

Network Fault Monitoring Alarm



RTU5028E

User Manual

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Preface

Thanks for choosing BLIIOT Network Fault Monitoring Alarm. These operating instructions contain all the information you need for operation of RTU5028E.

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Disclaimer

This document is designed for assisting user to better understand the device. As the described device is under continuous improvement, this manual may be updated or revised from time to time without prior notice. Please follow the instructions in the manual. Any damages caused by wrong operation will be beyond warranty.

Revision History

Update Date	Version	Description
2019-07-01	V1.0	First Edition
2020-01-07	V1.1	Optimize configuration software connection

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1 Product Introduction

The Network Fault Monitoring RTU RTU5028E is special designed for remote monitoring Ethernet devices communication status and power supply status. It can detect the Ethernet device fault caused by power supply or network communication. If network communication fault, it can remote or automatically restart the switch, Router or device to solve issues, no need maintenance engineer to process, save time and maintenance costs. Support monitoring up to 7 network devices simultaneously.

The configuration software can be connected via LAN, User-friendly configuration; It also can be set and inquiry by SMS commands. Moreover, it also supports Modbus RTU, Modbus TCP and MQTT protocol to connect to cloud Platform, automatic switching to cellular network when the wired network failed, then monitor the current status in real time through GSM/3G/4G network.

RTU5028E power failure and network fault monitoring alarm is suitable for classrooms, public places, hospitals, stations, food warehouses, offices, factories, libraries, laboratories, etc., and any place that requires and supports power and network monitoring.

2 Safety Directions



Safe Startup

Do not use the unit when using 4G equipment is prohibited or might bring disturbance or danger.



Interference

All wireless equipment might interfere network signals of the unit and influence its performance.

3 Packing List



4 Features

- Network failure + power failure + network cable monitoring, remote monitoring the status of network device in many aspects;
- Support monitoring up to 7 network devices simultaneously;
- 1 relay output for automatic restart or remote restart of network equipment;
- Inbuilt MCU monitoring power supply input voltage value, measure range is 0~36V, no need additional sensor to save cost;
- Up to 10 authorized phone numbers to receive specified alarm message;
- Can set timer report and automatically send its status/value to the authorized number;





- Support remotely read 100 historic data via SMS or configuration software;
- Support Modbus RTU, Modbus TCP and MQTT protocol, can be connected to cloud platform;
- GSM/GPRS/3G/4G/Ethernet network communication, automatic connect to cellular network when wired network failed;
- Rechargeable backup battery can last 2-3 hours;
- Support wall-mounted and DIN35mm DIN rail installation.

5 Technical Specifications

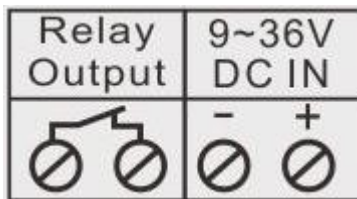
Item	Parameters
Power supply	12VDC, support 9~36VDC
Power consumption	Standby: 100mA@12V; Max: 380mA@12V
Communication method	SMS, GPRS/3G/4G, Ethernet
Protocol	Modbus RTU Over TCP, Modbus TCP, MQTT
GSM/3G/4G	GSM: 850/900/1800/1900MHz 3G: 3G WCDMA 4G LTE: 4G LTE
Ethernet port	1xRJ45, support DHCP dynamic obtain IP or static fixed IP
Relay output	1 NC relay output; 7A/125VAC, 5A/250VAC, 20A/14VDC
SIM slot	1.8V or 3.0V SIM card
Antenna	SMA antenna interface, 50ohm
Backup battery	3.7V/900mAh(Last 2~3 hours)
Working temperature	-10°C~60°C
Working humidity	95%(No condensation)
Dimension	70mm x 88mm x 30mm

6 Hardware

6.1 LED Indicators

LED Indicators	
	<p>When 2G module signal is normal, it flashes slowly (flash every 2 seconds), and flashes quickly when there is no signal (flash every 0.8 seconds);</p> <p>When the 3G/4G module signal is normal, the light turns off once every 2 seconds, and when there is no signal, the light turns on once every 2 seconds, and flashes continuously when transmitting data</p>
	LED light ON when connect power, otherwise it is OFF
	Light on when alarm occurs
	Light on when relay open

6.2 Interface



Interface instruction		
9~36V DC IN	+	DC9~36V positive input
	-	DC9~36V negative input
Relay Output	Normally closed relay output, no polarity distinction	
Ethernet	1 RJ45	
ANT	GSM/3G/4G antenna interface	

6.3 Switch&Button&SIM Card Slot

Please use a screwdriver to unscrew the screw of the small cover on the back of device, and you can see the power switch, reset button (the button has two functions: 1. Upgrade: Press and hold the power on to enter the upgrade mode; 2. Reset: Power on, press and hold for 3 seconds to reset) and the card slot (Chip faces down when

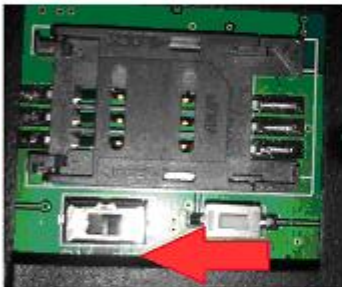
installing the SIM card).



