



**Industrial cellular Router** 

R10 R10A

**User Manual** 

Ver 1.0

Date updated: 2022-8-26 Shenzhen Beilai Technology Co.,Ltd www.iot-solution.com



#### Preface

Thank you for using the industrial cellular router of Shenzhen Beilai Technology Co., LTD. Reading this product manual will enable you to quickly master the functions and usage of this product.

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#### Disclaimer

If the equipment can no longer be used due to the carrier's network upgrade, the company cannot provide free upgrade service. If the operator's network service is interrupted due to special reasons, the machine will not work normally, and the company will not bear the consequences.

This product is mainly used for data transmission based on 4G networks application, please provide the parameters according to the specifications and technical specifications used, at the same time please note especially 4G radio products should pay attention to when using the matters needing attention, the company does not undertake due to abnormal use or improper use or personal injury caused by the product property.

#### **Revision History**

Updated date	Version	Instructions	Author
2022.08.26	V1.0	The first edition	XJH

#### **Models Selection Table**

Model	SIM card	WiFi mode	RS 232	RS 485	GPS	Micro USB	Extend Function
R10	1	2	Multiplexing		optional	support	Modbus Slave/MQTT
R10A	1	2	Multi	plexing	optional	support	Modbus Master /Slave /MQTT



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## 1. Product introduction

#### 1.1. Brief Introduction

R10A is not only an industrial-grade router, but also has outstanding feature such as programmable logic control, cycle timer, edge computing and replaces PLC to a certain extent. it can be used as Modbus RTU/TCP Master for data acquisition, convert Modbus to MQTT protocol, or Transparently Transmit data (Pass-through). One-click directly connect to multiple cloud platforms such as AWS IoT, Thingsboard cloud, Huawei cloud etc. It is suitable for remote monitoring and remote control.

Router function:

R10A support WiFi both AP mode and Client mode. It can provide Internet access for other networking devices, such as IP camera.

Data acquisition DAQ and cloud monitoring :

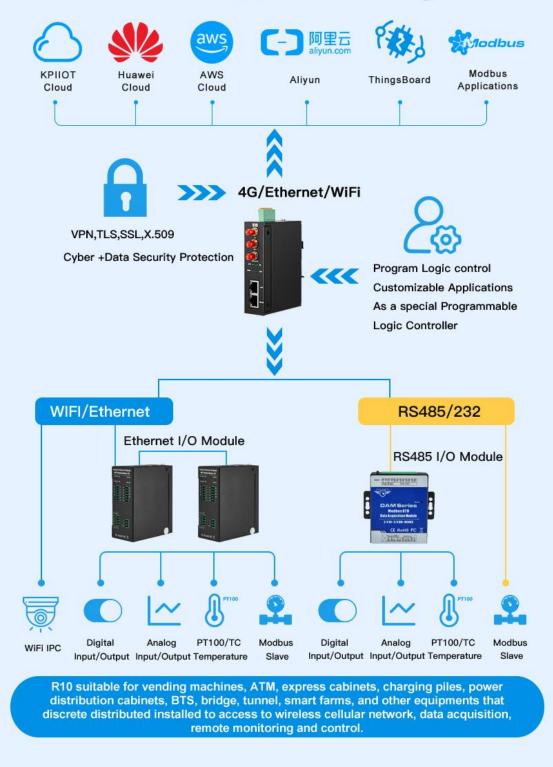
R10A can performs Modbus Master to poll data from meters/sensors , and then transmit data to cloud platform for remote monitoring

Extension function :

R10A can connect the I/O modules either by RS485/232 or Ethernet cable, so as to extend I/O .



## Industrial IoT Edge Router R10 Application Diagram

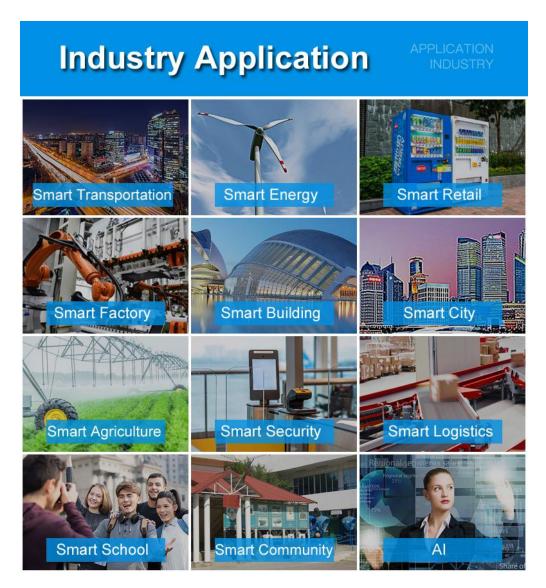




## **1.2. Typically Applications**

R10 router can be widely used in the M2M industry in the Internet of Things industry chain. Such as smart power grid, intelligent transportation, smart home, financial Internet of Things wireless communication router, mobile POS terminal, supply chain automation, industrial automation, intelligent building, fire protection, public safety, environmental protection, meteorology, digital medical, remote sensing survey, agriculture, forestry, water, coal, petrochemical and other fields.

BTS Monitoring, Security Alarm System applications, Supervision and monitoring alarm systems, Automatic monitoring system, Vending Machines security protection, Pumping Stations, Tanks, Oil or Water levels, Buildings and Real Estate, Weather Stations, River Monitoring and Flood Control, Oil and gas pipelines, Corrosion protection, Temperatures, water leakage applications, Wellheads, boat, vehicle, Energy saving, street lights control system, Valve controls, Transformer stations, Unmanned machine rooms, Control room application, Automation System, M2M, etc.





#### 1.3. Safety instructions



Safety instructions Please do not use this product in places where mobile phones are prohibited!



Radio interference This product uses GSM/GPRS/3G/4G wireless network, please pay attention to wireless interference

## 1.4. Standard Packing List

Before installing and using the equipment, please check whether the following materials are available in the product packaging box. (pictures are for reference only)

• 1 x Router device



• 1 x 7PIN 3.5mm Terminal





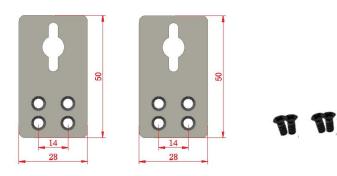
• 1 x antenna for 2G/3G/4G cellular



• 2 x antenna for WIFI 2.4G



• 2 x bracket kit for wall-mounted



• 1 x bracket kit for DIN rail mounted



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- 1 x Instruction Manual (PDF version) Note: Please scan the card QR code to download
- 1 x Certificate of QC pass



#### • 1 x Warranty card



Note: The package does not include any SIM card or Power Adapter

#### 1.5. Main Features

- Supports 4G wireless Internet access, and APN parameters can be set.
- Intelligent anti-drop line, support online detection, online maintenance, automatic redial, ensure that the device is always online;
- Cloud remote background management, remote upgrade and remote configuration;
- > GPS is supported and location data can be published via MQTT;
- Supports VPN protocols such as L2TP, IPSEC, and OPENVPN;
- Support RS485 and RS232 serial port transparent transmission and MODBUS RTU to TCP;
- Complete and robust router function, support a variety of Internet access methods: automatic allocation, specified IP, PPPoE;



> Monitors the online status of network devices connected to the LAN port and reports the

status through the platform;

- Support IPTABLES firewall, various network protocols;
- Support WAN port and 4G network connection switch, preferentially use WAN port wired network;
- Supports MODBUS and MQTT protocols, and MQTT supports SSL encryption;
- Alarms are sent by SMS or email;
- Supports one-time timers, periodic timers, and cyclic timers;
- Supports remote upgrade through web pages.
- > Dynamic DDNS: Supports peanut shell, 88IP, and dynDNS;

## 1.6. Technical parameters

Item	Parameters	Description		
	Input voltage	9~36VDC		
Power	Input current	Normal: 130mA@12V. Maximum: 800mA@12V		
Supply	Connection	3.5mm wiring terminal		
	Protection	Anti-reverse connection Protection		
	Qty	1		
	Interface Spec	RJ45 interface, 10M/100Mbps, adaptive MDI/MDIX		
WAN		ESD $\pm 30$ kV (contact), $\pm 30$ kV (air)		
	Protection	EFT 40A (5/50ns)		
		Lightning 24A (8/20µs)		
	Qty	1		
LAN	Interface Spec	RJ45 interface, 10M/100Mbps, adaptive MDI/MDIX		
(non-POE)		ESD $\pm 30$ kV (contact), $\pm 30$ kV (air)		
(IIOII-POE)	Protection	EFT 40A (5/50ns)		
		Lightning 24A (8/20µs)		
	Qty	1		
	Туре	1 Channel RS485 or RS232		
	Baud rate	1200, 2400, 4800, 9600, 14400, 19200, 38400, 57600, 115200, 230400		
	Data Bit	5, 6, 7, 8		
Serial Port	Parity	None, Even, Odd		
Serial Port	Stop Bit	1,2		
	Working mode	Transparent transmission, Modbus RTU to TCP, Modbus slave, Modbus master (R10A support but R10 can't)		
		ESD contact: 8KV Surge: 4KV (8/20us)		
	Protection	ESD $\pm 8kV$ (contact), $\pm 15kV$ (air)		
		EFT 4KV, 40A (5/50ns)		
	Antenna Port qty	2		
WIFI	Antenna type	SMA hole type		



	Protocol	802.11a/b/g/n (mixed)		
	Mode	AP mode, client mode		
	Frequency	2.4G		
	Channel	Channel 1 - 13		
	Security	Open, WPA, WPA2		
	Encryption	AES, TKIP, TKIPAES		
	Connection number	16(Max)		
	Speed	300Mbps(Max)		
	Transmit Distance	Max. 20 meters in open space where there is no obstruction		
	SSID			
	Broadcast Switch	Support		
	Antenna Port Qty	1		
	Antenna Port Type	SMA hole type		
		GSM/EDGE: 900,1800MHz		
		WCDMA: B1,B5,B8		
	4G(L-E)	FDD: B1,B3,B5,B7,B8,B20		
		TDD: B38,B40,B41		
		GSM/EDGE: 850,900,1800MHz		
		WCDMA: B1,B2,B5,B8		
	4G(L- AU)	FDD: B1,B2,B3,B4,B5,B7,B8,B28		
		TDD: B40		
Cellular		WCDMA: B2,B4,B5		
Network	4G(L-A)	FDD: B2,B4,B12		
	4G(L-V)	FDD: B4,B13		
		WCDMA: B1,B3,B8,B18,B19,B26		
	4G(L-J)	FDD: B2,B4,B12		
		TDD: B41		
		GSM/EDGE: 900,1800MHz		
		WCDMA: B1,B8		
	4G(L-CE)	TD-SCDMA: B34,B39		
		FDD: B1,B3,B8		
		TDD: B38,B39,B40,B41		
	Qty	1		
SIM	Interface Spec	Drawer interface, support 1.8V/3V SIM/UIM card (NANO)		
	Protection	Built-in 15KV ESD protection		
	Antenna qty	1		
CDC	Antenna type	SMA hole type		
GPS	Tracking Sensitivity	> -148 dBm		
(optional)	Horizontal Accuracy	2.5m		
	Protocol	NMEA-0183 V2.3		
	C)/C	System running indicator (blinking for 2S and then off after		
Indicator	SYS	normal operation)		
light	4G	4G cellular operating status indicator ( when SIM registered		



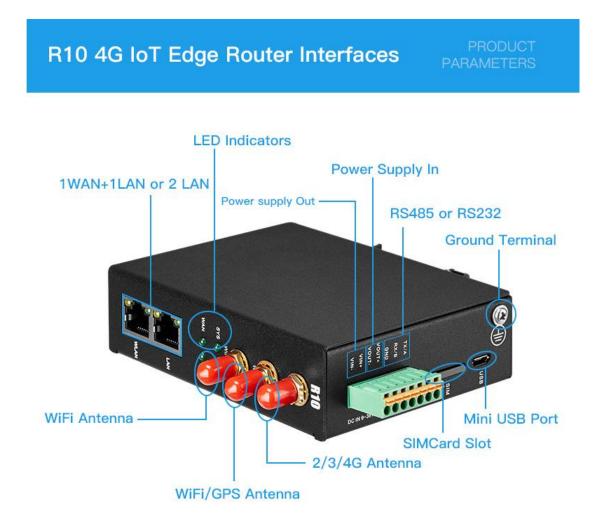
		successfully, this indicator always on )			
	WAN	WAN status indicator			
	LAN	LAN status indicator			
	CPU	MIPS CPU, main frequency 580Mhz			
System	Storage	128Mbits SPI Flash			
	RAM	1024Mbits DDR2			
	Network Drete cel	PPP, PPPoE, TCP, UDP, DHCP, ICMP, NAT,			
	Network Protocol	HTTP, HTTPs, DNS, ARP, NTP, SMTP, SSH2, DDNS			
	VPN	IPsec, OpenVPN, L2TP			
	Firewall	DMZ, DoS defense, IP packet, domain name and MAC			
Software	FILEWAII	address filtering, port mapping, access control			
	Remote	Supports web remote configuration			
	Management	Supports web remote configuration			
	System Log	Support			
	Firmware Update	Supports serial port local TFTP and Web upgrade			
	EMI	EN 55022: 2006/A1: 2007			
		IEC(EN)61000-4-2(ESD)			
		IEC(EN)61000-4-3(RS)			
Certificate	EMS	IEC(EN)61000-4-4(EFT)			
Certificate		IEC(EN)61000-4-5(Surge)			
		IEC(EN)61000-4-6(CS)			
		IEC(EN)61000-4-8			
	Others	CE, FCC, ROHS, 3C			
	Working	-20∼+65°C			
Working	temperature				
Environment	Storage	-40∼+85°C			
Linnonnent	temperature				
	Humidity	5~95%RH (non-condensation)			
	Enclosure	Metal material			
	Size	Height 110mm * Length 83mm * Width 30mm			
Others	IP level	IP30			
	Net weight	300g			
	Installation	Wall mounted, DIN rail			



## 1.7. Models Selection Table

Model	SIM card	WiFi mode	RS 232	RS 485	GPS	Micro USB	Extend function
R10	1	2	Multiplexing		optional	support	Modbus Slave/MQTT
R10A	1	2	Multi	plexing	optiona	support	Modbus Master /Slave /MQTT

## 2. Hardware Description





## 2.1. Device Size





## 2.2. Indicator light



	LED Indicator light						
	Name	Status	Description				
CVC		Always on	Working normally				
SYS	System running status indicator	Light off	Device fail				
		Slow flach	Cellular network normal				
4G	4G cellular status indicator	Slow flash	(registration successful)				
		Light off	abnormal				
		Fast flash	WAN port normal				
WAN	WAN status indicator	Light off	abnormal				
		Always on	LAN port is normal				
LAN	LAN status indicator	Light off	abnormal				

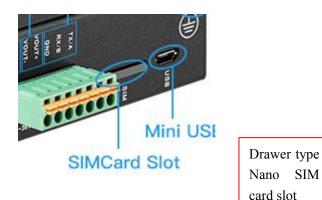
#### 2.3. Reset button

After the router runs normally, press and hold the Reset button for about 10 seconds with a pointed stick. Release the button when all the indicators are off until the WAN indicator blinks slowly. At this time, restart the router and restore the factory default Settings.

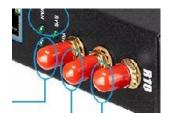


## 2.4. SIM card

When inserting or removing a SIM card, ensure that the device is powered off, insert the card pin into the hole in the card slot, and press down to push the card slot out.



## 2.5. Connect the external antenna



## 2.6. Ground the Router

The router grounding cable helps protect against electromagnetic interference. Before connecting the device, ground the device by connecting the ground screw. Note: The product should be installed on a well grounded device surface, such as a metal plate.

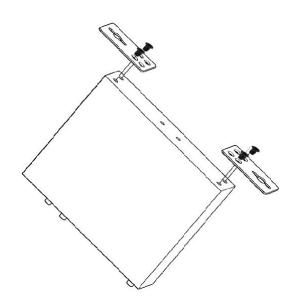




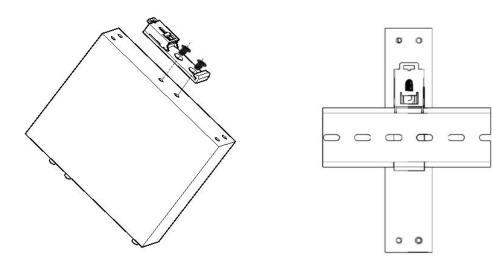
## 2.7. Installation

This device supports horizontal desktop placement, wall mounting and rail mounting.

#### 2.7.1 Wall-mounted installation



## 2.7.2 Rail mounting





## 3. Router operation (basic operation)

#### 3.1. Start the Router device

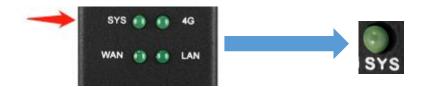
#### 3. 1. 1. Power on the device

Power input port: the device adopts 9 to 36V dc power supply,



#### 3. 1. 2. System running status

Observe the system running status indicator -SYS: The indicator is off when the device is powered on. Wait 1 to 2 minutes until the SYS indicator blinks slowly. If the light is not on, the device is faulty, please contact the agent, or email after the sale: <u>technical@bliiot.com</u>





#### 3.2. SIM Card operation instructions

The device supports dual SIM cards (only NANO SIM cards). When installing the card, disconnect the power supply of the device, remove the card holder with the card taking pin, install the NANO SIM card into the card holder according to the position, insert the card holder back into the card slot, and then power on the device again.

