westermo Ibex-RT-370 Series WLAN 802.11 Access Point with Optical Ethernet User Guide

Contents

westermo Ibex-RT-370 Series WLAN 802.11 Access Point with Optical Ethernet

General Information

Legal Information

The contents of this document are provided “as is”. Except as required by applicable law, no warranties of any kind are made in relation to the accuracy and reliability or contents of this document, either expressed or implied, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. Westermo reserves the right to revise this document or withdraw it at any time without prior notice. Under no circumstances shall Westermo be responsible for any loss of data or income or any special, incidental, and consequential or indirect damages howsoever caused. More information about Westermo can be found at **www.westermo.com**.

About This Guide

This guide is intended for installation engineers and users of the Westermo products. It includes information on safety and regulations, a product description, installation instructions and technical specifications.

Software Tools

Related software tools are available at **www.westermo.com**.

License and Copyright for Included FLOSS

This product includes software developed by third parties, including Free/Libre Open Source Software (FLOSS). The specific license terms and copyright associated with the software are included in each software package respectively. Please visit the product web page for more information. Upon request, the applicable source code will be provided. A nominal fee may be charged to cover shipping and media. Please direct any source code request to your normal sales or support channel.

Safety and Regulations

Warning Levels

Warning signs are provided to prevent personal injuries and/or damages to the product. The following levels are used:

Level of warning	Description	Consequence personal injury	Consequence material damage
WARNING	Indicates a potentially hazardous s ituation	Possible death or major injury	Major damage to the Pr oduct
CAUTION	Indicates a potentially hazardous s ituation	Minor or moderate injury	Moderate damage to th e product
NOTICE	Provides information in order to av oid misuse of the product, confusion or misunderstanding	No personal injury	Minor damage to the pr oduct
NOTE	Used for highlighting general, but i mportant information	No personal injury	Minor damage to the pr oduct

Safety Information

- Before Installation: Read this manual completely and gather all information available on the product. Make sure it is fully understood. Check that your application does not exceed the safe operating specifications for the product. This product relies on convection cooling. Make sure that it is installed so that the ambient temperature is within the specified temperature range, e.g. by avoiding obstruction of the airflow around the product.
- **WARNING SAFETY DURING INSTALLATION**
- The product must be installed and operated by qualified service personnel and installed info an apparatus cabinet or similar, where access is restricted to service personnel only. For Ibex products outdoor installation is allowed.
- During installation, ensure a protective earthing conductor is first connected to the protective earthing terminal. Westermo recommends a cross-sectional area of at least 4 mm2.
- Upon removal of the product, ensure that the protective earthing conductor is disconnected last.
- **WARNING – HAZARDOUS VOLTAGE**
- Do not open a connected product. Hazardous voltage may occur when connected to a power supply.
- **WARNING – PROTECTIVE FUSE**
- The power supply wiring must be sufficiently fused. It must be possible to disconnect manually from the power supply. Ensure compliance to national installation regulations.
- **WARNING RADIO PRODUCTS**
- Observe the usage limitations of radio products at filling stations, in chemical plants, in systems with explosives or potentially explosives locations. The devices may not be used in airplanes. Exercise particular caution near personal medical aids, such as pacemakers and hearing aids. Never perform work on the antenna system during a thunderstorm.
- To fulfill human safety, a minimum separation distance of 20 cm or more should be maintained between the antenna of the product and personnel during operation.
- CAUTION – HOT SURFACE Be aware of that the surface of this product may become hot. When it is operated at high temperatures, the external surface may exceed the Touch Temperature Limit according to the product’s relevant electrical safety standard.
- CAUTION – CORROSIVE GASES If the product is placed in a corrosive environment, it is important that all

unused connector sockets are protected with a suitable plug, in order to avoid corrosion attacks on the gold-plated connector pins.
- CAUTION – CABLE TEMPERATURE RATING There may be a requirement on the minimum temperature rating of the cable to be connected to the field wiring terminals, see Interface

Care Recommendations
Follow the care recommendations below to maintain the full operation of the product and fulfill the warranty obligations:

- Do not drop, knock or shake the product. Rough handling above the specification may cause damage to internal circuit boards.
- Use a dry or slightly water-damp cloth to clean the product. Do not use harsh chemicals, cleaning solvents, or strong detergents to clean the product.
- Do not paint the product. Paint can clog the product and prevent proper operation.
- If the product is used in a manner not according to specification, the protection provided by the equipment may be impaired.
- If the product is not working properly, contact the place of purchase, nearest Westermo distributor office, or Westermo technical support.

