



ZHC1661 Application Guide

Ethernet series

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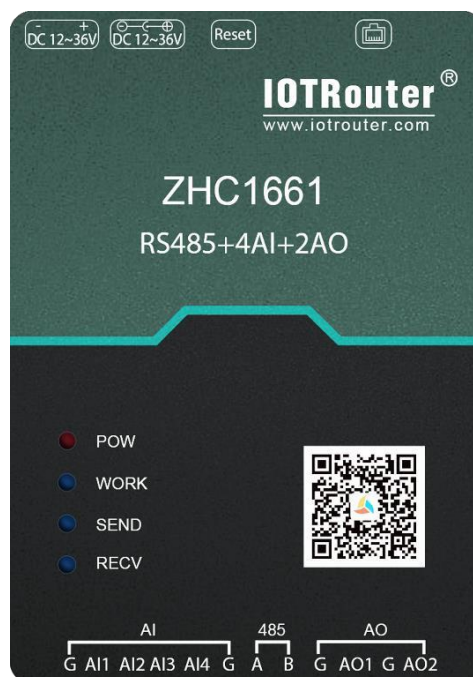
1 Overview

1.1 Product Introduction

ZHC1661 is a device that supports 4 channels of analog detection (current 4~20mA), 2 channels of analog output (4~20mA)

1 serial port (RS485) transparent transmission network IO product, compatible with Modbus RTU/TCP protocol. With "remote control" as the core function and high ease of use, users can easily and quickly integrate into their own systems to realize remote and local control based on Ethernet and RS485.

1.2 Appearance description



Ethernet:RJ45 interface

DC power supply:5.5*2.5mm, 9~36V

Reset:Reset button

Serial port:RS485, 3.81mm terminal plug-in

AI:AI1~4 are 4 current input detection

AO:AO1~2 are 2 current outputs

2. Product function

2.1. WEB configuration

2.1.1. Wiring

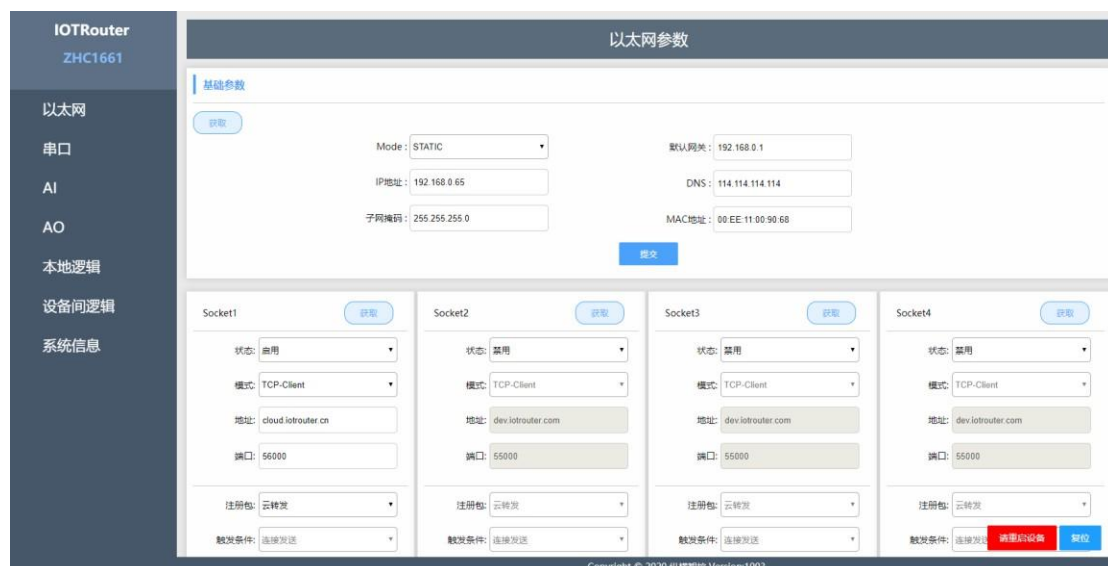
Connect the device and the computer with a network cable. After the device is powered on, observe that the WORK indicator is always on, indicating that the network hardware environment of the device is normal and it can communicate with the device.



