



# Leatherwood / Hi-Lux Optics

## PENTALUX™ TAC-V SERIES



## RIFLESCOPE INSTRUCTIONS

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**CONGRATULATIONS!** You have just purchased the advanced Hi-Lux Optics PentaLux TAC-V variable rifle scope. Designed for the serious long range tactical shooter or hunter, the PentaLux "Five-Ratio" magnification technology of the TAC-V models provides a wider range of power settings... without adding bulk or length. These new compact models feature more precise MIL adjustment, with each click moving bullet impact just 0.1 MIL at 100 meters. The new TAC-V models also incorporate a powerful illuminated etched glass ranging reticle, with ranging scales and hold-over aiming marks in both MRAD and MOA.

The TAC-V rifle scope series is constructed with premium quality lenses, polished to photographic clarity. Fully multi-coated with our proprietary DiamondTuff14 technology, the lenses provide the sharpest and brightest sight picture possible. When you combine the remarkable clarity of the DiamondTuff glass with the convenient Fast Focus Eye Adjustment, you are ensured a crystal clear sight picture and reticle that offer you quick target acquisition and ranging capabilities. The side parallax adjustment turret (on models with more than 10x magnification) keeps targets down range in clear focus. Still, superb clarity and accuracy don't mean a thing if your rifle optics can't withstand the rugged requirements demanded by today's modern shooter. Leatherwood/Hi-Lux is committed to providing today's sportsman or sportswoman with the optical gear that meets such hard use demands. The rigid aluminum scope tube is finished with the Leatherwood/Hi-Lux Optics PermaCoat soft luster blue-black finish that's practically impervious to wear, ensuring this scope will maintain its good looks through years of hard service. Our "Tri-Center" spring tension technology provides consistent, crisp and positive adjustment turret clicks.

Here is a riflescope that's built to take on anything that Mother Nature can dish out. You can pay more, a lot more, but why? With a Leatherwood/Hi-Lux Optics PentaLux riflescope, you get Quality, Precision and Ruggedness at a price that doesn't break your budget. You simply cannot buy a brighter, more precise or tougher built scope...anything else is second best! If you're looking to take your shooting to the professional level, you need one of these scopes on your rifle setup. All PentaLux Scopes are Waterproof – Fogproof – Shockproof – Recoilproof. Your scope is backed by a DIAMONDTUFF LIFETIME WARRANTY. Congratulations on choosing the finest scope in its class, thanks for choosing a Hi-Lux Optics TAC-V rifle scope.

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# SECTION 1: SPECIFICATIONS AND BASIC DEFINITIONS

## (1) PentaLux TAC-V SERIES SPECIFICATIONS :

Model	Power	Obj. (m m)	F.O.V. @ 100 Yds (Feet)	Eye Relief (Inch)	Length (Inch)	Weight (O.Z.)	Exit Pupil Range in Variable mm	Elevation Windage Total adj. (MOA)	Tube (mm)
TAC-V210X42	2x-10x	42	49 -10	4	12	21.4	18-4	90MOA	30mm
TAC-V410X50	4x-20x	50	26 -8.9	4	14.5	27.9	9.6-2.44	70MOA	30mm

The click adjustments for both Elevation and Windage are 0.1 MRAD. One full revolution is 8 MRAD (26.8 MOA). The scope comes with the turret covers, flip-open lens covers, and the power ring throw lever.

## (2) BASIC DEFINITIONS:



**A. RHEOSTAT; B. POWER RING WITH THROW LEVER; C. ELEVATION ADJUSTMENT KNOB; D. WINDAGE ADJUSTMENT KNOB; E. TRI-CENTER COIL SPRING; F. SIDE FOCUS PARALLAX KNOB; G. EYEPIECE & FAST FOCUS.**

## SECTION 2: EYEPIECE FOCUSING AND RHEOSTAT

Hold the scope between three to four inches from your eye and look through the eyepiece in a well lit environment. Aim at a featureless, flat area such as a wall or the open sky. If the reticle is not sharply defined at first glance, you just need to turn the **Fast Focus**



eyepiece in or out for adjustment until the reticle appears in sharp focus.

