ENGLISH

Anybus® Wireless Bolt 5G™

USER MANUAL

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Important User Information

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1. Preface

1.1. About This Document

This document describes how to install and configure Anybus® Wireless Bolt 5G™.

For additional documentation and software downloads, FAQs, troubleshooting guides and technical support, please visit www.hms-networks.com.

1.2. Document Conventions

Lists

Numbered lists indicate tasks that should be carried out in sequence:

1. First do this
2. Then do this

Bulleted lists are used for:

- Tasks that can be carried out in any order
- Itemized information

User Interaction Elements

User interaction elements (buttons etc.) are indicated with bold text.

Program Code and Scripts

```
Program code and script examples
```

Cross-References and Links

Cross-reference within this document: Document Conventions (page 1)

External link (URL): www.hms-networks.com

Safety Symbols

DANGER
Instructions that must be followed to avoid an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING
Instructions that must be followed to avoid a potential hazardous situation that, if not avoided, could result in death or serious injury.

CAUTION
Instruction that must be followed to avoid a potential hazardous situation that, if not avoided, could result in minor or moderate injury.

IMPORTANT
Instruction that must be followed to avoid a risk of reduced functionality and/or damage to the equipment, or to avoid a network security risk.

Information Symbols

NOTE
Additional information which may facilitate installation and/or operation.

TIP
Helpful advice and suggestions.

1.3. Trademarks

Anybus® Wireless Bolt 5G™ is a trademarks of HMS Networks AB.

All other trademarks are the property of their respective holders.

2. Safety

2.1. General Safety

CAUTION
Ensure that the power supply is turned off before connecting it to the equipment.

CAUTION
To ensure proper functioning and electrical safety, connect the Bolt 5G Functional Earth (FE) connection to earth.

CAUTION
The supply circuit must be limited to PS2 or fulfill the requirements in IEC 62368-1:2023 standard Annex Q, equivalent to Limited Power Source (LPS).

The supply circuit transient voltages must not exceed 1500 V.

IMPORTANT
When powering the Bolt 5G, do not use PoE and DC power at the same time. Ensure to use only one source of power.

IMPORTANT
To prevent wires from overheating, use a power supply wire rated to carry the rated current of the Bolt 5G.

2.2. Intended Use

The intended use of this equipment is as a communication interface and router.

The equipment receives and transmits data over wired and cellular standard networks.

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

3. Preparation

3.1. Support and Resources

For additional documentation, software downloads and technical support, please visit www.hms-networks.com.

3.2. Network Environment

Ensure that you have all the necessary information about the capabilities and restrictions of your local network environment before installation.

3.3. SIM Card

NOTE
The supported SIM card type is Nano SIM (4FF).

SIM Card Data Plan

Use a SIM card with a data plan suitable for the application and network.

3.4. Required Distance Between Devices

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

3.5. Surface Heat Considerations

Mount the Bolt 5G on a surface with good thermal conductance to the surrounding air.

For optimal thermal performance, it is recommended that the heat transfer capacity of the surface corresponds to a square aluminum plate with a minimum side dimension of 300 mm and a thickness of 3 mm.

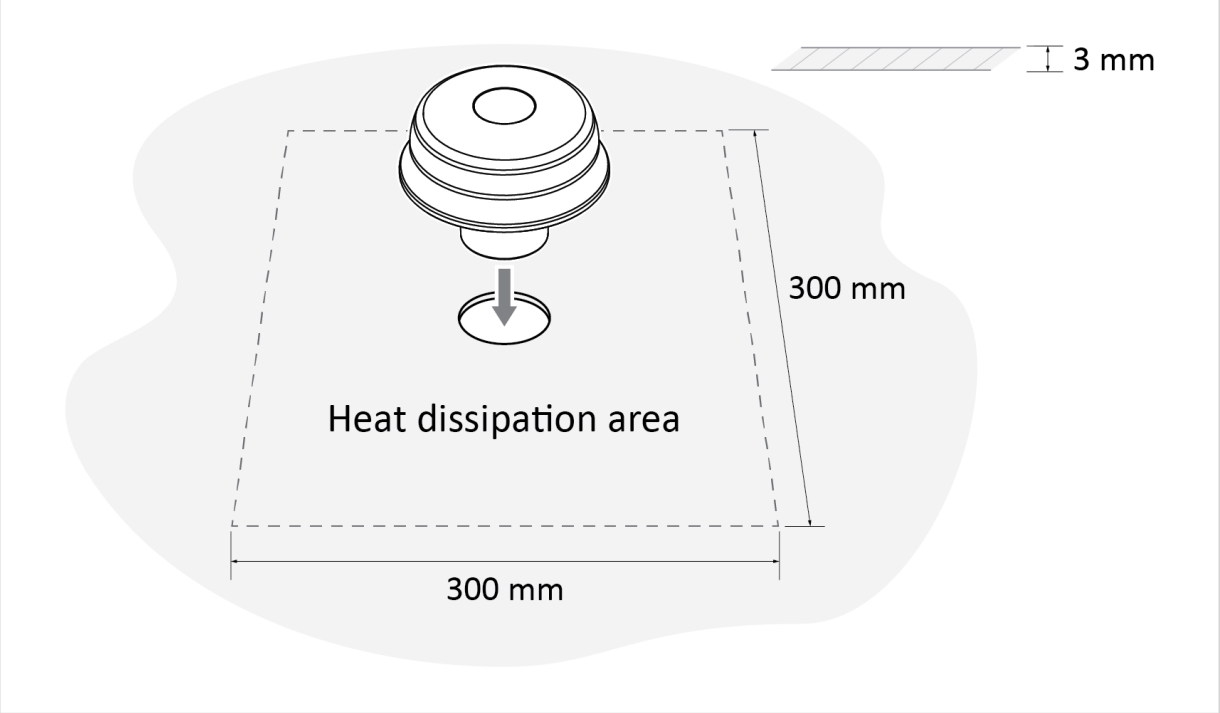


Figure 1. Mounting surface heat dissipation area

3.6. Firewall and Routing

There are routing options set for the system.

By default, the firewall allows routing of:

- Outgoing traffic for TCP, UDP and ICMP (for IPv4 only).
- Incoming traffic for already established connections only.

For other possible configurations, see NAT/Passthrough Settings.

4. Installation

4.1. Install SIM Card

NOTE
The supported SIM card type is Nano SIM (4FF).

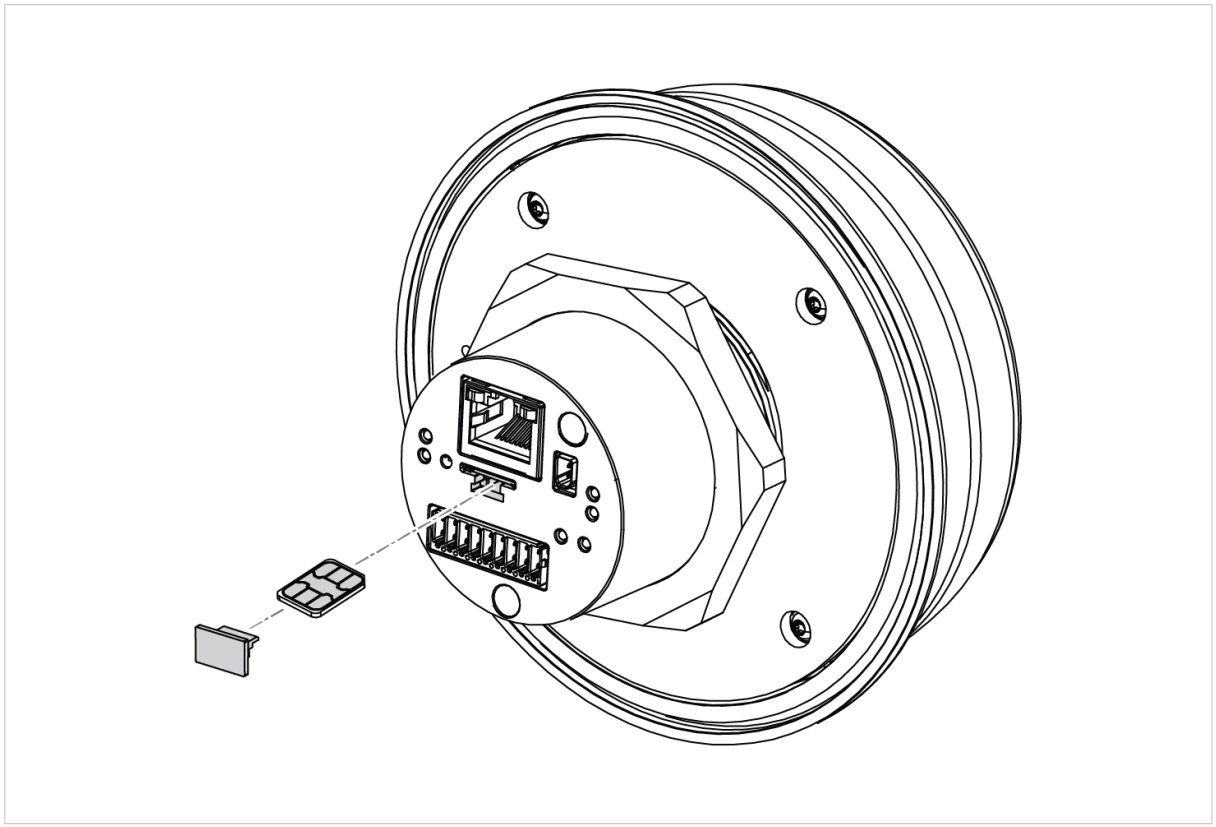


Figure 2. Insert SIM card

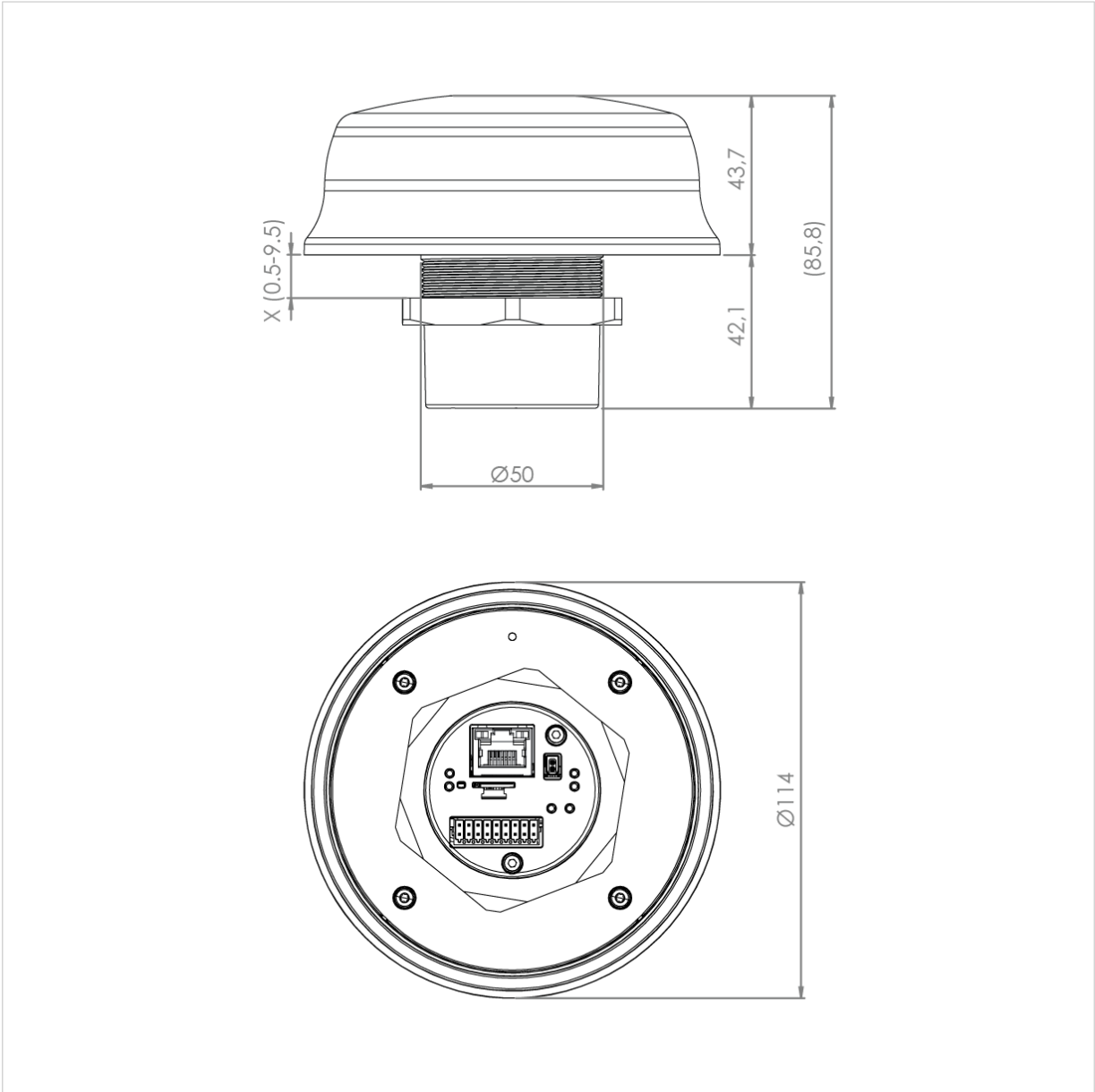
To connect Bolt 5G to a cellular data network, install a cellular SIM card:

1. Remove the SIM card holder plug.
2. Insert a SIM card into the push-push SIM card holder.

   NOTE
   Ensure that the SIM card contact surface is facing towards the Ethernet port.

3. Attach the SIM card holder plug.

4.2. Installation Drawing



All measurements are in mm.

Figure 3. Bolt 5G installation drawing

4.3. Surface Mounting

Before You Begin

Placement Considerations

For information about placement considerations, see Required Distance Between Devices (page 4).

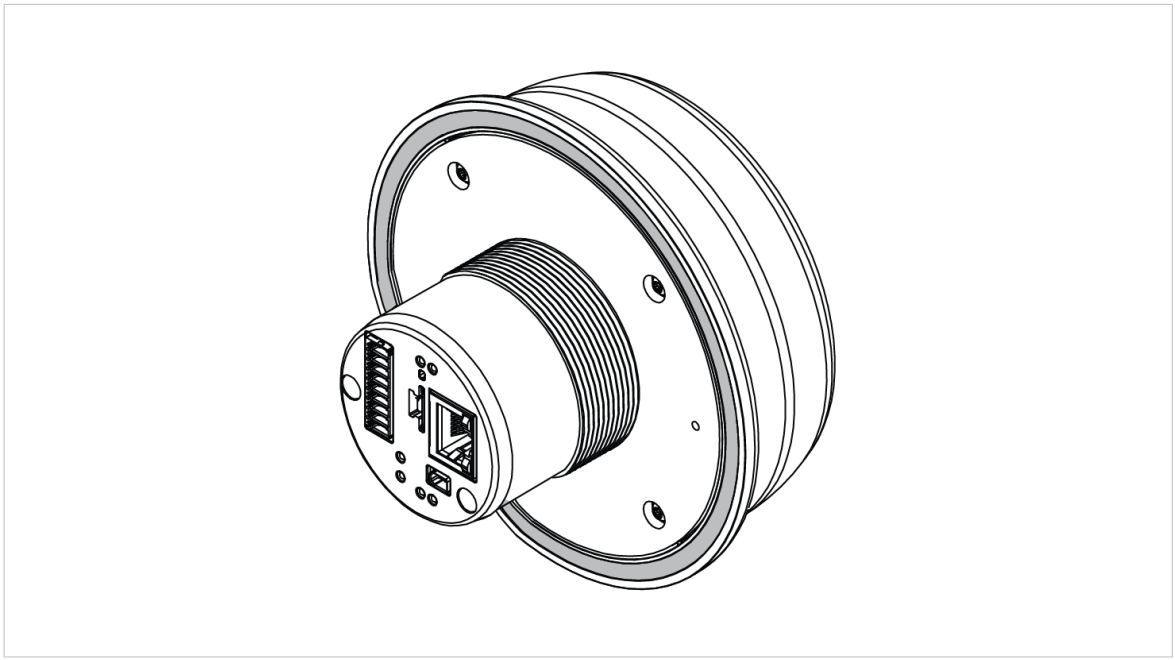
Mounting Considerations

- Mount the Bolt 5G on a machine or cabinet.
- For information about surface heat considerations, see Surface Heat Considerations (page 4).
- Mounting hole diameter: M50 (50,5 mm).
- To fix the Bolt 5G position and prevent the Bolt 5G from being rotated, see To Lock the Bolt 5G Position (page 11).
- Bolt 5G lock nut tightening torque: 5 Nm ±10 %.
- Ensure to use the included housing sealing ring and lock nut.
- The top mounting surface, in contact with the sealing, must be:
  - flat with a finish equivalent to Ra 3.2 or finer.
  - cleaned and free from oils and greases.

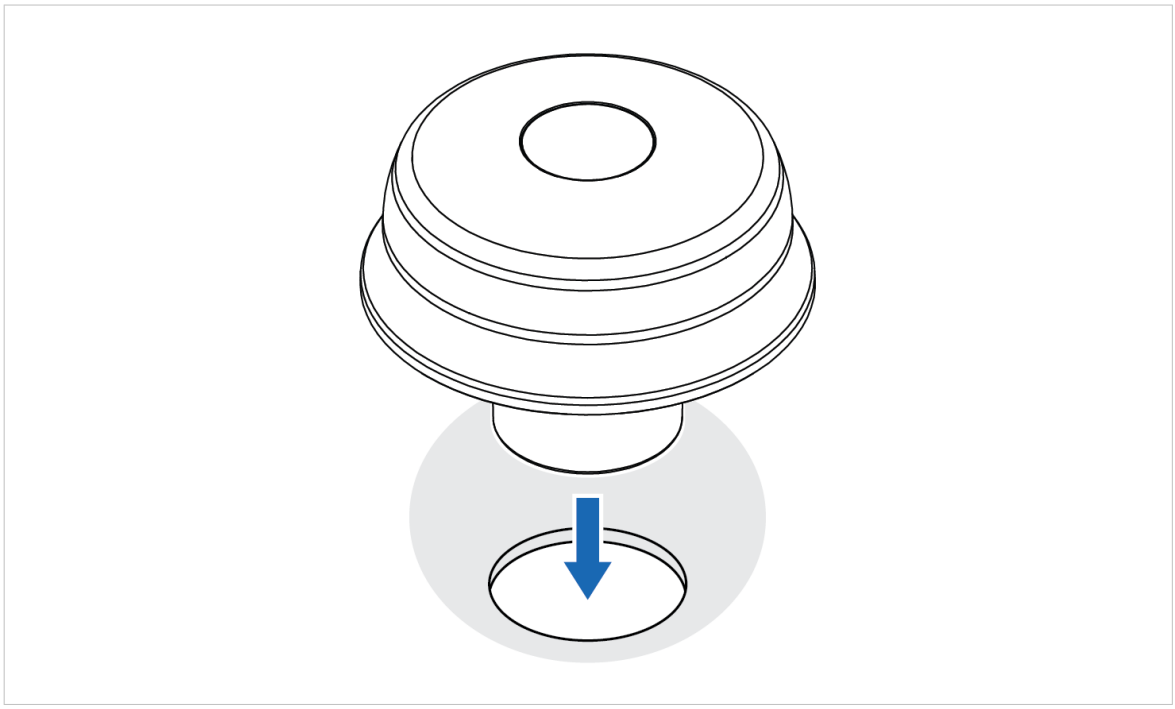
Mounting Procedure

1. Unscrew and remove the Bolt 5G lock nut.

2. Place the Bolt 5G housing sealing ring in its groove.

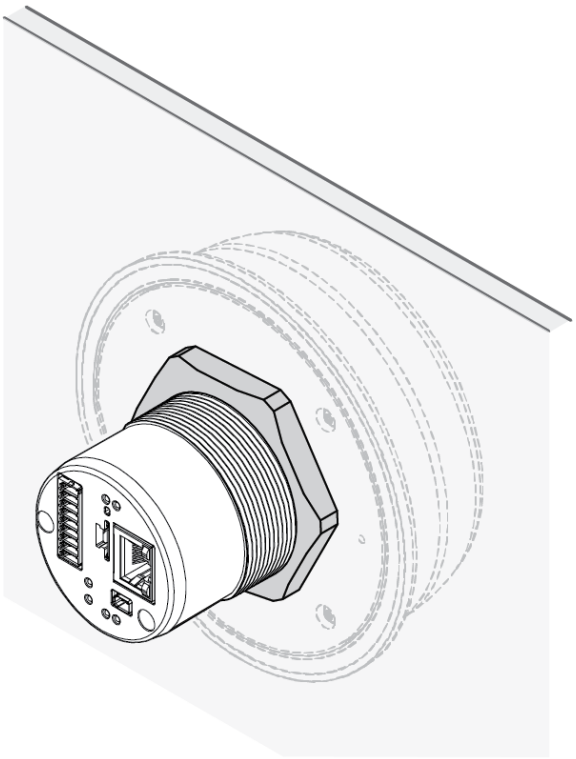


3. In the mounting surface, drill a mounting hole with the size Ø M50 (50,5 mm).
   Option: To fix the Bolt 5G position, see To Lock the Bolt 5G Position (page 11).
4. Place the Bolt 5G in its mounting hole.



5. Screw the Bolt 5G lock nut into place and tighten it.
   Tightening torque: 5 Nm ±10 %

IMPORTANT
To keep the Bolt 5G sealed against dirt and moisture, make sure the housing sealing ring is properly seated in its groove before tightening the lock nut.



4.4. To Lock the Bolt 5G Position

The complete surface mounting procedure is described in, Surface Mounting (page 8).

