

SMART PARTS



Impulse™

Operating and Maintenance Manual for:

Impulse™

Impulse Vision™

Please read all operating instructions before using the Impulse™ paintball marker.

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www.smartparts.com

WARNING

The Impulse™ 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 to be 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 a barrel blocking device when not involved in actual play. When gassing and de-gassing the marker's system, never aim the marker 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. Do not attempt to lighten or alter the trigger assembly in any way, doing so will void your Smart Parts warranty. This includes any modifications such as: spring removal, installing or adjusting set screws, and/or removing material from the trigger.

IMPORTANT - Dry-Firing Your Impulse™

It is recommended that you do not dry-fire (fire without paint) your Impulse. The Impulse has a low pressure design, which makes the marker more accurate, and decreases ball breakage. Because of its low pressure design, the marker requires a paintball in front of the bolt to produce back-pressure, which makes the marker re-cock. If you must dry-fire the Impulse, remove the barrel and place a rag over the front portion of the marker where the barrel screws into. This will simulate the paintball and create the required back-pressure to re-cock the marker. If the Impulse is fired without anything in front of the bolt, the bolt will remain forward and allow air to continuously drain down the barrel. If the bolt remains forward after firing the marker with paint, increase the inlet pressure and decrease dwell settings.

The Impulse Paintball Marker

The Impulse is an electro-pneumatic paintball marker designed to fire at a low operating pressure (150-200 psi) to reduce ball breakage and increase accuracy. Power is supplied to the marker by a standard replaceable 9 volt alkaline battery that is housed in the grip frame. Paintballs are propelled by CO2 gas or compressed air, that is regulated by the Max-Flo regulator which supplies the required low pressure airflow at a high volume. The Impulse consists of three main assemblies:

Body

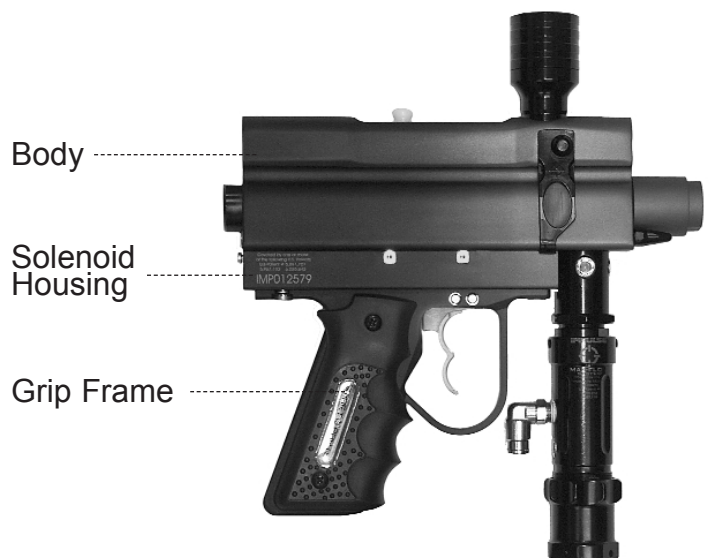
The Body consists of two inter-linked systems; the Bolt and the Firing System, which also includes an air transfer port. The Bolt is contained in the upper chamber, which is connected to the hammer in the lower chamber by the bolt pin. The function of the bolt is to load paintballs into the breech of the marker and to transfer the air from the valve to the ball in order to propel it.

Solenoid Housing

The solenoid housing serves three functions. First, it encloses and protects the solenoid; second it holds the circuit board, and third it connects the body and the grip frame.

Grip Frame

The Grip Frame contains the trigger and battery. The batteries are replaceable standard 9-volt alkaline.



Electrical Power Supply

The Impulse is powered by a replaceable 9-volt battery. With normal care and usage, the battery should last for approximately 25,000 shots. It is recommended that the Impulse be powered only by alkaline batteries.

Propellant CO2 / Compressed Air Supply

NOTE: We do not recommend the use of CO2 or compressed air systems that use a pin valve. If your air system uses a pin valve, it is highly recommended that you use an inline on/off valve to eliminate gassing and degassing problems.

The Impulse is capable of using either CO2 gas or a compressed air system (nitrogen system). For compressed air use it is required to use the Max-Flo regulator specifically designed to work on low pressure markers. Please follow all instructions included for the air system being used on your Impulse.

