



# Ibex-RT-280 Series

WLAN 802.11 Access Point with Dual Optical Ethernet  
for Ring Backbone Topologies

---

## Contents

|       |   |    |
|-------|---|----|
| 1     | General Information.....                            | 4  |
| 1.1   | Legal Information .....                             | 4  |
| 1.2   | About This Guide .....                              | 4  |
| 1.3   | Software Tools.....                                 | 4  |
| 1.4   | License and Copyright for Included FLOSS .....      | 4  |
| 2     | Safety and Regulations .....                        | 5  |
| 2.1   | Warning Levels .....                                | 5  |
| 2.2   | Safety Information.....                             | 6  |
| 2.3   | Care Recommendations .....                          | 8  |
| 2.4   | Product Disposal.....                               | 8  |
| 2.5   | Compliance Information.....                         | 8  |
| 2.5.1 | Agency Approvals and Standards Compliance .....     | 9  |
| 2.5.2 | United States - FCC.....                            | 10 |
| 2.5.3 | United States - AREMA.....                          | 10 |
| 2.5.4 | Canada - IC.....                                    | 11 |
| 2.5.5 | Europe - Simplified Declaration of Conformity ..... | 11 |
| 3     | Product Description.....                            | 12 |
| 3.1   | Product Description.....                            | 12 |
| 3.2   | Available Models .....                              | 12 |
| 3.3   | Hardware Overview.....                              | 13 |
| 3.3.1 | Front Side View.....                                | 13 |
| 3.3.2 | Front Side Label .....                              | 13 |
| 3.3.3 | Rear Side Label .....                               | 14 |
| 3.3.4 | Interface Ports View .....                          | 14 |
| 3.4   | Connector Information.....                          | 14 |
| 3.4.1 | Power Input Connection.....                         | 14 |
| 3.4.2 | 100BASE-FX Ports .....                              | 15 |
| 3.4.3 | Ethernet Port .....                                 | 15 |
| 3.4.4 | Antenna Ports.....                                  | 16 |
| 3.5   | LED Indicators.....                                 | 16 |
| 3.6   | Factory Reset.....                                  | 17 |
| 3.6.1 | Factory Reset Procedure .....                       | 17 |
| 3.7   | Dimensions .....                                    | 17 |
| 4     | Installation.....                                   | 19 |
| 4.1   | Mounting.....                                       | 19 |
| 4.2   | Earth Connections .....                             | 19 |
| 4.3   | Connection of Cables.....                           | 20 |
| 4.4   | Cooling.....  | 21 |
| 4.5   | Replacement of Product.....                         | 22 |
| 5     | Specifications.....                                 | 23 |
| 5.1   | Interface Specifications .....                      | 23 |
| 5.2   | Type Tests and Environmental Conditions .....       | 25 |
| 6     | Abbreviations and Terms .....                       | 27 |
| 7     | Revision Notes.....                                 | 28 |



# 1 General Information

## 1.1 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](http://www.westermo.com).

## 1.2 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.

## 1.3 Software Tools

Related software tools are available at [www.westermo.com](http://www.westermo.com).

## 1.4 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.

## 2 Safety and Regulations

### 2.1 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    |
|--|---|--------------------------------|--------------------------------|
| <br>WARNING | Indicates a potentially hazardous situation   | Possible death or major injury | Major damage to the Product    |
| <br>CAUTION | Indicates a potentially hazardous situation   | Minor or moderate injury       | Moderate damage to the product |
| <br>NOTICE | Provides information in order to avoid misuse of the product, confusion or misunderstanding | No personal injury             | Minor damage to the product    |
| <br>NOTE  | Used for highlighting general, but important information                                    | No personal injury             | Minor damage to the product    |




Table 1 Warning levels





## 2.2 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.

|   |  |
|---|--|
|    | <p><b>WARNING – SAFETY DURING INSTALLATION</b></p> <p>The product must be installed and operated by qualified service personnel and installed into an apparatus cabinet or similar, where access is restricted to service personnel only. For Ibex products outdoor installation is allowed.</p> <p>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 mm<sup>2</sup>.</p> <p>Upon removal of the product, ensure that the protective earthing conductor is disconnected last.</p> |
|  | <p><b>WARNING - HAZARDOUS VOLTAGE</b></p> <p>Do not open a connected product. Hazardous voltage may occur when connected to a power supply.</p>  |
|  | <p><b>WARNING - PROTECTIVE FUSE</b></p> <p>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.</p>   |