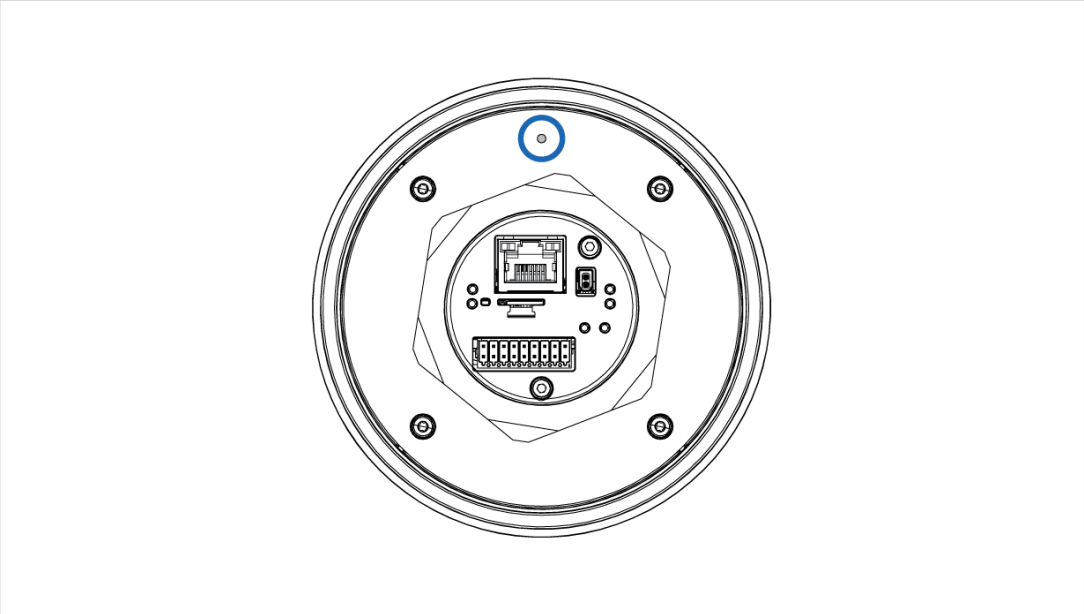


Figure 4. Bolt 5G steering hole for locking screw

To prevent the Bolt 5G from being rotated, use a screw and the Bolt 5G steering hole to fix the position.

Before You Begin

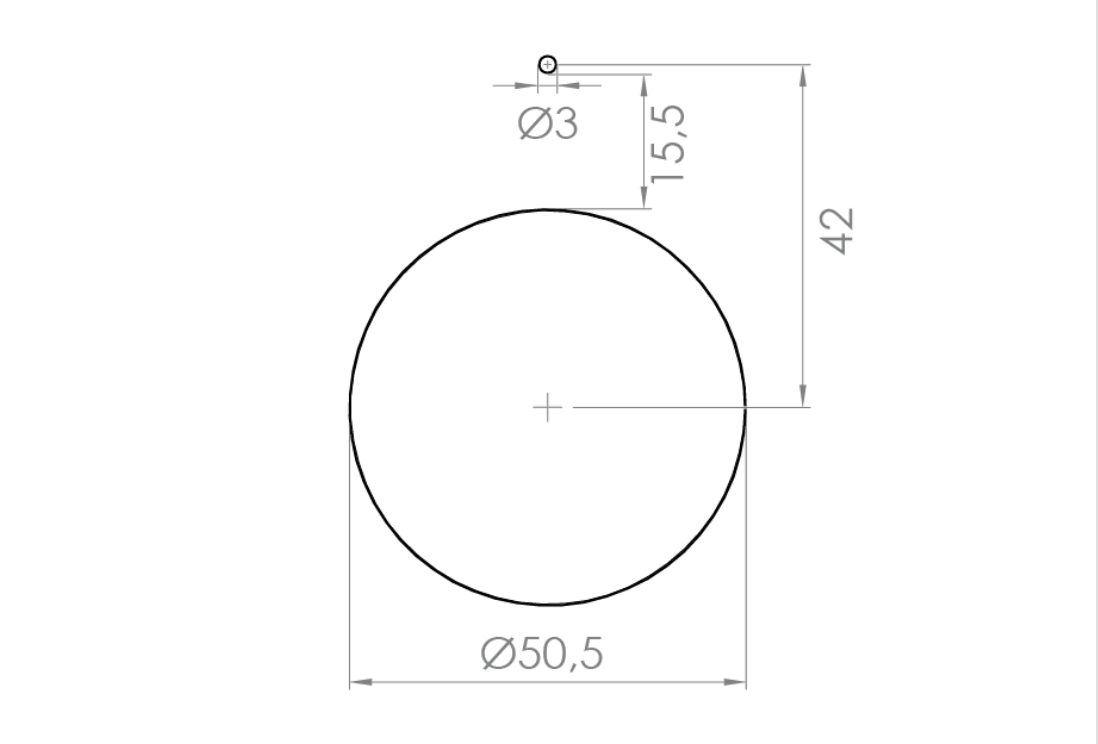
Locking screw dimension: M2.5 (2,5 mm)

NOTE

To avoid galvanic corrosion between the screw and the Bolt 5G product housing, do not use a stainless/acid proof steel screw.

Procedure

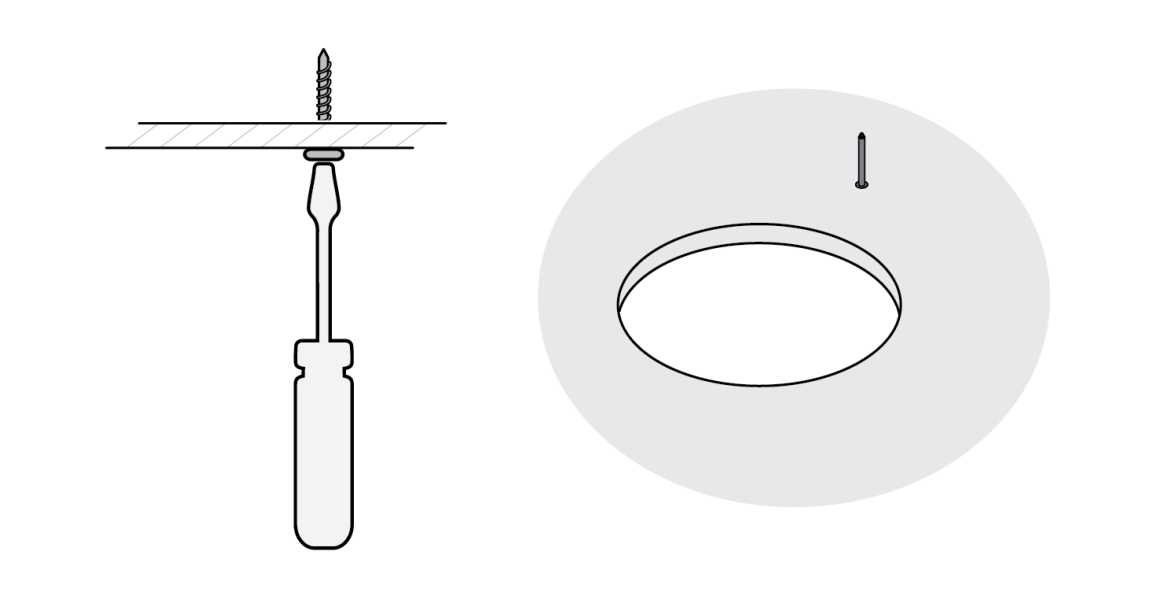
1. Drill a mounting hole with the size Ø M50 (50,5 mm) for the Bolt 5G and a hole with the size Ø 3 mm for the locking screw.



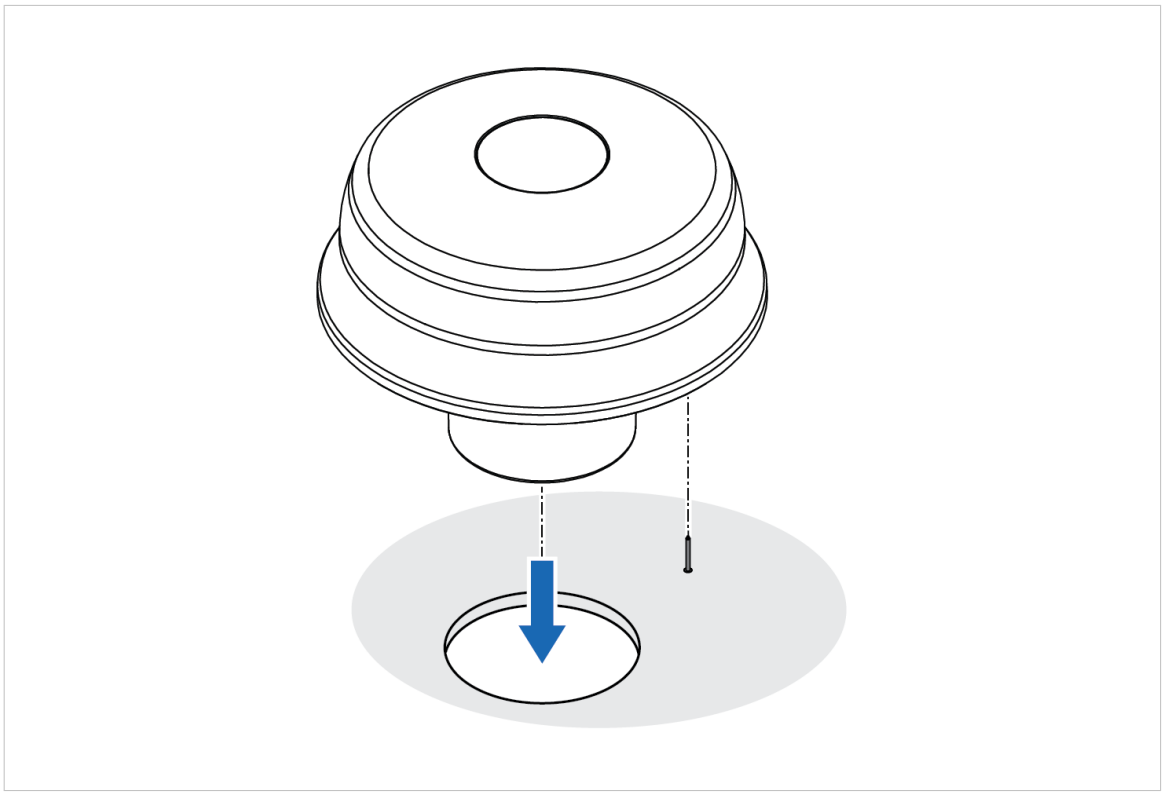
All measurements are in mm.

Figure 5. Mounting hole and locking screw hole dimensions

2. Fasten the locking screw in the Ø 3 mm hole.



3. Place the Bolt 5G in the surface mounting hole and fit the locking screw into the Bolt 5G steering hole.



4.5. Signal and Power Connector Cabling

4.5.1. Signal and Power Connector Pinout

An 18-pin connector cable assembly with individual wire leads is included with the product.

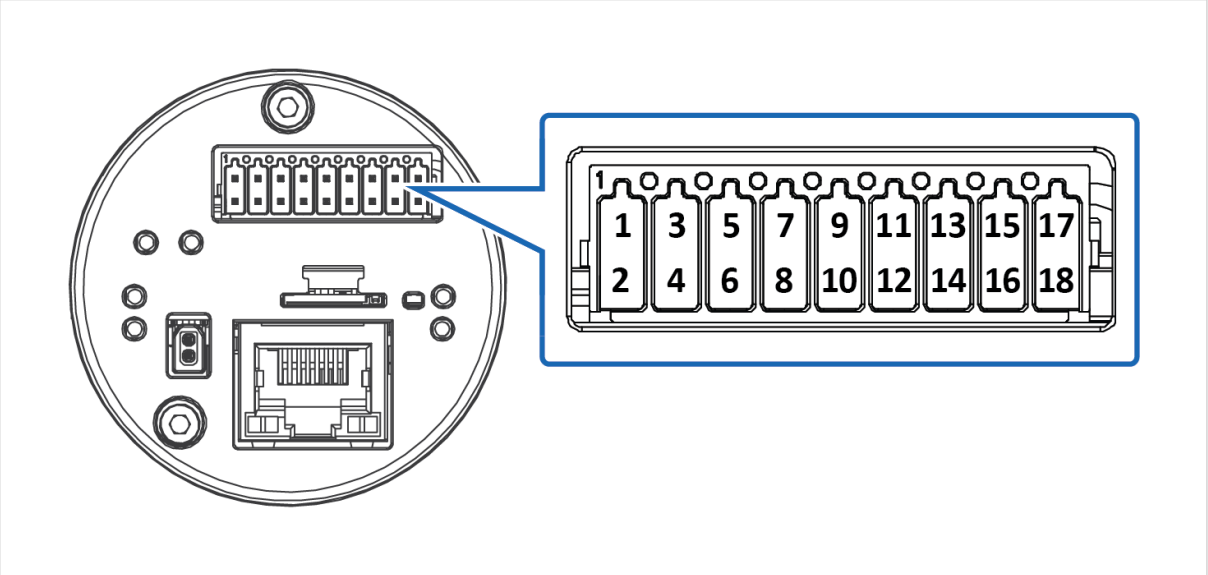


Table 1. 18-Pin Signal and Power Connector

Pin	Function	Color
1-14, 16	Not used	N/A
15	Power V+	Red
17	Power Ground (GND)	Black
18	Functional Earth (FE)	Green/Yellow

4.5.2. DC Power Interface

IMPORTANT
When powering the Bolt 5G, do not use PoE and DC power at the same time. Ensure to use only one source of power.

IMPORTANT
To prevent wires from overheating, use a power supply wire rated to carry the rated current of the Bolt 5G.

4.5.3. Connector Type

An 18-pin connector cable assembly with individual wire leads is included with the product.

Recommended Phoenix Contact PCB connector type:

- DFMC 0,5/ 9-ST-2,54
- DMCC 0,5/ 9-ST-2,54

4.6. Connect to DC Power

Option when you use DC Power. To use Power over Ethernet (PoE), see Connect to Power Over Ethernet (PoE).

Before You Begin

CAUTION
To ensure proper functioning and electrical safety, connect the Bolt 5G Functional Earth (FE) connection to earth.

IMPORTANT
When powering the Bolt 5G, do not use PoE and DC power at the same time. Ensure to use only one source of power.

NOTE
When Bolt 5G is installed in an environment with a high level of electrical noise, use a power/ Functional Earth (FE) cable with a maximum length of 3 meters.

Power Supply Requirements

- Input voltage: 24 VDC (9 -30 VDC)
- Reverse polarity protect: Yes
- Input current: Max 625 mA @ 24 VDC
- Power consumption: Max 15 W

Functional Earth (FE) Wire Screw Placement

When Bolt 5G is mounted on a sheet metal plate, connect Functional Earth (FE) to the plate near Bolt 5G.

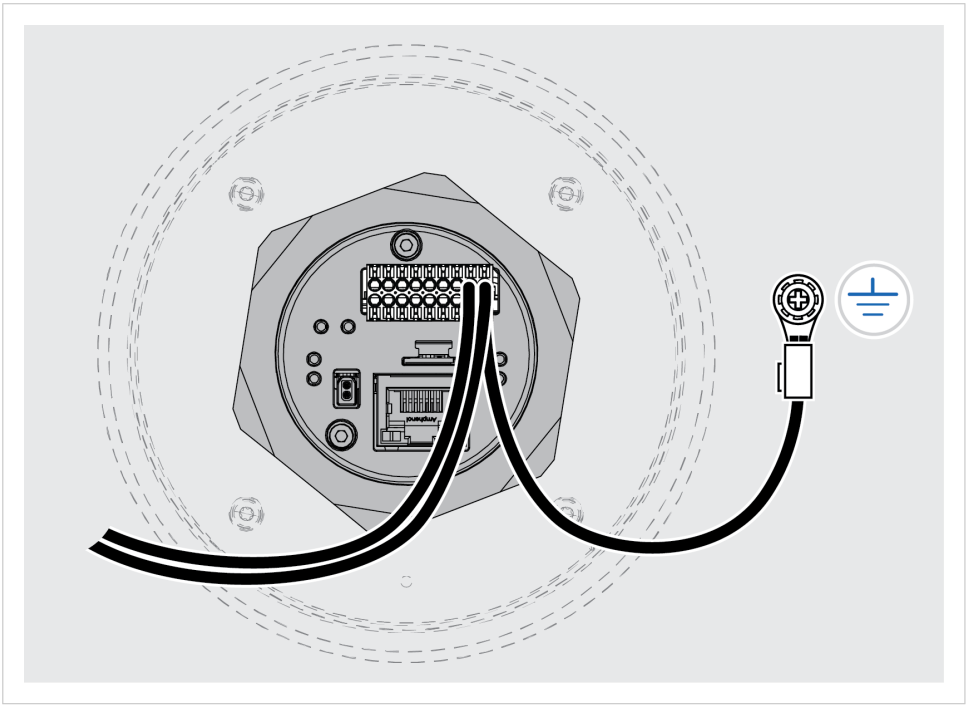


Figure 6. Functional earth wire screw placement, view from below

Procedure

Connect to DC Power and Functional Earth (FE)

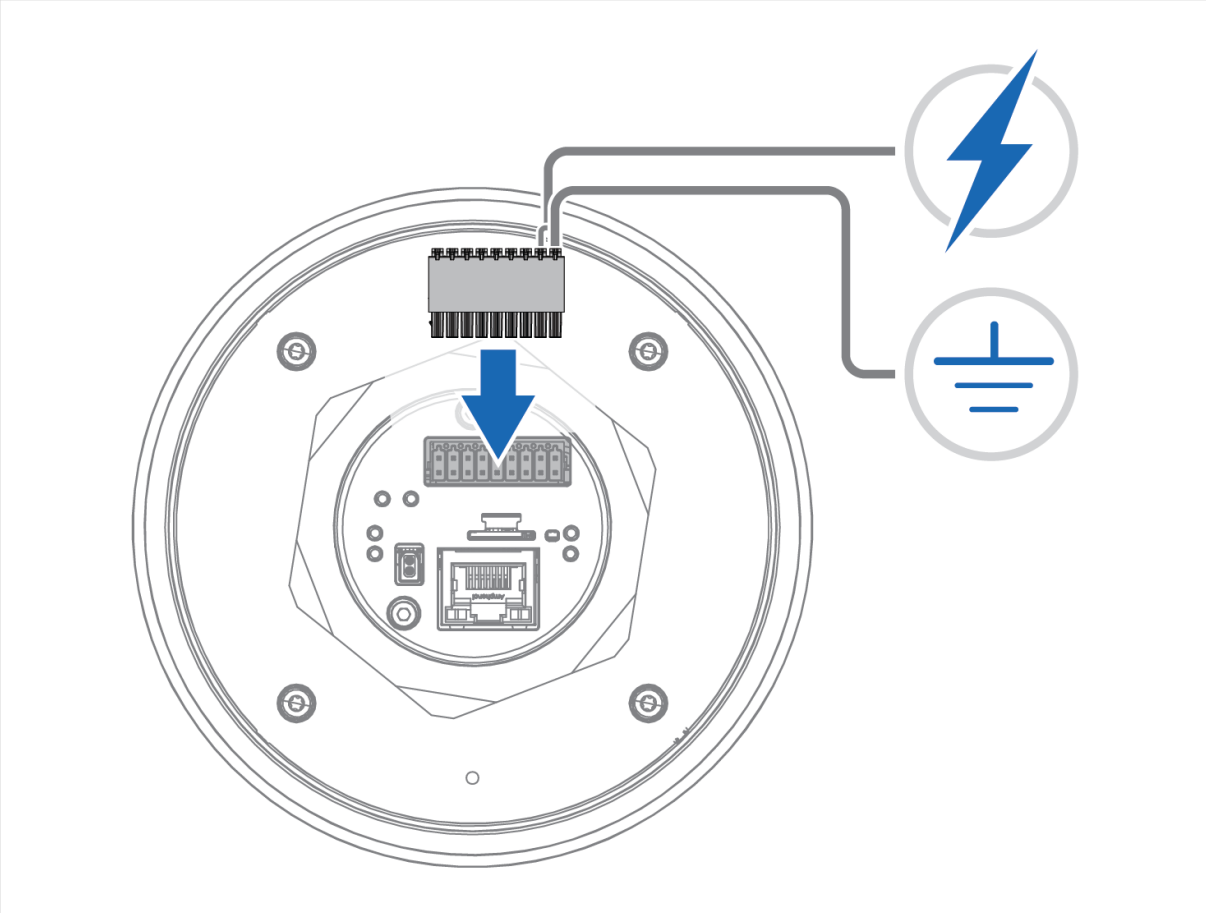


Figure 7. DC Power and Functional Earth (FE)

1. Connect Bolt 5G Power connector to Functional Earth (FE).
2. Connect Bolt 5G Power connector to a power supply.

4.7. Connect to Power Over Ethernet (PoE)

Option when you use Power over Ethernet (PoE). To use DC Power, see Connect to DC Power (page 15).

Before You Begin

CAUTION
To ensure proper functioning and electrical safety, connect the Bolt 5G Functional Earth (FE) connection to earth.

IMPORTANT
When powering the Bolt 5G, do not use PoE and DC power at the same time. Ensure to use only one source of power.

Power Supply Requirements

- RJ45 Power over Ethernet (PoE)
- IEEE 802.3at compliant, Type 2, Class 0
- Input voltage: 37-57 VDC
- Power consumption: Max 12.95 W

Functional Earth (FE) Wire Screw Placement

When Bolt 5G is mounted on a sheet metal plate, connect Functional Earth (FE) to the plate near Bolt 5G.

Place one of the functional earth wire screws in the Bolt 5G steering hole.

For information about hole dimension and screw size, see To Lock the Bolt 5G Position (page 11).

