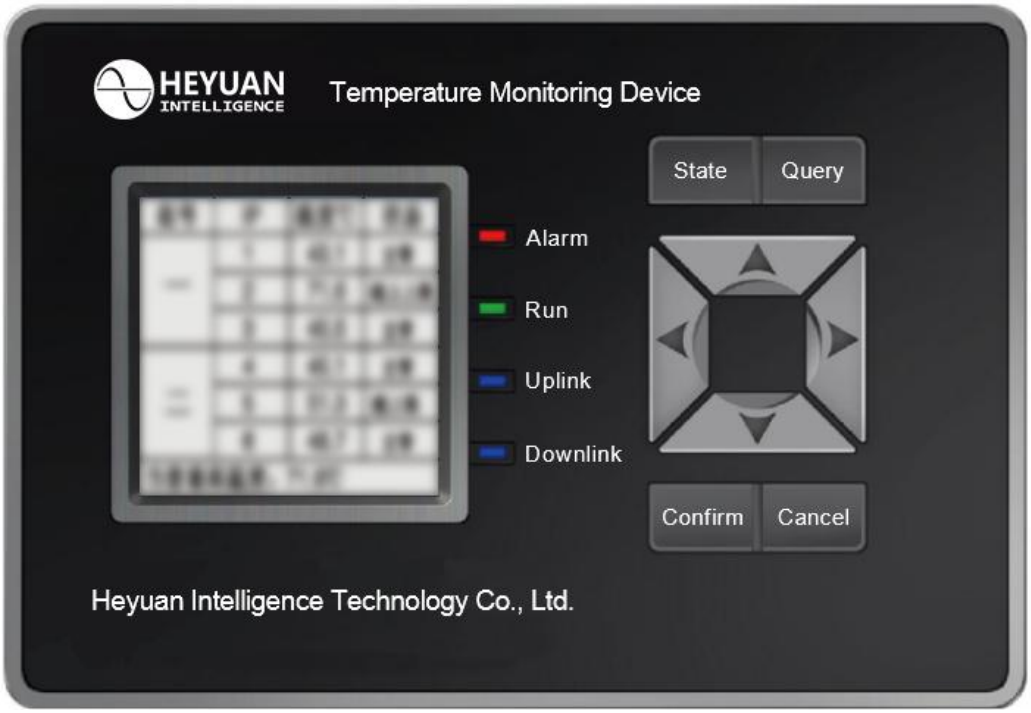
Wireless Temperature Monitoring Device

HYTR-20F



Heyuan Intelligence Technology Co., Ltd

IMPORTANT DECLARATIONS

Please read this manual carefully before the product is operated. And once you start operating the meter, you'll be considered to have read this manual and accept all our terms. Heyuan shall not be responsible or liable for any damages or injuries caused by improper meter installation and/or operation.

Attention: the following symbols in this manual refer to meanings as follows

 **Electric Shock Symbol: Carries information about procedures which must be followed to reduce the risk of electric shock and danger to personal health**

 Safety Alert Symbol: Carries information about circumstances which if not considered may result in injury or death

The meter must be installed and operated by one who has experience with high-voltage devices or has qualifications. Please connect the meter to correct voltage before operating the meter. Please install and use the meter according to the user manual. Heyuan shall not be responsible or liable for any damages or injuries caused without following the instructions in the user manual.

