MODBUS to MQTT Gateway BL100





BL100 User Manual

Version V1.0

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Shenzhen Beilai Technology Co., Ltd.

Website:https://www.bliiot.com



Preface

Thanks for choosing BLIIoT Modbus to MQTT Gateway BL100. Reading this manual with full attention will help you quickly learn device functions and operation methods.

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Disclaimer

If any problem caused by network upgrading of telecommunication service provider, BLIIoT will not be liable for it. This Modbus to MQTT Gateway is mainly used for data transmission through GSM/SMS/GPRS/3G/4G. Please follow the instructions in the manual and pay attention to the tips of GSM/3G/4G wireless products. Any damages caused by wrong operation will be beyond warranty.

Revision History

Revision Date	Version	Description	Owner
Aug 2, 2021	V1.0	Initial Release	XJH



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1 Product Introduction

1.1 General Introduction

- BL100 is a Modbus to MQTT gateway based on cellular network. It supports Modbus RTU, Modbus TCP, MQTT, Alibaba Cloud, HUAWEI Cloud, King Pigeon Cloud, custom platform and transparent data transmission. Users can connect it to third-party server, cloud platform and SCADA easily.
- With built-in industrial GSM/GPRS/3G/4G communication module, BL100 has integrated stable and reliable 32-bit MCU based on embedded uCOSII real time operation system
- It supports Modbus Slave and Modbus Master with up to 320 extended datapoints for data collection. Users can configure high/low limit parameters according to various application requirement. If any threshold is triggered, device will send notification to users via SMS and transmit the data to monitoring center without operator on-site check



1.2 Application Illustration





1.3 Safety Introduction



Safety Notice

Please don't use the device where mobile phones are prohibited



Wireless Interference

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

1.4 Packing List

Before using the device, please make sure below parts are included in the package (Below pictures are for reference only. Please follow real product)

• 1x BL100 Gateway



• 1x 4PIN 3.5mm Female Connector



• 1x 8PIN 3.5mm Female Connector



1x Micro_USB Cable





• 2 x Wall-Mounting Clip Buckle Kit(Optional)



• 1 x DIN Rail Clip Buckle Kit



• 1x 2G/3G/4G SMA Cellular Network Antenna



• 1 x Data Card Picking PIN



• 1 x Product Qualification Card



• 1 x Warranty Card

Modbus to MQTT Gateway



	保修	4
用户姓名	联系电话	购买日期
通讯地址		(曲印 · 如阳)
产品基本信息		(销售单位盖印)
问题简述		

 1 x User Manual (PDF soft copy) Note: Please scan QR code to download it.
 Note: if any of the above items are missing, please contact BLIIoT sales team

1.5 Product Features

- > Use 4G cellular network for communication without range limit
- Support 9~36VDC power supply with reverse connection protection
- 2 channels of built-in DC power output (Output power voltage is equal to input power voltage) to save wiring cost
- Simple and convenient parameter setting with local configuration software and remote SMS
- > Built-in software and hardware watchdog to prevent false deadlock
- > 1 RS485 serial port, support Modbus RTU to MQTT and transparent transmission
- Serial port baud rate supports 2400bps-115200bps; stop bit supports 1, 2, data bit supports 8, parity bit supports None, Odd, Even
- Support Modbus Slave protocol and can be connected to host computer like SCADA, HMI, DSC, PLC, etc. Support Modbus RTU Master and can connect up to 48 Modbus Slave devices with max 320 datapoints
- Support SMS alarm for monitoring various Modbus data, support configuration software parameter setting and SMS inquiry, if any communication problem, will notify users with SMS
- Use complete offline prevention mechanism to re-transmit offline data and notify users with SMS
- Support remote device restart and parameter setting with SMS
- Support 10 user numbers to receive device disconnection, serial port data beyond limit, and other alarm messages
- Built-in timer function to perform scheduled automatic data reporting, SMS, Arm/Disarm and device restarting
- Support PC configuration software to read, import, export parameters and upgrade firmware through USB interface



- Metal case, IP30 protection grade, metal case and PCBA are isolated safely, applicable in industrial sites
- > Compact size, support wall-mounting and 35mm DIN rail mounting

1.6 Technical Parameters

Category	Parameter	Description		
	Power Voltage	9~36V DC		
	Power Consumption	Normal: 50mA@12V, Max: 150mA@12V		
Power Supply		• 2 channels		
	Power Output	 Output voltage: 9~36V DC(equal to input voltage) 		
		 Output current: 1500mA@12V(Max) 		
	Power Protection	Reverse connection protection,		
		ESD air: 15KV, surge:4KV		
	Serial Port Qty	1x RS485		
	Baud Rate	1200bps-115200bps		
	Data Bit	8		
Serial Port	Parity Bit	None, Even, Odd		
	Stop Bit	1,2		
	Protocol	Modbus RTU (slave), Modbus RTU (master)		
	Protection	ESD contact: 8KV, surge: 4KV (8/20us)		
SIM/UIM Card	Slot Qty	1		
Slot	Slot Type	Standard drawer type card slot, support 1.8V/3V nano		
		card with built-in 15KV ESD protection		
	L-E version	GSM/EDGE:900,1800MHz		
		100-L1E.030,040,041 CSM/EDGE:000.1800MHz		
	L-CE version	TD-SCDMA·B34 B39		
		FDD-I TE·B1 B3 B8		
		TDD-LTE:B38.B39.B40.B41		
Cellular Network		WCDMA:B2.B4.B5		
	L-A version	FDD-LTE:B2,B4,B12		
		GSM/EDGE:850,900,1800MHz		
		WCDMA:B1,B2,B5,B8		
	L-AU VEISION	FDD-LTE:B1,B3,B4,B5,B7,B8,B28		
		TDD-LTE:B40		
	I-AF version	WCDMA:B2,B4,B5		
		FDD-LTE:B2,B4,B5,B12,B13,B14,B66,B71		
		GSM:900,1800		
	CAT-1 version	FDD-LTE:B1,B3,B5,B8		
		TDD-LTE:B34,B38,B39,B40,B41		
Software	Protocol	Modbus RTU, Modbus TCP, MQTT, HUAWEI Cloud,		
Parameter		Alibaba Cloud, King Pigeon Cloud		
	Protocol Conversion	Support Modbus RIU to MQII		

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	Indicator	System running, alarm and RS485 data indicators
	User Configuration	PC configuration software, support WIN XP, WIN 7, WIN 8 and WIN 10
	Slave Connection	Max 48 slave devices can be connected. Up to 320 mapping register addresses (Bool, 16-bit, 32-bit, 64-bit)
	Transparent Transmission	Support transparent transmission
	SMS Commands	Support SMS commands
	Login Package	Support custom login package
	Heartbeat Package	Support custom heartbeat package
	MTBF	≥100,000 hours
		EN 55022: 2006/A1: 2007 (CE &RE) Class B
		IEC 61000-4-2 (ESD) Level 4
	EMC	IEC 61000-4-3 (RS) Level 4
Certification		IEC 61000-4-4 (EFT) Level 4
		IEC 61000-4-5 (Surge)Level 3
		IEC 61000-4-6 (CS)Level 4
		IEC 61000-4-8 (M/S) Level 4
	Others	CE, FCC, ROHS
Faviranment	Working Condition	-45∼85℃, 5∼95%RH
Environment	Storage Condition	-45∼105℃, 5~95%RH
	Case	Metal Case
	Size	83mm×30mm×100mm
Others	Protection Grade	IP30
	Net Weight	225g
	Mounting	Wall-Mounting/DIN Rail Mounting

1.7 Model Selection

No. Model		2G/3G/4G	Serial Port (Default is RS485, optional RS232)	Extendable I/O Datapoint Qty			
	Model			Bool	16Bit	32Bit	64Bit
1	BL100	\checkmark	1	64	128	64	64
2	BL100Pro	\checkmark	2	64	128	64	64



2 Hardware Introduction

2.1 Outline Dimension





2.2 LED Indicator

49
ALARM 🕐 🕐 RUN
TX 🜔 🔵 RX
VOUT+ VOUT- TX/A1 RX/B1 GND TX/A2 RX/B2 GND
BL100
CE ROHS FC

	LED Indicator					
No.	Item	Color	Status Description			
1	Alarm	Green	Steady on	Alarm is triggered		
1	Лапп	Green	Off	No Alarm		
		Green	Flickering	Registering data card		
2 R	Run		Steady on	Data card is successfully registered and system is running		
2	TV	Crean	Flickering	Serial port is transmitting data		
3	3 1	Green	Off	No data		
4	RX	Green	Flickering	Serial port is receiving data		
4			Off	No data		

2.3 Interface Definition



	Interface Definition				
No.	No. Interface Description				
1	VOUT +	2 nd power output positive			
2	VOUT -	2 nd power output negative			
3	TX/A1	1 st serial port A / TX			
4	RX/B1	1 ST serial port B / RX			
5	GND	Grounding			
6	TX/A2	2 nd serial port A / TX			
7	RX/B2	2 nd serial port B / RX			
8	GND	Grounding			





Interface Definition					
No.	Interface	Description			
1	USB	Connect configuration software for parameter setting and program upgrading			
2	SIM	Make sure device is powered off before inserting or removing SIM card			
3	RESET	In running mode, long press it for 5 seconds. Once all indicators are off and on again, reset is done successfully			
4	ON/OFF	Power ON / Power OFF device			
5	VOUT+	1 st power output positive			
6	VOUT-	1 st power output negative			
7	VIN+	Power input positive			
8	VIN-	Power input negative			
Power with time	Power off the device first, insert picking PIN to card slot and eject slot with tiny force				

2.4 Debugging & Upgrading USB Interface

Micro USB interface is used to connect configuration software for firmware upgrading. Use standard Micro USB cable to connect this device and PC (CH340 driver must be installed first)

2.5 Antenna Connection



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3 Product Mounting

This device supports horizontal placement, wall-mounting and DIN Rail mounting.

3.1 Wall-Mounting



3.2 **DIN-Rail Mounting**





Assemble clip





4 Configuration Software Introduction

BL100 parameters are configured in PC software. It supports Windows XP/Vista/7/8/10 operation system through Micros USB connection.

4.1 **Preparation before Configuration**

4.1.1 USB Driver Installation

Option 1

Double click below USB to RS485 driver file. Download and unzip it to install on the computer



Option 2

Download universal driver program, for example, Drive the Life, and install it on the computer.

4.1.2 Search for Port Number

Right click [my computer], click [property] > [device manager] > [port] If driver installation and connection is normal, it will show like below (device port number is COM44)





4.2 Login to Configuration Software

 Execute BL100 configuration software in PC, select the correct COM port (the port shown in device manager), and click confirm as below picture:

MODBUS to MQTT	ateway BL100 Configuration Software V1.0	10 <u>_</u> 01		×
	Choose Port COM44 Welcome to use BEILAI technology BL100 I gateway 1. Connect the device to the computer USB 2. Configure serial port parameters. 3. Configure MODBUS address correspond 4. Configure cloud platform parameters. 5. Complete Configure.	Refresh MODBUS to M and turn on th dence.	QTT he devic	8.
	Support device model : BL100			

 Select SIM card type (M2M card or normal SIM card) and click enter configuration page



MODBUS to MQT	T gateway BL100 Configuration Software — 🛛 🗆	×
Select SDM Ca	ard Category	
🗹 Normal SIM	Card(Call and SMS) 🔲 IOT M2M SIM Card(Data only)	
	Enter Setting	

• Once it's logged in successfully, it will enter below page

B MODBUS to MQTT gates	vay BL100 Configuration Software V1.0	3000	×
Load Configuration File	📲 Export Configuration File 📲 Factory Reset 🛛 Language 📓 About		
Serial Port	Serial Port 🗙		
Slave Mapping I	Channel 1 Mode ModBus RTU Master ~		
Self-Check	Baud Rate 9600 V (200~65535mS)		
. Advanced functi	Data Bit 8 Timeout 200 (200~65535mS)		
-3647.	Parity Bit none Slave Error ACK Time 60 (0~65535 S)		
	Stop Bit 1 V		
	Read Save		
< >			
COM44	Device model:BL100 www.BLiiot.com		

4.3 Serial Port Configuration

 This part includes RS485 serial port functions and parameters, including Modbus RTU Master, Modbus RTU Slave and Transparent Transmission.



🛃 Load Configuration File 🛛 🐴 E:	port Configuration File 🛛 📳	Factory Reset Language	About					
Basic Setting	参数设置 × Cellular	Network \times Equipment Up	late $ imes $ Parameter $ imes$	$\langle $ Hour Timer $\times $	Alarm Numbers $ imes$	Serial Port	- X	
Parameter	Channel 1							
Alarm Numbe	Mode Transpar	rent transmission \sim	Scan Bate	5000 (200~6	5535mS)			
E Timer Setting	Baud Rate Close ModBus	RTU Master	Timent	1000 (200 4	(5555)((5)			
Hour Timer	Data Bit Dation Bit Transpar	RTU Slave ent transmission	Timeout	(200~6	(2232ms)			
Periodic Time	Stop Bit 1	~	Slave Error ACK Tim	e 00 (0~655	(35 S)			
Serial Port Setting								
Serial Port			Notice: 1. Scan Rate can't le	ss than 200mS.				
Slave Setting			2. Timeout can't les 3. Slave Error ACK T	s than 200mS. ime: Stands for Slave no				
Manning Reg			response longer tha authorized phone n	in ACK time, will send SM umbers.	IS to			
Cloud Platform Setti			Read	Save	Ĩ			
Cellular Netwo			i i i i i i i i i i i i i i i i i i i	Jure				
Equipment Update								
Equipment Up								
Self-Detection								
Self-Detection								

Note: "Poll Cycle", "Timeout", "Master and Slave Disconnection Acknowledgement Time" will only be valid when RS485 is used as Modbus RTU Master

	Serial Port Configuration	
ltem	Description	Default
RS485	Select from "disabled", "ModBus RTU Master", "ModBus RTU Slave" and "Transparent Transmission"	Disabled
Baud Rate	Select from 1200, 2400,4800,9600,19200,38400, 57600, 115200	9600
Data Bit	8	8
Parity Bit	Select from none, even, odd	none
Stop Bit	Select 1, 2	1
Polling Cycle	The time interval between 2 consecutive commands unit: ms	200
Timeout	Max time duration of waiting after Master sends command to slave (unit: ms). If waiting for more than the limit, then system will identify slave has no response data	200
Timeout Acknowledgement Time	If communication between master and slave fails, after the set time duration, system will send SMS alarm to user	60

4.4 Slave Mapping Table

Slave devices can be quickly added, modified and deleted. Please read mapped slave information once enter slave mapping table so that the new added slave will not replace the old slave. Select the slave and right click it to delete, add or modify parameters.