The default IP address of ZHC1661 is 192.168.0.65. The configuration needs to set the IP of the computer and ZHC1661 to the same IP address range, otherwise the device and the computer cannot communicate. As shown below:



Open the browser and enter 192.168.0.65 in the address bar to enter the configuration page



2. 1. 2 .basic functions

The ZHC1661 has a built-in parameter configuration web page. The user does not need to pay attention to the device-related holding registers, but only needs to understand the reported data of the device. This document describes the WEB configuration items in the corresponding part.

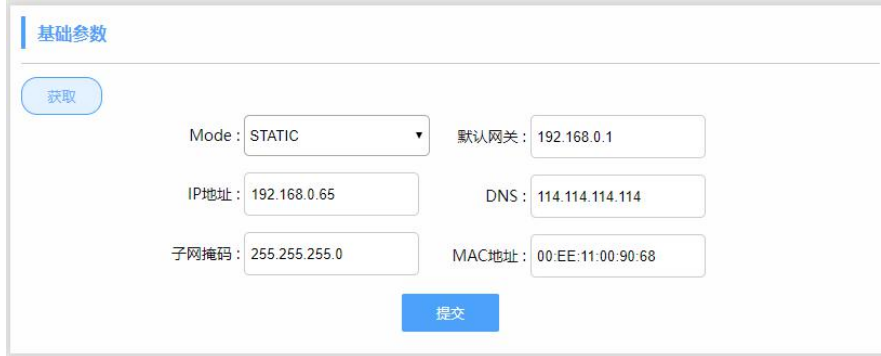
The following figure shows the recommended registers:

南向接口寄存器								
输入寄存器 0x03	AI	30001	0x0000	1	A11输入值	只读	unsigned short, 单位(V/mA)	0x04 (读输入寄存器)
		30002	0x0001	1	A12输入值	只读		
		30003	0x0002	1	A13输入值	只读		
		30004	0x0003	1	A14输入值	只读		
保留								
保持寄存器 0x04	AO输出	40001	0x0000	1	A01输出值	读/写	unsigned short, 单位(V/mA)	0x03 0x06 0x10
		40002	0x0001	1	A02输出值	读/写		
保留								

2.2. The internet

2.2.1 .Basic parameters

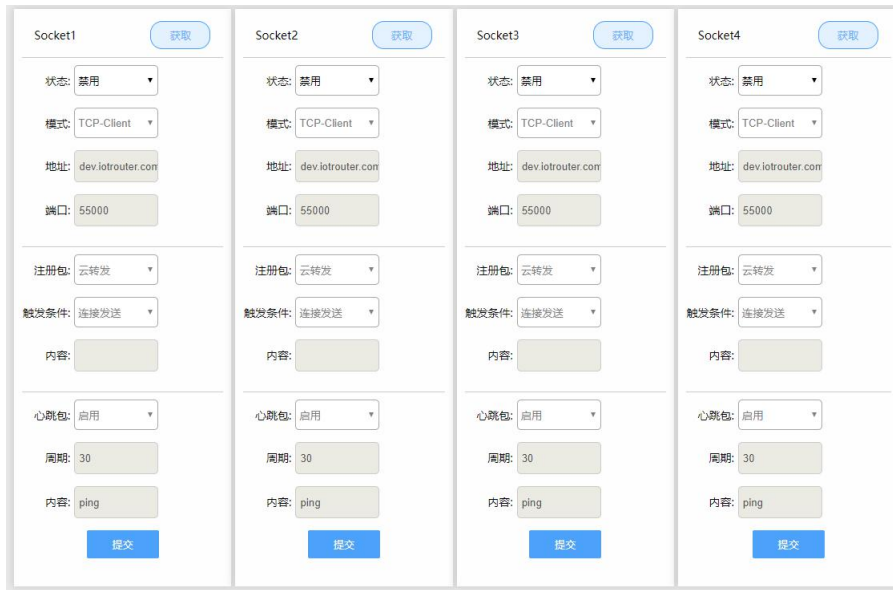
ZHC1661 provides one RJ45 Ethernet communication.



