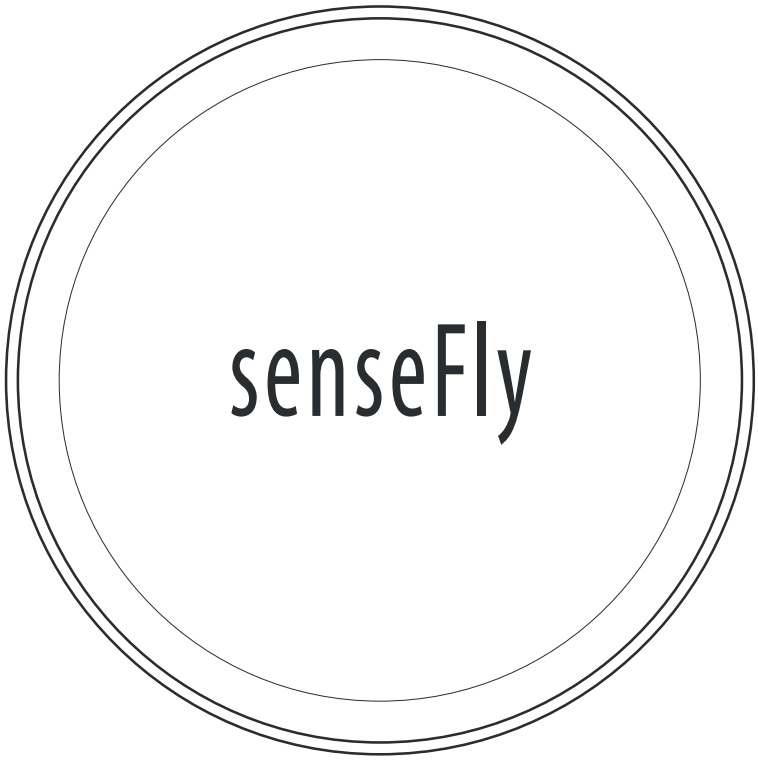
GeoBase User Manual

Revision 1.7 / December 2021



senseFly
AN AGEAGLE COMPANY

GENERAL INFORMATION

READ ALL USER MANUALS CAREFULLY BEFORE USING A SENSEFLY PRODUCT.

USER MANUALS ARE AVAILABLE ON MY.SENSEFLY WEBSITE.

senseFly products (the "Product(s)") are intended for professional use only.

Always comply with Civil Aviation regulations and other applicable laws, act responsibly and follow the instructions in your Product User Manuals.

Regulations

ALL USE OF THE PRODUCT INCLUDING, BUT NOT LIMITED TO, THE USE CONFORM TO THE APPLICABLE LAW OF THE COUNTRY IN WHICH THE PRODUCT IS OPERATED, IS UNDER THE CLIENT'S SOLE RESPONSIBILITY.

Limited warranty

senseFly (the "Supplier") provides a one-year warranty for the delivered **GeoBase** device, cables and other accessories, free from defects in materials and workmanship, from the date of shipping by senseFly to the original client.

The warranty does not cover:

- Defects due to accidents, abuse, misuse, carelessness, negligence, abnormal use or any other non-recommended use.
- Defects due to environmental conditions that do not conform to the **GeoBase**'s specifications.
- Defects due to improper installation or operating procedures.
- Defects due to modifications, alterations, or changes not made in accordance with the **GeoBase**'s User Manual and other technical documentation or directly authorised by senseFly.
- Normal wear and tear use.
- Shipping damage.
- Third party software included with the **GeoBase**.

Please note that the warranty is void if the **GeoBase** has been tampered with or opened.

During the Warranty Period, should the **GeoBase**, in the Supplier's sole opinion, malfunction due to any defect in material and/or workmanship, the Client's sole remedy and the Supplier's sole liability shall be, at Supplier's option, to either repair or replace the malfunctioning **GeoBase** with a similar product at no charge, or if repair or replacement is not possible, issue a credit note; provided that the malfunctioning **GeoBase** is returned in accordance with the support and repair form together with all required information, with proof of purchase in the form of the Client's original copy of the sales receipt, within the applicable Warranty Period.

Battery cells are excluded from warranty after first use.

The Client shall make available to the Supplier, at the Supplier's request, all data regarding this and any related Products' flight and maintenance parameters. The Client further agrees and acknowledges that the Supplier is entitled, at any time, to access, analyse and use all data available on the Client's Account regarding the flight and maintenance parameters. If such data are not available for a reason over which the Supplier has no control or responsibility, including but not limited to an external service provider issue, network fault or power failure, the Supplier is under no obligation to provide the Limited Warranty coverage until such data is made available.

