

CSV Antenna Launcher Assembly Instructions (2019)



CSV19 Antenna Launcher with Mini Coaxial Reel and Launch Balls
Barrel Painted with Krylon Fusion Safety Blue

*Revised in 2019 for the March 2010 Threaded Valve design
Updated August 22, 2020*

Introduction

These are the instructions for assembling the threaded Pneumatic Antenna Launcher kits which started shipping in 2010. You can tell if the kit is threaded by the main (black) valve. If it is threaded on the input and output ports then the design is the threaded version. Otherwise the ports will be smooth inside for cement. For information on assembling the older cement-socket design, see <http://www.antennalaunchers.com/csv19/csv19asm.html> for the 2008 instructions.

These instructions cover several sizes and variations of CSV (Compact Sprinkler Valve) Antenna Launcher. The number following the designation refers to the overall length, so CSV17's are about 17" long while CSV19's are 2" longer (and so on). The pressure chambers are either 3" or 4" in diameter. Special longer models also can follow these instructions, the differences are just barrel and chamber length. The photos will include different models and variants of launchers so may not be exactly like the parts you have. The photos may also contain tools and accessories that are not included in your kit. Refer to the packing list to see what is included.

Order of Assembly

The order of assembly has been changed in this set of instructions to better align the barrel and chamber to the new 3D Printed Barrel-Chamber Spacer. Be very careful if you are mixing these instructions with earlier instructions that may be in a different order.

Miscellaneous

I changed my callsign from WB6ZQZ to W6AKB after our Field Day group (www.hsfdg.org) tried to use it one year. So you may find either callsign on documents or labels. Eric WD6CMU was a collaborator on the initial conceptual development of this project, and he made the mounts for the Saunders Zip Reels for many years. Unfortunately those reels are no longer produced, if you have one take good care of it. The PVC Mini Coaxial Reels and the new 3D Printed Mini Coaxial Reels work quite well and take less space to store. More detail on Antenna Launcher history and development can be found at www.AntennaLaunchers.com.

3D Printing has added a number of new parts to improve the Pneumatic Antenna Launchers, and it has also added a number of tools and holders that we use in the production of pre-assembled launchers. Some of those tools and holders will be visible in the photos. Other than the ball holding tool (and the tap) included in the Super Kits, these are not included in the launcher kits.

Feedback

These instructions are subject to improvement. Use this document with care. If you have any questions contact us and get them resolved before proceeding. Please send questions or feedback to sales at akbeng dot com. Thanks for your patience and feedback!

2019 - 2020 Updates

The instructions are being moved to Google Docs format and updated. The overall launcher design has not changed since 2010, but some of the parts (and the order of assembly) have been updated. Depending on when your kit was prepared (and which kit variant was purchased) the parts may differ. Contact us if you want to update parts before assembly.

Trigger Struts are now provided for and recommended for all launchers (in the past they were supplied only for Super kits). They used to be aluminum, the updated struts are 3D printed plastic with built in spacers and flexures to reduce stress. The purpose of the trigger strut is to keep the trigger from rotating on the threads into the valve top. Avoid bending the strut flexures too far.

Precisely fitted Barrel to Chamber Spacers are now provided and **recommended for all launchers**, in the past they were supplied only for the four inch diameter chamber models (and

they were simple spacer blocks). Spacers have been redesigned with custom 3D printed plastic to match the curvature of both the barrel and the chamber and have the proper spacing to match the fittings. They have **internal slots to accept a large cable tie** and provide better support for the barrel and chamber and make a stronger launcher.

The 2020 update includes instructions for the new 3D Printed Barrel Endcaps which facilitate easier assembly and maintenance. Many other improvements to the text have been made.

Assembly Preparations

Parts Inventory

It is advisable to inventory the Launcher parts both to familiarize you with the parts and to ensure that all parts are present. Refer to the packing list and verify the parts against these instructions.

Inspect the parts for damage or cracks. Do not use damaged parts - replace any bad parts before assembly.

Tools and Supplies



Fusion Single Step, Purple, Clear Primer and PVC Cements from Oatey

A pressure rated PVC Pipe Cement system should be used. The type of available cements and primers vary by locale. In our area Purple Primer is required for plumbing code, and this combination ensures an excellent cement bond that can be easily inspected. Clear primer is available and avoids the purple stains, but is harder to see and use. Recently single component cement that does not need a separate primer has become available (Oatey Fusion), and we

recommend this cement. It is easier to work with and we now use this on the launchers we assemble. Throughout the rest of this document we will refer to PVC Primer and Cement for consistency. If you are using a single component Cement then skip the primer steps.

