CorivaSat Real Time Locating System User Manual

Contents

CORIVA

CorivaSat Real Time Locating System

Product Information

Specifications

- Product Name: Coriva Real Time Locating System
- Versions: 2023.2, 2023.3, 2023.4, 2024.1
- Protection Class: IP20 and IP67
- Standard: omlox open locating standard

Product Usage Instructions

CorivaSat
Welcome to the technical data sheet for our Ultra-Wideband (UWB) Satellite, the fixed device of our Coriva Real-Time Location System (RTLS). The CorivaSat is designed to receive UWB signals from CorivaTags or other 3rd party “omlox air 8”-certified mobile devices. CorivaSat is a cutting-edge Ultra-Wideband (UWB) device that is designed for highly accurate and reliable asset tracking. Equipped with advanced Ultra-Wideband technology, this compact infrastructure device is capable of collecting real-time location data, ensuring that you always have access to the most up-to-date position information about your assets. The CorivaSat is designed to collect data from omlox-compliant UWB tags (such as the CorivaTag) and transmit this data to the CorivaEngine, where the positions of the mobile devices are calculated with high precision. omlox is the world’s first open locating standard which aims to implement flexible real-time locating solutions with elements from various manufacturers. For more information about omlox, please visit **omlox.com**. There are two different versions of the CorivaSat, an IP20 protection class version and an IP67 version, which achieve their protection class through a different cap and sealings.

Version	Status	Date	Author	Modifications
2023.2	Draft	02.05.2023	Paul Balzer	Initial 2023.2 Version
2023.2	Draft	04.05.2023	Paul Balzer	Added PoE Installation informations
2023.2	Release	23.05.2023	Silvio Reuß	Added Transmitting Power and Spectral Density for Wifi, ISM and UWB
2023.3	Release	21.08.2023	Paul Balzer	Add Helpdesk Information
2023.4	Release	05.02.2024	Paul Balzer, Silvio Reuß	Add Wi-Fi connection option, change support email, update system overview, add Technical Data Power Density for US
2023.4	Release	04.03.2024	Christoph Röhm	Add Wall Mount Adapter “H”
2024.1	Release	17.04.2024	Silvio Reuß	Update Compliance Information (RF Exposure Notice), Label, Technical data and Conformity

Legal Notice

Copyright

Proprietary Statement / Use

Product Improvements

Liability Disclaimer

Limitation of Liability

Safety and Compliance Information

Excessive ambient temperatures and heat accumulation can cause overheating and thus damage the device.

- Operate and store the device only within the specified ambient and storage temperatures.
- Do not cover the device during operation.

Mechanical impacts
Excessive mechanical impact can damage the device.

- Do not subject the device to excessively high loads.
- If the device has been damaged or is likely to be damaged, disconnect the device from the power supply
- Do not put the device back into operation after it has been damaged. Send it in for repair or replace it with a new device.

Explosive environment
Under unfavorable conditions, radio waves as well as technical defects of the device can cause explosions or fire in the vicinity of an explosive atmosphere. Do not operate the device near potentially explosive atmospheres. Follow the instructions in potentially hazardous environments by disconnect it from the power supply.

Radio interference
Radio interference can be generated by a variety of different devices that actively transmit and receive electromagnetic radio waves.

- Do not use or operate the equipment in locations where the use of radio equipment is prohibited.
- Observe the regulations on air freight and carrying in the aircraft. Disconnect the device from the power supply
- Observe the instructions and notes in sensitive areas, especially in medical facilities.
- Consult an appropriate doctor or the manufacturer of medical electronic implants (e.g. pacemakers, hearing aids, etc.) to determine whether these will function without interference if the device is operated simultaneously.
- If necessary, observe the minimum distance recommended by the manufacturer of the medical product.

Compliance Information
This device complies with Part 15 of the FCC Rules.

Operation is subject to the following two conditions:

1. this device may not cause harmful interference, and
2. this device must accept any interference received, including interference that may cause undesired operation.

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 using one 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 technician for help.

This equipment may only be operated indoors
Operation outdoors is in violation of 47 U.S.C. 301 and could subject the operator to serious legal penalties.

