SAFEAIR

Phantom Parachute Manual

PARAZERO
DRONE SAFETY SYSTEMS

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Congratulations on your purchase of the SafeAir Phantom Safety System!

This manual explains how the SafeAir Phantom system works and how to properly operate the system on the ground and in the air.
Be sure to take the time to read this manual carefully, in order to increase your safety and the safety of those around you.
The SafeAir Phantom system is a smart-parachute system that deploys autonomously after detecting a critical failure in your drone. The parachute slows the descent rate of your drone and reduces the kinetic energy upon impact.

Note – Using the SafeAir Phantom System does not eliminate all risk of drone operation. Please fly responsibly and in accordance with the rules and regulations defined by authorities in the area where you are operating.
Visit the ParaZero website (www.parazero.com) on a regular basis for the latest information and updates.

General

ParaZero's SafeAir Phantom is a low altitude, independent, autonomous parachute-based safety system.
The SafeAir Phantom is designed to protect the drone and the payload.
The SafeAir Phantom System is designed to work on all versions of DJI's Phantom 4 series (excluding RTK).
The average measured descent rate of the Phantom with an open parachute is 5.1 meters per second (16.7 feet per second).

Main Features

- A unique parachute deployment system that opens in a fraction of a second, even at zero speed.
- Autonomous emergency identification and activation capabilities.
- Electro-mechanic flight termination system.
- Access data logs from black box via the desktop application.

Safety Instructions

The ParaZero SafeAir Phantom is a drone safety system, designed to deploy instantaneously by using a powerful spring-based mechanism. Be careful not to lean against, press or drop the system.

Caution

Do not move the drone or system while the system is armed (green LED).
An angle breach may cause the system to deploy.
The parachute and cover will be projected at high speed and may cause injuries.
Turn the system off immediately after landing.

Caution

Using the SafeAir Phantom System is not recommended in **Sport mode**.

System Package includes the following parts:

A. SafeAir Phantom System
and connected safety catch

B. Safety insert

C. Placement stamp

D. Placement tool

E. USB-C cable

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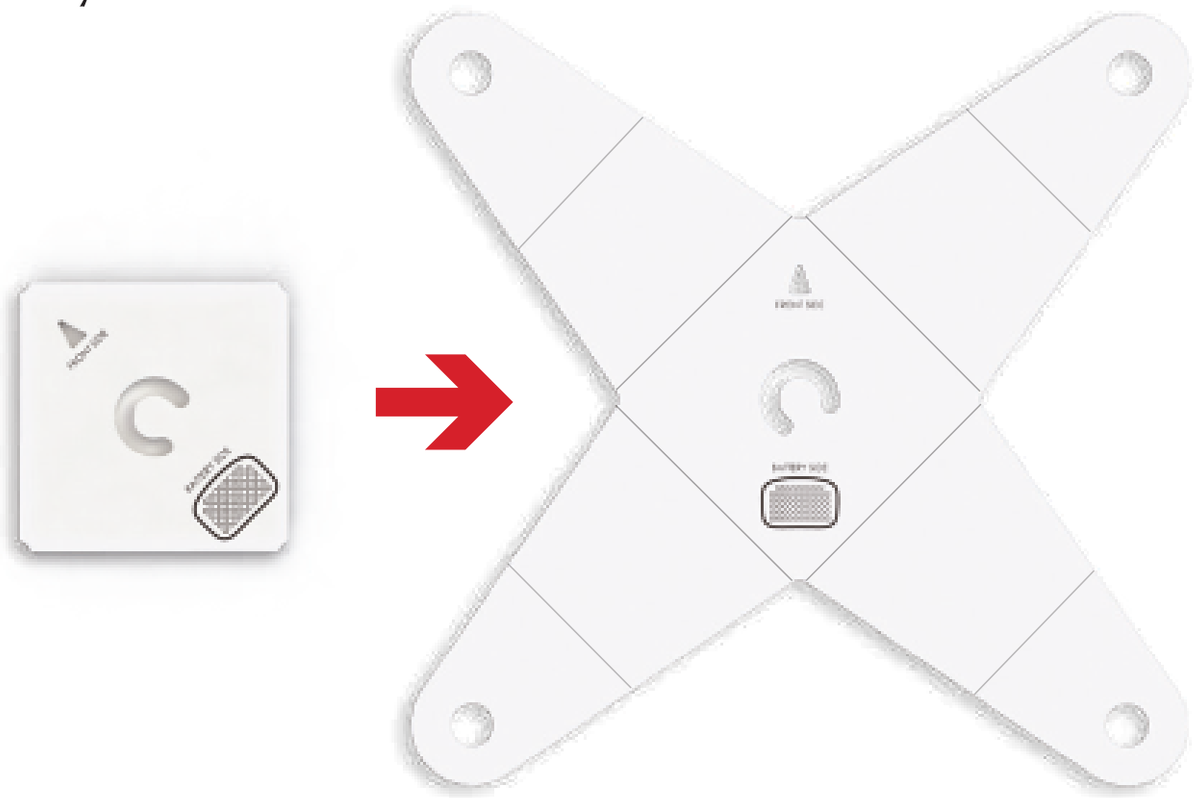
Installation Step 1

Place the drone with the battery facing towards you and remove the rotors. Unfold the placement tool so that the arms are fully extended with the battery side facing towards you.



Caution

Follow installation instructions carefully. Systems that are not installed correctly may interfere with the spinning rotors.

Installation Step 2

1. Place the placement tool on the drone with the four circular holes around the four motors.
2. Reconnect the four rotors in order to verify the placement tool's correct position.

Installation Step 3

Remove the sticker cover from the placement stamp.

Installation Step 4

Stick the placement stamp to the center of the drone by placing it carefully through the hole in the placement tool.

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Installation Step 5

Remove the rotors and the placement tool and verify that the placement stamp is still securely in place.

Installation Step 6

Remove the safety catch from the bottom of the system and store it in a safe place for reuse during transport.

Installation Step 7

Place the harness cord around the landing gear of the drone with the SafeAir Phantom System placed upside-down to the left of the drone, while the string holder is adjacent to the drone.

Installation Step 8

Place the SafeAir Phantom System by matching the three plugs at the bottom of the system inside the corresponding sockets of the placement stamp.

