

Kite-5000 Series

MOBILE WIRELESS GATEWAY WITH LTE CAT-7 AND WI-FI 5



USER GUIDE

Revision: **1.0** | Date: **18.09.2026**

DISCLAIMER

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SAFETY INFORMATION

Electrical safety

	WARNING The device can be operated with voltages over 75 V DC. Incorrect handling risks causing a fatal electrical shock. Before connecting the power supply, connect the device to protective earth.
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General advice

- Only qualified personnel is allowed to install, operate and maintain the devices.
- Please take safety precautions against electrostatic discharge (ESD).
- Access to the devices may only be granted to qualified personnel.
- To prevent the risk of electric shock, turn off the external power supply and remove the power supply cable from the electrical outlet before handling or disassembling the system.
- When adding or removing devices to or from the system, ensure that the power cables for the devices are unplugged before the signal cables are connected.
- Make sure that your power supply is set to the correct voltage in your area. If you are not sure about the voltage of the electrical outlet you are using, contact your local power company.
- If the power supply is broken, do not try to fix it by yourself. Contact a qualified service technician or your retailer.

Operation safety

	WARNING The device can become very hot during operation ($> 80^{\circ}\text{C}$). Make sure it is protected from accidental contact. The device must be installed so that it is not accessible to children. To prevent burns, switch off the device and allow to cool down for half an hour before disassembling or working on it.
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- Before installing the device and connecting cables to it, carefully read the related manuals.
- Before using the device, make sure all cables are correctly connected and the power cables are not damaged. If you detect any damage, contact your dealer immediately.
- Avoid dust, humidity, and temperature extremes. Do not place the product in any area where it may become wet.
- Place the product on a stable surface.
- If you encounter technical problems with the product, contact a qualified service technician or your retailer.

Radio Frequency Exposure Statement

At least 20 cm separation distance between the antenna and the user's body must be maintained at all times.

RECYCLING

Please recycle packaging environmentally friendly:



Packaging materials are recyclable. Please do not dispose packaging into domestic waste but recycle it.

Please recycle old or redundant devices environmentally friendly:



Old devices contain valuable recyclable materials that should be reutilized. Therefore please dispose old devices at collection points which are suitable.

EU DECLARATION OF CONFORMITY



Westermo Eltec GmbH herewith declares that the device is compliant to the basic requirements of the directive 2014/53/EU. The full text of the EU declaration of conformity is available at the product support section on www.westermo.com.

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CONTENTS

1	ABOUT THIS DOCUMENT	1
2	OVERVIEW	2
2.1	Products	2
3	HARDWARE	3
3.1	Device Connectors	3
3.1.1	Power Supply Connector	3
3.1.2	M12 Ethernet Interfaces	3
3.1.3	M12 Service Interface (USB and Serial Port)	4
3.2	Mezzanine extensions	5
3.2.1	2.5 Gbps Ethernet Interface	5
3.2.2	M.2 PCIe SSD Extension	5
3.3	Antenna Connectors	6
3.4	Front Panel and Module-to-Antenna Connections	7
3.4.1	Correlation Front Panel Labelling – Software	8
3.5	LED Indicators	9
3.5.1	Power LED Status	9
3.5.2	Status LED 1	9
3.5.3	Status LED 2	9
3.5.4	Module 1-4 LED Status	10
3.5.5	LAN LED (100 M 1000 M) Status	10
3.6	Reset Switch	10
3.7	SIM Cards	11
4	MOUNTING	12
4.1	Connecting an Earthing Cable	13
4.2	Electrical Connection	13

LIST OF TABLES

Table 1	Pin Assignment of Power Supply Connector (PWR)	3
Table 2	Pin Assignment of M12 Ethernet Connectors (LAN 1/2)	3
Table 3	Pin Assignment of M12 Service Connector	4
Table 4	Pin Assignment of 2.5 Gb M12 Ethernet Connector (LAN 3)	5
Table 5	Overview Front Panel Antenna Description	8
Table 6	Power LED Status	9
Table 7	Status LED 1	9
Table 8	Status LED 2	9
Table 9	Module 1-4 LED Status	10
Table 10	LAN LED Status	10
Table 11	Reset Switch Behavior	10

