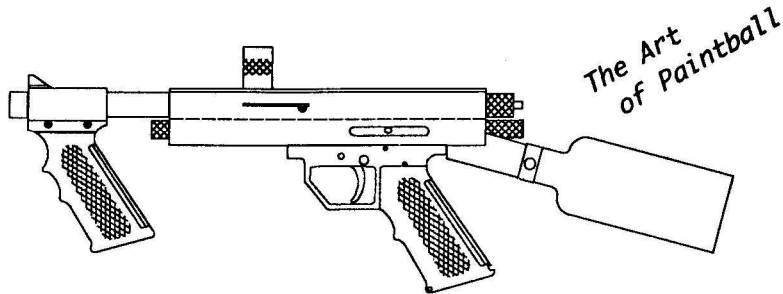


# F1 ILLUSTRATOR™

User Manual--version 1.2



## CAUTION

- The F1 is not a toy. It can cause injury or death.
- The compressed CO2 source used with the F1 can cause injury or death.
- The F1 is not for sale to individuals under the age of 18.
- The F1 is not intended for use by individuals under 18 years of age.
- The F1 is to be used only as described in this manual.
- Fire only 0.68 caliber paintballs from the F1.
- Check the velocity of your F1 before each use.
- Read this manual before using the F1.

The purchaser and all users of this gun acknowledge that it is a potentially dangerous instrumentality and thereby assume all risk in its use.

←←←  
←←← **PLEASE READ BACK COVER**  
←←←

Include this manual if you sell or loan your F1. (Contact your dealer [or write us at PO Box 59654, Renton, WA 98058], if you need a replacement manual.)

For service or parts, contact your dealer or Techline at 503-667-3705.

The information in this manual is subject to change without notice. It does not represent a commitment on the part of Feral Action Sports Technology, Inc. We reserve the right to change and improve products with no obligation to modify products previously sold.

U. S. Patent No. 5,063,905.

F1 ILLUSTRATOR is a trademark of Feral Action Sports Technology, Inc.

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**QUICK GUIDE TO THE F1 ILLUSTRATOR** (see your User Manual for details and troubleshooting hints)

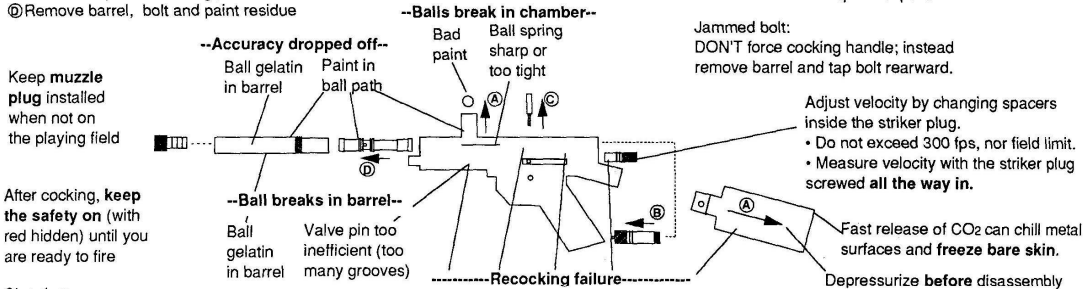
**CAUTION** This gun is not a toy. It is not for use by persons under 18 years of age. It can cause injury or death. It is dangerous up to 125 yards. Use it only for firing .68 caliber paintballs, with all persons within range wearing proper protective equipment. Be careful; this gun recocks itself when it is fired! If not cocked, it can fire when dropped.

To field strip for cleaning, follow steps A-D:

- Ⓐ Depressurize and unload (for safety)
- Ⓑ Use bolt plug to get tool from grip
- Ⓒ Use tool to pull connecting pin
- Ⓓ Remove barrel, bolt and paint residue

Your gun can fire if you release the cocking handle while cocking

If your gun double fires (except with low CO<sub>2</sub>): Lubricate the trigger; if this does not correct the problem, there may be a **dangerous trigger defect** which requires repair.



Cleaning:

- Paint--water or alcohol
- Ball gelatin (in barrel)--car windshield cleaner

Lubrication:

- Striker & bolt--Gold Cup Lube (2-3 drops), or a very thin oil like WD-40 (frequently)
- Trigger assembly--oil (to prevent rust)
- Inside barrel--silicone

- Valve pin too efficient (not enough grooves) or cup seal unscrewed
- Dirty or poorly lubed
- Buffer too long
- Low velocity
- Low CO<sub>2</sub> (or, bottle adapter screw in too far)

**DANGER** Do not create a rocket by unscrewing the CO<sub>2</sub> bottle from the bottle valve. Be sure they are attached tightly. Lube the bottle adapter threads on the gun.

U. S. Patent  
No. 5,063,905.

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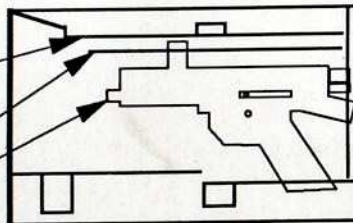
To learn how to keep your gun operating, and how to avoid injuries with it, see your User Manual.

If you need a replacement, write to: Feral Action Sports Technology, Inc., Box 59654, Renton, WA 98058.

## READ THIS FIRST!!!

This new F1 *ILLUSTRATOR* box is lined with a renewable resource, cardboard, rather than petroleum-based foam plastic. TO REMOVE YOUR GUN:

1. Fold this edge of the barrel support flap upward and remove barrel.
2. Push top edge of feed tube support panel toward rear of box, releasing the tube.
3. Lift forward end of gun, then pull gun up and to the left to remove it.



RECENT CHANGES AND TUNING HINTS (page numbers refer to your user manual):

**Buffers:** Your gun includes a firm rubber buffer (#48 on p 13) on a new longer bolt plug (#21). The hard plastic striker buffer (#15) is no longer used. A buffer which is too long can prevent recocking. Recock margin testing and adjustment (p 8-10) must be done with all buffers removed! To install a new rubber buffer, thoroughly clean the end of the bolt plug, then roughen the end with coarse sandpaper. Install with a good cyanoacrylic adhesive (instant glue, super glue), **OBSERVING ALL MANUFACTURER'S PRECAUTIONS**. Use enough adhesive to thoroughly wet the surface between the buffer and plug.

**Lubrication:** To work reliably, your F1 *ILLUSTRATOR* must be clean and properly lubed. Gold Cup lubricant, formulated specially for paintball guns, has proven effective in the F1 *ILLUSTRATOR* at all playing temperatures. A sample is shipped with your gun. With the gun cocked, place 2-3 drops in the connecting pin hole and in the front end of the cocking handle slot. If Gold Cup is not available, use a thin oil such as WD-40. (NOTE: WD-40 evaporates rapidly and must be reapplied frequently, especially in hot weather!)

