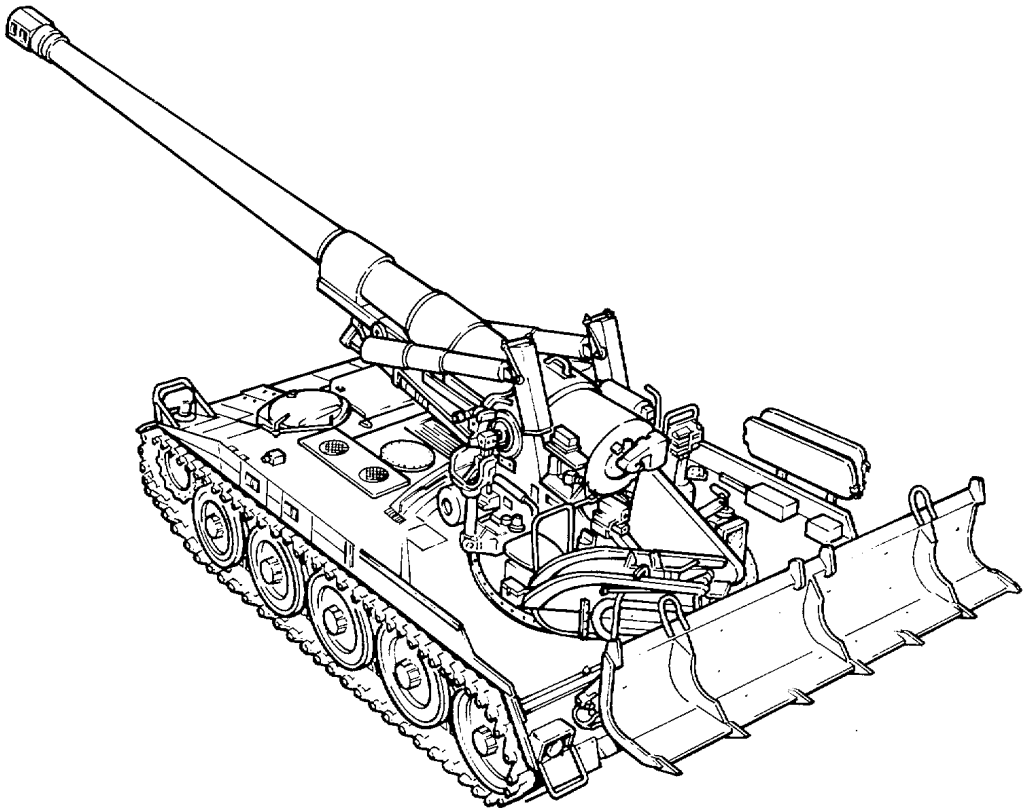
TECHNICAL MANUAL
UNIT MAINTENANCE MANUAL

ARMAMENT AND
TURRET COMPONENTS
HOWITZER, HEAVY,
SELF-PROPELLED:
8-INCH, M 11 OA2
(2350-01-041-4590)(EIC:3E3)



TECHNICAL MANUAL

No. 9-2350-304-20-2

HEADQUARTERS
DEPARTMENT OF THE ARMY
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UNIT MAINTENANCE MANUAL
ARMAMENT AND TURRET COMPONENTS
HOWITZER, HEAVY,
SELF-PROPELLED: 8-INCH, M110A2
(2350-01-041-4590)

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to Commander, U.S. Army Armament, Munitions and Chemical Command, ATTN: AMSMC-MAS, Rock Island, IL 61299-6000. A reply will be furnished to you.

Table of Contents

*This manual supersedes armament and turret components portions of TM 9-2350-304-20, November 1979, including all changes.

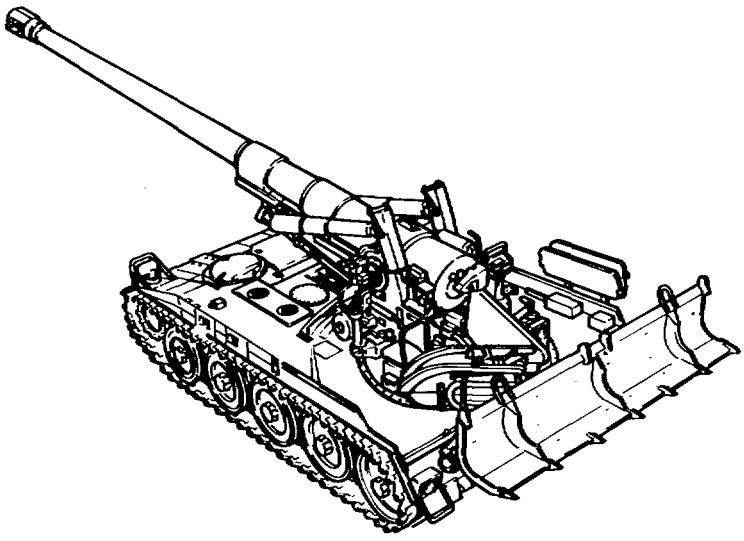
TABLE OF CONTENTS (CONT)

