



Tinder Rocketry's –Peregrine Exhaustless CO2 Ejection System

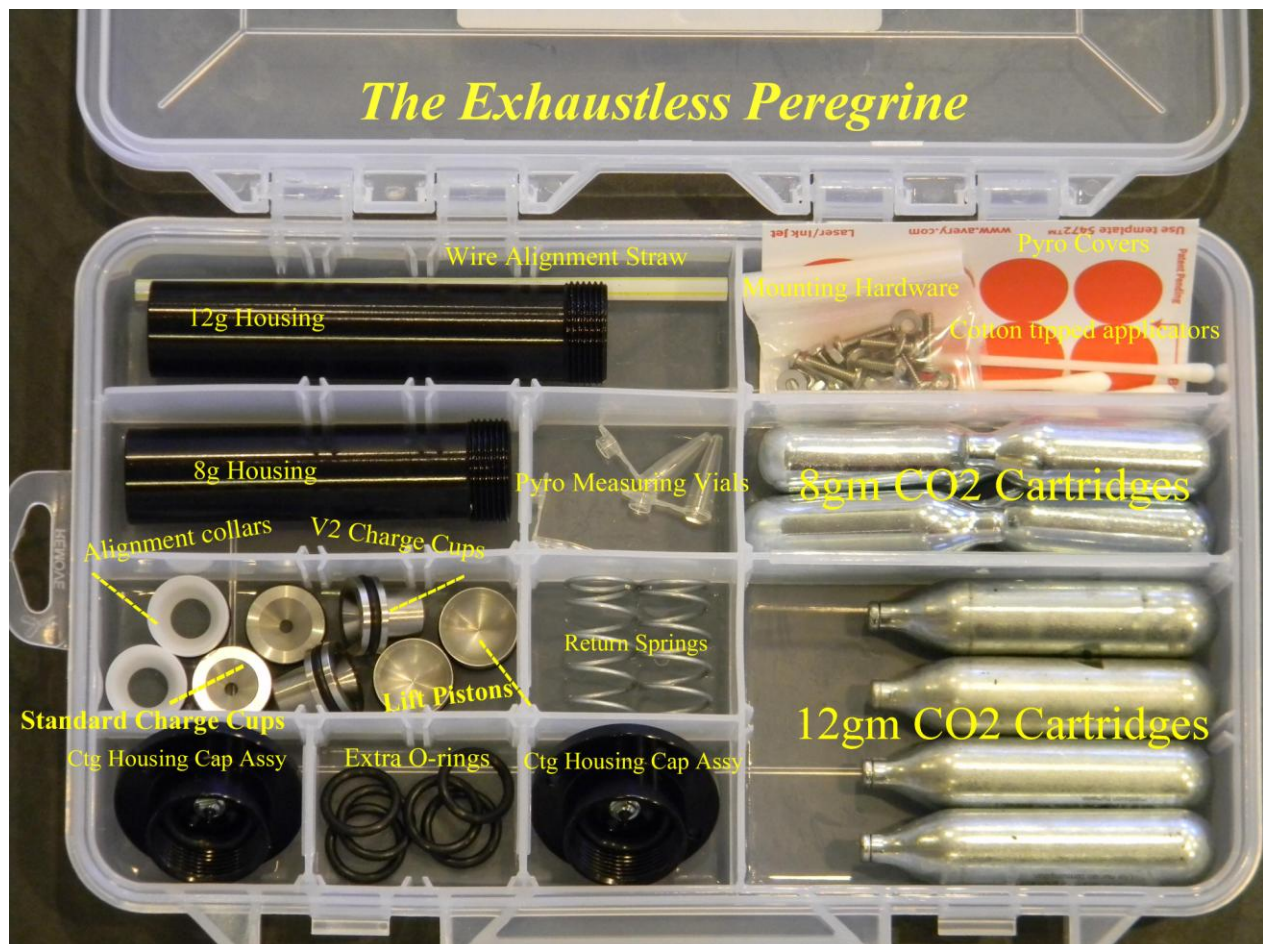


This Tinder Rocketry Peregrine is an “exhaustless” CO2 ejection system designed for parachute deployment in high powered rockets at any altitude. The Peregrine is designed to be easy to use and works with the CO2 cartridges that you can find at your local hardware store. This Peregrine is intended to be mounted behind the bulkhead on the other side of the parachute compartment. As a result, the parachute can be packed much tighter and into a smaller area.