NOTE Devices not used shall be kept in the factory-sealed moisture barrier bag. Open, unsealed devices shall not be kept unpowered for more than 30 days.

Product Disposal
This symbol means that the product shall not be treated as unsorted municipal waste when disposed of it. It needs to be handed over to an applicable collection point for recycling electrical and electronic equipment. By ensuring the product is disposed of correctly, you will help to reduce hazardous substances and prevent potential negative consequences to both environment and human health, which could be caused by inappropriate disposal.

Figure 1 WEEE symbol for treatment of product disposal

Compliance Information
REGULATORY NOTICE Any changes or modifications shall be approved by the party responsible for compliance. If not, users could void the user’s authority to operate the equipment. Country code and antenna gain needs to be set properly for correct functionality in the installed country.

Agency Approvals and Standards Compliance

Type	Approval/Compliance
Climate	· EN 50125-3, Railway applications – Environmental conditions for equipment, Part 3: Equipment for signalling and telecommunications
EMC	· EN 50121-4, Railway applications – Electromagnetic compatibility. Part 4: Emission and immunity of the signalling and telecommunications apparatus · ETSI EN 301 489-1, Electromagnetic compatibility (EMC) and Radio spectrum Matte rs (ERM) for radio equipment and services – Part 1: Common technical requirements · ETSI EN 301 489-17, Electromagnetic compatibility (EMC) and Radio spectrum Matt ers (ERM) for radio equipment – Part 17: Specific conditions for Broadband Data Transmis sion Systems
Mechanical (Shock and vibrati on)	· EN 50125-3, Outside the track
Insulation (Coordi nation and test)	· EN 50124-1, Railway applications – Insulation coordination
Radio Communic ation	· ETSI EN 300 328, Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using wide band modulation techniques · ETSI EN 301 893, 5 GHz RLAN · IEEE 802.11, Wireless LAN Medium Access Control (MAC) and Physical Layer (PH Y) Specifications · FCC-47-15, Radio frequency devices
Safety	· EN/IEC 62368-1, Safety Requirements for audio/video, information and communicati on technology equipment · EN 45545-2, Requirements for fire behaviour of materials and components on railwa y vehicles · NFPA 130, Fire protection and life safety requirements for fixed guideway transit and passenger rail systems

United States

FCC The enclosed device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (i.) this device may not cause harmful interference and (ii.) this device must accept any interference received, including interference that may cause undesired operation.

To satisfy FCC RF exposure requirements for mobile transmitting devices, a separation distance of 20 cm or more should be maintained between the antenna of this device and persons during operation. To ensure compliance, operations at closer distances than this are not recommended.

This product has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This product generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this product does cause harmful interference to radio or television reception, which can be determined by turning the product off and

on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the unit and receiver
- Connect the product into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

NOTE This product contains the FCC ID 2AEJD-103902-DT50RF.

United States – FCC
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- Connect the product into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

United States – AREMA
The product has been tested according to AREMA Part 11.5.1 environmental class B and AREMA Part 11.5.2 exposure class External.

Canada – IC
This device complies with Industry Canada's license-exempt RSSs. Operation is subject to the following two conditions: · This device may not cause interference. · This device must accept any interference, including interference that may cause undesired
operation of the device.

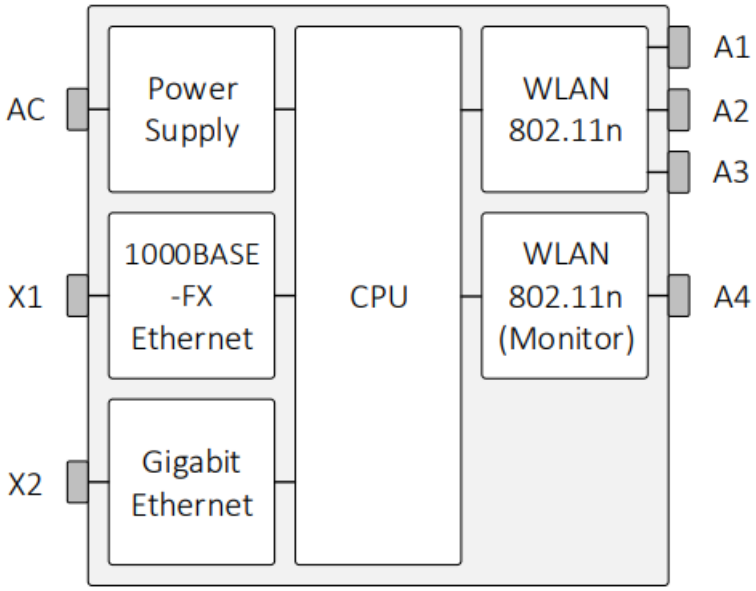
NOTE This product contains the IC Certification number 9301A-103902DT50.