Contents

Chapter 1 Overview

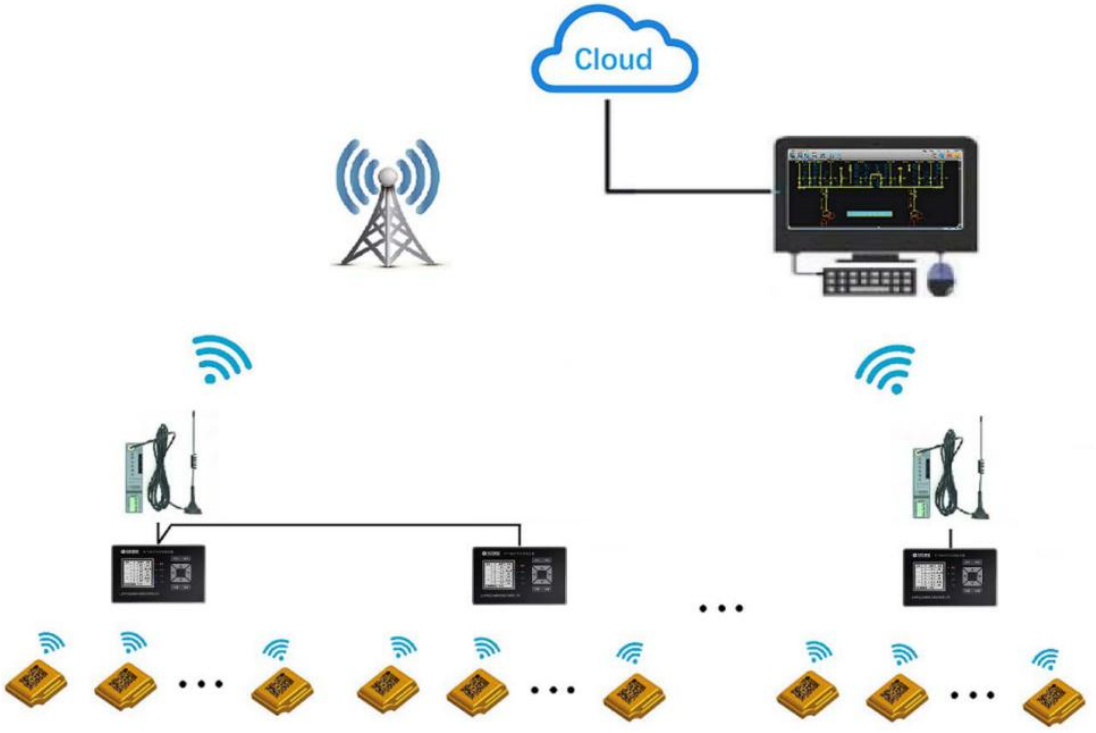
Aiming at the hidden danger of the electric equipments, which may caused by the factors of aged materials, poor contact and overloaded current at the electric connection, these faults will make the temperature get higher than normal. based on HYTR-20F, we developed the upgrade product HYTR-20F, this system can monitor temperature in real time. Using advanced Cortex-M3 inner core ARM chip, FSTN LCD of 160*160 dot matrix which accords with the standards of State Grid, the design of super-low power consumption, RF wireless separation and photoelectrical separation technology, characterized as complete separation, strong capacity of resisting disturbance, reliable operation and convenient installation, this product can solve various problems of monitoring and measuring temperature under high voltage.

Application field：

Contacts and connection points of various high voltage and low voltage switch cabinets, breakers and switches, joints of high voltage cables, dry transformers, low voltage and large current cabinets.

Composition of System

1. SPS061V2:wireless temperature sensor
(short as "sensor" or "sensors" in this file)
2 SPS2000F:control instrument
3 communication module
4 Computer: background

