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Preface

Application Scope

This guide describes installation steps, troubleshooting, technical specifications, and specifications and use criteria of cables and connectors. It is intended for users who have experience in installing and maintaining network hardware, provided that the users of RG-MTFi-M520 are familiar with terms and concepts related to Ethernet.

Document Structure

- Chapter 1 "**Preparation Before Installation**" lists the safety, power supply, and site requirements that must be met before installation.
- Chapter 2 "**Product Installation**" describes how to install the device and connect the power supply.
- Chapter 3 "**Troubleshooting**" describes possible problems and solutions in the device installation and application.

1 Preparation Before Installation
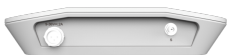
1.1 Product Overview

1.1.1 RG-MTFi-M520

◆   Figure 1-1 Front Panel

◆   Figure 1-2 Rear Panel

◆ Figure 1-3 Top View

◆ LED Indicators

LED	Color	Status	Description
PWR	Green	Solid on	RG-MTFi-M520 is powered

			on.
		Off	RG-MTFi-M520 is powered off.
System	Green	Blinking	Initialization in progress.
		Solid on	Startup completed.
WiFi1	Green	Off	2.4 GHz WiFi is disabled.
		Solid on	2.4 GHz WiFi is enabled without data transmission.
		Blinking	2.4 GHz WiFi is enabled with data transmission.
WiFi2	Green	Off	5.8 GHz WiFi is disabled.
		Solid on	5.8 GHz WiFi is enabled without data transmission.
		Blinking	5.8 GHz WiFi is enabled with data transmission.
3G/4G1	Green	Off	3G/4G1 is disabled.
		Solid on	3G/4G1 is enabled without data transmission.
		Blinking	3G/4G1 is enabled with data transmission.
3G/4G2	Green	Off	3G/4G1 is disabled.
		Solid on	3G/4G1 is enabled without data transmission.
		Blinking	3G/4G1 is enabled with data transmission.
S	Green	Solid on	The device is not located.

		Blinking	The device is located.

1.1.2   Application

◆   Power supply and antenna verification

　　1.   Check whether the power cable on the rear panel is properly connected.

　　2.   Check whether the antenna is properly connected.

◆   Power-off

Power off RG-MTFi-M520 before maintenance to avoid damage to the SIM card, the hard disk, and the radio frequency (RF) module.

1.1.3   Network Service Application

◆   Power on RG-MTFi-M520. If PWR is steady on, it indicates that RG-MTFi-M520 is powered on successfully, and the system runs properly.

◆   Check whether the 3G/4G function is enabled. If 3G/4G1 or 3G/4G2 is steady on or blinking, it indicates that the 3G/4G function is properly enabled.

◆   Check whether the WiFi function is enabled. If WiFi1 or WiFi2 is steady on or blinking, it indicates that the 2.4 GHz or 5.8 GHz WiFi function is properly enabled.

◆ Choose **Settings** > **Wireless and Network** > **WLAN** on a STA to select a specified SSID and perform connection.

1.2 Requirements

1.2.1 Temperature & Humidity Requirements

Please maintain a minimum clearance of 10cm at both sides and rear panel of the chassis to facilitate ventilation.

To ensure the normal operation and a prolonged useful life of **RG-MTFi-M520**, you must maintain an appropriate temperature and humidity in the equipment room. Inappropriate temperature or humidity may damage the device.

Table 1-1 Temperature and Humidity Requirement

Temperature		Humidity	
Long-time working	Short-time working	Long-time working	short-time working
10℃-55℃	-10℃-60℃	40%-65%	10%-90%

> 📖 ⚠ The temperature and humidity are measured at the place 1.5m above the floor and 0.4m in the front of the front panel without any cover.
>
> 📖 The short time refers to a period no longer than consecutive 48 hours or accumulated 15 days a year.

