Dronavia

MADE IN FRANCE

# USER MANUAL & INSTRUCTIONS

## ACCESSORY KIT MOC2511/12 FOR DJI MATRICE 3D

*Flight Manual (MOC) - PRS-FTS-MOC Kronos AD Matrice 3D V1.2*

# SUMMARY

## 1 INTRODUCTION



## 2 PARACHUTE SYSTEM

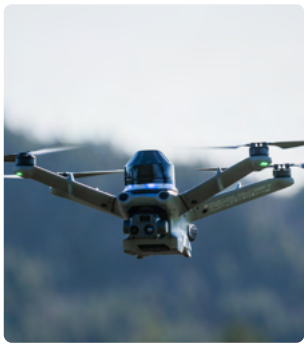


## 3 ANNUAL MAINTENANCE

# SUMMARY

# WE MAKE YOUR DRONE SAFER






Since 2015, Dronavia has been designing and manufacturing innovative safety accessories for professional drones in France. Developed in our workshops, the Kronos range of devices, including Parachute Recovery Systems (PRS) and Flight Termination System (FTS), are the result of 10 years of research and development and meet the highest standards set by EASA.

Thanks to these solutions, which comply with European regulations, professional drones operator benefit from the best guarantees in terms of safety and risk management for their flight missions.

Thank you for your trust and have a good flight.

*Ludovic Pelletey, CEO of Dronavia*

# VERSION NOTE

*Version 1.0*

- *Initial release.*

*Version 1.1 – 05/05/2025*

- *Implementation of an automatic lockout for the parachute system below 20 meters altitude to prevent ineffective or accidental deployment.*

***Version 1.2***

- ***Improved power-up sequence for the parachute and flight termination systems.***
- ***Integration of parachute deployment control via DJI FlightHub 2.***

# TUTORIAL

*Flight Termination System Testing Procedure*

*User’s manual Klick trigger remote control*

# DRONAVIA UPDATER

*Dronavia has recently launched an innovative software solution specifically designed to simplify the updating of Kronos systems. Thanks to this new software, Dronavia customers can now manage and update their systems more quickly and easily.*

Download Dronavia Updater software

# GENERAL *presentation*

Congratulations on acquiring your Kronos M3D MOC2511/12 accessory kit, which includes a Parachute Recovery System & autonomous Flight Termination System, specifically designed for the DJI Matrice 3D drone.

***The Kronos M3D MOC2511/12 accessory kit meets the technical requirements defined by EASA, and has been developed according to a rigorous research and development process, guaranteeing the highest level of safety for flight operations.***

Based in Remiremont, France, Dronavia is here to support you with the use of your Kronos M3D MOC2511/12 accessory kit and to answer any technical or commercial questions you may have.

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# GENERAL *presentation*

The Kronos M3D Parachute Recovery System and internal Flight Termination System have been specifically designed for DJI Matrice 3D drones, with the primary goal of ensuring ultra-fast deployment to optimize deceleration and minimize impact energy in the event of an in-flight issue.

Multirotor drones, even when properly maintained and operated, can sometimes encounter emergency situations—such as severe weather conditions, radio transmission failure, propulsion system malfunction, or GPS signal loss—where immediate activation of a safety system is crucial.

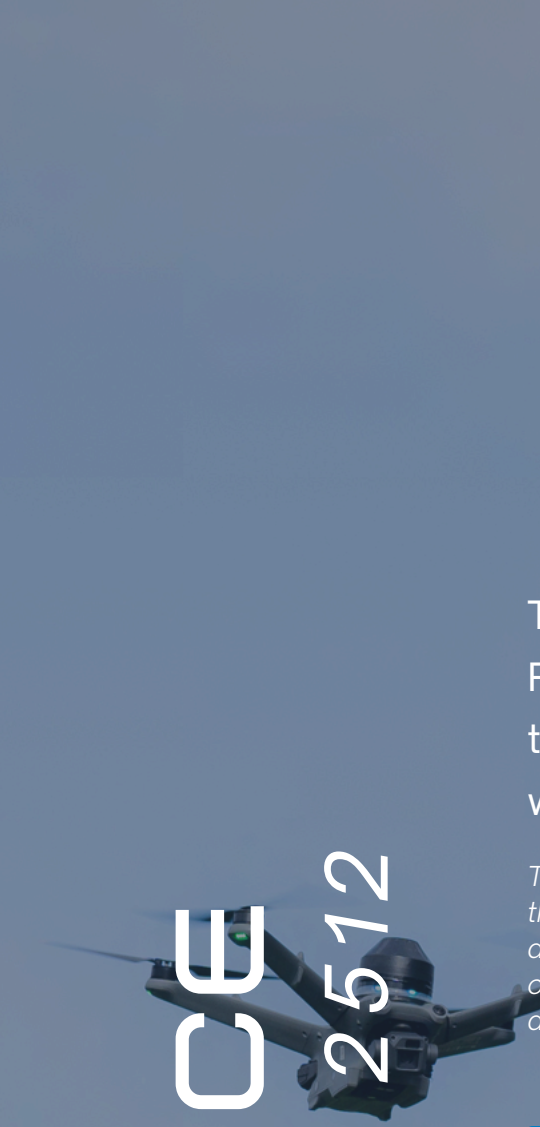
In such critical scenarios, the combined deployment of the Flight Termination System and Parachute Recovery System can mean the difference between a minor incident and a serious accident. Kronos M3D systems are engineered to activate and deploy in under one second.

# GENERAL *presentation*

**TO BE READ CAREFULLY**

These safety devices do not guarantee the integrity of the equipment, nor the absence of damage to property or injury to persons. They are complementary safety features, designed to enhance existing safety measures. Under no circumstances shall Dronavia or its distributors be held liable for any malfunction, perceived performance shortcomings, or failure to deploy.

# COMPLIANCE with MOC2511 / 2512



The Kronos Matrice 3D MOC2512 (M2) Parachute Recovery System has been developed to meet the requirements of the Means of Compliance with Light-UAS.2512 published by the EASA:

*The Light-UAS.2512 standard offers several options for complying with the SORA's M2 mitigation measures. M2 mitigation measures are designed to reduce the effect of ground impact once control of the operation is lost. This is done by reducing the effect of the UA impact dynamics (i.e. area, energy, impulse, transfer energy, etc). '*

EASA

The Kronos Matrice 3D MOC2511 Flight Termination System has been developed to meet the requirements of the Means of Compliance with Light-UAS.2511 published by the EASA:

*A Flight Stop System (FTS) is a system which, when activated, terminates the flight. By its very nature, it is an emergency measure and not a precautionary one. Its purpose is to ensure that an out-of-control UAS does not enter adjacent areas with an indefinite trajectory but, on the contrary and preferably, that it stops, and that its crash/debris zones are kept strictly within the ground risk buffer zone.*

EASA

# WARNINGS & safety precautions

TO BE READ CAREFULLY

The Kronos M3D MOC2511/12 accessory kit includes two safety accessories designed to, under certain conditions, prevent the equipped drone from exiting its regulatory flight envelope by cutting its motors, and to avoid free fall in the event of a critical failure.

***Activating the Flight Termination System and/or the Parachute Recovery System will inevitably result in the drone falling.***

These systems do not prevent technical failures from occurring. Any drone operation inherently involves a risk to equipment and nearby individuals, regardless of the safety systems in place. The use of the Kronos M3D Flight Termination System and Parachute Recovery System must never lead to increased risk-taking during flight operations.

# WARNINGS *& safety precautions*

TO BE READ CAREFULLY

Dronavia may suspend the warranty and disclaim any responsibility for anyone who fails to adhere to the basic safety instructions outlined below.

Before handling the Kronos M3D systems, you must carefully read this manual. It provides information on the deployment of the Parachute Recovery System and the Flight Termination System. In addition to the important notes and information mentioned in this manual, the device owner must comply with all the essential safety instructions outlined below.

# 15 SAFETY
## instructions to follow

**TO BE READ CAREFULLY**

1. *It is forbidden to carry out any manipulations other than those specified in the manual.*

2. *The device should only be used by or under the supervision of a responsible adult. Always keep the device out of the reach of children. Do not let them play with it.*

3. *Do not under any circumstances dismantle the various parts of the device, except when resetting it in accordance with the instructions in this manual.*

4. *Do not place the device in a damp or wet environment and keep it out of direct sunlight.*

5. *Do not expose the system to high temperatures, strong shocks, shock hazards, contact with chemicals or acids, or long-term storage in a high-humidity or dusty environment. The maximum operating temperature is 40°C and the minimum operating temperature is -5°C.*

6. *Check that the Kronos Parachute Recovery System and Flight Termination System is in good condition before each use. Do not use the device if it is damaged. If necessary, contact your dealer.*

7. *The Kronos Parachute Recovery System and Flight Termination System cannot prevent the drone from malfunctioning.*

8. *Any flight with a drone implies the existence of a risk for equipment and people in the vicinity, with or without Kronos safety systems.*

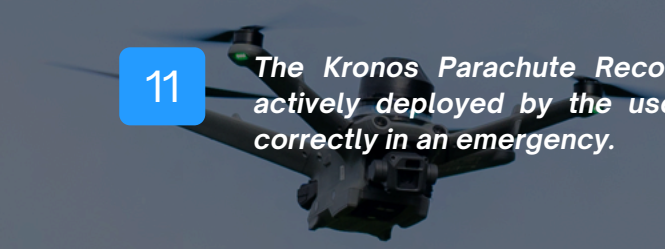
# 15 SAFETY

instructions to follow

## TO BE READ CAREFULLY

9 *Using a Kronos Parachute Recovery System and Flight Termination System should in no way increase your risk.*

10 *The Kronos Parachute Recovery System and Flight Termination System attempts to prevent a drone experiencing a malfunction from free-falling. However, there are fall situations in which the effectiveness of the Kronos Parachute Recovery System may be limited or impeded.*



11 *The Kronos Parachute Recovery System and Flight Termination System can be actively deployed by the user. Regular training is necessary to be able to react correctly in an emergency.*

12 *The spring ejection system only works once. You can recharge the system yourself by following the instructions in this manual. It is your responsibility to ensure that the system is under warranty.*

13 *When reloading, it is forbidden to do so with people nearby, and especially with the barrel pointing in their direction. You must take the same precautions as when handling a loaded rifle. In the event of accidental firing during this stage or mishandling, the spring could be ejected and cause serious injury. Safety glasses must be worn.*

14 *After deploying the device, we recommend that you carefully inspect each component to ensure its integrity. If in doubt, contact your reseller.*

15 *After switching on the system, if the LED changes to a steady red, do not use it and contact your reseller for assistance.*