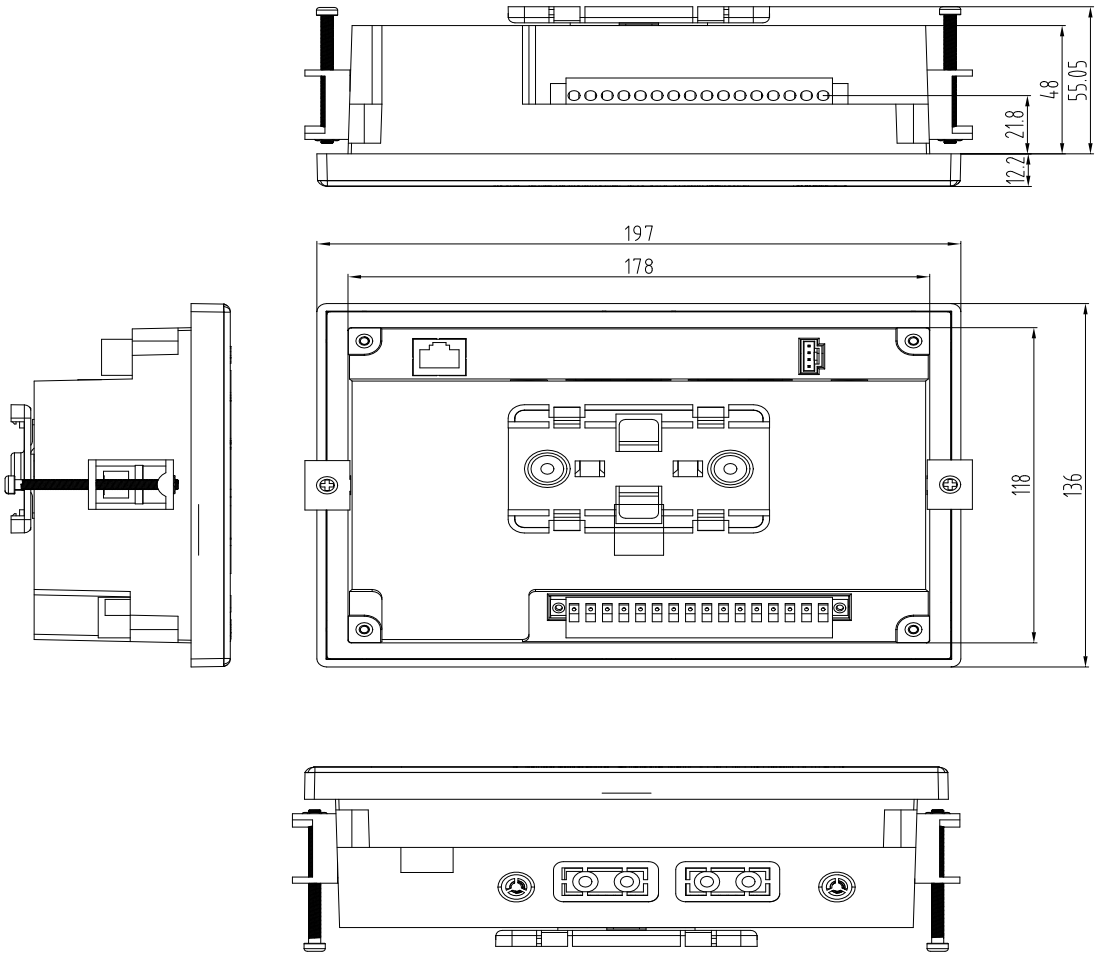


Chapter 2 Specifications

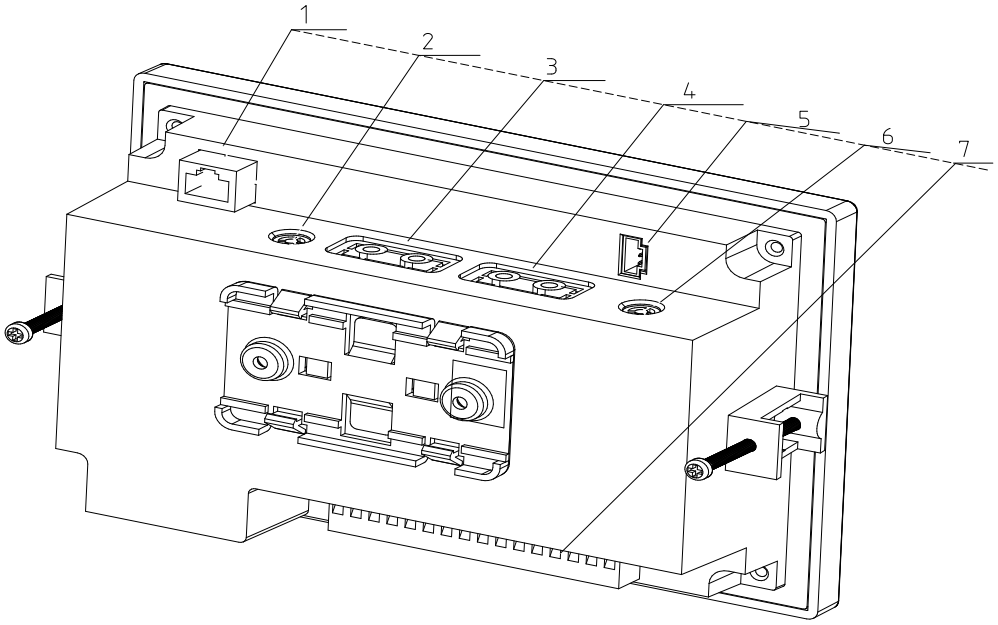
RF Operating Frequency	433MHz
RF Sensitivity	-110dbm
RF Transmission Distance	0.4 ~ 500m
Input Power	AC220V±20%　DC110 ~ 220V
Maximum Power Consumption	⩽3W
RS485 Communication Distance	<1200m
RS485 Communication Speed	2400~9600 bps, default 2400bps
LCD Display	3.5’　FSTN
Temperature Variation Curve	2 hours
Max number of sensors	<240(80 groups)
Optical Fiber Communication Distance	<5kM
Optical Fiber Communication Baud Rate	2400~56000 bps, default 9600bps

