

M14.ca Blackfeather® “RS” Installation Instructions



From the developers at M14.ca, thank-you for your support and your purchase of the Blackfeather “RS” rifle system. After two years of on and off development, an estimated 95+ changes to the rifle stock concept over 13 full length prototypes (not including receiver test blocks) and 640+ machine hours (not including human research and development and range trials over 2 months), we are pleased to present to you what we believe to be the most advanced, modular M14 platform rifle stock.

This document is provided for information purposes only. As with any firearm part or accessory, the Blackfeather “RS” rifle stock should be installed only by a qualified gunsmith or by persons specifically experienced with the maintenance and modification of the M14 rifle. If you are unsure of your abilities to complete the install, consult a qualified M14 gunsmith.

By opening this package, you expressly agree that under no circumstances and under no legal or equitable theory, whether in tort, contract, strict liability or otherwise, shall The Upgrade Path Inc., or any of its employees, directors, officers, agents, vendors or suppliers be liable to you or to any other person for any indirect, special, incidental or consequential damages, injury of any nature or death resulting from the installation or use of the M14/M1A Blackfeather “RS” rifle stock.

Compatibility of the Blackfeather “RS” with M14/M1A Receivers and Barrels:

- 1.] The Blackfeather stock is not inletted to fit genuine US GI M14 rifles, or any full auto M14 clones.
- 2.] Genuine US GI connector lock pins will protrude out the right side of the receiver and are designed to connect to the front of the connector. These GI style pins are longer than the commercial / semi auto pins. The Blackfeather stock is inletted to use only the shorter style pin, flush with the side of the receiver.
- 3.] The Blackfeather stock is not inletted to fit receivers with lugs.

4.] The Blackfeather stock is designed and precisely CNC machined to fit M14 type receivers that follow US GI specifications for external dimension. Over the years, there have been several M14 receiver clones manufactured and some of them are not dimensioned properly to US GI specifications. Out of specification receivers may require some modifications before they will properly fit the stock.

5.] The new M14.CA adjustable op rod guide is designed to fit standard contour M14 barrels with an operating rod guide mounting boss “OD” (outside dimension) of .800”. If the mounting boss has been modified to increase diameter to tighten the previously fitted op rod guide, or if chemicals such as Loctite® or Epoxy have previously been used here, some clean up and material removal may be required to get the barrel boss “OD” back to standard size.

SAFETY:

The M14 rifle design uses the stock as an integral part of the trigger mechanism. Fitting a new stock to the M14 action can change the trigger geometry, and therefore the relationship of various trigger parts to each other. In some cases, this can result in an UNSAFE condition where the hammer will follow the bolt as it closes, potentially causing accidental discharge when loading, or causing “doubling” or multiple discharges. This condition can occur even when simply removing and replacing the M14 action into the same original stock, when painting the internal parts of the stock, swapping between various stocks, and bedding a conventional stock.

For this reason, always perform a [Hammer Follow/Trigger Safety Test](#) every time you remove and replace the M14 action from any stock. There are detailed [Hammer Follow/Trigger Safety Test](#) instructions at the end of these install instructions.

[Hammer Follow Test Video Link Pending]

[Tilt Test Video Link Pending]

Minimum Tools Required .

1. Safety glasses
2. 1/8” punch
3. 1/16”, 1/4”, 5/32” allen wrenches
4. Rubber mallet
5. Small hammer
6. Large crescent wrench, (pad wrench jaws with tape)
7. Flash suppressor pliers
8. Machinist center punch
9. Aluminum or brass drift
10. Solid bench, preferably with a vise and aluminum angle iron no-mar jaw pads
11. Automotive brake cleaner for use as a cleaner and degreaser
12. High quality grease - for lubricating op rod new op rod guide after assembly
13. Dial calipers for measuring OD of barrel op rod guide boss
14. Automotive style feeler gages – for confirming perfect rotational alignment of receiver and new ORG
15. 3/8” wrench (if you use the M14 cleaning kit handle, you may scratch the fore end around the retaining bolt)

Included with the stock:

1. Op Rod Guide Installation Assist Tool (aluminum round tube 7/8” ID)

2. Blue Loctite®
3. 1” x 9” emery paper strip

Blue Loctite® is provided for extreme/heavy duty use, for the ultimate in security, and for semi-permanent installations,. Screws installed with blue Loctite® are still removable with normal hand tools: no heat is required.

INSTALLATION OVERVIEW **(THE “QUICK” INSTALL** **GUIDE):**

For those already experienced with the M14 and comfortable working on it, this high-level overview will describe the meta-process of fitting the new Blackfeather “RS” alloy stock to your M14/M1A rifle.

STEP 1: Remove the M14 action from the original stock, test receiver and trigger group for proper fit in new Blackfeather “RS” stock.

STEP 2: Remove the flash hider.

STEP 3: Remove the Gas Assembly from the barrel.

STEP 4: Remove the old operating rod guide.

STEP 5: Install the NEW M14.CA adjustable op rod guide on the barrel.

STEP 6: Adjust new op rod guide for proper linear and vertical fit.

STEP 7: Install the Handguard & Gas Assembly, check alignment.

STEP 8: Reinstall flash hider on barrel, barreled receiver into stock, trigger group.

STEP 9: Final Inspection – Tilt test, Hammer Follow /Trigger /Safety/Test.

STEP 10: OPTIONAL: Adjust tension for maximum accuracy.

