ShenZhen Hi-Link Electronic co.,ltd

HLK-DIO16

16 channel digital input output controller

User manual

--Configuration tool &APP

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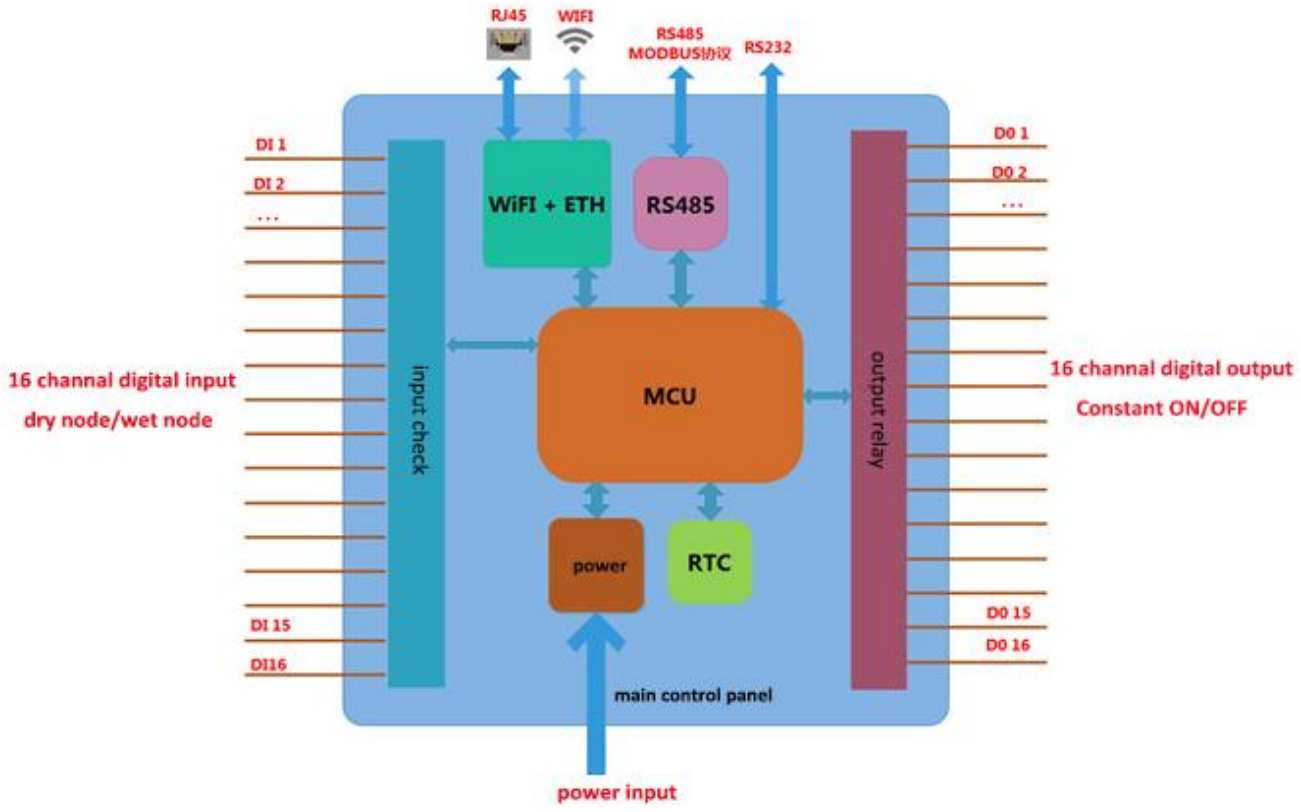
Terminology explanation

name	explanation
DI	Digital input or switch input，High or low level or on or off state
DO	Digital output， Corresponding relays's closing and disconnecting
Dry node	A kind of switch output device.The output is a passive switch such as the button pressed and released, the switch is on and off.
Wet node	A kind of switch output device. Output high and low of logic level
Modbus	A kind of Communication Protocol in Industry.Usually build on RS485 and TCP/IP protocol.
Inching	A kind of action from relay output. After triggering, the relay is closed and then delayed for a period of time to automatically disconnect.
Auto-lock	A kind of output action. After triggering, the relay action keep the default mode.
Rolling-over	A kind of output action. The output relay is disconnected when it is closed, and the output relay is closed when it is disconnected.
Delayed execution	A kind of output action execution mode. When an action is triggered, it is not performed immediately, but is delayed for some time before it is executed.
loop execution	A kind of output action execution mode. When an action is triggered, it is repeated in a cycle.
linkage	A kind of Automatic control output mode. The device automatically control the output action according to the input state.