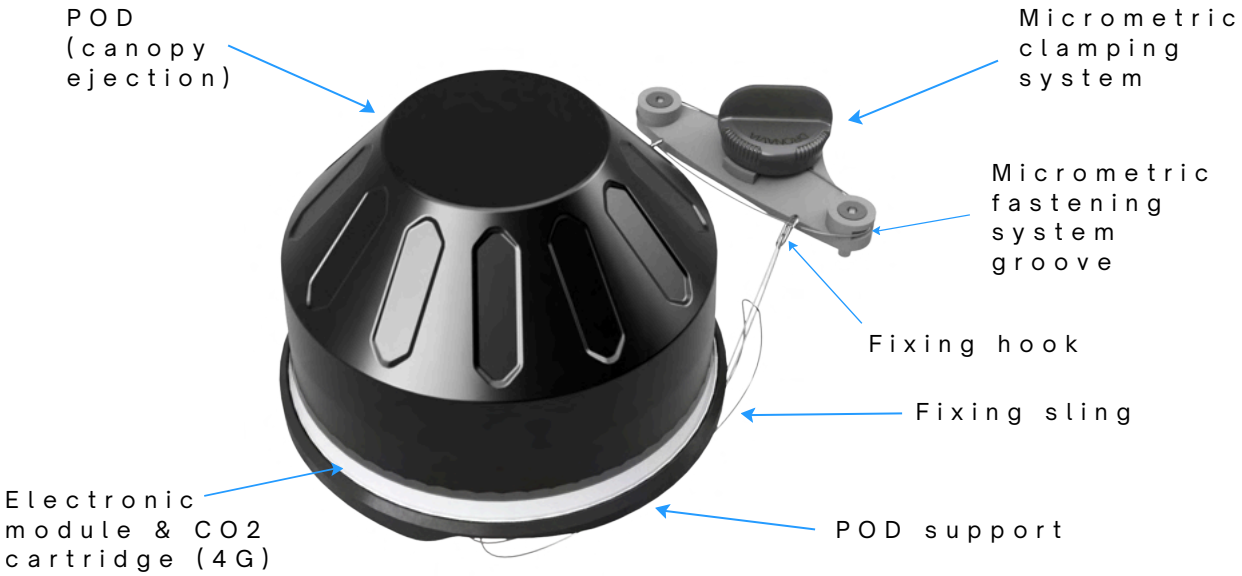
SECTION

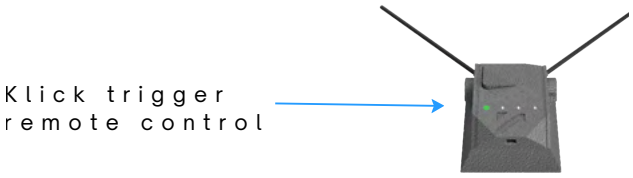
# KRONOS M3D

PARACHUTE RECOVERY SYSTEM FOR DJI MATRICE 3D

# COMPONENTS

*presentation*




## ADDITIONAL ACCESSORIES SUPPLIED

Micro-USB cable

Screw x2 (H2 M3x10)

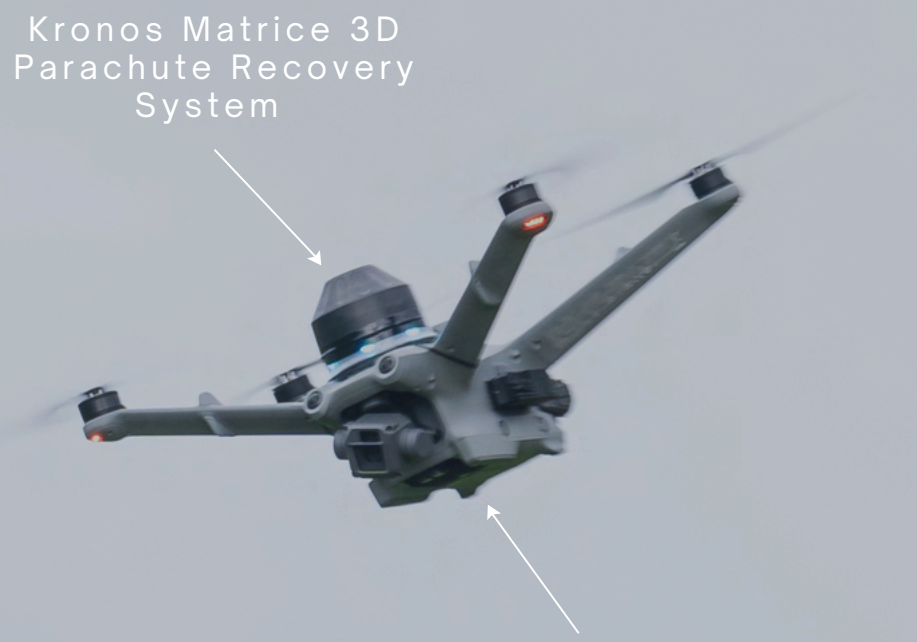
Positioning screw x2 (T6)

Allen Key 2mm/1.5mm

Reset tool

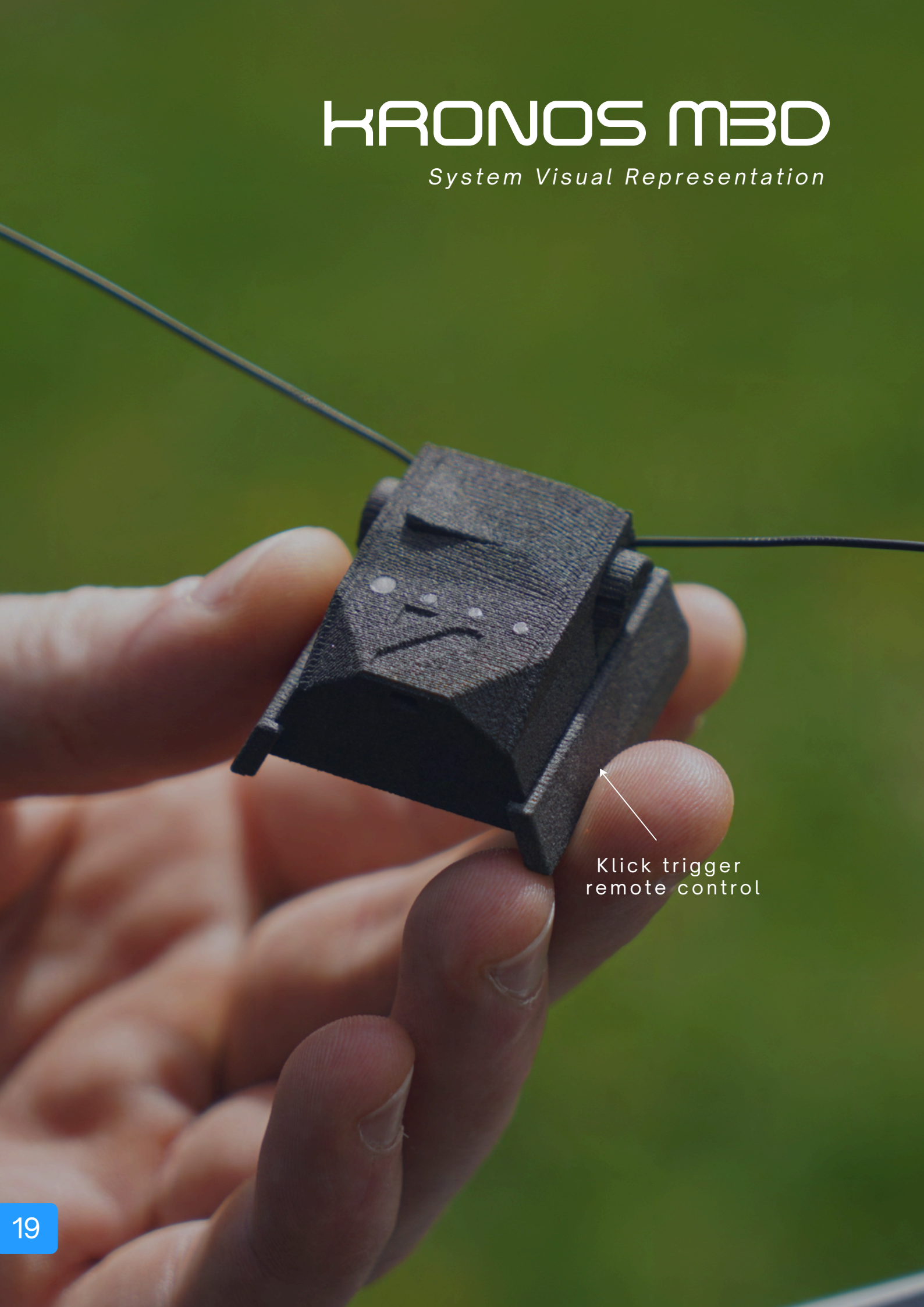
# KRONOS M3D

*System Visual Representation*



# KRONOS M3D

*System Visual Representation*



# KRONOS M3D

*Overview of Key System Figures*

# KRONOS M3D

## Technical specifications

***TOTAL WEIGHT (PRS+FTS) : 268 G***

| | |
|---|---|
| ***PRS WEIGHT**** | 190 G |
| ***EJECTION DEVICE*** | CO2 CARTRIDGE<br>4 GRAMS |
| ***MINIMUM HEIGHT EFFICIENCY*** | 20 METERS |
| ***COMMUNICATION WIRELESS RADIO*** | SRD860 WITH ENCRYPTED KEY<br>(869 MHZ / 100 MW) |
| ***RANGE OF THE KLICK TRIGGER REMOTE CONTROL*** | 1500 METERS* |
| ***PARACHUTE AUTONOMY*** | UNLIMITED WHEN CONNECTED TO THE DRONE |
| *KLICK TRIGGER* ***REMOTE CONTROL AUTONOMY*** | 20 HOURS |
| ***ENERGY GROUND IMPACT*** | 14 J |
| ***OPERATING TEMPERATURE*** | -5°C À 40°C |
| ***WATERPROOFING LEVEL*** | IP54 |

**can reach up to 1.5 km, under optimum conditions and in an environment free of obstacles and interference.*

# KRONOS M3D

## PRS Operational Limits

| | |
|---|---|
| ***MAXIMUM WIND SPEED AT GROUND LEVEL*** | 9.1 m/s |
| ***MINIMUM FLIGHT ALTITUDE (AGL)*** | 20 metres |
| ***OPERATING TEMPERATURES*** | MIN : -5 °C<br>MAX : 40 °C |
| ***USABLE IN RAINY WEATHER*** | Yes |

# KRONOS M3D

## Dimensions and weights

DRONE

33.5 x 39.8 x 15.3 cm

1410 g

PARACHUTE

8 x 6.1 cm

190 G

PARACHUTE + DRONE

33.5 x 39.8 x 15.3 cm

1600 g

# KRONOS M3D

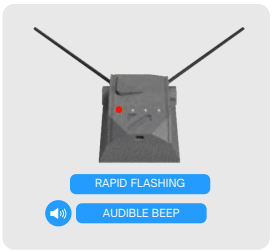
## Minimum Size of the Ground Risk Buffer (GRB)

| OPERATING VOLUME VERTICAL LIMIT | SOIL-RELATED RISK BUFFER ZONE |
|---|---|
| 20 | 47 |
| 30 | 71 |
| 40 | 95 |
| 50 | 120 |
| 60 | 144 |
| 70 | 168 |
| 80 | 193 |
| 90 | 217 |
| 100 | 241 |
| 110 | 265 |
| 120 | 290 |

*The ground risk threshold can be calculated based on various drone parameters and assumptions. Please refer to the document dedicated to calculating the ground risk threshold if you need to calculate more accurate ground risk thresholds based on your application.*

# SYSTEM states

## INITIALIZATION




System initialisation


PRS not connected with Klick

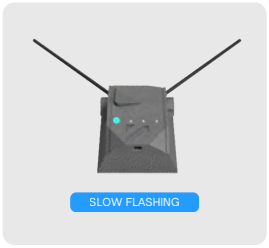



Waiting Phase

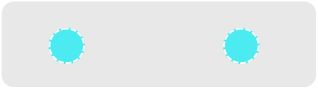


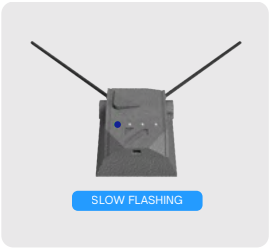
*In case of a low battery in the parachute system, a steady yellow LED will remain on until the minimum charge level required for initialization is reached.*

