The Vortex® Viper® XBR™ Crossbow Scope

The Vortex Viper XBR crossbow scope is intended for extended range crossbow shooting. Using the specially-designed XBR reticle along with an uncapped, rapid travel elevation turret featuring our CRS zero stop, this scope allows crossbow shooters to either “dial up” or, alternately, quickly use the reticle for arrow drop compensation on long-range shots.

— Please read entire manual before using your new optic.
**Reticle Options**

**The Focal Plane**

All scope reticles can be termed either first focal plane (FFP) or second focal plane (SFP), depending upon their internal location within the scope. This model features the second focal plane design.

**Second Focal Plane Reticles**

Second focal plane (SFP) reticles are located near the scope’s eyepiece behind the image erecting and magnifying lenses. This style of reticle does not visually change in size when you change the magnification. The advantage of an SFP reticle is that it always maintains the same ideal visual appearance.

*Note:* The marked reticle subtensions used for arrow drop and wind drift compensation for the Viper XBR 2.5-10x44 crossbow scope are correct at a magnification of 10x.

**Crossbow Scope Adjustments**

**Reticle Focus**

The Viper XBR crossbow scope uses a *fast focus* eyepiece designed to quickly and easily adjust the focus on the scope’s reticle.

To adjust the reticle focus:

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

*Note:* Try to make this particular 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 crossbow scope. However, because your eyesight may change over time, you should re-check this adjustment periodically.

**Warning**

Looking directly at the sun through a crossbow scope, or any optical instrument, can cause severe and permanent damage to your eyesight.
Windage and Elevation Adjustments
The Viper XBR scope incorporates precision finger adjustable elevation and windage dials with audible clicks.

To make adjustments:

1. Turn the adjustment knob in the appropriate direction: Up/Down or Left/Right as indicated by the directional pointer on the turret cap.

2. Following the directional pointer on the turret cap, turn the knobs in the direction you wish the arrow’s point-of-impact to go to.

Note: After sight-in, you can re-align the zero marks on the turret knobs with the reference dots if you wish (see Indexing the Windage Dial with Zero Reset on page 18). Replace outer covers when done.

MOA Adjustments
The Viper XBR crossbow scope uses finger adjustable elevation and windage turrets with scales measured in minutes of angle (MOA). MOAs are a unit of arc measurement which approximately equal one inch at 100 yards.

The tactical-style elevation turret is designed to provide a high travel range along with rapid adjustment ability. Each click will provide 1 MOA of reticle movement. The windage turret uses a standard design with an external cap. Each click will provide 1 MOA of reticle movement.

<table>
<thead>
<tr>
<th>MOA at Common Distances</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 MOA =</td>
</tr>
<tr>
<td>1 inch at 100 yards</td>
</tr>
<tr>
<td>1/2 inch at 50 yards</td>
</tr>
<tr>
<td>1/3 inch at 33 yards</td>
</tr>
<tr>
<td>1/4 inch at 25 yards</td>
</tr>
<tr>
<td>1/5 inch at 20 yards</td>
</tr>
</tbody>
</table>

Remember that one click of the turret equals 1 MOA.
**Turret Rotation**

The Viper XBR scope incorporates Vortex’s patented **Radius Bar** to visually assist in keeping track of turret rotations. The Radius Bar provides a quick visual reference that allows the shooter to confirm:

- Knob orientation is correct and has not shifted as a result of accidental contact.
- Knob orientation is at the zero point when using the CRS feature.
- By watching the position of the bar while making elevation adjustments, the shooter is able to quickly track full, half and quarter rotations.

To get these benefits from the Radius Bar, the “0” mark on the turret must be indexed with the zero reference line on turret post (see **Setting the CRS Stop and Indexing Elevation Knob** on page 17).

**Variable Power Adjustments**

To change the magnification, turn the magnification ring to the desired level. The Vortex fiber optic magnification indicator will provide a low light reference for magnification level. A small tactile indent is provided at the 5x magnification setting for quick acquisition by the shooter.

**Illumination Adjustments**

The Viper XBR scope uses a variable intensity reticle illumination system to aid in low light performance. To activate the illumination, rotate the adjustment knob in either direction.

