OPM 007 REV C

Operator's Manual

SpecterOS 3.4x by ELCAN

Lightweight Day Sight
3.4x Single Field-of-View Optical Sight

This page intentionally left blank.

TABLE OF CONTENTS

This page intentionally left blank.

TABLE OF FIGURES and TABLES

This page intentionally left blank.

CHAPTER 1: GENERAL DESCRIPTION & SPECIFICATIONS

WARNING: Clear and safe the weapon prior to mounting the sight!

1.1 Description

The SpecterOS 3.4x by ELCAN is a fixed 3.4 power, 28mm optical sight that has been designed to engage targets accurately out to a range of 1200 m. The optical sight weights 24 oz (681 g) and is extremely rugged for rough field conditions. The sight has an 0.3" (8.2mm) diameter exit pupil, which provides the shooter with rapid target acquisition. The long 2 ¾" (70mm) eye relief permits ease of use. The SpecterOS 3.4x has a dual purpose reticle suitable for 5.56mm (or equivalent) or 7.62mm (or equivalent) ammunition.

The zeroing adjustment increments in both Azimuth (Windage) and Elevation with each click moves the point of aim by 1 Minute of Angle (MOA) (approximately 1" (25.4mm) at 100 yards (91m)).

The mount is designed to fit to the "Picatinny" rail MIL-STD 1913, by means of a torque limiting knob that ensures that the sight is tightened to the weapon's rail by the clamping force each time, thus ensuring zero repeatability when reattaching the sight.

1.1 Description (continued)

Figure 1-1: Long eye relief

1.1 Description (continued)

Left Side View

Right Side View

Figure 1-2: Selected Overall Views

1.2 Technical Specifications (nominal)

Specification	
Fixed Magnification	3.4x
Field of View	8°
Objective Lens Dia.	28 mm (1.1”)
Exit Pupil	8.2 mm (0.3”)
Eye Relief	70mm (2 ¾”)
Zeroing Range	±60 MOA
Movement Per Click	1 MOA
Mount Compatibility	MIL-STD-1913
Length	175mm (7”)
Reticle Pattern	BDC (Bullet Drop Compensating) Illuminated

Table 1-1: Technical Specifications (nominal)

1.2 Technical Specifications (nominal)

Specification	
Illumination	LED (650nm)
Operating Temp	-40 to +65 °C (-40 to 140 °F)
Storage Temp	-40 to +85 °C (-40 to 180 °F)
Submersion	2 hours @ 20 m (66 FSW)
Battery / Life	DL 1/3 N Min 300 hrs @ max brightness
Finish	Anodized with chemically resistant rubber casing
Mount Attach	Torque Limiting Knob
Weight	680 g (24 oz)

Table 1-1: Technical Specifications (nominal)