DETAILED INSTALLATION

GUIDE FOR THE

BLACKFEATHER “RS”

BEGINS HERE

STEP 1: Remove the M14 action from the original stock, verify proper receiver and trigger group fit in new Blackfeather “RS” alloy stock

STEP 1.1: Remove the magazine, pull back on the operating rod, check chamber and verify that the rifle is unloaded

STEP 1.2: Remove the Trigger Group

STEP 1.3: Remove the Receiver and Barrel Groups from the original stock

STEP 1.4: Install the M14 barreled action and trigger guard into the new alloy stock

NOTE: ***BEFORE PROCEEDING ANY FURTHER,*** check that your M14 receiver will fit **PROPERLY**, all the way down, into the new Blackfeather “RS” stock. Check that your trigger guard will close with proper tension and lock into place, and that the **RECEIVER AND NEW STOCK COMBINATION WILL PASS THE TILT TEST AND THE HAMMER FOLLOW/ TRIGGER / SAFETY TEST** as noted near the end of this document.

STEP 1.5: : Remove the new adjustable Blackfeather Op Rod Guide (*known from here as the “BFOG”*) from the Blackfeather stock by removing the castle headed locking bolt in the bottom of the fore end. Set aside the BFOG and locking bolt for installation later.

STEP 1.6: Test fit your M14 barreled receiver into the Blackfeather alloy stock. Make sure the connector lock pin is the short/flush type, and that it is not extending out past the right side of the receiver [a common problem that if not noticed can damage your stock and prevent full insertion]. Check that the receiver is all the way down into the top of the stock, at both the front and the rear of the receiver. Insert the trigger assembly and check that the trigger guard also seats all the way into the trigger guard recess in the bottom of the stock. Check that the trigger guard closes with proper tension and locks firmly into place.

NOTE: For best accuracy, the fit between receiver and stock should be tight. During the initial installation, and subsequent removal and replacement of the barreled action into the alloy stock, some “encouragement with a rubber mallet” may be required. If the receiver and trigger assembly do not fit all the way in during initial test fitting, even with a few smacks from the rubber mallet, then **STOP** and consult a qualified M14/M1A gunsmith.

Some civilian M14 receivers are out of spec for external dimensions, especially in the receiver legs. Most such out of spec receivers can be properly fitted with minor modifications, but such modifications should be performed only by experienced, competent M14 experts with precision tools.

Cock the action a few times SLOWLY and feel for binding, interference, or more friction than usual. Inspect for points of interference between the moving parts and the new alloy stock. Do the HAMMER FOLLOW/ TRIGGER / SAFETY TEST.

If any problems occur at this point, consult an experienced, competent M14 expert. Unmodified M14.ca stocks in as new condition may be returned for refund, but stocks that are scratched, dented or gouged due to improper installation procedures are not refundable, so make sure your receiver fits the stock properly before going forward.

STEP 1.7: Remove the M14 barreled receiver from the M14.ca alloy stock. A rubber mallet and/or a block of wood pushed through the mag well from the bottom, or some thin tapered soft wedges may be helpful. Do not attempt to pry between the front or back of the stock and the barreled action with anything hard!

STEP 1.8: Remove the Op Rod Spring Guide, Spring, Op Rod and Bolt

STEP 2: Removing the flash hider. Please read both notes prior to proceeding to step 2.1.

NOTE: some Chinese M14 clones may have the flash hider welded to the barrel. The two shallow spot welds on the bottom of the flash hider must be broken to allow removal of the flash hider. There are videos detailing the welded on flash hider removal process on Youtube.

NOTE: Removing a welded on flash hider (known from here as the “FH”) may result in damage to the FH, or reveal the original FH front sight dovetail or the internal splines to be out of true. If the removed FH is damaged or out of specification, consider replacement with a US GI or better quality commercial FH. Or else, having the barrel shortened and threaded by a competent gunsmith, and using an aftermarket screw on muzzle accessory.

STEP 2.1: Mount the receiver securely into a solid bench vise, preferably with aluminum angle iron non-mar jaw pads. Do not tighten the vise jaws enough to crush the receiver.

STEP 2.2: Using a 1/16” allen wrench remove the castle nut set screw. Using proper M14 castle nut pliers, unscrew the flash suppressor castle nut forwards as far as you can. If you are not concerned about marring the castle nut, or do not have proper castle nut pliers, the castle nut can be removed with a 1/8” punch and a small hammer.

STEP 2.3: Tap the flash hider forwards until it is again tight against the castle nut. Repeat unscrewing the castle nut and tapping the flash hider forwards until the flash hider comes off.

STEP 3: Remove the Gas Assembly from the barrel.

STEP 3.1: Remove the Gas Plug

STEP 3.2: Slide out the Gas Piston.

STEP 3.3: Remove the Gas Lock.

STEP 3.4: Slide the Gas Cylinder off of the barrel.

STEP 3.5: Remove the Stock Ferule (Front Band).

STEP 3.6: Pull the hand guard forward to remove.

STEP 4: Remove the old op rod guide.

STEP 4.1: Support the op rod guide at the back with some solid object with a hole that allows the pin to escape through, or else carefully mount the op rod guide itself in the vise. With a 1/8" punch, tap out the op rod guide cross pin. **The Blackfeather "RS" rifle stock ships with a new OPTIONAL heavy duty coiled op rod guide pin, so you will not be re-using the old pin.**

STEP 4.2: Remove the op rod guide off of the barrel. You may need to rotate the op rod guide to get it started, and/or tap it off with an aluminum or brass drift. In some severe cases, you may need to cut off the old op rod guide with a rotary tool and cutoff wheel.

With the old op rod guide removed, you are now ready to begin the installation of the new BlackFeather adjustable op rod guide.

