STM-PW Series

High Temp. Water Heater

Date:May. 2017

Version: Ver.F (English)

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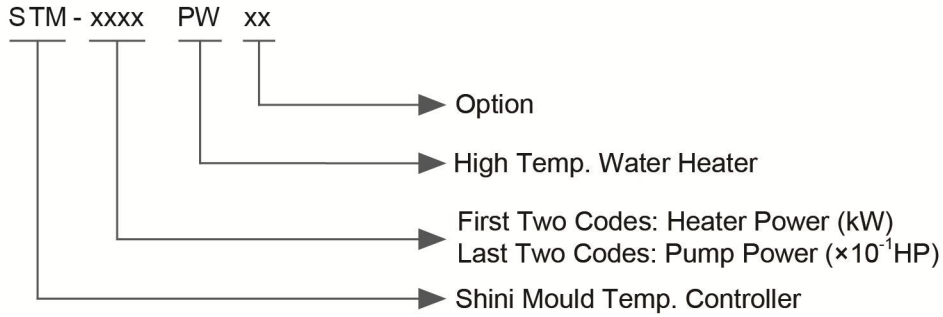
1. General Description

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

STM-PW series high temp. water heaters are used to heat up the mould and maintain temperature, they can be used in other similar applications as well. High temp.water from mould through high-temp. heating pipe after it is pressurized by pump returns to the mould, which is cooled indirectly for heating and constant temperature purpose. With PID temperature control, it could ensure stable temperature control with accuracy reaching 180 ± 5℃.

Model: STM-607PW

1.1 Coding Principle



1.2 Feature

- P.I.D. multi-stage temperature control system can maintain an mould temperature with accuracy of ±0.5℃.
- Adopts high efficiency water cycle magnetic pump, with which precise moulds and mould loop with minor diameter can achieve precise temperature control and high efficient heat exchange. Pump inside adopts stainless steel to avoid explosion.
- Multiple safety devices including power reverse phase protection, pump overload protection, overheat protection and low level protection that can automatically detect abnormal performance and indicate this via visible alarm.
- The highest temperature can reach 180℃.
- Equipped with high pressure protection, safety pressure relieving, automatic water supplying and air exhausting.
- Adopts indirect cooling, which makes temperature control more precise. The low viscosity of water realizes fast heat exchange.
- RS485 communication function is standard.
- Equipped with water level probe and high-pressure plunger pump .The water level probe can accurately detect the water level . When the system level is too low, the plunger pump to supply the high pressure system with water to avoid pipe dry burning.

1.3 Options

- Water manifolds and Teflon hose are optional.
- Buzzer is optional .Add “B”at the model behind.

- It could option with magnetic filter to prolong service life of magnetic pump. Add “MF” at the end of the model code.

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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1.4 Technical Specifications

1.4.1 Specification

Table 1-1: Specification

Model	**STM-607PW**	**STM-1220PW**
Ver.	F	F
Max. temp	180℃	180℃
Heater (kW)	6	12
Pump (kw) (50/60Hz)	0.55+0.05	1.0+0.05
Max. pump flow (L/min) (50/60Hz)	25.5/28	50/60
Max. pump pressure (bar) (50/60Hz)	12/15.8	12/15.8
Heating tank number	1	1
Heating tank capacity	3.4	3.4
Cooling tank capacity	1	1
Coonling method	Indirect	Indirect
Mould coupling* (inch)	3/8 (2×2)	3/4 (1×2)
Inlet / Outlet (inch)	3/4 / 3/4	3/4 / 3/4
Dimensions (mm) (H×W×D)	750×320×770	750×320×810
Weight (kg)	80	90

Note: 1) "PW" stands for water medium with high temp.

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

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

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

We reserve the right to change specifications without prior notice.

1.4.2 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

1.5 Safety Regulations

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

1.5.1 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.

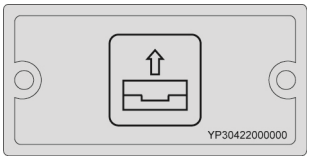
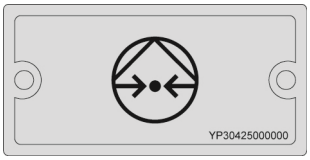
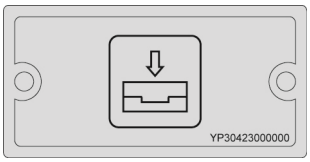
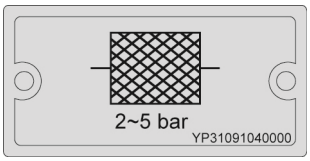
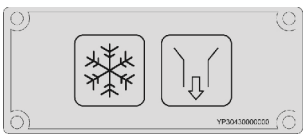
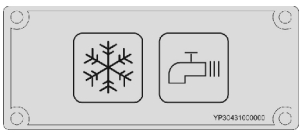
Warning!

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.

1.5.2 Signs and Labels

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

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

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

Warning! High voltage!

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

Warning! Be careful!

Be more careful when this mark appears.

1.5.3 Operation Regulations

1) Before operation, make sure that cooling water is clean soft water without pollutants.
   ※ Low quality water brings limescales, which may cause problems.
2) If problems of drainage or bad temperature control are noted, please clean solenoid valve and cooling water inlet and outlet.
3) Do not move the unit when it is in operation.
4) When in need of repairing, wait until oil temperature falls below 30℃.
5) Motor overload may be caused by phase shortage, pipe obstruction, broken bearing, etc. Motor overload relay will trip off to stop the machine when this happens. Fixing the problems, press RESET on overload relay to clear the alarm.
6) Before turn off the pump, wait until oil temperature falls blow 50℃. Or the life of the unit would be affected.
7) If the setting temperature is below 100℃, then the pressure switch setting value should be 1.5-2 bar; If the setting temperature sets between 100℃ and 200℃, then the recommendable pressure switch setting value should be 2.8 bar. If the cooling water pressure is too low, then the pressure switch setting value can be adjusted properly to ensure normal running. However, it may affect the limitation of setting temperature or cause unstable temperature control.
8) Please connect the coolng water outlet with high temperature resistant pipe when temperature is above 100℃.

1.5.4 Transportation and Storage of the Machine

Transportation

1) STM-PW series standard oil heater are packed in crates or plywood cases with wooden pallet at the bottom, suitable for quick positioning by fork lift.
2) After unpacked, castors equipped on the machine can be used for ease of movement.

3) Do not rotate the machine and avoid collision with other objects during transportation to prevent improper functioning.
4) The structure of the machine is well-balanced, although it should also be handled with care when lifting the machine for fear of falling down.
5) The machine and its attached parts can be kept at a temperature from -25℃ to +55℃ for long distance transportation and for a short distance, it can be transported with temperature under +70℃.

Storage

1) STM-PW series standard oil heater should be stored indoors with temperature kept from 5℃ to 40℃ and humidity below 80%.
2) Disconnect all power supply and turn off main switch and control switch.
3) Keep the whole machine, especially the electrical components away from water to avoid potential troubles caused by the water.
4) Plastic film should be used to protect the machine from dust and rains.

Working environment

The machine should be operated:

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

Do not use the machine:

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

Rejected parts disposal

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

Fire Hazard

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

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

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

 Warning! High voltage!
This mark is attached on the cover of the control box.

 Warning! Be careful!
Be more careful when this mark appears.

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

1.6 Exemption Clause

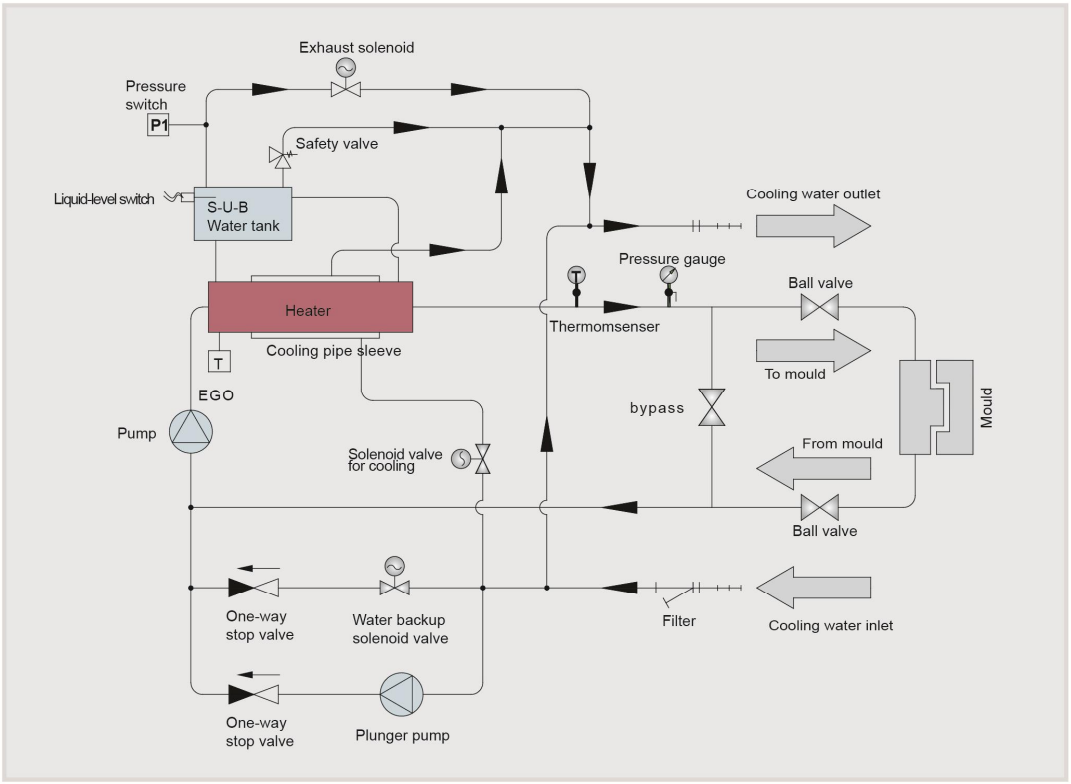
The following statements clarify the responsibilities and regulations born by any buyer or user who purchases products and accessories from Shini (including employees and agents).

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

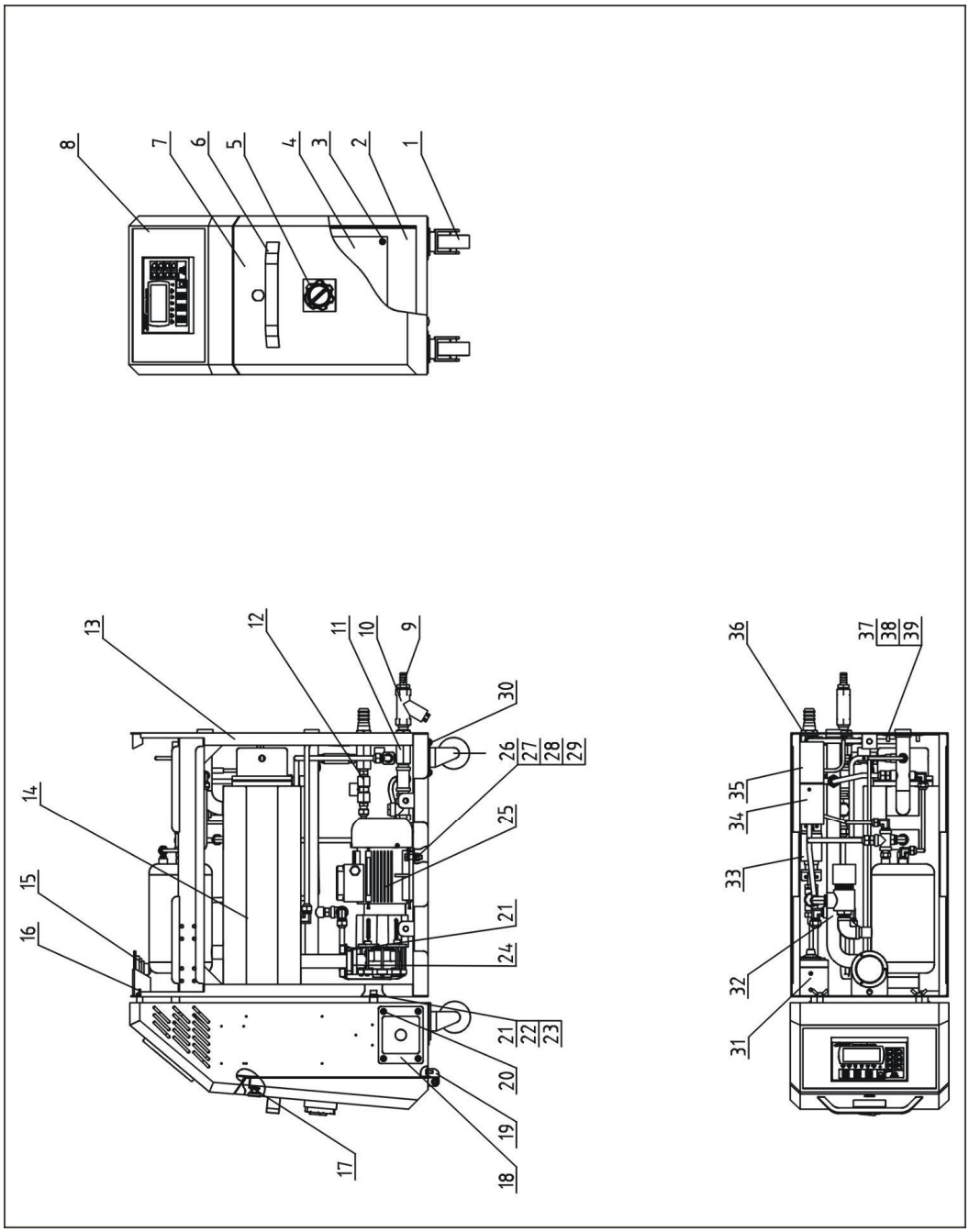


Picture 2-1: Working Principle

High-temp. water from the mould returns to pump inlet through pipeline and is conveyed to heater by pump pressurizing, then it gets to the mould after heating by pipe heater. During the process, if probe detects the water level dropping to the set value, and it will halt with alarm if water level is still low afterward. If high-temp. water is over value, the system will start the cooling solenoid valve to cool down the high-temp. water and decrease the temperature for constant temperature. If the high-temp. water is still higher than the EGO set value, the system will start high-temp. alarm and halt; If the pressure climbs to safety-valve set value, the safety valve will depressurize the system; when system pressure is over the high-pressure switch set value, the machine will halt and alarm.

