



EG9012

KONE Connection 210 (North America)

For 3G/4G Networks

User Guide

robustOS




About This Document

This document provides hardware and software information of the Robustel EG9012 Gateway, including introduction, installation, configuration and operation.

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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 gateway is used in a normal manner with a well-constructed network, the 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 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 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 gateway should be away from computers, office equipment, home appliance, etc.
- An external antenna must be connected to the gateway for proper operation. Only uses 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. Gateway may be used at this time.

Using the Gateway in Vehicle

- Check for any regulation or law authorizing the use of cellular devices in vehicle in your country before installing the gateway.
- The driver or operator of any vehicle should not operate the gateway while driving.
- Install the gateway by qualified personnel. Consult your vehicle distributor for any possible interference of electronic parts by the gateway.
- The 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 gateway is powered by the vehicle's main battery. The battery may be drained after extended period.

Protecting Your Gateway

To ensure error-free usage, please install and operate your gateway with care. Do remember the following:

- Do not expose the 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 gateway. There is no user serviceable part inside and the warranty would be void.
- Do not drop, hit or shake the 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 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.

Industry Canada statement

- ❶ This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions:
 - 1) this device may not cause interference, and
 - 2) this device must accept any interference, including interference that may cause undesired operation of the device.
- ❶ Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:
 - 1) l'appareil ne doit pas produire de brouillage, et
 - 2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.
- ❷ This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter, except tested built-in radios.
- ❷ Cet appareil et son antenne ne doivent pas être situés ou fonctionner en conjonction avec une autre antenne ou un autre émetteur, exception faites des radios intégrées qui ont été testées.
- ❸ The County Code Selection feature is disabled for products marketed in the US/ Canada.
- ❸ La fonction de sélection de l'indicatif du pays est désactivée pour les produits commercialisés aux États-Unis et au Canada.

Radiation Exposure Statement:

This equipment complies with IC 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.

Déclaration d'exposition aux radiations:

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

Regulatory and Type Approval Information

Table 1: Directives



2011/65/EC	Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)	
2012/19/EU	Directive 2012/19/EU the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE)	

Table 2: Standards of the Ministry of Information Industry of the People's Republic of China


SJ/T 11363-2006	"Requirements for Concentration Limits for Certain Hazardous Substances in Electronic Information Products" (2006-06).	
SJ/T 11364-2006	<p>"Marking for Control of Pollution Caused by Electronic Information Products" (2006-06).</p> <p>According to the "Chinese Administration on the Control of Pollution caused by Electronic Information Products" (ACPEIP) the EPUP, i.e., Environmental Protection Use Period, of this product is 20 years as per the symbol shown here, unless otherwise marked. The EPUP is valid only as long as the product is operated within the operating limits described in the Hardware Interface Description.</p> <p>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.</p>	

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	x	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	Firmware Version	Doc Version	Change Description
25 April, 2017	0.10.2	v.1.0.0	Initial release
2 June, 2017	0.11.2	v.1.1.0	Updated: <ol style="list-style-type: none">1. Product picture2. Input Voltage3. Power Consumption4. Packing list5. Operating temperature6. LED Indicator7. 4.1 Generate diagnose file about APN8. 4.3.1 ISP APN, dial up number

Contents

Chapter 1	Product Concept	10
1.1	Key Features	10
1.2	Package Contents	11
1.3	Specifications	11
1.4	Ordering Information	12
1.5	Dimensions.....	13
Chapter 2	Hardware Installation	14
2.1	LED Indicators.....	14
2.2	PIN Assignment	15
2.3	Ethernet Ports	16
2.4	Insert or Remove SIM Card	17
2.5	Attach External Antenna (SMA Type).....	18
2.6	Mount the Gateway	19
2.7	Ground the Gateway	20
2.8	Connect the Gateway to a Computer.....	20
2.9	Power Supply.....	21

Chapter 1 Product Concept

1.1 Key Features

Robustel EG9012 is an industrial gateway designed for monitoring and provides fast, reliable and stable Internet connectivity.

EG9012 is a powerful gateway developed from **RobustOS**, a Robustel self-developed and Linux-based operating system which designed to be used in Robustel hardware gateways. The RobustOS includes basic networking features and protocols providing users with a custom experience. Meanwhile, Robustel offers a **Software Development Kit (SDK)** to partners and customers to allow additional customization by using C or Python or Java, also provides rich **APPs** to satisfy fragmented IoT market.

