

Shocker Sport™ Manual



Includes: Shocker Sport™ 4X4, Shocker Sport™ S/F, Shocker Sport™ Turbo, and Shocker Sport™ Turbo S/F

SMART PARTS™
EQUIPMENT | COUNTS



WARNING: The Shocker Sport™ Paintball Marker is not a toy. Misuse or careless use may cause serious injury or death. The user and any person within range must wear eye protection designed for paintball use. Recommended at least 18 years old to purchase, 14 years old to use with adult supervision, or 10 years old to use on paintball fields meeting ASTM-standard F1777-97. Read operation manual before using. Always use barrel plugs when not involved in actual play. When gassing and degassing the marker's system never aim the gun at another person. Always point the barrel towards the ground. Never use over-filled CO₂ bottles as this will "spike" the system causing the hoses to burst.

Shocker Sport™ Limited Warranty

Smart Parts warrants for 1 year to initial retail purchaser that the Shocker Sport™ paintball marker and regulator are free from defects in materials and workmanship. Disposable parts, including batteries, o-rings, seals, etc are not warranted. The fill poppet and firing piston are warranted for six months. The solenoids and electronics on your Shocker Sport™ are unconditionally warranted for six months, plus an additional warranty of six months for electronic parts only (installation and labor are not included.) This warranty does not cover surface damages (scratches and nicks,) misuse, or improper disassembly and reassembly, or attempts made to drill holes or remove metal from the external surfaces, which could result in degrading the performance and reducing pressure safety factors. Do not use teflon tape on any part of this marker--the tape can break off and plug the solenoids. Instead, use *Loctite 271*. Do not make changes to the basic marker parts without written approval. The only authorized lubricant for the gun is DOW 33 Lubricant. Use of any other lubricant could result in voiding your warranty. Use only those "on/off" switches purchased from Smart Parts. Unauthorized "on/off" switches will void this warranty. This warranty is limited to repair or replacement of defective parts with the customers to pay shipping costs. This warranty is effective only if the customer returns the warranty registration card enclosed with the marker.

Attention Shocker Sport™ SF Owners!!!!

The Shocker Sport™ SF is a select fire marker capable of shooting full-auto. This may not be legal in some countries, such as the United Kingdom. It is the responsibility of the marker's owner to check these laws before attempting to transport the marker into that country. Failure to do so may result in heavy fines and/or imprisonment and confiscation of said marker, which by the way is not covered under your warranty.

Thank you for purchasing the Shocker Sport™. The Shocker Sport™ is the culmination of years of research and testing. Engineers at Smart Parts, building on their experience with the original Shocker, have given the Shocker Sport™ a complete overhaul to keep up with the demands of today's players and the quality you expect from Smart Parts, Inc. We've made the Shocker Sport™ smaller, lighter and

faster than the original Shocker while keeping the low pressure, accuracy and extremely low ball breakage! In addition, we've upgraded the electronics, wiring and grounding to make the marker far more reliable. The Shocker Sport™ now incorporates a digital circuit board, redesigned bolt assembly, new solenoid valves and an optional integrated air assist port.

The Basics

The Shocker Sport™ 4x4, Sport™ SF and Turbo™ consist of three main assemblies. The first is the **Body**, second is the **Solenoid Housing** and the last is the **Grip Frame**.

Body

The Body is two interlinked systems, the Bolt and the Firing System. It also includes an air transfer port and air assist fitting port.

The Bolt is contained in the upper chamber and should only be removed when the gun is degassed. The Bolt is operated by the rearmost solenoid controlling the air going to the front and rear of the bolt piston in order to make it travel back and forth. The bolt's function is to load the paintballs into the breach of the gun and to transfer the air from the firing system to the ball in order to propel it.

The firing system contains three main moving parts: the firing piston, the fire rod and the fill poppet. The firing system is controlled by the foremost solenoid valve which when activated starts the firing cycle. The firing piston and fill poppet are contained in their respective housings. *NOTE: The firing piston also contains a glide ring that is split to facilitate assembly.*

The air transfer port distributes air to the entire gun and has 1/8" N.P.T. ports at the front and rear of the gun.

The air assist fitting port is where the 10-32 air fitting is screwed into for the optional air assist elbow. It is located on the right-hand side of the gun.

Solenoid Housing

The solenoid housing serves three functions. First it encloses and protects the solenoids, secondly it holds the circuit board and third it connects the body and the grip frame. The solenoid housing is held to the body using four 10-32 phillips head cap screws. It is important not to over tighten these screws as thread damage may occur. Shocker Sport™ SF owners please note: The solenoid housing screws for the front of the gun are longer than the screws for the back of the gun. If you try to tighten the longer screws into the back of the gun or assembly the gun without the tournament cap in place you may damage the body threads. The circuit board is mounted to the solenoid housing using screws and should not be removed or adjusted. The circuit board is coated with a water-repellent coating to prevent problems in wet playing conditions. The timing of the gun is preset at the factory.

A small red LED is located on the front of the solenoid housing. This is the battery life indicator. It will begin to flash when your batteries are getting low and will light up continuously when they need replaced.

If you have purchased a Shocker Sport™ SF your solenoid housing will have a 3-way switch protruding from the front of it. This is the **S**elective **F**ire switch, it allows you to select between three different firing programs, with the switch in the center position the gun is in single fire mode, the gun

shoots once per trigger pull. The second is the three shot burst setting. Moving the switch to the right position when you are facing the back of the gun sets the three shot burst. The gun will fire three times during each trigger pull. NOTE: The trigger must stay depressed during the entire three shots, if it is not it may not shoot all three shots. The last setting is the fully automatic setting. Moving the switch to the left position when you are facing the back of the gun sets this. This setting tells the gun to continue firing as long and the trigger is depressed. This setting should be used with the utmost caution and care. Remember this gun can fire at 10+ balls per second. At this rate, with the proper conditions, you could empty an entire 2500 round case of paint in roughly 4.2 minutes.