It is the Client's responsibility to check that the **GeoBase** is compliant with applicable requirements under local laws and regulations. Additional maintenance may be required by international or governmental authorities and the Client should make any and all necessary checks before operating the **GeoBase**.

There are no express or implied warranties, representations or conditions other than those stated in this Limited Warranty. This Limited Warranty is made in lieu of all other warranties, representations or conditions, whether expressed or implied, including without limitation, merchantability or fitness for a specific purpose.

The remedy set forth herein shall be the sole, exclusive remedy with respect to the **GeoBase**.

Limitation of liability

UNDER NO CIRCUMSTANCES WILL THE SUPPLIER BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES (EVEN IF THE SUPPLIER IS NOTIFIED OF THE POSSIBILITY OF SUCH DAMAGES) INCLUDING, BUT NOT LIMITED TO, ANY CRASH OR DAMAGES CAUSED BY THE CLIENT OR A THIRD PARTY WHILE OPERATING OR USING THE PRODUCT(S) (INCLUDING SIMULTANEOUS FLIGHTS OF PRODUCTS USING A SINGLE INSTANCE OF THE SOFTWARE, ENCRYPTION MODE) AND ANY DAMAGES CAUSED BY FAILURE OF THE AUTOPILOT, ELECTRONICS OR SOFTWARE (EVEN IF CAUSED BY A MALFUNCTION OF THE PRODUCT, AUTOPILOT, ELECTRONICS OR SOFTWARE), ANY LOSS OF REVENUE, LOSS OF PROFIT, OR LOSS OF DATA WHETHER BASED UPON ANY ALLEGED BREACH OF WARRANTY, REPRESENTATION OR CONDITION, CONTRACT, OR ANY OTHER CONDUCT INCLUDING NEGLIGENCE (INTENTIONAL OR OTHERWISE), GIVING RISE TO SUCH CLAIM. THE CLIENT SHALL NOT OPERATE THE PRODUCT(S) IN AREAS OR UNDER CIRCUMSTANCES WHERE A FAILURE COULD CAUSE DAMAGES AND/OR HARM TO PEOPLE, PROPERTY AND/OR ANIMALS.

Intellectual property rights

senseFly Products and software are protected by intellectual property rights. senseFly is the proprietor and legal and beneficial owner and/or the authorised licensee of any intellectual property rights within the Products, and senseFly is entitled to the benefit of all applications made for the grant of senseFly Intellectual Property Rights.

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Copyrights

senseFly reserves the right to make changes to the terms, specifications and product descriptions contained in this document at any time without notice. Please consult the my.senseFly website for the latest release.

Address

senseFly SA
Route de Genève 38
1033 Cheseaux-Lausanne
Switzerland

Website: http://www.sensefly.com

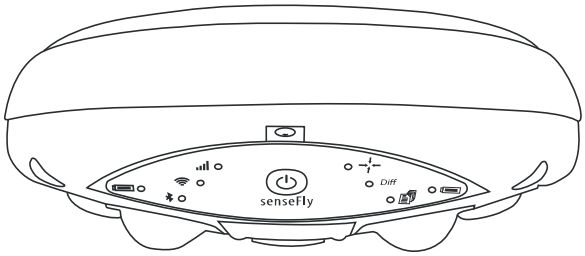
Technical support

senseFly and our resellers are dedicated to providing you with full professional product support. To submit a support ticket and/or view your outstanding tickets, please use our customer portal my.senseFly (http://my.senseFly.com). Log in with the same account details you used to download your drone's software (see the separate software information document in your ***eBee***'s case).

In addition to support access, my.senseFly includes:

- Details of all your senseFly drones, including their serial numbers.
- The Knowledge Base – packed full of helpful articles, tips, tutorials and webinars.
- Download links for the latest versions of our software.