HOW TO USE THIS MANUAL

This manual (TM 9-2350-304-20-2) contains unit level maintenance procedures for the armament and turret components of the M110A2 Self-Propelled Heavy Howitzer. This manual is to be used in conjunction with TM 9-2350-304-10 and TM 9-2350-304-24P-2. Chapter 1 contains general information; equipment description and data; and principles of operation. Chapter 2 contains information concerning repair parts, special tools, TMDE, and support equipment; and unit level troubleshooting and maintenance procedures.

Be sure to read and understand maintenance instructions before beginning any maintenance task. Also, read and understand information in chapter 1 and general maintenance procedures on page 2-84 before beginning any maintenance task.

M110A2 SELF-PROPELLED HEAVY HOWITZER



CHAPTER 1
INTRODUCTION

CHAPTER INDEX

Section I. GENERAL INFORMATION

1-1. SCOPE.

a. *Type of Manual.* Unit level maintenance.

b. *Model Number and Equipment Name*. M 1 10A2, 8-inch, heavy, self-propelled howitzer.

c. *Purpose of Equipment.* Transports a long-barrel howitzer and its crew. Travels at convoy speed for artillery support in offensive and defensive combat operations.

1-2. MAINTENANCE FORMS, RECORDS, AND REPORTS. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA PAM 738-750, The Army Maintenance Management System (TAMMS).

1-3. DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE.

a. *Tactical Situations.* Situations may arise in which it is necessary to abandon equipment in the combat zone. All abandoned equipment must be destroyed to prevent its use by the enemy. The destruction of equipment subject to capture or abandonment in the combat zone will be undertaken only upon authority delegated by a division or higher commander.

b. *Plans.*

(1) Plans for destruction of equipment must be adequate, uniform, and easily carried out in the field.

(2) Destruction must be as complete as the available time, equipment, and personnel will permit. Since complete destruction re- quires considerable time, priorities must be established so the more essential parts are destroyed first.

(3) The same essential parts must be destroyed on all like units to prevent the enemy from constructing a complete unit from undamaged parts.

1-3. DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE (CONT).

(4) Spare parts and accessories must be given the same priority as parts installed on the equipment.

c. *Methods.* To destroy equipment adequately and uniformly, all personnel of the unit must know the plan and priority of destruction and be trained in the methods of destruction.

d. *References.* Read TM 750-244-6 for information on destruction of mechanical equipment. Read TM 750-244-5-1 for information on destruction of ammunition.

1-4. PREPARATION FOR STORAGE OR SHIPMENT. Administrative storage is restricted to 90 days and must not be extended. Refer to page 2-312 for detailed instructions on administrative storage.

1-5. OFFICIAL NOMENCLATURE, NAMES, AND DESIGNATIONS.

Nomenclature Cross-Reference List.

Common Name	*Official Nomenclature*
Dial pressure gage assembly	Pressure gage dial
LOADER control handle	Loader and traversing valve control handle
Lockwire	Nonelectrical wire
M1 15 Pantel Telescope	Ml 1 5 Panoramic
Nitrogen cylinder	Technical nitrogen
RAMMER control handle	Manual control handle
SWING control handle	Loader and traversing valve control handle

1-6. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR). If your Ml 1 0A2 Howitzer needs. improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design. Put it on an SF Form 368 (Product Quality Deficiency Report). Mail it to us at Commander, U.S. Army Armament, Munitions and Chemical Command, ATTN: AMSMC-QAD, Rock Island, IL 61299-6000. We will send you a reply.