Two switch covers are provided with the Sport™ SF, the tournament cover does not allow the rate of fire to be altered without removal while the other cover does allow the switch to be moved during play.

Grip Frame

The Grip Frame contains the trigger, batteries and the mechanical safety. It is held to the solenoid housing with two 1/4"-20 screws. The front screw can be replaced with a 1/4"-20 stud and a handle. The batteries are replaceable and can be purchased through Smart Parts or any Smart Parts Authorized dealers. *NOTE: It is highly recommended that you unplug your battery after each day of play. This will greatly extend the life of the batteries—if you do not unplug your battery the power will slowly drain.* With normal care and usage the batteries should last at least 100,000 shots. An additional feature can be purchased from Smart Parts to allow easier battery disconnection. Smart Parts is offering a switch that will mount in the grip and allow you to turn off your batteries without removing your grips. There are also holes on the bottom of the grip frame for a standard bottomline fitting.

Another grip frame available to Shocker Sport™ owners is a double trigger grip frame. This functions the same as the standard grip frame but is fitted with a double trigger.

Maintenance

General Cleaning and Lubrication

The body of the gun should be cleaned off with a damp cloth. In the unlikely event of a ball break, the bolt can be removed when the gun is degassed and a squeegee can be run through the entire upper chamber to clean out the paint residue. *DO NOT run the gun under water to clean out broken paint.*

If you should ever lose or damage an o-ring or seal in your Shocker or your Shocker regulator you may purchase o-ring kits from Smart Parts. They are available in partial and complete kits for both the Shocker regulator and the Shocker.

Your Shocker may occasionally need to be disassembled and relubricated with a LIGHT coat of Dow Corning 33 silicon grease. The main parts that need greased are the bolt, the firing piston and the fill poppet. **Proper lubrication is vital to the performance of your Shocker. If it is not lubricated thoroughly it will not perform at its optimum level.**

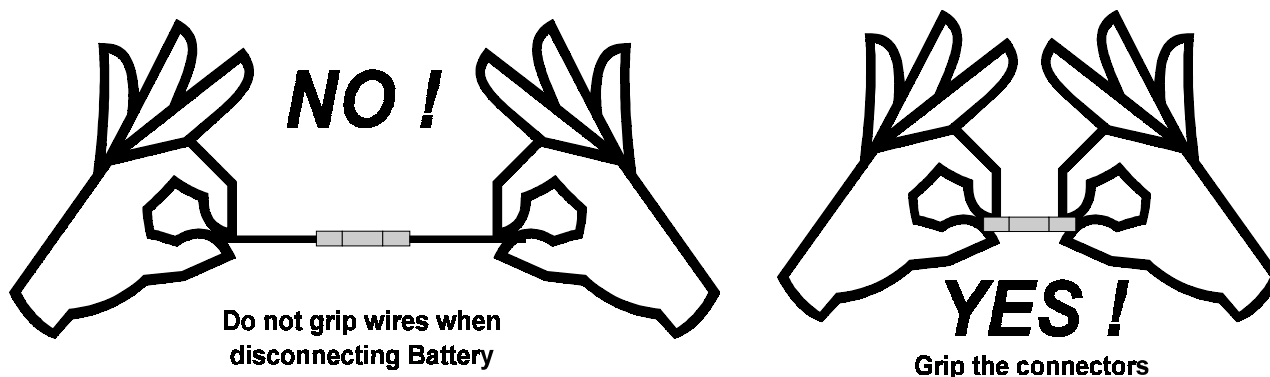
To lubricate the bolt you must unscrew it from the gun. Then using your finger work a small amount of grease into the holes in the body of the bolt, onto the bolt shaft and on the o-rings around the outside of the bolt cylinder body. After this is done work the bolt head back and forth to distribute the grease throughout the assembly.

To lubricate the firing piston (10), first remove the firing cylinder (9) from the gun using a large flat headed screwdriver. (Note: The firing cylinder is located underneath the barrel on the front of the gun.) Next using a small pair of needle nosed pliers remove the firing piston from the firing cylinder. After it is removed spread a light coating of grease on all the o-rings and on the firing piston guide (11). After this is done replace the firing piston and the firing cylinder.

To lubricate the fill poppet (13) first remove the fill poppet seat (12) from the rear of the gun using an adjustable wrench. The fill poppet seat is located below the bolt. Once the seat is removed you must remove the fill poppet guide (14) using a flat bladed screwdriver while holding the housing with an adjustable wrench. Once the cap is removed you should see the end of the fill poppet and the fill poppet bearing (19). Remove these items with a pair of needle nosed pliers. Once you have removed the poppet, spread a light coating of grease on the poppet and the poppet bearing and reassemble the poppet housing. Finally reinstall the poppet housing into the gun.

Battery Pack Removal and Replacement

The battery pack is located in the grip frame and can be replaced easily. In order to change the battery pack one side of the grip must be removed. To do this you must use a phillips head screwdriver and remove the two screws in the side of the grip frame holding the grip on. Once this is done you can pull the grip back and see the battery pack. Disconnect the battery pack by simply unplugging the connector-plug. *Note: It is important that the battery pack be disconnected after each day of play.* Replacement battery packs are available through Smart Parts and their distributors.



Disassembly of the Shocker Sport™

*Before attempting any disassembling of the Shocker Sport™: remove all sources of paint and air, remove the barrel, and disconnect the battery pack. Failure to follow these precautions may result in damage to the gun and/or **grievous injury** to operator or bystanders.*

The disassembly of the Shocker Sport™ into its three main parts is easy. Usually it is not necessary to remove the grip frame and the solenoid housing from the body to do normal maintenance of the components in the body. If you need to access the body or firing chamber skip down to the second paragraph in this section.

