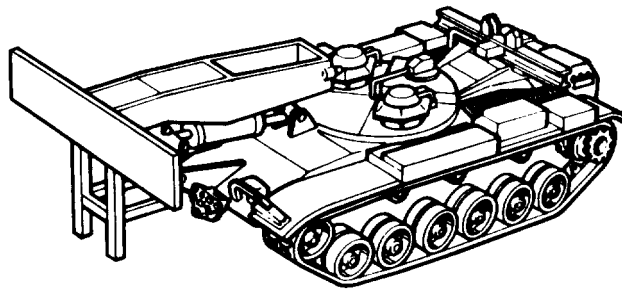


TM 5-5420-228-24

TECHNICAL MANUAL

ORGANIZATIONAL, DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL



LAUNCHER HYDRAULICS SYSTEM, M60A1 TANK CHASSIS, TRANSPORTING: FOR BRIDGE, ARMORED-VEHICLE-LAUNCHED SCISSORING TYPE, CLASS 60 (5420-00-889-2020)



Technical Manual
No. TM 5-5420-228-24

HEADQUARTERS
DEPARTMENT OF THE ARMY
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ORGANIZATIONAL, DIRECT SUPPORT, AND GENERAL SUPPORT
MAINTENANCE MANUAL
LAUNCHER HYDRAULICS SYSTEM, M60A1 TANK CHASSIS
TRANSPORTING:
FOR BRIDGE, ARMORED-VEHICLE- LAUNCHED,
SCISSORING TYPE, CLASS 60
5420-00-889-2020

REPORTING OF ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistake 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, US Army Tank-Automotive Command, Attn: AMSTA-MBC, Warren, Michigan 48397-5000. A reply will be furnished to you.

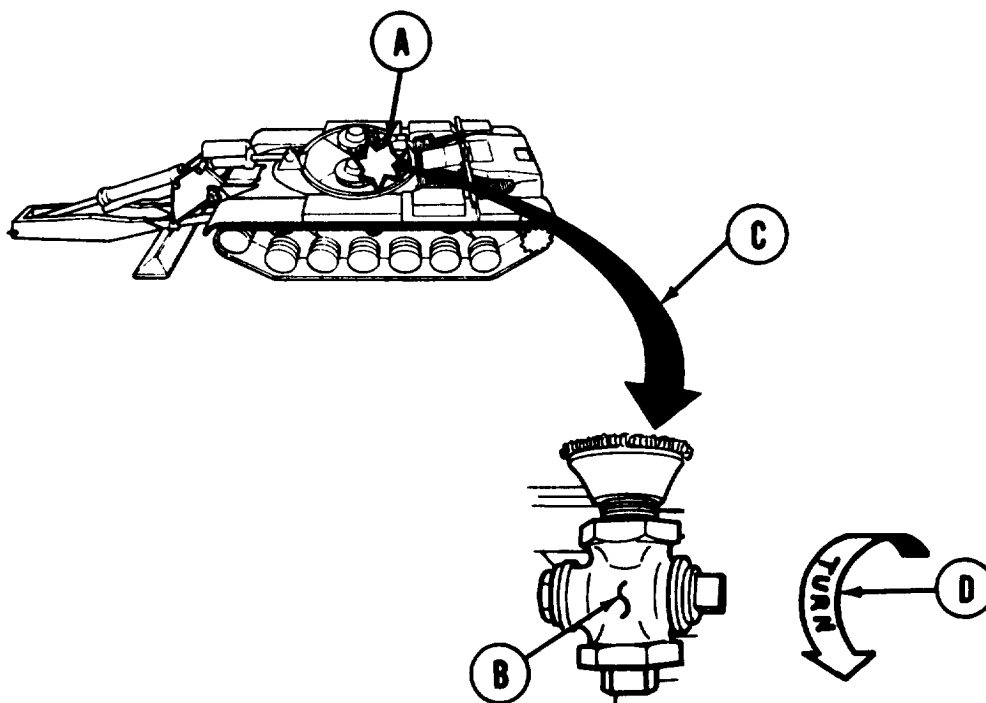
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HOW TO USE THIS MANUAL:

