UNITED STATES MARINE CORPS
THE BASIC SCHOOL
MARINE CORPS TRAINING COMMAND
CAMP BARRETT, VIRGINIA 22134-5019

M240B MEDIUM MACHINE GUN W3I0003XQ STUDENT HANDOUT

M240B Medium Machine Gun

Introduction

From the invention of the Gatling Gun in the 1860's the machine gun has been the device that has broken the back of many attacks or has been the key support asset that has suppressed the enemy to allow the maneuver unit to close with and destroy the enemy.

Importance

The M240B is the backbone of the machine gun section within the weapons platoon of a rifle company. By understanding the operating procedures of this weapon, you will be prepared to employ this asset in the platoon (reinforced) offense or the defense.

In This Lesson

In this lesson, we will cover the history, characteristics, nomenclature, assembly and disassembly of the M240B medium machine gun. We will also cover immediate and remedial action, barrel change procedures, mounts and accessories, loading and unloading, weapons conditions, and weapons commands of the M240B medium machine gun.

This lesson covers the following topics:

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M240B Medium Machine Gun

Learning Objectives

Terminal Learning Objectives

TBS-CSW-1005 Given an M240 medium machine gun, cleaning gear, and lubricants, maintain a medium machine gun, to ensure the weapon is complete, clean, and serviceable.

TBS-CSW-1006 Given an M240 medium machine gun, ammunition, and a target(s), while wearing a fighting load, engage targets with a medium machine gun, to achieve effects on target.

TBS-CSW-1004 Given an M240 medium machinegun with a malfunction or stoppage not corrected by immediate action, perform remedial action on a medium machine gun, to return the weapon to service.

TBS-CSW-1003 Given an M240 medium machine gun and ammunition, while wearing a fighting load, perform immediate action on a medium machine gun, to return the weapon to action, without endangering personnel or equipment.

TBS-CSW-1002 Given a loaded M240 medium machine gun requiring a barrel change, during target engagement, while wearing a fighting load, change the barrel on a medium machine gun, to return the weapon to service.

TBS-CSW-1001 Given an M240 medium machine gun and ammunition, while wearing a fighting load, perform weapons handling procedures for the medium machine gun without endangering personnel or equipment.

Enabling Learning Objective

TBS-CSW-1001a Given an evaluation, identify M240 medium machine gun nomenclature, without error.

TBS-CSW-1001b Given an evaluation, identify M240 medium machine gun ammunition, without error.

TBS-CSW-1002a Given an M240 medium machine gun, clear the medium machine gun, to make a condition 4 weapon.

Learning Objectives (Continued)

TBS-CSW-1002b Given an M240 medium machine gun, load the medium machine gun, to enable target engagement.

TBS-CSW-1003a Given an M240 medium machine gun that fails to fire, communicate a verbal "misfire" warning three times to alert surrounding personnel.

TBS-CSW-1003b Given an M240 medium machine gun that fails to fire, demonstrate hang fire procedures for a period of 5 seconds to prevent a hang fire.

TBS-CSW-1003c Given an M240 medium machine gun that fails to fire, pull the action to the rear to take the weapon out of action and guard against cookoff.

TBS-CSW-1003d Given a loaded M240 medium machine gun, observe for feeding and ejecting of ammunition to verify clearance of stoppage.

TBS-CSW-1004a Given an M240 medium machine gun with a hot barrel, demonstrate training-environment hot barrel remedial action procedures for a period of 15 minutes to prevent cookoff and allow barrel to cool.

TBS-CSW-1004b Given an M240 medium machine gun with a malfunction or stoppage not corrected by immediate action, identify the cause of failure to function to determine further action.

TBS-CSW-1005a Given an M240 medium machine gun, execute disassembly and reassembly of a medium machine gun in a time limit of 6 minutes.

TBS-CSW-1005b Given an M240 medium machine gun, perform a functions check on a medium machine gun to verify the weapon’s readiness for action.

TBS-CSW-1006c Given an evaluation, define rates of fire for the M240 medium machine gun without error.

TBS-DEF-1002a Given an evaluation, identify machine gun capabilities and limitations without omission.

TBS-DEF-1002m Given an evaluation, identify the characteristics of the M240B medium machine gun without error.

History

The M240B medium machine gun (see diagram below) is a result of a Marine Corps search for a weapon that could fire at an extended range with greater dependability and accuracy than the M60E3. The search was not long, for the machine gun chosen was already in the Marine Corps inventory. The M240C and “E” series machine guns are found on the light armored vehicle (LAV) and the M-1 Abrams main battle tanks. The M240G is the first ground variant was the Golf. The Bravo was not introduced until later on in the 2000’s. Made by Fabrique Nationale of Herstal, Beligum, (the same manufacturer of the M249 squad automatic weapon). A European version, called the FN MAG 58, is used by over 100 different nations throughout the world and is the premier machine gun used in NATO. The M240B is fitted with improvements for ground mounting such as a forward heat shield, ammunition adapter, and a hydraulic buffer. The M240B is a battle-proven machine gun that has demonstrated many times the highest possible performance levels in combat throughout the world.

Characteristics

Description. The M240B machine gun is a belt-fed, air-cooled, gas-operated, fully automatic machine gun that fires from the open bolt position. The M240B machine gun is found in the machine gun section of the weapons platoon of every rifle company in the Marine Corps. Six of these machine guns are in each section, divided into three, two-gun squads.

Specifications.

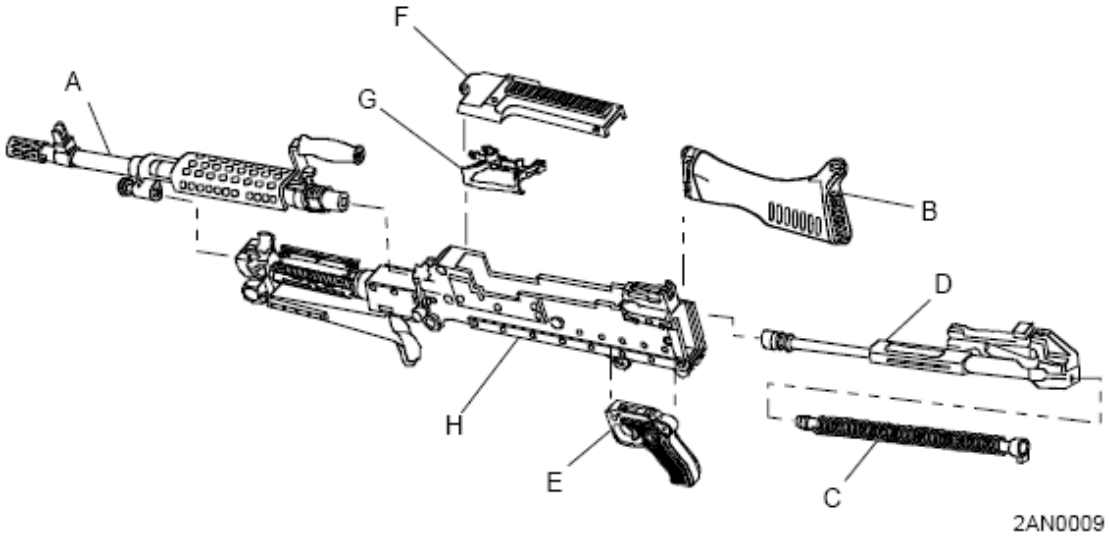
Machine gun	27.4 pounds
Spare barrel case, SL-3 complete	12.9 pounds
Tripod, flex mount, and T&E	20 pounds
Total system	47.4 pounds
Length of machine gun	48.5 inches
Rifling	6 grooves with a uniform right-hand twist. One turn in 12 inches.
Sustained rate of fire	100 rpm
Rapid rate of fire	200 rpm
Cyclic rate of fire	650 rpm
Muzzle velocity	2,750 fps
Maximum Range	3,725 meters
Effective range (suppression)	1,800 meters
Grazing fire	600 meters

Characteristics (Continued)

Component Groups

Eight Main Components (see diagram below).