The illumination knob allows for 10 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.

**Replacing the Battery**

1. Unscrew the outer cap with a coin.
2. Remove the battery.
3. Replace with a new CR 2032 battery.
4. Re-install the outer battery cap and be sure to fully tighten it down.
Customizable Rotational Stop (CRS)
The Viper XBR scope elevation turrets incorporate the unique CRS rotation stop feature. After the crossbow is sighted in, the design of the CRS allows a shooter to quickly and easily return to an original zero point when using the elevation turret to dial-in temporary arrow drop corrections.

The CRS feature is particularly useful when dialing large multi-revolution elevation corrections. Without this feature, the shooter must pay very careful attention when dialing these large corrections. If the shooter loses track of the number of revolutions, the original zero point may become lost when returning the adjustment. The Viper XBR scope is equipped with the CRS allow the elevation dial to be quickly spun back to original zero without having to carefully count revolutions or clicks.

Once the CRS shims are installed after sight-in, the elevation dial will stop turning shortly past the original zero point when being returned (turning clockwise direction) from a temporary elevation adjustment. The shooter can then turn the elevation knob a partial turn in a counter-clockwise direction until the zero reference and radius bar are correctly aligned—achieving the original zero point.

See CRS shim installation in the Setting the CRS Stop and Indexing Elevation Knob section on pages 17–18 for more information.

Focus and parallax
Viper XBR crossbow scope is pre-focused at 75 yards and will be virtually free of parallax at distances of 35 to 125 yards. At distances closer than 30 yards, there may be a very slight shift of the reticle on the target (parallax) if the shooter’s eye is not centered behind the scope’s eyepiece. This shift will be two inches or less and can be eliminated by keeping the shooter’s eye centered behind the scope when shooting.

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. When the shooter’s eye is not precisely centered in the eyepiece, there can be apparent movement of the target in relation to the reticle, which can cause a small shift in the point of aim. Parallax error is most problematic for precision shooters using high magnification.
Crossbow Scope Mounting

Most modern crossbows will have a pre-installed Weaver base, so ring choice should be compatible with this type of base. The XBR scope requires 30 mm mounting rings in a medium or high height.

Due to the typically short stocks used on crossbows, Vortex highly recommends using a cantilever ring design which pushes the scope forward compared to standard rings and provides the optimal sight picture.

Note: For specific ring recommendations, please refer to the Viper XBR product page at www.vortexoptics.com.

Eye Relief and Reticle Alignment

After installing the bottom ring halves on the mounting base, place the crossbow scope on the bottom ring halves and loosely install the upper ring halves. Before tightening the scope ring screws, adjust for comfortable eye relief:

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

After aligning the reticle, tighten and torque the ring screws down per the manufacturer's instructions.

Use bubble levels to square the crossbow scope to the base. Shown on Scorpyd reverse draw crossbow.
Sighting in the XBR Crossbow Scope

For best long range ability, Vortex recommends a 30 yard zero on the center crosshair. Due to arrow trajectory, this will also equal a zero at about 8 yards. Points of impact between 8 and 30 yards will be just slightly high and may be compensated for by holding point of aim on the first reticle tick above center.

Sight In – Step 1

Once the XBR scope has been mounted, begin the initial sight-in at a distance of 8 yards. Turn the scope down to 2.5x magnification, and shoot an arrow at the target center. Try to keep your eye centered behind scopes eyepiece, as there will be some parallax at this very near distance. Most likely, you will not hit the target center with this shot.

Method A - Measure Using the Reticle

Measure the distance the arrow missed the bulls eye using the reticle hashmarks—while looking through the scope. Please note, hashmarks as seen in the reticle are marked in increments of 5 MOA, but at 2.5x these increments span 20 MOA, not 5 MOA.

Example

When looking through the scope, arrow strike from center is 1 hashmark high and 2 hashmarks right of the bulls eye.

1. Calculate amount of adjustment needed:
   Elevation: 1 x 20 MOA = 20 MOA
   Windage: 2 x 20 MOA= 40 MOA

2. Adjust the turrets:
   Elevation: Rotate turret “Down” 20 clicks.
   Windage: Rotate turret “Left” 40 clicks.

Note: Each click of the turret equals 1 MOA. Shoot another arrow to check adjustment, and repeat as necessary until arrow hits close to the bulls eye.

