

CHAPTER 3

OPERATION AND FUNCTION

This chapter discusses the operation of the M249 automatic rifle. This includes loading, unloading, cycle of functioning, adjusting the sight, and using the bipod.

3-1. OPERATION

The M249 AR's operations are loading, firing, unloading, and using belted ammunition or, in an emergency, a 20- or 30-round M16 magazine. The firing operation works on gas pressure created as a fired round passes through the barrel. The M249 is loaded, fired, unloaded, and cleared from the open-bolt position. The safety must be in the FIRE position before the bolt can be pulled to the rear. Before using belted ammunition, it must be checked to ensure it is properly linked with the double link or the link tab at the open end of the box. It must be free of dirt and corrosion. When using a magazine of ammunition, it must be loaded into the magazine well and be free of dirt and corrosion.

3-2. LOADING

To load the M249 AR, make sure the weapon is cleared in accordance with paragraph 2-1. (With the feed cover raised, make sure your face is not exposed to the open chamber area when loading.) (Figure 3-1.)

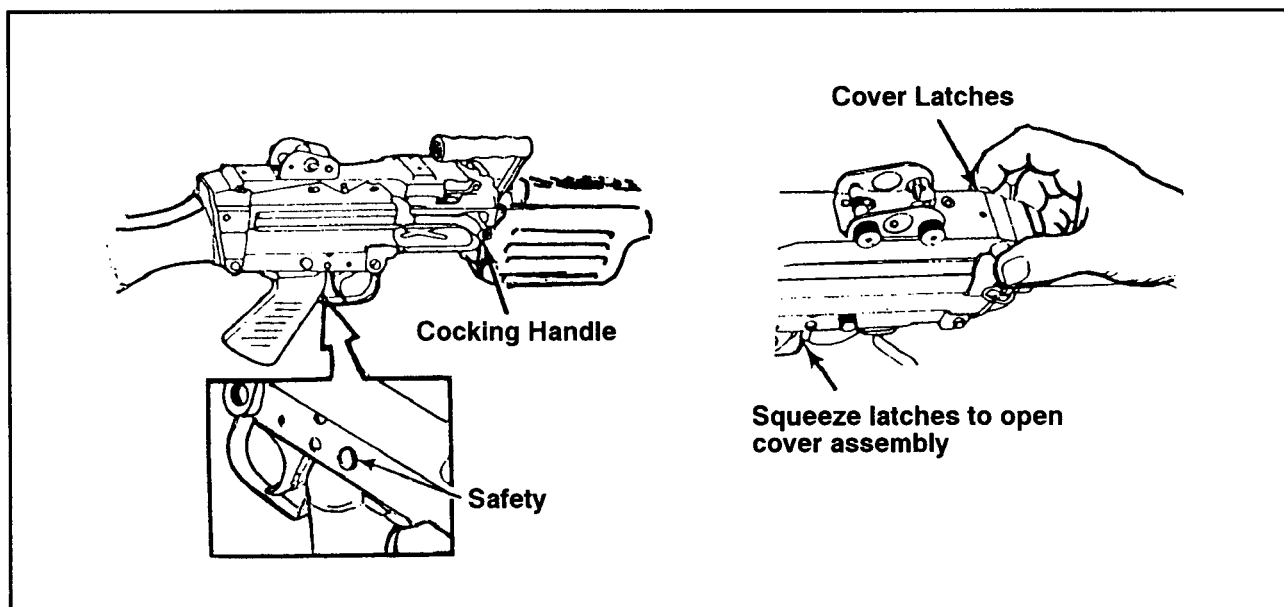


Figure 3-1. Loading.

a. **Belt-Fed.** When loading belted ammunition, always cant the weapon to the right. Make sure the open side of the links is facing down, and place the lead link tab or first round of the belt in the tray groove against the cartridge stop. The rounds should be placed flat across the feed tray. With your left hand, count five to six rounds down to hold ammunition in place on the feed tray, while at the same time close the feed cover with your right hand. When closing the feed cover, always place your hand in front of the rear sight to prevent accidentally changing the sight adjustment.

