Anybus® Wireless Bolt™ IoT

Important User Information

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1   Preface

1.1   About This Document

This manual describes how to install and configure Anybus Wireless Bolt IoT.

For additional documentation and software downloads, FAQs, troubleshooting guides and technical support, please visit www.anybus.com/support.

1.2   Document Conventions

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

►   An action

     →   and a result

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

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Program code and script examples
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Cross-reference within this document: *Document Conventions, p. 4*

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

> ⚠ **WARNING**
> Instruction that must be followed to avoid a risk of death or serious injury.

> ⚠ **Caution**
> Instruction that must be followed to avoid a risk of personal injury.

> ❗ 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.

> ⓘ *Additional information which may facilitate installation and/or operation.*

1.3   Trademarks

Anybus® is a registered trademark and Wireless Bolt IoT™ is a trademark of HMS Industrial Networks AB. All other trademarks mentioned in this document are the property of their respective holders.

2   Safety

2.1   General Safety Instructions

⚠️ **Caution**
This equipment emits RF energy in the ISM (Industrial, Scientific, Medical) band. Make sure that all medical devices used in proximity to this equipment meet appropriate susceptibility specifications for this type of RF energy.

⚠️ **Caution**
Minimum temperature rating of the cable to be connected to the field wiring terminals, 90 °C.

⚠️ **Caution**
Use copper wire only for field wiring terminals.

❗ This equipment is recommended for use in both industrial and domestic environments. For industrial environments it is mandatory to use the functional earth connection to comply with immunity requirements. For domestic environments the functional earth must be used if a shielded Ethernet cable is used, in order to meet emission requirements.

❗ This equipment contains parts that can be damaged by electrostatic discharge (ESD). Use ESD prevention measures to avoid damage.

2.2   Intended Use

The intended use of this equipment is as a communication interface and router. The equipment receives and transmits data over Ethernet and Cellular standard networks.

3   Installation

3.1   Installing SIM Card

(i) *Supported SIM card types are Nano SIM for IoT and M2M, for data communication, as well as standard mobile phone Nano SIM.*
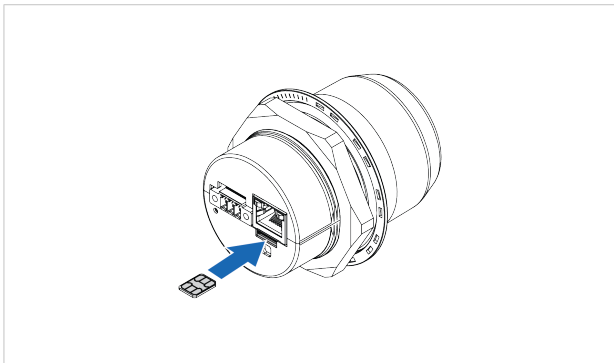

Fig. 1

To connect Wireless Bolt IoT to a cellular data network, install a cellular SIM card:

1.   Insert a *SIM card* into the Wireless Bolt IoT *SIM card holder.*

(i) *Ensure that the SIM card contact surface is facing towards the Ethernet port.*

3.2   Mechanical Installation

Placement

- The device is intended to be mounted on top of a machine or cabinet through an M50 (50.5 mm) hole using the included sealing ring and nut.

- The top mounting surface, in contact with the sealing, must be flat with a finish equivalent to Ra 3.2 or finer and cleaned and free from oils and greases.

- For optimal reception, cellular devices require a zone around them clear of objects that could obstruct or reflect the signal. To avoid interference, a minimum distance of 50 cm between Wireless Bolt IoT and other cellular devices should be observed.

> **!** Make sure that the sealing ring is correctly placed in the circular groove in the top part of the housing before tightening the nut.

