

OPM 002 REV C

Operator's Manual SpecterDR by ELCAN



1.5-6x Dual Field-of-View Optical Sight

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CHAPTER 1: GENERAL DESCRIPTION & SPECIFICATIONS

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

1.1 Description

The SpecterDR Optical Sight is unique in providing the shooter with two fields-of-view. The first is a 1.5x powered sight with a 16° field-of-view. 1.5x magnification together with a red dot illuminated aiming point provides the shooter with an extremely fast, “both eyes open” target acquisition. The second is a 6x-magnified sight with a field-of-view of 4° and a range-compensating reticle. This magnification provides the shooter with long-range target identification and precision marksmanship capability. These two different fields-of-view are easily and quickly interchanged using a lever mounted on the side of the optical housing.

The SpecterDR provides four ways of targeting for maximum flexibility:

- “CQB” – 1.5x magnification with a 6 MOA illuminated red dot.
- “Long Range Red Dot” – 6x magnification with a 1.5 MOA illuminated red dot.
- “Long Range Crosshair” – 6x magnification with an illuminated, ballistically-compensated reticle.
- “Rain Sight” – Close range rain sight for heavy rain and emergency situations.

1.1 Description (continued)



Figure 1-1: Long eye relief facilitates use with most Rain Sights.

1.1 Description (continued)

A red LED is used to illuminate the reticle. When turned in the counter-clockwise direction, the reticle illumination switch provides five illumination levels of a "red dot" aiming mark. The red dot attracts the eye to the precise point of aim and bullet impact. By rotating the switch in the clockwise direction, five levels of illumination for the whole reticle allows dawn to dusk and night shooting of the sight

'Throw Levers' attach the sight to the MIL-STD 1913 rail. This lever system provides accurate zero retention when the sight is repeatedly removed and replaced on the rail.

The sight can be fitted with an accessory mount that fits on top of the housing to accommodate a 'mini red dot sight'. An anti-reflection device (ARD) and a laser protection filter are also available as options.

1.2 Technical Specifications (nominal)

Specification		
Fixed Magnification(s)	1.5x	6.0x
Field of View	16°	4°
Objective Lens Dia.	42mm (1.65")	
Exit Pupil	7.0 mm (0.275")	
Eye Relief	70mm (2 ¾")	
Zeroing Range	±60 MOA	
Movement Per Click	½ MOA	
Mount Compatibility	MIL-STD-1913	
Length, Width, Height	184mm x 76mm x 76mm (7.25" x 3" x 3")	
Rain Sights	Yes, Modular	
Aiming Point	6 MOA Dot	1.5 MOA DOT

Table 1-2: Technical Specifications (nominal)

1.2 Technical Specifications (nominal - continued)

Specification	
Reticle Pattern	5.56, 7.62 STD or 0.50 cal
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
Mount Attach	Dual Levers
Weight	700 g (1.54 lbs)

Table 1-2: Technical Specifications (nominal)

