AIRGUN DESIGNS INC

BECAUSE QUALITY SHOOTS STRAIGHT ALWAYS

68 AUTOMAG

MINIMAG

Instruction
Manual

Level 7

AIRGUN DESIGNS, INC.

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WARNING: This is not a toy. Misuse/careless use may cause serious injury or death. Eye protection designed specifically for paintball use must be worn by the user and any person within 200yds(183m). Read Operation Manual before using.

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WARRANTY

Congratulations on the purchase of your new Airgun Designs marker! There have been some important changes in the way Airgun Designs handles warranty repair work, so please read this thoroughly.

In the past, Airgun Designs produced markers of the highest quality and provided premium service by fixing most markers for free. We charged a correspondingly high price for this combination of quality and service. In reviewing our policies and realizing that the majority of players in today's paintball world are on a limited budget, we have changed both our pricing and warranty policies. In the past, by charging a higher price and repairing markers for free, we rewarded the people who did not take the time to fix or maintain the markers while excluding the people on a more limited budget.

We are reducing the prices significantly on most of our product line to make them more affordable to the majority of the paintball public in 1998. We don't have to tell you that when you reduce the selling price something else has to go to reduce the cost. **WE DID NOT REDUCE THE QUALITY OF OUR PRODUCT IN ANY WAY** in order to reduce the selling price to our customers. The marker you purchased today is the same in every way as the markers we produced in the past. The only thing that has changed is the warranty policy.

Our New Warranty Policy

We now offer a 90 day limited warranty from the date of original retail purchase. This warranty covers parts, labor, manufacturing defects, and malfunctions. It does not cover abuse such as wrapping the gun around a tree when you lose a game nor does it cover damage that occurs as part of an accident such as a house fire.

After the 90 day limited warranty ends we now have what we call the punch card warranty program. There is no actual punch card, but there are one to four stars laser engraved above the serial number on your marker's valve assembly. Each star entitles you to a free repair of your marker. When you send your marker in for repair we will remove one star and so "punch" your card. After we have punched a star there is a 30 day warranty to ensure we fixed your marker properly. If the marker still has the same problem it was sent in for we will fix it again without punching another star as long as the marker is returned to us within 30 days.

Once the stars are used up we will still service your marker, but we will charge you a standard rebuild fee which covers the replacement of soft parts and return ground shipping. There will be additional charges for hard parts such as bolts or sear assemblies. Just as there is a 30 day warranty of repairs done under the punch card program, there is also a 30 day warranty on rebuild repair work. This punch card warranty program is good for three years from the date of manufacture. In this way you can save the punches for times when you really have a problem and we will be happy to fix it for you.

Parts not manufactured by Airgun Designs

In evaluating in-house repairs, we have found that about 20% of the time we are fixing problems caused by modifications and/or aftermarket accessory parts installed in our markers. In most cases we must replace these aftermarket parts with our own parts to make the marker work again. We are sure you can see that this is very unfair to us and eventually to you in higher prices. **We will no longer fix markers for free either under the limited warranty or the punch card warranty if the marker has an aftermarket part and/or accessory that causes a problem**. Some examples of modifications and/or parts that can cause problems include: painted mainbodies, two finger triggers, wooden grips, aftermarket o-rings, aftermarket seals, aftermarket bolts, aftermarket on/off assemblies and aftermarket trigger frames.

In many cases, aftermarket accessories such as barrels, expansion chambers and grip frames do not cause a problem and will not void the warranty. Many aftermarket parts and accessories are available. We have no problem with aftermarket parts being installed in our markers. However, please keep your stock parts on hand and replace them first if you have problems with your marker. If you are still having problems when all the original parts are installed, then call us for assistance or to arrange for your marker to be sent to us for repair.

*****Return Authorization Required*****

We have <u>always</u> required that you call and get a return authorization number before you send in your marker. This is for your safety and insures a speedy repair. With an RA number we know your name and address, the problem, and the date promised as soon as the marker arrives at our factory. If a marker comes in without an RA number someone has to track down the owner, find out what's wrong, and then enter the information in the computer system. **Therefore, we will no longer accept repairs without an RA number. Packages without RA numbers clearly marked on the outside of the package will be returned to the sender!**

Technical Support

Our technical support hotline (847-520-7225) will not change. Technical support is available by telephone any time from 9:00 a.m. until 11:30 a.m. and 1:00 p.m. until 4:30 p.m. (Central Time) on Mondays through Fridays. Please note that our telephone lines are busiest on Mondays and Fridays. Please have your serial number ready so that we can look up your file quickly. Send in your warranty card so we will have you on file when you call.

Our Commitment

Here at Airgun Designs we want to continue our long history of producing quality products and providing quality service. Airgun Designs is focusing on giving you, the player, the best possible value for your money. We hope that this new policy reflects our commitment to you, the player, now and into the future.

Tom Kaye
President

SAFETY

THIS PAINTBALL MARKER IS NOT A TOY! This paintball marker should be treated as a dangerous instrument and should always be treated with respect. Never point a paintball marker at anyone not properly attired. If misused or improperly maintained, this paintball marker can cause serious bodily injury, including blindness, or even death. Please read all safety instructions and directions in this manual *before* using this paintball marker.

Do not point or shoot this paintball marker at animals. Do not point or shoot this paintball marker at any person unless you and your target are engaged in paintball activities and are wearing proper safety gear including approved paintball goggles, mask, and pads. Follow all maintenance instructions carefully. If you are unsure about any aspect of the maintenance procedures, contact your local dealer or the Airgun Designs, Inc. Tech Line at (847) 520-7225.

This paintball marker is always armed and cocked when an air supply is installed. Always use the safety located behind the trigger on the grip when an air supply is attached or installed. Disengage the safety only when on a playing field and the game has started. The safety is off and the paintball marker *will* fire when the red ring of the safety pin is showing.

Always chronograph this paintball marker before using it. Never shoot this paintball marker when the chronograph readings exceed 300 feet per second! There is a blow-off valve incorporated into the valve mechanism that will release air pressure if pressure exceeds a predetermined amount. This blow-off valve is factory set and is not user adjustable.

Always remove the air supply from the paintball marker and dry fire in a safe direction before disassembling. The velocity adjusting nut is on the back of the regulator body. Do not disassemble the velocity adjusting nut while the paintball marker is under pressure. If air is leaking out the back of the velocity regulator nut the paintball marker is over-pressurized and will shoot at a higher than intended velocity. Reduce the regulated pressure by backing off the velocity regulator nut and re-chronograph the paintball marker. If problems persist call your dealer or Airgun Designs, Inc. **Do not put your fingers into the breech area or down the ball feed tube while firing the paintball marker!**

The pressure regulator allows gas under pressure to push the trigger forward after shooting. An excessively hard trigger pull may indicate the system is overpressurized. Do NOT fire a paintball marker that has excessively hard trigger pull; call your local dealer or Airgun Designs, Inc. immediately.

FAST START

This is a quick overview of how to use the 68AUTOMAG/MINIMAG™ for the experienced player. Introducing air pressure to the paintball marker will charge and cock the system. The system is a blow forward from open bolt, similar in concept to a cork in a champagne bottle.

The barrel utilizes a twist lock mount; a one-quarter twist is all that is required for

full lock. The regulator nut is on the back of the valve body and requires only one turn to adjust from 200 to 300 fps. Air venting out of the back of the regulator indicates that the internal blow-off valve is responding to over pressure in the system and the velocity should be turned down.

Field stripping is accomplished by unscrewing the field strip screw underneath the frame after removing the air supply. THE TRIGGER MUST BE PULLED TO SLIDE THE VALVE BODY OUT. There is a locking pin for alignment in the regulator body which allows the valve body to only come out part way before you must twist the valve body clockwise to continue sliding out the back. Reinstall in the same manner. Once removed, the entire valve and bolt assembly is available for cleaning.

Maintenance on all active o-rings can be accomplished without tools. See specific headings for valve body disassembly.

When adjusting the regulator nut, shoot several times before chronoing to allow the regulator piston and spring to seat properly. Always start below your intended velocity and work your way up. When firing the paintball marker, it's important to remain aware of how many balls are in your loader. If the quantity runs too low the slight blowback past the bolt will bobble the balls in the feed tube, thus preventing a positive ball feed. This increases the likelihood of ball breakage.

Always use high quality, fresh paintballs. The blow forward action aggressively pushes the ball into the barrel before firing and we have found that lower grades of paint cannot withstand the acceleration.

A slide-on sight rail is available from your local dealer or Airgun Designs, Inc.

FIRST TIME PROBLEMS

There are several first time problems to watch out for. Many times the paintballs will not feed because the recoilless design does not jiggle the loader. You must remain aware enough to keep the balls feeding.

Next, the bolt can stick forward causing the trigger to lock due to either paint chips wedging between the bolt and breech or, when degassing the paintball marker, caused by turning off the tank and shooting those last few blooping shots. When the bolt sticks forward the trigger will not come forward. Remove the barrel and push the bolt back until the trigger clicks forward.

The paintball marker will give very little indication that it is running out of gas; by the time you see the velocity drop you are 20-30 shots away from total shut-down. Additionally, if you use a constant air tank with an on/off valve make sure you open it all the way. The same is true for pin valves; you must rotate the tank at least one full turn after initial gas up or the tank will not feed enough air. *DO NOT USE A SIPHON TANK. IT WILL NOT WORK AND WILL MOST LIKELY DAMAGE THE PAINTBALL MARKER!!*

HISTORY AND THEORY OF DESIGN

The 68AUTOMAG/MINIMAG is the result of three years of development from the Airgun Designs research team. At the 1988 Poconos tournament we displayed our first semi-auto prototype, the PANTHER. The PANTHER was a blowback single-barrel design that was very advanced for its time. The paintball marker design and prototype were sold, but never produced.

The second, completely new paintball marker was developed during the following year and was code named P2 (for PANTHER #2). It was a blowback design that featured interchangeable barrels, no tools takedown to all seals, and reduced parts count. During this time we saw a tremendous improvement in pump paintball marker technology, giving the players field strip capability, doubling efficiency, and reducing weight. We knew that players would not be content with a semi-auto that simply shot when you pulled the trigger if it did not also meet the performance they had come to expect from their pump paintball markers.

After two years of research and development, we knew there were two inherent problems with a blowback design. First, while the heavy bolt being blown back was necessary to slow the action down, it reduced efficiency. The heavier the bolt, the more energy it consumed; lightening the bolt made it harder for the bolt to open the valve far enough. The second fundamental problem was in allocating how much energy went to blow back the bolt (requiring a fixed amount) versus propelling the ball (variable with tank pressure and velocity setting). With all of our blowback designs velocity was dependent on tank pressure which caused velocity to drop when firing enough to chill the tank down.

The semi-auto firearm from which the blowback design comes has a relatively fixed energy source (gunpowder) which burns the same no matter what the temperature, humidity, etc. There has not been a semi-auto firearm made that can shoot a clip of bullets all at the same velocity with only half the powder in some shells.

After two years, it was with some disappointment that we closed the book on our blowback designs and wiped the drawing board clean. We knew what our customers wanted and after the successes of the MICRO-C/A™, 6-PAK+™ and the TURBO VALVE, we didn't want a letdown. Starting fresh, the team took a "bottoms up" approach in starting with a list of performance specifications and then coming up with the design. The specifications list was as follows:

Light weight
Pistol size for one handed use
No tools takedown
High efficiency
Interchangeable barrels
Consistant velocity
Infinite velocity adjustment
No internal parts exposed
No premature parts breakage

This was a tough list but the team, undaunted, used the two years of accumulated knowledge and evaluated sixteen different combinations of valves and bolts and focused on what was soon to become P3. We knew that pressure in the tank could vary as much as 100% and the only way to get everything consistent was to incorporate a pressure regulator that would provide consistant velocity and infinite velocity adjustment. Second, any air not coming out behind the ball would be wasted and would be coming from a hole that would allow dirt in. Third, a light weight bolt for good efficiency combined with a trigger mechanism that did not try to stop the bolt while it was moving all resulted in a totally new design for us and the sport of paintball.

The paintball marker you have just purchased is P4, a further refined version of P3. Its function can be broken down into three independent stages: regulation, chamber fill, and chamber dump. Stage one occurs when an air source is connected to the paintball marker and the system builds up pressure. At a predetermined pressure, set by the regulator nut, the regulator valve closes, thus sealing off the air source from the rest of the paintball marker. The pressure inside the paintball marker is now approximately 400 psi even though CO_2 tank pressure may vary from 600-1000 psi under different temperatures. Stage two happens when the trigger is released, opening the ON/OFF VALVE and allowing the air chamber to fill to a regulated pressure of 400 psi.

Stage three is where everything happens. The air chamber is designed like a champagne bottle with a cork (the bolt) stuck in the opening. The cork (or bolt, in this case) wants to pop out, but is held in place by the sear. When you pull the trigger the sear first closes the ON/OFF VALVE (just before releasing the bolt) shutting off the air chamber from the regulator. This gives the paintball marker a precise amount of regulated air charge. Next the sear releases the bolt and, like the cork, it starts moving forward out of the bottle(power tube). At some point after the ball has been pushed into the barrel, the cork leaves the end of the bottle and all the air rushes out. Once the air is gone the BOLT SPRING which has been collapsed from the bolt moving forward pushes the BOLT back into the now empty air chamber. The process starts over when the trigger is released.

As with all designs, nothing is perfect and there are some inadequacies in this design. All pressure regulators, by the nature of their design, cannot fill a chamber instantly but must fill most of it quickly and then taper off to hit the desired pressure. (You do the same when pouring a glass of water.) When firing faster than three shots a second, the air chamber will not be fully filled and you will experience a 10-20 fps drop in average velocity. The other problems revolve around CO_2 itself. We usually think of CO_2 in terms of a liquid or a gas, but in reality it also takes the form of "steam." CO_2, like water, boils when heated and becomes steam; the steam will still exist as a form of "humidity" until its temperature is above 87 degrees. Pressure changes will also cause water or CO_2 to boil, but this is usually less understood by the general public. Everyday examples of water boiling caused by pressure are cavitation by boat propellers (boiling caused by low pressure) and car radiators (not boiling caused by high pressure).

What does this mean to your average paintball player? Simple! When you shoot

rapidly, the pressure in your tank drops causing the CO_2 to boil, the steam goes into your paintball marker's air chamber, you fire the paintball marker discharging the air chamber behind the ball (dropping pressure again), the steam boils into gas (steam is still a liquid and boils into 30 times its volume in gas) and the ball velocity varies. Switch tanks and you now have warm steam going into a cold paintball marker and, just like the mirror in the bathroom, you get liquid condensing in the paintball marker.

PERFORMANCE

The paintball marker will get a minimum of 400 good shots from a 7 oz. CO_2 tank under normal conditions. An eleven inch barrel gives the best efficiency; longer or shorter barrels will reduce these numbers.

Cold weather performance (below 50°) on CO_2 will be poor. Since the paintball marker is designed to function at a predetermined pressure, outside temperatures below freezing will not generate enough CO_2 tank pressure for adequate velocity. If you regularly play in these conditions, we recommend that you invest in a quality high pressure system (i.e. compressed air or nitrogen setup).

Take-up is the movement of the trigger before it comes in contact with the sear, after sear contact continuing to pull through fires the paintball marker. The trigger in the 68AUTOMAG/MINIMAG has been designed to have a "snap" action with no take-up to give the shortest possible stroke and thus the highest possible firing rate. The average person can fire 4-5 shots per second but, when charged with adrenaline, this can climb to 6 per second. Note that the loader can only feed 7 balls per second under ideal conditions, so be careful!

LUBRICATION

We find that customers who properly lubricate their paintball markers once a week have the fewest problems. To lubricate your 68AUTOMAG/MINIMAG properly, drip 4-6 drops of AUTOLUBE into the air inlet closest to the valve. Then gas up and dry fire the paintball marker several dozen times with the barrel removed (to prevent oil build-up in the barrel).

In addition, once a month remove the valve body and spray oil into the holes marked -OIL-. You may also use automotive grease (i.e. wheel bearing or any light grease) on the spring pack and Regulator Piston O-ring.

VELOCITY ADJUSTMENT

The velocity of your 68AUTOMAG/MINIMAG is adjusted by increasing or decreasing the regulated pressure. This is accomplished by turning the REGULATOR NUT located on the back of the regulator body. Only a minimal amount of rotation is necessary to adjust the velocity. We recommend that you always start at a low velocity setting and turn the adjustment screw clockwise to your desired setting.

Always shoot several shots to seat the regulator piston and spring. High velocities will cause the blow-off valve built into your system to vent air out the back of the regulator body. If you ever hear air venting, stop and re-chrono the paintball marker immediately. We find the best performance to be in the 270-280 fps range. Occasionally grease the threads of the regulator nut.

We offer an optional 3-piece Tournament Cap that is designed to prevent the regulator nut from backing out and thereby reducing velocity under severe playing conditions.

CONSTANT AIR TANKS

DO NOT USE A SIPHON TANK ON YOUR PAINTBALL MARKER!!!
Liquid CO_2 in this paintball marker will cause all the active o-rings to leak and the velocity will not be controllable. Make sure the tank valve is feeding air into the paintball marker fast enough when rapid firing; make sure the valve is completely open. Paintball markers that dramatically lose velocity often have this problem. For vertical tank and remote vertical tank setups, always use standard tanks that have been weight checked to ensure proper fills. Horizontal tanks should be anti-siphon. Contact your local dealer for information on an anti-siphon tank.

The vertical bottle adapter is an accessory for the 68AUTOMAG and a standard feature on the MINIMAG. It helps reduce the possibility of the paintball marker "going liquid" by mounting the standard air tank vertically.

When using CO_2, steps must be taken to keep liquid from entering the valve. The most effective setup we can recommend is a full size expansion chamber vertically mounted in front of the trigger frame and a remote tank. The hose would run from the A.I.R. valve to a vertical adapter mounted on the bottom of the rail, in front of the trigger frame. The expansion chamber screws into the adapter just like a tank. A hose would then run from the bottom of the chamber to remote tank positioned vertically on your back (in a pouch, on your belt?).

Many people who do not like remote tanks mount their tanks horizontally off the bottom of the trigger frame or main rail. Any horizontal tank should be anti-siphon. Anti-siphon tanks are tailored to specific adapters. They are setup for, and cannot be interchanged with other CA adapters. Remote tanks should be standard (Neither siphon nor anti-siphon).

Overall, remote tanks are more effective because they are vertical. Keep in mind that no setup is 100% effective in keeping liquid CO_2 out.

Below 50°F freezing will still occur, even with an expansion chamber and remote. If you plan on playing in cold weather, seriously consider a high pressure system.

FIELD STRIPPING

Field stripping the 68AUTOMAG/MINIMAG is accomplished by first degassing and removing the air supply, then unscrewing the knurled field strip screw at the

rear of the frame. To remove the valve body you must FIRST pull the trigger and THEN pull the valve body out. The valve body has a pin that slides in a Z-shaped slot in the rail. To remove the valve body pull it straight back 1/4 inch, rotate the valve body slightly(being careful to keep the 68AUTOMAG logo aligned). The valve body should then pull straight out the back, opening the paintball marker for cleaning.

CLEANING AND MAINTENANCE

To quickly clean the paintball marker without disassembly simply use a bucket of clean water and swish the paintball marker body in it WHILE THE PAINTBALL MARKER IS FULLY PRESSURIZED! Keeping the paintball marker pressurized keeps the water out of the internal workings of the valve body. After hard use the paintball marker should be taken down and all exposed parts cleaned and inspected for wear or problems. Lightly lubricate all surfaces and re-assemble according to instructions. To deep clean your paintball marker start by field stripping down to the valve body. Remove and clean the POWER TUBE O-RING (see POWER TUBE section), lightly lubricate and reinstall. Then remove and clean the REGULATOR VALVE and REGULATOR SEAT (see REGULATOR VALVE). The spring on the REGULATOR VALVE will catch particles of debris that come from your fill tank. Always clean the spring thoroughly; pay particular attention to the sealing edge that contacts the REGULATOR SEAT. The REGULATOR SEAT should be cleaned carefully and inspected for eny embedded particles; these particles can cause the regulator to leak slowly and can also cause the gun to shoot hot.

Install with the wide end ot the REGULATOR SEAT in first (see REGULATOR VALVE). With the REGULATOR BODY off, unscrew the REGULATOR NUT completely and remove the SPRING PACK; it will fall out. Use a paper clip to push the REGULATOR PISTON out by inserting the paper clip wire through the REGULATOR SEAT hole in the other end of the REGULATOR BODY. Clean the REGULATOR PISTON, lubricate and reinstall (see RE-ASSEMBLY OF VALVE).

PAINTBALLS

There are many different kinds of paintballs on the market, all with different specifications. The one thing that is consistent is that low quality paintballs will perform poorly in the 68AUTOMAG/MINIMAG. Always use fresh, high quality paintballs and try many different types and colors to find the best type suited for your paintball marker and playing conditions.

A common problem that we are all concerned about is ball breakage. Ball breakage was the one area we spent the most time on in the 68AUTOMAG/MINIMAG's development. There are two ways balls break in your paintball marker: first, because the ball did not feed all the way into the breech and was cut in half by the bolt; this is addressed in the LOADER section and is not a concern here. Second is the impact from the air blast. Because the paintball marker can shoot twice as much paint in the course of a game it will appear that, on a per game basis, you are breaking twice as many balls. Our trials show that

a properly setup paintball marker shooting quality paint will break approximately 3-4 paintballs per thousand. In comparison, low quality paint will break 1 in 50. A good test for shell strength is to drop several hundred paintballs one at a time from a height of 6 feet. Balls that consistently survive 6-7 bounces are considered fresh; balls that break within 3 bounces are either stale or have weak shells.

If you know the paintball marker is setup properly and you still experience problems, switch to a different brand or color and try again.

LIQUID IN THE VALVE

Liquid CO_2 can enter the air chamber of an airgun and when expelled into the barrel behind the ball it instantly boils into gas that is many times the volume of the liquid. This causes a hotter than normal shot and, depending on the volume of liquid, can show velocity readings in excess of 350 fps. This action is known as supercharging and is extremely dangerous and should be avoided at all times. **The blow-off valve will not protect against supercharging because the liquid is at the normal pressure when it is in the air chamber!** To prevent supercharging follow these basic rules: 1) never shoot the paintball marker at the ground since this allows the liquid to run straight into the valve; 2) never overfill a bottle since a higher than normal liquid level will drain fluid into the valve; 3) keep your paintball marker at outside temperature because a cold valve body allows liquid to remain in its liquid state instead of boiling into gas.

In addition, we have found that putting a warm bottle on a cold paintball marker causes the warm CO_2 vapor to enter the air chamber where it condenses into liquid; this is identical to freezing down a 7 ounce tank before filling from the warmer 50 pound tank — avoid this.

LOADER

When you receive your 68AUTOMAG PowerFeed or MINIMAG you also receive a free ViewLoader™ and elbow. Always keep at least twenty balls in the loader when fast firing. This will keep the balls from being blown up into the loader from the bolt blowback. The blowback WILL help the balls feed when the hopper is full.

Ball breakage is common with first time users of the 68AUTOMAG/MINIMAG due to the recoilless action and the tendency of the balls to hand in the loader. Become aware of the need to shake the paintball marker to keep the balls flowing and listen for the balls bobbling telling you to reload. If you find that the balls are cut in half in the breech, look at the loader or your technique.

Some elbows used with the ViewLoader will require smoothing out on the inside for maximum flow; make sure that there are no sharp corners or edges to catch balls on. The most reliable firing method is tri-burst until you become accustomed to keeping the balls feeding.

BARREL

The barrel on your 68AUTOMAG PowerFeed and MINIMAG is made from the same aluminum stock as the famous Bud Orr Sniper™, long known for its accuracy. The barrel lock is a stainless detent pin mounted in the paintball marker rail. To remove the barrel, twist the barrel counter clockwise one-quarter turn and pull straight out. To reinstall slide the barrel up to the stop; then, while exerting steady pressure, rotate the barrel to find the detent slot and continue to push straight in and then rotate clockwise into the detent position. The o-rings on the barrel serve to give the barrel a friction fit; they do not seal air pressure.

O-RINGS

The o-rings in your 68AUTOMAG/MINIMAG are all high quality 90 durometer urethane or teflon for long life and abrasion resistance. Replace any damaged o-rings with Airgun Designs, Inc. supplied replacements.

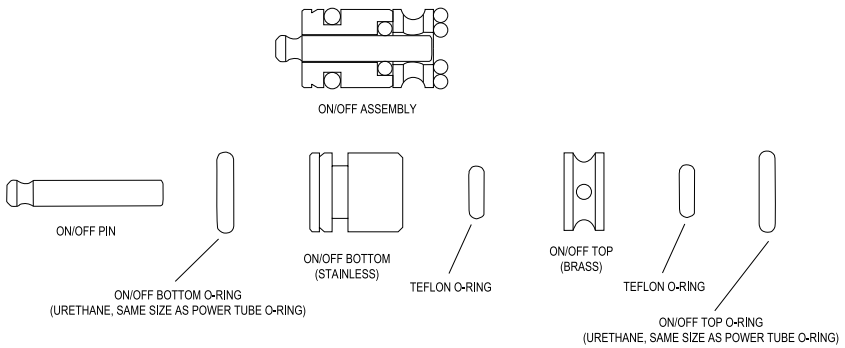
O-rings should only be lubricated with Autolube.

NUBBIN

Airgun Designs barrels utilize a wire nubbin to retain the paintball in the breech and to prevent double feeding. The wire nubbin will automatically compensate for all size balls and should give long life if not abused. If double feed problems develop, bend the wire so it protrudes slightly further into the bore. When properly installed, each nubbin should protrude about the thickness of a matchbook cover into the breech.

ON/OFF VALVE

The ON/OFF VALVE assembly is located on the bottom of the valve body and is actuated by the back end of the sear. Its function is to shut off airflow to the air chamber when firing and recharge the chamber when the trigger is released. It consists of three parts: the ON/OFF TOP, the ON/OFF BOTTOM, and the ON/OFF PIN (see diagram below).



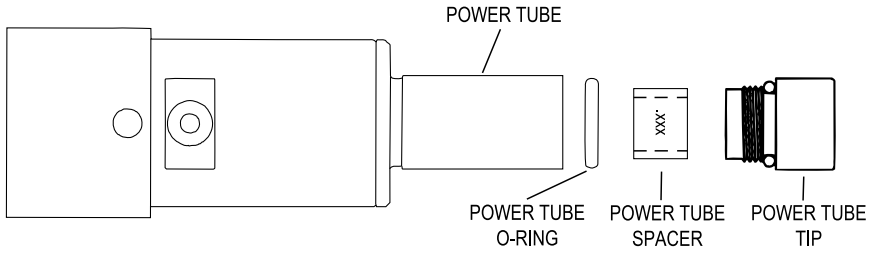
There are four o-rings in the assembly: two in the top of the valve body hole (one inside the other) and two more on the ON/OFF BOTTOM. There is an assembly diagram laser engraved on the valve body to show the proper assembly order. There are two small and two large o-rings in the assembly; only the small teflon o-ring in the bottom of the valve body is an active o-ring. The small active teflon o-ring can be swapped with its teflon double.

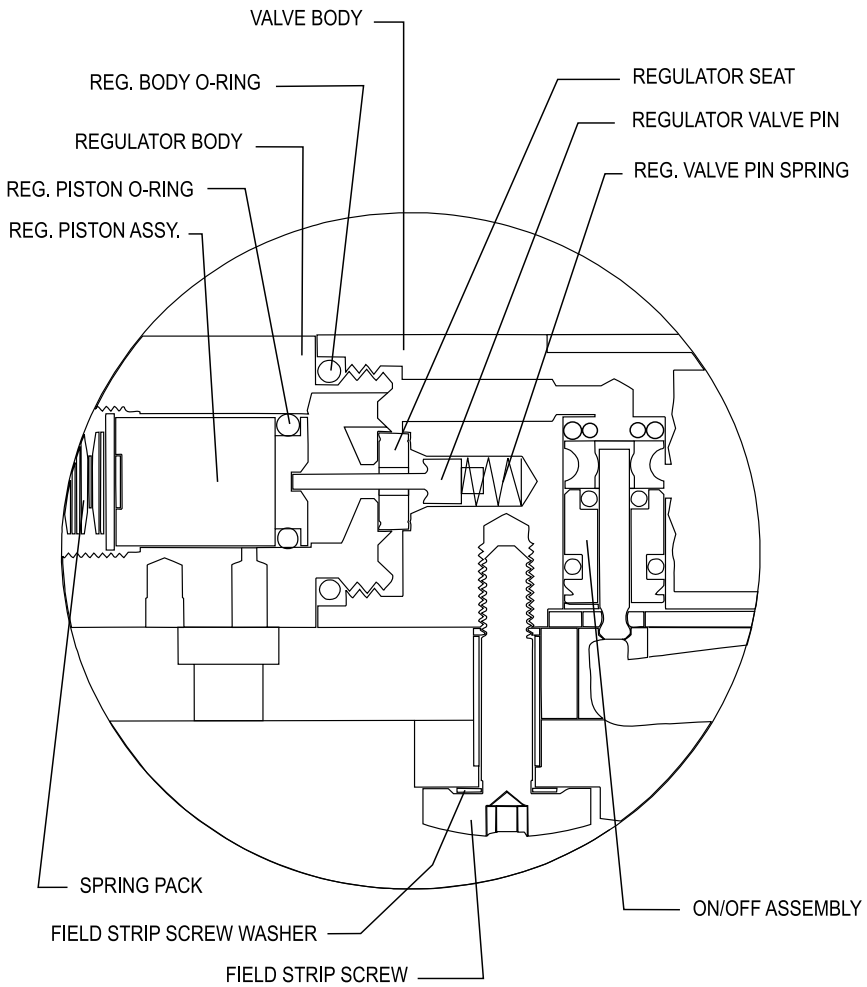
POWER TUBE

The Level 7 marker incorporates a POWER TUBE that is welded on to the air chamber. There is a blue urethane bumper at its base to keep the bolt from impacting the valve body on its return stroke. The brass POWER TUBE TIP is screwed into the front of the power tube and is prevented from unscrewing by a urethane o-ring seated in its base. It is important that this POWER TUBE TIP is tightened properly to avoid stripping the POWER TUBE TIP threads. To remove, use a coin to unscrew the insert from the POWER TUBE. Directly underneath the POWER TUBE TIP is the POWER TUBE SPACER and beneath that is the POWER TUBE O-RING. The POWER TUBE O-RING is an active seal that receives substantial abuse and should be inspected for wear regularly. It is 90 durometer urethane and should only be replaced with an identical replacement. If you need to replace it on the field, the o-rings in the ON/OFF VALVE are the same, giving you two potential spares to swap out.

Problems with the POWER TUBE O-RING occur when the paintball marker is not kept lubricated or when liquid CO2 passes through the system creating ice crystals that prevent the o-ring from sealing. Insufficient lubrication or ice causes spontaneous barrel leaks that are usually short lived but are an annoyance in the field. If ice is causing the barrel leak, continuing to fire will only prolong the problem; you must pause long enough to warm up the o-ring. An unlubricated o-ring will usually re-seal itself within several shots. If the barrel continues to leak and the action of the moment does not allow you to make repairs, hold the trigger back to stop the leak. When ready to fire, release and fire quickly; holding the trigger back after each shot, or during any pause. This method will give you reduced velocity, but will keep you in the game.

REMEMBER when reinstalling the POWER TUBE parts: O-ring first, POWER TUBE SPACER next, and then the POWER TUBE TIP.(See diagram below)





REGULATOR VALVE

The REGULATOR VALVE is the heart of the system. It is accessed by unscrewing the VALVE BODY (which has the air inlet) from the REGULATOR BODY (which has the velocity adjusting nut). Once unscrewed, you will find the REGULATOR VALVE and SPRING protruding from the VALVE BODY.

The REGULATOR VALVE and SPRING are held in by spring pressure and can be pulled out as one unit. On the REGULATOR BODY you will see a urethane washer(REGULATOR SEAT) snapped inot its hole; this is the most critical seal in the marker and must be inspected regularly and kept completely clean. If this seal leaks the paintball gun goes full pressure, the trigger gets hard, and the BLOW-OFF VALVE vents out the rear of the gun. Paintball markers venting out the BLOW-OFF VALVE usually have dirt on this seal; to prevent problems, regularly wipe this seal with a clean cloth. To reassemble, snap the REGULATOR SEAT back in its hole; it will only snap in and stay one way, but it can be reversed and carefully reassembled if a problem develops. Next push the REGULATOR VALVE and SPRING assembly back in its hole in the VALVE BODY until the 68AUTOMAG/MINIMAG logo lines up. If you forget how the parts go together, there is a diagram laser engraved on the VALVE BODY showing the correct relationship of the REGULATOR VALVE and the REGULATOR SEAT.

BLOW-OFF VALVE

The BLOW-OFF VALVE is self contained in the REGULATOR PISTON and is **NOT** user adjustable. It is a safety device for venting air from the paintball marker if abnormally high pressure occurs in the regulator or air chamber. It is factory set to vent automatically at 650 psi. Occasional short bursts of air venting out the VELOCITY ADJUSTING NUT usually means that liquid was present in the system; this liquid boiled, causing increased pressure and was vented off. Always check your velocity any time the BLOW-OFF VALVE has vented.

RE-ASSEMBLY OF VALVE

Assuming you have all the valve parts identified in front of you, begin with the REGULATOR BODY (rearmost end of paintball gun). Find the REGULATOR PISTON (brass 1/2” round with o-ring) and insert o-ring end first into the back of the REGULATOR BODY followed by the SPRING PACK, large washer first(looks like a bunch of washers stacked on a pin). Next screw in the REGULATOR ADJUSTING NUT finger tight to complete the back end of the paintball gun. On the end of the REGULATOR BODY that has threads and a large o-ring snap in the REGULATOR SEAT, which completes the subassembly.

Next, find the VALVE BODY (air inlet on one side) and the ON/OFF VALVE parts. Insert the ON/OFF VALVE parts according to the diagram on the VALVE BODY: large and small o-rings first, ON/OFF TOP next, ON/OFF BOTTOM (small stainless part with two o-rings) and finally the ON/OFF PIN (silver pin 1/8” diameter, 3/4” long). The REGULATOR VALVE ASSY(small silver pin with large head and small coil spring) goes into its hole (central hole in VALVE BODY) with the spring end entering the hole first. The REGULATOR BODY can now be screwed into the VALVE BODY until the logo lines up.

Finally, reassemble the POWER TUBE end. Find the POWER TUBE O-RING (cream-colored 1/4" OD) and place it into the POWER TUBE, followed by the POWER TUBE SPACER (small brass ring) and finally the POWER TUBE TIP. Tighten the POWER TUBE TIP as tight as possible with a coin to complete the assembly. Don't forget to slide the BUMPER over the POWER TUBE until it rests against the VALVE BODY.

RE-ASSEMBLY OF BODY

First set the mainbody on the rail, lining up the "pem"(spot welded) nut into its hole in the rail. Next fit the trigger frame assembly up to the rail. Carefully feed the TRIGGER ROD into the trigger frame until it pokes out behind the trigger. The rod must be fed in from back to front finding its way underneath the safety pin; when properly installed you should see the tip of the pin from the side of the paintball gun about midway down the trigger. To finish the frame sub-assembly, screw in and tighten the front frame screw firmly with the supplied 1/8" allen wrench.

The assembled VALVE BODY and BOLT can now be slid into place in the back of the mainbody being careful to line up the logo on the valve, and lock pin in the rail. The final step is to tighten the FIELD STRIP SCREW and your marker is ready to go.

UPDATES

We are constantly pushing the leading edge of paintball marker technology and are continuing to make refinements in our paintball markers. As a service to our customers, we offer updates to Level 7 for Level 5 and Level 6 markers at no charge. Please note that all 68AUTOMAGS since serial number CF3456 and ALL MINIMAGS have been built as Level 7. The update from Level 6 to Level 7 reduced ball breakage by enlarging the air chamber to function at a lower pressure.

ACCESSORIES

Call your local dealer or Airgun Designs, Inc. at (847) 520-7507 for information on replacement parts or factory produced accessories for the 68AUTOMAG/ MINIMAG series of paintball markers.

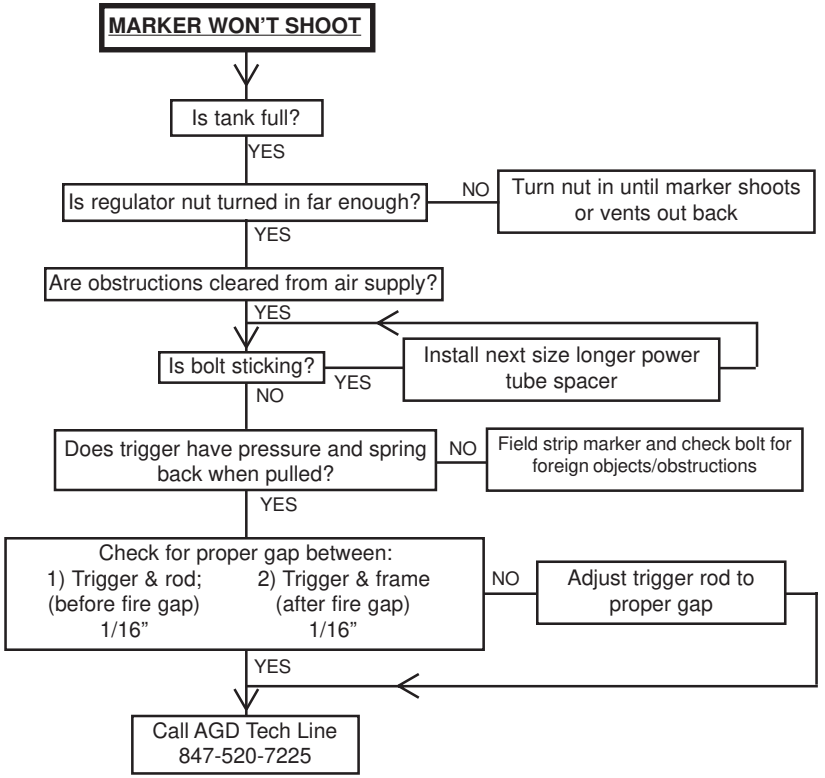
TROUBLESHOOTING

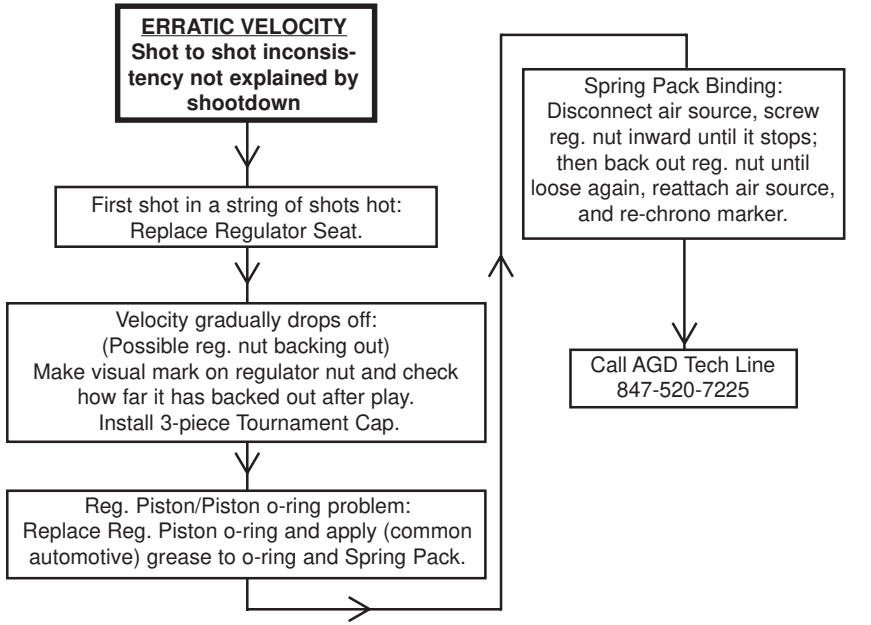
Does marker shoot at all? If not go to debug chart on following page.

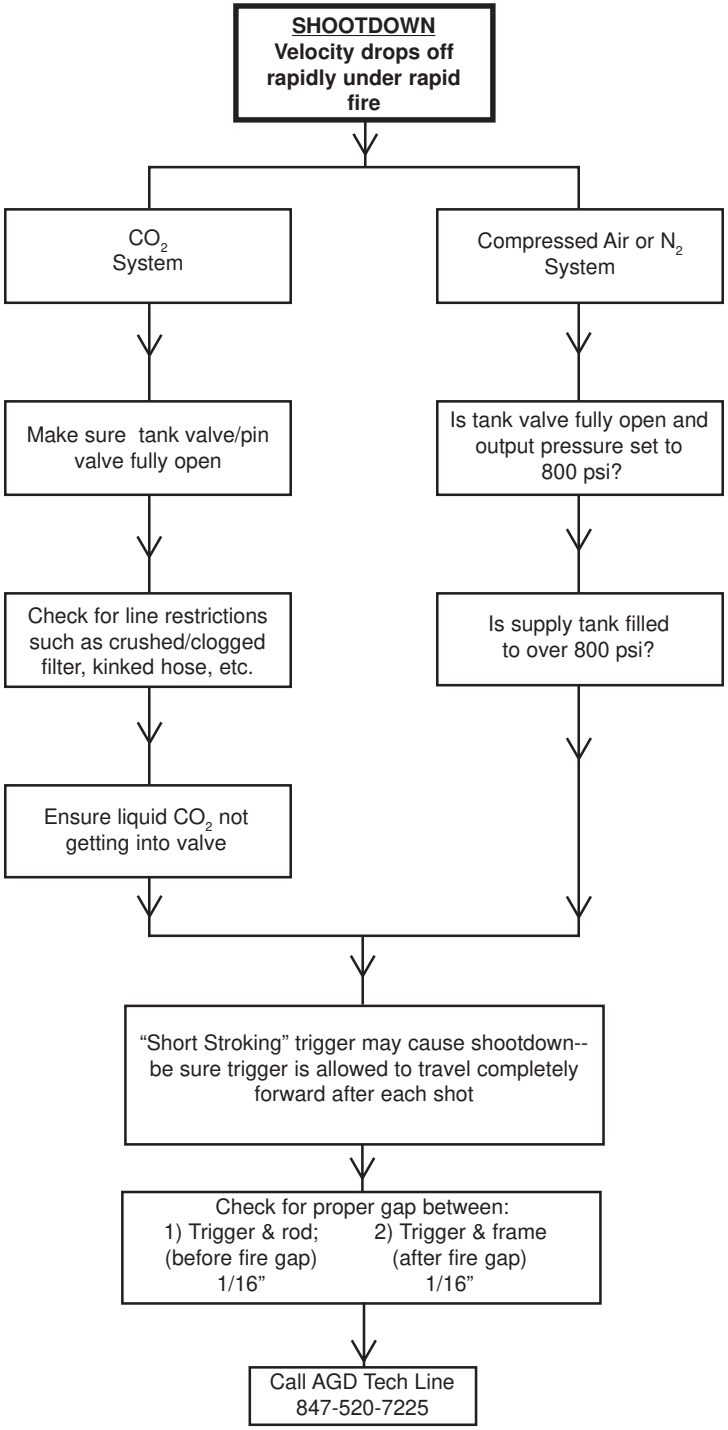
Does marker exhibit erratic velocity? Debug chart on following page.

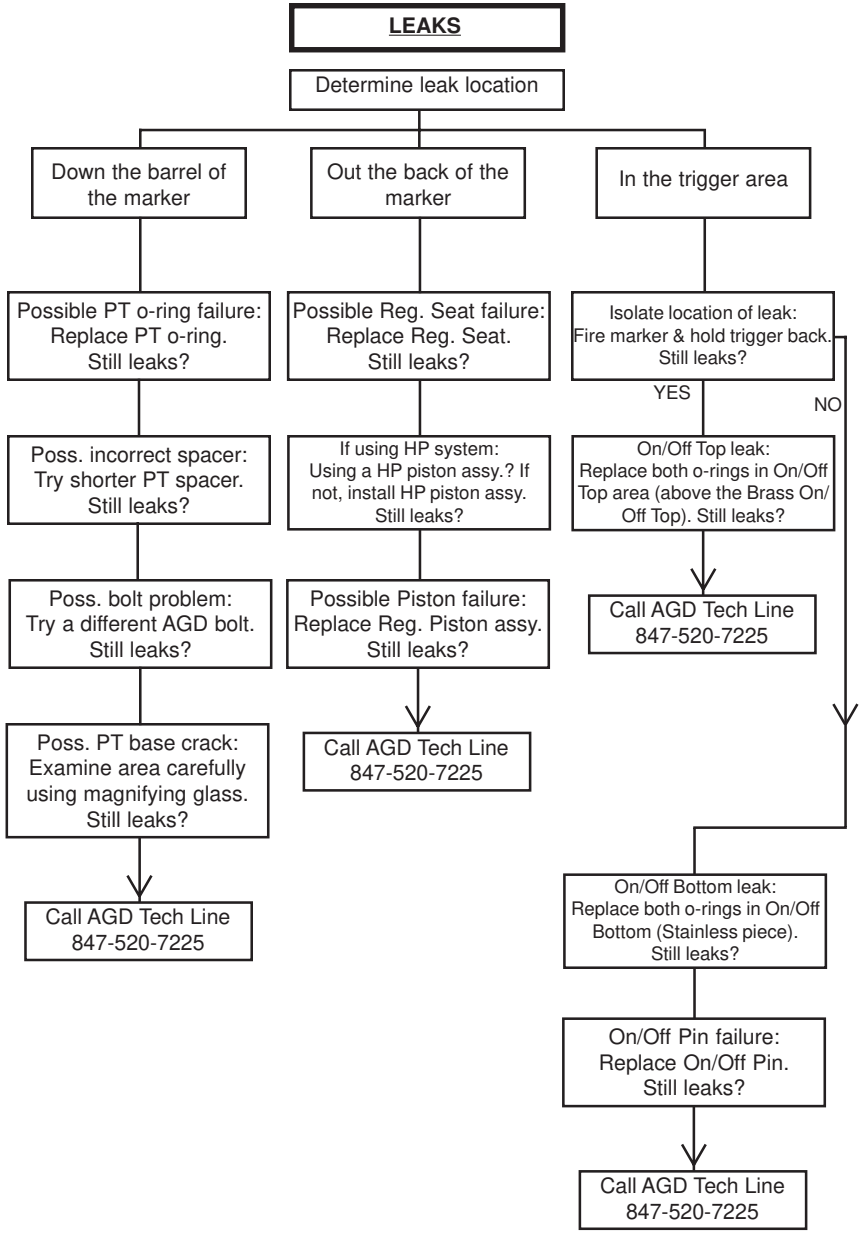
Does marker shoot but exhibits shootdown? Debug chart on page 22.

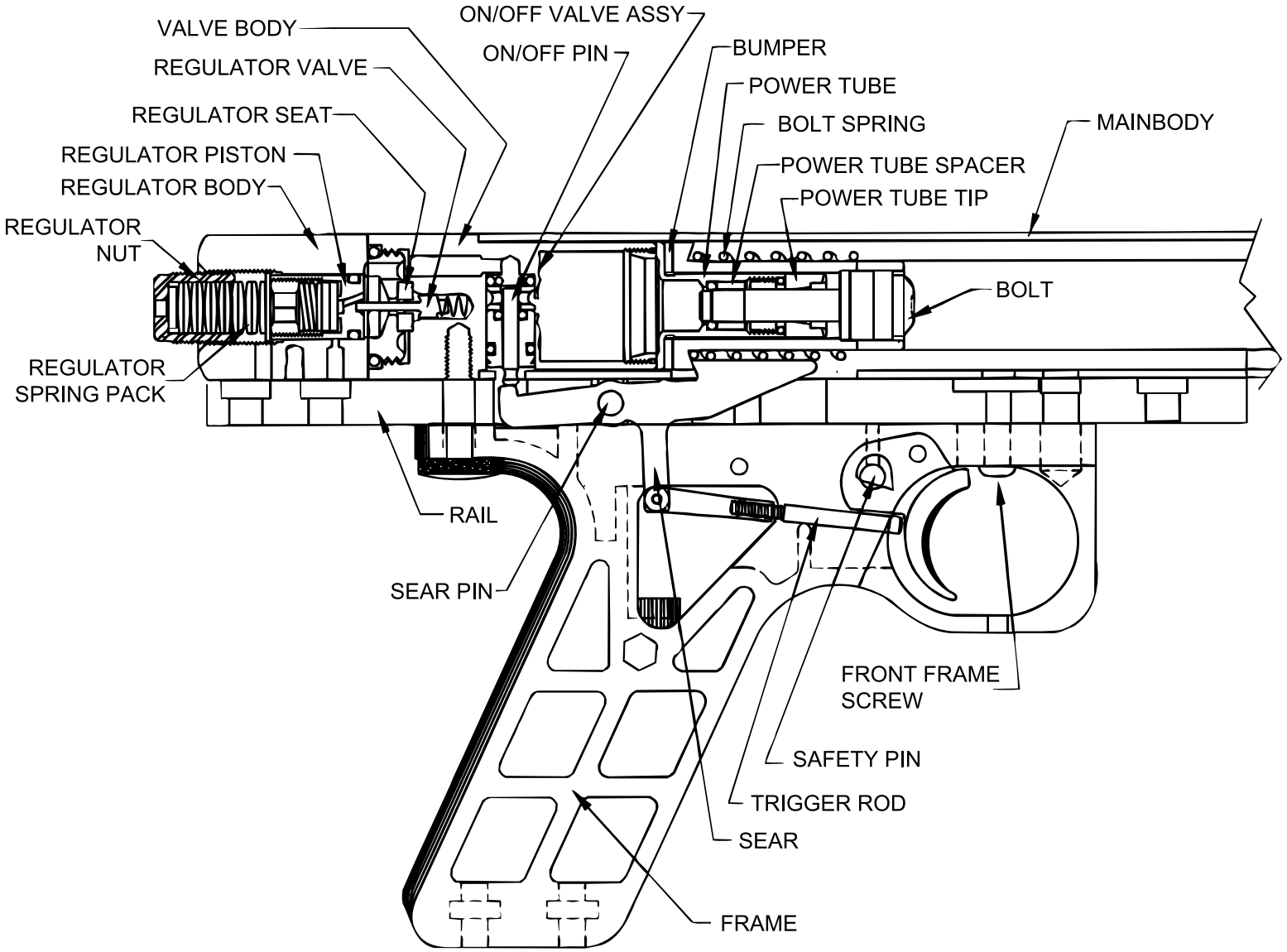
Does marker leak? Debug chart on page 23.






SHOOTDOWN
Velocity drops off rapidly under rapid fire
CO_2 System
Compressed Air or N_2 System
Make sure tank valve/pin valve fully open
Is tank valve fully open and output pressure set to 800 psi?
Check for line restrictions such as crushed/clogged filter, kinked hose, etc.
Is supply tank filled to over 800 psi?
Ensure liquid CO_2 not getting into valve
"Short Stroking" trigger may cause shootdown-- be sure trigger is allowed to travel completely forward after each shot
Check for proper gap between:
1) Trigger & rod; (before fire gap) 1/16"
2) Trigger & frame (after fire gap) 1/16"
Call AGD Tech Line 847-520-7225


LEAKS
Determine leak location
Down the barrel of the marker
Out the back of the marker
In the trigger area
Possible PT o-ring failure: Replace PT o-ring. Still leaks?
Possible Reg. Seat failure: Replace Reg. Seat. Still leaks?
Isolate location of leak: Fire marker & hold trigger back. Still leaks?
YES
NO
Poss. incorrect spacer: Try shorter PT spacer. Still leaks?
If using HP system: Using a HP piston assy.? If not, install HP piston assy. Still leaks?
On/Off Top leak: Replace both o-rings in On/Off Top area (above the Brass On/Off Top). Still leaks?
Poss. bolt problem: Try a different AGD bolt. Still leaks?
Possible Piston failure: Replace Reg. Piston assy. Still leaks?
Call AGD Tech Line 847-520-7225
Poss. PT base crack: Examine area carefully using magnifying glass. Still leaks?
Call AGD Tech Line 847-520-7225
Call AGD Tech Line 847-520-7225
On/Off Bottom leak: Replace both o-rings in On/Off Bottom (Stainless piece). Still leaks?
On/Off Pin failure: Replace On/Off Pin. Still leaks?
Call AGD Tech Line 847-520-7225



FUNCTIONAL STEPS

1. AIR TANK SUPPLIES AIR AT 800-1000 PSI TO REGULATOR

2. REGULATOR TAKES PRESSURE TO 375 PSI

3. AIR FLOWS THROUGH ON/OFF VALVE AND FILLS AIR CHAMBER

4. TRIGGER IS PULLED, FIRST CLOSING ON/OFF VALVE THEN RELEASING BOLT

5. BOLT MOVES FORWARD AGAINST SPRING PRESSURE UNTIL POWER PISTON EXITS POWER TUBE.

6. AIR IS RELEASED INTO BOLT CAVITY AND FIRES BALL.

7. MAIN SPRING RETURNS BOLT TO COCKED POSITION.

8. TRIGGER IS RELEASED, BOLT IS LATCHED, AND ON/OFF VALVE PRESSURIZES AIR CHAMBER.

Instruction Manual

Table of Contents

SAFETY

THIS PAINTBALL MARKER IS NOT A TOY! This paintball marker should be treated as a dangerous instrument and should always be treated with respect. Never point a paintball marker at anyone not properly attired. This paintball marker can cause serious bodily injury including, but not limited to, blindness or even death. Please read all safety instructions and directions in this manual *before* using this paintball marker. **Always wear approved safety goggles or an approved mask whenever you handle this paintball marker!**

Do not point or shoot this paintball marker at animals. Do not point or shoot this paintball marker at any person unless you and your target are engaged in paintball activities and are wearing proper safety gear including approved paintball goggles, mask, and pads. Never shoot anyone at close range! Never load this paintball marker with anything except approved paintballs. Never put anything down the barrel except paintballs, barrel squeegees or barrel plugs. Do not attempt to repair this paintball marker by yourself. Follow all maintenance instructions carefully. If you are unsure about any aspect of the maintenance procedures contact your local dealer or Airgun Designs, Inc. at (847) 520-7225.