## CONNECTION

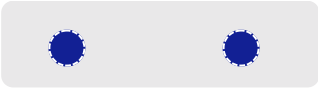



FTS & PRS Connected






FTS & PRS Connected with Autonomous Deployment



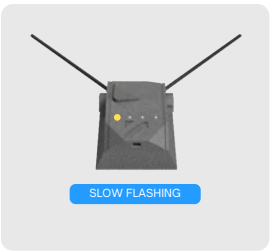
# SYSTEM states

## ACTIVATION AND DEPLOYMENT


FTS triggered & PRS deployed with Klick

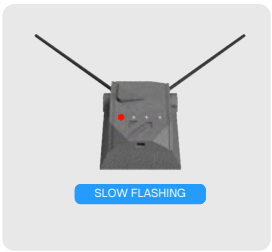

FTS triggered & PRS deployed with Autonomous deployment

## SYSTEM & BATTERY ALERTS

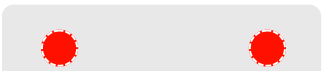



Signal lost with remote control (Klick)





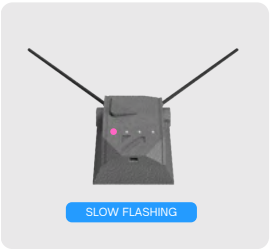

Low battery



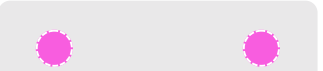

System error

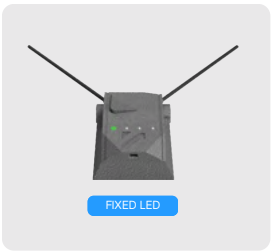

Charging the battery






Signal scrambled



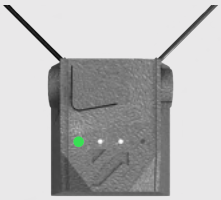
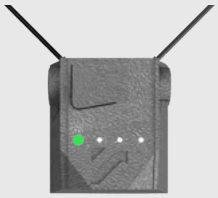



Battery charged

# SIGNAL states

*Four LEDs let you check the status of the link between the Klick trigger remote control and your Kronos M3D conversion kit. The signal level is represented by the number of lights on: the more lights, the more stable the connection.*

## The different LED states

| Lost signal | Low signal | Medium signal | Strong signal |
|---|---|---|---|
|  |  |  |  |
| FIXED LED<br>LONG BEEP | FIXED LED<br>DOUBLE SHORT BEEP | FIXED LED | FIXED LED |

## Warning

***If the signal is lost, the manual release of the Parachute Recovery System and the Flight Termination System will become inoperative. Move closer to the drone to re-establish the link with the Klick remote control.***

# INSTALLATION
*of the parachute system*

*The Kronos M3D Parachute System (PRS) can be installed in just a few minutes. To install the parachute, please follow the instructions below in the specified order:*

## *Required Skills and Tools*

Installing the Parachute System (PRS) does not require any specific technical skills. A 2 mm and 1.5 mm Allen key (provided by Dronavia) is required for the installation.

## *Instructions*

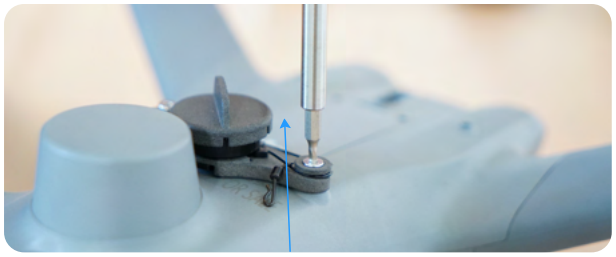
1 Attach the micrometric clamping system to the rear of the DJI Matrice 3D drone using the two supplied T6 screws.

### *Warning*

***Make sure the mounting orientation is correct. The flat side of the micrometric clamping system must face the DJI logo. The DJI logo must remain visible.***

# INSTALLATION
*of the parachute system*

2 Unclip the micrometric clamping system by pulling it upward until you hear a “click” sound. Then loosen the tensioning cable to allow slack.



3 Insert the two supplied positioning screws into the designated slots at the front of the DJI Matrice 3D drone.

4 Spread the sling cables apart, then insert the parachute system into the USB-C port of the DJI Matrice 3D drone and align it with the two previously installed positioning screws. Ensure the parachute system is securely mounted by gently rotating it to check for proper fixation.

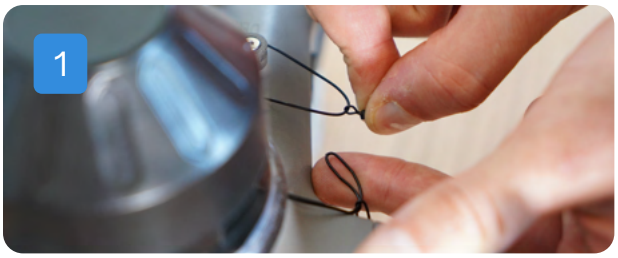
# INSTALLATION
*of the parachute system*

5 Take the front-left sling (the longest one) and hold it against the drone arm. Then take the rear-left sling (the shortest one) and loop it through the front sling's loop. Hold both slings firmly under tension before proceeding to the next step.

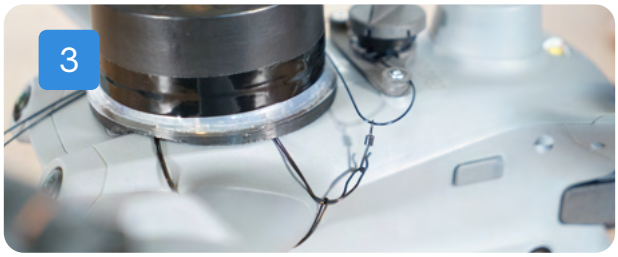


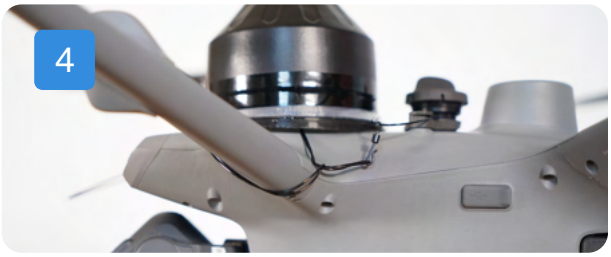


6 Use the hook located on the micrometric clamping system, then attach it to the loop of the rear attachment hook.



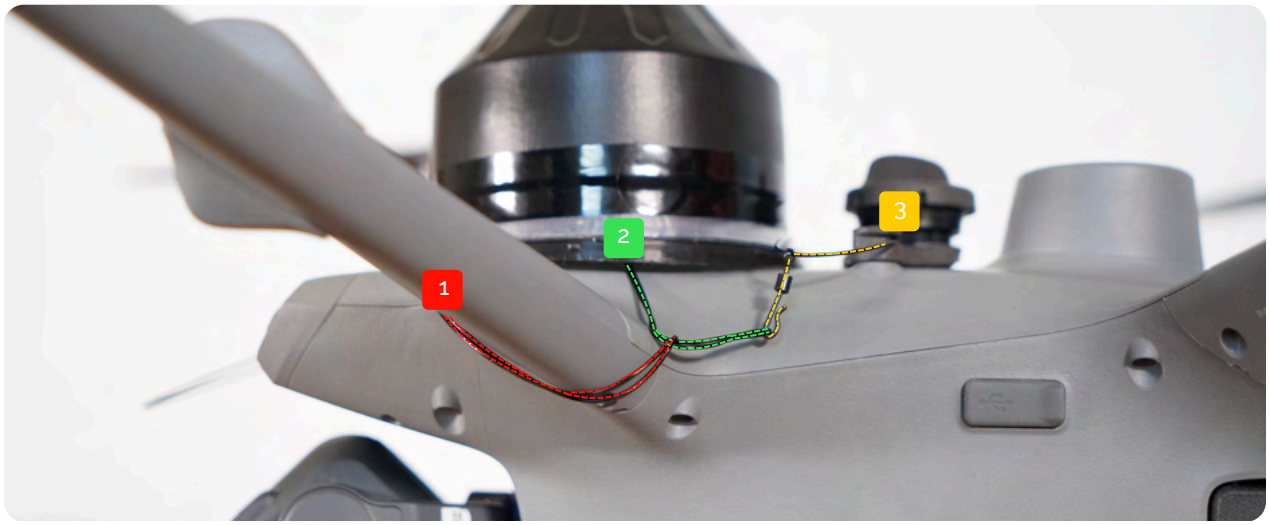


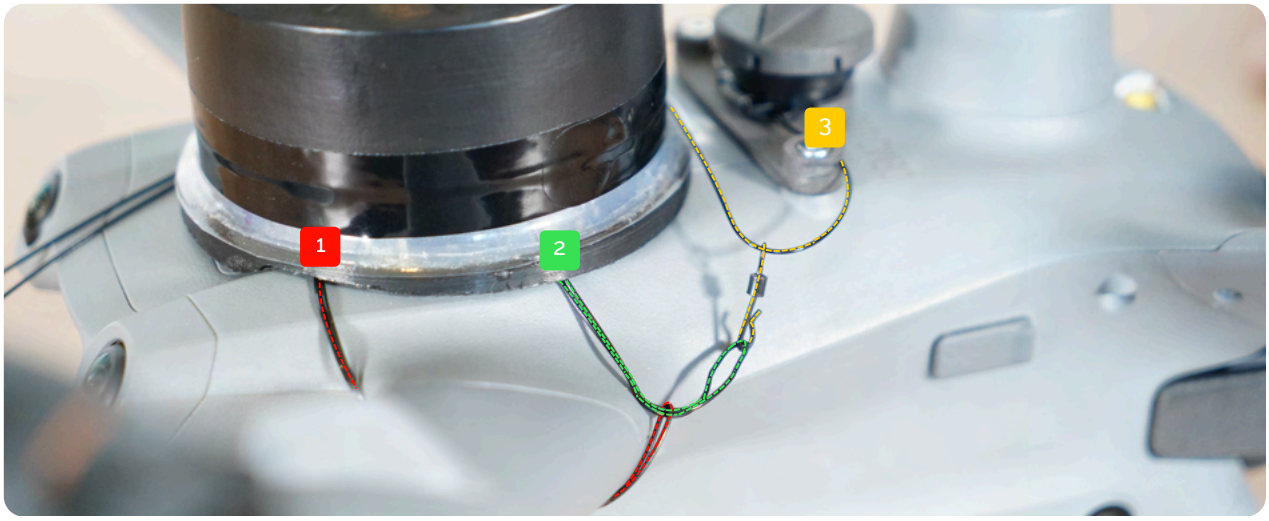


# INSTALLATION
*of the parachute system*

7 To verify the installation, ensure that sling 2 passes through the loop of sling 1. Sling 3 should be attached to sling 2 using the hook.



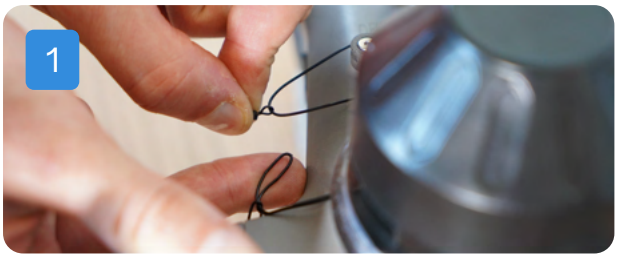
# INSTALLATION
*of the parachute system*

8 Take the front-right sling (the longest one) and hold it against the drone arm. Then take the rear-right sling (the shortest one) and pass it through the loop of the front sling. Hold both slings firmly under tension before proceeding to the next step.