1.3 SpecterDR Controls and Terminology

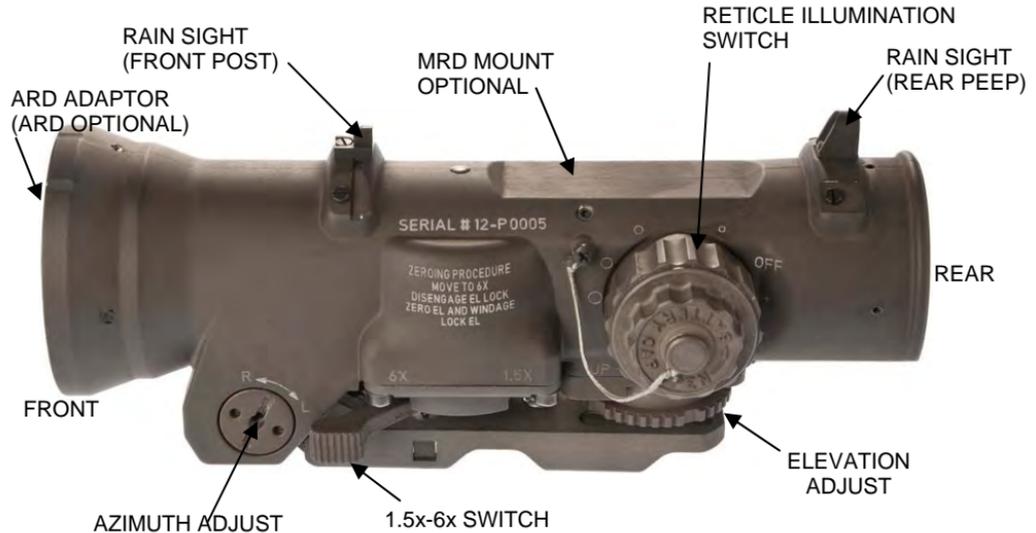


Figure 1-3: Left Side View and Selected Controls

1.3 SpecterDR Controls and Terminology (continued)



Figure 1-4: Right Side View and Selected Controls

1.3 SpecterDR Controls and Terminology (continued)

1.3.1 1.5x - 6x Switch Lever

The 1.5x - 6x Switch Lever allows the marksman to quickly adjust magnification from 1.5x magnification to 6x magnification without re-zeroing or affecting eye relief.

1.3.2 Rain Sights

These sights are intended for use in heavy rain or in emergency defense situations. Rain sights may be located on the SpecterDR in any of three positions. Typically, the center, or 12 o'clock, position is used. Consisting of a 4mm diameter rear sight and a 2mm wide front post sight, the front post is adjustable for left and right (azimuth/windage) zeroing. Moving the post to the right moves the point of impact (POI) to the left. The elevation is fixed to provide a zero at a close shooting range of 35 meters (114 feet).

1.3.3 Mount Attachment 'Throw Levers'

The throw levers are used to secure the sight to the weapon's MIL-STD 1913 "Picatinny" rail. The SpecterDR uses two low profile locking levers that point to the rear when attached. Additional tie/wire wrap points are provided as an additional means to lock the levers in place.

1.3.4 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) ½ 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 SpecterDR Controls and Terminology (continued)

1.3.5 Azimuth/Windage Adjustment Screw

The azimuth/windage adjustment screw is located at the front left side of the mount. Rotating it adjusts the Point of Impact (POI) to the right or left. Each 'click' moves the point of impact ½ MOA (approximately ½" (12.7mm) at 100 yards (91m)).

1.3.6 Reticle Illumination Switch

Rotating this knob illuminates the reticle at varying levels of brightness. Reference marks on the housing indicate the operating positions of the switch. The first two settings from **OFF**, each way, are night vision equipment compatible.

- Counter Clockwise rotation - illuminates the *Red Dot* with 5 intensity levels.
- Clockwise rotation - illuminates the *ballistic reticle* with 5 intensity levels.

1.3.7 Battery Cap and Lanyard

Located on the Reticle Illumination Switch, the battery cap may be removed by hand by unscrewing it in the counter clockwise direction. A lanyard attaches it to the sight housing and prevents loss when changing the battery. A battery cap should only be tightened until snug.

1.3 SpecterDR Controls and Terminology (continued)

1.3.8 Mini Red Dot

A Mini Red Dot sight with a matching mounting pattern can be mounted to the optional MRD Mount on top of the SpecterDR.

1.3.9 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/Eye Relief

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

- Ensure that the sight is in 6x magnification mode (see Section 2.3).
- Loosen the mount throw levers by rotating them out at 90° to the sight and place the sight on top of the MIL-STD 1913 rail.



