**Manuals+** — User Manuals Simplified.

# Dedrone RF-560 Long Range Digital Logger Installation Guide

**Contents**

## INSTALLATION MANUAL

## RF-560

Long range, cloud-ready, RF-based localization of drones and their remote controls

Dedrone

## Legal provisions

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## 1 Safety

### 1.1 Symbols

| Symbol | Explanation |
|---|---|
| **NOTICE** | Indicates a situation which, if not avoided, can result in property damage |
| (i) | Information that is important for a specific goal, but is not safety-relevant |
| ☐ | Indicates a requirement for meeting a specific goal |
| ✔ | Desired result |
| ⊗ | A problem that might occur |
| 🔧 | Action to resolve a problem |

### 1.2 Intended use

The RF-560 is a passive, network-attached sensor for the detection and direction finding of radio frequencies (RF) and Wi-Fi signals. The RF-560 detects targeted radio signals, classifies them and identifies their direction. In combination with two or more RF-560 it is able to determine the position of a drone and remote controls by the RF signals. The RF-560 sends the data, along with an alert via mobile or LAN connection to the DedroneTracker System.

The RF-560 is intended for civil commercial and private use in conjunction with a DedroneTracker System. The RF-560 is suitable for outdoor use.

Use this product only in accordance with the information provided in the enclosed documentation and with the locally applicable legal standards and directives. Any other application may cause personal injury or property damage.
Any use of the product other than that described in the intended use section does not qualify as appropriate. The enclosed documentation is an integral part of this product. Keep the documentation in a convenient place for future reference and observe all instructions contained therein.
The type label must remain permanently attached to the product.

**Compliance Information Statement FCC and IC**
The RF-Sensor RF-560 complies with Industry Canada license-exempt RSS standard(s) and complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.

2. This device must accept any interference received, including interference that may cause undesired operation.

**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:

- 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/television technician for help.

**Modifications:** Any modifications made to this device that are not approved by Dedrone may void the authority granted to the user by the FCC to operate this equipment.

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**Caution!**
To prevent permanent exposure, the device should be installed and operated with a minimum distance of 20 cm (7.87 in) between the device and your body.

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**1.3 Safety information**

Read, follow and retain all of the following safety instructions. Heed all warnings on the unit and in the operating instructions before operation.

Warning! Setup should be carried out by trained personnel only, in accordance with the national electric code, ANSI/NSPA, and all local country codes.



**Danger of life due to electric shock.**
Whenever any damage to the device has occurred live components could be touched, which can lead to lethal electric shocks. Such damages can be:

- the AC cable is damaged
- the patch cable is damaged
- an object has fallen on the device
- the device has been dropped, or its enclosure has been damaged
- the device does not operate normally when the user follows the operating instructions correctly

When the RF-560 is plugged into an AC power source, there is always voltage applied to the internal electronics. Unplug the devices from the power source by disconnecting the AC cable and patch cable immediately. Make sure, that the power socket is always accessible.
Refer all servicing to qualified service personnel. This device has no user-serviceable internal parts. Do not attempt to service this device yourself.

Adjust only those controls specified in the operating instructions. Improper adjustment of other controls may cause damage to the unit.

Despite careful construction, electrical devices can cause fires. Do not mount the RF-560 in areas containing highly flammable materials or gases. Do not mount the RF-560 in a potentially explosive atmosphere.

Do not install product near any heat sources such as radiators, heaters, exhaust air systems or other equipment (including amplifiers) that produce heat.