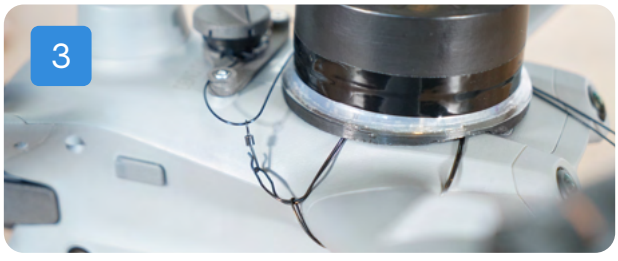




9 Use the hook on the micrometric clamping system and attach it to the loop of the rear attachment hook.

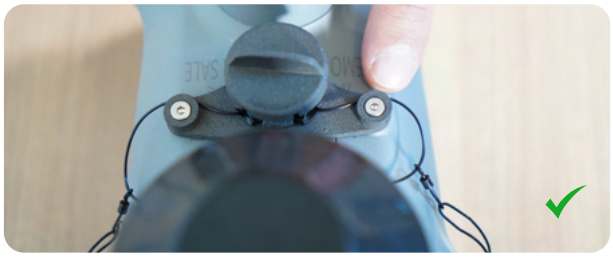




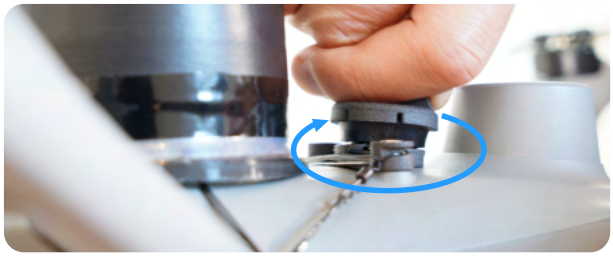



# INSTALLATION
*of the parachute system*

10 Ensure that the tensioning cable of the micrometric clamping system fits perfectly into the groove of the mount.



11 Press the micrometric clamp to unlock it. You should hear a “click” indicating it has been successfully unlocked. Then, turn the micrometric clamp to tighten the cable. The slings should be sufficiently taut. Finally, press the micrometric clamp again to lock it back in place.



12 ***Your Kronos Matrice 3D parachute is now installed.***

13 ***Each installation must be recorded in the chapter “Listing of Installations, Uninstallations, and Maintenance Operations” on page 58.***

# INITIALIZATION
*of the parachute system*

*To initialize the Parachute System (PRS), please follow the instructions below in the specified order:*

## *Instructions*

1 Turn on your DJI Matrice 3D drone. If the Parachute System (PRS) is connected to the drone, both the PRS and the Flight Termination System (FTS) will power on automatically.

2 ***Your Kronos Matrice 3D parachute is initialized.***

## *The different LED states*

System Initialization

CLIGNOTEMENT RAPIDE BIP SONORE



Parachute Initialization

LED FIXE



Parachute powered on, awaiting activation

CLIGNOTEMENT LENT

Parachute not connected to the SDK

LED FIXE

# INITIALIZATION
## of the parachute system

### Warning

*If the parachute module LED remains solid yellow, it means the system is in a charging or preheating phase, which prevents the drone from taking off. This behavior may also occur when the ambient temperature is below -5 °C, making deployment impossible. The system may take up to 5 minutes to reach its operational state.*

*If the parachute module LED remains solid red after the initialization phase, it indicates that the parachute system was not properly rearmed, the capsule is not correctly tightened, or the system is not properly connected to the SDK. Rearm the system, perform a full inspection of the parachute module, and carefully check the USB-C connection between the parachute system and the drone.*

# ACTIVATION
*of the parachute system*

*To activate the Kronos M3D Parachute Recovery System, follow the instructions below in order:*

## *Warning*

***For reasons of operational safety and to prevent inadvertent deployment, the M3D Parachute Recovery System incorporates an automatic lock that prevents deployment at altitudes below 20 metres. This limitation ensures that the parachute can only be activated in conditions that guarantee the minimum effectiveness of the system.***

## *Instructions*

1. The Kronos M3D Parachute Recovery System automatically detects when your drone is ready to take off. During this phase, the LEDs on the parachute module and on the Klick remote control flash purple, and double beeps are emitted.

2. When the drone reaches an altitude of 20 metres, two distinct beeps confirm that the minimum threshold required to activate the autonomous parachute deployment function has been reached. The LEDs on the parachute module and on the Klick remote control then flash dark blue.

3. ***Your Kronos M3D Parachute Recovery System is active with the autonomous deployment function.***

## *Warning*

***If there is no audible signal or dark blue LED, it is likely that the autonomous deployment function has not yet been activated due to insufficient altitude. To activate the autonomous deployment function, a minimum altitude of 20 metres is required.***

# ACTIVATION
*of the parachute system*

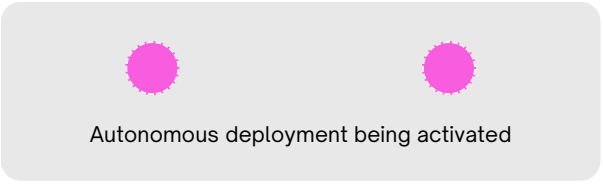
## *The different LED states*

Parachute not connected to the Klick remote control

SLOW FLASHING AUDIBLE BEEP

Parachute connected to the Klick remote control

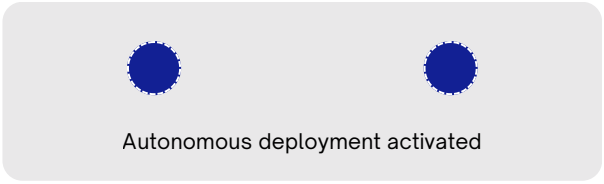
SLOW FLASHING AUDIBLE BEEP



Autonomous deployment being activated

CONTINUOUS DOUBLE BEEP

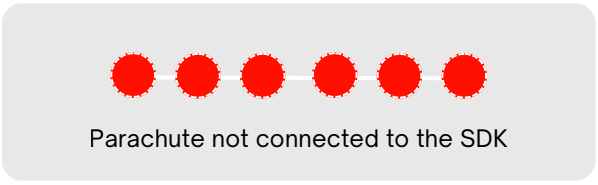
SLOW FLASHING



Autonomous deployment activated

2 SHORT, LOUD BEEPS

SLOW FLASHING



Parachute not connected to the SDK

LED FIXE

# DEACTIVATION
*of the parachute system*

*To deactivate the Kronos M3D Parachute Recovery System, follow the instructions below in order:*

## *Instructions*

1 The Kronos M3D Parachute Recovery System automatically detects the landing of the DJI Matrice 3D drone. Approximately 5 seconds after detection, a beep is emitted and the LED stops glowing dark blue. The take-off detection module is then automatically deactivated. It will reactivate on the next flight, as soon as the drone reaches a minimum altitude of 20 metres.

## *Warning*

*If the dark blue LED on the Kronos M3D Parachute Recovery System remains lit, this indicates that the autonomous deployment function is still active. Do not manipulate the drone to avoid any risk of involuntary deployment. Wait a further 5 seconds for the automatic deactivation.*

2 The autonomous deployment of the Kronos M3D Parachute Recovery System is deactivated, but your parachute remains active and can be deployed using the Klick trigger remote control.

3 To completely deactivate your Kronos M3D Parachute Recovery System, switch off the DJI Matrice 3D drone.

## *Warning*

*Do not perform any ground handling until the parachute system (PRS) has fully powered down.*

# DEACTIVATION

*of the parachute system*

## *The different LED states*

Parachute not connected to the Klick remote control

CLIGNOTEMENT LENT BIP SONORE

Parachute connected to the Klick remote control

CLIGNOTEMENT LENT BIP SONORE


YOUR PARACHUTE IS
ACTIVE AND
OPERATIONAL!

# DEPLOYMENT
*of the parachute system*

*To deploy the Kronos M3D Parachute Recovery System (with autonomous deployment or manually), observe the following safety instructions:*

## *Warning*

1. Never attempt to deploy the M3D Parachute Recovery System on the ground.

2. The Kronos M3D Parachute Recovery System is designed to be deployed at a minimum height of 20 metres from the ground in standard atmospheric conditions.

3. For a fall from a height of 120 meters, the ground impact energy is reduced to less than 14 joules with the Kronos Matrice 3D parachute system, compared to 1930 joules without any device.

## *Warnings*

***This data may vary depending on altitude above sea level, relative wind and many other external factors. That's why we recommend a minimum height of 20 m above ground level to deploy the Kronos M3D Parachute Recovery System and sufficiently limit the impact of your drone on the ground.***

***For reasons of operational safety and to prevent inadvertent deployment, the M3D Parachute Recovery System incorporates an automatic lock that prevents deployment at altitudes below 20 metres. This limitation ensures that the parachute can only be activated in conditions that guarantee the minimum effectiveness of the system.***

# AUTONOMOUS

*deployment of the parachute system*

## *Instructions*

1 When autonomous deployment is activated, the parachute system analyses the flight parameters (altitude, acceleration, inclination, angular velocity) in real time. If any abnormal behaviour is detected, indicating a loss of control, the M3D Parachute Recovery System is automatically triggered, without pilot intervention.

## *The different LED states*

Parachute deployed with autonomous deployment function

AUDIBLE BEEP RAPID FLASHING

# MANUAL

## *deployment of the parachute system*

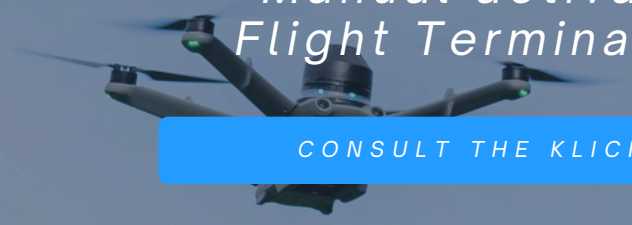
*To manually deploy the Kronos M3D Parachute Recovery System, follow the instructions below in order:*

### *Instructions*

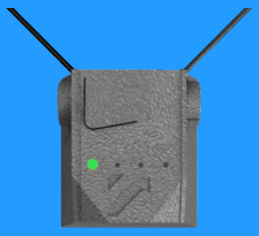
1. Find out how to deploy your Kronos M3D Parachute Recovery System manually with the help of our user and instruction manual for the Klick remote activation system.

# KLICK

## *Manual activation of the Flight Termination System*



CONSULT THE KLICK USER MANUAL

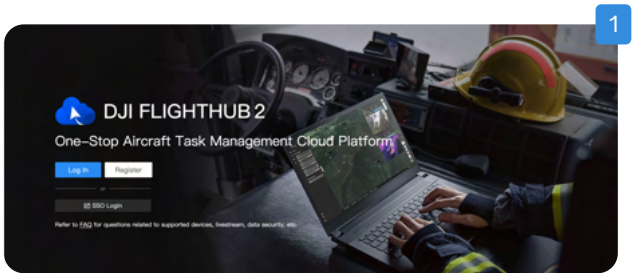


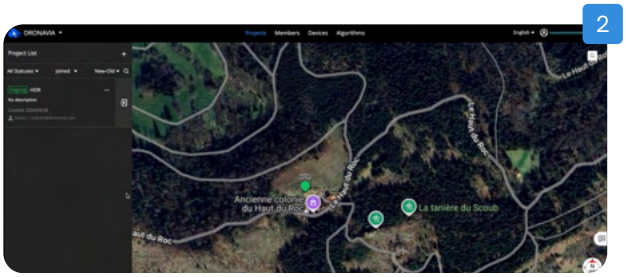
# DEPLOYMENT

*manual via FlightHub2*

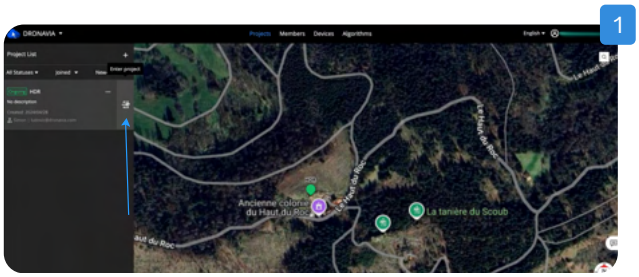
*To manually deploy the Kronos Matrice 3D parachute system (PRS) from the FlightHub 2 application, follow the instructions below in the given order:*