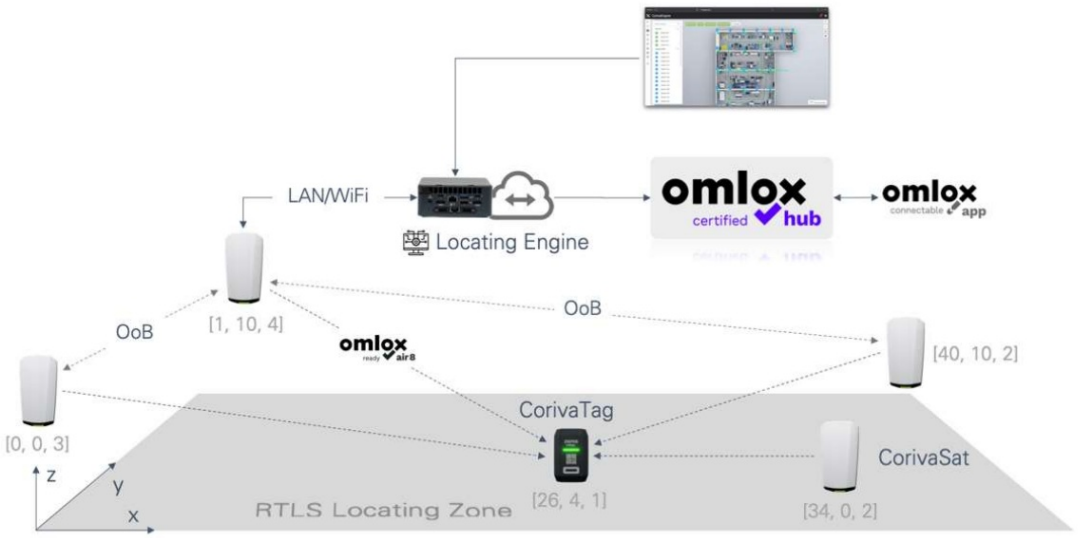
This equipment may only be operated as a fixed installation
Mobile operation is in violation of 47 U.S.C. 301 and could subject the operator to serious legal penalties.

UWB devices may not be employed for the operation of toys
Operation onboard an aircraft, a ship or a satellite is prohibited.

Changes or modifications
Any changes or modifications not expressly approved by ZIGPOS could void the user's authority to operate this equipment

RF Exposure Notice
This device is a radio transmitter and receiver. CorivaSat complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 50 cm between the radiator and a human body. This transmitter must not be colocated or operating in conjunction with any other antenna or transmitter.

System Overview
CorivaSats only operate (i.e. receive and transmit UWB signals) within a complete UWB real-time location system, which must be professionally installed. The installed system is configured to cover only the area inside the building, preventing CorivaSats and other UWB devices of the system from emitting UWB signals outdoors. Contact your system administrator if you are unsure as to the extent of coverage.



Operation

1. Optical Status: Check the LED indicators for device status.
2. Buttons: Use the buttons for device control if applicable.
3. Nameplate: Refer to the nameplate for product information.

Scope of Delivery

Package List

There are two protection class versions of the CorivaSat with different package lists, depending on the version.

CorivaSat IP20	CorivaSat IP67
1 x CorivaSat base body	1 x CorivaSat base body
1x CorivaSat IP20 Cap	1 x CorivaSat IP66/67 cap
1 x Wall Mount Adapter "H"	1 x Wall Mount Adapter "H"
	2 x screw M4x30 for the IP67 cap
	1 x cable gland M25 WISKA ESKV25
	1 x slotted sealing for gland
	1 x sealing reduction

Not included

Neither the screws nor the wall plugs to secure equipment to the wall nor the tools used to connect the lines are contained in the scope of delivery!

Tools needed for installation

- Flathead screwdriver, maximum 3.5 x 0.6 mm for DC plugs
- 3-mm Allen key to tighten the IP67 cap
- 29-mm open-end wrench for the cable fitting

Installation

1. Project Planning: Plan the installation location and requirements.
2. Wall Mounting: Mount the CorivaSat device securely on the wall.
3. Power Supply and Network: Connect the device to power and network.

