FLYING EYE

FLYSAFE KIT

DJI Mavic 3 Pro / Enterprise series

Circuit breaker + Parachute
(EASA C5 certification)

5

User manual

Made in France

Summary

About us

FFlying Eye has been your specialist partner in drone technology since 2009. We have been developing parachute arresters since the introduction of drone regulations in 2012. With its pyrotechnic system derived from aviation technology, you have the most effective and lightest system on the market.

We would be delighted to provide you with any technical or commercial information you may require.

www.flyingeye.fr

Green Side 1B, 400 Av. RoumanilleBiot - Sophia Antipolis 06410

09 72 62 78 50

info@flyingeye.fr

Read this manual carefully before handling the Flysafe system.

Warnings and precautions

Flying Eye reserves the right to suspend the warranty of any person who fails to comply with the basic safety instructions set out below. Flying Eye declines all responsibility in case of damage or injury directly or indirectly linked to the use of the pyrotechnic cartridges or due to the use of pyrotechnic cartridges that do not meet the safety requirements and standards.

- It is forbidden to carry out any manipulations other than those specified in the manual.
- The device must only be used by (or under the supervision of) a responsible adult. Keep the device out of the reach of children.
- Do not place the device in a damp or wet environment and keep it away from UV light.
- Do not expose the system to low or high temperatures, strong shocks, risks of impact, contact with chemicals or acids, or long-term storage in a high-humidity or dusty environment. Improper use could cause the pyrotechnic cartridges to explode, putting you in danger. The maximum operating temperature is 40°C and the minimum operating temperature is -15°C.

Warnings and precautions

Check that the parachute system is in good condition before each outing. Do not use the device if it is damaged or if the test procedure is inconclusive. If necessary, contact your dealer.

The parachute in no way alters the operation of the drone.

Any flight with a drone implies the existence of a risk for the equipment and people in the vicinity, with or without a parachute.
Under no circumstances should the use of a parachute increase your risk.

The parachute must be activated manually by the user. Regular training is necessary to be able to react correctly in an emergency. For the safety of the equipment and third parties, you should therefore regularly carry out dummy parachute releases using the Test LEDs.

The ejection system only works once.
Once used, the pod containing the parachute and the load must be replaced before any further use.

Technical specifications

Description

- Kit enabling DGAC to upgrade to EASA Class C5
- Manual and automatic parachute release
- The circuit-breaker module is internal to the drone
- Compatible with all DJI Mavic 3 models (Pro, Standard, Combo, Ciné and Enterprise 3E, 3T and 3M)
- Conformity matrixes: MoC2511 & MoC2512
- Declaration of conformity MoC2511
- Declaration of conformity C5
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Installation is carried out in our workshop (assembly included in the price).

Even if drones are used and maintained correctly, they can sometimes find themselves in severe weather conditions or encounter problems such as loss of GPS signal, technical failure of the engines or radio control failure.

In this kind of critical and emergency situation, it is crucial to have a safety device activated immediately.

Technical specifications

Parachute rescue systems with automatic fall detection can make all the difference compared with human reflexes. The Flying Eye parachute kit can be deployed automatically in these situations, ensuring the safety of your drone but above all reducing the impact on the ground for the safety of third parties.

Technical specifications

Weight	81g
Range	2km
Trigger	Automatic by fall detection Manual triggering by simultaneous double pressure
Autonomy	Over 30 hours for the radio control (1800mAh li-po battery rechargeable via USB-C
Remote control	Automatic power-down after 30 minutes without connection Safe switching on and off (short press then long press)
Communication	Bi-directional link FTS transmission frequency: 868MHz 256-bit encrypted and authenticated frames
Security	Redundant power supply for Flysafe kit
Impact energy	84 Joules (with a maximum wind speed of 12m/s) 8.4 Joules (without wind)

Hardware

Supplied

Flysafe remote control

Screw holder (Flysafe radio control)

Circuit breaker module + Parachute pod

Charger (5V/1A) and USB-C cable

Certificate of conformity

Design certificate

Not supplied

Drone

Remote control

Using the radio control with this system is easier with a harness.