1 Launch the FlightHub 2 application, sign in to your account, and access your dashboard.

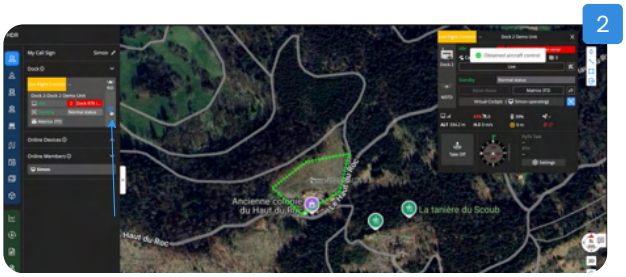


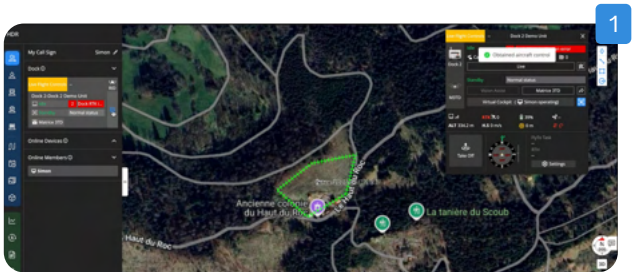

2 Select your project, then click on “Enter Project.”

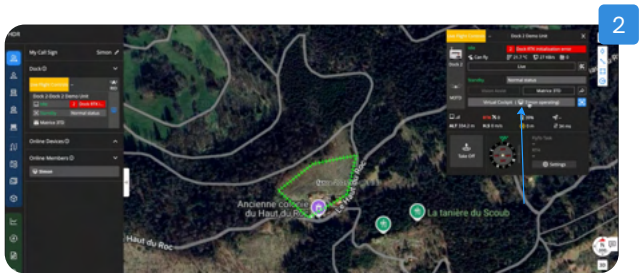



3 A menu will appear displaying all information related to your Dock and your drone. Then, click on “Flight Settings.”

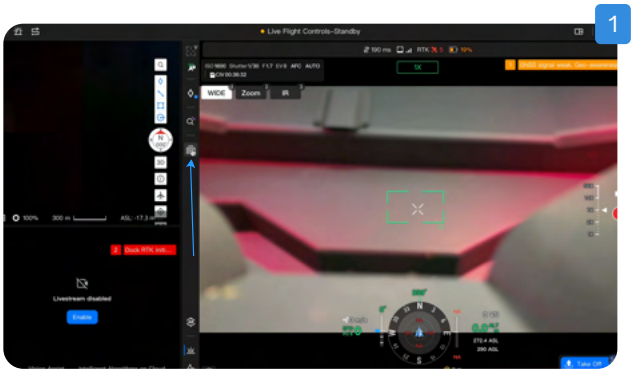



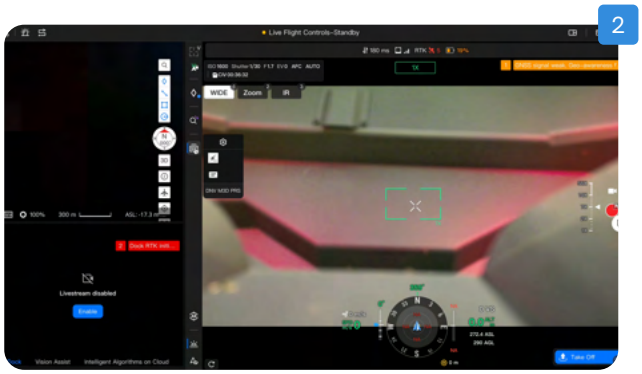

4 An “Aircraft Control” window will appear. Then, click on “Virtual Cockpit.”



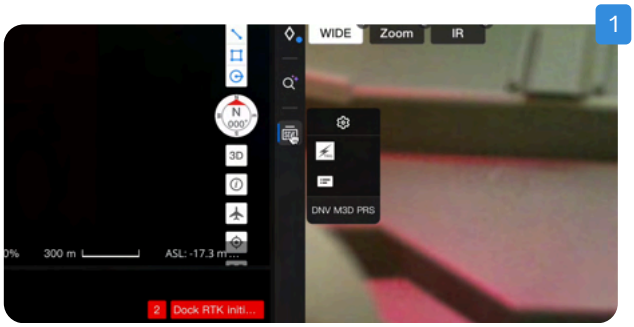




5 You will then access an interface similar to a standard DJI remote controller. Click on the “PSDK” icon.

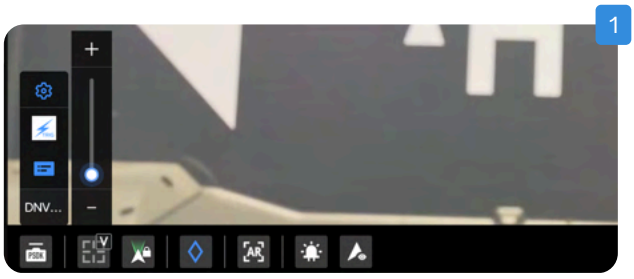


6 A menu will appear displaying all information related to the Kronos M3D system (see page 49). Check that your parachute and flight termination systems are properly connected.




7 To deploy the parachute system, slide the control slider upward (+) and hold it in position until the parachute system is fully deployed.

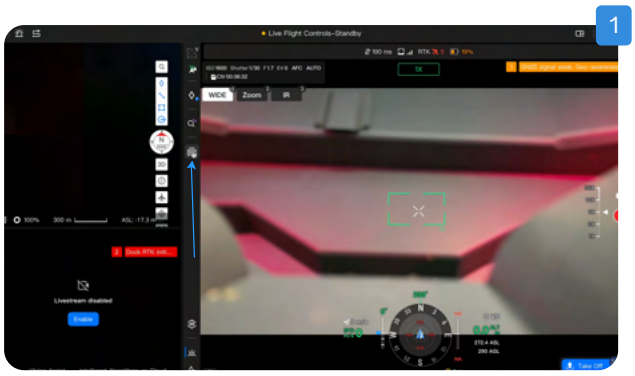


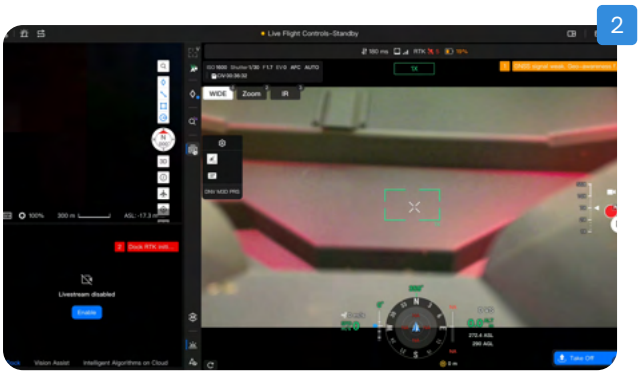
# FLIGHTHUB 2

## *Kronos system states*

*To monitor the real-time status of the Kronos Matrice 3D parachute system (PRS) directly from the FlightHub 2 application, follow the instructions below in the given order:*

1 Access the “Virtual Cockpit” interface and click on the “PSDK” icon. Refer to the list of system statuses on page 49.



# FLIGHTHUB 2

## The conditions of the Kronos system

| STATUS | EVENTS |
|---|---|
| ***FTS GROUND TEST OK*** | *The FTS ground test was successful.* |
| ***SYSTEM CHARGING UNABLE TO TAKEOFF*** | *The system is currently charging. Please wait until the batteries are fully charged. Takeoff is not permitted during this phase.* |
| ***CO2 HEATING UNABLE TO TAKEOF*** | *The system is currently heating the CO2 cartridge. Please wait until the temperature reaches the appropriate level. Takeoff is not possible during this phase.* |
| ***UNKNOWN*** | *Unidentified error* |
| ***NOT CONNECTED*** | *System not connected: the radio control or the FTS is not linked to the parachute system (PRS).* |
| ***CONNECTED PRS+FTS*** | *Connected system: PRS and FTS* |
| ***ASK TRIGGER*** | *Request for manual deployment using Dronavia's Klick remote control.* |
| ***TRIGGER BY DNV RC*** | *Manual deployment using the Dronavia Klick remote control* |
| ***TRIGGER BY DJI RC*** | *Manual deployment through DJI FlightHub 2 (refer to page 45)* |
| ***TRIGGER BY AD*** | *Autonomous deployment through crash detection* |
| ***TRIGGER ERROR*** | *Deployment issue* |
| ***AD MODE ENABLE*** | *Crash detection mode has been activated.* |
| ***AD MODE NOT ENABLE*** | *Crash detection mode is not activated.* |
| ***PRE ARMED*** | *Takeoff detection phase* |

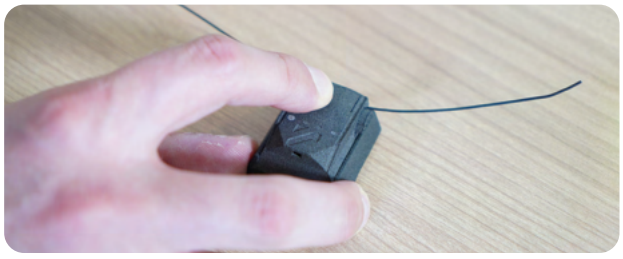
# STOP
## of the parachute system

*To stop, power off, and reset the Parachute System (PRS), please follow the instructions below in order:*

## Instructions

1 Turn off your DJI Matrice 3D drone. The Parachute System (PRS) and the Flight Termination System (FTS) will power off automatically.

2 Turn off your Klick trigger remote.



3 ***Your Kronos Matrice 3D parachute is now deactivated.***

## Warning

*To completely deactivate your parachute system, turn off the DJI Matrice 3D drone. Please note that the parachute system requires approximately 5 seconds (without deployment) and up to 40 seconds (after deployment) to fully power off once the drone has been turned off.*

# STOP

of the parachute system

## Warning

*Do not perform any operation on the ground until the parachute system (PRS) is completely powered off.*

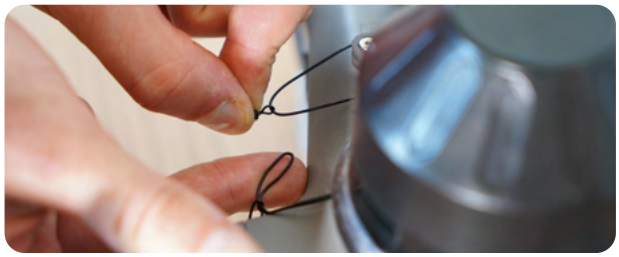
# DISMANTLING
## *of the parachute system*

*To disassemble the entire Parachute System (PRS), please follow the instructions below in order:*

## *Instructions*

1 Unclip the micrometric locking system by pulling it upward. You should hear a “click” sound. Then, slacken the tension cable slightly.

2 Remove the hook connecting the micrometric locking system to the slings.



# DISMANTLING
## of the parachute system

3 Remove the parachute from the USB-C port of the DJI Matrice 3D drone along with the two positioning screws. Then, remove the Parachute System (PRS) from the drone.




4 Remove the two positioning screws. Then, remove the micrometric locking system at the rear of the DJI Matrice 3D drone by unscrewing the two mounting screws.

5 *Each disassembly must be recorded in the chapter “Listing of installations, disassemblies, and maintenance operations” on page 58.*

# ANNUAL *maintenance*

TO BE READ CAREFULLY

Like all rescue parachute systems (rescue parachutes for paragliders or parachutists, avalanche airbags, etc.) Dronavia parachutes must undergo preventive maintenance to be kept in optimum working order. The only preventive maintenance operation is to replace the POD. It's a quick and easy operation, which means that pilots never have to leave their drone standing idle.

A use-by date is set for each POD. Dronavia disclaims all liability and cancels the warranty if your POD has exceeded this use-by date.

