WL-4031 4DI 4G Discrete Input Monitoring DTU User Manual

1. Introduction

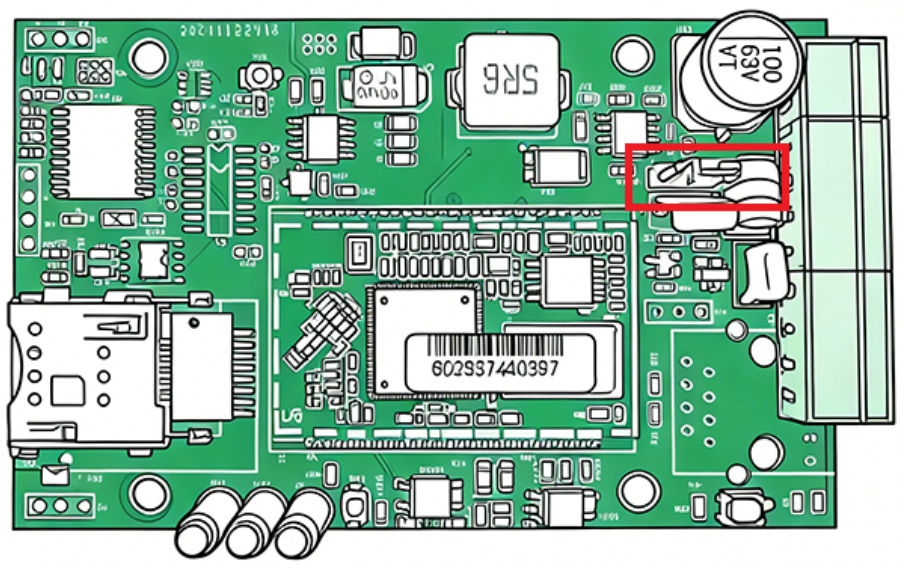
The WL-4031 4DI DTU comes with a built-in industrial-grade 4G wireless module, and provides serial ports (RS-485/RS-232) as well as four-channel DI discrete input pins. The serial ports can be easily connected to serial devices in industrial sites such as RTUs, PLCs, sensors and meters. The discrete input (wet contact or dry contact) pins monitor changes in high/low level or on/off status. The DTU can transmit DI changes to the host computer system through multiple methods including SMS and WeChat alarms, scheduled string uploads, and Modbus RTU protocol queries.

2. Product Functions

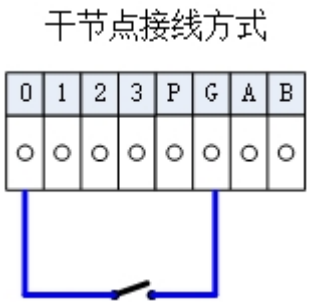
- 4-channel discrete inputs, enabling SMS alarm functions.
- 4-channel discrete input status supports Modbus protocol or scheduled string upload for connection with host computer software.
- 1 serial port (RS-485/RS-232) for connecting to on-site serial devices to achieve data communication.
- Serial communication function: supports Comway protocol, compatible with Sangrong and Hongdian protocols, ensuring convenient and reliable connection with configuration software.
- Supports internet access via 4G or WIFI.
- Online network management: realizes online management through Netview network management software.

3. Wiring Instructions for Discrete Input Pins

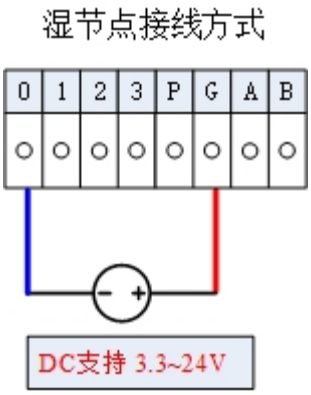
Open the housing as shown in the figure below. The default mode is **dry contact**: short-circuit the jumpers between **"+" and "COM"**. For **wet contact**, short-circuit the jumpers between **"COM" and "-"**.



