

# GCAN-213

Industrial CAN bus wireless bridge

User manual



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# 1 Function introduction

## 1.1 Overview

The GCAN-213 is a CAN bus wireless bridge that can be used to wirelessly transmit information between two CAN systems. Using the GCAN-213 CAN bus wireless bridge, users can easily complete the interconnection of two CAN-bus networks and further expand the scope of the CAN-bus network.

The GCAN-213 consists of a pair of radio transceivers operating in the 2.4GHz ISM band. It can provide the maximum allowable transmit power to ensure reliable connection and maximize communication distance. The omnidirectional antenna supports transmission and reception in any direction.

Because the 2.4 GHz ISM band can be used by many different radio technologies, it is subject to various rules designed to establish coexistence in areas where transmitters and receivers using the same band are densely distributed, and wireless signal communication quality may suffer declining situation.

## 1.2 Performance characteristics

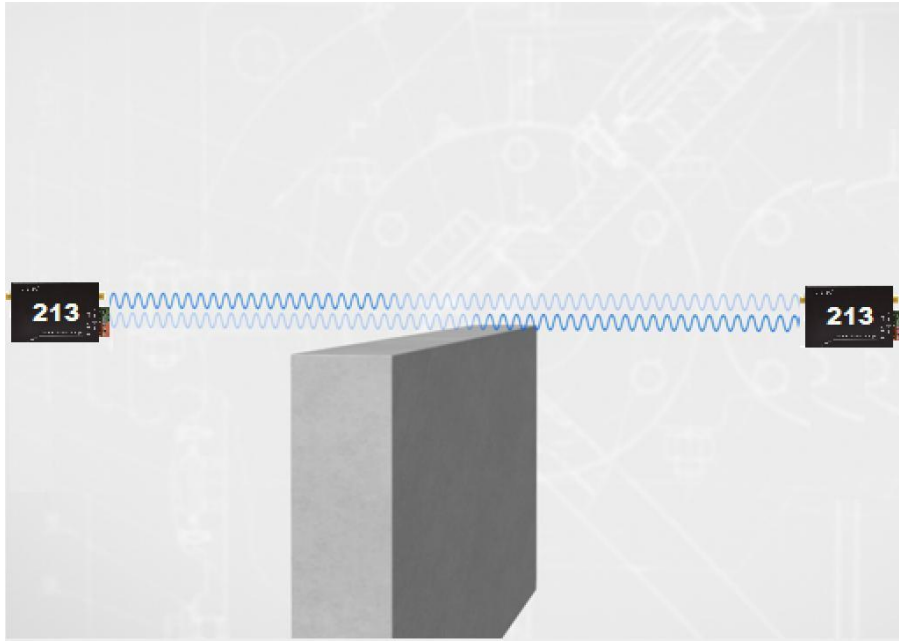
- 2.4GHz exclusive protocol, built-in antenna, maximum antenna output power 27dBm;
- USB interface: USB2.0 full-speed interface, compatible with USB1.1, USB3.0;
- CAN interface: complies with ISO 11898 standard and supports CAN2.0A/B;
- CAN baud rate: 5Kbit/s~1Mbit/s;
- Electrical isolation: 3000V, DC-DC;
- Power supply voltage: 9 to 30V DC ( $\pm 5\%$ );
- Power supply current: 200mA (24V DC);
- Operating temperature:  $-40^{\circ}\text{C}\sim+85^{\circ}\text{C}$ ;
- Working humidity: 15%~90%RH, no condensation;
- EMC test: EN 55024:2011-09, EN 55022:2011-12;
- Protection level: IP 20;
- Size: 114\*64\*24mm.