- Supports 3G/4G cellular network
- Various interfaces: RS232/RS485/Console/USB/Ethernet/FXS
- Emergency call and respond via voice interface
- Modbus gateway serial protocol Support
- RS485 interface supports BACnet protocol
- Event output via Email, SMS
- Auto reboot via SMS/Incoming Call/Timing
- RobustOS + SDK + App
- IPsec/OpenVPN/GRE/PPTP/L2TP/DMVPN Support
- Support IBM IoT (Bluemix Internet of Things) devices management platform
- Support KMC (KONE Monitoring Centre) monitoring platform
- Management and upgrading via SMS/Web/CLI/SNMP/RobustLink Cloud
- Robust industrial design (9 to 26V DC, desktop or DIN rail mounting)

1.2 Package Contents

Before installing your EG9012 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 EG9012 KONE Connection 210 (North America)



- 35 mm DIN rail mounting kit



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

1.3 Specifications

Cellular Interface

- Standards: W-CDMA/FDD-LTE/TDD-LTE
- W-CDMA: max. 14.4Mbps/5.76Mbps (DL/UL)
- FDD-LTE: max. 100/50 Mbps (DL/UL)
- TDD-LTE: max. 100/50 Mbps (DL/UL)
- SIM: 1 (3V & 1.8V)
- Antenna interface: SMA female (ANT1+ANT2)

Ethernet Interface

- Number of ports: 2 x 10/100 Mbps (LAN1+LAN2)
- Magnet isolation protection: 1.5KV

Serial Interfaces

- Number of ports: 2 x RS-232, 1 x RS-485
- Baud rate: 300bps to 57600bps
- RS-232: Tx, Rx, GND
- RS-485: A (Data+), B (Data-)

- Interface: 3.81mm connector

Audio Interface

- Physical Connector: 3.81mm 3-PIN terminal block
- Interface type: FXS
- Interface Standard: ITU Q.512 (SLIC), ITU K.20 (overcurrent and overvoltage protection)
- Subscriber line interface circuit (SLIC)
 - Ring voltage: 40~90 Vpk configurable
 - Ring frequency: 20~25 Hz
 - Ring waveform: sinusoidal
 - Maximum ringer load: 5 ringer equivalence numbers (RENS)
 - On-hook/off-hook characteristics:
 - On-hook voltage (tip/ring): -46~-56V;
 - Off-hook current: 18~20 mA
 - Terminating impedance: configurable

System

- LED indicators: PWR, DEV1, DEV2, NET, RSSI, KMC, ERR
- Built-in RTC, Watchdog, Timer
- Expansion: 1 x USB 2.0 host up to 480 Mbps

Software

- Network protocols: PPP, TCP, UDP, DHCP, ICMP, NAT, DMZ, DDNS, VRRP, HTTP, HTTPS, DNS, ARP, SNMP, Telnet, SNMP etc.
- Firewall: SPI, anti-DoS, Filter, Access Control
- Serial port: TCP client/server, UDP, Modbus RTU/ASCII to Modbus TCP, Virtual COM (COM port redirector), BACnet

Power Supply and Consumption

- Power supply interface: 2-PIN 3.81mm terminal block
- Input voltage: 9 to 26 VDC (Overvoltage Protection)
- Power consumption: 900mA(MAX)@9V, 600mA(MAX)@12V, 400mA(MAX)@26V

