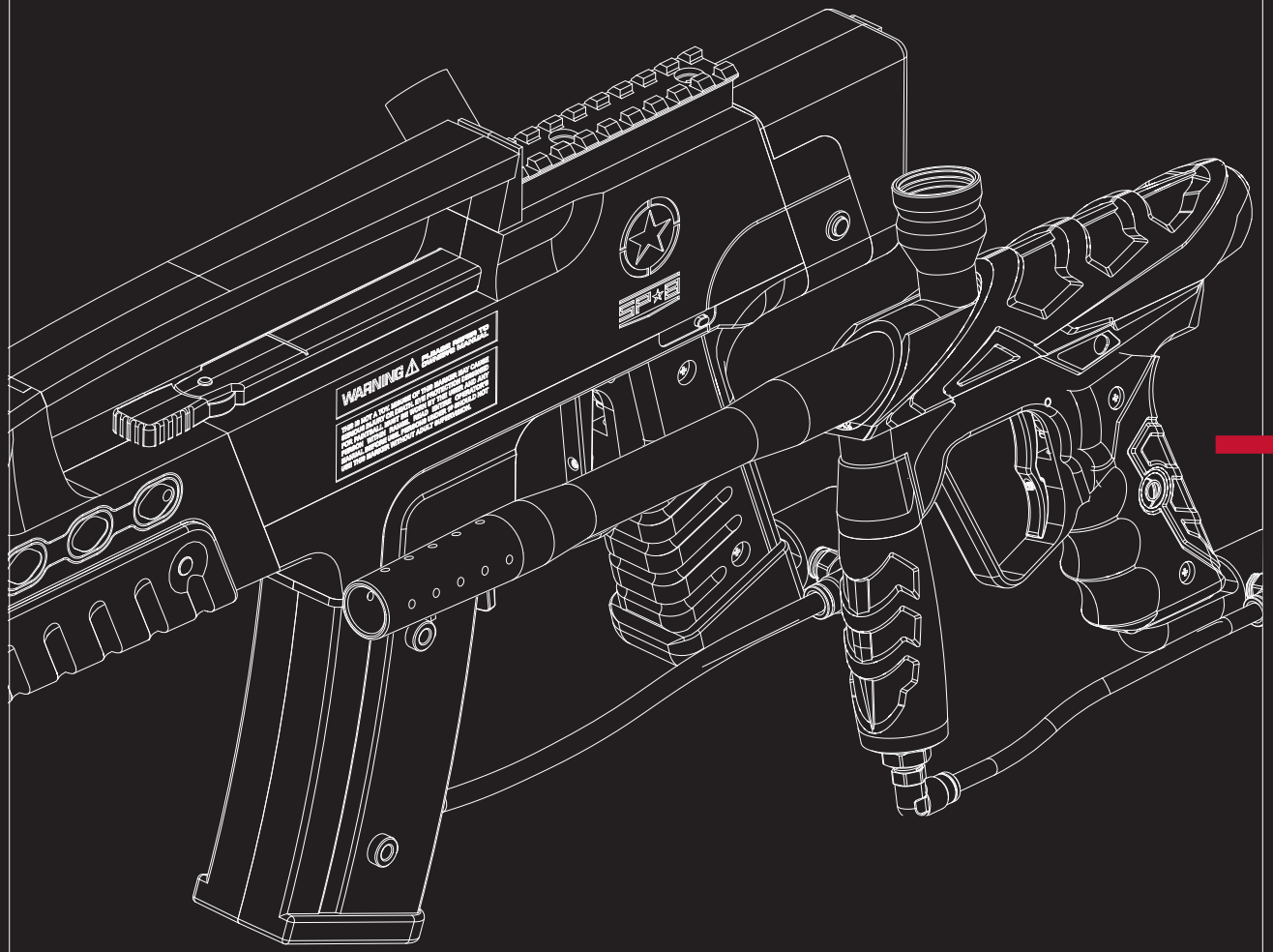
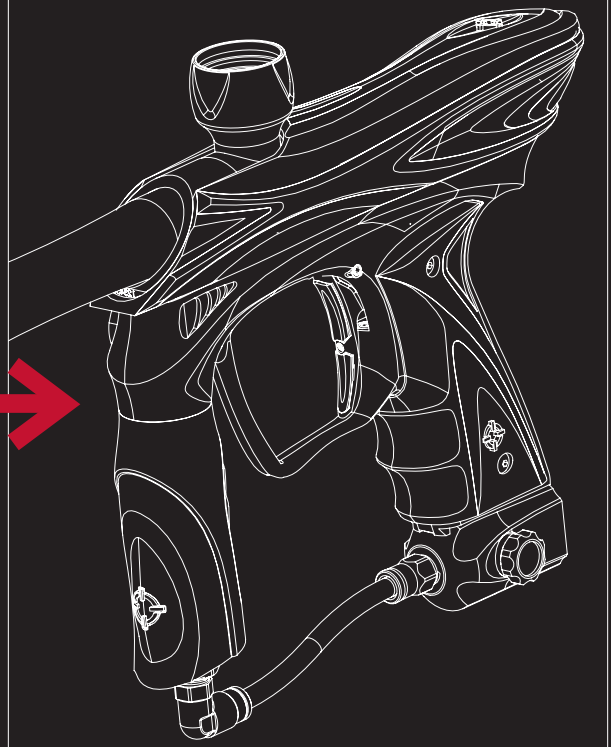
EPIPHANY CONVERSION