CO2

To use your Impulse with CO2, your bottle will need to have an anti-syphon tube that is correctly fitted to the Impulse to prevent liquid CO2 from entering the marker. If your CO2 bottle does not include an anti-syphon tube or your anti-syphon tube does not correctly position onto the marker, call a certified airsmith to install one into your bottle. Do not attempt to disassemble a CO2 bottle or install an anti-syphon device.

Compressed Air

The compressed air system installed must be able to provide a high volume of air regulated at 150-200 psi. If the compressed air system installed cannot regulate to the required pressure, a Max-Flo regulator will be required as a secondary regulator.

NOTE: Some of the steps below will require you to activate and fire the Impulse. Please read the section on *Operating the Impulse* (page 4) before continuing with the compressed air installation.

1. Attach the air system to the Impulse.
2. Adjust the air system output pressure to below 100 psi (turn the Max-Flo spring cap outward). This is to prevent the Impulse from being over-pressurized the first time the air system is turned on.
3. Turn on the Impulse. By default it will activate in “*Eye-Off Mode*”. This is the correct mode for initially setting the input air pressure, do not change.
4. SLOWLY turn on the air system and increase the input pressure to 150-160 psi. For accurate adjustment, fire the marker, and readjust if necessary.
5. Attach the barrel and a loader. Put paintballs in loader.
6. Change the Impulse to “*Eye-On Mode*”.
IMPORTANT: In Eye-On Mode, the first shot will always fire with or without a ball in the chamber.
7. Adjust regulator pressure between 150-200 psi to achieve desired velocity.

NOTE: If your Impulse is using a compressed air system and a secondary regulator, set the output pressure of the primary air systems regulator to 650-750 psi. Follow Step 4 to set the output pressure of the Max-Flo regulator.

Impulse Operating Instructions

The following section will review standard operating instructions for activating, deactivating and mode selection for the Impulse.

Activating the Impulse

To turn on the Impulse, press and hold the power button for 2 seconds. The power button is located on the back of the solenoid housing. Upon activation the Impulse will beep once and the LED light will display a slow double blink. The Impulse is now active and in *Eye-Off Mode*.

Deactivating the Impulse

To turn off the Impulse, press and hold the power button for 2 seconds. When deactivated, the Impulse will beep once and the LED will not flash.

Auto Shut-Down Feature

If the Impulse is not fired for 20 minutes, it will automatically deactivate and not fire.

Low Battery Indicator

When the battery level of the Impulse drops below 6.8 volts, the marker will sound an audible beep every 5 seconds.

Setting the Vision Eye Mode

The new Vision Eye detects the dropping motion of the paintball into the Impulse's chamber. With the Impulse in *Eye-On Mode*, it will only fire when a paintball has been detected by the Vision Eye and is in the chamber ready to fire. With the Vision Eye turned off, the Impulse will fire every time the trigger is pulled regardless of the position of the paintball.

To change Modes between *Eye-On Mode* and *Eye-Off Mode*, press the power button once to switch back and forth between the two modes.

IMPORTANT: In *Eye-On Mode*, the first shot will fire with or without a paintball in the chamber. This is to allow the Impulse to fire if a paintball was loaded into the chamber prior to the marker being turned on.

LED Display for Vision Eye Modes

- | | |
|--------------|---|
| Eye-Off Mode | Slow double blink every second. This is the default mode for the Impulse when it is activated. |
| Eye-On Mode | Rapid 5 blinks per second. Between shots, the LED will flash at 5 blinks per second if the next paintball has successfully loaded. If the next paintball has not correctly loaded, the LED will flash 1 blink per second until the next paintball is loaded successfully. |



Impulse Adjustments

The following section will review standard adjustment instructions for the Impulse.

Vision Eye

The new Impulse Vision Eye requires no manual adjustment. All settings are adjusted automatically by the circuit board programming.

Rate of Fire

The new Impulse has two default fire rates that do not require adjustment:

Vision Eye Off: 13.7 shots per second

Vision Eye On: 20 shots per second

Input Pressure Adjustment

The input pressure adjustment is made to the Max-Flo regulator included with the Impulse. The operating pressure should be set between 150-200 psi, depending on the velocity desired. Please read the Max-Flo operating manual included with the Impulse.

