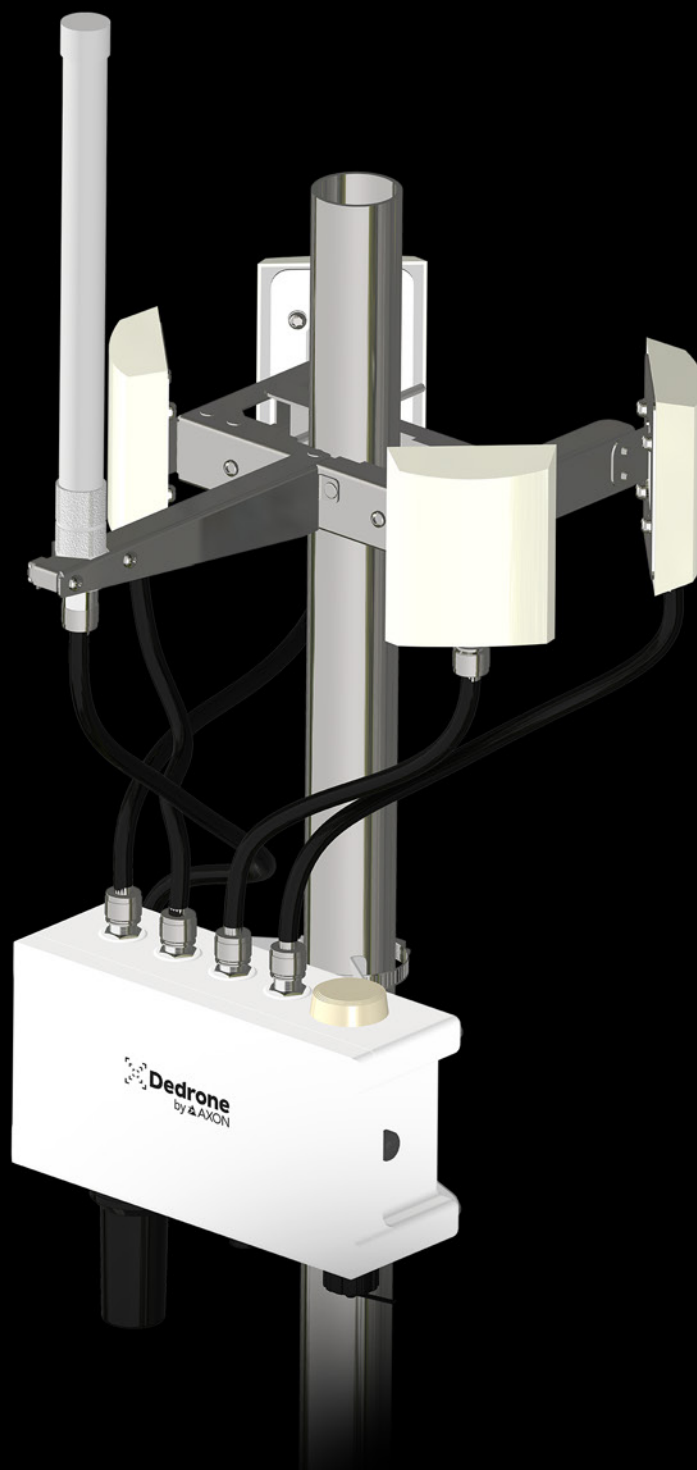


INSTALLATION MANUAL

/ RF-900

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



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1 Safety

1.1 Symbols

Symbol	Explanation
NOTICE	Indicates a situation which, if not avoided, can result in property damage
	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 may occur
	Action to resolve a problem

1.2 Intended use

The RF-900 is a passive, network-attached sensor. The sensor's intended use is to detect and localize drones and remote controls based on RF signals. The RF-900 sends the data, and an alert via mobile or LAN connection to the DedroneTracker.AI System.

The RF-900 is intended for civil, commercial, and private use in conjunction with a DedroneTracker.AI System. The RF-900 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-900 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 by Axon may void the authority granted to the user by the FCC to operate this equipment.


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.

1.3 Safety information

Read, follow, and retain all of the following safety instructions. Read 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

Danger of life due to electric shock.

Whenever any damage to the device has occurred live components can potentially be touched which can lead to lethal electric shocks. Potential damages includes:

- 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-900 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 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.



