

**READ AND UNDERSTAND THIS MANUAL COMPLETELY BEFORE
INSTALLING OR USING THIS BARREL!**

Transfer this manual to any subsequent owner or user of the barrel. If you are inexperienced in the handling of firearms, obtain expert instruction before attempting to shoot. Neither this manual nor this product can take the place of proper instruction in the safety aspects of shooting or the use of weapons.

Introduction:

Careful reading of this manual and proper installation by a competent gunsmith will help ensure safe use of the barrel. However, neither this manual nor this product can take the place of proper instruction in the safety aspects of shooting or use of firearms. If you are inexperienced in the handling of firearms, obtain expert instructions before attempting to shoot. **Severe injury to hands, eyes, face, other persons or property will occur with improper use of the hybrid compensation system.**

Safety Notes:

ALWAYS use eye/ear protection when shooting or when in proximity to shooting. The hybrid system, like most muzzle brake devices, produces greater noise than an uncompensated weapon and poses a danger to hearing if used without proper protection.

NEVER place any part of the body over or near hybrid exhaust ports.

NEVER cycle the slide with your hands over the hybrid exhaust ports.

NEVER point a gun at anything you do not intend to shoot.

If the pistol is drawn rapidly, it must not be discharged in proximity to the holster or the shooter's eyes, legs, arms, clothing or bystanders. When shooting a hybrid from the hip, the gun must be rotated to direct the blast of the hybrid away from the shooter. The blast from the exhaust ports can cause injury or property damage several feet away. Use caution when shooting to avoid overhead objects that may be damaged by the ports' blast.

Competition shooters using hybrid barrels should be especially careful when shooting through props such as windows, ports, culverts, tires, etc. Tell your range officer that you are shooting a hybrid.

Installation:

This barrel must be installed and tested by a competent gunsmith according to the specific instructions shipped with the barrel. Improper installation will void the manufacturer's warranty and may result in serious injury and/or damage to the barrel, firearm, or property. Have the gun checked by a competent gunsmith on a regular basis.

Maintenance:

Accumulated debris in the barrel or in any hybrid exhaust port may result in damage to the pistol or injury to the shooter. With the gun unloaded, regularly inspect the bore and hybrid exhaust ports for dirt and debris. Never discharge the firearm when any form of debris is present in the barrel or hybrid exhaust ports.

Ammunition:

DO NOT fire the barrel using any ammunition which exceeds S.A.A.M.I. (Sporting Arms and Ammunition Manufacturers Institute) specifications for pressure.

DO NOT use hybrid ported barrels with shot cartridges or any ammunition which is loaded with a fully frangible projectile or any ultra-lightweight projectile at elevated velocities, or any wooden or plastic projectile.

CAUTION: Fragments of the metal jackets on jacketed bullets may be propelled through the hybrid exhaust ports with great force and have the potential to cause injury or property damage at a distance of several feet.

The use of any of the ammunition described above may result in injury, property damage, or both.

ONLY shoot cartridges of the caliber engraved on the barrel.

(1) Cutting the Slot in the Slide for the Rib (Ribbed barrels only):

Measure the distance from the front of the slide to the aft surface of the aft slide locking lug. Then measure the distance from the back of the barrel rib to the aft edge of the aft locking groove. Subtract the second measurement from the first.

Measure this resulting distance aft from the front of the slide and place a mark on the top of the slide to indicate the aft end of the slot. Mount the slide horizontally in a mill vise. Make sure that the slide will not collapse when the slot is cut into the slide by placing a tight-fitting aluminum or brass plug in the slide bore at the front of the slide. Mill a 7/16 inch wide slot centered directly over the centerline of the bore in the slide from the front of the slide back to your mark. The rib to slide clearance should be 0.010 to 0.020 inch around the entire rib to ensure that the rib and slide do not touch during cycling of the slide. Once the slot in the slide is finished, chamfer the lower rear corner of the slot with a Dremel tool to clear the fillet at the base of the rib on the barrel.

