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## LASERSCOPE MODEL FA-14A

### INSTRUCTIONS AND INFORMATION

#### Summary Description and Specifications

The LASERSCOPE contains a helium neon laser that projects a small, red spot of intense light on an intended target. The Model FA-14A is small (14 inches or 35.5 cm long), light weight (1.55 lbs or 703 grams including battery), and built to withstand rugged military combat conditions and extreme hot or cold temperatures. It is powered by a specially designed, rechargeable battery that will operate the laser for at least one continuous hour. This provides a long period of operational use, as the laser is activated by a momentary pressure switch and is generally used for only a few seconds at a time.

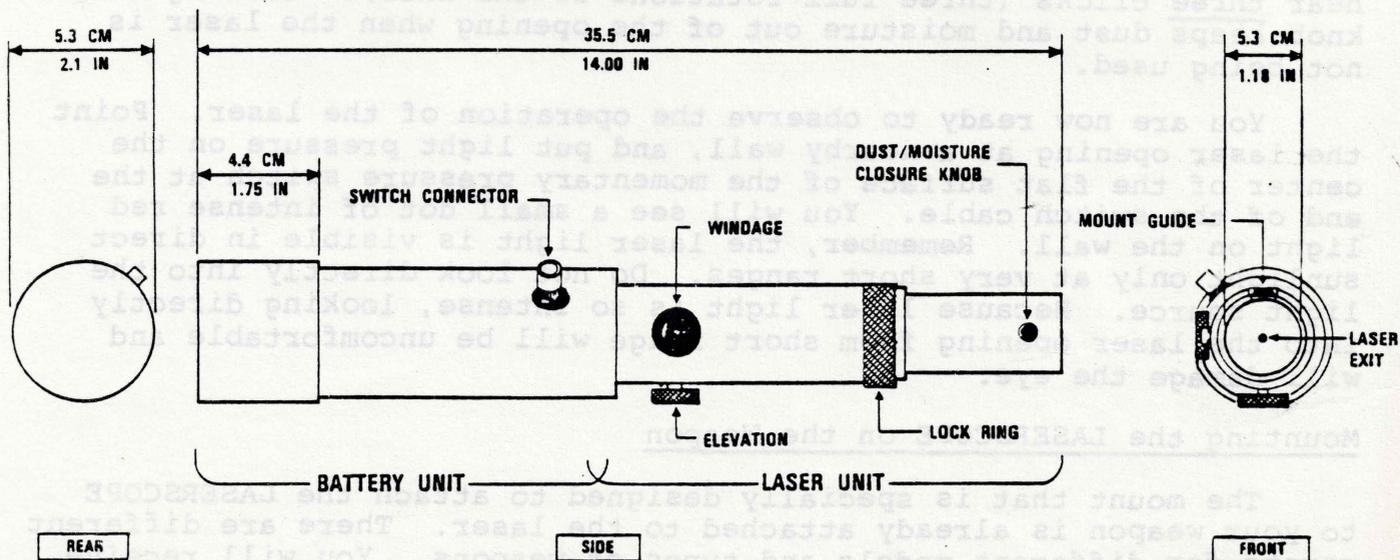


Figure 1

Effective range is at least 500 yards (457 meters) under favorable conditions, and farther when used in conjunction with night vision equipment or telescopic sight. It is intended primarily for use from dusk to dawn, when the laser spot is most visible, but the laser spot can also be seen in daylight indoors, or outdoors with the aid of special daytime-use glasses.

## Parts

The standard LASERSCOPE unit comes in a box with laser, one mount (for weapon specified by buyer), two batteries, battery recharger, pressure switch and switch cable, self-adhesive velcro switch mounts, and lens cleaning supplies.

Available accessories include daytime-use glasses, additional mounts, and LASERSCOPE carrying case. Available design options include switch cable of different length for optimal fit on your type of weapon (no extra cost), and battery recharger for 120 or 240 volts or adjustable for both (no extra cost).

## Assembly

To prepare the LASERSCOPE for use, first unscrew the battery cap on the wide end of the laser. Then insert battery and replace battery cap just as if you were replacing a flashlight battery. The second battery is a spare to be used while the other battery is recharging.

