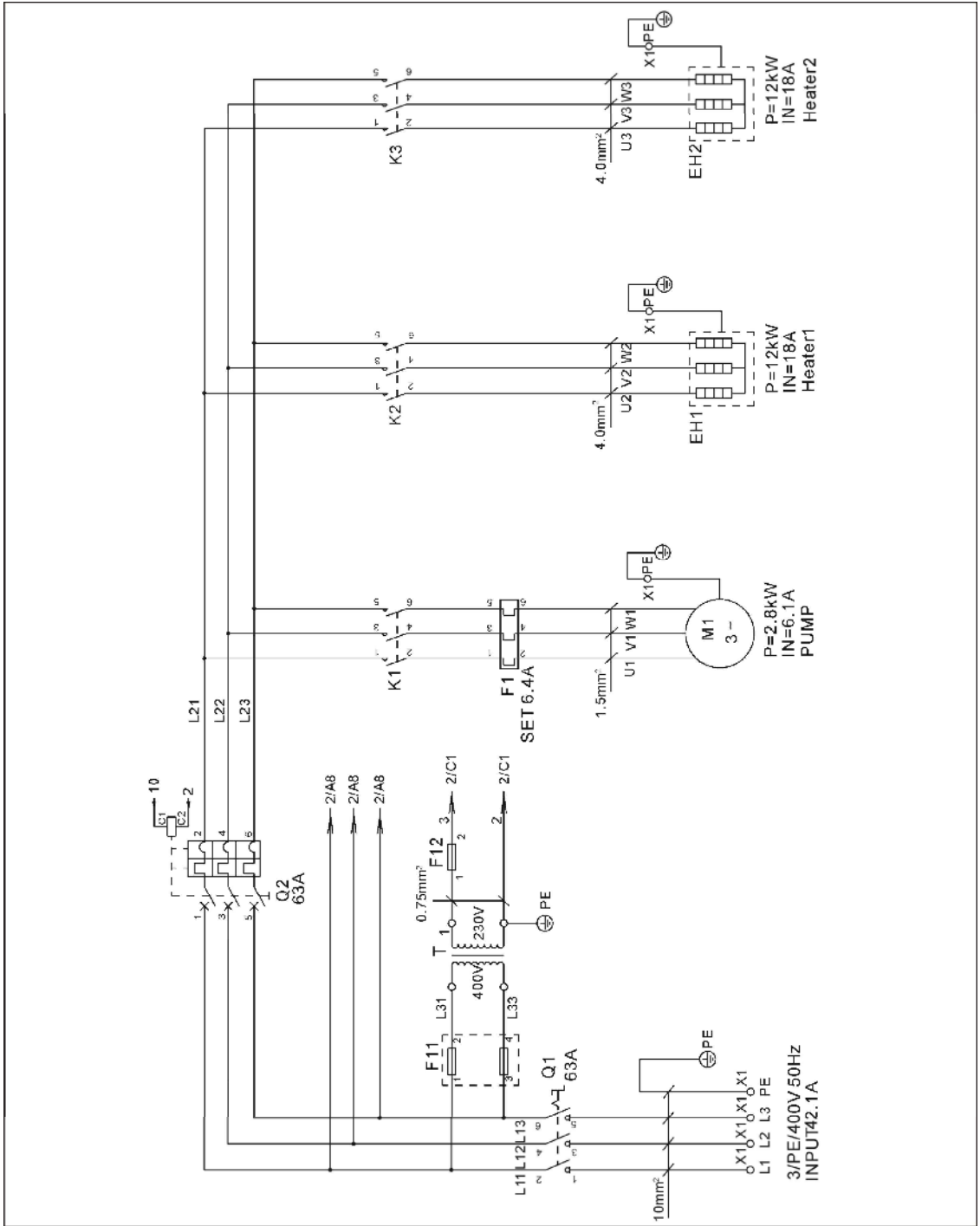
No.	Symbol	Name	Specification	Part No.
1	Q1	Main switch*	32A	YE10323200000
2	Q2	Circuit_breakers*	32A	YE40603200000
3	-	Excitation break away*	-	YE40023560000
4	K1	Contactors*	220V 50/60Hz	YE00601521000
5	K2	Contactors**	220V 50/60Hz	YE00602622000
6	F1	Overload relays	4.5~6.3A	YE01160450000
7	F11	Fuse box**	32A 2P	YE41032200000
8	-	Fuse**	2A	YE46002000100
9	F12	Fuse**	2A	YE41001000000
10	T	Transformer	500mA	YE70402300800
11	S1	Thermocouple	-	-
12	S2 S3	Thermocouple	-	-
13	S4	Overheat protector*	-	-
14	S5	Limit switch	250V 5(4)	YE14152400000
15	PC1	Circuit board**	100~240VAC 50/60Hz	YE81100010000
16	A	Control panel	-	
17	X1	Terminal board	-	YE61250040000
18	-	Terminal board	-	YE61253500000
19	-	Terminal board	-	YE61043500000
20	-	Terminal board	-	YE61060000000
21	-	Terminal board	-	YE61063500000
21	M1	Motor**	400V 50Hz 1.5kW	-
23	EH	Heater**	400V 50Hz 12kW	-
24	FM	Fan*	230VAC 50/60Hz	-

* means possible broken parts.

** means easy broken part. and spare backup is suggested.

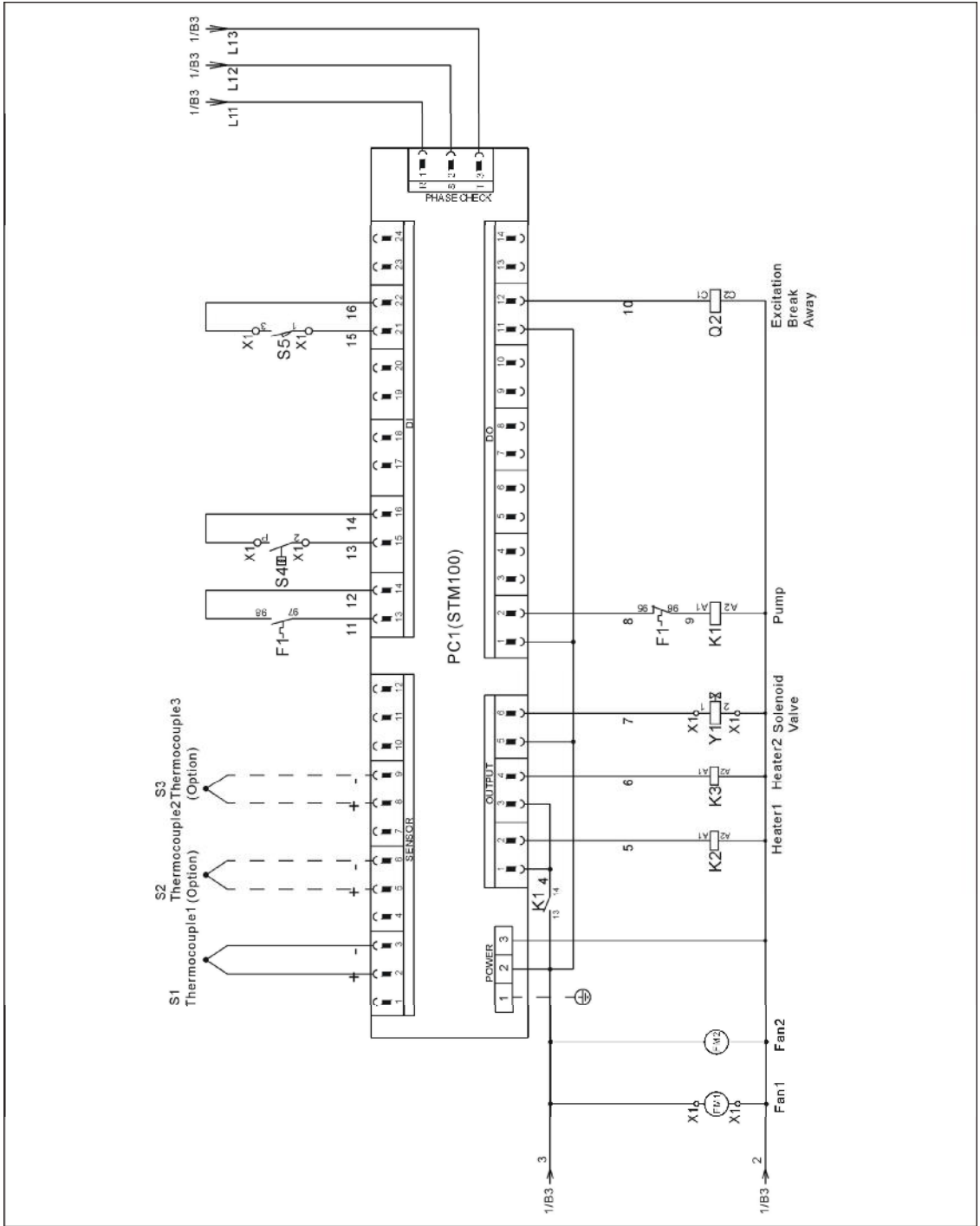
Please confirm the version of manual before placing the purchase order to guarantee that the item number of the spare part is in accordance with the real object.

2.3.10 Main Circuit (STM-2440) (400V)



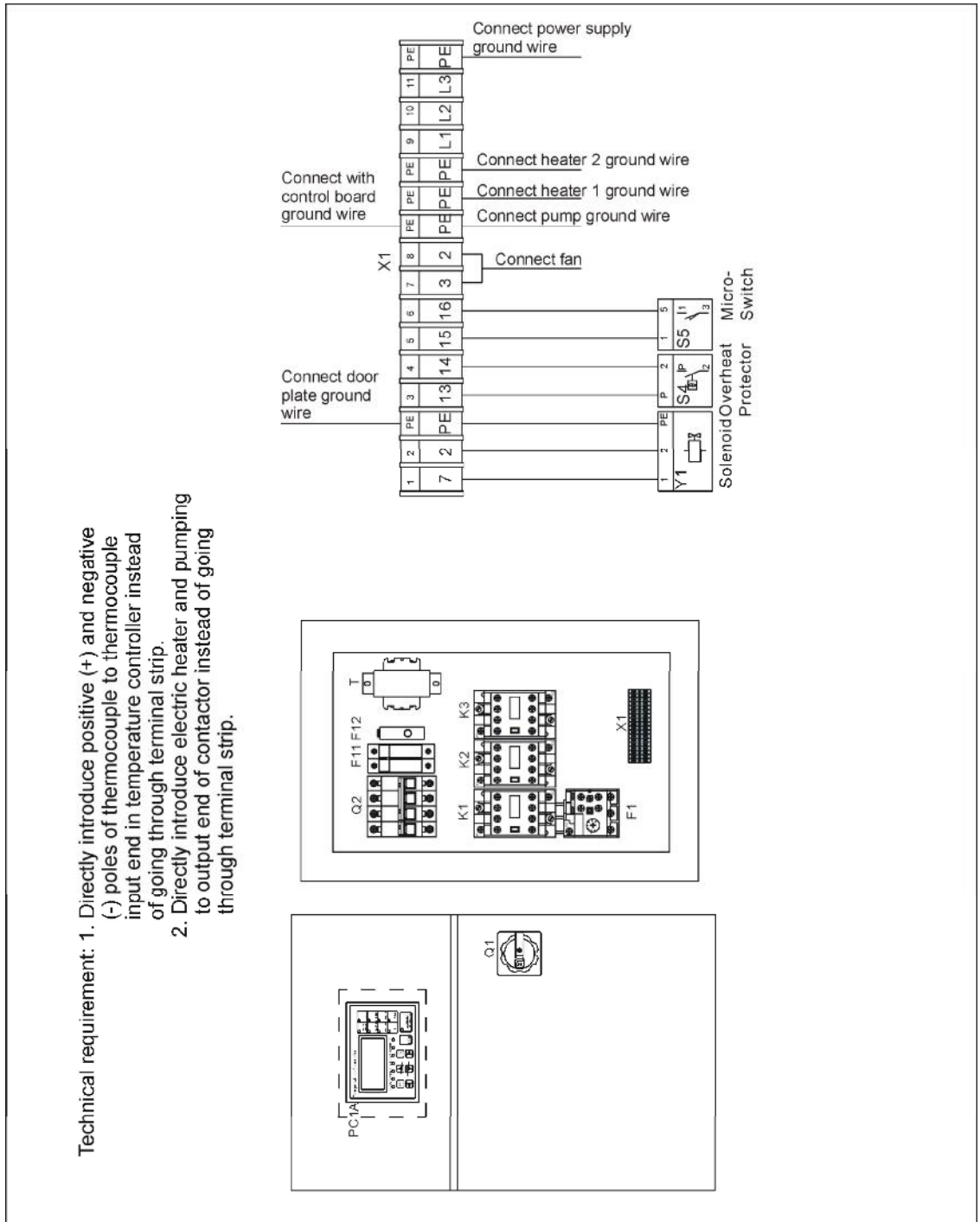
Picture 2-14: Main Circuit (STM-2440) (400V)

2.3.11 Control Circuit (STM-2440) (400V)



Picture 2-15: Control Circuit (STM-2440) (400V)

2.3.12 Electrical Components Layout (STM-2440) (400V)



Picture 2-16: Electrical Components Layout (STM-2440) (400V)

2.3.13 Electrical Components List (STM-2440) (400V)

Table 2-11: Electrical Components List (STM-2440) (400V)

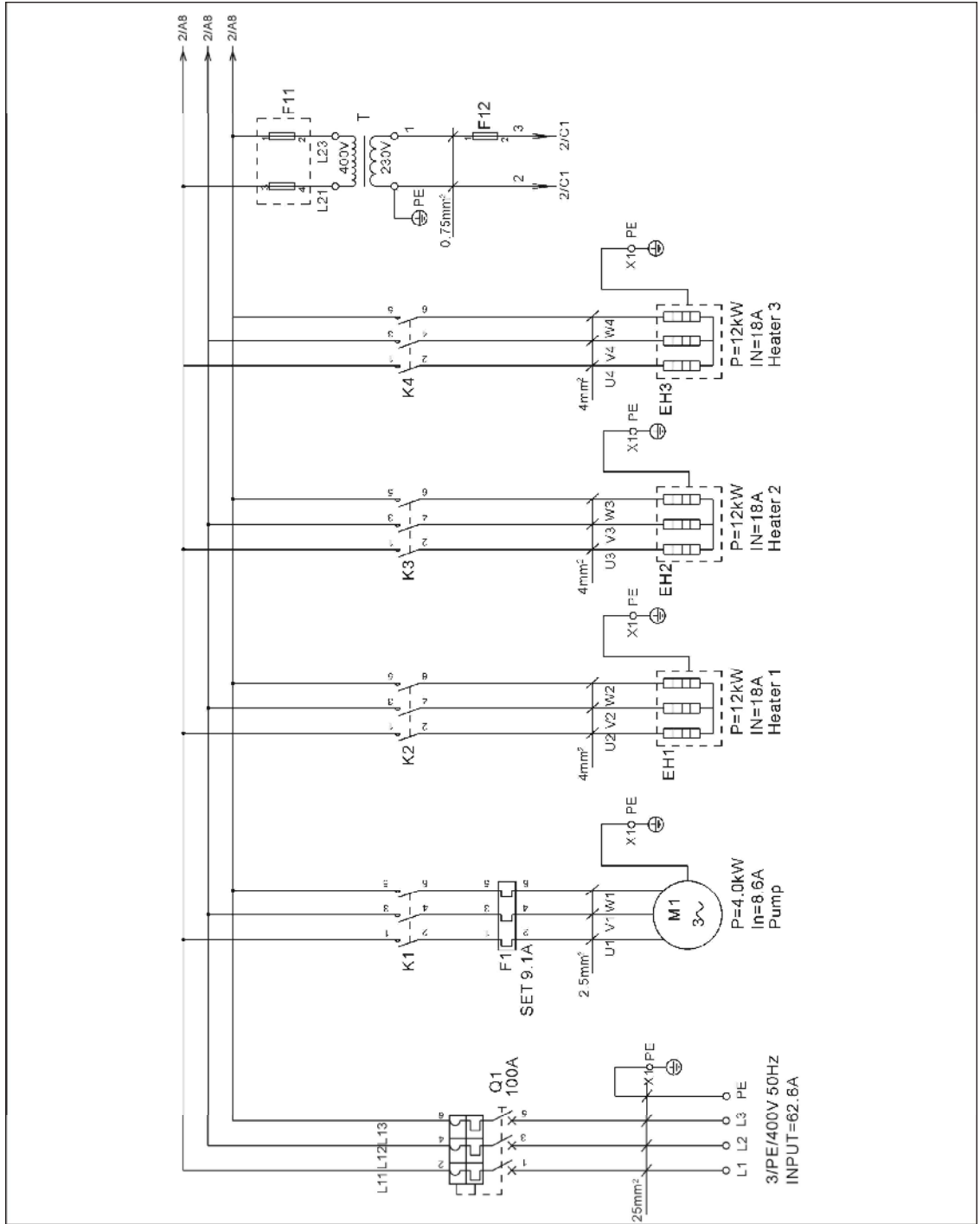
No.	Symbol	Name	Specification	Part No.
1	Q1	Main switch*	63A	YE10636300000
2	Q2	Circuit_breakers*	63A	YE40606000000
3	-	Excitation break away*	-	YE40023560000
4	K1	Contactors*	220V 50/60Hz	YE00601521000
5	K2	Contactors**	220V 50/60Hz	YE00602622000
6	F1	Overload relays	5.5~8A	YE01160550000
7	F11	Fuse box**	32A 2P	YE41032200000
8	-	Fuse**	2A	YE46002000100
9	F12	Fuse**	2A	YE41001000000
10	T	Transformer	500mA	YE70402300800
11	S1	Thermocouple	-	-
12	S2 S3	Thermocouple	-	-
13	S4	Overheat protector*	-	-
14	S5	Limit switch	250V 5(4)	YE14152400000
15	PC1	Circuit board**	100~240VAC 50/60Hz	YE81100010000
16	A	Control panel	-	
17	X1	Terminal board	-	YE61250040000
18	-	Terminal board	-	YE61253500000
19	-	Terminal board	-	YE61043500000
20	-	Terminal board	-	YE61160000000
21	-	Terminal board	-	YE61163500000
21	M1	Motor**	400V 50Hz 2.8kW	-
23	EH1 EH2	Heater**	400V 50Hz 12kW	-
24	FM1 FM2	Fan*	230VAC 50/60Hz	-

* means possible broken parts.

