FLUXPOSE

BETA DRAFT

FLUXPOSE

Beacon 4.1 HW integration guide

10/06/2025 Ver 1.1

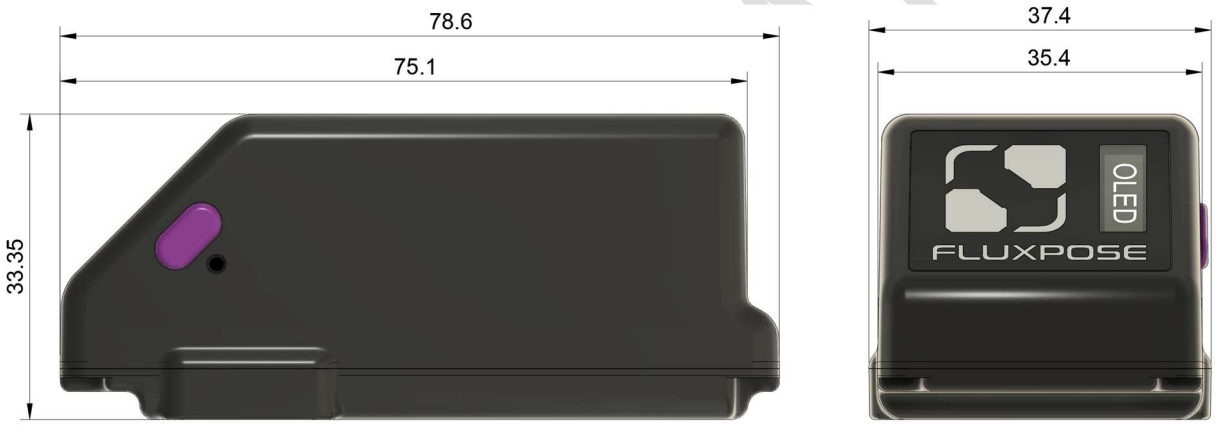
Contents

This document presents the hardware design considerations to repair, mod, integrate and develop accessories for the FluxPose beacon. It presents information regarding the mechanical considerations, available 3D models, Keep out zones and repairing the device.

Beacon mechanical considerations

This section presents an overview of the dimensions, coordinate system, docking mechanism and published 3D models and resources.

Dimensions and weigh



Dimension: 78.6mm (L) x 37.4mm (W) x 33.35mm (H)

Weight: 75gr

Coordinate system

The output coordinate frame is a right-handed coordinate system that is located as follows:

The center of the coordinate system is located at bottom surface of the device, in the center of the circle described by the middle pin of the magnetic connector.
The X axis follows the line described by the centers of the magnetic connector pins towards the furthest side of the device. The Y axis also lies within the bottom plane of the device and points away from the side with the button. The Z axis points up, towards the LED and button.

This can be seen in the following image.

Mechanical design resources

Different 3d models are available to aid with designing mods, enclosures and accessories.

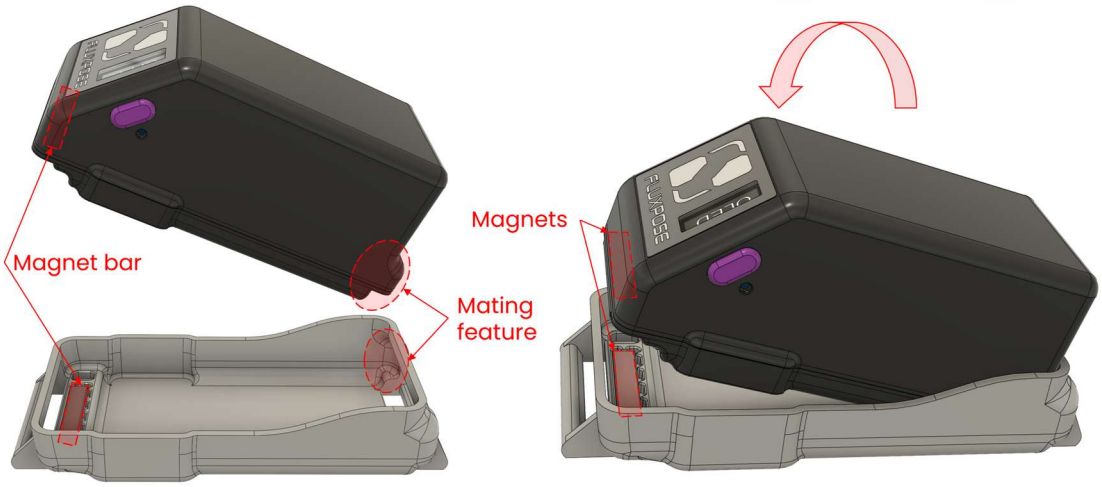
Tracker design resources:

