



RETICLE MANUAL

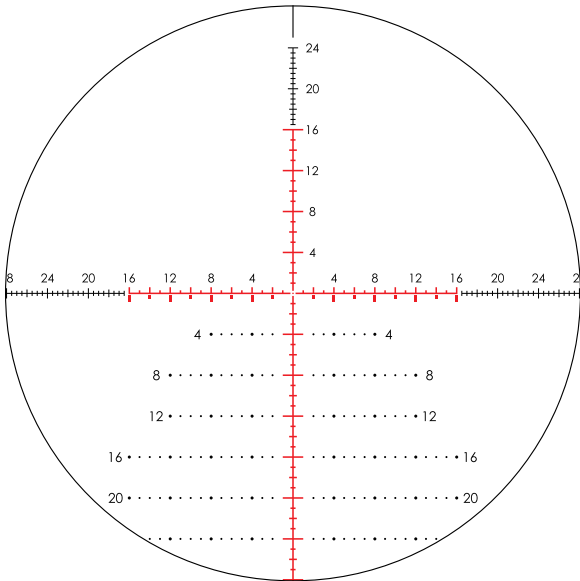
XLR-2

MOA RETICLE

RAZOR® HD LHT™

VORTEX® XLR-2 MOA Reticle

Designed to maximize long-distance shooting and ranging abilities, the XLR-2 reticle can be used to effectively determine ranges, holdovers, windage corrections, and moving target leads. Ultra-precision etching on the glass reticle ensures that specifications are kept to the tightest tolerances possible. The fine center crosshair subtensions were carefully chosen to provide the optimum balance between precision aiming and low-light visibility. Includes windage reference dots on drop lines.



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

MOA Subtensions

The XLR-2 MOA reticle is based on minute of angle (MOA) subtensions. MOA measurements are based on degrees and minutes: 360° in a circle, 60 minutes in a degree for a total of 21,600 minutes. These angular measurements are used to estimate range and correct for bullet-drop in riflescopes. An MOA will subtend 1.05" at a distance of 100 yds. (29.1mm at 100m). Most riflescopes with MOA adjustments use .25 minute adjustments which subtend .26" at 100 yds. (7.3mm at a 100m), 0.52" at 200 yds. (14.6mm at 200m), 0.78" at 300 yds. (21.9mm at 300m), etc.

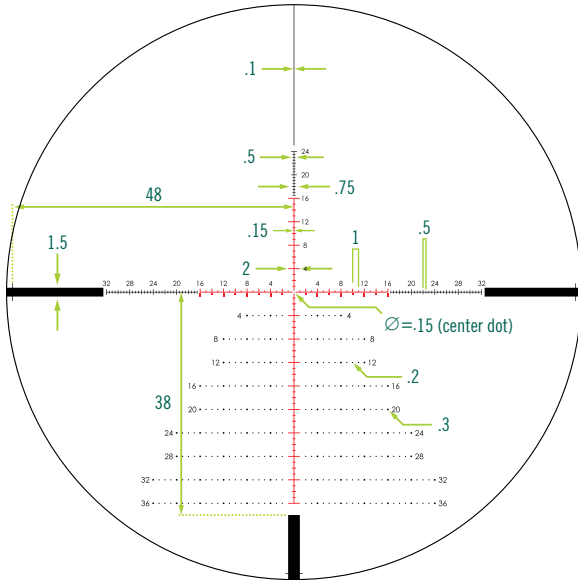
Estimating MOA

Although 1 MOA is very commonly corresponded to 1" at 100 yds., this is not quite correct: 1 MOA at 100 yds. equals 1.05". Calling 1 MOA an inch per 100 yds. may be acceptable at shorter distances, but it will cause a five percent error in ranging and holdover adjustments. This will result in missed shots at longer distances.

First Focal Plane Reticle

In First Focal Plane riflescopes, the listed MOA subtensions of the XLR-2 MOA reticle are valid at all magnification levels. This means the shooter can use the magnification level most appropriate for the situation and still have effective holdover and windage reference marks.

Reticle Subtensions



**Subtensions measured in MOA.
Reticle image shown for representation only.**

RANGING

MOA measurements are very effective for ranging using a simple formula. To use this formula, the shooter needs to know the size of the target or nearby object in inches.

