

K98 Sniper Scope Reproduction (No.1001)



*Note; it has come to our attention that many consumers believe that all “reproduction” optics emanate from one Asian manufacturer but are sold by a variety of companies. This is **not** the case at all, in fact there are several manufacturers of these optics located in the same geographical area of the world. Subsequently, not all reproduction optics are made the same or to the same quality. Red Star Mountain (RSM) uses known vendors and stringently controls the quality of all of its products to ensure consistency. Our products are manufactured as close to the originals as possible. Keep in mind that we do not have the original manufacturing drawings; rather we use original samples as models for our products. At times this can lead to missteps but we try our best to make our products as accurate and authentic as we possibly can.*

In 1939 the Third Reich which was already deeply committed to its expansion through force strategy commissioned the development of a new combat sniping optic; the ZF39. By this point the German army had extensive experience with sniper rifles and specifically optics having employed many during WWI. The development of the ZF39 was an attempt to develop a simple to use reliable and robust optic for use on precision rifles. The ZF39 became known as the “turret” optic or scope as it did not have the traditional adjustments, rather it featured what is known today as a “bullet drop compensator” which allowed the sniper to merely dial on the range to the target, hold for wind and fire. On these systems, windage adjustments were made in the mounts rather than on the optic, thus the individual sniper could not make any adjustment for windage while in the field. This system generally found great favor with the users as it was faster and more robust than many of the previously fielded commercial hunting scopes.

Initially the ZF39 was produced by Zeiss Zielvier and was intended to be specifically used on the Karabiner K98. The development of the ZF39 included a variety of mounts and was issued in various magnifications (3 and 4 power). While the optic was very good, the mounts proved challenging to the German Army, this was partly due to differences in rifles and how the rifles were used. Additionally, there were many optics and systems in use during this period and subsequently the quality of the ZF39 was not as recognized as it should have been.

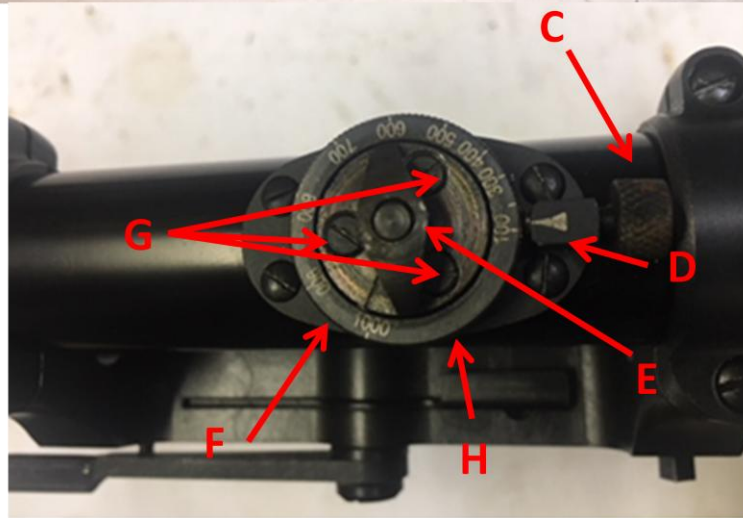
We highly recommend that the purchasers of our product fully research the ZF39 scope in any number of publications or online sources to learn more about how the optic functions, is mounted, zeroed and used. This document will provide a modicum of relevant information concerning our product for informational purposes.



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DESCRIPTION OF PARTS



***Note; pictured optic is for demonstration purposes only, the current production model may be slightly different, additionally the optic is pictured with optional mount*

ITEM	DESCRIPTION	COMMENTS
A	Ocular Lens	Also known as the "eyepiece"
B	Objective Lens	
C	Elevation Locking Screw	Used to lock the range down
D	Range Index Line	Indicates what range the optic is set to
E	Focus Adjustment	Used to focus on the target
F	Range Scale	In meters
G	Elevation Adjustment Wheel Zeroing Screws	Used to "slip" the Elevation Adjustment Wheel back to the zeroed range (<i>Allows the shooter to make the elevation adjustment read correctly</i>)
H	Elevation Adjustment Wheel	Used to apply changes in range