Increasing the pressure on your regulator

1. Turn the spring cap inward (clockwise), while watching the input gauge.
2. Fire 3-5 shots and then chronograph the Impulse.
3. Adjust the regulator until you achieve the desired pressure.

Decreasing the pressure on your regulator

1. Turn the spring cap outward (counter clockwise), while watching the input gauge.
2. Fire 3-5 shots and then chronograph the Impulse.
3. Adjust the regulator until you achieve the desired pressure.

Once your regulator is set to the desired pressure, you can lock it down by tightening the spring cap locking screw.

Dwell Adjustment

The dwell is the amount of time that the Impulse solenoid valve remains open. This controls the amount of air sent through the solenoid valve to the hammer. The dwell setting can modify the velocity of the Impulse and the marker should be chronographed after any adjustments made to the dwell or input pressure.

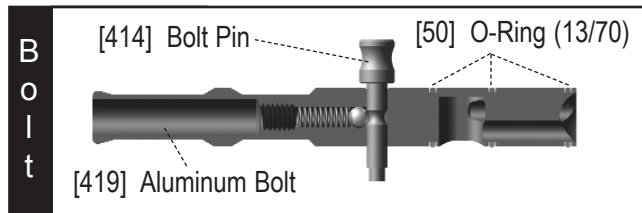
The dwell has an operating range of 4-14 milliseconds which is adjustable in .25 millisecond increments. The higher the setting, the longer the valve stays open, thus increasing the air flow to the hammer.

Increasing / Decreasing the Dwell - Using a small flat head tool press the Dwell Up or Dwell Down Button located on the side of the solenoid housing. Each press adjusts the dwell up or down .25 milliseconds and can be verified by a single high-pitch beep for each press. When the dwell setting has reached the limit of its adjustment, a rapid low pitch beep will sound.

Resetting the Impulse Operating Pressures

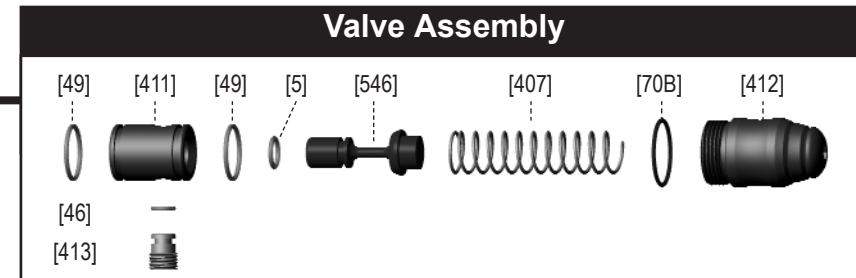
First reset the dwell by pressing and holding the dwell down button until a low-pitch beep sounds. The low pitch beep indicates that you have reached the bottom of the adjustment range for the dwell. Next, adjust your Max-Flo to the desired input pressure (150-200 psi). Finally, increase the dwell until the desired velocity is achieved.





