



User Guide

C9200-4L(NA)

4G IoT Wireless Gateway



robustOS

Guangzhou Robustel LTD


www.robustel.com

About This Document

This document provides hardware and software information of the Robustel 4G IoT Wireless Gateway, including introduction, installation, and configuration.

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Important Notice

Due to the nature of wireless communications, transmission and reception of data can never be guaranteed. Data may be delayed, corrupted (i.e., have errors) or be totally lost. Although significant delays or losses of data are rare when wireless devices such as the 4G IoT Wireless Gateway is used in a normal manner with a well-constructed network, the 4G IoT Wireless Gateway should not be used in situations where failure to transmit or receive data could result in damage of any kind to the user or any other party, including but not limited to personal injury, death, or loss of property. Robustel accepts no responsibility for damages of any kind resulting from delays or errors in data transmitted or received using the gateway, or for failure of the gateway to transmit or receive such data.

Safety Precautions

General

- The 4G IoT Wireless Gateway generates radio frequency (RF) power. When using the gateway, care must be taken on safety issues related to RF interference as well as regulations of RF equipment.
- Do not use your 4G IoT Wireless Gateway in aircraft, hospitals, petrol stations or in places where using cellular products is prohibited.
- Be sure that the gateway will not be interfering with nearby equipment. For example: pacemakers or medical equipment. The antenna of the 4G IoT Wireless Gateway should be away from computers, office equipment, home appliance, etc.
- An external antenna must be connected to the 4G IoT Wireless Gateway for proper operation. Only use approved antenna with the gateway. Please contact authorized distributor on finding an approved antenna.
- Always keep the antenna with minimum safety distance of 20 cm or more from human body. Do not put the antenna inside metallic box, containers, etc.
- RF exposure statements
 1. For mobile devices without co-location (the transmitting antenna is installed or located more than 20cm away from the body of user and nearby person)
- FCC RF Radiation Exposure Statement
 1. This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
 2. This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and human body.

Note: Some airlines may permit the use of cellular phones while the aircraft is on the ground and the door is open. 4G IoT Wireless Gateway may be used at this time.

Using the 4G IoT Wireless Gateway in Vehicle

- Check for any regulation or law authorizing the use of cellular devices in vehicle in your country before installing the 4G IoT Wireless Gateway.
- The driver or operator of any vehicle should not operate the 4G IoT Wireless Gateway while driving.
- Install the gateway by qualified personnel. Consult your vehicle distributor for any possible interference of electronic parts by the 4G IoT Wireless Gateway.
- The 4G IoT Wireless Gateway should be connected to the vehicle's supply system by using a fuse-protected terminal in the vehicle's fuse box.
- Be careful when the 4G IoT Wireless Gateway is powered by the vehicle's main battery. The battery may be drained after extended period.

Protecting Your 4G IoT Wireless Gateway

To ensure error-free usage, please install and operate your 4G IoT Wireless Gateway with care. Do remember the following:

- Do not expose the 4G IoT Wireless Gateway to extreme conditions such as high humidity / rain, high temperature, direct sunlight, caustic / harsh chemicals, dust, or water.
- Do not try to disassemble or modify the 4G IoT Wireless Gateway. There is no user serviceable part inside and the warranty would be void.
- Do not drop, hit or shake the 4G IoT Wireless Gateway. Do not use the gateway under extreme vibrating conditions.
- Do not pull the antenna or power supply cable. Attach/detach by holding the connector.
- Connect the 4G IoT Wireless Gateway only according to the instruction manual. Failure to do it will void the warranty.
- In case of problem, please contact authorized distributor.

Federal Communication Commission Interference Statement

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution:

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

Regulatory and Type Approval Information

Table 1: Directives



2011/65/EU	The European RoHS 2011/65/EU Directive was issued by the European parliament and the European Council on 1 July 2011 on the restriction of the use of certain Hazardous substances in electrical and electronic equipment.	
2012/19/EU	The European WEEE 2012/19/EU Directive was issued by the European parliament and the European Council on 24 July 2012 on waste electrical and electronic equipment.	
2013/56/EU	The European 2013/56/EU Directive is a battery Directive which published in the EU official gazette on 10 December 2013. The button battery used in this product conforms to the standard of 2013/56/EU directive.	

Table 2: Standards of the electronic industry of the People's Republic of China


SJ/T 11363-2006	The electronic industry standard of the People's Republic of China SJ/T 11363-2006 "Requirements for Concentration Limits for Certain Toxic and Hazardous Substances in Electronic Information Products" issued by the ministry of information industry of the People's Republic of China on November 6, 2006, stipulates the maximum allowable concentration of toxic and hazardous substances in electronic information products. Please see Table 3 for an overview of toxic or hazardous substances or elements that might be contained in product parts in concentrations above the limits defined by SJ/T 11363-2006.
SJ/T 11364-2014	The electronic industry standard of the People's Republic of China SJ/T 11364-2014 "Labeling Requirements for Restricted Use of Hazardous Substances in Electronic and Electrical Products" issued by the ministry of Industry and information technology of the People's Republic of China on July 9, 2014, stipulates the Labeling requirements of hazardous substances in electronic and electrical products, environmental protection use time limit and whether it can be recycled. This standard is applicable to electronic and electrical products sold within the territory of the People's Republic of China, and can also be used for reference in the logistics process of electronic and electrical products. The orange logo below is used for Robustel products: <div style="text-align: right; margin-right: 50px;">  </div> Indicates its warning attribute, that is, some hazardous substances are contained in the product. The "10" in the middle of the legend refers to the environment-friendly Use Period (EFUP) * of electronic information product, which is 10 years. It can be used safely during the environment-friendly Use Period. After the environmental protection period of use, it should enter the recycling system. *The term of environmental protection use of electronic information products refers to the term during which the toxic and hazardous substances or elements contained in electronic information products will not be leaked or mutated and cause serious pollution to the environment or serious damage to people and property under normal conditions of use.

Table 3: Toxic or Hazardous Substances or Elements with Defined Concentration Limits

Name of the Part	Hazardous Substances					
	(Pb)	(Hg)	(Cd)	(Cr (VI))	(PBB)	(PBDE)
Metal parts	o	o	o	o	o	o
Circuit modules	o	o	o	o	o	o
Cables and cable assemblies	o	o	o	o	o	o
Plastic and polymeric parts	o	o	o	o	o	o

o:
Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in SJ/T11363-2006.

x:
Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials for this part *might exceed* the limit requirement in SJ/T11363-2006.

Document History

Updates between document versions are cumulative. Therefore, the latest document version contains all updates made to previous versions.

Date	Doc Version	Change Description
5 Nov, 2018	v.1.0.0	Initial release
27 Nov, 2018	v.1.0.1	Added the FCC Statement

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Chapter 1 Product Concept

1.1 Key Features

Robustel is a leading global industrial IoT/M2M (machine and machine communication) products and solutions, providing customers with industrial-grade 4G IoT Wireless Gateway, gateways, modems, cloud management platforms, and end-to-end solution. Robustel can quickly respond to user needs, provide fast, professional services and more targeted R&D and technical support to meet the user's functional customization and personalized needs in an all-round way. Up to now, Robustel's products have been sold worldwide covering more than 100 countries and regions, and applying to various industries. Its products are widely used in global smart cities, electricity, oil and gas, finance, environmental protection, security, industrial automation, medical and other fields. Robustel's business continued to grow healthily, steadily and rapidly. After years of continuous efforts, Robustel has become a pioneer in the Internet of Things industry.

