



Leatherwood® / Hi-Lux™ Optics



THE SPG14X24MD RIFLESCOPE INSTRUCTIONAL MANUAL

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CONGRATULATIONS! You have just purchased one of our SPG1-4X24 rifle scopes - one of the best scopes built today. The Leatherwood / Hi-Lux Optics SPG series have been designed and built to take the guesswork out of long range shooting.

The Mil Dot BDC reticle of the SPG Series 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. The “short-bar” holdover aiming marks have been calibrated for either .308 Winchester or .223 Remington cartridges.

Manufactured by Leatherwood/Hi-Lux Optics, the SPG Series riflescope models are durable riflescopes, built with a solid one-piece 30mm diameter high tensile strength aluminum tube, and positive 1/2" click adjustment tactical/target turrets. The scope also features *Fast Focus Eye Adjustment* for easily adjusting the scope to your eyesight. All lenses have been meticulously polished to photographic quality for exceptional clarity and light gathering capability, then fully multi-coated with our proprietary *DiamondTuff* coating for maximum light transmission, which is especially critical in low light conditions during the hunt of a lifetime. These scopes are as bright, clear and sharp as rifle optics come.

Whether you use this scope for target 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 Riflescope* (ATR) models, these scopes have 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 ATR models are built to meet the specifications and needs of American hunters and shooters alike.

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SECTION 1: SPECIFICATIONS AND BASIC DEFINITIONS

(1) 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 (mm)
SPG14X24MD	1x – 4x	24	95 -26	Min. 3	10.3	15	11 - 6	30mm

All the air-glass surfaces are fully multi-coated using our proprietary *DiamondTuff* coating to maximize the light transmission. The **Elevation** and **Windage** click adjustment is 1/2 MOA at 100 yard \approx 1/2 inch at 100 yard \approx 14mm at 100 meter. A Mil-Dot BDC reticle is used in this model. The details of the reticle are illustrated in the Section 8. There is at least 150 MOA of elevation and windage adjustment – 75 MOA in all directions from optical/mechanical center.

(2) BASIC DEFINITIONS:



A. Eyepiece; **B.** Fast Focus Diopter Eye Adjustment; **C.** Rheostat; **D.** Power Ring **E**.** Magnification Throw Lever **F.** Windage Turret **G.** Elevation Turret **H.** Objective Lens **I.** Tri-Center Coil Spring

**** Magnification throw lever is an optional accessory**

Warning: The Tri-Center Coil Spring has been preset at the factory for the positive click turret adjustment. Please do not adjust it yourself. Tampering with the Tri-Center Coil Spring will likely cause damage to erector unit.

SECTION 2: EYEPIECE FOCUSING



Hold the scope about three to 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 just need to turn the fast focus eyepiece inwards or outwards until the reticle appears in sharp focus.

SECTION 3: ELEVATION AND WINDAGE TURRETS

The elevation and windage turrets have 0.5 MOA per click. One full-turn on the elevation turret can give you 30 MOA adjustment. Once you find the zero for your rifle scope, you can re-index turrets by loosening up the 3 Allen set screws. Next, rotate the MOA Index Mark Ring so that 0 mark on the ring corresponds to your scope's actual zero. You can also re-index the windage turret. Be sure to retighten the Allen screws after re-indexing the turret.



SECTION 4: MOUNTING

To achieve the best possible 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. We recommend a torque setting of 15 in lbs for the scope rings.

- 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 RINGS AND THE SCOPE. BE SURE THAT THE SCOPE IS MOUNTED FAR ENOUGH FORWARD. ITS BACKWARD MOTION MAY INJURE THE SHOOTER WHEN THE RIFLE RECOILS.

SECTION 5: HOW TO RESET THE SCOPE TO OPTICAL / MECHANICAL CENTER

The elevation and windage adjustments on all new Leatherwood®/Hi-Lux™ scopes are preset to optical center/mechanical center at the factory. **For all the new scopes you do not need to reset the scope to optical center.** However, if you are mounting a scope that was previously used on another rifle, you should recenter the scope first before you zero the scope again. Centering the **Elevation** and **Windage** adjustments to the scope optical and physical center not only will help you obtain maximum range of travel for the adjustments, but also to save you time when re-zeroing your scope. If the erector unit inside the scope is off center, the **Elevation** and **Windage** adjustments will not give you the equal travel in all directions. To regain the full adjustment travel, you need to recenter the adjustments as followings:

- (1) Turn the **Windage** adjustment all the way to the **Right** as the arrow indicates on the turret to the point that it stops moving.
- (2) Turn the **Elevation** adjustment all the way **UP** to the **TOP** as the arrow indicates on the turret to the point that it stops moving too.
- (3) Then turn the **Windage** adjustment all the way back in the other direction **Left** till it stopped. Counting the clicks or hash marks while you are turning the adjustment back. Remember the total clicks or the hash marks.
- (4) Moving the **Windage** adjustment back to **Right** half the amount of the clicks or hash marks. This is the position that has the **Windage** centered.
- (5) Then you can repeat the above (3) and (4) two procedures to reset the optical and physical center for **Elevation** adjustment too.
- (6) This is position that the erector unit inside the scope is centered. The **Windage** now in the scope is at optical and physical center. We hope you can zero the scope on your rifle near to this **Windage** optical center position. Then you will maximize your Elevation Adjustment.

SECTION 6: 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, loosen the two locking screws on both **Windage** and **Elevation**. Then you can turn the windage and elevation turrets freely.
- D. Look through the bore and center the target in the bore and adjust the **Windage** and **Elevation** turrets to position the reticle on the center of the target.
- E. For the **Windage** adjustment, turn the **Windage** adjustment turret **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 turret **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 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 adjustment of the scope, the gross adjustments should be made in the mount and then the final adjustments will be made with the scope's internal adjustment system.