project	parameter
Mode	<p>STATIC: The static IP needs to be manually set by the user. Pay attention to write the IP, subnet mask, and gateway at the same time during the setting process.</p> <ul style="list-style-type: none"> ◆ Advantages: access cannot be allocated Devices with IP addresses can be searched through the full network segment broadcast mode. ◆ Disadvantages: different network segments in different LANs can not perform normal TCP/UDP communication. <p>DHCP: The main function of DHCP is to dynamically obtain the IP address, Gateway address, DNS server address and other information from the gateway host, thereby eliminating the tedious steps of setting the IP address. It is suitable for scenarios where there is no requirement for IP and no one-to-one correspondence between IP and module.</p> <ul style="list-style-type: none"> ◆ Advantages: access routers, etc. The equipment of DHCP Server can communicate directly, reducing the trouble of setting IP address gateway and subnet mask. ◆ Disadvantages: no access For DHCP Server network, such as direct connection with computer, the device will not work normally.
IP address	<p>The IP address is the identity of the module in the local area network. It is unique in the local area network and cannot be duplicated with other devices in the same local area network.</p> <ul style="list-style-type: none"> ◆ Device supports static There are two ways to obtain IP and DHCP.
Subnet mask	<p>The subnet mask is mainly used to determine the network number and host number of the IP address, indicate the number of subnets, and determine whether the module is in the subnet.</p> <ul style="list-style-type: none"> ◆ The subnet mask must be set, what we commonly use C type subnet mask: 255.255.255.0, the network number is the first 24 digits, the host number is the last 8 digits, the number of subnets is 255, and the module IP is within the range of 255, it is considered the module IP in this subnet
Default gateway	<p>Gateway refers to the network number of the network where the current IP address of the module is located. If you connect to a device such as a router when connecting to an external network, the gateway is the router IP address. If you set it incorrectly, you cannot access the external network correctly. If you don't connect to the router</p> <p>For this type of equipment, you don't need to set it up, just the default</p>
DNS	<p>The DNS server is mainly used to convert domain names into IP addresses that can be recognized by the network. Users can set according to their needs</p> <p>The address of a specific DNS server.</p>

MAC address	The MAC address is used to identify network devices. <ul style="list-style-type: none">◆ equipment MAC address is generated based on device ID
-------------	--

2.2.2 .Internet connection



project	Attri bute s	para mete r
status	Whether to enable the current socket	Enable/disable
mode	Role in Ethernet communication	TCP Client TCP Server ◆ MQTT Socket1 only
address	Specify the remote to connect as the Client End server address	◆ Support domain name resolution ◆ TCP Sever mode is not selectable
port	Port used to establish the connection	In Client mode, it is the port of the destination server In Server mode, it is the port of the current socket
Registratio n package	After the TCP connection is established, the specified data is sent to the server to facilitate the server to mark the current socket data source	Cloud forwarding: the necessary registration package to connect to the "Zongkong Cloud Platform" Custom: Customize the content of the registration package, support up to 200 bytes DEVID: unique device number Disable: Turn off the registration package function
Triggering conditions	Trigger condition for sending registration package	Connection sending: send the specified registration package immediately after the TCP connection is established Data carrying: temporarily unavailable
content	Register package content	Customize the contents of the registration package, only "Custom" mode is available
Heartbeat package	Used to maintain TCP long connections	Enable/disable TCP Client TCP Server mode to take effect
cycle	Heartbeat cycle	0~65535 s
content	Heartbeat packet content	Support customization, up to 40 bytes

- ◆ ZHC1661 socket1 supports MQTT

Socket1
获取

状态: 启用

模式: MQTT-Client

地址: dev.iotrouter.com

端口: 55000

ClientID: clientid-XOyVRm2TWo

username:

password:

订阅Topic1: /public/TEST/1

订阅Topic2: /public/TEST/2

发布Topic1: /public/TEST/3

发布Topic2: /public/TEST/4

keepAlive:

cleanSession:

提交

project	Attr ibut es	parameter
ClientID	Device ID	Supports up to 60 bytes
username	username	Supports up to 60 bytes
password	password	Supports up to 60 bytes
Subscribe to Topic1	Subscribe to Topic1	Support 1 Topic temporarily
Subscribe to Topic2	Subscribe to Topic2	
Publish Topic1	Publish Topic1	Response to the requested topic
Publish Topic2	Publish Topic2	Response to the requested topic

2.2.3 .Wiring

Set up After the ZHC1661 parameters, connect the ZHC1661 to the network with a network cable. After the device is powered on, observe that the WORK indicator should flash for 3 seconds, indicating that the network hardware environment of the device is normal and data interaction is



possible.

