JNC technology
銘祥科技實業股份有限公司

JNC

Cloud Box

CB



For firmware v1.19 or later

V2.19

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Symbols Used in This Manual

What you see	Meaning
WARNING (gray box)	Failure to comply may result in personal injury or equipment damage
CAUTION (gray box)	Failure to comply will result in recoverable problems such as incorrect settings or data loss
Power off first	Turn off the power switch inside the enclosure and unplug the power adapter before proceeding (see 1-4 Pre-Operation Labels (p. 12))
Live work	Components inside the enclosure must be operated while powered; touch only the specified component
Factory setting – do not change	Set up by JNC at the factory; changing it may cause loss of connection or device failure
No label	You can complete the task yourself by following the steps in this manual
Red text	Key point
1 2	Corresponds to the same number in the screenshot above
A gray line "Path: A → B → C"	Where to click to open this screen
Blue underlined text (p. N)	Another section of this manual. Click it in the electronic file; in the printed manual, turn to that page

Product Overview and Features

The product name is Cloud Box (CB).

This product is an ideal tool for fixed-point monitoring and patrol inspection of outdoor environments, and can transmit data to the cloud platform. It has an IP68 waterproof (L and C types; A type IP67) and UV-resistant enclosure design, suitable for harsh environments such as humid and hot conditions. It has a web interface for real-time remote control, allows historical data and Event Log records on the USB flash drive to be downloaded remotely, and sends SMS notifications of power failure and power restoration. It rings before sending an SMS, sends an SMS notification on return to normal, and sends another SMS if the abnormality persists. Channel name, measurement range, unit, zero offset, slope, and HH/H/L/LL alarm points can be set by the user. Up to 20 mobile numbers can be set and managed in two-stage groups, and contacts can be assigned to each channel. This product is well suited to sites that require remote monitoring and management, such as environmental monitoring, independent monitoring stations, flood monitoring, pollution monitoring, wastewater treatment plants, and water treatment plants.

Product Features:

- **IP68 waterproof enclosure (L and C types; A type IP67), suitable for harsh environments, resistant to humidity, heat, and vibration.**
- **Web interface for remote management from a browser.**
- **Proactive early warning: optional SMS alarms (Chinese-language SMS supported; power failure SMS).**
- **Firmware can be updated via USB.**
- **Reads 4G signal strength.**
- **Can be charged by a solar panel, and detects battery level.**
- **Receives GPS signals.**
- **Sleep mechanism with configurable schedules.**
- **Measures solar charging voltage/charging current.**
- **Outputs 5 V, 12 V, or 24 V power to sensors (one of three, selected with a jumper cap).**
- **Three-network architecture: RJ-45, 4G (optional), and Wi-Fi (optional) communication at the same time.**
- **Automatic power source priority: mains power/solar/battery.**
- **0.96-inch color LCD screen showing on-site values, USB status, and date.**
- **Ideal for independent monitoring of a small number of points: on-site USB logging/SMS alarms/4G or NB-IoT communication/power-saving design.**
- **Application areas: environmental monitoring, weather monitoring, independent monitoring stations, flood monitoring, pollution monitoring, wastewater treatment plants, water treatment plants.**

PART 1.SAFETY INFORMATION

Questions Answered in This Chapter

- **Which terms should I understand before use?**
- **How many levels of warning boxes does this manual use?**
- **Which operations require powering off first, which must be performed while powered, and which settings must not be changed?**

Not Covered in This Chapter

- **Installation location restrictions → 4-1 Installation Requirements (p. 25)**
- **Wiring methods → 4-3 Wiring (p. 28)**

1-1 Before You Read: Terms

Term	Meaning	On-site example
Channel (Ch)	A data slot on the web page. Each sensor value, input point, or output point occupies one channel	Ch-1 = Temperature from an external thermometer
AI (analog input)	An input that receives continuously varying values. This unit has 1 point of 4–20 mA analog input	4–20 mA water level sensor
DI (digital input)	An input with only two states: closed and open. This unit has 2 points, which can count switching up to 200 Hz	Float switch
DO (digital output)	An output with only two states: on and off. This unit has 1 dry contact output point; connect equipment through an intermediate relay	Intermediate relay for external equipment
Dry contact	The contact only provides “closed/open” and does not supply power itself	Like a wall light switch; the power comes from elsewhere
RS-485	A communication line for connecting sensors. This unit has two sets (RS-485-1, RS-485-2), each configurable as Master or Slave	External RS-485 water quality sensor
Master/Slave	Master: this unit actively reads external sensors. Slave: this unit provides data for other devices to read	This unit reading sensors = Master
Firmware	The program in the device. The version number is shown in the upper-left corner of the web home page, or on the screen while the SW3 button is held down	v1.19 260827

1-2 Safety Message Levels

This manual uses two types of boxes to indicate risk. The level is identified by "WARNING/CAUTION" on the first line of the box:

WARNING

Failure to comply may result in personal injury or equipment damage.

CAUTION

Failure to comply will result in recoverable problems such as incorrect settings or data loss.

1-3 Safety Precautions

1. **Do not use the product in locations with strong vibration or strong electromagnetic interference, to avoid product damage, ERROR displays, or measurement errors. Shield sensor signal cables and do not bundle them with power cables, to avoid signal interference.**
2. **Disconnect power before any repair or maintenance, to avoid personal injury or product damage from accidental contact with the power source.**
3. **When installing in an environment contaminated with conductive contaminants (metal dust, moisture, etc.), provide appropriate sealing.**
4. **If any component or module of the product has been removed or disassembled, do not operate it, and contact JNC as soon as possible.**
5. **JNC is not liable for any effects or damage resulting from use not in accordance with this manual, or from applications and environmental conditions beyond those stated in the specifications.**

For installation location restrictions, see 4-1 Installation Requirements (p. 25).

1-4 Pre-Operation Labels

Operations without a label can be completed by following the steps in this manual. Operations requiring attention are marked with one of the following labels:

Label	Meaning	Example
Power off first	Turn off the power switch inside the enclosure (see 3-2 Internal Components (p. 19) 5) and unplug the power adapter before proceeding	Wiring
Live work	Open the top cover and operate components inside the enclosure while powered; touch only the specified component	Factory reset, firmware and web page update
Factory setting – do not change	Set up by JNC at the factory; changing it may cause loss of connection or device failure	IP setting, communication settings, channel source, configuration

- Settings such as channels, alarms, SMS, and DO control are shared by the whole unit; notify other on-site personnel before changing them.

PART 2.PRODUCT INTRODUCTION

Questions Answered in This Chapter

- What problem does this product solve? What can it do?
- How do I check which configuration my unit has?
- What do the specification values mean?

Not Covered in This Chapter

- Names of the components inside the enclosure → PART 3 Part Names (p. 18)

2-1 What This Product Solves

This unit is a logging and transmission box installed at outdoor monitoring points: it reads values from on-site sensors, logs them to a USB flash drive, uploads them via Ethernet cable, 4G (optional), or Wi-Fi (optional), and issues alarms and SMS messages when values are abnormal. It can log and evaluate data independently even when no network is available on site.

- View on site: The L type has a transparent top cover and a 0.96-inch screen showing the real-time value of each channel, the IP, the firmware version, and the date and time.
- View remotely: Connect to the device web page from a computer or mobile phone to view real-time values and the Event Log, and download log files.
- Notification of abnormalities: When a value exceeds the setpoint, it is written to the Event Log; with the SMS module, an SMS is sent after ringing first, and power failure and power restoration are also notified.
- Sites without mains power: The unit can be used with a solar panel and battery, and sleep can be set to save power.

Application areas: environmental monitoring, weather monitoring, independent monitoring stations, flood monitoring, pollution monitoring, wastewater treatment plants, water treatment plants.

2-2 What It Can Do

Function	Description	Details
Reading sensors	2 sets of RS-485 (Modbus), 1 point of 4–20 mA analog input, 2 points of digital input	3-3 Contacts and Terminals (p. 22)
Real-time data	Real-time values of each channel on the web home page and the screen	5-3 Home Page Overview (p. 35)
Alarms	Each AI channel can be set with Over High, High, Low, Over Low, High Fail, and Low Fail alarms	6-5 Alarm Settings (p. 45)
SMS (optional)	SMS for alarms, power failure, and power restoration, with optional ringing before sending; 20 mobile numbers in two-stage groups	6-7 SMS Settings (p. 50)
Logging and download	Logs the real-time log and Event Log to an inserted USB flash drive; downloadable from the web page	6-10 Download (p. 71)
Upload	Http and MQTT upload via Ethernet cable, 4G (optional), or Wi-Fi (optional)	6-8-6 Upload Settings (p. 63)
DO control	1 dry contact output point, switched by logic, schedule, or cycle. On/off only; connect equipment through an intermediate relay	6-6 DO Control Settings (p. 49)
Sleep	Wakes up at set times to read values, log, and upload, and sleeps the rest of the time to save power	6-8-10 Sleep Setting (p. 66)
Special functions	Reads this unit's battery voltage, charging current, etc., plus wind speed and temperature/humidity statistics and math operations	7-6 Special Function Applications (p. 79)
Reading by other systems	Modbus RTU (RS-485), Modbus TCP	APPENDIX A Modbus Register Table (p. 95)

2-3 Checking Your Unit's Configuration

This unit differs as follows depending on the options selected when ordering. This manual describes the standard configuration; for options and the latest specifications, contact your sales representative or refer to the product catalog on the official website.

Item	Difference	Affected content in this manual
Network	Ethernet (standard); Wi-Fi (optional, requires the Wi-Fi module)	Connecting by Wi-Fi from a mobile phone and Wifi Setting apply only to units with the Wi-Fi module
SIM card communication	None/NB-IoT/4G (built-in or external antenna)/4G with GPS	SMS, 4G upload, location alarm, and base station apply only to units with a communication module
Enclosure	L type: transparent top cover, with screen C type: opaque top cover, without screen A type: installed in an ABS waterproof enclosure (requires the separate CBA accessory option)	The C type has no screen, so check the device label for the IP; the A type differs in size, material, and ingress protection rating (see 2-4 Specifications (p. 16))
Battery charging	Charges lithium batteries/charges lead-acid batteries	Battery wiring
Sensor power output	Not supplied by this unit/5 V/12 V/24 V	Sensor power wiring and wattage limit (see 4-3 Wiring (p. 28))
Connectors	Cable glands/quick connectors	Wiring method

Check your unit's configuration: Look at the device label (see 3-4 Reading the Device Label (p. 24)). In the Output Power, SIM Card, Screen, and Communication Mode fields of the label, the items marked ■ are this unit's configuration.

2-4 Specifications

Description:

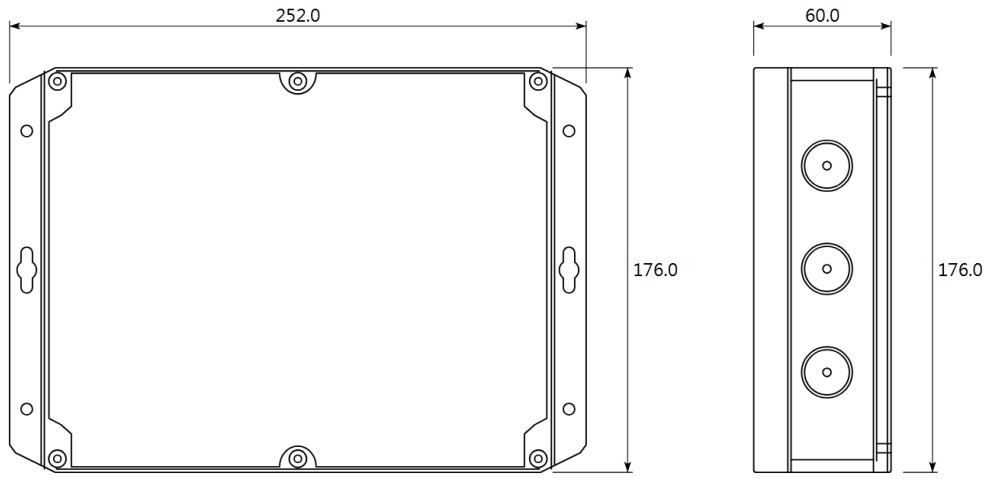
Item	Specification	Description
Power (device)	12–36 V DC	Two sets of power terminals (see 3-3 Contacts and Terminals (p. 22))
Power (supplied adapter)	Input 100–240 V AC, 50/60 Hz, 0.8 A; output 24 V DC, 1.0 A	A standard mains outlet is sufficient
Power consumption	≤ 3.6 W	Use this to estimate power requirements when using a solar panel and battery
Operating temperature	–20 to 70 °C (Wi-Fi 0 to 70 °C)	Suitable for outdoor use
Storage temperature	–20 to 70 °C	
Relative humidity	0–95 %RH, non-condensing	
Ethernet interface	RJ-45 Ethernet, Modbus TCP protocol	
Ethernet communication functions	Web Service, standard Modbus protocol, http upload, MQTT upload	
Communication interface	RS-485 × 2, each freely configurable as Master or Slave	Connects external sensors, or provides data to other systems
Communication protocol	Standard Modbus protocol	
4G communication (optional)	Alarm ringing and SMS, http(s) upload, MQTT(s) upload	
Analog input (AI)	4–20 mA × 1	
Digital input (DI)	× 2, switch counting up to 200 Hz	
Digital output (DO)	Dry contact × 1, 24 V DC 1 A	Connect equipment through an intermediate relay

Item	Specification	Description
Display	0.96-inch alphanumeric color TFT-LCD	L type only; displays English letters and numbers only
Product dimensions	L and C types: 252×176×60 mm A type: 300×400×180 mm	W×H×D
Product weight	L and C types: < 0.7 kg A type: < 3.5 kg	
Housing material	L and C types: PC + UV-resistant A type: ABS	
Ingress protection rating	L and C types: IP68 A type: IP67	Dustproof, waterproof, and weather-resistant
Logging	USB logging, up to 64 GB supported (FAT32 format)	
Safety certification	EU CE safety certification, US FCC certification	
Patents	Taiwan (R.O.C.) Patent Certificate Nos. M429156/M474956/M594326 China Patent Certificate Nos. 2514208/3968342	

Specifications are based on the official website catalog v1.43; the A type ingress protection rating follows the current enclosure specifications.

Product Dimensions (mm):

The L and C types use the same enclosure:



A type enclosure: 300 × 400 × 180 mm.

PART 3.PART NAMES

Questions Answered in This Chapter

- What can be seen on the enclosure and the screen?
- What is each component inside the enclosure called, and what does it do?
- What does each terminal connect to?
- What is written on the device label?

Not Covered in This Chapter

- How to wire → 4-3 Wiring (p. 28)

3-1 Exterior and Screen



L type: transparent top cover, with screen



C type: opaque top cover, without screen

The screen (0.96 inch) of the L type is behind the display window in the top cover and shows the following:

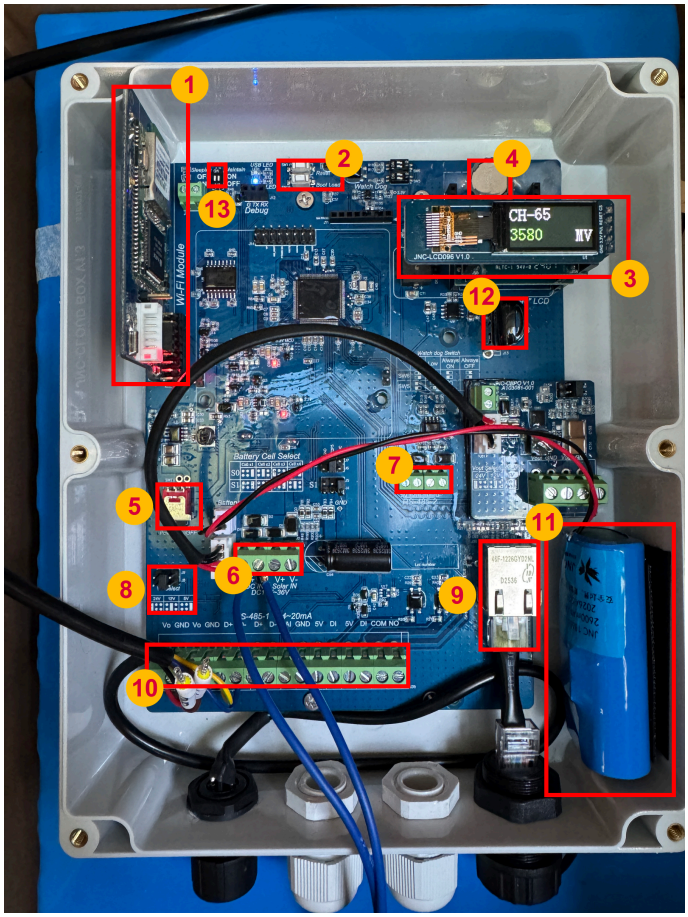
Screen	Content
Normal	Real-time value of the current channel (cycling through the channels), USB status, date, time
While SW3 is held down	IP, firmware version, model, and date; returns to the previous screen about 1 second after release (see 3-2 Internal Components (p. 19) 2)
When a sensor cannot be read	Shows READ (for what to do, see 8-1 Symptoms and Checks (p. 85))

- The screen can display only English letters and numbers. The channel names shown on the screen and the switching interval are set on the web page (see 6-8-9 Display Setting (p. 65)).
- The C type has no screen; check the device label for the IP (see 3-4 Reading the Device Label (p. 24)).

3-2 Internal Components

CAUTION

The photos of the enclosure interior in this section are for identifying components. Power off before wiring or adjusting jumper caps (see 1-4 Pre-Operation Labels (p. 12)); do not operate any buttons or switches other than SW1, SW3, the power switch, and the sleep switch SW4.



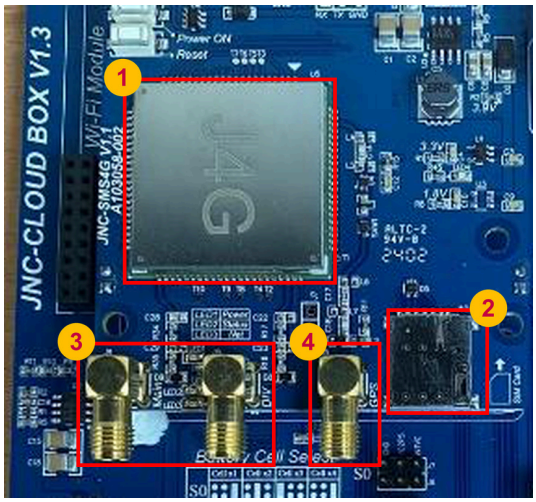
Description:

Code	Name	Function
1	Wi-Fi module (optional)	Enables Wi-Fi communication when installed: a mobile phone can connect to this unit's Wi-Fi and open the web page to view data, and devices can be bridged

Code	Name	Function
2	SW1 button (upper, printed on the board: Reset) SW3 button (lower, printed on the board: Boot Load)	SW1: Press once to restart the device. SW3: Press and hold to view the IP and current firmware version; press once (less than 10 seconds) to clear the COM2 alarm output (see 6-8-5 Basic Setting (p. 62)); press and hold for more than 10 seconds to restore all internal parameters to factory defaults (see 8-3-1 Factory Reset (p. 89)). Use SW1 and SW3 together to update the firmware (see 8-4 Firmware and Web Page Update (p. 90))
3	LCD screen	Shows the real-time value of the current channel, IP, version, date, and time (see 3-1 Exterior and Screen (p. 18))
4	Coin cell battery	Keeps the device time during power failure
5	Power switch (printed on the board: Power ON/OFF)	Turn to ON (slide to the right) to switch on the power
6	Power terminal block	12–36 V DC power input, two sets (see 3-3 Contacts and Terminals (p. 22))
7	RS-485-2 terminal block	Second RS-485 set (see 3-3 Contacts and Terminals (p. 22))
8	Sensor power output voltage selection jumper (printed on the board: Vo Select)	Select 24 V, 12 V, or 5 V with the jumper cap; the voltage is output to sensors from Vo and GND on terminal block 10. Set at the factory according to the order (see the Output Power field on the device label)
9	Ethernet port (RJ45)	For an Ethernet cable. A computer can connect to this unit's web page via the Ethernet cable to view real-time data. Light on and flashing = connected normally; off = Ethernet cable not connected properly or faulty
10	RS-485-1, AI, DI, DO terminal block	See 3-3 Contacts and Terminals (p. 22)
11	Backup battery	Lithium battery (2600 mAh shown)

Code	Name	Function
12	USB port	For a USB flash drive (type-A; a USB flash drive is inserted at the factory) to log historical data, alarm data, and alarm history; also used for firmware updates
13	Sleep switch SW4 (printed on the board: Sleeping/Maintain)	Both levers up (Maintain ON) = no sleep; both down (Sleeping ON) = sleep allowed, but the device sleeps only when sleep is also enabled in the web page settings (see 6-8-10 Sleep Setting (p. 66)). Power off before switching

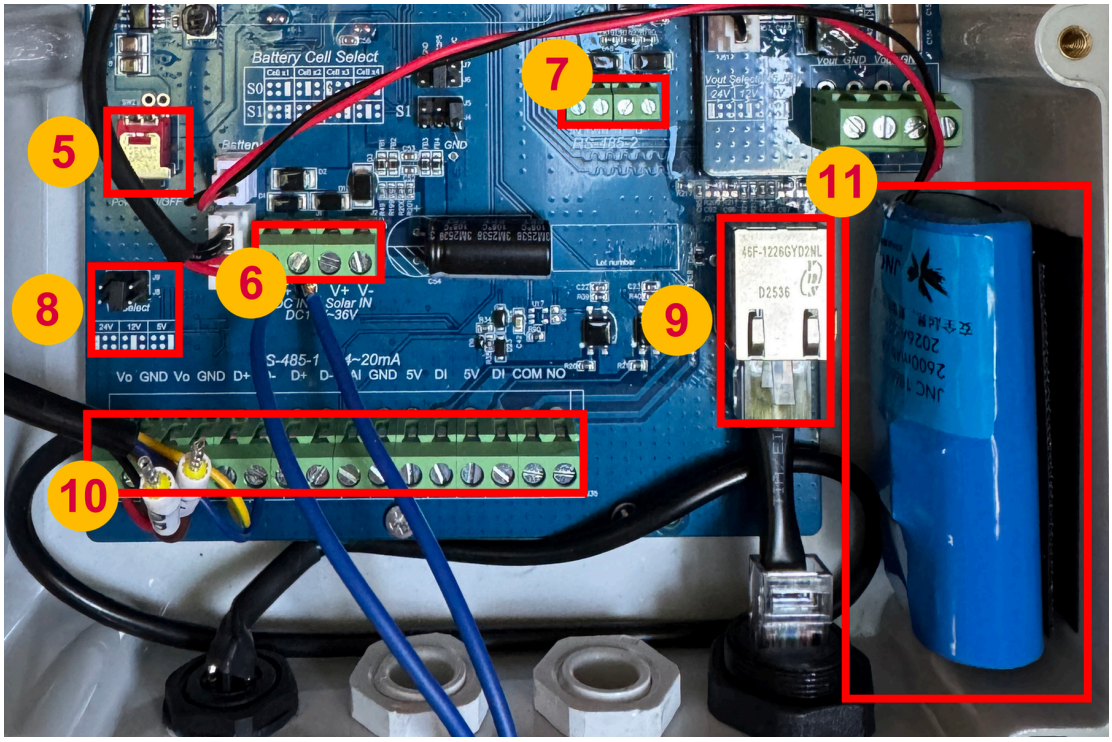
Optional components (4G and GPS types only): The unit in the photo at the beginning of this section does not have these options installed; see the figure below for their locations.