1 Introduction

HLK-DIO16 is such a multi-interface, networked, Intelligent Digital IO acquisition and Controller. With 16-channel digital input and 16-channel relay output, built-in WiFi network module, support Modbus. Which has the control channel of remote,local and direct connection, the free fine output movement control, the flexible reliable manual, automatic, linkage control method,and provide the PC end control software and the handset APP free of charge.

High performance, high integration, high flexibility, provide users with rich and free using way, can be widely used in a variety of switching quantity acquisition and control systems, for existing systems to increase the network control and automatic control capabilities and to enhance system functions and value.



Pic 1: Product composition block diagram

2 communication interface and communication protocol

The relay provides a variety of communication interfaces such as RS232 serial port, RS485,RJ45H interface, wireless WiFi and so on. According to the corresponding communication protocol, the relay can send control commands to the device, query the status information, query and modify the configuration parameters of the device, etc.

The device can communicate with the relay through any communication interface, and multiple interfaces can be used at the same time.

Connection mode	Interface	Communication protocol	Protocol function
Serial port direct connection	RS232 serial port	HEX instruction protocol defined by our company	Control output, query input and output status, configure device parameters, automatically report state changes
	RS485	MODBUS protocol	Control output, query input and output status, configure device parameters
Local LAN TCP/IP connection	RJ45 Network port or wireless WiFi	HEX instruction protocol defined by our company	Control output, query input and output status, configure device parameters, automatically report state changes
Remote network TCP/IP connection	RJ45 Network port or wireless WiFi	HEX instruction protocol defined by our company	Control output, query input and output status, configure device parameters, automatically report state changes

Table : 1 communication interface and protocol table

The real-time control of output and the query of input and output current value can be realized by using MODBUS protocol.please refer to 《HLK-DIO16 Modbus protocol specification》.

3 Operating instructions of PC configuration and Control tool Software

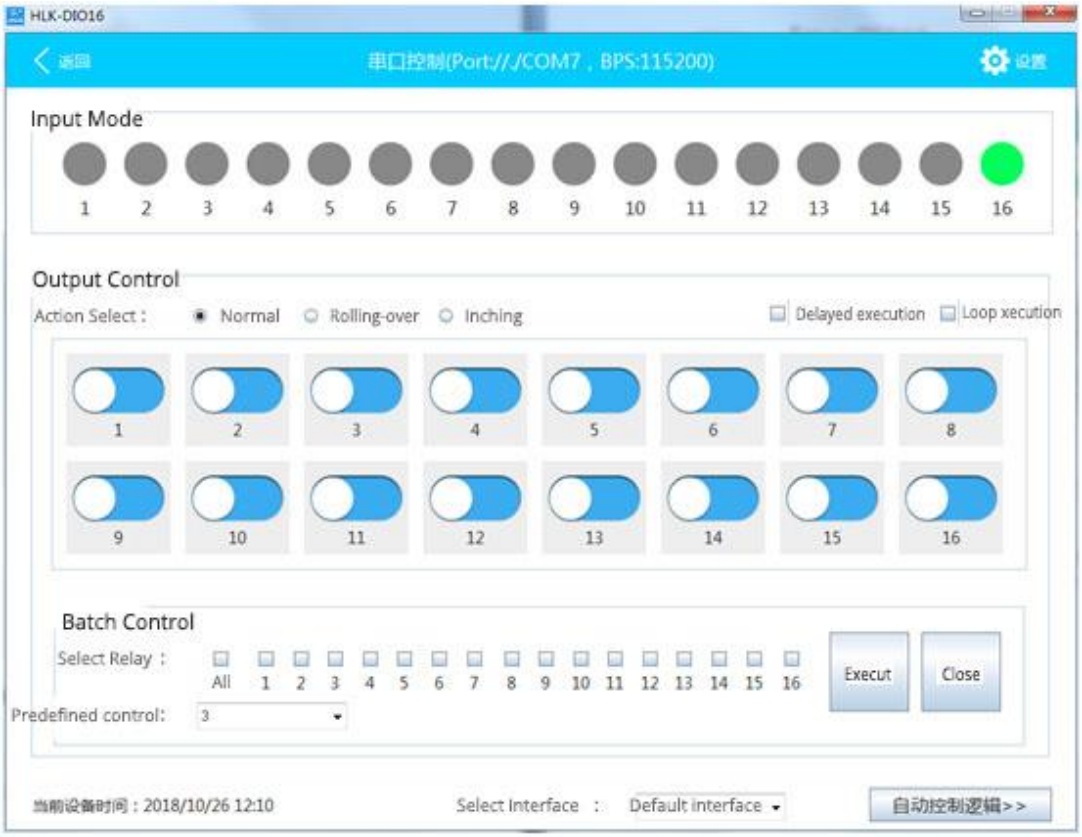
The device control and configuration software running on the PC side can communicate with the controller through the DB9 serial port or network port, or connect the computer to the device through WiFi. As shown below , If you use DB9 serial port control, Firstly use USB to connect the computer to the controller's 232 serial port, and then select serial port control. If you use a network cable connect a router to a controller, the computer ends with the same router. The controller under the local area network can be search out through local area network searching, and then realize local area network or remote control.