SMART PARTS

Instructions and Guidelines for upgrading an Ion or SP-8 to Epiphany Performance





INTRODUCTION

It may be tempting to think of the Epiphany as simply an Ion with some new accessories, but that would be misleading. The Epiphany is built for speed. The Epiphany has less airspace inside its fire chamber than the Ion. The smaller chamber can be refilled faster after every shot. The faster the fire chamber recharges, the earlier the marker is ready to take a shot at full velocity. This allows the Epiphany to maintain full velocity at high rates of fire. For players this means tighter target groupings and maximum range, without any shoot-down - whether taking a single shot, or ripping off 100 in a row at 15 bps.

In order to deliver 300 fps velocity from a smaller valve chamber, the Epiphany operates at a slightly higher pressure range than the Ion and SP-8's 180-200 psi. The Epiphany operates at pressures between 260 and 280 psi. Despite falling well below the limits for being considered a "low pressure" marker, the pressure needed to drive an Epiphany can cause incorrect operation or damage to standard Ion parts.

While Epiphany parts not exposed to gas pressure, like the alloy body cover and grip frame can be bolted straight on to an Ion with no problems, gas related and valve components must be upgraded as a group, making a complete internal Epiphany conversion.

This manual describes component installations necessary to complete an Ion to Epiphany internal conversion. These same principles apply to an SP-8 to Epiphany internal conversion. Refer to the SP-8 owner's manual for disassembly and reassembly of the SP-8 body and regulator cover.

If you are in doubt at any time about the conversion process or parts compatibility, contact your local authorized Smart Parts Dealer, or Smart Parts' Technical Support for assistance.

WARNING

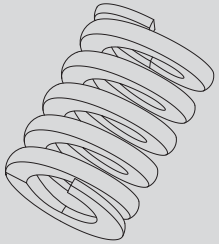
Converting an Ion or SP-8 to Epiphany performance requires changing several components at once – a partial conversion may result in incorrect operation or component failure. Read this complete manual to avoid incorrect installation or operation. Read the most recent version of the manual for your marker to become familiar with disassembly and proper operation. Read the Epiphany manual for information on tuning, operation and troubleshooting. The most recent version of each manual is available for download at SmartParts.com.

UPGRADE COMPONENTS

WARNING

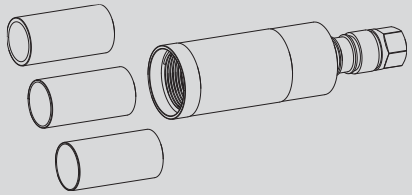
All of these components must be changed together, to accomplish an Epiphany upgrade. Changing only some components may cause marker damage.

01 REGULATOR SPRING



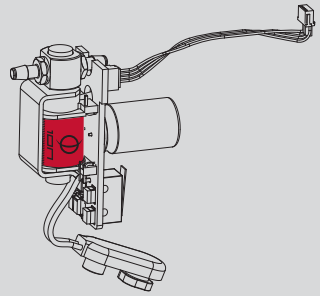
The Epiphany vertical regulator utilizes a slightly firmer regulator spring than the Ion or SP-8, in order to deliver 260-280 psi output. Upgrading to the Epiphany spring without changing the other listed components will very likely cause damage to your marker.

02 FIRE CHAMBER AND INSERT



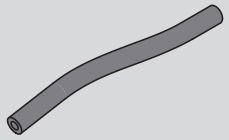
The heart of the Epiphany is its reduced volume fire chamber and inserts, which allow custom adjustment of the volume of gas to be released with each shot. Upgrading the fire chamber before other components will result in low velocities and unreliable operation. The fire chamber and volume control inserts must be made as part of a complete conversion in order to operate correctly and provide increased performance.
The Epiphany upgrade is not compatible with aftermarket fire chambers or bolt-out-back bodies which eliminate the fire chamber.