Wiring Method for Dry Contact

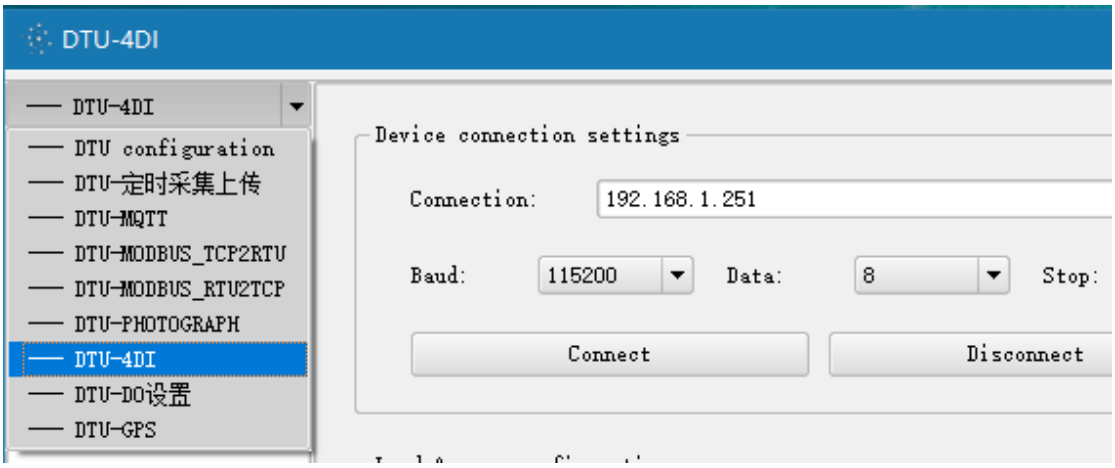


Wiring Method for Wet Contact



4. Install and Run the Configuration Software

Download and decompress the configuration file, then run dtu_config.exe and you will see the interface as shown in the figure below.

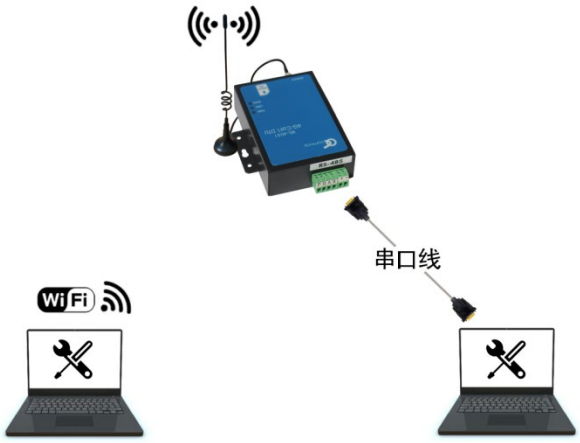


Select the **DTU-4DI** setting in the product list.

In the configuration page list as shown in the figure above, select the main control panel and connect to the DTU via serial port or WIFI.

1) Multiple Methods for Computer to Connect to DTU

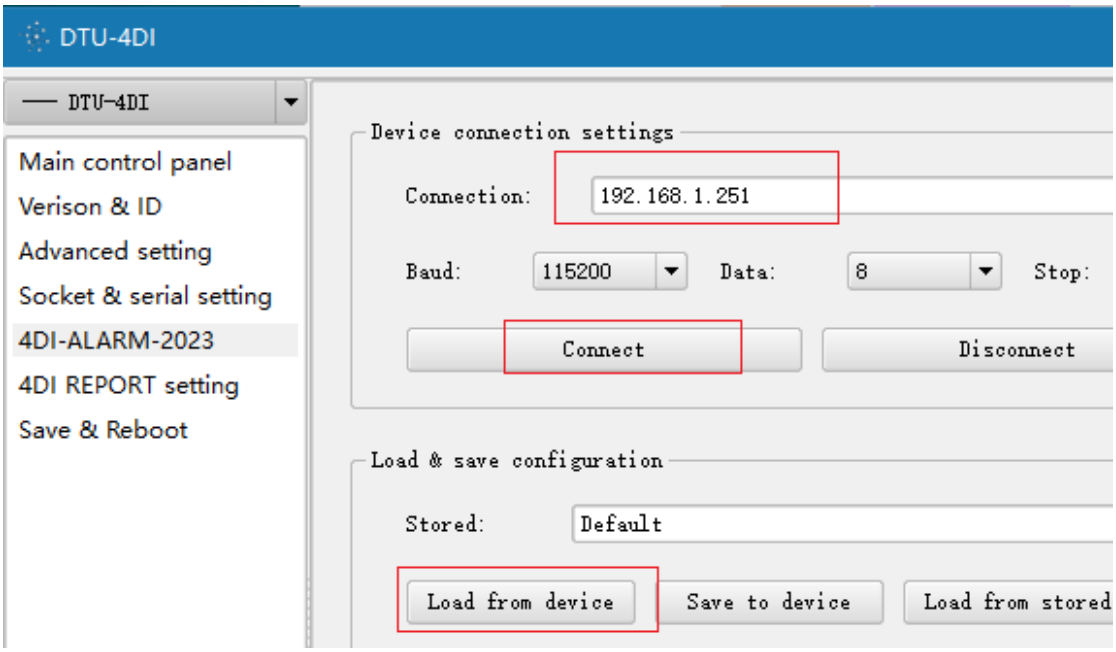
The DTU configuration software can connect to the DTU via the WIFI or computer's serial port, as shown in the figure below.



