Chengdu Ebyte Electronic Technology Co.,Ltd

Wireless Modem

User Manual



Wireless Remote Transmission Switch

E860-DTU(X0X0-900SLxx)-V2

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Statement

Thank you for choosing the products of Chengdu Ebyte Electronic Technology Co., Ltd.

To ensure that you can use this product correctly and safely, please read this manual carefully before use.

While this manual strives to be accurate and complete, due to rapid technological advancements, we cannot guarantee that all information is completely accurate. If you find any problems, please feel free to contact us.

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1. Product Overview

1.1 Product Introduction



The Wireless Transmission Switch is a wireless switch transmission terminal based on LoRa modulation technology. It supports digital input (DI) acquisition and relay output (DO) control. Its core function is to achieve remote, synchronous control of switch states. It requires no wiring and offers high ease of use, allowing for rapid integration into existing systems. The device uses a wide DC voltage input range of 8-28V and operates in the 850.125-930.125MHz frequency band.

1.2 Product Features

Excellent wireless performance

Ultra-long-range: Available in two transmission distance options: 5km and 10km, with a maximum range of 10km.

Flexible networking: Supports multiple operating modes: point-to-point (1:1), point-to-multipoint (1:N), and multipoint-to-point (M:1), with automatic matching for ease of use.

Strong anti-interference: Supports encrypted transmission to effectively prevent interference between devices.

Reliable communication: Features an automatic disconnection recovery function, automatically resetting the receiving end output (DO) status after a timeout, ensuring system continuity.

Operating frequency band: 850.125MHz ~ 930.125MHz.

Rich interface configuration

Relay output: 1, 2, 4 or 8 relay outputs are optional.

Signal input: 1, 2, 4 or 8 dry contact input signals are optional.

High Reliability and Safety

with Multiple Protections: The power supply features reverse polarity, overcurrent, and overvoltage protection.

Stable Operation: Supports dual software and hardware watchdog timers to ensure long-term stable and reliable operation.

Safe Enclosure: Crafted from flame-retardant engineering plastic.

Environmental Adaptability: Industrial-grade wide operating temperature (-40°C to +85°C) and humidity range of 5% to 95% RH (non-condensing).

Easy installation and maintenance

Power supply: Supports a wide range of DC 8V to 28V input voltage.

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Easy installation: Supports standard 35mm DIN rail mounting.

Intuitive operation: Equipped with multiple status indicators, one-touch pairing, and a separate reset/restore button, it facilitates commissioning and emergency response.

Upgradability: Supports firmware upgrades for future feature expansion and maintenance.

2. Technical indicators

2.1 Specifications

Category	Name	Parameter
Power supply	Operating voltage	DC 8～28V
	Power indicator	Blue LED indication
Wireless parameters	Operating frequency band	850.125MHz ~ 930.125MHz
	Transmit power	22dBm/30dBm optional
	Receive sensitivity	-148 dBm@2.4Kbps
	Transmission distance	22dBm for 5 km, 30dBm for 10 km (clear and open environment, maximum power, antenna gain 5dBi, height 2m)
	airspeed	2.4K
	Antenna options	SMA antenna base (external screw inner hole)
Response speed	Response speed	Within 300ms
DI input	DI channels	1/2/4/8 channels (optional)
	Input Type	Dry contact/NPN type
	Input Instructions	Green LED indicator
DO output	DO number	1/2/4/8 channels (optional)
	DO output type	1/2/4 are C-type relays, 8 is A-type relay
	DO output mode	Jog mode
	Relay contact capacity	1/2/4 channels: 7A 30VDC, 7A 250VAC 8-way: 10A 30VDC, 10A 250VAC

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	Output Indicator	Red LED indicator
Power consumption	Transmit current consumption	290mA @ DC 12V
	Average current consumption	70mA @ DC 12V
	One relay current consumption	15mA @ DC 12V
Other	Product size	E860-DTU(1010-900SL22)-V2: 113*37*65mm (L*W*H) E860-DTU(2020-900SL22)-V2: 113*52*65mm (L*W*H) E860-DTU(4040-900SL22)-V2: 113*72*65mm (L*W*H) E860-DTU(8080-900SL22)-V2: 113*107*65mm (L*W*H) E860-DTU(2020-900SL30)-V2: 113*52*65mm (L*W*H) E860-DTU(4040-900SL30)-V2: 113*72*65mm (L*W*H) E860-DTU(8080-900SL30)-V2: 113*107*65mm (L*W*H)
	Product weight	E860-DTU(1010-900SL22)-V2: 77±5g E860-DTU(2020-900SL22)-V2: 110±5g E860-DTU(4040-900SL22)-V2: 150±5g E860-DTU(8080-900SL22)-V2: 192±5g E860-DTU(2020-900SL30)-V2: 110±5g E860-DTU(4040-900SL30)-V2: 150±5g E860-DTU(8080-900SL30)-V2: 192±5g
	Working temperature and humidity	-40～+85℃, 5%～95%RH (no condensation)
	Storage temperature and humidity	-60～+125℃, 5%～95%RH (no condensation)

