

Supersedes copy dated  
November 1986 and all  
changes

DEPARTMENT OF THE ARMY  
TECHNICAL MANUAL

DIRECT AND GENERAL SUPPORT  
MAINTENANCE MANUAL  
FOR

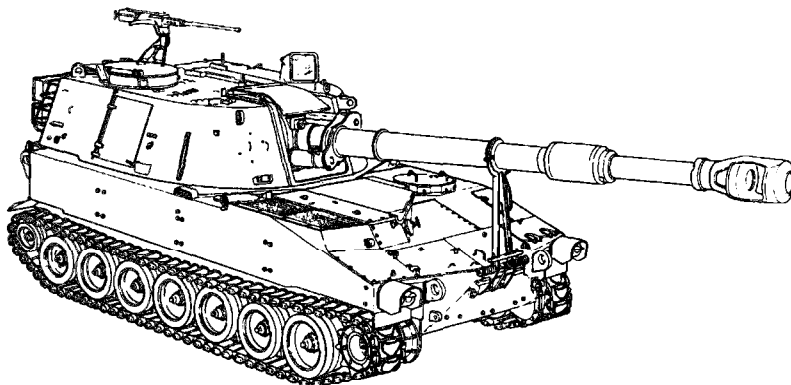
CAB, ARMAMENT, SIGHTING  
AND FIRE CONTROL, ELEVATING  
AND TRAVERSING SYSTEMS  
AND ASSOCIATED COMPONENTS  
HOWITZER, MEDIUM, SELF-PROPELLED  
155MM

M109A2 (2350-01-031-0586)(EIC:3EZ)

M109A3 (2350-01-031-8851)(EIC:3E2)

M109A4 (2350-01-277-5770)(EIC:3E8)

M109A5 (2350-01-281-1719)(EIC:3E7)



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MAINTENANCE OF CAB 3-1

DIRECT SUPPORT  
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DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

TECHNICAL MANUAL }  
No. 9-2350-311-34-2 }

HEADQUARTERS  
DEPARTMENT OF THE ARMY  
WASHINGTON, D.C., 2 September 1994

**DIRECT AND GENERAL SUPPORT  
MAINTENANCE MANUAL  
FOR  
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ELEVATING AND TRAVERSING SYSTEMS, AND ASSOCIATED COMPONENTS  
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M109A5 (2350-01-281-1719) (EIC: 3E7)**

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: Director, Armament and Chemical Acquisition and Logistics Activity, ATTN: AMSTA-AC-NML, Rock Island, IL 61299-7630. A reply will be furnished to you.

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\*This manual supersedes the following manual: TM 9-2350-311-34-2, November 1986, and all changes.

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## HOW TO USE THIS MANUAL

### This manual consists of:

1. Instructions for direct and general support maintenance on the M109A2/M109A3/M109A4/M109A5, 155MM, Self-Propelled, Medium, Howitzer cab systems and components. These tasks are listed in the Maintenance Allocation Chart (MAC) contained in TM 9-2350-311-20-2.
2. Location and description of the M109A2/M109A3/M109A4/M109A5 howitzer cab systems and components.
3. Cab systems/components maintenance procedures to:
  - a. Perform troubleshooting of malfunctioning systems/components (isolation of malfunction causes).
  - b. Remove, repair, and install cab system/components.
4. Appendixes for detailed listings of:
  - Appendix A. References applicable to M109A2/M109A3/M109A4/M109A5 howitzer, including supply catalogs, forms, and other M109A2/M109A3/M109A4/M109A5 publications.
  - Appendix B. Expendable and durable items list.
  - Appendix C. Illustrated list of manufactured items.
  - Appendix D. Torque limits.
  - Appendix E. Mandatory replacement parts list.
  - Appendix F. Tool identification list.
  - Appendix G. Hydraulic schematic symbols.
  - Index
  - Foldouts (FOs): Electrical and hydraulic schematics.

### Indexing

Five major indexing procedures are used in this manual to help mechanics locate information rapidly.

1. Cover Index: Lists sections of text and page number. Includes index mark which lines up with index marks on the actual page of reference.
 

Example: Troubleshooting 2-17
2. Table of Contents.
3. Chapter and section indexes listing data/information covered within the chapter and section.
4. Quick Guide to Troubleshooting identifies system malfunction and provides paragraph references for specific troubleshooting procedures or maintenance action.
5. Index: Alphabetical listing of information.