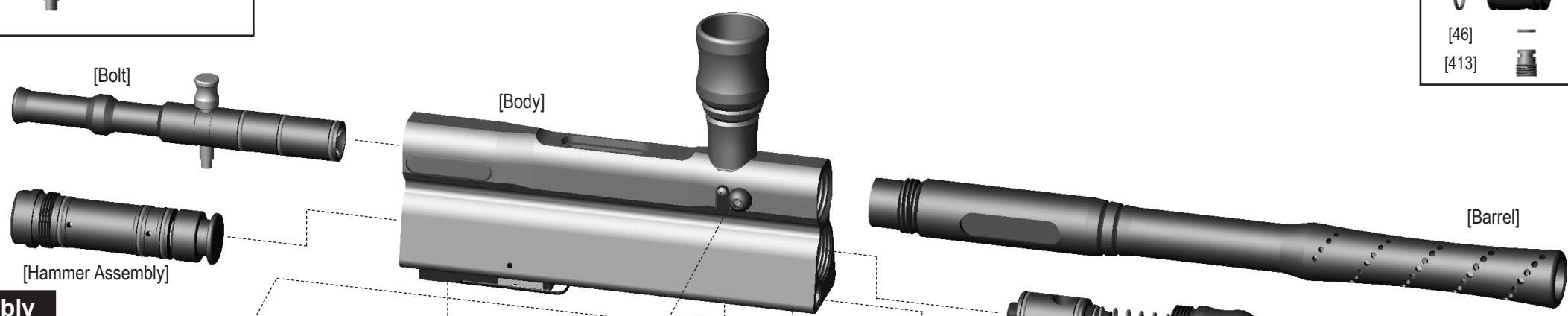
B
o
l
t

- [414] Bolt Pin
- [50] O-Ring (13/70)
- [419] Aluminum Bolt

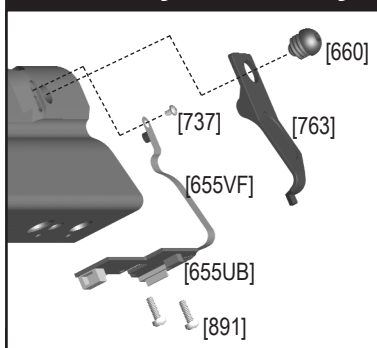


Valve Assembly

- [49] O-Ring (18/70)
- [411] Valve Seat
- [46] O-Ring (10/70)
- [413] Valve Seat Locator
- [5] O-Ring (11/70)
- [546] Delrin Valve
- [407] Valve Spring
- [70B] End Cap O-Ring
- [412] End Cap



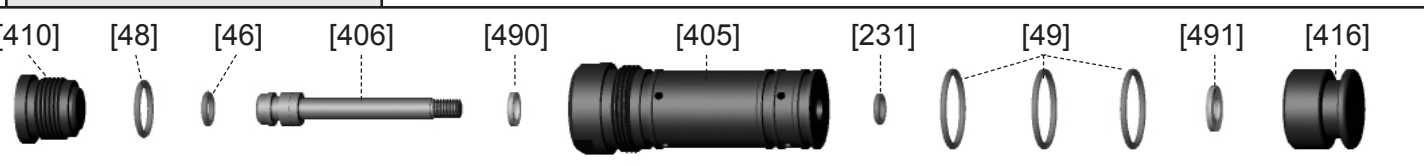
Vision Eye Assembly



- [660] Vision Eye Ball Detent
- [763] Vision Eye Cover
- [737] Vision Eye Screw
- [655VF] Eye Flex Circuit
- [655UB] Upper Board
- [891] Upper Board Screw

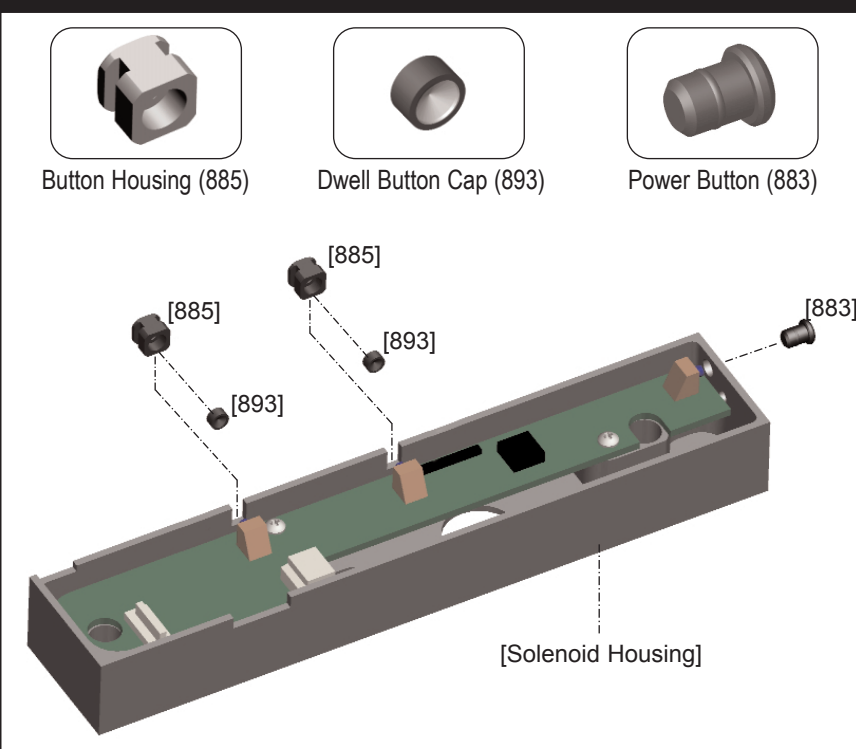
Hammer Assembly

- [410] Cylinder Cap
- [48] O-Ring (14/70)
- [46] O-Ring (10/70)
- [406] Piston
- [490] Piston Bumper
- [405] Firing Cylinder
- [231] O-Ring (9/70)
- [49] O-Ring (18/70)
- [491] Actuator Bumper
- [416] Bolt Actuator