|   |   |
|---|---|
|    | <p><b>WARNING – RADIO PRODUCTS</b></p> <p>Observe the usage limitations of radio products at filling stations, in chemical plants, in systems with explosives or potentially explosives locations.</p> <p>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.</p> <p>To fulfill human safety, a minimum separation distance of 20 cm or more should be maintained between the antenna of the product and personell during operation.</p> |
|    | <p><b>CAUTION - HOT SURFACE</b></p> <p>Be aware of that the surface of this product may become hot. When it is operated at high temperatures, the external surface may exceed Touch Temperature Limit according to the product's relevant electrical safety standard.</p>   |
|   | <p><b>CAUTION - CORROSIVE GASES</b></p> <p>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 goldplated connector pins.</p>   |
|  | <p><b>CAUTION - CABLE TEMPERATURE RATING</b></p> <p>There may be a requirement on the minimum temperature rating of the cable to be connected to the field wiring terminals, see Interface Specifications.</p>  |

## 2.3 Care Recommendations

Follow the care recommendations below to maintain full operation of the product and to 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 should not be kept unpowered for more than 30 days.

## 2.4 Product Disposal

This symbol means that the product shall not be treated as unsorted municipal waste when disposing 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

## 2.5 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.



## 2.5.1 Agency Approvals and Standards Compliance

| Type                               | Approval/Compliance   |
|------------------------------------|---|
| Climate                            | <ul style="list-style-type: none"> <li>EN 50125-3, Railway applications – Environmental conditions for equipment, Part 3: Equipment for signalling and telecommunications</li> </ul>  |
| EMC                                | <ul style="list-style-type: none"> <li>EN 50121-4, Railway applications - Electromagnetic compatibility. Part 4: Emission and immunity of the signalling and telecommunications apparatus</li> <li>ETSI EN 301 489-1, Electromagnetic compatibility (EMC) and Radio spectrum Matters (ERM) for radio equipment and services - Part 1: Common technical requirements</li> <li>ETSI EN 301 489-17, Electromagnetic compatibility (EMC) and Radio spectrum Matters (ERM) for radio equipment - Part 17: Specific conditions for Broadband Data Transmission Systems</li> </ul> |
| Mechanical (Shock and vibration)   | <ul style="list-style-type: none"> <li>EN 50125-3, Outside the track</li> </ul>   |
| Insulation (Coordination and test) | <ul style="list-style-type: none"> <li>EN 50124-1, Railway applications – Insulation coordination</li> </ul>  |
| Radio Communication                | <ul style="list-style-type: none"> <li>ETSI EN 300 328, Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using wide band modulation techniques</li> <li>ETSI EN 301 893, 5 GHz RLAN</li> <li>IEEE 802.11, Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications</li> <li>FCC-47-15, Radio frequency devices</li> </ul>   |
| Safety                             | <ul style="list-style-type: none"> <li>EN/IEC 62368-1, Safety Requirements for audio/video, information and communication technology equipment</li> <li>EN 45545-2, Requirements for fire behaviour of materials and components on railway vehicles</li> <li>NFPA 130, Fire protection and life safety requirements for fixed guideway transit and passenger rail systems</li> </ul>  |

Table 2 Agency approvals and standards compliance

### 2.5.2 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.

### 2.5.3 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.

#### 2.5.4 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.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

- l'appareil ne doit pas produire de brouillage.
- l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

**NOTE**

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

#### 2.5.5 Europe - Simplified Declaration of Conformity

Hereby, Westermo declares that this product is in compliance with applicable EU directives. The full EU declaration of conformity and other detailed information is available at [www.westermo.com/support/product-support](http://www.westermo.com/support/product-support).



Figure 2 The European conformity marking

## 3 Product Description

### 3.1 Product Description

The Ibex-RT-280 is an 802.11n MIMO access point with dual fiber optical ethernet for infrastructure installations in public transport and harsh industrial environments. The two optical ports allow a ring topology Ethernet backbone network based on FRNT/RSTP. 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 planning.