LIST OF FIGURES

Figure 1	Example Picture of Kite-5000 Series	2
Figure 2	Example M.2 PCIe SSD	5
Figure 3	Examples of Front Panels	7
Figure 4	SIM Slot Assignment per Modem	11
Figure 5	Dimensions of the Housing	12
Figure 6	Earth Cable Mounting on Earth Stud	13

1 ABOUT THIS DOCUMENT

This user guide provides information on the installation, hardware features, interfaces, LED indications, connectors, and integration of the product into a system environment. It is intended for system integrators, installers, service personnel, and other users responsible for deploying, commissioning, and maintaining the product.

The guide describes how to connect power, network, wireless, and peripheral interfaces, as well as important safety, environmental, and regulatory information required for proper operation.

Detailed information on product configuration, software management, security settings, diagnostics, and advanced application scenarios is provided in the separate Management Guide. The latest documentation, software releases, and additional support resources can be downloaded from the product support section at www.westermo.com.

2 OVERVIEW

2.1 PRODUCTS

The following product is covered by this user guide. The overview below illustrates the product and its main hardware interfaces, connectors, and indicators. Detailed descriptions are provided in the subsequent sections.



Figure 1 **Example Picture of Kite-5000 Series**

3 HARDWARE

3.1 DEVICE CONNECTORS

3.1.1 POWER SUPPLY CONNECTOR

The Kite-5000 series can be powered by a DC power source connected to the internal power supply and I/O connector, shown in Table 1. The nominal input voltage can vary between 24 V and 110 VDC. The electrical power can be supplied to the device using the A-coded M12 power connector, labeled PWR.

Table 1 shows the pin assignment of the power supply connector.

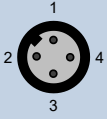
	PIN	SIGNAL NAME	DESCRIPTION
	1	+VIN	Supply voltage, positive terminal
	2	+VIN	Supply voltage, positive terminal
	3	-VIN	Supply voltage, negative terminal
	4	-VIN	Supply voltage, negative terminal

Table 1 **Pin Assignment of Power Supply Connector (PWR)**

3.1.2 M12 ETHERNET INTERFACES

The two LAN ports of the Kite-5000 series are utilizing M12 X-coded connectors with the pin assignment as shown in Table 2. Mating connectors are available from several manufacturers.

	PIN	SIGNAL NAME	DESCRIPTION
	1	D1+	First data line plus
	2	D1-	First data line minus
	3	D2+	Second data line plus
	4	D2-	Second data line minus
	5	D4+	Fourth data line plus
	6	D4-	Fourth data line minus
	7	D3-	Third data line minus
	8	D3+	Third data line plus

Table 2 **Pin Assignment of M12 Ethernet Connectors (LAN 1/2)**

3.1.3 M12 SERVICE INTERFACE (USB AND SERIAL PORT)

The Kite-5000 series is equipped with a M12-A coded USB/serial port. The USB port can be used to attach a memory device to update the firmware or to configure the device.

Note that the USB port is a dedicated maintenance port. It is not designed to be used while the device is in operation inside rolling stock equipment.

Table 3 shows the pin assignment of the service connector.

	PIN	SIGNAL NAME	DESCRIPTION
	1	USB-VCC	USB positive power supply voltage
	2	USB-D-	USB negative data line
	3	USB-D+	USB positive data line
	4	USB-GND	USB negative power supply voltage
	5	n.c.	Not connected
	6	RS232-TX	Console port transmit data
	7	RS232-RX	Console port receive data
	8	RS232-GND	Console port ground

Table 3 **Pin Assignment of M12 Service Connector**

3.2 MEZZANINE EXTENSIONS

3.2.1 2.5 GBPS ETHERNET INTERFACE

The 2.5 Gb LAN port extension of the Kite-5000 series is utilizing an M12 X-coded connector with the pin assignment as shown in Table 4. Mating connectors are available from several manufacturers.