## 1.3 Typical application

- CAN-bus network diagnosis and testing
- Smart cities, industrial Internet of Things
- Wireless remote control, drone
- Mobile vehicle CAN-bus debugging

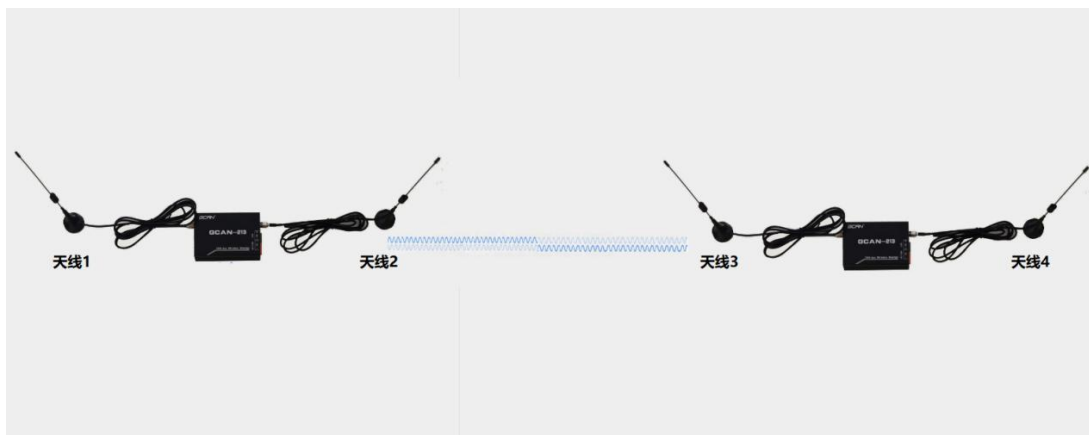
## 1.4 Rules of use

- Once both GCAN-213s are powered on, they begin the wireless network establishment procedure. If the wireless network is interrupted for some reason, it will be automatically re-established without the need for automatic baud rate detection again;
- The number of data frames can be kept slightly below approximately 2500 messages per second in each direction. The number of data frames should be kept slightly below this capacity taking into account possible causes of interference, such as occupied frequencies;
- The baud rates on connected CAN buses do not need to be the same, and high baud rates have advantages in terms of arbitration and message transmission delays on the CAN bus. Generally, it is recommended that the bus load be less than 50%;
- It may be necessary to limit the maximum number of messages transmitted to the GCAN-213 device on the local CAN bus within a short period of time to prevent the send buffer from overflowing, which would cause all messages in the buffer to be discarded.
- Keep the distance between GCAN-213 as short as possible and ensure that they are within line of sight of each other. Try to avoid obstacles near the line of sight path; if there are obstacles such as walls, the radio signal will be weakened and limit its maximum practical distance. (The attenuation of the signal depends on the material and thickness of the obstacle);

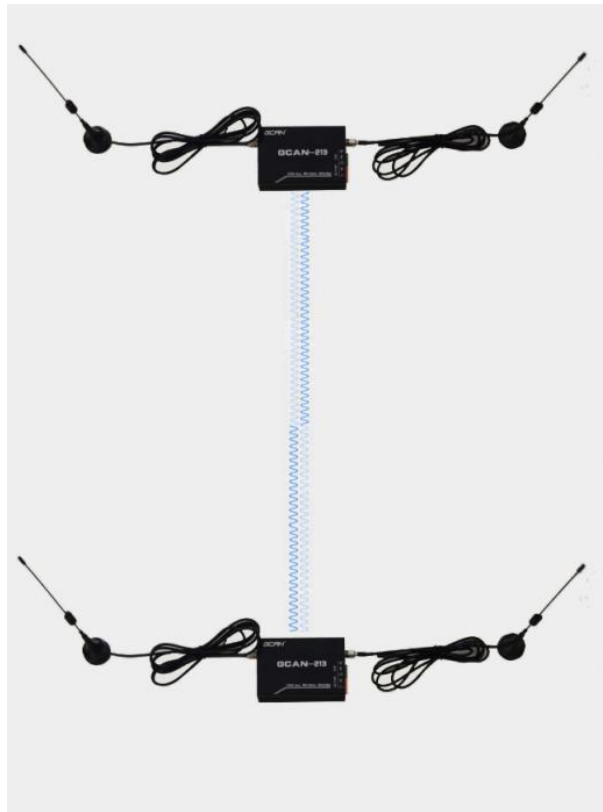


- GCAN-213 should be installed parallel to each other; for GCAN-213 used in pairs, the antennas must not be placed on the same straight line;

