| Date |
|---|

| Bill To: | Ship To: |
|---|---|

# STM-F

## "Large Flow" Oil Heater

| P.O. Number | Terms | Rep | Ship | Via | F.O.B. | |
|---|---|---|---|---|---|---|
| | | | | | | |

| Quantity | Item Code | Description | Price Each | |
|---|---|---|---|---|
| | | | | |

Date: Jul. 2014

Version: Ver.B (English)


**Total**

## Contents

## Table Index

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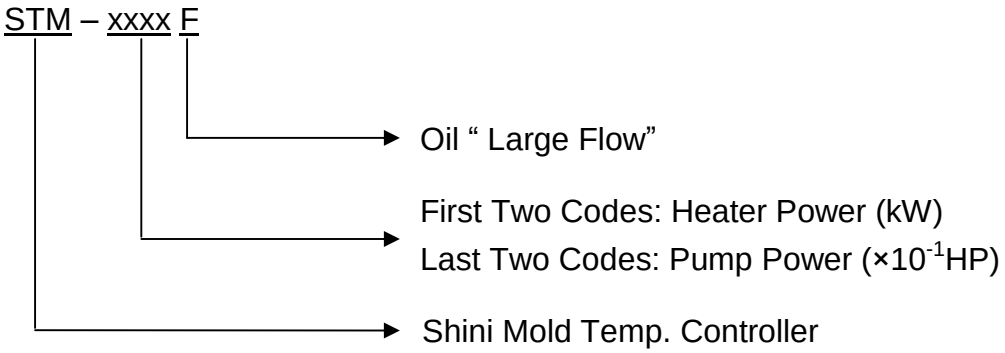
# 1. General Description

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

STM-F series "Large Flow" oil heater mainly applied in extruder and rubber injection molding or other occasion requires large flow, strong cooling capability. Besides, it’s also applicable to the fields with same requirements. This series of heaters adopt indirect cooling method after return oil from the mould passed through the cooler. The oil pressurized by pump, through heater pipe it will be heated, then it returns to the mould to reach the requirement of heating and maintaining constant temperature. Adopts P.I.D temperature controller can ensure stable temperature control.

Model: STM-4575F

## 1.1 Coding Principle




## 1.2 Feature

Standard Configuration

1) It’s easy for dismantlement and maintenance.
2) P.I.D. full-digital temperature control system can reach maximum temperature at 200℃ and maintain a mould temperature with accuracy of ±0.5℃ at any status.
3) Controller adopts 3.2" LCD for easy operation.
4) It equipped with large-flow pump which especially suitable for moulds requiring large-flow heating medium to maintain constant temperature in plastics molding occasions.
5) Cooler adopted plate heat exchanger has optimal exchanging effect which can reach the highest cooling ability to 40kW and lower temperature quickly.
6) Power phase reverse alarm, pump overload alarm, over-temperature alarm, low level sensor alarm and other safety devices can self-detect machine’s abnormality and display the abnormal situations.

Accessory option

1) Water manifolds, Teflon hose and Transfer oil are optional.
2) RS485 communication function is optional.
3) Display of mould temperature and mould return oil temperature is optional.
4) When machine stops, return oil reverse 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.

Headquarter and Taipei factory:
Tel: (886) 2 2680 9119

China Service Line:
Tel: 800 999 3222

# 1.3 Technical Specifications

## 1.3.1 Specification

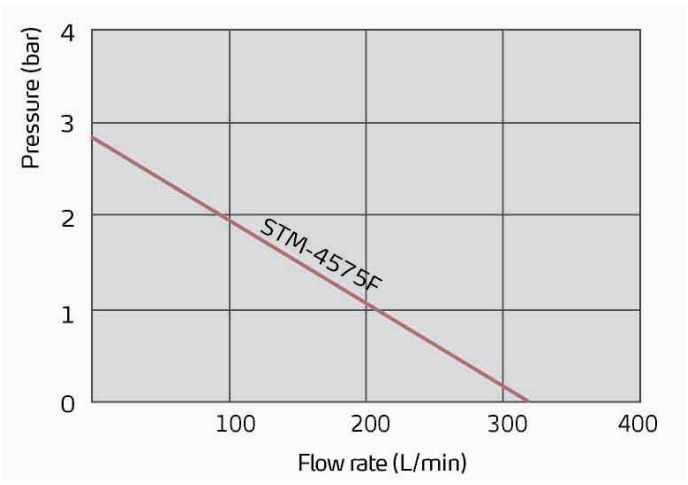
Table 1-1: Specification

| Model | Heater Power (kW) | Pump power (HP) | Max. pump Flow (L / min) | Max. pump pressure (bar) | Heating Tank Number | Main / Sub. Oil Tank (L) | Cooling Method | Mould Coupling* (inch) | Inlet/Outlet (inch) | Cooling Water Inlet/Outlet (inch) | Dimensions (mm) (H×W×D) | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STM-4575F | 45 | 7.5 | 424 | 3.0 | 3 | 16 / 51 | Indirect | $1\frac{7}{8}$ "-12(1x2) | 1.5" / 1.5" | 13 / 13 | 1200x500x1350 | 270 |

Note:: 1) "*" Stands for options.
2) Pump testing standard: Power of 50 Hz, purified water at 20℃. (There is ±10% tolerance for either max. flowrate or max. pressure).
3) Power supply: 3Φ, 400VAC, 50 Hz

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℃) × 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 put spare emergency switch in suitable place and remember the location.

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.

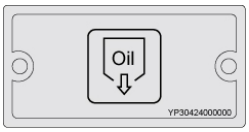
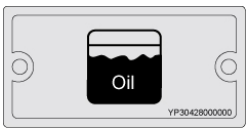
Protect the machine against severe vibration or collision.

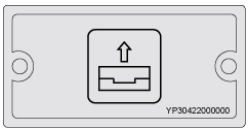
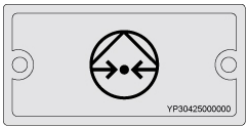
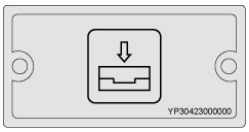
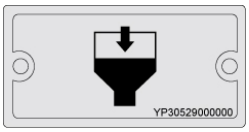
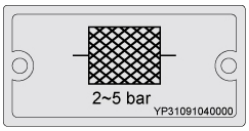
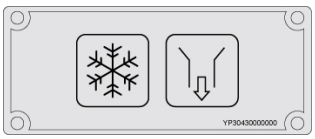
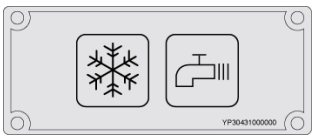
Don’t take off or dirty safety signs privately. Drunken, medicine-taking, or men without proper judgement should not operate the machine.

Warning!

All screws of electric components in cabinet have been tightened and no need for periodical checking.

## 1.4.2 Signs and Labels

| | |
|---|---|
|  | Please according to schedule to make regular maintenance. |
|  <br>(Attached on motor cover) | This is to indicate motor rotating direction.<br>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!<br>This is general warnings which operators should pay attention to. |
|  | Oil discharge valve: oil discharge port when machine is changing oil. |
|  | High oil level: max. oil level of machine in constant temperature. |

| | |
|---|---|
|  | From mould: connector for circulating water/oil of coming from mould |
|  | Pump pressure meter: indicating actual pressure of system. |
|  | To mold: connector for circulating water/ oil to go to mould. |
|  | Oil inlet: Machine oil inlet |
|  | 1. To maintain temperature stability, cooling water pressure must be higher than 2 bar at all time, but should never exceed 5 bar in any case.<br>2. Clean Y-shape Cooling Water Strainer periodically to ensure perfect cooling capacity. |
|  | Water outlet: cooling water outlet |
|  | Water inlet: cooling water intlet |

### 1.4.3 Operation Regulations

1) When cooling water: qualified standard cooler for industrial use is recommented. Reference as Table 1-2.
2) When in use, if there's poor water drainage or poor control effect, clean up the solenoid valve at once or check cooling water outlet has blockage or not.
3) Do not move the unit when it is in operation.
4) During repairing, wait until oil temperature falls below 30℃.
5) STM-F possesses pump overload device. When overload occurs, pump and

heater will stop working. At this moment, it needs to check overload reasons (phase shortage, pipe obstruction, broken bearing, etc.) After the system runs normally, press RESET on overload relay to rest the operation.

6) Before turn off the pump, wait until oil temperature falls blow 50℃. Or the service life of the unit would be affected.

Table 1-2: Standard Water Quality

| No. | Control Items | Cooling Water | |
|---|---|---|---|
| | | Direct Cooling Water | Circulating Cooling Water System Replenishment Water |
| 1 | pH | 6.0-9.0 | 6.5-8.5 |
| 2 | SS(mg/L)⩽ | 30 | - |
| 3 | Turbidity（NTU）⩽ | - | 3 |
| 4 | BOD5（mg/L）⩽ | 30 | 10 |
| 5 | CODcr⩽（mg/L） | - | 50 |
| 6 | Fe（mg/L）⩽ | - | 0.3 |
| 7 | Mn（mg/L）⩽ | - | 0.1 |
| 8 | Cl（mg/L）⩽ | 250 | 250 |
| 9 | GH（CaCO3 /mg/L）⩽ | 450 | 450 |
| 10 | Total ALK （CaCO3 /mg/L）⩽ | 500 | 350 |
| 11 | Sulfate（mg/L）⩽ | 600 | 250 |
| 12 | NH3-N（mg/L）⩽ | - | 10 |
| 13 | Total P（P mg/L）⩽ | - | 1 |
| 14 | TDS（mg/L）⩽ | 1000 | 1000 |
| 15 | Fecal coliform（/L）⩽ | 2000 | 2000 |
| 16 | Petroleum（mg/L）⩽ | - | 1 |
| 17 | Anionic surfactant（mg/L）⩽ | - | 0.5 |

## 1.5 Exemption Clause

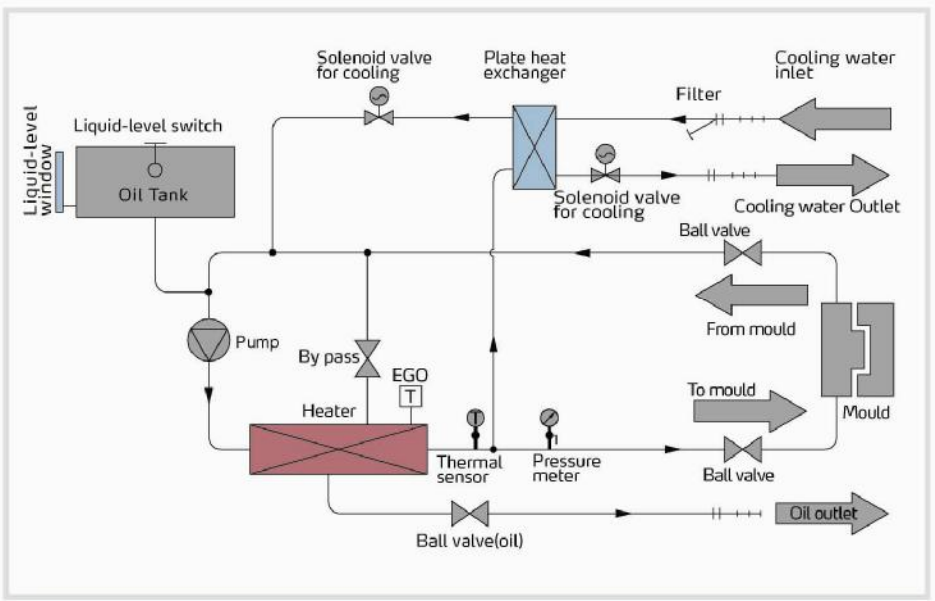
The following statements clarify the responsibilities and regulations born by any buyer or user who purchases products and accessories from Shini (including employees and agents).

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

1. Before use of the machine, careless or man-made installations, operation and maintenances upon machine without referring to the Manual.
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. Use consumables or oil media that are not appointed by Shini.

# 2. Structure Charateristics and Working Principle

## 2.1 Working Principle

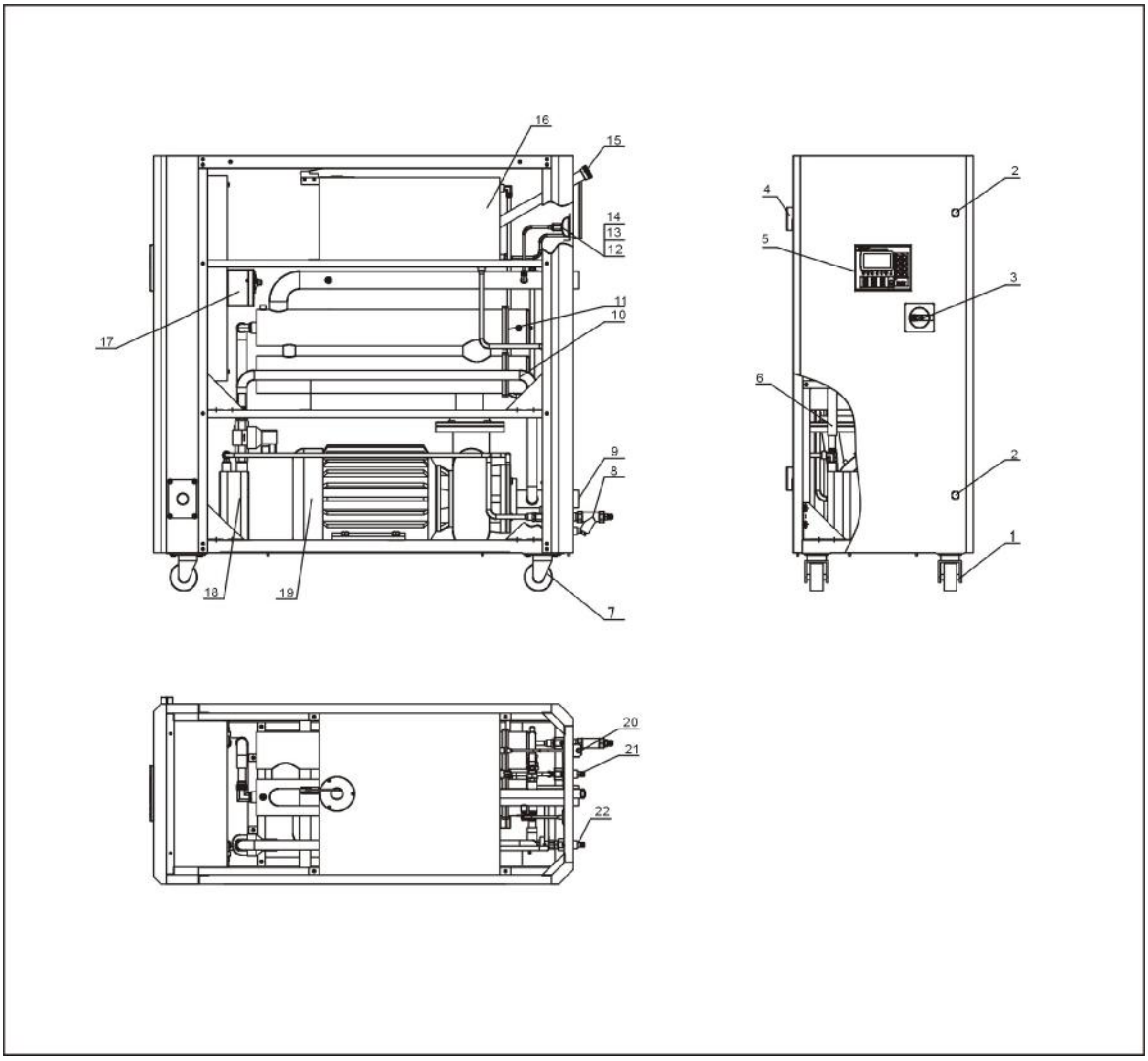



Picture 2-1: Working Principle

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-4575F)