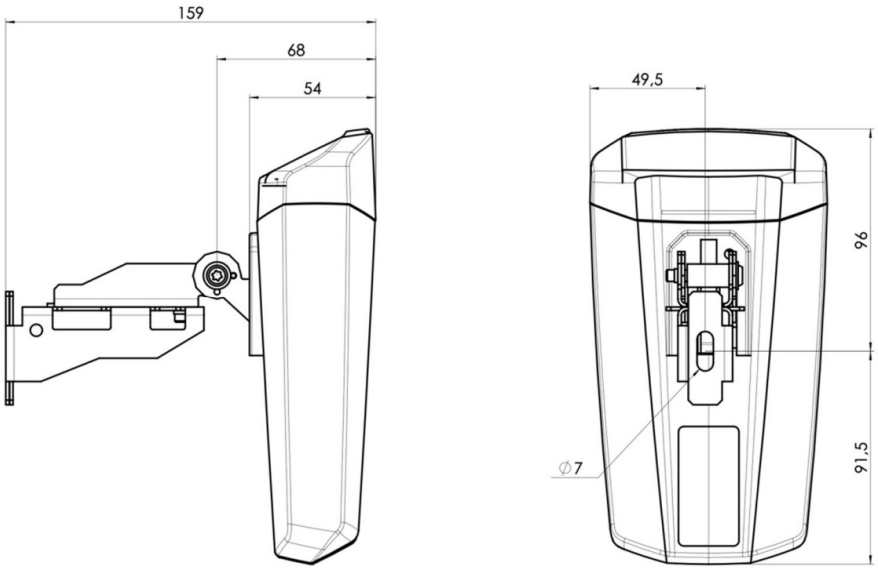
Project planning

For questions regarding the project planning of an RTLS and its locating precision use the Satellite planning tool available under **https://portal.coriva.io** General installation hints can be found in the User Manual > Setup > Satellite Planning

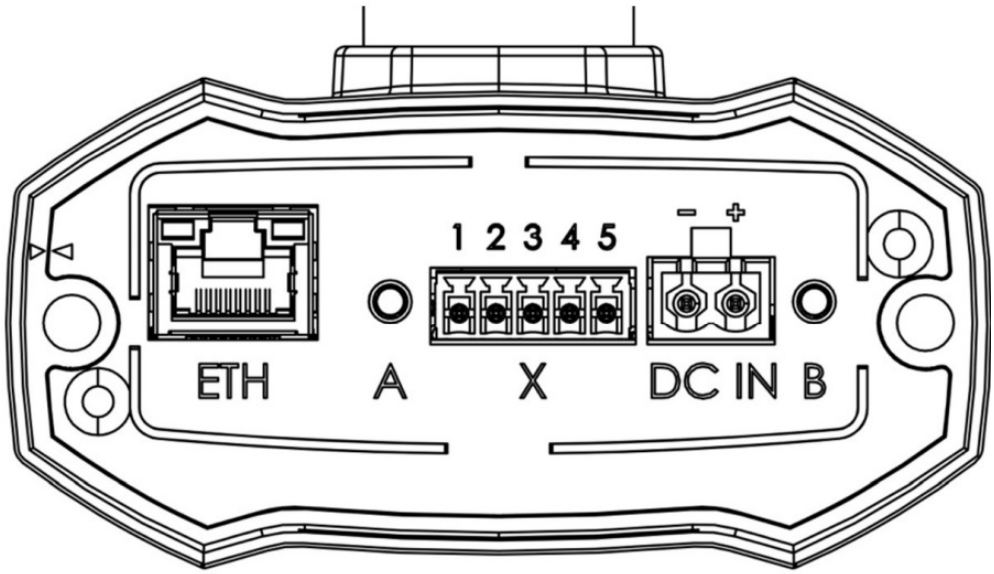
Wall Mounting

The CorivaSat has a slide-in mechanism on its rear for different mounting brackets or mounting adapters, allowing a variety of ceiling, wall and object installations.

The Wall Mount Adapter (Version "H") will be shipped with the CorivaSat:



Power Supply and Netwok
The CorivaSat can be powered with 24 V DC or with Power over Ethernet (PoE) LAN.



Attention
Please do not insert any plugs or cables into the interface (marked with X), as this may destroy the device or cause permanently irreparable damage.