This paintball marker is always armed and cocked when an air supply is installed. Always engage the safety (located behind the trigger on the grip) and use an approved barrel plug when an air supply is attached or installed. Disengage the safety and remove the barrel plug only when on a playing field, the game has started and all players are wearing proper safety gear. When the red ring of the safety pin is showing, the safety is off and the paintball marker *will* fire.

Always chronograph this paintball marker before using it. Never shoot this paintball marker when the chronograph readings exceed 300 fps! There is a blow-off valve incorporated into the valve mechanism that will release air pressure if pressure exceeds a predetermined amount. This blow-off valve is factory set and is not user adjustable. Remember to wear proper approved goggles or masks when chronographing your paintball marker.

Prior to disassembly remember to wear approved safety goggles or masks to prevent accidental injury. Never point the paintball marker at anyone or anything that could be injured or damaged, if shot. Always remove the air source from the paintball marker and dry fire in a safe direction before disassembling. The velocity adjusting nut is on the back of the regulator body. Do not disassemble the velocity adjusting nut while the paintball marker is under pressure. If air is leaking out the back of the velocity regulator nut the paintball marker is over-pressurized and will shoot at a higher velocity than intended. Reduce the regulated pressure by backing off the velocity regulator nut and re-chronograph the paintball marker. If problems persist call your dealer or Airgun Designs, Inc. Do not put your fingers into the breech area, down the ball feed tube or barrel while firing the paintball marker; serious injury could result.

The pressure regulator allows gas under pressure to push the trigger forward after shooting. An excessively hard trigger pull indicates over pressure in the system. Do NOT fire a paintball marker that has excessive trigger pull; call your local dealer or Airgun Designs, Inc. immediately.

COMPRESSED AIR ONLY

Your AUTOMAG RT is designed to run on compressed air only! It will not function at all on CO_2 no matter what hoses, expansion chambers, etc. you use. We recommend that you purchase a high-quality 3000 psi compressed air tank and regulator for your AUTOMAG RT. The maximum input pressure to the paintball marker should be above 600 psi and less than 1000 psi for best performance. Pressures over 1000 psi will damage the regulator and reduce performance.

FAST START

This is a quick overview of how to use the AUTOMAG RT for the experienced player. Introducing air pressure to the paintball marker will charge and cock the system. The system is a blow forward from open bolt, similar in concept to a cork in a champagne bottle.

The barrel utilizes a twist lock mount; a one-quarter twist is all that is required for full lock. The velocity adjustment nut is on the back of the valve body and requires only one turn to adjust from 200 to 300 fps. Air venting out of the back of the regulator indicates that the internal blow-off valve is responding to over pressure in the system and the velocity should be turned down.

Field stripping is accomplished by unscrewing the knurled bolt underneath the frame while the bottle is off. THE TRIGGER MUST BE PULLED TO SLIDE THE VALVE BODY OUT. There is a locking pin for alignment in the regulator body which allows the valve body to only come out part way before you must twist the valve body clockwise to continue sliding out the back. Reinstall in the same manner. Once removed, the entire valve and bolt assembly is available for cleaning.

Maintenance on all active o-rings can be accomplished without tools.

When adjusting the velocity regulator, dry fire the paintball marker several times before chronographing to allow the regulator piston and spring to seat properly. Always start below your intended velocity and work your way up. When firing the paintball marker, it's important to remain aware of how many balls are in your loader. If the quantity runs too low the slight blowback past the bolt will bobble the balls in the feed tube, thus preventing a positive ball feed. This increases the likelihood of ball breakage.

Always use fresh, high-quality paintballs. The blow forward action aggressively pushes the ball into the barrel before firing and we have found that lower grades of paint cannot withstand the acceleration.

FIRST TIME PROBLEMS

There are several first time problems to watch out for. Many times the paintballs will not feed because the recoilless design does not juggle the loader. You must remain aware enough to keep the balls feeding. We recommend that you use an agitator type loader to keep the balls feeding.

Next, the bolt can stick forward causing the trigger to lock due to either paint chips wedging between the bolt and breech or, when degassing the paintball marker, caused by turning off the tank and shooting those last few blooping shots. When the bolt sticks forward the trigger will not come forward. Remove the barrel and push the bolt back until the trigger clicks forward.

The paintball marker will give very little indication that it is running out of gas; by the time you see the velocity drop you are 20-30 shots away from total shutdown. Additionally, if you use a compressed air tank with an on/off valve make sure you open it all the way.

PERFORMANCE

Take-up is the movement of the trigger before it comes in contact with the sear, after sear contact continuing to pull through fires the paintball marker. The trigger in the AUTOMAG RT has been designed to have a “snap” action with no take-up to give the shortest possible stroke and, therefore, the highest possible firing rate. The average person can fire 4-5 shots per second but, when charged with adrenaline, this can climb to 6 per second.

LUBRICATION

We find that customers who properly lubricate their paintball markers once a week have the fewest problems. To lubricate your AUTOMAG RT, drip 6 drops of AUTOLUBE into the back bottle adapter. Then gas up and dry fire the paintball marker several dozen times with the barrel removed to prevent oil build-up in the barrel.

VELOCITY ADJUSTMENT

The velocity of your AUTOMAG RT is adjusted by increasing or decreasing the regulated pressure. This is accomplished by turning the regulator adjusting nut located on the back of the regulator body. Only a minimal amount of rotation is necessary to adjust the velocity. We recommend that you always start at a low velocity setting and continue to screw the adjustment clockwise up to your desired setting.

Always shoot several shots to seat the regulator piston and spring. High velocities will cause the blow-off valve built into your system to vent air out the back of the regulator body. If you ever hear air venting, stop and re-chronograph the paintball marker immediately. We found the best performance to be in the 270-280 fps range. Occasionally grease the threads of the velocity adjusting nut.

CLEANING

Always remember to wear approved safety goggles or mask when cleaning your paintball marker. To quickly clean the paintball marker without disassembly simply use a bucket of clean water and swish the paintball marker body in it WHILE THE PAINTBALL MARKER IS FULLY PRESSURIZED! Keeping the paintball marker pressurized keeps the water out of the internal workings of the valve body. After every hard use a paintball marker should be taken down and all the exposed parts cleaned and inspected for wear or problems. Lightly lubricate all surfaces and re-assemble according to instructions.

PAINTBALLS

There are many different kinds of paintballs on the market, all with different specifications. The one thing that is consistent is that low quality paintballs will perform poorly in the AUTOMAG RT. Always use fresh, high-quality paintballs and try many different types and colors to find the best type suited for your paintball marker and playing conditions.

A common problem that we are all concerned about is ball breakage. There are two ways balls break in your paintball marker: first, because the ball did not feed all the way into the breech and was cut in half by the bolt; this is addressed in the LOADER section and is not a concern here. Second is the impact from the air blast. Our trials show that a properly setup paintball gun shooting quality paint will break approximately 3-4 paintballs per thousand. In comparison, low quality paint will break 1 in 50. A good test for shell strength is to drop several hundred paintballs one at a time from a height of 6 feet. Balls that consistently survive 6-7 bounces are considered fresh; balls that break within 3 bounces are either stale or have weak shells.

If you know the paintball gun is setup properly and you still experience problems, switch to a different brand or color and try again.

LOADER

The ViewLoader VL 2000™ is the only loader currently approved for the efficient and effective use of your AUTOMAG RT. Always keep at least twenty balls in the loader when fast firing. This will keep the balls from being blown up into the loader from the bolt blowback. The blowback WILL help the balls feed when the hopper is full.

Ball breakage is common with first time users of the AUTOMAG RT due to the recoilless action and the tendency of the balls to hang in the loader. Become aware of the need to shake the paintball marker to keep the balls flowing and listen for the balls bobbling telling you to reload. If you find that the balls are cut in half in the breech, look at the loader or your technique. Or, consider using an agitator type of loader.

Some elbows used with the ViewLoader will require smoothing out on the inside for maximum flow; make sure that there are no sharp corners or edges to catch balls on. The most reliable firing method is tri-burst until you become accustomed to keeping the balls feeding.

NUBBIN

The AUTOMAG RT has a dual nubbin barrel to prevent double feeding. The wire nubbins will automatically compensate for all size balls and should give long life if they are not abused. When properly installed, each nubbin should protrude about the thickness of a matchbook cover into the breech.

BLOW-OFF VALVE

The blow-off valve is self contained in the regulator piston and is not user adjustable. It is a safety device for venting air from the paintball marker should abnormally high pressure occur in the regulator or air chamber. Always check your velocity any time the blow-off valve has vented.

ACCESSORIES

Airgun Designs has a variety of add-on products for your paintball marker, including left-hand models. Airgun Designs also carries hats, t-shirts, patches, gun cases, and other promotional items; please call us at (847) 520-7507 if you would like a product brochure and price list. Call your local dealer for information on ordering a factory customized AUTOMAG RT.

TECHNICAL SUPPORT

Please refer to this manual and/or the instructional video for basic information about your AUTOMAG RT. If you have questions about your AUTOMAG RT, please call our Technical Support staff at (847) 520-7225. Our technical support staff is available Monday through Friday between the hours of 9:00 a.m.-11:30 a.m. and 1:00 p.m.-4:30 p.m. (Central Time).

Please call us before you send your paintball marker to us for repair! Our Technical Support staff might be able to solve your problem over the telephone. If your paintball marker needs to be returned to us for repair we need to verify that you have registered your AUTOMAG RT by mailing in your Warranty Registration card, that we have your current address and telephone number on file, and that you are aware of our warranty repair policies and our usual turnaround time.

AIRGUN DESIGNS, INC.
804 Seton Court
Wheeling, Illinois 60090
USA
Telephone: 847-520-7507
Fax: 847-520-7848

E-MAG™ Instruction Manual

AIRGUN DESIGNS INC
BECAUSE QUALITY SHOOTS STRAIGHT ALWAYS

E-MAG™ Instruction Manual

SAFETY

THIS PAINTBALL MARKER IS NOT A TOY! This paintball marker should be treated as a dangerous instrument and should always be treated with respect. Never point a paintball marker at anyone not properly attired. This paintball marker can cause serious bodily injury including, but not limited to, blindness or even death. Please read all safety instructions and directions in this manual *before* using this paintball marker. **Always wear approved paintball goggles and mask whenever you handle this paintball marker!**

Do not point or shoot this paintball marker at animals. Do not point or shoot this paintball marker at any person unless you and your target are engaged in paintball activities and are wearing proper safety gear including approved paintball goggles and mask. Never shoot anyone at close range! Never load this paintball marker with anything except approved paintballs. Never put anything down the barrel except paintballs, barrel squeegees or barrel plugs. Do not attempt to repair this paintball marker by yourself. Follow all maintenance instructions carefully. If you are unsure about any aspect of the maintenance procedures contact your local dealer or Airgun Designs, Inc. at (847) 520-7507.

This paintball marker is always armed and cocked when an air supply is installed. Always engage the safety (located behind the grip) and use an approved barrel plug when an air supply is attached or installed. Disengage the safety and remove the barrel plug only when on a playing field, the game has started and all players are wearing proper safety gear. When the red ring of the safety pin is showing, the safety is off and the paintball marker *will* fire.

Always chronograph this paintball marker before using it. Never shoot this paintball marker when the chronograph readings exceed 300 fps! There is a blow-off valve incorporated into the valve mechanism that will release air pressure if pressure exceeds a predetermined amount. This blow-off valve is factory set and is not user adjustable. Remember to wear proper approved goggles and masks when chronographing your paintball marker.

Prior to disassembly remember to wear approved safety goggles or masks to prevent accidental injury. Never point the paintball marker at anyone or anything that could be injured or damaged, if shot. Always remove the air source from the paintball marker and dry fire in a safe direction before disassembling. The velocity-adjusting nut is on the back of the regulator body. Do not disassemble the velocity-adjusting nut while the paintball marker is under pressure. If air is leaking out the back of the velocity regulator nut the paintball marker is over-pressurized and will shoot at a higher velocity than intended. Reduce the regulated pressure by backing off the velocity regulator nut and re-chronograph the paintball marker. If problems persist call your dealer or Airgun Designs, Inc. Do not put your fingers into the breech area, down the ball feed tube or barrel while firing the paintball marker; serious injury could result.

When set in the Manual Trigger Mode (selector switch pointing to “M”) the pressure regulator allows gas under pressure to push the trigger forward after shooting. An excessively hard trigger pull indicates over pressure in the system. Do NOT fire a paintball marker that has excessive trigger pull; call your local dealer or Airgun Designs, Inc. immediately.

COMPRESSED AIR ONLY

Your E-MAG is designed to run on compressed air only! It will not function at all on CO_2 no matter what hoses, expansion chambers, etc. you use. We recommend that you purchase a high-quality compressed air tank and regulator for your E-MAG. The maximum input pressure to the paintball marker should be above 600 psi and less than 1000 psi for best performance. Pressures over 1000 psi will damage the regulator and reduce performance.

QUICK START

This is a quick overview of how to use the E-MAG for the experienced player. Introducing air pressure to the paintball marker will charge and cock the system. The system is a blow forward from open bolt, similar in concept to a cork in a champagne bottle.

The barrel utilizes a twist lock mount; a one-quarter twist is all that is required for full lock. The velocity adjustment nut is on the back of the valve body and requires only one turn to adjust from 200 to 300 fps. Air venting out of the back of the regulator indicates that the internal blow-off valve is responding to over pressure in the system and the velocity should be turned down.

Field stripping is accomplished by unscrewing the knurled field strip screw located underneath the frame while the air supply is off. THE SAFETY MUST BE “OFF” TO PULL THE TRIGGER BACK AND THE TRIGGER MUST BE PULLED (WITH SELECTOR SWITCH SET POINTING TO “M”) TO SLIDE THE VALVE BODY OUT. There is a locking pin for alignment in the regulator body that allows the valve body to only come out part way before you must twist the valve body clockwise to continue sliding out the back. Reinstall in the same manner. Once removed, the entire valve and bolt assembly is available for cleaning.

Maintenance on all active o-rings can be accomplished without tools.

When adjusting the velocity regulator, dry fire the paintball marker several times before chronographing to allow the regulator piston and spring to seat properly. Always start below your intended velocity and work your way up. When firing the paintball marker, it’s important to remain aware of how many balls are in your loader.

There are some unique characteristics of Airgun Designs’ blow forward design. Many times the paintballs will not feed because the recoilless design does not jiggle the loader. You must remain aware enough to keep the balls feeding. We recommend that you use an agitator type loader to keep the balls feeding.

Also, the bolt can stick forward causing the trigger to lock due to either paint chips wedging between the bolt and breech or, when degassing the

paintball marker, caused by turning off the tank and shooting those last few blooping shots. When the bolt sticks forward the trigger will not come forward. Remove the barrel and, USING A SQUEEGEE, push the bolt back until the trigger clicks forward.

The paintball marker will give very little indication that it is running out of gas; by the time you see the velocity drop you are 20-30 shots away from total shutdown. Additionally, if you use a compressed air tank with an on/off valve, make sure you open it all the way.

OPERATING MODES

The E-MAG has three distinctive modes of operation with each having their respective characteristics:

1. **Mechanical Mode:** Indicated by the selector switch positioned so that it points toward the "**M**" marked above the trigger on the left side of the grip frame **and the electronic system disengaged.** Disengage the electronic system by either removing the battery pack or installing the molded electrical interrupter.
   - This mode is purely mechanical.
   - No shot count, timer, burst mode, etc… is available in this mode.
   - This mode provides a "Reactive Trigger", meaning the trigger is returned forward by air pressure supplied from the A.I.R. valve pushing the trigger rod forward.
   - There is longer trigger travel and greater required pressure to pull the trigger in this mode.
   - Partial trigger pulls (a.k.a. "half stroking") are possible in this mode.
   - In this mode the E-MAG performs like an Automag RT or Automag RT Pro.

2. **Electronic Mode:** Indicated by the selector switch positioned so that it points toward the "**E**" marked behind the trigger on the left side of the grip frame and the electronic firing is on.
   - This mode "purely" electronically controlled.
   - The trigger pull will be light and short in this mode.
   - This mode will not allow "half stroking". Each time the trigger is pulled the electronics will activate causing a complete firing cycle to take place.
   - 3-Shot Burst and 6-Shot Burst modes are available in this mode only when the jumper is installed. (See section on MODE JUMPER)
   - The Shot Counter, Count-Down Timer and various other LED indicators are active in this mode.
   - The firing cycle is triggered via the Hall Effect Sensor in this mode.
   - This mode eliminates the "Reactive Trigger" meaning the trigger is returned via the return magnet system located above and forward of the trigger.

3. **"Hybrid" Mode:** Indicated by the selector switch positioned so that it points toward the "**M**" marked above the trigger on the left side of the grip frame **and the electronic system is engaged.** This can be accomplished by removing the molded electrical interrupter from the battery pack, thus making the battery pack operational.
   - This mode is a mixture or "Hybrid" of Mechanical and Electronic modes.
   - The firing cycle is controlled electronically and is triggered via the Hall Effect Sensor.
   - The trigger is "Reactive" and is returned via air pressure supplied from the A.I.R. valve pushing the trigger rod forward.
   - In this mode the Shot Counter, Count-Down Timer and various other LED indicators are active.

LUBRICATION

We find that customers who properly lubricate their paintball markers once a week have the fewest problems. To lubricate your E-MAG, drip 6 drops of AUTOLUBE into the back bottle adapter. Then gas up and dry fire the paintball marker several dozen times with the barrel removed to prevent oil build-up in the barrel. This cycles the oil throughout the marker and provides needed lubrication to internal parts.

VELOCITY ADJUSTMENT

The velocity of your E-MAG is adjusted by increasing or decreasing the regulated pressure. This is accomplished by turning the regulator-adjusting nut located on the back of the regulator body. Only a minimal amount of rotation is necessary to adjust the velocity. We recommend that you always start at a low velocity setting and continue to screw the adjustment clockwise up to your desired setting.

Always shoot several shots to seat the regulator piston and spring. High velocities will cause the blow-off valve built into your system to vent air out the back of the regulator body. If you hear air venting from the back of the regulator body, stop and re-chronograph the paintball marker immediately. We found the best performance to be in the 270-280 fps range. Occasionally grease the threads of the velocity-adjusting nut.

BATTERY

The E-MAG features a Nickel Metal Hydride (NiMH) battery. This more expensive type of battery is being used due to its lack of "memory". This means that you may "top-off" the battery at any time without it developing a "memory" which reduces future useful power.

The E-MAG battery provides approximately **18** volts when fully charged. The E-MAG will function on as little as 14 volts. The battery should provide about 20,000 shots when fully charged.

To charge the battery, you must:

- Unscrew and remove the battery retaining screw (interchangeable with a field strip screw)
- Slide the battery down and off the battery rail (located in front of the trigger guard)

Slide the battery into the charging unit **and press the field strip screw** through the hole in the charging unit and into the battery:

- Insert one end of the power cord adapter into the charging unit and the other into a 12 volt power source such as an automobile cigarette lighter.

- While the battery is charging the light on the charging unit will appear red. The light will change to green when it is in trickle charge mode; trickle charge mode occurs when the battery is about 85-90% charged. **At this point, the battery is ready for play.** Trickle charge an additional 3-4 hours, if desired, to attain 100% charge.

ELECTRONICS

The E-MAG is equipped with a computer that controls the firing of the marker in electronic mode. The computer is programmed via the two push buttons on the rear of the grip frame. The top button pages through the menu selections, the lower button allows changing the selections. The LED display in the side of the grip frame displays the following options when the top menu button is pressed and will display for 6 seconds before shutting off to conserve battery life.

FIRING MODES

Your E-MAG comes programmed with three firing modes: semi auto, 3 shot burst, and 6 shot burst. The 3 and 6 shot burst modes are only available with the mode jumper installed.

MODE JUMPER

Your E-mag is equipped with a jumper which allows you to enable or disable the 3 and 6 shot burst modes. The E-mag is shipped from the factory with the jumper installed, which enables the burst modes.

To remove the jumper, disconnect the electrical power to the E-mag by either removing the battery pack or installing the molded electrical disconnect plug into the frame. Next, remove the grip panel from the left side of the frame (the side with the LED display). Locate the 5-pin connector with a small loop of wire at one end (about halfway up the grip). Remove this connector by using a small pair of needle nose pliers to grasp the white plastic connector. Be careful not to touch the pliers to any other part of the electronic circuit board.

To reinstall the jumper, once again disconnect the electrical power, then carefully push the jumper back onto the 5-pin connector (once again using needle nose pliers) ensuring the loop of wire is toward the bottom of the Emag.

DISPLAY

While the marker is powered up display will flash one pixel every few seconds to show it's on. When the battery is low it will flash "low bat." every few seconds.

Press top button to show Game timer: displays minutes left in the game. If not counting down, it is waiting for a trigger pull to activate timer.

Press lower button to stop clock and reset timer if counting down. Starts timer if not running. Firing the marker can also start game timer.

Press top button to show firing mode: either one shot (semi auto), 3 shot burst at a maximum of nine shots per second, or six shot burst at a maximum of nine shots per second. This menu will only display if the mode jumper is installed on the circuit board. Tournament rules require this jumper to be removed before play. Firing mode always defaults back to semi auto when the marker is powered down.

Press lower button to select firing mode.

Press top button again to show number of shots fired since last power up.

Press lower button: does nothing

Press top button again to show total shots fired by this marker in its lifetime.

Press lower button: does nothing.

Press top button again to show shots per second limit. This will limit the firing rate to the indicated number of shots per second. The number is stored in memory and will come up again when you power up.

Press lower button to change shots per second.

Press top button again to show game timer. This will allow setting of the count down timer from five to thirty five minutes in one-minute increments. This setting will be saved in memory when power is off.

Press lower button to increment timer between 5 and 35 minutes.

Press top button again to go back to top of menu tree.

CLEANING

Always remember to wear approved paintball goggles and mask when cleaning your paintball marker if the marker is pressurized.

After each use a paintball marker should be taken down and all the exposed parts cleaned and inspected for wear or problems. Lightly lubricate all surfaces and re-assemble according to instructions. DO NOT USE "CLEANING" LUBRICANTS SUCH AS FOR FIREARMS OR SPRAYS SUCH AS "WD-40". Lubricate with quality lubricants designed for pneumatic devices such as "Autolube".

PAINTBALLS
There are many different kinds of paintballs on the market, all with different specifications. The one thing that is consistent is that low quality paintballs will perform poorly in the E-MAG. Always use fresh, high-quality paintballs and try many different types to find the best one suited for your paintball marker and playing conditions.

LOADER
An agitator loader such as a VL Revolution is mandatory for the efficient and effective use of your E-MAG. Always keep at least twenty balls in the loader when fast firing.

In order to assure the optimal feed rates and minimize ball chopping we recommend the use of Airgun Designs Warp Feed friction drive system. The Warp Feed system will consistently feed at a rate equal to the maximum firing rate of the E-MAG.

Ball breakage may occur with the E-MAG due to the incredibly high rates of fire achievable. If you find that the balls are cut in half in the breech, consider the purchase of a positive feed loader system combining an agitator with a Warp Feed. You can also reduce ball breakage by reducing the set rate of fire in Electronic mode.

NUBBINS
The E-MAG has a dual nubbin barrel to prevent double feeding. The wire nubbins will automatically compensate for all size balls and should give long life if they are not abused. When properly installed, each nubbin should protrude about the thickness of a matchbook cover into the breech.

BLOW-OFF VALVE

The blow-off valve is self-contained in the regulator piston and is not user adjustable. It is a safety device for venting air from the paintball marker should abnormally high pressure occur in the regulator or air chamber. Always check your velocity any time the blow-off valve has vented.

ACCESSORIES
Airgun Designs has a variety of add-on products for your paintball marker, including left, right and center feed models. Airgun Designs also carries hats, t-shirts, patches, gun cases, and other promotional items; please call us at (847) 520-7507 if you would like a product brochure and price list or visit our website at www.airgun.com.

TECHNICAL SUPPORT
Please refer to this manual for basic information about your E-MAG. If you have questions about your E-MAG, please call our Technical Support staff at (847) 520-7225. Our technical support staff is available Monday through Friday between the hours of 9:00 AM - 11:30 AM and 1:00 PM - 4:30 PM (Central Time).

Please call us before you send your paintball marker to us for repair! Our Technical Support staff might be able to solve your problem over the telephone. If your paintball marker needs to be returned to us for repair we need to verify that you have registered your E-MAG, that we have your current address and telephone number on file, and that you are aware of our warranty repair policies and the anticipated turnaround time.

Visit our website at www.airgun.com and our sister site www.automags.org for more information, forums and chat!

Instruction Manual

RT ULE

AIRGUN DESIGNS INC

BECAUSE QUALITY SHOOTS STRAIGHT ALWAYS

Airgun Designs Inc.

Table of Contents

SAFETY WARNING MUST READ

THIS PAINTBALL MARKER IS NOT A TOY! This paintball marker should be treated as a dangerous instrument and should always be treated with respect. Never point a paintball marker at anyone not properly attired. This paintball marker can cause serious bodily injury including, but not limited to, blindness or even death. Please read all safety instructions and directions in this manual before using this paintball marker. **Always wear approved safety goggles or an approved mask whenever you handle this paintball marker!** Do not point or shoot this paintball marker at animals. Do not point or shoot this paintball marker at any person unless you and your target are engaged in paintball activities and are wearing proper safety gear including approved paintball goggles, mask, and pads. Never shoot anyone at close range! Never load this paintball marker with anything except approved paintballs. Never put anything down the barrel except paintballs, barrel squeegees or barrel plugs. Do not attempt to repair this paintball marker by yourself. Follow all maintenance instructions carefully. If you are unsure about any aspect of the maintenance procedures contact your local dealer or Airgun Designs, Inc. at (847) 520-7225.

This paintball marker is always armed and cocked when an air supply is installed. Always engage the safety (located behind the trigger on the grip) and use an approved barrel plug when an air supply is attached or installed. Disengage the safety and remove the barrel plug only when on a playing field, the game has started and all players are wearing proper safety gear. When the red ring of the safety pin is showing, the safety is off and the paintball marker will fire.

Always chronograph this paintball marker before using it. Never shoot this paintball marker when the chronograph readings exceed 300 fps! There is a blow-off valve incorporated into the valve mechanism that will release air pressure if pressure exceeds a predetermined amount. This blow-off valve is factory set and is not user adjustable.

Remember to wear proper approved goggles or masks when chronographing your paintball marker. Prior to disassembly remember to wear approved safety goggles or masks to prevent accidental injury. Never point the paintball marker at anyone or anything that could be injured or damaged if shot. Always remove the air source from the paintball marker and dry fire in a safe direction before disassembling. The velocity adjusting nut is on the back of the regulator body. Do not disassemble the velocity adjusting nut while the paintball marker is under pressure. If air is leaking out the back of the velocity regulator nut, the paintball marker is over-pressurized and will shoot at a higher velocity than intended. Reduce the regulated pressure by backing off the velocity regulator nut and re-chronograph the paintball marker. If problems persist, call your dealer or Airgun Designs, Inc.

Do not put your fingers into the breech area, down the ball feed tube or into the barrel while firing the paintball marker; serious injury could result.

The pressure regulator allows gas under pressure to push the trigger forward after shooting. An excessively hard trigger pull indicates over pressure in the system. Do NOT fire a paintball marker that has excessive trigger pull; call your local dealer or Airgun Designs immediately.

COMPRESSED AIR ONLY

Your RT-ULE is designed to run on compressed air only! It will not function at all on CO_2 no matter what hoses, expansion chambers, etc., you use. We recommend that you purchase a high quality 3000 psi compressed air tank and regulator for your RT-ULE. The maximum input pressure to the paintball marker should be above 700 psi and less than 1000 psi for best performance. Pressures over 1000 psi will damage the regulator and reduce performance.

FAST START

This is a quick overview of how to use the RT-ULE for the experienced player. Introducing air pressure to the paintball marker will charge and cock the system. The system is a blow forward from open bolt, similar in concept to a cork in a champagne bottle.

The velocity adjustment nut is on the back of the valve body and requires only one turn to adjust from 200 to 300 fps. Air venting out of the back of the regulator indicates that the internal blow-off valve is responding to over pressure in the system, and the velocity should be turned down. Field stripping is accomplished by unscrewing the knurled bolt underneath the frame while the bottle is off. THE TRIGGER MUST BE PULLED TO SLIDE THE VALVE BODY OUT. There is a locking pin for alignment in the regulator body which allows the valve body to only come out part way before you must twist the valve body clockwise to continue sliding out the back. Reinstall in the same manner. Once removed, the entire valve and bolt assembly is available for cleaning.

Maintenance on most active o-rings can be accomplished without tools; however, a small dental type pick may be required. When adjusting the velocity regulator, dry fire the paintball marker several times before chronographing to allow the regulator piston and spring to seat properly. Always start below your intended velocity and work your way up. Always use fresh, high-quality paintballs.

The bolt may stick forward causing the trigger to lock due to when degassing the paintball marker, caused by turning off the tank and shooting those last few blooping shots. When the bolt sticks forward the trigger will not come forward. Remove the barrel and push the bolt back until the trigger clicks forward.

The paintball marker will give very little indication that it is running out of gas; by the time you see the velocity drop you are 20-30 shots away from total shutdown. Additionally, if you use a compressed air tank with an on/off valve, make sure you open it all the way.

LEVEL 10 ANTI-CHOP SYSTEM

Your RT-ULE utilizes a mechanical state of the art anti-chop system developed after extensive research by the AGD Engineering team. The details are beyond the scope of this manual but have been included on a Micro-CD in your packaging. Please refer to the LvL 10 Micro-CD for comprehensive information.

LOADER

Often paintballs will not feed because the recoilless design does not jiggle the loader. You must remain aware enough to keep the balls feeding. We recommend that you use an agitator and/or force-feed type loader to keep the balls feeding, such as a Viewloader coupled with a Warp Feed.

PERFORMANCE

Take-up is the movement of the trigger before it comes in contact with the sear. After sear contact, continuing to pull through fires the paintball marker. The trigger in the RT-ULE has been designed to have a “snap” action with no take-up to give the shortest possible stroke and, therefore, the highest possible firing rate. The average person can fire 4-5 shots per second but, when charged with adrenaline, this can climb to 6 per second.

If your marker came equipped with a ULE Trigger Pull Kit then your 3 lb. “snap” action trigger pull weight has been reduced to a mere 15 ounces.

LUBRICATION

We find that customers who properly lubricate their paintball markers once a week have the fewest problems. To lubricate your RT-ULE, drip 6 drops of AUTOLUBE into the back bottle adapter. Then gas up and dry fire the paintball marker several dozen times with the barrel removed to prevent oil build-up in the barrel.

VELOCITY ADJUSTMENT

The velocity of your RT-ULE is adjusted by increasing or decreasing the regulated pressure. This is accomplished by turning the regulator adjusting nut located on the back of the regulator body. Only a minimal amount of rotation is necessary to adjust the velocity. We recommend that you always start at a low velocity setting and continue to screw the adjustment clockwise up to your desired setting.

Always shoot several shots to seat the regulator piston and spring. High velocities will cause the blow-off valve built into your system to vent air out the back of the regulator body. If you ever hear air venting, stop and re-chronograph the paintball marker immediately. We found the best performance to be in the 270-280 fps range. Occasionally grease the threads of the velocity adjusting nut and regulator coils of the regulator.

BLOW-OFF VALVE

The blow-off valve is self contained in the regulator piston and is not user adjustable. It is a safety device for venting air from the paintball marker should abnormally high pressure occur in the regulator or air chamber. Always check your velocity any time the blow-off valve has vented.

CLEANING

Always remember to wear approved safety goggles or mask when cleaning your paintball marker. After every hard use, a paintball marker should be taken down and all the exposed parts cleaned and inspected for wear or problems. Lightly lubricate all surfaces and reassemble according to instructions.

PLEASE READ THIS CHRONOGRAPH PROCEDURE CAREFULLY BEFORE USING YOUR RT-ULE

The RT-ULE has the fastest recharging regulator found on any paintball marker. There are certain characteristics that you should understand about this regulator before you chronograph your RT-ULE.

The X-Valve recharges so quickly (up to five times faster than the 68 AUTOMAG valve) that friction heats up the compressed air molecules filling the air chamber. The temperature in the air chamber can get as high as 180 degrees and can make the front of the gun warm after a string of shots. It is important to understand that when the air chamber is filled with hot air under pressure, it cools off rapidly over several seconds. This cooling will reduce both the chamber pressure and the velocity.

If you fire the RT-ULE while the air chamber is hot (high pressure), your velocity will be higher. If you wait, the air chamber will cool and velocity will drop noticeably. The faster you fire your RT-ULE, the more consistent your velocity will be.

QUICK SETUP AND CHRONOGRAPH PROCEDURE FOR YOUR AUTOMAG RT

1. Set the pressure going into the RT-ULE to 800 psi.

2. To record your highest rapid fire velocity: Fire a paintball and hold the trigger back. Then release the trigger completely and fire the next paintball as quickly as possible, once again holding the trigger back. Repeat as necessary. This procedure will simulate rapid fire, thus recording your highest possible rapid fire velocity.

PLEASE NOTE: The RT-ULE is sensitive to differences in trigger release, so always attempt to be consistent with your trigger finger!

FURTHER DETAILS ABOUT SETUP AND CHRONOGRAPH PROCEDURE

The RT-ULE, like any manufactured product, will vary a bit from one example to the next. Our testing shows that the best input pressure for each RT-ULE will be somewhere between 750 and 850 psi. This is why we recommend 800 psi as a starting input pressure.

Higher input pressures will make the trigger more reactive, but the velocity will drop off more when fired slowly.

Lower input pressures will reduce the reactive trigger and may cause slight shoot down on rapid fire, but the RT will be more consistent over the chronograph when fired slowly.

As you can see, the RT-ULE can be adjusted to suit your preferences and style of play. We hope this information provides you with some insight on the best methods for setting up your RT and giving your game the performance edge.

Airgun Designs is committed to bringing you the highest performance products possible. The RT-ULE was designed to be (and is) the world's fastest shooting paintball marker! The RT-ULE performs best when fired rapidly, much like a high performance racing engine that runs best at high RPMs but doesn't idle well. After thousands of computer gun test runs and dozens of regulator variations, we feel that the RT-ULE X-Valve represents the best balance between outstanding rapid fire performance and stability over the chronograph.

Sincerely,

Tom Kaye
President, Airgun Designs

TECHNICAL DATA FOR EXPERIENCED AIRSMITHS

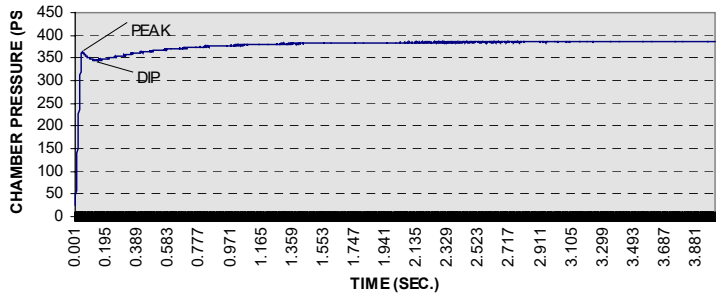
The velocity fluctuations in the RT-ULE are caused by the temperature changes of the compressed gas in the air chamber. Temperature-related pressure profiles will have different characteristics depending upon input pressure. The graphs on the next page show how chamber pressure changes over time. This page contains more technical data to help you understand what is going on inside the RT-ULE and to help you make the RT-ULE perform to your style of play.

Refer to the high input pressure graph. Notice that the graph peaks higher, goes into a dip, and then levels off. When the gas cools, the regulator opens up and maintains a steady pressure. After .5 seconds the pressure has stabilized. When firing at a rate of 2 shots per second or slower, the RT-ULE will maintain consistent velocities. When shooting at a rate of 3 shots per second or faster, the velocity will be closer to your maximum rapid fire velocity, as set with the quick shot test. Higher input pressure also gives a stronger Reactive Trigger. When chronographing at high input pressures, a rapid fire shot (as described earlier) will be higher than a shot fired after a ten second wait.

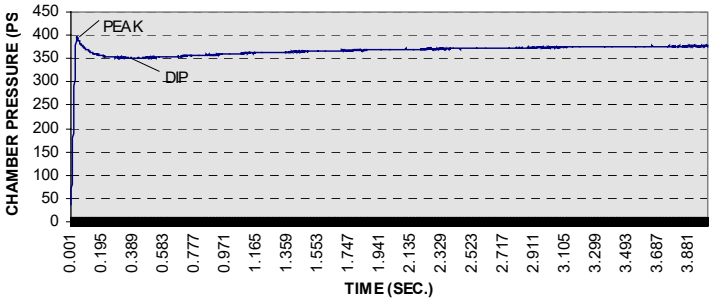
Refer to the medium input pressure graph. You will notice a peak followed by a dip and then a gradual climb back to your rapid fire pressure. The peak is where the temperature of the gas is at its highest. This is where your rapid fire pressures (velocities) will be seen. When shooting at your maximum rate, you will be shooting the same velocity as when you wait 10 seconds or more and take another shot. If you are shooting at a rate lower than your maximum, you will notice lower velocities. This is where the graph is falling to its lowest point (labeled “dip” on the graph). Here the gas is cooling, and the regulator has not opened back up. After this point, the regulator opens back up and the chamber pressure begins to climb back to your rapid fire pressure. This input pressure range is for the player who combines rapid firing with an occasional sniper shot. This will also give a positive Reactive Trigger feel. When chronographing at medium input pressures, a rapid fire shot (as described earlier) and a shot after a ten second wait will be similar.

Refer to the low input pressure graph. Notice that the peak and dip pressures in the first second are lower than the pressures after 1 second. This means that all shots spaced less than 1 second apart will be at lower velocity than shots spaced longer than 1 second apart. At lower input pressures, all benefits of the fast recharge regulator diminish and the regulator acts like the regulator on a 68 AUTOMAG. The main advantage is that this setup is more consistent over the chronograph where shots are at least one second apart and may benefit a sniper with consistent slow shots. Lower input pressure also weakens the Reactive Trigger. When chronographing at low input pressures, a rapid fire shot (as described earlier) will be lower than a shot fired after a ten second wait.

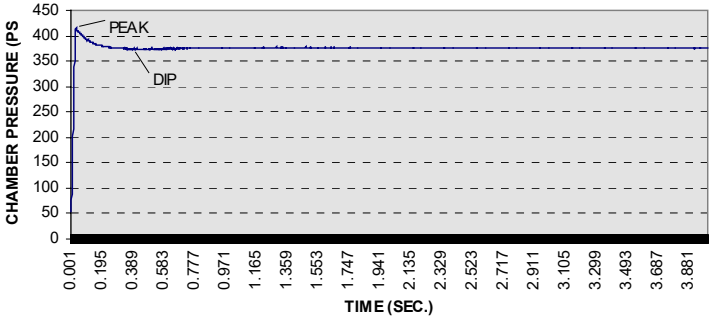
LOW INPUT PRESSURE



MEDIUM INPUT PRESSURE



HIGH INPUT PRESSURE



X-Valve
Part #

1 001507	6 001688	11 000818	16 000802	21 001083-10	26 000799	31 000844
2 002011	7 000844	12 000781	17 000815	22 000779	27 000800	32 000841
3 001687	8 002000	13 000736	18 000123	23 000123	28 000157	33 000782
4 000781	9 001694	14 000123	19 000778	24 000113	29 000826	34 000779
5 001695	10 000796	15 000798	20 000814	25 000822	30 000843	

ACCESSORIES

Airgun Designs has a wide variety of add-on products and accessories for your paintball marker like the powered force-fed feeder "Warp Feed," all available directy to you at our online store at http://store.airgun.com/

TECHNICAL SUPPORT

Please refer to this manual for basic information about your RT-ULE. If you have questions about your RT-ULE, please call our Technical Support staff at (847) 520-7225 or visit http://www.automags.org.

Our technical support staff is available Monday through Friday between the hours of 9:00 a.m.-11:30 a.m. and 1:00 p.m.-5:00 p.m. (Central Time). **Call us first** if you need to send your paintball marker to us for repair! Our Technical Support staff might be able to solve your problem over the telephone. If your paintball marker needs to be returned to us for repair, we need to verify that we have your current address, telephone number and email address on file, and that you are aware of our warranty repair policies and our usual turnaround time. At this point you will be given a return authorization number.

Important! Packages received without this RA number on them will be returned unopened.

This procedure can also be accomplished easily online and it is highly recommended that you visit http://www.airgun.com/Techinfo.shtml# and select " Request Repair Authorization". A Tech will then evaluate your problem and determain if you require an RA number or if your problem can be solved with simply an e-mail or phone call.

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Notes for printers:

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Inside back cover blank
Back cover is page above these notes.

AGD AIRGUN DESIGNS™ INTELLIFRAME

BECAUSE QUALITY ALWAYS SHOOTS STRAIGHT

Replacement 45 Grip for AGD Paintball Markers

Connecting your Intelliframe to a Revolution

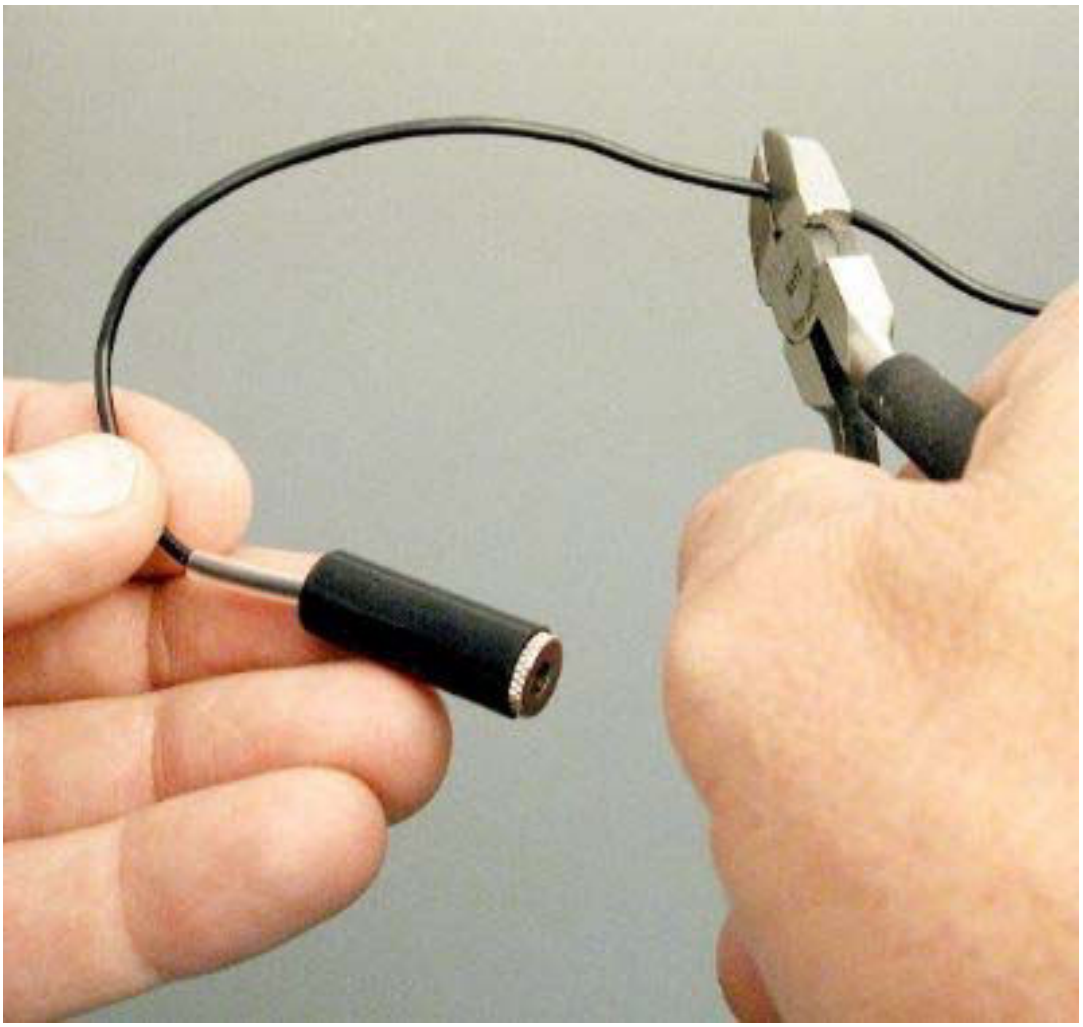
This simple step-by-step picture tutorial will show you how to easily connect your Airgun Designs Intelliframe to your Revolution™. When properly connected, the Intelliframe will activate the rotor in the Rev. every time you pull the trigger. Instead of waiting for the hopper to jam, activating the rotor on every pull keeps a constant flow of paintballs into your marker. This interface has long been the hot setup for pro tournament players and was only available on electronic markers. Now you can set up any of your AGD markers with the same feature. The Rev. will still function normally with the eye as well. This means that you get the best of both worlds! The necessary parts are very reasonable and readily available at Radio Shack. Let's get started!!

-

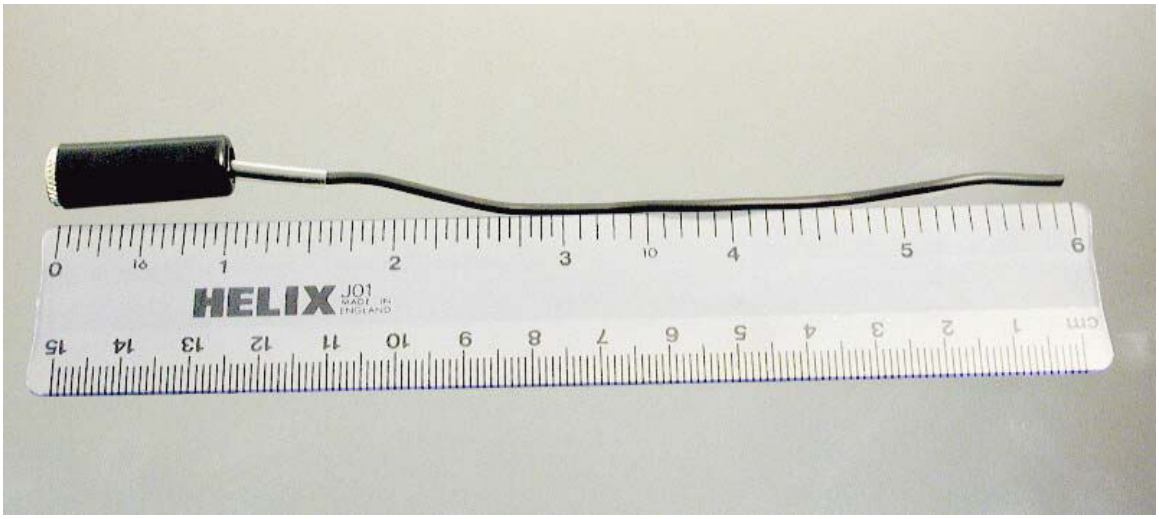
Here are the tools you'll need for this Mod.

These are the parts available from Radio Shack:

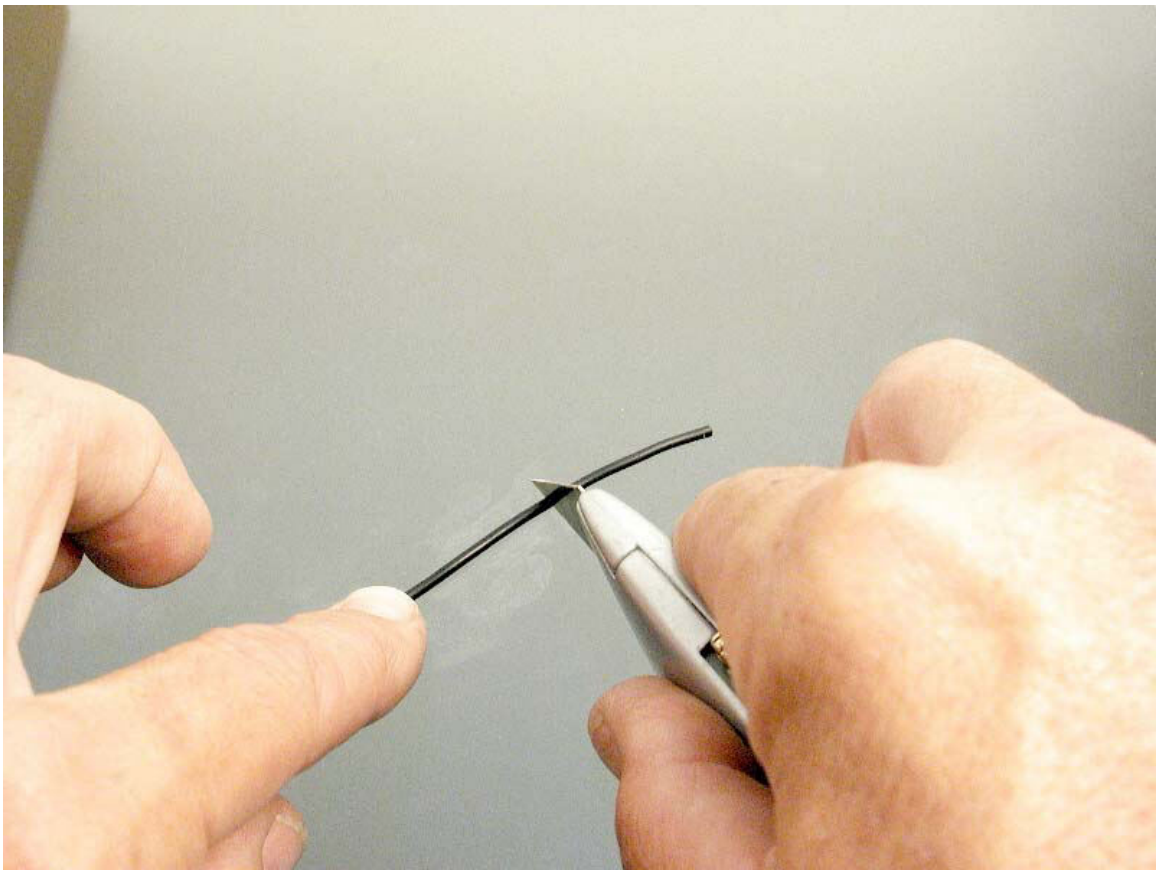
Roller Lever Switch	275-017
Earphone Extension Cord	33-176
Round Head Machine Screws	64-3010
Steel Machine Hex Nuts	64-3017



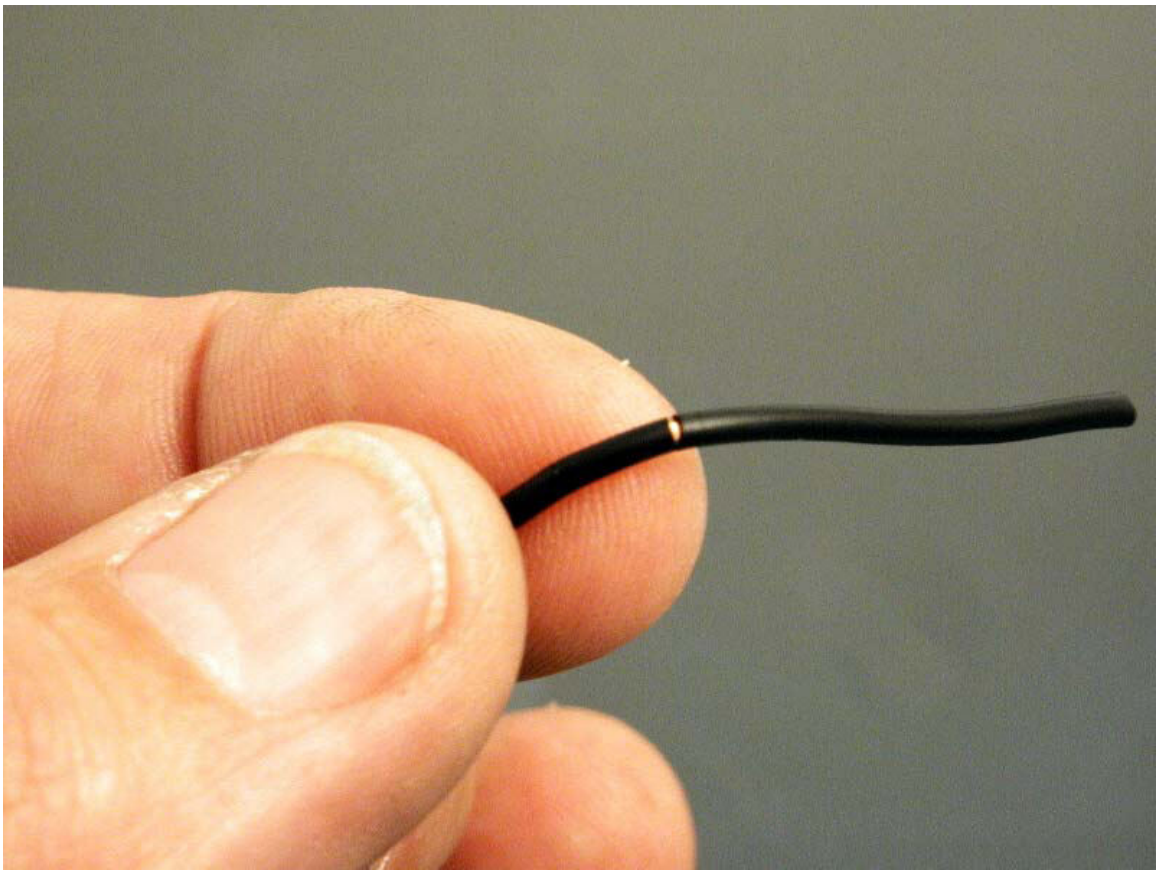
Cut six inches off the female end of the cable.