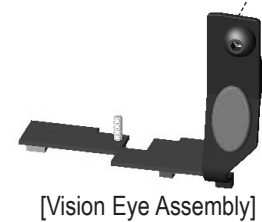


[6]

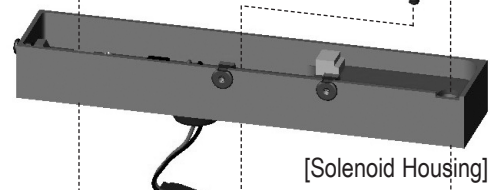
Solenoid Housing Assembly



[7]



[Vision Eye Assembly]



[Solenoid Housing]

[Valve Seat]

[Valve End Cap]

[Tapeworm (Optional Part)]

[Vertical Adapter]

[Gas thru Grip]

[Max-Flo Vertical Regulator] (optional part)

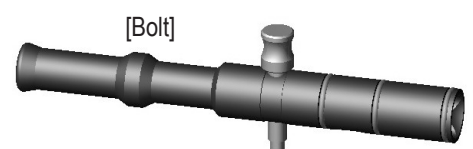
[Vertical Reg Bottom Line]

[Max-Flo Regulator]

[Grip Frame]

[Grip Frame Screw]

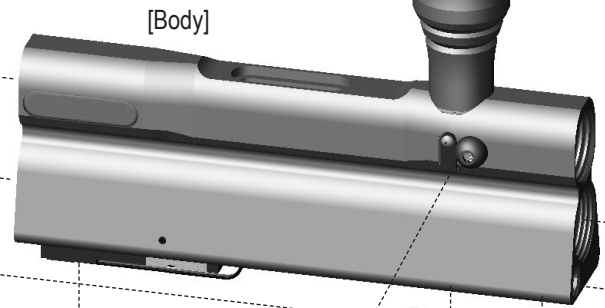
[Grip Frame Screw]



[Bolt]



[Hammer Assembly]