**Low Velocity:** If your gun recocks reliably but you can't get the velocity up to ~280 fps, even with lots of spacers behind the striker spring (You do have CO2 in your bottle, don't you?), your valve pin may have too many grooves. (See the discussion of recock margin on p 8-9, and troubleshooting hints on p 10-11.)

**Erratic Velocity:** If the velocity varies more than ~20 fps between successive shots, the striker O-ring may be nicked. For more hints, see p 10.

**Thread Lock Failures:** If the thread lock compound you are using on the cocking handle and trigger screws (p 12) isn't setting up, you may have oil on the threads. Thorough degreasing, (see bottom of p 12) is essential.

**Excessive Paint Breakage:** Clean your barrel and lubricate it with silicone (p 4). Minimize recock margin (p 9-10).

**Connecting Pin and Cocking Handle (#17 & #3 on p 13):** These are now made of high strength carbon steel and **can rust**. To minimize rusting, keep dry and lightly oiled.

## ONLY YOU CAN MAKE PAINTBALL SAFE

### CAUTION—AVOID HURTING YOURSELF OR SOMEONE ELSE

- Do not pressurize this gun until you have read this manual. Especially note ways injuries can occur, as shown in outlined sections and the centerfold.
- This gun can fire when dropped, especially if it is **not** cocked. Keep it unloaded and unpressurized when not in use.
- Install a muzzle plug in the barrel when not actually playing. One is included with your gun. Replacements are available from your dealer or us.
- Handle this gun **as if it is always ready to fire**. It recocks itself during firing, so it may be!
- This gun can be dangerous up to 125 yards (115 meters).
- Don't shoot at opponents who are closer than 20 feet (6 meters).
- Wear approved eye and head protection.
- Never shoot toward individuals not wearing approved eye and head protection.
- Never fire any object except .68 caliber paintballs from this gun.
- Never disassemble this gun while it is pressurized.
- Do not touch a chilled CO<sub>2</sub> container with bare skin; frostbite can result.
- Use of this or any gun while under the influence of drugs or alcohol is a criminal disregard of public safety.
- Never shoot at the property of others. Paint can damage surface finishes.
- Learn and follow the rules of the field where you are playing.
- Do not let this gun out of your control while it is pressurized.
- Never store this gun while it is pressurized.
- Two defects are particularly dangerous and require immediate attention by us or a qualified airsmith:
  1. The CO<sub>2</sub> bottle is hard to install or unscrew, or it leaks with a good O-ring.
  2. The gun double fires (other than when you are running out of CO<sub>2</sub>).
- Do not modify your gun, especially the trigger assembly.
- Do not use any power source except compressed CO<sub>2</sub>.

### ALSO, AVOID DAMAGING YOUR GUN

- Do not "dry fire" your gun (i.e., without CO<sub>2</sub> pressure). (p 3)
- Do not use liquid CO<sub>2</sub> (i.e., a siphon tube bottle).
- Do not overtighten the CO<sub>2</sub> bottle—let the O-ring do the sealing. (p 2)
- Do not crush the trigger safety spring when installing the trigger assembly. (p 11)
- Do not overtighten the cocking handle. (p 12)
- Do not remove the valve body unless it seems to be causing a problem. (p 12)
- Do not damage the safety pin behind the valve body. (p 12)
- Do not use excessive recocking margin. (p 9-10)

This gun is delivered by Feral Action Sports Technology, Inc. with the express understanding that we assume no liability for its resale or safe handling, nor for physical injury or property damage resulting from its use.

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## INTRODUCTION

Your F1 *ILLUSTRATOR* is a CO<sub>2</sub>-powered semiautomatic gun designed to fire 0.68 caliber paintballs. It incorporates a new patented valve design to achieve high efficiency and consistent firing. All moving parts are hardened or hard anodized for long life. It accepts standard constant air CO<sub>2</sub> bottles and cartridge adapters.

## SPECIFICATIONS

Paintball Caliber: 0.68  
Action: semiautomatic  
Trigger Safety: pushbutton on trigger frame  
Muzzle plug: supplied (**PLEASE USE IT!**)  
Power: compressed CO<sub>2</sub> from bottle or cartridge  
Ball feed: 7/8 inch OD; accepts standard gravity feed magazine adapters  
Weight: 1.8 lbs, plus magazine and CO<sub>2</sub> bottle or cartridge holder  
Barrel length: 9 inches  
Overall length: 28.5 inches (with 9 inch barrel and optional 7 ounce CO<sub>2</sub> bottle with butt plate)  
Materials: Hard-anodized aluminum; stainless steel; hardened carbon steel (connecting pin, cocking handle, and in trigger assembly)  
Muzzle Velocity: adjustable from about 250 to 350 fps (factory set to ~ 280 fps)  
(Optional "Dial-a-Bolt" replaces stock bolt to: simplify velocity adjustment; permit lower velocity (down to ~100 fps); and help maintain sufficient recock margin.)

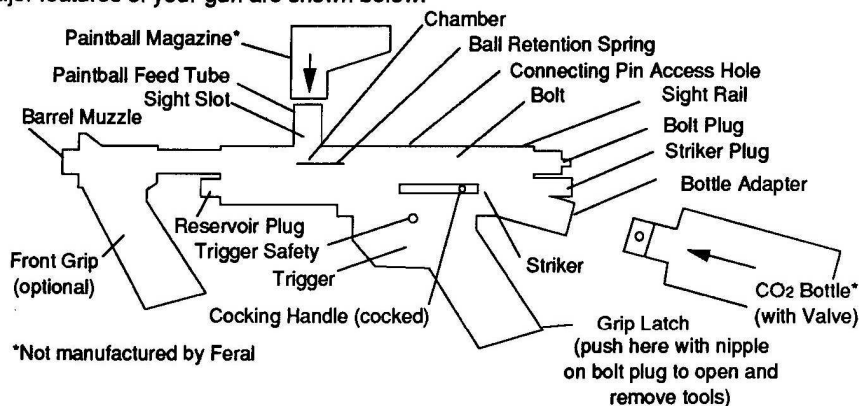
## OPERATION

### WARNING

During the following operations, keep your gun under control and pointed in a safe direction. Your gun can discharge:

- when it is being pressurized with CO<sub>2</sub>,
- when it is being uncocked, or
- when it is dropped (especially if it is *not* cocked).

Major features of your gun are shown below.