3.1 Connect device throught Serial port

Connect a computer to a device via serial line;

Open software, main interface select serial port control

Select the serial number and baud rate connected to the device (default 115200)，then click YES
The software will try to connect the device through the serial port, and will enter the main control interface when successfully connect

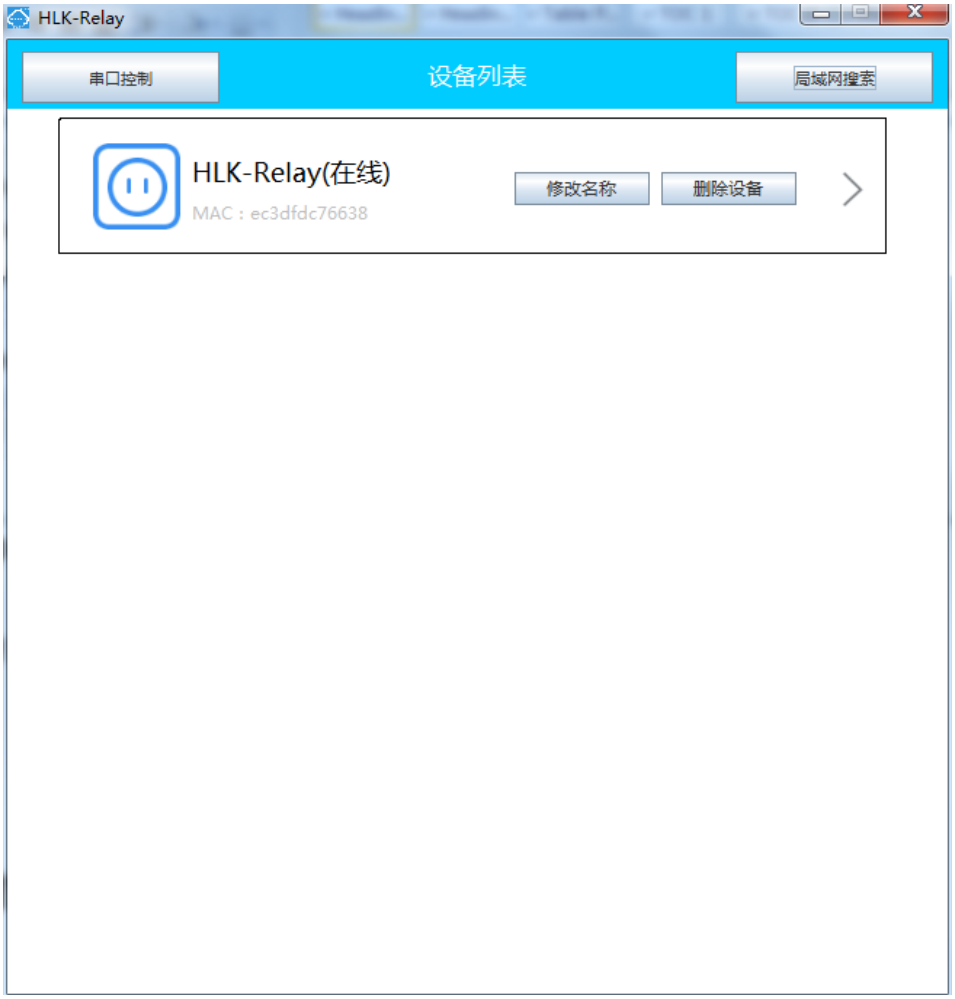


3.2 Connected device throught Network

3.2.1 Local Area Network Connection

Connect a device to a PC-connected router or switch via a wire or WiFi, Or connect your computer to the device's AP via WiFi

Then click on the LAN search, After searching the device, select it in the device list to establish a connection to the device and then enter the device control interface.


HLK-Relay
串口控制
设备列表
局域网搜索
HLK-Relay(在线)
MAC：ec3dfdc76638
修改名称
删除设备

HLK-DIO16
返回