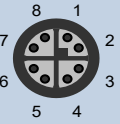
	PIN	SIGNAL NAME	DESCRIPTION
	1	D1+	First data line plus
	2	D1-	First data line minus
	3	D2+	Second data line plus
	4	D2-	Second data line minus
	5	D4+	Fourth data line plus
	6	D4-	Fourth data line minus
	7	D3-	Third data line minus
	8	D3+	Third data line plus

Table 4 Pin Assignment of 2.5 Gb M12 Ethernet Connector (LAN 3)

3.2.2 M.2 PCIE SSD EXTENSION

The Kite-5000 series can be equipped with an internal M.2 M-Key PCIe SSD as a mezzanine extension for all Kite-5000 variants with a storage capacity of up to 960 GB.



Figure 2 Example M.2 PCIe SSD

3.3 ANTENNA CONNECTORS

The QLS antenna connectors are located at the lower part of the front panel. All connectors are labeled for each radio interface and GNSS.

When connecting an antenna to the QLS connector, make sure that you hear a ‘click’ sound confirming proper mounting.

To remove an antenna, it has to be gently pulled from the basis of the connector with one hand while the other hand is holding the antenna. Alternatively, a screwdriver can be used as a lever arm at the basis of the antenna to facilitate the removal as illustrated below.

STEP 1	STEP 2
Place the screwdriver between the connector and the gateway	Rotate and/or push the screwdriver while pulling the antenna

3.4 FRONT PANEL AND MODULE-TO-ANTENNA CONNECTIONS

The figure below provides some examples of different front panel versions.

