HAC-NBh Meter Reading System
User Manual V3.0

深圳市华奥通通信技术有限公司
HAC SHENZHEN HAC TELECOM TECHNOLOGY CO., LTD.

Address:9th floor, Block A,Building 1,International Innovation Valley,Xingke 1st street,Nanshan district,Shenzhen,Guangdong

Telephone : 0755-23981078

Fax : 0755-23981007

Website: www.rf-module-china.com

Catalogue

1. Overview

The HAC-NBh meter reading system is a completed solution for low-power consumption smart remote meter reading applications developed by Shenzhen HAC Telecom Technology Co., Ltd. based on NB-IoT technology. It consists of management platform, handheld-unit RHU, and communication module. Its functions cover acquisition, measurement, bidirectional NB-IoT communication, valve control and maintenance etc. It fully meets the requirements for wireless remote meter reading applications of water, gas, and electricity companies.

System Topology Diagram：
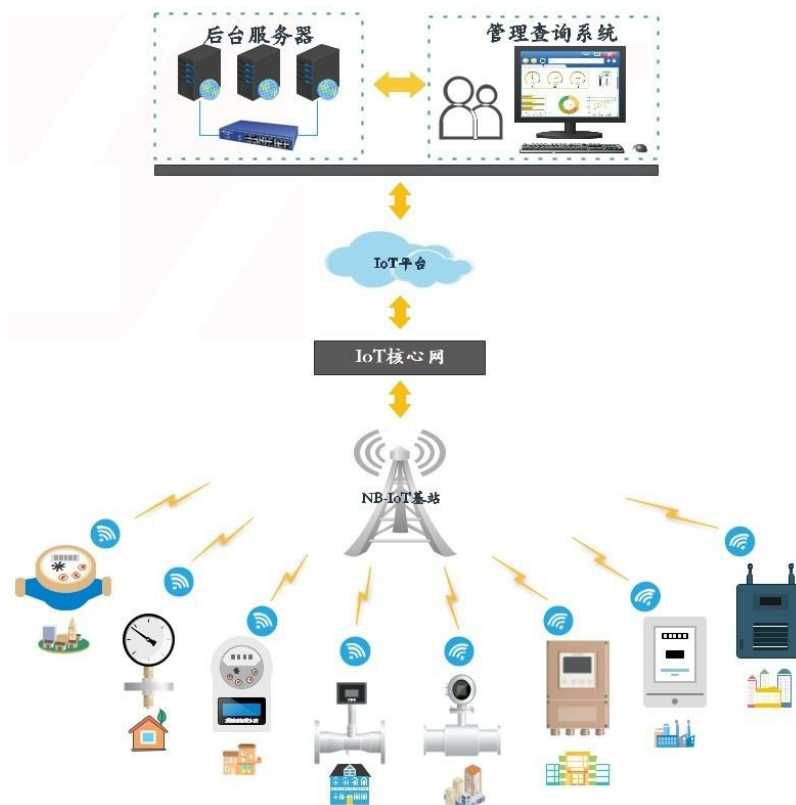
Main Features:

• Ultra-low power consumption: utilizing capacity type battery ER26500+SPC1520 can be able to reach 10 years of lifespan;

• Convenient to access: there is no need to rebuild the network, and it can be able to directly commercialized with the help of the operator's existing network;

• Large capacity: it can be able to storage 10 years of annual frozen data, 12 months of monthly frozen data, and 180 days of daily frozen data;

• Bidirectional communication: except remote meter reading, it can also achieve remote parameters configure and query, valve control etc.;

• Maintenance: it can be achieved through infrared tools, including firmware upgrades etc special functions.

Application Field:

• Wireless automative data collection

• Automative home and building

• Monitor and control functions in industrial IoT scenarios

• Wireless alarm and security system

• Sensor IoT (including smoke, air, water sensor, etc.)

• Smart home (smart door locks, smart household appliances, etc.)

• Smart transportation (smart parking, automative charging piles, etc.)

• Smart city (smart street light, logistic monitor, cold chain monitor, etc.)

2. NBh Module Parameters

2.1 Electrical performance

Parameter	Min	Typ	Max	Units
Working voltage	3.1	3.6	4.0	V
Working temperature range	-20	25	70	℃
Storage temperature	-30	-	80	℃
Sleep current	-	14.0	20.0	uA

Reminder: The working temperature is continuously higher than 40℃ or lower than -20℃. The battery solution should be selected carefully. If you have any questions, please consult us.

