BROWE

TACTICAL OPTICS

Operator Manual for the 4x32 BROWE Tactical Optic (BTO)

May 2017

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WARNING SUMMARY

This section contains general safety warnings that must be understood and applied during operation and maintenance of this equipment. Failure to observe these precautions could result in serious injury or death.

Warning: Before installing the 4x32 BTO, ensure the weapon is CLEAR. Start by pointing the muzzle in a designated SAFE DIRECTION. Place the selector lever on SAFE. Visually inspect the receiver and chamber to ensure these areas contain no ammunition, failure to do so may result in injury or death.

Warning: Batteries, if not properly stored or used, may cause property damage or personal injury. If a conductive material (e.g. jewelry, keys, or coins) touches exposed terminals, it may complete an electrical circuit causing heat or even fire. To prevent such hazards, you must exercise special care in handling lithium batteries. Store batteries in a cool, dry, and ventilated area, and keep them in original packaging until ready to use. Do not place loose batteries in a pocket, purse or other container containing metal objects; do not store them with other hazardous or combustible materials. Do not disassemble or puncture batteries; do not dispose with other waste unless permitted by applicable laws and regulations.

INTRODUCTION

BROWE, Inc. is a manufacturer of premium quality optical systems for military, law enforcement, and general shooting. Founded in 2009, BROWE produces optical solutions for defense, industrial, and commercial applications. The company designs, sources and manufactures Commercial-of-the-shelf optics in the United States with sales worldwide.

4x32 BROWE Tactical Optic (BTO)

The 4x32 BROWE Tactical Optic (BTO) is a state-of-the-art optic that delivers high-quality optical glass, high precision machining, and a rugged military design all packaged in a versatile 7075-T6 aluminum forged housing. The 4x32 BTO provides a tactical advantage while exhibiting modern design features and qualities superior to any other combat optic available. The design features were based on years of research and development along with operator feedback. Every feature was designed to better sever the operator and increased hit potential in all lighting conditions.

The 4x32 BTO offers a modern designed combat optic with features such as our **Target Light Sensor Technology** that detects and measures the target light passing through the optic and automatically adjusts the reticle illumination to the ideal intensity. A **Single Intuitive Control** (SIC) that gives the user a simple button, designed to simulate muscle memory and expedite manual operation. A utility port gives access to a programmable **Microcontroller** and allows the option to customize the firmware, power accessories, and attach a pressure pad switch that controls the SIC button at an alternate location on the weapon.

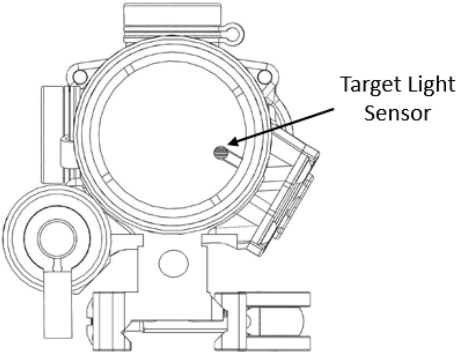
SPECIFICATIONS

Magnification: 4x
Entrance Pupil: 32mm
Exit Pupil: 8mm
Eye Relief: 38mm (1.5 inches)
Length: 132mm (5.18 inches)
Width: 67mm (2.6 inches)
Weight: 17oz. with battery
Field of View: 7 ° (12.3@100m or 36.8 ft@100yrds.)
Adjustment: .5 MOA per click
Bullet Drop Compensator: 5.56mm, 7.62x51mm, 7.62x39mm, or .300 Blackout
Color Day/Night: Red, Green, Blue, or Amber
Illumination Source: Battery-powered LED
Illumination Manual Control: 10 day and 3-night vision settings
Housing Material: Forged 7075-T6 Aluminum Alloy
Water Proof: 66ft (tested to 130ft.)
Fog Proof: Filled with dry nitrogen
Lens Coatings: Broad Band Anti-Reflective
Battery Life: 2000 hrs. avg. (min, 720hrs on Max)
Origin: MADE IN USA

FEATURES

Target Light Sensor Technology

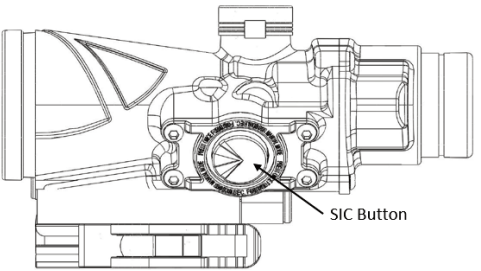
The BTO has a photocell light sensor that measures the target light transmission levels and automatically adjust the reticle illumination intensity. Photo sensors have been used in a variety of optics to detect ambient light. The BTO Target Light Sensor Technology is unique because the sensor is in the optical light path, so it measures light that is being transmitted through the optics and automatically adjusts the illumination to properly contrast the transmitted light.