1.3 SpecterOS 3.4x Controls and Terminology

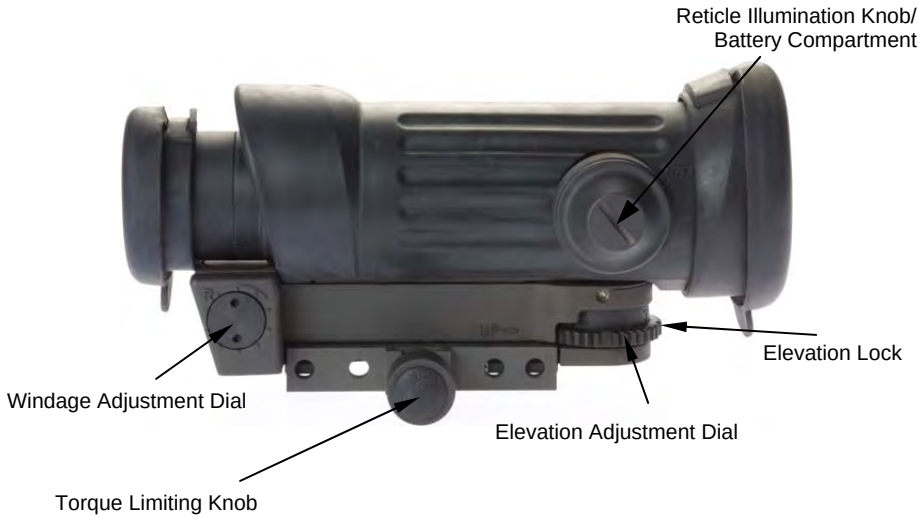


Figure 1-4: Left Side View and Selected Controls

1.3 SpecterOS 3.4x Controls and Terminology

Figure 1-5: Right Side View and Selected Controls

1.3.1 Mount Attachment (Torque Limiting Knob)

The torque limiting knob provides the operator with a fast and easy way to mount the optic without the risk of over torquing. In addition, it allows the operator the ability to secure the sight without the use of additional tools.

1.3.2 Elevation Dial and Lock

The elevation zero dial is located at the lower rear of the mount, and the zero lock (silver tab) is just above the dial. When the lock is in the UP position, the dial may be used to adjust the elevation of the Point of Impact (POI) 1 Minute of Angle (MOA) per click. If the zero lock is DOWN, the zero dial is locked in place and the sight elevation is fixed.

Caution: *To prevent damage, be sure that the lock is fully disengaged before attempting to turn the elevation dial!*

1.3.3 Azimuth/Windage Adjustment Screw

The azimuth adjustment screw is located at the front right side of the mount. Rotating it adjusts the Point of Impact (POI) to the right or left. Each ‘click’ moves the point of impact 1 MOA (approximately 1” (25.4mm) at 100 yards (91m)).

1.3.4 Reticle Illumination Switch

Rotating this knob illuminates the reticle at varying levels of brightness. Reference marks on the housing indicate the **OFF** position.

- Clockwise rotation - illuminates the *ballistic reticle* with 9 intensity levels.

1.3.5 Battery Cap

Located on the Reticle Illumination Switch, the battery cap may be removed by hand by unscrewing it in the counter clockwise direction. The battery cap should only be tightened until snug.

1.3.6 Laser Protection Filter and Anti-Reflection Device (ARD)

An optional Laser protection filter can be attached at the objective or front of the sight by rotating the filter in a clockwise direction until it is finger tight. It is removed by rotating it in a counter clockwise direction.

An optional ARD can be mounted on the sight in the same manner as the laser protection filter and can be fitted without using the filter.

WARNING

- The laser protective filter protects your eyes from being burned by battlefield lasers, but also greatly diminishes the performance of the optic. **When facing enemies who use battlefield lasers, failure to utilize the laser filter could result in the loss of your eyesight from enemy laser beams!**
- The ARD cuts down on reflection from the lens caused by the sun or other sources of ambient light. **Failure to utilize the ARD or take other tactical measures to hide your lens reflection in bright daylight could reveal your position.**

1.4 Safety

1. Ensure the weapon is clear, on safe and pointed in a safe direction while mounting the sight.
2. Ensure sight is secured tightly to the weapon prior to conducting live fire.
3. To avoid injury, ensure that the eye relief has been adjusted to provide a safe distance between your eye and the rear of the sight.
4. Proper zeroing techniques must always be taken prior to using the sight.

CHAPTER 2: PREPARATION FOR USE & INSTALLATION

2.1 Mounting Sight to the Weapon

Installing the optical sight onto the weapon involves the following steps:

- Loosen the torque limiting knob and place the sight on top of the MIL-STD-1913 rail.