2.2 NB-IoT Parameters

- The working frequency band can be selected as telecom 850MHz (Band 5), mobile 900MHz (Band 8) or the NB-IoT frequency band supported by local operators, there is no need to apply for extra frequency points.

- For other parameters of NB-IoT module, please refer to the user manual

2.3 Communication Parameters

- Infrared communication

  Rate：9600bps

  Communication distance：0-15cm（Avoid direct sunlight）

3. NBh Module Specification

3.1 Dimension

HAC-NBh 尺寸图
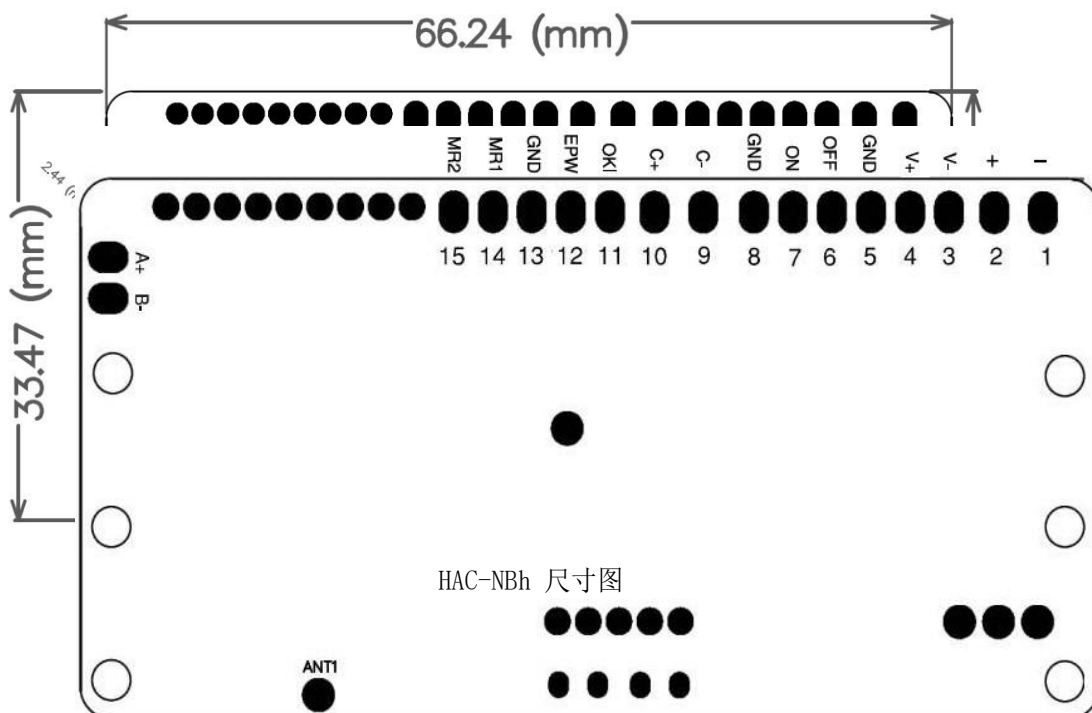
3.2 Pin Description

Pin Description:

Item	Name	Description
1	-	Input power negative
2	+	Input power positive, 3.1V-4.0V
3	V-	Valve motor drive output terminal
4	V+	Valve motor drive output terminal
5	GND	Power negative, the signal can be able to refer the level output
6	OFF	Close valve in place detection
7	ON	Open valve in place detection
8	GND	Power negative, the signal can be able to refer the level output
9	C-	Composite capacitor negative terminal
10	C+	Composite capacitor positive terminal
11	OKI	Magnetic attack detection (the software can be configured to use)
12	EPW	3.0V controllable power output (the software can be configured for use)
13	GND	Power negative, the signal can be able to refer the level output
14	MR1	Metering test line 1
15	MR2	Metering test line 2

Description:

(1) VDD: it connects to the positive of battery. It is recommended to use the capacity type battery ER26500+SPC1520 .

(2) EPW: The default is the DC power output terminal, which can be used to provide no more than 5mA working current for peripherals such as off-chip sensors. The current limit can be customized.

(3) The remaining electrical interfaces on the module that are not described in detail in this document are temporarily not open to the public, please be sure to leave them in the air.

