RAZOR HD RIFLESCOPE

Vortex Razor HD 1-4x24 Riflescope
CQMR-1 Reticle

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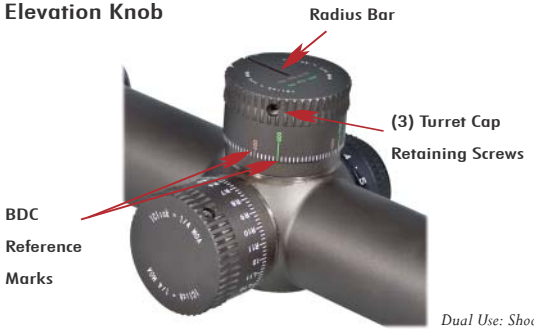
At Vortex Optics, the need for high-performance, precision optics is the driving force behind all that we do.

That's why we carefully built the Razor™ HD riflescope to provide shooters with the ultimate short and medium range tactical riflescope. Specifically designed for the 5.56mm round (.223 Remington) and the popular AR15 platform, the Vortex Razor 1-4x24 riflescope with the CQMR-1 reticle is a unique, compact high performance scope intended for close range CQB situations as well as longer range precision shooting out to 700 yards.

RAZOR HD RIFLESCOPE

The Vortex Razor HD 1—4x24 Riflescope

Elevation Knob



Dual Use: Shooting Tactical / Hunting

Razor 1—4x24 Riflescope Specifications

Waterproof	Yes
Fogproof	Argon gas purging
Length	10.3 inches (261.2mm)
Mounting Length	6.4 inches (162.6mm)
Weight	20.2 ounces (628.3g)
Eye Relief	3.9 inches (99.6 mm)
Field of View	94.5—24.2 feet/100 yards (18—4.6°)
Reticle Style	CQMR-1
Windage	200 MOA Total Travel
Elevation	200 MOA Total Travel
Turret Adjustment	24 MOA Per Rotation
	1/4 MOA Per Click
Recoil Tested	Rated for 50 BMG
Battery	CR2032

Dimensions

Accessories included with the Razor HD

Flip cap lens cover with killFLASH® ARD

Cleaning cloth

Riflescope Adjustments

Reticle Focus Adjustment

The Vortex Razor HD 1–4x24 riflescopes use a fast focus eyepiece, designed to quickly and easily adjust the focus on the riflescopes reticle.

To adjust the reticle focus, look through the riflescope at a blank white wall or up at the sky. Turn the eyepiece focus knob in or out until the reticle image is as crisp as possible. Try to do this quickly, as your eye will try to compensate for an out of focus reticle.

Once this adjustment is complete, it is not necessary to re-focus every time the scope is used. However, as your eyesight may change over time you should re-check this adjustment periodically.

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

The Vortex Razor HD 1–4x24 riflescope incorporates precision finger adjustable elevation and windage dials with audible clicks.

To make adjustments:

- Turn the adjustment dial in the appropriate direction Up/Down or Left/Right indicated by the arrows.
- Move the dials in the direction you wish the bullets point of impact to change.

The Razor 1–4x24 riflescope uses clicks scaled in ¼ minute of angle measurements (MOAs) so each small click will move the point of impact 1/4 MOA. One full MOA equals 1.05 inches at a 100 yard distance: ¼ MOA will equal .26 inches at 100 yards, .52 inches at 200 yards, .78 inches at 300 yards, etc.

Example: *At a 100 yard sight-in distance, it will take four clicks of the knob to move a bullet's point-of-impact 1.05 inches.*

The Razor HD 1–4x24 riflescope with the CQMR-1 uses an elevation knob that is pre-calibrated to two popular loads of the 5.56x45 mm round: the M193 and the M855. The M193 calibration will also work well with most 55 gr. .223 Remington loads. After the rifle is sighted in and the turret indexed, the elevation knob can be rotated to match the yardage being shot.