Method B - Measure Using a Ruler

Measure the distance the arrow missed the bulls eye using a ruler on the target, then convert the measurements to MOAs. At 8 yards, one MOA equals .08 inches—just less than 1/10th inch. The scope turrets click in one MOA increments, so each click at 8 yards distance will adjust the point of impact .08 inch (about 1/10th of an inch). Divide each measurement that you took earlier by .08 and, then, adjust the turret this number of clicks in the necessary up/down/left/right direction. Rotate the turret according to the directional pointer, turning in the direction you wish the arrow’s point-of-impact to move.

Example

Arrow strike from center is 2 inches high and 4 inches to the right of the bulls eye.

1. Calculate amount of adjustment needed:
   Elevation: 2 ÷ .08 = 25 MOA
   Windage: 4 ÷ .08 = 50 MOA

2. Adjust the turrets:
   Elevation: Rotate the turret “Down” 25 clicks.
   Windage: Rotate the turret “Left” 50 clicks.

Note: Shoot another arrow to check adjustment, and repeat as necessary until the arrow hits close to the bulls eye center.
Sight In – Step 2
Due to trajectory arc, the initial 8-yard zero will also very closely correspond to the desired final 30-yard zero. Move target back to 30 yards, adjust the scope to 5x magnification and shoot an arrow at the target center. Again pay attention to keeping your eye centered behind the eyepiece. Note: Be aware that if you used Method A, at 5x magnification each reticle hashmark increment will equal 10 MOA. If you used Method B, one MOA will equal .3 inches at 30 yards.

Example – Using Method A
Arrow strike is 1 hashmark low and 1.5 hashmarks left of the bulls eye.

1. Calculate amount of adjustment needed:
   Elevation: 1 x 10 = 10 MOA
   Windage: 1.5 x 10 = 15 MOA

2. Adjust the turrets:
   Elevation: Rotate the turret “Up” 10 clicks.
   Windage: Rotate the turret “Right” 15 clicks.

Example – Using Method B
Arrow strike is 1.2 inches low and 1.8 inches left of the bulls eye.

1. Calculate amount of adjustment needed:
   Elevation: 1.2 ÷ .3 = 4 MOA
   Windage: 1.8 ÷ .3 = 6 MOA

2. Adjust the turrets:
   Elevation: Rotate the turret “Up” 4 clicks.
   Windage: Rotate the turret “Right” 6 clicks.
   Remember that each click of the turret equals 1 MOA.

Note: Shoot another arrow to check adjustment, and repeat as necessary until arrows hit the bulls eye center. After scope has been zeroed, set the CRS zero stop and index the turret caps.

Setting the CRS Stop and Indexing Elevation Knob
After obtaining a satisfactory zero, the CRS stop can be set using the following technique:

1. Loosen the three turret cap retaining screws on the elevation turret. Gently pull the turret cap straight up and off of the turret post—being careful not to rotate the turret post.
2. Slide the CRS shims on the center section of the turret post below the V-grooved part.

Note: Shoot another arrow to check adjustment, and repeat as necessary until arrows hit the bulls eye center. After scope has been zeroed, set the CRS zero stop and index the turret caps.
4. Align the turret cap so the “0” mark on the cap matches up with the “0” reference line on the turret post. Again, be sure not to rotate the actual turret mechanism in the process.

5. Re-tighten the retaining screws, but do not overtighten. Use of thumb and forefinger on the short end of the hex wrench will provide sufficient force.

**Indexing the Windage Dial with Zero Reset**

The Viper XBR scope features a windage dial that will allow you to re-index the zero indicator after sight-in without disturbing your settings. This allows you to quickly return to your original zero if temporary windage corrections are used in the field. Index the windage dial in this way:

1. Remove the outer cap and pull the adjustment dial outward against the spring tension until it stops.

2. With the dial pulled fully outwards, rotate the dial to reposition the zero mark on the index line.

3. Release the dial, allowing it to return to the normal inward position.

Using the CRS Zero Stop

Once the CRS shims are installed, the elevation dial will stop turning shortly past the original zero point when being returned (turning clockwise direction) from a temporary elevation adjustment.