SPECIFICATIONS

ITEM	SPECIFICATION
Model	K98 SNIPER ZF39 SCOPE REPRODUCTION
Part Number	1001
Markings	Zielvier Nr. XXXX Jena (Similar to the original)
Material/s	Steel main tube (Same as the original)
Coating	Black (Similar to the original)
Magnification	4x (Same as Original)
Ocular size (diameter)	1.265in / 32.1mm (Same as the original)
Objective size (diameter)	1.125in / 28.5mm (Same as the original)
Eye relief	3.75 in / 95.25mm (Similar to the original)
Field of view (FOV)@100 yds	~26' (Similar to the original)
Tube diameter	26.5mm (Same as the original)
Weight (scope only)	14.1oz / 400g (Similar to the original)
Elevation (range) adjustment value	50 meters per mark beginning at 100 meters ending at 1000 meters (based on issued 7.92x57mm ammunition, 197 grain/12.8 grams at 2,493 ft/s/760 m/s) (Same as the original)
Windage (Deflection) adjustment value	NA – all windage adjustments are done in the mounts during the zeroing process
Amount of elevation (range) adjustment	~40 moa (Same as the original)
Amount of windage (deflection) adjustment	NA – all windage adjustments are done in the mounts during the zeroing process (Same as the original)
Reticle	Pointed post and horizontal side bar



MOUNTING AND ADJUSTMENTS

The adjustments of the RSM ZF39 are identical to the original optic. We highly encourage buyers of this product to research these precision optical sighting devices prior to making any adjustments on the product to avoid damage and to ensure proper function. This document is not intended to be historical in nature, nor is it a complete instruction manual for the installation or use of the optic as those directions may be found in a wide variety of historical books and publications. That said, we do feel that some information should be provided to allow our customers to develop a basic understanding of how the product functions and how it can be used.

NOTE: RSM is not liable for misuse or incorrect adjustment of its products; users MUST understand how to correctly mount, adjust and use the product prior to doing so. Given that this product is an accurate reproduction of an historical device, we feel that the information is readily available and should be consulted prior to using the product.

MOUNTING

GENERAL

It is highly recommended that the mount for this optic and the optic itself be mounted by a competent gunsmith especially if mounting to a rifle not originally configured for the mount. Attempting to mount this optic and its mount by an inexperienced person is at the risk of the owner of the product and not the responsibility of RSM.

Installation of the mount and subsequently the optic must be in line with the bore of the rifle. Incorrect or "off axis" mounting of the optic and/or its mount will result in poor accuracy and/or the inability to make the necessary corrections for sighting and/or wind conditions.

All mounting must be secure and tight prior to making any adjustments and/or firing the weapon. Specific torque values for the optic rings and the mount to rifle screws should be researched and applied, however care must be taken not to over tighten and subsequently damage either the mount and/or the optic.

BASES

There are a variety of optic bases (mounts) that can be used with the ZF39, each base (mount) will require specific procedures for mounting them correctly to the host weapon. Which base or system the user chooses to use is entirely up to them. RSM manufactures and sells a selection of period correct mounting solutions for the K98 and similar weapons systems. Mounting a base to the rifle (K98 or similar) requires that the base be correctly positioned on the rifle receiver and holes must be drilled and tapped into the receiver; this is a permanent alteration of the firearm and thus should not be attempted without the proper tools and knowledge.

As stated, RSM offers a variety of period representative mounts for the ZF39 Sniper Scope, thus it is up to the user to determine which mounting system meets their specific needs and objectives.

1. LSR Side Mount No. 1009 (or No. 1004 if ordered as a kit): This mount attaches to the side of the rifle receiver and was designed specifically for use with the ZF39 and was used extensively in WWII. It allows the optic to be removed from the rifle allowing the

iron sights to be used. Snipers would have appreciated this feature when/if the optic became damaged in combat or at times such as during movement when the sniper did not want the enemy to easily identify them as snipers. Additionally, airborne snipers would have liked this feature when conducting airborne operations as it allowed them to remove the optic to avoid damage during the insertion. The downside to this mount is that due to the ability to be removed, snipers would have questioned the retention of the optic/rifle zero and would have done extensive testing to confirm or deny that removing and replacing the optic would or would not yield a repeatable zero. The LSR mount uses two piece rings that allow the optic to be removed from the rings for repair or replacement in the field which was an important feature during the war. As with most European mount/optics of the period, windage adjustments are built into the mounting system rather than into the optic as found with US or even UK optics.

2. Mauser Sniper Scope Mount with Split Rings (No. 1008 or No. 1002 if ordered as a kit):

This type of mounting system was in use for many years by a wide variety of users in Germany prior to and throughout WWII. This mounting system was carried over from hunting rifles of the period and used on a wide variety of rifles and optics. This type of mount is typically very secure and lends itself well to harsh treatment such as military use. The split rings allow the optic to be removed from the bases for repair or replacement. In this system, the bases are mounted to the top of the rifle receiver with machine screws; the rings are mounted to the optic as a system. The front ring has a mounting or alignment bayonet on the bottom which is placed into the front base at 90 degrees, then the optic is rotated towards the rifle until the rear ring aligns with the rear base at which point the locking lever is rotated downward locking the optic/rings into place. The bases do feature a hole through the center to allow the use of iron sights (with the optic mounted or removed typically). This style of mounting is exceptionally robust and reliable and is said to have been favored by the more experienced and skilled snipers of the time.