Code	Name	Function
1	4G/NB-IoT module	4G or NB-IoT wireless communication that sends device data to the cloud platform, where it can be viewed from a mobile phone or computer
2	SIM card slot	After a SIM card (Nano SIM, 12×9 mm) is inserted, the SMS function can be used and values can be uploaded to the platform
3	External antenna connectors	Improve signal strength (left: main antenna, right: auxiliary antenna; the left one is primary)
4	GPS antenna connector	For an external GPS antenna to determine the location

3-3 Contacts and Terminals

Power off first



Vo	GND	Vo	GND	D+	D-	D+	D-	AI	GND	5V	DI	5V	DI	COM	NO
A				B				C		D				E	

Code	Name	Terminal	Description
6	Power terminal block	DC IN (V+, V-), Solar IN (V+, V-)	12–36 V DC power input, two sets; V+, V-, V+, V- from left to right; observe polarity when wiring
7	RS-485-2 terminal block	5V, GND	5 V power output
		D2+, D2-	RS-485 connection. The connection type can be set to Master (for external standard RS-485 sensors) or Slave (provides this unit's data to other devices)
8	Sensor power output voltage selection jumper	—	Select the Vo output voltage with the jumper cap: 24 V, 12 V, or 5 V (one of three)
A	Terminal block 10: sensor power output	Vo, GND	Outputs the voltage selected with jumper 8 to power sensors, two sets
B	Terminal block 10: RS-485-1	D+, D-	RS-485-1 connection. The two pairs of D+ and D- are connected internally and belong to the same set; use them to daisy-chain the next device. The connection type can be set to Master or Slave, as for RS-485-2
C	Terminal block 10: analog input	AI, GND	4–20 mA input contact
D	Terminal block 10: digital input	5V, DI	Two sets of DI contacts
E	Terminal block 10: digital output	COM, NO	DO output contact (dry contact, 24 V DC 1 A; connect equipment through an intermediate relay)
11	Backup battery	—	Where the battery connects to the controller board. Battery capacity options: 10000 mAh/50000 mAh

- RS-485 Master/Slave is set on the web page under System → Rs485 Setting (see 6-8-4 Communication Settings (Rs485 Setting) (p. 61)). On the same RS-485 line, each device must have a unique slave ID.

3-4 Reading the Device Label

All units have the same factory IP, which is also shown on the device label; the serial number differs for each unit; check it on the device label. The label is on the top cover; fields with options are shown as boxes: ■ means this unit has the item, □ means it does not.



Field	Content
Model (型號)	CB
Serial No. (序號)	Different for each unit
Input Power (輸入電源)	12–36 V DC
Output Power (輸出電源)	Sensor power output voltage: the item marked ■ is this unit's setting (5 V/12 V/24 V)
IP	The address to enter in the browser when connecting with an Ethernet cable
SIM Card (SIM卡)	This unit's communication module: the item marked ■ (4G/NB-IoT); all □ means none installed
Screen (螢幕)	■ means a color LCD screen (L type); □ means no screen (C type)
Communication Mode (通訊模式)	Communication methods available on this unit: the items marked ■ (RS-485/WiFi/Ethernet (乙太))

PART 4.INSTALLATION

Questions Answered in This Chapter

- Where should it be installed, and what should be avoided?
- How are the power, sensors, and outputs wired?
- What should I do at first power-up?

Not Covered in This Chapter

- Terminal names → 3-3 Contacts and Terminals (p. 22)
- Web page operation after power-on → PART 5 Basic Operation (p. 31)

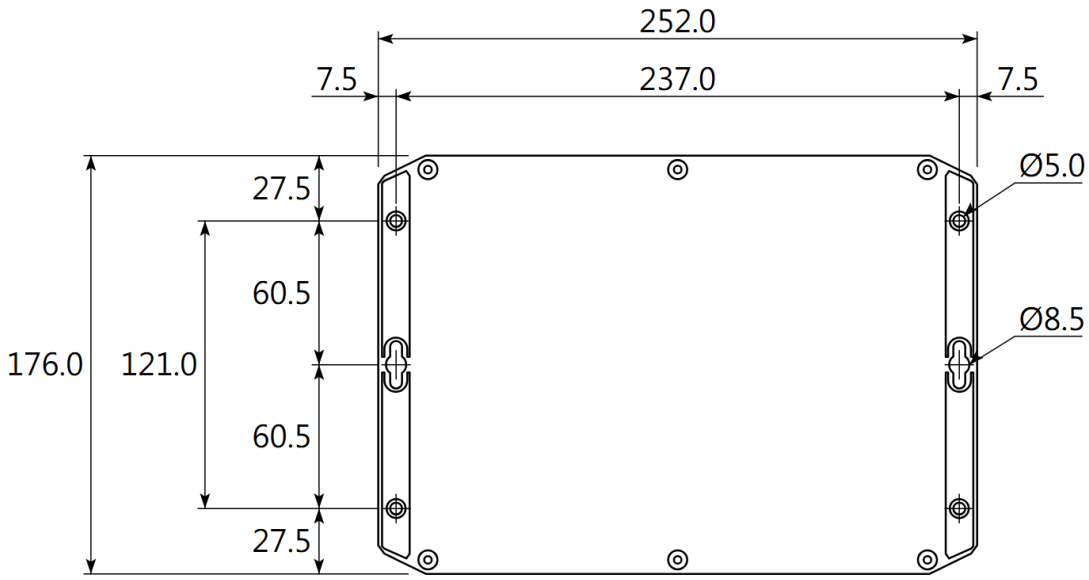
4-1 Installation Requirements

Condition	Requirement	Consequence of violation
Vibration, electromagnetic interference	Do not install in locations with strong vibration or strong electromagnetic interference	Product damage, ERROR display, or measurement errors
Signal cables	Shield sensor signal cables and do not bundle them with power cables	Signal interference
Conductive contamination	Where conductive contaminants such as metal dust or moisture are present, provide appropriate sealing	Short circuits or corrosion causing device failure
Operating environment	Operating temperature −20 to 70 °C (Wi-Fi 0 to 70 °C); relative humidity 0–95 %RH, non-condensing (see 2-4 Specifications (p. 16))	Reading deviation or device failure

4-2 Mounting

4-2-1 L and C Types

The mounting tabs on the left and right sides of the enclosure are molded in one piece with the enclosure; each side has 2 round holes (Ø5.0 mm) and 1 keyhole slot in the middle (large circle Ø8.5 mm). The figure below shows the hole positions on the rear of the enclosure.

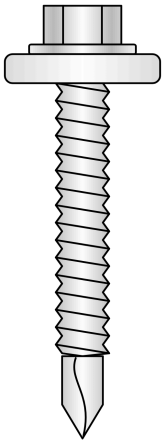


Unit: mm

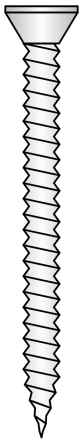
Mounting Surface Screws (Supplied by User)

Prepare screws according to the mounting surface material, 4 per unit (2 round holes on each side):

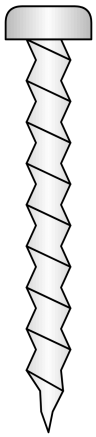
Mounting surface material	Screw	Specification	Pilot hole
Metal (sheet thickness 3 mm or less)	Self-drilling screw (hex washer head, with sealing washer)	Diameter 4.2 mm (#8) Length 25 mm (1 in.)	Not required
Wood	Wood screw	Diameter 4.2 mm (#8) Length 38 mm (1.5 in.)	Not required
Concrete	Concrete screw	Diameter 4.2 mm (#8) Length 38 mm (1.5 in.)	Required Drill bit 3.2 mm (1/8 in.) Depth approx. 45 mm (1.8 in.)



For metal: self-drilling screw



For wood: wood screw



For concrete: concrete screw

Installation Steps

1. Select the installation location: it must meet 4-1 Installation Requirements (p. 25) and leave space for the enclosure (for dimensions, see 2-4 Specifications (p. 16)).
2. Following the mounting hole layout, mark the centers of the 4 round holes on the mounting surface: 237.0 mm apart horizontally and 121.0 mm apart vertically. For a concrete mounting surface, first drill pilot holes at the marked positions (for drill bit and depth, see the table above).
3. Align the round holes of the mounting tabs with the marks and fasten them with screws at all 4 points. Stop tightening as soon as the mounting tabs sit flat; overtightening will crack the plastic mounting tabs.

4-2-2 A Type

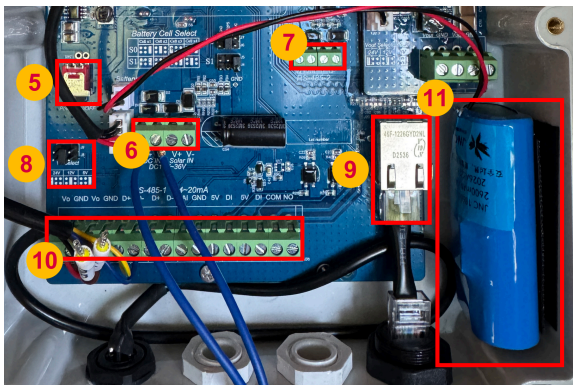
The A type is shipped with the CB already installed in an ABS waterproof enclosure. Depending on the CBA accessories ordered, the enclosure contains a no-fuse breaker (NFB), terminal block, fuse, and power supply (12 V DC or 24 V DC, 50 W); solar types do not include the power supply or the no-fuse breaker. For enclosure dimensions, see 2-4 Specifications (p. 16).

The internal layout varies by project; contact JNC for installation and wiring.

4-3 Wiring

Power off first

Before wiring, turn off the power switch inside the enclosure (3-2 Internal Components (p. 19) 5) and unplug the power adapter. See the figure below for terminal locations, and 3-3 Contacts and Terminals (p. 22) for terminal descriptions.



What to connect	Where to connect	Description
Power	DC IN (V+, V-) on power terminal block 6	12–36 V DC; observe polarity. The supplied adapter outputs 24 V DC 1.0 A
RS-485 sensor	RS-485-1 (D+, D- on terminal block 10) or RS-485-2 (D2+, D2- on terminal block 7)	When this unit reads the sensor, set that RS-485 set to Master
4–20 mA sensor	AI, GND on terminal block 10	1 point
Switch signal	5V, DI on terminal block 10	2 points, switch counting up to 200 Hz
External equipment	COM, NO on terminal block 10	Dry contact 24 V DC 1 A; connect equipment through an intermediate relay
Sensor power	Vo, GND on terminal block 10	Voltage selected with jumper 8: 24 V, 12 V, or 5 V; see below
Solar panel	Solar IN (V+, V-) on power terminal block 6	12–36 V DC; observe polarity
Battery	Backup battery 11 (connected at the factory)	Lithium or lead-acid battery depending on the ordered configuration

Sensor power output voltage: Set at the factory according to the order; see the item marked ■ in the Output Power field of the device label (see 3-4 Reading the Device Label (p. 24)). To change the voltage, power off first and move the jumper cap according to the diagram printed on the board: the column in which the jumper cap is inserted vertically determines the output voltage (left column 24 V, middle column 12 V, right column 5 V).



Sensor power output wattage limit:

Output voltage	Wattage limit
5 V	< 16 W
12 V	< 24 W
24 V	< 24 W

- **When using the supplied adapter (24 V DC 1.0 A, 24 W), this unit consumes up to 3.6 W; the total power consumption of the sensors must be 20 W or less and must not exceed the limit for that voltage in the table above.**

4-4 First Power-Up

1. Confirm that wiring is complete and a USB flash drive is inserted in the USB port.
2. Plug in the power adapter, and turn the power switch inside the enclosure (3-2 Internal Components (p. 19) 5) to ON (slide to the right).
3. L type: The screen shows the value of each channel.
4. Connect to the device web page (see 5-1 Connecting to the Device Web Page (p. 31)) and change the login password immediately (see 5-2 Login and Password Change (p. 34)).
5. Check that the values of all channels on the home page are normal; for channels showing Read.., check according to 8-1 Symptoms and Checks (p. 85).

PART 5.BASIC OPERATION

Questions Answered in This Chapter

- How do I connect to the device web page from a computer (Ethernet cable) or a phone (Wi-Fi)?
- What is the login password?
- How do I read the home page and the options of the settings button?

Not Covered in This Chapter

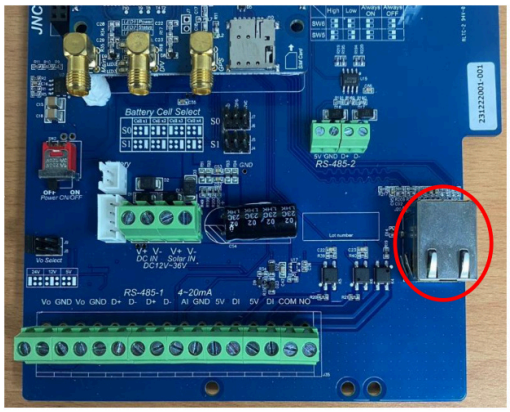
- Channel, SMS, and system settings → PART 6 Settings (p. 37)
- DO control rules and special functions → PART 7 Advanced Control (p. 73)

5-1 Connecting to the Device Web Page

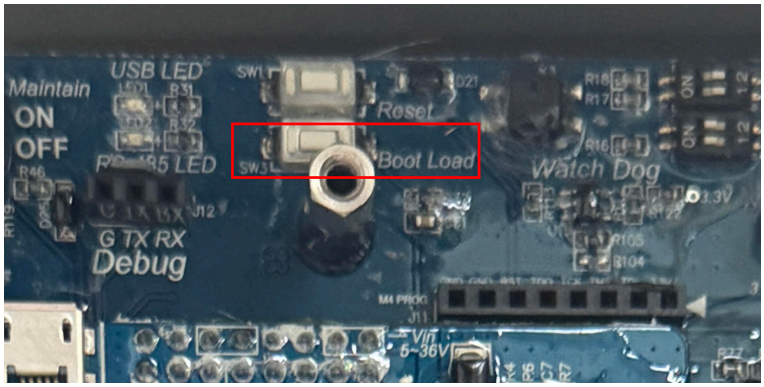
There are two ways to connect to the device web page: connect a computer with an Ethernet cable, or connect a phone or tablet over Wi-Fi (requires a Wi-Fi board).

Connecting with a computer (Ethernet cable):

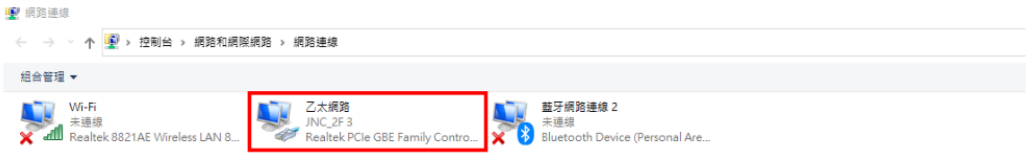
1. Connect the RJ45 Ethernet port of the CB (red circle in the figure below) to the Ethernet port of the computer with an Ethernet cable.



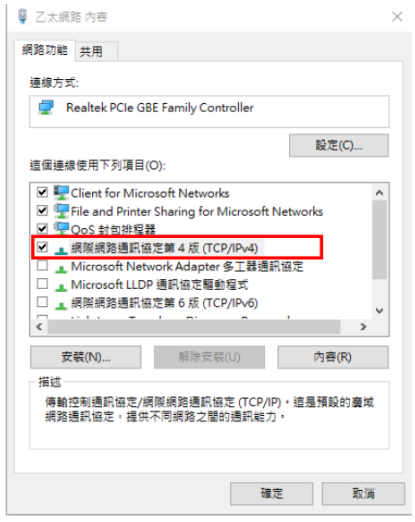
2 **Live work** **Open the top cover and, with the power on, press and hold the SW3 button on the controller board (printed Boot Load; red box in the figure below). The display shows the IP of the CB (factory default 192.168.0.88); about 1 second after release, it returns to the previous screen. Touch only SW3; do not touch other components or terminals. The C type has no display; check the IP on the device label (see 3-4 Reading the Device Label (p. 24)).**



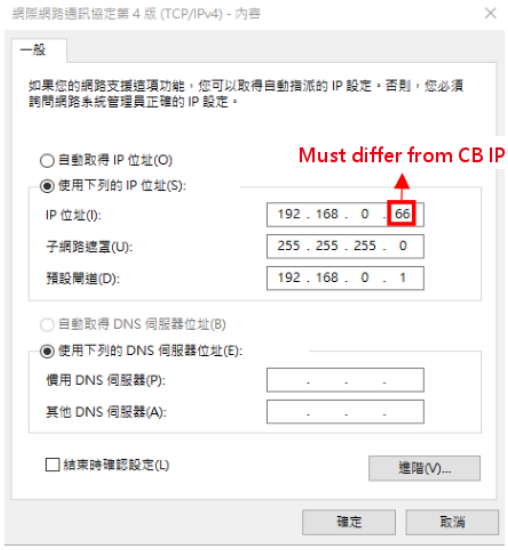
3 **On the computer, open Control Panel → Network and Internet → Network Connections.**



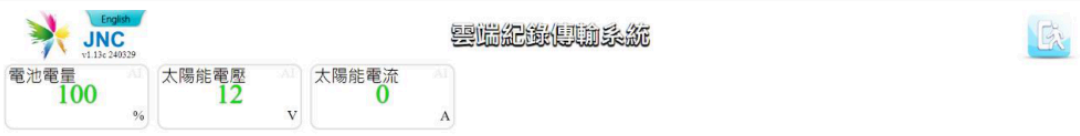
4 **Right-click Ethernet → Properties → select Internet Protocol Version 4 (TCP/IPv4).**



5 **Set the IP of the computer to the same network as the CB, but with a different last number. Example: if the IP of the CB is 192.168.0.88 (last number 88), the computer cannot use 88; set it to 192.168.0.66 instead. Subnet mask: 255.255.255.0; default gateway: 192.168.0.1.**



6 **Open a browser on the computer and enter the IP of the CB in the address bar (for example 192.168.0.88) to open the CB home page.**





CAUTION: Holding the SW3 button for more than 10 seconds restores all parameters to factory defaults

To check the IP, just hold the button. While it is held, one more color block appears at the bottom of the screen every second as a reminder that 10 seconds is approaching. Release it before 10 seconds.

Connecting with a phone or tablet (Wi-Fi; requires a Wi-Fi board):

1. **Turn on Wi-Fi on the mobile device and connect to JNC_CBXXXXX (XXXXX = last five digits of the CB serial number).**



2. **After connecting, open a browser and enter the IP of the CB in the address bar (for example 192.168.0.88) to open the CB home page.**

5-2 Login and Password Change

- **Login password: default 1234.**
- **How to log in: click the login button at the top of the home page, enter the password, and click Login. After login, the login button changes to the home button and the settings button appears (see 5-3 Home Page Overview (p. 35)).**
- **Change the password: settings button → System → Password Setting (see 6-8-3 Password Setting (p. 60)).**

5-3 Home Page Overview



Description:

Code	Name	Function
1	Home button	Returns to the home page (before login, this is the login button)
2	Settings button	Appears after login; 6 options: Homepage, Event Log, Channel, Sim card, System, Download. See 5-4 Settings Button Options (p. 36)
3	Device name	Shows the device name; changed in System → Basic Setting (see 6-8-5 Basic Setting (p. 62))
4	System version	Shows the current system version (version number and date, for example v1.19 260827). Provide this version when requesting repair
5	Language switching	Switches between the Chinese interface and the English interface (the button shows 中文 in the English interface and English in the Chinese interface)
6	Channel status	Shows the name, signal type (AI/DI/DO), real-time value, and unit of each channel. A value of Read.. means the value of that channel has not been read yet
7	Time	Shows the system date and time
8	Status bar	USB icon: shows whether a USB flash drive is inserted; when inserted, a percentage is also shown next to the icon. SIM icon: shows that there is no SIM signal
9	Place	Sets the name of the monitoring location

5-4 Settings Button Options

Path: click the settings button on the home page (code 2 in the previous section).