### CO<sub>2</sub> Installation and Removal

Only pressurize your gun with CO<sub>2</sub> after you understand how to handle it safely. Before pressurizing, check that it is cocked but not loaded. **If not cocked, it can fire as it is being pressurized**, or an excessive amount of CO<sub>2</sub> may leak from the gun.

Constant Air CO<sub>2</sub> Bottle--To pressurize, simply screw the bottle into the bottle adapter. You should hear a brief hiss as the bottle valve opens during the last 1/2 turn of the bottle. The bottle O-ring provides the seal, so just tighten the bottle until it is snug. Overtightening the bottle can damage your gun. If a leak persists, you need to replace the bottle O-ring. To depressurize, unscrew the bottle from the gun.

### WARNING

**Do not unscrew the bottle from the bottle valve; you may turn the bottle into a rocket! For more details on this exciting topic, see the safety centerfold, page 7.**

CO<sub>2</sub> Cartridge Holder--Install and remove as directed by the manufacturer.

### CAUTION

**To be safe, depressurize your gun unless you are about to use it.**

### Loading

Install a magazine on the ball feed tube. Following the directions of the magazine manufacturer, fill the magazine with .68 caliber paintballs.

### WARNING

**Your gun can fire if it is dropped, or the cocking handle is struck a sharp blow, especially if the gun is *not* cocked!**

### Cocking and Uncocking

To cock your gun, pull the cocking handle rearward until it latches. Be careful. If you release the cocking handle before it latches, **the gun can fire**. Releasing the handle too soon on a gun that is not pressurized can cause damage--see the discussion of dry firing below.

Before uncocking your gun, first unload it by rotating it sideways to allow paintballs in the chamber and ball feed tube to roll back into the magazine. If you uncock with a ball in the chamber, it will be forced forward into the barrel. When you next cock your gun, a second ball will enter the chamber. Firing two balls at once can cause ball breakage. Gun cleaning is covered on page 4.

To finish uncocking, grasp the cocking handle securely, pull the trigger, and allow the cocking handle to move forward slowly. (The trigger safety must be disengaged to permit the trigger to be pulled.)

### Trigger Safety

Your gun includes a trigger safety to help prevent accidental firing. Engage the trigger safety by pushing it to the right. When the trigger safety is toward the left, a narrow red band visible on the left end provides a reminder that the gun can then be fired. The trigger safety may not engage unless the gun is cocked. Remember, the only time your gun is truly safe is when it is unloaded and unpressurized!

### Firing

#### WARNING

**When firing, pay attention to where your gun is pointed; it will immediately recock!**

To fire your gun, point it in a safe direction and pull the trigger. (The trigger safety must be off; that is to the left, with red showing.) Keep your hand clear of the ball retention spring or you may have to clean a broken paintball from the chamber. Also, keep clear of the cocking handle; it moves rapidly and can cause injury.

So long as your gun is not tilted too far to the right or left, another paintball should feed into the chamber as it recocks. The F1 has very little recoil, so with some magazines you may occasionally need to shake your gun lightly to ensure the paintballs feed properly.

Your gun may be fired as often as you like with CO2 but no paintballs in it. Firing a new gun this way several thousand times will help break it in and it will operate smoother. However, *dry firing* (without CO2) should be avoided because the cocking handle will hit the front edge of the cocking handle slot, deforming the gun receiver.

### Failure to Recock

If, when you fire your gun it seems to fire several times in rapid succession, it has probably "beat down" and not recocked. It probably needs CO2 (p 2), lubrication (p 4), cleaning (p 4), a shorter buffer (p 10), more recock margin (p 8-9), or trouble shooting (p 9-11).

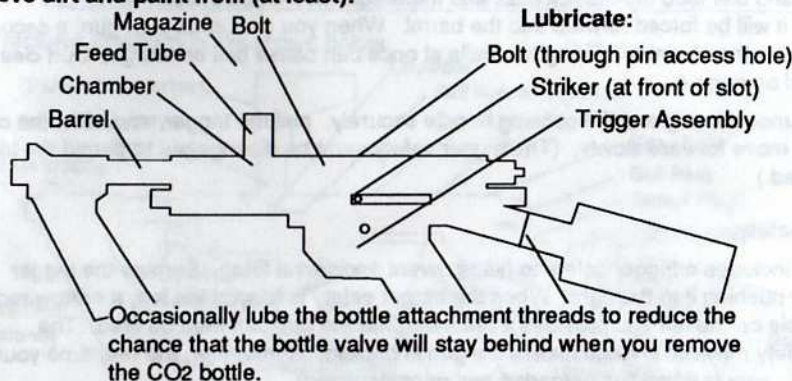
### Broken Paintballs

Occasionally, a paintball will break in your gun. Excessive recock margin can cause paintballs to break in the barrel (p 8-11). Incorrect ball retention spring adjustment can cause breakage in the gun chamber (p 9-11). Paintball residue anywhere it can contact a paintball (the magazine, feed tube, chamber, or barrel) can reduce accuracy. Cleaning broken paintballs from your gun is covered on pages 4 and 5.

## KEEPING YOUR GUN OPERATING

Before each use, your gun must be cleaned, lubed, and tuned. The cleaning and lubrication serve to eliminate the friction that will prevent reliable operation, and remove the paintball residue which can destroy accuracy. Tuning (p 8-9) is necessary to ensure that velocity is not excessive, that recocking will be reliable, and that paintballs will feed without breaking.

### Remove dirt and paint from (at least):



### WARNING

Uncock your gun before removing or cleaning the barrel. **Be careful; it can still propel a paintball at a dangerous velocity with the barrel removed!**

### Cleaning

Occasionally, a paintball will break as it is being fired from your gun. Frequent breakage means something is wrong with your paintballs or your gun--see pages 9-11. If the ball broke in the barrel, the residue can usually be removed by swabbing out the barrel. This will be easier if the barrel is first unscrewed from your gun.

If the break was in the chamber, the gun can be field stripped for cleaning as shown on the next page. The tool for pulling the bolt connecting pin from the gun is in the rear grip.

For thorough cleaning, alcohol can be used to wash paint residue and dirt from your gun. For stubborn paintball residue (primarily gelatin) inside a barrel, a good grade of automobile windshield washing fluid is helpful. If there is paint in the bolt O-ring grooves, the O-rings should be removed and the grooves should be cleaned. (Ideally, put a thin layer of silicone on your O-rings before reinstalling them.)

### Lubrication

Lubrication affects both recocking and the velocity of your gun. Gold Cup Lube works well at all temperatures; a sample is normally supplied with your gun. 2-3 drops are usually sufficient in each of the locations shown above. If Gold Cup is not available, a thin oil such as WD-40 can be substituted; it evaporates fast and must be reapplied as often as every game, especially in hot weather. Firearm lubricants such as Break-Free CLP don't work consistently; they can get sticky when chilled by CO2.

