

TM 9-1750B

★ RESTRICTED

WAR DEPARTMENT

TECHNICAL MANUAL



**ORDNANCE MAINTENANCE
POWER TRAIN UNIT, ONE-PIECE DIFFERENTIAL CASE,
FOR MEDIUM TANKS M4 AND MODIFICATIONS
AND RELATED GUN MOTOR CARRIAGES**

16 AUGUST 1943

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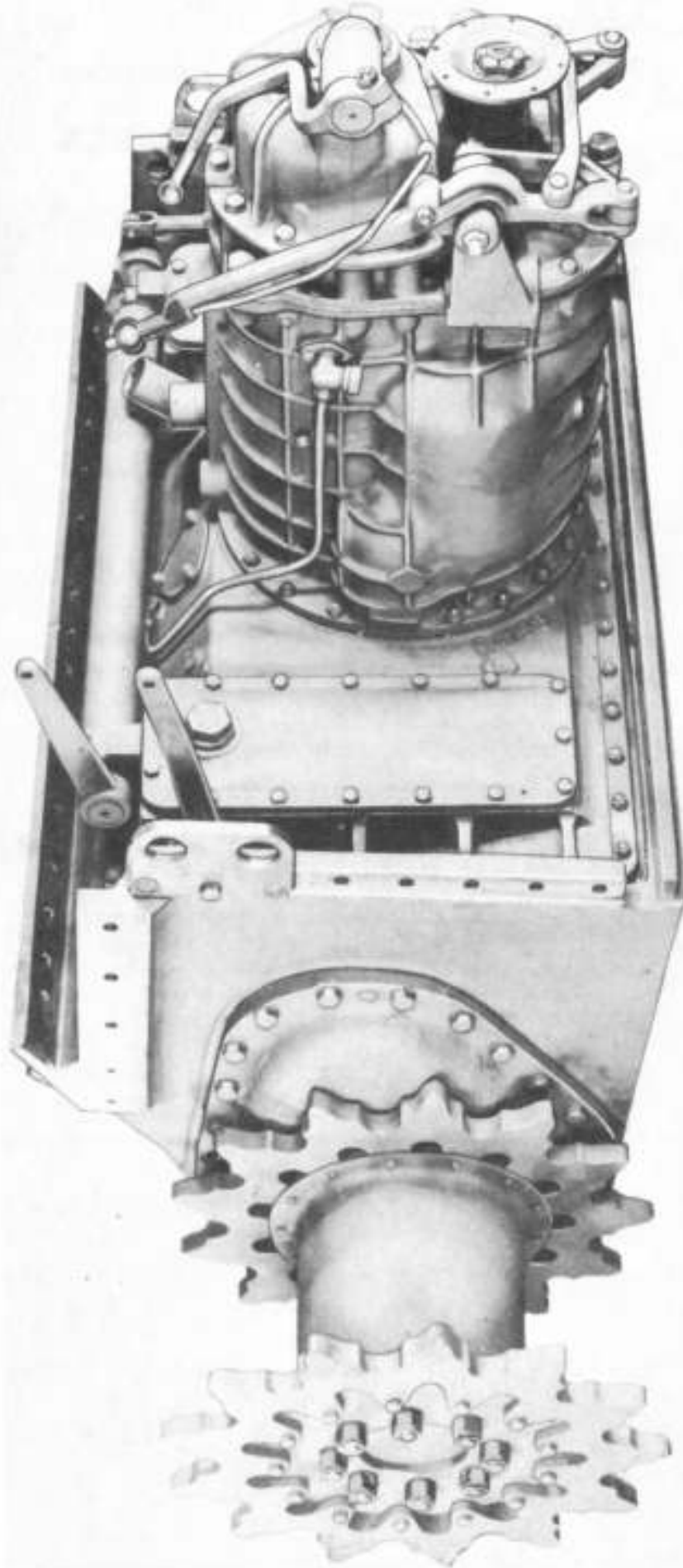
FOR ORDNANCE PERSONNEL ONLY

★RESTRICTED**TECHNICAL MANUAL****No. 9-1750B****WAR DEPARTMENT****Washington, 16 August 1943****ORDNANCE MAINTENANCE****POWER TRAIN UNIT, ONE-PIECE DIFFERENTIAL CASE,
FOR MEDIUM TANKS M4 AND MODIFICATIONS
AND RELATED GUN MOTOR CARRIAGES****CONTENTS**

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Figure 1 — Power Train Removed from Vehicle

Section I**INTRODUCTION**

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1. PURPOSE.

a. The purpose of this manual is to furnish instructions to all personnel charged with the maintenance and overhaul of the power train unit of the Medium Tank M4 and Modifications. The power train unit consists of the transmission, one-piece differential with two steering brake assemblies, two final drive assemblies, and two hub and sprocket assemblies.

