SMS Alert

Inquiry Onsite value with a FREE Call or SMS!
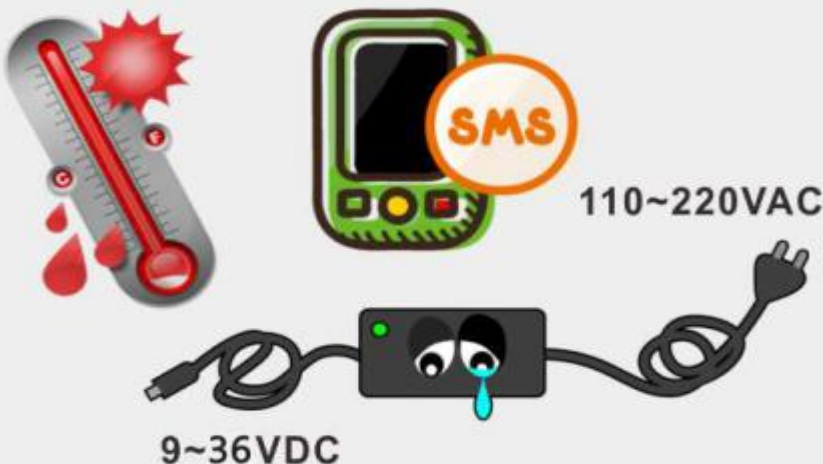
High-Low Threshold alarm with SMS text Message alert!

Interval Report Status to Your Mobile Phone by SMS!

GSM/GPRS/3G/4G/Cloud Temperature&Humidity&Analog &Voltage&Power Status Alarm

SMS Alert

Temperature: 32°C
Humidity: 92%
Voltage: 0/9~24VDC

Temperature&Humidity&Analog &Voltage&Power Status

SMS
110~220VAC
9~36VDC

KING PIGEON

User Manual

Ver 2.5

RTU5023/6/7/8/9

Date Issued: 2020-12-15

www.iot-solution.com

Temperature&Humidity&Analog &Voltage&Power Status Alarm

Table of contents

> This handbook has been designed as a guide to the installation and operation of RTU5023,RTU5026,RTU5027, RTU5028,RTU5029 temperature&humidity&analog&voltage&power status alarm and monitor.
>
> Statements contained in the handbook are general guidelines only and in no way are designed to supersede the instructions contained with other products.
>
> We recommend that the advice of a registered electrician be sought before any Installation work commences.
>
> King Pigeon Hi-Tech.Co., Ltd, its employees and distributors, accept no liability for any loss or damage including consequential damage due to reliance on any material contained in this handbook.
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> King Pigeon Hi-Tech.Co., Ltd, its employees and distributors, accept no liability for GSM Network upgrading or SIM Card upgrading due to the technology specifications contained in this handbook.

【UPGRADE HISTORY】

DATE	VERSION	DESCRIPTION
2015-09-10	Ver1.0	RTU5023 Origin Version
2018-08-01	Ver2.0	RTU5023/6/7/8/9 New Version
2018-08-11	Ver2.1	Add continue dialing function(avoid alarm calling is transferred to voicemail leads to user missed alarm reminding)
2019-01-24	Ver2.2	Upgrade dial & data offline reconnection function;Modify RTU5023/5026/5027 Alarm Verify Time to"0"(Alarm immediately).
2019-09-20	Ver2.3	Modify the server default parameters, increase the default registration mechanism(Login Message)
2019-11-30	Ver2.4	Add 5023/5026/5027 Alarm Verify Time modification instruction.
2020-12-15	Ver2.5	RTU5028 adds voltage over-high/low-limit alarm function

Strongly recommend you use the APP to program it

(SMS APP)

KING PIGEON

【Model List】

Model	GSM/3G/4G	Description	Input/Output Type	DC Input
RTU5023	Optional	Environmental Monitoring Alarm	AM2301 Temperature&Humidity Sensor	9~36VDC
RTU5026		Temperature Monitoring Alarm	DS18B20 Temperature Sensor	
RTU5027A		Analog Transducer Monitoring Alarm	4~20mA Analog Input	
RTU5027V		Analog Transducer Monitoring Alarm	0~5V Analog Input	
RTU5028		AC/DC Power Monitoring Alarm	12VDC Output	
RTU5029A		Phase Loss Monitoring Alarm	3 Phase Input,12VDC Output	
RTU5029B		Phase Loss Monitoring Alarm	Single Phase Input ,12VDC Output	

1. Brief introduction

RTU5023/6/7/8/9 provide 1 input for temperature,humidity,analog,power voltage,power status monitoring and alarm.When the temperature, humidity, power voltage exceed high threshold or low threshold value, will send SMS alert to up to 10 preset mobile phone immediately.

