



**The Toby Bridges Signature Series
Leatherwood HPML Scope
TB-ML39X40
By Hi-Lux, Inc.**



RIFLESCOPE INSTRUCTIONS

Dear Muzzleloading Hunter:

Congratulations on choosing the finest muzzleloader hunting scope available today - the *Leatherwood HPML* scope by Hi-Lux, Inc.

The *HPML* designation stands for "*High Performance Muzzleloading*" and that's exactly what this 3-9x40mm scope will do for your muzzleloader. It will turn the rifle into a more effective big game rifle by helping you tap all the downrange performance your rifle and load are capable of producing out at 200 yards and farther.

Today's modern in-line ignition rifles, hot black powder substitutes and sabot bullets produce the best big game taking accuracy and energy levels muzzleloading hunters have ever known. Still, hard-hitting bullets of 240 to 300 grains, even shot at top end muzzleloader velocities, suffer from very noticeable bullet drop once past 150 yards. Many of these rifles and loads are fully capable of shooting solid 3-inch groups at 200 yards, and retain more than enough velocity and energy needed to cleanly down deer, elk and other big game. The key is just being able to put that bullet where it needs to go.

I was elated when *Leatherwood/Hi-Lux, Inc.* contacted me to assist with the development of this scope. I've never been truly satisfied with any other muzzleloader scope on the market, or simply using a standard 1" diameter center-fire riflescope. Until now, most scopes sold as muzzleloader scopes were basically nothing more than a scope built for shooting shotgun slugs, constructed to take the heavier and longer recoil. A few have offered multiple reticles for aiming at different ranges. Some clutter the sight picture with complicated reticles, while most others place the additional "*long-range*" reticles evenly spaced below the primary crosshair without any relationship to specific bullets or loads.

The new *Leatherwood HPML* scope is built with much of the same internal construction found in the military ART (Auto Ranging & Trajectory) scopes designs by Jim Leatherwood. These are battle proven rifle optics built to take on the toughest conditions. The *HPML* scope just may be the most solidly built scope you'll ever own. One thing is for certain, the recoil of even the heaviest muzzle-loaded powder charges won't affect the alignment or precision sighting of this scope.

Hundreds of rounds were fired through several modern .50 caliber in-line rifles, loaded with both 150-grain Triple Seven Pellet and 100 to 110-grain charges of FFFg Triple Seven to determine the position of the three simple crossbar reticles located below the primary crosshair. With the now widely used high ballistic coefficient sabot 240- to 260-grain polymer-

tipped spire-point bullets, the rifles and loads would consistently print within 2 inches of point of aim at 200 yards when aiming with the first (upper) crossbar. Using the center crossbar, point of impact was repeatedly within 2 inches of point of aim at 225 yards, while the third crossbar placed shots within 2 inches of point of aim all the way out at 250 yards.

More than a thousand additional rounds were fired to compile the accompanying chart to determine where the different crossbars impacted "on" at various velocities with a wide range of today's most commonly used sabot muzzleloader bullets - both the newer and extremely aerodynamic design and older blunt-faced hollow-point and flat-nosed bullets.

It is a simple, yet extremely effective system that can precisely place shots on big game at various ranges.

My primary hunting muzzleloader is a .50 caliber Knight DISC Extreme ("*Long Range Hunter*" model), and with the HPML scope sighted to hit 1 inch high at 100 yards with a 110-grain charge of FFFg Triple Seven behind a sabot 260 grain Scorpion PT Gold poly-tipped spire-point from Harvester Muzzleloading, the rifle prints just 1-1/2 to 2 inches high at 200 yards...1 to 1-1/2 inches low at 225...and just 1 to 1-1/2 inches low at 250. At 50 yards, using the primary crosshair, point-of-impact is just 1-1/2 inches below point of aim, and at 150 yards the load prints barely 2-1/2 inches low. Using one of the four simple reticles of the *HPML* scope, I can hold pretty much "on" the chest cavity of a buck at any range to 250 yards and effectively place the bullet in the kill zone.