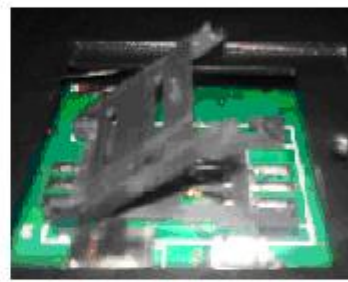
Switch OFF



Switch ON



Card slot move to the left



Lift up



Put SIM card in it



Move to the right

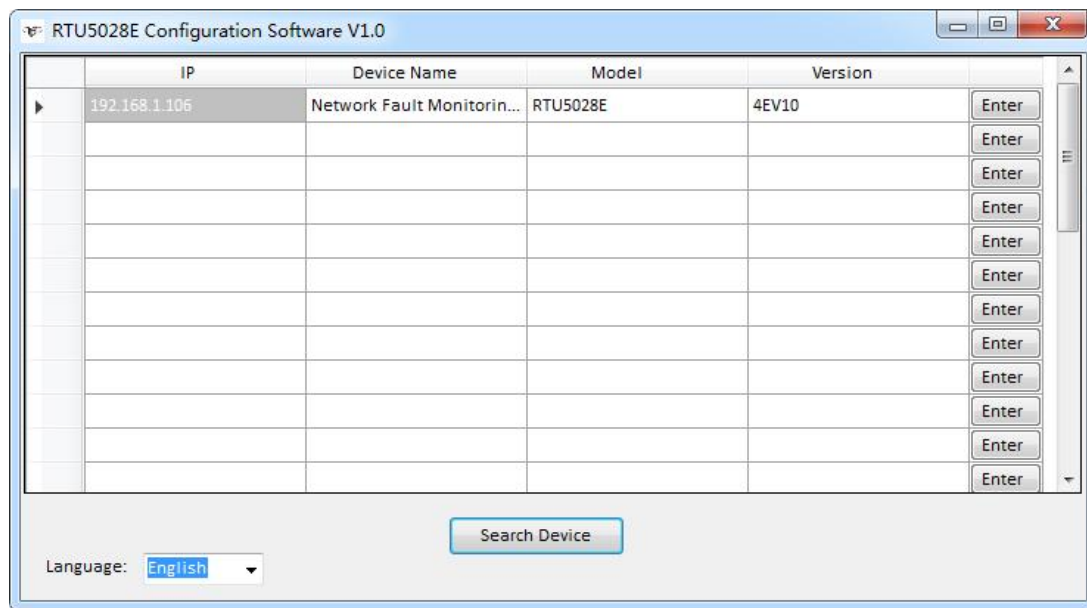
7 Reset

- 1) Power on the device, press and hold the reset button for 3 seconds, and wait for the power indicator to flash 3 times, indicating that the reset is successful.
- 2) Reset by SMS command "password+RESET", and return SMS "reset successful" to indicate successful reset.

8 Configuration Software

When connecting to the configuration software for the first time, it is recommended to connect the device to a router with the DHCP automatic IP assignment function; if the network connected to the device cannot automatically assign IP, the device will use the following default network parameters after connecting to the network cable and waiting for 1 minute: IP address 192.168.1.111, subnet mask 255.255.255.0, and gateway address 192.168.1.1. At this time, please set the computer network parameters to other IP addresses in the same network segment to connect; if the device is directly connected to the computer, please use a crossover cable to connect, and please configure the computer network parameters before connecting the device.

8.1 Search Device



【Search Device】 Search all devices in the current LAN. Computer and the device must be in the same network segment, and the subnet mask must be 255.255.255.0

【Enter】 Enter the configuration interface of corresponding device

【Language】 Change language

Note: If the device cannot be found, but the fixed IP of the device has been set, you can directly enter the fixed IP of the device in the IP input field.

8.2 Selection

Device Password

【Device Password】 Default 1234

【Connection】 Configuration after a connection has been established

【Read】 Read the current configuration of the device, please read it before editing the parameters

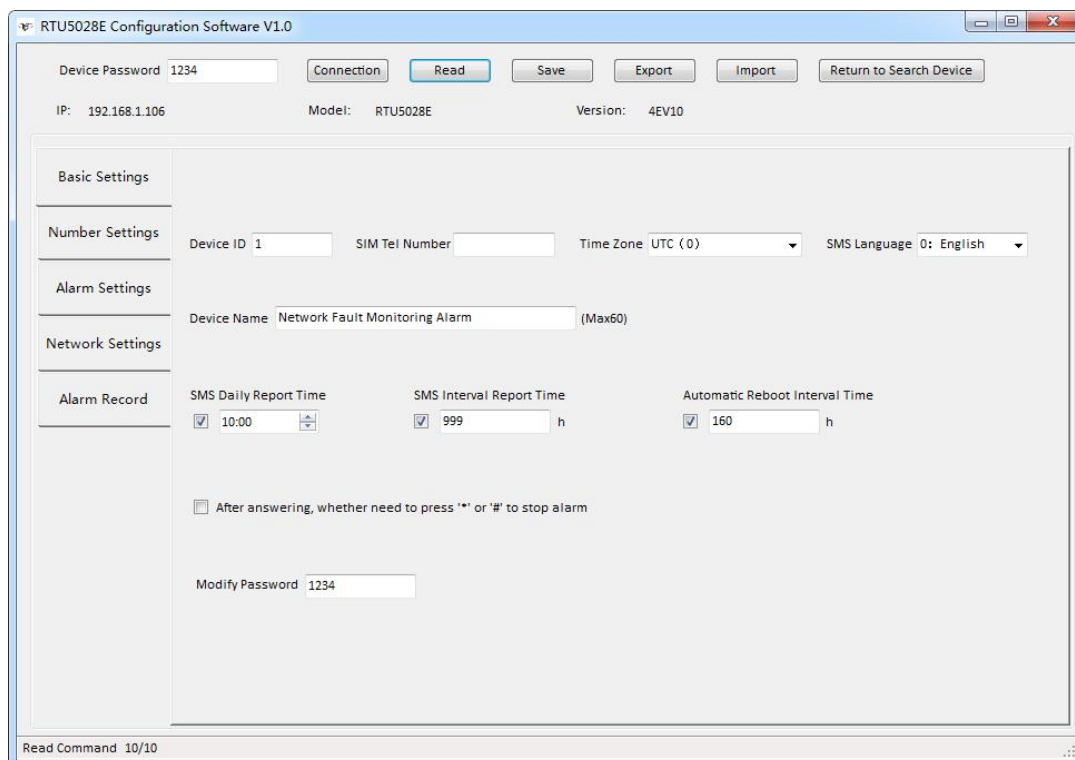
【Save】 Write the edited parameters into the device, and the edited parameters will take effect only after saving.

【Export】 Export the edited parameters to the computer configuration file

【Import】 Import the previously exported configuration file parameters to the current software.

【Return to search device】 After returning to the search device page, you can click again to enter other device configuration interfaces.

8.3 Basic Settings



The screenshot shows the 'RTU5028E Configuration Software V1.0' window. At the top, there are buttons for 'Connection', 'Read', 'Save', 'Export', 'Import', and 'Return to Search Device'. Below these, the IP is 192.168.1.106, Model is RTU5028E, and Version is 4EV10. A sidebar on the left contains tabs for 'Basic Settings', 'Number Settings', 'Alarm Settings', 'Network Settings', and 'Alarm Record'. The 'Number Settings' tab is active, showing fields for 'Device ID' (1), 'SIM Tel Number', 'Time Zone' (UTC (0)), and 'SMS Language' (0: English). The 'Alarm Settings' tab shows 'Device Name' (Network Fault Monitoring Alarm). The 'Alarm Record' tab shows 'SMS Daily Report Time' (10:00), 'SMS Interval Report Time' (999 h), and 'Automatic Reboot Interval Time' (160 h). There is also a checkbox for 'After answering, whether need to press '*' or '#' to stop alarm' and a 'Modify Password' field (1234). A status bar at the bottom indicates 'Read Command 10/10'.

