STC-A Cooling/Heating

Temperature Controllers (Air-cooled)

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SHINI

Content

Table Index

Picture Index

1. General Description

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

Shini Cooling/Heating Temperature Controllers STC-A consist of the mould temperature controller and water chiller functions, which can heat up the moulds and cool down the products simultaneously.

a.Water Chiller section：

The refrigeration system adopts the single-stage vapor compression circuit, and has the compressor overload protection, pump overload protection, reverse phase warning, anti-freezing protection, and high/low pressure protector that ensure stable machine performance and long service life. It is applicable to the cooling occasions in the modern industry that is not subject to the impact of environment temperature, which is an indispensable configuration device. The Bangpu temperature controller can ensure stable temperature control within the control accuracy of ±1℃, and display accuracy of ±0.1℃。

b.Oil Heater section:

Used to heat up the mould and maintain temperature, although they can be used in other similar applications. High temperature water from the mould is returned to the cooling tank and cooled by either indirect cooling (For high temperature models) or direct cooling (for standard models). It is then pressurised by the high - pressure pump, sent to the heating tank and finally to the mould with a constant temperature. The HANYOUNG temperature controller can maintain an accuracy of ±1℃.

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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1.1 Feature

Water Chiller

1) Cooling range 7～35℃.
2) Insulated water tank and evaporator made of stainless steel.
3) Equipped with anti-freeze therostate.
4) Adopt R22 refrigerant.
5) Refrigeration loop controlled by high and low pressure switches to ensure stable operation.
6) Compressor and pump overload protection.
7) Adopt Bangpu temperature controller with an accuracy of ±1℃
8) Adopt quality compressors from major supplier.
9) Adopt fin style condenser and tube-in-shell condenser with excellent heat transfer and rapid cooling.
10) Equipped cooling water pipe pressure gauge.
11) Automatic water supply.

Oil Heater

1) The water chiller is used for the cooling, within the temp.range of 10-120℃, and temp. control accuracy of ±1℃.
2) P.I.D multi-stage temperature control system can maintain mould temperature with accuracy of ±1℃.
3) Adopt high efficiency water cycle pump.
4) 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.
5) Adopt stainless steel pipe, high pressure explosion-proof.
6) Possess water output high pressure, refilling low pressure and overheat protection.

1.2 Specifications

Item/parameter \ Model			STC-8A-P/40W
Refrigerant(1)	kW		19.5
	Kcal/hr		16,770
Heating capacity	kW		40
Compressor	Type		Scroll type
	Output Power	kW	6.11
		HP	8
Refrig-erant	Filling amount(kg)		7
	Control mode		Thermostatic expansion valve
	Type(2)		R22
Evaporator	Type		Plate heat exchange
Chilled water in/out pipe(inch)			1.5”
Condenser	Type		Shell-tube style
	Blower power (KW)		0.25x2
Cooling water pump	Power		1.1
	Working pressure (kgf/cm^2)		2.6
Medium pump	Pump(KW)		3
	Pump flow(L/min)		208
	Working pressure (kgf/cm^2)		3.3
Protector	Compressor		Overload relay
	Pump		Overload relay
	Chilling water return circuit		High and low pressure switch/anti-freezing switch
	Water return circuit		Water level switch(Option)/Bypass-valve
W×D×H(mm)			1300×2400×1750
Unit conversion			1kW=860 Kcal/hr 1RT=3,024 Kcal/hr 10,000Btu/hr=2,520 Kcal/hr
Voltage specification			3Φ, 415VAC, 50Hz

Note: 1) Refrigeration capacity is measured based on the flow $0.172m^3/(h•kw)$ and the outlet temperature(7℃) of chilled water under the environment temperature of 30℃, and the flow of $0.215\ m^3/(h•kw)$

2) Environment-friendly R407C refrigerant is optional. (Add "R1" at model behind, such as STC-910-5W-R1)

We reserve the right to change specifications witchout prior notice

1.3 Safety Regulations

The user must conform to the following safety rules when operating the machine.

1.3.1 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.

1.3.2 Signs and Labels

This is for indicating motor rotating direction.

1.3.3 Operation Notices

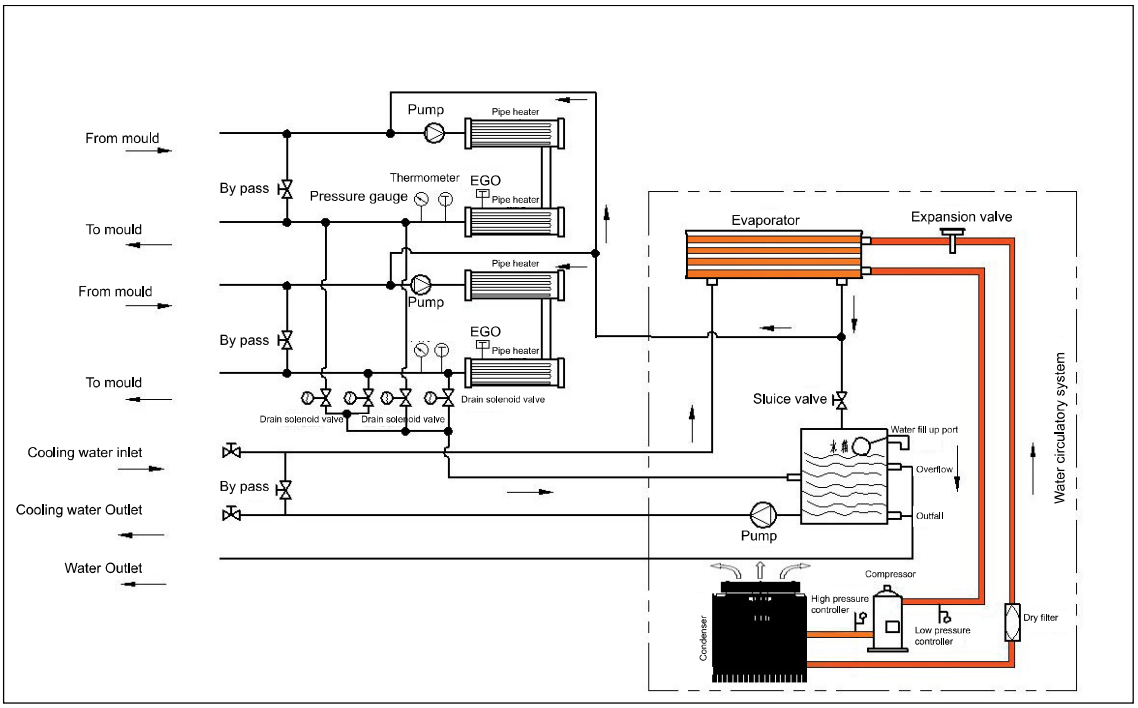
1) Before operation, check whether the cooling water and medium liquid is the clean water without impurities or drinking water meets the standard.
   ※ When the water quality is bad, it's easy to cause failures due to the scale and other reasons.
   ※If the water quality is not good, it will break the heating pipe, damage the pump impeller and reduce the flow rate, resulting in the temperature can not rise.
2) If the drainage is not smooth or the temperature control effect is poor, please clean the solenoid valve immediately or check whether there is blockage in the cooling water inlet and outlet.
3) The machine will generate high temperature when running, so don't touch the high temperature part when running.
4) During repair, the temperature must be cooled to below 30℃.
5) Cool down the temperature below 50℃ before machine shutdown, then it can shut down the pump; otherwise, it will affect the service life of the pump.
6) As to ensure the stability of heating temperature, and the pressure of cold water pump should be 2-5bar.
7) If the temperature is above 100℃, the cool water outlet must be connected with the high temperature resistant pipe.
8) If the temperature is below 100 ℃, it can set the value of pressure switch to 1.5～2bar; If the temperature is above 100 ℃, the recommended pressure value is 2.8bar.
9) If the first start or cold water pump stops running, the mould temperature controller will sound low pressure alarm when start, which requires manual reset of the high and low pressure controller that can operate the machine unit.