HLK-DIO16(ec3dfdc76638)---局域网在线(IP:192.168.18.101，Port:8080)
设置
输入状态
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
输出控制
动作选择：
普通
翻转
点动
延时动作
循环动作
1 2 3 4 5 6 7 8
9 10 11 12 13 14 15 16
批量控制
继电器选择：
全选 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
执行
关闭
预定义控制：
5
当前设备时间：2018/10/26 12:21
界面选择：
默认界面
自动控制逻辑>>

3.2.2 Remote control

After the LAN connection, the online status of the device will be seen in the device list if the device is configured correctly and have access to the external network,it can access to the control interface when the statue is on-line.

3.3 Device control interface

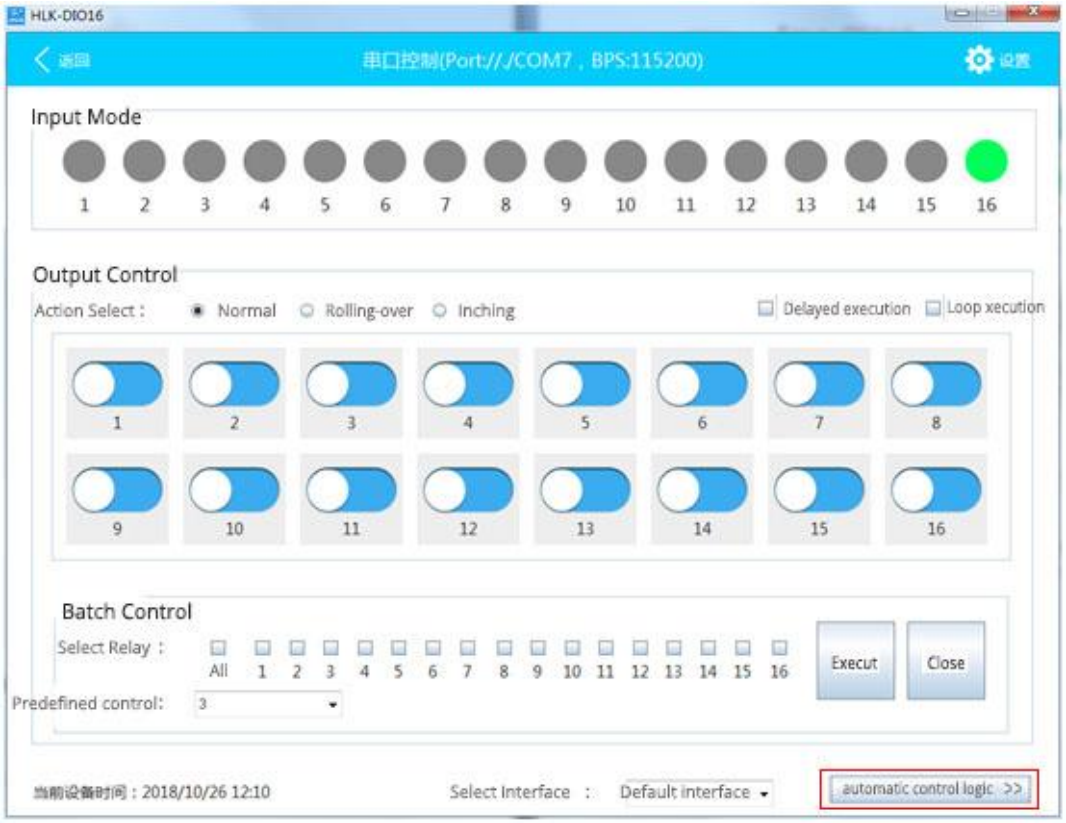
the software automatically enters the device control interface after successfully connect. As shown below, this interface can display the current input status and output state, can set up relay individually or in batches and select different output mode.