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2.2 Port Description



serial no.	E860-DTU(1010-900SL22)-V2 Device Port Description	E860-DTU(2020-900SL22)-V2 E860-DTU(2020-900SL30)-V2 Device Port Description	E860-DTU(4040-900SL22)-V2 E860-DTU(4040-900SL30)-V2 Device Port Description	E860-DTU(8080-900SL22)-V2 E860-DTU(8080-900SL30)-V2 Device Port Description
1	RS485-A	Switch input port 1	Switch input port 1	Switch input port 1
2	RS485-B	Switch input port 2	Switch input port 2	Switch input port 2
3	PE (protective earth)	Switch common terminal	Switch common terminal	Switch input port 3
4	DC 8～28V(V-)	RS485-A	Switch input port 3	Switch input port 4
5	DC 8～28V(V+)	RS485-B	Switch input port 4	Switch common terminal
6	Switch input port 1	PE (protective earth)	Switch common terminal	Switch input port 5
7	Switch common terminal	DC 8～28V(V-)	GND	Switch input port 6
8	Relay output normally open port 1	DC 8～28V(V+)	RS485-A	Switch input port 7
9	Relay output COM port 1	Relay output normally open port 1	RS485-B	Switch input port 8
10	Relay output normally closed port 1	Relay output COM port 1	PE (protective earth)	Switch common terminal
11	STATE configuration reset button	Relay output normally closed port 1	DC 8～28V(V-)	GND

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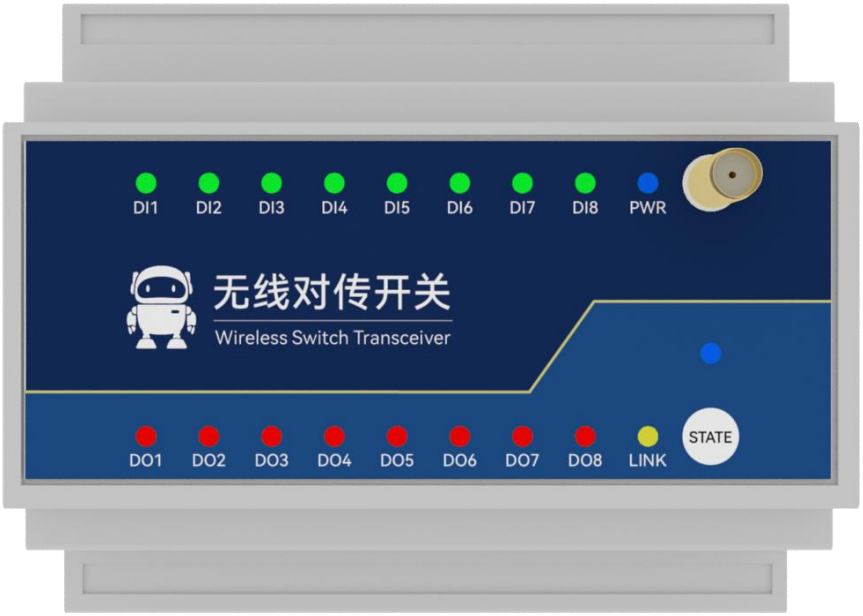
12		Relay output normally open port 2	DC 8～28V(V+)	RS485-A
13		Relay output COM port 2	Relay output normally open port 1	RS485-B
14		Relay output normally closed port 2	Relay output COM port 1	PE (protective earth)
15		STATE configuration reset button	Relay output normally closed port 1	DC 8～28V(V-)
16			Relay output normally open port 2	DC 8～28V(V+)
17			Relay output COM port 2	Relay output normally open port 1
18			Relay output normally closed port 2	Relay output COM port 1
19			Relay output normally open port 3	Relay output normally open port 2
20			Relay output COM port 3	Relay output COM port 2
21			Relay output normally closed port 3	Relay output normally open port 3
22			Relay output normally open port 4	Relay output COM port 3
23				
24			Relay output normally closed port 4	Relay output COM port 4
25			STATE configuration reset button	Relay output normally open port 5
26				Relay output COM port 5
27				Relay output normally open port 6
28				Relay output COM port 6
29				Relay output normally open port 7
30				Relay output COM port 7