Chapter 3 Dimensions & Installation

3.1 Overall Dimension (unit: mm)



3.2 Installation Method

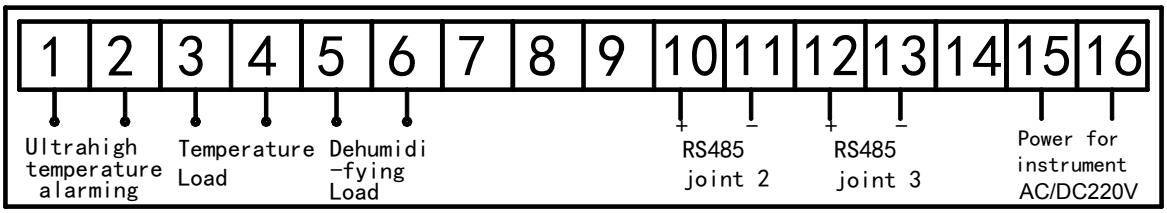


Instructions：

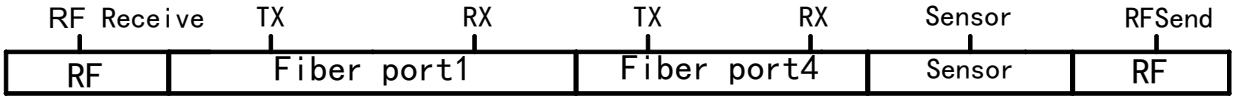
(1) Network port (2) Antenna Ⅰ (3) Fiber port Ⅰ (4) Fiber port Ⅱ

(5) Sensor (6) Antenna Ⅱ (7) 16PIN terminals

3.3 Wiring



16PIN Wiring instructions



Lnterface description

Chapter 4 Operation Interface

The HYTR-20F will initialize all modules when it is powered-on. The backlight is on.

After 3 seconds, it goes to the interface of temperature node display, as shown in the following chart, for example:

Name of switch cabinet	1		
NO. of switch cabinet	1	T	C°

Position	Temperature/C°	Position	Temperature/C°
A-up	***	A-down	75 ▲▲
B-up	***	B-down	*** !
C-up	*** ▲	C-down	***

"▲": over-temperature alarm level Ⅰ; "▲▲": over-temperature alarm level Ⅱ
"***!": No temperature data received in 60 minutes, disrupted Communication
"***" :Never received temperature data since powered-on

4.1.1 When the LCD shows version no. at the time of start-up, press Confirm button for a long time, it goes to the page of system parameter setting.

4.1.2 When the LCD shows version no. at the time of start-up, press Cancel for a long time, it goes to the page of communication parameter setting.

4.1.3 At the interface of temperature node display, press Confirm button for more than 2 seconds, it goes to the page of operational parameter setting.

4.1.4 Press both State and Query, it goes to the corresponding sub-menu. (The parameter setting mode is invalid.)

4.1.5 Press Left or Right, the display will switch between the interfaces of the date chart and the curve chart.

4.1.6 Press the button of Up or Down, it will display the node temperature of the previous two groups or the next two groups (paging).

