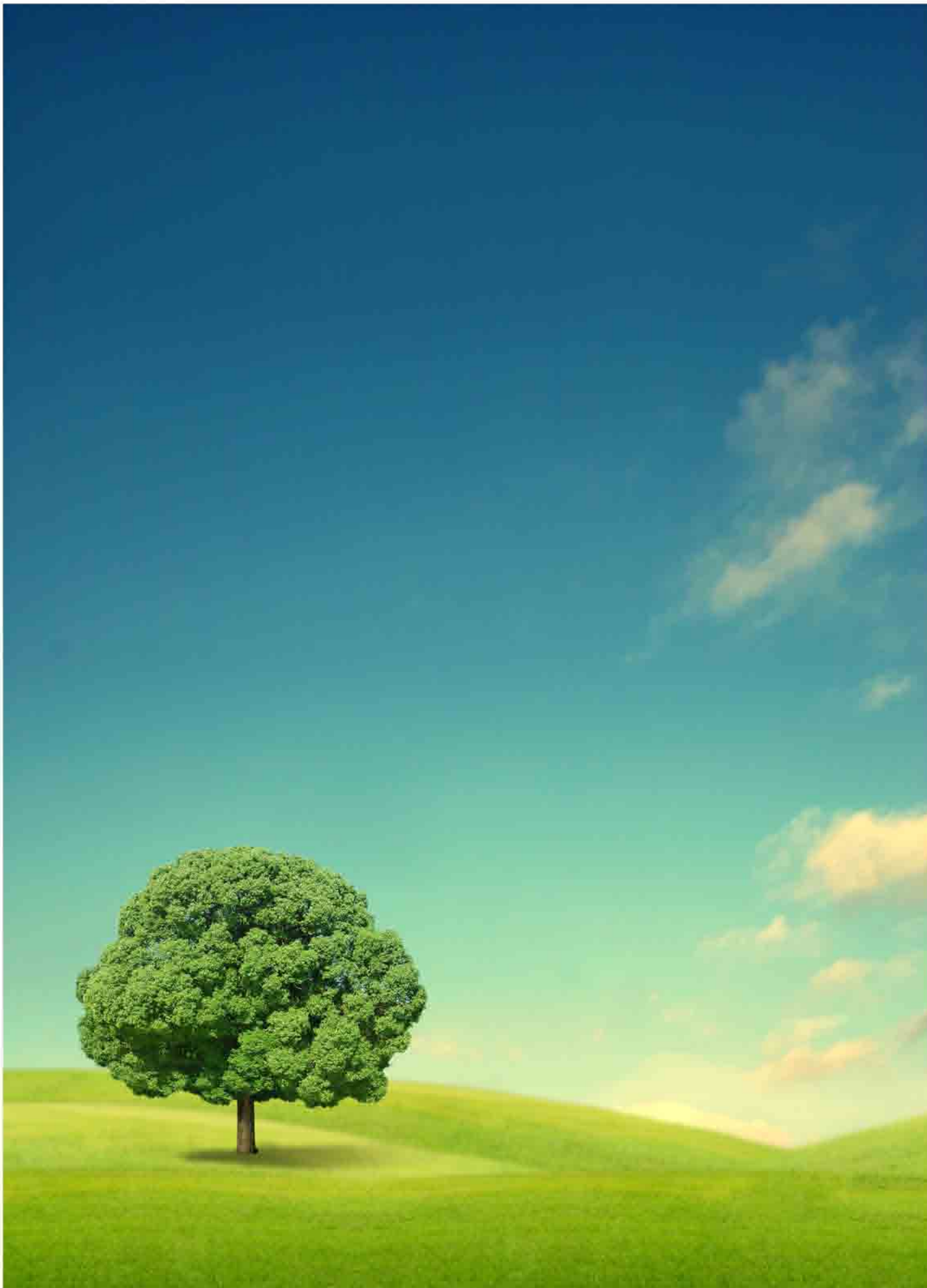




DONPER 东贝

Solar water heating system manual





[Company introduction]

Huangshi Dongbei Mech-Electric Group Solar Energy Co., Ltd is the indirect holding company of Donper group. It is established on May in 2003, specializes in producing solar heater, solar light, heat exchanger pressure hot water tank, PV grid tie solar inverter etc.

At the beginning, our company have established the documental quality control system according to the requirement of the ISO9001 standard, and took the lead in 2003 to pass the ISO9001 certification in solar energy industries, and in 2008 we passed the environment symbol product certification which recognized by the state environment protection agency. Many series products also successively passed "CCC", "CE" and other certification. The product can satisfy the different users' demands because of the pretty appearance, energy saving, thermostable high and cold high reliability, economical, and safe using. Depends on the thorough management system and advanced product technology, our company cooperates with ARISTON and other international enterprise with long term stable relation. Our products not only sells well in domestic market, but also exports to the Europe, the Middle east and Australia markets. In 2005, the company was rated as the administrative director unit in China solar energy heat utilization industry.

In 2006 the company obtained "Hubei top brand". In April 2007, the company was evaluated as "Solar energy profession recommendation brand" by chinese energy conversation association solar energy specialized committee, and December 2008, the company obtained the Hubei province high and new technology enterprise.

Donper solar have been successfully built many projects like solar hot water, heat pump hot water, hot cold unite supply in Huangshi, Huanggang, Wuhan, Shanghai, Jingmen, Yichang, Wuhu and other places. And our company has great experience in researching, designing and installing big hot water project, it is the experienced hot water projects expert in the solar energy industry.