03 SOLENOID VALVE



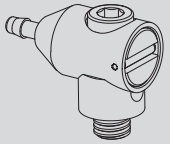
Standard Ion/SP-8 and many aftermarket circuit boards for these markers have solenoid valves which not only are not strong enough to open consistently at 260-280 psi, but may suffer physical failure. A circuit board with an Epiphany rated solenoid valve must be used. Recommended models are the Epiphany circuit board (identified by a red protective wrap on the solenoid coil bearing a black Ion logo) or Blackheart circuit boards manufactured after the fall of 2007 (identified by the same black logo on red wrap, with the addition of a small speaker shrink wrapped to the capacitor.) Upgrading to an Epiphany rated solenoid valve by itself will not cause any damage to other parts, but will not provide any performance benefit until a complete conversion is made.

04 HOSES



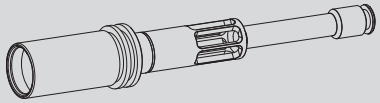
Standard Ion and SP-8 microline hoses which connect between the banjo fittings and the solenoid valve must be upgraded to their black Epiphany rated counterparts. Especially in warmer weather the standard hoses are prone to failure at Epiphany pressures. Upgrading hoses before other components will not cause any problems, but will not show a performance benefit until a complete conversion is made.

05 QEV (OPTIONAL)



Quick Exhaust Valves allow an Ion, SP-8 or Epiphany to cycle faster, by reducing pneumatic resistance against the bolt as it closes. A QEV is not required for Epiphany operation, however if a QEV is to be used, it must be rated to handle 280 psi or higher. When selecting a QEV for an Epiphany or Epiphany upgraded Ion or SP-8, only choose models which are warranted as “Epiphany Rated” by their manufacturer. Installing an Epiphany rated QEV may be done before or after Epiphany conversion. To avoid premature bolt bumper wear, a QEV is best installed along with a reduced weight bolt, such as the Smart Parts Firebolt.

06 FIREBOLT (OPTIONAL)



The Firebolt is not required for Epiphany conversion, however it is used as the stock bolt on Epiphany markers. Because of it’s reduced weight, thw Firebolt causes less “kick” with each shot fired, allowing you to remain steady on target for tighter shot groupings at high rates of fire.

TABLE OF CONTENTS

While every effort has been made to ensure that the information contained in this guide is accurate and complete, no liability can be accepted for errors or omissions. Smart Parts, Inc. reserves the right to change the specifications of the Ion at any time without prior notice. The latest version of this manual may be downloaded free of charge at www.SmartParts.com.

WARNING

- THE EPIPHANY IS NOT A TOY
- MISUSE OF THE EPIPHANY MAY RESULT IN SERIOUS INJURY OR DEATH.
- EYE PROTECTION SPECIFICALLY DESIGNED FOR PAINTBALL USE MUST BE IN COMPLIANCE WITH ASTM SPECIFICATION F1776 AND MUST BE USED BY THE USER AND ANYONE WITHIN RANGE OF THE EPIPHANY
- SMART PARTS RECOMMENDS THAT THE EPIPHANY ONLY BE SOLD TO PERSONS 18 AND OLDER.
- THOROUGHLY READ THE EPIPHANY OPERATION AND INSTRUCTION MANUAL BEFORE OPERATING.
- TREAT EVERY PAINTBALL MARKER AS IF IT WERE LOADED.
- NEVER LOOK DOWN THE BARREL OF A PAINTBALL MARKER.
- KEEP YOUR FINGER OFF THE TRIGGER UNTIL READY TO SHOOT.
- NEVER POINT THE EPIPHANY AT ANYTHING YOU DON'T WISH TO SHOOT.
- KEEP THE EPIPHANY ON SAFE (POWER OFF) UNTIL READY TO SHOOT. (SEE QUICK START)
- KEEP THE BARREL BLOCKING DEVICE ON THE EPIPHANY'S MUZZLE WHEN NOT SHOOTING. (SEE BARREL BLOCKER SECTION).
- ALWAYS REMOVE PAINTBALLS AND DEGAS THE EPIPHANY BEFORE DISASSEMBLY. (SEE DEGASSING SECTION.)
- STORE AND TRANSPORT THE EPIPHANY UNLOADED AND DEGASSED IN A SECURE PLACE.
- FOLLOW ALL MANUFACTURER'S WARNINGS AND INSTRUCTIONS FOR PROPELLANT SOURCE HANDLING, STORAGE, AND FILLING.
- DO NOT SHOOT FRAGILE OBJECTS SUCH AS WINDOWS.
- ALWAYS MEASURE THE VELOCITY OF PAINTBALLS FIRED BY THE EPIPHANY BEFORE USE, AND NEVER ADJUST TO FIRE ABOVE 300FPS (91.44 M/S)

