

**TM 9-1731F**

**RESTRICTED**

**WAR DEPARTMENT**

**TECHNICAL MANUAL**



**ORDNANCE MAINTENANCE**

**HYDRAULIC TRAVERSING MECHANISM  
(LOGANSPORT)**

**FOR MEDIUM TANKS M4 AND MODIFICATIONS**

**MAY 6, 1943**

**FOR ORDNANCE PERSONNEL ONLY**



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**HYDRAULIC TRAVERSING MECHANISM (LOGANSPOUT)**  
**FOR MEDIUM TANKS M4 AND MODIFICATIONS**

Prepared under the direction of the  
**Chief of Ordnance**

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\* This manual includes such information from TB 1731F-1 and 1731G-1, March 5, 1943, as is pertinent.

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**ORDNANCE MAINTENANCE—HYDRAULIC TRAVERSING MECHANISM  
(LOGANSFORT) FOR MEDIUM TANKS M4 AND MODIFICATIONS**

**Section I**

**INTRODUCTION**

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**1. SCOPE.**

a. This manual is published for the information and guidance of ordnance maintenance personnel. It contains detailed instructions for inspection, disassembly, maintenance, and repair of the Hydraulic Traversing Mechanism (Logansport) For Medium Tanks M4 And Modifications, supplementary to those in the field, and technical manuals prepared for the using arms. This manual does not contain information which is intended primarily for the using arms, since such information is available to ordnance maintenance personnel in 100-series technical manuals or field manuals.

**2. ARRANGEMENT.**

a. Sections I, II, III, and IV are general and apply to the mechanism as a whole. Sections V to X cover the lower assembly and its components which are the hydraulic pump, hydraulic control valve, oil reservoir, and electric motor. Sections XI, XII, XIII, and XIV cover the upper assembly which consists of hydraulic motor, traversing gear mechanism, and manual drive. The remaining sections of the manual are general in that they apply to all of the various components of the turret traversing mechanism for Medium Tanks M4 and Modifications.

**3. STATEMENT REGARDING OPERATOR'S MANUAL.**

a. Many second echelon operations outlined in the operator's manual are often performed by ordnance maintenance personnel. In such instances, the pertinent manual for the specific tank should be referred to by ordnance maintenance personnel.

**4. ORGANIZATION MAINTENANCE.**

a. **Scope.** The scope of maintenance and repair by the crew and other units of the using arms is determined by the availability of suitable tools, availability of necessary parts, capabilities of the mechanics, time available, and the tactical situation. All of these are variable and no exact system of procedure can be prescribed.

## INTRODUCTION

**b. Allocation Of Maintenance.** Indicated below are the maintenance duties for which tools and parts have been provided for the using arm personnel. Other replacements and repairs are the responsibility of ordnance maintenance personnel but may be performed by using arm personnel when circumstances permit, within the discretion of the commander concerned. Echelons and words as used in this list of maintenance allocations are defined as follows:

**SECOND ECHELON:** Line organization regiments, battalions, companies, detachments, and separate companies (first and second echelons).

**THIRD ECHELON:** Ordnance light maintenance companies, ordnance medium maintenance companies, ordnance divisional maintenance battalions, and post ordnance shops.

**FOURTH ECHELON:** Ordnance heavy maintenance companies, and service command shops.

**FIFTH ECHELON:** Ordnance base regiments, ordnance bases, arsenals, and manufacturers' plants.

**SERVICE (Including preventive maintenance):** Refer to AR 850-15, paragraph 23 a (1) and (2). Consists of servicing, cleaning, lubricating, tightening bolts and nuts, and making external adjustments of subassemblies or assemblies and controls.

**REPLACE:** Refer to AR 850-15, paragraph 23 a (4). Consists of removing the part, subassembly or assembly from the vehicles and replacing it with a new or reconditioned or rebuilt part, subassembly or assembly, whichever the case may be.

**REPAIR:** Refer to AR 850-15, paragraph 23 a (3) and (5), in part. Consists of making repairs to, or replacement of the part, subassembly or assembly that can be accomplished without completely disassembling the subassembly or assemblies, and does not require heavy welding, or riveting, machining, fitting and/or alining or balancing.