Installation

Screw the Flysafe radio control under the radio control of the Mavic 3 remote control:

This is the result you should obtain:

Next comes the preparation and installation of the parachute on the drone.

Installation

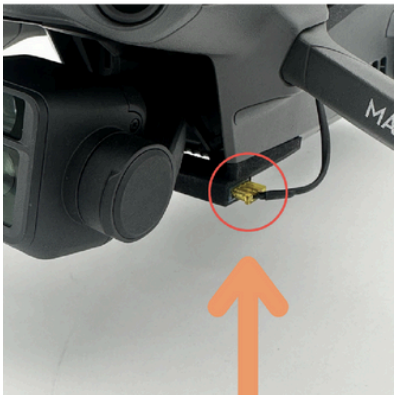
Before starting installation, unfold the arms and remove the nacelle protection from the drone.

Handle with care

1.insert the parachute on the drone

2. rotate it slightly to ‘clip’ the bracket into the drone's holes.

Don't hesitate to press lightly on the bracket at the holes until you hear a small ‘click’.



The parachute is now in place.
3 Connect the system to the drone.

4 Switch on the system (it can remain permanently installed).

User guide

01 LOADING

Connect the USB-C cable to the module. The red LED flashes to indicate charging, then turns green when fully charged (around 40 minutes).

02 START

Before switching on the Flysafe kit, align the case horizontally:

The USB-C port is tactile

-Switching on: 1 short press, then 1 long press. The green LED is displayed, then a sound is heard, confirming that the pod is switched on.

User guide

03 STOP

Press and hold down the Type-C touch port and wait for the LED to go out completely.

04 EJECTED PARACHUTE

The red LED is always lit and the buzzer sounds every ten seconds (the remaining power must be greater than 20%). Switch off the buzzer when you have found the drone.

05 VIEW THE LOAD ON THE PARACHUTE

Once the parachute pod is switched on :

- The green light stays on for one second: power is above 70%.
- The yellow light stays on for one second: power is 40%-70%.
- The red light stays on for one second: power is insufficient, please recharge as soon as possible.
- Use the 5 Volt, 1 Amp charger supplied.
- Does not work with more powerful chargers.

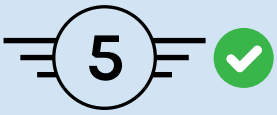
How to use it

Pod on

+

Radio control switched off

Automatic triggering only



Pod off

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Remote control on

Manual release only

Pod on

+

Remote control on

Automatic & manual release

Flysafe remote control

START-UP

PTo switch on the parachute remote control, press and hold the power button (black).
The charge level is indicated on the screen.

TRIGGER

The parachute is released by pressing the 2 'FIRE' buttons (red) simultaneously.

RADIO CONTROL INTERFACE

- OPERATIONAL SYSTEM
- LOSS OF LINK WITH THE DRONE
- TRIGGERING THE SYSTEM
- SYSTEM FAILURE

Pre-Flight Test

Before the first flight of the day at a given operating site, check all the components of the system and verify its integrity. If any anomaly is found, do not proceed with the flight and contact your dealer.

Ground test:

1	Ensure that the entire drone system is powered down. Battery disengaged, automatic module switched off
2	Disconnect the parachute pod connector (located on the underside of the drone)
3	Fitting the battery
4	Switching on the drone's remote control
5	Switching on the Flysafe remote control
6	Switching on the drone
7	Start up the drone's engines
8	Activate the Flysafe system by pressing the 2 red 'FIRE' buttons: The four motors stop.
9	Switching off the drone
10	Switch off both radio controls
11	Reconnect the parachute pod

Flight preparation

Simplified memo for preparing flights in specific categories:

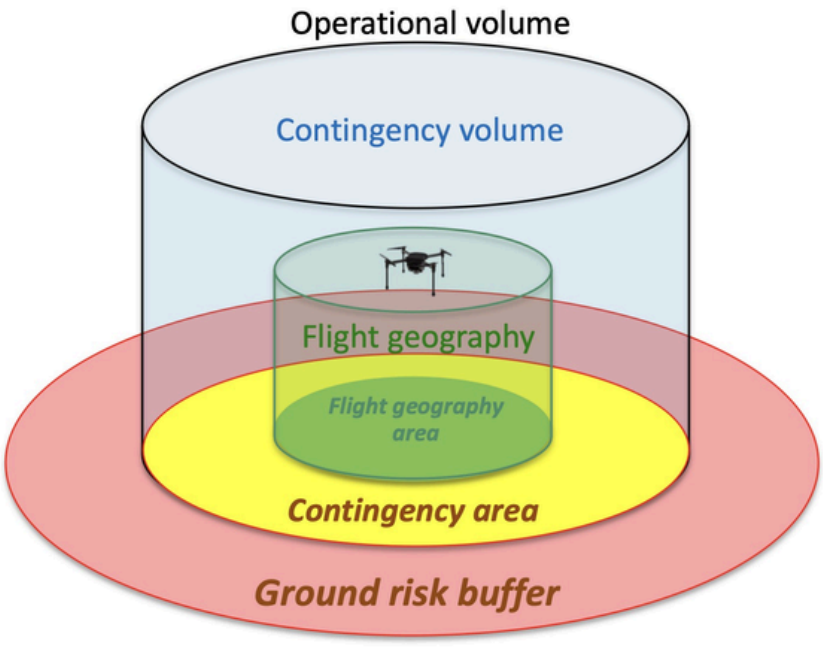
Volumes, Limits and Zones to be defined for your operations using the automatic FTS:

Flight Geography: Volume of flight programmed in the case of automatic flight or planned for your trajectories in manual mode.

Contingency volume: Flight volume in which you can trigger contingency procedures to return to the programmed or planned flight zone.

Contingency volume limit: If this limit is exceeded, emergency procedures must be triggered. This is particularly the case for the automatic FTS Flying Eye Flysafe.

Ground Risk Buffer: projected area on the ground where no third party should be present in the event of an aircraft crash, also known as the Third Party Exclusion Zone (ZET).



Operating conditions

Minimum height (for optimum parachute efficiency): **15 m**
Maximum transmission distance: **2000 m (on flat, clear ground with no interference)**
Maximum wind speed: **43km/h**
Parachute opening time: **1.5s**
Parachute drop speed: **4m/s**
Operating temperature : **- 15 to 40°C**
Impact energy without wind: **8.4 J**

Frequency used: **868MHz**
LORA 869 MHz is shared with other users and devices using the same frequency band, such as remote controls for home automation, energy networks (Linky), IoT home networks, industrial communication systems, etc. These devices can interfere with the FTS system, causing interference in transmissions between the radio control and the receiver, resulting in transmission delays, data loss and even complete communication interruptions.
It is therefore necessary to check the signal strength before the flight and to monitor it throughout the flight.
You should also avoid flying close to high-power radio frequency transmitters or electrical installations.