REGULATOR SPRING UPGRADE

PLEASE READ CAREFULLY

01

////////⚠WARNING

Parts of the Ions's vertical regulator use left-handed threads. These parts must be turned counter-clockwise to screw them in, and clockwise to unscrew them – the opposite direction of normal screws. Epiphany and Ion/SP-8 regulator springs look very much alike, take precautions not to confuse them during regulator maintenance or upgrade.

02

Degas the marker, and remove the macroline hose from the regulator. Unscrew the regulator from the Ion's vertical ASA. Remove and clean the metal filter screen which is located between the regulator and the vertical ASA. Slide the regulator body out of its sleeve.

03

Use a 5/8-inch open-end wrench or adjustable wrench to turn the adjuster cap on the bottom of the regulator, as if you were adjusting velocity, until the safety screw is visible in the vertical safety screw slot. The safety screw ensures that the regulator will not be unscrewed too far during normal use.

04

Use a 3/32-inch Allen wrench to remove the safety screw. The adjuster cap is left-hand threaded. Turn it clockwise to unscrew it from the vertical regulator body. Use the open end or adjustable wrench to completely remove the adjuster cap.

05

Locate the lock screw halfway up the side of the regulator body, and remove it with a 3/32-inch Allen wrench. The lock screw secures the spring platform in place. Now that it is unlocked, use a 9/16-inch deep well socket and ratchet to remove the spring platform by unscrewing it clockwise (the spring platform is also left-hand threaded.) The hex faces on the spring platform are short, so you will need to exert a steady pressure on the socket to maintain contact.

06

The regulator spring should fall easily out of the regulator body once the spring platform is removed.

////////⚠WARNING

The Regulator piston may require light pressure from an Allen wrench through the top of the regulator body for removal. Use a gentle hand here, as the brass of the regulator piston can be scratched by hard tools.

07

Clean all of the regulator parts with a soft cloth or paper towel. Inspect all o-rings and the regulator seat (the clear part on the end of the piston) for damage, and replace if necessary. Lubricate the o-rings on the piston assembly with SL33K.

////////⚠WARNING

Do not lubricate the regulator seat or the o-ring on the adjuster cap.

08

Place the new Epiphany regulator spring on the regulator piston assembly. Hold the regulator body ASA side down, and slide the two parts into the body. Lower the spring platform into the regulator body nut side up, and use the 9/16-inch deep well socket to screw it into place with a counter-clockwise motion.

09

When the spring platform is fully seated, it will be visible through the lock screw hole in the side of the regulator. Lock it in place by reinstalling the lock screw. Reinstall the pressure adjuster cap by screwing it counter-clockwise into the regulator body. Turn it until the safety screw aligns with the safety screw slot. Put a small amount of blue Loctite 242 threadlocker or equivalent (even clear fingernail polish can do in a pinch) on the safety screw. Reinstall the safety screw.

////////⚠WARNING

Be certain that the safety screw is fully seated and the adjuster cap can turn freely.

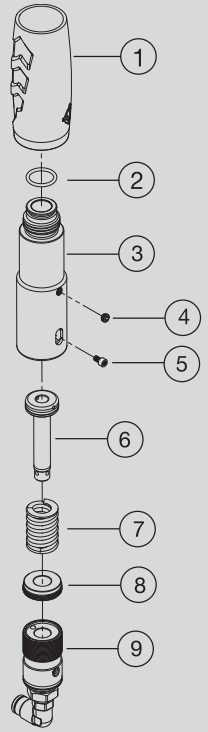
10

Place the regulator inside the sleeve. Do not lubricate the regulator body or inside of the sleeve, or the regulator will become extremely difficult to remove from the marker. Reinstall the regulator into the vertical ASA of the marker. Reconnect the macroline, and be sure to use a chronograph to re-adjust the marker's velocity before use.

////////⚠WARNING

Do not supply gas to your marker until you have completed the rest of the Epiphany upgrade, or component damage may occur due to the increase in operating pressure.

