



## **Leatherwood / Hi-Lux Optics**



### **RIFLESCOPE INSTRUCTIONS**

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**CONGRATULATIONS!** You have just purchased one of our Professional Tactical scopes - one of the best scopes built today. The Leatherwood / Hi-Lux Optics SPG series scopes have been designed and built to take the guesswork out of long range shooting.

The Mil Dot BDC reticle provides the shooter with a very reliable means for determining the distance of the target, while precisely positioned bullet drop compensating holdover marks allow for taking shots out to 600 yards. These holdover short-bar aiming marks have been calibrated for either .308 Winchester or .223 Remington cartridges and work well with many other cartridge ballistics.

Built by Leatherwood/Hi-Lux Optics, the SPG series Tactical models are high quality riflescopes, built with a tough one-piece 1" diameter high tensile strength aluminum tube, and very precise 1/4" click adjustment tactical/target turrets. The scope also features a handy side parallax adjustment and **Fast Focus Eye Adjustment** for easily keeping distant targets in sharp focus. All lenses have been meticulously polished to photographic quality for exceptional clarity and light gathering capability, then **DiamondTuff** fully multi-coated for maximum light transmission, which is especially critical during low light conditions - either during a tactical situation or during a hunt of a lifetime. These scopes are as bright, clear and sharp as rifle optics come.

Whether you use this scope for serious tactical shooting...on a long-range big game hunting rifle...or for hunting varmints, it is destined to become one of your favorite riflescopes. Like all other **All Terrain Riflelescope** (ATR) models, this scope has been designed and constructed to be Waterproof – Fogproof – Shockproof – Recoilproof.

Here is a riflescope that's built to take on anything that Mother Nature can dish out. With your Leatherwood/Hi-Lux riflescope, you get Quality, Precision and Ruggedness at a price that doesn't break your budget. All SPG Series models are built to meet the wants and needs of American shooters.

The SPG series Tactical scope comes with a 2-year warranty.

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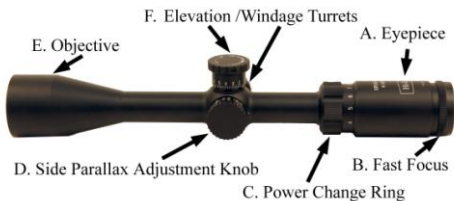
## SECTION 1: SPECIFICATIONS, BASIC DEFINITIONS AND ACCESSORIES

### (1) SPG SERIES PROFESSIONAL TACTICAL SCOPE SPECIFICATIONS:

Model	Power	Obj. (mm)	F.O.V. @ 100 Yds (Feet)	Eye Relief (Inch)	Length (Inch)	Weight (O.Z.)	Exit Pupil Range In Variable mm	Tube
SPG416 X44MD	4x-16x	44	24.1-6.3	3	11.5	16.5	8-6	1"
SPG624 X44MD	6x-24x	44	17-4.3	3	16	19	6-2.3	1"
SPG832 X50MD	8x-32x	50	11.8-2.6	3	16.3	26.5	6.4-1.6	30mm

All air-glass surfaces are fully multi-coated using high technology to maximize the light transmission. The Mil-Dot BDC reticle can be easily used for ranging and quick hold over shots. The click adjustments for both Elevation and Windage are  $\frac{1}{4}$  MOA for both models. The scopes are built with a one-piece tube. The extended sunshade and flip-up lens covers are available for all the models as accessories. They are sold separately.

## (2) BASIC DEFINITIONS:



**A. EYEPIECE; B. FAST FOCUS; C. POWER CHANGE RING; D. SIDE PARALLAX ADJUSTMENT KNOB; E. OBJECTIVE; F. ELEVATION AND WINDAGE ADJUSTMENT TURRETS;**

## (3) ACCESSORIES OF THIS SCOPE

There are two accessories available for this scope. They are sold separately.

### (1) The Extended Sunshade:

There is a screw-on type sunshade available for this scope. You can screw this sunshade into the front objective lens as needed. The threads in the front



objective of this scope can only accept our screw-on type sunshade.

## (2) The Flip-Open Lens Covers:

Two-piece flip-open covers come as a set for this scope. The larger one is for the front Objective. The smaller one is for the E.P. for the rear lens.



Flip-Open Lens Covers

## SECTION 2: EYEPIECE FOCUSING AND SIDE PARALLAX ADJUSTMENT

### (1) Eyepiece Focus Adjustment

Hold the scope about three or four inches from your eye and look through the eyepiece at a flat, featureless, brightly lit area



such as a wall or open sky. If the reticle is not sharply defined instantly, you need to turn the quick focus eyepiece in or out for adjustment until the reticle appears in sharp focus.

## (2) Side Parallax Adjustment



### Side Parallax Adjustment

The SIDE parallax adjustment knob allows for parallax correction at various user-select ranges from 25 yards or less, up to infinity. To be parallax free, the target must be located at the distance for which the scope is focused. A target at any other distance will cause parallax. Parallax manifests itself as apparent movement of the reticle against the stationary target. The Leatherwood/Hi-Lux proprietary SIDE Parallax Adjustment is easily accessible.