(2) Hood fitting

The width of the hood is 0.010 inch wider than the hood slot in a typical slide to allow for fitting. When fitting the sides of the hood be sure that: (1) the lower standing lugs are either physically in the standing lug slot in the frame to be used or centered between the slide rails (using Cherry Corners barrel alignment block or equivalent); (2) the forward end of the chamber section of the barrel is centered in the slide (by using shim stock between each side of the barrel and the adjacent interior surfaces of the central hole in the slide just below the radial lugs); and (3) the rib on a hybrid barrel is completely clear of contact with the slide.

Measure the distance between the breech face and the back of the aft locking lug in the slide (EGW makes a gage which simplifies this measurement). Shorten the hood so that the distance between the back of the hood and the back of the first locking groove in the barrel is the same as this measurement.

(3) Frame Modifications (Ramped Barrels Only)

(3.1) Clamp the frame in a mill vise with the frame rails horizontal. Install an 11/32 inch or smaller flat bottom end mill. Set the machine zero at the top of the rails, then move the end mill downward 0.315 inch and cut a slot aft from the standing lug slot to the magazine well, centered between the rails. For best accuracy, the slot should form a tight slip fit with the barrel standing lugs.

(3.2A) (Wilson/Nowlin Ramped Barrels Only) Insert a slide stop into the frame. Measure the distance between the rear of the slide stop pin and the aft face of the standing lug slot. Subtract this distance from 0.500. Clamp the frame in the mill vise with the frame rails vertical, and using a 29/64 inch flat bottom end mill or the Nowlin ramped barrel frame bridge cutter, move the aft face of the frame standing lug slot downward (aft relative to the frame) by the resultant distance (typically about 0.160). Then clamp the frame in the mill vise with the frame rails at 45 degrees from vertical. Chamfer the corner at the intersection of the two above cuts. The intersection is chamfered its full length between the sides of the frame standing lug slot and the chamfer has a width of 0.050 inch. Using a flat needle file, round the two edges of the chamfer to match the rounded mating corner on the barrel (1/16" radius).

(3.2B) (Clark/ParaOrdnance Ramped Barrels Only) Insert a slide stop into the frame. Measure the distance between the rear of the slide stop pin and the aft face of the standing lug slot. Subtract this distance from 0.600. Clamp the frame in the mill vise with the frame rails horizontal, and using a 3/8 inch flat bottom end mill do a vertical plunge cut, moving the aft face of the frame standing lug slot aft by the resultant distance (typically about 0.260), with the end mill centered between the rails. Use a Dremel tool to round the corner at the top of the cut to a 1/16" radius to match the fillet on the barrel standing lugs.

(4) Barrel Lockup

Put the new barrel in the slide and measure the distance between the top of the barrel and the top of the slide at the front of the ejection port with the barrel unlocked from the slide (hood forward of the breechface approximately 1/8 inch and the top of the barrel touching the upper surface of the hole in the slide). Then check the distance between the top of the barrel and the top of the slide at the front of the ejection port but this time with the radial lugs of the barrel and slide fully engaged. The difference between these two measurements is the barrel lockup and should be 0.045 inch or greater.

(5) Barrel Standing Lugs

(5.1) Using the Brownells M1911 Barrel Holder (or equivalent) press the barrel up into full engagement with the slide. Put the resulting slide/barrel assembly onto the frame and cut the bottom of the standing lugs with a Tom Wilson 1911 Auto Lug Cutter with the standard sized cutter. DO NOT ALLOW THE CUTTER TO REMOVE ANY METAL FROM THE AFT SURFACE WHERE THE SLIDE STOP PIN STOPS THE FORWARD MOTION OF THE SLIDE AND BARREL! It is already properly positioned relative to the link pin hole. Any discontinuity between the slide and frame at the back of the gun should be corrected by removing metal from the slide or frame.