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

2.1 Mounting Sight to the Weapon/Eye Relief (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.

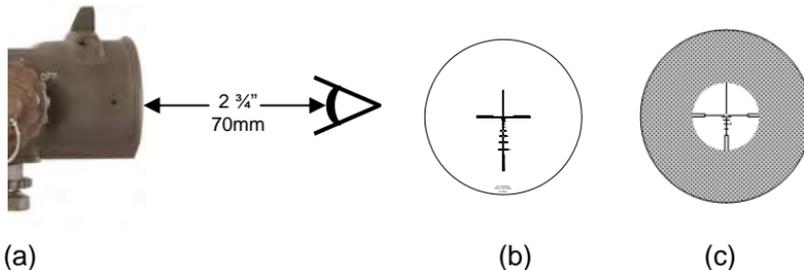


Figure 2-2: Proper Eye Relief

- Eye shown at proper 70mm (2.75") eye relief distance from rear-most glass surface.
- Image through sight is sharp and circular when eye is placed at or near the proper relief distance (no scope shadow).
- Image through sight when eye is too close or too far from optimal viewing distance.

2.1 Mounting Sight to the Weapon/Eye Relief (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 throw levers towards the back of the sight until they are parallel to the sight body.
- 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.
- For extra mounting security, the mount provides slots to accommodate plastic or wire tie wraps so that the levers can be locked into their closed position.
- Mark the sight's position on the weapon to be used as a future reference point.

2.2 Zeroing

Zeroing the SpecterDR aligns point of aim (center of the reticles' crosshairs) with the point of impact (POI) of the weapon.

NOTE: Zeroing should be conducted at the highest magnification as well as the longest range for the given conditions.

2.2 Zeroing (continued)

Controls

- Azimuth or windage zeroing uses the azimuth adjustment dial at the front of the mount. Rotate the azimuth zero dial clockwise to move the point of impact to the left; or counter-clockwise to move the impact to the right. Each click of the azimuth dial moves the point of impact by $\frac{1}{2}$ Minute of Angle (MOA) (approximately $\frac{1}{2}$ " (12.7mm) at 100 yards (91m)).

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 $\frac{1}{2}$ MOA (approximately $\frac{1}{2}$ " (12.7mm) 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)

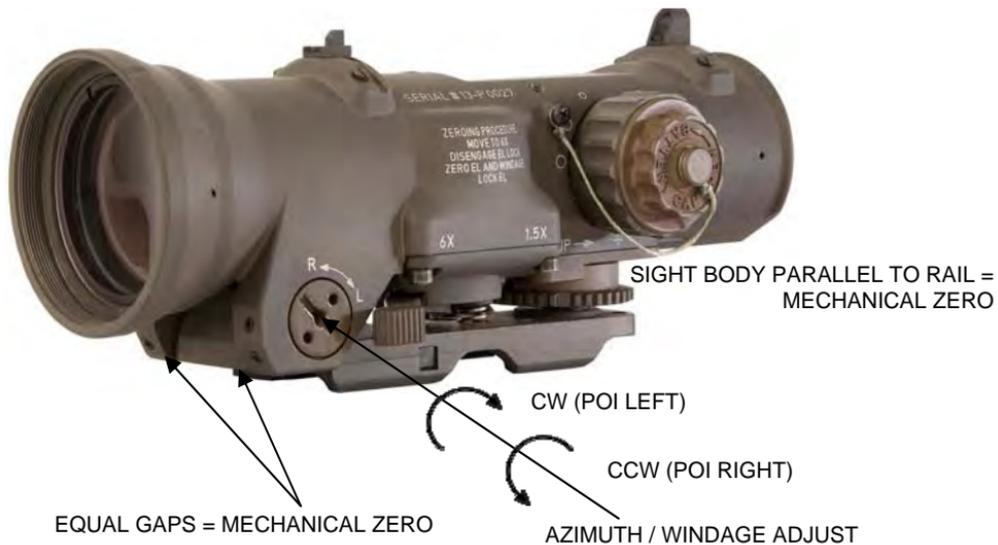


Figure 2-3: Azimuth/Windage Adjusts

2.2 Zeroing (continued)

Zeroing must be performed at the highest magnification (6x). The recommended distance is at 100 meters! However, a 25 meter zero will enable fall of shot to be registered on a target. It is recommended that the marksman fires three to five round groups and make adjustments based upon the geometric center of those groups.