** means easy broken part. and spare backup is suggested.

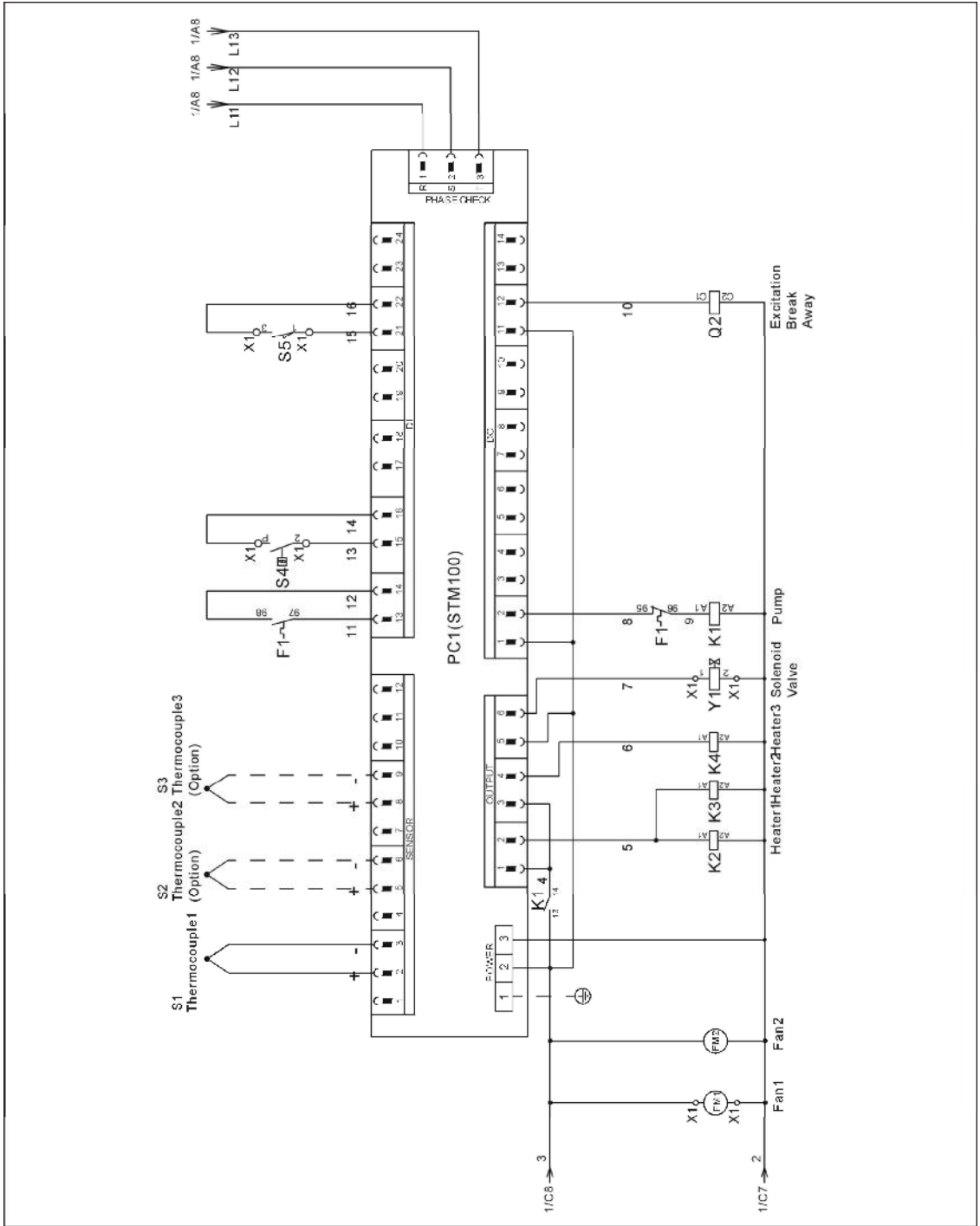
Please confirm the version of manual before placing the purchase order to guarantee that the item number of the spare part is in accordance with the real object.

2.3.14 Main Circuit (STM-3650) (400V)



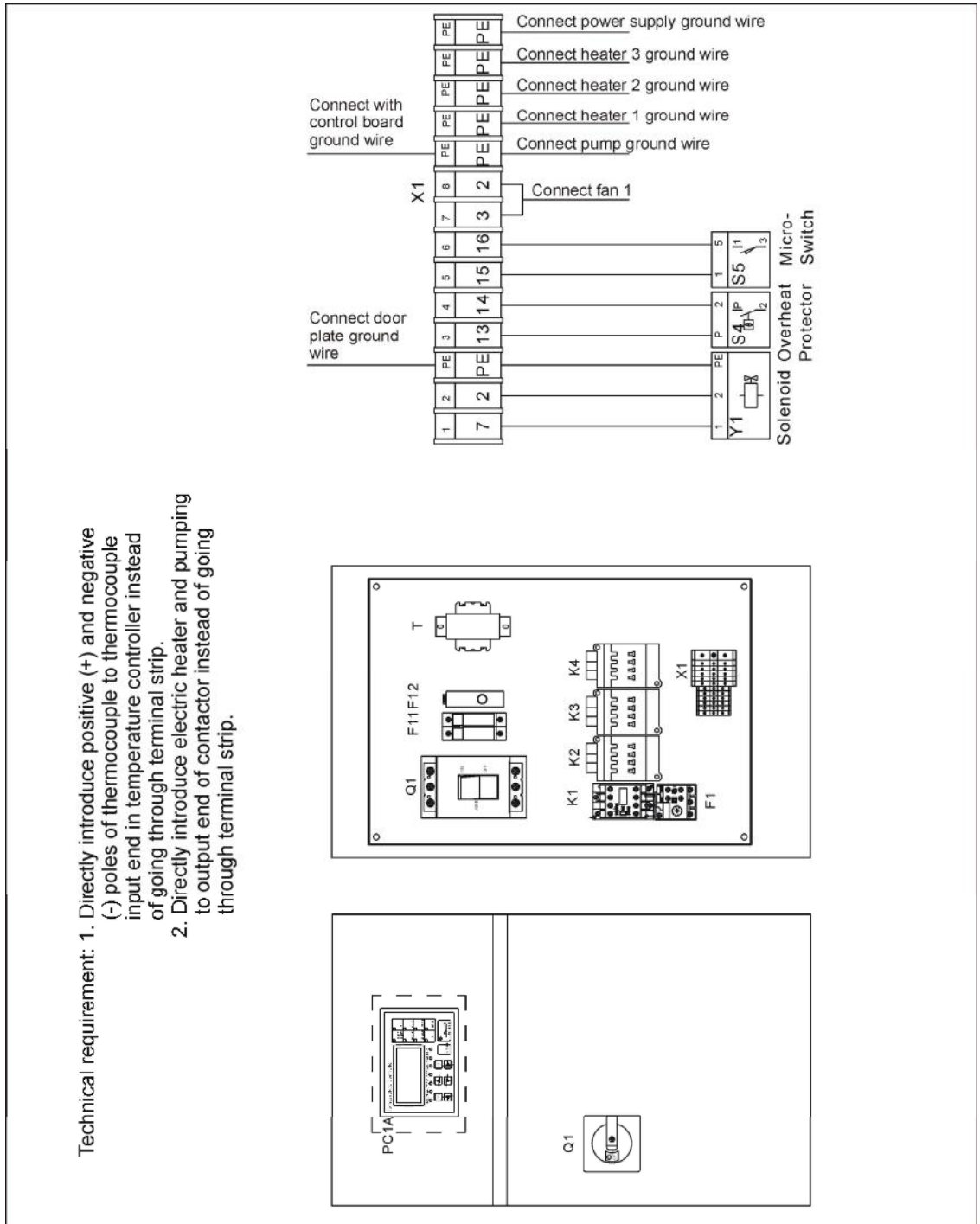
Picture 2-17: Main Circuit (STM-3650) (400V)

2.3.15 Control Circuit (STM-3650) (400V)



Picture 2-18: Control Circuit (STM-3650) (400V)

2.3.16 Electrical Components Layout (STM-3650) (400V)



Picture 2-19: Electrical Components Layout (STM-3650) (400V)

2.3.17 Electrical Components List (STM-3650) (400V)

Table 2-12: Electrical Components List (STM-3650) (400V)

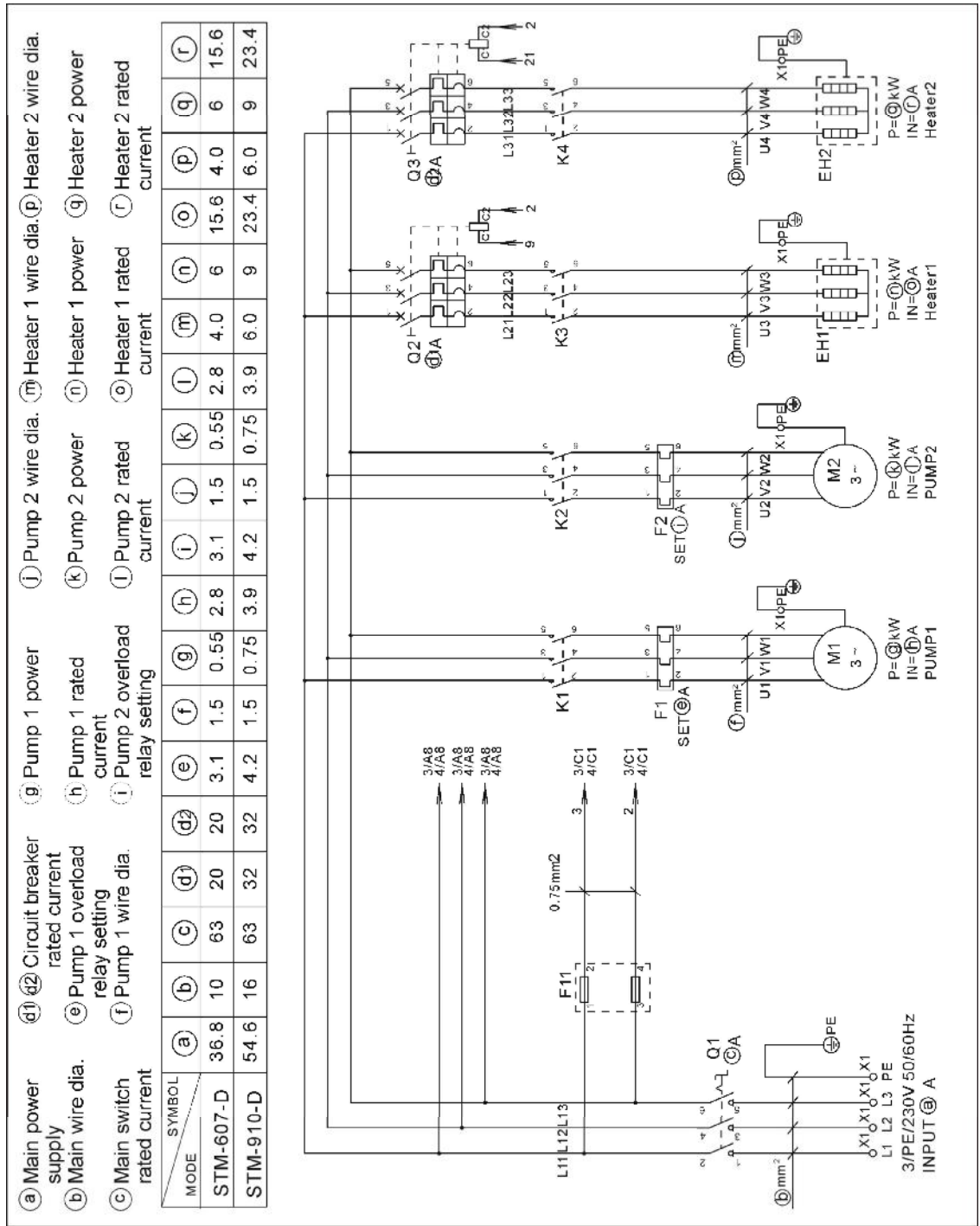
No.	Symbol	Name	Specification	Part No.
1	Q1	Circuit break	100A	YE41110000000
2	-	Excitation break away*	220VAC 50/60Hz	YE40101600000
3	K1	Contactors*	220V 50/60Hz	YE00601621000
4	K2	Contactors**	220V 50/60Hz	YE00602622000
5	F1	Overload relays	7~10A	YE01167100000
6	F11	Fuse box**	32A 2P	YE41032200000
7	-	Fuse**	2A	YE46002000100
8	F12	Fuse**	2A	YE41001000000
9	T	Transformer	500mA	YE70402300800
10	S1	Thermocouple	-	-
11	S2 S3	Thermocouple	-	-
12	S4	Overheat protector*	-	-
13	S5	Limit switch	250V 5(4)	YE14152400000
14	PC1	Circuit board**	100~240VAC 50/60Hz	YE81100010000
15	A	Control panel	-	
16	X1	Terminal board	-	YE61250040000
17	-	Terminal board	-	YE61253500000
18	-	Terminal board	-	YE61043500000
19	-	Terminal board	-	YE61163500000
20	M1	Motor**	400V 50Hz 4.0kW	-
21	EH1 EH2	Heater**	400V 50Hz 12kW	-
22	FM1 FM2	Fan*	230VAC 50/60Hz	-

* means possible broken parts.