## HOW TO USE THIS MANUAL - CONTINUED

### Maintenance Text and Illustrations (Chapters 3 through 14)

1. Maintenance procedures are to be performed in the sequence shown in the text and illustrations. Step 1 must be performed before Step 2. Procedure A must be performed before Procedure B, and so on.
2. Equipment illustrations use numbers to identify parts of the system/components.

Example: Remove two cap screws (7) and two lockwashers (8).

3. This manual is written to include all parts authorized to be used or repaired at the direct and general support level using Repair Parts and Special Tools List (RPSTL) (TM 9-2350-311-24P-2) as a guide. All parts with SMR code maintenance levels "F" and "H" are mentioned in the order of functional group codes whenever possible, to enable location in the RPSTL.

# CHAPTER 1

## INTRODUCTION

### GENERAL

This chapter provides the maintenance mechanic with basic information on the M109 howitzer series' primary armament, elevating, traversing, and other cab-related components. This information is provided through a physical description of major components, which the mechanic is required to maintain, service, inspect, replace, or repair.

Additional information is provided as reference and guidance on use of forms, maintenance of records, and filing of reports.

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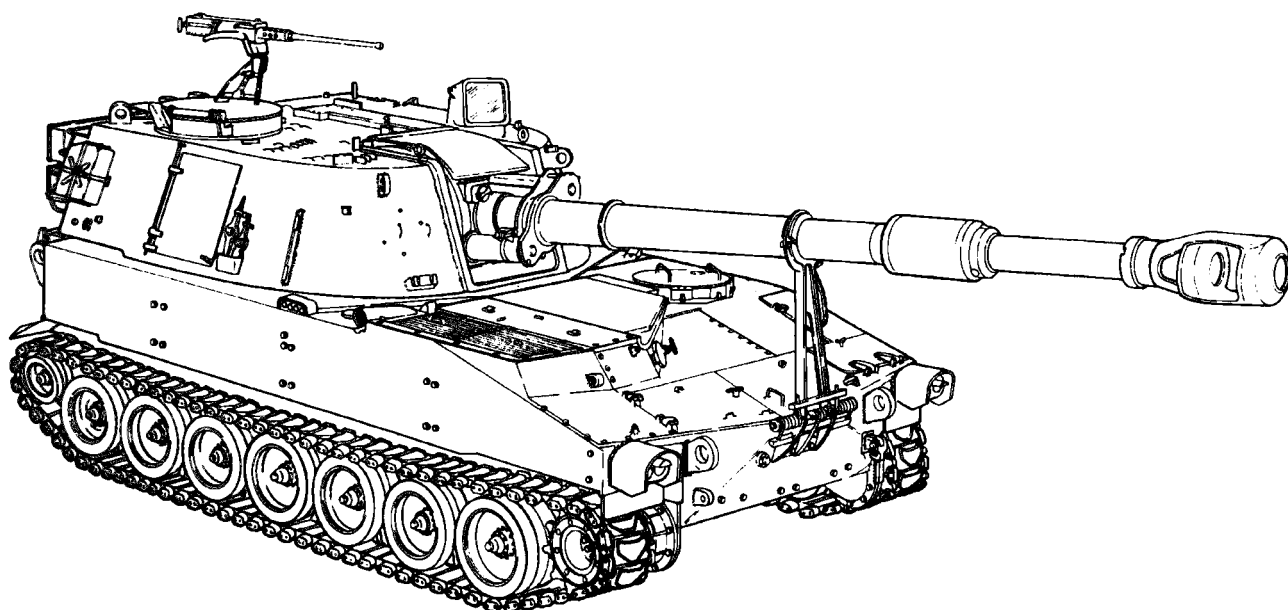
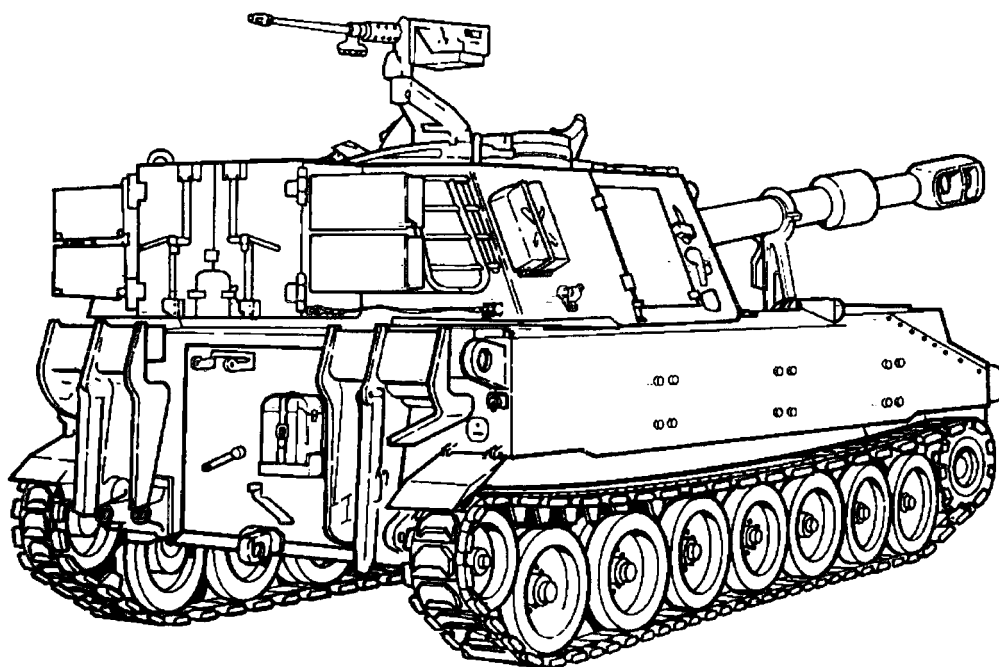
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M109A2/M109A3/M109A4/M109A5