The inside of the trigger assembly must be kept lubricated with oil or a light grease to keep it moving freely and to prevent rusting. The connecting pin should also be kept oiled to prevent rusting.

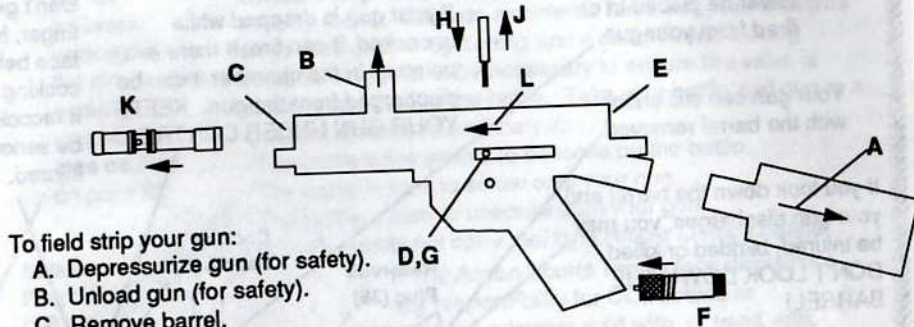
The inside of your gun barrel should occasionally be wiped down with silicone to help prevent a buildup of paintball gelatin.



## Field Stripping

### WARNING

Never remove any parts except the barrel while the gun is pressurized.



To field strip your gun:

- A. Depressurize gun (for safety).
- B. Unload gun (for safety).
- C. Remove barrel.
- D. Uncock gun.
- E. Remove bolt plug.
- F. Use nipple on bolt plug to open grip and take out the pin removal tool.
- G. Move bolt (with cocking handle) to align connecting pin under access hole.
- H. Insert pin tool through access hole and screw it into connecting pin.
- J. Pull connecting pin from gun.
- K. Remove bolt through front of gun (to keep debris away from striker).
- L. Swab bolt chamber in a forward direction (to keep debris away from striker).

In steps G-J above, if the bolt has jammed on a paintball shell, free the bolt by pressing against it with a wood or plastic rod. Do NOT attempt to move a severely jammed bolt by pushing on the cocking handle; the handle may break. If the cocking handle is loose, BE CAREFUL attempting to move the bolt; the jam could be caused by the connecting pin falling downward into the trigger assembly --see "Bolt is jammed" on page 11).

## Preventive Maintenance and Storage

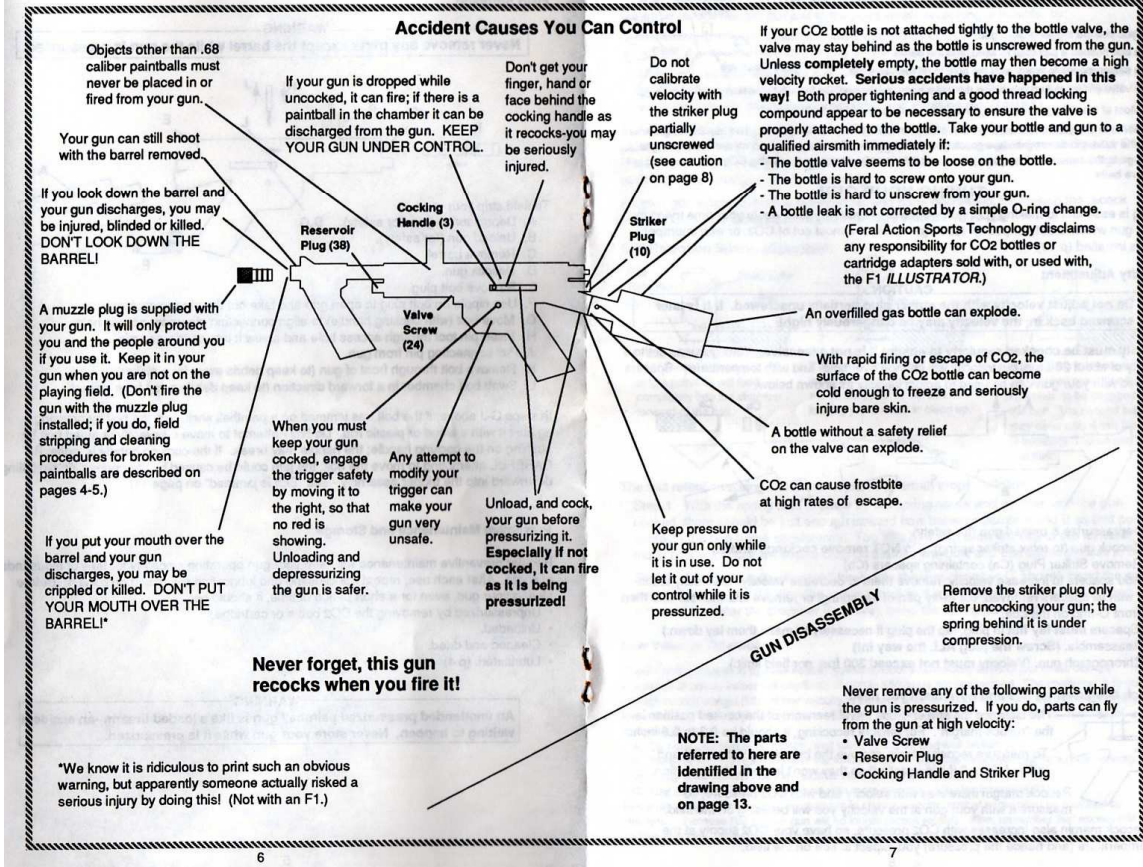
Regular preventive maintenance will keep your gun operating smoothly for tens of thousands of shots. After each use, repeat the cleaning and lubrication discussed on page 4. Before storing your gun, even for a short period of time, it should be:

- Unpressurized by removing the CO2 bottle or cartridge.
- Unloaded.
- Cleaned and dried.
- Lubricated. (p 4)

### WARNING

An unattended pressurized paintball gun is like a loaded firearm--an accident waiting to happen. Never store your gun while it is pressurized.

## Accident Causes You Can Control



Objects other than .68 caliber paintballs must never be placed in or fired from your gun.

Your gun can still shoot with the barrel removed.

If you look down the barrel and your gun discharges, you may be injured, blinded or killed. **DON'T LOOK DOWN THE BARREL!**

A muzzle plug is supplied with your gun. It will only protect you and the people around you if you use it. Keep it in your gun when you are not on the playing field. (Don't fire the gun with the muzzle plug installed; if you do, field stripping and cleaning procedures for broken paintballs are described on pages 4-5.)