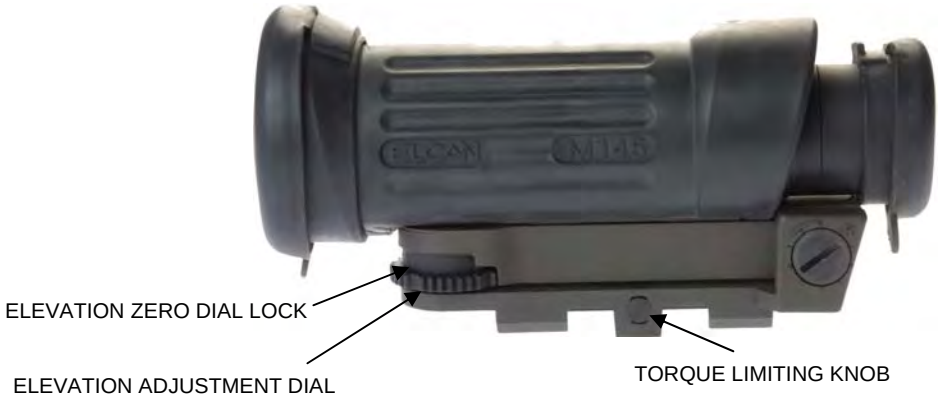


Figure 2-1: Torque lock sight to MIL-STD 1913 rail

2.1 Mounting Sight to the Weapon (continued)

- ‘Cheek’ the weapon in the normal firing position.
- Slide the sight along the rail until the correct eye relief is achieved for the user’s natural head position and a full field of view is visible through the sight. Approximate eye relief is 70mm (2.75”). The field of view tunnel effect should be minimized when the eye relief is adjusted properly, producing a circular and sharp image (see Figure 2-2).
- Note the position of the sight on the rail.

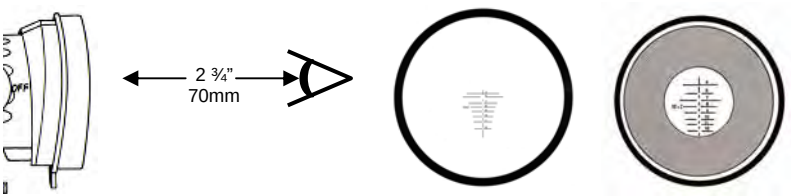


Figure 2-2: Proper Eye Relief

(a) Eye shown at proper 70mm (2.75”) eye relief distance from rear-most glass surface.

(b) Image through sight is sharp and circular when eye is placed at or near the proper relief distance (no scope shadow).

(c) Image through sight when eye is too close or too far from optimal viewing distance.

2.1 Mounting Sight to the Weapon (continued)

- Mount the sight on the rail at the rail slot which is the closest match with the mount slot bar. Apply forward pressure to the sight and rotate the torque limiting knob until 3 clicks are heard/felt/observed. This needs to be reverified and/or retorqued periodically during use.
- Cheek the weapon at the normal firing position. Verify that the sight is approximately 70mm (2.75”) in front of the eye and that a full target picture is observed through the sight.
- Mark the sight’s position on the weapon to be used as a future reference point.

2.2 Zeroing

Zeroing the SpecterOS 3.4x aligns point of aim (center of the reticles’ crosshairs) with the point of impact (POI) of the weapon.

Controls

- Azimuth or windage zeroing uses the azimuth adjustment dial at the front of the mount. Rotate the azimuth zero dial counter-clockwise to move the point of impact to the left; or clockwise to move the impact to the right. Each click of the azimuth dial moves the point of impact by 1 Minute of Angle (MOA) (approximately 1” (25.4mm) at 100 yards (91m)).

2.2 Zeroing (continued)

Using a common item such as a flat-head screwdriver, dog tag, cartridge case or coin, rotate the azimuth dial.

- Elevation zeroing uses the elevation dial at the bottom rear of the mount. *Unlock the zeroing lock* (silver tab) by raising it up as far as it will go. **Be sure that the lock pin at the bottom of the zeroing lock is fully disengaged from the elevation dial.** Adjust the elevation dial as required. Each click of the elevation dial moves the point of impact by 1 MOA (approximately 1" (25.4mm) at 100 yards (91m)). When elevation adjustment is completed, lower the zeroing lock (silver tab) fully *to lock the elevation zero in place*. **Be sure that the lock pin at the bottom of the zeroing lock is fully engaged into the elevation dial.**

A mechanical zero of the sight is recommended so that the optical axis is in rough alignment with the bore axis of the weapon. This will make zeroing easier to accomplish.