See close-up on the next page

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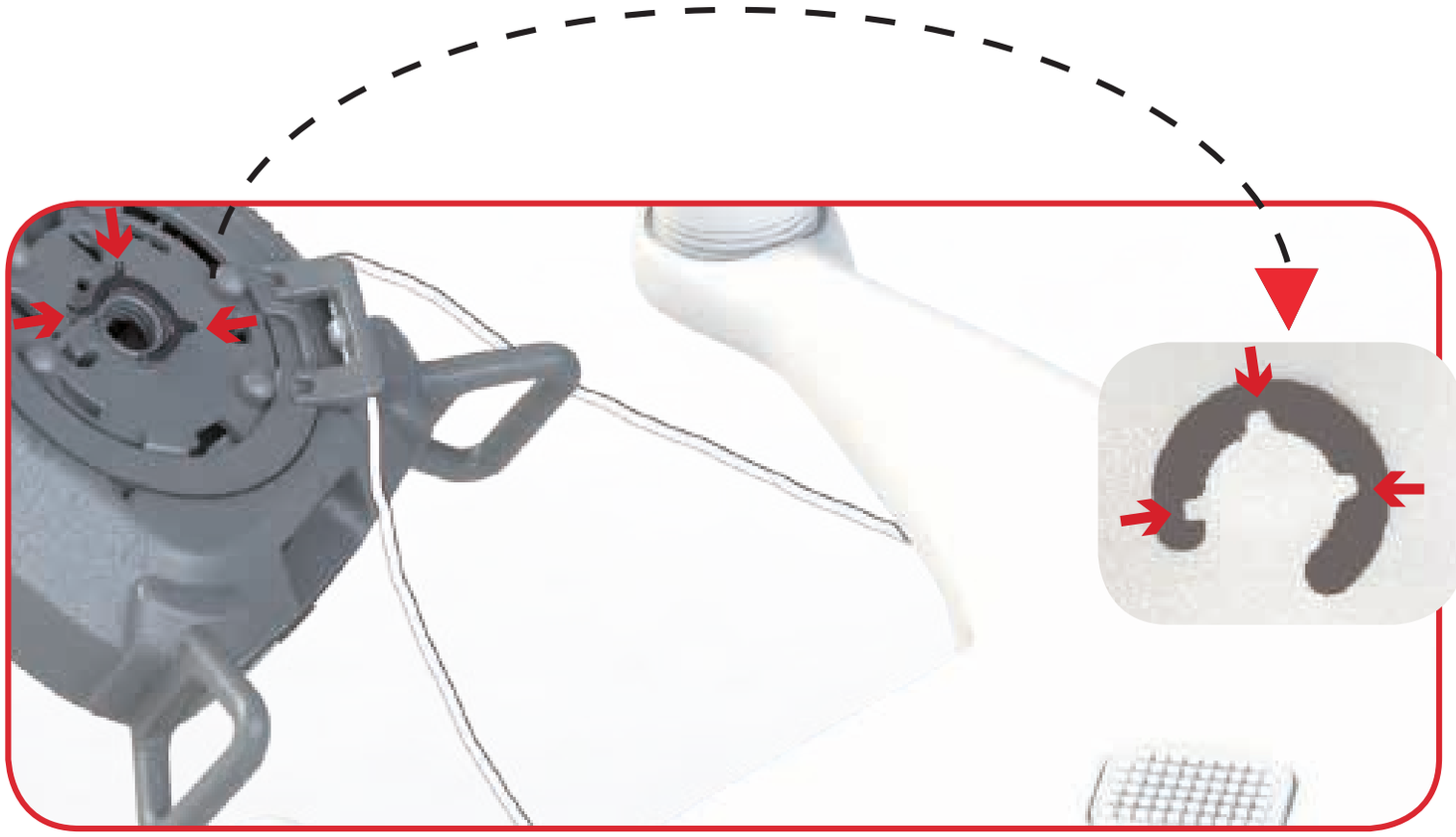
Installation Step 9

Match plugs to sockets.



Installation Step 10

1. Slide the tension ratchet to the battery side of the drone.

2. Lift the harness cord and hang it on the hook on the right side of the system.

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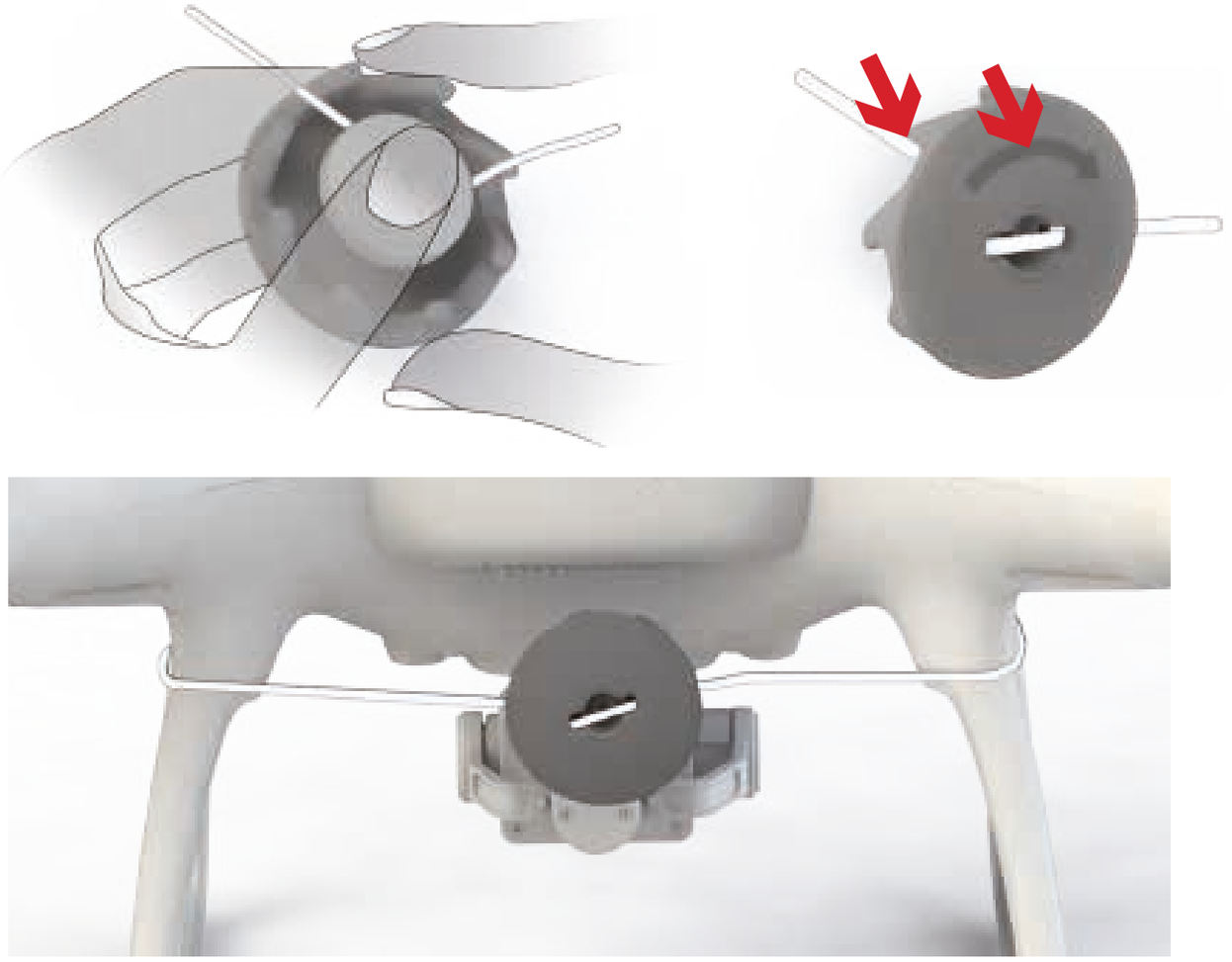
Installation Step 11

Tighten the harness cord by turning the tension ratchet clockwise. Make sure that the cord is being wrapped around the center of the ratchet. Once the harness cord is firm, lock it using 2 opposite teeth of the tension ratchet.

Throughout the whole tightening process verify that the system is still placed correctly on the placement stamp.

