

INSTRUCTION MANUAL

Version 1.2

Indian Creek Design BushMaster series Model BKO

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WARNING:

This is not a toy. Misuse may cause serious injury or death. Eye protection designed for paintball use must be worn by the user and any person within range. It is to be used by adults only. It is to be used on safety certified fields only. Obey all local, state and federal laws. Follow the rules of safe paintball gun handling. Read all instructions before use.

***BKO* OVERVIEW**

The *BKO* is a quality marking instrument specially designed to meet the needs of the professional style tournament player. The *BKO* is an electronic solenoid actuated computer controlled marking device. The major components of the *BKO* are machined from solid, aircraft-grade aluminum, and then hard anodized per military specifications. No castings are used in the construction of the *BKO*, thereby providing the end user with a high-quality, precision-engineered marking instrument.

Paintball markers get a lot of abuse. Indian Creek Design, Inc., has built the *BKO* with this in mind. All internal parts, wear and contact surfaces have been heat treated or hard anodized. The toughest and most resilient materials and components have been used in the design of this instrument.

The *BKO* uses a single standard 9-volt battery for operation. The circuitry is a microprocessor based digital controller.

The *BKO* does not need tools in order to field-strip it. Removing the field-strip link-pin of the bolt enables the removal of the entire bolt assembly.

The *BKO* offers low-pressure operation. The main operating pressure is 200-300 PSI nominally adjusted to visually via the gauge on the primary (input) regulator. The secondary pressure is factory pre-set and regulated to 85-95 PSI. Gas usage is controlled through these 2 internal regulators. The unique feature of this gun is the regulator adjustment. This allows precise adjustment for the velocity control of the gun and for gas efficiency.

The *BKO* comes with a removable barrel system. This feature allows the user to select a barrel that is most suitable for the playing conditions. All barrels are mirror-honed with a step-bore and porting and stock length is 11".

OPERATION

Read the entire manual before you prepare your *BKO* for firing. Safety and safe gun handling are the most important aspects of paintball sports. Please practice each of the following steps with an **unloaded** gun before attempting to charge your gun with compressed air and paint pellets. **Do not load compressed air and paint pellets into your *BKO* until you feel completely confident with your ability to handle your *BKO* safely.**

Keep your finger out of the trigger guard and away from the trigger; point the muzzle of the gun in a safe direction at all times. Keep the gun turned off until ready to operate. The *BKO* does not have a mechanical safety, only an on-off switch! ***Always keep your *BKO* pointed in a safe direction. Always use a barrel plug.***

Installing the 9 volt Power Source

The *BKO* requires a single 9-volt battery as the electronic power source. The use of long life batteries is recommended.

The 9-volt battery is located inside the 45 grip frame beneath the left side panel. The battery is accessed through the two screws that hold the left side panel in place.



Remove the 2 screws that hold left side panel in place. Connect the battery to the terminal and place the battery inside the grip frame carefully, being sure that the black and red wires to the terminal are not stressed. Make sure that there are no abrupt kinks and the wires are comfortably placed, do not force them into place. Replace the side panel and 2 screws.

CO2, Nitrogen or Compressed Air Usage

The *BKO* comes with a male quick-disconnect adapter on the bottom of the regulator. The *BKO* can be set up to use a nitrogen or compressed air system. Although it may be used, CO2 is not recommended for use as the propellant. Generally the CO2 that we use as an industry is industrial grade CO2. It is dirty, pumped from large tanks full of contaminants including rust and metal flakes. CO2 can be used successfully if used with anti-siphon systems and filters. Be aware that under the conditions of CO2 the results may not be as expected. Consult the place where you purchased your *BKO*, or a recognized and competent airsmith, for instruction in the safe handling of compressed-air cylinders before purchasing or connecting one to your *BKO*.

Adjustable regulator compressed air systems:

The input pressure from your compressed air system should be regulated down to 350-500 PSI output pressure. Note: on MOST systems, there is a large difference between the setting pressure and the actual output operating pressure. If your compressed air system does not have an output pressure gauge on its regulator we do not recommend its use.