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-4575F)

## 2.2.2 Parts List (STM-4575F)

Table 2-1: Parts List (STM-4575F)

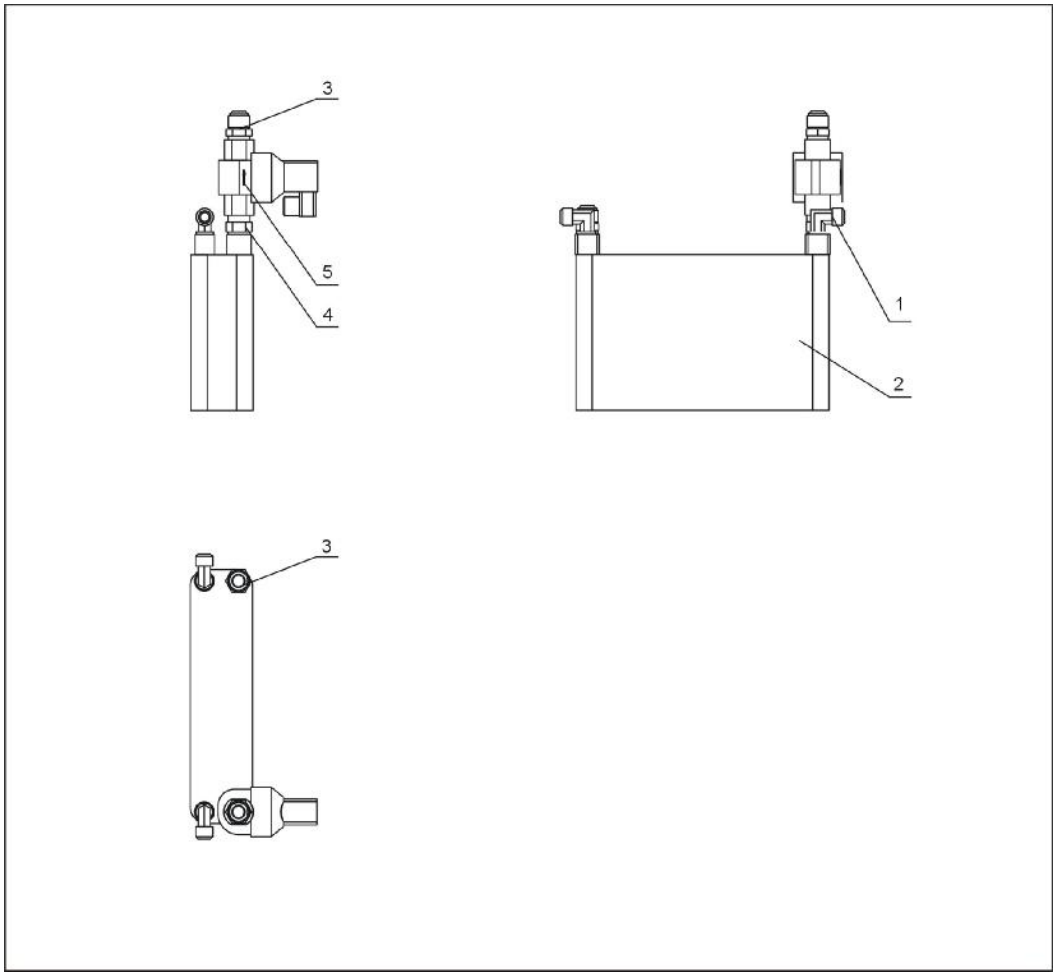
| No. | Name | Part No. |
|---|---|---|
| | | STM-4575F |
| 1 | Movable castor 3"* | YW03000300200 |
| 2 | Long door lock | YW00000000100 |
| 3 | Breaker interlock* | YE41161500000 |
| 4 | Big hinge-left CL203-1 | YW06203100400 |
| 5 | Controller MT100-01* | YE81100010000 |
| 6 | Oil inlet pipe of plate heat exchanger | STM-4575F-ALL-16 |
| 7 | Castor with brake 3" | YW03000300000 |
| 8 | Water inlet connector assembly | STM-4575F-F-ALL |
| 9 | oil pipe from pump assembly | STM-4575F-B-ALL |
| 10 | Oil outlet pipe of plate heat exchanger | STM-4575F-ALL-15 |
| 11 | Heating tank assembly | STM-4575F-A-ALL |
| 12 | H transfer to PT connector | STM-607-ALL-07/01 |
| 13 | LOK-fitting 6mm*1/4"PT | YW05061400000 |
| 14 | Pressure gauge (0~1.0MPa)* | YW85001000100 |
| 15 | Aluminium oil cap 3/4"PT | BH12030403040 |
| 16 | Oil tank assembly | STM-4575F-C-ALL |
| 17 | EGO assembly ** | BH90115000050 |
| 18 | Heat exchanger assembly | STM-4575F-D-ALL |
| 19 | Pump YS-35F low (YUANXIN 5.5kw) * | YM20153500000 |
| 20 | Liquid level indicator assembly* | BH12060700210 |
| 21 | Oil discharge connector assembly* | STM-4575F-G-ALL |
| 22 | Water drainage connector assembly* | STM-4575F-E-ALL |

* 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 Heat Exchanger Drawing



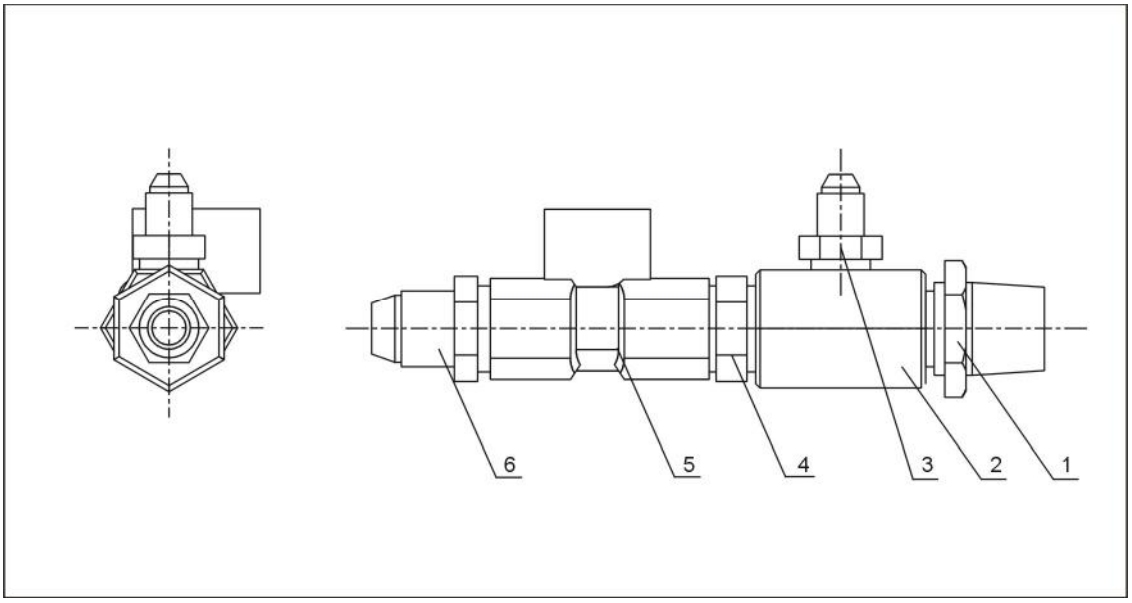

Picture 2-3: Heat Exchanger Drawing

Table 2-3: Heat Exchanger Parts List

| No. | Name | Part No. |
|---|---|---|
| 1 | Tonflon tube connector 1/2"PT×1/2"H(L) | YW04121200000 |
| 2 | Plate heat exchanger （BL20-78D) | YW87957800000 |
| 3 | Tonflon tube connector 3/4"PT×3/4"H | BH12030400310 |
| 4 | Copper pipe coupler 3/4"PT×3/4"PT | BH12030400010 |
| 5 | Solenoid valve 3/4"( KL 5231020S) * | YE32312200000 |

* 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.

## 2.2.4 Water Inlet Contector Assembly



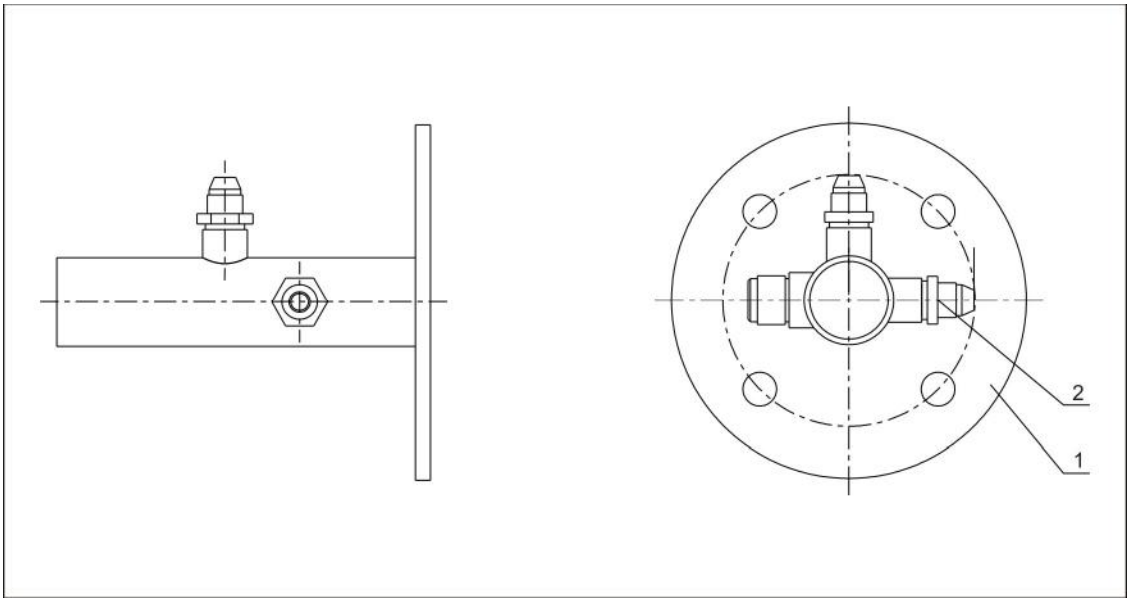

Picture 2-4: Water Inlet Contector Assembly

Table 2-4: Water Inlet Contector Parts List

| No. | Name | Part No. |
|---|---|---|
| 1 | General Copper nut | BH12060703910 |
| 2 | The 9th set of copper connector | - |
| 3 | Tonflon tube connector 1/4H×1/4PT | BH12010400410 |
| 4 | Pipe coupler 1/2"PT×1/2"PT | BH12010230110 |
| 5 | Solenoid valve 1/2" (Airtac 2L15015A)* | YE32501500000 |
| 6 | Tonflon tube connector 1/2"PT×1/2"H | BH12010200210 |

* 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 Oil pipe from pump Assembly