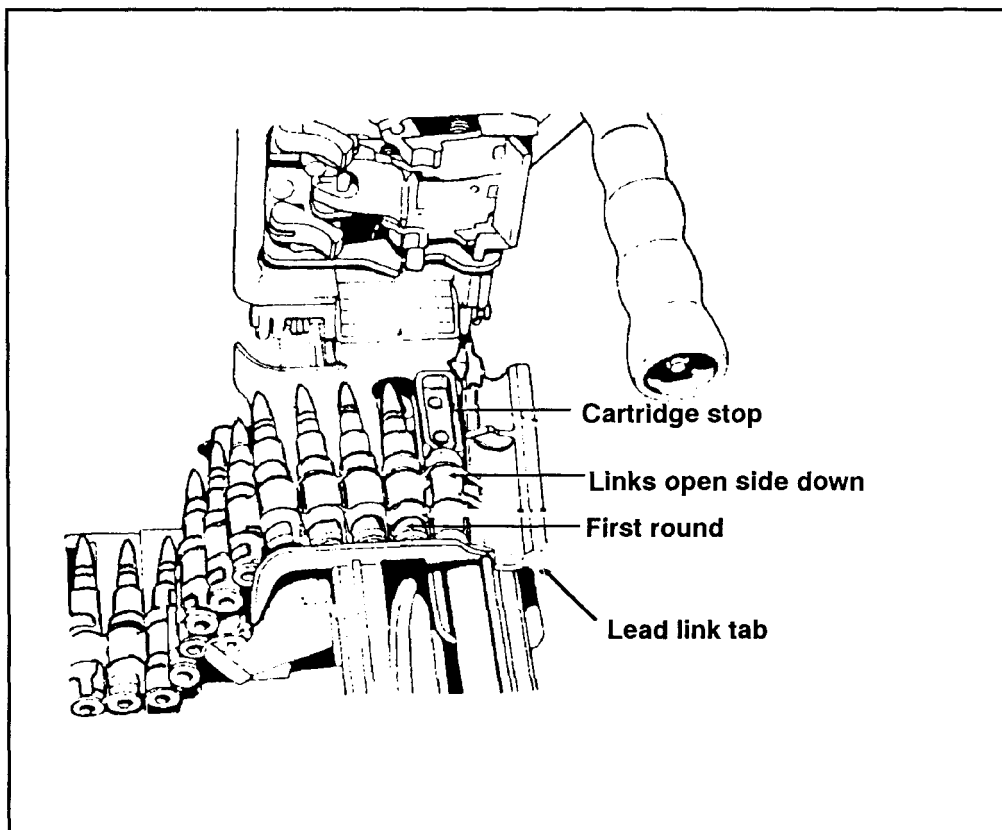


Figure 3-2. Belt-fed.

NOTE: The 20- or 30-round magazine is for emergency use only when linked ammunition is not available.

b. **Magazine-Fed.** Load the 20-or 30-round magazine by inserting it into the magazine well on the left side of the receiver. Push the magazine firmly into the well until it seats and the release tab clicks into the recess on the magazine (Figure 3-3).

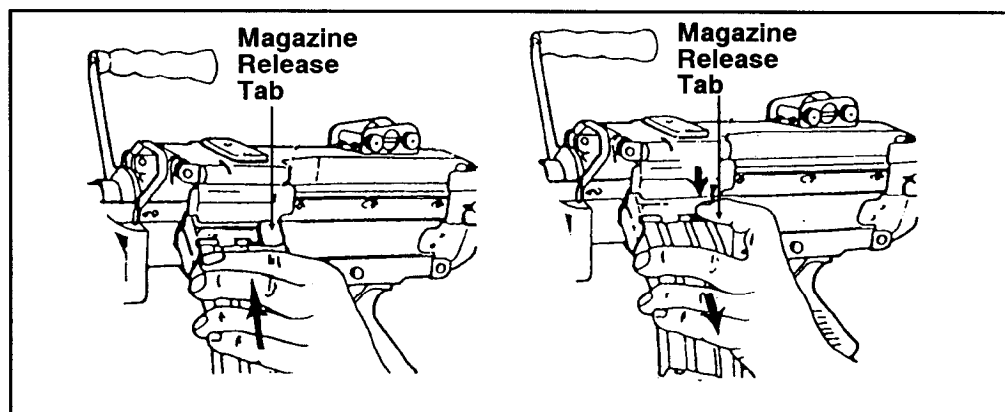


Figure 3-3. Loading a magazine.

3-3. UNLOADING

To unload the weapon, pull the bolt and lock it in the rear position if not already there. Place the safety on SAFE. Depending on whether belt-fed or magazine-fed ammunition is used, use the following procedures.

CAUTION

Before you raise the feed cover, move the weapon away from your face so that you are not exposed to the open chamber.

- a. **Belt-Fed.** Raise the feed cover and remove any ammunition or links from the feed tray. Perform the five-point safety check.
- b. **Magazine-Fed.** Push the magazine release tab down and pull the magazine from the magazine well. Raise the feed cover and perform the five-point safety check.