Fixed output regulated compressed air systems:

Fixed output regulated tanks (preset) will work just fine with the *BKO*, however it will not perform as well as an adjustable regulated tank. VERIFY the output pressure from the regulator. If your compressed air system does not have an output pressure gauge on its regulator we do not recommend its use.

CO2 usage:

Although it may be used, CO2 is not recommended for use as the propellant. Generally the CO2 that we use as an industry is industrial grade CO2. It is dirty, pumped from large tanks full of contaminants including rust, metal flakes and dirt. CO2 can be used successfully if used with anti-siphon systems and filters. Be aware that under the conditions of CO2 the results may not be as expected.

REMEMBER: CO2, compressed air or nitrogen systems can be extremely dangerous if misused or improperly handled. Use only D.O.T. certified tanks.

Before pressurizing your *BKO*, check to make sure that you have a barrel plug or barrel sock in place and there is no paint in the gun. The on-off switch should be OFF. Air can now be applied, the gun will become pressurized and the gauge on the regulator system adapter will show the air pressure regulated thru the input regulator.

Paintball and Loader Usage

The *BKO* comes equipped to accept 1.03" OD standard-gravity feed loaders. Fit the loader directly into the vertical feed tube. Always twist it down in a CLOCKWISE direction. Always twist it off in a CLOCKWISE direction as well. The *BKO* uses .68 caliber, water-soluble paint pellets. The pellets are gravity fed from the loader through the direct vertical feed nipple and into the breech of the gun.

Firing the *BKO*

Keep your finger out of the trigger guard and away from the trigger; point the muzzle of your gun in a safe direction at all times during this process. Be sure your goggles are securely in place. Push the on-off switch into the off position.

Always keep your BKO pointed in a safe direction!

1. Place the empty loader onto the gun. Be sure that it is securely mounted in place.
2. Apply the compressed gas, pressurizing the gun.
3. Put the paintballs into the loader.
4. Remove the barrel plug.
5. Aim the gun at the target.
6. Push the on-off switch to the ON position, the LED will light up.
7. Place your finger on the trigger.
8. Pull the trigger with a smooth squeezing motion. **BANG. . . .**

UNLOADING THE *BKO*

Keep your finger out of the trigger guard and away from the trigger; point the muzzle of your gun in a safe direction during this entire process. ***Always keep your BKO pointed in a safe direction!***

1. Push the on-off switch to the off position. The LED will be off.
2. Remove the pressurized gas from the marker carefully.
3. Place the barrel plug into the end of the barrel.
4. Tilt the marker so that the loader is lower than the body of the gun.
5. Remove the paintball loader from the direct vertical-feed tube, turning the loader in a clockwise direction.
6. Inspect the inside of the direct vertical-feed tube to be sure that a ball does

not remain inside the breech.

MAINTENANCE

CAUTION: Before attempting to perform any maintenance operations or any gun disassembly, make sure that *all* paint pellets and sources of air propellants have been removed from the gun. Insert a barrel plug, push the on-off switch to the OFF position and keep the gun in its "SAFE" mode.

Simple Maintenance

Keep your *BKO* clean and lubricated to eliminate the friction that would prevent reliable operation. Clean and lube the gun before each use, and do not put it away dirty. **USE NO OILS!** Do *not* use petroleum-based lubricants in the lubrication of this gun. Do *not* use oils "made for paintball guns". Do *not* use oils "made for pneumatic tools". Teflon or silicon spray lubricants are the recommended types of lubrication for the bolt area of the main housing. **Lithium grease** is recommended for lubricating the regulator pistons and the cylinder assembly. Be sure it is *Lithium Grease* not axel grease.

Cleaning Paint from the Barrel

Unscrew the barrel with approximately one and one half (1-1/2) revolutions to remove the barrel for swabbing/cleaning. Keep the barrel clean to insure the continued accuracy of the *BKO*. Gelatin from the paintballs has a tendency to build up in the barrel. As part of your cleaning ritual, wash out the barrel with hot soapy water and rinse it well.