SECTION 7: 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. If you want to use the special ranging reticle to compensate

the drop, you need to zero the SPG scope at 100 yards. The hold over value in the Ballistic Data Compare Chart is based on the 100-yard zeroing. The reticle subtensions to frame the target or estimate the holdover is true at the magnification 4X.

- B. From a rested position, fire three rounds at the target.
- C. 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 turrets and by the amount indicated.
- D. Repeat as necessary.
- E. Once the zeroing of the scope is completed, you can re-index the MOA index mark ring to line up with the zero mark and then tighten the three locking screws on both **Elevation** and **Windage** turret.

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 (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 $\frac{1}{2}$ - the "click value" indicated on the adjustment turrets by 2 and the adjustment at 200 yards is 1 inch per click. For 400 yards, you would multiply $\frac{1}{2}$ - the "click value" by 4 and that would give 2 inches per click and so on. Once the zeroing of the scope is completed, you can reset the zero marking per the instruction by tightening the screws on the windage and elevation turrets in place.

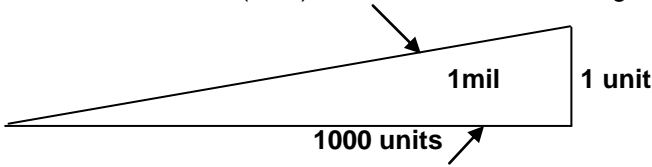
WARNING: ALL SHOOTING SHOULD BE DONE AT AN APPROVED RANGE, OR SAFE AREA. EYE AND EAR PROTECTION IS RECOMMENDED.

SECTION 8: 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 = $\text{ArcTan}(.001) = 3.44 \text{ minutes} = 0.57 \text{ degree}$



How does a conventional mil-dot system work?

If you know actual size of an object in meters or yards, you can observe the number of mils that the object subtends on the reticle. Then, it is possible to determine the approximate range to the object. The range can be determined by multiplying the known size by 1000, and dividing the result by the number of Mils subtended.

Range = Object size in meters x 1000 / Mils 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 ½ mil-dots, then the range solution is as:

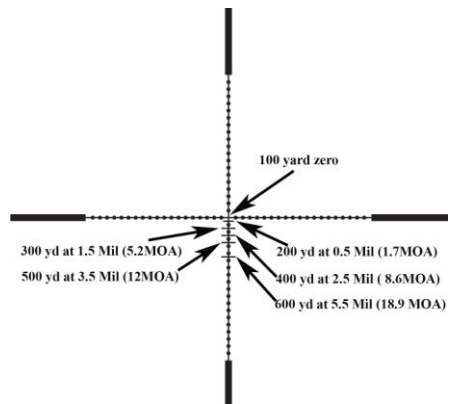
$$\text{Range} = 1.5 \times 1000/2.5 = 600 \text{ meters}$$

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

(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, bottom, left and right there are mil dots.



The true Mil relationship is at 4X. On lower vertical portion there are also five BDC hold over lines, which will be used at 4X. After you zero the scope at 100 yards, the 1st BDC line is for 200 yard shot. The 2nd line is for 300 yards. The 3rd BDC line is for 400 yards. The 4th BDC is for 500 yards. The 5th BDC

Range (Yards)	Holdover Value		Meaning of each BDC Holdover Line at 4X
	MOA	MIL	
100	0	0	Zero the scope at 100 yards.
200	1.7	0.5	The 1 st BDC Hold over line is the impact point at 200 yards.
300	5.2	1.5	The 2 nd BDC hold over line is the impact point for 300 yards.
400	8.6	2.5	The 3 rd BDC hold over line is the impact point for 400 yards.
500	12.0	3.5	The 4 th BDC hold over line is the impact point for 500 yards.
600	18.9	5.5	The 5 th BDC hold over line is the impact point for 500 yards.

line is for 600 yards. Here is the chart of hold over values 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.

SECTION 9: SPG14X24MD SCOPE ACCESSORIES

(1) Scope Extended Lever (Item No. : SMA-EL)

This is an optional accessory for SPG14X24MD. This kit includes three components: Bushing Screw #1; Screw #2; Extended Lever.



The installation instructions are as followings:

- (a) Remove the existing small top covering screw on the power change ring. **Do not unscrew the screw underneath the covering screw. This underneath screw is connected to the erector unit. Unscrewing the underneath screw will damage the scope.**



- (b) Place Bushing Screw # 1 into the screw hole and tightened it down until it is flush with the curved surface.
- (c) Place the Extended Lever on top of the curved surface. Make sure the small arch of the Extended Lever matches up properly with the curved surface on the bump.
- (d) Place Screw #2 through the extended lever and tighten it into the bushing screw #1.

(2) The Flip-Open Lens Covers:

Optional Flip-Open lens covers are available as an accessory. The larger one is for the front Objective. The smaller one is for the E.P. for the rear lens.



(3) AR One-Piece Mount (AR-30MT)

This Aluminum one piece mount is designed for AR-Platform rifles. It goes on any Picatinny rail. The mount has 30mm rings with 1" inserts.



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, gun cabinets and closets 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: WARRANTY

Hi-Lux, Inc. warrants its products against defects arising from faulty workmanship, or materials, for two years of the **original purchaser** from the date purchased the product. 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.**, which 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 or register it online at www.hi-luxoptics.com/warranty 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 list the number on the enclosed statement inside of the package, which will describe 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 \$21 to cover postage and handling fee.

Attn.: Warranty & Service Dept.

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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™