



RAZOR[®] HD GEN II

RIFLESCOPE

PRODUCT MANUAL

VORTEX® RAZOR® HD GEN II RIFLESCOPES

Specifically designed for the tactical, law enforcement and committed precision shooting communities, the Razor® HD Gen II series of riflescopes offer the highest levels of performance and reliability.



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

RETICLE OPTIONS

The Focal Plane

All riflescope reticles can be termed first focal plane (FFP) or second focal plane (SFP), depending on the reticle's internal location within the riflescope. This model features a first focal plane design.

First Focal Plane Reticles

First focal plane (FFP) reticles are located near the windage and elevation turrets in front of the image-erecting and magnifying lenses. This style of reticle will visually grow and shrink as you change the magnification. The advantage of an FFP reticle is that the reticle subtensions used for ranging, holdover, and wind drift correction are consistent at all magnifications.

RIFLESCOPE ADJUSTMENTS

Reticle Focus

Razor® HD Gen II use a fast focus eyepiece, which allows the reticle focus to be set quickly and easily.

To adjust the reticle focus:

1. Look through the riflescope at a blank white wall or up at the sky.
2. Turn the eyepiece in or out until the reticle image is as crisp as possible.

Note: Try to make this adjustment quickly, as the eye will try to compensate for an out-of-focus reticle.

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



Adjust the reticle focus.

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

Windage and Elevation Adjustments

Depending on which version you have purchased, your Razor® HD Gen II riflescope will feature adjustments and reticles scaled in MOAs or MRADs. Both minute-of-angle (MOA) and milliradian (MRAD) unit of arc scales are equally effective when ranging or adjusting riflescope for bullet trajectory.



MOA Models
"1 Click = 0.25 MOA"



MRAD Models
"1 Click = 0.1 MRAD"

MOA Adjustments

MOA unit of arc measurements are based on degrees and minutes. There are 360 degrees in a circle and 60 minutes in a degree for a total of 21,600 minutes (MOA) in a circle. A minute of angle will subtend 1.05 inches at a distance of 100 yards (29.1 mm at 100 meters). Razor HD riflescopes with MOA adjustments use .25 minute clicks which subtend .26 inches at 100 yards (7.3 mm at a 100 meters), .52 inches at 200 yards (14.6 mm at 200 meters), .78 inches at 300 yards (21.9 at 300 meters), etc.

MRAD Adjustments

MRAD unit of arc measurements are based on the radian. A radian is the angle subtended at the center of a circle by an arc that is equal in length to the radius of the circle. There are 6.283 radians in all circles and 1000 milliradian in a radian for a total of 6283 milliradians (MRADs) in a circle. An MRAD will subtend 3.6 inches at a distance of 100 yards (10 cm at 100 meters). Razor HD riflescopes with MRAD adjustments use .1 MRAD clicks which subtend .36 inches at 100 yards (1 cm at 100 meters) .72 inches at 200 yards (2 cm at 200 meters), 1.08 inches at 300 yards (3 cm at 300 meters), etc.

Magnification Adjustments

To change magnification, turn the magnification ring to the desired level.



External Rotation Indicator

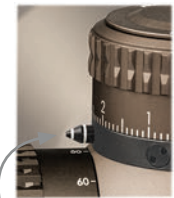
The external indicator on the elevation turret provides quick visual and tactile reference of the elevation turret's rotational position. As the turret enters the second turn of rotation, the indicator will extend outward from the turret. On the third turn of rotation, the indicator will be fully extended.



Turret in first turn of rotation (not visible).



Turret in second turn of rotation (partially extended).



Turret in third turn of rotation (fully extended).

Note: Some combinations of rifle, base and rings may not allow a second or third rotation of the elevation turret.

Locking Side Illumination Control

Razor® HD Gen II riflescopes use a variable intensity reticle illumination system to aid in low light performance. Integrated on the side focus dial for easy access, the illumination can be set and locked at your preferred setting.

To activate the illumination, pull out the dial and adjust by rotating the adjustment dial in either direction. The illumination dial allows for 11 levels of brightness intensity; an off click between each level allows the shooter to turn the illumination off and return to a favored intensity level with just one click.



Pull out to unlock and adjust.



Push in to lock.

Replacing the Battery

1. Unscrew the outer cap with the side of the L-Tec Tool.
2. Remove the battery.
3. Replace with a new CR2032 battery.
4. Re-install the outer battery cap and be sure to fully tighten it down.



Battery Cap

Image Focus and Parallax Correction

Razor® HD Gen II riflescopes feature a side focus dial which should be used to fine-tune the image focus. When the image is sharply focused, parallax error will also be eliminated.