Your GeoBase



Thank you for purchasing the **GeoBase**, a highly-capable base station preconfigured for use with **eMotion** and senseFly drones. The **GeoBase** features:

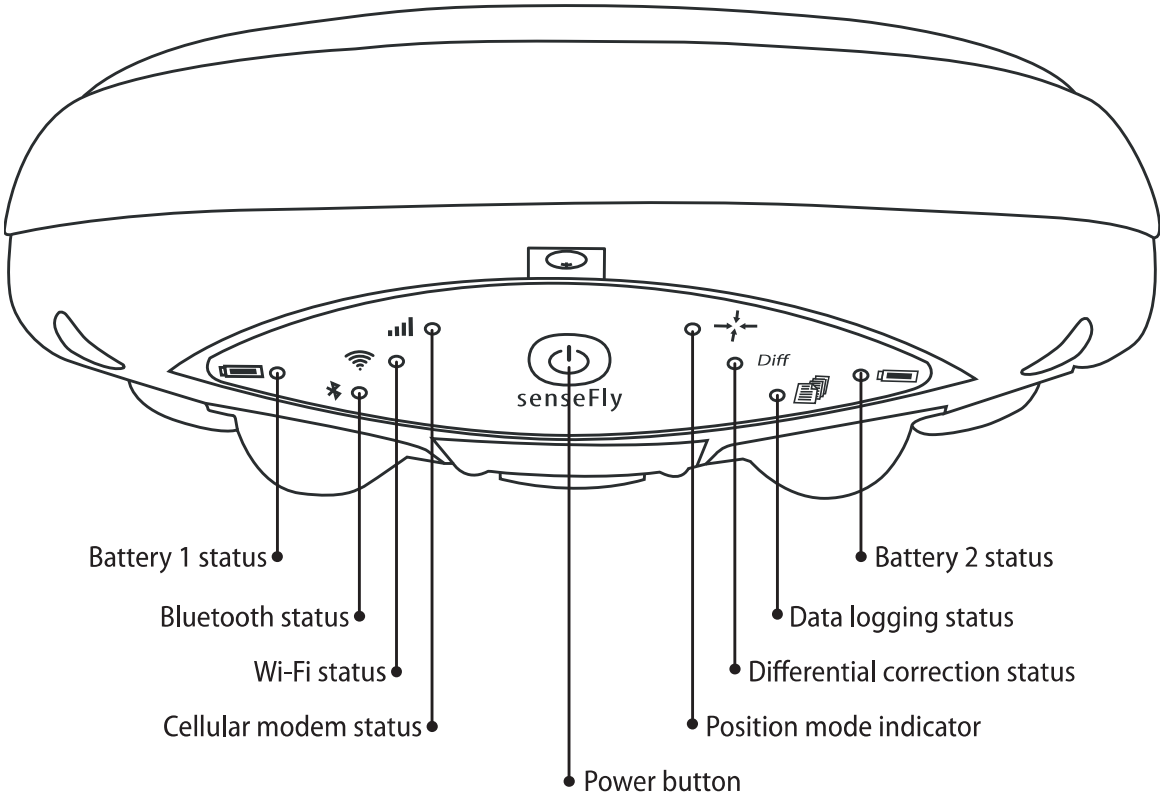
- Dual-frequency L1/L2 code/carrier tracking of GPS and GLONASS signals
- Integrated Bluetooth (2.1 + EDR/4.0)
- Hot-swappable batteries
- Receiver Autonomous Integrity Monitoring (RAIM) support
- Auto-detection of correction type
- APME+ multipath mitigation technology
- ION+ advanced ionospheric scintillation mitigation
- Track+ for robust tracking under weak signal conditions
- GLO+, ultra-precise GLONASS bias calibration

