Chengdu Ebyte Electronic Technology Co.,Ltd

Isolated 1 to 2/4/8 channel RS-485 Hub

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Contents

1. Overview

1.1 Introduction

E810-R12/E810-R14/E810-R18 is an isolated repeater (HUB) that converts 1-channel RS-485 to 2/4/8-channel RS-485 launched by Chengdu Ebyte Electronic Technology Co., Ltd. An RS485 hub is a communication device that supports one RS-485 master station device and one or more RS-485 slave station devices. Photoelectric isolation technology is used to protect the master station and slave station devices from interference. The circuit is designed in accordance with EMC Level 3 standards, with 1.5KV isolation voltage, 4KV electrostatic protection contact discharge, 8KV air discharge, and lightning surge protection of 1KV differential mode and 2KV common mode, which can effectively isolate the harm caused by lightning strikes and static electricity to the equipment. No configuration required, there is transparent data transmission between master and slave interfaces.

This product is suitable for comprehensive RS485 communication systems such as automated control systems, monitoring systems, alarms, access control systems, IC card charging, meter reading, all-in-one cards, parking lot charging, etc.
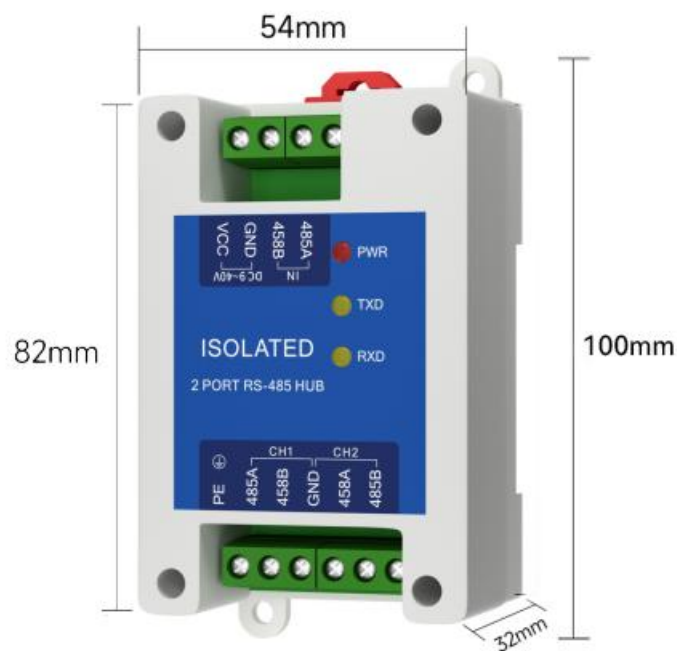
1.2 Features and functions