2.2 Assembly Drawing

2.2.1 Assembly Drawing (STM-607PW)



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-607PW)

2.2.2 Parts List (STM-607PW)

Table 2-4: Parts List (STM-607PW)

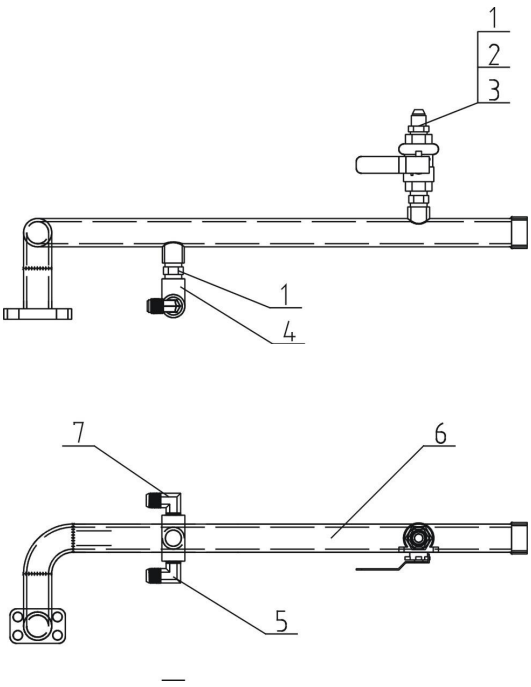
No.	Name	Part No.	No.	Name	Part No.
1	Caster 2.5"	YW03002500000	21	Inner hexagon screw M8x20	YW61082000200
2	Control cabinet base plate	-	22	Spring washer 8	YW65008000100
3	Thick head screw M6x20	YW63062000000	23	Flat gasket 8	YW66082200100
4	Control cabinet base plate	-	24	Flange pad **	YR10110000000
5	Main power switch*	YE12003000000	25	Magnetic pump MP-55	BM20005500550
6	Door plate handle	YW20660900100	26	Hexagon screw bolt M6x25	YW60062500000
7	Door plate	--	27	Hxagon screw M6	YW64000600300
8	Control box	--	28	Spring washer 6	YW65006000100
9	Copper inserted core M13x1/2PT	BH12131200010	29	Flat gasket 6	YW66061800000
10	Y -type filter 1/2"	YW57010200000	30	Flat head screw M6x15	YW63061700000
11	Water filling connector components	--	31	EGO units	BH90115000050
12	Drainage connector component	--	32	Return water pipe components	--
13	Rack	--	33	Water filling assembly of plunger pump	--
14	Heating tank components	--	34	High pressure switch controller 0~2.0MPa	YE90002000000
15	Pressure guage (0~1.5MPa)	YW85015000000	35	Low pressure switch controller 0~8KG	YE90000800000
16	Butterfly screw M8x15	YW69081500000	36	Copper female connector 1234 universal	BH12060703910
17	Long door lock	YW00000000100	37	Spring washer 6	YW65006000100
18	Fixed plate of cable clamp	--	38	Flat gasket 6	YW66061600000
19	Big hinge CL219-1	YW06219100000	39	Hxagon screw M6	YW64000500300
20	Flat head screw M5x10	YW63051000100			

* 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 Return Water Pipe Assembly (STM-607PW)



Picture 2-3: Return Water Pipe Assembly Drawing (STM-607PW)

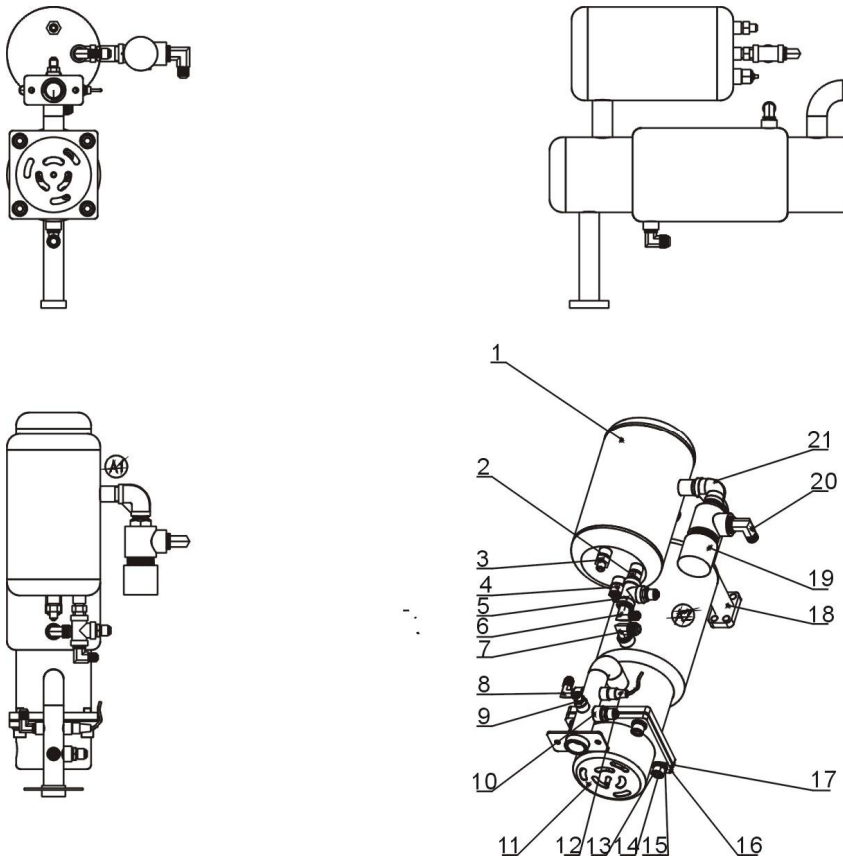
2.2.4 Return Water Pipe Parts List (STM-607PW)

Table 2-4: Return Water Pipe Parts List (STM-607PW)

No.	Name	Part No.	No.	Name	Part No.
1	pipe coupler 3/8"	BH12030800110	5	Copper Teflon pipe contactor 3/8Hx3/8PT L	YW04030800300
2	Stainless steel ball valve 3/8" Anti –pressure 2.3MPa(KITZ)	YW50382300500	6	Return water pipe	--
3	Copper Teflon pipe contactor 3/8"PTx3/8"H	BH12030800610	7	Copper Teflon pipe contactor 1/4Hx3/8PT L	YW04030800500
4	Stainless steel water pipe three way 3/8"	YW52030800000			

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 Heating Tank Assembly (STM-607PW)



Picture 2-4: Heating Tank Assembly Drawing (STM-607PW)

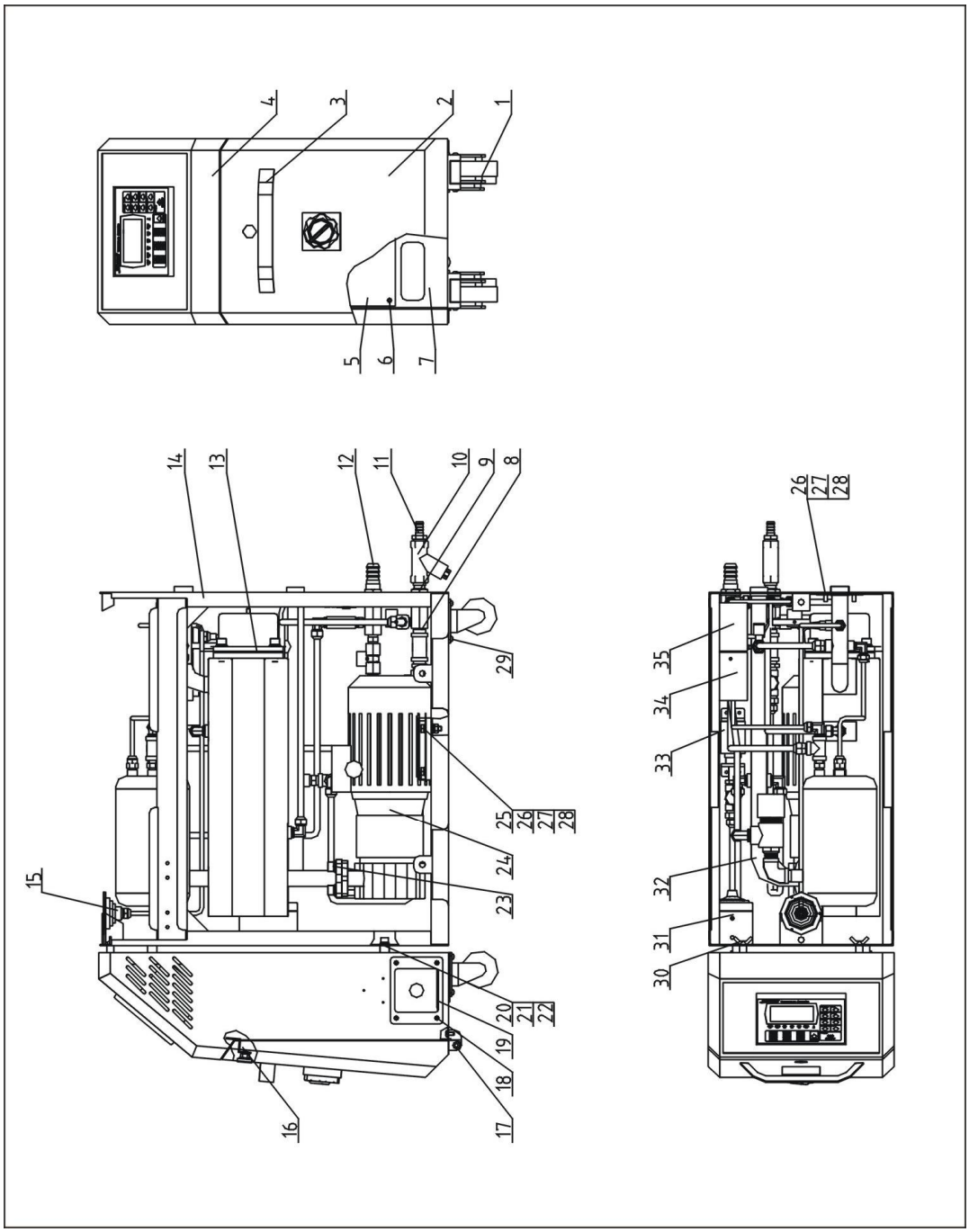
2.2.6 Heating Tank Parts List (STM-607PW)

Table 2-4: Heating Tank Parts List (STM-607PW)

No.	Name	Part No.	No.	Name	Part No.
1	Expansion tank	--	12	Thermocouple	BE90342500050
2	Copper pipe coupler	--	13	Inner hexagon cylindrical screwM10x30	YW61103000100
3	Copper Teflon pipe contactor	BH12010400410	14	Standard spring washer 10	YW65010000000
4	Single water-level probe	YW09003800500	15	Flat gasket A level 10	YW66102000100
5	3/8" Stainless steel three way	YW52030800000	16	Heating pipe assembly (three row in series connection 400V)	--
6	Copper Teflon contactor	YW04030800500	17	Flexible graphite pad **	YR20121200000
7	Copper Teflon contactor	YW04030800300	18	Heating tank	--
8	Teflon pipe male connector	YW04010400400	19	Safety valve	YW05141200000
9	Connector for pressure gauge	--	20	Copper Teflon pipe contactor	YW04010200200
10	Teflon pipe male connector	BH12030800610	21	Stainless steel elbow 1/2'' PT	YW53001200100
11	Heating pipe cover	--			

* 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 Assembly Drawing (STM-1220PW)



Remarks: Please refer to material list 2.2.8 for specific explanation of the Arabic numbers in parts drawing.