The first step is to remove the grip frame from the solenoid housing. This is done using a 5/32"

Allen wrench to loosen and remove the two screws holding the two parts together. If you have a front handle it takes the place of the front frame screw. *Note: Use caution when separating the grip frame from the solenoid housing. The spring détente in the safety may come out.* The battery pack must also be disconnected from the circuit board. The next step is to separate the solenoid housing from the main body. The four body screws must be loosened and removed using a Phillips screwdriver. Once this is done the solenoids must be disconnected from the circuit board. Disconnecting the solenoids is accomplished by unplugging the connector from the board itself. Now you have separated the gun into its three main parts.

The body of the gun is the only part that can really be disassembled any further. The first and easiest part to remove is the bolt. To remove the bolt, simply grasp the knurled end and unscrew. A schematic of the bolt and its replacement seals is shown on **page 4, figure 1**.

The next step is to remove all the parts to the firing chamber. The first part of this is the firing piston housing. This is located beneath the barrel in the front of the gun. The firing piston housing is removed using a flat head screwdriver, once the threads are out the part can be removed by simply pulling on it. *Note: Once this part is removed the firing rod may fall out of the gun.* Inside the housing is the firing piston. To remove the piston grasp the end of it using a pair of needle nosed pliers. The firing piston housing is shown on **page 15, figure 2**.

The poppet housing is the next part that can be removed from the marker body. To remove this use a 7/8" open-ended wrench and turn counter clockwise. Again once the threads are out the part can be removed by simply pulling on it. To access the poppet, the poppet guide cap must be removed. This is done using a flat head screwdriver. Once this is unscrewed the poppet, poppet guide and spring can be removed with a pair of needle nosed pliers. The poppet housing is shown on **page 14, figure 3**.

The two solenoids can be removed from the body by unscrewing the two mounting screws. *Note: We highly recommend you DO NOT attempt to remove the solenoids because the mounting threads are easily stripped. If the threads become stripped you must purchase a new body.*

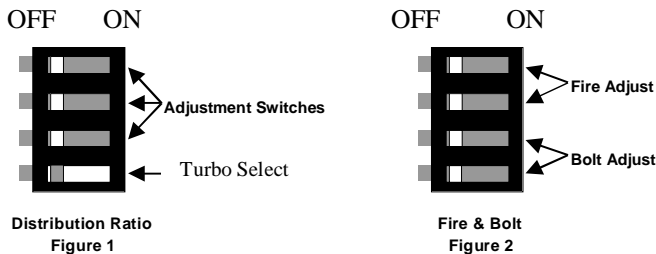
The Circuit Board

The circuit board for the Shocker Sport™ controls the timing of the bolt and firing systems. Three different circuit boards are available for the Shocker. The two standard boards are the 4x4™ and the S/F™. The newest board available is the Turbo™ board. The Turbo™ board allows for an impressive fire rate.

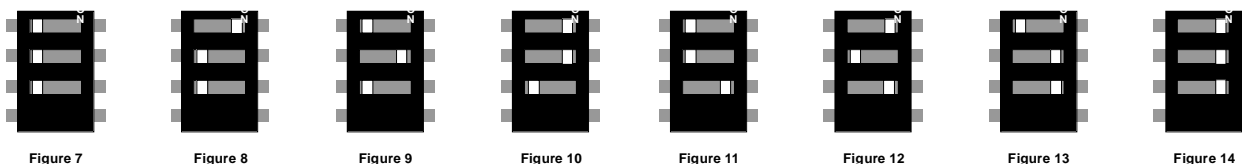
Another option available through Smart Parts is the VL Revolution loader kit. This loader kit allows you to upgrade your Revolution loader. Instead of being controlled by the seeing eye, the loader is controlled by the trigger pull of the Shocker Sport™. The new loader also has a speed adjustment feature, which allows you to adjust the speed of the motor in your loader. This loader also has a battery saving feature that can extend the life of your loader batteries.

A picture of the circuit board is shown at the end of this section. Your Shocker Sport™ has two independent actions with each shot. A FIRE pulse and a BOLT pulse. The fire pulse sends the paintball down the barrel. The bolt pulse feeds a new ball into the fire chamber. Your marker has been factory set for optimum performance of both fire and bolt action. In the unlikely event that your Shocker Sport™ needs fine tuning, adjustment switch banks have been provided for the fire and bolt pulses.

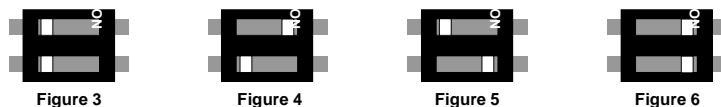
Each switch bank has four individual switches, which can be set to increase, decrease or redistribute these pulses. Sliding its tab or rocker arm to the ON position (see below) turns on a switch.



The Distribution Ratio switch pack, seen in figure 1, uses the upper three switches to adjust the distribution ratio of the fire and bolt. (See page 8 for settings of fire rate options.) Each gun is a unique mechanical device with a fixed relationship between the fire and bolt actions. The distribution ratio switch pack electronically adjusts that relationship for maximum speed and accuracy. Your gun will sound different as you make these adjustments, this is normal. Below **figures 7 through 14** show all the possible adjustments for the Distribution Ratio. **Figure 7** shows all the switches off through **figure 14** that has all switches on. The Distribution Ratio switch pack also controls the turbo triggering characteristics. Turning the Turbo Select switch on enables turbo triggering. Turning the switch off disables it.