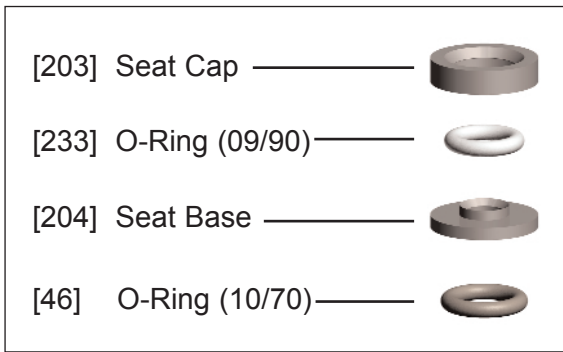
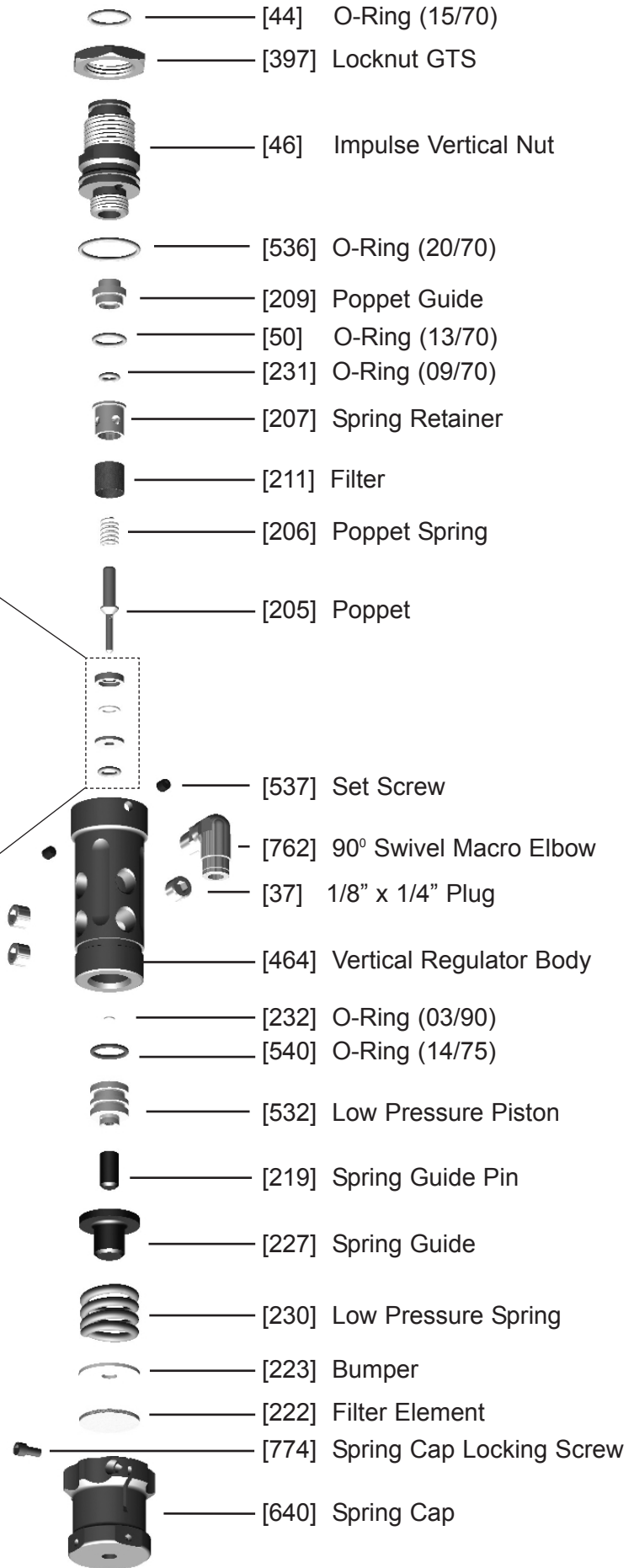
[Body]



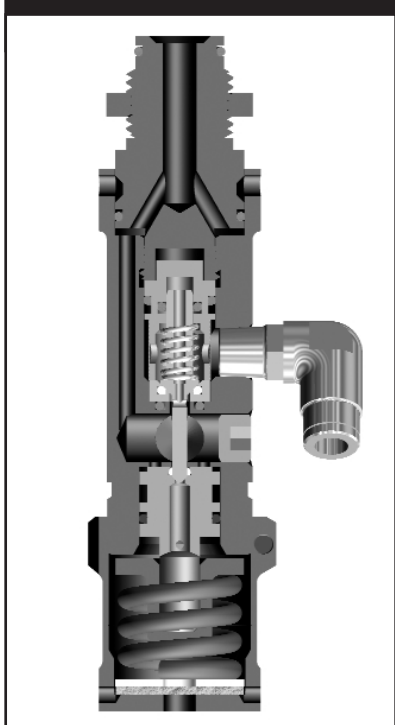
[Barrel]

- [49] O-Ring (18/70)
- [411] Valve Seat
- [46] O-Ring (10/70)
- [413] Valve Seat Locator
- [5] O-Ring (11/70)
- [546] Delrin Valve
- [407] Valve Spring
- [70B] End Cap O-Ring
- [412] End Cap

Max-Flo Vertical Regulator Parts List & Assembly Guide



Max-Flo V-Reg Assembled



Impulse Maintenance

The following section will review standard maintenance instructions for the Impulse.

Changing the Battery

To change the battery in the Impulse, remove the two grip cover screws on either side of the grip frame. Remove the old battery and replace with a new 9-volt alkaline battery.

Lubricating the Bolt

To remove the bolt from the Impulse, remove the bolt pin located at the top of the body and slide the bolt out the back of the body. Wipe clean with a paper towel. Apply a generous amount of Dow 33 Shocker lubricant to the bolt. While the bolt is removed, the inner surface of the upper bore should be cleaned by pushing a paper towel through the body.