The PentaLux Tac-V is equipped with a red or green illuminated MRAD and MOA ranging reticle. The rheostat has 11-positions for varying the brightness of reticle illumination. For best results in a low light situation, we recommend that you set the brightness as low as possible while maintaining clear vision of the reticle. The “NV1, NV2, and NV3” positions are designated for night vision use. The settings 4 and 5 are for low light illumination. The settings 6 to 9 are the intermediate brightness settings. The Max position is the brightest setting. There are two “Off” positions that are located at 0° and 180° positions. There is a protruded rib at the main “0” off position to help the shooter locate the main off position in low light. The two off positions will ambidextrously allow shooters to power off the illumination, from both the right and left side. The rheostat is located at 45° left of the top of the eyepiece. The battery compartment, located underneath the cap on the rheostat knob, accepts standard CR2032 3V lithium coin batteries. When replacing batteries, be sure to place the CR2032 battery with “+” side facing up and retighten the cover.

**WARNING: NEVER LOOK DIRECTLY AT THE SUN WITH THIS PRODUCT, OR EVEN THE NAKED EYE. YOU COULD PERMANENTLY DAMAGE YOUR EYES.**

### **SECTION 3: MOUNTING**

To achieve the best accuracy possible from your rifle, the scope must be mounted properly. You should use a high-quality mount with bases designed to fit your particular rifle. To mount the scope:

- A. The scope should be mounted as low as possible without touching either the barrel or the receiver.
- B. 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.
- C. Rotate the scope in the rings until the reticle pattern is perpendicular to the bore. Check to make sure that the elevation turret is on top.
- D. Tighten the mounting screws. We recommend that you tighten the rings to no more than 15 Inch Pounds of torque.

**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 UPPER AND LOWER HALVES OF THE RINGS. BE SURE THAT THE SCOPE IS MOUNTED FAR ENOUGH FORWARD. ITS REARWARD MOTION MAY INJURE THE SHOOTER WHEN THE RIFLE RECOILS.**

## **SECTION 4: PRE-ZEROING**

Pre-zero sighting can be done either manually, or with a bore-sighting device.

To bore sight manually,

- A. 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.
- B. If your scope has parallax adjustment, set it for the range to the target.
- C. Set the variable-power scope to its lowest power.
- D. With the firearm in a rested position, remove the caps from the windage and elevation screws.
- E. Look through the bore and center the target in the bore and adjust the elevation and windage turrets to position the reticle on the center of the target.
- F. For windage adjustment, turn the windage turret clockwise to move the point of impact right and counterclockwise to move the point of impact left.
- G. For elevation adjustment, turning the elevation turret clockwise to lower the point of impact and counterclockwise to raise the point of the impact.
- H. If you require a large amount of adjustment to align the reticle, we recommend that you make approximately one-half of the windage correction, then approximately one-half of the required elevation correction.
- I. Finish by applying the remaining 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 external adjustment, we recommend that you make the majority of adjustment externally in the mount. Save the internal scope adjustment for fine tuning your shot placement.

Remove the protective caps and rotate the windage and elevation turrets to center the reticle in the same manner as described above.

## SECTION 5: ZEROING

This turret has MRAD adjustment. Each click is 0.1 MRAD. After you zero the scope you can loosen the three M2 Allen screws to re-index the turret markings to your zero.

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

The zero range will depend on your shooting/hunting conditions.

- A. In general, if most of your shots will be at short range, zero your scope at 100 yards. For long-range shooting at big game, most experienced shooters zero-in about three inches high at 100 yards.
- B. If the scope has parallax adjustment set it to the range to the target. Set variable-power scopes to the highest power.
- C. From a rested position, fire three rounds at the target.
- D. 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 by the amount indicated.
- E. Repeat as necessary.
- F. Once the zeroing of the rifle is completed, you can replace the windage and elevation turrets caps to prevent losing your zero.

Each click of the adjustment changes bullet impact at 100 meters by the 1 cm. To calculate the click value at distances other than 100 meters, use the following formula:  $\frac{\text{Distance\_in\_meters}}{100} * \text{adjustment\_click\_value\_at\_100m}$ . This will give you the actual click value of the scope at that distance.

For Example: Your range is 200 meters. Actual click value at 200 meters =  $\frac{200 \text{ meters}}{100} * 1 \text{ cm} = 2 \text{ cm}$ . Thus, the adjustment at 200 meters is 2 cm per click. For 400 meters, you would multiply 1cm by 4 and that would give 4 cm per click and so on.

