

# RT-310 / RT-320

## User Guide



REV. A 6623-2270 2018-03 Westermo Teleindustri AB, Sweden

## Version History

Version	Date	Comments
A	2018-03	First version

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# 1 Foreword

This document describes the installation procedure of the RT-310 and RT-320 devices.

## 1.1 References

No.	Title
[1]	Software Management Guide
[2]	RT-320 Datasheet
[3]	RT-310 Datasheet

## 1.2 Abbreviations and Terms

Abbreviation	Description
AP	Access Point
BSSID	Basic Service Set ID
EMC	Electro Magnetic Compatibility
ETH	Ethernet
FAI	First Article Inspection
GW	Gateway
HTTP	Hyper Text Transfer Protocol
ID	Identification
IP	Internet Protocol
LED	Light Emitting Diode
MAC	Media Access Control
MMI	Man-Machine Interface
PE	Protective Earth
RSSI	Receive Signal Strength Indicator
RX	Receive
SN	Serial Number
SNMP	Simple Network Management Protocol
STA	Station
TRE	Trackside Radio Equipment
TX	Transmit
WLAN	Wireless Local Area Network

## 2 RT-310 / RT-320 Introduction

The RT-310 / RT-320 is a wireless communication product, developed for demanding industrial and railway applications. It is a radio device operating at 2.4 and 5 GHz WLAN bands, and configured either as Access Point or Station.

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.



Figure 1 RT-320 Picture

The product functional block diagram is shown in Figure 2.

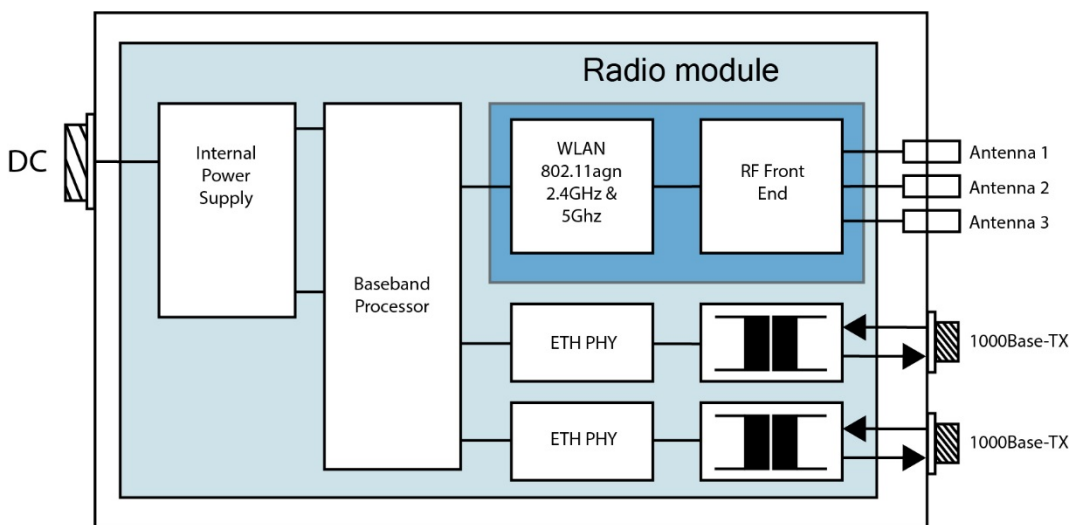


Figure 2 RT-310 / RT-320 Block diagram







## 2.1 Supported Product Versions, Variants and SW

Supported product versions, variants and SW:

<b>Specification</b>	<b>Value</b>	<b>Notes</b>
<b>Product Versions/ Variants</b>	<b>RT-320</b>	
	<b>RT-310</b>	<i>Limited operating modes and output power in comparison to RT-320, please refer to product datasheet for more details</i>
<b>Software Version</b>	<b>V6.8 and higher</b>	

**Table 1 Supported product versions, variants and SW**

## 2.2 Important Safety Notes

	<p><b>Danger!</b> Do not use damaged equipment and/or accessories such as damaged power cord.</p>
	<p><b>Danger!</b> Never try to open the device. There are no serviceable parts inside.</p>
	<p><b>Warning!</b> Product warranty gets void and any liability will be disclaimed when opening the device.</p>
	<p><b>Warning!</b> Read this user guide carefully before mounting, installing and operating the device.</p>
	<p><b>Warning!</b> Never unplug equipment from the electrical outlet by holding the cord only, always disconnect the cable by applying force directly to the plug.</p>
	<p><b>Warning!</b> Do not operate the device in any other environmental conditions than it is designed for.</p>

**Table 2 Important safety notes**



## 2.3 RT-320 Delivery Content

The RT-320 delivery consists of following main components:

<b>Description</b>	<b>Number of Parts</b>	<b>Notes</b>
<b>RT-320</b>	<b>1</b>	
<b>Connector Dust Cap</b>	<b>6</b>	<i>Temporary protection of connectors:</i> <ul style="list-style-type: none"> <li>• <i>2 plastic protection caps for Ethernet connectors</i></li> <li>• <i>1 plastic protection cap for power connector</i></li> <li>• <i>3 plastic protection caps for antenna connectors</i></li> </ul>

Table 3 RT-320 delivery content

## 2.4 RT-310 Delivery Content

The RT-310 delivery consists of following main components:

<b>Description</b>	<b>Number of Parts</b>	<b>Notes</b>
<b>RT-310</b>	<b>1</b>	
<b>Connector Dust Cap</b>	<b>6</b>	<i>Temporary protection of connectors:</i> <ul style="list-style-type: none"> <li>• <i>2 plastic protection caps for Ethernet connectors</i></li> <li>• <i>1 plastic protection cap for power connector</i></li> <li>• <i>3 plastic protection caps for antenna connectors</i></li> </ul>

