

# DT-5302R PRODUCT FAMILY

## Installation and Maintenance Guide

Public

<b>Version:</b>	<b>Date:</b>	<b>Status:</b>
1.8	2019-10-15	Approved
<b>Author:</b>	<b>Owner:</b>	<b>Approved by:</b>
Michael Aeschbacher	Michael Aeschbacher	Stephan Habegger
<b>Doc.-No.:</b>	<b>File Name</b>	
5127.70.300	DT-5302R_Installation_and_Maintenance_Guide.docx	

## Version History

Version	Date	Author	Status	Comments
0.1	2015-11-25	MAE	Draft	First draft based on DT50R product
0.2	2015-12-18	SAN	Draft	Added some of the new drawings
0.3	2015-01-19	SAN	Draft	Updated measurement drawings
1.0	2015-01-20	SAN	Approved	
1.1	2015-02-18	SAN	Approved	Added DT-5302 variant
1.2	2016-10-18	MAE	Approved	Regulatory part updated
1.3	2017-03-01	MAE	Approved	PoE information added
1.4	2017-08-15	SHA	Approved	Product label example updated for RED directive
1.5	2018-11-30	MAE	Approved	Bug in power consumption table fixed
1.6	2019-02-04	MAE	Approved	Added DT-5302R-HV variant
1.7	2019-02-18	MAE	Approved	Added DT-5302R-48 variant, earth warning and voltage ripple comment
1.8	2019-10-15	MAE	Approved	FCC statement added

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization is prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

—

Weitergabe sowie Vervielfältigung dieses Dokuments, Verwertung und Mitteilung seines Inhalts sind verboten, soweit nicht ausdrücklich gestattet. Zuwiderhandlungen verpflichten zu Schadenersatz. Alle Rechte für den Fall der Patent-, Gebrauchsmuster- oder Geschmacksmustereintragung vorbehalten.

## Table of Contents

<b>1 Foreword</b>	<b>5</b>
1.1 References	5
1.2 Abbreviations and Terms	5
<b>2 Introduction</b>	<b>6</b>
2.1 Supported Product Versions, Variants and SW	7
2.2 Important Safety Notes	8
2.3 DT-5302R Delivery Content	9
2.4 Installation Countries	9
2.5 Regulatory notices	9
2.5.1 United States (FCC)	10
2.5.2 Canada (IC)	10
2.5.3 Certified antennas for FCC and IC	11
2.6 Output power limitations	11
2.7 Product Identification and Version Information	12
<b>3 Installation</b>	<b>14</b>
3.1 Installation Procedure, Overview	14
3.2 Dimensions for Fixing Points	15
3.2.1 Mechanical Overview	15
3.2.2 Mechanical Integration, Fixing Points and Connector Positions	17
3.3 Considerations when Mounting the Device	18
3.3.1 General Installation Considerations	18
3.3.2 Temperature Alarms	18
3.3.3 Ambient Operating Temperature Range	18
3.3.4 Installations at Very High Temperatures	19
3.4 Connecting the Protective Earth	21
3.5 Connecting the RF Antenna Interfaces	21
3.5.1 RF Antenna Interface Operation Modes	21
3.5.2 RF Antenna Connectors	22
3.6 Connecting Ethernet Interface	23
3.6.1 Ethernet Port Features	23
3.6.2 Ethernet Connector	24
3.6.3 PoE Connection (ETH2 and DT-5302R / DT-5302 only)	24
3.6.4 PoE Power Feed Specifications	24
3.7 Connecting the Power Feed	25
3.7.1 Power Feed Connector	25
3.7.2 Power Feed Specifications	25
3.7.3 Power consumption examples	26
3.7.4 Power supply ripple	26
<b>4 Configuration and Use</b>	<b>27</b>
4.1 LED Indicators during Power Up Sequence	27
4.2 Factory Reset Interface, Process for Factory Reset	27
4.2.1 Factory Reset Adapter Specification	28
4.2.2 Factory Reset Procedure	28
<b>5 Maintenance</b>	<b>29</b>
5.1 Cleaning– Resistance to Chemicals	29
5.2 Troubleshooting Based on Functional Behavior	30
5.3 Repair Work	30
5.3.1 Exchange of the product	30

## Figures and Tables

Figure 1 DT-5302R picture .....	6
Figure 2 DT-5302R Block Diagram .....	6
Figure 3 DT-5302R Product Identification Label Position .....	12
Figure 4 DT-5302R Product Identification Label Example .....	12
Figure 5 DT-5302R Product Label Example .....	13
Figure 6 Mechanical Overview .....	15
Figure 7 Connectors .....	17
Figure 8 Installation with blocked Airflow shall be avoided .....	19
Figure 9 Installation with free Airflow– good Installation .....	19
Figure 10 Improved Heat Transfer based on Fixing Plate .....	20
Figure 11 Grounding Contact .....	21
Figure 12 Antenna Interfaces .....	22
Figure 13 Ethernet Interfaces .....	23
Figure 14 DT-5302R, Power Connector .....	25
Figure 15 Power, Operation, Status and Ethernet LEDs.....	27
Figure 16 Ethernet Port for Factory Reset .....	27
Figure 17 Neratec DT50 FACTORY RESET PLUG X-CODED .....	28
Table 1 Supported Product Versions, Variants and SW .....	7
Table 2 Important Safety Notes.....	8
Table 3 DT-5302R Delivery Content .....	9
Table 4 Installation Countries .....	9
Table 5: FCC and IC certified antennas .....	11
Table 6: Output power limitations .....	11
Table 7 Product Identification Label .....	12
Table 8 Product Label .....	13
Table 9 Installation Procedure.....	14
Table 10 Dimensions and Weight.....	16
Table 11 Fixing points and Connector Positions .....	17
Table 12 RF Antenna Interface Operation .....	21
Table 13 Pinning: RF Antenna Connector.....	22
Table 14 4.6.1 Ethernet Port Features .....	23
Table 15 Ethernet Connector .....	24
Table 16 PoE Connection.....	24
Table 17 PoE Power Feed Specification .....	24
Table 18 Pinning: PWR Connector.....	25
Table 19 Power Feed Specification.....	25
Table 20: 2.4GHz power consumption .....	26
Table 21: 5GHz power consumption .....	26
Table 22 Factory Reset Procedure.....	28
Table 23 Exchange flow .....	30

# 1 Foreword

This document describes the installation procedure of the DT-5302R product family. The difference between the product variants is shown in chapter 2.1. In this guide DT-5302R stays for all variants.