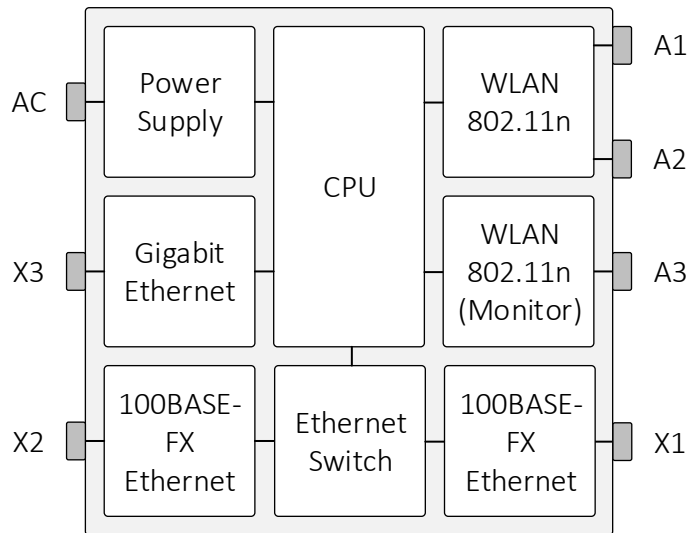


Figure 3 Ibex-RT-280 block diagram

The Westernmo 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-280 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.

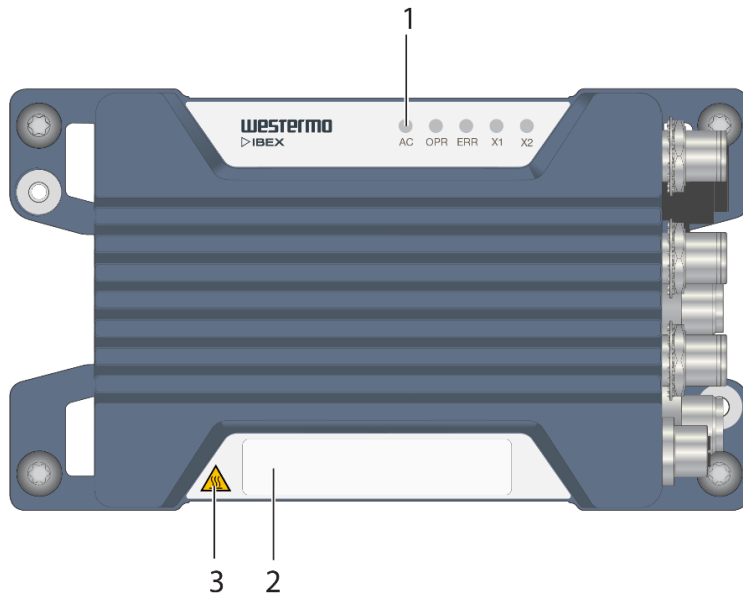
### 3.2 Available Models

| Art. no.    | Model          | Region        |
|-------------|----------------|---------------|
| 3623-078001 | Ibex-RT-280 EU | Europe        |
| 3623-078002 | Ibex-RT-280 NA | North America |

Table 3 Available Models

### 3.3 Hardware Overview

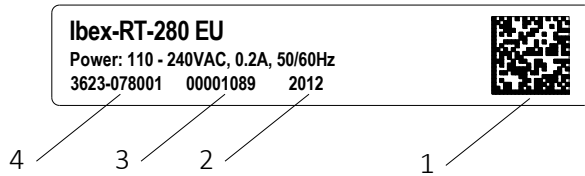
#### 3.3.1 Front Side View



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

Figure 4 Location of interface ports and LED indicators

#### 3.3.2 Front Side Label



| No. | Description        | Remarks  |
|-----|--------------------|--|
| 1   | QR code            | The data matrix is: AAAAAAAAAARR-1-VV-SSSSSSS-YYWW<br>AAAAAAAAAA = Article number<br>RR = Region code<br>VV = Product revision<br>SSSSSSSS = Serial number<br>YY = Manufacturing Year<br>WW = Manufacturing Week |
| 2   | Manufacturing date | The Date Format is: YYWW<br>YY = Manufacturing Year<br>WW = Manufacturing Week   |
| 3   | Serial number      |  |
| 4   | Article number     |  |