Contents

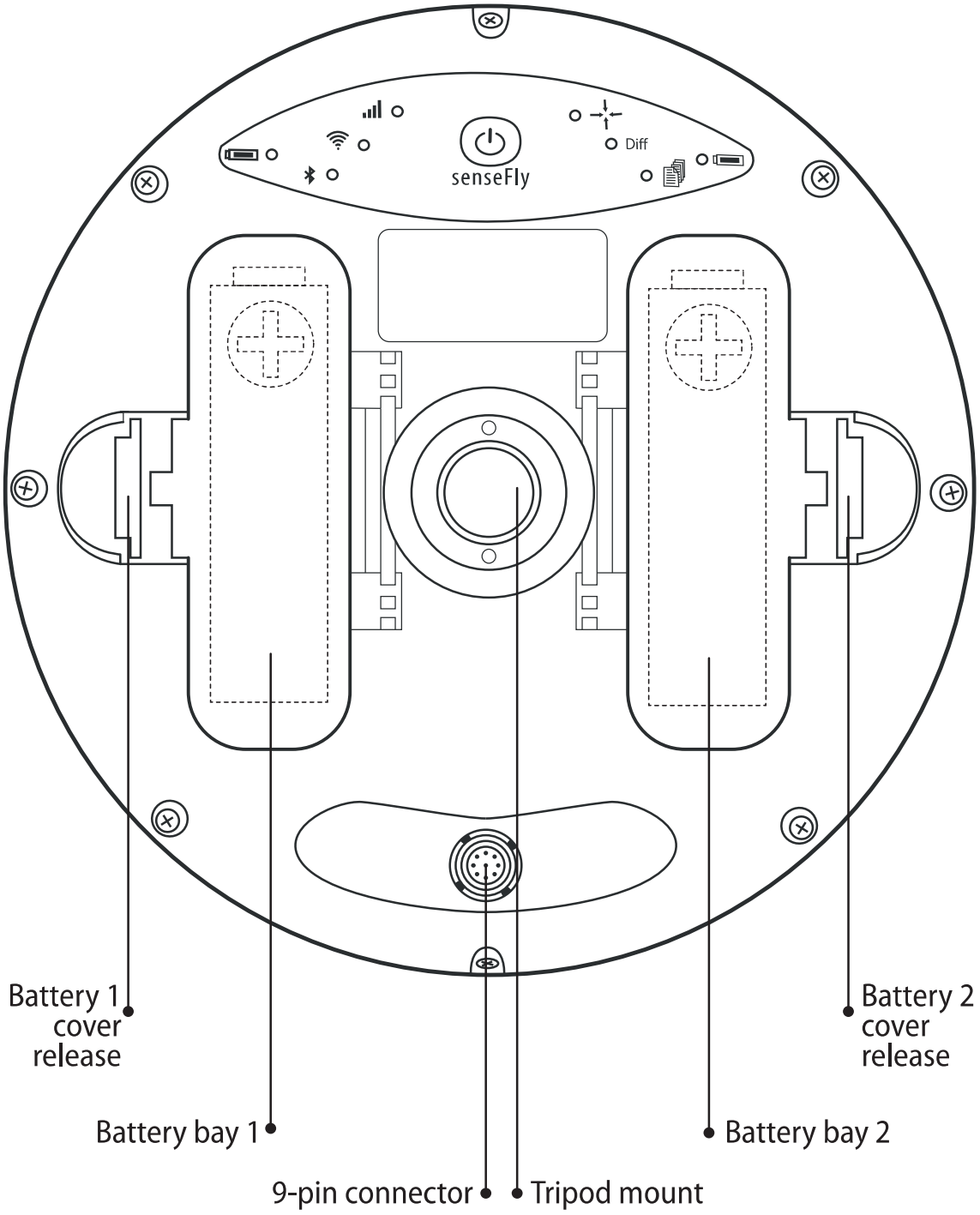
1 Package contents

- 1 x **GeoBase**
- 4 x Li-ion batteries
- 1 x Battery charger
- 1 x Battery charger mains power cable
- 1 x Battery charger car adapter cable
- 9-pin USB cable for base-computer communications

Hardware features



Front


senseFly
Diff
Battery 1 cover release
Battery bay 1
9-pin connector
Tripod mount
Battery bay 2
Battery 2 cover release

Bottom

- **Power button**
  Press to power the device on or off. See *Using the power button* on page 21.
- **Battery bay**
  Holds the **GeoBase**'s battery.
- **Battery cover release**
  Push towards the battery to open the cover.
- **9-pin connector**
  Use to connect the **GeoBase** to your computer or to charge the batteries.
- **Tripod mount**
  Use to mount the **GeoBase** on a tripod with 16 mm (5/8 inch) thread.

LEDs


See *Understanding the battery status LED* on page 25


See *Understanding the Bluetooth status LED* on page 26


If the LED is on, Wi-Fi is enabled


See *Understanding the cellular modem status LED* on page 26


See *Understanding the position mode indicator LED* on page 27

Diff
See *Understanding the differential correction LED* on page 27


See *Understanding the data logging status LED* on page 27

2 Safety precautions

- **Be careful**
  Be aware of any warnings notices in the environment you will work in and follow their advice. Before working on any equipment, be aware of the hazards involved with electrical circuitry and familiarise yourself with standard practices for preventing accidents.

- **Only used approved power supplies**
  Only use the power adapters provided with the **GeoBase** in the way described in this user manual.

- **Keep your GeoBase cool** Never place the equipment or its batteries in an environment where the specified maximum storage temperature can be exceeded.

- **Take care of your GeoBase**
  Only clean the outside of the device with a clean, lightly dampened cloth. Do not use any cleaning liquids containing alcohol, methylated spirit, ammonia etc.

- **Never leave a powered battery charger unattended**
  If the battery or the charger behaves unexpectedly during charging (for example, overheating, smoking, melting, leaking, a suspicious smell or noise etc) immediately disconnect the mains and store the battery and charger in a safe location.