Next attach the pressure switch cable to the socket on the side of the LASERSCOPE. (Note: When the LASERSCOPE is not being used, either the battery should be removed or the switch unplugged in order to avoid accidental activation of the pressure switch when the weapon is laid on its side.) Finally, open the dust/moisture closure knob located near the laser opening. Turn it counterclockwise until you hear three clicks (three full rotations of the knob). Closing this knob keeps dust and moisture out of the opening when the laser is not being used.

You are now ready to observe the operation of the laser. Point the laser opening at a nearby wall, and put light pressure on the center of the flat surface of the momentary pressure switch at the end of the switch cable. You will see a small dot of intense red light on the wall. Remember, the laser light is visible in direct sunlight only at very short ranges. Do not look directly into the light source. Because laser light is so intense, looking directly into the laser opening from short range will be uncomfortable and will damage the eye.

## Mounting the LASERSCOPE on the Weapon

The mount that is specially designed to attach the LASERSCOPE to your weapon is already attached to the laser. There are different mounts for different models and types of weapons. You will receive separate instructions for each type of mount you order.

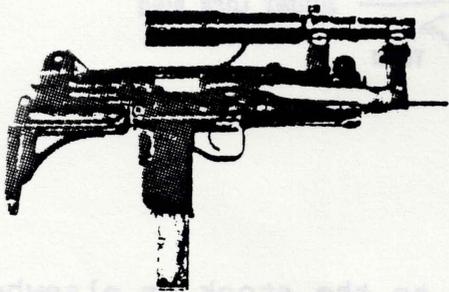
In general, the procedure for attaching the mount to the weapon is extremely simple. The mounts that fit the M-16, AR-15, Ruger Mini 14, Belgian FN-FAL and UK L1-A1, for example, simply slide over the end of the barrel. There are two clamps with screws that are tightened with an Allen wrench. One clamp attaches over the barrel, the other to the bayonet lug; Allen wrench is stored within the mount. The pictures in Figure 2 show how the LASERSCOPE appears when attached to various weapons. Mounts are already available or will be designed on request to fit virtually any rifle, shotgun, submachine gun, or gas gun.



M-16



Remington 870 Shotgun



Uzi (T)



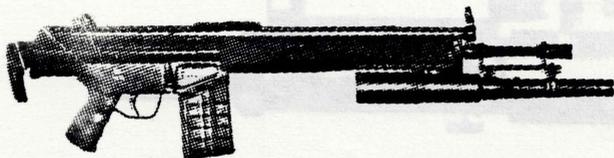
Galil



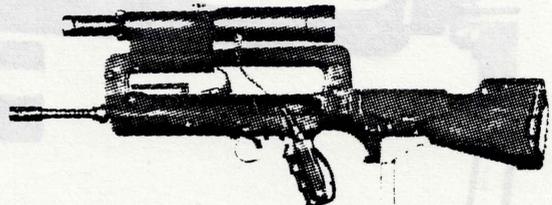
Ruger Mini 14



Remington 700



H&K G-3



FAMAS

Figure 2

The LASERSCOPE is removed from the mount by turning the mount lock ring until the open slot in the ring is aligned with the mount rail. Then slide the LASERSCOPE off the rail. This is shown in Figure 3.