4.1.7 No button operation in 20 seconds, it will enter into the automatic cycle display mode. It will display each screen for 8 seconds in each sub-menu in a continuous loop.

4.1.8 No button operation in 30 seconds, the backlight will be turned off automatically.

4.1.9 When a user carries out a button operation, the backlight will be light up. Pressing the button again, the corresponding function will response.

4.1.10 The “Highest Temperature at the Moment” at the bottom shows the highest temperature of the nodes in the whole system.

4.1.11

*When it is just energized, the temperature and the status are all shown as “***”.

*When the corresponding node receives the temperature from sensor, it shows the date received and judges the status as "Normal", "Exceed Upper Limit(over-temperature alarm level Ⅰ▲) or Exceed Up Upper Limit(over-temperature alarm level Ⅱ▲▲). The standard of status is the

threshold value set up in the operational parameters.

*If it had received a temperature date but can't receive any further date uploaded from the same node in an hour (+/- 5 minutes), then the corresponding node temperature is shown as “***!” and the status is shown as “Disrupted Communication”.

4.2 State of Equipment, as shown in the chart:

State of Equipment

Environmental Temperature	*** ℃
Environmental Humidity	*** % RH
Load of Temperature Control	On/Off
Load of Dehumidification	On/Off
Exceed Upper Limit	On/Off
Exceed Up Upper Limit	On/Off

4.2.1 Press the State button to enter this interface. Press this button again or Confirm /Cancel to return to the interface of node display.

4.2.2 Environmental Temperature: It shows the current environmental temperature which is collected by inner or external temperature sensor. If no such a sensor is connected, it will show No Sensor. Normally, it shows the actual temperature.

4.2. 3 Environmental Humidity: It shows the current environmental humidity which is collected by inner or external humidity sensor. If no such a sensor is connected, it will show No Sensor. Normally, it shows the actual value.

4.2.4 Load of Temperature Control:

4.2.4.1 If the type of cooling is selected in the system parameter (selection of heating/cooling mode), when the environmental temperature exceeds the upper limit set up by user, it will switch on the relay of “Load of Temperature Control”. At the same time, it will show On. When it is lower than the lower limit, the status of Off will be shown and the relay will be switched off.

4.2.4.2 If the type of heating is selected, when the environmental temperature is below the lower limit set up by user, it will switch on the relay of “Load of Temperature Control”. At the same time, it will show On. When it reaches or exceeds the upper limit, the status Off will be shown and the relay will be switched off. When the control is not on, the relay is always on.

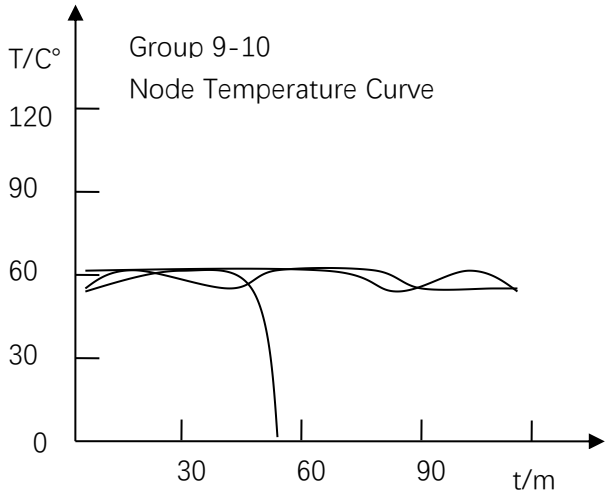
4.2.5 Load of Dehumidification: When the environmental humidity exceeds the upper limit set up by user, it will switch on the relay of “Load of Dehumidification”. At the same time, it will show On. When it is below the lower limit, the status of Off will be shown and the relay will be switched off. When the control is not on, the relay is always on.

4.2.6 Exceed Upper Limit: When any of external wireless temperature sensors transmits a temperature higher than the upper limit set by user, it will show On. Otherwise, it will show the status of Off.