Europe – Simplified
Declaration of Conformity Hereby, Westermo declares that this product is in compliance with applicable EU directives and UK legislation. The full EU declaration of conformity and other detailed information is available at **www.westermo.com/support/product-support.**
Figure 2 The European Conformity marking and the UK Conformity Assessment

Product Description

Product Description
The Ibex-RT-370 is an 802.11n MIMO access point with a fiber optical ethernet port for infrastructure installations in public transport and harsh industrial environments. The high-power radios are operating at 2.4 GHz and 5 GHz

frequency bands. The second radio allows monitoring/scanning features for optimized frequency band utilization.

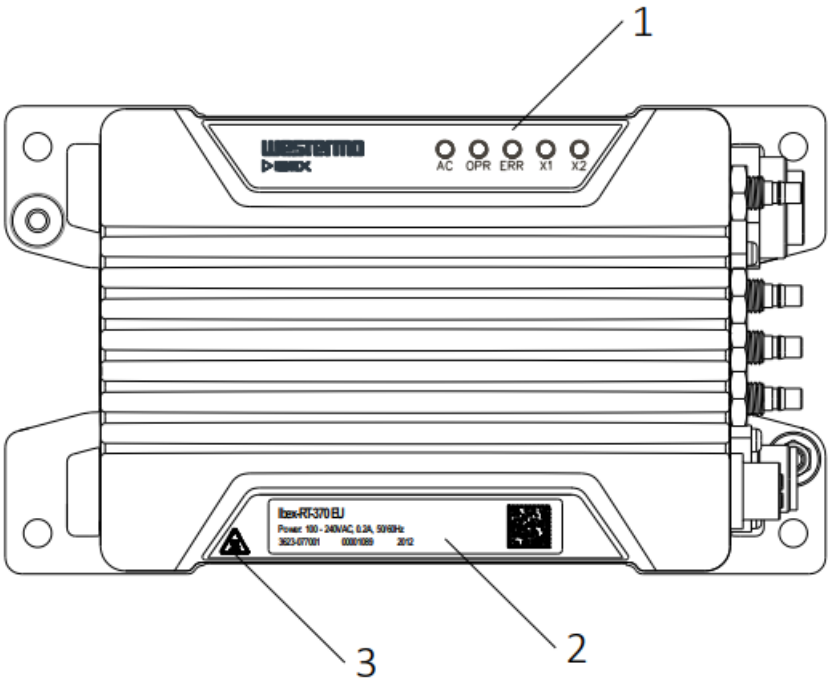


The Westermo configuration management tool, WeConfig, can be used for discovery and basic configuration and maintenance. The configuration can be done via SNMP or via WebGUI. The status information is available in local LED status indicators, and through SNMP/WebGUI. The Ibex-RT-370 access point is designed to withstand tough environmental conditions and can be remotely managed using web browser or SNMP management tools. Integrating hardware, software and network design support tools, this access point offers advanced capabilities, the lowest total cost of ownership and will create the most reliable and resilient networks. The access point is engineered to maintain uninterrupted data communication, even in exceptionally harsh environments. Tested and certified to withstand extreme temperatures, vibrations and shocks, these access points only use industrial grade components which contributes towards a market leading mean time between failure (MTBF), maximized service life, and reduced operational and life cycle costs.

Available Models

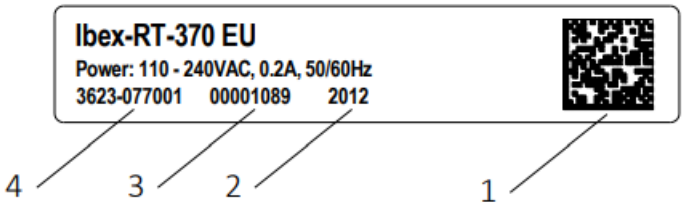
Art. no.	Model	Region
3623-077001	Ibex-RT-370 EU	Europe
3623-077002	Ibex-RT-370 NA	North America