If you put your mouth over the barrel and your gun discharges, you may be crippled or killed. **DON'T PUT YOUR MOUTH OVER THE BARREL!**

If your gun is dropped while uncocked, it can fire; if there is a paintball in the chamber it can be discharged from the gun. **KEEP YOUR GUN UNDER CONTROL.**

Don't get your finger, hand or face behind the cocking handle as it recocks-you may be seriously injured.

Do not calibrate velocity with the striker plug partially unscrewed (see caution on page 8)

If your CO2 bottle is not attached tightly to the bottle valve, the valve may stay behind as the bottle is unscrewed from the gun. Unless **completely empty**, the bottle may then become a high velocity rocket. **Serious accidents have happened in this way!** Both proper tightening and a good thread locking compound appear to be necessary to ensure the valve is properly attached to the bottle. Take your bottle and gun to a qualified airsmith immediately if:

- The bottle valve seems to be loose on the bottle.
- The bottle is hard to screw onto your gun.
- The bottle is hard to unscrew from your gun.
- A bottle leak is not corrected by a simple O-ring change.

(Feral Action Sports Technology disclaims any responsibility for CO2 bottles or cartridge adapters sold with, or used with, the F1 ILLUSTRATOR.)

An overfilled gas bottle can explode.

With rapid firing or escape of CO2, the surface of the CO2 bottle can become cold enough to freeze and seriously injure bare skin.

A bottle without a safety relief on the valve can explode.

CO2 can cause frostbite at high rates of escape.

Keep pressure on your gun only while it is in use. Do not let it out of your control while it is pressurized.

Remove the striker plug only after uncocking your gun; the spring behind it is under compression.

When you must keep your gun cocked, engage the trigger safety by moving it to the right, so that no red is showing. Unloading and depressurizing the gun is safer.

Any attempt to modify your trigger can make your gun very unsafe.

Unload, and cock, your gun before pressurizing it. **Especially if not cocked, it can fire as it is being pressurized!**

**Never forget, this gun recocks when you fire it!**

**GUN DISASSEMBLY**

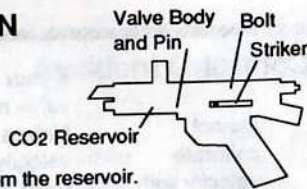
**NOTE: The parts referred to here are identified in the drawing above and on page 13.**

\*We know it is ridiculous to print such an obvious warning, but apparently someone actually risked a serious injury by doing this! (Not with an F1.)

## THEORY OF OPERATION

When you pull the trigger of your gun:

- The bolt pushes a paintball forward, into the barrel.
- The striker moves forward, with the bolt, to hit the valve pin.
- The valve pin is pushed forward in the valve body, releasing CO2 from the reservoir.
  - Most of the CO2 goes upward, through the bolt, to propel the ball.
  - Some is channeled rearward to push the striker back to the cocked position. The number of grooves on the valve pin determines how much goes to the striker. Too many grooves means too much gas will go to the striker, making your gun recock too violently, stressing it, wasting CO2, and **breaking more balls.**



## TUNING YOUR GUN

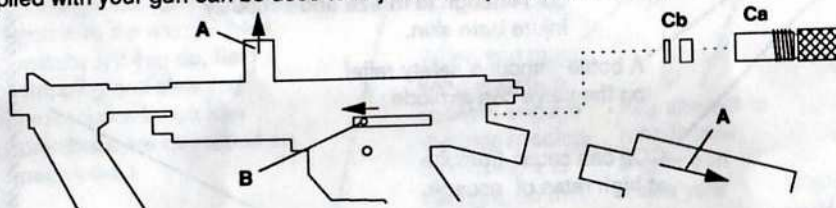
Tuning is essential to making your gun work well. However, don't waste your time trying to tune a gun which is dirty or poorly lubed (p 4 & 5), or almost out of CO2, or with improper O-rings installed (p 13).

### Velocity Adjustment

#### CAUTION

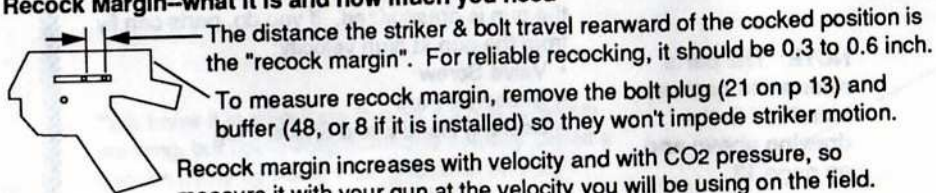
**Do not adjust velocity with the striker plug partially unscrewed. If it is later screwed back in, the velocity may be dangerously high!**

Velocity must be checked regularly to ensure it is not excessive. Your gun was set to a velocity of about 280 fps, but velocity will change over time, and with temperature. Spacers supplied with your gun can be used to adjust velocity as shown below.



- Depressurize & unload gun (for safety).
- Uncock gun (to relax striker spring). (**Do NOT remove cocking handle.**)
- Remove Striker Plug (Ca) containing spacers (Cb)
- Add spacers to increase velocity; remove them to decrease velocity. If velocity is too high with all spacers removed, cut away part of the spring, or remove first the rear and then the front O-ring on the bolt.
  - (Spacers **must lay flat** in plug; tap the plug if necessary to make them lay down.)
- Reassemble. (**Screw the plug ALL the way in!**)
- Chronograph gun. (Velocity **must not exceed 300 fps**, nor field limit.)

### Recock Margin—what it is and how much you need



Recock margin also increases with CO2 pressure, so have your CO2 supply at the temperature (and hence the pressure) you expect to see on the field.

### Recock Margin Adjustment

Increase recock margin, but just to the point where recocking is reliable, by:

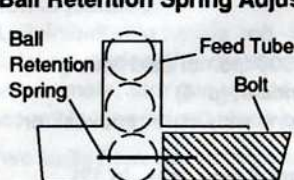
**Reducing friction**--Friction is usually caused by dirt, paintball residue, or poor lubrication. Rarely, it is caused by a torn O-ring on the bolt or striker.

**Using a less efficient valve pin**--Valve pins with 0,1,2, or 3 grooves are available; more grooves denote more recock margin, and less efficiency. (Note--When you change the valve pin, velocity changes unpredictably and **must** be recalibrated.)

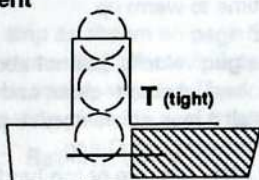
Increased recock margin makes recocking more reliable. But too much margin can: cause paintballs to break in the barrel; increase trigger snap; damage your gun; and waste CO2. **Use the minimum recock margin (the most efficient valve pin, with the least grooves) which makes your gun operate reliably.**

As your gun wears in, friction between moving parts decreases, increasing the recock margin. This may allow you to move to a more efficient valve pin.