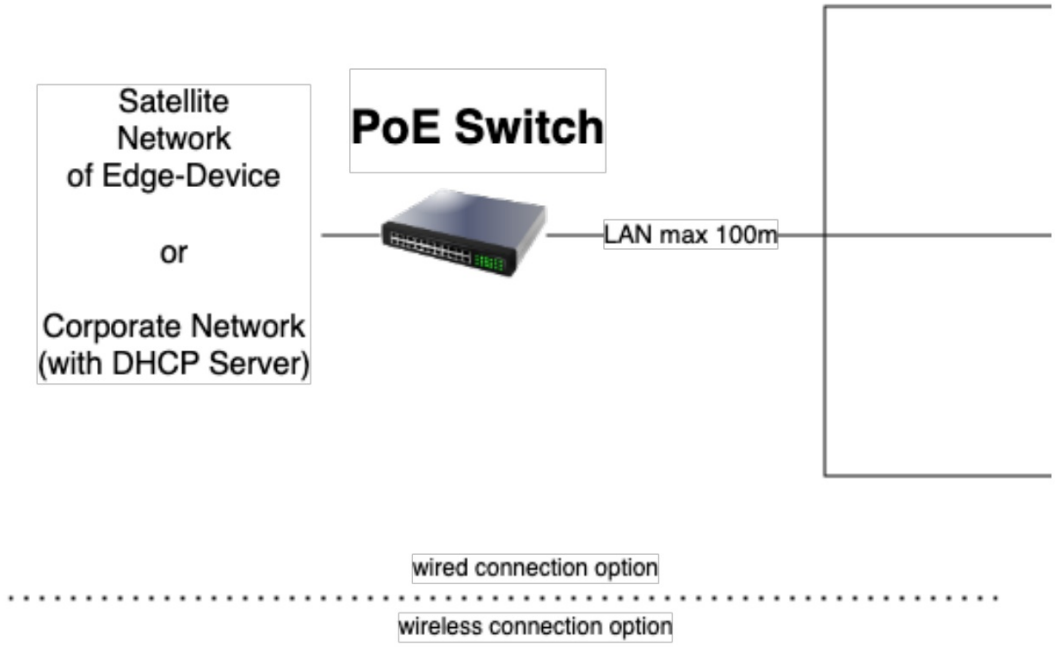
Direct current connection
The electrical connection to a 24 V DC network is made using the two-pole connector marked “DC IN” with screw terminals. This power supply is mandatory for Wi-Fi connection option. The screw terminals serve a connection cross-section of 0.2 mm² to 3.3 mm² for flexible or rigid lines.

Please pay attention to the correct wiring
Please note the polarity-correct connection and the tightening torque of max 0.5 Nm for the DC In

Wired Network connection including power supply
The CorivaSat has a 10/100 Mbit/s network connection type 8P8C or RJ45 with an integrated power supply (power over Ethernet). The LAN connector is on top of the Satellite marked with ETH. The CorivaSat can receive an IP from the local area networks DHCP server and operates as a network device in this LAN.

Maximum LAN cable length
Please use only shielded network solutions with a maximum length of 100 meters.

The LAN connection point is typically several meters away from the installation site of the CorivaSat and is connected with a shielded network cable. The necessary network infrastructure is provided by the user and is not included in the scope of delivery.



Cable entry and sealing for CorivaSat IP67 version
In areas exposed to dust and/or water, the use of the CorivaSat with the IP67 cap is strongly recommended To guarantee a high IP-grade, particular attention must be paid to the sealing of the cables and the sealing between the base body and the cap. The installation methods for assembled cables (RJ45 network cables) and not assembled cables (DC cables) are described below.