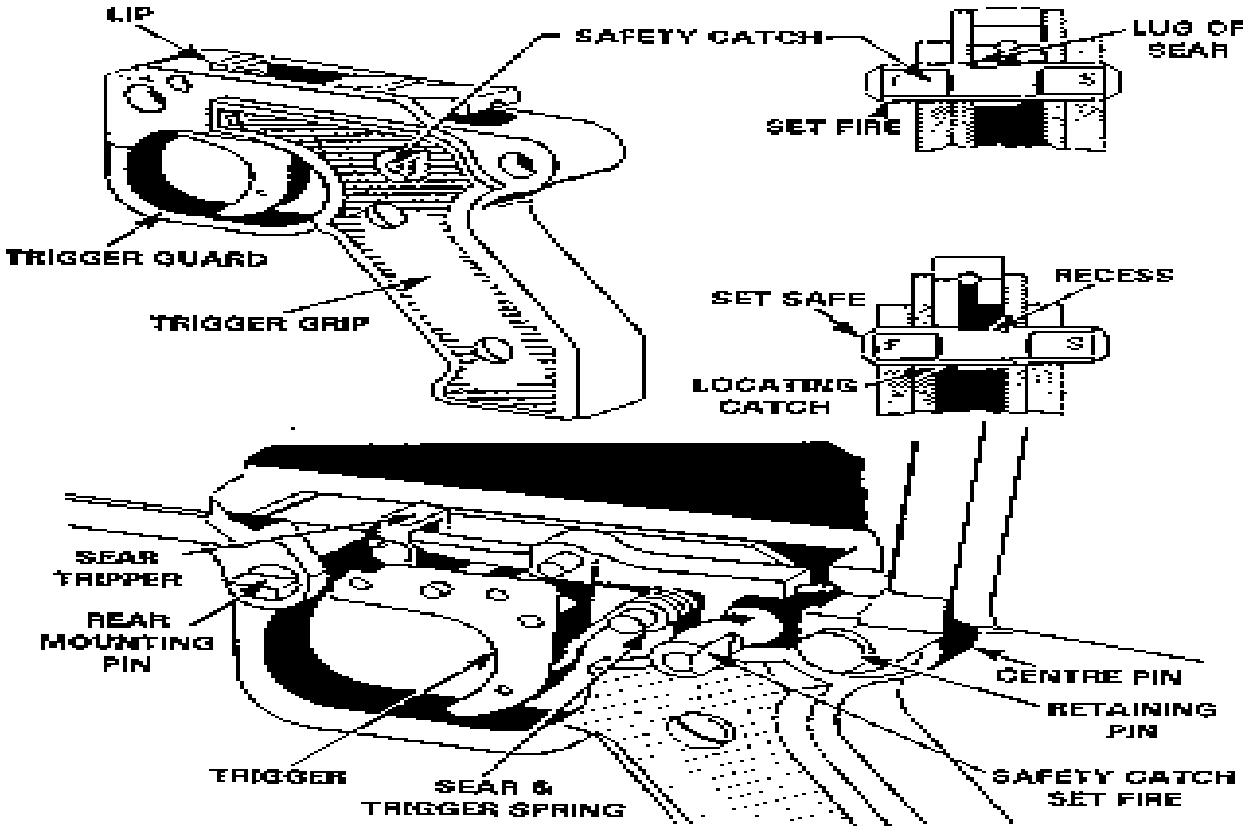
- (A) Barrel assembly
- (B) Butt-stock and buffer assembly
- (C) Driving spring rod assembly
- (D) Bolt and operating rod assembly
- (E) Trigger-housing assembly
- (F) Cover assembly
- (G) Feed tray
- (H) Receiver assembly



M240B

Characteristics (Continued)

Safety The safety (see diagram below) is located in the trigger-housing group. Push the safety from left to right (“S” visible) to render the weapon safe. When the safety is engaged, the cutaway portion of the safety bar is *not* aligned with the safety lug of the sear. When the trigger is pulled, the sear cannot rotate downward and the bolt cannot be released to go forward.



Safety

Push the safety from right to left (“F” visible) to render the weapon ready to fire. When the safety is *not* engaged, the cutaway portion of the safety bar is aligned with the safety lug on the sear. The sear is allowed to move downward when the trigger is pulled.

Note: The weapon cannot be placed on safe when the bolt is forward.

Functioning

Feeding

When the bolt is to the rear, the outer feed pawls are outside the first round of ammunition. The inner feed pawls are between the first and second rounds. As the bolt moves forward to fire the round in the feed tray groove, the belt feed pawl moves to the left. It moves up and over the second round in the belt of ammunition and is now in position to drag the second round into the feed tray groove. As the bolt moves to the rear after firing, the belt feed pawl moves to the right, dragging the second round into the feed tray groove. Inside the cover, the cam roller, feed arm with control spring, feed arm fork, and pivot arm exist only so the feed pawls can move back and forth, dragging rounds into position to be chambered.

Chambering

Chambering is the process of stripping a round from the belt and seating it in the chamber. As the bolt travels forward, the upper locking lug of the bolt contacts the base of the cartridge. The bolt strips the round from the belt link. The chambering ramp angles downward and forces the round toward the chamber along with the spring tension of the cartridge guide pawl. The cartridge guide pawl also holds back the belt link. When the round is fully seated in the chamber, the extractor snaps over the extractor rim of the cartridge, and the ejector is depressed.

Locking

During chambering, the bolt enters the barrel socket as the drive spring drives the operating rod forward. The locking lever, on which the bolt is riding, swings forward pushing the bolt forward and locking it to the barrel socket. Although the term, “locking,” is used here, note that in the M240B the bolt and barrel do not physically inter-lock. This is why the barrel can be removed even when the bolt is forward.

Firing

After the bolt reaches its locked position, the operating rod moves forward, independent of the bolt. The operating rod carries the striker of the fixed firing pin through the aperture in the face of the bolt, striking and detonating the primer of the cartridge.

Functioning (Continued)

Unlocking

After the cartridge ignites and the projectile passes the gas port, part of the gases enter the gas cylinder. The rapidly expanding gases enter the hollow end cap of the gas piston and force the operating assembly to the rear, providing the power for the last four steps in the cycle of functioning. The operating rod now moves rearward, independent of the bolt, for a short distance. At this point, the locking lever begins to swing toward the rear, carrying the bolt with it into its unlocked position, and clears the barrel socket.

Extracting

The extractor grips the rim of the cartridge as the bolt and operating rod pull the case from the chamber.

Ejecting

As the case is withdrawn from the chamber, the ejector exerts a push from the top, and the extractor exerts a pull from the bottom. The casing falls from the gun as soon as it reaches the cartridge ejection port. At approximately the same time, the empty link is forced out of the link ejection port between the cartridge stops on the feed tray by the next round moving into the feed tray groove.

Cocking

Cocking is the process of placing the parts of the gun in position to fire the next round. During the rearward independent movement of the operating rod, the firing pin striker is withdrawn from the face of the bolt. When the bolt has moved far enough to the rear to pick up the next round for chambering, cocking is completed.

Ammunition

The ammunition is issued in 100-round bandoleers. Weight of a 100 round assault pack (2 per can) is 7 pounds. Basic allowance per gun is 400 rounds. The five types of ammunition are listed below with their characteristics.

Type	Description	Purpose
M172 Dummy	Plain Fluted cartridge No primer or propellant	Training (loading/unloading) Gun drills
M82 Blank	Double tapered neck No bullet	Simulated firing
M80 Ball	Plain Full metal jacketed bullet	Field firing Personnel Light material vehicles
M62 Tracer	Orange tip	Observing fire Incendiary effects Signaling Marking (900m burnout)
M61/M993 Armor-piercing	Black tip on the bullet	Light armored targets

Unloading/Clearing

The following is the unloading and clearing procedures for the M240B:

Step 1 Determine if the barrel is hot (200 rounds in 2 minutes or less). A hot barrel may cause the round to cook off.

CAUTION: If the barrel is hot and a round is still chambered,

- Keep the cover closed
- Ensure the weapon is pointed in a safe direction
- Wait until the barrel cools

Step 2 If the bolt is not already locked to the rear, pull the bolt to the rear and lock it.

Step 3 Place the weapon on SAFE.

Step 4 Raise the cover and remove the belted ammunition.

Step 5 Lift the feed tray and inspect the chamber.

Step 6 Close the cover.

Step 7 Place the weapon on FIRE.

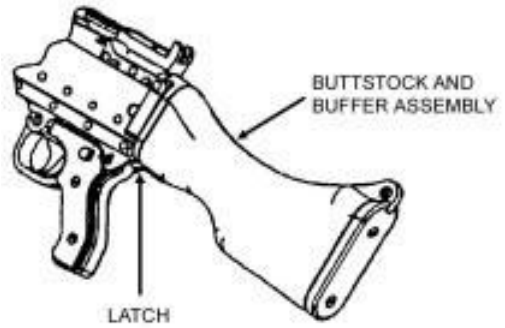
Step 8 While holding the cocking handle to the rear, pull the trigger and ease the bolt forward.

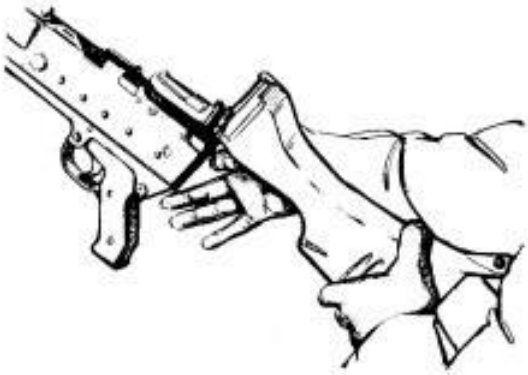
General Disassembly

General disassembly (field stripping) is the separation of the M240B into five main groups. Before beginning ensure the weapon is pointed in a safe direction and is clear.

Step 1 With the bolt forward, raise the cover.

Step 2 Depress the butt-stock latch located on the underside of the butt-stock where it joins the receiver (see diagram below).

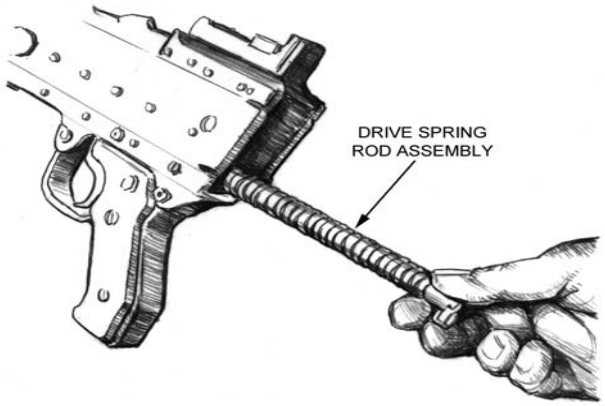




General Disassembly (Continued)

Step 3 To remove the drive spring rod assembly (see diagram below),

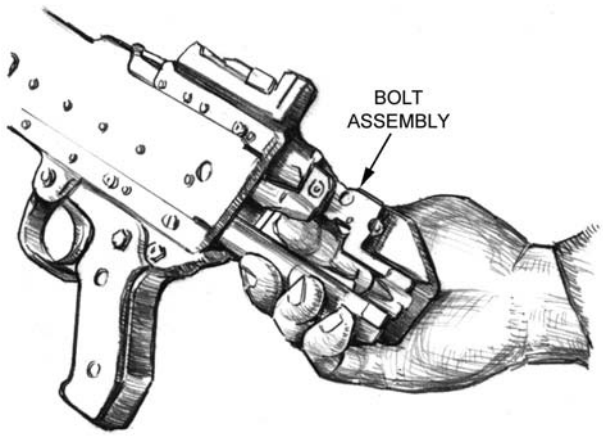
First push in against its base
Then lift up and outward so that it clears its retaining studs inside the receiver.