Code	Name	Function
1	Homepage	Returns to the home page and shows the real-time values
2	Event Log	Shows recent alarm records (alarm data and alarm history). See 6-9 Event Log (p. 70)
3	Channel	Sets the channel name/unit, value parameters, and control settings. See 6-1 Channel Settings Overview (p. 39)
4	Sim card	Sets alarm notification, power failure notification, phonebook, location alarm, and base station. See 6-7 SMS Settings (p. 50)
5	System	Sets the IP, time, password, communication settings, basic settings, upload settings, Mqtt, Wi-Fi, display settings, sleep settings, and configuration of the device. See 6-8 System Settings (p. 56)
6	Download	Downloads real-time logs and the Event Log. See 6-10 Download (p. 71)

- After an option is clicked, the menu collapses automatically; to switch to another option, click the settings button again.

PART 6.SETTINGS

Questions Answered in This Chapter

- **Where is each settings screen, and what does each field mean?**
- **How are the Channel Source, calibration values, and alarms of a channel set?**
- **How is SMS notification set up?**
- **Where are the time, password, network, and configuration settings? How are logs downloaded?**

Not Covered in This Chapter

- **Logic Control, Schedule Control, Cycle Control, and Auto Wash → PART 7 Advanced Control (p. 73)**

- **Settings screens that require attention have a pre-operation label below the title (see 1-4 Pre-Operation Labels (p. 12)). Settings without a label can be completed by following the steps in this chapter.**
- **Settings such as channels, alarms, SMS, and DO control are shared by the whole device. Notify other personnel on site before changing them.**

Task	Section	Label
Enable or disable a channel	6-1 (p. 39)	—
Connect an external sensor (Channel Source)	6-2 (p. 41)	Factory setting – do not change
Change a channel name or unit	6-3 (p. 43)	—
Calibrate values (Gain, Offset)	6-4 (p. 44)	—
Set alarm values and alarm delays	6-5 (p. 45)	—
Set a DO channel to manual or automatic	6-6 (p. 49)	—
Set up SMS notification and the phonebook	6-7 (p. 50)	—
Correct the device time	6-8-2 (p. 59)	—
Change the login password	6-8-3 (p. 60)	—
Change IP, communication, upload, or Wi-Fi settings	6-8 (p. 56)	Factory setting – do not change
Set up sleep	6-8-10 (p. 66)	Power off first (switch SW4)
Back up or import the configuration	6-8-11 (p. 69)	Factory setting – do not change
View the Event Log or download log files	6-9 (p. 70), 6-10 (p. 71)	—

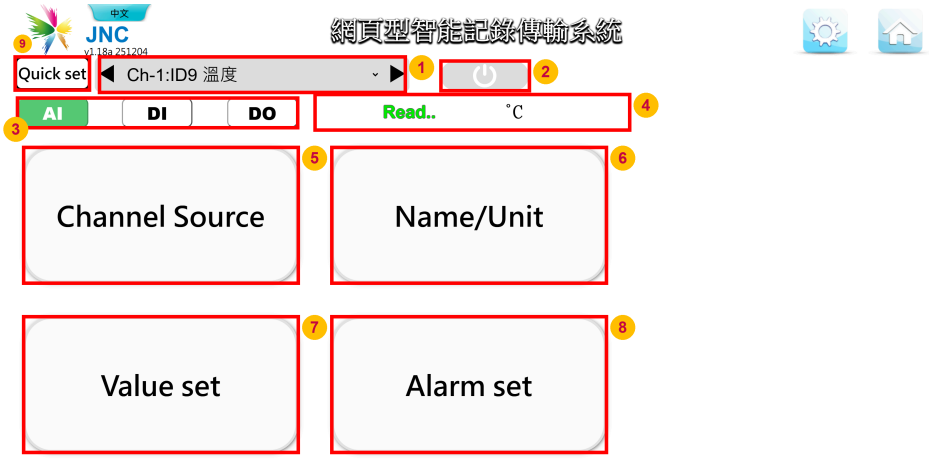
CAUTION: All settings in this chapter are examples.

Actual thresholds and parameters must be set by the user organization based on site conditions, applicable regulations, and professional judgment.

6-1 Channel Settings Overview

Path: settings button → Channel → select a channel.

Select a channel from the drop-down list at the top to open the main settings screen of that channel (figure below), then click each button to open the corresponding settings.



Description:

Code	Name	Function
1	Current channel / channel switching	The current channel; select a channel from the drop-down list, or click the left and right arrows to switch channels
2	Enable	Whether the channel is enabled (power button). When enabled, the real-time value is shown; when disabled, the real-time value is not shown and the channel is turned off
3	Type setting	Selects the signal type: AI, DI, DO
4	Real-time value	The current real-time value and unit of the channel
5	Channel Source	Data source of the channel value. See 6-2 Channel Source (p. 41)
6	Name/Unit	Channel name, channel unit, whether the channel is shown on the display, and the display name. See 6-3 Name/Unit (p. 43)
7	Value set	Gain, Offset, Decimal, LowCut, and the accumulation function. See 6-4 Value Set (p. 44)
8	Alarm set	HH/HI/LO/LL alarm values, alarm deadband, alarm delay (seconds), and disconnection alarm. See 6-5 Alarm Settings (p. 45)
9	Quick set	Configures several channels at once; the tabs are Type and Source, Name/Unit, AI Parameters, DI Parameters, DO Parameters, Logic Settings, and Schedule Settings

- Channels with signal type DO also have Control set on the settings page. See 6-6 DO Control Settings (p. 49).

6-2 Channel Source

Factory setting – do not change

Path: Channel → select a channel → Channel Source.



Code	Name	Function
1	Item	Shows the signal type of this channel (AI, DI, DO). It cannot be changed on this page; switch it with the type setting on the main channel settings screen
2	Interface	Selects the connection interface: Local: local source; reads internal values of the device; the slave ID must be set to 0 (for usage, see 7-6 Special Function Applications (p. 79)). RS-485-1: reads real-time values from an external sensor over RS-485 (RTU communication). TCP: reads real-time values from an external device over the network. RS-485-2: reads real-time values over the second RS-485 port (Modbus BT (D2) on the Rs485 Setting page). When RS-485-1 or RS-485-2 is used, set the Connect type of that RS-485 port to Master in Rs485 Setting so that the device reads from external devices (see 6-8-4 Communication Settings (Rs485 Setting) (p. 61))
3	ID	ID of the sensor; must match the slave ID of the device to be read (1–255; enter 0 when the interface is Local). Slave IDs must not be duplicated, to avoid ID conflicts

Code	Name	Function
4	Address	Address of the sensor data. Enter the address to read the data at that address. How to enter: check the Modbus table of that device, convert the hexadecimal address to decimal, add the type prefix, then add 1. Example: AI channel, address 0x0023 (decimal 35) → enter 300036
5	Sampling interval (ms)	How often the real-time value is read
6	Read multiple	Checked: faster reading. Has no effect if the other device does not support multi-address reads. Unchecked: one channel is read at a time; not recommended when there are many channels
7	Original range / Corresponding range	Converts the original range into the corresponding range, for example both set to 0–100. The number of decimal places shown depends on the number of decimal places entered in the corresponding range
8	Gain / Offset	Gain: multiplier. Offset: added or subtracted value
9	Data Types	INT16, INT32, INT64: signed integers. UINT16, UINT32, UINT64: unsigned integers. FLOAT, DOUBLE: floating-point numbers (values with decimals)
10	Byte/word order	High byte first, Low byte first; High word first, Low word first. Select the high/low byte order of the returned data according to the data type of the other device

6-3 Name/Unit

Path: Channel → select a channel → Name/Unit.



Code	Name	Function
1	Channel Name	Channel name shown on the web page; also used in alarm SMS messages. Chinese can be entered; up to 15 Chinese characters, letters, or digits
2	Channel Unit	AI channels only. Unit of the channel value; select it from the drop-down list (for example °C, ppm, mA, m/s, %), or select “Custom” and enter it in the input box (up to 15 characters)
3	Display Ch	Checked: the name and value of this channel are shown on the device display
4	Display name	Channel name shown on the device display. Only letters and digits (ASCII) can be shown; Chinese cannot be shown

6-4 Value Set

Path: Channel → select a channel → Value set.



Code	Name	Function
1	Gain / Offset	AI channels only. Gain: calibrates by multiplication. Offset: calibrates by addition or subtraction. Formula: V = ax + b (V = calibrated value, a = gain, x = raw value, b = offset)
2	Decimal	AI channels only. Number of decimal places shown
3	LowCut	Values within a small band below the minimum of the corresponding range are always shown as the minimum of the corresponding range. Example: corresponding range 0–100, LowCut set to 5 → readings between –5 and 0 are always shown as 0
4	Accumulate enable	Accumulates the real-time value over time: Close (off) / Unit sec (seconds) / Unit min (minutes) / Unit hour (hours). Example: power consumption 3.8 W, Unit sec selected; after one minute the accumulated value is 228 (W)
5	Accumulate value	Shows the accumulated value

6-5 Alarm Settings

Path: Channel → select a channel → Alarm set.

The alarm settings of AI channels and DI channels differ; they are described in two sections.

6-5-1 AI Alarm Settings



Code	Name	Function
1	Alarm settings	Each alarm stage must be checked before its alarm value can be set. Issued when the value is above the set value: Over High Alarm (HH) = second-stage high alarm; High Alarm (HI) = first-stage high alarm. Issued when the value is below the set value: Low Alarm (LO) = first-stage low alarm; Over Low Alarm (LL) = second-stage low alarm
2	Fault settings	High Fail: high fault alarm; when the value exceeds High Fail, the Event Log shows HI FAIL. Low Fail: low fault alarm
3	Alarm Deadband	Alarm deadband, also called hysteresis. The alarm clears (also called return to normal) only when the value returns below “alarm value minus deadband”. Example: HI alarm value 80, deadband 3 → 80 – 3 = 77; the value must fall below 77 for the alarm to clear
4	Delay time(Sec)	When an alarm occurs, the alarm is triggered only when the value stays out of limits longer than this number of seconds (0–32767 s)
5	Discon alarm	Checked: an alarm is issued when the device does not return a value and Read.. is shown. Check it for important channels. To send disconnection SMS messages, also check Disconnected notify in the SMS settings (see 6-7-1 SMS Settings Tab (p. 50))

6-5-2 DI Alarm Settings



Code	Name	Function
1	Digital Input Alarm	Checked: the alarm is enabled
2	Delay time(Sec)	Same as AI
3	Discon alarm	Same as AI (see code 5 in 6-5-1 AI Alarm Settings (p. 45))

6-5-3 Who Is Notified When an Alarm Is Triggered

Step	What happens	Requirement
1	The value crosses the alarm value and timing starts	—
2	The condition persists longer than the alarm delay, and the alarm becomes active	—
3	The alarm is written to the Event Log (see 6-9 Event Log (p. 70))	None; it is always logged
4	An SMS is sent to mobile phones	Optional 4G + SIM card + SMS settings + phonebook (all required; see 6-7 SMS Settings (p. 50))
5	Buzzer or DO channel action	COM1 and COM2 in Basic Setting specify a buzzer or DO channel (see code 5 in 6-8-5 Basic Setting (p. 62))
6	Shown or notified on the cloud platform	Data has been uploaded to the cloud platform (see 6-8-6 Upload Settings (p. 63))
7	Linked switching of equipment	Alr= operator in Logic Control; see 7-2 Logic Control (p. 75)

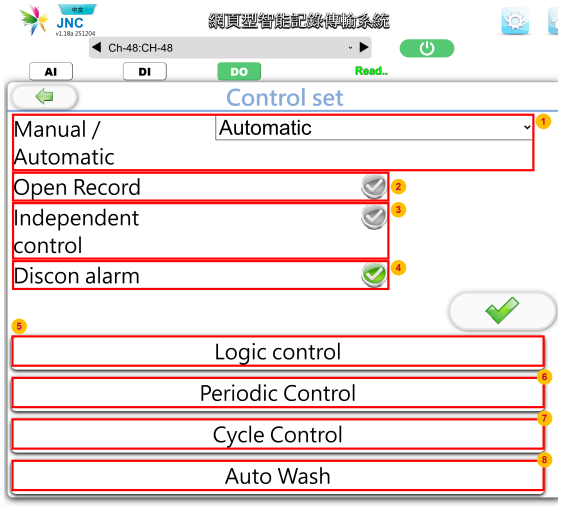
- Setting an alarm value does not switch equipment by itself. To link an alarm to equipment switching, use the Alr= operator in Logic Control.
- Restarting during an active alarm: if the condition is still met after startup, the alarm is triggered again, a new Event Log entry is added, and another SMS is sent.

WARNING: Without a SIM card or a cloud connection, alarms do not notify anyone who is not on site (for the buzzer or DO on site, see step 5)

If COM1 and COM2 are not set, alarms are only recorded on the Event Log page of the device; someone must check it to find out.

6-6 DO Control Settings

Path: Channel → select a DO channel → Control set.



Code	Name	Function
1	Manual / Automatic	Automatic: this channel is controlled by other channels (ADIO). Manual: the channel can be switched on and off manually
2	Open Record	When enabled, the start and stop of this channel are logged in Event.csv
3	Independent control	When enabled, this channel is not controlled by other channels (ADIO) in automatic mode: Logic Control is skipped, and the channel switches according to Schedule Control (when enabled) and Cycle Control; when neither is enabled, the channel is on
4	Discon alarm	When checked, an alarm is issued when the device does not return a value and Read.. is shown (same as code 5 in 6-5-1 AI Alarm Settings (p. 45))
5	Logic control	Sets the control conditions of this channel. See 7-2 Logic Control (p. 75)
6	Periodic Control	See 7-3 Schedule Control (p. 77)
7	Cycle Control	See 7-4 Cycle Control (p. 78)
8	Auto Wash	See 7-5 Auto Wash (p. 78)

- For the order in which these rules are evaluated when they are enabled at the same time, see 7-1 Automatic Control Decision Sequence (p. 74) (DO control flowchart).

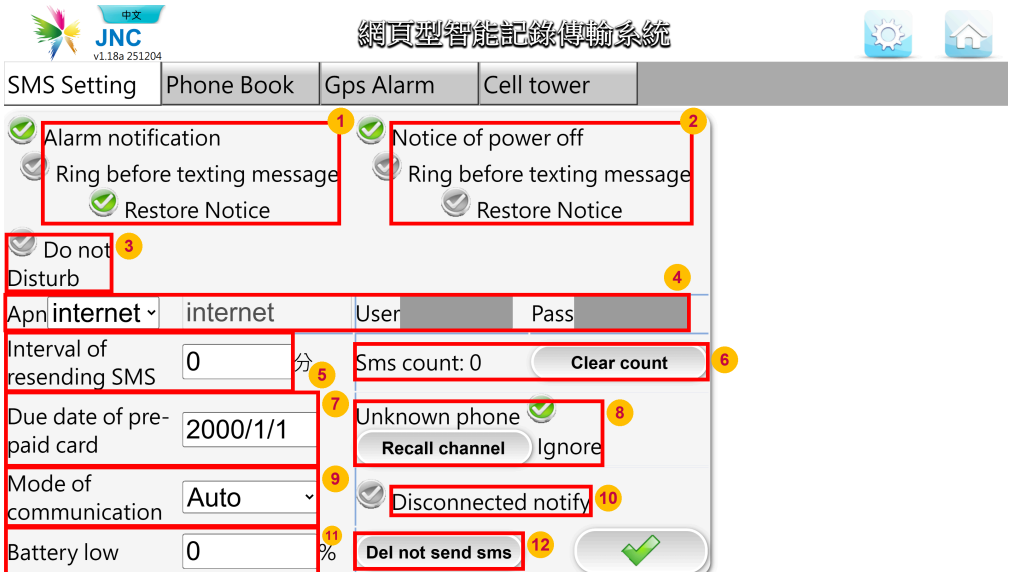
6-7 SMS Settings

Path: settings button → Sim card → select a tab (SMS Setting / Phone Book / Gps Alarm / Cell tower).

To receive SMS messages, all three of the following are required:

1. **SMS Setting tab: check Alarm notification.**
2. **Insert a SIM card and select the correct Apn (Access Point Name).**
3. **Phone Book tab: enter the mobile number and select the channels to be notified.**

6-7-1 SMS Settings Tab



Code	Name	Function
1	Alarm notification	Sends an SMS when an alarm occurs. Two check boxes below it: Ring before texting message: the device calls the phone before sending the SMS; after the call is answered, hung up, or not answered, the alarm SMS is sent. Restore Notice: an SMS is sent when the alarm ends and the value returns to normal

Code	Name	Function
2	Notice of power off	Sends an SMS when the device loses power. Two check boxes below it: Ring before texting message: the device calls the phone before sending the SMS; after the call is answered, hung up, or not answered, the power failure SMS is sent. Restore Notice: an SMS is sent when power is restored after a power failure. Note: Power failure notification requires the SMS module.
3	Do not Disturb	No SMS is sent during the set time range
4	Apn (Access Point Name)	Access Point Name (APN); enter the name provided by the carrier. Example: internet in Taiwan. Options in the drop-down list: internet: carriers in Taiwan, Penghu, Kinmen, and Matsu; the APN is obtained automatically. iot.1nce.net: IoT SIM card supplied by JNC; the APN of the local partner carrier is obtained automatically. Other: countries outside Taiwan, Penghu, Kinmen, and Matsu; enter the APN name of the local carrier. User and Pass fields on the right: fill them in when the carrier requires a user name and password
5	Interval of resending SMS (min)	SMS resend interval: while an alarm persists, an SMS is resent at this interval (minutes)
6	Sms count	Number of SMS messages sent. Click Clear count to reset it to zero
7	Due date of pre-paid card	A prepaid card usually has a validity period after top-up and must be topped up again after it expires (handling may differ by carrier). This function sends reminder SMS messages 14 days and 1 day before expiration so that the card can be topped up. Note: Be sure to activate the SIM card first

Code	Name	Function
8	Unknown phone	Ignore on (factory default): unknown numbers are ignored; calls from numbers not in the phonebook are not answered, and SMS commands from them are not executed. Off: unknown callers also receive an SMS with the site values; the channels included in the reply are set with Recall channel
9	Mode of communication	Signal used by the SIM card: Auto / 4G / 3G / 2G
10	Disconnected notify	Sends an SMS when a channel is disconnected (unchecked at the factory). Discon alarm of that channel must also be checked for the SMS to be sent
11	Battery low	Unit: %. Default 0 (disabled). An SMS is sent when the set condition is met. Note: Requires an activated SIM card
12	Del not send sms	When the SIM card data is used up, SMS messages that cannot be sent are held and sent all at once when data is restored. Click this to clear them first and avoid a flood of alarm SMS messages. Cleared messages are not resent; click it only when these old alarms are no longer needed

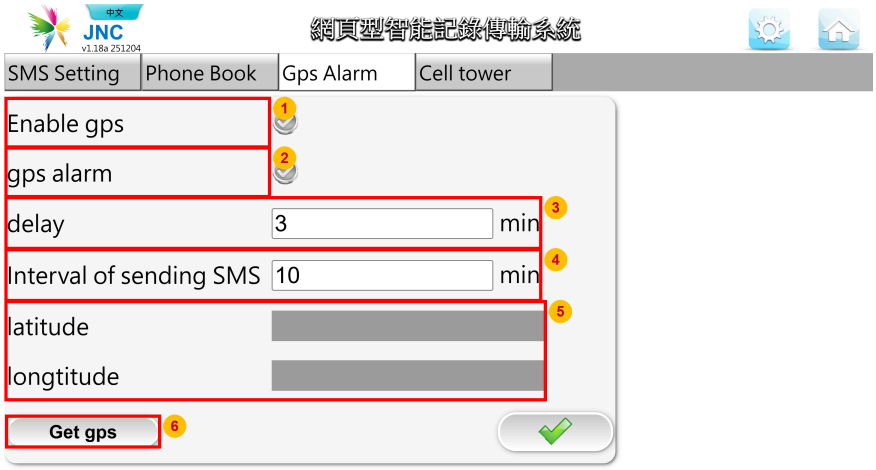
6-7-2 Phonebook



Code	Name	Function
1	Alarm stage setting (1/2 drop-down list on screen)	1 first-stage alarm: receives both first-stage and second-stage alarms. 2 second-stage alarm: receives second-stage alarms only (HH, LL)
2	Channel selection for SMS to this mobile phone (CH buttons on screen)	Selects which channel alarm SMS messages are sent to this mobile phone
3	Mobile number	Mobile number that receives SMS messages
4	Previous page / Next page	The phonebook has 5 rows per page; click to change pages

- Fault alarms and channel disconnection notifications are second-stage alarms (same as HH and LL); mobile phones with alarm stage 1 or 2 both receive them.