2. SCOPE.

a. This manual contains information on the detailed construction of the unit, disassembly and assembly procedure, inspection, maintenance, and repair. As changes are made or additional information is obtained on the power train unit, changes in the manual will be issued to the field.

3. REFERENCES.

a. The reference section in the back of this manual lists Technical Manuals, Standard Nomenclature Lists, and other publications relative to the materiel described herein.

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Section II
DESCRIPTION

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4. DESCRIPTION AND MAINTENANCE ALLOCATION.

a. Description (fig. 1).

(1) The power train unit consists of a transmission, a one-piece differential with two steering brake assemblies, two final drive assemblies, and two hub and sprocket assemblies.

(2) The transmission (fig. 2) is mounted on the differential carrier and drives the differential assembly, through bevel gears. **NOTE:** *On some of these power train units a parking brake is mounted on the rear of the transmission case.*

(3) The steering brake assemblies are mounted one on either side of the differential assembly. The final drive assemblies are mounted one on either side of the differential housing, and carry the hub and sprocket assemblies.

(4) The steering brake shoes can be adjusted or replaced, and the final drive assemblies can be removed from the differential housing without removing the power train unit from the tank. However, most other repair operations require removal of the power train unit.

b. Maintenance Allocation.

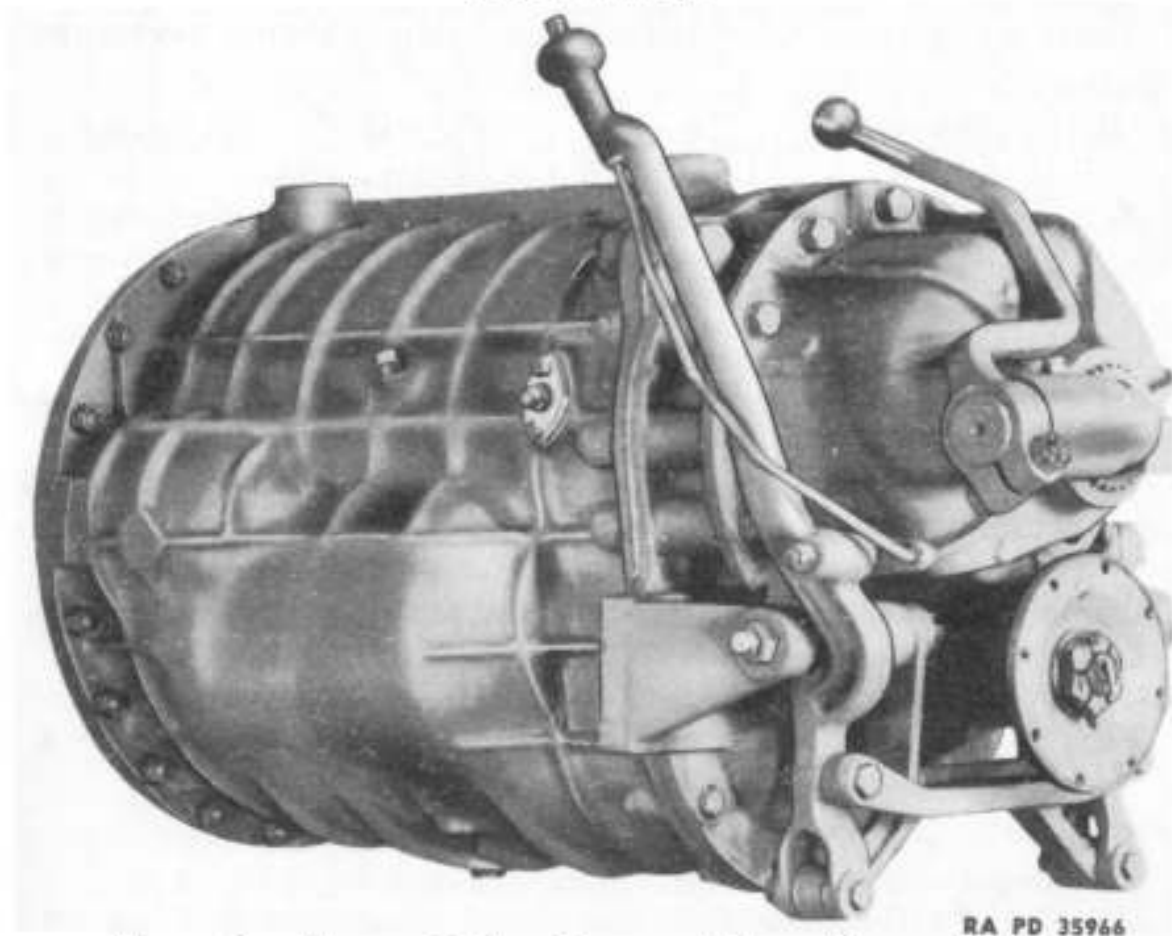
(1) **SCOPE.** The scope of maintenance and repair by the crew and other units of the using arms is determined by the availability of suitable tools, availability of necessary parts, capabilities of the mechanics, time available, and the tactical situation. All of these are variable, and no exact system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

(2) **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.