2) Connect to the DTU via WIFI

The DTU is shipped with the **WIFI hotspot mode** enabled by default, and the default IP address is also **192.168.1.251**. First, use your laptop's WIFI to search for the DTU hotspot. The hotspot name is the DTU's 12-digit product serial number, and the connection password is **comway666**.

Enter the **DTU IP address** (default: 192.168.1.251) and **VPN IP** (the vpn-client software must be run first) in the **Connection Parameters** section, then click **Connect Device**.



3) Connect to the DTU via Serial Port

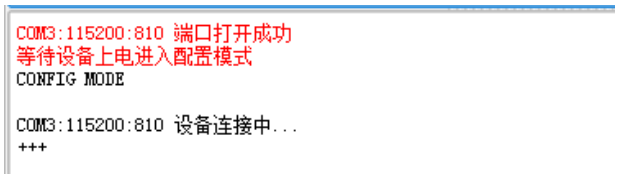
In the **Connection Parameters** section, select the computer serial port number for connecting to the DTU (click **Update** in the drop-down menu to display all available serial ports) as well as the relevant communication parameters: **baud rate** and **parity bit**.

Default serial port parameters of the DTU upon shipment: Baud rate **115200**, data bit **8**, stop bit **1**, parity bit **None**.

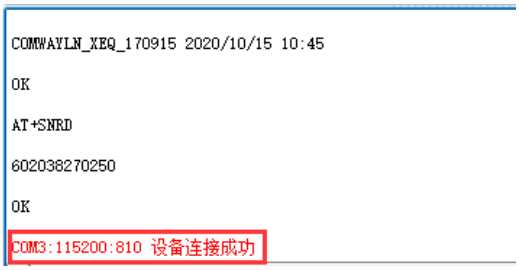
Do not insert a SIM card when connecting to the DTU via serial port (power off the device before inserting or removing the SIM card), to prevent the DTU serial port from entering data connection mode.

Set the serial port parameters correctly and click **Connect Device**.

If the user fails to connect to the DTU via the serial port normally, run the configuration software first, then click **Configuration Mode Connection**. When the message **Waiting for device to power on and enter configuration mode** appears, power on the device. *(Note: Follow this operation sequence)*



Once the serial port communication is normal, the message **"Device Connected Successfully"** will be displayed.