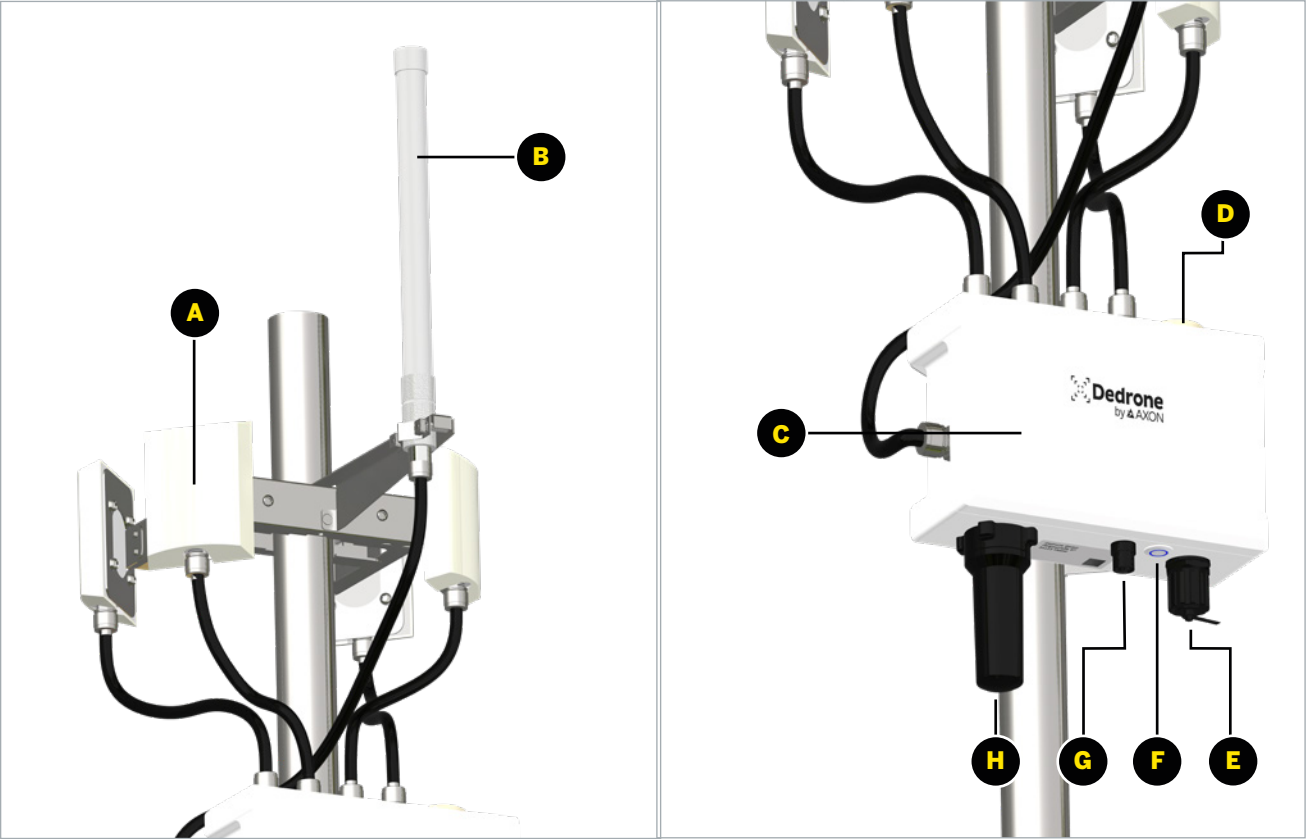
Despite careful construction, electrical devices can cause fires. Do not mount the RF-900 in areas containing highly flammable materials or gases. Do not mount the RF-900 in a potentially explosive atmosphere.



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-900

The RF-900 is a passive, network-attached sensor. The sensor's intended use is to detect and localize drones and remote controls based on RF signals. The RF-900 sends the data, and an alert via mobile or LAN connection to the DedroneTracker.AI System.



Parts of the antenna head

Parts of the RF-900

A	Four directional antennas	E	Ethernet plug
B	ADS-B antenna	F	Power button
C	RF-900 sensor	G	AC-In plug
D	GPS antenna	H	Covered USB interface for cell connectivity

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

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 by Axon Partner.