Some have asked “Why would I want to use a CO2 ejection system?” Well, there are actually two reasons you might want to consider CO2 deployment. The first and most obvious reason is that it is clean! There is neither flame nor the resulting residue all over the inside of your rocket! As a result of not having a large BP flame, you can do away with the flame resistant cloths that now protect you valuable parachutes! If there was no other reason for going to CO2 deployment, a clean interior might be good enough motivation. However there is another reason that you might want to consider CO2 Deployment and that is high altitude.

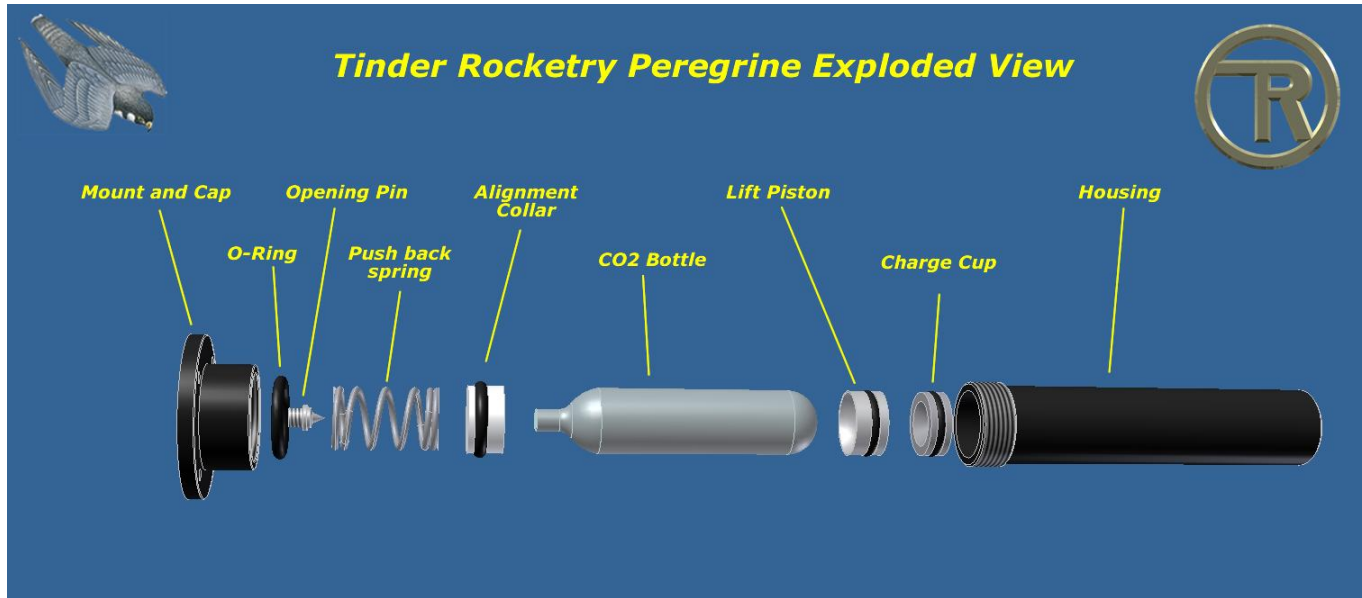
It is well known that BP begins to burn inconsistently at much over 20,000' ASL and will not sustain a burn at over 50,000'. There have been many attempts and devices made to try and contain BP so that it will burn at high altitudes, some of them have worked, many have not. CO2 deployment systems, such as the Exhaustless Peregrine, where the small pyro charge is sealed from the outside air, or the lack there of, are capable of deployment at any altitude. The Exhaustless Peregrine has been tested down to minus 29+ inches Hg which simulates to about 80,000 feet!