- The power supply supports DC 9-40V wide voltage input and has over-current and reverse connection protection;
- Supports communication between one RS485 master device and one or more RS485 slave devices;
- No configuration required, ready to use;
- The host interface data can be sent to all slave interfaces at the same time, and the slave interface data is sent to the host interface in a time-sharing manner;
- The signal interface is protected against static electricity, lightning strikes, and surges.
- Communication and power supply are completely isolated between the master device and slave device interfaces
- The power signal between the host interface and the slave interface is fully isolated
- Using super anti-interference and high-speed isolation components, the baud rate can reach up to 230400bps
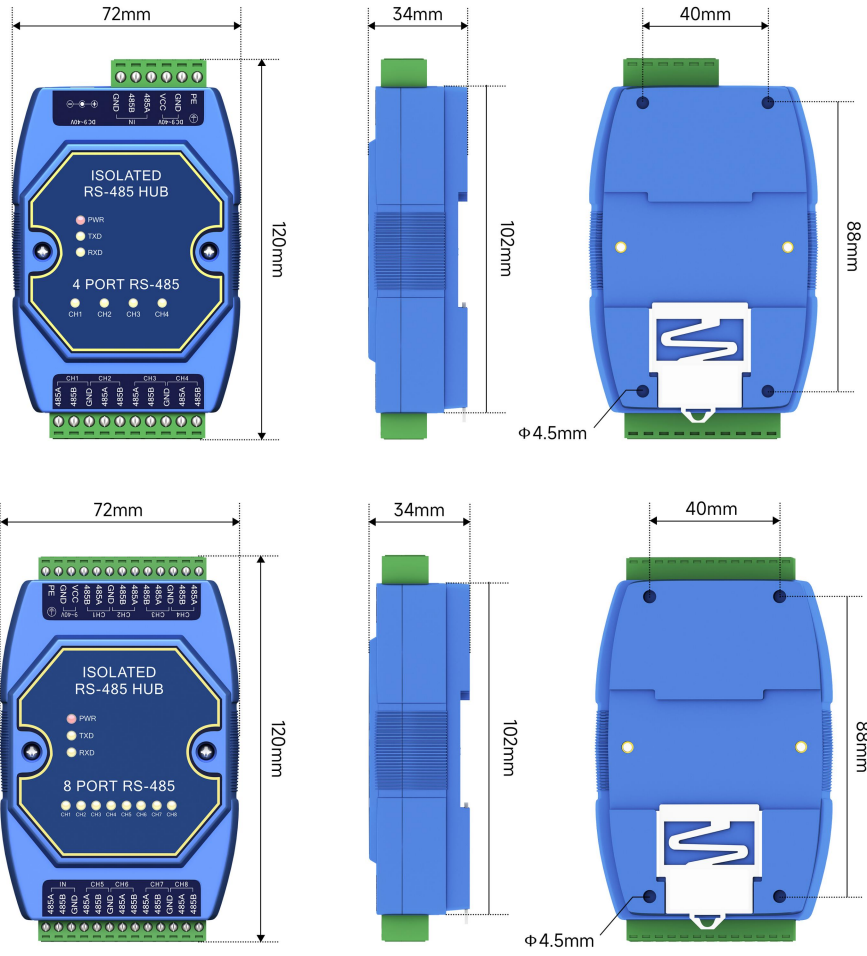- The slave communication port supports a maximum of 32 nodes.

1.3 System parameters

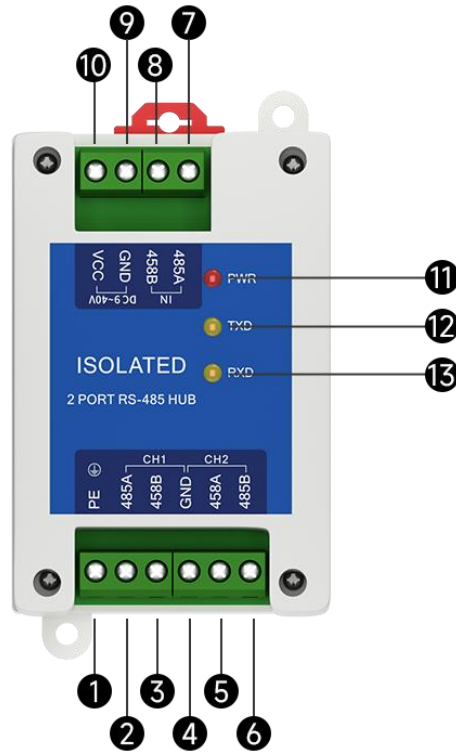| Parameter name	Parameter value	Description
Common parameters	Data interface	RS-485 interface
	Baud rate	300~230400, support custom baud rate
	Operating Voltage	DC 9~40V
	Protection level	Industrial EMC Level 3
	Isolation voltage	1.5KV
	Electrostatic protection level	Contact 4KV, Air 8KV
	Pulse wave surge	Differential mode 1KV, Common mode 2KV