FIG. 1 → REGULATOR

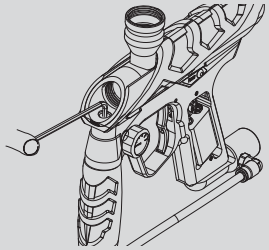


1 IRG106 – Vertical Regulator Grip
2 ORN0159OUR – Regulator ASA O-Ring
3 IRG101 – Ion Vertical Regulator Body
4 SCRN1032X0125SCO – Lock Screw
5 SCRN0440X0188CO – Safety Screw
6 IRG105ASM – Piston Assembly
7 SPR030 – Epiphany Regulator Spring
8 IRG 102 – Spring Platform
9 IRG104 ASM – Pressure Adjuster Cap

FIRE CHAMBER AND INSERT UPGRADE

DISASSEMBLY

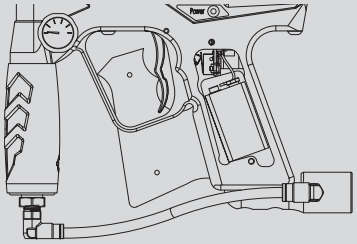
01



WARNING

Use a 1/8-inch allen wrench to remove the body flat cap screw which is normally concealed by the barrel.

02

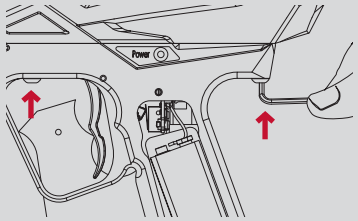


Remove both left side (gauge side) grip screws with a #2 phillips screwdriver and open the flexible wraparound grip. Remove the battery from the grip frame. Grasp the battery in one hand and with the other hand grasp the battery clip by the sides and unplug it from the battery. Remove the right side grip screws and the flexible grip, as the upper right grip screw may catch on the circuit board, making its removal difficult.

WARNING

Do not pull on the battery wires or circuit board to unplug the battery as this may cause significant damage.

03



Remove the front and rear grip frame screws using a 1/8-inch allen wrench.

[CONTINUED ON NEXT PAGE]

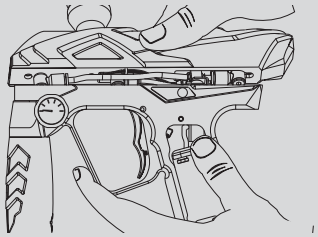
WARNING

Before beginning any maintenance or repair procedures, completely unload and degas the marker following the instructions in the Degassing section of the marker's manual. Choose a clean, stable and protected work area where small parts will not be lost, such as a table covered with a towel to prevent parts from rolling. Remove the barrel.

FIRE CHAMBER AND INSERT UPGRADE

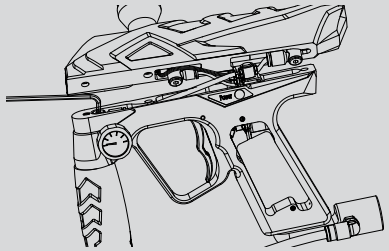
DISASSEMBLY CONTINUED

04



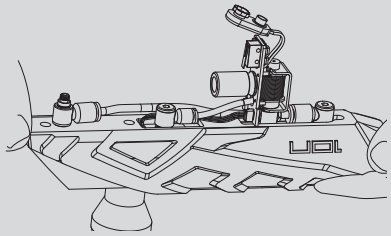
Grasp the body with one hand and the grip frame with the other. Slowly pull the body away from the grip frame, rolling it slightly to the side, exposing the top of the grip frame and banjo fitting. It can be helpful to gently push on the bottom of the circuit board with a thumb, helping it to slide upward.

05



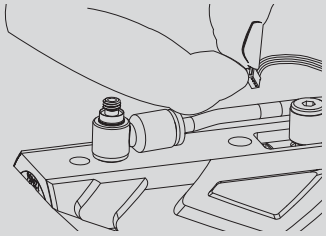
Remove the front banjo fitting from over the vertical adapter with a 1/8-inch allen wrench. The center of the banjo fitting will turn with the wrench, pivoting inside the rest of the fitting.

06



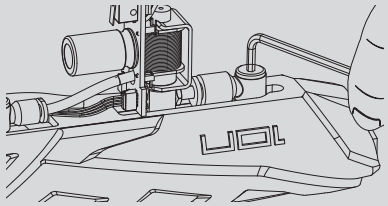
Gently complete the process of separating the body from the grip frame. Take care to make sure that the circuit board slides out of the grip frame without being strained, and that the battery wires and battery clip follow without catching on the grip frame. Set the grip frame aside, and hold the body upside down (with the feedneck facing down.)