6-7-3 Location Alarm



Code	Name	Function
1	Enable gps	Enables positioning to locate the device
2	gps alarm	Enables the location alarm
3	delay (min)	When a location alarm occurs, the alarm is triggered only when it persists longer than this time (minutes)
4	Interval of sending SMS (min)	While an alarm persists, an SMS is resent at this interval (minutes)
5	Latitude and longitude (latitude and longtitude fields on screen)	Sets the latitude and longitude of the device
6	Get gps	Click to get the coordinates of the current position of the device

6-7-4 Base Station

Scans nearby base stations and selects the carrier with the better signal for connection.

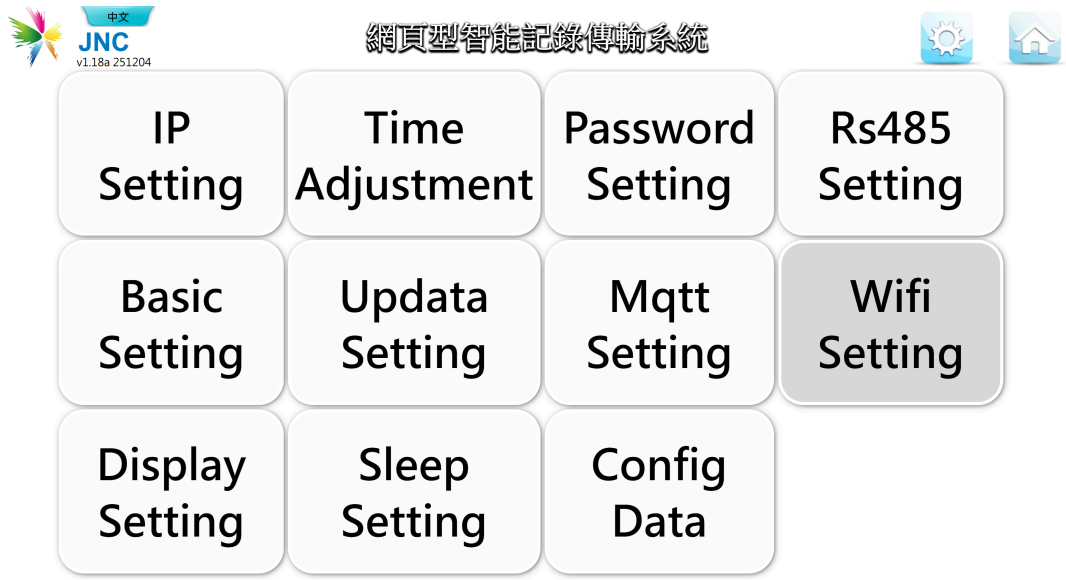


Code	Name	Function
1	Now cell tower	Shows the base station currently connected
2	Connect test	≤ 20 ms: excellent signal. 50–100 ms: good signal. ≥ 150 ms: poor signal
3	get ip	Click to get the current IP
4	Find cell tower	Measures the carriers of nearby base stations in real time (also works abroad). Note: Requires a 1nce SIM card

- **After measuring, select the local carrier with the better signal from the list of measured base stations to connect. Note: Requires a 1nce SIM card**

6-8 System Settings

Path: settings button → System → select the item to set.



Item	Function	Label
IP Setting	IP, Mask, Gateway, and Mac network settings. See 6-8-1 IP Setting (p. 58)	Factory setting – do not change
Time Adjustment	Synchronizes with the computer time, or sets the time manually after synchronization is turned off; Ntp enable can also be used for automatic time synchronization. See 6-8-2 Time Adjustment (p. 59)	—
Password Setting	Changes the device password. See 6-8-3 Password Setting (p. 60)	—
Rs485 Setting	RTU communication settings (Baudrate, Parity, Data bits, Stop bits, Connect type, Interval) for two RS-485 ports, and Modbus TCP. See 6-8-4 Communication Settings (Rs485 Setting) (p. 61)	Factory setting – do not change
Basic Setting	Number of Channel, Recording interval, Device name, Place of device. See 6-8-5 Basic Setting (p. 62)	—

Item	Function	Label
Update Setting	Enables Http upload or cloud platform upload; the upload method can be Ethernet or Sim card. See 6-8-6 Upload Settings (p. 63)	Factory setting – do not change
Mqtt Setting	Uploads device parameters using the MQTT protocol. See 6-8-7 Mqtt Setting (p. 63)	Factory setting – do not change
Wifi Setting	SSID name, Encryption mode, and WiFi Mode (AP or Client). See 6-8-8 Wifi Setting (p. 64). Without a Wi-Fi board, this item is gray and cannot be clicked	Factory setting – do not change
Display Setting	Switch time, time display, and voltage display of the device display. See 6-8-9 Display Setting (p. 65)	—
Sleep Setting	Sets the device to sleep periodically. See 6-8-10 Sleep Setting (p. 66)	Power off first (switch SW4)
Config Data	Imports and exports the parameter configuration of the device over USB or the network. See 6-8-11 Configuration (Config Data) (p. 69)	Factory setting – do not change

- After an item is clicked, its tile moves to the left side of the screen; click the tile to return to the item list of System.

6-8-1 IP Setting

Factory setting – do not change



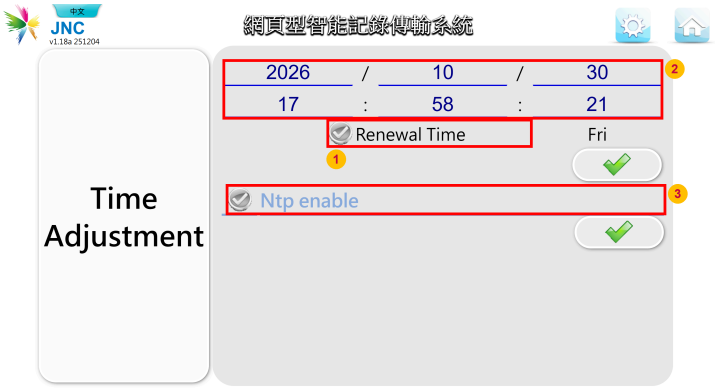
This page sets the IP, Mask, Gateway, and Mac.

Code	Name	Function
1	Network settings	IP, Mask (subnet mask), Gateway (default gateway)
2	Mac	Device identifier assigned at the factory, used for network connection. Do not change it unless necessary

Factory defaults:

Field	Factory default
IP address	192.168.0.88
Subnet mask (Mask)	255.255.255.0
Default gateway (Gateway)	192.168.0.1

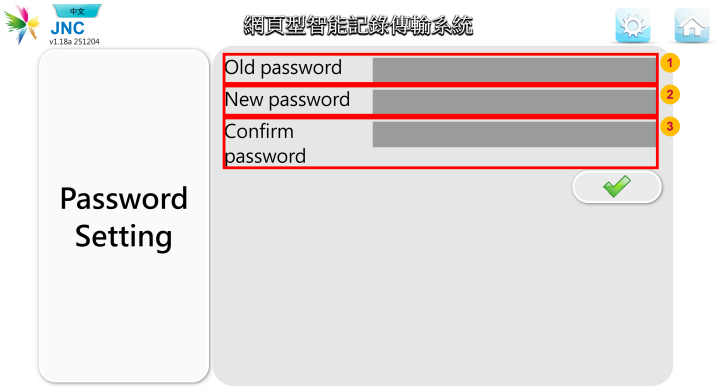
6-8-2 Time Adjustment



Code	Name	Function
1	Renewal Time	Checked: synchronizes with the computer time. Unchecked: synchronization is turned off. Click the check mark button to finish
2	Change time	Changes the time manually (year/month/day, hour:minute:second; the day of the week is shown on the right)
3	Ntp enable (Network Time Protocol)	When checked, the device synchronizes automatically with a time server on the network; the fields below are shown only after it is checked. Connect type: Ethernet / 4G SIM (optional). GMT (time zone): enter according to the location. Connect address: Other allows a custom NTP server; or select a server of the National Time and Frequency Standard Laboratory (tock/watch/time/clock/tick.stdtime.gov.tw). The device must be able to reach the network; without network access, checking it does not synchronize the time

- The time is retained after power loss by the coin cell battery on the controller board.

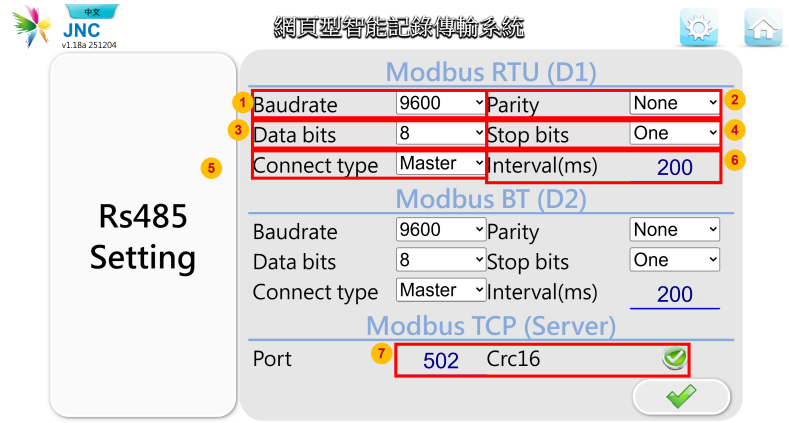
6-8-3 Password Setting



Code	Name	Function
1	Old password	Enter the old password
2	New password	Enter the new password
3	Confirm password	Enter the new password again

6-8-4 Communication Settings (Rs485 Setting)

Factory setting – do not change

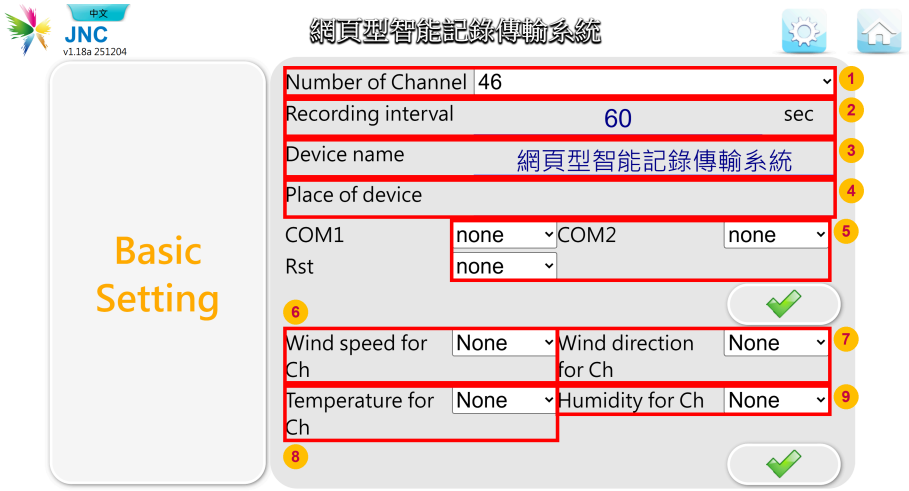


The screen has three areas: Modbus RTU (D1) is RS-485-1; Modbus BT (D2) is RS-485-2 (the second RS-485 port); and Modbus TCP (Server). The two RS-485 ports have the same fields and can be set separately.

Code	Name	Function
1	Baudrate	2400, 4800, 9600, 19200, 38400, 57600, 115200 bps; default 9600
2	Parity	None/Even/Odd; default None
3	Data bits	8/7; default 8
4	Stop bits	One/Two; default One
5	Connect type	Master: connects external sensors with standard RS-485. Slave: provides the data on the CB to other devices
6	Interval(ms)	Interval between communications
7	Modbus TCP (Server)	Port: Modbus TCP port (factory default 502); must not duplicate other communication devices. When connecting with general Modbus TCP software, uncheck Crc16.

- **All devices on the same RS-485 line must have the same baud rate, parity, data bits, and stop bits, and different slave IDs.**

6-8-5 Basic Setting



Code	Name	Function
1	Number of Channel	Selects the number of channels (1–120)
2	Recording interval	Time interval for logging data (seconds; factory default 60 s, minimum 10 s; 0 = no logging)
3	Device name	Name of this device
4	Place of device	Location where the device is installed
5	COM1, COM2, Rst	Channels can be selected as COM1, COM2, and Rst. COM1, COM2: select none (factory default), 蜂鳴器 (buzzer), or a DO channel; the buzzer or DO acts when an alarm occurs. COM1 follows the alarm as it occurs and clears; COM2 is the second-stage alarm output and latches after triggering; it is reset by pressing SW3 once (release within 10 seconds) or by the DI specified in Rst. Pressing SW3 is Live work. Rst: selects the DI channel that resets the COM2 alarm output (none = not specified)
6	Wind speed for Ch	Sets one channel as the wind speed channel (for wind speed statistics; see 7-6 Special Function Applications (p. 79))
7	Wind direction for Ch	Sets one channel as the wind direction channel
8	Temperature for Ch	Sets one channel as the temperature channel
9	Humidity for Ch	Sets one channel as the humidity channel

6-8-6 Upload Settings

Factory setting – do not change

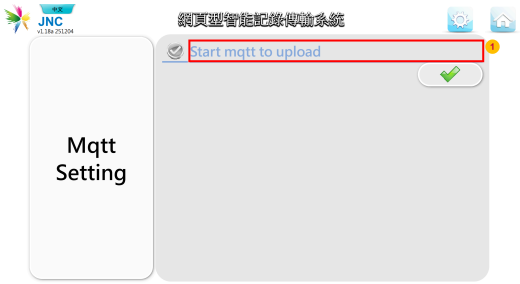


Code	Name	Function
1	Start Http to upload	Enables Http upload to the cloud platform. The Http upload fields are shown only after it is checked
2	Start JNC System	Enables upload to the cloud platform
3	Upload method	Ethernet (Ethernet transmission) or Sim card (4G SIM transmission; requires the SMS module). With a Wi-Fi board and Wi-Fi set to Client mode, select Ethernet; the device uses Wi-Fi only when the Ethernet cable is not connected
4	Address/Port	IP address and port for uploading to the cloud platform

- Enabling upload does not mean that data is being uploaded: the device must be able to reach the network and the address must be correct for data to be sent.

6-8-7 Mqtt Setting

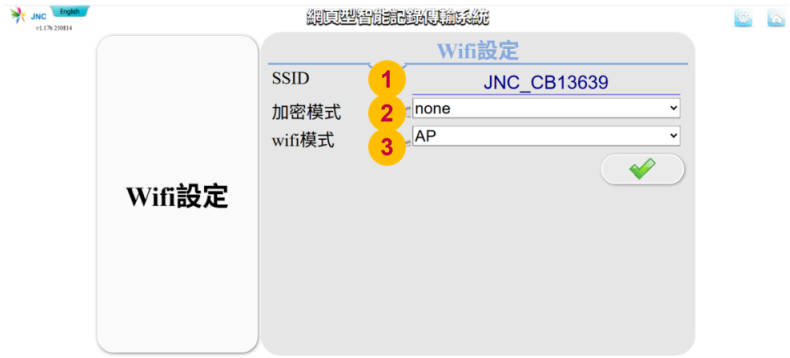
Factory setting – do not change



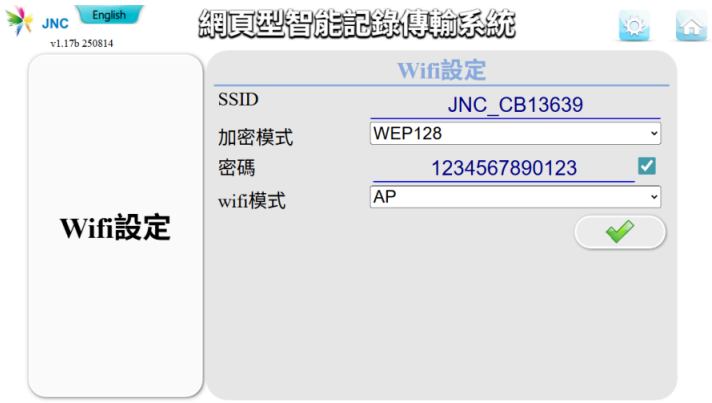
Code	Name	Function
1	Start mqtt to upload	Enables MQTT upload to the cloud platform. The setting fields below are shown only after it is checked

6-8-8 Wifi Setting

Factory setting – do not change



Code	Name	Function
1	SSID	Wireless network name
2	Encryption mode	None: no encryption (default). WEP64: 5-character password. WEP128: 13-character password. WPA2: password up to 31 characters; available only in Client mode
3	WiFi Mode	AP mode: the CB acts as an access point that other devices connect to. Client mode: the CB acts as a client and connects to an existing Wi-Fi network



- AP mode: after a phone or computer connects to the Wi-Fi of the CB, the CB settings page can be opened.
- Client mode: the CB connects to an existing Wi-Fi network; a fixed IP can be specified, or check Wifi DHCP to have the router assign the IP. After setup, devices on the same subnet can open the CB settings page. Example: when the IP of the CB is 192.168.16.20, computers or phones with an IP of 192.168.16.x can open the CB settings page.

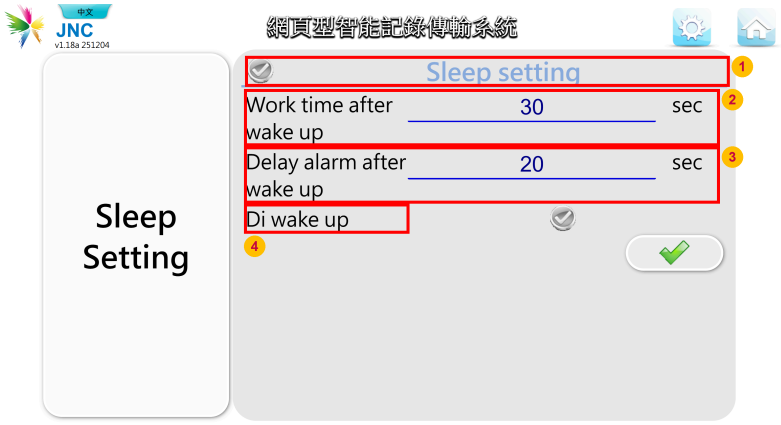


6-8-9 Display Setting



Code	Name	Function
1	Switch time	Number of seconds before the display switches to the next channel
2	Display time	Checked: the time is shown on the display
3	Display Voltage	Checked: the voltage is shown on the display

6-8-10 Sleep Setting



Code	Name	Function
1	Enable sleep (Sleep setting check box on screen)	The fields below are shown only after it is checked. Record cycle: at each set number of seconds, the device wakes up early and records the values. Update cycle: at each set number of seconds, the recorded values are uploaded to the platform. Three rows, Nomal, Alarm lv1, and Alarm lv2, set the record cycle (minimum 60 s) and the upload cycle (minimum 300 s) for each state; all are 600 s at the factory. Alarm lv2 = any AI channel reaches HH/LL, or any DI alarm; Alarm lv1 = other alarms (HI/LO, fault). When keep connect is checked for a level, the device does not sleep and stays connected while an alarm of that level is active; at the factory, keep connect is checked for Alarm lv2
2	Work time after wake up (s)	Early wake-up time within the sleep cycle (factory default 30 s). During this time, one round of reading values, alarm evaluation, logging, and upload is performed
3	Delay alarm after wake up (s)	AI alarms are not evaluated during this time after wake-up (factory default 20 s)
4	Di wake up	When enabled, a signal change on the local DI1/DI2 wakes the device early from the current sleep; after one round of operation, the device goes back to sleep if the conditions are still met. Off at the factory; after changing it, restart the device for the change to take effect

- **The device sleeps only when both levers of the sleep switch SW4 on the controller board are set down (Sleeping ON; the switch is in the upper-left corner of the controller board, printed Sleeping/Maintain; disconnect the power before switching it) and sleep is enabled on this page. During sleep, DO control, alarm evaluation, the web page, RS-485 reading, and logging all stop; do not enable sleep where DO outputs must keep switching according to conditions.**

6-8-11 Configuration (Config Data)

Factory setting – do not change

Configuration = the parameter settings of the CB (including channel settings, IP, SSID, etc.) exported as a single file.

- **Export configuration: exports the parameter settings of the CB.**
- **Import configuration: imports a configuration into the CB; the CB settings become the settings in that configuration.**



Code	Name	Function
1	Pall Ip	When checked before import, the previous IP is overwritten. Pall Ssid on the right: when checked before import, the SSID of the device is replaced by the SSID in the configuration file
2	Ethernet Config	Ethernet inport: imports a configuration over the network (select the config.cws file). Ethernet export: exports the configuration over the network. Export and import are performed on the computer or phone you are using
3	USB Config	USB inport: imports a configuration from a USB flash drive (config.cws must be in the root folder of the flash drive). USB export: exports the configuration to a USB flash drive
4	Load Web	Loads the fs file through the web page (Load fs button on screen). Make sure a USB flash drive is inserted in the controller board and contains the fs.bin file. Use it only when updating the web page file as instructed by JNC (for the procedure, see 8-4 Firmware and Web Page Update (p. 90)); do not click it otherwise

WARNING: If Pall Ip/Pall Ssid is checked before importing, the device label will no longer match

After import, the IP of the device is replaced by the IP in the configuration file, and the device cannot be reached at the IP on the device label.

6-9 Event Log

Path to the Event Log: settings button → Event Log.