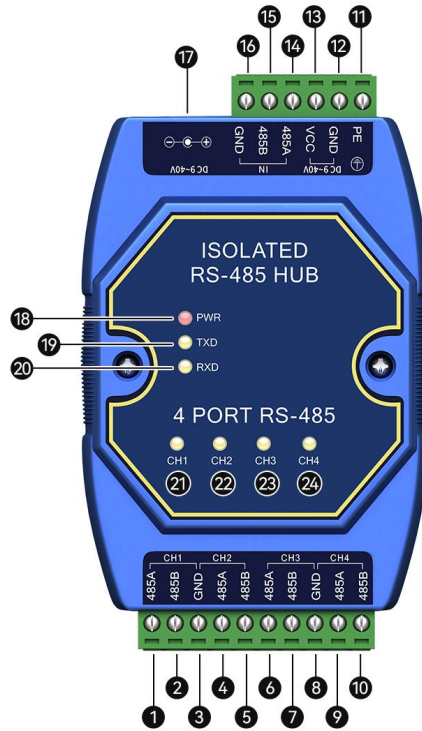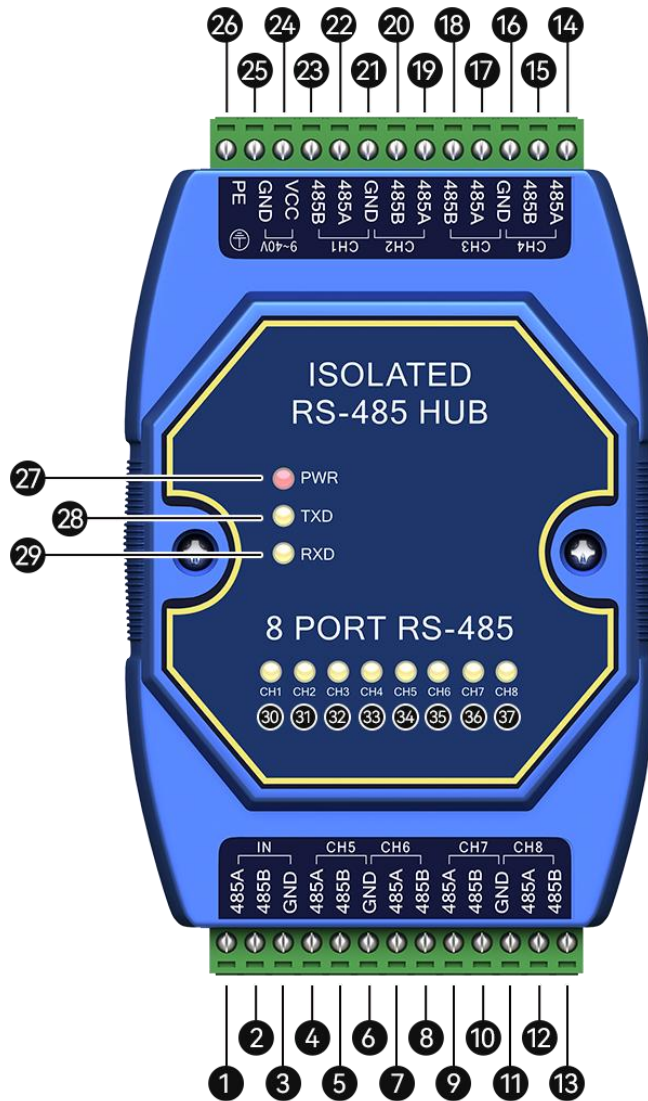| Difference Parameters | Working temperature and humidity | -40~85℃、5%~95% (no condensation) |
	Storage temperature and humidity	-40~105℃、5%~95% (no condensation)
	Ground terminal	support
	Expansion number	E810-R12: 2 channel RS-485 E810-R14: 4 channel RS-485 E810-R18: 8 channel RS-485
	Product Size	E810-R12:100×54×32mm E810-R14:120×72×34mm E810-R18:120×72×34mm
	Product weight	E810-R12:70±5g E810-R14:120±5g E810-R18:120±5g
	Interface standards	E810-R12:5.08mm copper pin plug terminal E810-R14:5.08mm plug-in terminal E810-R18:3.81mm plug-in terminal

