



# SPI Manual

# Content

General information.....	1
Product description.....	2
System description.....	3
Fault message.....	9
Packing list .....	9
Appendix: Network Connection Manual	

## 1 About this manual

This manual book describes the installation, functions and operation rules of our intelligent controller series for solar water heating control system. When install with other applications on this system, such as solar collector, pump station, and storage, please follow the instruction of correlative suppliers. The installation, electrical connection, adjustment and maintenance should be carried out by a qualified specialist.

## 2 Safety rules

- The controller can't be installed in the room where easily inflammable and explosive mixtures (e.g. gas or oil) are present or may occur.
- The controller can't be installed in the location which exceeds its allowable environment condition.
- All operations which require opening the controller are only to be taken without the power supply. And the operation should be carried out by a qualified specialist.
- Before connecting the electrical wire, make sure that the power supply matches the required parameter.
- All devices connected to the controller must match the technical parameter of the controller.
- Once the controller is damaged or failure to work, please take it out of system and inform the supplier.

## 3 Liability waivers






- Improper installation or operation can cause damages to material and persons. The manufacturer cannot monitor the compliance with these instructions or the circumstances and methods used for installation, operation, utilization and maintenance of this device. Damage by mishandling or improper installation on costumer site is immediately leading to warranty exclusion.
- As faults can never be excluded, we don't offer a guarantee for the completeness of the drawings and texts of this manual, they only represent some examples. They can only be used on own risk. No liability is assumed for incorrect, incomplete or false information and the resulting damages.
- The manufacturer preserves the right to put changes to product, technical date or installation and operation instructions without prior notice.

## 4 About Sensors










- Only original equipped Pt1000 temperature sensors can be matched the solar collector. It is equipped with 1.5m silicone wire and suitable for all kinds of weather conditions. They can resist the temperature up to 280 °C. There is no need to distinguish the positive and negative charges when connect them to the controller.
- Only original equipped NTC10K temperature sensors can be matched the storage and pipeline. It is equipped with 1.5m PVC wire. They can resist the temperature up to 105 °C. There is no need to distinguish the positive and negative charges when connect them to the controller.
- All sensor wires can carry low voltage. In order to avoid inductive effects, the wires must not be laid close to 230 V or 400 V cables (The min. distance should be 100mm).
- If external inductive effects exist, e.g. heavy current cables, overhead train cables, transformer substations, radio and television devices, amateur radio stations or microwave devices, then the wires for the sensors must be adequately shielded.
- Sensor wires can be extended to a maximum length of 100m. When it is extended to 50m, use 0.75mm<sup>2</sup> wire. When it is extended to 100m, use 1.5 mm<sup>2</sup> wire.

## Product description

### 1 Button

Button	Function
	Cancel set value
	Adjust
	System setting
	Adjust
	Confirm set value

### 2 Operation regulations

- When connect to power, the default mode is system working mode.
- Press  button to start the system data set mode. Press it again to convert to different set choice. Every choice is corresponding to different signal display. Please see the description of signals in the following instruction.  
Press  and  buttons to adjust the set value, press  button to switch on correlative function or confirm the current set value.  
Press  button to cancel correlative function or cancel the current set value, then start the system working mode.
- On the system data set mode, if not press any button within 15 seconds, the system will cancel the current set value, start the system working mode.
- On the system working mode, press  button to switch on or switch off the auxiliary heating output. Press  button to switch on or switch off the heat collecting function.
- On the system working mode, press  button for 2 seconds to switch on or switch off the R1 output handily. Press  button for 2 seconds to switch on or switch off the R2 output handily.