Picture 2-5: Assembly Drawing (STM-1220PW)

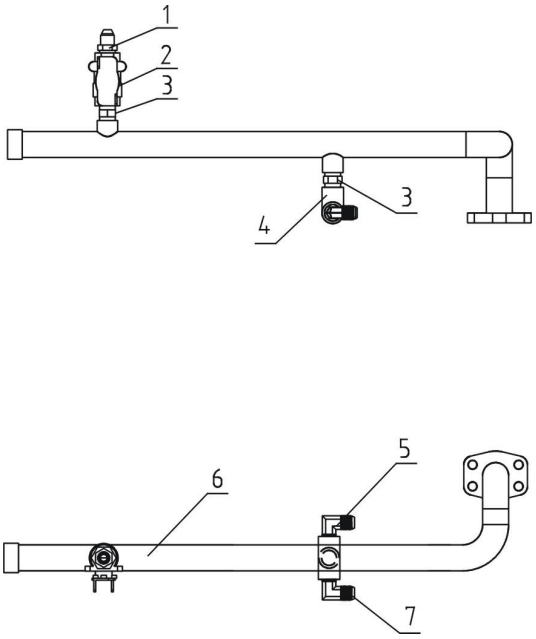
2.2.8 Parts List (STM-1220PW)

Table 2-4: Parts List (STM-1220PW)

No.	Name	Part No.	No.	Name	Part No.
1	Caster 2.5"	YW03002500000	19	Fixed plate of cable clamp	--
2	Door plate	--	20	Inner hexagon screw M8x20	YW61082000200
3	Door plate handle	YW20660900100	21	Spring washer 8	YW65008000100
4	Control box	--	22	Flat gasket 8	YW66082200100
5	Control cabinet base plate	--	23	Hexagon screw bolt M10x25	YW61102500000
6	Thick head screw M6x20	YW63062000000	24	Magnetic pump MP-100	BM20010000550
7	Control box rear plate	--	25	Hexagon screw bolt M6x25	YW60062500000
8	Water filling connector components	--	26	Hexagon screw M6	YW64000600300
9	Copper female connector 1234 universal	BH12060703910	27	Spring washer 6	YW65006000100
10	Y -type filter 1/2"	YW57010200000	28	Flat gasket 6	YW66061800000
11	Copper inserted core M13x1/2PT	BH12131200010	29	Flat head screw M6x15	YW63061700000
12	Drainage connector component	--	30	Butterfly screw M8x15	YW69081500000
13	Heating tank components	--	31	EGO units	BH90115000050
14	Rack	--	32	Return water pipe components	--
15	Pressure guage (0~1.5MPa)	YW85015000000	33	Water filling assembly of plunger pump	--
16	Long door lock	YW00000000100	34	High pressure switch controller 0-2.0MPa	YE90002000000
17	Big hinge CL219-1	YW06219100000	35	Low pressure switch controller 0-0.8MPa	YE90000800000
18	Flat head screw M5x10	YW63051000000			

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 Return Water Pipe Assembly (STM-1220PW)



Picture 2-6: Return Water Pipe Assembly Drawing (STM-1213HPW)

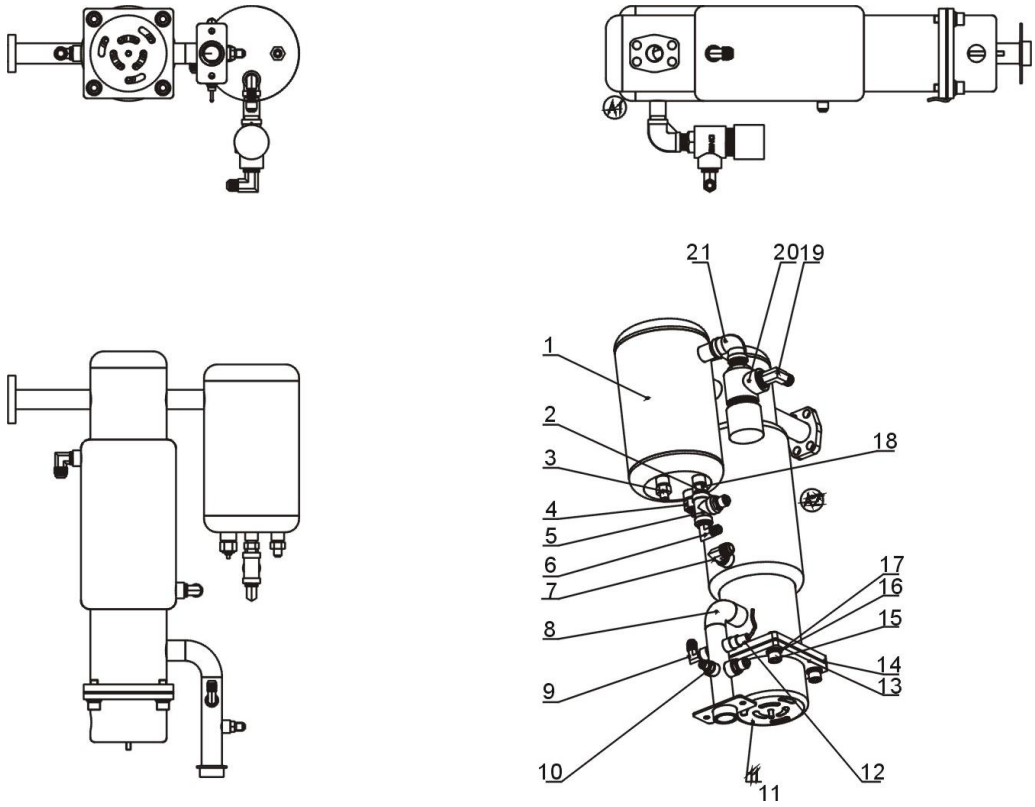
2.2.10 Return Water Pipe Parts List (STM-1220PW)

Table 2-4: Return Water Pipe Parts List (STM-1220PW)

No.	Name	Part No.	No.	Name	Part No.
1	Copper Teflon pipe contactor 3/8"PTx3/8"H	BH12030800610	5	Copper Teflon pipe contactor 3/8Hx3/8PT L	YW04030800300
2	Stainless steel ball valve 3/8" Anti –pressure 2.3MPa(KITZ)	YW50382300500	6	Return water pipe	--
3	Pipe coupler 3/8"	BH12030800110	7	Copper Teflon pipe contactor 1/4Hx3/8PT L	YW04030800500
4	Stainless steel water pipe three way 3/8"	YW52030800000			

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.

2.2.11 Heating Tank Assembly (STM-1220PW)



Picture 2-7: Heating Tank Assembly Drawing(STM-1220PW)

2.2.12 Heating Tank Parts List (STM-1220PW)

Table 2-4: Heating Tank Parts List (STM-1220PW)

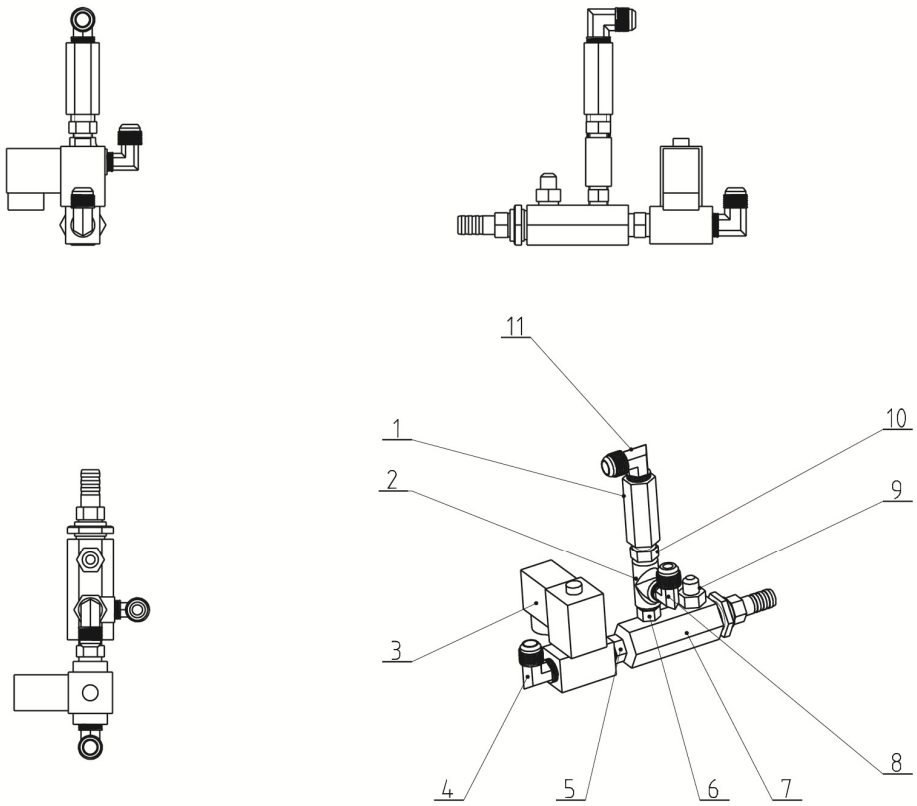
No.	Name	Part No.	No.	Name	Part No.
1	Expansion tank	--	12	Thermocouple	BE90341500050
2	Teflon pipe male elbow	BH12030800610	13	Heating pipe assembly	--
3	Copper Teflon pipe contactor	BH12010400410	14	Flexible graphite washer **	YR20121200000
4	Single water-level probe	YW09003800500	15	Inner hexagon cylindrical screw M10x30	YW61103000100
5	3/8" Stainless steel pipe three way	YW52030800000	16	Standard spring washer 10	YW65010000000
6	Copper Teflon contactor	YW04030800500	17	Flat gasket A level 10	YW66102000100
7	Copper Teflon contactor	YW04030800600	18	Copper pipe coupler	--
8	Heating tank	--	19	Copper Teflon pipe contactor	YW04010200200
9	Teflon pipe male elbow	YW04010400400	20	Safety valve	YW05141200000
10	Connector for pressure gauge	--	21	Stainless steel elbow 1/2” PT	YW53001200100
11	Heating pipe cover	--			

* 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.

2.2.13 Drainage Connector Assembly (STM-607/1220PW)



Picture 2-8: Drainage Connector Assembly Drawing (STM-607/1220PW)

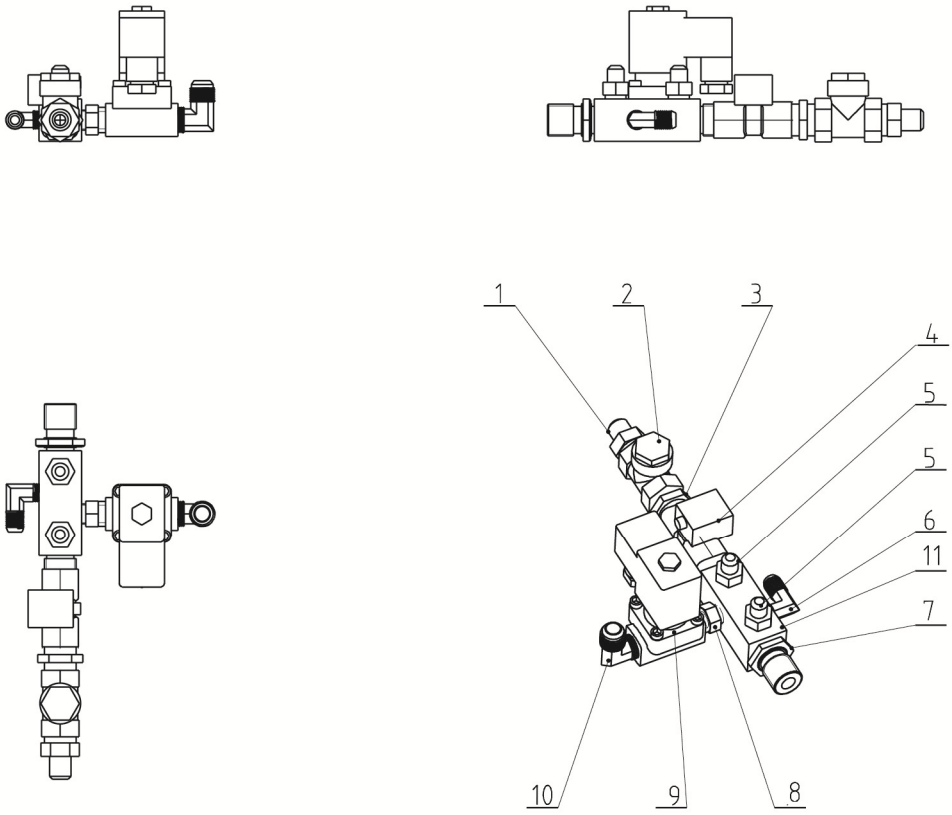
2.2.14 Drainage Connector Parts List (STM-607/1220PW)

Table 2-4: Drainage Connector Parts List (STM-607/1220PW)

No.	Name	Part No.	No.	Name	Part No.
1	Non-return valve 3/8"	YW59383400000	7	Copper head 8 set	--
2	Stainless steel water pipe three way 1/4"	YW52010400000	8	Copper Teflon contactor	YW04030800400
3	Solenoid valve *	YE32331000000	9	Copper Teflon pipe contactor	BH12010400410
4	Copper Teflon pipe contactor	YW04030800300	10	Copper pipe coupler	--
5	Copper pipe coupler	--	11	Copper Teflon contactor	YW04030800600
6	Copper Teflon pipe contactor	--			

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.

