Dedrone

INSTALLATION
Manual

DroneTracker Event Kit 2.5

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1 Safety

1.1 Symbols

Symbols	Explanation
⚠ CAUTION	Indicates a hazardous situation which, if not avoided, can result in minor or moderate injury
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 might occur
🔧	Action to resolve a problem

1.2 Intended Use

The Event Kit is an accessories for a mobile, temporary use of a Multi Sensor and RF-100, e.g. at events or a product demonstration.

The Event Kit with a Multi Sensor and RF-100 is intended for civil commercial and private use. The Multi Sensor is not a security camera to observe the ground.

The product 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.

Do not use the Event Kit with a battery for more than 12 hours with 2 connected PoE+ units.

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.

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 personal only, in accordance with the national electric code, ANSI/NSPA, and all local country codes.

Do not attempt to service this device yourself. Refer all servicing to qualified service personnel. This device has no user-serviceable internal parts. Whenever any damage to the device has occurred, unplug the devices from the power source and refer servicing to qualified service personnel. Such damages can be:

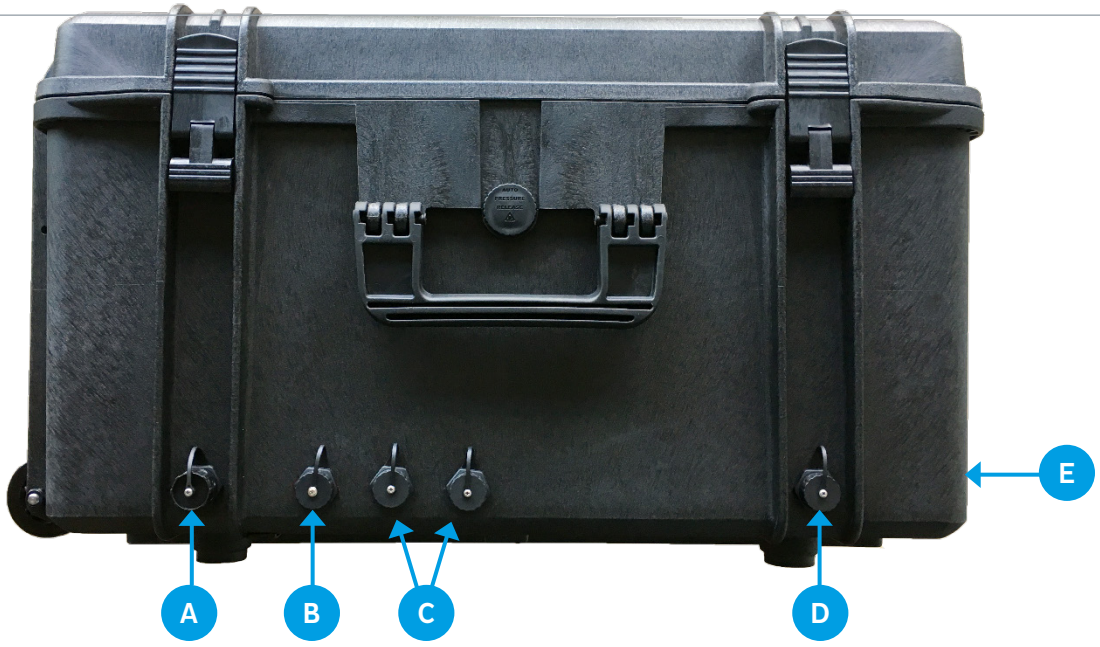
- the patch cable is damaged
- the device has been dropped, or its enclosure has been damaged
- the device does not operate normally when the user follows the operating instructions correctly

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

2 Product Description

2.1 The Tec Case

The Tec Case is the central component of the Event Kit. The contained battery serves as power supply in autarkic areas for the two PoE+ units (e.g. Multi Sensor and RF-100) and the integrated router. The Event Kit is an accessories for a mobile, temporary use of a Multi Sensor and RF-100, e.g. at events or a product demonstration.