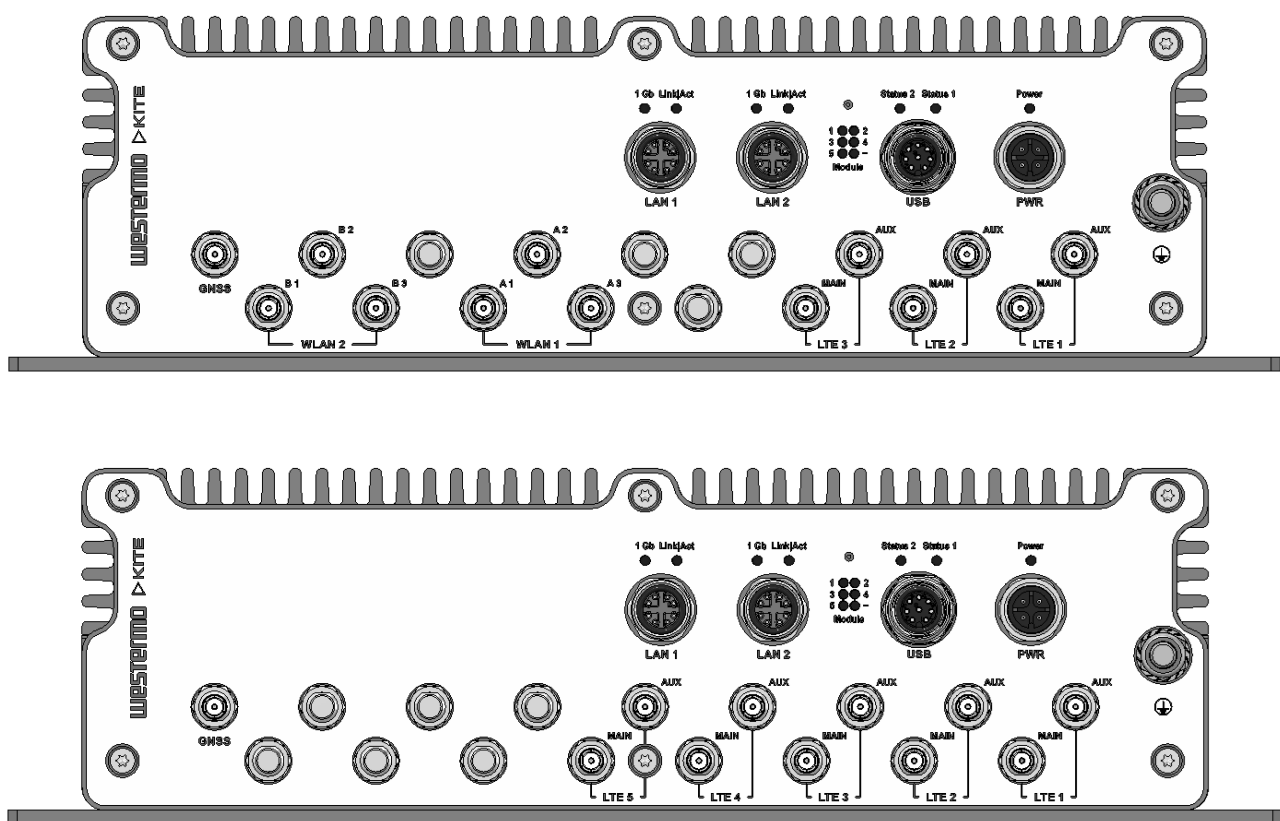


Figure 3 **Examples of Front Panels**

3.4.1 CORRELATION FRONT PANEL LABELLING – SOFTWARE

- The ports and LEDs “LAN 1” and “LAN 2” correspond to the interfaces “eth0” and “eth1”
- The LEDs “Module 1” to “Module 5” refer to WLAN and/or LTE modules
- WLAN modules are called “radio” within the software
- LTE modules are called “modem” within the software
- The number of antennas depends on the modules inserted in your Kite-50xx model with max. 5 module slots available

CYBOX MODELS	LED ⇔ SOFTWARE CORRELATION	ANTENNAS				
3x LTE + 2x WLAN	Module 1 ⇔ MODEM_S1 Module 2 ⇔ MODEM_S2 Module 3 ⇔ MODEM_S3 Module 4 ⇔ Radio 0 Module 5 ⇔ Radio 1	LTE 1 (MODEM_S1) Main-Aux	LTE 2 (MODEM_S2) Main-Aux	LTE 3 (MODEM_S3) Main-Aux	WLAN 1 (Radio_0) A1-A3	WLAN 2 (Radio_1) B1-B3
5x LTE	Module 1 ⇔ MODEM_S1 Module 2 ⇔ MODEM_S2 Module 3 ⇔ MODEM_S3 Module 4 ⇔ MODEM_S4 Module 5 ⇔ MODEM_S5	LTE 1 (MODEM_S1) Main-Aux	LTE 2 (MODEM_S2) Main-Aux	LTE 3 (MODEM_S3) Main-Aux	LTE 4 (MODEM_S4) Main-Aux	LTE 5 (MODEM_S5) Main-Aux

Table 5 **Overview Front Panel Antenna Description**

3.5 LED INDICATORS

The LEDs on the front panel of the Kite-5000 series provide quick indication of the device status.

3.5.1 POWER LED STATUS

LED COLOR	STATE	DESCRIPTION
Green	On	Device is receiving correct input power
Green	Off	Device is not powered

Table 6 **Power LED Status**

3.5.2 STATUS LED 1

LED COLOR	STATE	DESCRIPTION
Red	On	System boot failure (U-Boot) detected or network interface fault detected (wireless or LAN1 only)
Green	On	Normal operation
Green	Off	U-Boot and self testing executed
Green	Blinking	Resetting to factory settings
Red/Green	Blinking	Executing emergency system

Table 7 **Status LED 1**

3.5.3 STATUS LED 2

LED COLOR	STATE	DESCRIPTION
Red	Off	Reserved for customer-specific application use
Green	Off	Reserved for customer-specific application use