MOA Ranging Formulas

$$\frac{\text{Target Size (yds.)} \times 95.5}{\text{Measured MOA}} = \text{Range (yds.)}$$

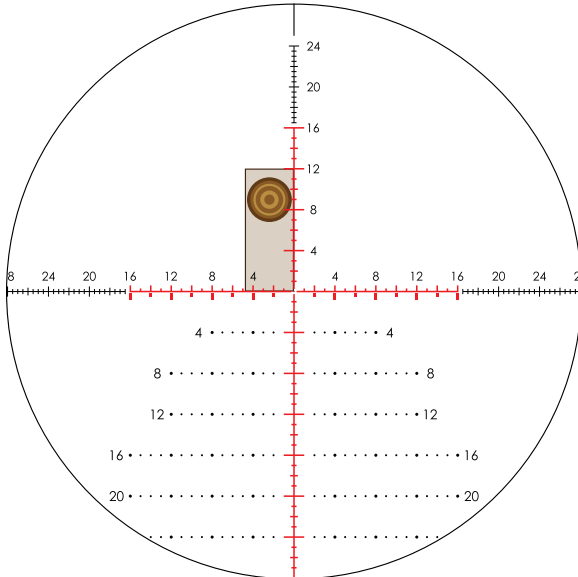
$$\frac{\text{Target Size (cm)} \times 34.4}{\text{Measured MOA}} = \text{Range (m)}$$

Using either the vertical or horizontal MOA scale, place the reticle on a target of known dimensions and read the number of MOA spanned. You will obtain maximum accuracy in ranging by calculating exact MOA measurements. MOA should be estimated in quarters if possible.

Accurate measuring will depend on a very steady hold. The rifle should be solidly braced using a rest, bipod, or sling when measuring. Once you have an accurate MOA reading, use any of the listed ranging formulas to calculate distance.

Note: In the MOA ranging formula, a shooter may substitute 100 for 95.5 in the interest of speedier calculations. Be aware that this will produce a five percent over-estimation error of the yardage distance obtained.

Ranging Example



Ranging a 6" target (72") at 12 MOA yields 573 yds.

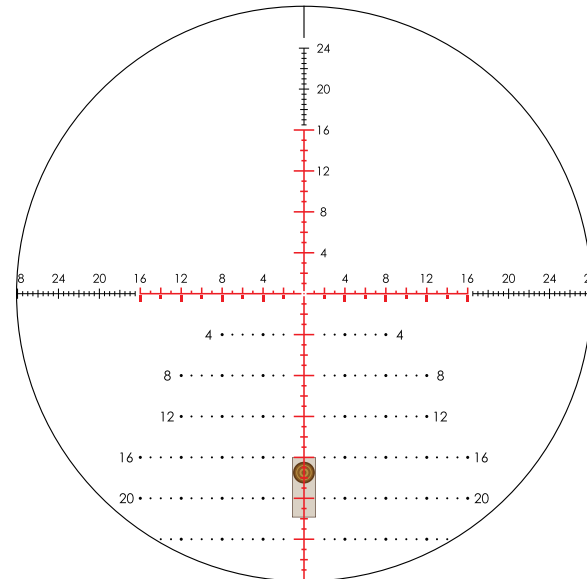
$$\frac{72" \times 95.5}{12 \text{ MOA}} = 573 \text{ yds.}$$

Elevation Holdovers

Once the distance has been calculated using the reticle or a laser rangefinder, the reticle can be used for rapid holdover correction for bullet-drop of the cartridge being used. To get the most benefit out of the XLR-2 equipped riflescope, Vortex Optics highly recommends shooters learn their bullet-drop numbers in MOA rather than inches.

Since these reticles are scaled in MOA, it is an easy job to quickly select the correct drop reference line once the shooter knows the bullet-drop and windage/lead corrections in MOA. If the shooter prefers to dial for bullet-drop using the elevation turret, knowing bullet-drop in MOA will allow for much faster adjustments as the MOA can be quickly read on the elevation turret.