Leatherwood/Hi-Lux, Inc. does not recommend shooting beyond the effective (energy) range of the load you shoot. The minimum acceptable energy level for taking whitetails and other deer sized game is 800 foot pounds, for elk and similarly sized game your load should retain at least 1,000 to 1,200 foot pounds of energy - at the distance of the target. The load shot out of my .50 caliber Knight muzzleloader generates 2,380 foot-pounds at the muzzle, retains close to 1,200 foot-pounds at 200 yards, and hits with 900 foot pounds at 250 yards.

Thanks to the new 3-9x40mm *Leatherwood HPML* scope, today's high performance muzzleloading big game rifles have just become a bit more lethal - and effective!

Thanks,

Joby Bridges, Host

HIGH PERFORMANCE MUZZLELOADING Web Magazine

www.hpmuzzleloading.com

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SECTION 1: PECIFICATIONS

Magnification: 3 – 9 X

Tube: 1"

Exit Pupil Range In Variable(mm): 13.3 – 4.4

Click Adjustment: ¼" MOA at 100 Yard

Weight: 15.40 O.Z.

Features: Fully Multi-Coated, Fast-Focus Eyepiece, Flip Open Lens Covers, Nitrogen Filled, One Piece Tube.

Objective: 40mm

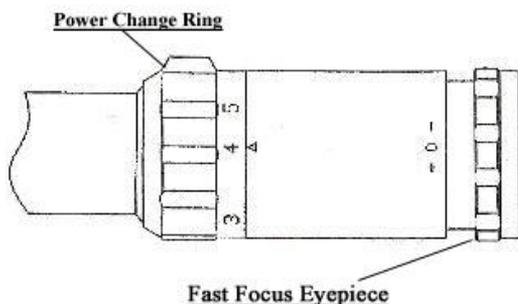
F.O.V.@100_Yard: 39'-13'

Eye Relief: 3.40" – 2.72"

Length: 12-1/4"

Model No.: TB-ML39X40

SECTION 2: EYEPIECE FOCUSING



Hold the scope about three or four inches from your eye and look through the eyepiece at a featureless flatly lit bright area such as a wall or open sky. If the reticle is not sharply defined instantly, you need just to turn the quick focus eyepiece in or out for adjustment until the reticle appears in sharp focus.

WARNING: EVER LOOK AT THE SUN WITH THIS PRODUCT OR EVEN THE NAKED EYE. IT MAY PERMANENTLY DAMAGE YOUR EYES.

SECTION 3: MOUNTING

To achieve the best accuracy from your rifle, the scope must be mounted properly. You should use a high-quality mount with bases designed to fit your particular rifle. The scope should be mounted as low as possible without touching either the barrel or the receiver. Before tightening the mount rings, look through the scope in your normal shooting position. Adjust the scope (either forward or backward) until you find the furthest point forward (to ensure maximum eye relief) that allows you to see a full field of view. Rotate the scope in the rings until the reticle pattern is perpendicular to the bore and the elevation turret is on top. Then tighten the mounting screws.

WARNING: AVOID OVER-TIGHTENING THE RINGS. THIS CAN DAMAGE THE SCOPE, AFFECTING PERFORMANCE OR RENDERING IT INOPERABLE. THERE SHOULD BE A SLIGHT EVEN GAP BETWEEN THE RINGS AND THE SCOPE. BE SURE THAT THE SCOPE IS MOUNTED FAR ENOUGH FORWARD. ITS REARWARD MOTION MAY INJURE THE SHOOTER WHEN THE RIFLE RECOILS.