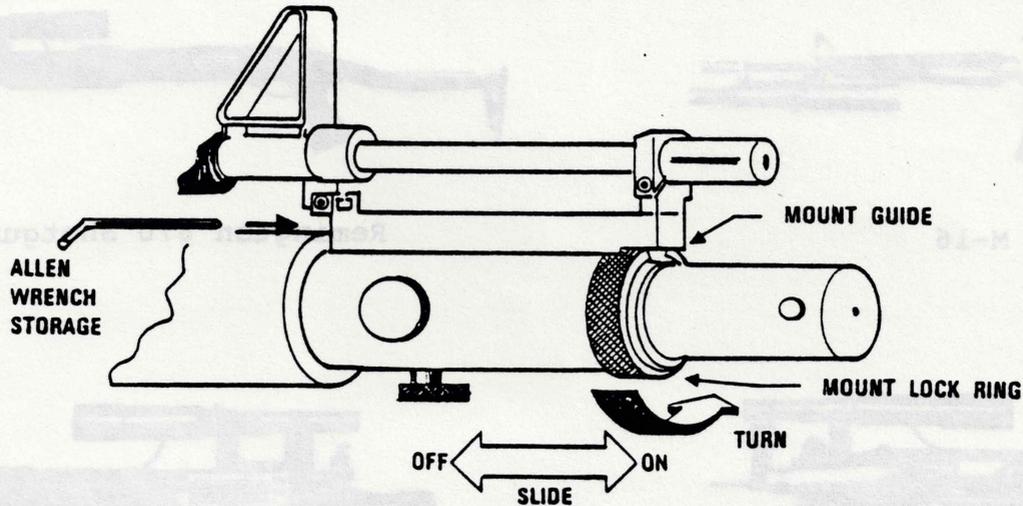


Figure 3

#### Switch Placement

The momentary pressure switch attaches to the stock or elsewhere on the weapon by means of a self-adhesive velcro tab, as shown in Figure 4. The tab may be placed in the position of your choice, wherever you customarily hold the weapon. The switch is, therefore, adaptable to either left-handed or right-handed use. The switch cable may be ordered in various lengths in order to obtain the best possible fit on your weapon.

The switch is custom-designed with heavy duty materials for long wear. A large service area assures convenient usage. Light pressure anywhere along the middle section of the flat service area activates the laser, and the laser stops as soon as this pressure is released.

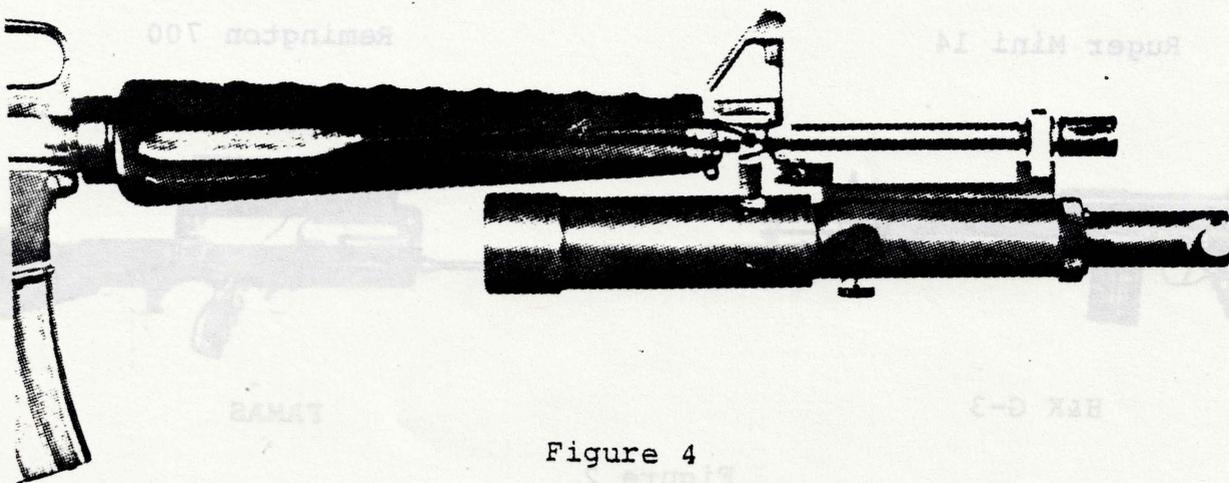


Figure 4

## Alignment and Calibration

When mounting the LASERSCOPE on your weapon for the first time, it needs to be aligned to the barrel and calibrated for range. These adjustments are made by turning the windage and elevation knobs. The location of these knobs is shown in Figure 1. Your LASERSCOPE has been tentatively aligned and calibrated at the factory for the type of weapon on which you intend to use it. Some additional adjustment will probably be necessary, however, as there are minor variations even between weapons of the same make and model. Do not change the position of the windage and elevation knobs until you have mounted the LASERSCOPE on your weapon and determined how much change is needed, following the instructions below.

Calibration for range is necessary because the LASERSCOPE is mounted either below or above the barrel. This means the laser beam and barrel elevation coincide precisely only at a single range. The changes in calibration for different ranges are very small as long as the projectile has a flat trajectory.