2. Strutural Features and Working Principle

2.1 Functional Description

Shini Cooling/Heating Temperature Controllers STC-A is the temperature chamber that integrates the heating and cooling functions. The machine can offer a group of chilled water in temp. range of（7～35℃）and two groups of hot water temp. in range of（10～120℃）.

2.1.1 Working Principle



Picture 2-1: System Flow Chart

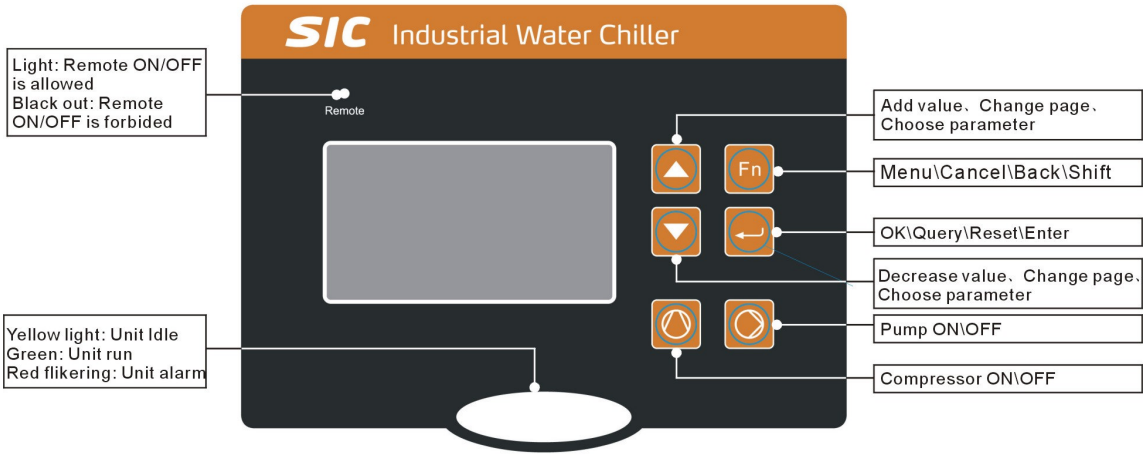
Water Chiller section: mainly consists of the compressor, condenser, evaporator and thermostatic expansion valve. Adopt the single-pole vapor compression refrigeration system, and use the gas-liquid mutual transformation of the refrigerants to achieve the cooling effect based on the heat absorption and release principle.

Mould Temperature Controller section: Adopt the water chiller to provide the cooling water, heating tube and pump pressurized cycle for the constant temperature.

3. Parts Structure and Application

3.1 Operation Nameplate

3.2 Wather chiller panel diagram

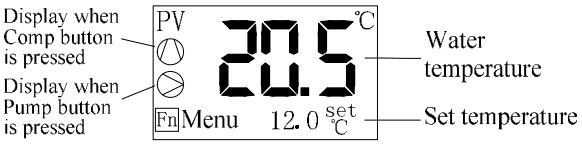


3.3 Common Screens

Commonly used screens include the main screen and the alarm screen.

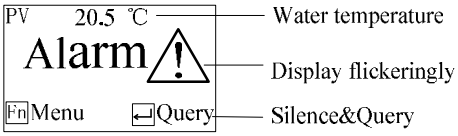
1. Main Screen

The system will enter the main screen after countdown, which displays as follows:



2. Alarm Screen

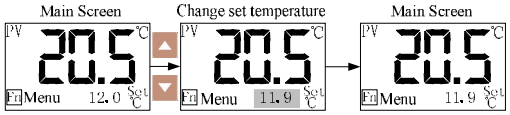
In case of unit failure, the alarm screen is as follows:



3.4 Quick Operation

1. Changing and Setting Temperature

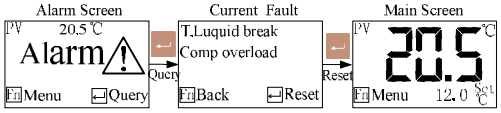
If the user parameter [Lock Temp.] is set to "No", the setting temperature can be modified directly in the main screen, with operation details as follows:



Note: the setting temperature can also be modified in the user parameters.

2. Query/Reset Fault

In case of fault, the alarm screen will automatically pop up. The operation details of query and reset faults are as follows:



Attention: Pump rotating direction should be correct.

Attention: Before starting the system, make sure that cooling water pump is turned on. Check the water tank of the chiller. Do not start the machine when there is no water left in water tank. We shall not be liable for any damages caused by this reason.

Attention: In order to reduce the possibilities of machine damage and prolong the life, start the machine with correct methods.

Attention: The compressor can't be started frequently because of its characteristics (Frequent start will shorten its service life.). If emergency shut-down happens, the compressor will run again 3 minutes later.

3.5 Startup

1) Open the main power switch.

Start

Stop

2) Set the temperature of chilling water (if the temp. has already been set, omit this step). The minimum temperature of this series machine should be set as 7℃.

3) Press  button to start the water pump.

4) Press  button to start the compressor.

3.6 Shutdown

1) Turn off the switch of compressor.
2) Turn off the pump switch. If it adopts the quick molding cycle and low cooling water temperature, keep continuous running of water pump till the mould temperature rises to non-condensated temperature, then turn off the pump switch.
3) Switch the main power switch to OFF position.

Attention: When main power switch is at ON position, please be careful the electric shock!

Attention: As to reduce the machine damage and prolong its service life, please turn off the machine in correct orders.

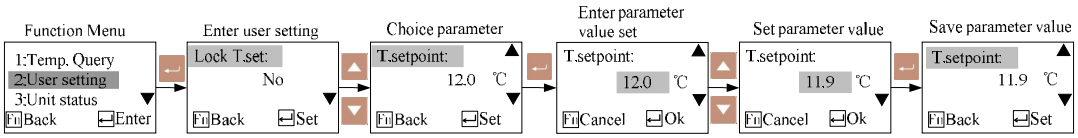
3.7 User Menu

Press the button Fn on the main screen to enter the User Menu, which includes five items as the table below:

No.	Menu Item	Funtion	Remark
1	User Setting	To set the user parameters	-
2	Unit Status	To display the current operating status of the unit	--
3	Fault Record	Allowing the query of the last 10 faults	Press ↵ for 2s to clear the fault history.
4	Machine Set	To set language, backlight, time and so on.	--
5	Temp Query	To query all the temperature value	It is not display these item If measure the water temperature only.

3.7.1 Parameter Operation

For the modification operation of parameter value, the user's modification of setting temperature will be described as an example.