## 1.1 References

No.	Author, "Title", Version, Date, Source/Filename/Link
[1]	Neratec, "Software 6 User Manual", 5100.20.105

## 1.2 Abbreviations and Terms

Abbreviation	Description
CE	Conformité Européenne
DC	Direct Current
ESD	Electro Static Discharge
ETSI	European Telecommunications Standards Institute
FCC	Federal Communication Commission
IC	Industry Canada
ID	Identification
IP	Ingress Protection
ISO	International Standardization Organisation
LED	Light Emitting Diode
PoE	Power over Ethernet
RF	Radio Frequency
SN	Serial Number
SNMP	Simple Network Management Protocol
WebGUI	Web Graphical User Interface
WLAN	Wireless Local Area Network

## 2 Introduction

The DT-5302R is a wireless communication product, developed for railway applications. It is a radio device operating at 2.4 and 5GHz WLAN bands, and configured either as Access Point or Station.

The configuration can be done via SNMP or via WebGUI. The status information is available in local LED status indicators, and through SNMP/WebGUI.

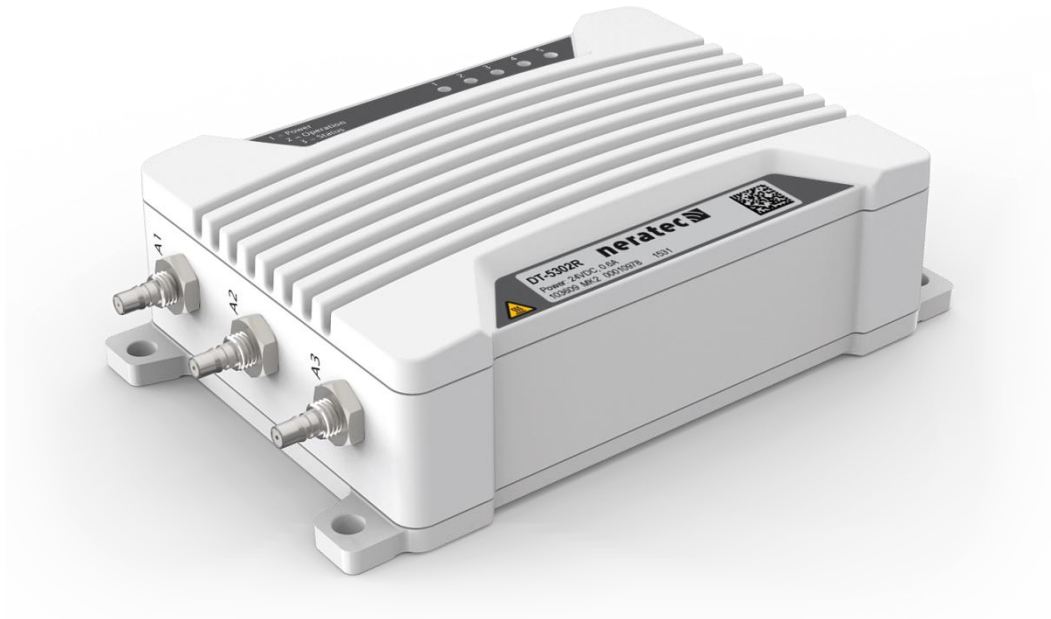


Figure 1 DT-5302R picture

The product functional block diagram is shown in Figure 2.

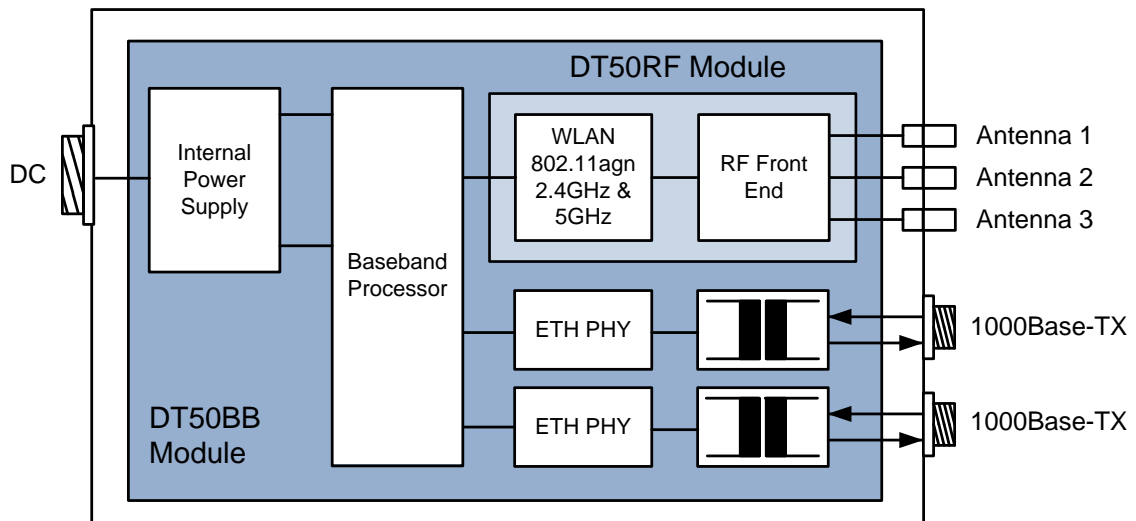


Figure 2 DT-5302R Block Diagram








## 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>DT-5302R</b>	<i>24V / PoE variant</i>
	<b>DT-5302R-48</b>	<i>36-48V variant</i>
	<b>DT-5302R-HV</b>	<i>72-110V variant</i>
	<b>DT-5302</b>	<i>24V / PoE variant, limited operating modes and output power in comparison to DT-5302R, please refer to product datasheet for more details</i>
<b>Software Version</b>	<b>V6.6 and higher</b>	

**Table 1 Supported Product Versions, Variants and SW**

## 2.2 Important Safety Notes

	<b>Danger!</b> Do not use equipment without protective earth connection.
	<b>Danger!</b> Do not use damaged equipment and/or accessories such as damaged power cord.
	<b>Danger!</b> Never try to open the device. There are no serviceable parts inside. By trying to open the device you will be exposed to a risk of death or injury.
	<b>Warning!</b> Product warranty gets void and any liability will be disclaimed when opening the device.
	<b>Warning!</b> Read this user guide carefully before mounting, installing and operating the device.
	<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.
	<b>Warning!</b> Do not operate the device in any other environmental conditions than it is designed for.