To achieve a mechanical zero of the sight, adjust the azimuth dial until the gaps between the mount base and the front fork of the optical housing are equal. Adjust the elevation dial by raising the silver lock and turning the dial until the sight body is parallel to the rail. (See Figure 2-3).

2.2 Zeroing **(continued)**

In addition to setting the sight to its mechanical zero, it is also recommended that the weapon is bore sighted prior to going on the zeroing range. When done correctly, this can save a lot of time and ammunition. Follow the steps below to acquire a good bore sight.

1. Place the weapon on a stable platform that does not allow for any movement (bench rest, cradle, rucksack).
2. Get behind the weapon and along the barrel axis.
3. Choose an identifiable object down range (preferably at about the same range that you will be zeroing at).
4. If possible, look through the barrel and center the object in the bore circle. Otherwise, look parallel to the bore axis and align the weapon with an identifiable object.
5. Look through the optic and locate the identifiable object.
6. Adjust the windage and elevation until the crosshairs are on the object.
7. As necessary, perform safety checks, assemble weapon, follow range procedures and then commence zeroing (first shot should be on paper).

2.2 Zeroing (continued)

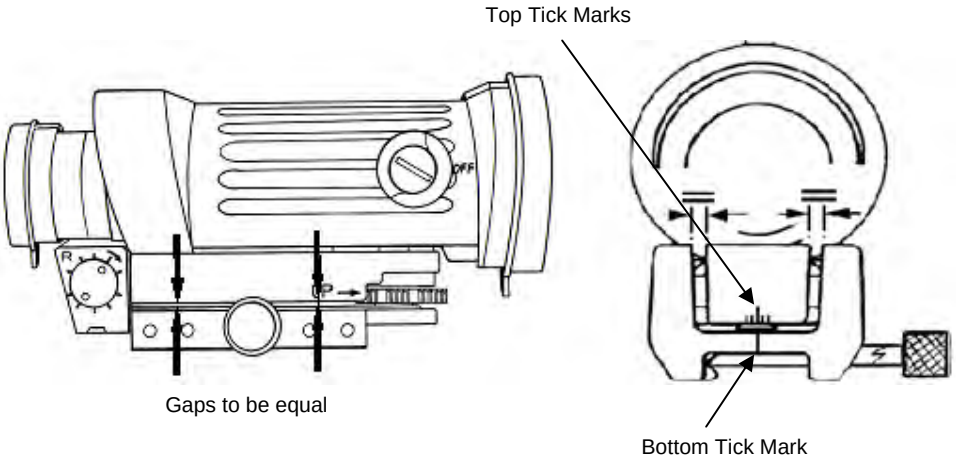


Figure 2-3: Mechanical Zero

2.2 Zeroing (continued)

2.2.1 500m Actual Distance

The preferred method for zeroing the Specter OS 3.4x is an actual distance of 500 meters using the 500 meter reticle line. A recommended practice is to have a spotter present to observe and relay the impact of the rounds. Since this distance is not always available prior to operation the 10 meter zero option is described. For either distance follow the process of zeroing described for the controls and sequence of adjustments.

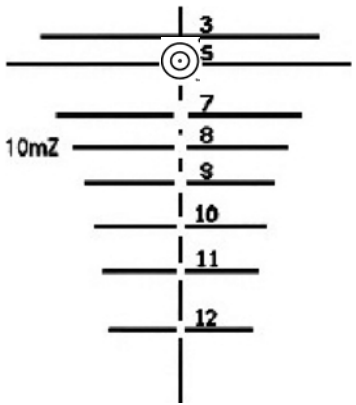


Figure 2-4: 500m Zero Aimpoint

2.2 Zeroing (continued)

2.2.2 10m Range Zeroing

When fired, the bullet crosses at 10 meters prior to crossing again at 800 meters.