Picture 2-5: Oil pipe from pump Assembly

Table 2-5: Oil pipe from pump parts list

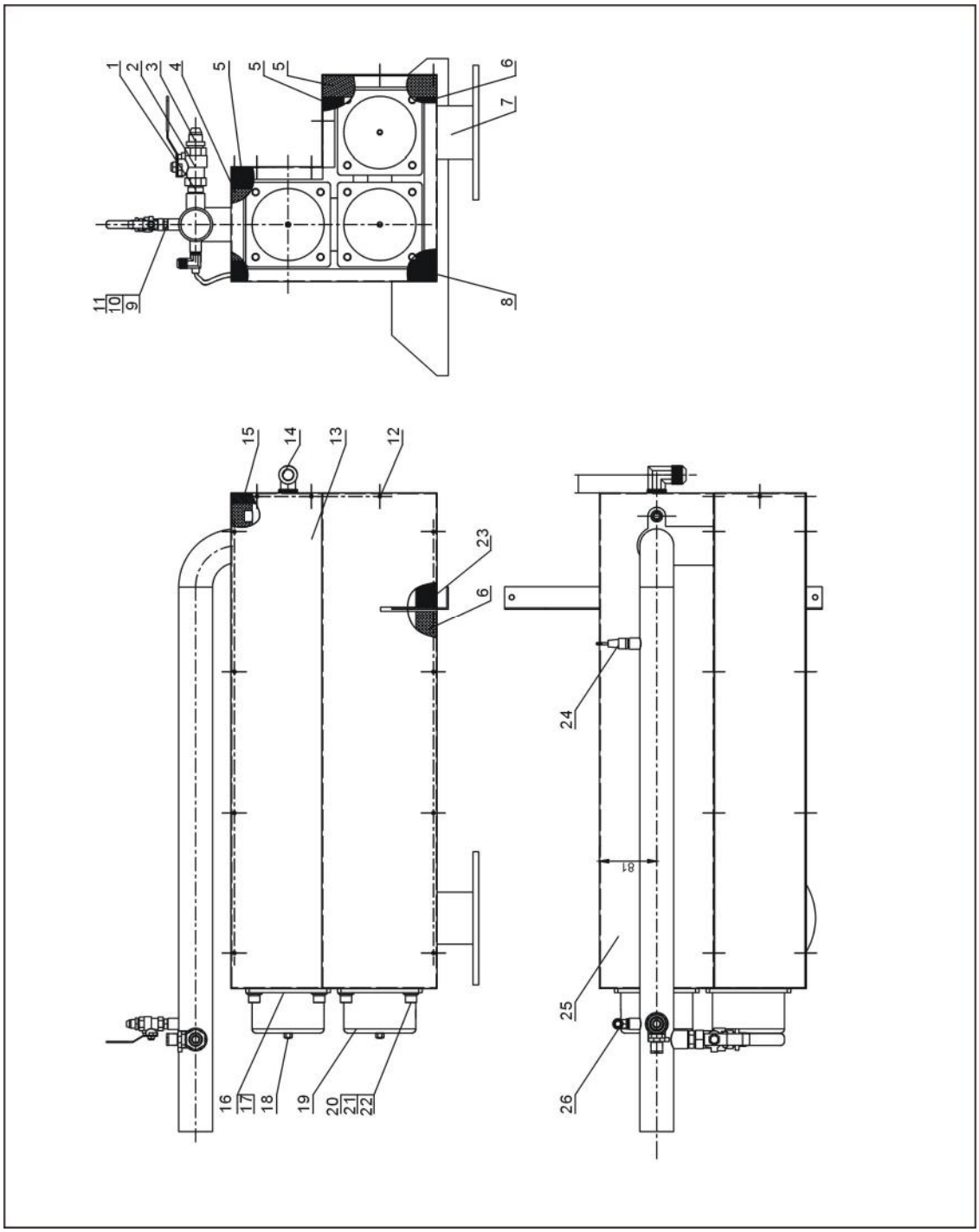
| No. | Name | Part No. |
|---|---|---|
| 1 | Oil pipe from pump | BH12060703910 |
| 2 | LOK-fitting 12mm×1/2"PT | YW05121200000 |

* 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.

## 2.2.6 Heating Hopper Assembly




Picture 2-6: Heating Hopper Assembly

Table 2-6: Heating Hopper Parts List

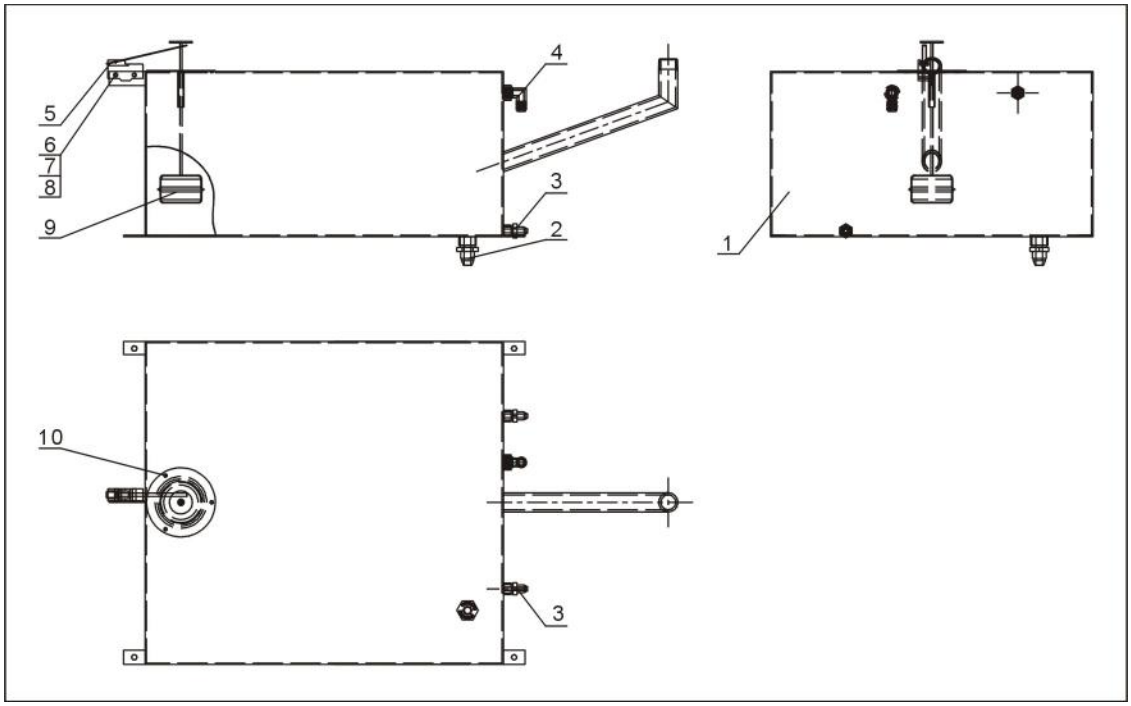
| No. | Name | Part No. |
|---|---|---|
| 1 | Pipe coupler 1/2"PT×1/2"PT | BH12010230110 |
| 2 | Stainless steel ball valve 1/2"* | YW50010200200 |
| 3 | LOK-fitting connector 12mm×1/2"PT | YW05121200000 |
| 4 | Heating tank insulation cotton 5 | - |
| 5 | Heating tank insulation cotton 6 | - |
| 6 | Heating tank insulation cotton 3 | - |
| 7 | Heating tank | - |
| 8 | Heating tank insulation cotton 2 | - |
| 9 | Copper pipe coupler 1/4×1/4(S-08) | BH12010400110 |
| 10 | Stainless steel ball valve 1/4"PT* | YW50010400000 |
| 11 | Tonflon tube connector 1/4"PT×1/4"H | BH12010400410 |
| 12 | ST3.5*10 tapping screw | YW67351000000 |
| 13 | Heating tank cover plate 2 | - |
| 14 | Tonflon tube connector 3/4"PT×3/4"H(L) | YW04030400000 |
| 15 | Heating tank insulation cotton 1 | - |
| 16 | Flexible graphite washer 120×120×2.0mm** | YR20121200000 |
| 17 | Pipe heater unit * | - |
| 18 | Nut M6 | YW64000600300 |
| 19 | Pipe heater cover | BL80091000120 |
| 20 | Inner hexagon screw M10×25 | YW61102500000 |
| 21 | Flat washer 10 | YW66102500000 |
| 22 | Spring washer 10 | YW65010000000 |
| 23 | Heating tank insulation cotton 4 | - |
| 24 | Thermocouple (2.5M)* | BE90342500050 |
| 25 | Heating tank cover plate 1 | - |
| 26 | LOK-fitting connector 6mm×1/4"PT L | YW05061400100 |

* 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 Oil Tank Assembly




Picture 2-7: Oil tank drawing

Table 2-7: Oil tank Parts List

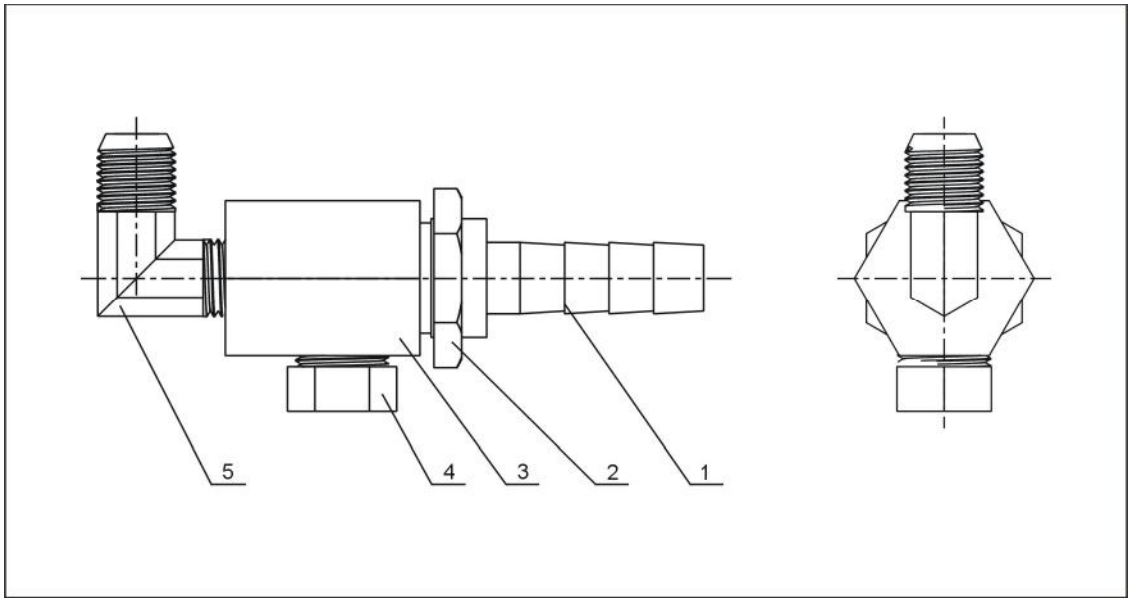
| No. | Name | Part No. |
|---|---|---|
| 1 | Oil tank | - |
| 2 | LOK-fitting connector 12mm×1/2"PT | YW05121200000 |
| 3 | Tonflon tube connector 1/4H×1/4PT | BH12010400410 |
| 4 | Tonflon tube connector 3/8H×3/8PT(L) | YW04030800300 |
| 5 | Microswitch LXW5-1124 rod length 120mm* | YE14152400000 |
| 6 | Nut M5 | YW64000600000 |
| 7 | Flat head screw M5×30 | YW60530000000 |
| 8 | Heat insulation pad of liquid level switch | YR10109000000 |
| 9 | float ball | - |
| 10 | Flat head screw M6×15 | YW63061700000 |

* 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.

## 2.2.8 Oil Discharge Connector Assembly



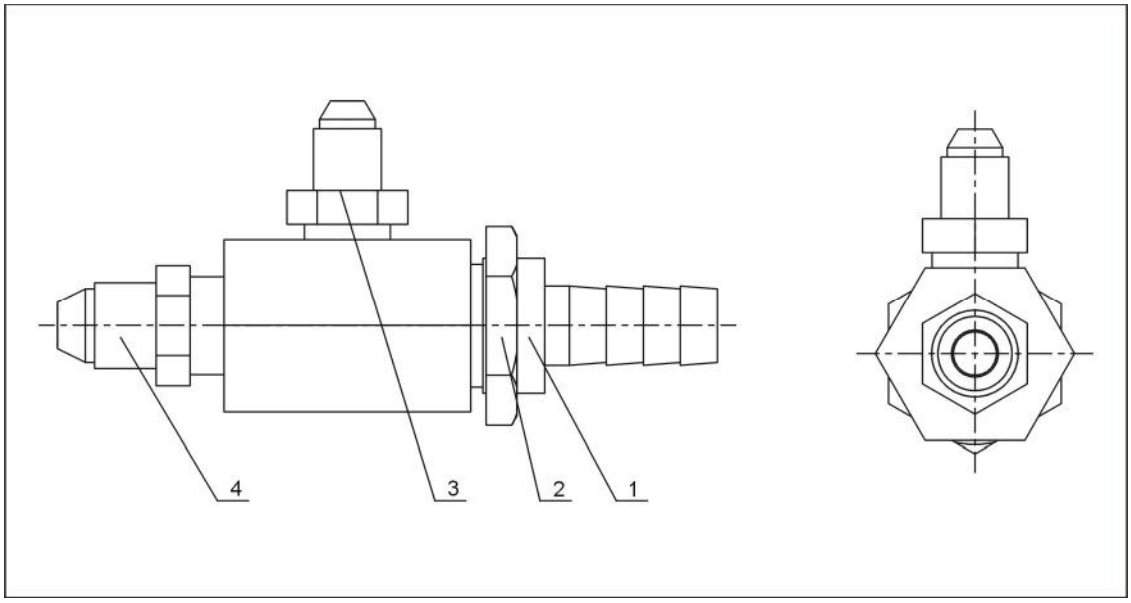

Picture 2-8: Oil Discharge Connector Assembly

Table 2-8: Oil Discharge Connector Parts List

| No. | Name | Part No. |
|---|---|---|
| 1 | 3/8"PT×⌀13 Copper joint | - |
| 2 | General copper nut | BH12060703910 |
| 3 | Water filling copper joint | - |
| 4 | 1/4" Hopper bottom screw | BH12010400710 |
| 5 | Tonflon tube connector 3/8"PT×3/8"H(L) | YW04030800300 |

* 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.