Once the zeroing of the rifle is completed, you can re-index the adjustment turrets to your zero by loosening the three screws on the windage and elevation knobs.



**WARNING:** ALL SHOOTING SHOULD BE DONE AT AN APPROVED RANGE, OR SAFE AREA. EYE AND EAR PROTECTION IS RECOMMENDED.

## SECTION 6: PARALLAX CORRECTION (Models Greater Than 10X)

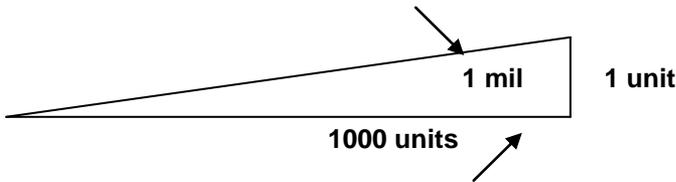
The parallax adjustment is located at left side of the scope. It allows for parallax correction at various user-selected ranges from 25 or less meters up to infinity. To be parallax free, the target must be located at the distance for which the scope is focused. Targets at any other distance will cause parallax. Parallax manifests itself as apparent movement of the reticle against the stationary target.

## SECTION 7: HOW TO USE THE M2TAC RETICLE

### (1) What is a Mil?

1 Mil is a milli-radian or 1/1000 of a radian. It is an angular measurement with the following values:

$$1 \text{ mil} = 1 \text{ milli-radian} = \text{ArcTan}(.001) = 0.0573 \text{ degree} = 3.437 \text{ minutes}$$



How does a conventional mil-dot system work?

By knowing the width of an object in meters and observing the number of mils that the object subtends on the reticle, it is possible to determine the range to the object.

$$\text{Approximate Range} = \frac{\text{Object\_size\_in\_meters} \times 1000}{\text{Mils\_subtended\_by\_the\_object}}$$

### For example:

If the object is 1 meter tall and it fits between the center of 2 mil-dots, then the approximate range is:

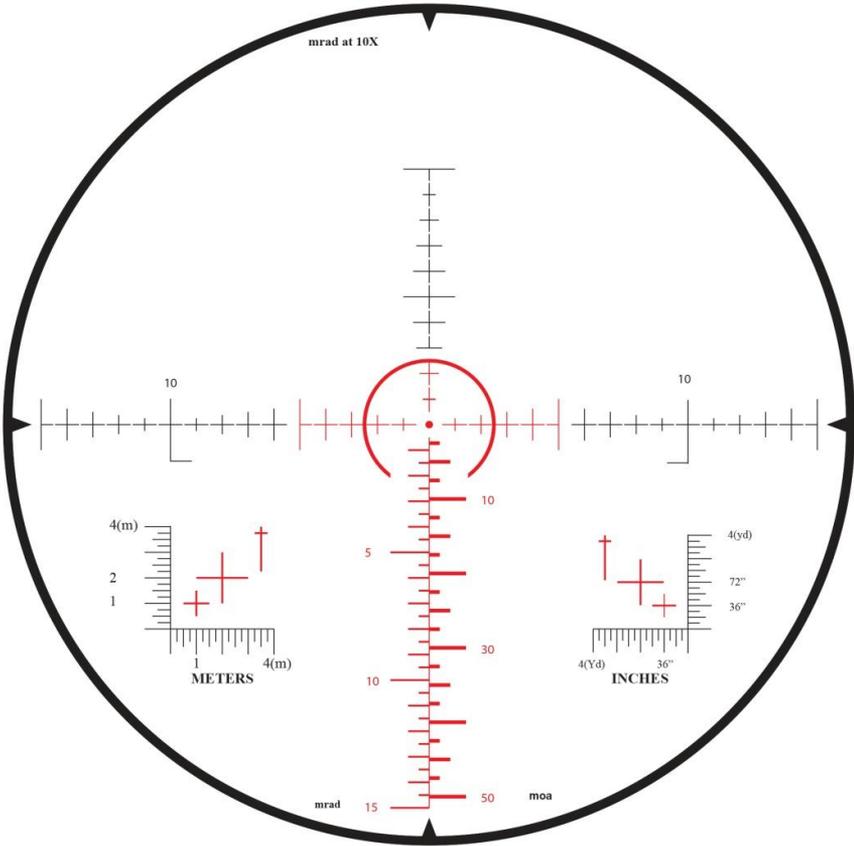
$$\text{Range} = \frac{(1\text{m} \times 1000)}{2 \text{ Mils}} = 500 \text{ meters}$$