After the device is powered on and running properly, log in to the router configuration interface -- Network -- Cellular network (For login operations, see<u>4.Log in to the Web page and configure</u> 4G cellular dial-up networking by default SIM card For details, see<u>5.3.1Network setting</u> <u>interface</u>and <u>5.3.3.The cellular network</u>

R10A	
	internet + VPN + Remote I/O + Events and Alerts + Operations and Control + cloud platform + quit
contaition * System * The	
cellular network	
Enable cellular	
registration status	registered
operator	China Unicom
signal strength	19 Signal value normal range 14-31
Firmware version	EC200NCNLAR03A02M08
IMSI	460015426281730
IMEI	865016056486590
SIM card ID	89860120801848168834
card number	
Card APN	
card username	
card password	
GPS enabled	
automatic network switch	0
save and apply save	reset

#### 3. 3. Serial port operation

The device has a communication port 485/232. The default port is 485. It can be used for communication between Modbus master and Modbus slave, transparent transmission, and Modbus RTU to TCP.

Note: Only one function can be selected for a serial port at a time. If you cannot select the serial port on the configuration page, it indicates that the serial port has been configured on another configuration page.





## 3. 3. 1. Modbus Master

Modbus master function: The local PC functions as the Modbus master, and the serial port connects to the Modbus slave device <u>5.5.5.Modbus master</u> After configuring slave machine parameters, the local computer will collect slave machine data through Modbus protocol and store slave machine data in the local mapping register. You can query slave machine data directly on the configuration page, Also available in <u>5.8.Cloud Platform</u> Configure the Modbus or MQTT protocol to upload data from the slave computer to the server and convert the Modbus protocol to MQTT protocol<sub>o</sub>

If the slave port is set to RS485/RS232 or Ethernet, the device will continuously poll the slave device based on Modbus RTU (RS485 and RS232 are slave ports) or Modbus TCP (Ethernet is slave ports). To read the value of a register from a machine device into the device mapping area for storage. In this way, the register data in the machine will be mapped to the device. Reading and writing the mapped register of the device will be directly transmitted to the slave device through RS485 serial port, RS232 serial port or Ethernet. There is a one-to-one correspondence between the slave register address and the mapped register address in the device, which is the mapped register list.

Users can connect various slave computers through RS485 serial port, RS232 serial port, or Ethernet port to add I/O ports and read and write intelligent instruments and devices. For example, connect the remote I/O module of Mxxx series of our company to expand the number of INPUT ports of DIN, DO, AI, AO and PT100, or connect the power parameter monitoring module to read the current, voltage and power of three-phase power, or connect it to the UPS power supply for parameter monitoring, etc. Or a combination of the above intelligent devices, etc., can meet the functional requirements of most applications.

#### 3. 3. 2. Modbus slave

Modbus slave function: The local PC serves as the Modbus slave, and the serial port is connected to the Modbus master device <u>5.5. Remote I/O and Serial Port setting</u>. After serial port and server parameters are set, the master device can collect data from the local device using Modbus RTU



(RS485/RS232 interface) or Modbus TCP (Ethernet interface).

#### **3. 3. 3. Transparent transmission**

Transparent transmission: The local machine acts as a data transfer station between the server and slave device, through the configuration page <u>5.5. Remote I/O and Serial Port setting</u>. After serial port parameters and server parameters are configured, the local PC transparently transmits data from the PC to the server and sends data from the server to the slave PC. Data content is not processed but only forwarded, realizing transparent data transmission.

#### 3. 3. 4. Modbus RTU to TCP protocol convert

Transfer from Modbus RTU to TCP: The local host communicates with the slave host using Modbus RTU, and the local host communicates with the server using Modbus TCP, through the configuration page <u>5.5</u>. Remote I/O and Serial Port setting. After setting serial port parameters and server parameters, the local computer automatically converts the Modbus TCP commands sent by the server into Modbus RTU commands and sends them to the slave computer, and then converts the Modbus RTU commands returned by the slave computer into Modbus TCP commands and replies to the server. Realize the communication between Modbus RTU slave and Modbus TCP server.

#### 4. Prepare Configuration router by WEB

The router supports web page configuration. There are two ways to connect the router. One is to connect the computer to any LAN port of the router through cable connection. The other is to connect to a router via WIFI. The PC can automatically obtain an IP address through DHCP or set a static IP address on the same network segment as the router. After the connection is set up, enter the default login address 192.168.3.1 in the browser of the PC to access the Web login page of the router. The default login user name is admin and there is no password.

#### 4.1. Wired connection router

On the PC, you can configure its IP address in two ways. Enable automatic IP address acquisition on the local connection of the PC. Configure a static IP address on the local connection of the PC on the same subnet as the router.

The following uses Windows 7 as an example. The configuration of Windows is similar.



1. Click Start > Control panel & GT; Network and Sharing Center, double-click Local Connection in the window that opens"

	× + + = = = = = = + +	
Control Panel >	Network and Internet   Network and Sharing Center	r • 4 Search Control Panel
File Edit View Tools Help		
Control Panel Home	View your basic network information a	and set up connections
Change adapter settings	A	See full map
Change advanced sharing settings	PC-20190610RMNY Netw (This computer)	vork Internet
	View your active networks	Connect or disconnect
	Public network	Access type: Internet Connections: Uccal Connection
	Change your networking settings	
	Set up a new connection or network Set up a wireless, broadband, dial-up, ad	t hoc, or VPN connection; or set up a router or access point.
	Connect to a network	
	Connect or reconnect to a wireless, wired	d, dial-up, or VPN network connection.
	Choose homegroup and sharing options	5
		er network computers, or change sharing settings.
See also	Troubleshoot problems	
HomeGroup	Diagnose and repair network problems, o	or get troubleshooting information.
Internet Options		
Windows Firewall		

2. In the Local Area Connection Status window, click Properties

IPv4 Connect	ivity:	Internet
IPv6 Connect	ivity:	No Internet access
Media State:		Enabled
Duration:		07:35:18
Speed:		100.0 Mbps
Details	]	
	Sent —	Received
ctivity —	0	
	Sent — 102, 166, 751	Received

3. Select Internet Protocol Version 4 (TCP/IPv4) and click Properties"



		Configure
his connection uses t	he following items:	Contraguio
🗹 📲 Client for Mici		
Shrew Soft Li		
QoS Packet	Scheduler er Sharing for Microsoft	Networks
	col Version 6 (TCP/IP)	
Contraction of the local division of the loc	col Version 4 (TCP/IP)	
	pology Discovery Map	
✓ ▲ Link-Layer I	pology Discovery Res	ponder
Install	Uninstall	Properties
Description		
Transmission Contro	Protocol/Internet Prot	
wide area network		

4. You can configure the IP address of the PC in either of the following ways:

To automatically obtain an IP address from the DHCP server, click Automatically Obtain an IP address" ;

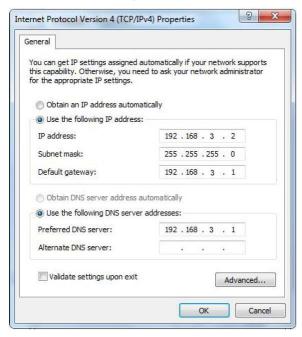
Seneral	Alternate Configuration				
this cap	n get IP settings assigned auto ability. Otherwise, you need to appropriate IP settings.				
() Oł	otain an IP address automatica	lly			
O Us	e the following IP address:				
IP ac	ldress:				
Subr	iet mask:				
Defa	ult gateway:	*	,		
() Oł	otain DNS server address auto	matically			
O Us	e the following DNS server add	dresses:			
Prefe	erred DNS server:			4	
Alter	nate DNS server:		,	,	
V	alidate settings upon exit			Advi	anced



Manually configure a static IP address for the PC on the same subnet as the IP address of the router. Click and configure Use the following IP address"

Seneral	Alternate Configuration					
this cap	n get IP settings assigned a bability. Otherwise, you nee appropriate IP settings.					
0	btain an IP address automa	atically				
O Us	se the followin <mark>g</mark> IP address:	-				
IP ad	ddress:					
Subr	net mask:					
Default gateway:					,	
() O	btain DNS server address a	utomatically	,			
O Us	se the following DNS server	addresses:				
Prefe	erred DNS server:				4	
Alter	mate DNS server:				2	
V	alidate settings upon exit				Adv	anced

5. Click OK to complete the configuration



## 4.2. WiFi Connection router

Search for wireless networks: The default WiFi network name is King-XXxxxx(XXXXXX is a 6-digit random number and letter combination) without password



Dial-up and VPN	^	*
Broadband Connection		E
Wireless Network Connection	^	
KINGPIGEON	lite.	
niuren	liter	
ChinaNet-DFxQ	Ine	
mazentop	lie.	
King-xxxxx	lte.	
Connect automatically	Connect	
DIRECT-11-HP DeskJet 3630 series	Ite.	
TP-E	100	+

1. Establish a connection: no encryption is required by default. Click "Connect".

Currently connected to:	+1	^
King-xxxxx Internet access		ш
Dial-up and VPN	~	-
Broadband connection		- 23
Wireless internet connection	~	
King-xxxxx	Connected	
niuren	lite.	
KINGPIGEON	line.	
ChinaNet-DFxQ	lite.	
mazentop	liter	
DIRECT-11-HP DeskJet 3630 series		+

#### 4. 3. Factory default Settings

Before logging in to the Web configuration page, it is necessary to understand the following default Settings...



Project	Describe
Login IP Address	192.168.3.1
User name	admin
Password	There is no password
DHCP server	The default open
	SSID: KING-XXXXXX (XXXXXX is a 6-digit random number and
WIFI	letter combination)
	KEY: No encryption (open network)

#### 4.4. Login configuration page on WEB browser

- After connecting the router with wired or wireless operation, open the browser, such as IE, Edge, Google, etc., on the PC;
- 2) Enter the IP address of the router in the address bar of your browser <u>192.168.3.1</u> The login page is displayed.

(÷	🕞 🔃 🕪 192.168.3.1	* >

On the login page, enter the user name admin (default), leave the password blank (default), and click Login.

- 3) After you log in to the router, the status summary page is displayed
- 4) Notice After configuring the parameters, click Save and Apply" to take effect

R10
Authorization required Please enter your username (default is admin) and password (default is no password). username password
Log in Powered by KingPigeon Technology Co., Ltd. (v1.20.8) / 2021-07-22



## 5. Configure router

#### 5.1. Status

R10A	
condition - system - The internet - VPN -	<ul> <li>Remote I/O</li></ul>
	UNSAVED CONFIGURATIONS 2 AUTO REFRESH ON
system	
CPU name	R10A
Host model	R10A-4G Industrial Router
Firmware version	KingPigeon Technology Co., Ltd. v1.30.2
kernel version	4.14.162
local time	2022-03-03 17:57:57
operation hours	0h 29m 25s
load average	0.06, 0.06, 0.09
RAM	
Available numbers	61.88MB / 121.33MB (50%)
number of idle	70 69MB / 121 33MB (58%)
buffered	6.78MB / 121.33MB (5%)
cached	19.10MB / 121.33MB (15%)
The internet	
IPv4 upstream	IPv4 upstream
Protocol: UMTS/GPRS/EV-DO Address: 10.139.110.210/32	Protocol: DHCP Client Address: 192.168.1.220/24
Gateway: 10.64.64.64 DNS 1: 120.80.80.80	Gateway: 192.168.1.1 DNS 1: 202.96.128.166
DNS 2: 221.5.88.88	DNS 2: 114.114.114
Connected: 0h 27m 4s	Expiration Time: 1h 32m 26s Connected: 0h 27m 34s
	The Devices Software VI ANI: "ath0.2"

Status provides the overview, firewall, routing table, system logs, kernel logs, and real-time information to view the running status of the router.



## 5.2. System

## 5.2.1. System Properties

1	R10A
	condition * system * The internet * VPN * Remote I/O * Events and Alerts * Operations and Control * cloud platform * quit
	UNSAVED CONFIGURATIONS : 2 AUTO REFRESH ON
	System properties
	basic settings log time synchronization Language and Interface
	local time 2022/3/3 下午5.59.02 Sync browser time Synchronize with NTP server
	CPU name R10A
	Time zone 亚洲化出等 🗸
	Please restart the router to take effect
	save and apply - save reset
	Powered by KingPigeon Technology Co., Ltd. (v1.30.2) / 2022-02-21

Configure basic device information, such as the host name and time zone.

		System property	
Project	_	Instructions	
	Local	You can set the time of the router to synchronize the time of the	
	time	browser or the NTP server	
Basic	Host	Same as product type, modification is invalid	
setup	name	Same as product type, mountcation is invalid	
	Time	Select a region and restart the router for the Settings to take effect	
zone		Select a region and restart the router for the Settings to take effect	
Log		Log property, you can set the external system log server to save	
Log		logs externally	
Time synchronization		Configure the NTP server to synchronize time	
Languaga	and	Language optional automatic (according to the browser language	
Language Interfaces	allu	change, only Chinese and English), Chinese, English; The theme	
Interfaces		cannot be modified	
Product typ	be	That is, the product model, factory curing, modification is invalid	



## 5. 2. 2. System Management Rights

R10A					
condition 👻 system 👻 The	e internet + VPN + Remote I/O +	Events and Alerts -	Operations and Control -	cloud platform -	quit
				UNSAVED CO	NFIGURATIONS: 2
host password Change the administrator passw	rord to access the device				
password					
confirm password		*			
					save
	Powered by KingPigeo	n Technology Co., Ltd. (v	1.30.2) / 2022-02-21		

	System Management
Project	Instructions
Password	Change the administrator password for accessing the device
SSH access	Provides SSH access and SCP services
	The public key allows password-less SSH login with greater
SSH key	security than using a common password. To upload the new key
	to the device, paste the OpenSSH compatible public key line or
	drag the.pub file into the input field.

## 5. 2. 3. Software Package

This function provides software installation, removal, and upgrade.



filter: Enter to filter	Clear Download and install the pa	ckage: action: confirm update list	Upload package configure opkg
available It has been installed		no package	>
package name	Version	size (.ipk)	describe
No information available			
	Powered by KingPigeon Tec	thnology Co., Ltd. (v1.30.2) / 2022-02-	21

(Note: This is advanced function for professionals!)

## 5. 2. 4. Backup/Upgrade

R10A				
condition - system - The	internet - VPN - Ren	note I/O - Events and Alerts -	Operations and Control -	cloud platform - quit
action configure				UNSAVED CONFIGURATIONS : 2
backup				
Click "Make Backup" to download	a tar archive of the current	configuration file.		
Download backup	generate backup			
recover				
Upload a backup archive to restor	e the configuration. To rest	ore the firmware to its original stat	e, click Perform Reset (only s	quashfs formatted firmware works).
restore to factory settings	perform a reset			
restore configuration	Upload backup			
	Custom files (certificat	es, scripts) remain on the system	If you don't need to keep it, p	elease perform a factory reset first.
Save mtdblock content	:			
Click Save mtdblock to download	the specified mtdblock file.	(Note: This feature is for profession	onals!)	
select mtdblock	u-boot	~		
download mtdblock	save mtdblock			
flash new firmware				
Upload a sysupgrade compatible	mage from here to update	running firmware.		
firmware file	Flash the firmware			

Backup/Upgrade				
Project	Instructions			
Backup	Click Build Backup to download the tar archive of the current			
Баскир	configuration file.			



	Upload the backup archive to restore the configuration. To					
Restore	restore the firmware to its initial state, click Perform Reset (valid					
	only for squashFS format firmware).					
Save the MTdblock	Click Save MtdbLock to download the specified MTdblock file.					
content	(Note: This feature is for professionals!)					
Druch norr firmerrons	Upload a SysupGrade compatible image from here to update the					
Brush new firmware	running firmware					

## 5. 2. 5. **Reboot**

Click Perform Reboot to restart the system on your device.

R10A									
conditio	on <del>-</del>	system 👻	The internet +	VPN +	Remote I/O -	Events and Alerts +	Operations and Control -	cloud platform <del>+</del>	quit
								UNSAVED CO	NFIGURATIONS : 2
Warnin	g: Som	e unsaved o	configurations will	be lost aft	er reboot!				
perfor	m a res	tart							
				0		Technology Co. 144 (c	1 20 2) (2022 02 24		
				Powere	a by KingPigeon	Technology Co., Ltd. (v	1.30.2)/2022-02-21		

#### 5.3. Network

#### 5.3.1 Network setting Interface (WAN/LAN switching, 4G, WAN6)

You can restart, close, edit, or delete an existing interface, or add a new interface. By default, interfaces such as LAN, WAN, WAN6, and 4G are configured. You can click Edit to modify detailed configurations.



interface		U.	ISAVED CONFIGU	ATIONS : Z A	UTO KEFKESH
LAN	Protocol: Static Address Runtime: 0h 34m 55s MAC: BE:52:50:C9:D8:28				
br-lan	Receive: 3.50 MB (23523 packets) Send: 6.45 MB (25563 packets) IPv4: 192.168.3.2/24 IPv6: fd3b:3dbb:e566::1/60	reboot	closure	edit	delete
WAN	Protocol: DHCP Client Run Time: 0h 33m 49s				
eth0.2	MAC: BE:52:50:C9:D8:2C Receive: 4.21 MB (31541 packets) Send: 3.29 MB (18732 packets) IPv4: 192.168.1.220/24	reboot	closure	edit	delete
WAN6	Protocol: DHCPv6 Client MAC: BE:52:50:C9:D8:2C	reboot	closure	edit	delete
eth0.2	Receive: 4.21 MB (31541 packets) Send: 3.29 MB (18732 packets)	160001	closure	cuit	Uelete
4G	Protocol: UMTS/GPRS/EV-DO Runtime: 0h 33m 19s				
3g-4G	Receive: 66 B (5 packets) Send: 180 B (19 packets) IPv4: 10.139.110.210/32	reboot	closure	edit	delete
Add new interface					

## 5.3.1.1 LAN port

R10A					
interface » LAN	he interne	t <del>~ VPN~ R</del> e	emote I/O – Even	its and Alerts ← Operations and Control ← cloud platform ← quit	
	d - anto an		Firewall settings	DUCD	
in basic settings advance	a settings	physical setup	Firewall settings	UTICP server	
con	dition	Device: br-lan Runtime: 0h 34 MAC: BE:52:50 Receive: 3.34 M Send: 6.15 MB IPv4: 192.168.3 IPv6: fd3b:3dbl	0:C9:D8:28 MB (22861 packets) (24779 packets) 3.2/24		
pro	tocol	static address	~		
Auto run at	boot 🗹	2			
IPv4 add	Iress 1	192.168.3.2			
IPv4 subnet r	mask 2	255.255.255.0	*		
IPv4 gate	eway				
IPv4 broad	dcast [1	192.168.3.255			
Use a custom DNS s	erver		+		
IPv6 allocation le	-	60 ② Allocate the give	• en length portion of e	aach public IPv6 prefix to this interface	
IPv6 Assignment			idecimal subID prefi	x to this interface.	
IPv6 :		"a:b:c:d::") is obt		andom" and other fixed values (eg: "::1" or "::1.2"). When the IPv6 prefix (eg orization server, use the suffix (eg "::1") to synthesize the IPv6 address ce	
		("aːbːcːdːː1") ass	signed to this interfa	Ce.	