Example



17.5 MOA correction for 625 yd. shot. No wind.

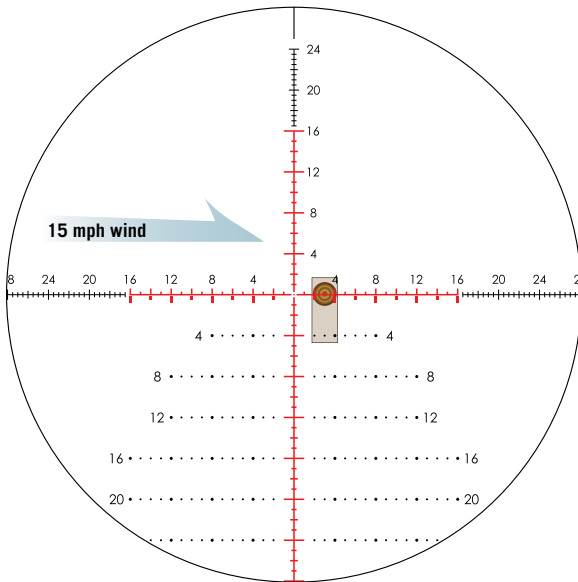
Windage and Moving Targets

The XLR-2 MOA reticle is highly effective when used for wind and moving target leads. Using the reticle for effective windage and moving target leads requires thorough knowledge of your weapons system's ballistic performance under varying conditions and experience in reading wind strengths and target speeds. As with bullet-drop, it is important for the shooter to learn a particular weapon's windage/moving target corrections in MOA rather than inches. Always hold the reticle into the wind.

Basic Windage Correction on Center Crosshair

When dialing elevation, use the center horizontal crosshair for windage or moving lead corrections.

Example

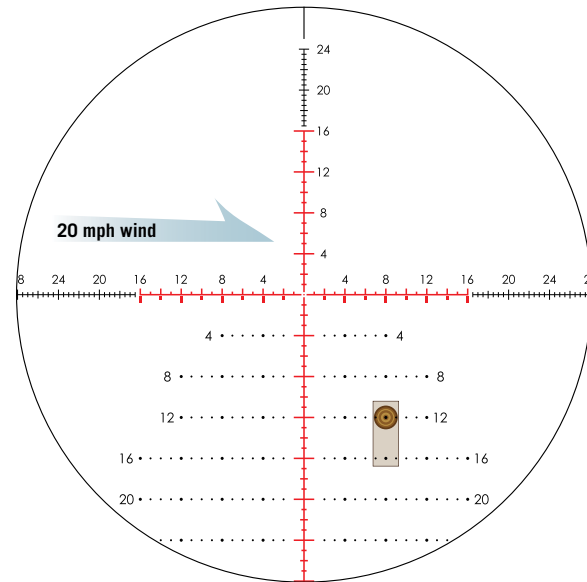


3 MOA correction for 15 mph wind at 700 yds. Elevation already dialed into turret.

Basic Windage Correction Using Drop Line on Reticle

When using the reticle for elevation correction rather than dialing, the MOA marks on the center horizontal crosshair can still be used to help visually reference windage corrections. Remember to hold the reticle into the wind.

Example



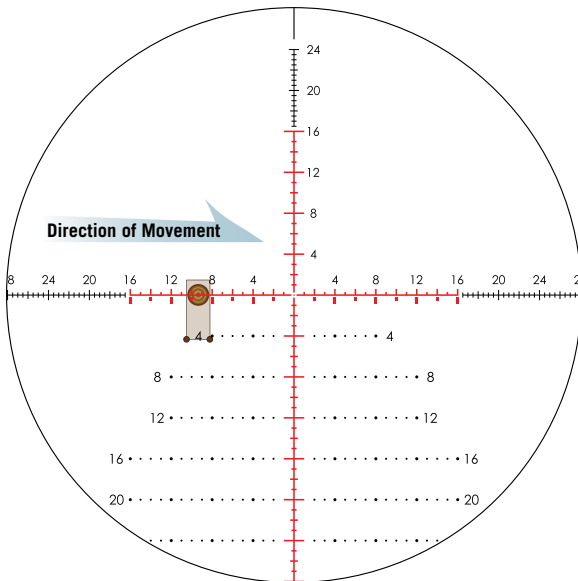
8 MOA correction for 20 mph wind using 12 MOA drop line at 500 yds.

Basic Moving Lead Correction

When estimating moving target leads, use the MOA marks on the center horizontal crosshair. Estimating moving leads will require knowing yardage distance, wind speed, moving target speed, and total bullet flight times including rifle lock time. Bullet flight times can be roughly calculated based on FPS velocities or a ballistic calculator.

Note: Correctly estimating moving leads is very difficult and requires considerable practice and knowledge beyond the scope of this manual.

Example



9.4 MOA correction for a target moving at 3 mph at 800 yds. No wind.
Total bullet time of flight from trigger pull is 1.5 seconds during which the target travels 6.6'.
Elevation already dialed into turret.



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