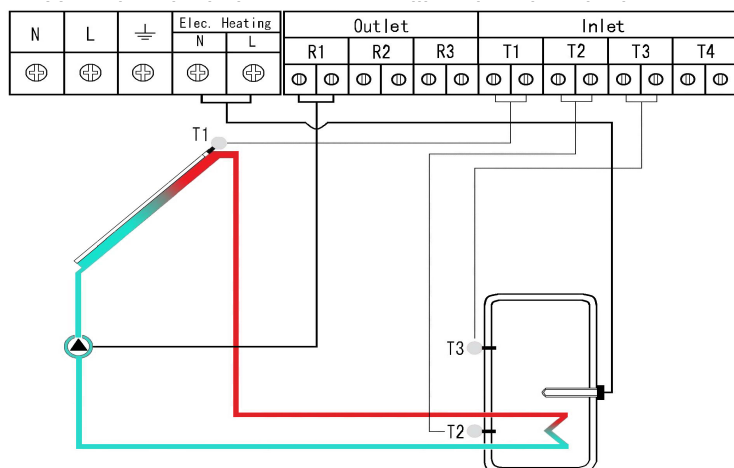
### 3 Main technical data

- Dimension: 186x140x41 mm
- Input voltage: 220V ~ 240V AC or 100V ~ 120V AC
- Power: 5W
- Accuracy of temperature measuring:  $\pm 1$
- Range of temperature measuring: PT1000: 0 ~ 199      NTC 10K: 0 ~ 99
- Input signals:
  - 1 x PT1000 sensor temperature probe 500 , silicon cable 280 ;
  - 3 x NTC10K sensor temperature probe 135 , PVC cable 105
- Output signals:
  - 1 x Auxiliary heating output (Max. load current: 12 A)
  - 3 x Relay output (Max. load current: 3A)
- LCD-display
- Communication port: 1 x RJ45
- Range of environment temperature: -10 ~ 50
- Water protection grade: IP40

## System description

### System 1

The standard split pressurized solar water heating system with 1 collector array and 1 storage.

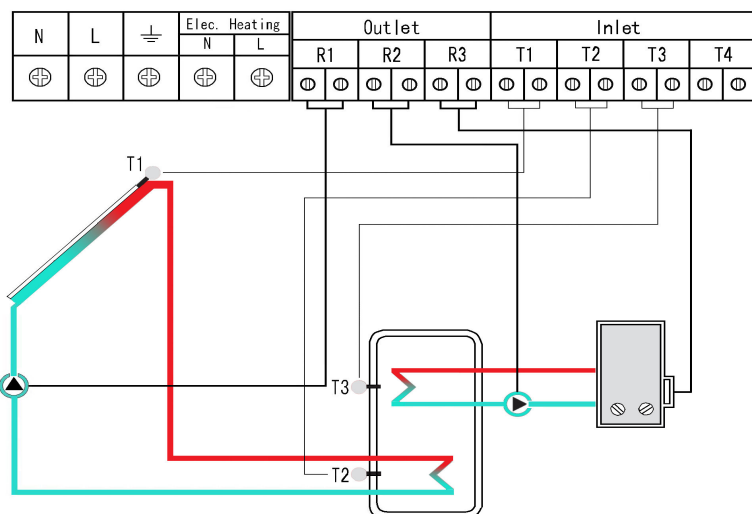


Relay output	Note
Elec. Heating	Elec. Heater
R1	Pump 1
Sensor input	Note
T1	Temp. of Collector
T2	Temp. of Storage base
T3	Temp. of Storage top

Signal	Function	Factory setting	Value arrange	Description
	System choice	1	1-6	System 1
	Time display			Display the current time
	Three time periods on auxiliary heating	04:00-05:00 10:00-10:00 17:00-22:00	00:00-23:50	Adjust the auto. working time period of auxiliary heating
	Storage keeping temp.	60	45-75	Adjust the referenced temp. of auxiliary heating
	Switch-on temp. difference	8	5-20	Adjust the desired switch-on temp. difference
	Switch-off temp. difference	4	2-12	Adjust the desired switch-off temp. difference
	Overheating protection of storage	80	50-95	When the storage reaches the desired overheating protection temp., temp. difference circulation will be switched off.
	System frost protection	3	2-8	When the collector temp. is lower than the desired frost protection temp., this function will be activated.
	Holiday function			This function will be activated when a holiday is planed or when there is no need to use hot water for a long time.
	Factory default			All the desired values (except Time display) can be set back to factory default.
	System overheating protection			When the collector is overheating, the system stops working, which to avoid the accessories to be destroyed.
	Anti-bacteria protection			To avoid the bacteria occur, the system takes the bacteria-killing process periodically.

## System 2

The standard split pressurized solar water heating system with 1 collector array and 1 storage.  
Use gas boiler as auxiliary heating device.