Just dial from authorized user number, the Monitor Alarm unit will reject at the first "Ring", no communication cost, and then return the current temperature, humidity, power status or voltage.It can report current status interval or daily.Moreover,it can also support Modbus RTU Over TCP and Modbus TCP to connect to cloud platform,then monitor the current status in real time through GSM/3G/4G network.

RTU5023/6/7/8/9 Monitor Alarm unit can be used for temperature,humidity,4~20mA/0~5V analog signal,DC voltage,3 phase power status,single phase power status monitoring and alarm, suitable for classrooms, public places, hospitals, stations, Food warehouses, offices, factories, libraries, laboratories, etc., and any place that requires and supports monitoring.

2. Safety Directions

Safe Startup
Do not use GSM unit when using GSM equipment is prohibited or might bring disturbance or danger.

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

3. Standard Packing List

Monitor Alarm unit X 1; Antenna X 1; AC/DC adaptor(DC12V 1.5A) X1 ;User manual X 1.

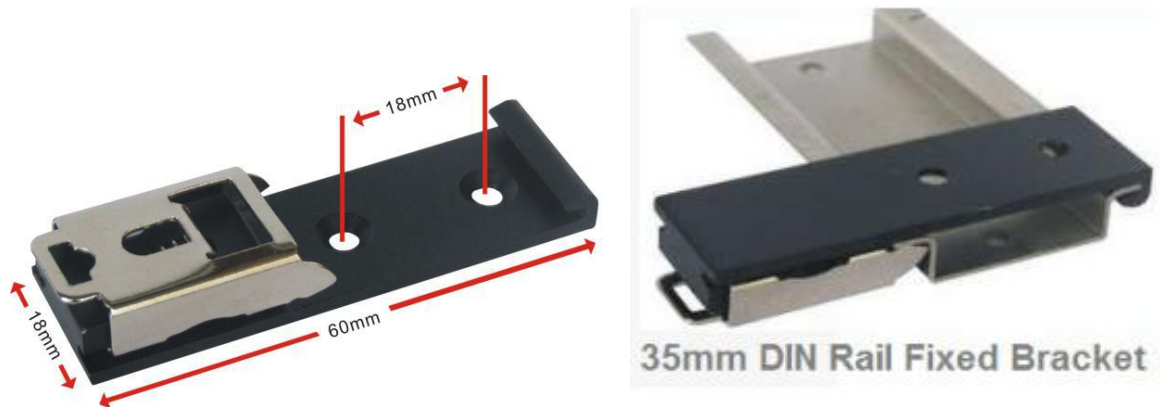*Note: The package does not include any SIM card.*

Optional:

AM230x   Temperature &Humidity Sensor, cable length 1m,5m,20m

DS18B20   Temperature Sensor,cable length 1m,5m,10m,20m

SR-x Siren

DIN 35mm Standard DIN rail fixed Bracket:

35mm DIN Rail Fixed Bracket

4. Mainly Features

- ➢ GSM/GPRS/3G/4G network communication, can be operated from anywhere, no distance;
- ➢ Multiple applications:temperature,humidity,power supply voltage,analog signal,3 phase power status, single-phase power status, etc.;
- ➢ 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, 5 can be used to receive call or SMS,and 5 can be used to call and SMS while alarm occurrence;
- ➢ Can set timer report and every x hours automatically send its status/value to the first authorized number;
- ➢ Support remotely read historic data via SMS;
- ➢ Rechargeable backup battery inside can last 8 hours;
- ➢ Modular structure design, replace a module can upgrade the network from 2G to 3G/4G or 3G to 4G;
- ➢ Compatible wall installation and DIN35mm industrial rail installation;
- ➢ Support Modbus RTU Over TCP and Modbus TCP, can be connected to cloud platform.