> **!** Always hold the BOTTOM part of the unit when untightening the nut, not the top part (the cap).
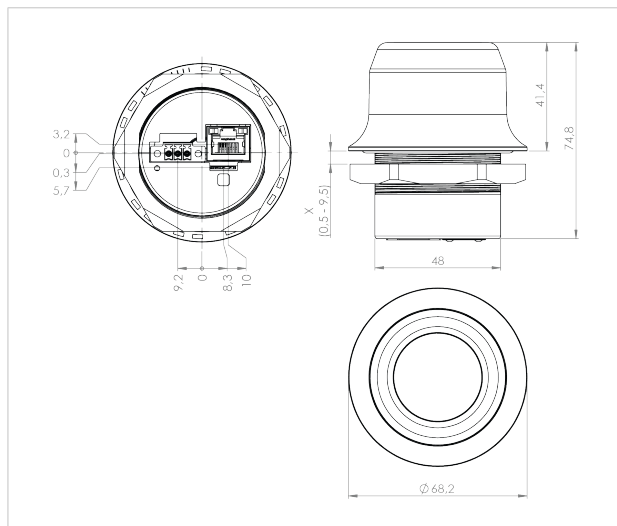
Tightening torque: 5 Nm ±10 %

Fig. 2   Installation drawing

All measurements are in mm.

3.3   Connecting to Power Over Ethernet (PoE)

Before You Begin

> **!** Connecting the Wireless Bolt IoT to PoE and DC power simultaneously may result in a current loop that could damage both the power sources and the Wireless Bolt IoT. Ensure to use only one of the power connections at a time.

> **(i)** *Shielded or unshielded Ethernet cables may be used.*

> **(i)** *Wireless Bolt IoT is designed to comply with PoE class 0 (37-57 VDC, max 0.35 A), according to IEEE 802.3.*
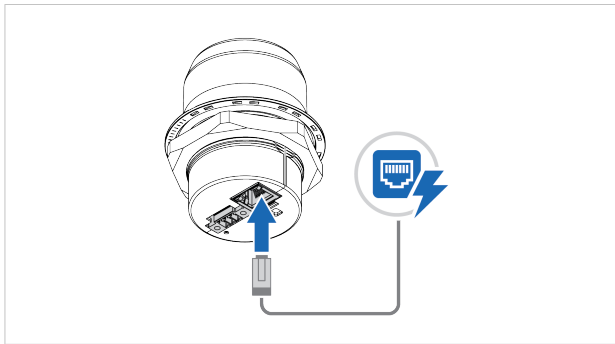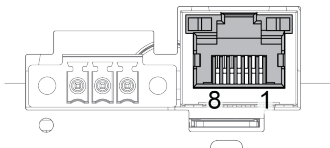
Procedure

Fig. 3

1.   Connect the Wireless Bolt IoT *Ethernet port* to Ethernet/PoE.

Ethernet Connector, RJ45 PoE

Pin	Data	PoE	
1	TD+	A+	Positive power from alt. A PSE
2	TD-		
3	RD+	A-	Negative power from alt. A PSE (with pin 6)
4		B+	Positive power from alt. B PSE
5			
6	RD-	A-	Negative power from alt. A PSE (with pin 3)
7		B-	Negative power from alt. B PSE
8			
Housing	Shield	Functional Earth (FE), via 1 nF capacitor and 1 MΩ bleeder resistor	

3.4   Connecting to Power and Ethernet

Before You Begin

> ! Connecting power with reverse polarity or using the wrong type of power supply may damage the equipment. Make sure that the power supply is connected correctly and of the recommended type.

> ! Connecting the Wireless Bolt IoT to PoE and DC power simultaneously may result in a current loop that could damage both the power sources and the Wireless Bolt IoT. Ensure to use only one of the power connections at a time.

> ! When Wireless Bolt IoT is powered via the power connector, Functional Earth (FE) must be connected.