Shows recent alarm records, including alarm data and alarm history; the latest 85 entries are kept, and older entries are overwritten. Example: when the humidity has exceeded the alarm threshold, the record lists the value at that time and shows the time the alarm was issued.



Code	Name	Function
1	Alarm entry	Each alarm that has occurred, newest at the top, preceded by a sequence number. Blue text = alarm cleared; red text = alarm active
2	Channel name	The channel on which the alarm occurred
3	Value	The value when the alarm occurred
4	Alarm status	Four-stage value alarms: HIHI, HI, LO, LOLO (the HH, HI, LO, LL on the alarm settings page). Fault alarms: HI FAIL, LO FAIL. Channel disconnection: Discon
5	Alarm time – return time	Time when the alarm condition was met; after the alarm clears, the return time is shown after ~

6-10 Download

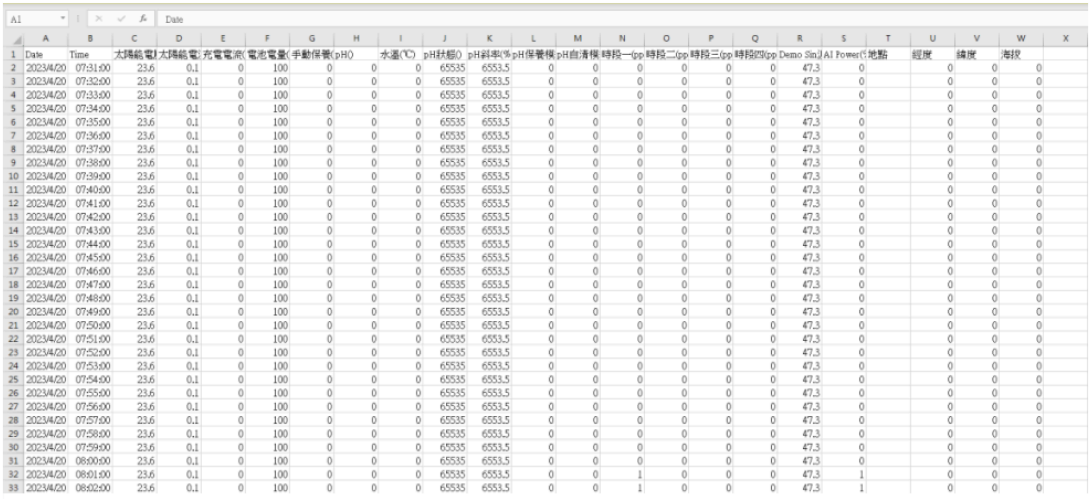
Path to download: settings button → Download → Record or Event Log.



Real-time log (shown on screen as Record): select the start time and stop time of the data to download, up to 24 hours at a time; in Sampling interval, enter the number of seconds between entries. Press Download to start downloading, or Close to cancel.



The downloaded real-time log opened in Excel is shown below.



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
1	Date	Time	太陽能電壓	太陽能電流	充電電流	電池電量	手動保養(pH)		水溫(℃)	pH狀態()	pH斜率(%	pH保養模	pH自清模	時段一(pp	時段二(pp	時段三(pp	時段四(pp	Demo Sin	AI Power(%	地點	經度	緯度	海拔	
2	2023/4/20	07:31:00	23.6	0.1	0	100	0	0	0	65535	6553.5	0	0	0	0	0	0	47.3	0		0	0	0	
3	2023/4/20	07:32:00	23.6	0.1	0	100	0	0	0	65535	6553.5	0	0	0	0	0	0	47.3	0		0	0	0	
4	2023/4/20	07:33:00	23.6	0.1	0	100	0	0	0	65535	6553.5	0	0	0	0	0	0	47.3	0		0	0	0	
5	2023/4/20	07:34:00	23.6	0.1	0	100	0	0	0	65535	6553.5	0	0	0	0	0	0	47.3	0		0	0	0	
6	2023/4/20	07:35:00	23.6	0.1	0	100	0	0	0	65535	6553.5	0	0	0	0	0	0	47.3	0		0	0	0	
7	2023/4/20	07:36:00	23.6	0.1	0	100	0	0	0	65535	6553.5	0	0	0	0	0	0	47.3	0		0	0	0	
8	2023/4/20	07:37:00	23.6	0.1	0	100	0	0	0	65535	6553.5	0	0	0	0	0	0	47.3	0		0	0	0	
9	2023/4/20	07:38:00	23.6	0.1	0	100	0	0	0	65535	6553.5	0	0	0	0	0	0	47.3	0		0	0	0	
10	2023/4/20	07:39:00	23.6	0.1	0	100	0	0	0	65535	6553.5	0	0	0	0	0	0	47.3	0		0	0	0	
11	2023/4/20	07:40:00	23.6	0.1	0	100	0	0	0	65535	6553.5	0	0	0	0	0	0	47.3	0		0	0	0	
12	2023/4/20	07:41:00	23.6	0.1	0	100	0	0	0	65535	6553.5	0	0	0	0	0	0	47.3	0		0	0	0	
13	2023/4/20	07:42:00	23.6	0.1	0	100	0	0	0	65535	6553.5	0	0	0	0	0	0	47.3	0		0	0	0	
14	2023/4/20	07:43:00	23.6	0.1	0	100	0	0	0	65535	6553.5	0	0	0	0	0	0	47.3	0		0	0	0	
15	2023/4/20	07:44:00	23.6	0.1	0	100	0	0	0	65535	6553.5	0	0	0	0	0	0	47.3	0		0	0	0	
16	2023/4/20	07:45:00	23.6	0.1	0	100	0	0	0	65535	6553.5	0	0	0	0	0	0	47.3	0		0	0	0	
17	2023/4/20	07:46:00	23.6	0.1	0	100	0	0	0	65535	6553.5	0	0	0	0	0	0	47.3	0		0	0	0	
18	2023/4/20	07:47:00	23.6	0.1	0	100	0	0	0	65535	6553.5	0	0	0	0	0	0	47.3	0		0	0	0	
19	2023/4/20	07:48:00	23.6	0.1	0	100	0	0	0	65535	6553.5	0	0	0	0	0	0	47.3	0		0	0	0	
20	2023/4/20	07:49:00	23.6	0.1	0	100	0	0	0	65535	6553.5	0	0	0	0	0	0	47.3	0		0	0	0	
21	2023/4/20	07:50:00	23.6	0.1	0	100	0	0	0	65535	6553.5	0	0	0	0	0	0	47.3	0		0	0	0	
22	2023/4/20	07:51:00	23.6	0.1	0	100	0	0	0	65535	6553.5	0	0	0	0	0	0	47.3	0		0	0	0	
23	2023/4/20	07:52:00	23.6	0.1	0	100	0	0	0	65535	6553.5	0	0	0	0	0	0	47.3	0		0	0	0	
24	2023/4/20	07:53:00	23.6	0.1	0	100	0	0	0	65535	6553.5	0	0	0	0	0	0	47.3	0		0	0	0	
25	2023/4/20	07:54:00	23.6	0.1	0	100	0	0	0	65535	6553.5	0	0	0	0	0	0	47.3	0		0	0	0	
26	2023/4/20	07:55:00	23.6	0.1	0	100	0	0	0	65535	6553.5	0	0	0	0	0	0	47.3	0		0	0	0	
27	2023/4/20	07:56:00	23.6	0.1	0	100	0	0	0	65535	6553.5	0	0	0	0	0	0	47.3	0		0	0	0	
28	2023/4/20	07:57:00	23.6	0.1	0	100	0	0	0	65535	6553.5	0	0	0	0	0	0	47.3	0		0	0	0	
29	2023/4/20	07:58:00	23.6	0.1	0	100	0	0	0	65535	6553.5	0	0	0	0	0	0	47.3	0		0	0	0	
30	2023/4/20	07:59:00	23.6	0.1	0	100	0	0	0	65535	6553.5	0	0	0	0	0	0	47.3	0		0	0	0	
31	2023/4/20	08:00:00	23.6	0.1	0	100	0	0	0	65535	6553.5	0	0	0	0	0	0	47.3	0		0	0	0	
32	2023/4/20	08:01:00	23.6	0.1	0	100	0	0	0	65535	6553.5	0	0	1	0	0	0	47.3	1		0	0	0	
33	2023/4/20	08:02:00	23.6	0.1	0	100	0	0	0	65535	6553.5	0	0	1	0	0	0	47.3	1		0	0	0	

Event Log: click Event Log; the downloaded Event Log opened in Excel is shown below.

	發生日期	發生時間	頻道	數值	型式	復歸日期	復歸時間
2	2023/4/7	11:31:43	系統	OFF	關機	2023/4/7	13:18:51
3	2023/4/7	14:25:20	保養模式	OFF	Discon._警	2023/4/7	14:56:04
4	2023/4/7	14:25:21	即時值	20	Discon._警	2023/4/7	14:56:05
5	2023/4/7	14:25:21	水溫	-40	Discon._警	2023/4/7	14:56:05
6	2023/4/7	14:25:22	Sensor狀態	0	Discon._警	2023/4/7	14:56:06
7	2023/4/7	14:25:25	自清模式	OFF	Discon._警	2023/4/7	14:56:03
8	2023/4/7	16:13:53	自清模式	OFF	Discon._警	2023/4/14	11:17:57
9	2023/4/7	16:13:55	保養模式	OFF	Discon._警	2023/4/14	11:17:59
10	2023/4/7	16:13:56	即時值	0	Discon._警		
11	2023/4/7	16:13:56	水溫	120	Discon._警		
12	2023/4/7	16:13:57	Sensor狀態	0	Discon._警		
13	2023/4/8	03:03:12	即時值	0	Discon._警		
14	2023/4/8	03:03:12	水溫	0	Discon._警		
15	2023/4/8	03:03:12	Sensor狀態	0	Discon._警		
16	2023/4/9	03:03:12	即時值	0	Discon._警		
17	2023/4/9	03:03:12	水溫	0	Discon._警		
18	2023/4/9	03:03:12	Sensor狀態	0	Discon._警		
19	2023/4/10	03:03:12	即時值	0	Discon._警		
20	2023/4/10	03:03:12	水溫	0	Discon._警		
21	2023/4/10	03:03:12	Sensor狀態	0	Discon._警		
22	2023/4/10	08:43:17	即時值	0	Discon._警		
23	2023/4/10	08:43:17	水溫	0	Discon._警		
24	2023/4/10	08:43:17	Sensor狀態	0	Discon._警		
25	2023/4/10	08:48:56	即時值	0	Discon._警		
26	2023/4/10	08:48:56	水溫	0	Discon._警		
27	2023/4/10	08:48:56	Sensor狀態	0	Discon._警		
28	2023/4/10	18:51:30	系統	OFF	關機	2023/4/11	03:00:11
29	2023/4/11	03:03:12	即時值	0	Discon._警		
30	2023/4/11	03:03:12	水溫	0	Discon._警		
31	2023/4/11	03:03:12	Sensor狀態	0	Discon._警		
32	2023/4/12	03:03:12	即時值	0	Discon._警		
33	2023/4/12	03:03:12	水溫	0	Discon._警		

- **The real-time log first reads the files on the USB flash drive, then appends data inside the device that has not yet been written to the flash drive. When no flash drive is inserted, only the internal buffer is available (about 28 KB; with a logging interval of 60 seconds and 4 channels, about 5.7 hours of data, after which the oldest data is overwritten). Download and save important data regularly.**
- **The Event Log file (event.csv) is stored only on the USB flash drive; when no flash drive is inserted, the screen shows not find data.**

PART 7.ADVANCED CONTROL

Questions Answered in This Chapter

- When several control rules are set for one DO channel, in what order are they evaluated?
- How do I set Logic Control, Schedule Control, Cycle Control, and Auto Wash?
- How do I use the special functions (4–20 mA, battery voltage, wind speed statistics, math operations, etc.)?

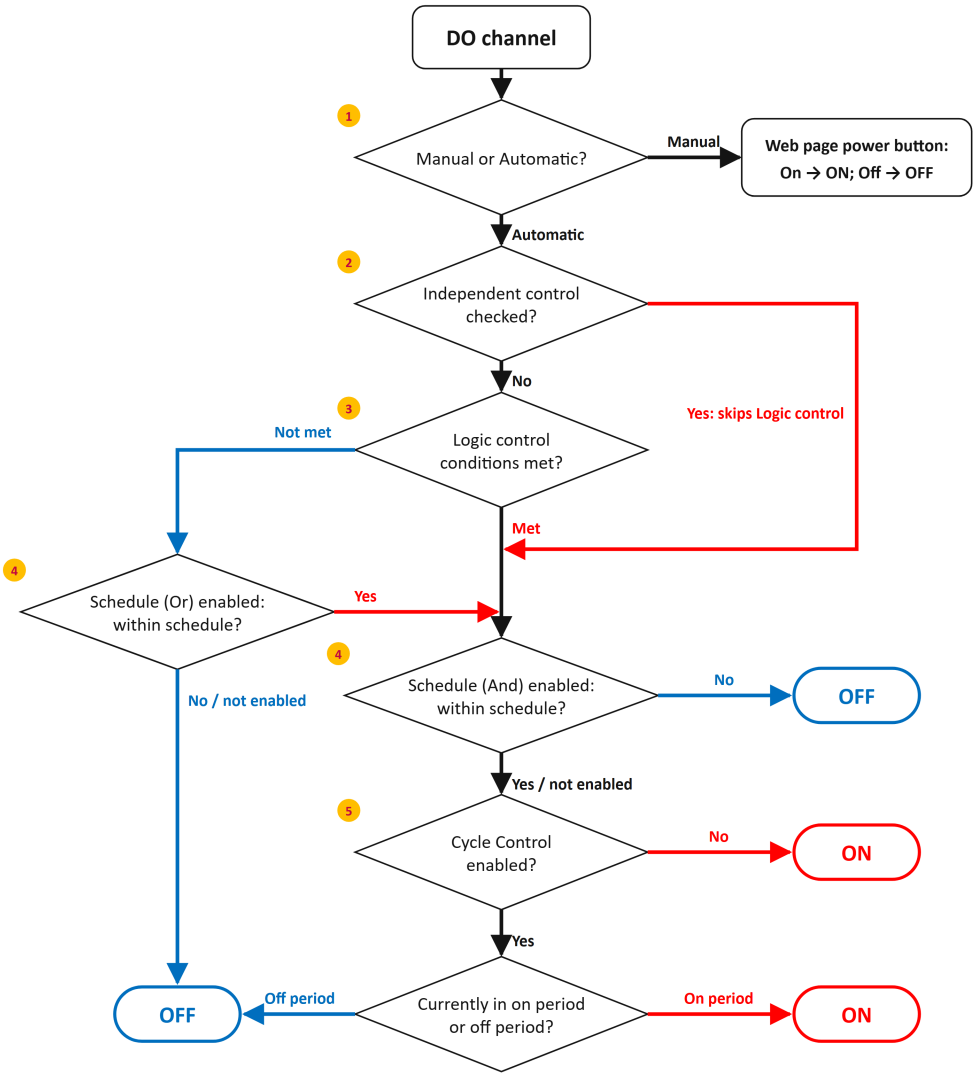
Not Covered in This Chapter

- Basic channel settings → PART 6 Settings (p. 37)

The first half of this chapter (decision sequence, Logic Control, Schedule Control, Cycle Control, Auto Wash) is needed only when DO channels are used (the built-in DO contacts of this device, or DO channels of external Modbus devices). If only sensors are connected, go directly to 7-6 Special Function Applications (p. 79).

7-1 Automatic Control Decision Sequence

When several rules are set for one DO channel, they are evaluated according to the "DO control flowchart" below.



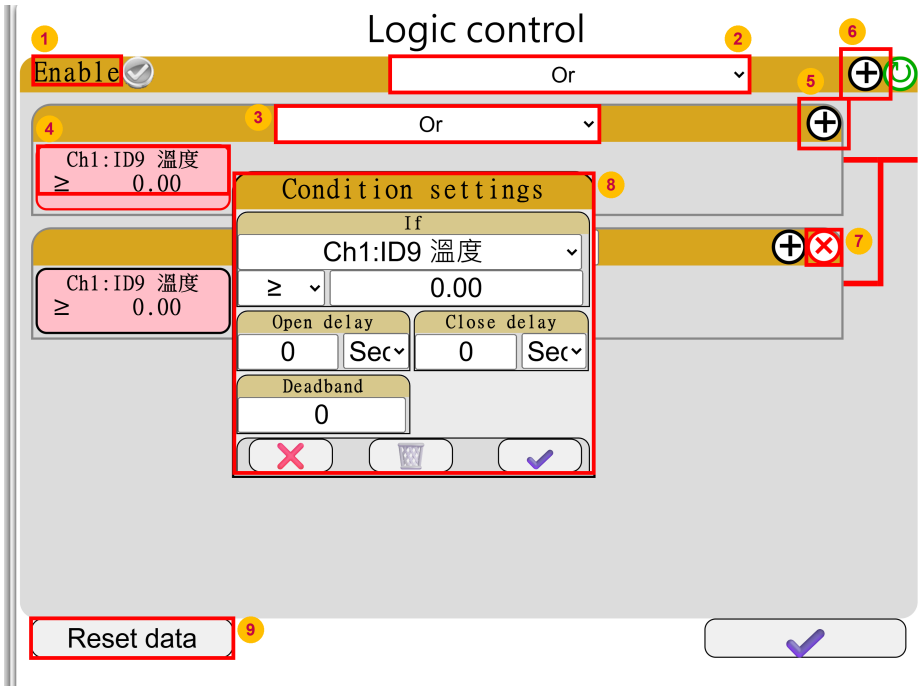
Read from top to bottom:

1. **Manual or automatic? Manual → the manual switch decides on or off.**
2. **Automatic → is "Independent control" enabled? Yes → Logic Control is skipped, and the flow goes directly to the Schedule Control decision on the right (the same path as "condition met").**
3. **Independent control not enabled → is the Logic Control condition met?**
   - **Condition met → Schedule Control not enabled: go to Cycle Control; Schedule Control enabled with And: within the schedule, go to Cycle Control; outside the schedule, OFF.**
   - **Condition not met → Schedule Control not enabled: OFF; Schedule Control enabled with Or: within the schedule, go to Cycle Control; outside the schedule, OFF.**

4 Cycle Control: enabled → cycles through the on period (ON) and off period (OFF); not enabled → ON.

7-2 Logic Control

Path to DO Logic Control: Channel → select a DO channel → Control set → Logic control.



Description:

Code	Name	Function
1	Enable	Logic is evaluated only when this option is enabled
2	Block evaluation type	Or: the DO starts when any one of the one to three blocks below is met. And: the DO starts only when all of the one to three blocks below are met
3	In-block evaluation type	Or: the block is met when any one of the conditions in the block is met. And: the block is met only when all of the conditions in the block are met
4	Condition	Shows the content of this condition
5	Add condition	Click to add a condition. The Logic Control of one channel allows up to 15 conditions, which can be distributed freely across the three blocks

Code	Name	Function
6	Add block	Click to add a block, up to three blocks
7	Delete block	Click to remove that block
8	Condition settings	If: for AI channels, =, ≠, ≥, ≤, Alr=, Alr≠ can be selected and compared with a value; for DI channels, equal to LO or HI can be selected; for DO channels, equal to ON or OFF can be selected. Open delay: after the condition is met, it must persist for this time before it counts as met. Close delay: after the condition has been met and is no longer satisfied, it must persist for this time before it counts as cleared. Deadband: also called hysteresis; see 6-5-1 AI Alarm Settings (p. 45)
9	Reset data	Press to remove all conditions and blocks. Read the warning below before pressing

WARNING: "Reset data" clears all logic rules of this channel

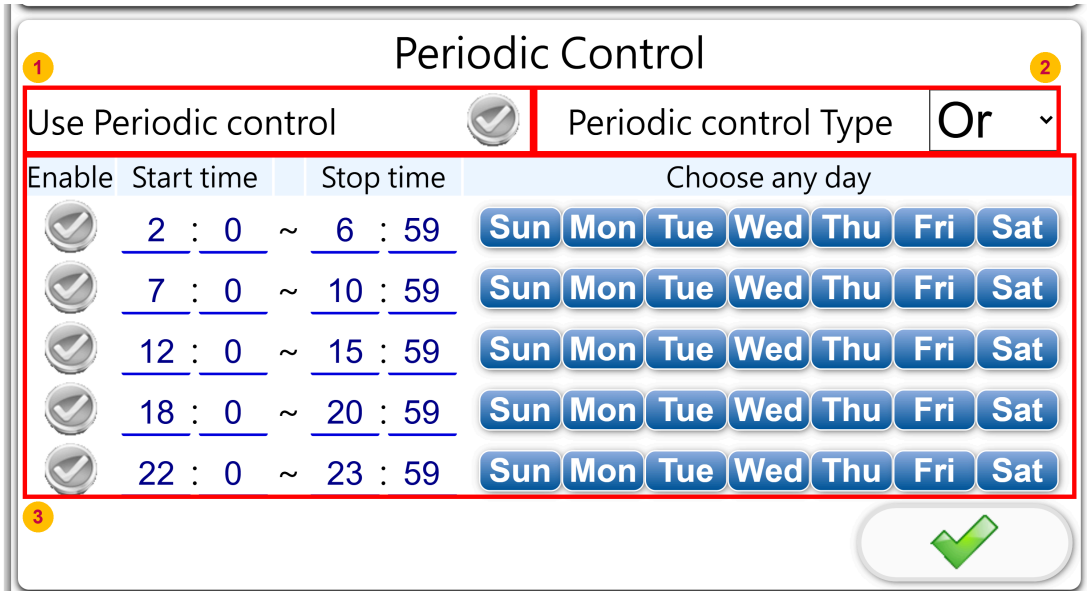
Pressing it clears the conditions and blocks of this channel and clears the Enable check box; rules that have been set must be set again. Manual/Automatic, Independent control, Schedule Control, Cycle Control, and the settings of other channels are not affected.