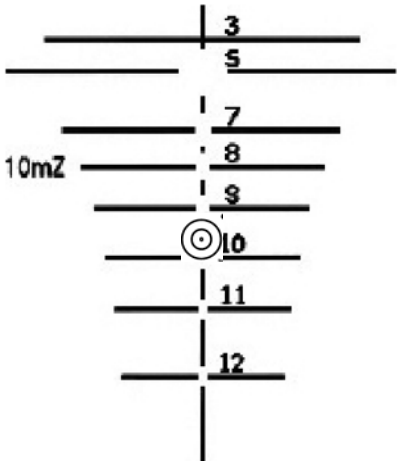


Figure 2-5: 10m Zero Aimpoint

2.2 Zeroing **(continued)**

1. Look through the sight with proper eye relief and align the appropriate aiming point onto the center of the target (Figure 2-4 for 500m zeroing and Figure 2-5 for 10m zeroing).
2. Fire three to five aimed individual rounds (Figure 2-6).
3. Determine the approximate center of the group (Figure 2-7).

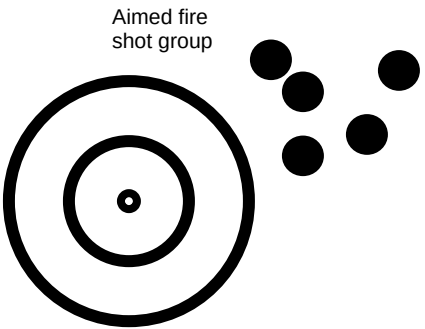


Figure 2-6: Aimed fire shot group

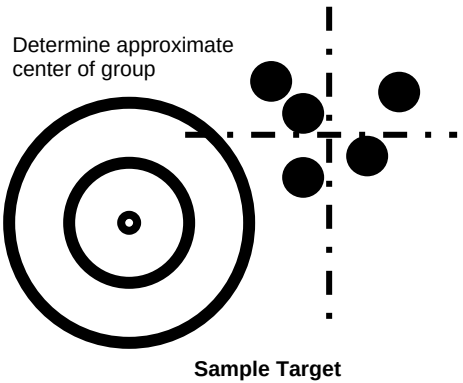


Figure 2-7: Determine approximate center of group

2.2 Zeroing (continued)

4. Measure the amount of movement required left or right (Azimuth or windage) to move the center of the POI group onto the aimpoint in mm or inches (Figure 2-9).
5. To adjust azimuth/windage, each click of the azimuth/windage dial moves the POI by 1 MOA (approximately 1" (25.4mm) at 100 yards (91m)). Direction of POI change is labelled on the housing next to the Azimuth Adjustment Dial. Table 2.1 is provided to convert mm or inches into a 1 MOA click of movement for a given target range. Calculate the number of clicks to adjust the POI to the aimpoint for your target's range.

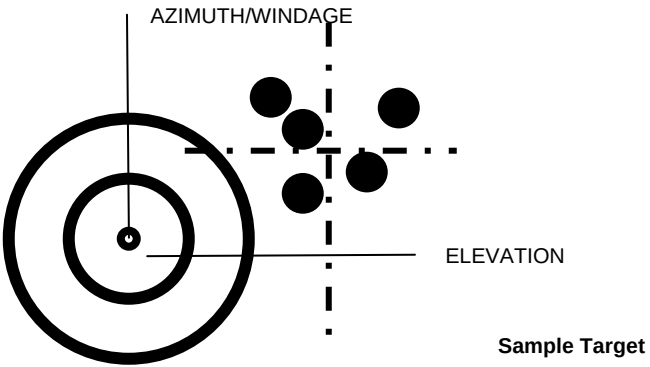


Figure 2-8: Adjust azimuth/windage or elevation

2.2 Zeroing **(continued)**

Calculation for _____ Range to Target:

$$\frac{\text{Measured from } \_\_\_\_\_ \text{ mm or inches}}{\text{Conversion factor for that range}} = \text{clicks to adjust}$$