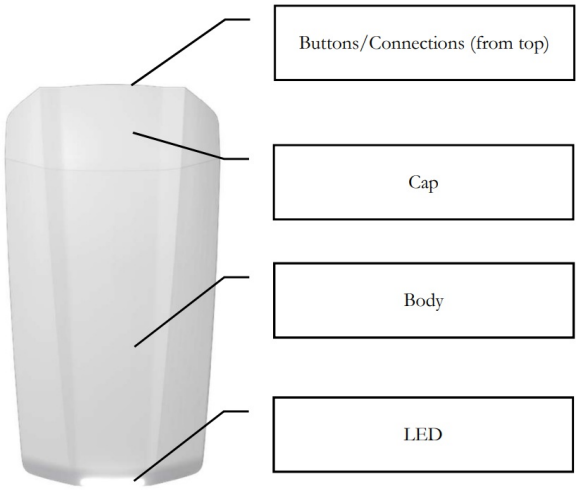
1. Installation of the M25-cable gland in the IP66/67 cap.
2. Preparing DC cable: Strip the sheathed cable by approx. 4 cm, then strip the cable ends by approx. 8 mm. If it is not solid wire, put ferrules on it.
3. For DC cable entry: Insertion of the corresponding sealing insert into the cable gland, which matches with the outer diameter of the DC cable. For a “Daisy chain” installation, please use a sealing insert with multiple slots. For RJ45 network cables entry: Guide the RJ45 plug with cable through the full opened gland. Outside the cap place a slotted seal for one wire over the cable and push it into the gland. If you need DC cable and network cable, use a slotted seal for two wires.
4. Guide the DC cable through the cap and tighten the cone nut slightly so that the cover is held against the cable.
5. Connect the wires to the connector according to their polarity.
6. Plug in the DC plug and/or the RJ45 plug.
7. Attach the cap while slightly pulling the cables back.
8. Screw the housing alternately with the M4 x 30 mm screws until the gap is almost evenly closed
9. Tighten the cable gland nut. Check the tightness by pulling on the cable.
10. Ensure a straight and tension-free cable section in the cable entry area.
11. If the unit is exposed to water or rain, it is advisable to provide a U-shaped drain elbow after the straight cable entry.

Wireless Network connection

The CorivaSat can be connected wirelessly to the corporate network with Open Wi-Fi, WPA2, WPA3, WPA Enterprise EAP-TLS or PEAPv0/EAP-MSCHAPV2 security. Please refer to the documentation: **https://portal.coriva.io** The 24 V DC power supply is necessary for Wi-Fi connection.

Operation

After the CorivaSat is powered and connected with the LAN, it will receive an IP address and try to discover Omlox Air 8 interface compliant devices.



Optical status

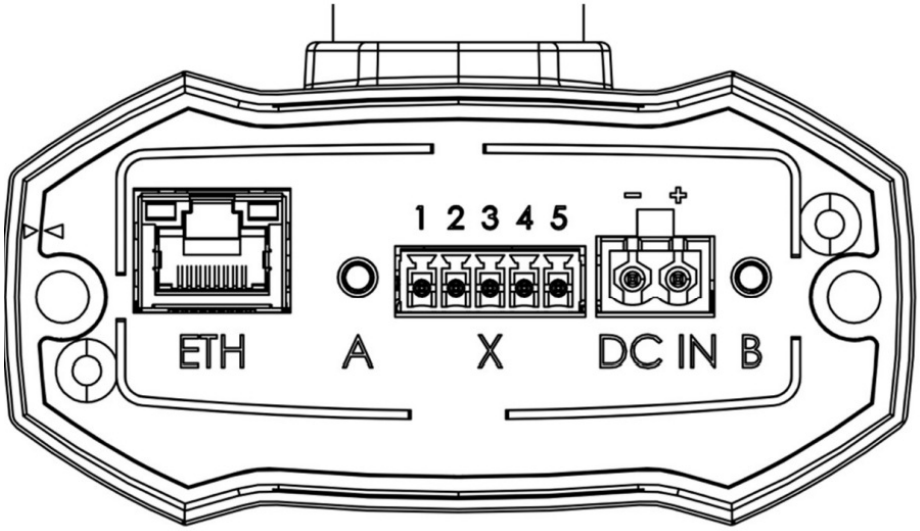
The LED indicates the following status of the CorivaSat:

Situation	LED signaling
Device off No power supplied	-
Network search Device is waiting for an IP address	flashing blue
RTLS search Device is looking for a RTLS network (UWB)	constant blue
Connected to the network Active state, everything OK	constant white
Acknowledgement/identification Among other things after pushing button 'A'	flashing white
Error General error	flashing red

Please note that the LED signaling as well as the states depend on the firmware implementation of the CorivaSat and might change over time. For the latest release, see **https://portal.coriva.io/**

Buttons

There are two buttons on the connection field on the top.



- Button ‘B’: Restart button – to restart the device (no settings are getting lost)
- Button ‘A’: User button – has multiple functions (see table below):

Duration of activity	Function	LED signaling
Short press	Identification	flashing white
Long press (>10s)	Connection Reset	flashing blue
Long press (>15s)	Factory Reset	flashing red

Reset of the Device
Resetting the connection settings or loading the factory settings always requires a new setup of the device in the RTLS and should only be performed by qualified persons.