** means easy broken part. and spare backup is suggested.

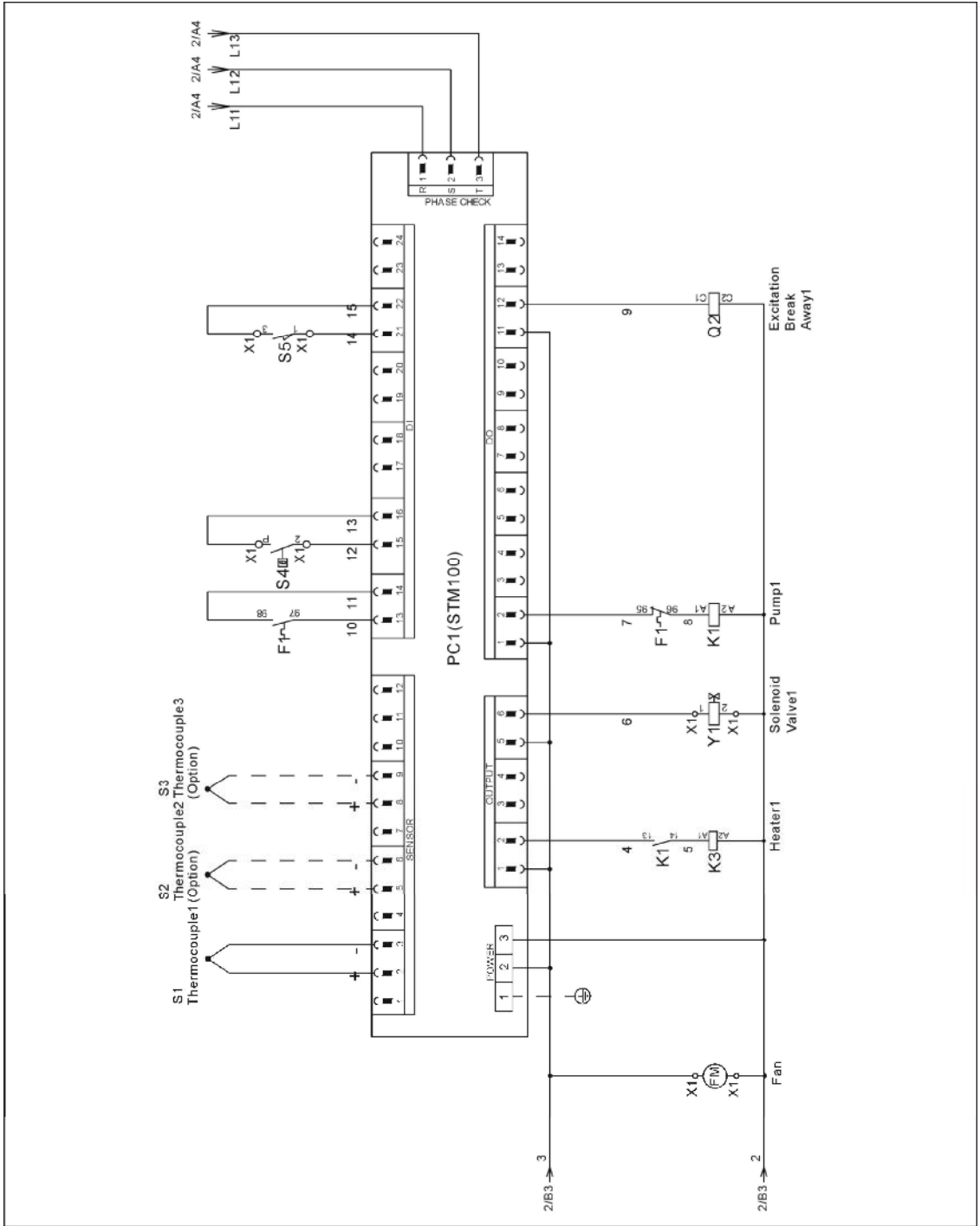
Please confirm the version of manual before placing the purchase order to guarantee that the item number of the spare part is in accordance with the real object.

2.3.18 Main Circuit (STM-607/910-D)(230V)

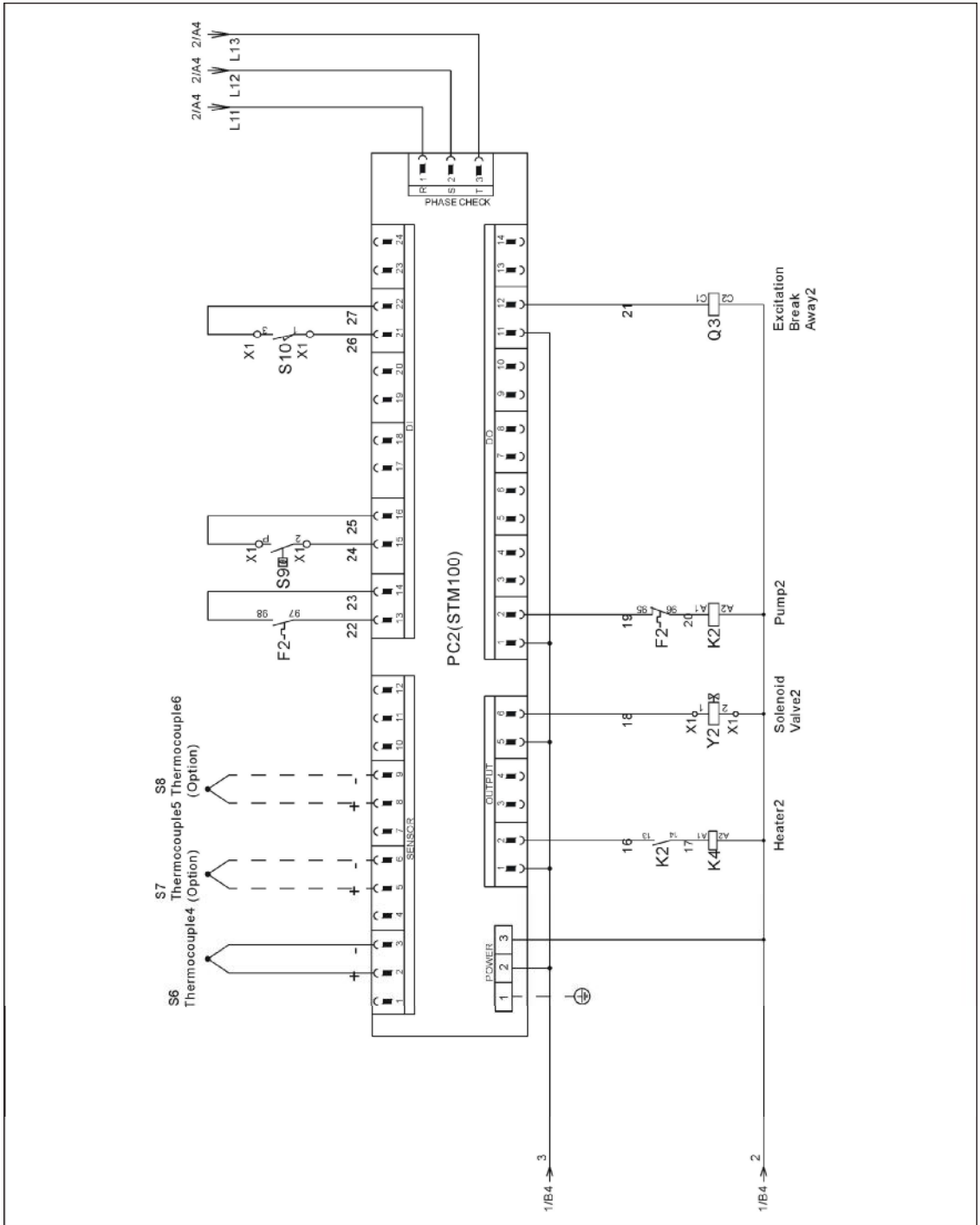


Picture 2-20: Main Circuit (STM-607/910-D) (230V)

2.3.19 Control Circuit (STM-607/910-D) (230V)

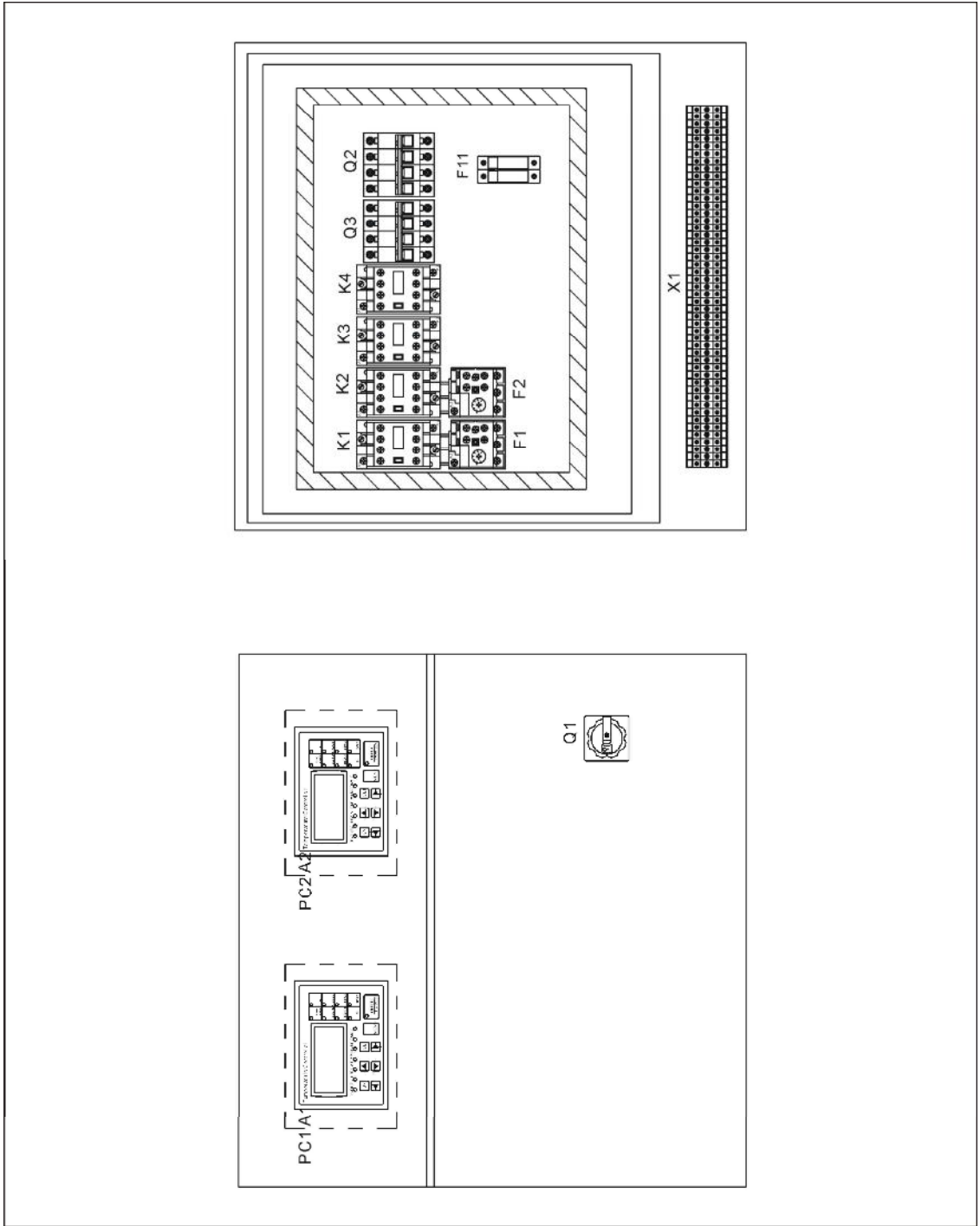


Picture 2-21: Control Circuit 1 (STM-607/910-D) (230V)



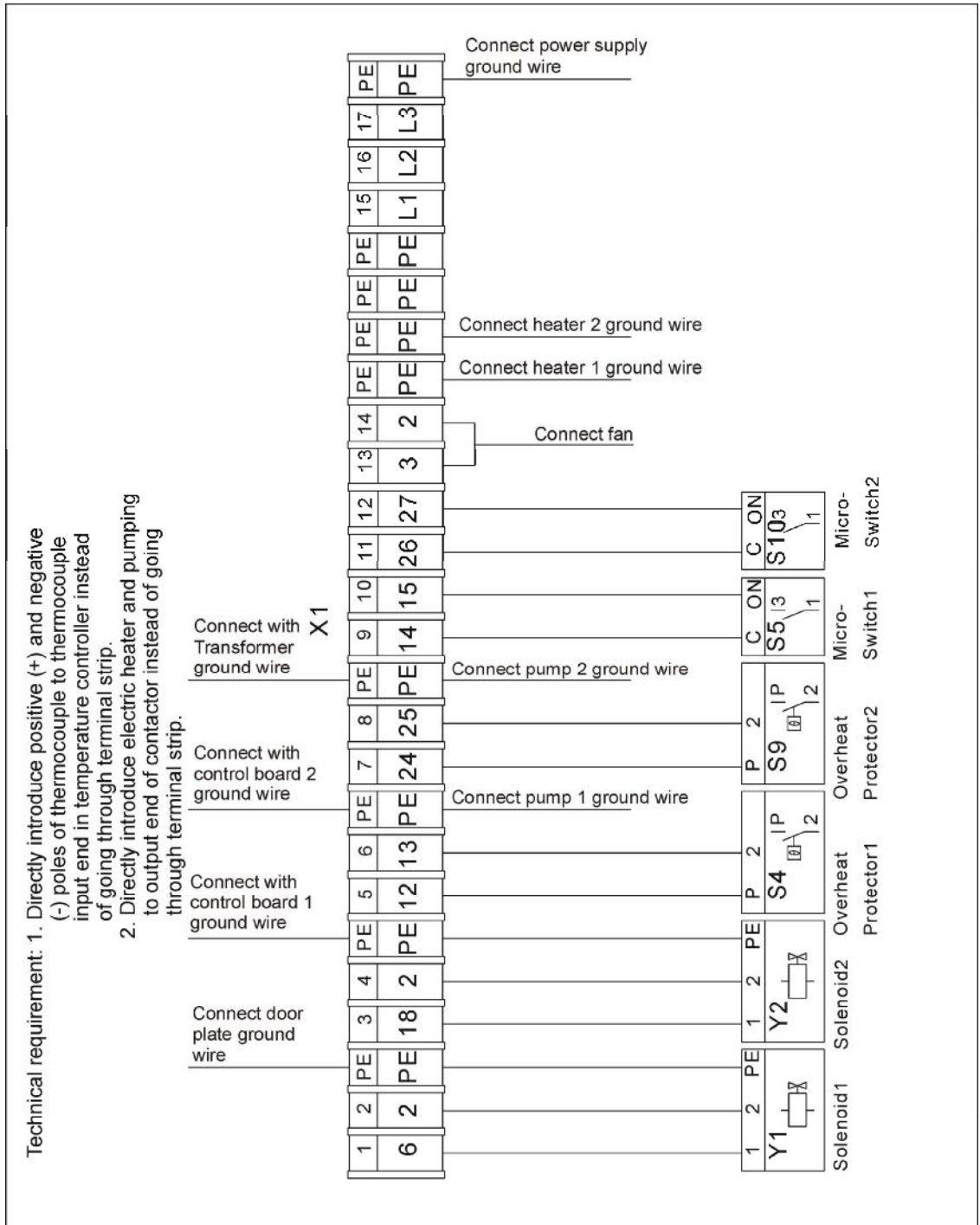
Picture 2-22: Control Circuit 2 (STM-607/910-D) (230V)

2.3.20 Electrical Components Layout (STM-607/910-D) (230V)



Picture 2-23: Electrical Components Layout (STM-607/910-D) (230V)

2.3.21 Thermocouple and Terminal Layout (STM-607/910-D) (230V)



Picture 2-24: Thermocouple and Terminal Layout (STM-607/910-D) (230V)

2.3.22 Electrical Components List (STM-607/910-D) (230V)

Table 2-13: Electrical Components List (STM-607-D) (230V)

No.	Symbol	Name	Specification	Part No.
1	Q1	Main switch*	63A	YE10636300000
2	Q2 Q3	Circuit_breakers*	25A	YE40602500000
3	-	Excitation break away*	230V 50/60Hz	YE40023560000
4	K1 K2	Contactors*	230V 50/60Hz	YE00601521000
5	K3 K4	Contactors**	230V 50/60Hz	YE00602522000
6	F1 F2	Overload relays	2.8~4A	YE01160280000
7	F11	Fuse box**	32A 2P	YE41032200000
8	-	Fuse**	2A	YE46002000100
9	S1 S6	Thermocouple	-	-
10	S2 S3 S7 S8	Thermocouple	-	-
11	S4 S9	Overheat protector *	-	-
12	S5 S10	Hydraulic switch	-	YE14152400000
13	PC1 PC2	Circuit board**	100~240VAC 50/60Hz	YE80000100000
14	A1 A2	Control panel	-	
15	Y1 Y2	Solenoid valve*	230VAC 50/60Hz	-
16	X1	Terminal board	-	YE61250040000
17	-	Terminal board	-	YE61253500000
18	-	Terminal board	-	YE61043500000
19	-	Terminal board	-	YE61100000000
20	-	Terminal board	-	YE61103500000
21	M1 M2	Motor**	400V 50Hz 0.55kW	-
22	EH1 EH2	Heater**	400V 50Hz 6kW	-
23	FM	Fan*	230VAC 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 2-14: Electrical Components List (STM-910-D) (230V)