Table 8 **Status LED 2**

3.5.4 MODULE 1-4 LED STATUS

LED COLOR	STATE	DESCRIPTION
Green	On	Indicates module N (1..4) is in use
Green	Blinking	Indicates data transfer on module N (1..4)
Green	Off	Indicates module N (1..4) is inactive

Table 9 **Module 1-4 LED Status**

3.5.5 LAN LED (100 M | 1000 M) STATUS

1 GBIT (YELLOW)	LINK/ACT (GREEN)	DESCRIPTION
On	On	1 Gbit link established
Off	Off	No link
Off	On	10/100 Mbit link established
Off	Blinking	10/100 Mbit link established and active
On	Blinking	1 Gbit link established and active

Table 10 **LAN LED Status**

3.6 RESET SWITCH

The Kite-5000 series is equipped with a reset switch behind the front panel, close to the LEDs. The button is accessible with a straightened paper clip pushed through the little hole on the front panel. The effect of pressing the reset switch depends on the duration of its activation, as indicated in Table 11 below. The time response is valid only if the device has completely booted (after approx. 1 min). While the device is booting or executing U-Boot, pushing the button will always reset the device.

The following table describes the functions of the reset switch.

HOLD TIME	FAIL LED BEHAVIOR	ACTION
< 2 seconds	Off	Reboot after release
2-5 / > 20 seconds	Off	No action
5-20 seconds	green blinking	Factory reset (Remove custom configuration then reset)

Table 11 **Reset Switch Behavior**

3.7 SIM CARDS

The Kite-5000 series provides 4x Micro SIM slots per 5G/LTE modem. Only one slot per modem can be active at any time. To install the Micro-SIM cards the back panel of the Kite-5000 series has to be removed using a suitable torx 10 screwdriver. After installing the Micro-SIM cards the back panel must be closed and the screws tightened to a maximum torque of 0.55 Nm. The indexing of SIM slots is software dependent and can be selected via an SNMP command or using the web interface.

Note: Switching between SIM slots takes about 30 seconds, slot 1 being preselected at power up.

If you plan to use only one Micro-SIM card for a given 5G/LTE modem it is advisable to use slot 1 to avoid slot switching delay during booting.

The drawing in Figure 4 shows the Micro-SIM slot assignment per modem.