3.7.2 User Setting

All the parameters in user settings please refer to following table:

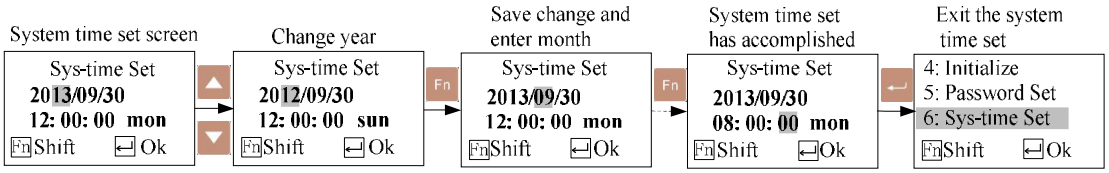
No.	Parameter Name	Factory Default	Setting Range	Remark
1	Lock Temp.	No	Yes ~ No	Yes: the [Set Temp.] can not be modified on the main screen when locked. No: the [Set Temp.] can be modified on the main screen.
2	Set Temp.	20.0℃	7.0~25℃	Setting range is limited by the manufacturer parameters [max. Temp.], [min. Temp.].
3	On/Off Mode	Local	Local / Local + Remote / Remote	Local: the unit can only start and stop locally. Local + Remote: the start and stop of the unit can be controlled both locally and remotely. Remote: the unit can only start and stop remotely.

3.7.3 Machine Set

The machine set includes six items as the table below:

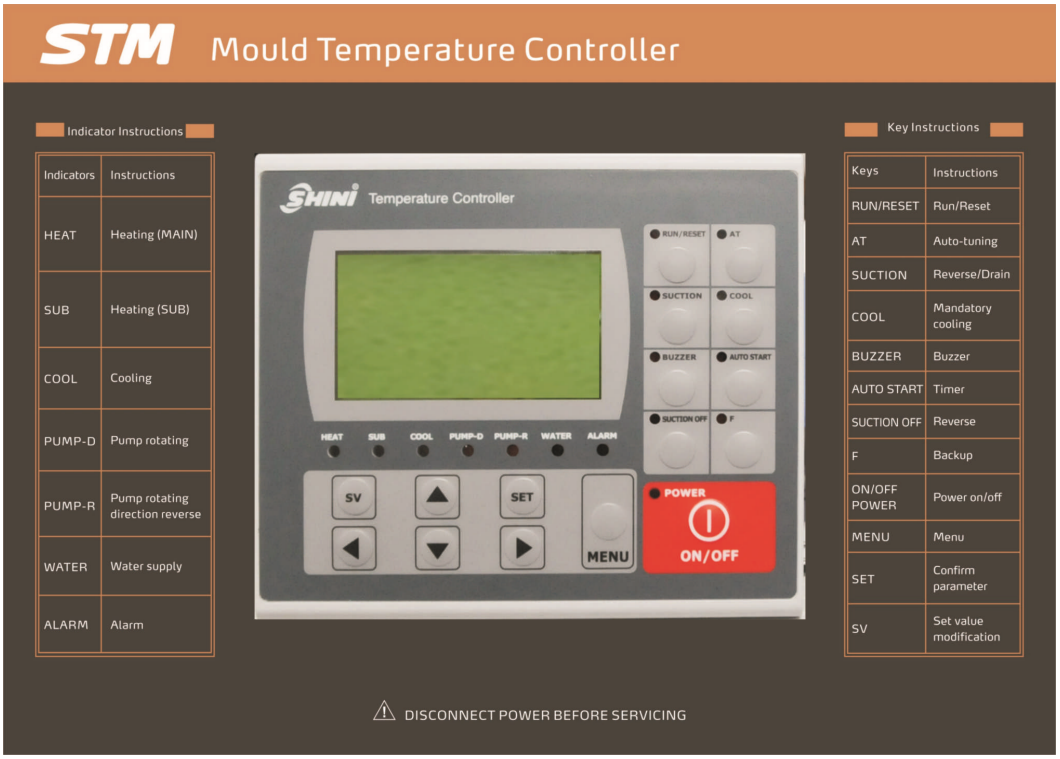
No.	Item	Function	Remark
1	Language	To set the display language.	Chinese and English
2	Backlight Time	Setting range：0~255min	0: backlight is not turned off.
3	Compr Use Time	To query the cumulative operation time of the compressor	
4	Comm. Setting	To set baud rate, parity bit, stop bit and communication address.	Communication protocol：Modbus RTU
5	Machine Info.	To query the machine version information.	
6	Clock setting	To query and set the system time.	

3.7.4 System Time Set



Note：Press the button  can exit the system time set quickly, and the set value will be saved when exit.

3.8 Wather Heater Panel Diagram



Picture 3-1: Control Panel

Table 3-1: 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	
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).

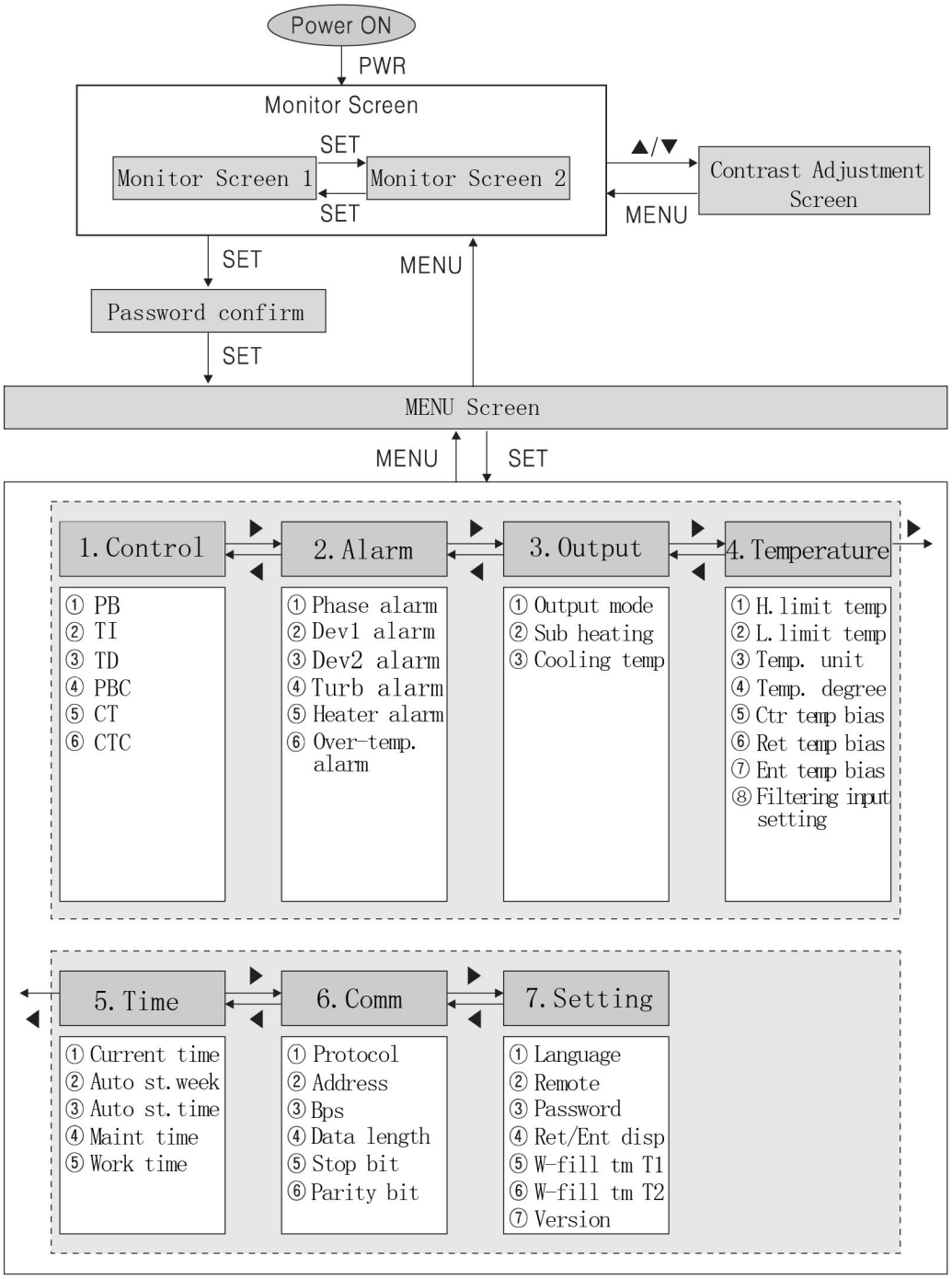
No.	Name	Functions	Remarks
11	COOL	Force cooling ON/OFF Switch	Hold the button for 2 secs to enable force cooling. It stop heating while enable 100% cooling. It stops after the temperutre drops below Cooling Temp.
12	BUZZER	Buzzer off switch	After press” BUZZER” button, ” BUZZER” LED on, Buzzer and alarm 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 3-2: 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	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.

