

Operation manual

SR981S/SR982S

Solar Pump Station



Please read this manual carefully before using!

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1. Safety information

1.1 Important information

We have carefully checked the text and pictures of this manual and provided the best of our knowledge and ideas, however inevitable errors maybe exist. Please note that we cannot guarantee that this manual is given in the integrity of image and text, they are just some examples, and they apply only to our own system. Incorrect, incomplete and erroneous information and the resulting damage we do not take responsibility. Please understanding!

1.2 About this manual

This manual describes the installation, functions and operation of a solar station, which integrates a solar controller. When installing the remaining components e.g. the solar collectors and the storage unit, please be sure to observe the appropriate installation instructions provided by each manufacturer. Installation, electrical connection, commissioning and maintenance of the device may only be performed by trained professional personnel. The professional personnel must be familiar with this manual and follow the instructions contained herein.

1.3 Liability waiver

The manufacturer can't monitor the compliance with these instructions or the circumstances and methods used for installation, operation, utilization and maintenance of this pump station. Improper installation can cause damages to material and person. This is the reason why we do not take over responsibility and liability for losses, damages or cost that might arise due to improper installation, operation or wrong utilization and maintenance or that occur in some connection with the aforementioned. Moreover we do not take over liability for patent infringements or infringements – occurring in connection with the use of this pump station on the third parties rights. The manufacturer preserves the right to put changes to product, technical date or installation and operation instructions without prior notice. As soon as it becomes evident that safe operation is no longer possible (e.g. visible damage). Please immediate take the device out of operation. Note: ensure that the device can't be accidentally placed into operation.

1.4 Description of symbols

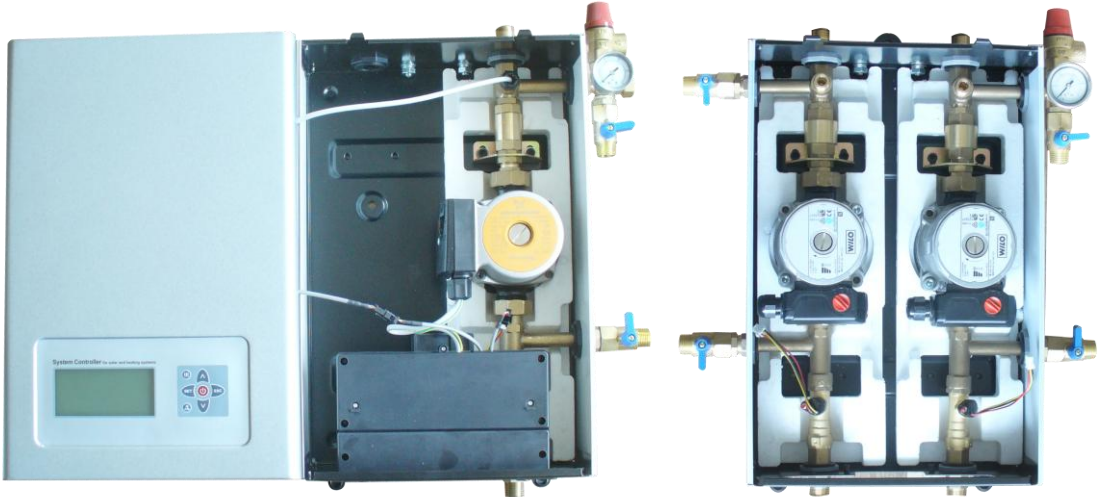


Safety indication: Safety instructions in the text are marked with a warning triangle. They indicate measures which can lead to injury of person or safety risks.

Operation steps: small triangle “▶” is used to indicate operation step.

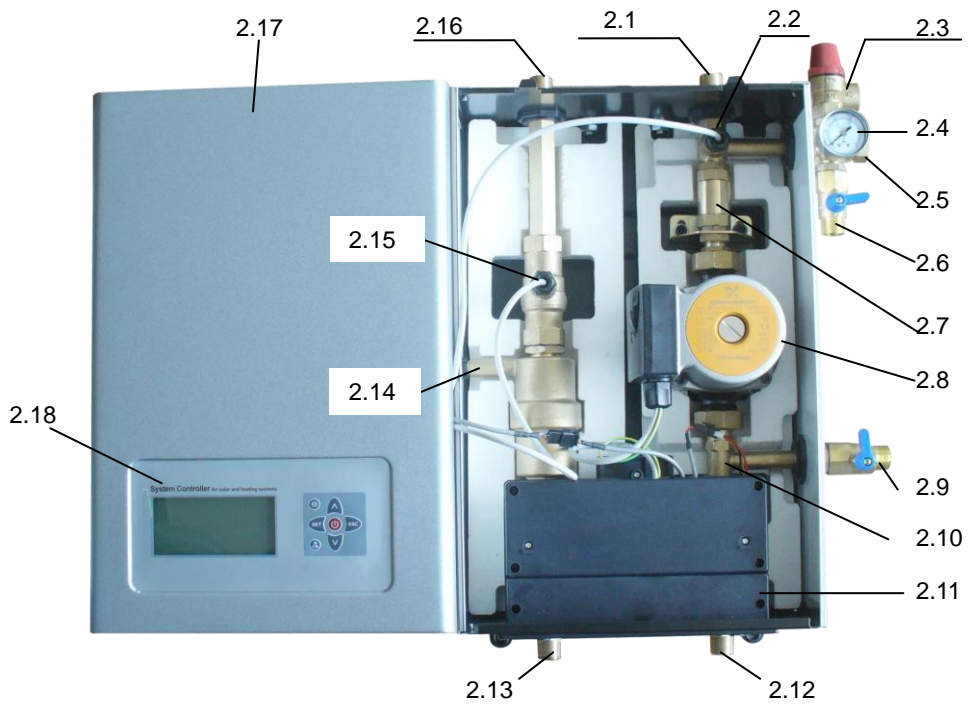
Notes: Contains important information about operation or functions.

2. Overview of solar station



SR981S Single Line Pump Station

SR982P Double Pumps Station



SR982S Double Lines Pump Station

2.1	Collector flow pipe connections, male thread G1/2(to collector)
2.2	Sensor on the tank output pipe, NTC10K, B=3950
2.3	Safety valve, release pressure 6 bar
2.4	Pressure gauge, measuring range: 0~10bar system pressure
2.5	Expansion connection, male thread G1/2
2.6	Filling valve connection, male thread G1/2
2.7	One – way stop valve
2.8	Circulation pump (for solar liquid)
2.9	Draining valve connection, male thread G1/2
2.10	Electrical flow meter
2.11	Connection terminal box of built-in controller
2.12	Tank output pipe connection (from tank), male thread G1/2
2.13	Tank input pipe connection(to tank), male thread G1/2 (not on SR981S single pipe pump station)
2.14	Manual and automatic combined air separator (not on SR981S single pipe pump station)
2.15	Sensor on the collector return pipe (high temperature) NTC10K, B=3950 (not on SR981S single pipe pump station)
2.16	Collector return pipe connection, male thread G1/2 (from collector) (not on SR981S single pipe pump station)
2.17	Front cover of pump station
2.18	Display and control panel of built-in controller

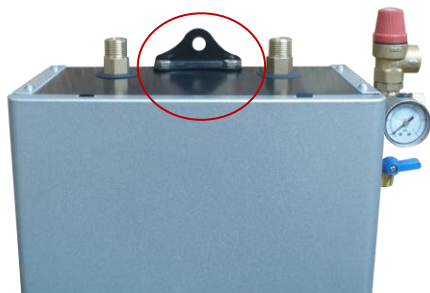
2.19 Specification of pump station

Components	Parameters	Remark
Size of pump station		
Height (not include the pipe connection)	420mm	
Width (not include the pipe connection)	280mm	
Thickness (not include the pipe connection)	155mm	
Safety components		
Pressure of safety valve	6bar	
Display range of pressure gauge	0~10bar	
Connection of expansion vessel	G1/2,male thread	
Maximum permission pressure	10 bar	
Maximum permission temperature	115 °C	
Pump parameter		
Pump type	Wilo RS15/6	Grundfos 15-65
Maximum flow rate	2.5(t/h)	2.5(t/h)
Maximum water head	5.5m	5.5m

Maximum operation pressure	10bar	10bar
Suitable liquid temperature range	-10~110°C	-10~110°C
Stop units		
Ball valve size	G1/2	
One – way stop valve		
Withstand pressure	0~16bar	
Maximum permission temperature	-20~110°C	
Flow meter		
Measuring range	0.1~20L/min	
Manual/automatic air separator		Not on SR981S
Filling/draining connection unit		
Connection size	G1/2	
Insulation		
Insulation material	EPS	
Built-in solar controller	see controller manual part	
Sensor on collector return pipe	NTC10K, B=3950	Not on SR981S
Sensor on collector flow pipe	NTC10K, B=3950	

3. Mounting the solar station

- ▶ Drill the upper fixing hole
- ▶ Fasten the screw, hang the station(Picture1)
- ▶ Mark the bottom fixing hole(Picture2)
- ▶ Drill the bottom hole
- ▶ Fasten the bottom screw

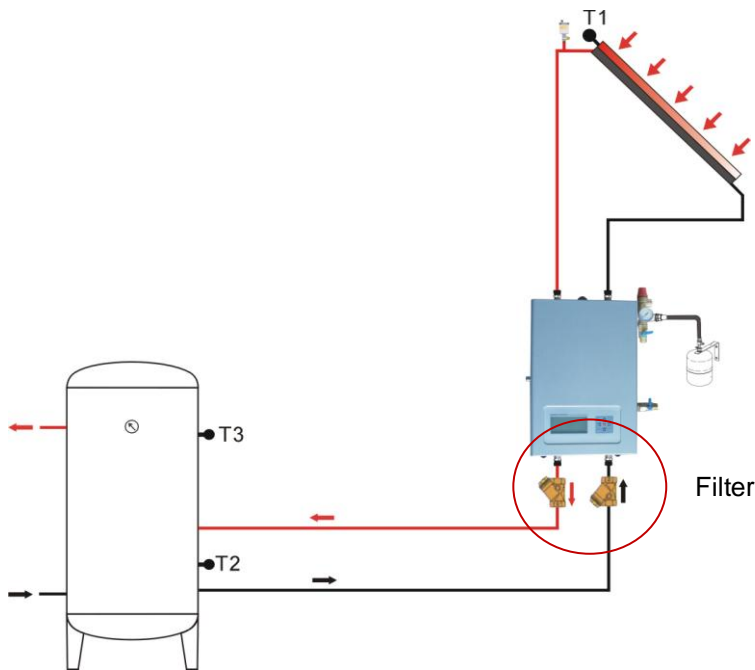


Picture1



Picture2

4. Attention Items for solar station installation



Note: In order to avoid jam the digital flow meter and in result to displays no flow on solar station, the filter must be installed on the return and flow pipeline of solar station.

- All devices connected to the controller must conform to the technical specifications of the controller, assembly, installation and maintenance work may only be performed by properly qualified and authorized personnel with a generally recognized qualification.
- The solar station must be installed indoors, prior to installation, remove sealing caps from solar station.
- According to the manual of expansion vessel to install and adjust it, the pipeline for connecting pump station and expansion vessel should be not insulated.
- Safety valve: Risk of scalding from hot steam with discharge from the safety valve due to heating and excess pressure in the hydraulic pipes. Using a copper pipe to drain the discharged liquid from the safety valve to the barrel and disposed it in an eco-friendly

way, according to valid technical regulations and local codes, do not allow solar fluid to leak into the environment.

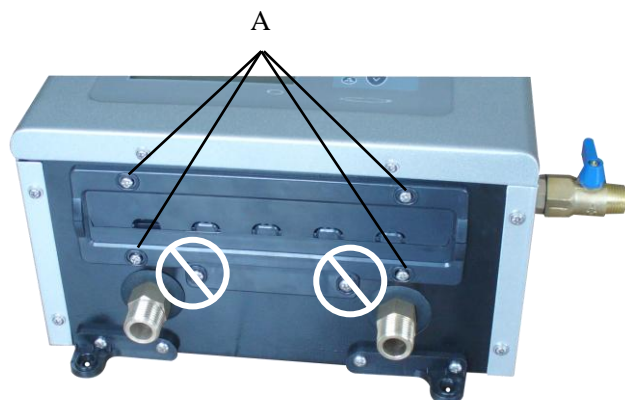
- Be careful of scald from hot fluid. Maximum temperature of collectors during filling/leak check or installation/maintenance should be below 70°C, allow collectors to cool down if necessary.
- Please ensure hydraulic connections are pressure-tight, connections pipe should be insulated, and unused connections must be sealed tightly with a suitable end plug.
- Air-separator: if the system is pressure-tight (no leakage), connect the power supply to the solar controller, using the manual mode of controller to circuit system for 15 minutes, then switch-off power supply, solar fluid is heated gradually, air dissolved in fluid is released out, through air –separator to release air. If necessary, repeats this process until no more air is vented out. If the system pressure drops due to over air release, then it is necessary to refilling fluid to the required pressure.
- After filling the system, please check safety valve according to its manual.
- All safety regulations for working on the power supply are valid, All installation and maintenance work should be performed when power is switched-off.

5. Connection terminal of built-in controller

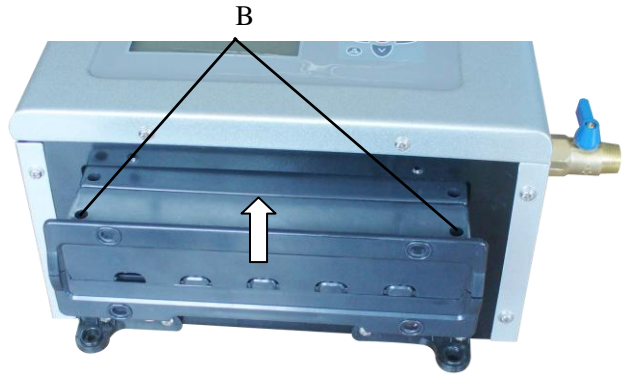
5.1 Open the connection terminal box

► Loosen the 4 fixing screws (picture A) which are on the back of connection box.

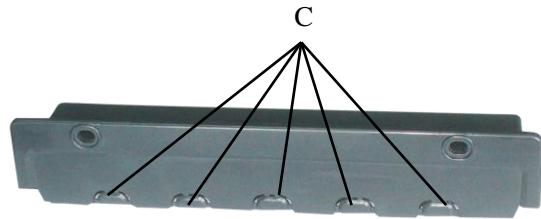
Note: 2 screws inside circle are for fixing the box, not need to loosen it.



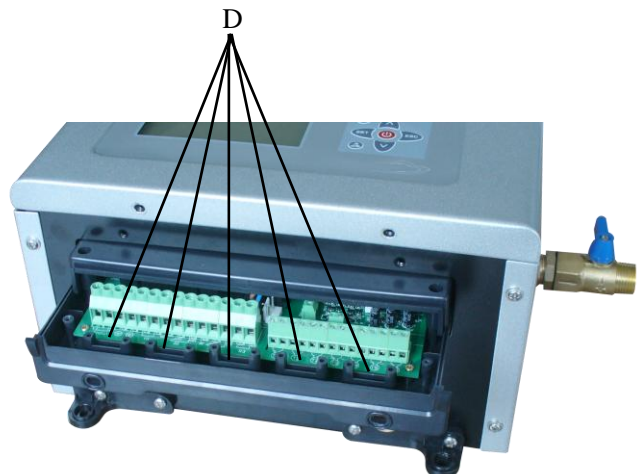
- ▶ Parallel pull out the connection box downwards parallel.
- ▶ Loosen the protection screw (picture B), open the cover of terminal upwards



- ▶ Using proper tools (like knife) to take out the plastic (picture C) piece, wires can penetrate connection terminal through pre-prepared holes.

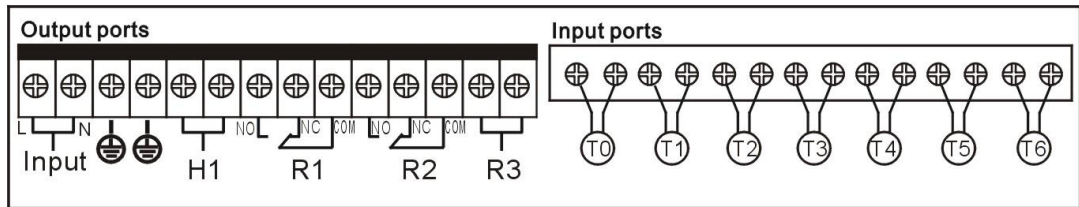


Note: Please use delivered clamps to fix wires correctly. (Picture D)



5.2 Terminal connection

- Terminal ports layout



- Power connection

Input: for power connection, L is for live wire, N is for neutral line.

 is for connection with ground.

- Input ports

Input T0 ~ T1: PT1000 temperature sensor, for measuring the collector temperature

Input T2~T6: NTC10K, B=3950 temperature sensor, for measuring tank and pipeline temperature

Note: T7、T8 pipeline temperature sensors have been wired on built controller,so no position on the input ports(SR981S NO T8).

- **Advice regarding the installation of temperature sensors:**

- ① Only original factory equipped Pt1000 temperature sensors are approved for using with the collector, it is equipped with 1.5meters silicon cable and suitable for all weather conditions, the cable is temperature resistant up to 280°C, not necessary to distinguish the positive and negative polarity of the sensor connection.
- ② Only original factory equipped NTC10K,B=3950 temperature sensors are approved for using with tank and pipe, it is equipped with 1.5m PVC cable, and the cable is temperature resistant up to 105°C, not necessary to distinguish the positive and negative polarity of the sensor connection.
- ③ All sensor cables carry low voltage, and to avoid inductive effects, must not be laid close to 230 volt or 400 volt cables (minimum separation of 100mm).
- ④ If external inductive effects are existed, e.g. from heavy current cables, overhead train cables, transformer substations, radio and television devices, amateur radio stations, microwave devices etc, then the cables to the sensors must be adequately shielded.

⑤ Sensor cables may be extended to a maximum length of ca. 100 meters, when cable's length is up to 50m, and then 0.75mm² cable should be used. When cable's length is up to 100m, and then 1.5mm² cables should be used.

● Output ports

Output R1: electromagnetic relay, max. switching current 3.5A

Output R2: electromagnetic relay, max. switching current 3.5A

Output R3: electromagnetic relay, max. switching current 3.5A

Output H1: electromagnetic relay, max. switching current 3.5A, (for back-up heat source)

Note: P1、 P2 solar pumps have been wired on built controller,so no position on the output ports.

6. Operation manual of built-in controller

6.1 Operation button



Set button



Exit/confirm



upwards



downwards



ON/OFF button



manual heating















Holiday button

Note:

- Connect the sensors, pumps or switching valves to the controller before you connect the power.
- After power is switched on, you can set time, password, select system and relevant parameters.