General Disassembly (Continued)

Step 4

- Pull the cocking handle to the rear to start the rearward movement of the bolt and operating assembly inside the receiver
- With the index finger, reach inside the top of the receiver and push rearward on the face of the bolt until the bolt and operating rod assembly are exposed at the rear of the receiver (see diagram below).



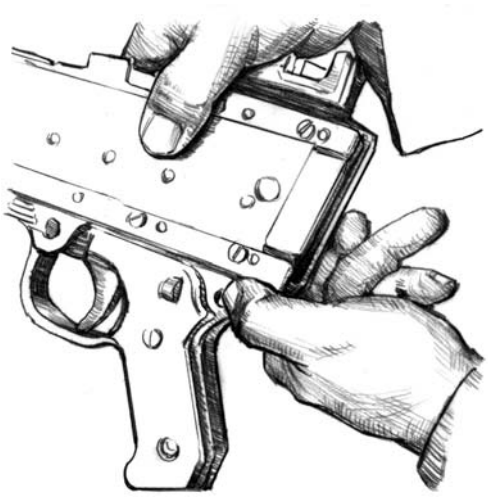
Step 5 Grasp the bolt and operating rod assembly and remove them from the rear of the receiver.

To separate the operating rod and bolt, remove the spring-loaded pin that holds them together

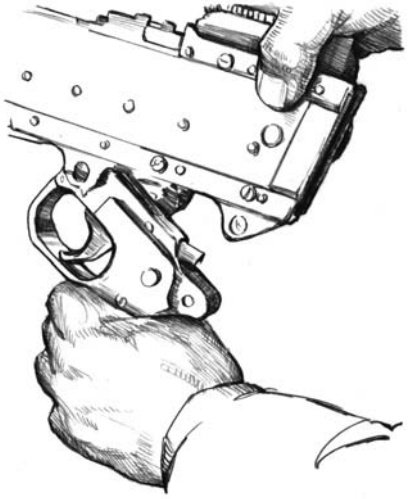
Then, pull the bolt forward until it is clear of the firing pin, thus disengaging the bolt from the operating rod.

General Disassembly (Continued)

Step 6 Remove the trigger housing assembly spring pin.



Step 7 Rotate the rear of the trigger housing assembly down (see diagram below).

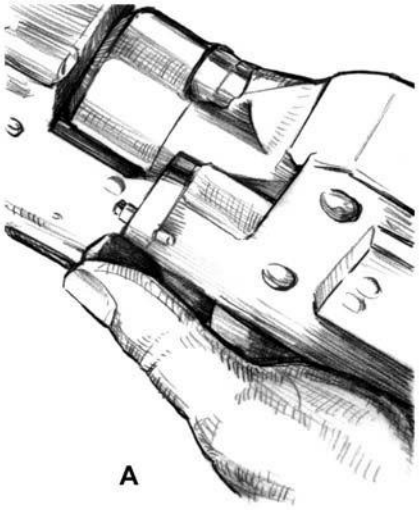


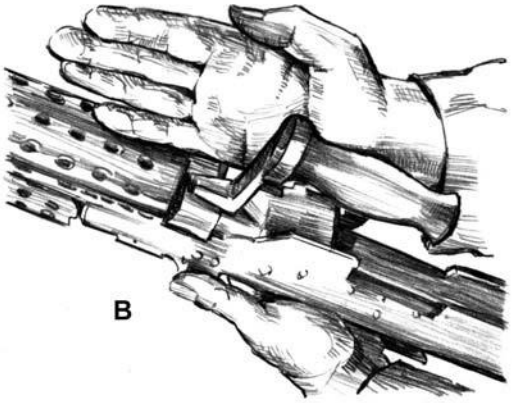
Step 8 Disengage the holding notch at the front of the assembly from its recess on the bottom of the receiver.

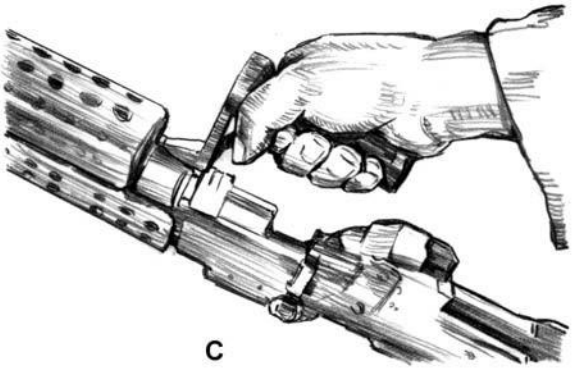
General Disassembly (Continued)

Step 9 Remove the trigger assembly from the receiver.

Step 10 Depress the barrel-locking latch located on the left side of the receiver where the barrel joins the receiver. Grasp the carrying handle and rotate it to an upright position. Then push forward and pull up, separating the barrel from the receiver.



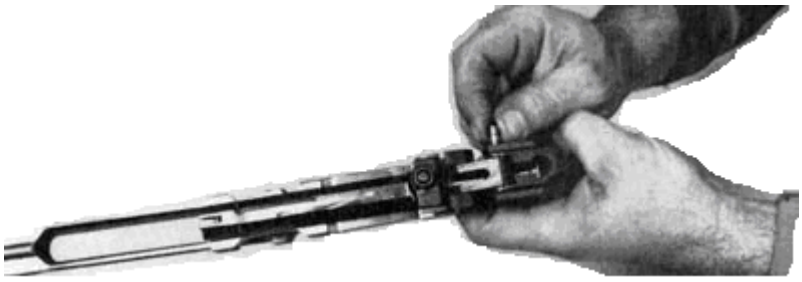


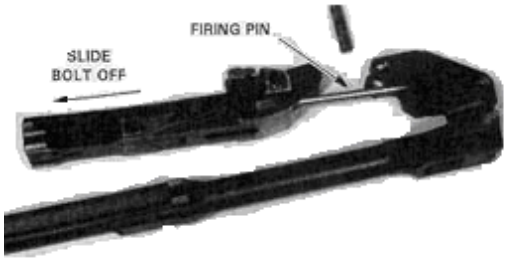


Detailed Disassembly

Detailed disassembly involves removal of component parts of some of the main groups.

Step 1 Detailed Disassembly of the Operating Group. Remove the spring-loaded pin that holds the bolt and operating rod together (see diagrams below).

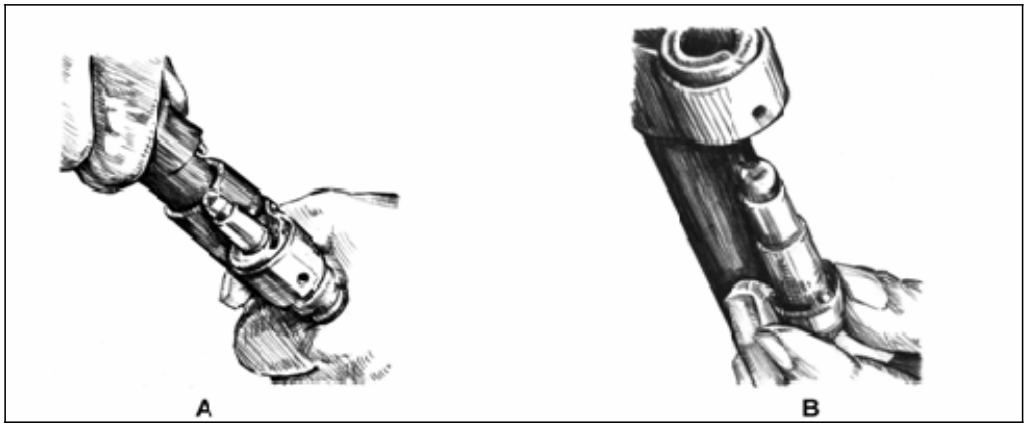


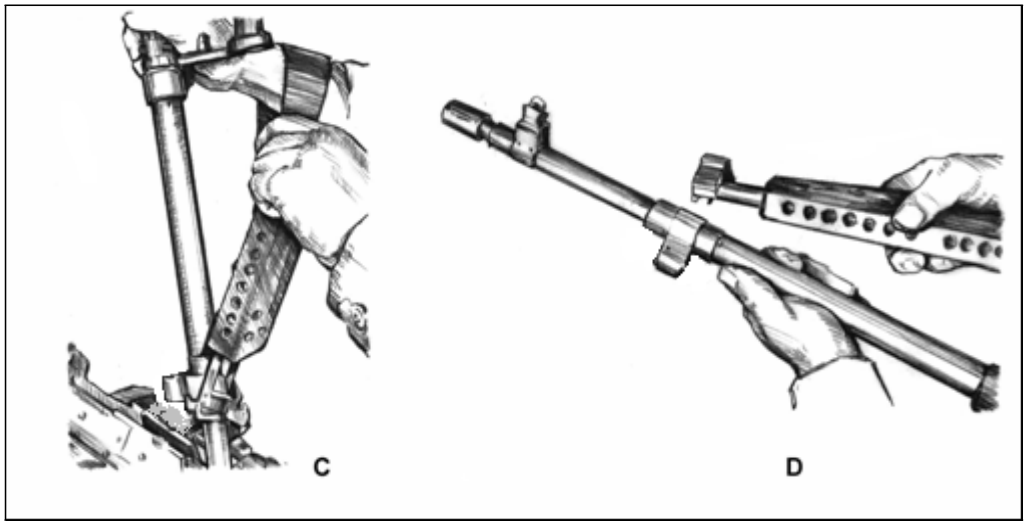


Step 2 Hold the barrel at the point where the gas system attaches to it.