2.2.15 Water Filling Connector Assembly (STM-607/1220PW)



Picture 2-9: Water Filling Connector Assembly Drawing (STM-607/1220PW)

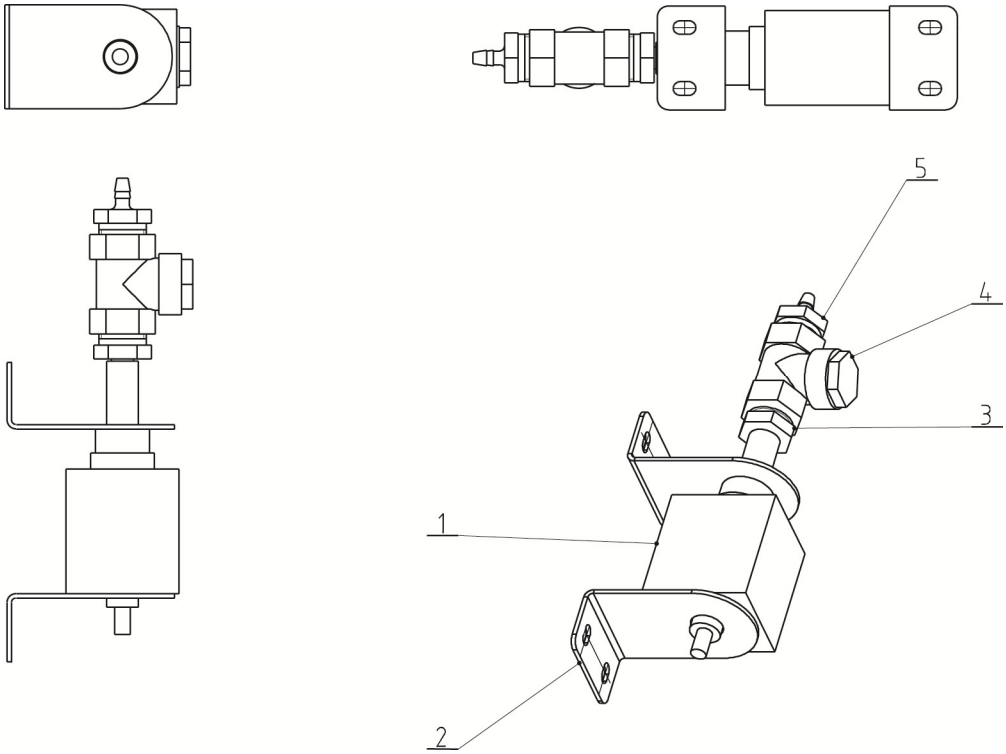
2.2.16 Water Filling Connector Parts List (STM-607/1220PW)

Table 2-4: Water Filling Connector Parts List (STM-607/1220PW)

No.	Name	Part No.	No.	Name	Part No.
1	Teflon pipe male connector	BH12030800210	7	General copper nut	--
2	Non-return valve	YW59010200100	8	Copper pipe coupler	--
3	Pipe coupler	--	9	Solenoid valve *	YE32382400000
4	Solenoid valve *1/2"	YE32501500000	10	Copper Teflon pipe contactor	YW04030800300
5	Copper Teflon pipe contactor	BH12010400410	11	Water filling connector	--
6	Teflon pipe male connector	WY04010400400	12		

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.

2.2.17 Water Filling Assembly of Plunger Pump (STM-607/1220PW)



Picture 2-10: Water Filling Assembly of Plunger Pump (STM-607/1220PW)

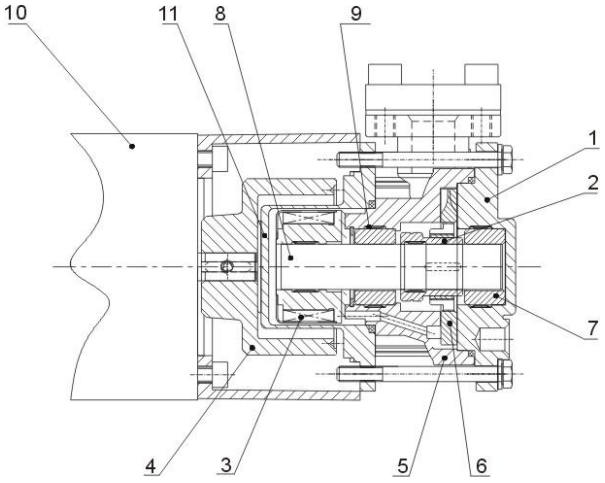
2.2.18 Parts List for Water Filling Ass. of Plunger Pump (STM-607/1220PW)

Table 2-4: Parts List for Water Filling Ass. of Plunger Pump (STM-607/1220PW)

No.	Name	Part No.	No.	Name	Part No.
1	Pressured column plunger pump*	YM20100400000	4	Non-return valve	YW59010200100
2	Pressured pump mounting frame	--	5	Pressured pump pagoda	--
3	Pressured pump connector	--			

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.

2.2.19 Pump



Names of Parts:

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

Picture 2-11: Pump

3. Installation and Debugging

3.1 Installation Space

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

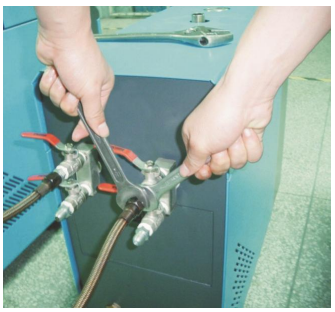
Do not sit on the machine.

Keep away flammable and explosive goods.

Picture 3-1: Installation Space

3.2 Mould and Water Coupling

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



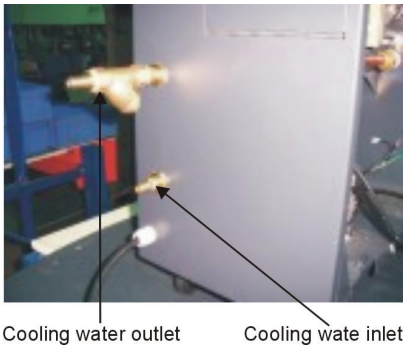
Picture 3-2: Mould and Water Couplings 1

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

Picture 3-3: Mould and Water Couplings 2

Note!

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



Picture 3-4: Mould and Water Couplings 3

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

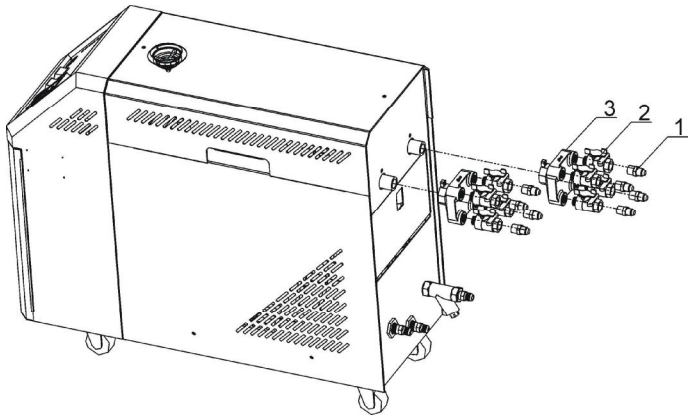
3.3 Power Supply

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

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

3.4 Options Installation

3.4.1 Installation steps for options water manifold (dewaxing)

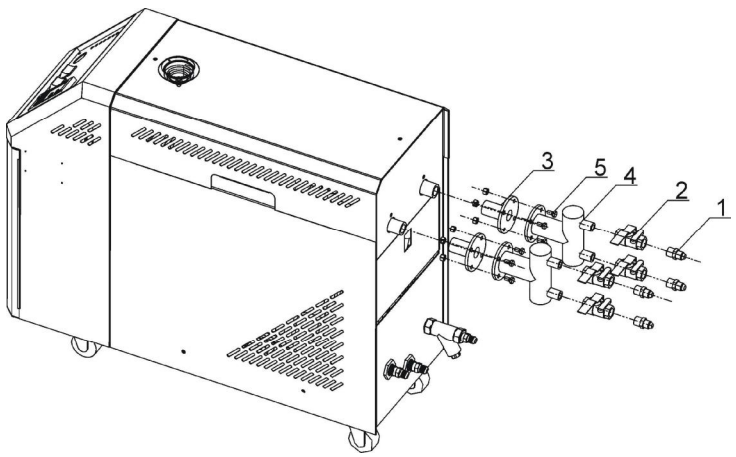


1) Install copper joint to the level valve.
2) Install level valve with copper joint to the dewaxing water manifold.
3) Install water manifold to the machine.
4) Install Teflon to copper joint.

Note!

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

3.4.2 Installation steps for options water manifold (welding)



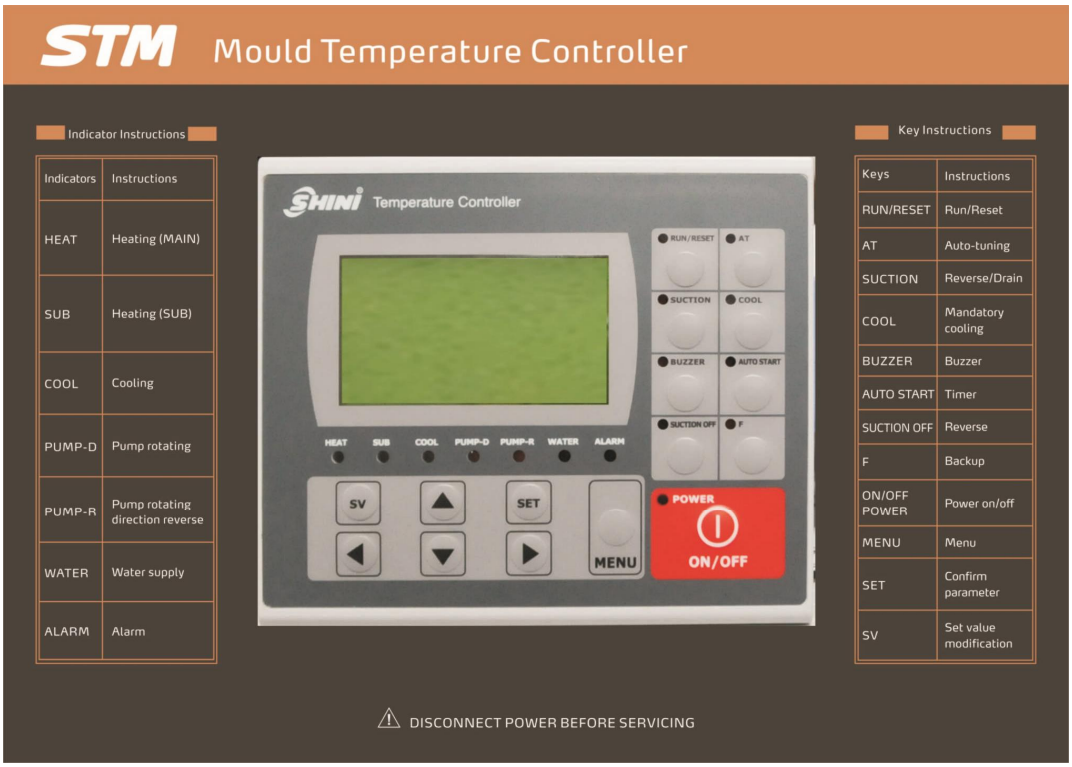
1) Install copper joint to the level valve.
2) Install level valve with copper joint to the welding water manifold.
3) Install water manifold to the machine.
4) Connect water manifold with manifold joint via screws.
5) Install Teflon to copper joint.

 Note!