Table 4 RT-310 delivery content

## 2.5 Installation Countries

Installation country regulatory limits and operating parameters are controlled by Software Country Code parameter. This product supports:

<b>Country Code</b>	<b>Operating Frequency Ranges</b>	<b>Notes</b>
<b>Europe (EU)</b>	<b>2412 ... 2472 MHz and 5180 ... 5320 MHz, 5500 ... 5700 MHz</b>	<i>Operation according to ETSI limitations For detailed specification, refer to document [1]</i>
<b>United States (USA)</b>	<b>2412 ... 2472 MHz and 5180 ... 5320 MHz, 5500 ... 5700 MHz 5725 ... 5850 MHz</b>	<i>Operation according to FCC limitations For detailed specification, refer document [1]</i>
<b>Canada (CANADA)</b>	<b>2412 ... 2472 MHz and 5180 ... 5320 MHz, 5500 ... 5700 MHz 5725 ... 5850 MHz</b>	<i>Operation according to IC limitations For detailed specification, refer to document [1]</i>

**Table 5 Installation countries**

**Note:** Further Software releases might support additional country codes, for up-to-date country code specification refer to document [1]

## 2.6 Regulatory Notices

### Caution!

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.

### 2.6.1 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.

Contains FCC ID: **2AEJD-103902-DT50RF**

#### RF Exposure requirements:

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.

#### Antennas:

The device can operate with the antennas listed in 2.6.3.

## 2.6.2 Canada (IC)

This device complies with Industry Canada's license-exempt RSSs. Operation is subject to the following two conditions:

1. This device may not cause interference.
2. 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:

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

IC Certification Number of the implemented WLAN communication module: **9301A-103902DT50**

### Antennas:

The device can operate with the antennas listed in 2.6.3.

## 2.6.3 Certified Antennas for FCC and IC

The following antennas can be used with the device (the antenna type ID has to be set to the right value):

<i>Type</i>	<i>Part number</i>	<i>Manufacturer</i>	<i>Gain</i>	<i>Chains</i>	<i>Antenna Type ID</i>
Dipole	F51-N	Tekfun	2 GHz: 4.5 dBi max 5 GHz: 7 dBi max	1, 2, 3	04
Patch	SPA 2400/75/8/0/V	Huber & Suhner	2 GHz: 7.5 dBi max	1, 2, 3	05
Patch	SPA-5600/40/14/0/V_2	Huber & Suhner	5 GHz: 14 dBi max	1, 2	06
Patch	SPA-5600/65/9/0/MIMO	Huber & Suhner	5 GHz: 9 dBi max	1, 2, 3	07
Shark	SPA-5600/45/12/10/V	Huber & Suhner	5 GHz: 12 dBi max	1, 2	08

**Table 6: FCC and IC certified antennas**

## 2.7 Output power limitations

The RT-310 and RT-320 have following output power limitations for ambient temperatures from -40°C to +70°C.

<b>Active antennas</b>	<b>Max. output power with DC supply</b>	<b>Max. output power with PoE supply</b>
1	22 dBm per chain	22 dBm per chain
2	22 dBm per chain	22 dBm per chain
3	22 dBm per chain	20 dBm per chain

**Table 7: Output power limitations**

## 2.8 Product Identification and Version Information

Product identification information is available at the product label. The product label is fixed to the device.

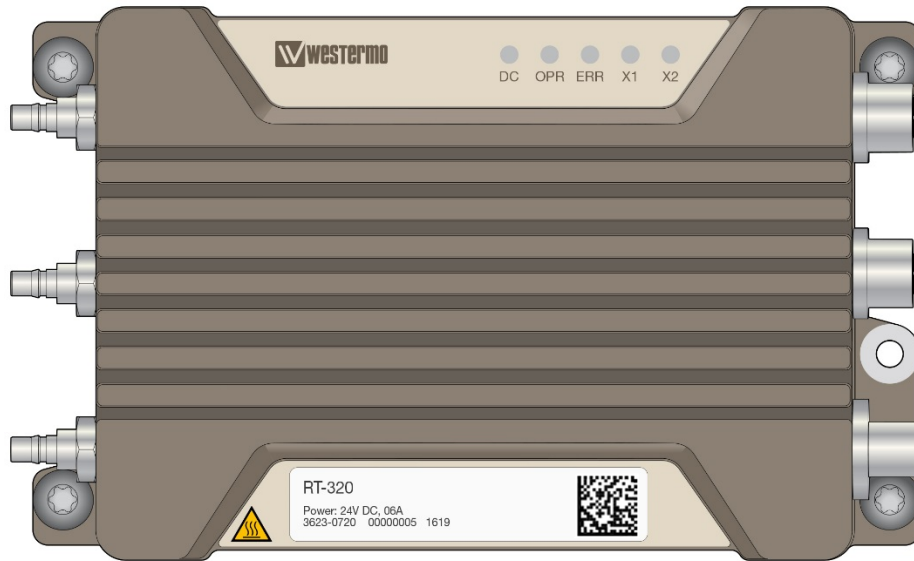


Figure 3 RT-320 Product identification label position

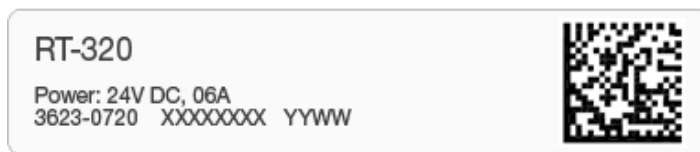


Figure 4 RT-320 Product identification label example


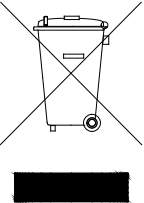



Specification	Value	Notes
<b>Product Name</b>	<b>RT-320</b>	Or respectively RT-310
<b>Part Number</b>	<b>3623-0720</b>	Or respectively 3623-0710
<b>SN</b>	<b>XXXXXXXX</b>	Internal serial number
<b>Manufacturing Date</b>	<b>YYWW</b>	The date format is: YY = manufacturing year WW = manufacturing week
<b>BAR CODE</b>	<b>SN information</b>	Data matrix
<b>Hot surfaces</b>		Surface temperature can be above 60°C

Table 8 Product Identification Label

At the rear side of the product further product specific information is printed to a second label.