Physical Characteristics

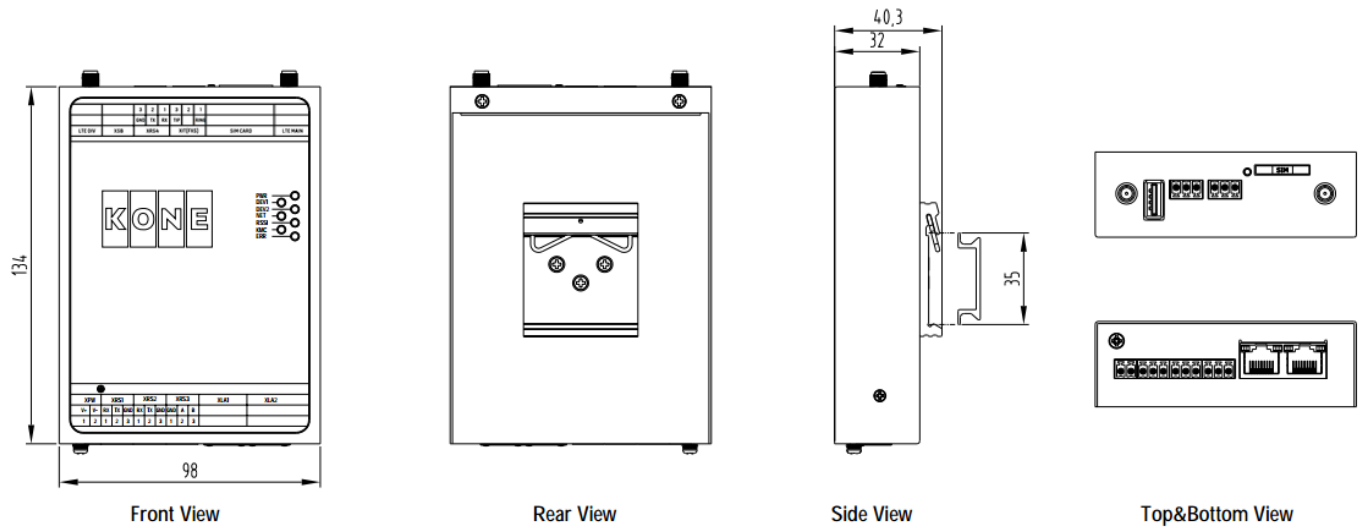
- Housing & weight: Metal, 300g
- Dimension: (L x W x H): 134mm x 98mm x 32mm
- Installation: 35mm DIN rail
- Normal Operating Temperature: -30~+70°C,
- Extended Operating Temperature: -40~-30°C, +70~+85°C
- Humidity: 5~95%RH

1.4 Ordering Information

Model No.	Description	Frequency	Operating Environment
EG9012-4LB	Gateway, 4G module	4G:B2/4/5/13/17 3G:B2/5	Normal Operating Temperature: -30~+70°C

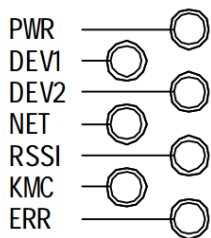
			Extended Operating Temperature: -40~-30°C, +70~+85°C Humidity: 5~95%RH
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1.5 Dimensions



Chapter 2 Hardware Installation

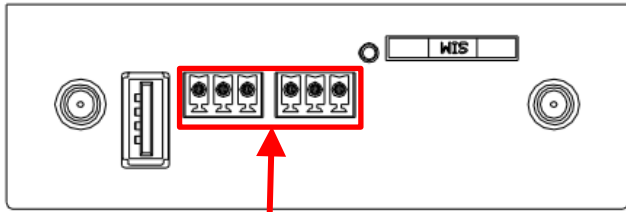
2.1 LED Indicators



Name	Color	Status	Description
PWR	Green	On	Gateway is powered on
DEV1	Green	On	Connected to controller1
DEV2	Green	On	Connected to controller2
NET	Green	Always On	Connected to 4G network
		Blinking every 100ms	Connected to 3G network
RSSI	Green	Blinking every 1s	Signal level: 0-9 (Low Signal)
		Blinking every 100ms	Signal level: 10-19 (Medium Signal)
		Always on	Signal level: 20-31 (High Signal)
		Off	No signal
KMC	Green	Blinking	Registering the KMC Platform
		On	Connected to the KMC Platform
		Off	Disconnected to the KMC Platform
ERR	Green	On	Gateway in fault