When to press it: when the rules are set and Logic Control is enabled, but the equipment does not act. A channel that reuses the configuration of another device or a previous site may retain old logic settings internally, which prevent new rules from executing. To resolve this:

1. Press Reset data → confirm.
2. Set the same rule again and check Enable.
3. Go back to Channel → Control set and make sure it is still "Automatic".

7-3 Schedule Control

Path to DO Schedule Control: Channel → select a DO channel → Control set → Periodic Control.



Code	Name	Function
1	Use Periodic control	When checked, the schedule conditions below are evaluated and Schedule Control starts
2	Periodic control Type	And/Or; see the table below for the meaning
3	Schedule selection	Five schedule rows in total; for each row, set the start to stop time and the days of the week on which it starts

Type	Meaning	Example
And	Switches on only when the logic condition is met and within the schedule	Switch on only during working hours and when CO2 is high
Or	Switches on when the logic condition is met or within the schedule; either one switches it on	Always on during working hours; after hours, also on when CO2 is high

WARNING: Schedule type Or allows equipment to start outside the schedule

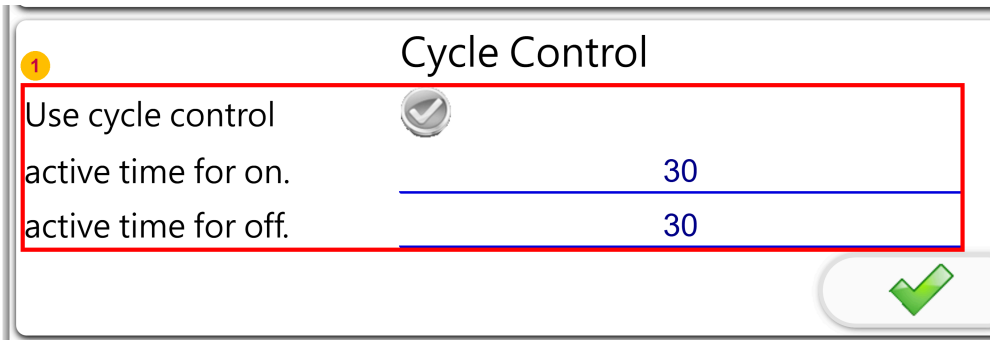
Whenever the logic condition is met, the equipment switches on even outside the schedule (for example, at midnight). To act only within the schedule, select And.

- Rows are combined by Or: if any row is met, the time is within the schedule.
- Up to 5 rows.

- **The schedule is based on the device time. If the device time is incorrect, Schedule Control acts at the wrong time; see 6-8-2 Time Adjustment (p. 59).**

7-4 Cycle Control

Path to DO Cycle Control: Channel → select a DO channel → Control set → Cycle Control.

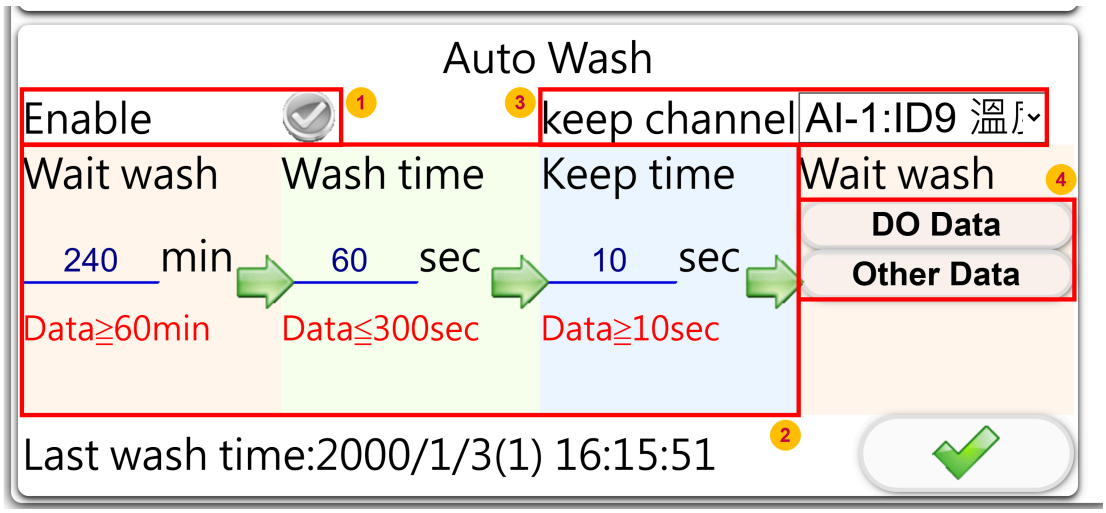


Code	Name	Function
1	Use cycle control	When enabled and the channel is activated, the output turns on for the time set in active time for on., then off for the time set in active time for off., and repeats

7-5 Auto Wash

Path to DO Auto Wash: Channel → select a DO channel → Control set → Auto Wash.

The Auto Wash entry appears only on separately added DO channels whose channel source is an external Modbus device; the built-in DO channels of this device (COM, NO dry contacts) do not have this setting.



Code	Name	Function
1	Enable	Enables Auto Wash
2	Wash process	Wash interval (shown on screen as Wait wash): washing (DO) starts when “current time minus last wash time” is greater than the wash interval. Input limit ≥ 60 min. Wash time: number of seconds the washing (DO) stays on. Input limit ≤ 300 s. Keep time: after washing (DO) turns off, values are not yet stable, so the value is held for this many seconds. Input limit ≥ 10 s
3	keep channel	While a sensor is being washed, its values may be unstable or incorrect. During the wash time and keep time, the selected channel therefore stops updating its value until the keep time ends
4	Default parameters (DO Data/Other Data buttons on screen)	Click to restore the wash process to the default parameters for a dissolved oxygen (DO) sensor or for other sensors

7-6 Special Function Applications

When the Interface of the channel source is set to Local (local source), the device can read its own special values (4–20 mA, battery voltage, wind speed statistics, etc.) or perform math operations, depending on the address entered.

Setup procedure:

1. Settings button → Channel, and open the channel to use.
2. Click Channel Source.
3. Change Interface to Local and ID to 0, and enter the address of the desired function from the table below. Example: address 300100 = Math formula 1.

4 **Press the confirm button at the lower right.**



Address table:

Address	Function
300001	Reads the 4–20 mA value connected to the CB
300011	DI 1 speed calculation: reads the rotational speed of the sensor connected to DI 1
300030	Battery voltage/100 (V)
300031	External input voltage/100 (V)
300032	IC output voltage/100 (V)
300033	Battery charging current/100 (A)
300034	External supply current/100 (A)
300035	Battery level (%)
300051	Hourly maximum wind speed ※
300052	Hourly average wind speed ※
300053	Hourly most frequent wind direction ※
300054	Hourly average temperature ※
300055	Hourly average humidity ※
300056	Hourly average wind direction angle ※
300061	Per-minute maximum wind speed ※
300062	Per-minute average wind speed ※
300063	Per-minute most frequent wind direction ※

Address	Function
300064	Per-minute average temperature ※
300065	Per-minute average humidity ※
300066	Per-minute average wind direction angle ※
300100	Math formula 1
300101	Math formula 2
300102	Math formula 3
300103	Math formula 4
300200	Arithmetic 1
300201	Arithmetic 2
300202	Arithmetic 3
300203	Arithmetic 4
301000	Demo value: sine wave

※ For wind speed, wind direction, temperature, and humidity statistics, complete the following steps first.

Wind speed, wind direction, temperature, and humidity statistics (addresses 300051–300066):

1. Settings button → System → Basic Setting.
2. In Wind speed for Ch, Wind direction for Ch, Temperature for Ch, and Humidity for Ch, select the corresponding channels and press the confirm button.
3. Settings button → Channel, and select the channel that shows the statistic.
4. Channel source: Interface Local, ID 0, enter the address (example: 300051 for hourly maximum wind speed), and press the confirm button at the lower right.

Math formula (addresses 300100–300103): select the channels to calculate; the functions are sum, average, maximum, minimum, and range. Example: selecting “sum” in the step figure above adds all selected channels together. Another example: selecting “average” to average Ch-1 and Ch-1 (both fields set to Ch-1 in the figure below) gives 23.6 V (figure below).



Arithmetic (addresses 300200–300203): addition, subtraction, multiplication, and division between channels. Example: selecting addition to add Ch-1 and Ch-1 (both fields set to Ch-1 in the figure below) gives 47.2 V (figure below).



Demo sine wave (address 301000): shows sine wave values between 0.0 and 100.0.



PART 8.MAINTENANCE AND TROUBLESHOOTING

Questions Answered in This Chapter

- What should I check first when I see an abnormal condition?
- Which conditions are not malfunctions?
- What are the factory defaults of the device? How do I restore them?
- How do I update the firmware and device web page?

Not Covered in This Chapter

- Disassembly and repair → Contact JNC

8-1 Symptoms and Checks

First, check according to the table below. If the problem persists after following the table, contact JNC (see “About us” on the last page of this manual).

#	Symptom	Check
1	The display shows READ, or a channel on the web page shows Read..	The device cannot read the sensor of that channel. ● First, power cycle the device (turn the power switch to OFF and back to ON). ● Still not readable: check whether the sensor communication wires (D+, D-) and power wires have come loose (see 3-3 Contacts and Terminals (p. 22)). Power off first
2	Time or date is incorrect	● Set the time and date again on the device web page (see 6-8-2 Time Adjustment (p. 59)). ● Time and date still incorrect after power is restored following a period without power → the coin cell battery is depleted (see 3-2 Internal Components (p. 19) 4) and must be replaced; alternatively, connect to the network and turn on Ntp enable, and the device synchronizes its time automatically (see 6-8-2 Time Adjustment (p. 59))
3	SIM card not detected	● Prepaid card: has the card been activated? ● Is a PIN code set on the SIM card? If so, remove it first
4	SMS not received	● Is the SMS storage of the SIM card full? If so, delete old messages. ● Are the phone numbers in the phonebook entered correctly (see 6-7-2 Phonebook (p. 53))? ● Is Alarm notification checked on the SMS settings page (see 6-7 SMS Settings (p. 50))? ● Does the SIM card have remaining credit?
5	Channel parameters cannot be set from the web page	● Has the device display returned to the main screen?

#	Symptom	Check
6	Forgot the device IP	● L type: press and hold the SW3 button; the display shows the IP (see 3-2 Internal Components (p. 19) 2; release before 10 seconds). Live work ● C type: check the device label (see 3-4 Reading the Device Label (p. 24))
7	Cannot open the device web page from a computer connected by Ethernet cable	● Is the computer IP in the same subnet as the device, with a different last number? See 5-1 Connecting to the Device Web Page (p. 31)
8	Network disconnects intermittently, no data on the platform	● Is the Ethernet cable connected properly? Are the Ethernet port lights on and flashing (see 3-2 Internal Components (p. 19) 9)? ● Does another device on the same network use the same IP (see 6-8-1 IP Setting (p. 58))? ● When uploading via 4G: is the SIM status on the home page normal? What is the result of the base station signal test (see 6-7-4 Base Station (p. 55))?
9	Communication error, no response after wiring	● Is the power supply normal? Does the wiring comply with 3-3 Contacts and Terminals (p. 22)? Is there a short circuit? Power off first

8-2 Not a Malfunction

Symptom	Cause
While SW3 is held, one more color block appears at the bottom of the display every second	Indicates that 10 seconds is approaching. Releasing before 10 seconds does not perform a factory reset
During a factory reset, the buzzer beeps twice and the device restarts automatically	Normal factory reset process
After sleep is enabled, the web page cannot be reached, and values and records update only at fixed intervals	During sleep, reading, alarm evaluation, the web page, and logging are all suspended; one cycle runs only within the Work time after wake up after each wake-up. For the number of seconds set in Delay alarm after wake up after waking (factory default 20 seconds), AI alarms are not evaluated (see 6-8-10 Sleep Setting (p. 66)). To change settings, power off first, set both levers of the sleep switch SW4 back to the up position, then apply power and connect
not find data appears when downloading the Event Log with no USB flash drive inserted	The Event Log file is stored only on the USB flash drive (see 6-10 Download (p. 71))
After a function is turned off, the fields below it disappear	General rule for the entire web page: when a function is off, its sub-fields are hidden as a group

8-3 Factory Defaults and Factory Reset

Item	Factory default
IP / Mask / Gateway	192.168.0.88 / 255.255.255.0 / 192.168.0.1 (same for every unit; also shown on the device label)
Wi-Fi encryption (optional Wi-Fi module)	None (no encryption)
Web page login password	1234
RS-485 communication format	9600 bps, N, 8, 1
Modbus TCP Port	502
COM1, COM2 (alarm output)	none
Ignore unknown callers	On
Channel disconnection notification	Unchecked
Sleep setting	Work time after wake up: 30 seconds; Delay alarm after wake up: 20 seconds; Record cycle and Update cycle for normal, Alarm lv1, and Alarm lv2: all 600 seconds; keep connection checked for Alarm lv2; Di wake up off

What you want to do	Action
Check the IP and firmware version	Press and hold the SW3 button (L type, see 3-2 Internal Components (p. 19) 2; release before 10 seconds) Live work; C type: check the device label
Forgot or changed the IP incorrectly and cannot connect	L type: first press and hold the SW3 button to see the IP on the display (see 3-2 Internal Components (p. 19) 2; release before 10 seconds) Live work; C type: check the device label. Perform a factory reset only if the IP cannot be found or the device still cannot be reached at that IP (see 8-3-1 Factory Reset (p. 89); all settings are cleared)
Update the firmware or device web page as instructed by JNC	See 8-4 Firmware and Web Page Update (p. 90) (export a configuration backup first)

8-3-1 Factory Reset

Live work

The SW3 button on the controller board of this device (printed on the board: Boot Load; see 3-2 Internal Components (p. 19) 2) operates as follows:

Operation	Result
Press and hold SW3	The display shows the IP, firmware version, model, and date; one more color block appears at the bottom of the screen every second. About 1 second after release, the display returns to the previous screen
Press and hold SW3 for more than 10 seconds	System reset; all internal parameters return to factory defaults (see the factory default table above); the buzzer beeps twice and the device restarts automatically

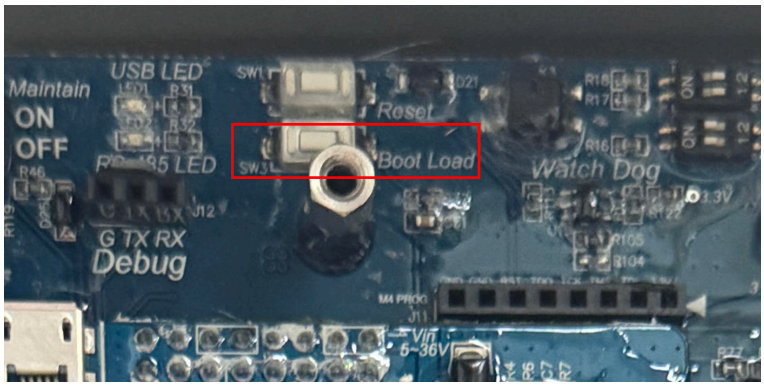
WARNING: Factory reset clears all settings

Cleared: channel settings, DO control logic and schedule rules, IP and login password, phonebook and SMS settings, Wi-Fi settings, upload settings (Http, MQTT, cloud), device name and location, APN, and the data and Event Log buffered inside the device.

Not cleared: files on the USB flash drive, MAC, serial number, clock.

Export a configuration backup first (see 6-8-11 Configuration (Config Data) (p. 69)). After the reset, reconnect using the factory defaults (IP 192.168.0.88, login password 1234).

Procedure:



1. Open the top cover and locate the SW3 button on the controller board (the lower button at 3-2 Internal Components (p. 19) 2).
2. With power applied, press and hold SW3 for more than 10 seconds until the buzzer beeps twice. Touch only SW3, not other components or terminals.
3. After the device restarts automatically, reconnect using the factory defaults.

8-4 Firmware and Web Page Update

Live work

When it is confirmed that the firmware needs to be updated, update it according to this section.

JNC provides the update files. The two files are updated as a pair:

Update file	What it updates	Update method
FIRMWARE.bin (firmware)	The device program: reads inputs, evaluates alarms and control, logs and uploads data	USB flash drive + SW1 and SW3 buttons on the controller board
fs.bin (web page file)	The device web page screens	USB flash drive + Load fs on the web page

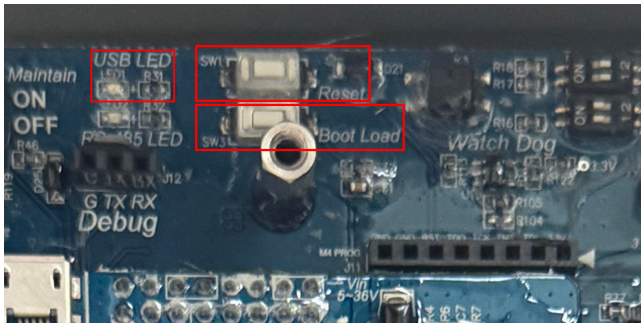
WARNING: Do not power off while LED1 is on

LED1 on indicates that the firmware is being written. Powering off at this time may prevent the device from starting. If LED1 stays on for a long time, keep the power on.

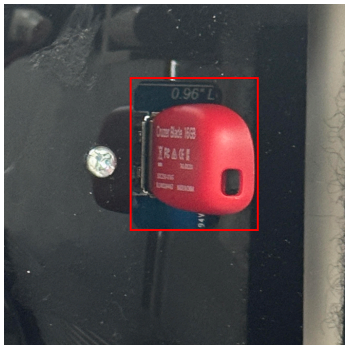
8-4-1 What You Need

- FIRMWARE.bin and fs.bin provided by JNC
- A computer (able to read a USB flash drive)
- A computer or mobile phone that can connect to the device web page (see 5-1 Connecting to the Device Web Page (p. 31))
- USB flash drive: use the flash drive already in the USB port

Components used on the controller board (the figure below shows the same controller board model; left red frame: LED1; upper and lower right red frames: SW1 and SW3):



Component	Board marking	Function
SW1	Reset	Press once to restart
SW3	Boot Load	Used with SW1 to enter firmware update; pressing and holding for more than 10 seconds performs a factory reset (see 8-3-1 Factory Reset (p. 89))
LED1	USB LED	Lights up during firmware update and goes off when the update is complete
USB port	—	Insert the USB flash drive (red frame in the figure below)



CAUTION: Press only SW1 and SW3

Press only the two buttons marked Reset (SW1) and Boot Load (SW3). Do not operate the similarly named Reset and Power ON buttons on the optional communication module, or any other buttons, slide switches, or DIP switches on the controller board (except the power switch, 3-2 Internal Components (p. 19) 5).

8-4-2 Update Procedure

Preparation (no need to open the enclosure)

1. Note the current firmware version: on the device web page home page, below the JNC logo at the upper left (for example, v1.19 260827).
2. Export a configuration backup: System → Config Data, press Ethernet export under Ethernet Config; the configuration file is downloaded to the computer or mobile phone in use (see 6-8-11 Configuration (Config Data) (p. 69)).

Power off and load the update files

3. Open the top cover, turn off the power switch (3-2 Internal Components (p. 19) 5), and unplug the power adapter.
4. Remove the USB flash drive from the USB port and note its insertion direction.
5. On the computer, first copy all files on the flash drive to the computer for safekeeping. The flash drive contains the device log files and may also contain update files of the current version; in the next step, the new files overwrite old files with the same name.
6. Copy FIRMWARE.bin and fs.bin to the root folder of the flash drive (top level, not inside a folder), leaving other files unchanged. The file name must be exactly FIRMWARE.bin; for example, FIRMWARE (1).bin cannot be used for the update.
7. Safely remove the flash drive from the computer and insert it back into the USB port in the original direction.

Apply power and update the firmware

8. Plug in the power adapter, turn the power switch to ON, and wait for the device to finish starting (on the L type, the display shows the value of each channel).

> **CAUTION: If LED1 does not light up after SW1 is released, do not keep holding SW3**
>
> Holding SW3 for more than 10 seconds performs a factory reset. Release SW3 immediately.

9. Use one hand, touching only SW1 and SW3:
   1. Press and hold SW1 and SW3 at the same time.
   2. Release SW1 while continuing to hold SW3.
   3. When LED1 lights up, release SW3.

	Step 1	Step 2	Step 3
SW1	Pressed	Released	—
SW3	Pressed	Held	Released
LED1	Off	On	On

10. When LED1 goes off, the firmware update is complete and the device restarts automatically.
11. Confirm that the firmware version has changed: reconnect to the device web page and check the upper left of the home page, or press and hold the SW3 button and check the upper right of the display (L type; release before 10 seconds) Live work.