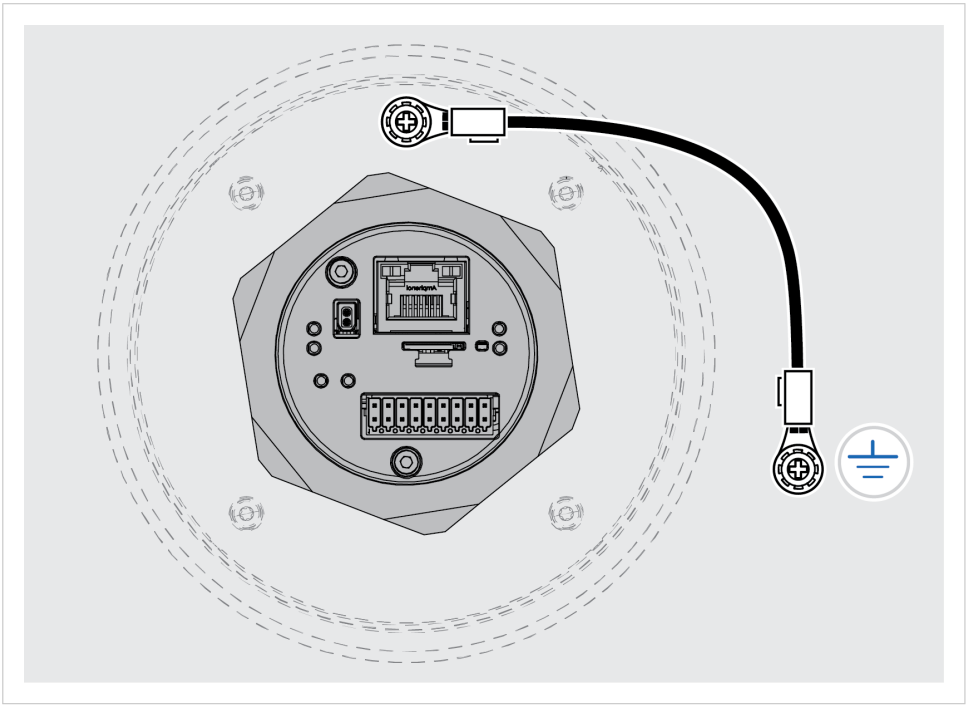


Figure 8. Functional earth wire screw placement, view from below

Procedure

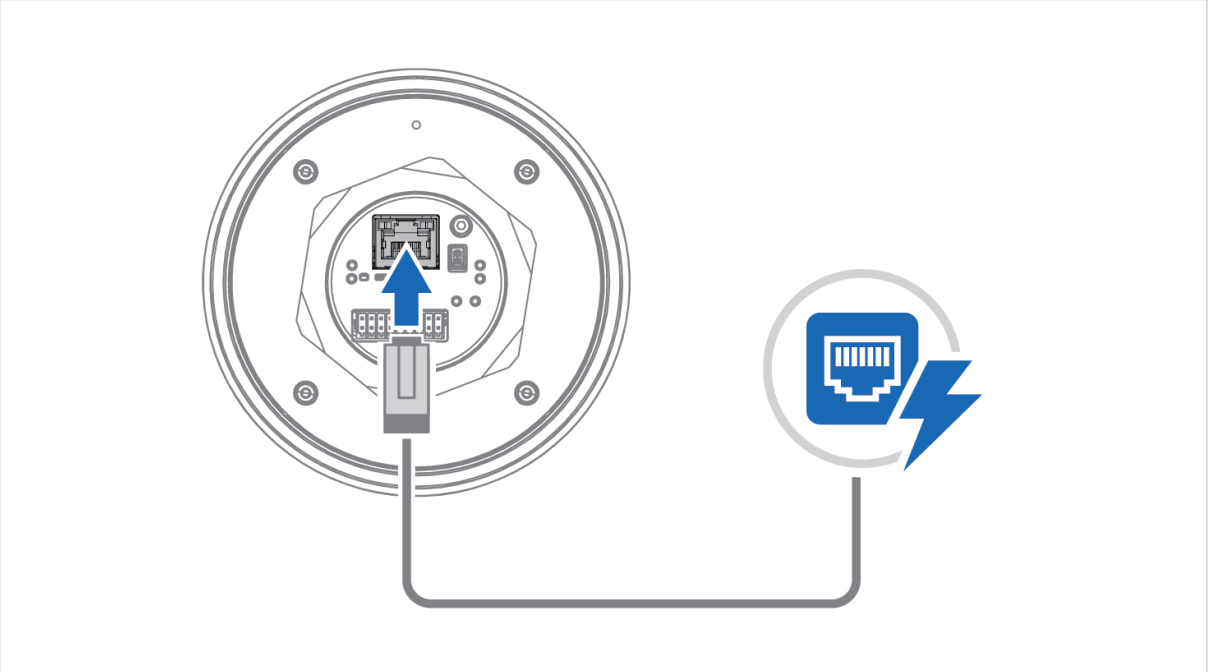
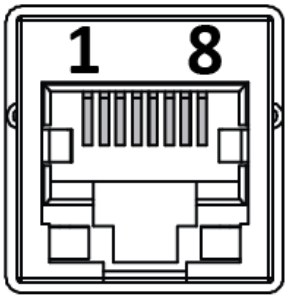


Figure 9. Connect to Power Over Ethernet (PoE)

1. Connect the Bolt 5G to Functional Earth (FE).
   Use the Bolt 5G steering hole to connect the functional earth connection cable to the Bolt 5G.
   See Functional Earth (FE) Wire Screw Placement (page 17) and To Lock the Bolt 5G Position (page 11).
2. Connect the Bolt 5G Ethernet port to Ethernet/PoE.

Ethernet RJ45 PoE Connector Pinout

RJ45 Ethernet PoE Connector	Pin	Data	PoE	
	1	TP0_P	A+	Positive power from alternative A PSE
	2	TP0_N		
	3	TP1_P	A-	Negative power from alternative A PSE (with pin 6)
	4	TP2_P	B+	Positive power from alternative B PSE
	5	TP2_N		
	6	TP1_N	A-	Negative power from alternative A PSE (with pin 3)
	7	TP3_P	B-	Negative power from alternative B PSE
	8	TP3_N		
	Housing	Shield	Functional Earth (FE), via 1 nF capacitor and 1 MΩ bleeder resistor	

4.8. Connect to Ethernet

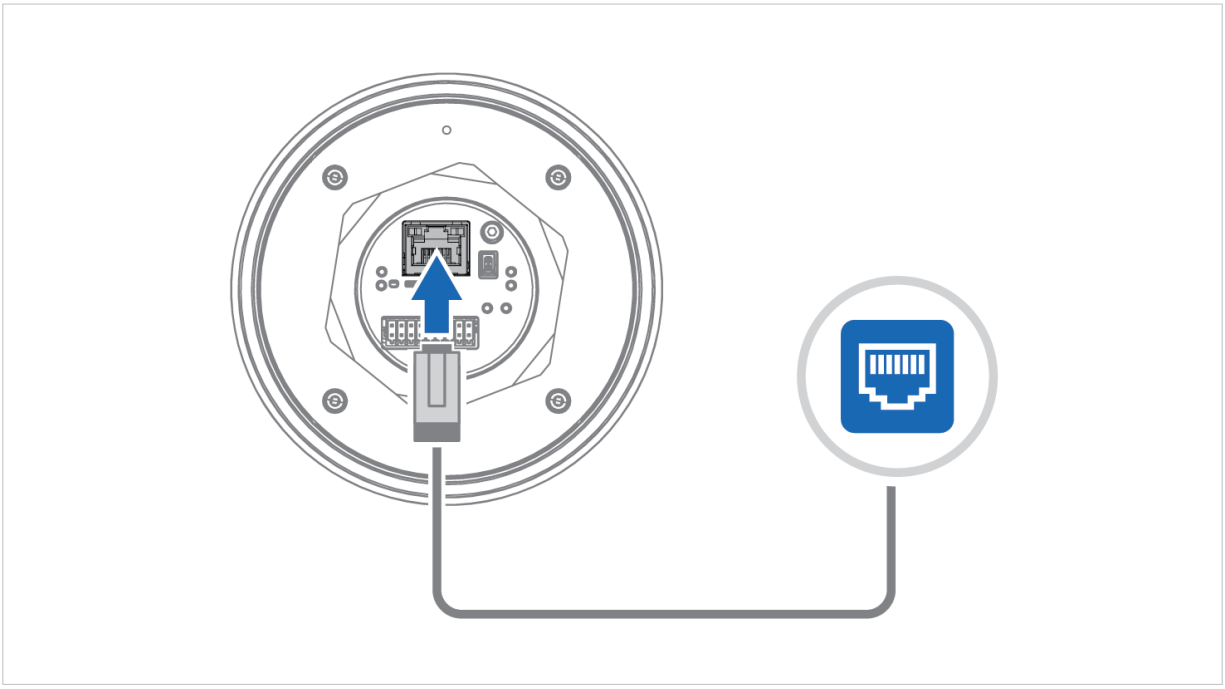


Figure 10. Connect to Ethernet

Connect the Bolt 5G to Ethernet network.

4.9. Frequency Bands and Power Level

Standard	Mode	Bands	Frequency (MHz)	Transmit Power
UMTS (Universal Mobile Telecommunications System)	Wideband Code Division Multiple Access (WCDMA)	B1	1920 – 1980	25 dBm
		B2	1850 – 1910	
		B4	1710 – 1755	
		B5	824 – 849	
		B8	880 – 915	
		B19	830 – 845	
LTE (Long Term Evolution)	Frequency Division Duplexing (FDD)	B1	1920 – 1980	25 dBm
		B2	1850 – 1910	
		B3	1710 – 1785	
		B4	1710 – 1755	
		B5	824 – 849	
		B7	2500 – 2570	
		B8	880 – 915	
		B12	699 – 716	
		B13	777 – 787	
		B14	788 – 798	
		B17	704 – 716	
		B18	815 – 830	
		B19	830 – 845	
		B20	832 – 862	
		B25	1850 – 1915	
		B26	814 – 849	
		B28	703 – 748	
		B30	2305 – 2315	
		B66	1710 – 1780	
		B71	663 – 698	
	Time Division Duplex (TDD)	B34	2010 – 2025	25 dBm
		B39	1880 – 1920	
		B40	2300 – 2400	
		B46	5150 – 5925	
		B48	3550 – 3700	
		B38	2570 – 2620	28 dBm
		B41	2496 – 2690	
		B42	3400 – 3600	
		B43	3600 – 3800	
5G NR (New Radio)	Non-standalone (NSA) Standalone (SA)	n1	1920 – 1980	25 dBm
		n2	1850 – 1910	
		n3	1710 – 1785	
		n5	824 – 849	
		n7	2500 – 2570	
		n8	880 – 915	
		n12	699 – 716	
		n13	777 – 787	
		n14	788 – 798	
		n18	815 – 830	
		n20	832 – 862	
		n25	1850 – 1915	

Standard	Mode	Bands	Frequency (MHz)	Transmit Power
		n26	814 – 849	
		n28	703 – 748	
		n30	2305 – 2315	
		n48	3550 – 3700	
		n66	1710 – 1780	
		n70	1695 – 1710	
		n71	663 – 698	
		n75	698 – 716	
		n38	2570 – 2620	28 dBm
		n40	2300 – 2400	
		n41	2496 – 2690	
		n77	3300 – 4200	
		n78	3300 – 3800	
		n79	4400 – 5000	

5. Configuration

5.1. Connect to Configure

5.1.1. Connect to PC and DC Power

Option if you use DC Power.

When configuring Bolt 5G it must be connected to a PC.

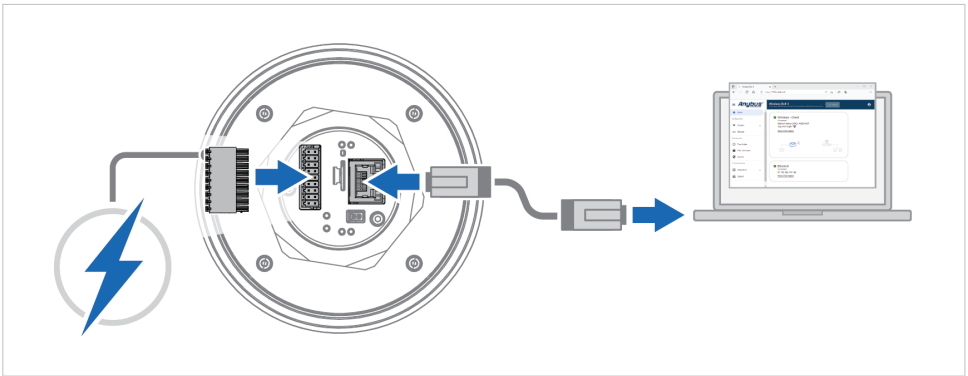


Figure 11. Connect to PC and Power

1. Connect the Bolt 5G Ethernet port to your PC.
2. Connect the Bolt 5G Power connector to a power supply.

5.1.2. Connect to PC and Power over Ethernet (PoE)

Option if you use Power over Ethernet (PoE).

When configuring Bolt 5G it must be connected to a PC.

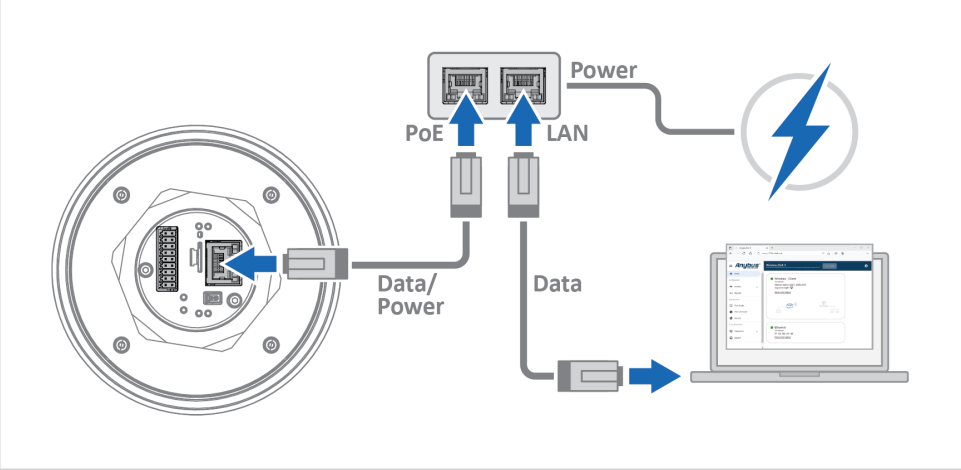


Figure 12. Connect to PC and PoE

1. Connect the Bolt 5G Ethernet port to the PoE injector **PoE** port.
2. Connect your PC to the PoE injector **LAN** port.
3. Connect the PoE injector to a power supply.

5.2. Access the Built-In Web Interface

5.2.1. Required IP Address Settings

NOTE
The Bolt 5G default IP address is 192.168.0.1 and the subnet mask is 255.255.255.0.

On the PC accessing the Bolt 5G built-in web interface, set a static IP address within the same IP address range as the Bolt 5G IP address.

Result

NOTE
The Bolt 5G comes with a default password. You find the default password on the Bolt 5G product housing.

Now you can enter the Bolt 5G IP address in your web browser and search to access the built-in web interface login page.

5.2.2. Login to the Built-In Web Interface

The Bolt 5G built-in web interface can be accessed from a standard web browser.

Before You Begin

IMPORTANT
For cybersecurity reasons, you are prompted to change the password at first login using the Bolt 5G factory default password. You are redirected to the **Change password** page, see Change the Bolt 5G Password (page 54).

NOTE
The Bolt 5G comes with a default password. You find the default password on the Bolt 5G product housing.

NOTE
The Bolt 5G default IP address is 192.168.0.1 and the subnet mask is 255.255.255.0.

Procedure

Login to the Bolt 5G built-in web interface:

1. Open a web browser.
2. Click to select the **Address bar** and enter https:// and the Bolt 5G IP address.

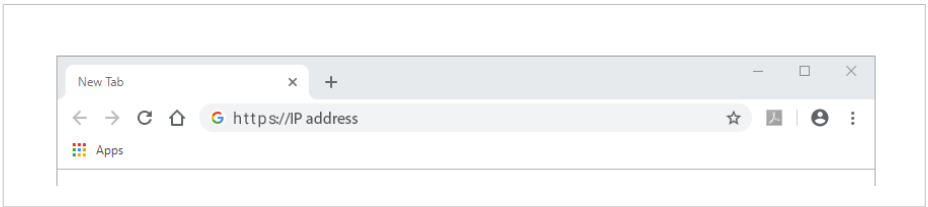


Figure 13. Enter IP address in web browser

3. Press **Enter**.
   The Bolt 5G built-in web interface login screen appears.
4. Enter **Username** and **Password** and click **Login**.

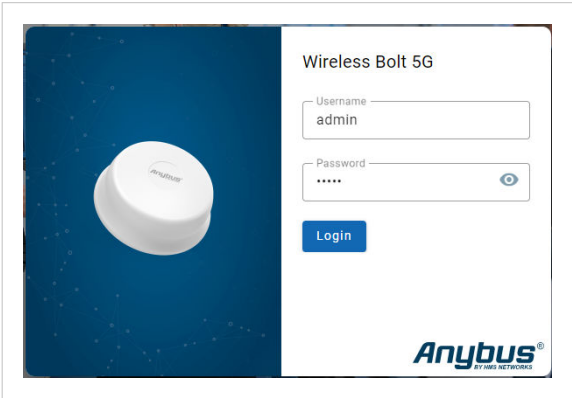


Figure 14. Built-in web interface login screen

Result

You are logged in to the Bolt 5G built-in web interface **Home** page.

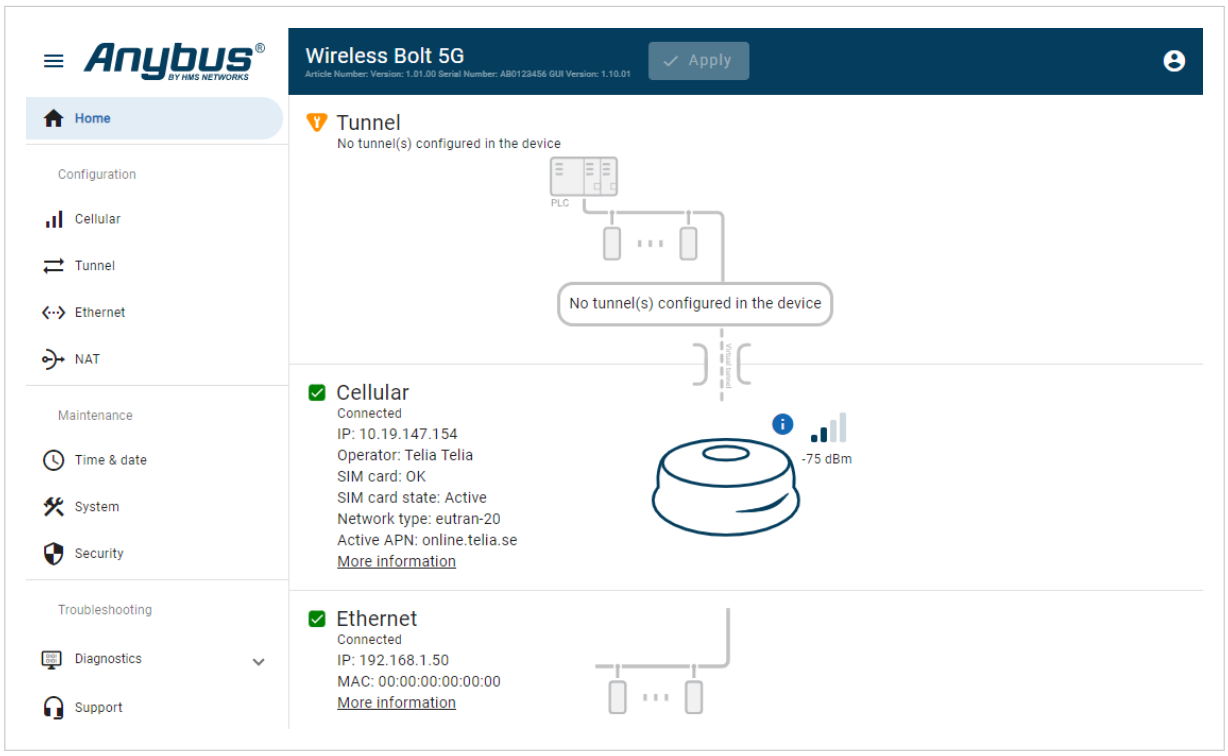


Figure 15. **Home** page

5.3. Bolt 5G Built-In Web Interface Overview

Use the Bolt 5G built-in web interface to configure, maintain and troubleshoot the Bolt 5G.

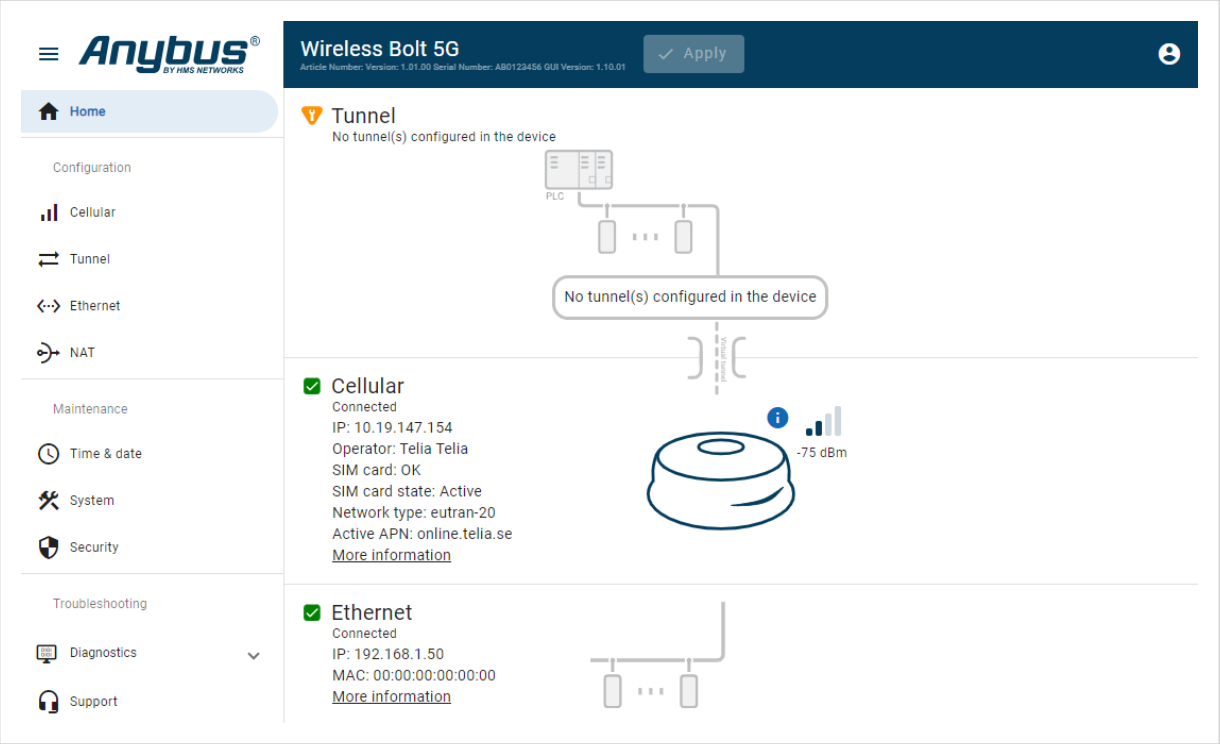


Figure 16. The Bolt 5G built-in web interface Home page

Table 2. The Bolt 5G built-in web interface menu

Menu item	Description
Home	View the current Bolt 5G settings and network status.
Cellular	Configure the cellular network, operator selection, SIM card, and APN settings.
Tunnel	Add tunnel(s) and configure the tunnel settings.
Ethernet	Configure the **Ethernet** network **IP Settings**.
Time & date	Set device time and date. Enable/Disable NTP synchronization. Enable/Disable Timezone.
System	Save settings in a configuration files, upload configuration files and upgrade firmware. Revert, reboot, or reset the Bolt 5G.
Security	Upload a web server certificate to the Bolt 5G.
Diagnostics	Monitor and troubleshoot the Bolt 5G.
Support	Contains Bolt 5G product information, Anybus contact information, link to Anybus support website, and product file for download. Here you can generate a support package with product information, to send to your Anybus support technician.
Apply	After configuration changes are made and verified, press **Apply** to make the settings take effect.