6.2 Signal description

Signal on the display screen shows the current status. Its meaning is explained in following table.

Signal status	Display	Flashing display
		Back-up electrical heater is in active
		Collector safety temperature function is in active
		 Tank urgent stop function is in active
	Collector low temperature protection function is in active	
		Collector frost protection function is in active
		Tank re-cooling function is in active Collector cooling function is in active
	Tank high temperature protection function is in active	
	Tank thermostat function is triggered	Tank thermostat function is in active
	Manual function is in active	
	Holiday function is in active	

6.3 Set up clock/week

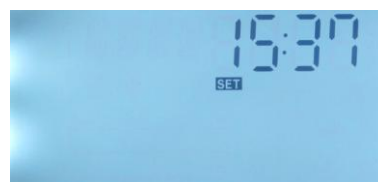
▶ Press “SET” button, “TIME” displays on the screen.



▶ Press” SET” button, hour area “00” blinks on the screen.

▶ Press“ ^ v ” button to adjust hour.

▶ Repress “SET” button, minute area “00” blinks.



▶ Press“ ^ v ” button to adjust minute.

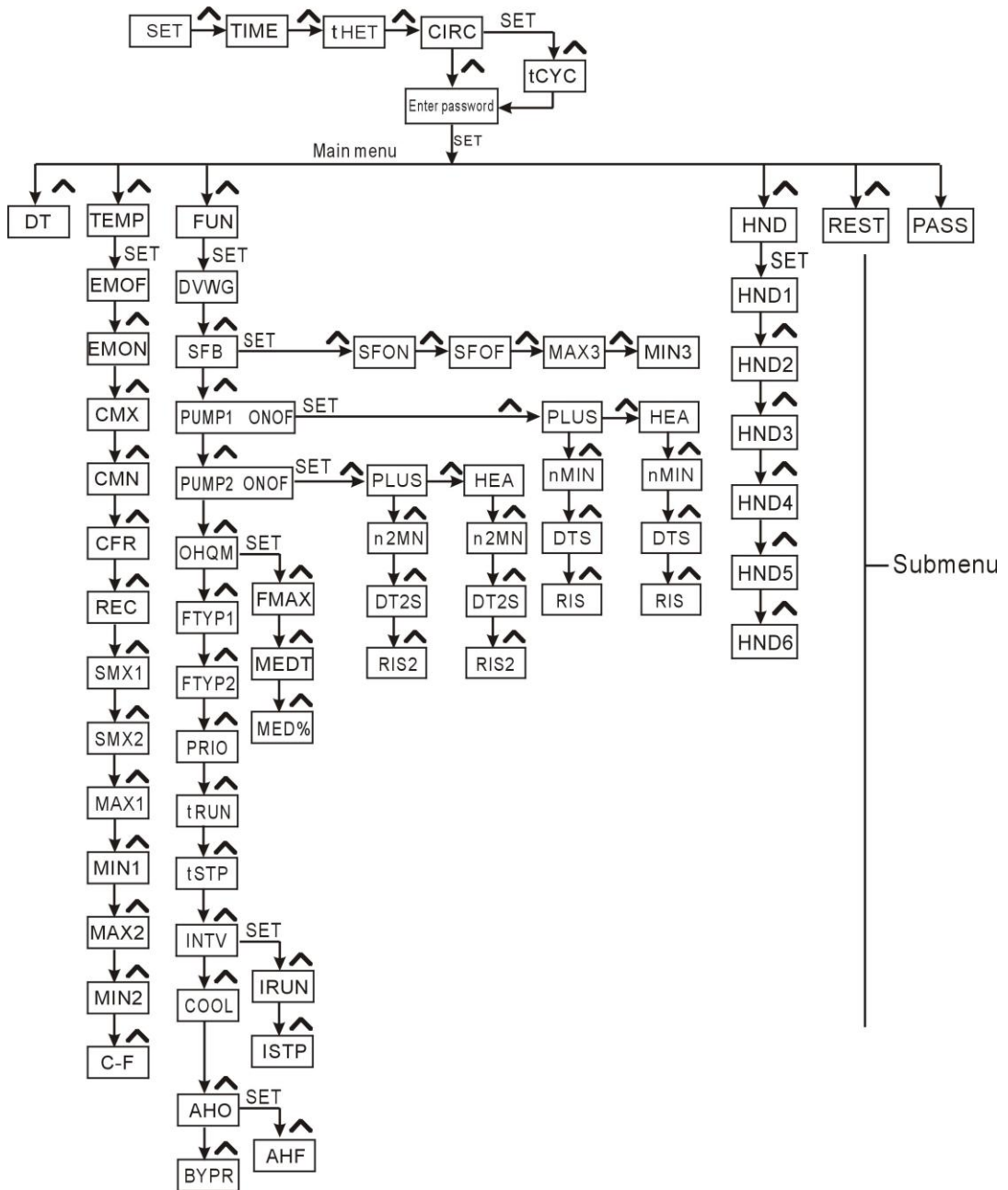
▶ Repress “SET” button to adjust week, week area “MO” blinks.

▶ Press“ ^ v ” button, to adjust week.

▶ Press “ESC” to exit setup menu, or wait for 20 seconds to exit, set parameters are saved automatically.

Code	Weekday
MO	Monday
TU	Tuesday
WE	Wednesday
TH	Thursday
FR	Friday
SA	Saturday
SU	Sunday

6.4 Menu structure



Note: according to the different of system, menu structure of the system may be different.

Submenu: Through submenu you can setup more detailed, please make sure to understand the content in submenu.

6.5 Menu description

Code Main menu	Code Submenu	Code Submenu	Description
SCH			System
DT			Temperature difference
TEMP			Temperature (for setup relevant temperature parameters)
	EMOF		The maximum switch-off temperature of collector
	EMON		The maximum switch-on temperature of collector
	CMX		The maximum temperature of collector (Collector cooling function)
	CMN		Low temperature protection of collector
	CFR		Frost protection temperature of collector
	REC		Cooling temperature of Tank
	SMX1		Maximum temperature of tank 1
	SMX2		Maximum temperature of tank 2
	MAX1		Maximum switch-off temperature (for heat transfer between tank and heating circuit)
	MIN1		Minimum switch-on temperature (for heat transfer between tank and heating circuit)
	MAX2		Maximum switch-off temperature (for heat transfer between heat exchanger and tank)
	MIN2		Minimum switch-on temperature (for heat transfer between heat exchanger and tank)
	C_F		Switch between Celsius and Fahrenheit
FUN			Auxiliary functions
	DVWG		Anti legionnaires' bacteria function
	SFB		Solid fuel boiler function
		SFON	Minimum switch-on temperature of tank
		SFOF	Maximum switch-off temperature of tank
		MAX3	Maximum switch-off temperature of solid fuel

			boiler
		MIN3	Minimum switch-on temperature of solid fuel boiler
	PUMP1		Running mode of circulation pump 1(ONOF,PLUS,HEA)
		nMIN	Speed adjustment of pump 1 (RPM control function)
		DTS	Standard temperature difference of pump 1 (for speed adjustment)
		RIS	Gain for circulation pump 1 (for speed adjustment)
	PUMP2		Running mode of circulation pump 2(ONOF,PLUS,HEA)
		n2MN	Speed adjustment of pump 2 (RPM control function)
		DT2S	Standard temperature difference of pump 2 (for speed adjustment)
		RIS2	Gain for circulation pump 2 (for speed adjustment)
	OHQM		Thermal energy measuring
	FTYPE1		Flow meter type 1 selection
	FTYPE2		Flow meter type 2 selection
		FMAX	Flow rate
		MEDT	Heat transfer liquid type
		MED%	Concentration of heat transfer liquid
	PRIO		Priority of tank
		tRUN	Interval heating run-on time
		tSTP	Interval heating run-off time
	INTV		Intermission function
		IRUN	Pump intermission run-on time
		ISTP	Pump intermission run-off time
	COOL		Tank re-cooling function
	AHO		Switch-on temperature of thermostat function

		AHF	Switch-off temperature of thermostat function
	BYPR		Bypass (high temperature)
HDN			Manual controlling
REST			Recovery to factory set
PASS			Password setup

6.6 System overview



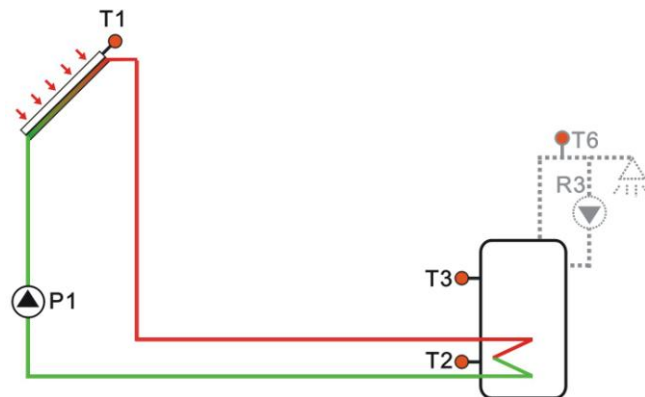
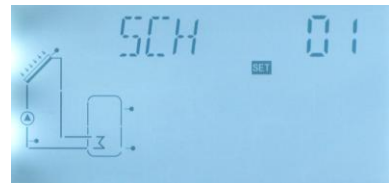
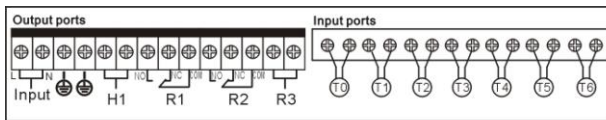
6.7 System description

Note: T3 is an alternative sensor, when no sensor (T3) is installed on the top part of tank, controller will use the signal of sensor T2 automatically to control the auxiliary heating or the circulation pump.

System 1: Standard system - 1 tank

Description:

The solar circuit pump (P1) is switched on as soon as the switch-on temperature difference (DT1O) between the collector array (T1) and the storage tank (T2) is reached. If the temperature difference between the collector array (T1) and storage tank (T2) drops below the switch-off temperature difference (DT1F), or the temperature of storage tank reaches its preset maximum storage temperature, then the solar circuit pump (P1) is switched off.



Input ports	Description	Output ports	Description
T1	Sensor of Collector	P1	Pump for solar circuit P1
T2	Sensor on the bottom part of tank		
T3	Sensor on the top part of tank	H1	Back-up heat resource
T6	DHW sensor	R3	Pump for DHW circuit
T7	Sensor on the return pipe		
T8	Sensor on the flow pipe(SR981S no)		

List of available auxiliary functions in this system (functions are selectable)

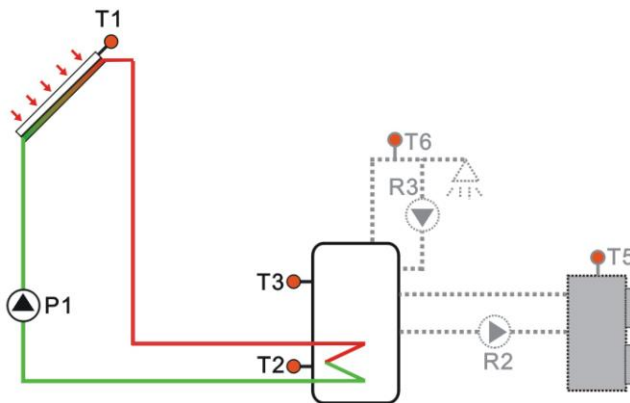
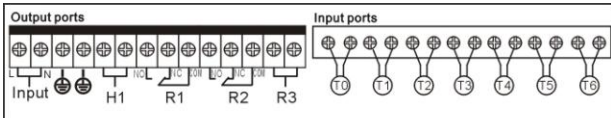
Input ports	Description	Output ports	Description
T4	Sensor of thermostat function	R1	Selectable: (COOL) tank cooling (AHO) thermostat; (BYPR) pipe bypass
T5	Sensor on the solid fuel boiler	R2	Pump for solid fuel boiler (see Paragraph 8.5.2)

Above mentioned auxiliary functions should be activated in menu in advance.

System 2: 1 tank + 1 solid fuel boiler

Description:

The solar circuit pump (P1) is switched on as soon as the switch-on temperature difference (DT1O) between the collector array (T1) and the storage tank (T2) is reached. If the temperature difference between the collector array (T1) and storage tank (T2) drops below the switch-off temperature difference (DT1F), or the temperature of storage tank reaches its preset maximum storage temperature, then the solar circuit pump (P1) is switched off.



Input ports	Description	Output ports	Description
T1	Sensor of Collector	P1	Pump for solar circuit
T2	Sensor on the bottom part of tank		
T3	Sensor on the top part of tank	H1	Back-up heat resource
T5	Sensor on the solid fuel boiler	R2	Pump for solid fuel boiler
T6	DHW sensor	R3	Pump for DHW circuit
T7	Sensor on the return pipe		
T8	Sensor on the flow pipe(SR981S no)		

List of available auxiliary functions in this system (functions are selectable)

Input ports	Description	Output ports	Description
T4	Sensor of thermostat function	R1	Selectable: (COOL) tank cooling (AHO) thermostat (BYPR) pipe bypass

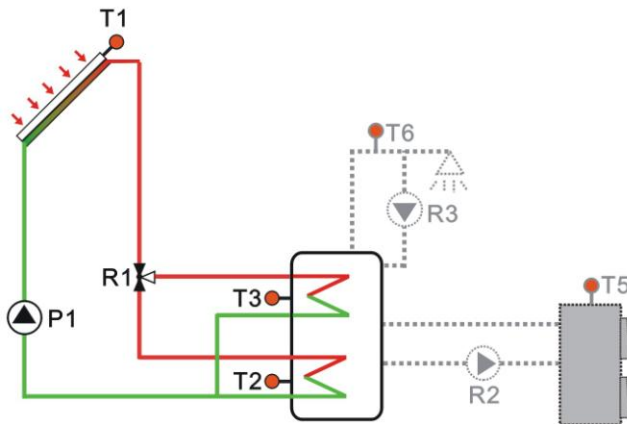
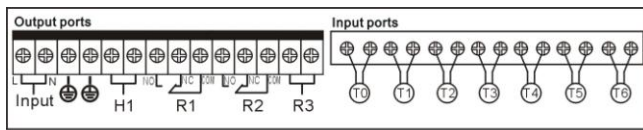
Above mentioned auxiliary functions should be activated in menu in advance.

System 3: 1 tank + T-valve to heat tank in layer

Description:

Controller compares the temperature of collector T1 and temperature of tank T2 and T3, if the temperature difference between collector and tank is over the preset switch-on temperature difference (T1 & T2 is corresponding DT1O, T1 & T3 is corresponding DT2O), then pump P1 is switched-on, and simultaneously, T-valve is switched to heat the corresponding tank part, when the switch-off temperature difference between collector and part reaches (T1 & T2 is corresponding DT1F, T1& T3 is corresponding DT2F) or the tank temperature reaches to its maximum value, then P1,R1 are ceased.

Tank priority logic will decide to heat bottom part of tank firstly.



Input ports	Description	Output ports	Description
T1	Sensor of Collector	P1	Pump for solar circuit
T2	Sensor on the bottom part of tank	H1	Back-up heat resource
T3	Sensor on the top part of tank	R1	For T-valve to heat tank different part
T6	DHW sensor	R3	Pump for DHW circuit
T7	Sensor on the return pipe		
T8	Sensor on the flow pipe(SR981S no)		

List of available auxiliary functions in this system (functions are selectable)

Input ports	Description	Output ports	Description
T5	Sensor on the solid fuel boiler	R2	Pump for solid fuel boiler(See Paragraph 8.5.2)

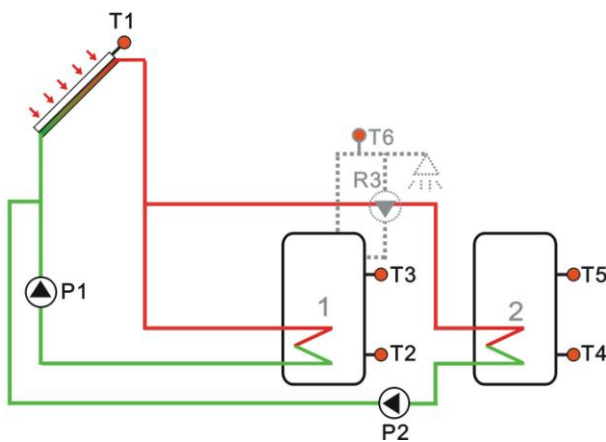
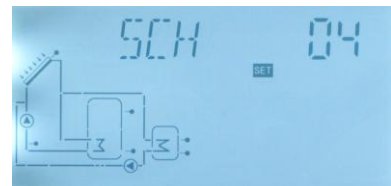
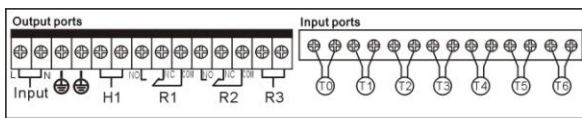
Above mentioned auxiliary functions should be activated in menu in advance.

System 4: 2 tanks controlled by pump logic

Description:

Controller compares the T1 temperature of collector and T2 temperature of tank 1, or and T4 temperature of tank 2, when either one of 2 temperature differences reaches its switch-on temperature difference (T1&T2 corresponding DT1O, T1&T4 corresponding DT2O) then the corresponding pump P1 or P2 is triggered. Tank is heated, until tank's temperature reaches to its preset maximum value, or when temperature difference (T1&T2 corresponding DT1F, T1&T4 corresponding DT2F) drops to the preset switch-off value, then P1 and P2 are ceased.

Tank priority logic will decide to heat tank1 firstly.