Figure 5 Front side label content

### 3.3.3 Rear Side Label

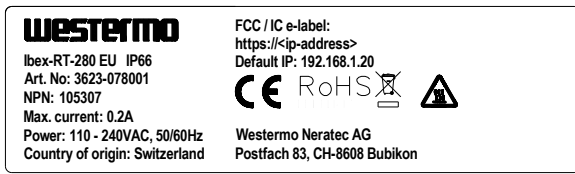
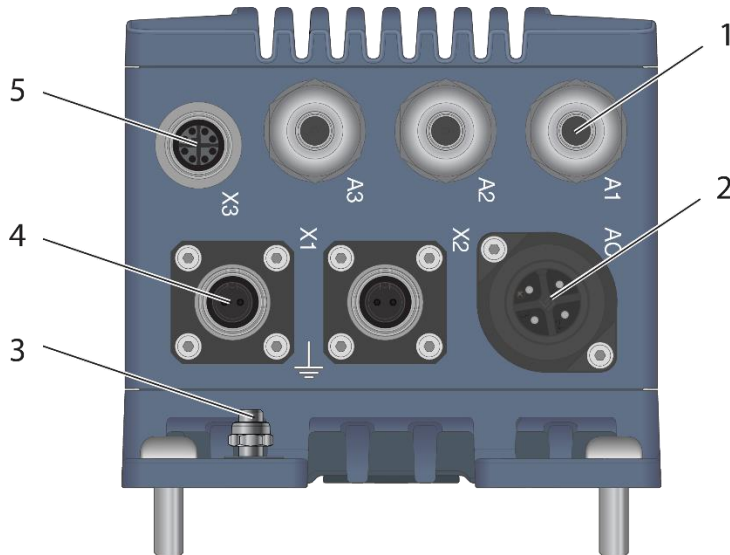


Figure 6 Rear side label content

### 3.3.4 Interface Ports View



| No. | Description         | No. | Description      |
|-----|---------------------|-----|------------------|
| 1   | Antennas (A1 to A3) | 2   | Power            |
| 3   | Grounding point     | 4   | 100Base-FX ports |
| 5   | 1000Base-T          |     |                  |

Figure 7 View to interface ports

## 3.4 Connector Information

### 3.4.1 Power Input Connection

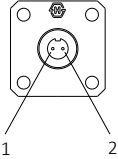
| Binder 693 male power connector 3+PE |          |           |                     |
|--------------------------------------|----------|-----------|---------------------|
| Marking                              | Position | Direction | Description         |
| AC                                   | PE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

Table 4 Power input connection

### 3.4.2 100BASE-FX Ports

The product includes two optical Ethernet ports X1 and X2 which supports 100 Mbit/s operation.

| ODC-2 male FO connector |          |           |             |
|-------------------------|----------|-----------|-------------|
| Marking                 | Position | Direction | Description |
| X1 / X2                 | 1        | Out       | TX          |
|                         | 2        | In        | RX          |




#### NOTICE

The optical fast Ethernet interfaces 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 eye-safe under all operating conditions.



#### NOTE

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



#### NOTE

The optical performance is very dependent on the cleanliness of the FO fibers. Small dust particles on the fibers will noticeably decrease the performance and need to be removed by appropriate cleaning devices.

### 3.4.3 Ethernet Port

The product includes one Ethernet ports X3 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                 |
| X3   | 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) |

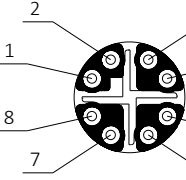


Table 5 Ethernet connection

**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.

### 3.4.4 Antenna Ports

The antenna connectors are identified on the product with A1 to A3. N-type industrial standard connector is used.

A1 to A2 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.

A3 is used for real-time scanning/monitoring of the occupied WLAN frequencies bands and possible Radar interferences. A3 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-Ohms, otherwise the device might be damaged when power is applied to a non-terminated antenna port.

**NOTICE**

For lightning protection of the antenna interfaces, external lightning protectors need to be installed to the antenna feed.

**NOTE**

To ensure specified IP protection, suitable N connectors / cables and terminations must be used.

### 3.5 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 fiber optical port X2 |



**NOTE**

Refer to management guide for detailed LED status indication.

### 3.6 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 |

Table 6 Factory reset plug

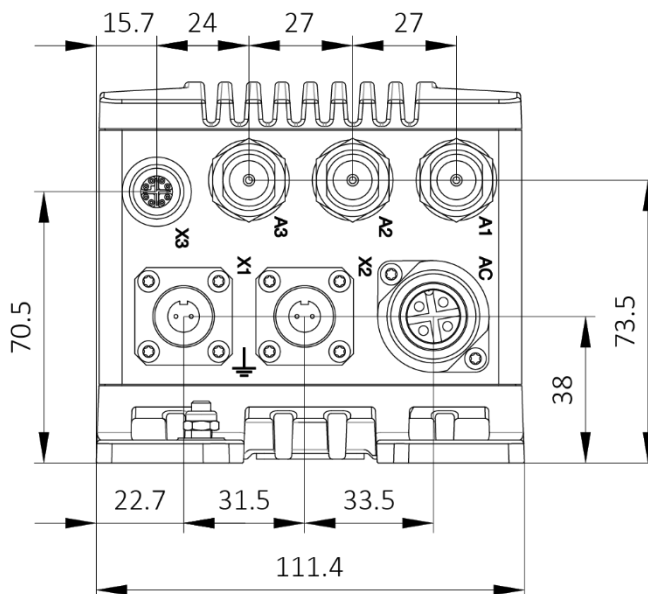
#### 3.6.1 Factory Reset Procedure

| Step | Description   |
|------|---|
| 1    | Plug the factory reset adapter to the X3 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      |

Table 7 Factory reset procedure

### 3.7 Dimensions

Dimensions are stated in mm and are regardless variants.