**Figure 5 RT-320 Product label example**

<b>Specification</b>	<b>Value</b>	<b>Notes</b>
<b>Product Name</b>	<b>RT-320</b>	<i>Or respectively RT-310</i>
<b>Part Number</b>	<b>3623-0720</b>	<i>Or respectively 3623-0710</i>
<b>Max current</b>	<b>0.6 A</b>	<i>Information on input current</i>
<b>Power</b>		<i>Information on input power feed</i>
<b>WEEE</b>		<p><i>This symbol, found on the product indicates that this product should not be treated as household waste when disposing of it.</i></p> <p><i>Instead it must be handled over to an applicable collection point for the recycling of electrical and electronic equipment.</i></p> <p><i>By ensuring this product is disposed correctly, you will help prevent potential negative consequences to the environment and human health, which could be otherwise be caused by inappropriate disposal of this product.</i></p>
<b>CE</b>		<i>CE mark</i>
<b>Notified body</b>	<b>0682</b>	<i>Identification number of the notified body Cetecom ICT Services GmbH Germany</i>
<b>R&amp;TTE directive</b>		<i>Class 2 radio equipment for which restrictions apply to putting into service.</i>
<b>Hot surfaces</b>		<i>Surface temperature can be above 60°C.</i>
<b>FCC / IC e-label</b>	FCC / IC e-label: http://<ip-address> Default IP: 192.168.1.20	<i>Link to the FCC / IC e-label</i>

**Table 9 Product label**

### 3 Technical Features

Technical features are described in reference documents [2] and [3].

## 4 Installation

### 4.1 Installation Procedure, Overview

<i>Order of Installation Step</i>	<i>Description</i>
<b>1. Fixing</b>	The product is fixed in operating environment, ensuring that the environment complies with the installation environment constrains. See chapter 4.2
<b>2. System Grounding</b>	The system grounding is ensured and verified based on customer installation. See chapter 4.4
<b>3. Antennas</b>	The antenna interfaces are installed based on customer requirements. See chapter 4.5
<b>4. Ethernet</b>	The Ethernet data interfaces are installed. See chapter 4.6
<b>5. Power Feed</b>	Power feed cable is connected (the power may be already activated in the cable), the power supply is switched on and verify that the LED indicators shows correct power up procedure. See chapter 4.7
<b>6. Configuration</b>	The configuration process is described in reference document [1] chapter: Configuration.