1-7. CORROSION PREVENTION AND CONTROL (CPC).

a. Corrosion Prevention and Control (CPC) of Army materiel is a continuing concern. It is important that any corrosion problems with this item be reported so that the problem can be corrected and improvements can be made to prevent the problem in the future.

b. While corrosion is typically associated with rusting of metals, it can also include deterioration of other materials such as rubber and plastic. Unusual cracking, softening, swelling, or breaking of these materials may be a corrosion problem.

c. If a corrosion problem is identified, it can be reported using SF Form 368, Product Quality Deficiency Report. Use of key words such as "corrosion," "rust," "deterioration," or "cracking" will assure that the information is identified as a CPC problem.

d. The form should be submitted to: Commander, U.S. Army Armament, Munitions and Chemical Command, ATTN: AMSMC-QAS/ Customer Feedback Center, Rock Island, IL 61299-6000.

Section II. EQUIPMENT DESCRIPTION AND DATA

1-8. EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES.

a. Purpose. The M1 10A2 Howitzer is a weapon that defends against close-in or long- range ground targets.

b. *Capabilities and Features.*

CAUTION

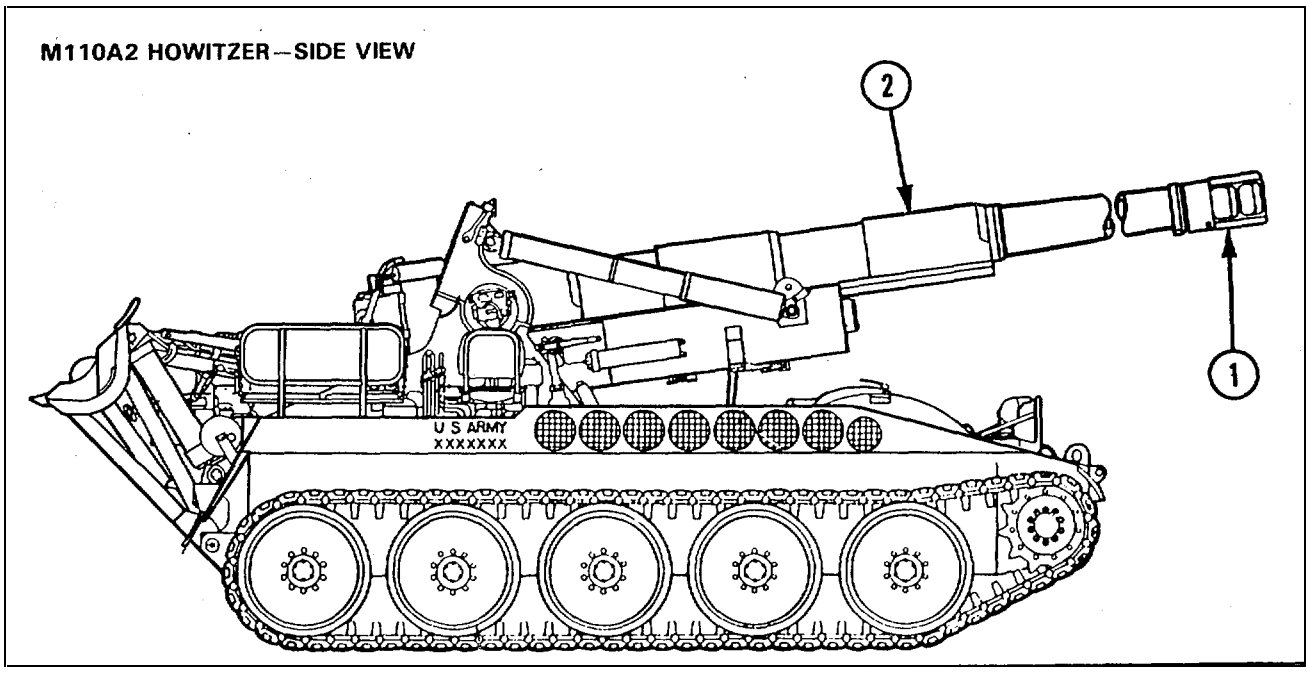
Do not ford water which exceeds 42 in. (106.7 cm) in depth. Check for soft mud or sandy bottoms.

(1) The M1 10A2 Howitzer is an unarmored, full-tracked, heavy, self-propelled, 8-inch (203-mm) howitzer. This diesel- powered artillery piece is highly mobile, maneuverable, and may be air transported. The vehicle is capable of long-range, high- speed operation on improved roads. It can traverse rough terrain, muddy or marshy ground, sand, and snow or ice. The M1 10A2 Howitzer can ford streams up to 42 in. (106.7 cm) deep.

(2) A hydraulic suspension lockout system and spade assembly help. provide a stable platform for firing the cannon. The can- non elevating and traversing mechanisms and the projectile loader and rammer are also hydraulically powered. However, they may be manually operated in case of a power failure.