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31				Relay output normally open port 8
32				Relay output COM port 8
33				STATE configuration reset button

2.3 LED Indicator and Button Description



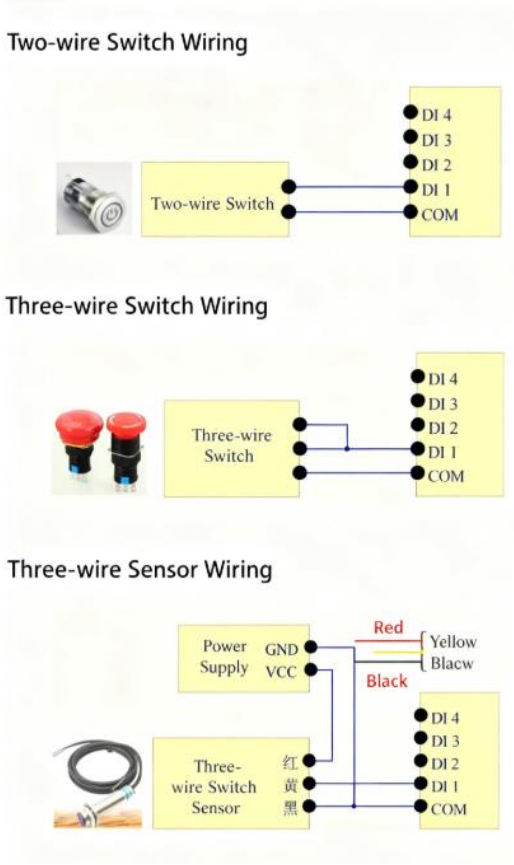
Port	LED indicator color	Illustration
PWR	Blue LED	Power indicator light, always on when powered on, off when no power
LINK	Yellow LED	1 to many (including 1 to 1) - bidirectional (when the devices have the same number of channels): ● As long as one slave is successfully connected to the master, the LINK indicator of the master will be on; ● After the slave device is successfully connected to the host device, the slave device's LINK indicator light will be on; 1 to many - two-way (different number of channels, each channel of the host is independently controlled by the slave): the host LINK indicator flashes several times according to the number of devices connected (cycle 300ms, after flashing, it goes out for 1s, and then flashes again). For example: if 3 devices are connected, the LINK indicator

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		flashes 3 times according to the cycle, then goes out for 1s and flashes again;
STATE (indicator light)	Blue LED	Host: The indicator light is always on; Slave: indicator light flashes slowly; Pairing: indicator light flashes quickly; Not paired: the indicator light is off;
STATE (button)	White buttons	1、Long press for 2 seconds to enter pairing mode; 2、Long press for more than 6 seconds to restore to factory settings; 3、Long press to cycle through the pairing state and reset state; 5. In pairing mode, short press to exit pairing mode
DI1-DI8	Green LED	Device switch input data indication, normally on means there is input, normally closed means there is no input
DO1-DO8	Red LED	Each of the 8 relay output switch indicators corresponds to the 8 relay outputs; normally on indicates output is in progress, and normally closed indicates no output.

2.4 Wiring Instructions



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3. Detailed Functions

This series has three working modes, as shown in the table below. When using this series of products, the working mode will be automatically selected for matching based on user usage. Each time a different pairing modeis used, the last operation must be restored to factory settings before the operation is repeated.