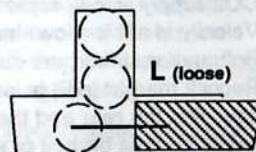
### Ball Retention Spring Adjustment



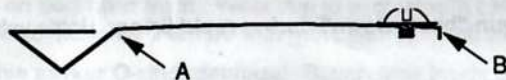
With correct adjustment, a single paintball will feed completely into the chamber forward of the bolt.



If the spring is too tight, the ball will not feed all the way in and will be chopped by the bolt, leaving you a mess to clean up.



If the spring is too loose, a second ball can enter the chamber to be chopped by the bolt. The second ball may enter only when the gun is bumped! Tap on gun to test this.



The ball retention spring should be adjusted in **small steps** as follows:

**Step 1.** With the spring held in place by the spring screw and washer, and the gun cocked, there should be just enough upward bow between points A and B so that point A contacts the gun frame consistently. Too little bow can allow the ball to slip forward; too much bow will cause excessive drag on the ball and bolt, and can cause the ball to break.

**Step 2.** If a single ball will not roll freely into the gun chamber (T above), bend the spring outward at point A. If, when the gun is jarred as it might be in normal use, a second ball can partially enter the chamber (L above), bend the spring inward at point A.

### Low Velocity Operation

The F1 was designed to operate best at typical outdoor field velocity limits of just under 300 fps. Operation at typical indoor velocity limits of 200 to 250 fps is not guaranteed. The challenge is to get enough recock margin (RM) at low velocity to achieve reliable recocking. If you want to attempt these low velocities, first study the material on RM and valve pin efficiency on pages 8 & 9. Then try the following steps:

- A. Be sure your gun is very clean, well lubed (p 4 & 5), and well broken in.
- B. Remove first the rear, and later the forward bolt O-rings; this increases RM for a given velocity, and may eliminate the need for another valve pin (as called for in step C).
- C. Use a less efficient valve pin (one with more grooves); this also increases RM.

Reducing velocity reduces RM, so changes to reduce velocity must at some point be matched by changes to increase RM or your gun will no longer recock reliably. Also, remember that excess RM is bad for your gun. Velocity reductions are made, of course, in the standard way (p 8).

## TROUBLE SHOOTING HINTS

### Double firing (2 or more firing cycles on a single trigger pull):

- A. Trigger mechanism is dirty--clean it.
  - B. Recock margin (p 9) is excessive--use a more efficient valve pin (with fewer grooves).
  - C. Striker or trigger mechanism is worn--inspect and replace if suspect. (The striker can be removed for inspection by removing the connecting pin and then the cocking handle; the trigger sear which engages the striker can be inspected through the cocking handle slot in the left side of the gun; the trigger assembly can be removed to inspect other trigger parts.)
- NOTE: Double firing when your gun fails to recock as described below is normal; double firing otherwise is a safety hazard and must be remedied immediately.

### Gun "beats down" and fails to recock, and:

- Velocity is low (<260 fps)--see A, B, C, D, F, and G.
  - Velocity is normal (260-295 fps)--see D, E, F, G, H, and I.
  - Velocity is high (>295 fps)--see E, F, H, and I. (And lower velocity before using gun.)
- This occurs only during rapid firing --see A, B, and G.
- A. CO2 supply is too cold--give it time to warm up.
  - B. CO2 supply is low--replenish it.
  - C. Velocity is set too low--increase gun velocity, but not above 300 fps nor field limit. (p 8)
  - D. Bolt and/or striker, are dirty or need lubricant--clean and lubricate. (p 4)
  - E. Recock margin (p 9) is low--install a less efficient valve pin (one with more grooves). or remove first the rear and then the forward bolt O-ring.
  - F. Sticky O-rings on bolt or striker (they are torn or too hard)--install new ones. (p 12)
  - F'. Leaky O-rings on bolt or striker (they are torn or worn)--install new ones. (p 12)
  - G. CO2 bottle valve isn't fully open--screw bottle further in (but don't force it); replace bottle.
  - H. Cup seal is partially unscrewed from valve pin--retighten cup seal. †
  - I. Buffer (48 or 8 on p 13) is too long--shorten it.

**Velocity drops excessively and gun "beats down" during rapid firing:** Bottle valve isn't fully open--see G above.

### Velocity is excessively erratic (>20 fps between shots):

- A. O-rings on bolt or striker are nicked or torn--install new ones. (p 12)
- B. Lube is sticky (including teflon buildup)--clean gun and apply Gold Cup Lube lightly. (p 4)
- C. Cup seal is partially unscrewed from valve pin--retighten cup seal. †
- D. There is liquid CO2 in the gun--is your bottle overfilled?
- E. CO2 bottle valve isn't fully open--screw bottle further (but don't force it); replace bottle.
- F. Your paintballs aren't round or they vary in diameter--get better paint.
- G. Barrel is dirty (gelatin residue can be very difficult to see!)--clean with good windshield washing fluid and lube with silicone.
- H. Striker spring is bent, or binding, or hanging up on striker buffer (if this discontinued buffer is installed)--replace spring; debur buffer.

### Velocity is too low even with lots of spacers behind spring, and gun recocks reliably:

Too many grooves on the valve pin--replace using pin with fewer grooves.

### To achieve reliable recocking, velocity must be adjusted too high:

- A. Striker O-ring is leaking (usually due to a nick in the ring)--replace it. (p12)
- B. Too few grooves on valve pin--replace using pin with more grooves.

### Accuracy is degraded:

- A. Paint residue or other moisture in the barrel, chamber, feed tube or magazine--clean it.
- B. Paintball gelatin in the barrel--If alcohol won't remove it, try car windshield washing fluid, then swab with silicone.

†A thread locking compound should be applied to these parts as discussed on page 12.

## TROUBLE SHOOTING HINTS (continued)

### Excessive paintball breakage:

- A. Too much recock force--use a more efficient valve pin (one with fewer grooves)
- B. Paintball gelatin in barrel--clean with windshield washing fluid, then swab with silicone.
- C. Defective paintballs--get better paintballs.
- D. Defective barrel--polish or replace barrel.

### Paintball chopped in chamber by bolt:

- A. Defective paintballs--get better paintballs.
- B. (during an isolated shot) Ball retention spring is misadjusted--adjust per page 9.
- C. (during rapid firing) Firing rate exceeded rate at which paintballs entered gun--check that feed path is clear, OR replace paintball magazine with one which will feed paintballs into gun faster, OR velocity is too high, blowing balls upward in feed tube.