Threads and Sealing

The threaded joints in the launcher are National Pipe Threads (NPT) which are tapered. They are not self sealing, some form of sealant is required. Pipe sizes refer to nominal inside diameter and small sizes have much larger threads than the pipe sizes called out. So 1/8" NPT threads are about 3/8" diameter, and 1/4" NPT threads are about 1/2" diameter.

Teflon tape is provided with the Super kits for sealing threads. This works and is safe to ship, but you may prefer to use Rectorseal Number 5, or other quality thread sealing paste as long as it is compatible with plastic, brass and compressed air. We recommend following the manufacturer's instructions with sealing tapes and pastes, however it has been our experience that applying modest quantities of paste to the female threads (instead of the recommended male threads) generally seals better and makes less mess - but it is up to you. Only the pressure chamber seals are important, everything downstream of the main valve only has pressure for tens of milliseconds.

Safety

Always work with cement, primer and paint in an area with adequate ventilation. Read and follow the instructions on the PVC cement, primer, thread sealant and paint. Wear eye protection when building and using the launcher. Do not work near an open flame or other ignition sources. Do not smoke near cement, primer and paint as they are extremely flammable.

Organize and Prepare Work Area

Make sure the work area has good ventilation. A fan is recommended to bring fresh air and push fumes away.

Make sure there is adequate lighting in the work area.

Make sure that the work surface is protected from the solvent cement, primer and paint. Layers of paper or cardboard should be spread on the work area.

Protect your good clothes from cement, primer and paint splatter. Wear old clothes or a shop coat or apron and old shoes.

Print out the instructions or set up a computer nearby to use. Make certain the computer is safe from any primer, cement or paint splatter.

Preparing the PVC

Remove any tape or stickers from the PVC in the areas that will be painted or cemented. Labels, tape or stickers in other locations may be left or removed, it is up to the builder. Remove any loose PVC from the parts. File or sand any sharp edges or projections.

Wash the PVC parts with detergent and warm (not hot) water and rinse well. Pot scrubbers (such as Brillo pads) may be used on the barrel and pressure chamber pipes (but are not recommended for shiny parts such as PVC fittings).

Make sure that PVC is clean and dry before painting or cementing.

Be very careful about test fitting the PVC parts, do not force them together or they may become stuck. The tapered fittings will slide together easily when lubricated by the cement but when dry they can become very difficult to separate.

Painting

Painting is optional. If you don't plan to paint then skip this section and jump down to Initial Assembly.

PVC can be painted if the proper preparation and paint is used. Krylon Fusion works well if allowed to dry sufficiently to become fully hardened. If you choose to paint the Barrel it is best to paint it before assembly. The pressure chamber and U sections are better painted during assembly after cementing to prevent reactions with the paint. Mask off the areas to be cemented (a bit under 2 inches from the end(s) on barrel and chamber) to prevent painting the surfaces to be cemented.

Make sure the paint dries according to the manufacturer's instructions before handling or cementing the parts. Fusion instructions recommend 7 days to fully harden.

Initial Assembly

Introduction to PVC Solvent Cementing

PVC joints are strongest if the PVC Primer is used (and the PVC is clean, dry and tightly fitted). Primer (if used) and then Cement is applied and the parts are joined and held for a short period of time while the cement 'sets'. Enough cement must be used to lubricate the joint or it may 'freeze' before it is fully inserted. It is important to hold long enough that the parts don't 'back out'. Review the Manufacturer's instructions for your PVC cement and primer to use it correctly. The new single-step cements do not require primer and meet requirements for strength. Oatey Fusion is clear and non-staining, and is easier to use than primer-cement systems.

If using the purple primer - it stains, so it pays to think which way the primer will run (downhill) and orient the part so the runs are not staining the visible portions. Keep your fingers clean and use absorbent paper on the work surface to catch the drips. Nitrile exam gloves may be used to keep the cement and primer off the skin.

Preparation

In the next step you will be locating some items and setting them aside.



Ball Holding Tools and Loop Kit

If you have a Super kit locate the Launch Ball Loop Kit and Ball Holding Tool and set these aside. Shown above are several different versions of the Ball Holding Tool. Whichever one is in your Super Kit it is designed to hold the ball and prevent it from moving while you are working on it. The preparation of launch balls is covered after the launcher build instructions in this document (approx page 36). The Loop Kit is nylon covered stainless steel wire and crimp tubes sufficient for making six launch balls. Additional loop kits are available.