# PROCEDURES

*maintenance requirements*

*To be kept in optimum working order, each parachute system must undergo preventive or post-deployment maintenance. Here is a summary table of the mandatory maintenance operations:*

| FREQUENCY | OPERATION | CAN BE MADE BY |
|---|---|---|
| **Every year** | Replacement of the POD<br>**or**<br>Repackaging of the canopy | Final user<br>**or**<br>DRONAVIA or any certified partner |
| **Every 5 years** | Mandatory manufacturer global maintenance | Manufacturer |
| **After every deployment** | Rearming of the parachute system | Final user<br>**or**<br>DRONAVIA or any certified partner |
| **After every deployment** | Inspection of the CO2 system | Final user<br>**or**<br>DRONAVIA or any certified partner |
| **After every deployment** | CO2 cartridge replacement | Final user<br>**or**<br>DRONAVIA or any certified partner |
| **After every deployment** | Replacement of the POD<br>**or**<br>Repackaging of the canopy | Final user<br>**or**<br>DRONAVIA or any certified partner |
| **After 30 deployments** | Mandatory manufacturer global maintenance | Dronavia |
| **After 1000 initialization** | Mandatory manufacturer global maintenance | Dronavia |

## *Warning*

*If you wish to carry out global maintenance yourself, Dronavia will disengage its responsibility for the system, in addition to cancelling the warranty.*

# LISTING

## *parachute deployment failures*

*If the deployment of the Kronos M3D Parachute Recovery System fails during flight, record the following:*

| Drone affected by activation failure | Flight hours accumulated at the time of activation failure | Distance between the control unit and the drone during the activation attempt | Location of the operation | Presence of a high-power transmitter in the operational volume |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |

# LISTING

## *voluntary and untimely deployment of the parachute*

*If the Kronos M3D Parachute Recovery System is deployed during flight, record the following:*

| Drone concerned by activation | Flight hours accumulated at the time of activation | Distance between the control unit and the drone during the activation attempt | Location of the operation | Was the activation commanded or uncommanded? | Presence of a high-power transmitter in the operational volume |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |

### *Warning*

*If the probability of failure observed in service is greater than 10-2/FH (taking into account the statistical uncertainty), the operator must inform the competent authority.*

# LISTING

*monitoring of installations / de-installations & maintenance operations*

*To be maintained in optimum working order, each Parachute Recovery System must be monitored for installation, de-installation, firmware updates, preventive or post-deployment maintenance. Here is a table summarising the operations to be listed:*

| Date | Operation | Problems | Operator and signature |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

# USE-BY DATE

*for the POD*

*Each POD has a use-by date to ensure that it remains in optimum working order:*

The optimum life of a POD is 1 year. The use-by date is shown on the label on the back of the POD.


## *Warning*

*If a POD is used after its use-by date, Dronavia accepts no liability for partial or slower activation of the parachute system.*

# PROCEDURE

*of return of the POD for maintenance*

*There are several options for exchanging your POD that is past (or close to) its use-by date:*

## *Buy* 99€

1 Buy a POD in advance from your dealer. You'll be able to continue flying during the annual maintenance of your first POD.

## *Exchange* 49€

2 Return your POD to a reseller and receive a new one at a preferential price.

## *Warning*

***Please plan in advance how long it will take to contact your reseller (order, delivery time, etc.) so as not to exceed the use-by date and jeopardise your flight missions.***

# DISMANTLING
## *of the POD system for maintenance*

*To remove the POD from the parachute system, please follow the instructions below in order:*

### *Instructions*

1 Unlock the POD by detaching it from its central mount. To do this, remove the securing slings.




# REARMING *of the Kronos Parachute*

TO BE READ CAREFULLY

Once the Parachute Recovery System has been deployed, Kronos systems have been designed to be rearmed quickly, enabling telepilots to resume their missions without undue delay.

Simple reactivation procedures should be followed. As some of them may present risks, it is imperative that you read the instructions in this section carefully.

A use-by date is defined for each POD. Dronavia disclaims all liability and voids the warranty if your POD has exceeded this use-by date.

# REARMING
## *of the parachute system*

*To rearm your Parachute System (PRS), please follow the instructions below in order:*

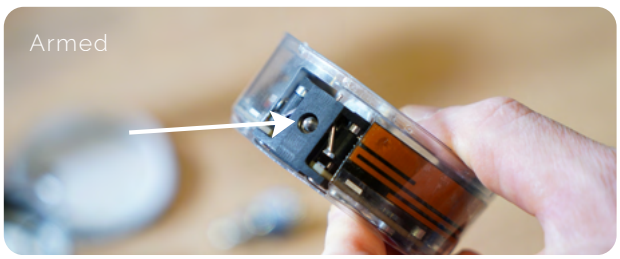
### *Warning*

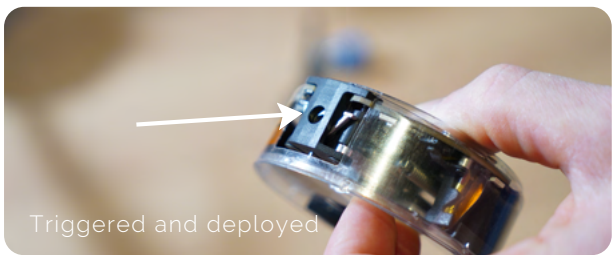
***For operational safety and to prevent accidental deployment, the M3D parachute system includes an automatic lock that prevents deployment below 20 meters altitude. This limitation ensures the parachute can only be activated under conditions that guarantee minimum device effectiveness. However, manual deployment via the Klick trigger remote remains possible. Exercise caution when handling the armed parachute to avoid unintended ground deployment, which may cause physical injury or equipment damage.***

### *Instructions*

1 Remove the CO2 cartridge by unscrewing it.

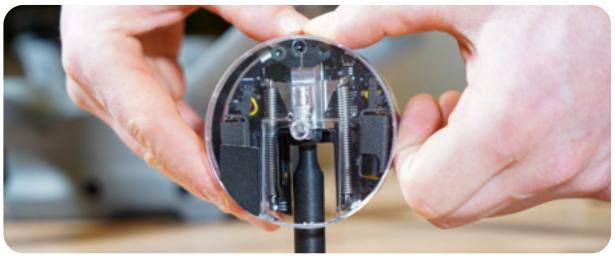
2 Check the condition of the firing pin. If the firing pin is extended, the parachute is armed and has not deployed. If the firing pin is not extended, the trigger has been activated and the parachute has deployed.



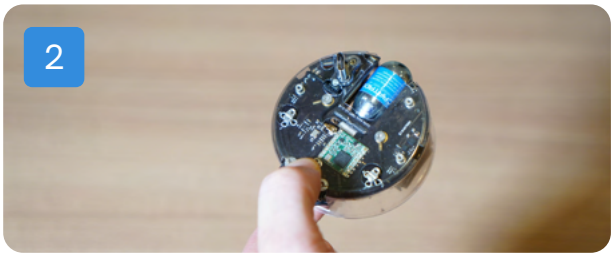



# REARMING
*of the parachute system*

3 Take the rearming tool and insert it into the striker until you hear a “click” sound. The parachute is now rearmed.



4 Replace the CO2 cartridge. For safety reasons, the parachute must be oriented downward. Then, insert the parachute module into its base.

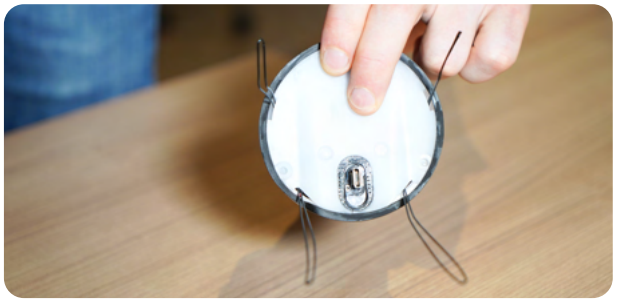



5 *Each CO2 cartridge replacement must be recorded in the chapter “Listing of installations, uninstallations, and maintenance operations” on page 58.*

# REPLACEMENT
*of POD system*

6 Take your replacement POD. There are four guides on the POD that allow you to insert the suspension lines. The two long lines must be inserted at the front of the parachute (on the USB-C side). The first line to position is the one located near the $CO_2$ cartridge. The two short lines must be inserted at the rear of the parachute.



7 ***Each POD replacement must be recorded in the section “List of Installations, Uninstallations, and Maintenance Operations” on page 58.***

8 ***Your Kronos Matrice 3D parachute system is rearmed.***


YOUR PARACHUTE IS REARMED!

# PROCEDURE

*for returning a used POD*

*There are several options for returning your used POD:*

## *Buy* 99€

1 Purchase a spare POD from your reseller in advance. This will allow you to continue flying during the annual maintenance of your first POD.

## *Exchange* 49€

2 Return your POD to a reseller and receive a new one, while benefiting from a preferential rate.

## *Warning*

***Please plan in advance how long it will take to contact your reseller (order, delivery time, etc.) so as not to exceed the use-by date and jeopardise your flight missions.***

# REPLACEMENT

*the parachute's CO2 cartridge*

| | |
|---|---|
| **TYPE** | CARTRIDGE OF CO2 |
| **VOLUME** | 4 CC |
| **TOTAL WEIGHT** | 18G (+/- 2G) |
| **CAPACITY** | 4G (+/- 1G) |
| **LID** | WELDED |
| **CONTAINER** | UNWELDED STEEL |
| **RECYCLING** | 100% RECYCLABLE |
| **TRANSPORTABILITY** | PLANE / TRAIN /BOAT |

*Warning*

*Only cartridges officially sold by Dronavia may be used, as they are subject to specific checks. Dronavia disclaims all responsibility and voids the warranty if any other type of CO2 cartridge is used.*

# 12 INSTRUCTIONS
*to follow*

1. Keep the CO2 cartridge at a temperature below 45°C.
2. Do not leave full cartridges in the car when the temperature is too high.
3. In the event of prolonged inactivity, store your CO2 cartridges at normal temperatures between 10 and 20°C. CO2 cartridges may burst at temperatures above 70°C.
4. High temperatures can increase the pressure in the cartridge and this can prevent the device from working, possibly damaging it.
5. Avoid hitting the cartridge.
6. If corrosion spots appear on the surface of the cartridges, change them immediately.
7. Make sure the used cartridge is completely empty before removing it.
8. Do not cut or puncture the cartridge.