SECTIONS 4: PRE-ZEROING

Pre-zero sighting can be done either manually or with a bore-sighting device. To bore sight manually, it is necessary to be able to see through the bore from the breech end. In the case of a bolt action, this usually means removing the bolt. If your scope has parallax adjustment, set it for the range to the target. Set the variable-power scope to low power. With the firearm in a rested position, remove the caps from the windage and elevation screws. Look through the bore and center the target in the bore. Adjust the windage and elevation screws to position the reticle on the center of the target. For windage adjustment, turn the windage adjustment screw clockwise to move the point of impact right and counterclockwise to move the point of impact left. In the same manner, adjust the elevation by turning the elevation adjustment screw clockwise to lower the point of impact and counterclockwise to raise the point of the impact. If a large amount of adjustment is required to align the reticle, make approximately one-half of the windage correction, then approximately one-half of the required elevation correction. Finish by applying the balance of windage and elevation correction.

If you can't see through the bore then it will be necessary to use some type of bore-sighting device. When using a bore-sighting device, follow the instructions provided with the device.

NOTE: If your mounting system allows for adjustment of the scope, the gross adjustments should be made in the mount and then the final adjustments made with the scope's internal adjustment system.

FOR FINGER-ADJUSTABLE SCOPES: remove the protective caps and rotate the finger-adjustable windage and elevation turrets to center the reticle in the same manner as described above.

SECTION 5: ZEROING

DANGER: IF A BORE SIGHTING COLLIMATOR OR ANY OTHER BORE OBSTRUCTING DEVICE WAS USED; IT MUST BE REMOVED BEFORE PROCEEDING. AN OBSTRUCTION CAN CAUSE SERIOUS DAMAGE TO THE GUN AND POSSIBLE PERSONAL INJURY TO YOU AND OTHERS NEABY.

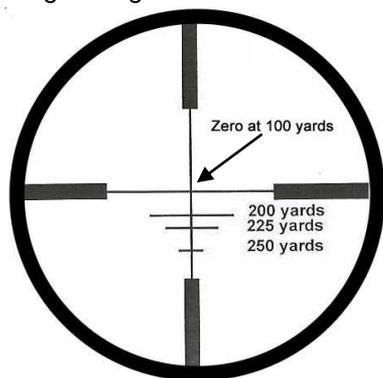
The zero range will depend on your hunting conditions. In general, if most of your shots will be at short range, zero-in at 100 yards. But, for long-range shooting at big game, most experienced shooters zero-in about three inches high at 100 yards. If the scope has parallax adjustment set it to the range to the target. Set variable-power scopes to the heist power. From a rested

position, fire three rounds at the target. Observe the center of the points of impact on the target and adjust the windage and elevation screws as needed to bring the point of aim to the desired relationship to the points of impact. The point of impact moves in the direction indicated on the adjustment and by the amount indicated. Repeat as necessary.

Each click of the adjustment changes bullet impact at 100 yards by the amount indicated on the windage and elevation adjustments. The adjustments are calibrated in minutes of angle. One minute of angle is very close to 1 inch at 100 yards. To calculate the click value at distances other than 100 yards, use the following formula: divide the distance (number of yards) by 100. Then multiply this number by the click value stated on the windage and elevation adjustments. This will tell you the actual click value of the scope at that distance. For Example: your range is 200 yards. Divide 200 by 100 and that equals 2. Multiply the $\frac{1}{4}$ minute indicated on the adjustments by 2 and the adjustment at 200 yards is $\frac{1}{2}$ inch per click. For 400 yards, you would multiply $\frac{1}{4}$ by 4 and that would give 1 inch per click and so on. Once the zeroing of the rifle is completed, you need to put the windage and elevation caps back to protect the zeroing from moving.