**Table 2 Important Safety Notes**



## 2.3 DT-5302R Delivery Content

The DT-5302R delivery consists of following main components:

<b>Description</b>	<b>Number of Parts</b>	<b>Notes</b>
<b>DT-5302R</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>- 2 plastic protection caps for Ethernet connectors</li> <li>- 1 plastic protection cap for power connector</li> <li>- 3 plastic protection caps for antenna connectors</li> </ul>

**Table 3 DT-5302R Delivery Content**

## 2.4 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, see SW User Manual [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, see SW User Manual [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, see SW User Manual [1]</i>

**Table 4 Installation Countries**

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

## 2.5 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.

### **2.5.1 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 20cm 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 2.5.3.

#### **Part 15B statement:**

Note: This equipment 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 equipment 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 equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment 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 equipment and receiver.
- Connect the equipment 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.

### **2.5.2 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 2.5.3.

### 2.5.3 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 ID</i>
Dipole	F51-N	Tekfun	2GHz: 4.5dBi max 5GHz: 7dBi max	1, 2, 3	1001
Patch	SPA 2400/75/8/0/V	Huber & Suhner	2GHz: 7.5dBi max	1, 2, 3	1000
Patch	SPA-5600/40/14/0/V_2	Huber & Suhner	5GHz: 14dBi max	1, 2	1002
Patch	SPA-5600/65/9/0/MIMO	Huber & Suhner	5GHz: 9dBi max	1, 2, 3	1003
Shark	SPA-5600/45/12/10/V	Huber & Suhner	5GHz: 12dBi max	1, 2	1004

**Table 5: FCC and IC certified antennas**

### 2.6 Output power limitations

The DT-5302R has 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	22dBm per chain	22dBm per chain
2	22dBm per chain	22dBm per chain
3	22dBm per chain	20dBm per chain

**Table 6: Output power limitations**

## 2.7 Product Identification and Version Information

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



Figure 3 DT-5302R Product Identification Label Position



Figure 4 DT-5302R Product Identification Label Example


Specification	Value	Notes
<b>Part Name</b>	<i>DT-5302R</i> <i>DT-5302R-48</i> <i>DT-5302R-HV</i> <i>DT-5302</i>	
<b>Part Number</b>	<i>104051 (DT-5302R)</i> <i>104607 (DT-5302R-48)</i> <i>104537 (DT-5302R-HV)</i> <i>104119 (DT-5302)</i>	<i>Neratec part number</i>
<b>Neratec Product Revision</b>	<i>MKX</i>	<i>Neratec product revision code</i>
<b>SN</b>	<i>XXXXXXXX</i>	<i>Neratec internal serial number &amp; product code</i>
<b>Manufacturing Date</b>	<i>YYWW</i>	<i>The date format is: YY = manufacturing year WW = manufacturing week</i>
<b>BAR CODE</b>	<i>SN information</i>	<i>Data matrix: 104051-2-RR-XXXXXXXX-YYWW, where RR is Neratec internal revision</i>
<b>Hot surfaces</b>		<i>Touch temperature levels TS2</i>

Table 7 Product Identification Label

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

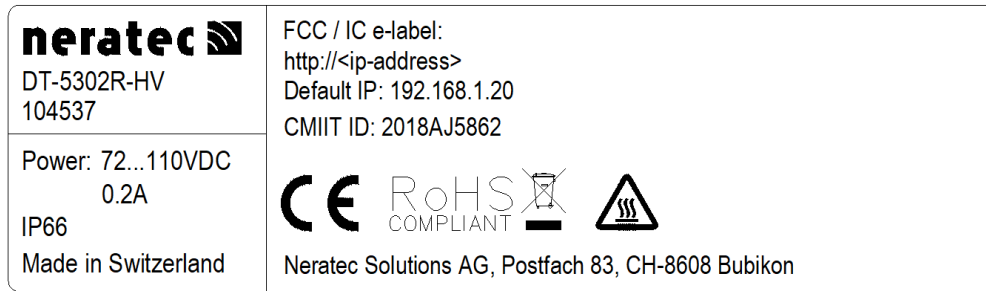


Figure 5 DT-5302R Product Label Example

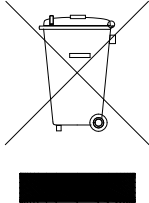


Specification	Value	Notes
<b>Product Name</b>	<b>DT-5302R</b> <b>DT-5302R-48</b> <b>DT-5302R-HV</b> <b>DT-5302</b>	
<b>Part Number</b>	<b>104051 (DT-5302R)</b> <b>104607 (DT-5302R-48)</b> <b>104537 (DT-5302R-HV)</b> <b>104119 (DT-5302)</b>	<i>Neratec part number</i>
<b>Power</b>		<i>Information on input power feed</i>
<b>Ingress Protection</b>	<b>IP66</b>	
<b>WEEE</b>		<i>This symbol, found on the product indicates that this product should not be treated as household waste when disposing of it.</i> <i>Instead it must be handled over to an applicable collection point for the recycling of electrical and electronic equipment.</i> <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>
<b>CE</b>		<i>CE mark</i>
<b>Hot surfaces</b>		<i>Touch temperature levels TS2</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 8 Product Label

## 3 Installation

### 3.1 Installation Procedure, Overview

<b><i>Order of Installation Step</i></b>	<b><i>Description</i></b>
<b>1. Fixing</b>	The product is fixed in operating environment, ensuring that the environment complies with the installation environment constrains. See chapter 3.2
<b>2. System Grounding</b>	The system grounding is ensured and verified based on customer installation. See chapter 3.4
<b>3. Antennas</b>	The antenna interfaces are installed based on customer requirements. See chapter 3.5
<b>4. Ethernet</b>	The Ethernet data interfaces are installed. See chapter 3.6
<b>5. Power Feed</b>	Power feed cable is connected (the power maybe already activated in the cable), the power supply is switched on and verify that the LED indicators shows correct power up procedure. See chapter 3.7
<b>6. Configuration</b>	Configuration Process is described in document: [1] chapter Configuration.