U Assembly



Barrel Endcap, Upper Elbow, Elbow Joiner pipe, Lower Elbow, Threaded Bushing

The 3D Printed Barrel Endcaps are not white. If the kit has a 3D Printed Endcap the Upper and Lower elbows are identical, so no need to mark or differentiate them. If the kit has a PVC Barrel Endcap (white, shown above), locate the Upper and Lower Elbows, the Elbow Joiner Pipe and one Threaded Bushing, as well as the Barrel Endcap. Note that the upper and lower elbows are the same material but the upper has been modified so that it fits fully into the round hole bored into the PVC Barrel Endcap. Determine which end fits easily and fully into the barrel endcap. There is usually a raised bump that is ground away to allow the endcap to sit properly on this elbow. **Mark this end** to keep track of it and **do not** install the threaded bushing on this end. Set the Barrel Endcap aside (whether it is PVC or 3D Printed), **do not** attach it to the “U” at this time. The bushing will go into the opposite end of the U later in this section.

Find the seams on the elbows (on the end with the lettering). One end has two ridges along the sides from the casting of the part as well as the lettering. The ridges are used to precisely align the elbows when the U is assembled. These ends are joined by the Elbow Joiner Pipe.

Find the elbow joiner pipe. Draw a mark halfway down the length to help install it centered in the elbows.



Prime the inside of the Upper Elbow on the end with the text. Take care to orient the part so the primer runs downhill inside the elbow and keep the outside of the elbow primer free.

Prime half of the Elbow Joiner Pipe. This half will be installed in the elbow.

Apply cement inside the Elbow on the end with the text (that you already primed).

Apply minimal cement to the primed half of the Joiner Pipe.

Seat the Tube halfway into the seamed end of the Upper Elbow and hold it until it sets.

Prime the inside of the Lower Elbow on the end with the text. Take care to orient the part so the primer runs downhill inside the elbow and keep the outside of the elbow primer free.

Prime the half of the Elbow Joiner Pipe that is sticking out of the Upper Elbow.

Apply cement inside the Elbow on the end with the text (that you already primed).

Apply minimal cement to the primed half of the Joiner Pipe.

Slide the Lower Elbow **fully** onto the Joiner Pipe and **quickly align** the seams to make the U flat. Pushing it down hard against a flat surface can also help align it, but it must be done quickly, before the cement sets. Clean off any excess cement oozing out of the joint.



“U” Elbow Seams Lined Up

Verify which end of the U goes into the barrel endcap (the Upper Elbow). Install the bushing into the other end (the Lower Elbow) in the next step.

Prime the inside of the lower elbow and the outside of the Threaded Bushing. Apply cement to the inside of the Elbow and the outside of the bushing. Seat the bushing fully into the Elbow and hold until set. Set the U assembly aside to dry at least an hour before handling.



Pressure Chamber and Valve Assembly

Introduction

Now you have had experience with PVC Solvent Cementing. In the next steps you will be assembling the more critical joints that have continuous pressure when the launcher is pressurized. Leaks in these joints will cause the pressure to fall off, so minimizing this leakage is especially desirable. Make sure to use PVC primer and sufficient cement on both surfaces to facilitate full depth seating and adequately seal the joint (or use the single-step Fusion cement).

The following steps will no longer call out the primer and cement application in detail but you should continue to use the recommended procedures for your cement in this assembly.

Pressure Chamber assembly



Locate the pressure chamber rear endcap (3-4" encap with bored hole), a threaded outlet bushing that fits this hole, and bushing support tube that fits over this bushing on the inside of the endcap. The size of the endcaps varies with different launchers, so the photo may not be exactly the parts you will be using.



Install the rear chamber endcap outlet bushing into the bored endcap from the outside. Use PVC primer and plenty of cement.

Install the bushing support tube on the outlet bushing from the inside of the endcap. Use PVC primer and plenty of cement, especially in the bottom of the endcap to aid sealing against leakage. Set this aside to dry for at least 60 minutes before it is handled.



Locate the pressure chamber pipe and forward endcap (same size endcap without a bored hole), and the pressure chamber pipe. The size of these parts varies with different launchers (three or four inch), so the photo may not be exactly the parts you will be using.