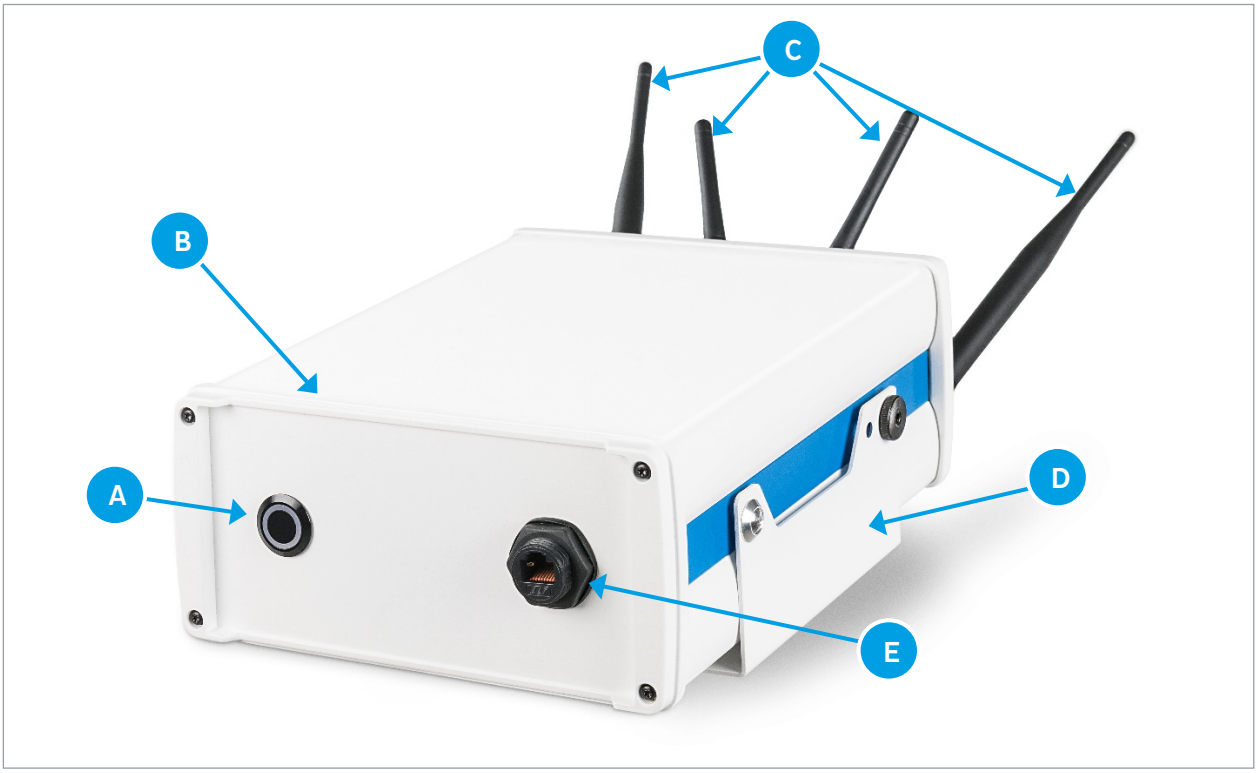
Parts of the Tec Case

A	Battery Charger	D	PC Connection
B	Uplink DSL / Router	E	Power Button
C	PoE+ Connection for Sensors		

The router builds a network, which is the interface between the Sensors and the PC or tablet. This network could be a Wi-Fi or a local network (LAN).

2.2 The RF-100

The RF-100 is a passive, network-attached sensor for the detection of radio frequencies (RF) and Wi-Fi signals. It supplements the DroneTracker System with another level of detection. The RF-100 detects and decodes targeted radio signals and sends the data, along with an alert, to the DroneTracker System.