**2 The RF-560**

The RF-560 is a passive, network-attached sensor for the detection and direction finding of radio frequencies (RF) and Wi-Fi signals. The RF-560 detects targeted radio signals, classifies them and identifies their direction. In combination with two or more RF-560 it is able to determine the position of a drone and remote controls by the RF signals. The RF-560 sends the data, along with an alert via mobile or LAN connection to the DedroneTracker System.
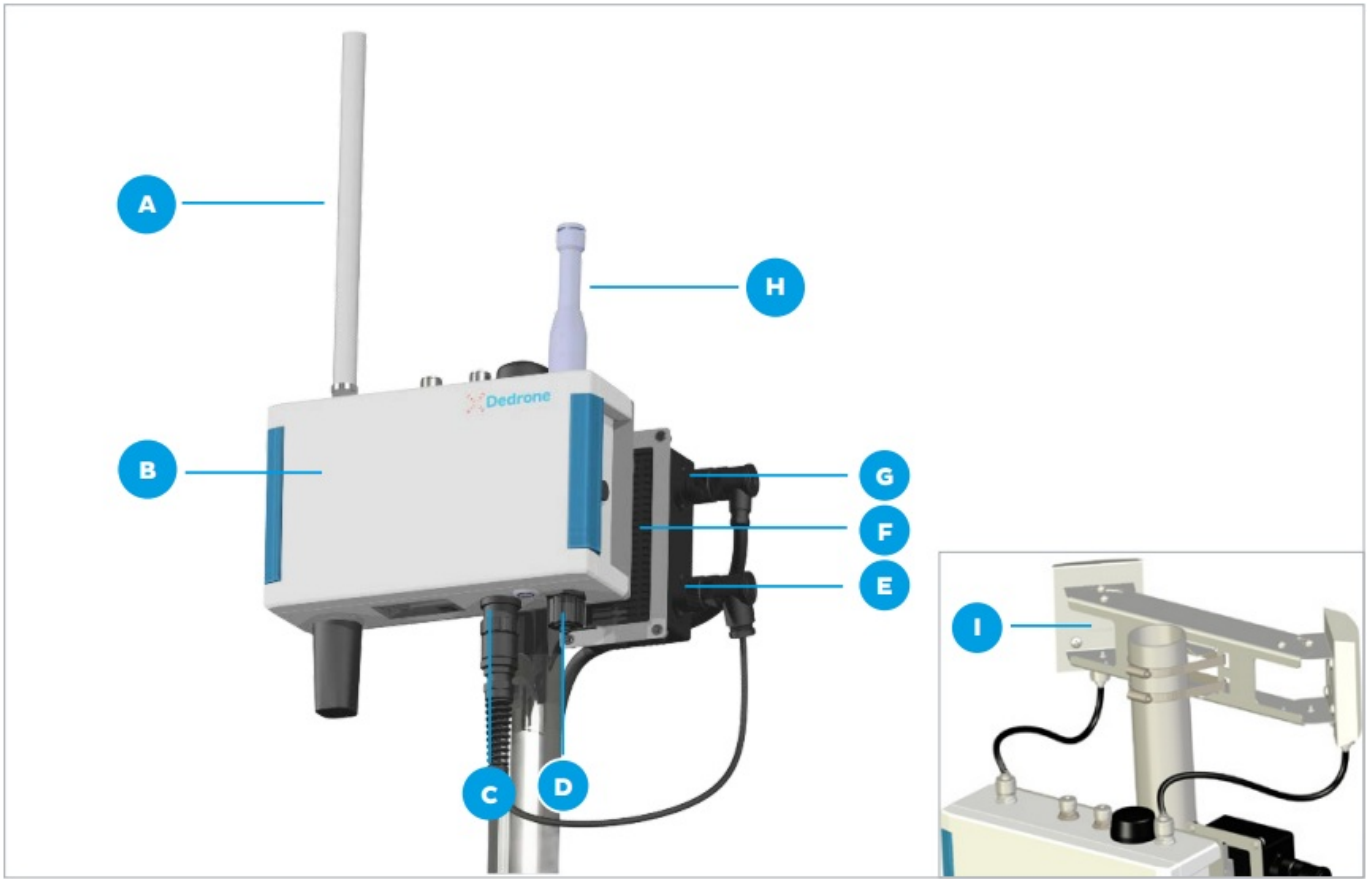


Parts of the RF-560

| A | High-gain antenna (omnidirectional) | F | Power unit |
|---|---|---|---|
| B | RF-560 | G | AC-In plug |
| C | DC-In plug | H | Low-gain antenna (omnidirectional) |
| D | Ethernet plug | I | Directional antennas with pole mount |
| E | DC-Out plug | | |

It scans a wide frequency band for radio frequencies and classifies them. The data is recorded and available on the user interface DedroneTracker UI.

## 3 Unpacking

This equipment should be unpacked and handled with care. Check the exterior of the packaging for visible damage. If an item appears to have been damaged in shipment, notify the shipper immediately.

## 4 Scope of delivery

Verify that all the parts listed in the scope of delivery are included. If any items are missing, notify your Dedrone Partner.

Do not use this product if any component appears to be damaged. Please contact Dedrone in the event of damaged goods.