(3) The turret can traverse 30 degrees (533 mils) right or left of vehicle centerline and the cannon can elevate to 65 degrees (1156 mils) above horizontal position.

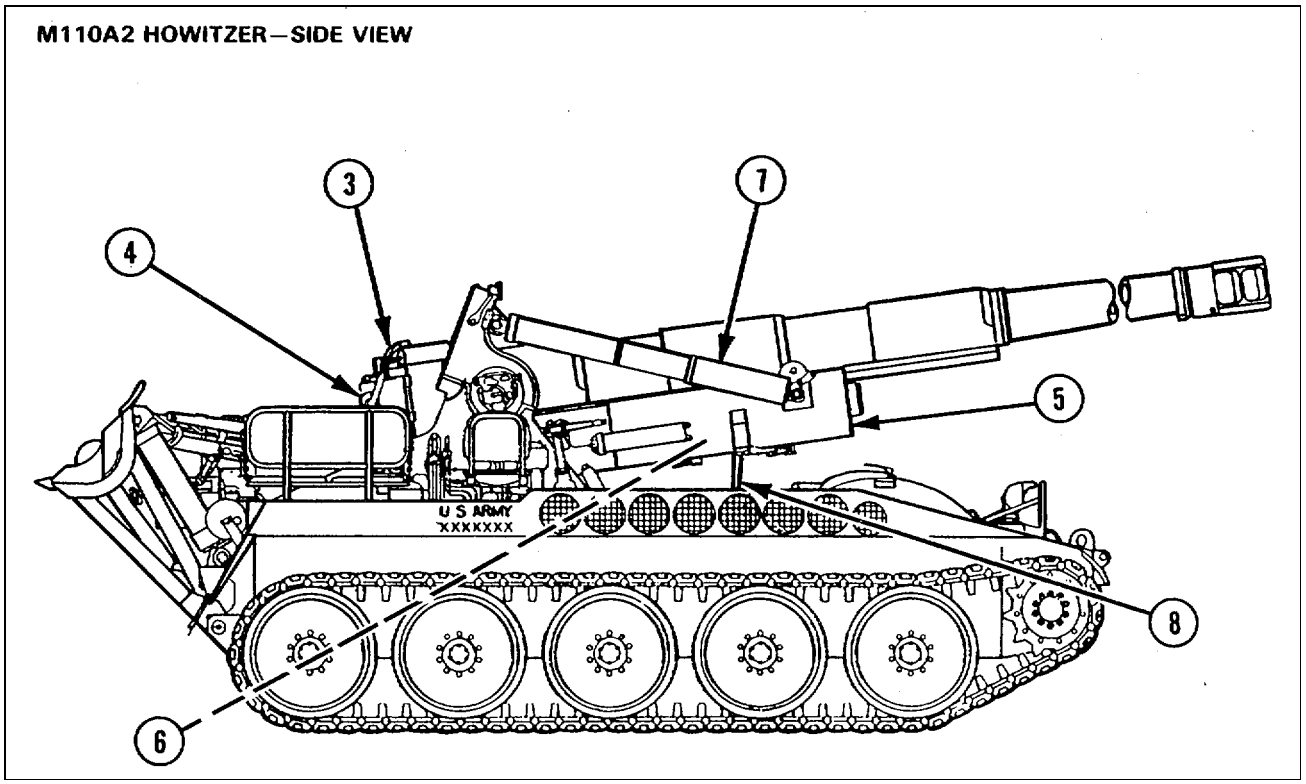
1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS. Refer to TM 9-2350-304-10 for location and description of major components not listed below.



1 *Muzzle Brake*. The muzzle brake helps reduce cannon recoil by diverting the blast forces of the escaping gases.

2 *Cannon Tube Assembly*. Rails secured to three hoops maintain alinement of the cannon tube assembly in the gun mount.

1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (CONT).



3 *Breech Mechanism.* Internal threads in the breech ring secure the breech mechanism to the cannon tube. The breech mechanism consists of the breech ring, breechblock group, counterbalance as- sembly, firing block, obturator spindle, and operating lever.