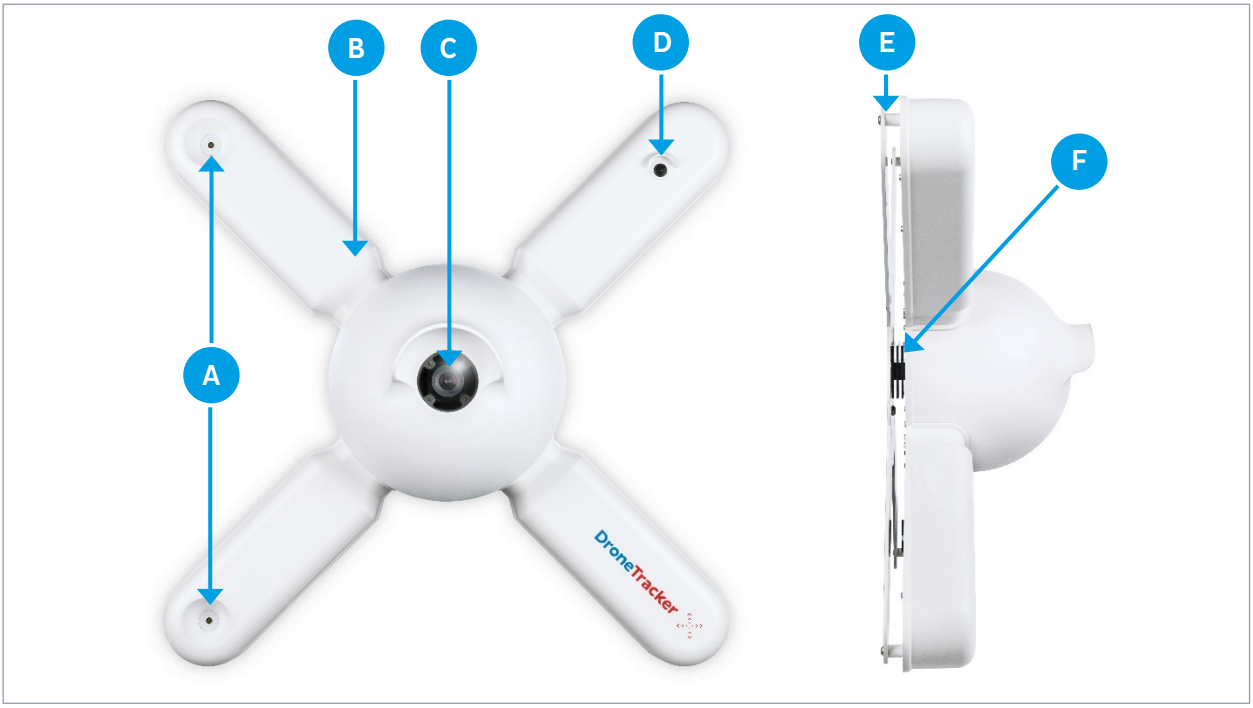
Parts of the RF-100

A	Power Button	**D**	RF Mounting Plate
B	RF-100	**E**	Network Socket
C	Antenna		

It scans a wide frequency band for radio frequencies, classifies and decodes them. Thus, drones with cameras for example, that send video signals in real time to a ground station, are identified. The decoded data is recorded and available on the user interface DT Control Center.

2.3 The Multi Sensor

The Multi Sensor is a network-attached multi-sensor system, which detects civil drones and triggers an alarm. An alarm can be sent to the network and is shown in the user-interface, known as the DT Control Center. The Multi Sensor is able to be operated with the battery of the Tec Case or a PoE+ injector.



Parts of the Multi Sensor

A	Audio Sensor	**D**	Near Infrared HD Camera
B	Multi Sensor	**E**	DT Mounting Plate
C	HD Camera	**F**	DT Heat Sink

With the interacting sensors the Multi Sensor is able to detect all kinds of civil drones. Based on multiple parameters such as noise, shape, and movement patterns, the detection rate is optimal. Depending on the environmental, weather conditions, drone type and drone size, the detection rate varies significantly.

In case of a drone alert the built-in camera saves videos in HD quality and the audio sensor saves the sounds, providing evidence of the threat intrusion.

2.4 Other Enclosed Parts

Battery Charger

The battery enables an autarkic use of the Tec Case with two PoE+ units, e.g. Multi Sensor and RF-100. The battery supplies the router and the connected PoE+ units with electricity.

The battery charger recharges the battery in the best and safest way. Use only the supplied battery charger.

The LED at the charger shows the charging state:

- Orange: boost charge, battery level < 90 %
- Yellow: top-up charge, battery level 90 % - 100 %
- Green: float charge, battery level 100 %, charger in standby

Tripods

The Tripod is a mobile mount for the Multi Sensor and RF-100. The Tripods helps to exhibit and position the Multi Sensor and RF-100

3 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.

1x Tec Case (incl. battery, fuses, energy management, router, 2x PoE+ injectors)

1x Battery Charger

2x Tripod

2x Tripod Head

1x Tripod Head Adapter (if the Event Kit is ordered without sensors)

2x Patch Cable with environmentally sealed Ethernet connectors (5 m)

1x Patch Cable (1,5 m)

1x Safety Information

1x Installation Manual

1x Environmentally sealed Ethernet connector

4 Set Up

There are two ways to run a Event Kit with the Multi Sensor and the RF-100 - autonomously with battery or with LAN connection. In this chapter you can read, what to consider for the positioning of the Dedrone sensors and how to setup the Event Kit for both scenarios.