Hardware Overview
Front Side View



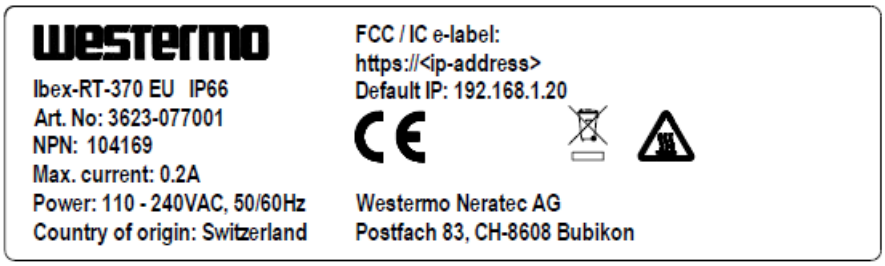
No.	Description
1	LED indicators
2	Front side label
3	Warning symbol for surface temperatures above +60°C

Front Side Label

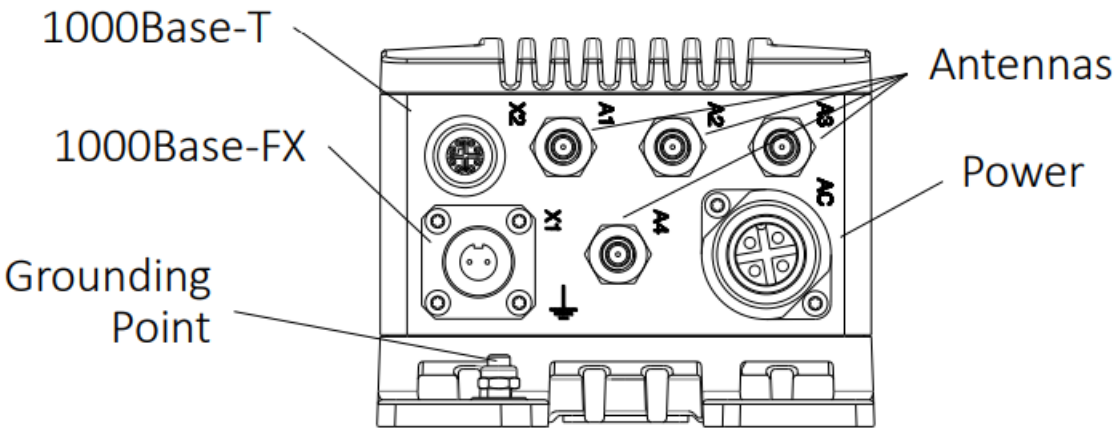


No.	Description	Remarks
1	QR code	The data matrix is: AAAA-AAAARR-1-VV-SSSSSSSS-YYWW AAAA -AAAA = Article number RR = Region code VV = Product revision SSSSSSSS = Serial number YY = Manufacturi ng Year WW = Manufacturing Week
2	Manufacturing date	The Date Format is: YYWW YY = Manufacturing Year WW = Manufacturing Week
3	Serial number	
4	Article number	

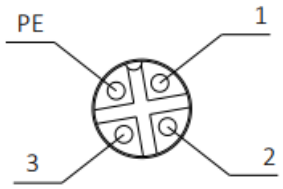
Rear Side Label



Interface Ports View

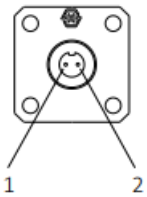


Connector Information
Power Input Connection

Binder 693 male power connector 3+PE				
Marking	**Position**	**Direction**	**Description**	
AC	PE	–	Protective Earth	
	1	Phase	AC Phase terminal	
	2	Neutral	AC Neutral terminal	
	3	–	Not used	

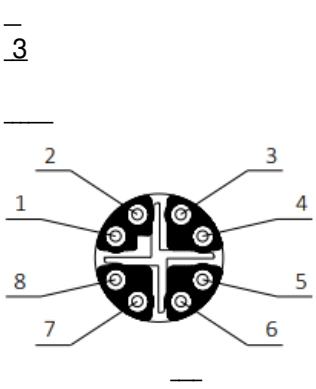
3 _

1000BASE-FX Port
The product includes an optical Ethernet port X1 which supports 1000 Mbit/s operation.

ODC-2 male FO connector				
Marking	**Position**	**Direction**	**Description**	
X1	1	Out	TX	
	2	In	RX	

NOTICE The optical fast Ethernet interface of this device uses a class 1 laser product. It complies with EN 60825-1 and FDA 21 CFR 1040.10 and 1040.11. The laser is eyesafe under all operating conditions. If the optical Ethernet port is not used, the protective dust cap which is part of the delivery must be closed to protect the interface from water or dust ingress. The optical performance is very dependent on the cleanliness of the FO fibers. Small dust particles on the fibers will noticeable decrease the performance and need to be removed by appropriate cleaning devices.