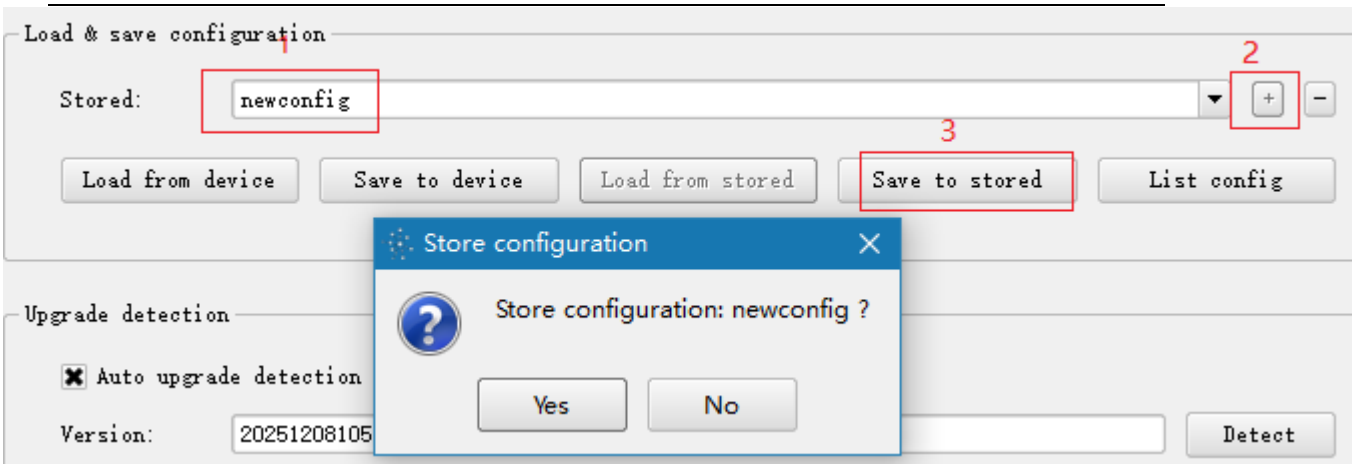


At this point, click the "Read from Device" button to correctly read the current configuration parameters of the DTU.

1) Reading Device Parameters and Saving Parameters to a Configuration File

Click **Read from Device** on the interface below to read all configuration parameters saved in the DTU.

Click **Save to Device** on the interface below to save all current parameters of the configuration software to the DTU in one go.



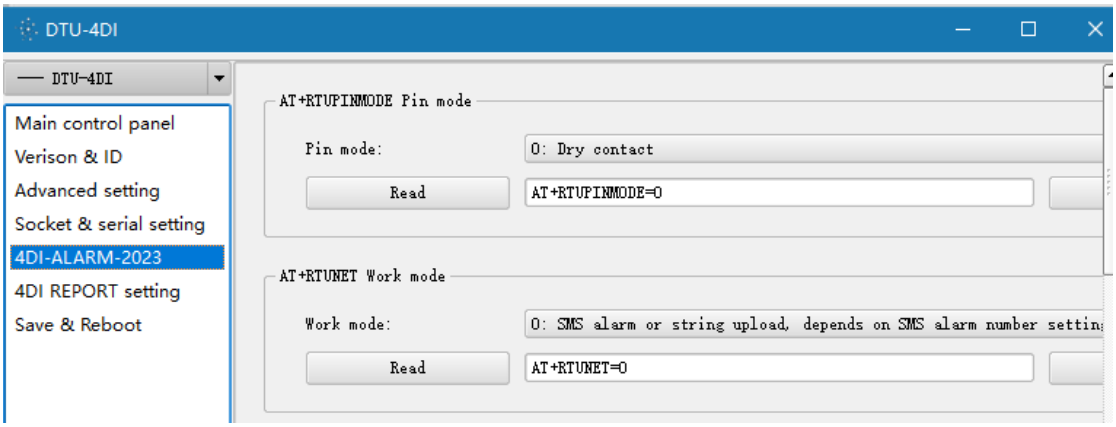
Click the **Save to Pre-stored Configuration** button to save the configuration parameters modified by the user as a file, which facilitates directly reading the configuration file and quickly completing the configuration of the DTU in the future. The operation steps are as follows:

1. Enter the file name
2. Click "+" to create a new file
3. Click **Save to Pre-stored Configuration**

Clicking the **Read from Pre-stored Configuration** button allows you to directly read configuration parameters from an already configured setting file. When used together with the **Save to Device** button, it can facilitate the quick configuration of DTU parameters.

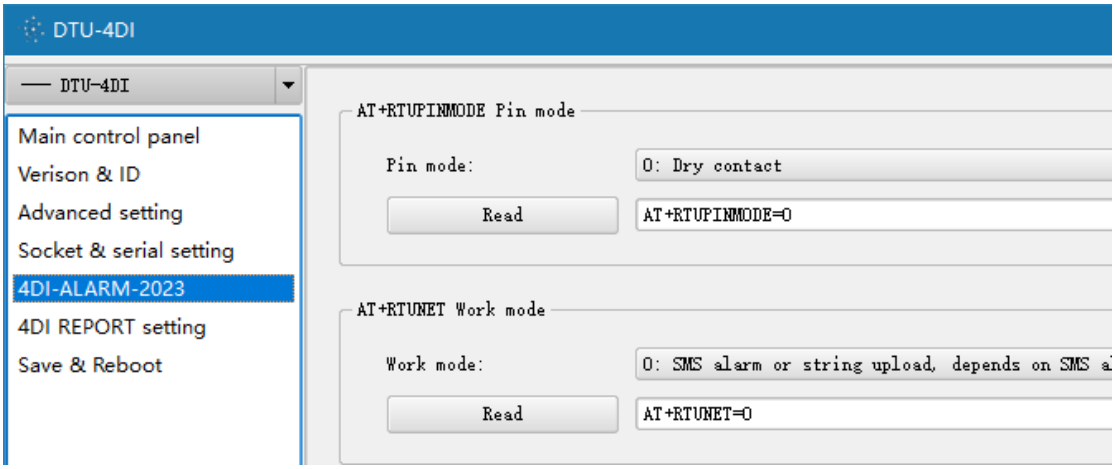
5. Configuration of 4-channel Discrete Input Monitoring