Draw a pencil line $1\frac{7}{8}$ " from each end around the pressure chamber pipe. Use this line to guide the application of primer and cement to the end of the pipe to keep it inside the endcap when assembled.

Install the pressure chamber pipe to the forward endcap. Use plenty of PVC primer and cement for this large joint. Ensure this pipe is fully pushed into the endcap. Hold until set. Allow the pressure chamber components to dry for at least 60 minutes before proceeding to the next step.





Install the pressure chamber pipe and forward encap assembly to the rear endcap assembly. Use plenty of primer and cement for this large joint. This completes the cementing on the pressure chamber. Set aside the Pressure Chamber to dry undisturbed for 24 hours before drilling and tapping. You may continue with other steps below.

Barrel to Endcap Assembly



If your kit includes a 3D Printed Barrel Endcap (it won't be white) - skip this step - the printed endcap will not be cemented.

If your kit includes a bored PVC Barrel Endcap (white) - install the Barrel into the Barrel Endcap using PVC Primer and Cement. Prime both parts but use cement only inside the Barrel Endcap. Ensure that the Barrel is fully seated into the Endcap. Hold in position until set.

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Trigger Assembly



Unthread and remove the flow restrictor from the tip of the trigger, if it is there. In the photo above it is the tube with transverse large oval holes on the upper end of the blow gun. Discard this part. If the flow restrictor is left on the trigger it may still work but will reduce the performance of the launcher.

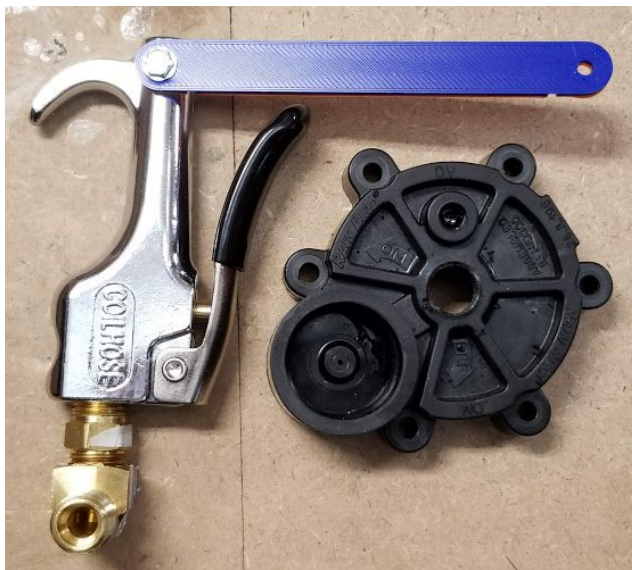
Drill a hole in the tip of the trigger to mount the strut using a $7/64$ " bit located about $5/16$ " from the end of the trigger on the side as shown below (note the strut is not oriented correctly in this photo, but it is okay for locating hole to drill). Make sure that the metal chips from the drilling process do not get down into the trigger valve, after drilling point the tip down and carefully shake them out. Install the screw temporarily now (about halfway), the trigger strut will be installed later.



Remove the screws holding the main valve top to the valve body. Set aside the valve top, screws, rubber diaphragm and spring. They will be reinstalled later.

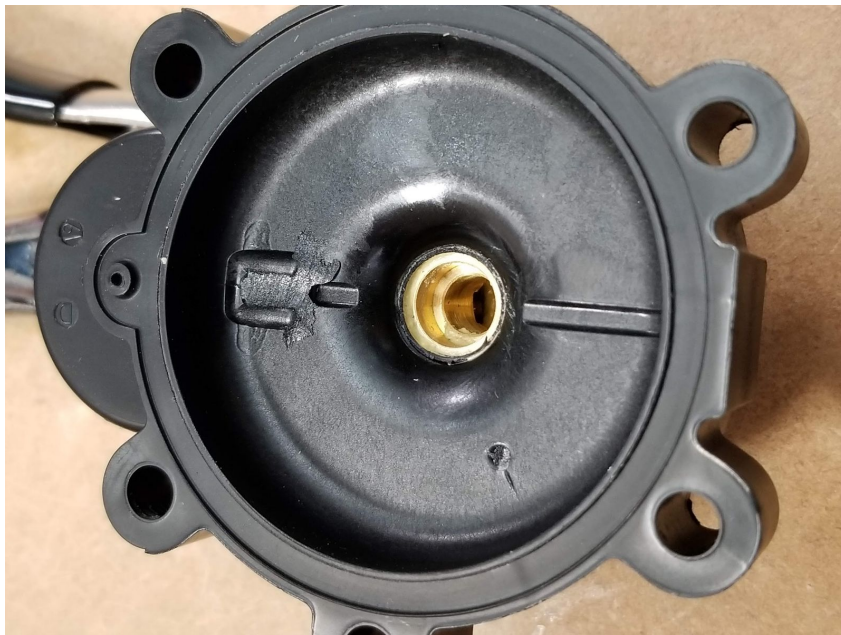
Carefully unthread the brass elbow from the valve top.