Ethernet Port
The product includes an Ethernet port X2 which supports auto-negotiated 10 Mbit/s, 100 Mbit/s and 1000 Mbit/s operation. Automatic MDI/MDIX crossover is supported for 10BASE-T, 100BASE-T, 1000BASE-T operation.

M12 X-coded 8-pin female Ethernet connector according to IEC 61076-2-109				
Marking	**Position**	**Direction**	**Description**	
X2	1	In / Out	DA+	
	2	In / Out	DA-	
	3	In / Out	DB+	
	4	In / Out	DB-	
	5	In / Out	DD+	
	6	In / Out	DD-	
	7	In / Out	DC-	
	8	In / Out	DC+	
	Housing	Shield	Chassis of product (ground)	

NOTE If the Ethernet function is not used, the protective dust cap which is part of the delivery must be closed to protect the interface from water or dust ingress.

Antenna Ports
The antenna connectors are identified on the product with A1 to A4. QMA-type industrial standard connector is used.
A1 to A3 are used for the WLAN communication at 2.4 GHz / 5 GHz. At least A1 must be connected to an external WLAN antenna. The antenna configuration is made through the Software interface. A4 is used for real-time scanning/monitoring of the occupied WLAN frequencies bands and possible Radar interferences. A4 must be connected to an external WLAN antenna to make use of the scanning/monitoring functions.

NOTICE
Any unused antenna ports must be properly terminated with 50 Ohm, otherwise the device might be damaged when power is applied to a non-terminated antenna port. For lightning protection of the antenna interfaces, external lightning protectors need to be installed to the antenna feed. To ensure specified IP protection, suitable QMA connectors / cables and terminations must be used.

LED Indicators

LED	Description
AC	Power status
OPR	Operation status
ERR	Error status
X1	Ethernet status for fiber optical port X1
X2	Ethernet status for Ethernet port X2

NOTE
Refer to management guide for detailed LED status indication.

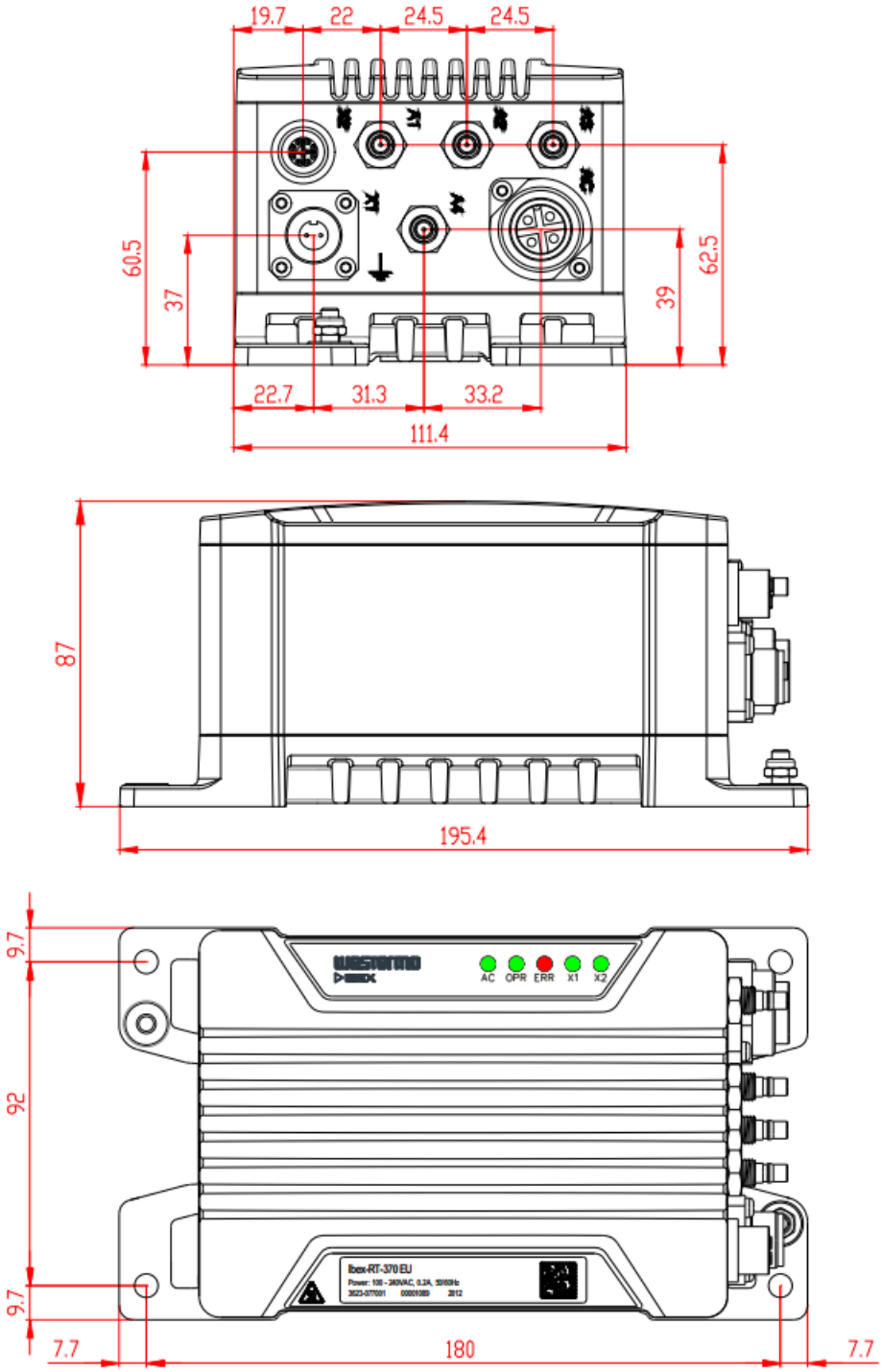
Factory Reset
To reset the product into factory default settings, a reset adapter is needed which is plugged into the Ethernet port X3 during startup.