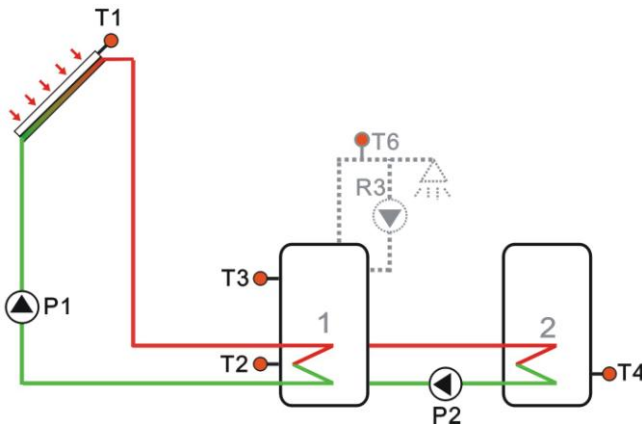
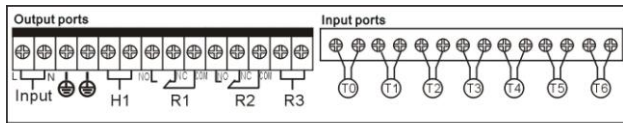
Input ports	Description	Output ports	Description
T1	Sensor of Collector	P1	Pump 1 for tank 1's solar circuit
T2	Sensor on the bottom part of tank 1	P2	Pump 2 for tank2's solar circuit
T3	Sensor on the top part of tank 2	H1	Back-up heat resource
T4	Sensor on the bottom part of tank 2		
T5	Sensor on the top part of tank 2		
T6	DHW sensor	R3	Pump for DHW circuit
T7	Sensor on the return pipe		
T8	Sensor on the flow pipe(SR981S no)		

System 5: 2 tanks controlled by thermal energy transfer logic

Description:

Controller compares the T1 temperature of collector and T2 temperature of tank 1, when this temperature difference reaches its switch-on value, then pump P1 is switch-on to heat tank, until tank 1's temperature reaches to its preset maximum value, or when temperature difference drops to the preset switch-off value, then P1 is ceased.

Another temperature difference between T1 and T4 (corresponding DT2O, DT2F) controls the pump P2, to transfer the stored thermal energy from tank1 to tank 2. See 8.4.8/8.4.9 items to know detailed operations.



Input ports	Description	Output ports	Description
T1	Sensor of Collector	P1	Pump 1 for tank 1's solar circuit
T2	Sensor on the bottom part of tank 1	P2	Pump 2 for thermal energy transfer from tank 1 to tank2
T3	Sensor on the top part of tank 2	H1	Back-up heat resource
T4	Sensor on the bottom part of tank 2		
T6	DHW sensor	R3	Pump for DHW circuit
T7	Sensor on the return pipe		
T8	Sensor on the flow pipe(SR981S no)		

List of available auxiliary functions in this system (functions are selectable)

Input ports	Description	Output ports	Description
		R1	(COOL) tank cooling function
T5	Sensor on the solid fuel boiler	R2	Pump for solid fuel boiler(See Paragraph 8.5.2)

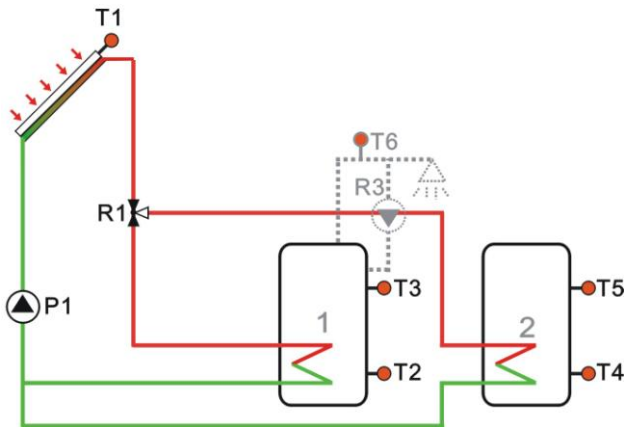
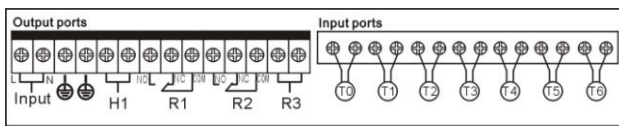
Above mentioned auxiliary functions should be activated in menu in advance.

System 6: 2 tanks controlled by T-valve logic

Description:

Controller compares the T1 temperature of collector and T2 temperature of tank 1, or and T4 temperature of tank 2, when either one of 2 temperature differences reaches its switch-on temperature difference (T1&T2 corresponding DT1O, T1&T4 corresponding DT2O) , then the pump P1 is triggered, and simultaneously, T-Valve R1 switches its direction to the corresponding tank; tank is heated, until tank’s temperature reaches to its preset maximum value, or when temperature difference (T1&T2 corresponding DT1F, T1&T4 corresponding DT2F) drops to the preset switch-off value, then P1 and R1 are ceased.

Tank priority logic will decide to heat tank1 firstly.

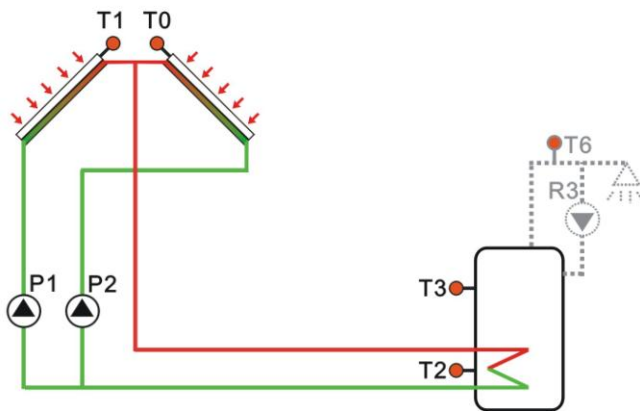
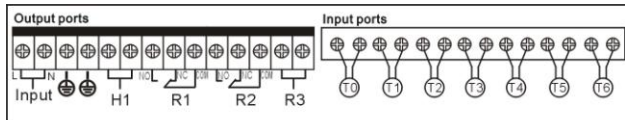


Input ports	Description	Output ports	Description
T1	Sensor of Collector	P1	Pump 1 for tank 1's solar circuit
T2	Sensor on the bottom part of tank 1	R1	T-Valve switched tank1 or tank 2
T3	Sensor on the top part of tank 2	H1	Back-up heat resource
T4	Sensor on the bottom part of tank 2		
T5	Sensor on the top part of tank 2		
T6	DHW sensor	R3	Pump for DHW circuit
T7	Sensor on the return pipe		
T8	Sensor on the flow pipe(SR981S no)		

System 7: East/West collector array + 1 tank controlled by pump logic

Description:

Controller compares the temperature of east/west collector array T0, T1 and tank temperature T2, when temperature difference reaches its switch-on value (DT10), then P1 ,P2 is triggered , they keeps running until tank temperature reaches its maximum value or when temperature difference drops to its switch-off value, then P1, P2 is ceased.



Input ports	Description	Output ports	Description
T0	Sensor of west collector array	P1	Pump 1 for collector array circuit
T1	Sensor of east collector array	P2	Pump 2 for collector array circuit
T2	Sensor on the bottom part of tank		
T3	Sensor on the top part of tank	H1	Back-up heat resource
T6	DHW sensor	R3	Pump for DHW circuit
T7	Sensor on the return pipe		
T8	Sensor on the flow pipe(SR981S no)		

List of available auxiliary functions in this system (functions are selectable)

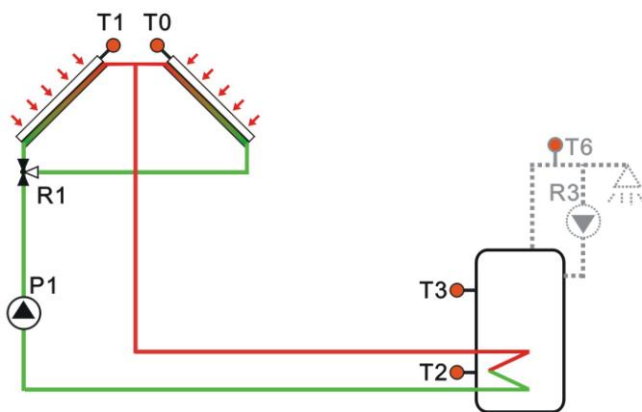
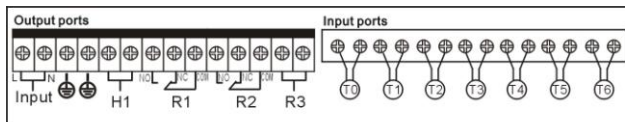
Input ports	Description	Output ports	Description
T4	Sensor of thermostat function	R1	Selectable: (COOL) tank cooling (AHO) thermostat
T5	Sensor on solid fuel boiler	R2	Pump for solid fuel boiler

Above mentioned auxiliary functions should be activated in menu in advance.

System 8: East/West collector array + 1 tank controlled by T-Valve logic

Description:

Controller compares the temperature of east/west collector array T0, T1 and tank temperature T2, when temperature difference reaches its switch-on value (DT1O), then P1 is triggered, and simultaneously, T-valve R1 switches its direction to the corresponding collector array (and priority circuit is T1 collector array), they keeps running until tank temperature reaches its maximum value or when temperature difference drops to the switch-off value, then P1, R1 is ceased.



Input ports	Description	Output ports	Description
T0	Sensor of west collector array		
T1	Sensor of east collector array	P1	Pump 1 for collector array circuit
T2	Sensor on the bottom part of tank	R1	For T-valve
T3	Sensor on the top part of tank	H1	Back-up heat resource
T6	DHW sensor	R3	Pump for DHW circuit
T7	Sensor on the return pipe		
T8	Sensor on the flow pipe(SR981S no)		

List of available auxiliary functions in this system (functions are selectable)

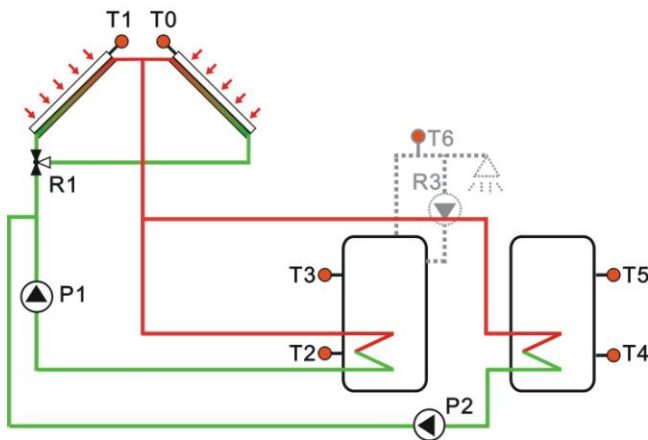
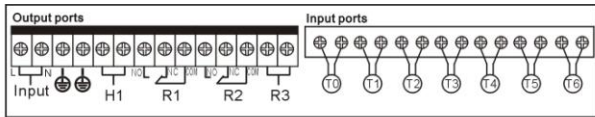
Input ports	Description	Output ports	Description
T5	Sensor on solid fuel boiler	R2	Pump for solid fuel boiler (See Paragraph 8.5.2)

Above mentioned auxiliary functions should be activated in menu in advance.

System 9: East/West collector array + 2 tanks controlled by T-Valve logic

Description:

Controller compares the temperature between east/west collector array T0, T1 and T2 of tank 1, T4 of tank 2, when temperature difference reaches its switch-on value (T0,T1 and T2 corresponding DT1O, T0,T1 and T4 corresponding DT2O), then P1,P2 are triggered, and simultaneously, T-valve R1 switches its direction to the corresponding collector array (and priority circuit is T1 collector array), they keeps running until tank temperature reaches its maximum value or when temperature difference (T0,T1 and T2 corresponding DT1F; T0,T1 and T4 corresponding DT2F) drops to the switch-off value, then P1, P2, R1 is ceased.



Input ports	Description	Output ports	Description
T0	Sensor of west collector array		
T1	Sensor of east collector array	P1	Pump 1 for collector array circuit
T2	Sensor on the bottom part of tank 1	R1	For T-valve
T3	Sensor on the top part of tank 1	H1	Back-up heat resource
T4	Sensor on the bottom part of tank 2		
T5	Sensor on the top part of tank 2	P2	Pump 1 for collector array circuit
T6	DHW sensor	R3	Pump for DHW circuit
T7	Sensor on the return pipe		
T8	Sensor on the flow pipe(SR981S no)		

System 10: 1 tank + T-valve controlled by return heating

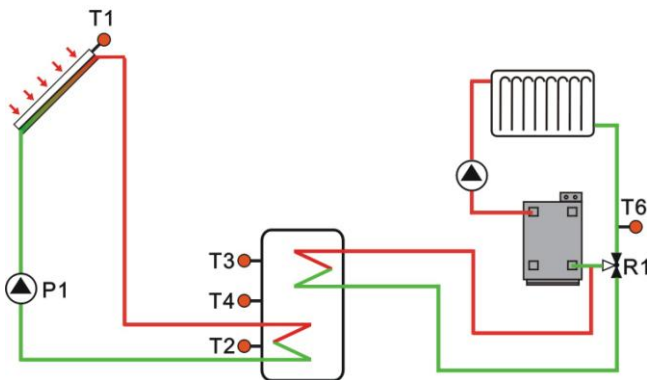
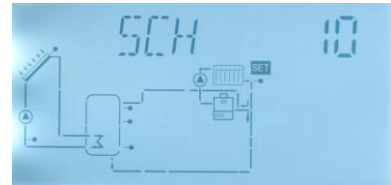
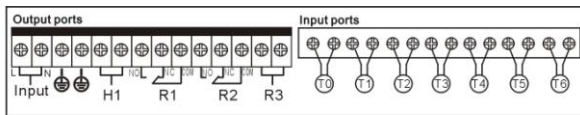
Description:

Controller compares the temperature between T1 of collector array and T2 of tank, when temperature difference reaches its switch-on value (DT1O), then P1 is triggered, tank is heated until tank temperature reaches its maximum value or when temperature difference (DT1F) drops to the switch-off value, then P1 is ceased.

Another temperature difference between T4 and T6 (DT2O/DT2F) to control T-valve R1 to heat the heating return by solar.

Note: when T4 is not installed, then temperature difference between T3, T6 (DT2O/DT2F) is used to control T-valve R1
 When T3, T4 are not installed, then temperature difference between T2, T6 (DT2O/DT2F) is used to control T-valve R1

See detailed in 8.4.8/8.4.9



Input ports	Description	Output ports	Description
T1	Sensor of collector array		
T2	Sensor on the bottom part of tank	P1	Pump 1 for collector array
T3	Sensor on the top part of tank	H1	Back-up heat resource
T4	Sensor on the middle part of tank		
T6	Sensor on the heating return pipe	R1	T-valve for heat the heating return
T7	Sensor on the return pipe		
T8	Sensor on the flow pipe(SR981S no)		

List of available auxiliary functions in this system (functions are selectable)

Input ports	Description	Output ports	Description
T5	Sensor on solid fuel boiler	R2	Pump for solid fuel boiler (See Paragraph 8.5.2)

Above mentioned auxiliary functions should be activated in menu in advance.

System 11: East/west collector array +1 tank + T-valve controlled by return heating

Description:

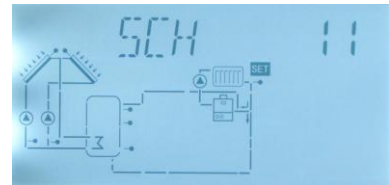
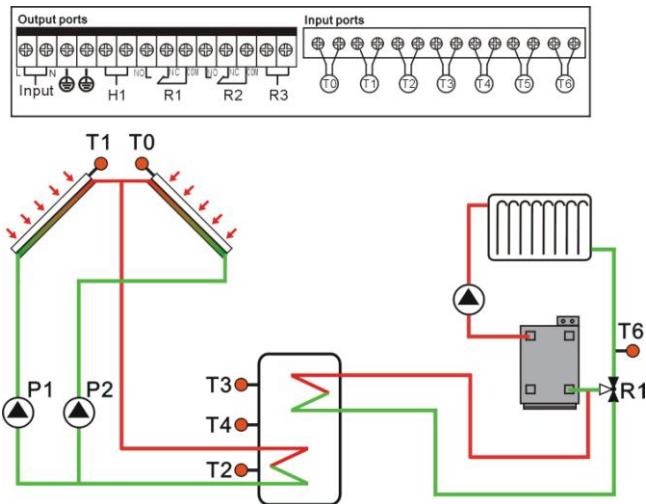
Controller compares the temperature between T0,T1 of west/east collector array and T2 of tank, when temperature difference reaches its switch-on value (DT1O), then corresponding pump P1,P2 are triggered, tank is heated until tank temperature reaches its maximum value or when temperature difference (DT1F) drops to the switch-off value, then P1,P2 are ceased.

Another temperature difference between T4 and T6 (DT2O/DT2F) to control T-valve R1 to heat the heating return by solar.

Note: when T4 is not installed, then temperature difference between T3, T6 (DT2O/DT2F) is used to control T-valve R1

When T3, T4 are not installed, then temperature difference between T2, T6 (DT2O/DT2F) is used to control T-valve R1

See detailed in 8.4.8/8.4.9



Input ports	Description	Output ports	Description
T0	Sensor of west collector array	P2	Pump 2 for collector array circuit
T1	Sensor of east collector array	P1	Pump 1 for collector array circuit
T2	Sensor on the bottom part of tank		
T3	Sensor on the top part of tank	H1	Back-up heat resource
T4	Sensor on the middle part of tank		
T6	Sensor on the heating return pipe	R1	T-valve for heat the heating return
T7	Sensor on the return pipe		
T8	Sensor on the flow pipe(SR981S no)		

List of available auxiliary functions in this system (functions are selectable)

Input ports	Description	Output ports	Description
T5	Sensor on solid fuel boiler	R2	Pump for solid fuel boiler (See Paragraph)

Above mentioned auxiliary functions should be activated in menu in advance.

System 12: Standard solar system with heat exchanger

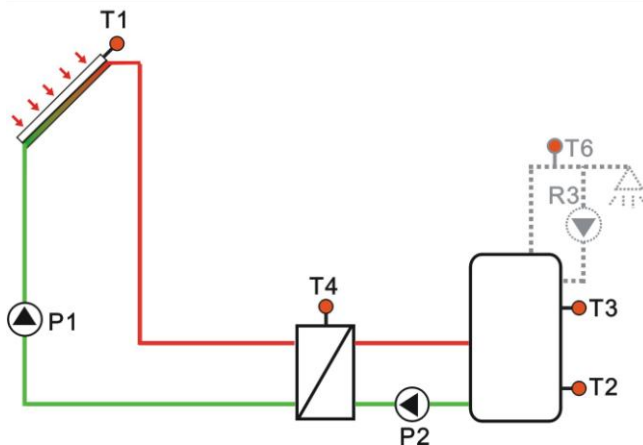
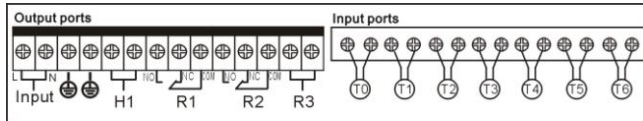
Description:

Controller compares the temperature between T1 of collector array and T2 of tank, when temperature difference reaches its switch-on value (DT1O), then corresponding pump P1 is triggered, tank is heated until tank temperature reaches its maximum value or when temperature difference (DT1F) drops to the switch-off value, then P1 is ceased.