【Device ID】 The device ID is mainly used in the Modbus server center to distinguish devices, valid range: 1~255, default is 1.

【SIM Tel Number】 The SIM card number installed in the device, can be set up to 22

digits, which is used for automatic time calibration of the device. If the network port cannot be connected to the Internet when it is turned on, the device will send a text message to itself to obtain the time of the SIM card operator.

【Time Zone】 When the network port is connected to the Internet, it will automatically obtain the GMT, and the device will automatically convert to the correct time according to the selected time zone. Please select the correct time zone according to the current region of the device; if there is no corresponding time zone, you can also directly enter the difference in minutes between the current local time and GMT. For example, the difference between Beijing time and GMT is +480 minutes, then enter "+480".

【SMS Language】 Change SMS language.

【Device Name】 Description of the device, which is convenient for identifying the device, and can be set up to 60 characters.

【SMS Daily Report Time】 Report the current status of the device at a specific time every day.

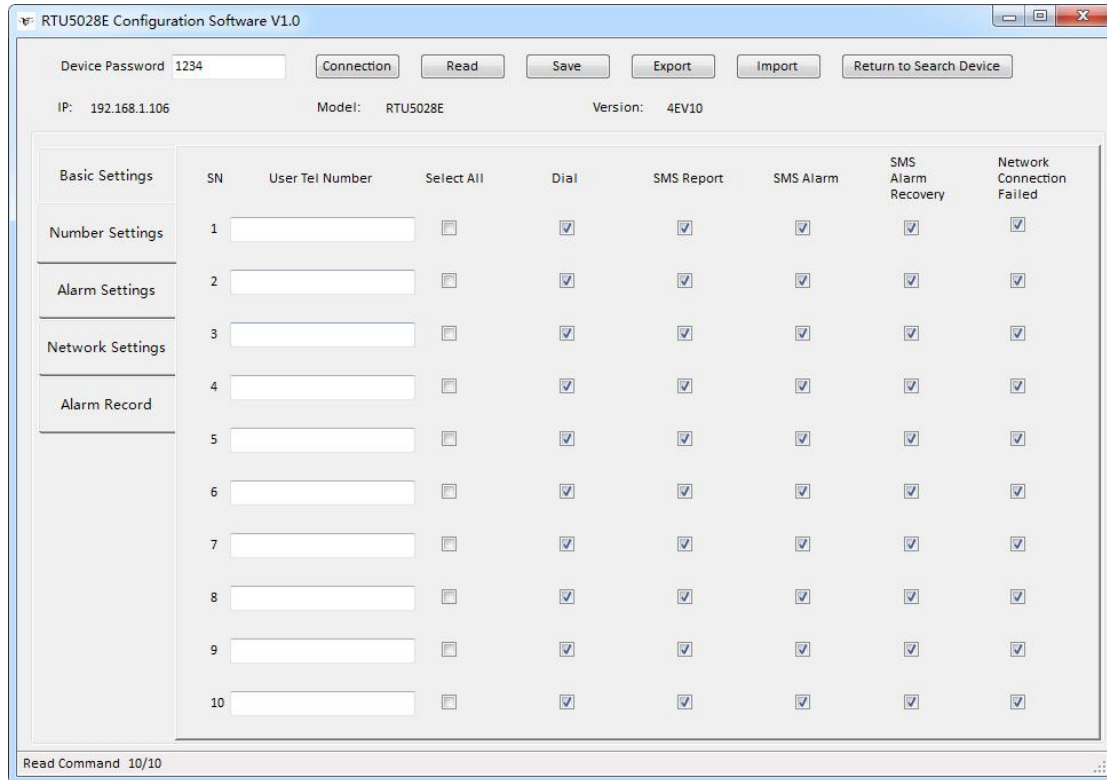
【SMS Interval Report Time】 Time interval of reporting, can be set from 0 to 999 hours, the default is 999, which means no report.

【Automatic Reboot Interval Time】 Time interval for automatically restart the device, can be set from 0 to 65535 hours, the default is 160 hours.

【After answering, whether need to press "*" or "#" to stop alarm】 When not checked, the device will not dial again after any one answers the alarm call; when checked, the device will stop dialing only after the user pressing * or #.

【Modify Password】 The device password can be modified, 4 digits are fixed, and the default password is 1234.

8.4 Number Settings



【User Tel Number】 Each number supports a maximum of 22 digits, please add country codes, such as "0086".

【Dial】 If checked, this number will be dialed when the alarm occurs.

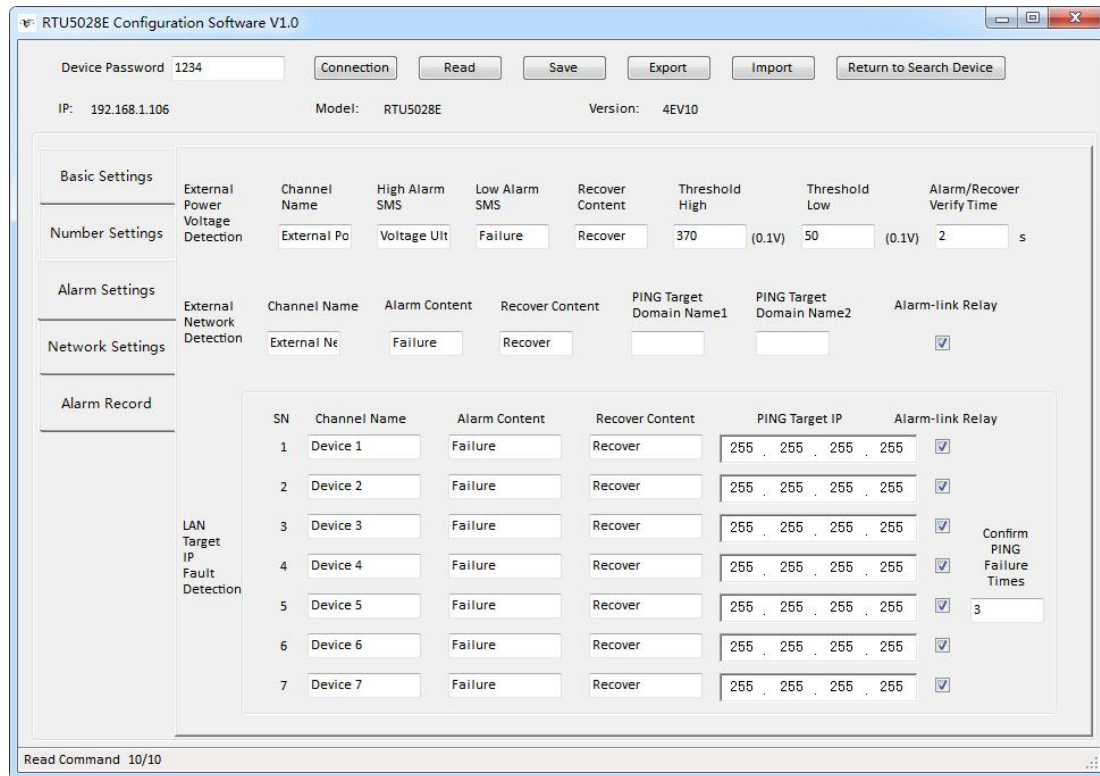
【SMS Report】 If checked, the number can receive regular reporting SMS.