If the object is 1.5 meters tall and in the scope it fits between the center of 2 and ½ mil-dots, then the range solution is as:

$$\text{Range} = \frac{1.5\text{m} \times 1000}{2.5\text{Mils}} = 600 \text{ meters}$$

Tense tactical or big game hunting conditions can make it difficult to quickly approximate distance by miling. For this reason we have designed the Auto-Ranging Reticle with MRAD and MOA scales at the lower vertical axis.

**(2) PentaLux M2-TAC Illuminated Ranging Reticle:**

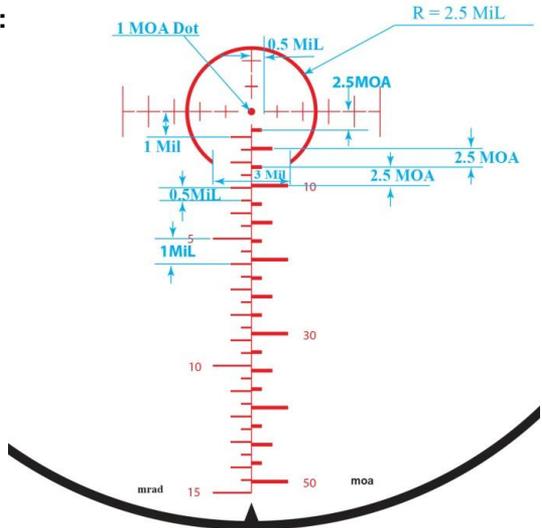


This is the **PentaLux M2-TAC (MOA/MRAD) illuminated** ranging reticle. It comes in either red or green illumination. This reticle has a true MRAD relationship at 10X.

The opening between each mil indicates the half MRAD mark. There are two ranging scales in lower two quadrants of the reticle. The lower left scale is in meters. The lower right scale is in inches.

The left side of the lower vertical axis is marked by graduations of 0.5MRAD. Every fifth MRAD is labeled up to 15 Mil. The right side of the lower vertical axis is marked by graduations of 2.5 MOA. The center dot measures 1 MOA. The open horseshoe has a radius of 2.5 Mil from the center. The brackets under the horizontal 10mil mark are used to frame a 19" target (0.5 meter) at 25 meters. The ranging capacity for the PentaLux TAC-V 2-10X42 and 4-20X50 scopes are from 200 meters to 1000 meters and 400 meters to 2000 meters, respectively. The approximated range is determined by multiplying the current magnification setting by 100m. For example, if you framed a known sized target within the framing brackets at 8X, you are approximately at 800 meters away from the target. Please refer to Section 8 to learn how to range using the ranging scale in detail.

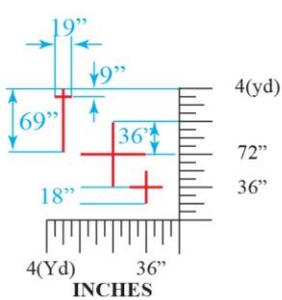
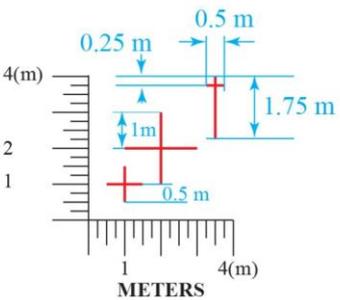
**a) Center Reticle:**



**b) Ranging Left and Right Scales:**

Left Scale :

Right Scale :

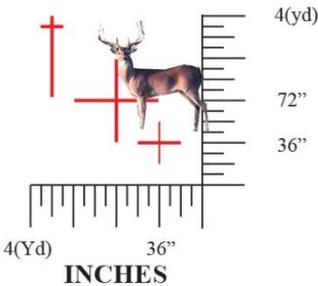
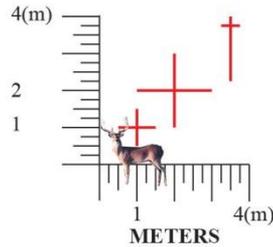