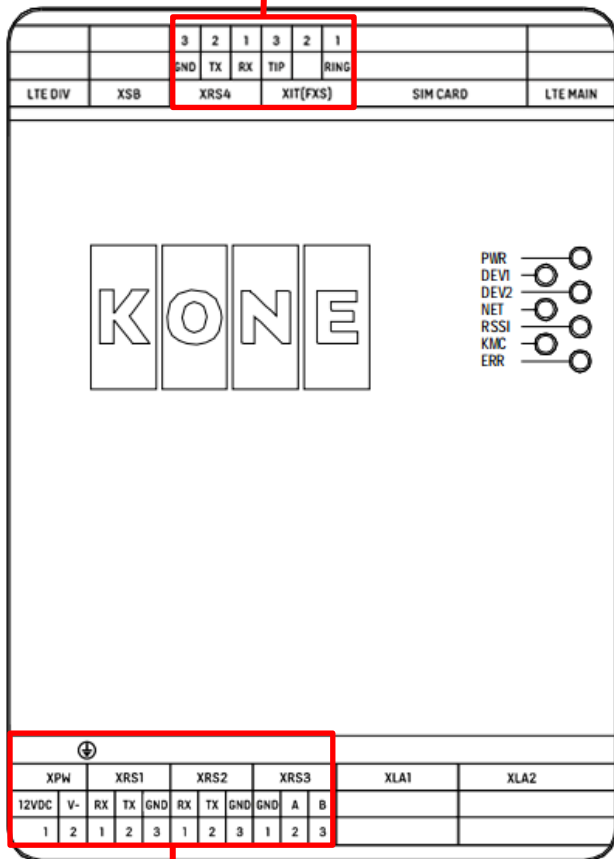
2.2 PIN Assignment

There are terminal block PIN relationship tables on the front view of the EG9012, as the following figure showed.



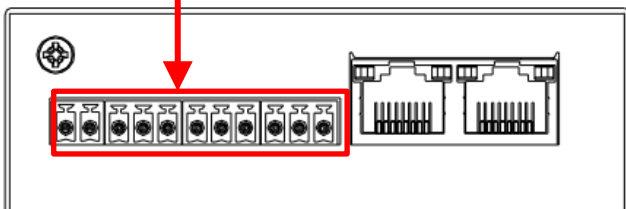
Top View

XRS4 (Debug)		
PIN	Function	Direction
1	RX	Device → EG9012
2	TX	EG9012 → Device
3	GND	--



Front View

XIT (FXS)		
PIN	Function	Direction
1	RING	Device → EG9012
2	--	
3	TIP	EG9012 → Device



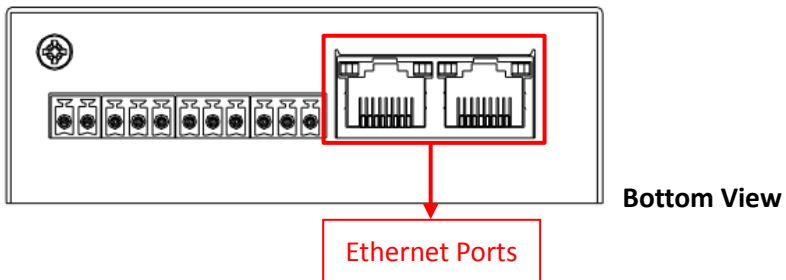
Bottom View

XPS (Power supply interface)		
PIN	Function	Direction
1	V+	Adapter → EG9012
2	V-	EG9012 → Adapter

XRS1/XRS2 (RS232 serial port)		
PIN	Function	Direction
1	RX	Device → EG9012
2	TX	EG9012 → Device
3	GND	--

XRS3 (RS485 serial port)		
PIN	Function	Direction
1	GND	--
2	A	--
3	B	--

2.3 Ethernet Ports

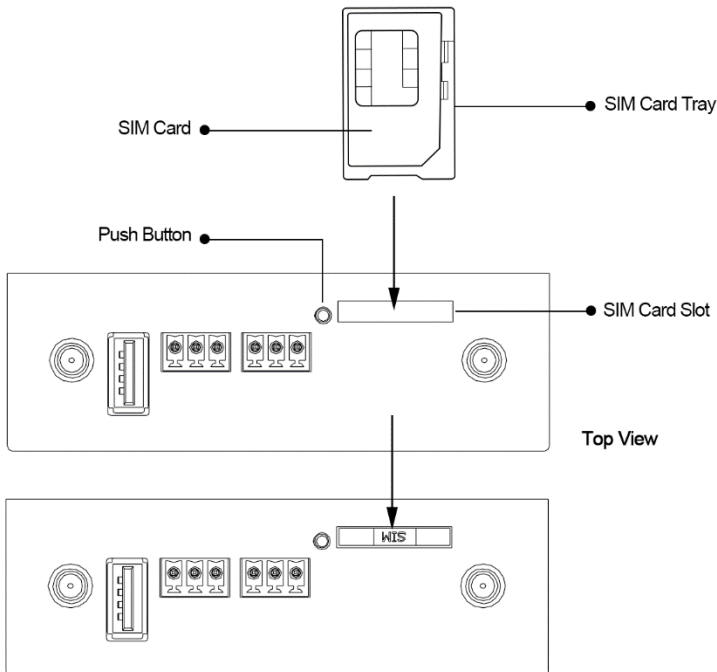


Each Ethernet port has two LED indicators (please check the picture above). The yellow one is Speed indicator and the green one is Link indicator. There are three status of each indicator. For details please refer to the form below.