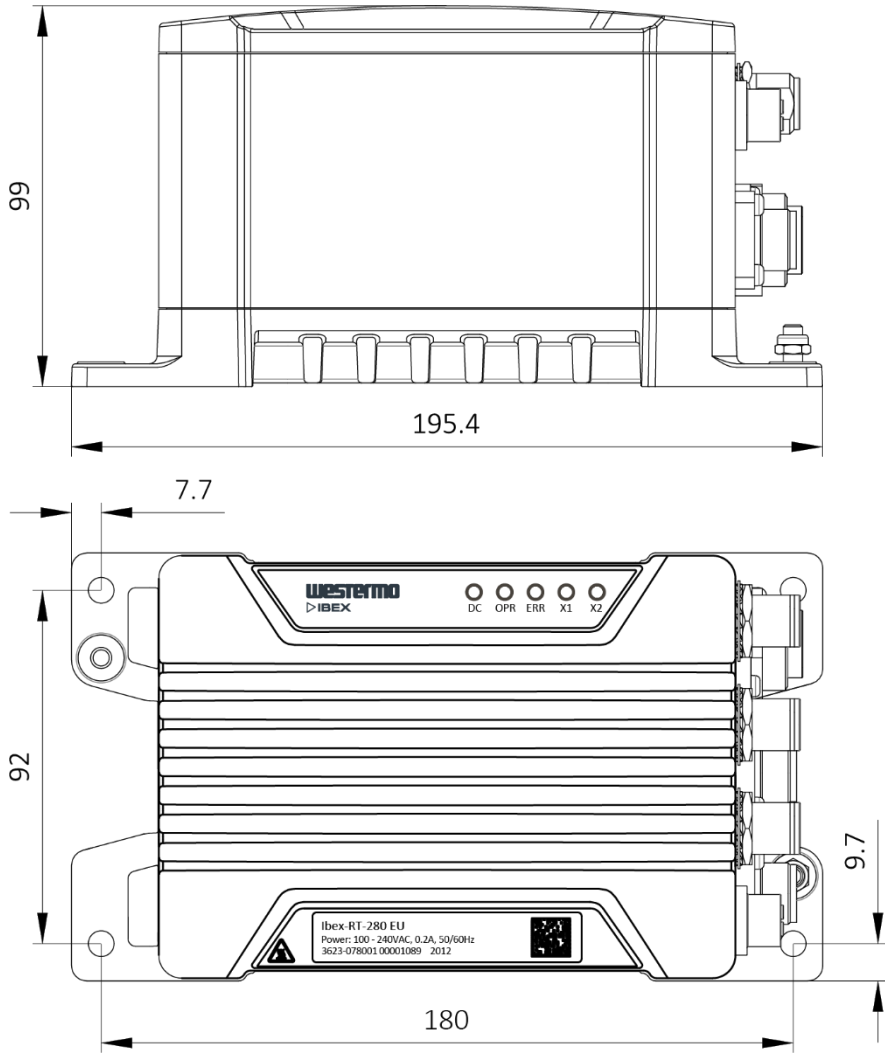


Figure 8 Dimensional drawing

## 4 Installation

### 4.1 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).

**NOTICE**

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.

**NOTE**

For indoor installation consider additional protection against dust to ensure proper heat dissipation.

**NOTE**

For outdoor installation consider additional protection against sun radiation, dust and dirt to optimize ambient temperature range.

**NOTE**

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.

### 4.2 Earth Connections

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-280 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 mm<sup>2</sup> 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.

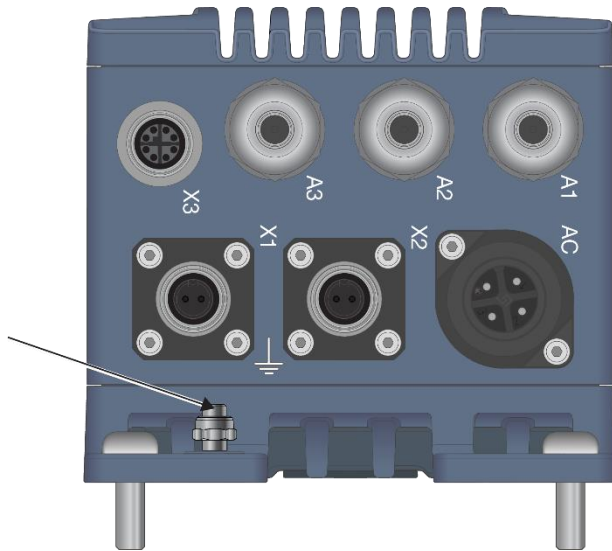


Figure 9 Earth connection

**NOTICE**

Do not use equipment without protective earth connection.