**REBUILD:** Refer to AR 850-15, paragraph 23 a (5) in part, and (6). Consists of completely reconditioning and replacing in serviceable condition any unserviceable part, subassembly or assembly of the vehicle, including welding, riveting, machining, fitting, alining, balancing, assembling, and testing.

	ECHELONS		
	2nd	3rd	4th
Mechanism, turret traversing (manual)—replace . . . . .	X		
Mechanism, turret traversing (manual)—repair . . . . .		X	
Mechanism, turret traversing (manual)—rebuild . . . . .			X

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(LOGANSFORT) FOR MEDIUM TANKS M4 AND MODIFICATIONS**

**Section II**

**GENERAL DESCRIPTION**

	Paragraph
Purpose of mechanism.....	5
Description .....	6
Operation of mechanism.....	7

**5. PURPOSE OF MECHANISM.**

a. The hydraulic turret traversing mechanism is a means of power traversing the turret of the tank. Its purpose is to rotate the turret at required speeds and stop the turret dead on the target.

**6. DESCRIPTION.**

a. The Logansport turret traversing mechanism has an electric motor directly connected to a hydraulic pressure pump. The pump draws oil from an oil reservoir and delivers it under pressure to the inlet port of a manually-operated control valve.

b. The control valve directs the flow of oil through one or the other of two tubes that connect with a hydraulic motor, and rotates the motor in one direction or the other, depending upon which tube is carrying the oil. Turning the control valve to right or left determines which tube the oil will flow through, the direction of motor rotation, and the direction of turret rotation.

c. The hydraulic motor is mounted on the top of the traversing gear mechanism and is connected through a series of gears in the gear box with the stationary ring gear on the hull of the tank.

d. Also mounted on the traversing gear mechanism is a separate hand-operated mechanism and a shift lever that enables the operator to change to manual traversing of the turret.

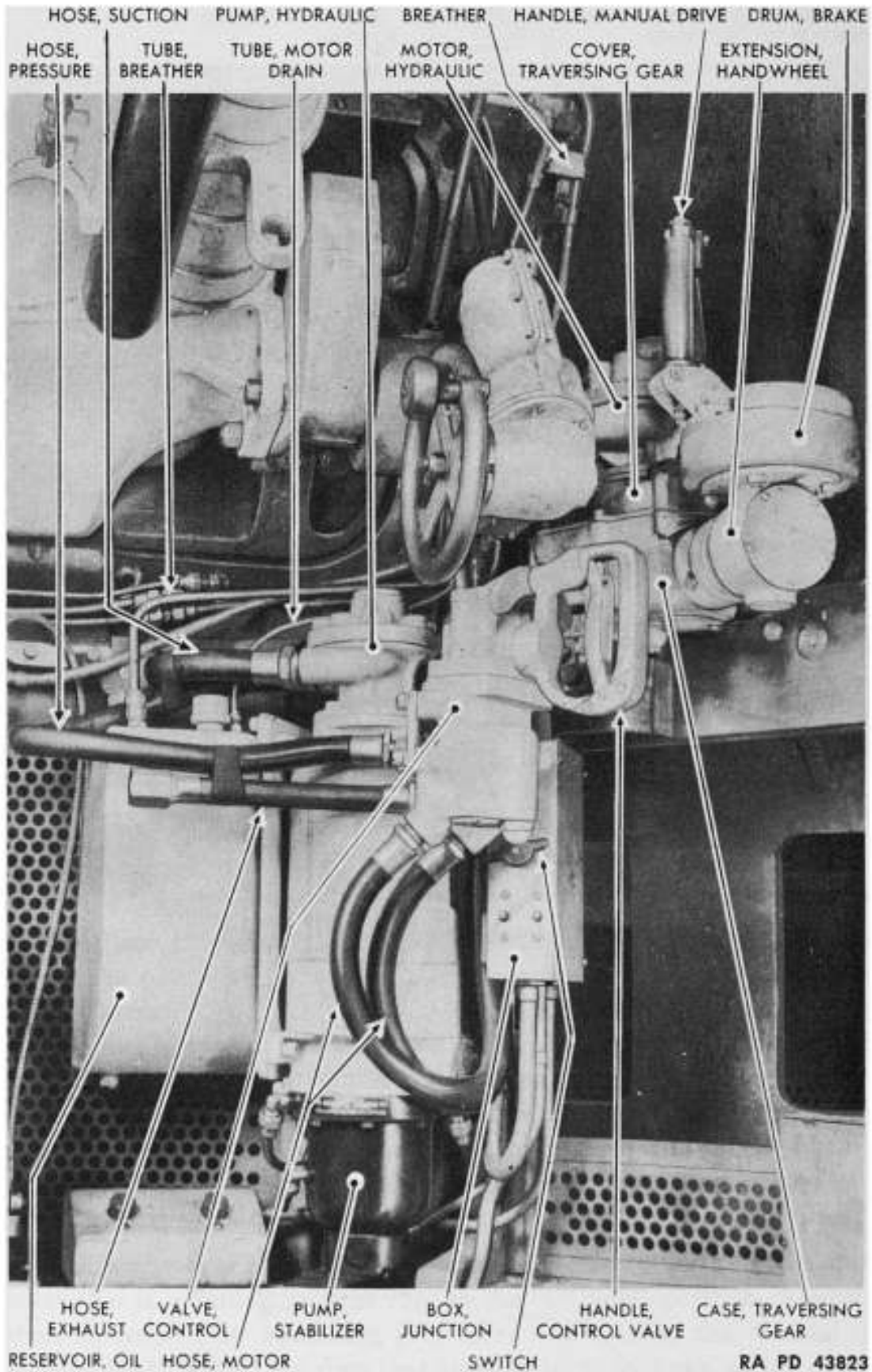
e. Incorporated in the control valve is a relief valve that determines the system pressure. Oil returned by the hydraulic motor or spilled over by the relief valve returns to the oil reservoir for recirculation.