5.4. Factory Default Settings

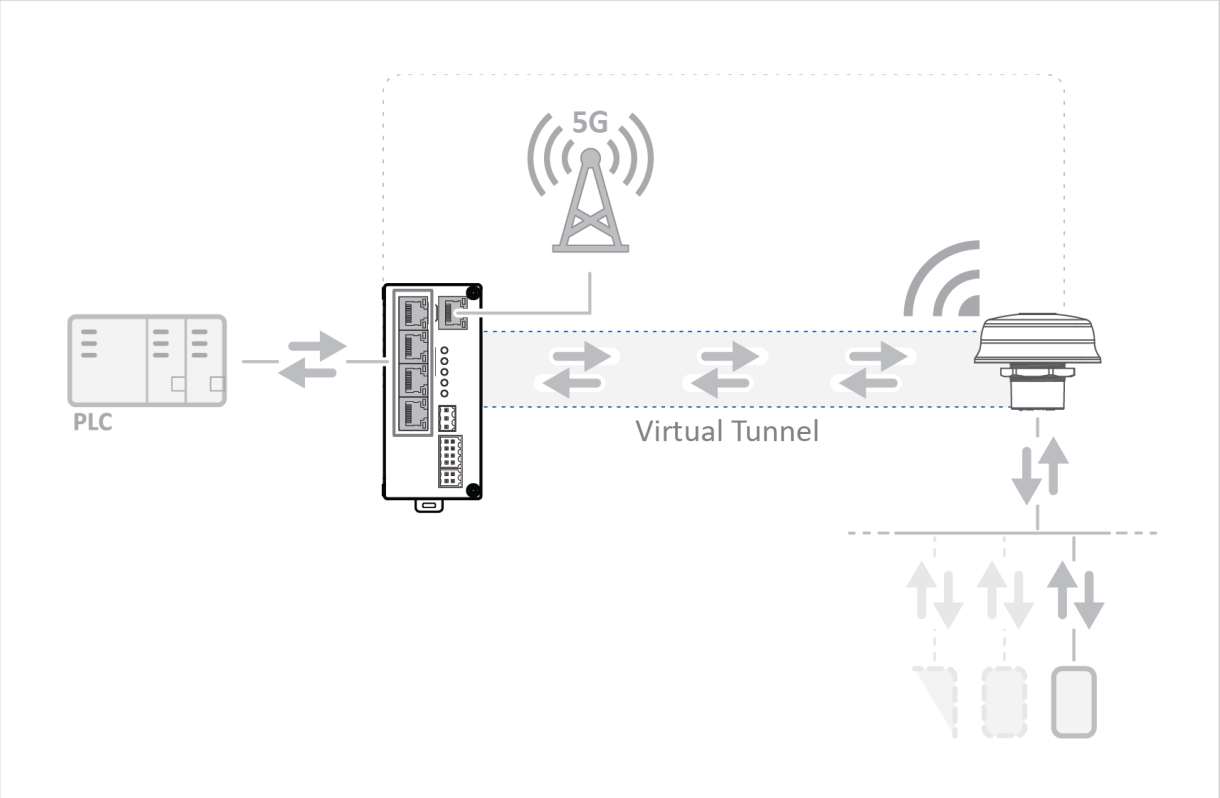
Bolt 5G comes with the following factory default settings for the Ethernet interface.

Table 3. Bolt 5G Ethernet interface default settings

IP Assignment	Static
IP Address	192.168.0.1
Subnet Mask	255.255.255.0
Internal DHCP Server	Enabled

You can restore factory default settings by making a Factory Reset. Refer to Factory Reset Using the Reset Button and Factory Reset Using the Built-In Web Interface.

5.5. Setup Virtual Tunnel



In this example, a virtual tunnel is established between a Bolt 5G and a Tunnel Gateway to facilitate communication between a PLC and devices within a subnetwork.

Figure 17. Example, Virtual tunnel between a Bolt 5G and Bolt 5G

Anybus Tunnel Gateway Configuration

NOTE
Before you start configuring the Bolt 5G, ensure you have the remote IP address for each Tunnel Gateway unit available. See also Tunnel Settings (page 36).

Configure and install your Anybus Tunnel Gateway unit(s) according to the Tunnel Gateway user manual.

Ethernet Device(s) Configuration

Configure the Ethernet device(s) to be connected to the Bolt 5G and communicating with the Tunnel Gateway unit(s) according to the user documentation provided by the manufacturer.

Bolt 5G Configuration

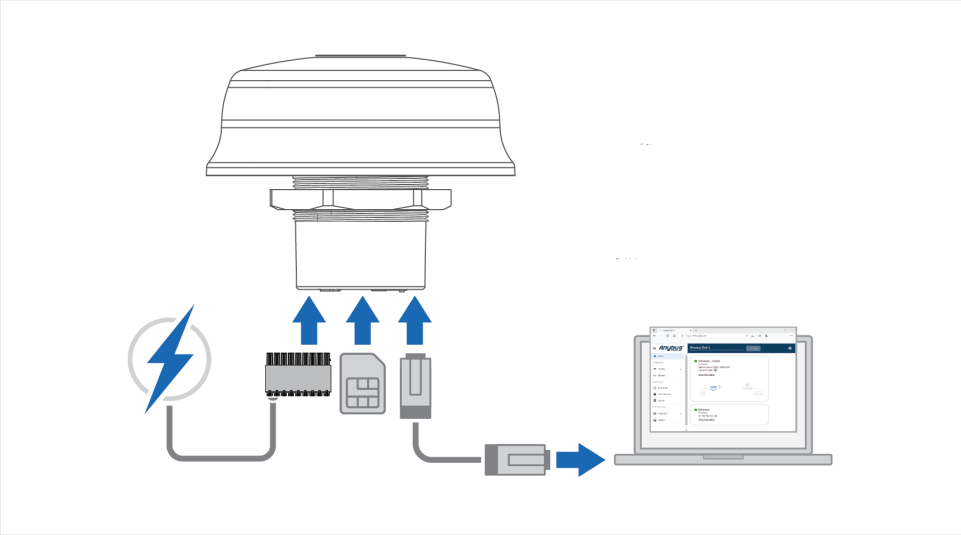


Figure 18. Connect the Bolt 5G to your PC and to power

Procedure

1. Install a SIM card in the Bolt 5G SIM card holder.
   See Install SIM Card (page 6).
2. Connect the Bolt 5G Ethernet port to your PC.
3. Connect the Bolt 5G to power.
4. Login to the Bolt 5G built-in web interface.
5. On the **Cellular** page, configure the settings required by the 5G core network that the Bolt 5G i going to be connected to.
   See Cellular Settings (page 31).
6. On the **Tunnel** page, add tunnel(s) and configure the tunnel settings.
   See Tunnel Settings (page 36).
7. On the **Ethernet** page, configure the IP settings required by the wired network.
   See Ethernet Settings (page 38).
8. On the **NAT** page, configure the settings for the incoming traffic.
   See NAT Settings (page 39).
9. For the setting to take effect, click **Apply**.
10. Disconnect the Bolt 5G from power and your PC.

Installation

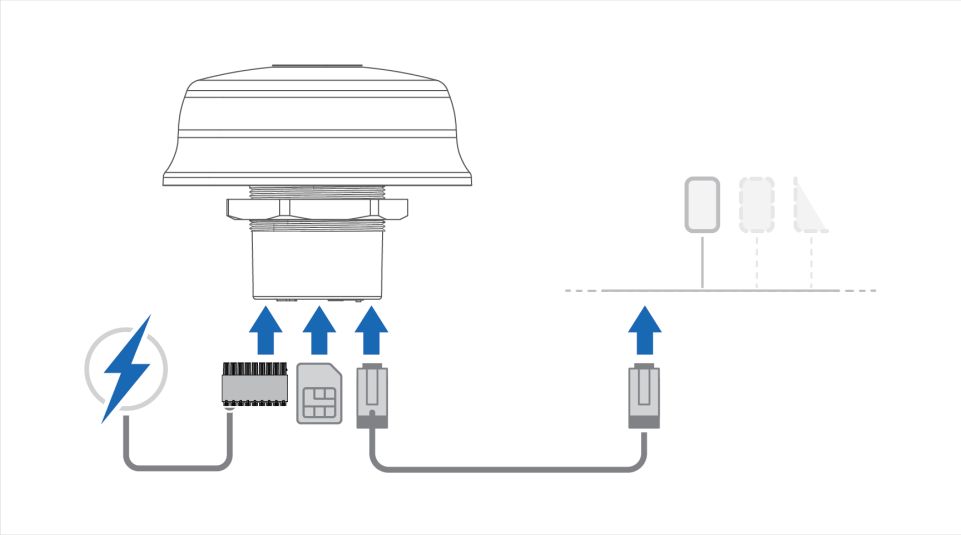


Figure 19. Connect the Bolt 5G

Procedure

1. Connect the Bolt 5G to power and Functional Earth (FE), see Installation (page 6).
2. Connect your Ethernet Device(s) to the Bolt 5G.

Verify Connection

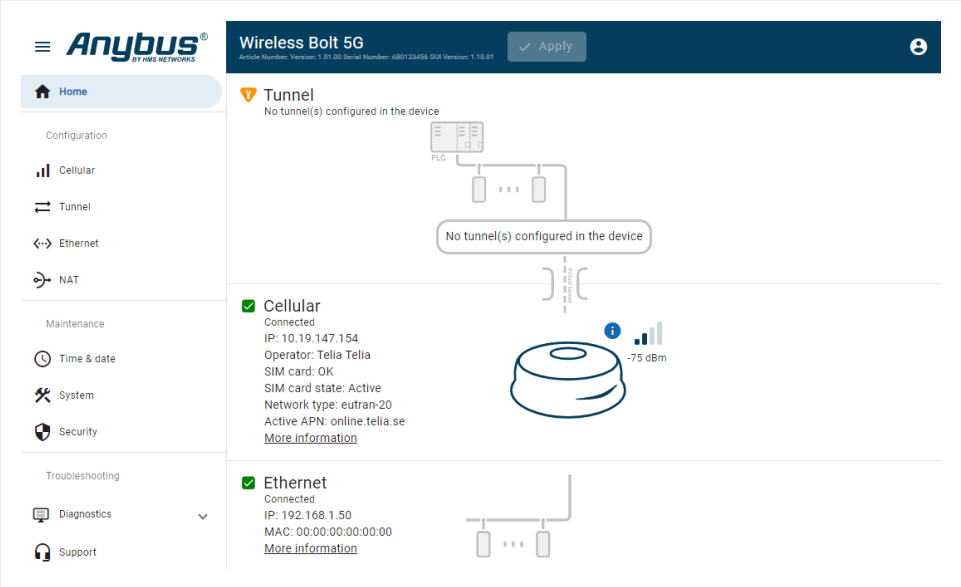


Figure 20. Example, tunnel status connected

On the **Home** page, you can view the connection status.

To verify the tunnel connectivity, see Verify Operation (page 40).

5.6. Cellular Settings

On the **Cellular** page, configure the operator and SIM card settings, as well as the network settings for the 5G core network that the Bolt 5G is going to be connected to.

Before You Begin

When you are going to connect Bolt 5G to a cellular network, ensure that you have installed a SIM card in the Bolt 5G SIM card holder.

Refer to Install SIM Card (page 6).

5.6.1. Network Settings

NOTE
When connecting the Bolt 5G to a private stand-alone 5G network, it may be required to set 5G SA as preferred network type and to disable roaming.

By default, the **Preferred network type** is set to **Automatic**.

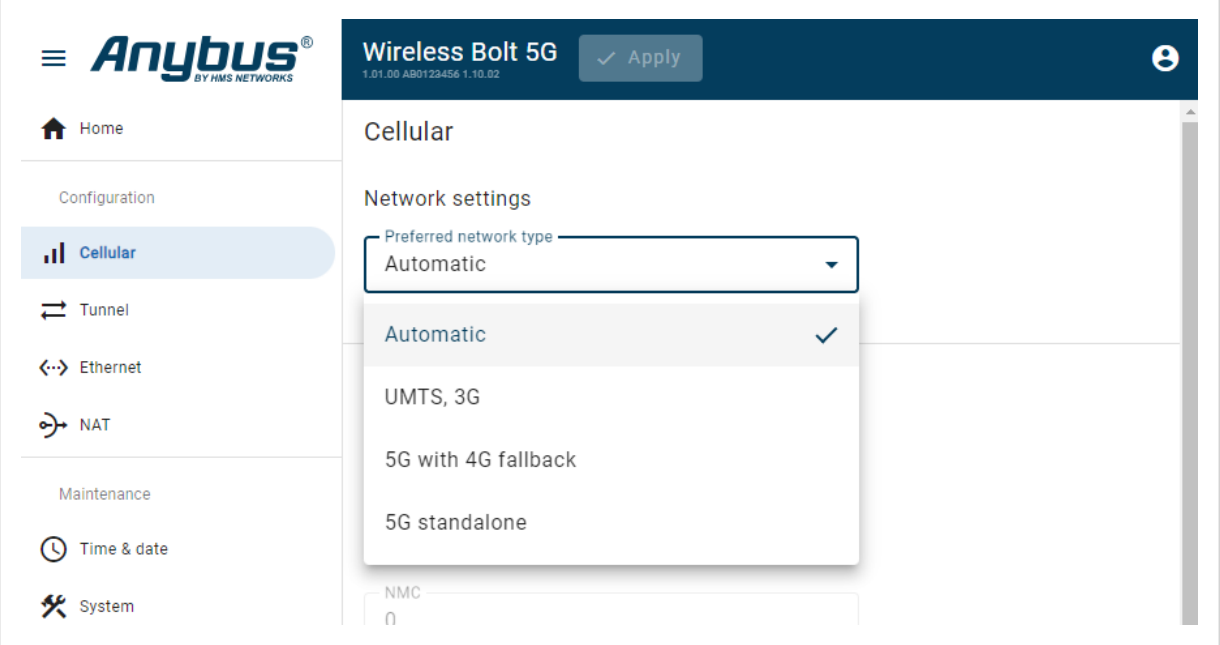


Figure 21. **Cellular** page, Network settings

Select a **Preferred network type**:

Setting	Description
Automatic	Use the Modem Preset List search order for Radio Access Technology (RAT). Connects automatically to an available network according to following priority order LTE, UMTS, GSM, and 5G mobile network. The Bolt 5G modem scans for all available Public Land Mobile Networks (PLMN) in each RAT.
UMTS, 3G	Universal Mobile Telecommunications System (UMTS) mode. Use when connecting to a UMTS network.
5G with 4G fallback	Mode for Long Term Evolution (LTE) and 5G Non-standalone (NSA). 5G NSA operates on the 4G LTE core. It is a solution for 5G networks supported by the existing 4G infrastructure. Use when connecting to LTE or non-standalone 5G networks.
5G standalone	5G Standalone (SA) mode. Use when connecting to a standalone 5G network.

5.6.2. Operator Selection

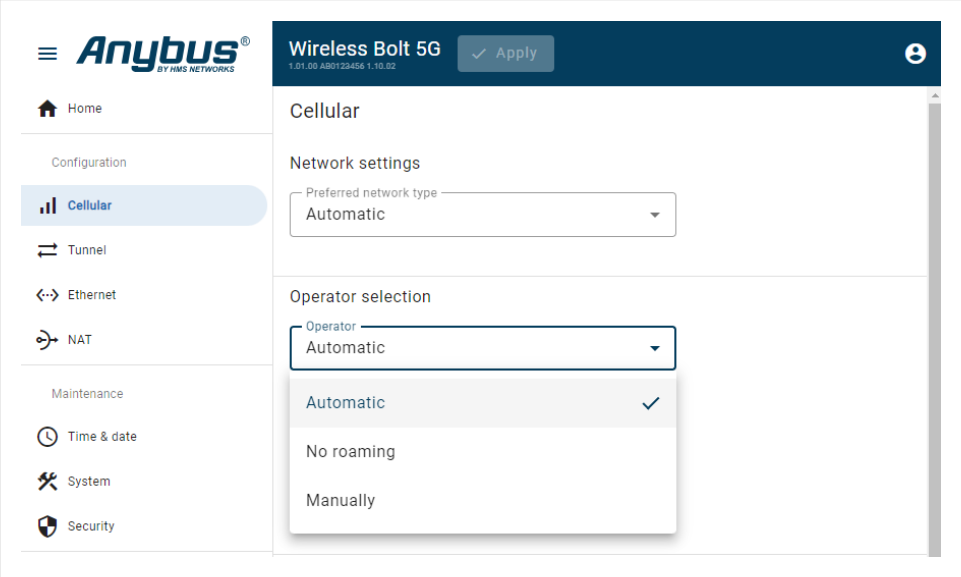


Figure 22. **Cellular** page, Operator Selection

Automatic
By default, the **Operator** is set to **Automatic**. The mobile operator is assigned automatically.

No Roaming
When **No roaming** is enabled, the Mobile Country Code (MCC) and Mobile Network Code (MNC) of the SIM card installed in the Bolt 5G are automatically selected.

Manually
You can set the **Operator** manually.

The Mobile Country Code (MCC) is a unique 3-digit number to identify a country.

The Mobile Network Code (MNC) is a unique two- or three digit number assigned to a mobile network operator (MNO) within a country.

MCC 999 and MNC 99 are special codes allocated for private networks.

Example 1. MCC and MNC example

MCC for Sweden: 240

MNC assigned to the mobile network operator Telia, in Sweden: 01

Procedure

Figure 23. Operator settings example

1. In the **Operator** drop down menu, select **Manually**.
2. In the **MCC** field, enter the MCC code.
3. In the **MNC** field, enter the MNC code.

5.6.3. SIM Settings

Activate SIM Card

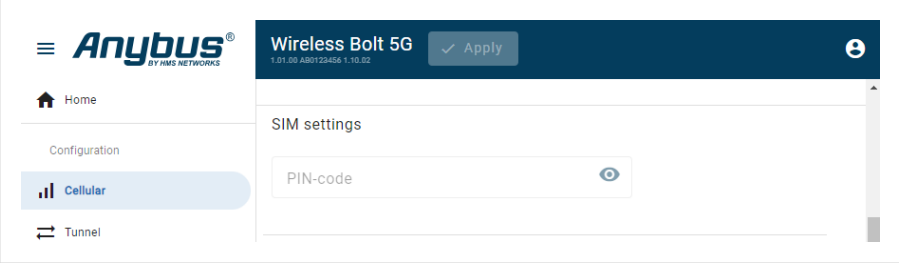


Figure 24. Cellular page, SIM settings

Procedure

1. Navigate to the **Cellular** page, **SIM settings**.
2. If the SIM card installed in the Bolt 5G is locked with a PIN code, enter it in the **PIN** field. The SIM card is unlocked and the PIN code is disabled.
3. For the setting to take effect, click **Apply**.
4. On the **Home** page, you can view the SIM card status.

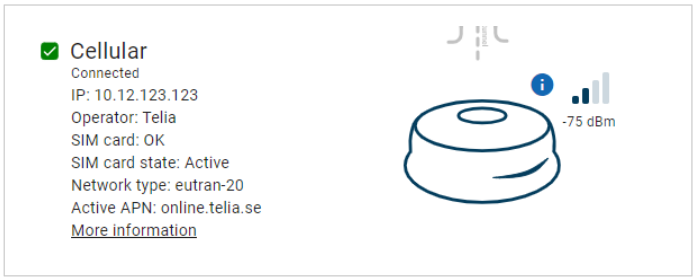


Figure 25. **Home** page, Cellular SIM card status example

5.6.4. APN Settings

APN Assignment Automatic

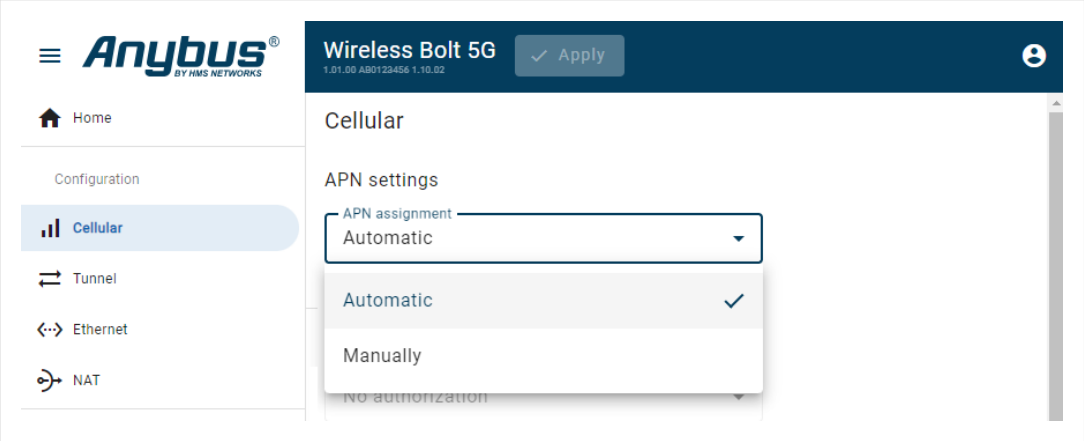


Figure 26. **Cellular** page, APN Assignment Automatic

By default, **APN assignment** is set to **Automatic**. The APN (Access Point Name) is assigned automatically.

APN Assignment Manually
Ensure that you have the APN supplied by your carrier available.

Procedure

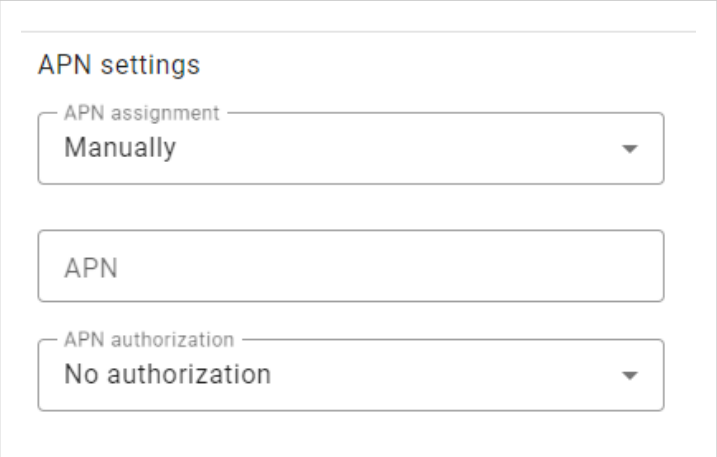


Figure 27. APN assignment, Manually

To set the APN assignment manually:

1. In the **APN assignment** drop down menu, select **Manually**.
2. In the **APN** field, enter the access point name.

APN Authorization

By default, **APN authorization** is set to **No authorization**.

When enabled, the Password Authentication Protocol (PAP) authentication method is used.

NOTE

APN authorization is to be configured only if your carrier has setup APN (Access Point Name) with username and password.

NOTE

Ensure that you have the APN username and password supplied by your carrier available.