Parts Diagram

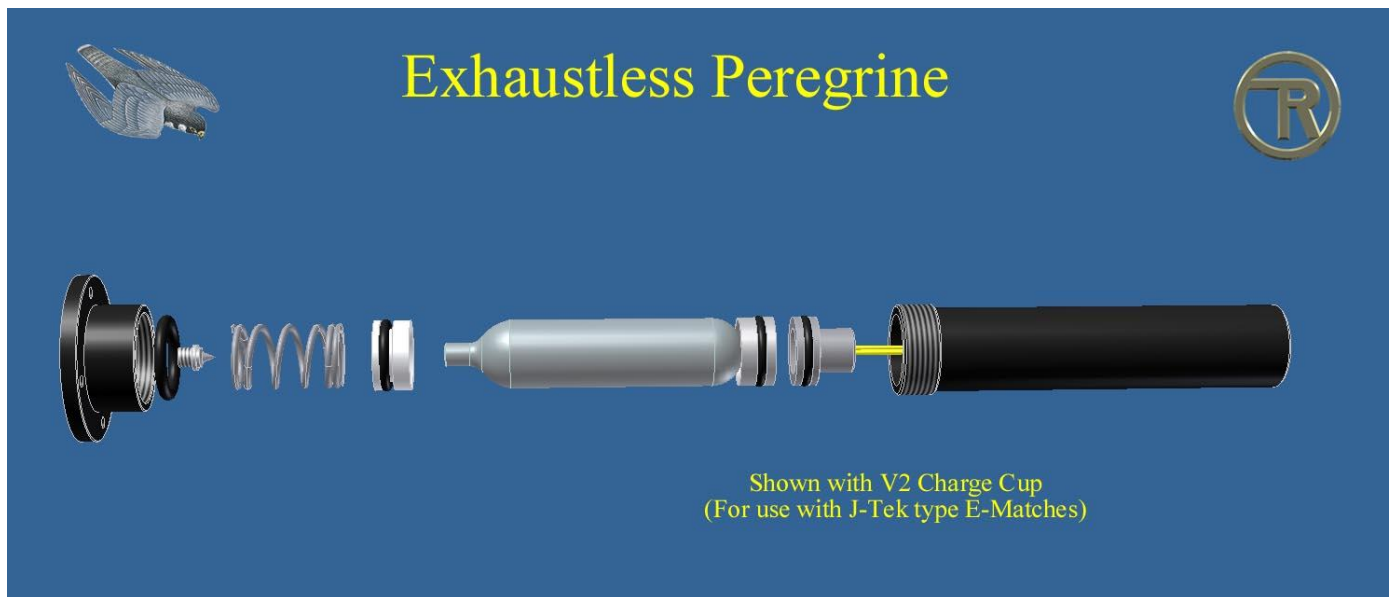


Loading/Re-loading Guide

This guide will show how to prepare the Rocketry Peregrine for flight. While this guide illustrates the Peregrine 12G Exhaustless CO2 unit, all of the Rocketry Peregrines are prepped in the exact same manner. The illustrations below show all the internal components of the Peregrine 12g with the two different charge cups:



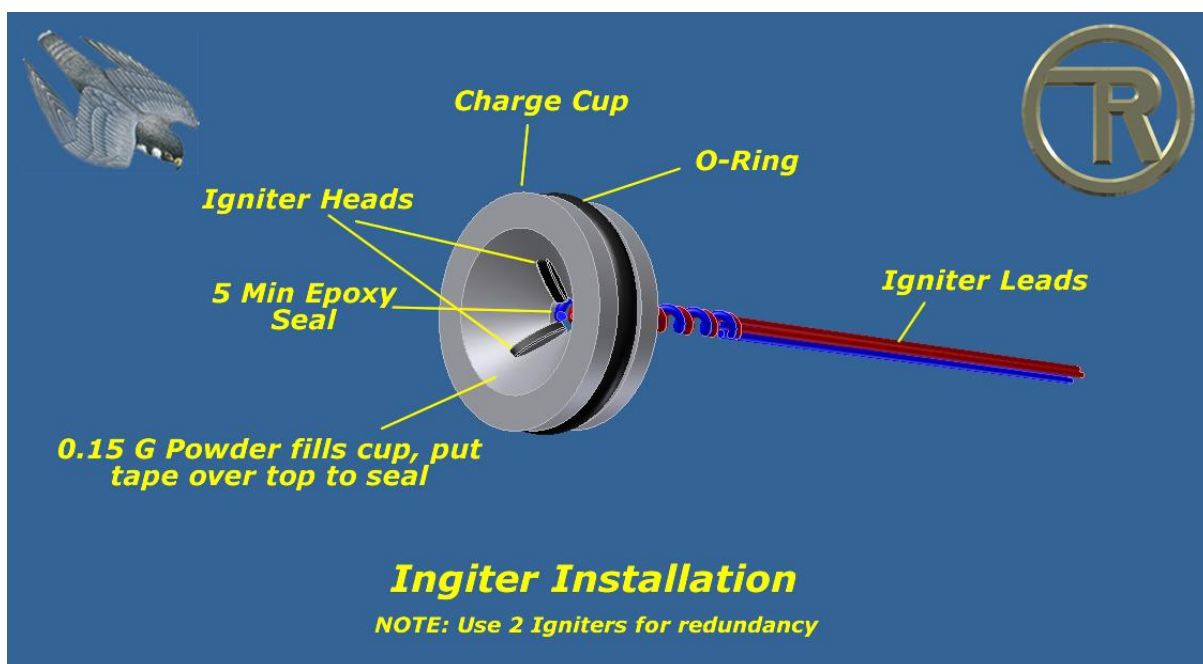
The Peregrine 12g shown with the STANDARD charge cup for use with Q2G2 initiators.