## 2.2.9 Water Drainage Connector




Picture 2-9: Water drainage connector drawing

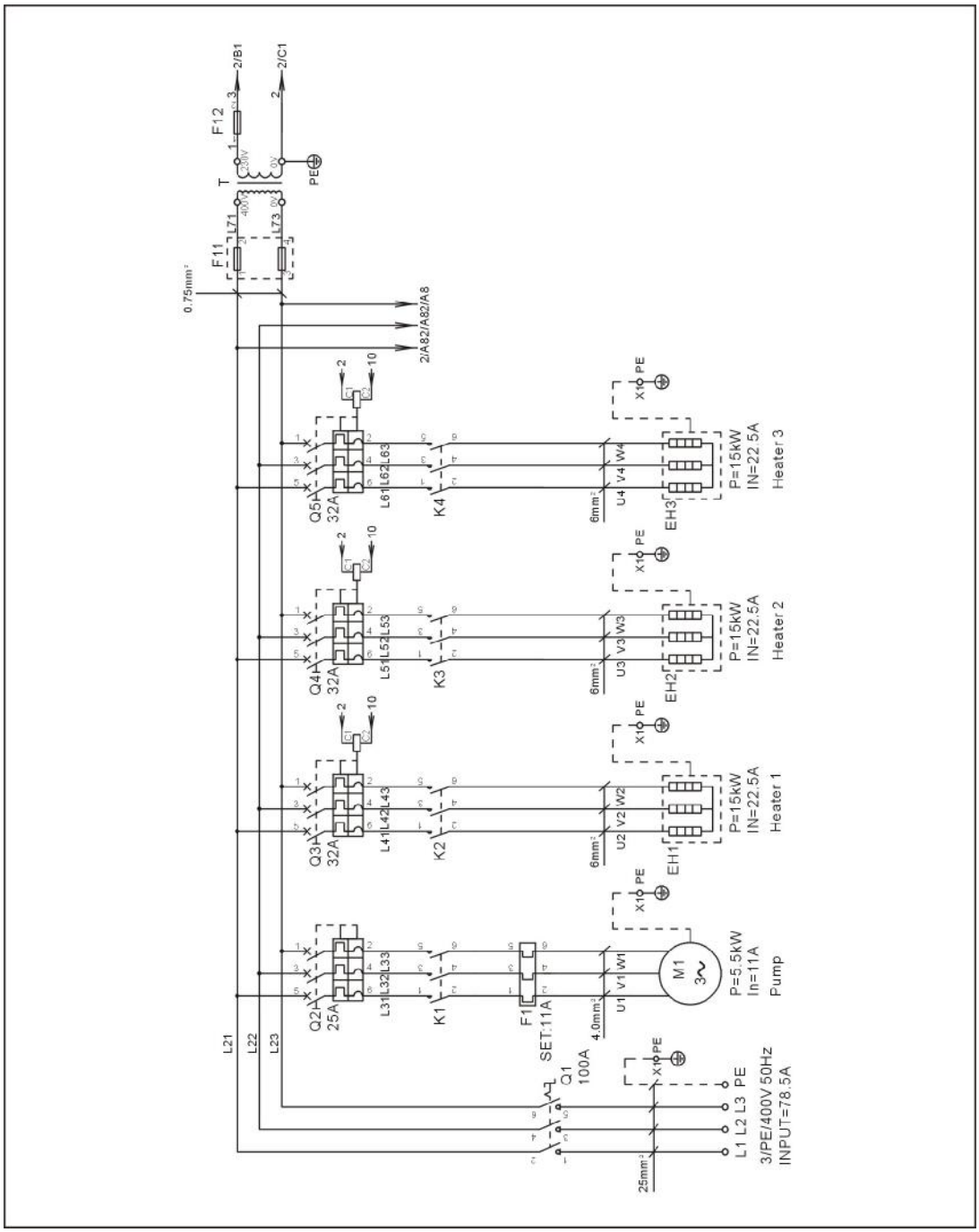
Table 2-9: Water Drainage Connector Parts List

| No. | Name | Part No. |
|---|---|---|
| 1 | The 2nd set of copper connector | - |
| 2 | General copper nut | BH12060703910 |
| 3 | Tonflon tube connector 1/4H×1/4PT | BH12010400410 |
| 4 | Tonflon tube male thread connector 1/2H×3/8PT | BH12010200310 |

* 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.

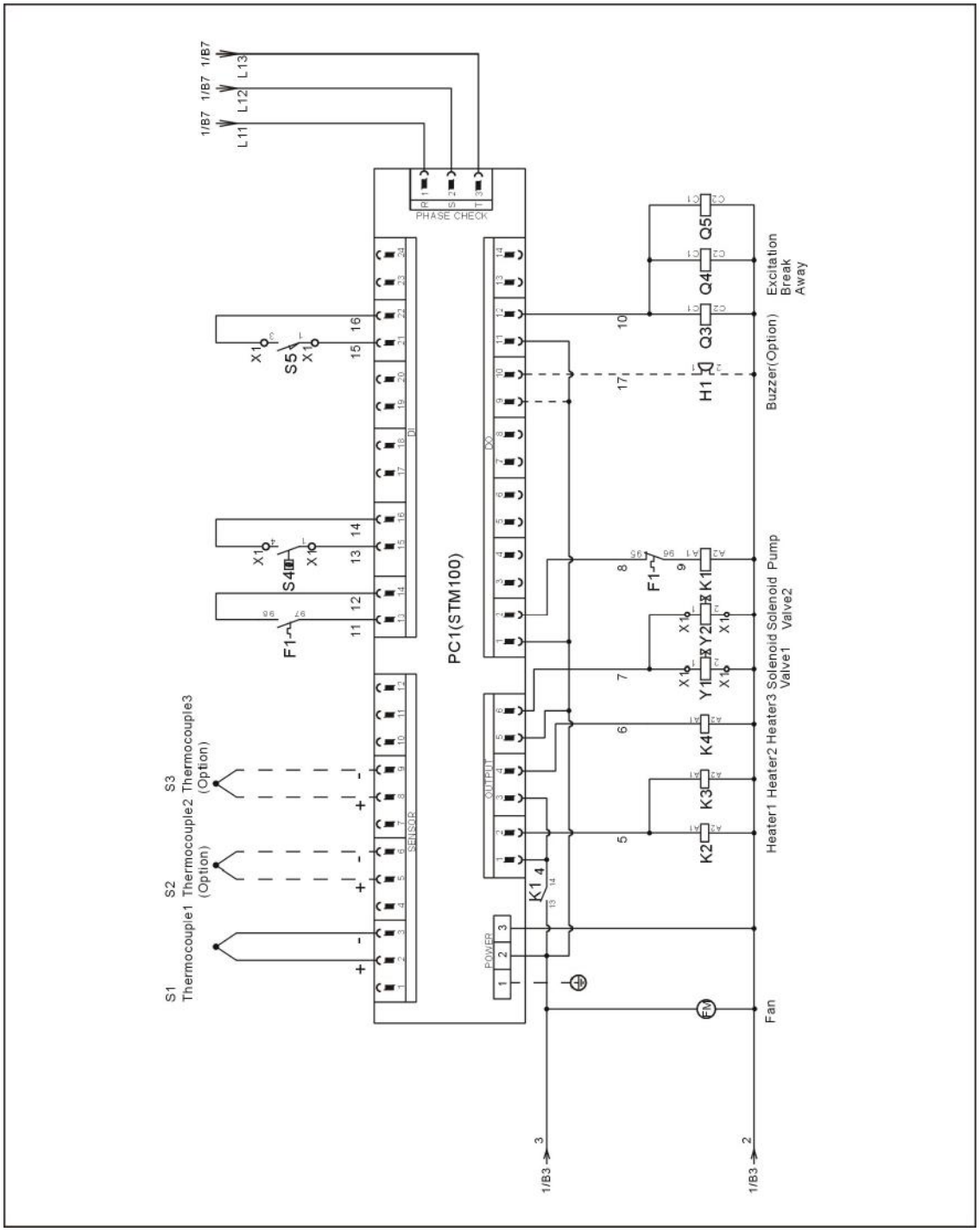
## 2.3 Electrical Diagram

### 2.3.1 Main Circuit (STM-4575F) (400V)



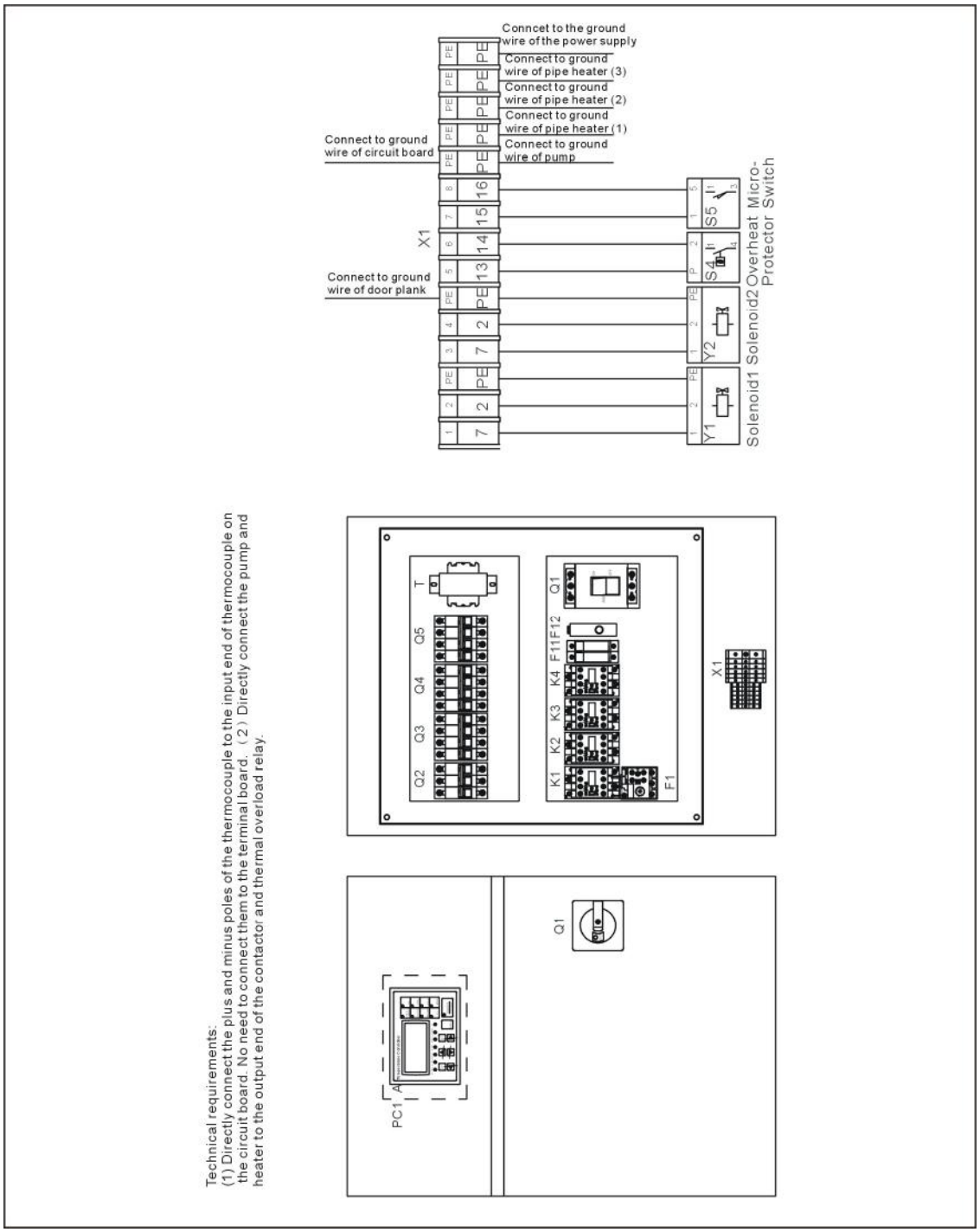

Picture 2-10: Main Circuit

## 2.3.2 Control Circuit (STM-4575F) (400V)




Picture 2-11: Control Circuit (STM-4575F) (400V)

## 2.3.3 Electrical Components Layout (STM-4575F) (400V)




Picture 2-12: Electrical Components Layout (STM-4575F) (400V)

## 2.3.4 Electrical Components List (STM-4575F) (400V)

Table 2-10: Parts List (STM-4575F) (400V)

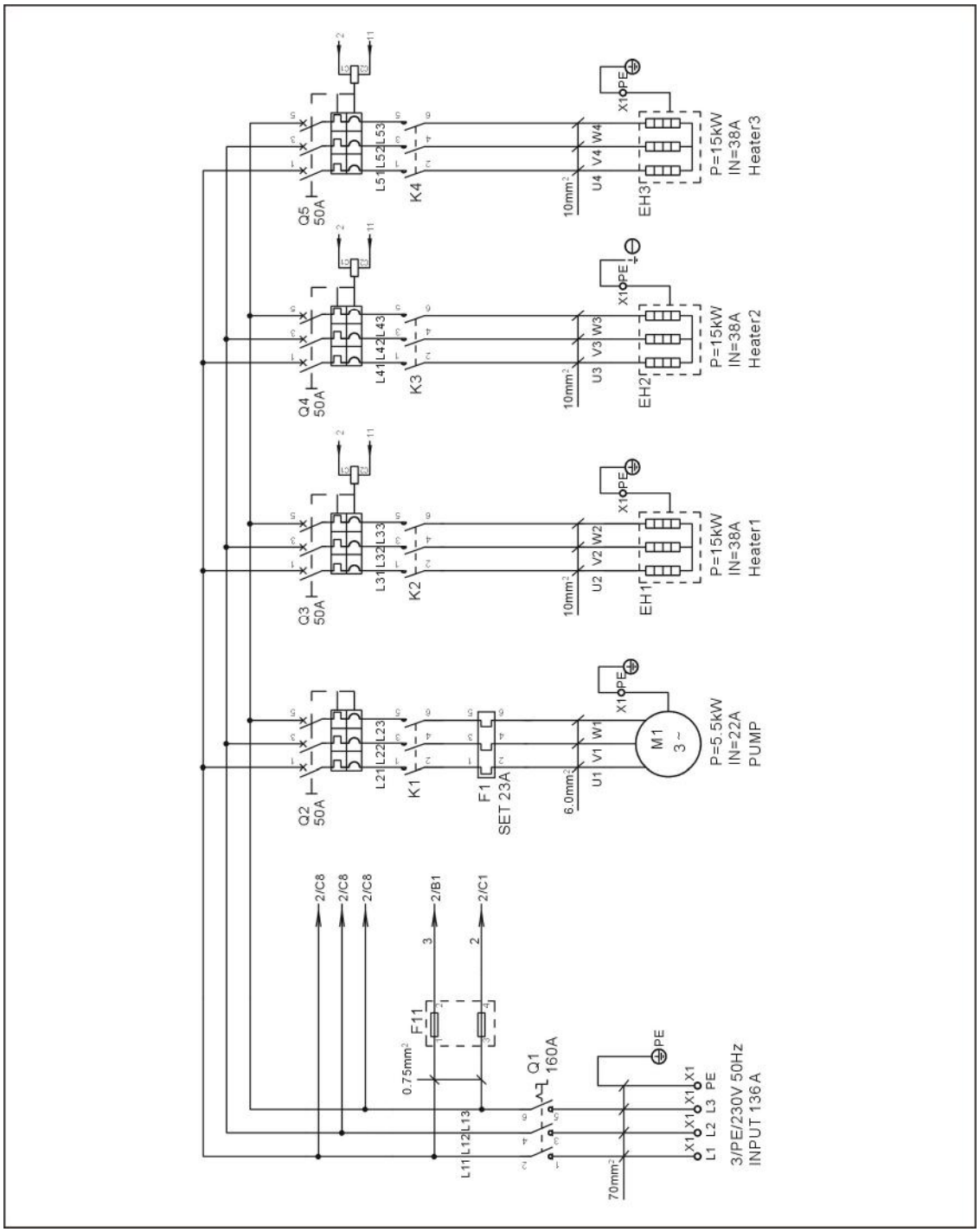
| No. | Symbol | Name | Specification | Part No. |
|---|---|---|---|---|
| 1 | Q1 | Breaker interlock | 100A | YE41110200000 |
| 2 | Q2 | Breaker | 25A | YE40302503000 |
| 3 | Q3 Q4 Q5 | Breaker | 32A | YE40303203000 |
| 4 | - | Excitation Tripper | - | YE40023560000 |
| 5 | K1 | Contactor * | 220V 50/60Hz | YE00601800000 |
| 6 | K2 K3 K4 | Contactor ** | 220V 50/60Hz | YE00602822000 |
| 7 | F1 | Heat overload relay | 9-12.5A | YE01169125000 |
| 8 | F11 | Fuse base | 32A 2P | YE41032200000 |
| 9 | - | Fuse** | 2A | YE46002000100 |
| 10 | F12 | Breaker* | 2A | YE41001000000 |
| 11 | T | Transformer* | 500mA | YE70402300800 |
| 12 | S1 | Thermocouple | K | - |
| 13 | S2 S3 | Thermocouple | K | - |
| 14 | S4 | Overheat protector* | - | - |
| 15 | S5 | Limit switch* | 250V 5(4) | - |
| 16 | PC1 A | PCB** | 180~430V 50/60Hz | YE81184300200 |
| 17 | X1 | Terminal board | - | YE61250040000 |
| 18 | - | Grounding Terminal block | - | YE61253500000 |
| 19 | - | Grounding Terminal block | - | YE61063500000 |
| 20 | - | Grounding Terminal block | - | YE61163500000 |
| 21 | M1 | Pump YS-35F* | 400V 50Hz 5.5Kw | YE20153500000 |
| 22 | EH1 EH2 EH3 | Heater** | 400V 50Hz | - |
| 23 | FM | Fan* | 230V 50/60Hz | - |
| 24 | H1 | Buzzer | 230V 50Hz | YE84003500000 |
| 25 | Y1 Y2 | Solenoid valve* | 230V 50/60Hz | - |

* means possible broken parts.