The 4G IoT Wireless Gateway (C9200-4L) customized for OTIS on the basis of ARM9 core by Robustel is a rugged hardware product offering state-of-the-art mobile connectivity for internet of things applications. C9200-4L is a powerful platform developed based on RobustOS, a Robustel self-developed and Linux-based operating system. Meanwhile, Robustel offers a Software Development Kit (SDK) for partners and customers to allow additional customization by using C language. The hardware has the networking function of 4G module access, and the intercom function of T/G interface voice module access, which can transmit data through RS422 serial port, CAN, GPIO and other physical interfaces; C9200 undergoes strict quality in R&D and production process. Test and reliability testing to meet the process safety of transportation and storage and normal operation in harsh environments.

- Supports RobustOS+SDK+APP, supports secondary development of C language
- Supports loading and running OTIS APP
- Supports Microsoft Azure IOT SDK
- Supports 2G/ 3G/ 4G full Netcom communication
- Supports DoS defense, IP packet, domain name and MAC address filtering, access control and other firewall functions
- Supports CLI to upgrade firmware and app applications
- Supports firmware backup and abnormal automatic recovery
- Supports BLE driver module

- Supports remote connection of Robust VPN platform
- Supports TCP/UDP/PPP/FTP/HTTP/HTTPS/SMTP and other protocols
- Built-in security encryption chip
- Built-in Watchdog, Timer
- Supports RTC and power-off save;
- Normal operating temperature: -20 to +70°C.

1.2 Package Contents

Before installing your C9200 Gateway, verify the kit contents as following.

Note: The following pictures are for illustration purposes only, not based on their actual sizes.

- 1 x Robustel C9200-4L 4G IoT Wireless Gateway



- 1 x power adapter (12V DC, 1.5 A)



- 4 x round magnet (20 * 3 mm)



- 5 x cross recessed countersunk head tapping screw (ST3 * 6; type F)



Optional Accessories (sold separately)

- BT antenna (RP- SMA-J antenna)
Stubby antenna



sucker antenna



- LTE 4G antenna (SMA-J antenna)
Stubby antenna



sucker antenna



Note: If any of the above items is missing or damaged, please contact your Robustel sales representative.

1.3 Specifications

Kernel

- CPU: ARM926EJ-S core, main frequency 300MHz
- Memory: 64MB DDR2

- Storage: 64MB FLASH

Cellular Interface

- Number of antennas: 2
- Connector: Standard SMA-K
- SIM: 1 (3.0V/1.8V)
- Band: LTE FDD: B2/ B4/ B12
WCDMA: B2/ B4/ B5

Bluetooth interface

- Number of antennas: 1
- Connector: Standard RP-SMA-K
- Chip: Nrf52832-Nordic

Serial port

- Number of interfaces: 1
- Port type: 4-bit 3.5mm terminal
- Baud rate: 9600bps, maximum rate: 115200bps
- RS-422:TX-A/TX-B/RX-A/RX-B

CAN interface

- Number of interfaces: 1
- Port type: 3-bit 3.5mm terminal
- Interface rate: 125kbps
- CAN:CAN-H/CAN-L/GND
- Switch: 3pin two speed dial switch

Digital input

- Number of interfaces: 2
- Interface type: 2-bit 3.5mm terminal
- Voltage range: $2.0V \leq V_{IH} \leq 5.0V$, $0V \leq V_{IL} \leq 0.8V$;
- Current: $0.1mA \leq i_{in} \leq 50mA$
- Di1 / di2 is fixed as the default drop-down;

USB interface

- Number of interfaces: 1
- Interface type: Micro USB female

Other

- LED indicator (green): 1xRUN + 1xMDM + 1xRSSI + 1xLINK + 1xDEV + 1xMESH
- SMI card: Standard 25x15mm SIM interface
- Built in: watchdog, timer
- Key: 1xRST

Power Supply and Consumption

- Power supply interface: 3-position 5.08mm terminal
- Input voltage: 9-36VDC
- Power consumption: 60-80ma @ 12V in idle state
Communication status 210ma (peak) @ 12V

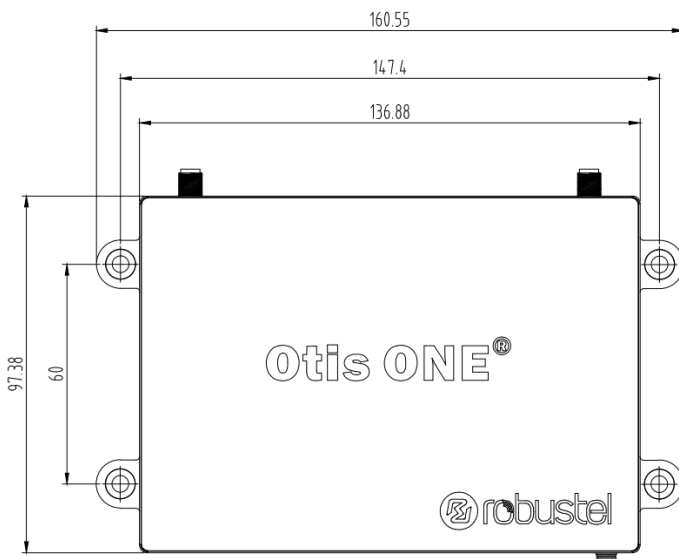
Physical Characteristics

- Housing: PC + ABS environmental protection plastic
- Dimension: (L x W x H): 136.9mm x 97.4mm x 30.1mm
- Installation: lug and magnetic installation

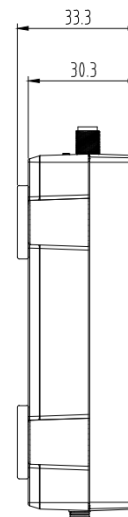
Reliability

- Working temperature: -20 °C to +70 °C;
- Storage temperature: -40 °C to +85 °C;
- Altitude: 2000 meters above sea level
- Humidity: 5% RH to 95% RH
- MBTF: 100000 hours
- Encryption chip: compatible with ATSHA204A / ATAES132A