1. **Tracker:** Our enclosure design
2. **Bounding geometry:** A simple 3D outline of our beacon. This model is present both without and with a tolerance of 0.2mm
3. **Bounding geometry strap:** The outline of the tracker that was used for the strap. It has a curved front and side sections that enable the tracker to pivot properly in objects like the strap. This model is present both without and with a tolerance of 0.2mm
4. **Strap:** The 3D model of the strap holder for the beacon.

Magnetic Docking mechanism

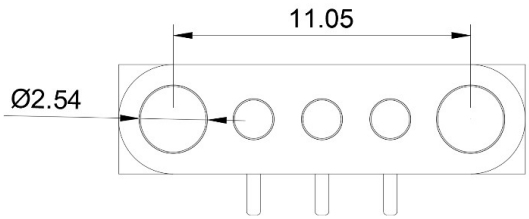
This section presents the official FluxPose strap design to illustrate the mechanisms utilized to secure the tracker in the strap.

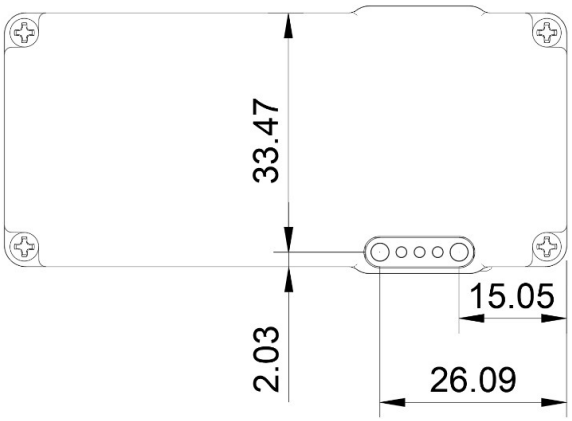
We use a magnetic docking mechanism that utilizes the feature on the back of the beacon as well as a large magnet to secure the beacon in the strap. This mating features ensures the initial movement while releasing the beacon is normal to the magnet while maximizing the moment arm of the magnet. The strap and the beacon utilize a 20x4x2mm N45 Nickel-plated NdFeB magnet.



Magnetic connector

The magnets present in the device are ⌀2.54mm (0.1 inch) and are separated 11.05mm. They are located 26.09mm and 15.05mm from the front of the device and 2.03mm from the side.





Keep out zones

When integrating the FluxPose beacon in some other system or accessory you should keep metallic objects away from certain areas of the device. Represented by the red sphere, metal close to the RF antenna is at risk of degrading the RF link performance. Additionally, metal in close proximity to the EMF antenna might also worsen tracking accuracy.

Radio frequency (RF)

To ensure a stable wireless connection between the FluxPose beacon and the FluxPose Hub or dongle, please keep as little extra material as possible within 3cm of the RF antenna.

It is quite important that you avoid using metallic materials inside the red sphere. It is also recommended to avoid covering this area with thick materials or putting it against the human body as that can also affect negatively the radio performance. (i.e. grabbing the tracker with two fingers right in the antenna location)

Magnetic tracking (EMF)

To ensure an accurate tracking performance, please keep metal outside of the green sphere. The general rule of thumb is that the farther you are from the center of the green sphere, the smaller the effect will be.

Metallic objects in close proximity will degrade the absolute accuracy of the tracking and performance of the fusion algorithm, but it won't change its precision (noise).

If you are designing hardware around the device or integrating it in your own system, we recommend keeping metallic components **as far as possible** from that area, even beyond the sphere. For example, you should use polymer screws when possible or choose the position of heatsinks or other from large chunks of highly conductive or ferromagnetic objects nearby so that they are farther from the tracker. If you need to use metallic objects, use low conductivity and non ferromagnetic metals.

