TECHNICAL MANUAL
DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL

ARMAMENT AND TURRET COMPONENTS HOWITZER, HEAVY, SELF-PROPELLED: 8-INCH, M110A2 (2350-01-041-4590)(EIC:3E3)

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HEADQUARTERS, DEPARTMENT OF THE ARMY

TECHNICAL MANUAL

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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.

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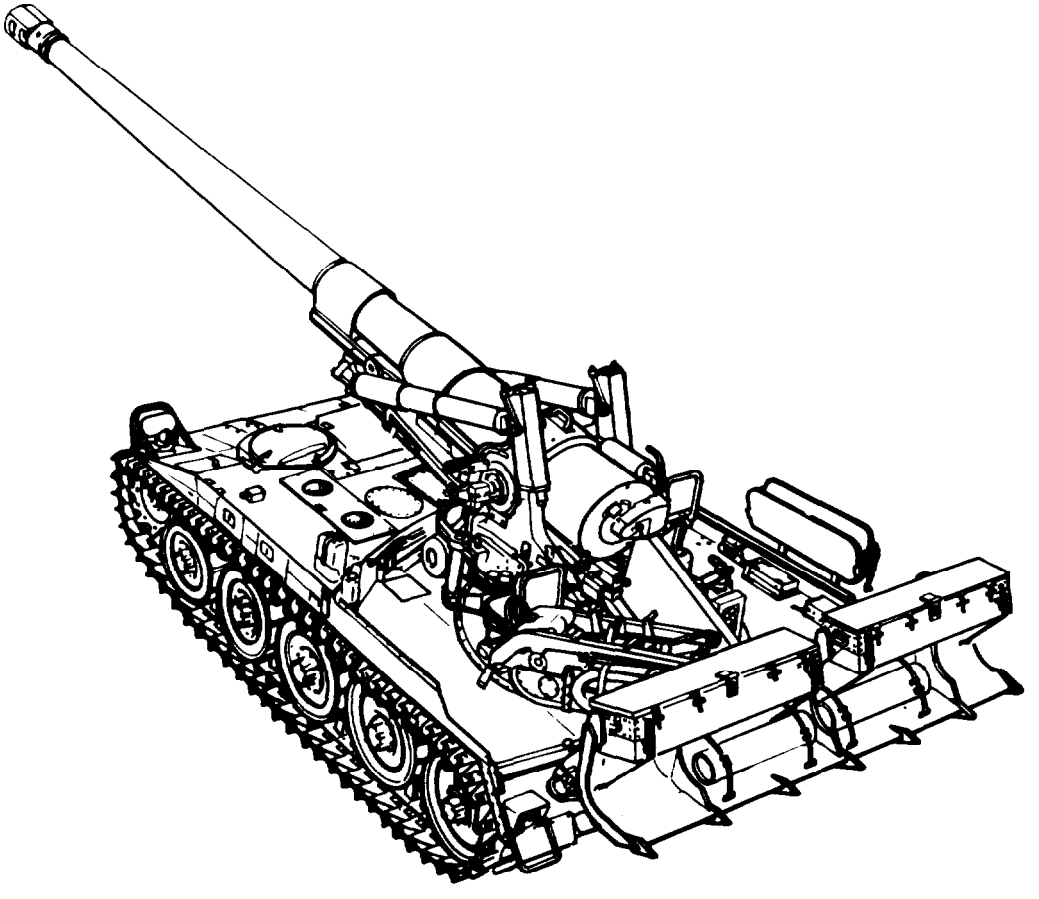
*This manual supersedes TM 9-2350-304-34-2, dated 20 December 1979, including all changes.

HOW TO USE THIS MANUAL

This manual (TM 9-2350-304-34-2) contains direct support maintenance procedures for the armament and turret components of the M110A Self-Propelled Howitzer. This manual is to be used in conjunction with TM 9-2350-304-20-2 and TM 9-2350-304-24P-2. Chapter 1 contains general information and equipment description and data. Chapter 2 contains information concerning repair parts, special tools, TMDE, and support equipment; direct support troubleshooting, direct support maintenance procedures, and information concerning preparation for storage or shipment.

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 2-29 before beginning any maintenance task.

M110A SELF-PROPELLED HEAVY HOWITZER



CHAPTER 1
INTRODUCTION

CHAPTER INDEX

Section I. GENERAL INFORMATION

1-1. SCOPE.

a. *Type of Manual:* Direct support and general support maintenance.

b. *Model Number and Equipment Name:* M110A2, 8-inch, heavy, self-propelled howitzer.

c. *Purpose of Equipment:* M110A2, 8-inch, heavy, self-propelled howitzer transports a long-barrel howitzer and its crew and travels at convoy speed for artillery support in both 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 requires 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.

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

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

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 TM 9-2350-304-20-2 for detailed instructions on administrative storage.

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

Nomenclature Cross-Reference List.

Common Name	*Official Nomenclature*
Differential gear	Helical power input gear
Differential gear shaft	Helical gear shaft
Drive assembly	Elevating final drive assembly
Gear housing	Internal sun gear shaft
Handle	Nonelectrical wire
LOADER control handle	Loader and traversing valve control handle
Lockwire	Nonelectrical wire
Pinion gear shaft	Elevating pinion spur gear
RAMMER control handle	Manual control handle
Slotted nut	Recoil nut
Slotted nut	Counterrecoil nut
SWING control handle	Loader and traversing valve control handle

1-6. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR).