3-4. CYCLE OF FUNCTIONING

M249 automatic riflemen can recognize and correct stoppages when they know how the weapon functions. The weapon functions automatically as long as ammunition is fed into it and the trigger is held to the rear. Each time a round fires, the parts of the weapon function in a cycle or sequence. Many of the actions occur at the same time. These actions are separated in this manual only for instructional purposes.

- a. The cycle is started by putting the first round of the belt in the tray groove or by inserting the magazine into the magazine well. Then the trigger is pulled, releasing the sear from the sear notch. When the trigger is pulled to the rear, the rear of the sear is lowered and disengaged from the sear notch. This allows the piston and bolt to be driven forward by the expansion

of the operating rod spring. The cycle stops when the trigger is released and the sear again engages the sear notch on the piston.

b. The sequence of functioning is as follows.

(1) *Feeding.* As the bolt starts its forward movement, the feed lever is forced to the right, causing the feed-pawl assembly to turn in the opposite direction. This forces the feed-pawl assembly over the next round in the belt, and it is ready to place the next round into the tray groove when the rearward action occurs again. As the bolt moves to the rear after firing, the feed roller forces the feed lever to the left. The feed lever is forced to turn, moving the feed pawl to the right. This places a round in the tray groove.

(2) *Chambering.* As the bolt travels forward, the upper locking lug engages the rim of the round. The pressure of the front and rear cartridge guides holds the round so that positive contact is made with the upper locking lug of the bolt. The front cartridge guide prevents forward movement of the link as the round is stripped from the belt. The upper locking lug carries the round forward. The cambering ramp causes the nose of the round to be cammed downward into the chamber. When the round is fully seated in the chamber, the extractor snaps over the rim of the round, and the ejector on the rail inside the receiver is depressed.

(3) *Locking.* As the round is chambered, the bolt enters the barrel socket. The upper and lower locking lugs contact the bolt camming surfaces inside the barrel and start turning the bolt clockwise. The action of the bolt into the slide assembly, as the piston continues forward, turns the bolt to complete its 90-degree (one-quarter turn) clockwise rotation. Locking is now complete.

(4) *Firing.* After the bolt is fully forward and locked, the piston continues to go forward, independent of the bolt, for a short distance. The slide assembly carries the firing pin through the face of the bolt. The firing pin strikes the primer of the round and the primer fires the round.

(5) *Unlocking.* After the round is fired and the bullet passes the gas port, part of the expanding gases go into the gas regulator through the gas plug. The rapidly expanding gases enter into the gas cylinder from the gas regulator, forcing the piston to the rear. As the piston continues to the rear, the slide assembly, also moving to the rear, causes the bolt to begin its counterclockwise rotation. The upper and lower locking lugs of the bolt contact the bolt camming surfaces inside the barrel socket and, as the bolt continues toward the rear, it completes a one-quarter turn counterclockwise. The rotation and movement to the rear unlocks the bolt from the barrel socket.

(6) *Extracting.* Extracting begins during the unlocking cycle. The rotation of the bolt loosens the cartridge case in the chamber. As the piston and bolt move to the rear, the extractor pulls the cartridge case from the chamber.

(7) *Ejecting.* As the cartridge case is pulled from the chamber, the bolt passes by the ejector. This causes the ejector clip to expand, forcing the ejector to push the expended cartridge. The extractor grips the right side of the cartridge and causes it to spin from the weapon as it reaches the ejection port. The empty belt links are forced out the link ejection port as the rearward movement of the bolt causes the next round to be positioned in the tray groove.

(8) *Cocking.* The piston assembly acts against the firing pin, pulling the firing pin from the primer of the spent cartridge case. The action of the piston assembly, continuing to the rear with the firing pin, releases the compression of the firing pin spring. As long as the trigger is held to the rear, the M249 AR will continue to complete the eight steps of functioning automatically. When the trigger is released and the sear again engages the sear notch, the cycle of functioning is stopped and the weapon is cocked. To prevent undue wear to the sear and sear notch, the automatic rifleman must hold the trigger firmly to the rear during firing.