3.4 Set point time,delay time,cycle time

Click on the upper right corner settings button in the device control interface, pop-up the following interface, you can set point time, delay time and cycle time. Each channel has its own settings

3.5 Automatic control configuration interface

Click on the lower right corner of the control interface to enter the automatic control interface, automatic control can be set up to 16 groups, each group can choose one of the them such as time point, time period, linkage, time point linkage, time period linkage.



Individually setting automatic control 1- automatic control 5 with time point, time period, linkage, time point linkage, time period linkage as an example to introduce how to configure automatic control.

The specific steps of setting automatic control with time point model are as following:

1. Select enable, turn on automatic control1;
2. select automation, choose automatic control 1;
3. Select start time, set the parameter to 05:12 on October 4, click the enable of the upper-right corner in the start time area;
4. Select output action, set to open the Relay1;
5. Click Save, and wait to save successfully;

The specific steps of setting automatic control with time period model are as following:

1. Select enable, turn on automatic control 2 ;

2. select automation, choose automatic control 2;

3. Select the start time, set the parameter to 03:03 on October 2, and click the enable of the upper-right corner in the start time area ;

4 . Select the end time, set the parameter to 05:03 on October 2, and click the enable of the upper-right corner in the start time area;

5. Select output action to turn off relay 1 and 2;

6. Click Save, and wait to save successfully;

The specific steps of setting automatic control with linkage model are as following:

1. Select enable, turn on automatic control 3;

2. select automation, choose automatic control 3;

3. Select input linkage, select long shock level, input selection set to 1-12channel, click the enable of the upper right corner in start time area;

4. Select the output action and set up the 1-3 relay rolling-over;

5. Click Save, and wait to save successfully;

The specific steps of setting automatic control with time point linkage model are as following:

1. Select enable, turn on automatic control 4;
2. select automation, choose automatic control 4;
3. Select start time, set the parameter to 05:05 on April 3, and click enable of the upper-right corner in the start time area;

4 . Select input linkage, select long shock level, input selection set to 1-12channel, click the enable of the upper right corner in start time area;

5. Select the output action, setting inching 1-4 relay;
6. Click Save, and wait to save successfully;

The specific steps of setting automatic control with time period linkage model are as following:

1. Select enable, turn on automatic control 5;

2. select automation, choose automatic control 5;

3. Select start time, set the parameter to 03:04 on Aug. 5, and click enable of the upper-right corner in the start time area;

4. Select the end time, set the parameter to 02:05 on September 1, and click on the enable of the upper-right corner in the start time area;

5 . Select input linkage, select short touch pulse, input selection set to 16th path, click on the enable of the upper-right corner in the start time area;

6. Select output action, setting delay open 1-5 relay;

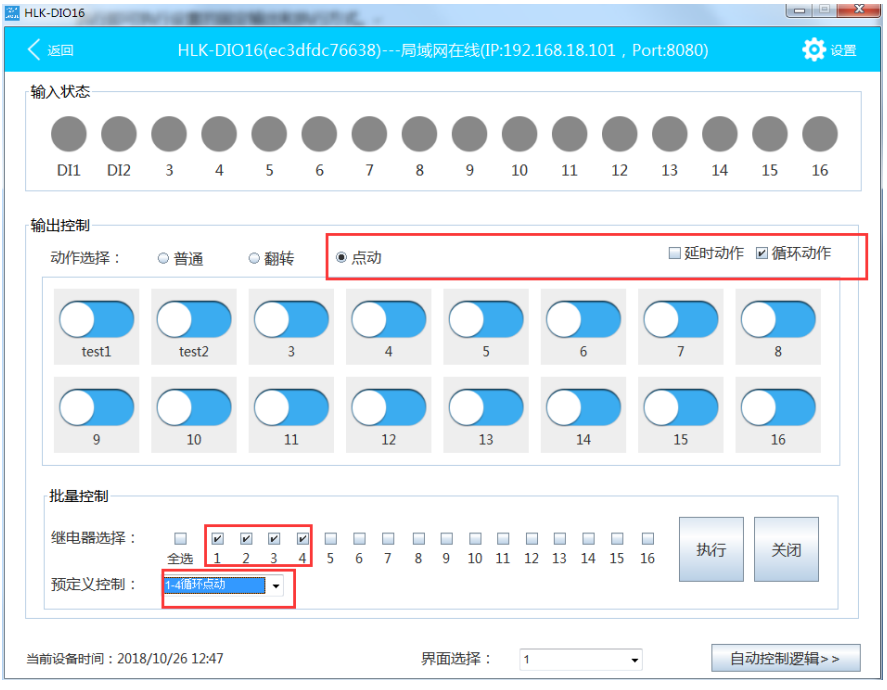
7. Click Save, and wait saving successfully;