	LAN						
Project		Instructions					
Basic setup	state	Equipment: br - LAN Running time: 8h 57m 16s					



	1				
		MAC: E2:2F:C4:54:93:BA			
		Reception: 18.81 MB (149126 packets)			
		Send: 99.87 MB (132321 packets)			
		IPv4:192.168.3.1/24			
		IPv6: fdb2:428b:ddbe::1/60			
	Agreement	Static address			
	Automatic startup	Check the default			
		The default IP address is 192.168.3.1. Modifying this setting can change the network segment that DHCP assigns IP to the			
	IPv4 address	LAN port. This is also used as the login address of router. If the IP address is modified, select Force application when saving the application. After the modification			
		is complete, please log in with the new IP address.			
	IPv4 subnet mask	Default 255.255.255.0			
	IPv4 gateway	This parameter is empty by default. If multiple IPv4 addresses are configured, you need to specify the gateway address			
	IPv4 radio	Default 192.168.3.255			
	Use a customized DNS server	Default empty			
	IPv6 Allocation Length	Assigns a given length portion of each public IPv6 prefix to this interface, 60 by default			
	IPv6 Assignment Prompt	Assign this hexadecimal subID prefix to this interface.			
	IPv6 suffix	Optional. Allowed values: EUi64, Random, and other fixed values (for example ::1 or ::1:2). If an IPv6 prefix (such as A :b: C :d::) is obtained from the authorization server, a suffix (such as ::1) is used to synthesize an IPv6 address (A :b: C: D ::1) and assign it to the interface.			
	Use the built-in IPv6	Selected by default			
	management				
Advanced Settings	Mandatory link	Always use application Settings regardless of the link state of the interface (if selected, link state changes will no longer trigger hotPlug event handling). This parameter is selected by default.			
		the link state of the interface (if selected, link state changes will no longer trigger hotPlug event handling). This parameter is selected by			



	Use ga	ateway hops	The default 0
physical setting	Bridge interfaces		Create a bridge for the specified interface.
			This parameter is selected by default.
	Open the STP		Enable spanning tree protocol on this bridge,
			not selected by default.
	Enable IGMP sniffing		Enable IGMP snooping on this bridge, not
			selected by default.
	Interface		VLAN: eth0.1 (LAN) for switches and
			Master king-xxxxx (LAN) for wireless
			networks. You do not need to change the
			Settings of physical interfaces that use LAN
			interfaces
Firewall Settings	Create/assign firewall areas		Assign a firewall area to the interface, select
			unspecified to remove the interface from the
			associated area, or fill in the Create field to
			create a new area and associate the current
			interface with it.
DHCP server	Basi c setup	Ignore this interface	The DHCP service is not provided on this interface. This perspecter is not selected by
			interface. This parameter is not selected by default.
		start	The starting base address assigned to a
			network address. The default of 100.
		The customer	Maximum number of addresses allocated.
		number	The default of 150.
		Lease	The minimum expiration time of the rented
			address is 2 minutes (2m). The default 12 h.
	Adv ance d Setti ngs	Dynamic DHCP	Provides DHCP services for all clients. If
			disabled, only customers with static leases
			will be served. This parameter is selected by
			default.
		Mandatory	Force DHCP on this network even if another
			server is detected. This parameter is not
			selected by default.
		IPv4 subnet mask	Reset the subnet mask sent to the client.
		DHCP options	Set the DHCP additional options, such as
			setting "6192168 2.1, 192.168.2.2" said notice
			different DNS server to the client.
	IPv6 is set	Routing	
		Advertisement	Default Server mode
		service	
		DHCPv6 service	Default Server mode
		HDP agent	Disabled by default
		DHCPv6 mode	The default is stateless + stateful
		Always advertise	It advertises itself as the default route even if



the default route	no public network prefix is available. This parameter is deselected by default.
DNS server for notification	This parameter is not required based on actual Settings
TheadvertisedDNSdomainname	This parameter is not required based on actual Settings

# 5.3.1.2 WAN port

E	R10A			
	condition - system - The inte	ernet + VPN + Remote I/O + Events and Alerts +	Operations and Control -	doud platform 🛩 quit
	Interfaces » WAN			ON
iı	basic settings advanced sett	ings physical setup Firewall settings		
	condition	<ul> <li>Device: eth0.2 Runtime: 0h 34m 10s MAC: BE:52:50:C9:D8:2C Receive: 4 25 MB (31885 packets) Send: 3.36 MB (18967 packets) IPv4: 192:168.1.220/24     </li> </ul>		
	protocol	DHCP client 🗸		
	Auto run at boot			
	Hostname sent when requesting DHCP	R10A		
		RECEIVE: 4.20 MD (21000 packets)		Cancel save
	eth0.2	Send: 3.36 MB (18967 packets)		
	4G 3g-4G	Protocol: UMTS/GPRS/EV-DO Runtime: 0h 33m 40s Receive: 66 (6 packets) Send: 180 B (19 packets) IPv4: 10.139.110.210/32	reboot closure	edit delete
			save and	apply - save reset

	V	WAN	
Project	_	Instructions	
		Equipment: eth0.2	
		Running time: 9h 37m 16s	
	State	MAC: E2:2F:C4:54:93:BB	
	State	Reception: 113.65 MB (290226 packets)	
		Send: 19.02 MB (137282 packets)	
Desis estas		IPv4:192.168.1.173/24	
Basic setup		DHCP client by default. If the network	
	Agreement	connected to the WAN requires an account	
		and password to log in, select PPPoE	
	Automatic startup	Selected by default	
	Host name sent when	The default value is maduat model	
	requesting DHCP	The default value is product model	



	Use the built-in IPv6 management	Selected by default
	Mandatory link	Always use application Settings regardless of the link state of the interface (if checked, link state changes will no longer trigger hotPlug event handling). This parameter is NOT selected by default.
	Use broadcast tags	Some ISPs require DOCSIS 3 for coaxial network. This option is not selected by default.
Advanced	Using the Default Gateway	If the default route is left blank, it is selected by default.
Settings	The DNS server is automatically obtained	If left blank, the advertised DNS server address is ignored. This parameter is selected by default.
	Use gateway hops	The default 0
	ID of the client sent when	This parameter is not required based on actual
	requesting DHCP	Settings
	Vendor Class option sent	This parameter is not required based on actual
	when requesting DHCP	Settings
	The MAC address was reset	Changing a MAC Address
	Reset the MTU	default is 1500
Physical	Bridge interfaces	Create a bridge for the specified interface. This parameter is not selected by default.
setting	Interface	Switch VLAN: eth0.2 (wan, WAN6). You do not need to change the value of this parameter
Firewall Settings	Create/assign firewall areas	Assign a firewall area to the interface, select unspecified to remove the interface from the associated area, or fill in the Create field to create a new area and associate the current interface with it.

#### 5.3.1.3 WAN/LAN switching

When you do not need to use the WAN interface function, you can convert the WAN into the LAN function to use, save and apply.



R40B state - system -	service * The internet *	VPN - application -	rtu I/o -	logic operation -	cloud platform - quit
interface LAN/WAN switch Glo	pal network options				AUTO REFRESH ON
LAN/WAN switch					
Switch WAN port to LAN port					
				Save and a	pply save Reset
Powered by KingPigeon Technology	Co., Ltd. (v1.20.10) / 2021-09	9-09			

### 5.3.1.4 WAN6 Port

condition - system - The inter	net - VPN - Remote I/O - Events and Ale	erts • Operations and Control •	cloud platform + quit
Interfaces » WAN6			ON 1
ir basic settings advanced settin	gs physical setup Firewall settings		
condition	<ul> <li>Device: eth0.2</li> <li>MAC: BE:52:50:C9:D8:2C</li> <li>Receive: 4.28 MB (32070 packets)</li> <li>Send: 3.42 MB (19115 packets)</li> </ul>		
protocol	DHCPv6 client		
Auto run at boot			
request IPv6 address	try 🗸		
Request an IPv6 prefix of the specified length	automatic *		
			Cancel save
	ienu, 5.42 mb (10110 packets)		
4G F 30-4G S	Irotocol: UMTS/GPRS/EV-DO tuntime: 0h 33m 55s teoclev: 66 B (5 packets) iend: 180 B (19 packets) Pv4: 10 139 110 210/32	reboot closure	edit delete
		save and	d apply - save reset

	WAN6				
Project		Instructions			
		Equipment: eth0.2			
Basic setup	state	MAC: E2:2F:C4:54:93:BB			
		Reception: 115.31 MB (299495 packets)			



		Send: 19.41 MB (140798 packets)
	Agreement	DHCPv6 client by default
	Automatic startup	Selected by default
	Requesting an IPv6 Address	Try by default
	Requests an IPv6 prefix of the specified length	Default automatic
	Use the built-in IPv6 management	Selected by default
	Mandatory link	Always use application Settings regardless of the link state of the interface (if checked, link state changes will no longer trigger hotPlug event handling). This parameter is not selected by default.
	Using the Default Gateway	If this parameter is left blank, the default route is not configured
Advanced Settings	User-defined assigned IPv6 prefix	This parameter is not required based on actual Settings
	The DNS server is automatically obtained	If left blank, the advertised DNS server address is ignored. This parameter is selected by default
	ID of the client sent when requesting DHCP	This parameter is not required based on actual Settings
	The MAC address was reset	Changing a MAC Address
	Reset the MTU	The default is 1500
The physical	Bridge interfaces	Create a bridge for the specified interface. This parameter is deselected by default.
setting	Interface	Switch VLAN: eth0.2 (wan, WAN6). You do not need to change the value of this parameter
Firewall Settings	Create/assign firewall areas	Assign a firewall area to the interface, select unspecified to remove the interface from the associated area, or fill in the Create field to create a new area and associate the current interface with it.

### 5.3.1.5 4G Port



Interface »	alams The Intern 4G	et = VPN = Remote I/O =	Events and Alerts + Operations and Co	ontrol → cloud platform → quit	
ir _basic settings	advanced settings	s Firewall settings			
	condition	Device: 3g-4G Runtime: 0h 34m 15s Receive: 66 B (5 packets) Send: 180 B (19 packets) IPv4: 10.139.110.210/32			
	protocol	UMTS/GPRS/EV-DO	~		
	Auto run at boot	2			
	modem device	/dev/ttyUSB2	•		
	Service type	UMTS/GPRS	•		
	APN	cmnet			
	PIN				
PAP/	CHAP username				
PAP/	CHAP password				
	dial number	*99***1#			
				Cancel save	

**4**G

		40		
Project		Instructions		
		Equipment: 3 g to 4 g		
		Running time: 0h 11m 52s		
	State	Reception: 1.06 KB (18 packets)		
		Send: 8.50 KB (36 packets)		
		IPv4:10.94.92.16/32		
	Agreement	UMTS/GPRS/EV-DO		
Desis setur	Automatic startup	Selected by default		
Basic setup	Modem equipment	The default/dev/ttyUSB4		
	Service type	The default UMTS/GPRS		
	APN	SIM card Access point		
	PIN	SIM card PIN code		
	PAP/CHAP user name User name used for PPP authentication	User name used for PPP authentication		
	PAP/CHAP password	Password used for PPP authentication		
	Dial the number	SIM card Dial-up		
	Use the built-in IPv6 management	Selected by default		
		Always use application Settings regardless of		
	Mandatory link	the link state of the interface (if checked, link		
Advanced		state changes will no longer trigger hotPlug		
Settings		event handling). Not selected by default.		
	Obtaining an IPv6	The default automatic		
	Address			
	Modem initialization	Maximum wait time (seconds) for the modem		
	timed out	to be ready. Default is 10.		



	Using the Default Gateway	If the default route is left blank, it is selected by default.
	Use gateway hops	If the default route is empty, the route is selected by default.
	The DNS server is automatically obtained	If left blank, the advertised DNS server address is ignored. This parameter is selected by default.
	LCP response fault threshold	If a specified number of LCPS respond to a fault, assume that the link is disconnected. 0 indicates that the fault is ignored. The default value is 0
	LCP response interval	LCP response is sent periodically (in seconds), valid only when combined with the fault threshold. The default is 5
	Activity timeout	Closes the inactive link after a given time (seconds). 0 remains the connection. Default: 0
Firewall Settings	Create/assign firewall areas	Assign a firewall area to the interface, select unspecified to remove the interface from the associated area, or fill in the Create field to create a new area and associate the current interface with it.

# 5.3.2 WIFI (AP mode or WLAN Client)

The internet       MAC address       host       Signal/Noise       Receive Rate/Transmit Rate         No information available             Save and apply • save reset    Powered by KingPigeon Technology Co., Ltd. (v1.30.2) / 2022-02-21	The internet     MAC address     host     Signal/Noise     Receive Rate/Transmit Rate       No information available         Image: save and apply image: save image	R10A condition - system radio0	m - The internet - VPN - Media Tek MT76x8 802. Channels: 11 (2.462 GHz)] SSID: King-R10TEST   Mode BSSID: C6:EE:A6:99:88:11	<b>.11bgn</b> Transfer Rate: ? Mt e: Master		UN SAVED CONFIGU	oud platform ~ RATIONS : 2 Al scanning edit	quit UTO REFRESH ON Add to remove
save and apply 🔹 save reset	save and apply save save					Receive Rate/Trans	mit Rate	
Powered by KingPigeon Technology Co., Ltd. (v1.30.2) / 2022-02-21	Powered by KingPigeon Technology Co., Ltd. (v1.30.2) / 2022-02-21					save and a	apply 🔹 sa	ive reset
			Powe	ered by KingPigeon	Technology Co., Ltd. (v1.	30.2) / 2022-02-21		



It can be used as both a WLAN hotspot (WiFi AP mode) and a WLAN client (WiFi client mode). WiFi Settings display the current wireless status. You can click Edit to enter detailed configuration, or restart, scan, add, disable, remove and other operations. Connected Site Displays connected wireless sites that you can disconnect.

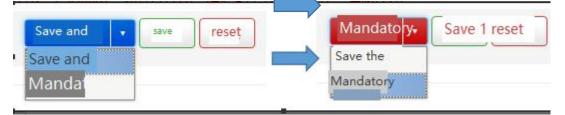
### 5.3.2.1 WLAN Hotspot (WiFi AP mode)

R10A				
condition - content - The internal - VPN - Remote RO - Events and Alerts - Ordentians and Control - cloud diatorm - dust Wireless Network: Main "King-R10TEST" (wlan0)				
Device Configuration				
basic settings advanced settings				
condition Mode: Master   SSID: King-R10TEST 0% BSSID: C8-EE-A6:99.88:11 Encryption: None Chamels: 11 (2.462 GH2) Transmit Power: 20 dBm Signal: 0 dBm Noise: 0 dBm Transmit Rate: 0.0 Mbit/s   Country: 00				
wireless network enabled disabled model channel bandwidth				
working frequency N V 11 (2462 Mhz) V 40MHz V				
maximum transmission power driver default  Current power : 20 dBm  Specifies the maximum transmit power. Depending on regulatory requirements and usage, the driver may limit the actual transmit power below this value.				
Interface configuration				
basic settings wireless security MAC filtering advanced settings model access point AP				
ESSID King-R10TEST				
The internet I an 💯 👷 🗘 🗸 🔹				
Hide ESSID				
WMM mode 🔽				

The default SSID is KING-XXXXXX (XXXXXX is a 6-digit random number and letter combination). The encryption mode does not exist. Other clients (such as mobile phones and computers) can directly search for wireless networks and connect to this hotspot.

Quick configuration: Select the wireless configuration in Master mode in WiFi Settings, click "Edit" to enter the configuration page, find "Interface Configuration" -- "Basic Settings" -- "ESSID" to modify the WiFi hotspot name, find "Interface Configuration" -- "Wireless Security" --"Encryption" to modify the encryption mode and set the WiFi password.

Note: If you use WiFi to access router configurations, select Force Apply to modify WLAN hotspot configurations. In this case, click Save and Apply and select Force Apply.