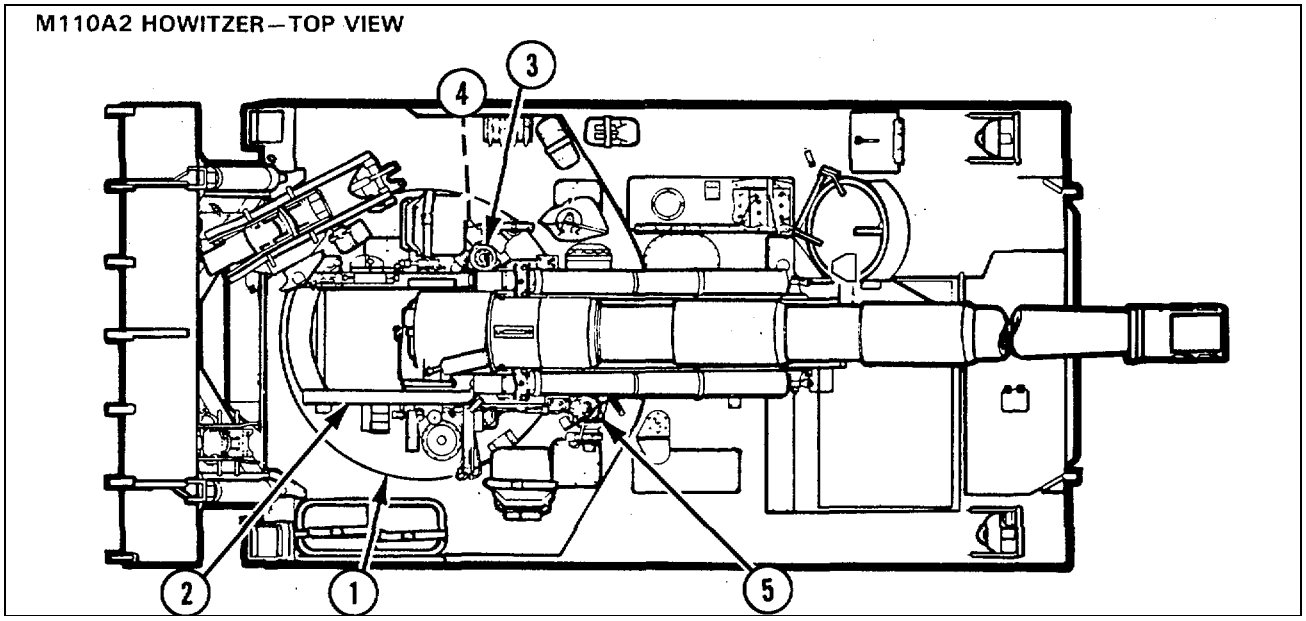
4 *M35 Firing Mechanism.* The M35 firing mechanism is a percussion type with spring-loaded firing pin.

5 *Gun Mount M174.* The gun mount supports the cannon and contains the recoil mechanism.

6 *Recoil Mechanism.* The recoil mechanism is a hydropneumatic variable, recoil type. It slows and cushions the recoil of the cannon. It also returns the cannon to battery position.

7 *Equilibrator.* Two pneumatic-type equilibrators balance the weight of the cannon. The equilibrators are filled with nitrogen gas under pressure.

8 *Recoil Mechanism Supports.* A short shipping support secures the gun mount to the hull during shipment and during removal of gun tube. A long travel sup- port secures the cannon and gun mount to the hull during travel.



1 *Turret.* The turret is a steel weldment reinforced with stiffeners to make it rigid.

2 *Trunnions.* Two trunnion supports for the gun mount are located on top of the turret. A hydraulic reservoir is part of the right trunnion support and extends under the turret. A turret ring at the bottom of the turret provides for mounting the turret to the turret bearing.

NOTE

For detailed description and function of each hydraulic subsystem, refer to Appendix F.

3 *Traversing Drive Assembly*. The traversing drive assembly includes a handcrank, a torque lock drive, and a motor and brake assembly.

a. The handcrank on the left of the turret transfers manual power through the torque lock drive to the traversing drive assembly.
b. The torque lock drive drives a shaft in the housing of the traversing drive assembly with manual power from the handcrank.
c. Control handles on the left side of the turret regulate hydraulic pressure to the motor and brake assembly. The motor and brake assembly transfers power to the traversing drive assembly.

4 *Traversing Final Drive Assembly*. Power is transferred by the traversing drive assembly to the traversing final drive assembly. The final drive assembly en- gages the turret bearing gear to traverse the turret.