For many years, our company depends on the advanced technology, outstanding products quality, optimized integrated technology and users' solutions. Elaborate construction technology and timing effective after service. Won the wide trust and good public praise.

Huangshi Dongbei Mech-Electric Group Solar Energy Co., Ltd developing many solar products with stable quality, can meet the requirement of organs, enterprises and institutions, schools, army, hotel, restaurant with hot water.



System introduction

Donper solar hot water heating system

7 key components

24 hours constant temperature hot water supply

Donper solar hot water heating system includes solar collector, water tank, control system, auxiliary heater, circulating pump, pipeline accessories, thermal insulation material etc.

Bi-energy heat supply Intelligent optimize Timing and temperature-set Anti-freezing protection

The whole system prior to use the solar energy, perfectly combined with the auxiliary heating, maximal reduce the consuming of the auxiliary heating. The system is stable, reliable, precisely control, high capacity of resisting disturbance, highly intelligentize, easy operation, temperature difference circulation, constant temperature water, timing or circulating heat, pipeline constant temperature circulating, system antifreezing circulating etc. The system also endow with protection measures like short circuit , over current, leakage of electricity, overtemperature etc.

To meet the requirement of different customers by offering most economic benefit technical solution

Base on the demand of customers, For the different region, different roof structure, different hot water application, Professional designers of Huangshi Dongbei Mech-Electric Group Solar Energy Co., Ltd optimized the hot water, provide the most reasonable technical solutions. The solar water heating system can meet the requirement of organs, enterprises and institutions, schools, army, hotel, restaurant with hot water.

A comparative analysis of the economic benefit

Donper solar hot water heating system

According to expert estimates, a square meter of solar water heating system can save 120 kg standard coal every year, save 86.24 m³ natural gas, 924.87 KWH electricity, corresponding reduction in carbon dioxide emissions of 308 kilograms, (according to the ministry of science and technology in 2008 《Manual of energy conservation and emission reduction》).

【 Take the example with 10 tons of 15 °C of cold water heating to 50 °C (Need 350000 kilocalorie heat)】

Item	Solar heater	Electric water heater	Gas water heater	Diesel boiler
Capacity of hot water	10000L/Day	10000L/Day	10000L/Day	10000L/Day
Initial cost	185000 (RMB)	120000 (RMB)	95000 (RMB)	68750 (RMB)
Initial temperature	15℃	15℃	15℃	15℃
Finished temperature	50℃	50℃	50℃	50℃
Working time	273Day	365Day	365Day	365Day
Annual consume energy	39412.4 KWH	156364.7KWH	42011.5KWH	15658.5KWH
Annual consume energy fee	26771.1 (RMB)	114146.2 (RMB)	105028.8 (RMB)	65763.7 (RMB)
Annual operation maintenance fee	500(RMB)	500(RMB)	500(RMB)	4000(RMB)
5 years investment operation consume fee	331355(RMB)	693231(RMB)	622644(RMB)	417578.3(RMB)
Duration	Above 15 years	8 years	8 years	8 years
Operation security	Safe	Unsafe	Unsafe	Unsafe
Environmental conservation	Non-pollution	Pollution	Pollution	Pollution

1. Electric calorific value is 860 kilocalorie/KWH, electric water heater's thermal efficiency is 95%, the average electrovalence is 0.73 yuan/KWH.
2. Pipelined gas calorific value is 3800 kilocalorie/ m³, combustion efficiency is 80%, the average price is 2.5 yuan/ m³.
3. Diesel oil calorific value is 10200 kilocalorie/ kg, combustion efficiency is 80%, the average price is 4.2 yuan/ kg.

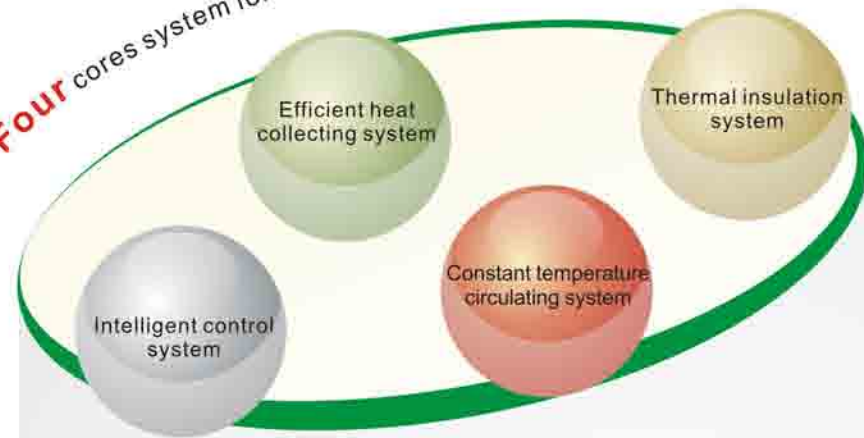


It can be seen from the form above, using solar water heating system could save 360000 yuan in 5 years compared with electric heater, save 290000 yuan compared with gas water heater, save 86000 yuan compared with diesel oil boiler. Under the same water needs condition, the solar water heating system would cost less in many aspects than those three traditional heating ways mentioned above except the initial outlay. Besides, many potential safety hazard often exist in those three traditional ways and environmental contamination may be caused.