- Manual is divided into chapters.
- Chapters are by functional group code and presented in same order as the RPSTL (Repair Parts and Special Tool List).
- All manual references refer to page numbers.
- Steps are numbered and are to be performed in that order.
- Be sure to read all NOTES, WARNINGS, and CAUTIONS.
- Locator views are included wherever necessary. These, will help you locate the item which the procedure is describing.
- Callouts on art are shown by a circle with a letter inside.
- Jagged circle (★) on locator (A) indicates a cutout and item is inside of tank.
- A (~) symbol represents the outside surface (B) of a piece of equipment.
- Locator arrows (C) are black and motion arrows (D) are white.



HOW TO USE THIS MANUAL - Continued

- Bridge will not be shown on vehicle on locator views.
- Locator views will show tongue in travel position (folded on top of vehicle) unless maintenance procedure requires it in another position.
- MASTER BATTERY switch should be in OFF position prior to performance of any maintenance procedures.
- Diagrams of the hydraulic system with reference designators, part numbers, and related maintenance tasks will be found on pages 3-67 thru 3-70. A schematic diagram of the hydraulic system is located at the back of this manual (page FP-1).
- All torque values are dry torques unless otherwise specified.
- A maintenance information index lists all maintenance tasks. It provides the location of all maintenance tasks related to a component in this manual.
- As a general maintenance practice, throw away all removed lockwashers, locknuts, and cotter pins and replace with new lockwashers, locknuts, and cotter pins at installation.
- LO 5-5420-202-12, M60A1 AVLB lubrication order, has been rescinded. All crew lubrication tasks have been incorporated into TM 5-5420-202-10 PMCS and are to be performed as required or as a part of crew PMCS. All organizational maintenance lubrication tasks have been incorporated into PMCS contained in this manual and in TM 5-5420-202-20-1 and are to be performed as required and as a part of organizational maintenance PMCS. Any reference to LO 5-5420-202-12 must be considered a reference to either the crew PMCS or organizational PMCS and must be performed in accordance with instructions provided in the applicable PMCS.

CHAPTER 1

INTRODUCTION

Section I. GENERAL INFORMATION

SCOPE

Type of Manual: Organizational, Direct Support, and General Support Maintenance.

Model Number and Equipment Name: Launcher, M60A1 Tank Chassis, Transporting: for Bridge, Armored-Vehicle-Launched, Scissoring Type, Class 60.

Purpose of Equipment: To launch, retrieve, and transport a class 60 scissoring type bridge.

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).

DESTRUCTION OF ARMY MATERIAL TO PREVENT ENEMY USE

Refer to TM 750-244-6 for instructions on destruction of material to prevent enemy use.

PREPARATION FOR STORAGE OR SHIPMENT

Refer to TM 740-90-1 for instructions on administrative storage.

QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

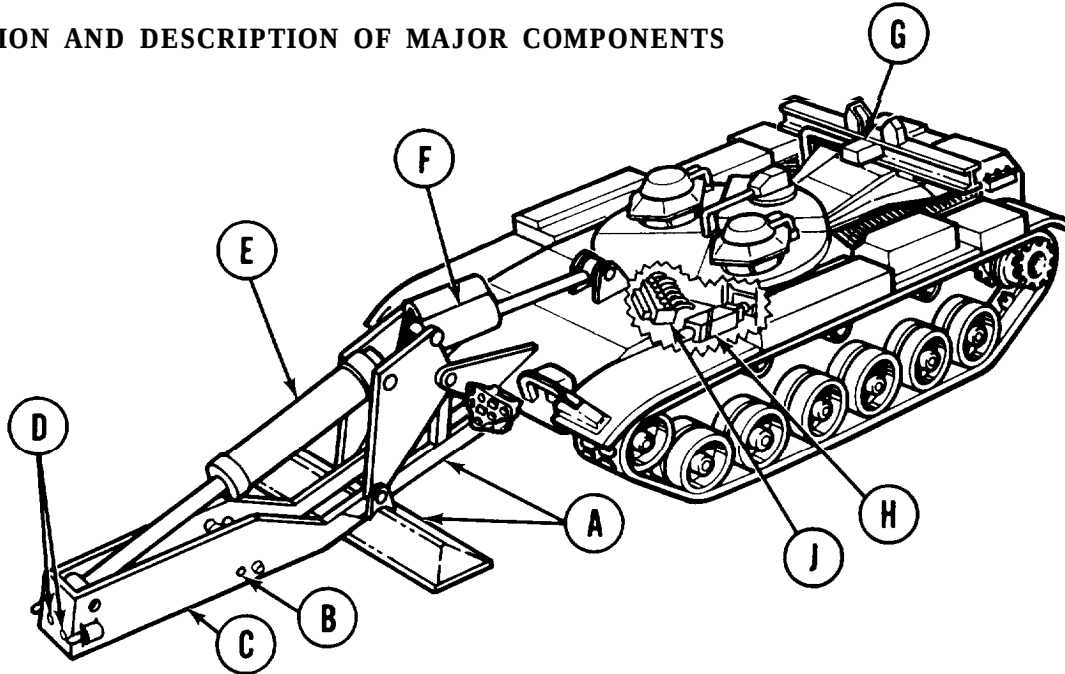
- a. No particular quality assurance or quality control manual pertains specifically to this vehicle.
- b. Defective material received through the supply system should be reported on Quality Deficiency Report (QDR) SF 368. Instructions for preparing QDR's are provided in AR 702-7, Reporting of Quality Deficiency Data. QDR's should be mailed to Commander, U.S. Army Tank-Automotive Command, ATTN: AMSTA-Q, Warren, MI 48937-5000. A reply will be furnished directly to you.

REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR's)

EIR's must be submitted by anyone who knows of an unsatisfactory condition with equipment design or use. You do not have to show a new design or list a better way to do a procedure, just tell why the design is unfavorable or why a procedure is hard. EIR's may be submitted on SF 368 (Quality Deficiency Report). Instructions for preparing SF 368 are provided in DA PAM 738-750. Mail directly to Commander, U.S. Army Tank-Automotive Command, AMSTA-Q, Warren, MI 48397-5000. A reply will be sent directly to you.

Section II. EQUIPMENT DESCRIPTION AND DATA

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS



- (A) BOOM AND OUTRIGGER. Provide firm support for tongue to pivot on.
- (B) LOCKING CYLINDER. Locks scissoring bridge to the launcher tongue.
- (C) TONGUE. Contains hydraulics and provides necessary components to connect and disconnect scissoring bridge.
- (D) EJECTION CYLINDERS. Provide capability to push bridge loose from vehicle after locking cylinders are retracted.
- (E) TONGUE CYLINDER. Controls tongue and bridge movement from 90 degrees vertical to the ground.
- (F) OVERHEAD CYLINDER. Controls tongue and bridge movement from transport position to 90 degrees vertical.
- (G) HOLDDOWN CYLINDER. Provides capability to lock scissoring bridge at rear end of vehicle. It automatically unlocks when overhead cylinder operating lever is raised.
- (H) PUMP-CLUTCH. Provides hydraulic pressure for entire system.
- (J) VALVE BANK. Provides manual levers to actuate entire system.