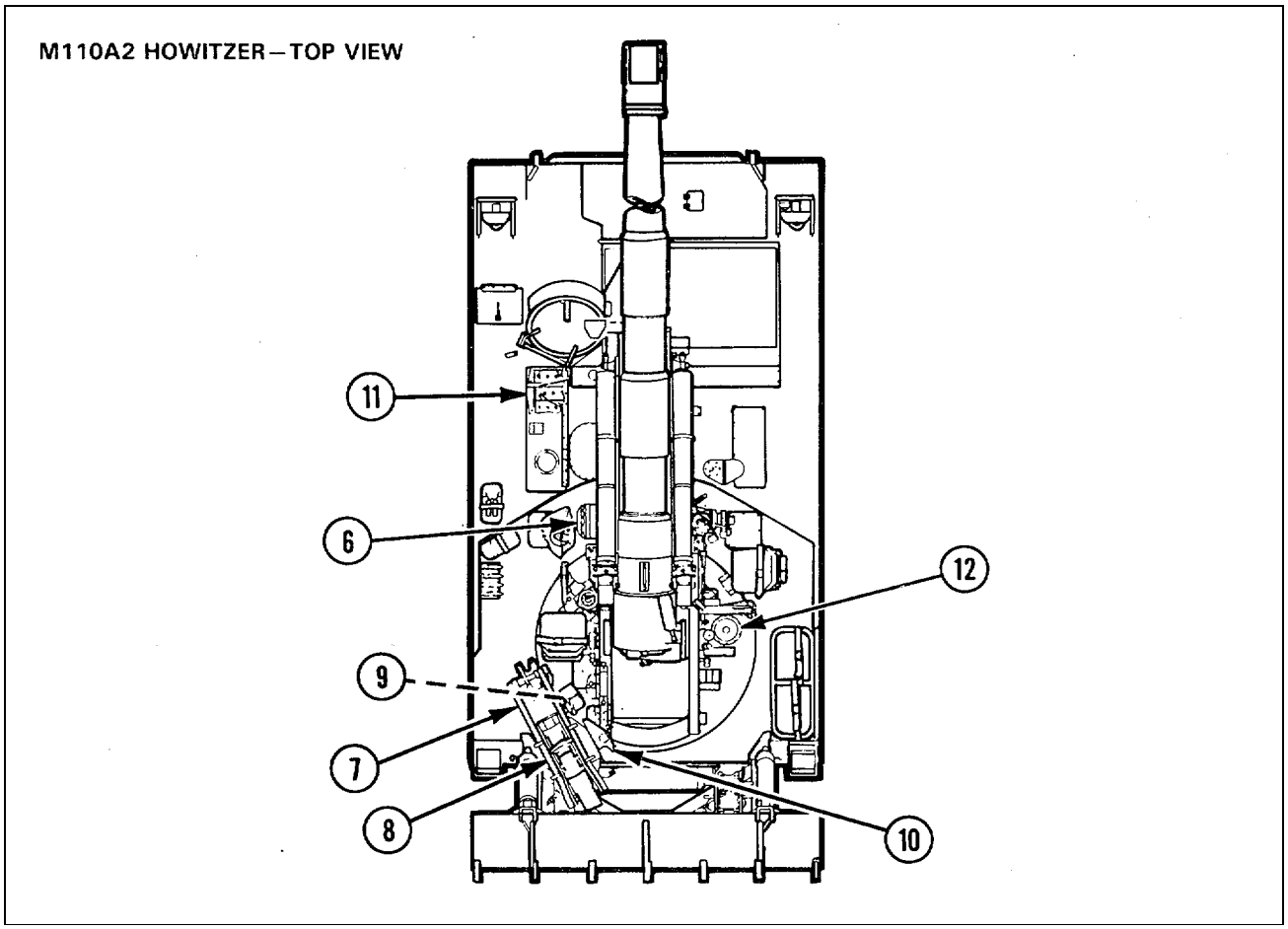
5 *Elevating Drive Assembly*. The elevating drive assembly includes a handcrank, a torque lock drive, and a motor and brake assembly.

a. The handcrank on the right of the turret transfers manual power through the torque lock drive to the elevating drive assembly.

b. The torque lock drive transfers manual power from the hand to the elevating drive assembly.

c. Control handles on the left and right side of the turret regulate hydraulic pressure to the motor and brake as- sembly. The motor and brake assembly transfers power to the elevating drive assembly.

1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (CONT).



6 *Assembly. Power is transferred* Elevating Final Drive by the elevating drive assembly to the elevating final drive assembly. The final drive assembly engages the gun mount gear to raise or lower the gun mount and cannon.

7 *Loader and Rammer*. The loader and rammer is a hydraulically powered assembly that lifts, positions, and rams a projectile into the cannon chamber.