- **Inspect your batteries and the charger before using**
  Inspect the batteries and charger regularly for damage to, or corrosion of the cable, plug, enclosure or other parts. Do not use a battery if the plastic cover has been torn or compromised in any way. Never charge a swollen battery, one that is leaking,

- **Only charge GeoBase batteries**
  Only charge approved **GeoBase** batteries with the device's charger. Do not attempt to charge any other batteries with the **GeoBase**'s charger.

- **Place the charger on a flat, heat-resistant, non-flammable, insulating surface**
  Do not charge batteries near flammable materials or on an flammable or conducting surface, for example, do not charge on carpet, a car seat, wooden flooring or wooden furniture.

- **Take care of your device's charger and batteries**
  Do not expose batteries or chargers to excessive physical shock such as impact, intense vibration or crushing force. Do not place any heavy objects on the batteries or on the charger and avoid dropping them. Keep the charger away from dust and high temperatures and void leaving it directly exposed to the sun.

- **Do not force a battery to charge**
  If any of your batteries have been overly discharged the battery may be irreversibly damaged and dangerous to charge. Do not attempt to charge an over-discharged battery.

- **Keep the batteries and charger out of the reach of children**

- **Keep the GeoBase, batteries and charger away from liquids**
  Do not allow them to come into contact with any kind of liquid. Do not leave them out in the rain or near a source of moisture.

- **Do not attempt to dismantle or repair the device**
  The **GeoBase** has no user-serviceable parts.

- **Keep the charger away from flammable substances**
  Keep the **GeoBase**'s charger away from flammable liquids, gases, vapours and materials.

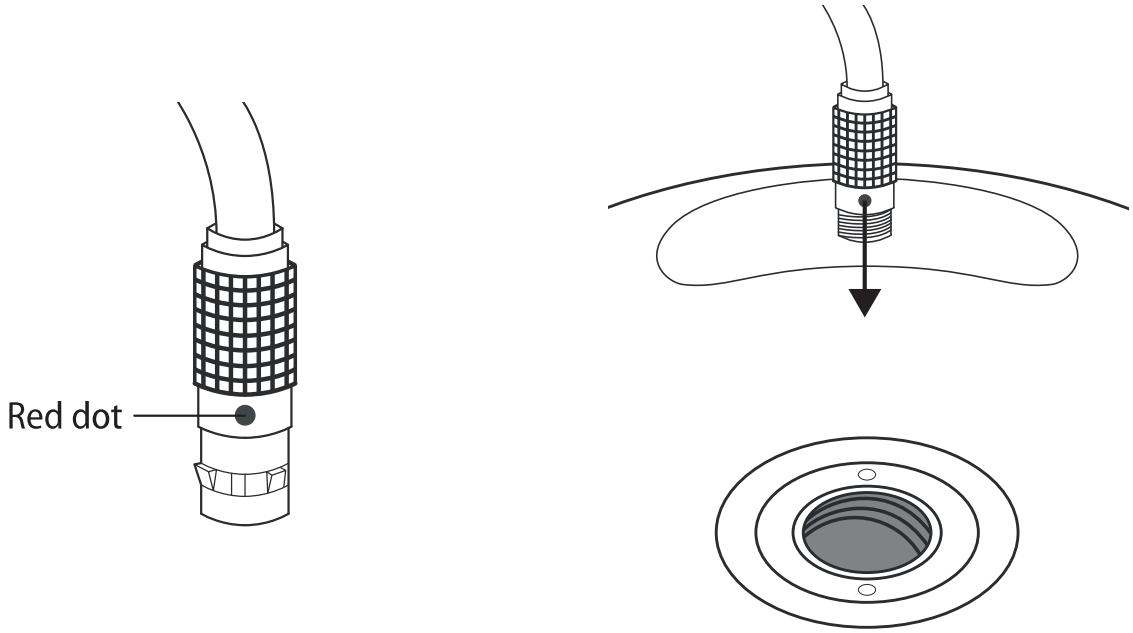
- **Remove batteries after charging/discharging**
  Once complete, unplug or remove the batteries from the charger.

- **Always install the batteries in the GeoBase and charger correctly**

- **Take care when handling the charger**
  It may become hot during use.

- **Comply with regulations**
  Refer to the local regulations when shipping or travelling with batteries.

3 Connecting the 9-pin connector



1. Always plug in the 9-pin plug with its red dot towards the centre of the **GeoBase**.
2. Push the 9-pin plug firmly into the socket until the locking mechanism clicks it into place.