1.2.2 Cleanness Requirements

Table 1-2 Dust Particle Limit

Substance	Concentration Limit (particles/m^3)
Dust particles (diameter ≥0.5μm)	≤3.5×10^6
Dust particles (diameter ≥5μm)	≤3×10^4

The equipment room should also meet requirement in terms of salt, acid and sulfide in the air. These poisonous substances may accelerate the corrosion of the metal and the aging of some parts. The equipment room should be protected from the intrusion of harmful gases (for example, SO_2, H_2S, NO_2 and Cl_2), requirements listed in table 1-3.

Table 1-3 Harmful Gas Limit

Gas	Average (mg/m^3)	Maximum (mg/m^3)
SO_2	0.3	1.0
H_2S	0.1	0.5
NO_2	0.5	1.0
Cl_2	0.1	0.3

📖 The **Average** refers to the average limit of harmful gas in one week. The **Maximum** value is the upper limit of the harmful gas measured in one week for up to 30 minutes per day.

1.2.3   Anti-interference Requirements

External interference may affect the system in the conductive ways such as capacitive coupling, inductive coupling, and electromagnetic radiation.

- Keep RG-MTFi-M520 away from like high-power radio stations, radar stations and high-frequency large-current device.
- Take EMI shielding measures, such as shielded cables.
- Port cables must be managed indoor, so as to prevent port damage caused by lightening.

1.2.4   Installation Position Requirements

Verify the installation position and the power supply mode before the installation, so as to facilitate subsequent maintenance and line checks. It is recommended that RG-MTFi-M520 be installed on the luggage rack above the driver.

Verify the specifications and installation positions of the power cable and the antenna.

- ✧ Install RG-MTFi-M520 in a position free from collisions, overheat, direct sunlight, waste, water, oil, and dust, and away from the gasbag controller, stereo equipment, ABS system, and other electrostatic-sensitive devices.
- ✧ Install RG-MTFi-M520 in a hidden, stable, shock-proof, heat-insulated, and water-proof position.

- ✧ Secure RG-MTFi-M520 in accordance with Ruijie guidelines to prevent loosening and fall-off.
- ✧ Keep ports of RG-MTFi-M520 away from damage caused by external factors. Ensure that LED indicators of RG-MTFi-M520 can be conveniently observed.

1.3 EMI

Various interference sources, from either outside or inside the device or application system, affect the system in the conductive ways such as capacitive coupling, inductive coupling, and electromagnetic radiation.

- ● Take measures to protect the power system from the interference of the electric grid.
- ● The working ground of the routers should be properly separated and kept as far as possible from the grounding device of the power equipment or the anti-lightning grounding device.
- ● Keep RG-MTFi-M520 away from like high-power radio stations, radar stations and high-frequency large-current device.
- ● Take EMI shielding measures.

1.4 Installation Tools

- ✧ Adjustable wrench

- ◇ Electric drill
- ◇ Screwdriver (Phillips screwdriver, hexagon socket-head screwdriver)
- ◇ Diagonal pliers
- ◇ Multimeter (or electrical tester pen)
- ◇ Headlamp (flashlight)
- ◇ 20-mm hole saw
- ◇ Nylon straps

✎ **Note:**

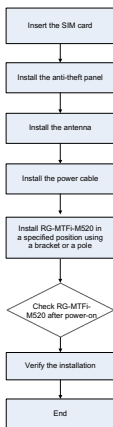Users must prepare the tools and auxiliaries.

2 Product Installation

2.1 Installation Procedure

Before installation, ensure that:

◇ Sufficient airflow is available for the device.

◇ Temperature and humidity requirements for the device are met.

◇ The power supply is properly deployed and power requirements are met.

◇ There is sufficient space for installing the device.