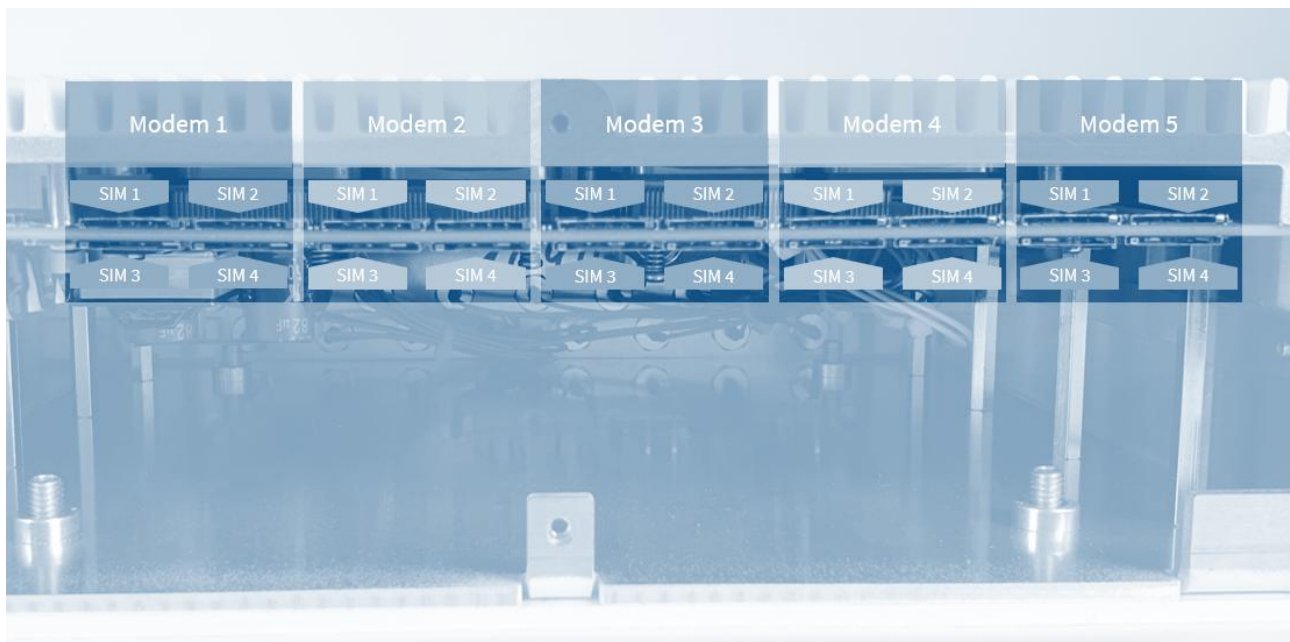


Figure 4 **SIM Slot Assignment per Modem**

Important: Do not change the Micro-SIM cards when the device is powered since there is a danger of touching the main voltage when the device is open.

4 MOUNTING

This product uses convection cooling. Ensure it's installed within the specified ambient temperature range by avoiding airflow obstructions. Install it where natural airflow isn't blocked, with sufficient spacing. At high ambient temperatures, mount the product on a metallic base plate to improve heat dissipation by increasing the surface area.

When mounting the Kite-5000 series, please consider the following aspects:

- Do not install the device close to any sources of heat, such as radiators or heat registers.
- Keep the device away from any liquids and avoid exposure to dripping or splashing. The protection class of the housing is IP40.
- For optimal heat dissipation, the connectors should face down (chimney effect).
- The housing provides four mounting cutouts to install the device in horizontal or vertical orientation on a flat and stable surface.
- For fixation use M6 screws of sufficient length with additional M6 washers.

The drawing in Figure 5 shows the outer dimensions of the housing, including the position of the mounting cutouts.