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Reparability

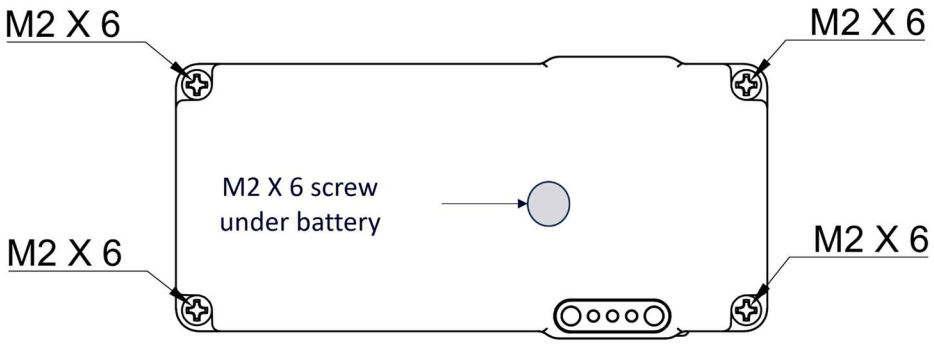
This section aims to aid in the opening and closing of the device as well as providing some guides for the most common repairs.

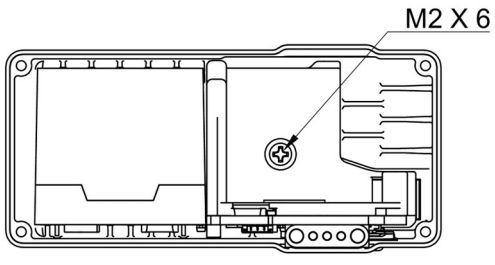
> ⚠ We recommend only opening the device when absolutely necessary or under supervision. Opening the tracker can change the calibration worsen tracking performance

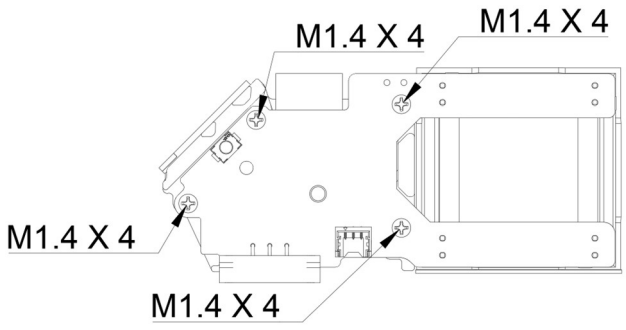
Opening and closing the device

Screws:

The beacon has 5x M2X6mm and 4x M1.4X4 304 steel plastic threading screws. These screws are located as follows. 4x M2X6mm are in the corners of the device to close the enclosure. An Additional M2X6mm is placed to secure the electronics and skeleton to the enclosure. Lastly four M1.4X4mm screws found in the back of the PCB secure the skeleton to the electronics PCB.





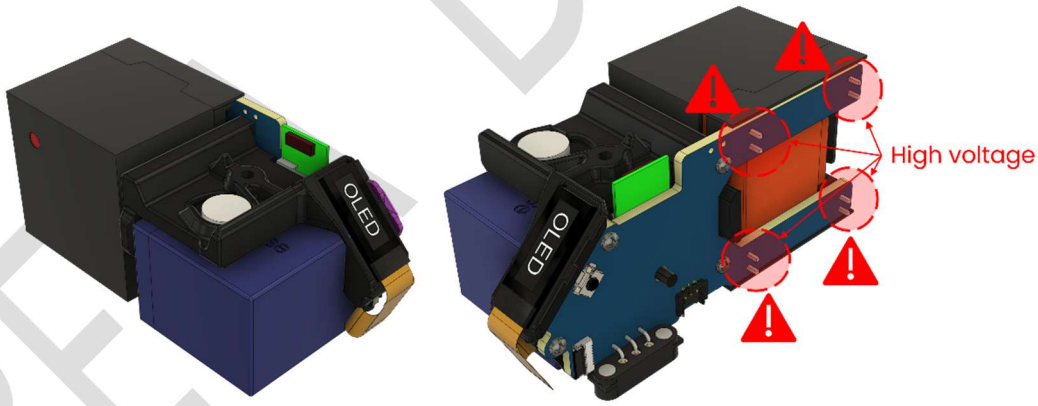


Opening the device

> ⚠ Before opening the device ensure its turned off and on a surface that wont accidentally press the button (and turn it on).