Lubricating the Hammer Piston

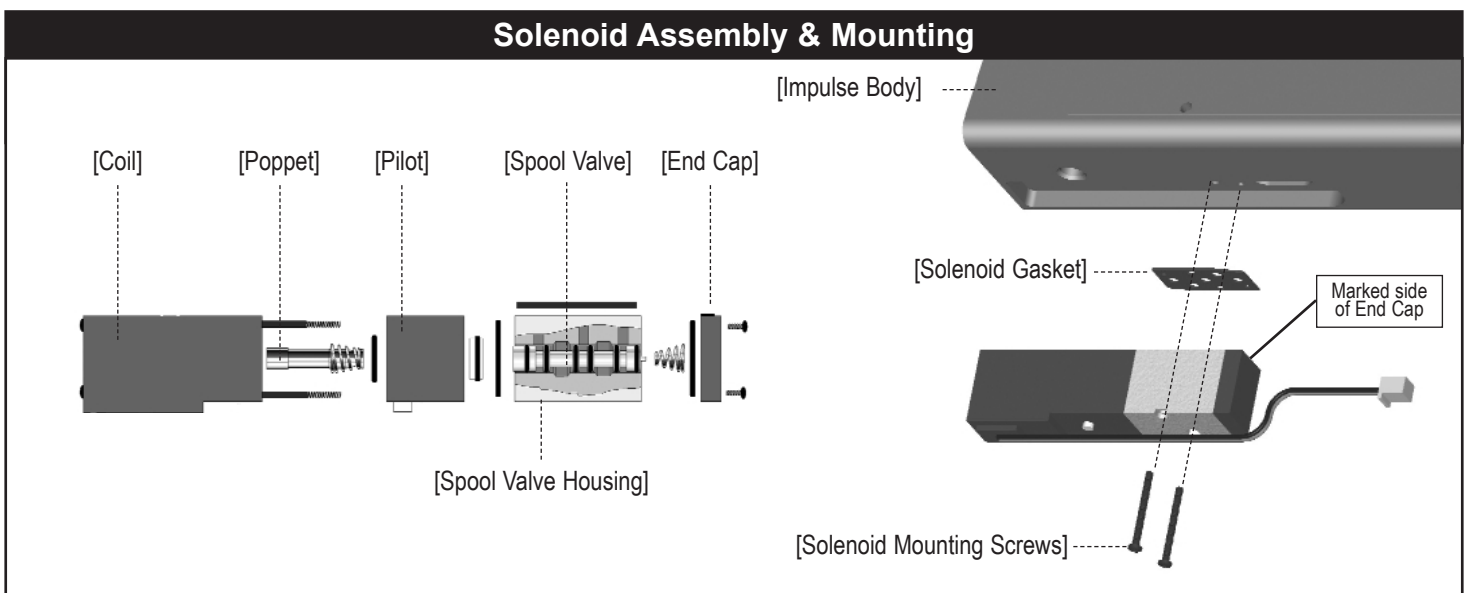
To remove the Hammer Assembly from the Impulse, remove the bolt pin from the top of the body. Then use an adjustable wrench to loosen the hammer assembly from the back of the body. After removing the hammer assembly, apply a generous amount of Dow 33 Shocker lubricant to the stainless piston and holes at the rear of the assembly. Do not apply lubricant to hammer head.

Cleaning the Valve

Remove the end cap and valve spring. Remove the Hammer Assembly from the back of the Impulse. Push the valve out through the front of the Impulse. Do not use a tool or object with sharp edges, as this may damage the inner surface of the body. Wipe the valve with a clean paper towel, apply Dow 33 lubricant to the o-ring and reassemble.

Cleaning the Solenoid Spool Valve

Remove the two grip frame screws using a 1/8" allen wrench. (See Diagram on page 6-7) Slowly move the body to the side of the grip frame and disconnect the wire harness that connects the solenoid to the board. Remove the two end-cap screws from the solenoid and remove the end cap. Using a pair of needle-nose pliers, pull the spool valve out of the spool valve housing. Wipe the valve with a clean paper towel and apply Dow 33 lubricant to the o-rings. Reassemble the solenoid, making sure that the marked side of the end-cap is correctly reattached to the solenoid.