**Paintball flies from feed tube (no magazine on gun):** This is normal with more than 2-3 balls in the feed tube, and helps prevent feed tube jams.

### Bolt is jammed:

- A. Paintball chip beside bolt--field strip as shown on page 5 (push on bolt, not handle).
- B. Loose cocking handle allowed connecting pin to slip into trigger mechanism--loosen handle more, turn gun upside down, and try to jolt pin back into position; OR, remove trigger assembly (see below), push connecting pin back, and tighten cocking handle.†

**Two balls fired on a single shot:** Ball retention spring is misadjusted--adjust per page 9.

**Connecting pin won't insert:** Cocking handle is screwed in too far, probably because spacer is missing or deformed--reinstall cocking handle, with good spacer in place.†

**Trigger screws vibrate loose:** Oil on threads or no thread lock--see "Thread Locking". (p 12)†

**Groove on bolt near front:** Wear due to contact with ball retention spring--this is normal and does not normally interfere with gun operation; bolt can be rotated a half turn if desired.

**Excessive striker O-ring damage:** Rough area inside gun receiver, possibly at front of slot where receiver has been struck by cocking handle--smooth rough area.

**Very short bottle O-ring life:** A. Bottle valve releases gas during more than last 1/2 turn of bottle installation, stressing O-ring--try a different bottle on your gun. B. O-ring and bottle threads are dry--lube them lightly.

**Bottle won't release CO2:** Bottle valve is defective.

**CO2 is leaking:** A. CO2 bottle is very loose--Remove and then replace it, and tighten to the point where it is snug. B. Cup seal is forced to the side by the cup seal guide (40) --See "Cup Seal" on p 12. C. Bottle O-ring; cup seal; reservoir plug O-ring; or valve body forward O-ring is defective or is displaced by a particle of dirt--identify problem and remove dirt or replace bad part. D. Forward lip of valve body is rough--remove & polish or replace it (p 12). E. Bottle adapter is broken loose from gun--gun must be replaced (contact Direct Connect at 708-331-8878).

**Gun won't fire when trigger is pulled:** Assuming gun is cocked and safety is off, then the trigger assembly is defective--contact Direct Connect at 708-331-8878.

†A thread locking compound should be applied to these parts as discussed on page 12.

## SERVICE HINTS\*

**Trigger Assembly:** Keep the trigger assembly clean. The trigger, trigger sear, and trigger pins are hardened, high carbon steel so they must be kept oiled to prevent rust. (p 4) There are no user serviceable parts within the trigger assembly.

- **Removal(Δ):** First, depressurize and uncock gun. Remove the two trigger screws (32,34). (Removal of stubborn thread-locked screws is discussed below.) Don't lose or damage the safety spring (26) or detent ball (29).
- **Reinstallation(Δ):** Don't crush the trigger safety spring (26). Apply thread lock compound and tighten the trigger screws.†

**Connecting Pin (17):** If you install the connecting pin with the trigger assembly removed, don't push the pin through your gun and **into your hand!** The latest pin is made of carbon steel; as a result, it must be kept dry and oiled or it will rust.

**Cocking Handle (3):** Install with thread locking compound. Keep the compound away from the plunger or it may seize up. The spacer (4) limits how far the handle goes in.†

**O-rings:** The valve body O-rings should last for years if not disturbed. O-rings other than specified on page 13 can interfere with gun recocking or cause CO<sub>2</sub> leakage. The O-rings on the bolt and striker must be kept clean; grit and dust can abrade them rapidly.

**Cup Seal:** The cup seal (45) will eventually wear and have to be replaced. If the cup seal guide (40) is tight on the cup seal, it can force the seal to the side, causing the valve to leak.

**Valve Body(Δ):** **A.** To extend the life of the valve body O-rings, avoid removing the valve body! **B.** Depressurize your gun **before removing the valve body screw (24)**. A safety pin just rearward of the valve body (42) prevents the valve body from being shot from the rear of the gun if you really screw up and remove the striker plug, striker and valve body screw while the gun is still pressurized. However, if the valve body is forced repeatedly against this safety pin, it could be weakened to the point where it could fail just when you need it. Because of this pin, the valve body must be removed and installed through the front of the gun. **C.** The end of the valve body screw is only slightly tapered, so the valve body may need to be positioned with a drift pin before the screw is inserted. **D.** The front lip of the valve body must be very uniform for the plastic cup seal to seat against it. Resurfacing (on a lathe, by an airsmith!) involves cutting (<0.002") or precision filing, followed by polishing; otherwise, a bad valve body must be replaced. **E.** Only the front O-ring seals high pressure CO<sub>2</sub> and hence must be hard urethane (44); any material can be used in the rear valve body groove.

**Striker:** To insert, use a hex wrench through the handle slot to depress the trigger sear.

**Bolt Buffer:** To install a new buffer (48), thoroughly clean the end of bolt plug (21), then roughen the end of the plug with sandpaper. Install buffer with cyanoacrylic adhesive (instant glue, or super glue), **OBSERVING ALL MANUFACTURER'S PRECAUTIONS**. Use sufficient adhesive to thoroughly wet the surface between the buffer and plug.

**Striker Buffer:** If the buffer (8) is too long, shorten it by sanding or filing. Remove rough edges to prevent binding. NOTE--This part has been replaced by the bolt buffer (48).

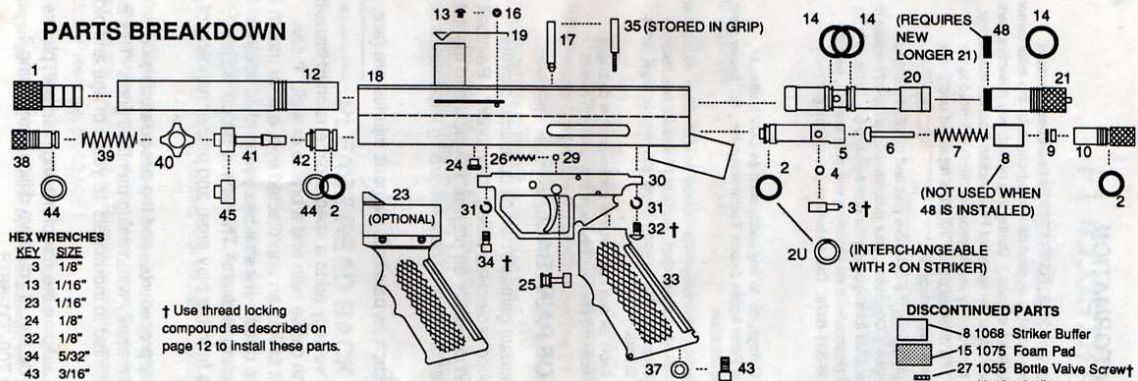
**Thread Locking:** Parts which should be secured with a medium strength thread locking compound such as Perma Lok™ MM115 (blue) or LocTite™ 242 (blue) to ensure they do not vibrate loose include: the cocking handle (3), the trigger assembly screws (32, 34), and the cup seal (45). Before applying the thread lock, clean any oil, and **especially any silicone**, from the screw and the screw hole. Brake degreasing compound, available from auto parts stores, is a convenient cleaning material, but be careful -- it may be toxic. Setup time for these compounds is extended by cold, and even at 75 degrees F can require a full day. **During removal, do not force a screw installed with thread lock compound which will not turn.** Instead, first apply heat directly to the screw with a soldering iron or similar device.