Detailed Disassembly (Continued)

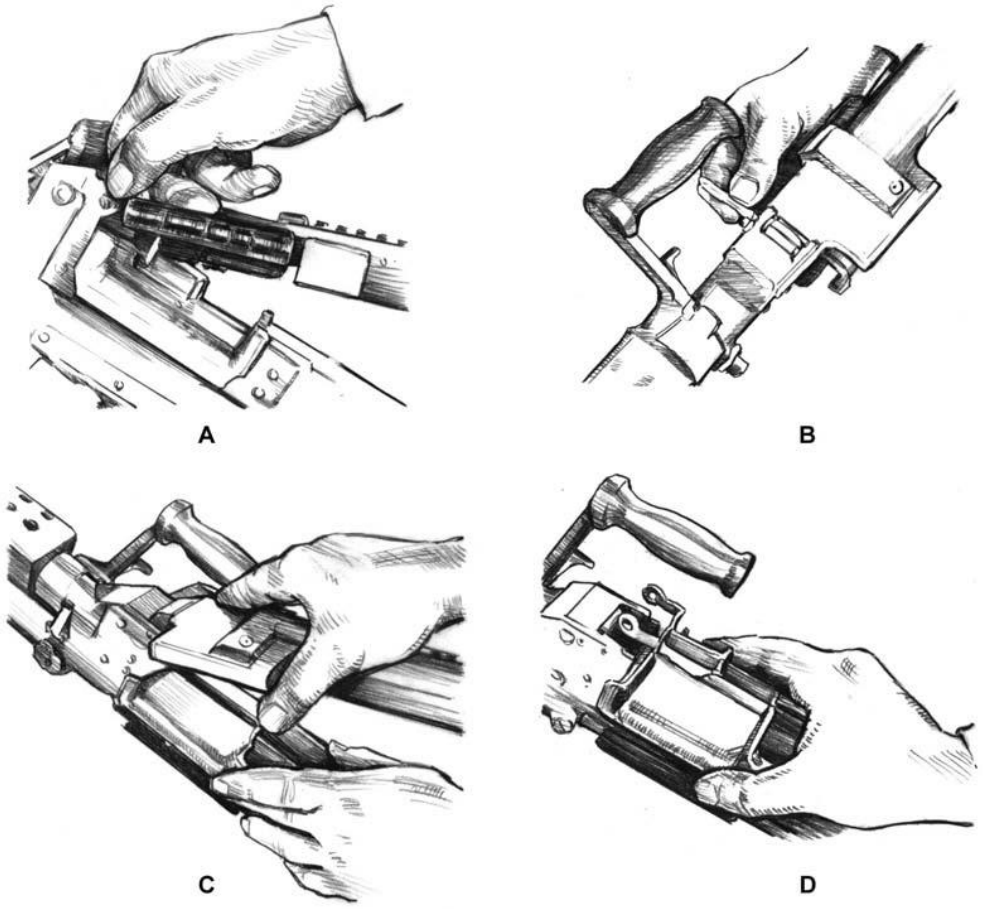
Step 3 Grasp and rotate the collar clockwise until it releases from the gas plug. Remove the collar from the gas plug and separate the plug and collar from the barrel. Remove the heat shield by pulling up on the rear of the heat shield, releasing the spring tension around the barrel.





Detailed Disassembly (Continued)

Step 4 Pull the hinge spring pin out and lift the cover and feed tray from the receiver (see diagrams below).

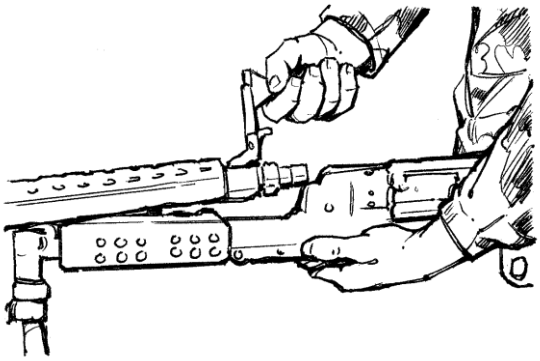


Detailed Assembly

Step 1	To replace the Feed tray, lay the feed tray on the receiver so the feed tray guides are aligned with the receiver brackets
Step 2	Place the cover onto the receiver aligning its mounting holes with the mounting brackets on the receiver. Push the cover down into its closed position. Then, insert the cover hinge spring pin into the holes to affix the cover and feed tray to the receiver
Step 3	Snap the heat shield on top of the barrel, engaging the front hinges before snapping the rear of the shield in place.
Step 4	Insert the gas plug into the gas regulator.
Step 5	Place the collar over the forward end of the plug.
Step 6	Push against face of the collar while rotating counterclockwise until it locks into place.
Step 7	Pull on the collar to ensure it is in the locked position.
Step 8	To join the bolt and operating rod, hold the rod in one hand, then position the rear of the bolt and slide it over the firing pin.
Step 9	Align the holes on the bolt with those on the operating rod.
Step 10	Push the spring-loaded pin (inserted from the left or right) through them to secure the two assemblies together.

General Assembly

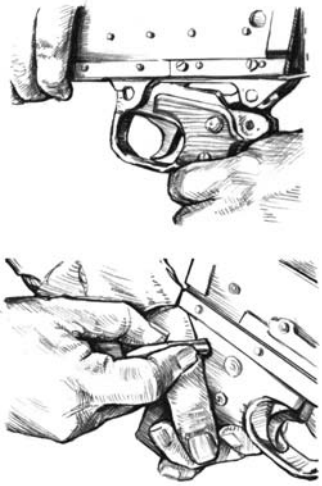
Step 1 Insert the barrel socket into the receiver forward of the cover and align the rear of the gas plug with the gas cylinder tube in front of the bipod.



Step 2 Fully seat the barrel in the receiver. Rotate the carrying handle down to its lowered position to lock the barrel in place.

Step 3 Check for proper headspace by rotating the barrel-changing handle while counting the number of clicks heard. You should hear a minimum of two clicks but not more than seven.
CAUTION: If this is not the case, do not fire the weapon; turn it in for higher echelon maintenance/inspection.

Step 4 Insert the holding notch on the front of the trigger housing into its recess on the bottom of the receiver (see diagram below).



General Assembly (Continued)

Step 5 Rotate the rear of the trigger housing upward.

Step 6 Align the hole of the trigger housing with the mounting bracket on the receiver.

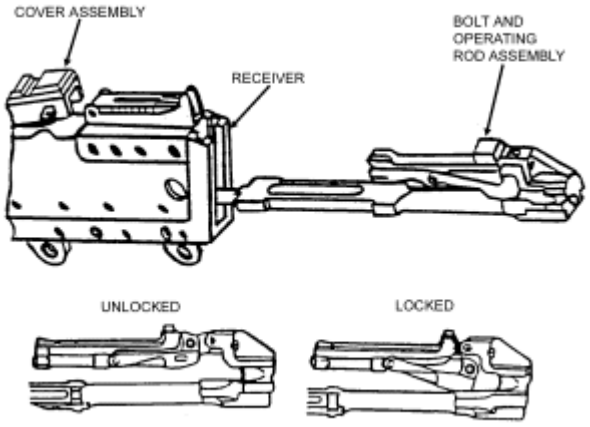
Step 7 Insert the trigger housing assembly spring pin (from the left or right) into the hole, securing the assembly to the receiver.

Step 8 To join the bolt and operating rod, hold the rod in one hand, then position the rear of the bolt and slide it over the firing pin.

Step 9 Align the holes on the bolt with those on the operating rod.

Step 10 Push the spring-loaded pin (insert from the left or the right) through them to secure the two assemblies together.

Step 11 Insert the bolt and operating rod into the receiver, aligning the slots along their sides with the rails inside the receiver.



Step 12 Extend the bolt to the unlocked (forward) position and then push the entire bolt and operating rod assembly inside the receiver.

Step 13 Pull the trigger so that the assembly can slide all the way into the receiver.

General Assembly (Continued)

Step 14 Insert the drive spring rod assembly into the receiver, sliding it all the way forward against the recess in the rear of the operating rod.

Step 15 Then lower it so that its base seats against the retaining studs inside the receiver that holds it into place.

Step 16 Align the recessed grooves at the front of the butt-stock with the vertical rails at the rear of the receiver.

Step 17 Slide the butt-stock downward until it locks in place on the receiver.

Step 18 Function Check:

- Close the cover and cock the weapon.
- Put the weapon on safe.
- Attempt to fire/weapon should not fire.
- Put the weapon on fire.
- Ride the bolt forward.