Slave Mapping Table

Right click the box and clik Add Slave to enter below page MODBUS to MQTT gateway BL100 Configuration Software V1.0 🖷 Load Configuration File 🔺 Export Configuration File 📲 Factory Reset Language 🗐 About Slave Mapping List 🔀 Co Serial Port 序号 从机地址 数据类型 功能码 寄存器起始地址 映射寄存器数量 映射寄存器起始地址 映射寄存器结束地址 通道 O Slave Mapping List 1 💀 Setting Slave × Cellular network set 2 Self-Check 3 Advanced functions 5 Slave Serial Number 6 7 Slave Address (Range 1~254) OK Data Type Boolean 8 9 Modbus Function Code Boole Word Cancel 10 Register Starting Addr. Integer 11 Mapping Register Qty. Double 12 Mapping Register Starting Addr. 64 13 14 15 Tips: 1. Register Starting Addr. : In Slave, from which register address starting to mapping to RTU, no need to setup the end register address, the RTU will automatically calculate it according to mapping register Qty. 2. Mapping Register Qty. : How many registers in slave need to mapping to ortic 16 Notice: 1. Before adding device, pls click "Read" buttor 2. Select a blank line, right click to add mappin 3. Max adding 48 devices Save 3. Mapping Register Starting Addr. : In RTU, from which register address used to save the mapping register address value. No need to setup the end register address, the RTU will automatically calculate it according to mapping register Qty. 4. The Data Type and Modbus Function Code of the mapping registers must Hold register Command 06 command Coil command 05 command ~ modify COM44 Device Type:BL100 www.BLijot.cn

Add Slave@Slave Setting						
Item	Description	Default				
No.	Item No.					
Slave Address	Slave Device Address, range 1-247	Null				
Register Type	Select from "Bool", "16-bit", "32-bit", "64-bit"	Bool				
Function Code	Select from "01", "02", "03", "04", "15", "16"	Null				
Slave Register Starting Address	Slave register starting address to be read and written	Null				
Slave Qty to be Read	Qty of Slave to be read	Null				
BL100 Mapping Register Starting Address	BL100 register starting address mapped by Slave register starting address	Null				
BL100 Mapping Register Ending Address	BL100 register ending address is automatically calculated according to starting address and reading qty.	Null				
Holding Register Control Function Code	Hold register Command 06 commar ~ modify	Default 16				
Coil Control Function	Coil command 05 commai ~ modify	Default 15				



Note: Usually it's OK to keep the default setting without any changes. If any devices can't support 05 15 or 06 16 function codes, then set the function code supported by the device

Edit Slave

Select the slave and right click it to enter below operation window.

Darameter	Slave Serial Number	Slave Address	Data Type	Modbus Function Code	Register Startin	g Addr. Mapping Register Qty.	Mapping Register Starting Addr
- arameter	1	2	Boolean	1	0 —		64
	2	2	Word	3	0	Edit Slave	20000
Timer Setting	3	2	Integer	3	1	Edit Slave	20128
£	4	2	Double	3	3	Write Value	20256
	5					Dalata Claus	
Periodic Timer	6					Delete Slave	
No.	7					Clear Display	
Serial Port Setting	8						
Serial Port	9						
1000 C	10						
lave Setting	11						
Slave Mapping	12						
	13						
Mapping Regi	14						
oud Platform Settir	<						
Cellular Netwo quipment Update	Notice: 1. Before adding mapping device I 2. Select a blank 3. Max adding 48	device, pls click ist first ine, right click to devices	"Read" button, add mapping	to read device	Delete R	tead Save	

Click Edit Slave to enter below page Boolean slave editing page:

Slav	e Manning Lie	or	Siav	e Addres	s Data Type Woo	abus runcuon coo	se Register s	arting Addr.	mapping neg	ister Qty. Ivia		X	g Addi.	1
Cell	Channel Name	Data Type		Ratio	Alarm Verify Time(0~65535)	Threshold high	Threshold low	High Alarm SMS Content	Low Alarm SMS Content	Recovery SMS Content	Enable Recovery SMS	Enal		
Adv	Double20256	DATA_DOUBLE_ABCDEFGH	×	1	2	0	0							
	Double20260	DATA_DOUBLE_ABCDEFGH	~	1	2	0	0							
	Double20264	DATA_DOUBLE_ABCDEFGH	~	1	2	0	0							
	Double20268	DATA_DOUBLE_ABCDEFGH	~	1	2	0	0							
	Double20272	DATA_DOUBLE_ABCDEFGH	~	1	2	0	0							
	Double20276	DATA_DOUBLE_ABCDEFGH	~	1	2	0	0							
	Double20280	DATA_DOUBLE_ABCDEFGH	~	1	2	0	0							
	Double20284	DATA_DOUBLE_ABCDEFGH	~	1	2	0	0							
	Double20288	DATA_DOUBLE_ABCDEFGH	×	1	2	0	0							
	Double20292	DATA_DOUBLE_ABCDEFGH	~	1	2	0	0							
	٤										Q	•		
					OK	Cancel								

16-bit/32-bit/64-bit slave editing page:

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Slave Editor									·- 🗆	>
Address Mapping	Channel Name	Data Type	Ratio	Alarm Verify Time(0~65535)	Threshold high	Threshold low	High Alarm SMS Content	Low Alarm SMS Content	Recovery SMS Content	Er Rec S
20002	Int20002	DATA_SIGNED_AB	1	2	0	0				
20003	Int20003	DATA_SIGNED_AB	1	2	0	0				[
Slave Editor Address Mapping	Channel Name	Data Type	Ratio	OK Cancel Alarm Verify Time(0~65335)	Threshold	Threshold	High Alarm SMS	Low Alarm SMS	- Recovery SMS	× En Rec
20128	Din+20128		v 1	2	0	0	Content	Content	Content	5
20120	Dint20120	DATA LONG ABCD	× 1	2	0	0				r I
20132	Dint20132	DATA LONG ABCD	× 1	2	0	0	0.		2	r I
20134	Dint20134	DATA LONG ABCD	v 1	2	0	0				r r

OK Cancel

Edit Slave@Slave Mapping Table							
Item	Description	Default					
Mapping Address	BL100 mapping address corresponding to slave register address						
Channel Name	Can be set, Once alarm is triggered, device will send SMS "channel name"+"alarm content". If alarm is recovered, device will send "channel name"+"alarm recovery content" to the authorized phone number. Enable Recovery SMS must be ticked in user number setting for receiving recovery SMS						
Data Tura	 Boolean Can't be set. It's selected when adding Slave AC hit/20 hit/C4 hit 	Bool					
рака туре	 T6-DIT/32-DIT/64-DIT Can be set according to slave datapoint type. ABCDEFGH represents slave register datapoint 	ABCDEF GH					
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	sequence	
Input Type (Boolean Slave)	 NO: Normal Staus is Open (0) NC: Normal Status is Closed (1) 	NO
Ratio (16-bit/32-bit/64-bit Slave)	The data in mapping address will multiply the ratio. Multiplied value will compare with high and low threshold. Once it's beyond the limit, alarm will be generated. Alarm content and current value will be sent to authorized user number. This ration only applies to cloud platform. It's not applicable for GPRS/3G/4G data collection	1
Alarm Verify Time	If abnormal data keeps for more than the verification time, device will send SMS to authorized number	2
Threshold High (16-bit/32-bit/64-bit Slave)	If mapping address data multiplies ration is higher than the threshold and alarm is enabled, device will send SMS "Channel name+high limit alarm content" to authorized numbers	Null
Threshold Low (16-bit/32-bit/64-bit Slave)	If mapping address data multiplies ration is lower than the threshold and alarm is enabled, device will send SMS "Channel name+low limit alarm content" to authorized numbers	Null
High Alarm SMS Content	If there's high limit alarm, send SMS "Channel name+high limit alarm content"	Null
Low Alarm SMS Content	If there's low limit alarm, send SMS "Channel name+low limit alarm alarm content"	Null
Alarm SMS Content	If there's alarm, send SMS "Channel name+alarm content"	Null
Recovery SMS Content	If alarm is recovered, send SMS "Channel name+Recovery Content" to authorized numbers	Null
Enable Recovery SMS	It's ticked, alarm recovery SMS will be sent	Not ticked

Note: If SMS alarm is needed, it's necessary to tick Slave Alarm for authorized numbers in user number setting

4.5 **Cloud Platform Connection Configuration**

This page is used to configure device to connect to internet. Abundant automatic handshake package, custom heartbeat message and logout mechanism work together so that this device is compatible with many third-party cloud platforms and host computer system. Two-way communication between device and monitoring software or cloud platform is done through 4G cellular network It supports below platforms:

♦ King Pigeon Cloud 3.0 login address: kpiiot.com

- ♦ King Pigeon Cloud 2.0 via Modbus login address: www.my-m2m.com
- King Pigeon Cloud 2.0 via MQTT login address: www.my-m2m.com
- HUAWEI IOT login address: www.huaweicloud.com
- Alibaba IOT login address: www.aliyun.com
- Other self-built platforms



4.5.1 King Pigeon Cloud 3.0

Slave Mapping Li	KPIIOT 3.0 KPIIOT 2.0	KPIIOT 2.0 HuaWei Clould ALi C	Clould Other IOT	
Cellular network :	(Wodbus)		Server	
Self-Check	Communication Protocol	Server 1 IP/DNS	modbusrtu.kprtu.com	(Max60)
Advanced functio	Modbus RTU Prote	Server Listen Port	4000 (0-65535)	
- tear	Protocol TCP	Server 2 IP/DNS	s	(Max60)
	Access Point Name	Max60) Server Listen Port	t (0-65535)	
	APN User Name	(Max60) Heartbeat Interval	60 (1-9999 S)	
	APN Passsword	(Max60) No Response Resend	Times 3 ~ (1-9)	
	Pls fill in the login message(device I	D of cloud) and click save		
		765XN8V/16725X (May60)		
		(Max60)		
		((((1440))		
	Heartheast Message ASCII and Asc	(Max60)		
	Heartbeat Message ASCIT V Feq	(Maxou)		
	Heartbeat ACK Wessage ASCI V res	(WIAXOO)		
	Login Message Strategy Send Once W	Vhen Login Server 🗸 🗸		

Note: Only Login Message needed to be entered for connecting King Pigeon cloud. Others keep the default settings

King Pigeon Cloud 3.0@Network Setting							
ltem	Description	Default					
Communication protocol	If King Pigeon Cloud 3.0 is selected, keep the default configuration software parameters						
Connection Mode	TCP	TCP					
APN (Access Point Name)	Telecommunication service provider APN	Null					
APN User Name	User name of APN to connect to network	Null					
APN Password	Password of APN to connect to network	Null					
Login Message	Unique device serial number (Contact BLIIoT sales team)						
Login ACK Message	default	Null					
Logout Message	default	Null					
Heartbeat Message	req	Default					
Heart ACK Message	res	Default					
Login Message Strategy	default	Send once to login					
Server 1 IP/DNS	modbusrtu.kpiiot.com	Default					
Server Listen Port	Target server 1 port number	4000					
Server 2 IP/DNS	Target server 2 domain name or IP	Null					

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Server Listen Port	Target server 2 port number (0-65535)	Null
Heartbeat Interval	If connection to server fails for 3 times, it will reconnect after the set interval. Unit: second (1-9999) seconds	60
No Response Resend Times	If no response(login acknowledgement and heartbeat acknowledgement message is set) from server, data will be sent again for the set times (1-9)	3

4.5.2 King Pigeon Cloud 2.0 via Modbus

oad Configuration File 🍝	Export Configuration Fil	e 📲 Facto	ry Reset	Language	Abo	out				
Serial Port	Serial Port X Cel	lular networ	k setting	×						
Slave Mapping Li	KPIIOT 3.0	KPIIOT 2.0 (Modbus)	۲	(MQTT)	Hua	Wei Clould ALi	Clould	Other IOT Server		
Cellular network	Cellular Network Settir	ngs						<u>M</u>		
Self-Check	Communication Pro	otocol				Server 1 IP/DI	IS modbus.d	ltuip.com	(Max60)	
Advanced functio	M	lodbus RTU I	Prote ~			Server Listen Po	rt 6651	(0-65535)	_	
	Protocol TC	CP	~		_	Server 2 IP/DI	IS		(Max60)	
	Access Point Name			(M	ax60)	Server Listen Po	rt	(0-65535)		
	APN User Name			(M	ax60)	Heartbeat Interv	al 60	(1-9999 S)		
	APN Passsword			(M	ax60)	No Response Reser	d Times 3	~ (1-9)		
	Login Messag Login ACK Messag	e ASCII ~	HS765XN	I8YV16725Y		(Max60) (Max60)				
	Login Messag Login ACK Messag Logout Messag	e ASCII ~ e ASCII ~ ASCII ~	HS765XN	I8YV16725Y		(Max60) (Max60) (Max60)				
	Login Messag Login ACK Messag Logout Messag Heartbeat Messag	e ASCII ~ pe ASCII ~ pe ASCII ~ pe ASCII ~ pe ASCII ~	HS765XN Q	18YV16725Y		(Max60) (Max60) (Max60) (Max60)				
	Login Messag Login ACK Messag Logout Messag Heartbeat Messag Heartbeat ACK Messag	e ASCII ~ pe ASCII ~ ASCII ~ ac ASCII ~ ge ASCII ~ ge ASCII ~	U Q A	18YV16725Y		(Max60) (Max60) (Max60) (Max60) (Max60)				
	Login Messag Login ACK Messag Logout Messag Heartbeat Messag Heartbeat ACK Messag Login Message Strate	e ASCII ~ ASCII ~ ASCII ~ ASCII ~ ASCII ~ ASCII ~ age ASCII ~ age Send On	Q A A ce When I	18YV16725Y Login Server		(Max60) (Max60) (Max60) (Max60) (Max60)				
	Login Messag Login ACK Messag Logout Messag Heartbeat Messag Heartbeat ACK Messag Login Message Strate	e ASCII ~ e ASCII ~ e ASCII ~ e ASCII ~ ge ASCII ~ ge ASCII ~ ge ASCII ~ sequences of the sequences o	Q A A A	18YV16725Y		(Max60) (Max60) (Max60) (Max60) (Max60)				
	Login Messag Login ACK Messag Logout Messag Heartbeat Messag Heartbeat ACK Messag Login Message Strate	e ASCII ~ ASCII ~ ASCII ~ ASCII ~ ASCII ~ ASCII ~ ASCII ~ ASCII ~	Q A A cce When I	Login Server		(Max60) (Max60) (Max60) (Max60) (Max60)				
	Login Messag Login ACK Messag Logout Messag Heartbeat Messag Heartbeat ACK Messag Login Message Strate	e ASCII ~ ASCII ~ ASCII ~ ASCII ~ ASCII ~ ASCII ~ ASCII ~ Send On	Q A ce When I	Login Server		(Max60) (Max60) (Max60) (Max60) (Max60) ✓				
	Login Messag Login ACK Messag Logout Messag Heartbeat Messag Heartbeat ACK Messag Login Message Strate	e ASCII v le ASCII v	Q A ce When I	Login Server		(Max60) (Max60) (Max60) (Max60)	Paad	Save	_	
	Login Messag Login ACK Messag Logout Messag Heartbeat Messag Heartbeat ACK Messag Login Message Strate	e ASCII v e ascin v	Q A fer to [Hel	Login Server		(Max60) (Max60) (Max60) (Max60)	Read	Save		
	Login Messag Login ACK Messag Logout Messag Heartbeat Messag Heartbeat ACK Messag Login Message Strate	e ASCII v e ASCII v	HS765XN Q A ce When I	Login Server		(Max60) (Max60) (Max60) (Max60)	Read	Save		

