



PRODUCT MANUAL

RAZOR[®] HD GEN III

1-10x24 RIFLESCOPE

CONFIGURATION	1-10x24	
RETICLE	EBR-9 BDC MOA	EBR-9 MRAD
FOCAL PLANE	First Focal Plane (FFP)	
ILLUMINATION	Yes	
ILLUMINATION SETTINGS	11	
BATTERY TYPE	CR2032	
BATTERY LIFE @ INTENSITY 6	211 hours	
EYE RELIEF	3.6"	
LINEAR FIELD OF VIEW	116' - 11.7' @ 100 yds.	
TURRET STYLE	Capped	
TUBE SIZE	34mm	
ADJUSTMENT GRADUATION	1/4 MOA	0.1 MRAD
TRAVEL PER ROTATION	25 MOA	10 MRAD
MAX ELEVATION ADJUSTMENT	120 MOA	30 MRAD
MAX WINDAGE ADJUSTMENT	120 MOA	30 MRAD
PARALLAX SETTING	Fixed at 150 yds.	
LENGTH	10.1"	
WEIGHT W/O BATTERY	21.5 oz.	



LENGTHS	L1	L2	L3	L4	L5
	10.1" (256.5mm)	6.3" (160mm)	3.4" (86.4mm)	2.5" (63.5mm)	2.0" (50.8mm)
DIAMETERS & HEIGHTS	H1	H2	H3	H4	
	1.8" (45.7mm)	1.8" (45.7mm)	0.15" (3.8mm)	1.3" (34mm)	

RAZOR® HD GEN III 1-10x24 FFP RIFLESCOPE

At Vortex Optics, the need for high-performance, precision optics is the driving force behind all that we do. We carefully built the Razor® HD Gen III rifle scope to provide shooters with the ultimate short- and medium-range tactical rifle scope.

Understanding the Controls



Images are for representation only. Product may vary slightly from what is shown.

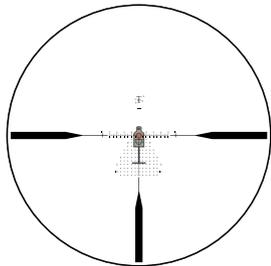
INITIAL SETUP

Reticle Focal Plane (Second Focal Plane vs First Focal Plane)

All riflescope reticles can be termed either first focal plane (FFP) or second focal plane (SFP), with respect to the reticle's internal location within the optical system. An SFP reticle is visually consistent in size and weight across the magnification range; however the subtension values are only accurate on one magnification, typically the highest. In contrast, an FFP reticle will scale with magnification, and their subtensions used for ranging, holdovers, and wind corrections will remain constant. The reticle size will appear larger at higher magnifications, and smaller at low magnification.

First Focal Plane Reticle

The Razor® HD Gen III 1-10x24 riflescopes feature a first focal plane (FFP) reticle. FFP reticles are located within the riflescope near the windage and elevation turrets. This style of reticle will appear to grow and shrink as you change the magnification.



Low-Magnification



High-Magnification

Shown: EBR-9 MRAD Reticle

Ocular Focus

The ocular focus is typically a one-time adjustment used to focus the reticle for maximum sharpness. This adjustment is slightly different for every shooter. A clearly focused reticle is a critical component for accurate shooting. When setting up a scope, this should be the first adjustment you make and should only need to be changed from user to user, or if your eyesight changes over time.

Ocular Focus - Fast-Focus Eyepiece Adjustment

The Razor® HD Gen III 1-10x24 FFP uses a Fast-Focus Eyepiece designed to easily adjust the focus on the riflescope's reticle.

WARNING: Looking directly at the sun through a riflescope, or any optical instrument, can cause severe and permanent damage to your eyesight.

Adjusting the reticle focus to your eye:

1. Turn the magnification ring to the highest power. Looking through the optic, turn the Fast-Focus Eyepiece counterclockwise until the reticle is slightly blurry.
2. While looking at a white wall or a clear blue sky, taking short glances through the optic, turn the Fast-Focus Eyepiece clockwise until the reticle is clear and crisp as soon as you look through the optic. This may take several attempts.