【SMS Alarm】 If checked, the number can receive alarm SMS.

【SMS Alarm Recovery】 If checked, the number can receive recovery SMS.

【Network Connection Failed】 If checked, the number can receive SMS when network connection failure.

8.5 Alarm Settings



SN	Channel Name	Alarm Content	Recover Content	PING Target IP	Alarm-link Relay
1	Device 1	Failure	Recover	255 . 255 . 255 . 255	<input checked="" type="checkbox"/>
2	Device 2	Failure	Recover	255 . 255 . 255 . 255	<input checked="" type="checkbox"/>
3	Device 3	Failure	Recover	255 . 255 . 255 . 255	<input checked="" type="checkbox"/>
4	Device 4	Failure	Recover	255 . 255 . 255 . 255	<input checked="" type="checkbox"/>
5	Device 5	Failure	Recover	255 . 255 . 255 . 255	<input checked="" type="checkbox"/>
6	Device 6	Failure	Recover	255 . 255 . 255 . 255	<input checked="" type="checkbox"/>
7	Device 7	Failure	Recover	255 . 255 . 255 . 255	<input checked="" type="checkbox"/>

【Channel Name】 Name of each device.

【High Alarm SMS】 【Low Alarm SMS】 【Recover Content】 【Alarm Content】 The SMS content sent by the device.

【Threshold High】 【Threshold Low】 Once current voltage value higher/lower than threshold value, SMS content will be sent to authorized numbers.

【Alarm/Recover Verify Time】 Default 2 seconds, it means waiting for 2 seconds to confirm alarm or recovery, to prevent false alarm. Range (0~65535s).

【PING Target Domain Name 1, 2】 Two external network domain names or IP can be set, and the alarm will only be triggered when both external network addresses cannot be pinged to prevent false alarms.

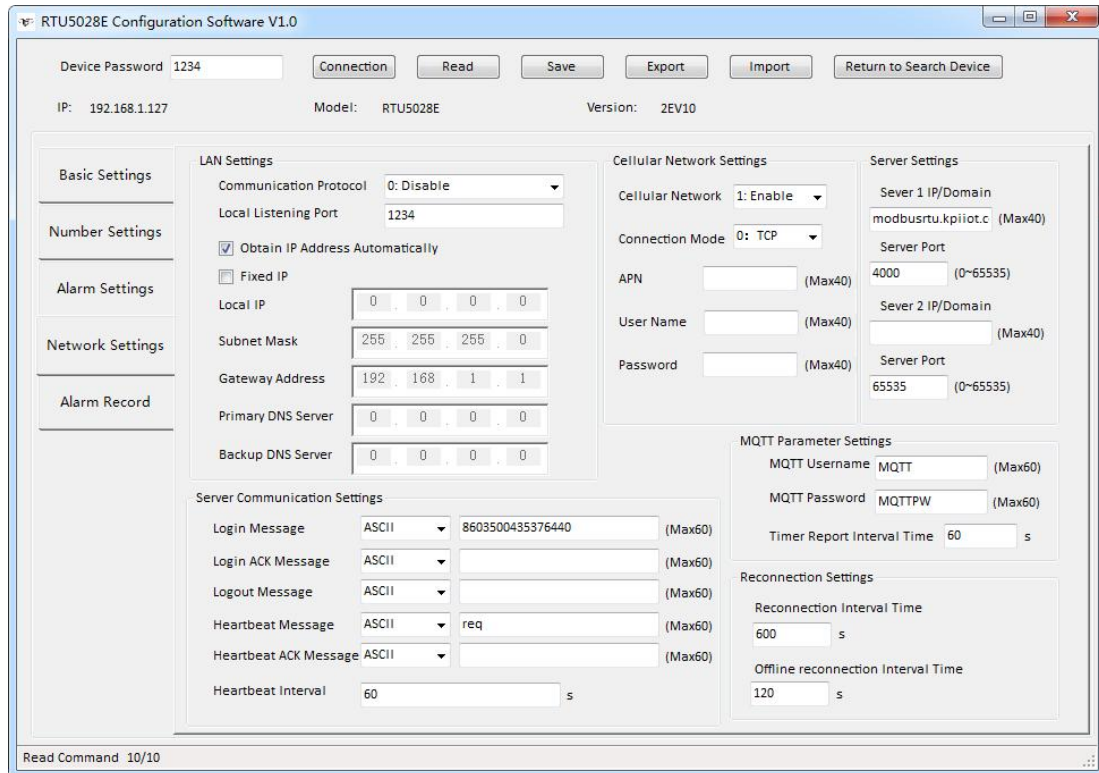
【PING Target IP】 7 network device IP can be set. When set to 0.0.0.0 or 255.255.255.255, it means that the target IP is empty, and the PING test will not be performed.

【Confirm PING Failure Times】 It can be set from 1 to 255, and the default is 3 times, which means that if PING fails for 3 consecutive times, it will be confirmed as an alarm.

【Alarm Link Relay】 Check it, the alarm will be linked to the relay (linkage method: the relay is disconnected for 2 seconds during the alarm, and it will be disconnected again for 2 seconds if it has not recovered after 2 minutes, and it will be disconnected

for 2 seconds for the last time if it has not recovered after 5 minutes).

8.6 Network Settings



【LAN Settings】

【Obtain IP Address Automatically】 The device will automatically obtain an IP address through DHCP.