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.

DESCRIPTION

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Figure 2 — Transmission Removed from Power Train

FIFTH ECHELON: Ordnance base regiments, ordnance bases, arsenals, and manufacturer's 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.

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

NOTE: Operations allocated will normally be performed in the echelon indicated by "X".

Operations allocated to the echelons as indicated by "E" may be accomplished by the respective echelons in emergencies only.

	ECHELONS			
	2nd	3rd	4th	5th
DRIVE, FINAL (GEAR TRAIN ASSEMBLY) (ONE PIECE)				
*Drive, final, gear train assembly—replace	*	X		
Drive, final, gear train assembly—repair		X		
Drive, final, gear train assembly—rebuild			E	X
DIFFERENTIAL AND SUBASSEMBLY, CONTROLLED				
*Differential and subassembly, controlled—replace . .	*	X		
Differential and subassembly, controlled—repair . .		X		
Differential and subassembly, controlled—rebuild . .			E	X
Drums, steering brake—replace and/or repair		X		
Shoes, steering brake—service and/or replace	X			
Shoes, steering brake—repair (reline)		X		
REDUCTION, FINAL				
Hubs, sprocket—replace	X			
Hubs, sprocket—repair		X		
Hubs, sprocket—rebuild			E	X
Reduction assembly, final drive—replace	X			
Reduction assembly, final drive—repair		X		
Reduction assembly, final drive—rebuild			E	X
Sprockets—replace	X			
Sprockets—rebuild			E	X
TRANSMISSION ASSEMBLY				
Brake, parking—service and/or replace	X			
Brake, parking—repair (reline)		X		
*Transmission assembly—replace	*	X		
Transmission assembly—repair		X		
Transmission assembly—rebuild			E	X

*The second echelon is authorized to remove and reinstall items marked by an asterisk. However, when it is necessary to replace an item marked by an asterisk with a new or rebuilt part, subassembly or unit assembly, the assembly marked by an asterisk may be removed from the vehicle by the second echelon only after authority has been obtained from a higher echelon of maintenance.

DESCRIPTION

	ECHELONS			
	2nd	3rd	4th	5th
DRIVE, FINAL, (GEAR TRAIN ASSEMBLY) (THREE-PIECE)				
*Drive, final, gear train assembly—replace	*	X		
Drive, final, gear train assembly—repair		X		
Drive, final, gear train assembly—rebuild			E	X
DIFFERENTIAL ASSEMBLY, CONTROLLED				
*Differential assembly, controlled—replace		X		
Differential assembly, controlled—repair		X		
Differential assembly, controlled—rebuild			E	X
DIFFERENTIAL SUBASSEMBLY, CONTROLLED				
*Differential subassembly, controlled—replace		X		
Differential subassembly, controlled—repair		X		
Differential subassembly, controlled—rebuild			E	X
Drums, steering brake—replace and/or repair		X		
Shoes, steering brake—service and/or replace	X			
Shoes, steering brake—repair (reline)		X		
REDUCTION, FINAL				
Hubs, sprocket—replace	X			
Hubs, sprocket—repair		X		
Hubs, sprocket—rebuild			E	X
Reduction assembly, final drive—replace	X			
Reduction assembly, final drive—repair		X		
Reduction assembly, final drive—rebuild			E	X
Sprockets—replace	X			
Sprockets—rebuild			E	X
TRANSMISSION ASSEMBLY				
Brake, parking—service and/or replace	X			
Brake, parking—repair (reline)		X		
*Transmission assembly—replace	*	X		
Transmission assembly—repair		X		
Transmission assembly—rebuild			E	X