SECTION 6:TB-ML39X40 SCOPE POINT-OF-IMPACT CHART

For each of the bullet groups and velocity ranges listed, a .50 caliber fast-twist bore in-line muzzle-loaded rifle is first sighted "dead on" with the primary crosshair. The information shared here will give today's muzzleloading hunter an idea of where these bullets and velocities will impact the target with each of the lower three cross-bar reticles. Every rifle shoots a little differently, due to actual bore size, quality of the rifling, the barrel length and differences in modern plastic sabots and bullets. It is imperative that the shooter/hunter sight his/her rifle in with a favorite big game load, then spend some time at the range to determine the exact distance where the rifle, load and 3-9x40mm *Leatherwood HPML* scope prints the bullet being shot. As you will notice in the following chart, the higher the *ballistic coefficient* of the bullet the flatter the trajectory and the greater the application of this scope at longer ranges.



ML-TB39X40 SCOPE RETICLE

In addition to the primary crosshair, the reticle has three lower short crossbars that provide reticles for shooting at longer ranges. The positions of these additional reticles were determined by thousands of rounds fired with today's more popular sabot muzzleloading bullets at a wide range of velocities.

With a high ballistic coefficient 250 grain polymer tipped spire-point bullet, shot at 1,950 to 2,000 f.p.s., this reticle can be sighted “on” at 100 yards, and the lower crossbars will print the load “on” at 200, 225, and 250 yards.

High Ballistic Coefficient Saboted Bullets

Weight Range: 240 to 260 grains

Bullet Design: Spitzer or Spire-Point

Ballistic Coefficient Range: .210 to .240 (i.e. Hornady SST, Barnes TMZ, Harvester ML Scorpion PT Gold)

Zero: 100 Yards

1st Crossbar	2nd Crossbar	3rd Crossbar
Velocity: 1,925 to 2,000 f.p.s. 200 yds. +/- 2"	225 yds. +/- 2"	250 yds. +/- 2"
Velocity: 1,850 to 1,925 f.p.s. 190 yds. +/- 2"	210 yds. +/- 2"	225 yds. +/- 2"
Velocity: 1,775 to 1,850 f.p.s. 180 yds. +/- 3"	200 yds. +/- 3"	215 yds. +/- 3"
Velocity: 1,675 to 1,750 f.p.s. 165 yds. +/- 3"	180 yds. +/- 3"	195 yds. +/- 3"

Weight Range: 285 to 300 grains

Bullet Design: Spitzer or Spire-Point

Ballistic Coefficient Range: .230 to .260 (i.e. Hornady SST, Barnes Spit-Fire, Harvester ML Scorpion PT Gold)

Zero: 100 Yards

1st Crossbar	2nd Crossbar	3rd Crossbar
Velocity: 1,900 to 1,950 f.p.s. 185 yds. +/- 2"	210 yds. +/- 2"	225 yds. +/- 2"
Velocity: 1,825 to 1,900 f.p.s. 180 yds. +/- 2"	200 yds. +/- 2"	215 yds. +/- 2"
Velocity: 1,725 to 1,800 f.p.s. 175 yds. +/- 3"	190 yds. +/- 3"	205 yds. +/- 3"
Velocity: 1,625 to 1,700 f.p.s. 165 yds. +/- 3"	180 yds. +/- 3"	195 yds. +/- 3"

Low Ballistic Coefficient Saboted Bullets

Weight Range: 240 to 260 grains

Bullet Design: Blunt Hollow-Point or Flat-Point

Ballistic Coefficient Range: .145 to .160 (i.e. Hornady XTP, Harvester ML Scorpion)

Zero: 100 Yards

<u>1st Crossbar</u>	<u>2nd Crossbar</u>	<u>3rd Crossbar</u>
Velocity: 1,925 to 2,000 f.p.s. 185 yds. +/- 2"	205 yds. +/- 2"	215 yds. +/- 2"
Velocity: 1,850 to 1,925 f.p.s. 175 yds. +/- 3"	190 yds. +/- 3"	200 yds. +/- 3"
Velocity: 1,775 to 1,850 f.p.s. 165 yds. +/- 3"	180 yds. +/- 3"	190 yds. +/- 3"
Velocity: 1,675 to 1,750 f.p.s. 160 yds. +/- 3"	175 yds. +/- 3"	180 yds. +/- 3"