07



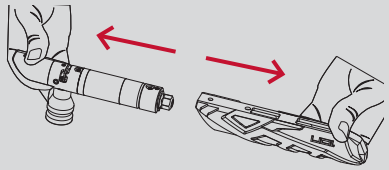
Locate the Vision wiring harness. This group of four black wires runs from the lower circuit board to the Vision circuit board in the body breech. Unplug the Vision wiring harness from the body end, being careful not to strain the wires by tugging on them. As much as possible, pull on the connector directly.

08



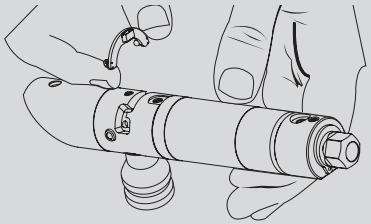
Remove the remaining two banjo fittings from the body with a 1/8-inch allen wrench.

09



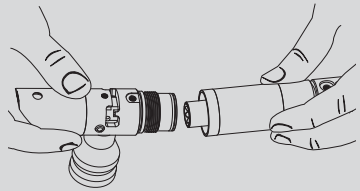
Keeping the body upside down, slide the inner receiver components out of the body cover.

10



Remove the Vision circuit board from the body breech and set aside carefully. This circuit board is shaped like the letter C, and should come easily out of place. Take care to make sure that the infra-red emitter and detector (these look like clear LEDs) are not set on anything that can scratch them.

11



Unscrew the body breech from the fire chamber, and remove the bolt from inside. If the bolt stop does not come out with the bolt, pull it out with a finger.

FIRE CHAMBER AND INSERT UPGRADE

CHANGING FIRE CHAMBERS
Use a pair of clip ring pliers to remove the clip ring securing the swivel donut to the fire chamber. Slide the swivel donut off the fire chamber, and use an o-ring pick or suitable tool to remove the two o-rings from the rear of the fire chamber. Install them on the new Epiphany fire chamber and lubricate with SL33K. Slide the swivel donut in place on the new chamber and secure it with the ring clip.

In order to tune the Epiphany for optimal performance, three inserts are available, allowing four levels of adjustment to the volume of the fire chamber. These range from the largest volume (no insert) to the green insert (second largest volume) to the blue insert (second smallest volume) and finally to the silver insert (smallest volume.) An increase in operating pressure can be balanced with a decrease in fire chamber volume to maintain desired velocity.

COMMON EPIPHANY CONFIGURATIONS:
Choosing the ideal insert and operating pressure level is a balancing act between lower pressures which allow for gentler, quieter operation with longer hose life in high temperatures, and high pressures which allow for better velocity consistency at high rates of fire (10 bps and above.) While some experimentation will be necessary to find the best settings for any given marker configuration and playing conditions, the following guidelines will help select the proper volume insert.

Firebolt and a Quick Exhaust Valve (QEV) – Blue (middle size) Volume Insert – The volume of the blue insert will compensate for the volume of gas in the Firebolt's air spaces, to provide 300 fps operation at approximately 260 psi.

Firebolt or stock Ion bolt without QEV – No Volume Insert – The entire volume of the Epiphany fire chamber is utilized to deliver a velocity of 300 fps at approximately 260 psi.

Stock Ion bolt with QEV or reducing pressure – Green Insert (thinnest wall, high gas volume) – If the pressure at the desired velocity is above the Epiphany's maximum of 280 psi, or temperatures are extremely high (which can soften pneumatics hoses) an increase in fire chamber volume to reduce operating pressure can be desirable.

Indoor Operation – Silver Insert (thickest wall – smallest gas volume) – Many indoor paintball fields restrict marker velocity to a maximum of 250 fps. By reducing the fire chamber volume even further, the silver insert allows this velocity to be reached while keeping the fire chamber pressure up in the range of 250-280 psi, protecting against velocity drop-off under rapid fire conditions.