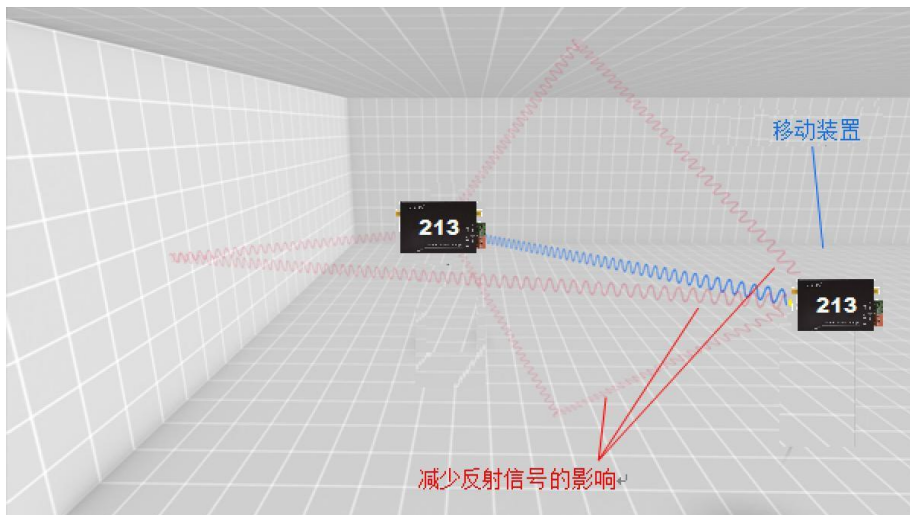
Wrong antenna placement:



Correct antenna placement:



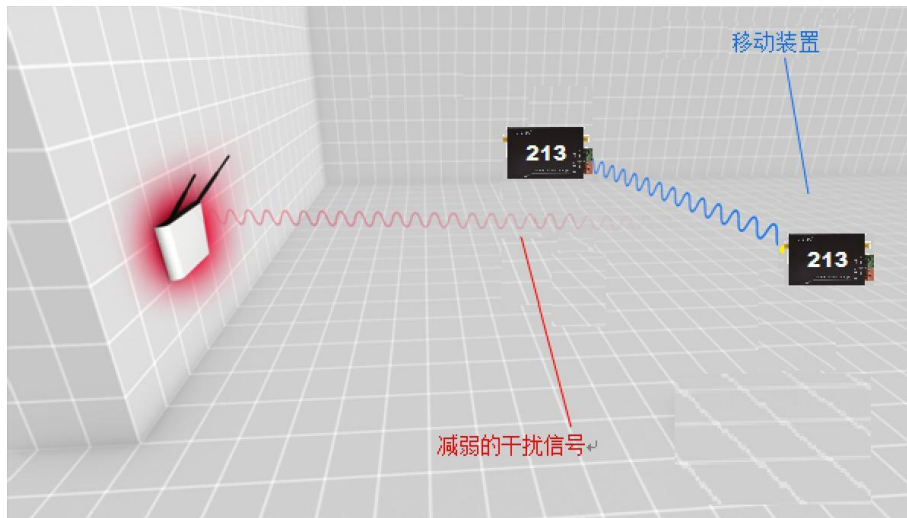
- GCAN-213 should adjust its position and height to reduce reflections from walls or floors. The impact of reflections depends on the extension of the wall and the distance from the wall;
- The average distance from the device to the wall should be at least one-tenth of the line-of-sight distance. For example, if these devices are used 30 meters apart, the average distance to the wall should be 3 meters or more



- GCAN-213 should reduce interference from other devices, such as 2.4G Hz band devices such as WiFi; WiFi hotspots can be reconfigured to use other WiFi modes or another frequency band, such as the 5GHz ISM band. Either turn them off temporarily, or try to place

the GSCAN-213 device away from suspected sources of interference

● Please note: Microwave ovens and electric motors may also emit signals that interfere with radio equipment;