5. Technical specifications

Item	Reference Scope
DC Power supply	Standard adapter:12VDC，Range 9~36VDC
Power consumption	Standby：20mA@12V；Working Max：150mA@12V

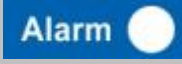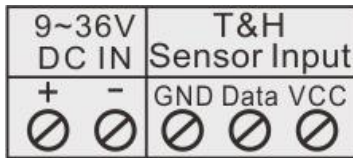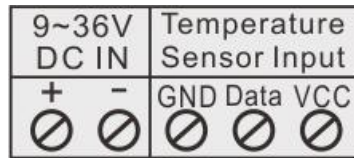| GSM/3G/4G	GSM frequency: 850/900/1800/1900MHz
	3G/4G: Optional: WCDMA/TDD-LTE/FDD-LTE
SIM interface	Support 3V SIM Card
External antenna	SMA Antenna interface, 50 Ohm, Gain: 3dB
Protocol	Modbus RTU Over TCP,Modbus TCP
Temp.&Hum Inputs	AM230x:temperature range -40℃~80℃,accuracy±0.5℃, humidity range 0~99%RH,accuracy ±3%RH
	DS18B20:temperature range -55℃~125℃,accuracy ±0.5℃
Analog input	4~20mA or 0~5V
Phase power input	Phase power voltage:100~500VAC
Backup Battery	3.7V/900mAh,can last 8 hours
Working temperature	-10℃~60℃
Working　Humidity	Relative humidity 95% (condensation free)
Exterior dimension	70mm * 88mm * 30mm

6. Physical Layout

6.1 LED Indicator Instruction

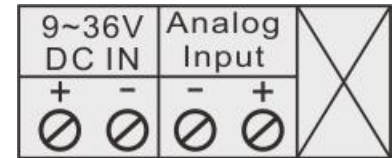| LED Indicator Instruction	
	Cellular network indicator： 2G module,flashing quickly (flash per 0.8s) means searching for cellular or no network; flashing slowly(flash per 2s) means registered successfully. 3G/4G module,when searching for cellular or no network ,the light will 2seconds flick once; registered successfully will be on 2s,off 1s... Flicks quickly means data transmission.
	Power indicator：LED ON when connect power;otherwise,it is OFF
	Alarm Indicator:Alarm will ON.;Normally is OFF;
	Status Indicator: Arm is ON;Disarm is OFF

6.2 Interface Instruction
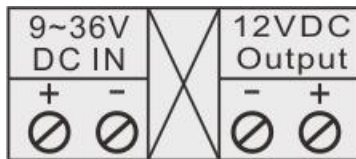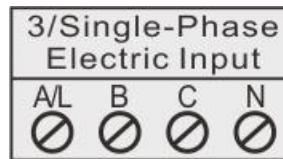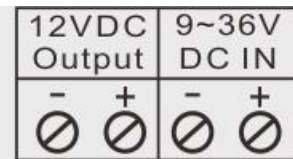

RTU5023 interface   RTU5026 interface   RTU5027 interface

RTU5028 interface   RTU5029 interface

| Interface instruction		
9~36V DC IN	**+**	DC9~36V positive input
	–	DC9~36V negative input
T&H Sensor Input （**RTU5023**）	**VCC**	DC3.3V output,connected with AM230x VCC power wire（red）
	Data	Connected with AM230x Data wire（yellow)
	GND	Connected with AM230x GND wire（black or white）
Temperature Sensor Input **(RTU5026)**	**VCC**	DC3.3V output,connected with DS18B20 VCC power wire（red）
	Data	Connected with DS18B20 Data wire（yellow）
	GND	Connected with DS18B20 GND wire（black or white）
Analog Input （**RTU5027**）	**+**	4~20mA or 0~5V analog positive input
	-	4~20mA or 0~5V analog negative input
12VDC Output （**RTU5028、RTU5029**）	**+**	12VDC positive output
	-	12VDC negative output
3/Single-Phase Electric Input （**RTU5029**）	**A/L**	Three- phase A phase input or single-phase fire wire input
	B	Three-phase B phase input
	C	Three-phase C phase input
	N	Three-phase or single-phase null wire input
ANT	GSM/3G/4G antenna interface	