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

- 1 RF-900
- 1 Antenna mount with 4 premounted directional antennas and a ADS-B antenna
- 1 AC cable with outdoor plug, 10 m (32 ft)
- 5 Antenna cable
- 1 Bag with 5 parts of the outdoor housing for prewired RJ45 cordset and a quick manual
- 2 Strap
- 1 Installation manual
- 1 Safety information
- 1 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 by AxonService)

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-900 has a strong impact on the detection range. The RF-900 is intended for pole mounting. Ensure a suitable pole is available (diameter between 40 mm to 90 mm (1.6 in to 3.5 in)).

For ideal results, the location should fulfill the following conditions:

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

5.2 Mounting surface

- Make sure the selected mounting surface is capable of supporting the combined weight of the RF-900 including antennas (9.9 kg (21.9 lb)) and the pole under all expected conditions of load, vibration, and temperature.

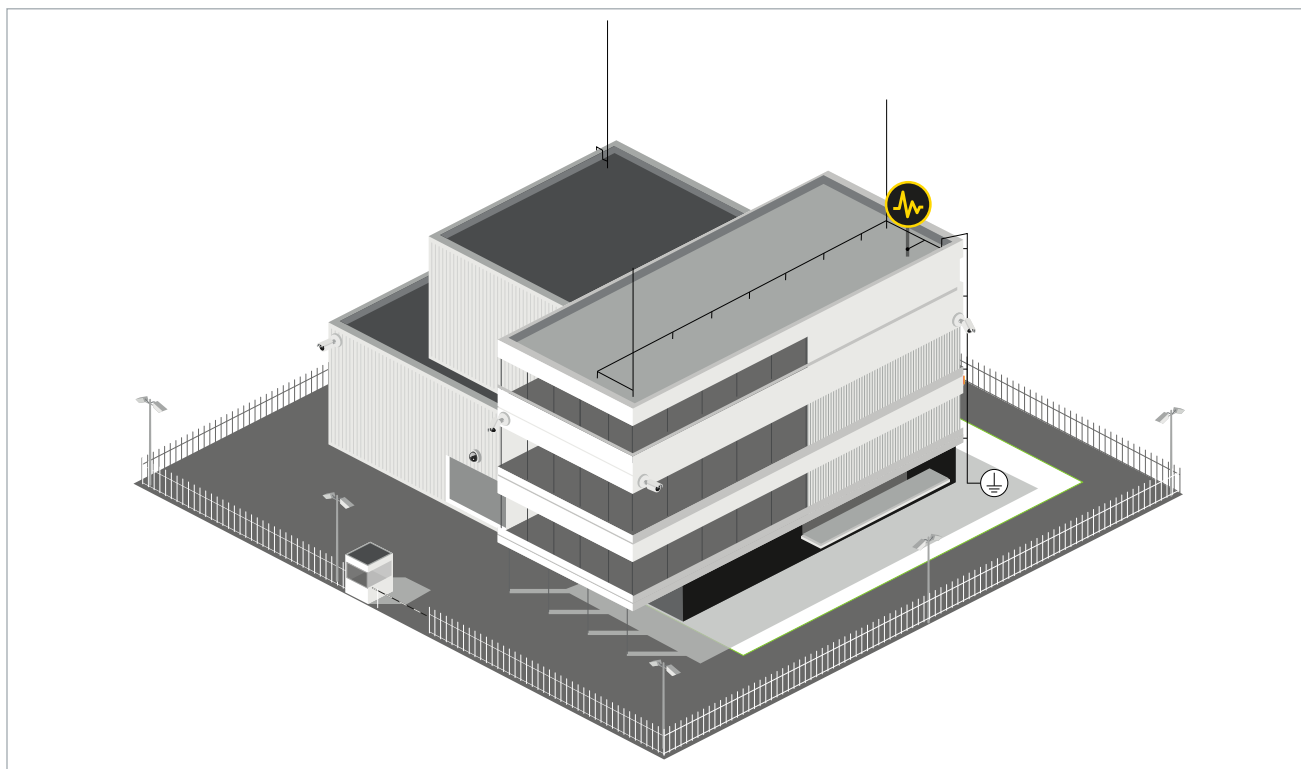
5.3 Mounting orientation

- Important for a good result is the vertical alignment of the antennas. Do not tilt the antennas.
- Ensure the antennas has a clear line of sight in all directions.