Note: You do not want your eye to focus to the reticle, rather you want the reticle in focus to your eye instantly when looking through the optic. Looking away and letting your eyes refocus is important in getting the Fast-Focus Eyepiece set correctly.

You may notice that on 1x you have to make an additional adjustment to the diopter to achieve a flat field of view. This is specific to all 1x optics.



Adjusting the reticle focus for the flattest field of view on 1x:

- Turn the magnification ring to 1x. While looking at an object about 25 yards away, taking short glances through the optic, turn the Fast-Focus Eyepiece clockwise until the image is true 1x. The object should appear the same size through the optic as it does to your naked eye. This may take several attempts.

Note: This will be a target-dependent adjustment for close range shooting and may cause the reticle to appear slightly out of focus on the highest power.

Once this adjustment is complete, it will not be necessary to refocus every time you use the riflescope. However, because your eyesight may change over time, you should recheck this adjustment periodically.

Parallax

Parallax results when the target image is not on the same optical plane as the reticle within the scope. This can cause an apparent movement of the reticle in relation to the target if the shooter's eye is off-axis behind the optic.

Fixed Parallax

The Razor® HD Gen III 1-10x24 FFP comes equipped with a fixed parallax setting at 150 yards. There is no adjustment on this model.

With a fixed 150 yard parallax, the shooter may experience small amounts of parallax error inside, and outside, 150 yards, or if the shooter is off-axis behind the optic. If the shooter is perfectly aligned behind the optic, or at 150 yards, there should be no parallax error.

Magnification Adjustment

The Magnification Adjustment Ring is used to change the riflescope's "power." The Razor® HD Gen III 1-10x24 FFP is a variable powered optic with a 10x optical design. This will allow you to change the power from 1x to 10x using the Magnification Adjustment Ring.



To adjust your optic's magnification, rotate the Magnification Adjustment Ring clockwise, or counterclockwise, to increase or decrease the magnification to your desired level.

Throw Lever

Make magnification adjustments smooth and easy by attaching the included Throw Lever.

Installation

1. Find the center of travel on your riflescope's Magnification Adjustment Ring. This should ensure that the Throw Lever does not contact anything on the rifle.
2. Gently spread the ring apart far enough to get it over the eyepiece.
3. Slide the Throw Lever onto the magnification ring at the desired position.
4. Insert the 2mm hex screw through the unthreaded hole in the lever and into the ring, and tighten only until snug and the ring does not slip when rotated. If using a torque wrench, tighten to 2.2 in-lbs.
5. Test to ensure the Throw Lever is in the best position for you. To adjust, simply loosen the screw and reposition the lever to a more comfortable position. Then, retighten the screw and test the new position.



TURRETS

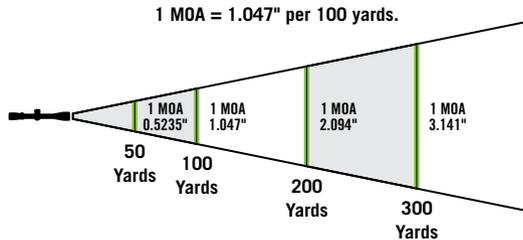
The Razor® HD Gen III 1-10x24 FFP riflescopes are offered in either Minute of Angle (MOA) or Milliradian (MRAD). All Razor® HD Gen III FFP riflescopes will have a matching reticle/turret configuration.

Note: The top of both the windage and elevation turret will state what unit the scope is laid out in.