Use teflon tape (or thread sealing paste) on the adapter tube threads. Thread the trigger to the trigger adapter tube, and the adapter tube into the brass elbow. Tighten finger tight and continue 1 to 2 turns with a wrench until aligned as shown. With the trigger on the table and the strut on top, the trigger elbow's male threads should point up perpendicular to the table. The trigger strut is shown here but it will be installed later, do not install it at this time, it will just be in the way.



Use teflon tape (or thread sealing paste) on the brass elbow threads. Carefully thread the trigger elbow into the valve top. Take care and **DO NOT CROSS THREAD**. Turn in about two turns and align as shown, with the trigger over the large circular ring in the valve top and clearing all six of

the screw mounting holes. Avoid turning too deep into the valve top. The trigger may or may not be too tight, the strut will hold the alignment later when assembly is complete.



Drill and Tap Pressure Chamber

*****Ensure the Pressure Chamber cement has dried 24 hours before this step*****

There are two or three locations to drill and tap in the chamber. If you have a pressure relief valve to install (included in Super kits) it will require the third hole. If there is no relief valve there will be only two holes to drill and tap. All holes must be drilled and tapped into the plastic in areas where it is double-thick. This provides more support and depth for the threads.



CSV19 Pressure Chamber Marked Up

Position the chamber with the outlet toward the left as shown above. Choose (or make) a line down the length of the chamber, the barrel will sit over this line. In the photo above, there is a blue line on the chamber that is used for this example. Measurements are from this line, and from the edges of the endcaps. 1½" outward from the edges of the endcaps and 1¾" downward from the center line locate two holes F and G for Fill Valve and Gauge as shown.

If you have a safety pressure relief valve a third hole goes to the left rear (upward), 1¼" on a CSV19 or 1" on a CSV17 from the centerline and 1½" from the edge of the endcap. This is marked S in the photo above.



Drill the holes initially with a small bit and then enlarge to 5/16". Make the holes perpendicular to the chamber tube. A drill press is good but it can be done with a hand drill. Go slowly and carefully. If possible use drill bits designed for plastic or brass, but wood or metal bits will also work. Be careful and go slow as it will try and grab as it breaks through.



Tap these holes with a $\frac{1}{8}$ " NPT (National Pipe Thread) tap (included in Super kits). Keep the tap straight in the hole and run it in only about $\frac{2}{3}$ of the way in to make the tapered hole tight enough (if the tap is run deeper it will loosen the fit). Using a couple drops of oil on the tap makes the threads cut cleaner. Use the normal procedure for tapping - 1 turn in, $\frac{1}{2}$ turn back, etc. (Note - if the tap won't start into the hole a slightly larger hole may be required such as size "R" or $\frac{11}{32}$ ", or better yet - get a tap with a longer taper.) Keep the tap oriented straight down the hole.

After tapping clean the Pressure Chamber of all bits of PVC. Use a shop vac (best), water rinse (good), or compressed air to get it clean. Get the tank as clean as you can, any bits of plastic that remain may foul the valves and make leaks and more work later on.

Tank Valve and Gauge Installations



Apply teflon tape (or thread sealing paste) to the threads of the Schrader Fill Valve, Pressure Gauge, and (if applicable) the optional Pressure Safety Relief Valve.

Install the Fill Valve in the threaded hole farthest away from the Tank Outlet, toward the front of the tank. Proceed with care to avoid cross threading. Tighten finger tight, then using an appropriate wrench tighten 1 to 2 more turns.

Install the pressure gauge in the threaded hole near the outlet (in line with the fill valve) finger tight. Tighten the Pressure Gauge carefully about 1 to 2 more turns using a thin wrench, stopping with the gauge aligned as desired. Avoid trapping the wrench between the gauge and the tank body and damaging the gauge.