When turning the windage and elevation knobs, the rate of change is approximately three minutes of angle per audible click of the adjustment knobs. One click moves the laser spot approximately  $1\frac{1}{2}$  inches at 100 yards or  $\frac{3}{4}$  inch at 50 yards (approximately 4.2 cm at 100 meters, 2.1 cm at 50 meters).

The direction of change is not indicated on the knobs, as this varies according to how the LASERSCOPE is mounted. On weapons where the LASERSCOPE is mounted below the barrel, a clockwise turn of the elevation knob moves the laser beam down, and a clockwise turn of the windage knob moves the beam to the right. A counterclockwise turn moves the beam in the opposite direction. If the LASERSCOPE is mounted above the barrel, however, the movement is reversed. With the LASERSCOPE above the barrel, turning the elevation knob clockwise moves the laser beam up, while a clockwise turn of the windage knob moves the beam to the left.

To align the laser beam to the barrel, pick a target at the desired range and line up this target in the weapon's conventional sight. (A telescopic sight is very good for this purpose but is not required.) Then turn the windage and elevation knobs to move the laser spot onto the target. When sight, target, and laser spot are all in the same line, your alignment will be accurate if your sight is accurate. Distance calibration may still be slightly off because of the LASERSCOPE's position above or below the barrel.

Final checking and adjustment of alignment and calibration requires test firing at the range. From benchrest, fire as tight a group as possible of three shots. Note how far they impact high or low, left or right, of your laser aiming point, then use the windage and elevation knobs to move the laser so that it points where the bullets went. Always move the laser toward the point where the bullets hit the target. This is important, and it can be confusing. If your grouping was low, move the laser down, not up. Adjusting the laser to point lower forces the shooter to aim the weapon higher.

If your initial group at the range hits the target 3 inches below your laser aiming point at 50 yards, use the elevation knob to move the laser down four clicks (3/4 inch per click). If it hits 1 1/4 inches to the right at 50 yards, use the windage knob to move the laser two clicks to the right. A brief period of experimentation at the range will identify the number of clicks of the elevation knob required to change the calibration from 50 to 100 to 200 yards (or meters) for your particular weapon and ammunition.

Note that the alignment and calibration procedure needs to be done only once. If you detach the LASERSCOPE from the mount in order to use the weapon without it, you can subsequently reattach it to the mount without having disturbed alignment or calibration. If you remove and reattach the mount, however, you may have to repeat the alignment and calibration procedure.

### Laser and Laser Beam

The helium neon laser has a power of approximately 2 milliwatts. It is specially designed and manufactured exclusively for use in the LASERSCOPE. The laser is so carefully cushioned that the LASERSCOPE may be dropped or even thrown on the floor or hard ground with no damage. The outside tube is made of a special, light-weight, high-strength material. The laser may be used in desert heat or arctic cold. In short, it is built to withstand rugged combat conditions.

The laser projects an intense, narrow beam of red light. Generally, the only visible element of the laser beam is the spot on the target where the beam hits a solid object and reflects light back to the operator. The beam itself is invisible in clear air, but becomes visible in rain, fog, smoke, or dust as it then reflects off of these particles. The entire beam is also visible, and very bright, when viewed with night vision equipment.

Size of the laser spot as it appears to the LASERSCOPE operator is less than 2 inches diameter at 50 yards, or 4 inches at 100 yards (6 cm at 50 meters, 12 cm at 100 meters). The operator sees only the most intense light at the center of the spot; the target or a nearby observer can see a larger spot approximately 3.5 inches at 50 yards (9 cm at 50 meters).

The distance at which the spot is visible to the operator depends upon degree of darkness and the nature of the background off which the beam is reflected. When projected onto a building in semi-darkness, the spot is visible from at least 500 yards (457 meters). It is less clear against a background of foliage which absorbs rather than reflects light. Range is greatly extended when the LASERSCOPE is used with night vision equipment or telescopic sight.

As a general rule, the LASERSCOPE is intended for use from dusk through darkness to dawn, as this is when the laser spot is most visible outdoors. The spot starts to become visible as soon as the sun passes over the horizon, and the range increases as darkness approaches. The spot is visible in direct sunlight only with the aid of special glasses or at ranges that are too short to be operationally useful.