IDENTIFICATION, LOCATION, AND INSTRUCTION INFORMATION

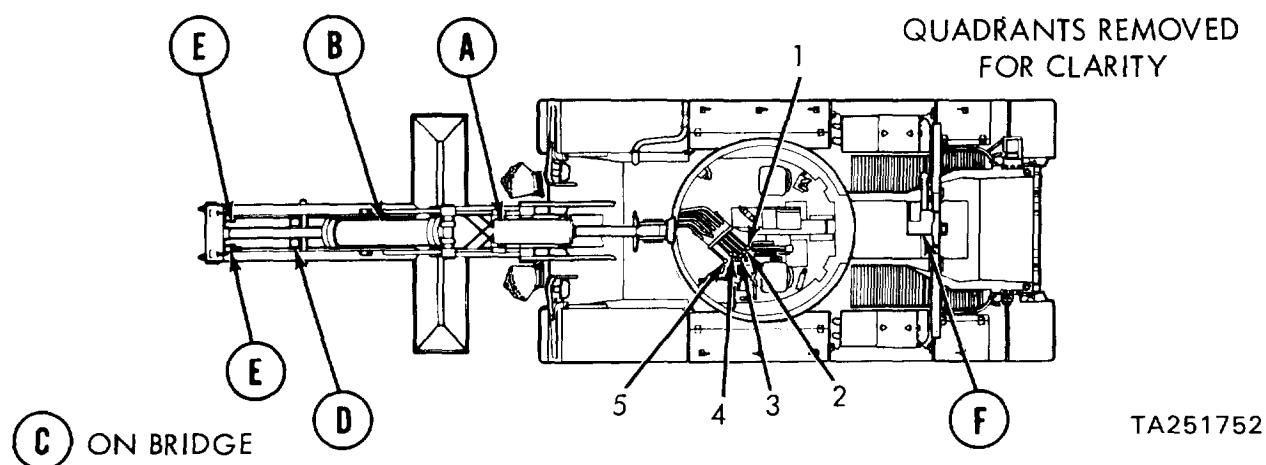
Refer to TM 5-5420-202-10 for identification, location, and instruction nameplates, decals, and stencil information under "Stowage and Sign Guides."

EQUIPMENT DATA

Refer to TM 5-5420-202-10 for performance data.

Section III. PRINCIPLES OF OPERATION

Hydraulic pressure is used to actuate various components to launch and retrieve a bridge. A hydraulic pump is driven by the vehicle engine through a power take-off and a manually actuated clutch. Hydraulic pressure is delivered by the hydraulic pump to the manually operated valve bank. The valve bank in turn delivers pressure to either the cap end or the rod end of the various cylinders, to either extend or retract them. Pressure relief valves, flow regulators, and check valves are located in the system to provide protection to components parts. A master relief valve is in the pressure line from the hydraulic pump, located under the hydraulic reservoir, which protects the entire system. You will find a system diagram and a hydraulic schematics on pages 3-67 thru 3-70 to aid in system analysis.



- (A) OVERHEAD CYLINDER. This cylinder is actuated by lever (1) which will shut off or allow pressure to flow to either the cap end (lever up) or the rod end (lever down) of this cylinder.
- (B) TONGUE CYLINDER. This cylinder is actuated by lever (2) which will shut off or allow pressure to flow to either the cap end (lever up) or the rod end (lever down) of the cylinder.
- (C) SCISSORS CYLINDER. This cylinder (not illustrated, is on bridge) is actuated by lever (3) which will shut off or allow pressure to flow to either the rod end (lever up) or the cap end (lever down) of the cylinder.
- (D) LOCKING CYLINDER. This cylinder is actuated by lever (4) which will shut off or allow pressure to flow to either the rod end (lever up) or the cap end (lever down) of the cylinder.
- (E) EJECTION CYLINDERS. These cylinder are activated by lever (5), (for these cylinders to operate lever (4) must be held in the up position) which will allow pressure to flow to the cap end (lever up) or the rod end (lever down) of the cylinders.
- (F) HOLDDOWN CYLINDER. This cylinder is actuated by overhead cylinder level (1) which will shut off or allow pressure to flow to either the rod end (lever up) or the cap end (lever down) of the cylinder.