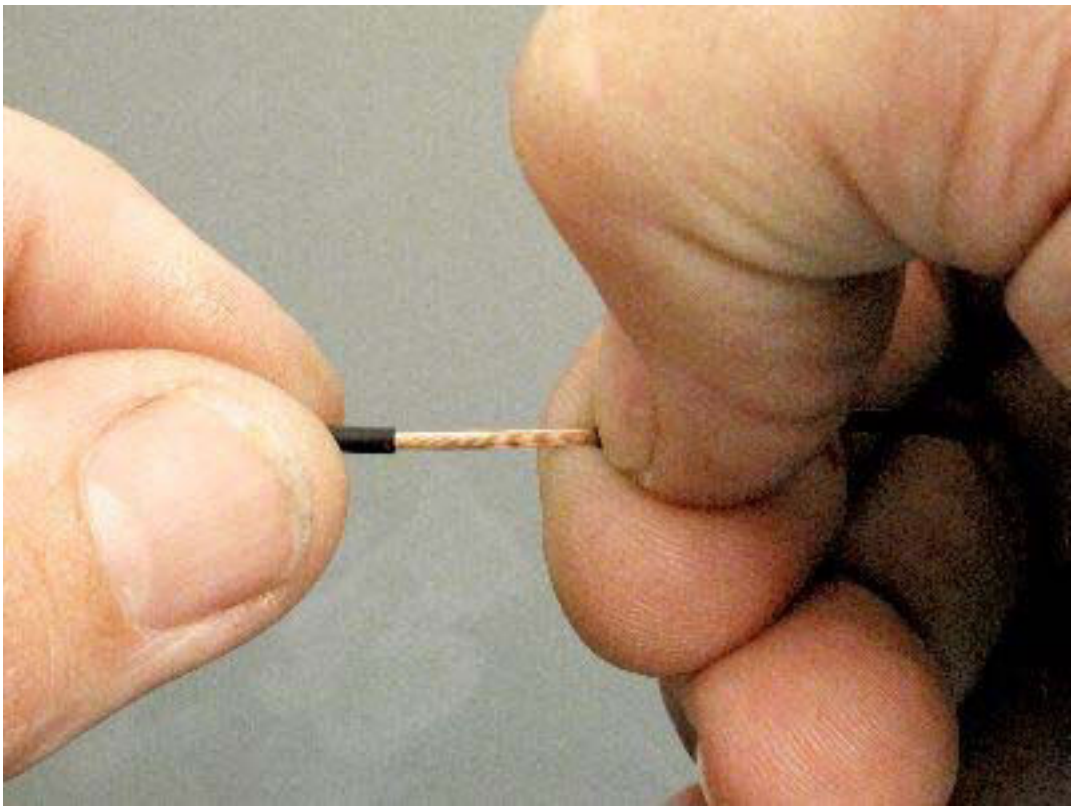
Now we will prep this piece before we attach it to the switch



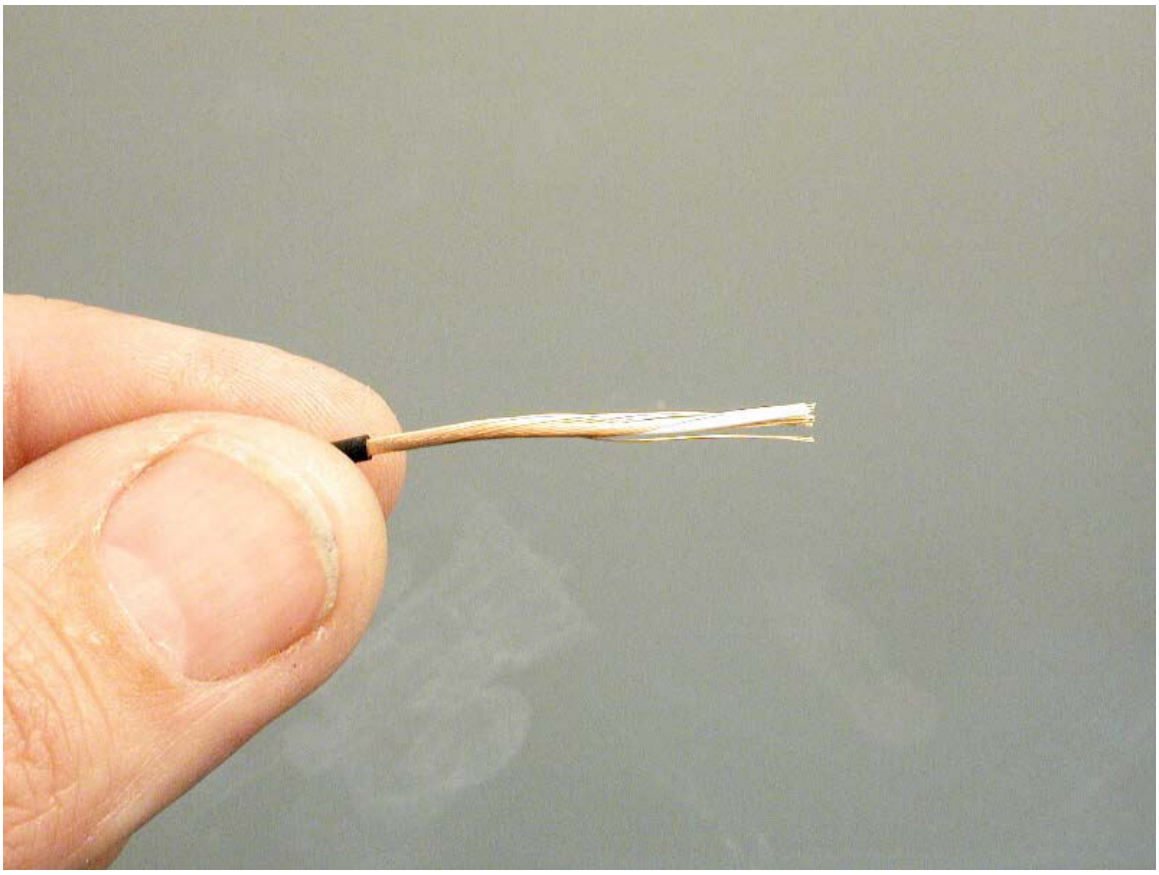
Lightly score just the outer insulation around an inch from the end.



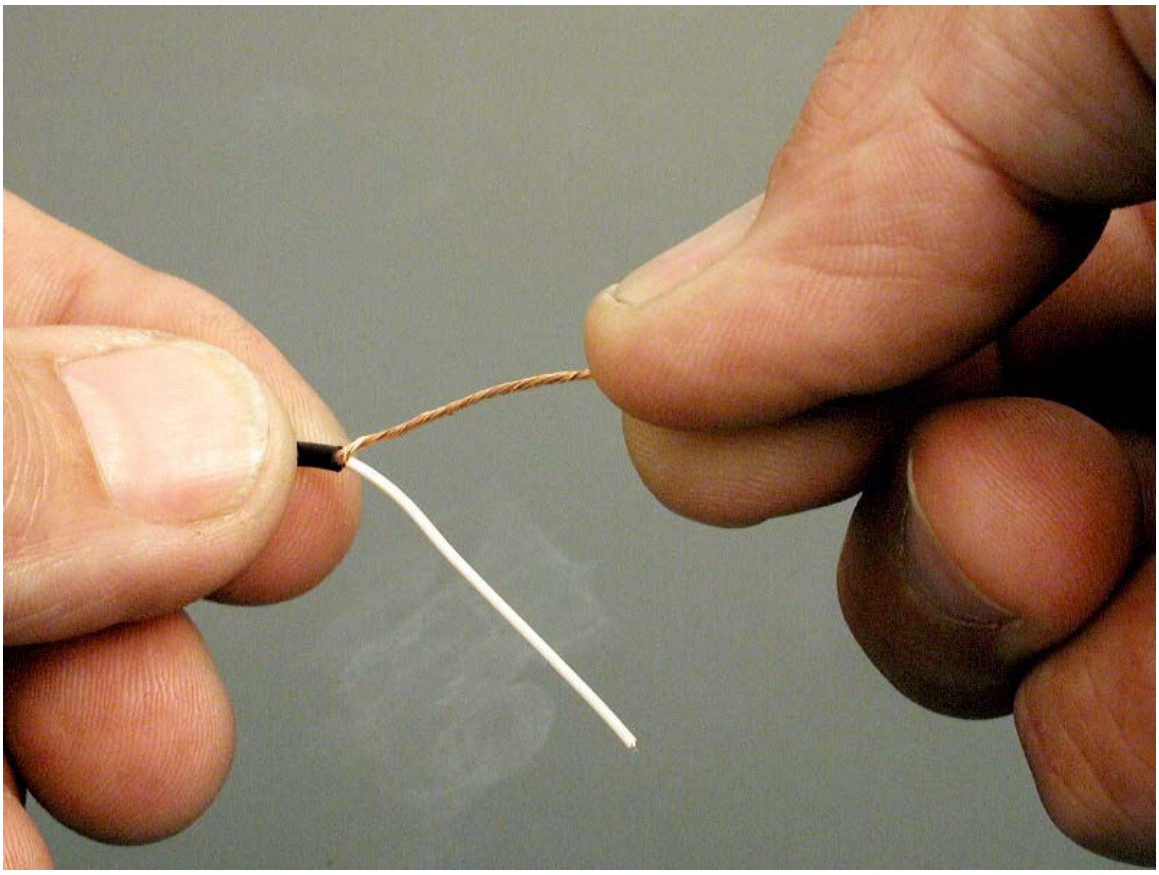
Open up the cut by lightly bending the wire



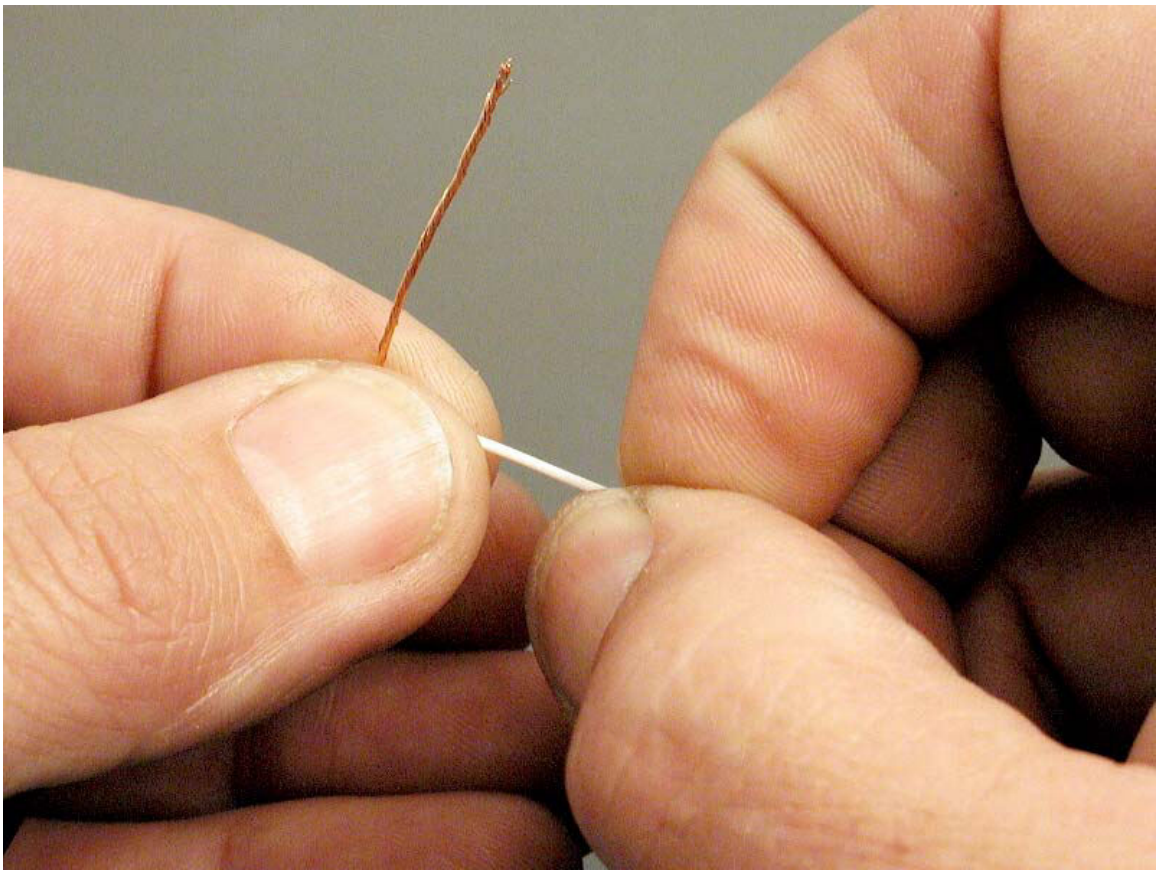
Use your fingernail to pull the insulation off.



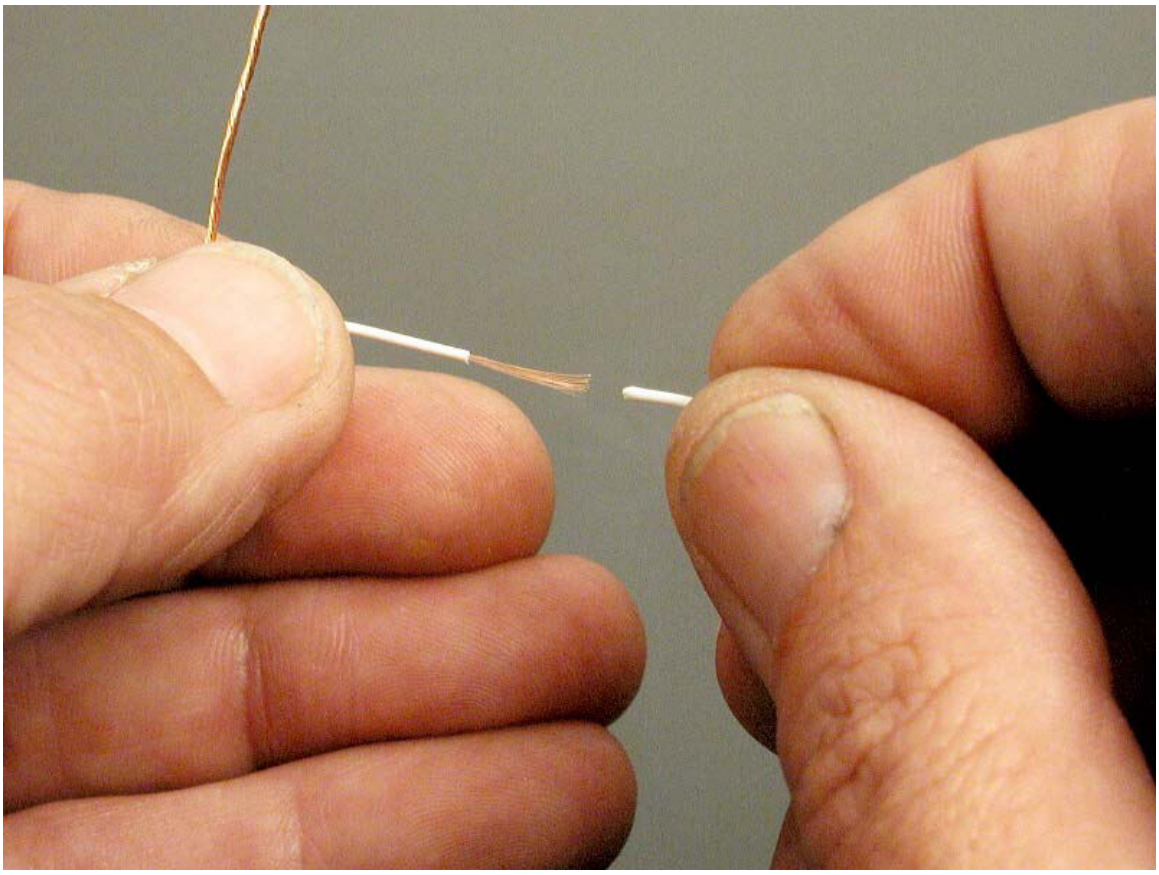
Separate the inner white wire from the copper strands.



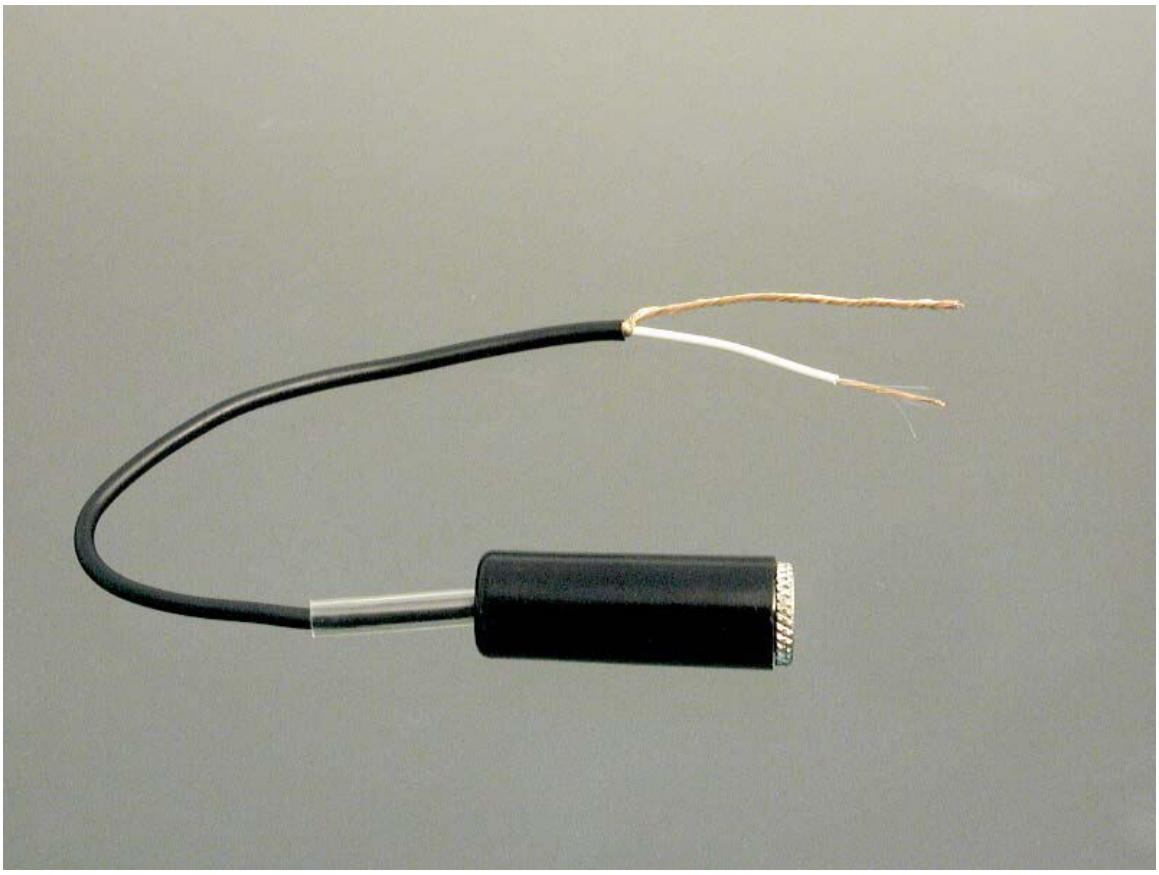
Twist the strands together



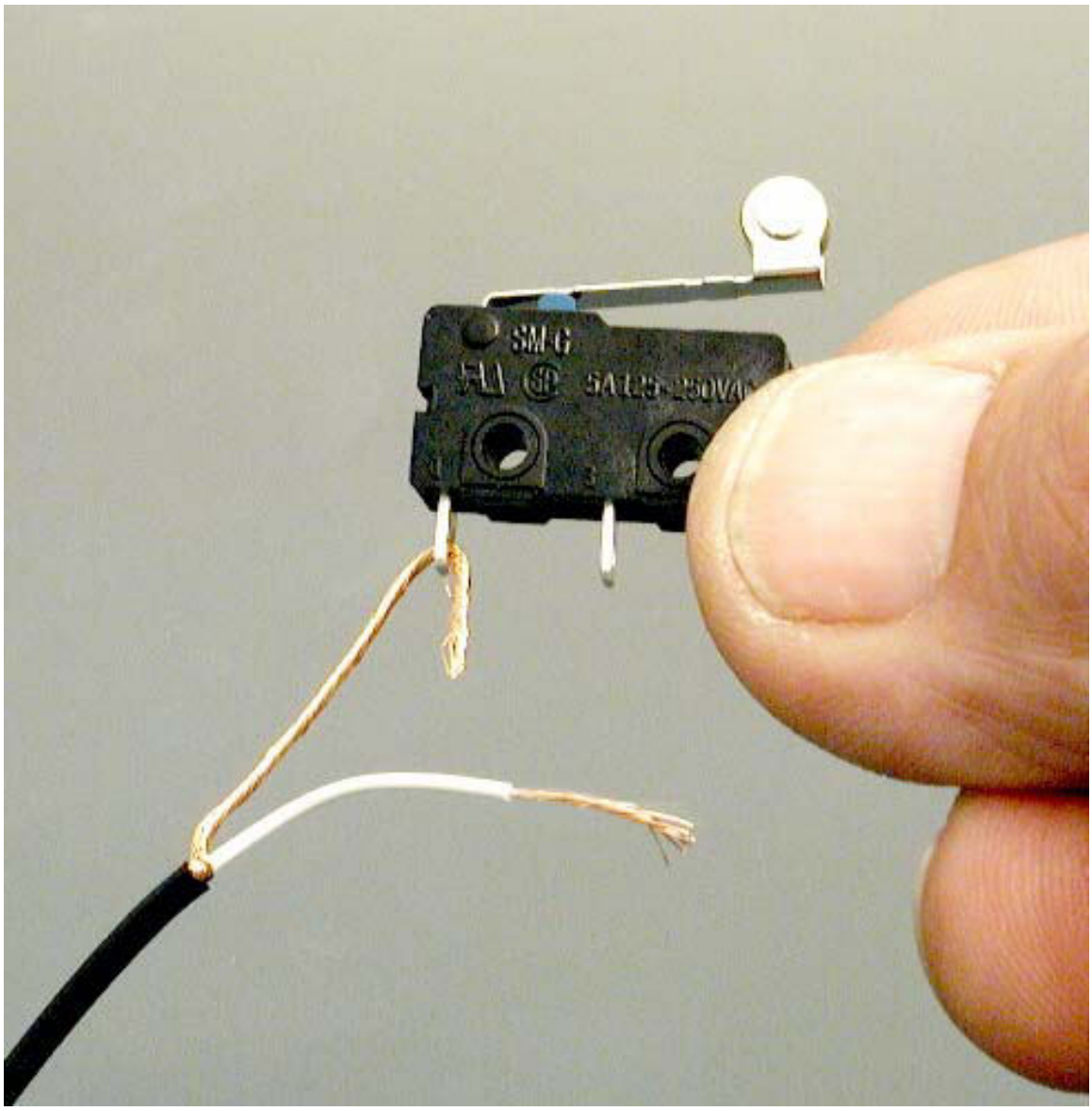
The white wire is delicate enough to strip with your fingernail.
Expose about ½ inch of it.



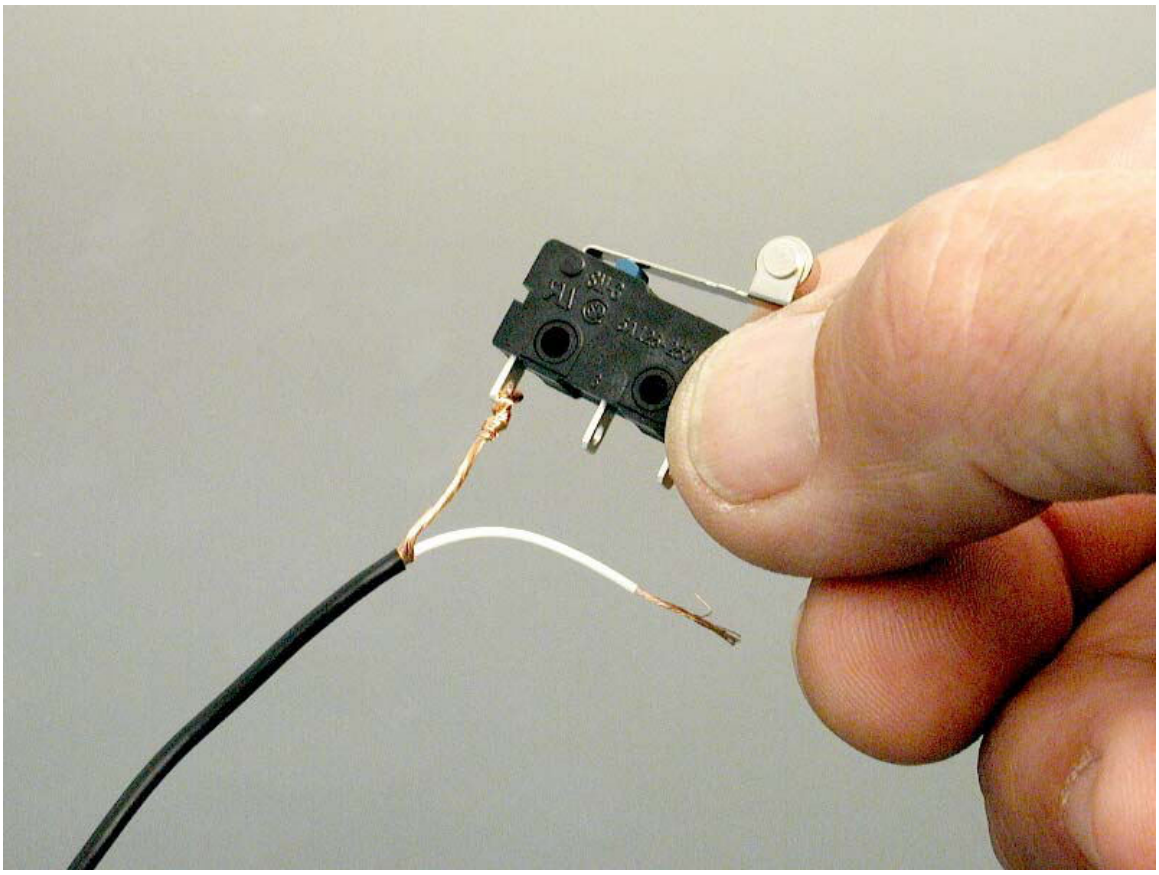
There we go



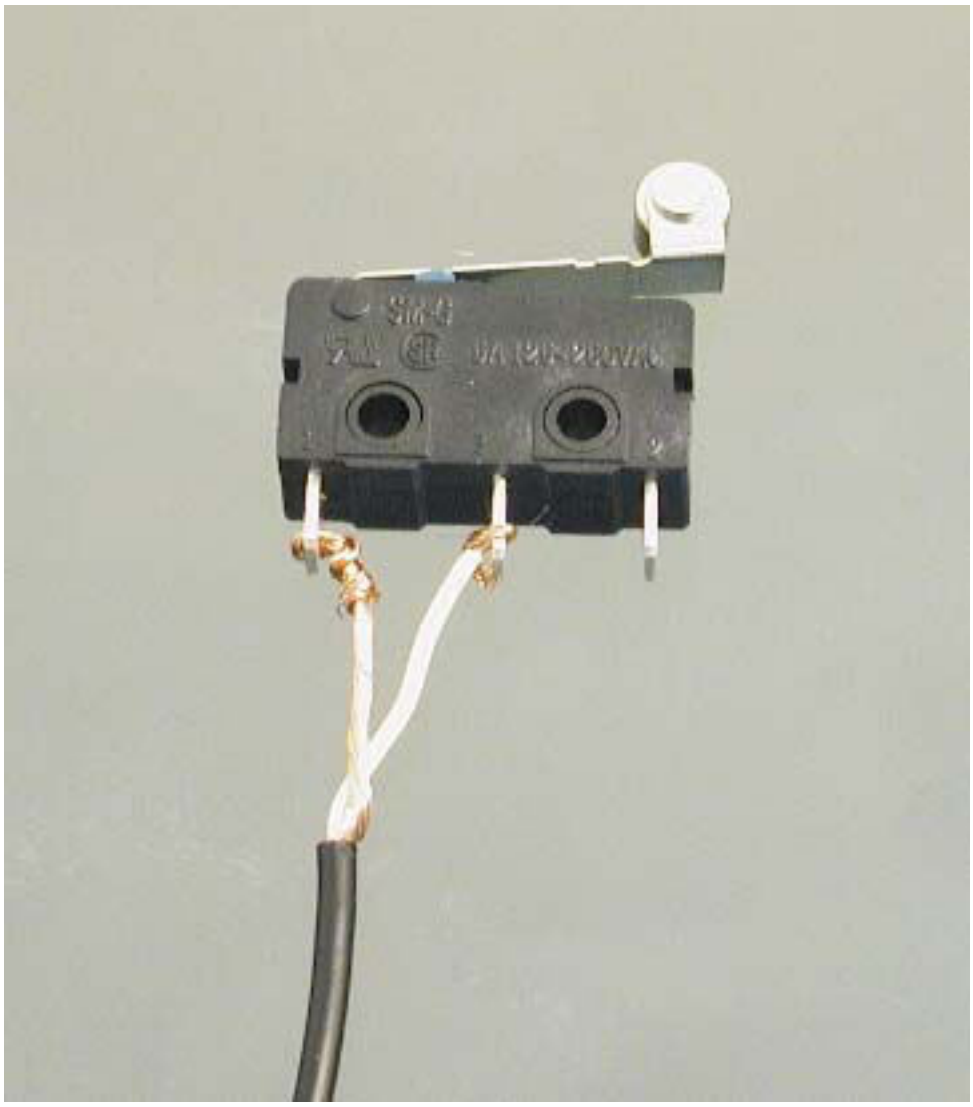
Now this is ready to connect to the switch.



Note the orientation of the switch.
Thread the shielded wire through the hole
in terminal one.

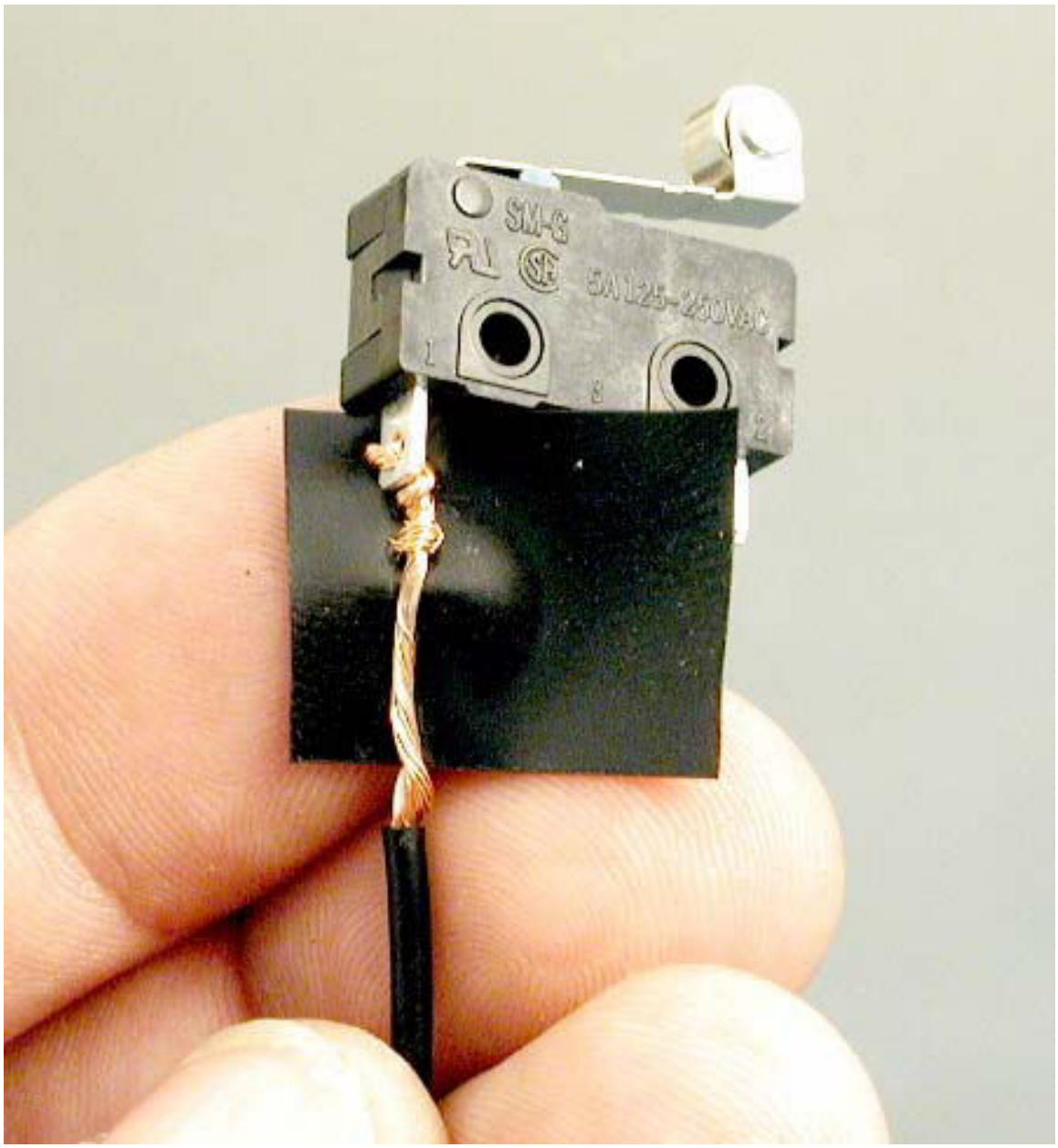


Twist it tightly to insure a good connection.

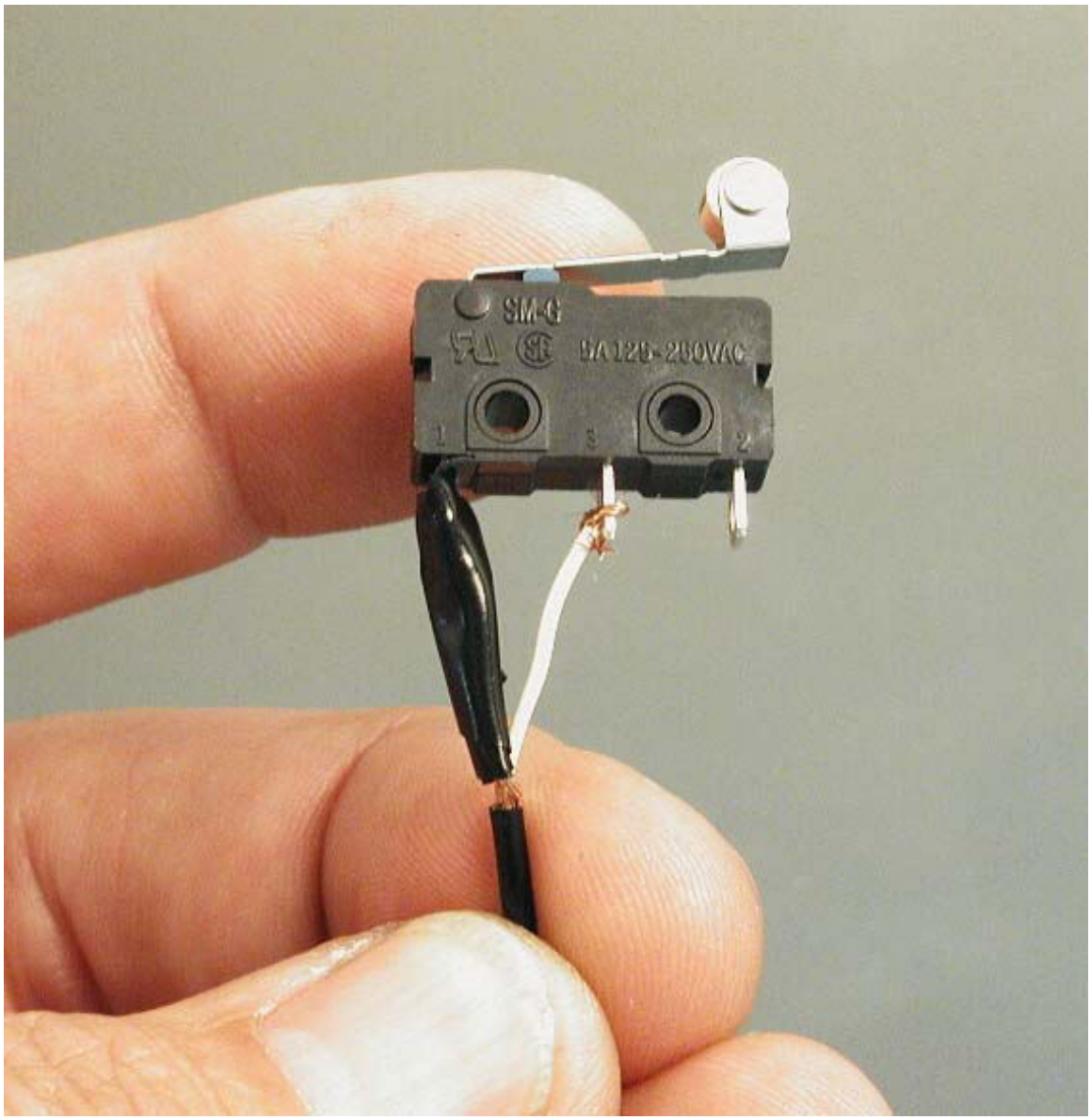


Thread and wrap the white wire through center terminal 3.

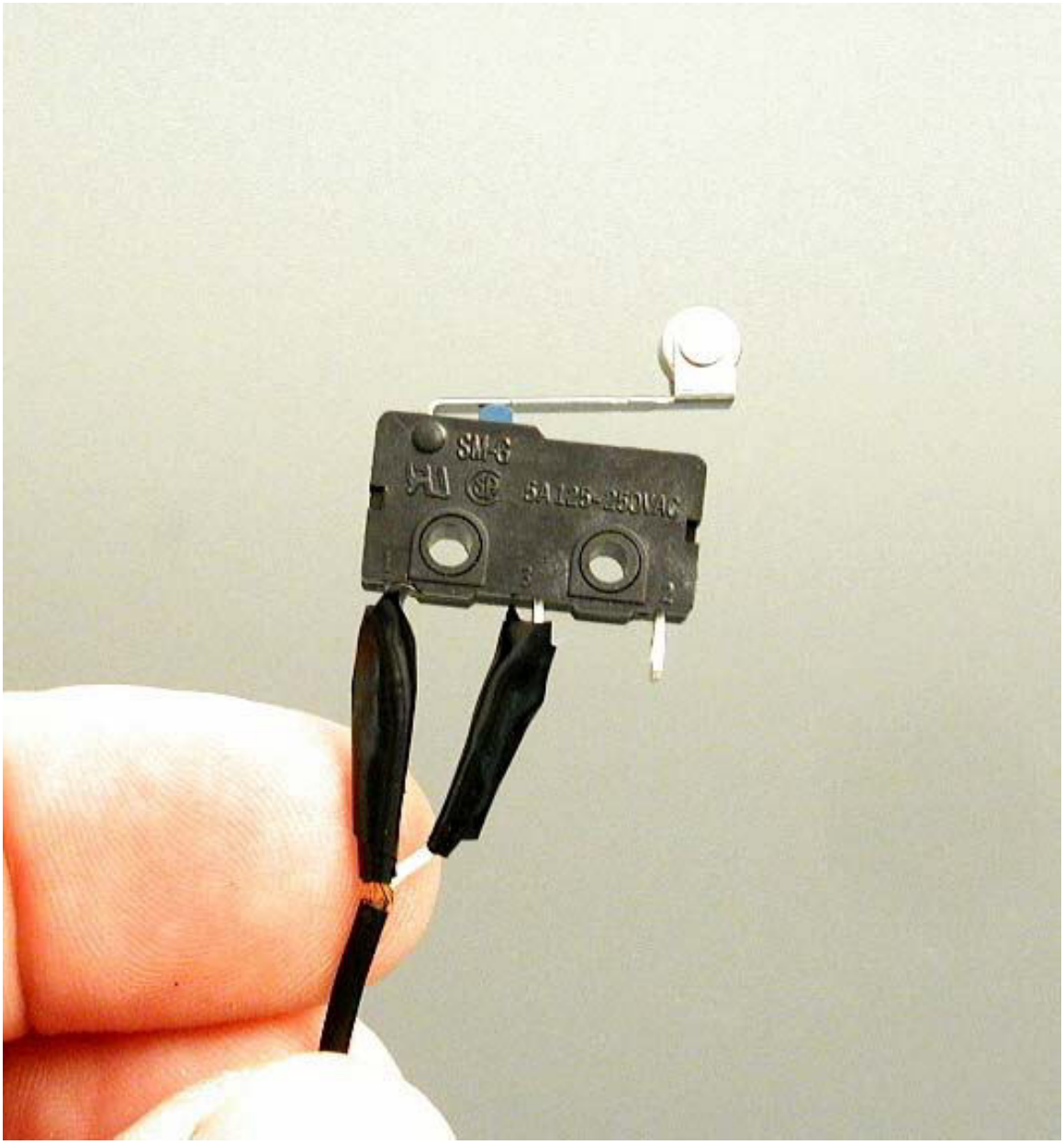
We recommend that these connections be soldered at this point but adequate results can be obtained without solder.



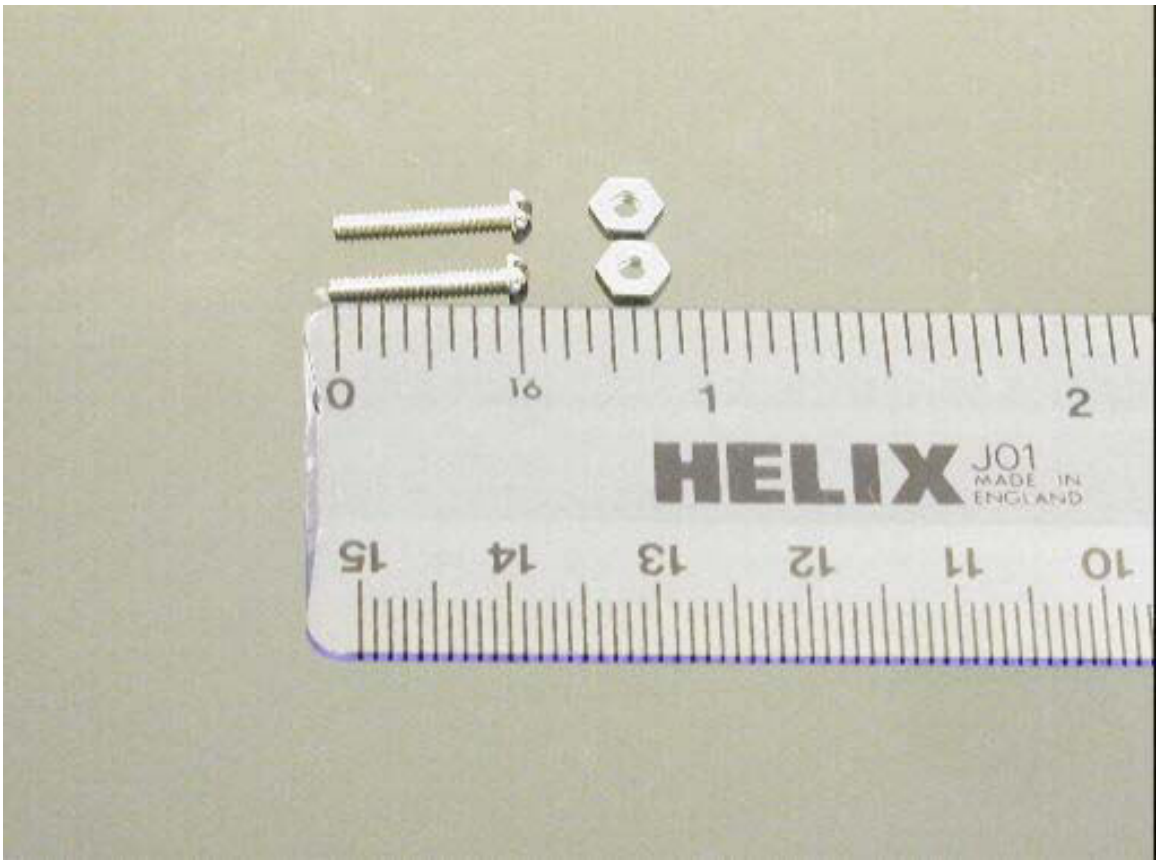
Cut a small piece of tape and apply as shown.



Wrap it tight and repeat for the white wire.



Set this aside for a minute and grab the bag of machine screws.



Select two screws out of the bag that are ½ inch long.

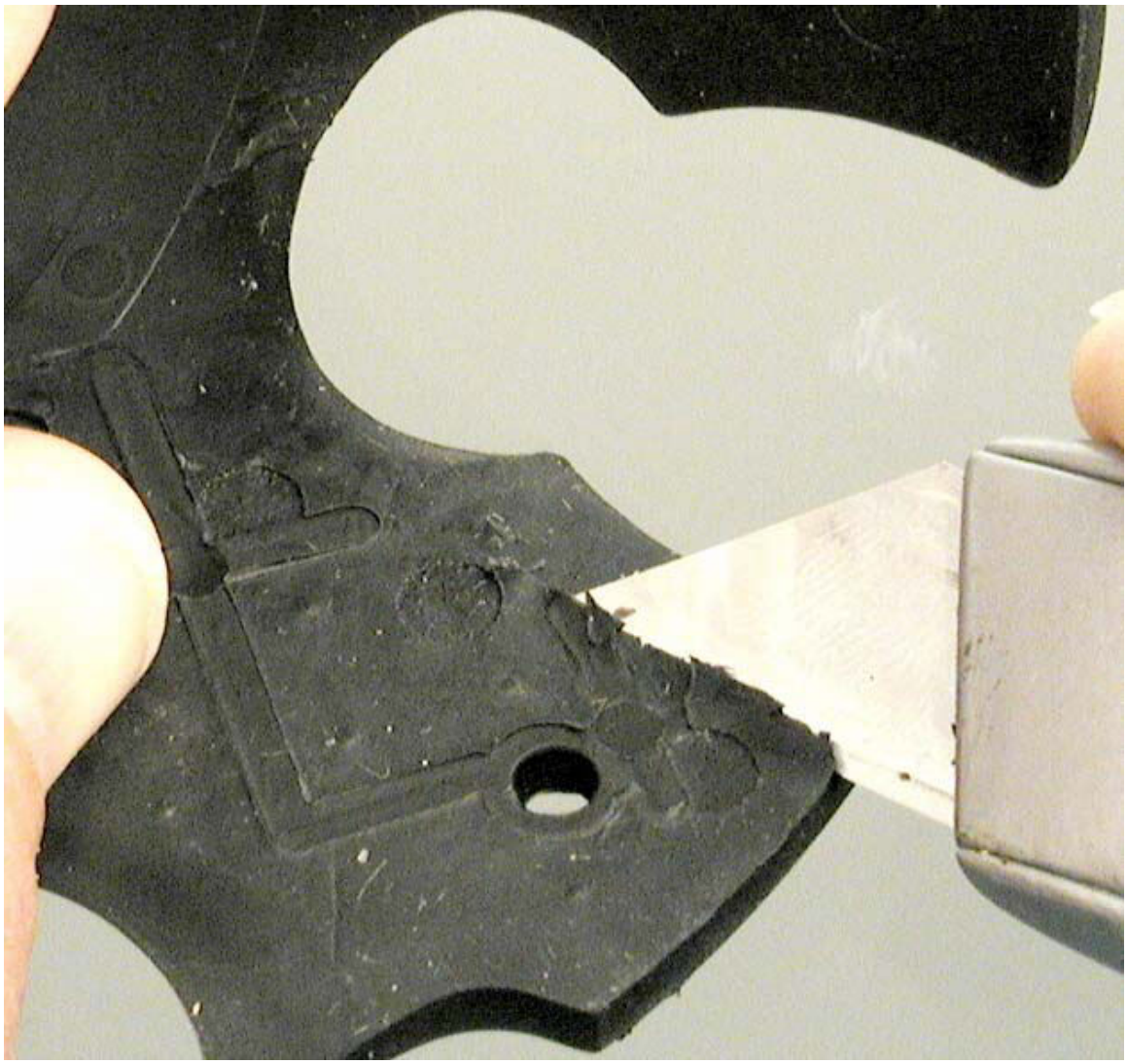
Place and hold the two screws from the left side of the grip.

Position the switch as shown and hand tighten one of the nuts.
Note the wire running through the notch.

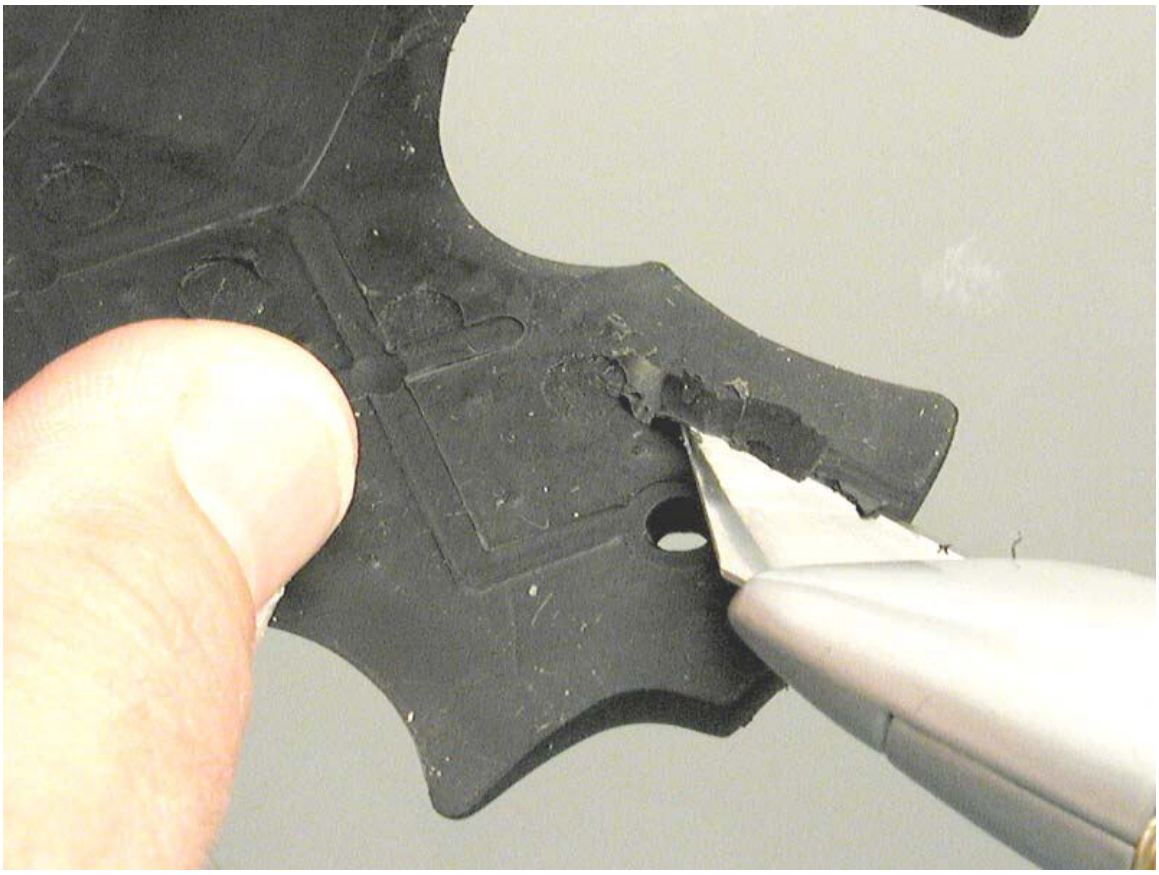
Get the other nut started then tighten them both snug. Not too tight you can break the plastic housing.

Now we will notch the inside of the grip out to clear the wire.

Open the grip up as shown.



Very Carefully, start a ¾ ‘long cut in at an angle, midway between the screw mounting hole and the edge of the grip.



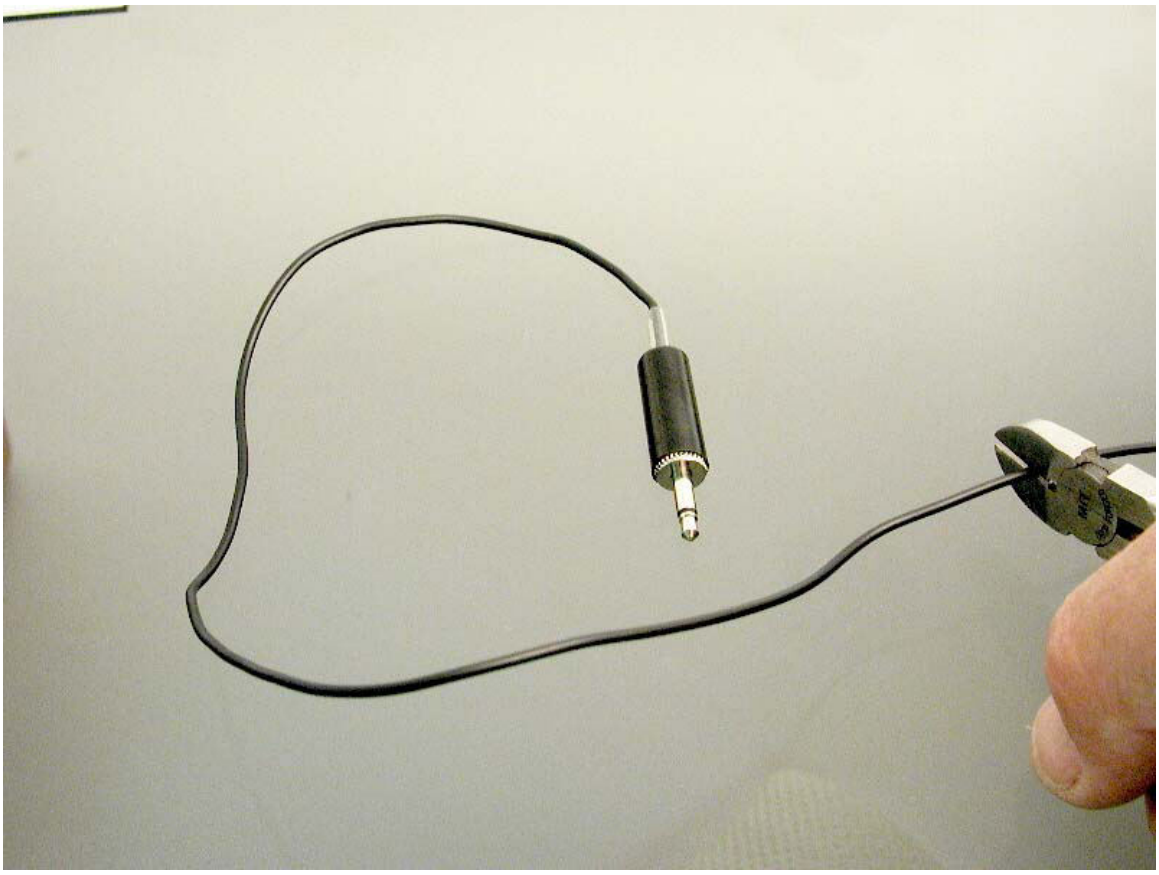
Now cut in from the other direction to make a small groove that will fit the wire. Be carefull not to cut all the way through the grip.