3. German K98 Rifle Scope Mount Set/Closed Loop (No. 1007 or No. 1003 if ordered as a set): Very similar to #2, this mounting system was a carryover from hunting rifles of the period. The main difference in these two mounts is that the closed loop design must be mounted directly to the main tube of the optic which requires some disassembly of the optic itself. This system was designed for 2 specific purposes, first is that the closed loop design does not lend itself to any loosening of the optic, thus the optic remains firmly fixed and attached to the rifle. This equates to more reliability and zero retention. Secondly, this design was/is very aesthetically pleasing and found great favor with very expensive high-end hunting rifles of the period. In many instances, these rings were engraved ornately along with the rifle itself. The bases are attached to the weapon in the same fashion as #2 and the optic (with rings) is attached to the bases similarly. The drawback of this design is that if the rings are not attached to the optic correctly (as in the scope is level when mounted, there is little recourse).

4. German K98 K98K Mauser Double Claw Sniper Scope Mount (No. 1006): Like the others, this mount had its origins in the hunting community prior to being adopted for military use. The design features 2 "hooks" or "claws" under each ring that are inserted into their respective bases with the rear set being captured by a spring assisted "latch". The intent here was to allow for a quick yet repeatable method to attach and remove the optics. The rings are built as units and require the optic to be partially disassembled for installation, however they do feature a split clamping (compression) mechanism which allows the optic to be leveled during/post installation.

5. German K98 Mauser BNZ Single Claw Sniper Scope Mount (No. 1005): This mount features a single claw on each ring assembly as well as a retention screw on the rear base to affect solid mounting. The bases must be mounted to the rifle receiver after



which the optic with rings can be attached. Like #4 and 5, these rings require partial disassembly of the optic for installation. Additionally, these rings are of the split or “compression” variety as they allow the optic to be rotated to level once mounted to the rifle.

RSM is not responsible for any damage incurred while attempting to mount any of its products to any firearm.

RINGS

As noted above, there are basically 3 styles of rings used with the ZF39;

- Two piece
- Closed loop
- Split

Depending on which style of ring is being used, specific instructions apply toward ensuring that the optic will be level once mounted onto the weapon.

Given that closed loop and split style rings require the partial disassembly of the optic, it is beyond the scope of this document to provide specific instruction as to how to properly disassemble and mount the rings. However, with regards to the compression style rings, users should ensure that once the rings are on the main tube of the optic and the optic with rings are attached to a weapon, the optic be rotated level with the weapon and the compression screws are tightened.

The LSR mount features rings that are the two piece design in that the tops of the rings are removable and allow the optic to be assembled or replaced easily. Each ring cap features 2 screws which must be removed, once both caps are off the optic can be laid into the ring bases, the caps reinstalled, the optic leveled and the screws tightened. Another advantage of this type of mount is that the eye relief can be somewhat adjusted for an individual sniper allowing the movement of the optic forward and rearward slightly.

Each mount requires its own method of attaching the optic with rings its respective mount. RSM encourages users to research their chosen mounting system for specific instructions.

OPTIC ADJUSTMENT

The ZF39 was very unique for its time in that it featured a “Bullet Drop Compensator” or BDC. This system allowed the sniper to quickly compensate for various ranges by merely turning the elevation drum to the required range (hundreds of yards), compensate for wind and fire. It was and remains to be a very effective tool for combat snipers. Due to this feature however, snipers were not able to “fine tune” their elevation adjustment for environmental conditions, shooter tendencies, changes in ammunition, etc. Regardless, it appears that German snipers found this feature to be very useful and applied it with deadly results.

There are essentially 2 adjustment activities that users of this product will experience; proper zeroing of the optic and adjustments for range and/or wind.

Zeroing the optic:

****NOTE 1: All instructions are relative to properly installed mounts; they must be centric to the bore of the rifle.***



****NOTE 2: Please observe all firearms safe handling procedures while using this product on a weapon. RSM is not responsible for any accidental or negligent firing of a weapon while attempting to use its products.**

PREEQUISITES

- Unloaded firearm in good working condition (consult a competent professional to determine if your weapon is capable of firing live ammunition).
- A quantity of the appropriate ammunition (please research the caliber and ballistics of the ammunition to determine the ballistic specifics as there are many choices)
- The optic securely mounted to the weapon
- An applicable range supporting center fire rifle fire out to 109 yards or 100 meters minimum
- Applicable target/s
- Appropriate hearing and sight protection