The Peregrine 12g shown with the V2 charge cup for use with J-Tek type initiators.

To make the Peregrine ready for flight, follow these steps:

1. **Once the Peregrine has been fired**, disassemble the unit as seen in the above diagram but without removing any of the o-rings or the opening pin.
2. Use hot water to thoroughly rinse residue from the inside of the Peregrine housing.
3. Fold a paper towel in half then roll up like a small cigar and use to swab the Housing clean and dry. Use opposite end of rolled up towel and repeat. Set aside.
4. If using the standard charge cup (Discontinued) and the Q2G2 initiator, use pliers to grab the wires close to the bottom of the charge cup and twist until the wires break off. Use a small finishing nail punch to gently tap on the cut wires from the bottom of the charge cup to dislodge the spent initiators and epoxy from the charge cup. Clean charge cup as necessary. Set aside.
5. If using the V2 charge cup and a e-match initiator or equivalent, (Such as the J-Tek) use pliers to grab the wires close to the bottom of the charge cup and twist until the wires break off. Use a small finishing nail punch to gently tap on the cut wires from the bottom of the charge cup to dislodge the spent initiator(s) and the epoxy from the charge cup. You may need needle nosed pliers to grip and pull the spent initiators from the charge cup. Clean charge cup as necessary. Set aside.
6. Completely clean all other components with a paper towel. Set aside. **NOTE:** It is a good idea to change the O-ring on the Lift Piston after every use. Failure to do so may risk O-ring breakage that could make disassembly more difficult.
7. With a cotton tipped applicator (Q-tip or equivalent) use silicone grease (like Super Lube) to generously lube the bottom 1 inch of the housing. Best way to do this is from the bottom small opening in the housing. Set aside. **NOTE: It is VERY IMPORTANT not to use a petroleum based lube such as Vaseline! Doing so could cause a catastrophic failure of this device!**
8. Use the cotton tipped applicator with silicon lube, to wipe a residue of lube on the inside surface of the charge cup. Remember – this is ONLY a **RESIDUE** of lube! Be careful not to get any lube on the top surface of the charge cup!
9. Now prepare the charge cup. Below is an illustration of the (Discontinued) STANDARD charge cup with the initiators installed. To save time you can prepare several sets at a time making reloading in the field easy.

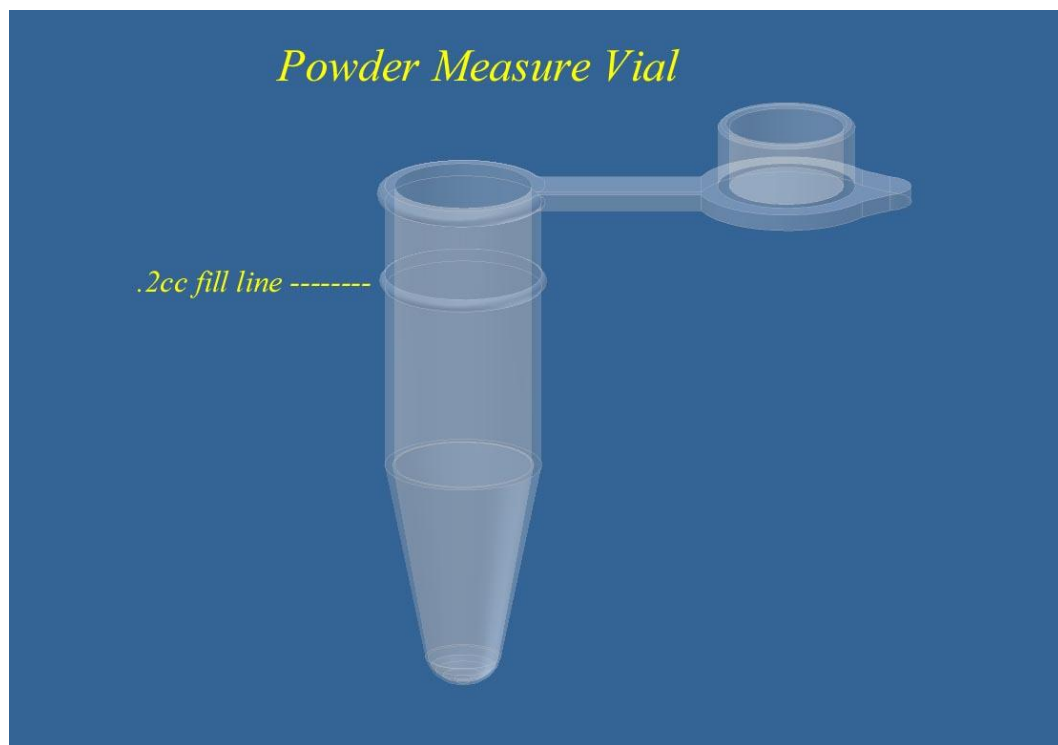


Steps to load the (Discontinued) STANDARD charge cup are:

- a. Twist two initiator leads together so the heads form a "Y". The (Discontinued) STANDARD Charge cup was designed to use the Quest Q2G2 initiator. Many model rocketry resellers may still carry these both in the US, Europe and other countries.
- b. Drop the twisted leads through the cup opening. The splayed igniter heads will support the igniter in the cup and keep them from falling through.
- c. Mix a little 5 minute epoxy and carefully dab a little epoxy in the center hole. Avoid getting epoxy on the initiator pyrogen. Let it cure for at least 10 minutes.

NOTE: This will seal the cup as well as keep any powder from leaking out. Both the charge cup and the lift piston have o-rings so once assembled, the powder is protected from any moisture **and has been vacuum tested to almost 29" Hg!**

- d. Once the epoxy has hardened, **measure out .2cc with the provided measuring scoop** your choice of 3or 4F Black Powder, Pyrodex or Triple Seven. The two propellants can be ordered online from retailers that have gun reloading supplies or find it at your local sporting goods store. For instance Wal-Mart and Bass Pro Shop carry this. Black powder is a bit more difficult to find these days, but it can still be found at many gun stores. Fill the provided scoop to the line on the scoop as shown in the diagram below. **Warning: Do not use more than the recommended amount of powder!**



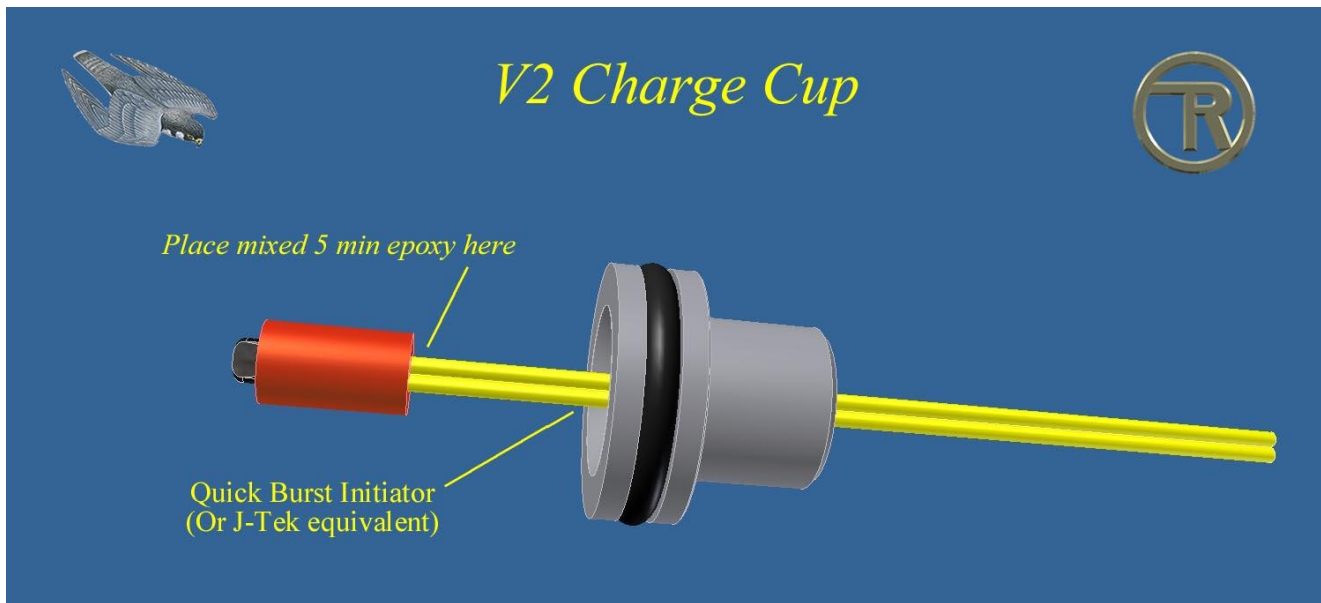
- e. Pour powder into the prepared charge cup. Apply a Pyro charge cover disk or use a piece of 3M blue masking tape over the charge cup to seal in the propellant. Trim the edges as necessary around the cup so the tape is flush with the edges. The tape will seal in the powder.