System Accessories

Donper solar water heating system

Four cores system for Donper solar water heating system



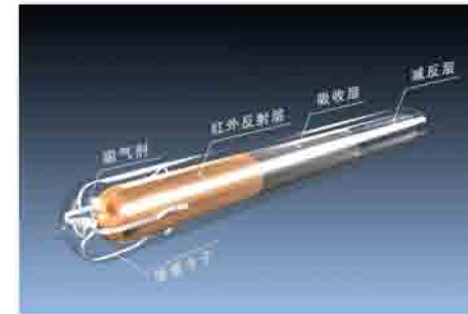
High-borosilicate vacuum tubes

High-efficiency thermal insulation modules

Flagship galvanized bracket



Efficient heat collecting system



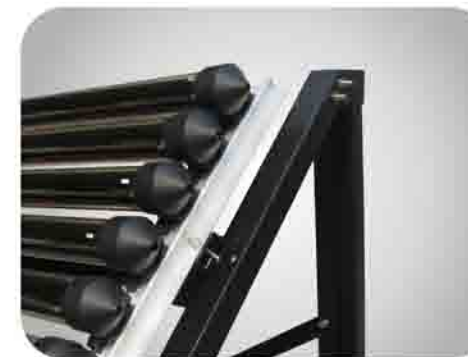
1. Vacuum tube

Adopts high quality borosilicate glass with high solar-thermal conversion and low heat loss, and stable advanced coating up to 400 centigrade, the absorption rate for vacuum tube is more than 92.5%, the emittance rate is less than 8%, and the hail resistance up to 25mm.



2. Module water tank

The water tank is made of stainless steel with the thickness of 0.4mm. And adopts polyurethane foams with high solar-thermal conversion and low heat loss.



3. Bracket

Adopts galvanized steel plate bracket with high-grade outdoor powder coating, its surface has resistance performance of corrosion, heat and sunshine.

Thermal insulation system

Heat collecting and heat providing water tank

The hot water tank is made of stainless steel(SUS 304), and the water tank insulation layer using the overall high-pressure polyurethane foaming technology, a casting molding, with high solar-thermal conversion and low heat loss.

Intelligent control system

Control cabinet

Control cabinet is mainly used for controlling solar water heating system and heat pump system.

- The control cabinet is available for different hot water system.
- Adopts key signal data communication technology, high anti-interference and stability.
- Modularized main component, works reliably, installs and maintains easily.
- It also can be customized for particular requirements.

Constant temperature recycling system

Circulating water pump

With overheat protector and cooling fan, reduce motor temperature.

Adopt high efficient impeller, low noise and long service life.

Easy to install for the pipeline connection



Model	Power		Pumping head		Water flow		Pipe diameter	Weight	Brand
	Input	Output	Max.	Rated	Max.	Rated			
PH-101E	200	100	5	3	130	85	40	8.5	Wilo pump
PH-123E	265	125	5	3	190	135	50	11	
PH-251E	410	250	7.5	4	230	190	65	17	
PH-253E	410	250	7.5	4	230	190	50	17	
PH-254E	330	250	15	10	100	50	40	10	
PH-401E	900	400	19	16	280	110	50	22	



Voltage	210-250W
Mounting form	Wall-mounted type
Display	LED
Acquisition	5 channels for temperature acquisition, 1 channel for water level
Output	5-8 channels output respective control
Outlet solenoid valve	220V/5A
Water-supply solenoid valve	220V/5A
Circulating pump for temperature difference or antifreezing	220V/10A
Auxiliary heating	220V/10A
Circulating pump for pipeline	220V/10A
Antifreezing electric heating belt	220V/10A
Temperature range	0℃-99℃
Water level range	0-3m
Size	500×600×200mm
Assembly options	485/232 communication interface Within 45kw electric heater

Application program

Donper solar water heating system

System working principle diagram

Program ● Timing water heating system (solar+electric heater)

Method of operation

Temperature difference circulation

The forced circulation system is composed by hot water tank and vacuum tube collectors. When $T1-T3 \geq 8^\circ\text{C}$, The pump (P1) will be operated and transport the cold water (in hot water tank) into the collector. The cold water will be heated during the circulation. When $T1-T3 \leq 3^\circ\text{C}$, the pump stop working.