Remove the barrel from the slide and measure the distance between the bottom of the link pin hole and the bottom surface of the standing lugs where the slide stop pin holds the barrel up into engagement. Select a link which measures this same distance between the link holes. NEVER OPEN UP EITHER OF THE LINK HOLES FOR ANY REASON WHATSOEVER! Install this link into the barrel by pressing the link pin into the standing lug link pin hole. (Note that the link pin hole is supplied at 0.154 inch diameter to enable you to use either 0.154 or 0.156 link pins. If you want to use a 0.156, you will need to ream the link pin hole to 0.156 inch - do not try to force a 0.156 inch pin into the 0.154 inch hole) Insert the slide stop pin through the link hole with the slide stop pin near the aft limit of travel. Move the slide stop pin forward until the link has moved through a 45 degree arc. Any interference between the slide stop pin and the standing lugs should be eliminated by symmetrically removing metal from the two standing lugs where interference exists until the slide stop pin is able to traverse the 45 degrees without binding.

(5.2) Assemble the slide, barrel, slide stop pin, and frame. There should be no problem getting the barrel and slide to go forward into battery. Then determine if the slide will move aft, link down the barrel, and continue aft. If not, the rear of the standing lugs are probably contacting the frame prematurely which prevents the barrel's radial locking lugs from getting clear of the slide's locking lugs. If the slide is unable to move aft, move the aft surface of the frame standing lug slot aft by 0.005 inch and move the radiused corner aft 0.005 inch to match. Reassemble the slide, barrel, slide stop pin, and frame and repeat the above test. Continue moving the aft surface of the frame standing lug slot aft by 0.005 inch increments until the barrel ramps down properly and the slide is free to move aft.

(5.3) READ, UNDERSTAND, AND FOLLOW THE INSTRUCTIONS IN THIS SECTION BEFORE FIRING THE GUN!!!! ALMOST ALL BARREL LUG BREAKAGE OCCURS DUE TO FAILURE TO PROPERLY FOLLOW THESE INSTRUCTIONS!!!!

If you have the Schuemann Barrel Timing Test Tool, use it according to its instructions. If not, wrap tape around a long steel rod with a diameter slightly smaller than the bore of the barrel. The tape is to avoid scratching the bore with the rod. Clamp the rod horizontally in a vise leaving a length exposed which is roughly 1/2" less than the barrel length. Assemble the slide, barrel, frame, and slide stop pin. Slide the barrel over the protruding rod. Push forward and down on the grip of the gun while the vise pushes back on the muzzle end of the barrel. The purpose is to force the barrel aft toward the frame and to simultaneously lift the aft end of the barrel upward. While applying this pressure, try to move the slide aft out of the battery position. There should be NO INTERFERENCE between the barrel and slide as the slide starts moving aft, and the clearance between the top of the barrel and the inside of the slide should be a minimum of 0.010 inch. If it is less than this, return to step (5.2) and remove a little more metal from the aft surface of the frame standing lug slot until the clearance is a minimum of 0.010 inch. DO NOT remove more than 0.010 inch of extra metal from the frame without first evaluating what else might be preventing the barrel from locking down properly!

(5.4) Disassemble the gun and use a marking pen to color the aft end of the frame standing lug slot area everywhere the barrel might contact. Similarly mark the back and bottom of the barrel everywhere the barrel might contact the frame. Reassemble the slide, barrel, slide stop pin, and frame. Move the slide approximately 1/2 inch aft of the battery position. Holding the slide in this position use a plastic mallet to hammer the muzzle of the barrel aft a number of times to mark the contact locations between the standing lugs and frame. Then disassemble the gun and remove small amounts of metal from the frame where contact is obvious and repeat the preceding sequence until the contact between the barrel standing lugs and frame is reasonably uniform. The strongest contact should be in the upper portion of the vertical surfaces. There should be no contact between the barrel and frame rails, no contact between the barrel and frame in the horizontal portion of the slot, and only light contact between the lower portion of the vertical surfaces.

(6) Barrel Bushing

Barrels with integral bushings (Ultimatch, Hybrid, HybriComp, and Tribrid) have a cylindrical section near the muzzle which fits and wedges in the slide as the barrel locks up. Little or no further fitting is usually required. If the barrel seems to be wedging too tightly, remove a small amount of metal from the top rear or the bottom front of the cylindrical section with a smooth file or lapping compound.