FIG. 2 → REMOVING THE SNAP-RING

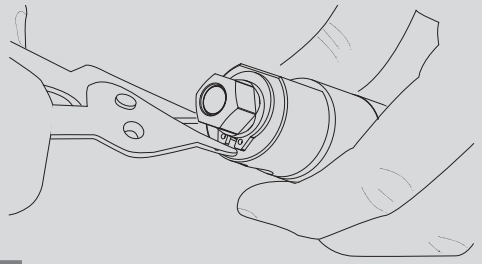
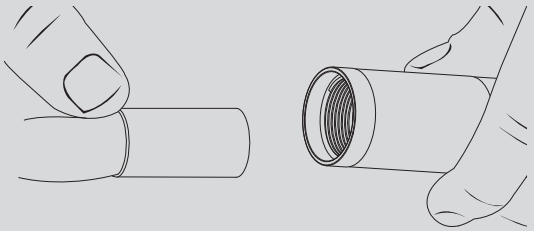


FIG. 3 → REMOVING VOLUME INSERT



CHANGING VOLUME INSERTS
Changing the volume inserts is simple. Degas and disassemble the marker, following the disassembly section of its manual. The selected insert (or no insert) can be slid freely into the Epiphany fire chamber, and installed inserts can be removed by reaching a finger into the insert and pulling it out. After installing the proper insert, the marker can be reassembled by following the reassembly section of its manual. The marker will then need to be set to the optimal dwell setting (see the dwell section of the Epiphany manual) and have its velocity measured and set (see the velocity section of the Epiphany manual.)

FIRE CHAMBER AND INSERT UPGRADE

REASSEMBLY

01

Use a soft cloth to clean all parts of paint and dirt as well as old oil or grease.

02

Make sure the Vision circuit board and its components are clean and undamaged. Make sure no dirt or debris is blocking the Vision holes in the body breech – use a cotton swab to clean these openings if necessary.

03

Use SL33K to grease all of the o-rings on the bolt and bolt stop. Apply only a thin coating, do not over-grease.

04

Place the bolt stop inside the fire chamber and make sure the fire chamber insert is fully seated. Make sure the concave side of the bolt stop (shaped like the inside of a cone) faces the back of the marker.

05

Slide the bolt into the bolt stop inside the fire chamber until it stops.

06

Screw the fire chamber into the body breech. Place the Vision circuit board into its slot in the body breech. Its plug should be on the side of the board facing the rear of the marker. The clear emitter and detector should be on the side facing the front of the body breech.

07

If necessary, rotate the swivel donut so that its screw holes are on the bottom of the receiver, lined up with the screw holes in the body breech.

08

Slide the inner receiver assembly into the body cover while holding both upside down to prevent the Vision circuit board from falling out, then plug the Vision wire harness back into the Vision circuit board, and reconnect the center and rear banjo fittings to the receiver, being careful not to cross thread them.

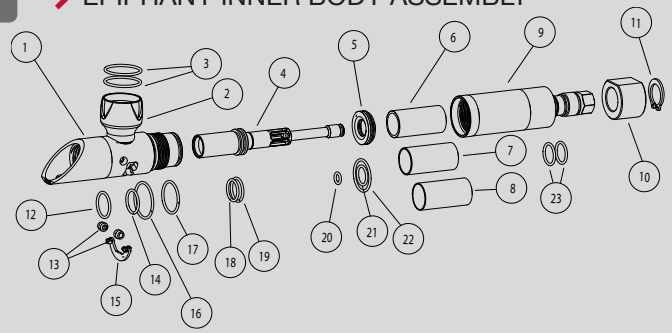
09

Carefully pass the battery clip down into the grip frame and slide the circuit board into place before reinstalling the forward banjo fitting to its position in the grip frame, again taking care not to cross-thread.

10

Reposition the body and grip frame together being careful not to pinch any wires or hoses. Reinstall the grip frame screws, and flat cap body screw, then tighten all three with an 1/8-inch allen wrench. Reinstall the battery, taking care not to pinch the battery wires, and secure the rubber grip in place with the grip screws.