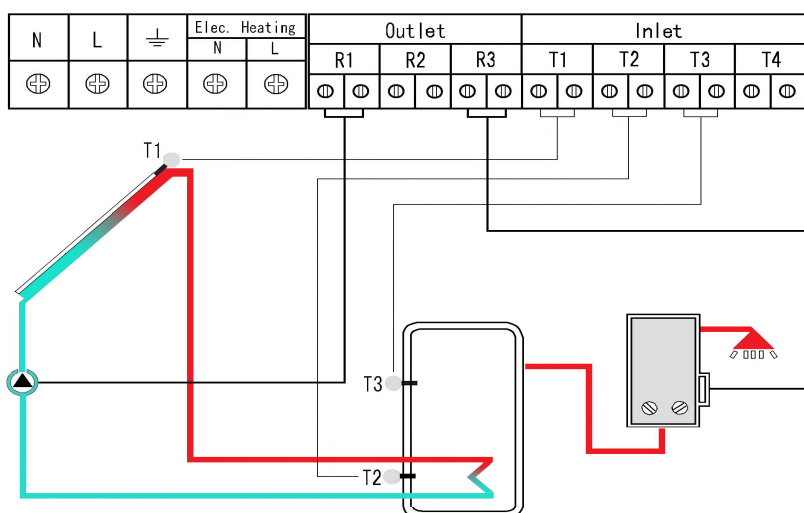


Relay output	Note
R1	Pump 1
R2	Pump 2
R3	Gas boiler
Sensor input	Note
T1	Temp. of Collector
T2	Temp. of Storage base
T3	Temp. of Storage top

Signal	Function	Factory setting	Value arrange	Description
	System choice	1	1-6	System 2
	Time display			Display the current time
	Three time periods on auxiliary heating	04:00-05:00 10:00-10:00 17:00-22:00	00:00-23:50	Adjust the auto. working time period of auxiliary heating
	Storage keeping temp.	60	45-75	Adjust the referenced temp. of auxiliary heating
	Switch-on temp. difference	8	5-20	Adjust the desired switch-on temp. difference
	Switch-off temp. difference	4	2-12	Adjust the desired switch-off temp. difference
	Overheating protection of storage	80	50-95	When the storage reaches the desired overheating protection temp., temp. difference circulation will be switched off.
	System frost protection	3	2-8	When the collector temp. is lower than the desired frost protection temp., this function will be activated.
	Holiday function			This function will be activated when a holiday is planed or when there is no need to use hot water for a long time.
	Factory default			All the desired values (except Time display) can be set back to factory default.
	System overheating protection			When the collector is overheating, the system stops working, which to avoid the accessories to be destroyed.
	Anti-bacteria protection			To avoid the bacteria occur, the system takes the bacteria-killing process periodically.

## System 3

The standard split pressurized solar water heating system with 1 collector array and 1 storage. Use electrical heater as auxiliary heating device.

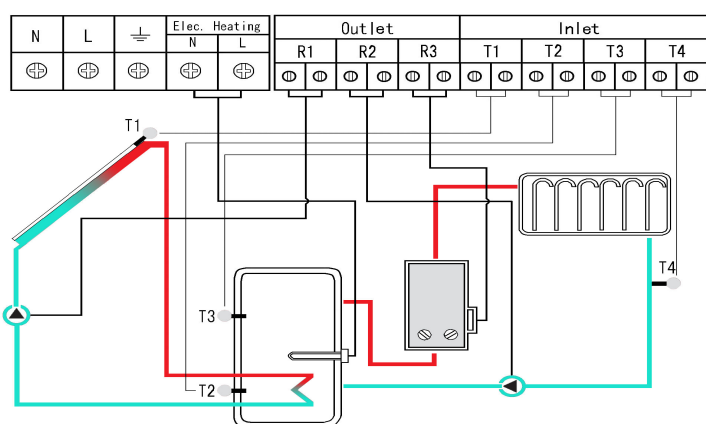


Relay output	Note
R1	Pump1
R3	Gas boiler
Sensor input	Note
T1	Temp. of Collector
T2	Temp. of Storage base
T3	Temp. of Storage top

Signal	Function	Factory setting	Value arrange	Description
	System choice	1	1-6	System 3
	Time display			Display the current time
	Reference temp. of output hot water output	45	30-60	Adjust the referenced switch-on and switch-off temp. of gas boiler
	Switch-on temp. difference	8	5-20	Adjust the desired switch-on temp. difference
	Switch-off temp. difference	4	2-12	Adjust the desired switch-off temp. difference
	Overheating protection of storage	80	50-95	When the storage reaches the desired overheating protection temp., temp. difference circulation will be switched off.
	System frost protection	3	2-8	When the collector temp. is lower than the desired frost protection temp., this function will be activated.
	Holiday function			This function will be activated when a holiday is planed or when there is no need to use hot water for a long time.
	Factory default			All the desired values (except Time display) can be set back to factory default.
	System overheating protection			When the collector is overheating, the system stops working, which to avoid the accessories to be destroyed.