The picture shows the nylon reinforcement imbedded in the grip.
Test fit the wire and adjust the notch if necessary.

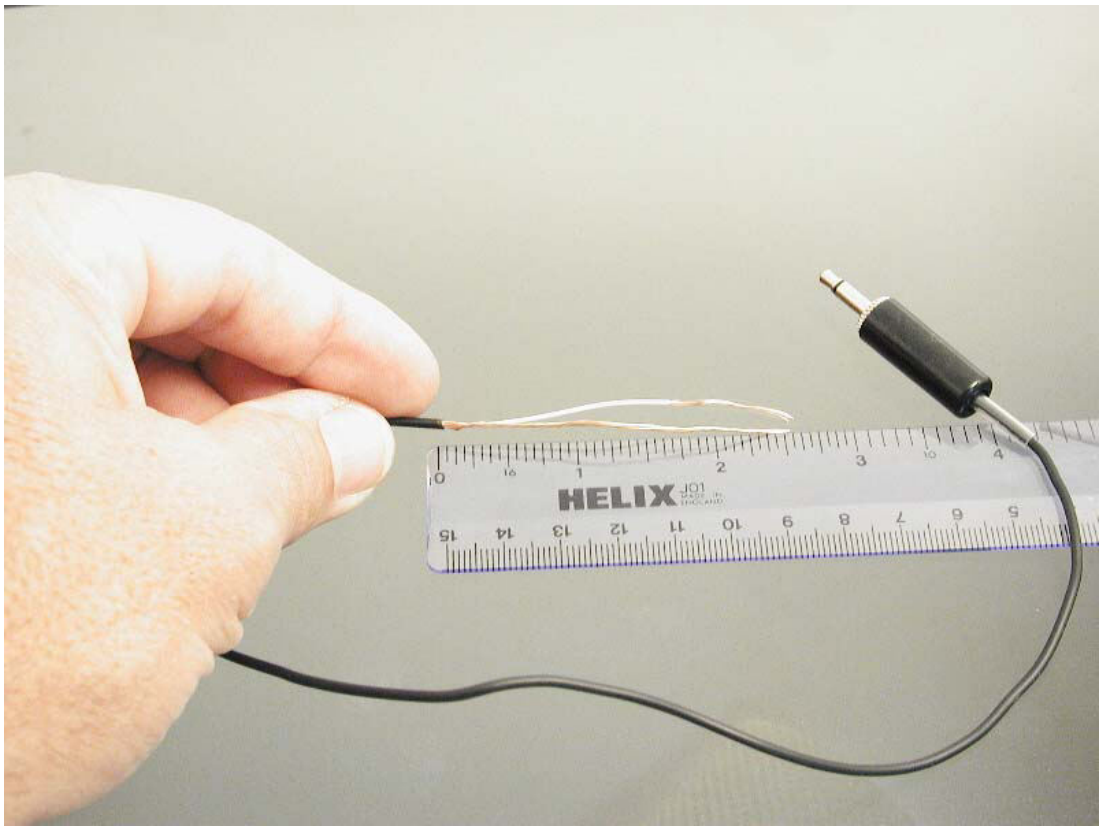
Screw the left side of the grip in first.

Route the excess wire from the switch, down through the notch and back up and out. We ended up hanging our plug out about ¼ of an inch.

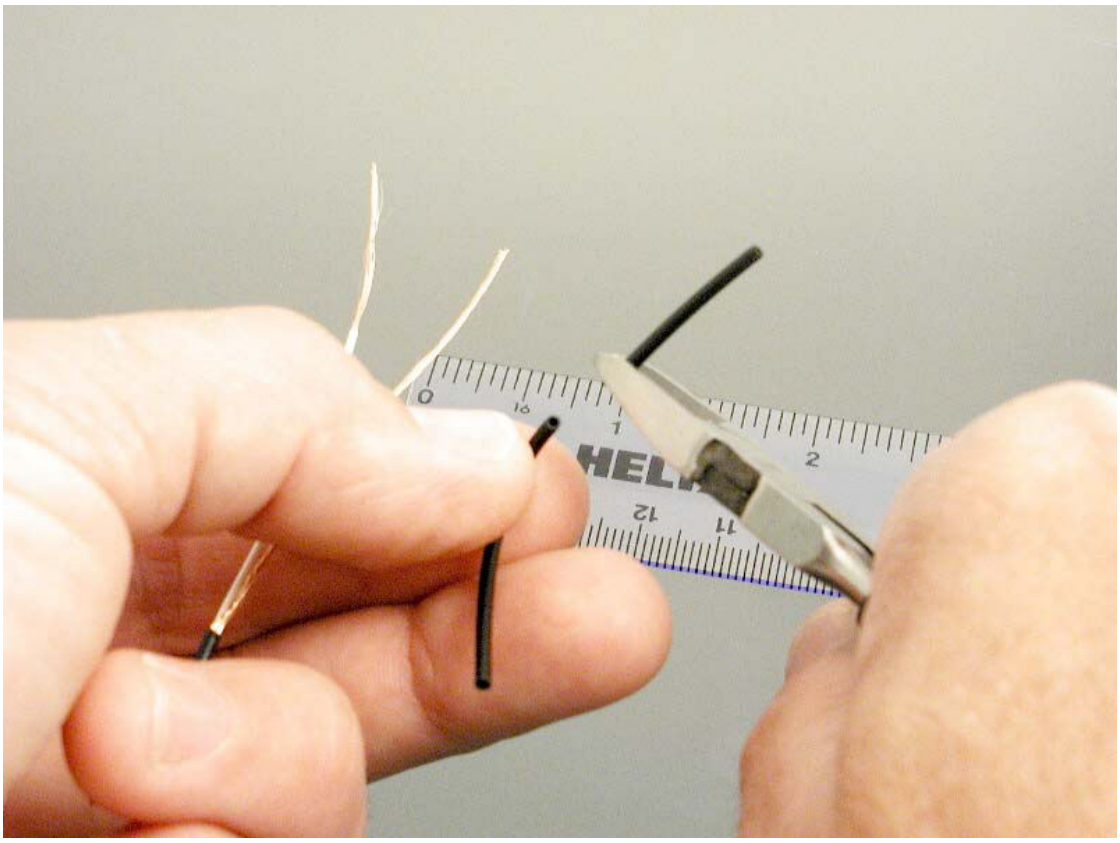
Line up the wire and notch and install the two remaining screws, and we are done with the grip for now.



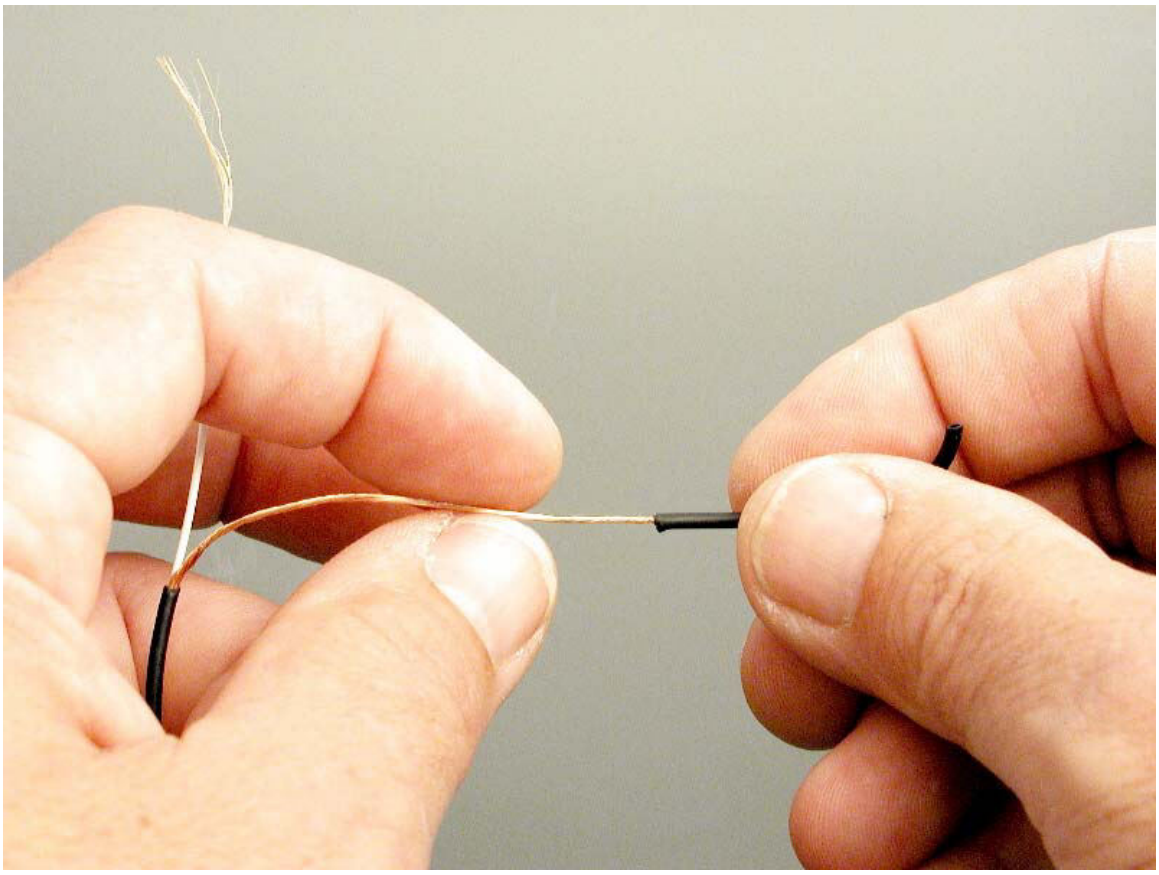
You will need enough wire from the male side, to reach comfortably from the plug in your grip to the board In your Rev. plus some for the connection. Ten inches should be enough for most setups. Check and see what length will work out best for you.



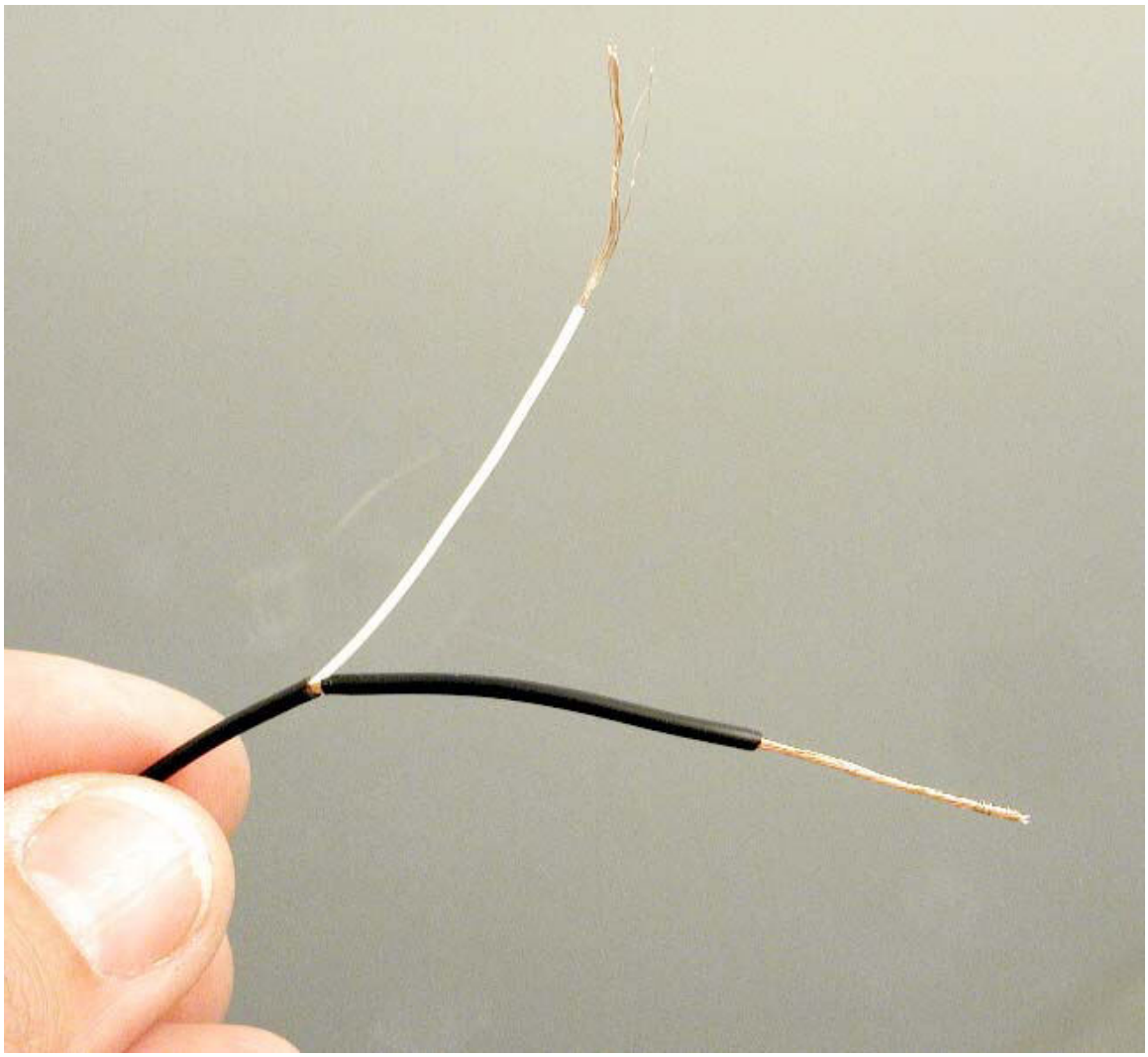
Strip approx. 2 ½ inches of insulation off the end, separate and twist as before.



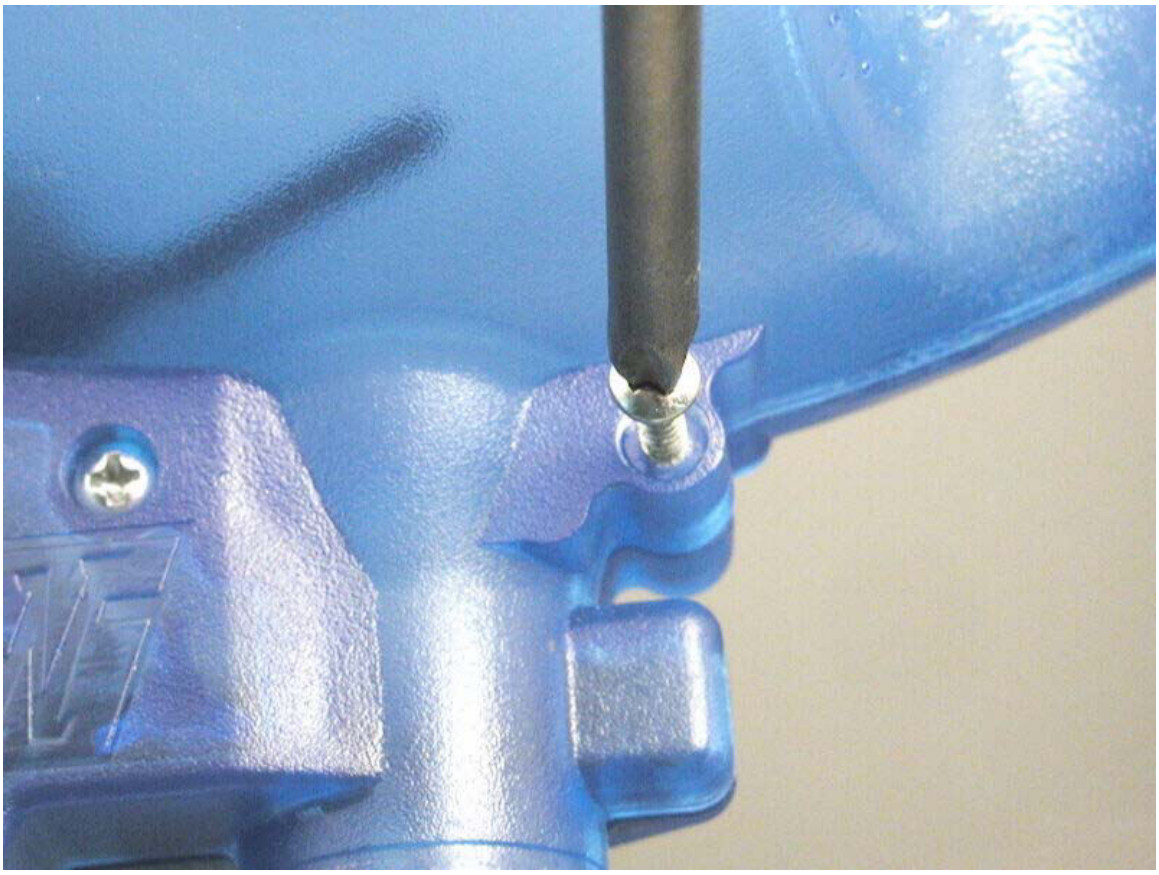
Cut about an inch off the insulation.



Put the piece of insulation back on the wire to prevent grounding.

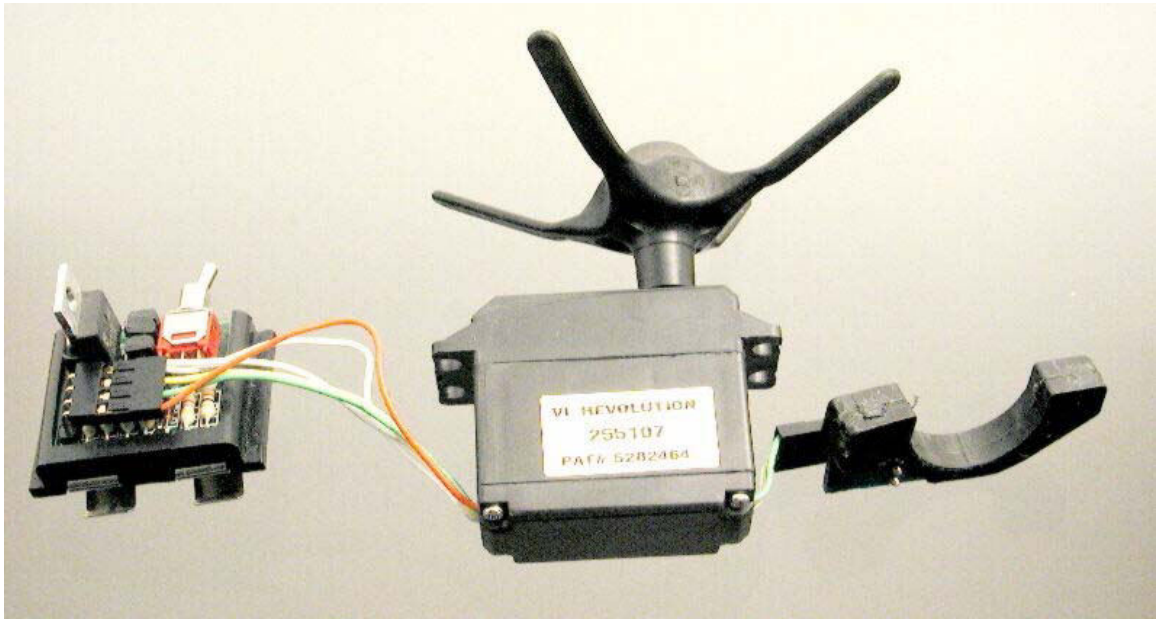


Good, now grab your Rev. and a Phillips screwdriver.

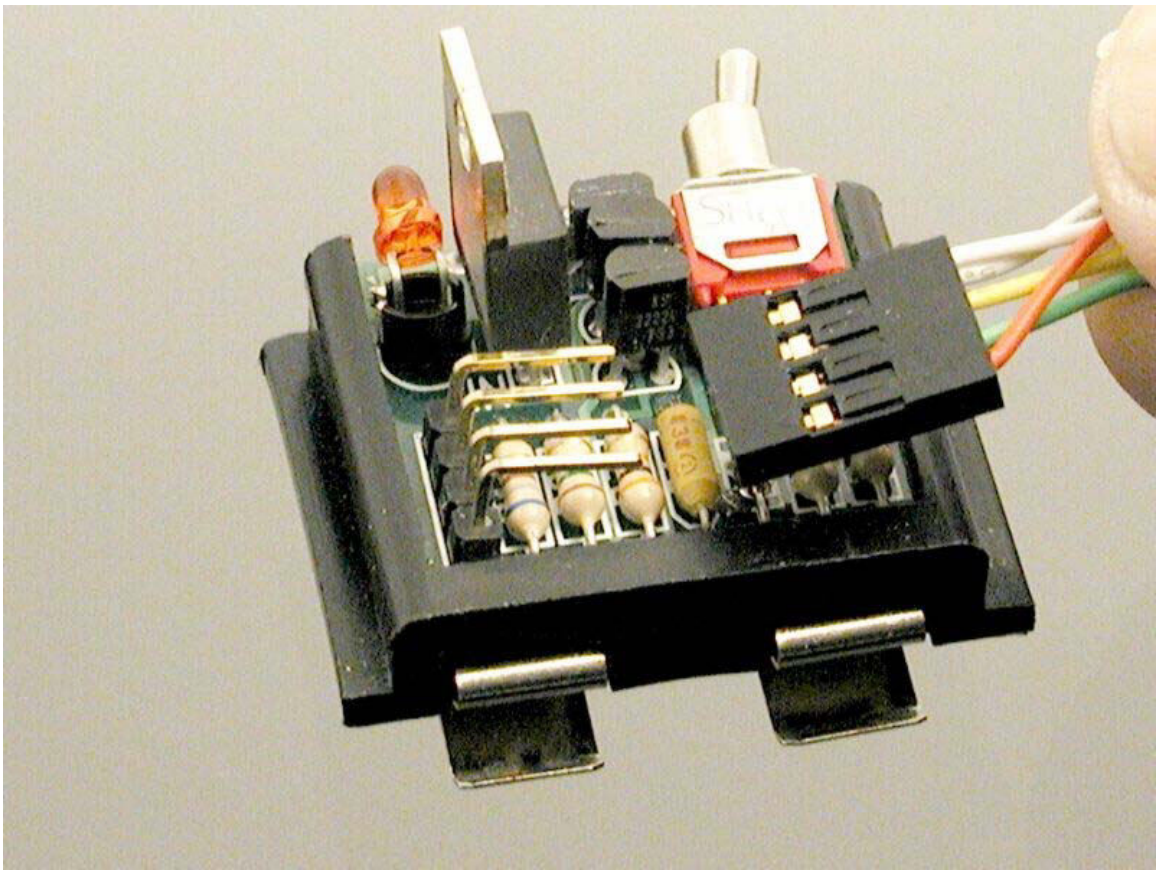


Remove all seven screws from the case.

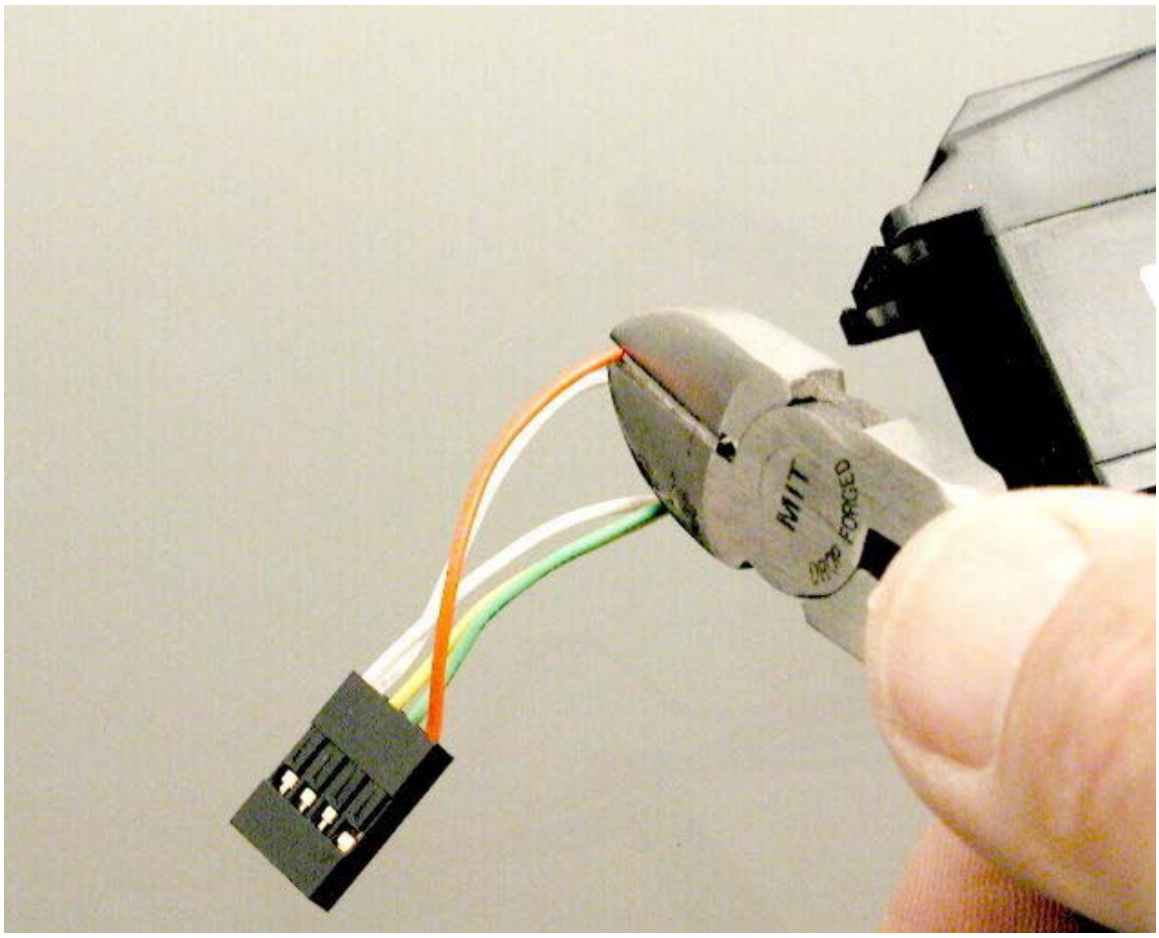
The entire guts will now lift out.



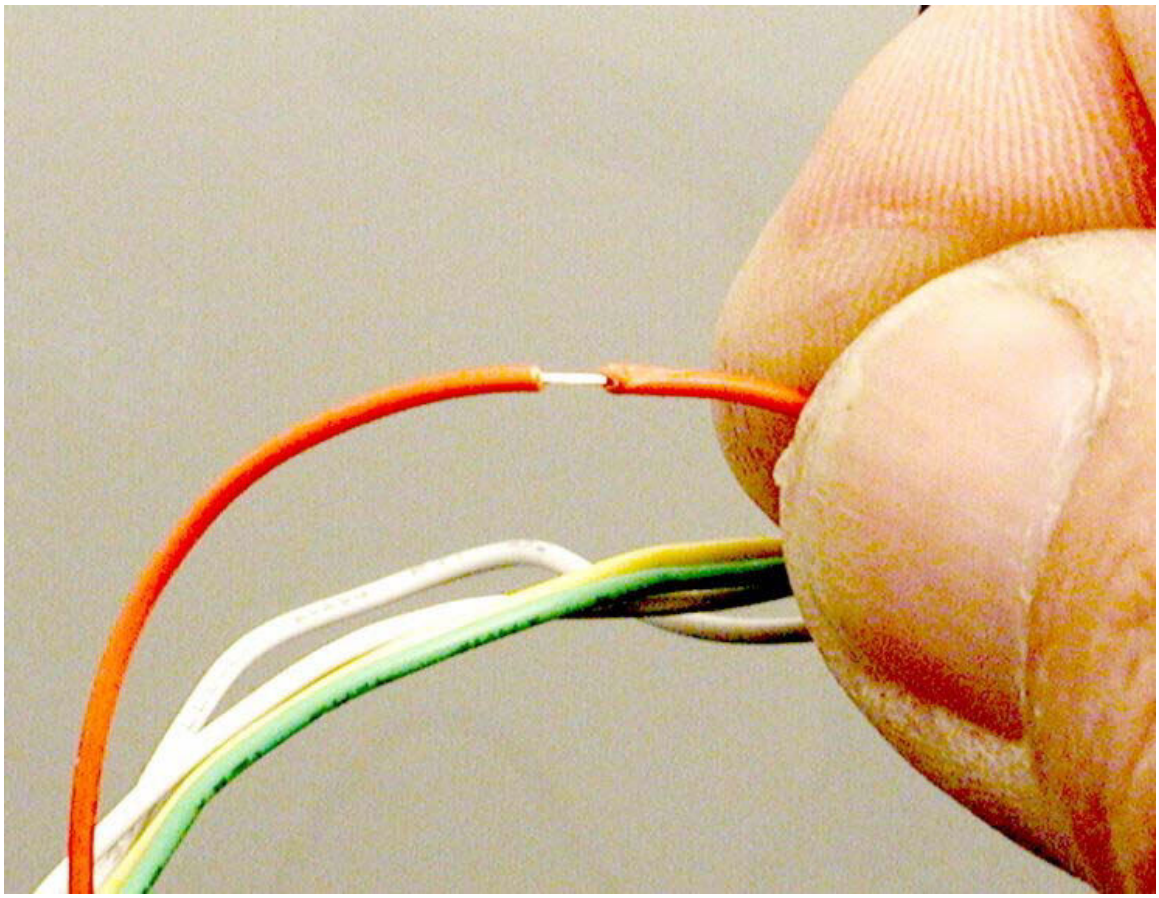
Board Drive Motor Sensor eye



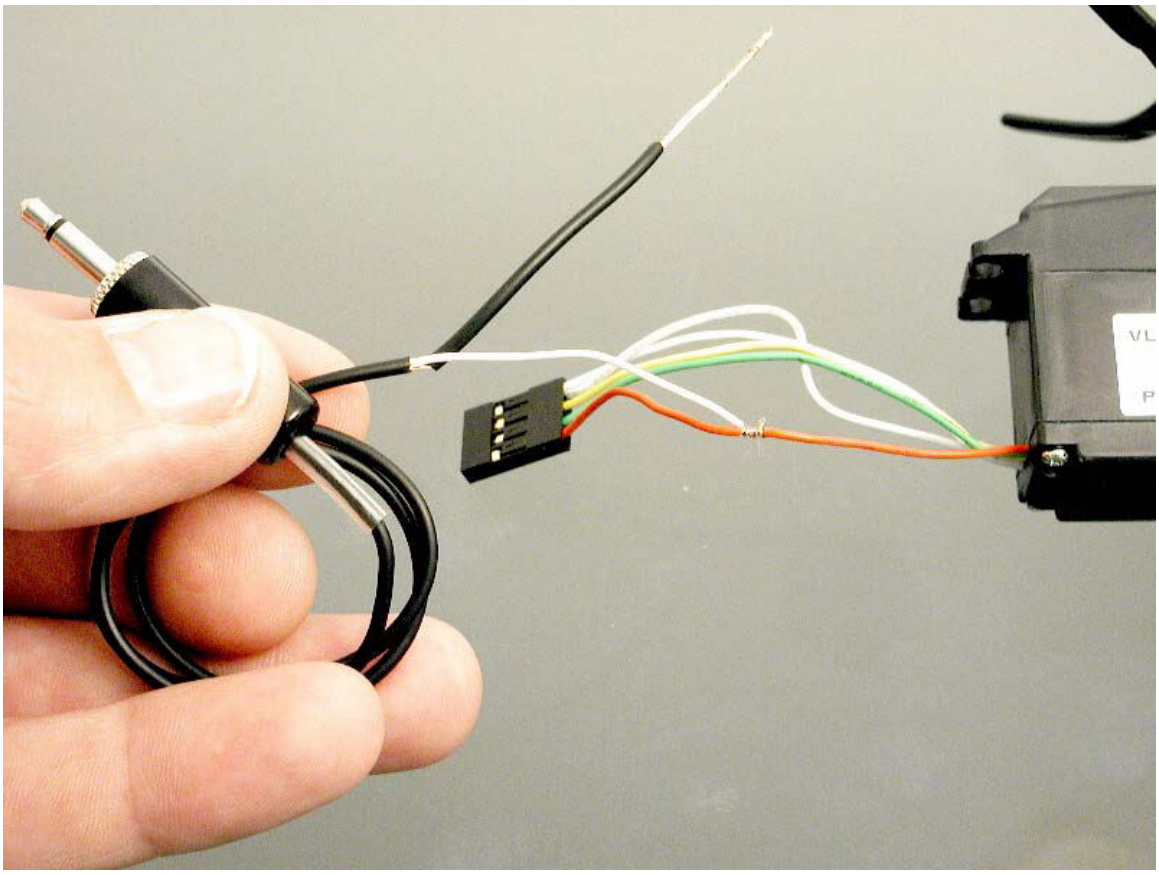
Disconnect the plug from the board (don’t pull it out by the wires)



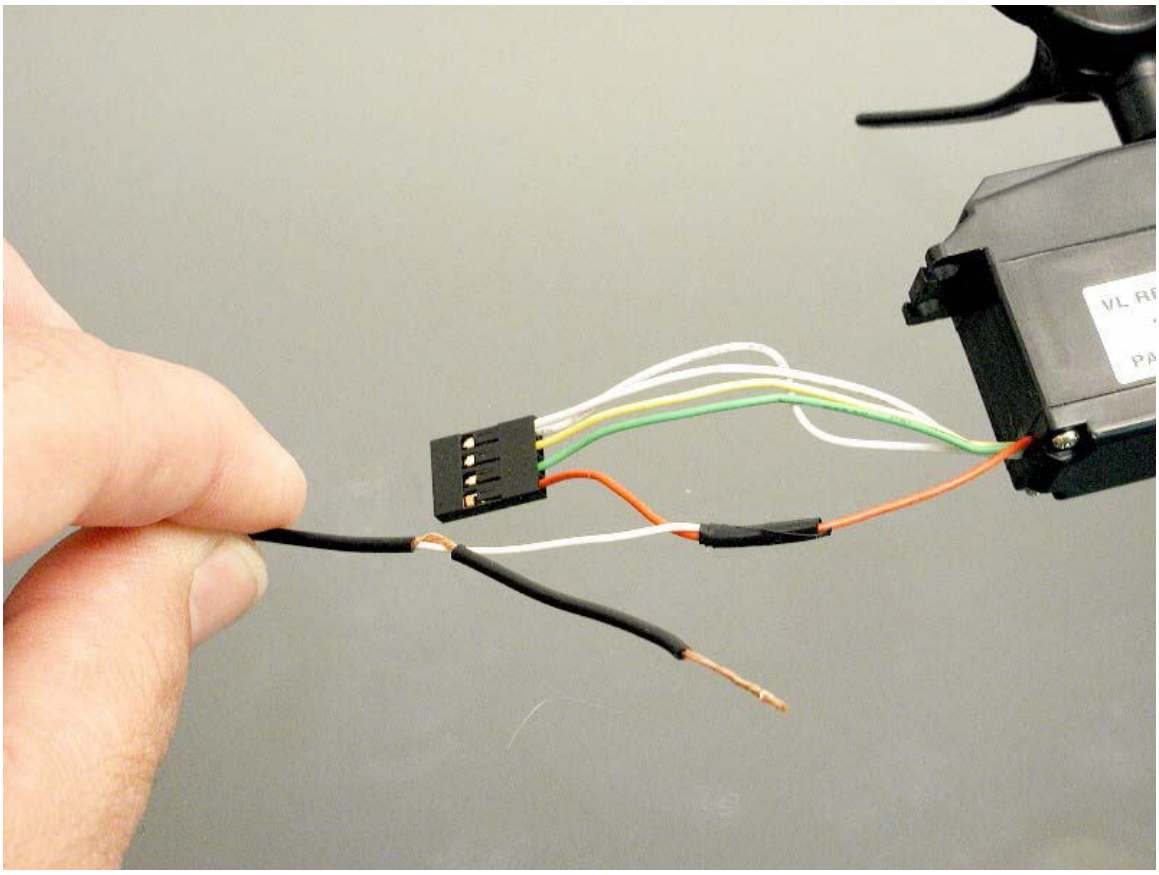
You need to tap into the RED wire about an inch from the plug by Carefully stripping the insulation back. Try not to cut the actual wire, just the insulation.



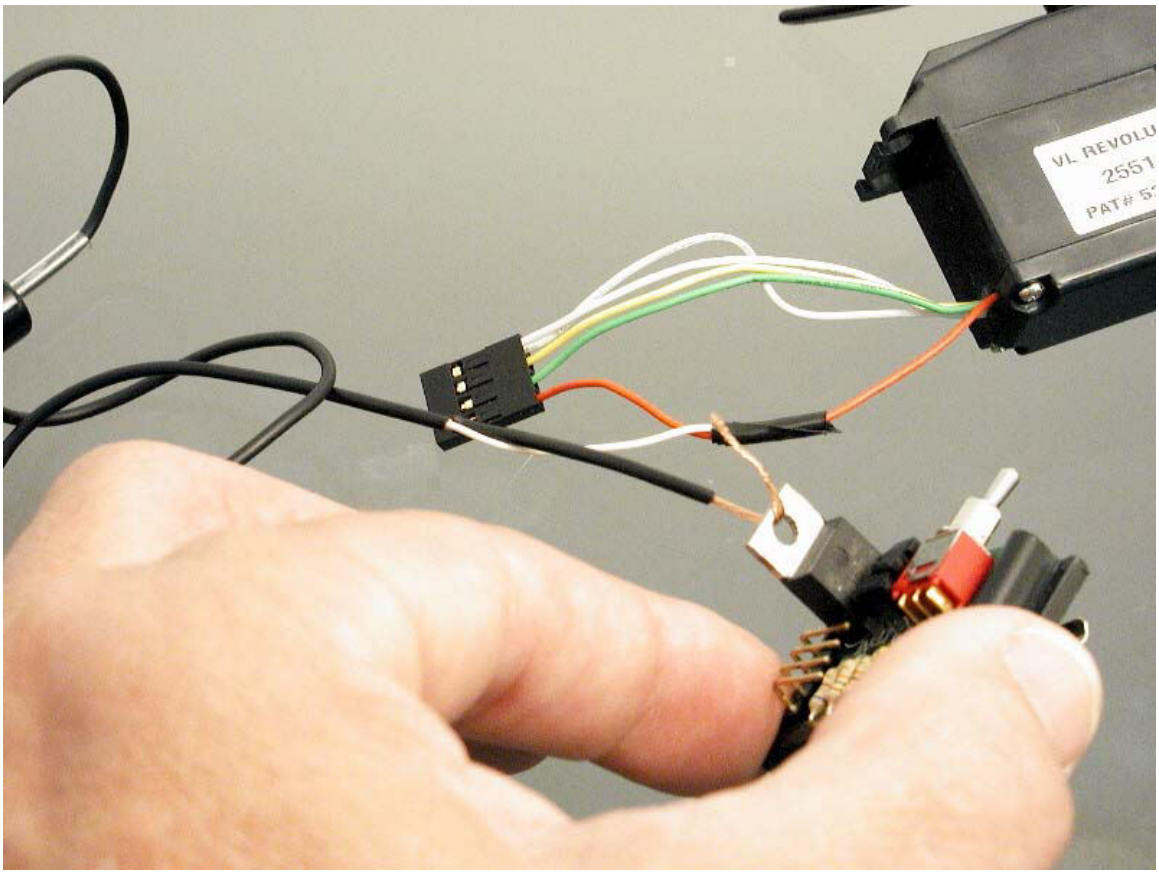
This is how it should look with the insulation removed. Now you can connect the white wire here.



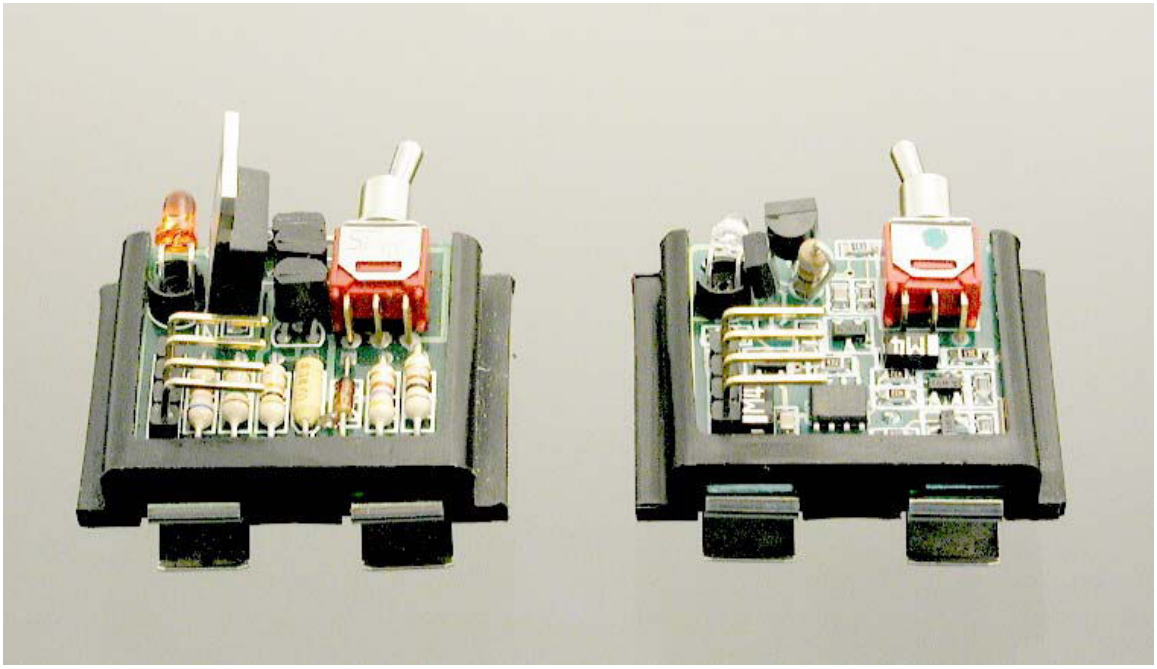
Wrap the white wire around the red wire several times.



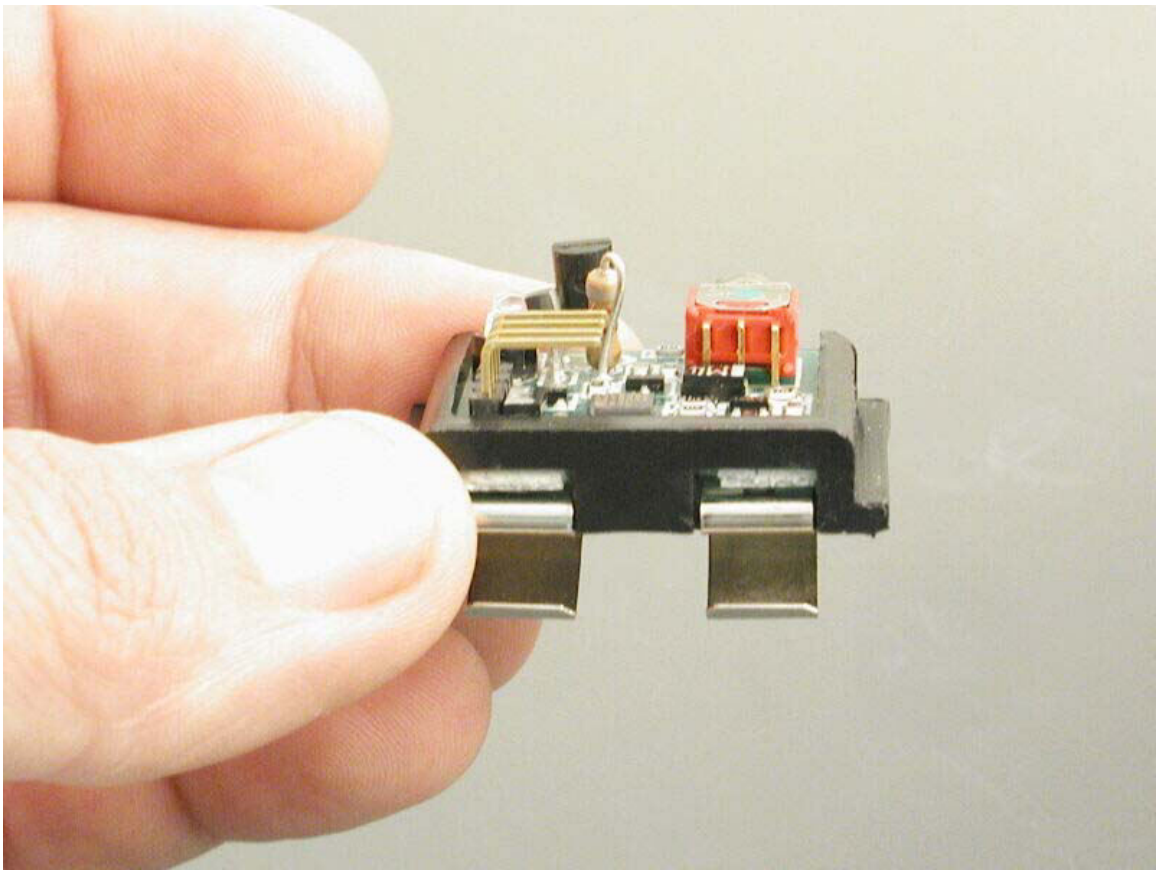
Add a small piece of tape.



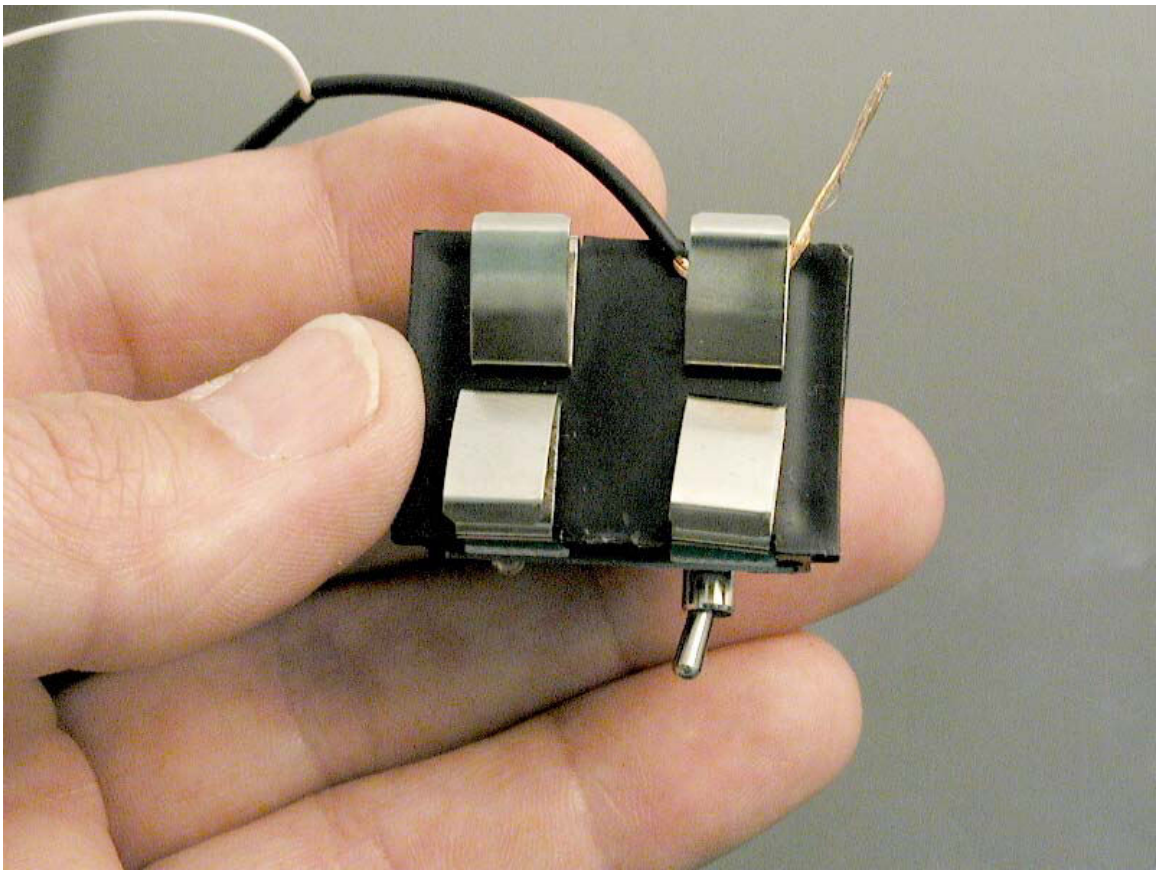
If your board has one, you can connect the shielded end of the cable through the hole in the voltage regulator as shown.



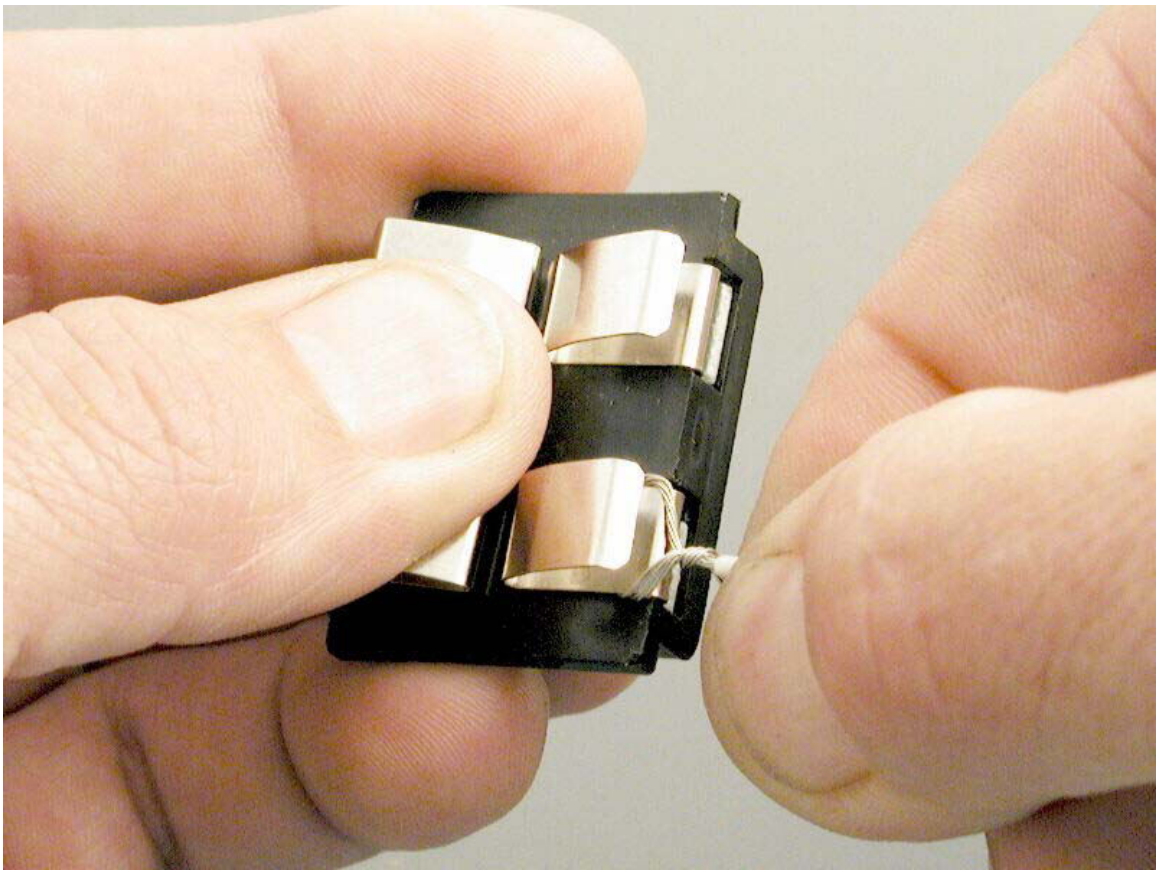
With Voltage regulator Without



If your board doesn't have that regulator, you can connect the shield
To one of the battery terminals on the underside.