【Fixed IP】 When checked, the local connection settings can be customized.

【Local IP】 【Subnet Mask】 【Gateway Address】 【Primary DNS Server】 【Backup DNS Server】 For local connection related settings, please set them according to the local area network you are in.

【Communication Protocol】 0: off; 1 Modbus RTU protocol; 2 Modbus TCP protocol; 3 MQTT protocol

【Local Listening Port】 The range is 0~65535, and the default port is 1234. The TCP client in the LAN can connect to the device through this port. After the connection, the device data can be collected through the Modbus TCP protocol.

【Cellular Network Settings】

【Cellular Network】 0 Disabled; 1 Enabled (the cellular network will only be enabled when the network port fails to connect to the network)

【Connection Mode】 0 TCP; 1 UDP

【APN】 【User Name】 【Password】 The Internet access parameters of the SIM card.

【Server Settings】

【Server 1 Domain/IP】 【Server Port】 The main server address, if the device uses the Modbus RTU protocol to connect to the BLIIoT Cloud Platform, the server address is modbusrtu.kpiiot.com:4000; if the device uses the Modbus TCP protocol to connect to the BLIIoT Cloud Platform, the server address is mbtcp.my-m2m.com:6655; if the device uses the MQTT protocol to connect to BLIIoT Cloud Platform, the server address is mqtt.my-m2m.com:1883

【Server 2 Domain/IP】 【Server Port】 Alternate server address, when the first server address fails to connect, it will automatically connect to the second server address.

【Server Communication Settings】

【Login Message】 The registration package sent by the device to the server when connecting to the server; when the device uses the MQTT protocol, this item is the MQTT client identifier (Client ID) and topic name (Topic Name); the default is the registration code for connecting to the BLIIoT Cloud Platform.

【Login ACK Message】 If this item is set, when registering to connect to the server, the server must send corresponding data to the device, otherwise the device will consider the registration connection failure.

【Logout Message】 When the device receives this data from the server, it will actively disconnect.

【Heartbeat Message】 The heartbeat packet sent by the device to the server to maintain the link.

【Heartbeat ACK Message】 If this item is set, the server must send the corresponding data to the device when receiving the heartbeat packet. If the device does not receive the data for 3 times, it will disconnect.

【Heartbeat Interval】 The range is 0~9999 seconds, if it is set to 0, it means no sending, and the default is 60 seconds.

【MQTT Parameter Settings】

【MQTT User Name】 【MQTT Password】 MQTT protocol connection parameters, the relevant parameters have been defaulted when connecting to the BLIIoT Cloud Platform (Default user name is MQTT, the default password is MQTTPW), please do not modify it.

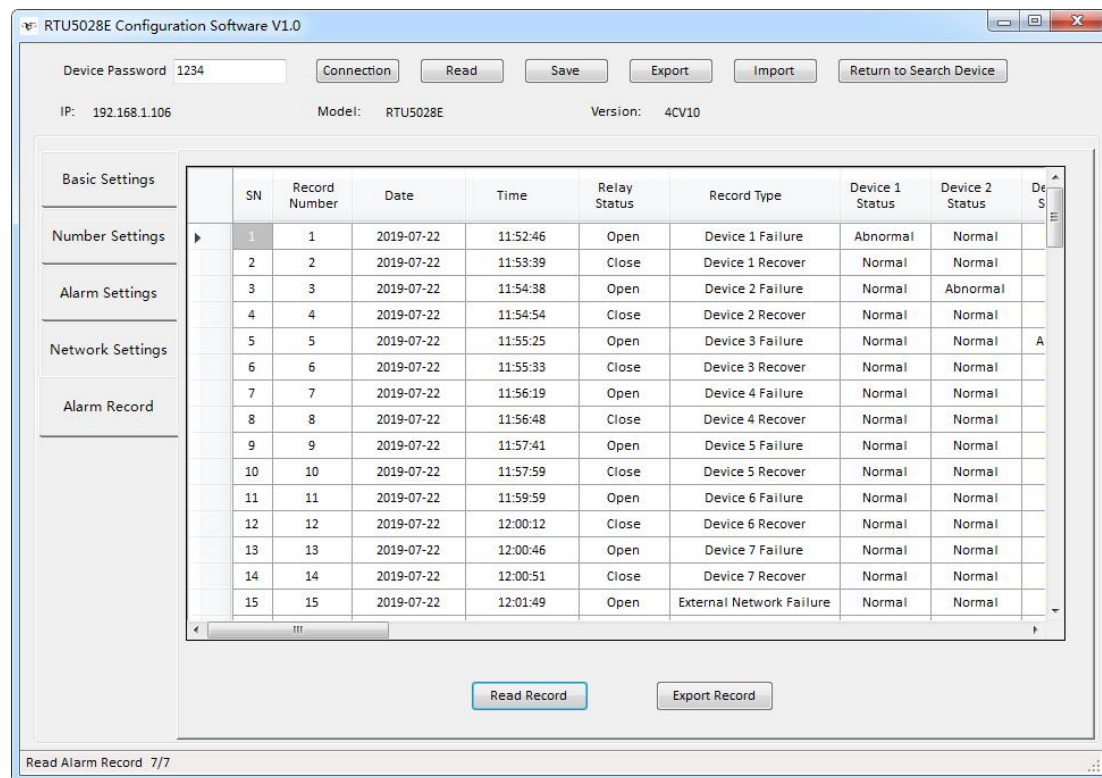
【Timer Report Interval Time】 The range is 0~65535 seconds, default 60 seconds, which means that the device will upload data to the server every 60 seconds.

【Reconnection Settings】

【Reconnection Interval Time】 The range is 0~65535 seconds, default is 600 seconds, which means that after the cellular network fails to connect to the server, it will try to connect again at an interval of 600 seconds.

【Offline Reconnection Interval Time】 The range is 0~65535 seconds, default is 120 seconds, which means that if the server does not send data to the device for 120 consecutive seconds, it will actively log off and then reconnect to the server.