\*Numerals refer to part numbers on page 13.

ΔThese service operations should be performed only by a qualified airsmith.

†A thread locking compound should be applied to these parts (see bottom of page).

## PARTS BREAKDOWN



### HEX WRENCHES

KEY	SIZE
3	1/8"
13	1/16"
23	1/16"
24	1/8"
32	1/8"
34	5/32"
43	3/16"

↑ Use thread locking compound as described on page 12 to install these parts.

### DISCONTINUED PARTS

8	1068 Striker Buffer
15	1075 Foam Pad
27	1055 Bottle Valve Screw† (4-40 x 3/8" set scrw)

### KEY NO. DESCRIPTION

1	1028 Muzzle Plug
2	1034 O-ring, 2-013, 70D (small, soft, black nitrile)
2U	1034U (same as 2, but white urethane with black mark)
3	1012 Cocking Handle†
4	1066 Cocking Handle Spacer
5	1011 Striker
6	1010 Striker Spring Guide
7	1040 Striker Spring
9	1073 Adjustment Spacers (pkg)
10	1009 Striker Plug
12	1019 Barrel
13	1054 Ball Spring Screw (4-40 x 1/8 button head)

### KEY NO. DESCRIPTION

14	1032 O-ring, 2-016, 70D (large, soft, black nitrile)
16	1064 Ball Spring Washer (#4 external star)
17	1015 Connecting Pin
18	1004 Receiver
19	1042 Ball Retention Spring
20	1014 Bolt
21	1008 Bolt Plug
23	1027 Front Grip (optional)
24	1018 Valve Body Screw
25	1023 Trigger Safety
26	1045 Safety Detent Spring

### KEY NO. DESCRIPTION

29	1024 Safety Detent (.067" ball)
30	1025 Trigger Assembly
31	1062 Trigger Washer (#10 split lock)
32	1051 Rear Trigger Screw† (10-24 x 3/8" BH; for guns with SN < 1501, use 1/2" screw cut to .375")
33	1026 Rear Grip
34	1052 Front Trigger Screw† (SH; size same as 32)
35	1070 Pin Removal Tool (4-40)
37	1061 Rear Grip Washer (1/4" star)

### KEY NO. DESCRIPTION

38	1007 Reservoir Plug
39	1041 Valve Spring
40	1067 Cup Seal Guide (guide must fit loosely on cup seal, 45; see p 11)
41	1017 Valve Pin (0-3 grooves)
42	1016 Valve Body (1/4-20 x 3/4" skt head)
43	1050 Rear Grip Screw (1/4-20 x 3/4" skt head)
44	1033 O-ring, 2-013, 90D (small, hard, white urethane)
45	1030 Cup Seal
48	1069 Bolt Buffer (used on new longer bolt plug, 21)



## WARRANTY INFORMATION

### Limited Warranty Statement

Feral Action Sports Technology, Inc., warrants that your F1 *ILLUSTRATOR* is free from defects in materials and workmanship for a period of one year from the original date of purchase by the initial owner. (For guns used for rental, the warranty is limited to three months.) During this period, any defective parts will without charge be repaired or replaced with new, or at the option of Feral Action Sports Technology, Inc., refurbished parts. (For camo colored guns, the warranty on the receiver finish is limited to six months, and replacement may be with a receiver of a different color.) All parts replaced under this warranty become the property of Feral Action Sports Technology, Inc.

User-installable parts will be replaced upon receipt by us of the defective part and proof of purchase identifying initial gun purchase date and serial number. Otherwise, your gun must be shipped prepaid to us, with proof of date of purchase. You are responsible for shipping your gun or gun parts to us, and for insuring against loss during shipping. For detailed instructions on obtaining warranty service, phone Techline at 503-667-3705 or Direct Connect at 708-331-8878. Call **before** shipping your gun!

### Exclusions and Limitations

This warranty does not extend to the cup seal or O-rings, nor to any parts, such as CO2 bottles or cartridge adapters, which are not manufactured by Feral Action Sports Technology, Inc., nor to any parts made defective by accident, misuse, abuse, or modification.

Except as expressly stated herein, Feral Action Sports Technology, Inc. makes no warranties, express or implied, including but not limited to any implied warranties of merchantability or fitness for any purpose beyond that for which the F1 *ILLUSTRATOR* is designed. This warranty gives you specific legal rights. You may have other rights which vary from state to state.

Feral Action Sports Technology, Inc. shall not be liable for any incidental or consequential damages arising from the use of the F1 *ILLUSTRATOR*, or from the breach of the warranty set forth herein.

## THE SPORT OF PAINTBALL

The sport of paintball involves action pursuit games in which opposing players attempt to shoot each other with dye-filled projectiles called "paintballs". Paintball is a serious sport which makes rigorous demands on players' physical and mental abilities. When played in a safe manner, it can provide a rewarding experience not available in any other sport.

There are hazards in any active sport such as paintball. Serious injuries are rare, but they do occur.

A 0.68 caliber paintball moving at high velocity adds a special dimension of hazard to paintball sports. At a minimum, it can cause pain and a bruise or welt. It can break the skin and cause bleeding. If it strikes an unprotected eye, ear, or mouth it can cause blindness, deafness, or even death. If it strikes a young child in other sensitive body areas, it can cause crippling or death. This is why proper safety gear for players, isolation of spectators from the play area, and proper handling of paintball guns are absolutely essential.

The criticality of **always** following safety procedures, and the associated risk of serious injury, require an adult level of maturity when using paintball guns. This is why sale of the F1 *ILLUSTRATOR* is limited to individuals 18 years of age and older.

If after reading this you do not want to assume the risk of playing paintball, please return your F1 *ILLUSTRATOR* to your dealer. If you have difficulty returning it, please contact Direct Connect, Inc., at 708-331-8878.