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

4. Operation Guide

4.1 Control Panel



Picture 4-1: Control Panel

Table 4-1: Control Panel

No.	Name	Functions	Remarks
1	LCD	LCD Display	
2	POWER: ON/OFF	ON/OFF Button	
3	MENU	Menu setting	Initial password: 0000
4	SET	Parameter setting	Confirm paramerters
5	SV	Edit set value	Modify process temperture
6	▲/▼	Edit input value	
7	◀/▶	Cursor movement	
8	RUN/RESET	Start and Stop of unit	

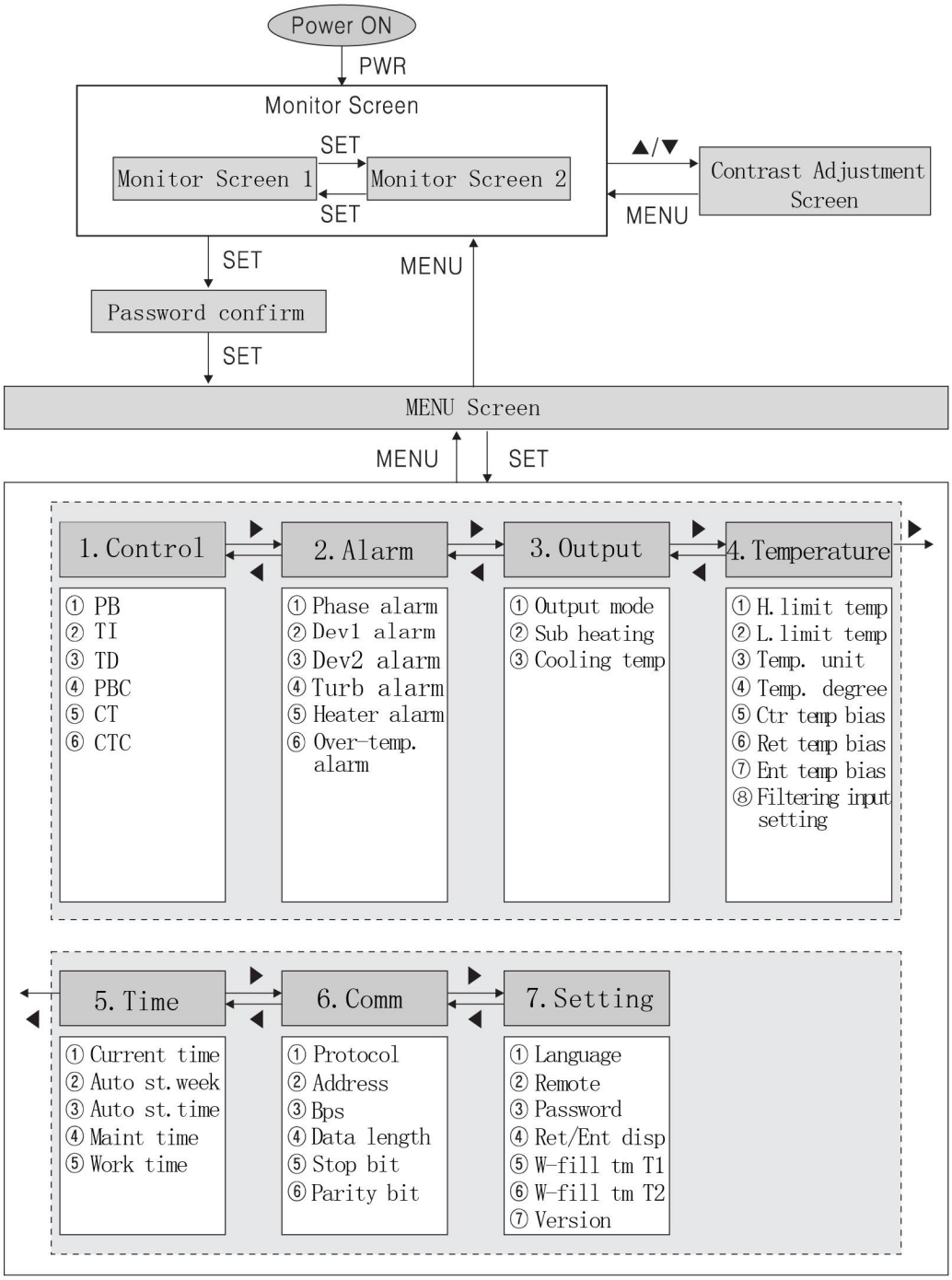
No.	Name	Functions	Remarks
9	AT	Start and Stop of auto-tuning.	Auto-tuning can run during operation. Auto-tuning cannot work under SUCTION and force cooling status.
10	SUCTION	Control unit: Optional water purge via compress air. (including STM-W/O) STM-W/O: Reverse drainage function of pump.	Press“SUCTION” button, pump reverse runs, water drainage valve opens, machine starts reverse drainage function. Note: in this time, press SUCTION OFF button, drainage valve closed, the machine is only at reverse running status (Negative pressure mode).
11	COOL	Force cooling ON/OFF Switch	Hold the button for 2 secs to enable force cooling. It stop heating while enable 100% cooling. It stops after the temperutre drops below Cooling Temp.
12	BUZZER	Buzzer off switch	After press” BUZZER” button, ” BUZZER” LED on, Buzzer and alarm relay in idle mode even error occurs.
13	AUTO START	ON/OFF timer	
14	SUCTION OFF	ON/OFF SUCTION relay	On/OFF SUCTION relay under SUCTION status (pump is still in reverse running).
15	F	No function.	Reserve for future use.
16	HEAT	Heating output (MAIN) LED	
17	SUB	Heating output (SUB) LED	
18	COOL	Cooling output LED	
19	PUMP_D	Pump on LED	
20	PUMP_R	Pump reverse LED	
21	WATER	Water replenishment LED	
22	ALARM	Alarm LED	Refer to table 4-2 for errors instruction.

Table 4-2: Error Type

Error display	Cause of Error	Alarm	Temp. control
Board error	Regulator error	Activated	Stop
Calib error		Activated	Stop
Adc error		Activated	Stop
Rjc error		Activated	Stop
Eeprom error		Activated	Maintain its status
Phase error	Default phase or phase reverse	Activated	Stop
EGO Over temp.	Check input EGO temp.	Activated	Stop
Pump overload	Check input pump overload	Activated	Stop
Low pressure	Check low pressure input	Activated	Stop
High pressure	Check high pressure input	Activated	Stop
Low water level	Check low water level input	Activated	Stop
Appear “-----“ on temperature display	Sensor abnormality	Activated	Stop
Dve1 alarm	Deviation between set (SV) and process (PV) water/oil temperature.	Activated	Maintain its status
Dev2 alarm	Deviation between process (PV) and return water/oil temperature.	Activated	Maintain its status
Turb. alarm	Process temperature (PV) drops rapidly.	Activated	Maintain its status
Heater alarm	Set temperature (SV) on but process temperature (PV) remains idle.	Activated	Maintain its status
Overheat	Over temp. alarm	Activated	Stop

Notes: When alarm sounds, controller will automaticlly stops the equipment. Press "RUN" to restart the machine.

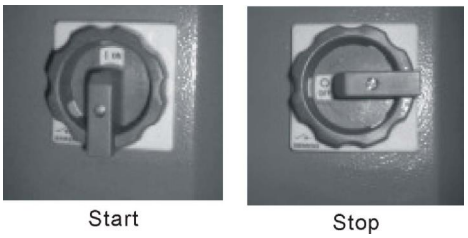
4.2 Menu Introduction



Pictute 4-2: Menu Outline

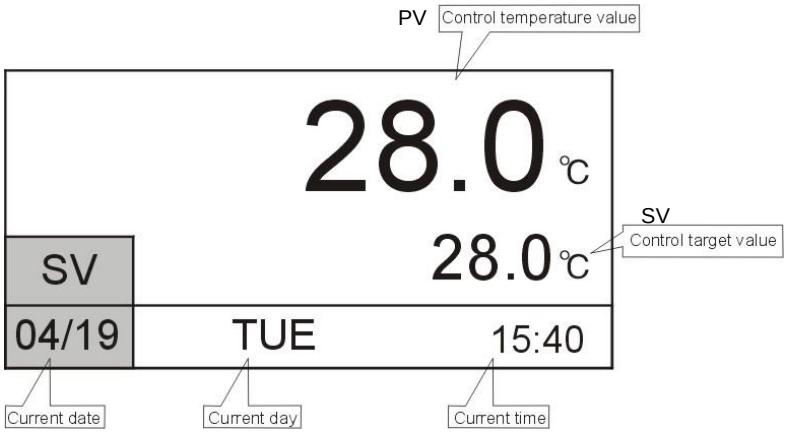
4.3 Machine Startup

1) Conenct hose from STM water/oil in/outlet to the mold. (Refer to chapter 3.2 for hose connection)
2) Connect water to cooling/water input (Refer to chapter 3.2 for hose connection)
3) Open all the ball valves.
4) Switch on main power.



Picture 4-3: Main Power Switch

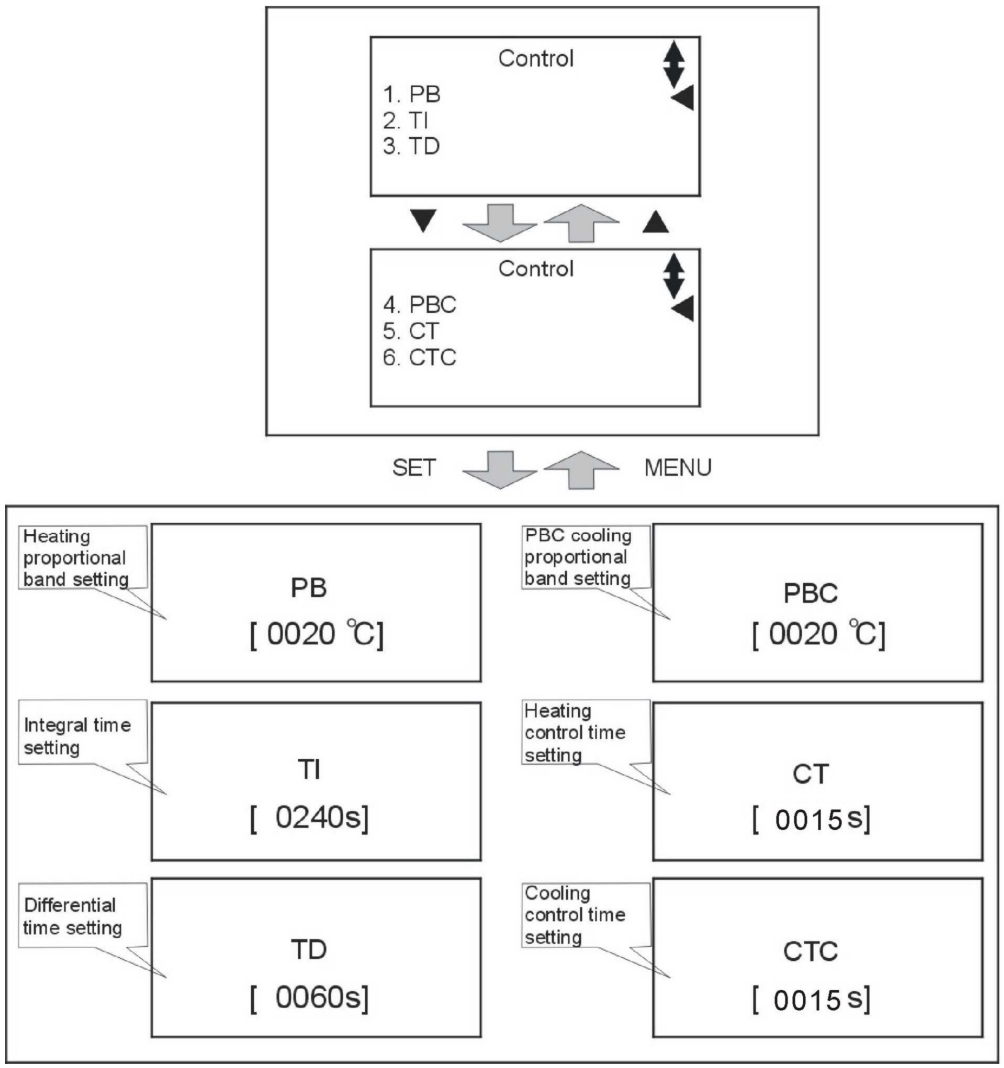
5) Press ON/OFF POWER button of the controller to enter initial screen.



Picture 4-4: Initial Menu

6) Press MENU key to enter menu selection screen, press ◄/► keys to control setting menu, press SET key to enter setting screen, see picture below.
Note: The parameters derived based on AT auto-tuning. Please do not change it with no special circumstance.