Please note that the user button functionality depends on the firmware implementation of the CorivaSat and might change over time. For the latest release, see **https://portal.coriva.io/**

Nameplate
On the rear of the CorivaSat, there is a nameplate with the following information:

1. Manufacturer
2. Type label / Item No.
3. Serial Number
4. FCC-ID
5. IP safety class
6. Power Supply
7. MAC Addresses for ETH, WiFi & omlox 8 channels
8. Code
9. CE Logo
10. FCC Logo
11. omlox Air 8 ready Logo
12. Disposal information symbol

Technical Data

Parameter	
Power supply	
Nominal voltage	24 V DC, ± 10%
Maximum power of power source	100 W, 8 A
power consumption / inrush current	2,0 W / 1 A
Connection	Two-pole line plug with screw terminal: Clamping area: 0.2 mm - 3.3 mm², torque max. 0.5 Nm
or (prefered)	
Power over Ethernet	802.3af
Network	
Data rate	10/100 MBit/s
Connection	8P8C (RJ45) for shielded lines (max. 100 m length)
Radio systems	integrated antennas
*Ultra-Wideband (**UWB**)*	7737 – 8237 MHz (UWB channel 9)
Standard	IEEE 802.15.4z
Power Spectral Density	-41.3 dBm/MHz
Max Output Power (conducted)	-3.61 dBm
Max. range: CorivaSat - CorivaSat	up to 60 m in Line-of-sight
ISM band	2405 - 2480 MHz
Standard	IEEE 802.15.4
Power Spectral Density	< 8 dBm/MHz
Max Output Power (EIRP)	< 10 dBm in RED regulated countries < 23 dBm in FCC regulated countries
WiFi 2.4 GHz	2400 – 2483.5 MHz EU: ch1 – ch13 US, CAN: ch1 – ch11
Standard	IEEE 802.11 b/g/n
Power Spectral Density	< 8 dBm/MHz
Max Output Power (EIRP)	< 20 dBm
WiFi 5 GHz	5150 - 5850 MHz EU: ch36 – ch140 US, CAN: ch36 - ch165
Standard	IEEE 802.11 a
Power Spectral Density	< 10 dBm/MHz for 5180 – 5250 MHz < 7 dBm/MHz for 5250 – 5735 MHz < 30 dBm/500 kHz for 5745 – 5825 MHz
Max Output Power (EIRP)	< 23 dBm for 5180 – 5250 MHz < 20 dBm for 5250 – 5735 MHz < 30 dBm for 5745 – 5825 MHz (FCC regulated countries)
Operation	Indoors
Optical	RGB LED over a waveguide
Operation and storage temperature	-30°C – 60°C
Relative humidity	0 – 90%, non-condensing

Housing	
Dimensions IP20 (WxHxD)	102 mm x 187 mm x 54 mm
Dimensions IP67 (WxHxD)	102 mm x 218 mm x 54 mm
Weight	270 g (IP20 version), 340 g (IP67 version)
Material	ASA polycarbonate
IP safety class	IP20 / IP67[2]
Mounting	Wall or ceiling mounting
Conformity	2014/53/EU
	FCC Part 15

Radio systems and environment
The CorivaSat has several integrated antennas for data transmission and Tag localization.

These are located in the lower half of the housing:

- **Two omlox radio frequency paths, each containing:**
  - IEEE 802.15.4z-compliant UWB transceiver, controller and antenna to communicate over UWB Channel 9 at ~8 GHz to enable UWB-based (“In-Band”) tracking
  - IEEE 802.15.4-compliant ISM transceiver, controller and two antennas to enable Out-of-Band (OoB) communication to enable offloading nontracking data communication such as discovery, device orchestration and over-the-air-updates for tags
- **WiFi RF path, containing**
  - IEEE 802.11a/b/g/n-compliant module and antenna, enabling WiFibased data backbone between RTLS satellite and a CorivaEngine via a Wifi Access Point on 2.4 GHz or 5 GHz bands For high positioning accuracy and stable data transmission, it is important to mount the CorivaSat where it can be seen from the neighboring Satellites and from the mobile devices to be located (tags/mobiles) and to constantly ensure this.

Radio Systems are influenced by their environment
Ceiling structures or other obstacles made of metal, reinforced concrete, or other shielding or absorbing materials can strongly influence the radio characteristics and thus limit the function of the tracking system.