*TO BE READ CAREFULLY*

# 12 INSTRUCTIONS
*to follow*

9 Only use certified CO2 cartridges sold by Dronavia.

10 Once the gas cartridge has been installed, do not attempt to unscrew or remove it.

11 Do not dispose of the cartridge in a fire.

12 Keep out of reach of children.


*TO BE READ CAREFULLY*

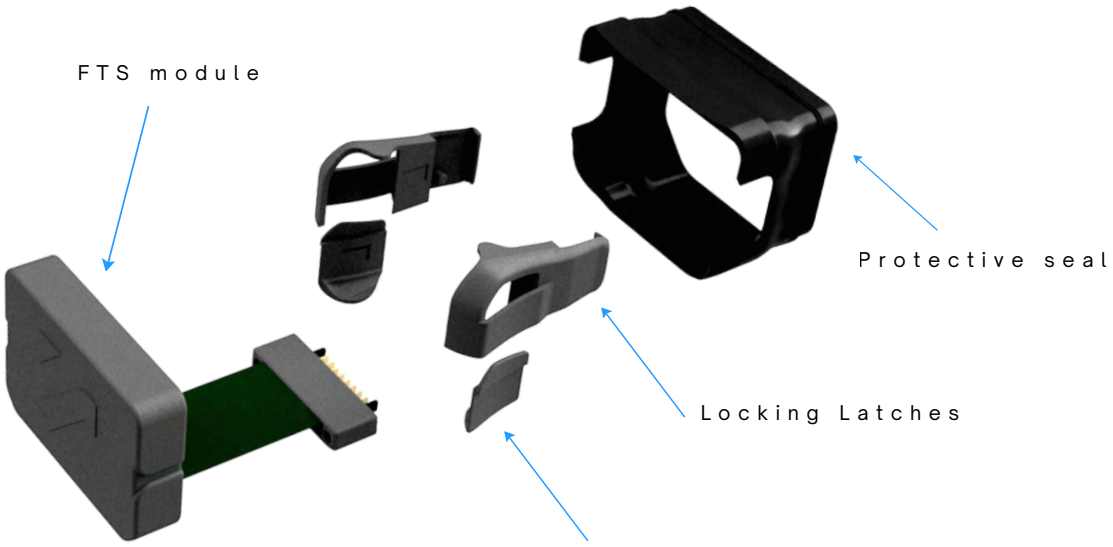
SECTION

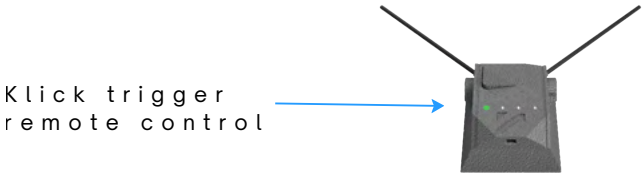
# KRONOS M3D

FLIGHT TERMINATION SYSTEM FOR DJI MATRICE 3D

# COMPONENTS

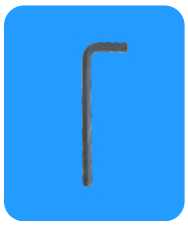
*presentation*




## ADDITIONAL ACCESSORIES SUPPLIED

Double-sided adhesive



Allen Key 2mm

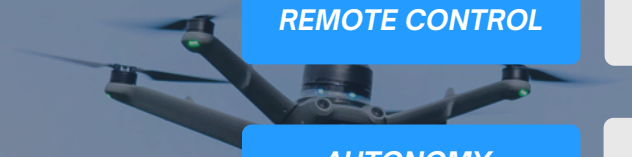
Screw x2

# KRONOS M3D

## Technical specifications

*TOTAL WEIGHT (PRS+FTS) : 268 G

| | |
|---|---|
| *FTS WEIGHT | 78 G |
| COMMUNICATION WIRELESS RADIO | SRD860 WITH ENCRYPTED KEY (869 MHZ / 100 MW) |
| RANGE OF THE REMOTE CONTROL | 1500 METERS* |
| AUTONOMY REMOTE CONTROL | 20 HOURS |
| OPERATING TEMPERATURE | -5°C TO 40°C |
| WATERPROOFING LEVEL | IP54 |
| DIMENSIONS | 78X59X48 mm |



*The range can be up to 1.5 km, under optimum conditions and in an environment free of obstacles and interference.

# KRONOS M3D

## FTS Operational Limits

| | |
|---|---|
| ***OPERATING TEMPERATURES*** | MIN : -5 °C<br>MAX : 40 °C |
| ***USABLE IN RAINY WEATHER*** | Yes |

# INSTALLATION
*of Flight Termination System*

*The Kronos M3D Flight Termination System (FTS) can be installed in just a few minutes. To install the Flight Termination System, please follow the instructions below in order:*

## *Instructions*

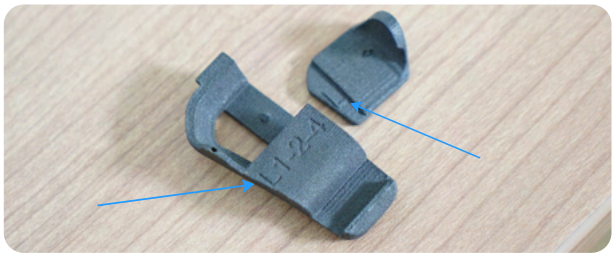
1 Remove the battery from the DJI Matrice 3D drone.

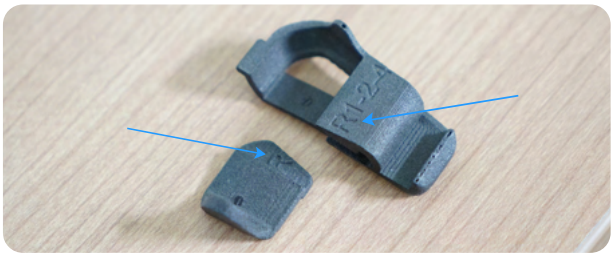
2 Insert the left Dronavia locking latch into the left battery latch of the DJI Matrice 3D. Then insert the Dronavia locking strap. Next, insert the right Dronavia locking latch into the right battery latch of the DJI Matrice 3D. Then insert the Dronavia locking strap.

# INSTALLATION
*of Flight Termination System*

## *Warning*

*To ensure the latches and locking straps are positioned correctly, each is marked with an L (left) and an R (right).*




3 Next, place the protective gasket around the battery of the DJI Matrice 3D drone.

# INSTALLATION
*of Flight Termination System*

## *Warnings*

*Before inserting the protective gasket, make sure the three small holes are positioned on the underside of the battery.*

*Check that the protective gasket fits snugly around the perimeter of the DJI Matrice 3D drone battery, to ensure a perfect seal.*

# INSTALLATION
*of Flight Termination System*

4 Attach the double-sided adhesive tape to the Flight Termination System module (FTS). Then connect the FTS to the battery connector on the DJI Matrice 3D drone. Finally, attach the circuit-breaker module to the battery by applying pressure to secure the adhesive.






# INSTALLATION
*of Flight Termination System*

5 Insert the battery into the DJI Matrice 3D drone. Then lock the latches on the DJI Matrice 3D drone by lowering them.




## *Warning*

*You should hear a 'click' sound to ensure that your battery is correctly inserted.*

6 ***Your external FTS for the DJI Matrice 3D is now operational.***

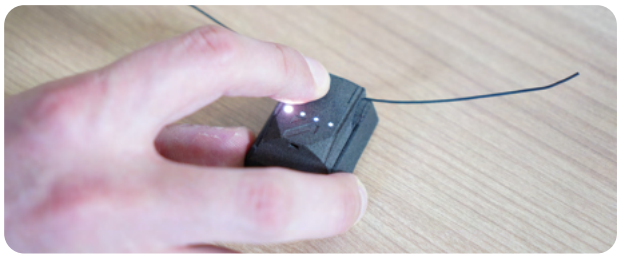
# INITIALIZATION
*of Flight Termination System*

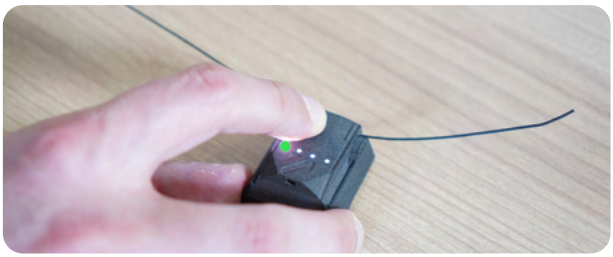
*To initialise the M3D Flight Termination System, follow the instructions below in order:*

## *Instructions*

1 Switch on your DJI Matrice 3D drone. The Flight Termination System (FTS) will switch on automatically.

2 Switch on your Klick remote control. When the Flight Termination System (FTS) is correctly connected, a green LED will flash on the Klick remote control.





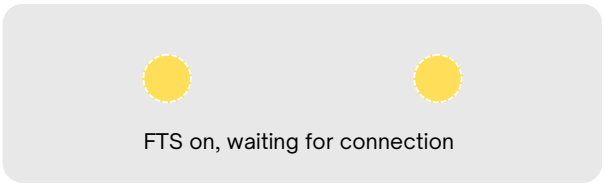
3 ***Your external FTS for the DJI Matrice 3D is initialised.***

# INITIALIZATION
## of Flight Termination System

### Warning

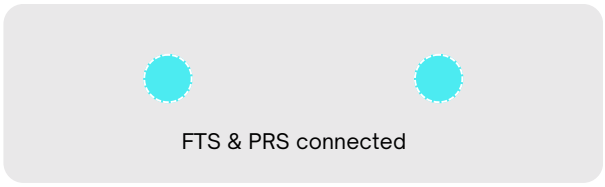
*If your Flight Termination System module is connected to a Kronos parachute system for DJI Matrice 3D a green and turquoise LED flashes on the Klick trigger remote control and on your parachute module.*

### The different LED states



FTS on, waiting for connection

SLOW FLASHING



FTS & PRS connected

SLOW FLASHING AUDIBLE BEEP


YOUR FTS IS
ACTIVE AND
OPERATIONAL!

# MANUAL

## *activation of Flight Termination System*

*To activate the M3D Flight Termination System, follow the instructions below in order:*

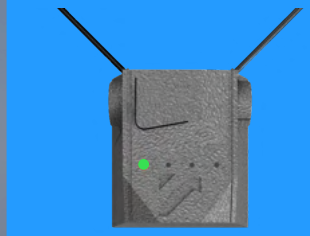
## *Instructions*

1. Find out how to activate your Kronos M3D Flight Termination System manually using our user and instruction manual for the Klick  trigger remote control.

# KLICK

*Manual activation of the Flight Termination System*

CONSULT THE KLICK USER MANUAL



# AUTONOMOUS

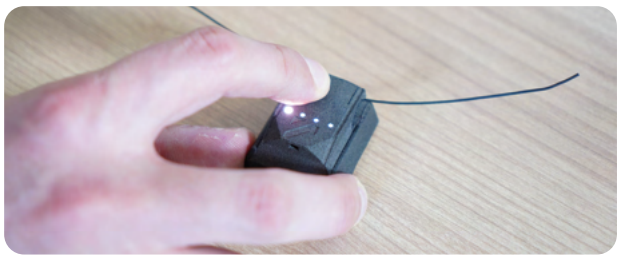
*activation of Flight Termination System*

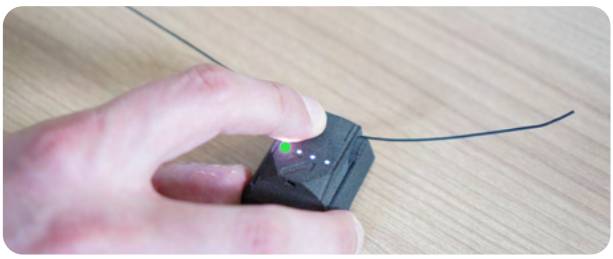
*To automatically activate your M3D Flight Termination System, follow these instructions in order*

## *Instructions*

1 Switch on your DJI Matrice 3D drone. The Flight Termination System (FTS) will switch on automatically.

2 Switch on your Klick remote control. When the FTS is correctly connected, a green LED will flash on the Klick remote control.





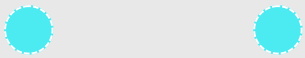
3 When the parachute is deployed, the Flight Termination system is automatically activated via a secure wireless link, established beforehand by Dronavia experts through precise pairing between the two modules.