1. Control Menu



Picture 4-5: Control Setting Screen

2. Alarm Menu

Press MENU key to return menu selection screen, press ◄/► keys to temp. setting menu, press SET key to enter setting screen, as picture. All parameters are as below:

Default parameters

PHASE Detection—Activate(prevent water pump reverse due to phase error)

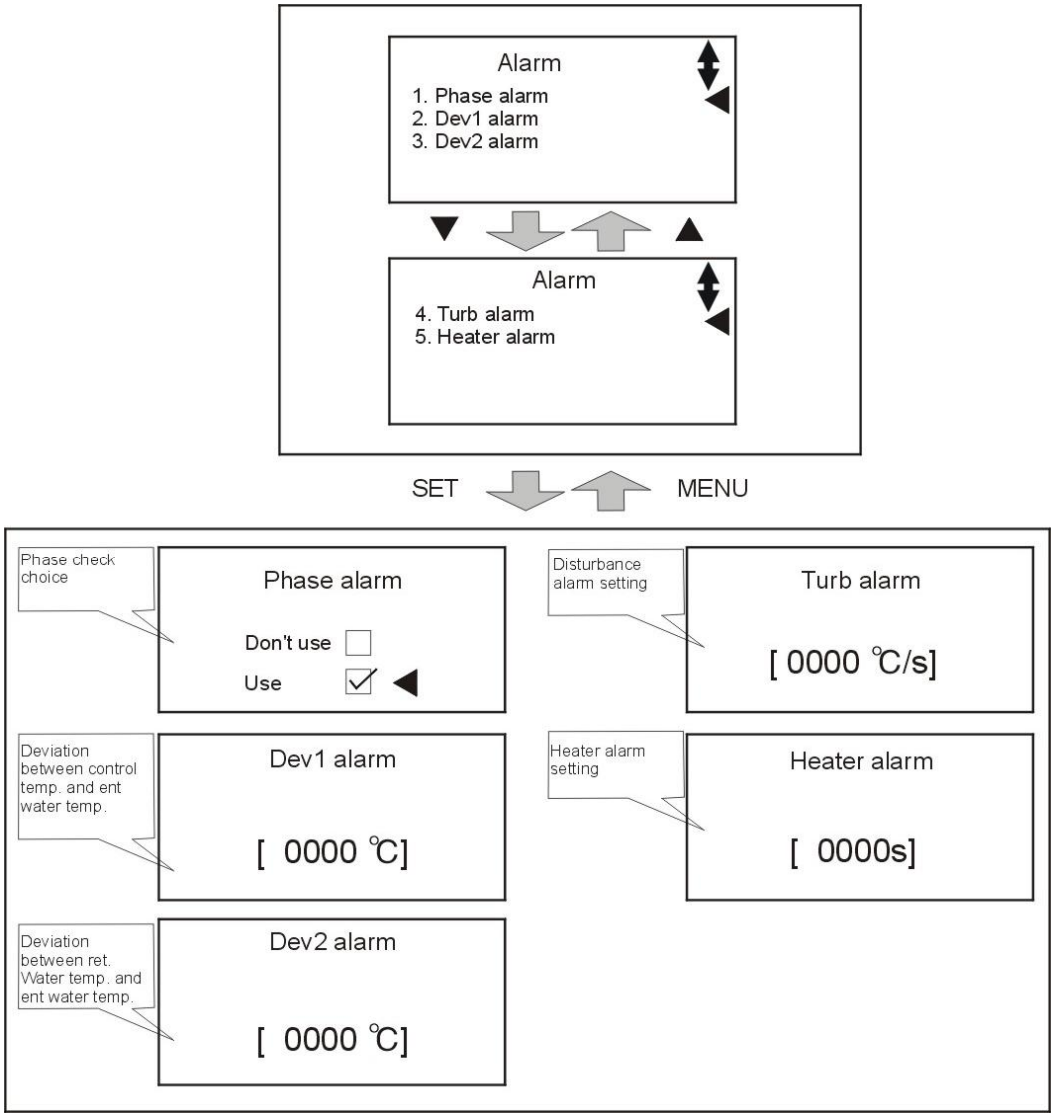
DEV1 ALARM——0 (without temp. sensor)

DEV2 ALARM——0 (without temp. sensor)

TURB ALARM——0℃/sec. (monitor temp. variation, it alarms when control temp. drops rapidly)

HEATER ALARM——activate when control temp. doesn't rise up. If default value is 0/ sec., the function is disabled.

Overheat——exceed permissible upper limit temp. n℃, machine alarms and excitation release enables power off (n is set value, the default is 20℃).



Picture 4-6: Alarm Setting Screen

3. Output Menu

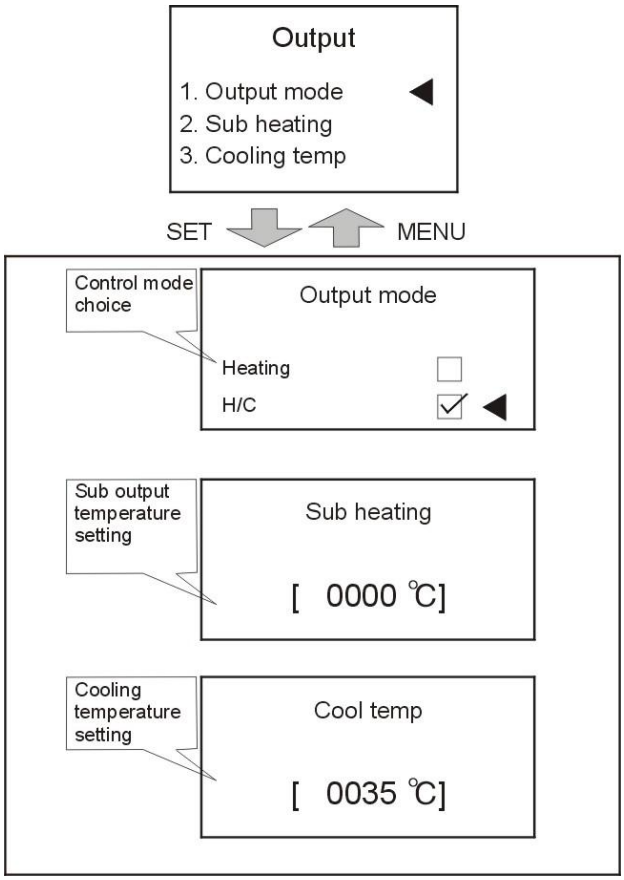
OUTPUT MODE——heating control or heating and cooling control (Default is heating and cooling control)

SUB HEATING——temp. difference of activating sub. heating ouput (SUB) function. When actual temp. is less than (set temp. – temp. difference), main heating output and sub. heating output share a same output; when actual temp. is higher than (set temp. –temp. difference), main heating output and sub. heating output only has one group of output (Note: output relay alternatively output to prolong lifespan).

0℃ ((SUB) function is forbidden, only 1 group of heater)

5℃ (two or more groups of heaters)

COOLING TEMP.——Force cooling setting temperature. Default is 35℃ (machine halts if temp. drops to set value).



Picture 4-7: Output Setting Screen

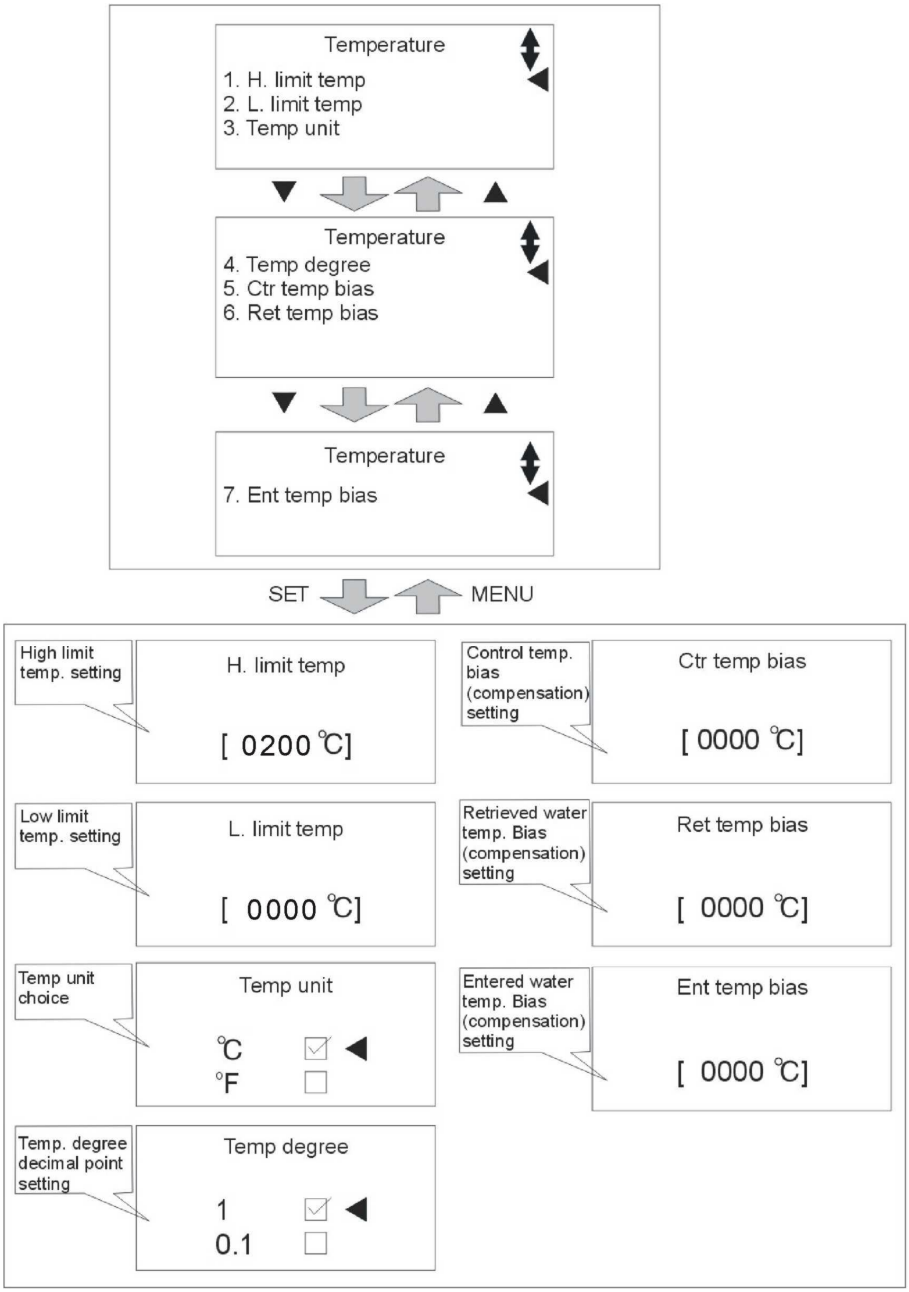
4. Temperature Setting Menu

Press MENU key to return menu selection screen, press ◄/► keys to temp. setting menu, press SET key to enter setting screen, as picture. All parameters are as below:

UPPER LIMIT TEMP.——Software limit on maximum temperature (each model default is as below)
(STM-O: 200, STM-O-HT: 260, STM-607E:150(max.value is 200), STM-W/STM-WF/STM-WE: 120, STM-PW:180, STM-W/O: Water 95 Oil 160).

LOWER LIMIT TEMP.——Software limit on minimum temperature. Default: 0. (Note: The equipment use external cooling water to cool. Cooling temperature can't below cooling water temperature.)

TEMP. UNIT——Unit in ℃/℉ (Celsius and Fahrenheit)
TEMP. DEGREE——Temperature display in 1℃/℉ or 0.1℃/℉. Default: 1
CTR TEMP BIAS——Bias correction of control water/oil temperature (Default is 0℃, modification is not recommended.)
RET TEMP BIAS——Bias correction of return water/oil temperature. (Default is 0℃, modification is not recommended.)
ENT TEMP BIAS——Bias correction of process water/oil temperature (Default is 0℃, modification is not recommended.)
Input filtersetting——average temperature during sampling process (Default is 0℃, modification is not recommended.)



Picture 4-8: Temperature Setting Screen

5. Time Setting Menu

Press MENU key to return menu selection screen, press ◄/► keys to time setting menu, press SET key to enter setting screen, as picture. The time has been adjusted before delivery. All the reserve time can be set according to actual production demands.