The V2 charge cup can be used with a single or dual initiator.

For use with a SINGLE e-match initiator (Such as the J-Tek E-Match)

IMPORTANT NOTE: If these loading procedures are not followed, the spent initiators and epoxy may not pop out easily during cleaning and may even need to be drilled out!

- Completely remove the protective sheath from over the initiator head.
- Cut the protective sheath to about 3/8th inch and re-install on initiator.
- Use the cotton tipped applicator with silicon lube **to wipe a residue of lube to the inside cavity** of the charge cup. Remember – this is **ONLY** a **RESIDUE** of lube! Be careful not to get any lube on the top surface of the charge cup!
- Pull initiator to within an inch or so of the V2 Charge Cup.
- Mix a small amount of 5 min epoxy. Dab a generous amount completely around the bottom of the initiator protective sheath as shown in the diagram below:



- Assemble and let cure for at least 10 minutes. Assembly should look like the diagram below:

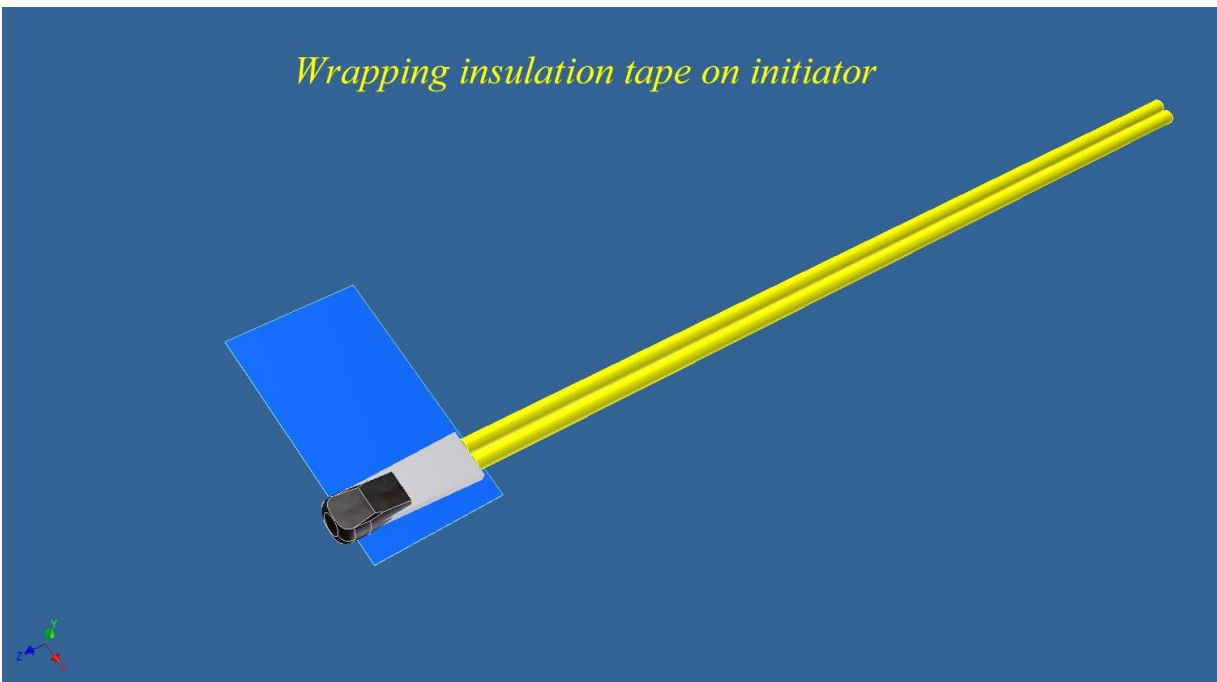


- g. Once the epoxy has hardened, measure out .2cc of Pyrodex, Triple Seven or Black Powder propellant with the provided measuring scoop. Fill the provided scoop just to the line on the scoop as shown in the diagram above. **Warning: Do not use more than the recommended amount of powder!**
- h. Pour powder into the prepared charge cup. Apply a Pyro charge cover disk or use a piece of 3M blue masking tape over the charge cup to seal in the propellant. Trim the edges as necessary around the cup so the tape is flush with the edges. The tape will seal in the powder.