# AUTONOMOUS

*activation of Flight Termination System*

4 ***Your external FTS Kronos M3D has been triggered.***

## *The different LED states*



FTS & Parachute connected

SLOW FLASHING AUDIBLE BEEP

FTS triggered & PRS deployed
with Autonomous Deployment

RAPID FLASHING AUDIBLE BEEP

# PROCEDURE

*of Flight Termination System Testing*

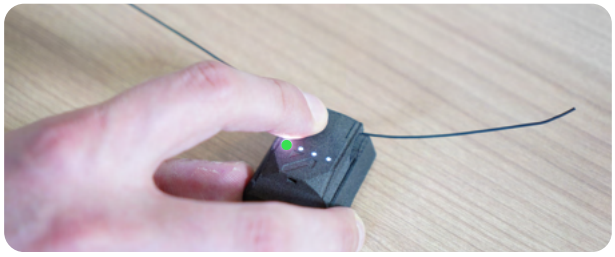
*Before the flight or before the first flight of the day, you can test the M3D Flight Termination System. Follow the instructions below in order:*

## *Warning*

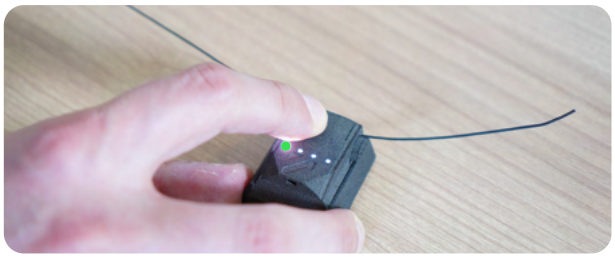
***If your drone is fitted with a parachute, remember to disconnect the parachute from the drone before carrying out the test procedure below. Otherwise, the parachute system will deploy at the same time as the circuit-breaker system.***

## *Instructions*

1 Switch on your DJI Matrice 3D drone and the Klick trigger remote control.



2 Check that the LEDs on your Klick remote control are flashing green. If your drone is fitted with a parachute, check again that it is switched off.



# PROCEDURE
*of Flight Termination System Testing*

3 Arm the motors and start the rotation while keeping the drone on the ground.

4 Stop the rotation of the motors by pressing the double release button on the Klick remote control. Check that the motors stop correctly and that the green LED on the Klick remote control lights up.

5 Perform a final flight test with the Flight Termination System powered on, without triggering it. If the flight proceeds normally and no error messages appear, the FTS is operational.

## *Warning*

***This final flight test (step 5) does not involve triggering the Flight Termination System in flight. For this step, simply perform a flight with the drone and check if any error messages appear during the flight. Warning: activating the Flight Termination System in flight will inevitably cause the drone to fall.***

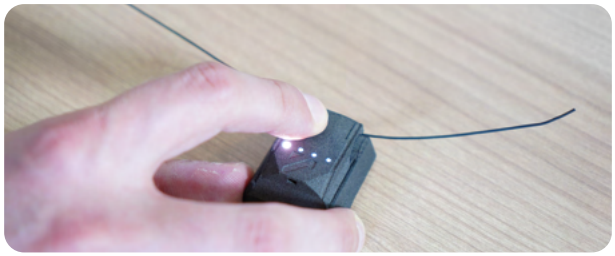
# STOP
## *of Flight Termination System*

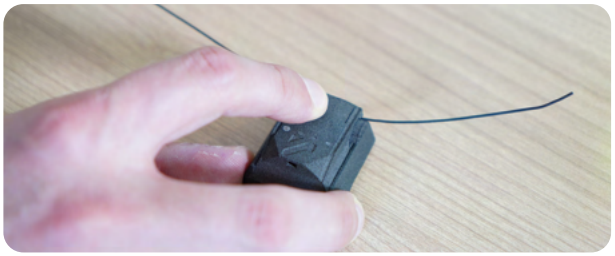
*To stop, switch off and reset the Flight Termination System (FTS), follow the instructions below in order:*

## *Instructions*

1 Switch off your DJI Matrice 3D drone and the Flight Termination System (FTS) will automatically switch off.

2 Switch off your Klick remote control.





3 ***Your external FTS Kronos M3D has been switched off.***

# DISMANTLING
## of Flight Termination System

*To dismantle the Flight Termination System, follow the instructions below in order:*

### *Instructions*

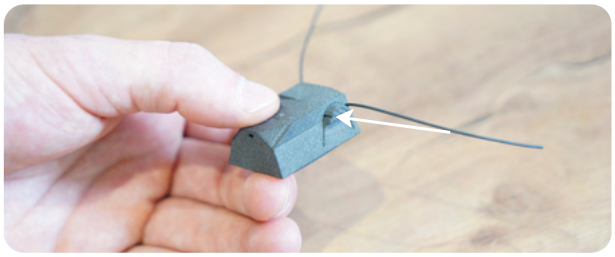
1. To disassemble the system, simply follow the installation instructions in reverse order. The Klick trigger remote control module can remain installed on the DJI Matrice 3D radio controller without affecting its operation.

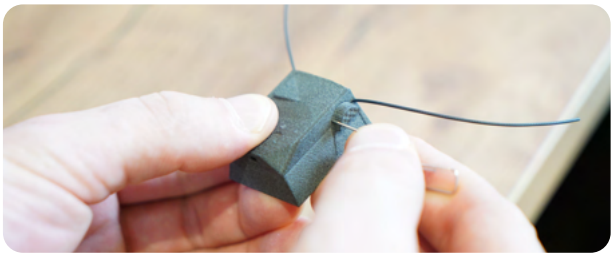
# RESET
## of Flight Termination System

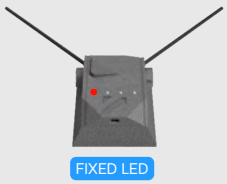
*In the event of a malfunction or any bug, follow these instructions in order:*

### *Instructions*

1 To reset the Klick remote control, locate the small hole on the left side. Insert a paper clip or other thin object into the hole and press briefly.








System error

2 If the malfunction persists, contact Dronavia customer service or your reseller.

# MAINTENANCE & warranty

## STORAGE

Store the Kronos safety accessorie in a dry place, at a temperature between 10°C and 30°C, clean and protected from UV light.

## SPECIFIC MAINTENANCE

In the event of contact with moisture, chemicals or other substances, the POD must be replaced immediately.

## WARRANTY

Dronavia takes great care in the design and production of its products. We guarantee our C5 conversion kit for one year from the date of purchase against any defect or design fault that may arise during normal use of the product. Any abusive or incorrect use, or exposure to aggressive factors (high humidity, excessively high temperatures, etc.) that could lead to damage will invalidate this warranty. It is strictly forbidden to replace the batteries in the drone when it is switched on (Hot Swap), as this may damage the system and invalidate the warranty.

## NOTICE OF LIABILITY

Flying a drone, whether manual or automatic, is an activity that requires attention, specific knowledge and good judgement. Be cautious, get trained in appropriate structures, take out insurance and comply with the requirements defined by the DGAC decrees of 11 April 2012 and 17 December 2015 and the EASA.

Ask our sales team your questions

# LINKS *to know*

For France, we recommend that you consult the website of the Ministry of Ecology, Sustainable Development and Energy if you have any doubts or questions. For Europe, we recommend that you consult the EASA website. Remember that you are flying under your own responsibility.

Website of the Ministry of Ecological Transition and Territorial Cohesion

Details of the Means Of Compliance (MOC) published by the EASA:

The IGn map of restricted areas for drones

European Union Aviation Safety Agency (EASA)

The French Civil Aviation Authority (DGAC)

Ask our sales team your questions

# CONTACT US

+33 3 54 40 00 78

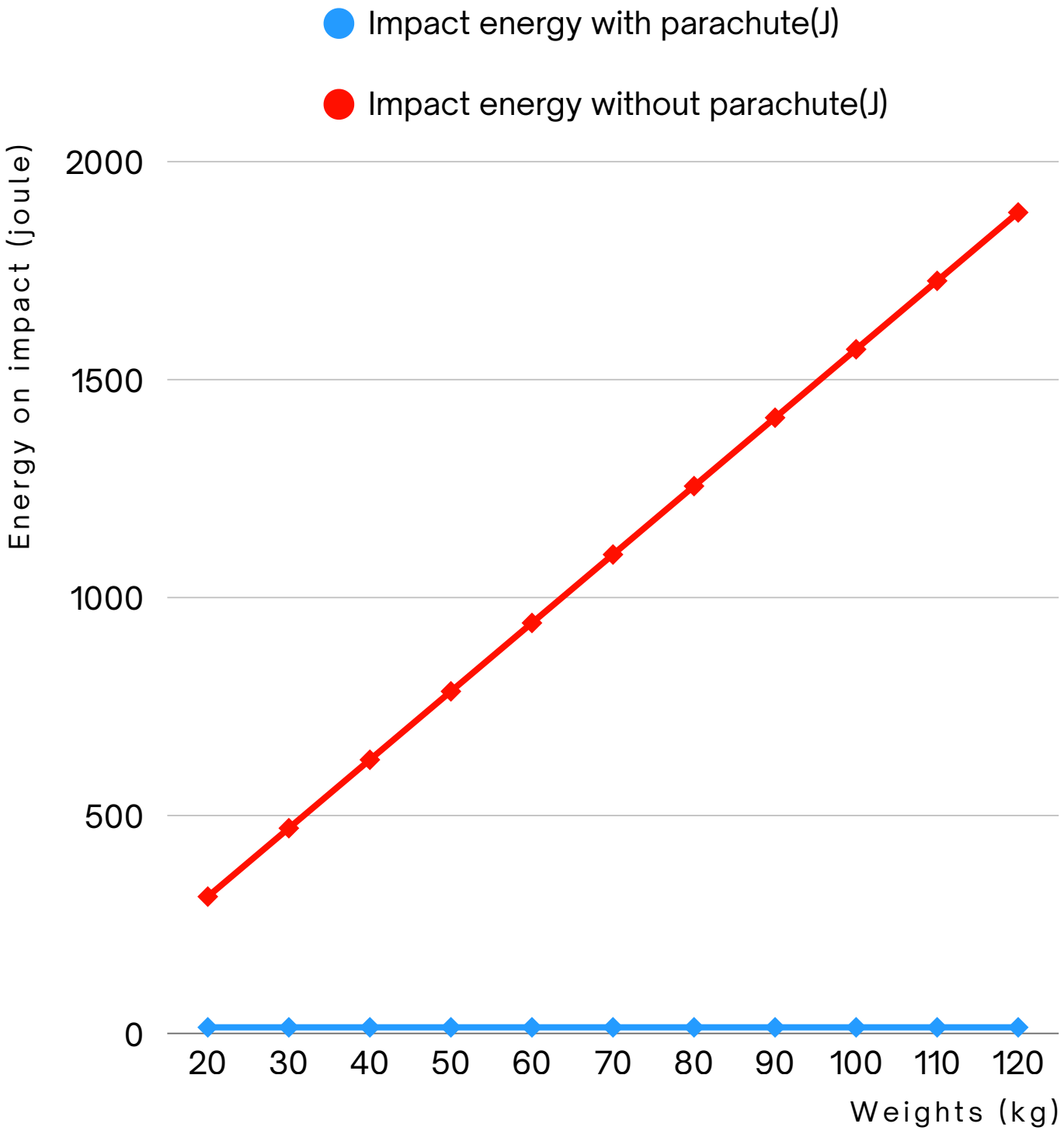
distri@dronavia.com

www.dronavia.com

| Dronavia Channel

# APPENDICES

*Impact energy (joule) X Weight (kg)*



# APPENDICES

*Falling speed (m/s) ) X Weight (kg)*

| Weight (kg) | Falling speed (m/s) | Fall speed without parachute (m/s) * |
|---|---|---|
| 1.60 kg | 4,08 m/s | 19,72 m/s |

*for a fall from a height of 20 metres

# KRONOS M3D

## *Minimum Size of the Ground Risk Buffer (GRB)*

| OPERATING VOLUME VERTICAL LIMIT | SOIL-RELATED RISK BUFFER ZONE |
|---|---|
| 20 | 47 |
| 30 | 71 |
| 40 | 95 |
| 50 | 120 |
| 60 | 144 |
| 70 | 168 |
| 80 | 193 |
| 90 | 217 |
| 100 | 241 |
| 110 | 265 |
| 120 | 290 |

*The ground risk threshold can be calculated based on various drone parameters and assumptions. Please refer to the document dedicated to calculating the ground risk threshold if you need to calculate more accurate ground risk thresholds based on your application.*