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

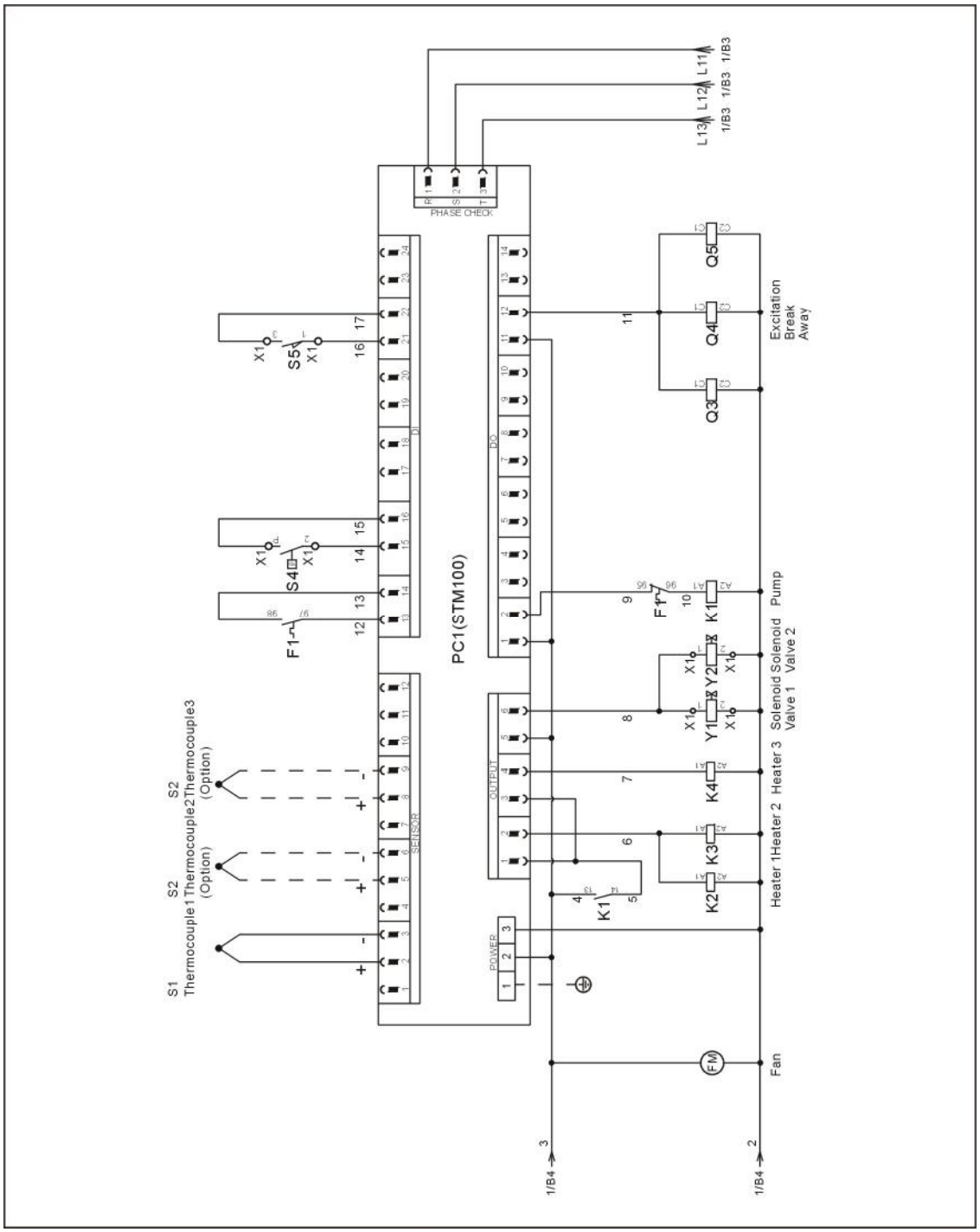
Please confirm the version of manual before placing the purchase order to guarantee that the item number of the spare part is in accordance with the real object.

## 2.3.5 Main Circuit (STM-4575F) (230V)



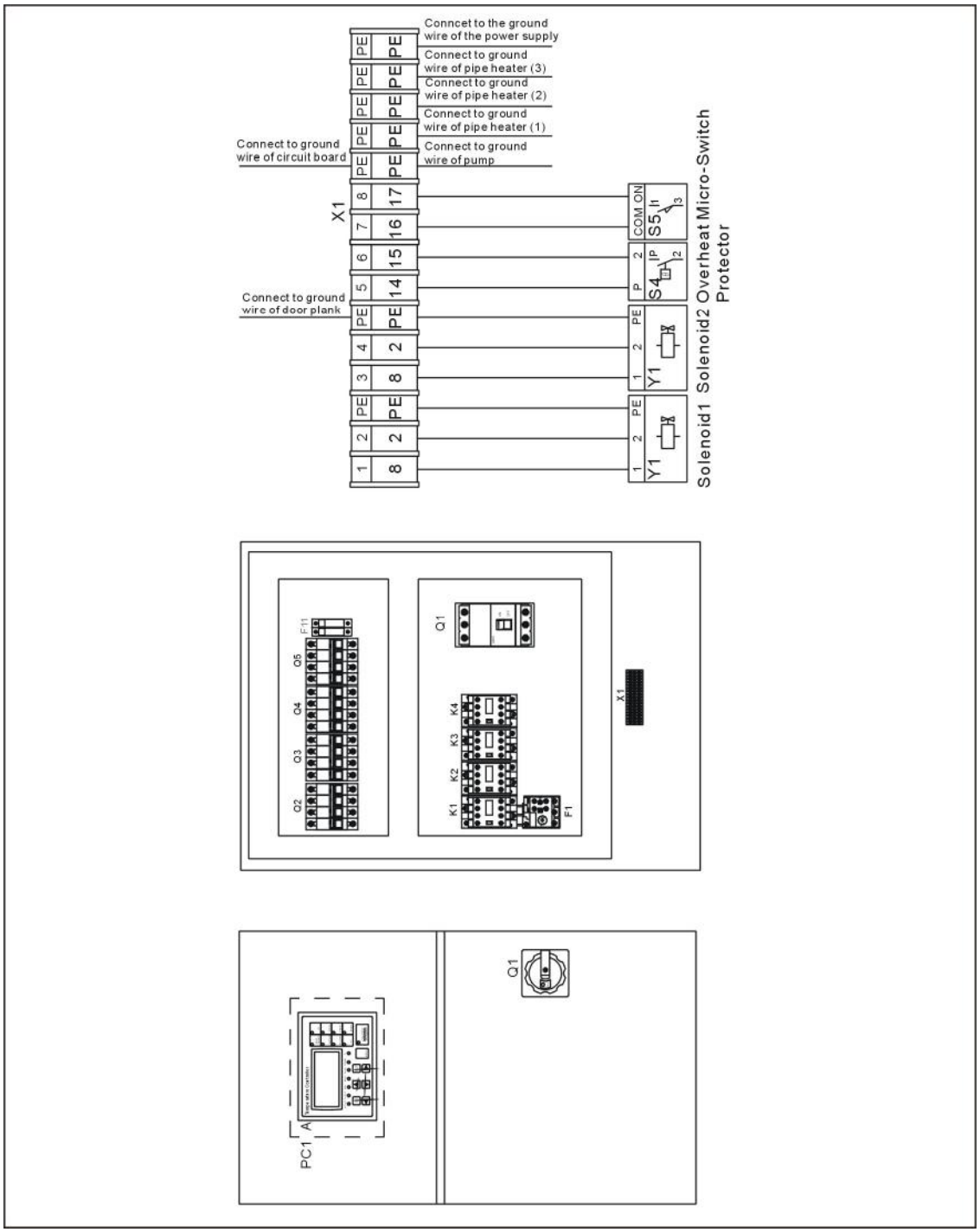

Picture 2-13: Main Circuit ( STM-4575F)(230V)

## 2.3.6 Control Circuit (STM-4575F) (230V)




Picture 2-14: Control Circuit (STM-4575F)(230V)

## 2.3.7 Electrical Components Layout (STM-4575F) (230V)




Picture 2-15: Electrical Components Layout (STM-4575) (230V)

## 2.3.8 Electrical Components List (STM-4575F) (230V)

Table 2-11: Parts List (STM-4575F) (230V)

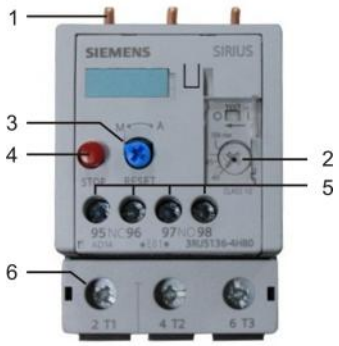
| No. | Symbol | Name | Specification | Part No. |
|---|---|---|---|---|
| 1 | Q1 | Breaker interlock | 160A | YE41161500000 |
| 2 | Q2 Q3 Q4 Q5 | Breaker | 50A | YE40305003000 |
| 3 | - | Excitation tripper | - | YE40023560000 |
| 4 | K1 | Contactor* | 220V 50/60Hz | YE00602722000 |
| 5 | K2 K3 K4 | Contactor** | 220V 50/60Hz | YE00503600000 |
| 6 | F1 | Overload relay | 20-25A | YE01260200000 |
| 7 | F11 | Fuse base* | 32A 2P | YE41032200000 |
| 8 | - | Fuse** | 2A | YE46002000100 |
| 9 | S1 | Thermocouple | K | - |
| 10 | S2 S3 | Thermocouple | K | - |
| 11 | S4 | Overheat protector* | - | - |
| 12 | S5 | Limit switch* | 250V 5(4) | - |
| 13 | PC1 A | PCB** | 180~430V 50/60Hz | YE81184300200 |
| 14 | X1 | Terminal board | - | YE61250040000 |
| 15 | - | Grounding terminal block | - | YE61253500000 |
| 16 | - | Grounding terminal block | - | YE61063500000 |
| 17 | - | Grounding terminal block | - | YE61103500000 |
| 18 | - | Grounding terminal block | - | YE61353500000 |
| 19 | M1 | Pump YS-35F* | 230V 50Hz 5.5kW | YE20153500000 |
| 20 | EH1 EH2 | Heater** | 230V 50Hz | - |
| 21 | FM | Fan * | 230V 50/60Hz | - |
| 22 | H1 | Buzzer | 230V 50Hz | YE84003500000 |
| 23 | Y1 Y2 | Solenoid valve* | 230V 50/60Hz | - |

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

## 2.4 Main Electrical Components Description

### 2.4.1 Overload Relay

At delivery, the overload relay is set for mannual reset. 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 2-16: Overload Relay

Overload Relay Description:

1) Connector of connecting to contactor.
2) Setting current adjusting scale.
   Through largely rotating the knob, it can adjust the overload current conveniently.
3) Manual/ Auto reset (RESET) selects switch, reset button and tripping indication.
   M: manual reset
   A: automatic reset
   When in manual reset, press RESET button can get equipment reset directly.
   Tripping of manual reset is indicated by a projecting pin in front of it.
4) Test button (red).
5) Auxiliary contact terminals are No. 95.96.97.98. NC contacts are No. 95.96. and NO contacts are No.97.98.
6) Main circuit connection No. must be corresponding with terminal Number of the contactor.

# 3. Installation and Debugging

## 3.1 Installation Space

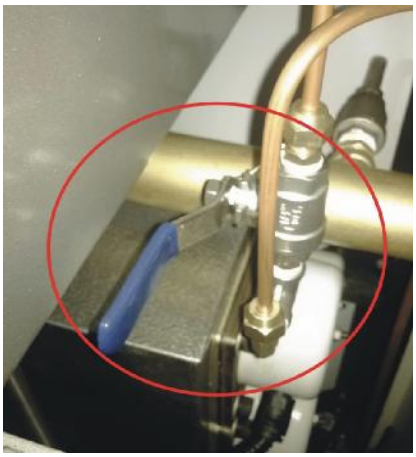
During installation of the machine, keep at least 500mm installation space around the machine as following picture. Don’t install the machine in a narrow or crowded place with other objects. This would cause inconvenience to operation, maintenance and repair.

Keep away inflammables and explosive goods.