Installing the New M14.ca Adjustable Op Rod Guide

***NOTE:* PLEASE READ THE FOLLOWING INSTRUCTIONS COMPLETELY BEFORE STARTING THE FOLLOWING PROCEDURES AS PROPER ROTATIONAL AND LINEAR FITTING AND PROPER TENSION ADJUSTING MUST BE DONE IN COMPLEMENTARY STEPS, WHICH MAY REQUIRE MOVING BACK AND FORTH SEVERAL TIMES BETWEEN EACH INDIVIDUAL ADJUSTMENT!**

The new M14.CA adjustable op rod guide is designed with a .802" ID hole to fit around Standard US GI contour M14 barrels with an op rod guide mounting boss OD of .800". Other aftermarket barrels with the standard sized .800" OD barrel boss should fit properly. However, many M14 rifles have had the original op rod guide to barrel connection tightened up by various methods such as stippling, peening, or chemical adhesives. If your barrel has such a non-standard modification, it may be necessary to thoroughly clean off any remaining adhesives, and/or to dress down any raised metal portions of the op rod guide barrel boss. Use an emery paper strip like a boot polish rag, held in both hands around the barrel boss, to return the boss to standard dimensions.

If absolutely necessary, a fine file may make things go faster, but you won't have as much control over the file, and may create flat spots or tapers. Work slowly and carefully as proper fit here is important with any op rod guide, and is especially critical to extracting the full accuracy potential of the new M14.CA heavy duty adjustable for tension op rod guide [BFOG].

STEP 5: Install the NEW M14.CA adjustable op rod guide on the barrel

STEP 5.1: Clean off any oil and residue from the barrel. Common automotive brake cleaner is recommended as a good cleaner/de-greaser. With the receiver clamped in the bench vise, use fine emery paper to clean up any rough edges and burrs, especially under the barrel, where the cross pin slot is

located. Confirm the op rod guide boss on the barrel is not damaged or deformed, especially at the slot for the cross pin, and that the boss OD is .800”.

STEP 5.2: The Black feather Op Rod Guide [“*BFOG*”] ships with three #10-32 x 1/8” socket head locking set screws pre-installed at 6, 9, and 12 o’ clock. Remove these three screws prior to attempting to install the BFOG. Slide the BFOG over the barrel towards the op rod locating boss, and check for fit. Confirm the BFOG will start well on to the boss, preferably with some noticeable force required.

The new BFOG should be snug, and not rock back and forth and should require some pressure to rotate. But the fit should still be loose enough to slip fully on to the barrel boss, with linear adjustment allowed by striking the Op Rod Guide Installation Assist Tool (*the Oprod Guide Installation Assist Tool, an aluminum pipe with two beveled ends slides over the barrel onto the vertical face of your BFOG to assist installation*). The fit must also allow for some rotational adjustment when moved by a padded wrench. **NOTE: The new “BFOG” is bi-directional, and can be installed with either side to the front.**

STEP 5.3: Begin moving the BFOG back towards the proper location on the op rod guide barrel boss. Check for fit, both fore and aft, and for rotation. The BFOG should rotate with firm application of the taped jaws of the crescent wrench. If the fit is too tight to allow rotation and sliding, or too loose for a proper snug fit, the clearance between the outside of the barrel boss and the inside of the BFOG must be adjusted. Otherwise, if the fit between the barrel op rod guide boss and the op rod guide seems proper, apply Blue Loctite®.

STEP 5.4: If fit is *TOO TIGHT*, **DO NOT ATTEMPT TO FORCE IT ON!!** The OD of the barrel boss can be *DECREASED* by using emery cloth strips around the boss. Holding both ends of a strip of emery cloth as if you were polishing a boot, clean off any old adhesives on the barrel boss, and also work down any raised tool marks.

Conversely, the ID of the BFOG can be *INCREASED* by using a strip of emery paper wrapped around a suitable diameter tool, such as the handle of the M14 cleaning kit. Don’t be tempted to use power tools here and go too fast, as a few seconds of polishing can remove a lot of metal and a sloppy fit here can decrease potential accuracy. For precise control, wrap a 4” length of emery paper around the handle of a GI cleaning kit tool, work by hand slowly and carefully, checking often to achieve the proper fit. A minute of polishing by hand can make a big difference here.

STEP 5.5: If the BFOG fit is *TOO LOOSE* on the barrel boss, you may need to peen or stipple the barrel boss to increase outside diameter prior to moving the BFOG into final location. Use your center punch to peen around the circumference of the barrel boss, two rows front and back. This will tighten the fit considerably. Test again for proper *SNUG* fit of the BFOG.

On a properly fitted BFOG to barrel boss, when the three 10-32 x 1/8” locking set screws are installed, they will solidly anchor the op rod guide to the barrel. If the fit was too loose to begin with, and peening the barrel op rod guide boss was required to achieve a snug fit, there will be voids around the peening between the op rod guide and the boss. These voids should be filled up with Loctite® before final location and permanent installation of the BFOG. If you need *LOTS* of Loctite® here, remove the receiver from the stock, slide the BFOG forward off the front of the barrel boss, apply the Loctite® to the barrel boss, and rotate the op rod guide as you re-align everything again.

NOTE: You will have to work quickly, as the Loctite® will set in approximately 15 minutes.

STEP 6: Adjust NEW op rod guide for proper linear and vertical alignment

LINEAR ALIGNMENT – In the book, “The U.S. .30 Caliber Gas Operated Service Rifles: A Shop Manual, Volumes I & II” the author Jerry Kuhnhausen gives the correct distance from the **center** of a standard ½” thick op rod guide to front of receiver as 6.825” +/- .003” The new thicker BFOG is .750” thick so the proper distance from the **back** of the new BFOG to the front of the receiver is **6.45” +/- .003”** [or if using a ruler, *approximately between 6 7/16” – 6 15/32”*]. This precise dimension is important to proper stock to receiver fit. Proper rotational / vertical alignment of the *BFOG* with the barreled receiver and with the stock is also important.



These critical alignments can be checked by test fitting the M14 barreled action into the alloy stock with the new BFOG installed *but not yet locked in place*. The 5/16” hole in the bottom of the forearm is **PRECISELY** sized and located to give perfect alignment with the ORG when the ORG is properly located on the barrel. In this way, the actual BF stock and a ¼” hex wrench can be used as a gauge to measure perfect linear and rotational adjustment ...the alloy stock itself is the template for confirming perfect alignment.