4.2.7 Exceed Up Upper Limit: When any of external wireless temperature sensors transmits a temperature higher than the up upper limit set by user, it will show On. At the same time, the red Alarm

LED Light will be lighted up and the relay of “Exceed Up Upper Limit Alarm” will be switched on. When the temperature becomes normal, it will show the status of Off and switch off the relay. When the control is not on, the relay is always on.

4.3 Temperature Curve, as shown in the chart:



This interface displays the historical temperature variation curve detected by the sensors SPS061V2. Each screen can show the temperature curves of 6 electric nodes in maximum. The coordinate Y is for temperature in centigrade degree. The coordinate X is for time in minute. It can record the temperature variation curves in the latest 120 minutes in maximum. The user can use Up or Down button to turn pages to see the curves of the previous or the next two groups. Press Left and Right, the interfaces will switch between the curve and the node temperature. The node temperature curve updates every minute.

4.4. Parameter Setting

4.4.1 When it shows the version no. at the time of start-up, press Confirm for a long time, it goes to the page of system parameter setting as shown in the following chart:

Sys. Para. Setting

Up. Co. Setting	On/Off
32-Di. Ver.	On/Off
Select TR/TD	TR/TD
RF Rec. Cha	0
RF Sen. Cha	2
LORA WRT	On/Off

Page Do. Save Exit

Sys. Para. Setting

Data Filling	On/Off
Chinese/English	English

Page Up Save Exit

4.4.1.1 Press Up or Down, the gray bar moves up or down to select the corresponding parameter for modification.

4.4.1.2 Press Left or Right to modify the value of the selected parameter.

The value of Item Number is from 0 to 999. If the function is not on, this value is meaningless.

4.4.1.3 Up. Co. Setting: on, it means the sensor information can be set through the configuration software.

4.4.1.4 32-Di. Ver.:on: the sensor ID is 32bits, Off: the sensor ID will be 16bits.

4.4.1.5 Select TR/TD: For the selection of way of control of load of temperature control of heating(TR) or cooling(TD) please refer to the above-mentioned 2.4.

4.4.1.6 RF Receiving Signal Channel: Select the communication signal channel for wireless temperature sensor, Channel 0-20

4.4.1.7 RF Sending Signal Channel: Select the upload signal channel for data of temperature, Channel 0-20

4.4.1.8 LORA WRT: Lora wireless sending function: When it is open, the received wireless data will be uploaded to the background via LoRa sending module. When it is closed, this communication way is not used.

Note: Do not use the same signal channel for both receiving and sending.

4.4.1.9 Press Up or Down key, save the selection of the cursor, then press Confirm to save the modified parameter and exit to the interface of node temperature display.

4.4.1.10 Press Up or Down key, quit the selection of the cursor, then press Confirm or Cancel to recover the content before modification and exit to the interface of node temperature display.

4.4.2 When it shows the version no. at the time of start-up, press Cancel key for a long time, it goes to the communication parameter setting as shown in the following chart:

Communication Address of this Machine: 1		
Port	Status	Speed
1	Input	2400
2	Output	9600
3	Close	2400
4	Close	2400

Save Quit

4.4.2 .1 Press Up or Down, the gray bar moves up or down to select the corresponding parameter for modification.

4.4.2 .2 Press Left or Right to modify the value of the selected parameter.

4.4.2 .3 The communication address of this machine, the identification parameter for communication with the upstream machine, the value is from 1 to 100.

4.4.2 .4 Communication Status: You can choose Close, Input and Output. For uploading data, this port is set as output. For receiving and forwarding the data of the previous level, it is set as input. When it is not

connected, it should be closed to improve the system response speed.

4.4.2 .5 Communication Speed: The values are 2400, 9600, 19200 and 56000 bps/S for modification.

4.4.2 .6 There are four ports of 1-4. Port 1 and Port 4 are the optical fiber ports. Port 2 and Port 3 are 485 communication ports. RS485 communication speed should not be set more than 9600.

4.4.2 .7 Press Up or Down key, save the selection of the cursor, then press Confirm to save the modified parameter and exit to the interface of node temperature display.