For use with DUAL e-match initiators (Such as the J-Tek)

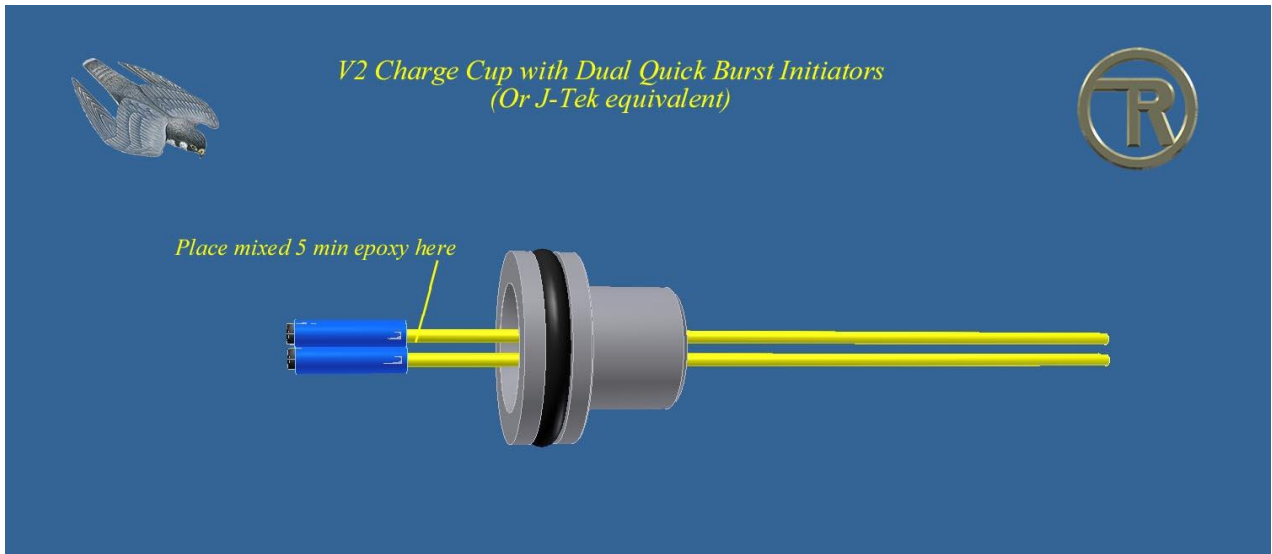
IMPORTANT NOTE: If these loading procedures are not followed, the spent initiators and epoxy may not pop out easily during cleaning and may even need to be drilled out!

- a. Completely remove the protective sheath from over the initiator head and discard.
- b. Cut a strip of blue painters masking tape about 3/8" x 3/4" install on initiator as shown below.
- c. Do this on both initiators. (This will insulate both initiator from each other and the SS Charge cup!)



- d. Use the cotton tipped applicator with silicon lube to **wipe a residue of lube to the inside cavity** of the charge cup. Remember – this is ONLY a **RESIDUE** of lube! Be careful not to get any lube on the top surface of the charge cup!
- e. Pull both initiators to within an inch or so of the V2 Charge Cup.
- f. Mix a small amount of 5 min epoxy. Dab a generous amount completely around the bottom of the initiators as shown in the diagram below:

NOTE: This will seal the cup as well as keep any powder from leaking out. Both the charge cup and the lift piston have O-rings so once assembled, the powder is protected from any moisture and **has been vacuum tested to just under 29" Hg!**



- g. Pull both initiators so that the tips do not extend past the top surface of the charge cup as seen in diagram below:

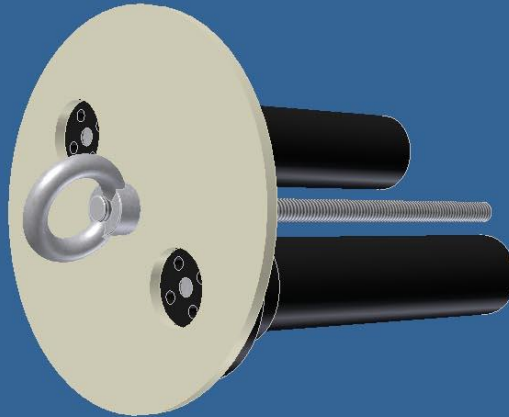


- h. Once the epoxy has hardened, measure out .2cc of Pyrodex, Triple Seven or Black Powder propellant with the provided measuring scoop. Fill the provided scoop just to the line on the scoop as shown in the diagram above. **Warning: Do not use more than the recommended amount of powder!**
- i. Pour powder into the prepared charge cup. Apply a Pyro charge cover disk or use a piece of 3M blue masking tape over the charge cup to seal in the propellant. Trim the edges as necessary around the cup so the tape is flush with the edges. The tape will seal in the powder.
10. Now insert the charge cup into the base unit, wires first, into the housing.
11. Use the Lift Piston and the CO2 cartridge to push the charge cup into position. Push in with your finger until the charge cup is snug up against the Housing. Now insert the rest of the components as shown in the exploded view illustration.
12. Screw the housing into the Mounting Cap and tighten a little more than snug. Do not over tighten!