Wireless AP hotspot device configuration			
Project		Instructions	
		<b>4</b> 97%	
		Pattern: Master   SSID: King - ff4a8a	
		BSSID: EE:0C:45:81:26:51	
	State	Encryption: None	
		Channel: 6 (2.437 GHz)	
		Transmission power: 20 dBm	
		Noise signals: - 42 dBm   : 0 dBm	
D. I. I.		Transfer rate: 58.5 Mbit/s   countries: 00	
Basic setup	Wireless network enabled	Enabled by default	
		If the current frequency has too many devices	
	Working frequency	in use, please change the frequency to reduce	
		interference and optimize the signal	
		Specifies the maximum transmitted power.	
	Maximum transmission	Depending on regulatory requirements and	
		usage, the driver may limit the actual	
	power	transmitted power below this value. The	
		signal	
	Country code	Driven by default	
	Allowstraditional802.11b rates	Check the default	
	Distance optimization	Distance of the farthest network user (in meters). Default automatic, according to the distance to automatically adjust the transmission power	
		When the data length exceeds the threshold,	
	Fragmentation threshold	fragments are automatically sent. The default	
		value is generally used	
Advanced		Request send/Permit send protocol. When the	
Settings	The RTS/CTS threshold	data length exceeds the threshold, enable this	
		protocol to avoid signal conflicts caused by	
		multiple terminals sending data to the AP.	
		The default value is generally used	
		The 40MHz channel is always used even when the auxiliary channels overlap. Using	
	Mandatory 40MHz mode	this option does not comply with IEEE	
	Mandatory 40MHz mode	802.11N-2009! This parameter is not selected	
		by default.	
		Indicates the interval at which a wireless	
	Beacon interval	route broadcasts its SSID periodically. The	
		default value is generally used	
		and a second and a second a se	



Configure AP hotspot interfaces on wireless networks		
Project		Instructions
	Model	Access point AP
	ESCID	Default king-xxxxx (XXXXXX is a 6-digit
	ESSID	random number and letter combination)
		Default LAN, select the network assigned to
Basic setup	network	this wireless interface, or fill in the Create
Basic setup		field to create a new network.
	Hide the ESSID	Not selected by default
		WiFi multimedia: Provides different priorities
	WMM mode	for different services to ensure service
		quality. This parameter is selected by default
Wireless security	Encryption	Default no encryption (open network)
MAC filtering	MAC Address Filtering	Disabled by default
		Disable communication between clients. This
	Quarantine client	parameter is not selected by default
	The name of the interface	Reset the default interface name
	Short Preamble	Different rates require different preambles. This parameter is selected by default
	DTIMinterval	As a terminal node, periodically wakes up and sends traffic indication message intervals
Advanced	Time interval for	The temporary secret key (GTK) uses the
Settings	re-encrypting GTK	default value
	Disable inactive polling	Not selected by default
	Inactive site restrictions	The default 300 seconds
	Maximum listening	Default maximum of 65535
	interval allowed	
	Disconnect on low Ack	Disconnect a wireless terminal in low ACK
	reply	mode when AP mode is enabled. This
	iopiy	parameter is selected by default

### 5.3.2.2 WLAN Client (WiFi Client Mode)



	R10A					
Join a Network: Search W		met = VPN =	Remote I/O -	Events and Alerts + Operations ar	Control + cloud platform + quit	
Signal	SSID	channel	model	BSSID	encryption	
60%	jinge	1	Master	24:69:68:82:3C:96	mixed WPA/WPA2 PSK (CCMP) Join the networ	*
41%	King-dc4c08	11	Master	C0:1C:30:00:0A:CE	None Join the networ	k U
35%	OrayBox-8778	1	Master	A0:C5:F2:BB:87:78	WPA2 PSK (CCMP) Join the networ	*
<b>al</b> 34%	ChinaNet-vwRV	3	Master	F0:92:B4:29:6F:B1	mixed WPA/WPA2 PSK (TKIP, CCMP) Join the networ	*
34%		4	Master	3A:54:9B:3C:16:72	mixed WPA/WPA2 PSK (CCMP) Join the networ	k U
28%	DIRECT-58-HP DeskJet 3630 series	6	Master	40:B0:34:63:EB:59	WPA2 PSK (CCMP) Join the networ	k
twenty four%	KingPigeon	11	Master	20:DC:E6:FF:D2:23	mixed WPA/WPA2 PSK (CCMP) Join the networ	k
twenty one%	xingchen	1	Master	30:FC:68:A7:84:46	mixed WPA/WPA2 PSK (CCMP) Join the networ	k
20%	King-b42dd6	11	Master	EC:0C:45:81:17:68	None Join the networ	k
						Cancel

Please first click "Scan" to search for wireless network, and select "Join Network" to enter the quick configuration page. If you need a password, enter the WiFi password in "WPA Key", then click "Submit" to enter the detailed configuration page, and finally click "Save".

Wireless network client device configuration		
Project		Instructions
Basic setup	State	Image: 100%Pattern: Client   SSID: jingekejiBSSID: EC:0C:45:81:26:51Encryption: WPA2 PSK (CCMP)Channel: 6 (2.437 GHz)Transmission power: 20 dBmNoise signals: - 38 dBm   : 0 dBmTransfer rate: 1.0 Mbit/s   countries: 00
	Wireless network enabled	Enabled by default
	Working frequency Maximum transmission power	If the current frequency has too many devices in use, please change the frequency to reduce interference and optimize the signal Specifies the maximum transmitted power. Depending on regulatory requirements and usage, the driver may limit the actual transmitted power below this value.
	Country code	Driven by default
	Allows traditional 802.11b rates	Selected by default
Advanced Settings	Distance optimization	Distance of the farthest network user (in meters). By default, the transmission power is automatically adjusted according to the distance
	Fragmentation threshold	When the data length exceeds the threshold, fragments are automatically sent. The default value is generally used



	RTS/CTS The threshold	Request send/Permit send protocol. When the
		data length exceeds the threshold, enable this
		protocol to avoid signal conflicts caused by
	value	multiple terminals sending data to the AP.
		The default value is generally used
		The 40MHz channel is always used even
		when the auxiliary channels overlap. Using
	Mandatory 40MHz mode	this option does not comply with IEEE
		802.11N-2009! This parameter is deselected
		by default.
		Indicates the interval at which a wireless
	Beacon interval	route broadcasts its SSID periodically. The
	default value is generally used	

	Wireless network clie	nt interface configuration
Project		Instructions
	Mode	The Client Client
	ESSID	Name of the wireless network to be added
	BSSID	NO
Basic setup	Network	Wwan, select the network assigned to this wireless interface, or fill in the Create field to create a new network. Generally do not modify.
	Encryption	WPA2-PSK(Strong security)
	Algorithm	Automatic
	Password	Join the wireless network password
	802.11w Managing	Requires a full version of Wpad/HostAPd and
	Frame Protection	WiFi driver support, disabled by default
	The name of the interface	Reset the default interface name
Wireless	Short Preamble	Different rates require different Preambl codes. This parameter is selected by default
	DTIMinterval	As a terminal node, periodically wakes up and sends traffic indication message intervals
security	Time interval for	The temporary secret key (GTK) uses the
	re-encrypting GTK	default value
	Disable inactive polling	Not selected by default
	Inactive site restrictions	The default 300 seconds
	Maximum listening interval allowed	Default maximum of 65535
	Disconnect on low Ack reply	Disconnect a wireless terminal in low ACK mode when AP mode is enabled. This parameter is selected by default



# 5.3.3 Cellular Network

R10A		
condition - system - The	ternet • VPN • Remote I/O • Events and Alerts • Opera	tions and Control 👻 cloud platform 👻 quit
cellular network		UNSAVED CONFIGURATIONS : 2
Enable cellular	2	
registration status	registered	
operator	China Unicom	
signal strength	19 ⑧ Signal value normal range 14-31	
Firmware version	EC200NCNLAR03A02M08	
IMSI	460015426281730	
IMEI	365016056486590	
SIM card ID	89860120801848168834	
card number		
Card APN		
card username		
card password		
GPS enabled		
automatic network switch		
save and apply save	reset	

The cellular network		
Project	Instructions	
Registration status	Displays cellular registration status	
Operator	The operator of the SIM card is displayed	
Signal strength	Signal value normal range 14 to 31	
Firmware version	Displays the module firmware version	
IMSI	The IMSI code of the SIM card is displayed	
IMEI	Displays the IMEI of the module	
SIM card ID	The ICCID number of the SIM card is	
SIM card ID	displayed	
The card number	Enter card 1 number	
Card APN	Enter the SIM card access point	
The card user name	Enter SIM card Internet access account	
Card password	Enter the SIM card Internet access password	
	Default is disable,	
	When the router you bought supports GPS	
	function, please check this item to enable	
	GPS function. GPS data will be uploaded	
Enable GPS	through MQTT protocol; if the router does	
	not have GPS function, please do not enable	
	it.	
	(The router does not support GPS function by	



factory default, if you need GPS function,
please remark when purchase)

# 5.3.4 DHCP/DNS

R10A	
condition ≁ system ≁ The	internet * VPN * Remote I/O * Events and Alerts * Operations and Control * cloud platform * quit
	UNSAVED CONFIGURATIONS : 2 AUTO REFRESH ON
Server settings	
basic settings HOSTS and pa	rsing files TFTP settings advanced settings static address assignment
Ignore empty domain name resolution	☑ On not forward resolve requests without <u>DNS names</u>
unique authorization	This is the only DHCP server on the local network
local server	/lan/ ② Local domain name rules. Names matching this domain are never forwarded, only resolved from the DHCP or HOSTS file
local domain name	Ian The local domain name suffix will be added to the DHCP and HOSTS file entries
Record query log	Write incoming DNS requests to the system log
DNS forwarding	/example.org/10.1.2.3 + <u>List of DNS</u> servers to forward requests to
rebinding protection	<ul> <li>Ø Discard RFC1918 upstream response data</li> </ul>
Allow native	☑ ② Upstream responses within the loopback range of 127.0.0.0/8 are allowed, for example: RBL service
Domain whitelist	ihost.netfliz.com + ② List of domain names allowed for RFC1918 responses

Dnsmasq Provides an integrated DHCP server and DNS forwarder for the NAT firewall .

Server Settings		
Project		Instructions
Ignore airspace name resolution		Do not forward resolution requests without DNS names. This parameter is selected by default
	The only authorized	This is the only DHCP server on the local network and is selected by default
Basic setup	Local server	Local domain name rules. Names that match this domain are never forwarded and are resolved only from the DHCP or HOSTS file
	The local domain name	The local domain name suffix is added to the DHCP and HOSTS file entries
	Recording Query Logs	Write received DNS requests to system logs. This parameter is not selected by default
	DNS forwarding	List of DNS servers to which requests are forwarded



	Rebinding protection	Discard RFC1918 uplink response data. This parameter is selected by default
	Allow the machine	Allows uplink responses in the 127.0.0.0/8 loopback range, such as RBL service. This parameter is selected by default
-	Domain name whitelist	List of domain names allowed to respond to RFC1918
	Local service only	The DNS service is available only on the subnet to which the NIC belongs. This parameter is selected by default
	Non-full address	Dynamically bound to an interface rather than a wildcard address (recommended as the Linux default), selected by default
	Listening to the interface	Listen only on these and loopback interfaces.
	Eliminate interface	Do not listen on these interfaces.
	Use/etc/ethers configuration	Configure the DHCP server based on /etc/ethers. This parameter is selected by default
HOSTS and parse files	The lease documents	Leases a file used to hold assigned DHCP leases. The default value is/TMP /dhcp.leases
	Ignoring parsing files	Not selected by default
-	Ignore the/etc/hosts	Not selected by default
-	Additional HOSTS files	The default empty
TFTP set	Enabling the TFTP Server	Not selected by default
	Not logging	Do not record routine operation logs of these protocols. This parameter is not selected by default
	Sequential IP address assignment	IP addresses are assigned from the lowest available addresses in sequence. This parameter is not selected by default
-	Filtering local Packets	This parameter is selected by default
Advanced	Filtering useless packets	Do not forward requests that the public domain name server cannot respond to. This parameter is not selected by default
Settings	Localized query	If more than one IP is available, the host name is localized based on the subnet from which the request came, selected by default
	Extend the host suffix in the HOSTS file	Add the local domain name suffix to the domain name in the HOSTS file. This parameter is selected by default
	Disable invalid information caching	Do not cache useless responses, for example, non-existent domain names. This parameter is not selected by default
1 1		



		"server=/domain/1.2.3.4" or "server=1.2.3.4".	
		The former specifies a DNS server for a	
		specific domain, while the latter does not	
		limit the resolution scope of the server.	
	Digorous abaak saguanaa	Query DNS servers in the sequence in Parse	
	Rigorous check sequence	File. This parameter is not selected by default	
		Example Query all available upstream DNS	
	All servers	servers. This parameter is not selected by	
		default	
	Ignore false airspace	List of servers that allow bogus airspace name	
	name resolution	responses	
	DNS Server Port	Inbound DNS query port	
	DNS Query port	Specifies the source port for DNS query	
	Maximum number of DHCP leases	Maximum number of DHCP leases	
	Maximum EDNS0 packet size	Maximum EDNS.0 UDP packet size allowed	
	Maximum number of concurrent queries	Maximum number of concurrent DNS queries	
	Size of DNS query cache	Number of DNS entries cached (Max. 10000,0 indicates no cache)	
		The static lease is used to assign fixed IP addresses and host IDS to DHCP clients.	
		Only the specified host can be connected, and	
		the interface must be non-dynamically	
		configured.	
		Use the Add button to add a new lease entry.	
		The IPv4 address and host name fields are	
Static Address	assignment	assigned to the hosts identified by the MAC	
		address field. The LEASE period is an	
		optional field. You can set the DHCP lease	
		duration for each host, for example, 12H, 3D,	
		and INFINITE, which indicate 12 hours, 3	
		days, and forever respectively.	
		, ,	



# 5.3.5 Host names

R10A								
condition -	system <del>-</del>	The internet -	VPN -	Remote I/O -	Events and Alerts -	Operations and Control -	cloud platform - quit	
Host/Dom	ain list						UNSAVED CONFIGURATIONS	: 2
CPU name					IP address			
					No configuration yet			
Add to								
						save a	and apply - save reset	
			Powere	d by KingPigeon	Technology Co., Ltd. (v	v1.30.2) / 2022-02-21		

After a host mapping is added, you can access a specified IP address by accessing the host name.

# 5.3.6 Static Routers

Static IPv4	Iting Static IPv6 routing				
interface	Target	IPv4 subnet mask	IPv4 gateway	hop count	On-Link routing
	host IP or network	if the object is a network			
				save and	apply save reset
		Powered by KingPigeon Technol	logy Co., Ltd. (v1.30.2) / 20	22-02-21	



The routing table				
Project		Instructions		
	Interface	Select set interface		
Basic setup	The target	The host IP address or network must be valid		
	IP Indicates the	If the object is a network, a valid IP or		
	subnet mask	network is required		
	IP gateways	A valid IP or network is required		
	Jump points	0		
	MTU	1500		
Advanced Settings	Routing type	unicast		
Advanced Settings	The routing table	main(254)		
	Source address	automatic		
	On cc-link routing	Not selected by default		

Routing tables describe the reachable paths of packets.

### 5.3.7 Diagnosis

www.baidu.com	openwrt.org	openwrt.org	
IPv4 V Ping	IPv4 V Traceroute	Nslookup	
PING www.baidu.com (14.215.177.38):	56 data bytes		
64 bytes from 14.215.177.38: seq=0			
64 bytes from 14.215.177.38: seg=1			
64 bytes from 14.215.177.38: seq=2			
64 bytes from 14.215.177.38: seq=3			
64 bytes from 14.215.177.38: seq=4	CC1=50 CIME=0.987 MS		
www.baidu.com ping statistics -			
5 packets transmitted, 5 packets re			
round-trip min/avg/max = 6.813/7.23			
	Powered by KingPigeon Technology Co., Ltd.	-4 20 2) / 2022 02 24	

The Ping, Traceroute, and Nslookup commands are provided to perform simple network diagnosis.

### 5.3.8 Firewall

### 5.3.8.1 Zone settings



	n 👻 The internet 🕶	VI IN . INCENDLE IN	O	<ul> <li>Operations and Control -</li> </ul>	cloud platform - quit
Firewall - Z			aces.		UNSAVED CONFIGUR
basic settings					
Enable SYN-flood	l defense 🗹				
Drop invalio	l packets 🗌				
Inbo	und data accept		•		
Outbo	und data accept		•		
	Forward accept		~		
	and the second	are-based Routing/NA	offload		
Software traffic o	🍘 Softw				
Software traffic o <b>area</b> Area ⇒ Forward	Softwork Inbound data	Outbound data	Forward	IP Dynamic Masquerading	
area		Outbound data		IP Dynamic Masquerading	≡ edit
area Area ⇒ Forward	Inbound data	Outbound data	Forward		E edit

Firewalls control network traffic by creating zones on network interfaces  $_{\circ}$ 

	Firewall -	Area Settings	
Project		Instructions	
	This section defines generic attributes for "LAN". Inbound data a outbound data options Set the default policies for inbound a outbound traffic in the zone. The forwarding option describes traffic forwarding policies between different networks in the zon.		
	The covered networks specify the networks that are subordinat this zone.		
	The name of the	lan	
	Inbound data	The default accept	
	The outbound data	The default accept	
Basic setup	Forwarding	The default accept	
	IP dynamic camouflage	You do not need to set the IP address of the LAN interface. The IP address of the WAN interface may change during dynamic allocation. Therefore, you need to configure	
		dynamic camouflage to connect to the Internet	
	MSS muzzle	Automatically adjust MSS (maximum segment size) according to MTU (maximum transmission unit)	



	Covered networks	lan		
	Allows forwarding			
	to the target zone	wan		
	Allow forwarding			
	from the source	Is not specified		
	region			
	The following option	ns control the forwarding policy between this		
		s. The destination area receives the forwarding		
		AN. Traffic matched by the source zone is		
	forwarded from other zones whose destination is THE LAN.			
	Forwarding rules are unidirectional. For example, forwarding traffic			
		he WAN does not mean that traffic from the		
	WAN to the LAN car	n be forwarded in reverse.		
	Equipment covered	This option classifies area traffic for raw, non-UCI-hosted network devices.		
		This option classifies area traffic for source or		
Advanced Settings	Covered subnets	target subnets rather than networks or		
		devices.		
	Limit the address	IPv4 and IPv6		
	Source subnets to			
	restrict IP dynamic	Based on actual Settings		
	masquerade			
	Target subnets to			
	restrict IP dynamic	Based on actual Settings		
	masquerade			
	Enable logging for this zone	Not selected by default		
		Do not install additional rules to reject		
		forward traffic whose Conntrack status is		
	Allow "invalid"	invalid. This may be a necessary setting for		
	traffic	complex asymmetric routes. This parameter is		
Conntrack set		not selected by default.		
	A	Automatically assign conntrack assistants		
	Automatic assistant	based on traffic protocols and ports. This		
	assignment	parameter is selected by default.		
	By passing iptables p	parameters to classification rules for source and		
	target traffic, packet	s can be matched based on criteria other than		
	interfaces or subnet	s. Care should be taken with these options		
Additional iptables	because invalid value	es can break the firewall rule set and expose all		
parameters	services.			
Purumotors		The iptables parameter is added to classify		
	Additional source	incoming traffic in an area. For example, -p		
	parameters	TCPsport 443 matches only inbound		
		HTTPS traffic.		