3-5. SIGHT SETTINGS AND CORRECTIONS

This paragraph provides information on how to set the sights for elevation and windage for the M249 AR. It also includes information on how to make corrections if the initial setting on the windage knob or peep sight is not accurate. At a 10-meter target, each paster is 1 cm. Therefore, two clicks on the windage knob in either direction moves the strike of the round left or right 1 cm and two turns on the peep sight moves the strike of the round up or down 1 cm. For example: If the shot group was 2 cm above and 1 cm to the right of the paster, sight corrections are made by correcting windage first. In this case, rotate the windage knob two clicks toward the buttstock (clockwise). Rotate elevation knob four turns toward the buttstock (clockwise) to lower the strike of the round. (Figure 3-4, page 3-6).

a. **Elevation.** Adjustments for elevation (range) require the automatic rifleman to turn the elevation knob (closest to the buttstock) on the rear sight to the desired range setting. Range settings are graduated increments from 300 to 1,000 meters. Even numbered settings are on the left side of the scale wheel and are numbered 4, 6, 8, 10 which represent 400, 600, 800, and 1,000 meters, respectively. Odd numbered settings are on the right side of the scale wheel and marked with the number 3 and three index lines, which represent 300, 500, 700, 900 meters, respectively. Rotation of the elevation knob toward the muzzle (counterclockwise) increases the range, while rotation toward the buttstock (clockwise) decreases the range. Fine adjustments, like zeroing, are made by adjusting the peep sight. Each 180-degree turn equals

a $\frac{1}{2}$ -mil change in elevation which equals a $\frac{1}{2}$ -cm change in impact at a range of 10 meters. Clockwise (to the right) rotations decrease elevation, while counterclockwise (to the left) rotations increase elevation. The peep sight can be turned nine 180-degree turns from top to bottom. To make the peep sight easier to grasp, the elevation knob is turned to its highest point (1,000 meters). The appropriate adjustment is made for the peep sight, and then the sight is returned to the desired range. Whenever readjusting the range, the point of aim is never changed. The point of aim is the center base of the target.

b. **Windage.** Adjustments for windage are made by traversing the rear sight right and left along the sliding scale. The sliding scale is marked or graduated with index lines. Each index line is equal to $\frac{1}{2}$ -mil change in direction or $\frac{1}{2}$ -cm change of impact at 10 meters. Rotation of the windage knob (closest to the muzzle end) toward the muzzle (counterclockwise) moves the rear sight aperture right, which moves the strike of the rounds right; while rotation toward the buttstock (clockwise) moves the aperture left, which moves the strike of the rounds left.

c. **Corrections.** One click of the windage knob or peep sight moves the strike of the round $\frac{1}{2}$ cm at a range of 10 meters or $\frac{1}{2}$ meter at 1,000 meters. To make corrections, Table 3-1 is used as a reference.

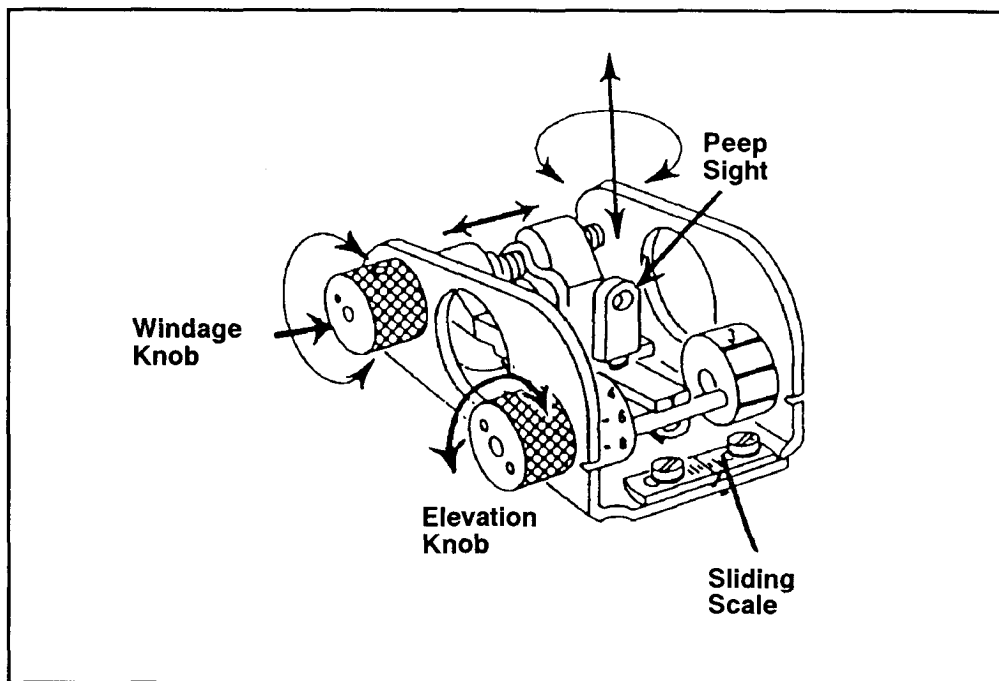


Figure 3-4. Sliding scale on sight.