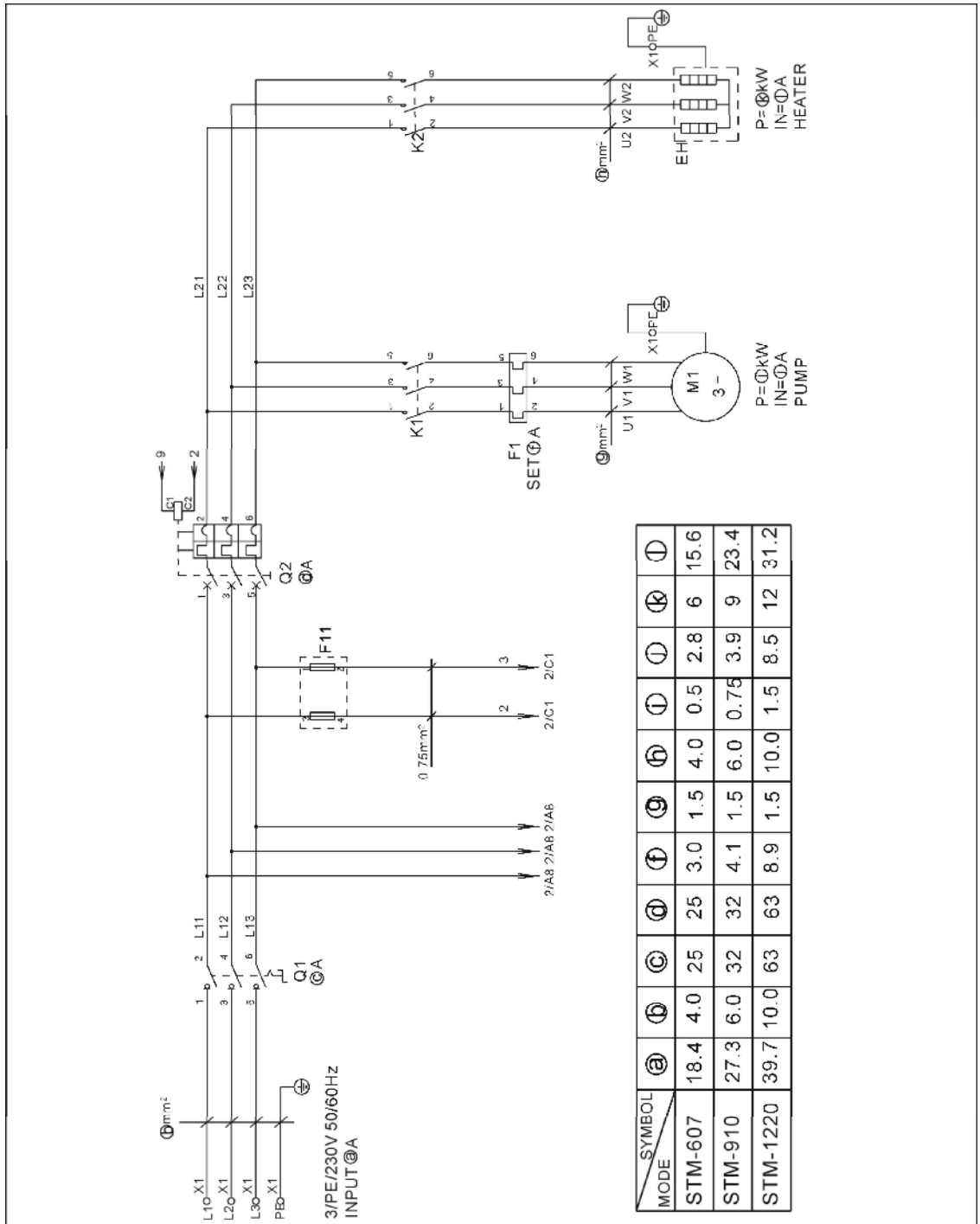
No.	Symbol	Name	Specification	Part No.
1	Q1	Main switch*	63A	YE10636300000
2	Q2 Q3	Circuit_breakers*	40A	YE40604000000
3	-	Excitation break away*	230V 50/60Hz	YE40023560000
4	K1 K2	Contactors*	230V 50/60Hz	YE00601521000
5	K3 K4	Contactors**	230V 50/60Hz	YE00602722000
6	F1 F2	Overload relays	3.5~5A	YE01160350000
7	F11	Fuse box**	32A 2P	YE41032200000
8	-	Fuse**	2A	YE46002000100
9	S1 S6	Thermocouple	-	-
10	S2 S3 S7 S8	Thermocouple	-	-
11	S4 S9	Overheat protector *	-	-
12	S5 S10	Hydraulic switch	-	YE14152400000
13	PC1 PC2	Circuit board**	100~240VAC 50/60Hz	YE80000100000
14	A1 A2	Control panel	-	
15	Y1 Y2	Solenoid valve*	230VAC 50/60Hz	-
16	X1	Terminal board	-	YE61250040000
17	-	Terminal board	-	YE61253500000
18	-	Terminal board	-	YE61063500000
19	-	Terminal board	-	YE61160000000
20	-	Terminal board	-	YE61163500000
21	M1 M2	Motor**	400V 50Hz 0.75kW	-
22	EH1 EH2	Heater**	400V 50Hz 9kW	-
23	FM	Fan*	230VAC 50/60Hz	-

* means possible broken parts.

** means easy broken part. and spare backup is suggested.

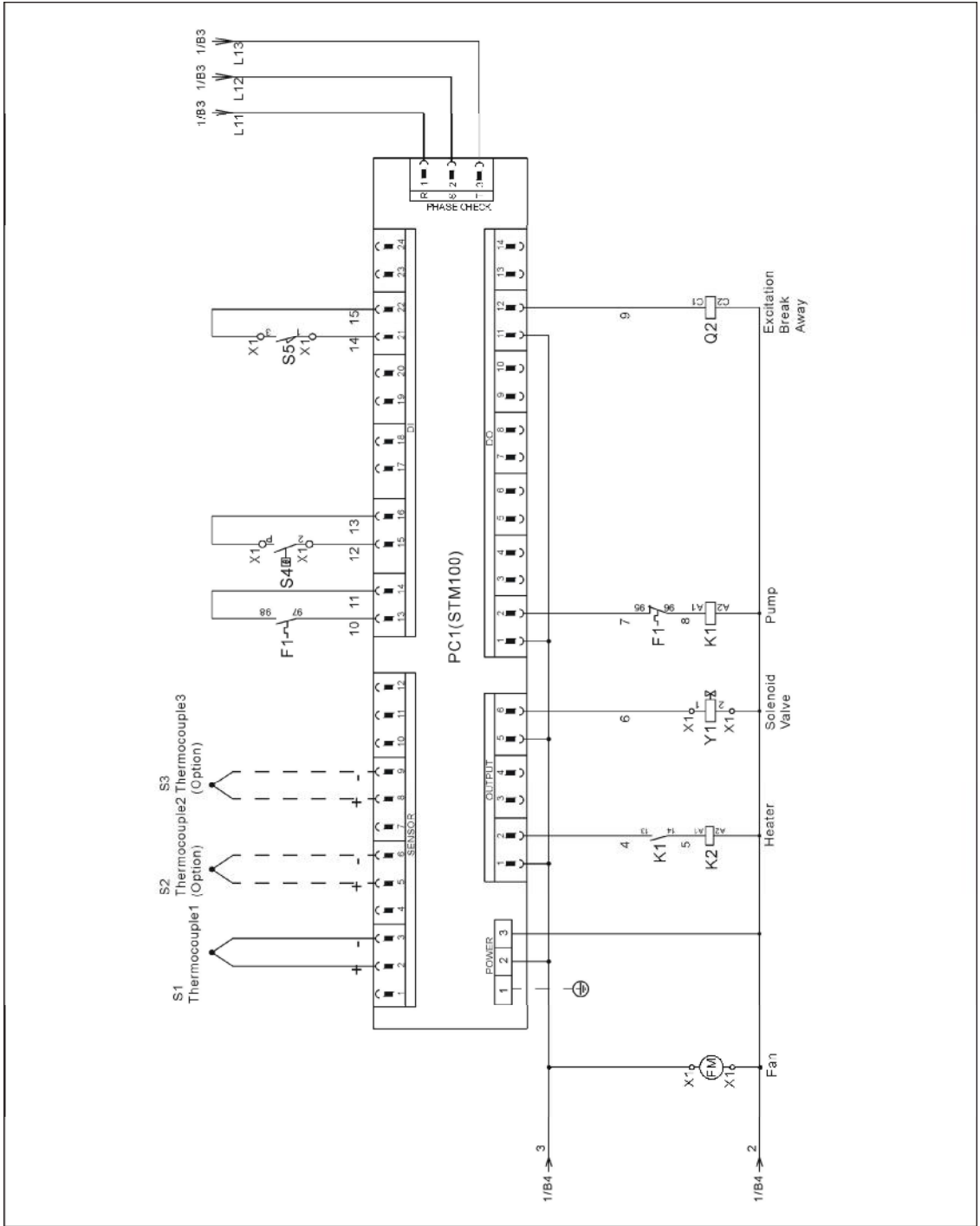
Please confirm the version of manual before placing the purchase order to guarantee that the item number of the spare part is in accordance with the real object.

2.3.23 Main Circuit (STM-607~1220) (230V)



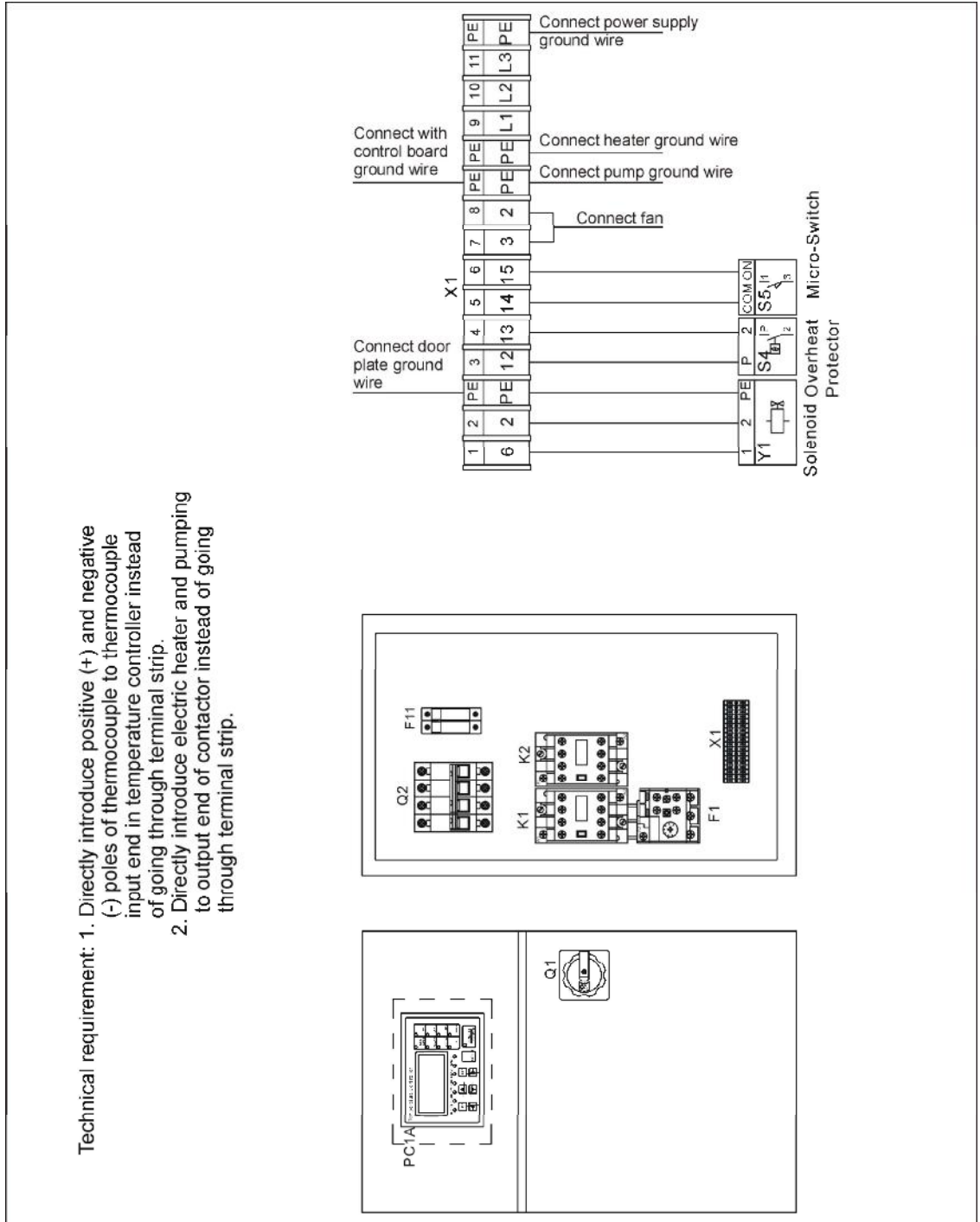
Picture 2-25: Main Circuit (STM-607~1220)(230V)

2.3.24 Control Circuit (STM-607~1220)(230V)



Picture 2-26: Control Circuit (STM-607~1220) (230V)

2.3.25 Electrical Components Layout (STM-607~1220) (230V)



Picture 2-27: Electrical Components Layout (STM-607~1220) (230V)

2.3.26 Electrical Components List (STM-607~1220) (230V)

Table 2-15: Electrical Components List (STM-607) (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*	230V 50/60Hz	YE00601521000
5	K2	Contactors**	230V 50/60Hz	YE00602522000
6	F1	Overload relays	2.8~4A	YE01160280000
7	F11	Fuse box**	32A 2P	YE41032200000
8	-	Fuse**	2A	YE46002000100
9	S1	Thermocouple	-	-
10	S2 S3	Thermocouple	-	-
11	S4	Overheat protector*	-	-
12	S5	Limit switch	250V 5(4)	YE14152400000
13	PC1	Circuit board**	100~240VAC 50/60Hz	YE81100010000
14	A	Control panel	-	
15	X1	Terminal board	-	YE61250040000
16	-	Terminal board	-	YE61253500000
17	-	Terminal board	-	YE61040000000
18	-	Terminal board	-	YE61043500000
19	Y1	Solenoid valve	230VAC 50/60Hz	-
20	M1	Motor**	230V 50Hz 0.55kW	-
21	EH	Heater**	230V 50Hz 6kW	-
22	FM	Fan*	230VAC 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 2-16: Electrical Components List (STM-910) (230V)

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*	230V 50/60Hz	YE00601521000
5	K2	Contactors**	230V 50/60Hz	YE00602722000
6	F1	Overload relays	3.5~5A	YE01160350000
7	F11	Fuse box**	32A 2P	YE41032200000
8	-	Fuse**	2A	YE46002000100
9	S1	Thermocouple	-	-
10	S2 S3	Thermocouple	-	-
11	S4	Overheat protector*	-	-
12	S5	Limit switch	250V 5(4)	YE14152400000
13	PC1	Circuit board**	100~240VAC 50/60Hz	YE81100010000
14	A	Control panel	-	
15	X1	Terminal board	-	YE61250040000
16	-	Terminal board	-	YE61253500000
17	-	Terminal board	-	YE61060000000
18	-	Terminal board	-	YE61063500000
19	Y1	Solenoid valve	230VAC 50/60Hz	-
20	M1	Motor**	230V 50Hz 0.75kW	-
21	EH	Heater**	230V 50Hz 9kW	-
22	FM	Fan*	230VAC 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 2-17: Electrical Components List (STM-1220) (230V)