Turn the elevation knob a partial turn in a counter-clockwise direction until the Radius Bar is correctly aligned with scope axis and zero marks match. This setting will match the original zero point.

If re-zeroing at a future time, be sure to remove all CRS shims before sight-in.
How to Shoot at Extended Distances with the XBR

1. Think of arrow drop in MOAs, not inches.
The first step to successful longer range crossbow shooting is to learn to think of arrow drops in MOAs, and not inches. This has the tremendous advantage of then allowing you to easily and rapidly adjust the scope using either the MOA marks on the elevation turret or the MOA marks on the vertical crosshair.

Arrow Drop in MOAs

<table>
<thead>
<tr>
<th>MOA</th>
<th>Distance</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100 yards</td>
<td>1.0</td>
</tr>
<tr>
<td>.9</td>
<td>90 yards</td>
<td>1.0</td>
</tr>
<tr>
<td>.8</td>
<td>80 yards</td>
<td>1.0</td>
</tr>
<tr>
<td>.7</td>
<td>70 yards</td>
<td>1.0</td>
</tr>
<tr>
<td>.6</td>
<td>60 yards</td>
<td>1.0</td>
</tr>
<tr>
<td>.5</td>
<td>50 yards</td>
<td>1.0</td>
</tr>
<tr>
<td>.4</td>
<td>40 yards</td>
<td>1.0</td>
</tr>
<tr>
<td>.3</td>
<td>30 yards</td>
<td>1.0</td>
</tr>
<tr>
<td>.2</td>
<td>20 yards</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Remember that MOA is an angular measurement, and so will change value with distance changes.

2. Build a Drop Chart in MOAs
The second step is to build an MOA drop chart for your specific crossbow and arrow combination at increasing stepped distances (30, 40, 50, 60, 70 yards, etc). After establishing a 20 or 30 yard zero (see Sighting In the XBR Crossbow Scope on page 14), you can begin a trial and error process of slowly shooting at slightly further and further distances, recording the correct arrow drops as you learn them.

<table>
<thead>
<tr>
<th>360 FPS – 400 Gr. Arrow</th>
<th>Sample Drop Chart</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 yards</td>
<td>0</td>
</tr>
<tr>
<td>40 yards</td>
<td>-11 MOA</td>
</tr>
<tr>
<td>50 yards</td>
<td>-24 MOA</td>
</tr>
<tr>
<td>60 yards</td>
<td>-36 MOA</td>
</tr>
<tr>
<td>70 yards</td>
<td>-49 MOA</td>
</tr>
<tr>
<td>80 yards</td>
<td>-63 MOA</td>
</tr>
</tbody>
</table>

Refer to the sample drop charts on page 24 to get started with drop estimates, but be aware that every crossbow and arrow combination will be slightly different and you will have to spend a day at the range learning and recording your own exact drop numbers. You may find it easier to initially record your yardage drops in inches, but remember to convert these to MOAs (see the MOA chart on page 20) to use with your reticle or turrets adjustments. You may also wish to learn and record the wind drift numbers at varying ranges if you desire.

3. Adjust for Arrow Drop
Once you have built an MOA drop chart for your crossbow and arrow choice, correct for arrow drop when using the XBR scope with one of the following two methods of using the reticle or the turret.
Method A - Using the Reticle

Compensating for arrow drop and wind drift using the reticle is quick and easy, and has a big edge in hunting situations because no extra game spooking hand motion is required when adjusting for arrow drop at various distances. Simply choose your hold point on the reticle based on your MOA drop chart and then shoot.

Using a reticle for arrow drop and wind drift compensation has one important drawback that you must be aware of. In second focal plane scopes such as the Viper XBR, reticles using drop lines are sensitive to magnification and the marked MOAs on the XBR-1 reticle are only marked correctly marked with the scope set at the highest magnification (10x). At 5x, actual MOAs will be twice what is marked on reticle; at 2.5x, actual MOAs will be four times what is marked on the reticle.