Your Peregrine may now be connected to your altimeter and is now ready for flight!

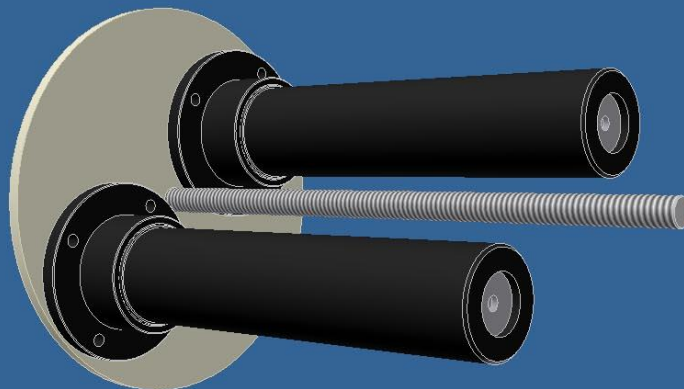
Dual Peregrine Mounting Example

Dual Peregrines on a 3.9" Bulkhead



Important note: Because the Peregrine is “exhaustless,” these CO2 deployment systems may be and are intended to be mounted on the inside of the Electronics Bay!

Backside of the Dual Peregrines on a 3.9" Bulkhead



Choosing the Right CO2 Cartridge for your Rocket

"Make everything as simple as possible, but not simpler."

This is a quote from that really smart guy with the bad hair, Albert Einstein. Simple is good and simple is what we are going to try and do here.

Choosing the right CO2 cartridge:

Method 1:

You may choose this method if you have flown your rocket (or you have ground tested it) and a known qty of BP has been used for deployment. **The factor is 5. Whatever the qty of BP that you have used in your rocket, measured in GRAMS, multiply that by 5 to get the equivalent grams of CO2 needed for the same deployment pressure.**

For example: A smaller rocket that has been flown (or ground tested) with 1.5 grams of BP, would need about 7.5 grams ($1.5\text{gms} \times 5$) of CO2 to achieve the same ejection pressure. The 8gm CO2 ctg would most probably work just fine, but you will want to ground test anyway!

Example #2: A rocket that has been flown (or ground tested) with 2 grams of BP, would need about 10 grams ($2\text{gms} \times 5$) of CO2 to achieve the same ejection pressure. In this case you will want to round up and choose the 12 gram CO2 ctg and you of course will want to ground test!

Method 2:

You might choose this method if you have never flown nor tested your rocket and have no idea as to how much BP you might need for adequate deployment. First thing you are going to want to do, is you are going to want to follow this link to the [Rocketry Online Info Central page](#) and use the BP calculator to determine how many grams of BP your rocket might need for BP deployment. Use this number and go to Method 1. Then you must GROUND TEST!

There you go! This is as simple as it gets! The point here is to get you to a starting point where you will then ground test this CO2 deployment system in your rocket!

A word on CO2 cartridges:

The CO2 cartridges for use in the Peregrine 8g & 12g can be easily found in a store near you. The 8gm cartridges are commonly used in soda dispensers and might be found at a big box store or at your local hardware store. The 12gm cartridges are also very common. They might also be found at a big box store as well as your local hardware or your local sporting goods stores. If you cannot find CO2 cartridges near you, you may order them directly from Tinder Rocketry or from one of the Tinder Rocketry distributors.

Soon, Tinder Rocketry will have a larger CO2 ejection systems as well. The CO2 cartridges for these larger systems are a bit more difficult to find locally, as a result, you may wish to get them directly from Tinder Rocketry.

You have questions? Give me a shout and I will try to help you out!
cameron@tinderrocketry.com

Replacement Parts list

Replacement parts may be purchased from the Tinder Rocketry website. Some of these items you will find locally (such as the CO2 cartridges) and you are encouraged to purchase locally when possible. As an added service to you, we are stocking the replacement CO2 cartridges for the now discontinued CD3!

Questions?

cameron@tinderrocketry.com