1.4 Product size

1.5 Pin Definition

No.	Name	Instruction
1	PE	5.08mm terminal block, connected to earth terminal
2	CH1-485A	5.08mm terminal block, CH1 output A interface
3	CH1-485B	5.08mm terminal block, CH1 output B interface
4	GND	5.08mm terminal block, output digital signal ground
5	CH2-485A	5.08mm terminal block, CH2 output A interface
6	CH2-485B	5.08mm terminal block, CH2 output B interface
7	IN-485A	5.08mm terminal block, RS485 input A interface
8	IN-485B	5.08mm terminal block, RS485 input B interface
9	DC 9~40V-GND	5.08mm terminal block, power ground, not interoperable with digital signal ground
10	DC 9~40V-VCC	5.08mm terminal block, power input positive
11	LED-PWR	Power Indicator
12	LED-TXD	Main serial port data sending indicator
13	LED-RXD	Main serial port data receiving indicator

No.	Name	Instruction
1	CH1-485A	5.08mm terminal block, CH1 output A interface
2	CH1-485B	5.08mm terminal block, CH1 output B interface
3	GND	5.08mm terminal block, output digital signal ground
4	CH2-485A	5.08mm terminal block, CH2 output A interface
5	CH2-485B	5.08mm terminal block, CH2 output B interface
6	CH3-485A	5.08mm terminal block, CH3 output A interface
7	CH3-485B	5.08mm terminal block, CH3 output B interface
8	GND	5.08mm terminal block, output digital signal ground
9	CH4-485A	5.08mm terminal block, CH4 output A interface
10	CH4-485B	5.08mm terminal block, CH4 output B interface
11	PE	5.08mm terminal block, connected to earth terminal
12	DC 9~40V-GND	5.08mm terminal block, power ground, not interoperable with digital signal ground
13	DC 9~40V-VCC	5.08mm terminal block, power input positive
14	IN-485A	5.08mm terminal block, RS485 input A interface
15	IN-485B	5.08mm terminal block, RS485 input B interface
16	IN-GND	5.08mm terminal block, RS485 input GND interface
17	DC 9~40V plug	DC plug, outer diameter 5.5mm, inner diameter 2.0mm
18	LED-PWR	Power Indicator
19	LED-TXD	Main serial port data sending indicator light
20	LED-RXD	Main serial port data receiving indicator light
21	LED-CH1	CH1 data sending indicator light
22	LED-CH2	CH2 data sending indicator light

23	LED-CH3	CH3 data sending indicator light
24	LED-CH4	CH4 data sending indicator light

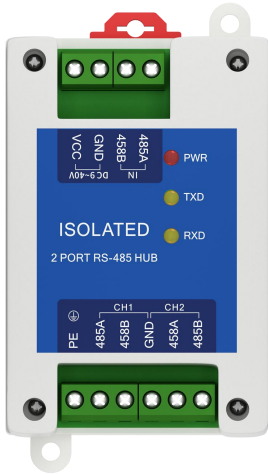| No.	Name	Instruction
1	IN-485A	3.81mm terminal block, RS485 input A interface
2	IN-485B	3.81mm terminal block, RS485 input B interface
3	IN-GND	3.81mm terminal block, input digital signal ground
4	CH5-485A	3.81mm terminal block, CH5 output A interface
5	CH5-485B	3.81mm terminal block, CH5 output B interface
6	GND	3.81mm terminal block, output digital signal ground
7	CH6-485A	3.81mm terminal block, CH6 output A interface
8	CH6-485B	3.81mm terminal block, CH6 output B interface
9	CH7-485A	3.81mm terminal block, CH7 output A interface
10	CH7-485B	3.81mm terminal block, CH7 output B interface
11	GND	3.81mm terminal block, output digital signal ground
12	CH8-485A	3.81mm terminal block, CH8 output A interface