The sensor is so important because in the AUTOMATIC mode it relays the target light information directly to the BTO Microcontroller, which is programmed to automatically adjust the illumination of the LED. This feature allows the BTO reticle to be properly illuminated, even when the user and target are in dissimilar light. More importantly, as the operator is on the move, the BTO will continuously adjust automatically. For example, light levels vary from dark alleys, buildings, or simply from walking down the street. In today's urban warfare, when a nanosecond can make a difference, there's no time to search for a poorly illuminated reticle or make manual illumination adjustments.

Single Intuitive Control (SIC)

The operation is simple and intuitive. The idea is revolutionary. A Single Intuitive Control (SIC) gives the user a simple button, designed to simulate muscle memory and expedite manual operation. The figure below shows the location of the SIC button:



OPERATION

The operational firmware rests in the OFF position or SLEEP mode. The first press of the SIC button puts the system into AUTOMATIC mode. In this mode, Target Light Sensor Technology detects and measures the target light passing through the optic and automatically adjusts the reticle illumination to the ideal intensity. The second press of the button puts the system into MANUAL mode. The MANUAL mode gives the user a consistent light from the choice of (10) day and (3) night vision settings. The first manual position is the brightest setting. With each press of the SIC button, it will decrease the illumination down to the next lowest setting. After navigating through the night vision settings, the program will cycle back through to the brightest setting. To exit the manual control, just hold the SIC button for three seconds; this puts the system back into the SLEEP mode. To return to the AUTOMATIC mode, simply press the SIC button once again. Additionally, if the SIC button is accidentally depressed in a carrying case or storage rack for more than three seconds, the BTO operating program will, by design, revert to SLEEP mode to conserve battery life. The firmware will timeout and revert to SLEEP mode after four (4) hours of non-use. Simple, Intuitive, Effective.

Utility Port

The BTO Microcontroller is the brain of the operating system. It is custom programmed to control all the electronic features. Unique to the industry, the BTO microcontroller is capable of being re-flashed with alternative firmware programs via a sealed utility port located on the

rear side of the battery housing. This utility port can be used to updated firmware programs or customizations to the existing program. The utility port can also be used to power accessories or plug in a remote pressure pad switch that allows the user full control of the SIC button at a preferred area of the weapon. To access, simply remove the flash port cover located on the backside of the battery housing.

Internal Timer

The internal timer conserves battery life by putting the electronics in SLEEP mode if operation is not detected after four (4) hours.

Housing designed to accept Accessories

When designing the BTO housing the idea of versatility at the forefront of the design. This basic concept pushed us to add multiple areas for mounting "add-on" accessories. The OD of the eye-housing is a machined 30mm diameter surface with a 2mm groove for locking on dust covers or an assortment of other accessories. Also, there are two mounting bosses placed on top of the housing for attaching additional accessories. This area is ideal for mounting mini red dots sights or CQB sights. On the objective end, we added a 42mm x 3mm OD groove and threaded the ID for added versatility for accessories, such as anti-reflection devices, dust covers, and/or laser filters.

Battery Life

The BTO has an average battery life of 2000 hours with a minimum of 720 hours on max brightness. In the SLEEP mode, the battery has a life expectancy of over 88,000+ hours and will last the entire 10-year shelf life of a Lithium 123A battery

Manual Day Setting	Battery Life Hours
10	720
9	840
8	1416
7	1656
6	1992
5	2160
4	2232
3	2280
2	2280
1	2280

Night Vision Setting	Battery Life Hours
NV3	2280
NV2	2280
NV1	2280

Mode	Battery Life Hours
SLEEP	88,000+

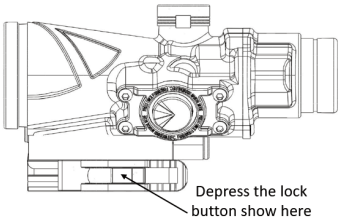
Battery Installation
To install the battery, remove battery cap by turning it counter clockwise. Insert the provided 3-volt Lithium 123A battery with the negative (-) end facing out towards the cap.
Note: See +/- markings on the battery housing.