		The iptables parameter is added to classify
Additional	target	area outgoing traffic. For example, -p TCP
parameters		dport 443 matches only outbound HTTPS
		traffic.

## 5.3.8.2 Port forwarding

Port forwarding		onnect to specific computers or services on the	UNSAVED CONFIGU	
oort forwa <sup>名称</sup>	matching rules	forward to	enable	
		No configuration yet		
Add to			save and apply • save	reset
	Powered by F	KingPigeon Technology Co., Ltd. (v1.30.2) / 202	22-02-21	

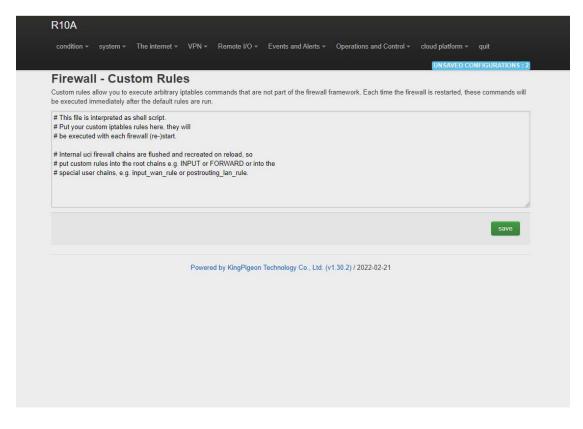
Port forwarding allows remote computers on the Internet to connect to specific computers or services on the internal network

	Firewall - Port forwarding			
Project		Instructions		
	The name	Forward named		
	Agreement	Optional TCP+UDP、TCP、UDP、ICMP		
	The source area	wan		
Basic setup	External port	Matches inbound traffic that points to a specified destination port or range of destination ports on this host		
	The target area	lan		
	Internal IP address	Redirects matching inbound traffic to the specified internal host		
	The internal port	Redirect the matched inbound traffic to the port of the internal host		
Advanced Settings	The source MAC	Only inbound traffic from these Macs is		
Advanced Settings	address	matched.		



The source IP	Only inbound traffic from this IP address or		
address	IP range is match.		
	Matches only inbound traffic originating from		
Source port	a given source port or range of source ports		
	on the client host		
External IP address	Only inbound traffic from this IP address or		
External IP address	IP range is match		
Enable NAT loop	Calastad by default		
back	Selected by default		
Additional	Additional arguments passed to iptables.		
parameters	Careful when use it		

#### 5.3.8.3 Traffic rules



Communication rules define packet transmission policies between different areas. For example, they deny communication between hosts and open ports on the ROUTER WAN.

#### 5.3.8.4 Custom rules



save

Custom rules allow you to execute arbitrary iptables commands that are not part of the firewall framework. Each time you restart the firewall, these commands will be executed immediately after the default rules run.



### 5.4. VPN

### 5.4.1 IPSec

				UNSAVED CONFIGURA
Security	Alliance			ONSAVED CONTRONA
name	Both ends of the tunnel		condition	operation hours
		No configura	ation yet	
security	strategy			
Below is the	configuration and current status of	IPSec		
名称	peer gateway	peer network	local subnet	enable
Hua				
E40.		Nerreferre	elies unt	
H13.		No configura	ation yet	
HIP	Add to	No configura	ation yet	
HIP	Add to	No configura	ation yet	
	Add to reset	No configura	ation yet	
		No configura	stion yet	
	nd apply save reset	No configura		

IPSec is an open network layer security framework protocol developed by Internet Engineering Task Force (IETF). It is not a single protocol, but a collection of protocols and services that provide security for IP networks. IPSec includes Authentication Header (AH) and Encapsulating Security Payload (ESP). Internet Key Exchange (IKE) and some algorithms used for network authentication and encryption.

IPSec provides security services for IP packets through encryption and authentication. Security services provided by IPSec

Including:

(1) User data encryption: provide data privacy through user data encryption.

(2) Data integrity verification: ensure that data has not been tampered in the transmission path through data integrity verification.

(3) Data source authentication: Ensure that the data comes from the real sender by authenticating the source that sends the data.

(4) Prevent data replay: prevent malicious users from repeatedly sending captured data packets to attack by rejecting repeated data packets at the receiver.



	I	PSec
Project		Instructions
	Enable	Check the enable
	Encapsulation type	Tunnel mode and transmission mode are optional. Tunnel mode Indicates host-to-host, host-to-subnet, or subnet-to-subnet tunnels. Transport Mode Indicates the host-to-host transmission mode.
IPSec	To end the gateway	Peer gateway with which the IPSec connection is established
configuration	Local subnet IP address/mask	In tunnel mode, you need to specify the local end and peer terminal network range for the subnet-to-subnet tunnel
	IP/ mask of the terminal network	In tunnel mode, you need to specify the local end and peer terminal network range for the subnet-to-subnet tunnel
	Pre-shared key	Pre-shared keys are used for authentication by default
Stage 1 Setup		Phase 1 negotiates encryption parameters, exchanges key information, and authenticates device identities
IKE Encryption Alg	orithm	Specify the protocol message encryption algorithm in the IKE negotiation phase
Authentication algor	rithm	Specify the digital signature authentication algorithm for encrypted packets
DH group		Specifies the Diffie Hellman (DH) key group used for key exchange
IKE version		IKEv1or IKEv2
Exchange pattern		Main mode or Savage mode. The main mode is safer and faster than the aggressive mode. If the responder (server) cannot know the address of the initiator (end user) in advance or the address of the initiator always changes and both parties want to use the pre-shared key authentication method to create an IKE SA, the aggressive mode can be adopted
Negotiation model		Responder or originator, the originator is the end user and the responder is the server
Local ID		The value can be an IP address, standard domain name, email address, or distinguished name. The default value is a local IP address
The client ID		It can be an IP address, standard domain name, email address, or distinguished name. The default is the peer IP address



IKETime to live	The time to renegotiate the key			
Store 2 Setur	Phase 2 establishes an IPSec SA for data			
Stage 2 Setup	transmission			
ESP operation algorithm	Specifies the algorithm used for data			
ESP encryption algorithm	encryption			
The bash algorithm	Specifies the digital signature authentication			
The hash algorithm	algorithm for encrypted data			
	Perfect Forward Secrecy (PFS) : When a key			
PFS group	is decrypted, the security of other keys is not			
	affected			
Time to live	How long should it take from the negotiation			
	success to the connection instance			
	Dead Peer detection (DPD) : When no traffic			
DDD datastion interval	occurs within a period of time, the local end			
DPD detection interval	sends a DPD message to Detect the status of			
	the Peer end before sending traffic			

# 5.4.2 L2TP

R10A						
condition	- system -	The internet -	VPN - Remo	te I/O − Events and Alerts − C	perations and Control -	cloud platform <del>-</del> quit
212.00	nnection					UNSAVED CONFIGURATIONS
		nd current statu	s of L2TP			
名称	username	S	erver/client	IPSec encryption	condition	enable
				No configuration yet		
		Add to				
save a	ind apply	save	t			
			Powered by Kir	ngPigeon Technology Co., Ltd. (v1.3	0.2) / 2022-02-21	

Layer 2 Tunneling Protocol (L2TP) is a Virtual Private Dial-up Network (VPDN) tunnel Protocol. The Virtual Private Dial Network (VPDN) uses the dial-up function and access Network of public networks (such as ISDN and PSTN) to implement the Virtual Private Network (VPDN) to provide access services for enterprises, small ISPs, and mobile office workers.

VPDN uses a dedicated network encryption communication protocol to establish secure virtual private networks for enterprises on public networks. An enterprise's overseas offices and



employees on business trips can remotely connect to the enterprise headquarters over the public network through a virtual encrypted tunnel. However, other users on the public network cannot access resources on the enterprise network through the virtual tunnel. The Layer Two Tunneling Protocol (L2TP) is the most widely used VPDN tunnel Protocol.1.

PPP defines an encapsulation technology that can transmit packets of various protocols on layer 2 point-to-point links. In this case, PPP runs between users and Network Access servers (NAS). L2TP supports Tunnel transmission of PACKETS at the PPP link layer, allows layer-2 link endpoints and PPP session points to reside on different devices, and uses packet switching technology to exchange information, thus extending the PPP model. L2TP function is to establish point-to-point PPP session connections on a non-point-to-point network. L2TP combines the advantages of Layer 2 Forwarding (L2F) and Point-to-point Tunneling Protocol (PPTP), becoming the industrial standard of IETF.

L2TP					
Project	Instructions				
Enable	Check the enable				
User name	User name used for PPP authentication				
Password	Password used for PPP authentication				
Server/client The client and server are optional					
Server address Address of the L2TP Network Se					
IPSec encryption	Optional: Use the default IPSec policy when selecting IPSec encryption. Manual IPSec configuration is not required. Before using an IPSec policy, you need to configure an IPSec policy in advance				
Pre-shared key	When selecting encryption, you need to set the pre-shared key of IPSec				
The security policy	The IPSce security policy has been configured				



# 5.4.3 OpenVPN

R10A	- syster	n → The internet →	VPN - Remote I/O	<ul> <li>Events and</li> </ul>	Alerts - Operations and	Control - cloud platfo	orm <del>~</del> quit
OpenV	-N insta	ince				UNSA	ED CONFIGURATIO
Below is a 名称	list of Open model	VPN configured insta protocol	nces and their current sta	itus port	TUN/TAP device	connected	enable
				No configurati	on yet		
		Add to					
save	and apply	save rese					
			Powered by KingPige	on Technology C	o., Ltd. (v1.30.2) / 2022-02	-21	

OpenVPN is an application-layer VPN implementation based on OpenSSL library. It uses virtual network cards to establish connections and transmit data, and uses SSL to encrypt and authenticate data.

Virtual network card is a driver software implemented by network programming technology. It can be configured like other network cards. If an application to access a remote virtual address (belong to virtual network card with the address of the series, different from the real address), the operating system will be through the routing mechanism packets (top) or data frames (TAP) sent to the virtual network adapter, service program receives the data and process accordingly, through the SOCKET send out from the Internet, The remote server program receives data from the Internet through the SOCKET, processes the data, and sends it to the virtual network card. Then the application software can receive the data, completing a one-way transmission process, and vice versa. OpenVPN provides two types of virtual network interfaces: the universal Tun/Tap driver, through which layer 3 IP tunnels can be established or virtual Layer 2 Ethernet can transmit any type of Layer 2 Ethernet data, which can be compressed by LZO algorithm.

The Secure Socket Layer (SSL) protocol uses the public key system and X.509 digital certificate technology to protect the confidentiality and integrity of information transmission. The SSL protocol includes server authentication, customer authentication (optional), data integrity on SSL links, and data confidentiality on SSL links. SSL is independent of application-layer protocols. High-level application-layer protocols (such as HTTP, FTP, and Telnet) can be transparently established on SSL. SSL completes encryption algorithm, communication key negotiation, and server authentication before communication with application-layer protocols. After this, data transmitted by application-layer protocols is encrypted to ensure communication privacy.

OpenVPN				
Project	Instructions			



Enable	Check the enable			
Configure the client mode	Select client mode			
VPN Subnet IP address/mask	In TAP mode, the server can transfer data from a host to a subnet			
Server address	IP address of the server with which the client establishes a VPN connection			
Port	TCP/UDP port provided by the server for establishing connections. The default value is 1194			
Use agreement	UDP, TCP-server, and TCP-client are used by default			
TUN/TAPequipment	TUN mode Establishes layer 3 tunnels to implement point-to-point transmission. Layer 2 tunnels are established in TAP mode to implement transparent transmission of IP packets			
User name/password	When security certificate authentication is not applicable, you can use the user name and password for authentication			
Encryption algorithm	Select an encryption algorithm for data			
Authentication and Authorization (Root Certificate)	Select the root certificate provided by the server for file upload			
Local certificate	If file upload is selected, the client certificate is generated based on the root certificate			
A local private key	Select the key corresponding to the client certificate for file upload			
DH key exchange parameters	This command is used for key exchange and can be generated by openssl dhparam-out dh2048.pem 2048			
Compression algorithm	LZO、LZ4			
Keepalive interval time (seconds)	Interval at which the server sends probe packets to the client			
Keepalive timeout time (s)	If the server does not receive any response from the probe packet at this time, the connection is restarted			

**Note:** When uploading the certificate file, you need to find the directory where the file is saved after you click to select the file, and then select the file after the upload is complete.



# 5.5. Remote I/O and Serial Port setting

### 5.5.1 Serial Port settings

R10A								
condition -	system <del>-</del>	The internet +	VPN +	Remote I/O <del>-</del>	Events and Alerts -	Operations and Control -	cloud platform +	quit
							UNSAVED CO	NFIGURATIONS : 2
Serial por	r settings							
	equipm	ent serial port						
	baud r	ate 9600		*				
	data t	oits 8		~				
	Check D	igit without		~				
	stop	bit 1		~				
save and	apply	save						
			Power	ed by KingPigeon	Technology Co., Ltd. (v	1.30.2) / 2022-02-21		

Serial port Settings						
Project		Instructions				
ID of the level Modh	us daviaa	Modbus device ID Ranges from 1 to 247. The				
ID of the local Modbus device		default value is 1				
	Baud rate	Optional 1200, 2400, 4800, 9600, 14400,				
	Dauu Tale	19200, 38400, 57600, 115200, 230400				
RS485 set	Data bits	Optional 5, 6, 7, 8				
	Check digit	Optional None, parity check, even check				
	Stop bit	Optional 1, 2				



# 5.5.2 Transparent Transmission data

R10A			
		Events and Alerts - Operations and Control -	cloud platform - quit
Serial port transparent tr	ansmission		5 : 2
S equipment		<b>▼</b>	
network protocol type	TCP client	~	
Host IP or domain name	0.0.0;host.domain.xxx		
port	5000		
registration package			
heartbeat packet			
Heartbeat response packet			
Heartbeat period (seconds)	60		
Host silent time (seconds)	3600		
Enable retransmission			
			Cancel save

# 5.5.3 Modbus RTU to TCP

R10A			
condition - system - The inte	met - VPN - Remote I/O -	Events and Alerts * Operations and Control * cl	oud platform 👻 quit
Modbus RTU to TCP			5.2
N equipment	•		
network protocol type	TCP client	•	
Host IP or domain name	0.0.0;host.domain.xxx		
port	5000		
registration package			1
heartbeat packet			
Heartbeat response packet			
Heartbeat period (seconds)	60		
Host silent time (seconds)	3600		_
			Cancel save



## 5.5.4 Modbus Slave

R10A					
condition 👻 system 👻 The	e internet ≁ VPN ≁ Remote I/O ≁	Events and Alerts - Operation	ions and Control <del>-</del>	cloud platform <del>+</del>	quit
Modbus slave				UNSAVED CON	FIGURATIONS : 2
Native Modbus Device ID	2				
RTU Modbus Slave					
equipment	serial port 🗸				
TCP Modbus Slave					
port	503				
			save an	d apply - sav	e
	Powered by KingPigeon	Technology Co., Ltd. (v1.30.2) / 2	2022-02-21		

### 5.5.5 Modbus Master

名称	alias	slave address	register type	function code	Register first address	number of data	map address	Slave Interface	Enable settings	
123	1	3	boolean data	1	0	10	64-73	Ethernet		edit delete
234	2	4	16-bit data	3	0	10	20001- 20010	Ethernet		edit delete
3 <b>4</b> 5	3	5	32-bit data	3	0	10	20128- 20147	Ethernet		edit delete
			Add to							
								sav	e and apply 🔹	save reset

Note: The Modbus master is displayed only when the selected device model supports this function.

Before clicking "Add", you need to fill in the name; otherwise, the file cannot be saved.