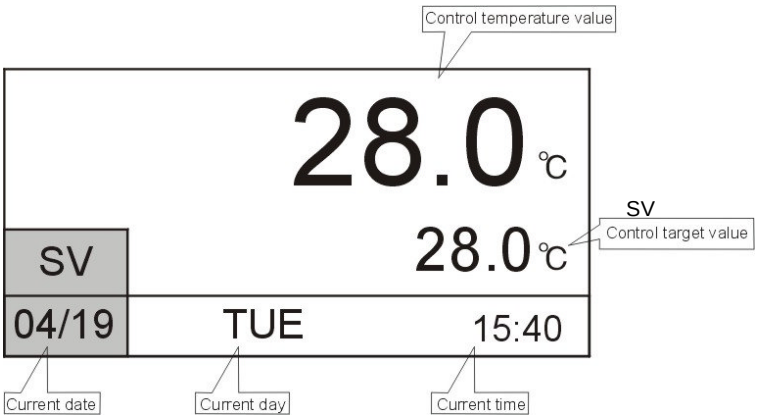
3.9 Menu Introduction



Pictute 3-2: Menu Outline

3.10 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.

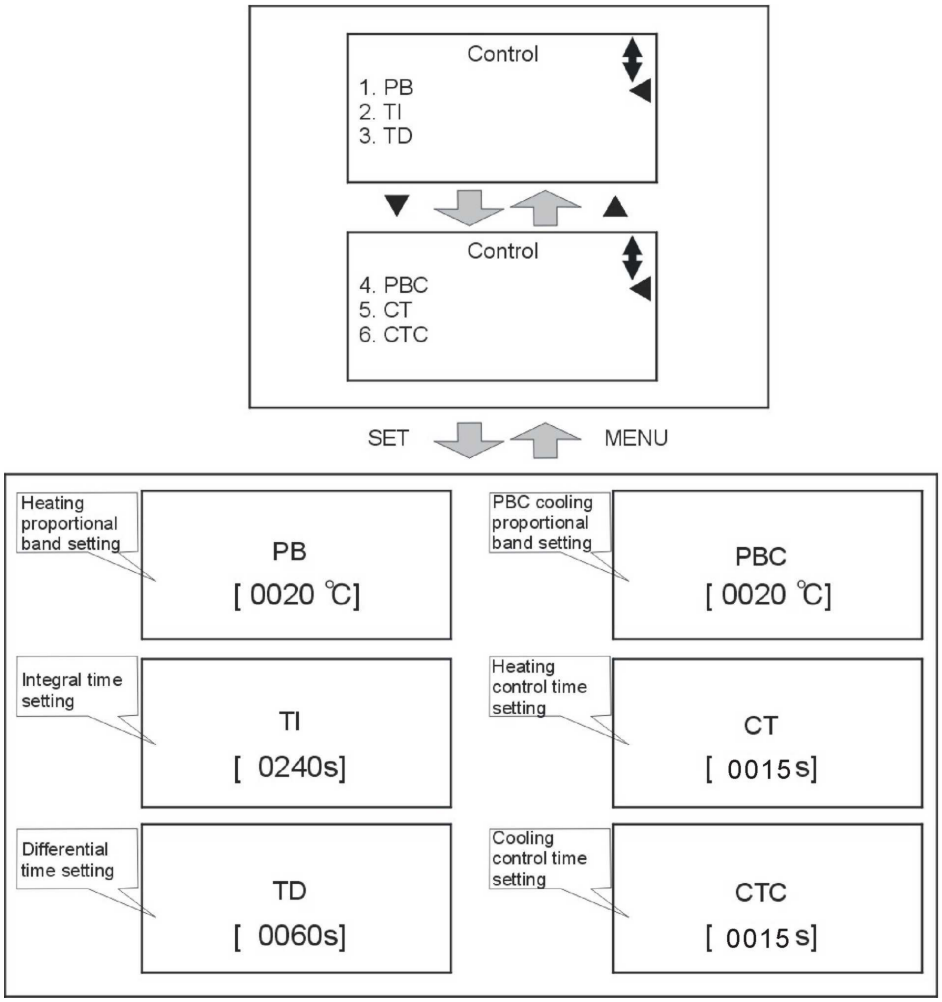


Picture 3-3: Initial Menu

5) Press MENU key to enter menu selection screen, press ◄/► keys to control setting menu, press SET key to enter setting screen, see picture below.

Notes: As mould temperature controller uses the chilled water from the chiller to replenish, it can't start independently, which only can operate after the chiller start.