Note: Use caution while replacing the battery. Before installing the battery cap, inspect that the o-ring is present and not damaged. Failure to do so could result in water leakage into the battery compartment. Install battery cap by turning clockwise until snug. Hand-tighten only; using tools could damage equipment. The battery compartment is sealed from the rest of the system with or without the battery cap installed.

Installation instructions for ADM QD AutoLock System
The 4x32 BTO has an integrated quick detach mount designed to easily attach to any MIL-Std 1913 rail system.

1. Before attempting to install the BTO, please take the time to ensure that your firearm is unloaded and the muzzle is pointed in a safe direction.

2. Unlock the mount. To do this, depress the lock button and swing the lever 180° to the open position.

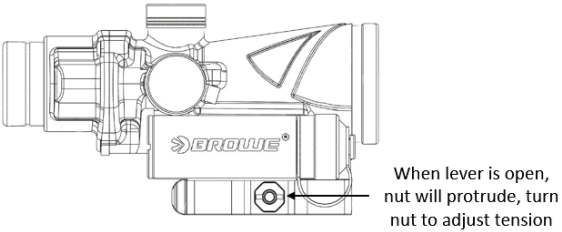


3. The 4x32 BTO can be placed in any of the slots located on top of the receiver. The eye relief of the BCO optical system is 38mm / 1.5 inches, so it is recommended to lock the mount into one of the slots towards the rear of the receiver. Be sure to align the interface stud located on the bottom of the mount with the groove in the rail system.

4. Install assembly onto the rail and move the lever to the locked position.

5. Check the tension to close. The correct amount of tension is the maximum amount you apply with one hand to move the lever to a closed position. How much tension you prefer is dependent on your own judgement and personal preference. Please remember, this system has a lot more surface contact than most other mounts, so you may not need to push the lever as hard to achieve the same results.

6. To adjust the tension, move the lever to the open position and push the lever towards the base. This will make the adjustment nut protrude on the opposite side of the base. With the nut protruding, it may be turned to the right or the left to make the necessary adjustment. We recommend tightening one to two flats per time, then test the tension. Since there are eight flats on the octagonal nut, this process may take a few tries to get it where you want it. You will need NO tools for this process.



Adjuster Caps

The adjuster caps must be finger tightened until the adjuster cap makes contact with the main housing. This will insure a good waterproof seal and prevent possible damage to the cap or threads. No tools should be used to tighten or loosen the caps.

Elevation and Windage Adjustment

The elevation and windage adjustments are located beneath the adjuster caps. The elevation adjustment is located on top of the BTO, while the windage adjustment is located on the right side. The adjusters are designed to position the internal prism assembly against a shock absorbing spring. The arrow is pointing clockwise on both adjusters, rotating the adjuster clockwise will move the bullet strike in the direction noted on the adjuster. The elevation adjuster is marked with a "U" for UP and the windage adjuster is marked with an "R" for RIGHT. Of course, the opposite effect on the bullet strike will occur if turned counter clockwise.

Zeroing Procedures

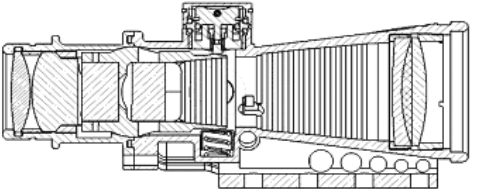
The 4x32 BTO is shipped with a factory zero. This means that only small adjustments should be required to zero the optic. Follow these simple instructions to zero the BTO:

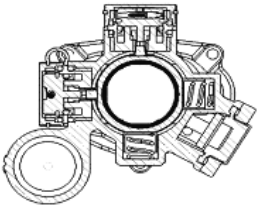
1. Turn the BTO on by pressing the SIC button once, putting the illumination in AUTOMATIC mode.
2. Remove the adjuster caps to access the windage and elevation knobs.
3. Set a target at 25 meters and fire 3 rounds using the 300m crosshair.
4. As required, rotate the adjuster to move the bullet strike to the desired position. A screwdriver, coin, or an empty shell can be inserted in the slot to make the adjustment.
5. Confirm zero by firing at least three shots after each adjustment. Confirm accuracy and repeat above procedure as required.