Weight Range: 285 to 300 grains

Bullet Design: Blunt Hollow-Point or Flat-Nose

Ballistic Coefficient Range: .180 to .195 (i.e. Hornady XTP, Harvester ML Scorpion)

Zero: 100 Yards

<u>1st Crossbar</u>	<u>2nd Crossbar</u>	<u>3rd Crossbar</u>
Velocity: 1,900 to 1,950 f.p.s. 180 yds. +/- 2"	195 yds. +/- 2"	210 yds. +/- 2"
Velocity: 1,825 to 1,900 f.p.s. 175 yds. +/- 3"	190 yds. +/- 3"	200 yds. +/- 3"
Velocity: 1,725 to 1,800 f.p.s. 170 yds. +/- 3"	180 yds. +/- 3"	190 yds. +/- 3"
Velocity: 1,600 to 1,700 f.p.s. 160 yds. +/- 4"	170 yds. +/- 4"	180 yds. +/- 4"

Note: When using lower reticles for longer range shooting, the *HPML* scope needs to be at 9x. The variations in points of impact are due to the variations in actual bullet speeds and the aerodynamics (ballistic coefficient) of a particular bullet. Knowing the exact range when taking a longer shot is critical. We recommend that for all shooting beyond 150 yards that today's

muzzleloading hunter rely on a laser rangefinder. And before ever shooting at game at extended ranges, that the hunter needs to invest the adequate time shooting at those ranges to know exactly how a muzzle-loaded rifle and load performs at those distances. This chart is provided ONLY to give shooters an idea of where the indicated ranges of bullet designs, weights and ballistic coefficients will print shots when using the lower crossbar reticles. Determining the exact range for each is the responsibility of the individual muzzleloading hunter. The majority of the data in this chart was collected shooting a 26" barreled .50 caliber Knight DISC Extreme, by Toby Bridges.

SECTION 7: TYPICAL .50 CALIBER SABOTED MUZZLELOADER BULLET DROP

Zero: 100 Yards

Bullet	Velocity	At 200 Yards	At 250 Yards
250 gr. Hornady XTP-HP	1,700 f.p.s.	20"	49"
300 gr. Hornady XTP-HP	1,650 f.p.s.	24"	56"
250 gr. Hornady XTP-HP	2,000 f.p.s.	17"	44"
300 gr. Hornady XTP-HP	1,900 f.p.s.	19"	47"
260 gr. Harvester ML Scorpion HP	2,000 f.p.s.	15"	41"
260 gr. Harvester ML Scorpion PT Gold	2,000 f.p.s.	8.5"	30"
250 gr. Barnes TMZ	1,950 f.p.s.	10.5"	33"
290 gr. Barnes TMZ	1,900 f.p.s.	11.5"	35"
250 gr. Hornady SST	1,950 f.p.s.	10.8"	34"
300 gr. Hornady SST	1,900 f.p.s.	12.5"	37"
260 gr. Precision Rifle Dead Center	1,950 f.p.s.	7.8"	20"
300 gr. Precision Rifle Dead Center	1,900 f.p.s.	9.5"	26"

SECTION 8: MAINTAINING YOUR RIFLESCOPE

Your scope, though amazingly tough, is a precision instrument that deserves reasonable cautious care. Do not attempt to disassemble or clean the scope internally. The external optical surfaces should occasionally be wiped clear with the lens cloth provided, or an optical quality lens paper. Keep the protective lens covers in place when the scope is not in use. Remove any external dirt or sand with a soft brush so as to avoid scratching the finish. Wipe the scope with a damp cloth, following with a dry cloth. Then

go over the metal portions of the scope with a silicon treaded cloth in order to protect the scope against corrosion.