Another temperature difference between T4 and T2 (DT1O/DT1F) to control pump P2 to heat tank.

Note: when T4 is not installed, then temperature difference between T1 of collector and T2 of tank reaches the switch-on value, P1 and P2 are switched-on at the same time, tank is heated until tank temperature reaches its maximum value or when temperature difference (DT1F) drops to the switch-off value, then P1and P2 are ceased also at the same time.

See detailed in 8.4.8/8.4.9



Input ports	Description	Output ports	Description
T1	Sensor of collector array	P1	Pump 1 for collector array circuit
T2	Sensor on the bottom part of tank	P2	Pump 2 for heat exchanger
T3	Sensor on the top part of tank	H1	Back-up heat resource
T4	Sensor on the heat exchanger		
T6	DHW sensor	R3	Pump for DHW circuit
T7	Sensor on the return pipe		
T8	Sensor on the flow pipe(SR981S no)		

List of available auxiliary functions in this system (functions are selectable)

Input ports	Description	Output ports	Description
T5	Sensor on solid fuel boiler	R2	Pump for solid fuel boiler (See Paragraph 8.5.2)

Above mentioned auxiliary functions should be activated in menu in advance.

System 13: 2 tanks controlled by T-valve logic + T-valve for return heating

Description:

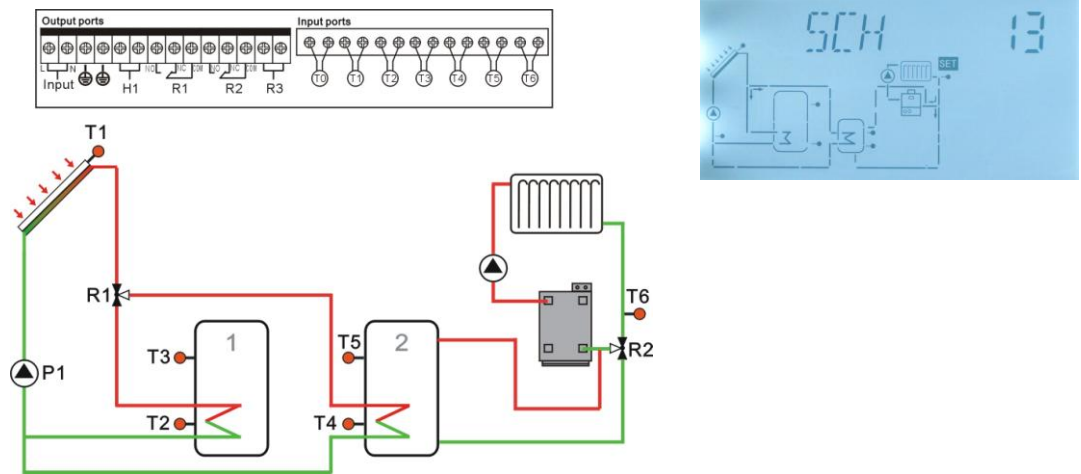
Controller compares the temperature between T1 of collector array and T2 of tank 1 or T4 of tank 2, when temperature difference reaches its switch-on value (T1&T2 corresponding DT1O, T1&T4 corresponding DT2O), then pump P1 is triggered, and simultaneously, T-valve switches to its direction to heat the corresponding tank, tank is heated until tank temperature reaches its maximum value or when temperature difference (T1&T2 corresponding DT1F) or (T1&T4 corresponding DT2F) drops to the switch-off value, then P1,R1 are ceased.

Tank priority logic will decide to heat tank1 firstly.

Another temperature difference between T5 and T6 (DT3O/DT3F) to control pump R2 to heat the heating return by solar.

Note: when T5 is not installed, then temperature difference between T4, T6 (DT2O/DT2F) is used to control T-valve R2

See detailed in 8.4.8/8.4.9



Input ports	Description	Output ports	Description
T1	Sensor of collector array		
T2	Sensor on the bottom part of tank 1	P1	Pump 1 for collector array circuit
T3	Sensor on the top part of tank 1 (optional)	H1	Back-up heat resource
T4	Sensor on the bottom part of tank 2	R1	T-valve switched between tank 1 and tank2
T5	Sensor on the top part of tank 2 (optional)		
T6	Sensor on heating return	R2	T-valve for heat the heating return
T7	Sensor on the return pipe		
T8	Sensor on the flow pipe(SR981S no)		

System 14: 2 tanks controlled by pump logic + T-valve for return heating

Description:

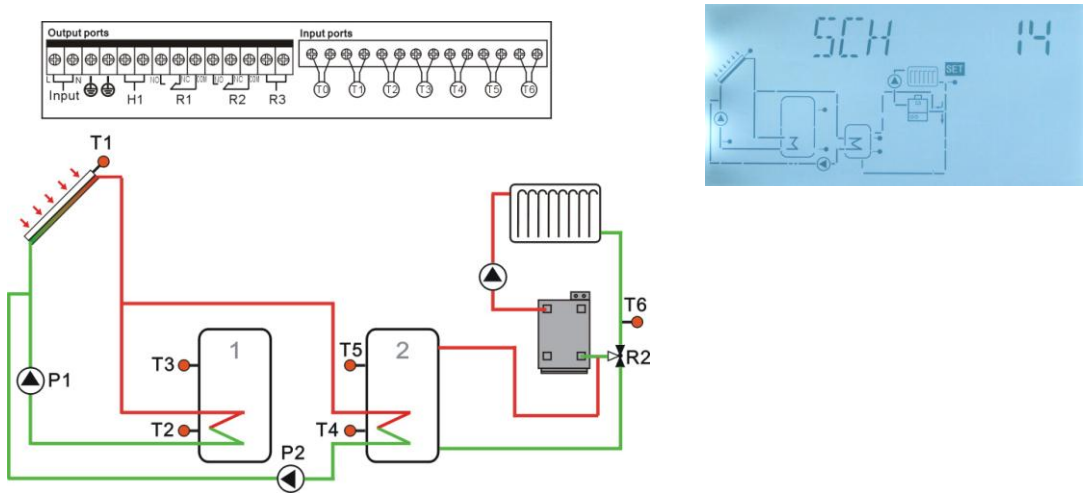
Controller compares the temperature between T1 of collector array and T2 of tank 1 or T4 of tank 2, when temperature difference reaches its switch-on value (T1&T2 corresponding DT1O, T1&T4 corresponding DT2O), then pump P1, P2 are triggered, tank is heated until tank temperature reaches its maximum value or when temperature difference (T1&T2 corresponding DT1F) or (T1&T4 corresponding DT2F) drops to the switch-off value, then P1, P2 are ceased.

Tank priority logic will decide to heat tank1 firstly.

Another temperature difference between T5 and T6 (DT3O/DT3F) to control pump R2 to heat the heating return by solar.

Note: when T5 is not installed, then temperature difference between T4, T6 (DT3O/DT3F) is used to control T-valve R2

See detailed in 8.4.8/8.4.9



Input ports	Description	Output ports	Description
T1	Sensor of collector array		
T2	Sensor on the bottom part of tank 1	P1	Pump 1 for tank 1 circuit
T3	Sensor on the top part of tank 1	H1	Back-up heat resource
T4	Sensor on the bottom part of tank 2	P2	Pump 1 for tank 2 circuit
T5	Sensor on the top part of tank 2		
T6	Sensor on heating return	R2	T-valve for heat the heating return
T7	Sensor on the return pipe		
T8	Sensor on the flow pipe(SR981S no)		

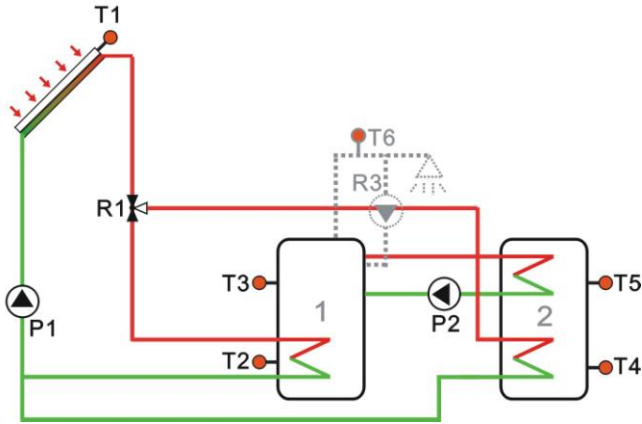
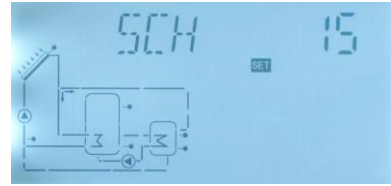
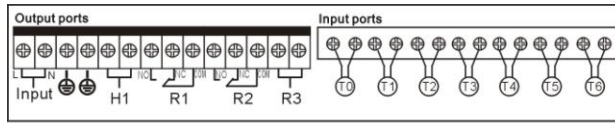
System 15: 2 tanks controlled by T-valve logic + heat transfer between 2 tanks

Description:

Controller compares the temperature between T1 of collector array and T2 of tank 1 or T4 of tank 2, when temperature difference reaches its switch-on value (T1&T2 corresponding DT1O, T1&T4 corresponding DT2O), then pump P1 is triggered, and simultaneously, T-valve switches to its direction to heat the corresponding tank, tank is heated until tank temperature reaches its maximum value or when temperature difference (T1&T2 corresponding DT1F) or (T1&T4 corresponding DT2F) drops to the switch-off value, then P1,R1 are ceased.

Tank priority logic will decide to heat tank1 firstly.

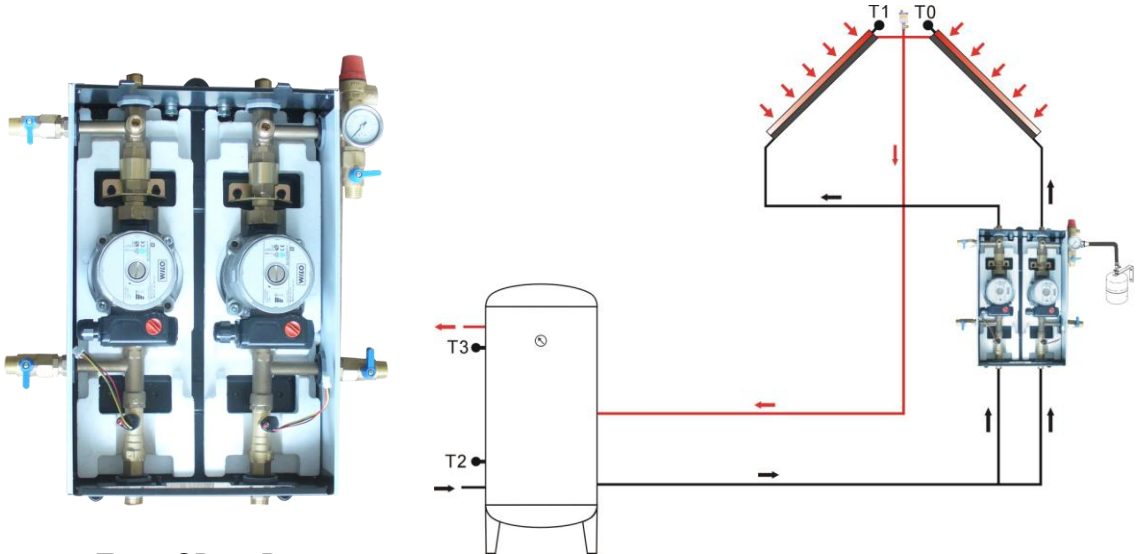
Another temperature difference between T4 and T3 (DT2O/DT2F) to control pump P2 to transfer thermal energy from tank1 to tank 2.



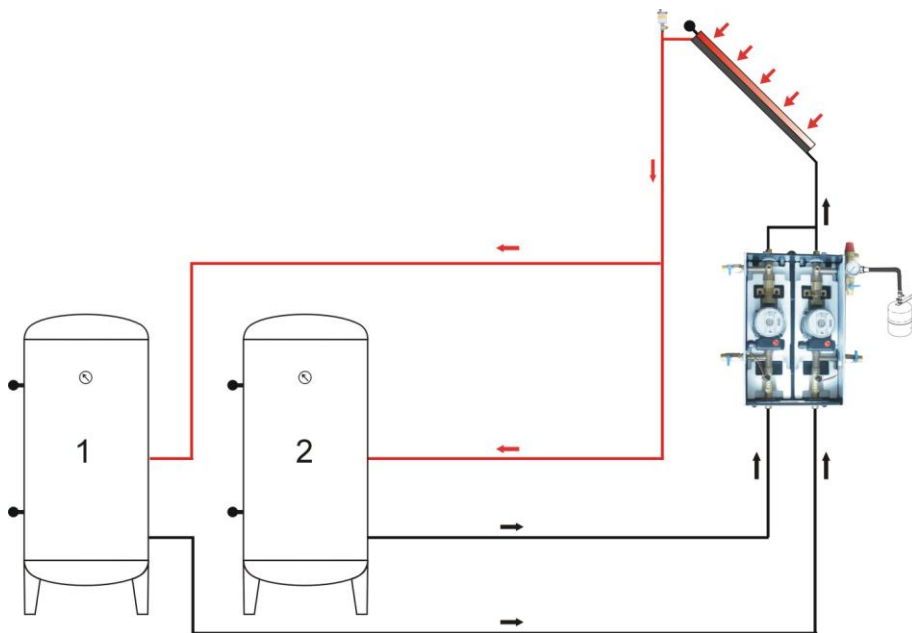
Input ports	Description	Output ports	Description
T1	Sensor of collector array	P1	Pump 1 for tank 1 circuit
T2	Sensor on the bottom part of tank 1	P2	Pump 1 for heat transfer from tank 1 to tank 2
T3	Sensor on the top part of tank 1	H1	Back-up heat resource
T4	Sensor on the bottom part of tank 2	R1	T-valve for tank switch
T5	Sensor on the top part of tank 2		
T6	DHW sensor	R3	Pump for DHW circuit
T7	Sensor on the return pipe		
T8	Sensor on the flow pipe(SR981S no)		

6.8 East/west collector array with double pumps station

If user needs a double pump then it is possible to order double pumps station, see this picture. (Type: SR982P)



Type: SR982P



7. Functions operation and parameters setup (user grade)

7.1 THET Timing heating

Description:

Electrical heater, gas boiler or oil boiler can be integrated into solar system and used as back-up heat source; they can be triggered automatically at preset schedule by preset temperature. Within a preset time section, when the temperature (T3) of top part of tank drops below the preset switching-on temperature of this function, back-up heating H1 starts to work, when T3 rises up to the preset turning off temperature, back-up heating H1 is stopped. Within 24 hours, three time sections can be set with this controller.

Factory set:

- The first time section: back-up heating function starts at 4:00 and ends at 5:00 am. Within this time section, default switch-on temperature is 40°C; default switch-off temperature is 45°C.
- The second time section: starts at 10:00 and ends also at 10:00 am, it means no back-up heating in this time.
- The third time section: back-up heating function starts at 17:00 and ends at 22:00 pm. Within this time section, default switch-on temperature is 50°C; default switch-off temperature is 55°C.

The switch-on temperature adjustable range: 10 °C ~ (OFF-2 °C)

The switch-off temperature adjustable range: (ON+2 °C) ~ 80 °C

If you want to shut off one timing heating, then you can set the turning on time and turning off time with a same value (for example, the second time section without this function, then you can set turning on/off time is 10:00 ~ 10:00)

When time is outside of the preset schedule, back-up heating doesn't work automatically even when the tank temperature drops to the switch - on temperature of heating.








Note:

- When there is no sensor installed in the top part of tank (no T3 sensor), controller will take the signal of T2 (sensor in bottom of tank) automatically to control this function.
- The time in this controller is 24 hours mode, when you set time section, the switch-off time of heating should be larger than switch-on time. For example: if you








set the switch-on time of heating is at 17:00, but switch-off time of heating is 6:00, then this setting doesn't take effect, that means within this time section, heating function doesn't work. The correct set is like following: it should be divided into two time sections, one time section is from 17:00 to 23:59, the other time section is from 00:00 to 06:00.

Setup steps:


Under standby status,

- ▶ Press “SET” button ,repress  button,to select THET menu.
- ▶ Press “SET” button, “tH 1o 04:00” shows on the screen, access the submenu of the switch-on time and temperature for the first time heating.
- ▶ Press “SET” button, hour “04” blinks on the screen; the switch-on time and temperature for the first time heating function can be set.
- ▶ Press “   ” button to adjust hour.
- ▶ Repress “SET” button, minute “00” blinks on the screen.
- ▶ Press “   ” button to adjust minute of time.
- ▶ Repress “SET” button, temperature “40°C” blinks on the screen.
- ▶ Press “   ” button, to set the switch-on temperature of heating.
- ▶ then, press “ESC” to exit and confirm setting.





- ▶ Press “  ” button, “tH 1F 05:00” shows on the screen, access the submenu of the switch-off time and temperature for the first time heating function.
- ▶ Press “SET” button again, hour “05” blinks on the screen.
- ▶ Press “   ”button to adjust hour of time.
- ▶ Repress “SET” button, minute “00” blinks on the screen.
- ▶ Press “   ”button to adjust minute of time.
- ▶ Repress “SET” button, temperature “45°C” blinks on the screen.
- ▶ Press ‘   ’ button, to set the switch-off temperature of heating.
- ▶ Then, press “ESC” to exit and confirm setting.



▶ Press “” button, “tH 2o 10:00” shows on the screen, access the submenu of the switch-on time and temperature for the second time heating section.

▶ Press “SET” button, hour “10” blinks on the screen; the switch-on time and temperature for the second time heating function can be set.





▶ Press “ ” button to adjust hour.


▶ Repress “SET” button, minute “00” blinks on the screen.

▶ Press “ ” button to adjust minute of time.

▶ Repress “SET” button, temperature “50°C” blinks on the screen.

▶ Press “ ” button, to set the switch-on temperature of heating.

▶ then, press “ESC” to exit and confirm setting.

▶ Press “” button, “tH 2F 10:00” shows on the screen, access the submenu of the switch-off time and temperature for the second time heating function.

▶ Press “SET” button again, hour “10” blinks on the screen.





▶ Press “ ” button to adjust hour of time.


▶ Repress “SET” button, minute “00” blinks on the screen.

▶ Press “ ” button to adjust minute of time.

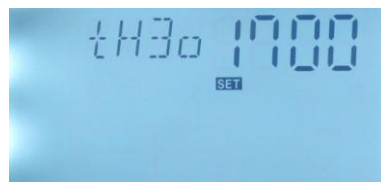
▶ Repress “SET” button, temperature “55°C” blinks on the screen.



▶ Press “ ” button, to set the switch-off temperature of heating.