5.4 Overvoltage protection

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

Ensure 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-900.



Lightning Protection Installation with RF-900s

Ensure 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 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

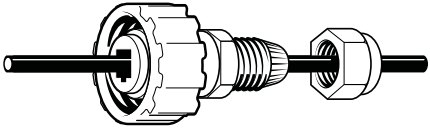
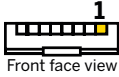
The sensor can be connected via LAN connection. To connect the sensor with an ethernet cable note the following requirements.

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

6.3 Cable preparation for LAN connection

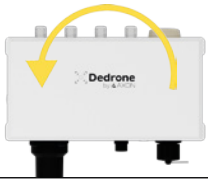
For a weather resistant connection to the RF-900, it is necessary to crimp the supplied environmentally sealed Ethernet connector to the patch cable.

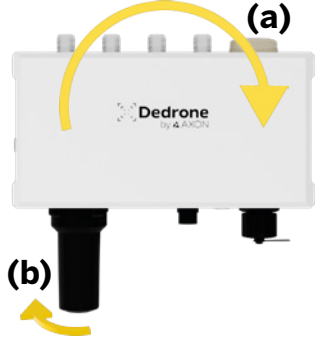
Procedure:

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. Take precautions not to damage the braid and foil!																												
5	Fold back the braid and foil over the cable jacket. 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. The required wiring standard can be checked on the previous cut-off RJ45 plug.	 <table border="1"> <thead> <tr> <th>Position</th><th>568-A</th><th>568-B</th></tr> </thead> <tbody> <tr><td>1</td><td>White/Green</td><td>White/Orange</td></tr> <tr><td>2</td><td>Green</td><td>Orange</td></tr> <tr><td>3</td><td>White/Orange</td><td>White/Green</td></tr> <tr><td>4</td><td>Blue</td><td>Blue</td></tr> <tr><td>5</td><td>White/Blue</td><td>White/Blue</td></tr> <tr><td>6</td><td>Orange</td><td>Green</td></tr> <tr><td>7</td><td>White/Brown</td><td>White/Brown</td></tr> <tr><td>8</td><td>Brown</td><td>Brown</td></tr> </tbody> </table>	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
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7	White/Brown	White/Brown																											
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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.																												

6.4 Access the USB interface

The USB interface can only be used with a USB devices certified by Dedrone by Axon.

1	Turn the RF-900 sensor upside down. This is important to loosen the security mechanism. Make sure the connectors are not getting scratched or dirty.	
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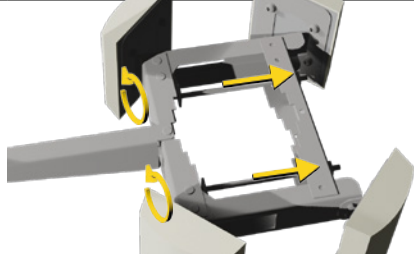
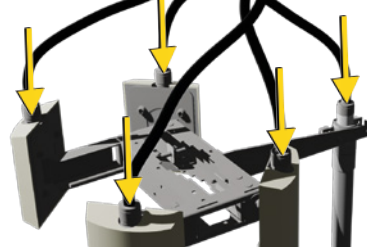
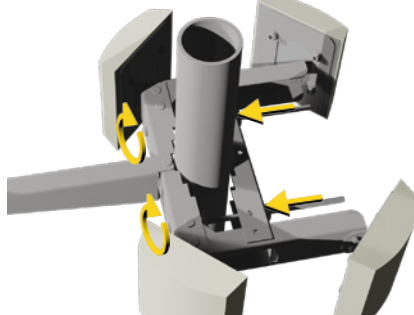
2	Unscrew the cap of the USB interface and plug in the USB device.  The device may be a maximum of 15 mm x 30 mm x 95 mm (0.59 in x 1.81 in x 3.74 in) including USB connector in size.	
3	Place the cap over the USB device and screw it tight.	
4	Turn the RF-900 sensor back to top down (a) and loosen the cap slightly (b). ✓ The security mechanism locks in place.	