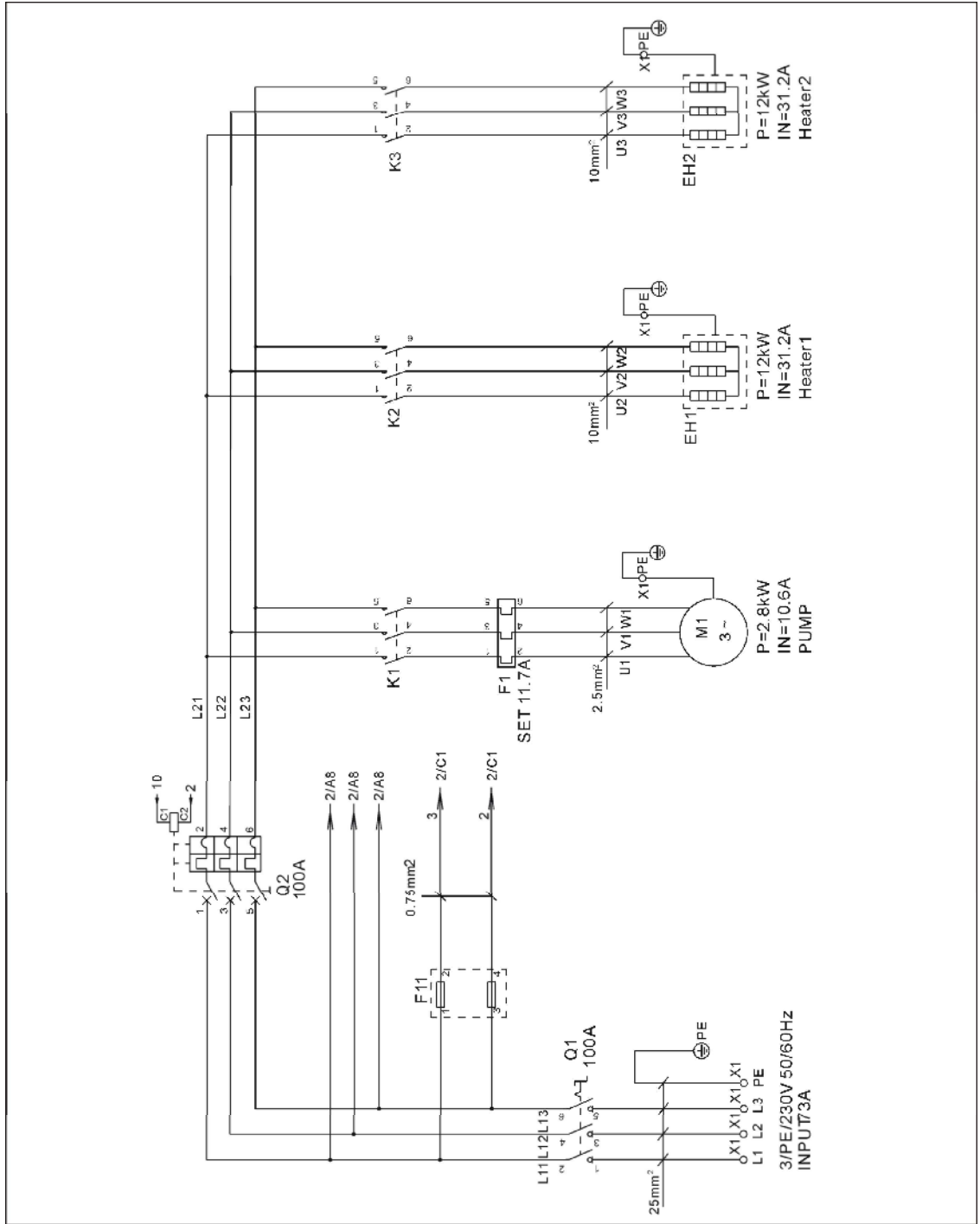
No.	Symbol	Name	Specification	Part No.
1	Q1	Main switch*	63A	YE10636300000
2	Q2	Circuit_breakers*	60A	YE40606000000
3	-	Excitation break away*	-	YE40023560000
4	K1	Contactors*	230V 50/60Hz	YE00601621000
5	K2	Contactors**	230V 50/60Hz	YE00500350000
6	F1	Overload relays	7~10A	YE01167100000
7	F11	Fuse box**	32A 2P	YE41032200000
8	-	Fuse**	2A	YE46002000100
9	S1	Thermocouple	-	-
10	S2 S3	Thermocouple	-	-
11	S4	Overheat protector*	-	-
12	S5	Limit switch	250V 5(4)	YE14152400000
13	PC1	Circuit board**	100~240VAC 50/60Hz	YE81100010000
14	A	Control panel	-	
15	X1	Terminal board	-	YE61250040000
16	-	Terminal board	-	YE61253500000
17	-	Terminal board	-	YE61043500000
18	-	Terminal board	-	YE61100000000
19	-	Terminal board	-	YE61103500000
20	Y1	Solenoid valve	230VAC 50/60Hz	-
21	M1	Motor**	230V 50Hz 1.5kW	-
22	EH	Heater**	230V 50Hz 12kW	-
23	FM	Fan*	230VAC 50/60Hz	-

* means possible broken parts.

** means easy broken part. and spare backup is suggested.

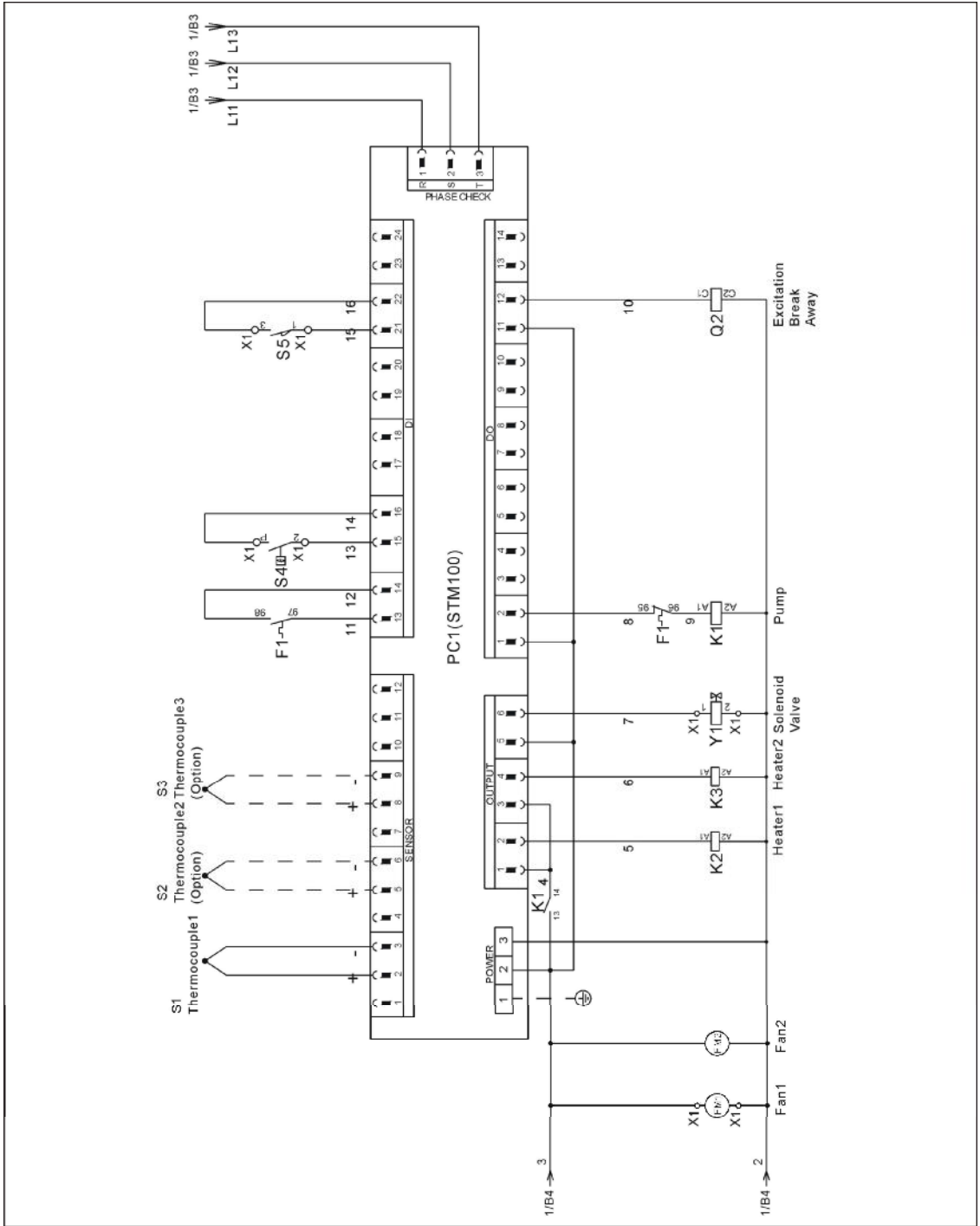
Please confirm the version of manual before placing the purchase order to guarantee that the item number of the spare part is in accordance with the real object.

2.3.27 Main Circuit (STM-2440) (230V)



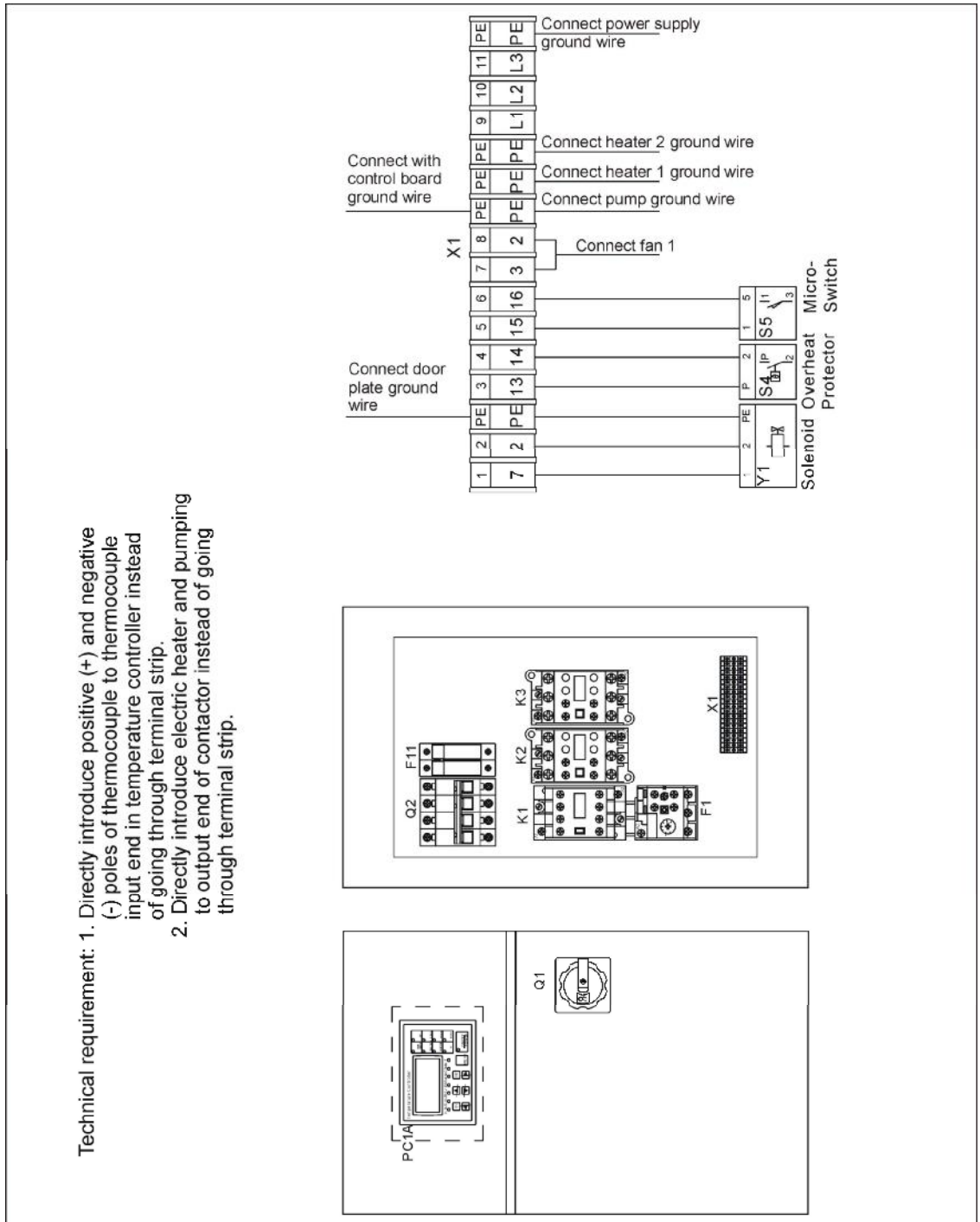
Picture 2-28: Main Circuit (STM-2440) (230V)

2.3.28 Control Circuit (STM-2440) (230V)



Picture 2-29: Control Circuit (STM-2440) (230V)

2.3.29 Electrical Components Layout (STM-2440) (230V)



Picture 2-30: Electrical Components Layout (STM-2440) (230V)

2.3.30 Electrical Components List (STM-2440) (230V)

Table 2-18: Electrical Components List (STM-2440) (230V)

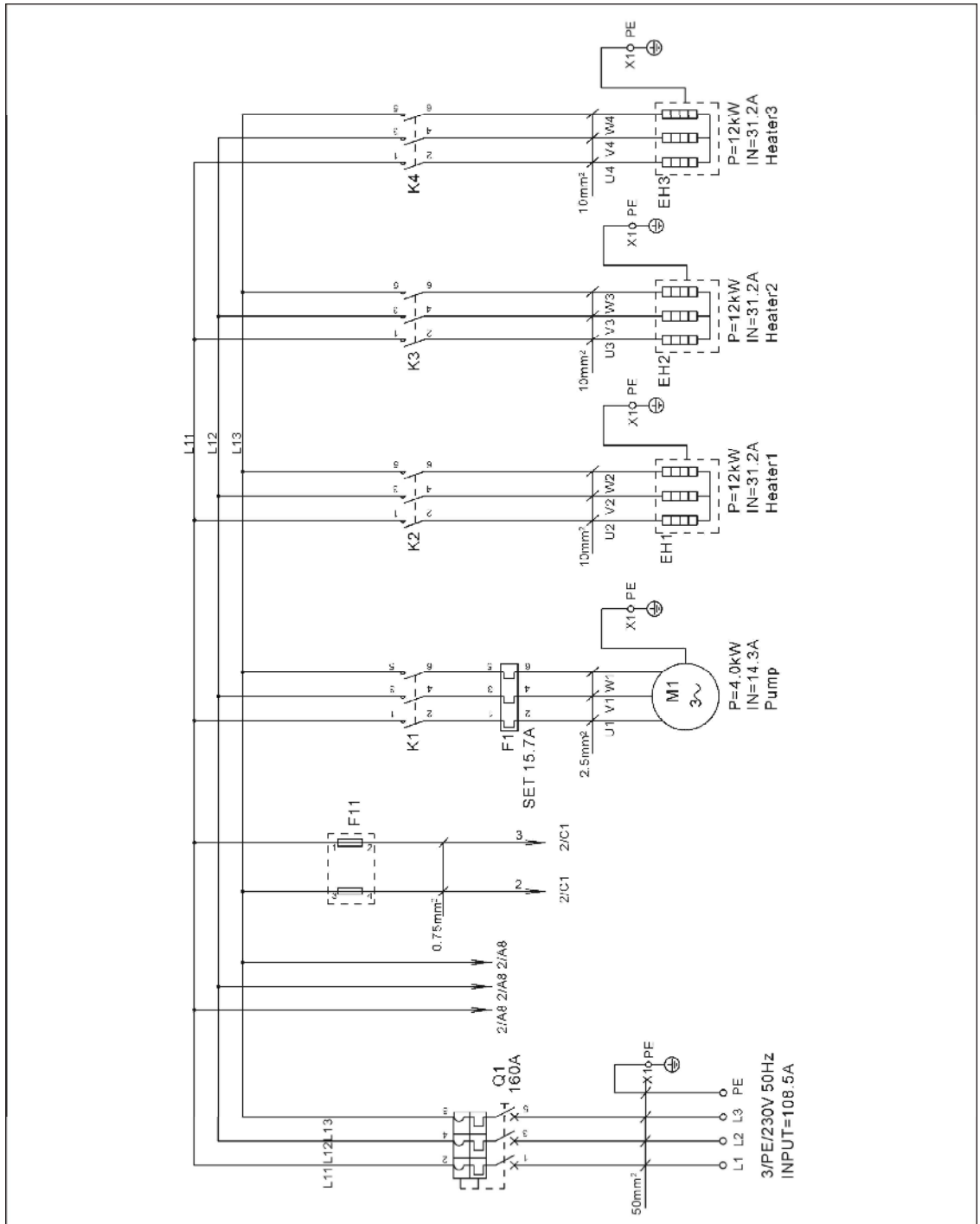
No.	Symbol	Name	Specification	Part No.
1	Q1	Main switch*	100A	YE10010000000
2	Q2	Circuit_breakers*	100A	YE40100300000
3	-	Excitation break away*	230V 50/60Hz	YE40010000000
4	K1	Contactors*	230V 50/60Hz	YE00601721000
5	K2 K3	Contactors**	230V 50/60Hz	YE00503500000
6	F1	Overload relays	11~16A	YE01611640000
7	F11	Fuse box**	32A 2P	YE41032200000
8	-	Fuse**	2A	YE46002000100
9	S1	Thermocouple	-	-
10	S2 S3	Thermocouple	-	-
11	S4	Overheat protector*	-	-
12	S5	Limit switch	250V 5(4)	YE14152400000
13	PC1	Circuit board**	100~240VAC 50/60Hz	YE81100010000
14	A	Control panel	-	
15	X1	Terminal board	-	YE61250040000
16	-	Terminal board	-	YE61253500000
17	-	Terminal board	-	YE61103500000
18	-	Terminal board	-	YE61163500000
19	Y1	Solenoid valve	230VAC 50/60Hz	-
20	M1	Motor**	230V 50Hz 2.8kW	-
21	EH1 EH2	Heater**	230V 50Hz 12kW	-
22	FM1 FM2	Fan*	230VAC 50/60Hz	-

* means possible broken parts.