								UNSAVED CONFIGU	RATIONS -
	ous query	7						UNSAVED CONTINU	AGENUNS -
equipme	ent ty	pe of data	slav	ve address	Config	uration name		display channel	
Etherne	et 🗸 🕅	Numeric type	<ul> <li>✓ all</li> </ul>	~	all		~	display channel	
Modbu	s master								
alias	Configuration name	Slave Interface	slave address	type of data		map address	register address	Numerical value	
without	234	Ethernet	4	16-bit signed numl	ber AB	20001	0	0	edit
without	234	Ethernet	4	16-bit signed numl	ber AB	20002	1	0	edit
without	234	Ethernet	4	16-bit signed numl	ber AB	20003	2	0	edit
without	234	Ethernet	4	16-bit signed numl	ber AB	20004	3	0	edit
without	234	Ethernet	4	16-bit signed numl	ber AB	20005	4	0	edit
without	234	Ethernet	4	16-bit signed numl	ber AB	20006	5	0	edit
without	234	Ethernet	4	16-bit signed numl	ber AB	20007	6	0	edit
	234	Ethernet	4	16-bit signed numl		20008	7	0	edit

Click "Edit" on the last edge to enter the interface for setting slave mapping parameters:

odbus Master - 123				
alias	1			
unto				
slave address	3			
register type	boolean data	~		
function code	01	~		
Register first address	0			
number of data	10			
map address assignment	automatic	~		
Polling period (seconds)				
	If not set, the default is (	0.2 seconds		
Response timeout (seconds)				
	If not set, the default is (	0.5 seconds		
Slave Interface	Ethernet	~		
Slave IP address	192.168.3.232			
port	503			
				Cancel



Click "Ed	t" under detailed	configuration to	enter the interface	of setting slave	data points:
-----------	-------------------	------------------	---------------------	------------------	--------------

Modbus query	emer VPN Kempe //	o = Events and Alens =	Operations an	0.13011101 - 810	ud plattorm ≁ – dui	5-3
<b>N</b> alias						
S type of data	16-bit signed number AB	~				
coefficient	1					
high threshold	100					
N High threshold recovery	80					
low threshold	0					
low threshold recovery	20					
Confirmation time (seconds)	1					
Enable alerts						
release						
					Cancel	save
without 234 E	themet 4	16-bit signed number AB	20006	5	0	edīt
without 234 E	ithernet 4	16-bit signed number AB		6		edit
without 234 E	themet 4	16-bit signed number AB		7		edit

Mod	bus master			
Project	Instructions			
Enable	Check the enable			
Alias	Name the setting			
Slave address	ID of a Modbus device on the slave			
Register typeBoolean data, 16 bit data, 32 bit data				
	01, 02, 03, 04;			
	01/02 function code applies to Boolean data			
Function code	type, 03/04 function code applies to 16/32 bit			
Function code	data type;			
	If 01 is selected, 05/15 is supported. If 03 is			
	selected, 06/16 is supported.			
Register start address	Set according to the slave register address			
The number of data	Set according to the number of slave registers			
Mapping address allocation	Automatic, manual			
	Player movement distribution visible;			
	Boolean type mapping register addresses			
	64~256,			
Mapping start address	16-bit data type mapping addresses 20001 to			
	20127,			
	32-bit data type mapping addresses 20128 to			
	20254			
Slave interface	RS485/RS232, Ethernet If RS485 or RS232			



		has been configured for serial port		
IP address of the s	slave machine	applications, this parameter is unavailable Visible when Ethernet is selected from the machine interface		
Port		Visible when Ethernet is selected from the machine interface		
	Mapping the address	Slave register address		
	The alias	Name slave data points, for example, note usage; After the alias is set, the slave data point is displayed as the configured alias on other configuration pages. If no alias is set, the slave data point is displayed as the mapped address		
	The data type	Slave register data type		
	Input type	Boolean data type visible, open or closed		
	The coefficient	The 16/32 bit data type is visible, and the true value is proportional to the register value		
	High threshold	16/32 bit data type visible, greater than or equal to the high threshold will trigger an alarm		
Detailed configuration	High threshold recovery	16/32 bit data type visible, less than or equal to the high threshold recovery value will trigger alarm recovery		
	The low threshold	16/32 bit data type visible, less than or equal to the low threshold will trigger an alarm		
	Low threshold recovery	16/32 bit data type visible, greater than or equal to the low threshold recovery value will trigger alarm recovery		
	Confirmation time (s)	Confirm trigger alarm time		
	To enable the alarm	Select Enable Alarm		
	Action	The machine can be linked to DO closed or disconnected		
	Hold time (seconds)	DO action time		
	Release	Check to publish data via MQTT		



### 5.6. Event and Alarm (without RTU IO)

### 5.6.1 Alarm by E-mail & SMS

E-Mail settings			UNSAVED CONFIGURATIONS
Allow sending mail			
sender mail server	smtp.xxx.com		
port	465		
mail recipient	recipient@xxx.com		
mairrecipient	recipient@xxx.com		
mail sender	sender@xxx.com		
username	user name		
password		*	
SMS settings			
Alert phone number	13040884077	×	
		+	
	Mobile phone number to rece	ive text messages	
SMS language	Chinese (Chinese)	~	

Email Settings					
Item	Description				
Allow sending emails	Check allow mail to be sent				
Mail server	Enter the SMTP mail server address smtp.qq.com				
port	Port number of the SMTP mail server Port number: 465				
Mail recipient	Enter the email receiving address				
Mail sender	Enter the email sending account address				
The user name	Enter the email sending account user name (User's email address				
The user name	Opens the SMTP server)				
Password	Enter the third-party password for enabling the SMTP port				
	SMS Settings				
Project	Instructions				
	You can add multiple mobile phone numbers to receive SMS				
Alarm Phone Number	messages. After entering a mobile phone number, click + to save				
	the number				
Short message	Optional English, Chinese (Chinese)				
language	optional English, Chinese (Chinese)				

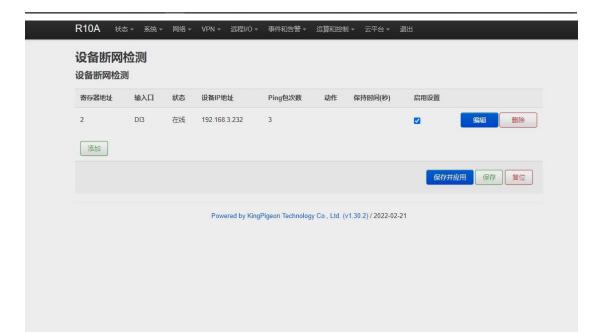
Note: The SMTP service must be enabled on the mail server. If the mail fails to be sent, ensure that the SMTP service is enabled on the email box and the account and password are correct.



## **5.6.2** Device monitor ( device disconnection alarm)

This function allows the router device detect itself whether connect to internet properly. In case of network disconnection, router will enable alarm and trigger action.

(••) R40B - Device Monitor&Ala	m × +								- 6	9	×
$\leftrightarrow$ $\rightarrow$ C $\blacktriangle$ Not secu	re   192.168.3.1/cgi-bi	n/luci/admin/io/mc	onitor						☆	θ	:
	R40B Status *	System - Services	✓ Network ✓ VPN ✓ S	erial Port - RTU I/C	- Logical opera	ation - Cloud	platform 👻 Logout				
	Device Monitor Device Monitor										
	Register Address	In Name Sta	tus Device IP Address	Ping Times	Action Ho	old time(s)	Enable setting				
	This section contains no values yet										
	Add										
						Save & Apply	Save Reset				
	Powered by KingPigeon	Technology Co., Ltd. (v	(1.18) / 2020-10-16								



Device Monitor( router disconnection alarm)						
Item	Description					
Register address	Range 2~63					
Input	DI3~DI64, Automatically generated according to the register address, MQTT report data identifier					
Device IP address	Detect IP address of device (Max 20 IP					



	addresses can be detected)
	According to the set value PING how many
PING times	times, if there is no PING, then the detection
	equipment is disconnected from the network
Action	Linkage DO close or open
Hold time (seconds)	DO action time
Enable	Tick to enable

## 5.6.3 Event and Alarm

		No e	configuration yet	
add alert				
Alarm name	texting	text message content	send email	content of email
REG64: close		DObj		
REG20001: Overthreshold 🗸		Alcx		
		Powered by KingPigeon Tec	chnology Co., Ltd. (v1.30.2) / 2022-	.02.21

When the trigger conditions are set in the Modbus master , digital input and output, analog input, network disconnection detection and alarm related settings and the alarm is enabled, the related alarm events can be seen here. You can set related alarm messages and content of email.

Note: SMTP service needs to be enabled to use the mail server.

If email is sent unsuccessfully, please check again to make sure the SMTP service is enabled in the mailbox settings, and the account password is entered correctly.



# 5.7 Edge computing and logical control

# 5.7.1 Timer

R40B state - system -	service -	The internet +	VPN -	application 🛩	rtu I/o -	logic operation	n - cloud	platform -	quit	
Timer							U	NSAVED CO	NFIGURATION : 2	
Timer setting										
Alias	ccc									
Time interval	1									
time unit	minute		~							
action	All DO		~							
DO status	closure		~							
Hold time (seconds)	30									
Start/stop time	every day		~							
Start time (hours)	14		~							
Start time (minutes)	11		~							
Stop condition	Cycles		~							
Cycles	8									
Return to overview sa	ve rese									
5404										
R10A					N					
condition - system -	The internet	vPN <del>-</del> Re	emote I/O -	Events and	Alerts - O	perations and Cor	itrol - cic	ud platform	<ul> <li>quit</li> <li>CONFIGURATIONS : 2</li> </ul>	
Loop timer										
Loop timer										
名 alias time 称 interval	time unit		start (year)	start (month)	start (day)		start (min)	enable		
1A Yes 1		TREG-1A: close	without	without	without	16	32		edit delete	
2a Time 1		REG72: close	without	without	without	16	32		edit delete	
	Add to									
							save and a	pply -	save reset	
		Powered by	KingPigeo	n Technology C	o., Ltd. (v1.30	0 <mark>.2)</mark> / 2022-02-21				
		Powered by	KingPigeo	n Technology C	o., Ltd. (v1.30	0.2) / 2022-02-21				
		Powered by	KingPigeo	n Technology C	o., Ltd. (v1.30	0.2) / 2022-02-21				

Timer execution actions are optional, such as trigger DO close or open, send mail, restart device etc

Regular timer: Execution at a certain regulation such as daily or weekly



Once timer: Execution only one time at a certain appointed time, similar to Alarm clock Cycle timer: Execution cycle at a certain time interval, such as every 5 seconds, every 1 hours

# 5.7.2 arithmetic operation & logical operation

## 5.7.2.1 Introduction of arithmetic operation

R10A						
condition - system - The Inte		ite I/O - Events and A	Alerts + Operations and	Control - cloud p	latform – quit	-
Arithmetic Operations - A	.3					S : 2
a Enter 1	REG20001	~				
a operation	+	~				
Enter 2	REG20002	~				
operation	*	~				
Enter 3	REG20003	~				
output address	REG20005	~				]
					Cancel save	
	r owered by rol	ignigeon recinology oc	., Ciu. (v 1.00.2) / 2022-02	-21		



名称	输入1	运算	输入2	运算	输入3	输出地址	输出值	
G	REG20001	х^у	1.53	*	0.5354	REG40000	23.978699	编辑  删除
		添加						
							保	存并应用・保存 复位
			Powered	l by KingPig	eon Technolog	y Co., Ltd. (v1.31.1)	2022-05-06	

**Arithmetic operation** supports the "addition, subtraction, multiplication and division" operations between the value type registers of the local device (R40 router) and the Modbus slave device. You can adjust the order of operations at will, "addition, subtraction, multiplication and division" between registers value.

For example:

Slave 2 register REG20001 adds the value of REG20002 multiplied by REG20003, performs arithmetic operation, and outputs the result to REG20004

See below:



G R				运算	输入3	输出地址	輸出值		
	EG20001	х^у	1.53	*	0.5354	REG40000	23.978699	编辑	删除
A R	EG20001	+	REG20002	+	REG20003	REG20004	12	编辑	删除
		添加	]						
							保存并	立用・保存	复位
			Powered b	y KingPigeo	n Technology Co.,	Ltd. (v1.31.1) / 2022	-05-06		

As shown in below, use the virtual serial port tool to simulate the slave 2 register, and the operation result is displayed in SLAVE as follows.

12	slave1				
Service Service	: F = 03				
	Alias	00000	5.0	^	
0	REG20001	15			
1	REG20002	20			
2	REG20003	30			
3	REG20004	1050			
4	REG20005	0			
5	REG20006	0			
6	7	0			
7	8	0			
8		0		~	

Note: If a 16-bit register address is used as the output result, the fractional part will be output as an integer.



(**) R408 - 逻辑运算 - LuCl × +	• - • >
← → C ▲ 不安全   192.168.3.1/cgi-bin/luci/admin/logic/logic/logic	☆ 😩 :
R40B	
算术运算 逻辑运算 逻辑运算 布尔逻辑	
名称 输入1 条件 关系 输入2 条件 输出地址 输出值 逻辑值	
11A ALARM-REG20001 闭合 逻辑与 alarm20002 闭合 REG20003 5555 1 编辑	删除
添加	
数值逻辑	
名称 输入1 条件 门限值 关系 输入2 条件 门限值 输出地址 输出值 逻辑值	
尚无任何配置	
添加	
组合逻辑	
名称 输入1 条件 关系 输入2 条件 输出地址 输出值 逻辑值	
尚无任何配置	
志力	
<b>保存井应用 - </b> 保存 ]	复位

# 5.7.2.2 Introduction of logical operation

										UNSAV	D CONFIGU	IRATIONS : 2
	c opera	ation										
名称	Enter 1	condition	relation	Enter 2	conditior	output	address	output value	logical	value		
1b	REG72	closure	without	without	without	without		without	0		edit	delete
2b	TREG-1A	closure	without	without	without	without		without	0		edit	delete
			Add to									
Nume	erical log	ic										
名称	Enter 1	condition	Threshold value	relation	Enter 2	condition	Threshold value	output address	output value	logical value		
1c	REG20001	more than the	80	without	without	without	without	without	without	0	edit	delete
			Add to									
Com	oinatorial	logic										
名称	Enter 1	condition	relation	Enter 2	conditio	n output	address	output value	logical	value		
1d	1b	true	logical and	2b	true	REG20	002	1111	0		edit	delete
			Add to									
								1.8				
									save and	apply -	save	reset



R40B 状态 - 系统 -	服务 - 网络 -	VPN - 应用 -	RTU I/O - 逻辑	运算 - 云平台 -	退出	未保存的配置
逻辑设置						
组合逻辑输入						
输入1		~				
条件	为真	~				
关系	逻辑与	~				
输入2		~				
条件	为真	~				
輸出类型	布尔类型	~				
輸出地址	DO1	~				
布尔值	断开	~				
输出延时(毫秒)						
设置默认值						
返回至概况						保存复位

The logical operation function can link the local device I/O (digital input and output, analog input) with the Modbus slave I/O (slave device register), combine them at will as required.

See below picture examples:

为小汉 \$	<sup>₽</sup> A			В			Y			
名称	输入1	条件	孫关	输入2	条件	输出地址	输出值	逻辑值		
1	DI1	断开	逻辑与	DI2	断开	DO1	闭合	undefined	編輯	删除
			添加							
<b>女</b> 值逻辑	胄 <mark>C</mark>			D				Y		
名称	输入1	条件()	限值关系	输入2	条件	门限值	输出地址	输出值 逻辑值		
2	AJN1	大于 10	)0 逻辑	武 AIN1	小于	30	DO2	闭合 undefined	编辑	删除
			添加							
目合逻辑	咠						Y			
名称	输入1	条件	孫关	输入2	条件	输出地址	输出值	逻辑值		
3	1	为真	逻辑与	2	为真	REG20005	10000	undefined	编辑	删除
			添加							

Logical operation example (1)

Logic AND: When condition A and condition B are satisfied at the same time, the action is triggered, and then output result Y.

logical operation example (2)

Logical OR: either condition C or condition D is satisfied, the action is triggered and then output result Y.



logical operation example (3)

Combined logical operation: the result of the above said logic operation 1 is used as an input value, and the result of logical operation 2 is used as another input value, these two can be combined and comprise logical operation 3.

Similarly, you could create more combined logical operations.

### 5.7.3 Combined conditions operation

Combined conditions operation is an advanced function. It combines timer, arithmetic operation and conditional operation to realize logic control under multiple conditions. it is programmable. You can adjust the combination method, so as to achieve complex task of edge computing and logic control.

名称	时器别名	定时间隔	时间单位	动作	开始(年)	开始(月)	开始(日)	开始(时)	开始(分)	启用	
西标 123	元	AEROIPJPee	分钟	AUTF TREG-123:关闭	无	デボネ(/J) 无	デガキ(ロ) 无	デザA(IIS) 无	元 无		除
[			添加								
									保存)		Ŷ
				Powered by King	Pigeon Tech	nology Co., I	.td. (v1.31.1)	/ 2022-05-06	5		



	输入1	运算	输入2	运算	输入3	输出地址	輸出值	
G	REG20001	х^у	1.53	*	0.5354	REG40000	23.978699	编辑》》除
A	REG20001	+ 添动	REG2000	02 +	REG20003	REG20004	12	編輯 删除
							保存并	☆用 ▼ 保存 复位
日本运算	逻辑运算	4运算						
		+运算						
件	运算	4运算						
<b>;件;</b> 件运	运算		ę, 可通过MQT	11发布,或通过	Vlodbus读取			
《件道 件运算	<b>运算</b> 算			TT发布,或通过 谕入2 运算	Modbus读取 输入3	输出地址	輸出值	
<b>长件</b> 近 件运 <sup>000及以</sup>	<b>三算</b> 算 人上地址用于保存中	间计算结果	运算			输出地址 REG40002	· 輸出值 2877.443848	
<b>;件;</b> 件运	<b>运算</b> 算 心地此用于保存中 条件(直)	间计算结果 <b>输入1</b> G	运算 <b>\$</b> * (	谕入2 运算	输入3			
<b>长件</b> 近 件运 <sup>000及以</sup>	<b>运算</b> 算 心地此用于保存中 条件(直)	间计算结果 输入1	运算 <b>\$</b> * (	谕入2 运算	输入3			编辑  删除
<b>计计算机</b> (件运) (00及L) (新	<b>运算</b> 算 心地此用于保存中 条件(直)	间计算结果 <b>输入1</b> G	运算 <b>\$</b> * (	谕入2 运算	输入3			
<b>计计算机</b> (件运) (00及L) (新	<b>运算</b> 算 心地此用于保存中 条件(直)	间计算结果 <b>输入1</b> G	运算 <b>\$</b> * (	谕入2 运算	输入3		2877.443848	
<b>计计算机</b> (件运) (00及L) (新	<b>运算</b> 算 心地此用于保存中 条件(直)	间计算结果 <b>输入1</b> G	运算 <b>4</b> * 6	續入2 运算 30 +	输入3	REG40002	2877.443848 <del>G.G.M.</del>	

Combined conditions operation can perform exponential logarithmic operations. Take a cumulative water flow that is accumulated every 1 minute as an example to create the process as follows:

TREG123: Circular timer acts as an accumulation count trigger.