However, the stock should not be used as a tool to forcefully change adjustments. Use the included Op Rod Guide Installation Assist Tool and tap gently on the guide to align the “BFOG” correctly for proper linear location. To achieve proper rotational/vertical alignment with the receiver, use a wrench with jaws padded with tape.

With proper fit of the ID of the BFOG to the OD of the barrel boss established, use the provided aluminum tube as an installation tool to drift the BFOG back to the proper linear location, 6.45” from back of BFOG to front of receiver. Go carefully here ... *it is much easier to move the BFOG back with the installation tool, than it is to pull it forwards if you go back too far*. Do not be overly concerned if the cross pin slot in the barrel does not line up perfectly with the cross pin holes in the BFOG as with this new ORG design the cross pin is optional.

VERTICAL ALIGNMENT - some rotation may be required!

The ORG should fit around the barrel boss fairly snug, *yet still be loose enough for some rotation to achieve perfect vertical alignment with the receiver.* When rotating the ORG on the barrel, make sure you rotate the ORG in a way that does not mar the outside of the ORG or the inside of the alloy locating bosses in the stock forearm. The recommended procedure here is to use electrical tape to pad the jaws of a large adjustable wrench [crescent wrench type]. This can then be used to rotate the ORG with some measure of control and consistency, and also with no marring of the finish.

The hole in the BF stock forearm is 5/16" diameter, exactly the right size to allow a 1/4" hex wrench to fit through this hole and into the head of the large **"Tension Adjusting Screw"** at the bottom of the BFOG.

When the M14 barreled receiver has the BFOG perfectly aligned front to back and aligned vertically, a 1/4 hex wrench fits easily through the hole into the socket jam screw in the bottom of the BFOG.

STEP 6.1: Rotate the BFOG until the sides are aligned as close as you can get them with the sides of the receiver. Precise rotational alignment of the ORG with the receiver can be measured using the straight edge of the vertical flats at the side of the ORG and indexed by eyeball against the straight edge on the vertical flats of the M14 receiver. If you can't see well enough with this method, use a pair of longer straight edges clamped on to the BFOG and the receiver. If you have a precision digital level [or a level program for your Android cell phone or Iphone] you can also use the level on the side or the bottom of the M14 receiver .

STEP 6.2: With the BFOG installed on the barrel, ***BUT NOT YET LOCKED INTO PERMANENT LOCATION WITH LOCTITE® AND THE THREE LOCKING SET SCREWS,*** test the barreled receiver for initial fit in the BF stock. Make sure the BFOG is as close to vertical zero as possible, as indicated by the fit within the alloy bosses inside the BF stock forearm. A bit of grease here will aid assembly/disassembly and minimize any marring from a slightly angled ORG.

If the BFOG is correctly aligned for vertical rotation, you should be able to slip the same sized very thin feeler gages between both sides of the BFOG and the internal buttresses in the fore arm of the Blackfeather stock. When you have perfect vertical alignment, the M14 barreled receiver with the ORG should now slip smoothly in and out of the forearm. The alloy bosses in the BF forearm can be used as a gage to determine when perfect vertical alignment is achieved ... **BUT SHOULD BE NOT USED AS A TOOL TO FORCE THE OP ROD GUIDE TO ROTATE!** If you check between the ORG sides and the alloy bosses with thin feeler gages, any minor variations should be apparent.

STEP 6.3: Install the trigger guard assembly. Check to see if side to side alignment has shifted. Install the 3/8" castle head BFOG retaining bolt and hand tighten with a 3/8" inch wrench. **Do not use the M14 cleaning rod handle here as it can easily mar the anodised surface around the retaining bolt.**

STEP 6.4: ***Ensure that the 1/4" bolt tip does not protrude into the op rod guide hole*** by visually inspecting the assembly from the front, through the op rod hole in the ORG. The tip of the bolt should be at least 1/16" below the surface of the hole.

STEP 6.5: Remove the barreled receiver assembly with BFOG from the BF stock. Test op rod travel and alignment by installing the op rod and the bolt, **WITHOUT** installing the op rod spring or op rod spring guide. Tilt the barreled receiver with op rod and bolt installed up and down at a 45 degree angle, and ensure the op rod and bolt move smoothly and completely through their travel, aka "THE TILT TEST".

STEP 6.6: Reassemble the barreled receiver with op rod and bolt installed into the BF stock. Lock the trigger guard into place, and with the hammer cocked, do the tilt test again to confirm the op rod and bolt still move smoothly with no interference from the stock. *NOTE:* there will be some interruption in travel as the bolt passes over the hammer and forces it down slightly. Check clearances between BFOG sides and the insides of the alloy buttresses with the fine feeler gages again to ensure the barrel is still centered between the buttresses.

STEP 6.7: Install the castle head BFOG retaining bolt, and hand tighten with a 3/8" inch wrench. Perform the tilt test again. There should be no extra friction or binding than the last time tested.

With the barreled receiver installed in the BF stock, with the trigger guard installed, the BFOG retaining screw tightened down, and with the op rod/bolt assembly sliding smoothly in the tilt test, linear and rotational fit of the new ORG to the barrel is now confirmed as correct.

LOCKING THE ORG IN PLACE - *With the precisely CNC machined new ORG and BF stock used as an installation template, achieving a proper ORG fit should require minimal effort ... for most unmodified barrels and in spec receivers.*

Once perfect front to back alignment and perfect vertical alignment have been achieved, the BFOG should be secured in place on the barrel. This procedure should be considered semi-permanent, as removing the new BFOG or re-adjusting it will be difficult once the Loctite® sets, and the locking set screws mar up the surfaces of the barrel boss. TAKE YOUR TIME AND GET IT RIGHT THE FIRST TIME!