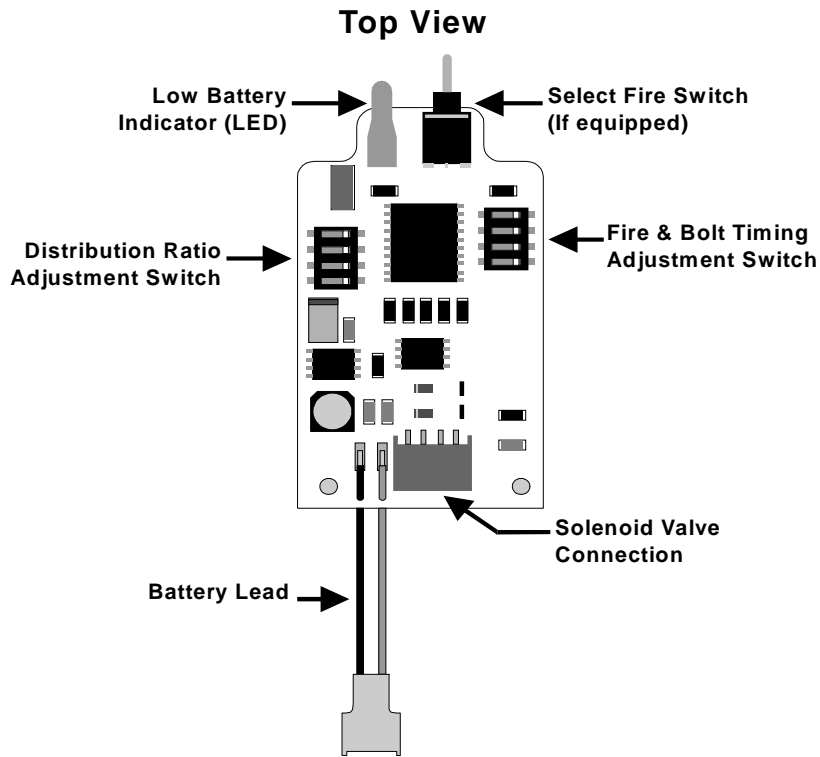


The fire adjustment can be set to four different settings, as can the bolt adjustment. The fire is adjusted using the upper two switches and the bolt is adjusted using the bottom two switches in the switch pack, see **figure 2** above. Below **figures 3 through 6** show the minimum to maximum pulse adjustments.



The minimum fire and bolt is demonstrated by the switch settings in **figure 3**. The maximum is shown in **figure 6**.

If and only if you own a Turbo™ board you can turn this feature on and off using the Turbo™ Select switch located on the circuit board. If you would like to turn the Turbo™ board off simply move the switch to the left or OFF position. To turn the Turbo™ feature back on just push the switch to the right or ON position.



Velocity Adjustment

The velocity of the Shocker Sport™ is controlled by the pressure going into the gun. This pressure, and in turn the velocity, is adjusted at the regulator. To adjust the velocity you must turn the spring housing on the regulator. The spring housing is the long black cylinder on the regulator with a hex nut at the top and a hole drilled in the bottom. To increase the velocity you must turn the spring housing in or clockwise. *Caution: Do not increase the pressure over 200 psi. This will cause the solenoids to leak and the hose may burst.* To decrease the velocity you must turn the spring housing out or counter clockwise. Once you have the velocity adjusted to where you want it, you should lock down the lock nut and rechronograph your marker. *Note: In order to get the proper velocity reading from your Shocker Sport™ you must point the barrel up when shooting across the chronograph.*

Fire Rate – Options Adjustment

MODEL	DISTRIBUTION RATIO SWITCH PACK				FIRE RATE / OPTION
	<i>Switch 4</i>	<i>Switch 3</i>	<i>Switch 2</i>	<i>Switch 1</i>	
4x4, SF, Turbo		OFF	OFF	OFF	11.25 shots per second
4x4, SF, Turbo		OFF	OFF	ON	10.50 shots per second
4x4, SF, Turbo		OFF	ON	OFF	10.00 shots per second
4x4, SF, Turbo		OFF	ON	ON	9.75 shots per second
4x4, SF, Turbo		ON	OFF	OFF	9.50 shots per second
4x4, SF, Turbo		ON	OFF	ON	9.25 shots per second
4x4, SF, Turbo		ON	ON	OFF	9.00 shots per second
4x4, SF, Turbo		ON	ON	ON	8.75 shots per second
Turbo	OFF				Turbo OFF
Turbo	ON				Turbo ON

Trouble Shooting

PROBLEM	SOLUTION
1. Gun skips shots	<ol style="list-style-type: none"> 1. Check LED light (on the front of gun) to see if it lights up when you are pulling the trigger. If it lights up your battery will need to be replaced. 2. Check the gun and the regulator for air leaks. 3. Remove main bolt by unscrewing it out of the back of the gun and check o-rings on the bolt tip (the silver part with two seals) to make sure they are not twisted, cracked or in any way damaged. If the o-rings are damaged replace them. 4. Make sure your loader is feeding paintballs as fast or faster than the gun is shooting. (Smart Parts recommends using a VL Revolution.) 5. Remove your fire piston and check the front and back o-rings for damage. If they are damaged replace them. Relubricate the firing piston before you reinstall it. 6. Remove and disassembly fill poppet housing. Stretch the spring inside, relubricate and reassemble. 7. Check to see if your barrel is the appropriate diameter for the size of the paint you are using (*).
2. Air leaks down barrel	<ol style="list-style-type: none"> 1. Remove fire piston housing and check the o-rings on the front and back of the fire piston for twisting or damage. Relubricate and reinstall. 2. Shoot the gun 4 or 5 times to make sure the o-rings have seated right. 3. Solenoid SH3000 is contaminated, you will need to take it apart and clean it. Call Smart Parts for assistance.
3. Bolt cycles but gun doesn't fire	<ol style="list-style-type: none"> 1. Check the LED light when pulling on the trigger, if the LED lights up you will need to replace your batteries. 2. Check all components in the fire chamber are well greased- this includes taking out the fire cylinder out of the front of the gun and removing and regreasing the fire piston. Also remove the fill poppet guide from the back of the gun and disassemble to regrease the poppet.