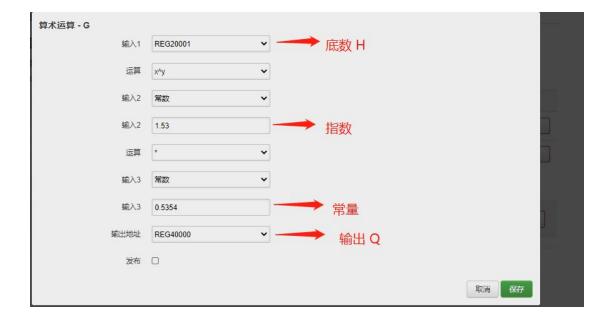
G: Create water flow per second for the formula



B: TREG123 (condition) and (G operation result per second \* 60 seconds per minute) + continuous output result REGXXX

#### Equal to cumulative output value

巴歇尔槽自由流流量公	式: Q = CH"
巴歇尔槽规格: 5	(1~25号)
水位高度: 0.1	(0~2.13m)
	始转换
	始转换 Q = 0.5354 * H <sup>1.53</sup>
✓ 5#巴歇尔槽参数:	
✓ 5#巴歇尔槽参数: 自由流流量公式:	Q = 0.5354 * H <sup>1.53</sup>





## 5.8 Connection to Cloud Platform

## 5.8.1 Private cloud ( KPIIOT or Custom MQTT cloud)

This router can connect to various private cloud platform, including KingPigeon Cloud Platform KPIIOT V2.0 and V3.0 or other private clouds, for example custom MQTT platform. The configuration is described below, and the setting interface is shown in screenshot.

cloud platform	Host IP or domain name	port	Link Agreement	Enable settings	
Golden Pigeon Cloud V2	modbus.dtuip.com	6651	MODBUS RTU	D	Edit delete
Golden Pigeon Cloud V2	mqtt.dtuip.com	1883	MQTT		Edit delete
Golden Pigeon Cloud V2	mbtcp.dtuip.com	6655	MODBUS TCP		Edit delete
thingsboard	thingsboard.cloud	1883	MQTT		Edit delete
Add to					
Save and apply sav	reset				
Powered by KingPigeon Techn	ology Co., Ltd. (v1.20.8) / 2021-07-2	2			
rowered by Kingrigeon recim	ology Co., Llu. (V1.20.8) / 2021-07-2	2			

	Cloud Conne	ction Settings				
Item		Description				
Enable setting		Select to enable				
Cloud Platform		King Pigeon KPIIOT V2, KPIIOT V3, other				
		private clouds				
Host IP or domain	n name	Connect Server Port				
Port		Connect to other cloud platform server ports				
Link Protocol		Modbus RTU, Modbus TCP , MQTT				
	Modbus Device ID	Default is 1				
	Degister packet	Server register handshake protocol package				
Modbu	Register packet	contact salesman if need				
Protocol	Heartbeat packet	Heartbeat content to avoid network offline				
Parameters	Heartbeat response packet	The server responds to the heartbeat packet				
raiameters	Heartbeat period (s)	Network keep online heartbeat interval time				
	Host Silence time (s)	The server sends silent time without data,				
		and will reconnect if it times out				



		The client identifier used in the MQTT		
		connection message, the server uses the		
	MQTT Client ID	client identifier to identify the client, and		
		each client connected to the server has a		
		unique client identifier.		
		The user name used in the MQTT connection		
	Username	message, which can be used by the server for		
		authentication and authorization.		
		The password used in the MQTT connection		
	Password	message, which can be used by the server for		
		authentication and authorization.		
		The subject name used in the MQTT publish		
		message. The subject name is used to identify		
		the information channel to which the payload		
	Publish topic	data should be published. The subject name		
		in the publish message cannot contain		
MOTT Protocol		wildcards.		
Parameters		The topic name used in MQTT subscription		
		messages. After the subscription, the server		
	Subscribe topic	can send publish messages to the client to		
		achieve control.		
	Publish Period (seconds)	MQTT data timing publish interval		
		Service quality level guarantee for application		
	Publisher QOS	message distribution: 0-at most once, 1-at		
		least once, 2-only once		
		Optional not encrypted, encrypted (root		
	Encryption	certificate), encrypted (self-signed)		
	Authentication and			
	authorization	Choose file upload		
	(root certificate)			
	Local certificate	Choose file upload		
	Local private key	Choose file upload		
	Enable data transfer	Enable to work		
	Data packing	Send multiple data in one message		



## 5.8.1.1 KingPigeon Cloud Platform (KPIIOT)

Connection to KingPigeon cloud KPIIOT V2.0 by Modbus RTU protocol, see below setting

Cloud connection sett	UN SAVED CONFIG	URATIONS . 1
cloud platform	Golden Pigeon Cloud V2	
link agreement	MODBUS RTU V	
Native Modbus Device ID	2 ② The native Modbus device ID is set in the serial port settings	
registration package	BR8SH70C PC	
heartbeat packet		
Heartbeat response packet		
Heartbeat period (seconds)	60	
Host silent time (seconds)	600	
return to overview sa	e reset	

Connection to KingPigeon cloud KPIIOT V2.0 by Modbus TCP protocol, see below setting

R10A				
condition - system - The	internet ≁ VPN ≁ Remote I/O ≁	Events and Alerts -	Operations and Control -	cloud platform <del>+</del> quit
Cloud connection sett	ngs			UNSAVED CONFIGURATIONS : 2
cloud platform	Golden Pigeon Cloud V2			
link agreement	MODBUS TCP 🗸			
Native Modbus Device ID	2 ② The native Modbus device ID is set	et in the serial port setti	ngs	
registration package	BR8SH70GQ C			
heartbeat packet				
Heartbeat response packet				
Heartbeat period (seconds)	60			
Host silent time (seconds)	600			
return to overview sav	ereset			
	Powered by KingPigeon	Technology Co., Ltd. (v	1.30.2) / 2022-02-21	

Connection to KingPigeon cloud KPIIOT V2.0 by MQTT protocol, see below setting



Cloud connection sett	ings			UNSAVED CONFIGURATIONS
cloud platform	Golden Pigeon Cloud V2	~		
link agreement	MQTT	<b>~</b>		
MQTT client ID				
Release cycle (seconds)				
Enable data upload				
return to overview sa	ve reset			
	Powered by KingP	igeon Technology Co., Ltd. (v1	30.2) / 2022-02-21	

Connection to KingPigeon cloud KPIIOT V3.0 by Modbus RTU protocol, see below setting

Cloud connection sett	UN SAVED CONFIGUR/
cloud platform	Golden Pigeon Cloud V3 🗸
link agreement	MODBUS RTU 🗸
Native Modbus Device ID	2 ② The native Modbus device ID is set in the serial port settings
registration package	BR8SH
heartbeat packet	
Heartbeat response packet	
Heartbeat period (seconds)	60
Host silent time (seconds)	600
return to overview sav	e reset

## 5.8.1.2 Other private cloud --- Custom MQTT

You could also connect to other private cloud platform by custom MQTT data format. See blow setting



	ngs		and the second se
cloud platform	Other cloud platforms		
Cloud platform name			
Host IP or domain name	n		
port			
link agreement	MODBUS RTU ~		
Native Modbus Device ID	2 2 Image: The native Modbus device ID is a second seco	et in the serial port settings	
registration package	BR8SI		
heartbeat packet			
Heartbeat response packet			
Heartbeat period (seconds)	60		
Host silent time (seconds)	600		

Cloud connection				UNSAVED CONFI	GURATION : 2
ereau connocho	n settings				
Cloud connection sett	ings				
cloud platform	Other cloud platforms	~			
Cloud platform name					
Host IP or domain name	0.0.0,0;host.domain.xxx				
port					
Link Agreement	MQTT	~			
MQTT client ID					
username	MQTT				
password	•••••	*			
encryption	Not encrypted	•			
Release data format	Custom data format	~			
Subscribe to topics					
Release period (seconds)					
Posted by QOS	0-at most once	•			
Custom data format					



Data format example	0	
Custom data formal	"使用"GI用本机或MODBUS缺射表存器地址" {	<u>^</u>
	"主题":"( "單性1":〔 "對版11"\$DO1",	
	"数据2":"\$REG20128" }, "犀性2": {	
	"数据1":"SDI1", "数据2":"SGPS"	
	), ), "主题2":{	
	"犀性1":{ "数据1":"\$COUNT1", "数据22":"\$REG20256"	
	}, "犀性2":{ "数据1:"SAI1",	
	*数据2":"STIME"	•

## 5.8.2 Alibaba Cloud platform

Alibaba Cloud Setting	s		UNSAVED CONFIGURATIONS	: 2
Enable settings				
verification method	device key 🗸			
ProductKey				
Device Name (DeviceName)				
Device Secret (DeviceSerect)				
Region (Region ID)	East China 2 •			
Release cycle (seconds)				
Post only changed data				
save and apply save	reset			

Ali Cloud Connection Settings			
Item	Description		
Enable setting	Select to enable		
Authentication method	Device secret key, X509 certificate		
Product Key	Set the product key on Alibaba Cloud		
Device Name	Set the device name on Alibaba Cloud		
Device Secret	Set the device key on Alibaba Cloud		
Region ID	Ali cloud region		



Publish period (seconds)	>60
Certification authority (root certificate)	Choose file upload
Local certificate	Choose file upload
Local key	Choose file upload

Ali cloud device creation certificate creation and details reference <u>Ali Cloud help documentation</u> <u>guide</u>

# 5.8.3 AWS Cloud

R10A	
condition - system - The	internet + VPN + Remote I/O + Events and Alerts + Operations and Control + cloud platform + quit
Amazon Cloud Setup	UNSAVED CONFIGURATIONS : 2
Enable settings	
host (endpoint)	
Client ID	
Item Name	
Authentication and Authorization (Root Certificate)	Select the file
	Ø /etc/mqtt/root.crt
Device certificate	Select the file
	Ø /etc/mqtt/local.crt
Device private key	Select the file
	Ø /etc/mqtt/private.key
publish data format	Default data format
Post topic	
Release cycle (seconds)	
Post only changed data	
save and apply save	reset

AWS Cloud Con	nection Settings
Item	Description
Enable setting	Select to enable
Host (Endpoint)	Set End point
	The client identifier used in the MQTT
	connection message, the server uses the
Clint ID	client identifier to identify the client, and
	each client connected to the server has a
	unique client identifier.
Item name	Set Item name
	The subject name used by MQTT to publish
Dublish tonia	messages. The subject name is used to
Publish topic	identify which information channel the
	payload data should be published to. The



	subject name in the published message
	cannot contain wildcards.
Publish period (seconds)	>60
Certification authority (root certificate)	Choose file upload
Local certificate	Choose file upload
Local key	Choose file upload

For details about how to create a certificate for an Amazon device, see: <u>Amazon Getting Started</u> <u>documentation tutorial</u>

## 5.8.4 Huawei cloud

HUAWEI CLOUD supports access to the cloud platform in two ways: device secret key and authentication certificate:

HUAWEI CLOUD Settin	ngs			UNSAVED CO	FIGURATIONS : 2
Enable settings					
verification method	device key 🗸				
Device ID					
key	*				
Service ID					
Region (Region ID)	North China - Beijing IV 🗸 🗸				
Release cycle (seconds)					
Post only changed data					
save and apply save	reset				
	Powered by KingPigeon Te	echnology Co. Ltd. (v1.3	0 2) / 2022-02-21		

	Huawei cloud connection settings
Item	Description
Enable setting	Select to enable
Authentication method	The device secret key method and the authentication certificate method can be selected, and the authentication certificate method needs to upload the certificate
Device ID	The ID of the device when HUAWEI CLOUD creates the device,



	R40A   Offlir	ne -
	Node ID	R40A
	Device ID	5ee965a0496bac073bb6120d_R40A
	Registered	Jun 17, 2020 08:37:57 GMT+08:00
	Node Type	Directly connected
	Software Version	v1.0
	The product needs	s to create a service to report data.
	Model Definition	Online Debugging Topic Management
Service ID	ID Add Service ID: R40	Library Model Import Local Profile Import from Excel
Region ID	The location of the platform	device can be queried on the HUAWEI CLOUD
Publish Period (s)	Above 60s	
	For the password e	entered when creating the device certificate,
Secret key	you can refer to the test certificate	e HUAWEI CLOUD help document to create a
Certification		
authority (root	Root certificate prov	vided by Huawei:rootcert.pem, It's included in the
certificate)	release version, gener	ally don't need to upload
	Device certificate de	eviceCert.pem,Upload to the /etc/conf directory
Device certificate	and select the file,	you can refer to the HUAWEI CLOUD help
	document to create	a test certificate
	Device key/deviceCer	t.key,Upload to the /etc/conf directory and
Device key	select the file, yo	u can refer to the HUAWEI CLOUD help
	document to create	a test certificate

For the steps of creating and registering devices on the platform, please refer to the help documents of Huawei Cloud.



# 5.8.5 Thingsboard cloud platform

Cloud connection set				
MQTT client ID				
usemame				
password		 *		
Release cycle (seconds)				
Enable data upload				
Post only changed data				
save and apply save	reset			

Th	ingsboard Cloud Connection Settings					
Item	Description					
Enable setting	Select to enable					
Host (Endpoint)	Set End point					
	The client identifier used in the MQTT connection message,					
Clint ID	the server uses the client identifier to identify the client, and					
	each client connected to the server has a unique client					
	identifier.					
Item name	Set Item name					
	The subject name used by MQTT to publish messages. The					
Dublich topic	subject name is used to identify which information channel					
Publish topic	the payload data should be published to. The subject name in					
	the published message cannot contain wildcards.					
Publish period (seconds)	>60					
Certification authority (root	Choose file upload					
certificate)						
Local certificate	Choose file upload					
Local key	Choose file upload					
Enable data transfer	click to enable this function					
Only release changed data	click to enable this function					

For thingsboard cloud device user manual, please refer to the

Thingsboard Getting Started document



### 5.9 Logout

After the router parameter configuration is complete, click "Logout", the device will log out and return to the login web configuration page.

## 6. Communication Protocol

The device supports Modbus RTU protocol, Modbus TCP protocol and MQTT protocol. For specific communication protocol, please refer to relevant materials. The following introduces the application of Modbus RTU and MQTT protocol on the device.

Modbus TCP and RTU protocol are very similar, as long as an MBAP header is added to the RTU protocol, and the two byte CRC check code of the RTU protocol can be removed.

### 6.1 Modbus RTU Protocol

## 6.1.1 Platform connection setting

Cloud connection sett cloud platform	Golden Pigeon Cloud V2	*		
Link Agreement	MODBUS RTU	~		
Native Modbus device ID	1 💿 The local Modbus device	ID is set in the serial port set	tlings	
Registration package	168Y2M4U6K95H5L0			
Heartbeat package				
Heartbeat response packet				
Heartbeat cycle (seconds)	60			
Host slient time (seconds)	600			
Return to overview	reset			

1. Set the platform server IP and port, select Modbus RTU protocol and set the local Modbus device ID (the effective range of Modbus device ID is  $1^{2}$ 47)

2. Set relevant message information according to the platform to be connected (if not, you can not set it)



[Register Package]: The registration package sent by the device to the server when connected to the server. \*This is required when you connect KPIIOT, please contact sales to get it if you need. [Heartbeat Packet]: A heartbeat packet sent by the device to the server to maintain the connection.

[Heartbeat Response Packet]: The server responds to the heartbeat packet

[Heartbeat period]: The heartbeat packet sending period.

[Host Silent Time]: Silent time when no data is sent from server, timeout will reconnect.

## 6.1.2 Read Mapping Address

### 6.1.2.1 Mapping Register Address

1) Boolean Slave Mapping Register Address, holding coil type, input coil type (Function Code 01/02/05/15)

Modbus Register Address(Decim al)	PLC or configuration address (Decimal)	Data Name	Data Type	Description
64	00065 or 10065	Bool 64	Bool	Boolean type,
65	00066 or 10066	Bool 65	Bool	Slave mapping
66	00067 or 10067	Bool 66	Bool	address, can
			Bool	map the slave
			Bool	input coil and
256	00257or 10257	Bool 256	Bool	holding coil state, 193 addresses in total.