2.3 Serial port RS485

2.3.1 .Basic parameters

基础参数

主从模式: 主机

波特率: 115200

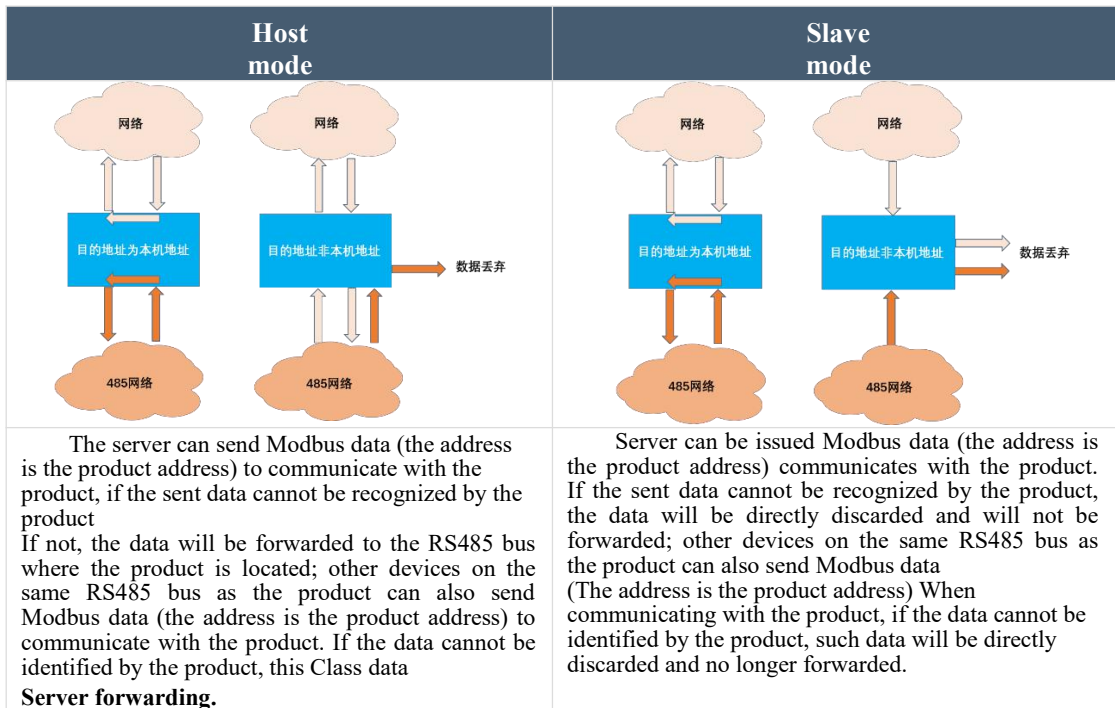
停止位: 1

数据位: 8

校验位: 无

提交

project	Attributes	parameter
Master-slave mode	Role in RS485 communication	Master/slave
Baud rate	Serial port rate	1200~921600bit /s
Stop bit	Stop bit	1/1.5/2



2.3.2 .special function

ZHC1661 supports serial port timing to send heartbeat.