4.1 Choose the Position of the RF-100

The position of the RF-100 has strong impacts to the detection range. For an ideal result the location should fulfil the following conditions:

- ☐ clear view over the area
- ☐ elevated position (minimum 3 m)

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.

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). Do not install the device near the following object:

- Any excessive heat sources
- Any overhead power lines, power circuits, or electrical lights, or where there is a chance of electrical discharge.
- Behind metal surfaces or vaporized glass, this could have negative affects to the range

Orientation

The orientation of the device itself does not have any effect for the performance. Important for a good result is the orientation of the antenna. Both antenna should be orientated skywards.

4.2 Choose Position of the Multi Sensor

The Multi Sensor is developed for a fixed long term observation. The mobile use on a product demonstration, exhibition or an event is a special case. If configured incorrectly or unfavorable positioned, the Multi Sensor could generate many false alarms. You should consider the following things for the best result:

Sonic and ultrasonic noise can disturb or disable the acoustic detection.

Position the Multi Sensor as far away as possible from any source of noise, e.g.:

- Fans
- Radiators
- Converters
- Speakers
- Electrical motors
- Capping power supplies
- Trees (moving leaves producing ultrasonic noise)

Don't walk in front of the Multi Sensor, because of that, the camera could detect wrong moving objects and eventually you are creating false alarms.

Don't position the Multi Sensor on moving objects like boats or trucks. When the Multi Sensor is tottering, the video scanning is getting disturbed.

4.3 Set Up autonomously

Requirements:

☐ Check batteries and make sure that the electric connection is working.

Procedure:

NOTICE **Multi Sensor or RF-100 breaks**

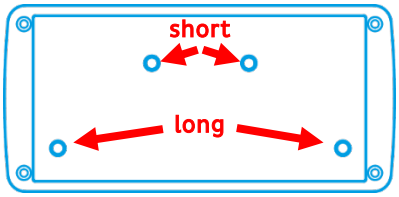
By overheating of the Tec Case, the Tec Case shuts down automatically and the sensor could break.

- Take care, that inside the Tec Case the temperature is not getting over 149 °F (65 °C), for example by open the lid or providing shadow.

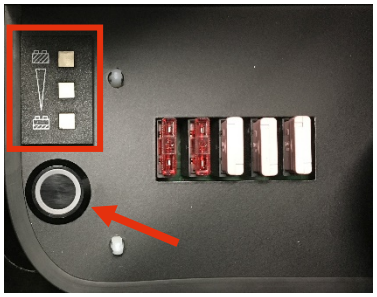
1 Turn on your notebook, set up the tripod, screw the tripod head on the tripod and attach the Dedrone sensors to the tripods.

2 If you set up the RF-100, screw the antenna on the screw threads at the top of the RF-100.

Therefor note the correct positioning of the short and long antenna.



3 Turn on the main switch inside the Tec Case and check the charge of battery at the battery display.



✔ The battery display shows the charge of battery:
- **Green**: ready/standby
- **Orange**: low state of charge, full functionality is not guaranteed, **charge the battery** (see chapter 5, page 17)
- **Red**: battery is empty, shut down in next seconds.

4 Use the switch outside the Tec Case, to turn the power on.

Wait for **30 seconds**, before following the next steps.

✔ The router boots and is going to provide the Wi-Fi network and is preparing LAN communication.

5

a. Connect your sensors to the socket PoE+ with the screwable patch cable.

✔ The sensor boots automatically and after approximately 10 sec the blue button at the sensor, indicating that the hardware is ready.

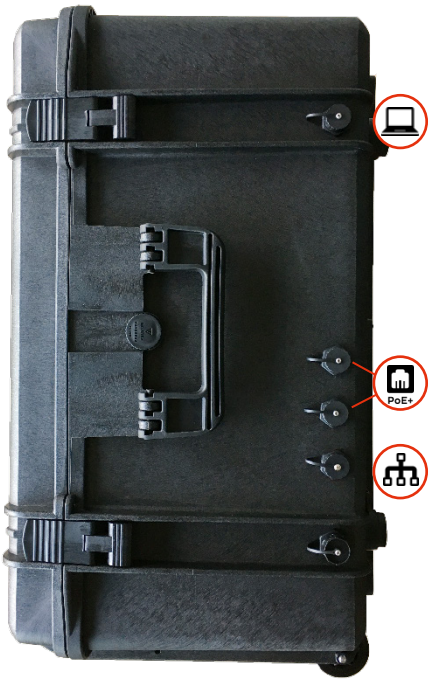
⊗ The sensor boots not automatically after approximately 10 sec?