6. Once zeroed at 25m, move the target out to 100m and repeat the steps above using the tip of the chevron.
7. Fine tune the adjustment as required.
8. Replace the adjuster caps.
   CAUTION: Do not continue to adjust windage and elevation mechanisms if resistance is encountered.

Zeroing Tips

The BTO has an internally adjustable prism, which uses the ball and socket design principal. The prism is held in location by the tension between the adjuster assemblies and the springs on the opposite sides. When adjusters are turned clockwise, they have an absolute positive connection with the prism and the leverage of the adjustment screw to align the prism. For this reason, it is recommended to zero the optic by moving adjusters clockwise; this moves the bullet strike UP or RIGHT. When the adjusters are turned counter clockwise, they move away from the internal prism housing and the alignment relies on the spring tension to properly relocate the prism. This precise movement may be effected by the equal tension from the opposite adjuster. The tensions from the opposite adjuster can be released by turning it counter clockwise a few clicks and then returning it back to its original location. Alternatively, when adjusting the bullet strike DOWN or LEFT, allow the recoil from the first round to align the prism properly. To insure proper alignment, it is recommended to fire three rounds per adjustment and use the average bullet strike to make adjustment corrections.





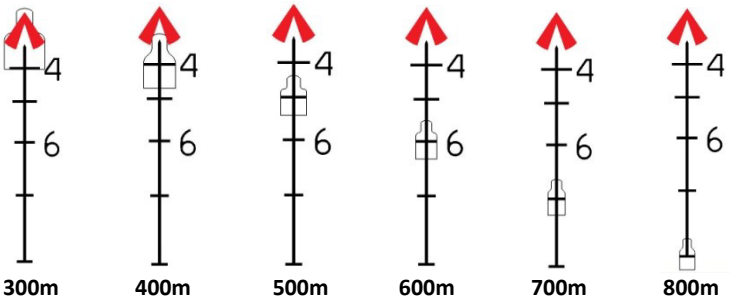
4x32 BTO Reticle choices

The 4x32 BCO has a variety of reticle choices including 5.56mm NATO chevron, 7.62x51mm NATO chevron, 5.56mm NATO crosshair, .300 blackout horseshoe & dot reticle, 7.62x39 Chevron reticle, 5.56mm NATO horseshoe & dot reticle, and many more. Many of the ranging principals of the bullet drop compensated reticles are consistent with each other. As example, we cover the ranging features with the 5.56mm chevron reticle, see Ranging Ballistic Reticle – 5.56mm Chevron Reticle.

Ranging Ballistic Reticle – 5.56mm Chevron Reticle

The reticle is designed to compensate for the trajectory of the bullet and is parallax free along the vertical axis. This allows ranging capabilities from 100-800 meters.

The tip of the BTO chevron is designed to be zeroed at 100 meters. At 200m, the crotch of the chevron should be used. The width of the BTO chevron represents a 19" silhouette at 300m, which is the average width of a man's shoulders. Also, the tip of the stadia tree is designed to be the 300m aiming point. For combat speed, use the BTO chevron center mass from zero to 300m. If the silhouette is smaller than the width of the BTO chevron, it means the target is beyond 300m. The width of the 19" silhouette at the 400m, 500m, 600m, and 700m are represented by the corresponding stadia line below the BTO chevron. To range, raise the point of aim until the silhouette best fits the proper stadia line as noted in the figure below.



Reticle Color Options

The 4x32 BTO reticles are available in four color options including amber, blue, green, or red. The illumination color is fix and must be manufactured with the preferred illumination color. As a standard with all 4x32 BTO's the illumination is controlled automatically with our Target Light Sensor Technology. It works by measuring the target light transmission and automatically adjust the reticle illumination to the proper light level. The 4x32 BTO also features a manual override if a consistent light level is required with 10 day setting and 3 night visions settings. Once in manual mode the optic will stay in manual until the unit is shut off by holding the SIC button for 3 seconds or timing out (factory set 4hrs.).