If applicable, install the optional Pressure Safety Relief Valve into the remaining threaded hole. Tighten finger tight, then 1 to 2 more turns.

Install Main Valve

Apply teflon tape (or thread sealing paste) to each end of the chamber to valve short threaded joiner pipe.

Thread the short pipe into the chamber outlet finger tight.



Thread the main valve onto the joiner pipe finger tight, ensuring the flow arrow is pointing away from the pressure tank. Continue 2 to 3 turns further and stop with it lined up. The seam in the valve should be lined up with the line drawn earlier (under where the barrel will sit), and the open side of the valve pointed toward the side where the pressure gauge is located.



Install Trigger



Place the diaphragm and spring on the Main Valve oriented as shown in the photo. The holes in the diaphragm and valve top will line up when it is correct. The spring points away from the valve body (and snaps onto a nub on the diaphragm).



Set the valve top in place on the diaphragm oriented so the holes all line up.

Insert the first screw into one of the holes in the valve top. Hold the valve top down against the valve.

Turn the screw backwards gently till it clicks. Then turn the screw gently forward so it follows the existing threads (easy to turn) and avoid cutting new threads in the plastic (hard to turn). Tighten till the screw just touches the plastic of the valve top.

Repeat for the opposite screw, then do the remaining 4 screws.

Alternately tighten the six screws evenly until the rubber diaphragm is just slightly squeezed. Do not overtighten.

Pressure Test



Inspect the Launcher. Look for cracks or other damage. If the launcher is damaged it will have to be repaired or destroyed. Do not apply pressure to a damaged launcher.

Use Safety Glasses and Hearing Protection for the following steps.

Fill the pressure chamber to approximately 40 psi. Wait one minute for the pressure to stabilize and refill to about 40 psi if it has dropped. New launchers may initially drop in pressure as the valve seats. Disconnect the pressure source and note the actual pressure.

After 5 minutes read the pressure gauge again. If the pressure has dropped more than 5 psi see the following section on Leak Repairs.

Increase the pressure to the maximum pressure (80 psi for the CSV19 and 90 psi for the CSV17). Allow to sit at maximum pressure for 10 minutes to complete the pressure testing.

Bleed the pressure down by gently depressing the core pin of the fill valve inward.

Leak Repairs



Leaking in the Main Valve Threads

If the launcher is holding pressure, skip this section and proceed to the Final Assembly below.

If the launcher is leaking the first step is to determine where the leak is. The best way to find a leak is to immerse the pressurized chamber in water. The only part that water will damage is the pressure gauge - the scale inside is cardboard and not protected against water. Don't submerge the plastic part of the gauge.

If the leak is in a cemented joint it may be difficult to repair. You can try to soak some PVC cement into the leak area. If that doesn't work the best thing is usually to get replacement plastic parts and remake the chamber.

If the leak is in threads try tightening them slightly, if that doesn't work (or is impractical due to alignment requirements) then disassemble, clean the threads, redo the sealant and reassemble. Consider the sealant used and ensure it is the correct type for plastic and/or metal and compressed air, and that it was properly applied. Good paste sealants like RectorSeal number 5 or PTFE paste may seal better than teflon tape.

If the leak is coming through the main valve (or around the diaphragm edges) the valve can be disassembled and cleaned. Remove the strut screw on the barrel endcap to free the trigger, then the six screws in the valve top. Clean the diaphragm and valve seat. Reassemble.

If the leak is in the main valve or tank outlet threads disassemble, clean off the sealant, apply new sealant and reassemble. If the threads are damaged replace that part. If the short pipe breaks off and is difficult to remove we can supply a smaller pipe to cement into the broken part to remove it, contact us for details, or find a broken pipe extractor tool.