## System 4

The standard split pressurized solar water heating system with 1 collector array and 1 storage. Use gas boiler as auxiliary heating device to realize heat collecting function.



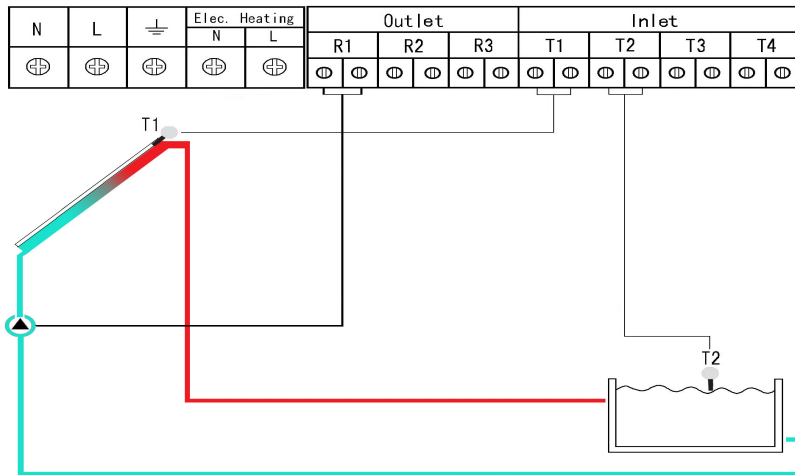
Relay output	Note
Elec. Heating	Elec. Heater
R1	Pump 1
R2	Pump 2
R3	Gas boiler
Sensor input	Note
T1	Temp. of Collector
T2	Temp. of Storage base
T3	Temp. of Storage top
T4	Heating circuit return temp.

Signal	Function	Factory setting	Value arrange	Description
	System choice	1	1-6	System 4
	Time display			Display the current time
	Three time periods on auxiliary heating	04:00-05:00 10:00-10:00 17:00-22:00	00:00-23:50	Adjust the auto. working time period of auxiliary heating
	Three time periods on heat collecting	Whole day working	00:00-23:50	Adjust the auto. Working time period of heat collecting function
	Reference temp. of heat collecting	25	15-65	Adjust the base reference temp. of heat collecting function
	Storage keeping temp.	60	45-75	Adjust the reference temp. of auxiliary heating
	Switch-on temp. difference	8	5-20	Adjust the desired switch-on temp. difference
	Switch-off temp. difference	4	2-12	Adjust the desired switch-off temp. difference
	Overheating protection of storage	80	50-95	When the storage reaches the desired overheating protection temp., temp. difference circulation will be switched off.
	System frost protection	3	2-8	When the collector temperature is lower than the desired frost protection temp., this function will be activated.
	Holiday function			This function will be activated when a holiday is planed or when there is no need to use hot water for a long time.
	Factory default			All the desired values (except Time display) can be set back to factory default.
	System overheating protection			When the collector is overheating, the system stops working, which to avoid the accessories to be destroyed.
	Anti-bacteria protection			To avoid the bacteria occur, the system takes the bacteria-killing process periodically.








## System 5

The standard unpressurized solar pool system with 1 collector array and 1 pool.

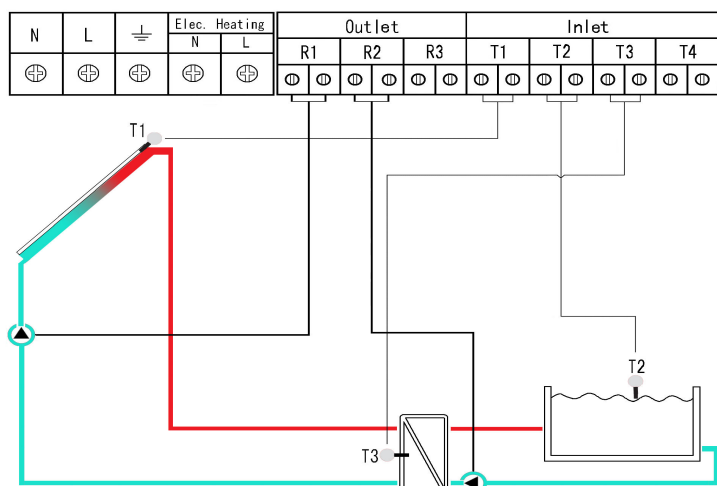


Relay output	Note
R1	Pump1
Sensor input	Note
T1	Temp. of Collector
T2	Temp. of pool