100 meters - one click moves strike	5 cm (2 inches).
200 meters - one click moves strike	10 cm (4 inches).
300 meters - one click moves strike	15 cm (6 inches).
400 meters - one click moves strike	20 cm (8 inches).
500 meters - one click moves strike	25 cm (10 inches).
600 meters - one click moves strike	30 cm (12 inches).
700 meters - one click moves strike	35 cm (14 inches).
800 meters - one click moves strike	40 cm (16 inches).
900 meters - one click moves strike	45 cm (18 inches).

Table 3-1. Windage and elevation (peep sight) correction chart.

3-6. BIPOD POSITIONING

The bipod group is used to fire from the prone position. The shoulder rest on the buttstock provides support for the AR when fired in the bipod mode. The gas cylinder group holds the bipod group in place. Once the gas cylinder is removed, the bipod group can also be removed from the receiver.

a. To lower the bipod legs, hold the legs together and pull down and away from the handguard. Release the legs so that they lock in the vertical position. To extend the bipod legs, grasp the foot of each leg and pull down. (Figure 3-5).

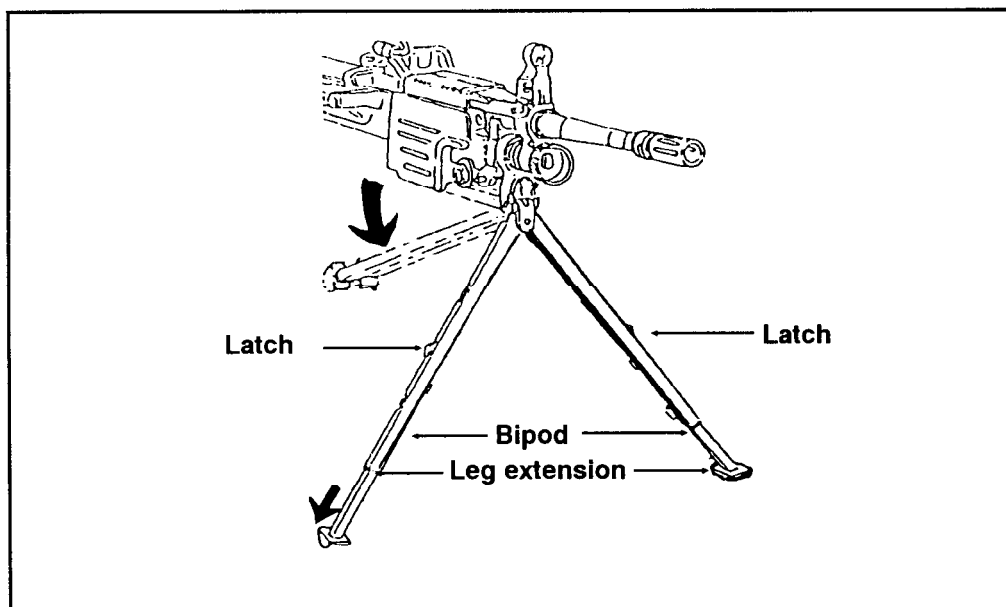


Figure 3-5. Lowering the bipod.

- b. To retract the bipod legs, push in the latches and push in the legs.
- c. Fold the bipod legs when transporting the weapon. Hold the two legs together, pull back under the handguard, and release so that the hooks on the legs grip the handguard. The bipod can be folded only when the legs are in the closed position (Figure 3-6).

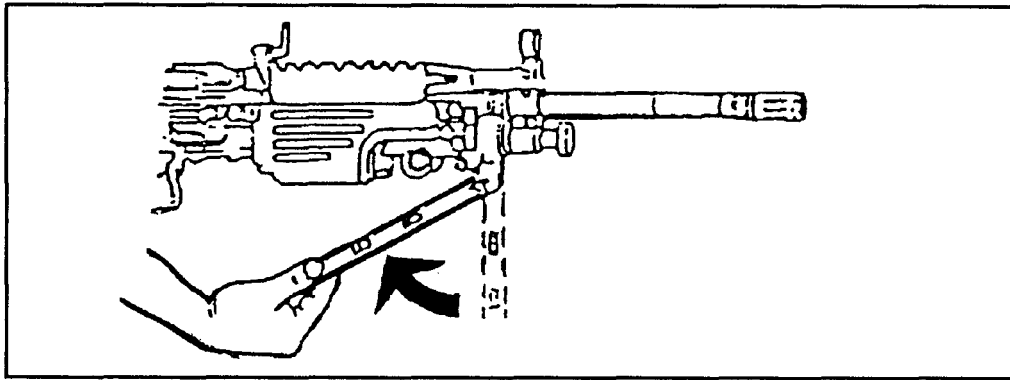


Figure 3-6. Folding of the bipod under the handguard.