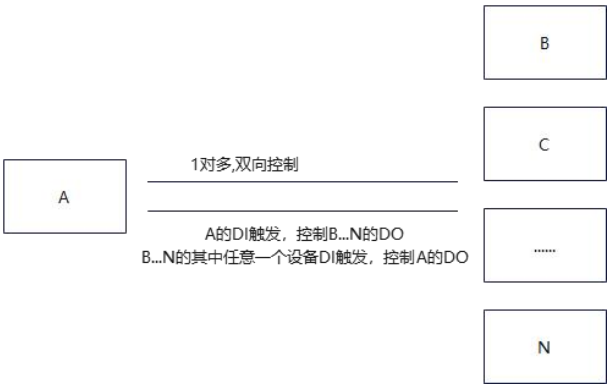
1 to 1 two-way	
1 to many - bidirectional: (maximum 1 to 200; any slave is input, the master is controlled)	
1 to many - two-way (different number of routes)	Combination mode: 8-way master can match 4 2-way slaves/2 4-way slaves/2 2-way + 1 4-way slaves. The DI and DO indicator lights correspond to different slaves. For example, if slave 1 is 2-way, DI1, DI2, DO1, and DO2 of the master correspond to slave 1. If slave 2 is 2-way, it corresponds to DI3, DI4, DO3, and DO4 of the master, and so on. The total number of slave channels is not allowed to exceed the number of master channels

Figure 3-1 Working modes

3.1 One-to-one (two-way) working mode

Device configuration

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two E860-DTU (1010-900SL22)-V2 units, two 12V power supplies, and two antennas.

Wiring

Connect the power supply as shown in Figure 3-2-1.

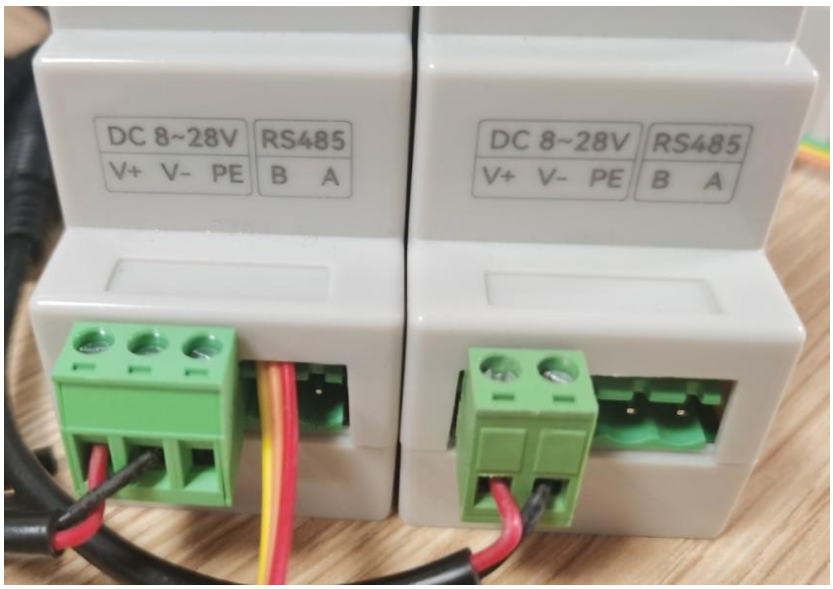


Figure 3-2-1

Pairing steps

Set the master: Press and hold the STATE button on device A for 2 seconds → the buzzer beeps once and the STATE light flashes.

Set the slave: Press and hold the STATE button on device B for 2 seconds → the buzzer beeps once and the STATE indicator flashes.

Automatic pairing: The two devices will beep twice → pairing is successful.

Exit pairing: Short press the STATE button on both devices to exit.

Status Indicator

Host: The LINK light and STATE light are always on (as shown in 1-22-3 in Figure 3-2-2).

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Figure 3-2-2

Slave: LINK indicator is always on and STATE indicator is flashing (as shown in 1-22-2 in Figure 3-2-2).

Control Logic

Master DI1 → control slave DO1

Slave DI1 → control host DO1

(Figure 3-2-3 demonstrates slave DI controlling master DO)



Figure 3-2-3

*Note: 2/4/8-channel devices operate in the same way, and DI/DO can be connected to the user control system .

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3.2 One-to-many (two-way) working mode

The device is configured
with one master (e.g., E860-DTU(2020-900SL22)-V2)
and multiple slaves (e.g., two E860-DTU(2020-900SL30)-V2)
with corresponding power supplies and antennas (wiring is the same as Figure 3-2-1).

The pairing rule
supports a maximum of 1 master to 200 slaves.
The master's DI can control all slaves' DOs, and any slave's DI can control the master's DO.
The first slave must have the same number of channels as the master, and subsequent slaves can have a number greater than or equal to the master (for example, if the master has 4 channels, the slave can have 8 channels, but only the first 4 will be controlled).