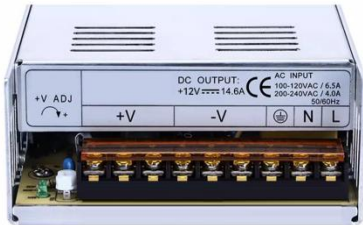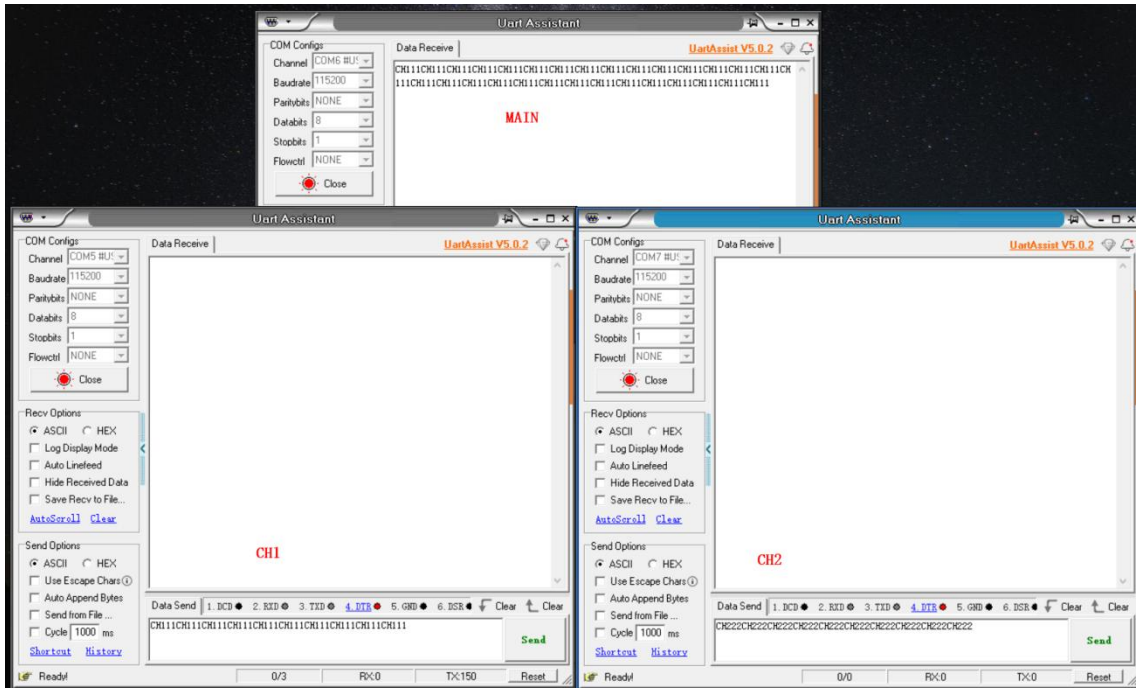| 13	CH8-485B	3.81mm terminal block, CH8 output B interface
14	CH4-485A	3.81mm terminal block, CH8 output A interface
15	CH4-485B	3.81mm terminal block, CH8 output B interface
16	GND	3.81mm terminal block, output digital signal ground
17	CH3-485A	3.81mm terminal block, CH3 output A interface
18	CH3-485B	3.81mm terminal block, CH3 output B interface
19	CH2-485A	3.81mm terminal block, CH2 output A interface
20	CH2-485B	3.81mm terminal block, CH2 output B interface
21	GND	3.81mm terminal block, output digital signal ground
22	CH1-485A	3.81mm terminal block, CH1 output A interface
23	CH1-485B	3.81mm terminal block, CH1 output B interface
24	DC 9~40V-VCC	3.81mm terminal block, power input positive
25	DC 9~40V-GND	3.81mm terminal block, power ground, not interoperable with digital signal ground
26	PE	3.81mm terminal block, connected to earth terminal
27	LED-PWR	Power Indicator
28	LED-TXD	Main serial port data sending indicator light
29	LED-RXD	Main serial port data receiving indicator light
30	LED-CH1	CH1 data sending indicator light
31	LED-CH2	CH2 data sending indicator light
32	LED-CH3	CH3 data sending indicator light
33	LED-CH4	CH4 data sending indicator light
34	LED-CH5	CH5 data sending indicator light
35	LED-CH6	CH6 data sending indicator light
36	LED-CH7	CH7 data sending indicator light
37	LED-CH8	CH8 data sending indicator light