◇ Install RG-MTFi-M520 to a mounting bracket or a pole. The following figure shows the installation procedure.

```
┌─────────────────────────┐
│   Insert the SIM card   │
└─────────────────────────┘
            │
            ▼
┌─────────────────────────┐
│ Install the anti-theft panel │
└─────────────────────────┘
            │
            ▼
┌─────────────────────────┐
│   Install the antenna   │
└─────────────────────────┘
            │
            ▼
┌─────────────────────────┐
│  Install the power cable │
└─────────────────────────┘
            │
            ▼
┌─────────────────────────┐
│ Install RG-MTFi-M520 in │
│ a specified position using │
│   a bracket or a pole   │
└─────────────────────────┘
            │
            ▼
        ◇─────────◇
       Check RG-MTFi-
       M520 after power-on
        ◇─────────◇
            │
            ▼
┌─────────────────────────┐
│  Verify the installation │
└─────────────────────────┘
            │
            ▼
┌─────────────────────────┐
│           End           │
└─────────────────────────┘
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2.2 RG-MTFi-M520 Installation

Precautions:

◇   Verify that the external power supply meets the requirement of 9–36 V and 2 A DC before connecting to the power supply.

◇   Verity that the switch of the power module is disconnected before connecting to the power cable.

◇   Connect power cables of different colors to corresponding binding posts.

◇   Ensure that the connected power cables have sound contact.

◇   Verify that all antenna ports are connected to the antennas before power-on.

◇   Do not insert or remove the SIM card in a powered-on state.

🛑 Caution:

Ensure that all antenna ports are connected to the antennas before RG-MTFi-M520 is powered on. Otherwise, total reflection of RF signals occurs on the port, and the RF module may be damaged.

Install RG-MTFi-M520 in a corresponding position according to the installation procedure above. Ensure that components are secured.
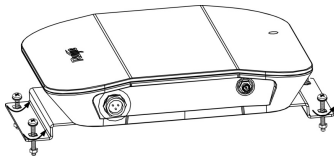
- -
🛑 Caution:
- -

1. Ensure that the power supply is disconnected before installing or moving RG-MTFi-M520.

2. Make sure that RG-MTFi-M520 is installed in a proper position so that the LED indicators can be conveniently observed.

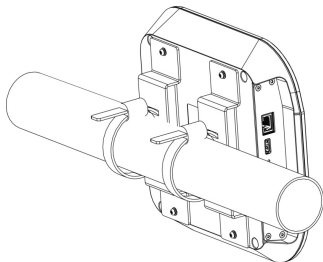3. Ensure that screws are fastened.

2.2.1 Installing the Host

Installation using a mounting bracket: Install the host in a specified position using the mounting bracket, and fasten the host using M5 screws and nuts, as shown in the following figure.

Installation using a pole: Fasten two mounting brackets to the rear of RG-MTFi-M520 using four M5x14 screws, and secure RG-MTFi-M520

to the pole by threading two band clamps through slots of the brackets, as shown in the following figure.

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❶ Caution:

- ✧ Before installing the mounting bracket, attach the two rubber dampers in the accessories to the rear of RG-MTFi-M520.

- ✧ Match the screws with screw holes, so as to fasten all components.

- ✧ Fasten all screws to prevent RG-MTFi-M520 from vibrating or falling off.

◇ Stick the two 20 cm double-sided tapes to the bottom and the installation plane of RG-MTFi-M520 respectively if required.

Remarks:

1. Insert the SIM card of RG-MTFi-M520-M into SIM Card-1.

2. Standard accessories of RG-MTFi-M520 include the anti-theft panel. To prevent SIM card missing, fasten the anti-theft panel to the front panel using four M3 hexagon socket-head screws after the SIM card is inserted.

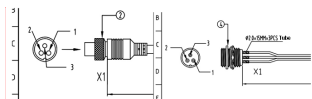3. The following figure shows appearance of the anti-theft panel

2.2.2 Installing the Antenna

Screw the antenna delivered with RG-MTFi-M520 into corresponding antenna connectors on the rear panel, and make sure that the antenna is fastened. The antenna is provided with 3M adhesive, and may be attached to gaps near the window.