3.6 Interface management

Interface management can set multiple relay aliases, input aliases and set the names of this group aliases (interface aliases). After saving successfully, you can select the saved interface aliases in the interface selection of manual control interface.to manual control interface input name and relay name change after successful application.

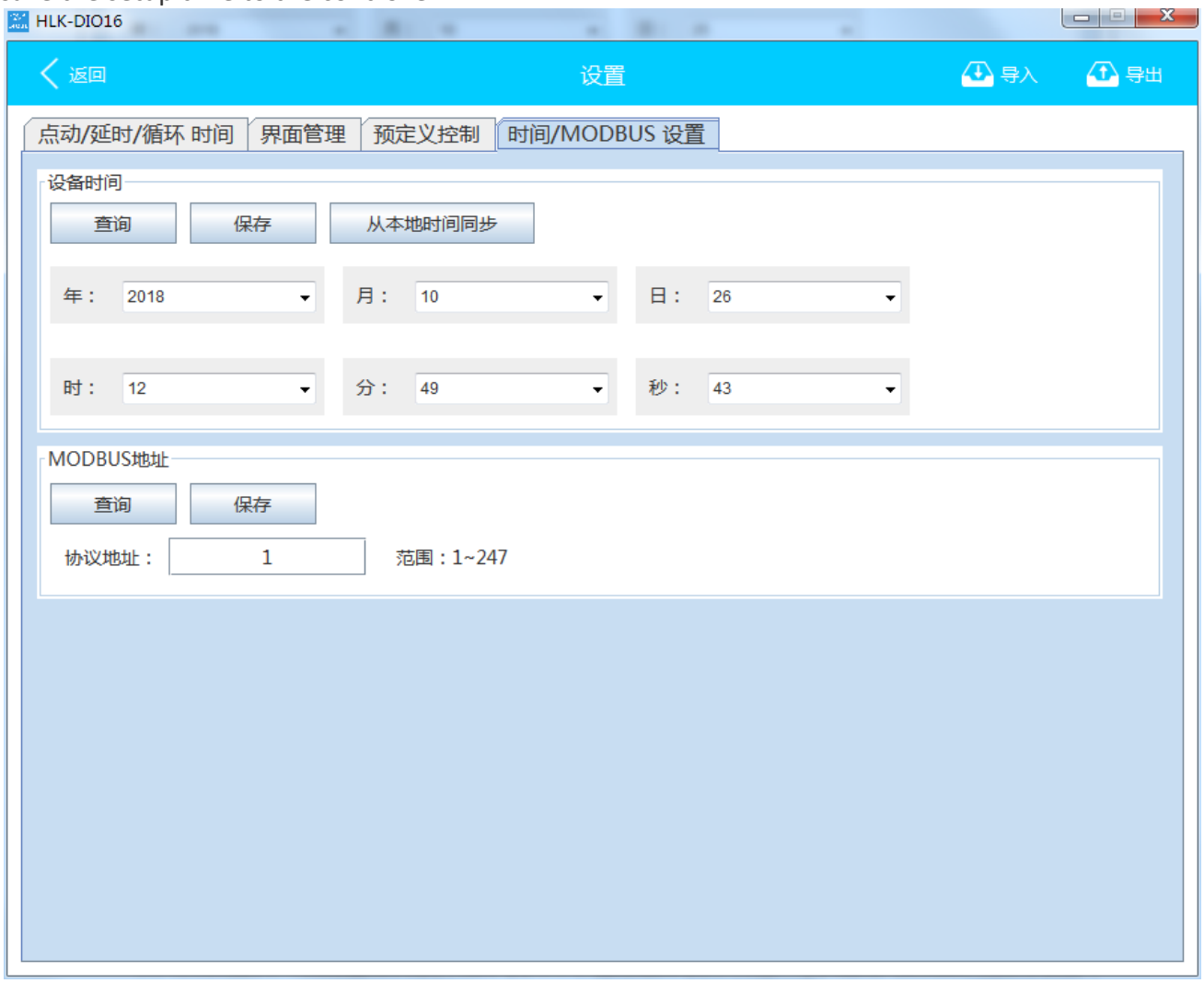
3.7 Predefined control

The predefined control is scene setting, setting the output selection and output mode of the relay to form a fixed scene, setting the scene alias.you can choose the saved scene alias in the predefined control of the control interface after saving successfully, The contents of this scenario are automatically loaded, and the fixed output and execution mode of the settings can be executed by clicking execution botton.