Removing the Bolt Assembly (Field Stripping)

Remove the paint and pressurized gas from the gun. *The gun can be field stripped while it is pressurized.*

1. Remove (pull) the knurled pin from the top of the marker. Pull the bolt body out the back of the main body.

Once the bolt assembly is removed, it is possible to clean the entire upper receiver of the gun, including the breech and feed tube area. You may slightly lubricate the

rear section of the bolt and bolt chamber with a light synthetic spray lubricant before re-installing the bolt. Do *not* use petroleum/oil-based lubricants; *do* use Teflon or silicon-based lubricants. The bolt is **NOT** a simple plastic; it is a natural Delrin acetate material, which is a Dupont 3M material, developed specifically for this type of application. *The use of a metal type of bolt will void all warranties.*

1. Point the barrel downward and slide the bolt in until the link pin hole lines up with the slot in the hammer and carefully install the link pin.

Note: You must be sure that the link pin is engaged PROPERLY with the hammer, if the link pin IS NOT PROPERLY replaced, you may damage the hammer/cylinder assembly.



STORAGE AND TRANSPORTATION

- Your *BKO* must be clear of all paint and propellant when not being used.
- Be sure the on-off switch is off and the LED is not lighted.
- Put the barrel plug in place.
- Make sure the gun is clean.
- Store your *BKO* in a clean, cool, dry place.
- Keep your *BKO* away from children.

This air gun is not a toy! To be used by adults only, or persons over 18 years of age!

Your *BKO* must be clear of all paint and any source of propellant during transportation to and from the playing field. Keep your barrel plug in place. Keep the on-off switch in the off position. Protect your *BKO* from excessive heat during transportation. Observe and obey all local, state and federal laws concerning the transportation of paintball guns. For information concerning any of the laws in your area, contact your nearby friendly law enforcement agency.

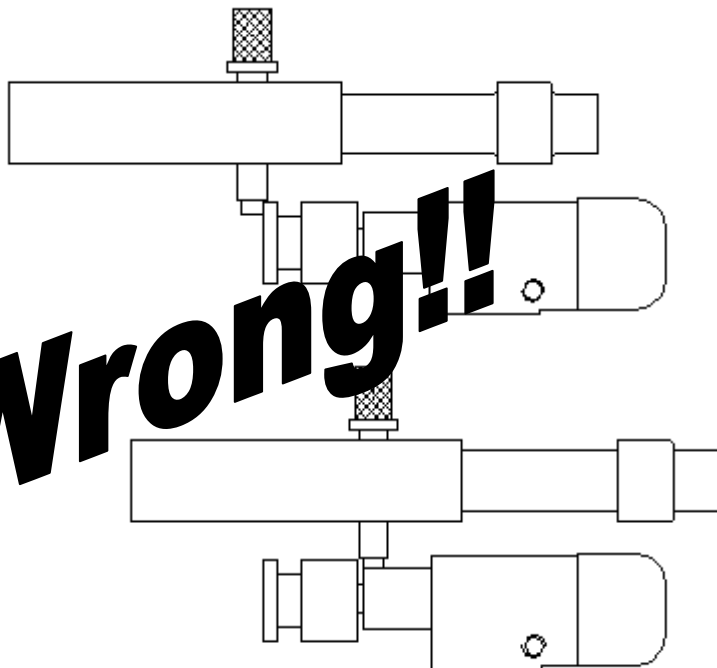
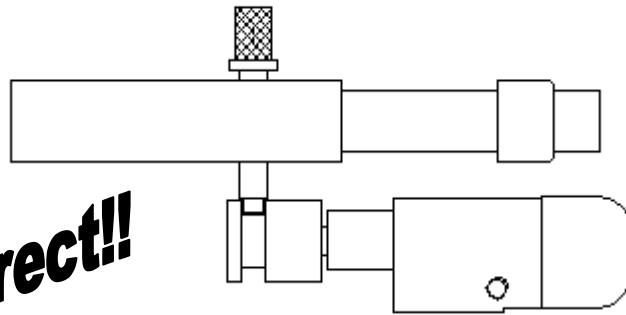
IMPORTANT: Never carry your *BKO* uncased when not on a playing field. The non-playing public and law enforcement personnel may not be able to distinguish between a paint marking device and firearm. For your own safety and to protect the image of the sport, always carry your *BKO* in a suitable gun case or in the box in which it was shipped.