Picture 3-1: Installation Space

## 3.2 Pipeline Connection

1) Open the ball valve when machine is filling the oil. After the mould is filled with oil, close the valve and start up the machine.



Picture 3-2: Ball Valve

2) After connect the cooling water outlet to drainage port, turn on the water source switch.

Attention!

Cooling water discharge port is shown as below. Reverse connection is forbidden.


Picture 3-3: Pipeline Connection

## 3.3 Power Connection

Make sure the power match the specification, then connect the power supply.

Please check the voltage specification signs on machine’s nameplate carefully. The power supply must match the specification indicated on nameplate. The cable must match the section specification indicated in circuit diagram.

# 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 | POWER ON/OFF | Power ON, OFF shift key | After connect power, press “POWER ON/OFF”, initial screen is displayed and starts. Pls note that electrci shock may happen if power is on. |
| 3 | MENU | LCD menu shift key | Initial password: 0000 |
| 4 | SET | Parameter setting key | Confirm paramerters |
| 5 | SV | Change set value | Modify setting temp. |
| 6 | ▲/▼ | Change parameters | |
| 7 | ◄/► | Cursor movement | |
| 8 | RUN/RESET | Control start and stop | |

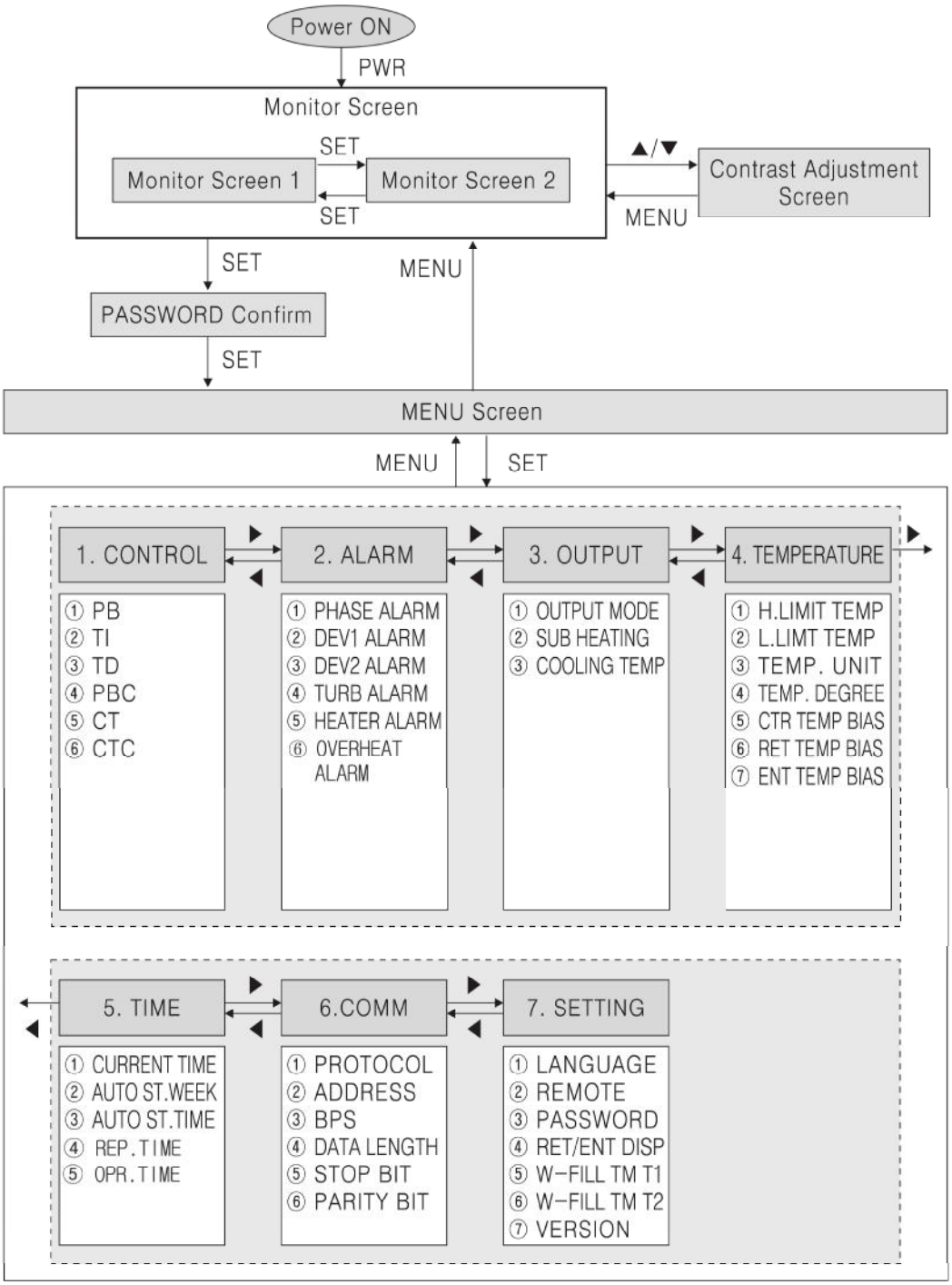
| No. | Name | Functions | Remarks |
|---|---|---|---|
| 9 | AT | AUTO-TUNING switch start and stop | Auto-tuning can run during operation.<br>Auto-tuning cannot work under SUCTION and COOL operation. |
| 10 | SUCTION | SUCTION relay switch start /stop key | SUCTION is to remove medium (watre/oil) from molds. Can not start during operation or cooling. After SUCTION turns on, “SUCTION relay” and “pump inverse run relay” will turn on. |
| 11 | COOL | Forced cooling switch start /stop key | Press it for 2 secs for forcedcooling, then stop heating output while output 100% cooling control. If control temp. is below Cooling Temp, forced cooling will be auto stopped then control turns off. |
| 12 | BUZZER | Turn off buzzer | Press “BUZZER” key and “BUZZER” LED lightens; buzzer and alarm relay are idle even error occurs. |
| 13 | AUTO START | Start and stop key | |
| 14 | SUCTION OFF | SUCTION relay switch start /stop key | Under SUCTION is on, this key is to turn on or off SUCTION relay. |
| 15 | F | Not used (for extension) | |
| 16 | HEAT | Heating output (MAIN) display LED | |
| 17 | SUB | Heating output (SUB) display LED | |
| 18 | COOL | Cooling output display LED | |
| 19 | PUMP_D | Display pump running LED | |
| 20 | PUMP_R | Display pump inverse running LED | |
| 21 | WATER | Display water filling LED | |
| 22 | ALARM | Give the alarm LED | Refer to table 4-2 for errors type. |

Table:4-2: Error Type

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

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

## 4.2 Structure of the Unit



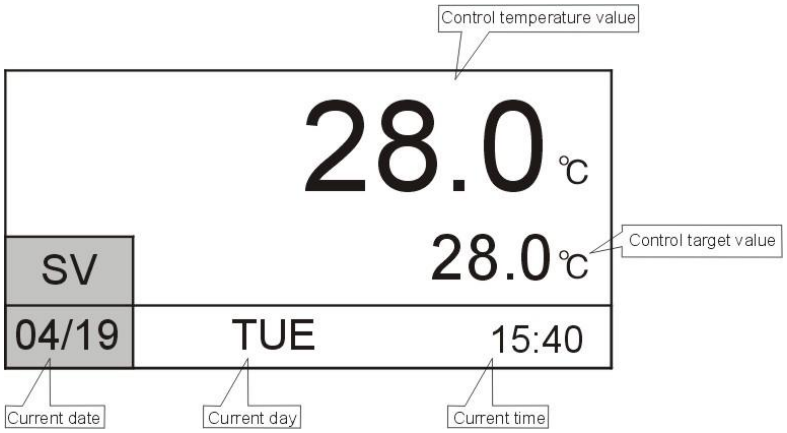

Picture 4-2: Menu Outline

## 4.3 Machine Startup

1) Conenct pipeline from STM water in/outlet to the mold. (Refer to chapter 3.2 for pipeline connection)
2) Connect cooling water port and water backup port. (Refer to chapter 3.2 for pipeline connection)
3) Open all ball valves of the pipeline
4) Turn on main power switch.

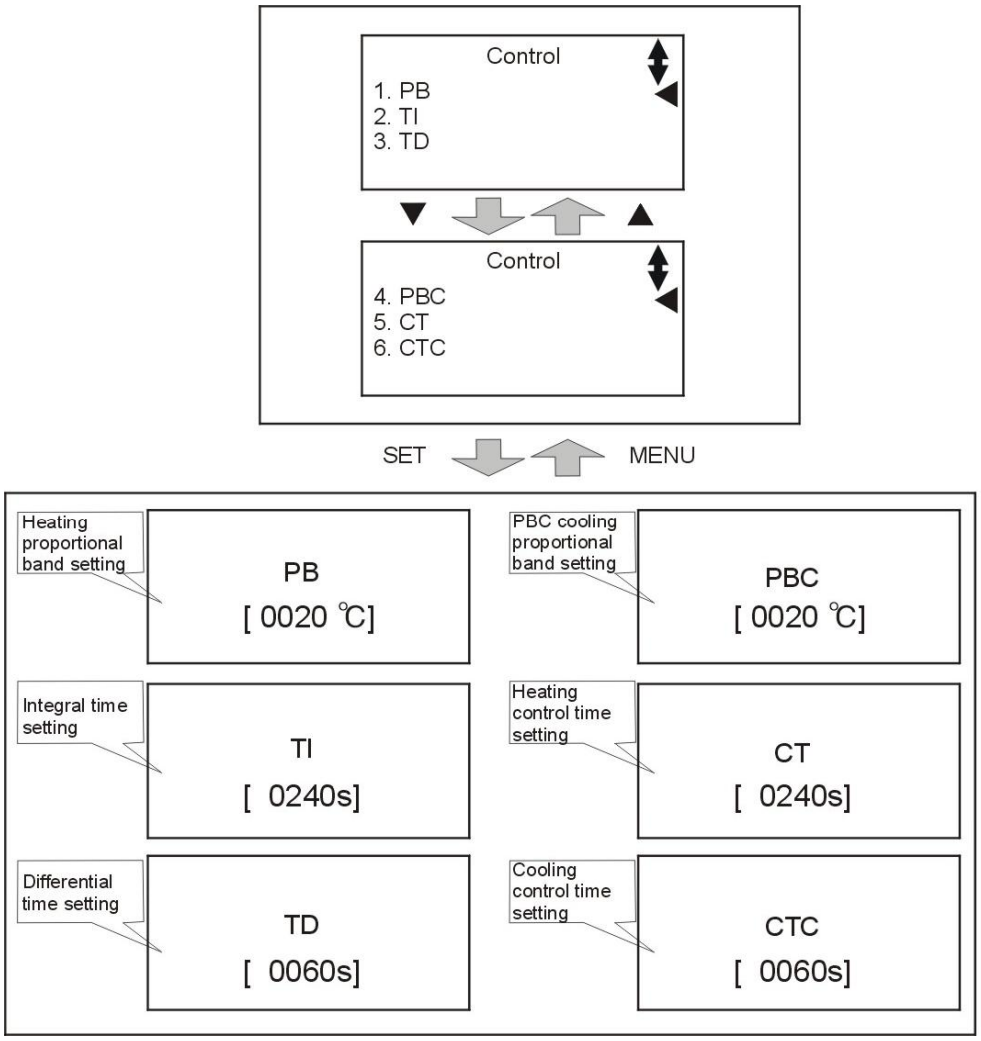

Picture 4-3: Main Power Switch

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




Picture 4-4: Initial Menu

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

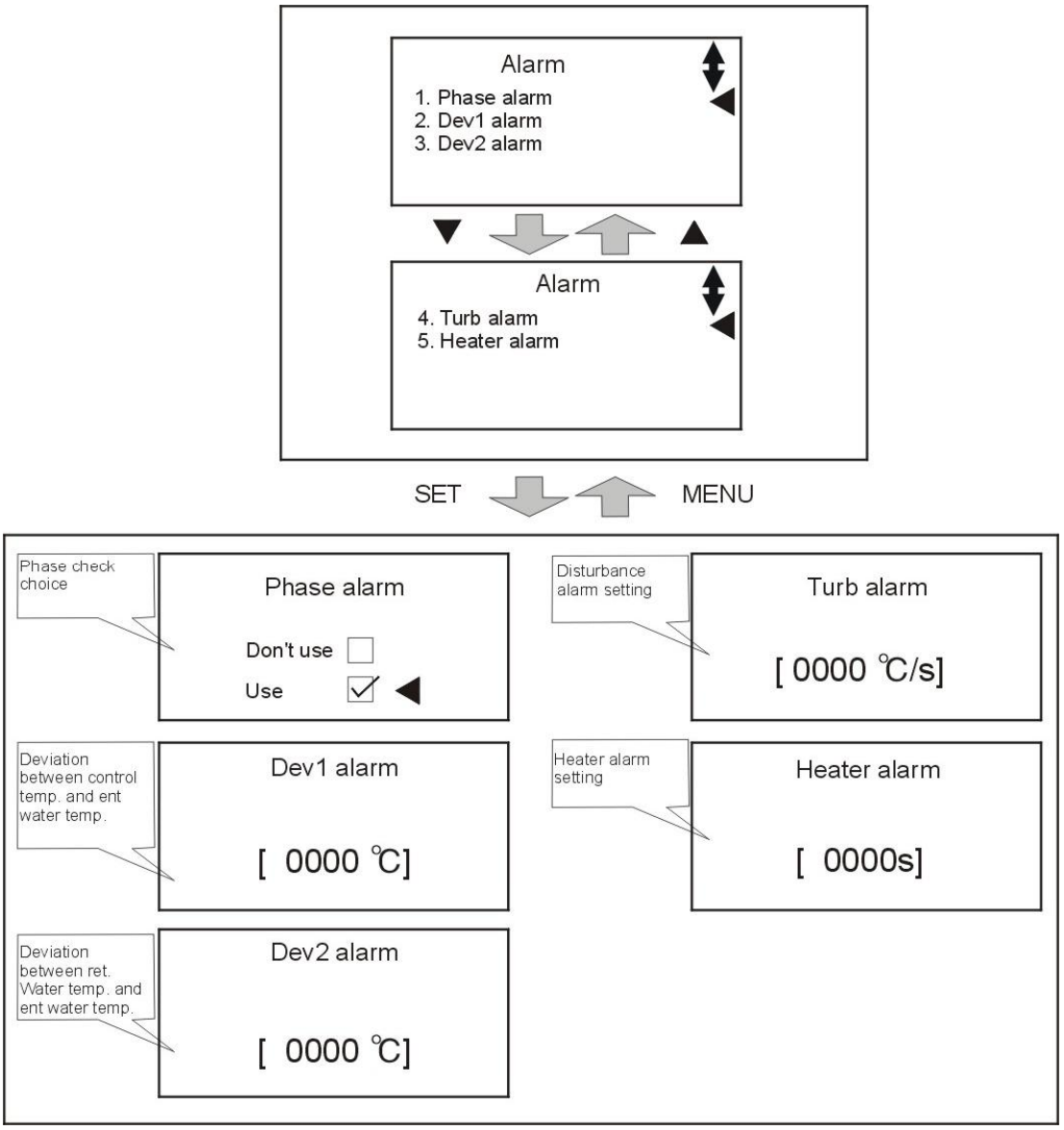



Picture 4-5: Control Setting

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

- PHASE——used
- DEV1 ALARM——0 (without temp. sensor)
  5 (with temp. sensor, the value can be increased properly when alarm sounds frequently)
- DEV2 ALARM——0——0 (without temp. sensor)
  10 (with temp. sensor, the value can be increased properly when alarm sounds frequently)

