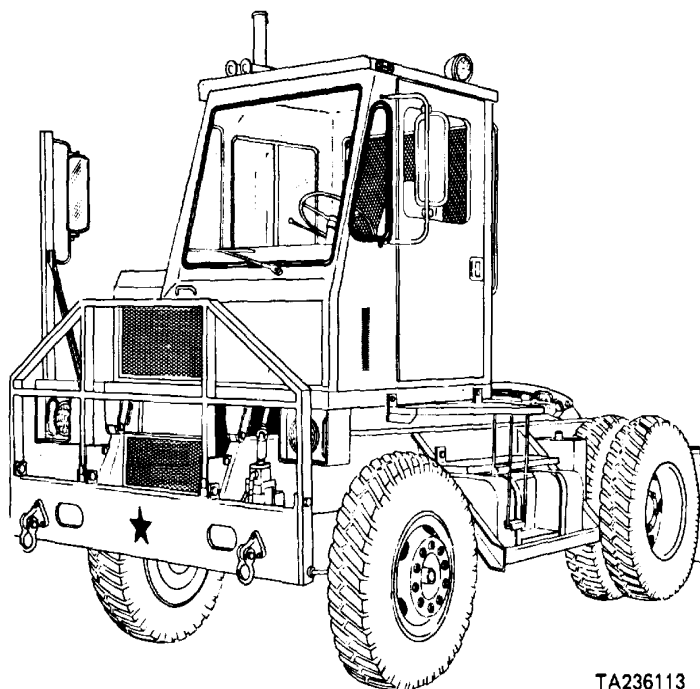


TECHNICAL MANUAL

ORGANIZATIONAL, DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL



TRUCK TRACTOR, YARD TYPE,
43,500 LB GVW, DED, 4x2,
ARMY MODEL M878A1
(OTTAWA MODEL 50)
(NSN 2320-01-121-2102)

HEADQUARTERS, DEPARTMENT OF THE ARMY
OCTOBER 1985

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Technical Manual

No. 9-2320-285-24-1

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C. 9 October 1985TECHNICAL MANUAL
ORGANIZATIONAL, DIRECT
SUPPORT AND GENERAL SUPPORT
MAINTENANCE MANUALTRUCK TRACTOR, YARD TYPE
43,500 LB GVW, DED, 4X2,
ARMY MODEL M878A1
(OTTAWA MODEL 50)
NSN 2320-01-121-2102

REPORTING OF ERRORS

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 back of this manual direct to: Commander, US Army Tank-Automotive Command, ATTN: DRSTA-MT, Warren, MI 48397-5000. A reply will be furnished to you.

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HOW TO USE THIS MANUAL

This manual is designed to help you maintain the M878A1 tractor. It's divided into volumes, chapters, sections, and appendices. Volume 1 chapters contain general information and organizational maintenance procedures. Volume 2 chapters contain direct support and general support maintenance procedures. The chapters are divided into sections containing maintenance procedures for the various tractor systems.

The appendices contain supplemental information which you require to maintain the M878A1 tractor.

The maintenance procedures contained in this manual tell you several things:

.....what tools you need to do the job
materials or parts required
what condition the vehicle is to be in before work is started

In addition to text, you'll have either an assembled view or an exploded-view illustration of the associated parts. Sometimes, the illustration will be keyed by an arrow to an overall view of the vehicle to help you determine the approximate location of the parts. The illustration is keyed to the text by numbers and shows you how to take the part off and put it on. The following problem will show you some of the features of this manual.

PROBLEM

An operator brings his M878A1 tractor into the shop with an engine problem: The engine is hard to start. The best way to solve his problem is by using your manual. This is what you do:

1. How do you start?
 Look at the cover of this manual.
 On the cover you'll find a listing for TROUBLESHOOTING INDEX. It tells you to go to page 2-11. To find page 2-11 fast, open the manual by using the black tab that lines up with the listing on the cover.
2. What kind of problem do you have?
 Find it in the symptom index.
 The symptom index is a list of problems covered by the section. It tells you that your problem, "engine hard to start or will not start" is covered in paragraph 2-8, Malfunction entry number 1.
3. How do you determine what is causing the problem?
 Go to paragraph 2-8, Malfunction entry number 1.
 There you'll find the troubleshooting procedures you'll need. The procedure has columns with the headings: MALFUNCTION, TEST OR INSPECTION, and CORRECTIVE ACTION. Starting at step 1, read the procedure. Each step tells you what to do and what to look for. Follow the steps, in order, until you find your problem. When you find the problem, the CORRECTIVE ACTION column will tell you how to fix it.