Minute of Angle (MOA) Adjustment

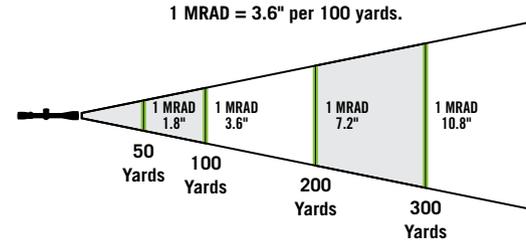
Minute of Angle (MOA) arc measurements are based on the concept of degrees and minutes in a circle. There are 360° in a circle, and 60 minutes in a degree. One MOA will always subtend 1.05" for each 100 yds. of distance. Most riflescopes using MOA turrets will adjust in 1/4-minute increments. Adjustments can be felt by mechanical "clicks," which subtend .26" for each 100 yds. of distance.

Note: These measurements are often rounded down to 1 MOA equaling 1" at 100 yds., and each adjustment (each mechanical click) equaling 1/4" at 100 yds.



Milliradian (MRAD) Adjustment

Milliradian (MRAD) arc measurements are based on the concept of the radian. There are 1,000 milliradians in a radian. A milliradian is always 1/1000th of any unit. So, 1 MRAD is 1m at 1000m, 1 yd. at 1000 yds., or 1 in. at 1000 inches. Most riflescopes using MRAD turrets will adjust in 1/10 MRAD increments. Adjustments can be felt by mechanical "clicks," which subtend .10 units for each 100 units of distance (e.g. 0.01 yd. or 0.36" at 100 yds.; 0.02 yd. or 0.72" at 200 yds.; or 1cm at 100m, 2cm at 200m).



Elevation and Windage Turrets

Use turrets to adjust the bullet's point of impact. The Razor® HD Gen III FFP 1-10x24 riflescopes use either 1/4 MOA or .1 MRAD turret adjustments on both the Windage and Elevation Turrets. Each click will move the bullet's point of impact roughly .25" at 100 yards for MOA, and .36" at 100 yards for MRAD. The turret on the top of the riflescope is the Elevation Turret, which is used to adjust the bullet's point of impact up and down. The turret on the right-hand side of the riflescope is the Windage Turret and is used to adjust the bullet's point of impact left and right.



Capped Turrets

The Razor® HD Gen III 1-10x24 FFP riflescopes come equipped with capped Windage and Elevation Turrets. This protects the turrets from accidental adjustment while out in the field, in transit, or in storage. You will need to remove the caps prior to making any adjustments on the turrets.

Note: The scope is still waterproof with the caps removed.

Adjusting Capped Turrets:

1. Remove the turret caps by spinning counterclockwise.
2. Following the directional arrows, turn the dials in the direction you wish the bullet's point of impact to change. (If you hit high, dial down. If you hit low, dial up. If you hit right, dial left. If you hit left, dial right.)
3. When finished adjusting, replace the turret caps.

Note: The reticle will move in the opposite direction of the turret dials. When you dial up, the reticle will move down, forcing you to aim higher, changing your point of impact upward.

Illumination

The Razor® HD Gen III 1-10x24 FFP riflescopes use a variable intensity illuminated reticle to aid in low-light performance.

To Adjust Illumination Brightness

Pull out the Illumination Dial and adjust by rotating the adjustment dial in either direction to the desired intensity. The Illumination Dial allows for 11 levels of intensity with an "off" setting between each level. Push in to lock the Illumination Dial in the desired position.



**Pull out to
unlock and adjust.**



Push in to lock.

Battery Installation/Replacement

To install/change the battery, unscrew the Illumination Dial's cap using a coin or L-TEC™ Tool and install a new CR2032 battery with the positive side (+) facing out.

1. Unscrew the cap by spinning counterclockwise using a coin or L-TEC™ Tool.
2. Remove the CR2032 battery.
3. Replace with a new CR2032 battery with the positive side (+) facing out.
4. Reinstall the battery cap by spinning clockwise until tight.



Sunshade

The Razor® Gen III 1-10x24 FFP comes with a Sunshade in the box. A Sunshade will help decrease image distortion from low-angle sun.

To install the Sunshade, thread it into the objective end of the optic by spinning it clockwise. To uninstall the Sunshade, spin the Sunshade counterclockwise until the Sunshade is separated from the optic.