Using the following technique, the XBR-1 reticle will allow you to shoot effectively with your reticle at a magnification of 5x as well as 10x so you can use whichever magnification is best for the situation at hand.

- If you are shooting with the scope set at 10x for farther distances, all MOA markings on the reticle are correct as displayed.
- If you are shooting at 5x for nearer distances (marked by a slight click detent on the magnification ring that can be felt when turning the ring), all MOA markings on the reticle should be exactly doubled. All reticle marks are in even increments for rapid and easy 2x conversion.

Example

Your drop chart indicates you need a 20 MOA holdover to make your shot. With the scope set at 5x, you should hold on the 10 MOA reticle mark which yields the actual 20 MOA that you need.

Note: When using the center crosshair, any magnification can be used. Magnification changes do not affect the zero of the center crosshair.

Method B - Using the Elevation Turret

Using the elevation turret to adjust for arrow drop is slower than using the reticle, and also entails some hand motion which could spook game in a hunting situation. There are some advantages to using a turret, though. A turret adjustment is not sensitive to scope magnification, and can be used successfully at any magnification. Simply turn the turret in the “Up” direction the required number of MOAs from your drop chart and then shoot using the center crosshair.

Note: When using a turret to adjust for arrow drop, any magnification setting can be used.

Once an MOA drop chart has been built for a crossbow, it is also possible to etch or tape a custom elevation turret which is marked in yards rather than MOAs. A yardage marked turret allows quick adjustment in the field without having to consult an MOA drop chart. If you are interested in doing this, please feel free to call our office at (800) 426-0048 or e-mail info@vortexoptics.com for options and assistance.
**Drop Chart Examples**

<table>
<thead>
<tr>
<th>Speed</th>
<th>Arrow</th>
<th>30 yards</th>
<th>40 yards</th>
<th>50 yards</th>
<th>60 yards</th>
<th>70 yards</th>
</tr>
</thead>
<tbody>
<tr>
<td>325 FPS</td>
<td>400 Gr.</td>
<td>0</td>
<td>-17 MOA</td>
<td>-36 MOA</td>
<td>-56 MOA</td>
<td>-77 MOA</td>
</tr>
<tr>
<td>360 FPS</td>
<td>400 Gr.</td>
<td>0</td>
<td>-11 MOA</td>
<td>-24 MOA</td>
<td>-36 MOA</td>
<td>-49 MOA</td>
</tr>
<tr>
<td>425 FPS</td>
<td>400 Gr.</td>
<td>0</td>
<td>-7.5 MOA</td>
<td>-16.5 MOA</td>
<td>-26 MOA</td>
<td>-37 MOA</td>
</tr>
</tbody>
</table>

These are representational examples only. Your drop chart results will vary from these examples depending on the combination of crossbow and arrow that you use.

**Maintenance**

**Cleaning**

The fully waterproof and fogproof Viper XBR scope 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 LensPen, 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 Viper XBR scope are permanently lubricated, so no additional lubricant should be applied.

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

**Storage**

If possible, avoid exposing your scope to direct sunlight or any very hot location for long periods of time.
**The VIP Warranty**

We build optics based on our commitment to your absolute satisfaction. That’s why Vortex products are unconditionally guaranteed and we make this Very Important Promise to you—a Very Important Person.

Rest assured that in the event your Viper XBR scope becomes damaged or defective, Vortex Optics will repair or replace the scope at no charge to you. Call Vortex Optics at 800-426-0048 for prompt, professional, and friendly service.

Vortex Optics
2120 West Greenview Drive
Middleton, WI 53562
service@vortexoptics.com

Visit [www.vortexoptics.com](http://www.vortexoptics.com) for more information. Canadian customers may visit [www.vortexcanada.net](http://www.vortexcanada.net) for customer service information.

**Note:** The VIP warranty does not cover theft, loss, or deliberate damage to the product.

Vortex Optics believes strongly in responsible, ethical hunting and a word should be said about long range shooting at game. Although scopes can make long distance shots much easier, there are still many other variables, such as wind, affecting every shot. It is important for hunters shooting at long distances to learn their personal effective range, particularly in windy conditions, and to not shoot beyond those distances at game. Please be responsible—the keys are knowing your rifle, ammunition and your own abilities!