Radius Bar

The Vortex Razor HD riflescopes incorporate the patented ***Radius Bar*** to visually assist in keeping track of the correct turret knob position at the rifle's zero. By watching the position of the bar during field use, the shooter can quickly verify the correct turret knob position.

In a CQB type of situation, the shooter can also use the Radius Bar as a quick visual aiming reference.

To benefit from the Radius Bar, the turret cap must be indexed with the zero reference line on turret post. See the *Sight In* section for details on indexing cap.

Variable Power Adjustment

To change magnifications, turn the magnification ring to the desired level. The patented Vortex ***MagView*** will provide a low light reference for magnification level.

Illumination Adjustment

The Vortex Razor 1–4x24 riflescopes use a variable intensity reticle illumination system to aid in low light performance. Illumination intensity levels will vary from bright to ultra low intensity compatible with night vision devices at the lowest setting.

The illumination knob 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. The top six settings (6, 7, 8, 9, 10 and 11) are visible in the daytime, depending on the background color. Settings below 6 are for low light use when the user's eyes have adjusted to lower light levels. Lowest settings are for use with night vision devices.

To change the battery, unscrew outer cap with a coin. Remove the battery and replace with a new one.

Parallax Adjustment

The Razor 1-4x24 series riflescopes are non-adjustable for parallax correction and are set from the factory to be parallax-free at 100 yards.

- At distances under 100 yards, parallax error is less than 1 inch.
- At distances over 100 yards parallax error is minimal; using good consistent shooting form and cheek weld will prevent most problems with parallax.

Riflescope Mounting

To get the best performance from your Vortex Razor HD 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.*

Centering of the Reticle

The Vortex Razor HD riflescope is pre-set from the factory with the reticle in the center of the adjustment ranges. If you have changed the settings and wish to reset the reticle to the center, this can be done easily:

1. Turn the dial (windage or elevation) fully in either direction until stopped. *Do not force the dial—as soon as any resistance is felt, stop turning.*

2. Carefully counting the dial rotations, turn the dial in the other direction until stopped. *Again, stop turning as soon as resistance is felt.*

3. Turn the dial back again half the amount of rotations counted and that adjustment will be centered.

After this procedure is completed for both windage and elevation dials, the reticle will be approximately centered.

Rings and Bases

Following the manufacturers instructions, mount a high quality base and rings to your firearm. The Vortex Razor 1–4x24 riflescopes require 30mm rings. Vortex Optics recommends using premium quality rings mounting to a one-piece Picatinny base.

Ring height for Vortex Razor HD 1–4x24 riflescopes will depend on the firearm and mount being used. Consult the ring and base manufacturer for suggested heights.

AR15 style rifles will usually require a specialized extra-high mounting height on a cantilever style mount. Most other traditional rifle or shotgun applications will use a low or medium ring height.

Eye Relief and Reticle Alignment

Before the final tightening of the scope ring screws, adjust for maximum eye relief to avoid injury from recoil.

To make the adjustment:

1. Set the riflescope to the middle of its magnification range.

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 the shooter's face—paying attention to the field of view. *Just as the full view is visible, stop.*

4. Without disturbing the front-back placement, rotate the riflescope until the vertical crosshair exactly matches the vertical axis of the rifle. Use a reticle leveling tool, plumb bob, or an adjustable set of feeler gauges placed between a one-piece base and the flat bottom of the riflescope's center section for this procedure.

5. After aligning the reticle, tighten and torque the ring screws down per the manufacturer's instructions. Use caution and do not over-tighten.

Square the riflescope to the base using flat feeler gauges.

Use of an adjustable set of feeler gauges between a one-piece base and flat bottom section of the riflescope to square the riflescope (and reticle) to the base.

Sighting in the Rifle

Bore Sighting

Initial bore sighting of the riflescope will save time and money at the range. This can be done using a mechanical or laser bore sighter according to the manufacturer's instructions. On some rifles, bore sighting can be accomplished by removing the bolt and visually sighting through the barrel.