6.5 Mount the antenna head

Requirements:

- Desired mounting place fulfills the requirements (see chapter 5 Select the mounting place, page 7).
- Diameter of the pole: between 40 mm to 90 mm (1.6 in to 3.5 in)

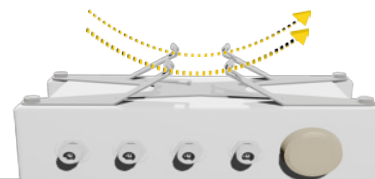
Procedure:

1	Open the antenna mount with the two fixing screws until it fits on the mast. If you cannot put the antenna mount on the mast, unscrew the slide completely.	
2	Connect the straight plugs of the antenna cables to the antennas at the antenna head.	
3	Mount the antenna head to the mast: • Place the antenna head at the desired position, at least 100 mm (4 in) below the end of the mast. • Tighten the screws alternately and evenly, otherwise the carriage may jam.	

6.6 Mount the sensor

1

Run the straps through the slashes of the sensor pole mount.



2

Mount the the RF-900 to the mast:

- Hold the RF-900 at the desired height of the pole.
To be able to install the antenna cables, place the RF-900 at least 400 mm (16 in) below the antenna head.
- Lay the straps around the pole.
- Put the strap in the slash under the screw and tighten it with the socket wrench 8 mm ($\frac{5}{16}$ ") appropriately.



6.7 Connect and power the sensor

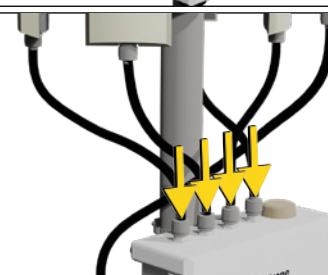
1

Connect the ADS-B antenna cable to the antenna plug at the side of the sensor.



2

Connect the four antenna cables to the connector on top of the RF-900.



3

Connect the patch cable to the RF-900:

- Remove the protection cap.
- Plug the patchcable with the connector gland into the ethernet plug.
- Turn the connector gland until it is locked.

For a correct cable preparation, see 6.3 Cable preparation for LAN connection, page 9.



4	Plug the AC cable into the RF-900 and connect it to a power source (see 6.1 Power supply, page 8). ✓ If the patch cable and the AC cable are connected, the RF-900 boots automatically. ✓ After approximately 60 second the LED at the RF-900 illuminates indicating the hardware is ready. ✗ The AC cable is connected to the power source and the RF-900 does not boot automatically after approximately 60 second? • Check the power supply. • Check the AC connection. • Disconnect and reconnect the AC connection.	
5	Make sure that the pole is grounded (see chapter 5.4 Overvoltage protection, page 8).	

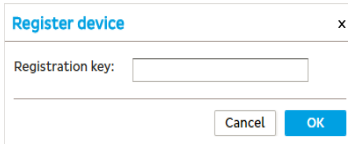
7 Connect the RF-900 to DedroneTracker.AI

7.1 Connect and configure the RF-900 to the Dedrone Cloud

Requirements:

- RF-900 is installed.
- The power supply is working and the LED at the RF-900 illuminates blue.
- The address of your Dedrone Cloud access is known (provided by Dedrone by Axon).
- 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. For optimal performance, it is recommended to use the latest version of Chrome or Firefox.
2	Log in the DedroneTracker.AI user interface as an administrator or configurator.
3	Choose OPTIONS > Site Configuration .
4	Choose [Add device] > Register device. ✓ The window Register device appears. 
5	Enter the registration key of your sensor and choose [OK]. ✓ The RF-900 appears in the Site Explorer. ✓ The RF-900 is getting placed automatically on the map via GPS, but needs to be aligned (see following steps).
6	To sort the RF-900 in the Site Explorer, drag and drop the element to the desired position.
7	Choose OPTIONS > Map Editor and choose the RF-900.

8	 An accurate alignment of the sensor and configuration in the DedroneTracker.AI are prerequisites for a good direction finding result. • If the sensor was aligned during the installation via a prominent landmark, move the arrow to the chosen prominent landmark. • 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] .  The menu Map Editor closes.

7.2 Integrate the RF-900 in your local DedroneTracker.AI System

To connect to the RF-900, DHCP services are required to assign an IP address to the RF-900 automatically. If the RF-900 and the DedroneTracker.AI Server are in the same Layer2 network, they can be connected directly. If the RF-900 and the DedroneTracker.AI Server are in different networks refer to the Dedrone by Axon Planning Manual or consult your network administrator.