1.4 Dimensions



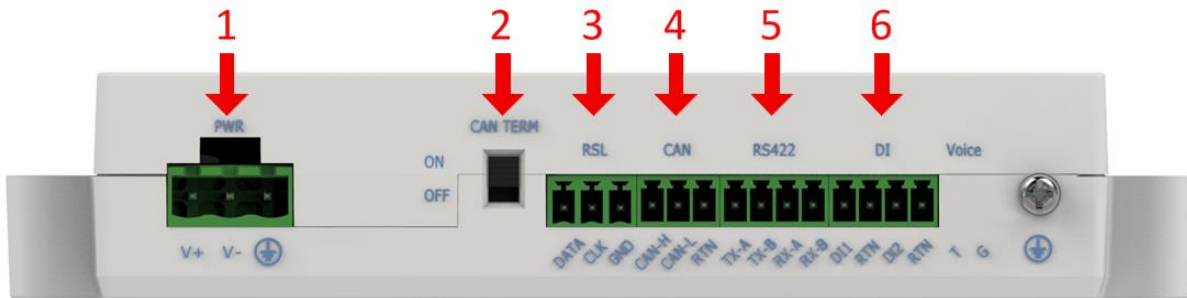
Front View



Rear View

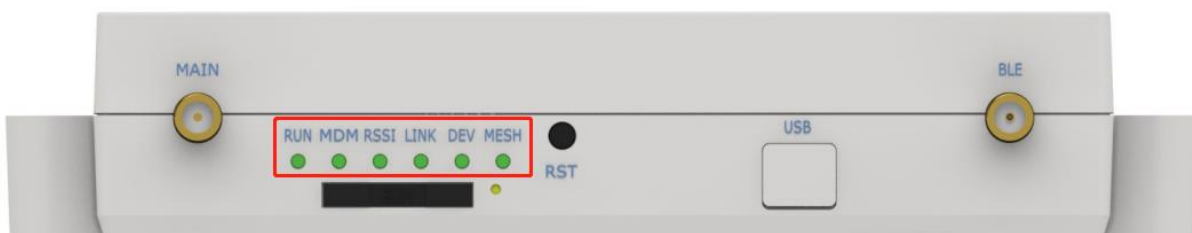
Chapter 2 Hardware Installation

2.1 Front Panel Interface



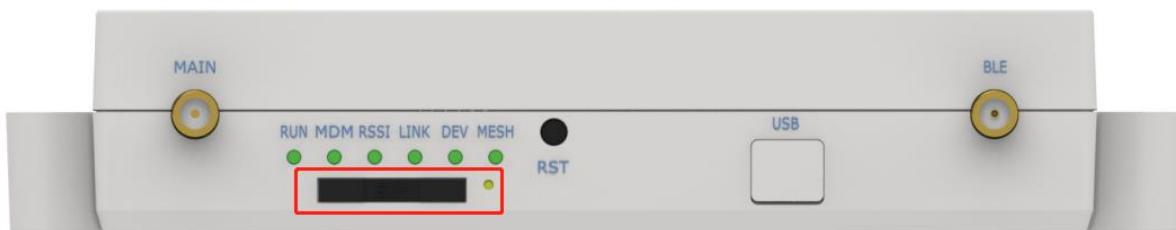
Item	Name	Mark	Functions	Direction
1	Power interface	PWR	Power input positive, 9-36VDC	C9200 ← Gateway
2	CAN interface switch (reserved)	CAN TERM	Control CAN port function switch (reserved)	C9200 ↔ Gateway
3	Remote serial interface (reserved)	RSL	Remote serial data transmission (reserved)	C9200 ↔ Gateway
4	CAN interface	CAN	Provide controller area network transmission	C9200 ↔ Gateway
5	Serial interface	RS422	RS-422 data transmission	C9200 ↔ Gateway
6	Digital input interface	DI	DI1/DI2 input function	C9200 ← Gateway

2.2 LED Indicators



Name	Color	Status	Description
RUN	Green	On, fast blinking(250ms)	Gateway is powered on
		On, slow blinking(500ms)	Gateway starts operating
		Off	Gateway is powered off
MDM	Green	On, solid	Link connection is working
		On, blinking	In link communication
		Off	Link is disconnected
RSSI	Green	On, solid	High Signal (CSQ:22-31)
	Green	On, slow blinking	Medium Signal (CSQ:11-21)
	Green	On, fast blinking	Low Signal (CSQ:1-10)
	Green	Off	No Signal
LINK	Green	On, blinking	Provide software API interface to control flashing according to requirements
DEV	Green	On, blinking	Provide software API interface to control flashing according to requirements
MESH	Green	On, blinking	Provide software API interface to control flashing according to requirements

2.3 Insert or Remove SIM Card



Please confirm that the SIM card has been inserted before use. When the SIM card is turned on and the correct PIN code is not configured when the device is configured, the SIM card is not available. Insert or remove the SIM card as shown in the following steps.

- **Insert SIM card**

1. Make sure gateway is powered off.
2. Press the card slot with the card pin to eject the SIM card slot. After the SIM card is placed in the SIM card slot, insert the card slot back into the SIM card slot of the device.

- **Remove SIM card**

1. Make sure gateway is powered off.
2. Press the card slot with the card pin to eject the SIM card slot. After the SIM card is placed in the SIM card slot, insert the card slot back into the SIM card slot of the device.

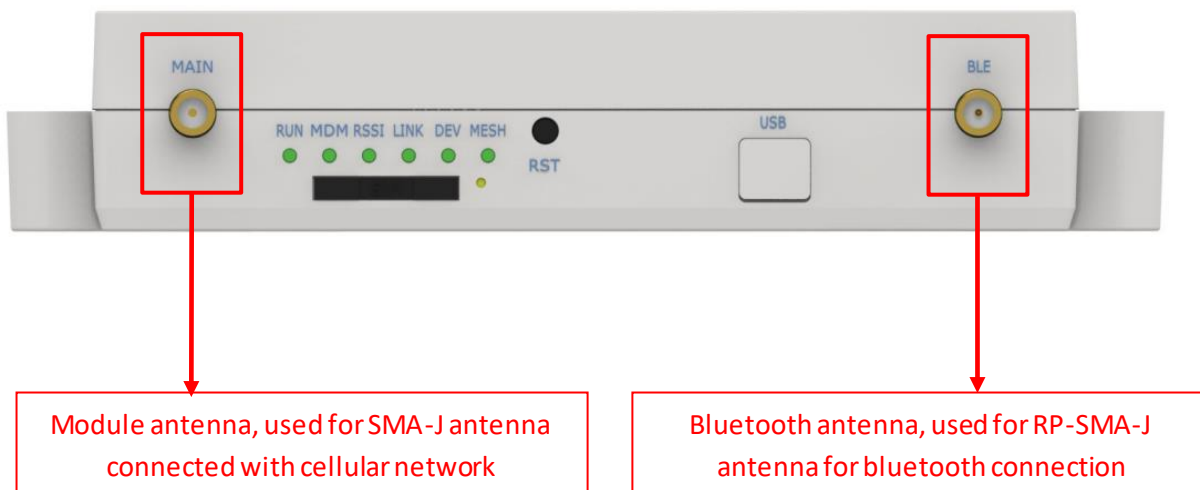
Note:

1. Use the specific M2M SIM card when the device is working in extreme temperature, because the regular card for long-time working in harsh environment will be disconnected frequently.
2. Do not touch the metal of the card surface in case information in the card will lose or be destroyed.
3. Do not bend or scratch the card.
4. Keep the card away from electricity and magnetism.
5. Make sure router is powered off before inserting or removing the card.

2.4 Attach External Antenna (SMA Type)

Attach an external SMA antenna to the 4G IoT Wireless Gateway's antenna connector and twist tightly. Make sure the antenna is within the correct frequency range provided by the ISP and with 50 Ohm impedance.