### 4.3 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.

**NOTE**

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.

#### 4.4 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.

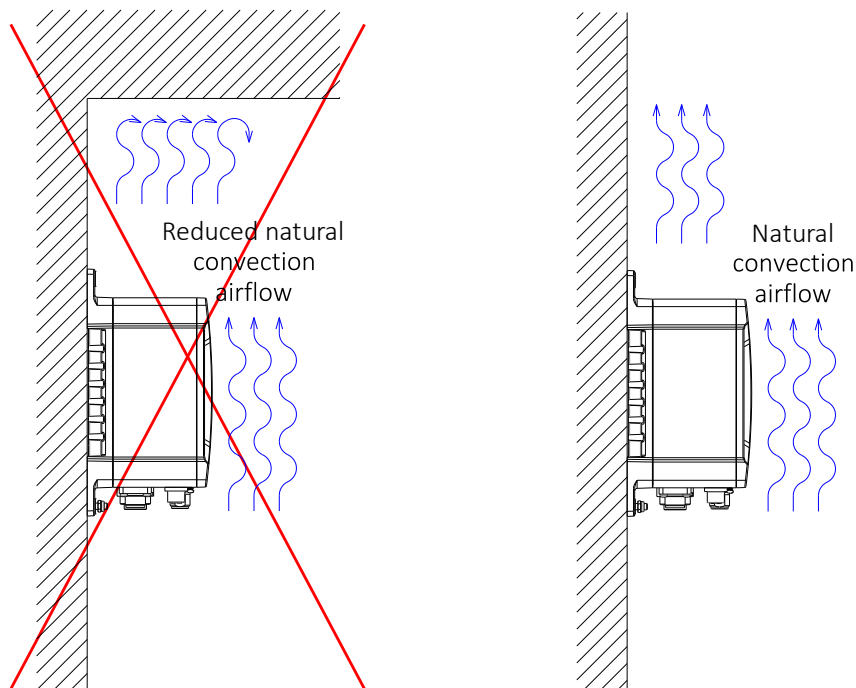


Figure 10 Installation with natural convection airflow

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.

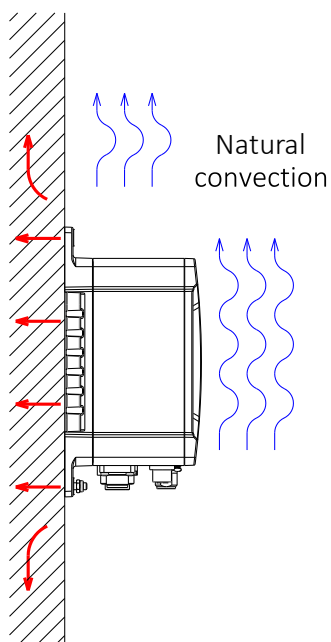


Figure 11 Improved heat transfer based on fixing plate

**NOTICE**

Limited air flow is rising the device temperature and may lower the upper limit of the operating temperature range.

**NOTICE**

Temperature is dependent on the operational parameters, like RF output power, amount of traffic.

**NOTICE**

This product has integrated temperature sensors for monitoring the internal device temperatures. If temperature limits are exceeded, alarms are sent through the SW interface.

**NOTICE**

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.

#### 4.5 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 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 Touch Temperature Limit according to the product's relevant electrical safety standard.

This product complies with Touch Temperature Limits throughout its operational temperature range.