Note: Only Login Message needed to be entered. Others keep the default setting

King Pi	King Pigeon Cloud 2.0 via Modbus@Network Setting			
Item	Description	Default		
	If King Pigeon Cloud 2.0 (Modbus) is selected,			
Communication Protocol	keep the default configuration software			
	parameters			
Connection Mode	TCP	TCP		
APN (Access Point Name)	Telecommunication service provider APN	Null		
APN User Name	User name of APN to connect to network	Null		
APN Password	Password of APN to connect to network	Null		
Login Message	Unique device serial number			

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	(Contact BLIIoT sales team)	
Login ACK Message	Default	Null
Logout Message	Default	Null
Heartbeat Message	Q	Default
Heartbeat ACK Message	A	Default
Login Message Strategy	Default	Send once to login
Server 1 IP/DNS	modbus.dtuip.com	Default
Server Listen Port	Target server 1 port number	6651
Server 2 IP/DNS	Target server 2 domain name or IP	Null
Server Listen Port	Target server 2 port number (0-65535)	Null
Heartbeat Interval	If connection to server fails for 3 times, it will reconnect after the set interval. Unit: second (1-9999) seconds	60
No Response Resend Times	If no response(login acknowledgement and heartbeat acknowledgement message is set) from server, data will be sent again for the set times (1-9)	3

4.5.3 King Pigeon Cloud 2.0 via MQTT



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King Pigeon Cloud 2.0 via MQTT@Network Setting				
Item	Description	Default		
APN (Access Point Name)	Telecommunication service provider APN	Null		
APN User Name	User name of APN to connect to network	Null		
APN Password	Password of APN to connect to network	Null		
Server 1 IP/DNS	mqtt.dtuip.com	Default		
Server Listen Port	Target Server 1 port number	1883		
Server 2 IP/DNS	Target Server 2 domain name or IP	Null		
Server Port Number	Target server 2 port number (0-65535)	Null		
	If connection to server fails for 3 times, it will			
Heartbeat Interval	reconnect after the set interval. Unit: second	60		
	(1-9999) seconds			
	If no response(login acknowledgement and			
	heartbeat acknowledgement message is set)			
No Response Resend Times	from server, data will be sent again for the set	3		
	times (1-9)			
		Automatically		
Subscribe Topic	Topic of subscribing message/+	generated based		
		on MQTT Client ID		
		Automatically		
Publish Topic	Topic of device publishing message	generated based		
		on MQTT Client ID		
MQTT Clent ID	Unique device serial number			
	(Contact BEnor Sales team)			
MQTT User Name	server	MQTT		
	Password for device to publish topic in broker			
MQTT Password	server	MQTTPW		
	Interval for device to upload data (10-65535)			
Publish Period	unit: second	10		
	Tick it to enable offline data re-transmission			
MQTT Data Re-transmission	once network resumes	Enable/Disable		



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4.5.4 HUAWEI Cloud Configuration

Load Configuration File	🗈 Export Configuration File 📲 Factory Reset Language 🛿 About
Serial Port	Serial Fort X Cellular network setting 🗙
Slave Mapping Li	KPIIOT 3.0 KPIIOT 2.0 KPIIOT 2.0 HuaWei Clould ALi Clould Other IOT (Modbus) (MQTT)
Cellular network	Cellular Network Settings
Self-Check	Communication Protocol
Advanced functio	HuaWei Cloud 🗸
-36/C.	Protocol TCP
	Access Point Name (Max60) Region North China(Br v
	APN User Name (Max60) Heartbeat Interval 60 (1-9999 S)
	APN Passsword (Max60) No Response Resend Times 3 V (1-9)
	Service ID Publish Period(S) 60 (10-65535 S)
	Secret Key Service ID Publish Period(S) 60 (10-65535 S) Device Certificate
	Secret Key Service ID Publish Period(S) 60 (10-65535 S) Device Certificate Device Private Key Select File Update
	Secret Key Service ID Publish Period(S) 60 (10-65535 S) Device Certificate Device Private Key Calent File Update MQTT Data retransmission Enable / disable Clear Certificate
	Serret Key
	Serret Key Service ID Publish Period(S) 60 Device Certificate Select File Device Private Key Select File MQTT Data retransmission Enable / disable
	Serret Key Service ID Publish Period(S) 60 Device Certificate Select File Device Private Key Select File MQTT Data retransmission Enable / disable
	Serret Key Service ID Publish Period(S) 60 (10-65535 S) Device Certificate Device Private Key Select File Update MQTT Data retransmission Enable / disable Clear Certificate
	Secret Key
	Serret Key
	Secret Key

HUAWEI Cloud Configuration				
Item	Description	Default		
APN (Access Point Name)	Telecommunication service provider APN	Null		
APN User Name	User name of APN to connect to network	Null		
APN Password	Password of APN to connect to network	Null		
Authentication Method	Device Secret Key	Default		
Device ID	Set the same device ID as that in HUAWEI Cloud (device-device ID)	Refer to 5.2.3		
Secret Key	Set the same secret key as that of HUAWEI Cloud when creating device. If it's lost, reset the password in device authentication method	HUAWEI Cloud Application		
Service ID	Service ID created in HUAWEI Cloud			
Publish Period	Interval of publishing data, (10-65535) unit: second	60		
MQTT Data Re-transmission	Tick it to enable offline data re-transmission once network resumes	Disable		
Region	Select HUAWEI Cloud region. Default is North China Beijing 4	Default		
Heartbeat Interval	If connection to server fails for 3 times, it will reconnect after the set interval. Unit: second	60		
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	(1-9999) seconds	
No Response Resend Times	If no response(login acknowledgement and heartbeat acknowledgement message is set) from server, data will be sent again for the set times (1-9)	3
X509 certificate	Can't support it currently	

4.5.5 Alibaba Cloud Configuration

Carial Port	Export Configuration File The sectory Reset Language Language About Serial Port X Cellular network setting	
Slave Mapping Li	KPIIOT 3.0 KPIIOT 2.0 KPIIOT 2.0 (MQTT) HuaWei Clould ALi Clould Server	
Cellular network : Cellular network : Ce Self-Check Advanced functio	Cellular Network Settings Communication Protocol ALi Cloud	
	Access Point Name (Max60) Region North China 1 APN User Name (Max60) Heartbeat Interval 60 (1-9999 S) APN Passsword (Max60) No Response Resend Times 3 (1-9)	
	Authentication Method Device Sert Product Private Key	
	Device Private Key Publish Period(S) 60 (10-65535 S) MQTT Data retransmission Enable / disable	
	Device Private Key Publish Period(S) 60 (10-65535 S) MQTT Data retransmission Enable / disable FAQ for settings please refer to [Help] menu Read	

Alibaba Cloud Configuration			
Item	Description	Default	
APN (Access Point Name)	Telecommunication service provider APN	Null	
APN User Name	User name of APN to connect to network	Null	
APN Password	Password of APN to connect to network	Null	
Authentication Method	Device Secret Key	Default	
Product Private Key	Set ths same ProductKey as Alibaba cloud (Device-click Device Secret to view it)	Refer to	
Device Name	Set the same DeviceName as Alibaba Cloud (Device—Click DeviceSecret to view it)	<u>Alibaba</u>	
Device Private Key	Set the same DeviceSecret as Alibaba Cloud. (Device—Click DeviceSecret to view it)	Application	
Publish Period	Interval of publishing data, (10-65535)	60	

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	Unit: second	
MOTT Data Ba transmission	Tick it to enable offline data re-transmission once	Disable
	network resumes	Disable
Region	Select Alibaba Cloud region. Default is East China 2	Default
	(Shanghai)	
	If connection to server fails for 3 times, it will	
Heartbeat Interval	reconnect after the set interval. Unit: second (1-9999)	60
	seconds	
	If no response(login acknowledgement and heartbeat	
No Response Resend Times	acknowledgement message is set) from server, data	3
	will be sent again for the set times (1-9)	

4.5.6 Other IOT Server (Custom Protocol)

785	Serial Fort X - Uellular network setting X				^
Slave Mapping Li	KPIIOT 3.0 KPIIOT 2.0 KPIIOT 2. (Modbus) (MQTT)	0 HuaWei Clould	ALi Clould Other I Serve	OT r	
Condian Incluiorie	Cellular Network Settings				
Self-Check	Communication Protocol				
Advanced functio	ALi Cloud 🗸				
<u></u>	Protocol TCP				
	Access Point Name	(Max60)	Region North China 1 🗸		
	APN User Name	(Max60) Hearthea	at Interval 60 (1-99	99 5)	
	APN Passervord	(Max60) N D		(1.0)	
	AFIT Passsword	(Waxoo) No Respons		(1-9)	
	Pis fill in the login message(device ID of cloud),and	d click save	MQTT Settings		
	Login Message ASCII ~ HS765XN8YV1672	5Y (Max60)	Subscribe Topic		
	Login ACK Message ASCII 🗸	(Max60)	Publish Topic]	
	Logout Message ASCII ~	(Max60)	MQTT Client ID		
	Heartbeat Message ASCII V O	(Max60)	MOTT User Name MOTT		
		(Max60)			
		(11/12/00)	MQTT Password MQTTPW		
	Login Message Strategy Send Once When Login Ser	rver v	Publish Period(S) 60	(10-65535 S)	
			MQTT Data retransmission	🗌 Enable / disable	
			Tips: Only use MQTT Proto	col require to setup.	

Custom Protocol Configuration					
Communication Protocol	Select according to user requirement				
Server IP/ Domain Name	User-defined				

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Server Listen Port	User-defined
Login Message	User-defined
Login ACK Message	User-defined (server response to login message)
Heartbeat Message	User-defined (heartbeat message to keep connection)
Heartbeat ACK Message	User-defined (Server response to heartbeat message)
Heartbeat Interval	Interval of sending heartbeat message,default is 60s
Login Message Strategy	User-defined

Note: Users set the parameters based on custom protocols and actual requirements. Note: Custom MQTT protocol data format is the same as King Pigeon Cloud 2.0 MQTT data format. Refer to <u>5.2.5 MQTT Application</u>. Modbus RTU and Modbus TCP are standard Modbus protocol. Refer to <u>Appendix 6.3, 6.4 and 6.5</u> for message details

4.6 Device Self-Checking

BL100 supports self-checking before configuration

Below page shows self-checking is completed

Cellular network				
Calf Charle	self-checking		Self-check	
Sell-Check	Memory detection complete	success	Skip	
Advanced functi	Clock detection complete	success		
	GSM communication detection completed	success		
	SIM card detection completed	SIM card inserted		
	GSM registration detection completed;4G module,Sig	Registered		
	Cellular network communication detection completed	success		
	Key detection completed	fail	prompt X	
	Serial port detection completed	success		
	Self-check completed		Self-check completed	
	Preparation before self inspection: 1. Put the 3 / 4G SIM card into the device 2. Connect the antenna to the device	colf test. Please sh	usek the promote	

Note: Insert SIM card, connect antenna properly and manually press self-check button to trigger it.



4.7 Advanced Functions

4.7.1 Parameter Configuration

In this section, users can quickly read and configure device basic information, including model, version, device time, device ID and description.

Slave Mapping List Cellular network setti	Modify password Old password:	Synchronous machine time Time: 2021-08-19 09:22:44
Self-Check	Confirm password: Modify password	Time zone: (UTC+08:00) Read time Sync time
	Basic information Device ID 1 (1~247)	Model No. BL100 Version 4EH11
	Device Description: BL100TEST	(60 Byte) IMEI 863418051081537 Arm Automatically when power on. Signal 25 linute(S) (0~9999)
	Timer Reporting SMS Content Settings	
	Add the following additional information in the report SMS	Device ID Device Description
	Add the following additional information in the report SMS Arm Status GSM Signal Value Alarm SMS Content Settings Add the following additional information in the alarm SMS	Device ID Device Description

	Sync Device Time@Basic Information	
Item	Description	Default
Time	Display/select device current time	
Read Time	Click it to read RTU time	
Sync Time	Click it to sync computer time to RTU	
Signal	Display device signal strength, range 0-31	Automatic
	General Operation@Basic Information	
Item	Description	Default
Device ID	Used as device ID address in ModBus protocol,	1
	range 1-247	
Model Number	Automatically read device model number	
Version	Automatically read device version	
Device Description	If device description is set, it will be included in alarm SMS	Null
Add timestamp to alarm SMS	If ticked, SMS alarm content will include timestamp	Tick
Arm automatically when power on	If ticked, it will automatically be armed once powered on.Only in armed status alarm event will happen if it's triggered	Tick
Auto Arm after Disarm Set interval:	Once device is disarmed, it will be armed automatically after the set interval	Not Ticked



Timer Reporting @Basic Information					
ltem	Description	Default			
Add the following additional information in the report SMS	If following items are ticked and SMS reporting is set in timer, SMS will be sent to authorized number. To get regular SMS reporting, need to set SMS reporting in Timer, tick this item and set user number	Not ticked			
	Alarm SMS Setting@Basic Information				
ltem	Description	Default			
Add the following additional information in the alarm SMS	If following items are ticked, the status will be included in the SMS if there's any alarm and sent to authorized user number	Not ticked			

4.7.2 User Number Setting



Note: For alarm SMS, please select according to actual requirement

User Number Setting						
Item	Description	Default				
User No.	Total 10 user numbers can be set to receive SMS	Null				
Power On	If it's ticked, SMS will be sent to user number, including device model, version, description, IMEI, status, cellular network signal value, etc once device is powered on	Ticked				
Timer Report	If it's ticked, SMS will be sent to user number as scheduled reporting cycle	Ticked				
Arm/Disarm SMS	If it's ticked, SMS will be sent to user number if device arm/disarm status changes	Ticked				
Low Signal	If it's ticked, SMS will be sent to user number once cellular network signal value is less than 14	Not ticked				