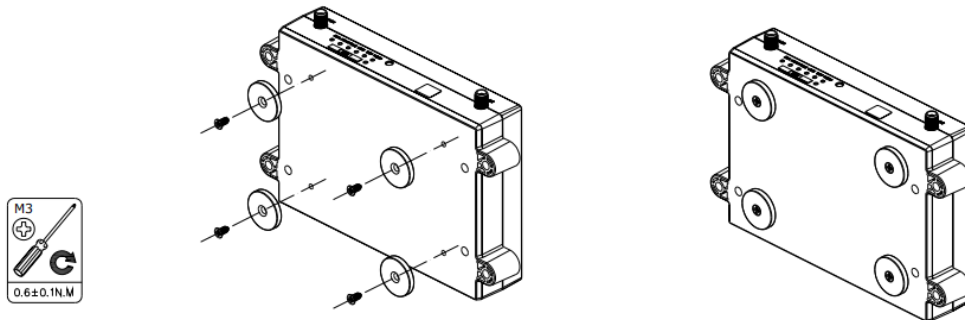
Note: Recommended torque for tightening is 0.35 N.m.



2.5 Mount the 4G IoT Wireless Gateway

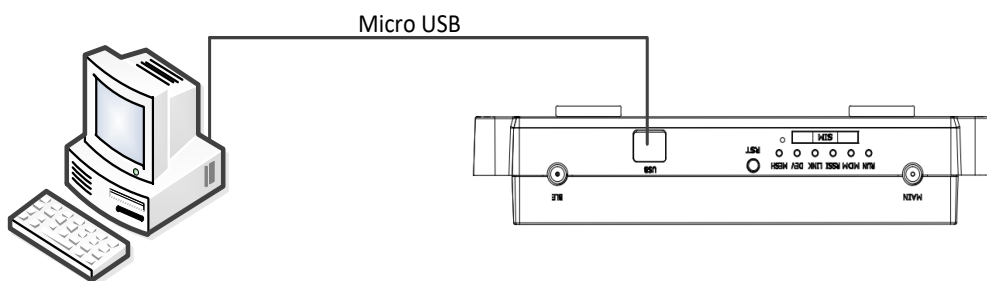
The 4G IoT Wireless gateway can be placed on a desktop or magnet installation.

- **Magnet installation method**

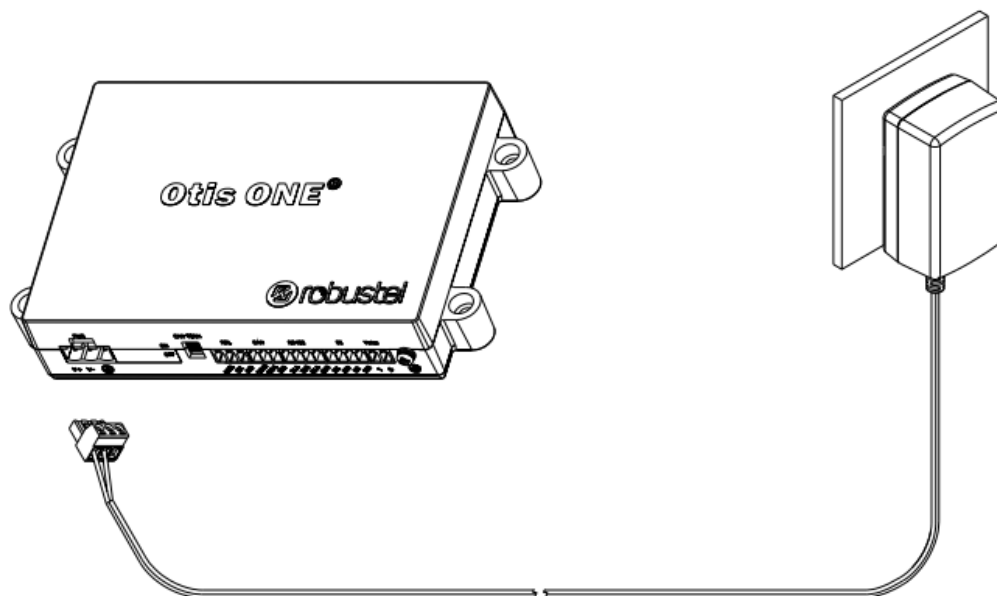


2.6 Connect the 4G IoT Wireless Gateway to a Computer

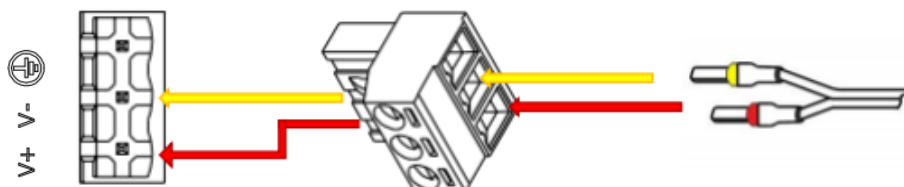
Use a microUSB data cable to connect the microUSB interface of 4G IoT Wireless Gateway to the USB interface of the computer.



2.7 Power Supply



COLOR	POLARITY
RED	+
YELLOW	-



Connect the power adapter to the gateway power interface as shown in the figure above.

Note: there are positive and negative wires on the power adapter. The wire of the red connector is connected to the positive pole of the gateway through the terminal, and the wire of the Yellow connector is connected to the negative pole of the gateway through the terminal.