Signal	Function	Factory setting	Value arrange	Description
	System choice	1	1-6	System 5
	Time display			Display the current time
	Switch-on temp. difference	8	5-20	Adjust the desired switch-on temp. difference
	Switch-off temp. difference	4	2-12	Adjust the desired switch-off temp. difference
	System frost protection	3	2-8	When the collector temp. is lower than the desired frost protection temp., this function will be activated.
	Factory default			All the desired values (except Time display) can be set back to factory defaults.
	System overheating protection			When the collector is overheating, the system stops working, which to avoid the accessories to be destroyed.

## System 6

The standard split pressurized solar pool system with 1 collector array, pool, and heat exchanger.



Relay output	Note
R1	Pump 1
R2	Pump 2
Sensor input	Note
T1	Temp. of Collector
T2	Temp. of pool
T3	Temp. of heat exchanger

Signal	Function	Factory setting	Value arrange	Description
	System choice	1	1-6	System 6
	Time display			Display the current time
	Switch-on temp. difference	8	5-20	Adjust the desired switch-on temp. difference
	Switch-off temp. difference	4	2-12	Adjust the desired switch-off temp. difference
	System frost protection	3	2-8	When the collector temp. is lower than the desired frost protection temp., this function will be activated.
	Factory default			All the desired values (except Time display) can be set back to factory default.
	System overheating protection			When the collector is overheating, the system stops working, which to avoid the accessories to be destroyed.

## Fault message

### Note 1:

If there are faults on the controller, please do not repair it by yourself. It should be taken by the qualified specialist.

If there is a problem with the controller or temperature sensor, the fault signals will be displayed on the screen as the following:

Fault signal	<FF>	<FE>
Possible cause	The inside of sensor or the connection wire between sensor and controller is open circuit.	The inside of sensor or the connection wire between sensor and controller is short circuit.
Solution	Check the connection or resistance value of the sensor, replace it on necessary.	

### Note 2:

Use Ohmmeter to check the resistance value of sensors. According to the comparative with the standard value, the fault sensor can be checked out. When check the resistance value, the sensor should be cut off from the system. Small error can be allowed when compare the test value with the standard value.

### PT1000 Resistance value:

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

### NTC 10K B=3950 Resistance value:

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

## Packing list

No.	Item	Specification	Quantity
1	Main controller	186×140×41mm	1 pc
2	Power line		1 pc
3	PT1000 sensor	1.5m	1 pc
4	NTC sensor	1.5m	3 pcs
5	Network line	1m	1 pc
6	Fixed screw		1 bag
7	Manual		1 pc

# SP I Controller Network Connection Manual

The product can be connected to any kind of web browser currently, such as Internet Explorer, Google Chrome, Fire fox, and so on.