MAINTENANCE

Cleaning and General Care

The 4x32 BTO requires very little maintenance. If the optic gets dirty, wash the unit with fresh water and dry with a clean cloth. Be careful to wash thoroughly before wiping. If dirt or debris is pulled across the lens they could be scratched or damaged. If transitioning from cold weather, fog may cover the outside lenses. If so, lenses may be wiped clean with a clean cloth. To help reduce this, anti-fog solutions can be applied to the exterior of the lenses to help prevent fogging during rapid temperature changes.

Storage

When storing the BTO for extended periods of time, it is best to remove the battery from the optic. The BTO utilizes a smart electronic system, so even in the SLEEP mode the system is drawing a small amount power. In the SLEEP mode, the battery has a life expectancy of over 105,000 hours (full shelf life of the Lithium 123A battery).

LensPen

The LensPen is a superior lens cleaning system for all fine optics. The LensPen cleaning tip is has a revolutionary non-liquid cleaning compound that absorbs oily residues and contaminates safer, easier and more effectively than any other method. The unique cap replenishes the cleaning compound and keeps the tip protected when not in use. A pocket clip lets you attach it to anything and it is compact enough to throw in a pocket or bag. The retractable brush lets you safely remove dust or hard particles from the lens surface.

LensPen Operation Instructions

1. Remove all foreign material from the lenses before cleaning.
2. Extend the retractable brush and wipe away any dust or grit particles.
3. Remove the cap to expose the cleaning tip. Wipe away any smudges with a smooth, circular motion. In cases of hardened deposits, breathe lightly on the lens, then wipe again with LensPen.
4. Replace the cap and turn half way to replenish the non-liquid cleaning compound.

Notice: Anti-fog solutions or cloths work by applying a special thin film on the lens surface to which they are applied. If you have applied an anti-fog material to the lens, be sure to wipe off the film using a soft dry cloth before using a LensPen.

TROUBLE SHOOTING

Why is the reticle not illuminated?

- Battery may be discharged: Replace battery
- Battery installed incorrectly: Confirm battery is installed properly
- Battery cap not making ground: check by removing the battery cap and depressing the ground spring a couple of times to insure it is centered and moving freely.

Why does the reticle illumination flicker?

- Some lighting conditions may confuse the light sensor, in these unique lighting situations it is recommended to switch to MANUAL mode to get a consistent illuminated reticle.

Why is the optic not able to zero?

- The adjustment screw is at its limit: Check alignment of rail to barrel
- Impact point is moving: Check mount and weapon rail stability

Note: If an issue cannot be resolved, contact the factory for additional support or request a return merchandise authorization number from our website at www.browe-inc.com.

AIMING TECHNIQUES

Quick Acquisition and target ranging

The 4x32 BTO is designed to be utilized with both eyes open from muzzle to 800 meters and providing quick acquisition and target ranging. When speed is critical, the illuminated chevron reticle can be placed center mass from 0 to 300m. Beyond 300m, simply continue to raise the weapon until one of the stadia lines match the target silhouette. With training, this should be very effective.

Close Quarter Battle

At close quarter ranges, focusing on the sight picture is not required. What's important is to keep both eyes open and to put the illuminated reticle on the target. This aiming technique allows the BTO to be utilized as a reflex style sight in CQB situations. Another CQB technique is putting your line of sight just above the optical housing. When engagement is required, raise the weapon put the illuminated reticle on the target simultaneously with the pull of the trigger. With training, the BTO can be very effective in CQB situations.

NOTES

LIMITED LIFETIME WARRANTY

BROWE, Inc. warrants every product, to the original registered owner, for a lifetime against defects in material and workmanship. We will repair, replace, or refund your original purchase price of these products at our discretion. This warranty exclusively applies to the optical systems and the metal structure of the product and does not apply to the electric system. The electrical system has a limited two (2) year warranty from the original date of purchase. Normal wear and tear, including battery draining, is not covered by this warranty. Before returning any product, you MUST obtain a Return Merchandise Authorization number. To obtain a Return Merchandise Authorization number, please contact a customer service representative or visit our website for product return instructions. This warranty does not cover defects caused by unauthorized repair, improper handling, installation or maintenance, abnormal use or unapproved alterations. This warranty gives the registered owner certain legal rights, which vary from state to state.

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