STEP 6.8: Remove the BFOG retaining screw . Confirm there is proper vertical clearance between the bottom of the tension adjusting screw and the metal anti-wear plate on the inside surface of the forearm. To confirm this adjustment, back out the tension adjusting screw until it just touches the inside of the forearm, then adjust back in 2/6 of a turn [two sides of a hex / allen wrench]. If you can not feel precisely when the tension screw contacts the fore arm, watch carefully at the forearm tip to see if the forearm flexes out and in. Once again, adjust the tension screw out to first contact, then back in 1/3 of a turn.

STEP 6.9: Re-install the BFOG retaining bolt and hand tighten with what feels tight with a short handled 3/8" inch wrench. Confirm with a tilt test that the op rod/bolt assembly still slides smoothly.

STEP 6.10: The initial fitting of the ORG is now complete, and the ORG can now be secured to the barrel with the three locking set screws, with Loctite®, and with the *optional* heavy duty cross pin.

STEP 6.11: Put a drop of Loctite® in each locking set screw hole. Reinstall the set screws tightly. The screws will force the Loctite® between the ORG and the barrel boss. Remove any excess Loctite® from the exterior of the installation. Leave the Loctite® to set for at least 8 hours.

STEP 6.12: Remove the barreled receiver from the BF stock. The front and back should fit tightly, but still be removable without *excess* force. A rubber mallet or a block of wood pushed through the mag well from the bottom, or some thin tapered SOFT wedges may be helpful. DO NOT ATTEMPT TO PRY BETWEEN THE FRONT OR BACK OF THE STOCK AND THE BARRELED ACTION WITH ANYTHING HARD!

STEP 6.13: Look at the cross pin holes in the ORG and confirm the cross pin slot in the barrel boss lines up. If the slot does not line up with the holes, it means your barrel has the cross pin slot cut located incorrectly. This is common with Chinese M14 clones, and is NOT critical, as the cross pin is optional..

STEP 6.14: If the slot and the holes line up, you may choose to install the optional new heavy duty spiral cross pin. If installing the cross pin, put a few drops of Loctite® in the cross pin holes, support the far side of the ORG against a non-marring surface, and being careful not to mar the close side of the ORG with the punch, or twist the ORG out of alignment, drive the cross pin in. **Ensure that the cross pin does not protrude outside the ORG surfaces.** Recheck that the pin did not force the ORG out of proper alignment, either fore and aft or by rotation from true vertical.

STEP 6.15: If not using the cross pin, at each side, you can add another few drops of Loctite® deep into the holes for the cross pin.

STEP 6.16: A fine coating of grease may be applied to the ORG sides to ease vertical adjustment, and removal and replacement of the barreled action from the stock.

STEP 6.17: The enlarged hole sections at the front and back of the ORG, which fit around the op rod, may be filled with extra grease. These will act as a convenient reservoir, so greasing the op rod will not be required as often.

STEP 7: Install the Handguard & Gas Assembly, Check Alignment.

Re-install the handguard, barrel ferrule and the gas assembly on to the barrel. Check alignment between front tip of the op rod guide with the tail of the piston. Any mis-alignment here is a symptom of an out of index barrel, a bent op rod, or a gas cylinder bored out of true to the bore. Perfect piston tail/ op rod tip alignment is desirable for best accuracy and long term wear, however proper vertical alignment of the new ORG to the receiver and stock is much more important.

Some mis-alignment of the piston tail / op rod tip can be corrected by proper procedures. Most gas assemblies are a bit loose on the lug to slot fit, and some slight rotational correction may be achieved by peening only one side of the slots.

Other misalignment issues can be cured by straightening or bending the op rod, replacing the gas cylinder with one that is true, etc. If the barrel is mis-aligned with the receiver [aka out of index], more serious work by a serious M14 gunsmith is required. If the mis-alignment is not too great, just ignore it ... most rack grade M14 type rifles have loose op rod guides with considerable play here, and they usually shoot and function quite well. However, if maximum accuracy is the goal, or if the barrel is off index quite a bit, it is best to correct this issue. Otherwise accuracy can suffer slightly, and op rod drag, op rod tab wear, and op rod jumping out of the receiver slot can become an issue.

STEP 8: Reinstall flash hider on barrel, barreled receiver into stock, trigger group

STEP 9: Final Inspection – REDO Tilt test & Hammer Follow/ Trigger/ Safety Test

ADJUSTING TENSION

(Recommended Standard Setting for Best Average Accuracy, and Experimenting for Best Accuracy with Individual Loads).

In a 1000 rd trial, using several different types of ammunition, three different M14 type rifles and two different Blackfeather “RS” alloy stocks, the best **average** accuracy was achieved with the recommended starting tension adjustment of 1/3 turn **draw** between barrel and forearm. Every individual M14 can have

distinct individual preferences, and your M14 type rifle might prefer different tension settings all together. Therefore, we can make no guarantees regarding accuracy with your individual M14 type rifle. Adjusting the tension settings to best suit your individual M14, and confirming that adequate accuracy is achieved, is the responsibility of the individual owner.

However, one piece of advice here ...while experimenting with tension settings to find the **perfect** setting for your M14 can be rewarding, it can also be frustrating, and the more experimenting you do, the more *expensive* it gets. So unless absolute best accuracy is required, know when to stop and know when the point of diminishing returns is reached.

Once the tension adjustment has been verified on the range as accurate enough, the tension adjusting screw may be locked in place semi-permanently, to ensure this accuracy setting does not shift. Removing and replacing the M14.ca adjustable ORG equipped barrel and receiver assembly should not significantly affect zero or accuracy. In fact, one of the design goals of the Blackfeather stock was to make the lower stock assembly interchangeable with various M14.ca ORG equipped "upper assemblies", with minimum change in zero or accuracy.