**1 x** RF-560

**1 x** Screwdriver Torx TX25

**1 x** AC cable with outdoor plug, 32 ft. (10 m)

**1 x** Outdoor ethernet cable, 32 ft. (10 m)

**1 x** Bag with the outdoor housing for prewired RJ45 cordset and a quick manual

**1 x** Installation manual

**1 x** Safety information

**1 x** Product registration document (this information is only needed for a cloud based sensor operation and is provided by an enclosed document or online by the Dedrone Service)

The original packing carton is the safest container in which to transport the unit and must be used if returning the unit for service. Save it for possible future use.

## 5 Select the mounting place

### 5.1 Mounting location

The position of the RF-560 has strong impact to the detection range. The RF-560 is intended for pole mounting. Make sure that a suitable pole is available (diameter between 1.75 in to 3.5 in (40 mm to 90 mm)).

For ideal results the location should fulfill the following conditions:

☐ **Clear view over the area**
☐ **Exposed, elevated position: 10 ft (3 m) minimum, 33 ft (10 m) recommended**

Do not install the device nearby the following objects:

- **Metal surfaces or coated glass**

  Disturbs the detection and prevents the localization.

- **Walls**

  These shade the detection area and prevent classification of signals behind the wall.

- **Base station and other strong signal sources**

  The detected signals are getting interfered.

- **Any excessive heat sources**

- **Any overhead power lines, power circuits, high-voltage lines or electrical lights**

  Electrical discharge can damage the device.

Select a secure installation location and mounting position for the device. Ideally, this is a location where the device cannot be interfered with, either intentionally or accidentally.

## 6 Installation

### 6.1 Power supply

AC power supply with the supplied power plug via a socket (AC 100-240V 50/60 Hz).

☐ Make sure that the power socket is grounded.
☐ In Denmark: Apparatets stikprop skal tilsluttes en stikkontakt med jord som giver forbindelse til stikproppens jord.
☐ In Finland: Laite on liitettävä suojakoskettimilla varustettuun pistorasiaan.
☐ In Norway: Apparatet må tilkoples jordet stikkontakt.
☐ In Sweden: Apparaten skall anslutas till jordat uttag

### 6.2 LAN cable requirements

The sensor can be connected via LTE or LAN connection. To connect the sensor with another ethernet cable as the supplied, note the following requirements.

| Type | Cat-6 patch cable, shielded, suitable for outdoor use<br>Recommendation: Cat-7 patch pable, shielded, suitable for outdoor use |
| --- | --- |
| Maximum Length | 328 ft (100 m) |
| External Diameter | 3.5 mm – 7.5 mm |

### 6.3 Mounting surface

- Make sure the selected mounting surface is capable of supporting the combined weight of the RF-560 (17.7 lb (8.0 kg)) and the pole under all expected conditions of load, vibration, and temperature.

### 6.4 Mounting orientation

- Important for a good result is the vertical alignment of the device. Do not tilt the device.
- The omnidirectional antennas have a 360° coverage. Ensure the sensor has a clear line of sight in all directions.
- Each directional antenna covers 92° in one direction and they are installed on the mount to cover 180°. During

the installation, ensure the antennas with the mount are aligned in the desired direction with clear line of sight.

### 6.5 Overvoltage protection

For safe mounting in an exposed position overvoltage protection must be observed.