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## Section I. GENERAL INFORMATION

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### 1-1 SCOPE

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- a. Type of Manual: Direct support and general support maintenance.
  - b. Model Number and Equipment Name: M109A2/M109A3/M109A4/M109A5 Howitzer, Medium, Self-Propelled, 155MM. This manual deals with maintenance of the cab and associated components. TM 9-2350-311-34-1 deals with maintenance of the hull and associated components.
  - c. Purpose of Equipment: The howitzer cab, containing the M185 or M284 155MM cannon and secondary armament M2 heavy barrel caliber 50 machine gun, provides the firepower for the howitzer. The cab components also provide the fire control for the 155MM cannon.
- 

### 1-2 MAINTENANCE FORMS, RECORDS, AND REPORTS

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- a. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by (as applicable) DA PAM 738-750, The Army Maintenance Management System; DA PAM 738-751, Functional Users Manual for the Army Maintenance Management System-Aviation (TAMMS-A); or AR 700-138, Army Logistics Readiness and Sustainability.
  - b. Accidents involving injury to personnel or damage to materiel will be reported on DA Form 285 (Accident Report) in accordance with AR 385-40. Explosives and ammunition malfunctions will be reported in accordance with AR 75-1.
  - c. For information on ammunition refer to SB 742-1) Ammunition Surveillance Procedures; and AR 700-22, Worldwide Ammunition Reporting System (WARS).
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### 1-3 DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE

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Refer to TM 750-244-8 for procedures on how to destroy the M109 self-propelled howitzer. You will find procedures for destruction of munitions in TM 43-0002-33 (improved conventional munitions). Procedures for destruction of chemical munitions are outlined in TM 3-250. For general guidelines to follow in destruction of equipment to prevent enemy use, refer to TM 9-2350-311-20-2.

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1-4 CALIBRATION

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For fire control alinement tests and measurements, refer to TM 9-2350-311-10.

For illustration and description of how to synchronize, adjust, and test the M109 series sighting and fire control equipment, refer to TM 9-2350-311-20-2.

For direct and general support maintenance procedures and Repair Parts and Special Tools List (RPSTL) on M117/M117A2 panoramic telescope, M145/M145A1 telescope mount, M118A2/M118A3 elbow telescope, M146 telescope mount, M15 elevation quadrant, and M42 tank periscope, refer to TM 9-1240-401-34&P.

For M1A1 collimator maintenance procedures and RPSTL, refer to TM 9-1240-324-34&P.

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1-5 PREPARATION FOR STORAGE OR SHIPMENT

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Instructions on proper storage and shipment of the M109 self-propelled howitzer are covered in TM 9-2350-311-20-2.