3.8 Time setting

You can query the controller's time, synchronize the computer's time to the controller, and save the setup time to the controller

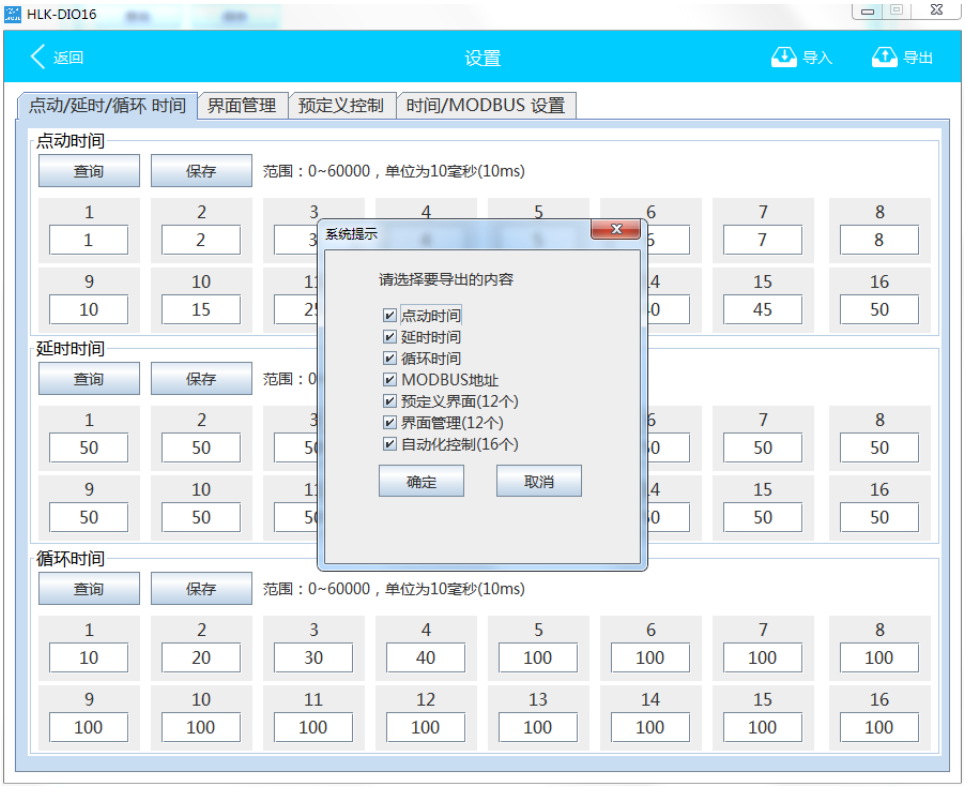


3.9 Configure inport/export

This software provides the function of the configuration parameters and software configuration parameters importing and exporting with current device. It can easily export and save various configuration files, and import the corresponding configuration files when needed to restore the prior configuration information.

Click Export in the upper right corner of the setup interface, select what you want to export in the pop-up dialog, then select the location and name of the configuration file to save, click YES, The software exports the configuration file to a file with a specified name.