6.3 Backside Switch & Card Slot

At the backside of the panel, please use the tool to remove the screw, and you can see switch button, RESET button(reset button has the function: 1.upgrade,press it and switch on the device will enter upgrade state;2.reset,press it then hold on 3 seconds in the state of power on will reset) and card slot as below:
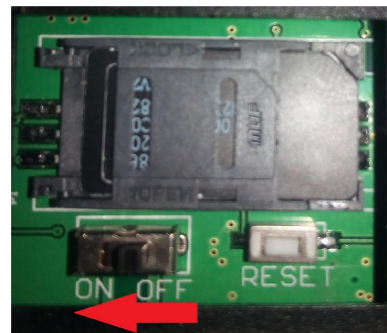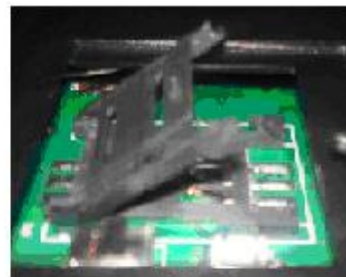
Switch OFF   *Switch ON*
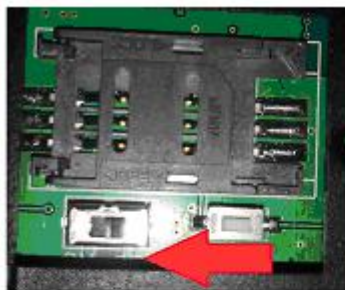
Move left the card slot   Lift up the card slot

Install sim card
(chip faces down)   Move right to
fix card slot

7. Reset the unit

(1) Switch on the device,press and hold RESET button for 3 seconds,after power indicator flash 3 times ,the device will reset successfully.

(2) Sending SMS command "password+RESET ",receive returns SMS "Reset successfully",means device is reset successfully.

8. Settings&Operation

Strongly Recommend using the APP to program it

Notice:

1. The default Password is 1234.
2.   The unit cannot support PIN Code Protected SIM Card.

3.   You can program the unit with SMS commands using your phone.

4.   Remember that commands must be CAPITAL LETTERS. It is PWD not pwd, CAP not Cap etc. Don't add spaces or any other character.

5.   The PWD in the commands is means the password, when you use it, please in stand of it by the digital number; the capital letters **PWD** is the command letter, use PWD directly.

6.   In some GSM/3G operators they use different SMS parameter; the units can't return the SMS confirmation in some gsm operators, but it can performance the functions correctly. Also, you can try to add the country code before the number, see the below settings:

> **For example:**
>
> E.g.: the country code is 0086, or +86.
>
> The user cell phone number is 13600000000 and has been assigned as a SMS Alert number, the sim card number in the panel is 13512345678.
>
> When you setup the number as the authorized number, please setup as 008613600000000 or +86136000000000. Not 13600000000.

7.   If the password is correct but the command is incorrect, the RTU502x 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 then will not any response SMS.

8.   Once the GSM/3G Unit received the SMS Command, will return SMS to confirmation, if no SMS return, please check your command or resend again.

9.   The SMS commands that you will certainly use in the GSM units are the following:

SMS Commands For Program and Operation the RTU50236789

1) Setup the RTU502x SIM Card Number (Max 21 digits)

This number is used for automatically adjust the time from GSM Operator.

Command	Return SMS	Example
PWD+TEL+x+# x stand for the unit phone number,max 21 digits	Set success!	1234TEL008613570810254# Stands for the unit phone number is 13570810254

2) Setup RTU502x system Time

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

3) Modify Password (4digits, Default is: 1234)

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

4) Armed or Disarmed

Command		Return SMS	Example
Armed	PWD+AA	Armed	Armed stands for while alarm occurrence, will send SMS or dial to alert users.
Disarmed	PWD+BB	Disarmed	Disarmed stands for while alarm occurrence, will not send SMS or dial to alert users.