Art. no.	Description
3623-0799	Factory Reset Plug, X-coded

Factory Reset Procedure

Step	Description
1	Plug the factory reset adapter to the X2 Ethernet interface
2	Power the product
3	Wait until factory reset adapter is detected. This is indicated by solid ORANGE OPR LED and RED ERR LED
4	Remove factory reset adapter within 15 seconds
5	Successful initiation of the factory reset is indicated by blinking ORANGE OPR LED and RED ERR LED

Dimensions
Dimensions are stated in mm and are regardless variants.



Installation

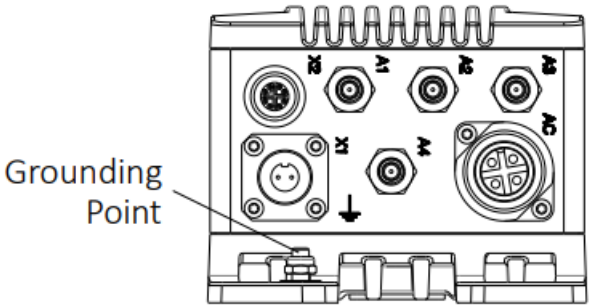
Mounting

The product is fixed with the four fixing points located at the corners of the product. M5 or M6 screws are used for the fixation of the product. The screws are tightened with min. 3.0 Nm (fixing screw ISO 898/1, quality class 8.8). All four specified fixing points must be used for fixing. The installation surface should be flat to have all fixing points connected to the surface. For indoor installation consider additional protection against dust to ensure proper heat dissipation. For outdoor installation consider additional protection against sun radiation, dust and dirt to optimize ambient temperature range. Unused connectors must be covered by a protective cap (delivered with the product), tightened to the specified torque in order to fulfill the specified ingress protection code.

Earth Connection

There are two earth connection points. At the AC connector there is the connection point for the protective earthing conductor and at the grounding screw of the Ibex-RT-370 housing is the connection point for the protective bonding conductor. For a safe operation and proper protection against lightning, both earth contacts must be connected to a solid ground. The grounding must be done always as a first step before connecting any

other external interfaces. An M5 grounding screw at the housing is used for the protective bonding conductor. A short wire with a cross section of at least 4 mm2 shall be used. The grounding wire is set below the rip-lock washer. The nut is fixed for good reliable grounding contact. The tightening torque of the nut shall be 2.0 Nm.



NOTICE Do not use equipment without protective earth connection.

Connection of Cables

Recommended tightening torque for the power-, antenna- and FO-connectors is 1.0 Nm and for the M12 Ethernet connector 0.6 Nm.

NOTE This product has no replaceable fuse and should be connected via an external fuse for protection. External connector Binder 99-4222-00-04 (outer cable diameter 6…9.5 mm) or Binder 99-4222-14-04 (outer cable diameter 10…12 mm) shall be used in order to fulfill the specified ingress protection code at the power connector.

Cooling

This unit uses convection cooling. It is recommended to install the product in areas where the natural convection airflow is not blocked and that there is enough spacing around the device.