** means easy broken part. and spare backup is suggested.

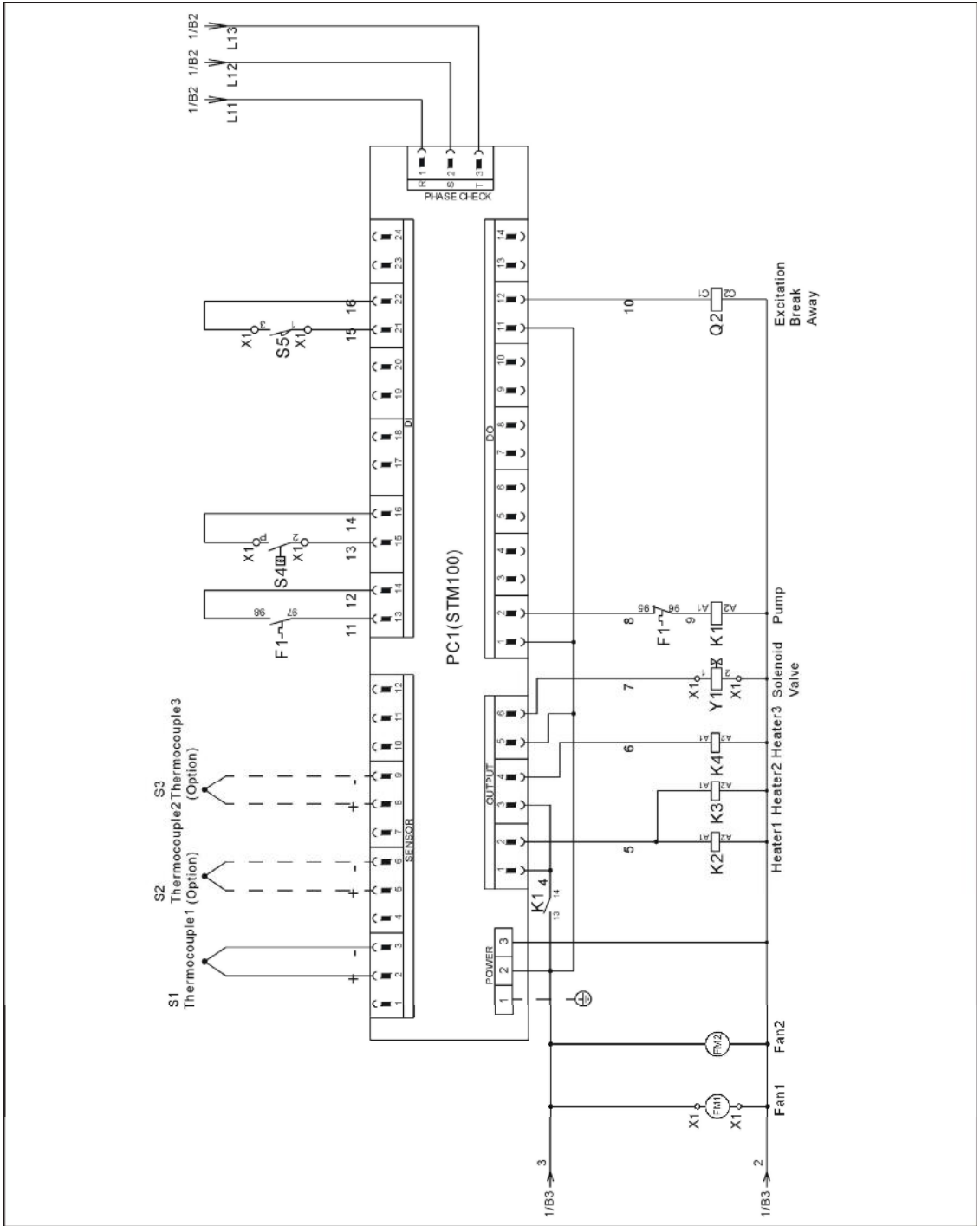
Please confirm the version of manual before placing the purchase order to guarantee that the item number of the spare part is in accordance with the real object.

2.3.31 Main Circuit (STM-3650) (230V)



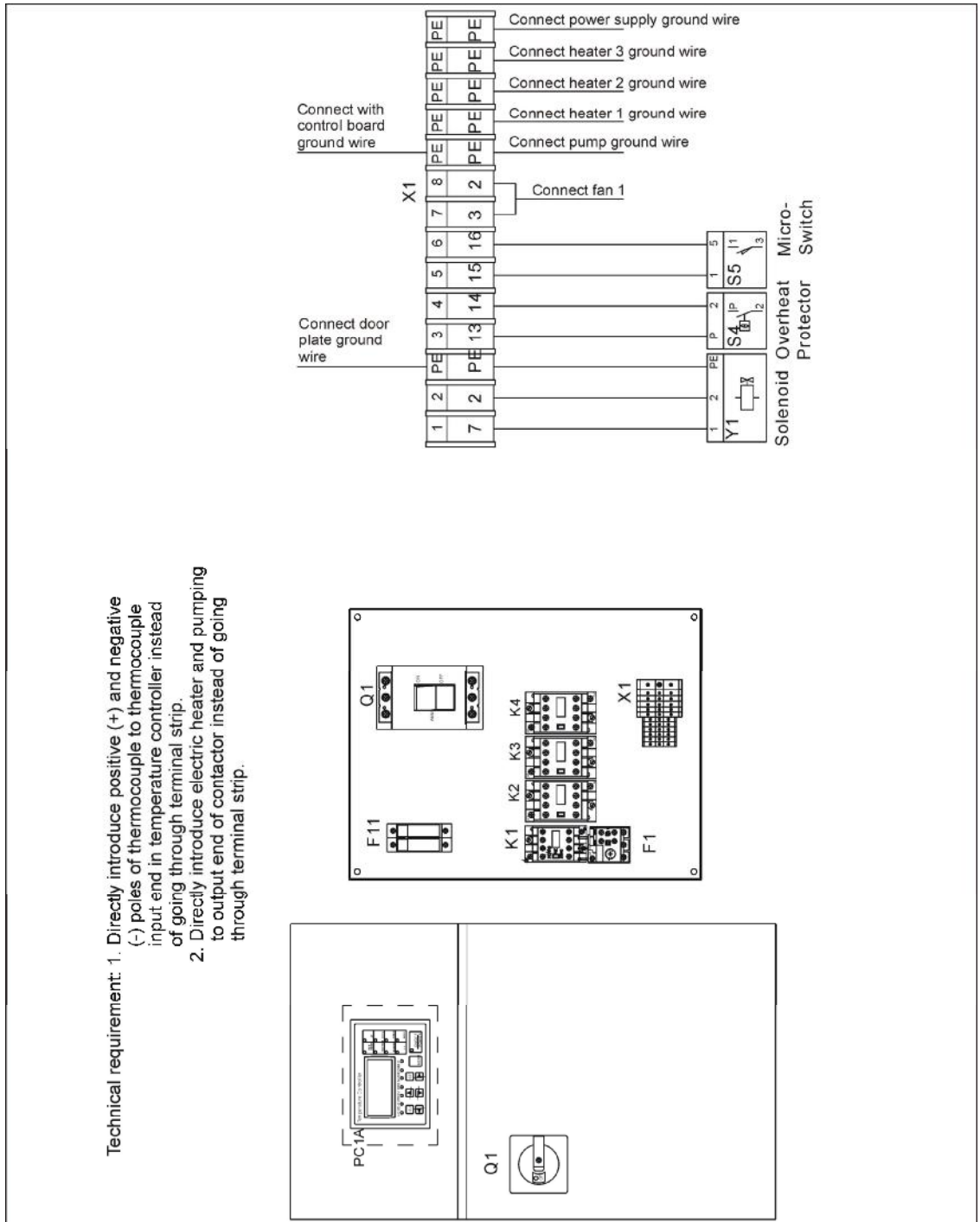
Picture 2-31: Main Circuit (STM-3650) (230V)

2.3.32 Control Circuit (STM-3650) (230V)



Picture 2-32: Control Circuit (STM-3650) (230V)

2.3.33 Electrical Components Layout (STM-3650) (230V)



Picture 2-33: Electrical Components Layout (STM-3650) (230V)

2.3.34 Electrical Components List (STM-3650) (230V)

Table 2-19: Electrical Components List (STM-3650) (230V)

No.	Symbol	Name	Specification	Part No.
1	Q1	Circuit break	160A	YE41161200000
2	-	Excitation break away*	220VAC 50/60Hz	YE40101600000
3	K1	Contactors*	230V 50/60Hz	YE00602522000
4	K2~K4	Contactors**	230V 50/60Hz	YE00503500000
5	F1	Overload relays	14~20A	YE01260140000
6	F11	Fuse box**	32A 2P	YE41032200000
7	-	Fuse**	2A	YE46002000100
8	S1	Thermocouple	-	-
9	S2 S3	Thermocouple	-	-
10	S4	Overheat protector*	-	-
11	S5	Limit switch	250V 5(4)	YE14152400000
12	PC1	Circuit board**	100~240VAC 50/60Hz	YE81100010000
13	A	Control panel	-	
14	X1	Terminal board	-	YE61250040000
15	-	Terminal board	-	YE61253500000
16	-	Terminal board	-	YE61043500000
17	-	Terminal board	-	YE61353500000
18	Y1	Solenoid valve	230VAC 50/60Hz	-
19	M1	Motor**	230V 50Hz 4.0kW	-
20	EH1 EH2	Heater**	400V 50Hz 12kW	-
21	FM1 FM2	Fan*	230VAC 50/60Hz	-

* means possible broken parts.

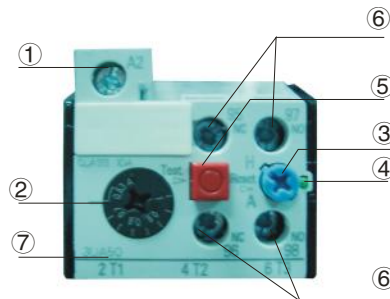
** means easy broken part. and spare backup is suggested.

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 manual 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 2-34: 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.

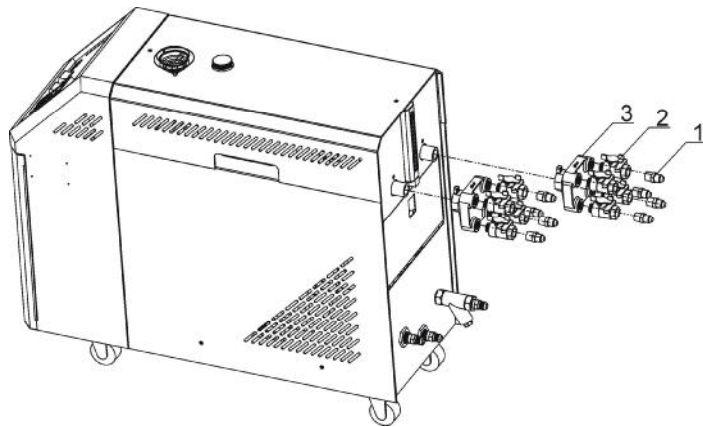
- 5) Test button (red).

- 6) Auxiliary contact terminals shown in 95.96.97.98. NC and NO contacts are shown in position 95.96. and 97.98. respectively.

- 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)



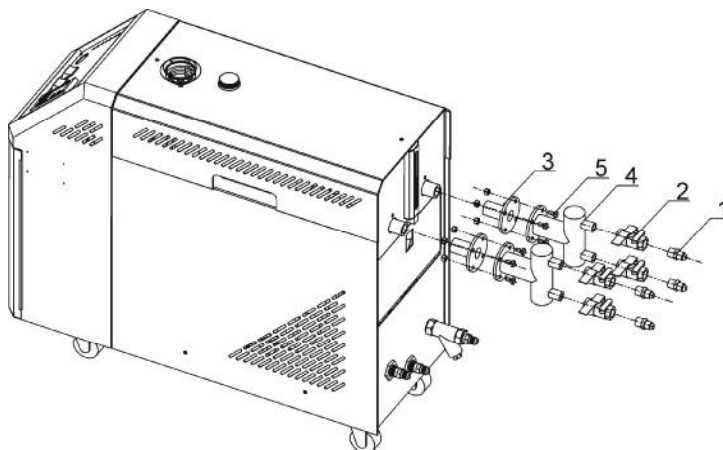
- 1) Install copper joint to the level valve.
- 2) Install level valve with copper joint to the dewaxing water manifold.
- 3) Install water manifold to the machine.
- 4) Install Teflon to copper joint.



Note!

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

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°C, Teflon with temperature resistance 200°C is usable; for the operating temperature from 200 to 300°C, must use Teflon with temperature resistance 300°C.

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) When connect mould coupling with pipes from the mould. Use a spanner to secure one end of the coupling, insert mould connecting pipe and fasten it by another spanner.



Picture 3-2: Mould and Water Coupling 1

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

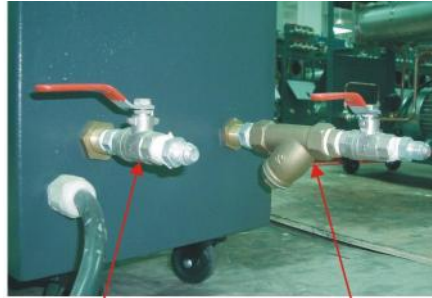


Picture 3-3: Mould and Water Coupling 2



Note!

Cooling water inlet and outlet as shown by the picture 3-4.



Cooling water outlet

Cooling water inlet

Picture 3-4: Mould and Water Coupling 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 heaters are generally set to be used with 3 Φ 400V 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, electric shock may happen if power is on.
3	MENU	LCD menu shift key	Initial password: 3588
4	SET	Parameters setting	Confirm parameters
5	SV	Change setpoint	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. SUCTION, can not auto-tuning under forced cooling.

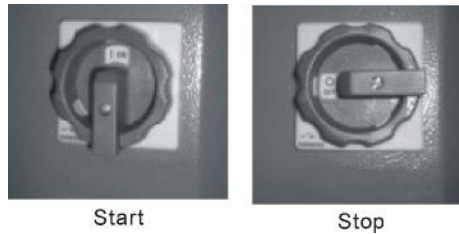
No.	Name	Functions	Remarks
10	SUCTION	SUCTION switch start and stop	SUCTION is to remove medium (water/oil) from molds. Can not start during operation or cooling. After SUCTION turns on, "SUCTION relay" and "pump inverse run relay" will turn on.
11	COOL	Forced cooling switch start and stop	Press it for 2 secs for forced cooling, 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 if errors.
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 backup 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
PCB error	Regulator error	Occur	Stop
Calibration error		Occur	Stop
ADC error		Occur	Stop
RJC error		Occur	Stop
EEPROM error		Occur	Invariant
Phase alarm	Default or reverse phase detection	Occur	Stop
EGO overheat	Detect EGO temp. Contactor input	Occur	Stop
Pump overload	Pump overload detect contactor input	Occur	Stop
Underpressure	Low pressure detect contactor input	Occur	Stop
Overpressure	High pressure detect contactor input	Occur	Stop
Low water level	Low level detect contactor input	Occur	Stop
Temp. window display "----"	Abnormal sensor	Occur	Stop
Water out temp. deviation	Deviation between control temp. and water out temp.	Occur	Invariant
Return water temp. deviation	Deviation between water out temp. and return water temp.	Occur	Invariant
Interfere alarm	Control temp. plummets	Occur	Invariant
Heater alarm	Control temp. not rising	Occur	Invariant

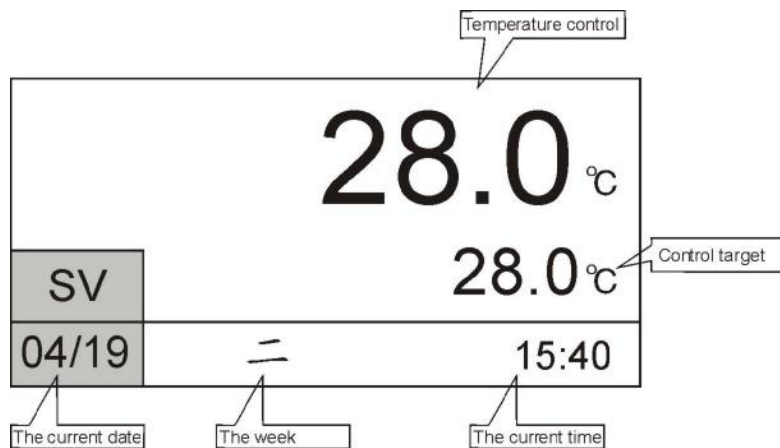
pipeline connection)

- 3) Turn on all the globa valves.
- 4) Switch on mian power.