(7) Chambering

The chamber as supplied is machined undersized to allow for setting headspace after the hood is cut to the proper length to fit the slide. Once the barrel is fitted to the slide, finish ream the chamber to minimum depth (9mm = 0.754", 9x21 = 0.833", 38Super & 9x23 = 0.900", 40S&W = 0.850", 10mm = 0.992", 45ACP = 0.898"; all +0.010" max).

Freeboring the throat approximately 0.2 inches will lower peak pressure without affecting accuracy. Chamfering the corner between the chamber and throat approximately 0.005 inch will reduce the possibility of lead being shaved off the side of a lead bullet when it is chambered or fired, thereby increasing reliability.

(8) Barrel Groove, Land, and Recommended Bullet Diameter

Barrels will have the following groove and land diameters. For optimum accuracy, lead bullets should be 0.002 or 0.003 inch larger than groove diameter; copper jacketed bullets should be 0.001 or 0.002 inch larger than groove diameter.

.355 caliber: groove diameter = 0.3550 inch, land diameter = 0.3460 inch.

.400 caliber: groove diameter = 0.4000 inch, land diameter = 0.3910 inch.

.450 caliber: groove diameter = 0.4500 inch, land diameter = 0.4420 inch.

(9) Powder Choice

Caliber 0.355 Hybrid, HybriComp, Tribrid, and externally compensated barrels loaded to make major should use the densest slowest burning powder for maximum compensator performance and lowest peak pressure. The only powders which satisfy these requirements are Winchester 571, Hodgdon HS-7, and Accurate 7. All other commonly used powders (540, 3n37, n350, 4756, WAP, etc.) provide less compensator performance, raise peak pressures unnecessarily, and cause accelerated barrel wear.

(10) Barrel Cleaning

Our barrels are designed to perform best with minimal cleaning. Never use chemical bore cleaners to clean the bore. An occasional brushing with a dry bronze bore brush is acceptable, but generally not necessary. Use bullets which are copper jacketed, copper plated, or cast from bullet-specific hard lead alloys. If any of the above bullets are used consistently and the bore is not cleaned vigorously, the barrel will quickly develop a thin, polished, and stable coating of leading which delivers outstanding accuracy and requires little or no maintenance.

(11) Barrel Wear

Barrel life when shooting light jacketed bullets at high velocity is only 1/5 to 1/10 the life obtainable when shooting heavy lead bullets at moderate velocity. With light jacketed bullets and hot loads, the life of the barrel may only be 5,000 to 10,000 rounds. (Please note that this is true of all barrels. Our barrels tend to last longer than most others due to the superior quality and hardness of our barrel steel.)

Hybrid Notes

Front Sight: Hybrid barrels are shipped with a standard Smith & Wesson dovetailed front sight, S&W part number 10911 (dovetail is .250x74, .090 deep). Shorter and Tritium sights are available from Smith & Wesson. If the fit between the sight and dovetail is too tight, place a piece of 150-220 grit sandpaper on a flat surface and sand a little bit off the bottom of the sight.

Rear Sight: In barrels with hybrid ports, the impact point is lowered compared to a stock gun due to the fact that the hybrid is pushing down on the gun before the bullet has left the muzzle. To compensate, the rear sight of a hybrid will need to be about 0.030 higher than normal. For adjustable sights, the MMC and Bomar BMX (the BMCS sits too low on the slide to work well) are good choices. Novak, Millett and Aristocrat make fixed sights that have sufficient height.

Red Dot Scopes: The flow out of the hybrid ports is a well defined plume. Do not place the scope over the ports. If the front of the scope is 1.0 inch or farther aft of the aft port, the installation will be successful. The front of the scope should be smooth. If lips or other protuberances extend from the front of the scope toward the ports, the resulting eddies will aggravate darkening of the scope. Jacketed bullets generally do not produce much darkening of the scope. Lead bullets which are 0.001 inch or more larger than the groove diameter will not normally cause serious darkening of the scope. Powders which are too fast create higher temperatures and can melt and erode lead from the bullet base and darken the scope to a greater degree.