Backwater circulation

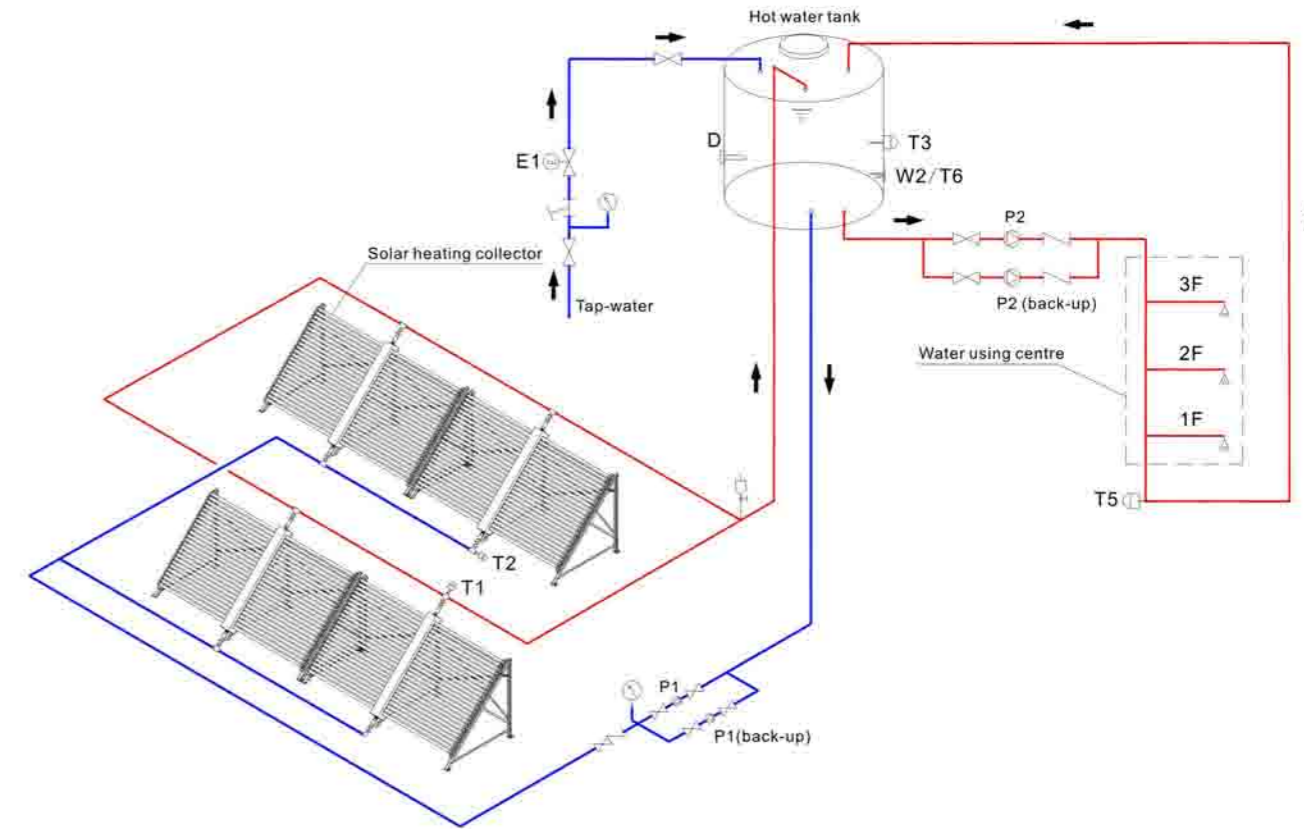
The hot water tank and water supply point formed into a closed loop circuit. When T5 is very low, the pump (P2) will be operated and transport the cold water (in the pipe) into the hot water tank. Ensure the user can use hot water at anytime. In the mean time, decrease the flow of cold water, save water.

Antifreezing circulation

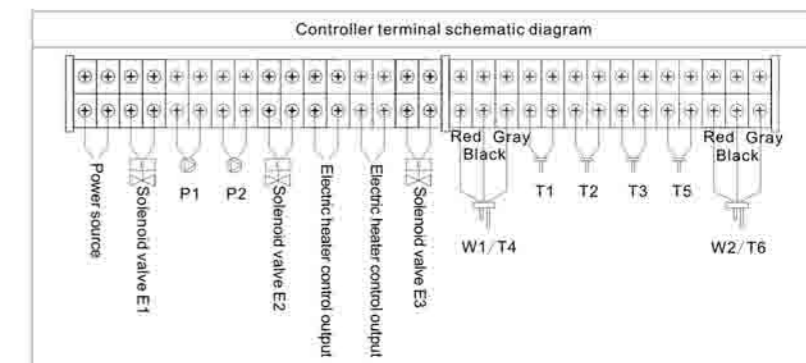
When $T2 \leq 2^\circ\text{C}$, pump(P1) will be operated and transport the hot water(in the hot water tank) into the collector to protect the collector from broken because of freezing temperature.

Fixed temperature heating

When T3 is lower than setting temperature, the electric heater will be operated. When T3 is higher than setting temperature, the electric heater stop working.



Marginal Indication			
	Sluice valve		Temperature probe
	Check valve		Temperature probe (water level)
	Solenoid valve		Electric heater
	Water pump		Automatic air valve
	Strainer valve		Pressure meter
	Connector		Elbow
	Tee valve		Four way valve



Program  *Timing water heating system (solar+air source heat pump)*

System working principle diagram 

Method of operation 

Temperature difference circulation

The forced circulation system is composed by hot water tank and vacuum tube collectors. When $T1-T3 \geq 8^{\circ}\text{C}$, The pump (P1) will be operated and transport the cold water (in hot water tank) into the collector. The cold water will be get heated during the circulation. When $T1-T3 \leq 3^{\circ}\text{C}$, the pump stop working.