<p>3. Bolt cycles but gun doesn't fire (cont'd)</p>	<ol style="list-style-type: none"> 6. Check the pressure coming into the gun to ensure it is above 150 psi. Also check your tank is not empty. 7. Make sure there are no air leaks in the gun or attachments. If there are, find and fix them. 8. Increase the fire pulse on the circuit board. Refer to page 5 figures 2 through 6. 9. If steps 1 through 4 fail then you will need to check the solenoid valve for contamination (this will be the SH3000 solenoid). If you have never taken a solenoid apart please call Smart Parts for assistance in this matter.
<p>4. Air leak on the inside of the gun.</p> <p style="text-align: center;">--See diagram on page 16--</p>	<ol style="list-style-type: none"> 1. Remove the four corner screws from the solenoid housing and split the gun in half. Once this is done check the solenoid screws to ensure they are snug but use caution not to over tighten and strip the threads. 2. With the body of the gun separated from the grip assembly, gas up the gun and try to locate the exact position of the leak. If you cannot get it to stop then call Smart Parts. Be sure to have your gun and tools ready to remedy the problem.
<p>5. Inconsistent velocity</p>	<ol style="list-style-type: none"> 1. Clean your barrel. 2. Point barrel upward to keep the ball from rolling out of the breach of the gun. 3. Check your paint to see if it fits your barrel properly*. 4. Check regulator and gun for leaks. 5. Check fire piston o-rings and glide rings for cuts or nicks. 6. Check your bottle valve to ensure it is open completely. 7. If velocity will only reach 250 fps, at a high pressure (about 220psi), the middle section of the solenoid is plugged with dirt and will need to be replaced—call Smart Parts.

(*) The proper way to check to see if you barrel's bore is the right size for the paint you are using is to insert a paintball into the barrel you are using. Then try to blow the ball out of the barrel. If the ball is extremely hard to blow out or if it won't move at all, your bore size may be too small or your paint may be too big. If your ball rolls out the barrel easily your paint may be too small or your barrel may be too big. If you can blow the ball out of the barrel with minimal force then your bore size is just right.

Note: It is best to try this with a number of paintballs because they may vary from ball to ball.

Anti-siphon information page.

An anti-siphon tube is a tube that is installed in a CO₂ tank's valve in order to help prevent liquid CO₂ from entering the system. The tube is screwed into the back of the valve and bent so that the end of the tube will be pointing up when the tank is screwed into the gun. When the valve is completely screwed into the gun mark an "X" on the outside of the valve (or on the outside of the tank) near the neck to indicate the *up position* of the tube inside the tank and to also show that the tank is an **Anti-Siphon Tank**. NOTE: Tanks with anti-siphon tubes should only be used on the cradle or fitting that it was set-up for. If you use an anti-siphon tank on a different bottle adapter there is a good possibility that the tube will be oriented wrong and draw liquid CO₂. Anti-siphon equipped tanks should never be used on remote systems.

Anti-siphon tubes should only be installed by QUALIFIED AIRSMITHS. Please do not attempt to install an anti-siphon tube on your tank, have a professional install it for you. If you need more information regarding this matter please feel free to contact your local paintball field or Smart Parts at (724) 539-2660.

Parts List for the Shocker Sport™

Shocker Parts (Page 14)

- | | |
|---------------------------------|----------------------------------|
| 1. Gun Body | 28. 4-Way Solenoid |
| 2. Solenoid Housing | 28A. Solenoid Gaskets and Screws |
| 3. Grip Frame | 30. Trigger Spring |
| 15. Trigger Pin | 31. Safety Spring |
| 16. Safety Pin | 32. Circlip |
| 17. Trigger | 33. Grip Frame Screw |
| 18. Push Rod | 34A. Solenoid Housing Screw |
| 20. Ball Tube | 35. Trigger Screw |
| 21. Switch Cover (Tournament) | 38. Grip Screw |
| 22. Switch Cover (Recreational) | 39. Safety Ball |
| 23. 4X4 Circuit Board | 40. Grip |
| 24. S/F Circuit Board | 55. Circuit Board Screw |
| 25. Battery | 58. Turbo Circuit Board |
| 27. 3-Way Solenoid | 59. Turbo S/F Circuit Board |

Bolt Assembly (Page 15)