Radiation Pattern

UWB8GHZ

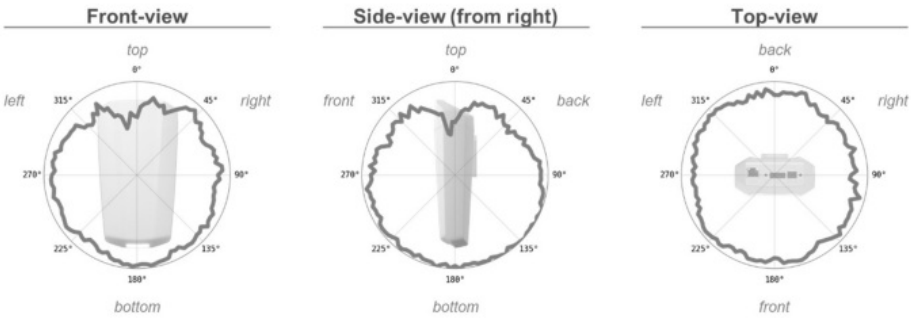


Figure 8 - Radio characteristics for 8 GHz UWB from front, side and top view

WIFI2.45GHZ

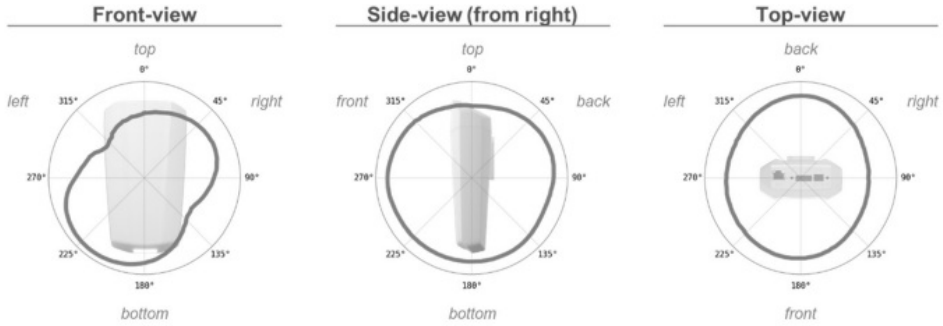


Figure 9 - Radio characteristics for 2.45 GHz WiFi from front, side and top view

WIFI5.4GHZ

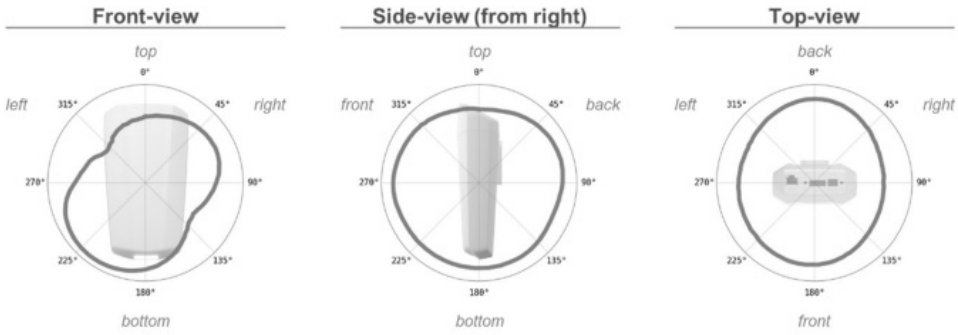


Figure 9 - Radio characteristics for 2.45 GHz WiFi from front, side and top view

Dimensions

CORIVASAT (IP20 VERSION)