There are two steps to accesing the electronics. First you open the enclosure and extract the electronics subassembly. The electronics subassembly is a large subassembly consisting on the mainboard and a plastic piece that holds in place the vibration motor, OLED screen and prevents the battery from moving while in the enclosure. It is pictured below to aid in seeing what needs to be taken out of the enclosure in the next steps.

> ⚠ While the device operates there is a high voltage around the pads and capacitors in the areas marked in the following picture. Don't operate the device while open and avoid touching these areas. There isn't enough energy in the HV system to cause serious harm.

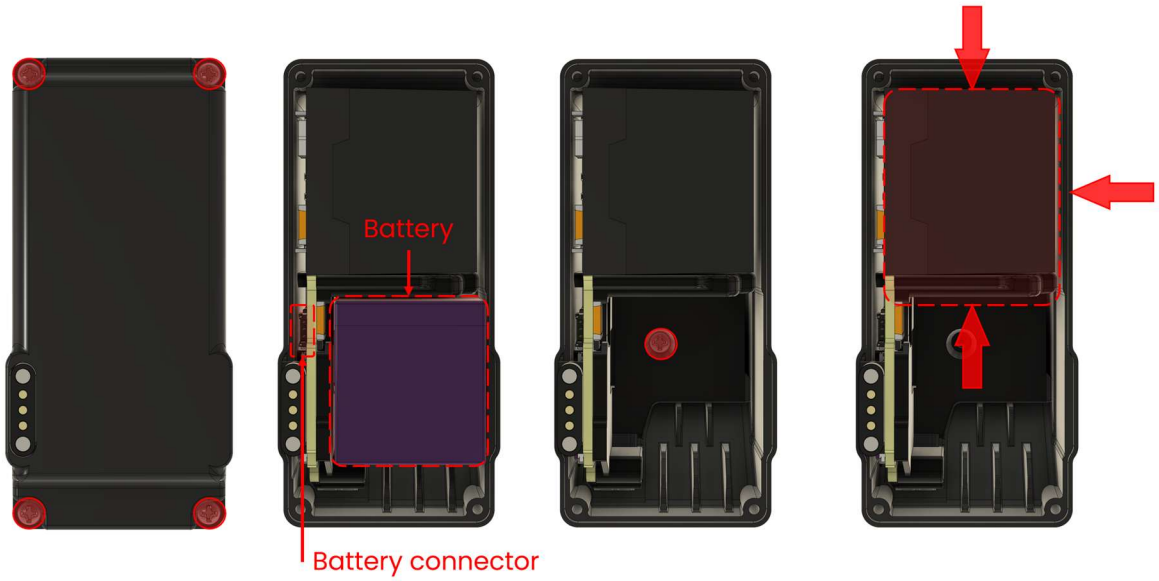


We start by removing all 4 screws in the bottom of the device.

Once you open the device we advise to unplug the battery immediately to prevent any damage to the electronics. The battery connector location is shown in the second picture.

Lift and remove the battery to acess the M2X6 screw underneath it. This screw secures the electronic subassembly skeleton to the enclosure.

Lift the electronics subassembly out of the device. We advise using the coil and plastic skeleton to extract the electronics



Only some repairs require revealing the electronics underneath the plastic skeleton. We advise to only remove it if necessary for your repair.