f. Avoid confusing the hydraulic pump with the hydraulic motor. These two components are similar in appearance and in their principle of operation, although they serve entirely different functions. Note that the word "PUMP" is cast into the body of the pump and the word "MOTOR" is cast into the body of the hydraulic motor.

**7. OPERATION OF MECHANISM.**

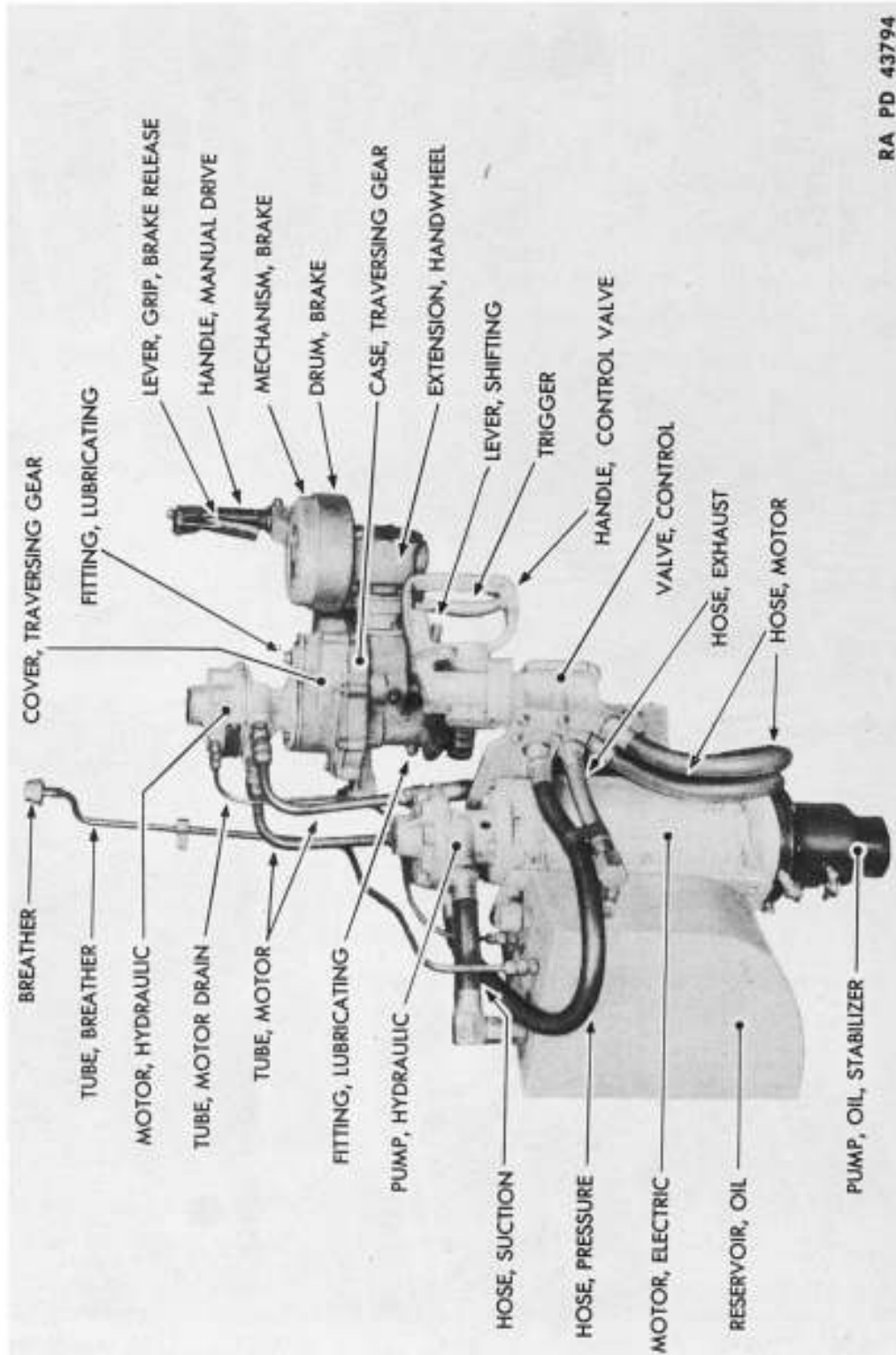
a. To operate the mechanism, close the switch that starts the electric motor. (Be sure the handle of control valve is locked in vertical posi-

