VectorSave™ 10

Manual for VectorSave™10 Mavic

Introduction to VectorSave™ rescue parachute system

Purpose of a rescue parachute system

VectorSave™ rescue parachute system is designed to reduce and protect possible damage that may be caused by impact energy of free falling drone hitting people, objects or ground. This is achieved by deploying parachute at sufficient altitude allowing the parachute to open before impact.

Ways to deploy parachute

VectorSave™ systems support multiple ways of deployment depending on system you selected. Deployment can be automatic, external radio or system radio based.

Automatic parachute deployment is based in sensing free fall or tilt. Special software in VectorSave™ system computes acceleration condition and angle of the aircraft compared to level condition in gravity field. If free fall is detected for over defined time parachute will be deployed. Angle detection is also set so that the defined angle deviation needs to occur for over period of time before it is considered unusual and the deployment will occur. It is also possible to disable one or both of automatic conditions.

VectorSave™ system equipped with internal Rx-option can deploy parachute by separate external RadioSave™ unit or servo signal by drone flight controller or radio system (your drone must have dedicated output function/ free channel to do so).

Those deployment option that you choose to have active can be configured separately.

No transport limitations

VectorSave™ systems utilize special patented technology that makes it reliable and reusable. You can safely transport it in an airplane or any other type of transportation.

VectorSave™ has NO explosives - NO compressed gas - NO burning wires.

What is in the package ?

Scope of delivery

In the VectorSave™10 Mavic basic package you will receive

1. VectorSave™10 launcher
2. Parachute with shock cord and tube cap
3. Front and rear tubeholders
4. Mavic harness kit with two ropes and shackle
5. USB cable

In the VectorSave™10 Mavic Rx package you will receive

1. VectorSave™10 Rx launcher (unit has a built in radio option)
2. Parachute with shock cord and tube cap
3. Front and rear tubeholders
4. Mavic harness kit with two ropes and shackle
5. USB cable

In the VectorSave™10 Mavic RadioSave™ package you will receive

1. VectorSave™10 Rx launcher (unit has a built in radio option)
2. RadioSave™ remote trigger
3. Parachute with shock cord and tube cap
4. Front and rear tubeholders
5. Mavic harness kit with two ropes and shackle
6. USB cable

Technical specifications

Launch tube

diameter	*34 mm*
length	*163 mm*
weight	
basic tube	*46 g*
Rx tube	*49 g*
connector	*micro USB*

Parachute

weight	*25 g*

Shock cord/harness

tension strength	*420 kg*

RadioSave™

range (open air)	*2 km*
frequency EU	*863 to 870 MHz*
frequency US	*902 to 928 MHz*
frequency CN	*779 to 787 MHz*

Operating temperature range

lower limit	*- 15 deg C*
higher limit	*+ 55 deg C*

Installing system
DJI Mavic installation

Installing the mounting stands

Follow the following images to mount the brackets that will hold your VectorSave™ Mavic system in place on top of you Mavic quadcopter. The brackets are equipped with special glue pads that will safely hold then in place. You need to degrease the area where mounts will be attached on your Mavic drone. We use "bräkleen" by CRC but any degreasers like isopropanol will work fine. There may be strong degrease agents that we have not tested that may harm the surface of your Mavic - pls test with small area first if any doubt. Remove protective cover from bracket stand and place it firmly in its wanted position.

Alternative consideration for mounting
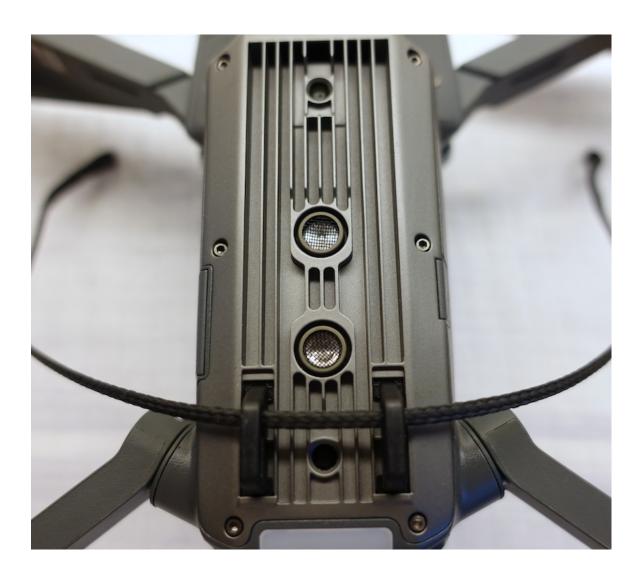
When mounting stands on Mavic consider whether you like to shoot to back or to front. Then choose your preferred mounting style. We think shooting direction to rear is better since in most scenarios Mavic is likely to have forward speed. In that case rear launch will get help for chute opening by velocity of vehicle.

Allow the glue to set overnight for a permanent strong connection.

Installing the harness

Follow the following images to mount the harness for VectorSave™ on your Mavic. We have tested this way of mounting harness and it seems safe to avoid any contact with propellers when flying. Also the center of gravity of Mavic is behind the hanging point so Mavic will land first on its back protecting camera unit as much as possible in case of emergency landing by deployed parachute.