Care and Cleaning

Cleaning Material

- Cleaning, lubricant, protectant (CLP)
- Rifle Bore Cleaner (RBC)
- Dry cleaning solvent

Lubricants

- CLP
- Lubricant, artic weather (LAW)
- Lubricant, weapon, semi-fluid (LSA)
- Liquid solvent agent with Teflon (LSA-T)

Before Firing

Inspect for cleanliness, proper mechanical condition, and missing or broken parts. Press the barrel release latch and turn the barrel carrying handle clockwise while counting the number of clicks (fewer than 2 clicks or more than 7 clicks indicates a possible barrel defect)

Remove excess oil from the:

- Bore
- Chamber
- Barrel socket
- Face of the bolt

Lubricate the gun by placing a light coat of CLP on the:

- Operating rod: Apply CLP on those recesses along the side that make contact with the receiver rails.
- Bolt: Place a very small amount of CLP on the
  - o Spring pin
  - o Roller
  - o Other moving parts
- Receiver: With the bolt to the rear, apply a line of CLP on either side of the bolt. Manually pull the bolt back and forth, so that CLP is spread over the bolt and receiver rails.

During Firing

During firing, maintain a light coat of CLP on the parts listed in the general assembly section above. Ensure that the gas system's connections remain tight. Change barrels when necessary.

Care and Cleaning (Continued)

After Firing	• After firing, clean the gun with CLP, RBC, or dry cleaning solvent. Even the most careful initial cleaning will not remove all carbon deposits; therefore, you must clean the gun for three consecutive days after firing. After cleaning each day, wipe off all cleaning materials and place a light coat of CLP on all metal parts. • If the gun is fired daily, remember that repeated detailed disassembly will cause unnecessary wear. Adequate cleaning can be performed on a gun that has been disassembled into its five main groups. You must perform detailed disassembly only after prolonged firing. • Ensure that cleaning materials such as CLP and RBC are not used on the nonmetallic portions of the gun, such as the buttstock. Use hot water, rags, and nonabrasive brushes to remove dirt from the nonmetallic portions of the gun. • Clean the M122 tripod to remove all dirt; then apply a light coat of CLP, especially to the sleeve and sleeve latch.
Normal Maintenance Procedures	• Clean each gun as soon after firing as possible and each time it is exposed to field conditions. • In combat conditions, clean and lubricate the gun daily, whether or not it has been fired. • During normal training conditions, inspect the gun daily for rust and maintain a light coat of CLP on all metal parts. • In ideal conditions, when the gun is not used and is kept in a clean place, you may only have to disassemble and clean the gun every three to five days. Disassemble, clean, and lubricate the gun in a clean, dry location where it is least exposed to dirt and moisture.
Inspection	• Always check for cleanliness. • Look for broken, missing, or burred parts. • Test the spring tension of appropriate parts, and perform appropriate checks to determine if the gun functions properly.

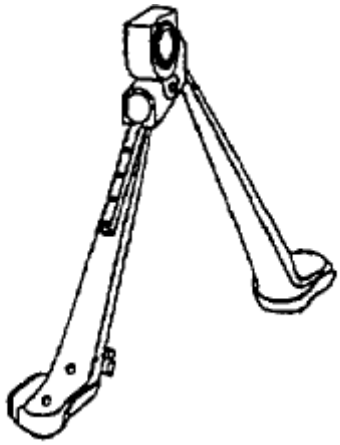
Mounts and Accessories

Sights

- The M240B has a front sight post which can be adjusted using the tool, combination, front sight adjusting. This adjustment is normally only done to zero the weapon.
- The rear sight consists of a peep sight aperture on an adjustable sight leaf slide. This sight leaf slide rides on a range plate with a graduated scale that is attached to the weapon by a hinged mount. The gun is normally carried with the sight in its horizontal position. The gun can be used with the sight in this position to engage close in targets (800 meters or below) from the bipod or tripod.
- The sight can also be raised to a vertical position for sighting on targets at greater ranges (more than 800 meters). These settings are normally used only when the gun is employed on the tripod, which provides the stable platform necessary to accurately engage targets at these greater ranges.
- The range plate scale, located on both sides of the range plate, is marked at 100-meter intervals from 200 meters to the maximum effective range of 1,800 meters. Make range changes by:
  - Moving the rear sight slide horizontally along its graduated steps for range settings from 200 meters to 800 meters
  - Raising the sight to its upright position and moving the rear sight slide vertically for range settings from 800 meters to 1,800 meters.

Bipods

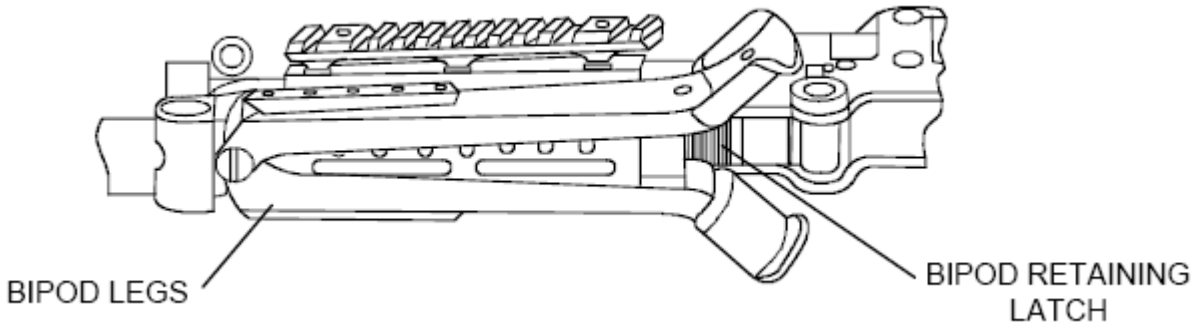
The bipod mount is part of the receiver group; **the operator cannot remove it**. The bipod is held in position by the ball joint that joins it to the bottom of the receiver.



Mounts and Accessories (Continued)

Bipods (Continued)

To lower the bipod legs, push in on the bipod latch and rotate the legs down and forward (see diagram below). Release the legs, and they will automatically spring outward into their open and locked position.



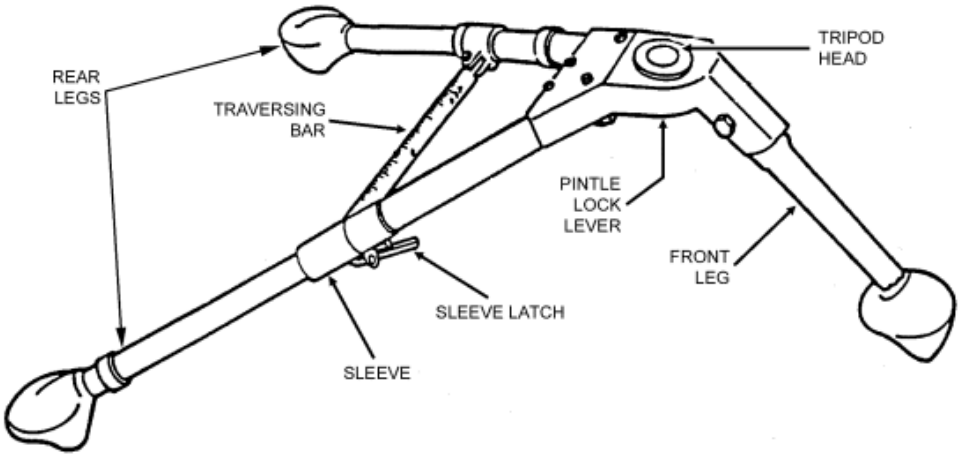
To raise the bipod legs, squeeze them together (see diagram below) and rotate the legs rearward and upward into the slot on the bottom of the receiver until the bipod latch engages, locking them in position.

The M240B's bipod pivots on the ball joint, allowing the gunner to quickly and easily move the weapon to the right or left.

Mounts and Accessories (Continued)

M122 Tripod The tripod assembly provides a stable and relatively lightweight base that is far superior to the bipod. The tripod may be extended and collapsed easily and consists of:

- A tripod head
- One front and two rear legs
- A traversing bar (see diagram below)



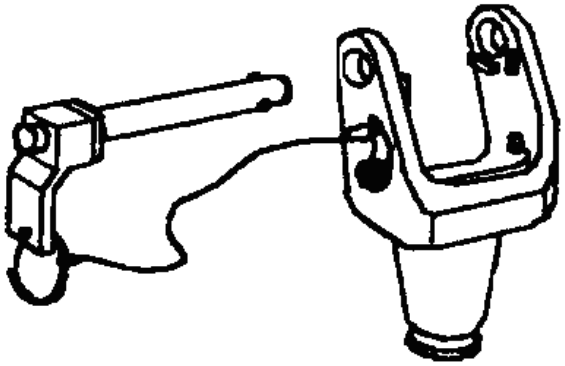
The traversing bar:

- Connects the two rear legs
- Is hinged on one side with a sleeve and on the other side with a sleeve latch
- Allows the tripod to collapse to a closed position for carrying or storage or to lock in an open extended position for use
- Also supports the T&E mechanism
- Engraved on the bar is a scale, graduated in 5 mil increments, that measures direction in mils. The scale is numbered every 100 mils from 0 in the center to 450 mils on the left side and 425 mils on the right side (see diagram below).