> ℹ️ *When Wireless Bolt IoT 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.*

See also *Technical Data, p. 18* regarding power supply requirements.
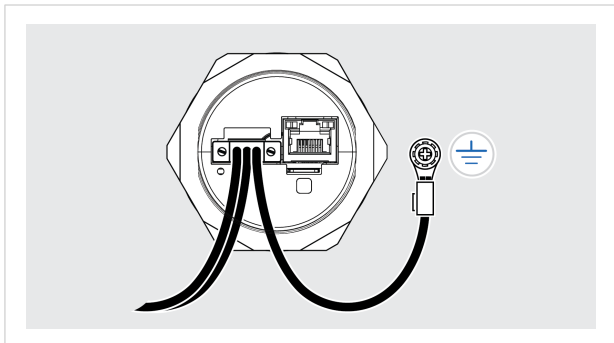
Functional earth wire screw placement

Fig. 4

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

Procedure

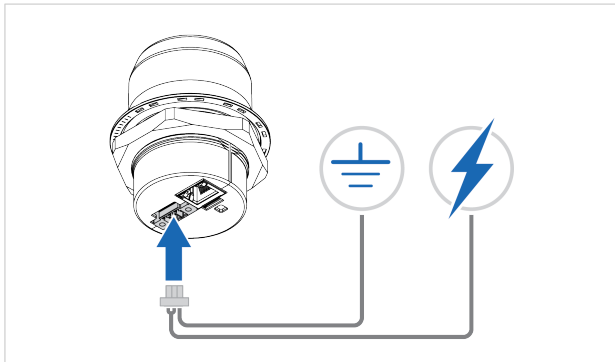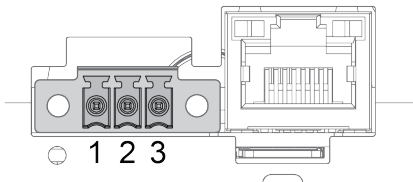**Connecting to power**

Fig. 5

1. Connect Wireless Bolt IoT *Power connector* to a power supply.

2. Connect Wireless Bolt IoT *Power connector* to Functional Earth (FE).

Power connector, 3-pin terminal block

Pin	Function	
1	+	11–33 VDC
2	-	
3	Functional Earth (FE)	

Connecting to Ethernet

3.   Connect the Wireless Bolt IoT to Ethernet.
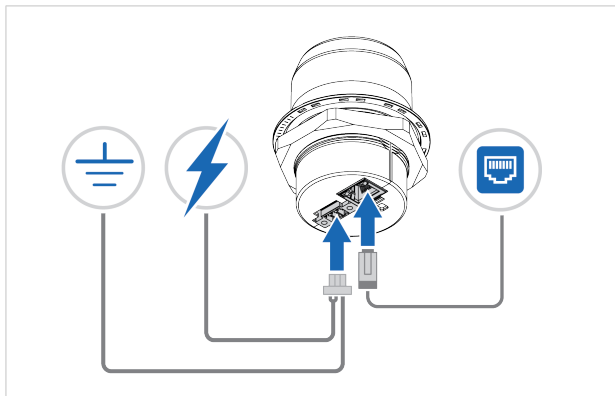

Fig. 6

4   Configuration
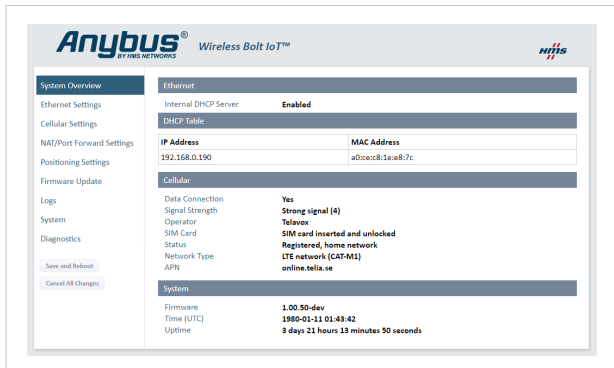
Wireless Bolt IoT Built-In Web Interface

Fig. 7   Example, Wireless Bolt IoT built-in web interface

The Wireless Bolt IoT built-in web interface is used to configure the Wireless Bolt IoT system settings.

The *System Overview* page shows the current settings and network connection status.

Before You Begin

The Wireless Bolt IoT comes with a default username and password.

*The default username is **admin**. Written in lowercase letters.*

You find the default password on the Wireless Bolt IoT product housing.