Chapter 3 Initial Configuration

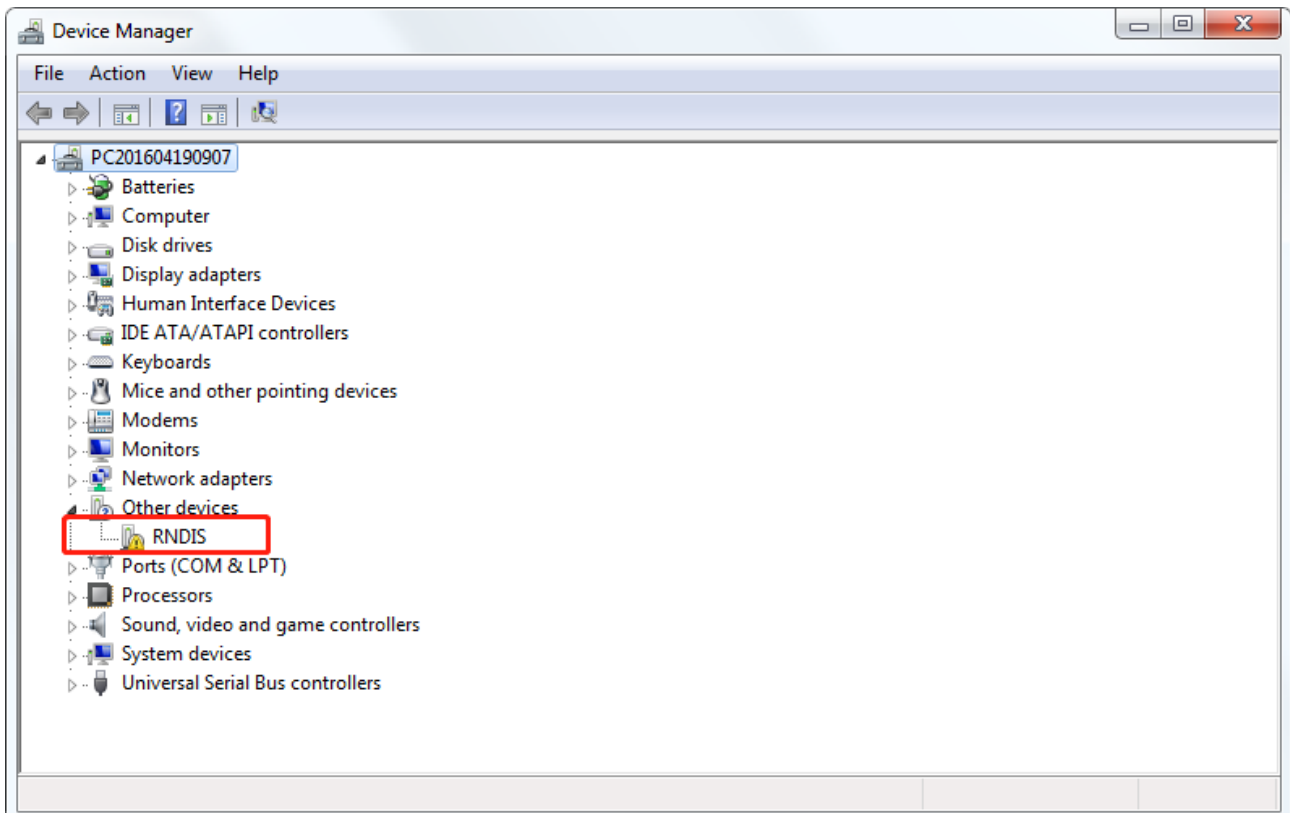
The 4G IoT Wireless Gateway can be configured through your web browser that including IE 8.0 or above, Chrome and Firefox, etc. A web browser is included as a standard application in the following operating systems: Windows 7/10, etc. It provides an easy and user-friendly interface for configuration. For C9200, the way to connect the 4G IoT Wireless Gateway is as follows: users use PC to connect The 4G IoT Wireless Gateway through micro USB data line, a new USB network adapter will be added on PC, and the IP address of the network adapter and 4G IoT Wireless communication terminal are configured in the same network segment on PC, so as to establish LAN connection. After the connection is successfully established, enter the default login address of The 4G IoT Wireless Gateway on the computer browser, and enter the web login interface of The 4G IoT Wireless Gateway.

3.1 Configure the PC

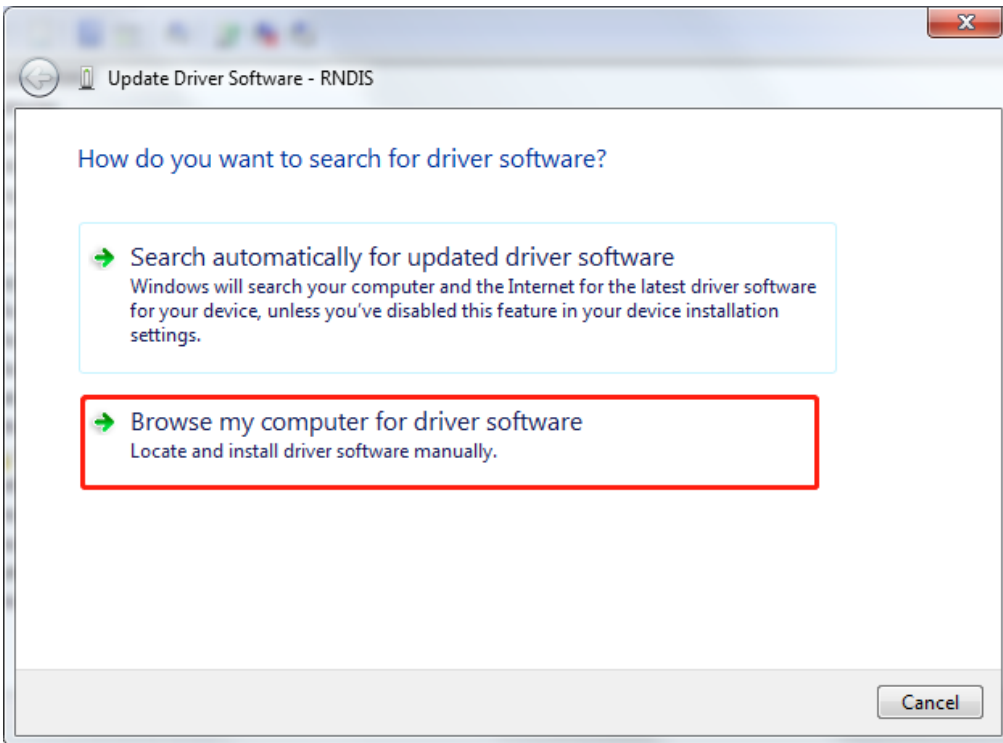
3.1.1 Load network adapter driver

After the user connects the 4G IoT Wireless Gateway through the micro USB data line, the PC will automatically load the network adapter driver. If it fails to load successfully, configure the correct network adapter driver through the following methods.

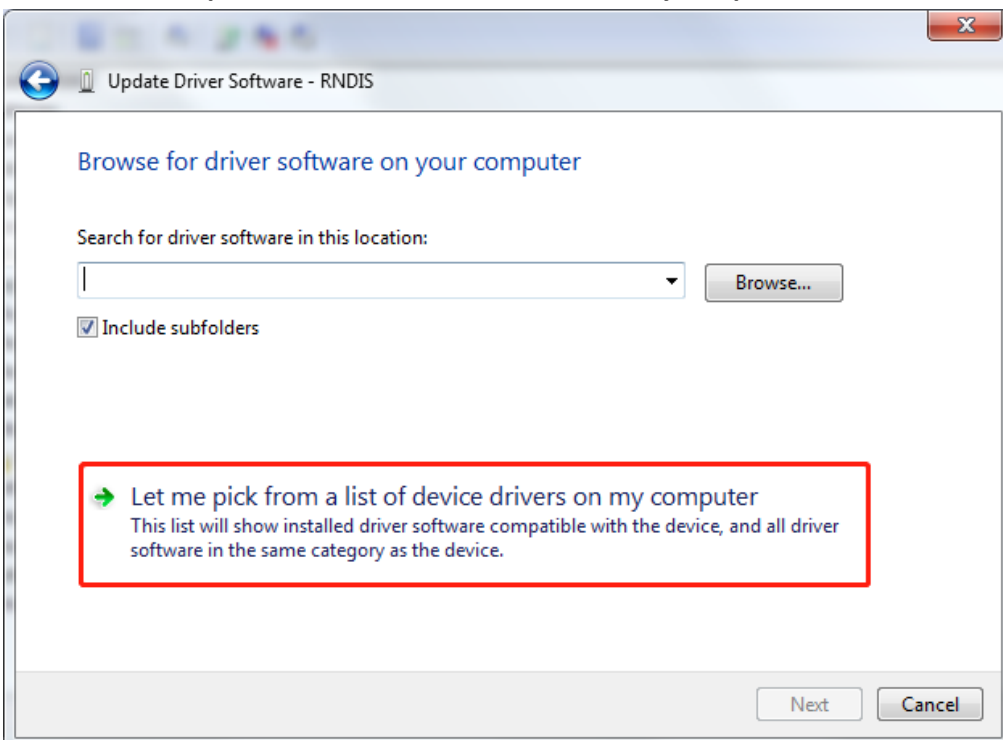
1. Click **Start > Control Panel > device manager**. After the device is powered on, the PC detects the new device and tries to install the driver;