3.11 Control Menu



Picture 3-4: Control Setting Screen

3.12 Alarm Menu

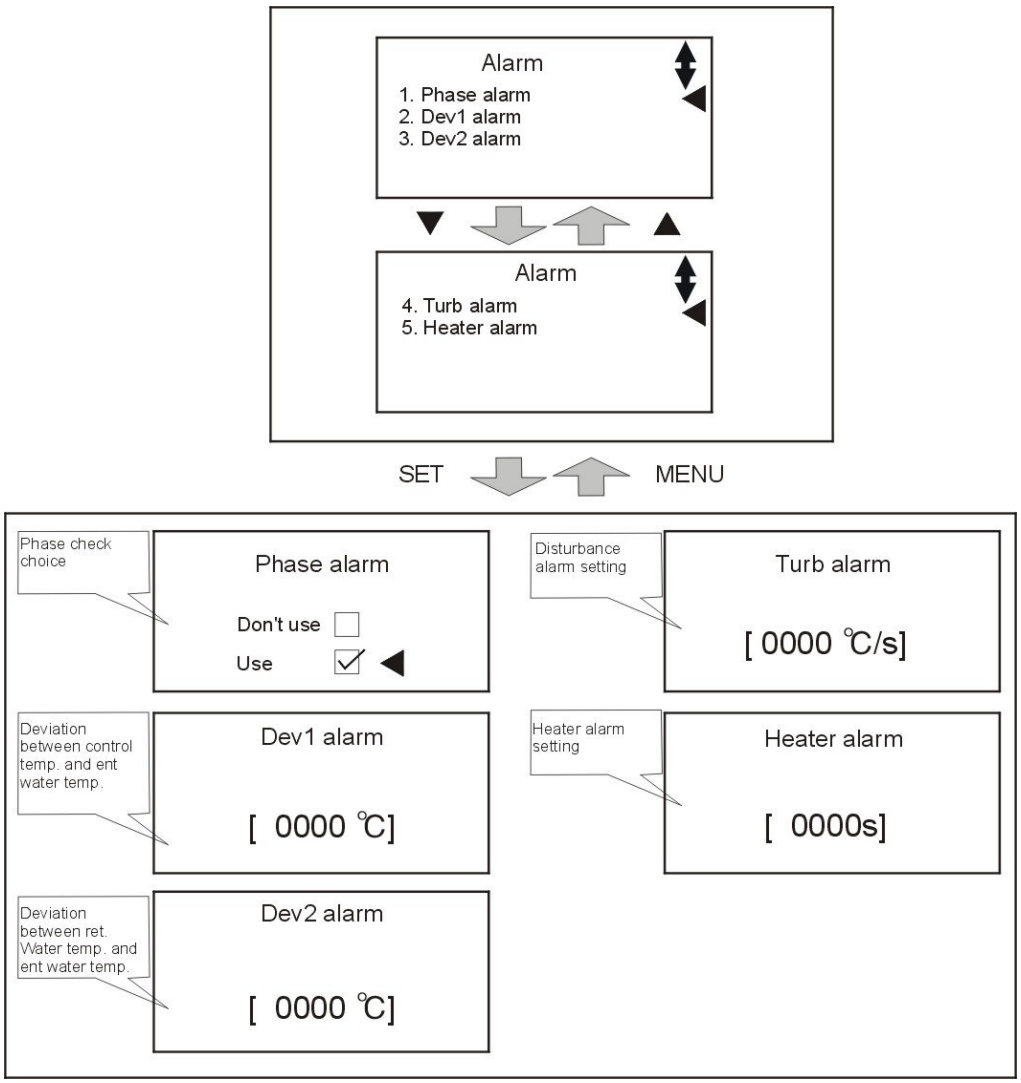
Press MENU key to return menu selection screen, press ◄/► keys to temp. setting menu, press SET key to enter setting screen, as picture. All parameters are as below:

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)

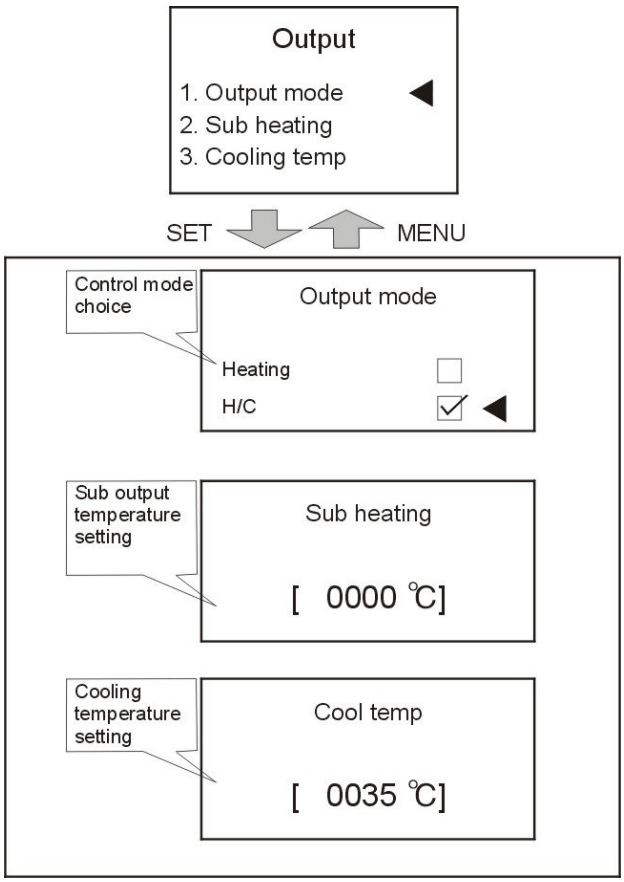
- HEATER ALARM——activate when control temp. doesn't rise up. If default value is 0/ sec., the function is disabled.
- Overheat——exceed permissible upper limit temp. n℃, machine alarms and excitation release enables power off (n is set value, the default is 20℃).



Picture 3-5: Alarm Setting Screen

3.13 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).

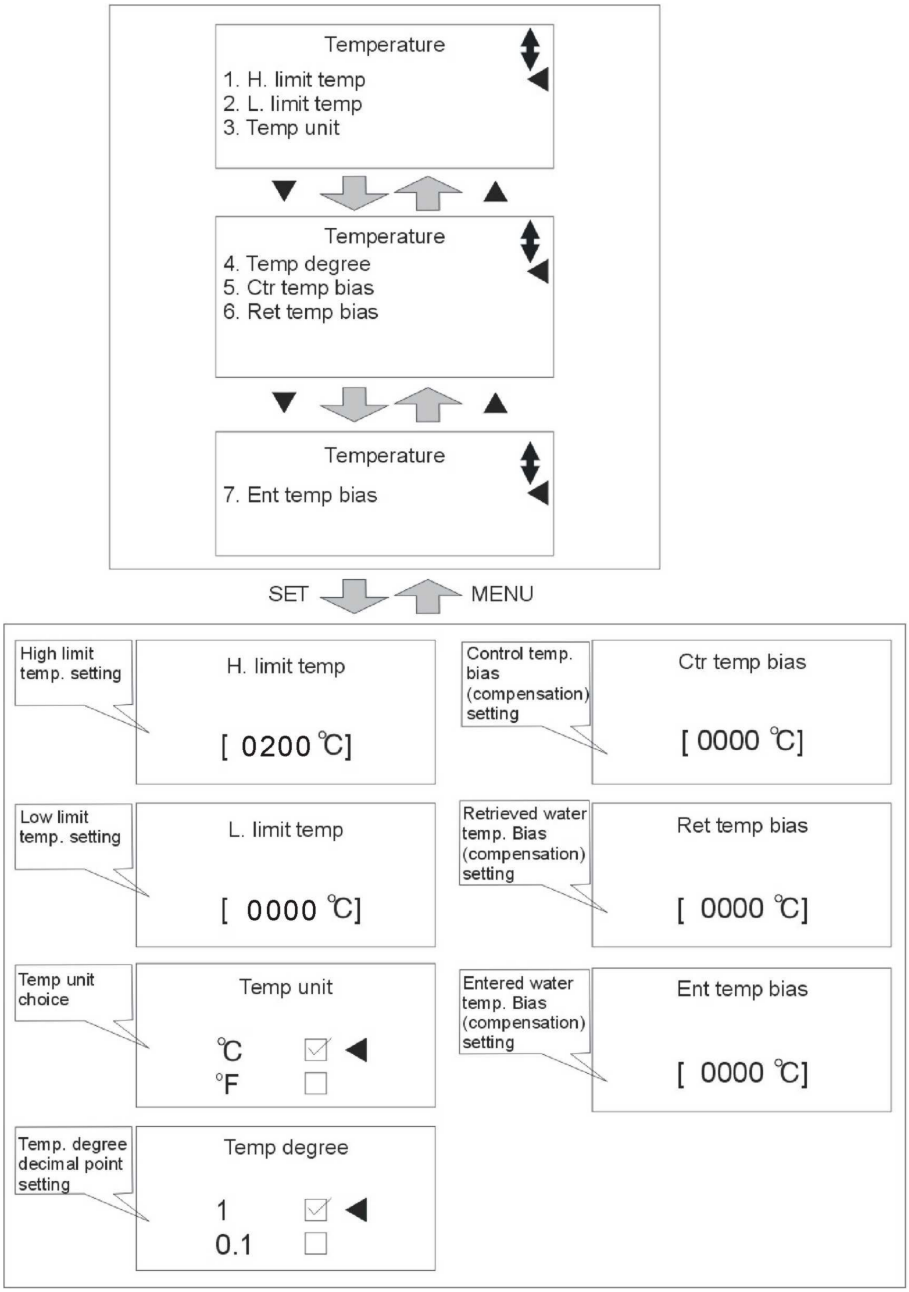


Picture 3-6: Output Setting Screen

3.14 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: 160, STM-HPW: 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.)

