Ibex-4000 Series

RAILWAY ACCESS POINT WITH WI-FI 6(E) TRIPLE RADIO

INSTALLATION MANUAL

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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.

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 ° 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.

- 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 in the Download Center at www.eltec.com.

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1 ABOUT THIS DOCUMENT

This installation manual is intended only for system developers and integrators; it is not intended for end users.

It describes the hardware functions of the product, connection of peripheral devices and integration into a system. Additional information on special applications and the configuration of the product is available in a separate configuration manual which can be downloaded from the Download Center at www.eltec.com.

2 OVERVIEW

2.1 PRODUCTS

This installation manual comprises all information to set-up the following product.

Figure 1 **Picture of Ibex-4000**

3 HARDWARE

3.1 DEVICE CONNECTORS

3.1.1 POWER SUPPLY CONNECTORS

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.

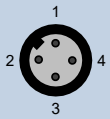
	PIN	SIGNAL NAME	DESCRIPTION
	1	+VIN	Supply voltage, positive terminal
	2	+VIN	Supply voltage, positive terminal
	3	-VIN	Supply voltage, negative terminal
	4	-VIN	Supply voltage, negative terminal

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

3.1.2 ETHERNET INTERFACES

The two LAN-ports of the Ibex-4000 series are utilizing M12 X-coded connectors with the pin-assignment as shown in Table 2. Mating connectors are available from several manufacturers.

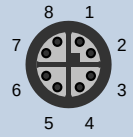
	PIN	SIGNAL NAME	DESCRIPTION
	1	D1+	First data line plus
	2	D1-	First data line minus
	3	D2+	Second data line plus
	4	D2-	Second data line minus
	5	D4+	Fourth data line plus
	6	D4-	Fourth data line minus
	7	D3-	Third data line minus
	8	D3+	Third data line plus

Table 2 **Pin Assignment of M12 Ethernet Connectors (LAN1/2)**

3.1.3 ANTENNA CONNECTORS

The QLS antenna connectors are located at the bottom part of the front panel. The radio interface connectors are labeled as A1 to A4 for the first WLAN module, B1 to B4 for the second module, and C1 to C4 for the third module. Their functionalities depend on the Ibex model (see 3.4.1 Assignment Front Panel Labelling – Software).

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 access point	Rotate and/or push the screwdriver while pulling the antenna
	

3.2 POWER SUPPLY

3.2.1 POWER INPUT

The Ibex-4000 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.

3.2.2 POWER OVER ETHERNET (POE+, POE++)

The Ibex-4000 is designed to be supplied via the Ethernet uplink, as class 4 powered device, according to IEEE 802.3at (PoE+) and as class 6 powered device, according to IEEE 802bt (PoE++). In this case the supply voltage is provided remotely over the injector.

Important: The Power-over-Ethernet option is applicable on certain devices only, which don't include bypass relays.

3.3 M12 SERVICE INTERFACE

The Ibex-4000 is equipped with a USB and serial port. The USB port can be used to attach a memory device to update the firmware or to configure the device. It can also be used to perform a factory reset.

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.

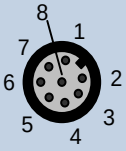
	PIN	SIGNAL NAME	DESCRIPTION
	1	USB-VBUS	USB positive power supply voltage (5V)
	2	USB-D-	USB negative data line
	3	USB-D+	USB positive data line
	4	USB-GND	USB negative power supply voltage
	5	Reset	Low Active Reset Input
	6	RS232-TX	Console port transmit data
	7	RS232-RX	Console port receive data
	8	RS232-GND	Console port ground

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

3.4 FRONT PANEL AND MODULE-TO-ANTENNA CONNECTIONS

The figure below provides an overview of the front panel.