1.] The starting point for tension adjustment is 1/3 turn [two sides of the HEX wrench] UP = DRAW from neutral/initial contact between the bottom of the new ORG tension adjusting screw and the top of the steel wear reduction plate embedded in the forearm. If range testing shows that accuracy with this setting is acceptable, you can now remove the M14 barreled receiver assembly and lock the tension adjusting screw in place with the provided locking set screw.

2.] You can also choose to experiment further with the tension adjustment by adjusting the tension adjusting screw up or down till you find best accuracy. **Small** adjustments here can make significant differences in point of impact and in group size. Use a six sided hex wrench as an indexing device, and adjust one wrench flat at a time [1/6 of a turn]. When range testing shows that accuracy with this setting is acceptable, you can remove the M14 barreled receiver assembly and lock the tension adjusting screw in place with the provided locking set screw.

3.] POI and group size may vary with different ammunition. If you have one **specific** load that you prefer, the tension adjustments and range testing should be done to achieve best accuracy with this particular ammunition.

SAFETY

The Tilt Test

Remove the op rod guide, op rod spring and trigger assembly leaving the op rod and the M14 bolt still installed. With the trigger assembly out, tilt the M14 Barrel Group 45 degrees up and down making sure the operating rod and bolt move freely, without any tight spots or catching. Try this again with the op rod, bolt, etc lubricated with the grease you prefer. Re-install the trigger assembly, and repeat... . NOTE that with the trigger assembly installed, the hammer must be cocked by the bolt as it travels back and forth. This will highlight any excess bolt/hammer drag.

Hammer Follow / Trigger Safety Tests

Because the stock is an integral component of the trigger mechanism of the M14 rifle, you must always include a hammer follow / trigger / safety test after removing and replacing the barreled receiver into a stock ... ANY stock ... even the one you just took the action out of! Ignoring this basic safety check can have dangerous consequences including damage to your rifle, serious personal injury or death.

- 1.] With no magazine in the rifle, pull the op rod fully to the rear, let go of the cocking handle and let the bolt fly forward under spring tension. Place the safety in the ON [*rearward*] position, and try to pull the trigger. You should not be able to make the hammer release despite firm pressure on the trigger.
- 2.] Place the safety in the OFF [*forward*] position and pull the trigger. The hammer should be released and make firm contact with the bolt.
- 3.] With your trigger finger holding the trigger fully to the rear, pull back on the op rod fully to the rear, let go of the cocking handle, and let the bolt fly forward under spring tension. Do NOT ride the cocking handle ... just let it fly. The hammer should not follow the bolt forward. Cycle the action again 4 or 5 times to confirm the hammer stays back.

IF THE HAMMER FOLLOWS THE BOLT FORWARD, THE M14 RIFLE IS UNSAFE TO FIRE. THE M14 SHOULD BE INSPECTED AND REPAIRED BY A COMPETENT M14 GUNSMITH.

Final Note

Stay safe! The Blackfeather “RS” includes natural finger scalloping for an ambidextrous, ergonomically ideal “Trigger Ready” position. Use it as an extra built in “safety” feature.

Notes on Blackfeather “RS”

Receiver Fitting

Genuine US GI M14 receivers are held to very tight tolerances, as are genuine US GI stocks. The new Blackfeather “RS” aluminum stock is precision machined on CNC equipment and the bedding surfaces inside the stock are also held to very close tolerances. These tolerances are closely controlled to allow the simple and trouble free swapping of stocks and M14 barreled receivers in the field. However, even with genuine US GI stocks and receivers, wear, tolerance stack, and improper modifications can and often does lead to problems fitting the stock to the receiver, and also to possible safety issues.

With the M14 design, the stock itself is an integral component of the trigger assembly fit and function. If the rear of trigger group is held too far away from the bottom of the receiver by the stock, the bolt may not push the hammer down far enough to catch the sear, and hammer follow may occur. **For this reason, any time an M14 barreled receiver is removed and replaced in ANY stock, it is absolutely necessary that a Hammer Follow / Trigger / Safety test be performed before firing.**

We have set the distance inside the stock between the trigger guard mounting surfaces and the top bearing surfaces of the stock to the recommended 1.720”, which will provide safe engagement for all *in spec* trigger assemblies and receivers.

Over the last few decades, there have been many different commercial manufacturers of M14 type receivers, and some of these receivers can vary considerably from true US GI specifications. These variations in receiver dimensions can complicate stock fitting of any stock to these out of specification receivers.

The new Blackfeather “RS” alloy stock has been designed to work with any *semi auto only* M14 type receivers that closely match the US GI receivers for external dimensions. Fortunately, most commercial receivers will fit with no extra work. However, for those out of specification receivers that don’t “drop in”, many receivers can be quickly and easily modified to properly fit the stock. This type of precision work is best left to an experienced professional M14 gun smith, with precision tools. The information included below is meant for the use of such professionals, for making subtle and precise changes to the receivers, *not to the stock bedding*.

Even though the receiver is made of hardened steel and the stock is made of much softer aluminum alloy, it is better to correct receiver out of spec areas rather than try to modify the stock to match any out of spec receivers. This procedure is also recommended because the receivers are the male part of the puzzle, with external surfaces that will be MUCH easier to modify, while the stock is the female part of the fitting puzzle, with internal surfaces that will be difficult to properly modify without a milling machine and other precision equipment.

When modifying the receiver, a hand held dremel would not be considered “precision equipment.”

RECEIVER TO STOCK ISSUES and SOLUTIONS:

1.] Receiver legs that are too thick front to back to fit into the bedding slots in the stock ... displays as a receiver that won't seat all the way down into the stock.

If the receiver goes almost all the way down, a bit of *gentle* persuasion with your friend, Mr. Big Rubber Mallet is acceptable here. But remember that the anodized alloy bedding surfaces are designed to resist wear and deformation to ensure long life. . More force is NOT the recommended solution here. If the receiver does not fit completely down into the stock bedding surfaces with some gentle persuasion, STOP NOW and consider your options.

