

# VIPER<sup>®</sup>

RIFLESCOPE

## RIFLESCOPE MANUAL

Second Focal Plane Reticle



### The Vortex® Viper® Riflescopes

Viper® riflescopes are rugged performers built for strength and durability with a single-piece tube of aircraft-grade aluminum. Premium, fully multi-coated optics deliver the detail and color differentiation needed for hunting in any environment. Engineered and designed to perform where comparable scopes fall short, the Viper delivers. No questions asked.



## RETICLE OPTIONS

### The Focal Plane

All riflescope reticles can be termed either first focal plane (FFP) or second focal plane (SFP) according to the internal location of the reticle within the scope. This model features a second focal plane reticle design.

### Second Focal Plane Reticles

Second focal plane reticles are located near the 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.

## RIFLESCOPE ADJUSTMENTS

### Reticle Focus

Your Viper riflescope uses a fast focus eyepiece designed to quickly and easily adjust the focus on the riflescope'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.



Adjust the reticle focus

**TIP:** Try to make this particular adjustment quickly as your 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

Your Viper rifle scope features adjustable elevation and windage turret dials with audible clicks. Each audible click moves the bullet's point-of-impact 1/4 of a minute of angle (MOA). 1/4 MOA closely corresponds to 1/16 inch at 25 yards, 1/8 inch at 50 yards, 1/4 inch at 100 yards, and 1/2 inch at 200 yards.

### Example

It will take four (4) clicks to move the bullet's point-of-impact approximately one inch at 100 yards.

To make turret adjustments:

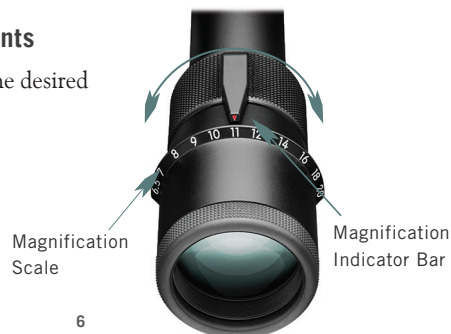
1. Remove the outer turret covers.
2. Turn the turret in the appropriate direction: up/down or left/right as indicated by the arrows.
3. Following the directional arrows, turn the dials in the direction you wish the bullet's point-of-impact to go to.



**TIP:** After sight-in, you can re-align the zero marks on the turret dials with the reference dots if you wish (see *Indexing Adjustment Dials with Zero Reset* on page 12). Replace the outer covers when done.

## Variable Power Adjustments

Rotate the indicator bar to the desired magnification.



## Using the Side Focus

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.

Select Viper riflescopes (PA models) feature a side focus dial to adjust for maximum image sharpness and eliminate parallax error. Models without the side focus adjustment and are factory-focused at a distance of 100 yards.

Setting the side focus:

1. Be sure the reticle is correctly focused (see *Reticle Focus* on page 5).
2. Turn the side focus adjustment dial until the target image is as sharp as possible. The yardage numbers referenced on the dial should closely match the actual yardage to the target.
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.



## RIFLESCOPE MOUNTING

To get the best performance from your Viper 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

Viper riflescopes are available with either a 30 mm or 1-inch tube so select the ring size that matches the tube diameter of your riflescope. 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 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 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.

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.



Visually bore-sighting a rifle.

## Final Range Sight-In

After you have bore sighted your rifle and scope, you should go to the range and do a final sight-in using the exact ammunition you expect to use while shooting. Sight in and zero your riflescope at the preferred distance. 100 yards is the most common zero distance, although a 200-yard zero may be preferred for long range applications.

1. Be sure the reticle is in focus (see *Reticle Focus* on page 5) and set the side focus adjustment (if present) to match the distance being used for sight-in.
2. Following all safe shooting practices, fire a three-shot group as precisely as possible.
3. If the shot group is not centered on the bullseye, adjust the point-of-aim using the windage and elevation turrets (see *Windage and Elevation Adjustment* on page 6).

**TIP:** 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 the bullet group is not centered, repeat Step 3.

This procedure can be repeated as many times as necessary to achieve a perfect zero.

### Indexing Adjustment Dials with Zero Reset

Viper riflescopes feature windage and elevation dials that allow you to re-index the zero indicator after sight-in without disturbing your settings. Though not a required process, resetting the windage and elevation dials allows you to quickly return to your original zero if temporary corrections are dialed in the field.

Reset the windage and elevation dials in this way:

1. Remove the outer cap.
2. Pull the adjustment dial outward against the spring tension until it stops.
3. With the dial pulled fully outwards, rotate the dial to align the “0” with the etched indicator line on the scope.
4. Release the dial, allowing it to return to the normal inward position.
5. Replace the turret cap.

Align the “0” with the indicator line.



## MAINTENANCE

### Cleaning

The fully waterproof and fogproof Viper 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 such as the Vortex Fog Free cleaning products or LensPen.

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

### Lubrication

All components of the Viper riflescope 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 the scope may void the warranty.

### Storage

If possible, avoid storing your scope in 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 that the correct base and rings are being used and are in the correct orientation. Be sure that the base screws and rings are tight. An insufficient windage or elevation adjustment range may indicate problems with the rings, base, base alignment, 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 the bore sighter, or remove bolt and visually bore sight the 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.

### Tips for Solving Bullet Grouping Problems

- 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.

## 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 becomes damaged or defective, Vortex Optics will repair or replace the riflescope at no charge to you. If we cannot repair your riflescope, we will replace it with a riflescope in perfect working order and in equal or better physical condition. 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](mailto: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 loss, theft or deliberate damage to the product.



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