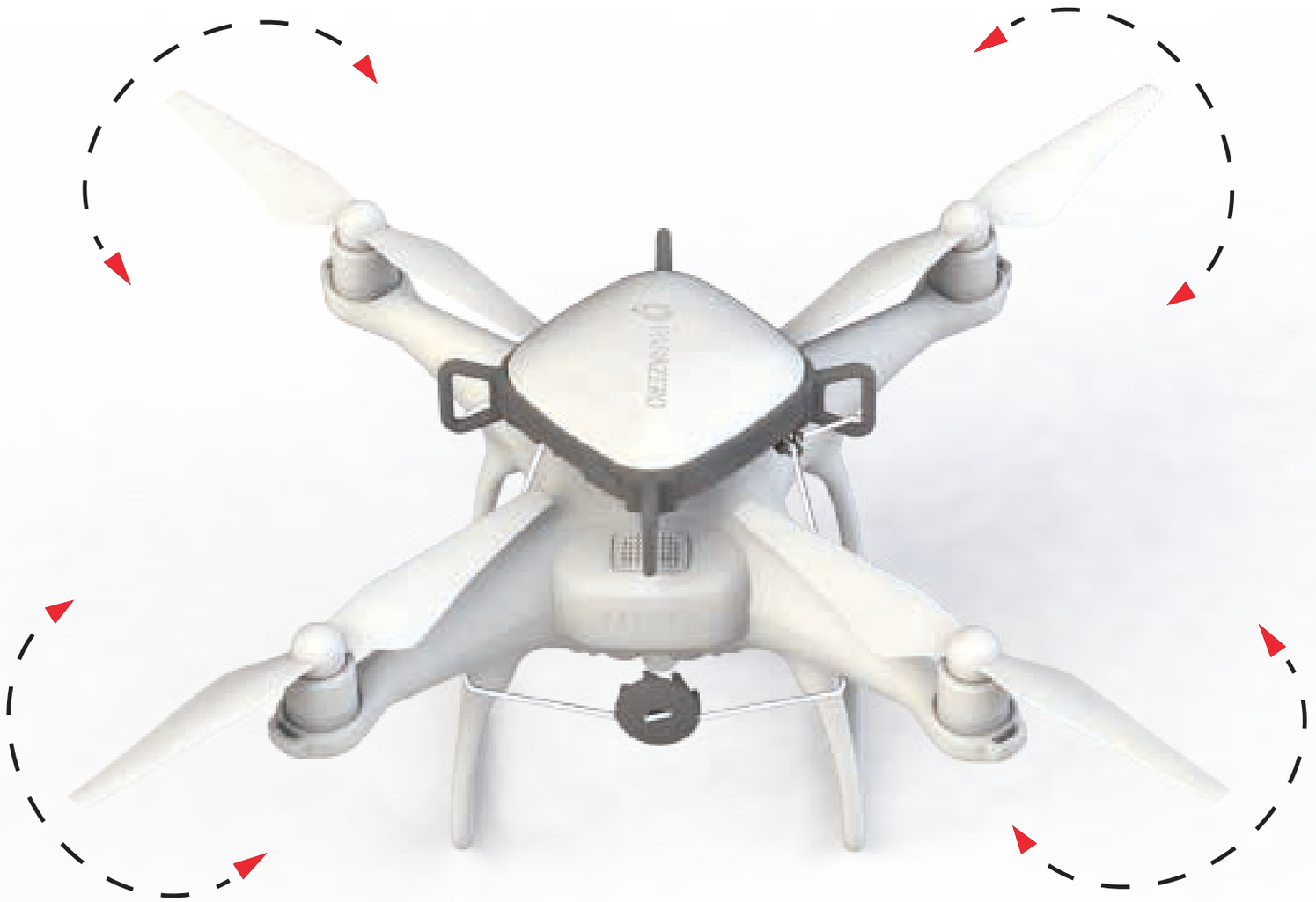


Installation Step 12

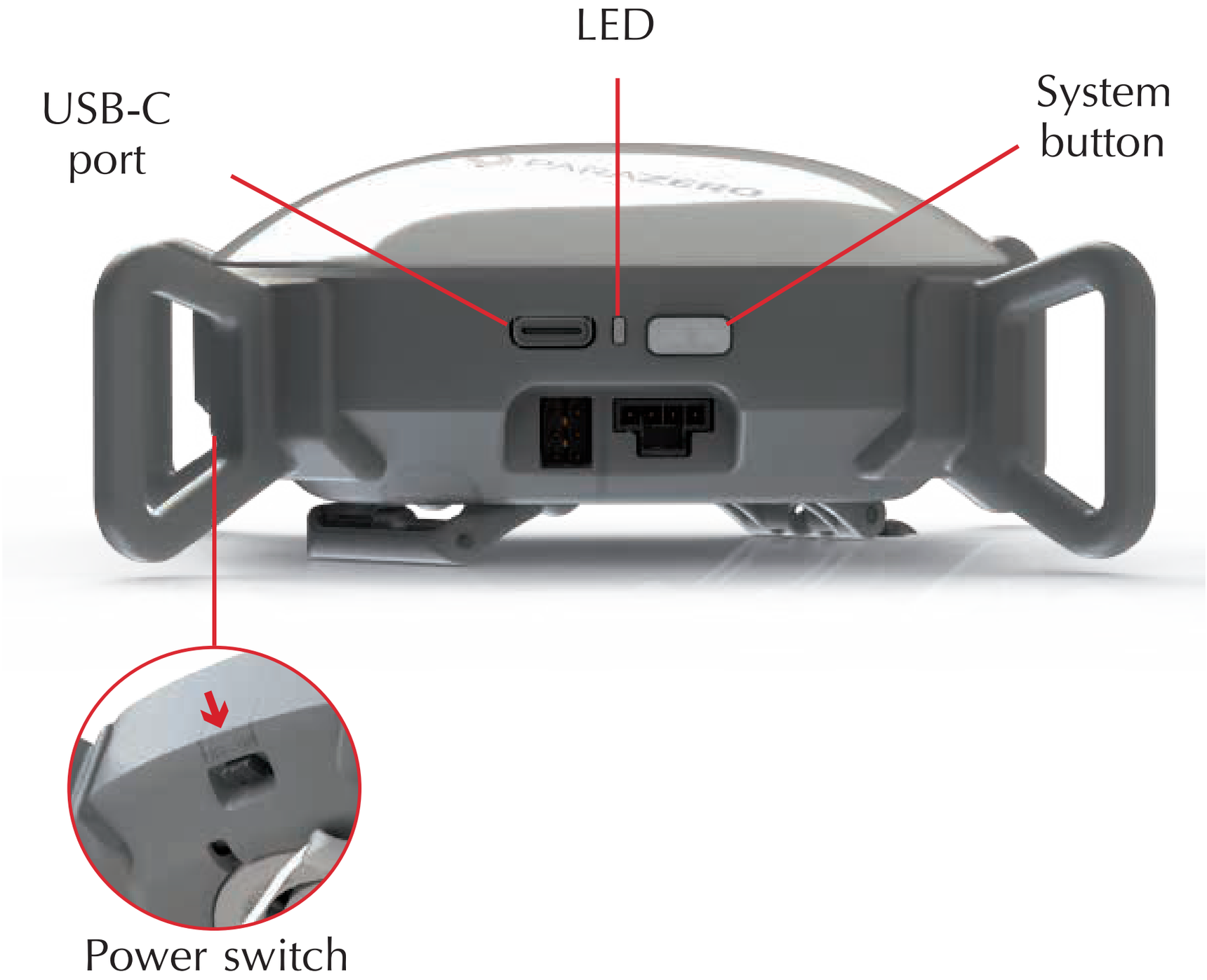
To verify that the harness cord is tight enough, hold the SafeAir Phantom System, lift it together with the drone and swing gently. The system and drone should move as one unit without movement between them.