▶ Then, press “ESC” to exit and confirm setting.

▶ Press “” button, “tH 3o 17:00” shows on the screen, access the submenu of the switch-on time and temperature for the third time heating section.

▶ Press “SET” button, hour “17” blinks on the screen; the switch-on time and temperature for the third time heating function can be set.



▶ Press “ ” button to adjust hour.

▶ Repress “SET” button, minute “00” blinks on the screen.

▶ Press “ ” button to adjust minute of time.

- ▶ Repress “SET” button, temperature “50°C” blinks on the screen.
- ▶ Press “ ^ v ” button, to set the switch-on temperature of heating.
- ▶ Then, press “ESC” to exit and confirm setting.

▶ Press “ ^ ” button, “tH 3F 22:00” shows on the screen, access the submenu of the switch-off time and temperature for the third time heating function.



▶ Press “SET” button again, hour “22” blinks on the screen.

▶ Press “ ^ v ” button to adjust hour of time.

▶ Repress “SET” button, minute “00” blinks on the screen.

▶ Press “ ^ v ” button to adjust minute of time.

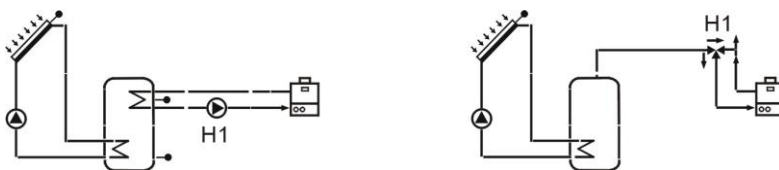
▶ Repress “SET” button, temperature “55°C” blinks on the screen.

▶ Press “ ^ v ” button, to set the switch-off temperature of heating.

▶ Then, press “ESC” to exit this submenu, or waiting for 20 seconds to exit this menu automatically, value of the parameters are saved automatically

Note: when no gas or oil boiler is connected to the solar system, electrical heater can be installed as back-up device, when electrical heater is in stand-by status, (⊞) sign shows on the screen; when electrical heater is running, (⊞) sign flashes on the screen.

If customer uses electrical heater as back-up, please according to the power of electrical heater to equip corresponding safety devices like contactor and breaker with this controller, we strongly recommend equipping SR802 device with this controller, (SR802 detailed technical data see spare part)



Application sample

7.2 CIRC DHW circulation function activated /deactivated

Setup steps:

Under standby status,

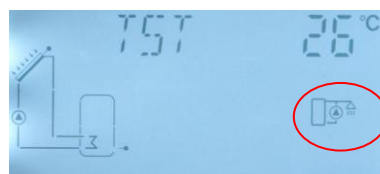
▶ Press “SET” button, and then press ‘’ button, to select “ CIRC” submenu, “CIRC OFF” displays on the screen, default set is “ OFF”.

▶ Press “SET” button, “CIRC OFF” blinks on the screen.

▶ Press “SET” button, “CIRC ON” displays on the screen; it means DHW water circulation function is triggered.

▶ Press “ESC” button to exit menu, or waiting for 20 seconds to exit this menu automatically, value of the parameters are saved automatically

Note: when the circled sign displays on the screen, it indicates that the function is in activate.



7.3 tCYC Temperature or time setting for DHW pump in three time sections

When CIRC function is triggered, this menu just appears in the program menu, under this menu, you can set the temperature and time to run the DHW pump.

DHW Temperature control description:

This controller has an output to run the DHW circulation pump which can be controlled by temperature, in this case, this function needs an extra circuit pump (connect with output R3) and an extra temperature sensor (connect with input T6) which mounted on the hot water return pipe. When the measured temperature T6 is lower than the switch-on temperature of circuit pump, pump is triggered, until temperature rises up to the switch-off temperature, pump is stopped.

Precondition of temperature controlling: tank temperature T3 should be higher than the preset switch-off temperature of this function, and then DHW pump just can be triggered.

DHW Time control description:

This controller has an output to run the DHW circulation pump which can also be controlled by time section; in this case, this function needs only an extra circuit pump (connect with output R3). Pump is triggered by time, within a running time section, as default set, pumps

runs for 3 minutes and then ceases for 15 minutes, same process repeated within the running time section.

Default time section:

The first time section: starts at 05:00, stops at 07:00

The second time section: starts at 11:00, stops at 13:00

The third time section: starts at 17:00, stops at 22:00

If it is needed to close one time section, just set the start time and stop time at a same value (e.g. 05:00 starts, 05:00 stops)

Note:

- Temperature control mode is prior to time control mode
- When pipe temperature sensor T6 is installed, the controller will automatically stop time control mode and transfer to the temperature control mode.
- If it is necessary to install T6 sensor, in order to avoid measuring error, please be sure to install it at place minimum 1.5 m far away to tank.

Setup steps:

Under stand-by status, access tCYC menu,

▶ Press “SET” button to enter the tCYC menu, “tC 1o 05:00” shows on the screen, access the submenu of the switch-on time for the first time section

▶ Press “SET” button, hour “05” blinks on the screen

▶ Press “ ^ v ” button to adjust hour

▶ Repress “SET” button, minute “00” blinks on the screen

▶ Press “ ^ v ” button to adjust minute of time

▶ Repress “SET” button, minute “03Min” blinks on the screen

▶ Press “ ^ v ” button, to set the running time of DHW pump

▶ then, press “ESC” to confirm the parameters and to exit this setup








▶ Press “ ^ ” button, “tC 1F 07:00” shows on the screen, access the submenu of the switch-off time for the first time section







▶ Press “SET” button again, hour “07” blinks on the screen.

▶ Press “ ^ v ” button to adjust hour of time










- ▶ Repress “SET” button, minute “00” blinks on the screen
- ▶ Press “  ”button to adjust minute of time
- ▶ Repress “SET” button, minute “15Min” blinks on the screen
- ▶ Press “  ”button, to set the interval time of DHW pump
- ▶ Then, press “ESC” to confirm the parameters and to exit this setup

▶ Press “ ” button, “tC 2o 11:00” shows on the screen, access the submenu of the switch-on time for the second time section


- ▶ Press “SET” button again, hour “11” blinks on the screen
- ▶ Press “  ”button to adjust hour of time
- ▶ Repress “SET” button, minute “00” blinks on the screen
- ▶ Press “  ”button to adjust minute of time
- ▶ Repress “SET” button, minute “03Min” blinks on the screen
- ▶ Press “  ”button, to set the running time of DHW pump
- ▶ then, press “ESC” to confirm the parameters and to exit this setup









▶ Press “ ” button, “tC 2F 13:00” shows on the screen, access the submenu of the switch-off time for the second time section

- ▶ Press “SET” button again, hour “13” blinks on the screen
- ▶ Press “  ”button to adjust hour of time
- ▶ Repress “SET” button, minute “00” blinks on the screen
- ▶ Press “  ”button to adjust minute of time
- ▶ Repress “SET” button, minute “15Min” blinks on the screen
- ▶ Press “  ”button, to set the interval time of DHW pump
- ▶ Then, press “ESC” to confirm the parameters and to exit this setup




▶ Press “ ” button, “tC 3o 17:00” shows on the screen, access the submenu of the switch-on time for the third time section



- ▶ Press “SET” button again, hour “17” blinks on the screen
- ▶ Press “  ”button to adjust hour of time
- ▶ Repress “SET” button, minute “00” blinks on the screen
- ▶ Press “  ”button to adjust minute of time
- ▶ Repress “SET” button, minute “03Min” blinks on the screen
- ▶ Press “  ”button, to set the running time of DHW pump



▶ then, press “ESC” to confirm the parameters and to exit this setup

▶ Press “” button, “tC 3F 22:00” shows on the screen, access the submenu of the switch-off time for the third time section


▶ Press “SET” button again, hour “22” blinks on the screen

▶ Press “ ” button to adjust hour of time

▶ Repress “SET” button, minute “00” blinks on the screen

▶ Press “ ” button to adjust minute of time

▶ Repress “SET” button, minute “15Min” blinks on the screen

▶ Press “ ” button, to set the interval time of DHW pump

▶ Then, press “ESC” to exit this submenu, or waiting for 20 seconds to exit this menu automatically, value of the parameters are saved automatically.



Note: above is the setting steps for time control mode, temperature control mode is same like these steps



8. Functions operation and parameter setup (engineer grade)

8.1 Access main menu


Under standby status,

▶ Press “SET” button, and then press “” until “PWD 0000” displays on the screen,



▶ Press “SET” button, the left figure flashes to ask for entering password, factory set: password “0000”

▶ Press “ ” button, to enter the first figure of password



▶ Press “SET” button, the second figure flashes

▶ Press “ ” button, to enter the second figure of password

▶ Press “SET” button, the third figure flashes

▶ Press “ ” button, to enter the third figure of password

▶ Press “SET” button, the fourth figure flashes

▶ Press “ ” button, to enter the fourth of password

▶ Press “SET” button again to access main menu





▶ Press “ ” button, to select a main menu

▶ Press “ESC” button, to exit main menu



8.2 Access submenu

After select and confirm main menu,

- ▶ Press “SET” button to enter the submenu
- ▶ Press “   ” button, to select a submenu
- ▶ Press “SET” button to access this submenu
- ▶ Press “   ” button, to adjust parameter
- ▶ Press “ESC” button, to exit submenu
- ▶ Press “ESC” button, to exit main menu



8.3 DT Temperature difference for solar circuit pump

Description:

Solar circuit pump P1 is triggered by the temperature difference function, so long as the temperature difference between collector and storage reaches the switch-on DT, solar circuit pump is triggered. When the temperature difference drops to the switch-off DT, then solar pump is ceased.



For example: the switch-on DT is 8°C, switch-off DT is 4°C, if the temperature on the bottom part of storage is 20°C, then just when collector temperature rises up to 28°C, pump is triggered, and when collector temperature drops to 24°C, pump is ceased.

Note: to avoid mistake the minimum difference between two temperature differences ($\Delta T_{on} - \Delta T_{off}$) is set as 2 °C.


Setup switch-on temperature difference

Under standby, following steps described in paragraph 8.1 to access main menu DT temperature difference menu.



▶ Press “SET” button, to access settings program of main menu DT, “DT 1o 08°C” shows on the screen, “08 °C” flashed, the switch-on temperature difference can be set.

▶ Press “   ” button, to adjust the value of switch-on DT O, adjustable range (OFF+2 °C) ~20 °C, factory setting is 8 °C

▶ Press “ESC” button to exit this setting, parameter is saved automatically.

▶ Press “  ” button, “DT 1F 04°C” shows on the screen.



- ▶ Press “SET” button, “04 °C” flashed, the switch-off temperature difference can be set.
- ▶ Press “   button, to adjust the value of switch-off DT F, adjustable range : 0°C~ (On-2 °C), factory setting is 4 °C
- ▶ Press “ESC” button to exit this setting, or after seconds to exit automatically, parameter is saved automatically.

Note: due to different system, maximum 3 temperature differences (DT1o, DT1F), (DT2o, DT2F), (DT3o, DT3F) can be set, setup steps are same above steps.

8.4 TEMP Temperature main menu

For solar system, the factory set parameters are for the best operation condition, which is fully integrated into the entire solar system. But these parameters can also be set individually to cater the special requirements, please carefully observe the operation data of system components after setting.

Note: Parameters that can be set rely on the system design; it means not all the parameters are suitable for all solar systems.

Following submenu can be accessed though TEMP main menu.

Paragraph	Tem. Code	Function of temperature	Adjustable range	Factor y set	Function exit tem.
8.4.1	EMOF	Maximum switch-off temperature of collector	(ON+3°C)~200 °C	130 °C	
8.4.1	EMON	Maximum switch-on temperature of collector	(OFF-3 °C)~197°C	120 °C	
8.4.2	CMX	Maximum limited temperature of collector (collector cooling function)	90 °C ~180 °C	110 °C	107 °C
8.4.3	CMN	Low temperature protection of collector	0 °C~90 °C	OFF	
8.4.4	CFR	Frost protection temperature of collector	-10 °C~10 °C	OFF	
8.4.5	REC	Re-cooling temperature of tank		OFF	
8.4.6	SMX1	Maximum temperature of tank 1	2 °C~95 °C	60 °C	58 °C
8.4.7	SMX2	Maximum temperature of tank 2	2 °C~95 °C	60 °C	58 °C
8.4.8	MAX1	Maximum switch-off temperature for heat transfer between tank and heat return	(MIN1+2°C)~95 °C	60 °C	
8.4.9	MIN1	Minimum switch-on temperature for heat transfer between tank and heat return	10 °C~(MAX1-2 °C)	30 °C	
8.4.10	MAX2	Maximum switch-off temperature for heat transfer between heat exchanger and tank	(MIN2+2 °C)~95 °C	60 °C	
8.4.11	MIN2	Minimum switch-on temperature for heat transfer between heat exchanger and tank	10 °C~ (MAX2-2 °C)	30 °C	
8.4.12	C - F	Switch between Celsius and Fahrenheit	°C ~°F	°C	

8.4.1 EMOF Maximum switch-off temperature of collector (for collector emergency close function)

Description:

When collector temperature rises up to this maximum switch-off temperature (EM), collector emergency function is activated, solar circulation pump is stopped in order to avoid the damage of system's other components caused by high temperature. The adjustable range of EMOF temperature is (EMON+3 °C~200 °C), factory set is 130 °C. If the temperature of collector rises up to EMOF limited temperature, solar circuit pump is ceased, but when collector temperature drops to the collector maximum switch-on temperature EMON (factory set is 120 °C), solar circuit pump will be recovered to standby, and collector emergency close function is deactivated.

● EMOF Maximum switch-off temperature of collector

Setup steps:

To access main menu TEMP, then select submenu EMOF, "EMOF 130 °C" shows on the screen

▶ Press "SET" button, parameter "130 °C" flashes.

▶ Press "▲ ▼" button, to adjust this maximum switch-off temperature, adjust range (EMON+3 °C) ~ 200 °C, factory set is 130 °C

▶ Repress "SET" button to activate and deactivate this function, if deactivate the function, "EMOF - -" shows on the screen.

▶ Press "ESC" button to exit menu or wait for 20 seconds to exit, set parameters are saved automatically.



● EMON Maximum switch-on temperature of collector

Setup steps:

To access main menu TEMP, then select submenu EMON, "EMON 120 °C" shows on the screen

▶ Press "SET" button, parameter "120 °C" flashes.

▶ Press "▲ ▼" button, to adjust this maximum switch-on temperature, adjust range (EMOF-3 °C) ~



197°C, factory set is 120°C

▶ Repress “SET” button to activate and deactivate this function, if deactivate the function, “EMON - - -” shows on the screen.

▶ Press “ESC” button to exit menu or wait for 20 seconds to exit automatically, set parameters are saved automatically.



When these 2 signs of collector emergency close function simultaneously blink on the screen, it indicates the function is activated, and tank temperature reaches to its maximum limitation.



When only this sign of collector emergency close function blinks on the screen, it indicates the function is also activated, but temperature of tank doesn't reach to its maximum limited temperature



8.4.2 CMX Maximum limited temperature of collector (collector cooling function)

Description:

If hot water in tank isn't used for long time, then the capacity that solar system absorbs solar energy reduces, when tank temperature rises to its preset maximal temperature, solar circuit pump is ceased compulsively even the temperature difference is satisfied. then when more solar irradiation shines in, as a result collector temperature will rise continuously, temperature of collector maybe rise up to the evaporated temperature of heat fluid, this phenomenon names collector - overheat, it should be avoided. Through set the Maximum limited collector temperature (collector cooling function) can delay the vaporization of the heat transfer fluid. Shortly before reaching the maximum temperature of the collector, the solar pump starts working to cool down the heat transfer fluid using the heat losses occurring on pipelines and storage cylinder.

When collector temperature rises up to its maximal temperature, solar pump will be triggered again even at the case that tank temperature is already to its maximal temperature. And solar pump works until the temperature of collector drops because of this reversed circulation or when tank temperature rises its emergency temperature (95°C).



When  displays, and  blinks on the screen, it indicates that tank emergency temperature reaches, tank emergency stop function is activated, and tank temperature is

≥95°C

Setup steps:

To access main menu TEMP, then select submenu CMX, “CMX 110 °C” shows on the screen



▶ Press “SET” button, “110 °C” blinks

▶ Press “SET” button to activate and deactivate this function, if deactivate the function, “CMX - -” shows on the screen

▶ Press “ ” button to adjust collector limited maximum temperature , adjust range: (110 °C~190 °C), factory set is 110 °C

▶ Press “ESC” button to exit menu or wait for 20 seconds to exit, set parameters are saved automatically.



CMX sign displays on the screen, it indicates that collector cooling function is activated.

8.4.3 CMN Low temperature protection of collector

Description:

When the actual temperature of collector is below the preset CMN temperature, solar circuit pump is ceased, even when the temperature difference between collector and tank exceeds switch-on temperature difference, solar pump doesn't work yet. When the temperature of collector is 2°C higher than the preset CMN temperature, solar circuit pump is recovered to standby, controller exits this program.



Setup steps:

To access main menu TEMP, then select submenu CMN, “CMN - - -” shows on the screen, default set is OFF.

▶ Press “SET” button, default off sign “- - -” blinks on the screen.



▶ Repress “SET” button to activate and deactivate this function.

▶ Press “ ” button to adjust the low protection temperature of collector CMN, adjustable range (00 °C ~90 °C), after activate the function, factory set is 10 °C

▶ Press “ESC” button to exit the menu or wait for 20 seconds to exit automatically,

parameters are saved automatically.



CMN sign displays on the screen, it indicates that this function is activated.

8.4.4 CFR frost protection temperature of collector

Description:

In winter when the temperature of collector is below the preset frost protection temperature (CFR) (factory set is 4 °C), solar circuit pump is triggered to transfer hot water from tank to collector and to heat collector by this reversed circuit. And when tank temperature (T2) drops to 6 °C, electrical heater is triggered automatically and it keeps running until tank temperature T2 rises up to 20 °C or it is stopped when program of CFR is exited. And when collector temperature rises up to 7 °C, solar circuit pump is ceased, program of CFR exits automatically.



This function is used in system, which uses water as heat transfer liquid, to avoid the freezing of solar heat transfer fluid.

Setup steps:

To access main menu TEMP, then select submenu CFR, “CFR - - -” shows on the screen, default set is off.

- ▶ Press “SET” button, default off “- - -” blinks.
- ▶ Repress “SET” button to activate or deactivate this function



- ▶ Press “ ” button to adjust the temperature of frost protection function, adjustable range is (-10 °C ~ 10 °C) , after function is activated, default set is 4 °C
- ▶ Press “ESC” button to exit the menu or wait for 20 seconds to exit, parameters are saved automatically.