**Table 10** Installation procedure

## 4.2 Dimensions for Fixing Points

### 4.2.1 Mechanical Overview

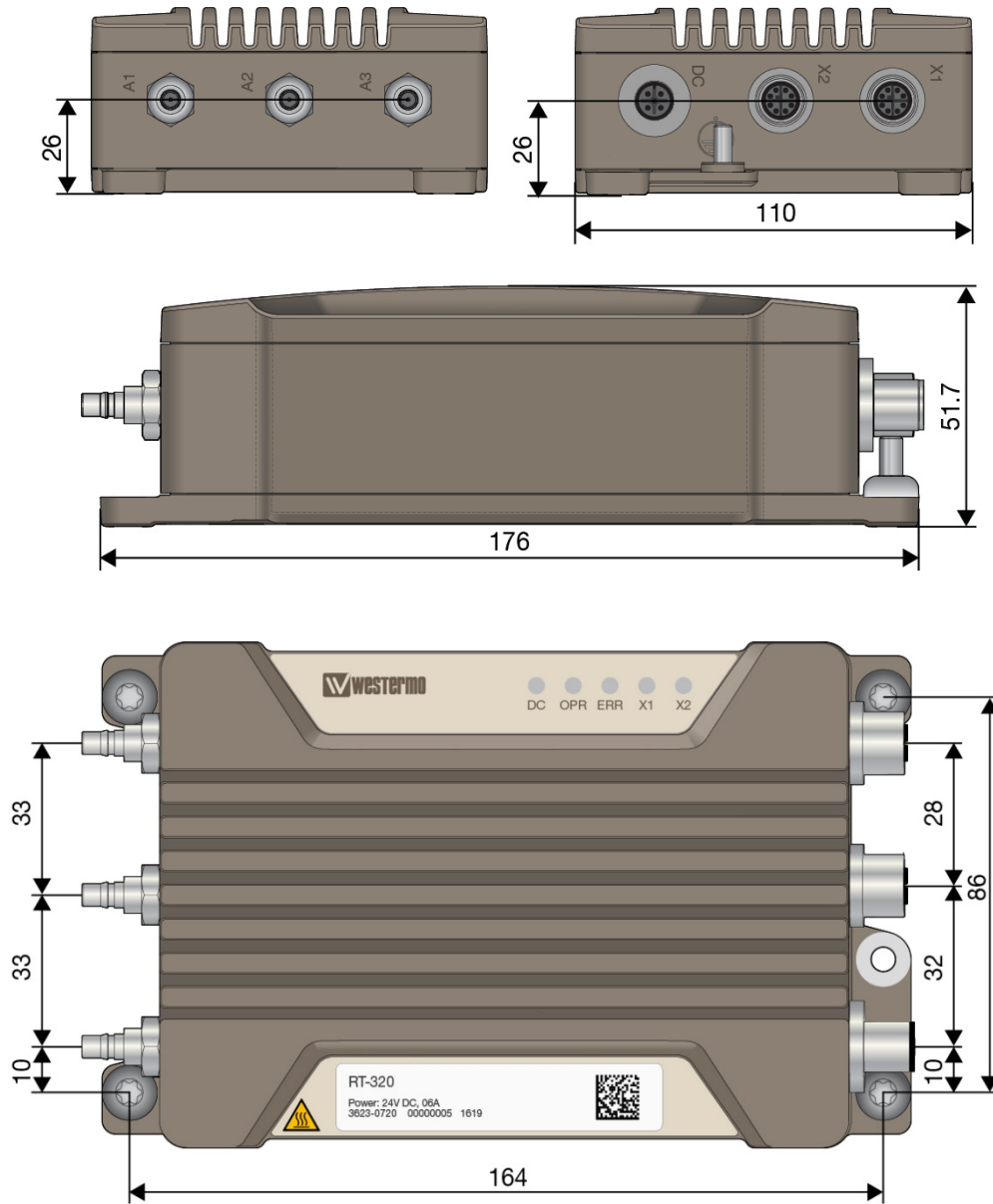


Figure 6 Mechanical overview

<b>Parameter</b>	<b>Value</b>	<b>Notes</b>
<b>Maximum dimensions</b>	<i>176 x 110 x 52 mm</i>	<i>Length with antenna connectors 180mm</i>
<b>Maximum dimensions, with cables but not including antennas</b>	<i>App 300 x 110 x 52 mm</i>	<i>Space needed for installation</i>
<b>Location of the fixing points</b>	<i>In each corner</i>	<i>With four M6 screws</i>
<b>Color</b>	<i>RAL 7006, beige grey</i>	<i>Powder Coating</i>
<b>Protection</b>	<i>IP67</i>	
<b>Weight</b>	<i>1.08 kg</i>	

Table 11 Dimensions and weight



### 4.2.2 Mechanical Integration, Fixing Points and Connector Positions

The product must be fixed with the four fixing points located at the corners of the product. M6 screws shall be used for the fixation of the product. The screws shall be 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 fixing surface should be flat to have all fixing points connected to the surface.

The product has a membrane vent at the connector side of the product for equalizing pressure changes.

**NOTICE:** The vent does not require any maintenance. Any manipulations at the vent are not allowed.

Specification	Value					
Fixing holes positions	Fixing holes without threads, for 6mm screws: four pieces of slot holes, see: Figure 6					
	0 mm, 0 mm			164 mm, 0 mm		
	0 mm, 86 mm			164 mm, 86 mm		
Connector positions	DC POWER	Antenna 1	Antenna 2	Antenna 3	1000Base-TX ETH1	1000Base-TX ETH2
	See Figure 7 Figure 14	See Figure 7 Figure 12	See Figure 7 Figure 12	See Figure 7 Figure 12	See Figure 7 Figure 13	See Figure 7 Figure 13
Grounding	See Figure 7, Figure 11					

Table 12 Fixing points and connector positions

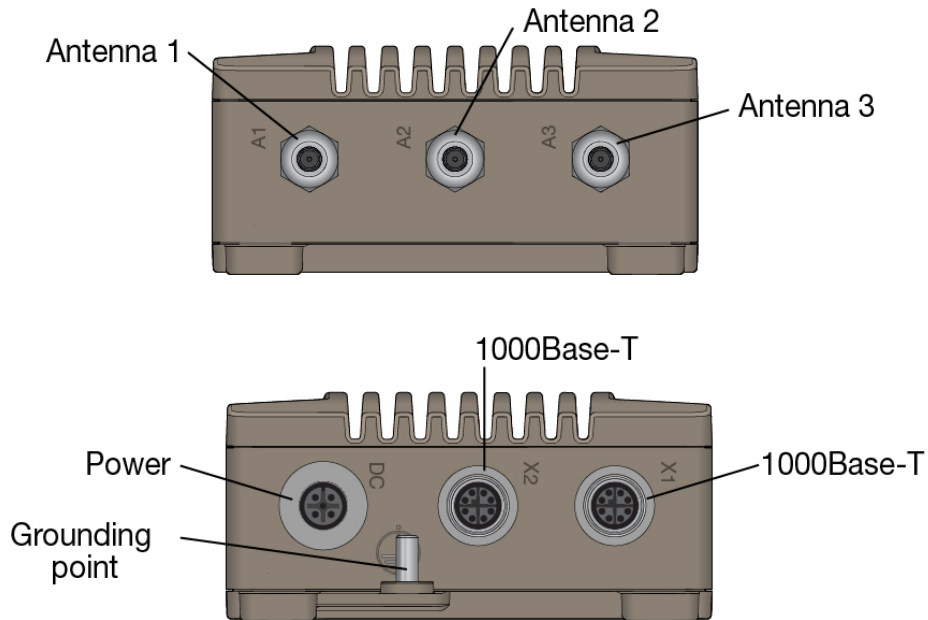


Figure 7 Connectors

## 4.3 Considerations When Mounting the Device

### 4.3.1 General Installation Considerations

When planning an installation at least the following points shall be considered:

- Indoor: protecting for dust (to ensure heat dissipation), vandalism, animals (rats, birds etc)
- Outdoor: protecting for sun (to optimize ambient temperature range), dust, dirt, vandalism etc.

### 4.3.2 Temperature Alarms

This product has integrated temperature sensors for monitoring the internal device temperature. The limits for the sensors are set so, that operation without alarm is ensured for ambient temperatures as specified for the product assuming correct installation.

**NOTICE:** The limits have been set so that some of the components are close to the limit of the specified temperature range. For this reason the unit shall not be operated in conditions where the temperature alarm is activated.

### 4.3.3 Ambient Operating Temperature Range

This product includes a vent allowing controlled air exchange due to temperature changes. Humidity is blocked by the vent.

To ensure correct operation over the whole specified temperature range, certain aspects need to be considered.