**Table 9 Installation Procedure**

## 3.2 Dimensions for Fixing Points

### 3.2.1 Mechanical Overview

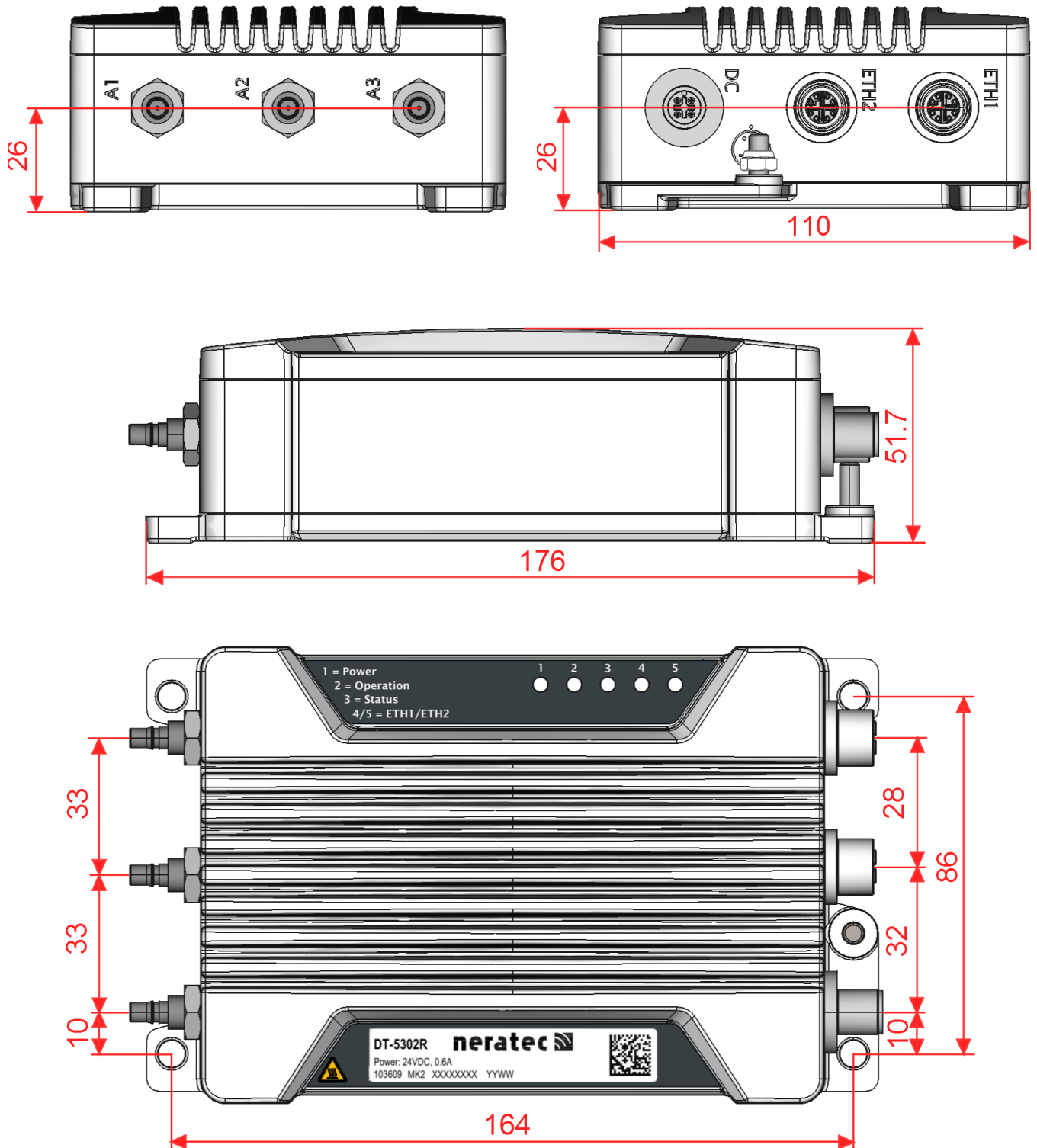


Figure 6 Mechanical Overview

<b>Parameter</b>	<b>Value</b>	<b>Notes</b>
<b>Max dimensions</b>	<b>176 x 110 x 52mm</b>	<i>Length with antenna connectors 180mm</i>
<b>Max dimensions, with cables</b>	<b>App 300 x 110 x 52mm</b>	<i>Space needed for installation</i>
<b>Location of the fixing points</b>	<b>In each corner</b>	<i>With four M6 screws</i>
<b>Color</b>	<b>RAL 9010, Pure White</b>	
<b>Protection</b>	<b>IP 66</b>	
<b>Weight</b>	<b>1.1 kg</b>	

**Table 10 Dimensions and Weight**



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

The product must be fixed with the 4 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. 3.0Nm (fixing screw ISO 898/1, quality class 8.8).