Ensure that the mast is connected to the lightning conductor of the building and there is a metallic contact between the mast mount and the mast. The lightning conductor must be installed at least 1.5 m above the RF-560.
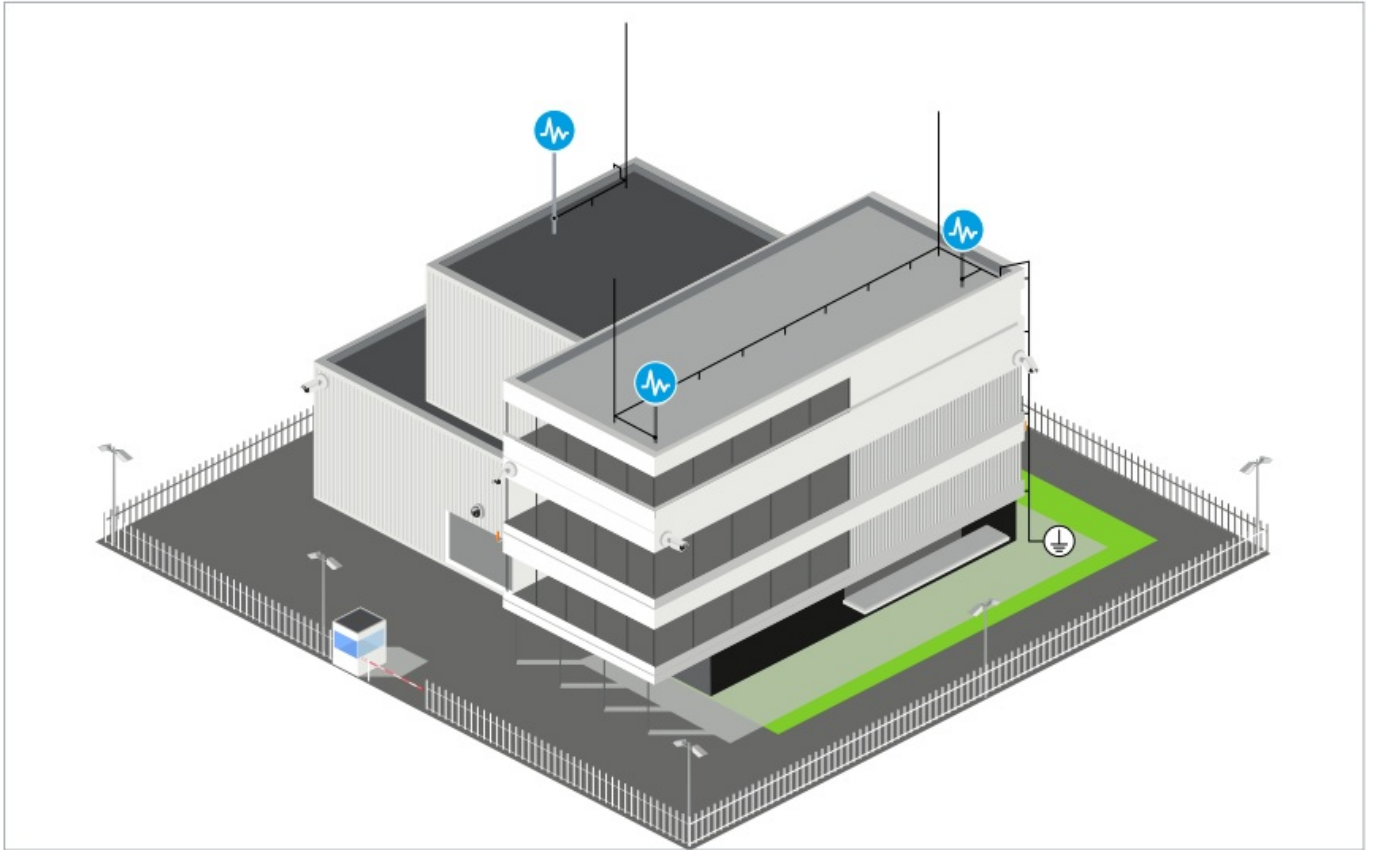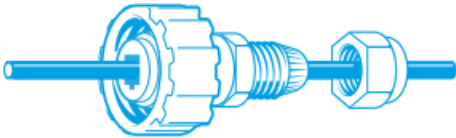


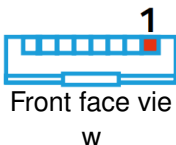Lightning Protection Installation with RF-560s

Ensure that the location has the appropriate clearance from power and lightning conductors, in accordance with NEC725 and NEC800 (CEC Rule 16-224 and CEC Section 60 and Section 810 of the National Electrical Code, ANSI/NFPA No.70).

### 6.6 Cable preparation for LAN connection

For a weather resistant connection to the RF-560, it is necessary to crimp the supplied environmentally sealed Ethernet connector to the patch cable.