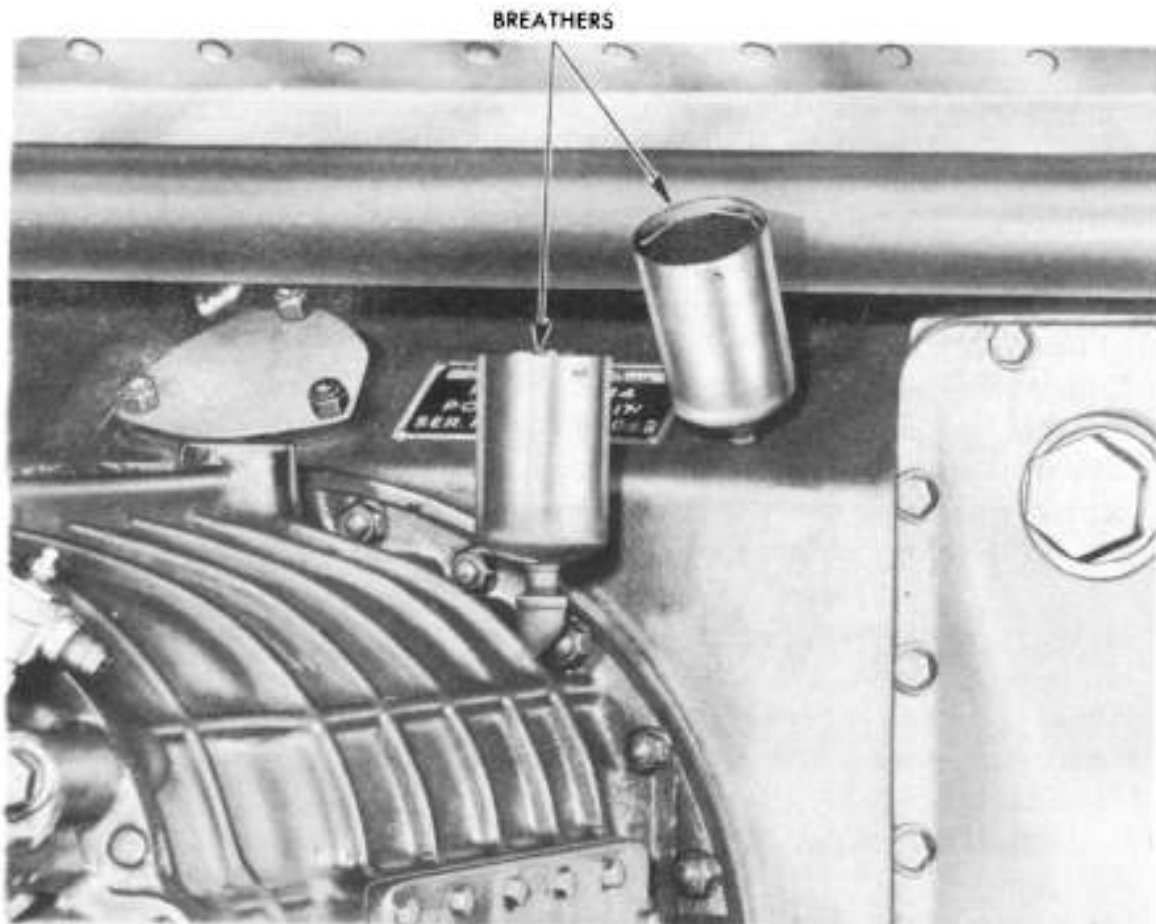
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5. OPERATION.

a. In operation, power is transmitted from the power transfer unit by propeller shaft to the input (lower) shaft on the transmission, and through various gears (five speeds forward and one reverse) to the output shaft. From a transmission differential drive bevel pinion on the front end of the output shaft, the power goes to the differential bevel ring gear, through the differential to the final drive shafts, then through the pinions and gears of the final drive assemblies to the track drive sprocket shafts, to which are attached the hub and sprocket assemblies.

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Figure 3 — Power Train Air Breathers

b. The transmission provides five speeds forward and one reverse. All gears except first and reverse are provided with synchronizers. Shifting is accomplished by a lever, at the left rear of the transmission, which operates selectively any one of the three shifter rods, each with a shifter fork attached. Two forks operate on the output shaft (one on the second and third speed synchronizer, and one on the first and reverse speed clutch gear), and a third fork operates on the input shaft (on the fourth and fifth speed synchronizer). An interlock mechanism prevents more than one speed being engaged at a time. In this type of transmission all the gears are in constant mesh. The shifter fork rides in a groove in the synchronizer gear shifter collar mounted on the synchronizer clutch gear. The internal splines on the synchronizer clutch gear mesh with the external splines on the input shaft clutch gear, which is keyed in fixed position on the input shaft. As the fork is moved in shifting into fifth gear, for example, the synchronizer is moved into contact with the fifth speed gear on the input shaft. As the two parts come together the speeds of the input shaft and the fifth speed gear are equalized, and it is then possible to complete the shift by sliding the internal teeth of