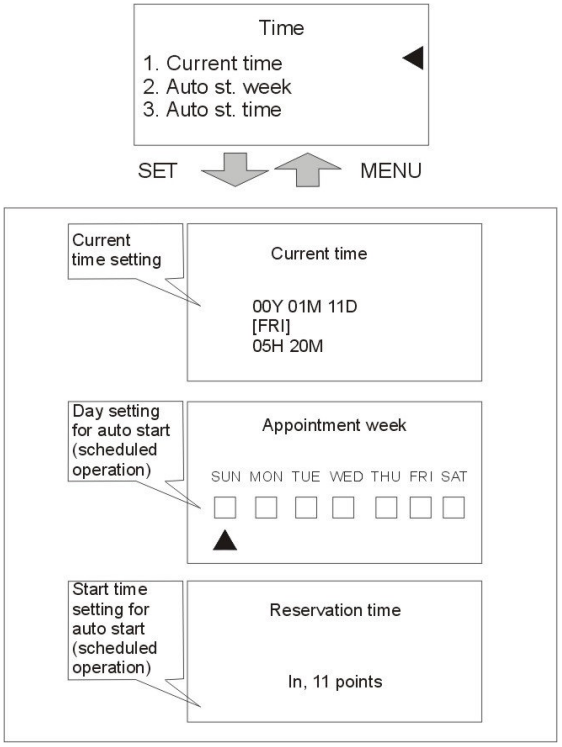


Picture 3-7: Temperature Setting Screen

3.15 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



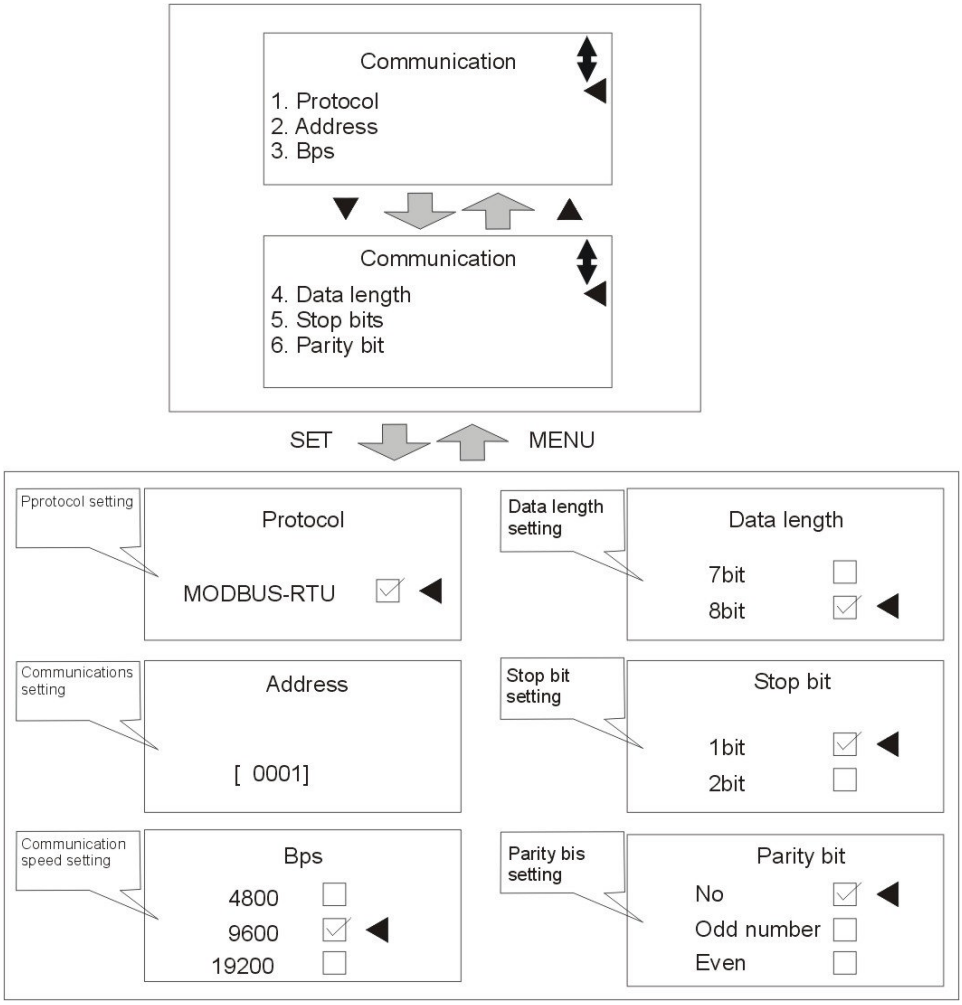
Picture 3-8: Time Setting Screen

3.16 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 3-9: Communication Setting Screen

3.17 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.

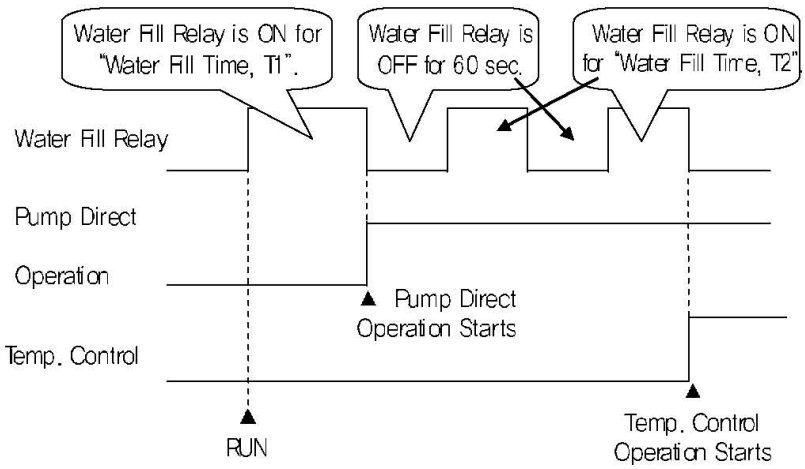
Table 3-3: Water-filling Time of Each Water Unit

Model	STM-607W/W-D/PW /PW-D/HPW/WF STM-910W/W-D//WF	STM-1220W/PW/WF /STM-1213HPW/STM-2440W /STM-2430WF	STM-3650W /STM-3650WF /STM-4875WF
t1	60S	120S	180S
t2	10S	15S	20S