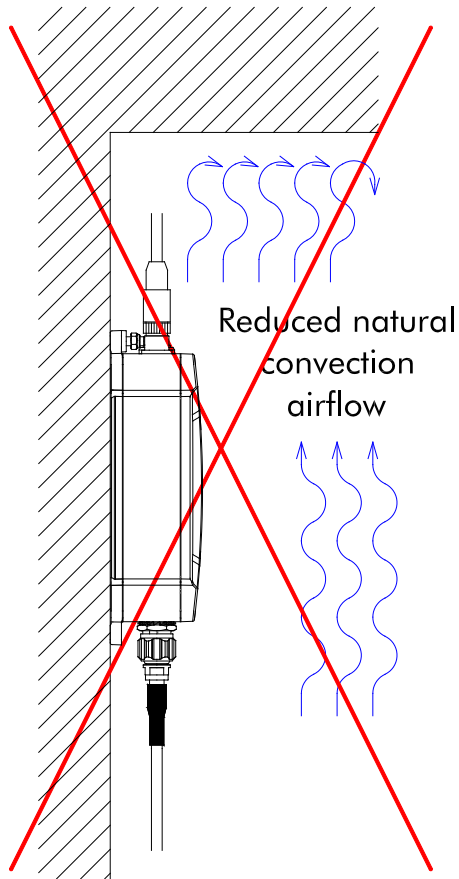
The limits are defined for installations with free air flow in the installation environment.

It shall be noted that in real environment:

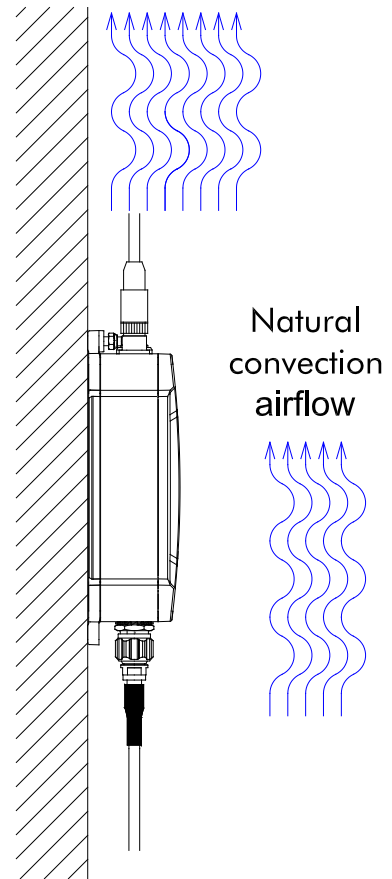
- Limited air flow is rising the device temperature and may lower the upper limit of the operating temperature range
- Conducted heat exchange through metal surfaces at the product fixing point is improving the device heat transfer and improving the operating conditions
- Temperature is dependent on the operational parameters, like RF output power, amount of traffic
- This product has internal temperature sensors that will issue alarms for too high or too low temperature. The operating conditions shall be ensured so that the normal operation does not cause temperature alarms. Any temperature alarms shall be immediately rectified. See reference document [1] for detailed specification of the temperature sensors alarms.

### 4.3.4 Installations at Very High Temperatures

For installations, where the product is operated close to its maximum specified ambient temperature ( $+55^{\circ}\text{C} < T_{\text{Ambient}} < +70^{\circ}\text{C}$ ), it must be ensured that the natural convection is not blocked by objects close to the product.

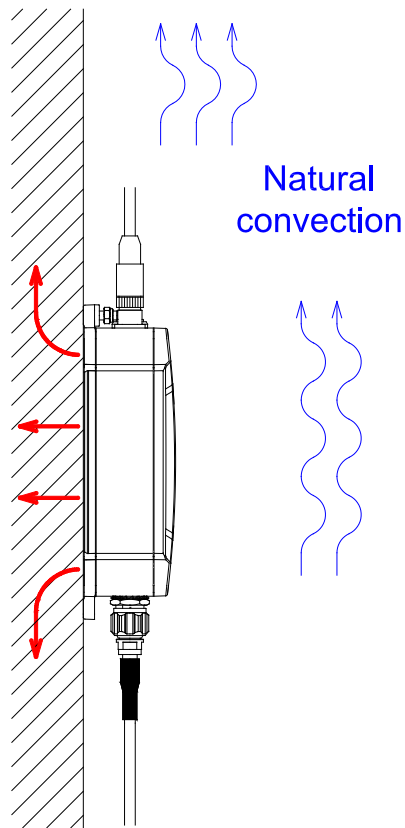


**Figure 8 Installation with blocked airflow shall be avoided**



**Figure 9 Installation with free airflow - good installation**

When operating the device at ambient temperatures above app. +60C 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 10 Improved heat transfer based on fixing plate**

## 4.4 Connecting the System Grounding

There is a single grounding connection point in RT-310/ RT-320. An M5 grounding screw at the housing is used for grounding (see Figure 11).

**NOTICE:** The grounding is organized by connecting the grounding to the ground contact in the casing. For the grounding at the ground contact (M5 stud), a short wire with a cross section of at least 6.0 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.

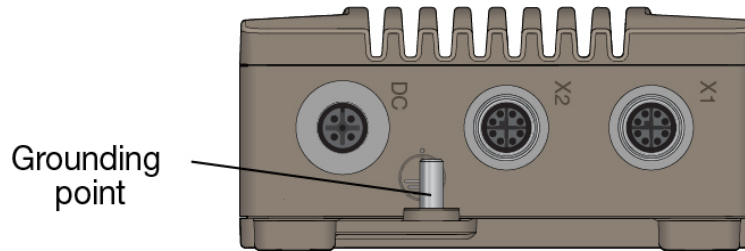


Figure 11 Grounding contact

## 4.5 Connecting the RF Antenna Interfaces

### 4.5.1 RF Antenna Interface Operation Modes

RT-310/RT-320 has three antenna interfaces. The antenna interfaces are operating independently of each other.