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 you can visually center the target 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.

Note: *If you are using rings which permit windage adjustments, make your initial bore sighting windage adjustments with the rings as much as possible.*

Range Sight-In

After bore-sighting the riflescope, select the exact ammunition you expect to hunt or shoot with and go to the range for the final sight-in. The Razor HD 1–4x24 riflescope with CQMR-1 reticle and BDC elevation turret knob is specifically calibrated for two popular loads of the 5.56x45 mm cartridge: the M193 and M855 using a 100 yard zero range.

Note: *The Razor HD 1–4x24 CQMR-1 riflescope can be used with other cartridges, but the bullet drop references marked on the elevation turret may not accurately match.*

Before range shooting, be sure the reticle is in focus (see *Reticle Focus Adjustment*).

1. Following all safe shooting practices, fire a three-shot group as precisely as possible.

2. Next, adjust the reticle to match the approximate center of the shot group (see section on Windage and Elevation Adjustment).

3. If the rifle is very solidly mounted and cannot be moved, simply look through the scope and adjust the reticle until it is centered on the fired group.

4. Carefully fire another three-shot group and see if the bullet group is centered on the bullseye.

If necessary, make another adjustment to the riflescope and fire another group to verify zero. This procedure can be repeated as many times as necessary to achieve a perfect zero.

After the rifle has been zeroed at 100 yards, the elevation and windage knobs should be re-indexed to their zero indicators. This will allow you to accurately keep track of the elevation or windage corrections dialed on the turrets in the field and quickly return to an original zero point setting. The elevation knob ***must*** be indexed at zero to use the BDC references on the elevation knob.

After completing the final sight-in:

- Loosen the three elevation turret cap retaining screws using the 2.0 mm hex wrench and carefully rotate cap until the 100-yard mark on cap matches up with the reference line on turret post. *Be sure that the cap is turning freely and that you don't rotate the actual turret mechanism.*

Correct elevation and windage cap placement.

- Re-tighten retaining screws using thumb and forefinger on short end of hex wrench.

Repeat procedure with windage turret, aligning the "0" mark with indicator line.

After making this adjustment, the turret cap's position will correspond with the 100-yard zero on the rifle.

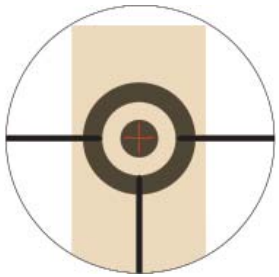
Shooting with the CQMR-1 Reticle

Once the Razor HD 1–4x24 riflescope with the CQMR-1 reticle has been sighted-in at 100 yards and the turret caps indexed, it is ready to be used in the field. The following suggestions are based on using the Razor HD 1-4x on an AR15 style rifle chambered in either of two popular 5.56mm loads (M193 or M855).

Note: If you are using a different rifle and ammunition, your results will differ somewhat, but still be close. For help with a different application, see *Using the Razor HD with Other Calibers and Loads*.

For distances inside of 50 yards

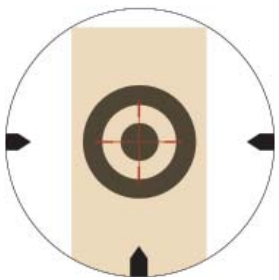
Maximum performance will come from using the Razor HD set at the lowest 1x magnification and shooting with both eyes open using the heavy outer crosshairs and illuminated center crosshair section to quickly center the target. Actual point-of-impact will typically be 1–2 inches below the crosshair intersection from 0–15 yards.