Procedure

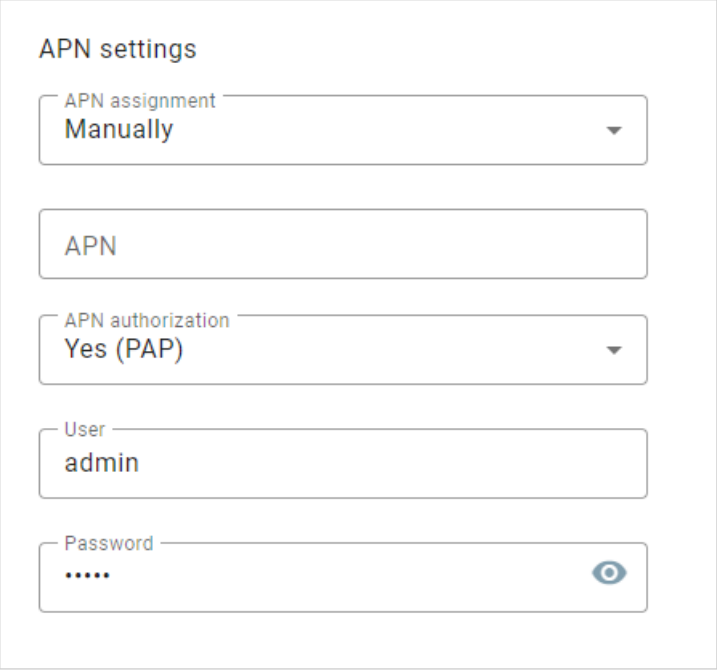


Figure 28. Cellular page, APN authentication Yes (PAP)

To activate APN authentication:

1. Set the **APN authentication** setting to **Yes (PAP)**.
2. In the **User** field, enter a username.
3. In the **Password** field, enter a password.
4. For the setting to take effect, click **Apply**.

5.7. Tunnel Settings

Before You Begin

NOTE
You can add up to 8 tunnels.

Procedure

1. On the **Tunnel** page, select the desired tunnel type: **Wireless Bolt 5G**, **Tunnel Gateway** or **Other device** from the **Add tunnel to ...** menu.

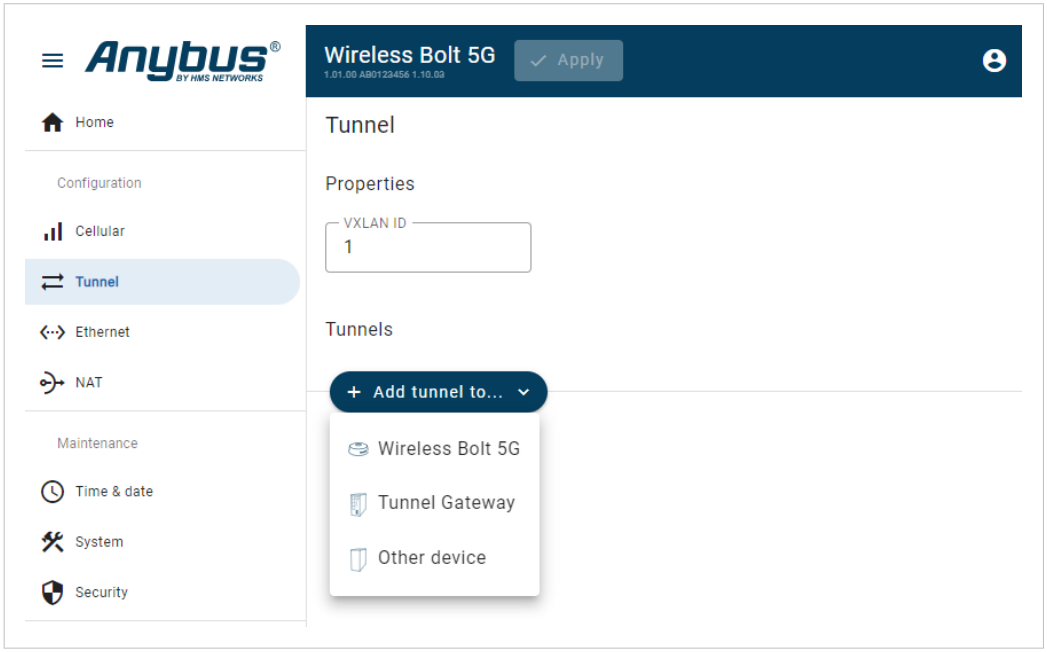


Figure 29. **Add tunnel to ...** menu

2. Select the tunnel and configure the **Tunnel properties**.

Figure 30. **Tunnel properties** panel

Setting	Value	Description
VXLAN ID	0-16777215 1, default value	Virtual Extensible LAN (VXLAN) is used to create a layer 2 network tunnel over the regular layer 3 network. VXLAN IDs enable the use of separate traffic in different virtual networks.
Remote IP	There is no default setting.	Enter the static remote IP address of the device connected to the other end of the tunnel. Write in IPv4 dot-decimal notation.
Name	There is no default Name	You can name the Tunnel to make it easier to identify. By default, the Tunnel is assigned the name Tunnel, followed by an incremental number suffix.

3. Repeat until you have added and configured all your tunnels.
4. For the setting to take effect, click **Apply**.

5.8. Ethernet Settings

IMPORTANT
By default, the Bolt 5G internal DHCP server is enabled. To avoid interference, keep only one DHCP server enabled on the network.

By default, DHCP server is enabled.

This means that the IP address settings are set automatically by the Bolt 5G internal DHCP server.

To disable the DHCP server and configure the IP settings manually, deselect the **DHCP server enabled** checkbox.

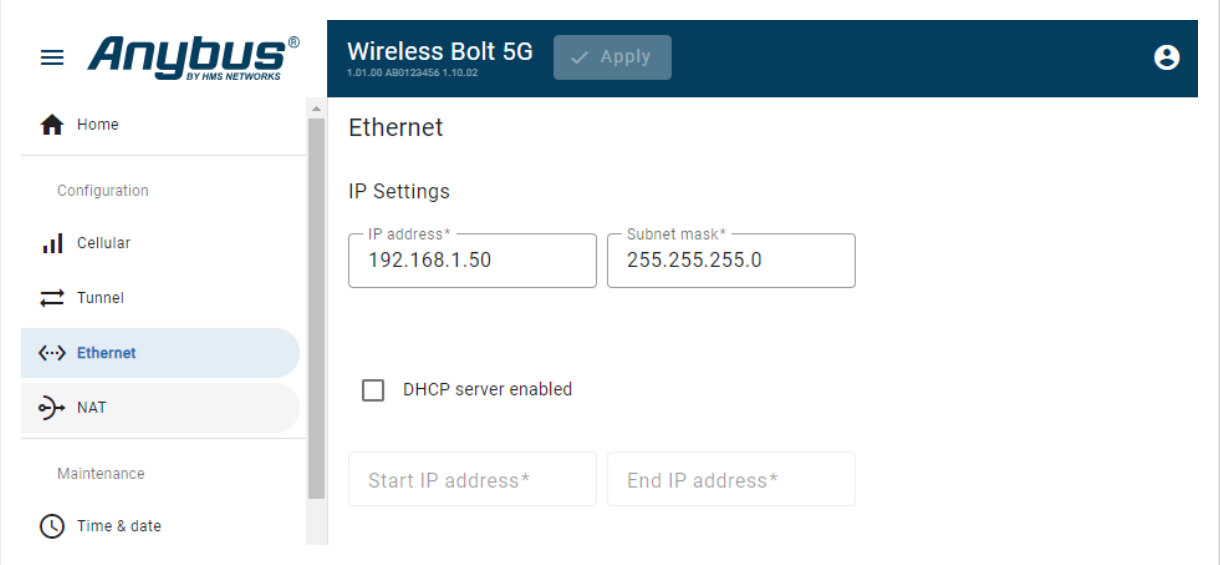


Figure 31. **Ethernet** page

Setting	Description
IP address	The Bolt 5G network IP address. Write in IPv4 dot-decimal notation. Default: 192.168.0.1
Subnet mask	The Bolt 5G network Subnet mask. Write in IPv4 dot-decimal notation. Default: 255.255.255.0
Start IP address	Enter the first IP address of the DHCP address pool. Write in IPv4 dot-decimal notation.
End IP address	Enter the last IP address of the DHCP address pool. Write in IPv4 dot-decimal notation.

5.9. NAT Settings

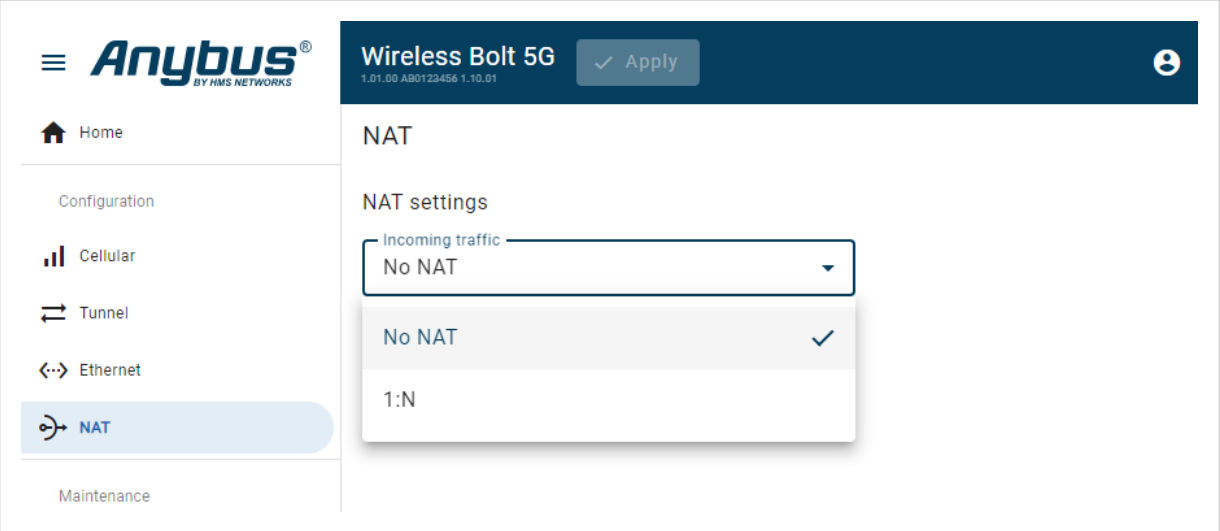


Figure 32. NAT page, Incoming traffic menu

By default, NAT (Network Address Translation) is enabled, and **1:N** is selected in the **Incoming traffic** drop-down menu.

When 1:N is enabled:

- Multiple internal hosts are allowed to share a single publicly exposed IP address.
- All outbound traffic initiated by the local hosts destined for remote hosts is allowed.
- All incoming traffic initiated by remote hosts destined for the local hosts is rejected.

Routing Behind Mobile Station (RBMS)

When Routing Behind Mobile Station (RBMS) is active on the mobile network, disable NAT.

To disable NAT, select **No NAT** in the **Incoming Traffic** drop-down menu.

6. Verify Operation

6.1. Bolt 5G Status Monitor

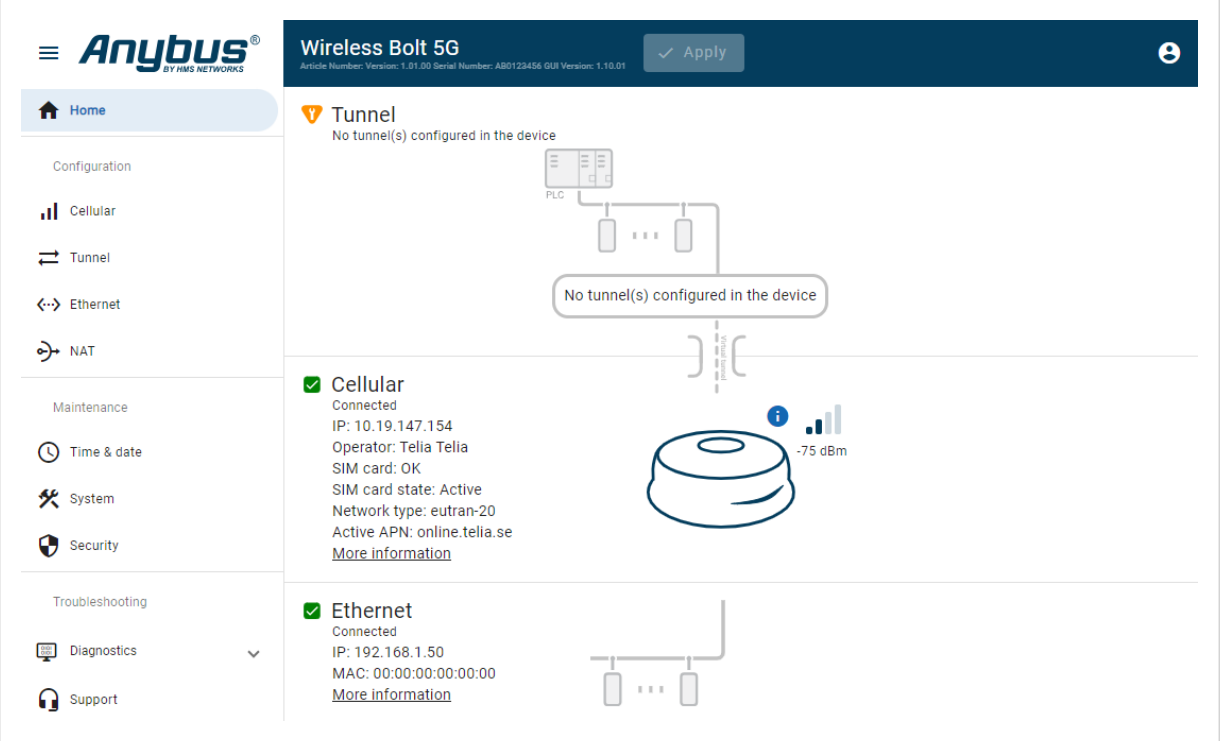


Figure 33. Home page

Tunnel Status

View the connection status for the tunnel(s).

Cellular Status

Overview of connection status, signal strength and current cellular settings.

Ethernet Status

View the Ethernet network communication status and IP settings.

Status Symbols

Symbol	Description
	Internal error has occurred, and operation cannot be guaranteed. Examples for Run Time System: • Could not initialize WLAN device management control: Could not add device management data point wlan-station/rssi: Endpoint receive operation timed out (-32603). • Could not initialize SystemInfo Managment Control: SystemInfo: Error (-32603) adding data point system : os, Endpoint receive operation timed out. • Could not initialise Device Manager Control: Update DevMgmCtrl: Error (-32603) adding data point update : counter, Endpoint receive operation timed out.
	Out of Specification.
	• Power fail handling not supported. • Could not load and start program. Alerts for Cable replacement, Client: • The unit is in idle state, waiting for an event. • The unit is inactive. • The unit is disconnected. • The unit is restarting. • Incorrect password is detected. Alerts for Access point and Cable replacement, Access point: • The unit is disabled.
	Normal operation. Cable replacement, Client: • The unit is connected. • The unit is scanning. Access point and Cable replacement, Access point: • The unit is enabled. • The unit is connected to Ethernet network.

SIM Card State

State	Description
Active	SIM card installed.
N/A	No SIM card installed.

SIM Card Status Messages

Status	Description
OK	SIM is inserted, and PIN is not required.
Absent	SIM is not inserted.
PIN Required	SIM is inserted, but PIN is required.
PUK Required	SIM is inserted, but PUK is required. The SIM needs to be unlocked by a device supporting PUK entry.
Blocked	SIM is permanently blocked.
Error	Any other error.

6.2. Bolt 5G LED Status Indication

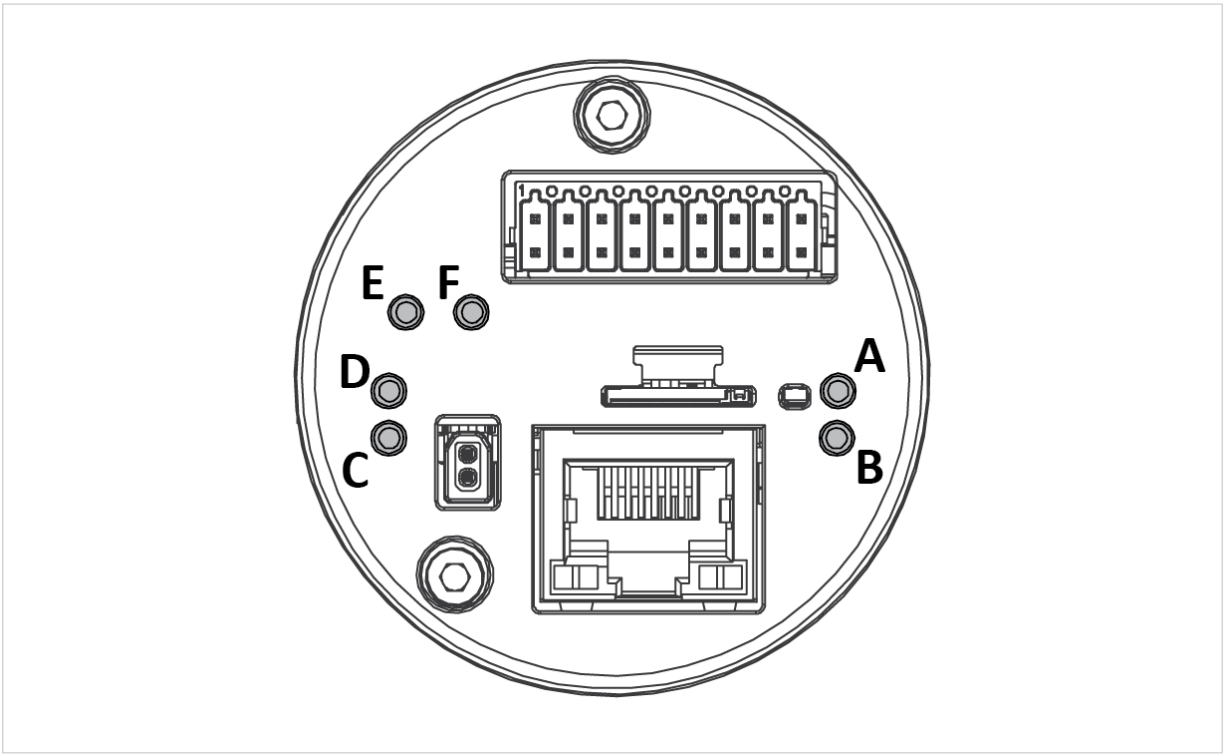


Figure 34. Bolt 5G LED Indicators

	LED A	LED B	LED C	LED D	LED E	LED F
LED Status	**Cellular Status**	**Power**	**SPE RX LED**	**SPE TX LED**	**IO-Link Activity LED**	**IO-Link Error LED**
Off	Cellular modem inactive	No power	No Single Pair Ethernet (SPE) Link	No Single Pair Ethernet (SPE) link	IO-Link is inactive or no data from IO_Link device is received	IO-Link is inactive, or no error is detected
Green, solid	Connected to cellular network	Power on	SPE link active	SPE link active	N/A	N/A
Green, flashing	N/A	N/A	SPE link active and RX activity	SPE link active and TX activity	Data from IO_Link device is received	IO_Link error is detected
Green, fast flashing (once per second)	SIM not found, or PIN is required	N/A	N/A	N/A	N/A	N/A
Green, slow flashing (once per two seconds)	Searching for cellular network and trying to connect.	N/A	N/A	N/A	N/A	N/A

6.3. Ethernet RJ45 LED Status Indication

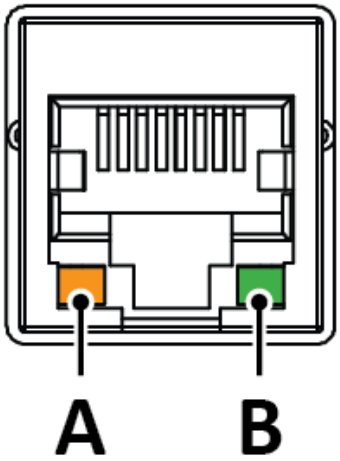


Figure 35. RJ45 Ethernet LED indicators

LED A – LINK/ACTIVITY	Function
Off	No Ethernet link
Yellow	Ethernet link established
Yellow, flashing	10/100/1000 Mbps Ethernet link activity

LED B – STATUS	Function
Off	No Ethernet link or 10/100 Mbps link
Green	1000 Mb/s Ethernet link established

7. Maintenance

7.1. Time & Date Settings

7.1.1. Set Time

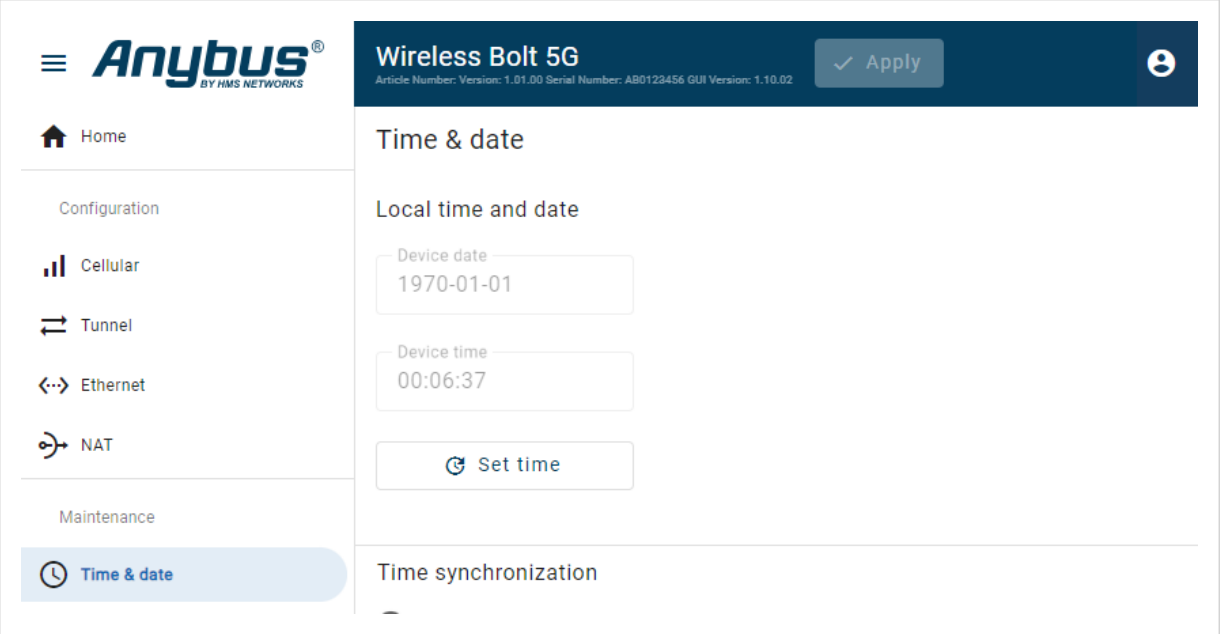


Figure 36. Time & date page, Set time

You can set the current browser time and date in the Bolt 5G.

On the **Time & date** page, click **Set time**.