RIFLESCOPE MOUNTING

To get the best performance from your riflescope, proper mounting is essential. Although not difficult, the correct steps must be followed. If you are unsure of your abilities, use the services of a qualified gunsmith.

Riflescope Mounting Checklist

- Gun vise or a solid platform for your rifle
- Scope rings
- Torque wrench
- Reticle leveling tool(s) (such as feeler gauges or bubble levels and a plumb bob)

Recommendation: Pick up the Vortex® Torque Wrench Mounting Kit, which comes with a complete set of bits needed to install Vortex® scopes and rings!



Rings And Bases

The Razor® HD Gen III 1-10x24 FFP riflescopes feature a 34mm main tube. Be sure to select a base and matching rings appropriate for your riflescope's mount according to manufacturer's instructions.

Tip: Selecting the proper ring height to provide appropriate clearance between the riflescope and any part of the rifle is paramount. The proper height will also allow for a comfortable head position and aid in establishing a solid and consistent shooting position. A ring's height will not have an adverse effect on accuracy and overall range or performance.



Eye Relief And Reticle Alignment

After installing the bottom ring halves on the mounting base, place the riflescope on the bottom ring halves and loosely install the upper ring halves. Before tightening the scope ring screws, adjust for maximum eye relief to avoid injury.

1. Set the riflescope to its highest magnification.
2. Move the riflescope fore and aft in the rings until you achieve a full, unobstructed sight picture.
3. Without disturbing the fore-aft placement, rotate the riflescope until the reticle is level. Use a leveling tool(s) such as feeler gauges or bubble levels and a plumb bob to aid in this process.
4. After leveling the reticle, tighten and torque the ring screws down per manufacturer's instructions. Use caution and do not over-tighten ring screws.

Note: We typically suggest 15-18 in-lbs of torque on the ring screws. If the mount/ ring manufacturer suggests more or less, contact the Vortex® Technical Department for best instructions. For base clamp screws on the rings/mounts, reference the ring manufacturer's specifications. We do not recommend liquid thread-locking compound on the ring screws.

If you have questions about a specific setup, please call our Technical Department at: 1-800-4VORTEX (1-800-486-7839) Ext. 5

Bore Sighting

Initial bore sighting of the riflescope will save time and money at the range by roughly aligning the scope to the rifle. This can be done several ways, either by using a mechanical or laser bore sighter according to the manufacturer's instructions, or by removing the bolt and sighting through the barrel.



To Visually Bore Sight a Rifle

1. Place the rifle on a solid rest and remove the bolt.
2. Sight through the bore at a target approximately 100 yards away.

Note: It will help to have larger, high contrast target to focus on as it can be difficult to pick up smaller targets through the rifle's bore.
3. Move the rifle and rest until the target is visually centered inside the barrel.
4. With the target centered in the bore, make the necessary windage and elevation adjustments until the reticle is also centered on the target. You may notice the reticle travel in the opposite direction as listed on the turrets. This is completely normal.

Final Range Sight-In

After the riflescope has been bore sighted, final sight-in should be done at the range using the exact ammunition you expect to use while hunting or shooting competitively. Sight-in and zero the riflescope at the preferred distance. 50 to 200 yards are the most common zero distances.

1. Following all safe shooting practices, fire a three-shot group as precisely as possible to determine an average point of impact to correct from. This will also help you establish the accuracy potential of the weapon system.
2. Adjust the turrets to correct for any offset in your point of impact. Be sure to read page 10 prior to adjusting.
3. Fire another three-shot group to establish another average point of impact. This procedure may be repeated as many times as necessary until your point of impact and your point of aim are in the same place, and you have achieved a perfect zero.

Note: Vortex® does not recommend the use of a weighted gun vise, as it can put extreme stress on the gun, stock, scope, and mounts. It is best practice to use a combination of sandbags or a bipod and sandbags. Letting your weapon recoil naturally also provides consistency from shot to shot.