Select the 4DI-ALARM-2023 configuration in the configuration page list as shown in the figure below.

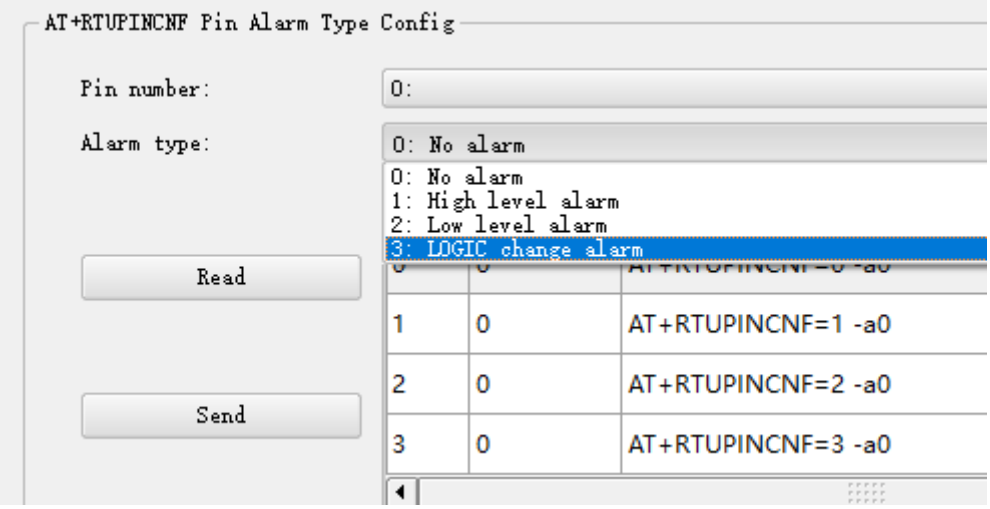


1) Settings for SMS Alerts

i. Set the pin mode of the DI input: dry contact or wet contact



ii. Set the alarm trigger type for each DI pin



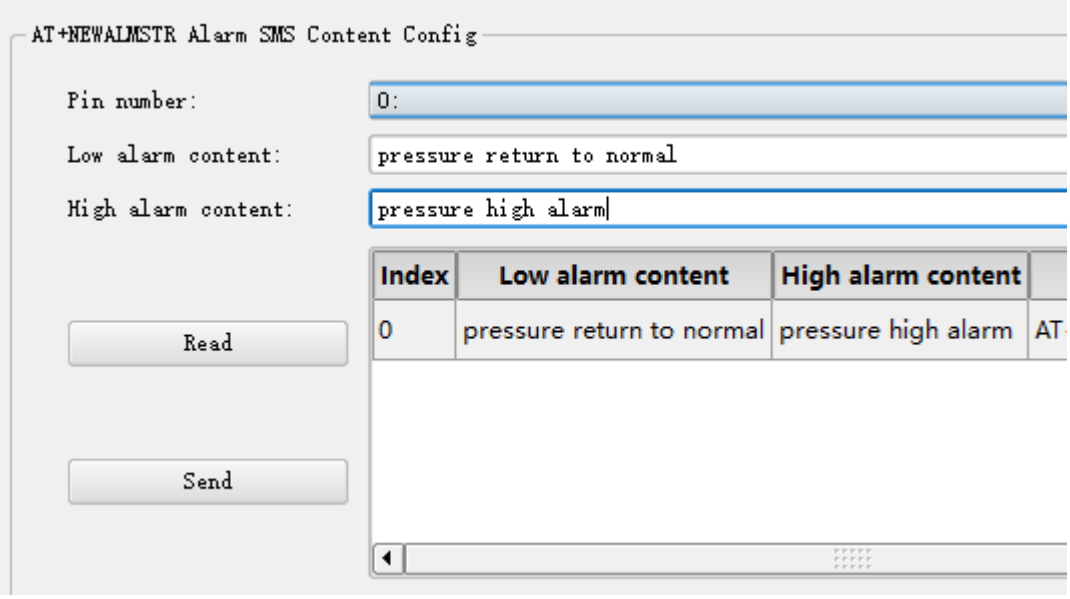
When using **wet contact input**, the alarm types are divided into: No Alarm, High-level Alarm, Low-level Alarm, and Level Change Alarm.