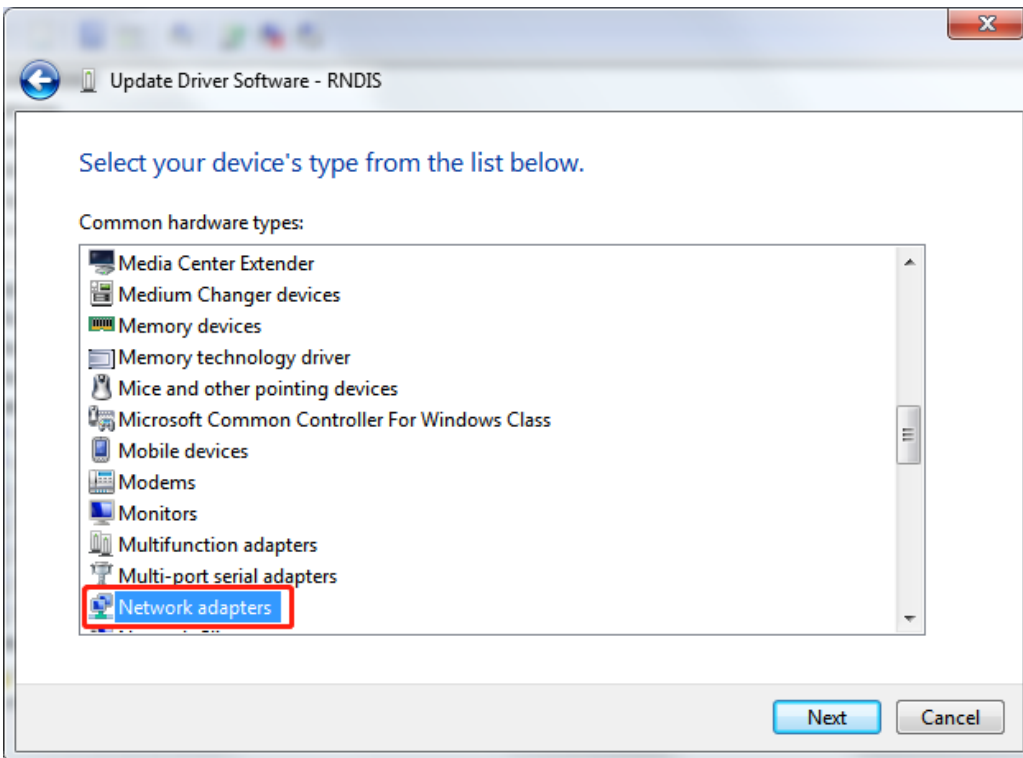
2. Click the device, right-click to select **update driver software**, and select **Browse my computer for driver software** in the pop-up box;



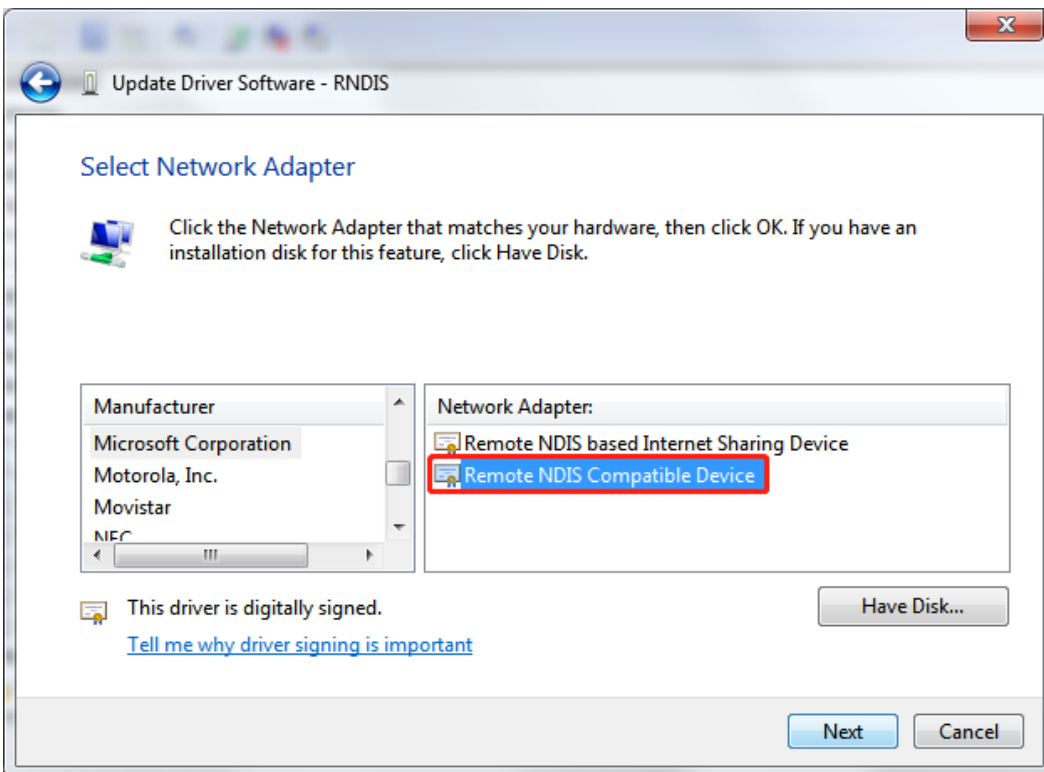
3. Select **let me pick from a list of device drivers on my computer**;



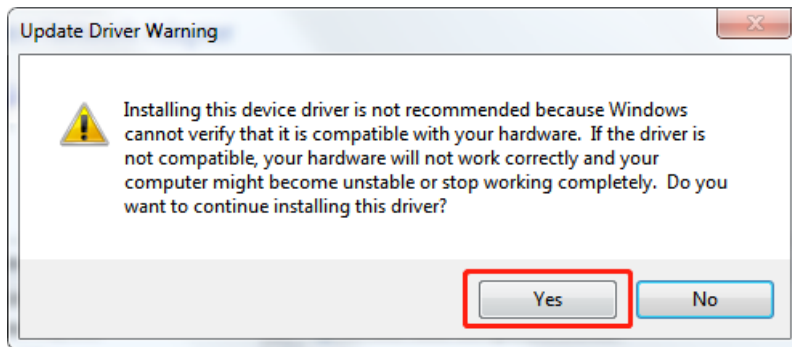
4. Select **network adapters** in the list and click **next**;