CFR sign shows on the screen, it indicates that this function is activated.

Note: this function is only available in special solar system which using un-anti-freezing liquid; this kind of system is only suitable in area where the ambient temperature is near to 0 °C only for a few days. If safety requirement is very high, then anti-freezing liquid is necessary, we suggest using suitable anti-freezing liquid to avoid frost problem.

8.4.5 REC Recooling temperature of tank

Description:

If storage temperature rises up to its maximum temperature, and at the same time, collector temperature is 5°C lower than storage temperature, then solar pump can be triggered, through this reversed circulation, tank temperature is reduced by heat loss occurs in collector, solar pump keeps in working until tank temperature drops below its maximum temperature.


Setup steps:

To access main menu TEMP, then select submenu REC, “REC OFF” shows on the screen, default set is off.

▶ Press “SET” button, parameter “OFF” blinks on the screen

▶ Re-press “SET” button to activate or deactivate this function; after function activated, factory set is “REC ON”

▶ Press “ESC” button to exit the menu or wait for 20 seconds to exit, parameters are saved automatically.

 REC sign blinks on the screen; it indicates that this function is activated.



8.4.6 SMX1 Maximum temperature of tank 1

Description:

When the DT between collector T1 and tank T2 meets the switch-on DT of circulation, solar pump is triggered, but in order to avoid the high temperature inside tank, controller will check whether the temperature (T3) of the top part of tank is higher than the maximum temperature of tank, when T3 is higher than the preset maximum tank temperature SMX, solar pump is ceased even at the case that DT caters condition. When tank temperature drops and is 2°C below the SMX temperature, solar pump restarts when DT meets the condition.

Setup steps:

To access main menu TEMP, then select submenu SMX1, “SMX1 60°C” shows on the screen.

▶ Press “SET” button, parameter “60°C” blinks

▶ Press “ ” button to adjust the value of



maximum temperature of tank 1, adjustable range is(2 °C~95 °C), default set is 60 °C

▶ Press “SET” button to activate and deactivate this function, if function deactivated, “SMX1 - -” displays on the screen.

▶ Press “ESC” button to exit the menu or wait for 20 seconds to exit, parameters are saved automatically.





SMX1 sign shows on the screen, it indicates that this function is activated.

8.4.7 SMX2 Maximum temperature of tank 1

Setup steps:

To access main menu TEMP, then select submenu SMX2, “SMX2 60 °C” shows on the screen.

▶ Press “SET” button, parameter “60 °C” blinks

▶ Press “ ” button to adjust the value of maximum temperature of tank 2, adjustable range is(2 °C~95 °C),

default set is 60 °C

▶ Press “SET” button to activate and deactivate this function, if function deactivated, “SMX 2- -” displays on the screen.

▶ Press “ESC” button to exit the menu or wait for 20 seconds to exit, parameters are saved automatically.



8.4.8 MAX1 Maximum switch-off temperature for heat transfer between tank and heat return

Description:

Example with system 10



When temperature difference between tank T4 and heating return T6 meets the switch-on condition DT2O, then electronic magnetic valve R1 is switched to tank, heating return is heated by tank; when temperature difference between tank T4 and heating return T6 drops to the switch-off condition DT2F, or temperature of tank T4 drops to its minimum switch-on temperature MIN1, or temperature of heating return T6 rises up to its maximum switch-off temperature, then electronic magnetic valve is closed.

Setup steps:

To access main menu TEMP, then select submenu MAX1, “MAX1 60 °C” shows on the screen.



▶ Press “SET” button, parameter “60 °C” blinks

▶ Press “ ” button to adjust the value of maximum temperature of tank, adjustable range is (MIN1+2 °C) ~ 95°C, default set is 60 °C

▶ Press “ESC” button to exit the menu or wait for 20 seconds to exit, parameters are saved automatically.



8.4.9 MIN1 Minmium switch-on temperature for heat transfer between tank and heat return

Setup steps:

To access main menu TEMP, then select submenu MIN1, “MIN1 30 °C” shows on the screen.



▶ Press “SET” button, parameter “30 °C” blinks

▶ Press “ ” button to adjust the value of maximum temperature of tank, adjustable range is 10 °C ~ (MAX1-2°C), default set is 30 °C

▶ Press “ESC” button to exit the menu or wait for 20 seconds to exit, parameters are saved automatically.

8.4.10 MAX2 Maximum switch-off temperature for heat transfer between heat exchanger and tank

Description:

Example with system 12

In the case that collector T1, heat exchanger temperature T4 and tank T2 all meet the switch-on condition, when value of T4 is between the minimum switch-on temperature MIN2 and its maximum switch-off temperature MAX2, P1 and P2 pump are triggered at the same time; when T4 exceeds the MAX2, then P1 is ceased. When T4 drops below its MIN2, then P2 is ceased.

In the case that collector T1, heat exchanger temperature T4 and tank T2 all meet the

switch-off condition, corresponding P1 or P2 is ceased.

Setup steps:

To access main menu TEMP, then select submenu MAX2, "MAX2 60 °C" shows on the screen.



▶ Press "SET" button, parameter "60 °C" blinks

▶ Press "▲ ▼" button to adjust the value of maximum temperature of tank , adjustable range is (MIN2+2 °C) ~ 95°C, default set is 60 °C

▶ Press "ESC" button to exit the menu or wait for 20 seconds to exit, parameters are saved automatically.

8.4.11 MIN2 Minmium switch-on temperature for heat transfer between heat exchanger and tank

Setup steps:

To access main menu TEMP, then select submenu MIN2, "MAX2 30 °C" shows on the screen.



▶ Press "SET" button, parameter "30 °C" blinks

▶ Press "▲ ▼" button to adjust the value of

maximum temperature of tank, adjustable range is 10 °C ~ (MAX2-2°C), default set is 30 °C

▶ Press "ESC" button to exit the menu or wait for 20 seconds to exit, parameters are saved automatically.

8.4.12 C_F Switch between Celsius and Fahrenheit

Setup steps:

To access main menu TEMP, then select submenu C_F, "C_F °C" shows on the screen,



▶ Press "SET" button, displayed parameter °C blinks on the screen

▶ Press "▲" button, to select Celsius or Fahrenheit temperature unit, default set is °C

▶ Press "ESC" button to exit the menu or wait for 20 seconds to exit, parameters are saved automatically.

8.5 FUN Auxiliary functions

The auxiliary functions of this controller can be set under menu “FUN”; it is possible to activate several auxiliary functions at the same time.

Note:

Sometimes, the selected function needs controller to have an extra input to connect a temperature sensor or an extra output to control a pump or electromagnetic valve. Under main menu “FUN”, some submenu functions maybe deactivated, so the displayed contents for below mentioned submenu functions maybe different.

Following submenu can be access though FUN main menu.

Paragraph	Fun. code	Function description	Adjustable range	Factory set
8.5.1	DVWG	Anti legionnaires' function	5°C~95°C	OFF
8.5.2	SFB	Switch-on/off of the solid fuel boiler	OFF/ON	OFF
8.5.2.1	SFON	Minimum switch-on temperature of tank	10°C ~ SFOF-2°C	50°C
8.5.2.2	SFOF	Maximum switch-off temperature of tank	SFON+ 2°C ~ 80°C	55°C
8.5.2.3	MAX3	Maximum switch-off temperature of solid fuel boiler	MIN3+2°C ~ 95°C	60°C
8.5.2.4	MIN3	Minimum switch-on temperature of solid fuel boiler	10°C ~ MAX3-2°C	30°C
8.5.3	PUMP1	P1 Pump operation mode selection	ONOF: switch control PLUS: normal pump HEA: high efficiency pump	ON/OF switch control
8.5.3.1	nMIN	Pump1 speed adjustment (RPM)	30~100% (HEA20~100%)	30%
8.5.3.2	DTS	Standard temperature difference of pump 1 (for pump 1 speed adjustment)	2°C~30°C	8°C
8.5.3.3	RIS	Gain for circulation pump 1 (for pump 1 speed adjustment)	1°C~20°C	1°C
8.5.4	PUMP2	P2 Pump operation mode selection	ONOF: switch control HEA: high efficiency pump	ON/OF switch control
8.5.4.1	n2MN	Pump2 speed adjustment (RPM)	30~100% (HEA20~100%)	100%

8.5.4.2	DTS2	Standard temperature difference of pump 2 (for pump 2 speed adjustment)	2°C~30°C	8°C
8.5.4.3	RIS2	Gain for circulation pump 2 (for pump 2 speed adjustment)	1°C~20°C	1°C
8.5.10	OHQM	Thermal energy measuring	ON/OFF	OFF
8.5.9	FTYPE	Flow meter type 1 selection	01: mechanical flow meter 02: Electronic flow meter	01: mech. flow meter
8.5.9	FTYP2	Flow meter type 2 selection	01: mechanical flow meter 02: Electronic flow meter	01: mech. flow meter
8.5.10.1	FMAX	Flow rate	0.1~20L/min	2.0L/min
8.5.10.2	MEDT	Type of heat transfer liquid	00: Water 01: Propylene glycol 02: Glycol 03: Tyfocor LS/G-LS	01: Propylene glycol
8.5.10.3	MED%	Concentration of heat transfer liquid	20~70	40
8.5.11	PRIO	Tank priority	00-02, Su1, Su2	01
8.5.11.1	tRUN	Interval heating run-on time	1~30 minute	15minute
8.5.11.2	tSTP	Interval heating run-off time	1~30 minute	2 minute
8.5.12	INTV	Pump Intermission function	ON/OFF	OFF
8.5.12.1	IRUN	Pump interval run-on time	2~60 minute	30minute
8.5.12.2	ISTP	Pump interval run-off time	5~120 seconds	15 seconds
8.5.13	COOL	Tank cooling function	5°C~120°C	95°C
8.5.14	AHO	Switch-on temperature of thermostat function	0~95°C	50°C
8.5.14	AHF	Switch-off temperature of thermostat function	0~95°C	55°C
8.5.15	BYPR	By-pass pipe (high temperature)	OFF/ON	ON

8.5.1 DVWG Anti legionnaires' function

Description:

In order to avoid occurring bacteria in water tank when the temperature of tank is lower for a long time, controller will check the temperature of tank every 7 days in a period automatically, if the temperature of tank is never over 70°C during this period, then at the factory default time of 01:00 on seventh day, auxiliary heating system is triggered automatically to heat water until its temperature rises up to 70°C, bacteria is killed by high

temperature, and then function is deactivated.

Setup steps:

To select submenu DVWG, “DVWG ---” shows on the screen. Default set is “OFF”.



- ▶ Press “SET” button, parameter “---” blinks on the screen.
- ▶ Press “SET” button to activate this function, and then “DVWG 70°C” shows on the screen.
- ▶ Press “▲ ▼” button to adjust temperature of anti legionnaires’ function, adjustable range: 5°C ~ 95°C.
- ▶ Press “ESC” button to exit the menu or wait for 20 seconds to exit automatically, parameters are saved automatically.

8.5.2 SFB Switch-on/off of the solid fuel boiler

Example: (system 1) under the status that solid fuel boiler is enabled, When tank temperature T3 drops below the switch-on temperature of solid fuel boiler (SFON), and temperature of solid fuel boiler (T5) is between its minimum and maximum temperature(MIN 3 and MAX3), then solid fuel boiler R2 is triggered; when tank temperature T3 rises up to the switch-off temperature of solid fuel boiler (SFOF), or when temperature of solid fuel boiler (T5) exceeds the scope of its “MIN3” and “MAX3”, then solid fuel boiler is ceased.

Note: The value of “MIN3” should be minimum 1°C higher than value of “SFOF”, for example, when “SFON” is 50°C, “SFOF” is 55°C, and then “MIN3” must be “56°C” at least, then when tank temperature is below 50°C, solid fuel boiler starts to run until tank temperature rises up to 55°C, then solid fuel boiler stops to run.

Select “SFB” menu, “SFB” displays on the screen.





- ▶ Press “SET” button to enter menu, “SFB OFF” displays on the screen.
- ▶ Press “SET” button again, “OFF” blinks; default set is “OFF”
- ▶ Press “SET” button to enable this function, “SFB ON” shows on the screen.
- ▶ Press “ESC” button to exit the menu or wait for 20 seconds to exit, parameters are

saved automatically.

8.5.2.1 SFON Minimum switch-on temperature of tank

Select “SFON” submenu, “SFON 50°C” displays on the screen.

▶ Press “SET” button, “50°C” blinks,

▶ Press “ ” button to adjust temperature value, adjustable range: 10°C ~ SFOF-2°C, default set is “50°C”



▶ Press “ESC” button to exit the menu or wait for 20 seconds to exit, parameters are saved automatically



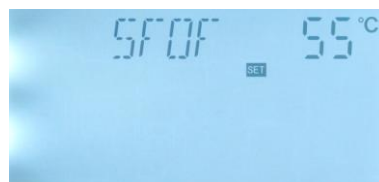
8.5.2.2 SFOF Maximum switch-off temperature of tank

Select “SFOF” submenu, “SFOF 55°C” displays on the screen.

▶ Press “SET” button, “55°C” blinks,

▶ Press “ ” button to adjust temperature value, adjustable range: (ON+2°C) ~ 80°C, default set is “55°C”



▶ Press “ESC” button to exit the menu or wait for 20 seconds to exit, parameters are saved automatically



8.5.2.3 MAX3 Maximum switch-off temperature of solid fuel boiler

Select “MAX3” submenu, “MAX3 60°C” displays on the screen.

▶ Press “SET” button, “60°C” blinks,

▶ Press “ ” button to adjust temperature value, adjustable range: MIN3+2°C ~ 95°C, default set is “60°C”

▶ Press “ESC” button to exit the menu or wait for 20 seconds to exit, parameters are saved automatically





8.5.2.4 MIN3 Minimum switch-on temperature of solid fuel boiler

Select “MIN3” submenu, “MIN3 30°C” displays on the screen.

▶ Press “SET” button, “30°C” blinks,



▶ Press “ ” button to adjust temperature value, adjustable range: 10 °C ~ MAX3-2 °C, default set is “30°C”

▶ Press “ESC” button to exit the menu or wait for 20 seconds to exit, parameters are saved automatically

8.5.3 PUMP1 P1 pump operation mode selection

Description:

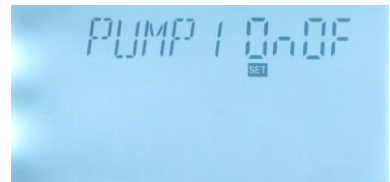
P1 output mode can be configured to function as one of below three modes:


- ON/OF mode: for normal pump, switch on/off mode
- PLUS mode: for normal pump, pulse control
- HEA mode: mode for high efficiency pump. RPM control


Setup steps:

To access main menu FUN and then select submenu P1 pump operation mode selection, “PUMP 1 ONOF” displays on the screen,

▶ Press “SET” to access the menu, “PUMP1 ONOF” shows and blinks on the screen; factory set is “ON/OF mode”.



▶ Press “” button, “PUMP1 PLUS” shows on the screen, then pump output is pulse controlled.

▶ Press “” button, “PUMP1 HE A” shows on the screen, then pump output is high efficiency mode (RPM controlled)

▶ Press “ESC” button to exit the menu or wait for 20 seconds to exit, parameters are saved automatically.

Note: when pump mode is set as “PUMP1 HE A”, pump speed is changed with scope 20%~ 100%.

Note: when pump mode is set as” PUMP1 ONOF”, pump is running with fixed speed, RPM control is deactivated.

8.5.3.1 nMIN Pump1 speed adjustment (RPM)

Output mode of P1 can be set as RPM output or as simple on/off mode, only you set the output mode as RPM mode, then you can see this submenu, and when you set “nMIN” value of 100%, then this output becomes “on/off “ control mode.

Normal ONOF switch output: circuit pump speed control (RPM) is deactivated, pump is

operated with a fixed speed, and flow rate is not changed.



HE A control output: (speed control is activated), the control system attempts to maintain a constant temperature difference between collector and tank, and as a result the pump performance is continuously adjusted; the flow rate of pump is increased or reduced based on the temperature difference

Setup steps:

To access main menu FUN, select submenu “nMIN”, “nMIN 30” shows on the screen.



▶ Press “SET” button, parameter “30” blinks on the screen.

▶ Press “ ” button, to adjust pump speed. adjustable range: (30~100%), factory set is 30%.

▶ Press “ESC” button to exit the menu or wait for 20 seconds to exit automatically, parameters are saved automatically.

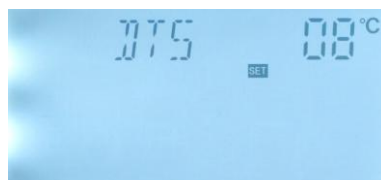
8.5.3.2 DTS Standard temperature difference of pump 1 (for pump 1 speed adjustment)

Description:

When the temperature difference between collector and tank meets the switch-on temperature difference, solar pump starts to work; subsequently, pump speed reaches to its minimum speed of 30% in 20 seconds. And then controller checks temperature continuously, when a standard temperature difference (DTS) reaches, the speed of pump rises a grade (10%) automatically; and when a temperature difference (gain RIS) increases every 1°C, pump speed increases 10%, until pump speed reaches to its 100%. Controller can achieve this function by parameter RIS. If temperature difference drops to the switch-off temperature difference (DT F), circuit pump is ceased.



Setup steps:

To access main menu FUN, select “DTS” submenu, “DTS 08°C” shows on the screen.



▶ Press “SET” button, parameter “08°C” blinks on the

screen

▶ Press “ ” button, to adjust the standard DTS, adjustable range: 2°C~30°C, factory set is 08°C

▶ Press “ESC” button to exit the menu or wait for 20 seconds to exit, parameters are saved automatically.



8.5.3.3 RIS Gain for circulation pump 1 (for pump1 speed adjusting)

Setup steps:

To access main menu FUN, select “RIS” submenu, “RIS 01°C” shows on the screen.



▶ Press “SET” button, parameter “01°C” blinks on the screen

▶ Press “ ” button, to adjust standard RIS, adjustable range: 1°C~20°C, factory set is 1°C

▶ Press “ESC” button to exit the menu or wait for 20 seconds to exit, parameters are saved automatically.

8.5.4 PUMP2 P2 pump operation mode selection

Description:

Pump output mode can be configured to function as one of below three modes:


- ON/OF mode: for normal pump, switch on/off mode
- PLUS mode: for normal pump, pulse control
- HEA mode: mode for high efficiency pump. RPM control


Setup steps:

To access main menu FUN and then select submenu P2 pump operation mode selection, “PUMP 2 ONOF” displays on the screen,



▶ Press “SET” to access the menu, “PUMP2 ONOF” shows and blinks on the screen; factory set is “ON/OF mode”.