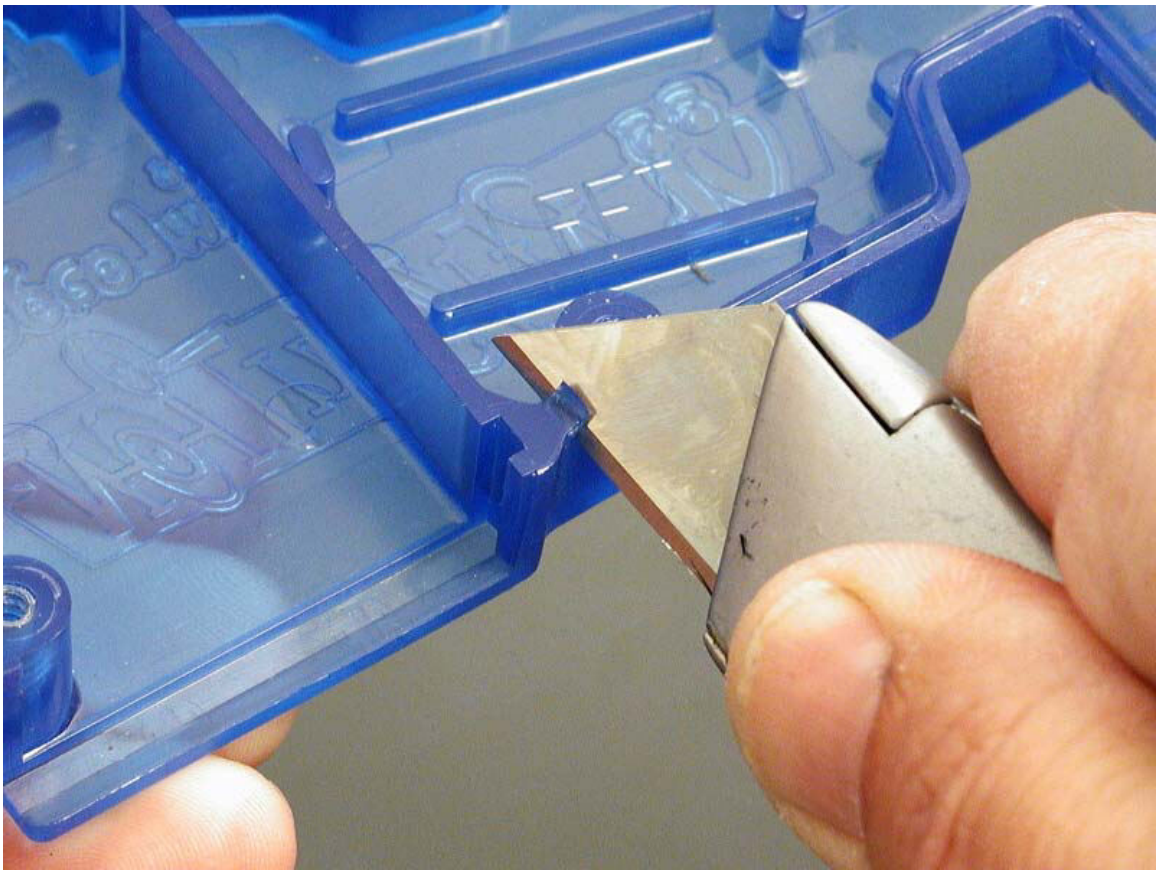


Note that it’s the terminal opposite the switch as shown here.

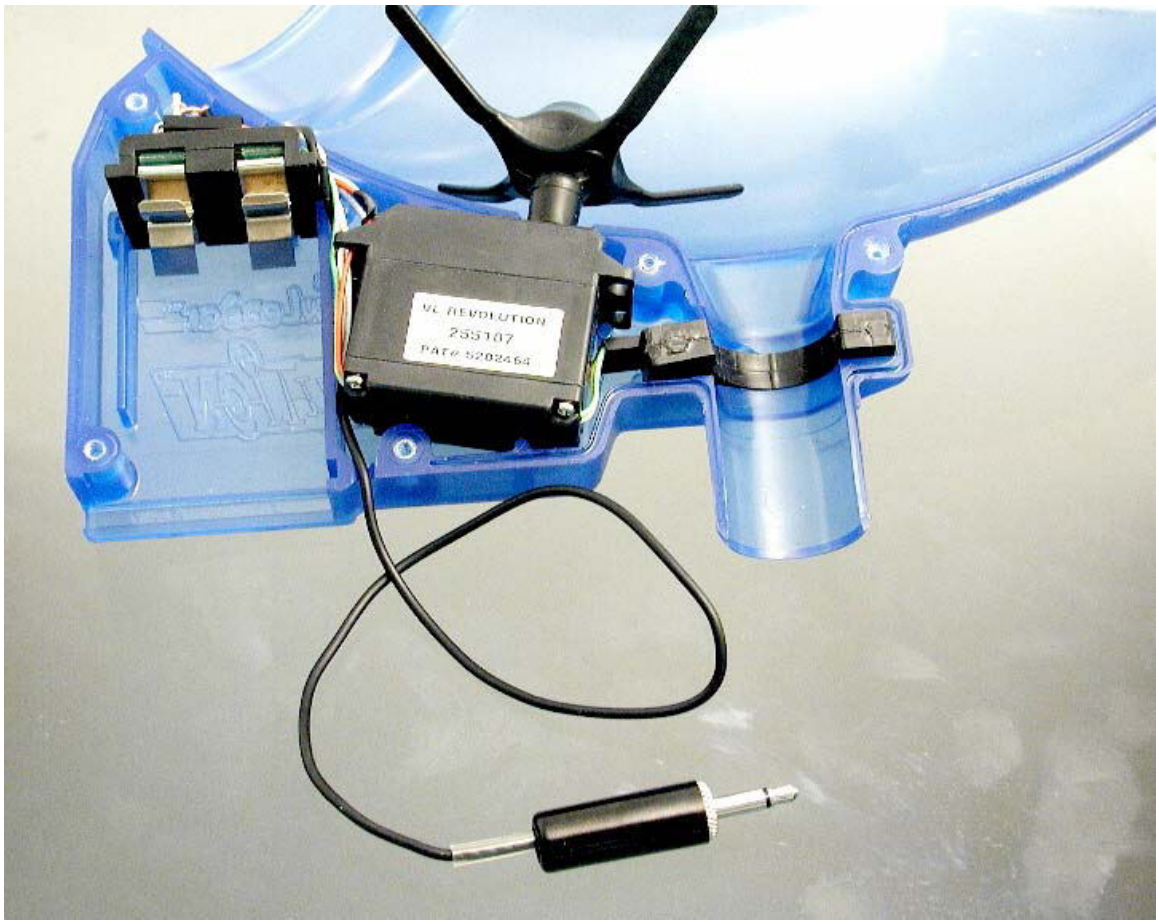


Twist the excess up

With your knife you will need to make a small notch on the bottom of the Rev. Case for the cable to exit . We made one just on the other side of the battery compartment wall.



Make the notch just smaller than the cable for a snug fit.



Connect the plug back into the circuit board and reinstall the guts.

Your finished Intelliframe system!! For help and to see how other people are using the Intelliframe, please visit AGD's forum www.automags.org. There are hundreds of people there that will answer your questions including factory techs.

www.airgun.com
www.automags.org
Airgun-UK

Email to: office@airgun.com
Office hours:
9:00 am - 5:00 pm
(Central Time)
TUESDAY through Friday
Office Tel: (847) 520-7507
Office Fax: (847) 520-7848

Tech Support hours:
9:00 am to 11:30 am,
1:00 pm - 4:30 pm
(Central Time)
Monday through Friday

Tech Support Tel:
(847) 520-7225

WARP FEED Instruction Manual

WARP FEED®
INSTRUCTIONS

Overview

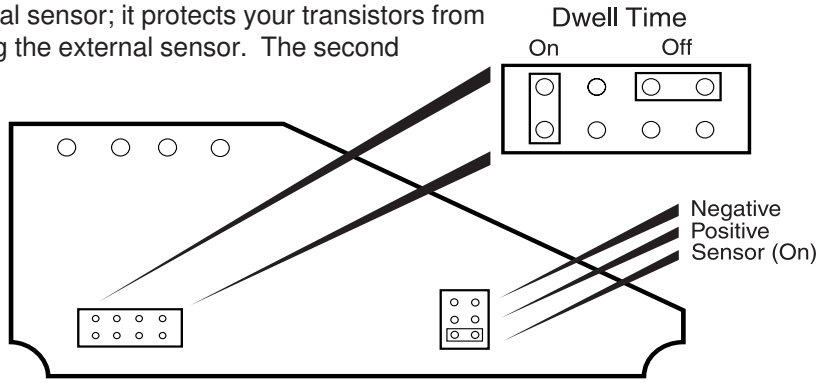
The patent pending Warp Feed® is the world's first universal force-feed system. It is a "friction drive," meaning the drive wheel has friction discs instead of pockets so the balls can never jam or break. When you stop shooting, the feed wheel will harmlessly slip past the balls in the system and then pause, waiting for the next shot. When a "fire" signal comes from the gun, or when the sensor determines the gun has been fired, the motor will spin the feed wheel and push balls into the feed tube. The feed wheel will continue to spin for a preset amount of time that is adjustable. The system uses special MOSFET technology that eliminates the need for an on/off switch. The battery only feeds power to the system when it receives a signal to feed balls. Disconnect your battery for very long storage.

What you need to make it work

When using the Warp Feed the balls are being PUSHED into the breech. Because of this it becomes very important that you use the specially designed Parabolic PowerFeed Plug supplied with your unit if you are mounting it on a PowerFeed gun. The standard PowerFeed Plug will NOT work at all with the Warp Feed. It is just as important that the barrel you are using has a good ball detent system or nubbin. Test this yourself by pushing a ball past the detent; if it offers little or no resistance, the Warp Feed may double feed balls or, worse, cause the second ball in the tube to get chopped.

Jumpers

There are two sets of jumpers on the circuit board, which can be found under the cover plate on the back of the unit. The first jumper has three positions labeled "**–**" (Negative**)**, "**+**" (Positive**)**, and "**sens**" (Sensor). If the gun sends a ground signal or you are interfacing to a switch mounted on the gun, select the "**–**" position. Select "**+**" if the gun on which you are installing the system sends a positive voltage pulse every time the gun is fired or if you have an external vibration sensor plugged into the input jack. The "**sens**" position activates the built in sensor that reacts to the gun's vibration when fired and requires no further interface. This setting works best on guns with blowback; there may have problems with guns that don't have enough vibration. Leave this jumper in place for guns using an external sensor; it protects your transistors from blowing up from high voltages that can be generated by hitting the external sensor. The second jumper has four positions and the unit comes with jumpers in a non-functional storage position on all four. These jumpers control the length of time the feed wheel spins after it gets the signal from the gun. The more jumpers you install the shorter time the wheel will spin. It does not matter which ones you install first because they all shorten the timing an equal amount. You should set the timing so that at your maximum firing rate the wheel spins continuously. Setting this to the minimum timing to get reliable feeding will maximize battery life. Store the jumpers you remove in a safe place in case you need them.



Vibration Sensor

Some versions of the Warp Feed come with either an internal or externally mounted vibration sensor. This sensor allows you to use a variety of non-electronic guns with the Warp. It senses the vibration and rotates the feed wheel. We have included a sensitivity adjustment on the circuit board since all guns vibrate different amounts. This is a one-turn potentiometer that varies the offset voltage and makes the sensor more or less sensitive. To set the adjustment, unscrew the gear cover plate and find the blue potentiometer. To set the system to its highest sensitivity, turn the potentiometer clockwise until the motor spins, then back off until it stops. This should be your most sensitive adjustment, but will likely spin the motor when you don't want it to. Fire your gun and continue to rotate the potentiometer counterclockwise until the Warp starts missing shots. Your best position will be about half way between most sensitive and missing shots.

Run In

The electric motor has carbon brushes that spark when new. The sparking creates electrical noise that looks like the sensor is sending a fire signal. The motor may run continuously when using the sensor system on a brand new Warp adjusted to maximum sensitivity. This will go away after a short run in period. The quickest way to break in your brushes is turn your sensitivity adjustment clockwise until the motor spins, then back it off a little. Let the motor spin as long as it wants and when the brushes break in it will stop on its own in several minutes. Do this several times and you should be ready to go.

Maintenance

Your Warp Feed should require little maintenance, but you should do the following to keep it in top shape:
1) Lubricate the feed wheel, shaft, and gears with any good quality grease; 2) Replace the oring drive belt once or twice a year to maintain reliable operation; 3) Occasionally clean the inside of the case to prevent build up of grime that may interfere with the gearing.

Batteries
The Warp Feed offers several options for battery power. The unit comes with a battery clip for four AA batteries, which delivers six volts. This should be sufficient to feed most standard guns and is the best battery value. Higher voltages will spin the feed wheel faster allowing for very fast firing rates. If the six-volt clip does not keep up with your gun, it can be replaced with a nine-volt alkaline battery, which keeps up with feed rates of well over 10 BPS. We suggest you hold a spare 9-volt battery in the compartment next to the one you are using; the spare will come in handy if you lose power on the field. There is an optional rechargeable battery pack that puts out 10 volts, see your dealer for availability. Never put more than 12 volts into the system! Doing so will blow the board. There is no on/off switch because the components are all voltage controlled and use very little current. The battery will drain about 4 volts per month so disconnect it for long term storage.

Feed Tube
The Warp Feed comes supplied with a length of feed tube and two feed tube adapters. One adapter fits into the front port of the Warp Feed and the other fits on the bottom of the PowerFeed Tube. Use a razor to cut the feed tube slightly longer than needed and force it all the way into the adapters. Try mounting it on the gun; if it's too long trim the feed tube and try again. Make sure the feed tube is forced all the way inside the adapters for best performance. We have eliminated the elbow because it slows the ball feed down.

Hopper
We only recommend an agitator loader such as the Viewloader® series of loaders. These are the only loaders capable of keeping up with today's high firing rates. The Warp Feed body must be mounted far enough out from the gun to clear the feed tube but can be modified to fit closer to the gun. To fit the loader in tight requires a high temperature heat gun; heat up a small section of the loader and your gun barrel to form a dent in the side of the loader to clear the Warp's feed tube. See www.airgun.com for detailed information on this process or see your qualified air smith.

Lefties
For left handed shooters simply reverse the mounting plate and mount the Warp Feed on the other side of the gun.

Automag Bodies
For best results use the specially designed Warp Feed body from Airgun Designs. See your dealer about purchasing a new body for your 'Mag. If you're a right handed player; the Hopper Right PowerFeed Body will work too. See your dealer about the Extended Parabolic PowerFeed Plug that will fit into the long end of the feed tube and allow the Warp Feed to push balls into the lower end of the feed tube. Vertical feed and hopper left bodies may work if you extend the feed hose, but we do not guarantee the performance. Contact Pro-Team Products at (904) 437-3375 for special adapters and mounts for a wide variety of guns.

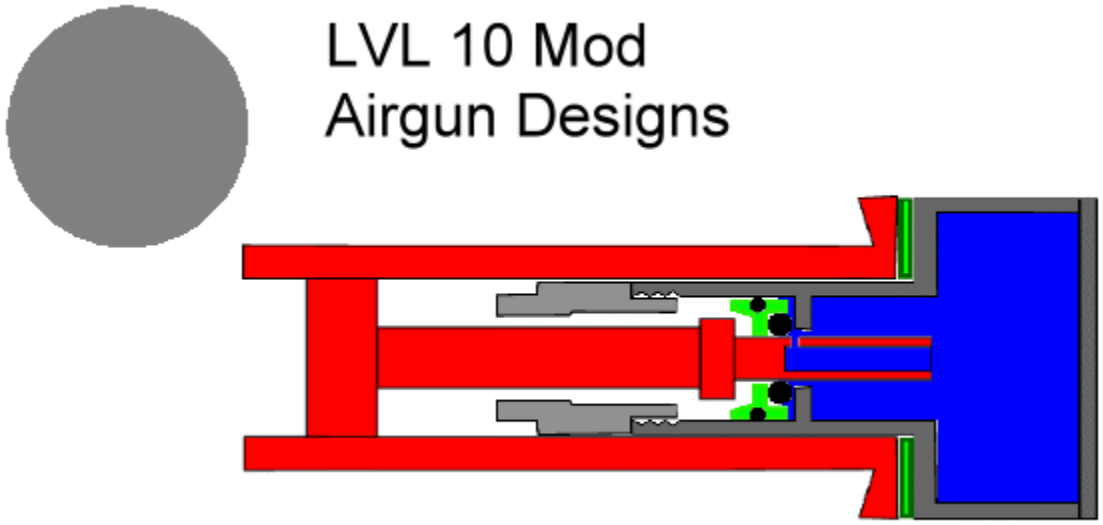
Level 10 Guide

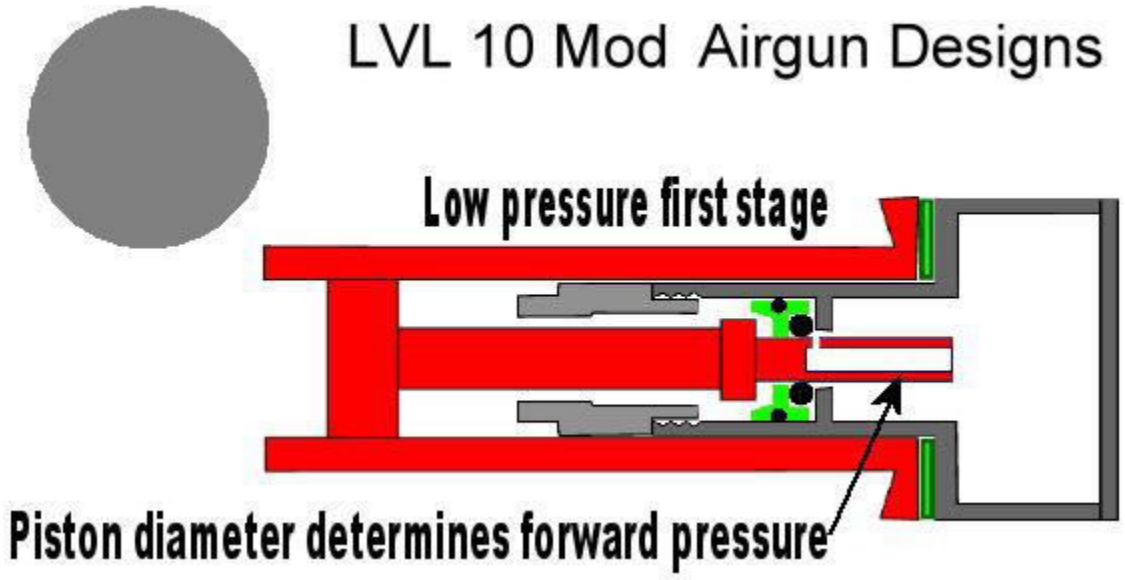
New from Airgun Designs - the Level 10 Mod - for all AGD Markers!
AGD has been hard at work, refining the performance of their Automag line of markers. What they came up with is the new Level 10! Level 10 replaces the stock bolt and power tube tip with the newly redesigned Superbolt II and power tube tip assembly kit. With the kit properly tuned, your Automag bolt will bounce off of even the most brittle of tournament paint! Kits work on all AGD markers, including the Automag, MiniMag, RT, RT Pro, and E-Mag.

This page is your one stop resource for information on what the new Level 10 does, how it works, and how to set it up properly.

How Does it Work?

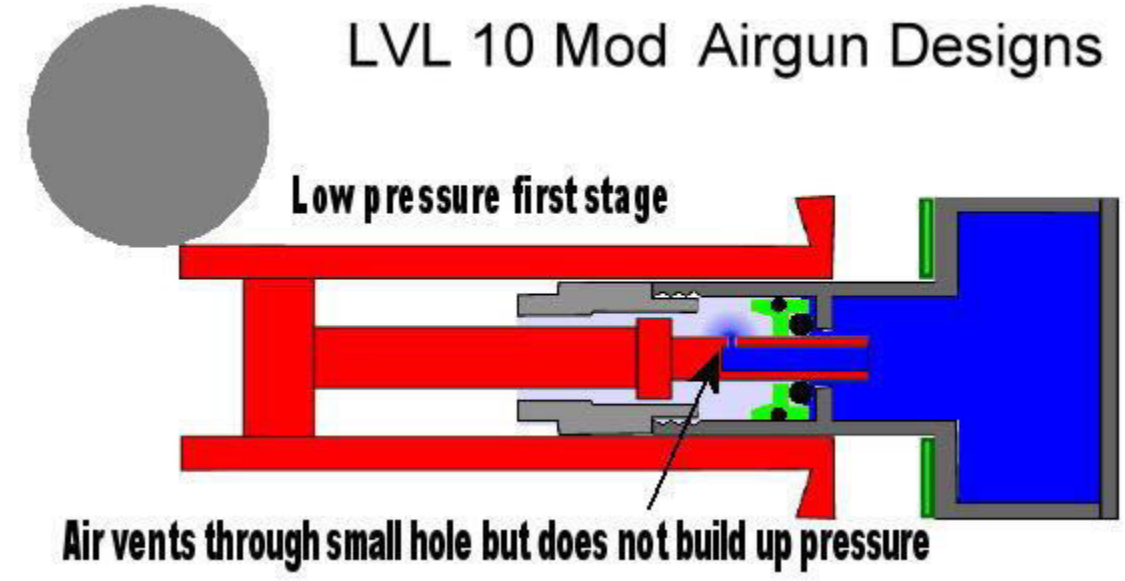
Here is a simplistic animation of how the Level 10 mod works. The main spring is eliminated for simplicity.





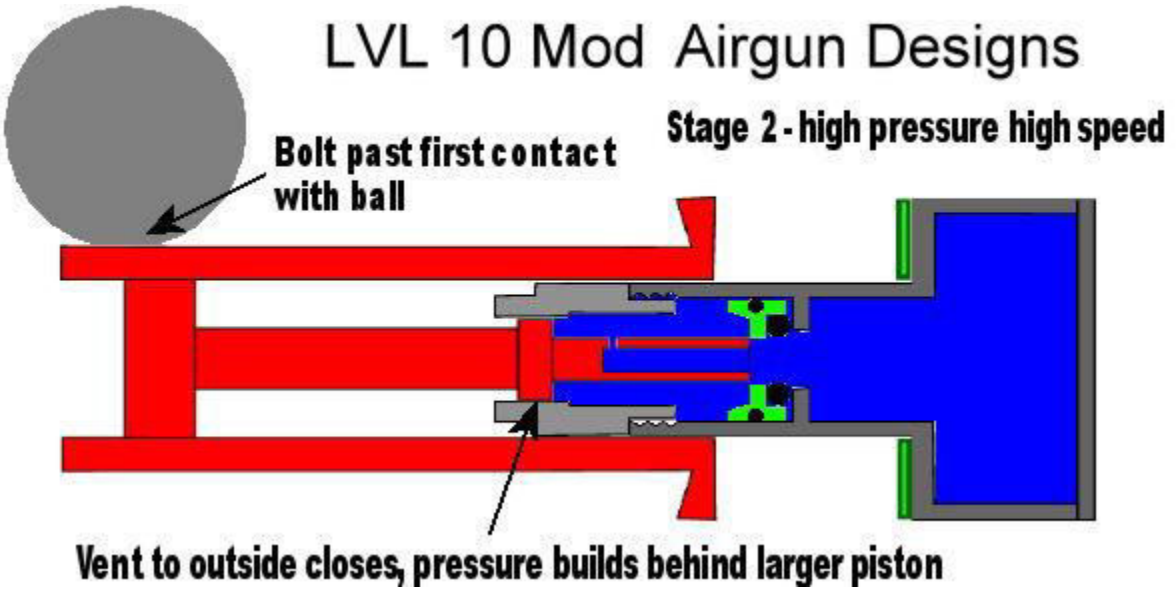
The above image shows the slow speed, low pressure phase of the bolt stroke. It is very slow - about 4-6 FPS (as compared to 20 FPS for the Level 7 valve). This slow speed and low pressure makes sure the bolt will pinch rather than chop a paintball. There is an additional advantage - the slow moving bolt does not crack or bobble the ball waiting to go in.

A smaller diameter (as compared to the level 7) power piston gives the pressurized air within the chamber less area to push against. This, combined with a stronger bolt mainspring gives us the slow initial bolt force & acceleration.



As the bolt starts its initial travel, the small vent hole in the power piston moves past the power tube o-ring. As it does so, the hole begins to vent a small amount of air which leaks out through the power tube tip, as shown in the image below. The amount of air venting is miniscule and has a very minor effect upon gas efficiency.

Why do we have the vent? If a paintball is partially in the breech, the slow moving bolt will stop on the ball, rather than chopping through it. When the bolt stops on the partially fed paintball, the power piston vent allows the pressurized gas in the air chamber to escape. Once enough air pressure escapes, the bolt spring pushes the bolt back and recocks the marker. Also at this time, the paintball drops the rest of the way into the breech and the marker is set to fire once again.



Above we show the second stage of bolt acceleration which starts after the bolt gets past the ball stack. During this acceleration stage, the end of the power piston moves completely past the power tube o-ring. This allows pressurized air to flow into the power tube where it pushes against the larger diameter section in the middle of the power piston. At this point, the bolt accelerates to full speed - approximately 15 FPS. It is at this point where the valve goes to full power - loading the paintball into the barrel, firing, and retracting the bolt.

This second acceleration stage is very important - it allows us to maintain the high firing rate of the marker. If the bolt continued to travel at the same speed it would severely limit the firing rate. The animation at the top does not properly show the speed increase.

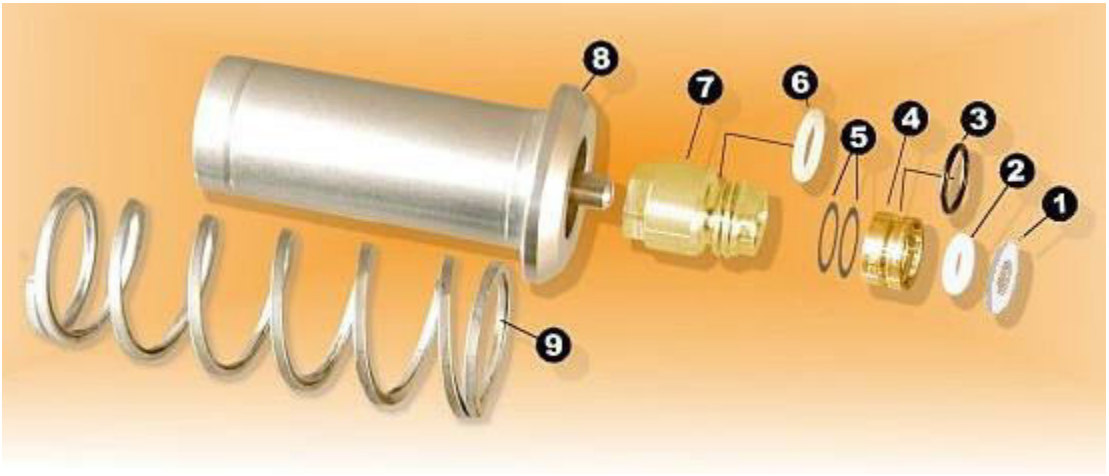
Top

Superbolt II Cutaway and Information

Here is a cutaway showing how the new Superbolt II is lightened . Note that the wall is much thinner now but still has great strength because it's stainless. To see how much was cut away look at the rear end where it gets thicker back to original size. Radiused edges were also added. This all stainless, never wear out version only weighs 8% more than the original Superbolt. It weighs in at 1.16 oz and is in contention for the lightest reciprocating bolt in a paintball gun. That also means less kick!!

Top

Fast Start Assembly Instructions



Parts List:

1. Backing washer
2. Power tube o-ring
3. Carrier O-ring
4. Carrier
5. Shims

6. Power tube O-ring
7. Power tube tip
8. Superbolt
9. Main spring

From experience, AGD has put together these quick set of instructions that should be a good starting point for you to your Level 10 Mod up and running. For more detail instructions, see below.

1. Take the guts out of your power tube and put them in a bag along with your old bolt.

2. Install the backing washer (1)

3. find the carrier (4) that has two grooves cut in it and install a power tube O-ring (2) and lightly lubricate the power tube oring and the black carrier O-ring (3)

4. Using the end of a pen cap push the carrier, O-ring first, into the power tube.

5. Drop in TWO shims (5) and make sure they are sitting flat.

6. Holding the valve upright, screw in the power tube tip (7) and tighten.

7. Find the middle length bolt spring (9). This one can be identified because it has one coil cut off the end. Put the end with the coil cut off on the bolt first so the end without the coil cut off is hanging off the end of the bolt.

8. install the bolt on the valve, assemble into the marker and gas up.

9. The marker may or may not be leaking down the barrel. If the marker does not shoot, turn up the velocity until it does so consistently every time you pull the trigger. Fire the marker a few hundred times to wear in the O-ring while you let it leak.

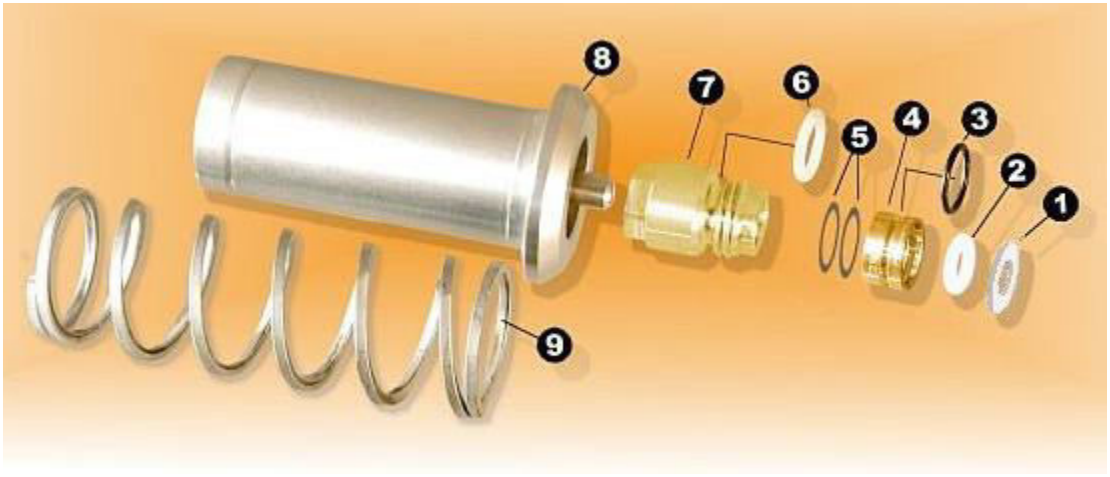
10. Now that you have the O-ring settled in, switch to the next size smaller carrier until the marker stops leaking down the barrel.

11. Set your velocity to 280-300 and you should be good enough to use the marker as is.

This configuration should get you working and out on the field. The next step in fine tuning is to switch to the longest spring and see if you can get the marker firing reliably in the 280-290 fps range with that spring.

Top

More Detailed Assembly Instructions



Parts List:

1. Backing washer
2. Power tube O-ring
3. Carrier O-ring
4. Carrier
5. Shims
6. Power tube O-ring
7. Power tube tip
8. Superbolt
9. Main spring

How to Install and Setup your LVL 10 Kit - Ver 1.0

Remove parts First remove your valve system, unscrew the power tube tip with a coin and take out all the parts from inside the power tube. Put them together with the bolt in a bag and save them. If you ever have problems you can switch back.

Install backing washer
While referring to the LVL 10 parts diagram, first place the backing washer (1) into the bottom of the power tube. Make sure it's sitting flat on the bottom. Its made from delrin and should go in a little tight and stay there. This washer prevents the new smaller O-ring from getting pushed into the air chamber.

O-ring inside carrier
Pickup one of the brass O-ring carriers (4) and push a power tube O-ring (2) into the end that does not have a tapered hole. It should not go in one side and either slide in or press into the correct side. There are 5 carriers supplied with your kit, each one is a little bigger than the next. They each have small grooves on the outside to help you tell them apart. The more grooves the larger the carrier.

Tune the carrier to the bolt and O-ring
Each batch of o-rings is a little different than the last. In order to compensate for this we need to find the proper size carrier. The idea is to get a good seal with as little friction as possible. Take the carrier with the O-ring installed and push it O-ring first onto the pin sticking out the back of the bolt. If it pushes on too hard then go to a larger carrier, if it slides freely on the pin then go one smaller. The proper fit should be just snug.

Install the O-ring carrier
Lightly lubricate the black O-ring (3) on the outside of the carrier. Push the carrier, O-ring first, into the power tube. Use the blunt end of a plastic pen to fully seat the carrier into the bottom of the power tube. When looking down into the power tube you should NOT see the white power tube O-ring (2).

Install the power tube
tip Next install the new power tube tip (7) it should already have the power tube tip O-ring installed from the factory (6). These new tips have wrench flats to tighten the tips. DO NOT OVERTIGHTEN!! Notice that we did NOT put in the shims (5) at this time.

Test the O-ring carrier
Now slide on your new Superbolt II with your original main spring (not one of the new ones) then reassemble the valve into the marker. Gas the marker up as see if it leaks. If it does leak use your finger or a squeegee to push the front face of the bolt around while its leaking. If the leak changes tone then it's most likely the wrong O-ring carrier (4) and you have to go to the next one tighter. If it doesn't leak you have the right carrier and can proceed to the next step.

Shim adjustments
Put a squeegee right in front of the bolt and pull the trigger. With very little clearance between the bolt and squeegee you will notice that the bolt comes forward and just stops on the squeegee. Then nothing else happens. Pulling the trigger does nothing to reset the bolt. In order to get the bolt to reset when it pinches a ball, we have to let the air out of the air chamber. The shims (5) control where in the forward stroke the air chamber starts venting. Its works a lot like the spacers in the original Mags. We left them out before so you could tell the difference between a carrier leak and a shim leak.

Remove the power tube tip (7) and drop in two shims (5). Make SURE they are sitting flat in the bottom of the power tube before you screw the power tube tip on otherwise you will bend them up. Bent shims are useless and you will have to buy more. Reassemble the valve system as before using the original main spring and new Superbolt. Now when you air up the marker it should not leak but when you do the squeegee test you will notice that the air starts venting when the Superbolt moves forward. If you keep adding shims eventually the bolt will just leak all the time. For most people two shims work just fine. If you find that when you pinch a ball the marker locks up and does not reset then add another shim.

Main spring tuning
You are almost finished now. You have probably noticed that when you used the original main spring the bolt came forward with less force than usual but still had enough to chop a ball. The pin in the middle of the bolt is called the Power Piston, it acts like a cork to seal the air chamber. Just like a cork,

it's being pushed out by the air pressure but the sear holds it in. When you fire the marker, the bolt is getting pushed out by the air chamber pressure but the mainspring is pushing BACK against the bolt at the same time. The level 10 modification reduces the size of the "cork" so the main spring has an easier time holding it back. If you put a big enough main spring on the bolt and it will not fire at all!!

The last thing to do is find the right main spring that pushes back hard enough on the bolt but not so hard that the marker does not fire. The right main spring will depend on many things such as what velocity you are shooting, what barrel you are using, the size of your paint etc. Start with the longest mainspring (9) from the LVL10 kit, assemble the valve with it and gas the marker up. Try firing, if it doesn't fire, turn up the velocity until it does. Turning up the velocity is normal for Level 10 tuning it does not mean anything is wrong. If the marker starts venting out the back or the velocity is too high when it does start firing then the main spring is too long.

Switch to the next shorter main spring. There are three mainsprings supplied in your kit. For the AO beta testers we have cut one coil off the longest main spring to make a "middle" spring. This spring looks funny on one end like it's missing a coil (cause it is) put that end on the bolt first so the good end is sticking out. In our experience either the longest or the middle main springs make the Level 10 config work on all the markers we have tested. If you need to shoot 250 fps for indoor you need to go back to the original main spring.

Fine tuning

For most people the setup outlined above will make every paintball day a great experience. For those looking to get maximum anti chop with fragile tourney paint we offer the following suggestions. The O-ring friction can be used to additionally slow the bolt down. By going to the next smaller carrier you add an additional layer of protection at the expense of risking bolt stick. You must keep your marker oiled daily to keep it working reliably. The long mainspring can be trimmed to further fine tune the performance. The best performance comes when the marker just starts firing at 270 fps and works reliably at 290 fps.

The penalty for over tuning is the fact that the marker may occasionally refuse to fire. This is because the main spring combined with the power tub O-ring has too much sticktion to let the bolt go forward. Try at your own risk.

That's it! Your new Level 10 marker is ready to go!!

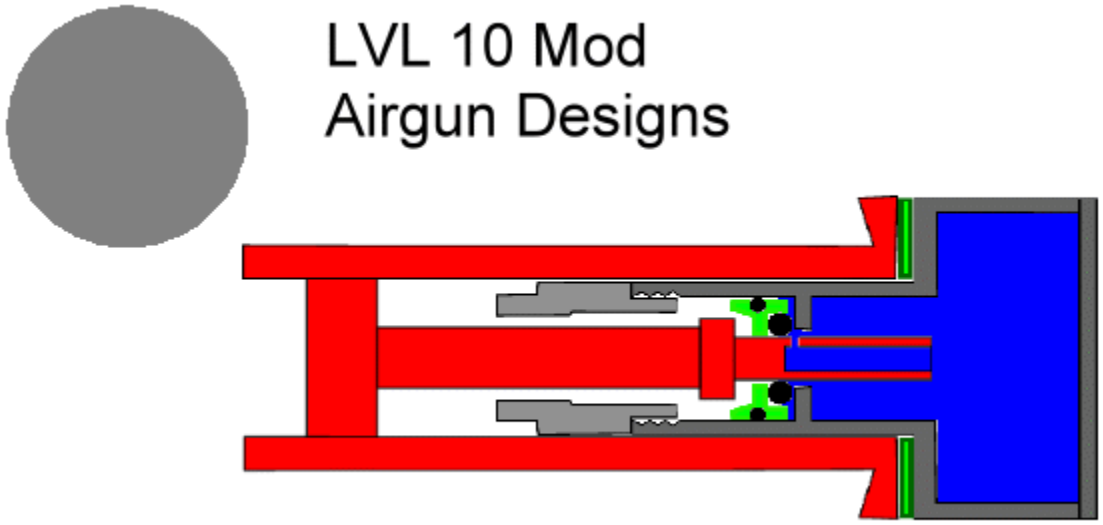
Level 10 Guide

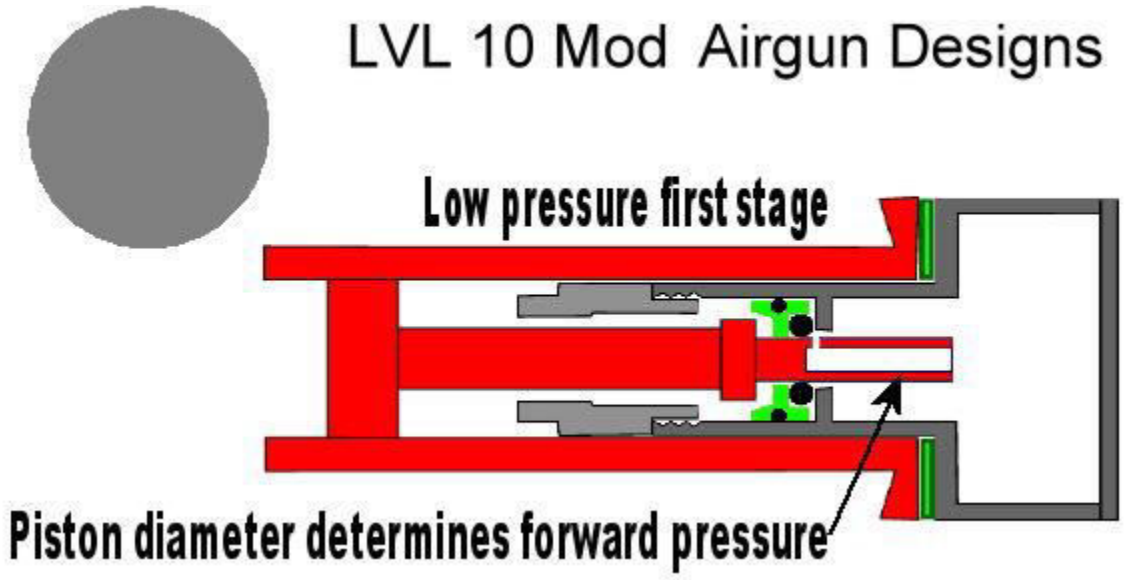
New from Airgun Designs - the Level 10 Mod - for all AGD Markers!
AGD has been hard at work, refining the performance of their Automag line of markers. What they came up with is the new Level 10! Level 10 replaces the stock bolt and power tube tip with the newly redesigned Superbolt II and power tube tip assembly kit. With the kit properly tuned, your Automag bolt will bounce off of even the most brittle of tournament paint! Kits work on all AGD markers, including the Automag, MiniMag, RT, RT Pro, and E-Mag.

This page is your one stop resource for information on what the new Level 10 does, how it works, and how to set it up properly.

How Does it Work?

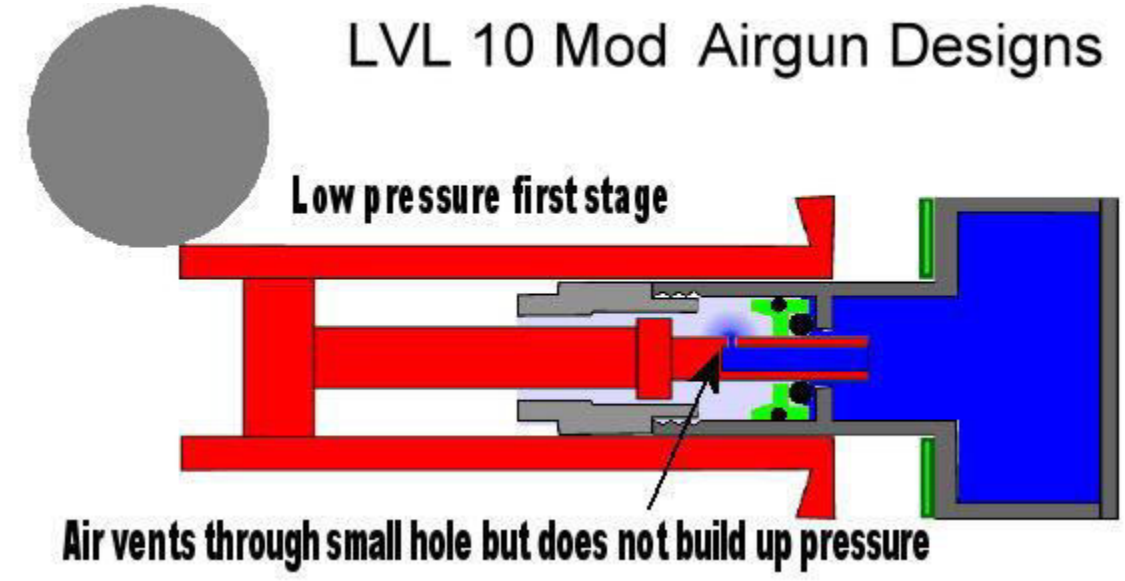
Here is a simplistic animation of how the Level 10 mod works. The main spring is eliminated for simplicity.





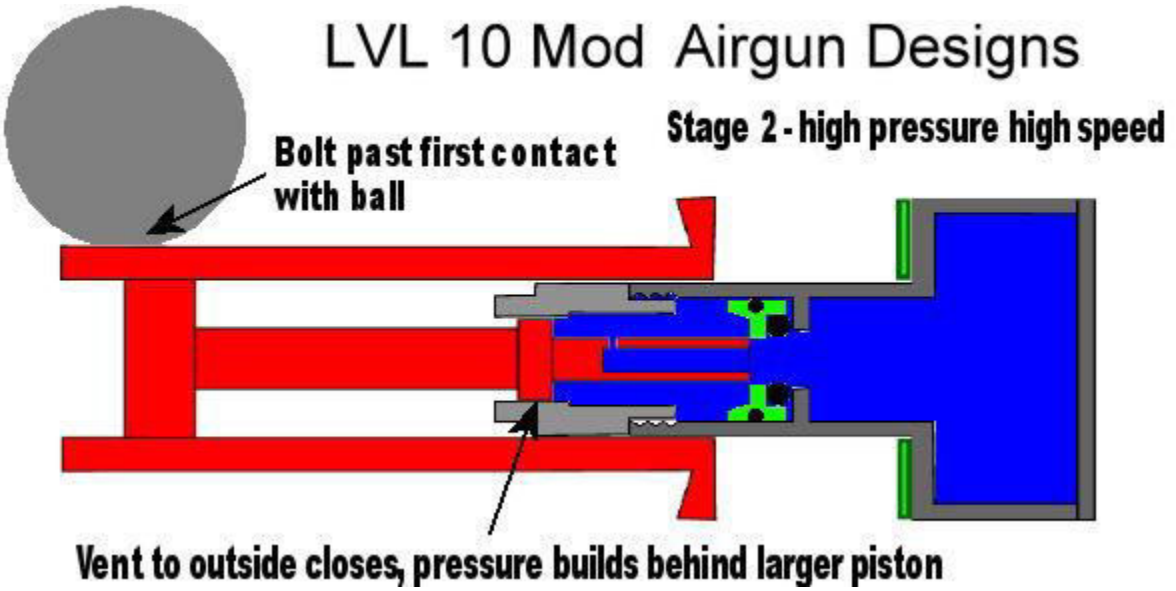
The above image shows the slow speed, low pressure phase of the bolt stroke. It is very slow - about 4-6 FPS (as compared to 20 FPS for the Level 7 valve). This slow speed and low pressure makes sure the bolt will pinch rather than chop a paintball. There is an additional advantage - the slow moving bolt does not crack or bobble the ball waiting to go in.

A smaller diameter (as compared to the level 7) power piston gives the pressurized air within the chamber less area to push against. This, combined with a stronger bolt mainspring gives us the slow initial bolt force & acceleration.



As the bolt starts its initial travel, the small vent hole in the power piston moves past the power tube o-ring. As it does so, the hole begins to vent a small amount of air which leaks out through the power tube tip, as shown in the image below. The amount of air venting is miniscule and has a very minor effect upon gas efficiency.

Why do we have the vent? If a paintball is partially in the breech, the slow moving bolt will stop on the ball, rather than chopping through it. When the bolt stops on the partially fed paintball, the power piston vent allows the pressurized gas in the air chamber to escape. Once enough air pressure escapes, the bolt spring pushes the bolt back and recocks the marker. Also at this time, the paintball drops the rest of the way into the breech and the marker is set to fire once again.



Above we show the second stage of bolt acceleration which starts after the bolt gets past the ball stack. During this acceleration stage, the end of the power piston moves completely past the power tube o-ring. This allows pressurized air to flow into the power tube where it pushes against the larger diameter section in the middle of the power piston. At this point, the bolt accelerates to full speed - approximately 15 FPS. It is at this point where the valve goes to full power - loading the paintball into the barrel, firing, and retracting the bolt.

This second acceleration stage is very important - it allows us to maintain the high firing rate of the marker. If the bolt continued to travel at the same speed it would severely limit the firing rate. The animation at the top does not properly show the speed increase.

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Superbolt II Cutaway and Information

Here is a cutaway showing how the new Superbolt II is lightened . Note that the wall is much thinner now but still has great strength because it's stainless. To see how much was cut away look at the rear end where it gets thicker back to original size. Radiused edges were also added. This all stainless, never wear out version only weighs 8% more than the original Superbolt. It weighs in at 1.16 oz and is in contention for the lightest reciprocating bolt in a paintball gun. That also means less kick!!

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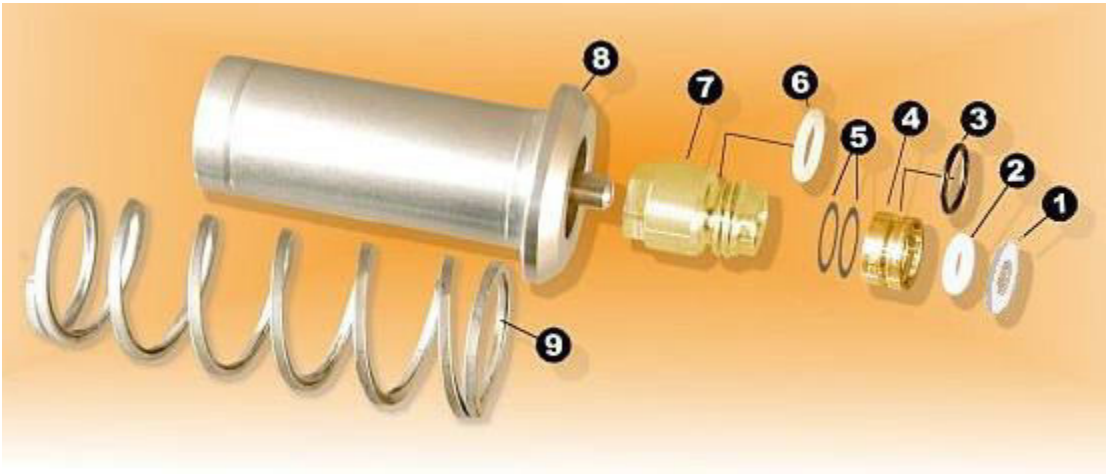
Fast Start Assembly Instructions



Parts List:

1. Backing washer
2. Power tube o-ring
3. Carrier O-ring
4. Carrier
5. Shims

6. Power tube O-ring
7. Power tube tip
8. Superbolt
9. Main spring

From experience, AGD has put together these quick set of instructions that should be a good starting point for you to your Level 10 Mod up and running. For more detail instructions, see below.

1. Take the guts out of your power tube and put them in a bag along with your old bolt.

2. Install the backing washer (1)

3. find the carrier (4) that has two grooves cut in it and install a power tube O-ring (2) and lightly lubricate the power tube oring and the black carrier O-ring (3)

4. Using the end of a pen cap push the carrier, O-ring first, into the power tube.

5. Drop in TWO shims (5) and make sure they are sitting flat.

6. Holding the valve upright, screw in the power tube tip (7) and tighten.

7. Find the middle length bolt spring (9). This one can be identified because it has one coil cut off the end. Put the end with the coil cut off on the bolt first so the end without the coil cut off is hanging off the end of the bolt.

8. install the bolt on the valve, assemble into the marker and gas up.

9. The marker may or may not be leaking down the barrel. If the marker does not shoot, turn up the velocity until it does so consistently every time you pull the trigger. Fire the marker a few hundred times to wear in the O-ring while you let it leak.

10. Now that you have the O-ring settled in, switch to the next size smaller carrier until the marker stops leaking down the barrel.