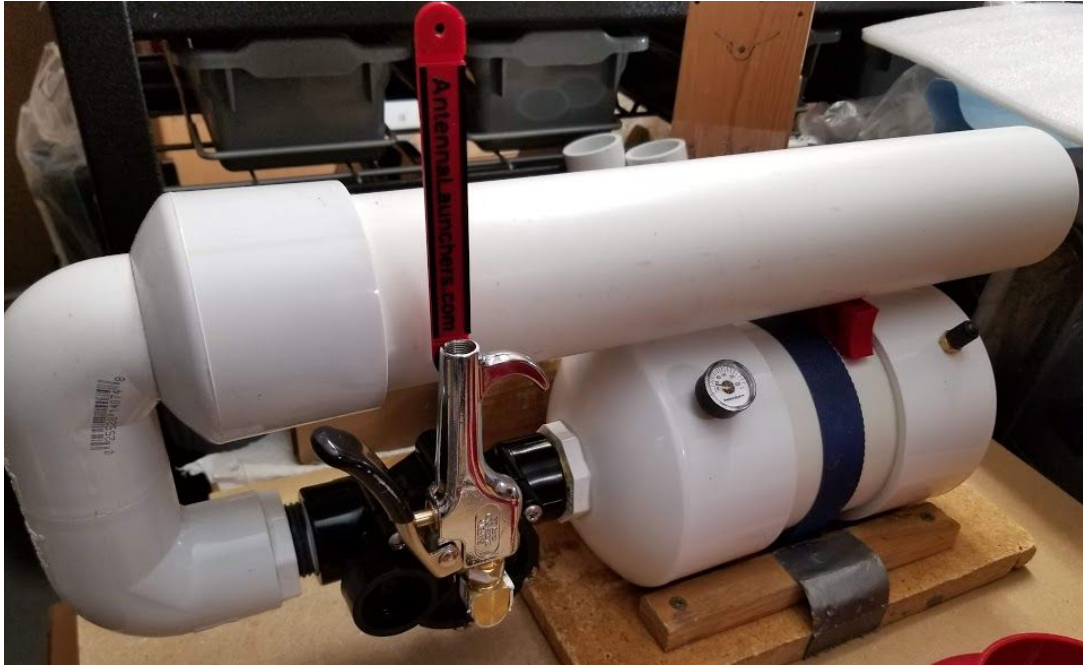
If the leak is coming through the trigger valve it should be cleaned out and retested, if it still leaks it should be replaced.

If the leak is coming through the pressure relief valve it should be disassembled and cleaned. During reassembly maintain the number of threads showing above the locknut as this determines the pressure relief setting.

If the 1/8" NPT threads into the plastic are damaged they can be drilled out and retapped to 1/4" NPT and a brass bushing installed, or remake the chamber with new plastic.

After making repairs repeat the Pressure Test.

Installing the PVC Barrel Endcap



If your kit has the 3D Printed Barrel Endcap skip to the next section.

Make sure the trigger strut is installed on the trigger and positioned out of the way. Sit the barrel-chamber spacer onto the chamber pipe toward the forward endcap. Sit the barrel on the spacer and make sure the curvatures match the barrel and chamber. Slide the barrel endcap over the upper end of the “U” as far as it will go without forcing it. The barrel should sit fully onto the spacer and be straight and parallel to the chamber pipe. Mark the elbow lightly with a pencil around the edge of the endcap.



Remove the barrel from the “U”. Apply Primer to the forward part of the “U” elbow beyond the line, and to the inside of the bored edge of the barrel endcap. Apply cement to the elbow forward of the line and reseat the barrel onto the elbow, sliding and twisting it back to the line. Ensure the barrel is straight and sitting flat on the spacer and allow this to dry overnight.



3D Printed Barrel Endcap Pre-Installation

If you have the white PVC Barrel Endcap skip this step and proceed to “Strap Barrel...”.

Place the 3D Printed Endcap fully on the barrel and slide it onto the upper end of the U to facilitate strapping the barrel to the chamber. Final installation of the 3D Printed Barrel Endcap will be completed later.

Strap Barrel to Chamber

Install the large cable tie through the slot in the spacer, around the barrel, through the slot in the other side of the spacer, around the chamber and through the locking end of the cable tie as shown in the following 3 photos. Position the cable tie ends behind the chamber and tighten it. Use a Cable Tie Tool (or pliers) to tension and cut the cable tie flush (flush cutters or sharp utility knife if you don't have a cable tie tool). Don't leave a sharp end to cut you later.





3D Printed Endcap Final Installation

If you have the PVC Barrel Endcap skip to the next section on Strut Installation.

Rotate the 3D Printed Barrel Endcap so that one hole is at the top, one hole is on each side, and the other two holes are angling downward when looking at the launcher from the rear with the barrel directly above the chamber, as demonstrated in the following photo (don't put the screws in yet). The five remaining hex head screws will be installed in this step.



During this step keep the barrel and chamber parallel, the barrel slid fully into the endcap and parallel with the chamber, and the endcap fully toward the rear on the “U”. The holes will be drilled through a hole in the 3D Printed Endcap toward and perpendicular to the centerline of the barrel through the barrel (on the 2 sides) or into the upper elbow of the “U” (the top and two holes angling down). When drilling the side holes into the barrel stop after penetrating the barrel, we don’t need to drill all the way through the inner endcap into the air flow path as the short screws don’t go that deep. The three holes into the “U” need to go fully through.