1x at 25 Yards

For distances inside of 50—175 yards

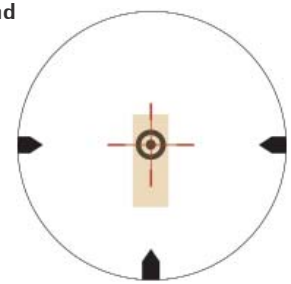
More magnification may be used if desired and main crosshairs should be used in a dead-on hold. Actual point-of-impact will typically be .2 inches below the crosshair intersection at 50 yards, dead on at 100 yards and 2.4 inches below crosshair intersection by 175 yards.



4x at 100 Yards

For distances 200 yards and beyond

Use the BDC elevation turret. Although any magnification can be used, best accuracy will be obtained at 4x. After estimating or lasering the distance to the target (see Ranging Distances with the CQMR-1 Reticle), simply dial the elevation turret *counter-clockwise* in the *up* direction until the correct range number scale matches up with the zero indicator line on scope body. Two scales are provided:



4x at 400 Yards

- Green numbers match 62 gr. M855 5.56mm ammunition.
- Copper numbers match 55 gr. M193 5.56mm ammunition.

Once the correct range number and indicator line are matched up, the shot may be taken using a dead-on hold with the center crosshair. After completing the shot, return the elevation knob to the original 100-yard zero location by turning the knob down in a *clockwise* direction—the knob should only require a partial clockwise turn to get back to original zero. Aligning the Radius Bar and the riflescope tube will help to quickly locate zero location.

Using the Razor HD with Other Calibers and Loads

Although the Razor 1-4 CQMR-1 uses an elevation turret knob calibrated specifically for two particular loads of 5.56mm ammunition, it can still be easily used with many other popular calibers and loads. For example, most 55 gr. loads of 5.56 ammunition will work well with the M193 references.

Listed below are the MOA drop numbers for the yard reference marks used on the elevation turret cap:

M193	M855
200 Yards – 1.75 MOA	200 Yards – 1.5 MOA
300 Yards – 4.25 MOA	300 Yards – 4 MOA
400 Yards – 7.5 MOA	400 Yards – 7.25 MOA
500 Yards – 11.75 MOA	500 Yards – 11 MOA
600 Yards – 17 MOA	600 Yards – 15.5 MOA
700 Yards – 23.5 MOA	700 Yards – 21.25 MOA

Generating a custom ballistic drop chart for other calibers and loads being used will allow the MOA drops to be compared for compatibility.

Example

The following drop chart for a .308 (7.62mm) Hornady 168 gr. AMAX bullet shot at 2700 fps. was generated on a ballistic website. As you can see, the drops are close to that of the M855 marked on the Razor HD 1–4 CQMR-1 elevation cap. Up to 600 yards, the difference is 1/2 MOA or less, and for many applications would allow the turret to be effectively used with the Hornady .308 168 gr. bullet.

Custom Drop Chart for Hornady .308 168 gr.

Range (Yards)	Drop (MOA)
100	-0.0
125	-0.3
150	-0.8
175	-1.3
200	-1.9
225	-2.5
250	-3.2
275	-3.9
300	-4.6
325	-5.3
350	-6.1
375	-6.9
400	-7.7
425	-8.5
450	-9.4
475	-10.3
500	-11.2
525	-12.2
550	-13.1
575	-14.1
600	-15.2
625	-16.3
650	-17.4
675	-18.5
700	-19.7

Ranging Distances with the CQMR-1 Reticle

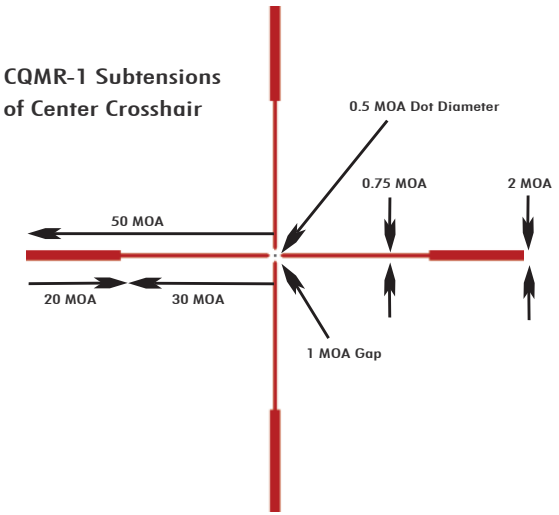
The CQMR-1 reticle can be used for approximate range estimations using a simple formula:

$$\frac{\text{Target Size (Inches) x 100}}{\text{Measured MOA}} = \text{Approximate Range (Yards)}$$