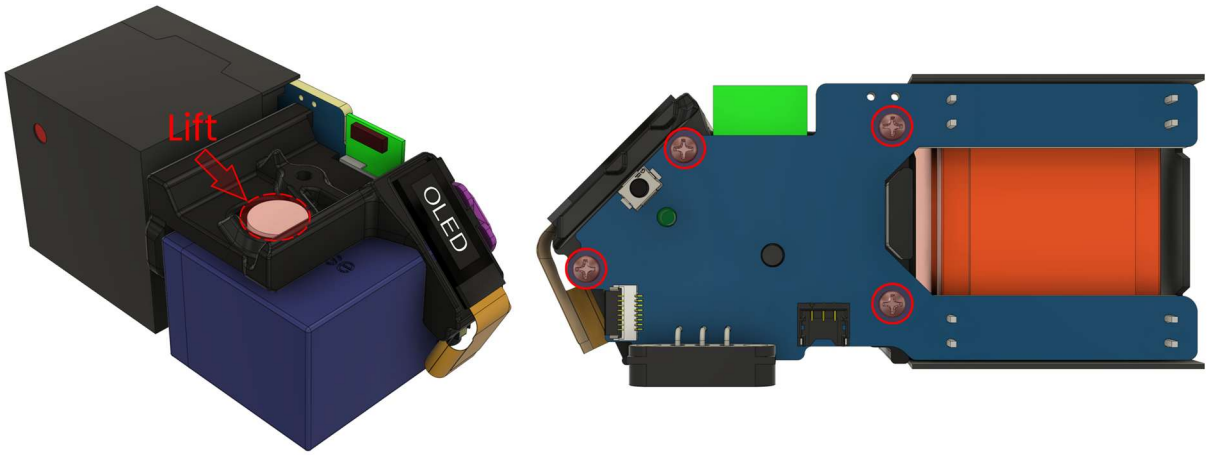
Don't need:

- Reprogramming/ Debuging
- Battery replacement
- Replacing the vibration motor.

Need to remove:

- Replacing the OLED screen

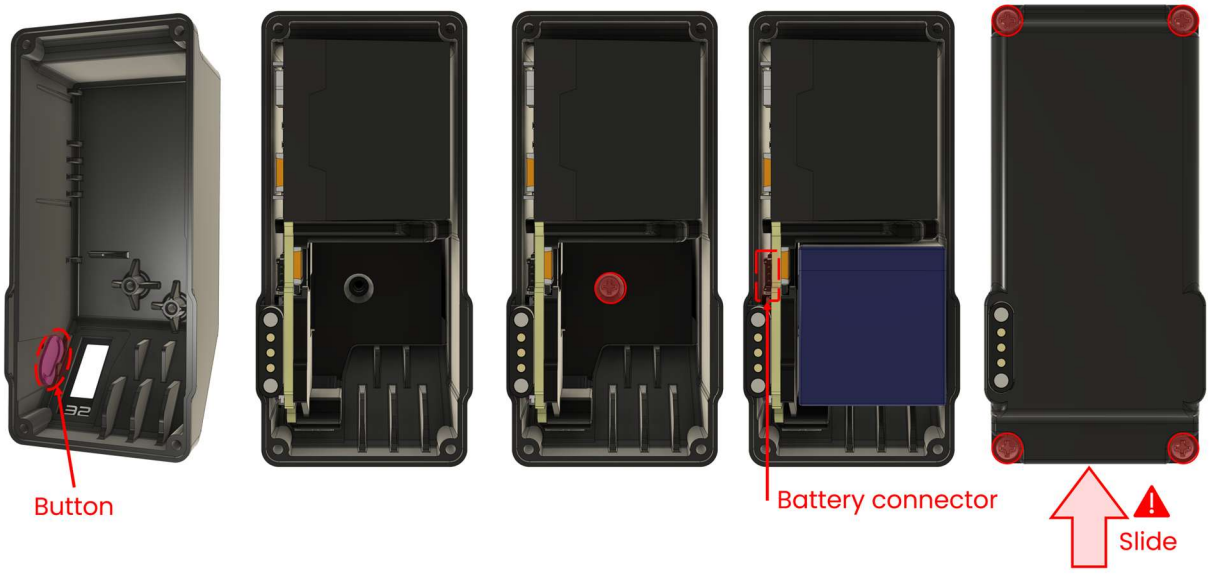
To remove the skeleton, lift the vibration motor out of its holder in the skeleton and unscrew the 4x M1.4X4 screws located in the back of the PCB.