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

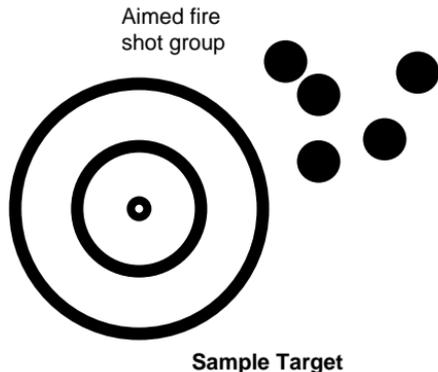


Figure 2-4: Aimed fire shot group

2.2 Zeroing (continued)

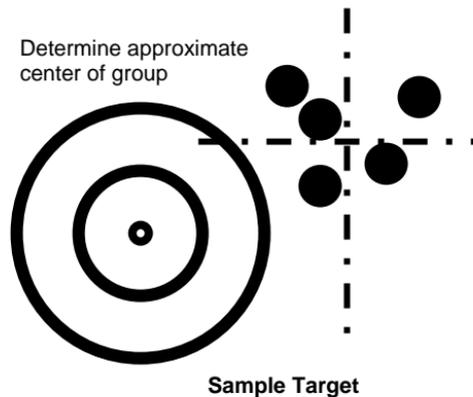


Figure 2-5: Determine approximate center of group

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 2-6).
5. To adjust azimuth/windage, each click of the azimuth/windage dial moves the POI by $\frac{1}{2}$ MOA (approximately $\frac{1}{2}$ " (12.7mm) 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 $\frac{1}{2}$ 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.

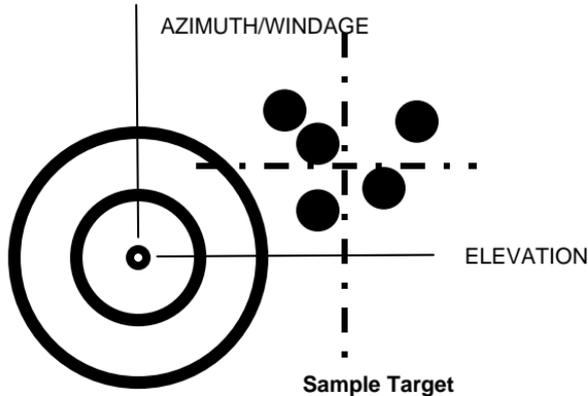


Figure 2-6: Adjust azimuth/windage or elevation

2.3 Zeroing (continued)

Calculation for _____ Range to Target:

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

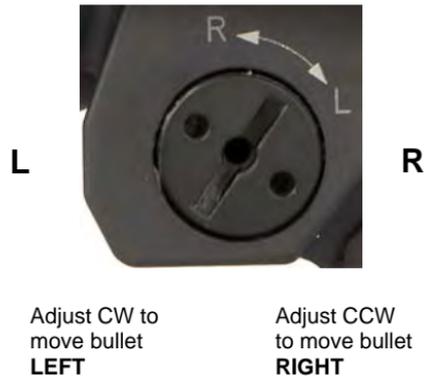
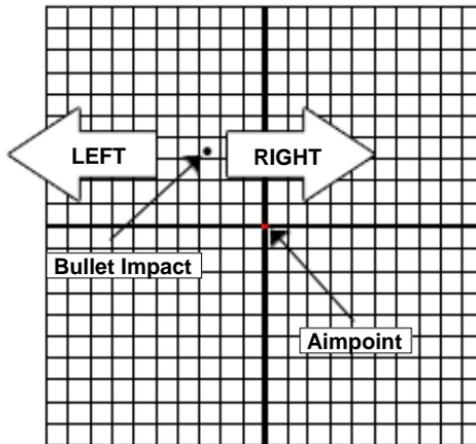