Backwater circulation

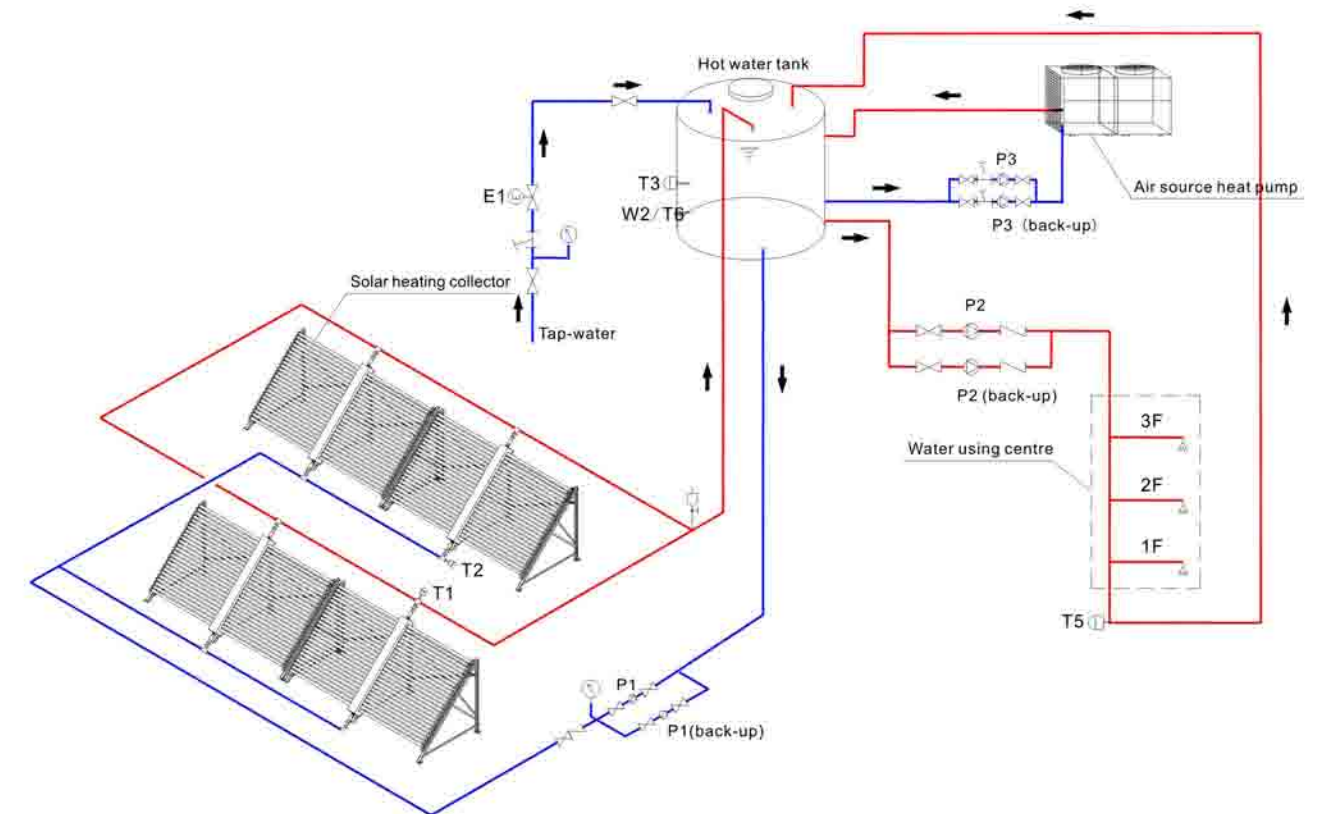
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
Antifreezing circulation

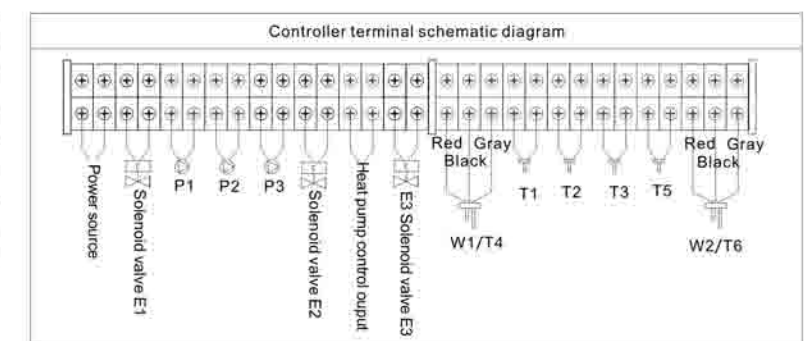
When $T2 \leq 2^{\circ}\text{C}$, pump(P1) will be operated and transport the hot water(in the hot water tank) into the collector to protect the collector from broken because of freezing temperature.


Fixed temperature heating

The air source heat pump and the hot water tank formed into a closed loop circuit. When T3 is lower than setting temperature, the air source heat pump will be operated. When T3 is higher than setting temperature, the air source heat pump stop working.



Marginal indication			
	Sluice valve		Temperature probe
	Check valve		Temperature probe (water level)
	Solenoid valve		Electric heater
	Water pump		Automatic air valve
	Strainer valve		Pressure meter
	Connector		Elbow
	Tee valve		Four way valve



Program  *Solar water heating system (solar+electric heater)*

System schematic diagram II 

Method of operation II 

Temperature difference circulation

Heat collecting water tank and vacuum tube collector are formed into a forced circulation system, the circulating pump P1 will start and transport the cold water to the heat collector when $T1-T3 \geq 8^{\circ}\text{C}$, the water temperature would keep rising with this circulation. The circulating pump will stop when $T1-T3 \leq 3^{\circ}\text{C}$.

Fixed temperature water replenishing

The pump P2 will start and transport the hot water in the heat collecting water tank to the heat providing one when the temperature of T3 is higher than the setting's. At the same time, the switch of pump P2 is controlled by the water level in the heat providing water tank, the pump P2 will stop when the level is a little high.