2. Quick Start

2.1 Hardware Preparation

Note: The usage of E810-R12 is exactly the same as that of E810-R14 and E810-R18. Here we take E810-R12 as an example.

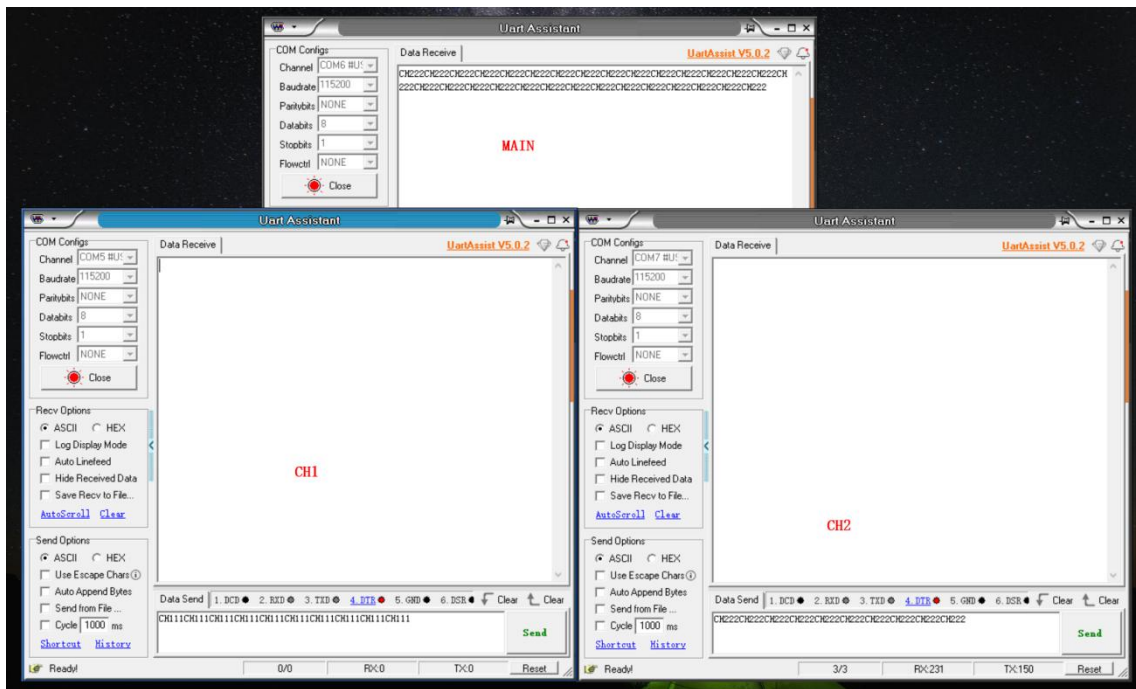The hardware required for this test is as follows:

E810-R12 Host 1unit	12V switching power supply
USB to RS-485 converter 3pcs	connecting wires

    1. Connect the device host to the 12V switching power supply: connect the device VCC to the positive pole (V+) of the switching power supply, and connect the device GND to the negative pole (V-) of the switching power supply;

    2. Use USB to RS-485 to connect to the 485_IN terminal of the device (here a computer is used to simulate the host): connect device 485A to the A terminal of USB to RS-485 converter, and connect device 485B to the B terminal of USB to RS-485 converter;

3. Use USB to RS-485 to connect to the CH1 and CH2 terminals of the device respectively (a computer is used to simulate the slave here), device 485A is connected to the USB to RS-485 A terminal, and device 485B is connected to the USB to RS-485 B terminal;

4. Connect the USB to the computer (the corresponding USB to serial port driver needs to be installed);

5. Turn on the power;

6. Open the serial ports of the host and slave respectively.

2.2 Software preparation

This article only shows two-way communication, taking the serial port tool as an example.