CHAPTER 2**MAINTENANCE INSTRUCTIONS**

Section I. REPAIR PARTS, SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT**COMMON TOOLS AND EQUIPMENT**

For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

Special tools for organizational, direct support, and general support maintenance are listed in TM 5-5420-202-20P and TM 5-5420-202-34P, which are the authority for requisitioning replacements.

1.	Adapter, EU male 90° 518428 (8D212)	Test flow of relief check valves during adjustment.
2.	Adapter, straight 980693 (61848)	Test flow of relief check valves during adjustment.
3.	Gage, pressure, dial indicating 980279 (61848)	Test flow of relief check valves during adjustment.
4.	Hose assembly 981005 (61848)	Test flow of relief check valves during adjustment.

REPAIR PARTS

Repair parts are listed and illustrated in TM 5-5420-202-20P and TM 5-5420-202-34P which are the authority for requisitioning replacements.

Section II. SERVICE UPON RECEIPT

1. This section contains information on services to be performed upon issue of the vehicle to the using organization. Where practicable, the crew will assist in services described. For services to be performed on the vehicle hull components, refer to TM 5-5420-202-34. Some of the services contained herein may not be required, depending upon the degree of preservation provided by the shipper and the planned use of the vehicle.
2. Cut hold-down straps and remove wooden boxes, containers of equipment, and any other tank components secured to the exterior or interior of the vehicle.
 - a. Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report the damage on DD Form 6, Packaging Improvement Report.
 - b. Check the equipment against the packing slip to see if the shipment is complete. Report all discrepancies in accordance with the instructions of DA PAM 738-750.
 - c. Check to see whether the equipment has been modified.
3. Conduct service upon receipt of the vehicle in accordance with the procedures specified in the following table.

Step/Location	Item	Action	Remarks
1. Launcher	Exterior	Check launcher components for damage.	---
2. Hull	Hatches	Remove wrapping, barrier material, and tape.	---
3. Hull	Periscope shields	Remove wrapping, barrier material, and tape.	---
4. Hull	Optical glass	Remove wrapping, barrier material, and tape.	---

PRELIMINARY SERVICING AND ADJUSTMENT OF EQUIPMENT

WARNING

Dry cleaning solvent P-D-680 is toxic and flammable. To prevent personal injury, wear protective goggles and gloves and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flash point for Type #1 Dry Cleaning Solvent is 100°F (38°C) and for Type #2 is 138°F (50°C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

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1. If any surfaces of the launcher components are coated with rust preventive compound, remove the coating with dry cleaning solvent.
2. Paint the equipment in accordance with unit camouflage requirements.
3. Follow instructions specified on tag DD Form 1397 regarding processing record and stowage of the vehicle and its equipment if the vehicle is not to be placed into immediate service. Tag DD Form 1397 will be found in the driver's compartment, attached to the steering control or transmission shift lever. If the using organization plans to place the vehicle into immediate service:
 - a. Open each wooden box and container.
 - b. Check packing list against Basic Issue Items (BII) list in TM 5-5420-202-10 to make sure all items have been received.
 - c. Open inner packs and remove material.
 - d. Degrease equipment such as tools and hardware as necessary.
4. Stow basic issue items as indicated in TM 5-5420-202-10.
5. Check hydraulic level in reservoir in accordance with TM 5-5420-202-10. While falling, check for leaks at filter connections, drain plugs, link quick disconnects, and valves.
6. Ensure parking brake is set. Start engine. Check hydraulic system for leaks. Shut down engine and correct leaks if any are found.
7. Check operation of all controls (TM 5-5420-202-10).
8. perform preventive maintenance checks and services (PMCS) (page 2-4).
9. Equipment faults found during preliminary servicing or during the break-in period will be corrected by the using organization or by the supporting maintenance unit as appropriate, depending upon the nature of the fault.
10. Serious equipment faults which appear to involve unsatisfactory design or material will be reported using SF 368 (Quality Deficiency Report), as prescribed in DA PAM 738-750, The Army Maintenance Management System (TAMMS).