Laser light is different from normal light, so your "logical" conclusions about when the laser spot will or will not be visible may be incorrect. Visibility depends upon type of light and reflectivity of the target, as well as the amount of light. The laser spot can be seen easily under artificial light. It is also reasonably visible during the daytime outdoors, as long as the beam and target are in full shade. Consequently, the LASERSCOPE is well suited for use at night on a brightly-lit city street. It is also well suited for use indoors in buildings illuminated by artificial light or a combination of artificial and window light, as in an airport terminal, prison, or indoor firing range. Effective range under these circumstances is as far as one would normally wish to shoot.

Special glasses are available as optional equipment to extend the use of the LASERSCOPE into the daylight hours. They make it possible to see the laser spot earlier in the evening and to continue seeing it for a longer time after sunrise. At midday, the effective range of the LASERSCOPE when wearing these glasses is 50 to 100 yards under optimal conditions. For training purposes, this can be extended by using special reflective targets. The glasses restrict normal vision somewhat, so they are intended primarily for training and static firing situations, not for combat situations that require quick-reaction firing. These glasses will fit persons who already wear prescription glasses as well as those who do not.

The LASERSCOPE has a special cap over the laser opening that is designed to limit the cone of visibility of the laser source to a target or other potentially hostile observer. If the target is looking toward the LASERSCOPE from a distance of 100 yards (91 meters), and if the beam is more than 5 feet (1.5 meter) off line from the target's eyes, the laser source is only faintly visible and will probably not be noticed. The laser source is not visible at all when the beam is more than 12 feet (3.7 meters) off line from the observer's eyes at 50 yards (46 meters) or 16 feet (4.9 meters) off line at 100 yards (91 meters).

The target can see the red spot on himself if he looks for it or happens to notice it. Under most circumstances, the spot will be on the target for only a fraction of a second before firing. Under some circumstances, it will be desirable to keep the spot on the target and to ensure that the target sees it. This provides psychological intimidation of the target and may help avoid the need to shoot.

### Battery

The rechargeable battery has been specially designed to withstand the heavy drain of the laser. When fully charged, the battery will last for one hour of continuous use. This provides a long operational period, as the laser is used for only a few seconds at a time.

If the laser comes on normally but then quickly dims, the battery is too low for full operation. It should be recharged promptly to avoid damage.

The battery will hold up for approximately 1,000 full recharges. A full recharge of a drained battery usually requires 5 to 7 hours; 4 hours is sufficient to restore a fully drained battery to 95% of capacity. In most cases, after limited usage of the LASERSCOPE, 1 or 2 hours of charge is sufficient. The battery will not be damaged if left on charge overnight, but lengthy and frequent overcharging may eventually shorten battery life.

The battery may be stored for extended periods of time with no harm to the battery, although it does slowly lose its charge while in storage.

After 4 weeks, 90% of the charge will remain.

After 6 weeks, 85% of the charge will remain.

After 8 weeks, 75% of the charge will remain.

After 3 months, 50% of the charge will remain.

About 20% of the charge is sufficient to operate the laser.

### Battery Recharger

To recharge a battery, simply plug in recharger and place the battery into recharger receptacle with the exposed surface pointing down, as shown in Figure 5.