When using **dry contact input**:

- Switching from closed to open is equivalent to a High-level Alarm.
- Switching from open to closed is equivalent to a Low-level Alarm.

A **Level Change Alarm** means that an alarm SMS will be sent both when the level changes from low to high and when it changes from high to low.

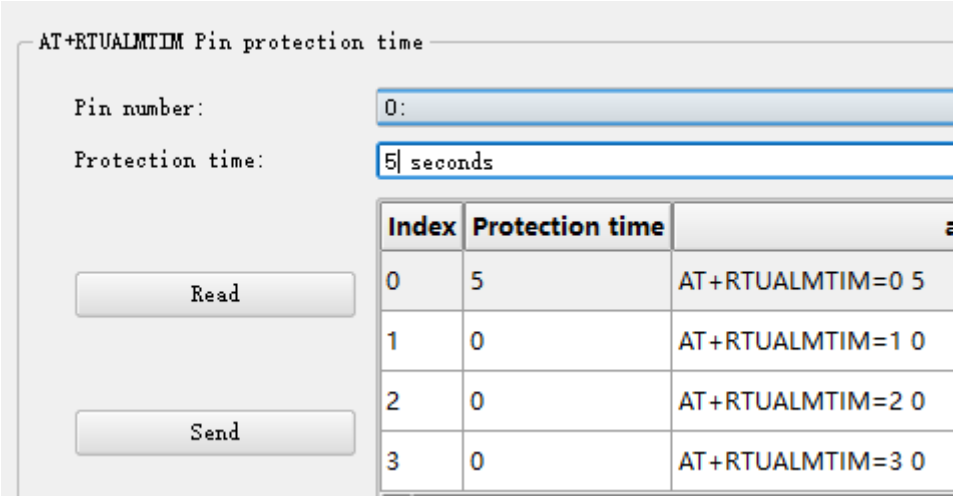
iii. Set the alarm SMS content for each DI pin:



Each DI pin can be configured with its own SMS content for low-level alarm and high-level alarm (maximum 256 characters). Combined with the alarm type settings of each pin, SMS alarm can be realized.

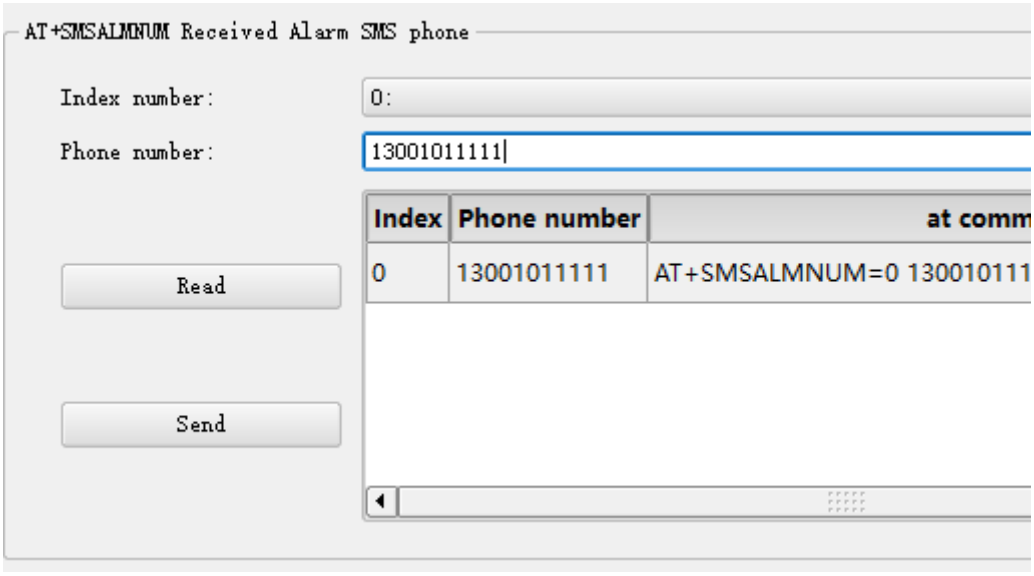
iv. Set the alarm state protection time for each DI pin:

After the DTU detects a change in the state of a DI pin, it will send an alarm **only when** the pin maintains the changed state for the configured protection time. The purpose of this setting is to avoid false alarm SMS caused by transient peak changes.



v. Set the mobile phone numbers for receiving alarm SMS:

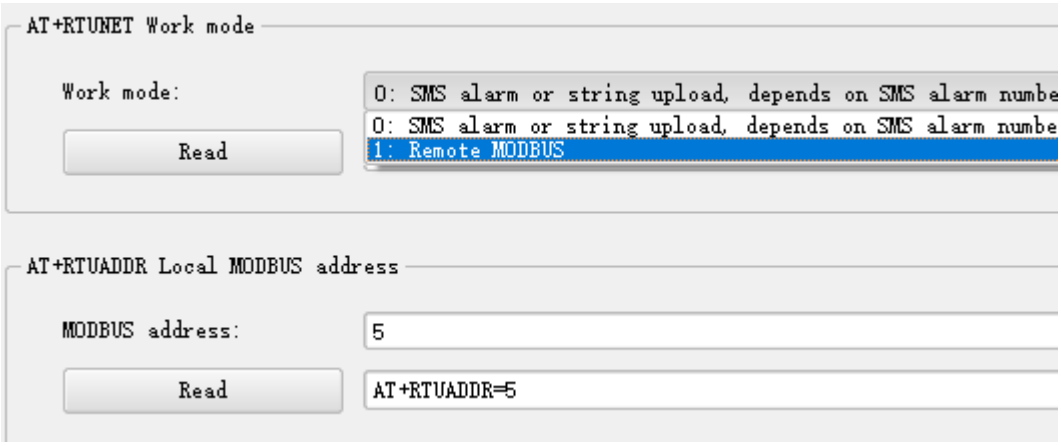
Set the mobile phone numbers for receiving alarm SMS in the following interface. A maximum of 16 numbers can be configured.



2) Upload Mode (Data Method) for Discrete Input State Change Information

0: SMS alarm or string timed upload working mode (when a mobile phone number is set, alarm messages will be sent via SMS).

1: Remote MODBUS working mode; set the MODBUS device address (ranging from 1 to 254) on the page shown in the figure below.



The Modbus register addresses of the four pins of the DTU are shown in the table below.

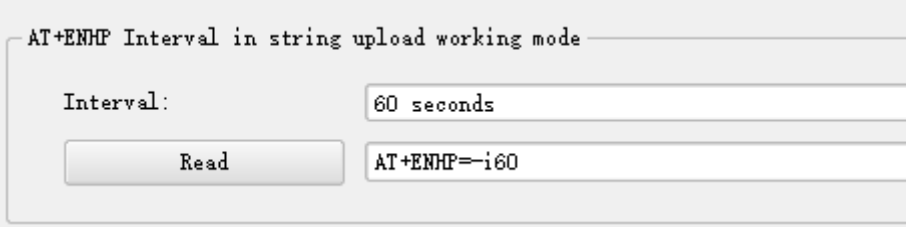
PIN NO.	Modbus Reginster Addr	W/R	Data type
DI-1	10001	Read only	BIT
DI-2	10002		
DI-3	10003		

DI-4	10004		

Corresponding Modbus query command: 01 02 00 00 00 04 79 C9

When the Modbus protocol is selected, set the string upload time in the figure below to 0 seconds, and the timed upload of string messages will be disabled.

Set the active reporting interval in string mode on the page shown in the figure below.



String content: 602242340956, 20231213085500, 8:1, 9:1, 10:1, 11:1

It includes the **device ID**, **time tag** and **pin status**, where

8 — Pin 0

9 — Pin 1

10 — Pin 2

11 — Pin 3