5) Setup Authorized User number (Total 10 authorized number, each number max 21 digits.)

- When alarm/Recovery occurrence, the RTU502x will send predefined SMS to the 1st ~5th numbers, and send SMS also dial 6th ~10th numbers, till any one answer it or cycle dial 3 times.
- Just dial from Authorized User number, the RTU502x will reject at the first "Ring", no communication cost, and then return the current temperature, humidity, power voltage by SMS.
- The 1th number can also receive daily report SMS.

Command		Return SMS
Setup	PWD+A+x+T+y (x= 01~10,must be 2 digits,stands for series number) (y stands for phone number,max 21 digits,supports add country code,e.g. +86 or 0086) e.g.: 1234A03T008613570810254 to setup 008613570810254 as the 3rd number.	1: --- 2: --- 3: 13570810254 4: ---
Inquiry	PWD+A	Return All numbers
Remove	PWD+A+x	

6) Setup Alarm Parameter 1

Command		Return SMS
Setup Channel Name	PWD+AIN+x+T+y x=1,2,3;1 stands for temperature or analog input,2 stands for humidity,3 stands for voltage(below x are the same) y stands for channel name,max 20 characters	Temperature/AIN:y Humidity:y Voltage:y
Inquiry	PWD+AIN123	
Setup Threshold Value	PWD+AINR+x+L+y+H+z+# y stands for low threshold value;z stands for high threshold value,if y=z,will not alarm RTU5023 valid temperature range:-400~800(stands for 40℃~80℃); RTU5026 valid temperature range:-550~1250(stands for -55℃~125℃); Humidity valid range:0~100(stands for 0%RH~100%RH); Voltage valid range:0~370(stands for 0V~37V); Analog signal range:-32767~32767(stands for -3276.7~3276.7); When sending SMS command to setup,except humidity should be setup according to actual value,the temperature, voltage and analog value should be setup at 10 multiples of actual value. If setup by APP, all of them can be setup according to actual value. Recommended to use the APP for setting. E.g.1234AINR1L-120H356# to setup temperature low threshold as	Temperature/AIN: low:y,High:z. Humidity: Low: y,High: z. Voltage: Low: y,High: z.

	-12.0℃,high threshold as 35.6℃; 1234AINR2L10H90# to setup humidity low threshold as 10%RG,high threshold as 90%RH	
Inquiry	PWD+AINR	
Setup Analog Measurement value range (Used for RTU5027)	PWD+AINML+y+H+z+# y,z=-32767~32767;y stands for min value,z stands for max value; RTU5027A default min is 40,max is 200(corresponds to 4mA,20mA); RTU5027V default min is 0,max is 50(corresponds to 0V,5V) When sending SMS command to setup,the value should be setup at 10 multiples of actual value; If setup by APP, can be setup according to actual value. Recommended to use the APP for setting. E.g. 1234AINML−13579H24680# to set up min value as -1357.9,max value as 2468.0	AIN: Min:y, Max:z
Inquiry	PWD+AINM	
Setup Alarm Verify Time	PWD+AIN+x+Q+y x=1,2,3;1 stands for temperature or analog input,2 stands for humidity,3 stands for voltage y=0~255 seconds; temperature, humidity, analog quantity default 5 seconds, voltage default 2 seconds	AINQ1:y(S) AINQ2:y(S) AINQ3:y(S)
Inquiry	PWD+AINQ	

Setup Alarm Parameter 2

Command		Return SMS
Setup Device Name	PWD+DN+y y stands for device name,max 60 characters	Device Name:y
Inquiry	PWD+DN	
Setup Alarm Verify Time	RTU5028: PWD+AINQ+y RTU5029: PWD+AIN+x+Q+y x=1,2; 1 stands for external power supply,3 stands for single/three phase power y=0~65535 seconds,default 2 seconds,0 stands for alarm immediately	The verification time of External Power Goes OFF: y Seconds AINQ1:y Seconds AINQ2:y Seconds
Inquiry	PWD+AINQ	
Setup Power Failure Alarm Content	RTU5028:PWD+AINA+y RTU5029:PWD+AINA+x+T+y x=1,2; 1 stands for External power supply,3 stands for single/three phase power y stands for power failure alarm content,max 40 characters	Alarm Content : y AINA1: y ANIA2: y
Inquiry	PWD+AINA	
Setup Power Recover Content	RTU5028: PWD+AINN+y RTU5059: PWD+AINN+x+T+y x=1,2; 1 stands for External power supply,3 stands for single/three phase power	Recover Content: y AINN1: y ANIN2: y