Installation Step 13

Reconnect the four rotors and verify that they are able to spin freely without any contact with the SafeAir Phantom System.



Ports & Switches



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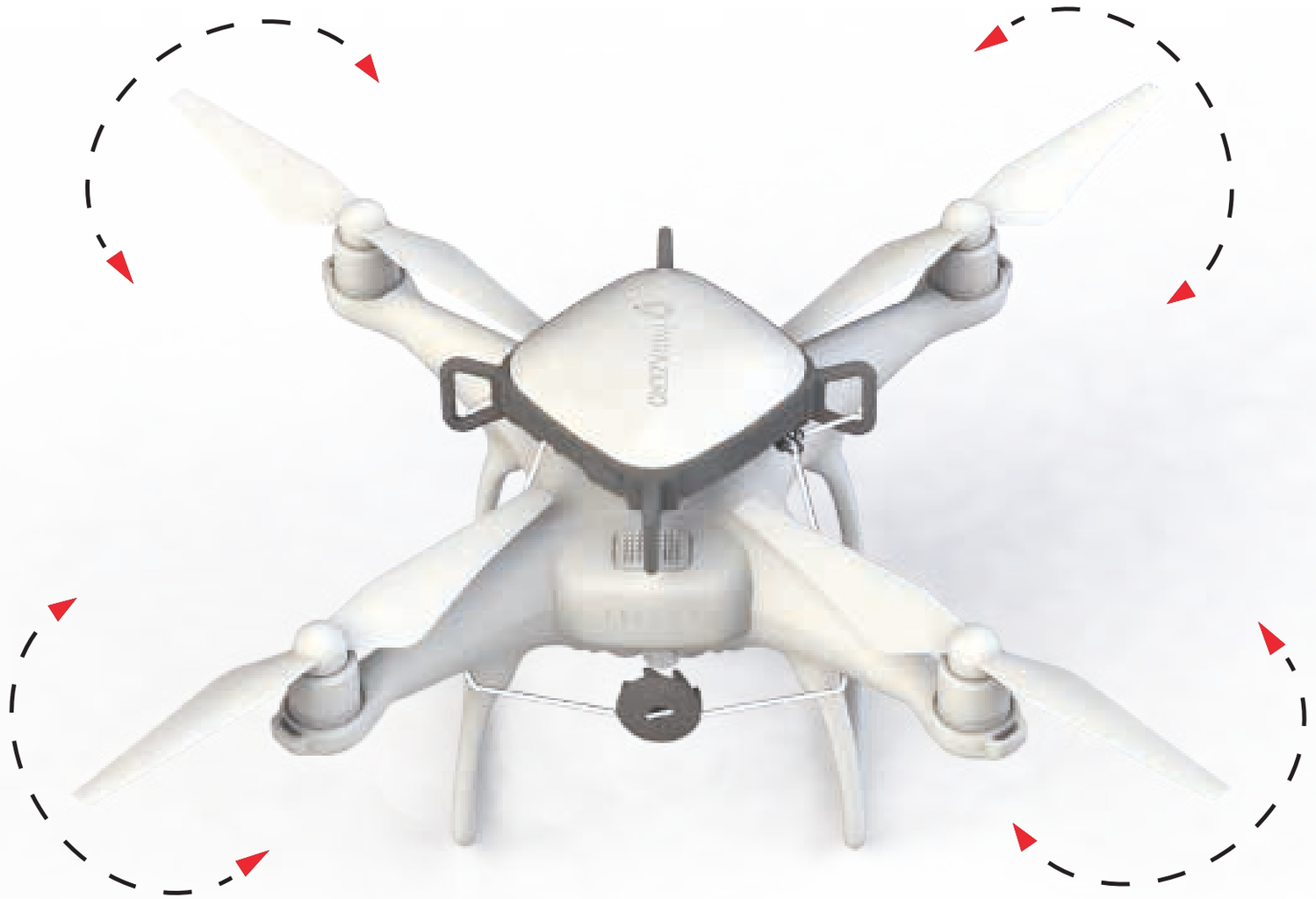
System Operation Step 1

Verify that the batteries are charged before each flight.
To charge the SafeAir's battery, use the USB-C port.
The minimum charging time before first flight is one hour.

Warning Batteries that are not fully charged may not be able to operate towards the end of a long flight. Be sure to charge your system for at least 20 minutes before each flight.

System Operation Step 2

Prior to takeoff, verify that the system is placed firmly in the center of the drone and that the drone's propellers can spin freely without touching the flight termination rings.



System Operation Step 3

To activate the system, verify that the system is on a level surface and turn the power switch to the ON position.
If it is already ON, turn it OFF and then ON again.
A starting sequence initiates, and the LED turns green and then yellow for about 20 seconds.
If the yellow LED is flashing, then the system is not on a level surface. After the system is on and ready in Standby mode, a blue LED appears.

System Operation Step 4

The system is now ready for flight. The system autonomously detects takeoff, switches to Armed mode and the LED turns green.

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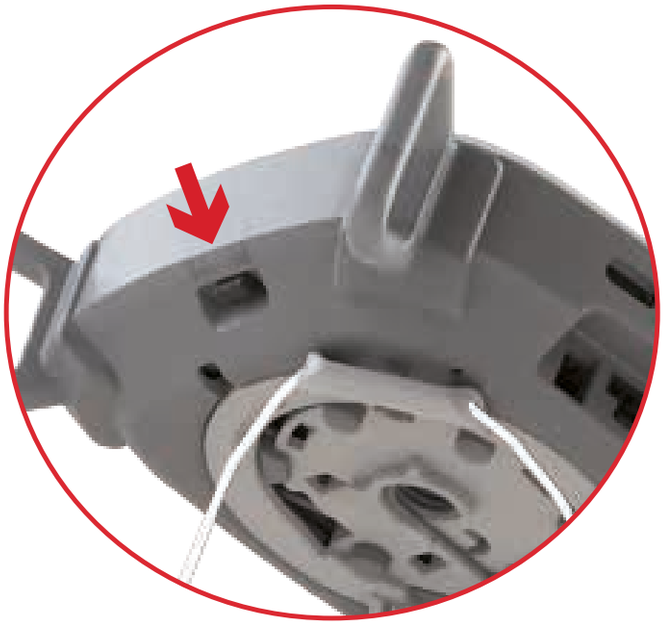
System Operation Step 5

After landing, the system autonomously disarms and the LED turns blue. Turn off the rotors and switch the power switch to the OFF position before moving the drone.