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Cellular Network	If it's ticked, SMS will be sent to user number once	Not ticked
Failure	connecting to server fails for 3 times	
Slave Alarm	If it's ticked, RS485 interface slave alarm will be sent to user number	Not ticked
Slave Communication Failure	If it's ticked, SMS will be sent to user number once the communication with RS485 interface slave timeout	Not ticked

Note: If alarm SMS is needed, please tick Slave Alarm in Number Setting

4.7.3 Timer

In this page, users can quickly set device to perform certain actions in scheduled time to realize automatic control devices. Labor cost can be largely saved. Total 10 events can be set based on weekly, daily or certain time interval

4.7.3.1 Clock Timer

Serial Port Serial Port Serial Port Serial Port Serial Port Serial Port ClockTi ClockTi ClockTi ClockTi ClockTi ClockTi ClockTi ClockTi Serial Port ClockTi Serial Port ClockTi Clock	Sunday Su	Hour 00 00 00 00 00 00 00 00 00 0	Minute 00 ~ 00 ~ 00 ~ 00 ~ 00 ~ 00 ~ 00 ~ 00 ~ 00 ~ 00 ~ 00 ~ 00 ~	Action Reboot Upload Data By Cellular network Auto Report By SMS -NA- Arm Disarm Reboot	
Slave Mapping List ClockTi Cellular network setting Cellu	Weekly Sunday Sunday Sunday Sunday Sunday Sunday Sunday Sunday	Hour	Minute 00 ~ 00 ~ 00 ~ 00 ~ 00 ~ 00 ~ 00 ~ 00 ~ 00 ~ 00 ~ 00 ~ 00 ~	Action Reboot Upload Data By Cellular network Auto Report By SMS -NA- Arm Disarm Reboot	
Cellular network setting Self-Check 1 Advanced functions(optio Parameter setting Clock timer Period timer Mapping Register Firmware Update 10	Weekly Sunday Sunday Sunday Sunday Sunday Sunday Sunday	Hour Hou Hou	Minute 00 ~ 00 ~ 00 ~ 00 ~ 00 ~ 00 ~ 00 ~ 00 ~ 00 ~ 00 ~ 00 ~ 00 ~ 00 ~	Action Reboot Upload Data By Cellular network Auto Report By SMS -NA- Arm Disarm Reboot	
Self-Check 1 Advanced functions(optio Parameter settings Clock timer Period timer Mapping Register Firmware Update 10	Sunday Su	 00 	> 00 > > 00 > > 00 > > 00 > > 00 > > 00 > > 00 > > 00 >	Reboot Reboot Upload Data By Cellular network Auto Report By SMS -NA- Arm Disarm	
Advanced functions(optio Parameter settings Advanced functions(optio Parameter settings Clock timer Period timer Advanced functions(optio Parameter settings Clock timer Period timer Period timer Period timer Period timer Period timer Period timer Parameter Settings Period timer Period timer	Sunday Sunday Sunday Sunday Sunday Sunday	 > 00 	> 00 > > 00 > > 00 > > 00 > > 00 > > 00 >	Reboot Upload Data By Cellular network Auto Report By SMS -NA- Arm Disarm	
Period timer Period timer Pe	Sunday Sunday Sunday Sunday Sunday	<pre>> 00 > 00 > 00 > 00 > 00</pre>	00 ~ ~ 00 ~ ~ 00 ~ ~ 00 ~ ~ 00 ~	Auto Report By SMS -NA- PMA- Disarm	
A Number setting Clock timer Period timer Mapping Register Register Pirmware Update 100	Sunday Sunday Sunday Sunday	 00 00 00 00 00 	<pre>> 00 ~ </pre> > 00 ~ 00 ~ 00 ~	-NA- Arm Disarm	
Clock timer 6 Period timer 7 Mapping Register 8 Firmware Update 9 10	Sunday Sunday Sunday	<pre>> 00 > 00 > 00</pre>	<pre>> 00</pre>	Disarm	
Period timer 6 Period timer 7 Mapping Register 8 Firmware Update 9 10	Sunday Sunday	~ 00 ~ 00	~ 00 ~	P I . .	
Period timer 7 Mapping Register 8 Firmware Update 9 10	Sunday	~ 00		Reboot	
Mapping Register 8 Firmware Update 9 10	Sunday		~ 00 ~	Reboot ~	
Firmware Update 9	Junuay	~ 00	~ 00 ~	Reboot ~	
	Sunday	~ 00	~ 00 ~	Reboot ~	
	0 Sunday	~ 00	~ 00 ~	Reboot ~	
				Read Save	
				iteau Save	
< >					

Clock Timer					
ltem	Description	Default			
1-10	Refers to 1-10 Timer	Not ticked			
Weekly	Set any day of the week or every day				
Hour	Set specific hour				
Minute	Set specific minute				
A	Action to be performed once at certain time. Select from				
Action	"restart", "uploading cellular network data", "Auto Report by				
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SMS", "Arm", "Disarm"

4.7.3.2 Period Timer

Serial Port	Clock ti	mer × Map	oing Regi	ster $ imes$	Period tim	ner 🔀	1	
Slave Mapping List	Periodic	Timer						
Cellular network setting		Weekly	1 10000	Hour	Minu	ite	Interval(s)	Action
	1	Sunday 🔻	00	~	00	~	0	Reboot
Self-Check	2	Sunday 🕓	00	~	00	~	0	Upload Data By GPRS
Advanced functions(optio	3	Sunday 🕓	00	~	00	~	0	Auto Report By SMS
Parameter settings	4	Sunday 🕓	00	~	00	~	0	-NA- Arm
Number setting	5	Sunday 🗸	00	~	00	~	0	Disarm
Clock timer	6	Sunday 🕓	00	~	00	~	0	Reboot ~
Deried times	7	Sunday 🕓	00	~	00	~	0	Reboot v
M 1 B 1	8	Sunday 🗸	00	~	00	~	0	Reboot ~
	9	Sunday 🔻	00	~	00	~	0	Reboot 🗸 🗸
Firmware Update	Notice 1, Fro 2, Wh recom	n the Start Tim In the cycle tim Mended	e,every x ier is use	xSeconds ex d for restart	cute the cho , more than	ose act 120 sec	ion. onds is	Read Save
Firmware Update	Notice 1, Fro 2, Wh recom	n the Start Tim In the cycle tim Mended	e,every x ler is use	xSeconds ex d for restart	cute the cho , more than	ose act 120 sec	ion. onds is	Read Save
Firmware Update	Notice 1, Fro 2, Wh recom	: om the Start Tim en the cycle tim mended	e,every x ler is use	xSeconds ex d for restart	cute the cho , more than	ose act 120 sec	ion. onds is	Read Save
Firmware Update	Notice 1, Frc 2, Wh recom	: om the Start Tim en the cycle tim mended	e,every x ler is use	xSeconds ex d for restart	cute the cho , more than	iose act 120 sec	ion. onds is	Read Save
Firmware Update	Notice 1, Frc 2, Wh recom	: m the Start Tim en the cycle tin mended	e,every x ier is use	xSeconds ex d for restart	cute the cho , more than	ose act 120 sec	ion. onds is	Read Save
Firmware Update	Notice 1. Frc 2. Wh recom	r: im the Start Tim ien the cycle tim mended	e,every x ier is use	xSeconds ex d for restart	cute the cho , more than	iose act 120 sec	ion. onds is	Read Save
Firmware Update	Notice 1, Frc 2, Wh recom	: m the Start Tim en the cycle tim mended	e,every x	xSeconds ex d for restart	cute the cho , more than	iose acti 120 sec	ion. onds is	Read Save
Firmware Update	Notice 1, Frc 2, Wh recom	: m the Start Tim en the cycle tim mended	e,every x er is use	xSeconds ex d for restart	cute the cho , more than	ose act	ion. onds is	Read Save
Firmware Update	Notice 1, Frc 2, Wł recom	: m the Start Tim en the cycle tin mended	e,every x er is use	xSeconds ex	cute the cho	ose act	ion. onds is	Read Save
Firmware Update	Notice 1, Frc 2, Wł recom	: m the Start Tim en the cycle tin mended	e,every x	xSeconds ex	cute the cho	ose act	ion. onds is	Read Save
O Firmware Update	Notice 1. Frc 2. Wh recom	: m the Start Tim en the cycle tin mended	e,every x	xSeconds ex d for restart	cute the choo , more than	iose act	ion. ands is	Read Save
Firmware Update	Notice 1, Frc 2, Wh recom	: m the Start Tim en the cycle tin mended	e,every x ler is use	xSeconds ex	cute the choo , more than	ose act	ion. ands is	Read Save

	Period Timer					
Item	Description	Default				
1-10	Refers to 1-10 Timer	Not ticked				
Weekly	Set any day of the week or every day					
Hour	Set specific hour					
Minute	Set specific minute					
Action	Action to be performed once at certain time. Select from "restart", "uploading cellular network data", "Auto Report by SMS", "Arm", "Disarm"					

4.7.4 Device Firmware Update

BL100 support online firmware update. Click Select to import program file and click Update. Once firmware update is 100% completed, restart the device



C Serial Port	Cellular network setting X Firmware Update 🗙	
 Slave Mapping List Cellular network settin Self-Check Advanced functions(o 	Note: do not disconnect the power supply of the device during the upgrade process, otherwise the device will not be used!!!	
Parameter setti O Parameter setti O Parameter setting O Clock timer	File Select Upgrade	
Period timer Mapping Regis Firmware Upda		

4.7.5 Mapping Register Data

Click [Mapping Register Data] to view slave device real-time value so that users can debug and install devices easily.

Serial Port	Serial Port X Slave Mappin	ng List 🗙 Mapping Register 🔀			
Slave Manning List	Boolean	16Bit	32位	64位	
Slave Mapping List	Register No. Current Value 🛆	Register No. Current Value	Register No. Current Value	Register No. Current Value ^	
Cellular network setti	64 1	20000 100	20128 500	20256 200	Tick it stand
Salf Chark	65	20001	20130	20260	automatical
Self-Check	66	20002	20132	20264	slaves, inter
Advanced functions(o	67	20003	20134	20268	2 Seco
Baramatar catti	68	20004	20136	20272	
Parameter setu	69	20005	20138	20276	Read
Number setting	70	20006	20140	20280	
Clash times	71	20007	20142	20284	Notice:
Clock unler	72	20008	20144	20288	1. Please go to
Period timer	73	20009	20146	20292	2 Click the IRe
	74	20010	20148	20296	abovemention
Mapping Regis	75	20011	20150	20300	will be incorre
	76	20012	20152	20304	
"her"	77	20013	20154	20308	
	78	20014	20156	20312	
	79	20015	20158	20316	
	80	20016	20160	20320	
	81	20017	20162	20324	
	82	20018	20164	20328	
	83	20019	20166	20332	
	84	20020	20168	20336	
	85	20021	20170	20340	
	86	20022	20172	20344	
	87	20023	20174	20348	
	88	20024	20176	20352	
	89	20025	20178	20356	
	90	20026	20180	20360	
	91 🗸	20027 🗸	20182 ~	20364 🗸	
>	< >	< >	< >	< >	

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Note: To read slave device data, click Read in Slave Mapping List first and then view it in Mapping Register Data

4.8 Export Configuration File

 Click top left button Export Configuration File, select file saving path and enter file name



• After a while, configuration exporting success window will pop out

4.9 Load Configuration File

• Click top left button Load Configuration File and select the file to upload it.



Slave Mapping List Cellular network settin Self-Check Advanced functionsto Parameter settin Number setting Clock timer Period timer Mapping Regis	Note: do not during the up be used!!!	disconnect the pr pgrade process, ot	ower supply of the devi	e device ce will not	
Parameter setti Number setting Clock timer Period timer Mapping Regis	file		Select	Upgrade	
- Sector					
Firmware Upda				Losing :	configuration information is successful
					補正

• After a while, loading configuration success window will pop up

4.10 Factory Reset

 Once device is powered on, connect it with PC configuration software and click Factory Reset. After factory resetting notice box pops out, click confirm to complete it.



MODBUS to MOTT gateway BU	100 Courligueation Software VLD		0	*
Eload Configuration File	port Configuration File 📲 Factory Reset 🛛 anguage 🛄 About			
G Serial Port	Callular natesek sar tong 🗠 - rinavar a data 🗮			
Slave Mapping List				
Cellular network settig	Note: do not disconnect the power supply of the device			
G Self-Check	during the upgrade process, otherwise the device will not			
- Advanced functionsio	be used!!!			
Parameter cetti				
Auriber setting	File Select Upgrade			
Clock timer				
Concentration				
Manalan Basia				
napping negrs				
A S Himmare Upda				
		×	1	
	Is the device parameter i	nitialized initially?		
		-		
	a:	10:14		
c >				

5 Device Application and Cloud Connection Example

5.1 Transparent Transmission (DTU) Setting

BL100 has DTU function of transparent data transmission. Data sent to BL100 from server or cloud platform via cellular network will be forwarded to RS485 interface. Data received from BL100 RS485 interface will be sent to server or cloud platform via cellular network. Detailed operation procedures are as below:

(1) In Parameter Setting Page, set device ID



Serial Port	Serial Port 🗙 Parameter settings 🗙	Number setting \times		
Slave Mapping List	N	Nodify password	Read time	Sync time
 Cellular network settin Self-Check 	Basic information Device ID	(1~247)	Model No. BL100	Version 4EH11
Advanced functions(o	Device Description: BL100TEST		(60 Byte)	IMEI 863418051081537
Parameter setti	Add timestamp to alarm	SMS 🗹 Arm Auto	matically when power on.	Signal 25
Number setting	✓ Auto Arm after disarm:	1 Minute(S)	(0~9999)	
Clock timer	Timer Reporting SMS Content Settings			
Period timer	Add the following additional information	ion in the report SMS		
Mapping Regis	Arm Status	GSM Signal Value	Device ID	Device Description
Firmware Upda	Alarm SMS Content Settings			
	Add the following additional information	tion in the alarm SMS		
	Arm Status	GSM Signal Value	Device ID	Device Description

Note: Device connected to RS485 interface can not have the same ID as BL100 ID

(2) In Serial Port setting, select Transparent Transmission as RS485 mode. Baud rate, data bit, parity bit and stop bit must be the same as those of RS485 interface device parameters. Otherwise the communication will not be successful

MODBOS to MiQIT gateway BLIC Load Configuration File Exp Serial Port	or Configuration Software VI.0 ort Configuration File 📲 Factory Reset Language 📓 About Serial Port 🗙
 Slave Mapping List Cellular network settii Self-Check Advanced functions(o Parameter settii Number setting Clock timer 	Channel 1 Mode Baud Rate Data Bit Parity Bit Stop Bit 1 Notice: Chose ModBus RTU Master ModBus RTU Master ModBus RTU Slave 1 ModBus RTU Slave Notice: Notice:
Period timer Mapping Regis Firmware Upda	1. Scan Rate can't less than 200mS. 2. Timeout can't less than 200mS. 3. Slave Error ACK Time: Stands for Slave no response longer than ACK time, will send SMS to authorized phone numbers. Read Save
COM44	Device model:BL100 www.BLiiot.com



If there are multiple devices connected to RS485 interface, their parameters must be the same as BL100 parameters. For scan rate, timeout and Slave Error ACK Time, it's OK to keep the default setting.