7.1.2. Network Time Protocol (NTP) Synchronization

You can use the **Network Time Protocol (NTP)** to synchronize with computer clock time sources on a network.

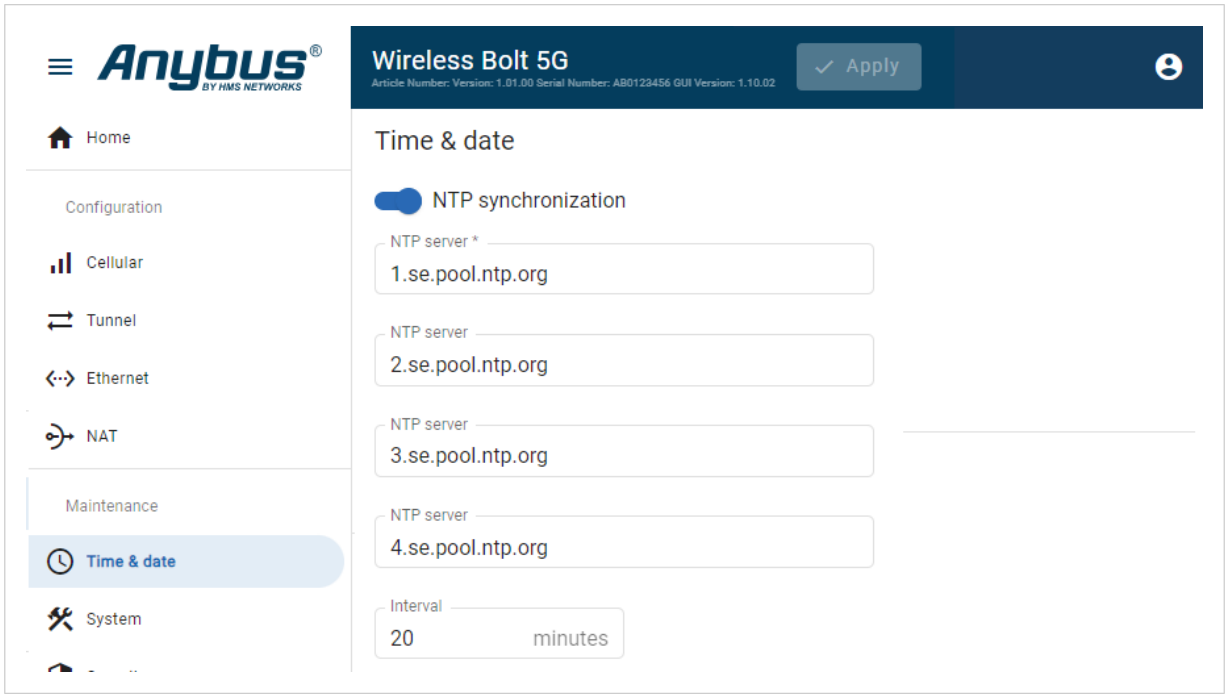


Figure 37. Time & date page, NTP synchronization enabled

By default, **NTP synchronization** is disabled.

To use **NTP synchronization**:

1. On the **Time & date** page, enable **NTP synchronization**.
2. In the **NTP server** fields, enter the Server name or IP number of the NTP server.
   You can enter up to four different NTP servers.
3. In the **Interval** field, enter the number of minutes between the time synchronization attempts (1-65535).

7.1.3. Use Timezone Settings

You can set the time zone for where the Bolt 5G is installed.

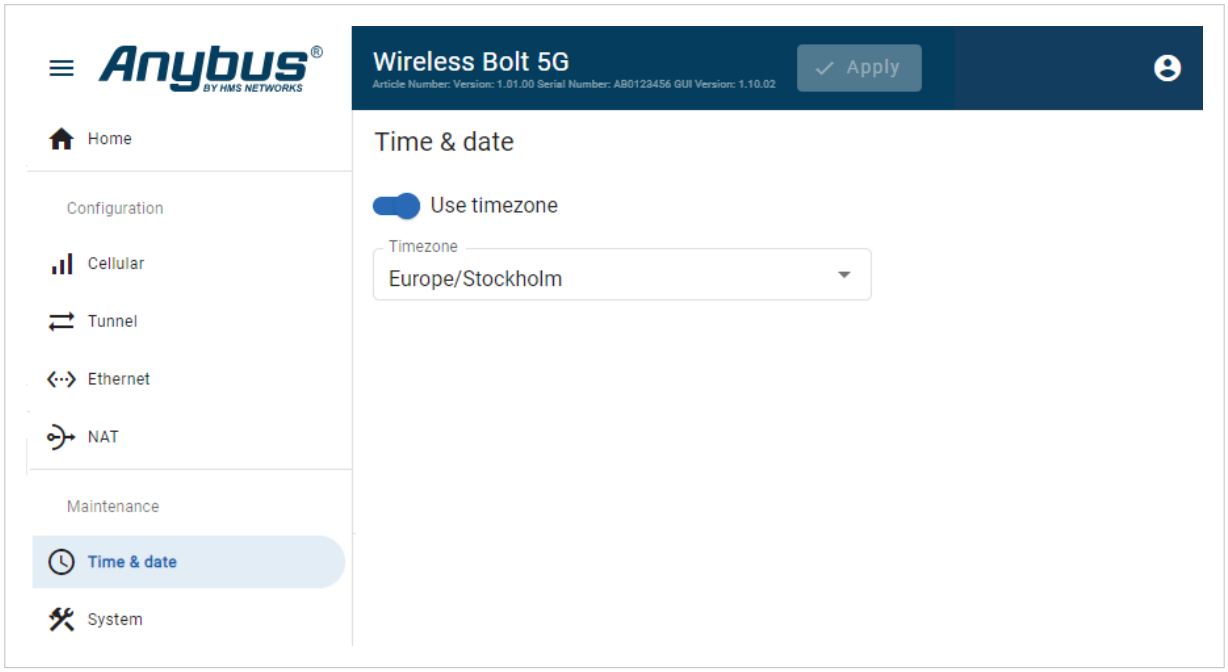


Figure 38. Time & date page, Use timezone

To set the **Use timezone**:

1. On the **Time & date** page, enable **Use timezone**.
2. In the **Timezone** menu, select the timezone where the product is installed.

7.2. Configuration File Handling

7.2.1. Export Configuration

You can export the current configuration, in order to store the configuration file as a backup or to import and use the same settings to configure additional Bolt 5G units.

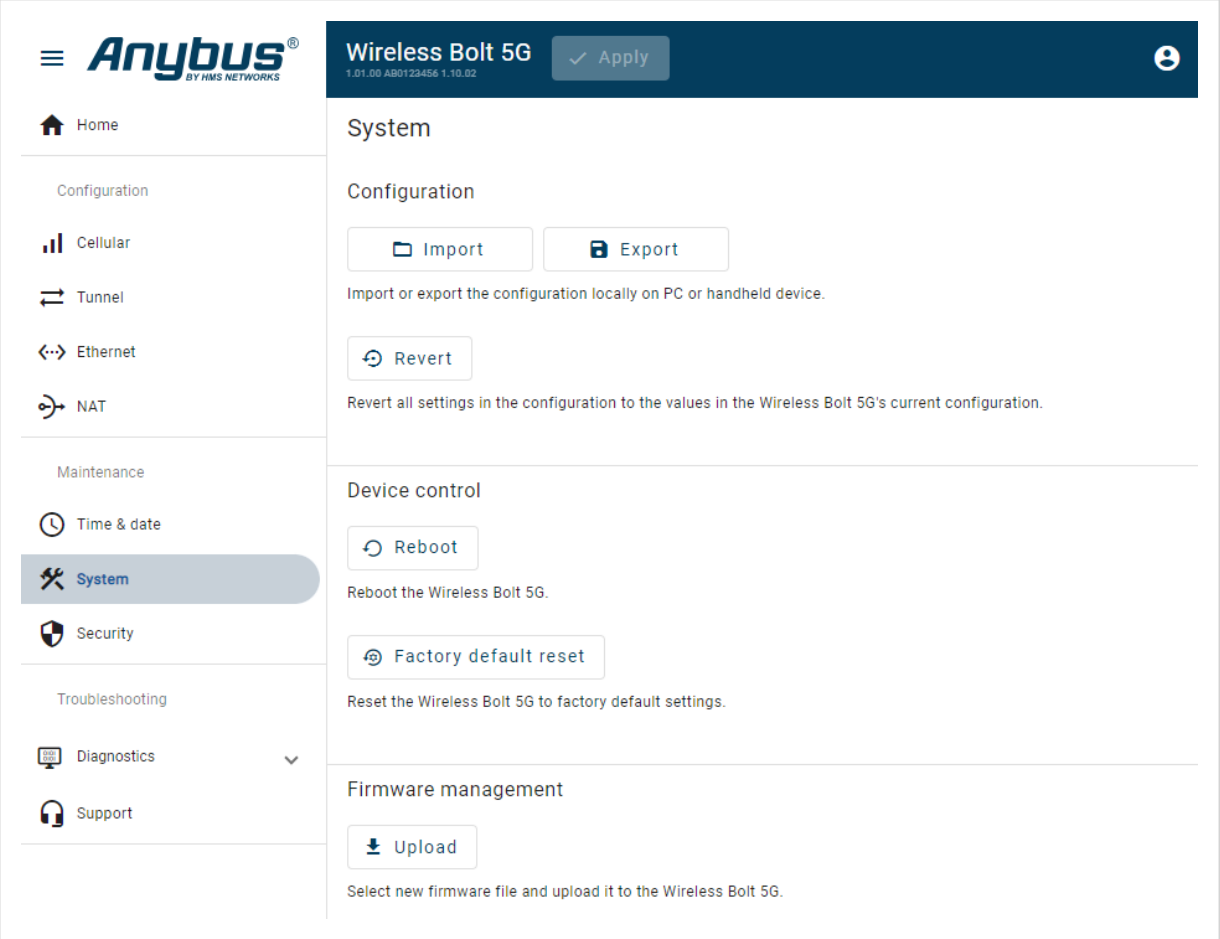


Figure 39. System page

To export a configuration file:

In **System**, click **Export**.

The configuration settings are stored in a .conf file and downloaded to your PC.

7.2.2. Import Configuration

To configure multiple Bolt 5G units with the same settings, you can import a configuration file.

Before You Begin

The supported file format is .conf.

Procedure

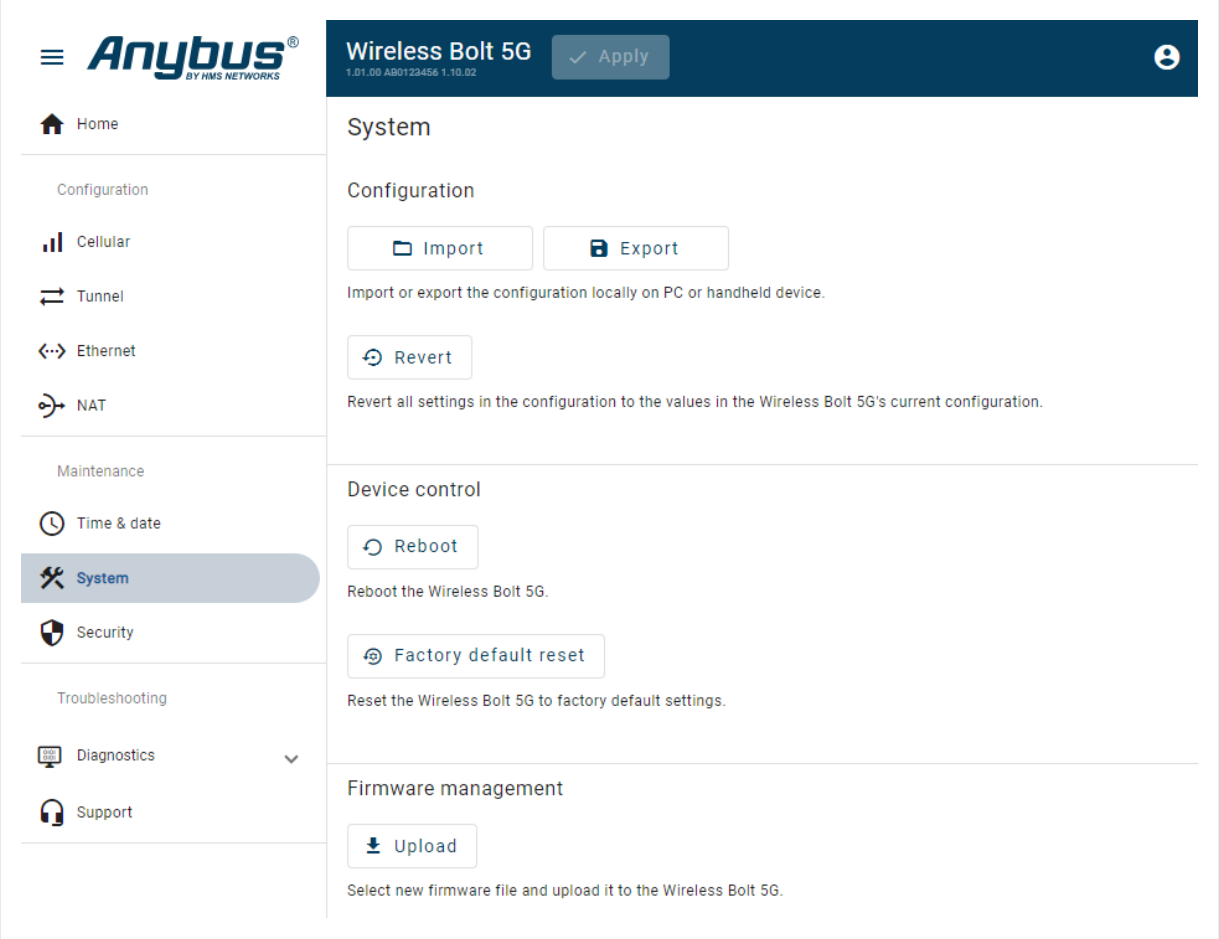


Figure 40. System page

Import configuration file:

1. On the **System** page, click **Import**.
2. In the Import configuration window, click **Select file (.conf)**.
3. In the Open dialog box, browse to and select the configuration file and click **Open**.
4. In the Import configuration window, click **Import**.
5. The configuration file is parsed.
   - If the configuration is compatible, the settings are imported.
   - If any compatibility mismatches occur, a message about the mismatch appears.
6. To apply the settings, click **Apply** in the web-interface header, and follow the instructions.

7.3. Revert Configuration

You can restore all settings in a configuration to the default settings.

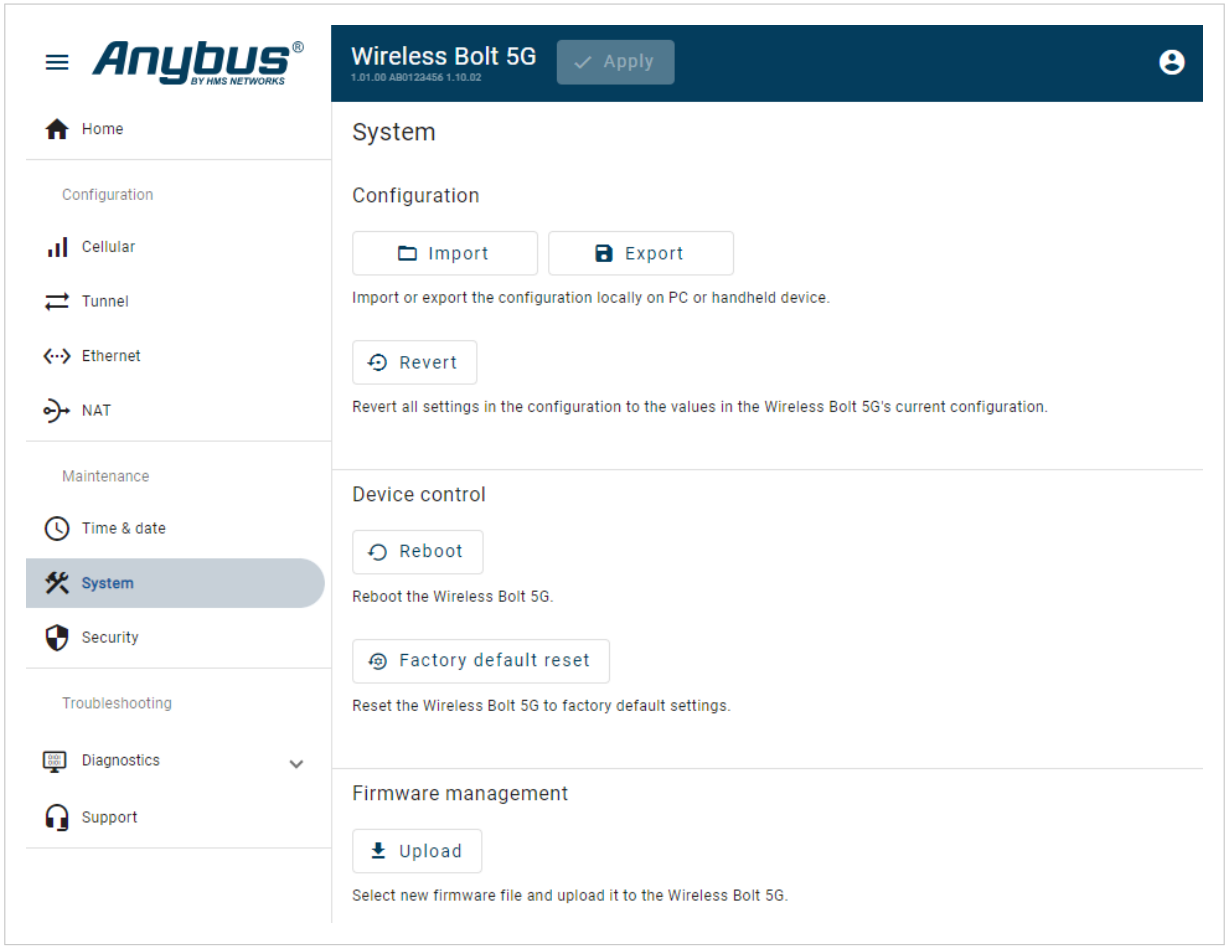


Figure 41. System page

When you want to remove any configuration made in a current session and re-load the configuration from the Bolt 5G.

1. On the **System** page, click **Revert**.
2. In the Confirm revert window, click **Revert**.

7.4. Firmware Management

7.4.1. View the Firmware Version

On the **Support** page, you can view the current applied firmware version.

Figure 42. Support page, Product information example

7.4.2. Firmware and Configuration Compatibility

Compatibility after Firmware Upgrade

Current configuration is still compatible after upgrading the firmware.

Compatibility after Firmware Downgrade

7.4.3. Firmware File Validation

Before the firmware file is imported into the system, the firmware upgrade function performs a validation of the file, to ensure compatibility and validity of the firmware file.

If the firmware file does not pass the validation, the firmware file is rejected, and an error message appear.

7.4.4. Update Firmware

Before You Begin

> **NOTE**
> If the firmware update process is interrupted or if the power is lost during the update process, the update process will resume as soon as the Bolt 5G is powered on again.

Procedure

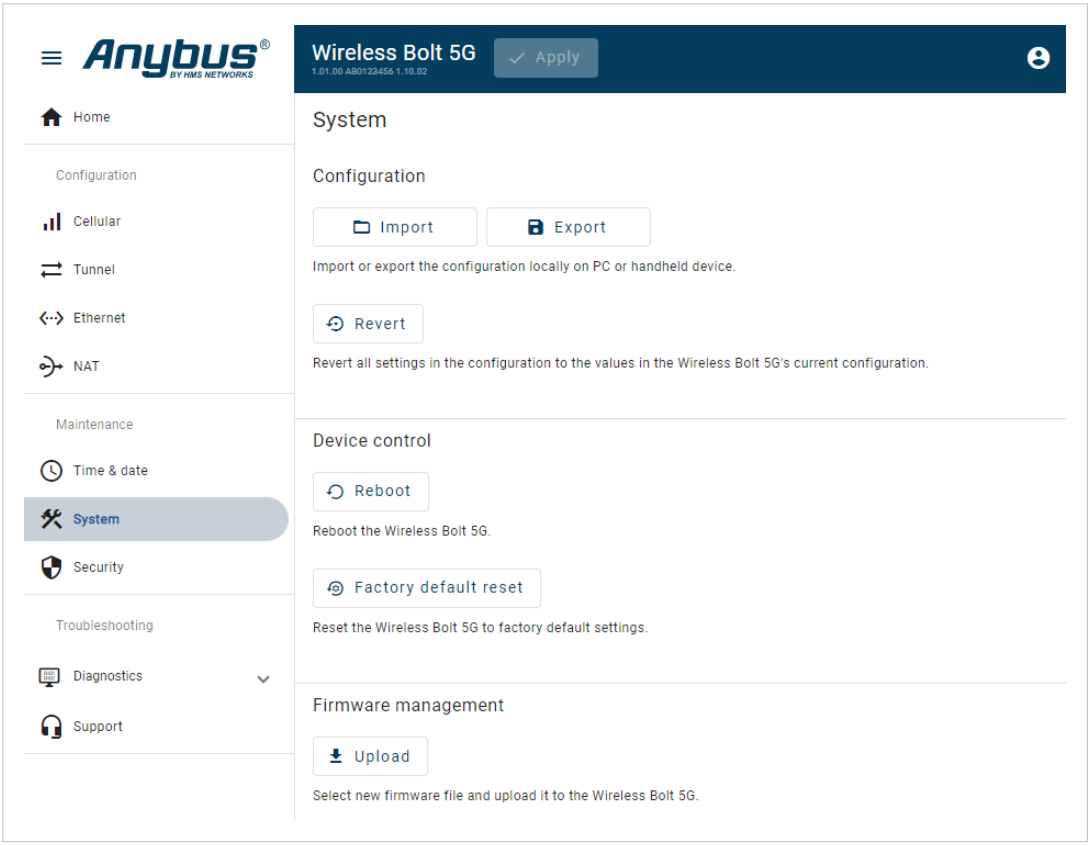


Figure 43. System page

To update the firmware:

1. On the **System** page > **Firmware management**, click **Upload**.
2. In the Upload Firmware window, click **Select firmware (.cup)**.
3. In the Open dialog box, browse to and select the firmware file and click **Open**.
4. To start the firmware upgrade, click **Update firmware**.
   The firmware file is validated and transferred.

Result

- If the firmware file passes the validation: The firmware is upgraded and then the Bolt 5G automatically reboots, for the upgrade to take effect.
- If the firmware file is rejected: An error message appears.

7.5. Web Server Certificate Settings

Install a web server certificate in the Bolt 5G.

Before You Begin

NOTE
The Web Server Certificate file must contain both Certificate and Private key.

NOTE
The device certificate must be a Base64 encoded DER certificate. Use the PEM (Privacy Enhanced Mail) file format.

NOTE
If the certificate is to be used by HTTPS, the subject name “CN” parameter must be set to the device address (IP number or DNS name).