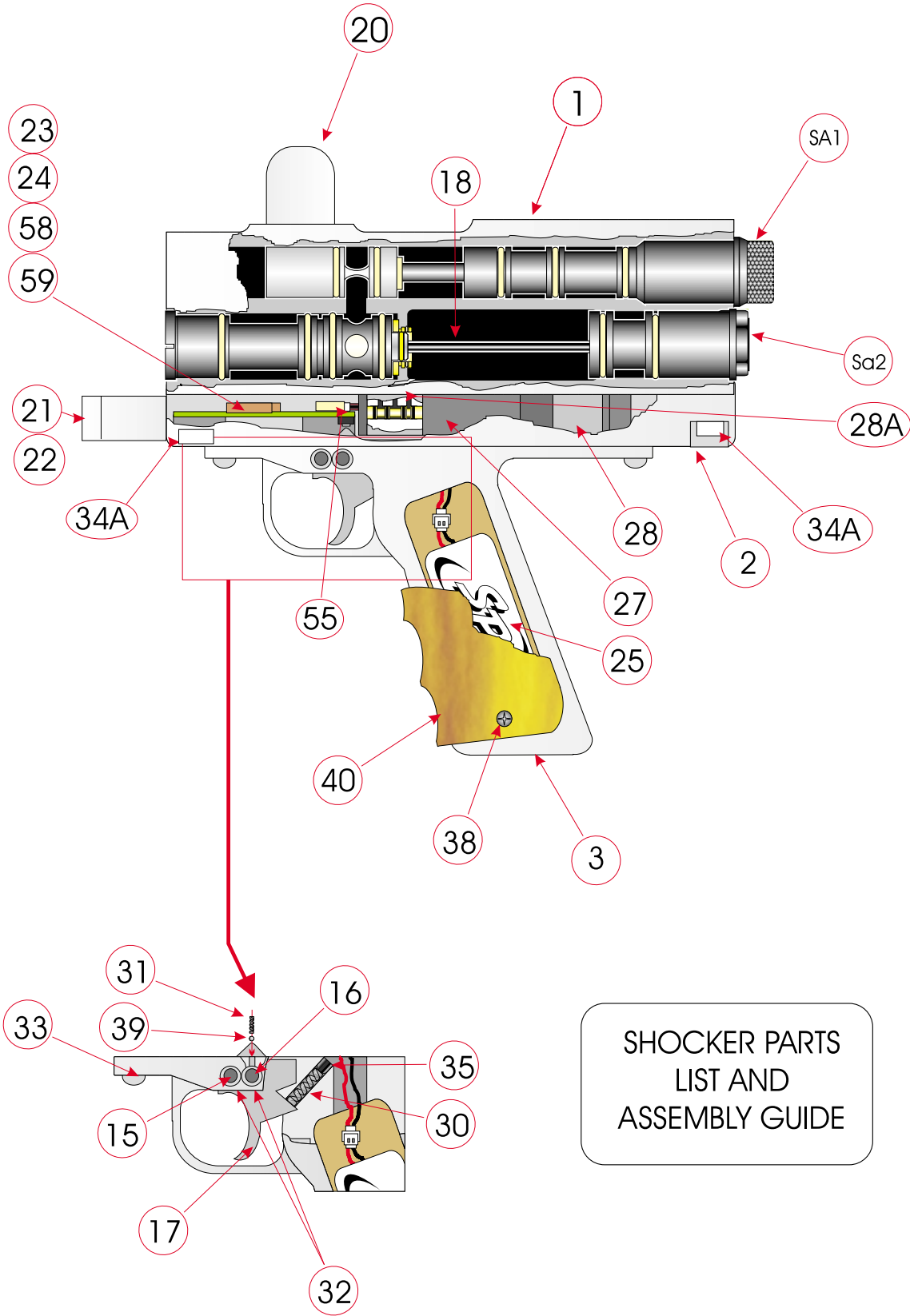
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|----------------------|---|
| 4. Bolt Tip | 43. Piston Bumper |
| 5. Bolt Tip Seals | 44. Bolt Cylinder Seal (outer) |
| 6. Bolt Cylinder | 45. Bolt Cylinder Seal (inner) |
| 7. Bolt Piston | 46. Piston Cylinder Seal |
| 8. Bolt Piston Guide | 47. Bolt Piston Seal/Firing Piston Seal |
| 18. Bolt Piston | 48. Piston Guide Seal |
| 42. Bolt Bumper | 51. Bolt Cylinder End Seal |

Fire Piston Assembly (Page 15)