Using the Side Focus

1. Be sure the reticle is correctly focused (see Reticle Focus section on page 5).
2. Turn the side focus knob until the target image is as sharp as possible.
3. Check for parallax error by moving your head back and forth while looking through the scope. The focus is correct if there is no apparent shift of the reticle on the target. If you notice any shift, adjust the focus knob slightly until all shift is eliminated.



Parallax is a phenomenon that results when the target image does not quite fall 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-centered. Correctly focusing the target image will allow it to fall on the same optical plane as the reticle within the riflescope.

L-TEC™ Turrets

The Razor® HD Gen II riflescope features the fast, accurate, easily-read L-TEC™ elevation and windage turrets with integrated locking mechanisms preventing accidental adjustments. The turrets feature the L-TEC zero stop which provides a reliable return to the original zero when long distance shots have been dialed. Note: The turrets will allow a slight over travel (1/2 MRAD or 1.25 MOA) for shooters who occasionally need to dial down below their zero.



To make adjustments:

1. Pull the windage or elevation turret knob outwards to disengage the lock.
2. Turn the knob in the desired direction: up or down for elevation adjustments; left or right for windage adjustments.
3. After the shot, return knobs to the zero position. The elevation turret can simply be spun clockwise until reaching a hard stop against the zero stop. Then, turn the elevation turret just slightly (1/2 MRAD or 1.25 MOA) in a counter-clockwise direction until the 0 mark on the cap lines up with the indicator mark on the turret body.
4. Push turret knobs inwards to return to the locked position.

MOA/MRAD Adjustments

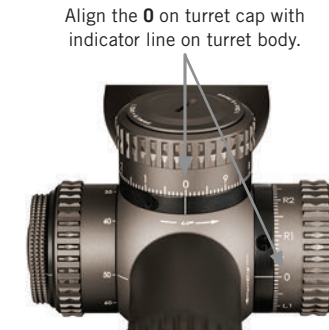
Each click of the Razor HD turret will move the point-of-impact either .25 MOA or .1 MRAD depending on the model. (Refer to MOA and MRAD Adjustments on page 6 for more details).

Adjusting the L-TEC™ Turrets for Bore and Range Sighting

Prior to making any zero adjustments, be sure the L-TEC™ turret caps are correctly positioned with the 0 mark on the turret cap indexed to the reference line on the turret body.

Lift the elevation turret cap and rotate turret clockwise until it hits a hard stop. Then, rotate just slightly (1/2 MRAD or 1.25 MOA) in a counter-clockwise direction until the 0 mark on the cap lines up with indicator line on the turret body. Once aligned, push the cap back down.

Lift the windage turret cap and rotate until the 0 mark on the cap lines up with indicator line on turret body. Depending on previous cap orientation, you may have to rotate either clockwise or counter-clockwise to do this. Once aligned, push the cap back down.



Steps for Bore Sighting and Range Sighting

Be sure the L-TEC turret caps are correctly positioned with the **0** mark on the turret cap indexed to the reference line on the turret body (see page 11).

1. Loosen the turret top cover with the included L-TEC Tool to reveal the circular scale on the top of the turret.



2. Loosen three set screws located on cap perimeters.



3. When adjusting, use the reference line and circular scale (MOA or MRAD) in the center of the turret housing to measure the desired adjustments.



4. Turn the brass center screw to make the adjustments changing the bullet's point-of-impact. No clicks will be felt when making this adjustment.



5. Once desired zero has been achieved, re-tighten three set screws. For best performance, turn in each of the three set screws until lightly seated. Then, go back and continue to turn each screw a little bit at a time until all three are fully tightened down.

6. Replace the turret top cover.

RIFLESCOPE MOUNTING

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



Rings and Bases

Razor® HD Gen II scopes have 34mm tubes. Be sure to select a base and matching rings appropriate for your rifle and mount according to the manufacturer's instructions.

Note: Vortex® Optics recommends not exceeding 18 in/lbs (inch/pounds) of torque on the ring screws.

Tip: Select the lowest ring height that will provide complete clearance between the riflescope and rifle in order to avoid contact with barrel, receiver, bolt handle or any other part of the rifle. A low mounting height will help assure proper cheek weld, aid in establishing a solid shooting position, and promote fast target acquisition.