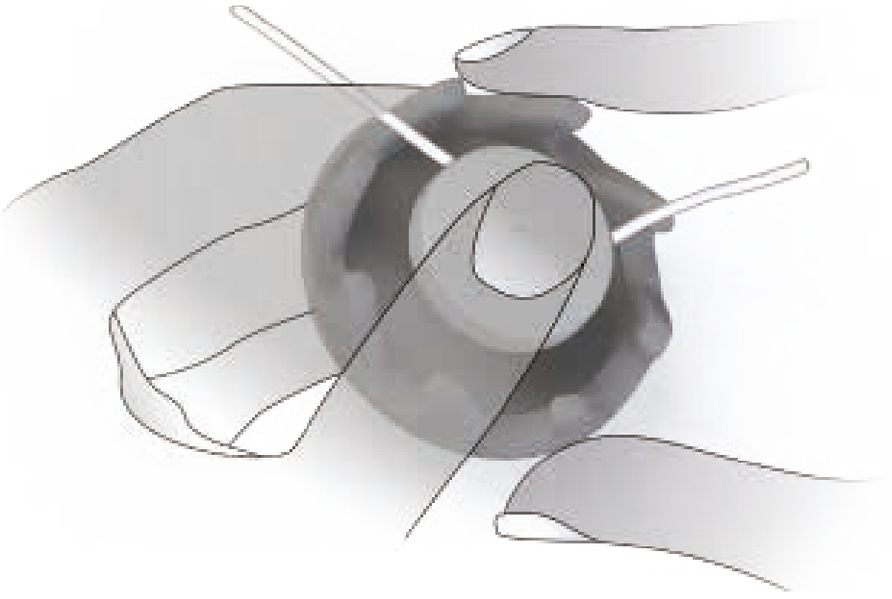
Warning As a precaution, always turn the system off before moving it. Failure to do so could initiate system deployment.
Inspect your system. Verify that the system is not damaged and that the rotor stoppers are intact.



System Removal Step 1

Warning Verify that the SafeAir Phantom System is off before removing it from the drone.

Unlock the tension ratchet by removing the cord from between the teeth.



System Removal | Step 2

Unhook the cord from the metal hook.

System Removal | Step 3

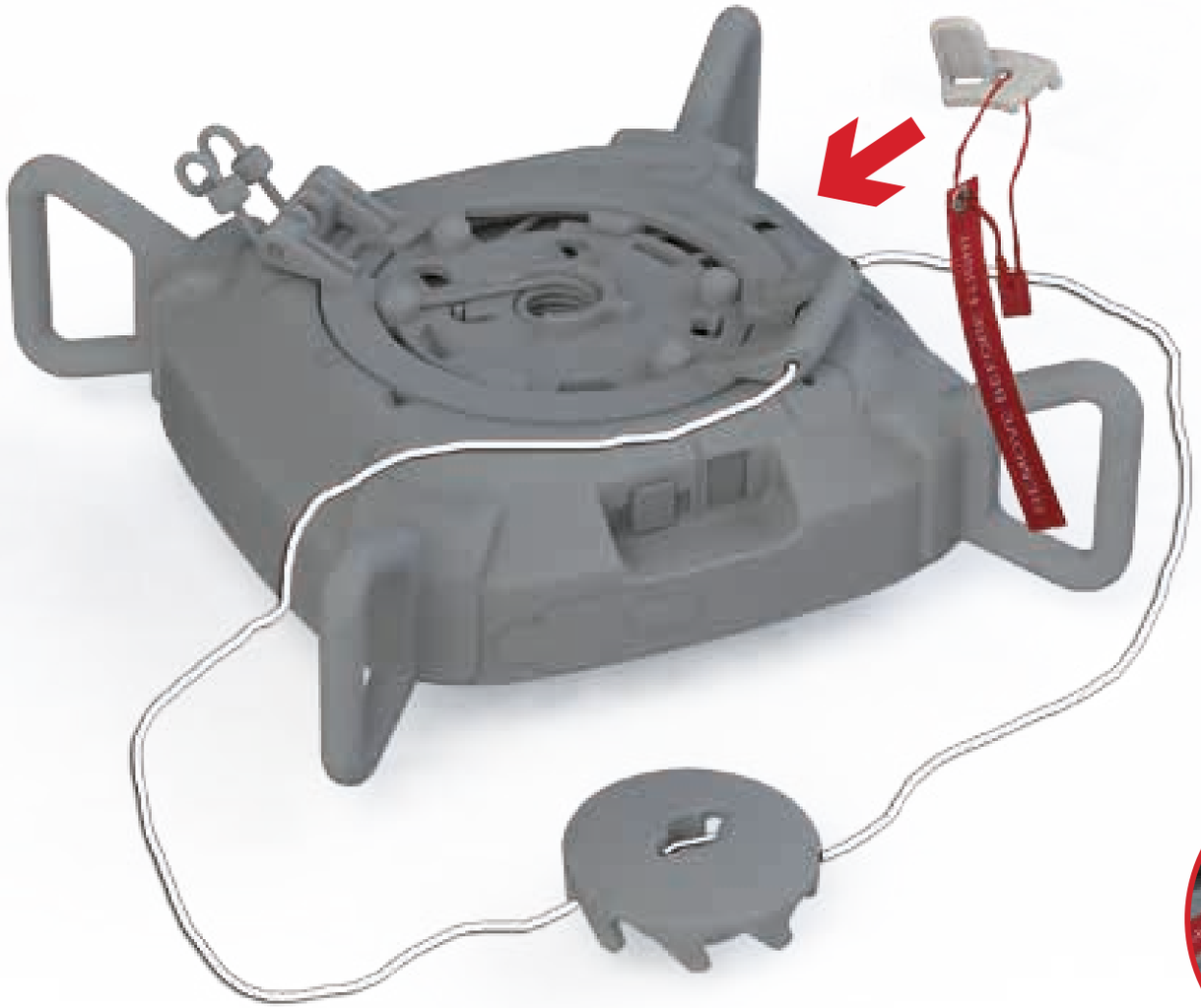
Remove the system from the drone.

System Removal | Step 4

Release the cord from the drone.

System Removal | Step 5

Insert the safety catch and store the system in a clean, dry place for reuse.



Deployment

The system includes an Autonomous Triggering System (ATS) that identifies critical failures and triggers the system autonomously. Should an emergency situation occur, the system automatically deploys the parachute, stops the rotors and reduces impact energy upon landing.

For the system to be effective, a minimum flight altitude of 9.5 meters (31.2 feet) above ground should be employed.

The system can only deploy when it is in Armed mode (green LED). Following a deployment, the LED turns red. To switch to Standby mode, reset the system by turning the power switch OFF and then ON again. The LED should turn blue after approximately 20 seconds.