(3) Click below Save button

(4) In configuration software, set cloud communication protocol to Modbus RTU. Other settings refer to <u>4.5.6 Other IOT Platform</u>

5.2 Modbus Master and Cloud Connection



BL100 can be connected to cloud platform or SCADA system via cellular network. Users can choose custom platform, King Pigeon Cloud 2.0, King Pigeon Cloud 3.0, Alibaba Cloud and HUAWEI Cloud.

If connecting it to King Pigeon Cloud, just click the selected platform in cellular network setting and enter Login Message (device serial number) provided by BLIIoT sales team. For other part, keep the default settings. Click Save to complete configuration easily.

Users can connect the device to private cloud via Modbus RTU,Modbus TCP and MQTT protocols. Refer to 5.2.5 MQTT Application for MQTT details

Cloud Connection Procedure:

(Step 1 & 2 are common and will not be repeated. Only Step 3 & 4 are different for different platforms.)

Step 1 Set serial port as Modbus Master in Configuration Software

Step 2 Set Slave Device Datapoint in Configuration Software

Step 3 Set Cloud Parameters in Configuration Software



Step 4 Set Device Datapoint in Cloud Platform

MAKE IIOT EASIER

5.2.1 RS485 Serial Port Mode Setting

(1) Set serial	port mode to Modbus RTU Master
MODBUS to MQTT gateway BL100	Configuration Software V1.0
🛃 Load Configuration File 🛛 🖣 Expor	t Configuration File 📲 Factory Reset 🛛 Language 🧃 About
 Load Configuration File Serial Port Slave Mapping List Cellular network setting Self-Check Advanced functions(optio Parameter settings Clock timer Period timer Mapping Register Firmware Update 	t Configuration File Factory Reset Language About Clock timer X Mapping Register X Period timer X Serial Port Channel 1 Mode ModBus RTU Master Data Bit ModBus RTU Master Data Bit Transparent transmission Stop Bit 1 Notice: 1. Scan Rate can't less than 200mS. 2. Timeout and tless than 200mS. 3. Slave Error ACK Time Stands for Slave no response longer than ACK Time, will send SMS to authorized phone numbers. Read Save
< >> COM44	Device Type:BL100 www.BLiiot.cn

(2) Set Slave Datapoint



Modbus to MQTT Gateway

- BL100

we Mapping List	序号	从机地址	数据类型	功能码	寄存器起始地址	映射寄存器数量	映射寄存器起始地址 即	期 寄存器结束地址 通	道
	1					Setting Sla	ave		- 🗆 X
llular network set	2								
lf-Check	3					-			
uppend functions	4					-			
vanceu functions	5					Slave S	erial Number	1	
	0					Slave A	ddress (Range 1~254)		
	0					Data T	/pe	Boolean V	ОК
	0					Made	a Farada a Cada	Boolean	Consul
	10					Wodbu	is runction Code	Word	Cancel
	11					Registe	er Starting Addr.	Integer	
	12					Mappi	ng Register Qty.	Double	
	13					Mappi	ng Register Starting Ad	dr. 64 🗸 🗸	
	14								
	15					Tips			
	16					1. Registe	r Starting Addr. : In Sla	ve, from which register	address starting to
						mapping	to RTU, no need to setu	up the end register add	ress, the RTU will
		Notice:	1.0		P 1 10 11 1	automatic 2 Mappin	ally calculate it according a Register Oby How r	ng to mapping register	Qty.
		2. Select a	adding de a blank line	vice, pis right cl	ick to add mapp	in RTU.	g register city now i	nany registers in slave	need to mapping to
		3. Max ac	dding 48 d	evices		3. Mappin	g Register Starting Ado	dr. : In RTU, from which	register address
						used to sa	we the mapping regist	er address value. No ne	eed to setup the end
						register Q	ty.	tornationally calculate it a	coording to mapping
	н	lold regist	ter Comma	nd	06 command	4. The Dat	a Type and Modbus Fu	inction Code of the ma	pping registers must
			Coil com	mand	05 command	X mod	£,		
			0011 00111				iy		

• Edit slave parameters:

Right click slave data type to enter setting page. High limit alarm, low limit alarm, alarm SMS content and recovery SMS content can be set. Tick Alarm SMS to enable it.

Celle										V	
Channel Self Name	Data Type	Ratio	Alarm Verify Time(0~65535)	Threshold high	Threshold low	High Alarm SMS	Low Alarm SMS	Recovery SMS	Enable Recovery	Enal	
Advoouble2025	DATA DOUBLE ABCDEFGH	1	2	0	0						
Double2026	DATA DOUBLE ABCDEFGH	1	2	0	0					13	
Double2026	A DATA DOUBLE ABCDEFGH	1	2	0	0						
Double2026	B DATA DOUBLE ABCDEFGH	1	2	0	0						
Double2027	2 DATA DOUBLE ABCDEFGH	1	2	0	0						
Double2027	DATA_DOUBLE_ABCDEFGH	1	2	0	0						
ouble2028	DATA_DOUBLE_ABCDEFGH	1	2	0	0						
Double2028	DATA_DOUBLE_ABCDEFGH V	1	2	0	0						
Double2028	DATA_DOUBLE_ABCDEFGH V	1	2	0	0						
Double2029	2 DATA_DOUBLE_ABCDEFGH V	1	2	0	0						
<									Q	>	3
			ОК	Cancel							

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 Once datapoint is set, click mapping register to read datapoint real-time value. Configuration before cloud connection is completed. The following procedure is to configure cloud connection.

5.2.2 King Pigeon Cloud Application

	onnection Fair	ameter					
IODBUS to MQTT gateway B	100 Configuration Software V1.0						
oad Configuration File 📲 8	sport Configuration File 🙀 Factory	Reset Language 鼠	About				
G Serial Port -	Serial Fort × Collular aste	urk setting #					
Slave Mapping List	PDuct -	VIDEOT 20			Other IOT		
Column to the second	KPHOT 3.0 (Modby	id (MQTT)	HuaWei Clouid	ALI Clould	Server		
Central network sets	Cellular Network Settings						
Sell-Check	Communication Protocol		Server	1 IP/DNS modbas	duip.com	(Max60)	
Advanced functions(o	Modbus RT	U Prate	Server Li	isten Port 6651	(0-65535)		
Parameter setti	Protocol TCP		Server	2 IP/DNS		(Max60)	
Number setting			Server Li	isten Port	(0-65535)		
×			Heartbea	et Interval 60	(1-9999 5)		
Clock timer			No Response	e Resend Times 3	 (1-9) 		
- Period timer	-						
- (@ Mapping Regis	Pis fill in the login message(d	levice ID of cloudLand cli	ik save	2			
Firmware Upda	Login Message ASCII	~	(Max60)	1			
	Cogn ACK Message ASCH	7.	(Meeto)				
	Logout Message ASCII		(50xAV)				
	Heartheat Message ASCII	q	(Max00)				
	Heartibeat ACK Message ASCH	- A	(Mar60)				
	Tanin Message Guanant Gend	Once When Logis Server					
					Λ		
					4		
	FAQ for settings please	refer to [Help] menu		Read	Save		
	< .						
3							
4		Device mo	deli8L100	www.B	Likot.com		
4 1		Device mo	del:BL100	www.B	Liot.com		
4 1	æ	Device mo	delaL100	www.B	Liot.com		

(4)Set Device Datapoint in Cloud Platform (for datapoint mark REGXXX details, please refer to Appendix 6.2 Mapping Register Address)





Set King Pigeon cloud modbus read & write command

CP Resident 1				Contract March			1	•		_
(TTP Presect)	-	lotal Renter	Second	Reve Address	Puestion Code		Deter Format	Sea the	Ryte Grain	Augus
e #10		141	-	¥	1 Peak and other		-			38
m tor	-	9	*****		Charleston -	20081	Heater Server 1.			20
AGET Protocol	Variable -	3220		N		1000	and the second s			1997
EP Praksiel		(P)	P#030128	$M_{\rm eff}$	Closel and with	21129	SPretton Spred II *		48:00	- 20
CP.SON Presmi		14	RECOOM	10 C	Sand pair with -	3057	Gillophon Floating (48-00 67-04	- 20
Cover Present						-				-
di-hit Postani		•								
Intel Presental										
laW Pranatal										
laW Pranacal										
Lakit Pratacal		h								
lafë Prancal		þ								
ayli Pranadi		þ								
of Panet		þ								
akê Parasal		þ								
akê Parasal		þ								
add Prenad		כ								
aw Prance		D								
add Prenad										
off Proses										
aw Pranci		D								
off Protocol)								

- Slave Address: Set BL100 device ID
- Function Code: select it according to slave type (refer to Appendix 6 Mapping Register Address for details)
- Bias: Add 1 to the address mapped to BL100 register. For example, if BL100 mapping register address is 64, then put 65 in cloud Bias
- Data Format: not necessary to set for boolean data. Select 16-bit, 32-bit, 64-bit data type according to actual status

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- Byte Order: numeric row datapoint sequence (For details, refer to Appendix 6.4 Read Mapping Register Address)
- > Acquisition Cycle: Interval of acquiring slave data

Once above setting is completed, device will be online after a while. Device datapoint status can be viewed from cloud.

M2M Monitoring Center				Cansole D	🔉 English 🍘 🕶
O Device name /ID Q	BL100 Serial Number HS70	55XN8YV16725Y			502
Al Equipment Alarm	HEG64 10:1644249	Connected Updated 2021/08/09 16:03:49		AmO	RT Curve : Hist Query->
	REG20000	☐ Connected Updated 2021/08/09 16:03:49	50 🛧 🛩	AmQ	RT Curve© Hist Query-}-
	REG20128 ID:1695078	Connected Updated 2021/08/09 16:03:58	60 🛧 🛩	AimQ	RT Curve은 Hist Query4-
G Carl	REG20256		80 🕆 🛩	AimQ	RT Curve () Hist Query 4
±					
> 分陽符 0.0					1
					l

5.2.3 HUAWEI Cloud Application

In above part, serial port and slave datapoint have been set. To configure HUAWEI Cloud parameters, it's necessary to create device in HUAWEI Cloud first and get device ID, secret key and service ID. Below is the procedure:

- (1) Create product
- (2) Register device
- (3) Get service ID, device ID and secret key
- (4) Copy service ID, device ID and secret key to configuration software and save it
- (5) Device is online in HUAWEI Cloud
- Create Product



	HUAWEI CLOUD	Console	9 Beijing4 +		Starth	Q Billing Center	Resources Servio	ce Tickets Enterprise IC	D License Support	English jinge123456 🕅	2
≡	IoT Platform		Products Description							2 Create Product	
	Device Edition Default Overview Products 1 Devices Rules Storage Management O&M •	• •	Besingtion 33 Children for particular is a collection of densities of particular series of the approximate by a device and marks in particular series of the approximate of the approximate of the approximate of the approximate of the approximate of the approximate of the approximate of the approximate of the approximate of the approximate of the ap	Create Product * Resource Space * Product Name Protocol	Default/app_lings132456_set To metals a new resource space, you can go to [10:100	• • • • •	×	hu a product model	Codec Codec Codec Tests Message charred	A DODU THE ADDA SHORE	
 ⊕ ⊕ ⊕ 	Resource Spaces IoTDA Instances Documentation API Explorer IoT Device Provisioning		Product Name Pr BL100/RE 61 BL100 60 BL100 60 10 Total Records: 3 ≤ 3 >	* Data Type * Manufacturer Industry * Device Type Advanced Settings	ISON BERARSHU Default RTU RTU Coltom Product (0 Decription		Cancel	Potocol Mort Mort Mort	හී Def	with Apy Jinper 123456 J. •) C Operation View Delete View Delete	6







Close the network platform	Th	e product/8L100	-		
The vision I		BL100 demonstration ID: 610 bc56c0ad1edo2863b648 register equipment Product name BL100 demonstration device type Gateway device json data type Manufacturer's name Iron and steel technology	Add the service to BLIDO Service type XXX ;		×
D	. •	The model Online ; Topic management		3/128	
Will Mr. And debugg	ing			Basic services	Electricity management services
σ			The command Set pressure readjoycle The cycle value The t (execution parameters panakreters)	Water temperature water	The residual voltage electricity is
		P ti	roduct cross type is used to describe de ne product model: if there is no definition Custom byild	rices have the ability and characteri of product model, equipment rep Upload the model file Ex- earn more	stics of the platform offers a variety of ways to define orted data platform only forwarded directly, do not do cel import import library model 1

Add Property: set data. Property name starts with REG. Select data type from boolean and numeric data. Property name is datapoint read-write mark. Refer to <u>6.2 Mapping Register Address</u> for details. For example, boolean slave mapping register address is 64, then property name is REG64