基础参数

获取

串口心跳001周期: 0 长度: 0 内容(HEX):

串口心跳002周期: 0 长度: 0 内容(HEX):

串口心跳003周期: 0 长度: 0 内容(HEX):

串口心跳004周期: 0 长度: 0 内容(HEX):

proj ect	Attri bute s	para mete r
cycle	Time interval from the last serial port heartbeat	0~65535 s
length	Serial port heartbeat packet length	0~16

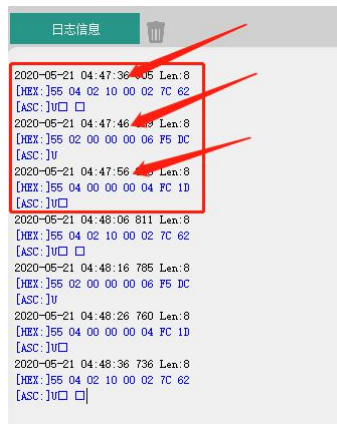
content	Hex format data	Example: Read 4 analog inputs with address code 0x55 55 04 00 00 00 04 FC 1D
---------	-----------------	---

Serial port heartbeat application example:

基础参数
获取

串口心跳001周期:	<input type="text" value="10"/>	长度:	<input type="text" value="8"/>	内容(HEX):	<input type="text" value="55 04 02 10 00 02 7C 62"/>
串口心跳002周期:	<input type="text" value="10"/>	长度:	<input type="text" value="8"/>	内容(HEX):	<input type="text" value="55 02 00 00 00 06 F5 DC"/>
串口心跳003周期:	<input type="text" value="10"/>	长度:	<input type="text" value="8"/>	内容(HEX):	<input type="text" value="55 04 00 00 00 04 FC 1D"/>
串口心跳004周期:	<input type="text" value="0"/>	长度:	<input type="text" value="0"/>	内容(HEX):	<input type="text"/>

提交



2. 4. AI

2. 4. 1 .Read status

Calculation formula:

Current value = return value / 1000 singleBit: mA

Send Modbus commands to ZHC1661 through the network and serial port to read the AI value.

project	parameter
Register address range	30001~30004 (0x0000~0x0003)
function code	02

Take the first current detection as an example:

Inquire: 55 04 00 00 00 01 3C 1E

Query response:55 04 02 10 00 82 0C

The returned data is 0x1000, which means 4096uA, which is 4.096mA

2. 4. 2 .Status report



proj ect	Attri bute s	para mete r
Proactively report	Whether to enable AI status reporting	Enable/disable
circulation time	When there is no change in AI status, the cycle of reporting status	0~65535 s
Escalation mode	Trigger mode for reporting AI status changes	Inside/Outside/Prohibited
MIN	Lower limit of interval	4000~20000 uA
MAX	Upper bound	4000~20000 uA

AI voluntarily report description:

Disable reporting mode: Report all AI values cyclically according to the set cycle.
 Report within the interval: set When the AI channel value enters the interval from outside the interval, all AI channel values are reported immediately and the cycle time is reset.
 Report outside the interval: set When the AI channel value enters the interval from inside the interval, all AI channel values are reported immediately, and the cycle time is reset.

2.5. AO

2.5.1 .Read status

Send Modbus commands to ZHC1661 through the network and serial port to read the AO set output value.

project	parameter
Register address range	40001~40002 (0x0000~0x0001)
function code	04

Read one AO set output value:

Inquire: 55 04 00 00 00 01 3C 1E

Query response:55 04 02 10 00 82 0C

The returned data is 0x1000, which means 4096uA, which is 4.096mA

2.6.logic

2.6.1 .Local logic

ZHC1661 supports setting 8 local logics.

本地逻辑

获取

-1-

触发条件: 禁用 ▼

输入: AI1 ▼

AI阈值: 4000

输出类型: DO输出: ▼

输出: AO1 ▼

DO值: 常开 ▼

-2-

触发条件: 禁用 ▼

输入: AI1 ▼

AI阈值: 4000

输出类型: DO输出: ▼

输出: AO1 ▼

DO值: 常开 ▼

-3-

触发条件: 禁用 ▼

输入: AI1 ▼

AI阈值: 4000

输出类型: DO输出: ▼

输出: AO1 ▼

DO值: 常开 ▼

-4-

触发条件: 禁用 ▼

输入: AI1 ▼

AI阈值: 4000

输出类型: DO输出: ▼

输出: AO1 ▼

DO值: 常开 ▼

提交

project	Attri bute s	para mete r
Triggering conditions	Logic trigger condition	Forward follow: When DI is closed, DO is closed Follow in reverse: When DI is closed, DO is opened. When DI is opened, DO is closed and greater than or equal to: when AI input is greater than or equal to the set value, DO output is triggered less than or equal: when AI input is less than or equal to the set value, DO output is triggered AO follows AI: AO output value = AI input value Disable: Turn off local logic
enter	Trigger logic input conditions	Can be specified to be triggered by DI X, AI X
AI threshold	Trigger logic after AI reaches a certain value (Greater than or equal, less than or equal to mode takes effect)	0~20000
Output type	Output type after logic trigger	Optional DO
Output	Output channel after logic trigger	Can specify DO X, AO X output
DO value	Specify the value of the DO channel output	Normally open, normally closed, flip