**WARNING:** NEVER LOOK 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 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. 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.
- C. Rotate the scope in the rings until the reticle pattern is perpendicular to the bore and the elevation turret is on top.
- D. 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 TOP AND BOTTOM 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. Set the variable-power scope to low power.
- C. With the firearm in a rested position, remove the caps from the windage and elevation screws.
- D. Look through the bore and center the target in the bore and adjust the windage and elevation screws to position the reticle on the center of the target.
- E. For the windage adjustment, turn the windage adjustment screw **clockwise** to move the point of impact **left** and **counterclockwise** to move the point of impact **right** as the arrow on the turret indicates.
- F. 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.
- G. 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 you're 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 NEARBY.**

The zero range will depend on your hunting conditions.

- A. In general, if most of your shots will be at short range, zero-in at 100 yards. For long-range shooting at big game, most experienced shooters zero-in two to three

inches high at 100 yards.

- B. Set the scope magnification 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 and by the amount indicated.
- E. Repeat as necessary.
- F. Once the zeroing of the rifle is completed, you can re-index the windage and elevation turrets by loosening the three Allen screws. Line up the zero with the zero line. Then tighten the three screws.

Each click of the adjustment changes bullet impact at 100 yards by  $\frac{1}{4}$  MOA, which is the amount indicated on the windage and elevation adjustments. The adjustments are calibrated in Minutes of Angle (MOA). 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 1/4 MOA indicated on the adjustments by 2 and the adjustment at 200 yards is 1/2 inch per click. For 400 yards, you would multiply 1/4 by 4 and that would give 1 inch per click and so on.

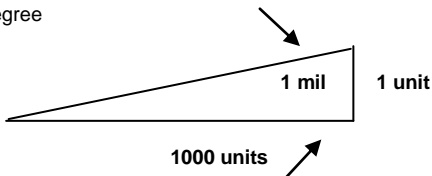
**WARNING:** ALL SHOOTING SHOULD BE DONE AT AN APPROVED RANGE, OR SAFE AREA. EYE AND EAR PROTECTION IS RECOMMENDED.

## SECTION 6: RETICLE IN USE

### (1) What is a Mil?

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

1 mil = 1 milli-radian =  $\text{ArcTan}.001 = 3.44$  minutes = 0.57 degree



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. Dividing the number of mils subtended by object by the actual width of the object in meters, then dividing that result into 1000 meters determines the range. Or use the formula directly as:

Range = Object size in meters x 1000 / Mills subtended by the object

For example:

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

$$\text{Range} = 1 \times 1000/2 = 500 \text{ meters}$$

If the object is 1.5 meters tall and in the scope it fits between the center of 2 and  $\frac{1}{2}$  mil-dots, then the range solution is as:

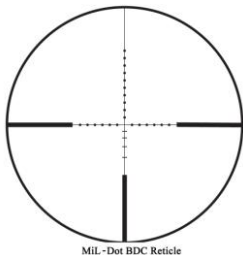
$$\text{Range} = 1.5 \times 1000/2.5 = 600 \text{ meters}$$

Doing the math necessary can become a problem under certain situations. For this reason we added the BDC lines.

## **(2) Mil-Dot BDC Reticle:**

The Mil-Dot BDC reticle provides the shooter a very reliable means for determining the distance

of the target, while precisely positioned bullet drop compensating holdover marks allow for taking shots out to 600 yards. These hold over short-bar aiming marks have been calibrated for either .308 Winchester



or .223 Remington cartridges and work well with many other cartridge ballistics.

As you can see in the reticle, at the top, left and right there are mil dots. The true mrad relationship is under 10 X. On lower vertical portion there are four BDC hold over lines. After you zeroed the scope at 100 yards, the 1<sup>st</sup> BDC line is for 200-yard shot. The 2<sup>nd</sup> line is for 300 yards. The 3<sup>rd</sup> BDC line is for 400 yards. The 4<sup>th</sup> BDC is for 500 yards. The top of the heavy post is for 600 yards. Here is the chart of hold over value for each BDC line. You can use the following chart to compare with many other cartridges' drop to find out that how each BDC line would work for your bullet.

Range (Yards)	Holdover Value		Meaning of each BDC Holdover Line
	MOA	MIL	
100	0	0	Zero the scope at 100 yards.
200	3.0	0.85	The 1 <sup>st</sup> BDC Hold over line is the impact point at 200 yards.
300	6.0	1.8	The 2nd BDC hold over line is the impact point for 300 yards.
400	10.0	2.8	The 3 <sup>rd</sup> BDC hold over line is the impact point for 400 yards.
500	15.0	4.2	The 4th BDC hold over line is the impact point for 500 yards.
600	23.0	6.4	The top of the heavy post is the impact point for 600 yards

## **SECTION 7: 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 treated 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 is 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 8: WARRANTY**

**Hi-Lux, Inc.** warranties its products against defects arising from faulty workmanship, or materials, for two years 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.**, 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 returns are to be shipped prepaid direct to **Hi-Lux, Inc.** including a check or money order in the amount of \$19 to cover postage and handling fee.

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

**Hi-Lux, Inc.**

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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™*