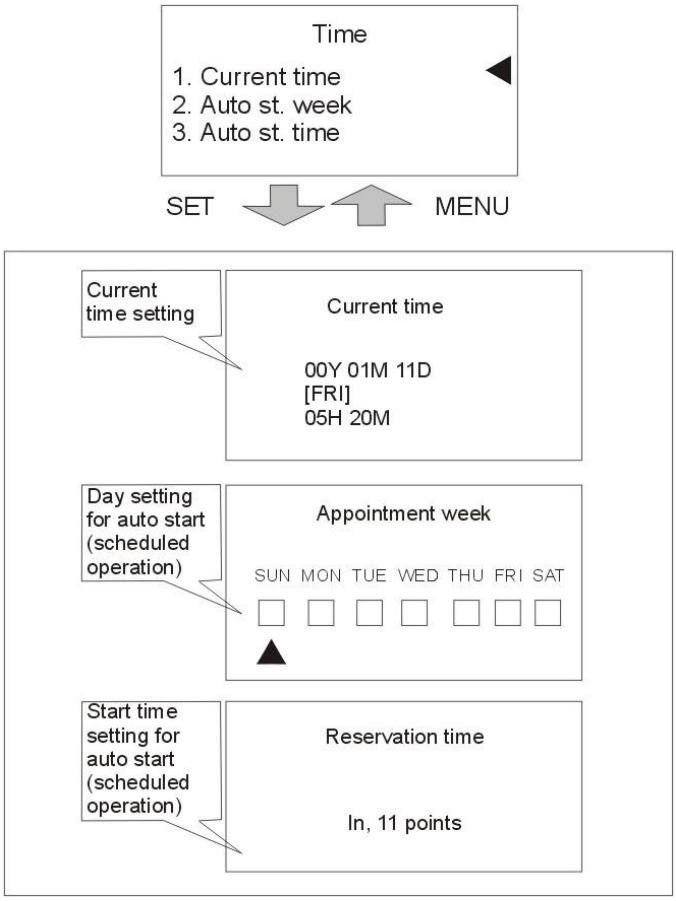
Current time——Format in YYMMDD

Reserv week——Weekly auto start/stop days

Reserv time——Auto start/ stop hour and minutes of the day. Format: xxHour xxMinutes

Maint. time—— Machine maintenance time

Work time —— Machine working hours



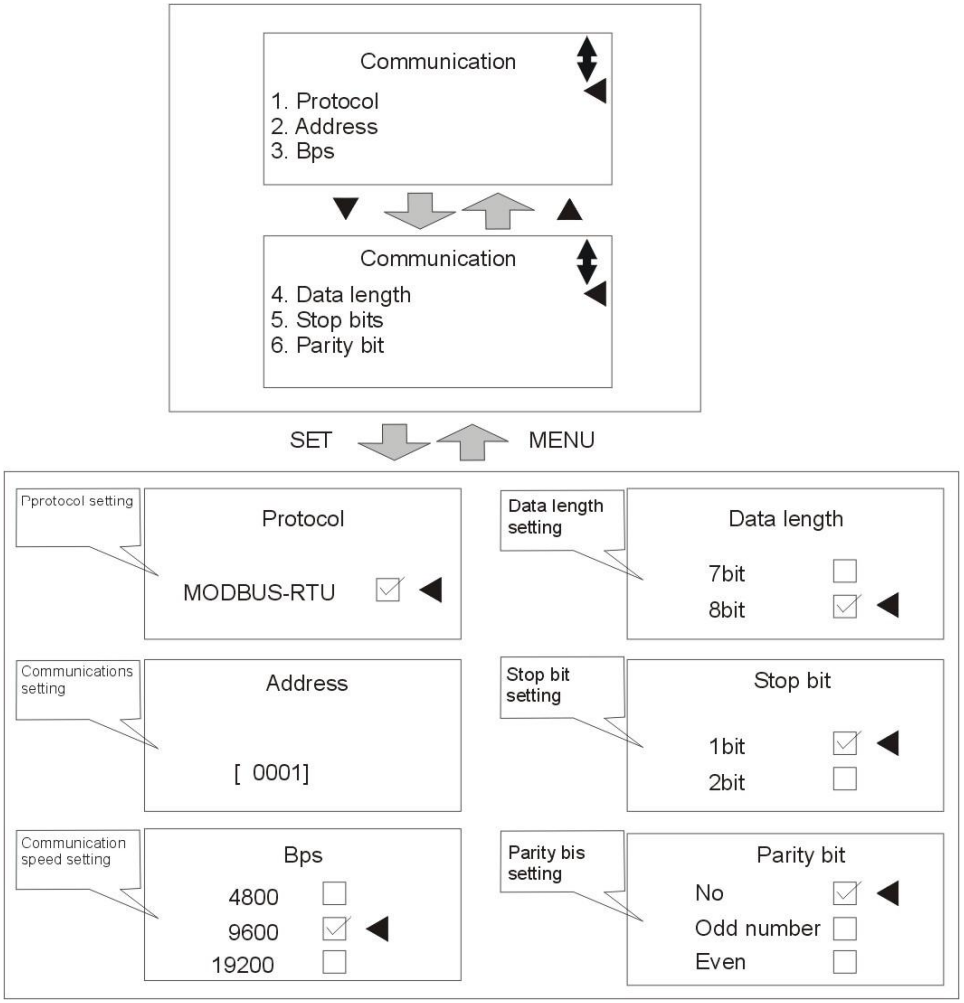
Picture 4-9: Time Setting Screen

6. Communication Setting Menu

Reserve used for RS485 communication protocol.

Press MENU key to return menu selection screen, press ◄/► keys to communication setting menu, press SET key to enter setting screen, as picture.

When optional with communication function, set the parameters according to the requirements.



Picture 4-10: Communication Setting Screen

7. Setting Menu

Press MENU key to return menu selection screen, press ◄/► keys to machine setting menu, press SET key to enter setting screen, as picture. The parameters are set before delivery, and all the parameters can be adjusted according to actual demands.

Language——English and Chinese.

Remote control: Default Unused (Special notes: this remote control uses 1-5 VDC to set control temp. value, which is unrelated with communication function. When remote control is activated, temp. set value can't be adjusted on the control panel.)

Password: Default 0000.

Ret/Ent Disp: Return and process water/oil temperature display. Default: Disable.

W-fill tm t1: Start delay for water unit to refill water in seconds. Automatically enable after disable the breaker. Default 1 for oil unit, water unit as below table.

W-fill tm t2: Interval delay for water unit to refill water in seconds. Automatically enable after disable the breaker. Default 0 for oil unit, water unit as below table.

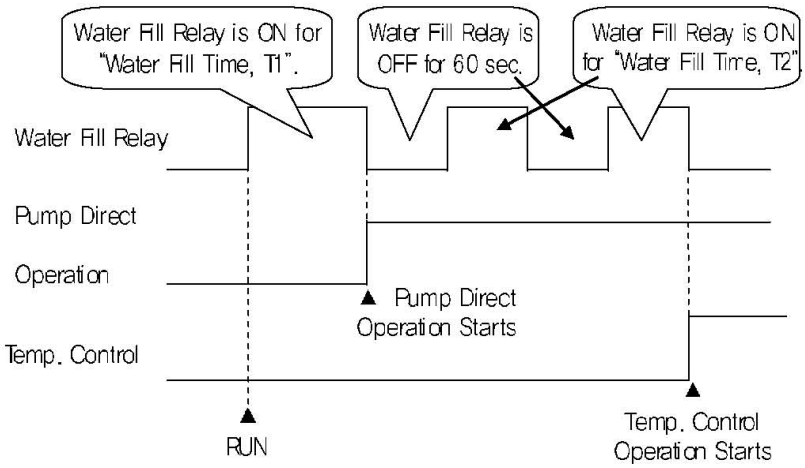
Table 4-3: Water-filling Time of Each Water Unit

Model	**STM-607W/W-D/PW/PW-D /WF/STM-910W/W-D//WF**	**STM-1220W/PW/WF /STM-2440W/STM-2430WF**	**STM-3650W/STM-3650WF /STM-4875WF**
t1	60S	120S	180S
t2	10S	15S	20S

Specific instructions are as follows:

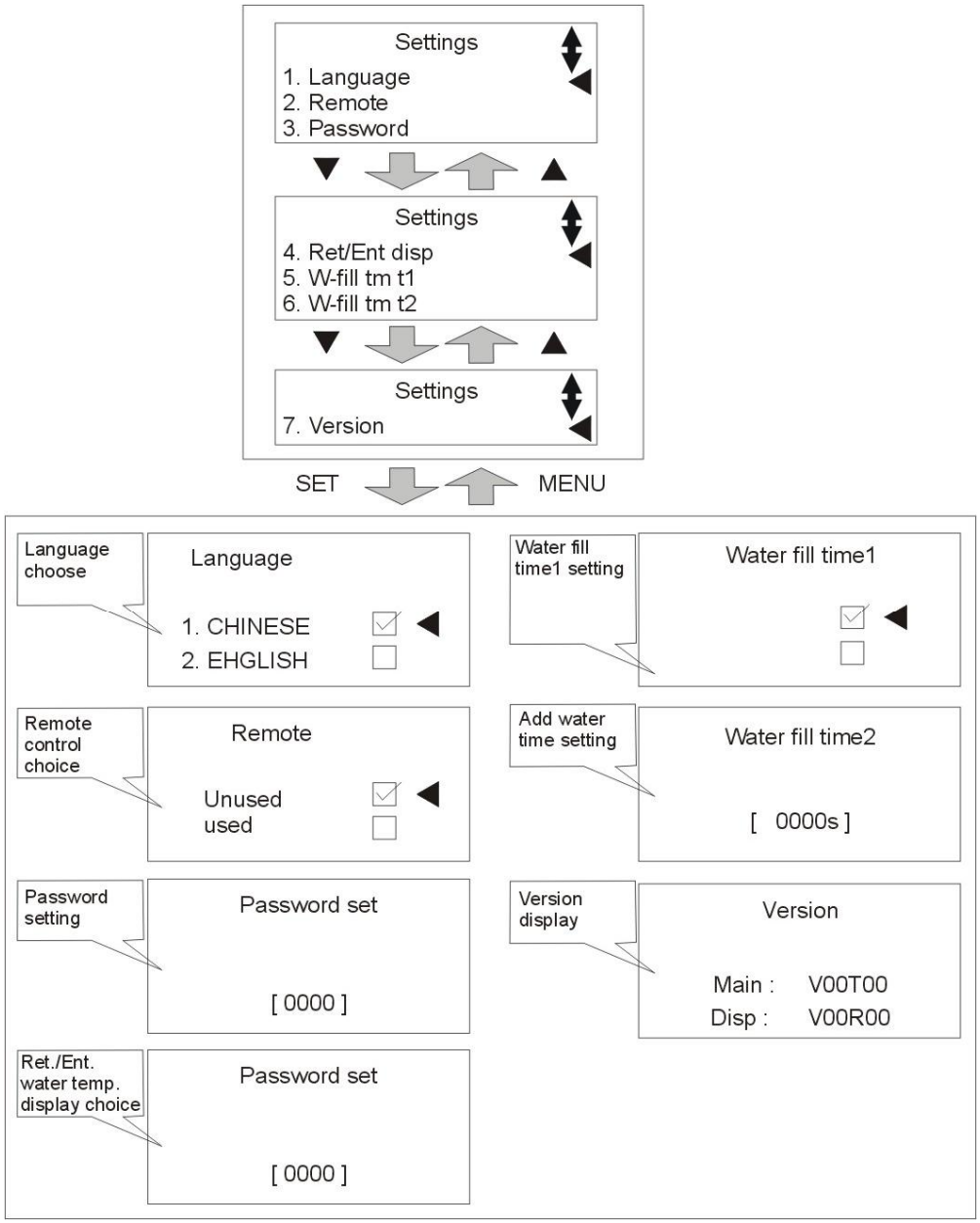
W-fill tm T1=0: press RUN key to start water refilling, when reaches the high water level it starts the pump and heating.

W-fill tm T1≠0: press RUN key to start water refilling t1, then pump starts, delay for W-fill tm t2, it starts heating (the water-filling process is as below picture).



(Water filling function in water filling time)

Version: version of control program.



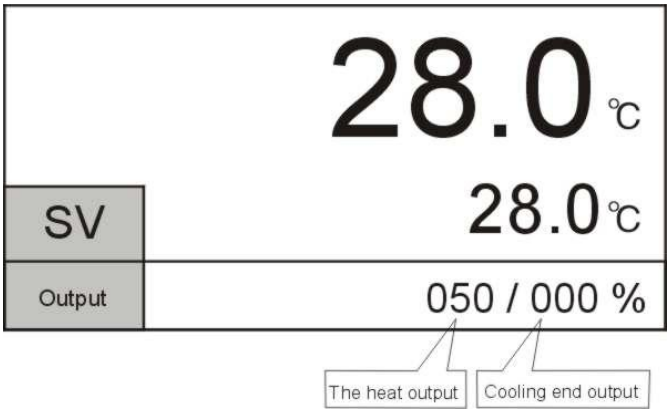
Picture 4-11: Machine Setting Screen

8. Input Heating Temperature

1) Set mold temperature (if temp. has been set, this step can be ignored). Press SV key and SV column will be flashing, press ◄/► key to move cursor then press ▲/▼ key to change values. Finally press SET key to confirm them.

2) After setting the SV, press RUN/RESET key to begin temperature control,

Auto-tuning is needed if deviation of temperature is 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 exisiting parameters before the Auto-tuning.



Picture 4-12: Operation Screen

4.4 Stop the Machine

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

Caution

Warning!

While the main switch is on, caution of electrical shock.

Note!

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

Note!