Backwater circulation

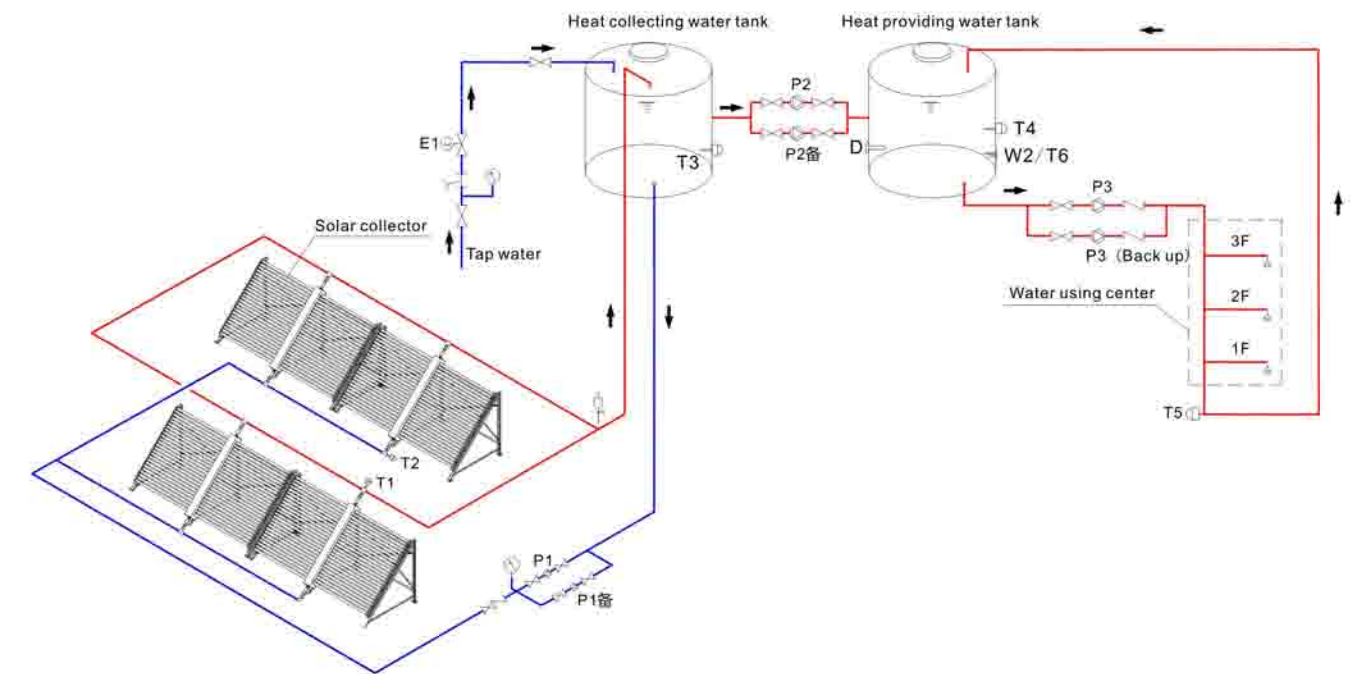
Heat providing water tank and water using end are formed into a closed loop circuit. When the temperature of T5 is low to unable to satisfy the using demand, the pump P3 will start and pump the cold water in the pipeline into the water tank, and ensure the users could use hot water anytime.














Antifreezing circulation

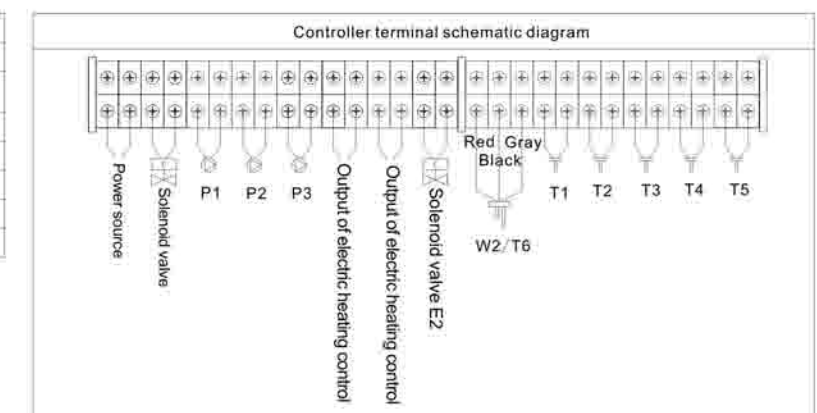
When the temperature of $T2 \leq 2^{\circ}\text{C}$, the pump P1 will start and push the hot water into the heat collector to prevent it from rupture because of low temperature.

Fixed temperature heating

The electric-heating tube will start and heat for the water when the temperature of T4 is lower than the setting's. The electric-heating tube will stop when the temperature of T4 is higher than the setting's.



Marginal indication		
	Sluice valve	
	Check valve	
	Solenoid valve	
	Water pump	
	Strainer valve	
	Connector	
	Tee valve	



Program Solar water heating system (solar+air source heat pump)

Method of operation

Temperature difference circulation

Heat collecting water tank and vacuum tube collector are formed into a forced circulation system, the circulating pump P1 will start and transport the cold water to the heat collector when $T1-T3 \geq 8^{\circ}\text{C}$, the water temperature would keep rising with this circulation. The circulating pump will stop when $T1-T3 \leq 3^{\circ}\text{C}$.