## 5 Specifications

### 5.1 Interface Specifications

| <b>AC, Power port</b>              |   |
|------------------------------------|---|
| Connector                          | Binder 693-type male                                    |
| Nominal voltage range              | 100 to 240 VAC  |
| Operating voltage                  | 90 to 264 VAC   |
| Rated current                      | 0.2 A   |
| Rated frequency                    | 50/60 Hz  |
| Inrush current                     | Peak: 36 A peak at 240 VAC, 90° phase<br>Duration: 1 ms |
| Touch current                      | < 3.5 mA  |
| Startup current <sup>1</sup>       | 2 x nominal current                                     |
| Redundant power input              | No  |
| Conductor cross section (flexible) | 0.5 to 5 mm <sup>2</sup> (AWG 20...13)                  |
| Cable temperature rating           | -40 to + 70°C   |
| Shielded cable                     | Not required  |

| <b>Ethernet FO</b>               |                  |
|----------------------------------|------------------|
| Connector                        | ODC-2 male       |
| Wavelength                       | 1310 nm          |
| Data rate                        | 100 Mbit/s       |
| Transmit power                   | -16...-7dBm      |
| Receiver sensitivity             | -32dBm or better |
| Receiver Saturation <sup>2</sup> | -3dBm            |

| <b>Ethernet TX</b>       |  |
|--------------------------|--|
| 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  |



**NOTE**

The product is to be connected to internal Ethernet networks without exiting a facility and being subjected to TNVs.

<sup>1</sup> Recommended external supply current capability for proper startup

<sup>2</sup> Optical attenuators need to be added to the installation if the optical level is above this limit

**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.

| <b>Antenna WLAN (A1..A3)</b>   |   |
|--------------------------------|---|
| Connector                      | N female  |
| Direction                      | Transmit (A1 and A2) and receive (A1 to A3)   |
| Cabling                        | 50-ohm coaxial cable and WLAN antenna required  |
| Conductive chassis             | Yes   |
| WLAN interface                 | 2x2 MIMO 802.11abgn Access Point (A1 & A2)<br>1x 802.11abgn Monitoring (A3)           |
| WLAN frequency bands           | 2.400...2.4835 GHz,<br>5.150...5.350 GHz, 5.470...5.725 GHz,<br>5.725...5.850 GHz     |
| Transmitting power (A1 and A2) | Max. conducted transmit power per port within the whole frequency range: up to +22dBm |

**NOTICE**

Depending on the installation country there are frequency/band restrictions and output power limitations.

**NOTICE**

Unused antenna port must be terminated with 50-Ohm terminations.

**NOTICE**

To avoid damages on the antenna interfaces, ensure that the far end side of the antenna cable and/or the antenna itself is connected to protective earth.



## 5.2 Type Tests and Environmental Conditions

| Environmental phenomena        | Basic standard       | Description                      | Test levels   |
|--------------------------------|----------------------|----------------------------------|---|
| ESD                            | EN 61000-4-2         | Enclosure                        | Contact: $\pm 6$ kV<br>Air: $\pm 8$ kV  |
| Fast transients                | EN 61000-4-4         | AC power port                    | $\pm 2$ kV, direct coupling   |
|                                |                      | Ethernet ports                   | $\pm 2$ kV, capacitive coupling clamp   |
|                                |                      | Antenna ports                    |   |
| Surge                          | EN 61000-4-5         | AC power port                    | L/N-PE: $\pm 2$ kV, $2 \Omega$ , $18 \mu\text{F}$ , $1.2/50 \mu\text{s}$<br>L/N-PE: $\pm 2$ kV, $12 \Omega$ , $9 \mu\text{F}$ , $1.2/50 \mu\text{s}$<br>L/N-PE: $\pm 2$ kV, $42 \Omega$ , $.5 \mu\text{F}$ , $1.2/50 \mu\text{s}$<br>L-N: $\pm 2$ kV, $2 \Omega$ , $18 \mu\text{F}$ , $1.2/50 \mu\text{s}$<br>L-N: $\pm 2$ kV, $12 \Omega$ , $9 \mu\text{F}$ , $1.2/50 \mu\text{s}$<br>L-N: $\pm 2$ kV, $42 \Omega$ , $.5 \mu\text{F}$ , $1.2/50 \mu\text{s}$ |
|                                |                      | Ethernet ports                   | $\pm 2$ kV, $2 \Omega$ , $18\mu\text{F}$ , $1.2/50 \mu\text{s}$   |
|                                |                      | Antenna ports                    |   |
| Power frequency magnetic 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<br>5 V/m, 80% AM (1kHz) at 2 GHz to 2.7 GHz<br>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<br>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<br>Leakage current $< 4.5$ mA   |