Requirements:

- ☐ RF-900 is installed
- ☐ The power supply is working and the button at the RF-900 illuminates blue
- ☐ RF-900 is connected to the network
- ☐ The IP address of the DedroneTracker.AI Server is known

Procedure:

1	Start your web-browser and enter the address of your DedroneTracker.AI Server. For optimal performance, it is recommended to use the latest version of Chrome or Firefox.
2	Log in the DedroneTracker.AI user interface as an administrator or configurator. The default login credentials are: User: admin Password: dedrone  The DedroneTracker.AI user interface appears.
3	Choose OPTIONS > Site Configuration .
4	Choose [Add device] > Discover devices .  The window Discovered sensors appears.
5	Select the desired RF-900 and choose [OK] .  The RF-900 appears in the Site Explorer.  The RF-900 is getting placed automatically on the map via GPS, but needs to be aligned (see following steps).
6	To sort the RF-900 in the Site Explorer, drag and drop the element to the desired position.
7	Choose OPTIONS > Map Editor and choose the RF-900.
8	 An accurate alignment of the sensor and configuration in the DedroneTracker.AI are prerequisites for a good direction finding result. • If the sensor was aligned via a prominent landmark, move the arrow to the chosen prominent landmark. • 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]. ✓ 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-900. Never use glass cleaner or other solvent cleaners to clean the RF-900.

- Use solvent-free cleaner to clean the RF-900.

9 Decommissioning

9.1 Shut down the RF-900

NOTICE RF-900 breaks

By disconnecting the cable of the power supply without shut down the RF-900, the RF-900 could break.

- Always shut down the RF-900 before disconnecting the cable.

You have the possibility to shut down the RF-900 via the DedroneTracker.AI user interface or directly on the sensor.

Shut down via DedroneTracker.AI user interface:

1	Log in to the DedroneTracker.AI user interface.
2	Choose OPTIONS > Site Configuration .
3	Right-click on the desired RF-900.
4	Choose System > Shutdown device .

Shut down directly at the RF-900:

	Briefly press the button at the RF-900. ✓ The RF-900 shuts down and the blue light goes out.
--	---

9.2 Dismantling



Hot surface due to permanent sunlight

The surface of the RF-900 may become hot from permanent strong sunlight.

- Wear safety gloves when dismantling the device.

9.3 Disposal



Dispose the RF-900 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 by Axon Germany with shipping paid by sender and labeled "ZUR ENTSORGUNG" ("FOR DISPOSAL").



10 Technical data

Typ. Range (line of sight)	Wi-Fi: 4 km (2.5 mi), Bluetooth: 8 km (5 mi), FLARM: 16 km (10 mi), ADS-B: 160 km (100 mi)
Coverage	360°
Remote ID protocols	Wi-Fi Beacon, Wi-Fi NAN (Aware), Bluetooth 4, Bluetooth 5 Compliant to Remote ID Standards in ASTM F3411-22a, EN 4709-002 (EU), Japan RemoteID rule
Additional Protocols	ADS-B IN (1090 MHz) and Flarm EU (868 MHz) or ADS-B IN (1090 MHz) and UAT USA (980 MHz)
Device Type	Passive sensor ¹
L x W x H	430 mm x 290 mm x 850 mm (17" x 11.4" x 33.5")
Weight	System: 9.9 kg (21.9 lb) Sensor: 5.1 kg (11.3 lb) Antennas with mount: 3.3 kg (7.3 lb)
Ingress Protection Rating	IP65
Operating Temperature	-20 °C to +55 °C (-4 °F to +131 °F)
Power Supply	AC 100-240V 50/60 Hz max. 1 A
Power Consumption	20 W (typical)
Connectivity	Via LAN to existing IT infrastructure or a mobile data connection with a Dedrone by Axon certified third-party USB device
Configuration, Operation, and Alarms	Via browser-based DedroneTracker.AI software (software version >= 6.2 and valid license)
Software Updates	Firmware and DedroneDNA updates provided by Dedrone

¹ Pole not included

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**Dedrone by Axon Support**

For any questions regarding your Dedrone System, our team of experts is happy to assist you. Please use the contact information provided to receive the support you need.

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