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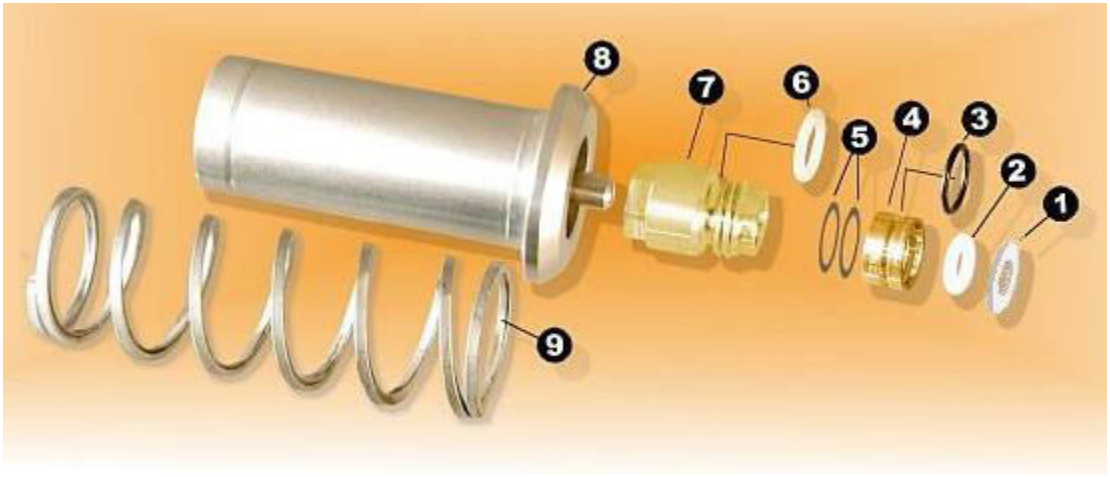
More Detailed Assembly Instructions



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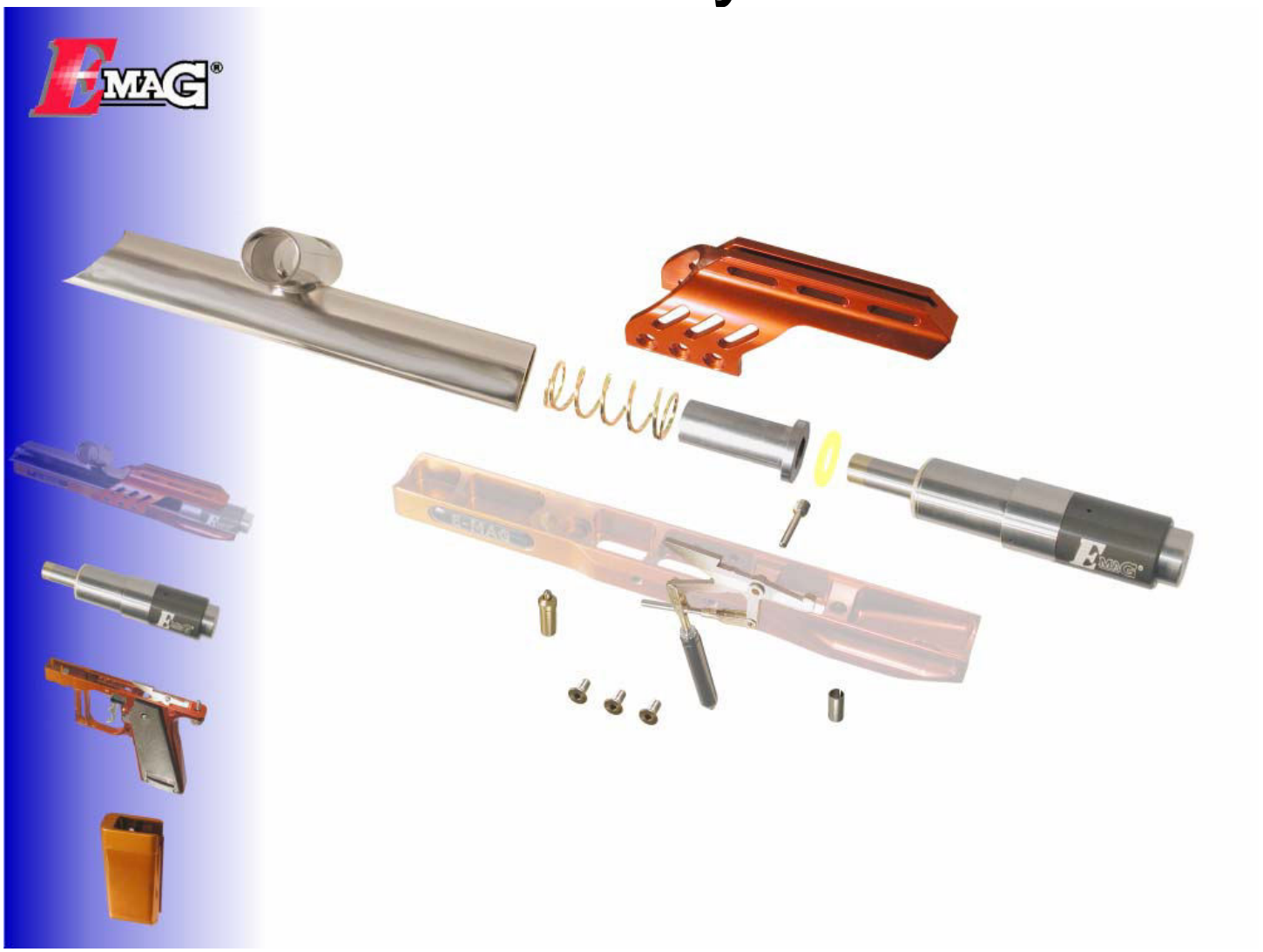
E-Mag Exploded View

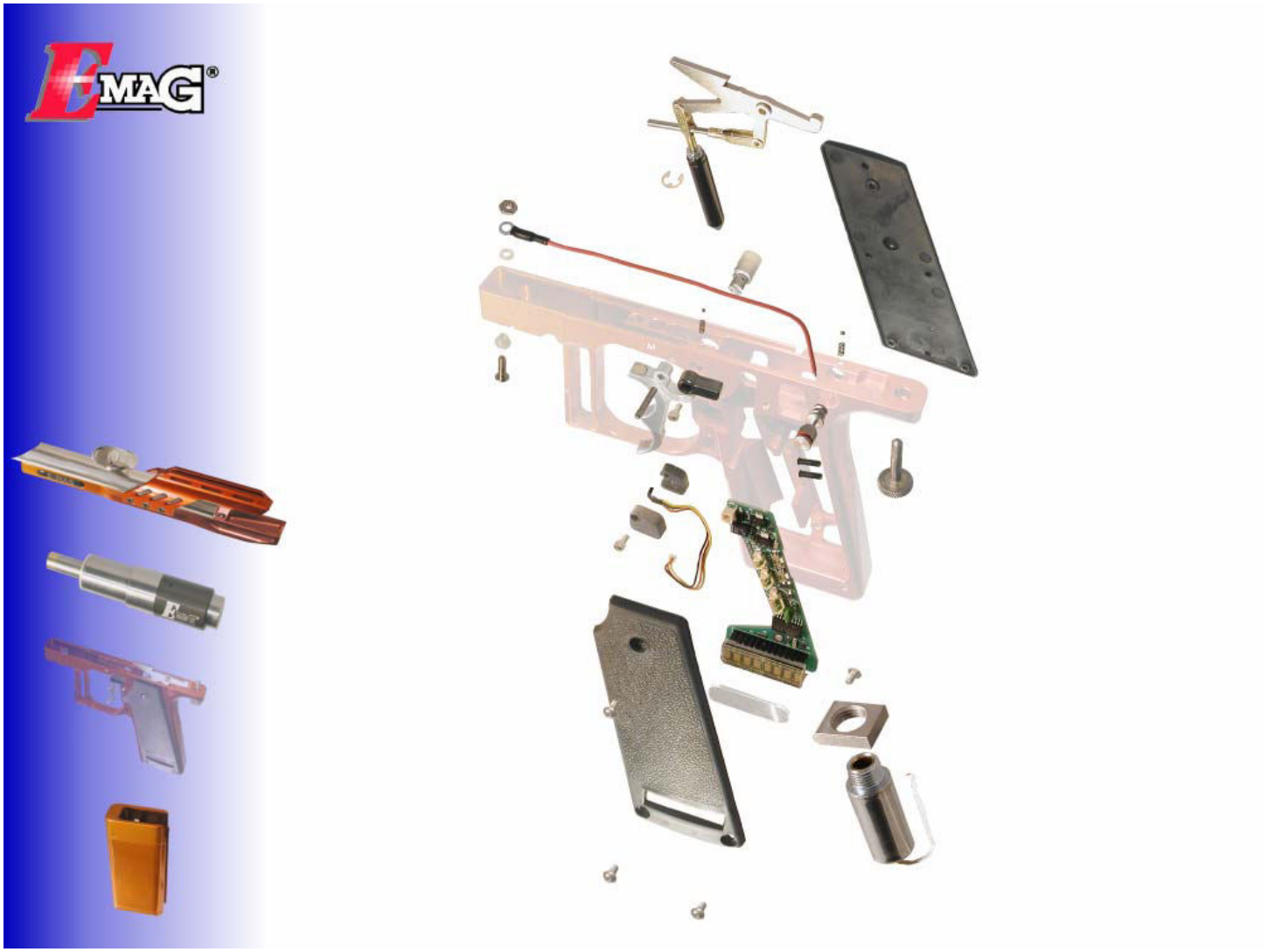
click on image

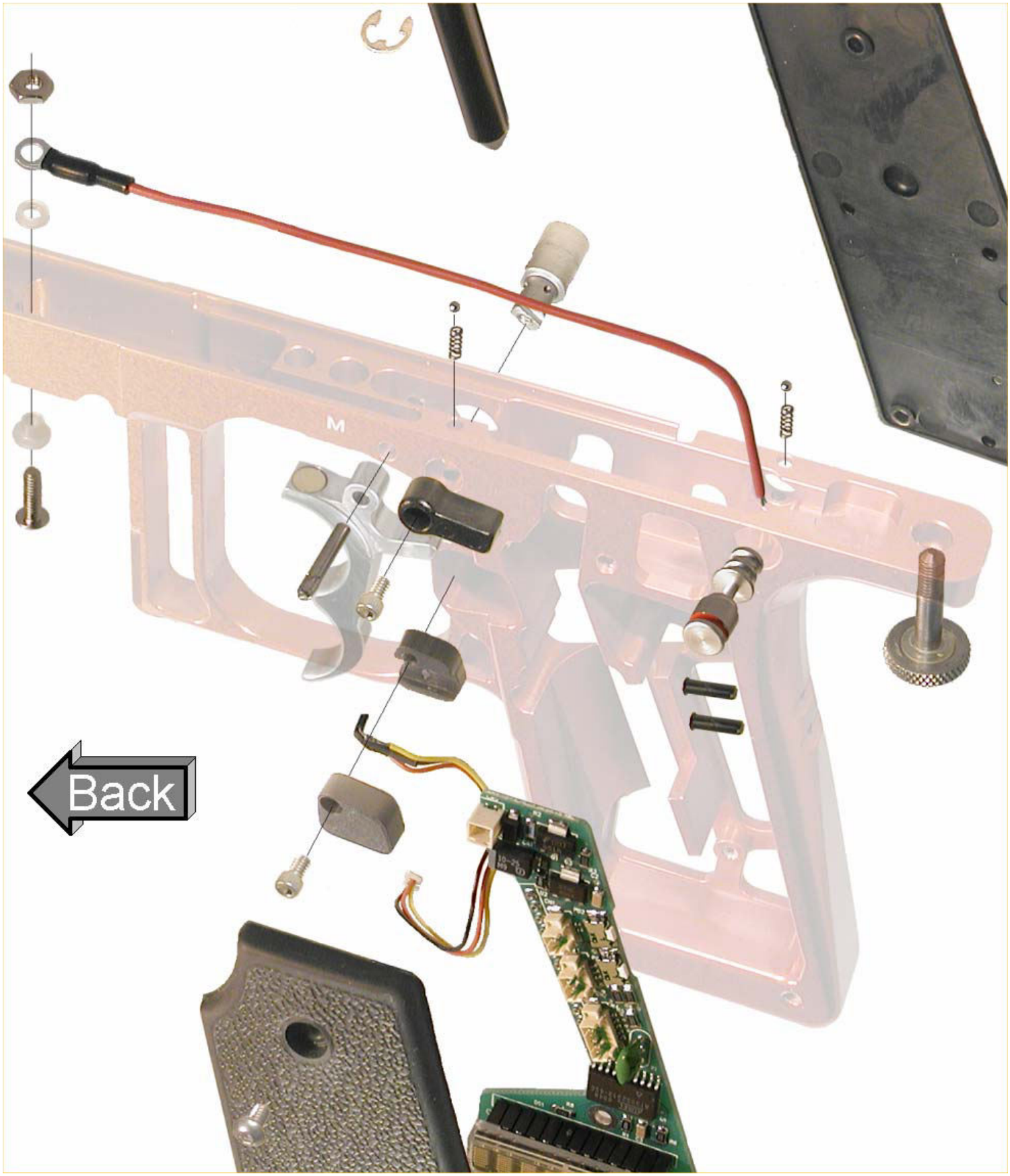
Rail and Main Body



Valve, Bolt, and Spring

Frame and Electronics

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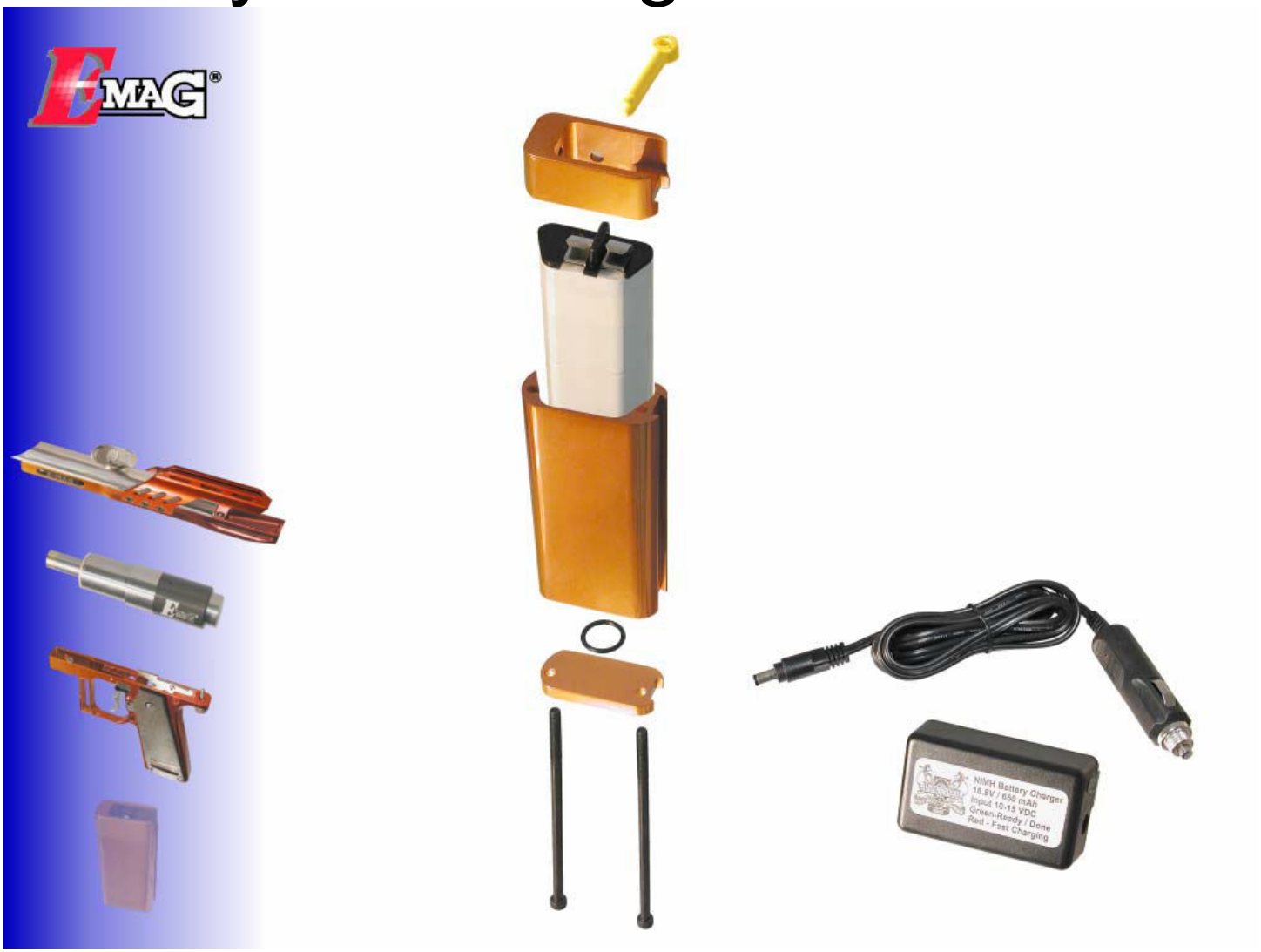
Battery and Charger



E-Mag Rail
Part #1410

Available in black only.

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Twist Lock Assembly
Part #223

Assembly that holds the barrel in.

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Rail Bushing
Part #129

The grip frame and rail are held in alignment with this bushing. It goes in the field strip screw hole.

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Sear Assembly
Part #1386

The entire sear assembly for the E-mag. Comes pre-adjusted for trigger rod length and solenoid plunger position.

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Sear Axle Pin
Part #775

Screws in the side of the marker into the sear bushing.

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Sight Rail
Part #1392

Comes in black only.

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Sight Rail Screw
Part #770

Very short flat head screws. Do not use hardware store screws; they might hit the sear.

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Main Body (Hopper Left)
Part #1414

See the Main Body page under Upgrades for a complete selection.

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Grips
Part #1297

Rubber E-mag grips, sold by the pair.

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Grip Screw/ Solenoid Mount Screw
Part#1307

Grip screws, three per side. Also used to hold the solenoid mount in place.

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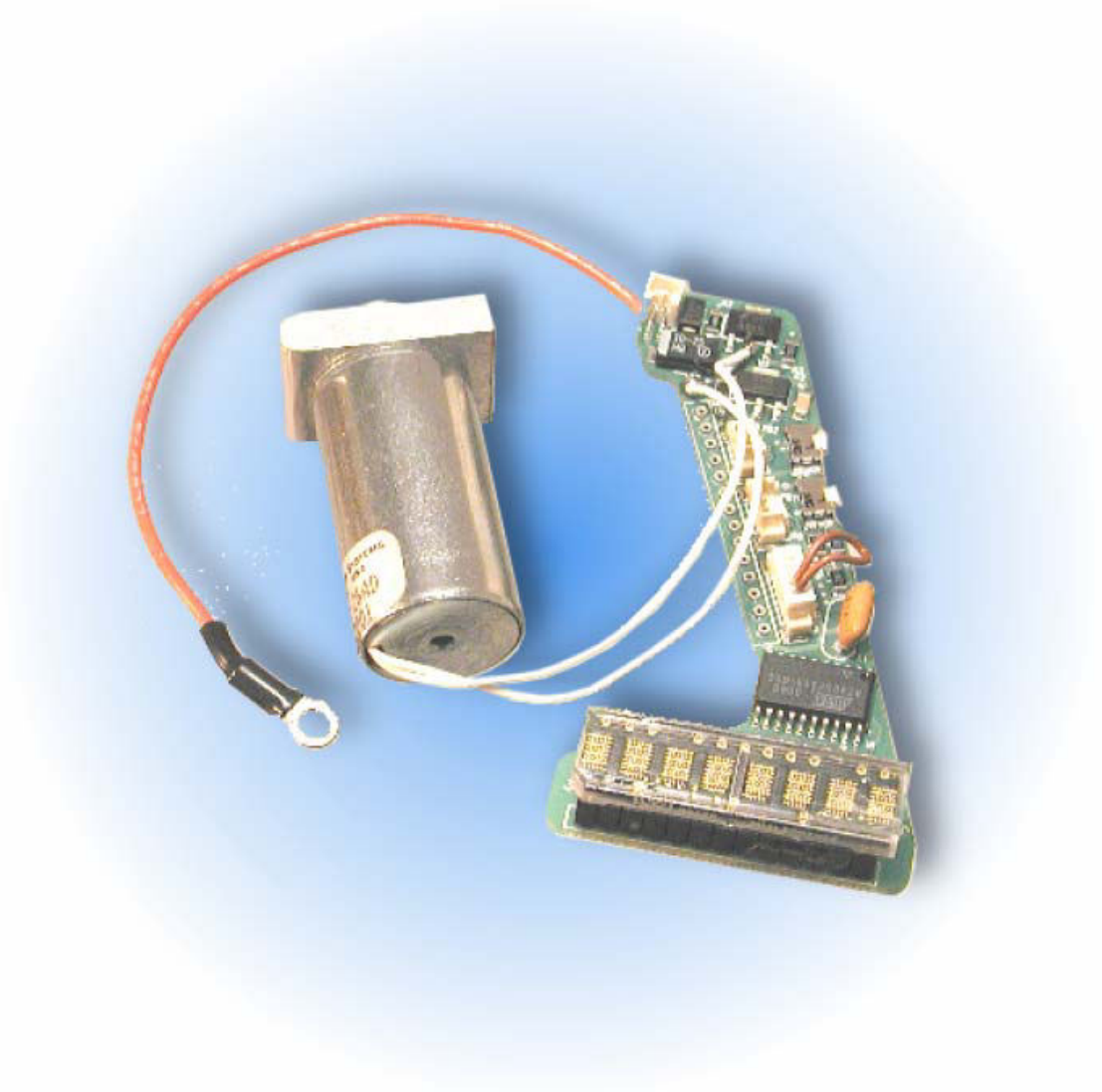
PCB and Solenoid Assembly
Part #1639



PC board and solenoid as one ready to go assembly. Comes pre programmed too!

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Extender Button
Part #1394

The little buttons in the back of the grip frame that are used to change the program settings.

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Field Strip Screw
Part #432

The screw that holds in the entire valve assembly.

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Hall Harness
Part #1304

This is the sensor that detects the magnet in the back of the trigger to fire the marker. Comes as a complete assembly.

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Hall Holder/ Bottom
Part #1320

The bottom half of the holder for Hall Effect Sensor.

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Selector Lever Bolt
Part #1309

This bolt holds the selector lever on its shaft.

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Hall Holder/ Top
Part #1422

The top half of the sensor holder.

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LED Window
Part #1316

Window inside of rubber grip that protects the LED display.

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Selector Switch Lever
Part #1321

Selector lever that switches between electronic and manual modes. Connects to selector switch.

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Hall Mount Bolt
Part #1310

Bolt that holds the Hall Effect sensor mounts.

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Selector Switch
Part #1287

This switch controls if the marker is in electronic or manual mode. Be careful when removing this part; there are springs and ball detents under this piece.

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Nylon Bushing
Part #1328

Insulator bushing for the battery contact screw in the front of the E-mag grip frame.

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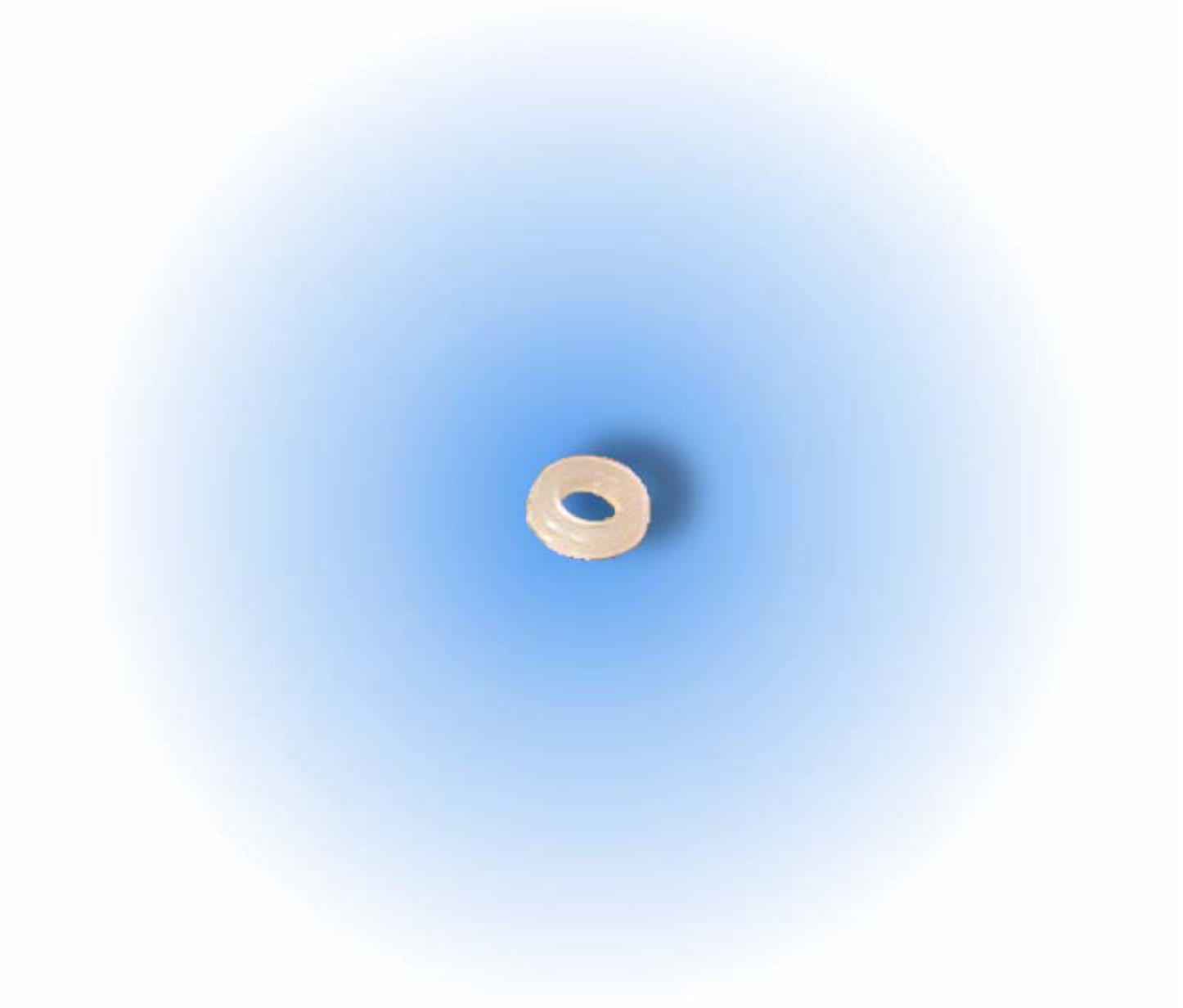
Nylon Washer
Part #1327



This is the other half of the insulator for the battery terminal mounting in the front of the grip frame.

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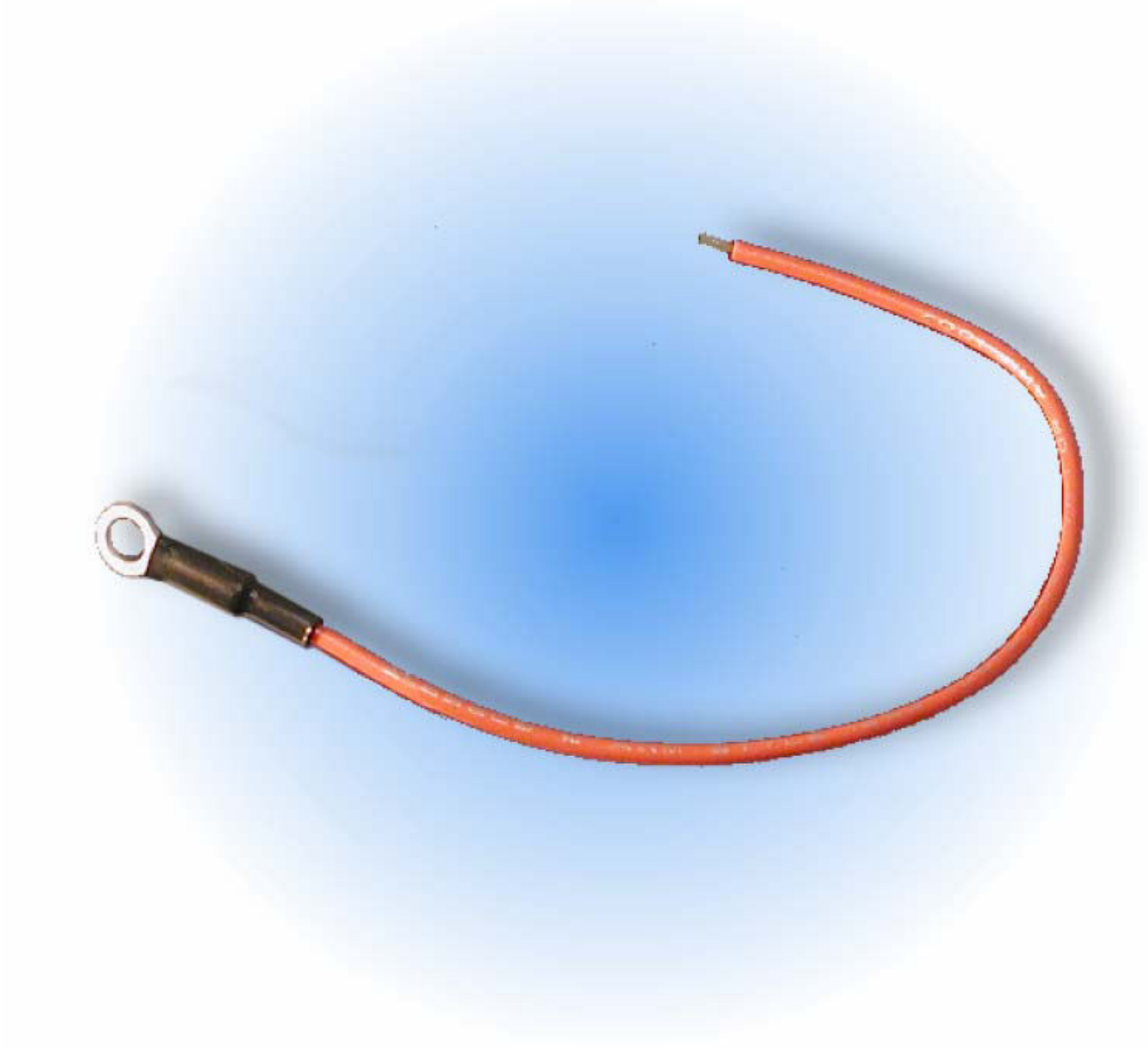
Wire Lead
Part #1594



The power wire from the battery contact bolt in the front of the grip frame to the PC board.

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Positive Terminal Nut
Part #1312

This nut is part of the positive battery contact.

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Positive Terminal
Part #1311

This bolt is part of the positive battery contact and uses the nylon insulators to isolate it from the grip frame.

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Sear Lock
Part #1462

If you are able to see the red line the marker is off safe and will fire. Be careful when removing this shaft; there are springs and ball detents in the frame.

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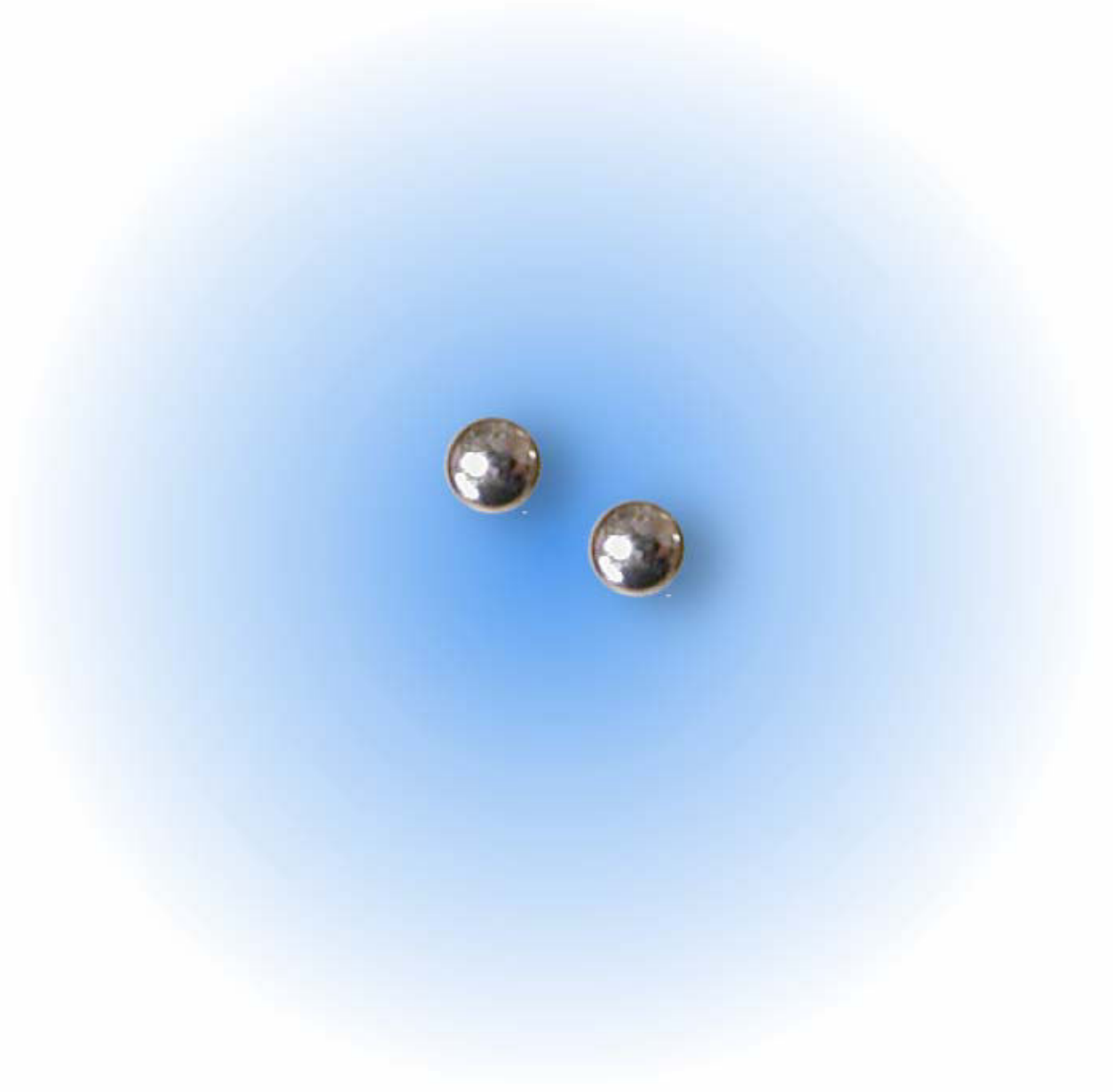
Safety Ball
Part #195



Hard steel ball bearing used as the safety detent.

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Safety Spring
Part #197

Spring that goes under the ball detent in the safety.

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Solenoid E Clip
Part #1470

This clip holds in the solenoid plunger.

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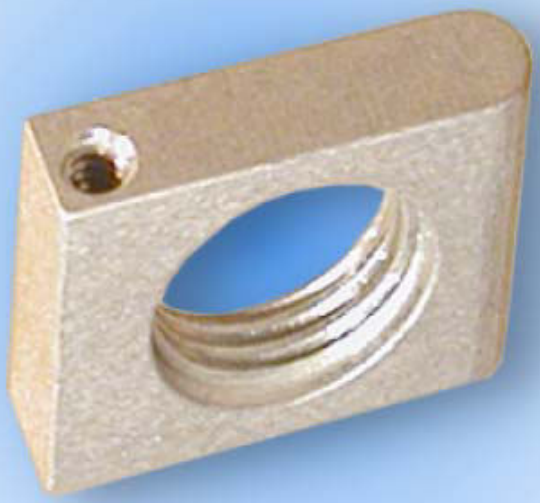
Solenoid Mount
Part #1325



Solenoid screws into this mount and the whole thing slides into the grip frame.

Order Online Now!

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E-Mag Trigger
Part #1411

Entire ready-to-go trigger assembly. Includes magnets. Does not come in colors.

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Back to Top

Magnet (Five Pack)
Part #1313

Super strong rare earth magnet that is used to adjust trigger tension. Take them out for less, add them for more tension.

Order Online Now!

Back to Top

Trigger Pin
Part #1314

The axle for the sear. The original pin needs to be pressed out from the right side of the marker (side without the E-mag logo on valve). The new pin gets pressed in from the left side.

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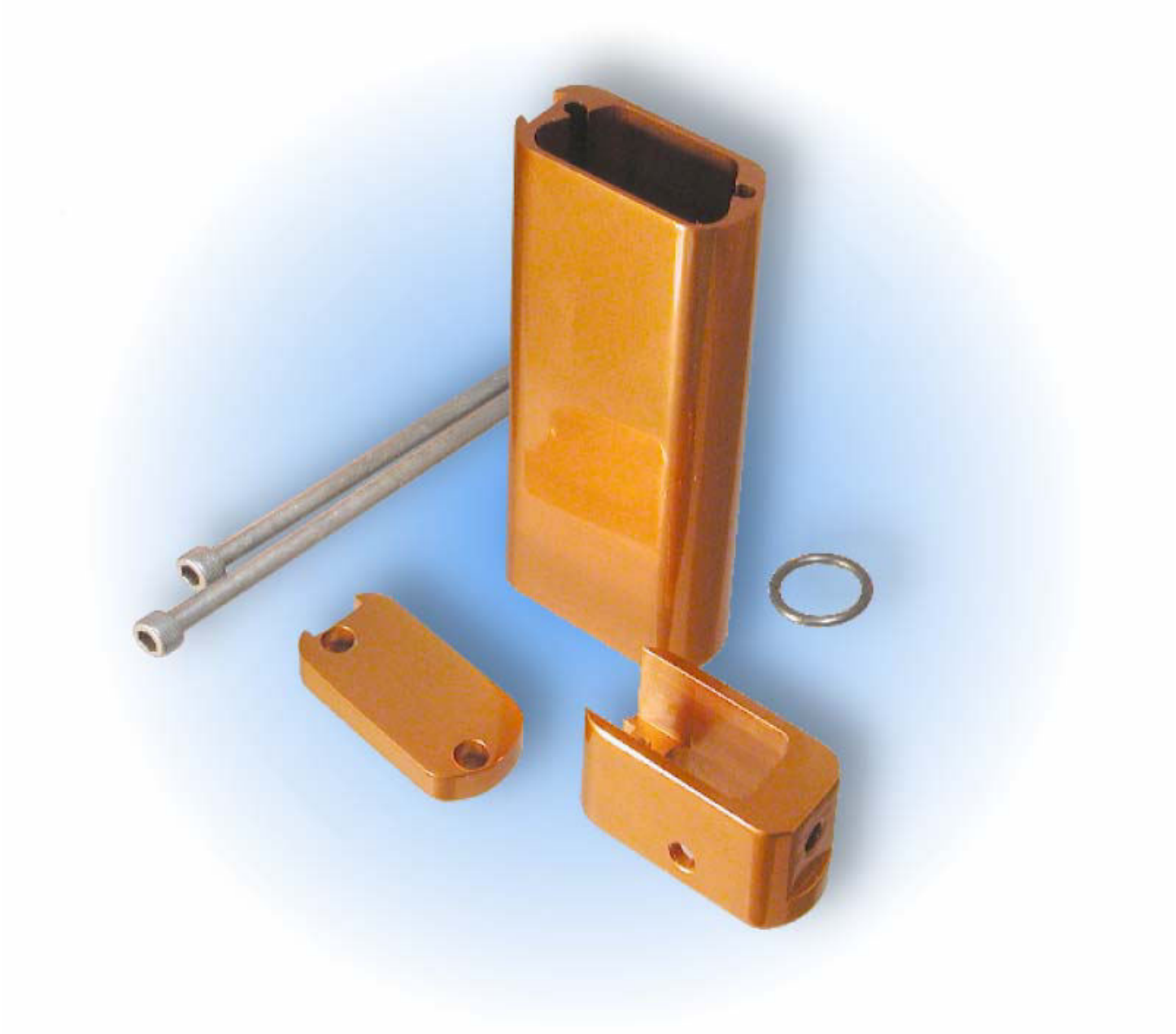
Battery Pack Housing Complete
Part #1393



Complete housing assembly; battery not included. Comes in black only.

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Battery Pack
Part #1223

This is the complete NiMh battery pack including contacts. Don't forget to recharge before use and remember to put the spacer o-ring back in the bottom of the housing.

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Back to Top

Battery Saver Plug
Part #1319

This is the pin that turns the battery on and off. Make sure you remove before flight!

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E-Mag O-ring Battery Bottom
Part # 1646

This o-ring goes under the battery pack inside the battery housing so the battery makes good contact and does not rattle.

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Back to Top

Battery Housing Screws
Part #1220

These are the bolts that hold the battery case together.

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Back to Top

Battery Charger Cord
Part #1388

Standard cigarette lighter adapter cord. Plugs into battery recharger.

Order Online Now!

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Charger Assembly
Part #1487

Battery charger for E-mag. Does not have the cigarette lighter adapter. Takes 12VDC input.

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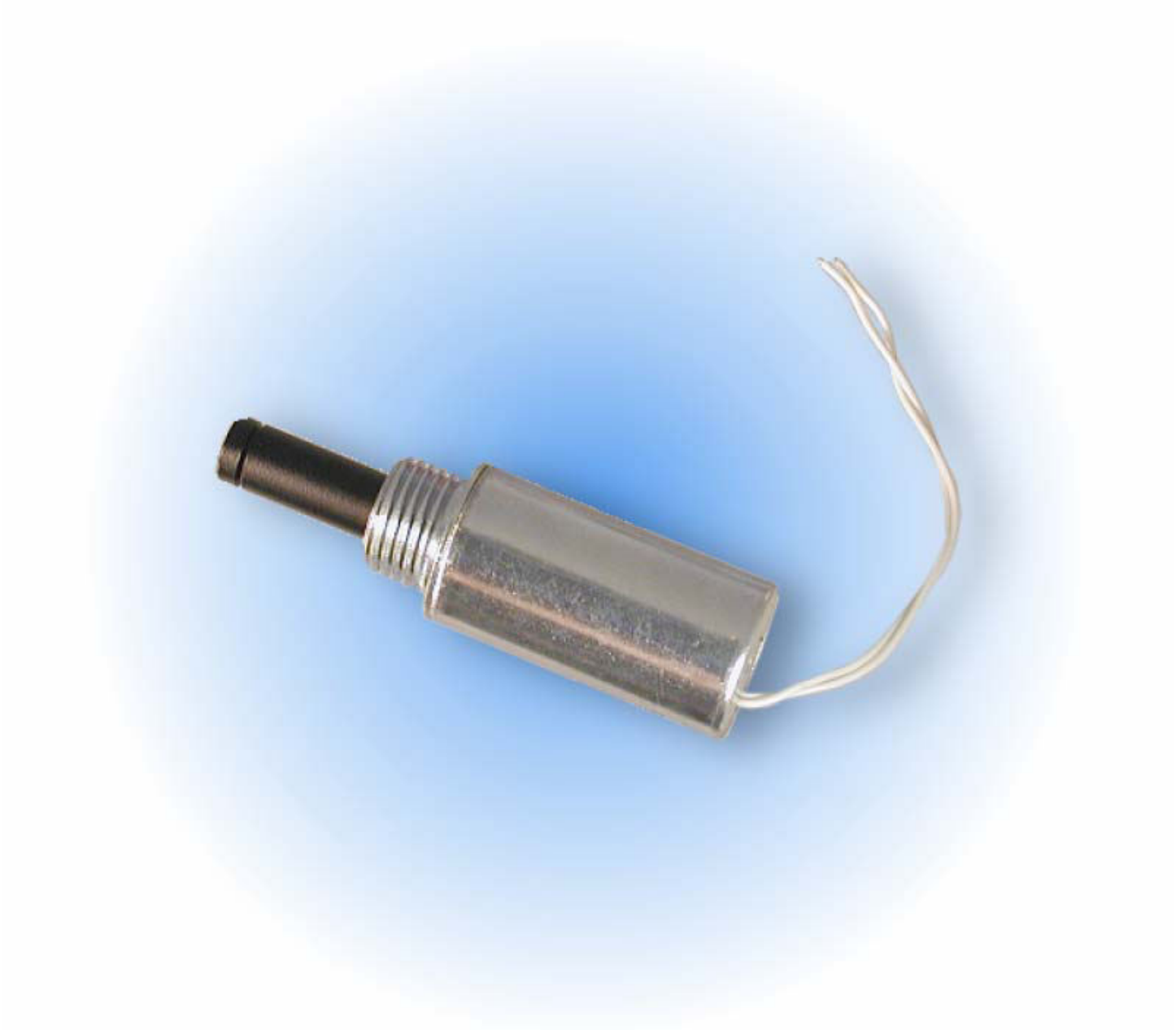
Solenoid
Part #1237



Solenoid that pulls the sear to fire the marker. Must be soldered to the PC board.

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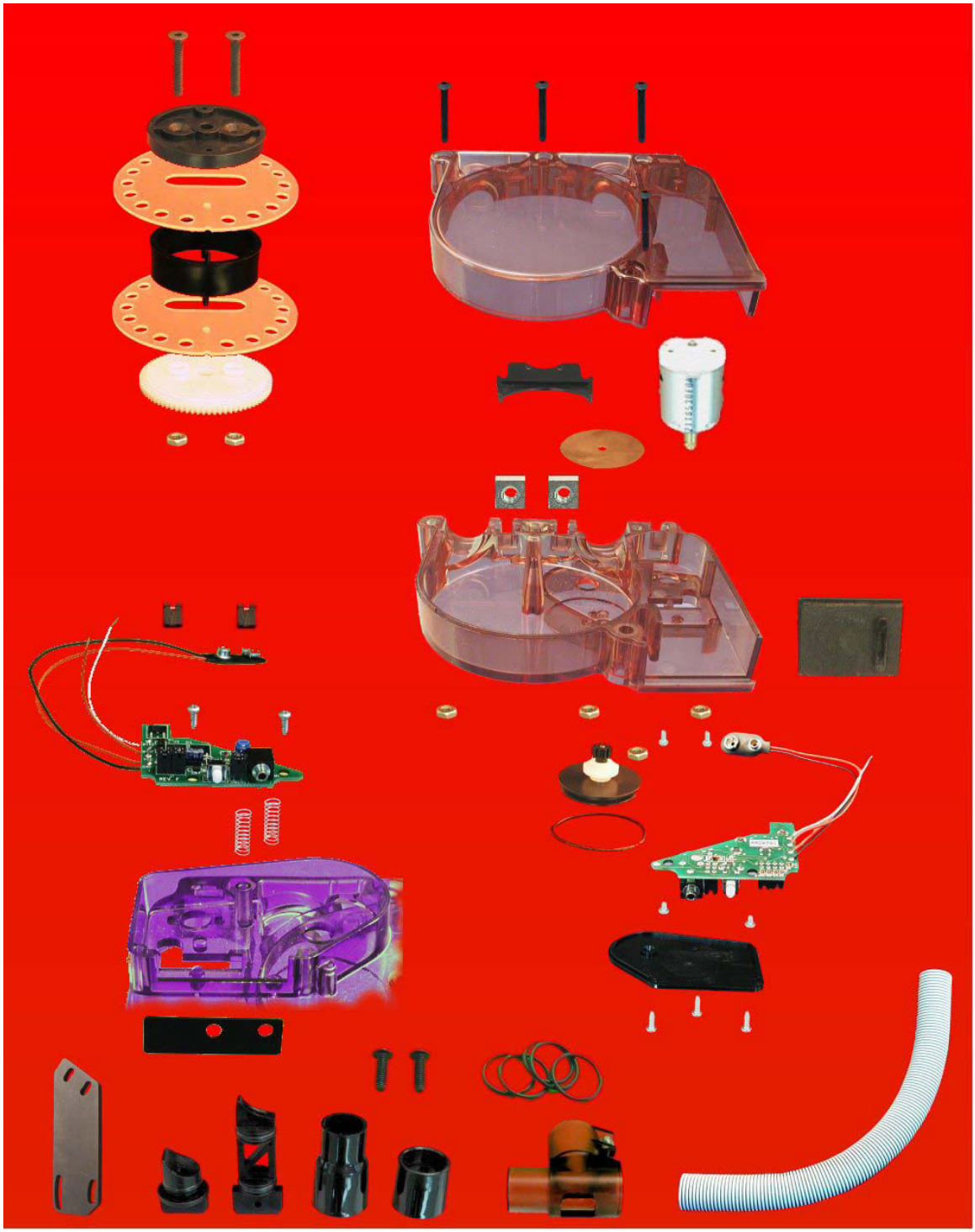
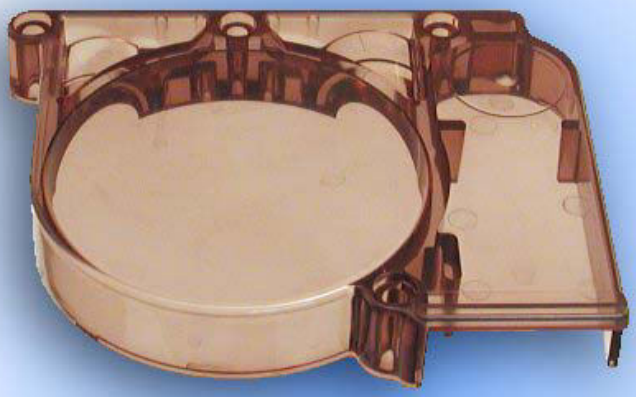
Warp Feed Exploded View
Click on any part for a description



Part #1295
Warp Housing Front



Front housing for Warp Feed, specify color when ordering. Clear can be colored with Rit Dye.

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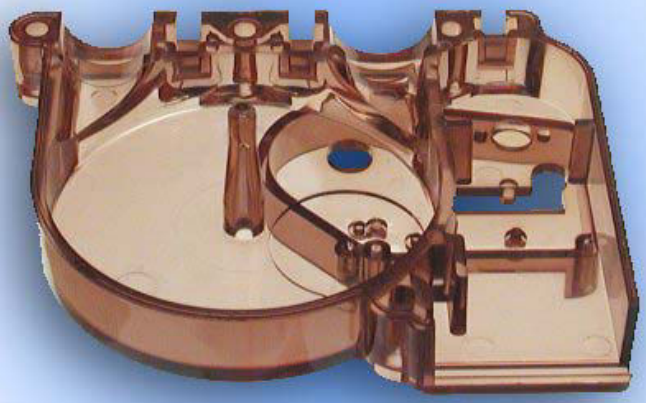
Part #1296
Warp Housing Back



Back housing for Warp Feed without sensor. Specify color when ordering, clear can be colored with Rit Dye.

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Part #1256
Warp Housing Screw

Standard 10-32 socket head cap screws 1.5 inches long. Get them at your hardware store.

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Part #1257
Warp Housing Nut

Standard 10-32 nuts. Get them at any hardware store.

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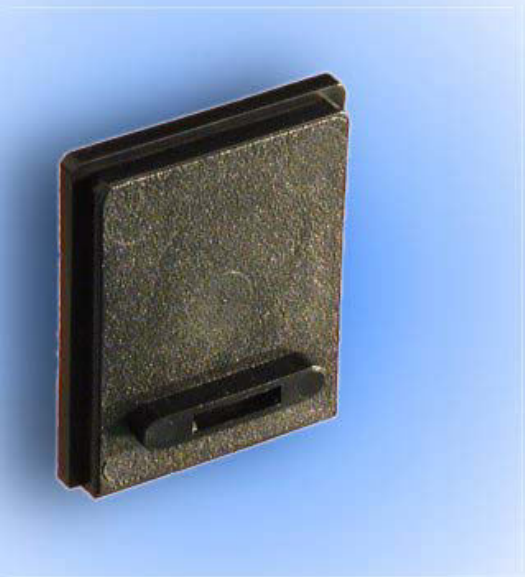
Part #1341
Warp Battery Lid - Black



Battery lid tension can be adjusted by trimming hump on the bottom of the lid.

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Part #1343
Warp Lid Black

Back cover plate for the PC board and motor.

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Part #1260
Warp Cover Screw

Special plastic screws. Do not use substitutes.

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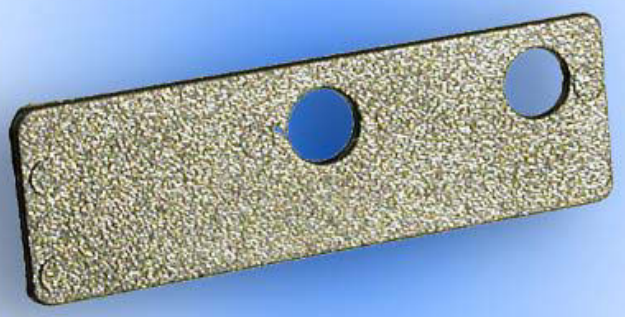
Part #1347
Warp Dust Cover



Dust cover goes on with the circuit board.

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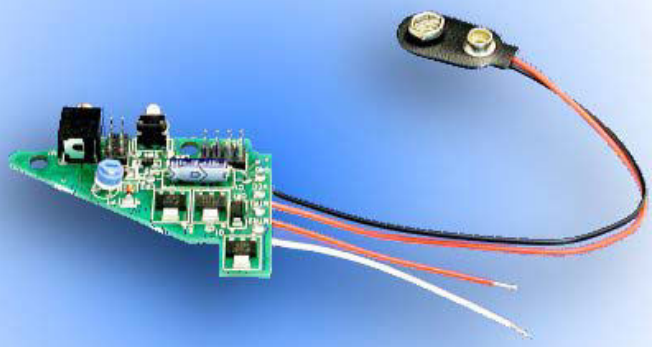
Part #1323
Warp PC Board



Board that controls the Warp. There are two springs under the board that make contact with the sensor; don’t lose them.

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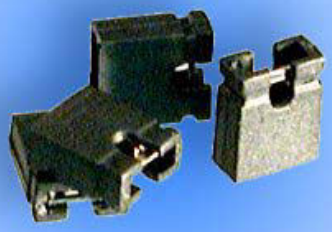
Part #1358
Warp Shunt (Jumper)



Used to program the Warp to set dwell time and input signal.

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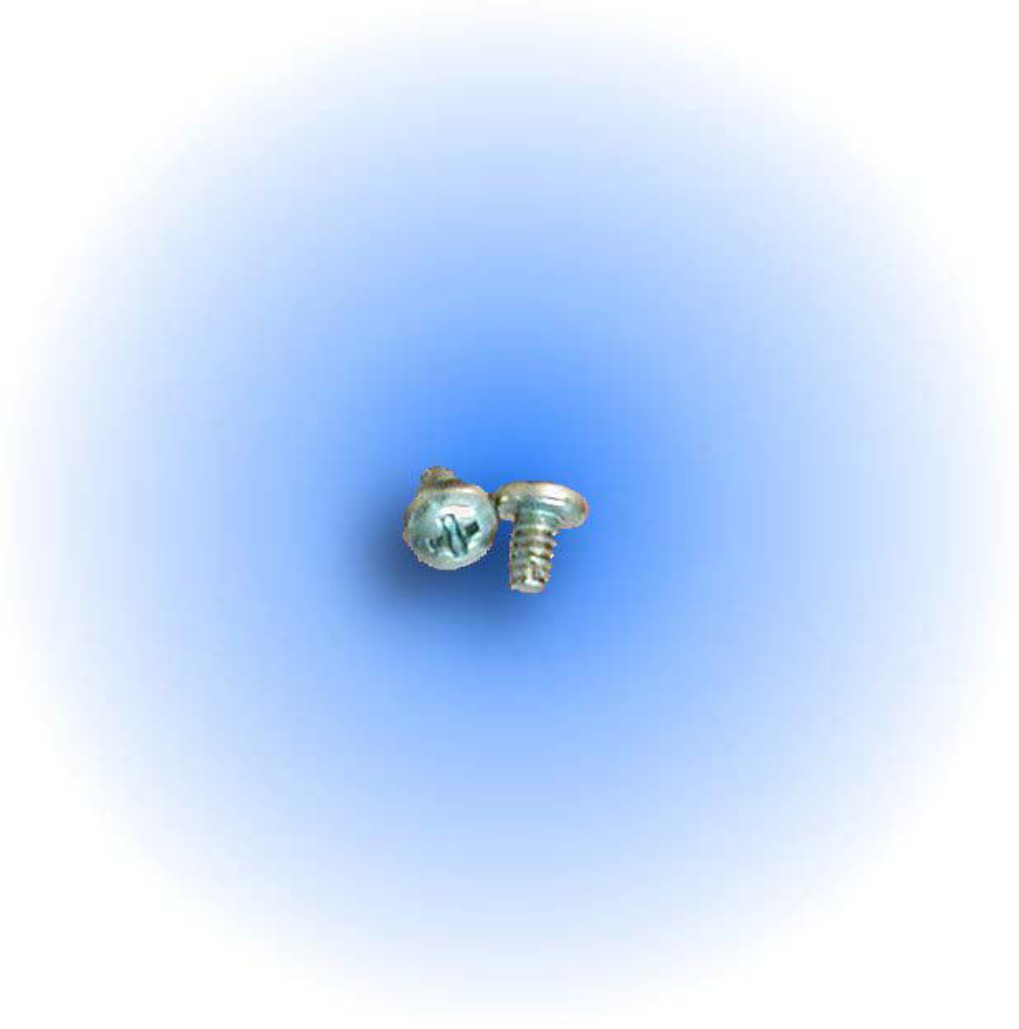
Part #1353
Warp Board Mount Screw



Screws that mount the PC board. Do NOT over tighten.

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Part #1418
Warp Contact Spring

Shown larger than actual size.

Two of these small springs make contact with the sensor and the bottom of the PC board. About 1/8” long in real life.

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Part #1467
Axle Assembly

Pulley assembly inside Warp snap fits in.

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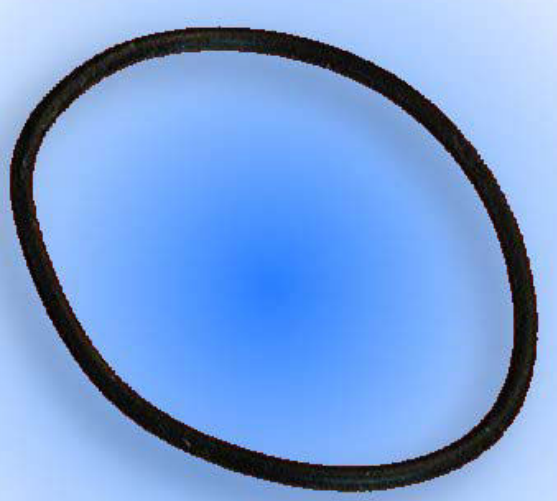
Part #1336
Warp Pulley Drive O-Ring



O-ring acts as a drive belt to turn Warp.