Table 8 EMC and electrical conditions

| Environmental phenomena | Basic standard                   | Description                    | Test levels  |
|-------------------------|----------------------------------|--------------------------------|--|
| Temperatures            | EN 60068-2-1                     | Operational                    | -40 to +70°C (-40 to +158°F) <sup>3</sup>  |
|                         | EN 60068-2-2<br>EN 60068-2-14    | 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                     |                                | 233133 hours   |
| Vibration               | MIL STD 810,<br>M514.7<br>(sine) | Operational                    | 5 to 10 Hz, 2.54 mm<br>10 to 200 Hz, 2.0 g<br>20 sweep cycles in each axis, 0.9 octave/min |
|                         | EN 60068-2-64<br>(random)        | Operational,<br>endurance test | 2.3 m/s <sup>2</sup> random, 5 to 2000 Hz,<br>3 x 4 h                                      |
| Shock <sup>4</sup>      | EN 60068-2-27                    | Operational                    | 20 m/s <sup>2</sup> , 11 ms, 3 x 6 shocks (half sine)                                      |
|                         | MIL STD 810,<br>M516.7           |                                | 10 g, 11 ms, 3 x 6 shocks (saw tooth)  |
| Weight                  |                                  |                                | 2000 gr  |
| Degree of protection    | EN 60529                         | Enclosure                      | IP66 <sup>5</sup>  |
| Cooling                 |                                  |                                | Convection   |
| Pollution degree        | EN 62368-1                       |                                | PD2  |
| Conformal coating type  | IPC-A-610                        | Electronic modules             | AR (Acrylic)   |

Table 9 Environmental and mechanical conditions

<sup>3</sup> Refer to "Safety Information" chapter regarding touch temperature

<sup>4</sup> The power and Ethernet cables need to be fastened 200 mm or closer to the unit. The same recommendation applies to the Antenna cables

<sup>5</sup> Provided all connectors are connected with IP66 cabling or fitted with protective caps (delivered with the unit) and tightened to the specified torque

## 6 Abbreviations and Terms

| Abbreviation    | Description   |
|-----------------|---|
| <b>AC</b>       | Alternating Current   |
| <b>AM</b>       | Amplitude Modulation  |
| <b>AREMA</b>    | American Railway Engineering and Maintenance-of-Way Association   |
| <b>AWG</b>      | American Wire Gauge   |
| <b>Binder</b>   | Connector Manufacturer, <a href="https://www.binder-connector.com/">https://www.binder-connector.com/</a> |
| <b>CAT5e</b>    | Category 5 Enhanced Cable   |
| <b>CE</b>       | Conformité Européenne   |
| <b>CPU</b>      | Central Processing Unit   |
| <b>DC</b>       | Direct Current  |
| <b>EMC</b>      | Electromagnetic Compatibility   |
| <b>EN</b>       | European Standard   |
| <b>ERR</b>      | Error   |
| <b>ESD</b>      | Electro Static Discharge  |
| <b>ETSI</b>     | European Telecommunications Standards Institute   |
| <b>FCC</b>      | Federal Communication Commission  |
| <b>FLOSS</b>    | Free/Libre Open Source Software   |
| <b>FO</b>       | Fiber Optic   |
| <b>IEC</b>      | International Engineering Consortium  |
| <b>IC</b>       | Industry Canada   |
| <b>ID</b>       | Identification  |
| <b>I/O</b>      | Input / Output  |
| <b>IP</b>       | Ingress Protection  |
| <b>ISO</b>      | International Standardization Organisation  |
| <b>LAN</b>      | Local Area Network  |
| <b>LED</b>      | Light Emitting Diode  |
| <b>MIMO</b>     | Multiple Input, Multiple Output   |
| <b>MTBF</b>     | Mean Time between Failure   |
| <b>MTTR</b>     | Mean Time to Repair   |
| <b>ODC-2</b>    | Outdoor Connector 2   |
| <b>OPR</b>      | Operation   |
| <b>QR</b>       | Quick Response  |
| <b>RF</b>       | Radio Frequency   |
| <b>TNV</b>      | Telephone Network Voltage   |
| <b>SN</b>       | Serial Number   |
| <b>SNMP</b>     | Simple Network Management Protocol  |
| <b>WebGUI</b>   | Web Graphical User Interface  |
| <b>WeConfig</b> | Westermo Configuration Tool   |
| <b>WEEE</b>     | Waste Electrical and Electronics Equipment  |
| <b>WLAN</b>     | Wireless Local Area Network   |

Table 10 Abbreviations and terms

## 7 Revision Notes

| <b>Revision</b> | <b>Date</b> |                |
|-----------------|-------------|----------------|
| <b>Rev. A</b>   | 2020-09     | First revision |

# **WESTERMO**

Westermo • SE-635 35 Stora Sundby, Sweden  
Tel +46 16 42 80 00 Fax +46 16 42 80 01  
E-mail: [info@westermo.com](mailto:info@westermo.com)  
[www.westermo.com](http://www.westermo.com)