**NOTICE:** All 4 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: 4 pieces of slot holes, see: Figure 6					
	0mm, 0mm			164mm, 0mm		
	0mm, 86mm			164mm, 86mm		
Connector positions	DC POWER	Antenna 1	Antenna 2	Antenna 3	1000Base-TX ETH1	1000Base-TX ETH2 / PoE
	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 11 Fixing points and Connector Positions

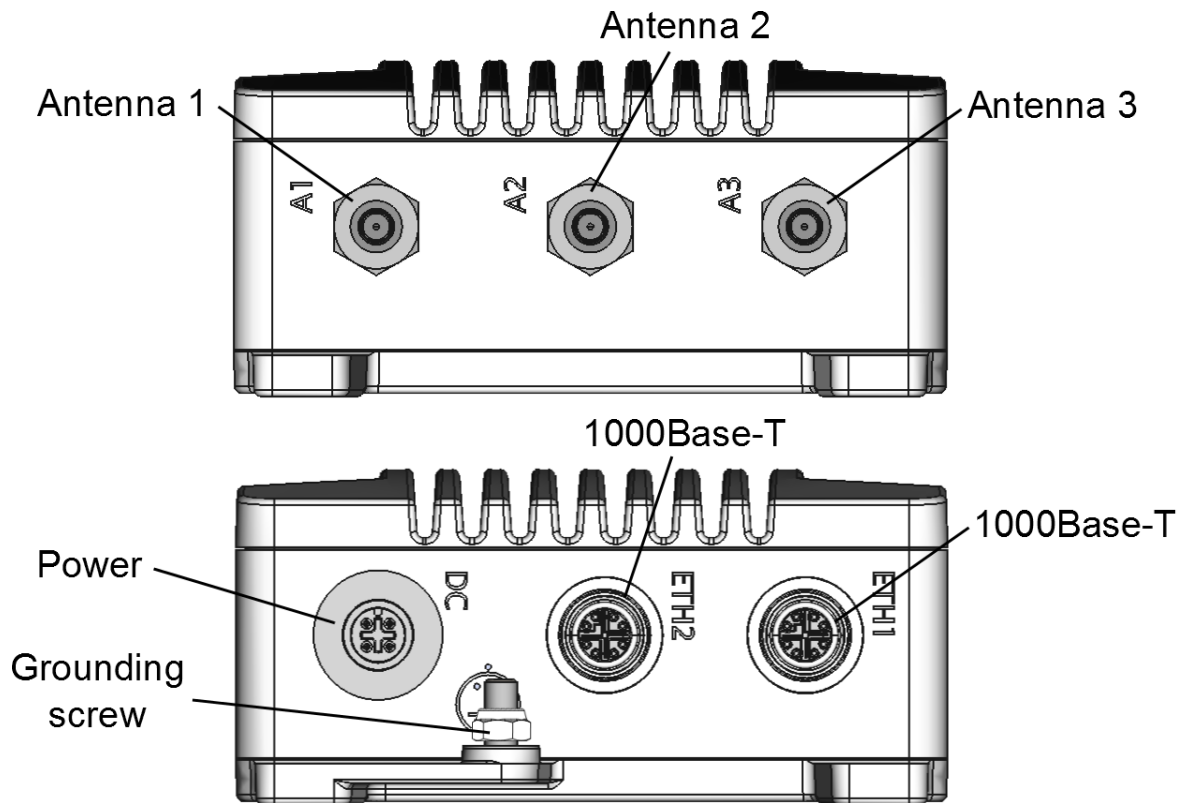


Figure 7 Connectors

## 3.3 Considerations when Mounting the Device

### 3.3.1 General Installation Considerations

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

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

### 3.3.2 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 specified temperature range. For this reason the unit shall be not operated in conditions where the temperature alarm is activated.

### 3.3.3 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.

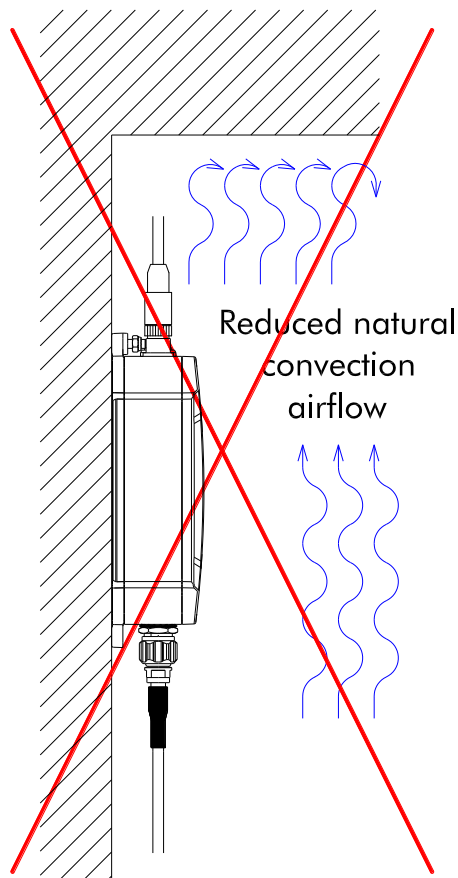
The limits are defined for installations with free air flow in installation environment.

It shall be noted that in real environment:

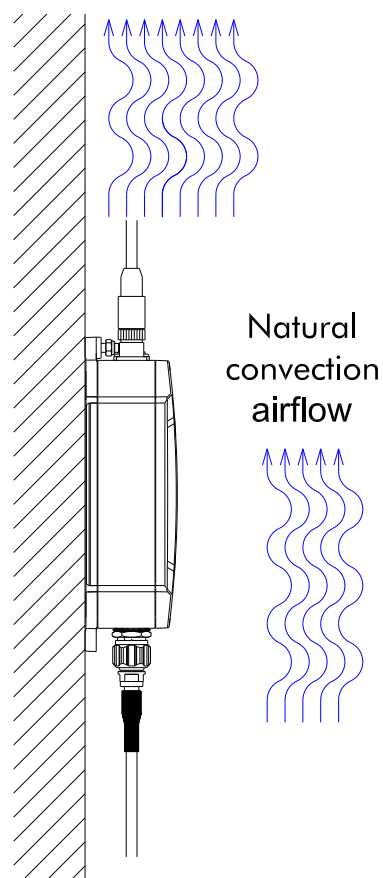
- Limited air flow is rising the device temperature and may limiting the high limit of the operating temperature lower than the specified one
- Conducted heat exchange through metal surfaces at the product fixing point is improving the device heat transfer and improving the operating conditions
- Temperature is dependent on the operational parameters, like RF output power, amount of traffic, amount of trains (long term duty cycle...)
- This product has internal temperature sensors that alarm for too high or too low temperature. The operating conditions shall be ensured so that the normal operation does not cause temperature alarms. The possible temperature alarms shall be immediately solved. See SW User Guide [1] for detailed specification of the temperature sensors alarms