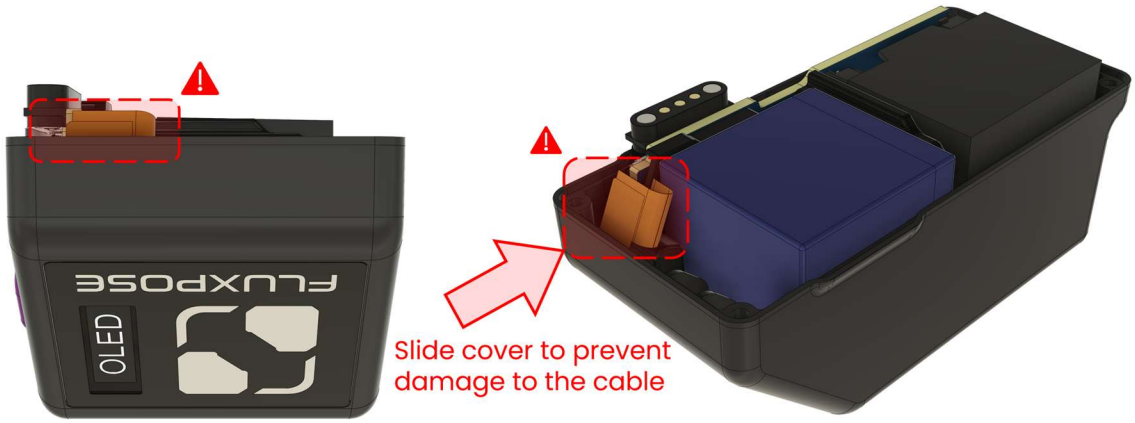


Closing the device

When closing the device ensure the

1. Place the button on the top side of the enclosure
2. Introduce the electronics subassembly in the enclosure.
3. Screw the electronics subassembly skeleton to the enclosure with a M2X6 screw
4. Place the battery in the device and connect it.
5. When placing the cover, slide it from the front. This is to prevent damage to the OLED screen cable as closing directly from the top may damage the cable.

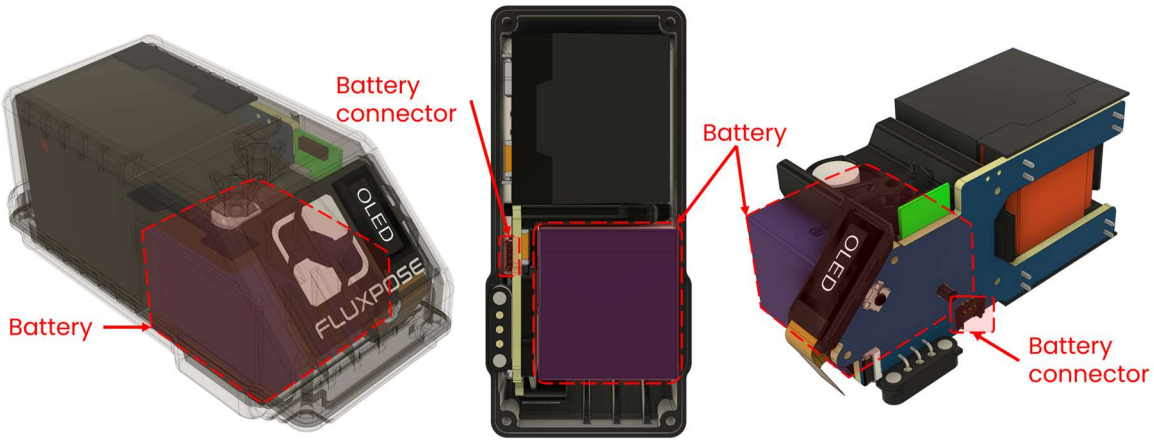




Battery replacement

The battery connector can be found on the top side of the PCB. Reaching this connector requires extracting the PCB outside of the enclosure. Its location is presented in the next picture.