Store the scope in a moisture-free environment. Avoid storing the scope in the hot place, such as the passenger compartments of the vehicles on hot days. The high temperatures could adversely affect the lubricants and sealants. A vehicle's trunk, a gun cabinet or a closet is the preferable. Never leave the scope where direct sunlight can enter either the objective or the eyepiece lens. Damage may result from the concentration (burning glass effect) of the sun's rays.

WARNING: UNNECESSARY RUBBING OR USE OF A COARSE CLOTH MAY CAUSE PERMANENT DAMAGE TO LENS COATINGS.

SECTION 9 LIMITED LIFETIME WARRANTY

Hi-Lux, Inc. warrants its products against defects arising from faulty workmanship or materials for the lifetime of the original purchaser. Any attempt to alter, dismantle or change the standard specifications of the products, will make this warranty null and void. This warranty is made to the original purchaser of the goods and applies only to the products purchased in the United States. The warranty is not transferable. Warranty obligation is limited to the repair or replacement of any product returned to **Hi-Lux, Inc.**, and which are determined by the manufacturer to adversely affect the satisfactory operation of the product. It should be noted that on items containing an etched glass reticle that the occasional appearance of some small particles is common and not a warrantable repair. We only have one-year warranty for the electronic components that are contained on the products. **Hi-Lux, Inc.** reserves the right to request proof of purchase and purchase date. To guarantee warranty service, the enclosed warranty form must be completed and returned within ten (10) days of purchase to establish all warranty rights between you, the original purchaser, and **Hi-Lux, Inc.** We assume no liability for any incidental or consequential damages or incidental expenses. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusion may not apply to you. No warranties are made or are authorized to be made other than those expressly contained herein. To file a claim under this warranty, please contact the Customer Service Department of **Hi-Lux, Inc.** at (310) 257-8142 to obtain a Return Authorization number (RA number). After receiving your RA number, please mark the number on the outside of the package, enclose the defective item with a brief explanation of the problem. Please be sure to include your name, address and phone number. Failure to obtain a RA number may result in either refusal upon delivery, or lengthy delays for warranty repairs and service required for the item returned to us. All returns are to be shipped prepaid direct to:

Attn.: Warranty & Service Dept.

Hi-Lux , Inc.

3135 Kashiwa Street

Torrance, CA 90505

Tel: (310) 257-8142, **Fax:** (310) 257-8096

E-Mail: service@hi-luxoptics.com

including a check or money order in the amount of \$15 to cover postage and handling. In the event of a non-warranty repair, you will receive an estimate prior to any work being done. This warranty gives you specific legal rights and you may have other rights, which vary from state to state. As defined by federal law, this is a limited warranty.

Dear Customer:

THANK YOU for Purchasing **Leatherwood HPML Scope**. When we started to work on the idea of scopes for muzzleloaders, I knew that I was weak in this area. So I called Ken Ramage the editor of Gun Digest and asked him who was a real expert and without hesitation, he said Toby Bridges. I have since found that Ken really knew what he was talking about.

Toby's knowledge and experience span not just the old guns. His many years of working at Dixie Gun Works gave him a depth of knowledge of antique arms that always amazes me. But Toby is foremost a user of muzzleloaders of all kinds and really is on the cutting edge of modern muzzleloading. Despite all the fanfare by many people who claim that modern inliners have the performance of a modern rifle, the reality is that today's Inliner is only now approaching the accuracy and lethality of the bullet rifles of the 1840's.

The main difference is that the modern muzzleloaders are easier to load and scope. A lot of the credit for these improvements in bullets and sabots has to go to Toby Bridges. Through his writing and photography he shares a lot of that knowledge that has changed muzzleloading forever.

When we decided we were ready to build our new scope line using the proven internal technology of the legendary **ARTII**, I asked Toby if he would design the scope the way he wanted it to be. The result is a one-inch tube 3x to 9x that has a simple reticle with easy to use multiple aiming points.

In recognition of one the men who created modern muzzleloading, we are honored to call this scope the Toby Bridges model.

Jim Leatherwood