Repacking

Caution

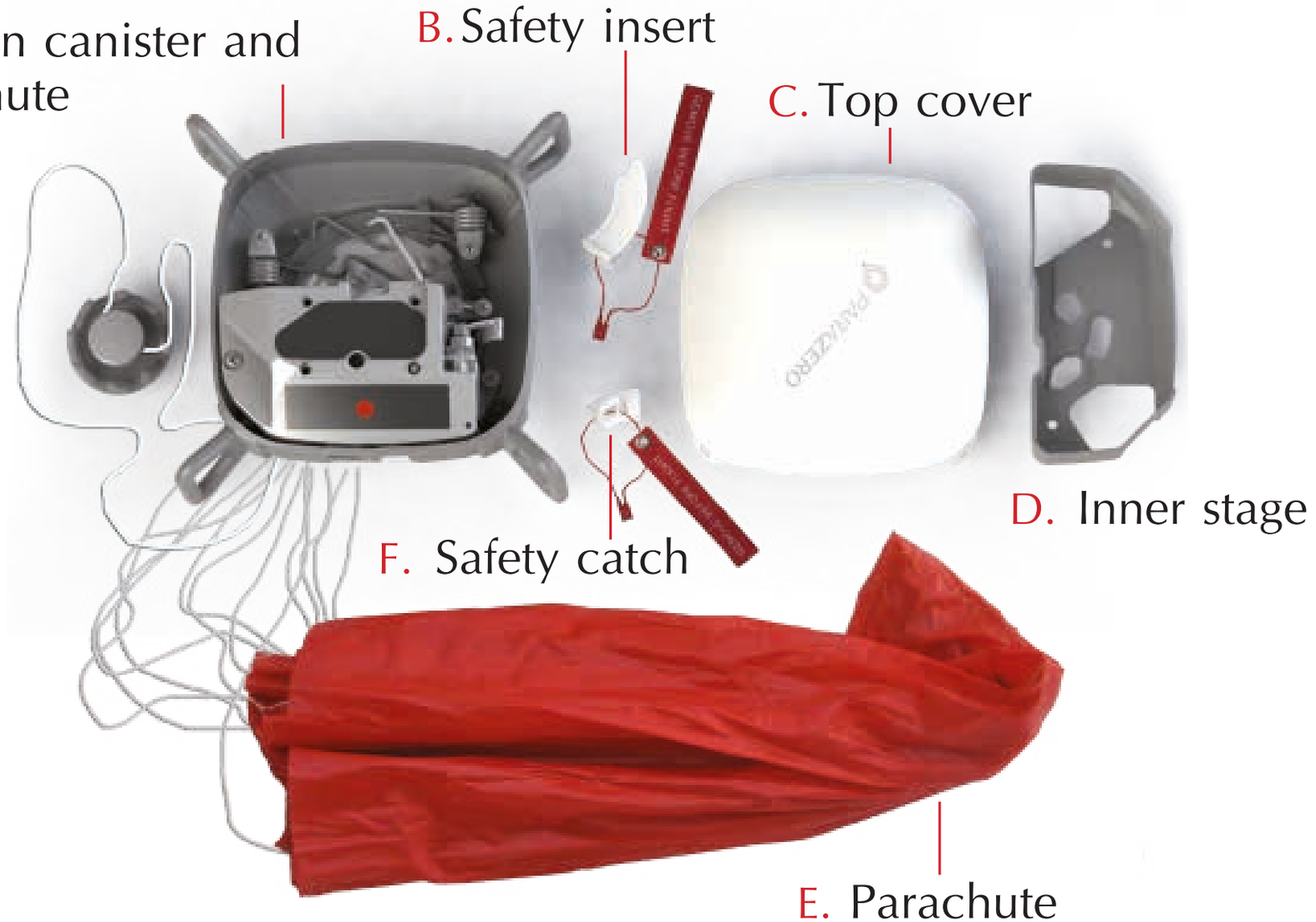
For professional SafeAir Phantom Systems that comply with ASTM F3322-18 and are intended for flight over people, parachutes must be packed and repacked by ParaZero (or by an entity that has been certified by ParaZero). For shipping instructions to ParaZero, contact the retailer from which you purchased the system or email ParaZero Support at support@parazero.com.

After the system has deployed, make sure to turn the power switch to the OFF position. Inspect your system to make sure that the parachute is not damaged, that rotor stoppers are intact and that the general condition is good. Ensure that you have all the parts listed in Step 1, and then follow the steps described in this chapter.

Important – The SafeAir Phantom System withstands significant force during deployment. Systems that have been deployed five times must not be repacked and reused, and should be replaced.

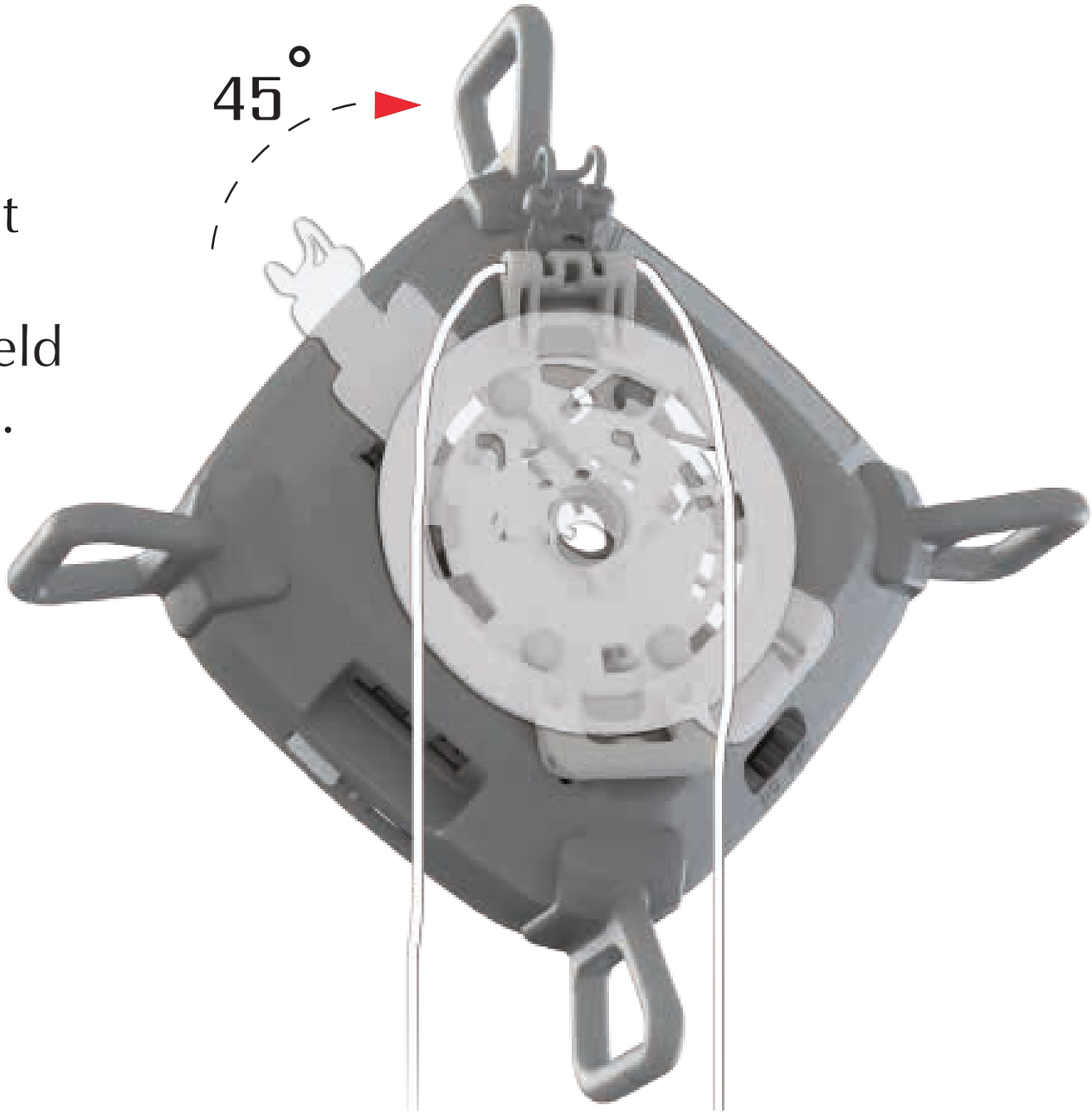
Repacking Step 1

Place all system components in front of you on a clean, dry surface.