🔧 Push the blue button at the sensor and wait for it to illuminate.

b. To connect your Laptop by LAN, connect the laptop to the socket with a patch cable.

c. To connect your laptop by Wi-Fi, connect the laptop to the Wi-Fi **Dedrone-Demo** or **Dedrone-Demo-5GHz**.
Password: **Dedrone-Demo**

Tip: For a most solid connection we recommend the LAN connection. If a Wi-Fi connection is needed, the 5GHz Wi-Fi is recommended for a more solid connection.



6

Start your browser.
For optimal use, we recommend Chrome or Firefox.

7

Enter the IP: **10.42.87.102** or **192.168.0.102**

✔ The web interface appears.

8

Enter your login data. The default login credentials are:
User: **admin** Password: **dedrone**

ⓘ For further information consult chapter “First Steps” of the integrated online help in the DT Control Center.

4.4 Cable Requirements and Preparation (Crimp)

Cable Requirements

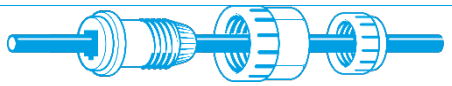
Type	Cat-6 Patch Cable Recommendation: Cat-7 Patch Cable
Maximum Length	328 ft (100 m) For longer distances, a PoE extender is required
External Diameter	3.5 mm – 7.5 mm

Cable Preparation

For a weather resistant LAN connection from your computer to the Tec Case, it is necessary to crimp the supplied environmentally sealed Ethernet connector to the patch cable (not included).

1 Cut the RJ45 plug off the laid cable. Keep the cut off plug, to check the wiring standard later.

2 Thread the small gland nut, the bigger gland nut and the connector body on to the cable.



3 Remove the cable jacket carefully. Therefore take care not to damage the braid and foil.

4 Fold back the braid and foil over the cable jacket.
Note: 25 mm (1”) of free conductors are needed.

5 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.

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

6 Crimp the RJ45 plug with the crimping tool.

7 Push down the latching clip of the plug and press the connector body all the way to the stop over the RJ45 plug.

8 Put the bigger gland nut over the connector body and screw down the small gland nut on the connector body.

4.5 Set Up with LAN Connection

For this setup the Tec Case is not required. Instead of the Tec Case, you need a network access for your DroneTracker and PC as well as the capability, to find out the IP address of the DroneTracker in that network.

Requirements:

- ☐ Plug socket for power supply
- ☐ LAN access for your Sensors
- ☐ Network access via Wi-Fi or LAN for your Laptop

Procedure:

NOTICE **Multi Sensor or RF-100 breaks**

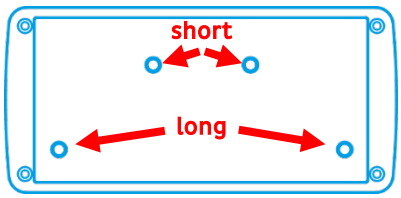
By overheating of the Tec Case, the Tec Case shuts down automatically and the sensor could break.

- Take care, that inside the Tec Case the temperature is not getting over 149 °F (65 °C), for example by open the lid or providing shadow.

1 Turn on your notebook, set up the tripod, screw the tripod head on the tripod and attach the Dedrone sensors to the tripods.

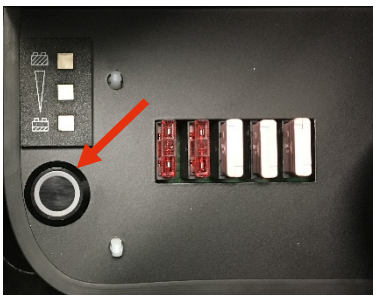
2 If you set up the RF-100, screw the antenna on the screw threads at the top of the RF-100.

Therefor note the correct positioning of the short and long antenna.