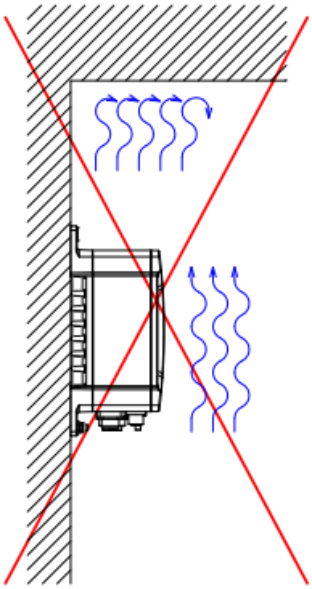


Figure 10 Installation with reduced natural convection airflow

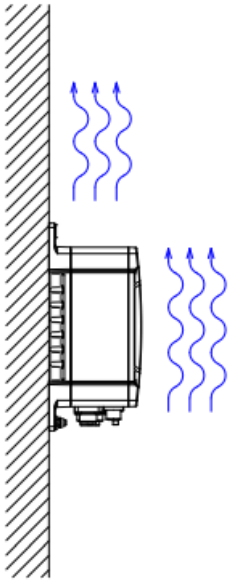


Figure 11 Installation with natural convection airflow
When operating the device at high ambient temperatures, it is recommended to mount the device to a metallic base plate to improve the heat dissipation. The base plate increases the surface to spread the heat.

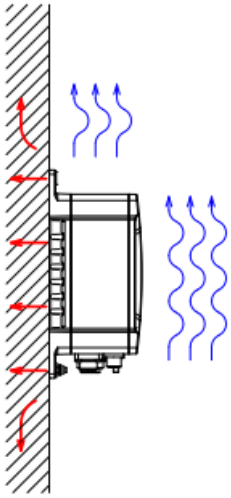


Figure 12 Improved heat transfer based on fixing plate

NOTICE Limited air flow is rising the device temperature and may lower the upper limit of the operating temperature range. Temperature is dependent on the operational parameters, like RF output power, amount of traffic. This product has integrated temperature sensors for monitoring the internal device temperatures. If temperature limits are exceeded, alarms are sent through the SW interface. The operating conditions shall be ensured so that the normal operation does not cause temperature alarms. Improve installation conditions or RF parameters in case of any temperature alarms.

Replacement of Product
Disconnect all cables and unscrew the product from the wall. Mount the replacement product and reconnect all cables, observing the instructions in the Connection of Cables. MTTR (Mean Time To Repair), i.e. time for replacement of product is: < 10 minutes.

CAUTION – HOT SURFACE
Be aware of that the surface of this product may become hot. When it is operated at high temperatures, the external surface may exceed the Touch Temperature Limit according to the product's relevant electrical safety standard. This product complies with Touch Temperature Limits throughout its operating temperature range.

Specifications

Interface Specifications

AC, Power port	
Connector	Binder 693-type male
Nominal voltage range	100…240 VAC
Operating voltage	90…264 VAC
Rated current	0.2 A
Rated frequency	50/60 Hz
Inrush current	Peak: 42 A peak at 240 VAC, 90° phase Duration: 1 ms
Touch current	< 3.5 mA
Startup current[1]	2 x nominal current
Redundant power input	No
Conductor cross section (flexible)	0.5…2.5 mm² (AWG 20…13)
Cable temperature rating	-40 to + 70°C
Shielded cable	Not required

Ethernet FO	
Connector	ODC-2 male
Wavelength	1310 nm
Data rate	1000 Mbit/s
Transmit power	-16…-7dBm
Receiver sensitivity	-32dBm or better
Receiver Saturation[2]	-3dBm

Ethernet TX	
Connector	M12 X-coded female
Electrical specification	IEEE std 802.3
Data rate	10 Mbit/s, 100 Mbit/s, 1000 Mbit/s, manual or auto
Duplex	Full or half, manual or auto
Transmission range	Up to 100 m with CAT5e cable or better
Cabling	Shielded cable CAT5e or better is recommended
Conductive chassis	Yes

NOTICE To avoid damages on the Ethernet interface, ensure that the far end side of the Ethernet cable shield itself is connected to protective earth.