To use this formula, you will need to know the size of the target or nearby object in inches. Begin by turning the magnification up to 4x. Using any part of the inner crosshair with listed MOA dimensions (diagram below) to match up to target object, estimate the number of MOAs spanned by the object. Depending on the size of object, you may have to visually estimate by comparing to 1/2 or 1/3 of a listed subtension specification.

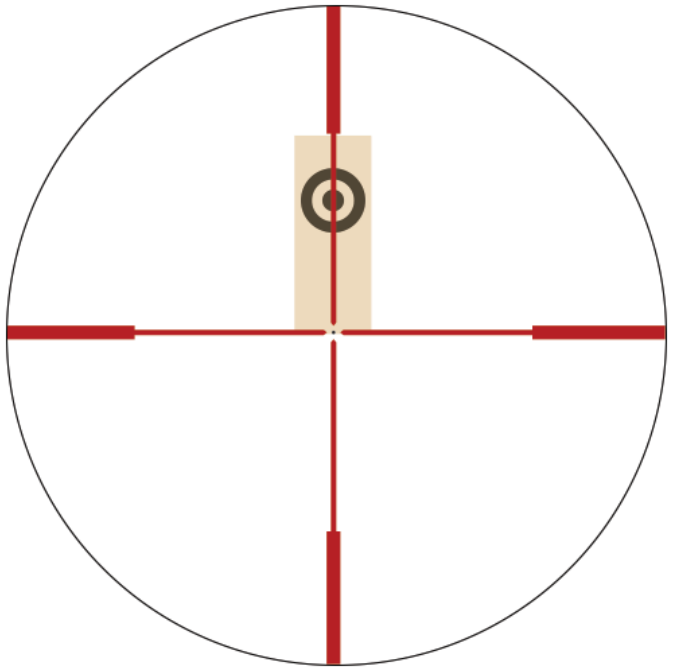
Once you have an accurate MOA reading, use the formula to calculate distance.

CQMR-1 Subtensions of Center Crosshair



Maximum accuracy in ranging will be obtained by calculating MOA measurements as closely as possible and will depend on a very steady hold. The rifle should be solidly braced using a rest, bipod or sling when measuring.

Example using Close-up of Center Crosshair



Ranging a 6-foot target (72 inches) at 30 MOAs to get 240 yards.

$$\frac{72 \text{ x } 100}{30 \text{ MOA}} = 240 \text{ Yards}$$

Maintenance

Cleaning

The Vortex Razor 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 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 Vortex Razor HD are permanently lubricated, so no additional lubricant should be applied. If possible, avoid exposing your Vortex riflescope to direct sunlight or any very hot location for long periods of time.

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

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. Re-center the scope reticle (see *Centering of the Reticle*).
2. Attach bore sighter, or remove bolt and visually boresight 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.

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RIFLESCOPE

VORTEX
THE FORCE OF OPTICS
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Vortex Service and Repair Policy

Unconditional Lifetime Warranty

Vortex Optics wants you to shoot and use your Razor HD riflescope under any conditions with complete confidence—that's why our warranty is straightforward and simple:

- Fully transferable
- No warranty card needed
- No receipt needed

Unconditional Lifetime Warranty

Rest assured, if this riflescope should ever require repair, all you need to do is contact Vortex for absolutely free service. Call 800-426-0048 or e-mail service@vortexoptics.com.

Vortex Optics
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Patents Pending
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