	y stands for power recovery alarm content,max 40 characters	
Inquiry	PWD+AINN	
Setup 12V Output Time	PWD+AOT+y y=0~65535 seconds,default 120 seconds,0 stands for always keep output	12V Output: y Seconds
Inquiry	PWD+AOT	
Open 12 V Output	PWD+AON	12V Output: ON/OFF
Close 12 V Output	PWD+AOF	
Inquiry	PWD+AOE	
Set voltage channel name (Only for 5028)	Password+AIN+3+T+y Note: y is the channel name, which supports up to 60 characters (1 Chinese character occupies 2 characters); Example: Set the voltage channel name to voltage, command 1234AIN3T Voltage	Voltage:y
Inquiry (Only for 5028)	PWD+AIN3	
Setup Threshold Value	Password+AINR+3+L+y+H+z+# Note: y is low threshold, z is high threshold. If the high and low threshold are set to be the same, there will be no alarm. The default is 0; Voltage setting range 0~370 (corresponding to 0V~37V); When setting the command, the voltage should be set 10 times of the actual value. For example, if the voltage is 12V, the set value should be 120; if you use APP to set, all the actual values can be used. It is recommended to use APP to set. Example: Set the low threshold voltage to 9V and high threshold value to 15V, command 1234AINR3L90H150#	Voltage: Low: y,High: z.
Inquiry (Only for 5028)	PWD+AINR	

7) Setup Daily Report Time (Default is 10:00AM)

The daily report is everyday report the RTU502x current status by SMS to the 1st Authorized number.

The content is same with return SMS of command "PWD+EE".

Command		Return SMS
Setup	PWD+DRT+hh:mm hh stands for hour;mm stands for minute,must be 2 digits	Daily SMS Report at:hh:mm
Inquiry	PWD+DRT	Daily SMS Report at:HH:MM
Delete	PWD+DRTDEL	Daily SMS Report at:

8) Setup Interval Report Time

The interval report is interval to report the current status by SMS to the 1st Authorized number.

The content is same with return SMS of command "PWD+EE".

Command		Return SMS
Setup	PWD+DT+x	Report status every xxx hours

	(xxx=001-998hours, must be 3digits,default 999,stands for disable report)	
Inquiry	PWD+DT	

9) Inquiry Current Status (We recommend user inquiry it by call from authorized numbers)

Command	Return SMS
PWD+EE	Armed/Disarmed; Device Name;(for RTU5028/9) A Phase:[Normal/Loss]; (for RTU5029A) B Phase:[Normal/Loss]; (for RTU5029A) C Phase:[Normal/Loss]; (for RTU5029A) Single Phase:Normal/Loss;(for RTU5029B) External Power Normal/Failure: Current value;(for RTU5028/9) AIN:Current Value,[Normal/Higher/Lower];(for RTU5027) Temp:xxxxC,[Normal/Higher/Lower];(for RTU5023/6) Humi:xxxxRH%,[Normal/Higher/Lower];(for RTU5023) Volt:xxxxVDC,[Normal/Higher/Lower];(for RTU5023/6/7) GSM Signal Value: IMEI: Model: Version:

10) Inquiry Historic Record (Only can inquiry the latest 100 alarm events.)

Command	Return SMS	Example
PWD+HIS+x (x=1-100,stands for inquiry qty)	[IMEI Code as Device ID] 2015-07-15,18:18 1:[Current Value] °C,[Higher/Lower/Normal] 2015-07-15,18:18 2: [Current Value]RH%,[Higher/Lower/Normal] 2015-07-15,18:18 3: [Current Value]VDC,[Higher/Lower/Normal] (0: Analog input, 1: Temperature, 2: Humidity, 3: Voltage. Each SMS will include one IMEI Code as Device ID.)	PWDHIS5 to read the latest 5 historic record.