2) 16 Bit Slave Mapping Register Address, holding type, input type (Function Code 03/04/06/16)

I	Read and Write Holding Register (Function Code 03,04, 06, 16)						
Modbus Register Address(Decimal)	PLC or configuration address (Decimal)	Data name	Data Type	Description			
20001	420002 or 320002	16 Bit data 20001	Data type according to slave mapping data type	Can map the slave input register and holding register, 64 addresses in total			
20002	420003 or 320003	16 Bit data 20002	Same as above	Same as above			



20003	420004 or	16 Bit data	Same as	Same as above
20003	320004	20003	above	Same as above
	127 data		Como oc	
	similar as		Same as	Same as above
	above		above	
20127	420128 or	16 Bit data	Same as	Sama as above
20127	320128	20127	above	Same as above

3) 32 Bit Slave Mapping Register Address, holding type, input type (Function Code 03/04/06/16)

	Holding Registe	er and input Reg	gister(Function Code 0	3,04, 06, 16)
Modbus Register Address(Decimal)	PLC or configuratio n address (Decimal)	Data name	Data Type	Description
20128	420129 or 320129	32 Bit data 20128	Data type according to slave mapping data type	Can map the slave input register and holding register, 64 addresses in total
20130	420131 or 320131	32 Bit data 20130	Same as above	Same as above
20132	420133 or 320133	32 Bit data 20132	Same as above	Same as above
	64 data similar as above		Same as above	Same as above
20254	420255 or 320255	32 Bit data 20254	Same as above	Same as above

### 6.1.2.2 Read Boolean Mapping Address Data

#### Master Send Data Format:

Content	Bytes	Data	Description	
Device ID	1	01H	01H Device, Range: 1-247, according to setting address	
Function Code	1	01H Read holding coil type, function code 01		
Boolean Register Starting Address	2	00 40H	Range: 0040H-0100H, address refer to [" Mapping Register Address"]	
Read Register Qty	2	00 0AH	Range: 0001H-00C1H, 193 address total	
16 CRC Verify	2	BD D9H	CRC0 CRC1 low byte in front, high behind	

### **Receiver Return Data Format:**

Content	Bytes	Data	Description
Device ID	1	01H	01H Device, according to data sent by master



Function Code	1	01H	Read holding coil type
Return Data Length	1	02H	Return data length
Returning Data	2	73 01H	
16 CRC Verify	2	5D 0CH	CRC0 CRC1 low byte in front, high behind

Example: Start from address 64, read 10 Boolean mapping data value, then:

Server send: 01 01 00 40 00 0A BD D9

01= Device ID; 01 = Read holding coil; 00 40 = Read Boolean data start from address 64; 00 0A = Serial to read 10 Boolean status; BD D9 CRC Verify.

### Device answer: 01 01 02 73 01 5D 0C

01= Device ID; 01 = Read holding coil; 02= Return Data byte; 73 01= Return 10 Boolean status. High byte stands for low address data, low address stands for high address.

According to Modbus protocol, fix 73 01H real value to be 01 73H, converter to Binary as below:

Register								
mapping	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid	73	72
address								
Value	0	0	0	0	0	0	0	1
Register								
mapping	71	70	69	68	67	66	65	64
address								
Value	0	1	1	1	0	0	1	1

The address value higher than 10 digits will be seen as invalid. 5D OC CRC Verify.

### 6.1.2.3 Modify Boolean Mapping Address Data

If you want to control the holding coil state of the access slave, you must configure the add slave 01 function code instruction mapping. After the mapping address value is changed, the corresponding slave address data will be written.

#### Master Send Data Format:

Content	Bytes	Data (H: HEX)	Description
Device Address	1	01H	01H Device, Range: 1-247, according to setting address
Function Code	1	05H	Write single holding coil, function code 05H
Boolean Mapping Register Address	2	00 40H	Range: 00 40H-0100FH, address refer to [" Mapping Register Address"]
Write value	2	FF 00H	This value: FF 00H or 00 00H, FF 00H stands for write 1; 00 00H stands for write 0
16 CRC Verify	2	8D EEH	CRC0 CRC1 low byte in front, high behind



#### **Receiver Return Data Format:**

Content	Bytes	Data (H: HEX)	Description
Device Address	1	01H	01H Device, according to the data Master send
Function Code	1	05H	Write single holding coil
Boolean Mapping Register Address	2	00 40H	Range: 00 40H-0100FH, address refer to [" Mapping Register Address"]
Write value	2	FF 00H	This value: FF 00H or 00 00H. FF 00H stands for write 1,00 00H stands for write 0.
16 CRC Verify	2	8D EEH	CRC0 CRC1 low byte in front, high behind

Example: Modify Boolean mapping address 64 status, modify to 1, then:

Server send: 01 05 00 40 FF 00 8D EE

01= Device address; 05= Write boolean value; 00 40=The mapping address which need to revise;

FF 00 = Write 1; 8D EE CRC Verify.

Device answer: 01 05 00 40 FF 00 8D EE

01= Device address; 05= Write boolean value; 00 40= The mapping address which need to write;

FF 00= Write 1; 8D EE CRC Verify.

If need multiple modify, please check function 15 of Modbus protocol.

### 6.1.2.4 Read Data Type Mapping Address Data

#### Master Send Data Format:

Content	Bytes	Data (H: HEX)	Description		
Device Address	1	01H	01H Device, Range: 1-247, according to setting address		
Function Code	1	03H	Read holding register, function code 03		
Mapping Register Starting Address	2	4E 20H	The starting address of the mapped data type, and the corresponding address refer to ["Slave Mapping Register Address"]		
Read Mapping Register Qty	2	00 0AH	Read input register qty.		
16 CRC Verify	2	82 EFH	CRC0 CRC1 low byte in front, high behind		
Receiver Retu	rn Data I	Format:			
Content	Bytes	Data	Description		

(H: HEX)



Device Address	1	01H	01H Device, according to the data Master send	
Function Code	1	03H	Read holding register	
Range Data Bytes	1	14H		
		00 14 00 1E 00		
Boturning Data	20	28 00 32 00 4B	Poturning Data	
Returning Data	20	00 41 00 0A 00	Returning Data	
		25 00 14 00 2AH		
16 CRC Verify	2	FB 34H	CRC0 CRC1 low byte in front, high behind	

Example: Mapping address start from 20001, read 10 address data, then:

#### Server send: 01 03 4E 21 00 0A 82 EF

01= Device address; 03= Read holding register ; 4E 21=Mapping register starting address,

current is Decimal data 20001; 00 0A = Read 10 register value; 82 EF=16 CRC Verify.

#### Device answer: 01 03 14 00 14 00 1E 00 28 00 32 00 4B 00 41 00 0A 00 25 00 14 00 2A FB 34

01= Device address; 03= Read holding register; 14= Returning 20 byte; 00 14 00 1E 00 28 00 32 00 4B 00 41 00 0A 00 25 00 14 00 2A = Returning data.

Register Mapping	20010	20009	20008	20007	20006	20005	20004	20003	20002	20001
Address	20010	20009	20008	20007	20000	20005	20004	20003	20002	20001
Value	00 2A	00 14	00 25	00 0A	00 41	00 4B	00 32	00 28	00 1E	00 14

FB 34=16 CRC Verify.

### 6.1.2.5 Modify Data Type Mapping Address Data

If you want to rewrite slave data, you must configure the add slave 03 function code instruction mapping. After the mapping address value is changed, the corresponding slave address data will be rewritten. If address 20001 mapping slave data type is Signed Int, sort AB.

Content	Bytes	Data (H: HEX)	Description
Device Address	1	01H	01H Device, Range: 1-247, according to setting address
Function Code	1	06H	Write single holding register, function code 06
Mapping Register			Mapping data type address range, refer to
Address	2	4E 21H	["Slave Mapping Register Address"]
Write Data	2	00 64H	Data writing value is Decimal data 100
16 CRC Verify	2	CF 03H	CRC0 CRC1 low byte in front, high behind

#### Master Send Data Format:

#### **Receiver Return Data Format:**

Content	Bytes	Data (H: HEX)	Description
Device Address	1	01H	01H Device, according to the data Master send
Function Code	1	06H	Write single holding register



Mapping Register Address	2	4E 21H	Mapping data type
Write Data	2	00 64H	Write 100 successfully
16 CRC Verify	2	CF 03H	CRC0 CRC1 low byte in front, high behind

Example: If address 20001 mapping slave data type is Signed Int, sort AB, modify mapping address 20001 register to 100, then:

Server send: 01 06 4E 21 00 64 CF 03

01= Device address; 06= Modify single holding register value; 4E 20=Modify address 20001 register value; 00 64 = Write Decimal value 100; CF 03=16 CRC Verify.

Device answer: 01 06 4E 20 00 64 CF 03

01= Device address; 06= Modify single holding register value; 4E 20= R Modify address 20001 register value; 00 64= Modify to Decimal value 100, CE 03=16 CRC Verify. If need to modify multiple data type mapping address, pls check function code 16 in Modbus protocol.

## 6.2 MQTT Protocol

MQTT is a client-server based message publish/subscribe transport protocol. The MQTT protocol is lightweight, simple, open, and easy to implement, and these features make it very versatile. In many cases, including restricted environments such as machine to machine (M2M) communication and the Internet of Things (IoT). It is widely used in satellite link communication sensors, occasionally dialed medical devices, smart homes, and some miniaturized devices. The MQTT protocol runs on TCP/IP or other network protocols, providing ordered, lossless, two-way connectivity.

## 6.2.1 MQTT Introduction

MQTT is a client-server based message publish/subscribe transport protocol. The MQTT protocol is lightweight, simple, open, and easy to implement, and these features make it very versatile. In many cases, including restricted environments such as machine to machine (M2M) communication and the Internet of Things (IoT). It is widely used in satellite link communication sensors, occasionally dialed medical devices, smart homes, and some miniaturized devices. The MQTT protocol runs on TCP/IP or other network protocols, providing ordered, lossless, two-way connectivity.

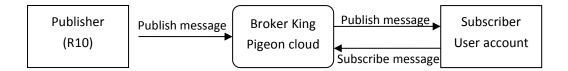
## 6.2.2 MQTT Principle

There are three identities in the MQTT protocol: Publisher (Publish), Broker (Server), Subscriber (Subscribe). Among them, the publisher and subscriber of the message are both clients, the message broker is the server, and the message publisher can be the subscriber at the same time.



Devices use MQTT communication through only two steps. 1.Devices publish the Topic through broker;

2. Users can create a account on broker to subscribe to the device to achieve monitoring



(uploads data to Broker)



(The R10 receives the downlink message from the Broker to implement control of the R10)

## 6.2.3 Device Communication Application

#### **Client configuration**

1. Connect Platform: KPIIOT cloud platform 2.0 or other cloud platform to enter the corresponding IP and port.

2. Connection protocol: MQTT protocol.

3. MQTT client ID: the unique identification of the device, which can be a serial number, device ID, or IMEI code; (King Pigeon 2.0 device ID defaults is the serial number).

4. MQTT account: the account where the device publishes the theme on the proxy server (King Pigeon 2.0 defaults is MQTT).

5. MQTT password: the device's account password for publishing the theme on the proxy server (King Pigeon 2.0 defaults is MQTTPW).

6. Publish topic: refers to the topic of the device publishing uplink data to the platform, King Pigeon Cloud 2.0 is the cloud service ID / +.

7. Subscription topic: refers to the topic that the device subscribes to when receiving downlink data, King Pigeon Cloud 2.0 is the cloud platform serial number/+.

8.Release cycle (seconds): MQTT data release interval, in seconds. The King Pigeon Cloud 2.0 cycle needs to be set to 10 seconds or more. If it is less than 10 seconds, the platform will disable the device.

9. Publisher QOS: The service quality level guarantee for application message distribution,
0-at most once, 1-at least once, 2-only once, you can choose according to your needs.
10. Encryption: You can use encryption to connect to the server according to your needs, and you can choose not to encrypt when you connect to King Pigeon Cloud 2.0. non-encrypted
11. Enable data re-transmission: Check enable, after enabling, when reconnecting to the



cloud platform, the data during the offline period will be re-transmitted. 12. Data packing: After checking, send multiple data in one message, when unchecked, one message corresponds to one I/O data point.

After the configuration is complete, the client will initiate a connection to the server: **CONNECT:** The client sends a CONNECT connection message request to the server; CONNACK: The server responds with a CONNACK confirmation connection message, indicating that the connection is successful; After the client establishes a connection, it is a long connection, and the client can publish or subscribe to the message on the server; For example the device and the client's mobile phone as the client: After the device publishes the topic on the proxy server, customers can view the data

through subscription. That is, the device is the publisher and the customer's mobile phone is the subscriber.

Users can also publish topics through the MQTT server to control the device. That is, the user is the publisher and the device is the subscriber.

#### **Publish MQTT Format** 6.2.4

If data packing is selected during configuration, multiple I/O data points will be sent in one message (when there are many data points, multiple messages will be sent separately, and each message contains multiple data points), if not selected, one message only corresponds to one I/O data point, please noted the two publishing formats are slightly different.

#### (1)Following is the device communication data format(Data packing):

```
Publish Topic Name: serial numbers // Corresponding configured topic options
"sensorDatas":
  ſ
      {
      // switch type,
      "switcher":"1",
                                               // Data type and value
      "flag":"DI1"
                                              //Read and write Flag
      },
      {
      // Slave switch type
      "switcher":"0",
                                            // Data type and value
      "flag":"REG64"
                                            //Read and write Flag
      },
      {
       //value
      "value":"10.00",
      "flag":"AI1"
      },
   {
```

{



```
//Slave value
     "value":"217.5",
    "flag":"REG2001"
    },
  {
    //Positioning
    "lng":"116.3",
                                             // longitude data
    "lat":"39.9",
                                            // latitude data
    "spd":"0.0",
                                             // speed data
  "dir":"0.0",
                                          // direction data
     "flag":"GPS"
    }
],
"time":"1602324850"
                                    //Time, data release timestamp UTC format
     "retransmit":"enable"
```

//Retransmission flag, indicating historical data (retransmission historical data only has this flag, real-time data does not have this flag)

} Note:

Each I/O point must contain three types of information when the device publish message: add Time, data

type and value, read and write flag;

// Data type and value: according to the type is divided into the following:

1. The numeric character is "value" followed by: "data value".

2. The switch character is "switcher" followed by: "0"or"1" (0 is close,1 is open).

3. Positioning data :

The GPS longitude character is "lng" and the value is: "data value".

The GPS latitude character is "lat" and the value is: "data value".

The GPS speed character is "spd" and the value is: "data value".

The GPS direction character is "dir" and the value is: "data value".

#### Read and write Flag:

Each I/O port has a fixed flag when the device publish a message, The specific flags are as follows:

Data name	Flag	Data type	Description
Digital output	DO1,DO2	Switcher	0 is open,1 is close
Digital input	DI1,DI2	Switcher	0 is open,1 is close
Analog input	AI1,AIN2,AIN3,AIN4	Value	The actual value = original value
Network	DI3~DI22	Switcher	0 is offline,1 is online
failure			
Pulse count	COUNT1,COUNT2	Value	

#### Device own I/O Port



#### Extend I/O Port

Data name	Flag	Data type	Description
Boolean	REG64~256	Switcher	Defined according to slave data
16 Bit	REG20000~20127	Value	Defined according to slave data
32 Bit	REG20128~20254	Value	Defined according to slave data

#### Note:

//Time flag: the character is "time", followed by "specific reporting timestamp"

//Re-transmission flag: the character is "Re-transmit", followed by "enable"

The data collected during the network offline period will be temporarily stored in the device, and will be republished when the network is restored. It is identified by the "Re-transmit" field to indicate historical data. (Need to check the enable data transmission on the configuration interface)

(2) The payload data format in the device release message (data unpacking)

Publish Topic: serial numbers			
{			
"switcher": "0",			
"flag": "DI1",			
"time": "1602324850"			
}			

Note: When the data is unpacking, there is a little difference except for the format. The others are exactly the same. This is an example of DI1. For other data types, please refer to the above description.

### 6.2.5 Device Subscribe MQTT Format

### The payload data format in the device subscription message

Subscription format serial number /+ (subscription topic needs to add the wildcard "/+" after the serial number)

```
{
    "sensorDatas":
    [
    {
        "sensorsId": 211267, // cloud platform sensor ID
        "switcher":1, // switch type data, 0 is off, 1 is closed
        "flag":"DO1" //read write flag
    }
    ],
        "down":"down" // platform downlink message
}
```

#### Note:

The data sent by the device control must contain three types of information: sensor ID, data type,flag, and downlink message packet.



//Sensor ID: The character is "sensorsID", and the ID is automatically generated according to the platform definition.

// Data type and value: according to the type is divided into the following:

- 1. The switch character is " switcher " followed by: "0"or "1",0 is open,1 is close.
- 2. The numeric character is " value " followed by: "data value"
- //Read write flag: the character is "flag" followed by "flag"
- // "down" confirmation data sent to subscribers by the platform.

### 7. SMS Command List

This device supports remote query and control operations through SMS commands. The following are the precautions:

1. The default password is 1234, you can edit the SMS command to modify the password;

2. The "password" in the SMS command refers to the device password, such as 1234, just enter the password directly;

3. The "+" sign in the SMS command is not used as the content of the SMS, please do not add any spaces or other characters;

4. The SMS command must be CAPITAL LETTERS, such as "PWD" instead of "pwd";

5. 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 then will not any response SMS.

6. If the password is entered incorrectly, no information will be returned;

7. Once the Unit received the SMS Command, will return SMS to confirmation, if no SMS return, please check your command or resend again.

#### 1) Modify Password, 4 digits, default is 1234

SMS Command	Return SMS Content		
Old Password+P+New Password	Password reset complete		

#### 2) Inquiry Current Status SMS Command

SMS Command	Return SMS Content
password+EE	Model:xxx
	Version:xxx
	IMEI:xxx
	GSM Signal Value:xxx



## 8. Warranty

 This device is warranted to be free of defects in material and workmanship for one year.
 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 router altered by purchasers.

> The End! Any questions please feel free to contact us. <u>www.iot-solution.com</u>