Repacking Step 2

While holding
the main canister
upside down,
rotate the base unit
clockwise by 45°
until the base is held
in its new position.



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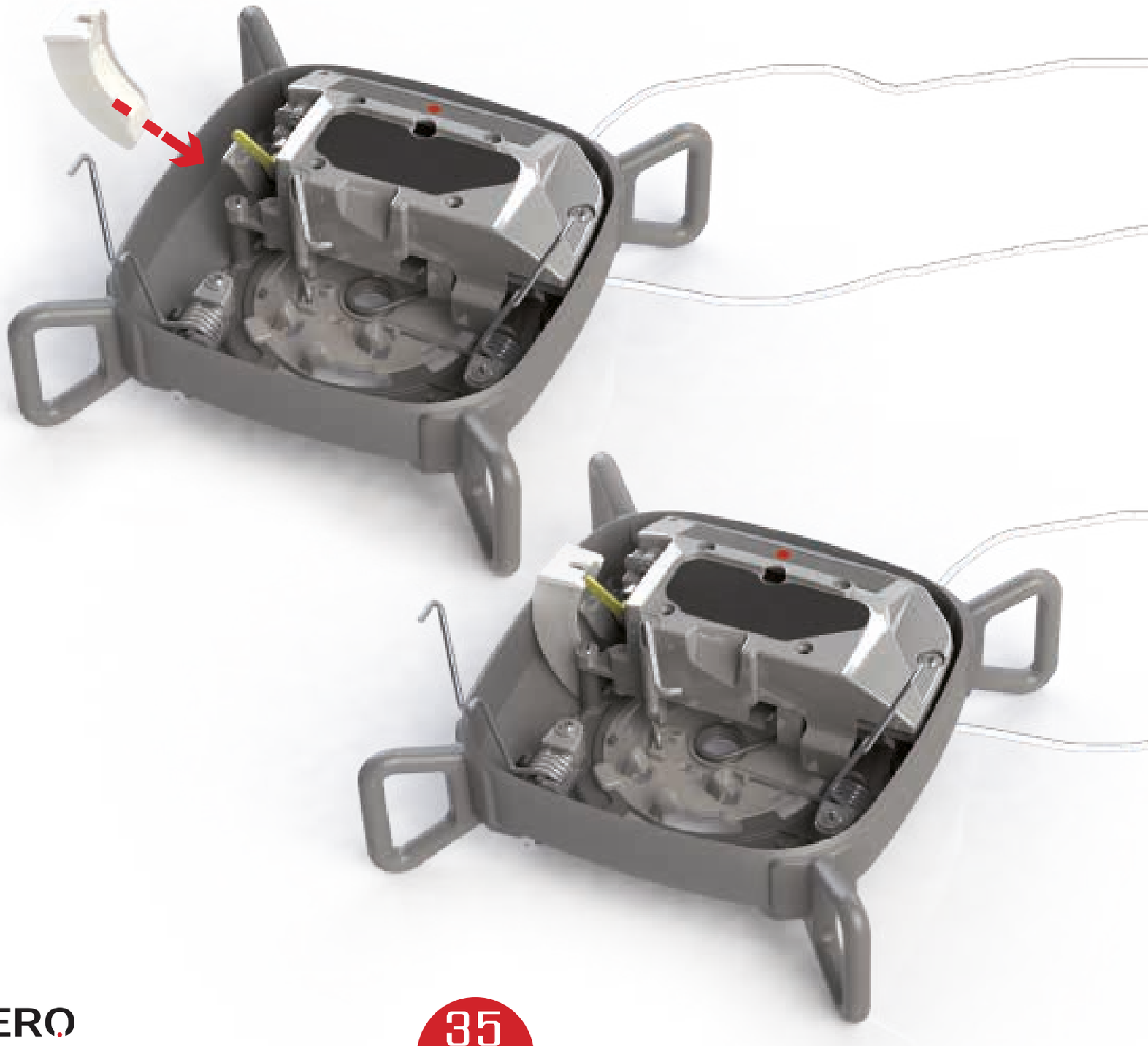
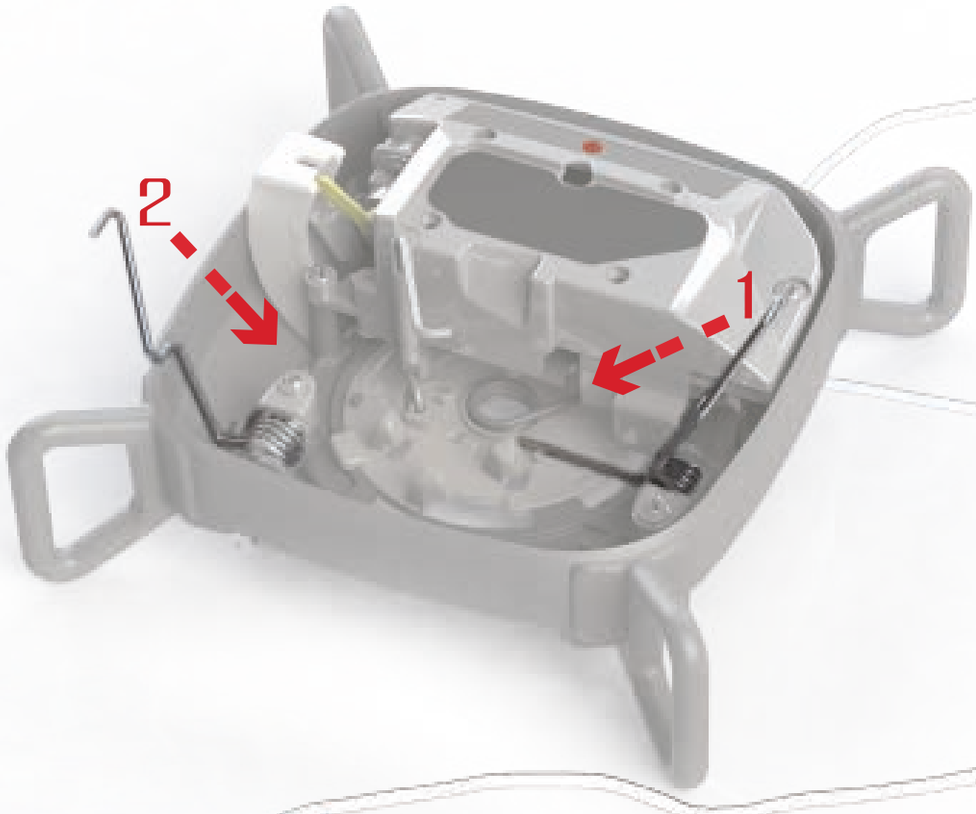
Repacking Step 3

Place the Safety insert on the activation lever, in order to avoid unintentional activation.