8.7 Alarm Record



SN	Record Number	Date	Time	Relay Status	Record Type	Device 1 Status	Device 2 Status	Device 3 Status
1	1	2019-07-22	11:52:46	Open	Device 1 Failure	Abnormal	Normal	
2	2	2019-07-22	11:53:39	Close	Device 1 Recover	Normal	Normal	
3	3	2019-07-22	11:54:38	Open	Device 2 Failure	Normal	Abnormal	
4	4	2019-07-22	11:54:54	Close	Device 2 Recover	Normal	Normal	
5	5	2019-07-22	11:55:25	Open	Device 3 Failure	Normal	Normal	A
6	6	2019-07-22	11:55:33	Close	Device 3 Recover	Normal	Normal	
7	7	2019-07-22	11:56:19	Open	Device 4 Failure	Normal	Normal	
8	8	2019-07-22	11:56:48	Close	Device 4 Recover	Normal	Normal	
9	9	2019-07-22	11:57:41	Open	Device 5 Failure	Normal	Normal	
10	10	2019-07-22	11:57:59	Close	Device 5 Recover	Normal	Normal	
11	11	2019-07-22	11:59:59	Open	Device 6 Failure	Normal	Normal	
12	12	2019-07-22	12:00:12	Close	Device 6 Recover	Normal	Normal	
13	13	2019-07-22	12:00:46	Open	Device 7 Failure	Normal	Normal	
14	14	2019-07-22	12:00:51	Close	Device 7 Recover	Normal	Normal	
15	15	2019-07-22	12:01:49	Open	External Network Failure	Normal	Normal	

【Record Number】 1~65535, marked according to the order of records.

【Date】 Current date when recording, year month day.

【Time】 The current time when recording, hours minutes seconds.

【Relay Status】 The state of the relay at the time of recording is closed or open.

【Record Type】 The type of alarm or recovery.

【Device 1~7 Status】 【External Network】 【External Power】 Each status is normal or abnormal at the time of recording.

【Power Voltage】 The external power supply voltage value at the time of recording.

【Read Record】 Read the last 100 historical records.

【Export Record】 Export records to CSV format file.

9 SMS Command

- 1.Default Password is 1234.
 - 2.The device doesn't support PIN Code Protected SIM Card.
 - 3.You can program the device with SMS commands.
 - 4.Remember that commands must be CAPITAL LETTERS. It is PWD not pwd, CAP not Cap. Don't add spaces or any other character.
 - 5.The PWD in the commands means the password, such as 1234, just enter the password directly.
 - 6.If the password is correct but the command is incorrect, the device will return: SMS Format Error, Please check Caps Lock in Command! So please check the Command, or add the country code before the telephone number or check the input is in ENGLISH INPUT METHOD and CAPS LOCK. If password incorrect, there is no response SMS.
 - 7.Once the device received the SMS Command, it will return SMS for confirmation, if no SMS return, please check your command or resend message.
- Some operators use different SMS parameter, the device can't return the SMS confirmation in rare cases, but the SMS function can still be used.

9.1 Modify Password

Command	Return SMS	Example
PWD+P+new password	[New password], This is the New Password, please remember it carefully.	<u>1234P4321</u> stands for change password from 1234 to 4321

9.2 Time Zone

When the network port is connected to the Internet when it is turned on, it will automatically obtain GMT, and the device will automatically convert to the correct time according to the set time zone.

Command		Return SMS	Example
Set	PWD+TZ+s+x s stands for “+”or“-”, x stands for min;	Set success!	The minute difference between the time zone of the equipment and Greenwich Mean Time, 1 time zone=60 min. Eg:Device located at Beijing east 8 zone, + 480 minutes difference from GMT, SMS command: <code>1234TZ+480</code>

9.3 Set the SIM Card Number

When the network port cannot be connected to the Internet when it is turned on, it will automatically adjust the time through SMS. The host number is the SIM card number installed in the device.

Command	Return SMS	Example
PWD+TEL+x+# x stand for the unit phone number, max 22 digits	Set success!	<code>1234TEL008613570810254#</code> Stands for the unit phone number is 13570810254

9.4 Set RTU5028E System Time

Command	Return SMS	Example
Set PWD+D20xx-yy-zz+Thh:mm or PWD+Dxxxyyzz+Thhmm Notice: xx(year),yy(month),zz(day),hh(hour),mm(minute)	xx(Y)xx(M)xx(D)xx(H)xx(M)	<code>1234D2018-01-02T03:04</code> <code>4</code> <code>1234D180102T0304</code> Stands for 03:04, January 2,2018
Inquiry PWD+D	xx(Y)xx(M)xx(D)xx(H)xx(M)	

9.5 Inquiry Current Status

Command		Return SMS
Inquiry	<p>PWD+EE</p> <p>Note: Only set to Ping device IP and internet IP, the return SMS will contain network device 1~7 and internet status</p>	<p>Current time;</p> <p>Device Name;</p> <p>External Power Normal/Failure/Voltage Higher: Current value;</p> <p>Device 1:Normal/Fault</p> <p>Device 2:Normal/Fault</p> <p>Device 3:Normal/Fault</p> <p>Device 4:Normal/Fault</p> <p>Device 5:Normal/Fault</p> <p>Device 6:Normal/Fault</p> <p>Device 7:Normal/Fault</p> <p>Internet:Normal/Fault</p> <p>Network cable:Normal/Fault</p> <p>GSM Signal Value:</p> <p>IMEI:</p> <p>Model:</p> <p>Version:</p>

9.6 Set Daily Report Time

Command		Return SMS
Set	<p>PWD+DRT+hh:mm</p> <p>hh stands for hour; mm stands for minute, must be 2 digits</p>	Daily SMS Report: hh:mm
Inquiry	PWD+DRT	
Delete	PWD+DRTDEL	

9.7 Set Interval Report Time

Command		Return SMS
Set	<p>PWD+DT+x</p> <p>(xxx=001-999hours, must be 3digits, default</p>	Report status every xxx hours

	999, stands for disable report)	
Inquiry	PWD+DT	

9.8 Set Authorized User number

Command		Return SMS
Set	PWD+A+x+T+y (x= 01~10,must be 2 digits, stands for series number) (y stands for phone number, max 22 digits, supports add country code, e.g. +86 or 0086) e.g.: 1234A03T008613570810254 to setup 008613570810254 as the 3 rd number.	1: --- 2: --- 3: 13570810254 4: ---
Inquiry	PWD+A	Return All numbers
Remove	PWD+A+x	

9.9 Whether to Press * or # to End the Alarm

Press * or # to end the alarm after answering.