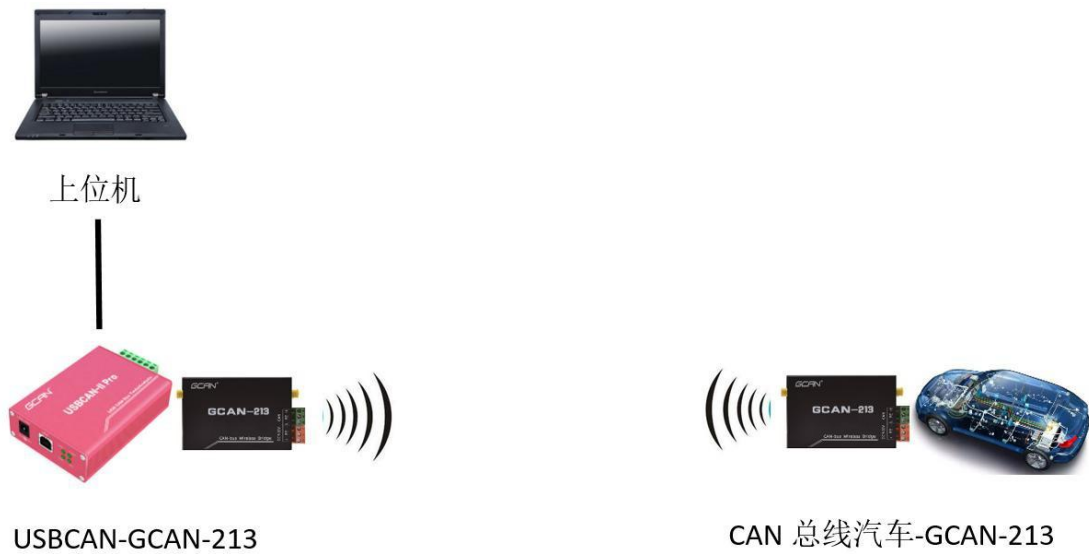


● If multiple pairs of devices need to be used on the same occasion, the SN tail numbers of the paired devices should be the same or similar as possible, but avoid using multiple pairs of devices with the same tail number at the same time. For example, 01 and 11 are a set of devices, which can be combined with 03 and 13. Use it in the same situation, avoid using it with a group of devices numbered 21 and 31; for a pair of devices, the SN tail number is not required.

## 1.5 Application icon



GCAN-213 Application—Peer-to-Peer Use



GCAN-213 Application—Mobile Vehicle CAN-bus Debugging

### 1.6 Actual testing

The CAN-213 module is unobstructed, and the measured data transmission and reception is normal within a range of 220 meters; the measured data transmission and reception through 2 walls are normal. The actual measured data is as follows:

CAN Baud rate	Test distance	bus load	Data Frame Intervals	conclusion
1000K	50 米	24%	0.5ms	Data sending and receiving is normal,Test passed
	100 米	12%	1ms	Data sending and receiving is normal,Test passed
	220 米	2%	7ms	Data sending and receiving is normal,Test passed
125K	50 米	24%	2ms	Data sending and receiving is normal,Test passed
	100 米	5%	10ms	Data sending and receiving is normal,Test passed



	220 米	2%	20ms	Data sending and receiving is normal, Test passed
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## 2 Installation

### 2.1 device size

Equipment dimensions: (length, including terminals) 114mm \* (width) 64mm \* (height) 24mm, its schematic diagram is shown in Figure 2.1.



Figure 2.1 Dimensions of GCAN-213

### 2.2 Interface definition and function

The GCAN-213 module integrates one antenna interface and one standard USB interface. The interface location and definition are shown in Figure 2.3 and Table 2.1.