Figure 2-7: Adjust POI - Azimuth/Windage

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 2-6).
7. Each click of the elevation dial moves the POI by $\frac{1}{2}$ MOA (approximately $\frac{1}{2}$ " (12.7mm) at 100 yards (91m)). Table 2-1 is provided below to convert mm or inches into a $\frac{1}{2}$ 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: To prevent damage, be sure that the lock is fully disengaged before attempting to turn the elevation dial!

- 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.

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

2.3 Zeroing (continued)

Calculation for _____ Range to Target:

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

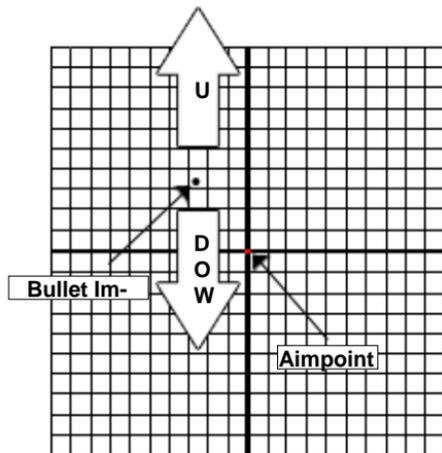
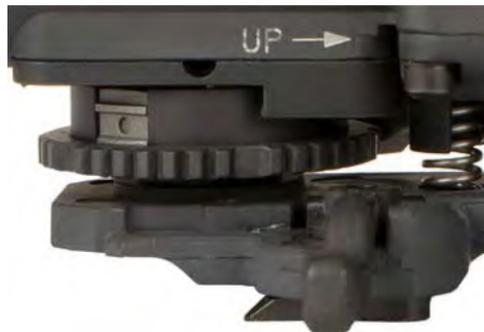


Figure 2-8: Adjust POI - Elevation



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

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	1.58	0.06
25	82	4	0.10
50	164	7	0.30
100	328	15	0.60
200	656	29	1.10
300	984	44	1.70
400	1312	58	2.30
500	1640	73	2.90
600	1968	87	3.40
700	2297	102	4.00
800	2625	116	4.60
1000	3280	145	5.70
1500	4920	218	8.60
2000	6560	291	11.50

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

CHAPTER 3: PRINCIPLES OF OPERATION

3.1 FOV

The SpecterDR Optical Sight is unique in providing the shooter with two fields-of-view:

1. The first is a 1.5x powered sight with a 16° field-of-view. 1.5x magnification together with a red dot illuminated aiming point provides the shooter with an extremely fast, “both eyes open” target acquisition.
2. The second is a 6x-magnified sight with a field-of-view of 4° and a range-compensating reticle. This magnification provides the shooter with long-range target identification and precision marksmanship capability.

To change magnification, flip the 1.5x - 6x Switch Lever slightly downward and forward for 6x magnification or slightly downward and rearward for 1.5x magnification. Sight ‘zero’ and eye relief are not affected.

3.2 Reticle and Ranging

The SpecterDR reticle provides the shooter with easy-to-locate aiming marks to designate the target both at short and long ranges. The following are sample illustrations of a reticle pattern.

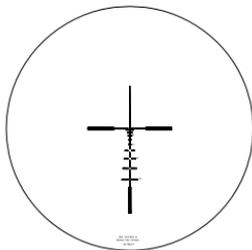


Figure 3-1 Sample Illustration of Reticle -- Calibrated for 5.56, M855 ball, M4 Weapon (not to scale)

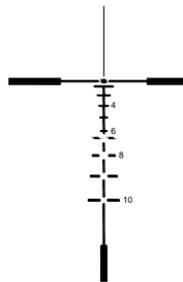


Figure 3-2 Sample Illustration of Reticle detail (not to scale)

3.2 Reticle and Ranging (continued)

Describing the sample reticle pattern, the main horizontal line provides a reference to the marksman and coincides with the 100 meter aiming point at both 1.5x and 6x. The reticle pattern is designed to be zeroed at 100 meters using the 6x setting.