### 3.3.4 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.

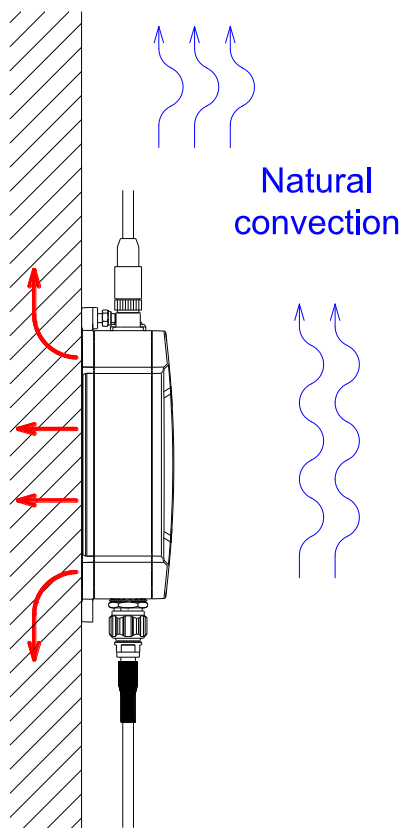


**Figure 8 Installation with blocked Airflow shall be avoided**



**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**

### 3.4 Connecting the Protective Earth

There is a single grounding connection point in DT-5302R. An M5 grounding screw at the housing is used for grounding (see Figure 11).

	<p><b>Danger!</b>                  Do not use equipment without protective earth connection.</p>
---	--

**NOTICE:** The Grounding is organized by connecting the grounding to Ground Contact in Casing. For the grounding at the Ground Contact (M5 stud), a wire with a cross section of **at least 6.0mm<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 2.0Nm.

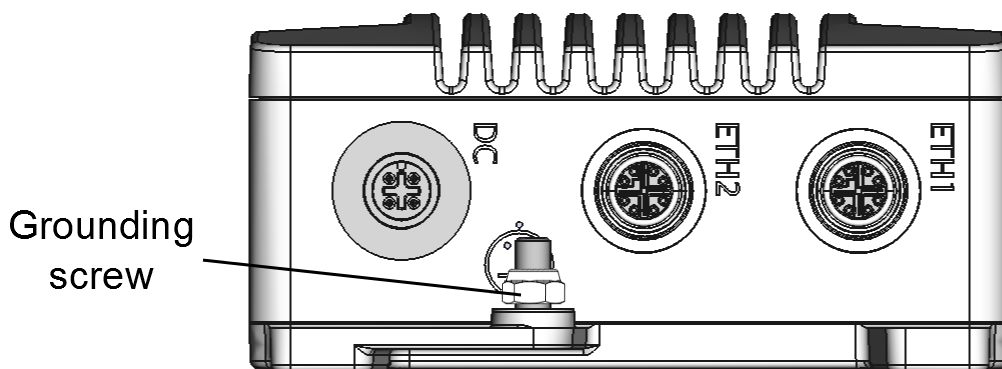


Figure 11 Grounding Contact

### 3.5 Connecting the RF Antenna Interfaces

#### 3.5.1 RF Antenna Interface Operation Modes

DT-5302R has two antenna interfaces. The antenna interfaces are operating independently of each others.

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

Table 12 RF Antenna Interface Operation

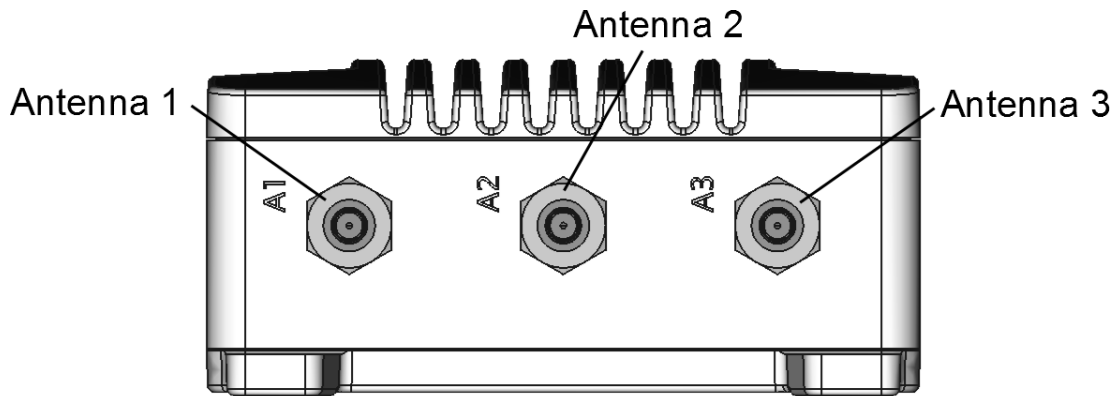
**NOTICE:** If antenna A2 and/or A3 will be NOT used in customer application, the antenna connector MUST be terminated with 50 ohm termination.

**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 3.4 with a short cable.

### 3.5.2 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**

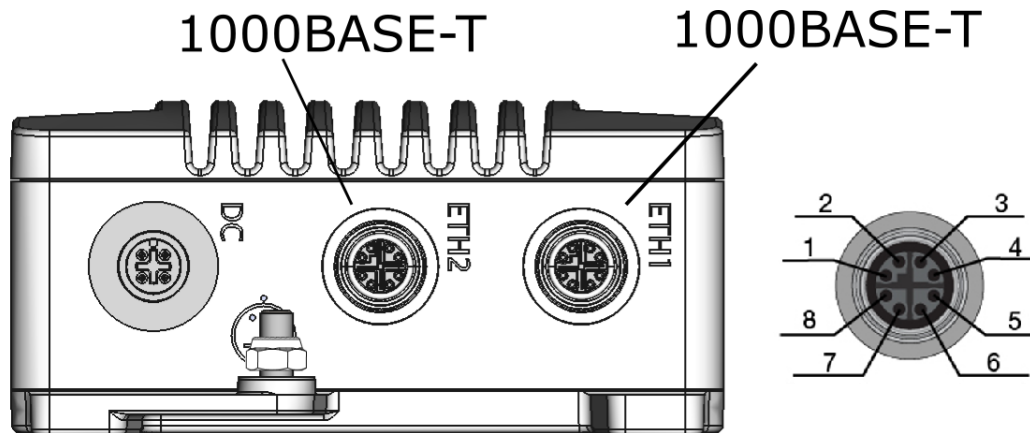
**NOTICE:** If one of the antennas is NOT used, the non-used antenna connectors MUST be terminated with 50 ohm termination.