Dimension of the Ground Risk Buffer

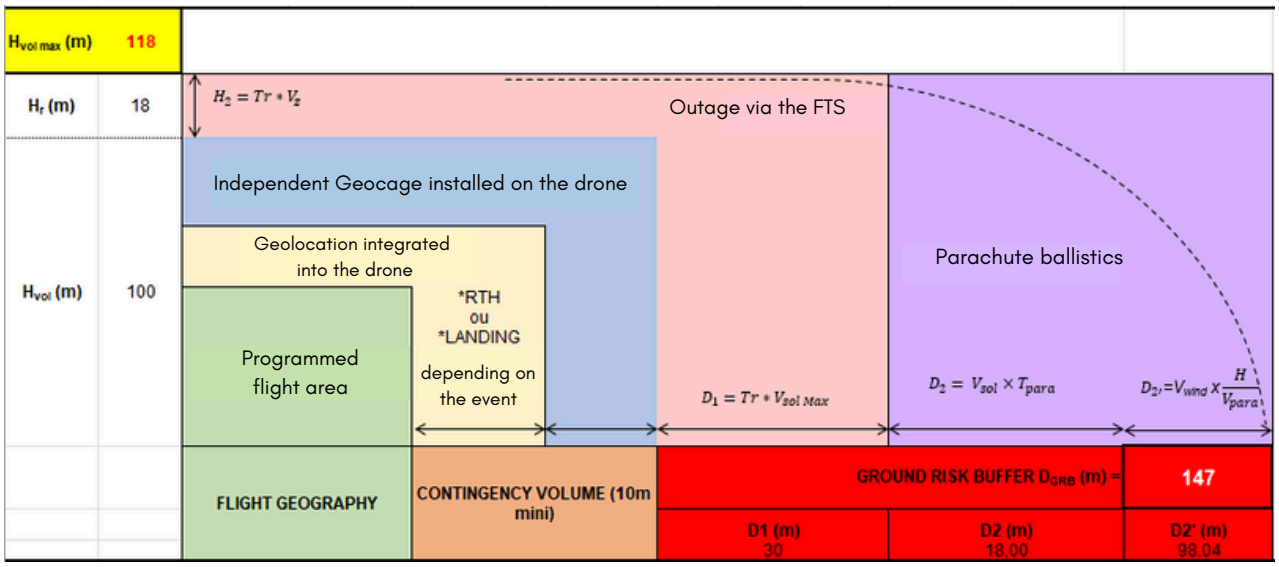
Sub-scenario STS-01 :

	Minimum distance to be covered by the buffer zone for the prevention of risks on the ground for non-captive aircraft without crew on board	
Maximum height above ground	**With a MTOM of 10 kg or less**	**With a MTOM greater than 10 kg**
30 m	10 m	20 m
60 m	15 m	30 m
90 m	20 m	45 m
120 m	25 m	60 m

Dimension of the Ground Risk Buffer

Under licence :

Evaluation of the crash zone when using the Flysafe kit in manual mode, assuming an operator reaction time of 3s and a ground speed of 10m/s.



Height of operational volume (m)	Ground Risk Buffer correspondant (m)
10	58
20	68
30	78
40	88
50	98
60	107
70	117
80	127
90	137
100	147
110	156
120	166

Example with the following data:

Maximum vertical speed Vz = **6m/s**
Reaction time Tr = **3s**
Max drone speed Vsol = **10m/s**
Deployment time Tpara = **1.8s**
Drop speed Vpara = **5.1 m/s**

This method is an example. The operator can refine the GRB calculation by referring to Appendix 1 of the SORA implementation guide.

Emergency procedures

Important note:
The procedures below do not exhaustively describe the actions to be taken by the remote pilot in response to all possible types of anomaly.
They assume that the telepilot has first attempted to return to a normal flight situation and are limited to describing the ultimate safeguard measures when :

-The aircraft cannot be maintained within the flight limits provided;
-In the event of flight out of sight, the telepilot no longer has sufficient information to pilot the aircraft or ensure that it remains within the flight limits provided.

Flying out of sight: if the remote pilot no longer has the aircraft's altitude or location information, or if there is any doubt about the validity of this information, he must abort the mission by activating a failsafe device, either manually or, if necessary, by shutting down the engines.
If the aircraft cannot be kept within the flight limits, the remote pilot must abort the flight by shutting down the engines using the Flysafe radio control system.
If the Flysafe radio control loses contact, as indicated by the corresponding light, the mission must be aborted immediately and an RTH procedure initiated.

Scenario S3 or STS-01 :

In the event of a malfunction causing the aircraft to crash or preventing it from remaining within the flight limits, the remote pilot must immediately activate the FTS.
In the event of a loss of connection to the Flysafe radio control system, as indicated by the corresponding warning light. The mission must be aborted immediately and an RTH procedure initiated.

