

# 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<sub>2</sub> 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 blooming 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](http://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](http://www.airgun.com) and our sister site [www.automags.org](http://www.automags.org) for more information, forums and chat!