Update the web page file

12. Log in to the device web page → System → Config Data, and under Load Web, press Load fs (see 6-8-11 Configuration (Config Data) (p. 69) code 4). Alternatively, enter the device IP followed by /Flash.html in the browser (for example, 192.168.0.88/Flash.html) and press Load fs.bin.
13. One beep from the buzzer indicates that the update has started; after 10–20 seconds, two beeps or a success message on the web page indicates completion. Do not switch screens or power off during the update.

Confirm and finish

14. Refresh the web page, confirm that all channels appear on the home page, and spot-check that settings are retained. If settings have been cleared, import the configuration file exported during preparation (see 6-8-11 Configuration (Config Data) (p. 69)).
15. Close the top cover and leave the USB flash drive in the USB port (the device continuously logs data to the flash drive).

If the device behaves abnormally after the update, contact JNC and keep the files copied to the computer in step 5 so that the previous version can be restored.

APPENDIX A.MODBUS REGISTER TABLE

Who Should Read This Appendix

System engineers: when the customer's central control system (PLC, control PC, etc.) needs to read or control this device. General users do not need to read this appendix.

A-1 Direction of Communication

Situation	Role of this device	Whose table to use
This device reads an external sensor	Master	The sensor's Modbus table
Another system reads this device	Slave	This device's table, i.e., this appendix

A-2 Default Communication Settings

Item	Value
RS-485 communication format	9600 bps, N, 8, 1
Actual values	As set on the device web page under System → Rs485 Setting

A-3 Register Tables

The registers of this device are divided into the following five types of tables by function code. The channels are always CH1–CH120 (corresponding to the number of channels under System → Basic Setting on the web page).

Before using the tables, note the following three conventions:

- Addresses written as a range (e.g., 0x0000–0x0077): each address in the range holds one entry, and the number in the Item column increases by 1 with the address (e.g., CH1–CH120).
- FLOAT and ULong occupy 2 addresses: the first address holds the low word and the next address holds the high word; to assemble the value, place the high word first and then convert (see the read examples at the end of this section).

- For repeated groups, only group 1 is listed: the number of groups and the address interval are noted above the table; the address of group n = listed address + (n−1) × interval.

System Parameters (Function 03 read / 06, 16 write)

Address	Register No.	Item	Type	R/W	Remarks
0x0000–0x0002	400001–400003	Device model[1]|[0]–[5]|[4]	ASCII	R	
0x0003	400004	Device main version	INT16	R	0xABCD BCD = numeric version A = letter version 0='', 1='a', 2='b', 3='c'... Example: v1.05c = 0x3105
0x0004	400005	RTU(D1) slave ID	UINT16	R/W	
0x0005	400006	RTU(D1) baud rate	UINT16	R/W	2400 = 0 4800 = 1 9600 = 2 19200 = 3 38400 = 4 57600 = 5 115200 = 6 Values of 7 or higher are treated as 9600
0x0006	400007	RTU(D1) stop bits	UINT16	R/W	One = 1 Two = 2
0x0007	400008	RTU(D1) parity	UINT16	R/W	None = 0 Even = 1 Odd = 2
0x0008	400009	RTU(D1) data bits	UINT16	R/W	7 or 8
0x0009	400010	Number of channels	UINT16	R/W	Maximum 150 (larger written values are treated as 150)
0x000A–0x000B	400011–400012	COM1–COM2	INT16	R/W	0 = None 0x80 = Buzzer 1–150 = channel order (values above 150 are treated as 0)
0x000C	400013	Reset	INT16	R/W	
0x000D	400014	Logging interval	UINT16	R/W	Unit: seconds Factory default 60; web page minimum 10 0 = no logging
0x000F–0x0012	400016–400019	Device IP1–IP4 address	INT16	R/W	Used by network protocols Writing IP4 (0x0012) or Gateway4 (0x001A) saves IP, Mask, and Gateway as a set
0x0013–0x0016	400020–400023	Device Mask1–Mask4 address	INT16	R/W	Same as above
0x0017–0x001A	400024–400027	Device Gateway1–Gateway4 address	INT16	R/W	Same as above
0x001B–0x0020	400028–400033	Device Mac1–Mac6 address	INT16	R/W	Saved when Mac6 (0x0020) is written
0x0021	400034	RTU(D2) slave ID	UINT16	R/W	

Address	Register No.	Item	Type	R/W	Remarks
0x0022	400035	RTU(D2) baud rate	UINT16	R/W	2400 = 0 4800 = 1 9600 = 2 19200 = 3 38400 = 4 57600 = 5 115200 = 6 Values of 7 or higher are treated as 9600
0x0023	400036	RTU(D2) stop bits	UINT16	R/W	One = 1 Two = 2
0x0024	400037	RTU(D2) parity	UINT16	R/W	None = 0 Even = 1 Odd = 2
0x0025	400038	RTU(D2) data bits	UINT16	R/W	7 or 8
0x0026	400039	Display switch time	UINT16	R/W	
0x0027	400040	Display voltage	UINT16	R/W	
0x0028	400041	Display time	UINT16	R/W	
0x0029	400042	Scheduled restart	UINT16	R/W	On = 1 Off = 0
0x002A	400043	VBatAlarm (battery low-voltage alarm)	UINT16	R/W	Value/10
0x002B	400044	VInAlarm (power failure alarm)	UINT16	R/W	On = 1 Off = 0 Writing also sets 0x8019 (SMS power failure alarm)
0x002C	400045	Self-cleaning upper limit	UINT16	R/W	0–255
0x002D	400046	GPS on/off	UINT16	R/W	On = 1 Off = 0
0x002E	400047	PCB version	UINT16	R	0x00 : 1.0/1.1 0x01 : 1.2
0x0030	400049	Wind speed channel	UINT16	R/W	None = 0 Channel order = other values Example: 0x0011 is the 17th channel
0x0031	400050	Wind direction channel	UINT16	R/W	Same as above
0x0032	400051	Temperature channel	UINT16	R/W	Same as above
0x0033	400052	Humidity channel	UINT16	R/W	Same as above
0x0034	400053	Number of DOs on DO16	UINT16	R/W	bit0–6: number of DOs (≤16) bit7: flag
0x0035	400054	Lock Enable	UINT16	R/W	On = 1 Off = 0
0x0038	400057	System time - year	INT16	R/W	Applied about 5 seconds after writing
0x0039	400058	System time - month	INT16	R/W	
0x003A	400059	System time - day	INT16	R/W	
0x003B	400060	System time - hour	INT16	R/W	
0x003C	400061	System time - minute	INT16	R/W	
0x003D	400062	System time - second	INT16	R/W	
0x003E	400063	Web port	UINT16	R/W	

Address	Register No.	Item	Type	R/W	Remarks
0x003F	400064	Modbus port	UINT16	R/W	
0x0040	400065	tcp crc	UINT16	R/W	On = 1 Off = 0
0x0042	400067	Status update	UINT16	W	Writing changes only the flag (0/1); not saved
0x0048–0x004B	400073–400076	WQI-PSU, NTU, pH, O2 channels	UINT16	R/W	0 = None Other values = channel order (starting from 1)
0x004F	400080	HTTP upload method	UINT16	R/W	Ethernet = 0 Sim card = 1
0x0050–0x005D	400081–400094	HTTP upload page[1]|[0]–[27]|[26]	ASCII	R/W	
0x005E	400095	HTTP upload format	UINT16	R/W	Array= 0 JSON-J001 = 1 JSON-J002 = 2 YouYou = 0x80 WaterLevel = 0x81
0x005F	400096	HTTP upload interval	UINT16	R/W	
0x0060	400097	HTTP upload port	UINT16	R/W	
0x0061–0x006E	400098–400111	HTTP upload address[1]|[0]–[27]|[26]	ASCII	R/W	
0x006F	400112	HTTP encryption	UINT16	R/W	On = 1 Off = 0
0x0070–0x007F	400113–400128	Inverse upload address[1]|[0]–[31]|[30]	ASCII	R/W	
0x0080	400129	Inverse enable	UINT16	R/W	On = 1 Off = 0
0x0081	400130	Inverse upload method	UINT16	R/W	Ethernet = 0 Sim card = 1
0x0082	400131	Inverse Log	UINT16	R/W	
0x0083	400132	Inverse Modbus Port	UINT16	R/W	
0x0084	400133	Inverse Event Port	UINT16	R/W	
0x0085	400134	USB log clear	UINT16	R/W	Write any value to clear; reads back 0
0x0090–0x009F	400145–400160	Device name (characters 1–16)	UTF-16	R/W	
0x00A0–0x00AF	400161–400176	Location (characters 1–16)	UTF-16	R/W	
0x00B0	400177	Sleep on/off	UINT16	R/W	On = 1 Off = 0 (Sleep setting on the web page, not SW4 on the controller board)
0x00B1	400178	Normal sleep period	UINT16	R/W	
0x00B2	400179	First-stage alarm sleep period	UINT16	R/W	
0x00B3	400180	Second-stage alarm sleep period	UINT16	R/W	

Address	Register No.	Item	Type	R/W	Remarks
0x00B4–0x00B5	400181–400182	Normal upload period	ULong	R/W	
0x00B6–0x00B7	400183–400184	First-stage alarm upload period	ULong	R/W	
0x00B8–0x00B9	400185–400186	Second-stage alarm upload period	ULong	R/W	
0x00BA	400187	Keep connection on alarm	UINT16	R/W	Bit1: first-stage alarm Bit2: second-stage alarm
0x00BB	400188	Work time after wake up	UINT16	R/W	
0x00BC	400189	Di wake up	UINT16	R/W	
0x00BD	400190	Delay alarm after wake up	UINT16	R/W	
0x00C0	400193	Browse function	UINT16	R/W	On = 1 Off = 0
0x00C1–0x00C6	400194–400199	Browse password[1]|[0]–[11]|[10]	ASCII	R/W	
0x00C7–0x00CC	400200–400205	Administrator password[1]|[0]–[11]|[10]	ASCII	R/W	
0x8340	433601	NTP enable	UINT16	R/W	Off = 0 Ethernet = 1 Sim-Internet = 2 Sim-GPS = 3
0x8341	433602	NTP time zone	UINT16	R/W	v = GMT (v-12) Example: GMT +8 = 20 GMT 0 = 12
0x8350–0x835F	433617–433632	NTP server address[1]|[0]–[31]|[30]	ASCII	R/W	
0x9000	436865	Mqtt enable	UINT16	R/W	On = 1 Off = 0
0x9001	436866	Mqtt upload method	UINT16	R/W	Ethernet = 0 Sim card = 1
0x9002	436867	Mqtt Qos	UINT16	R/W	
0x9003	436868	Mqtt format	UINT16	R/W	Array= 0 JSON-J001 = 1 JSON-J002 = 2
0x9004	436869	Mqtt KeepTime	UINT16	R/W	
0x9005	436870	Mqtt Port	UINT16	R/W	
0x9006	436871	Mqtt upload interval	UINT16	R/W	
0x9010–0x901F	436881–436896	Mqtt upload address[1]|[0]–[31]|[30]	ASCII	R/W	
0x9020–0x903F	436897–436928	Mqtt Topic[1]|[0]–Topic[63]|[62]	ASCII	R/W	
0x9040–0x904F	436929–436944	Mqtt User[1]|[0]–User[31]|[30]	ASCII	R/W	

Address	Register No.	Item	Type	R/W	Remarks
0x9050–0x905F	436945–436960	Mqtt Pass[1]|[0]–Pass[31]|[30]	ASCII	R/W	
0x9060–0x907F	436961–436992	Mqtt ID[1]|[0]–ID[63]|[62]	ASCII	R/W	

Address	Register No.	Item	Type	R/W	Remarks
0xFF52	465363	Device restart	UINT16	W	Write any value; the device restarts after about 3 seconds
0xFF53	465364	Import USB configuration	UINT16	W	Executed only when 0x2852 is written
0xFF54	465365	Export USB configuration	UINT16	W	Executed only when 0x2852 is written
0xFF55	465366	Rename USB data.csv	UINT16	W	Write any value
0xFF56	465367	Rename USB event.csv	UINT16	W	Write any value
0xFF57	465368	Rename USB config.cws	UINT16	W	Write any value

SMS Parameters (Function 03 read / 06, 16 write)

Address	Register No.	Item	Type	R/W	Remarks
0x8010	432785	Return to normal: enable SMS alarm	UINT16	R/W	
0x8011	432786	Return to normal: ring before sending	UINT16	R/W	
0x8012	432787	Return to normal: return-to-normal notification	UINT16	R/W	
0x8013	432788	Return to normal: resend interval	UINT16	R/W	
0x8014–0x8016	432789–432791	Prepaid card expiration date (year, month, day)	UINT16	R/W	
0x8017	432792	Power restored: return-to-normal notification	UINT16	R/W	
0x8018	432793	Power restored: ring before sending	UINT16	R/W	
0x8019	432794	Power restored: enable power failure alarm	UINT16	R/W	Writing also sets 0x002B (VInAlarm)
0x801A	432795	Do-not-send period: enable	UINT16	R/W	
0x801B	432796	Do-not-send period: start time	UINT16	R/W	High byte = hour, low byte = minute
0x801C	432797	Do-not-send period: end time	UINT16	R/W	Same as above
0x801D	432798	Check number	UINT16	R/W	
0x801E	432799	Encoding mode	UINT16	R/W	
0x801F	432800	2G/3G/4G channel mode	UINT16	R/W	
0x8020–0x8027	432801–432808	Real-time value reply channels (CH1–16, 17–30, 31–46, 47–60, 61–76, 77–90, 91–106, 107–120)	UINT16	R/W	Bit mask: every 2 addresses cover 30 channels First address bit0–15 = channels 1–16 of the block Second address bit0–13 = channels 17–30 of the block

There are 20 phonebook groups, and the table below shows group 1; the address of group n = listed address + (n−1) × 0x0020, and the register number increases by (n−1) × 32 accordingly.

Address	Register No.	Item	Type	R/W	Remarks
0x8040–0x8047	432833–432840	Phonebook (1) assigned channels (CH1–16, 17–30, 31–46, 47–60, 61–76, 77–90, 91–106, 107–120)	UINT16	R/W	Same as 0x8020–0x8027
0x8048	432841	Phonebook (1) SMS level	UINT16	R/W	Read: 1 = options bit0 is 1, 2 = bit0 is 0 Write: 2 = clear bit0, other values = set bit0
0x8049–0x8052	432842–432851	Phonebook (1) number[1]|[0]–[19]|[18]	ASCII	R/W	Each address stores 2 characters, 20 characters in total The low byte holds the earlier character

Virtual AI Parameters (Function 03 read / 06, 16 write)

The item names are the variable names used in the program. Addition has 4 groups (interval 0x0010), Formula has 4 groups (interval 0x0010), and FormulaPro has 8 groups (interval 0x0020); the table below lists group 1 of each. The address of group n = listed address + (n−1) × interval.

To use a virtual AI on an AI channel: set the data interface of the data source to Local (or set the slave ID to 0), then select the group with the data address: 100–103 = Addition groups 1–4, 200–203 = Formula groups 1–4, 400–407 = FormulaPro groups 1–8. Each field in 0x7900–0x797F is internally 1 byte, with valid values 0–255.

Address	Register No.	Item	Type	R/W	Remarks
0x7900–0x790E	430977–430991	Addition[0].index[0]–[14]	UINT16	R/W	Number of a channel used in the calculation, starting from 0 (0 = CH1) 255 = not used
0x790F	430992	Addition[0].Math	UINT16	R/W	0 = Sum 1 = Average 2 = Maximum 3 = Minimum 4 = Range (maximum minus minimum) 5 = Median (average of the two middle values for an even count) Only channels with a normal connection are calculated; disconnected is shown when there is no valid channel The result is then multiplied by the data source gain and the offset is added
0x7940–0x7947	431041–431048	Formula[0].index[0]–[7]	UINT16	R/W	Number of a channel used in the calculation, starting from 0 (0 = CH1) 255 = not used
0x7948–0x794F	431049–431056	Formula[0].type[0]–[7]	UINT16	R/W	type[1]–[7]: 0 = add, 1 = subtract, 2 = multiply, 3 = divide type[0] is not used; the channel value of index[0] is the starting value Calculated item by item from left to right (multiplication and division do not take precedence) The result is then multiplied by the data source gain and the offset is added
0x7980–0x7997	431105–431128	FormulaPro[0].index[0]–[11]	FLOAT	R/W	Each item occupies 2 addresses; both addresses must be written consecutively to take effect type bit3 = 1: this item is a constant (formula coefficient) bit3 = 0: channel number, starting from 0; 240–243 = temporary values A–D; 255 = not used
0x7998–0x7999	431129–431130	Reserved	—	—	Not a valid field; writing here changes 0x799A–0x799B

Address	Register No.	Item	Type	R/W	Remarks
0x799A–0x799F	431131–431136	FormulaPro[0].type[1]|[0]–[11]|[10]	UINT16	R/W	Each address stores 2 items: low byte = items 1, 3, 5…, high byte = items 2, 4, 6… bit0–1: 0 = add, 1 = subtract, 2 = multiply, 3 = divide bit2: 0 = accumulated value ± f(this item), 1 = f(accumulated value ± this item) bit3: 1 = this item is a constant bit4–7 (function f): 0 = none, 1 = sin, 2 = cos, 3 = square, 4 = cube, 5 = square root, 6 = absolute value, 7 = log (base 10) Values 240–243: store the current accumulated value in temporary value A–D, then restart from this item The accumulated value starts from 0, and item 1 normally uses “add”; sin and cos use radians The result is not multiplied by the gain and the offset is not added

Channel Parameters: AI and DI Channels (Function 03 read / 06, 16 write)

The channel parameter tables are listed for Ch1. The high byte of the address = channel and the low byte = item, so the address of Ch n = listed address + (n−1) × 0x0100, and the register number increases by (n−1) × 256 accordingly. The same address range has two kinds of content depending on the channel type (0x0120): for AI and DI channels, use this table; for DO channels, use the next table.

Address	Register No.	Item	Type	R/W	Remarks
0x0100–0x010F	400257–400272	Ch1 channel name[0–15]	UTF-16	R/W	Send: 0x0102, 01 = channel; 02 = address corresponds to first channel name (3rd character) Example: Send: 0x0202, 02 = channel; 02 = address corresponds to second channel name (3rd character)
0x0110–0x011F	400273–400288	Ch1 channel unit[0–15]	UTF-16	R/W	Same as above
0x0120	400289	Ch1 channel type	UINT16	R/W	1 : AI 2 : DI 4 : DO Writing a different type resets all settings of the channel From v1.19, if the channel type is abnormal, all writes to the channel are rejected

Address	Register No.	Item	Type	R/W	Remarks
0x0121	400290	Ch1 data source slave ID	UINT16	R/W	0–255 0 = does not read from an external device and uses the data of this device instead (same as data interface Local) 1–255 = slave ID
0x0122	400291	Ch1 data source data interface	UINT16	R/W	0 : RS-485-1 1 : TCP 2 : Reserved 3 : Local (this device) 4 : RS-485-2 When 0 or 4 is used, the corresponding RS-485 port must be set to Master in the system settings before external reads are performed
0x0123	400292	Ch1 data source data function	UINT16	R/W	AI channel: 3 = read 4xxxxx (Function 03), 4 = read 3xxxxx (Function 04); other values are treated as 4 DI channel: 2 = read 1xxxxx (Function 02), 1 = read 0xxxxx (Function 01); other values are treated as 1 DO channel: 1 = coil (read Function 01, write Function 05, 15), 6 = register 4xxxxx (read Function 03, write Function 06, 16); other values are treated as 6 Set automatically when an address with a prefix (e.g., 400001) is entered on the device web page
0x0124	400293	Ch1 data source data address	UINT16	R/W	Starting from 1
0x0125	400294	Ch1 data source data type	UINT16	R/W	0 : INT16 1 : INT32 2 : UINT16 3 : UINT32 4 : Float 5 : DATA 6 : INT64, 7 : UINT64, and 8 : DOUBLE can be set only on the device web page; Modbus writes are limited to 0–5
0x0126	400295	Ch1 data source gain	UINT16	R/W	Integer, v/10000
0x0127	400296	Ch1 data source offset	UINT16	R/W	Integer, v/10^decimal places
0x0128	400297	Ch1 data source byte/word order	UINT16	R/W	0xAABB AA: 1 = high byte first, 0 = low byte first BB: 1 = high word first, 0 = low word first
0x0129–0x012A	400298–400299	Ch1 data source IP1 IP2–IP3 IP4	UINT16	R/W	0x0129: low byte = IP octet 1, high byte = octet 2 0x012A: low byte = IP octet 3, high byte = octet 4 Example: 192.168.1.100 → 0x0129 = 0xA8C0, 0x012A = 0x6401
0x012B	400300	Ch1 data source Port	UINT16	R/W	0–65535; factory default 502 Used only when the data interface is TCP