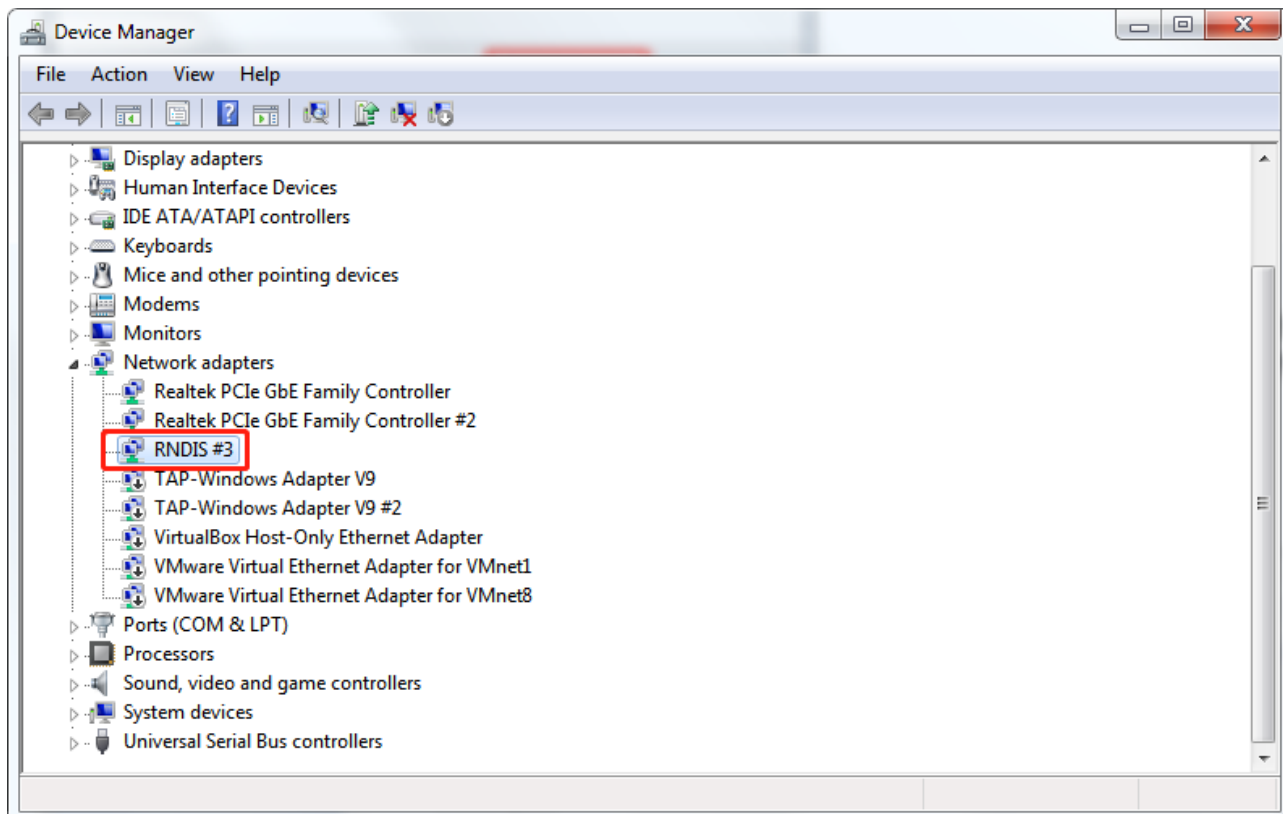
5. Find **Microsoft Corporation** in the manufacturer on the left and select **Remote NDIS Compatible Device** in the right network adapter and click **Next**.