Procedure

1. Login to the Bolt 5G built-in web interface.
2. Navigate to the **Security** page.

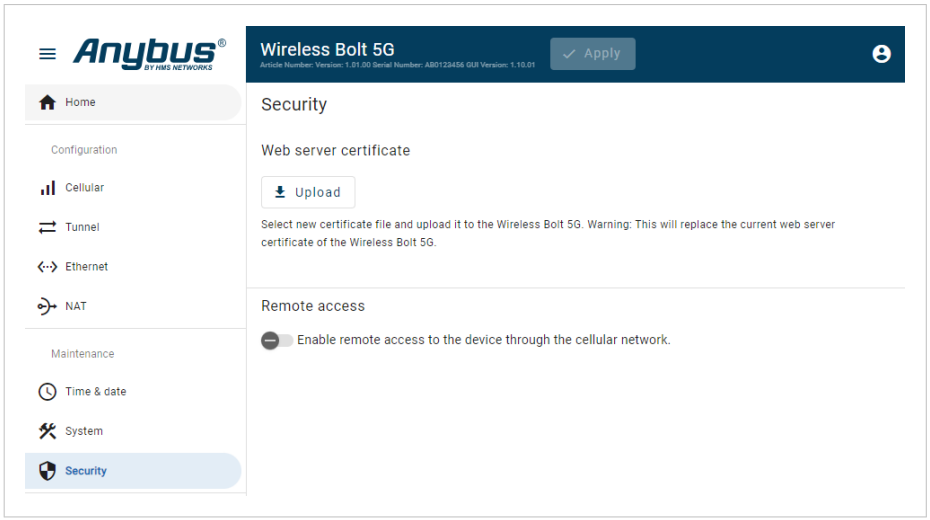


Figure 44. Security page

3. To upload the web server certificate, click **Upload**.
4. In the **Upload web server certificate** window, click **Select certificate file (.pem)**.
5. In the **Open** dialog box, browse to and select the web server certificate file and click **Open** > **Upload certificate**.

Result

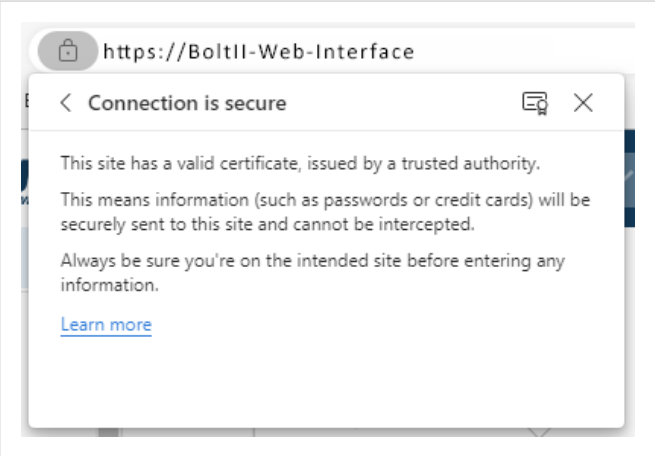


Figure 45. Example View site information > Connection is secure

The web server certificate is uploaded in the web browser.

In the web browser **View site information**, check that the **Connection is secure**.

7.6. Remote Access to Bolt 5G Built-In Web GUI

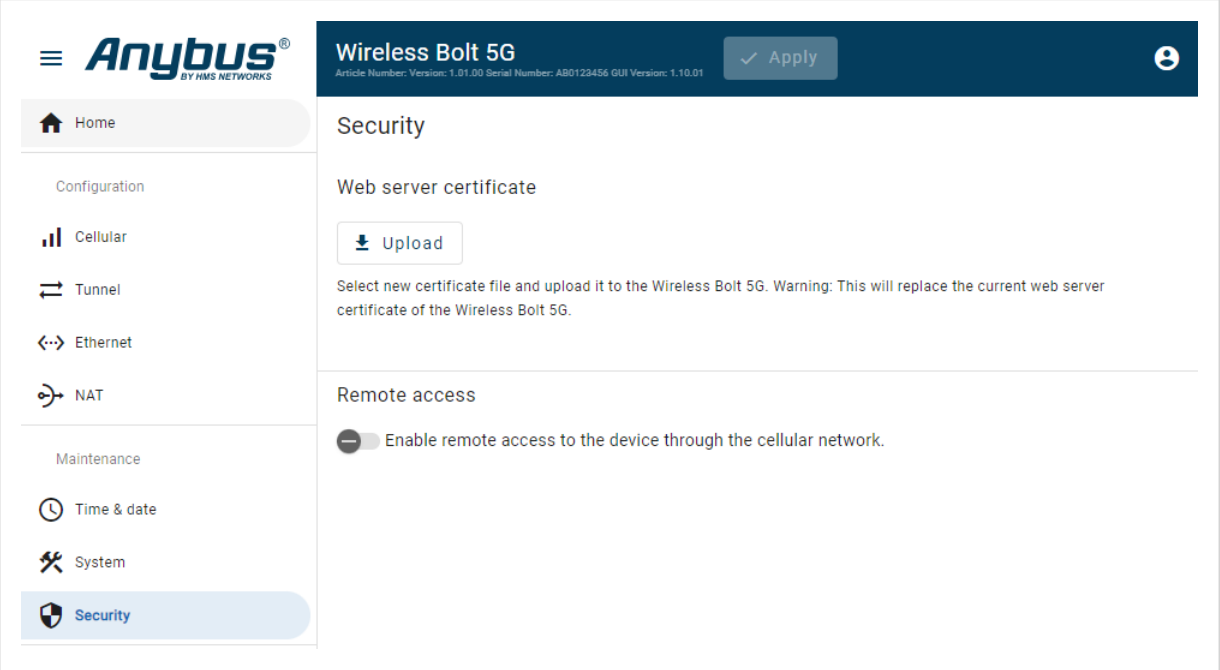


Figure 46. Bolt 5G Built-In Web GUI Remote Access

By default, **Remote access to web GUI** is disabled.

To allow remote access to the Bolt 5G, click the **slide toggle**.

When **Remote access to web GUI** is enabled, you can access the Bolt 5G built-in web interface from remote hosts.

7.7. Change the Bolt 5G Password

IMPORTANT
For cybersecurity reasons, you are prompted to change the password at first login using the Bolt 5G factory default password. You are redirected to the **Change password** page, see Change the Bolt 5G Password (page 54).

Procedure

To change the Bolt 5G built-in web interface login password:

1. In the Bolt 5G built-in web interface header, click on the **Account** icon > **Change password**.

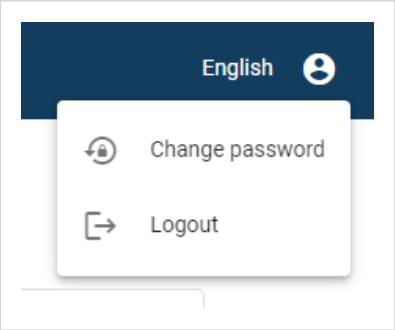


Figure 47. Account menu, Change password

2. Enter your current password, then enter a new password and confirm the new password.

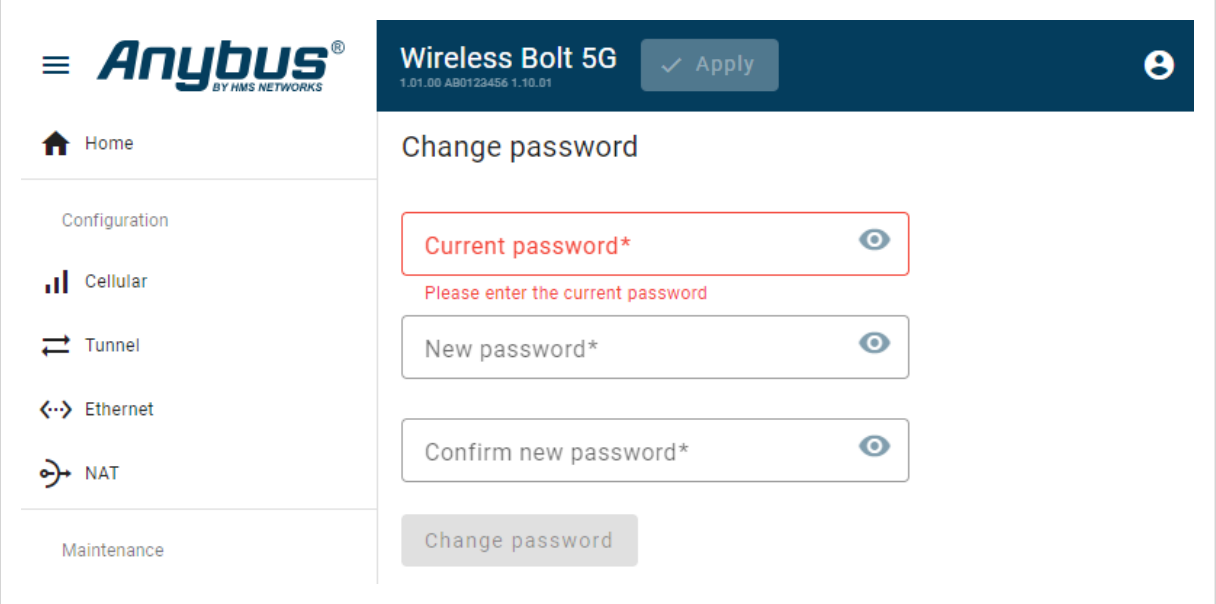


Figure 48. Change password page

3. To make the change take effect, click **Change password**.

8. Troubleshooting

8.1. Find the Bolt 5G IP Address

You can use the software application HMS IPconfig to find the Bolt 5G IP address.

Example 2. Device IP address detected in HMS IPconfig

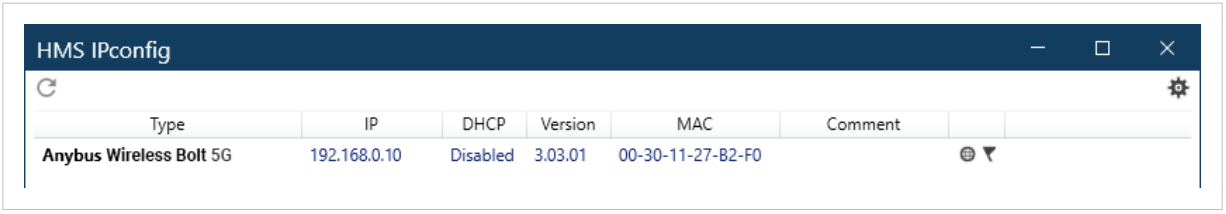


Figure 49. HMS IPconfig

To download the installation files, please visit www.hms-networks.com and enter the product article number to search for the Bolt 5G support web page. You find the product article number on the product cover.

8.2. Diagnostics

8.2.1. Event Log

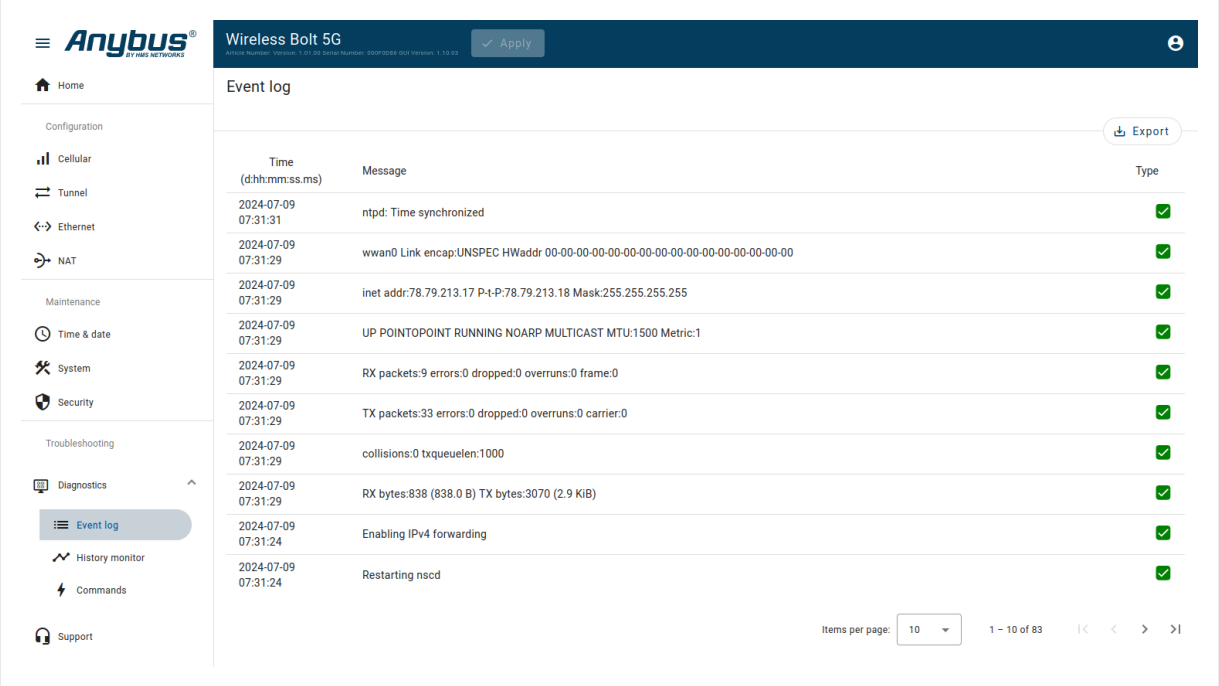


Figure 50. Event log page example

To export the log data, click **Export**. An Excel XLSX file with the data is downloaded to your PC.

How To Analyze the Information

The log follows the FIFO principle, first in and first out. The oldest (first) value is processed first.

Value	Description
Time (d:hh:mm:ss.ms)	The date and time when the event occurred.
Message	A brief description of the event.
Type	The severity of the event occurred. For description of the symbols, see Status Symbols (page 41).

8.2.2. Commands

On the **Commands** page you find tools for network troubleshooting and management.

Before You Begin

NOTE
If Bolt 5G is installed on a private cellular network, the methods are limited according to the restrictions of the private network.

NOTE
The methods are useful when evaluating the connection on the cellular network. Complete the evaluation by performing tests from the connected device on the LAN network.

NOTE
To get reliable network diagnostics results, large amounts of data may be used.

Before running the Wget method, check the SIM card data rate.

Command Types

Command	Description
Ping	Ping sends packets to the specified address and then waits for the response. Use ping to measure the round trip time. Ideally, measure towards the host that your device connects to, or another host at a similar distance. The host must be configured to respond to these types of requests. If errors exist, ping reports the errors. Ping can also show packet loss. If the host's IP address is known, start by pinging the host's IP address and then the host's DNS name. The DNS name is dependent on name server lookup. To verify that Bolt 5G is connected to internet, you can send a ping to a host or an IP number capable of returning ICMP echo responses, such as Google Public DNS.
Wget	Retrieve files using HTTP. The retrieval can help you evaluate the real download capacity of the connection. The retrieved file is not saved to the Bolt 5G. Wget can be used to evaluate performance. The reply message shows the elapsed time between the request being sent to the Target and the response being returned.
Nslookup	Nslookup is used to query internet domain name servers. When Nslookup is run, the IP address of the DNS server and the targeted host IP address are shown. The DNS server is usually specified by the network operator.

Procedure

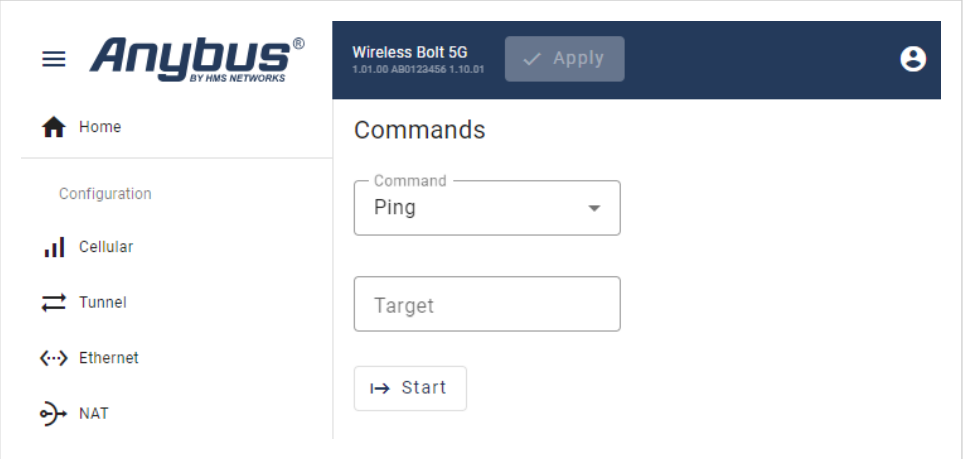


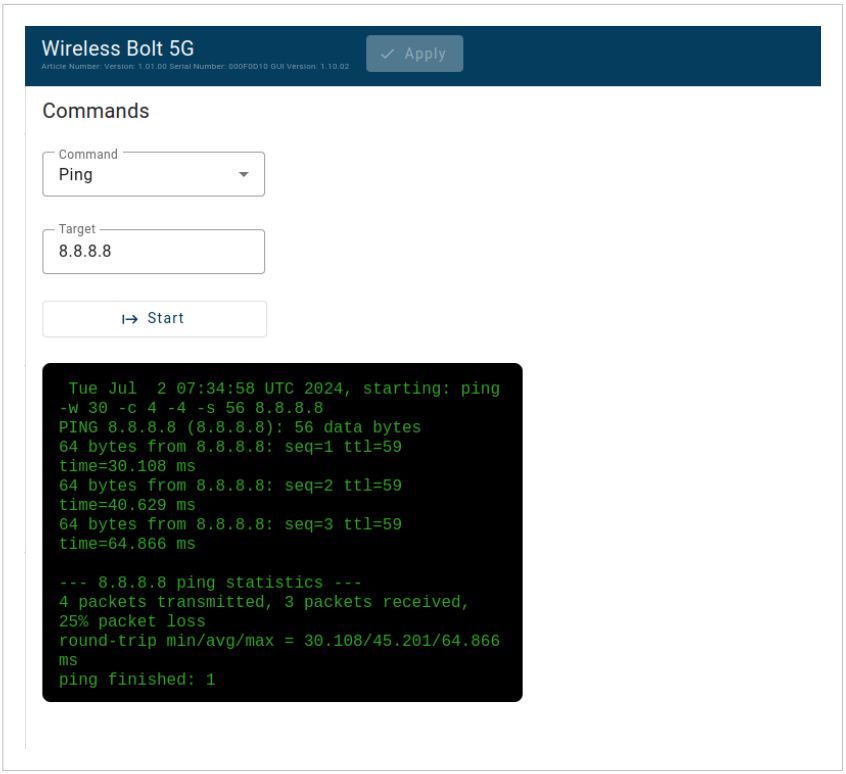
Figure 51. **Commands** page

1. From the **Command** drop-down menu, select a command type: **Ping**, **Wget,** or **Nslookup**.
2. Enter a **Target**.
   - **Ping**: Enter the IP address (IPv4) 8.8.8.8 or 8.8.4.4.
   - **Wget**: Enter the URL of the file or directory you want to download or synchronize.
   - **Nslookup**: Enter the domain name or IP address you want to query.
3. To send the command, click **Start**.

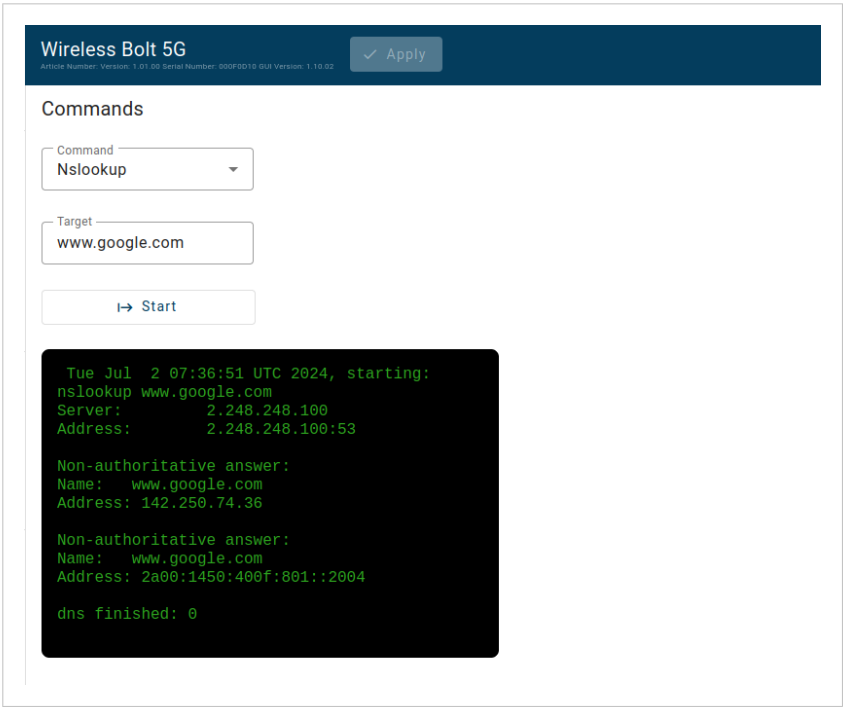
Result

The request is sent to the target. When the target response returns, a message appears.

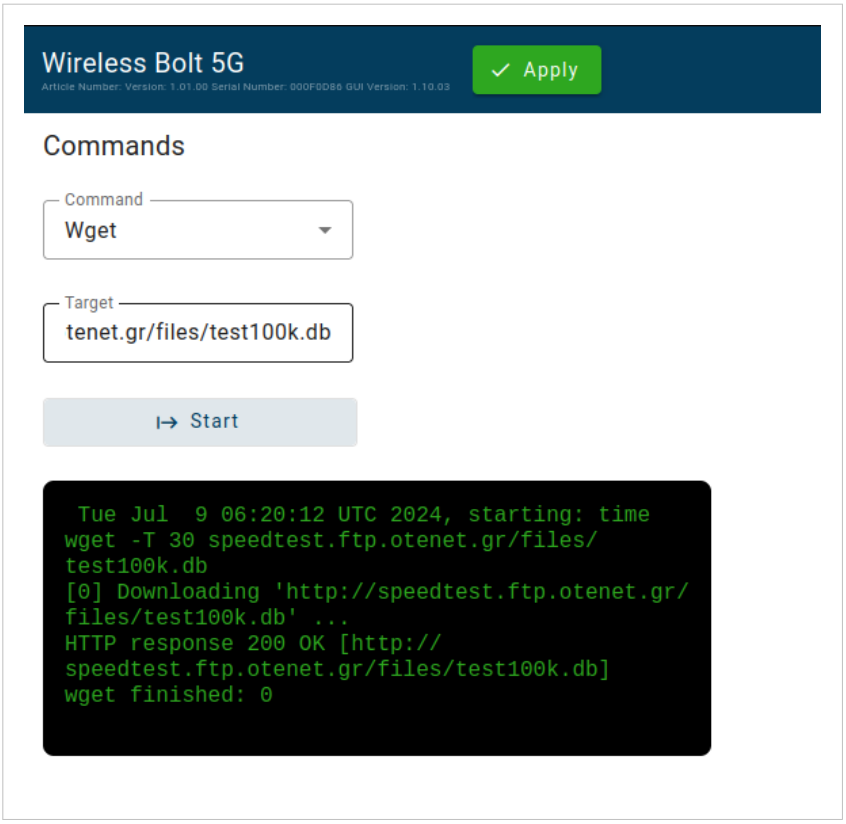
Example 3. Ping response message from target 8.8.8.8



Example 4. Nslookup response message from target webpage



Example 5. Wget response message from target Speedtest



Example 6. Wget response message from target webpage

Response message with elapsed time between the request being sent to the Target and the response being returned.