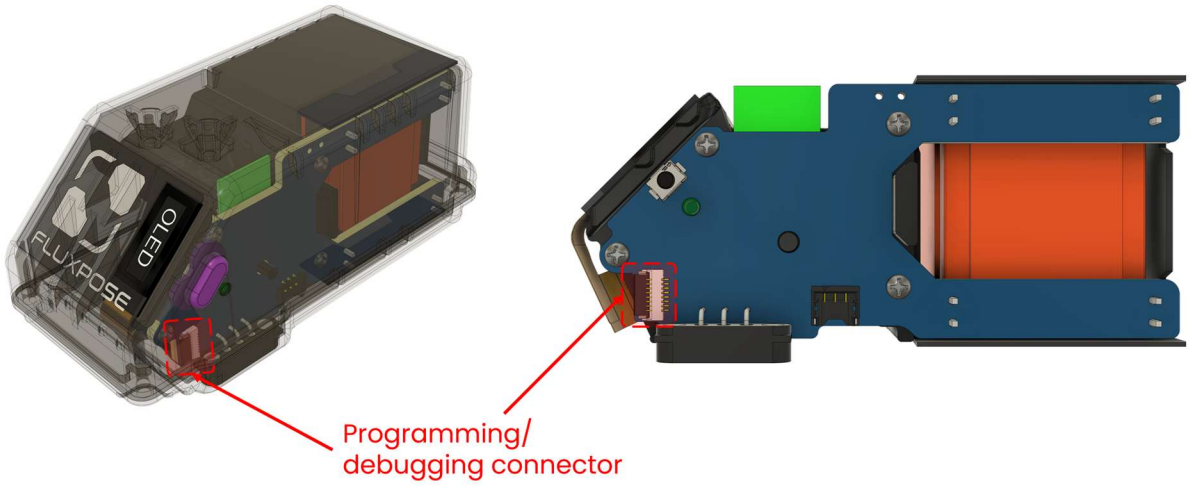
The FluxPose battery utilizes a 3pin Molex Pico-EZmate 1.2mm pitch connector (Part number: 781720003). Note that this is different than connector used in the tracker.



Reprogramming

Even though OTA programming is supported, if you brick the device or want to do development you can use a connector to program the devices with our programming adapter or a tool developed by yourself. More information on this in the system integration guide.

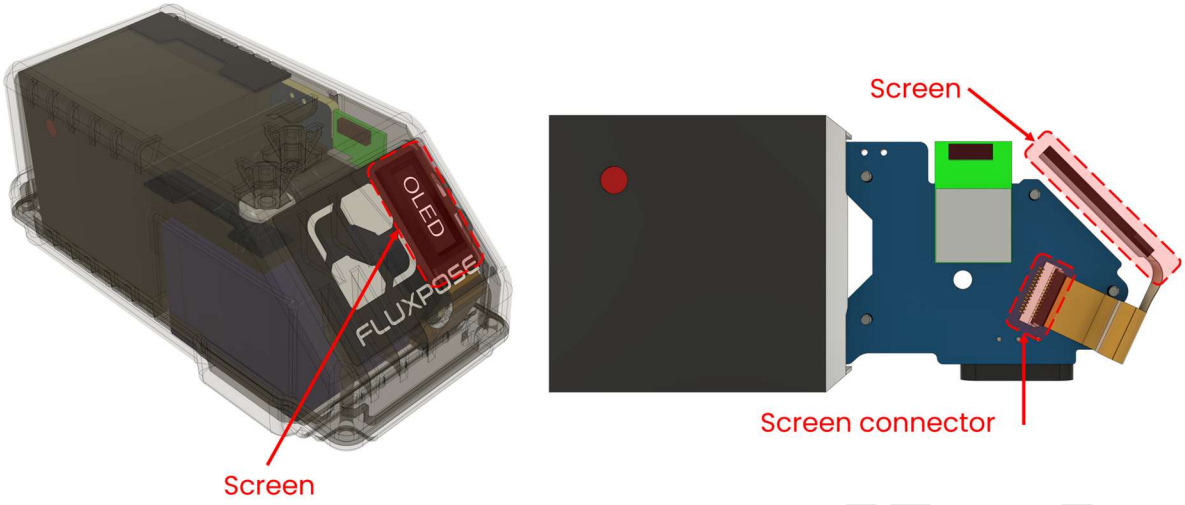
The programming connector is an 8P 0.5mm FPC cable with contact pads on the PCB side. The connector is located on the back side of PCB and you **do NOT need** to remove the PCB skeleton to access it.



Screen

The beacon integrates the same 0.54-inch OLED screen as the trackers. To access the connector for the screen FPC cable you need to remove the PCB skeleton. It´s location can be seen in the picture below.

The screen is held in place to the skeleton with some springy flexible double sided foam tape that ensures it is pushed against the acrylic front panel. We use a 1.26mm thickness frameless LCD tape.



Vibration motor

The vibration motor is adhesively attached to the skeleton with double sided tape. The two wires are soldered to the PCB. It can be replaced by removing it from the skeleton, removing the cables by de soldering them and putting a new vibration motor. The vibration motor is an 8mm diameter. 2,7mm thickness, 3V DC 9.000 rpm coin type vibration motor.