Some receivers may have legs that are oversize front to back, not equal in size, not finished with both legs square to the receiver, or with radiused corners at where the tops of the legs attach to the receiver. The alloy stocks have a slight radius built in to allow some extra clearance at the top corners of the legs, but this area may need to be dressed down further for a proper fit. A properly heat treated M14 type receiver will be too hard for a file. Dressing the legs down by hand with a large coarse stone is a slow but controllable method of achieving perfect legs-to-recoil-lugs fit. Remember that proper heat treatment leaves the receiver with a thin surface of hardened material, with the receiver core still soft for ductility. Do NOT remove more material from the receiver surface than is absolutely necessary.

The rear of the legs are slightly angled from true vertical/ 90 degrees from the bottom of the receiver, to allow rotating the receiver into place while the front end is held by the ferrule/barrel connection. Measured across the receiver, the rear surfaces of the two legs should be square to the receiver/bore line. Because the rear of the receiver legs takes most of the impact and wear from recoil, the fit here is the most critical. IF the rear surfaces of the legs are not perfectly square to the bore line, the receiver will set up at an angle in the stock. This will display as the barrel not being centered between the fore arm buttresses, as measured by differences in the gap between the sides of new op rod guide and the alloy bearing surfaces. Side pressure here may have an effect on accuracy.

If the legs measure square across the receiver, the best place to reduce leg width is at the front of the legs, which do not receive as much impact stress as the back. The front of the legs are supposed to be true 90 degrees/vertical with the receiver bottom.

2.] The half round "D" cuts in the rear of the receiver legs are cut in the wrong location.

This problem may be masked initially by a sloppy fitting stock, or a stock made from wood, which is soft and compressible, both at the top surfaces and at the trigger guard seating surfaces at the bottom. With the NON-compressible aluminum alloy stock, if these "D" cuts in the receiver legs are located too high, the trigger guard may not close without excessive force. If cut too low, then an unsafe condition may result where the firm alloy surfaces at the top of the stock hold the receiver up in the correct location with the bottom of the receiver tight against the top of the stock,

If the too low "D" cut dimensions hold the trigger guard down too far down, too much clearance between trigger assembly and receiver may result in the bolt not properly pushing the hammer down far enough to properly catch the sear. AKA, hammer follow!!!

First solution, try different trigger guards, hammers, trigger combinations for fit.

If too tight a trigger guard draw is the issue, another solution is to remove material at the locking surfaces of the bottom of the trigger guard tabs. Most used trigger guards will have the surface finish polished off at this location by wear, which will indicate the high spots that might still need a bit of stoning. . Lightly stone these surfaces where they mate into the cutouts in the receiver legs, test fitting often until proper fit and function is achieved..

3.] The two bedding pads at the front of the trigger group must be the correct height and contour to precisely locate the front of the trigger group for correct "DRAW. Too short a distance here and the trigger guard tension is not enough. Too long, and the trigger guard may not lock in place without springing and/or bending. We have designed our trigger guard pads to tension the trigger guard fit TIGHT. So tight that some trigger guards may not lock up initially without some persuasion from our friend, Mr. Big Rubber Mallet.. Use discretion here ... the object is to achieve a tight fit without springing/bending the trigger guard.

Genuine US GI M14 trigger guards will have the proper heat treatment to retain their shape, and have the proper contour to provide maximum strength here. Some commercial trigger guards may be soft, bend too easily, or even break. Before replacing an entire trigger assembly to fix a trigger guard fit problem, try replacing just the trigger guard by itself.

In the unlikely event that your trigger guard fit is too loose, once again first try replacing the trigger guard with a GI spec version. Or, perhaps bending it carefully outwards. Or, as quick fix, try putting some non-compressible tape between the mounting surfaces of the stock and the trigger assembly. The heavy duty aluminum tape sold as muffler wrap is ideal for this application, and has the side benefit of preventing any scratches on the anodized stock surfaces where the trigger assembly pads fit.

4.] Trigger assembly height differences at the front and at the rear also contribute to the angle the trigger group sits at, which can affect the latch height for the magazine. A magazine latch that sits too high can create difficulties when fully inserting and locking in place a magazine. A magazine latch that sits too low can cause ammunition feeding issues. So far in our testing, only one Chinese magazine has failed to fit properly, and inspection of that particular magazine showed a burr on the magazine tab that was easily filed down. It is a good idea to always mark [NUMBER] your magazines [I use SILVER Hi Liter] to help trouble shoot and isolate magazine feeding and fitment issues.

M14.ca Blackfeather® “RS” Engineering and Design Considerations of the M14.CA Tension Adjustable Op Rod Guide

The theory behind “free floating” a rifle barrel to improve accuracy seems simple ... “*If nothing touches the barrel when it oscillates through the vibration cycle immediately after a shot has been fired [aka **barrel harmonics**] a free floated barrel **should** be more consistent in returning to the same orientation for the next shot.*” And, as demonstrated on the firing range, *with improved consistency in barrel harmonics, improved accuracy often does occur.* A rifle with the receiver properly bedded and held solidly to the stock, with the barrel “free floated” will often shoot better than it did with some contact between the barrel and the fore end. This simple theory is well proven in single shot and bolt action rifles.

However, free floating an M14 barrel is not quite as simple. The gas and spring operated semi-automatic M14 rifle has a very heavy reciprocating mass consisting of the op rod, bolt, spring, and cartridge all frantically thrashing around under the barrel and inside the receiver. This heavy reciprocating mass can and usually does have a significant impact on M14 barrel harmonics. And because this heavy reciprocating mass is working on the barrel to receiver joint, true *full length* free floating of an M14 barrel could cause extra flexing, inaccuracy, and potentially even early failures of the receiver. So, the M14 design is better off if the barrel is only *partially* “free floated,” and at some point supported rigidly in line with the receiver .