Pairing steps
Set the Master: Press and hold the STATE button on the master (2-22-1) for 2 seconds → 1 beep and the STATE light flashes.
Pairing Slave 1: Press and hold the STATE button on Slave 1 (2-30-1) for 2 seconds → 1 beep and the STATE light flashes → Automatic pairing → Both devices will beep twice → Short press the STATE button on Slave 1 to exit.
Pairing Slave 2: Press and hold the STATE button on Slave 2 (2-30-2) for 2 seconds → Automatic pairing with the master → 2 beeps → Short press the STATE buttons on both devices to exit.

Status indicator
Master: STATE light is always on (2-22-1 in Figure 3-3-1).
Slave: STATE light is flashing (2-30-1/2 in Figure 3-3-1).



Figure 3-3-1

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Control logic:

Master DI2 → controls all slave DO2s simultaneously (Figure 3-3-2).

Any slave DI2 → controls master DO2 (Figure 3-3-3) .



Figure 3-3-2



Figure 3-3-3

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3.3 One-to-many (two-way, different number of channels) working mode

in the device configuration
the number of master channels must be more than the sum of the number of slave channels (e.g., an 8-channel master can be equipped with 4 2-channel slaves).

Example: Master 4 channels (4-22-2) + Slave 1 (2 channels: 2-22-1) + Slave 2/3 (1 channel each: 1-22-2/3).

The pairing steps
same as 3.1.2 One-to-many mode: pairing the slaves in sequence.

Status indicator
LINK yellow light on the master device: flashes three times on and one off in a cycle, indicating that three slaves are connected (Figure 3-4-1).

Control Logic

The master channel is assigned in the order of slave pairing:

Host Channel	Control relationship	controlled relationship
DI1/DO1	→ DO1 of slave 1	← DI1 of slave 1
DI2/DO2	→ DO2 of slave 1	← DI2 of slave 1
DI3/DO3	→ DO1 of slave 2	← DI1 of slave 2
DI4/DO4	→ DO1 of slave 3	← DI1 of slave 3

Operation example:
DI3 of the master → controls DO1 of slave 2 (Figure 3-4-1).
DI1 of slave 3 → controls DO4 of the master (Figure 3-4-2).



Figure 3-4-2

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4. Introduction to the host computer interface

4.1 Enter the host computer interface



图 4-1-1

Start and connect: Open the software -> Select device model EB60-DTU -> Click "Confirm" to enter the main interface.

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4.2 Main interface core function areas and parameters

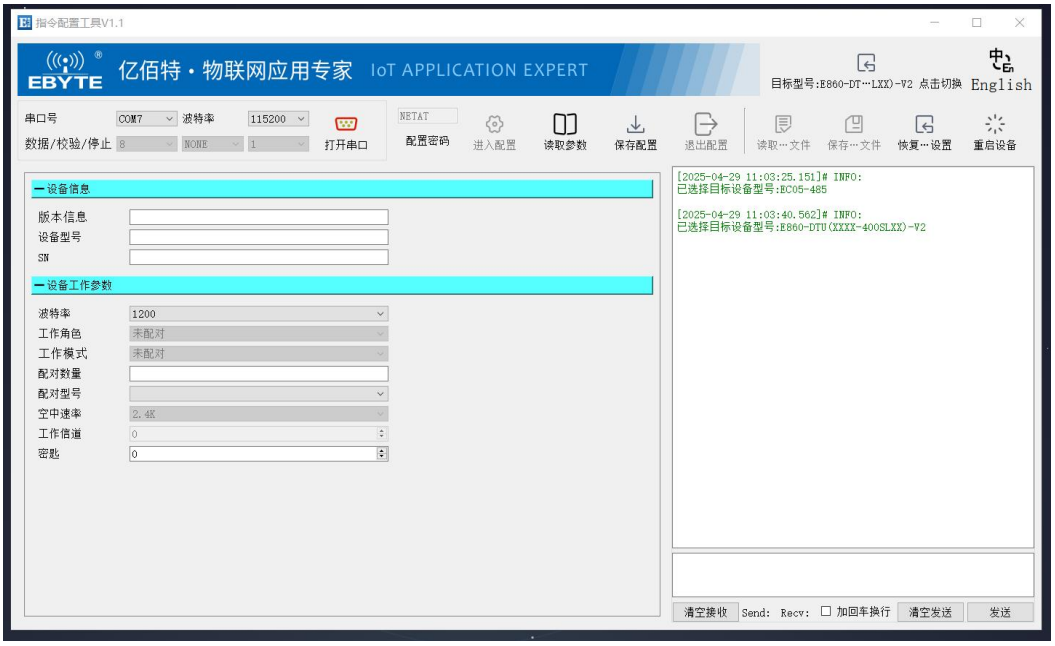


Figure 4-2-1

Basic Communication Settings

Language Switching: Supports Chinese and English interfaces.