Specific instructions are as follows：

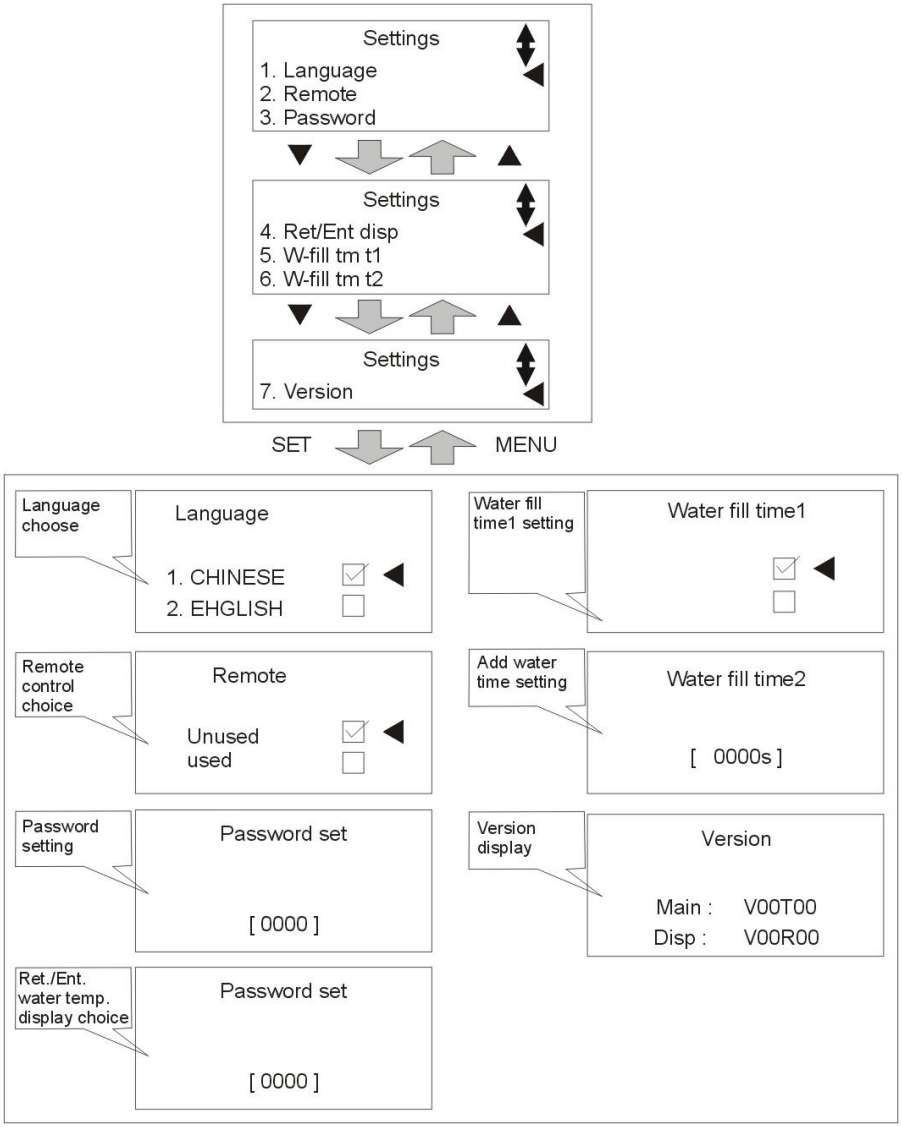
W-fill tm T1=0: press RUN key to start water refilling, when reaches the high water level it starts the pump and heating.

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)

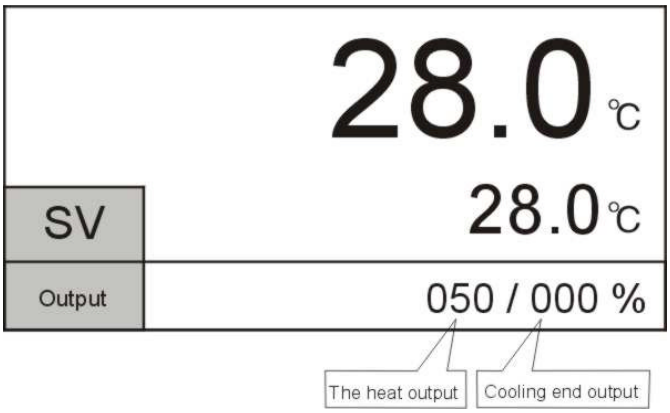
Version: version of control program.



Picture 3-10: Machine Setting Screen

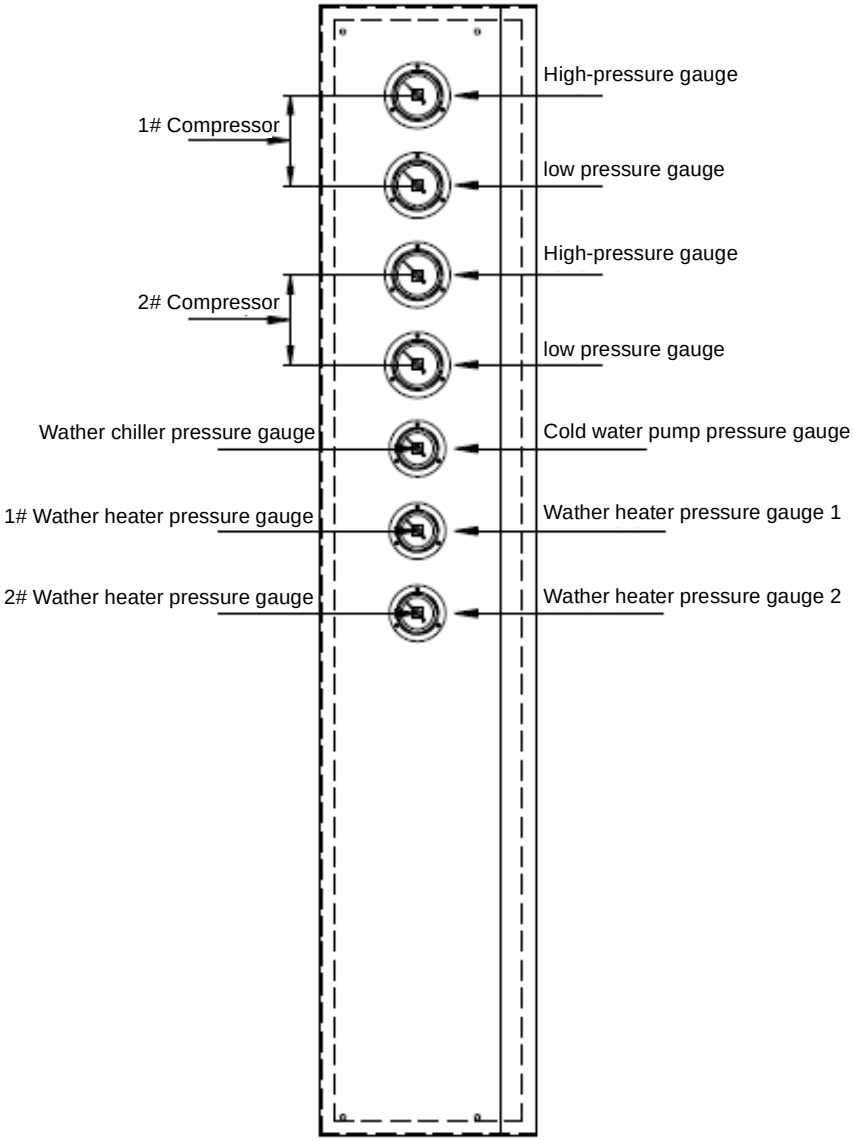
3.18 Input Heating Temperature

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 3-11: Operation Screen

3.19 Table board description



3.20 Safety switch

Picture 3-12: Heater

Picture 3-13: Compressor

Picture 3-14: Compressor anti-freeze switch

Note:

1. The features of mould temperature controller's pressure controller: connect the 2 cm copper pipe to the pressure connection point. The high pressure of the mould temperature controller's pressure controller is set as 8kg, and the low pressure is set as 2kg.