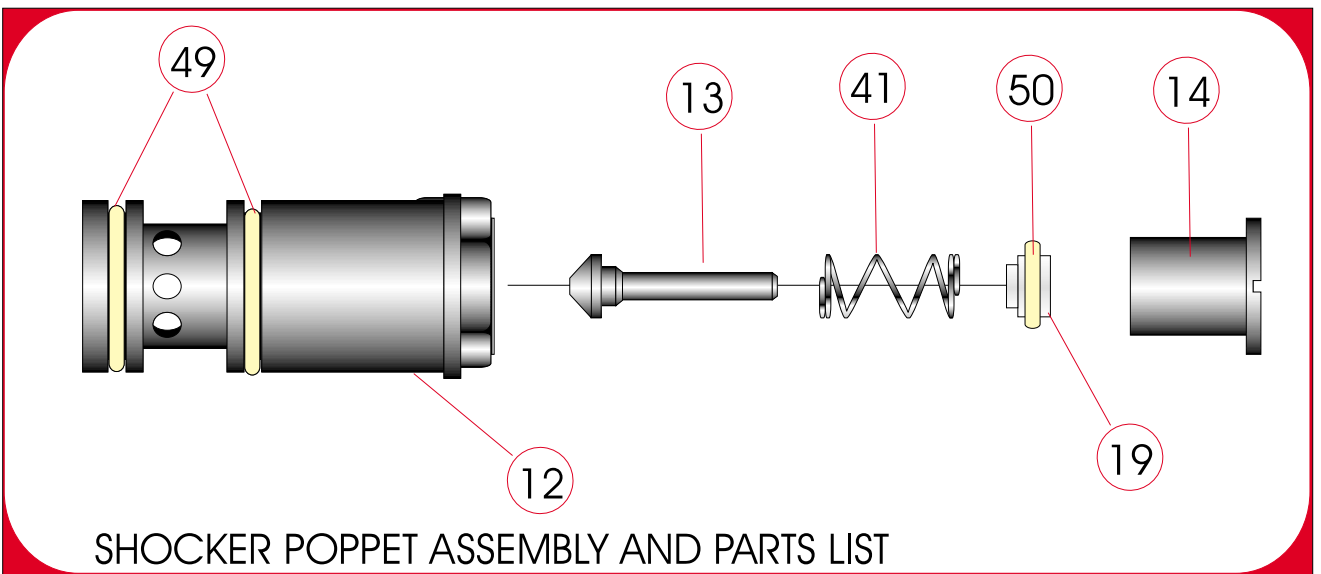
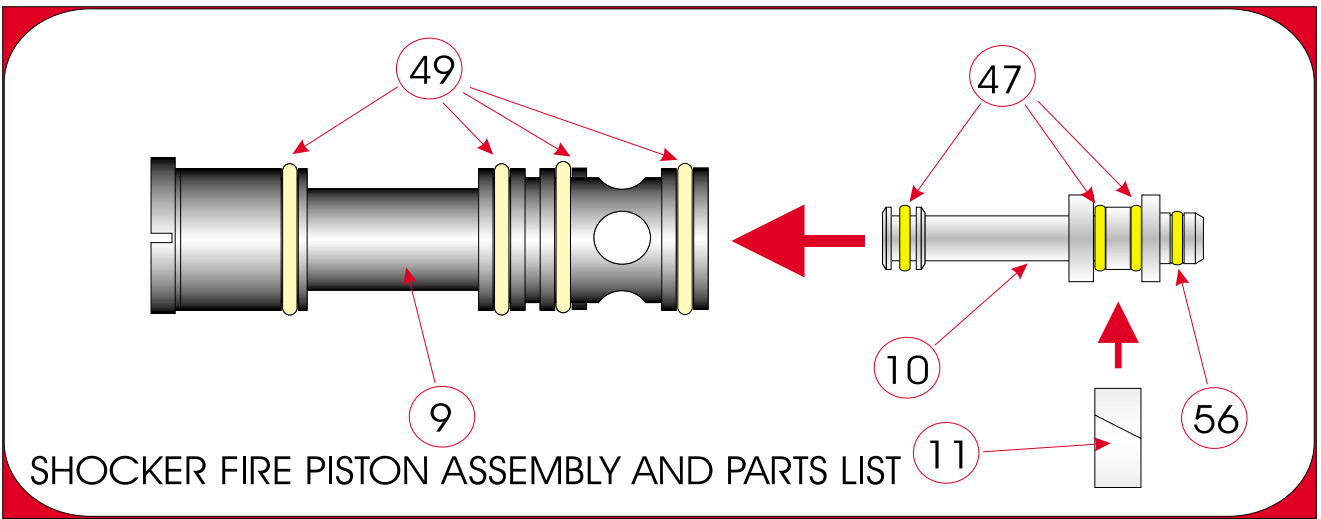
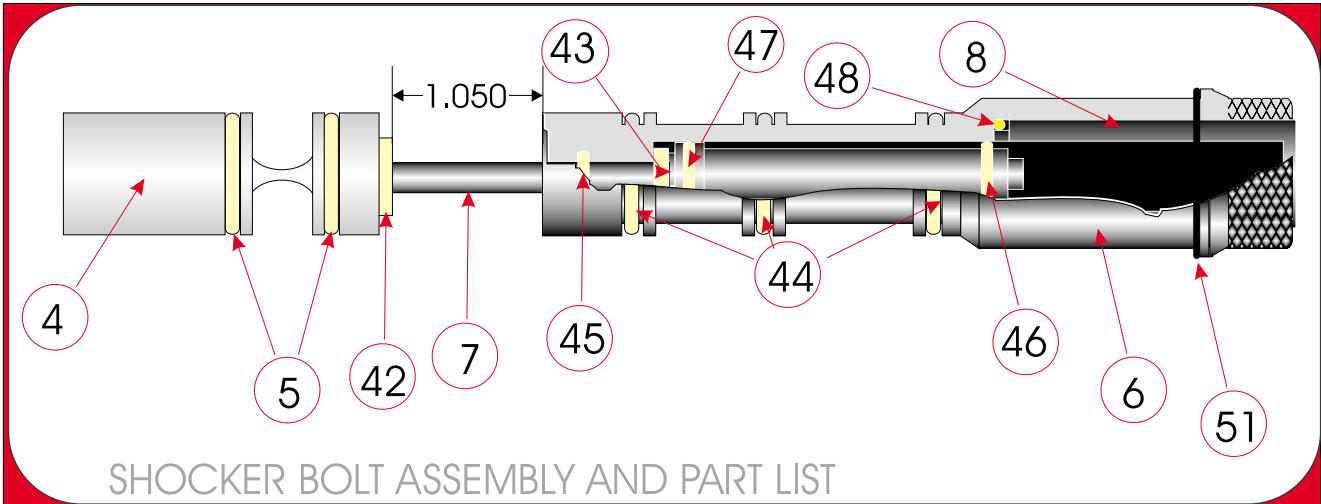
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|------------------------------------|---|
| 9. Firing Cylinder | 47. Firing Piston Seal/Bolt Piston Seal |
| 10. Firing Piston | 49. Firing Cylinder Seal/Poppet Seat Seal |
| 11. Firing Piston Guide/Glide Ring | 56. Firing Piston Seal Front |

Poppet Assembly (Page 15)

- | | |
|------------------|---|
| 12. Poppet Seat | 19. Poppet Bearing |
| 13. Poppet | 41. Poppet Spring |
| 14. Poppet Guide | 49. Poppet Seat Seal/Firing Cylinder Seal |
| | 50. Poppet Guide Seal |