2.6.2 .Inter-device logic

ZHC1661 supports setting 8 logics between devices.

设备间逻辑

基础参数

获取

-1-

触发条件: 禁用

远端地址: 01

输入: AI1

AI阈值: 4000

输出类型: DO输出

输出: AO1

DO值: 常开

-2-

触发条件: 禁用

远端地址: 01

输入: AI1

AI阈值: 4000

输出类型: DO输出

输出: AO1

DO值: 常开

-3-

触发条件: 禁用

远端地址: 01

输入: AI1

AI阈值: 4000

输出类型: DO输出

输出: AO1

DO值: 常开

-4-

触发条件: 禁用

远端地址: 01

输入: AI1

AI阈值: 4000

输出类型: DO输出

输出: AO1

DO值: 常开

提交

project	Attri bute s	para mete r
Triggering conditions	Logic trigger condition	Forward follow: When DI is closed, DO is closed Follow in reverse: When DI is closed, DO is opened. When DI is opened, DO is closed and greater than or equal to: when AI input is greater than or equal to the set value, DO output is triggered less than or equal: when AI input is less than or equal to the set value, DO output is triggered AO follows AI: AO output value = AI input value Disable: Turn off local logic
Remote address	This logic will receive the specified address code Trigger when the packet	01~FE
enter	Trigger logic input conditions	Can be specified to be triggered by DI X, AI X
AI threshold	Trigger logic after AI reaches a certain value (Greater than or equal, less than or equal to mode takes effect)	0~20000
Output type	Output type after logic trigger	Optional DO
Output	Output channel after logic trigger	Can specify DO X, AO X output
DO value	Specify the value of the DO channel output	Normally open, normally closed, flip

2.7 .system message

系统信息

基础参数

modbus 地址码:

DEVID:

密码:

上报模式:

组网模式:

组ID:

组密码:

组类型:

project	Attribute	parameter
Modbus address code	Modbus address code	01~FE
DEVID	Factory unique number	Read only
password	The password used to access the Zongkong cloud platform	Support 16 bytes
Escalation mode	Format and channel of actively reported data	The internet Modbus RTU report network modbus TCP report serial port modbus RTU report serial port modbus TCP report Serial + network Modbus RTU report Serial + network modbus TCP report
Networking mode	Use the networking mode when accessing to the crossbar cloud transparent transmission	Enable/disable
Group ID Group password	Devices with the same group ID and group password can establish a networking mode	Support 16 bytes
Group type	In the same group, different types of equipment can exchange data	A/B

2.8. Status Indicator

name	Features	status	State description
POW	Power Indicator	Chang Liang	System start
		Always off	The system does not start
WORK	System working status indicator	Always off	Network abnormality (Failed to obtain IP)
		2000ms off/300ms On/300ms off/300ms on	Network cable abnormal
		100ms on 100ms off	Domain name resolution
		Chang Liang	The network is normal
SEND	Network data sending indicator	Chang Liang	default
		Always off	Module not started
		200ms off	Send network data
RECV	Network data receiving indicator	Chang Liang	default
		Always off	Module not started
		200ms off	Receive network data

2.9 .reset

By operating the RESET button, the device can be restored to the field settings. Steps:

Step 1: Power on the device.

Step 2: Press and hold the RESET button until the indicator lights of the device are all off, and immediately release the reset button, the device is restored to factory settings successfully.

If the serial port of the device is found to start sending actively after reset **JSON** The data packet indicates that the reset button is pressed for too long and the device enters the local firmware upgrade mode. At this time, power off the device and perform the reset operation again.