2. The features of compressor's pressure controller: copper capillary is connected at the pressuer connection point.

The high pressure of the compressor pressure controller is set as 20kg, and the low pressure is set as 2kg.

3. The anti-freeze switch has been debugged, which only can be adjusted by qualified maintenance personnel.

4. 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 overheats.	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.	Fill high temp. oil.
Insufficient pressure.	Insufficient water pressure of external water supply. Pressure switch failure.	Increase the water pressure of external water supply. Repaly the pressure switch.
Excess process pressure.	Globe valve of mould circulating water is not open or pipe blockage. Pressure switch failure.	Check the globe valve and pipeline. Repaly the pressure switch.
Temp. window displays “----“	Abnormal sensor.	Check and repair sensor.
Once running, pump output indicator lightens but pump cannot start. After 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.

Failures	Possible reasons	Solutions
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.
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.

Table 4-1: Double Compressor

Fault	Test Conditions	Troubleshooting	Solution
Compressor 1 pressure high	Test when the compressor button has pressed	Stop compressor 1 only without affect other equipments to work.	Check if the input is consistent with the switch setting.
Compressor 1 pressure low	If the [LP Check Delay] is 0, test when the compressor button has pressed;If the [LP Check Delay] is not 0, then compressor 1 runs the test.		
Compressor 1 overload	Compressor 1 runs the test		
Compressor 2 pressure high	Test when the compressor button has pressed	Stop compressor 2 only without affect other equipments to work.	Check if the input is consistent with the switch setting.
Compressor 2 pressure low	If the [LP Check Delay] is 0, test when the compressor button has pressed;If the [LP Check Delay] is not 0, then compressor 2 runs the test.		
Compressor 2 overload	Compressor 2 runs the test		
Water Temp. Low	Runs test	Stop the compressor, and do not stop the pump.	Check if the water temperature is lower than the set temperature of Liquid protection.
Water Temp. High		Stop the compressor, and do not stop the pump.	Check if the water temperature is higher than the set temperature of Liquid protection.
Anti-freeze Err	Power on to test	Stop the compressor, and do not stop the pump.	Check if the antifreeze input is consistent with the switch setting.
Water-temp. Sensor breaks			Check if the temperature probe is in proper contact.
Water-temp. Sensor short circuit			
Anti-freeze Sensor breaks			
Anti-freeze Sensor short circuit			
Anti-freeze temperature is too low		Stop the compressor, and do not stop the pump.	Check if the antifreeze temperature is lower than the set temperature of antifreeze protection
Blower 1 fault (Only applicable for air-cooled series)	Compressor 1 runs the test	Stop the compressor, and do not stop the pump.	Check if the blower 1 fault input input is consistent with the switch setting.
Blower 2 fault (Only applicable for air-cooled series)	Compressor 2 runs the test		Check if the blower 2 fault input input is consistent with the switch setting.
Water flow short	Test after the pump starts for (Pump on delay)time	Stop the unit	Check if the water flow input is consistent with the switch setting
Pump Overload	Test after pump starts	Stop the unit	Check if the pump overload input is consistent with the switch setting.
Phase Err	Power on to test	Stop the unit	Check if there is default phase or anti-phase in the three-phase power input and if the switch is correct.
Water Level Low	Power on to test	Stop the unit	Check if the water level input is consistent with the switch setting.
Need Maintenance	Test after pump starts	The unit connot start once stops(the accumulative operation time of compressor exceeds the set value)	

Table 4-2: Triple,Quadruple Compressor

Fault	Test Conditions	Troubleshooting	Solution
Compressor 1 pressure high	Test when the compressor button has pressed	Stop compressor 1 only without affect other equipments to work.	Check if the input is consistent with the switch setting.
Compressor 1 pressure low	If the [LP Check Delay] is 0, test when the compressor button has pressed;If the [LP Check Delay] is not 0, then compressor 1 runs the test.		
Compressor 1 overload	Compressor 1 runs the test		
Compressor 2 pressure high	Test when the compressor button has pressed	Stop compressor 2 only without affect other equipments to work.	Check if the input is consistent with the switch setting.
Compressor 2 pressure low	If the [LP Check Delay] is 0, test when the compressor button has pressed;If the [LP Check Delay] is not 0, then compressor 2 runs the test.		
Compressor 2 overload	Compressor 2 runs the test		
Compressor 3 pressure high	Test when the compressor button has pressed	Stop compressor 3 only without affect other equipments to work.	Check if the input is consistent with the switch setting.
Compressor 3 pressure low	If the [LP Check Delay] is 0, test when the compressor button has pressed;If the [LP Check Delay] is not 0, then compressor 3 runs the test.		
Compressor 3 overload	Compressor 3 runs the test		
Compressor 4 pressure high	Test when the compressor button has pressed	Stop compressor 4 only without affect other equipments to work.	Check if the input is consistent with the switch setting.
Compressor 4 pressure low	If the [LP Check Delay] is 0, test when the compressor button has pressed;If the [LP Check Delay] is not 0, then compressor 4 runs the test.		
Compressor 4 overload	Compressor 4 runs the test		
Water Temp. Low	Test after pump starts	Stop the compressor, and do not stop the pump.	Check if the water temperature is lower than the set temperature of Liquid protection.
Water Temp. High		Stop the compressor, and do not stop the pump.	Check if the water temperature is higher than the set temperature of Liquid protection.
Anti-freeze Err	Power on to test	Stop the compressor, and do not stop the pump.	Check if the antifreeze input is consistent with the switch setting.
Water-temp. Sensor breaks			Check if the temperature probe is in proper contact.
Water-temp. Sensor short circuit			
Anti-freeze Sensor breaks			
Anti-freeze Sensor short circuit			
Anti-freeze temperature is too low		Stop the compressor, and do not stop the pump.	Check if the antifreeze temperature is lower than the set temperature of antifreeze protection

Fault	Test Conditions	Troubleshooting	Solution
Blower 1 fault (Only applicable for air-cooled series)	Compressor 1 runs the test	Stop the compressor, and do not stop the pump.	Check if the blower 1 fault input input is consistent with the switch setting.
Blower 2 fault (Only applicable for air-cooled series)	Compressor 2 runs the test		Check if the blower 2 fault input input is consistent with the switch setting.
Blower 3 fault (Only applicable for air-cooled series)	Compressor 3 runs the test		Check if the blower 3 fault input input is consistent with the switch setting.
Blower 4 fault (Only applicable for air-cooled series)	Compressor 4 runs the test		Check if the blower 4 fault input input is consistent with the switch setting.
Water flow short	Test after the pump starts for (Pump on delay)time	Stop the unit	Check if the water flow input is consistent with the switch setting
Pump Overload	Test after pump starts	Stop the unit	Check if the pump overload input is consistent with the switch setting.
Phase Err	Power on to test	Stop the unit	Check if there is default phase or anti-phase in the three-phase power input and if the switch is correct.
Water Level Low	Power on to test	Stop the unit	Check if the water level input is consistent with the switch setting.
Need Maintenance	Test after pump starts	The unit connot start once stops(the accumulative operation time of compressor exceeds the set value)	