**GENERAL DESCRIPTION**



**Figure 1—Turret Traversing Mechanism Installed In Vehicle**

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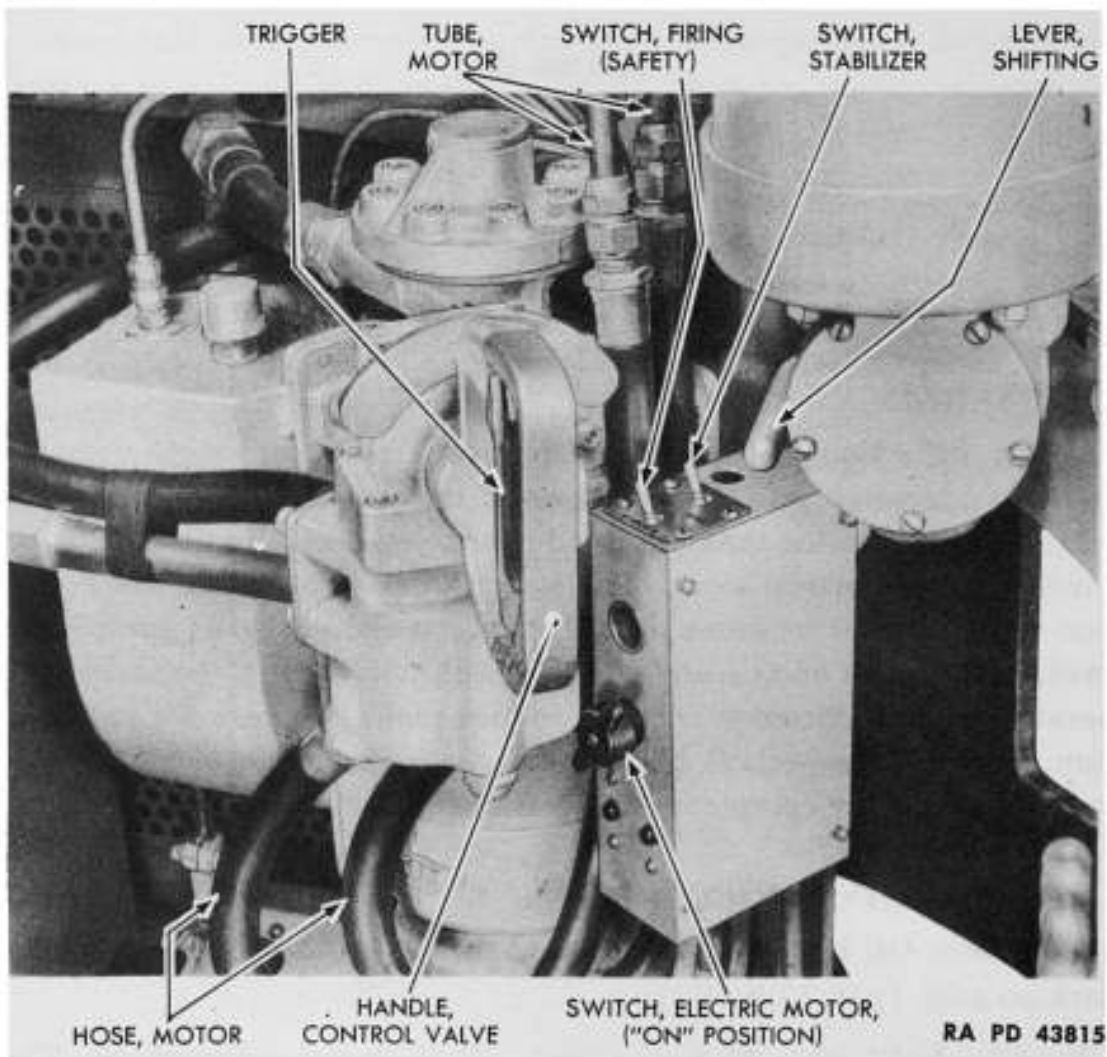