2. 10 .Firmware upgrade

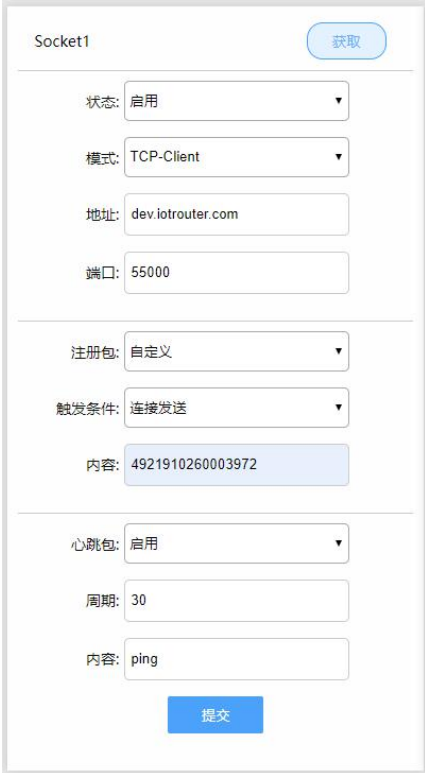
For the firmware upgrade process, please refer to "ZHC1661 Host Computer Instructions"

3. Product application

3.1. Transparent Cloud

Operation process (take socket1 as an example):

1. Set socket1 parameters



Please confirm the IP address and port of the server to be connected; the registration package and the heartbeat package are recommended to be enabled, and can be customized if necessary, and the settings are complete and restart.

2. Server operation

After the device is connected to the user server, a custom registration package will be sent to facilitate the customer to identify the device, and the customer can follow Modbus protocol to operate the device, and the device adapts to Modbus RTU/TCP protocol.

3.2. Local monitoring

Operation process (take socket2 as an example):

1. Set socket2 parameters



2. Client device operation

Customers can operate the device according to the Modbus protocol, and the device adapts to the Modbus RTU/TCP protocol.

3.3. MQTT

Refer to "IOTRouter_Modbus_On_MQTT_Application Guide"

3.4. Transparent Cloud Transmission

Refer to "ZHC1661 ZHC Cloud Transparent Transmission Instructions"

3.5. Zongkong Cloud Platform

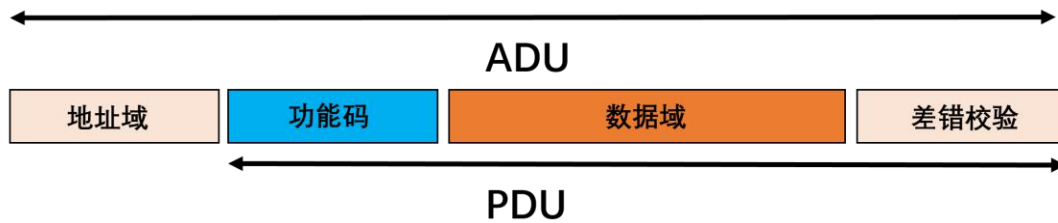
Refer to "ZHC1661 ZHC Cloud Platform User Manual"

4 Modbus command frame

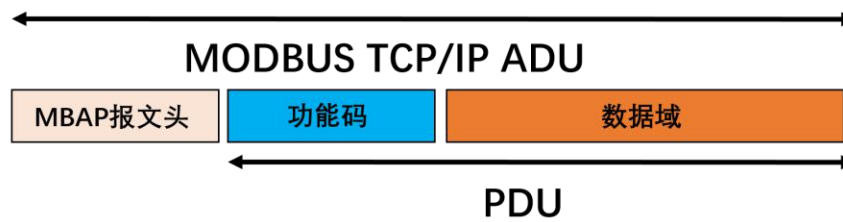
4.1 Modbus command frame

The ZHC1661 data format follows the general Modbus frame format. The device can parse the Modbus RTU/TCP protocol and perform related operations.

Modbus RTU:



Modbus TCP:



4.2 Register allocation

For register address allocation, please refer to "ZHC1661 Register Address Table"

5. Update history

6. Contact

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High-tech Zone, Chengdu, Sichuan Province :

Www.iotrout.com

Phone: 028-83268936