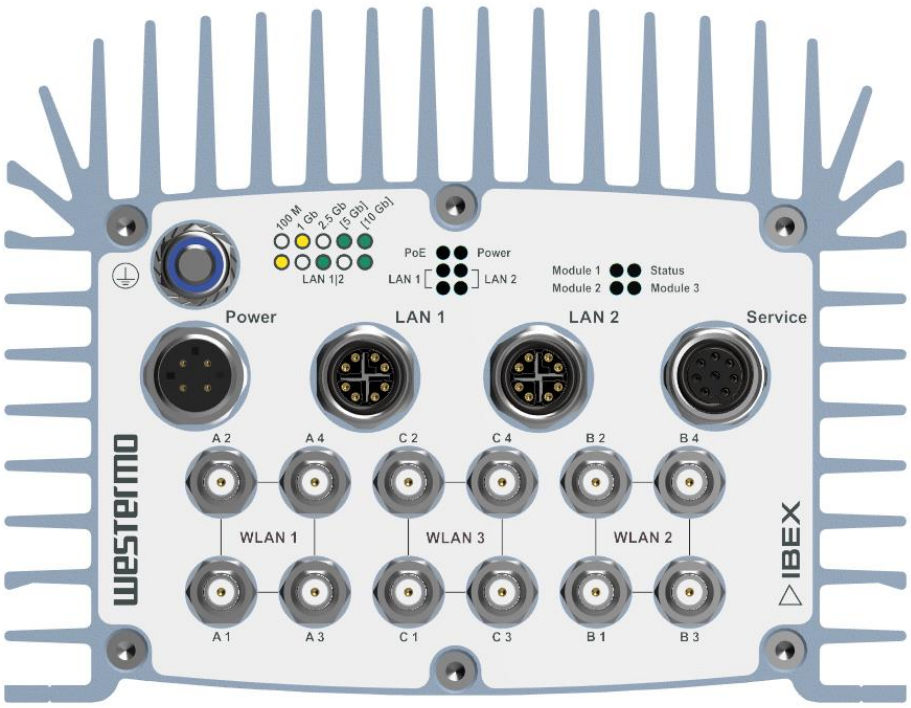


Figure 2 **Front Panel Overview**

3.4.1 ASSIGNMENT FRONT PANEL LABELLING – SOFTWARE

- The ports and LEDs “LAN 1” and “LAN 2” correspond respectively to the interfaces “eth0” and “eth1”
- The LEDs “Module 1”, “Module 2” and “Module 3” refer to the WLAN modules
- WLAN modules are called “radio” within the software
- The purpose of the antennas depends on the modules inserted in your Ibex model

IBEX MODELS	LED ⇔ SOFTWARE CORRELATION	ANTENNAS		
Ibex-4XXX Triple WLAN	Module 1 ⇔ Radio 0 Module 2 ⇔ Radio 1 Module 3 ⇔ Radio 2	WLAN 1 A1 to A4 (4x4) 2.4 / 5 Ghz	WLAN 3 (optional for 6E) C1 to C4 (4x4) 6 GHz	WLAN 2 B1 to B4 (4x4) 2.4 / 5 Ghz
Ibex-4XXX Dual WLAN with antenna combiner	Module 1 ⇔ Radio 0 Module 2 ⇔ Radio 1	-	-	WLAN 1 | 2 A1 to A4 (4x4)

Table 4 **Overview Front Panel Antenna Description**

3.5 LED INDICATORS

The LEDs on the front panel of Ibex-4000 provide quick indication of the device status.

3.5.1 POWER LED

LED COLOR	STATE	DESCRIPTION
green	on	Device is receiving correct input power
LED	off	Device is not powered

Table 5 **Power LED**

3.5.2 STATUS LED

LED COLOR	STATE	DESCRIPTION
LED	off	Device is booting
green	on	Normal operation
green	blinking	Device is resetting to factory settings
red / green	toggle	Emergency system booted

Table 6 **Status LED**

3.5.3 MODULE 1 / 2 / 3 LED

LED COLOR	STATE	DESCRIPTION
green	on	Indicates module is in use
green	blinking	Indicates data transfer on module
red	on	Indicates module failed
LED	off	Indicates module is inactive

Table 7 **Module 1, 2 and 3 LED**

3.5.4 POE LED

LED COLOR	STATE	DESCRIPTION
green	on	Indicates device is powered by PoE
LED	off	No PoE power

Table 8 **PoE LED**

3.5.5 LAN1 / LAN2 LED´S

LED COLOR	STATE	DESCRIPTION
green green	static	Indicates 10 Gbit Link established
green off	static	Indicates 5 Gbit Link established
off green	static	Indicates 2.5 Gbit Link established
yellow off	static	Indicates 1 Gbit Link established
off yellow	static	Indicates 100 Mbit Link established
off off	Static	Incidates no link
LED	blinking	Indicates network activity

Table 9 **LAN1 / LAN2 LED´s**

3.6 FACTORY RESET

The Ibex-4000 is equipped with a physical reset function on the service connector. The effect of triggering the factory reset depends on the duration of its activation, as indicated in Table 10 below. The timing behavior is only valid if the device has completly 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	STATUS LED	ACTION
< 2 seconds	off	Reset after release
2-5 seconds	off	No action
> 5 seconds	green blinking	Remove custom configuration then reset

Table 10 **Factory Reset Behavior**

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 Ibex-4000, 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 IP54.
- 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 3 shows the outer dimensions of the housing, including the position of the mounting cutouts.