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*Wireless Bolt IoT default IP address is **192.168.0.98**.*

To access the Wireless Bolt IoT built-in web interface, ensure that the Wireless Bolt IoT IP address and your PC IP address are within the same IP address range.
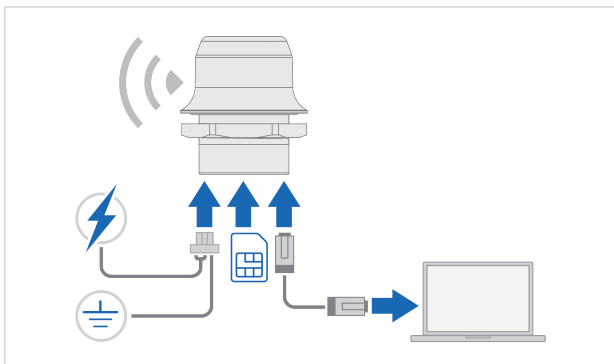
Procedure

Fig. 8

Connecting Wireless Bolt IoT to internet:

1. Insert a *cellular SIM card* in the Wireless Bolt IoT *SIM card holder*.

> ℹ️ *Ensure that the SIM card contact surface is facing towards the Ethernet port.*

2. Connect the Wireless Bolt IoT *Ethernet port* to your PC.

3. Connect the Wireless Bolt IoT *Power connector* to a power supply.

4. To access the built-in web interface, enter the Wireless Bolt IoT IP address in your web browser and click Enter.

5. Login to the Wireless Bolt IoT built-in web interface.

6. Configure the **Ethernet Settings**, IP address and internal DHCP server settings.

7. Verify that the **APN Settings** are correct. You can adjust the settings manually.

8. In the left sidebar menu, click **Save and Reboot**.

    → Wireless Bolt IoT automatically reboots for the settings to take effect.

9. On the **System Overview** page, verify that the cellular **Data Connection** has status **Yes**.

Result

Wireless Bolt IoT should now be connected to internet.

> (i) *Depending on the mobile network operator and network type, it can take up to 10 minutes the first time Wireless Bolt IoT is connecting to internet.*

Verify that Wireless Bolt IoT is connected to internet, by sending a ping to *Google Public DNS*.

1. On the **Diagnostics** page, select the **Ping** method.

2. In the **Target** field, enter the IP address *8.8.8.8*.

3. To **Perform Action**, click **Start**.

    → The ping request is sent.

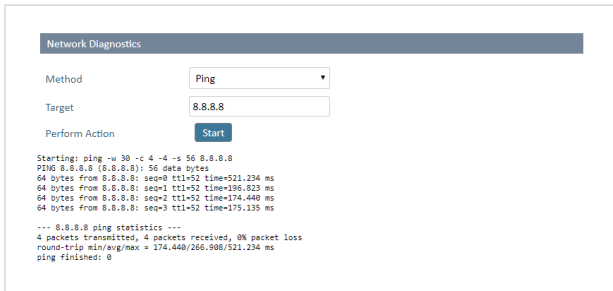   → When the ping response returns, a message appears.

Network Diagnostics

Method	Ping
Target	8.8.8.8
Perform Action	Start

```
Starting: ping -w 30 -c 4 -4 -s 56 8.8.8.8
PING 8.8.8.8 (8.8.8.8): 56 data bytes
64 bytes from 8.8.8.8: seq=0 ttl=52 time=521.234 ms
64 bytes from 8.8.8.8: seq=1 ttl=52 time=196.823 ms
64 bytes from 8.8.8.8: seq=2 ttl=52 time=174.440 ms
64 bytes from 8.8.8.8: seq=3 ttl=52 time=175.135 ms

--- 8.8.8.8 ping statistics ---
4 packets transmitted, 4 packets received, 0% packet loss
round-trip min/avg/max = 174.440/266.908/521.234 ms
ping finished: 0
```