Reindexing the Elevation and Windage Turrets

After the rifle and scope have been zeroed in, the elevation and windage dials should be reindexed to their zero indicators. This will allow you to accurately keep track of elevation or windage corrections dialed on the turrets in the field, and quickly return to an original zero-point setting.



To Reindex Capped Turrets

1. Remove turret cap by spinning counterclockwise.
2. While holding the elevation/windage turret dial firmly between thumb and forefinger to prevent any rotation, use the 2mm hex wrench to loosen and remove the set screw on top of the dial.
3. Gently pull the turret dial straight up and off of the turret post, being careful not to rotate the post.
4. Reinstall the turret dial lining up the "0" mark with indexing mark on the scope body and replace the spring and set screw on top of dial.
5. Replace the turret cap.



MAINTENANCE

Cleaning

Your Vortex® riflescope requires very little routine maintenance other than periodically cleaning the exterior lenses. The scope's exterior may be cleaned by wiping with a soft cloth. When cleaning the lenses, be sure to use products that are specifically designed for use on coated optical lenses.

- Be sure to blow away any dust or grit on the lenses prior to wiping the surfaces.
- Using your breath, or a very small amount of water or pure alcohol, can help remove stubborn dried water spots.

Lubrication

All components of the riflescope are permanently lubricated, so no additional lubricant should be applied.

Note: Other than removing the turret caps, turret dials, and battery cap do not attempt to disassemble any components of the riflescope. Disassembling of riflescope may void warranty.

Storage

If possible, avoid storing your scope in direct sunlight or any very hot location for long periods of time.

TROUBLESHOOTING

Please consult the following list prior to returning a riflescope for service. Many times, a problem thought to be with the scope is a mounting issue. Be sure the correct rings and bases are being used and that they are properly torqued to the rifle. Be sure there is no free play in the scope, base, or rings.

Common Issues

Point of Impact is Inconsistent or Changes Drastically After Turret Adjustment

- Verify that the ring screws are not over-torqued. Ring screws should only be torqued to Vortex® recommendations, and no thread locking compound or lubricants should be applied. Over-torquing ring screws will cause excess pressure on the tube, which may cause problems when making turret adjustments.
- Remove the scope from the rings and visually check the scope tube for slide marks, and/or indentations from over-torqued, or out-of-spec rings.
- Ensure the rifle's action screws are tightened to the rifle manufacturer's specification.
- Be sure that the base is tightened using thread-locking compound to the top of the rifle's receiver to manufacturer's specs.
- If using the scope on an AR-style rifle, ensure that the cantilever mount/rings are mounted only to the top of the receiver. The cantilever mount/rings need to be mounted to a single, solid surface. Make sure the forward connection of the cantilever mount, or ring, is not mounted to the fore-end of the rifle.
- Be sure the rifle barrel and action are clean and free of excessive oil, or copper and powder fouling.
- Some rifles and particular ammunition do not work well together. Try different ammunition and see if accuracy improves.

Insufficient Windage & Elevation Adjustment Ranges

- Be sure you have the proper base and rings for your rifle. If you need assistance, contact a local gunsmith or the Vortex® Technical Department.
- Once you have verified you have the correct base and mounts, and that you have been properly fitted for your gun, make sure you have followed the correct mounting procedure. See Riflescope Mounting Section on pages 12-16 for this procedure.
- Insufficient windage or elevation adjustment range usually indicates problems with the mounting, base mount holes drilled in the rifle's receiver, or barrel/receiver misalignment.

Cannot Focus on the Reticle and Target

- Check and reset the ocular focus for the shooter's eye. See Riflescope Adjustment Section, Ocular Focus – Fast-Focus Eyepiece Adjustment on page 5.

Reticle is Moving the Wrong Direction

- The reticle will always move opposite of the turrets. Markings on the turrets indicate point of impact change. If you dial down on the turret, the reticle will move upward, forcing you to move the gun down, to change your point of impact downward.

Reticle is Upside Down

- Riflescope is likely backwards. Confirm that you are looking through the larger end of the Razor® 1-10x24 FFP riflescope.

NOTICE

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