Antenna WLAN (A1..A4)	
Connector	QMA female
Direction	Transmit and receive
Cabling	50 Ohm coaxial cable and WLAN antenna required
Conductive chassis	Yes
WLAN interface	3×3 MIMO 802.11abgn Access Point (A1…A3) 1x 802.11abgn Monitoring (A4)
WLAN frequency bands	2.400… 2.4835 GHz, 5.150…5.350 GHz, 5.470… 5.725 GHz, 5.725… 5.850 GHz
Transmitting power (A1…A3)	Max. conducted transmit power per port within the whole frequency range: up to +22dBm

Type Tests and Environmental Conditions

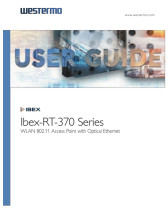
Environmental phenomena	**Basic standard**	**Description**	**Test levels**
ESD	EN 61000-4-2	Enclosure	Contact: ±6 kV Air: ±8 kV
		AC power port	± 2 kV, direct coupling

Fast transients	EN 61000-4-4	Ethernet ports	± 2 kV, capacitive coupling clamp
		Antenna ports	
Surge	EN 61000-4-5	AC power port	L/N-PE: ± 2 kV, 2 Ω, 18 µF, 1.2/50 µs L/N-PE: ± 2 kV, 12 Ω, 9 µF, 1.2/50 µs L/N-PE: ± 2 kV, 42 Ω, .5 µF, 1.2/50 µs L-N: ± 2 kV, 2 Ω, 18 µF, 1.2/50 µs L-N: ± 2 kV, 12 Ω, 9 µF, 1.2/50 µs L-N: ± 2 kV, 42 Ω, .5 µF, 1.2/50 µs
		Ethernet ports	± 2 kV, 2 Ω, 18uF, 1.2/50 µs
		Antenna ports	
Power frequency magn etic field	EN 61000-4-8	Enclosure	300 A/m continues, DC, 16.7 Hz, 50 Hz, 60 Hz
Pulsed magnetic field	EN 61000-4-9	Enclosure	300 A/m
Radiated RF immunity	EN 61000-4-3	Enclosure	20 V/m, 80% AM (1kHz) at 80 MHz to 2 GHz 5 V/m, 80% AM (1kHz) at 2 GHz to 2.7 GHz 3 V/m, 80% AM (1kHz) at 2.7 GHz to 6 GHz
Conducted RF immunity	EN 61000-4-6	AC power port	10 V, 80% AM (1kHz) from 0.15 to 80 MHz
		Ethernet ports	
		Antenna ports	
Radiated RF emission	CISPR 16-2-3	Enclosure	Class B FCC Part 15 B, Class B
Conducted RF emission	CISPR 16-2-1	AC power port	Class B
		Ethernet ports	
Insulation resistance		AC power port to all other ports	> 100 MOhm
Dielectric strength		AC power port to all other ports	1500 VAC, 50 Hz, 60 s

	AREMA 11.5.1 class B	AC power port to earth	3000 VAC, 60 Hz, 60 s Leakage current < 4.5 mA

Environmental phenomena	**Basic standard**	**Description**	**Test levels**
Temperatures	EN 60068-2-1 EN 60068-2-2 EN 60068-2-14	Operational	-40 to +70°C (-40 to +158°F)[3]
		Storage and transport	-55 to +85°C (-67 to +185°F)
Humidity	EN 60068-2-30	Operational	5-95% relative humidity
		Storage and transport	
Altitude		Operational	3000 m
MTBF	IEC TR 62380		241981 hours
Vibration	MIL STD 810, M5 14.7 (sine)	Operational	5 to 10 Hz, 5.08 mm p-p 10 to 200 Hz, 2.0 g 20 sweep cycles in each axis, 0.9 octave/ min
	EN 60068-2-64 (random)	Operational, endurance test	2.3 m/s^2 random, 5 to 2000 Hz, 3 x 4 h
Shock[4]	EN 60068-2-27	Operational	20 m/s^2, 11 ms, 3 x 6 shocks (half sine)
	MIL STD 810, M516.7		10 g, 11 ms, 3 x 6 shocks (saw tooth)
Weight			1900 gr
Degree of protection	EN 60529	Enclosure	IP66[5]
Cooling			Convection
Pollution degree	EN 62368-1		PD2
Conformal coating type	IPC-A-610	Electronic modules	AR (Acrylic)

Documents / Resources

	westermo Ibex-RT-370 Series WLAN 802.11 Access Point with Optical Ethernet [pdf] User Guide Ibex-RT-370 Series, WLAN 802.11 Access Point with Optical Ethernet, Ibex-RT-370 Series WLAN 802.11 Access Point with Optical Ethernet, Access Point with Optical Ethernet, Access Point

References

- Westermo ⊳ Robust and Secure Industrial Networking Solutions
- Westermo ⊳ Robust and Secure Industrial Networking Solutions
- Product support, user guides and software downloads ⊳ Westermo
- binder connector → specialist for circular connectors