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

**Table 13 Pinning: RF Antenna Connector**

### 3.6 Connecting Ethernet Interface

DT-5302R 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 / PoE) in the mechanics.



**Figure 13 Ethernet Interfaces**

The connectors should be assembled with correct torque (appr. 1.0Nm, 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.

#### 3.6.1 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 14 4.6.1 Ethernet Port Features**

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

### 3.6.2 Ethernet Connector

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

**Table 15 Ethernet Connector**

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

### 3.6.3 PoE Connection (ETH2 and DT-5302R / DT-5302 only)

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

**Table 16 PoE Connection**

### 3.6.4 PoE Power Feed Specifications

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

**Table 17 PoE Power Feed Specification**



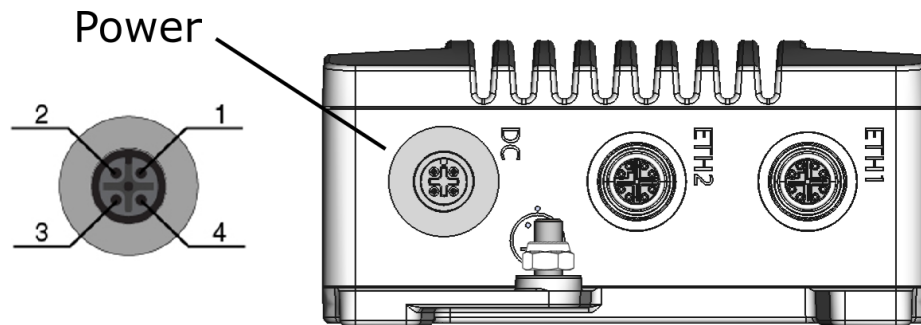
### 3.7 Connecting the Power Feed

The power feed is connected to the POWER connector. The power supply interface is a galvanic 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.

#### 3.7.1 Power Feed Connector

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



**Figure 14 DT-5302R, Power Connector**

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

Pin	Signal Name, Function	Notes
1	VCC+	The positive supply voltage is applied
2	Not used	
3	VCC-	The negative supply voltage is applied
4	Not used	

**Table 18 Pinning: PWR Connector**

#### 3.7.2 Power Feed Specifications

Parameter	DT-5302(R)	DT-5302R-48	DT-5302R-HV	Notes
<b>Nominal Voltage</b>	24VDC	36-48VDC	72-110VDC	
<b>Voltage Range</b>	16VDC – 30VDC	25VDC – 60VDC	50VDC – 138VDC	
<b>Nominal current</b>	0.6A	0.3A	0.2A	
<b>Power consumption</b>	App. 4W App. 8W	App. 4W App. 8W	App. 4W App. 8W	with no user data with full user data load
<b>Selecting external power connector and power cable diameter - Allowed wire cross section</b>	Min. 0.5mm <sup>2</sup>	Min. 0.5mm <sup>2</sup>	Min. 0.5mm <sup>2</sup>	Cable Plug: e.g. Phoenix Contact, SACC-M12FS-4CON-PG7-M

**Table 19 Power Feed Specification**

### 3.7.3 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
2.4GHz idle	1x1, 2x2, 3x3	2%	1...3 x 22dBm	-40°C	P = 3.8W
2.4GHz idle	1x1, 2x2, 3x3	2%	1...3 x 22dBm	+70°C	P = 4.4W
2.4GHz TX50 SISO, -40	1x1	50%	1 x 22dBm	-40°C	P = 4.5W
2.4GHz TX50 SISO +70	1x1	50%	1 x 22dBm	+70°C	P = 5.1W
2.4GHz TX50 2x2MIMO -40	2x2	50%	2 x 22dBm	-40°C	P = 5.3W
2.4GHz TX50 2x2MIMO +70	2x2	50%	2 x 22dBm	+70°C	P = 6.0W
2.4GHz TX50 3x3MIMO -40	3x3	50%	3 x 22dBm	-40°C	P = 6.0W
2.4GHz TX50 3x3MIMO +70	3x3	50%	3 x 22dBm	+70°C	P = 6.8W
2.4GHz TX90 SISO, -40	1x1	90%	1 x 22dBm	-40°C	P = 5.4W
2.4GHz TX90 SISO +70	1x1	90%	1 x 22dBm	+70°C	P = 5.9W
2.4GHz TX90 2x2MIMO -40	2x2	90%	2 x 22dBm	-40°C	P = 7.0W
2.4GHz TX90 2x2MIMO +70	2x2	90%	2 x 22dBm	+70°C	P = 7.5W
2.4GHz TX90 3x3MIMO -40	3x3	90%	3 x 22dBm	-40°C	P = 8.5W
2.4GHz TX90 3x3MIMO +70	3x3	90%	3 x 22dBm	+70°C	P = 9.0W