**Procedure:**

| | |
|---|---|
| 1 | Cut the RJ45 plug off the laid cable. Keep the cut off plug, to check the wiring standard later. |
| 2 | Screw the gland off the connector body. |

| 3 | Thread the gland nut and the connector body onto the cable. | | | | |
|---|---|---|---|---|---|
| 4 | Remove the cable jacket carefully. Therefore take care not to damage the braid and foil. | | | | |
| 5 | Fold back the braid and foil over the cable jacket.<br>Note: 25 mm (1") of free conductors are needed. | | | | |

| 6 | Unravel the conductors, sort the conductors in the required wiring standard (568-A or 568-B), and push the conductors all the way in the plug.<br>The required wiring standard can be checked on the previous cutoff RJ45 plug. | **1**<br>Front face view | Position | 568-A | 568-B |
|---|---|---|---|---|---|
| | | | 1 | White/Green | White/Orange |
| | | | 2 | Green | Orange |
| | | | 3 | White/Orange | White/Green |
| | | | 4 | Blue | Blue |
| | | | 5 | White/Blue | White/Blue |
| | | | 6 | Orange | Green |
| | | | 7 | White/Brown | White/Brown |
| | | | 8 | Brown | Brown |

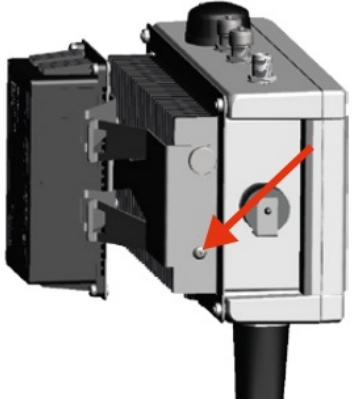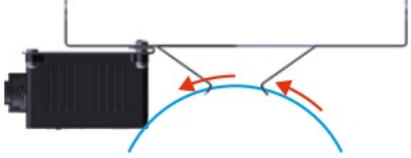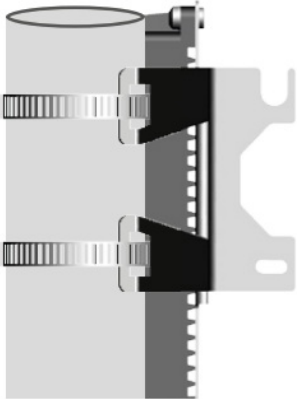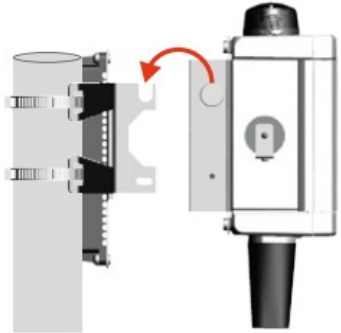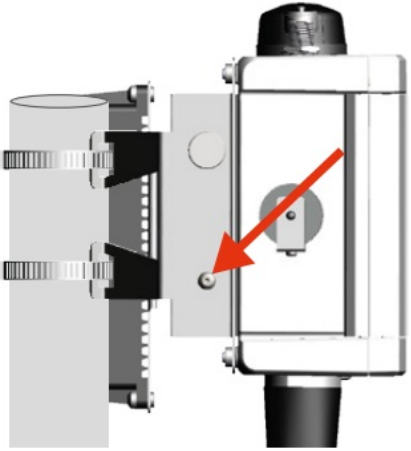| 7 | Crimp the RJ45 plug with the crimping tool. |
|---|---|
| 8 | Push down the latching clip of the plug and press the connector body all the way to the stop over the RJ45 plug. |

| 9 | Put the gland nut over the connector body and screw down the gland nut on the connector body. |
|---|---|

**6.7 Mount the sensor**

## Requirements:

☐ Desired mounting place fulfills the requirements (see chapter 5 Select the mounting place, page 7).
☐ Diameter of the pole: between 1.75 in to 3.5 in (40 mm to 90 mm).

## Procedure:

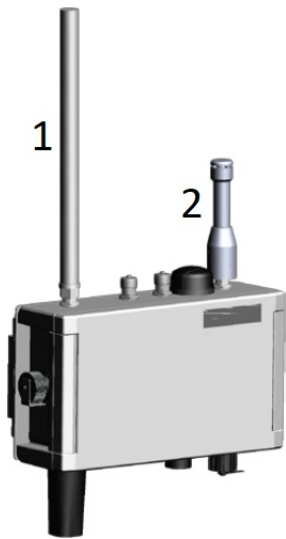| | |
|---|---|
| **1** | Loosen the safety screws (Torx TX25) on both sides of the RF-560 and unhook the RF-560 from the RF pole mount. |
| **2** | Run the straps through the slashes of the RF pole mount. |
| **3** | Mount the Pole Mount to the pole:<br><br>• Hold the RF pole mount at the desired height of the pole.<br>  To be able to install the directional antennas, place the sensor at least 8 in (200 mm) below the end of the mast<br>• Lay the straps around the pole.<br>• Put the strap in the slash under the screw and tighten it with the socket wrench 7 mm (9/32") appropriately. |
| **4** | Hook the RF-560 in the screw guidance of the RF pole mount. |
| **5** | Screw down the safety screws (Torx TX25) at both sides in the lower holes. |