FIG. 4 → EPIPHANY INNER BODY ASSEMBLY

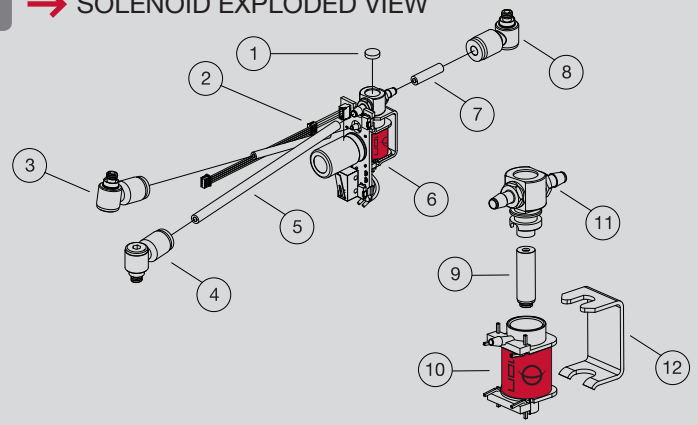


1 EPY102–Epiphany Body Breech
2 EPY103–Epiphany Feed Tube
3 ORN02552070BU – Feed Tube Friction O-rings
4 ION209–Fire Bolt
5 ION111 – Bolt Stop
6 EPYINTS–Small Epiphany Insert (Silver)
7 EPYINTM–Medium Epiphany Insert (Blue)
8 EPYINTL–Large Epiphany Insert (Green)
9 EPY104–Epiphany Fire Chamber
10 ION110–Swivel Donut
11 CLP004–Donut Clip
12 ORN01790UR–SFT O-Ring
13 ION108–Ball Detent (2x)
14 ORN01770HN–Rear Breech O-Ring
15 ION117UPRVSN-Break-Beam Vision Board
16 ORN02270BU–Body Breech Friction O-Ring
17 ORN02070BU–Body Breech Seal O-Ring
18 ORN01590CUR–Firebolt Bumper
19 ORN0162070HN–Firebolt Middle O-Ring
20 ORB01070UR–Firebolt Rear O-RIng
21 ORN01470UR–Bolt Stop Inner O-Ring
22 ORN02070BU–Bolt Stop Outer O-Ring
23 ORN01570BU X–Swivel Donut O-Rings (2x)

SOLENOID VALVE AND HOSE

UPGRADE

FIG. 5 → SOLENOID EXPLODED VIEW



1 BUM006 – Foam Disk
2 ION118 – Vision Wiring Harness
3 ELB1032X18PTCBNJ – Banjo Fitting
4 ELB1032X532PTCBNJ – Banjo Fitting
5 HOS4MMBLK4025 – Black Epiphany Hose
6 EPY117LOVUSASM – Epiphany Circuit Board
7 HOS4MMBLK875 – Black Epiphany Hose
8 ELB1032X532PTCBNJ – Banjo Fitting
9 Armature
10 SOL3UPG – Epiphany Solenoid Coil
11 Solenoid Head
12 Solenoid Bracket

The solenoid valve is not removable from the circuit board, so upgrading solenoid valves requires replacement of the complete circuit board. Epiphany Circuit boards and Blackheart circuit boards are available preassembled with Epiphany rated hoses and a Vision circuit board. An Epiphany circuit board can be identified by the red wrap around its solenoid coil bearing a black Epiphany logo. Epiphany rated Blackheart boards have the same wrap, and a speaker attached to their capacitor (the can shaped component opposite the solenoid valve.) Older Blackheart boards with a black coil wrap and red logo are not Epiphany compatible.

01

Completely unload and degas your marker following the instructions in the degassing portion of its manual.

02

Follow the disassembly instructions to remove the circuit board from your marker.

03

If your new circuit board with Epiphany Rated solenoid valve is pre-assembled with correct hoses and vision cable, skip ahead to step 5. If not, remove the Vision cable from your old circuit board, and install it on the new board.

04

Install the hoses as shown in the exploded view. The short 4mm hose fits to the rear of the solenoid head, and the long 4mm hose to the front. The 1/8” hose fits on a small black barb protruding from the solenoid body. If the hoses prove difficult to fit onto the barbs, their ends may be softened first by dipping them in hot water.

05

Remove the banjo fittings from the old hoses by pressing in on their collars then pulling them from the hose. Attach the fittings to the new Epiphany rated hoses. Be certain that the 1/8” fitting is installed on the 1/8” hose. When assembled, it should be the middle of the three fittings.

06

Following the reassembly instructions, reinstall the circuit board and reassemble your marker.

ADJUSTMENT AND OPERATION

IMPORTANT

Congratulations, your Ion or SP-8 now has an Epiphany inside, and is ready to provide you with a new level of performance on the field.

Tuning and operation of your upgraded marker is not entirely the same as before. The primary difference you will notice is that with proper insert selection, you will be operating between 260 and 280 psi to fire a paintball at 285 feet per second. You must use a chronograph to correctly adjust your velocity. For best performance, you will also need to optimize your dwell setting.

It is important that you obtain and read the Epiphany Operation and Instruction Manual, and thoroughly familiarize yourself with it. This manual contains the proper set-up and adjustment procedures for your new Epiphanized marker. The latest version of the Epiphany Manual is available as a free download at www.SmartParts.com.

TECH SUPPORT

Our Technical Support Department is open Monday through Friday, from 10am to 6pm EST, and can be reached at 724-539-2660. Additional support and downloadable product manuals are available through our web site, www.smartparts.com.