11) Remotely Reboot

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	No return SMS	

12) Remotely Reset

Command		Return SMS
Remotely Reset	PWD+RESET	Reset successfully

13) Setup Device ID

Command	Return SMS

Setup	PWD+ID+x x=0~65535,default is 1. If the device choose Modbus protocol,x=1~247		ID:x
Inquiry	PWD+IDE		

14) Setup GPRS/3G/4G Parameter

Command		Return SMS
Setup	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	

15) Setup Server IP/Domain Name/Port Parameter

Command		Return SMS
Setup	PWD+IP+x+*+y x stands for server IP address or domain name,y=0~65536,stands for server port.	Server IP:x Port:y
Inquiry	PWD+IP	
Delete	PWD+IPDEL	

16) Setup GPRS Communication Protocol

Command		Return SMS
Setup	PWD+GPRSON+x x=1,2,3;1 stands for Modbus RTU Over TCP protocol,2 stands for Modbus TCP protocol	GPRS/3G/4G:x
Inquiry	PWD+INTE	
Delete	PWD+GPRSOFF	

Tips:

If choose Modbus RTU Over TCP protocol, the Server will revert to the setting that domain name is modbusrtu.kpiiot.com, port is 4000;

If choose Modbus TCP protocol, the Server will revert to the setting that domain name is mbtcp.dtuip.com,port is 6655;

If want to connect own server, pls setup GPRS communication protocol first,then setup server parameter.

17) Setup GPRS Online

Command		Return SMS
Setup	PWD+GPRSonline	GPRS Online

18) Setup the no data offline reconnection time

Command		Return SMS
Setup	PWD+RECONT+x x=60~65535 seconds,default is 120 seconds,Indicate if no data sent within 120 seconds after the device is connected to the server, then it will be automatically disconnected and reconnected to the server.	Reconnect time:x seconds
Inquiry	PWD+RECONT	

19) Setup the Login Message

Command		Return SMS
Setup	PWD+RTP+x x stands for Login Message content,max 50 characters, default is "IMEI code+0"	Registration package:x
Inquiry	PWD+RTE	

20) Setup the Heartbeat

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

21) Setup the Heartbeat Interval

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

22) Setup continue to call next authorize number, even answering if without press a key (avoid alarm calling is transferred to voicemail leads to user missed alarm reminding)

Command		Return SMS
Not continue dialing (Default)	PWD+COFF# Once anyone answered, the device will not call next authorized number,if nobody answer will circular dialing for 3 times .	Set successfully
Continue dialing	PWD+CON# After answering, the device will continue to call next authorize number without pressing the key on the phone,press * or # will stop calling next authorize number	Set successfully

9. Data Communication Protocol

The RTU5023/6/7/8/9 supports GPRS/3G/4G data transfer to cloud server,supports Modbus RTU Over TCP and Modbus TCP protocol.

5023、5026、5027 Modbus Address Instruction				
Register Address	Definition	Data Type	Function Code	Data Description
0	Analog/Temperature	16bit signed int	4	Actual=Register Value/10
1	Humidity	16bit signed int	4	Actual=Register Value
2	Voltage	16bit unsigned int	4	Actual=Register Value/10

5028、5029 Modbus Address Instruction			
Register Address	Definition	Function Code	Data Description
0	12V Output	1、5	0 means Close，1 means Open
0	External Power Status	2	0 means External Power Failure,

			1 means External Power Normal
1	A Phase Status/Single Phase Status	2	0 means A Phase Loss/Power Failure, 1 means Normal
2	B Phase Status	2	0 means B Phase Loss，1 means Normal
3	C Phase Status	2	0 means C Phase Loss，1 means Normal
2 (Only for RTU5028)	Voltage	4	16bit unsigned int, Actual=Register Value/10

10. Warranty

1) This system is warranted to be free of defects in material and workmanship for one year.

2) This warranty does not extend to any defect, malfunction or failure caused by abuse or misuse by the Operating Instructions. In no event shall the manufacturer be liable for any alarm system altered by purchasers.

The End!

Any questions please help to contact us feel free.

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