**6.8 Connect the antennas**

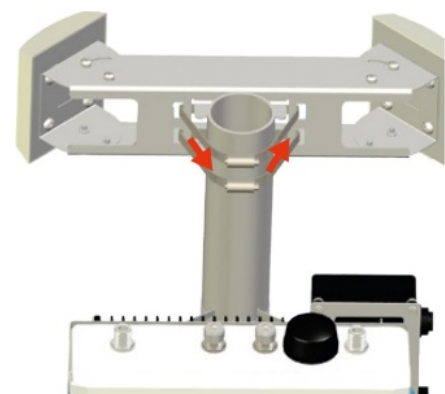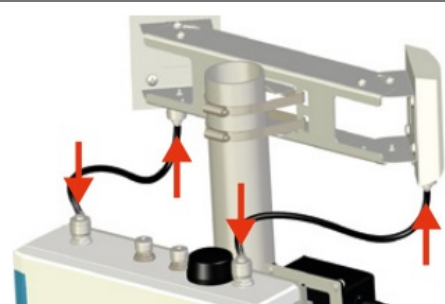The RF-560 is supplied with two types of antennas:

- Omnidirectional antennas, for a 360° detection
- Directional antennas, for a 180° directed detection coverage with a extended detection range

The antennas differ in the installation. Install the antennas intended for the application.
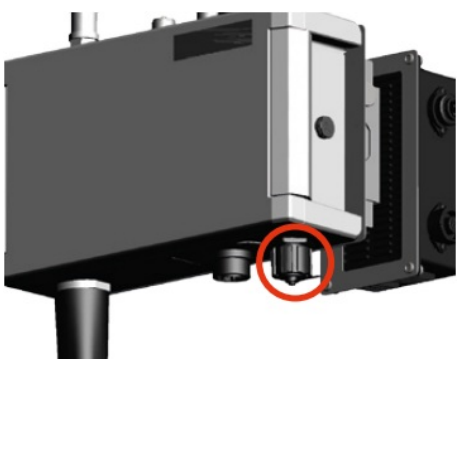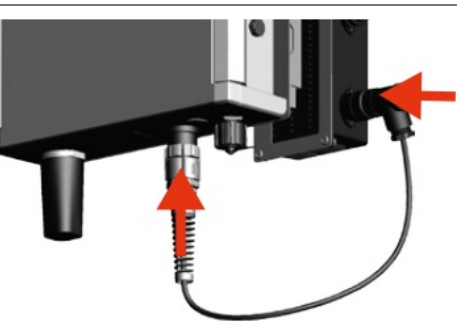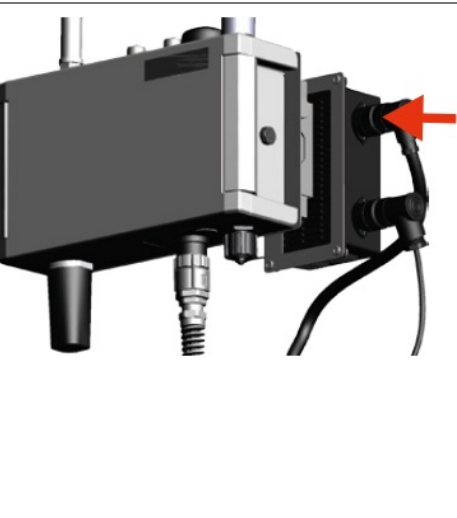
### 6.8.1 Connect the omnidirectional antennas

<table>
<tr>
<td>
Screw the antennas on the sensors screw thread:

- High-gain antenna (long) on the left screw thread
- Low-gain antenna (short) on the right screw thread

1. **High-gain**
2. **Low-gain**
</td>
<td></td>
</tr>
</table>

### 6.8.2 Install and connect the omnidirectional antennas

<table>
<tr>
<td>**1**</td>
<td>Run the straps through the slashes of the antenna mount.</td>
<td></td>
</tr>
<tr>
<td>**2**</td>
<td>
Mount the antenna mount to the pole:

- Hold the mount above the sensor and in the desired direction at the pole.
- Lay the straps around the pole.
- Put the strap in the slash under the screw and tighten it with the socket wrench 7 mm ( 9/32" ) appropriately.
</td>
<td></td>
</tr>
<tr>
<td>**3**</td>
<td>Connect the antenna cables to the antennas and the sensor.</td>
<td></td>
</tr>
</table>

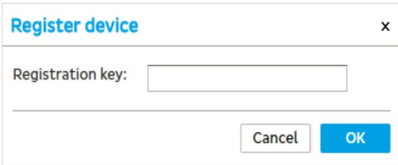| | |
|---|---|
| **1** | **If** the sensor is to be connected to the **local network**, connect the patch cable to the RF-560:<br><br>• Remove the protection cap.<br>• Plug the patch cable with the connector gland into the ethernet plug.<br>• Turn the connector gland until it is locked.<br><br>For a correct cable preparation see 6.3 Cable preparation for LAN connection, page 9. | |
| **2** | Plug the DC cable into the plug of the RF-560 and into the power supply unit. | |
| **3** | Plug the AC cable into the power supply unit and connect it to a power source (see 6.1 Power supply, page 8). ]<br><br>✔️ If the patch cable and the AC cable are connected the RF-560 boots automatically and after approximately 30 second the activation button at the RF-560 illuminates, indicating that the hardware is ready.<br><br>❌ The patch cable is connected to the network and the RF-560 does not boot automatically after approximately 30 second?<br><br>🔧 Push the blue button and wait for it to illuminate. | |
| **4** | Make sure that the pole is grounded (see chapter 5.4 Overvoltage protection, page 8). | |

**7 Connect the RF-560 to the DedroneTracker**

**7.1 Connect and Configure the RF-560 to the Dedrone Cloud**

**Requirements:**

☐ RF-560 is installed.
☐ The power supply is working and the LED at the RF-560 illuminates blue.
☐ The address of your Dedrone Cloud access is known (provided by Dedrone).
☐ The registration key of the sensor is available (provided by Dedrone).

**Procedure:**

| | |
|---|---|
| 1 | Start your web-browser and enter the address of your Dedrone Cloud.<br>For optimal performance it is recommended to use the latest version of Chrome or Firefox. |
| 2 | Log in the DedroneTracker UI as an administrator or configurator. |
| 3 | Choose **OPTIONS** > **Site Configuration**. |
| 4 | Choose [**Add device**] > **Register device**.<br><br>✔ The window **Register device** appears. |
| 5 | Enter the registration key of your sensor and choose [ **OK**].<br><br>✔ The RF-560 appears in the Site Explorer.<br><br>✔ The RF-560 is getting placed automatically on the map via GPS, but needs to be aligned (see following steps). |
| 6 | To sort the RF-560 in the Site Explorer, drag and drop the element to the desired position. |
| 7 | Choose **OPTIONS** > **Map Editor** and choose the RF-560. |
| 8 | ⓘ **An accurate alignment of the sensor and configuration in the DedroneTracker are prerequisites for a good direction finding result.**<br><br>• If the sensor was aligned during the installation via a prominent landmark, move the arrow to the chosen prominent landmark.<br>• If the sensor was aligned during the installation via a GPS device, enter the azimuth value in the field **Azimuth**. |
| 9 | To lock the settings, choose the option **Lock settings**. |
| 10 | Choose [**Save changes**].<br><br>✔ The menu **Map Editor** closes. |

**7.2 Integrate the RF-560 in your local DedroneTracker System**

To connect to the RF-560 DHCP services are required that automatically assign an IP address to the RF-560. If the RF-560 and the DedroneTracker Server are in the same Layer2 network they can be connected directly. If the RF-560 and the DedroneTracker Server are in different networks refer to the Dedrone Planning Manual or consult your network administrator.