Serial Port Number: Select the physical serial port to which the device is connected.

Baud Rate: Default value is 115200 (can be changed).

Data/Parity/Stop Bits: Fixed values, cannot be changed.

Core Operation Buttons

Open Serial Port: Click to establish a communication connection between the software and the device.

Read Parameters: (Requires opening the serial port first) Click to enter the "AT Command Operation Interface" to view device information and modify operating parameters.

Save Configuration: Saves the configuration information set on the current interface to the device.

Restore Factory: Resets the basic and advanced function parameters of the device to factory defaults.

Restart Device: Restarts the device.

The device information display area (need to "read parameters" first)
displays the device's version information, model, and SN code.

Device operating parameter display and configuration area (requires "Read Parameters" first)

Baud Rate: Displays the current value and can be changed via software.

Operating Role: Displays the current role (Master/Slave/Not displayed if not connected).

Operating Mode: Displays the current operating mode.

Number of Pairings: (Displayed only if the device is a master) Displays the number of paired slaves.

Paired Model: (Displayed only if the device is a master) Displays the model of the paired slave.

Air Speed: Displays the current wireless communication speed.

Operating Channel: Displays the current channel number and can be configured to specify a channel via software.

Key: Supports setting a communication password.

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4.3 Firmware Upgrade

Upgrade tool: Use the official "Ebyte Serial Port Upgrade Tool".



图 4-3-1

Upgrade steps:

Download the "Ebyte Serial Port Upgrade Tool" from the Ebyte official website.

Open the upgrade tool.

Select the corresponding serial port number of the device that is connected (via RS485) and "Open" the serial port.

Select the firmware package file and import it into the tool.

5. Troubleshooting

5.1 Common Problem Diagnosis

Problem 1: The device cannot be powered on

Symptom: The PWR light is off.

Possible reasons:

- The power supply voltage does not meet the requirements
- The power supply polarity is reversed
- The power cord is not in good contact

Solution:

1. Check if the power supply voltage is within the range of 8-28V
2. Confirm that the positive and negative poles are connected correctly
3. Re-tighten the power supply terminals

Problem 2: Devices cannot be paired

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Symptom: Pressing the STATE button does not respond or pairing fails

Possible reasons:
- The device is too far away
- There is severe environmental interference
- The device already has pairing information

Solution:
1. Bring the devices closer for pairing (recommended within 1 meter)
2. Keep away from strong electromagnetic interference sources
3. Restore factory settings and pair again

Problem 3: Unstable communication

Symptom: LINK light flashes or control is not timely

Possible reasons:
- Improper antenna installation
- Transmission distance exceeds the range
- Environmental obstacles affect

Solution:
1. Check if the antenna connection is secure.
2. Adjust the device position to reduce obstructions.
3. Choose a higher installation location.

Problem 4: The relay does not work

Symptom: There is a signal at the input but no action at the output

Possible causes:
- Load exceeds relay capacity
- Output wiring error
- Device pairing error

Solution:
1. Check if the load exceeds the rated capacity
2. Confirm that the output wiring is correct
3. Re-pair the device

5.2 Performance Optimization Suggestions

Increase transmission distance

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1. Choose a suitable installation height: It is recommended to be more than 2 meters from the ground
2. Reduce obstacles: avoid obstructions such as buildings and trees
3. Choose an open environment: The transmission effect is best in open areas

Improve system stability

1. Check connections regularly: Make sure all connections are secure
2. Keep the device clean: clean dust and dirt regularly
3. Monitor operating temperature: avoid overheating of equipment

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Important Notice

Ebyte reserves the right of final interpretation and modification of all contents in this manual.

Due to the continuous improvement of the product hardware and software, this manual may be changed without prior notice. The latest version of the manual shall prevail.

Users of this product need to visit the official website to follow product updates so that they can obtain the latest information about this product in a timely manner.

Revision History

Version	Revision Date	Revision Notes	Maintainer
1.0	2025-7-29	Initial version	LZH

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Technical support: support@cdebyte.com

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Phone: +86 028-61399028

Web: www.cdebyte.com

Address: B5, Mould Park, 199# Xiqu Ave, High-tech District, Chengdu, Sichuan, China

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