▶ Press “” button, “PUMP2 PLUS” shows on the screen, then pump output is pulse controlled.

▶ Press “  ” button, “PUMP2 HE A” shows on the screen, then pump output is high efficiency mode (RPM controlled)

▶ Press “ESC” button to exit the menu or wait for 20 seconds to exit, parameters are saved automatically.

Note: when pump mode is set as “PUMP2 HE A”, pump speed is changed with scope 20%~ 100%.

Note: when pump mode is set as” PUMP2 ONOF”, pump is running with fixed speed, RPM control is deactivated.

8.5.4.1 n2MN Pump 2 speed adjustment (RPM)

Output mode of R2 can be set as RPM output or as simple on/off mode, only you set the output mode as RPM mode, then you can see this submenu, and when you set “nMIN” value of 100%, then this output becomes “on/off “ control mode.

Normal ONOF switch output: circuit pump speed control (RPM) is deactivated, pump is operated with a fixed speed, and flow rate is not changed.



HE A control output: (speed control is activated), the control system attempts to maintain a constant temperature difference between collector and tank, and as a result the pump performance is continuously adjusted; the flow rate of pump is increased or reduced based on the temperature difference

Setup steps:

To access main menu FUN, select submenu “n2MN”, “n2MN 100” shows on the screen.

▶ Press “SET” button, parameter “100” blinks on the screen.



▶ Press “   ” button, to adjust pump speed. adjustable range: (30~100%), factory set is 100%.

▶ Press “ESC” button to exit the menu or wait for 20 seconds to exit, parameters are saved automatically.



8.5.4.2 DT2S Standard temperature difference of pump 2 (for pump 2 speed adjustment)

Setup steps:

To access main menu FUN, select “DT2S” submenu, “DT2S 08°C” shows on the screen.



▶ Press “SET” button, parameter “08°C” blinks on the screen

▶ Press “ ” button, to adjust the standard DT2S, adjustable range: 2 °C~30 °C, factory set is 08°C

▶ Press “ESC” button to exit the menu or wait for 20 seconds to exit, parameters are saved automatically.



8.5.4.3 RIS2 Gain for circulation pump 2 (for pump 2 speed adjustment)

Setup steps:

To access main menu FUN, select “RIS2” submenu, “RIS2 01°C” shows on the screen.



▶ Press “SET” button, parameter “01°C” blinks on the screen

▶ Press “ ” button, to adjust standard RIS2, adjustable range:1°C~20 °C, factory set is 1°C

▶ Press “ESC” button to exit the menu or wait for 20 seconds to exit, parameters are saved automatically.

8.5.10 OHQM Thermal energy measuring

Description:

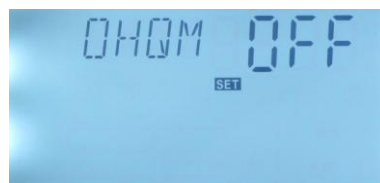
Controller has function of thermal energy measuring; it can measure the energy which is transferred from collector to tank. For the sake of measuring, the temperature on flow and return pipe should be checked, and an extra flow meter should be installed on the circulation pipe, it is used for measuring the flow rate.

The thermal energy transferred by solar system is calculated with measured parameters flow rate and temperature T1 and T7 (installed on the flow and return pipe). Thermal energy get in the current day displays in DkWh, accumulative thermal energy displays in kWh or MWh. The amount of 2 values is the total energy output.

OHQM Thermal energy measuring, factory set of OHQM is OFF

Setup steps:

To select submenu OHQM, “OHQM” shows on the screen,



▶ Press “SET” button, “OHQM OFF” displays on the screen

▶ Press “SET” button, parameter “OFF” blinks on the screen

▶ Repress “SET” button to activate this function, then “OHQM ON” appears on the screen

▶ Press “ESC” button to exit the menu or wait for 20 seconds to exit, parameters are saved automatically.

Note:

1) Thermal energy got in current day, accumulative thermal energy and operation time of pump can be reset, doing like following steps:

Under standby status,

▶ Press “ ^ v ” button, select the thermal energy of current day, “DKWH XX” “SET” displays on the screen.

▶ Press “SET” button for 3 seconds, buzzer makes 3 times “du-----”, the daily thermal energy is cleared, and daily thermal energy is reset to “00”.

▶ Press “ ^ v ” button, select to check accumulative thermal energy, “KWH XX” or “MWH XX” “Set” displays on the screen.

▶ Press “SET” button for 3 seconds, buzzer makes 3 times “du-----”, the sum of thermal energy is cleared, and accumulative thermal energy is reset to “00”.

▶ Press “ ^ v ” button, select the operation time of pump, “hP XX” “SET” displays on the screen.

▶ Press “SET” button for 3 seconds, buzzer makes 3 times “du-----”, the operation time of pump is cleared, and it is reset to “00”.

2) Only when the thermal energy measuring function is activated, operation time of circulation pump function just can be triggered.

8.5.9 FTYPE Flow meter type selection

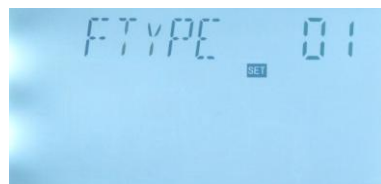
FTYPE: Type of flow meter 1 selection, adjustable between : 01、02

Type of flow meter:

01: mechanical flow meter

02: electronic flow meter

Select FTYPE submenu, “FTYPE 01” displays on the screen



▶ Press “SET” button, “01” blinks on the screen

▶ Press “ ” button, to adjust flow meter type, adjustable range: 01 or 02

▶ Press “ESC” button to exit the menu or wait for 20 seconds to exit, parameters are saved automatically.

8.5.9. FTYP2 Flow meter type selection

FTYP2: Type of flow meter 2 selection, adjustable between : 01、02

Type of flow meter:

01: mechanical flow meter

02: electronic flow meter

Select FTYP2 submenu, “FTYP2 01” displays on the screen



▶ Press “SET” button, “01” blinks on the screen

▶ Press “ ” button, to adjust flow meter type, adjustable range: 01 or 02

▶ Press “ESC” button to exit the menu or wait for 20 seconds to exit, parameters are saved automatically.

8.5.10.1 FMAX Flow rate

FAMX: Flow rate L/min. adjustable range: (0.1~20) L/min, increase rate 0.1L per button press, factory set is 2.0L/min

Setup steps:

To select submenu FMAX, “FMAX 2.0” displays on the screen.



▶ Press “SET” button, parameter “2.0” blinks on the screen

▶ Press “ ” button to adjust parameter of flow rate. adjustable range (0.1~20)

▶ Press “ESC” button to exit the menu or wait for 20 seconds to exit, parameters are saved automatically.

8.5.10.2 MEDT Type of heat transfer liquid

MEDT: type of heat transfer liquid, adjustable range (00~03), factory set: 01

Type of heat transfer liquid:

- 00: Water
- 01: Propylene glycol
- 02: Glycol
- 03: Tyfocor LS/G-LS



Setup steps:

To select submenu MEDT, “MEDT 01” displays on screen.

- ▶ Press “SET” button, parameter “01” blinks on the screen
- ▶ Press “ ^ v ” button, to adjust type of heat transfer liquid, adjustable range (00~03)
- ▶ Press “ESC” button to exit the menu or wait for 20 seconds to exit, parameters are saved automatically.

8.5.10.3 MED% Concentration of heat transfer liquid

MED% Concentration of heat transfer liquid (volume percentage %), depending on the type of heat transfer liquid, adjustable range (20 ~70), factory set 40

Setup steps:

To select submenu MED%, “MED% 40” displays on screen.

- ▶ Press “SET” button, parameter “40” blinks on the screen
- ▶ Press “ ^ v ” button to adjust concentration, adjustable range (20~70)
- ▶ Press “ESC” button to exit the menu or wait for 20 seconds to exit, parameters are saved automatically.



Note: When MEDT is set as 00 or 03, then its MED% concentration doesn't appear.

8.5.11 PRIO Tank priority

Description:

When the temperature difference of the first priority tank's reaches to its switch-on

condition earlier than the second priority tank, then the first priority tank will be heated until its maximum temperature reaches, afterwards, the second priority tank just can be heated. If the temperature difference of the second priority tank reaches to its switch-on condition earlier than the first priority tank, then the second priority tank can be heated, but, when the switch-on condition of the first priority tank reaches, then controller stops to heat the second priority tank, and it switches to heat the first priority tank. To ensure to heat the first priority tank, its switch-on temperature difference is monitored at any moment while the second priority tank is heating. The measuring and judging is checked every 15 minutes. As factory set, the measuring is done every 15 minutes, and measuring lasts 2 minutes every time. These 2 parameters are possible to be changed.

Tank priority function is used in the system with 2 tanks or tank is heated in layer along the body of tank. by priority selection thermal energy can be divided into 2 tanks. This controller has several different priority logics:

1. Tank priority logic (01 and 02)
2. Continuance heating (Su1 and Su2)
3. Parallel heating (0)

Select PRIO menu, "PRIO" displays on the screen.

▶ Press "SET" button to enter submenu, "PRIO 01" displays on the screen

▶ Press "SET" button again, "01" blinks on the screen

▶ Press "▲ ▼" button, to adjust tank priority, adjustable range: 01 ~ 02, Su1, Su2, factory set: 01

▶ Press "ESC" button to exit the menu or wait for 20 seconds to exit, parameters are saved automatically.



8.5.11.1 tRUN Intermission heating run-on time

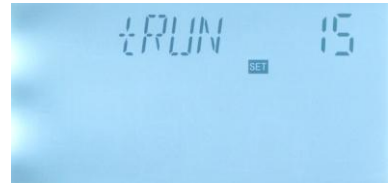
Description:

Controller monitors the temperature difference between collector and tank and compares whether it meets the switch-on condition. If the switch-on condition of the first priority tank is not met, then controller checks the switch-on condition of the second priority tank, if its



condition is met, controller will heat the second tank, but this heating time is controlled by parameter tRUN, when the tRUN heating time is gone, controller stops to heat the second tank, and collector is heated by solar within so named tSTP time, if within this tSTP time, the switch-on condition of the first priority tank is still not met, then controller starts to heat second tank again for tRUN time, if the switch-on condition of the first priority tank is met, then the first priority tank is heated, intermission heating function is ceased automatically.

Setup steps:

To select submenu tRUN, “tRUN 15” displays on the screen.



▶ Press “SET” button, parameter “15” displays and blinks, factory set is “15 seconds”

▶ Press “  ” button to adjust time, adjustable range: 01~ 30 minutes, factory set is “15 minutes”

▶ Press “ESC” button to exit the menu or wait for 20 seconds to exit, parameters are saved automatically.



8.5.11.2 tSTP Intermission heating run-off time

Setup steps:

To select submenu tSTP, “tSTP 02” displays on the screen.



▶ Press “SET” button, parameter “02” displays and blinks

▶ Press “  ” button to adjust time, adjustable range: 01~ 30 minutes, factory set is “02 minutes”

▶ Press “ESC” button to exit the menu or wait for 20 seconds to exit, parameters are saved automatically.

Functions	Default value	Adjustable range
PRIO priority tank	01	00 ~ 02, Su1, Su2
tSTP interval heating run-off time	2 minutes	01 ~ 30 minutes
tRUN interval heating run-on time	15 minutes	01 ~ 30 minutes

Note: if the tank priority is set as Su1 or Su2, then the corresponding tank will be heated to its maximum temperature directly, when the priority tank reaches its maximum temperature, just start to heat the second tank. If the priority tank's temperature drops again below its maximum temperature, then when its switch-on condition is met, controller switches to heat priority tank in time, and controller stops to heat the second priority tank. If its switch-on condition isn't met, then controller stops heating.

8.5.12 INTV pump Intermission function

Description:

This function is useful when collector sensor isn't installed on collector (sensor installed on the outlet pipeline of collector). When circuit pump is in standby status (since switch-on DT is not reached), in order to measure the actual temperature of collector, solar pump is triggered to run for 15 seconds (it is set by IRUN) in every 30 minutes (it is set by ISTP), as the result, the hot water inside the collector can flow to the pipeline, where sensor is mounted, and the actual temperature of collector can be measured and controller can monitor whether the temperature difference reaches the switch-on condition. This function is only in action during a preset time section, default time section is from 07:00~18:00.

Setup steps:

To access submenu INTV, "INTV" displays on the screen.

▶ Press "SET" button, parameter "INTV OFF" displays on the screen

▶ Repress "SET" button, "OFF" blinks on the screen, default is "OFF"

▶ Press "SET" button to activate this function, "INTV ON" shows on the screen

▶ Press "ESC" button to exit the menu or wait for 20 seconds to exit, parameters are saved automatically.



8.5.12.1 IRUN Pump interval run-on time

Setup steps:

To select submenu IRUN, "IRUN 15" displays on the



screen.

- ▶ Press “SET” button, parameter “15” displays and blinks, factory set is “15 seconds”
- ▶ Press “ ^ v ” button to adjust time, adjustable range: 5~ 120 seconds.
- ▶ Press “ESC” button to exit the menu or wait for 20 seconds to exit, parameters are saved automatically.

8.5.12.2 ISTP Pump interval run-off time

Setup steps:

To select submenu ISTP, “ISTP 30” displays on the screen.



- ▶ Press “SET” button, parameter “30” displays and blinks, factory set is “30 minutes”
- ▶ Press “ ^ v ” button to adjust time, adjustable range: 2~ 60 minutes.
- ▶ Press “ESC” button to exit the menu or wait for 20 seconds to exit, parameters are saved automatically.

8.5.13 COOL Tank cooling function

Description:

Tank cooling function is independent from solar system, it is used to transfer the extra thermal energy from tank to other heat release device, and as a result, tank temperature can be kept at a constant value. So for this function, an extra pump R1 should be installed in the system, corresponding tank is tank1, temperature controlled by T3.

For example:

We set the temperature of 70°C is the condition to run the cooling function, then when tank temperature T3 rises up to 71°C, cooling function is activated automatically, pump R1 starts to work, when tank temperature drops to 67°C, the pump R1 is stopped.



Setup steps:

To access submenu COOL, “COOL - - -” displays on the screen.

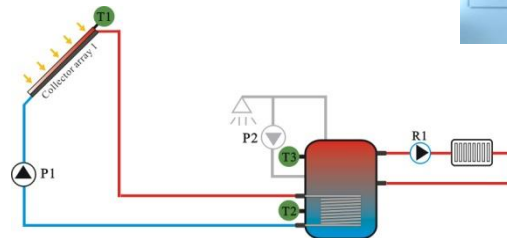
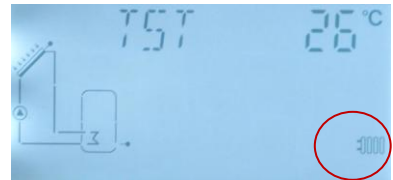


- ▶ Press “SET” button, parameter “- - -” blinks on the

screen, default set is “OFF”.

- ▶ Reprress “SET” button to activate or deactivate this function; after function activated, “COOL 95°C” displays on the screen and 95°C blinks,
- ▶ Press “  ” button to adjust temperature, adjustable range (5 °C ~120°C)
- ▶ Press “ESC” button to exit the menu or wait for 20 seconds to exit automatically, parameters are saved automatically.

When the sign in red circle displays on the screen, it indicates that cooling function is enabled.



Application example

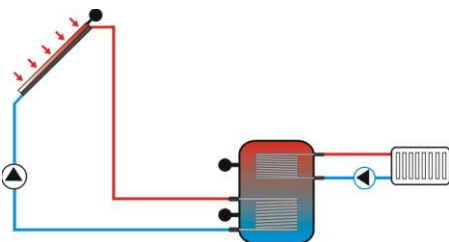
8.5.14 AHO Automatical thermostat function

Automatically thermostat function is independent from solar system, it is used to release the extra heat to reduce the tank temperature or to trigger back-up heater to heat tank to the desired temperature. This function needs an electromagnetic valve or circulation pump R1, corresponding temperature is T4.

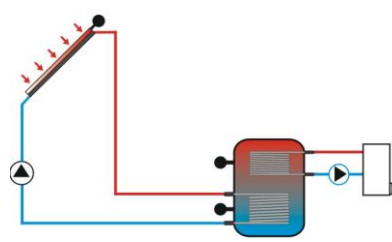
Note:

AHO<AHF: this thermostat function is used to control the back-up heater

AHO>AHF: this thermostat function is used to release the extra heat from tank



AHO>AHF, extra heat release

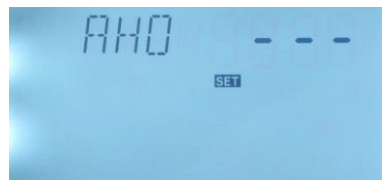




AHO<AHF, back-up heating

To access submenu AHO, “AHO- - -” displays on the screen.


- ▶ Press “SET” button, parameter “- - -” blinks on the screen

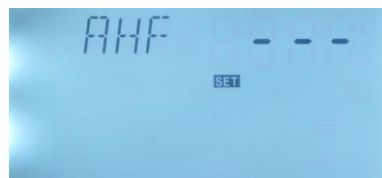
▶ Repress “SET” button, parameter “AHO 50°C” appears and “50°C” blinks on the screen, it indicates the function is enabled.





▶ Press “ ” button to adjust switch-on temperature of this function, adjustable range (5 °C ~95°C)


▶ Press “ESC” button to exit the menu

▶ Press “” button, “AHF 55°C” appears on the screen, and “55°C” blinks on the screen, default is “55°C”



▶ Press “ ” button to adjust switch-off temperature of this function, adjustable range (5 °C ~ 95°C)

▶ Press “ESC” button to exit the menu or wait for 20 seconds to exit automatically, parameters are saved automatically.

 When this sign shows on the screen, it indicates that the thermostat function is activated.

8.5.15 BYPR Bypass function (high temperature)

Description:

By bypass electromagnetic valve R1 (detailed see 6.7 system description), collector is switched either to heat tank or to preheat the pipe between collector and tank; first of all, temperature difference between collector T1 and tank T2 should meet the switch-on temperature difference (DT1O), then

When bypass temperature (T4) is higher than (tank temperature + switch-off temperature difference (DT1F) +2°C), electromagnetic valve will switch collector to heat tank.

When bypass temperature (T4) is lower than (tank temperature + switch-off temperature difference (DT1F)), electromagnetic valve will switch collector to heat pipe.

(Note:The function only available on system1,2)

Setup steps:

To access submenu BYPR, “BYPR OFF” displays on the screen.