Bullet Velocity Loss: The majority of the bullet's velocity is acquired in the first inch or so of travel. For heavy bullets this velocity is acquired in a shorter distance and for lighter bullets over a longer distance. The hybrid ports are far enough down the barrel (the bullet base travels almost 2 inches before the first port opens in a Hybrid barrel) and the time required to vent the gases is long enough that little velocity is lost compared to an unhybridized gun. The average velocity loss is 5% in a Hybrid and even less in a HybriComp. Slower burning powders produce slightly greater velocity loss and slightly better hybrid operation. Faster burning powders will show less velocity loss and less compensation. If the application allows for reloaded ammunition, increasing the powder charge (about 0.3 grains normally) will restore the original velocity and will also improve the performance of the hybrid.

Port Erosion: With normal loads there is no discernible hybrid port erosion even after many 10s of thousands of rounds. If the 38 Super or an equivalent cartridge with light bullets is loaded way over normal pressure limits to obtain 1400 feet/second and higher, the port erosion is discernible after several thousand rounds. Some powders will cause more port erosion than others by burning at higher temperatures and generating more particles. Chamber throat erosion will also be noticeable when shooting such loads.

Accuracy: Typically the accuracy of a hybridized gun is better than the same gun before being hybridized. Most of this increase in accuracy is due to the superior bore quality of our barrels. Another reason is that the hybrid vents almost all the gas from the barrel before the bullet leaves the muzzle, thereby eliminating the loss of accuracy caused by high pressure gas acting on the base of the bullet as the bullet leaves the muzzle. The third reason is that the hybrid barrel is pushing down with about 1000 pounds of force while the bullet is still in the barrel. The barrel pushing into the slide and the slide pushing into the frame with that much force will damp vibrations and establish a consistent positioning of the gun's parts before the bullet leaves the muzzle.

Particles from the Ports: If you take any conventional pistol, place the muzzle about one foot from a piece of cardboard, and fire the pistol through the cardboard, you observe the hole made by the bullet and any number of small perforations caused by small bits of metal and powder particles leaving the muzzle. In a hybridized pistol some of these small bits of metal and powder particles come out of the ports and travel upward instead of coming out of the muzzle traveling forward. This can pose a danger to objects or people located in line with the ports. Similarly, the gas coming out of the ports is moving as fast as the gas coming out of the muzzle and the high velocity gas can cause injury or damage to objects or people located above the exhaust ports or in front of the muzzle. READ AND UNDERSTAND THE ATTACHED SAFETY MANUAL BEFORE INSTALLING OR USING THE HYBRID COMPENSATOR SYSTEM.

Compensator Performance: The performance of the hybrid varies somewhat with powder burn rate, bullet weight, and the velocity of the bullet. Lighter bullets produce more compensation than heavier bullets in a given caliber, everything else being equal. Depending on bullet weight, the hybrid eliminates between 60% and 100% of the muzzle jump and gun rise. For comparison, Magna-Porting provides about 10% reduction and muzzle comps provide 20-25% reduction in muzzle jump and gun rise.

With a given bullet and caliber, the percentage of compensation increases as the velocity increases. This is because light loads require proportionately smaller amounts of faster burning powder while hotter loads inevitably require larger amounts of slower burning powder. The pressure peak occurs farther down the barrel with the slower burning powders, so when the ports open there will be more gas at a higher pressure to run the hybrid when shooting a given bullet at higher velocity.

Limited Warranty

Warranty of this barrel is limited to replacement of the barrel for failure due to material or manufacturing defects when the purchaser returns the barrel directly to Wil Schuemann with a description in writing of the claimed defects and of the circumstances under which the product was used and found to be defective. Wil Schuemann states that installation of this product may require fitting which should be performed by an experienced pistolsmith. IMPROPER INSTALLATION OR FAILURE TO CORRECTLY FOLLOW THESE INSTALLATION INSTRUCTIONS WILL VOID THIS WARRANTY! Wil Schuemann will not be responsible for any damage, personal injury, or other loss due to improper installation or use of this product or of any firearm to which this barrel is fitted or installed. Installation of this barrel may affect the warranties of other manufacturers. Wil Schuemann recommends that the firearm be completely checked and assessed for safety and correct operation by an experienced gunsmith before use.

Schuemann Z Barrels

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