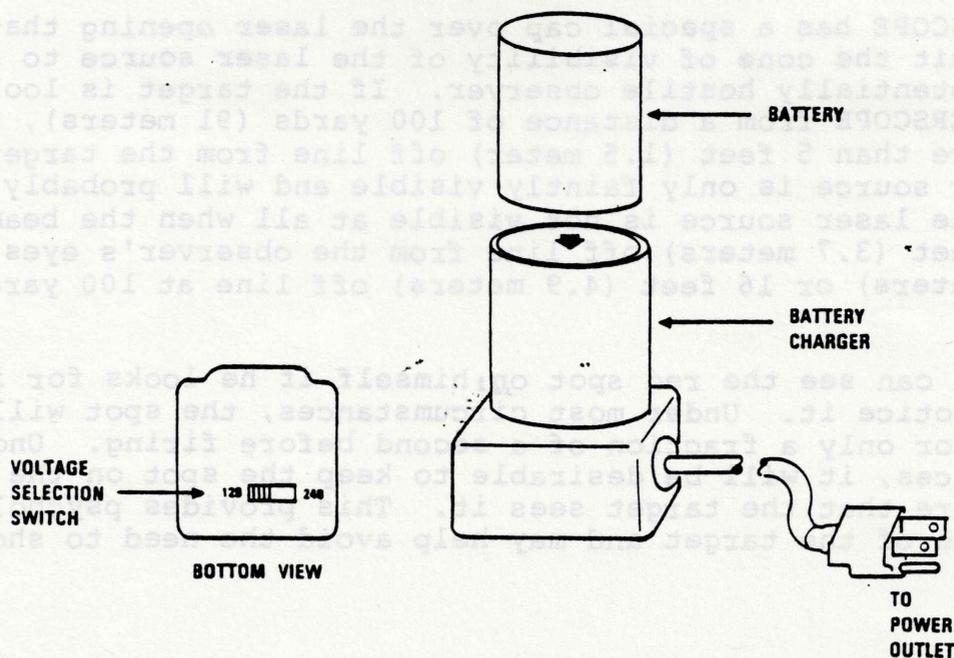


Figure 5

The battery recharger may have a switch to adapt it to either 120 or 240 volts AC. As electrical power outlets may not always be available during military operations, several other battery options may be ordered. For example, a solar battery recharger permits use in areas and circumstances when that is appropriate.

## Maintenance

The LASERSCOPE is designed to require no maintenance other than recharging the battery and an occasional cleaning of dust from the laser opening and the lens of the laser tube.

The dust/moisture closure knob near the laser opening closes this opening to keep out dust and moisture. To close the opening, turn the knob clockwise until it clicks three times (three full rotations of the knob). To open, turn it counterclockwise until it clicks three times. The opening should be kept closed when the laser is not in use.

The laser opening and lens of the laser tube should be cleaned of dust several times a year under normal usage. To do this cleaning, use the aspirator with small nozzle (supplied with the LASERSCOPE) to suck air out of the laser opening. You may also use the aspirator to force a jet of air into the laser opening to help dislodge any dust particles.

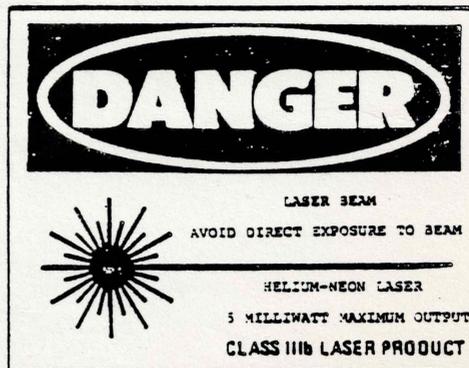
The LASERSCOPE is moisture-resistant.

Spare parts are available to replace lost or damaged components, and the entire LASERSCOPE may be returned to the manufacturer for reconditioning should this become necessary after extensive combat use.

## Safety

Small, low power lasers of this type are safe to use. The only emission is visible light. The LASERSCOPE does not emit x-ray, ultra-violet, or other potentially harmful radiation. The operator cannot remove or expose the laser from its housing. The LASERSCOPE has been approved for safety by the U.S. Army Surgeon General.

As with any extremely bright source of light, some common sense is required. The operator should never aim the laser beam at his own eyes and stare directly into the laser opening. Similarly, the laser beam should not be pointed directly at the eyes of another person at a distance of less than 10 meters, except as may be required in a combat situation. If the laser beam does hit another person directly in the eye, injury will be avoided by the natural, instinctive reaction of closing the eyes or looking away from an uncomfortably bright light. There are no other safety or health hazards associated with the LASERSCOPE. To help prevent accidental misuse, U.S. Government regulations require that the label to the right be attached to laser products and shown in product instructions.



LASERSCOPE conforms with U.S. Department of Health and Human Services safety and performance standards for Class IIIb laser products under 21 CFR Part 1040 plus subsequent and pending variances. It is authorized for sale to governmental military and law enforcement organizations.

Conditions of Sale

The LASERSCOPE carries a one year warranty (parts and labor) under normal use for any malfunction due to manufacturing defects.

Foreign sales are F.O.B. California. They require a partial down payment, letter of credit, and certificate of nontransfer and end use, and they are conditional upon U.S. State Department approval.

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