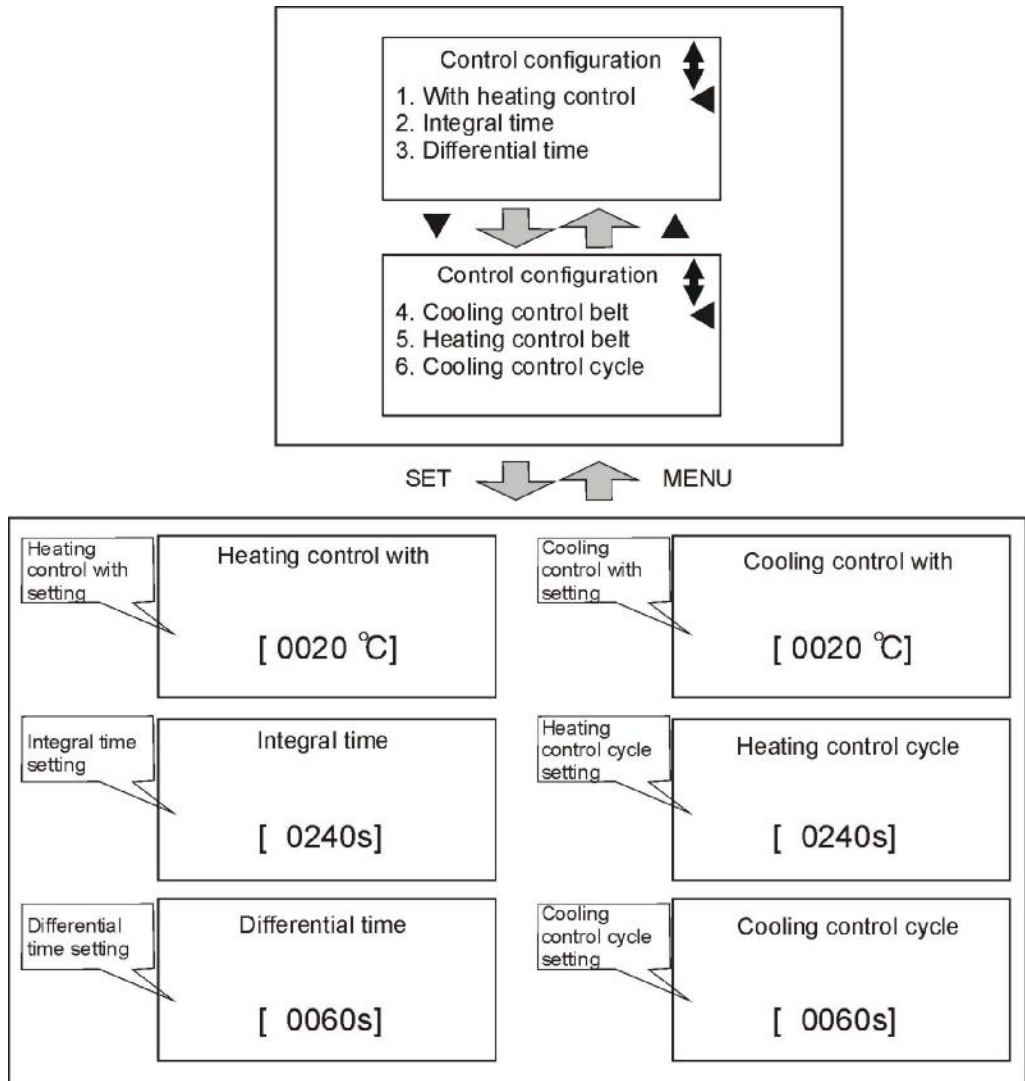
Picture 4-3: Main Power Switch

- 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 menu, press SET key to enter setting nemu, as shown in picture. Parameters setting is based on AT auto-tuning, do not change it privately.



Picture 4-5: Control Setting

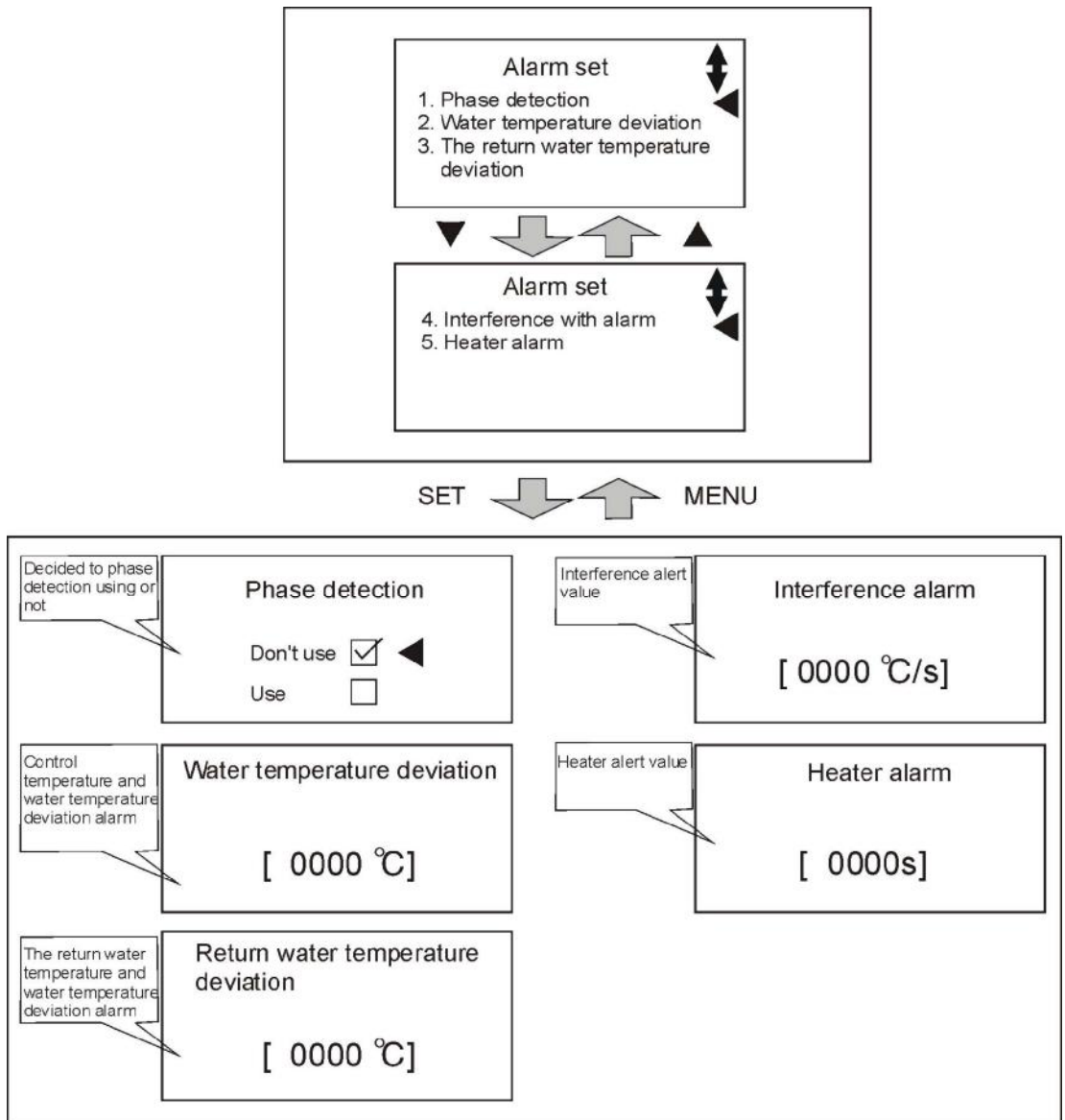
7) Press MENU key to return menu select screen, press ◀/▶ key to select alarm setting then press SET to enter setting menu, as shown in picture.

Below is parameter setting:

- Phase detect—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)

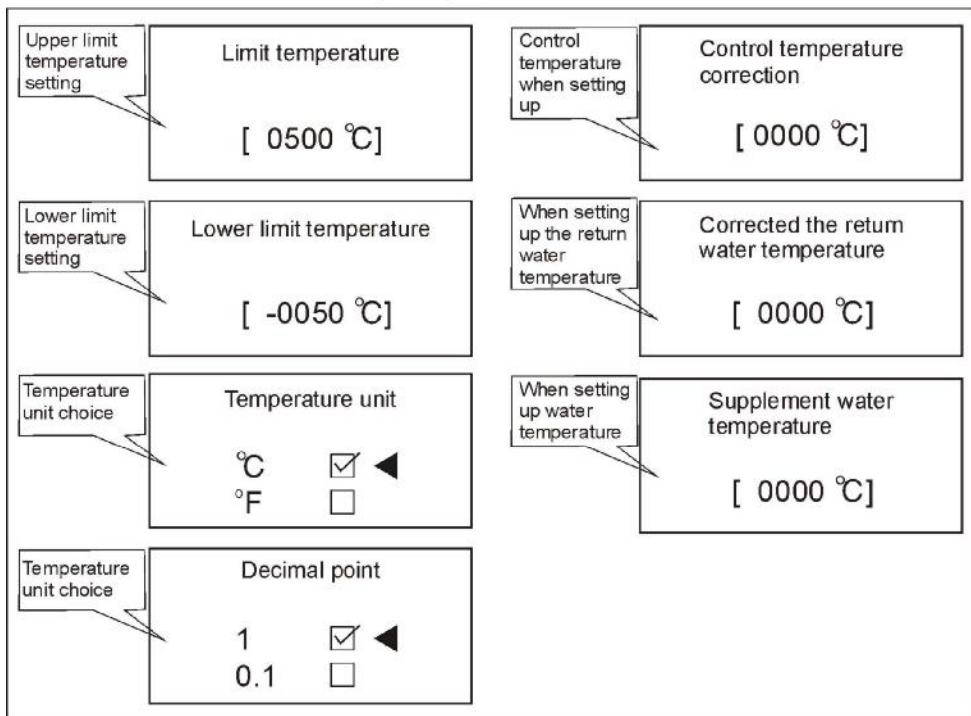
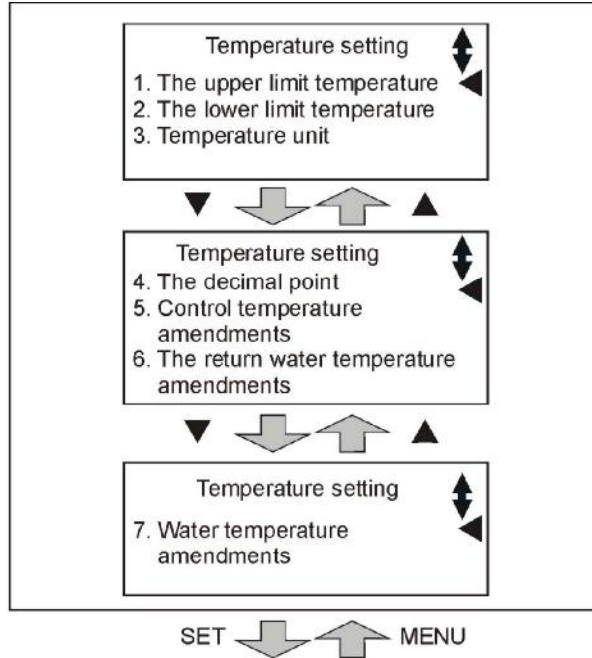
- Interfere alarm—control temp.-10
- Heater alarm—depending on actual setpoint, default setting is 0 upon delivery to make it out of service.



Picture 4-6: Alarm Setting

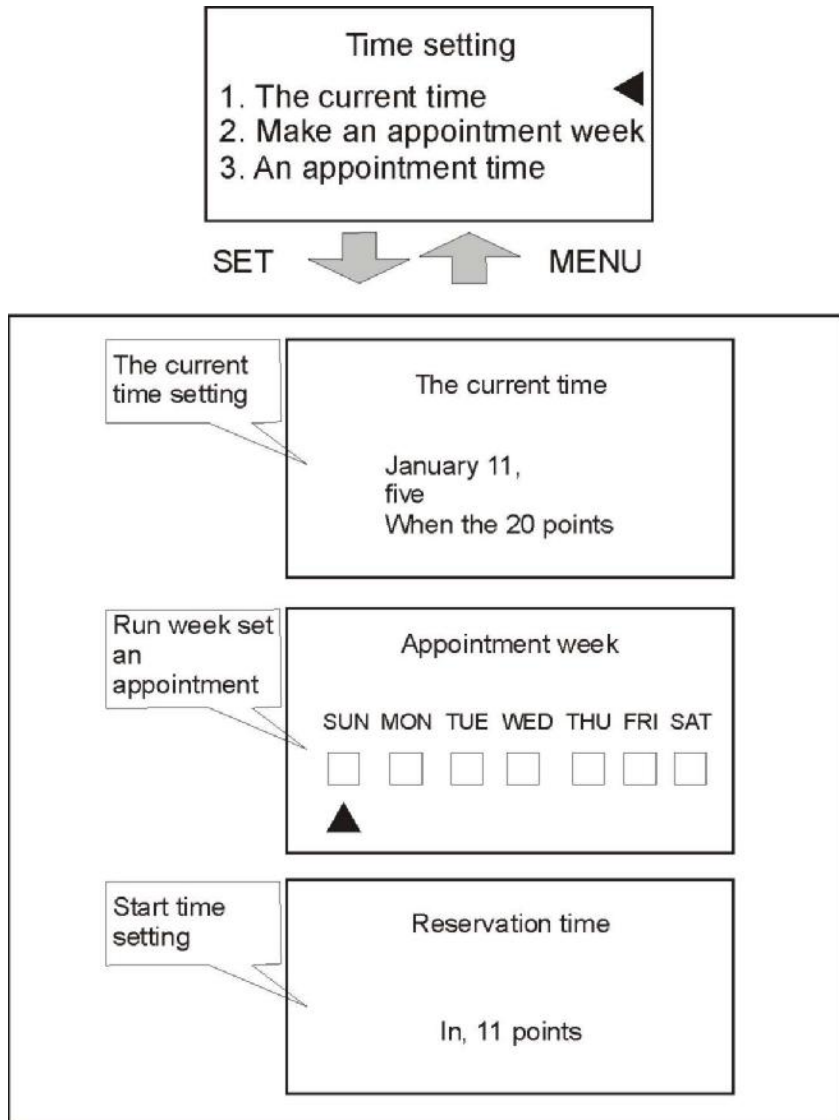
8) Press MENU key to return menu select screen, then press ◀/▶ key to select output setting menu, and press SET key to enter setting screen, as shown in

- Radix point—0.1
- Control temp. correction—based on actual operation.
- Water out temp. correction—based on actual operation
- Backwater temp. correction—based on actual operation



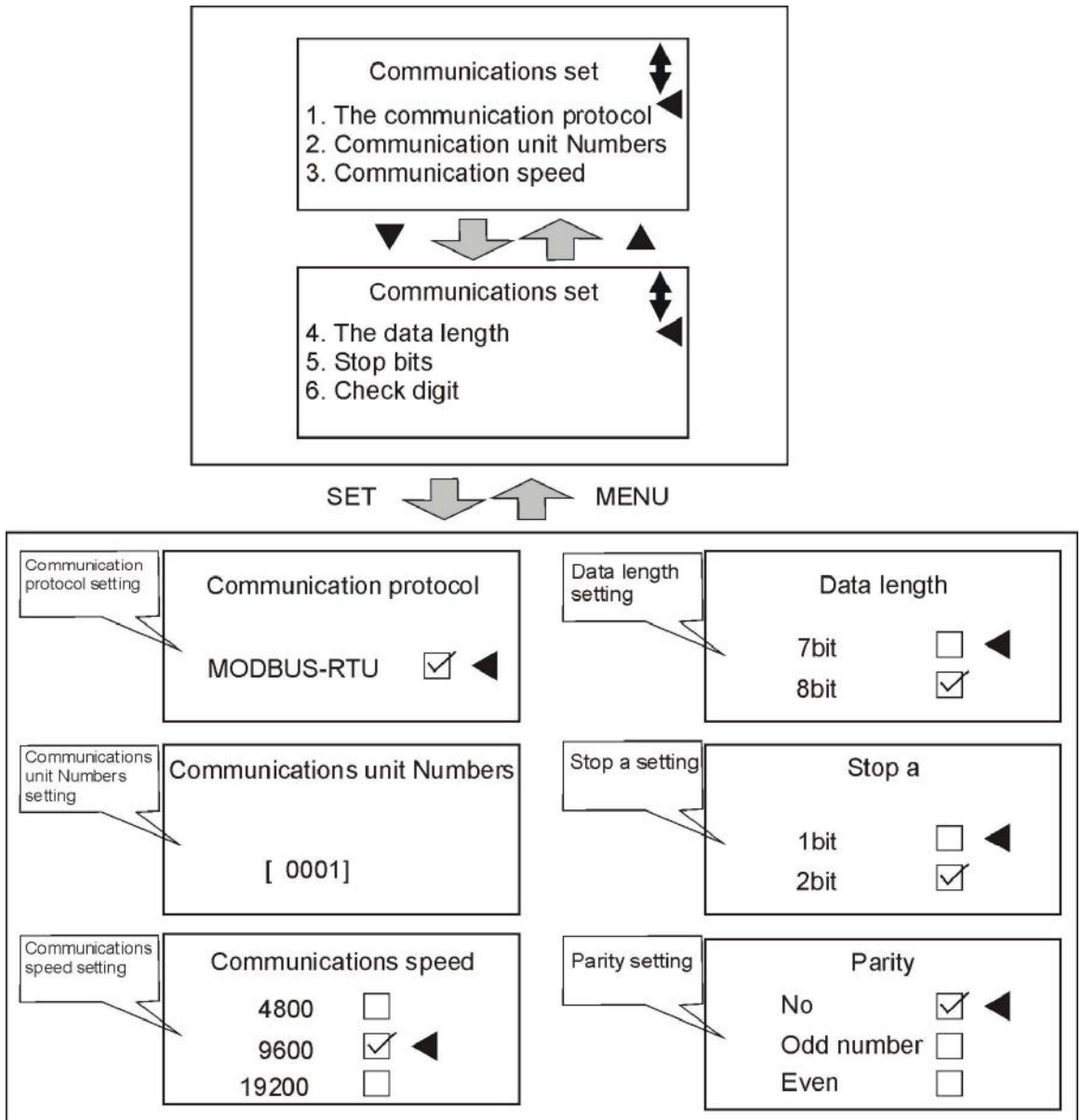
Picture 4-8: Temperature Setting

10) Press MENU key to return menu select screen, press ◀/▶ key to select time setting, press SET key to enter setting screen, as shown in picture. Time has been set upon delivery, customers can set appointment based on actual productions.



