

VORTEX
THE FORCE OF OPTICS®

VIPER® HS™
RIFLESCOPE



RIFLESCOPE MANUAL

Second Focal Plane Reticle

The Vortex[®] Viper[®] HS[™] Riflescopes

Specifically designed for the most discriminating hunters and shooters, the Vortex[®] Viper[®] HS[™] series of riflescopes offer the highest levels of performance and reliability. With features such as 4x optical zooms, generous long eye relief, and ruggedly constructed, single-piece main tubes. The Viper HS riflescopes are ready for any situation.



RETICLE OPTIONS

The Focal Plane

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

Listed reticle subtensions used for estimating range, holdover, and wind drift correction are accurate at the highest magnification. **Note:** Listed BDC reticle subtensions for a 6-24x50 model are accurate with the magnification set at 18x.



6-24x50 Model

The red dot indicates the magnification to use with the Dead-Hold BDC reticle (BDC model only).

RIFLESCOPE ADJUSTMENTS

Reticle Focus

The Viper HS riflescopes use a *fast focus* eyepiece designed to quickly and easily adjust the focus on the riflescope's 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.
- **Note:** Try to make this particular adjustment quickly, as the eye will try to compensate for an out-of-focus reticle.



Adjust the reticle focus

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.

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 Viper HS riflescope incorporates 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 1/4 inch at 100 yards, 1/2 inch at 200 yards, 3/4 inch at 300 yards—taking four (4) clicks to move the bullet's point-of-impact approximately one inch at 100 yards.

To make adjustments:

1. Remove the outer 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.



Note: 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 outer covers when done.

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.



Using the Side Focus

Select Viper HS riflescopes use a side focus adjustment which provides maximum image sharpness and eliminates parallax error. The Viper HS 2.5-10x44 riflescopes do not use side focus adjustments and are pre-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 knob until the target image is as sharp as possible. The yardage numbers referenced on knob 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.



Adjust the side focus knob

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.

RIFLESCOPE MOUNTING

To get the best performance from your Viper HS 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

Mount an appropriate base and matching rings to your rifle according to the manufacturer's instructions. Viper HS riflescopes require 30 mm rings.

Use the lowest ring height that will provide complete clearance of scope and rifle—avoiding any 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.

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

Using bubble levels to square the riflescope to the base.



Bore Sighting

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

To visually bore sight a rifle:

- Place the rifle solidly on a rest and remove the bolt.
- Sight through the bore at a target approximately 100 yards away.
- Move the rifle and rest until the target is visually centered inside the barrel.
- 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 the riflescope has been bore-sighted, final sight-in should be done at the range using the exact ammunition expected to be used while shooting. Sight in and zero the 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.

Note: 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:

- Following all safe shooting practices, fire a three-shot group as precisely as possible.
- Next, adjust the reticle to match the approximate center of the shot group (see *Windage and Elevation Adjustment* on page 6).

Note: 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.

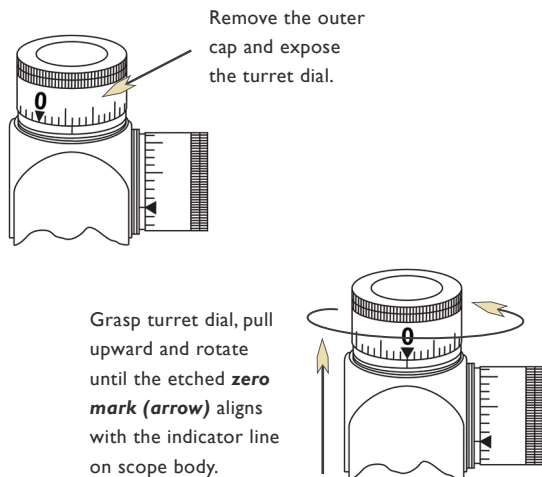
- Carefully fire another three-shot group and see if the bullet group is centered on the bullseye.

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

Indexing Adjustment Dials with Zero Reset

Viper HS riflescopes feature windage and elevation dials 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 corrections are used in the field. Index the windage and elevation dials 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.



MAINTENANCE

Cleaning

The fully waterproof and fogproof Viper HS rifle 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 HS riflescopes 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 rifle scope. Disassembling of rifle scope may void warranty.

Storage

If possible, avoid exposing your Vortex rifle scope 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 that correct base and rings are being used in the correct orientation, and that the base screws and rings are tight. Insufficient windage or elevation adjustment range may indicate problems with rings, base, base alignment, base mount holes drilled in the rifle's receiver, or barrel/receiver alignment.

Check for Correct Base and Ring Alignment

- Roughly center the reticle by adjusting both windage and elevation turrets to the mid point of their travel ranges.
- Attach bore sighter, or remove bolt and visually boresight rifle.
- 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 HS riflescope becomes damaged or defective, Vortex Optics will repair or replace the riflescope at no charge to you. Call Vortex Optics at 800-426-0048 for prompt, professional, and friendly service.



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Visit www.vortexoptics.com for more information. Canadian customers may visit www.vortexcanada.net for customer service information.

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

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