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 from recoil:

1. Set the riflescope to the maximum magnification.
2. Slide the riflescope as far forward as possible in the rings.
3. While viewing through the riflescope in a normal shooting position, slowly slide the riflescope back towards your face. Pay attention to the field of view. Stop sliding the riflescope back as soon as you see the full field of view.
4. Without disturbing the front-back placement, rotate the riflescope until the vertical crosshair exactly matches the vertical axis of the rifle. Use of a reticle leveling tool, a weight hung on a rope, flat feeler gauges, or a bubble level will help with this procedure.

Note: After aligning the reticle, tighten and torque the ring screws down. Vortex® Optics recommends a torque setting of 15-18 in/lbs on the ring screws.



Using bubble levels to square the riflescope to the base.

Bore Sighting

Initial bore sighting of the rifle and scope will save you money and time at the range. This initial sighting can be done in a number of ways. You may want to use a mechanical or laser bore sighter according to the manufacturer's instructions. On some rifles, bore sighting can be done visually by removing the bolt and sighting through the barrel.

Note: Be sure to read pages 11–12 prior to making adjustments.

To visually bore sight a rifle:

1. Place the rifle solidly on a rest and remove the bolt.
2. Sight through the bore at a target approximately 100 yards away.
3. Move the rifle and rest until the target is visually centered inside the barrel.
4. With the target centered in the bore, make windage and elevation adjustments until the reticle crosshair is also centered over the target.
5. If using a mechanical or laser boresighter, set up according to manufacturer instructions.



Visually bore-sighting a rifle.

Final Range Sight-In

Once the riflescope has been boresighted, final sight-in should be done at the range shooting the same ammunition expected to be used in the field. 100 yards is the most common zero distance, although a 200 yard zero may be preferred for long distance applications.

Note: Be sure to read pages 11–12 prior to making adjustments.

- Be sure to follow all safe shooting practices.
- Before shooting, be sure the reticle and side focus are properly set (see Reticle Focus on page 5, Image Focus and Parallax Correction on page 9).
- At your preferred zero distance, fire a three-shot group as precisely as possible. Next, adjust the reticle to match the approximate center of the shot group (see section on Windage and Elevation Adjustments). If the rifle is very solidly mounted and has not shifted you can simply look through the scope and adjust the reticle until it is centered on the fired group.
- Carefully fire another three-shot group and see if the bullet group is centered on the bullseye. Repeat process until group is centered in desired spot.

MAINTENANCE

Cleaning

The fully waterproof and fogproof Razor® HD Gen II riflescope requires very little routine maintenance other than periodically cleaning the exterior lenses. The exterior of the scope may be cleaned by wiping with a soft, dry cloth.

When cleaning the lenses, be sure to use products, such as the Vortex® Fog Free cleaning products or Lens Pen, 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 things like dried water spots.

Lubrication

All components of the Razor HD Gen II riflescopes are permanently lubricated, no additional lubricant should be applied.

Note: Other than to remove the turret caps, do not attempt to disassemble any components of the riflescope. Disassembling of riflescope may void warranty.

Storage

If possible, avoid exposing your Razor HD Gen II riflescope to direct sunlight or any very hot location for long periods of time.

TROUBLESHOOTING

Sighting-in Problems

Many times, problems thought to be with the scope are actually mount problems. Be sure the mounts are tight to the rifle and the scope is secured so it doesn't twist or move in the rings.

An insufficient windage or elevation adjustment range may indicate problems with the base mount, base mount holes drilled in the rifle's receiver, or barrel/receiver alignment.

Check for Correct Base and Ring Alignment

1. Roughly center the reticle by adjusting both windage and elevation turrets to the mid point of their travel ranges.
2. Attach bore sighter, or remove bolt and visually bore sight rifle.
3. Look through the scope. If the reticle appears way off center on the boresighter image or when compared to the visually centered target when looking through rifle's bore, there may be a problem with the bases or rings being used. Confirm that correct base and rings are being used—and in the proper orientation.

Grouping Problems

There are many issues that can cause poor bullet grouping.

- Maintain a good shooting technique and use a solid rest.
- Check that all screws on rifle's action are properly tightened.
- Be sure rifle barrel and action are clean and free of excessive oil or copper fouling.
- Check that rings are correctly torqued per the manufacturer's instructions.
- Some rifles and ammunition don't work well together— try different ammunition and see if accuracy improves.



VIP WARRANTY

OUR UNCONDITIONAL PROMISE TO YOU.

We promise to repair or replace the product. Absolutely free.

- ▶ **Unlimited**
- ▶ **Unconditional**
- ▶ **Lifetime Warranty**

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Note: The VIP Warranty does not cover loss, theft, deliberate damage, or cosmetic damage not affecting product performance.



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