Fig. 9   Example, Ping response message from target 8.8.8.8
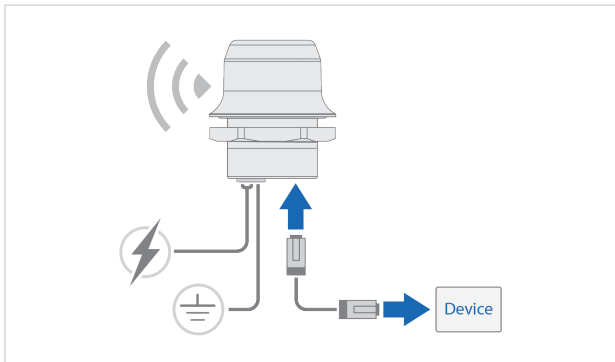
Connecting Devices

Fig. 10

Connecting a device to internet:

1. Connect an Ethernet cable between Wireless Bolt IoT and the device.
2. Verify that the device is connected to internet.

5   Technical Data

5.1   Technical Specifications

Order code	AWB1000	AWB1001
Color	Black	White top and black base
Operating temperature	Shadow: -40 to +65 °C Direct sunlight: -40 to +45 °C	Shadow: -40 to +65 °C Direct sunlight: -40 to +65 °C
Host interface	RJ45 Ethernet 10/100 Mbit/s, PoE	
Storage temperature	-40 to +85 °C	
Humidity compability	EN 600068-2-78: Damp heat, +40 °C, 90% (non-condensing).	
Vibration	Refer to datasheet at www.anybus.com/support.	
Dimensions	Diameter: 68 mm. Height: 75 mm without Power connector, 84 mm incl. Power connector. Height above mounting surface: 41 mm.	
Weight	95 g	
Housing material	Plastic (see datasheet for details)	
Protection class	Top (outside of host): IP66 and IP67 / UL Type 4X Base (inside of host): IP21	
Mounting	M50 screw and nut (50.5 mm hole needed)	
Power	3-pin screw connector and PoE (Power over Ethernet) 11-33 VDC through Power connector, PoE PD according to IEEE 802.3af through Eternet connector. Redundant or separate operation of PoE and DC connectors. Power Consumption: Sleep Mode: Power connector 0.1 W. PoE 0.3 W Idle Mode: Power connector 0.6 W. PoE 0.8 W Worst Case (GPRS/2G) average power: Power connector 3.2 W. PoE 3.6 W. Worst case (GPRS/2G) peak current: 1.2A@11VDC	
Cellular standards	4G LTE: Category Cat-M1 and NB-IoT.	

Order code	AWB1000	AWB1001
	Frequency Bands: B1, B2, B3, B4, B5, B8, B12, B13, B17, B18, B19, B20, B26, B28 2G: EDGE, GPRS bands 850, 900, 1800, 1900	
Maximum Data speeds	Cat-M1: Download 300 kbps, Upload 375 kbps NB-IoT: Download 27 kbps, Upload 65 kbps GPRS/EDGE Download: 200 kbps, Upload: 200 kbps.	
Ethernet protocols	Transparent transfer of any TCP/UDP based protocol, Built-in firewall, NAT and DHCP server.	
Certifications	Refer to datasheet at www.anybus.com/support.	

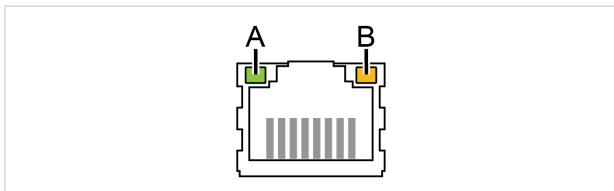This page intentionally left blank

A   Ethernet LED Status Indication

Fig. 11   RJ45 LED indicators

LED A – LINK/ACTIVITY	Function
Off	No Ethernet link
Yellow	10 Mb/s Ethernet link established
Yellow, flashing	10 Mb/s Ethernet activity
Green	100 Mb/s Ethernet link established
Green, flashing	100 Mb/s Ethernet activity

LED B – STATUS	Function
Off	No power
Blue	Connected on LTE-M
Purple	Connected on LTE NB1
Blue, slow blink	Connected on GSM.
Alternating blue/purple	Trying to connect
Red, slow blink	No configured cellular interface/no SIM card/no valid configuration
Red	Recoverable/unrecoverable fault
Yellow	Booting or sleep