2.2.3 Installing the Power Cable

Connect the DC aviation plug to RG-MTFi-M520 properly, and fasten the aviation plug by rotating the nut.

Left: DC aviation plug   Right: Aviation plug on RG-MTFi-M520

The following figure shows the power cable of RG-MTFi-M520 with two types of vehicle-mounted connector terminals. Select a connector terminal according to actual requirements, remove the stopple of the terminal, and properly connect the terminal to a matched terminal in the vehicle (VCC, ACC, and GND should be correspondingly connected). Do not remove the stopple of the other unused terminals to prevent exposing metal wires.

🛈 Caution:

1. Make sure that output of the power supply and power fall within an available range before the connection, and use the multimeter to check whether the vehicle power supply is 12 V or 24 V and whether the vehicle power cable is properly connected.
2. Adopt the solid state connection mode for the power cable adapter to avoid tension.
3. Conduct cabling management in hidden positions in a neat and artistic way, and apply protective cover over the cables.
4. Improper connection of the ACC may lead to a risk of losing system files.

Adapter

Select an adapter with a voltage within a voltage input range and with power higher than rated power of RG-MTFi-M520. Specific requirements are as follows:
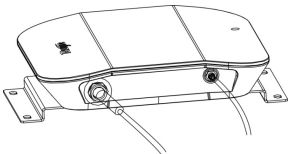
Input voltage: 100–240 V AC; input current: ≥ 1 A

Output voltage: 9–36 V DC; output current: ≥ 2 A

2.2.4 Power-On and Application Verification

After RG-MTFi-M520 is powered on, if PWR is steady on green, it indicates that RG-MTFi-M520 runs properly. If the indicator 3G/4G starts blinking, it indicates that a 3G/4G network is connected. If the indicator WiFi starts blinking, it indicates that WiFi is enabled.

A debugging test can be performed after RG-MTFi-M520 is started, or debugging can be completed before RG-MTFi-M520 is installed on the vehicle. Connect RG-MTFi-M520 to the network using SSID to check whether RG-MTFi-M520 can access the network properly.

The following figure shows installation of the power cable and antenna.

3 Troubleshooting

3.1 Troubleshooting Common Faults

1. PWR is off after power-on

    A) Vehicle-mounted power supply: Check whether the peer end of the cable meets power supply requirement, and check whether the cable is properly connected.

    B) Adapter power supply: Check whether the adapter is connected to the mains electricity, and check whether the adapter operates properly.

2. Indicator 3G/4G is off after the SIM card is inserted

Check whether a 3G/4G signal is available, check whether the SIM card is inserted properly, and check whether an external network can be accessed over the LAN interface.

✎ **Note:**

The SIM card is protected using the anti-theft panel before delivery, and an M3 hexagon socket-head screwdriver needs to be used to replace the SIM card. The anti-theft panel must be installed again after the replacement.

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3. STA cannot discover a signal of RG-MTFi-M520 or a wireless signal of RG-MTFi-M520 is weak

A) Check whether RG-MTFi-M520 is properly configured, and whether the indicator WiFi is on.

B) Adjust the angle of RG-MTFi-M520.

C) Move the STA, and adjust a distance between the STA and RG-MTFi-M520 (at least 1 m).

D) Fasten the antenna connector.

3.2 Maintenance

Pay attention to the following items during maintenance:

1. Ensure that RG-MTFi-M520 is not wet or damaged when cleaning the vehicle.

2. Keep RG-MTFi-M520 away from charged items, and keep RG-MTFi-M520 and the vehicle insulated.

3. Do not replace modules or components of RG-MTFi-M520 when it is powered on.

4. Do not disassemble RG-MTFi-M520 without guidance from Ruijie technical personnel.

5. Maintain the vehicle-mounted STA and bracket routinely to prevent loosening or falling off.