Pull to longer harness rope thru the landing pods so that it does not block bottom camera.

The shorter rope runs as shown and turns back around the front arms.

Finally run the longer rope thru the loops of the shorter rope as shown in picture.

Complete installation on Mavic

Use rubber bands to secure front clip and second rubber band to hold harness rope ends tight to the sides of launch tube unit. Harness rope ends will connect to shock-cord with stainless steel connector ring. Extra length of shock cord which is attached to the parachute lines is coiled inside the tube behind the cap as instructed in "packing the parachute" section.

Mavic battery can be changed by lifting front part of the tube from clip. No need to take away the whole setup. Harness can be left on for transportation too. Mavic will fold nicely with the harness in place.

Packing the parachute

General ideas about packing parachute

Parachute packing aims to flawless opening of the chute when deployed. There are many ways to pack your parachute and it will function in a correct way when opened. It is also imperative that you pack your parachute in a small volume so it takes as little space as possible when packed.

With use of VectorSave™10 launcher you also need to pack it to the right shape and size to fit into the tube correctly. Tube has only small space for it and if it is pushed in so that it spreads increasing the diameter it may cause parachute to stuck into the tube instead of shooting out nicely.

Therefore we like to suggest you follow our recommendations when packing and after some practice you will get it right every time.

Links to youtube parachute packing and testing videos

Packing the parachute https://youtu.be/fK81aFi2APM

Tilt angle test to deploy packed parachute https://youtu.be/dgIi2JfjT64

Do not store the parachute packed in the tube

If you store your VectorSave™10 system for longer time do not leave parachute packed in the tube. In our testing parachutes that have been packed inside the tube for days will take much more time to open fully once deployed. Best practice is to test launch tube after last flight of the day and store it by hanging it from shock cord.

Big benefit of VectorSave™10 launcher is that it can be reused over and over again without extra cost. We recommend you take most out of it since it can be done without consumables.

If tube cap is becoming loose over time

Should the cap fitting become loose over time you can use a piece of film tape or apply thin layer of ca glue to the fitting to increase diameter just a bit to regain nice snug fit.

Picture guide for packing the parachute

In the following pictures we show you the recommended way to pack your VectorSave™ parachute. You will start by making sure lines are untangled.
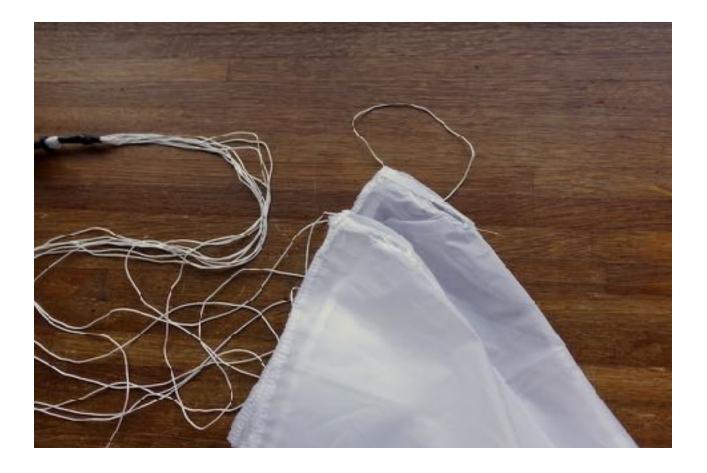
In our tests we find that this is possibly the best way to pack parachute in right shape so that it shoots out nicely every time.

If your package is too thick it and required a lot of power to push in you did not make it right. Bad packing may jam parachute in the tube and cause deployment failure.

Please be careful here - practice and do tilt test to get it right.

Make sure lines are untangled. Clear them if necessary,

Opposite corner pairs are then laid out on the table and folded inside one after another.

Lines will be positioned to loop inside along centerline while shock cord is left outside.

Roll in the outer sides and then make a Z fold.

Again roll the sides in to make a package that will now take same shape as the space for it inside the tube.

Finally loop the shock cord and place it on the side of the roll before you slide it into the loaded tube. Cord loop ensures that chute is not stopped by cord at shootout.

Here you see how everything should look with the chute half way in and cap closed.

VectorSave™ 10 launcher

Before first use

Before first use charge your parachute tube via USB connector for about 2 hours.

Testing tube by tilt

Once you have charged the launch unit it is time to test it is working correctly. Do not press the piston down yet. hold the tube vertically and press button at the end of tube once, you will see green light indicating the tube in powered on. Green light will stay on for 20 seconds before tube will shut down its power. Now press the tube button again (slightly longer) so that light turns into blinking blue. Blinking blue is indicating that tube has registered level position and is ready to sense tilt and free fall. After you arm sensors and have blinking blue you may tilt the tube to any direction by 90degrees and the blinking blue will turn solid blue indicating that deployment was activated. Blue light will remain on until you press button again and get green light for reset indication. If you arm tube by mistake you can reset back to green by pressing the button.