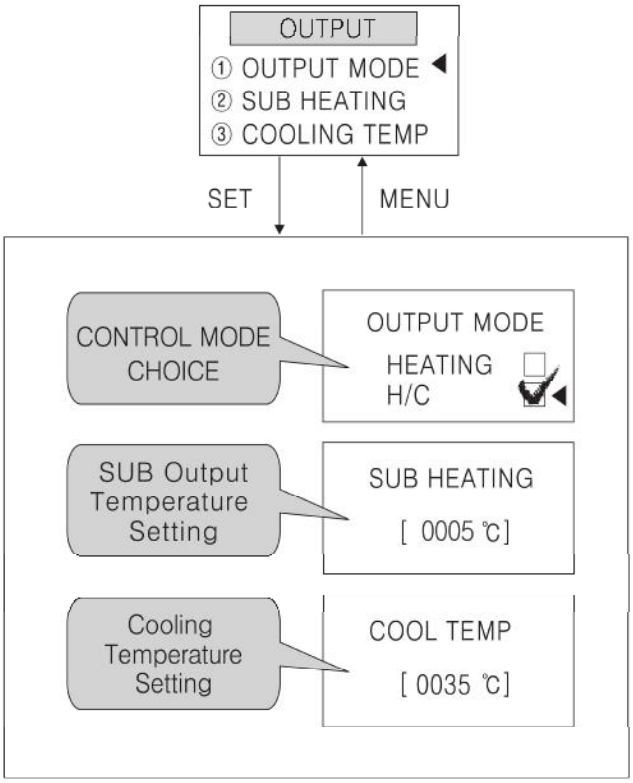
- TURB ALARM——control temp.-10
- HEATER ALARM——based on auctual set value. If factory default value is 0, the heater alarm is not available.
  If there's 7.5℃ difference compared with set temp. it will alarm.




Picture 4-6: Alarm Setting

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

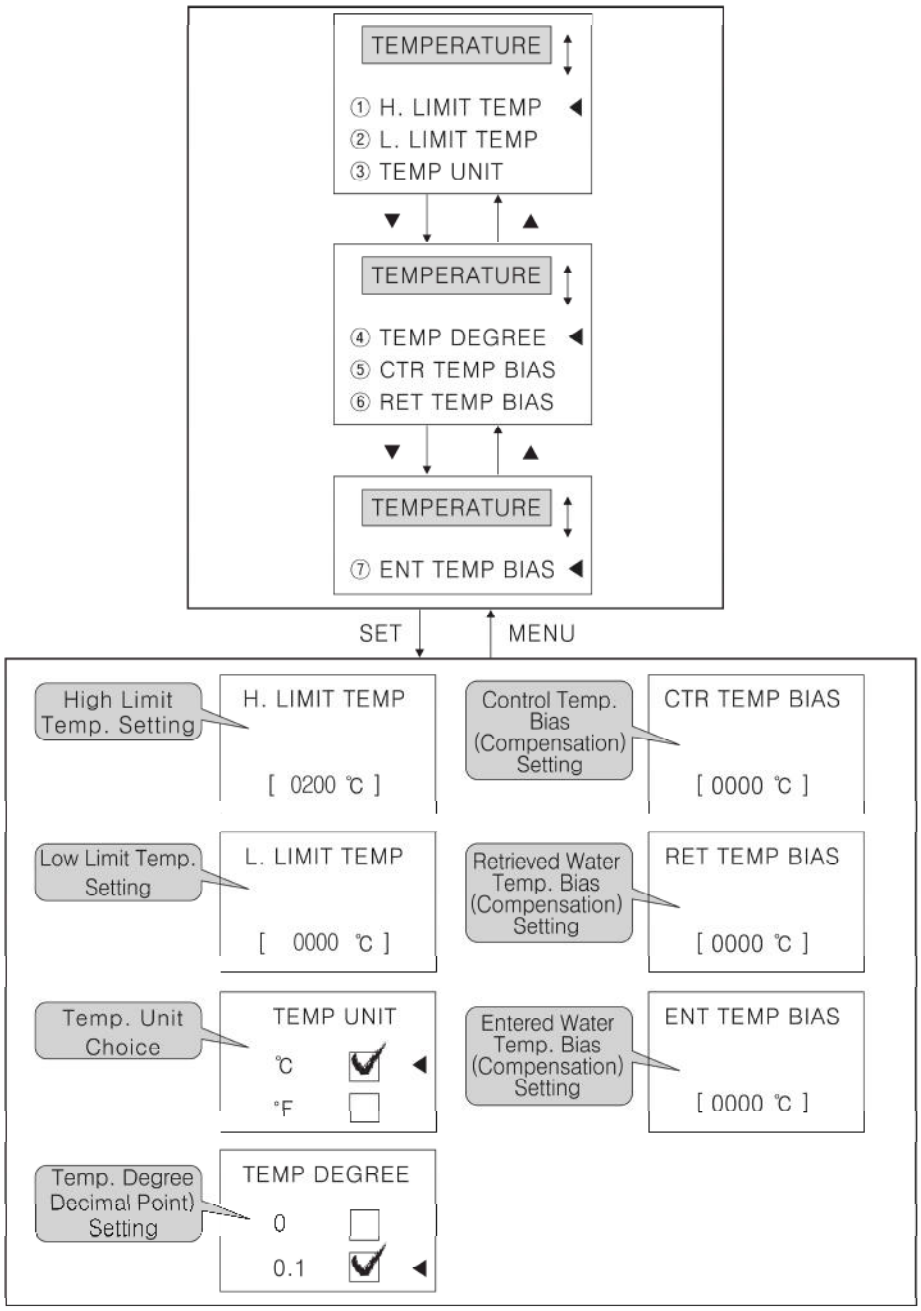
- OUTPUT MODE——heating or cooling control
- SUB HEATING——0 (only 1 group of heater)
- 5 (two or more groups of heaters)
- COOLING TEMP——35 (When forced cooling starts, control temp. is lower than the set value, the forced cooling will stop automatically).




Picture 4-7: Output Setting

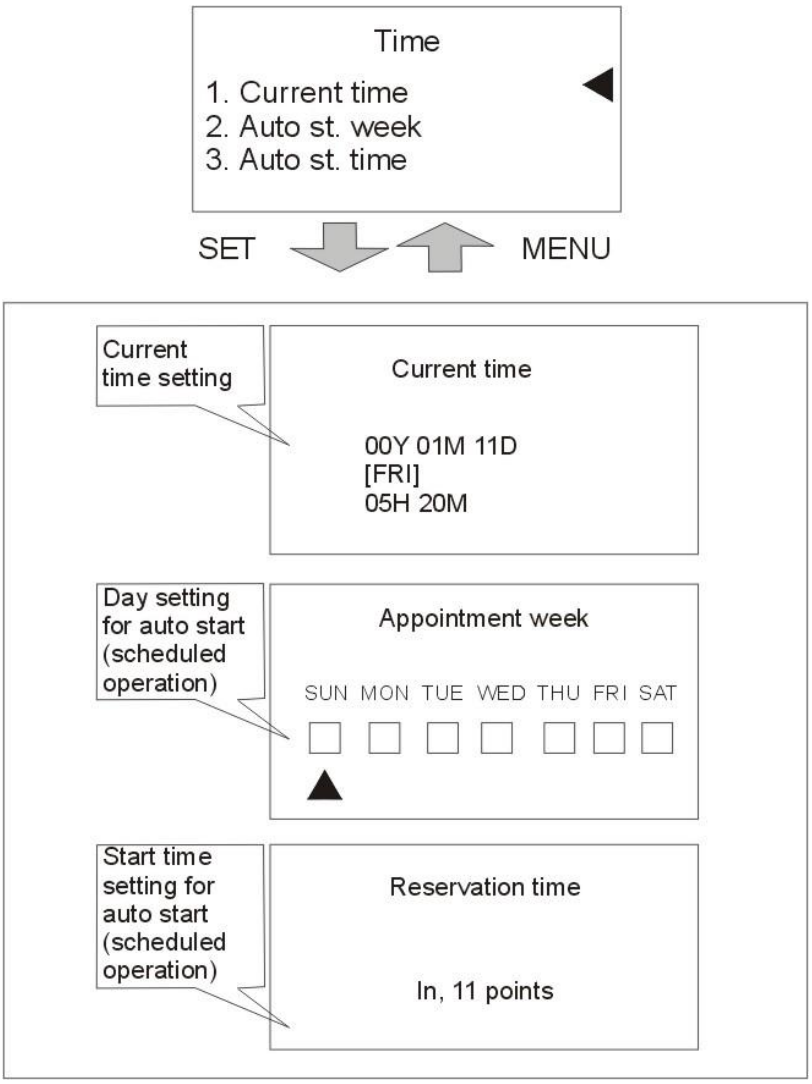
9) Press MENU key to return to menu screen, then press◄/► keys to select temp.setting, press SET key to enter setting screen, see picture below.