SHOCKER PARTS
LIST AND
ASSEMBLY GUIDE

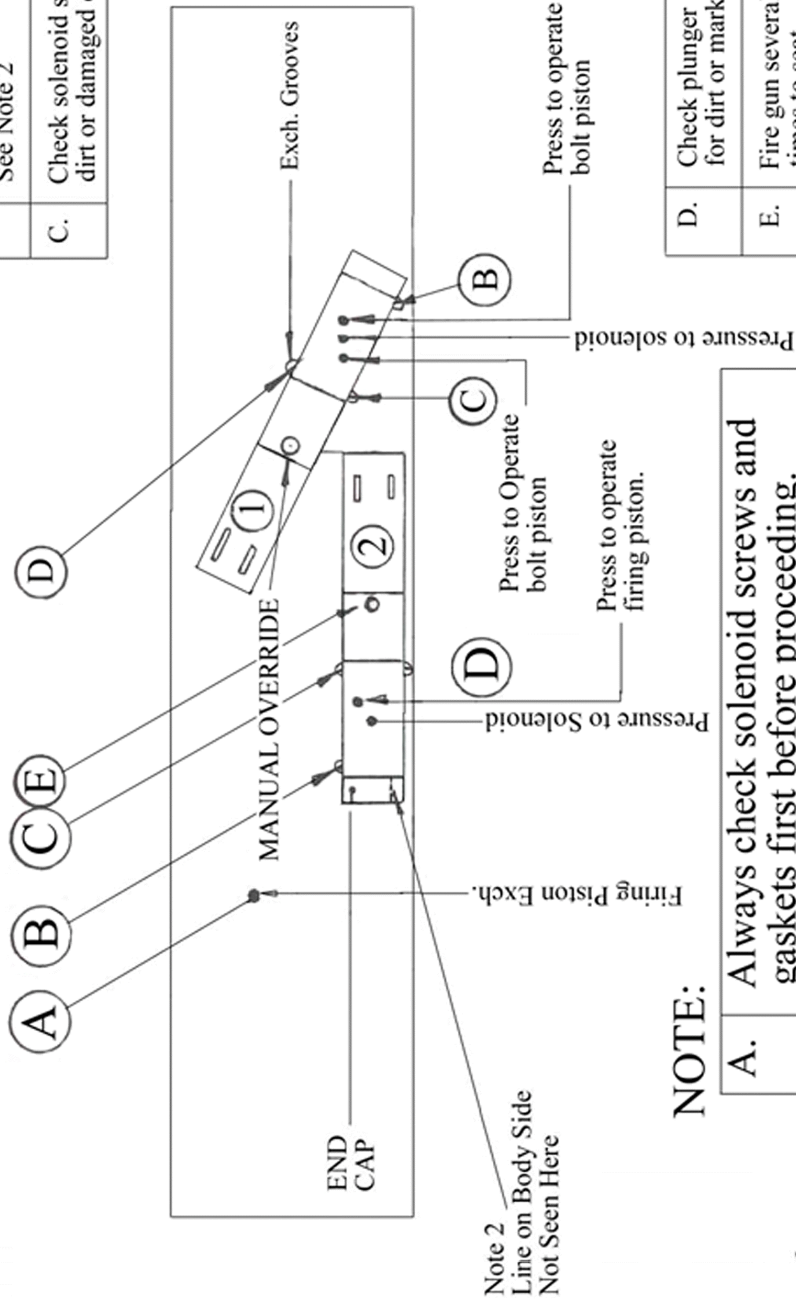


TROUBLESHOOTING FOR LEAKS ON SHOCKER SOLENOIDS

PLAN OF SHOCKER BODY

A.	Check seals on firing piston housing.
B.	Ensure end cap is fitted correctly. See Note 2
C.	Check solenoid spool for dirt or damaged o-rings.

- ① Bolt Solenoid
- ② Firing Piston Solenoid



Note 2
Line on Body Side
Not Seen Here

NOTE:

A.	Always check solenoid screws and gaskets first before proceeding.
B.	A,B,C, and D are for constant leaks only. Small puffs of air will be released when firing.

D.	Check plunger seat for dirt or marks.
E.	Fire gun several times to seat firing piston.

Smart Parts, Inc.
PO Box 3200
Latrobe, PA 15650-5000

Disassembly/Reassembly Instructions

Disassembly of Bolt

1. Remove back end cap from bolt and o-rings from bolt tip,
2. Using a torch, heat the lower end of the bolt head to loosen the Loctite connecting the bolt head, bolt piston,
3. After the Loctite has been loosened use a flathead screw driver and unscrew the bolt piston from the bolt head through the rear of the bolt (the back of the bolt piston has a groove in it to fit a flathead screw driver),
4. When the bolt head is unscrewed, the bolt piston can be removed from the bolt housing and checked for damage or needed maintenance.

Reassembly of Bolt

1. Apply a light coating of greases to the bolt piston o-rings,
 2. Slide the smaller bolt bumper over the front of the bolt piston, insert bolt piston into bolt housing,
 3. Place larger bolt bumper in between bolt head and bolt housing on bolt piston,
 4. Clean bolt head and bolt piston threads with alcohol,
 5. After threads are clean and dry apply 680 Green Loctite and reassemble,
 6. Screw bolt piston into bolt head until snug—DO NOT OVER TIGHTEN!
 7. Allow to dry for 30 minutes, minimum,
 8. Replace bolt tip o-rings.
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Disassembly and Cleaning of Both Solenoids

1. Using a small phillips head screw driver, remove the black cap at end of solenoid (positioned at the silver end of solenoid),
2. When removing cap notice the line and dot on the bottom of the cap (the cap MUST be reassembled with the line and dot *facing down* or solenoid will leak!!),
3. When the cap is taken off remove the cone shaped spring,
4. Using a pair of needle nose pliers pull the shaft out of the solenoid and inspect shaft o-rings for damage or debris.

Reassembly of Solenoids:

1. Grease solenoid shaft and o-rings,
2. Reinsert solenoid shaft with pointed end facing out.
3. Place cone shaped spring over shaft with small end facing shaft,
4. Place cap over spring and shaft (with line and dot on cap facing down) and reinsert phillips head screws,
5. Snug down screws—DO NOT OVER TIGHTEN!!!

Gun Will Not Fire