4 Charging the GeoBase's batteries

Important

The **GeoBase** uses Li-Ion batteries. Unlike the drone's Li-Po batteries, Li-Ion batteries will last longer if you regularly allow them to discharge completely and then recharge them back to 100%.

Note:
Empty batteries may take three to four hours to charge.

4.1 How to charge the batteries using the charger

1. Connect the charger to either a mains power supply or a car adapter using the cable provided.
2. Install a battery into the charger, making sure that it is the right way around.

For more information on using the **GeoBase**'s battery charger, you can find the full user manual in our Knowledge Base:

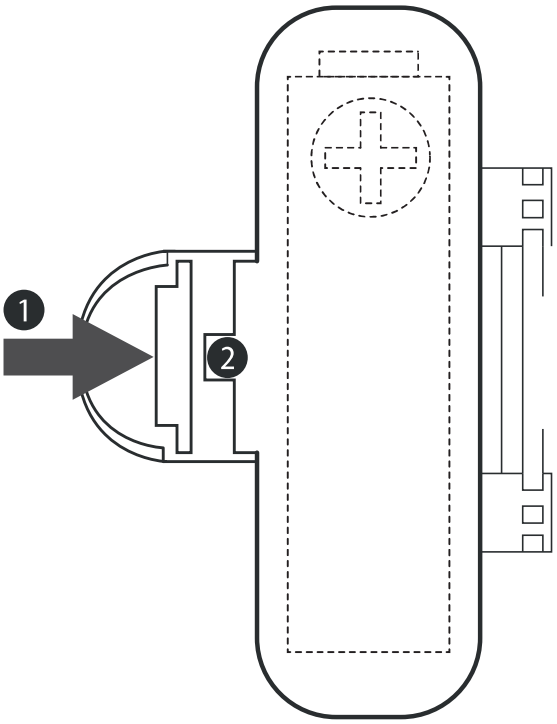
https://sensefly.zendesk.com/hc/en-us/articles/115003179014

4.2 Charging the batteries using the GeoBase

Do not try and charge the batteries by installing them in the **GeoBase** and connecting it to a USB charger using the 9-pin USB cable. Use the battery charger provided.

5 Using the GeoBase

5.1 How to install the batteries in the GeoBase



1. Push the battery cover release towards the battery (❶) and open the cover.
2. Insert the battery, making sure that it is the right way around.
3. Close the battery cover and press down on the latch (❷) until you clearly hear it click.

Install both batteries in the same direction, with the positive terminal towards the front panel (see diagram on page 13).

Note: Hot battery swapping is possible. You can replace one battery at any time without powering off the device. See *Hot swapping the batteries* on page 25.

5.2 How to power the GeoBase on and off

To power the device on, short press the power button.

It takes about 20 seconds for the **GeoBase** to start up. Do not press the power button again during this period. While starting up, the front-panel LEDs do not indicate the true status of the device.

To power the device off, long press the power button for 2 s (until all the LEDs shine). Do not press it for any longer.

5.3 Using the power button

Use the power button to:

Operation	Button press
Power the device on	Short press
Power the device off	Long press for 2 s

Although possible, do not use the power button to:

Operation	Button press	With device:	Result
Hard reset	Long press for 4 s	Off	Device stops working[2]
Logging on/off	Short press	On	Loss of logs/sbf files
Wi-Fi on/off	Double press	On	Wi-Fi drains battery

[2] if you do this by mistake, contact your support provider

If you have carried out one of these operations by mistake, please contact support[3].

5.4 How to install the drivers

To use the **GeoBase** connected to your computer with the 9-pin USB cable (if they have not already been installed by **eMotion**):

1. Make sure your computer has a working connection to the internet.
2. Launch a File Explorer on your computer and click This PC.
3. Connect the **GeoBase** to a USB port of your computer using the 9-pin USB cable.
4. After a few seconds, a new Geobase Drivers drive will appear in the Windows File Explorer. Some messages may also appear, indicating that drivers are being installed. You can safely ignore these messages.
5. In the new Geobase Drivers drive, open driver folder.
6. Right-click the executable file you find in the driver folder and choose Run as administrator.
7. When a message appears asking you to, disconnect then reconnect your **GeoBase**'s 9-pin USB cable.

5.5 About the device's Wi-Fi connection

The **GeoBase**'s Wi-Fi connection is only for use by senseFly support.

To save battery power, keep Wi-Fi switched off (see *Using the power button* on the previous page).

[3] see *Reporting a problem with your **GeoBase*** on page 29

5.6 Using the GeoBase with eMotion

The **GeoBase** starts logging as soon as you power it on.