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Part #1421
Warp Sensor

Sensor must be riveted in place; please call Airgun Designs if you have problems.

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Part #1463
Motor Assembly

Motor comes with pulley assembled as a unit.
Co33nnections must be soldered.

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Part #1298
Warp Motor Mount Screw

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Part #1338
Warp Plate

When assembling these parts make sure there is equal tension on both screws.

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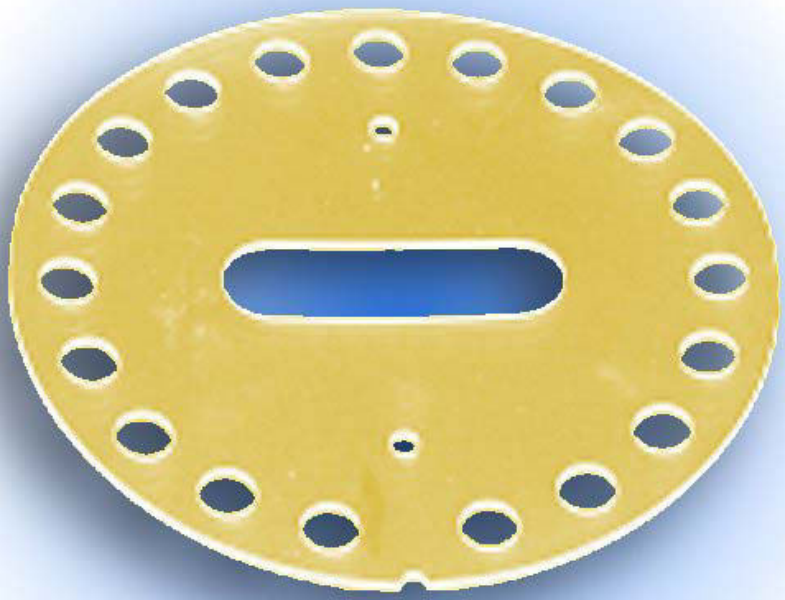
Part #1228
Warp Urethane Disc



Two disks in each unit, replace as a pair.

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Part #1339
Warp Center Piece

Center hub of feed wheel.

Back to Top

Part #1299
Warp Feed Gear 1

Make sure you tighten both mounting screws equally when assembling feed wheel.

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Part #1259
Warp Center Hub Screw

Standard 10-32 socket head cap screws can be found at your local hardware store.

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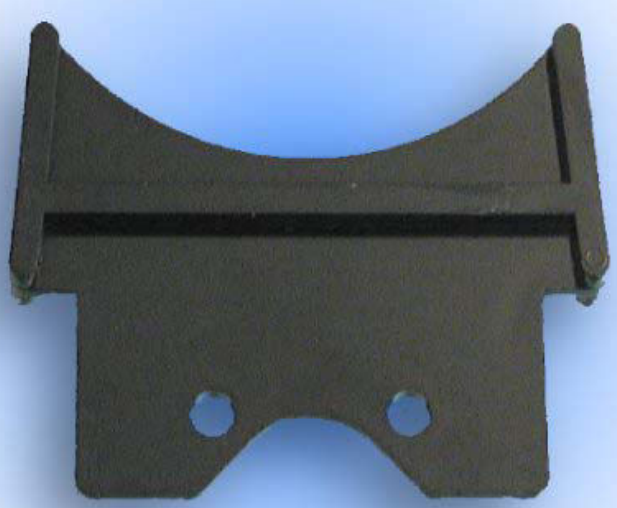
Part #1251
Warp Diverter Plate



Diverter plate directs the paintballs into the exit hose.

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Part #1465
Warp Mount

One piece aluminum mounting plate for Warp.
Adjustment slots at each end.

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Part #1258
Warp Mount Screw

Standard 10-32 socket head cap screws 5/8ths of an inch long. Get them at your local hardware store.

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Part #1289
Warp Feed Adapter Lower

Fits into the output port of the Warp.

Back to Top

Part #1288
Warp Feed Adapter Upper

Fits the marker's ¾ inch feed tube to the Warp feed hose.

Back to Top

Part #1395
PF Plug “P” Style Long

Used when feeding the Warp hose into the bottom of the power feed tube. Allows switching back and forth between Warp and hopper.

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Part #1387
PF Plug “P” Style Short

Parabolic Power Feed Plug is the standard part that comes with the Automag. Replaces original plug and improves feed rates.

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Part #1241
Warp Feed Adapter – 90 Degree

90 Degree Feed Adaptor is used with vertical feed markers to keep the feed hose low on the marker.

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Part #1566
Warp Feed Tubing, Black

Sold by the foot, uses o-rings in the hose grooves to insure a tight fit.

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Part #990
Warp Feed Hose O-Ring

Hose O-Rings for the Warp.
Use three on each end of the
Warp Hose to insure a tight fit.

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Part #159
Square Nut

Standard 10-32 square nuts available at your local hardware store.

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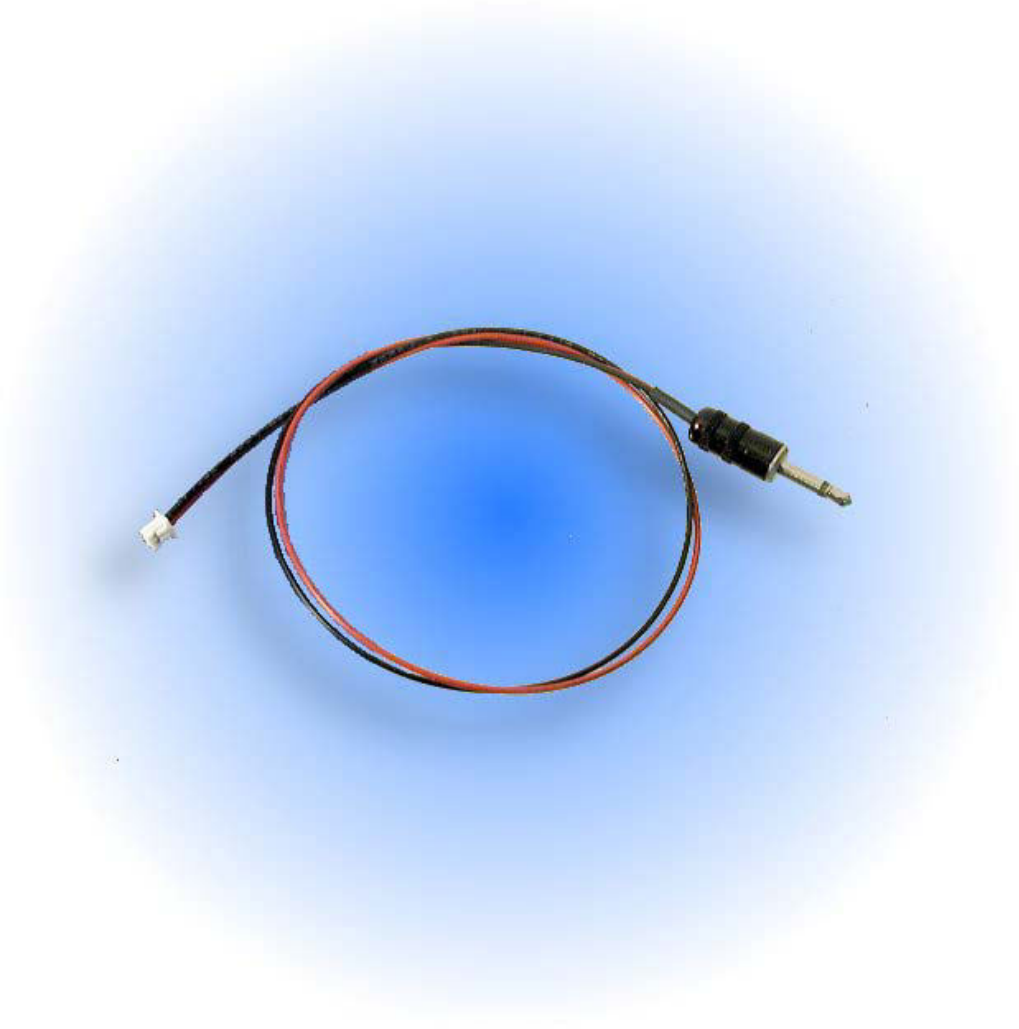
Part #1355
Emag Warp Harness



This interface cable plugs into the Intellifeed port on the Emag and the input port on the Warp Feed. Every time the marker shoots it tells the Warp to spin. Very reliable and a must have for tournament use.

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Part #1567
Emag Warp Harness - LH

Same as the regular Interlink Cable but longer for mounting the Warp on the left side of the marker.

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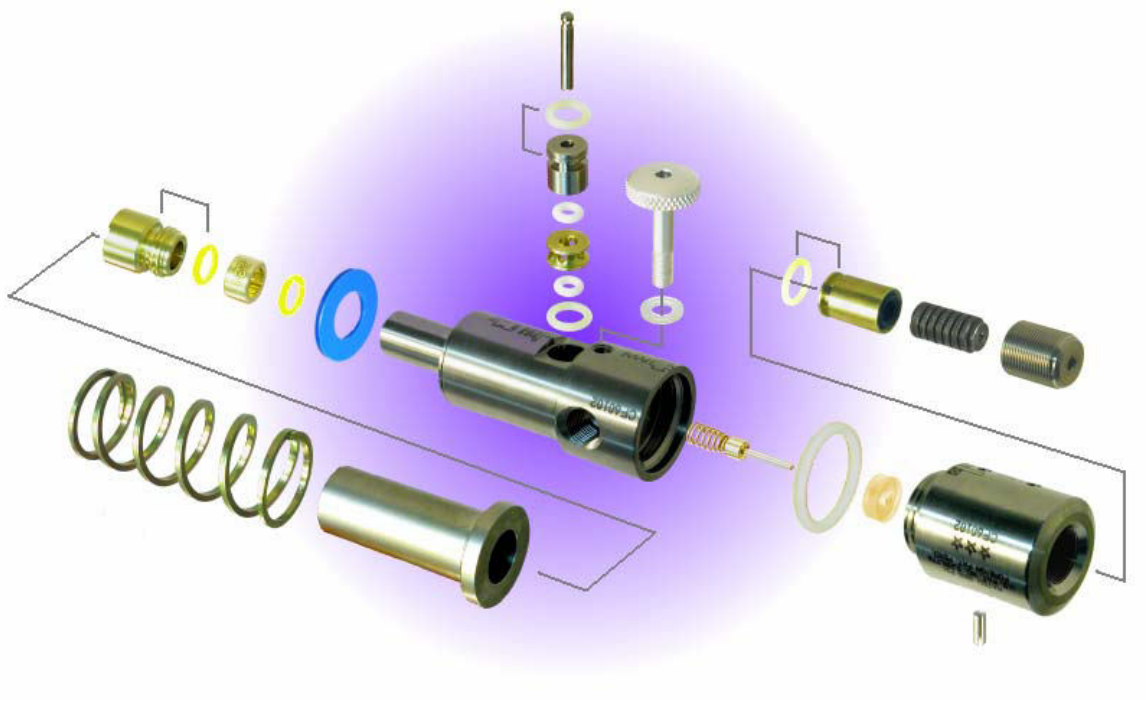
68 AUTOMAG Classic

Exploded View



Click on any part for a larger view and description.

Part #802
Bolt Foamieless

Bolts from AGD are made from hardened stainless for extra long life. They come in three different types:

1. Foamieless (hard nose): all stainless construction including the tip that pushes on the paintball. Get this one if you don't want to fool around with replacing stuff.

2. Foamie: a small foam rubber cushion is glued to the front of the bolt to softly push your paintballs into the barrel. Good if you play a lot in cold weather. The foamies do wear off and need to be replaced with superglue.

3. Superbolt: not shown here it is a different product (see link below). The Superbolt is for people who want the highest level of performance and the smoothest shooting marker possible. This bolt is about half the weight of the normal all stainless bolt shown here because it has a light weight delrin sleeve

Order Online Now!

Back to Top

Part #798
Bolt Spring

The Bolt Spring fits all AGD markers regardless of age or type. They are made from very special square wire so they don't fold inside themselves when collapsed. Replace your old springs when they sag below the front of the bolt. Special honed bolt springs come with Superbolts to prevent premature wear. One spring also comes in the Parts Kit. If you need any o-rings the kit is a good value.

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Part #432
Field Strip Screw Assembly

The Field Strip Screw holds your valve in place. Comes with a small urethane rubber washer on the base to prevent it from vibrating out. Make sure you tighten it with a wrench.

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Part #138
On/Off Bottom

The On/Off Bottom is last part of the assembly to go into the valve.

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Part #139
On/Off Pin

The On/Off Pin controls air flow in your marker. It is a critical precision component and should not be modified. It's hardened and chrome plated for extra long life.

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Part #141
On/Off Top

This part is one of several in the On/Off assembly. They all have names that start with On/Off to let you know where they go. This part can go in either way. Precision part, do not substitute with aftermarket items.

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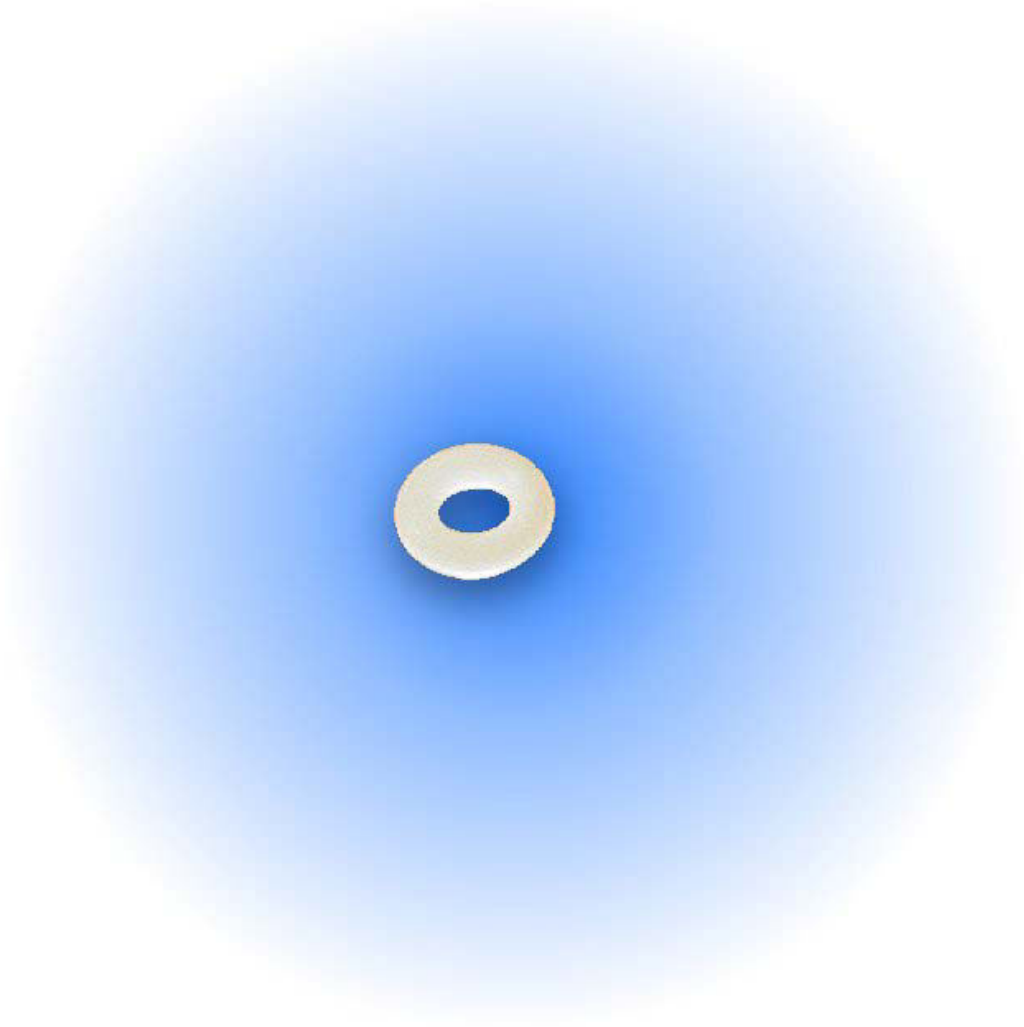
Part #140
O-Ring Teflon - On/Off



Found in the On/Off assembly the Teflon O-Ring opens and seals with every shot. Replace this o-ring if you can pull and hold the trigger and you still hear leaking out the barrel. This o-ring is not rubber but more like plastic. Do not dent or abuse it.

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Part #123
O-Ring - Power Tube

This is the most common size o-ring in the marker. It's a good idea to have spares on hand. They come in the Parts Kit for a better value. Used in the Power Tube and the On/Off assembly.

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Part# 113
Regulator Piston O-ring

Two Reg Piston O-Rings are included in the Parts Kit or you can purchase them separately. Replace if you notice air leaking from the side vent hole in the regulator body.

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Part #115
O-Ring - Regulator Body

The Regulator Body O-Ring seals the two halves of the Valve Body together. Also included in the Parts Kit.

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Part #781
O-Ring - Power Tube Tip, RT

Keeps the Power Tube Tip from Loosening up.

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Part #683
PT Spacer Kit

The PT Spacer Kit gives you five different brass spacers all legibly numbered so you can adjust the spacing of the power tube o-ring. If your marker has bolt stick use a longer one, if it leaks down the barrel use a shorter one. Find one that works and stick with it! Quality machined brass to AGD standards. PT Spacer Kit comes with an extra power tube o-ring not shown.

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Part #819
Power Tube Tip Assembly

This item screws into the end of the Power Tube and is a precision part. It releases the air blast behind the ball in a controlled manner so the air hits the ball with low pressure to gently accelerate it out the barrel. Use a coin to tighten it up.

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Part #104
Regulator Nut

The very back of the marker has this adjustment nut to change your velocity. Made from high quality stainless steel. Use a high quality grease on the threads to reduce galling.

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Part #684
Reg Piston Assembly (Pre Assembled)

The Regulator Piston comes as an assembly. DO NOT take this apart. It has a built in blow off valve that will leak air if your marker becomes over pressurized. The blow off resets once your pressure goes back to normal. This safety feature is found exclusively in AGD markers. Replace the entire assembly if your marker is shooting at normal speeds and it still leaks out the back.

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Part #116
Regulator Seat

The Regulator Seat is the most abused part of the marker. It opens and closes with every shot and every piece of dirt in your air system eventually goes through it. To fix most velocity problems the first place to start is the Reg. Seat. Keep it clean! The seat snaps in and stays one way.

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Part #368
Regulator Valve Pin with Spring

This part works in conjunction with the Regulator Seat to control the air pressure in the chamber. It is not normally a wear part and should last a lifetime. Keep it clean.

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Part #329
Spring Pack Assembly

Not usually something that wears out. The Spring Pack comes as an assembly with all the disk springs organized in a special way. DO NOT try to take it apart! Keep it clean and lightly greased.

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Part #225
Z-Lock Pin

Found in the rear of the Valve Assembly this pin insures that the valve is properly assembled before placing it into the body of the marker. Needs to be pressed in.

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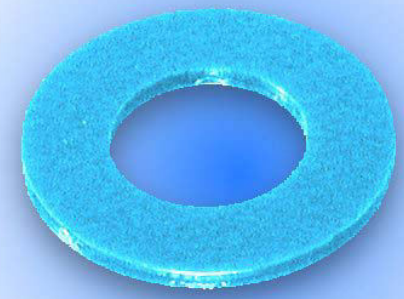
Part #122
Bumper Level 7 (Blue)



Bumpitty!! This is a urethane washer that sits at the base of your power tube. When the bolt returns, it hits this to decelerate. Not something that wears out normally. If you need one you probably lost it!

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Part #983
Valve Assembly Classic

Because we laser engrave matching serial numbers on each half of the Valve Assembly, you can't buy just one half of a Valve Assembly. This is a complete Valve Assembly with warranty!

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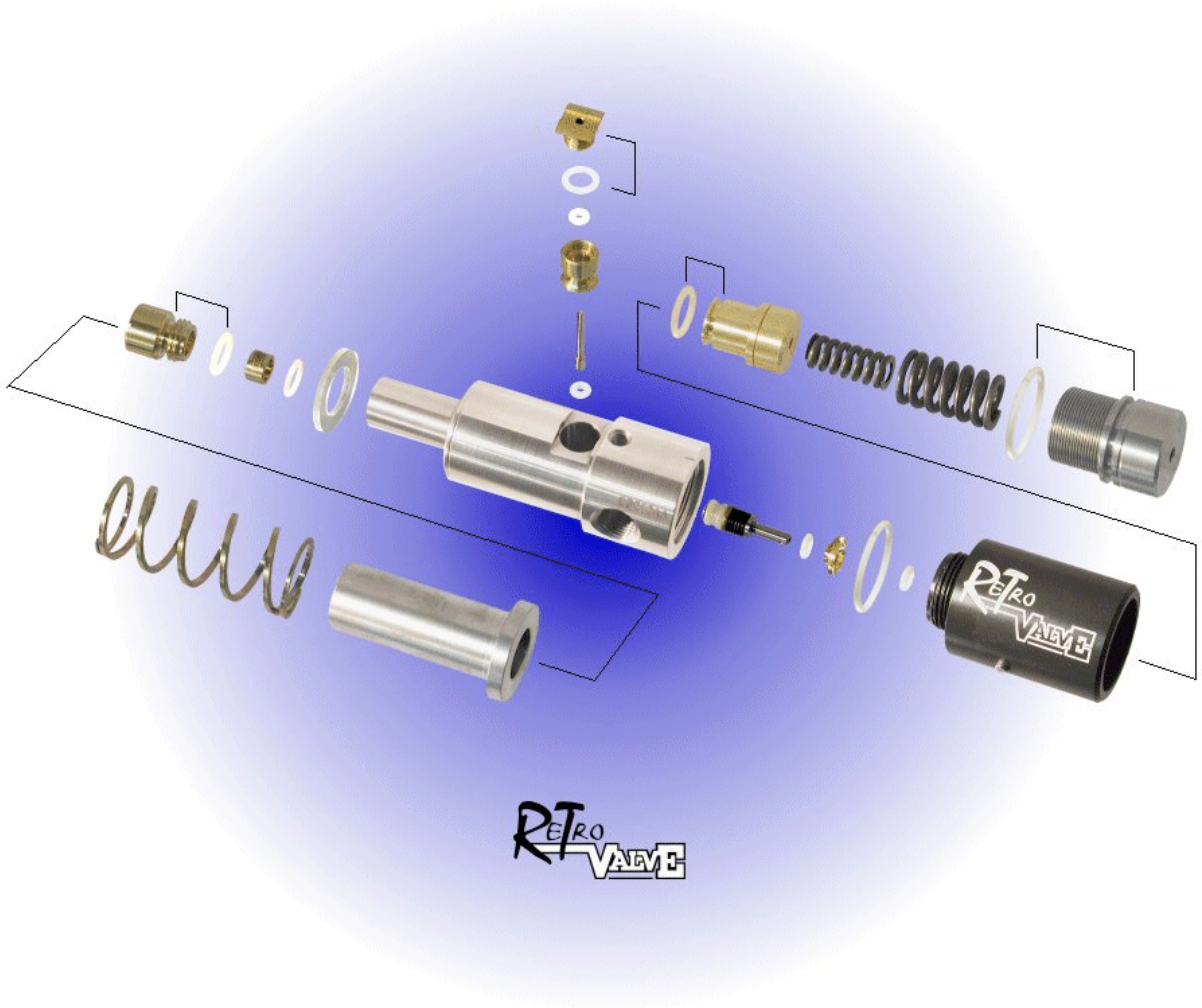
Retro Valve Exploded View

Click on any part for a larger view and description



Part #843
Regulator Valve Pin Assembly

The Regulator Pin comes as an assembly. Just push it in place and it should be good to go. If you have problems with this part call the factory.

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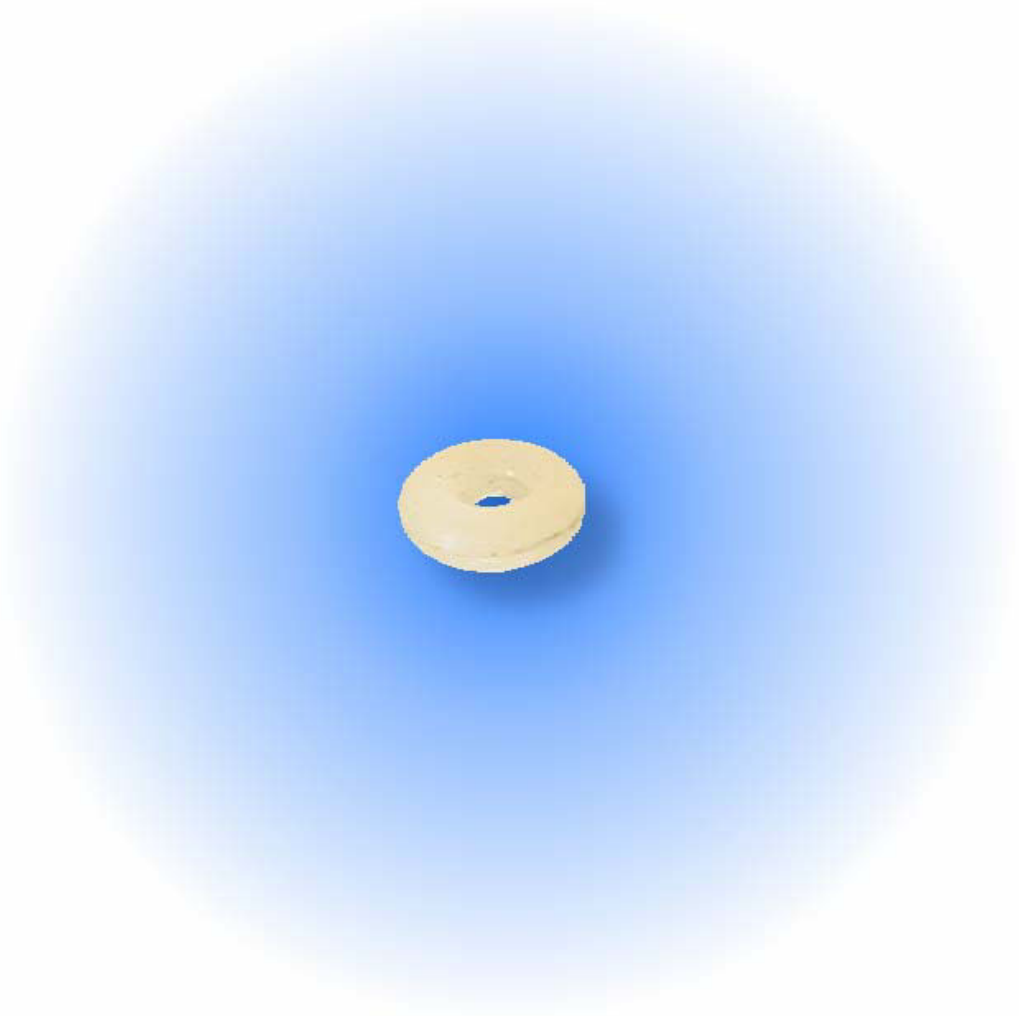
Part #844
Regulator Seat O-Ring



The Regulator Seat O-ring is the business end of the regulator. Replace it if you are having problems with velocity. Two are included in the **Parts Kit**.

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Part #841
Regulator Seat Holder

The Regulator Seat Holder holds the O-ring that acts as the regulator seal.

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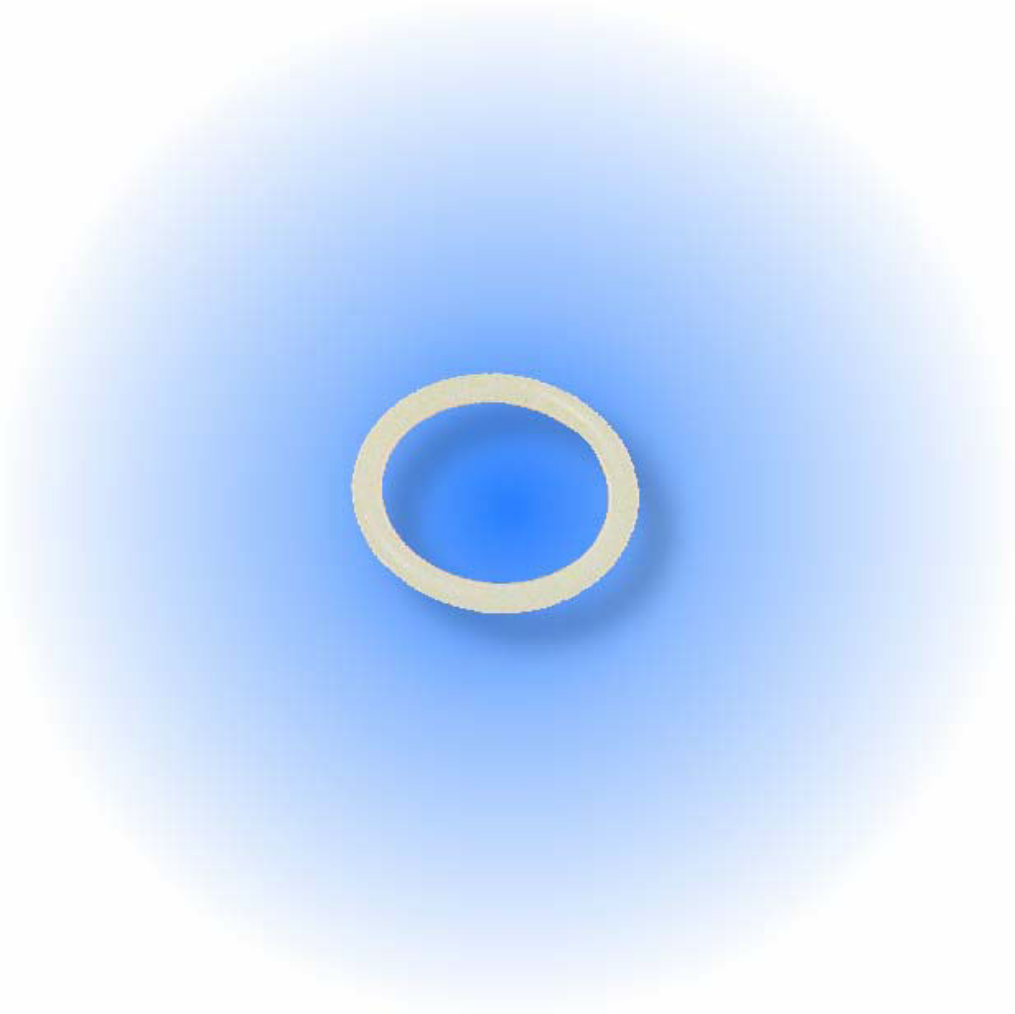
Part #115
Regulator Body O-Ring



The Reg. Body O-Ring seals the two halves of the Valve Body together. Included in the **Parts Kit**.

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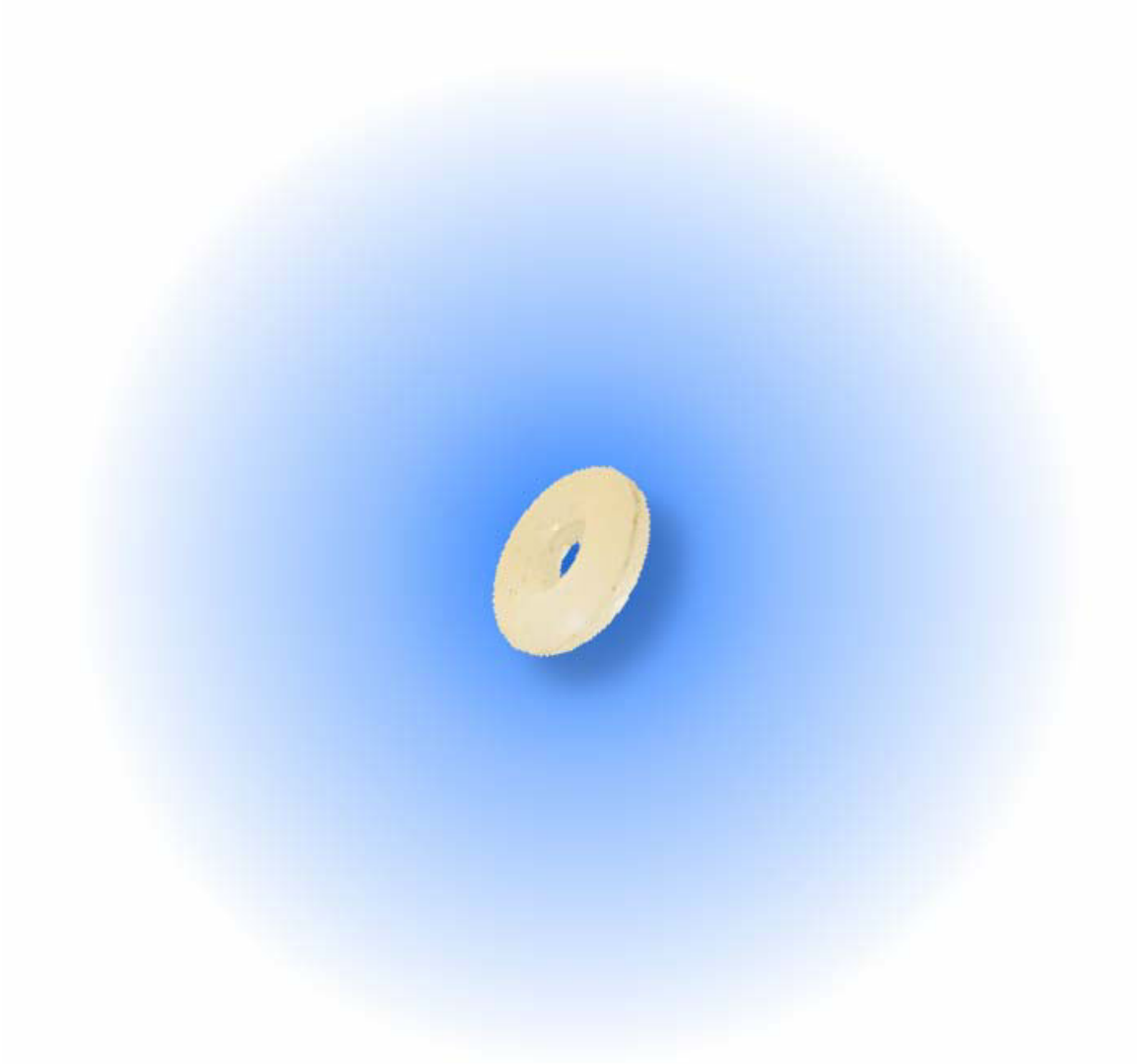
Part #779
Regulator Valve Pin O-Ring/
(On Off O-Ring)



Four of these desogrin O-rings are used in the Retro Valve, two as part of the regulator valve pin assembly, one on the On/Off Pin and one in the face of the regulator body. Four included in the **Parts Kit** .

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Part #796
Bumper – RT

This clear urethane washer sits at the base of your power tube. When the bolt returns, it hits this to decelerate. This bumper is a little softer than the standard blue bumper for the higher firing rate of the Retro Valve. The bumper should be replaced about once a year. One Included in the **Parts Kit**.

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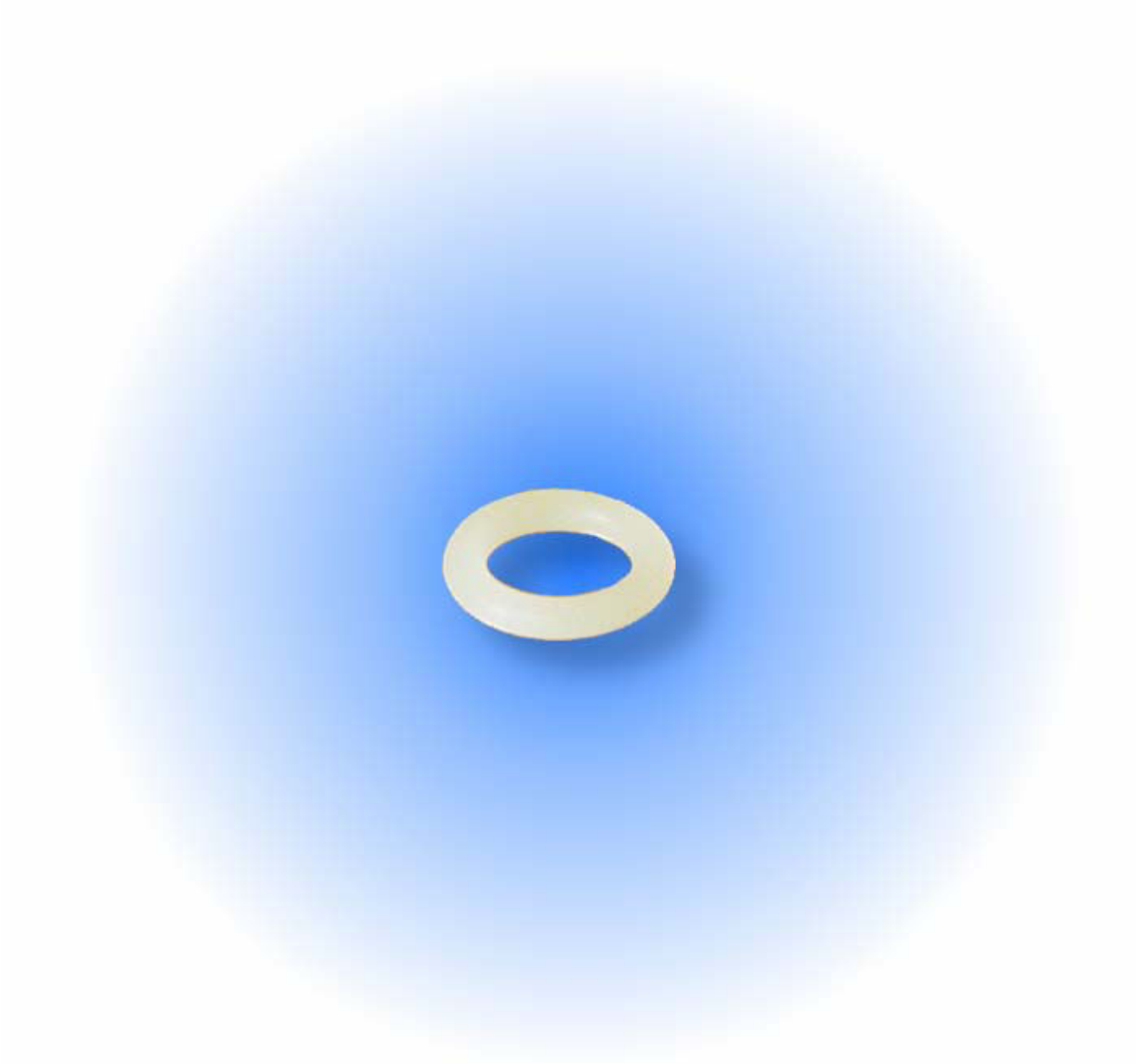
Part #123
Power Tube O-Ring
(On Off Bottom O-Ring)



A common size O-ring in the marker. It's a good idea to have spares on hand. Included in the **Parts Kit** Used in the Power Tube and the On/Off assembly.

Order Online Now!

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Part #736
Power Tube Spacer .220

The spacers are sold as a kit so you get several sizes. You need to swap them until you find the best size for your particular marker. Follow the link below to go to the spacer kits.

Order Online Now!

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Part #781
Power Tube Tip O-Ring

This O-ring keeps the Power Tube Tip from loosening up.

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Part #826
Regulator Nut/RT

The Regulator Nut screws into the back of the valve and adjusts the velocity. Keep the threads lubricated with a good grease.

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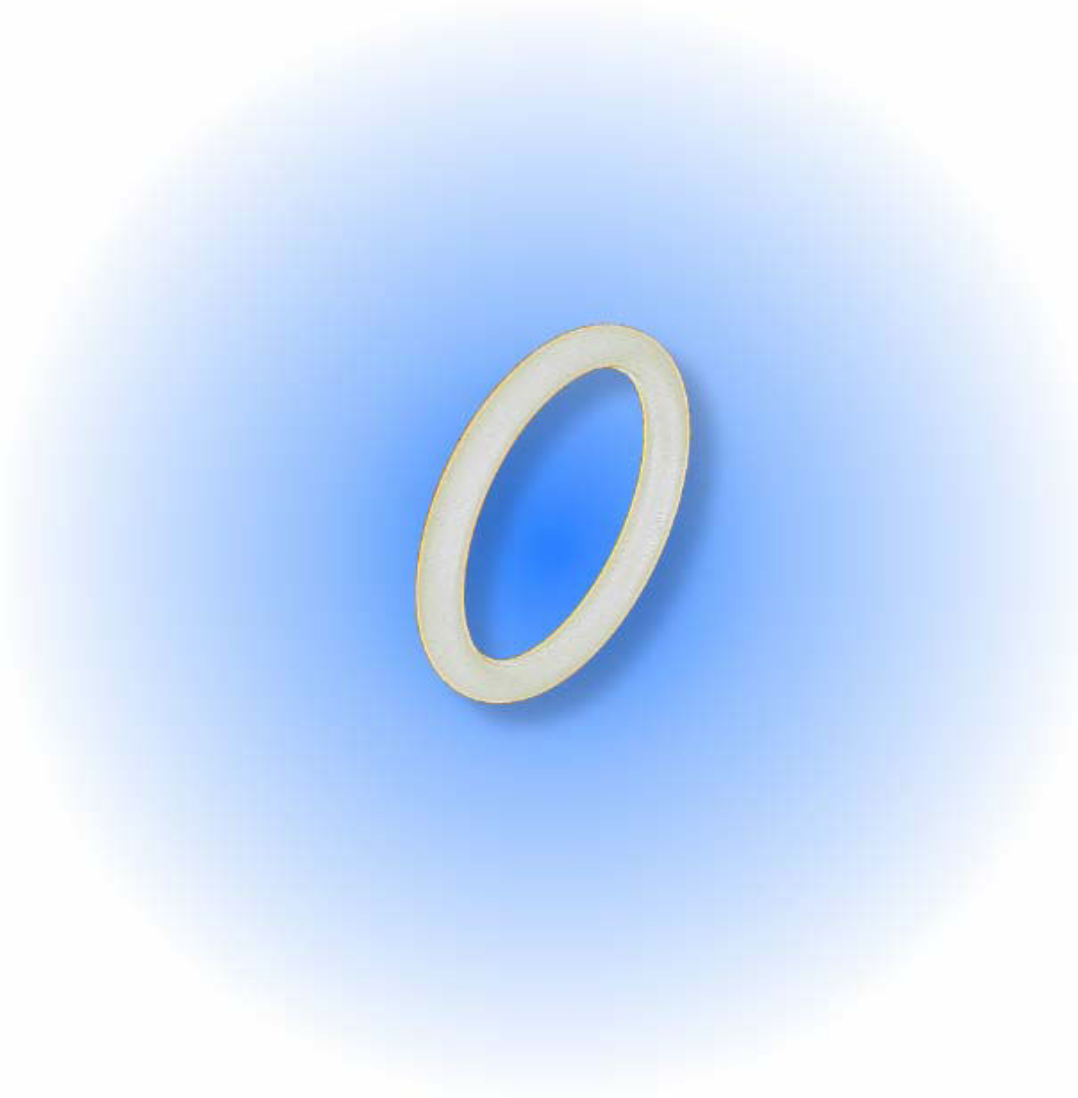
Part #157
Regulator Nut O-Ring/Barrel O-Ring



This is the same O-Ring used on most AGD barrels.
Keeps the Regulator Nut in place.

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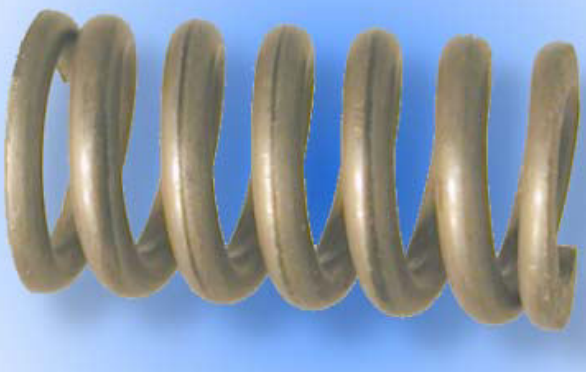
Part #800
Regulator Spring /Outer



The Retro Valve uses two coil springs behind the Regulator Piston. This is the larger of the two. Should never need replacing, just keep it greased.

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Part #818
Power Tube Tip

This item screws into the end of the Power Tube and is a precision part. It releases the air blast behind the ball in a controlled manner so the air hits the ball with low pressure to gently accelerate it out the barrel. Use a coin to tighten it up.

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Part #799
Regulator Spring /Inner

This is the smaller of the two springs that go behind the Regulator Piston. These springs assemble one inside the other.

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Part #822
Regulator Piston Assembly

The Regulator Piston comes as an assembly that has a built-in blow off valve. Do not disassemble! Replace this part when air is venting out the back of the marker and you are shooting less than 300 FPS.

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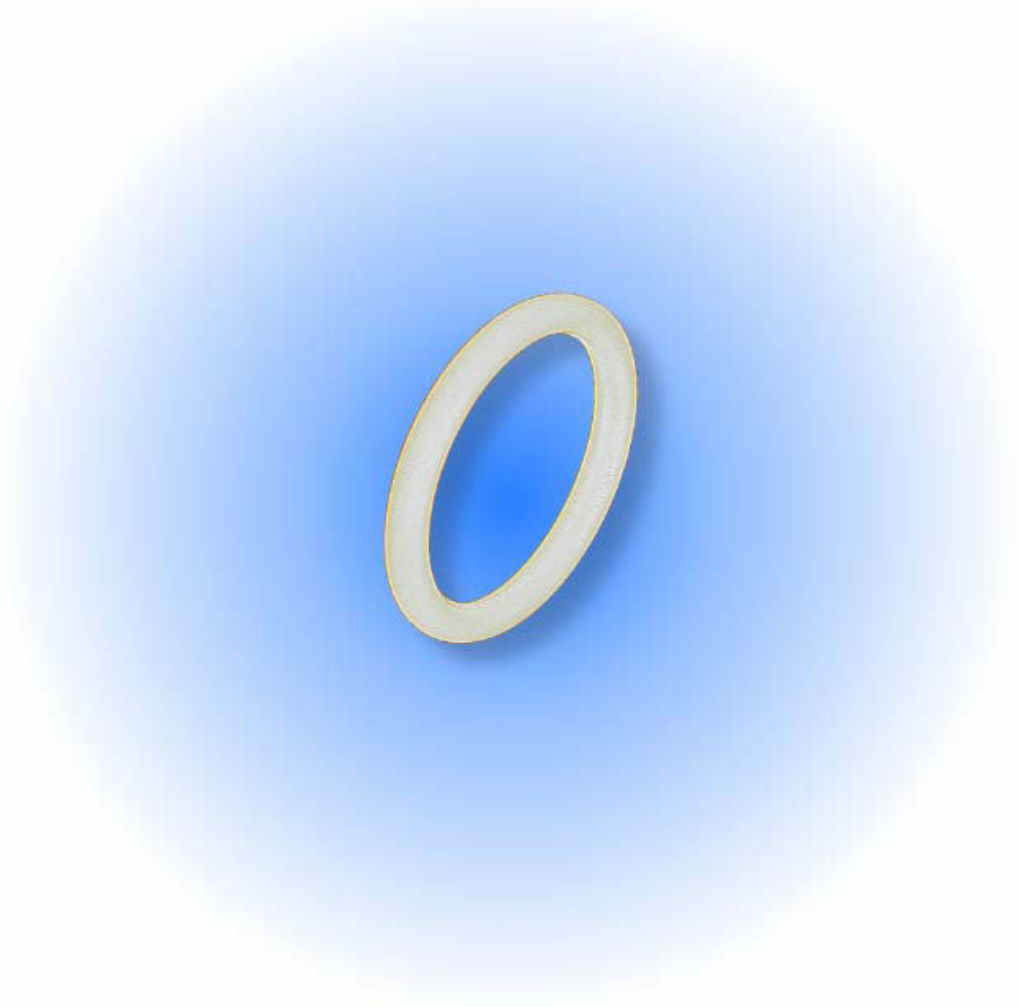
Part #113
Regulator Piston O-Ring



This O-ring goes around the Regulator Piston and is a wear item. Extras are found in the **Parts Kit** for a better value. Replace when the marker has erratic velocity problems and you have tried everything else.

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Part #815
On Off Bottom

On/Off Bottom is the lower half of the assembly. It screws into the On/Off Top.

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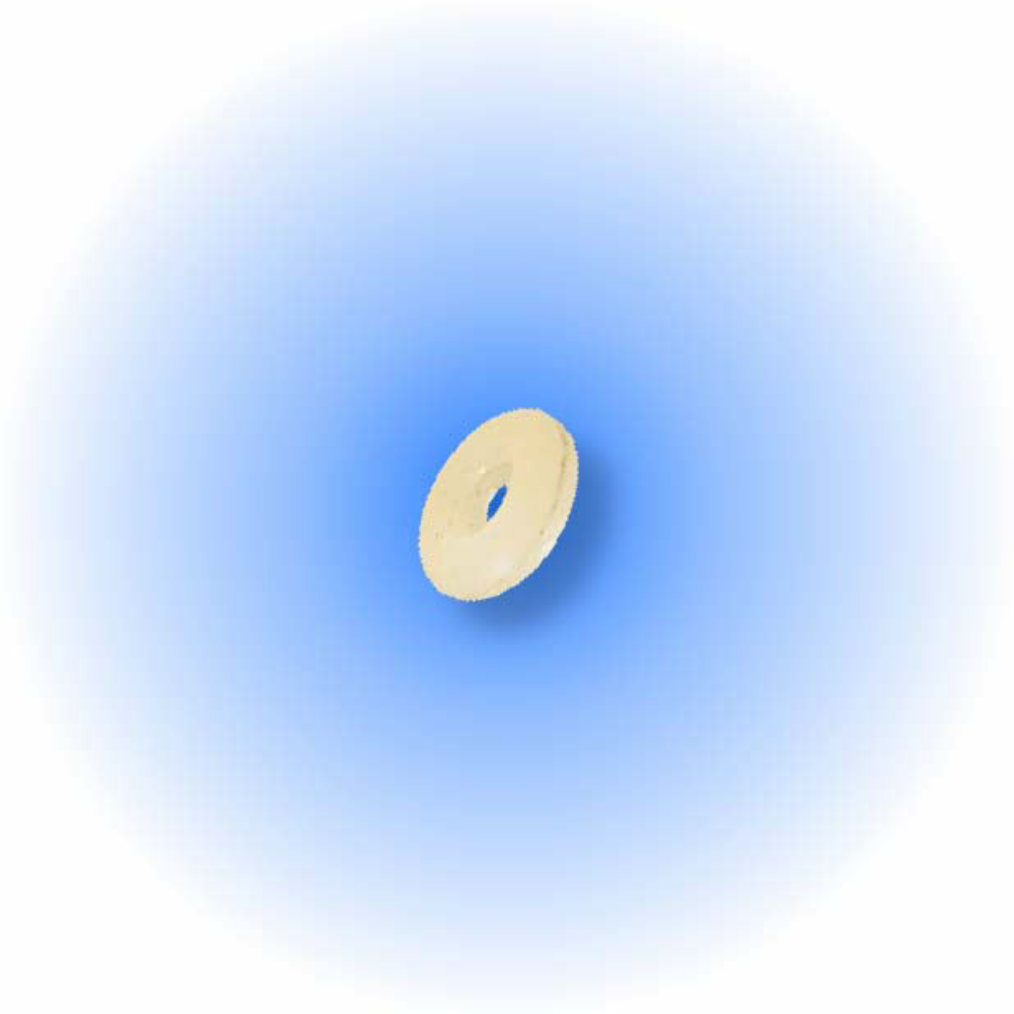
Part #778
On Off Small O-Ring



This urethane O-ring goes inside the On/Off Top.
Included in the **Parts Kit**.

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Part #814
On Off Top

This is the top part in the On/Off Assembly. The On/Off small urethane O-ring sits inside.

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Part #1083
On Off Pin .750

The Retro Valve On/Off Pin has a large head which makes it different from the Standard Valve. This feature contributes to the Reactive Trigger of the Retro Valve.

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Part #802
Bolt-Foamieless

Bolts from AGD are made from hardened stainless for extra long life. They come in three different types:

1. Hard Nose: all stainless construction including the tip that pushes on the paintball. Get this one if you don't want to fool around with replacing stuff.

2. Foamie: a small foam rubber cushion is glued to the front of the bolt to softly push your paintballs into the barrel. Good if you play a lot in cold weather. The foamies do wear off and need to be replaced with superglue.

3. Superbolt: not shown here, it is a different product (see link below). The superbolt is for people who want the highest level of performance and the smoothest shooting marker possible. This bolt is about half the weight of the normal all stainless bolt shown here because it has a lightweight Delrin sleeve.