HUAWEI CLOUD Consol	tr ♀ Beijing4. ▼		Search	Q Billing Cente	er Resources Serv	ice Tickets Enterprise	ICP License Support English	jinge123456
IoT Platform	Products / BL100示范							
Construction Default	BL100示范 ID: 610bc55cc0ad1ed022863b5648	istered devices: 1	Add Property	255 411	Q	×		
Products	Device Type 网天设备	Protocol		REG+ Address o	of the slave reg	ister		
Devices .	Data Type json	Created	* Property Name	REGXXX				
Rules	Manufacturer 假锦科技		Description	XXXXX				
Storage Management	X				4/1	28		
A Resource Spaces	Online Debugging	Topic Management	* rata Type	Integer				
loTDA Instances	Add Service Import from Library I	nport from Local Import from Exce	* Access Permissions	Read Write			Learn About Proc	uct Models Export
Documentation	Service List	Service ID BL100 Service ypt	# Volum Range	[a]-	65535		Modify Serv	ce Delete Service
API Explorer 🧬	BL100		A value hange			1		
toT Device Provisioning ap		Add Property Batch D	Step			ation	Operation	
		REG64	Unit		/		Copy Edit De	lete
		REG20000		Cancel			Copy Edit De	lete
		REG128					Copy Edit De	lete
		REG20256	Integer		Readable	XOX	Copy Edit De	lete
		10 💌 Total Records: 4 🤇	1 2.					
		Add Command						
IoT Platform		****	n de la composición de					
	Product Name BL100元语	Resource Space	DefaultApp_jinge123456_)	ot				
Basic Edition Default	Device Type	Protocol	MQTT 2021/08/05 19:02:08 CMT	-03-20				
Overview	Manufacturer 個線科技	610000	ava ijugus rasaau anir					
Products 1								
Devices •	Model Definition Online Debugging	Topic Management						
Rules •	Add Service Import from Library Import	from Local Import from Excel					Learn About Product M	odels Export
Storage Management	Service List							
Resource Spares		Service ID BL100 Service Type XXX	Description XXX				Modify Service E	elete Service
IoTDA Instances	BL100 3	Add Property Batch Deletion						
Documentation		Property Name	Data Type	Access	s Mode	Description	Operation	
API Explorer	4	REG64	Integer	Reada	ble,Writable	风島	Copy Edit Delete	
IoT Device Provisioning		REG20000	Integer	Reada	ible	12.E	Copy Edit Delete	
		REG128	Integer	Reada	ible	XXX	Copy Edit Delete	
		REG20256	Integer	Reada	ible	XOX	Copy Edit Delete	

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Click Device to Register it

****	HUAWEI CLOUD	Console	Deling4			Snarch	Q Billing Center	Resources	Service	Tickets I	interprise N	CP License	Support E	nglish jing	e123456	2
	IoT Platform		All Devices	otal: 4 🔍 Activated: 4 🔍 Online: 0									2		dvidual Regis	uer
8	Elise Folton Default		Device List	Batch Registration E	atch Deletion File Uploa	ds							Anab	rze historical di	itato gain insig	pts.
m	Overview				Individual Register				×	All	•	Device Name	• Search		Q	с
0			Status 🕐	Device Name	,				t T			Node	Type	Operation		
0	Devices	1	Offline	BL100xx	* Resource Space 🕥	DefaultApp_jinge123456_iot		*	7 78			Direc	tly connected	View Delete	Freeze	
	Groups		© Offline	BLIOOR	* Product	BL100示范		٠	2			Direc	tly connected	View Delet	Freeze	
٢	Software/Firmware		© Offline	R40	* Node ID	BL100		Ø				Direc	tly connected	View Deleta	Freeze	
4	Upgrades		Offline	BL100								Direc	tly connected	View Deleti	Freeze	
\oplus	Device CA Certificates		10 - 1	Total Records: 4 (1)	Device Name	BL100										
©	Rules	* *			Authentication Type 💮	Secret X.509 certificate		1	Enter 8 to	32 characters	. Only letters,					
	Storage Management				Secret	Set your ow	n password		numbers, are allowe	typhens (-), a d. (Due to pro	nd underscores	۵ ۳				
	• MãO	*						_	number of	hexadecimal	values.)					
	Resource Spaces				Confirm Secret				-	_		_				
	IoTDA Instances					OK Cancel										
	Documentation	8						_								
	API Explorer	ď														
	IoT Device Provisioning	2														C

 Click OK to confirm it. Device Register Success notice box will pop out. Save below password and product ID

HEARING	HUAWEI CLOUD					2
H	IoT Platform		All Devices Total: 5 • Activated: 4 • Online: 0	,	tradividual Registe	-
	Coverview Overview Products Devices All Devices Groups Software/Firmware Upgrades Device CA Certificates		Device List Batch Registration Status Ø Device Name 0 Inache BL100x Offine BL100x Offine BL100x Offine BL100x Offine BL100x Offine BL100x	Batch Deleter Control of the second sec	All Device Name Samb Q Q Note Type Operation BL100/RE Directly connected View Delice Press BL100/RE Directly connected View Delice Press BL100 Directly connected View Delice Press	rts
۲	Rules Storage Management O&M • Resource Spaces IoTDA Instances Documentation API Explorer IoT Device Provisioning	• • • • •	10 • Stat Records 5 < 1 >	Save the device D and password for setting platform param	eters	

 Copy above device ID and secret and copy it to configuration software as below picture. Service ID is the same one that created in HUAWEI Cloud.



Serial Port	Serial Fart × Cellular network setting 🔀
Slave Mapping List	KPHIOT 3.0 KPHIOT 2.0 KPHIOT 2.0 HawWei Clouid ALi Clouid Other IOT Server
Cellular network setts	Cellular Network Settings
5elf-Check	Communication Protocol
Advanced functions in	HaaWei Cloud
References functionings	Testing of the second se
Parameter setti	
(Number setting	Migici North China(Bi V
	Heartbeat Interview and Company's SI
Clock timer	No Response Resend Times 3 - (1.9)
- Period timer	
Mapping Regis	
*	Authentication Method Device Serec -
Frmware Upda	Device ID (111120-2007) 2800900-0 B
	Genet Key 1224 95
	enice iD al.100
	Publish Period(S) d0 110-b3535 5)
	Device Certificate Update
	Device Private Kay Update
	MQTT Data retransmission Enable / disable
	FAD for settions always refer to Helph menu
	THE TAX PROPERTY AND ADDRESS OF TAXABLE PROPERTY AND ADDRESS OF TAXABLE PROPERTY.

 Once configuration is done, wait for device to be online. Once it's activated, data can be viewed by clicking property

musiants.	HUAWEI CLOUD		♥ Beijing4													Jinge123456	
≡	IoT Platform		(all														
0			Product Name	BL100示范			Resource Space	DefaultApp_jinge123456_iot									
0	Basic Edition Default		Device Type	网关设备			Protocol	MQTT									
0	Overview		Data Type	Json			Created	2021/08/05 19:03:08 GMT+08:00									
.001			Manufacturer	授锦科技													
0	Products																
	Devices		Model Defi	nition Onl	ine Debugging	Topic Management											
	Rules																
0	Storage Management		Add Service	Import fro	m Ubrary In	nport from Local Impo	rt from Excel							Learn Al	out Product I	Models Exp	ort
٢	0111 (1)		Service List		A C												
A	Uam .				00	Service ID BL100	Service Type XXX	Description XXX						Mo	dify Service	Delete Service	
_	Resource Spaces		RI 100													_	
	IoTDA Instances					Add Property	Batch Deletion										
0	Documentation	2.1				Property Nar	ne	Data Type	19	Access Mode	Descr	iption		Operatio	n		
	API Explorer	1				REG64		Integer		Readable,Writable	风度			Copy E	idit Delete		
						REG20000		Integer	3	Readable	温泉			Copy E	idit Delete		
	101 Device Provisioning	P				REG128		Integer		Readable	202			Copy E	idit Delete		
						REG20256		integer		Readable	XOX			Copy E	dit Delete		
						10 Total Pac	ante A 🖉 🚹										
						IN TOUR RED	July 4	<u></u>									
						Add Command											
						Aug command											
						Command Name		Command Parameters		Respor	se Parameters		Oper	ration			
										_							
										!							
										Q							

 Click Device-Device Debugging to view detailed device data sending and receiving.



Application Simulator Command S Service Command	command Determine Data Reporting Sand	Col lot Platform		Message Tracing	' «Sho
	Data Received Commands	Duta licewed Commands Sent	Duta Record Commands Set	Command Set	Image: Commands Setting Command Service • Command • Make Reporting • Command • Image: Command Delivery • Command • Image: Command Delivery • Image: Command Deli

5.2.4 Alibaba Cloud Application

As stated above, serial port mode and slave device datapoint are set. It will not be repeated here. Before configuring Alibaba Cloud, it's necessary to create product in Alibaba cloud, add device and get device certificate, which is similar to configuring HUAWEI Cloud.

Step: Create product-Add Device-Get Certificate-Create Alibaba Cloud Data Point-Publish Device-Set Cloud Connection in Configuration Software-View Device in Cloud



Create Product (Login to Alibaba Cloud Console) ٠



Modbus to MQTT Gateway

- BL100

3 C - ali cloud workber	nch 2 east Chin	a (Shanghai),		Qq search	cost
Please public instance	New features, t	he 2021-07-30 announcement: the Internet of things platform release	I Check details		
Equipment management 🔨	The Internet of	things platform/product management/create products			
product	- to cre	ate products			
equipment			Nou have successful		oducte
grouping			then you can:	ly completed to create ph	ouucis,
task	S +	Add equipment			
The CA certificate		Device belonging to a product specific equipment, under the Internet of things platform platform, can also be used as a device through the gateway connecting Internet platform	n for equipment products in the only certificate DeviceName, de m	wices can be connected directly to the Inter	net of things
The rule engine \checkmark		To add			
Monitor the operationa	al eye	For the product definition model			
Equipment classified 🗸 🧹		Iot platform support for the product definition model, the actual p	roduct into abstract of the sex, services, events	, data model, is advantageous fo ducts under the device will autom	r the cloud ful atically
The data analysis of concave		ini To define the model	anon, you can donne content model, to it pro-		uncuny
Video service 🗸 🗸					
Documentation and tools			Straight see th	rns the list of products	

•	Add	Device
•		

ud	🖨 Workbanch China (Shanghai) 🗠				Expenses Tickets	ICP Enterprise Support App 🖾 🗘 🗑 🕅
	IoT Platform / Devices / Devices					
	Devices					
	Al	Total Devices @	Activated Devices	Coline		
		2	2	0		
	Device Lift Batch Management	Advanced search	Add Device 💿	×		
	Add Device Batch Add Device	lame 🌱 Enter DeviceNa	Note: You do not need to specify Device	Name. If DeviceName is not		
	DeviceName/Alias	Product Not	specified, Alibaba Cloud will issue a uniq as DeviceName.	ue identifier under the product		Actions -
	BL100x	BL100xx Get	Products	1, 09:10:56.8	83	View Delete Sub-device(0)
	BL100SDEVICE	BL100 Sat	BL100xx	× 1.18.18.17.2	76	View Delete Sub-device(0)
			DeviceName			
			X000X			
			Alias ()			
		, L	x004			
				OK Cancel		
		A Wettom Decet Hungler Decet Decet	d a Worksteern (Chine diblanghei) ~		Image: Control (Management) Image: Control (Management) Image: Control (Management) State Dences (I) Image: Control (Management) <td< th=""><th>Image: Control (Control (Contro</th></td<>	Image: Control (Control (Contro

 Once device is added successfully, it can be viewed in console by clicking view. Click Copy to save it on desktop for following configuration

E C-J Alibaba Cloud	S Workbench Ch	ina (Shanghai) 🛩				Expenses Tickets ICP	Enterprise Support App 🖬 🍐	₩ 🕐 EI
← Public Instance	IoT Platform / Devices /	Devices / Device Details						
Devices ^	← BL100xx	Offline						
Products	Products BL10	hox View		DeviceSecut	View			
Devices	Device Information	Topic List TSI Data Devic	ce Shadow Manage Files			Task		
Groups	Device Information		Device Certificate		~			
Jobs	Device internation		Device Certificate	/				
CA Certificate	Product Name	BL100xx	bence certificate copy	-		Region	China (Shanghai)	
Rules ~	Node Type	Gateway	ProductKey	a1TVShKjEJV Copy		Authentication Mode	Device Secret	
Maintenance ~	Alias 💿	示例表示 Edit	DeviceName	BL100xx Copy		Firmware Version		
Link Analytics	Created At	Aug 6, 2021, 11:19:37	DeviceSecret	8f7e3d6b741065b8023c1e15bd3ce25b Copy		Last Online	Aug 9, 2021, 09:10:56.883	
Link Visual 🗸 🗸 🗸	Current Status	Offline	Certificate Installation N	vlodes		Device local log reporting	Disabled	
Documentation and Tools	More Device Information	on	Introduction to the unique	certificate-per-device and unique-certificate-per-product mo	odes -			
	SDK Language			3100	Close	Module Manufacturer		
	Module Information							
	Tag Information	∠ Edit						

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- Create Data Point
- Product--Device--Add Self-defined Features
- Feature Name: Custom set it, like fan, light, temperature, light intensity, etc
- Identifier: REG (XXX), put the corresponding mapping register according to datapoint to be added. Refer to <u>6.2 Mapping Register Address</u> for more details. For example, boolean slave mapping register address is 64, then identifier is "REG64"
- > Data Type: Boolean, Numeric, select it from drop-down menu.
- Read/Write Type: Tick Read/Write or Read-only according to actual status
- > Description: provide any necessary description, can be blank

E C-J Alibaba Cloud	🛱 Workbench China (Shar	nghai) v		Q Search	Expens	ses Tickets ICP Enterprise Supp	ort App 🖾 🗘 🗑 🕐 EN 🎯
← Public Instance	IoT Platform / Devices / Produc	cts / Product Details					
Devices ^	← BL100xx						Publish
Products	ProductKey a1TVShKjEJV	Сору		ProductSecret	····· View		
Devices	Draduct Information	in Colombia	Data Daving Server side Subscript	ing Device Provisioning			
Groups	Produce information	Categories Denne Peator	e Data Parsing Server-side Subscript				
Jobs	What is currently displayed is	the function definition that has been	posted online. If you need to change it, please clic: E	dit Draft			
CA Certificate	TSL Model Build device-sid	ie code					
Rules V	Enter a module name Q	Default Module					
Resource Allocation	Default Module	Feature Type	Feature Name(all) 💟	Identifier 14	Data Type	Data Definition	Actions
Link Analytics	<	Properties	AAA (Custom)	REG20128	Int32	Value Range: 0 ~ 65535	View
Link Visual 🗸 🗸 🗸		Properties	CCC Custom	REG20256	Double	Value Range: 0 ~ 65535	View
Documentation and Tools		Properties	Rutt Custom	REG64	Boolean	Boolean value: 0 - 关 1 - 开	View
		Properties	物理位置(Required)	GeoLocation	Struct		View
😑 C-J Alibaba Cloud	중 Werkbench China (Shar	gha) ×		Q Beach	s	nes Tickets ICP Enterprise Sup	001 Aco 프 슈 포 ③ EN ④
← Public Instance	SoT Platform / Devices / Produc	ts / Product Details / Define F	Add Self-defined Feature		×		
Devices ^	← Edit Draft		Properties Services Events				
Products	Product Name BL100xx		* Feature Name ()		TTVSHGE/V Copy		
Devices	You are editing a draft. You ne	ed to click Publish to apply the TSL n	Enter the feature name		_		
Groups	Import TSL Model V	iersion History 😒	* Identifier Enter an identifier				?
Jobs	Enter a module nar Q +	Default Module	* Data Type				
Rules	Default Module	Add Standard Feature Add	int32				
Maintenance 🗸	+ Add Module	Feature Type	Feature Value Range	~ Max	lype	Data Definition	Actions
Resource Allocation		Properties	AAA (C			Value Range: 0 – 65535	Edit Delete
Link Analytics 🖾		Properties	CCC (2 Please input step		*	Value Range: 0 - 65535	Edit Delete
Link Visual 🗸 🗸		Properties	Unit Unit			Boolean value 0 - #	Edit Delete
Documentation and Tools			* Read/Write Tune			1-开	
		Properties	記憶位置 ● Read/Write 〇 Read-only				Edit
			Description Enter a description	0/	100		P 6
E Feedback	Release online Back			OK Cano	cel		