1. The host sends data and the two slaves CH1/CH2 receive it respectively.

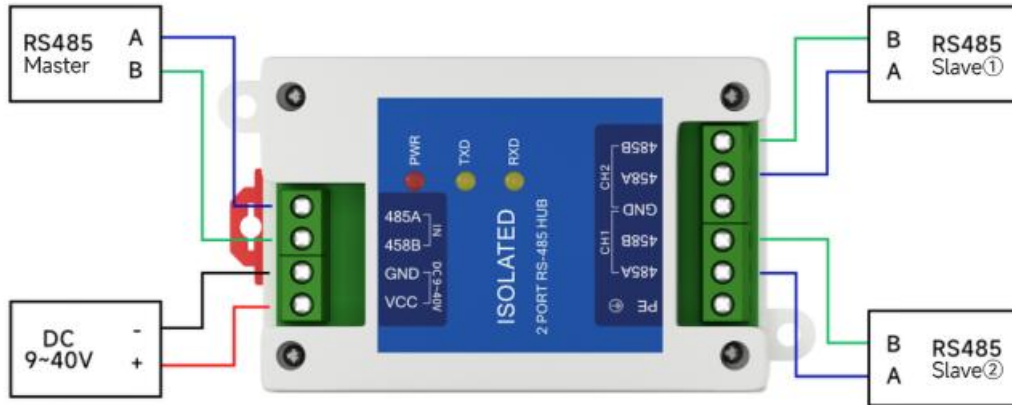2. CH1 sends data and the host receives it
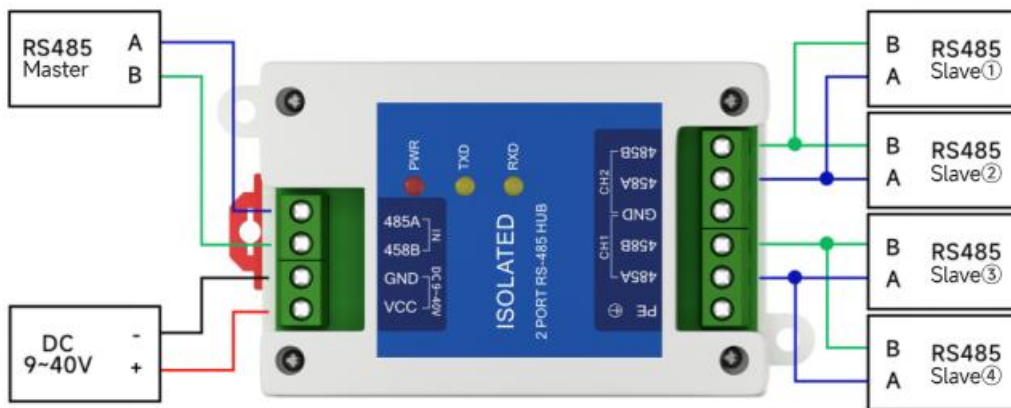
3. CH2 sends data and the host receives it