8 *Traversing Cylinder Assembly*. The loader and rammer assembly is bolted to a sup- port arm and traversing cylinder assembly. This arrangement allows the loader and rammer to be traversed for the load- ing operation.

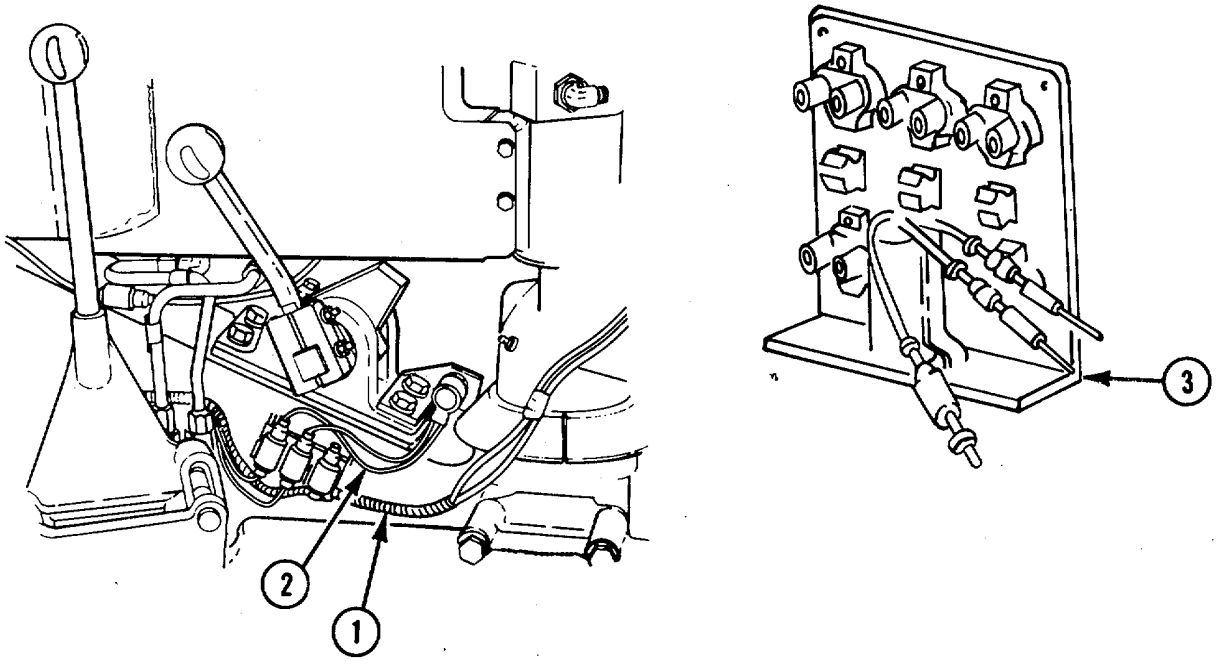
9 *Stow Position Lock.* A stow position lock secures the loader and rammer in stow position.

10 *Ram Position Lock*. A ram position lock secures the loader and rammer in ram position.

11 *Batteries*. Electrical power is provided by a 24 volt direct current (V dc), 300 ampere (A) generator and four series- parallel connected 12-V batteries. For complete vehicle schematic diagrams, refer to Figures FO-1 thru FO-3.

12 *Electric Pump and Hand Pump*. Hydraulic pressure can also be provided by an electric pump or a hand pump on the turret.

M110A2 HOWITZER—ELECTRICAL COMPONENTS



NOTE

This illustration cannot show all wiring on the M 110A2 Howitzer. For complete vehicle schematic diagrams, refer to figures FO-1 thru FO-3.

1 *Wiring.* Vehicle components are connected with single wire leads or multiple lead wiring harnesses. All wiring is standard ordinance waterproof cable. Connections are made by waterproof, rubber, 'single wire quick-disconnect connectors, plug-receptacle connectors, or solderless waterproof terminals.

NOTE

This illustration cannot show all electrical leads on M1 10A2 Howitzer, for complete vehicle schematic diagrams, refer to figures FO-1 thru FO-3.