If your M110A 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 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. *General.* 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. *Corrosion.* 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. *Reporting.* If a corrosion problem is identified, it can be reported using SF 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. ***Forms.*** **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 M110A2 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 M110A howitzer is an unarmored, full-tracked, heavy, self-propelled, 8-inch (203-mm) howitzer. This diesel-powered artillery piece is highly mobile, maneuverable, and transportable by air. 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 M110A 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 cannon 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 9-2350-304-20-2.

1-10. EQUIPMENT DATA. Necessary equipment data not furnished in this manual can be found in TM 9-2350-304-10 or TM 9-2350-304-20-2.

a. *Cannon M201A1.*
Shipping without muzzle brake
(1) Weight . . . . . 16,395 lb (7437 kg)
(2) Cube . . . . . 248.6 cu ft (7.0 cu m)

b. *Gun Mount M174.*
(1) Weight with Equilibrator . . . . . 4806 lb (2180) kg
(2) Recuperator gas pressure (70°F, 21°C). . . . . 2300 psi (15,859 kPa)
(3) Equilibrator gas pressure (70°F, 21°C). . . . . 2850 psi (19,651 kPa)

c. *Traversing Drive Assembly.*
(1) Weight . . . . . 156 lb (71 kg)
(2) Dimensions . . . . . 37.75 x 26.50 x 15.00 in. (95.89 x 67.31 x 38.10 cm)
(3) Minimum time for traverse of turret
(a) 60° (1068 mi) . . . . . 10 sec
(b) Slip clutch
1 Slipping torque (minimum) . . . . . 150 in.-lb (16.95 N-m)
2 Static torque (maximum) . . . . . 250 in.-lb (28.25 N-m)

1-10. EQUIPMENT DATA (CONT).

d. *Traversing Final Drive.*
(1) Dimensions . . . . . 16.00 x 11.75 x 7.50 in. (40.64 x 29.85 x 19.05 cm)
(2) Weight . . . . . 76 lb (34 kg)

e. *Elevating Drive Assembly.*
(1) Weight with motor . . . . . 119 lb (54 kg)
(2) Dimensions . . . . . 30.0 x 11.6 x 11.6 in. (76.2 x 29.5 x 29.5 cm)
(3) Minimum time for power elevation . . . . . 12 sec
(4) Slip clutch
(a) Slipping torque (minimum) . . . . . 650 in.-lb (73.44 N-m)
(b) Static torque (maximum) . . . . . 950 in.-lb (107.34 N-m)

f. *Elevating Final Drive.*
Weight (right and left components) . . . . . 1411 lb (640 kg)

g. *Traversing Cylinder Assembly.*
(1) Weight . . . . . 41 lb (19 kg)
(2) Diameter . . . . . 4.25 in. (10.80 cm)
(3) Length . . . . . 15.25 in. (38.74 cm)

h. *Pivot Arm.*
(1) Dimensions . . . . . 15.4 x 11.0 x 6.0 in. (39.1 x 27.9 x 15.2 cm)
(2) Weight . . . . . 48.50 lb (22.00 kg)

i. *Motor and Pump Assembly.*
(1) Dimensions . . . . . 22.00 x 12.50 x 10.75 in. (55.88 x 31.75 x 27.31 cm)
(2) Electric motor - Rated speed (full load) . . . . . 3800 rpm
(a) Rated power . . . . . 5 hp (3.73 kW)
(b) Rotation . . . . . Clockwise
(3) Pump
(a) Weight . . . . . 20.61 lb (9.35 kg)
(b) Type . . . . . Piston
(c) Working pressure . . . . . 1600 to 2400 psi (11,032 to 16,548 kPa)

j. *Accumulator.*
(1) Hydraulic pressure . . . . . 1600 to 2400 psi (11,032 to 16,548 kPa)
(2) Nitrogen pressure . . . . . 1215 to 2400 psi (8377 to 16,548 kPa)
(3) Dimensions:
(a) Length . . . . . 30.12 In. (76.50 cm)
(b) Diameter . . . . . 10.25 in. (26.04 cm)
(4) Weight . . . . . 188 lb (85 kg)

k. *Reservoir and Hydraulic System.*

(1) Reservoir	Integral with turret weldment
(2) Reservoir working capacity.	20 gal (76 l)
(3) Hydraulic system capacity, excluding recoil, counterrecoil, and retracting systems	40 gal (151 l)
(4) Nitrogen Bottle:	
(a) Length	38.52 in. (97.84 cm)
(b) Diameter	6.75 in. (17.1 cm)
(c) Weight	77.25 lb (35.04 kg)
(d) Gas charge, hydraulic fluid side relieved	1215 psi (8377 kPa)
(e) Gas used	Nitrogen

l. *Turret.*

(1) Height	49.70 in. (126.24 cm)
(2) Outside diameter	77.375 in. (196.533 cm)
(3) Weight, turret with rammer and drive assemblies	6650 lb (3016 kg)
(4) Weight, turret with rammer and drive assemblies and gun mount	11,450 lb (5194 kg)

m. *Turret Bearing.*

(1) Outside diameter	76 in. (193 cm)
(2) Weight	2250 lb (1021 kg)
(3) Ring gear teeth.	300
(4) Roller race surface	Flame hardened
(5) Type	Ball bearing with integral spur gear
(6) Number of balls	103
(7) Number of spacers	103