<b>Antenna Function</b>	<b>Operation</b>	<b>Notes</b>
<b>A1</b>	Antenna 1 is used for both transmitting and receiving	The antenna A1 shall be used.
<b>A2</b>	Antenna 2 is used for both transmitting and receiving	The antenna A2 can be enabled or disabled.
<b>A3</b>	Antenna 3 is used for both transmitting and receiving	The antenna A3 can be enabled or disabled.

Table 13 RF Antenna interface operation

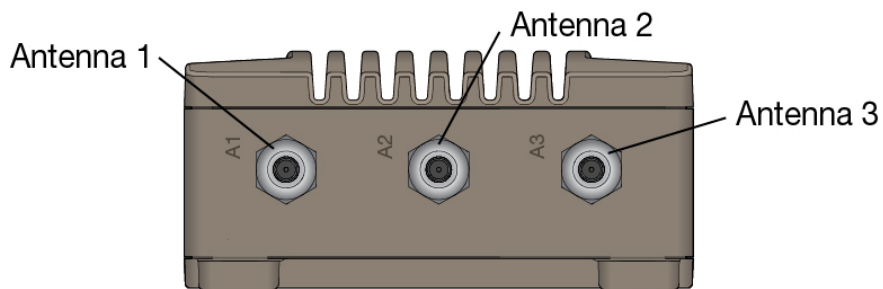
**NOTICE:** If antenna A2 and/or A3 will be NOT used in the customer application, the antenna connector MUST be terminated with a 50 ohm termination.

**NOTICE:** The antenna interfaces are protected against lightning with special protection devices. To ensure correct operation of these devices it is important, that the earth grounding contact is connected to protective earth as described in chapter 4.4.

### 4.5.2 RF Antenna Connectors

The antenna connectors are identified with the text markings A1 (Antenna 1), A2 (Antenna 2) and A3 (Antenna 3) in the mechanics.

The antennas might be fixed in antenna connectors directly or using antenna cables fixed to the antenna connectors.



**Figure 12 Antenna interfaces**

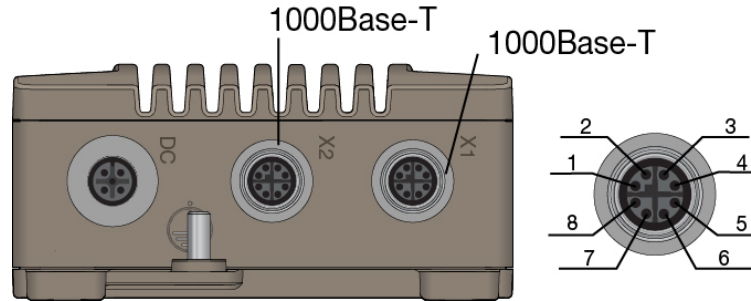
**NOTICE:** If one of the antennas is NOT used, the unused antenna connectors MUST be terminated with 50 ohm termination.

<b>Pin</b>	<b>Signal Name, Function</b>	<b>Notes</b>
<b>1</b>	Center pin: RF signal	Connector Type: QMA – Female
<b>2</b>	Connector body: RF ground	

**Table 14 Pinning: RF antenna connector**

## 4.6 Connecting Ethernet Interface

RT-310/RT-320 has two Ethernet interfaces. M12 industrial standard connector with keying is used. The Ethernet connectors are identified with the text markings ETH1 (Ethernet 1) and ETH2 (Ethernet 2) in the mechanics.



**Figure 13 Ethernet interfaces**

The connectors should be assembled with correct torque (appr. 1.0 Nm, check connector manufacturer data)

**NOTICE:** Ethernet signals have a transformer in the signal lines. There is no additional line protection for Lightning etc included at product hardware module.

**NOTICE:** The Ethernet Interface connector fulfills the IP67 protection when the cable plug or the dust cap is connected. If the Ethernet function is not used in application, the protective dust cap must be closed.

### 4.6.1 Ethernet Port Features

The Ethernet port supports the following network standards:

<b>Network Standard</b>	<b>Description</b>
<b>10BASE-T</b>	Ethernet over two pairs of twisted wires
<b>100BASE-TX</b>	Fast Ethernet over two pairs of twisted wires
<b>1000BASE-TX</b>	Gigabit Ethernet over four pairs of twisted wires

**Table 15 4.6.1 Ethernet port features**

The Ethernet ports support auto-negotiated 10 Mbps / 100 Mbps / 1000 Mbps operation. Automatic MDI/MDIX crossover is supported for 10BASE-T, 100BASE-T, 1000BASE-T operation. For final installation the use of auto-negotiation is however not recommended.

## 4.6.2 Ethernet Connector

<b>Connector Pin</b>	<b>Signal name, Function</b>	<b>Notes</b>
<b>1</b>	MX1 +	Connector Type: Industrial ETHERNET M12-Socket "X"-coded
<b>2</b>	MX1 -	
<b>3</b>	MX2 +	
<b>4</b>	MX2 -	
<b>5</b>	MX4 +	
<b>6</b>	MX4 -	
<b>7</b>	MX3 -	
<b>8</b>	MX3 +	
<b>Housing</b>	Ground	For possible cable protection/screening

**Table 16 Ethernet connector**

**NOTICE:** The pinning is compliant to IONA, Industrial Ethernet Planning and Installation Guide, Release 4.0.

## 4.6.3 PoE Connection (ETH2 only)

<b>Connector Pin</b>	<b>1000 mode A</b>	<b>1000 mode B</b>	<b>Notes</b>
<b>1, 2</b>	DC+		Connector Type: Industrial ETHERNET M12-Socket "X"-coded
<b>3, 4</b>	DC-		
<b>5, 6</b>		DC-	
<b>7, 8</b>		DC+	
<b>Housing</b>	Ground	Ground	For possible cable protection/screening