# SECTION 8: HOW TO RANGE WITH THE M2-TAC RETICLE

## (1) How to use the ranging scales in the reticle to estimate the range:

When you locate your target in your scope's field of view and are within the ranging capacity of the rifle scope, overlay the appropriate framing mark onto the target. Then, adjust the magnification ring until the size of the object overlain on the ranging scale matches the known size of the target. Once this is done, you can calculate the approximate distance to the target by multiplying 100 to your magnification. If you frame the target in meters, then your approximate range will be in meters. If you frame the target in inches, then your approximate range will be in inches/yards. Lastly, you can use either MRAD or MOA holdover lines on the lower vertical axis to compensate for your rifle's trajectory at the approximated range. With some practice, this procedure becomes one fluid motion...Frame, Aim and Shoot!

**Example 1:** You locate an adult buck in your scope, at an unknown distance. You know that the distance from the top of buck's torso to the bottom of the chest cavity, the "kill zone," is about 1/2 meter. Frame the 1/2 meter buck torso between the 1/2 meter open brackets in the reticle, and adjust the magnification until the chest cavity fits the open brackets. Simply multiply the magnification (indicated on the power ring) by 100 to calculate the approximate range in meters.



**Example 2:** You see a 72" (length) deer at an unknown distance. You locate it with your scope, overlay the 72" in the horizontal axis of the framing scale, and adjust magnification until the deer's approximate length corresponds to the reading on the scale. Multiply the current magnification (indicated on the power ring) by 100 to determine the approximate range in yards.

**Example 3:** A nine-inch paper target is set at an unknown distance within the PentaLux Tac-V's ranging capacity (200 meters to 1000 meters for 2-10X42 scope or between 400 meters to 2000 meters for 4-20X50 scope). Locate it in your scope, overlay the 9" in the reticle, and adjust the magnification until the scale approximately matches the size of the target. Simply multiply the current magnification (indicated on the power ring) by 100 to calculate the approximate range in yards.

Please remember this rule that if you frame the inches target, you will get the distance in yards. If you frame the meter target, you will get the distance in meters.

## **SECTION 9: MAINTAINING YOUR RIFLESCOPE**

Your scope, though amazingly tough, is a precision instrument that deserves reasonable and cautious care. For normal maintenance:

- A. Do not attempt to disassemble or clean the scope internally.
- B. The external optical surfaces should occasionally be wiped clear with the lens cloth provided or an optical quality lens paper.
- C. Keep the protective lens covers in place when the scope is not in use.
- D. Remove any external dirt or sand with a soft brush so as to avoid scratching the finish.
- E. Wipe the scope with a damp cloth, followed by a dry cloth.
- F. Then go over the metal portions of the scope with a silicon treaded cloth in order to protect the scope against corrosion.
- G. Store the scope in a moisture-free environment.
- H. Avoid storing the scope in a hot place, such as the passenger compartments of a vehicle on hot days. The high temperatures could adversely affect the lubricants and sealants. A vehicle's trunk, a gun cabinet or a closet are the preferred storage locations.
- I. Never leave the scope where direct sunlight can enter either the objective or the eyepiece lens. Damage may result from the concentration of the sun's rays (burning glass effect).

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

## SECTION 10: DIAMONDTUFF LIFETIME WARRANTY

Hi-Lux, Inc. warrants its products against defects arising from faulty workmanship, or materials, for the lifetime of the original purchaser. **Normal wear and tear is not covered under this warranty policy.** 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 including all international sales, and applies only to the products purchased through our authorized distributors or dealers. The international warranty is subject to approval from our authorized distributor or us directly. **The warranty is not transferable. Warranty obligation is limited to the repair or replacement of any product returned to Hi-Lux, Inc. that is determined by the manufacturer to have defects arising from faulty workmanship or materials that 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 a 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 scopes are to be shipped prepaid direct to Hi-Lux, Inc. and must include a check or money order in the amount of \$21 to cover return postage and handling, regardless of purchase date.

**Attn.:** Warranty & Service Dept.

**Hi-Lux, Inc.**

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Instagram: @leatherwoodoptics

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.



*We lead the way™*