Address	Register No.	Item	Type	R/W	Remarks
0x012C	400301	Ch1 data source interval	UINT16	R/W	Unit: 0.1 s 1–254 = 0.1–25.4 s 0 or 255 = no separate interval (read every cycle) Value shown in Sampling interval (ms) on the device web page = register value × 100
0x012D	400302	Ch1 data source read multiple	UINT16	R/W	0 = Off Other than 0 = On
0x0130	400305	Ch1(AI) channel enable	UINT16	R/W	
0x0131	400306	Ch1(AI) decimal places	UINT16	R/W	0–4 (values of 5 or higher are invalid)
0x0132	400307	Ch1(AI) original range maximum	UINT16	R/W	0x0132–0x013F (except 0x0136 and 0x013E): integer = actual value × 10^decimal places
0x0133	400308	Ch1(AI) original range minimum	UINT16	R/W	
0x0134	400309	Ch1(AI) corresponding range maximum	UINT16	R/W	
0x0135	400310	Ch1(AI) corresponding range minimum	UINT16	R/W	
0x0136	400311	Ch1(AI) gain	UINT16	R/W	Integer, v/10000
0x0137	400312	Ch1(AI) offset	UINT16	R/W	
0x0138	400313	Ch1(AI) Over High alarm value	UINT16	R/W	
0x0139	400314	Ch1(AI) High alarm value	UINT16	R/W	
0x013A	400315	Ch1(AI) Low alarm value	UINT16	R/W	
0x013B	400316	Ch1(AI) Over Low alarm value	UINT16	R/W	
0x013C	400317	Ch1(AI) High Fail alarm value	UINT16	R/W	
0x013D	400318	Ch1(AI) Low Fail alarm value	UINT16	R/W	
0x013E	400319	Ch1(AI) alarm delay time	UINT16	R/W	
0x013F	400320	Ch1(AI) alarm deadband	UINT16	R/W	
0x0140	400321	Ch1(AI) Over High alarm relay	UINT16	R/W	
0x0141	400322	Ch1(AI) High alarm relay	UINT16	R/W	
0x0142	400323	Ch1(AI) Low alarm relay	UINT16	R/W	
0x0143	400324	Ch1(AI) Over Low alarm relay	UINT16	R/W	

Address	Register No.	Item	Type	R/W	Remarks
0x0144	400325	Ch1(AI) Over High alarm switch	UINT16	R/W	0 = Off 1 = Alarm 2 = Alarm + log
0x0145	400326	Ch1(AI) High alarm switch	UINT16	R/W	0 = Off 1 = Alarm 2 = Alarm + log
0x0146	400327	Ch1(AI) Low alarm switch	UINT16	R/W	0 = Off 1 = Alarm 2 = Alarm + log
0x0147	400328	Ch1(AI) Over Low alarm switch	UINT16	R/W	0 = Off 1 = Alarm 2 = Alarm + log
0x0148	400329	Ch1(AI) High Fail alarm switch	UINT16	R/W	0 = Off 1 = Alarm 2 = Alarm + log
0x0149	400330	Ch1(AI) Low Fail alarm switch	UINT16	R/W	0 = Off 1 = Alarm 2 = Alarm + log
0x014A	400331	Ch1(AI) LowCut	UINT16	R/W	
0x014B	400332	Ch1(AI) accumulation function	UINT16	R/W	0 = Off 1 = Second 2 = Minute 3 = Hour
0x014C	400333	Ch1(AI) accumulated value	UINT16	R/W	v/100
0x014D	400334	Ch1(AI) accumulated current (gain)	UINT16	R/W	v/100
0x014E	400335	Ch1(AI) disconnection alarm	UINT16	R/W	0x00 : On 0x01 : Off 0X70 : Read
0x0150–0x0151	400337–400338	Ch1(AI) original range maximum	FLOAT	R/W	
0x0152–0x0153	400339–400340	Ch1(AI) original range minimum	FLOAT	R/W	
0x0154–0x0155	400341–400342	Ch1(AI) corresponding range maximum	FLOAT	R/W	
0x0156–0x0157	400343–400344	Ch1(AI) corresponding range minimum	FLOAT	R/W	
0x0158–0x0159	400345–400346	Ch1(AI) gain	FLOAT	R/W	
0x015A–0x015B	400347–400348	Ch1(AI) offset	FLOAT	R/W	
0x015C–0x015D	400349–400350	Ch1(AI) Over High alarm value	FLOAT	R/W	
0x015E–0x015F	400351–400352	Ch1(AI) High alarm value	FLOAT	R/W	
0x0160–0x0161	400353–400354	Ch1(AI) Low alarm value	FLOAT	R/W	

Address	Register No.	Item	Type	R/W	Remarks
0x0162–0x0163	400355–400356	Ch1(AI) Over Low alarm value	FLOAT	R/W	
0x0164–0x0165	400357–400358	Ch1(AI) High Fail alarm value	FLOAT	R/W	
0x0166–0x0167	400359–400360	Ch1(AI) Low Fail alarm value	FLOAT	R/W	
0x0168–0x0169	400361–400362	Ch1(AI) alarm deadband	FLOAT	R/W	
0x016A–0x016B	400363–400364	Ch1(AI) LowCut	FLOAT	R/W	
0x016C–0x016D	400365–400366	Ch1 data source gain	FLOAT	R/W	
0x016E–0x016F	400367–400368	Ch1 data source offset	FLOAT	R/W	
0x0180	400385	Ch1(DI) channel enable	UINT16	R/W	
0x0181	400386	Ch1(DI) start delay	UINT16	R/W	Unit: seconds An alarm is issued only after the DI state lasts longer than this number of seconds
0x0182	400387	Ch1(DI) off delay	UINT16	R/W	Unit: seconds No effect in the current firmware; not available on the device web page
0x0183	400388	Ch1(DI) inverted	UINT16	R/W	
0x0184	400389	Ch1(DI) alarm switch	UINT16	R/W	
0x0185	400390	Ch1(DI) control relay	UINT16	R/W	
0x0186	400391	Ch1(DI) alarm log	UINT16	R/W	
0x0187	400392	Ch1(DI) disconnection alarm	UINT16	R/W	0x00 : On 0x01 : Off 0X70 : Read
0x01C0–0x01C1	400449–400450	Ch1(AI) accumulated value	FLOAT	R/W	
0x01C2–0x01C3	400451–400452	Ch1(AI) hourly accumulated value	FLOAT	R/W	
0x01C4–0x01C5	400453–400454	Ch1(AI) daily accumulated value	FLOAT	R/W	

Channel Parameters: DO Channels (Function 03 read / 06, 16 write)

0x0100–0x012D (channel name, unit, type, and data source) are the same as in the previous AI and DI channel table; this table starts from 0x0130.

Address	Register No.	Item	Type	R/W	Remarks
0x0130	400305	Ch1(DO) channel enable	UINT16	R/W	1 :On 0 :Off
0x0131	400306	Ch1(DO) independent control	UINT16	R/W	1 :On 0 :Off
0x0132	400307	Ch1(DO) start log	UINT16	R/W	1 :On 0 :Off
0x0133	400308	Ch1(DO) inverted	UINT16	R/W	1 :On 0 :Off
0x0134	400309	Ch1(DO) manual/automatic mode	UINT16	R/W	1 :Manual 0 :Automatic
0x0135	400310	Ch1(DO) Cycle Control enable	UINT16	R/W	1 :On 0 :Off
0x0136	400311	Ch1(DO) Cycle Control on time	UINT16	R/W	Unit: seconds
0x0137	400312	Ch1(DO) Cycle Control off time	UINT16	R/W	Unit: seconds
0x0138	400313	Ch1(DO) timeout alarm	UINT16	R/W	Unit: seconds
0x0139	400314	Ch1(DO) manual open time	UINT16	R/W	
0x013A	400315	Ch1(DO) linked control	UINT16	R/W	DO channel number, starting from 1 0 = none
0x013B	400316	Ch1(DO) on delay control	UINT16	R/W	
0x013C	400317	Ch1(DO) off delay control	UINT16	R/W	
0x013D	400318	Ch1(DO) memory on value	UINT16	R/W	Output range for AO retransmission (see 0x0168)
0x013E	400319	Ch1(DO) memory off value	UINT16	R/W	Same as above
0x013F	400320	Ch1(DO) schedule control enable and type	UINT16	R/W	0 :Schedule control off, type Or 1 :Schedule control on, type Or 2 :Schedule control off, type And 3 :Schedule control on, type And
0x0140–0x0147	400321–400328	Ch1(DO) schedule control first to eighth time slot switches	UINT16	R/W	Read: returns the bit mask value of the time slot (time slot n = 2^(n−1)); any value other than 0 means on Write: other than 0 = On, 0 = Off
0x0148–0x014F	400329–400336	Ch1(DO) schedule control first to eighth time slot days of week	UINT16	R/W	bit0 = Sunday to bit6 = Saturday 1 = selected, 0 = not selected Example: 0x003F = Sun–Fri selected Example: 0x007E = Mon–Sat selected
0x0150–0x0157	400337–400344	Ch1(DO) schedule control first to eighth time slot start time	UINT16	R/W	Hour*60+minute (written value must be <1440)

Address	Register No.	Item	Type	R/W	Remarks
0x0158–0x015F	400345–400352	Ch1(DO) schedule control first to eighth time slot stop time	UINT16	R/W	Hour*60+minute (written value must be ≤1440)
0x0160	400353	Ch1(DO) self-cleaning mode enable	UINT16	R/W	1 :On 0 :Off On the device web page, this setting is available only for DO channels whose data source is external Modbus
0x0161	400354	Ch1(DO) self-cleaning mode detection channel	UINT16	R/W	
0x0162–0x0163	400355–400356	Ch1(DO) self-cleaning mode last cleaning time	ULong	R/W	
0x0164	400357	Ch1(DO) cleaning frequency	UINT16	R/W	Unit: minutes; minimum 60
0x0165	400358	Ch1(DO) cleaning time	UINT16	R/W	Unit: seconds; maximum 300
0x0166	400359	Ch1(DO) cleaning delay	UINT16	R/W	Unit: seconds; minimum 10 Called Keep time on the device web page
0x0167	400360	Ch1(DO) disconnection alarm	UINT16	R/W	0x00 : On 0x01 : Off 0X70 : Read
0x0168	400361	Ch1(DO) AO retransmission channel	UINT16	R/W	Source AI channel 0 = Off Other values = channel order The source value is scaled proportionally using the source range 0x016A–0x016D and the output range 0x013D–0x013E before output On the device web page, this setting is available only for DO channels whose data source is external Modbus
0x0169	400362	Reserved (AO retransmission type)	UINT16	R/W	Not implemented in the firmware; writing does not affect operation
0x016A–0x016B	400363–400364	Ch1(DO) AO original range minimum	FLOAT	R/W	Source range
0x016C–0x016D	400365–400366	Ch1(DO) AO original range maximum	FLOAT	R/W	Same as above
0x0170	400369	Ch1(DO) write-only mode	UINT16	R/W	
0x0171	400370	Ch1(DO) queue priority	UINT16	R/W	1 :On 0 :Off
0x0172	400371	Ch1(DO) corresponding current channel	UINT16	R/W	
0x0173	400372	Ch1(DO) interlock function switch	UINT16	R/W	
0x0174–0x0175	400373–400374	Ch1(DO) open count	ULong	R/W	

Address	Register No.	Item	Type	R/W	Remarks
0x0176–0x0177	400375–400376	Ch1(DO) run time	ULong	R/W	Unit: seconds (including the current on time)
0x0180	400385	Ch1(DO) Logic(1) switch	UINT16	R/W	0 : Close 1 :General logic control 2 : Forward/reverse mode 3 : Alternating operation Modbus writes save only 0/1; 2 and 3 must be set on the device web page
0x0181	400386	Ch1(DO) Logic(1) condition	UINT16	R/W	0: Or 1: And 2: First if>=0x10 pro condition
0x0182	400387	Ch1(DO) Logic(1) output value	UINT16	R	Read-only; returns only the integer part
0x0183	400388	Ch1(DO) Logic(1) condition switch	UINT16	R/W	bit0: condition 1 switch bit1: condition 2 switch bit2–bit13: and so on bit14: condition 15 switch
0x0184–0x0187	400389–400392	Ch1(DO) Logic(1) Pro condition 1–4	UINT16	R/W	bit0: condition 1 switch bit1–bit13: and so on bit14: condition 15 switch bit15: Or/And

There are 15 conditions, and the table below shows condition 1; the address of condition n = listed address + (n−1) × 0x0008, and the register number increases by (n−1) × 8 accordingly.

Address	Register No.	Item	Type	R/W	Remarks
0x0188	400393	Ch1(DO) Logic(1) condition 1 channel + type	UINT16	R/W	bit0–7: channel bit8–15: type 0x00xx = 0x01xx ≠ 0x02xx ≥ 0x03xx ≤ 0x08xx A/M 0x10xx Alr= 0x11xx Alr≠ 0x20xx =Ch 0x21xx ≠Ch 0x22xx ≥Ch 0x23xx ≤Ch
0x0189	400394	Ch1(DO) Logic(1) condition 1 on delay	UINT16	R/W	bit15: 0→seconds, 1→minutes bit0–14: time
0x018A	400395	Ch1(DO) Logic(1) condition 1 off delay	UINT16	R/W	Same as above
0x018B	400396	Ch1(DO) Logic(1) condition 1 deadband	UINT16	R/W	
0x018C–0x018D	400397–400398	Ch1(DO) Logic(1) condition 1 value	FLOAT	R/W	
0x018E–0x018F	400399–400400	Ch1(DO) Logic(1) condition 1 output value	FLOAT	R/W	

Real-Time Values (Function 04 read)

Address	Register No.	Item	Type	R/W	Remarks
0x0000–0x0077	300001–300120	CH1–CH120 real-time value	INT16	R	AI : Value/(10^decimal places) DI : HI=1,LO=0 DO : ON=1,OFF=0
0x0078	300121	SMS status	INT16	R	In standby: signal strength 0–5 10 (0x0A): not registered (same value as CheckState) 17 (0x11): SIM PIN locked When busy, the following values are returned: 7 : Http upload 8 : Sending SMS 9 : Dialing 11 : Https upload 12 : SIM MQTT 13 : Telit Http 14 : Telit MQTT 15 : SIM FTP 16 : Telit FTP
0x0079	300122	USB status	INT16	R	bit0: USB present bit1: USB present before sleep bit4 and above: result of the last USB access
0x007A	300123	Alarm status	INT16	R	1 : A channel alarm has triggered common contact COM2
0x007B	300124	Update	INT16	R	Settings changed = 1; clear with Function 06 by writing 0x0042 = 0
0x007C	300125	Alarm count	INT16	R	Alarm event count (0–255, cyclic)
0x007D	300126	Firmware version	INT16	R	Same format as Function 03 0x0003
0x007E	300127	Hardware version	INT16	R	
0x007F	300128	Sleep status	INT16	R	Same as 0x01FD
0x0100–0x01EF	300257–300496	CH1–CH120 real-time value	FLOAT	R	AI : Value DI : high word HI=1, LO=0; low word 0 DO : high word ON=1, OFF=0; low word = Value (when the data function is FC01, returns 0)
0x01F0	300497	SMS status	INT16	R	Same as 0x0078
0x01F1	300498	USB status	INT16	R	Same as 0x0079
0x01F2	300499	Alarm status	INT16	R	Same as 0x007A
0x01F3	300500	Update	INT16	R	Same as 0x007B
0x01F4	300501	Alarm count	INT16	R	Same as 0x007C
0x01F5	300502	Firmware version	INT16	R	Same as 0x007D
0x01F6–0x01F7	300503–300504	GPS East	FLOAT	R	Value/10^5
0x01F8–0x01F9	300505–300506	GPS North	FLOAT	R	Same as above
0x01FA–0x01FB	300507–300508	GPS High	FLOAT	R	Value/10
0x01FC	300509	Hardware version	INT16	R	Same as 0x007E

Address	Register No.	Item	Type	R/W	Remarks
0x01FD	300510	Sleep status	INT16	R	bit0: sleep hardware switch bit1: sleep firmware switch bit2: USB read/write in progress bit3: self-cleaning in progress bit4: post-wake-up work in progress bit5: Inverse upload in progress bit6: Http upload in progress bit7: Sleep Delay (hardware switch toggled) bit8: no sleep during channel alarm bit9: GPS reading in progress bit10: NTP reading in progress
0x0200–0x0277	300513–300632	CH1–CH120 Read status	INT16	R	0 : Normal 1 : Disconnected/cannot be read
0x0300–0x0377	300769–300888	CH1–CH120 type	INT16	R	1 : AI 2 : DI 4 : DO
0x0400–0x0477	301025–301144	CH1–CH120 manual/automatic	INT16	R	DO: 0 : Automatic, 1 : Manual AI, DI: returns 0
0x04FF	301280	Power failure status	INT16	R	0 : No SMS module 1 : Powered 2 : Power failure Also returns 2 when the charging IC detects an external power failure For PCB v3 or later with an SMS module, always returns 1
0x0500–0x0577	301281–301400	CH1–CH120 combined status	INT16	R	bit0–3: type (1 AI, 2 DI, 4 DO) bit4: manual (DO) bit5: interlock locked (DO) bit8: communication failure bit12: DO manual timeout
0x0800–0x08EF	302049–302288	CH1–CH120 total accumulated value	FLOAT	R	AI: total accumulated value DI: returns 0 DO: returns the value of the corresponding AI channel if one is assigned; otherwise returns 0
0x0900–0x09EF	302305–302544	CH1–CH120 hourly accumulated value	FLOAT	R	Same as 0x0800 Returns 0 when accumulation is not enabled for the AI channel
0x0A00–0x0AEF	302561–302800	CH1–CH120 daily accumulated value	FLOAT	R	Same as 0x0800 Returns 0 when accumulation is not enabled for the AI channel
0x0B00–0x0BEF	302817–303056	CH1–CH120 open count	ULong	R	AI, DI: returns 0 DO: open count
0x0C00–0x0CEF	303073–303312	CH1–CH120 total run time	ULong	R	AI, DI: returns 0 DO: total run time in seconds (including the current on time)

There are 85 Event Log entries, and the table below shows entry 1; the address of entry n = listed address + (n−1) × 0x0008, and the register number increases by (n−1) × 8 accordingly.

Address	Register No.	Item	Type	R/W	Remarks
0x2000–0x2001	308193–308194	Event Log (1) occurrence time	FLOAT	R	Entry 1 is the latest entry, and later entries are older Wraps around from entry 86 (0x22A8)
0x2002	308195	Event Log (1) occurrence channel	UINT16	R	Low 8 bits: occurrence channel High 8 bits: event sequence number
0x2003	308196	Event Log (1) alarm type	UINT16	R	0x00 = Normal 0x01 = LO 0x03 = LOLO 0x04 = HI 0x0C = HIHI 0x10 = HFAIL 0x20 = LFAIL 0x30 = Power failure 0x40 = DO timeout 0x50 = DO manual 0x60 = DO automatic (returns 0x8000 | automatic control data) 0x70 = Disconnected 0x80 = Initialization 0x90 = GPS displacement 0xA0 = Memory error 0xA1 = Reset 0xB0 = Battery low voltage
0x2004–0x2005	308197–308198	Event Log (1) alarm value	FLOAT	R	When the alarm type is DO automatic: automatic control data Otherwise: alarm value
0x2006–0x2007	308199–308200	Event Log (1) end time	FLOAT	R	

Digital Outputs (Function 01 read / 05, 15 write)

Address	Register No.	Item	Type	R/W	Remarks
0x0000–0x0077	000001–000120	CH1–CH120 real-time value	INT16	R/W	The channel signal must be set to DO DO : ON=1,OFF=0 Reads back 0 for non-DO channels or when the address ≥ number of channels No action when the written value is the same as the current state

Digital Inputs (Function 02 read)

Address	Register No.	Item	Type	R/W	Remarks
0x0000–0x0077	100001–100120	CH1–CH120 real-time value	INT16	R	The channel signal must be set to DI DI : HI=1,LO=0 Reads back 0 for non-DI channels or when the address ≥ number of channels

Read/Write Examples

In the following examples, the slave ID is always 01, and the CRC is the Modbus RTU 16-bit check code (low byte first).

Example 1: Read the logging interval (Function 03, UINT16)

Master request:

Slave ID	Function code	Start address	Quantity (words)	CRC
01	03	00 0D	00 01	15 C9

Slave response:

Slave ID	Function code	Byte count	Data	CRC
01	03	02	00 3C	B8 55

Data 0x003C = 60, so the logging interval is 60 seconds.

Example 2: Read the CH4 real-time value (Function 04, INT16)

Master request:

Slave ID	Function code	Start address	Quantity (words)	CRC
01	04	00 03	00 01	C1 CA

Slave response:

Slave ID	Function code	Byte count	Data	CRC
01	04	02	00 64	B8 DB

Data 0x0064 = 100. When the decimal places setting of CH4 is 0, the real-time value is 100 (the unit follows the channel setting; % in this example).

Example 3: Read the CH4 real-time value (Function 04, FLOAT)

Master request:

Slave ID	Function code	Start address	Quantity (words)	CRC
01	04	01 06	00 02	90 36

Slave response:

Slave ID	Function code	Byte count	Data	CRC
01	04	04	00 00 42 C8	CA B2

The first 2 bytes of the data, 00 00, are the low word (address 0x0106), and the last 2 bytes, 42 C8, are the high word (address 0x0107). Placing the high word first gives 42 C8 00 00, which converts to 100.0 as a FLOAT; that is, the real-time value of CH4 is 100.0.

An online conversion tool is available: https://gregstoll.com/~gregstoll/floattohex/

CAUTION: Real-time values must be read with Function 04

Reading 0x0100 with Function 03 returns the Ch1 channel name (ASCII), not the real-time value.

Revision History

Version	Revision date	Revision description	Maintenance personnel
V2.14	2024/05/23	Add new cover, update content, add new tags	Siao jǐng jhou
V2.19	2026/10/30	Fully rewritten for firmware v1.19; errors corrected	Ran

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