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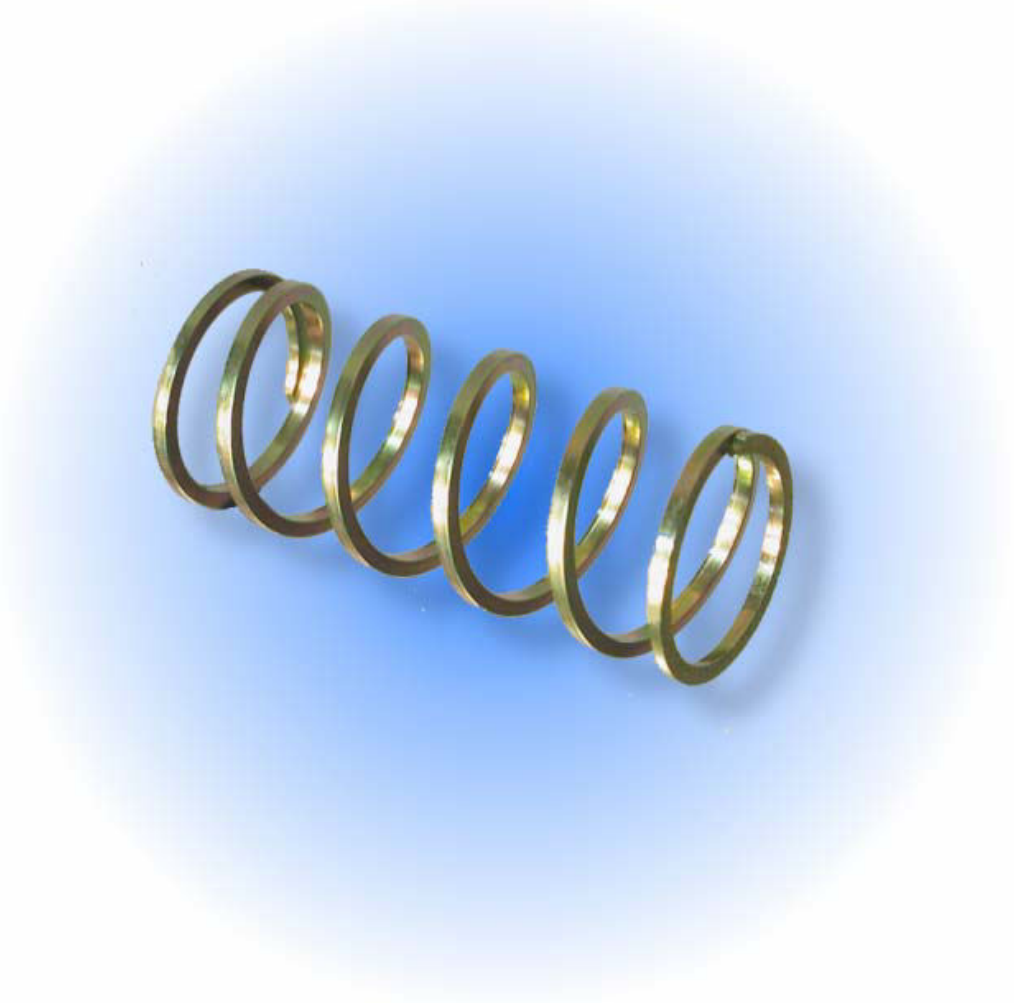
Part #798
Bolt Spring



The Bolt Spring fits all AGD markers regardless of age or type. They are made from very special square wire so they don't fold inside themselves when collapsed. Replace your old springs when they sag below the front of the bolt. Special honed bolt springs come with Superbolts to prevent premature wear. One spring also comes in the. **Parts Kit.** If you need any O-rings, the kit is a good value.

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Part #1103
Retro Valve Package

Because we laser engrave matching serial numbers on each half of the Valve Assembly, you can't buy just one half of a Valve Assembly. This is a complete Valve Assembly with warranty!

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Monday through Friday

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ARMAGEDDON^{tm}

BY *AIR AMERICA, INC.*

Congratulations! You have purchased the most advanced high-pressure Air/Nitrogen Paintball system available to the Paintball World. Your Air America® ARMAGEDDON^{tm} is engineered to provide a lifetime of performance and reliability, far exceeding the most rigid demands of the International tournament-level pro player.

The ARMAGEDDON^{tm} is a single stage regulator; Micro™ precision machined in Stainless Steel and high strength, tempered alloy Aluminum, designed to accept input working pressures up to 4500 PSI. With a 200 to 1100 PSI output pressure range, the ARMAGEDDON^{tm} is totally compatible with virtually all of the markers currently used in the sport of Paintball. The ARMAGEDDON^{tm} delivers unmatched tournament-level performance, high & low side pressure safeties, ambidextrous input/output hose and gauge positioning, fractional on-gun slide mounting rail adjustment, precision input and output gauges matched with the Military, Airline, and Space program, tried and proven, high pressure Composite Wrapped Bottles.

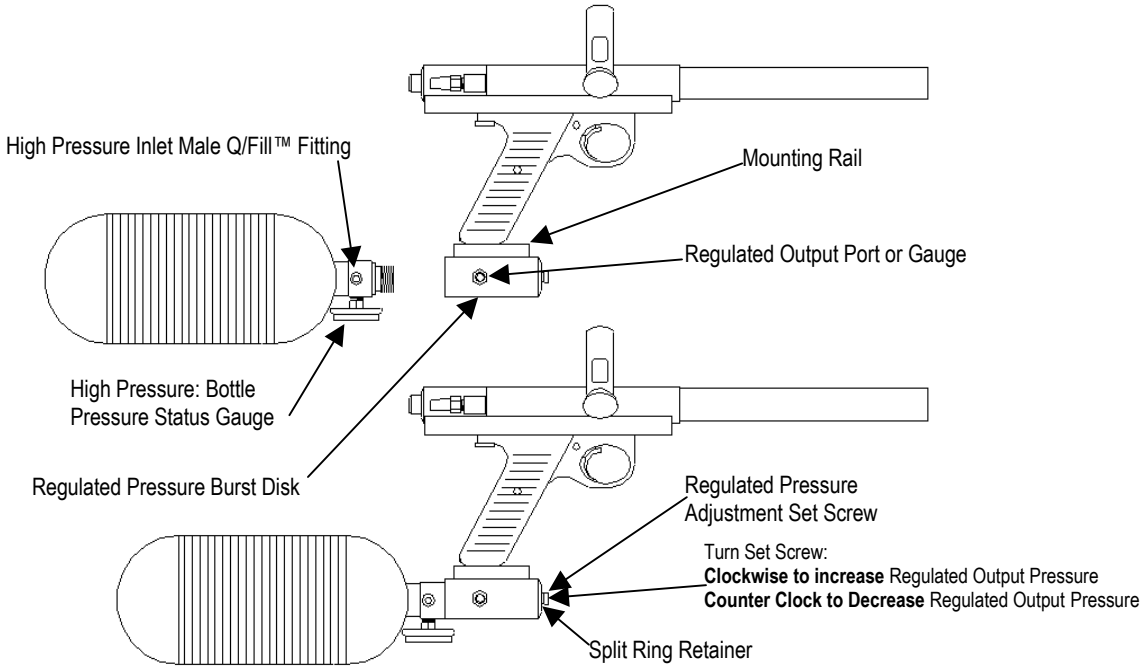
ARMAGEDDON^{tm} ON-GUN CONFIGURATION

In place of the 'cradle', used on the Air America®, 320™ and Raptor® series, the ARMAGEDDON^{tm} uses the identical mounting rail system used on the Air America® Apocalypse™.

The first step in mounting your ARMAGEDDON^{tm} is to attach the mounting rail to the pistol grip of your marker. The rail is configured to use two 10-32 Allen screws with a center-to-center spacing of 3/4". This is the standard thread and spacing found on AutoMags and Autocockers, as well as other popular markers. If your marker is equipped with a 'Lone Star' type M16 grip, contact your local dealer or Air America® for the appropriate adapter block.

When the mounting rail has been secured, slide your ARMAGEDDON^{tm} onto the dovetail portion of the rail. The rail can be installed with the long end facing either forward or to the rear. You can now position your ARMAGEDDON^{tm} at the optimum point for your arm length and shooting style. A ***light to medium*** torque on the rail set-screw will secure your ARMAGEDDON^{tm} in your selected position.

Once your system has been mounted on the marker, attach the output hose from the regulated ***output*** port male quick disconnect fitting on the Aluminum Body of your ARMAGEDDON^{tm}, to your marker, to complete the on-gun installation.



Note*: Safety Caution!*
Do not install or use substandard non-rated fittings on your ARMAGEDDON^{tm} or marker.

CHARGING THE SYSTEM

Your ARMAGEDDON™ can be charged/filled, on or off your marker, totally independent of the Aluminum Body portion of the ARMAGEDDON™ that is secured to the pistol grip of your marker. ***The Air America® 4500 psi pressure rated Stainless Steel male quick disconnect Q/Fill™; quick fill assembly, is the male quick disconnect fitting closest to the bottle on the Stainless Steel 'Arm' of your ARMAGEDDON™, opposite the bottle/tank/cylinder high pressure status gauge. The Stainless Steel 'Arm' is non-removable from your bottle/tank/cylinder. Do not attempt to remove the 'Arm' from your bottle/tank/cylinder.***

The Air America® 4500 psi pressure rated Stainless Steel male quick disconnect Q/fill™ is the standard Q/fill™ fitting used on all Air America® systems. If you have your own fill station, with a suitably rated Female fitting that is compatible with the Air America® Q/Fill™ male adapter, connect the rated Female quick disconnect to the ARMAGEDDON™ and follow the fill directions that pertain to your fill station. The fill operation for your ARMAGEDDON™ is identical to the procedure used with all other Air America® systems.

INITIAL ADJUSTMENTS

Your ARMAGEDDON™ left the factory set for a regulated output pressure of 700 psi. With the introduction of the new 'Super Guns' and the popularity of custom modified markers, your marker may require a regulated output delivery pressure ranging from 150 to 1000 psi. ***The regulated output delivery pressure setting for your marker will depend on the performance requirements of your marker and the modifications made to your marker.***

Note:
Check with your corresponding owner's manual, factory tech support staff or Airsmith, if in doubt regarding questions of performance pressures and tuning procedures for your marker.

The regulated output delivery pressure is adjusted with the small 10/32 adjusting set screw located in the threaded Stainless Steel shaft on the front of the Aluminum Main Body of the ARMAGEDDON™. You will need a suitable Allen key for this operation. Turning the set screw ***in, clockwise,*** as you face the front of your ARMAGEDDON™, ***increases*** the regulated output pressure, turning the set screw ***out***, ***counter-clockwise***, ***reduces*** the regulated output pressure. ***Adjust the regulated output pressure set screw in 1/4-turn increments as you increase, or decrease, the regulated output pressure to your marker.***

NOTE: As you adjust the pressure setting cycle your marker several times, after each adjustment, to allow your marker to adjust to the new setting.

SERVICING YOUR ARMAGEDDON™

The ARMAGEDDON™ has been engineered to require an absolute minimum of service/maintenance. The following section has been included for those individuals who prefer to do their own service/maintenance.

Your ARMAGEDDON™ can be completely disassembled using only a set of Allen keys; complete disassembly is rarely required. The basic components contained within the Aluminum Body of the ARMAGEDDON™ are the Regulated Outlet Pressure Gauge, Regulated Outlet Pressure Male Fitting, Regulated Outlet Pressure Burst Disk, Piston, Regulated Outlet Pressure Adjustment Strut and Set Screw, Piston Seal Carrier, MainSpring and Split Ring Retainer. The basic components of the Stainless Steel 'Arm' assembly are the Q/Fill™ Assembly, High Pressure Status Gauge, High Pressure Burst Disk, Hollow Hex Allen Set Screw Retainer, Regulator Seat Retainer, Seat/Seal and the Pin and Spring Valve assembly.

The following chart will assist you in troubleshooting your ARMAGEDDON™.

PROBLEM	POSSIBLE CAUSE
No Gas Delivery	Adjusting set screw not set in position. Defective Valve Seat. Internal Obstruction.
Poor Gas Delivery (Shootdown)	Pressure not set high enough for specific marker. Defective Valve Seat. Piston Seal Carrier O' ring failure. Main Spring malfunction.
Poor Gas Delivery (Erratic delivery pressure)	Piston Seal Carrier O' ring failure. Main Spring malfunction. Defective Valve Seat.
Poor Gas Delivery (Output pressure creeps up)	Defective Valve Seat. Dirt in regulator Seat/Pin Valve area. Damage to Seating face on regulator Pin Valve.
Burst Disk Failure	Over pressurized bottle/tank/cylinder, see 'Note' below.
Air leaks from Q/Fill™ port	Damaged or dirty "O" ring on Q/Fill™ check strut.

Note*: Safety Caution!*
In the event of a Safety Burst Disk failure do not attempt to change or reinstall the Safety Burst Disk. Contact Air America® for the designated replacement.

SERVICING THE PISTON/ MAIN SPRING ASSEMBLY

To remove the Piston Seal Carrier, Piston, Pressure Adjustment Strut, and MainSpring for maintenance inspection, first unscrew and separate the Bottle and 'Arm' Valve from the Aluminum Main Body of your ARMAGEDDON^{tm}. These components can be withdrawn from the Aluminum Main body with the removal of the Split Ring Retainer at the Pressure Adjustment set-screw. Once the Split Ring Retainer is removed the complete Piston Main Spring Assembly will separate from the Aluminum Main Body. The Pressure Adjustment Strut is then withdrawn from the Piston by pulling the Pressure Adjustment Strut out of the center of the Piston. ***Do not use any griping device to extract the Pressure Adjustment Strut.***

Carefully inspect the condition of the Inner and outer O' rings of the Piston Seal Carrier and the Pressure Adjustment Strut O' rings. If the O' rings appear to be bruised or scraped the O' rings should be replaced. The 2 (two) O' rings on the Pressure Adjustment Strut can be difficult to reinstall, they are a tight fit and can easily be damaged if they are over-stretched. If your inspection of the O' rings on the Piston Seal Carrier indicates; due to bruising or scrapes on the surface of the O' rings, that replacements are required, the following procedure is recommended.

The inner diameter bore of the Aluminum Main Body should be cleaned by inserting a piece of lint free cloth into the bore and rotating gently. The Piston Seal Carrier Inner & outer O' ring grooves must be free of grit or dirt. Before installing replacement O' rings, O' rings should be wiped with a ***very light coat of *Silicone lubricant***. Once the O' rings are replaced; ***O' ring type and size cannot be substituted***, the Piston Seal Carrier can be pushed back onto the Piston Rod. The inner O' ring of the Piston Seal Carrier will ensure a positive fit with the Piston Rod. The Outlet Pressure Adjusting Strut should then be re-inserted into the center shaft of the Piston Assembly, ensuring that the Outlet Pressure Adjusting Strut is inserted with the lubricated O' ring end first. Before re-inserting the Main Spring into the Aluminum Main Body wipe the coils of the Main Spring with a *Very light coat* of *Silicone lubricant. It is doubtful that the Main Spring will need replacing, in the event there are any visible signs of hair-line cracks or separations on the spirals of the Main Spring, the Main Spring must be replaced.

When the components of the Aluminum Main Body are in place, the Piston shaft must protrude out of the Aluminum Main Body enough to position the Split Ring Retainer onto the protruding Piston shaft at the location of the Pressure Adjustment set-screw. The basic maintenance of your ARMAGEDDON^{tm} Aluminum Main Body is now complete.

Note: *If a Silicone lubricant is not available, 10W/30 or 30W motor oil can be substituted***.** ***WD40 or similar products are not recommended for O' ring lubrication.***

SERVICING THE ARMAGEDDON^{tm} SEAT SEAL AND REGULATOR PIN & SPRING

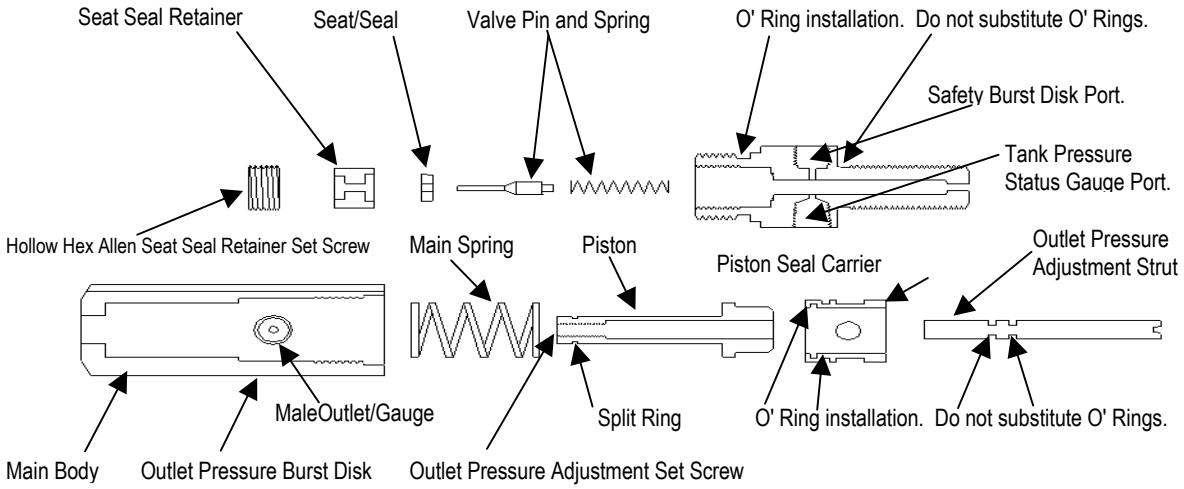
SAFETY ALERT!
ALWAYS DE-GAS YOUR SYSTEM
PRIOR TO DOING ANY SERVICE OR REPAIRS.

To service these components, it is necessary to unscrew/separate the 'Arm' regulator and bottle section from the ARMAGEDDON^{tm} Aluminum Main Body.

When the Bottle is completely empty of any pressure remove the large hollow hex Allen retainer set-screw securing the Seat Seal Retainer in place. The regulator Seat/Seal and regulator Valve Pin and Spring can now be inspected, and if necessary, replaced. The sealing face of the regulator Valve Pin should be free of nicks and scratches. If the Valve Pin appears to be marred in any way it must be replaced. Regulator Valve Pins and Springs rarely need replacement, unless they are damaged by careless handling.

The regulator Seat Seal can be removed from the Regulator Seat Retainer with finger pressure. If you find it necessary to pry it loose, be careful not to scratch any of the metal surfaces. The Air America® regulator Seat material has a 'memory,' and once removed from the Seat Retainer, may lose its sealing qualities. In an emergency, the Seat can be turned over and reinstalled as a temporary solution. Under optimum conditions a new Seat should be installed.

When reassembling, insert the Seat in the Regulator Seat Retainer, with the Seat in the Regulator Seat Retainer Seat pocket, facing the bottle. The Regulator Seat Retainer and Seat is placed over the Pin and Spring assembly. The large hollow hex Allen retainer set-screw is then tightened down with ***a light to medium torque, the amount of torque necessary to assure a pressure seal of the Seat. If excessive torque is applied to the Allen set screw, the removal of the Allen set screw, when a subsequent Seat replacement becomes necessary, could be very difficult. Do not use a sealant to secure the large hollow hex Allen retainer set-screw.***



CONVERTING YOUR ARMAGEDDON^{tm} TO LEFT HAND OUTPUT

If your playing style requires that you switch the regulated pressure ***output*** port to the opposite side of the Aluminum Main Body, the change can be made by swapping the low pressure gauge; gauge face: 1200 psi, and the male regulated output pressure fitting, from side to side.

The positions of the high pressure gauge; gauge face: 5000 psi, and the Q/Fill™ Adapter on the Stainless Steel 'Arm' Valve, although not recommended, can be interchanged/swapped.

Note: Always use a brand name, high-pressure anaerobic removable thread Sealant, when reassembling threaded fittings. The use of Teflon tape should be avoided.

ADVANCED TUNING OF THE ARMAGEDDON^{tm}

FOR THE AUTOCOCKER

NOTE: As you adjust the pressure settings, remember to cycle your marker several times after each adjustment.

STEP 1 - Turn the hammer spring adjustment all the way out to the minimum setting.

STEP 2 - Connect your ARMAGEDDON^{tm} to the marker.

STEP 3 - ***Reduce*** the output pressure on your ARMAGEDDON^{tm} down to the 'no flow' point by turning the Outlet Pressure Adjustment Set Screw ***counter clockwise in 1/4-turn increments, dry firing the marker after each 1/4 turn*** until the 'no flow' point is reached. ***Do not remove the Outlet Pressure Adjustment Set Screw***.

STEP 4 - ***Increase*** the output pressure slowly by turning the Outlet Pressure Adjustment Set Screw ***clockwise, in 1/4-turn increments, dry firing the marker after each 1/4 turn,*** until you have just enough pressure to operate the automation system and to recock the hammer.

STEP 5 - As soon as the marker's discharge sounds like it might launch a ball, start chrono-graphing two or three shot strings after each 1/4-turn adjustment. Write down the average of each string so that you can get a feel for the typical velocity increase each 1/4 turn should produce. The average marker will produce either no increase or possibly a decrease in velocity somewhere in the low 200's. At this point you have found the balance point between the hammer spring energy and the chamber pressure.

STEP 6 - Turn up your hammer spring just enough to produce the necessary velocity increase. The amount of hammer spring energy is now correct for the chamber pressure present.

STEP 7 - Your velocity is still in the low to middle 200's. From this point on, never increase the chamber pressure without making a corresponding increase in hammer spring energy. Work both adjustments together until you have the velocity you need.

STEP 8 - Once everything is set, note the output pressure from your ARMAGEDDON^{tm} system. This will eliminate repeating Steps 1 through 8 for future tuning.

This tuning procedure illustrates the importance of having a "balanced" set of springs working inside your marker. The gas pressure spring in the valve chamber is a spring just like the metal coil behind the hammer.

If the hammer spring is too strong for the chamber pressure present, excessively long Valve open times will occur. If it is too weak, the exhaust Valve will not be opened to its proper lift, and performance will suffer. Having these two spring elements in tune with each other is critical to the consistent performance of the marker.

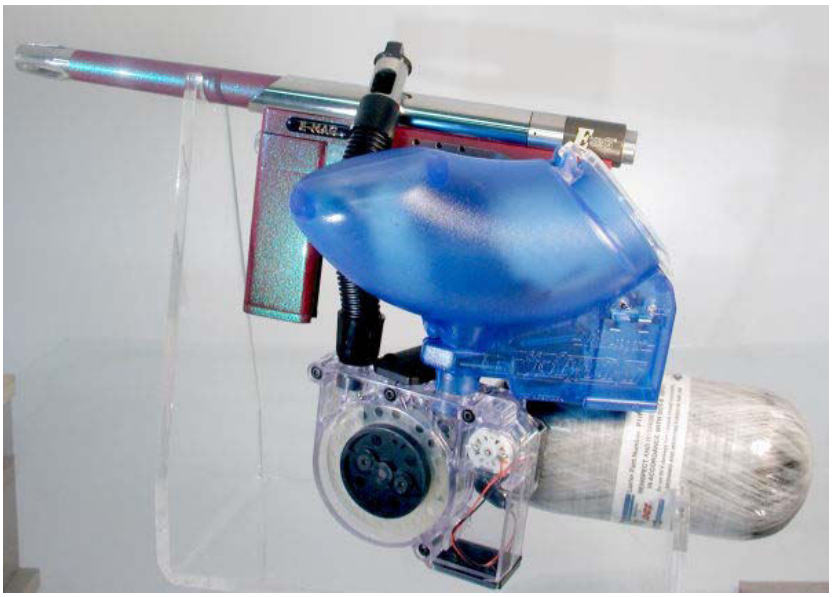
THE ARMAGEDDON^{tm} AND THE AUTOMAG

Since the AutoMag incorporates an internal regulator, when the ARMAGEDDON^{tm} is installed onto an AutoMag, a dual stage regulated system is created. The ARMAGEDDON^{tm} should be set to deliver approximately 700 PSI to the AutoMag's internal regulator. The minimum pressure your ARMAGEDDON^{tm} should deliver to your AutoMag regulator should be no less than 625 PSI.

Note: Always check with your markers manual or factory tech support staff if in doubt regarding questions of performance pressures and tuning procedures.

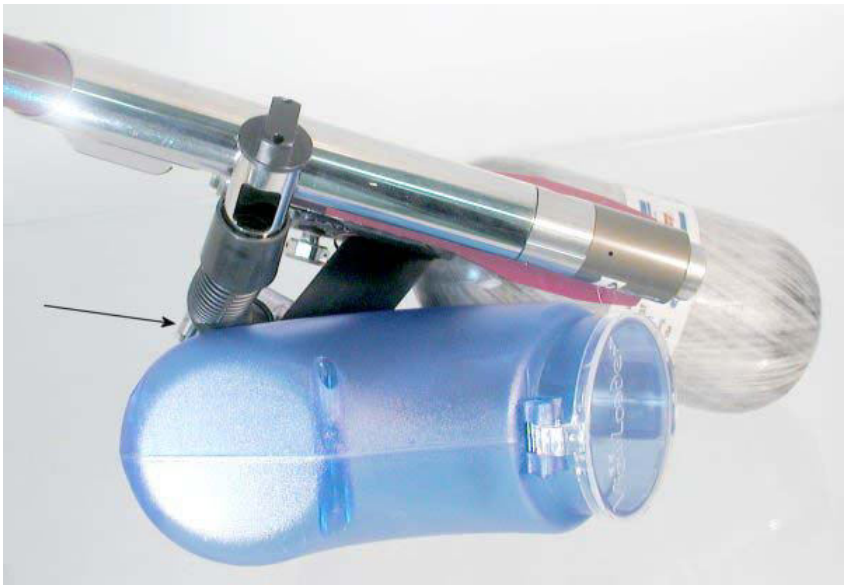
Hopper Modifications

Advanced Warp Feed Installation



To obtain a tighter setup with your Warp Feed and hopper the following two options are suggested:

(A) Melting a groove in the side of the hopper.
(B) Drilling a pass-thru hole in the hopper.

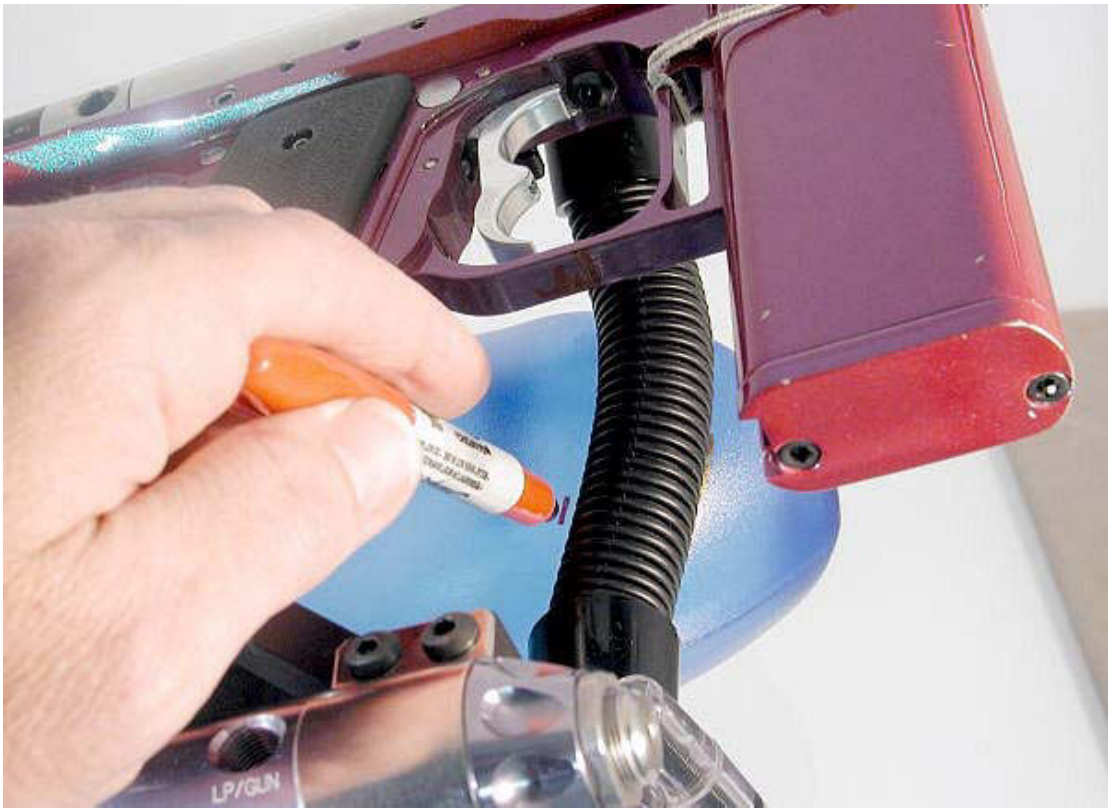


The feed hose limiting the parallel positioning of the hopper

What you'll need to melt the hopper:

You'll need either a high wattage heat gun or propane torch and a felt tipped marker. This pictorial will show us using a heat gun but the effect is the same with the propane torch. In either case, exercise caution and safety. Do this outside or in the garage!

Mark both sides of the feed tube on the hopper.



You'll be able to remove this later with some solvent when you're finished.

You'll need to apply more heat to the upper end of the hopper where the material will have to be pushed in edge on.

When you see that the plastic is starting to sag, it's time to make the depression with a barrel or length of pipe.

Press the barrel in and hold it for several seconds. The barrel will help cool off the plastic. Fit the hopper back on the gun to see if you need to deepen the notch anywhere. Don't be alarmed if at first you don't make a notch as deep as you planned on. Its better to err on that side! It may be helpful to go after it a little bit at a time anyway by repeating the process. This will also help give you a feel for how much heat to apply.

Now we're cooking!

Now, let's look at option (B)

Drilling a pass-thru hole in the hopper

You'll need a Dremel Tool or equivalent with a rotary file bit.

Another option would be a one inch hole saw and a drill, but keep in mind that because of the curved surface of the hopper, the holes will most likely have to be out of round. For that reason, the Dremel is superior.

With the feed tube off, adjust the hopper to a position you are going to be comfortable with and secure it.

From the side, mark where the center of the feed hose will pass through the hopper.

Now do the same looking from the front.

Verify the center marks by taking the power feed plug off and looking straight through the feed tube. This will insure you are in the right place.

Turn the marker over and mark the entrance hole from the underside.

Finally, estimate where the center of the hose will pass through from this angle and mark it.

The width of the feed hose is just under one inch. Because the surface of the hopper is curved, the entrance hole will have to be elongated.

If you’re not very experienced using a Dremel tool, practice on some similar material until you feel confident. Keep your hand away from the bit!
Make sure you hold both the work and the tool firmly as it has a tendency to walk so GO SLOWLY!!

Keep checking your work until the hose will pass through in a direction towards the other hole. A little bit more of this side here and we'll have it!

Remember, there is plenty of room for error, just less than the size of a paintball!

Nice!!!

Wait till the blimp patrol gets some of this!

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Pump Gun Conversion Kit

Please Note: To install this kit you must have a mainbody with an enlarged sear slot; all 68AUTOMAGs and MINIMAGs manufactured after June 1994 will have this type of mainbody. If you are unsure of the date, check with the factory. You will also need a custom rail with a pump slot. All current custom rails from Airgun Designs have the required slot.

Tools required:
1/8"Allen (hex) wrench
3/16"Allen (hex) wrench (For disassembly)
Please read all instructions prior to assembly.

Initial Installation:

1. Degas marker and remove gas source.
2. Remove Barrel, Valve Assembly, mainbody, and Vertical bottle adapter (if so equipped) from the Rail.
3. Remove Power Tube Tip to access the Power Tube Spring. Remove Power Tube Spring and replace with Power Tube Spacer included in kit. Reinstall Power Tube Tip. **See Figure A.**
4. Remove blue Bumper from the Power Tube and replace with black Bumper included in kit.
5. Place Wave Spring around black Bumper.
6. Remove Frame Assembly from Rail
7. Remove all parts necessary from your old rail and install onto new rail (i.e. Sear Assy, Bottle Mounts, etc.) **See Figure B.**
8. Remove Pump Rod from storage position in Pump Handle Assembly.
9. Insert L-shaped end of Pump Rod into oval hole in Pump Handle Assembly and snap Pump Rod firmly into place as shown in Figure B.
10. Slide Pump Handle Assembly onto front of Rail, ensuring that Pump Rod rests in Pump Slot and that Pump Post Mount rests underneath Rail.

For Markers without Vertical Bottle Adapter:

11a. Place 1/4-20 hex nut in bottom of Pump Post Mount.
12a. Insert 1/4-20 x 1/2" screw through Rail into nut and tighten.
13a. Reassemble marker.

For Markers with Vertical Bottle Adapter:

11b. Place Vertical Bottle Adapter under Pump Post Mount.
12b. Insert long 1/4-20 x 3/4" screw through Rail and Pump Post Mount into Vertical Bottle assembly and tighten.
13b. Reassemble marker.

NOTE: Pump Handle Assembly may be removed from Marker without mainbody removal by using a 3/16" Allen wrench to unscrew Pump Post from its mount.

Converting Pump Marker to Semi-Automatic Marker:
NOTE: The Pump Post Mount can remain on the marker.

1. Degas marker and remove gas source.
2. Remove Valve Assembly.
3. Remove Wave Spring from black Bumper.
4. Remove black Bumper from the Power Tube and replace with blue Bumper. (NOTE: Power Tube Spacer may need to be removed for proper operation.)

Converting Semi-Automatic Marker to Pump Marker:

1. Degas marker and remove gas source.
2. Remove Valve Assembly.
3. Reinstall Power Tube Tip and remove blue Bumper from the Power Tube.
4. Replace blue Bumper with black Bumper.
5. Place Wave Spring on black Bumper.
6. Place Pump Post mount under front of Rail.

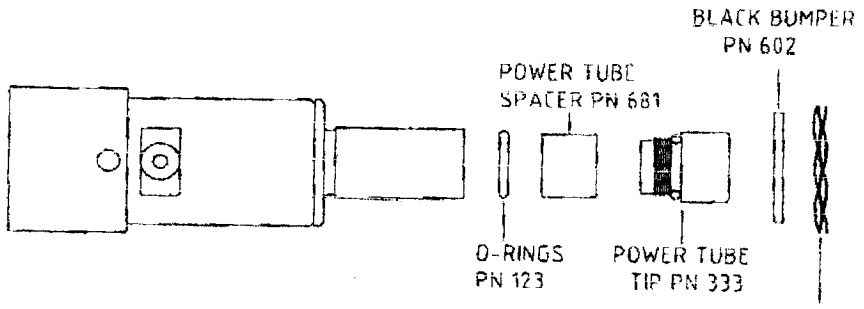


FIGURE A

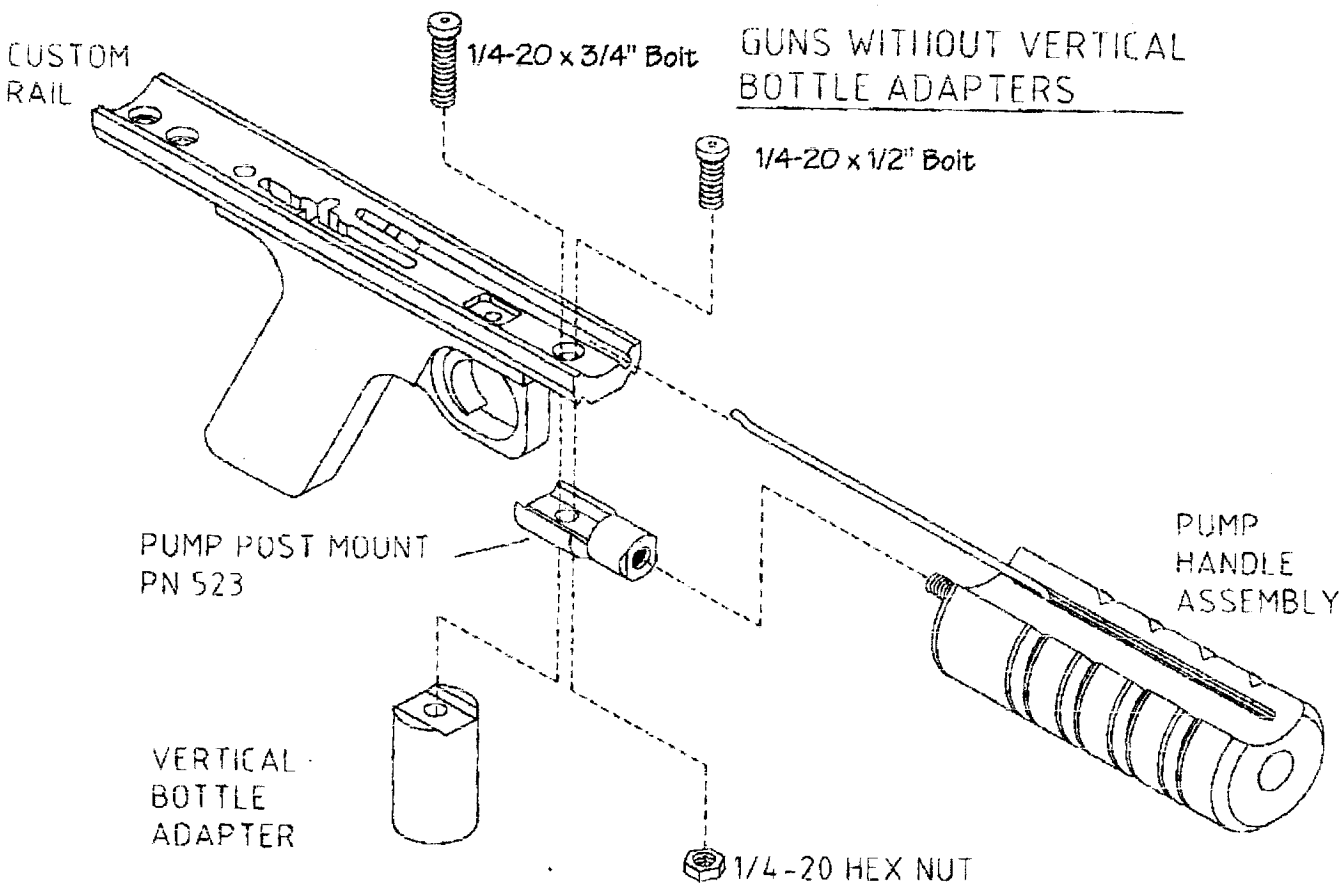


FIGURE B

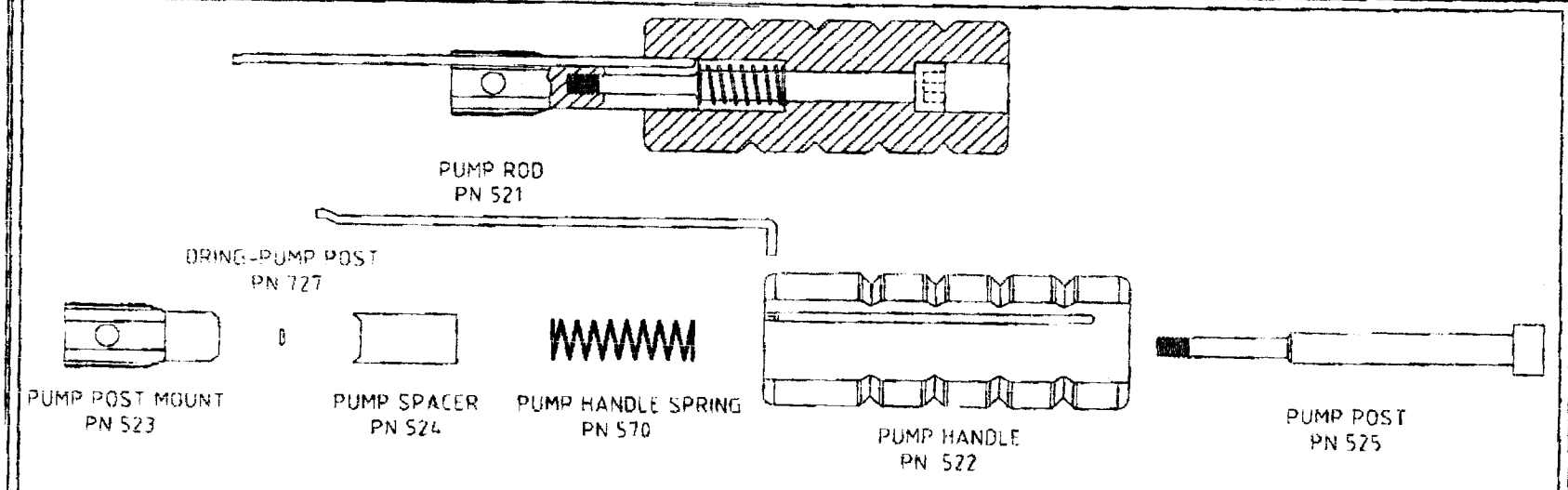
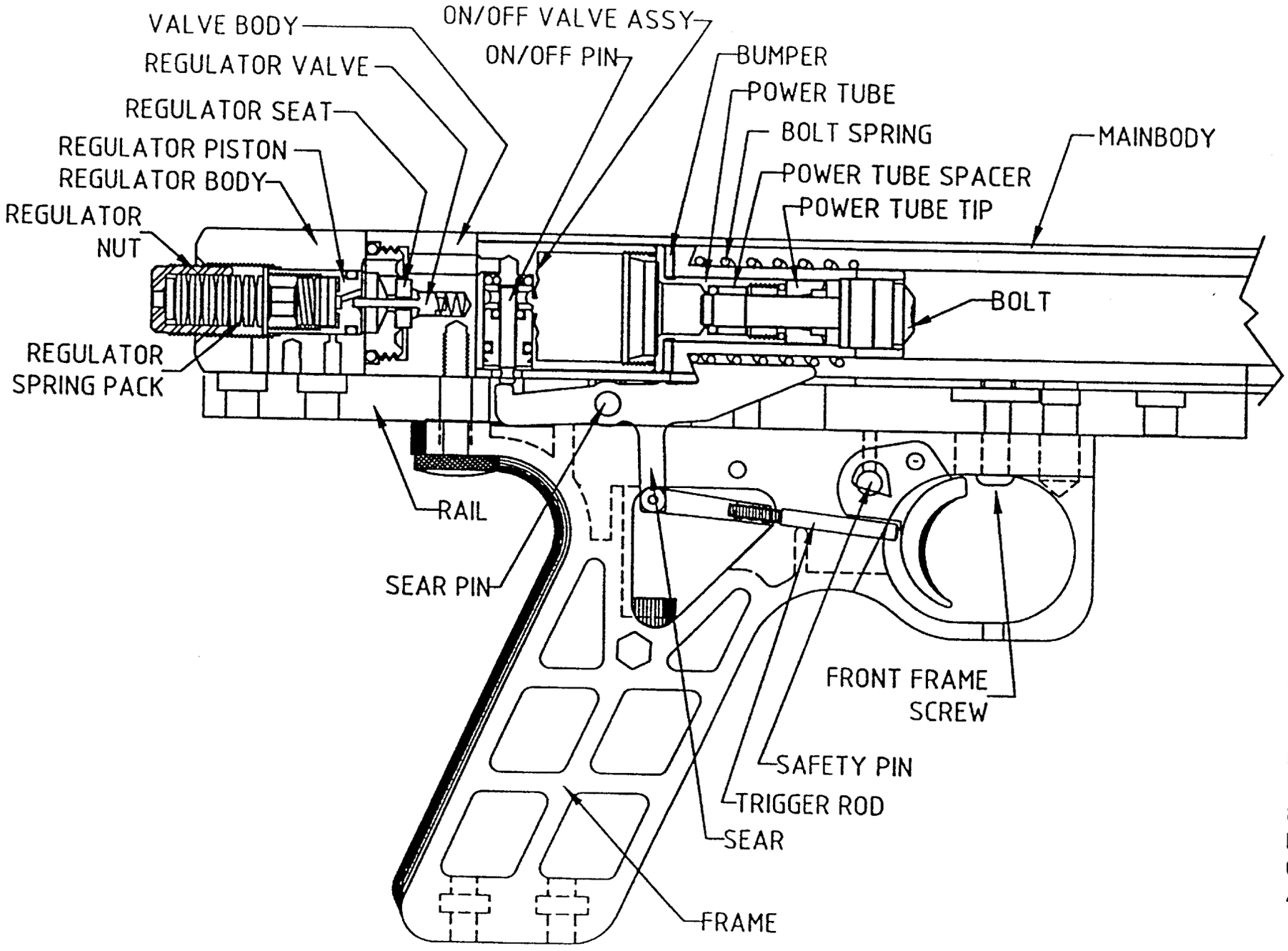


FIGURE C



FUNCTIONAL STEPS

1. AIR TANK SUPPLIES AIR AT 800-1000 PSI TO REGULATOR.

2. REGULATOR TAKES PRESSURE TO 375 PSI.

3. AIR FLOWS THROUGH ON/OFF VALVE AND FILLS AIR CHAMBER

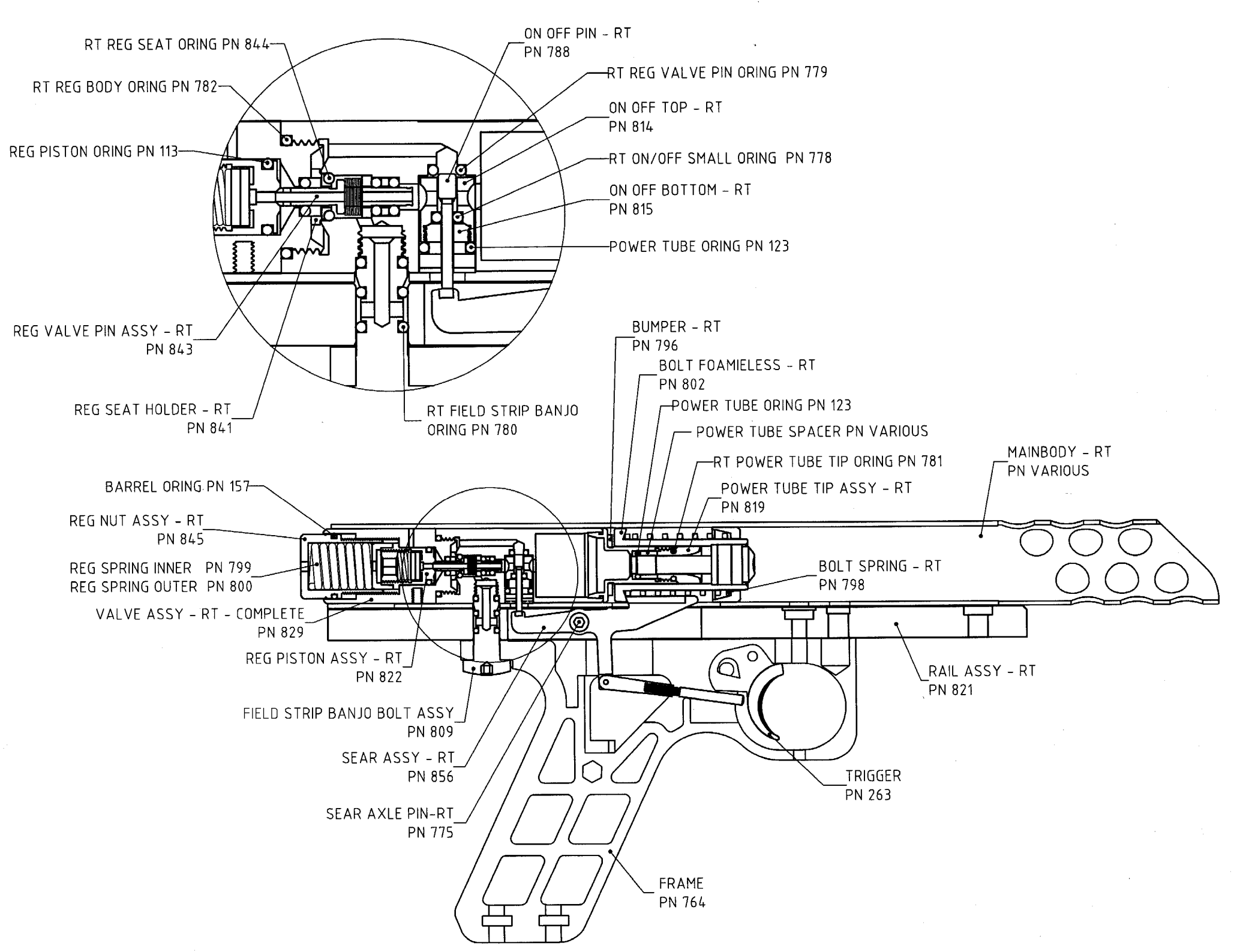
4. TRIGGER IS PULLED, FIRST CLOSING ON/OFF VALVE THEN RELEASING BOLT

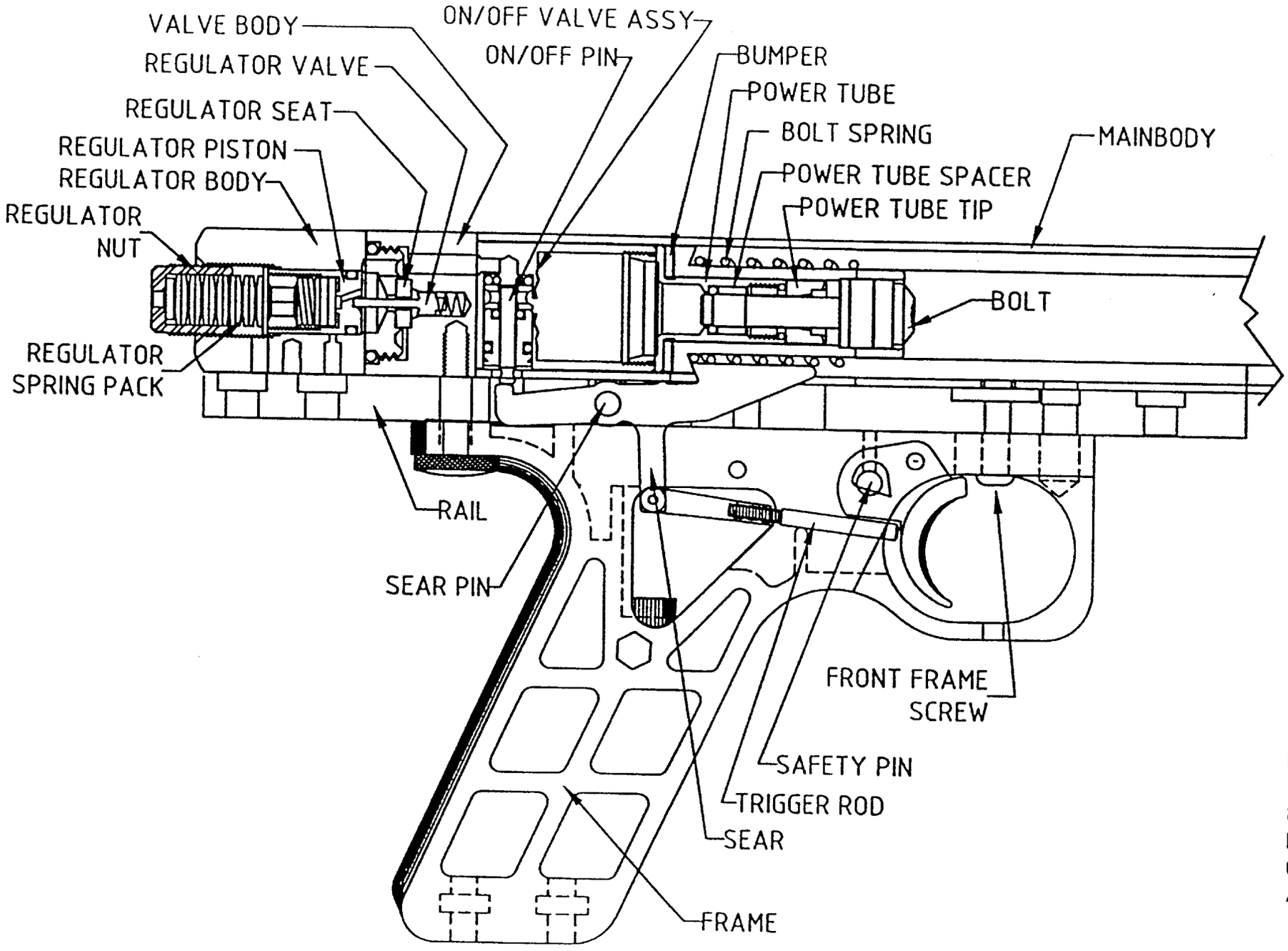
5. BOLT MOVES FORWARD AGAINST SPRING PRESSURE UNTIL POWER PISTON EXITS POWER TUBE.

6. AIR IS RELEASED INTO BOLT CAVITY AND FIRES BALL.

7. MAIN SPRING RETURNS BOLT TO COCKED POSITION.

8. TRIGGER IS RELEASED, BOLT IS LATCHED, AND ON/OFF VALVE PRESSURIZES AIR CHAMBER.


RT REG SEAT ORING PN 844
RT REG BODY ORING PN 782
REG PISTON ORING PN 113
REG VALVE PIN ASSY - RT
PN 843
REG SEAT HOLDER - RT
PN 841
ON OFF PIN - RT
PN 788
RT REG VALVE PIN ORING PN 779
ON OFF TOP - RT
PN 814
RT ON/OFF SMALL ORING PN 778
ON OFF BOTTOM - RT
PN 815
POWER TUBE ORING PN 123
RT FIELD STRIP BANJO
ORING PN 780
BUMPER - RT
PN 796
BOLT FOAMIELESS - RT
PN 802
POWER TUBE ORING PN 123
POWER TUBE SPACER PN VARIOUS
RT POWER TUBE TIP ORING PN 781
POWER TUBE TIP ASSY - RT
PN 819
MAINBODY - RT
PN VARIOUS
BARREL ORING PN 157
REG NUT ASSY - RT
PN 845
REG SPRING INNER PN 799
REG SPRING OUTER PN 800
VALVE ASSY - RT - COMPLETE
PN 829
REG PISTON ASSY - RT
PN 822
BOLT SPRING - RT
PN 798
RAIL ASSY - RT
PN 821
FIELD STRIP BANJO BOLT ASSY
PN 809
SEAR ASSY - RT
PN 856
SEAR AXLE PIN-RT
PN 775
TRIGGER
PN 263
FRAME
PN 764



FUNCTIONAL STEPS

1. AIR TANK SUPPLIES AIR AT 800-1000 PSI TO REGULATOR.

2. REGULATOR TAKES PRESSURE TO 375 PSI.

3. AIR FLOWS THROUGH ON/OFF VALVE AND FILLS AIR CHAMBER

4. TRIGGER IS PULLED, FIRST CLOSING ON/OFF VALVE THEN RELEASING BOLT

5. BOLT MOVES FORWARD AGAINST SPRING PRESSURE UNTIL POWER PISTON EXITS POWER TUBE.

6. AIR IS RELEASED INTO BOLT CAVITY AND FIRES BALL.

7. MAIN SPRING RETURNS BOLT TO COCKED POSITION.

8. TRIGGER IS RELEASED, BOLT IS LATCHED, AND ON/OFF VALVE PRESSURIZES AIR CHAMBER.