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



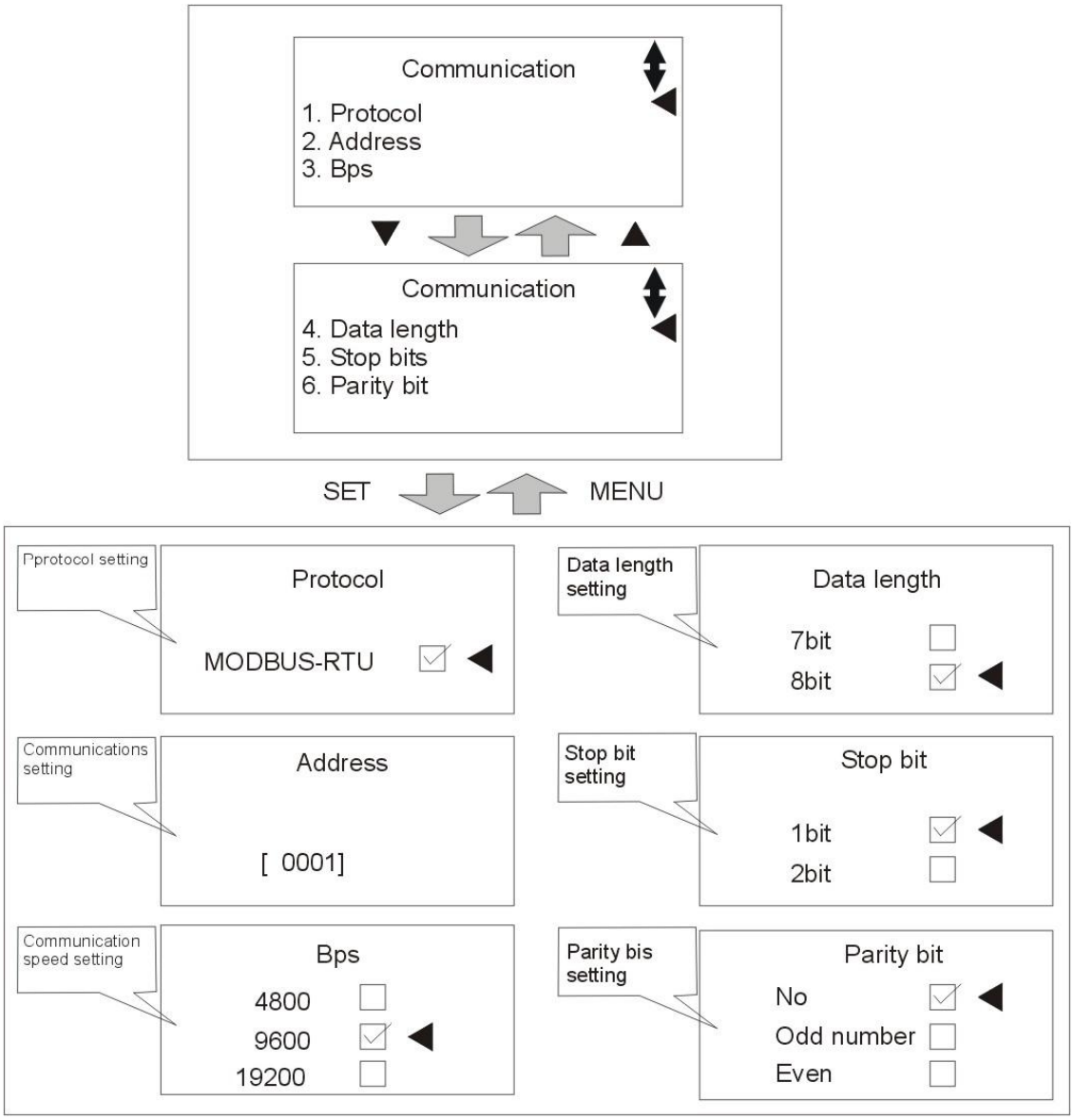

Picture 4-8: Temperature Setting

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



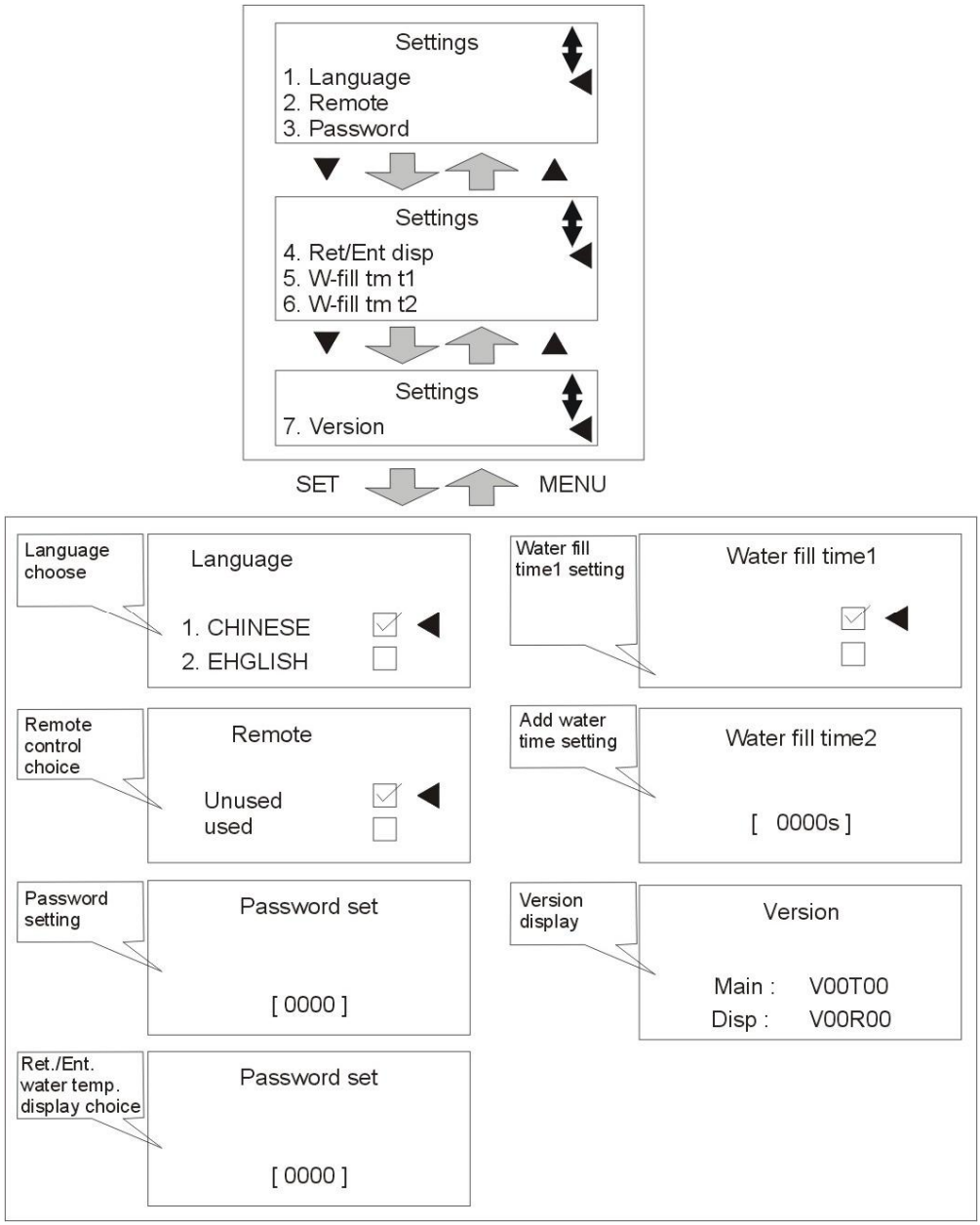

Picture 4-9: Time Setting

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




Picture 4-10: Communication Setting

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

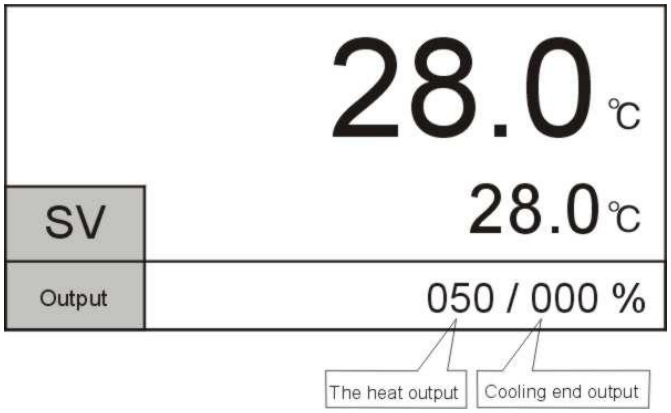



Picture 4-11: Equipment Setting

13) Set mold temperature (if temp. has been set, this step can be ignored). Press SV key and control target value column will 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℃.

14) After setting the target 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 start Auto-tuning. When flashing ends, Auto-tuning finishes and parameters will be automatically saved. During Auto-tuning, pressing AT key will exit Auto-tuning process; controller will conduct temperature control based on parameters set before Auto-tuning.




Picture 4-12: Operation Screen

## 4.4 Stop the Machine

1) Press COOL key to shut down heating output and cooling will be on 100%.
2) Wait until temp. drops below 50℃, press COOL key to shut down forced cooling, then press RUN/RESET key to stop operation.
3) tch off the main power.

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

Attention!
Pump motor rotating direction should be the same with the indicator.

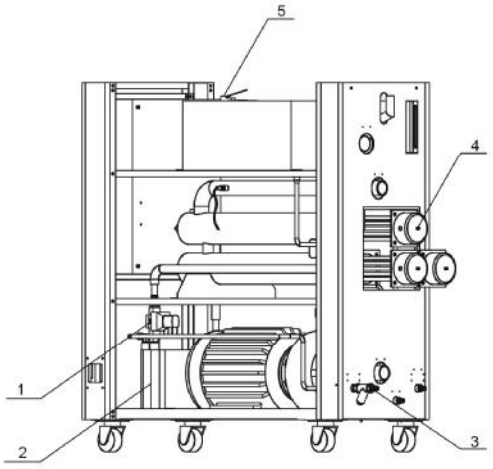
Attention!
In order to prolong machine lifespan, please do follow the above steps to turn on and off the machine.

# 5. Trouble-shooting

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

| | | |
|---|---|---|
| | Problems of circuit breaker. | |
| Circuit breaker trips off when pump running for a while. | Pump motor coil short circuit.<br>Problems of circuit breaker. | Check pump motor.<br>Replace circuit breaker. |
| Circuit breaker trips off after heater output for a while. | Heater pipe short circuit or shell contact.<br>Problems of circuit breaker. | Replace heater pipe.<br>Replace circuit breaker. |

# 6. Maintenance and Repair




1. Clean solenoid valve
   Period: trimonthly
2. Clean cooler
   Period: half yearly
3. Clean Y-type filter
   Period: half yearly
4. Clean heater pipe
   Period: half yearly
5. Clean liquid level switch
   Period: trimonthly

Use time of high temperature kerosene

| | |
|---|---|
| ≤120℃ | Replacement period: yearly |
| ≥120℃~≤160℃ | Replacement period: half yearly |
| >160℃ | Replacement period: 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 checking and maintenance space then start operation.
2) It's dangerous that 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) ing operation, the oil is heated up to a high temperature, wait it to fall below 5℃ then to perform repairing or maintenance.
   (Please note that it is dangerous to check or tear down the machine during operation.)

## 6.1 Y Type Strainer Cleaning

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. Impurities or pollutants may cause errors and bad temperature control. It needs to clean the Y type strainer periodly.

Cleaning steps: turn off power and cooling water supply. Open the top cover of filter screen to clean the filter.

Picture 6-1: Y Type Strainer

## 6.2 Solenoid Valve

Replacement steps:

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


Picture 6-2: Solenoid Valve

## 6.3 Heater Pipe Cleaning

After long use of the machine and with high temperature, there will be clingage and limscale accumulated on heater pipe which lower the heating efficiency. At this time, it needs to clean the clingage and limscale accumulated on heater pipe.

1) Open the heater cover (Press the black switch downward, then open the heater cover. As picture)


Picture 6-3: Heater Pipe 1

2) Take out the heater pipe (as picture, loose the screws, take out the heater pipe).


Picture 6-4: Heater Pipe 2

3) Heater pipe cleaning method: immerse the heater pipe into the thinner till all of the clingage fall off. Wet a cloth with some nature water, wipe the heater pipe cleanly and wait for the air drying.

4) After heater pipe cleaning up according to reverse orders to put them back to the machine.

## 6.4 Printed Circuit Board

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

① SENSOR TERMINAL1 (sensor terminal)
2, 3 : control temp. sensor termnal
5, 6 : return water temp. sensor terminal
8, 9 : water outlet 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 : Cooling 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 用触点输出端子
7, 8 : SUCTION contactor output terminal
9, 10 : alarm contactor output terminal
11, 12 : breaker contactor output terminal
13, 14 : reserve

⑤ PHASE CHECK TERMINAL (phase detect terminal)
1 : R phase connect terminal
2 : S phase connect terminal
3 : T phase connect terminal

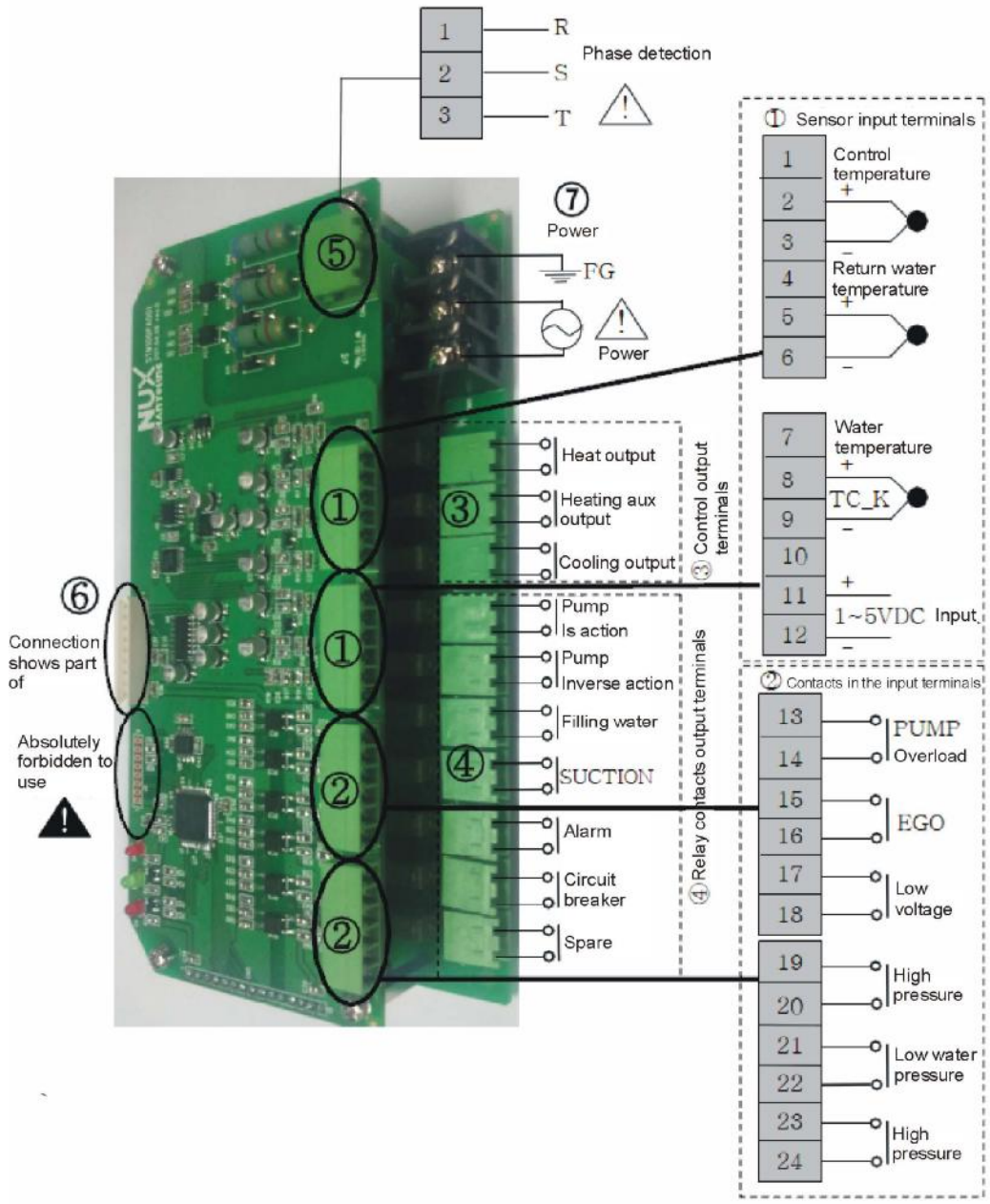
⑥ DISPLAY CN (connect terminal for dispaly)

Connect stub cable with STM100.

⑦ POWER TERMINAL (power supply terminal)

1 : FG terminal

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



## 6.5 Display Terminal Connecting Diagram

① DI TERMINAL (contactor input terminal)

1，2: RUN/STOP contactor input terminal

② COMM TERMINAL ( comm terminal)

1, 2, 3, 4: rs485 comm terminal

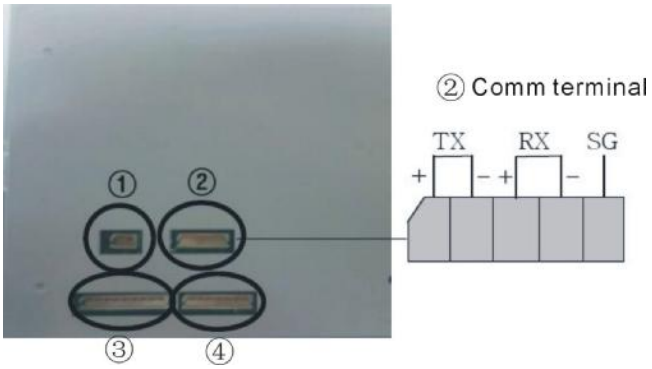
5: Earth terminal

③MAIN CN (MAIN earth terminal)

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 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.

### 6.6.5 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

- ☐ PCB board replacement
- ☐ No fuse switch replacement

Note: (1) Y-type strainer 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 it works eight hours per day, recommended replacing frequency is one and half a year, if it works 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.