**Table 20: 2.4GHz power consumption**

Test case	Antennas	TX duty cycle	TX output	Amb. Temp.	Avg. Power
5GHz idle	1x1, 2x2, 3x3	2%	1...3 x 22dBm	-40°C	P = 3.6W
5GHz idle	1x1, 2x2, 3x3	2%	1...3 x 22dBm	+70°C	P = 4.3W
5GHz TX50 SISO, -40	1x1	50%	1 x 21dBm	-40°C	P = 4.3W
5GHz TX50 SISO +70	1x1	50%	1 x 21dBm	+70°C	P = 4.9W
5GHz TX50 2x2MIMO -40	2x2	50%	2 x 21dBm	-40°C	P = 5.1W
5GHz TX50 2x2MIMO +70	2x2	50%	2 x 21dBm	+70°C	P = 5.7W
5GHz TX50 3x3MIMO -40	3x3	50%	3 x 21dBm	-40°C	P = 5.8W
5GHz TX50 3x3MIMO +70	3x3	50%	3 x 21dBm	+70°C	P = 6.4W
5GHz TX90 SISO, -40	1x1	90%	1 x 21dBm	-40°C	P = 5.0W
5GHz TX90 SISO +70	1x1	90%	1 x 21dBm	+70°C	P = 5.7W
5GHz TX90 2x2MIMO -40	2x2	90%	2 x 21dBm	-40°C	P = 6.4W
5GHz TX90 2x2MIMO +70	2x2	90%	2 x 21dBm	+70°C	P = 7.1W
5GHz TX90 3x3MIMO -40	3x3	90%	3 x 21dBm	-40°C	P = 7.8W
5GHz TX90 3x3MIMO +70	3x3	90%	3 x 21dBm	+70°C	P = 8.4W

**Table 21: 5GHz power consumption**

### 3.7.4 Power supply ripple

According to EN50155 the voltage ripple of the power supply may be 10% of the nominal voltage. Otherwise too high touch current may result.

## 4 Configuration and Use

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

### 4.1 LED Indicators during Power Up Sequence

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

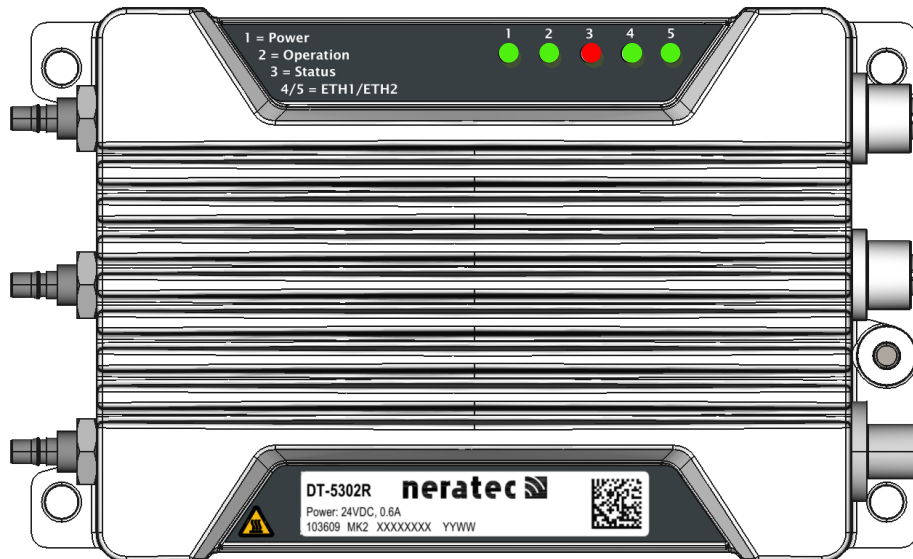


Figure 15 Power, Operation, Status and Ethernet LEDs

### 4.2 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.

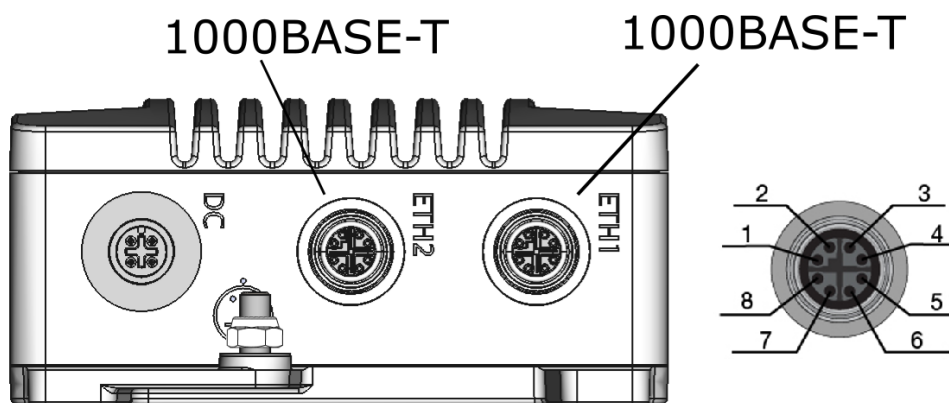


Figure 16 Ethernet Port for Factory Reset

**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.

## 4.2.1 Factory Reset Adapter Specification

Factory reset adapter is a special plug for the Ethernet interface that activates the Factory Reset signal.

There is specific factory reset adapter available from the product supplier, product code:

Neratec Solutions AG

DT50 FACTORY RESET PLUG X-CODED

Part Nr: 104094



**Figure 17 Neratec DT50 FACTORY RESET PLUG X-CODED**

## 4.2.2 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 a 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 a ORANGE BLINKING operation LED in combination with a RED BLINKING failure LED

**Table 22 Factory Reset Procedure**

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

## 5 Maintenance

	<b>Danger!</b> Never open the device. There are no serviceable parts inside. By trying to open the device you will be exposed to a risk of death or injury.
	<b>Warning!</b> Maintenance shall be done by trained staff only.

### 5.1 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 DT-5302R:

#### **Ethernet Connector Dust Cap**

Polyamide 66 (PA66)

Polyurethane (PUR)

#### **Pressure Equalizer Vent**

Polyamide 6 (PA6)

Polytetrafluoroethylene (PTFE)

#### **Stickers**

Autotex XE

## 5.2 Troubleshooting Based on Functional Behavior

Please read in the user manual [1] the chapter troubleshooting instructions.

## 5.3 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 manufacturer for repair.

### 5.3.1 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 (or PoE cable)</li> <li>• Antenna cables</li> <li>• Ethernet cables</li> <li>• Protective earth cable</li> </ul>
<b>2. Open Screw</b>	The four M6 screws in each corner of DT-5302R 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</li> <li>• Ethernet cables</li> <li>• Power cable</li> </ul>
<b>6. Configure</b>	Download configuration to the product

Table 23 Exchange flow