Indicator	Status	Description
Speed Indicator	Off	10 Mbps mode.
	On	100 Mbps mode.
Link Indicator	Off	Connection is down.
	On	Connection is up.
	Blink	Data is being transmitted

2.4 Insert or Remove SIM Card

Be sure to insert a SIM card before you use the gateway.



Insert or remove the SIM as shown in the following steps.

- **Inserting SIM Card**

1. Power off the gateway.
2. Use a pointed stick to press the Push Button, and then take out the SIM Card Tray.
3. Place the SIM card on the tray, and insert them to the slot until you hear “a cracking sound”.

- **Removing SIM card**

1. Power off the gateway.
2. Press the Push Button, and the tray with SIM card will pop up to be pulled out.

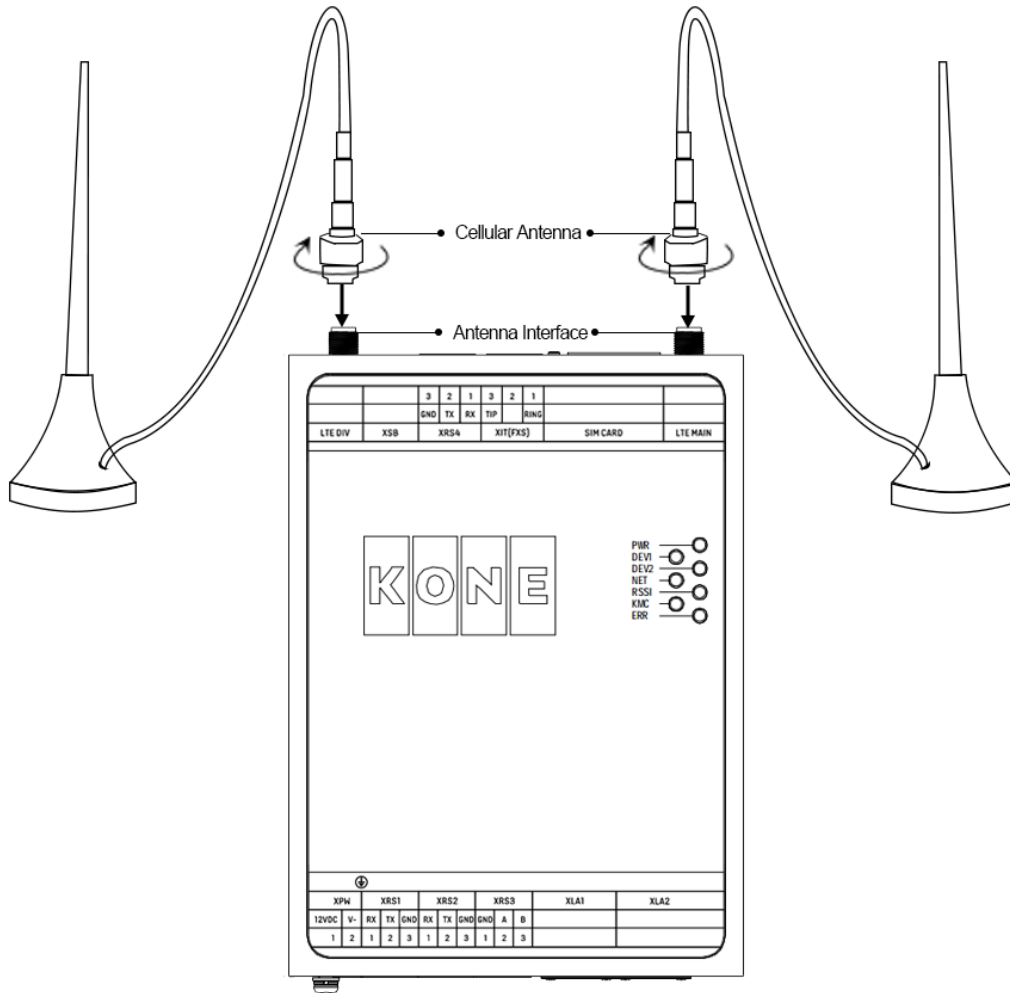
Note:

1. Don't touch the metal surface of the SIM card in case information in the card is lost or destroyed.
2. Don't bend or scratch your SIM card. Keep the card away from electricity and magnetism.
3. Make sure to disconnect the power source from your gateway before inserting and removing your SIM card.