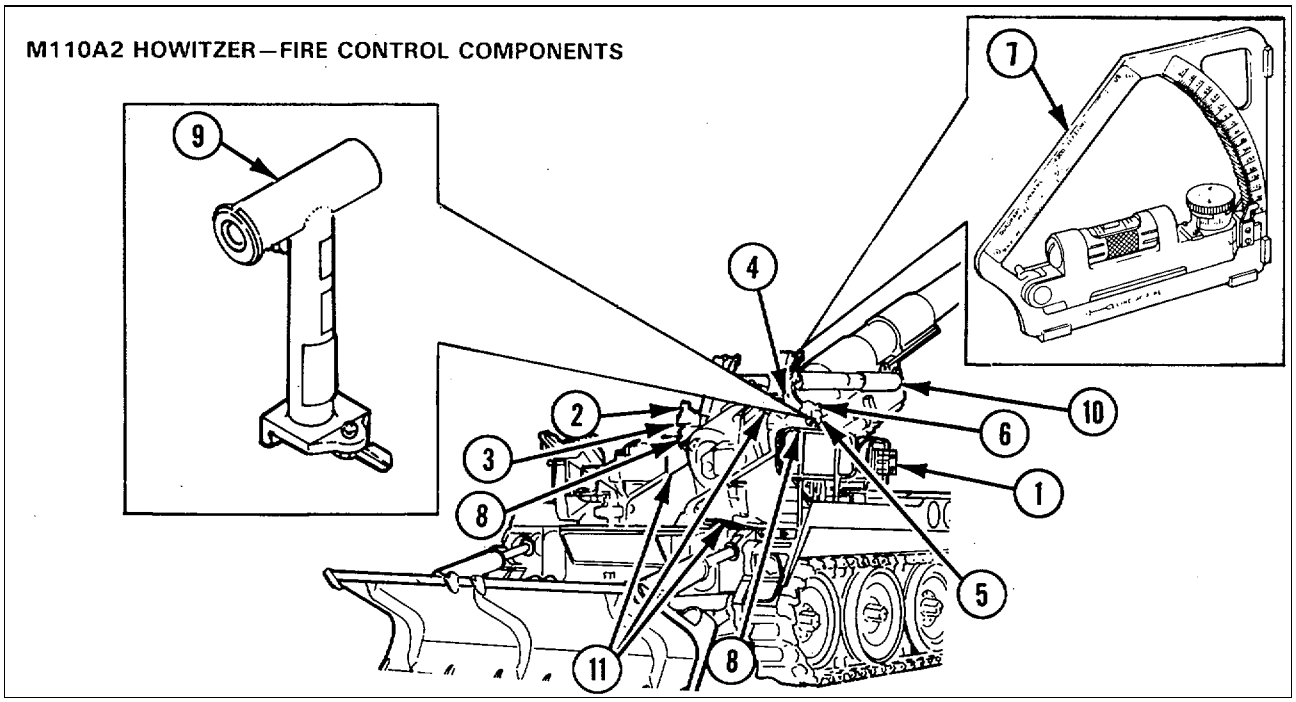
2 *Leads.* All leads are identified by a marker band attached to the wire and stamped with a circuit number. The socket and pin contacts of the connect- ors are identified by upper case letters of the alphabet, stamped on the connector insert.

NOTE

This illustration cannot show all circuit breakers on M1 10A2 Howitzer. For complete schematic diagrams, refer to figures FO-1 thru FO-3.

3 *Circuit Breakers.* Thermal break, automatic reset, 1 5 A and 20 A circuit breakers protect the vehicle components and circuits.

1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (CONT).



NOTE

Detailed descriptions of communications equipment are found in TM 11-5830-203-14P and TM 11-206.

1 *Vehicular Applique System.* The vehicular applique system, mounted on the rear of the assistant gunner's seat, enables the radio set to be operated with the data display group. For a detailed description of the vehicular applique system, refer to TM 11-5820-882-23.

2 *M 115 Pantel.* The M 15 pantel is a 4-power, fixed focus telescope with a 10 degree field of view.

3 *M137 Telescope Mount.* The M137 telescope mount provides an adjustable base for leveling the M115 panoramic telescope.

4 *M15 Elevation Quadrant.* The M15 elevation quadrant is used to adjust the weapon elevation.

5 *M138 Telescope Mount.* The M138 telescope mount provides an adjustable base for the M15 elevation quadrant and elbow telescope.

6 *M139 Elbow Telescope.* The M139 elbow telescope is a fixed focus, 3-power instrument used for direct firing of the weapon.

7 *MIA1/M1A2 Gunner's Quadrant.* The M1A1/M1A2 gunner's quadrant is used for leveling the cannon tube, boresighting, and leveling the telescope mounts.

8 *M140 Alinement Device Mount.* The M140 alinement device mount provides bases for mounting M140 alinement device.

9 *M140 Alinement Device.* The M140 alinement device provides an onboard boresight check of the cannon.