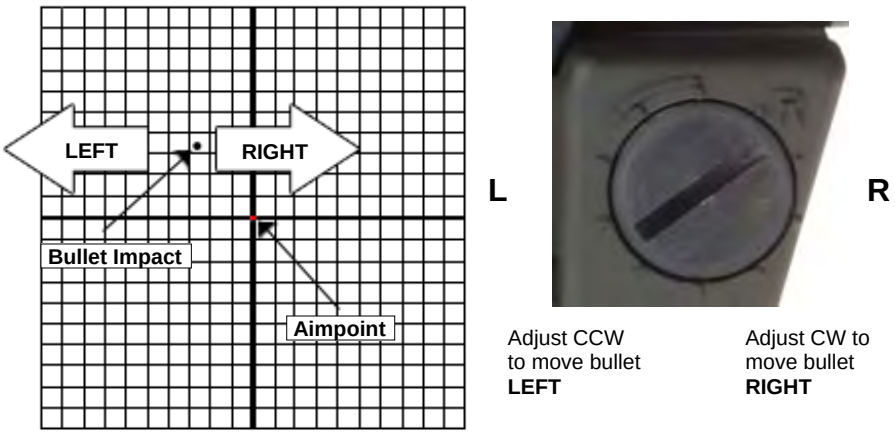


Figure 2-9: Adjust POI - Azimuth/Windage

2.2 Zeroing (continued)

6. Measure the amount of movement required up or down (elevation) to move the center of the POI group onto the aimpoint in mm or inches (Figure 2-10).

7. Each click of the elevation dial moves the POI by 1 MOA (approximately 1" (25.4mm) at 100 yards (91m)). Table 2-1 is provided below to convert mm or inches into a 1 MOA click of adjustment for a given target range. Calculate the number of clicks to adjust the POI to the aimpoint for your target's range.

   To adjust elevation:

   - Push the elevation zero lock (silver tab) up to disengage.
   - When viewing the sight from the rear, rotate the elevation dial Right to Raise - UP the POI or Left to Lower - Down the POI. Direction of POI change is labelled on the sight.

Caution: <u>To prevent damage, be sure that the lock is fully disengaged before attempting to turn the elevation dial!</u>

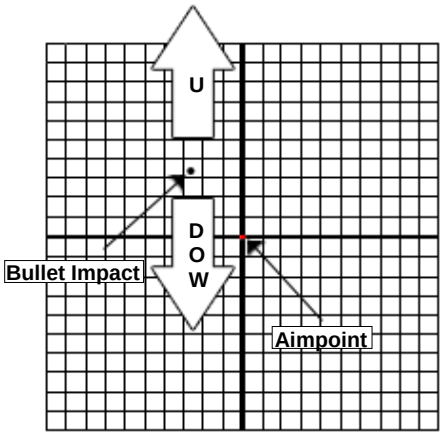
- When elevation adjustment is completed, lower the zero lock fully to lock the elevation zero in place. Be sure that the lock pin at the bottom of the zero lock is fully engaged into the elevation dial.