You can use the **GeoBase**:

- Connected to **eMotion** and providing in-flight RTK corrections **eMotion** has been preconfigured with the **GeoBase**'s parameters. **eMotion** will find the logs automatically.
- Standalone, then use PPK corrections after the flight. You must find the logs yourself.

5.7 How to connect the GeoBase to your computer using Bluetooth

Caution:
Install the latest version of **eMotion** before doing this.

To connect your **GeoBase** to a computer running Windows 10:

1. Turn your computer's Bluetooth on if it isn't on already. To do this, choose Bluetooth from the Action Center on the Windows taskbar.
2. In the Action Center, click Connect.
3. The **GeoBase** will appear as if it was a PC for a few seconds while your computer waits for the device to provide its name. Wait until the text **GeoBase** appears.
4. Click **GeoBase**.
5. When asked to, enter the passcode 1234.

5.8 How to use the GeoBase with it connected to eMotion (RTK)

1. Pair the computer that is running **eMotion** with the **GeoBase** using Bluetooth.

2. Launch **eMotion**, power up and connect to your drone and create or open a mission (see your drone and **eMotion** user manuals for instructions).

3. Choose **GeoBase** from the Choose RTK Source pulldown menu on **eMotion**'s left-hand, Mission panel's RTK/PPK tab.

4. Set the base's position, if needed and click Open base-drone datastream.

Note: The first time you use it, Bluetooth pairing may take several minutes.

5.9 How to use the GeoBase standalone (PPK)

1. Power on the **GeoBase**.

2. Fly your drone and use **eMotion**'s Flight Data Manager to treat your flight data[4].

3. Connect the **GeoBase** to a USB port of your computer using the 9-pin USB cable. Your **GeoBase** will appear as a new drive.

4. In the Flight Data Manager's RTK/PPK step, choose PPK.

5. Click Browse, browse to the new drive and select the log file (.sbf) that corresponds to your flight.

6. Complete the steps in the Flight Data Manager.

[4] see your **eMotion** user manual

5.10 Understanding the battery status LED

The LED colour indicates the battery charge level. **When a battery is not in use, its LED blinks**.

LED	Battery in use?	Charge level
Off	No	No battery
Solid Green	Yes	More than 20% charge remaining
Solid Orange	Yes	Less than 20% charge remaining
Solid Red	Yes	Less than 5% charge remaining
Blinking green	No	More than 20% charge remaining
Blinking orange	No	Less than 20% charge remaining
Blinking red	No	Less than 5% charge remaining

Caution: If you remove a battery that's in use, the **GeoBase** will restart.

5.11 Hot swapping the batteries

If you have both batteries installed in the **GeoBase** you can replace the battery that is not in use without interrupting the **GeoBase**'s operation, that is, you can hot swap that battery.

5.12 How to hot swap a battery

1. Identify the battery that is not in use. It's LED will be blinking.
2. Open that battery's battery cover and remove the battery.
3. Install a fresh battery and close the battery cover.

5.13 Understanding the Bluetooth status LED

LED	Meaning
Off	Bluetooth radio is off
On/Blinking	Bluetooth enabled

Note: The **GeoBase** is supplied with Bluetooth enabled. If you need to disable it, contact your support provider.

5.14 Understanding the Wi-Fi status LED

LED	Meaning
Off	Wi-Fi radio is off
On	Wi-Fi radio is on

Note: The **GeoBase**'s Wi-Fi connection is only for use by senseFly support.

5.15 Understanding the cellular modem status LED

LED	Meaning
Off	Not in use
Orange	Connecting
Green	Connected
Red	Connection error

5.16 Understanding the position mode indicator LED

LED	Status
Red	Standalone—position established
Orange	Position established but not RTK fixed or standalone
Off	Position cannot be established

5.17 Understanding the differential correction LED

LED	Status
Green	Differential corrections are being received
Red	Differential corrections are not being received

5.18 Understanding the data logging status LED

LED	Status
Off	Logging is disabled
On (green)	Logging is enabled

5.19 About the GeoBase's logs

The **GeoBase** does not log RINEX; its logs are in a proprietary format (.sbf).

You can find its logs in the geobase folder within **eMotion**'s data folder[5].

If you process your **GeoBase**'s logs using **eMotion**'s Flight Data Manager, you do not need to convert them to RINEX.

You can choose how your logs are organised into folders in the Geobase panel within **eMotion**'s ⚙ Options function tab[5].