Figure 2.3 Location of power supply and Ethernet interface

Pin (from left to right)	Interface	Name	Function
1	antenna	ANT1	Wireless network antenna interface 1
2	USB	USB	Device configuration, connection to computer

Table 2.1 Definition of power interface

The GCAN-213 module integrates a DC9-30V power interface, a CAN-bus interface, and an antenna interface. The power interface is led out by a 3 PIN plug-in terminal (orange), and the CAN-bus interface is led out by a 3 PIN plug-in terminal (green). The interface location and interface definition are shown in Figure 2.4 and Table 2.2.

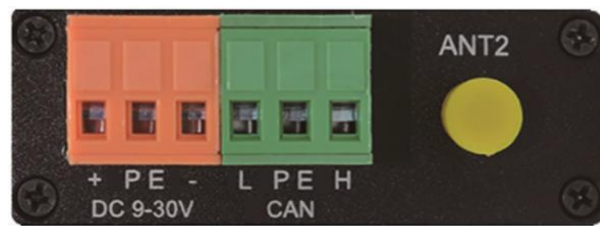


Figure 2.4 Location of CAN bus interface

Pin (from left to right)	Interface	Name	Function
1	DC 9-30V	V+	DC power input positive
2		PE	shield
3		V-	DC power input negative
4	CAN1	CAN1-L	CAN_L signal line (CAN low)
5		SHIELD	shield
6		CAN1-H	CAN1_H signal line (CAN high)
7	Antenna	ANT2	Wireless network antenna interface 2

Table 2.2 CAN bus interface definition

### 3 Device use

GCAN-213 needs to be used in point-to-point pairs. Before use, the user generally needs to configure the CAN bus and wireless module communication parameters or entrust our company with factory configuration. GCAN-213 CAN bus wireless bridges used in pairs can realize the forwarding and relaying of two CAN bus data through wireless transmission.

### 3.1 Software configuration

After installing the Windows driver, connect the GCAN-213, open the GCANTools software, and the setting interface will appear as shown below.



Click to open the device to see the corresponding device information. ID is the device SN number, as shown in the figure, the device SN number is GC22091701.

Turn the device over to view the SN number of the device:

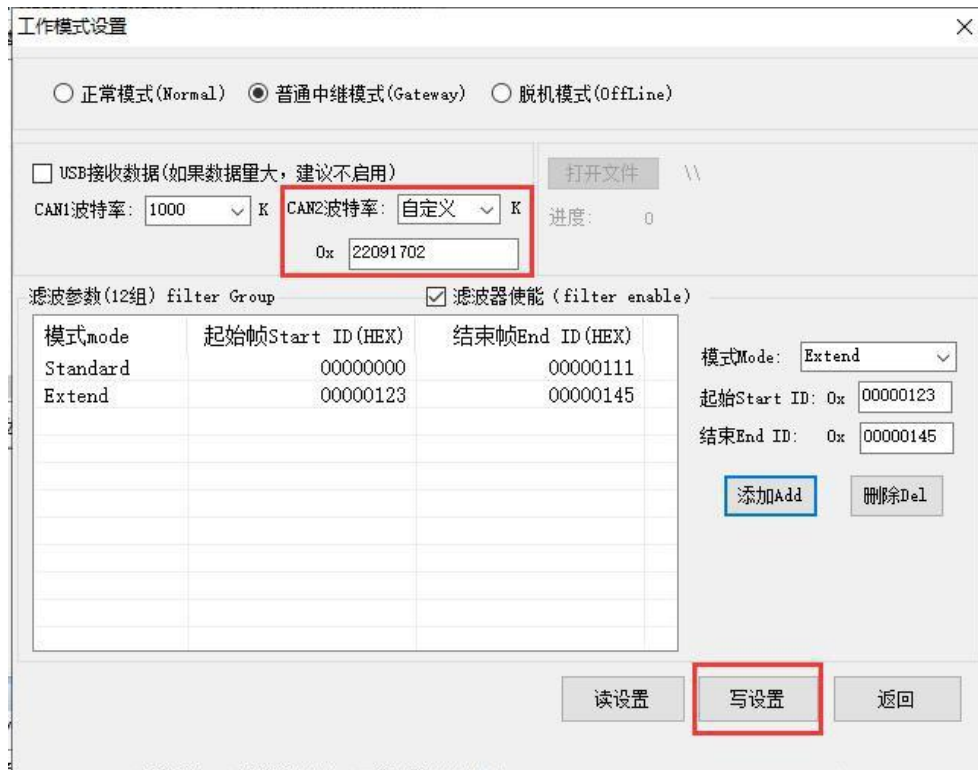


After clicking the OK button to enter the software, click the working mode.



Selecting the normal relay mode can realize the forwarding and relaying of data from two buses with different baud rates. "CAN1 baud rate" represents the baud rate of the device's CAN port, as shown in the figure, configure the baud rate of the CAN port to 1000K; "CAN2 baud rate" represents the wireless module configuration, pull down and select "Custom" and enter the data that needs to be paired. The last eight digits of the device SN number. The last eight digits of the SN number of the GCAN-213 configured in pairs as shown in the figure is 22091702. At the same time, the filter enable can be set to realize the filtering function. Filtering is a CAN-ID segment setting, and up to 12 can be set. Filtering must be checked to enable filter, and it will not take effect until the device is powered on again after the setting is completed.

Finally, click "Write Settings", close the software, and power on the device again to achieve offline relay. The hardware device is externally connected to a 24VDC standard industrial field power supply to facilitate industrial use.



### 3.2 System status indicator light

The GCAN-213 series module has 1 SYS indicator light to indicate the system power supply, 1 CAN indicator light to indicate CAN data transmission, 1 RX and 1 TX indicator light to indicate wireless network data transmission. The specific indicating functions of these four indicator lights are shown in Table 3.1. The meanings of these four indicator lights in various states are shown in Table 3.2.



indicator light	color	Indicate status
SYS	green	System instructions
CAN	Red and green colors	CAN communication status indication
RX	Red and green colors	Wireless network reception status indication
TX	Red and green colors	Wireless network sending status indication

Table 3.1 GCAN-213 series module indicators

indicator light	status	Indicate status
SYS	not bright	power supply is abnormal
	Green flashing	Device initialization passed
CAN	Red flashing	CAN channel data transmission error
	Green flashing	CAN channel has data transmission
RX	Red flashing	Wireless module reception is abnormal
	Green flashing	Wireless module reception is normal
TX	Red flashing	The wireless module transmits abnormally
	Green flashing	The wireless module sends normally

Table 3.2 GCAN-213 series module indicator status

- After the GCAN-213 series module is powered on, the system power supply light PWR flashes green, indicating that the device is powered. Otherwise, it indicates that there is a power failure or a serious error in the system;
- After both wireless and CAN are connected normally, when data is transmitted between CAN and wireless, the corresponding CAN and wireless indicators flash green;
- When there is a problem with the CAN bus or wireless communication, the corresponding indicator light flashes red.

## 4. Technical specifications

<b>Connection method</b>	
CAN terminal	OPEN3 Phoenix terminal
<b>CAN interface features</b>	
USB interface	USB2.0 full speed interface, compatible with USB1.1, USB3.0
CAN interface	Follow ISO 11898 standard, support CAN2.0A/B
CAN baud rate	5Kbit/s~1Mbit/s
Electrical isolation	DC3000V
<b>Antenna data</b>	
Antenna output power	Maximum about 27dBm
Antenna type	Built-in antenna module, external antenna required
Frequency Range	2.4GHz to 2.525GHz
<b>Power supply</b>	
Supply voltage	+9~30V DC
Supply current	200mA (24V DC)
<b>Environmental test</b>	
Operating temperature	-40℃ ~+85℃
Working humidity	15%~90%RH, no condensation
EMC test	EN 55024:2011-09 EN 55022:2011-12
Protection level	IP 20
<b>Basic Information</b>	
Dimensions	11.4cm *6.4cm *2.4cm
weight	140g