Mounts and Accessories (Continued)

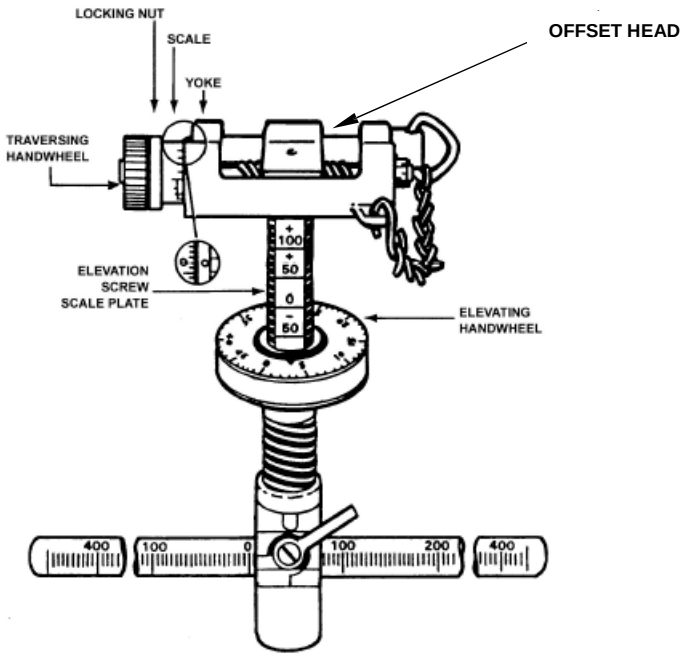
M122 Tripod (Continued)

Pintle: The Pintle mounts the M240B to the M122 Tripod.



The purpose of the T&E mechanism (see diagram below) is to provide controlled manipulation and the ability to engage predetermined target. The traversing portion of the mechanism consists of the:

- Traversing handwheel
- Traversing screw
- Offset Head
- Traversing slide with lock lever



Mounts and Accessories (Continued)

M122 Tripod (Continued)

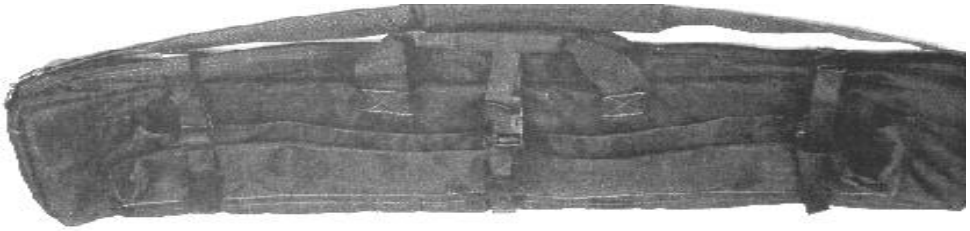
- As the handwheel is turned, the offset head will appear to move along the traversing screw: 1 click = 1 mil. A total of 100 mils traverse is on the traversing screw.
- Notice that the traversing slide is a U-shaped projection near the bottom of the T&E. The slide locking lever locks this slide to the traversing bar.
- The elevating portion of the mechanism consists of the upper elevating screw with scale, elevating hand-wheel, and lower elevating screw. The scale on the upper elevating screw is graduated in 50-mil increments from 0 to +200 and 0 to -200.

Gun Bag

The complete gun bag (see diagram below) is used to carry the

- Machine gun
- Tripod
- Pintle
- Traversing and Elevating mechanism
- Spare barrel
- All user maintenance equipment
- Other accessories (SL-3 components)

The gun bag keeps the gun and all its components together and protected during events such as unit movements for embarkation on ships or aircraft.

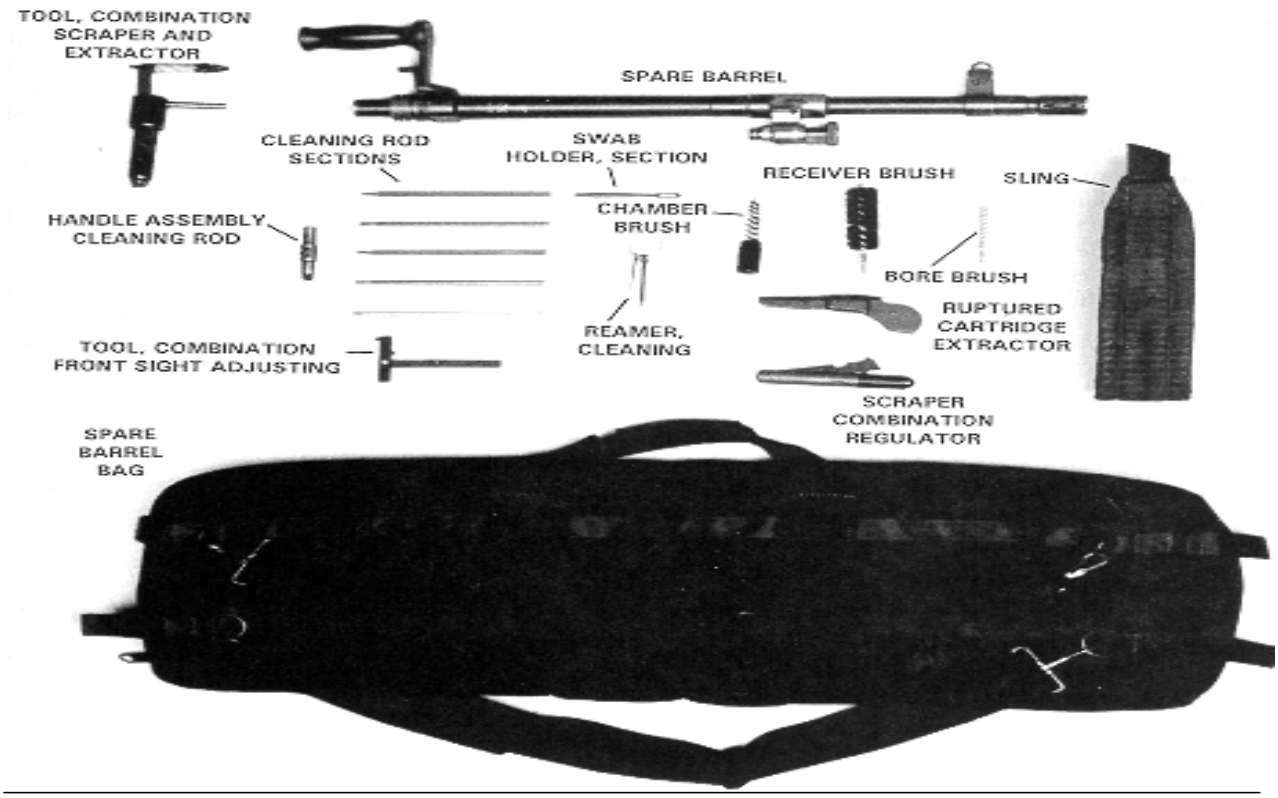


Mounts and Accessories (Continued)

Gun Bag (continued)

The removable spare barrel bag is designed for field use and will carry:

- The spare barrel
- A complete set of user maintenance equipment and accessories (see diagram below)



Mounting the Gun

Step 1 Prepare the tripod by extending its legs until the sleeve latch engages and locks the legs in the open position.

Step 2 Rotate the elevating handwheel until approximately 1½ inches (two fingers) are visible on the upper elevating screw.

Step 3 Rotate the traversing slide until approximately 1½ inches (two fingers) are visible on the lower elevating screw.

Step 4 Rotate the traversing handwheel until the offset head is centered on the traversing screw.

Step 5 Place the T&E on the rear trigger housing, aligning the holes on the T&E and trigger housing, and insert the T&E pin through the gun.

Step 6 Place the pintle into the pintle bushing until it locks.

Step 7 Place Gun in pintle and insert pintle pin. Lock traversing slide lock lever on traversing bar. Lower the traversing slide over the traversing bar with the traversing slide to the rear and the traversing wheel to the left; secure it by turning the locking lever clockwise.

Barrel Changing Procedures

The ability to quickly change the M240B barrel provides a great advantage: one barrel can be used while the other is cooling, thus increasing the life of each barrel and ensuring a continuous rapid rate of accurate fire. Change barrels when they are beginning to overheat. Changing a barrel takes only a few seconds and significantly improves the rate of fire and accuracy. As a guide, a barrel change is required after firing at the:

- sustained rate for 10 minutes
- rapid rate for 2 minutes

The table below outlines the steps to change the barrel for a tripod-mounted gun; however, they are very similar to those for a bipod-mounted gun:

Step 1 You may change the barrel with the bolt forward or to the rear. You do not necessarily need to unload the weapon; however, it must be placed on safe, and the gunner must maintain positive control of the cocking lever when the bolt is to the rear.

Step 2 The gunner depresses the barrel locking latch with the left hand and keeps it in that position (see diagram below).

Step 3 The team leader separates the barrel from the receiver by

- Grasping the barrel by the changing handle
- Rotating the changing handle to its upright position
- Pushing forward
- Pulling up

Barrel Changing Procedures (Continued)

Step 4

- The gunner then releases the barrel release latch.
- The team leader then grasps the spare barrel by the changing handle.

Step 5 The team leader:

- Inserts the barrel socket into the receiver
- Aligns the gas plug with the gas cylinder
- Pulls to the rear until the barrel is fully seated

Step 6 Once the barrel is fully seated, the team leader lowers the barrel-changing handle, while counting the clicks (minimum two, maximum seven) to ensure proper headspace.

Malfunctions

A malfunction is a failure of the gun to function satisfactorily; the gun will fire but fires improperly. Defective ammunition or improper operation of the gun by a crewmember is not considered a malfunction. Two of the more common malfunctions are sluggish operation and runaway gun.

Sluggish Operation Instead of firing at its normal rate (approximately 9 to 10 rounds per second), a sluggish gun fires very slowly due to excessive:

Friction usually due to

- lack of lubrication
- excessive dirt/carbon in the gas system or on the bolt and receiver rails

Loss of gas, usually due to

- loose connections in the gas system

To remedy continued sluggish operation, clean, lubricate, tighten, or replace parts as required.