Note: The baud rate of both communication parties must be consistent, and the slave cannot send data to the host at the same time.
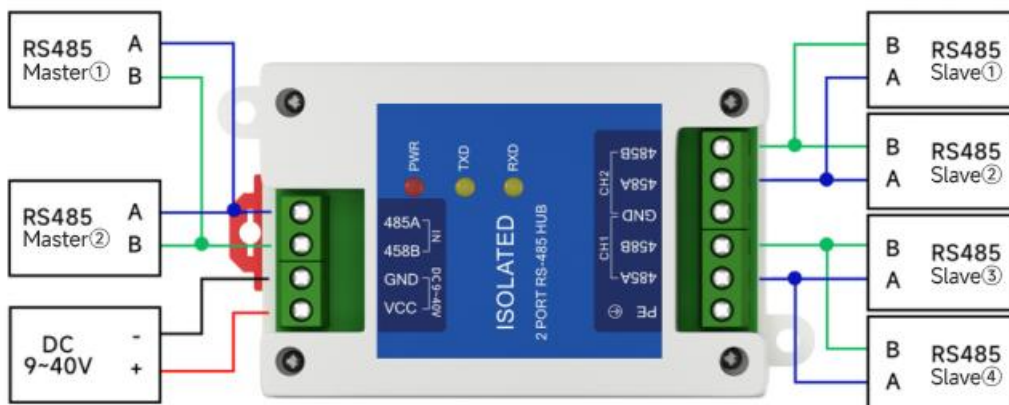
3. Connection diagram

1. Connection method for communication between 1 RS485 host and 2 RS485 slaves

2. Connection method for communication between one RS485 host and multiple RS485 slaves

3. Connection method for communication between multiple RS485 hosts and multiple RS485 slaves
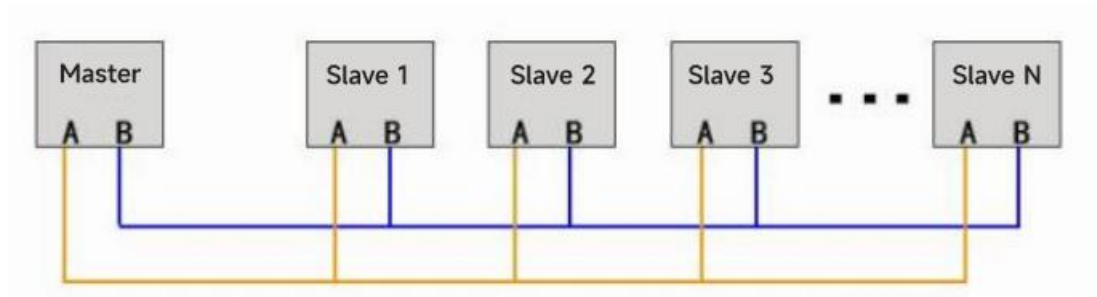
4. Wiring Precautions

4.1 RS485 bus wiring specifications

1. Use the standard RS485 bus wiring method, commonly known as the hand-in-hand connection method, and try to avoid the star connection method.

2. Use 2-core shielded twisted pair cable, the bus length shall not exceed 1200 meters, the number of bus-connected devices shall not exceed 32, and the branch line length shall not exceed 10 meters.

3. Communication lines should be kept as far away from interference sources as possible. Communication lines should be laid in weak-current wells and should not be laid parallel to strong-current or radio-frequency signal lines. If parallel laying is necessary, the distance should not be greater than 0.5 meters.

4.2 RS485 Wiring Considerations

1. The maximum communication distance of the 485 communication standard is 1200 meters, but in actual applications, this distance is less than that, and the higher the baud rate, the shorter the communication distance. Generally, if the communication distance exceeds 500 meters, a 485 signal repeater needs to be added.

2. To avoid signal reflection when there are many devices connected to the bus, a 120-ohm matching resistor should be connected between the communication ports AB of the farthest device.

3. The shielding wire of the communication line should be connected to the ground wire, which is the earth, not the negative pole of the power supply.

Wire selection recommendation table

Wiring distance	Wire
less than 200m	2*0.5 Two-core shielded twisted pair
200-500m	2*0.75 Two-core shielded twisted pair
more than 500m	2*1.0 Two-core shielded twisted pair

Revise history

Version	Revision date	Revision Notes	Maintenance man
1.0	2024-4-20	initial version	LYL
1.1	2024-8-2	Corrected pin definitions	LYL

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