**Table 17 PoE connection**

## 4.6.4 PoE Power Feed Specifications

<b>Parameter</b>	<b>Value</b>	<b>Notes</b>
<b>Nominal Voltage</b>	48 VDC	
<b>Voltage Range</b>	37 VDC ... 57 VDC	
<b>Power classification</b>	Class 3	

**Table 18 PoE power feed specifications**



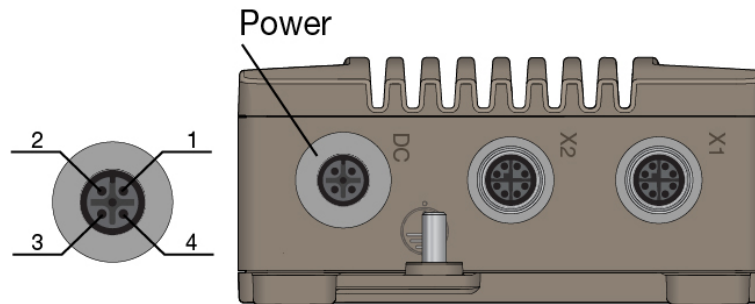
## 4.7 Connecting the Power Feed

The power feed is connected to the POWER connector. The power supply interface is a galvanically isolated interface; it is protected against surge and ESD. The power connector is keyed ensuring correct connector position.

**NOTICE:** The Power Feed Cable is not part of delivery.

### 4.7.1 Power Feed Connector

**Connector type:** M12 A-coded 4-pin male connector according to IEC 61076-2-101.



**Figure 14 RT-310/RT-320, power connector**

**NOTICE:** Power connector pinning: clockwise 1, 4, 3, 2 starting from the coding mark.

Pin	Signal Name, Function	Notes
1	+VCC1 or -COM	The supply voltage is applied, polarity free
2	Not used	
3	-COM or +VCC2	The supply voltage is applied, polarity free
4	Not used	

**Table 19 Pinning: PWR connector**

### 4.7.2 Power Feed Specifications

Parameter	Value	Notes
<b>Nominal Voltage</b>	24 VDC	
<b>Voltage Range</b>	16.8 VDC to 33.6 VDC	
<b>Nominal current</b>	0.6 A	Guaranteed min/max operating voltage range
<b>Power consumption</b>	App. 4 W App. 9 W	Idle load Full load
<b>Selecting external power connector and power cable diameter - Allowed wire cross section</b>	Min. 0.5 mm <sup>2</sup>	Cable Plug: e.g. Phoenix Contact, SACC-M12FS-4CON-PG7-M

**Table 20 Power feed specifications**

### 4.7.3 Power Consumption Examples

The power consumption is dependent on the operational parameters, like RF output power, amount of routed traffic and the RX duty cycle.

Test case	Antennas	TX duty cycle	TX output	Amb. Temp.	Avg. Power
2.4 GHz idle	1x1, 2x2, 3x3	2%	1...3 x 22 dBm	-40°C	P = 3.80 W
2.4 GHz idle	1x1, 2x2, 3x3	2%	1...3 x 22 dBm	+70°C	P = 4.41 W
2.4 GHz TX50 SISO, -40	1x1	50%	1 x 22 dBm	-40°C	P = 4.53 W
2.4 GHz TX50 SISO +70	1x1	50%	1 x 22 dBm	+70°C	P = 5.09 W
2.4 GHz TX50 2x2 MIMO -40	2x2	50%	2 x 22 dBm	-40°C	P = 5.28 W
2.4 GHz TX50 2x2 MIMO +70	2x2	50%	2 x 22 dBm	+70°C	P = 5.96 W
2.4 GHz TX50 3x3 MIMO -40	3x3	50%	3 x 22 dBm	-40°C	P = 6.03 W
2.4 GHz TX50 3x3 MIMO +70	3x3	50%	3 x 22 dBm	+70°C	P = 6.83 W
2.4 GHz TX90 SISO, -40	1x1	90%	1 x 22 dBm	-40°C	P = 5.36 W
2.4 GHz TX90 SISO +70	1x1	90%	1 x 22 dBm	+70°C	P = 5.86 W
2.4 GHz TX90 2x2 MIMO -40	2x2	90%	2 x 22 dBm	-40°C	P = 6.95 W
2.4 GHz TX90 2x2 MIMO +70	2x2	90%	2 x 22 dBm	+70°C	P = 7.46 W
2.4 GHz TX90 3x3 MIMO -40	3x3	90%	3 x 22 dBm	-40°C	P = 8.54 W
2.4 GHz TX90 3x3 MIMO +70	3x3	90%	3 x 22 dBm	+70°C	P = 9.04 W

**Table 21: 2.4 GHz power consumption**

Test case	Antennas	TX duty cycle	TX output	Amb. Temp.	Avg. Power
2.4 GHz idle	1x1, 2x2, 3x3	2%	1...3 x 22 dBm	-40°C	P = 3.60 W
2.4 GHz idle	1x1, 2x2, 3x3	2%	1...3 x 22 dBm	+70°C	P = 4.27 W
2.4 GHz TX50 SISO, -40	1x1	50%	1 x 21 dBm	-40°C	P = 4.30 W
2.4 GHz TX50 SISO +70	1x1	50%	1 x 21 dBm	+70°C	P = 4.90 W
2.4 GHz TX50 2x2 MIMO -40	2x2	50%	2 x 21 dBm	-40°C	P = 5.05 W
2.4 GHz TX50 2x2 MIMO +70	2x2	50%	2 x 21 dBm	+70°C	P = 5.65 W
2.4 GHz TX50 3x3 MIMO -40	3x3	50%	3 x 21 dBm	-40°C	P = 5.80 W
2.4 GHz TX50 3x3 MIMO +70	3x3	50%	3 x 21 dBm	+70°C	P = 6.40 W
2.4 GHz TX90 SISO, -40	1x1	90%	1 x 21 dBm	-40°C	P = 5.02 W
2.4 GHz TX90 SISO +70	1x1	90%	1 x 21 dBm	+70°C	P = 5.68 W
2.4 GHz TX90 2x2 MIMO -40	2x2	90%	2 x 21 dBm	-40°C	P = 6.41 W
2.4 GHz TX90 2x2 MIMO +70	2x2	90%	2 x 21 dBm	+70°C	P = 7.06 W
2.4 GHz TX90 3x3 MIMO -40	3x3	90%	3 x 21 dBm	-40°C	P = 7.80 W
2.4 GHz TX90 3x3 MIMO +70	3x3	90%	3 x 21 dBm	+70°C	P = 8.44 W

**Table 22: 5 GHz power consumption**

## 5 Configuration and Use

The operation parameters in configuration files define the functionality. The complete configuration process is described in reference document [1].