 Publish Device Data Once data point is created, click Release Online



E C-J Alibaba Cloud	🛱 Workbench China (Sha	inghai) ~		Q Search	Expense	es Tickets ICP Enterprise Supp	ort App 🖾 🗘 🗑 🕄) en 🙆
← Public Instance	IoT Platform / Devices / Produ	icts / Product Details / Define P	eature					
Devices ^	← Edit Draft							
Products	Product Name BL100xx			ProductKey	a1TVShKjEJV Copy			
Devices	You are editing a draft. You n	eed to click Publish to apply the TSL i	nodel.					
Groups	Import TSL Model	Version History 🗸						?
Jobs	Enter a module nar Q +	Default Module						
CA Certificate		Add Standard Feature Ad	d Self-defined Feature					
Rules V	Default Module	Feature Type	Feature Name(all) 💟	Identifier 11	Data Type	Data Definition	Actions	
Maintenance ~	+ Add Module	Properties	AAA Custom	REG20128	Int32	Value Range: 0 ~ 65535	Edit Delete	
Resource Allocation V		Properties	CCC (Custom)	REG20256	Double	Value Range: 0 ~ 65535	Edit Delete	
Link Visual ~ Documentation and Tools		Properties	风塘(Custom)	REG64	Boolean	Boolean value: 0 - 关 1 - 开	Edit Delete	
		Properties	地理位置(Required)	GeoLocation	Struct	•	Edit	
E feedback	Release online Back							E.

Click Publish to enter below dialogue. Tick it and confirm it by clicking Accept

	ta workbench China (Sha	angnai) 🗸			Expenses novers ICP Enlerprise S	NODDOLL YOD EN EN EN EN
← Public Instance	IoT Platform / Devices / Produ	acts / Product Details				
Devices ^	← BL100xx					Publish
Products	ProductKey a1TVShKjEJV	Сору		ProductSecret View		
Devices Groups	Product Information To	pic Categories D	Publish		×	
Jobs	What is currently displayed in	s the function definition t	You are publishing the following products: BL100xx			
CA Certificate	TSL Model Build device-si	ide code	Published products will transition from the development stage to either the prod	uction stage or implementation stage.		
Rules ~	Enter a module name Q	Default Module	Please confirm that all product information and device features meet the prerequisit	es for publishing:		
Maintenance ~	Default Module	Feature Type	Step 1 Check whether the product information is correct. Y	ou cannot modify or Confirmed 🥪	Data Definition	Actions
Resource Allocation V	c	Properties	Make sure that all features of the device have been	debugged. After the	Value Range: 0 – 65535	View
Link Analytics 🗠		Properties	Step 2 product is published, you can only modify the feature upgrade.	res through OTA Confirmed 🥪	Value Range: 0 ~ 65535	View
Documentation and Tools		Properties	Step 3 Make sure that the product is ready for publishing a in batches.	ind can be deployed Confirmed 😔	Boolean value: 0 - X 1 - TT	View
		Properties		Publish Cancel		View

• Set Cloud Connection in Configuration Software: Copy the data saved on desktop and paste it in configuration software. It can be viewed from Alibaba cloud device view page as well.

E C-D Alibaba Cloud	A Workbench Ch	ina (Shanghal) 🗡				Exp	enses Tickets ICP	Enterprise Support App 🖾 🛕 🙀 (
← Public Instance	IoT Platform / Devices /	Devices / Device Details						
Devices ^	← BL100xx	Offline						
Products	Products BL10	bo View			DeviceSecret ******	View		
Devices	Productkey allV	shkjeJV Copy						
Groups	Device Information	Iopic List ISL Data	Device Shadow Manage Files	Device Log Online Debug	Sub-device Management	Groups last		
Jobs	Device Information		Device Certificate			×		
CA Certificate	Product Name	BL100xx	Device Certificate Copy			78	legion	China (Shanghai)
Rules 🗸	Node Type	Gateway	ProductKey	a1TVShKjEIV Copy		4	luthentication Mode	Device Secret
Maintenance 🗸 🗸	Alias 🔘	示例演示 Edit	DeviceName	BL100xx Copy		F	irmware Version	
Resource Allocation V	Created At	Aug 6, 2021, 11:19:37	DeviceSecret	8f7e3d6b741065b8023c1e15bd3ce25b	Сору		ast Online	Aug 9, 2021, 09:10:56.883
Link Visual 🗸 🗸	Current Status	Offline	Certificate Installation I	Modes		E	Device local log eporting	Disabled
Documentation and Tools	More Device Informati	on	 Introduction to the unique 	e-certificate-per-device and unique-certificat	te-per-product modes			
					Clos	e		
	Module Information							
	Tag Information	Z Edit						

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Enter above parameter in configuration software and click save to complete it. Return to Alibaba cloud and wait for device to be online

Serial Port	Serial Port X Cellular network setting 🗙
Slave Mapping List	KPIIOT 3.0 KPIIOT 2.0 KPIIOT 2.0 (Modbus) (MQTT) HuaWei Clould ALi Clould Server
Cellular network setti	Cellular Network Settings
Self-Check	Communication Protocol
Advanced functions(o	ALi Cloud 🗸
Parameter setti	Protocol TCP 🗸
	Region North China 1 🗸
Number setting	Heartbeat Interval 60 (1-9999 S)
Clock timer	No Response Resend Times 3 (1-9)
Period timer	
Mapping Regis	
	Authentication Method Device Seri
Firmware Upda	Product Private Key
	Device Name
	Device Private Key
	Pablish Period(3) 60 (10 65535 5)
	MQTT Data retransmission Enable / disable
	FAQ for settings please refer to [Help] menu Read Save
	FAQ for settings please refer to [Help] menu Read Save

 Before device is online, it's inactivated. Once it's connected successfully, the status will be online like below picture.

O E cloud work in eas	t China (Shanghai) 2 v			Qq searc	h	Charge the repair order ICP chamber enterprises
 ←^{Public} instance equipment management 	The 02021-07-30 announcement: the Internew features! See the mood The Internet of things platform/facilities	rnet of things platform relea	sed			
product	All the products	Equipment number 0	• the activation device	e, the current online 0 1		
grouping task	Batch management advanced searc	h				
The CAscertificate	Add a flu Batch adding DeviceName Mouth DeviceName/children's name	Please enter the DeviceNa Not for their products	Node clasg	State/enable jie mouth	The last time online	operatio
i ^{See the} li ^{pu} ~	BL10OSDEVICE ali cloud testing	BL100	The gateway	e online	2021/08/04 18:18:17-27	6 Children watch
Real-time monitoring	Peng 1 with enable					
Online debugging						
Equipment simulator						
OTA upgrade						
Remote configuration						

Data point read-and-write can be performed in device online debug page.



Public Instance	Online Debug		
ices ~	Select device: BL100xx V BL100xx V		
в 🗸	Online debugging only supports debugging real equipment, please use Device	Real-time Logs Online	Auto-Refresh 🌒 C
ntenance ^	virtual equipment debugging	Time	Content
eal-time Monitoring	Property Debugging Service Calls Remote Login	1002	Constant
ishboard	Module: Default Module V	TSL Aug 9, 2021, 17:18:52:558	["Statu"/false "Instanced" "Instanced" "Instance" ("REGENT VERSED000"/S0.9) EVEPTIVENT 10.9 (REG20128/M0.0) EE00259/M0.0] "Time" 20 21-06-09 T176-2535" Operation "Context" Confer "Statist" ("ReGeNT VERSED000"/S0.9) EVEPTIVENT 10.9 ("REG2029/M0.0] "Time" 20 21-06-09 T176-2535" Operation "Context" Confer "Statist" ("ReGeNT VERSED000"/S0.9) EVENT 10.9 ("REG2029/M0.0] 2009/INDEb000000" ("Realiblat") "REG20000/V/S02- property not found" ("REF1/FWR") V202- property not found" ("REF1/FWR") 2009/INDEb000000" ("Realiblat") "REG2000/V/S02- property not found" ("REF1/FWR") V202- property not found" ("REF1/FWR") V202- statist") ("REF1/FWR") ("R F1/FWR") ("REF1/FWR") ("REF
line Debug	加速(空間(Latitude) の	•	ceName*/BL100x/",Messageld*/")
rice Simulation	Enter a parameter (double)	物模型消息	["Status": "true", "Instanceld": "Iot-public", "Params": ", "Time": "2021-08-09 17:18:52.553", "Operation "://syt/a1TV5hKjEIV/BL100x/thing/event/property/s
ice Log	地理位置(Altitude)	Aug 9, 2021, 17:18:52.553	Scole 100 (Hestor) - Victure 100 (Hestor) - Victure 100 (Hestor) - Victor Victor) - Victor Vi Victor Victor Vic
A Update	Enter a parameter (double)	· · · · · · · · · · · · · · · · · · ·	
note Config	地理位置(CoordinateSystem)		
ert Center	Please select a parameter (enum)		
rce Allocation \sim	风殿(REG64)	1	
nalytics 🖸	开-1 V Debugging	~	
isual 🗸	CCC(REG20256)		
	80.0 Debugging	×	
nentation and Tools	AAA(REG20128)		
	70 Debugging	~	

5.2.5 MQTT Application

MQTT Principle

There're 3 roles in MQTT protocols: Pulisher, Broker(Server) and Subscriber. Message publisher and subscriber are client. Message broker is server. Publisher can be subscriber at the same time. Below is the example of connecting BL100 to King Pigeon Cloud 2.0:





Modbus to MQTT Gateway

- BL100

Serial Port	Berial Pert ×	Callular nateork sett	ing 🔀						
Slave Mapping List Cellular network setti	KOPINOT 3.0	KPIIOT 2.0 (Modbus)	KPHOT 2.0 (MQTT)	HuaWei Clould	ALI Clould	Other IOT Server			
	Cellular Network Se	rtlings							
Self-Check	Communication	Protocol		Server	1 IP/DNS regituits	ipucoim	(Max60)		
Advanced functions(o		MQTT Protocol		Server L	isten Port 1883	(0-65535)			
Parameter setti	Protocol	TCP		Server	2 IP/DNE		(Max60)		
-				Server L	isten Port	(0-65535)			
Number setting				Heartber	t Interval 00	(1-9999 5)			
Clock timer				No Respons	e Resert Times	~ ct-9)			
Period timer				0.000		10000			
*									
Mapping Kegs					Wight settings				
- (@) Firmware Upde					subscribe Topa	6			
					Publish Topi	5		-	
					MQTT Client II	D			
					MOTT User Nam	MQTT .		1.0	
					MOTT Passage	A MOTTEN			
					0.45.4 D. C. 40	len lin	n 455235 P		
					Pucket Period(s	1 00	n-00033 20		
					MQTT Data reb	ansmission 🗆 Enab	sle / disable		
					Tips: Only use	MQTT Protocol requ	ire to setup.		
						_	_		
	FAQ for se	ttings please refer to	(Help) menu		Read	Save			
								-	

• Create device and data point in King Pigeon Cloud



 Read-Write identifier setting. Slave identifier starts with REG plus mapping register. Refer to <u>6.2 Mapping Register Address</u> for details

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Data View and Dissemination

M	Monitoring Center						
		D, SReturn B	L100 Serial Number	HS765XN8YV16725Y			
	All Equipment Alarm 0 Unline		G64	connected		ON	
	◇ 默认组		G20000				
Å	R 40		1644865	Updated 2021-08-09 16:07:44		50 个 🛩	
• •	S270	RE ID:"	G20128 1695078	♀ connected Updated:2021-08-09 16:07:44		60 🛧 🛩	
G	BL100	n RE	G20256	♀ connected		PD	
	M161	6 ID.:		Updated.2021-08-0 Data Disseminati	on — 🖾	×	
	· 并进模块475测试			100			
1	EC200模块测试5208E						
	R1098读						
	> 分隔符 (Carter		
					Contient		
				u de a Dudulia bia			
<u> </u>					<u>ig messac</u>	je	
Ρ	ublishing Topic: Se	rial Numb	er(same a	s the configured	publishing	topic)	
	{ "sensorDatas": [
I	//B	oolean va	alue				
	"flag": "REG64", // Read-Write Identifier						
	"switcher": 1//Data Type and Value						
	},						
	{						
	//Numer	TC Type					
	"Tiag": "H	KEG20000)", // Kead-\	write identifier			
	Page 58 of 68 Page	es	Shenzhe	n Beilai Technol	ogy Co., Lte	d.	