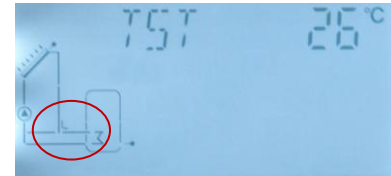
▶ Press “SET” button, parameter “OFF” blinks on the screen, default set is OFF.

▶ Repress “SET” button to activate or deactivate this function; after function activated, “BYPR ON” displays on the screen

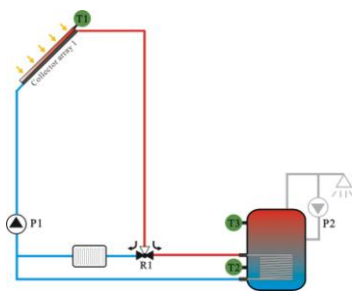


▶ Press “ESC” button to exit the menu or wait for 20 seconds to exit automatically, parameters are saved automatically.

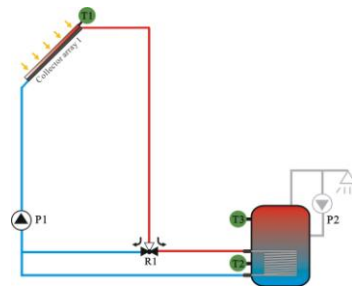
When the sign in red circle displays on the screen, it indicates that bypass function is enabled.



Application example (only for reference)



Heat released by radiator



Heat released by pipeline

Note: the one of three functions BYPR、AHO、COOL is activated, then the rest 2 functions are deactivated automatically.

8.6 HND Manual control

When using this controller first time or when debugging this controller, outputs of this controller (P1, P2, R1, R2, R3, H1) can be triggered manually with “On, OFF” control.

Setup steps:

To access main menu HND,


▶ Press “SET” button, “HND1 off” displays on the screen, P1 output manually set



▶ Repress “SET” button, “HND1 on” displays on the screen, P1 output is switched-on

▶ Repress “SET” again, “HND1 off” displays, P1 output is switched-off

▶ Press “ESC” to exit setup P1

▶ Press “” button, “HND2 off” displays on the screen, P2 output manually set



▶ Press “SET” button, “HND2 on” displays on the screen, P2 output is switched-on

▶ Repress “SET” again, “HND2 off” displays, P2 output is switched-off

▶ Press “ESC” to exit setup P2


▶ Press “” button, “HND3 off” displays on the screen, R1 output manually set

▶ Press “SET” button, “HND3 on” displays on the screen, R1 output is switched-on



▶ Repress “SET” again, “HND3 off” displays, R1 output is switched-off

▶ Press “ESC” to exit setup R1


▶ Press “” button, “HND4 off” displays on the screen, R2 output manually set

▶ Press “SET” button, “HND4 on” displays on the screen, R2 output is switched-on



▶ Repress “SET” again, “HND4 off” displays, R2 output is switched-off

▶ Press “ESC” to exit setup R2


▶ Press “” button, “HND5 off” displays on the screen, R3 output manually set

▶ Press “SET” button, “HND5 on” displays on the screen, R3 output is switched-on




▶ Repress “SET” again, “HND5 off” displays, R3 output is switched-off

▶ Press “ESC” to exit setup R3

- ▶ Press “” button, “HND6 off” displays on the screen, H1 output manually set
- ▶ Press “SET” button, “HND6 on” displays on the screen, H1 output is switched-on
- ▶ Repress “SET” again, “HND6 off” displays, H1 output is switched-off
- ▶ Press “ESC” to exit setup H1











Note: when manual mode is activated,  sign displays on the screen, after 15 minutes all outputs are switched-off automatically, controller exits manual mode.

8.7 PASS Password set

Setup steps:

To access main menu PASS,



- ▶ Press “SET” button, “PWDC 0000” appears,
- ▶ Press “SET” button again, the left figure blinks, ask for entering current password (factory set is “0000”)
- ▶ Press “ ” button to enter the first figure
- ▶ Repress “SET” button, the second figure blinks
- ▶ Press “ ” button to enter the second figure
- ▶ Repress “SET” button, the third figure blinks
- ▶ Press “ ” button to enter the third figure
- ▶ Repress “SET” button, the fourth figure blinks
- ▶ Press “ ” button to enter the fourth figure
- ▶ Press “SET” button, “PWDN 0000” shows on the screen, ask for entering a new password, doing like above to enter the new password
- ▶ Press “SET” button, “PWDG 0000” shows on the screen, ask for reentering the new password, doing like above to reenter the new password, “PWOK” shows on the screen to indicate reentering password successfully.
- ▶ Press “ESC” button to exit set program or wait for 20 seconds to exit automatically.





Warning!

If the password is forgot, it is impossible to recover, but you can recover the password to factory set, then you can reedit a password like above descript steps, doing like following to recover to factory set.

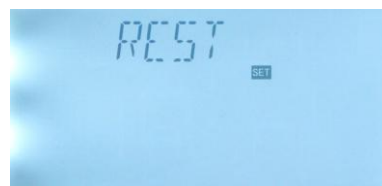
- ▶ Switch-off the power of controller firstly,
- ▶ Press “” button and hold it down, then reconnect the power supply.
- ▶ Buzzer makes “du-----” 3 times, then release “” button. Controller recovers to the factory set password (factory set password is 0000), a new password can be reset now.

8.8 REST Recovery to factory set

Setup steps:

To access main menu REST (recovery to factory set),



- ▶ Press “SET” button, “YES” displays on the screen.
- ▶ Hold down “SET” button, buzzer makes “du-----” 3 times, then release “SET” button and wait for display recovery to initial interface, that means controller recovers to factory set, new paramters can be reset now.



- ▶ Press “ESC” button to exit set program or wait for 20 seconds to exit automatically.

8.9 “ON/OFF” Controller switch on/off button

Under standby status,

- ▶ Press “” button for 3 seconds, controller is closed, “OFF” displays on the screen
- ▶ Repress “” button, Controller recovers to open status.

8.10 Holiday function


Description:



This function activates in night, solar liquid will flow from tank to collector to cool the tank, and as a result to prevent overheating problem of the solar system in the case that tank is already heated completely. The function is activated at night between 10 pm and 6 am, when the temperature of collector is 8 °C below the tank temperature (T2), solar circuit pump starts to work until the temperature of collector is 2 °C below the tank temperature, and then solar circuit pump is ceased.


Activate this function if:

- You intend to leave home for an extended period (holiday)
- No hot water is consumed in an extended period.
- Pump is ceased when the temperature on bottom part of tank is below 35 °C.

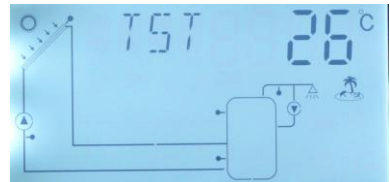
Activate/ deactivate this function:

▶ Press “” button for 3 seconds, sign of holiday function displays on the screen, holiday day number “07” flashes on the screen.

▶ Press “ ” button to adjust the holiday period, adjustable range is 1-60 days.

▶ Press “” button, holiday sign disappears, holiday function is deactivated.

Note: when you return from holiday, please deactivate this function in time.




8.11 Manual heating



Description:



Electrical heater, gas or oil boiler can be as back-up devices in a solar system, this controller can achieve constant temperature controlling, when temperature of top part tank (T3) is 2 °C below the preset switch-on temperature, back-up heating will be triggered. When the temperature on the top part tank (T3) rises up to the preset temperature, then heating is ceased.


Conditions for triggering manual heating function: the preset switch-on temperature of this function should be 2 °C higher than the tank actual temperature.

Activate/deactivate the function:

▶ Press “” button, temperature “60 °C” blinks on the screen.

▶ Press “ ” button to adjust switch-on temperature, adjustable range 10 °C~80 °C, factory set is 60 °C.

After 20 seconds, this function is activated, signal  displays on the screen, and heating sign  blinks also.



▶ Press “” button again, to switch-off manual heating function.


Note:

Manual heating can only heat tank one time, after manual heating is triggered, when temperature of tank rises up to the preset temperature, manual heating ceases, and manual heating function will be deactivated automatically, if customer wants to heat again, you need redo according to above steps.

8.12 Temperature checking function

Under standby status,

▶ Press “ ” button, you can check the value of temperature sensors T0 ~ T8, week and time.

When checking temperature, T0 ~ T8 displays one by one, corresponding sensor signal  blinks. (TST) tank temperature.

Note: Due to the different system, the available checking information is different. Pump accumulated running time (Hp), current daily absorbed thermal energy (DHW), accumulated thermal energy (KWH) or (MWH) can only be checked after enabling the (OHQM) thermal energy measuring function

9. Protection function

9.1 Memory protection

In case power failure occurs, controller keeps the parameter settings unchanged.

9.2 Screen protection

When no any press on button for 3 minutes, screen protection is activated automatically, and then LED background lamp is switched-off. Through press any button to light LED lamp again.

9.3 Pump P1/P2 dry running protection

Pump station is monitored that no liquid flows through pump for 30 seconds, then pump is stopped for 3 minutes; this monitoring is repeated for 3 times, then pump is ceased, “P1” or “P2” blinks on the controller screen, dry running protection is activated.


Reasons of no flow:




- Leakage on the pipeline








- Blade of electronic flow meter is jammed.

10. Trouble shooting

10.1 Trouble protection

When there is a break or short circuit between the connection of temperature sensors, controller switches off the corresponding functions and no more output signals are given, at the same time error sign  shows on the screen. If controller does not work correctly, please check following situations.






►Press “   ” button to check error code (warning sign  blinks on the LCD screen)

LED displayed error code	Code meaning	Cause of error	Error rectification
 T0 ---	T0 sensor problem	Sensor wiring short or open	Check resistance value or replace
 T1 ---	T1 sensor problem	Sensor wiring short or open	Check resistance value or replace
 T2 ---	T2 sensor problem	Sensor wiring short or open	Check resistance value or replace
 T4 ---	T4 sensor problem	Sensor wiring short or open	Check resistance value or replace
 T5 ---	T5 sensor problem	Sensor wiring short or open	Check resistance value or replace
 T6 ---	T6 sensor problem	Sensor wiring short or open	Check resistance value or replace
 T7 ---	T7 sensor problem	Sensor wiring short or open	Check resistance value or replace

10.2 Trouble checking

The built-in controller is a qualified product, which is conceived for years of continuous trouble-free operation. If a problem occurs, the most of causes is from the peripheral

components but no relation with controller itself. The following description of some well-known problems should help the installer and operator to isolate the problem, so that the system can be put into operation as quickly as possible and to avoid unnecessary cost. Of course, not all possible problems can be listed here. However, most of the normal problems encountered with the controller can be found in the list below, only return the controller to seller when you are absolutely sure that none of the problems listed below is responsible for the fault.

Symptoms	Secondary symptoms	Possible cause	Procedure
Controller does not appear any functions at all	Display shows nothing, no display illumination	Controller power supply is interrupted	Check the controller power cable and fuse
Solar pump doesn't operate, despite the fact that switch-on conditions are satisfied	The pump symbol on the display blinks	Pump power supply is interrupted	Check the pump power cable
Solar circuit pump doesn't operate	The pump symbol in the display doesn't blink.  Lighting or  blinks	The maximum storage tank temperature (SMX) has been reached, or The maximum tank temperature 95°C reached.	No fault, normal case
	 Lighting or  blinks	The maximum collector temperature (EMOF) reached	No fault, normal case
	 T1 - - - Error code displays on the screen	Sensor fault (short circuit or open circuit)	Check values of every connected sensor; replace all defective sensors and /or wiring.
Solar pump operated, despite the fact that the switch-on conditions are not satisfied	The pump symbol on the screen flashes.	Holiday function or Frost protection function or tank re-cooling function is activated.	No problem, it is normal. If necessary to deactivate the corresponding functions.
One of functions can't be used	In submenu, this function may not be activated.		No fault
Pump works, but flow rate is 0.0L/min	Filter valves are not installed on the flow and return pipeline	Blade of electrical flow meter is jammed	Dismantle the connected pipe of pump station, clean pipeline with high pressure water gun, And if figure of flow meter is changed means a normal status.

"P1/P2" flashes on the screen		<ol style="list-style-type: none"> 1. Blade of electrical flow meter is jammed 2.No heat transfer liquid in system 3. Pump is damaged. 	<ol style="list-style-type: none"> 1. Dismantle the connected pipe of pump station, clean pipeline with high pressure water gun, 2. Refill heat transfer liquid 3. Replace pump
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Warning! Remove the device from the mains supply before opening the case

A potentially defective sensor can be checked using an ohmmeter. To do this, the sensor must be disconnected, its resistance measured, and the numerical value compared with the figure in the table below, small deviation ($\pm 1\%$) is acceptable.

PT1000 resistance value

°C	0	10	20	30	40	50	60	70	80	90	100	110	120
Ω	1000	1039	1077	1116	1155	1194	1232	1270	1309	1347	1385	1422	1460

NTC 10K B=3950 resistance value

°C	0	10	20	30	40	50	60	70	80	90	100	110	120
Ω	33620	20174	12535	8037	5301	3588	2486	1759	1270	933	697	529	407

11. Quality Guarantee

Manufacturer provides following quality responsibilities to end-users: within the period of quality responsibilities, manufacturer will exclude the failure caused by production and material selection. A correct installation will not lead to failure. When a user takes incorrect handling way, incorrect installation, improper or crude handling, and wrong connection of sensor in system and incorrect operation, the quality responsibility is invalid for them.

The quality warranty expires within 18 months after the date of purchasing the controller.

12. Product specification

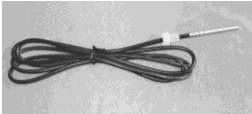
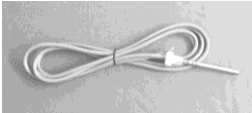




Parameter	Value
Controller Power supply	AC100~240V, 50~60Hz
Controller Power consumption	< 2W
Measure accurate	±2°C
Measure scope of collector sensor	-10~200°C
Measure scope of tank sensor	0~100°C
Available power of R1 electrical thermal trace	<200W
Available power of R2 electrical thermal trace	<200W
Available power of R3 electrical thermal trace	<200W
Available electrical heater can be controlled H1	1 heater, heater power≤ 1500W
T0, T1 sensor for collector	PT1000 , ≤ 300°C (Silicon cable ≤ 280°C)
T2, T3 sensor for tank	NTC10K, B=3950, ≤135 °C (PVC cable ≤105 °C)
T4, T5, T6,T7,T8	Optional sensor: NTC10K, B=3950, ≤135 °C (PVC cable ≤105 °C)
Ambient temperature	-10~50 °C
Water proof grade	IP42

13. Package list

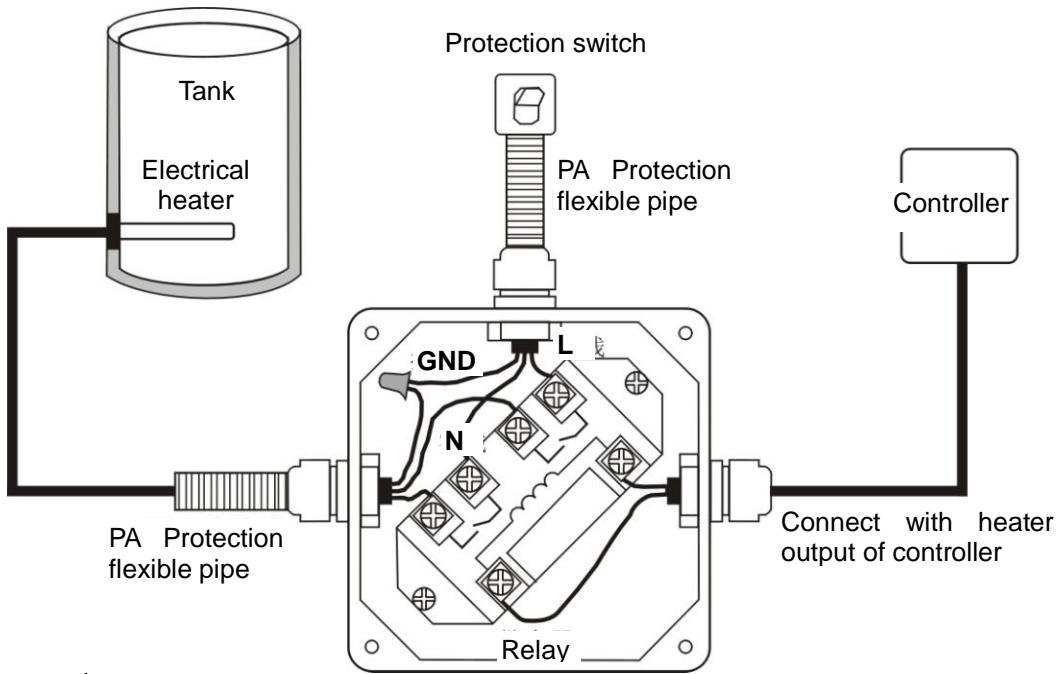
Components	Quantity
Solar pump station	1 pc.
User manual	1 pc.
PT1000 sensor (φ6*50mm, cable length 1.5m)	2 pc.
NTC10K sensor (φ6*50mm, cable length 3m)	4 pcs.
Mounting accessories (expansion screw, clamps)	1 bag
Power cable AC250V/10A	1 pc

14. Device matched to this pump station

Products listed in below table are useful accessories for this pump station; it is not included in the standard package, if you need, please order it separately.

Products name	Specification	Products picture
A01: High accurate Pt1000 sensor for collector	PT1000, $\Phi 6 \times 50\text{mm}$	
A02 High accurate sensor for tank and pipe	NTC10K, B=3950, $\Phi 6 \times 50\text{mm}$	
A05 304 stainless steel thermo well	304 stainless steel with thread 1/2' OT, Size: $\Phi 8 \times 200$	
SR802 Unit for high power electrical heater	Dimension: $100\text{mm} \times 100\text{mm} \times 65\text{mm}$ Power supply: AC180V ~ 264V, 50/60Hz Suitable power: $\leq 4000\text{W}$ Available ambient temperature: $-10 \sim 50^\circ\text{C}$ Waterproof grade: IP43	
Remote display SR805 with cable	Size: $130 \times 10 \times 20\text{mm}$ Available ambient temperature: $-10^\circ\text{C} \sim 50^\circ\text{C}$ Waterproof grade: IP40 See this manual about its application and connection (5.2 terminal connection, eBUS ports: remote display)	
Wireless remote display SR805W	Size: $130 \times 10 \times 20\text{mm}$ Available ambient temperature: $-10^\circ\text{C} \sim 50^\circ\text{C}$ Waterproof grade: IP40 See this manual about its application and connection (5.2 terminal connection, eBUS ports: remote display)	

SR802 connection diagram:



Note: Switch-off power, and perform by profession installer.