Malfunctions (Continued)

Runaway Gun

Runaway gun is when a gun continues to fire after the trigger is released; firing is uncontrolled. A runaway gun is

- usually caused by a worn, broken, or burred sear; the sear shoulder is unable to grab the operating rod and hold it to the rear
- also cause by an excessively worn sear notch on the operating rod

To stop a runaway gun, for both tripod and bipod-mounted guns, the team leader twists and breaks the belt of ammunition. The remedy for runaway gun is to replace worn parts.

Stoppages

A stoppage is any interruption in the cycle of functioning caused by

- faulty action of the gun
- defective ammunition

In short, the gun stops firing. Stoppages must be cleared quickly and firing resumed.

Immediate Action

Immediate action is action that the gunner/crew performs to reduce a stoppage, without investigating its cause, and quickly return the gun to action. Hang fire and cook off are terms that describe the ammunition condition and should be understood in conjunction with immediate action procedures.

Hang Fire

A hang fire occurs when the cartridge primer detonates after being struck by the firing pin but some problem with the propellant powder causes it to burn too slowly and delays the firing of the projectile. Wait five seconds before investigating a stoppage further because if the round goes off with the cover of the weapon open:

- personnel could be injured
- equipment could be damaged

Immediate Action (Continued)

Cook Off

A cook off occurs when the heat of the barrel is high enough to cause the propellant powder inside the round to ignite even though the primer is not struck. Immediate action is completed in a total of 10 seconds to ensure that the round is extracted before the heat of the barrel affects it. If the round fails to extract/eject, delay further action for 15 minutes if the barrel is hot; the gunner must assume that a round is still in the chamber and could cook off before the barrel cools down.

Classification of a Hot Gun/Immediate Action

- More than 200 rounds fired within a 2 minute period
- A long continuous burst or repeated firing of the weapon even though 200 rounds were not fired
- If the unit leader determines the weapon is hot for any reason.

WARNING: Climate affects the rate at which a machinegun barrel heats and cools. For example, a machinegun employed in a hot, arid climate will heat up and likely cause a cook-off much sooner than one employed in a cold, damp climate. Conversely, a machinegun barrel will cool off much more quickly in a colder climate. To mitigate the risk of a hot gun, barrels should be interchanged whenever possible to allow them to cool off when not in use.

The table on the following page lists the steps for immediate action for the M240B.

Immediate Action (Continued)

Classification of a Hot Gun/Immediate Action

<table>
<tr><th>Step</th><th>Action</th></tr>
<tr><td>1</td><td>Shout, “Misfire!”(x3)Wait 5 seconds after the misfire to guard against a hang fire.</td></tr>
<tr><td>2</td><td>Within the next 5 seconds (to guard against a cook off), pull the charging handle to the rear and observe the ejection port for feeding and ejecting. If brass:
• was seen ejecting, attempt to fire again
• did not eject, place the weapon on “S,” and determine if the barrel is:
• Immediate action is don’t 3x’s if feeding and or ejecting occurs prior to remedial action</td></tr>
<tr><td>3</td><td>Remedial Action:
o Hot (200 rounds or more fired in the last 2 minutes)
o Cold

<table>
<tr><th>Step</th><th>Hot Barrel</th><th>Cold Barrel</th></tr>
<tr><td>1</td><td>Assume a live round is in the chamber.</td><td>Raise the feed cover.</td></tr>
<tr><td>2</td><td>Wait until the barrel has reached air temperature (15 minutes).</td><td>Remove ammo belt and links.</td></tr>
<tr><td>3</td><td>Proceed with cold barrel procedures.</td><td>Inspect the chamber. If the chamber
• Is clear:
o Reload.
o Attempt to fire.

• Has brass present:
o Execute clear gun (use a cleaning rod to punch the bore).
o Reload.
o Attempt to fire.</td></tr>
</table>
</td></tr>
<tr><td>4</td><td>In either case, if the weapon fails to fire repeat cold barrel procedures a second time.</td></tr>
<tr><td>5</td><td>If the weapon fails to fire again, execute remedial action.</td></tr>
</table>

Remedial Action

When immediate action fails to reduce the stoppage, take remedial action. Remedial action involves investigating the cause of the stoppage which may involve some disassembly of the weapon and replacement of parts to correct the problem. Two common causes of stoppage that may require remedial action are failure to extract due to either a stuck cartridge or ruptured cartridge.

Stuck Cartridge

Some swelling of the cartridge occurs when it fires. If the swelling is excessive, the cartridge will be fixed tightly in the chamber. If the extractor spring has weakened and does not tightly grip the base of the cartridge, it may fail to extract the round when the bolt moves to the rear. Once the bolt is locked to the rear:

- Weapon is placed on “S,”
- Barrel has been allowed to cool
- Insert a length of cleaning rod into the muzzle to push the round out through the chamber

Ruptured Cartridge

Sometimes a cartridge is in a weakened condition after firing. In addition, it may swell (as described in stuck cartridge above). In this case, a properly functioning extractor may sometimes tear the base of the cartridge off as the bolt moves to the rear, leaving the rest of the cartridge wedged inside the chamber. In this case, the ruptured cartridge extractor must be used to remove it:

- remove the barrel
- insert the extractor into the chamber where it can grip and remove the remains of the cartridge

Weapons Conditions

Condition 1	• Ammunition in position on feed tray • Bolt locked to the rear • Weapon on safe
Condition 2	• Not applicable to the M240B
Condition 3	• Ammunition in position on feed tray • Chamber empty • Bolt forward • Safety not engaged
Condition 4	• Feed tray clear of ammunition • Chamber empty • Bolt forward • Safety not engaged

Weapons Commands

These are the commands to bring a Condition 4 weapon to Condition 1.

Step 1	• Raised Cover. Ensure the weapon is in condition 4 (bolt forward; weapon on “F”). • Cover Closed. Ensure the weapon is in condition 4 (bolt forward; weapon on “F”).
Step 2	• **Raised Cover.** Place the first round of the belt in the feed tray groove against the cartridge stop with the open side of the link down (“Brass to the Grass”). • **Cover Closed.** Insert the first round of a belt of ammunition with the open side of the links down into the feed way until the holding pawl engages it and holds it in place.

Weapons Commands (continued)

Step 3 Close the cover (see diagram below).

Step 4 To bring the weapon from condition 3 to condition 1 you must:

- Pull the cocking handle fully to the rear
- Place the weapon on “S.”
- Push the cocking handle fully forward to the locked position.

Step 5

- Place the weapon on “F.”
- Engage target.

These are the procedures used to bring a Condition 1 weapon to Condition 4.

Step 1 If the bolt is forward, pull the cocking handle fully to the rear until the bolt locks. Place the weapon on safe while maintaining positive control of the cocking handle.

Step 2 Lower head. Raise the cover and clear the feed tray of ammunition.

CAUTION: If the barrel is hot and a round is still chambered, immediately close the cover and feed mechanism assembly. Ensure the weapon is pointed in a safe direction and wait until the barrel cools. A hot barrel may cause the round to cook-off.

Weapons Commands (Continued)

Step 3	Lift the feed tray and inspect the chamber. *Have a second individual check to ensure no ammunition is present*.
Step 4	Close the cover.
Step 5	Place the weapon on “F.”
Step 6	While holding the cocking handle to the rear, pull the trigger and ease the bolt forward

Aiming Devices

Introduction:
The MDO sight is calibrated for the M240 Medium Machine Gun. It allows quick target acquisition at close range utilizing the Ruggedized Miniature Reflex (RMR). The MDO also provides 6x magnification and a Bullet Drop Compensator (BDC) reticle for ranges from 100m-1250m.

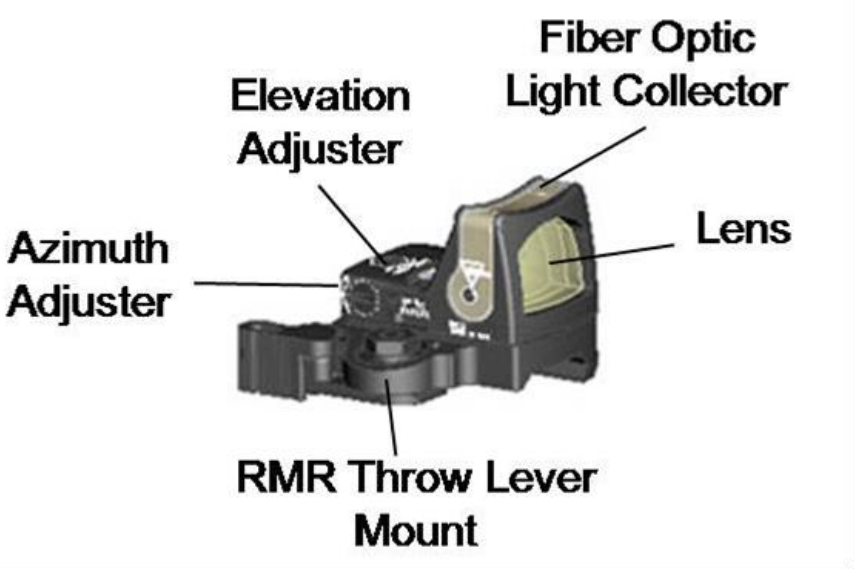
SU-260/P Machine Gun Day Optic (MDO)

SU-260/P Machine Gun Day Optic (MDO):

Characteristics

Objective Lens	48mm
Magnification	6x
Eye Relief	2.7 in
Exit Pupil	8mm
Field of View	3.3 degrees / 17ft @ 100m
Adjustments	1 click = .1 mil
Length	10.5 in
Weight	2.8 lbs
Reticle	Horseshoe Dot w/ Bullet Drop Compensator
Waterproof	66 ft
Tritium	0.1 curies
	Useful up to 15 years.