### 5.1 LED Indicators During Power Up Sequence

LED behavior during power-up sequence is described in reference document [1] in the chapter Status Indication.

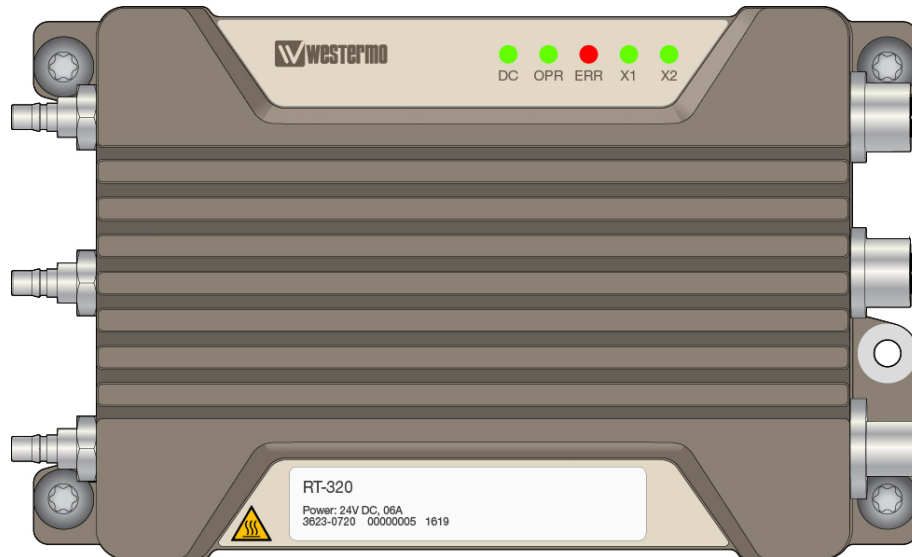


Figure 15 Power, operation, status and Ethernet LEDs

### 5.2 Factory Reset Interface, Process for Factory Reset

A factory reset is not typically needed for installation. It is required if the device configuration is lost.

The factory reset functionality is included in both Ethernet port interfaces. The factory reset process is performed using specific factory reset adapter.

#### 5.2.1 Factory Reset Adapter Specification

The factory reset adapter is a special plug for the Ethernet interface that activates the factory reset signal.

There is a specific factory reset adapter available:

FACTORY RESET PLUG X-CODED

Part No.: 3623-0799



Figure 16 Factory reset plug X-coded

## 5.2.2 Factory Reset Procedure

The Factory Reset is performed with a factory reset adapter that is connected to one of the Ethernet ports during the start-up.

<b>Step</b>	<b>Description</b>
<b>1.</b>	Plug the factory reset adapter to one of the Ethernet interfaces.
<b>2.</b>	Power the device
<b>3.</b>	Wait until factory reset adapter is detected. This is indicated by an ORANGE operation LED in combination with a RED status LED
<b>4.</b>	Remove factory reset adapter within 15 seconds
<b>5.</b>	A successful initiation of a factory Reset is indicated by an ORANGE BLINKING operation LED in combination with a RED BLINKING failure LED

**Table 23 Factory reset procedure**

After successful factory reset, the dust cap must be closed to ensure the IP requirements.

## 6 Maintenance



**Danger!**

Never open the device. There are no serviceable parts inside!

### 6.1 Cleaning– Resistance to Chemicals

In case the product is cleaned with cleaning chemicals, the resistance to chemicals of the plastic parts needs to be respected. The following plastic materials are used in the RT-310/ RT-320:

**Ethernet Connector Dust Cap**

Polyamide 66 (PA66)

Polyurethane (PUR)

**Pressure Equalizer Vent**

Polyamide 6 (PA6)

Polytetrafluoroethylene (PTFE)

**Stickers**

Autotex XE

## 6.2 Troubleshooting Based on Functional Behavior

Please read the troubleshooting instructions in reference document [1].

## 6.3 Repair Work

This product is exchanged as a whole unit. On product level no repair work is done in the field. Broken units need to be returned to the supplier for repair.

### 6.3.1 Exchange of the Product

<i>Order of Installation Step</i>	<i>Description</i>
<b>1. Remove Cables</b>	Remove cables in the following order: <ul style="list-style-type: none"> <li>• Power cable</li> <li>• Antenna cable A1</li> <li>• Antenna cable A2</li> <li>• Antenna cable A3</li> <li>• Ethernet cables</li> <li>• Protective earth cable</li> </ul>
<b>2. Open Screw</b>	The four M6 screws in each corner of the product must be opened and removed completely
<b>3. Exchange</b>	Lift the product out of its position. Place a replacement unit to its position
<b>4. Fix Screws</b>	The four M6 screws in each corner must be fixed again.
<b>5. Connect Cables</b>	Connect cables in the following order: <ul style="list-style-type: none"> <li>• Protective earth cable</li> <li>• Antenna cable A1</li> <li>• Antenna cable A2</li> <li>• Antenna cable A3</li> <li>• Ethernet cables</li> <li>• Power cable</li> </ul>
<b>6. Configure</b>	Download configuration to the product

**Table 24 Exchange flow**