Fixed temperature water replenishing

The pump P2 will start and transport the hot water in the heat collecting water tank to the heat providing one when the temperature of T3 is higher than the setting's. At the same time, the switch of pump P2 is controlled by the water level in the heat providing water tank, the pump P2 will stop when the level is a little high.

Backwater circulation

Heat providing water tank and water using end are formed into a closed loop circuit. When the temperature of T5 is low to unable to satisfy the using demand, the pump P4 will start and pump the cold water in the pipeline into the water tank, and ensure the users could use hot water anytime.

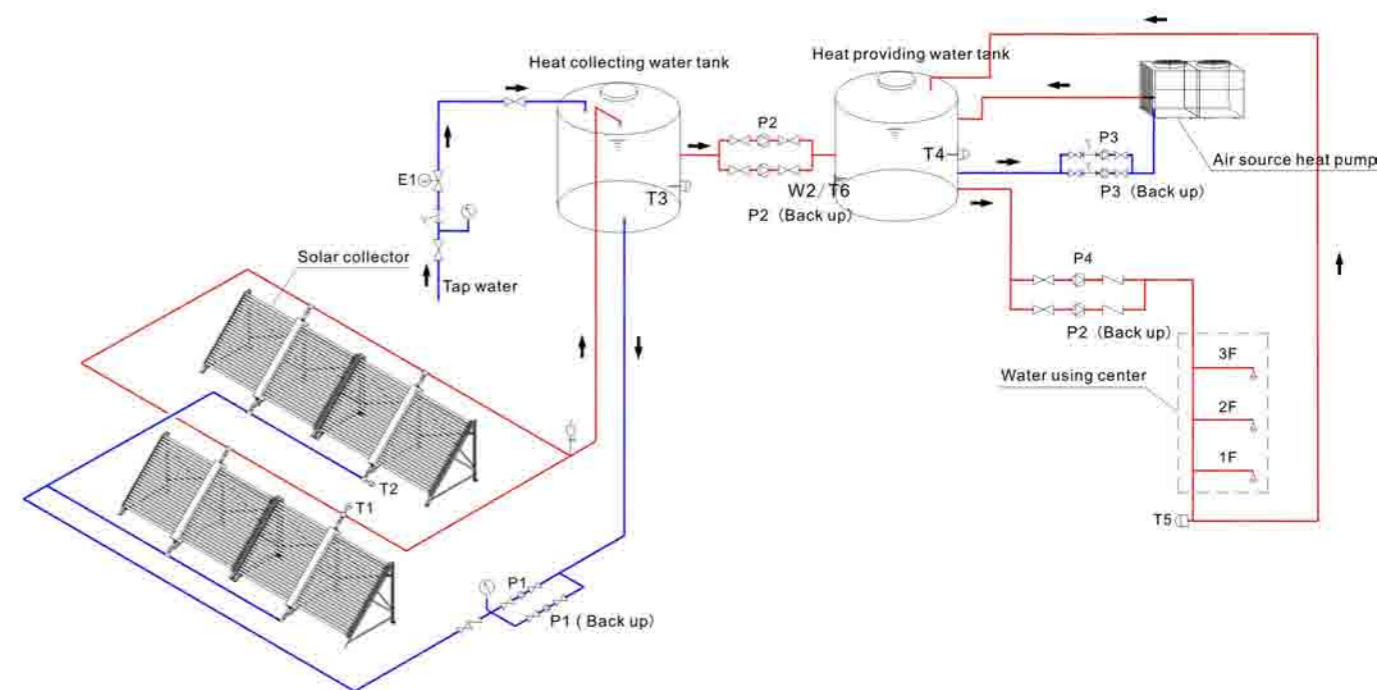
Antifreezing circulation















When the temperature of $T2 \leq 2^{\circ}\text{C}$, the pump P1 will start and push the hot water into the heat collector to prevent it from rupture because of low temperature.

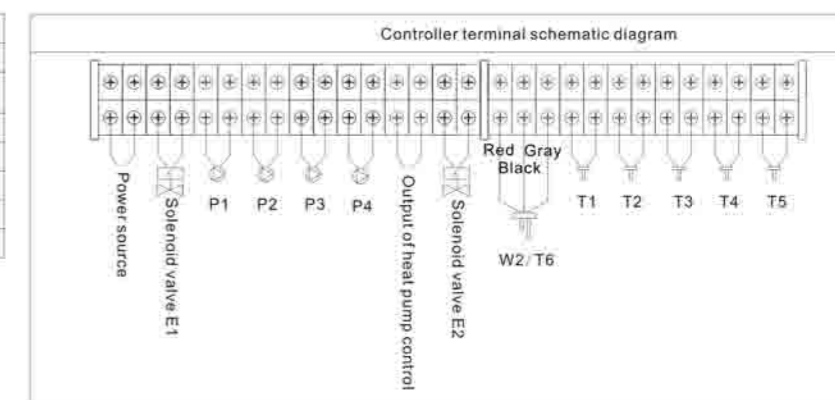
Fixed temperature heating

Air source heat pump is connected with heat providing water tank which forming into a closed loop circuit, The pump P3 will start and the air source heat pump heats for the water when the temperature of T4 is lower than the setting's. The pump P3 will stop when the temperature of T4 is higher than the setting's.