6. Select **Yes** if the following window pops up;



7. After installing the driver, you can view the new network adapter in device manager.

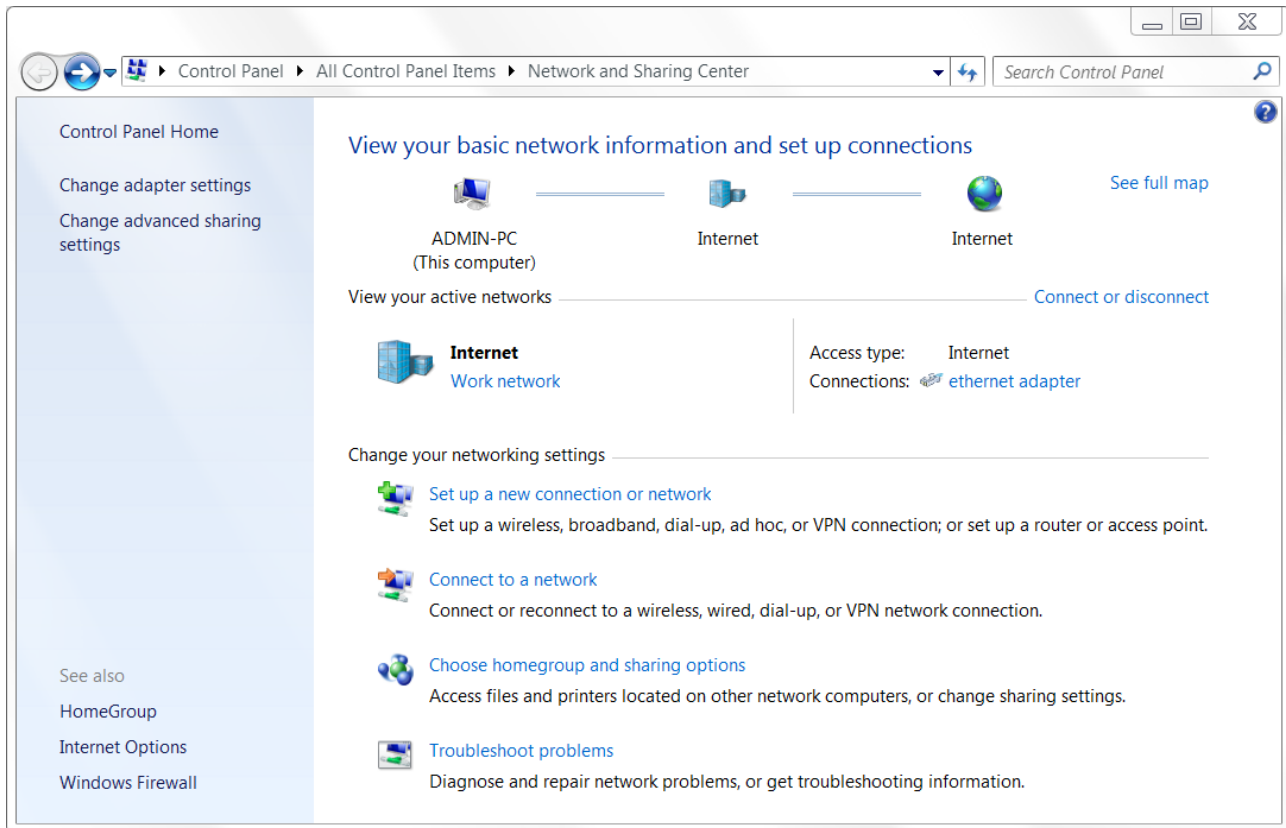


3.1.2 IP address configuration of PC end

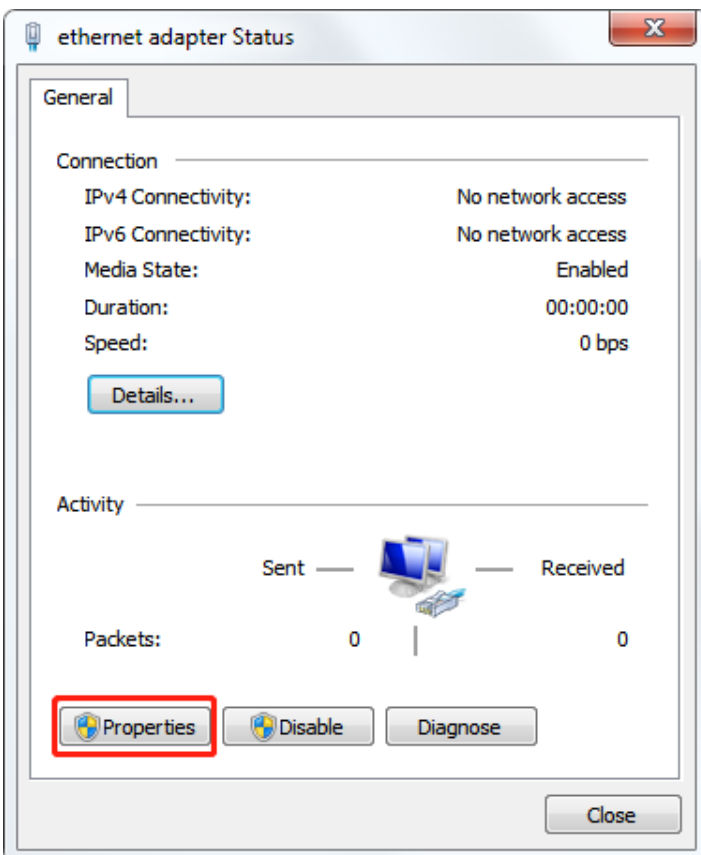
After the PC successfully loads the network adapter driver, the PC configures its IP address through the following methods: configure a static IP address on the local connection of the PC in the same subnet as the 4G Internet of things wireless communication terminal, and then access the device interface.

This section takes configuring a Windows 7 system as an example. The configuration of windows system is similar.

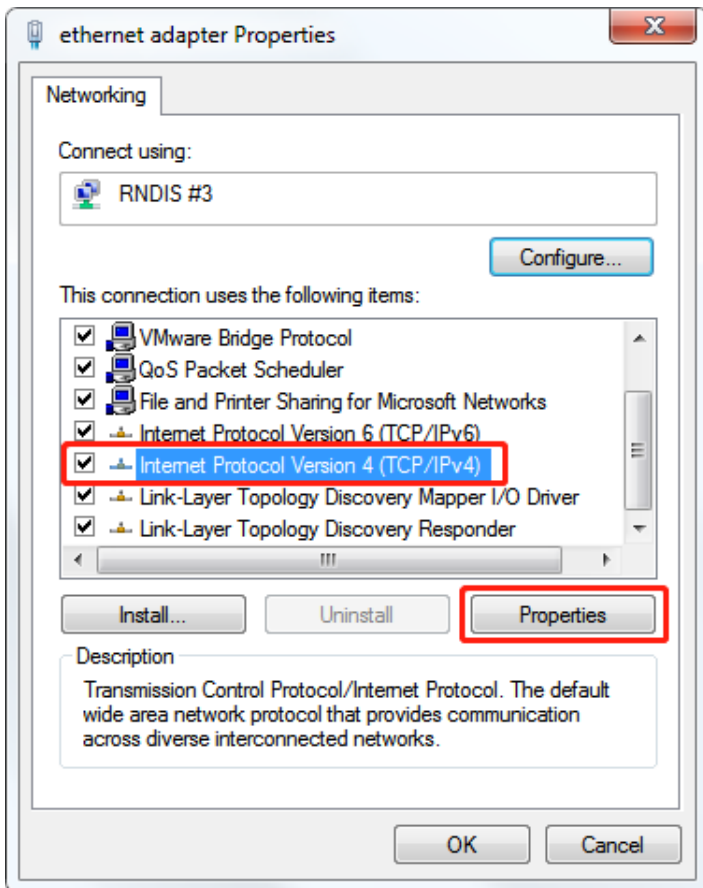
1. Click **Start > Control Panel > network and sharing center**, and click **Ethernet adapter** in the open window;



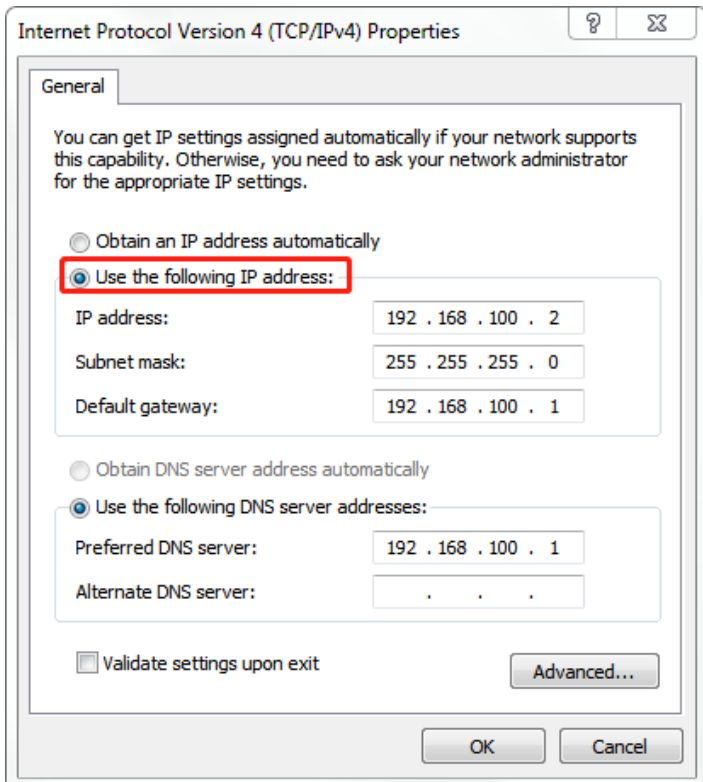
2. Click on **Properties** In the **ethernet adapter Status** window,;



3. Select **Internet Protocol Version 4 (TCP/IPv4)** and click **Properties**;



4. Click and configure **Use the following IP address** to manually configure the PC with a static IP address on the same subnet as the address of 4G IoT wireless gateway;



5. Click **OK** to complete the configuration.

Glossary

Abbr.	Description
DC	Direct Current
DI	Digital Input
GND	Ground
GPRS	General Package Radio Service
GSM	Global Standard for Mobile Communications
IMEI	International Mobile Equipment Identification
Kbps	kbits per second
LED	Light Emitting Diode
PC	Personal Computer
PPP	Point-to-point Protocol
PIN	Personal Identity Number
Rx	Receive Direction
SIM	Subscriber Identification Module
SMA	Subminiature Version A RF Connector
TCP/IP	Transmission Control Protocol / Internet Protocol
Tx	Transmit Direction

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