Cleaning the Vision Eye

Remove the Vision Eye ball detent (See page 6 for Vision Eye Assembly). Gently pull back the Vision Eye cover and remove the Vision Eye screw. Remove the Vision Eye from the Vision Eye slot and wipe with a clean paper towel or q-tip.

NOTE: The ball detent for the Vision Eye is longer than the standard ball detent on the opposite side.

General Body Cleaning

The Impulse body and outer surface items can be cleaned with a water/alcohol mix applied to a rag or cloth. Do not immerse the Impulse in any liquid.

Troubleshooting

The following section will review troubleshooting procedures for the Impulse.

Gun will not fire

- Verify correct air pressure from regulator.
- Check firing mode with *Eye-On Mode* and *Eye-Off Mode*. (See page 4 for setting the firing mode)
- Verify that battery is charged and is an alkaline battery.
- Verify that the bolt pin is correctly inserted through the bolt and into the bolt actuator.
- Verify that bolt is inserted correctly, with the air input facing down.
- Reset dwell to zero and readjust to desired velocity. (See page 5 for resetting the Impulse Operating Pressures)
- Verify that solenoid is correctly plugged into the circuit board.
- Verify that trigger is contacting the firing switch. (Set the firing mode to *Eye-Off Mode* and verify that the LED blinks when the trigger is pulled.)

Air leaking out breech (barrel)

- Verify the bolt is in the open position. The bolt pin should be at the back of the groove it cycles in.
- Clean valve. (See page 9 for instructions on cleaning the valve.)

Internal Air Leak

- Clean and lightly lubricate Spool valve with Dow 33 lubricant.
- Check o-rings on hammer assembly (See Hammer Assembly diagram on page 6)
- Change solenoid gasket.



Poor air efficiency

- Verify that air system has no leaks.
- Increase input pressure from air source and reset dwell to zero. From the lowest dwell setting increase the dwell until the desired velocity is achieved. (See page 5 for resetting Impulse Operating Pressures)

Paint Breakage (paint breaking in barrel)

For accurate troubleshooting related to paint breakage, please use premium quality paintballs while troubleshooting the Impulse. Paint breakage may also be caused by other conditions including incorrect bore size in barrel, misshaped paintballs or extreme weather conditions.

For Impulses without the Vision Eye or if the Vision Eye is in *Eye-Off Mode* the paintball loading may break if the marker is fired before the paintball has fully dropped into the breech. Also, for Impulse markers without a Vision Eye, the loader feeding the marker should be motorized and have fresh batteries.

- Check that both ball detents are clean and properly holding paintball in breech.
- Verify that the Impulse is in *Eye-On Mode* and that the Vision Eye is correctly detecting the paintball. (See page 4 for LED Display Modes)
- Decrease input pressure from air source. Increase the dwell until the desired velocity is achieved. (See page 5 for increasing dwell)

Bolt remains forward when gun is fired

- Verify that a paintball is in the breech when the Impulse is fired.
- Reset dwell and increase until the desired velocity is achieved. (See page 5 for resetting Impulse Operating Pressures)

Technical Support

For additional technical support please visit our web page at www.smartparts.com. Our technical support department is open Monday through Friday, from 10:00 am to 6:00 pm (Eastern Standard Time) and can be reached at (724) 539-2660.

Impulse™ Limited Warranty

Smart Parts warrants for 1 year, to initial retail purchaser, that the Impulse™ paintball marker and regulator are free from defects in materials and workmanship. Disposable parts (batteries, o-rings, seals, springs, gauges, ball detents, etc) are not warranted. The valve and hammer assembly are warranted for six months. The solenoid and electronics on your Impulse™ 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 re-assembly, 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 make changes to the basic marker parts without written approval. The only authorized lubricant for the marker is DOW 33 Lubricant. Use of any other lubricant could result in voiding your warranty. Use only "on/off" switches purchased from Smart Parts. Unauthorized "on/off" switches will void this warranty. Paintball markers are non-refundable. This warranty is limited to repair or replacement of defective parts with the customer to pay shipping costs. This warranty is effective only if the customer returns the warranty registration card enclosed with the marker. The warranty is non-transferable. Do not attempt to alter the trigger assembly in any way, as this will void your Smart Parts warranty.

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