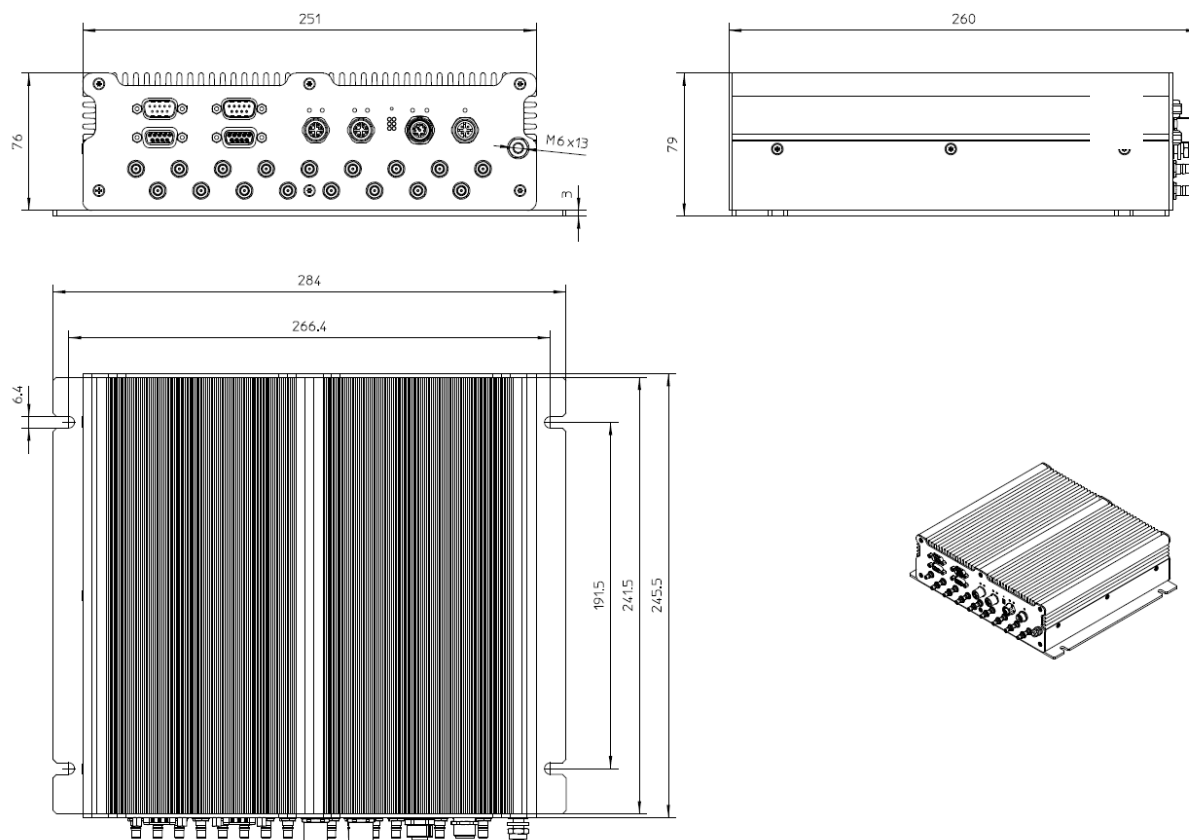


Figure 5 **Dimensions of the Housing**

4.1 CONNECTING AN EARTHING CABLE

A M6 earthing stud on the front panel of the device (also refer to Figure 1) for protective earth connection is essential for the device security. Carry out the following steps to connect an earthing cable:

- Use an earthing cable with a cross-section of at least 2.5 mm² and a wire end sleeve with eyelet suitable for a 6 mm threaded bolt.
- Mount the earth cable as shown in Figure 6.
- Fasten the cable by tightening the nut to the required torque (recommended according to EN 60947-1 are 3 Nm).

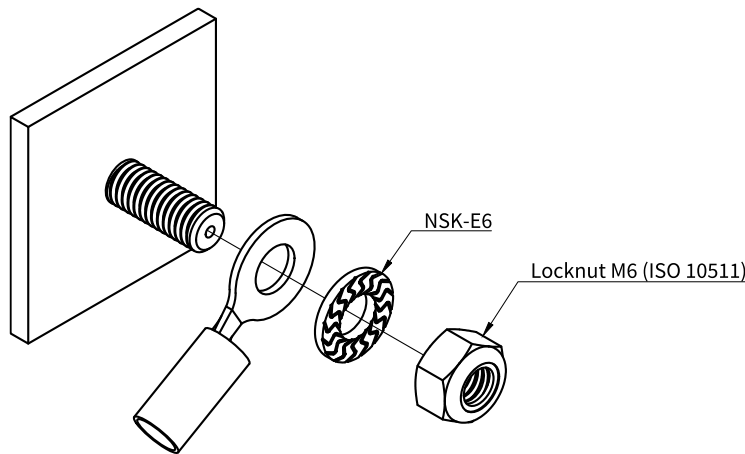


Figure 6 **Earth Cable Mounting on Earth Stud**

4.2 ELECTRICAL CONNECTION

1. Make sure the device is properly grounded.
2. Establish a connection to the network by plugging a M12 patch cable to one of the front panel M12 connectors. Each LAN port may be used if the gateway is supplied by a local power supply through the power supply connector.
3. Connect the desired number of antennas to the device. Each radio/modem can use up to four antennas for maximal performance.
4. In case of using a local power supply the appropriate wiring (see Table 1) must be established to connect the power line to the device.
5. Make sure that the voltage of the power supply conforms to the voltage on the type plate.
6. Ensure that the power supply is grounded correctly and that the power cable is intact and undamaged. Do not switch on the system if there are damages on the power cable or plug.
7. Use power cables which are approved for the power supply in your country.
8. The device itself has no on/off switch, it starts as soon as it is supplied with power.