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1-6 OFFICIAL NOMENCLATURE, NAMES, AND DESIGNATIONS

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Nomenclature in this manual was chosen in accordance with the terms used for provisioning as they appear in the RPSTL (TM 9-2350-311-24P-2) and Maintenance Allocation Chart (MAC) (TM 9-2350-311-20-2). A few tools and cab components, however, are referred to by names more common than those in the RPSTL. In many cases the more common name is a shorter name for the same component.

| Nomenclature Cross-Reference        |                                                      |
|-------------------------------------|------------------------------------------------------|
| Manual Nomenclature                 | Official Nomenclature                                |
| Actuating valve                     | Valve assembly, actuating, rammer                    |
| Assistant gunner's control assembly | Control assembly, right gunner's                     |
| Cab ammunition rack assembly        | Projectile stowage rack assembly                     |
| Cap screw                           | Hexagon head cap screw                               |
| Connector                           | Electrical plug connector                            |
| Contact board (or ring segment)     | Electrical contact race ring (or electrical segment) |
| Elevation selector valve assembly   | Selector valve assembly                              |
| Equilibrated elevating cylinder     | Cannon equilibrator                                  |

**Manual Nomenclature**

Fluid level gage

Gunner's control assembly

Howitzer

Hygroscopic breather

Lockwire

M178 mount

M182 mount

Operating handle

Panoramic telescope ballistic cover

Turret lock

**Official Nomenclature**

Gage rod-cap, liquid

Control assembly, left gunner's

155MM medium self-propelled howitzer,  
M109A2/M109A3/M109A4/M109A5

Filter-drier, relief

Safety wire/nonelectrical wire

Howitzer M178 mount

Howitzer M182 mount

Breechblock handle

Ballistic cover assembly

Turret mechanism

**1-7 REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)**

If your 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 or performance. Put it on an SF 368 (Product Quality Deficiency Report). Mail it to: Commander, U.S. Army Armament Research, Development and Engineering Center, ATTN: AMSTA-AR-QAW-A (R)/Customer Feedback Center, Rock Island, IL 61299-7300.

**1-8 WARRANTY INFORMATION**

The M109 howitzer series is no longer warranted.

## 1-9 SAFETY, CARE, AND HANDLING

### WARNING

Nuclear, Biological, and Chemical (NBC) agents can kill you. If NBC exposure is suspected, all air filter media must be handled by personnel wearing full NBC protective equipment (FM 3-4).

### WARNING



The M1A1 collimator is radioactively illuminated. Check for presence of illumination and damage. If discovered broken, damaged, or defective, follow the procedures on page b.



The M140 alignment device is radioactively illuminated. Check for loss of luminescence, breakage, damage, or defects. If present, follow the procedures on page b.

- a. Deleted.
- b. Prior to any maintenance action (e.g., purging or charging M1A1 collimator) check for illumination using following procedure:
  - 1 Device must be kept in the dark for at least four hours prior to performing the illumination test. This is to prevent exterior light from activating the phosphor.
  - 2 Adjust eyes to dark and check for illumination in the dark or a low light environment. If slight glow/haze appears, device is considered illuminated and maintenance actions may proceed.
  - 3 If illumination is not observed, source is considered broken. Entire device must be evacuated to depot level maintenance for repair/disposal (refer to AR 385-11). Take the following actions:
    - (a) Seal entire device in two plastic bags (item 7, Appx B) and place in a strong, tight container (such as fiberboard box (item 9, Appx B) with all seams secured using tape (item 36, Appx B) (masking tape is not authorized).
    - (b) Label the container: CAUTION - BROKEN H<sub>3</sub> SOURCE. DO NOT OPEN.
    - (c) Wash hands thoroughly with nonabrasive soap and water.
    - (d) Immediately notify the local Radiation Protection Officer (RPO).

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## 1-10 CORROSION PREVENTION AND CONTROL (CPC)

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

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.

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

The form should be submitted to:

Commander  
U.S. Army Armament Research, Development and Engineering Center  
ATTN: AMSTA-AR-QAW-A (R)  
Customer Feedback Center  
Rock Island, IL 61299-7300

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## 1-11 NUCLEAR HARDNESS

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Not applicable.

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## 1-12 SECURITY MEASURES FOR ELECTRONIC DATA

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Not applicable.