Now that your sensor test is done you can load the spring. To do this you need a ph or pz screwdriver. Holding the tube end in the palm of your hand point the end of screwdriver to center hole of the piston and press it down until you hear click and piston is locked to the down position. You may now repeat the tilt test while blocking the open tube end by hand to create some resistance for piston. Without resistance the piston may pop out and some damage may occur.

Test flight

It is important you also fly multiple test flights in normal conditions with parachute electronics armed (blue light blinking) and confirm that blue light will not become solid blue while flying. While doing these flights DO NOT push piston down and do not pack the parachute inside yet. Purpose of this is to test that your parachute will not be too sensitive for your used setup.

Should you encounter too sensitive launch contact us for support

Operating the VectorSave™ 10 launcher button - modes

1. Solid green - you get when button is pressed. Green is on for 20s before automatic shut down.

2. Blinking blue - tube is armed and gravity is registered when button was pressed.

3. Solid blue - launch event has occurred and blue remains on until reset. Remember to reset so you will not loose charge of your battery.

Radio remote trigger (RadioSave™)

General about the RadioSave™ remote trigger

If you bought the version of VectorSave™ with RadioSave™ you received a remote radio unit that can be used to deploy parachute manually.

Charging the RadioSave™ remote

Charge RadioSave™ remote unit before use for 2 hours via USB cable to ensure it is fully charged. Light goes on when you connect it with USB cable to indicate it is charging.

Using the RadioSave™ remote

RadioSave™ remote has range of 2 km in open air. Button is made so that it requires hard pressure to activate. This is protecting you from mistakenly pressing the button.

Button functions are here:

1. Turn on unit by pressing the button once

2. When light is on and you press the button your parachute will be deployed if your VectorSave™ 10 launcher has blinking blue light indicating it is armed.

3. To turn off the RadioSave™ remote unit power just keep the button pressed until the light goes off.

FAQ
Frequenty Asked Questions

Q: How do I know how much battery charge remains in the unit?
A: When you switch on power you will get red light blinking if the charge is too low. We recommend also to do test launch in hand (hold one had to block the open end to avoid piston popping out). If battery is too low you will get red light blinking instead of launch.

Q: Will it damage it if it is almost out of power and charged for more than 2 hours?
A: Tube unit has built-in charge controller so it will not damage if you leave it charging for longer time. Two hours is about what it takes to achieve full charge.

Q: How long do you estimate the unit will likely operate on a full charge?
A: With current latest firmware the battery last for 5 hours of operation for basic system and 2 hours of operation for system with built in radio.

Q: Is the position of the cap where the small opening is important to the units operation? Same question with the tube rotation, should it always be with label as shown in your photos or?
A: Cap positioning is meaningful only in sense that the cap should not open by mistake, so try to figure out a good safe way to have cap on and harness fitting nicely. We recommend the rubber band to hold harness and I prefer the cap hole on top so that the rope makes tight turn. The only case where the tube rotation matters is once it is armed. Same moment the tube is armed it will register the direction of gravity and you may no more rotate the tube. Tube can be in any rotational position when it is armed. Arming will define level position for using tube each time tube is armed.

Limited Product Warranty

VectorSave warrants products against defects in materials and workmanship for a one (1) year period from the date of purchase provided an original receipt is supplied for authentic-purchase verification.

VectorSave's sole obligation under this Limited Warranty is to repair or replace, at VectorSave's sole option, any Warranty Products that are returned to VectorSave during the Warranty Period and that VectorSave determines are defective.

This limited Warranty is VOID if VectorSave finds any signs of crash, damage, abuse, overloading, incorrect component matching, incorrect wiring, reverse polarity or negligence by the user.

Return Merchandise Authorization (RMA) number will be issued for your request via e-mail, and must be placed on the return shipment label (or clearly marked on the box) for proper processing.

Please refer to manuals and product video instructables (YouTube) for proper use, requirements, storage and maintenance.

If proper maintenance and storing is not performed as required, items may not be covered under the terms of this Limited Warranty.

This Limited Warranty is VOID for all purchases from non-authorized resellers or third-party sales (second-hand owners).

Refunds are not granted under this Limited Warranty.

Liability Policy

Aside from the Product Warranty VectorSave makes no other warranties or representations regarding any of its products, and hereby disclaims any and all implied warranties, including, without limitation, the implied warranties of non-infringement, merchantability and fitness for a particular purpose. Purchasers acknowledge that they alone have determined that the product will suitably meet the requirements of their intended use. VectorSave shall not be liable for special, indirect, incidental, or consequential damages, loss of profits or production or commercial loss in any way, regardless of whether such claim is based in contract, warranty, tort, negligence, strict liability, or any other theory of liability, even if VectorSave has been advised of the possibility of such damages. Further, in no event shall the liability of VectorSave exceed the individual price of the product on which liability is asserted. As VectorSave has no control over use, setup, final assembly, modification, or misuse, no liability shall be assumed nor accepted for any resulting damage or injury. By the act of use, setup, or assembly, the user accepts all resulting liability. If the purchaser or users are not prepared to accept the liability associated with the use of the product, they are advised to return the product in new and unused condition to VectorSave dealer or VectorSave warehouse.

VectorSave reserves the right to change or modify this policy at any time without prior notice.