Repacking Step 4

Push down the two main springs and secure them in place on the hooks in the base of the system.



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Repacking | Step 5

Place the Inner stage on top of the folded springs. Ensure that the parachute strings are guided through the indented gap between the platform and the system, as shown below.

Repacking Step 6

Verify that the parachute strings are not tangled, twisted, knotted or damaged in any way.
With one hand, hold the parachute from the center of the canopy, with the other hand in a ring shape, slide downwards along the parachute until you reach the parachute strings, so that the parachute is closed.

1

Check the strings

2

Fold parachute

Repacking Step 7

Fold the parachute and strings back and forth until they fit in your hand. The folded parachute should be approximately the length of the parachute platform.

Zigzag fold

One loop

Fold strings in an Eight shape

Combine the strings with the parachute

Repacking Step 8

Place the folded parachute inside the platform with the strings facing downwards. Keep the parachute compressed tightly in the platform. Take out the safety insert and store it.

Repacking | Step 9

Verify the cover's orientation based on the label underneath. Begin with inserting the two corners on the parachute side. This will allow you to keep the parachute compressed in place with the other hand.

Repacking Step10

While removing the hand that was compressing the parachute, fully close the cover. Press gently on the center of the closed cover to secure it in place.

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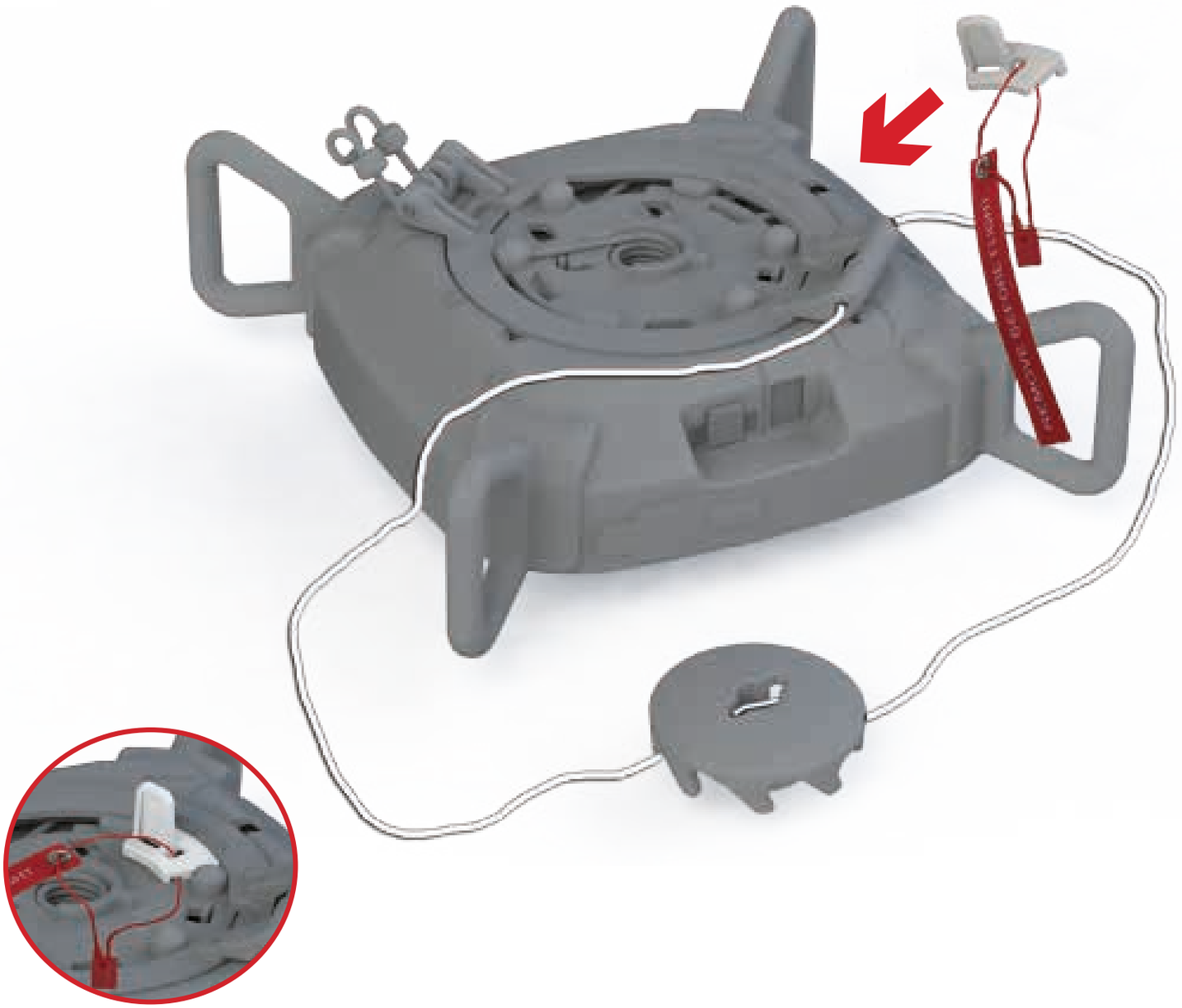
Repacking Step 11

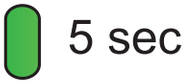
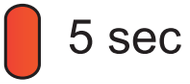
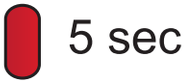
Ensure that parachute fabric is not sticking out of the gap between the cover and the system (up to 2mm is acceptable).

Repacking Step 12

Insert the safety catch and store the system in a clean, dry place for reuse.



System Status and Troubleshooting

	LED	System Status	Corrective Action	
1	Green	Power up		
2	Orange	Power up	Battery sufficient for up to 2 flights	
3	Red	Power up	Low battery, must charge battery	
4	Steady Yellow	System initiation sequence		
5	Blue	Standby mode		
6	Steady Green	Armed mode		
7	Steady Red	System has deployed	Turn the power switch to the OFF position and follow the repacking instructions	
8	Flashing Red	Low battery	Recharge the system for at least 20 minutes. (The red flashing LED may be accompanied by other colors)	
9	Flashing Yellow once	Remote Control (RC) error	Make sure the RC cable is connected to the predefined RC channel	
10	Flashing Yellow 2 times	System not level uring initiation sequence	Ensure that the system is level	

System Status and Troubleshooting continued

	LED	System Status	Corrective Action	
11	Flashing Yellow 3 times	Onboard storage error	Erase onboard storage using the ParaZero Desktop Application	

Other Specifications

Warranty	One year or first deploymont
Maximum Altitude Above Sea Level	6000 meters (19,700 feet)
Maximum Speed	72 kilometers per hour (43.5 miles per hour)
Maximum Wind Speed	10 meters per second (19.5 knots)
Temperature (°C)	0 - 40
Weight	160 grams (0.35 lbs.)

Compliance information

FCC Compliance Notice

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, and (2) this device must accept any interference received, including interference that may cause undesired operation.
Any 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:

- Reorient or relocate the receiving antenna.
- 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/TV technician for help.

The FCC Compliance Statement is available online at parazero.com/FCC-compliance

EU Compliance Statement

The EU Declaration of Conformity is available online at parazero.com/EU-compliance