3 Turn on the main switch inside the Tec Case.

✔ The battery display shows the charge state:
- Green: Ready/standby
- **Orange**: low state of charge, full functionality is not guaranteed, **charge the battery** (see chapter 5, page 17)
- Red: Battery is empty, shut down in next seconds.



4 Use the switch outside the Tec Case, to turn the power on.

Wait for **30 seconds**, before following the next steps.

✔ The router boots and is going to provide the Wi-Fi network and is preparing LAN communication.

5

a. Connect your sensors to the socket PoE+ with the screwable patch cable.

✔ The sensor boots automatically and after approximately 10 sec the blue button at the sensor, indicating that the hardware is ready.

⊗ The sensor boots not automatically after approximately 10 sec?

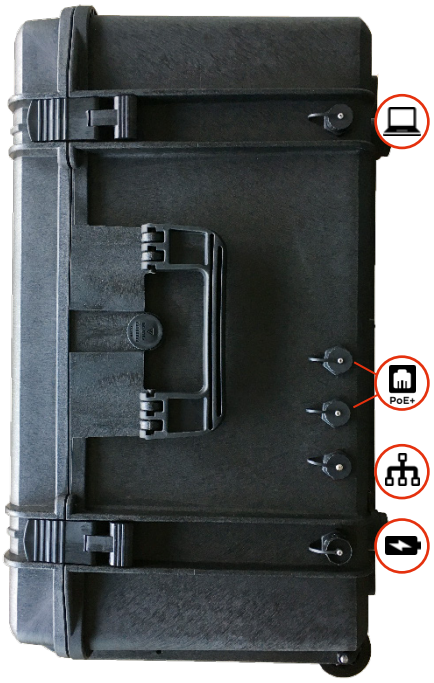
🔧 Push the blue button at the sensor and wait for it to illuminate.

b. To connect your laptop by LAN, connect the laptop to the socket with a patch cable.

c. To connect your laptop by Wi-Fi, connect the laptop to the Wi-Fi **Dedrone-Demo** or **Dedrone-Demo-5GHz**.
Password: **Dedrone-Demo**

Tip: For a most solid connection we recommend the LAN connection. If a Wi-Fi connection is needed, the 5GHz Wi-Fi is recommended for a more solid connection.

d. Connect the network socket to the socket at the Event Kit. For an environmentally sealed connection use a patch cable (not included) with the environmentally sealed connector (see 4.4 Cable Requirements and Preparation (Crimp), page 14).



6

Start your browser.
For optimal use, we recommend Chrome or Firefox.

7

Enter the IP: **10.42.87.102** or **192.168.0.102**

✔ The web interface appears.

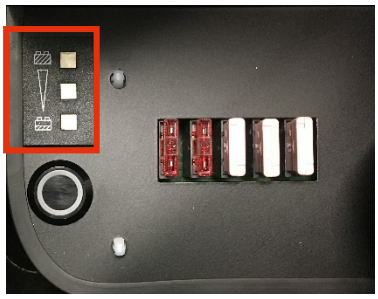
8

Enter your login data. The default login credentials are:
User: **admin** Password: **dedrone**

For further information consult chapter “First Steps” of the integrated online help in the DT Control Center.

5 Charge Tec Case

The charge of battery is shown at the battery display inside the Tec Case. Turn on the main switch, to see the charge of battery.



- **Green**: Ready/standby
- **Orange**: low state of charge, full functionality is not guaranteed → **charge the battery**
- **Red**: Battery is empty, shut down in next seconds. → **charge the battery**

Procedure:

1	If possible, shut down sensors and Tec Case (see 6 Shut Down Sensor and Tec Case, page 18).
2	Connect the battery charger to the socket and tighten the screw.
3	Connect the battery charger to the power supply.
4	Check that the main switch inside the Tec Case illuminates blue. ✔ The LED at the charger shows the charging state: Orange: boost charge, battery level < 90 % Yellow: top-up charge, battery level 90 % - 100 % Green: float charge, battery level 100 %, charger in standby ✔ The battery is charging. ⊗ The main switch is not illuminated? 🔧 Check the screw connection at the Tec Case and tighten firmly.

6 Shut Down Sensor and Tec Case

NOTICE **Multi Sensor or RF-100 breaks**

By disconnecting the cable or shut down the Tec Case without shut down the sensor, the sensor could break.

- Always shut down the sensor in the DT Control Center **before** disconnecting the cable or shut down the Tec Case.