RA PD 43794

**Figure 2—Turret Traversing Mechanism Removed From Vehicle**



## GENERAL DESCRIPTION



**Figure 3—Lower Assembly, Showing Controls**

tion.) Place shifting lever in "UP" position. As soon as electric motor starts, the pump begins to draw oil from the oil reservoir and sends it under pressure to the control valve. While the handle of the control valve is in vertical position, the oil bypasses through the control valve and returns to the reservoir. Operator then grasps the control valve handle and squeezes the trigger, thus unlocking handle. Operator turns handle so that top of handle points in direction he wants turret to rotate; the farther he turns the handle, the faster turret will rotate. Returning handle to vertical position stops rotation of the turret.

b. Change-over to manual operation is made by pushing the shifting lever that is mounted on gear case to the "DOWN" position. Turret can then be rotated by squeezing grip lever and turning the manual drive handle. **CAUTION:** Be sure that shifting lever is down as far as it will go when manual drive is being used, and up as far as it will go when using hydraulic drive. Moving the handle slightly when shifting will cause lever to go into position more easily.

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**Section III**

**INSPECTION**

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General .....	8
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**8. GENERAL.**

a. An inspection of the hydraulic turret traversing mechanism as a whole, its operation, and the operation of its various components should be made each time the tank is turned over to ordnance maintenance personnel for maintenance work. The extent of the inspection will depend upon the time and facilities available, but it should be as complete as possible. Frequent and careful checkup will help to keep the mechanism operating at full efficiency and will reduce maintenance work to a minimum. Practical inspection of the turret traversing mechanism can be made only with the complete mechanism installed in the tank.

**9. INSPECTION PROCEDURE.**

a. **Check Oil Level In Reservoir.** Be sure oil level is up to "FULL" mark on gage (par. 32 b (6)).

b. **Check Electric Motor.** Check all electrical connections. Then close motor switch, but be ready to open it again immediately. If motor fails to start, open switch. If motor is noisy, runs too fast, or sparks when running, turn it off immediately and locate the trouble (par. 34).

c. **Check For Oil Leaks.** Inspect all tube connections and hose connections for oil leakage. Inspect hydraulic motor, control valve, and hydraulic pump for oil seepage at joints. Tighten bolts and cap screws at all points. Inspect oil reservoir for leaks. Be sure oil reservoir drain plug is tight.

**d. Check Control Valve.**

(1) With motor switch open and system not operating, try control valve by squeezing trigger and turning handle in first one, then the other direction. Handle should turn 45 degrees in either direction and should return to within a few degrees of the vertical when released.

(2) With tank level and mechanism in operation, squeeze trigger and turn handle very slowly to right. Turret should rotate slowly, gaining speed as handle is turned away from vertical position. Repeat operation, turning handle to left.