Ensure the parts are aligned, drill a 7/64” hole, install that screw, and repeat. The three longer screws go into the deeper holes into the upper “U” elbow, and the two shorter screws go into the barrel through the side holes, with the one on the trigger side going through the trigger strut first. Do not overtighten these screws, just snug is adequate. Skip the Trigger Strut Final Installation step and proceed to Label Installation below.



Trigger Strut Final Installation

The Trigger Strut provides support for the trigger to keep it from rotating on the threads and possibly developing a leak.

Position the strut on the endcap as shown. Drill a 7/64" hole in the endcap near the back edge to align with the strut hole. The old metal struts used loose washers to space the strut to clear the thumb trigger lever, the newer plastic struts have spacing built in. Install the strut screw through the free end of the strut, then into the hole in the barrel endcap. Tighten till the strut is just snug. Do not overtighten. Metal struts can optionally be bent to fit better. Plastic struts automatically flex at the thin spots, however avoid bending the strut any further than necessary or it may snap. Contact us if you require a replacement plastic strut.



Launcher Label Installation



CSV19 Complete

Clean the barrel with isopropyl alcohol and position the launcher for the label installation.
Peel the backing from the Label.
Apply the label to the barrel at the location shown.

Ramrod Assembly



The ramrod assembly is friction fit. The end was a bushing on the older models, the newer units have a 3D printed ball pusher that resembles a funnel. The two piece ramrods for the PADS kit also include a coupler to join the halves. None of these parts need to be cemented, just friction fit them so they may be easily disassembled for storage. Pipes may be gray or white, and some bushings have hex flats on them while others do not and printed parts vary in color, so your parts may differ.

Reel Assembly, Installation and Use

Zip and Mini Coaxial Reels

NOTE - DO NOT cement the reel mounting tube to the launcher barrel. This is designed to be a friction fit for convenient removal during storage and winding operations.

If you have a Zip Reel or a Mini-Coaxial Reel it friction fits over the end of the barrel. Do not make it tighter than necessary as it may be difficult to remove. If it is too loose some masking or electrical tape may be used inside the coupling to tighten the fit. It is most convenient to remove the reel while winding the line back on, and when storing the launcher.

Rewinding the Coaxial Reels (after a Launch)

To properly wind the line back onto the Saunders Zip or our Mini Coaxial Reels, detach from the launcher and hold the reel in the left hand by the barrel mounting tube. Wind the line with the right hand, effectively reversing the path the line follows when it flows off the reel during launching to avoid twisting the line. DO NOT rotate the reel to wind the line as this will introduce twist into the line. DO NOT wind the line on the reel with too much tension. This may damage the reel (the Zip reels are particularly sensitive to excessive tension). Wind the line with just enough tension to hold it in position on the reel. Distribute the line over the reel to facilitate smooth feeding during launch.

(Note that Zip reels are no longer manufactured and cannot be replaced if damaged).

Fishing Reel Mount Assembly



If you have a fishing reel mount (included in Super kits that don't have Coaxial Reels), attach the reel foot to the reel mounting tube. Use the supplied hose clamps to hold the foot to the tube as shown. Best performance is with reels that have large fixed spools such as ocean spinning reels. A closed face reel is shown here. **DON'T FORGET** to release the line before launching.

Launch Ball Preparation



Collect tools and supplies.

Plug in the glue gun to get it warmed up.

Cut wire loop material into six inch lengths with a wire cutter.

Put a tennis ball into the safety holding tool oriented for a clear area to work on.



Cut a slot about one inch long with a sharp utility knife.

Mark and punch or drill holes for the loop on either side of the slot.



Push wire ends into the holes.



Pull loop ends out through the slot with long thin pliers and make them even.



Slip the crimping tube on the wire ends and smash the tube.

Push the crimp inside the ball and funnel 2 oz of sand into the ball.



Repeat for each ball (while the glue gun warms up).

Hot glue the slits closed on the launch balls, and don't forget to unplug the glue gun.



Go forth and launch antennas!!



Further Information

For further information on using and troubleshooting consult the Pneumatic Antenna Launcher User's Manual at www.akbeng.com/info. Contact us directly if you need further help.

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