4.4.2 .8 Press Up or Down key, quit the selection of the cursor, then press Confirm or Cancel to recover the content before modification and exit to the interface of node temperature display.

4.4.3 At the interface of node temperature display, press Confirm for a long time, it goes to the operational parameter setting as shown in the following chart.

Env. Para. Setting
View. Comm. Para.
W-less Para. Setting
Blt. Para. Setting
View Node Info.

4.4.3.1 Press Up or Down, the gray bar moves up or down to select the corresponding item.

4.4.3.2 Press Confirm to enter the corresponding sub-page.

4.4.4 Environmental Parameter Setting:

Env. Para. Setting

Env. Temp. UL	45
Env. Temp. LL	40
Env. Humi. UL	88
Env. Humi. UL	80
Contrast Sett.	155

Save Exit

4.4.4.1 Press Up or Down, the gray bar moves up or down to select the corresponding parameter for modification.

4.4.4.2 Press Left or Right to modify the value of the selected parameter.

4.4.4.3 Select Save, press Confirm, it will save the modified parameter and return to the interface of the higher level.

4.4.4.4 Select Exit, press Confirm or Cancel, it will recover the content before modification and return to the interface of the higher level.

4.4.4.5 Environmental Temperature Upper Limit: the minimum value is the lower limit of environmental temperature plus 2, the maximum value is 100.

4.4.4.6 Environmental Temperature Lower Limit: the minimum value is 1, the maximum value is the upper limit of environmental temperature minus 2.

4.4.4.7 Environmental Humidity Upper Limit: the minimum value is the lower limit of environmental humidity plus 5, the maximum value is 100.

4.4.4.8 Environmental Humidity Lower Limit: the minimum value is 1, the maximum value is the upper limit of environmental humidity minus 5.

4.4.4.9 Contrast is set from 140 to 170. It shows the effect of the modified value in real time.

4.4.5 View of Communication Parameter:

Comm. Para. Setting

Lo. Comm. Add. : 1		
Port	Status	Rate
1	Input	2400
2	Output	9600
3	Close	2400
4	Close	2400

The content of this interface is for view only.

Press Confirm or Cancel to return to the interface of the higher level.

4.4.6 Wireless Parameter Setting

WT Co. Value	0
WT UL	50
WT ULL	70
WS Gr. Count	40
MB Node SA	1
Buzzer Alarm	On/Off

Page Do. Save Exit

Data Upd. Dur.	60
MODBUS Tran. M	TEMP
Def. Data Sent	0

Page up Save Exit

4.4.6.1 Wireless Temperature Upper Limit: When the uploaded wireless temperature exceeds this parameter, an alarm signal will be generated. The minimum value is 1. The maximum value is the value of up upper limit minus 2.

4.4.6.2 Wireless Temperature Up Upper Limit: When the uploaded wireless temperature exceeds this parameter, an alarm signal will be generated. The corresponding alarm relay will be switched on. At the same time, the red alarm LED light will be lighted up. The minimum value is the temperature upper limit plus 2. The maximum value is 100.

4.4.6.3 Number of Groups of Wireless Sensors: A group consists of three phases of Circuit A, Circuit B and Circuit C. The setting of this value will limit how many groups of such signals of HYTR-20F will receive. The value of parameter is from 1 to 80.

4.4.6.4 MB Node S: the first MODBUS communication address.

4.4.6.5 Press Up or Down, the gray bar moves up or down on the parameters for modification. Press Left or Right to modify the corresponding parameter.

4.4.6.6 After modifying the parameter, press Up or Down to select “Save” and press OK, the equipment will save the modified parameter and return back to the main interface.

4.4.6.7 Press Up or Down to select “Quit”, press Cancel or OK, the equipment will recover the parameter before modification and exit to the main interface.

4.4.6.8 Open or close the super temperature alarm buzzer inside the machine.

4.4.6.9 Data Upd. Dur.(data update interval): the fastest data update time is 1second, the slowest is 255 seconds, the default is 60 seconds,

4.4.6.10 MODBUS Tran. M(modbus transmission mode):TEMP:all data will be transmitted, MAX: only transmit the Max value, MIN: only transmit the Min. Value.