A red dot aiming point is placed at the reticle crosshair center and is designed for use at either the 1.5x or 6x optical magnification settings. The red dot is 1.5 MOA at 6x magnification or 6 MOA at 1.5x magnification.

When using the 6x magnification, the ballistic drop reticle provides calibrated drop increments of 100 meters. The 400 and 600 meter stadia lines are labelled. At the 200, 300, 400, 500 and 600m ranges, the width of the stadia line represents a 19" wide target (the approximate width of a man's chest). The calibre of the weapon (5.56mm or 7.62mm) is indicated on the reticle as well as the sight.

Note: *The ballistic drop reticle is calibrated for 6x use. Do not use the reticle for ranging at 1.5x magnification.*

3.2.1 Reticle Illumination

The SpecterDR provides illumination for two types of reticles (see Figure 3-3):

- A red dot at the center of the crosshairs; and
- A Range Estimating and Bullet Drop Compensation Reticle.

Each reticle has multiple brightness settings which can be set by the Reticle Illumination Switch (rotary) on the left side of the sight (see Figure 3-4):

- Counter Clockwise rotation - illuminates the *Red Dot* with 5 intensity levels.
- Clockwise rotation - illuminates the *ballistic reticle* with 5 intensity levels.

The first two settings from **OFF**, each way, are night vision equipment compatible.

3.2.1 Reticle Illumination (continued)

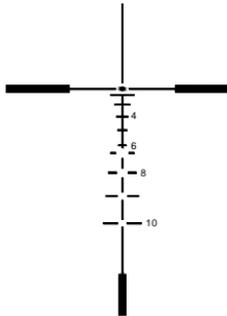


Figure 3-3 Sample Illustration: Red Dot and Illuminated Ballistic Reticle

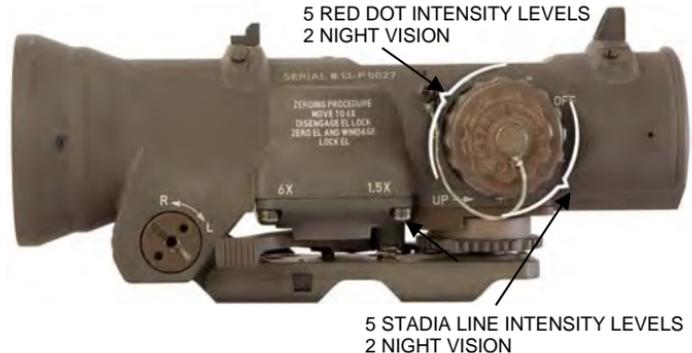


Figure 3-4: Reticle Illumination Switch Operation - rotate the switch to desired reticle brightness setting.

WARNING

The SpecterDR is designed to give the marksman maximum control of reticle illumination. However, at the higher illumination settings, reddish light shines forward from the sight. These higher illumination settings are for use in bright daylight.

Failure to use the lower reticle illumination settings at night, or failure to take other tactical measures to hide your forward light emissions during darkness, could reveal your position.

CHAPTER 4: MAINTENANCE

The SpecterDR 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 4.3), 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
Rear peep	208077-001
Front Post	208076-001
Battery cover without lanyard (Black)	903236-003
Battery cover without lanyard (Flat Dark Earth)	903236-001
Battery cover with lanyard (Black)	903236-003 KIT
Battery cover with lanyard (Flat Dark Earth)	903236-001 KIT
Lens Cover (Black)	208217-002
Lens Cover (Flat Dark Earth)	208217-001

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

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Dated January 10, 2011

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