<u>It is important to ensure that the zero lock is pushed back down to lock the elevation zero dial when zeroing is completed!</u>

2.2 Zeroing (continued)

Calculation for _____ Range to Target:

$$\frac{\text{Measured from } \_\_\_\_\_ \text{ mm or inches}}{\text{Conversion factor for that range}} = \text{clicks to adjust}$$



1. Lift tab to unlock elevation zero.
2. Rotate dial UP/DN to move bullet UP/DN.
3. Lower tab to lock elevation zero.

Figure 2-10: Adjust POI - Elevation

2.2 Zeroing (continued)

Range to Target		Conversion Factor	
Meters	Feet	POI Movement in mm/ click of adjustment	POI Movement in in/ click of adjustment
10	32.8	3	.12
25	82	5	.20
50	164	14	.60
100	328	30	1.20
200	656	58	2.20
300	984	88	3.40
400	1312	116	4.60
500	1640	146	5.80
600	1968	174	6.80
700	2297	204	8.00
800	2625	232	9.20
1000	3280	290	11.40
1500	4920	436	17.20
2000	6560	582	23.00

Table 2-1: POI Movement per click of Adjustment - Azimuth or Elevation

CHAPTER 3: PRINCIPLES OF OPERATION

3.1 Reticle Operation

The vertical gap in the stadia lines is for estimating ranges. The height of the gaps in the stadia lines represents a 60 in high target at the range noted i.e. 5, 7, 8, 9, 10, 11 or 1200 meters (Figure 3-1).

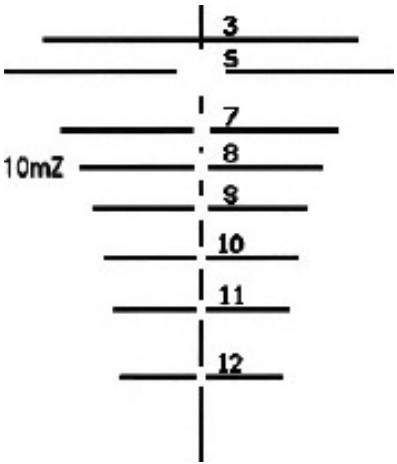


Figure 3-1: The 300 meter - 1200 meter aiming points on the reticle

3.2 Reticle Illumination

The SpecterOS 3.4x is equipped with a variable intensity LED that illuminates the 300, 500, 700 and 800 meter aiming points (Figure 3-2).

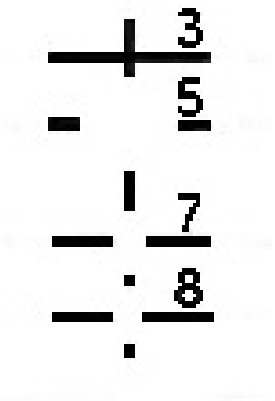


Figure 3-2: The aiming points are illuminated by the variable intensity LED

3.2 Reticle Illumination (continued)

There are 9 different levels of reticle illumination that can be adjusted by turning the rotary switch clockwise. The intensity of the illumination increase the further the switch is turned.

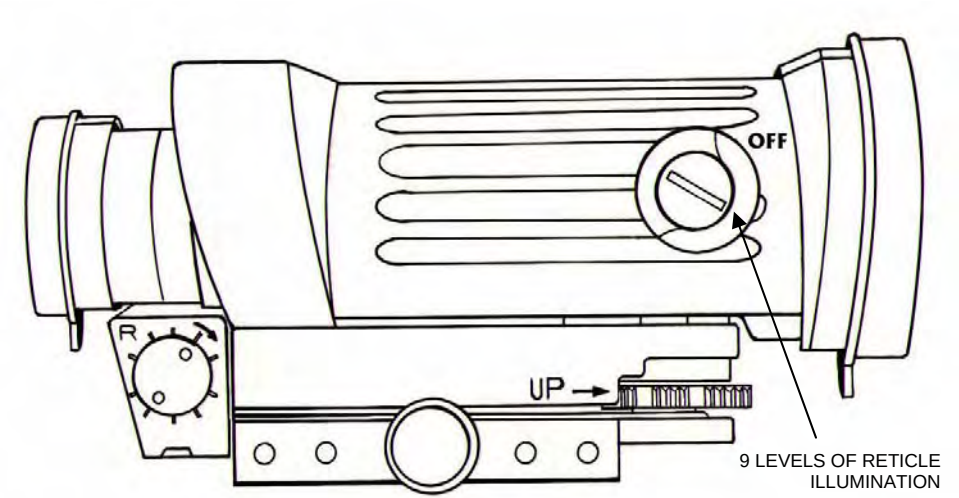


Figure 3-3: Reticle Illumination

CHAPTER 4: MAINTENANCE

The SpecterOS 3.4x is designed for ruggedness and minimal maintenance. The following sections describe recommended maintenance procedures.