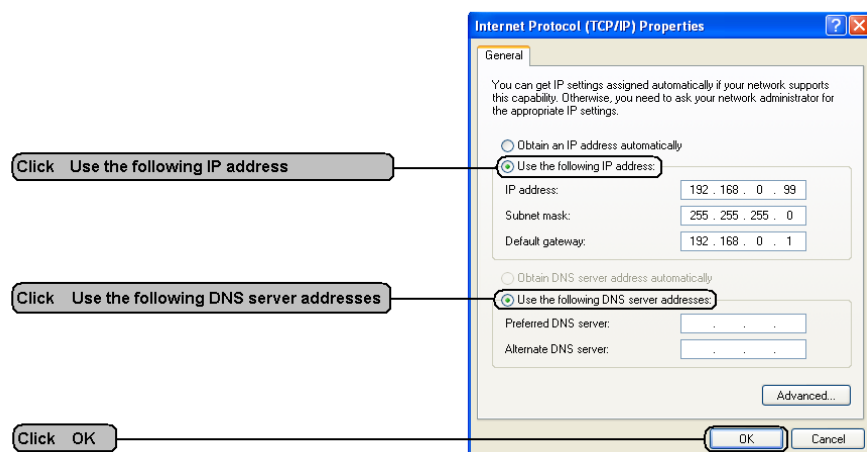
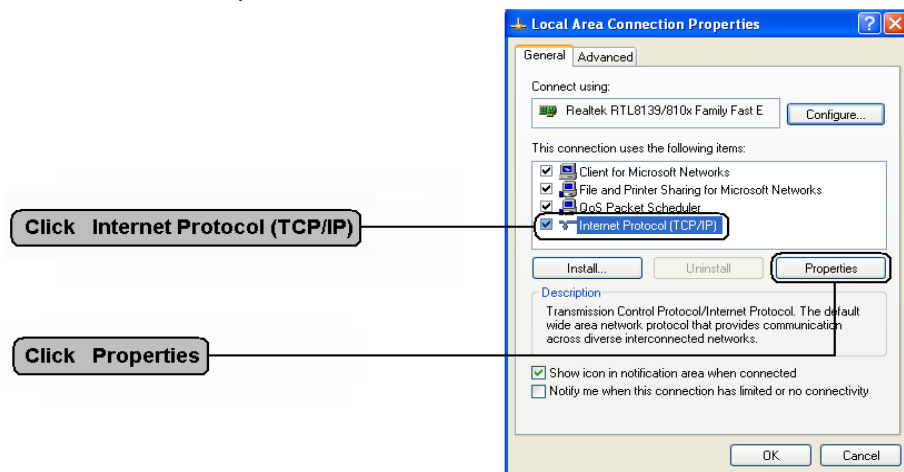


## Connect to the computer directly

1. Through the internet cable( CAT5 ,UTP ) ,connect the computer with network to the internet port in the right side of the product.
2. The default IP address for this controller is “192.168.0.10”.
3. If the IP address of the customer is not in the same net segment as the above IP address, please setup as the following steps:

**Take the Windows system as example:**

“Start”      “Control board”      “Internet connection”      Click the right key “Local Area Connection Properties”      “Properties”



### Connect to the computer through Router or Switch

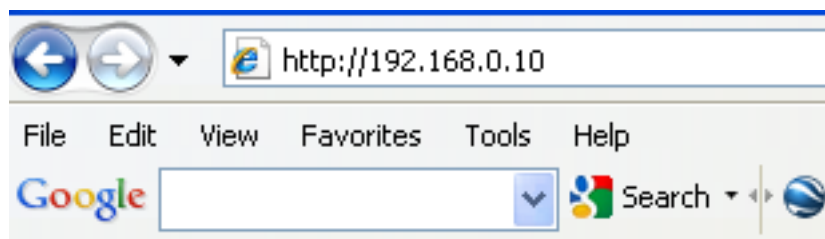
If the customer connects the product to the computer through Router or Switch, he should make sure that the computer can access the IP address of this product. And the customer should have the basic knowledge about TCP/IP, to take setup processes.

### Login into the controller

1. Open the web browser, and type the following address into the URL address bar:

[Http://192.168.0.10](http://192.168.0.10)

Then click the key of “Enter” or “Return”:

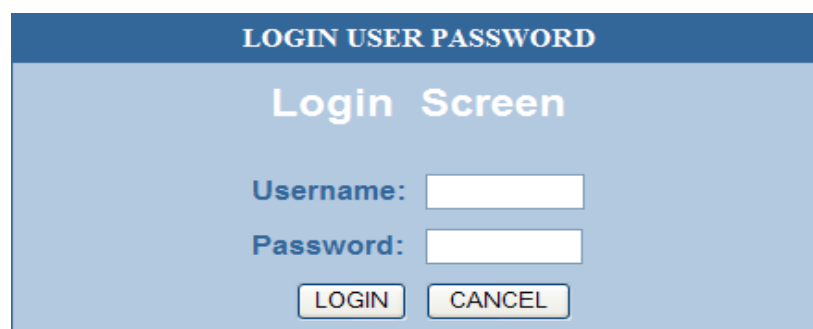


2. Go into the login interface

The default login name is “admin”

The password is "admin"

Click “Login”

A screenshot of a login interface. At the top is a dark blue header with the text 'LOGIN USER PASSWORD'. Below the header is a light blue background with the text 'Login Screen' in white. There are two input fields: 'Username:' and 'Password:'. Below the input fields are two buttons: 'LOGIN' and 'CANCEL'.

3. The login is successful, go into the homepage.
4. Browser the web page, the customer can review or setup the information about the product, such as the operation parameter, working state, and and so on.