2.5 Attach External Antenna (SMA Type)

Attach an external SMA antenna to the gateway's 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.

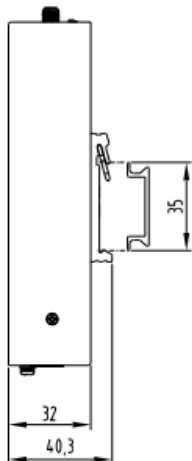


2.6 Mount the Gateway

The gateway can be mounted a 35 mm DIN rail.

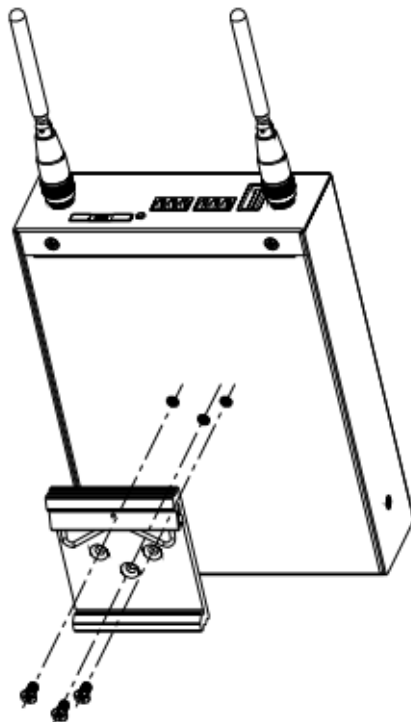
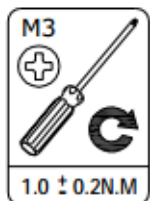
DIN rail size (measured in mm)

Din Rail



Use 3 pcs of M3*6 flat head Phillips screws to fix the DIN rail to the gateway, and then hang the DIN rail on the mounting bracket. It is necessary to choose a standard bracket.

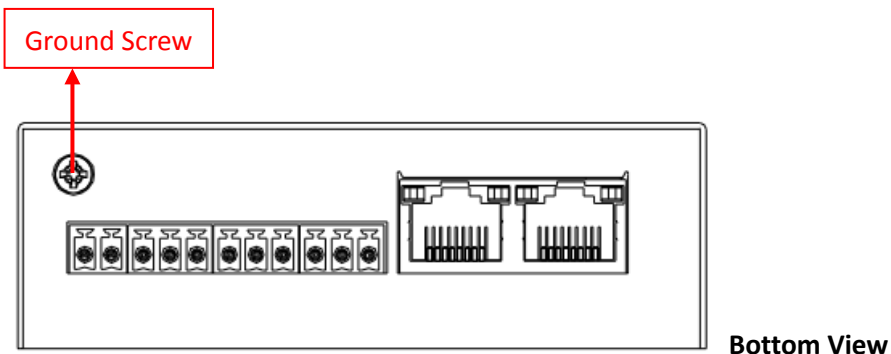
Note: Recommended torque for mounting is 1.0 N.m, and the maximum allowed is 1.2 N.m.



2.7 Ground the Gateway

Gateway grounding helps prevent the noise effect due to electromagnetic interference (EMI). Connect the gateway to the site ground wire by the ground screw before powering on.

Note: This product is appropriate to be mounted on a sound grounded device surface, such as a metal panel.



2.8 Connect the Gateway to a Computer

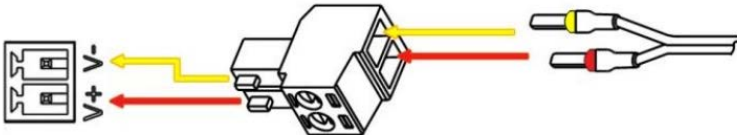
Connect an Ethernet cable to LAN1 or LAN2 at the bottom of the EG9012, and connect the other end of the cable to your computer.



2.9 Power Supply

CONNECTING THE POWER CABLE

COLOR	POLARITY
RED	+
YELLOW	-



EG9012 Gateway supports reverse polarity protection, but always refers to the figure above to connect the power adapter correctly.

Note: The range of power voltage is 9 to 26V DC.

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