"value": 30 //Data Type and Value

1,

}

"state":"alarm", //Alarm Identifier (Only exist when Alarm & Event is configured and alarm is triggered. It's not included in scheduled regular reporting) "state":"recovery", //Alarm Recover Identifier (Only exist when there's alarm recovery. It's not included in scheduled regular reporting)

"time": "1622700769", //**Time Identifier**, timestamp of data publishing "retransmit": "enable" //**Re-transmission Identifier** (only exist when there's historical data re-transmission. It's not included in scheduled regular reporting)

Note:

//Read-Write Identifier: character is"flag", followed by datapoint MQTT identifier, (The same MQTT identifier set in adding datapoint, can be customized) //Data Type and Value: can be categorized as below:

1.Boolean data: character is "switcher", followed by "0" or "1" (0 is open, 1 is closed) 2. Numeric Data: Character is "value", followed by actual value

//Alarm, Recovery Identifier: character is "state", followed by "alarm" or "recovery" (alarm is alarm data, recovery is alarm recovery data)

//Time identifier: character is "time", followed by actual timestamp of data reporting

//Re-transmission Identifier: character is "retransmit", followed by "enable"

Device offline data will be saved temporarily. Once network resumes, it will be re-transmitted. Identifier "retransmit" refers to historical data (need to be enabled in configuration software)

• Valid Payload Data Format in Device Subscribing Message

Subscribe Topic: Device Serial Number/+ (same as the subscribe topic in configuration software)

(King Pigeon Cloud 2.0 use "device serial number/sensor ID" as publishing topic. Thus Subscribe Topic must add wildcard character /+ to realize device control from cloud

```
{
    "sensorDatas":
    [
        {
            "sensorsId": 211267, //Cloud Senor ID
            "switcher":1, //Data Type and Value
            "flag":"REG65" //Read-Write Identifier
        }
        ],
        "down":"down" //Cloud Downlink Message Identifier
```

Note:

//Cloud Sensor ID: character is "sensorsID", followed by ID number (ID is generated by cloud automatically. Ignore this part for selt-built cloud platform) //Data Type and Value. Can be categorized as below:

1. Digital Data: character is "switcher", followed by "0" or "1" (0 is open, 1 is closed)

2. Numeric Data: character is "value", followed by actual value

//Read-Write Identifier: character is "flag", followed by datapoint MQTT identifier

//Cloud Downlink Message Identifier: character is "down", followed by "down", it's cloud mapping register slave mapping address identifier

Item Name	MQTT Read-Write Identifier	Data Type
Boolean Data Type	REG64~127	Switcher
16-bit Data Type	REG20000~20127	Value
32-bit Data Type	REG20128~20254	Value
64-bit Data Type	REG20256~20508	Value

5.2.6 Self-Defined Cloud Platform

BL100 supports customer self-defined cloud platform with Modbus RTU, Modbus TCP and MQTT protocol.

Custom MQTT protocol data format is the same as King Pigeon Cloud 2.0 MQTT data format. Refer to <u>5.2.5 MQTT Application</u> for more details. Modbus RTU and Modbus TCP are standard Modbus protocols. Refer to Appendix 6.3, 6.4 and 6.5 for message data details.

Operation Procedure is the same as above:

- (1) configure serial port mode
- (2) Create slave device datapoint
- (3) Configure self-defined cloud platform parameters Refer to below picture
- Cellular Network Setting- Select Other IOT Server-Select Communication Protocol-Enter Server IP/Domain Name and port number. Click Save.

Load Configuration File	configuration File 📲 Factory Reset Language 🕼 About	0	^
Serial Port	Seriel Port × Cellular network setting 🗙 Self-Check ×		
Slave Mapping List	KPIIOT 3.0 KPIIOT 2.0 KPIIOT 2.0 HuaWei Clould ALi Clould Other IOT Server		^
Cellular network setti	Cellular Network Settings		
Self-Check	Communication Protocol Server 1 IP/DINS mqtt.dtuip.com (Nax60)		
Advanced functions(o	MQTT Protocol Server Listen Pdrt 1883 (0-65535)		
Parameter setti	Protocol Disable Server 2 IP/DNS (Max60)		
Number setting	Modbus TCP Protocol Server Listen Port 0 (0-65535)		
	HuaWei Cloud Heartbeat Interval 60 (1-9999 S)		
	ALi Cloud No Response Resend Times 3 (1-9)		
Period timer			
Mapping Regis	MQTT Settings		
Firmware Upda	Subscribe Topic		
	Publish Topic		
	MQTT Client ID		
	MQTT User Name MQTT		
	MQTT Password MQTTPW		
	Publish Period(S) 60 (10-65535 S)		
	MQTT Data retransmission 🔲 Enable / disable		
	Tips: Only use MQTT Protocol require to setup.		
	EAO for settings please refer to Helph menu Read		
	The for settings prease refer to preipt menta		
د >	<		>
COM52	Device Type:BL100 www.BLiiot.cn		

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Modbus to MQTT Gateway



6 Appendix Register Address

6.1 BL100 Device Register Address

• Hold Register Type, Read-Write, support function code 03

Register Addre	ess	Data Nama	Data Tuna	Description	
Hexadecimal	Decimal	Data Name	Data Type	Description	
22A	554	Signal Value	16bit int	Y=X	

• Input Register Type, Read-Only, support function code 04

Register Address		Data Nama	Data Tuna	Description®	
Hexadecimal	Decimal	Data Name	Data Type	Description	
0	0	Power Supply Voltage	16bit int	Y=X/100	

6.2 Mapping Register Address

Note: expanded I/O identifier is: "REGx"(x is Modbus register address)

Mapping Register Address		Data Name	Read-Write Identifier	Data Type	Description [®]	
Hexadecimal	Decimal					
40	64	Bool 64	REG64	Bool	Boolean bit	
41	65	Bool 65	REG65	Bool	type,can map	
42	66	Bool 66	REG66	Bool	slave input coil	
				Bool	and hold coil	
				Bool	status. Total 64	
7F	127	Bool 127	REG127	Bool	addresses	

Boolean slave mapping register address: hold coil, function code 01/05/15

 16-bit data type slave mapping register address: hold register, Read-Write, support function code 03/06/16

Mapping Register Address		Data Name	ata Name Read-Write		Description	
Hexadecimal	Decimal		Identifier		·	
4E 20	20000	16-bit data 20000	REG20000		Set mapping rule according to	
4E 21	20001	16-bit data 20001	REG20001	Order AB, actual data type	configuration software. Data order is AB and saved in the address for	
4E 22	20002	16-bit data 20002	REG20002	is decided by slave mapped		
				data	Read-Write in cloud.	
					register and hold	

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		-		-
4E 9F	20127	16-bit data 20127	REG20127	register. Total 128 addresses

 32-bit data type slave mapping register address: hold register, Read-Write, support function code 03/06/16

Mapping Register Address		Data Nama	Read-Write		Description
Hexadecimal	Decimal	Data Name	Identifier	Data Type	Description
4E A0	20128	32-bit data 20128	REG20128		Set mapping rule
4E A2	20130	32-bit data 20130	REG20130	Order ABCD,	configuration
4E A4	20132	32-bit data 20132	REG20132	actual data	software. Data
				decided by	and saved in the
				slave mapped data	address for Read-Write in
4F 1E	20254	32-bit data 20254	REG20254		cloud. Total 64 addresses.

♦ 64-bit data type slave mapping register address: hold register, Read-Write, support function code 03/06/16

Mapping Register Address		Read-Write		Doto Turno	Description
Hexadecimal	Decimal	Data Name	Identifier	Data Type	Description
4F 20	20256	64-bit data 20256	REG20256		Set mapping rule
4F 24	20260	64-bit data 20260	REG20260		configuration
4F 28	20264	64-bit data 20264	REG20264		software. Data
				H, actual	ABCDEFGH and
				data type is decided by	saved in the
50 1C	20508	64-bit data 20508	REG20508	decided by slave mapped data	Read-Write in cloud. Can map slave input and hold register. Total 64 addresses

6.3 Edit Boolean Mapping Address Data

If it's necessary to control relay connected to RS485 slave, function code 15 for slave writing must be added in slave list of configuration software. Once mapping address is changed, RS485 slave address data will be written accordingly.

Message Forma	at from Master S	tation	
Manager Orestant	Durte Oto	Data	

Message Content	Byte Qty	Data Example	Description
Device Address	1	01H	Device 01H , range: 1-247, follow the set

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			address
Function	1	05H	Write single hold coil, use function code 05H
Boolean Mapping Register Address	2	00 40H	Range 00 40H-00 7FH, refer to <u>Appendix B Mapping Register</u> <u>Address</u> for details.
Written Value	2	FF 00H	Value is FF 00H or 00 00H. FF 00H is writing 1, 00 00H is writing 0
16 CRC Check	2	8D EEH	CRC0 CRC1 low byte is in front of high byte

Returned Message Format from device:

Content	Byte	Data Example	Description
Device Address	1	01H	Device 01H, same address as received
Function	1	05H	Write single hold coil
Boolean Mapping Register Address	2	00 40H	Range: 0040H-007FH
Written Value	2	FF 00H	Value is FF 00H or 00 00H. FF 00H is writing 1, 00 00H is writing 0
16 CRC Check	2	8D EEH	CRC0 CRC1 low byte is in front of high byte

 Example: change value of Boolean mapping address 64, change it to 1: Server sends: 01 05 00 40 FF 00 8D EE Note:

01: Device Address

05: Write Boolean value

- 00 40: Mapping Address of value to be changed
- FF 00: Write 1

8D EE : 16-bit CRC check

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

Note:

01: Device Address

05: Write Boolean Value

00 40: Mapping Address to write value

FF 00: Write 1

8D EE : 16-bit CRC Check

If more values to be changed, please refer to details of function code 15 in Modbus protocol.

6.4 Read Numeric Mapping Address Data

Content	Byte	Data Example	Description		
Device Address	1	01H	Device 01H, Range 1-247, same as the set address		
Function Code	1	03H	Read hold register, use function code 03		
			_		

Message Format from Server Master:

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Starting Address of Mapping Register	2	4E 20H	Numeric data mapping address range,refer to <u>Appendix B Mapping</u> <u>Register Address</u> for details
Qty of Mapping Registers to be Read	2	00 0AH	Qty of input registers to be read
16 CRC Check	2	3D 2FH	CRC0 CRC1 low byte is in front of high byte

Return Message Format from Device

Content	Byte	Data Example	Description
Device Address	1	01日	Device 01H, same device ID as that in
Device Address	Ι	UIII	received message
Function Code	1	03H	Read hold register
Return Data Byte	1	14H	
		00 14 00 1E 00	
Poturn Doto	20	28 00 32 00 4B	Potura data
Retuin Data	20	00 41 00 0A 00	Retuin data
		25 00 14 00 2AH	
16 CRC Check	2	FB 34H	CRC0 CRC1 low byte is in front of high byte

• Example: mapping address starts with 20000 and read 10 addresses data:

Server sends: 01 03 4E 20 00 0A D3 2F

Note:

- 01: Device Address
- 03: Read hold register
- 4E 20: Starting address of mapping register, current data is decimal 20000
- 00 0A: Read 10 registers' value
- D3 2F: 16 -bit CRC check

Device returns: 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

Note:

01: Device Address

03: Read hold register

14: Return 20 bytes

00 14 00 1E 00 28 00 32 00 4B 00 41 00 0A 00 25 00 14 00 2A; Return data

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

FB 34 : 16 -bit CRC Check

6.5 Edit Numeric Mapping Address Data

To change data of slave device connected through RS485, it's necessary to add read-write function code 16 in slave list of configuration software. Once mapping



address value is changed, the corresponding address data of slave connected through RS485 will be changed accordingly

For example, mapping address is 20000 and slave mapping data is signed integer type and order is AB

Content	Byte	Data Example	Description
Device Address	1	01H	Device 01H, range: 1-247, same as the set address
Function Code	1	06H	Write single hold register, use function code 06
Mapping Register Address	2	4E 20H	Address range: 4E 20H-50 1CH, refer to <u>Appendix</u> <u>6.2 Mapping Register Address</u> for details of mapped data address range
Written Data	2	00 64H	Data example, write decimal data value 100
16 CRC Check	2	9E C3H	CRC0 CRC1 low byte is in front of high byte

• Message Format from Sever Master Station:

Return Message Format from Device:

Content	Byte	Data Example	Description
Device Address	1	01日	Device 01H, same as the address in
Device Address	Address		received message
Function Code	1	06H	Write single hold register
Mapping Register Address	2	4E 20H	Address range: 4E20H-501CH
Written Data	2	00 64H	Write 100 successfully
16 CRC Check	2	9E C3H	CRC0 CRC1 low byte is in front of high byte

 Example: if mapping address is 20000 and slave mapping data is signed integer type with AB order, change mapping address 20000 value to 100:

Server sends: 01 06 4E 20 00 64 9E C3

- Note:
- 01: Device Address
- 06: Change single hold register value
- 4E 20: Change value of register address 20000 register
- 00 64: Write decimal value 100
- 9E C3: 16-bit CRC check

Device returns: 01 06 4E 20 00 64 9E C3

- Note:
- 01: Device Address
- 06: Change single hold register value
- 4E 20: Change value of register address 20000
- 00 64: Change to decimal value 100
- 9E C3 : 16 -bit CRC check

To change more numeric data type mapping address, please refer to details of function code 16 in Modbus protocol



6.6 SMS Function

BL100 support remote configuration, inquiry and control with SMS. Below are the notice points:

- 1. Default device password is 1234. It can be changed with SMS for safety
- 2. Password in SMS commands refers to device password, for example if device password is 1234, directly enter 1234
- 3. "+" in SMS commands means plus without any content, please don't add any space
- or character
- 4. Capital and lower case letters must be clarified. For example, PWD should be not be entered as pwd
- 5. If password is correct but command is wrong, device will return message: Wrong

command format, please confirm! Thus please check inputting method, capital and

lower case letters

- 6. If device password is wrong, there will be no message returned.
- 7. Device will return message once it receives SMS commands. If no return message, please check whether password is wrong or network signal is not good.

6.6.1 SMS Commands

Change Password

Action	Command	Return Message
Change	Old password + P + paw password	This is new password,
Password	Old password P new password	please remember!

Arm/Disarm

Action	Command	Return Message
Arm	password+AA	Armed
Disarm	password+BB	Disarmed

Inquire Device Status

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Action	Command	Return Message
		Arm/Disarm: xxx
Inquire		Model: xxx
Device	password+EE	Version: xxx
Status		IMEI: xxx
		GSM signal value: xxx

Set User Number

Action	Command	Return Message	
Set User	password+A+number+T+user number	Telx:	
Number	Number: 0~9		
Inquire	password+A	Return all user	
Inquire	passworu	numbers	
Doloto	password±A±numbor	Return number 0~4	
Delete	password+A+number	and 5~9	

Set Server (Cellular Network)

Action	Command	Return Message
Set Server	password+IP+IP address+P+port number	Sonvor
Inquire	password+IP	Port.
Delete	password+IPDEL	

Set Cellular Network Parameters

Action	Command	Return Message
Set	password+AP+APN+#+user name+#+user password	APN:
Inquire	password+AP	User Name:
Delete	password+APDEL	Password:

Reboot Device

Action	Command	Return Message
Reboot Device	password+Reboot	No return message

Note: There will be no return message for rebooting device with SMS. Tick Alarm automatically when power on in configuration software. Once device is rebooted successfully, SMS will be sent to user



7 After-Sale Service

7.1 Firmware Upgrading

This device has modular design. If telecommunication operators upgrade network, it's not necessary to change the whole hardware but only communication modules.

It supports firmware upgrading through USB interface. If any new requirement for firmware upgrading, please contact us directly.

7.2 Warranty Term

This device has one-year warranty from the day of purchase for any quality problems. Any faulty caused by human damage or wrong operations is beyond warranty

7.3 Technical Support

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