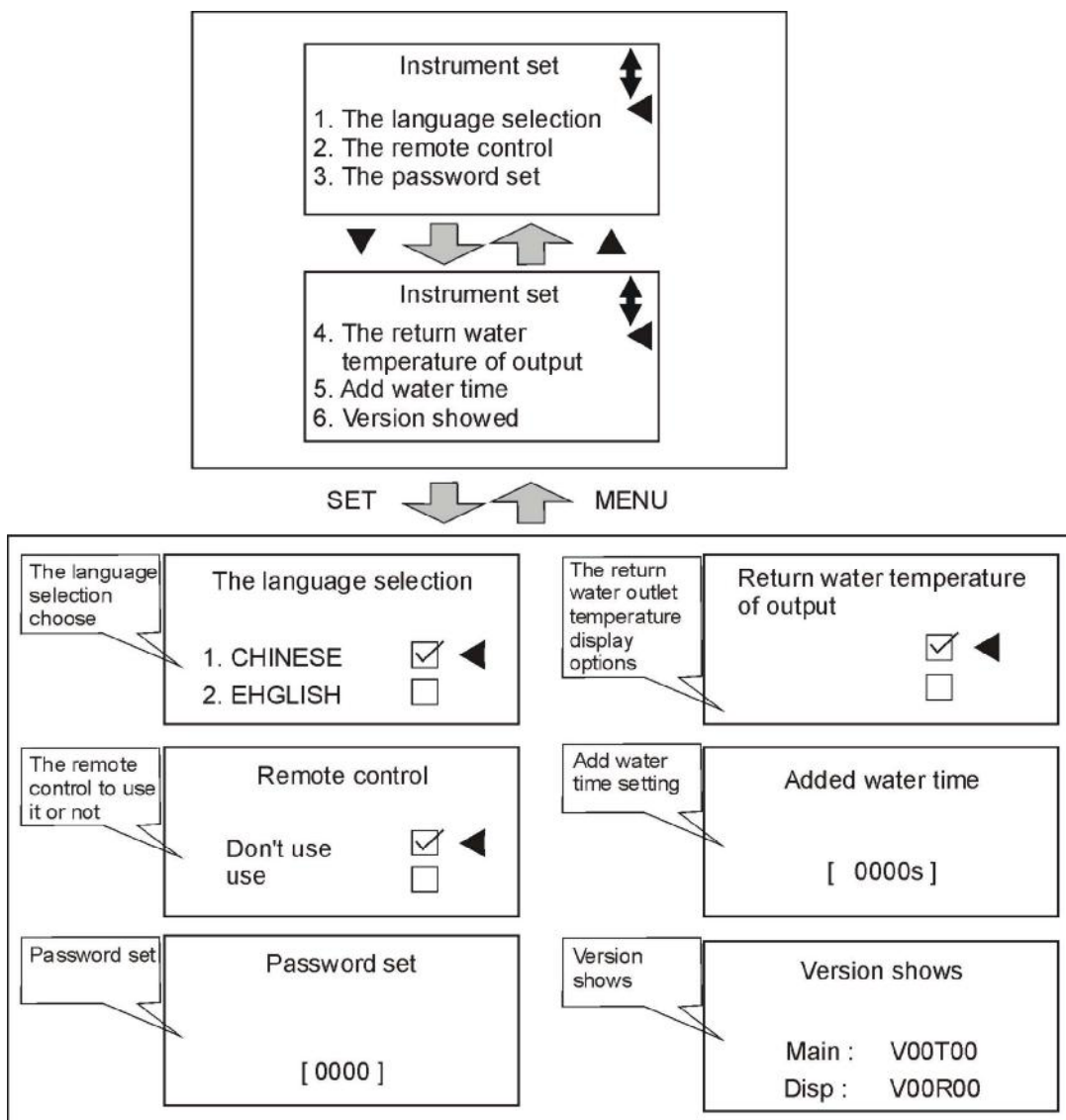
Picture 4-9: Time Setting

11) Press MENU key to return menu select screen, press ◀/▶ key to select communication setting, press SET key to enter setting screen, as shown in picture. If communication is selected as option, customers should set communication parameters based on demands.



Picture 4-10: Communication Setting

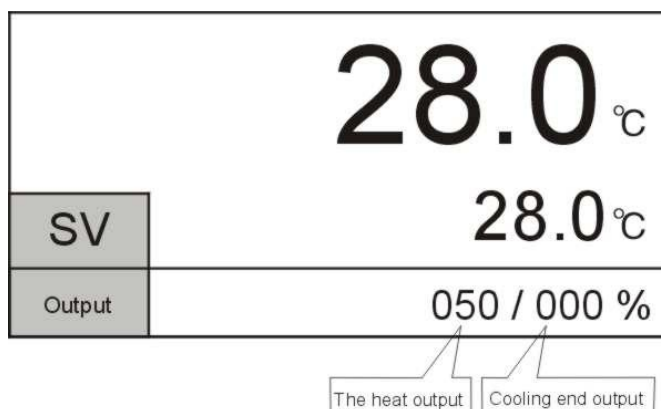
12) Press MENU key to return menu select screen, press ◀/▶ key to select equipment setting menu, press SET key to enter setting screen, as shown in picture. Upon delivery, parameters has been set and customers can modify them based on demands.



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 200°C.
- 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 before Auto-tuning.



Picture 4-12: Operation Screen

4.4 Stop the Machine

- 1) Press COOL key to shut down heating output, and open cooling process.
- 2) Await until temp. drops to 50°C below, press COOL key to shut down forced cooling, then press RUN/RESET key to stop operation.
- 3) Switch main 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!

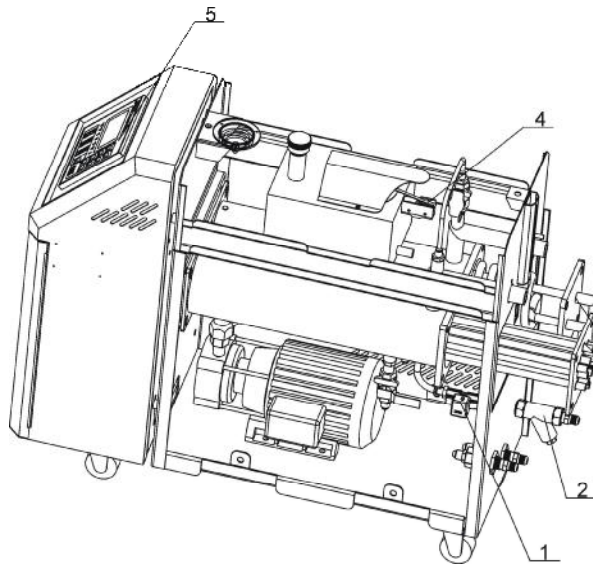
In order to prolong machine lifespan, please do as above steps to turn on and off the machine.

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 relay. 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 tripping off 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 level switch
Period: trimonthly
5. Check contactor
Period: trimonthly

Service time of high temperature oil:

≤ 120°C	Period: replace annually
≧ 120°C~≦ 160°C	Period: replace half yearly
> 160°C	Period: replace trimonthly

Pay attention to the following rules during maintenance:

- 1) Need at least two persons present when checking the machine. Let the machine cool down, turn off power supply, drain out the oil and water. Make sure enough place before checking and maintenance.
- 2) The machine works in high temperature. Stop the machine, wait it to cool down. Put on protective gloves before servicing or maintenance.
- 3) In order to prolong the life of the machine and to prevent accidents, check the machine at a fixed frequency.
- 4) During operation, the oil is heated up to a high temperature, wait it to fall below 50°C to perform repairing or maintenance. (Please note that it is dangerous to check or tear down the machine during operation.)



B A

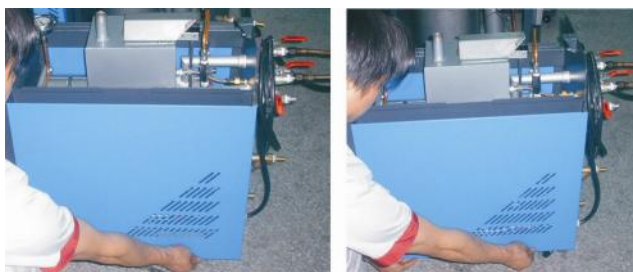
6.1 Open the Covers

1) Lift the top cover gently to open it. (Refer to the pictures below)



Picture 6-1: Open the Covers 1

2) Pull the bottom of side cover outward, and lift it to open. (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)



Butterfly screws

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 entering 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.

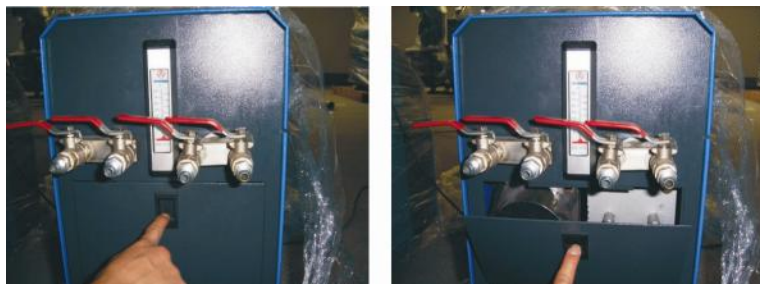


Solenoid valve

Picture 6-5: Solenoid Valve

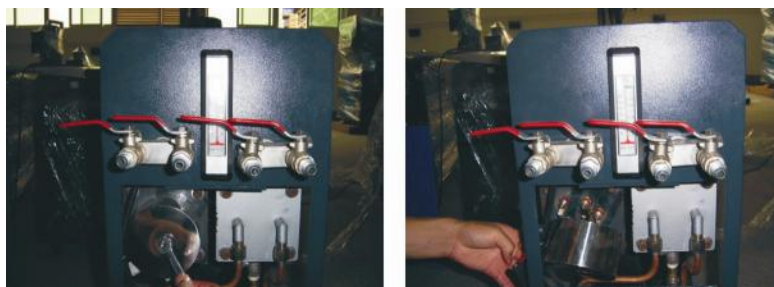
6.4 Pipe Heater

- 1) Pull the black door locker downward, then draw it outward to open machine rear cover. (Refer to pictures below)



Picture 6-6: Pipe Heater 1

2) Unscrew the screws of heater cap and take it down. (Refer to pictures below)



Picture 6-7: Pipe Heater 2

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



Picture 6-8: Pipe Heater 3

4) Re-fix the pipe heater in a reverse order.

6.5 Cooling Pipes

1) Pull the black door locker downward, then draw it outward to open machine rear cover. (Refer to pictures below)



Picture 6-9: Cooling Pipes 1

2) Screw off the screws of cooling pipe to take it out. (Refer to pictures below)



Picture 6-10: Cooling Pipes 2

3) Re-fix the cooling pipe in a reverse order.



Because the heat transfer oil may become carbonized agglutination after a long time heating, which will shorten the lifespan of the pump, so it is suggested to replace every three months.

Oil used parameters recommended:

Use kerosene up to 200 degrees model:

Model: Nanhai MCH32. For using other brands, fire point should be higher than 240 degrees.

Use kerosene up to 300 degrees model:

Model: Goddess HT-3 heat transfer oil. For using other brands, fire point should be higher than 340 degrees.

6.6 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 terminal

5, 6 : return 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

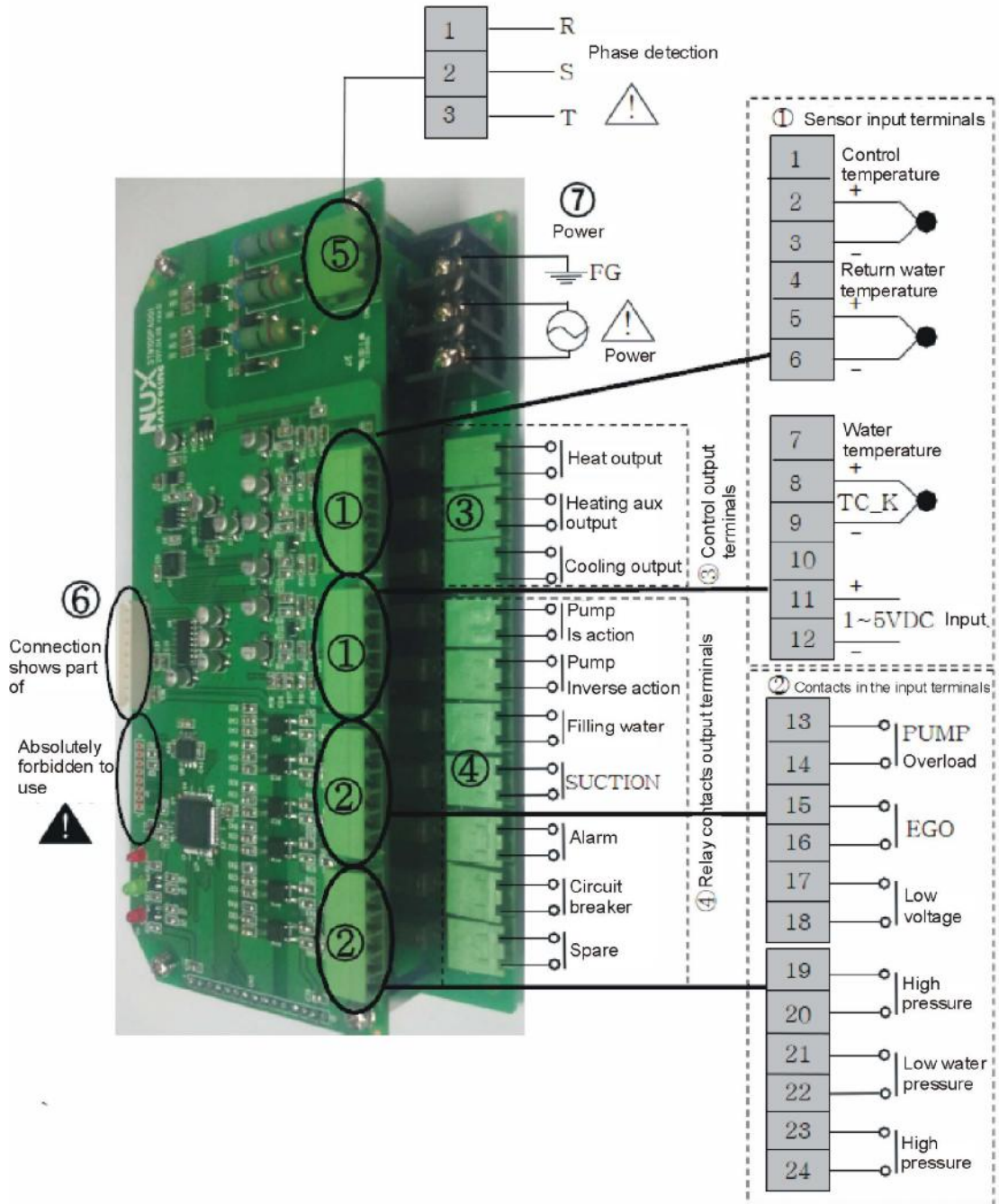
⑥ DISPLAY CN (connect terminal for display)

Connect stub cable with STM100.

⑦ POWER TERMINAL (power supply terminal)

1 : FG terminal

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



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 electrical 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.