Procedures

1. Load the rifle
2. Using appropriate marksmanship techniques, fire at a distinct distant aiming point (Point of Aim – POA)
3. After the recoil cycle, operate the bolt and reload the weapon
4. Repeat #2 (disregard the first point of impact unless it is not on the target at all)
5. Repeat #3
6. Repeat #2
7. Unload the weapon
8. Move to the target (or use optics) and determine the distance and direction that the shots (Point of Impact – POI) struck the target in reference to the aiming point
9. Using the elevation drum on the optic and the windage screws on the base adjust the aiming point in desired direction to the desired amount as indicated by center of the POI
 - Elevation
 - Unscrew the elevation locking screw
 - Rotate the elevation drum in the desired direction
 - Relock the elevation locking screw
 - Windage
 - Unscrew the adjustment slightly on the mount of the desired direction of adjustment (i.e. if the rear of the optic needs to be moved to the right (thus moving the POI to right), unscrew the right screw slightly such as ¼ turn.
 - Screw in the other side adjustment screw thus pushing the base in the desired direction
 - Tighten up both screws
10. Repeat steps 1 – 9 as many times as necessary to ensure that the POA and POI are the same.
11. Confirm zero (readjust if necessary)

Once the rifle is zeroed, the BDC must be adjusted to read correctly. The following steps should be followed.

1. Unscrew the top 3 elevation locking screws (**do not remove them**)
2. Rotate the elevation drum to the zeroed range (i.e. 100m)

3. Tighten the 3 elevation locking screws

Note: it is ideal to zero the rifle in “no wind” conditions so as not to induce a consistent error into the optic adjustments. Zeroing at a near target (such as 25 or 50 yards) will essentially negate the effect of wind, thus providing a better zero as it relates to wind however this may not yield the desired results at distant targets. It is highly recommended that if the rifle is zeroed as close as 25 or 50 meters that it be shot at 100 meters to confirm zero as this will have a direct impact on the accuracy of the BDC (elevation drum).

Adjustments for firing conditions:

While using the optic/rifle it may become necessary to make adjustments to compensate for range (distance) and wind (deflection). With the ZF39 this is relatively straight forward assuming the optic has been properly zeroed. Note: changes in ammunition type, bullet weight, and/or velocity will have a direct affect on the value of the adjustments of this optic. Additionally, users may see changes in the adjustment value as a result of environmental conditions and/or induced human error. In short, just because the elevation drum reads a specific range, it does not essentially mean that the round will hit dead center each and every time. Users must understand that this optic was designed to be used by trained marksman who compensated for a wide variety of factors constantly.

The ZF39 was designed to be adjusted for range (distance) frequently; however it was the shooter’s experience and training that allowed him to hold off the target enough to allow the round to hit the intended target quickly in combat conditions. This has been referred to as “Kentucky windage”, and with practice will yield very successful results. The ZF39 can and should be adjusted for differences in range (distance) using the BDC, however users should understand that these adjustments are relatively coarse and are not designed to deliver POA/POI hits at every range. Specifically, the ZF39 does not provide adjustments for any range under a 50 meter increment; ergo it is the sniper’s responsibility to understand how to cope with mid ranges engagements. At nearer ranges (200 and under) this is not an issue however at further ranges shooting results may not be as expected or desired if the shooter merely dials a range and fires.

Procedures (elevation)

1. Determine the range to the distant target in meters
2. Index the range on the optics BDC
 - a. Unscrew the elevation drum locking screw
 - b. Rotate the elevation drum to the desired range
 - c. Tighten the elevation drum locking screw
3. Position the reticle at this point (up, down, left, right or any combo thereof)
4. Engage the target
5. Repeat as necessary

Procedures (windage)

1. Determine the range
2. Determine the wind value and direction
3. Using ballistic charts or software, determine the correction in minutes of angle (MOA)
4. Convert to inches (1 MOA = 1 inch @ 100 yards, 2 inches @ 200 yards, etc. OR 1 MOA = 3 cm @ 100 meters, 6 cm = 1 MOA @ 200 meters, etc.)
5. Place the reticle the distance into the wind the amount determined from step #4
6. Engage the target
7. Repeat as necessary

THE RETICLE

As with many reticles of the past and certainly of current times, the reticle in the ZF39 had more uses than just as an aiming mechanism. As shown in the below picture taken from the 1943 German sniper training manual, this illustration titled “illustration to estimate distance using telescopic sight” the reticle was quite adept at helping the sniper to identify the range to his target.

As depicted and using modern sniper techniques and understanding, it appears that the width from the center of the point of the vertical post and the edge of either horizontal post is approximately 19 MOA.