If you must ship your *BKO* for any reason, the box in which you purchased the gun is acceptable to all major carriers. Never ship charged CO2 or pressurized gas containers.

ADJUSTING THE TRIGGER PULL

You will notice two screws in your trigger. These screws adjust the length of pull and actuation point of the trigger. The bottom screw adjusts your trigger stop point (length of pull). The top screw is the contact point for your micro switch.

1. Use *blue loctite* while adjusting the screws. Normal activity can cause the screws to back out of adjustment. **DO NOT** glob the loctite on, it can cause damage to the micro switch if you use too much.



Remember...operator error is not covered by warranty!

2. Begin by adjusting the bottom screw to your desired pull. Screw it in to lessen the distance the trigger must travel.
3. *Very Carefully* screw in the top screw. Making large adjustments can force the screw into the micro switch and damage it. You will want to screw it in to the point where it makes contact with the micro switch but does not permanently rest on it. Continually check to verify that the LED flashes off and then back on when you pull the trigger. If you pull the trigger and the LED goes off and *stays off*, you have adjusted the screw in too far. Back it out.
4. Clean up any excess loctite and let it dry for at least an hour before using your *BKO*. This ensures the screws will remain in place.

BKO TUNING GUIDE

Main Input pressure regulator adjustment:



The *BKO* operates on a proven and innovative system. Take the time to understand this section. The pressurized gas is regulated internally. The pressure regulator is

externally adjustable via the screw in the side of the high-pressure regulator. A 3/32 allen key for this screw has been provided to access to this screw. To increase the pressure apply the wrench into the screw and turn clockwise.

NOTE: *Only slight turns* are needed to accomplish changes in the pressure used to shoot the paintball, thus changes in the velocity at which it is propelled.

To decrease the pressure registered on the gauge, turn the screw counter-clockwise. You must take a clearing shot before the change in the decreasing direction can be registered.

A pressure gauge has been installed into the regulator body to indicate the exact operating pressure of the marker. This gauge is extremely useful. **At the factory** we set the regulator gauge to 200-250 PSI with an input pressure of 400 PSI using Compressed air as the base propellant. Under normal circumstances these settings will produce paintball velocities at approximately 280-300 fps.

- If you have an adjustable tank regulator, the input pressure from your tank should be set at 350-500 PSI. Higher input pressures will not provide increased performance.
- If you have a fixed output regulator on your tank (pre-set) then you may have to re-adjust the pressure shown on the gauge using the method discussed previously.
- If you plan to use CO2, then please use an anti-siphon tank and a filter.

Low pressure regulator adjustment:

The low pressure regulator is your main source for paintball velocity adjustments.

The low pressure regulator is the small cylindrical body that located directly behind the high pressure regulator and directly in front of the grip. The low pressure regulator is externally adjustable via the adjustment screw in the bottom of the regulator using the same 3/32 allen wrench used to adjust the high pressure regulator. The low pressure regulator is pre-set at the factory to 85-95 PSI to operate the single 3-way solenoid actuated valve. It may be necessary to re-adjust the low pressure regulator from time to time to accomplish the velocities that you require. Bench adjusting the regulator can be done by pressurizing the gun, be sure the input regulator is set properly, and then turning the adjustment screw inward (clock-wise) until you hear a leak coming from the 3-way valve in the grip area. The 3-way valve has an over-pressurization relief valve that will start to bleed off at approximately 125 PSI, once you hear the leak start then back off the adjustment

screw one half turn and the leak will stop. That will approximate the pressure to about 90 PSI. The low pressure regulator is designed to shut down and preserve the integrity of the low pressure system if it sees an input pressure over approximately 400 PSI coming from the main input regulator.