Command		Return SMS
No need to press the button to end the alarm (Default)	PWD+COFF# Once someone answered, the device will not call next authorized number; if nobody answer, it will dialing 3 times a loop.	Set successfully
Need to press the button to end the alarm dialing	PWD+CON# If no one answers the alarm dial or user don't press the button after answering, it will continue to dial. Need to press the * or # button to end the alarm dialing.	Set successfully

9.10 Set Voltage High and Low Limits

Command	Return SMS
---------	------------

Set	<p>PWD+AINR+x+L+y+H+z+#</p> <p>y stands for low threshold value; z stands for high threshold value, if y=z, will not alarm. Voltage value should be setup at 10 multiples of actual value.</p> <p><u>1234AINRL50H250#</u></p> <p>To setup voltage low threshold as 5V, high threshold as 25V.</p>	Voltage: Low: y, High: z.
Inquiry	PWD+AINR	

9.11 Set Alarm Confirmation Time

Command		Return SMS
Set	<p>PWD+AINQ+y</p> <p>Note: y=0~65535, default 2 seconds</p> <p><u>1234AINQ2</u></p>	Confirmation time: y seconds
Inquiry	PWD+AINQ	

9.12 Set Alarm/Recovery SMS Content

Command		Return SMS
Set Device Name	<p>PWD+DN+x+T+y</p> <p>X=0~9, 0 stands device, 1~7 stands for network device, 8 stands for internet, 9 stands for external power, y stands for channel name, max 60 characters.</p> <p><u>1234DN1Trouter</u></p> <p>To setup network device 1 channel name as "router"</p>	Channel Name:y
Inquiry	PWD+DN+x	
Set Alarm Content	<p>PWD+AINA+x+T+y</p> <p>x=1~10, 1~7 stands for network device1~7, 8 stands for internet, 9 stands for external power voltage low alarm, 10 stands for high alarm. y stands for alarm content, max 40 characters.</p> <p><u>1234AINA8Tfault</u> to set internet fault alarm</p>	Alarm Content: y

Inquiry	PWD+AINA+x	
Set Recover Content	<p>PWD+AINN+x+T+y x=1~9; 1~7 stands for network device 1~7, 8 stands for internet, 9 stands for external power, y stands for recovery alarm content, max 40 characters.</p> <p>1234AINN9Tfault to set internet recover alarm</p>	<p>Recover Content: y</p>
Inquiry	PWD+AINN+x	

9.13 Set Relay Output

Command		Return SMS
Close Relay	PWD+CC	relay close
Open Relay	PWD+DD	relay open

9.14 Set PING Network Device IP

Command	Return SMS	Example
<p>PWD+PINGIP+x=y (x=1~7, stands for network device 1~7, y stands for IP address)</p>	IPx:y	<p>1234PINGIP1=192.168.1.188</p> <p>to set device 1 IP address as 192.168.1.188</p>
Inquiry	PWD+PINGIP+x	
Delete	PWD+PINGIPDEL+x	

9.15 Set PING External Network IP or Domain Name

Command	Return SMS	Example
<p>PWD+PINGPUB+x=y (x=1,2, y stands for Internet IP address, both 2 internet IP can not PING successfully to confirm network fault)</p>	IP/domain x:y	<p>1234PINGPUB1=www.baidu.com</p> <p>to set internet 1 domain www.baidu.com</p>
Inquiry	PWD+PINGPUB	
Delete	PWD+PINGPUBDEL+x	

9.16 Set Local Connection

The local connection is automatically obtained by DHCP. If you need to set a fixed IP, please set the relevant parameters according to the local area network.

Command		Return SMS
Set Local IP and Listening Port	PWD+ETHIP+x+*+y (x=local IP, y=listening port, Used to listen for TCP client connections, acquire data via Modbus TCP after connection) <u>1234ETHIP192.168.1.101*1234</u> to set local IP as 192.168.1.101, port:1234	Local IP: x Port: y
Inquiry	PWD+ETHIP	
Delete	PWD+ETHIPDEL (If delete local IP address, the device will automatically obtain IP address through DHCP)	
Set gateway address	PWD+GATE=x (x=gateway address) <u>1234GATE=192.168.1.1</u> To set gateway as 192.168.1.1	Set successfully
Set Subnet mask	PWD+MASK=x (x=subnet mask) <u>1234MASK=255.255.255.0</u> To set subnet mask as 255.255.255.0	
Set Primary DNS Server	PWD+DNS1=x (x=DNS server) <u>1234DNS1=114.114.114.114</u> To set primary DNS server as 114.114.114.114	
Set Backup DNS Server	PWD+DNS2=x (x=DNS server) <u>1234DNS2=8.8.8.8</u> To set primary DNS server as 8.8.8.8	

9.17 Set Cellular Network Access Parameters

Command		Return SMS
Set	PWD+AP+x+#+y+#+z x stands for APN, y means user name, z means password	APN: x User name: y Password: z
Inquiry	PWD+AP	
Delete	PWD+APDEL	

9.18 Enable/Disable Cellular Network

Enabled: Switch to Cellular network when network port fails to connect to the network;

Disabled: Not switch to Cellular network at any time

Command		Return SMS
Set ON	PWD+GPRSON	GPRS/3G/4G: ON
Set OFF	PWD+GPRSOFF	GPRS/3G/4G: OFF

9.19 Set Network Online

Command		Return SMS
Set	PWD+ONLINE	Network Online

9.20 Set Disconnection Reconnection Time

Command		Return SMS
Set	PWD+RECONT+x X=0~65535 seconds, default is 600 seconds, stands for no data is sent within 600 seconds after the device is connected to the server, and the server will be automatically disconnected and reconnected to the server.	Reconnect time:x seconds
Inquiry	PWD+RECONT	

9.21 Set Register Package

Command		Return SMS
Set	PWD+RTP+x	Register

	x stands for Login Message content, max 60 characters	package:x
Inquiry	PWD+RTE	

9.22 Set Heartbeat Packet (For Modbus Protocol)

Command		Return SMS
Set	PWD++HET+x x stands for Heartbeat content, max 20 characters, default is ACK	Heartbeat package content: x seconds
Inquiry	PWD+HEE	

9.23 Set Heartbeat Interval

Command		Return SMS
Set	PWD++HT+x x=0~9999 seconds, default is 60 seconds, 0 stands for not upload	Heart Pack Period:x seconds
Inquiry	PWD+HTE	

9.24 Set Device ID

Command		Return SMS
Set	PWD+ID+x x=0~65535, default is 1 If the device choose Modbus protocol, x=1~255	ID:x
Inquiry	PWD+IDE	

9.25 Set Communication Protocol

Command		Return SMS
Setup	PWD+ETHON+x x=0,1,2,3; 0 stands for disable, 1 stands for Modbus RTU protocol, 2 stands for Modbus TCP protocol, 3 stands for MQTT protocol.	Network port:x
Tips:		