Procedure:

1	Connect to the DT Control Center.
2	Choose menu **OPTIONS > Site Configuration**.
3	For each connected Multi Sensor and RF-100, right-click on the sensor symbol and choose **System > Shutdown Hardware**. ✔ In the header the message **Network error, reconnecting...** is shown. ✔ The light of the blue button at the Multi Sensor or RF-100 turns off.
4	Push the blue button at the outside of the Tec Case. ✔ The light of the blue button at the Tec Case turns off and the Tec Case is off.
5	Disconnect all cables from the Tec Case and the sensors.
6	Push the blue button inside the Tec Case. ✔ The battery display in the Tec Case turns off and the Tec Case is shut down.

7 Update

7.1 Update a Dedrone Sensor with the Tec Case

Requirements:

- ☐ Existing internet connection
- ☐ Login ingredients for the DT Control Center
- ☐ Configured Dedrone Account
- ☐ Additional patch cable; for a weather resistant connection, the patch cable has to be prepared (see 4.4 Cable Requirements and Preparation (Crimp), page 14)

Procedure:

NOTICE **Multi Sensor destroyed by losing power supply during update!**

The update process must be passed without any power interruptions. In case of power lost during the process, the Multi Sensor gets destroyed.

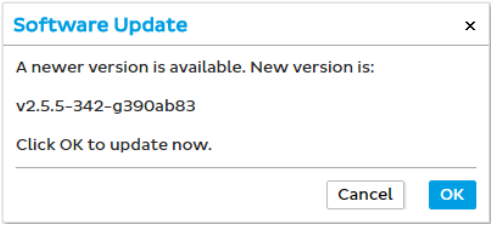
- Update the Multi Sensor only with a fully charged battery or connected battery charger.

1 Set up the Event Kit (see 4.3 Set Up autonomously, page 12 or 4.5 Set Up with LAN Connection, page 15) and connect to the DT Control Center.

2 Choose menu **OPTIONS** > **Software Version**.

3 Choose [**Check for Updates**].

✔ The window **Software Update** appears, where you can download the newest version or get the message, that your version is up-to-date.



4 To start the update, choose [**OK**].

✔ The update is starting in the background.

✔ The window **Software Update** appears.

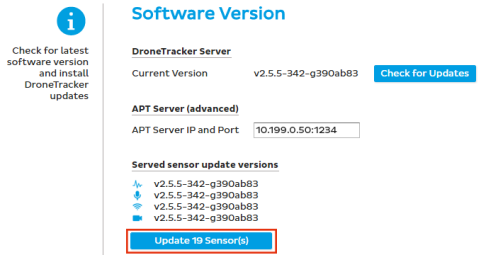
5 Confirm with **[OK]**.

✔ If the new software version is shown at **Current Version**, the download and software installation was successful.

✔ The button [**Update x Sensor(s)**] appears.

6 Choose [**Update x Sensor(s)**].

✔ The button is getting grey and the sensors are getting updated in the background. During the update, the sensors are getting disconnected and reconnected. Some short System Messages show connection process.



7.2 Update DroneDNA with the Tec Case

Requirements:

- ☐ Existing internet connection
- ☐ Login ingredients for the DT Control Center
- ☐ Configured Dedrone Cloud
- ☐ Installed latest software version for the sensors
- ☐ Additional patch cable; for a weather resistant connection, the patch cable has to be prepared (see 4.4 Cable Requirements and Preparation (Crimp), page 14)

Procedure:

NOTICE **Multi Sensor destroyed by losing power supply during update!**

The update process must be passed without any power interruptions. In case of power lost during the process, the Multi Sensor gets destroyed.

- Update the Multi Sensor only with a fully charged battery or connected battery charger.

1 Set up the Event Kit (see 4.3 Set Up autonomously, page 12 or 4.5 Set Up with LAN Connection, page 15) and connect to the DT Control Center.

2 Choose **OPTIONS > DroneDNA**, choose [**Check for Updates**] and confirm the download. The download can take some time, depending on your internet connection.

✔ The download is complete, if the newest version is shown in menu **DroneDNA** and the button [**Update x Sensor(s)**] appear.

3 Choose [**Update x Sensor(s)**].

8 Troubleshooting

8.1 Tec Case is beeping?

The Tec Case is equipped with a temperature sensor.

In case, the temperature inside the Tec Case gets over 149 °F (65 °C), the Tec Case begins to beep and the Tec Case switches off.