This gun was designed with safety and safety standards in mind. If you attempt to shoot paintballs higher than established safety standards, the gun will not function properly.

NOTE 1. You may notice that if you attempt to operate the gun at extremely high velocities, the internals will not function properly!

NOTE 2. This gun is not designed to shoot above the safety limits established by industry standards.

Just a side note:

Higher pressures do not equate into better performance and higher velocities. High pressures in this marker can cause problems, showing up in erratic velocity, extreme gas consumption and in general a poor day. This marker was designed to perform at lower pressures. If you were to keep the gauge on the side of the gun set at 250-300 and do the rest of your adjustments with the low pressure regulator, you would be operating the marker within the range in which it was designed.

Leak Related Problems

1. **The *BKO* has a leak down the barrel. Reason: gas is leaking through or around the valve pin seal or Oring area.**
 - a. Can you hear the leak when the gas is removed? Yes? There is no leak. You hear the ocean.
 - b. The valve seal is marred/scratched or worn out or dirt has gotten to it. Replace it.
2. **The *BKO* has a leak around the high pressure regulator seam. Reason: the seal between the regulator body and the main body or the regulator adapter is bad.**
 - a. Tighten the regulator to the body.
 - b. Check and/or replace the O'ring.
3. **The *BKO* has a leak around the low pressure regulator seam. Reason: the seal between the regulator body and regulator adapter body is bad or the regulator has loosened up.**
 - a. Tighten the regulator into the body.
 - b. Check and/or replace the O'ring gasket. Sized -019.
4. **The *BKO* has a leak inside the grip/battery area. Reason: the 3-way valve is leaking.**
 - a. Check for over-pressurization from the low pressure regulator. Re-adjust the low pressure regulator per instructions on the previous pages.
 - b. Tighten the 3-way valve to the manifold. Take care not to over-tighten.
 - c. Replace the solenoid/valve assembly.

Ball Breakage Problems

1. The ball breaks in the breech.

- a. The balls in your loader can bind, messing up your trigger timing.

Note: the ball drop and use an agitated loader.

- b. As you run and shoot, you actually unweigh the gravity-fed balls in your loader. This can cause a ball to hesitate in its drop. This affects your trigger timing.
- c. If the ball retention ball does not move freely, the paintballs will crush against it or it may have stuck in the depressed position allowing double feeding. Check its tension regularly and keep this area as clean as possible.
- d. If the ball retention ball is too sloppy, the ball will not be held in the proper position. This may allow the next ball to enter the path of the bolt, subjecting it to impact cracking or shearing. Verify the tension.

Regulator Related Problems

1. The gauge reads correctly when charged, but climbs in pressure after a few moments.

- a. The regulator seal has been contaminated. Disassemble the regulator, and clean the seal with a Q-tip and alcohol. If you need assistance in the Disassembly of the regulator, please call (208) 468-0446.

2. The gauge reads correctly when charged, but drops in pressure after a few shots.

- a. The regulator may not be adjusted correctly. Remove all pressurized gas, and back off the regulator adjustment screw 3 turns. Pressurize the system and adjust the pressure back up to the desired pressure.

3. The gauge reads correctly when charged, but drops in pressure after a few shots, and is slow to climb back to normal pressure.

- a. The recovery side of the regulator is sluggish and may need cleaning and lubrication. If you need assistance in the disassembly of the regulator, please

call (208) 468-0446.

- b. The regulator seal needs to be replaced if it has a deep groove in it from the regulator cup.

Replacing or removing the original regulators voids all warranties.

Battery Related Problems

1. LED functions but the marker does not fire.

2. Alternately missed shots.

3. Velocity drops while firing several shots.

4. Erratic Velocities. Jumps of 20 fps or more.

5. Unexplainable paint breakage.

6. Slight leak from the solenoid in the back of the grip.

- a. Change the battery. The LED only requires 1½ volts to function. The solenoid requires a minimum of 5 volts to operate. This means the marker may appear to be getting enough power when it is not. All batteries are NOT created equal. Performance will vary. *Therefore, if you experience any erratic behavior, always change the battery first.*