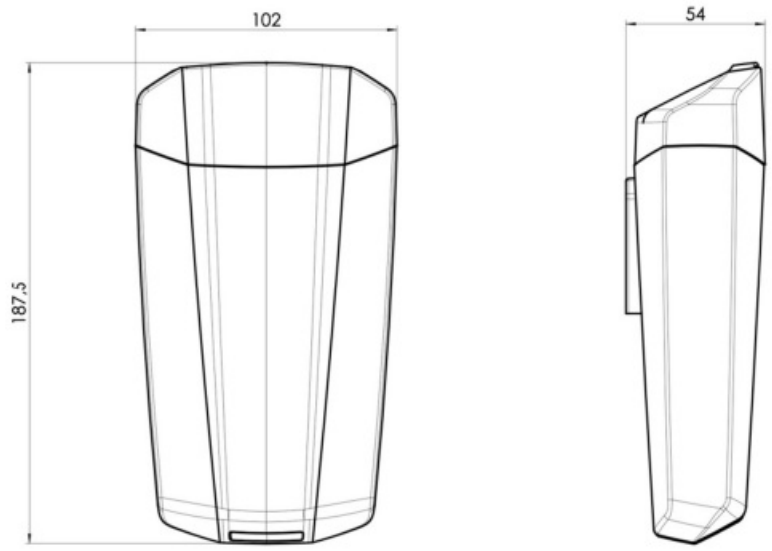


Figure 11 - Dimension of the CorivaSat (IP20 Version)

CORIVASAT (IP67 VERSION)

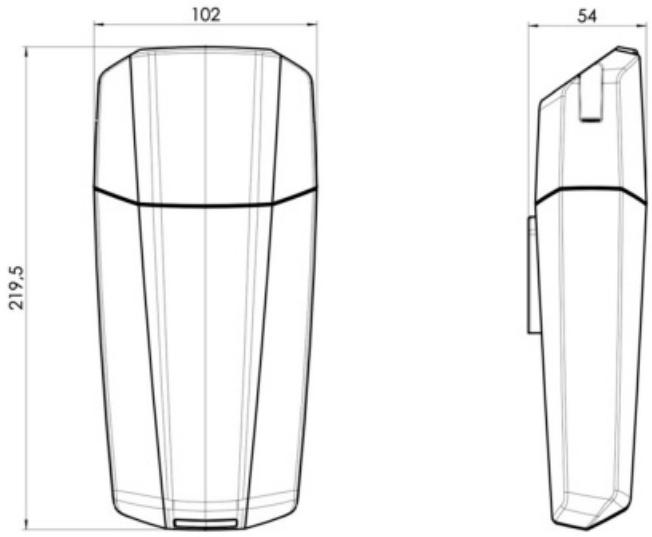


Figure 12 - Dimension of the CorivaSat (IP67 Version)

Cleaning and Disposal

Cleaning: Clean the device regularly following the manufacturer's guidelines.If the surface needs to be cleaned, please use a damp cloth with clear water or water with a mild soap.

Disposal: Dispose of the device responsibly according to local regulations. According to European directives and the German Electrical and Electronic Equipment Act, this device cannot be disposed of in the normal household waste. Please dispose of the device at a designated collection point for electronic devices.

Conformity

The manufacturer hereby affirms that the requirements of the Directive 2014/53/EU are fulfilled. The declaration of conformity can be seen in detail at **www.zigpos.com/conformity**.

The supplier hereby declares that the device complies with Part 15 of the FCC rules, in accordance with 47 CFR § 2.1077 Compliance Information. The Supplier's Declaration of Conformity can be seen in detail at **www.zigpos.com/conformity**.

Compliance

1. Follow all safety and compliance information provided in the manual.
2. Ensure proper handling to avoid damage to the device.

Ask for Support

We offer standardized as well as customized solutions. Please note that all documents may be updated without prior notice to individual customers. We provide remote assistance by email at **helpdesk@coriva.io** In the case of a support request, please indicate your system references.

FAQ

Legal Notice

Q: What is the policy regarding product improvements?

A: ZIGPOS continuously improves products, and specifications are subject to change.

Liability Disclaimer

Q: What is the liability disclaimer by ZIGPOS?
A: ZIGPOS corrects errors in documentation and disclaims liability resulting from them.

Safety and Compliance Information

Q: How should the device be handled to prevent overheating?
A: Operate and store the device within specified temperature limits to prevent overheating.

Q: What precautions should be taken for mechanical impacts?
A: Avoid subjecting the device to high mechanical loads to prevent damage.

Q: How to prevent explosions in potentially hazardous environments?
A: Do not operate the device near explosive atmospheres and follow safety instructions.

Documents / Resources

	CORIVA CorivaSat Real Time Locating System [pdf] User Manual ZP-OXSAT1, 2AHHJ-ZP-OXSAT1, CorivaSat Real Time Locating System, CorivaSat, CorivaSat Locating System, Real Time Locating System, Locating System, Locating

References

- Home: omlox
- Coriva Portal
- Coriva Portal
- User Manual