🔧 Cool down the inside of the Tec Case, for example by open the lid or providing shadow. The beeping stops, when the temperature gets under 149 °F (65 °C).

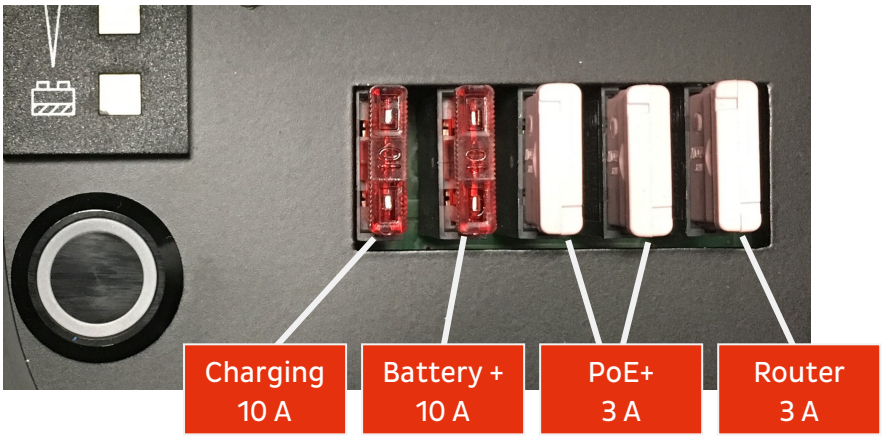
8.2 Single Components don't work?

Each component is protected by a single fuse.

In case of a short circuit or an overload, the fuse could trip.
This could cause by:

- Water
- Damaged cable
- Wrong connected device (max 24 W (typ) at PoE+)

🔧 Check and change the tripped fuse.



9 Technical Data

9.1 Tec Case

L x W x H	27“ x 20.8“ x 14.41“ (687 mm x 528 mm x 366 mm)
Weight	81.6 lb (31 kg) exclusive Multi Sensor and DT RF Sensor
Ingress Protection Rating	IP54*
Operating Temperature	-4 °F to +104 °F (-20 °C to +40 °C)
Battery Type	Rugged lead acid battery (36 Ah) -> no dangerous goods
Battery-Operating Time	Up to 12 hours with 2 PoE+ units
Battery-Charging Time	Approx. 5.5 hours
Power Supply	Active PoE+ (IEEE802.3at)
Connections	Battery-charging-connection, Router ADSL / UP connector, PoE+ connector 1, PoE+ connector 2, PC / Notebook connector, Wi-Fi (2.4 GHz and 5.0 GHz)
Switches	Start-Button (outside the case) Transportation main switch (inside the case)

* Battery charger: IP41

9.2 RF-100

L x W x H	7.7" x 3.7" x 17.3" (195 mm x 95 mm x 440 mm) Height without antenna: 9.8" (250 mm)
Operating Temperature	-4 °F to +122 °F (-20 °C to +50 °C)
Weight	6.8 lb (3.1 kg)
Ingress Protection Rating	IP64
Connectivity	Fast-Ethernet (100 Mbit/s)
Power Supply	Active PoE+ (802.3at)
Power Consumption	15 W (typ.)
Range	3,280 ft (1 km) in good conditions up to 1.24 mi (2 km)
Radio Frequency	Omnidirectional passive detecting and classification

9.3 Multi Sensor

L x W x H	17.3“ x 17.3“ x 6.46“(440 mm x 440 mm x 164 mm)
Operating Temperature	-4 °F to +104 °F (-20 °C to +40 °C)
Weight	8.4 lb (3.8 kg)
Ingress Protection Rating	IP54
Range	Up to 1 640 ft (500 m)
Internal Memory	256 GB
Connectivity	Fast-Ethernet (100 Mbit/s)
Power Supply	Active PoE+ (802.3at)
Power Consumption	20 W (typ.)
Audio	Stereo Audio (Audible Sonic & Ultrasonic, Spectrum 0 – 96 kHz)
Video	1080p HD Camera (11°, 22.5°, 60° or 85°)
Infrared*	Near Infrared HD Camera
Wi-Fi	Omnidirectional Scanning (2.4 GHz ISM band)
Mounting with Back Plate	VESA 75, VESA 100, 48x60, 130x130

*optional

DRONE DETECTION TECHNOLOGY

Dedrone

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