Maintenance

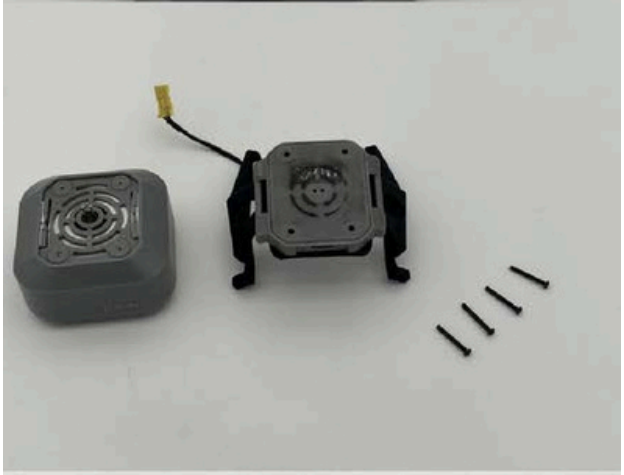
Maintenance after each activation
Change of pyrotechnic charges. Change parachute pods. Return used pods to Flying Eye

Drone tracking
Each day of flight, the operator completes the flight monitoring file provided (see appendix 1) or any other monitoring tool. In the event of a malfunction, he fills in the 'incident sheet' (see appendix 2) and sends it back to Flying Eye.

Maintenance after 700 activations (including pre-flight test)
After 700 activations of the Flysafe system, the drone must be sent to our premises for servicing.

Cleaning
Clean the accessory kit with a damp cloth. Do not use chemicals. Do not use a high-pressure cleaner.

Remplacement du Pod



Les étapes pour changer le pod parachute :

- Order a new parachute pod (grey case)
- Unscrew the screws on the underside of the pod
- Separate the two parts
- Screw (4 screws) the new pod onto the black bracket
- Re-install the system on the drone

Assistance and Warranty

Technical Support

If you encounter any difficulties during installation or have any further questions about using the Flysafe kit, please contact Flying Eye technical support.

Warranty

The Flysafe kit for DJI Mavic 3 is covered by a 12-month warranty according to the conditions of purchase. The warranty covers manufacturing defects, but does not apply to damage caused by incorrect installation, accident or improper use.

Monitoring tool (Appendix 1)

Flight feature					Weather		FTS default tracking				
Date <dj/mm /aaaa>	Nature flight	duration in min	Remote pilot	Location	average wind speed (m/s)	Temperature (°C)	FTS activation	Activation failure	Unintentional activation of the FTS	Remarks	Year for annual review

Incident form (Appendix 2)

FLYING EYE	Circuit-breaker and parachute system log sheet	Version : 01 Date d'application : 23/06/2023

1. UAS identification	
Date	
UAV serial number	
UAS number	
Number of UAS flight hours	

2. Circuit-breaker activation failure during pre-flight	
Number of UAS flight hours	

3. Failed to activate circuit breaker during		
Number of UAS flight hours		
Distance between remote control circuit breaker and drone		
Place of operation		
Presence of high-power transmitters in the operational volume	Yes	No

4. Activating the circuit breaker during flight		
Number of UAS flight hours		
Controlled activation	Yes	No
Distance between remote control circuit breaker and drone		
Place of operation		
Presence of high-power transmitters in the operational volume	Yes	No

Detailed information on using the aircraft can be found in the manual, which can be downloaded from this page:

https://dl.djicdn.com/downloads/DJI_Mavic_3/2.0/DJI_Mavic_3_User_Manual_v2.0_fr.pdf

FLYING EYE

WWW.FLYINGEYE.FR

INFO@FLYINGEYE.FR

09.72.62.78.50

400 AVENUE ROUMANILLE
GREEN SIDE - BATIMENT 1B
06410 BIOT / SOPHIA ANTIPOLIS