<p>If choose Modbus RTU protocol, the Server will revert to the setting that domain name is modbusrtu.kpiiot.com, port is 4000;</p> <p>If choose Modbus TCP protocol, the Server will revert to the setting that domain name is mbtcp.my-m2m.com, port is 6655;</p> <p>If choose MQTT protocol, the Server will revert to the setting that domain name is mqtt.my-m2m.com, port is 1883;</p> <p>If want to connect own server, setup GPRS communication protocol first, then setup server parameter.</p>	
--	--

9.26 Set Server Address

Command		Return SMS
Setup	Server1: PWD+IP+x+*+y Server2: PWD+IPB+x+*+y (x= server IP or domain; y=port, range:0~65535) <u>1234IPmodbusrtu.kpiiot.com*4000</u> to setup server1 address As modbusrtu.kpiiot.com:4000	IP:x Port:y
Inquiry	Server1:PWD+IP Server2:PWD+IPB	
Delete	Server1:PWD+IPDEL Server2:PWD+IPBDEL	

9.27 Inquiry History Record

Up to 100 recent historical records can be queried

Command	Return SMS	Example
PWD+HIS+x (x=1-100, stands for inquiry qty)	[IMEI Code as Device ID] Record event 1: Record event 2: Record event 3: (Each SMS will include one IMEI Code as Device ID.)	<u>PWDHIS8</u> to read the latest 8 historic record.

9.28 Set Language

Command	Return SMS
---------	------------

Setup English	PWD+EN	English
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9.29 Remote Restart Device

Command		Return SMS	Example
Setup Periodicity Reboot	PWD++REBOOT+x (xxxx=0-9999 hours, default is 160 hours)	Reboot: x Hours	1234REBOOT3 The device will be reboot automatically for every 3 hours.
	Inquiry		PWD+RE
Reboot Manually	PWD+RT	The device has restarted	

9.30 Remote Factory Reset

Command		Return SMS
Remotely Reset	PWD+RESET	Reset successfully

10 Communication Protocol

The RTU5028E supports GPRS/3G/4G data transfer to cloud server, supports Modbus RTU, Modbus TCP and MQTT protocol.

10.1 Modbus Protocol

Modbus Address				
Register Address	Definition	Data Type	Function Code	Data Description
0	Relay output	bool	1, 5	0=open, 1=close
0	Device 1 status	bool	2	0=fault, 1=normal
1	Device 2 status	bool	2	0=fault, 1=normal
2	Device 3 status	bool	2	0=fault, 1=normal
3	Device 4 status	bool	2	0=fault, 1=normal

4	Device 5 status	bool	2	0=fault, 1=normal
5	Device 6 status	bool	2	0=fault, 1=normal
6	Device 7 status	bool	2	0=fault, 1=normal
7	Internet status	bool	2	0=fault, 1=normal
8	External Power status	bool	2	0=fault,1=normal
9	Network cable status	bool	2	0=fault,1=normal
0	External Power voltage	16bit unsigned int	3, 4	Actual=Register Value/10

10.2 MQTT Protocol

MQTT Published Data Format

When PING network device IP and external network IP are set, the corresponding network device 1~7 and external network data will appear in the uploaded data; since the default PING IP is empty, some data points may not connected. After setting the PING IP, the data point can be uploaded and connected.

Device publish topic: Device serial number(The data filled in the “Login Message” parameter in configuration software.)

```
{
  "sensorDatas":
  [
    {
      //Comment, Not included in the data
      "addTime":"2019-01-02 12:34:56", //Timestamp
      "switcher":"1", //Switch type data, 0 is open, 1 is close
      "flag":"DO1" //DO identification
    },
    {
      "addTime":"2019-01-02 12:34:56",
      "switcher":"1", //Switch type data, 0 is fault, 1 is normal
      "flag":"DI1" //Network device 1 identification
    },
    {
      "addTime":"2019-01-02 12:34:56",
      "switcher":"1", //Switch type data, 0 is fault, 1 is normal
    }
  ]
}
```

```
"flag": "DI2"           //Network device 2 identification
},
{
  "addTime": "2019-01-02 12:34:56",
  "switcher": "1",      //Switch type data, 0 is fault, 1 is normal
  "flag": "DI3"         //Network device 3 identification
},
{
  "addTime": "2019-01-02 12:34:56",
  "switcher": "1",      //Switch type data, 0 is fault, 1 is normal
  "flag": "DI4"         //Network device 4 identification
},
{
  "addTime": "2019-01-02 12:34:56",
  "switcher": "1",      //Switch type data, 0 is fault, 1 is normal
  "flag": "DI5"         //Network device 5 identification
},
{
  "addTime": "2019-01-02 12:34:56",
  "switcher": "1",      //Switch type data, 0 is fault, 1 is normal
  "flag": "DI6"         //Network device 6 identification
},
{
  "addTime": "2019-01-02 12:34:56",
  "switcher": "1",      //Switch type data, 0 is fault, 1 is normal
  "flag": "DI7"         //Network device 7 identification
},
{
  "addTime": "2019-01-02 12:34:56",
  "switcher": "1",      //Switch type data, 0 is fault, 1 is normal
  "flag": "DI8"         // Internet identification
},
{
  "addTime": "2019-01-02 12:34:56",
  "switcher": "1",      //Switch type data, 0 is fault, 1 is normal
  "flag": "DI9"         //External Power identification
},
{
```

```
"addTime":"2019-01-02 12:34:56",
"switcher":"1",           //Switch type data, 0 is fault, 1 is normal
"flag":"DI10"            //Network cable identification
},
{
"addTime":"2019-01-02 12:34:56",
"value":"12.3",          //Numerical type data
"flag":"AI1"             //Voltage identification
},
]
}
```

Data Format of Control DO Published by Server

When the device successfully connects to the platform, it will subscribe to the topic, and the platform can only control the relay after confirming the subscription

```
Device subscribe topic: Device serial number/+
{
  "sensorDatas":
  [
    {
      "sensorId": 211267,           //server sensor identification
      "switcher":0,                //switch type data, 0 is open, 1 is close
      "flag":"DO1"                 //DO identification
    }
  ],
  "down":"down"                   //server downlink
}
```

11 Warranty

- 1) This equipment will be repaired free of charge for any material or quality problems within one year from the date of purchase.
- 2) This one-year warranty does not cover any product failure caused by man-made damage, improper operation, etc.

12 Technical Support

Shenzhen Beilai Technology Co., Ltd.

Website: <https://www.bliiot.com>