System schematic diagram



Marginal indication		
	Sluice valve	
	Check valve	
	Solenoid valve	
	Water pump	
	Strainer valve	
	Connector	
	Tee valve	



Project

Donper solar water heating system



Hubei Golden Mountain Industrial Zone



Anhui Wuhu Abaur Mech-electric Co.,LTD



Hubei Yicheng Four Season Hotel



Hubei Yangxin Army Farm



Jiangsu Yixing Wanshi School



Hubei Easten Mountain Industrial Zone



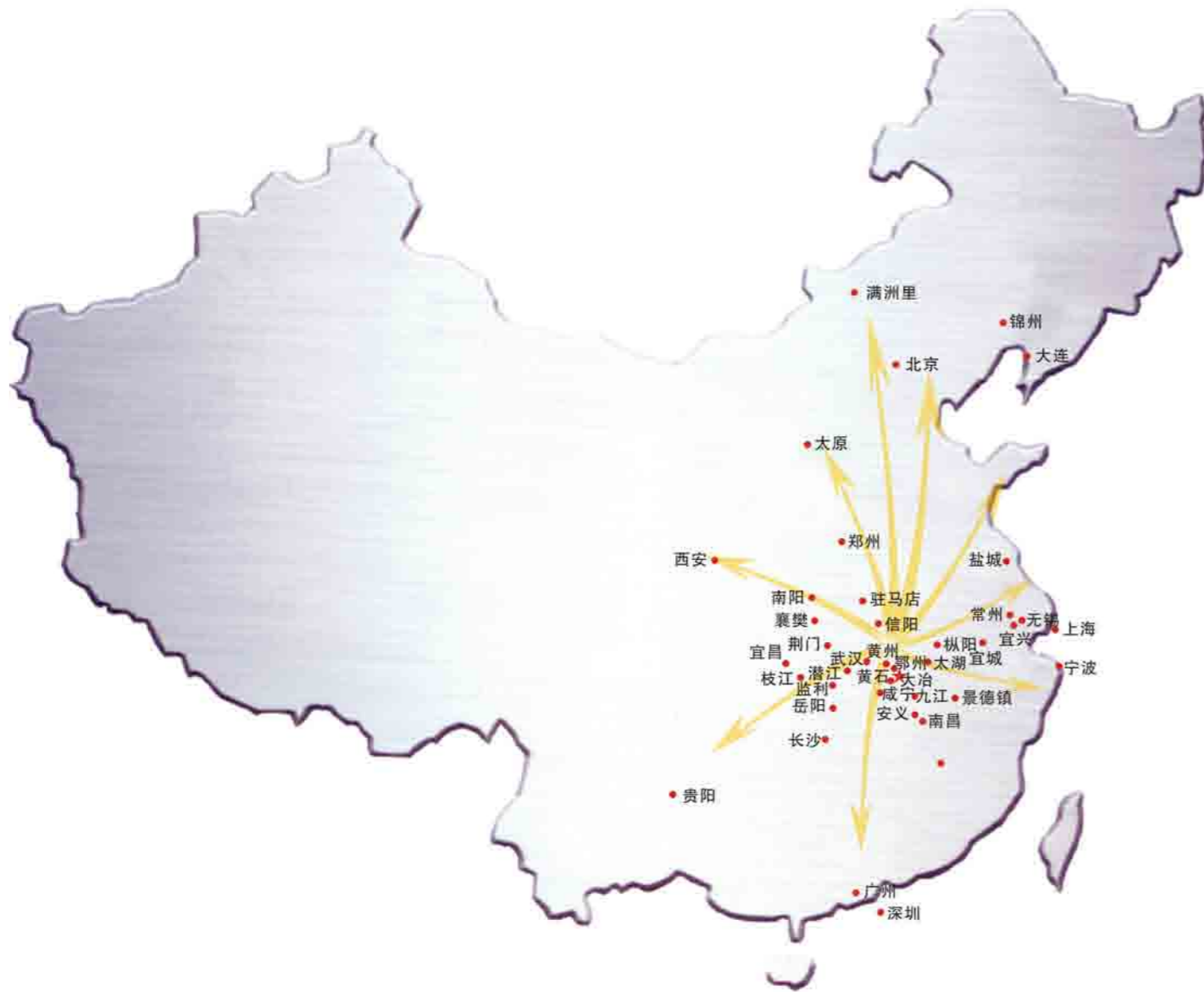
Henan Neixiang Airforce Base



Hubei Yicheng Wanzong Yarn Industry Co.,LTD

Sincere service

Donper solar water heating system



Free hotline:

800-880-7176

High quality, Perfect Service, Always satisfy our clients.

Service promise

1. Quality assurance: the main frame maintains for 3 years, the fitting and the electronic products etc for 1 years
2. Service aim: Pre-sale, sells, post-sale, feedback, always meet your demand.
3. Service items:

Promptly solve troubles

After receiving request repaired, the local serviceman will arrive to fix it in 4 hours.

Integrity service

We will provide a variety of parametes and data for your reference, Observe the treaty, complete the project on time after signing the contract.

Feedback center

Our after-sale service Dept make a record of each client, Staff will contact you and arrange feedback periodical. Handle the problems in time.

Sevice attitude

Serviceman should carry professional tools, material, work license, with overall.

Serviceman should visit client politely, smoking, drinking, eating, receiving gifts is absolutely prohibited during the maintainance,

Serviceman should clean up the repair surrounding when everything is finished, remind the user operating rules whe leaving.

Service goal

- Make your daily life easy and convenient, Creat low-carbon environment.





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