**Requirements:**

☐ RF-560 is installed

☐ The power supply is working and the button at the RF-560 illuminates blue

☐ RF-560 is connected to the network

☐ The IP address of the DedroneTracker Server is known

**Procedure:**

| | |
|---|---|
| 1 | Start your web-browser and enter the address of your DedroneTracker Server.<br>For optimal performance it is recommended to use the latest version of Chrome or Firefox. |
| 2 | Log in the DedroneTracker UI as an administrator or configurator. The default login credentials are:<br>User: **admin**　　Password: **dedrone**<br>✔ The DedroneTracker user interface appears. |
| 3 | Choose **OPTIONS** > **Site Configuration**. |
| 4 | Choose [**Add device**] > **Discover devices**.<br>✔ The window **Discovered sensors** appears. |
| 5 | Select the desired RF-560 and choose [**OK**]<br>✔ The RF-560 appears in the Site Explorer.<br>✔ The RF-560 is getting placed automatically on the map via GPS, but needs to be aligned (see following steps). |
| 6 | To sort the RF-560 in the Site Explorer, drag and drop the element to the desired position. |
| 7 | Choose **OPTIONS** > **Map Editor** and choose the RF-560. |
| 8 | ⓘ **An accurate alignment of the sensor and configuration in the DedroneTracker are prerequisites for a good direction finding result.**<br><br>• If the sensor was aligned via a prominent landmark, move the arrow to the chosen prominent landmark.<br>• If the sensor was aligned via a GPS device, enter the **Azimuth value** in the field **Azimuth**. |
| 9 | To lock the settings, choose the option **Lock settings**. |
| 10 | Choose [**Save changes**].<br>✔ The menu **Map Editor** closes |

**8 Cleaning**

NOTICE **Wrong cleaner damages the housing**

The wrong cleaner can damage the housing or antenna of the RF-560. Never use glass cleaner or other solvent cleaners to clean the RF-560.

- Use solvent-free cleaner to clean the RF-560.

## 9 Decommissioning

### 9.1 Shut down the RF-560

| NOTICE | **RF-560 breaks**

By disconnecting the cable of the power supply without shut down the RF-560, the RF-560 could break.

- Always shut down the RF-560 before disconnecting the cable.

You have the possibility to shut down the RF-560 via the DedroneTracker user interface or directly on the sensor.

**Shut down via DedroneTracker user interface:**

| | |
|---|---|
| **1** | Log in to the DedroneTracker.AI user interface. |
| **2** | Choose **OPTIONS** > **Site Configuration**. |
| **3** | Right-click on the desired RF-560. |
| **4** | Choose **System** > **Shutdown device**. |

**Shut down directly at the RF-560:**

| |
|---|
| Briefly press the activation button at the RF-560 in the grip recess. <br><br> ✔ The RF-560 shuts down and the blue light goes out. |

### 9.2 Dismantling

**Hot surface due to permanent sunlight**
The surface of the RF-560 may become hot from permanent strong sunlight.

- Wear safety gloves when dismantling the device.

### 9.3 Disposal

Dispose the RF-560 at the end of its service life in accordance with the disposal regulations for electronic waste which apply at the installation location at that time. Alternatively, send it back to Dedrone GmbH with shipping paid by sender, and labeled "ZUR ENTSORGUNG" ("FOR DISPOSAL").

**10 Technical data**

| | |
|---|---|
| Range (line of sight) | Under normal condition 3.1 mi – 5 mi (5 km – 8 km) for most COTS drones |
| Device type | Sensor[1] |
| Radio frequency | Passive detection and classification |
| L x W x H | 15.2" x 7.7" x 27.2" (384 mm x 194 mm x 690 mm) |
| Weight (including mast mount) | 17.7 lb (8.0 kg) |
| Ingress protection rating | IP65[2] |
| Operating temperature | -4 °F to +131 °F (-20 °C to +55 °C) |
| Power supply | AC 100-240V 50/60 Hz max. 1 A |
| Power consumption | 40 W (typical) |
| Communication technologies | Cellular Communication[3] or Ethernet |
| Connectivity | Via LAN to existing IT infrastructure or via the integrated mobile connection in the Dedrone Cloud |
| Configuration, operation, and alarms | Via browser-based DedroneTracker software (software version >= 6.0 and valid license) |
| Software updates | Firmware and DedroneDNA updates provided by Dedrone |

[1] pole not included

[2] No ingress of dust; complete protection against contact (dust tight). Water projected by a nozzle (6.3 mm) against enclosure from any direction shall have no harmful effects.

[3] for USA, Canada and most of Europe

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## Documents / Resources



**Dedrone RF-560 Long Range Digital Logger** [pdf] Installation Guide
RF-560, RF-560 Long Range Digital Logger, Long Range Digital Logger, Range Digital Logger, Digital Logger, Logger

## References

- ✕ **Dedrone: Counter-Drone Defense Solutions & Systems**
- ✕ **Dedrone: Counter-Drone Defense Solutions & Systems**
- **User Manual**