Click import in the upper right corner of the setup interface , select the configuration file that has been saved before in the pop-up dialog box, click YES, and the software will automatically update the imported content to the device and software



4 App operating instructions of mobile phone

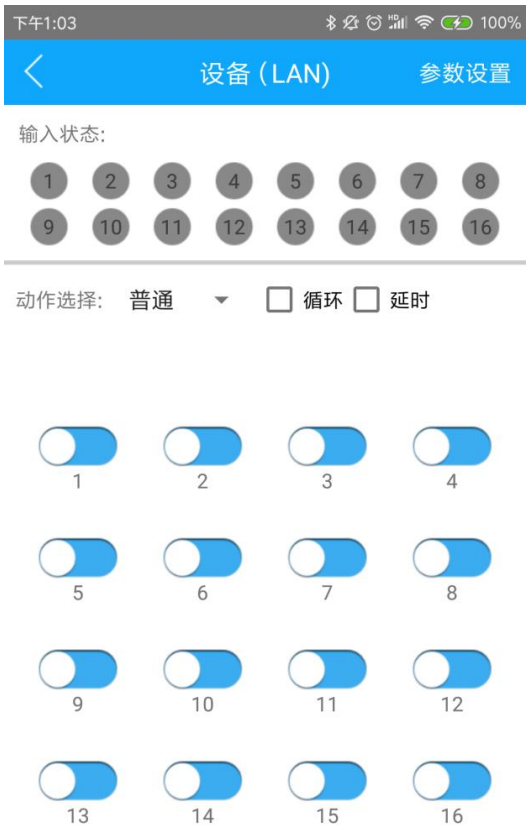
Install HLK-DIO16 APP on your phone;

The phone is connected to the router to which the device is connected via WiFi ,or to the AP of the device;

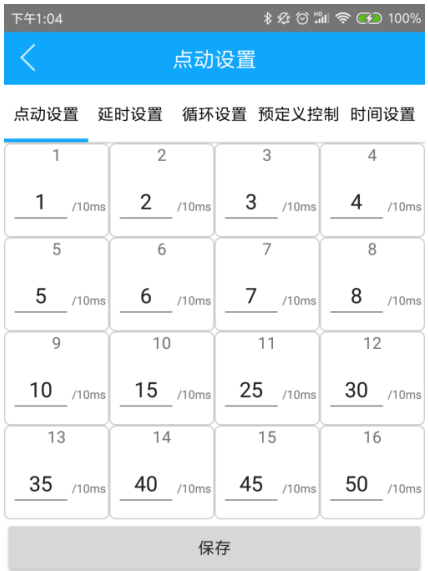
The phone can connect to the device anywhere when the device and the external network are connected;

Open the DIO16 APP on your phone, select it in the device list to establish a connection to the device and enter the device control interface after searching the device or when the device is online

The layout and function of the control interface is the same as that of the PC control software; there is no automatic control item setting function


下午1:03
100%
设备（LAN）
参数设置
输入状态:
1 2 3 4 5 6 7 8
9 10 11 12 13 14 15 16
动作选择:
普通
循环
延时
1 2 3 4
5 6 7 8
9 10 11 12
13 14 15 16

下午1:03
100%
设备（LAN）
参数设置
输入状态:
1 2 3 4 5 6 7 8
9 10 11 12 13 14 15 16
动作选择:
普通
循环
延时
批量控制
全选
加载预设方案
全开
1 2 3 4
5 6 7 8
9 10 11 12
执行
关闭


下午1:04
100%
点动设置
点动设置
延时设置
循环设置
预定义控制
时间设置
1 /10ms
2 /10ms
3 /10ms
4 /10ms
5 /10ms
6 /10ms
7 /10ms
8 /10ms
9 10 /10ms
10 15 /10ms
11 25 /10ms
12 30 /10ms
13 35 /10ms
14 40 /10ms
15 45 /10ms
16 50 /10ms
保存

5 Revised record

Date	Version	Modify content
2018-9-29	**1.0**	**Initial version**
2018-10-25	**1.1**	**Add output action execution options, complete instructions and diagrams**

6 Technical support and contact information

ShenZhen Hi-Link Electronic co.,ltd

Address ：3F Caiyue Mansion,No.24 Liuxian Avenue,longHua District, Shenzhen

Phone number：0755-23152658/83575155;

Website ： www.hlktech.com