4.4.7 Search Super Temperature:

← Exceed Upper Limit Temperature Node →

Number 001 Group 1 53.2 ℃

Number 002 Group 1 53.2 ℃

Number 003 Group 1 53.5 ℃

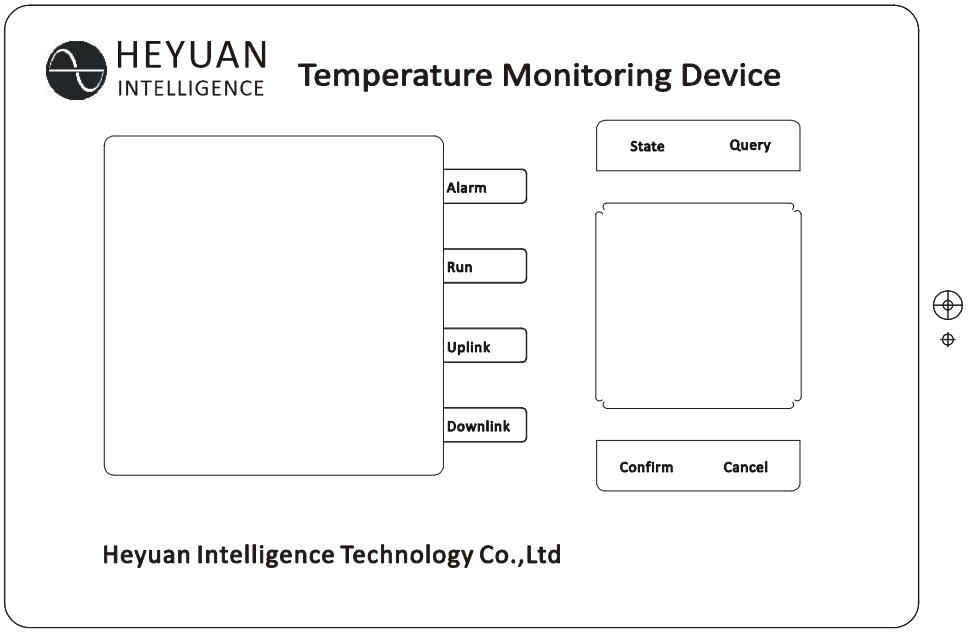
Number 004 Group 2 53.2 ℃

Number 005 Group 2 53.5 ℃

Number 006 Group 2 53.8 ℃

Press Query button to enter into this interface. The equipment will take the upper limit of wireless temperature set by client as judgment value to search and display the data higher than the upper limit. Each screen can show 6 nodes in maximum. If there aren’t any nodes that exceed the upper limit, the screen will show “No nodes of super temperature. If the top of the screen shows ← or →, there are more than 6 nodes exceeding the upper limit in the system, you can turn pages by Left or Right.

4.5. Notes on the Board



Alarm Light: As long as there is one wireless sensor receiving a temperature higher than the up upper

limit set by user, this light will be lighted up.

Operation Light: The light showing the operation of program. It shines every 0.4S. If it shines abnormally, it means that there is a problem in the system.

Data reception Light: It is not lighted up when the machine is power-on. It shines when a frame of data is received.

Data transmission Light: It is not lighted up when the machine is power-on. It shines when a frame of complete data is resolved and it uploads the data to the background.

The communication port is of double RS485, RF communication and double-fiber communication subject to the user's free selection.

Chapter 5 After-sales Service

Product Warranty

1. The product warranty period is one year.
2. The company is responsible for free maintenance or exchange within one-year warranty period.
3. The cost of the components and freight shall be charged for improper meter installation and/or operation.
4. Over the warranty period, part of the maintenance cost according to actual situation will be charged.

Service Guarantee

1. Product technical consulting and quality complaints will be replied within 12 hours.
2. Solutions for quality complaints will be provided within 24 hours.
3. Except statutory holidays and force majeure.

Chapter 6 Contact Us

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