Ruggedized Miniature Reflex (RMR) Site

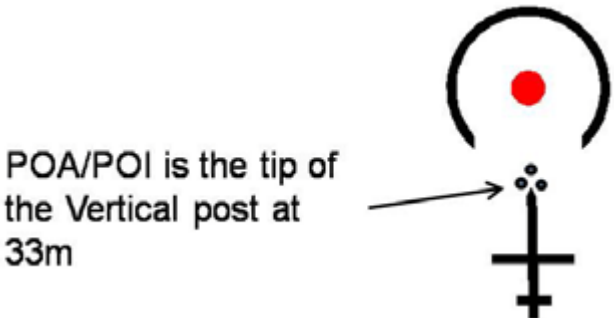


Characteristics:

Objective lens	22mm x 16mm
Magnification	1x
Eye Relief	N/A
Exit Pupil	N/A
Field of View	N/A
Length	45mm
Weight	1.2 oz
Reticle	9 MOA.DOT
Waterproof	66 ft for 2hrs
Tritium	0.25 curies
	Useful up to 15 years.

Zeroing

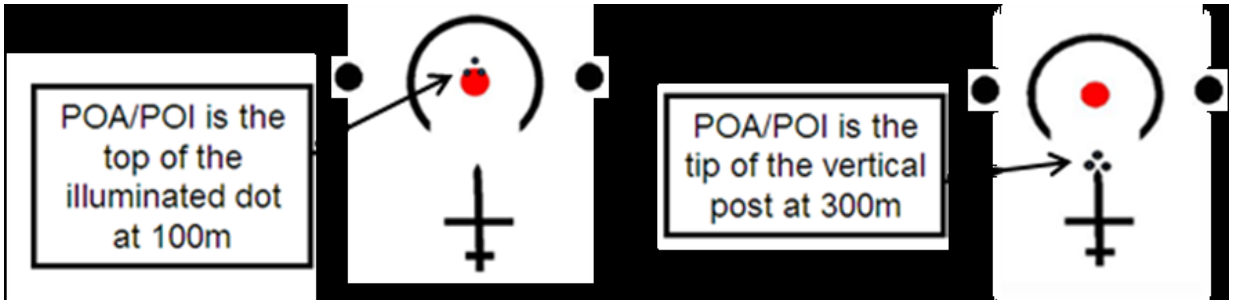
From 25m or 33m, use the tip of the 300m aiming point. Point of Aim/Point of Impact (POA/POI) is approximately the same at 33m; if firing from 25m, adjust POI approximately 1” below POA. This can be accomplished on any approved or expedient target. At any distance 1 click equals 0.1mil.
At 25m, 10 clicks equal 1”. At 33m, 8 clicks equal 1”.



ZERO MDO FROM 100M OR 300M

To Zero the MDO from 100m, the top edge of the center dot is used as POA/POI.
To zero from 300m use the tip of the vertical post. These methods ensure maximum accuracy to 1250m utilizing the Bullet Drop Compensator. At any distance 1 click equals 0.1mil. **At 100m, 5 clicks equal 2”.**

Zero from 100m or 300m
NOTE



Ideally confirm 300m Zero from 300m (vertical tip is a more precise aiming point). BDC can be aligned from any known distance using the appropriate aiming point for target range.

Zeroing (Continued)

ZERO THE RMR

To Zero the RMR, adjust POA/POI to the top edge of the 9 MOA dot at 100m.

ADJUSTMENT PROCEDURES

The MDO reticle is externally adjustable for azimuth and elevation.
CAUTION: **The Azimuth and Elevation Dials have definitive stops. Do not use tools or attempt to force adjusters beyond these stops.**

NOTE:

To mechanically center the MDO reticle, mount the MDO on an M240, remove the bolt group, then align the bore with a distant object or wall corner. Without disturbing the weapon, adjust the MDO reticle to sight at the same object.

ELEVATION ADJUSTER – MDO

Remove the **top** Adjuster Cap to expose the Elevation Dial. Turning in the direction of the arrow (clockwise) will move the strike of the bullet UP. **Adjustment increments are 0.1 Mil per click (5 clicks equal 2” at 100m).** Clicks are audible and tactile.

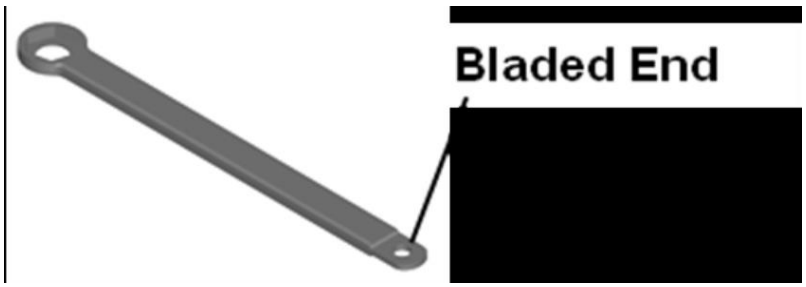
AZIMUTH ADJUSTER – MDO

Remove the **side** Adjuster Cap to expose the Azimuth Dial (Figure 3-2). Moving the dial in the direction of the arrow (clockwise) will move the strike of the bullet **RIGHT**. **Adjustment increments are 0.1 Mil per click (5 clicks equal 2” at 100m).** Clicks are audible and tactile.

Zeroing (Continued)

ELEVATION ADJUSTMENT – RMR

Moving the Elevation Dial in the direction of the arrow (Figure 3-3) will move the strike of the bullet UP. **Adjustment increments are 1 MOA per click (1 click equals 1” @ 100m).** Using Adjuster Wrench (Table 7-2, Item 6), remove hex key from handle, then remove wrench to expose bladed end. Clicks are audible and tactile.

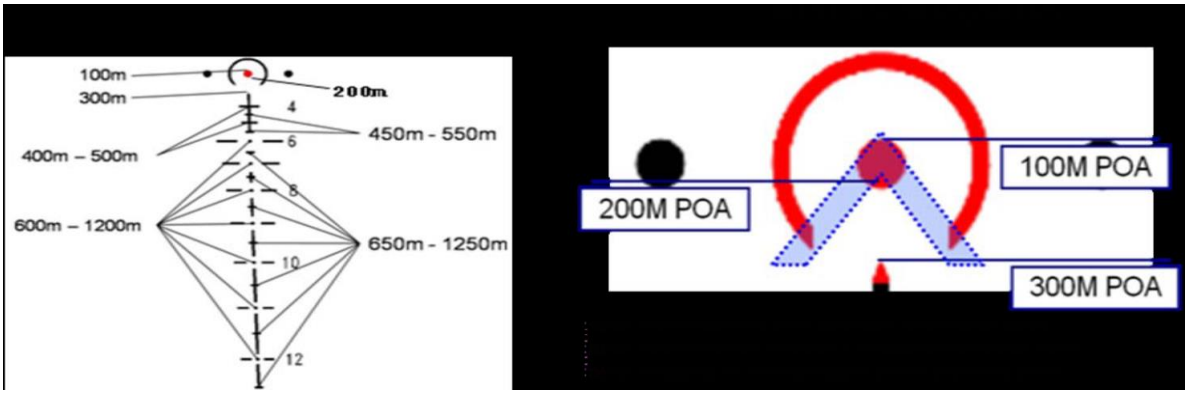


AZIMUTH ADJUSTMENT – RMR

Moving the Azimuth Dial in the direction of the arrow will move the strike of the bullet RIGHT. Adjustment increments are 1 MOA per click (1 click equals 1” @ 100m).
Using Adjuster Wrench, remove hex key from handle, then remove wrench to expose bladed end. Clicks are audible and tactile.

BULLET DROP COMPENSATOR (BDC)

The entire reticle pattern is a Bullet Drop Compensator (BDC), designed to compensate for the trajectory of the 7.62mm round from 100-1250m without making mechanical adjustments to the sight. When zeroed properly, the POA/POI is represented below



Summary

In this lesson we covered the history, characteristics, nomenclature, assembly and disassembly of the M240B medium machine gun. We also covered immediate and remedial action, barrel change procedures, mounts and accessories, loading and unloading, weapons conditions, and weapons commands of the M240B medium machine gun. We covered basic characteristics of the MDO, Zeroing Process and adjustments of the MDO and RMR.

References

Reference Number or Author	Reference Title
MCWP 3-15.1	Machine Guns and Machine Gun Gunnery (under revision)
TM 08670A-10/1B	M240 Operator's Manual (USMC)
TM 9-1005-313-10	M240 Operator's Manual (Army)

Glossary of Terms and Acronyms

Term or Acronym	Definition or Identification
CLP	Cleaning, Lubricant, Protectant
Elevating hand wheel	Hand wheel located on the elevating screw used to make adjustments in elevation
LSA	Lubricant, semifluid
LSA-T	Lubricant, semifluid , Teflon
LAV	Light armored vehicle
LAW	Lubricant, Artic, Weather
RBC	Rifle, Bore, Cleaner
T&E	Traverse and Elevation Mechanism
Traversing hand wheel	Hand wheel on the traversing screw used to make adjustments for deflection up to 100 mils

Notes