4.1 Preventative Maintenance

Prior to use in the field and every week of use, the following routine maintenance is recommended:

- Inspect the sight for missing or damaged parts.
- Inspect the sight for visual obstruction of target image, dust, dirt, pits or moisture on optical surfaces, loose or broken optical elements. If these conditions cannot be corrected by cleaning (see Section 3.2), the sight is unsuitable for use.
- Check battery cap - Ensure that the cap is present. Inspect the threads on the battery housing and battery cap for damage, dirt or moisture. Ensure that the rubber washer is present, free of damage and seated properly. An absent or improperly seated battery cap could lead to a loss of power or shorten battery life.
- Check the reticle - if the reticle does not illuminate, try replacing the battery.
- Verify proper positioning and mounting of the sight (see Section 2.1).

4.2 Changing the Battery

The battery cap is located on the Reticle Illumination Switch. To change the battery:

- Grip the large diameter switch to prevent it from rotating while turning the small diameter section in a counter-clockwise direction.
- Remove the old battery and dispose of it properly according to your regulations.
- Place a new DL1/3N Lithium battery into the compartment with the “-” terminal facing in.
- Replace battery cover (hand tighten only). See Figure 4-1.

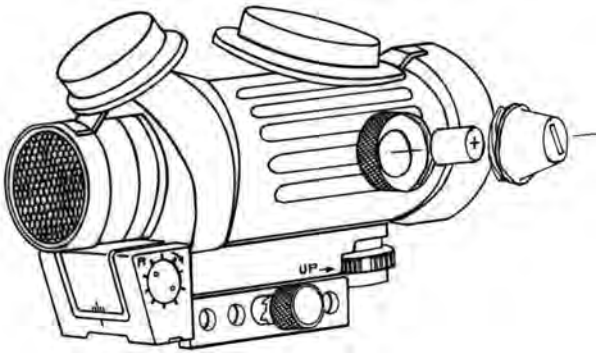


Figure 4-1: Battery Replacement

4.3 Cleaning

Clean the surfaces of the optical sight lenses by using cotton lens paper, microfiber or freshly laundered cheesecloth saturated with alcohol to wipe in a circular motion. Dry the lens by wiping with a clean piece of the same material in the same circular motion from the center outward.

CAUTION

- **DO NOT** use fingers to clean lenses. Apply only a light downward pressure on the cleaning material.
- **DO NOT** immerse the SpecterDR sight in solvents.
- **DO NOT** use hot water to clean the sight.
- If mud or hardened dirt is on or near the lens, flush with cold or warm water and gently wipe with a moistened tissue. Repeat the procedure above if necessary.
- **DO NOT** use compressed air to clean sight.

4.4 Replacement Parts

Description	Raytheon ELCAN Part Number
Battery Cover	901610-001 (Black)
Lens Cover Front Objective	901798-001
Lens Cover Rear Eyepiece	901799-001

Table 4-1: Replacement Parts

4.5 Preparation for Shipment

Clean and dry the sight. It is highly recommended that the lens covers be installed to protect the optical elements during shipment.

1. For shipment while attached to the weapon, make safe and properly stow the weapon.
2. For shipment as an individual sight, reinsert the sight into its original packaging, or equivalent, to cushion against impact and prevent crushing.

Raytheon
ELCAN Optical Technologies

450 Leitz Road, Midland ON
Canada L4R 5B8
Telephone: 011.705.526.5401
www.ELCANsightingsystems.com

Dated January 10, 2011