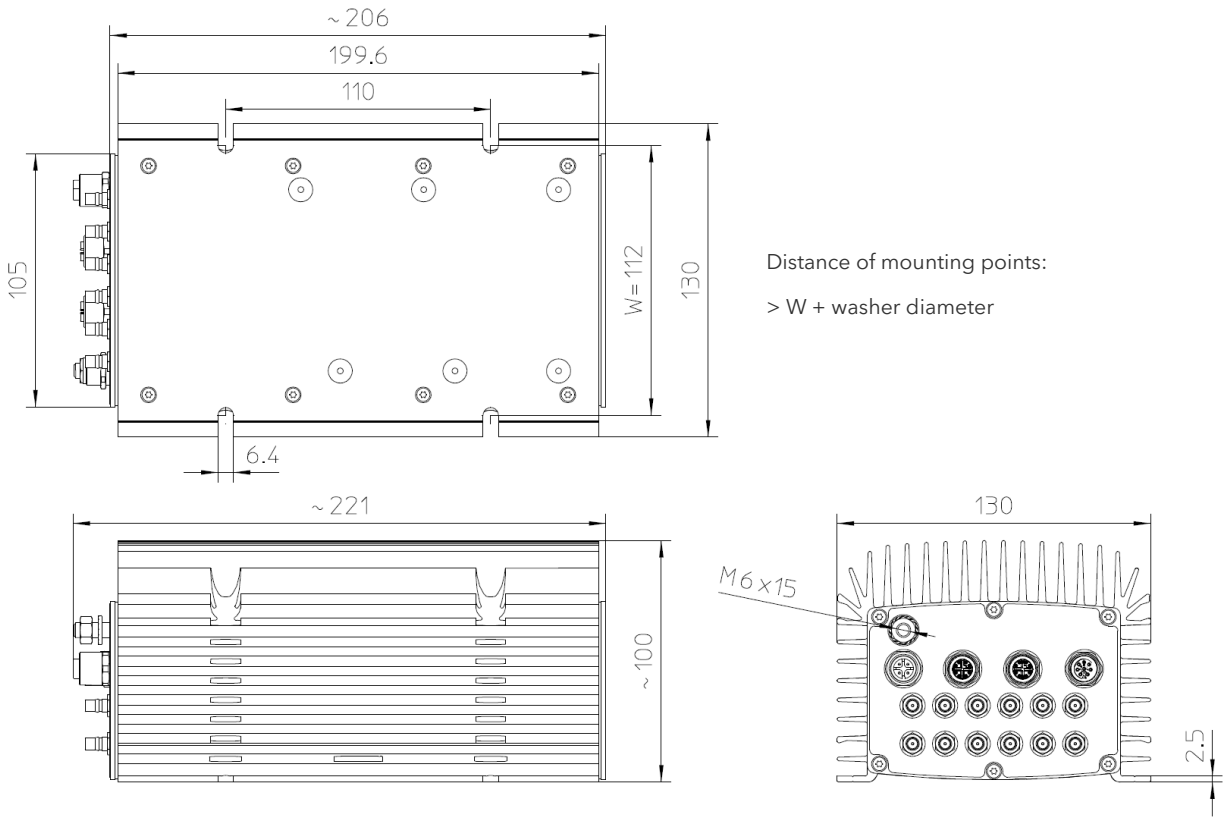


Figure 3 **Dimensions of the Ibex-4000 Housing**

4.1 CONNECTING AN EARTHING CABLE

The M6 earthing stud on the front panel of the device (also refer to Figure 2) 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 4.
- Fasten the cable by tightening the nut to the required torque (recommended according to EN60947-1 are 3 Nm).

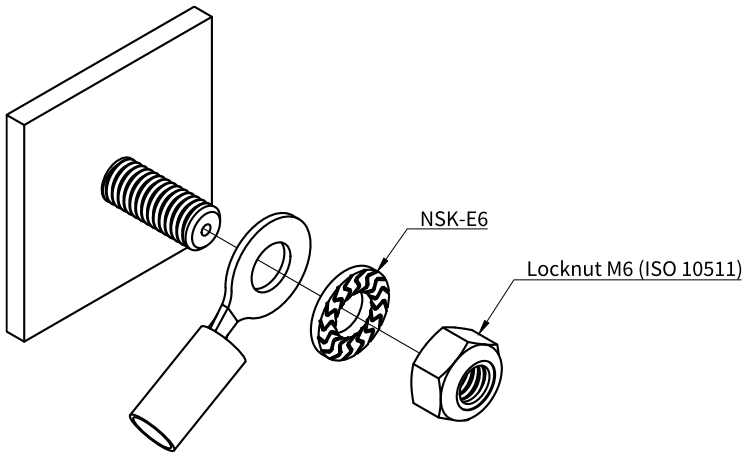


Figure 4 **Earth Cable Mounting on Earth Stud**

4.2 ELECTRICAL CONNECTION

1. Make sure the device is properly grounded.
2. Establish a connection to the network by plugging an M12 patch cable to one of the front panel M12 connectors. Each LAN port may be used if the access point is supplied by a local power supply through the power supply connector. When using PoE+, the connector labeled LAN1 must be used.
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 product label.
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 is damage 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.