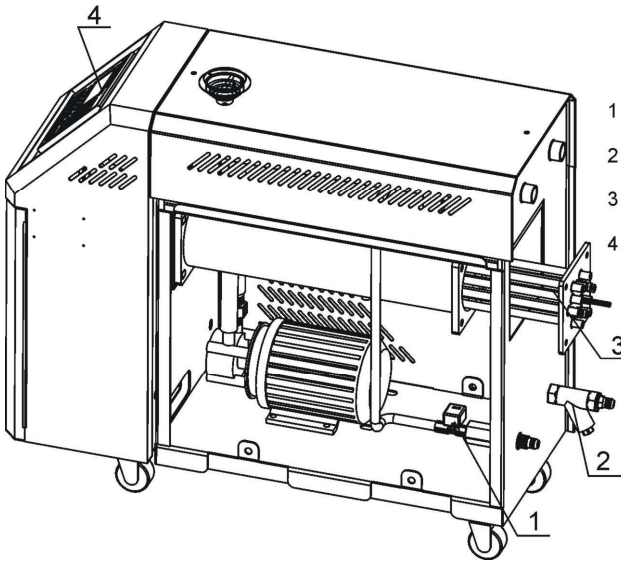
Please do follow the above steps to turn on and off the machine. Fail to do so will reduce the lifespan of equipment.

5. Trouble-shooting

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

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

6. Maintenance and Repair



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

Pay attention to the following rules during maintenance:

1) Please reduce the temperature to room temperature (below50℃), cut off power supply and drain oil and water first while inspecting the machine; carry out operations with safety gloves on after complete confirmation of spaces for inspection and maintenance.
2) It is necessary to carry out periodic inspections in order to prolong service life of the system and prevent from safety accidents.
   (Please note that it is dangerous to check or tear down the machine during operation.)

6.1 Open the Covers

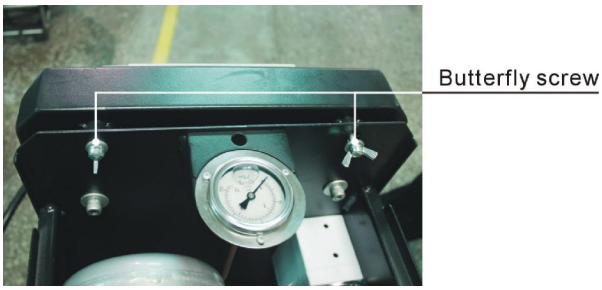
1) Open the top covers of the unit (Lift up it as shown picture).

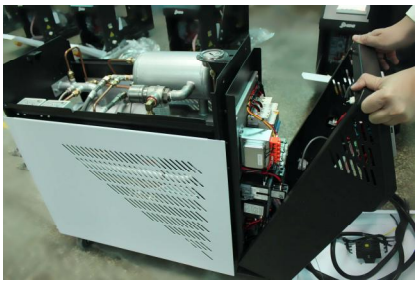
Picture 6-1: Open the Covers 1

2) Take down the side covers (Pull up it outward as shown picture).

Picture 6-2: Open the Covers 2

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

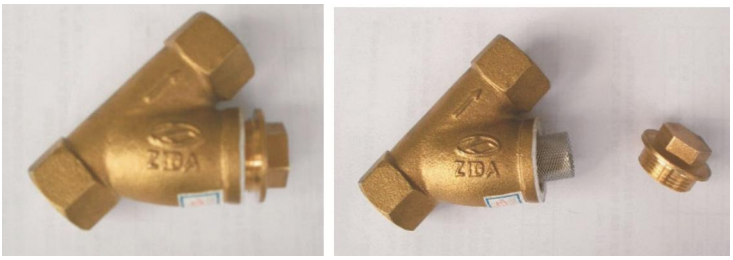




Picture 6-3: Open the Covers 3

6.2 Y Type Strainer

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

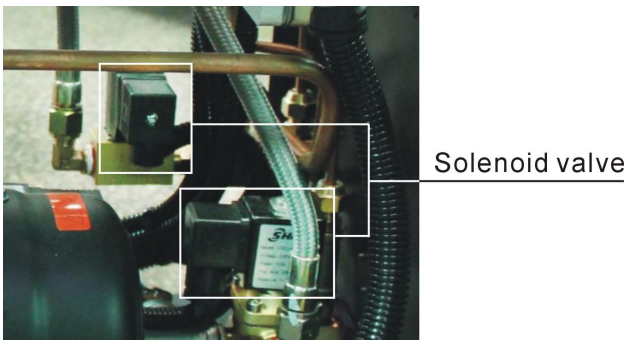


Picture 6-4: Y Type Strainer

6.3 Solenoid Valve

Replace solenoid valve:

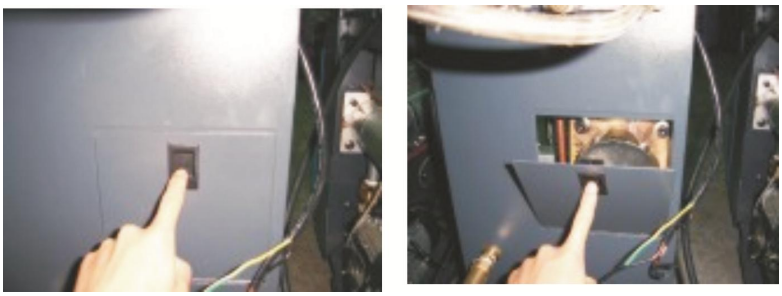
1) Open machine top cover.
2) Take down right side cover.
3) Unfix the solenoid valve for replacement.
4) Install the covers in a reverse order.



Picture 6-5: Solenoid Valve

6.4 Pipe Heater

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

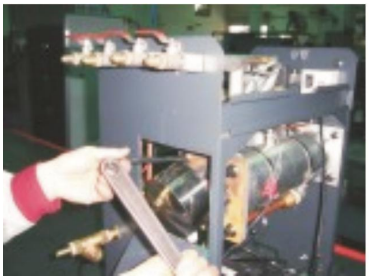
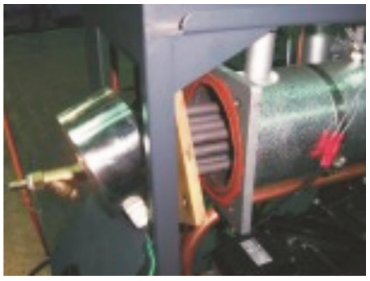


Picture 6-6: Pipe Heater 1

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

Picture 6-7: Pipe Heater 2

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

Picture 6-8: Pipe Heater 3

4) Install the pipe heater in a reverse order.

6.5 Printed Circuit Board

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

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

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

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

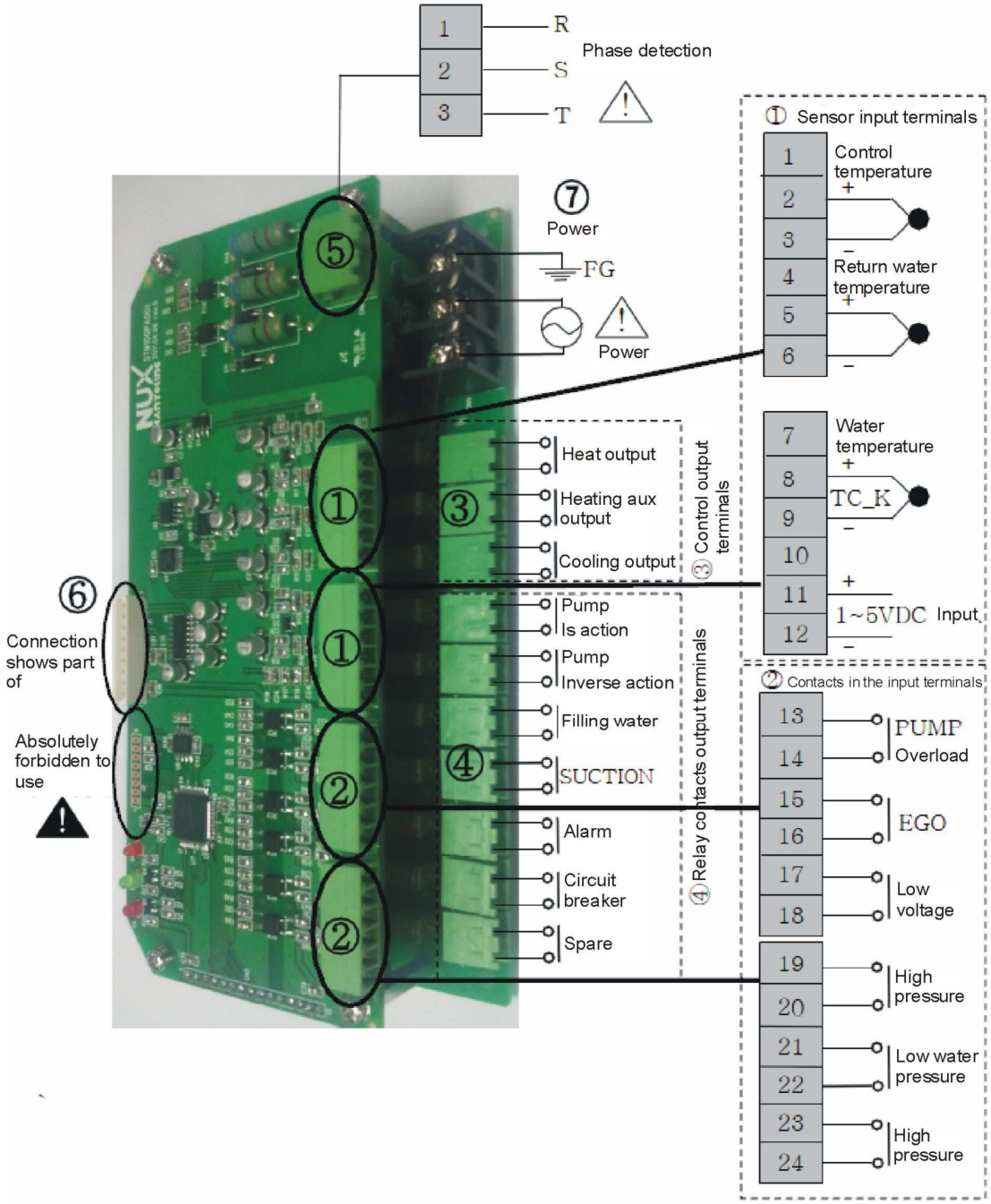
④ DO TERMINAL (relay contactor output terminal)
1, 2 : pump running contactor output terminal
3, 4 : pump inverse running contactor output terminal

5, 6 : backup water contactor output terminal
7, 8 : SUCTION contactor output terminal
9, 10 : alarm contactor output terminal
11, 12 : relay contactor output terminal
13, 14 : reserve

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

⑥ DISPLAY CN (connect terminal for dispaly)
Connect stub cable with STM100.

⑦ POWER TERMINAL (power supply terminal)
1 : FG terminal
2, 3 : power supply terminal (100~240VAC)


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

6.6 Displayer Terminal Connecting Diagram

① DI TERMINAL

1, 2: Run/stop di terminal

② COMM TERMINAL

1, 2, 3, 4: rs485 Comm terminal

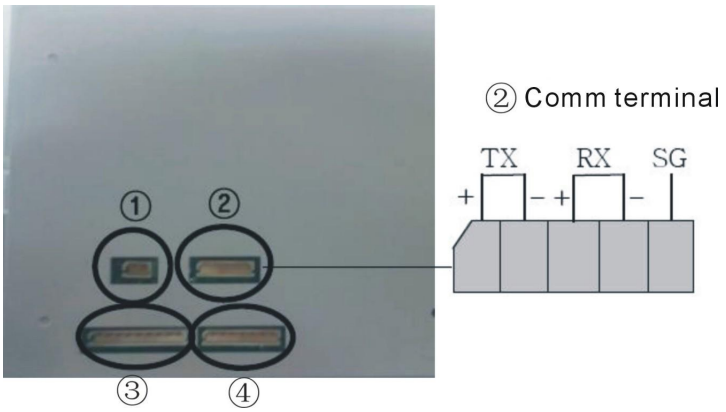
5: Earth terminal

③ MAIN CN

Connet to the electric cables which also connected with stm100

④ TEST PIN

Test pin No connection



6.7 Maintenance Schedule

6.7.1 About the Machine

Model _____ SN _____ Manufacture date _____

Voltage_____Φ_____V Frequency _____ Hz Power _____ kW

6.7.2 Installation & Inspection

☐Check the installation space is enough as required.

☐Check the pipes are correctly connected.

Electrical installation

☐Voltage: _____ V _____ Hz

☐Fuse melting current: 1 Phase _____A 3 Phase _____A

☐Check phase sequence of power supply.

6.7.3 Daily Checking

☐Check machine startup function.

☐Check all the electrical wires.

6.7.4 Weekly Checking

☐Check loose eletrical connections.

☐Check and clean Y type filter [1].

☐Check solenoid valve.

☐Check motor overload and phase reversal alarm function.

☐Check whether pipeline joints are under looseness.

☐Check the sensitivity of EGO.

6.7.5 Trimonthly Checking

☐Check level switch.

☐Check the contactor [2].

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

6.7.6 Half-yearly Checking

☐Check damaged pipes.

☐Clean process heater/cooler.

☐Check indicator and buzzer.

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

6.7.7 Yearly Checking

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

6.7.8 3 year Checking

☐PC board renewal.
☐No fuse breaker renewal.

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