5.20 How to obtain your base station logs in RINEX format

1. Browse to the geobase folder within **eMotion**'s data folder and launch the SBF to RINEX converter.
2. Click Browse and locate the logs you want to convert (the Input).
3. Browse to or enter the location you want to save the RINEX Output.
4. Click Process.

5.21 Using the GeoBase as a rover

senseFly supplies the **GeoBase** configured for use only as a base station (the drone acts as the rover). If you want to use the **GeoBase** as a rover, this capability will need to be activated. Contact your support provider for instructions.

5.22 About the GeoBase's hard reset

Only carry out a hard reset if asked to by your support provider.

To carry out a hard reset, power the **GeoBase** off then long press the power button for 4 s.

[5] see your **eMotion** user manual

5.23 Installing USB Drivers

The **GeoBase**'s USB drivers are installed when you install **eMotion**.

5.24 Reporting a problem with your GeoBase

If there is a problem with your **GeoBase** we recommend the following actions:

1. If there is an error message displayed in **eMotion**, begin by checking your **eMotion** user manual to see if there is a solution to the particular message.
2. Check our Knowledge Base, part of my.senseFly[6], to see if there is a solution to your problem.
3. If you have still not found a solution, contact your support provider. Please include the following information with your inquiry:
    - The serial number of your drone, in the format EB-XX-XXX. You can find this number inside the battery enclosure. Please include this serial number in the subject line of your message.
    - A short description of the problem.
    - The Drone Flight Log file (.bbx) of the flight that had a problem[7].
    - The eMotion Flight Log (.efl) file of the flight that had a problem. You can find this file in the `eMotion/logs/` directory which is created in `My Documents` on Windows.
    - Photos or video of the **GeoBase**, if required.

Note: In order to provide support, senseFly may request the flight log files for inspection.

[6] http://my.sensefly.com
[7] see your **eMotion** user manual for instructions on retrieving this file from the ***eBee***

6 Specifications

Mount	Standard survey 5/8 in (16 mm) thread
Receiver	132 Channel GPS + GLONASS + SBAS
Cellular modem	3.5G Quad-Band GSM/GPRS/EDGE + HSPA
Wi-Fi	802.11 b/g/n
Bluetooth	2.1 + EDR/4.0
Batteries	2x 3.6 V/3400 mAh/12 Wh
Memory	8 GB

GNSS Specifications

Channels	132
Positioning modes	L1/L2/L2C GPS, GLONASS and SBAS
	RTK, SBAS, DGPS and Standalone

Precision

	Horizontal	Vertical
Standalone	1.2 m	1.9 m
SBAS (WAAS, EGNOS, MSAS)	0.6 m	0.8 m
DGPS	0.4 m	0.9 m
RTK (Fixed)	0.6 cm + 0.5 ppm	1 cm + 1 ppm

Notices

The original manufacturer of this device attests to the following compliance statements.

The **GeoBase** receiver carries the CE mark and as such is compliant with the 2004/108/EC-EMC Directive and amendments, 2006/95/EC-Low Voltage Directive, both amended by the CE marking directive 93/68/EC.

With regards to EMC, this device is declared as class B, suitable for residential or business environment.

This device meets the EU requirements (1999/519/EC) and the International Commission on Non-Ionizing Radiation Protection (ICNIRP) on the limitation of exposure of the general public to electromagnetic fields by way of health protection. To comply with the RF exposure requirements, this equipment must be operated in a minimum of 20 cm separation distance to the user.

The **GeoBase** complies with European Union (EU) Directive 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS Directive).

The **GeoBase** complies with the European Union (EU) Directive 2002/96/EC on waste electrical and electronic equipment (WEEE). The purpose of this Directive is the prevention of waste electrical and electronic equipment (WEEE), and in addition, the reuse, recycling and other forms of recovery of such wastes so as to reduce the disposal of waste. If purchased in the European Union, please return the receiver at the end of its life to the supplier from which it was purchased.

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

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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:

1. Reorient or relocate the receiving antenna
2. Increase the separation between the equipment and the receiver
3. Connect the equipment into a an outlet on a circuit different from that to which the receiver is connected

4. Consult the dealer or an experienced radio/TV technician for help

FCC RF exposure compliance

This equipment complies with radio frequency (RF) exposure limits adopted by the Federal Communications Commission for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator and your body.

IC **RSS-Gen 7.1.3**

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions:

1. this device may not cause interference, and

2. this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

1. l'appareil ne doit pas produire de brouillage, et

2. l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

IC RF exposure compliance (MPE)

This equipment complies with IC RSS-102 RF exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator and your body.

Déclaration d'exposition aux radiations

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

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http://my.sensefly.com