In a *conventional* wood or fiberglass M14 stock, the point chosen to connect the barrel to the forearm is at the stock ferrule/barrel band, right behind the gas assembly, at the very tip of the forearm. Bedding the receiver with *precise vertical tension* of the tip of the stock forearm to the gas assembly and barrel band, is the well proven classic method of getting the M14 barrel to vibrate more consistently. Creating more consistent barrel harmonics through *unitizing* [minimizing play] the gas assembly, and achieving *precise* upwards forearm to barrel tension, works ... and it works well ... but this is more of an art form, done by experienced M14 craftsmen on an individual basis on each individual rifle. This method is not suitable for modern mass production methods.

In theory, solidly connecting the M14 barrel to the forearm closer to the receiver by using a larger, reinforced, rigidly held, heavy duty op rod guide [aka “*partially free floating the M14 barrel*”] should be a viable way to minimize M14 barrel oscillations, and/or possibly make the barrel harmonics more consistent and repeatable. The KISS principle is applied here by eliminating all the many variables and built in play inherent to using the complicated gas assembly/ barrel band/stock ferrule interface.

Where the new M14.ca op rod guide design differs from other “free floated” M14 op rod guide designs is that the M14.ca guide is *adjustable*, to allow for perfect fit with civilian M14 clones. It has the largest surface bearing area of any ORG. It offers a self-lubricating feature found in no other ORG with

special relief cuts at the front and rear for packing grease. The ORG is quad-locked and is buttressed inside the Blackfeather “RS” stock like no other and it uses 5 set screws. 3 of these 5 set screws allow you to maintain the vertical alignment of the ORG prior to installation and the other 2 set screws lock the large, vertical adjustment screw used for barrel tensioning and accurizing the M14. Our ORG is also pinned using a tensioned, coiled, stainless spring pin for extra strength. The ORG is seated on a large steel bedding surface embedded inside the Blackfeather “RS” stock to account for wear in this location.

Note that US GI M14 receivers are held to incredibly tight external dimensions, and will usually fit the also incredibly precise CNC machined alloy bedding surfaces consistently and properly. But many of the civilian M14 clones may have receivers that are slightly off from true GI M14 dimensions. With the M14.ca **adjustable tension** design, there is no longer any need to shim at the front or the back of the receiver to stock bedding surfaces to achieve perfect vertical alignment and proper barrel to forearm tension. Vertical/tension adjustment is now built right in to the new op rod guide.

When adjusted with the standard tension settings recommended, the M14.ca op rod guide has demonstrated a noticeable improvement in AVERAGE accuracy shot by the same rifle in M14 conventional type stocks ... with average calculated over groups fired with several different brands and weights of .308 WIN and 7.62 NATO spec ammunition. This standard setting uses the adjustability built in to the op rod guide to adjust vertical alignment of barrel to forearm precisely, even with slightly out of spec receivers, and then to add some *slight DOWNwards tension to preload and stabilize the barrel/forearm connection*. This slight vertical pre-tension is precisely adjustable, and *adjustments are repeatable*, to achieve the best **average** accuracy with most loads.

Once adjusted properly, the pre-tension can be locked in, and if necessary the barreled action can quickly be removed and replaced in the stock. This quick removal and replacement feature is unique to the M14.ca design, and allows multiple **“upper”** barreled receiver assemblies to be swapped into the same stock, with minimal disruption to zero.

For those who want to experiment further, barrel to forearm vertical tension is now *adjustable*, so that *the system can be fine tuned for best accuracy with an individual load*. Like the Browning Boss muzzle weight device, the M14.ca adjustable op rod guide can be fine tuned to create more consistent barrel oscillation and return to zero *for a specific load*. But unlike the boss, which is attached at the muzzle, the M14.ca op rod guide works further back on the M14 barrel. With either system barrel harmonics can be made more consistent for that one specific load, and accuracy with that specific load can improve significantly.

The M14.ca Blackfeather “RS” alloy stock was designed to tremendously improve the balance, fast handling and ergonomics of the M14 rifle. Because we have no control over the all too many variables in INDIVIDUAL M14 rifles, we can make no accuracy guarantees for the Blackfeather stock. However, in high round count range testing, we demonstrated that a near standard M14 clone [tested in five different conventional stocks] went from a best group of 1 3/8”, to a best group of 7/8” after fitting and tuning in the BF stock.

And these were FIVE shot 100 yd groups.

The new Blackfeather “RS” op rod guide (ORG) is thicker, wider, and protrudes down further than a standard M14 ORG. Both sides of the ORG and the insides of the alloy locating bosses inside the forearm are precision fit and finely finished. They are designed to minimize rotation ... but to still allow for easy removal and replacement of the barreled M14 action into the Blackfeather stock, and also still allow smooth, precisely adjustable vertical travel for tension tuning.

The thickness has been increased to provide *maximum linear bearing length* against the approximately 5/8" long barrel boss on a standard weight M14 barrel. This increased linear bearing, combined with the precisely sized .802" ID hole in the ORG [which fits snugly around the .800" OD of an in spec barrel boss] minimizes any potential wobble brought about by the back and forth motion of the op rod inside the guide.

The ORG width has also been increased significantly, and has been precisely matched to the two massive alloy locating bosses inside the fore arm of the Blackfeather stock. The interface between these oversized parts is loose enough to allow smooth and precise vertical adjustment and the quick removal and replacement of the barreled receiver into the Blackfeather stock, while still large enough and tight enough to minimise rotation of the ORG around the barrel...which is an all too common accuracy robbing condition with many M14 type rifles.

Note: a new copy of these instructions can be downloaded from: <http://www.m14.ca/>

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