4. NBh Module Functional Introduction

4.1 Touch button

The button is one of the ways to make the module enter the maintenance mode. The function of the button is as follows:

• **Short press**: don't exceed more than 2s, and the green led light will light up, indicating that the current terminal module is in an operational status.

• **Press key to trigger data report:**   press and hold until the red led light is on, and after letting go, touch the button again (with an interval of no more than 5s), and the green led light is on to activate the data report once. The activation time lasts no more than 7min. If the operation fails, you need to wait 5s before the operation.

• **Enter maintenance mode** Press and hold until the red and green led lights are on at the same time, and then touch the button again after releasing your hand (the green led light is on) to enter the local configuration mode, and the window will be opened for 3 minutes. If there is normal data interaction, continue to open the window for 3 minutes, Exit after 3min without data interaction.

• **Silent time**   The silent time is the duration of the module not responding to key actions. Each time during the data reporting process or during the infrared mode, the buttons are in silent state.

4.2 Maintenance

The communication module can be used for on-site maintenance of terminal equipment, including parameter setting, reading, firmware upgrades, etc. It uses infrared communication.

• **Infrared communication trigger working conditions**

Users need to press and hold the touch button to enter the infrared mode, please refer to section 4.1 for details.

• **Support module parameters configuration, modification and query**

• **Trigger NB-IoT module to report**

• **Terminal firmware upgrade**

4.3 NB-IoT communication

The module interacts with the platform through the NB-IoT network. The main functions of NB-IoT module are as follows:

- **Regular data reporting:** The terminal module regularly reports data according to the reporting cycle set by the user, once a day by default.

- **On-site trigger report:** The report can be triggered by pressing the button or by the local command;

- **Multiple retransmissions:**

According to the network conditions, the uplink data can be automatically retransmitted at 15~25min intervals for the data that fails to be reported regularly, and the maximum retransmission is twice, which effectively improves the reliability of communication;

- **NB-IoT communication protocol:**

It usually adopts telecom COAP bottom communication protocol, it can also be switched to UDP protocol;

- **Support remote parameter configuration, parameter query, and time calibration;**

- **Data reporting**

Data reporting contains terminal information, base station signals, battery voltage, meter real-time data, dense data, frozen data, and alarm data etc.

4.4 Metering valve control

- Support a variety of measurement methods, including single and dual pulse measurement (hall, reed switch, magneto-resistive sensor, etc.), non-magnetic, direct reading, etc., it's a fixed measurement method before leaving the factory.

- Magnetic attack detection function, which generates an alarm sign when detecting malicious magnetic attacks.

- Support the power off storage when the module is powered off, there is no need to re-initialize the measurement value.

- Support remote valve control, the application platform can transmit commands to control the valve.

- Support dredge valve function.

5. HAC-RHU Description

（RHU sample）

5.1 HAC-RHU Functional Features

• Maintenance: it can be able to do parameter reading, command setting, firmware upgrade, field signal detection.

• Connect to the mobile APP via Bluetooth for data transmission and command settings.

• Automatic power saving function, RHU will automatically shut down if there is no uplink and downlink data for communication within 10 minutes.

• Automatically shut down when the battery is low.

• Built-in rechargeable lithium battery, after fully charged, it can work continuously for more than 8 hours.

• The status indication light is clear and concise.

5.2 HAC-RHU Structure Instruction

5.2.1 Dimension

Length X Width X Height (9.7cm×,4.5cm×,2.3cm),without infrared head.

5.2.2 Indicator light and charging interface

① miniUSB charging input interface, the handheld can be charged through this interface.

②Infrared head, USB interface, plug and play.

③Handheld unit logo.

④The handheld unit power on/off button and power light, long press this button (about 2s) until the red power light lights up and the RHU power is turned on, which means it is turned on. After powering on for 3 seconds, press and hold this button (about 2s) until the red power light goes out and the RHU power is turned off, indicating shutdown.

⑤Handheld unit charging status light (red), this light is on when charging; this light will automatically go out after charging, indicating that the RHU is fully charged.

⑥Handheld unit charger connection light (yellow), this light will be on when the RHU is connected to the adapter.

⑦Bluetooth status light (red) of the handheld unit. This light flash when the Bluetooth is not connected; after the Bluetooth pairing connection is successful, the light will stay on.

⑧Handheld unit wireless data communication light (blue), when the wireless data transmits, the light will flash.

6. WEB server

web login address：**http://www.haciot.cn:7007/mls/**

Please contact the sales person for the user password.