8.2.3. History Monitor

On the **History monitor** page, you can view the status over time for the Connection State, Signal Strength, and Amplifier Temperature.

Figure 52. **History monitor** page

8.3. Reboot Using the Built-In Web Interface

Before You Begin

During reboot, the Bolt 5G is temporarily unavailable for approximately two minutes.

Procedure

1. Ensure that the Bolt 5G is powered on and running.

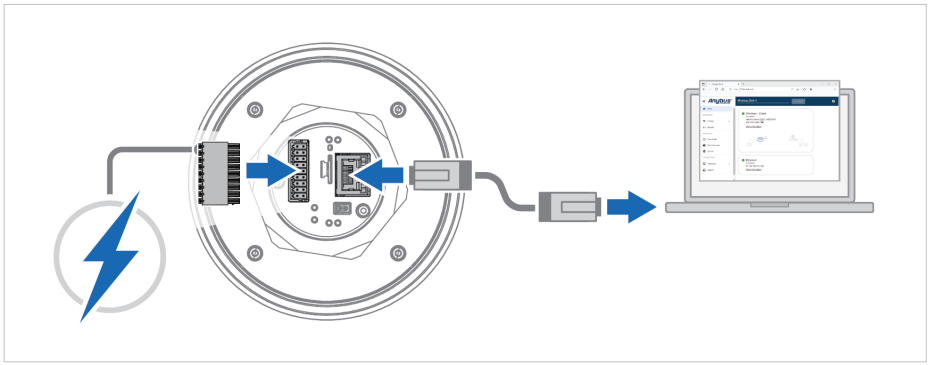


Figure 53. Power on the Bolt 5G

2. Login to the Bolt 5G built-in web interface.
3. On the **System** page, click **Reboot**.

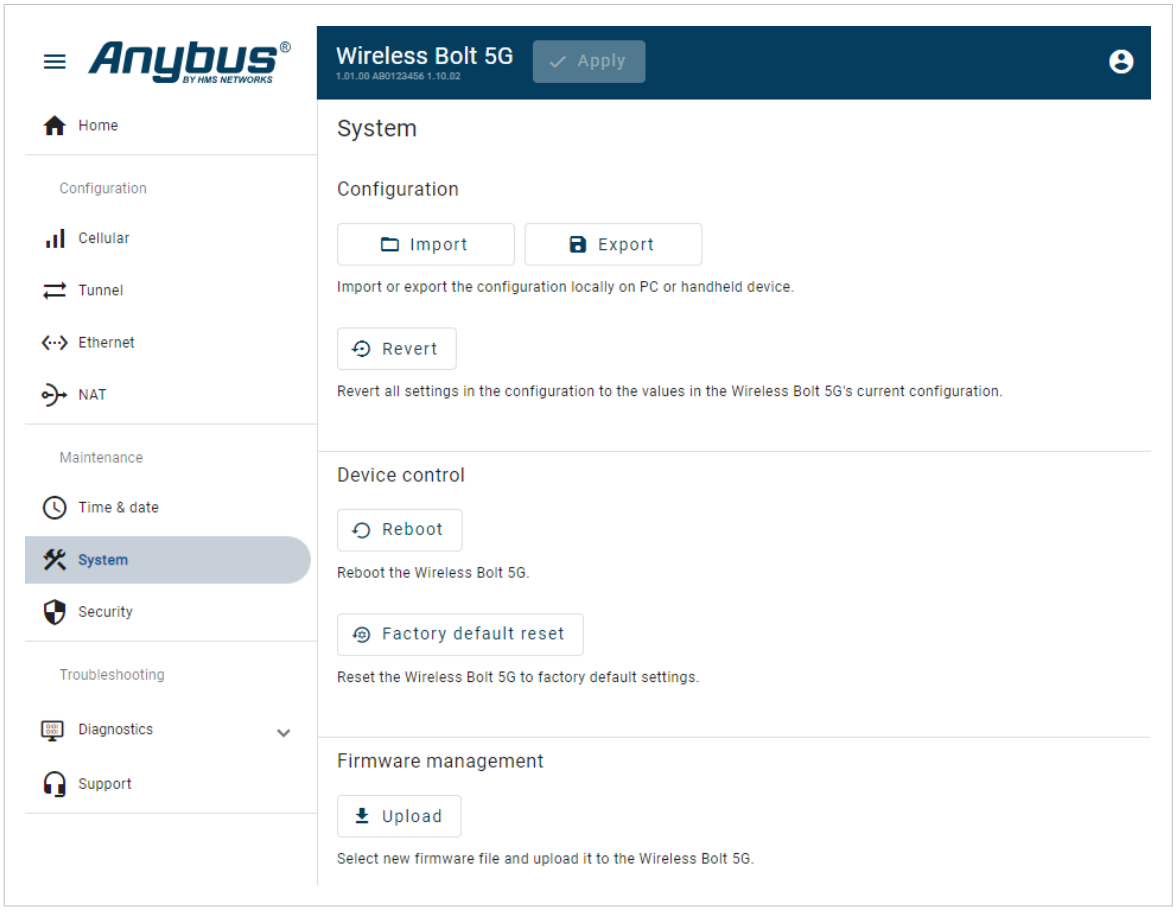


Figure 54. System page, Reboot

4. To confirm the reboot, click **Reboot**.

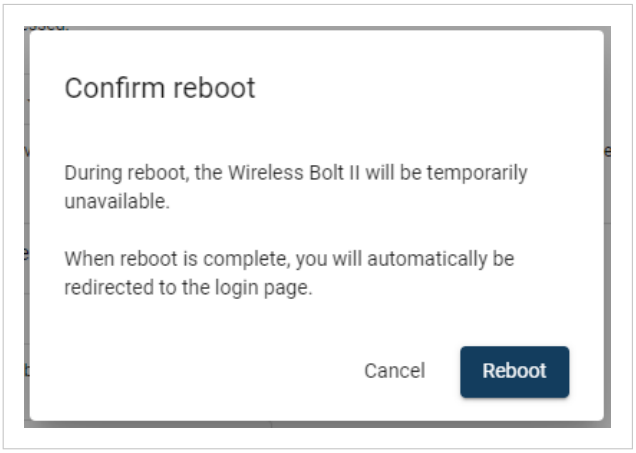


Figure 55. Confirm reboot

Result

You are logged out of the Bolt 5G built-in web interface and redirected to the login page.

8.4. Reboot Using the Reset Button

Before You Begin

During reboot, the Bolt 5G is temporarily unavailable for approximately two minutes.

Procedure

To reboot the Bolt 5G:

1. Ensure that the Bolt 5G is powered on.

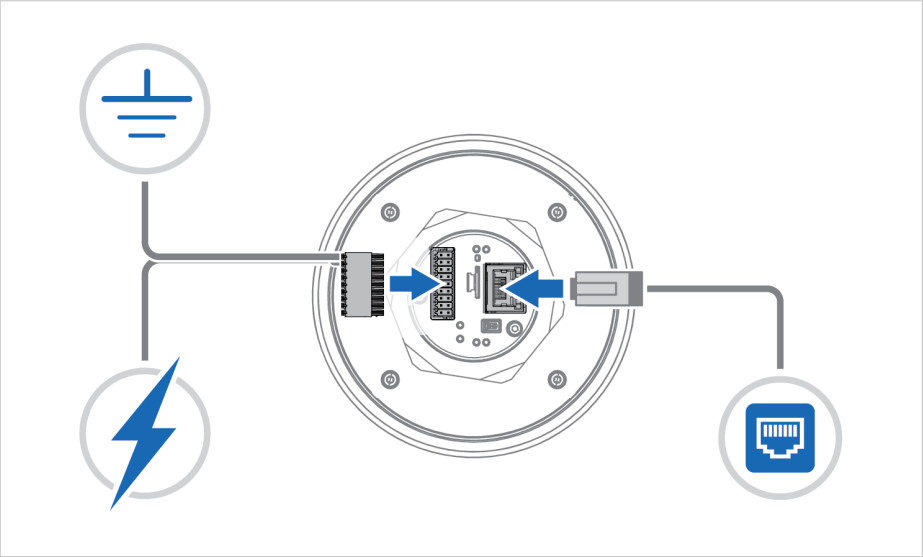


Figure 56. Power on the Bolt 5G

2. Use a pointed object, such as a paper clip, to press and hold the **Reset** button.

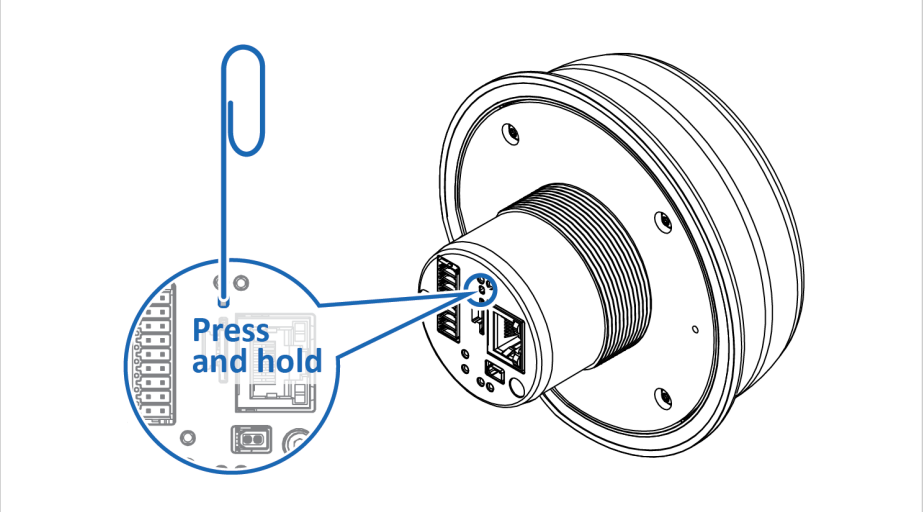


Figure 57. Press and hold **Reset** button

3. When the LED status indicators have flashed 3 times, release the **Reset** button, and wait while the Bolt 5G reboots.

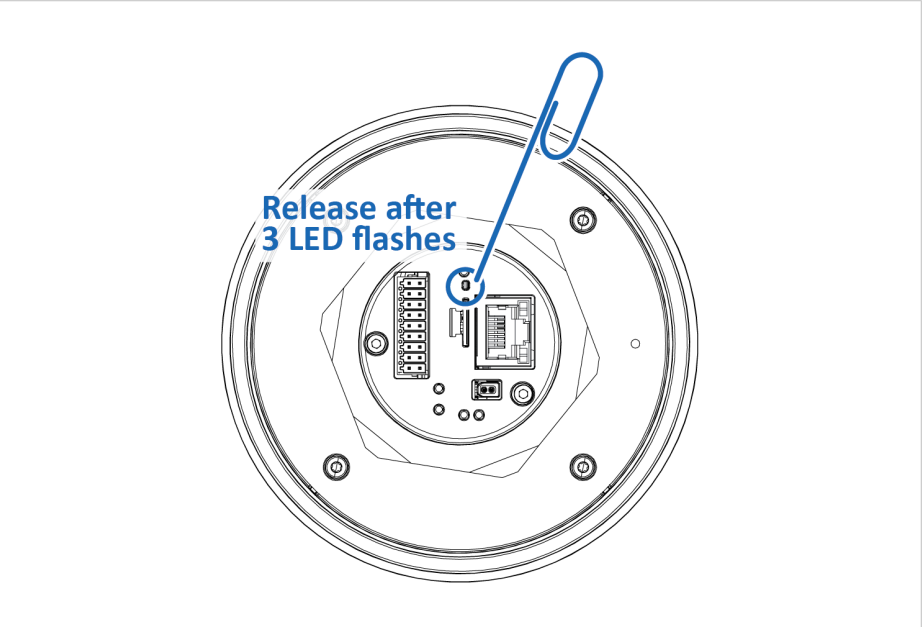


Figure 58. Release **Reset** button after the LED indicators have flashed 3 times

Result

You are logged out of the Bolt 5G built-in web interface and redirected to the login page.

8.5. Reset Using the Built-In Web Interface

Procedure

1. Ensure that the Bolt 5G is powered on and running.

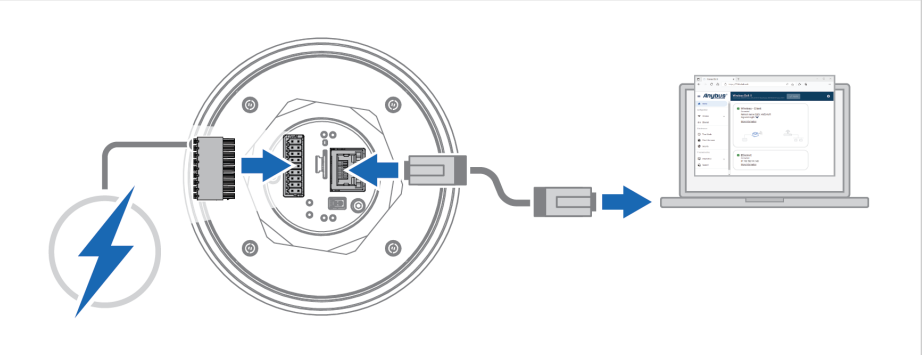


Figure 59. Power on the Bolt 5G

2. Log in to the Bolt 5G built-in web interface.
3. On the **System** page, click **Factory default reset**.

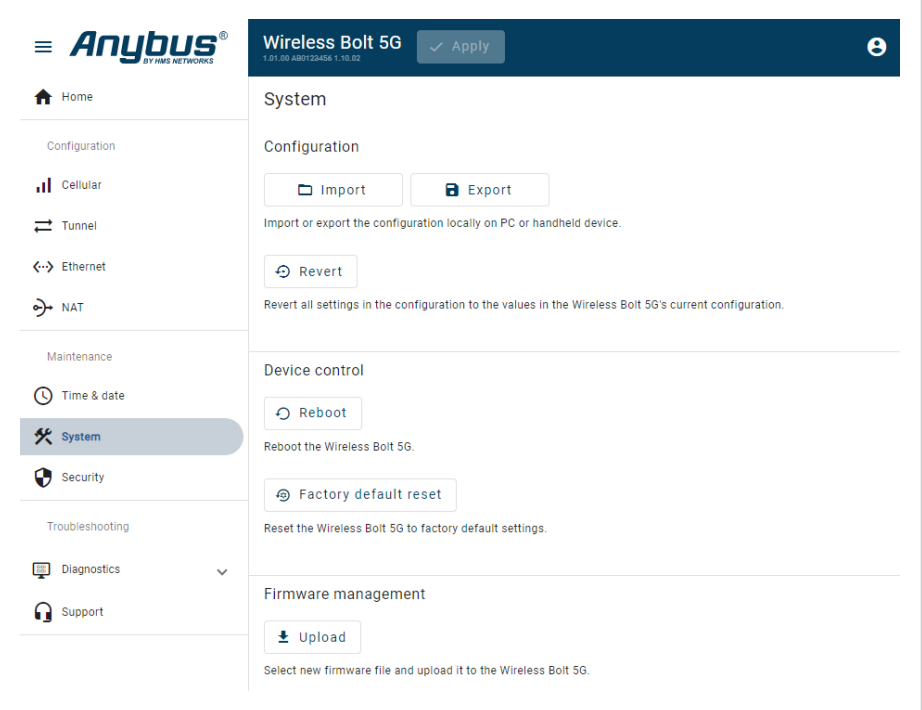


Figure 60. System page, Factory default reset

4. To confirm the factory default reset, click **Reset**.

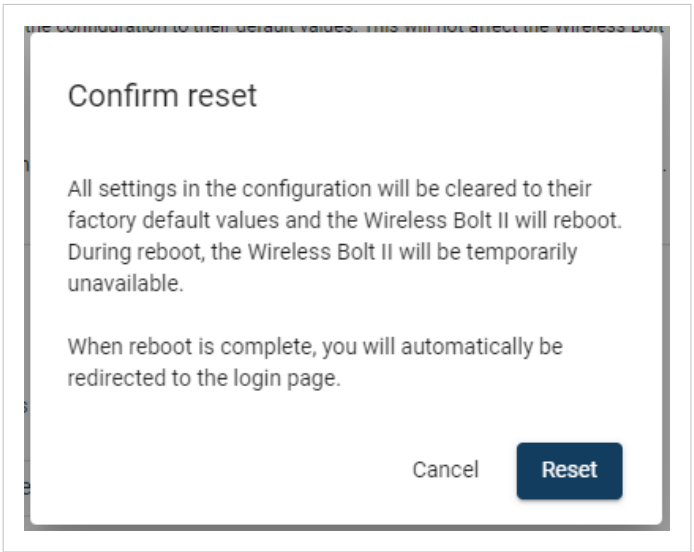


Figure 61. Confirm factory default reset

Result

You are logged out of the Bolt 5G built-in web interface and redirected to the login page.

When the Bolt 5G has successfully rebooted, the Bolt 5G configuration is reset to the factory default configuration.

8.6. Reset Using the Reset Button

IMPORTANT
Factory Reset will result in the loss of all configuration settings and logs.

1. Ensure that the Bolt 5G is powered on and running.

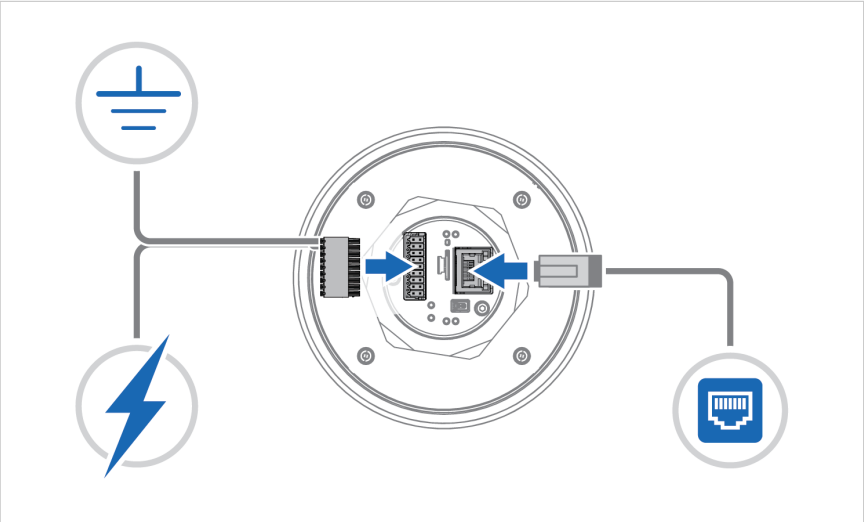


Figure 62. Power on the Bolt 5G

2. Use a pointed object, such as a paper clip, to press and hold the **Reset** button for >7 seconds.
When the **Reset** button is pressed, the Bolt 5G LED status indicators start flashing slowly.
After 7 seconds the rate increases, then release the reset button.

NOTE
Pressing the **Reset** button twice in a row will reboot the Bolt 5G without factory reset.

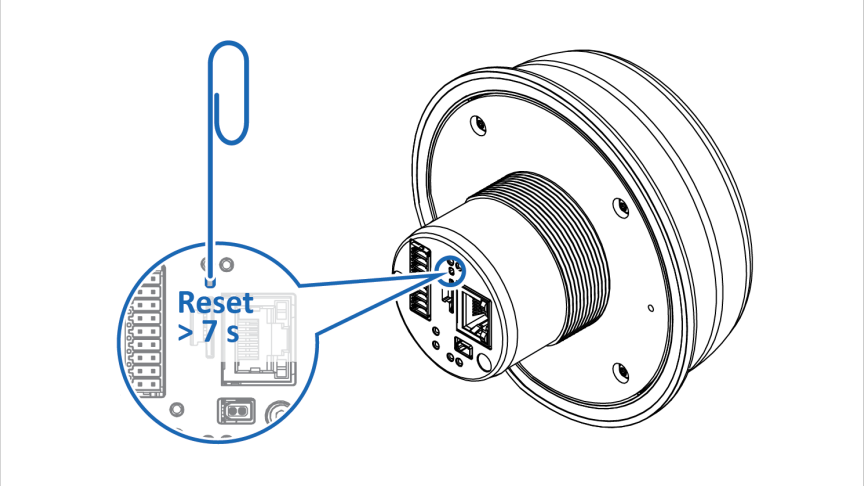


Figure 63. Reset button

Result

Bolt 5G is reset to the factory default settings.

9. Technical Data

9.1. Technical Specifications

Additional technical data and information related to the installation and use of this product can be found at www.hms-networks.com.

Model identification	NV200
Communication connector	RJ45 Ethernet 10/100/1000 Mbit/s, PoE
Signal and power connector	18-Pin signal and power connector, Phoenix Contact PCB connector DFMC 0,5/ 9-ST-2,54
Power supply, PoE	RJ45 Power over Ethernet (PoE) Input voltage: 37-57 VDC
Power supply, DC power	Input voltage: 24 VDC (9-30 VDC) Reverse voltage protection Input current: Max 625 mA @ 24 VDC Reverse polarity protect: Yes IEEE 802.3at compliant, Type 2, Class 0
Single Pair Ethernet (SPE) connector	2P2C SPE, IEEE802.3bw 100BASE-T1 Ethernet
Power consumption, PoE	Max 12.95 W
Power consumption, DC power	Max 15 W
Power over Ethernet (PoE)	44-57 VDC DTE Type1 according to IEEE 802.3af
Antenna	4 internal antennas
Frequency bands	See Frequency Bands and Power Level (page 20).
Storage temperature	-40 to +85 °C
Operating temperature	-40 to +70 °C
Humidity	EN 600068-2-78: Damp heat, +40°C, 90% Non-condensing
Housing material	Plastic (see data sheet for details) Aluminum (see data sheet for details)
Protection class	Top (outside of host): IP66 Base (inside of host): IP32
Product weight	300 g
Dimensions	Height: 87 mm Diameter Bottom: 50 mm Top: 114 mm
Mounting	M50 screw and nut. 50.5 mm hole needed. Locking screw M2.5 (2,5 mm)