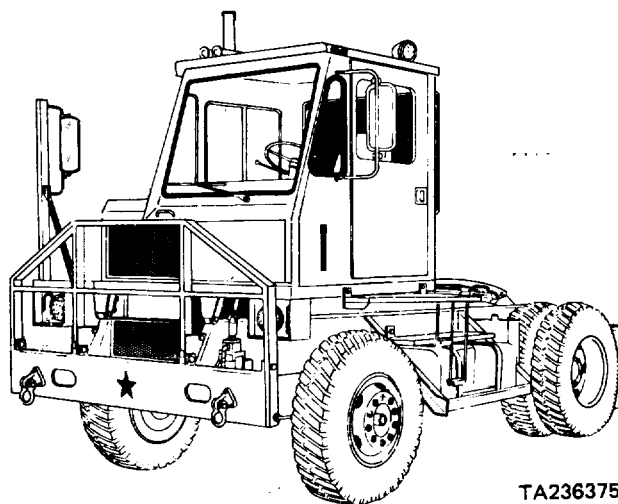
HOW TO USE THIS MANUAL (CONT)

4. Let's assume you've found that the starter is bad.
The replacement procedure is in paragraph 2-25b.

The procedure contains all the information you'll need to replace the starter. First check the introductory material. It tells you what you'll need before you start the job. Below the introductory material is an assembled view of the vehicle showing the approximate location of the engine, an assembled view of the engine showing the location of the starter, and an exploded-view illustration which shows you how to take it out and put it back in. The text which follows the illustration tells you how to do the job.

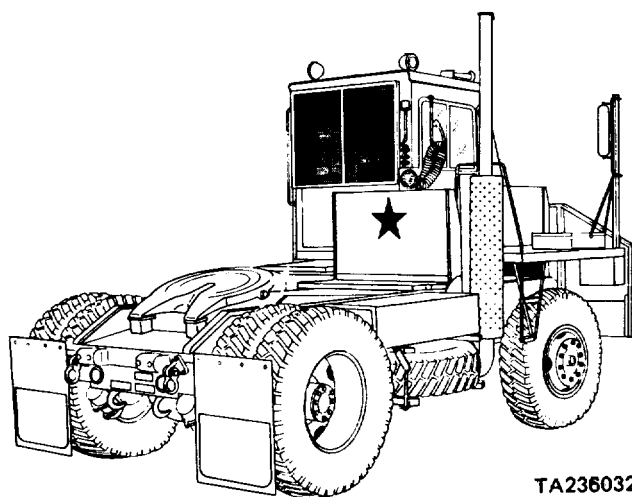
5. If on the other hand, you know what the problem is and its cause, refer to the alphabetical index located at the rear of this manual and find the name of the part to be replaced and the paragraph number in which maintenance procedures will be found.

For example, the engine is overheating, on filling the radiator with coolant you see that coolant is pouring out of a radiator hose indicating that the hose requires replacement. Referring to the alphabetical index under the listing "Hoses, Coolant" paragraph 2-15c is referenced. Turn to this paragraph for radiator hose removal and installation procedures.



TA236375

LEFT FRONT VIEW



TA236032

RIGHT REAR VIEW

M878A1 Yard Tractor

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CHAPTER 1**INTRODUCTION****CHAPTER OVERVIEW**

The purpose of this chapter is to give you standard data required in all manuals, to familiarize you with the purpose and capabilities of the vehicle, and to give you a brief description of its different systems and components.

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Section I. GENERAL INFORMATION

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Maintenance, Forms, Record, and		Recommendations (EIR)	1-5
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Preparation for Storage or		Special Tools, TMDE, and Support	
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1-1. SCOPE

- a. Type of Manual. Organizational, Direct Support, and General Support Maintenance.
- b. Model Number and Equipment Name. M878A1, 4x2, Diesel Engine Driven, 43,500 Pounds Gross Vehicle Weight, Yard Type Tractor Truck.
- c. Purpose of Equipment. Movement of truck trailers within a terminal yard.

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

For destruction of army materiel to prevent enemy use, refer to TM 750-244-6.

1-4. PREPARATION FOR STORAGE OR SHIPMENT

Refer to paragraphs 2-89 thru 2-92 for preparation for storage or shipment.

1-5. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)

If your M878A1 tractor 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 (Quality Deficiency Report). Mail it to us at: Commander, US Army Tank-Automotive Command, ATTN: DRSTA-MT, Warren, MI 48090. We'll send you a reply.

1-6. WARRANTY INFORMATION

The M878A1 tractor is warranted by Ottawa Truck Corporation for 15 months or 1500 hours of operation, whichever comes first. Warranty starts on the date found on DA Form 2410 or DA Form 2408-16 in the logbook. Report all defects in material or workmanship to your supervisor who will take appropriate action.

1-7. ORIENTATION

In this manual, right and left hand sides of the tractor are determined from the operator's seat facing toward the front of the tractor.

1-8. COMMON TOOLS AND EQUIPMENT

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

1-9. SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

No special tools, TMDE, or support equipment is required.

1-10. REPAIR PARTS

Repair parts are listed and illustrated in the repair parts and special tools list (TM 9-2320-285-24P) covering organizational, direct support, and general support maintenance for this equipment.

Section II. EQUIPMENT DESCRIPTION AND DATA

	Para		Para
Equipment Characteristics, Capabilities, and Features.....	1-11	Equipment Data	1-13
Location and Description of Major Components	1-12	Safety, Care, and Handling	1-14

1-11. EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES

Refer to the separate Operator's Manual, TM 9-2320-285-10, for equipment characteristics, capabilities, and features.

1-12. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS

- a. Refer to the separate Operator's Manual, TM 9-2320-285-10, for location and description of vehicle major components.
- b. Refer to para 2-74 for location of identification, instruction, and warranty plates.

1-13. EQUIPMENT DATA

Refer to separate Operator's Manual, TM 9-2320-285-10, for tabulated equipment data.

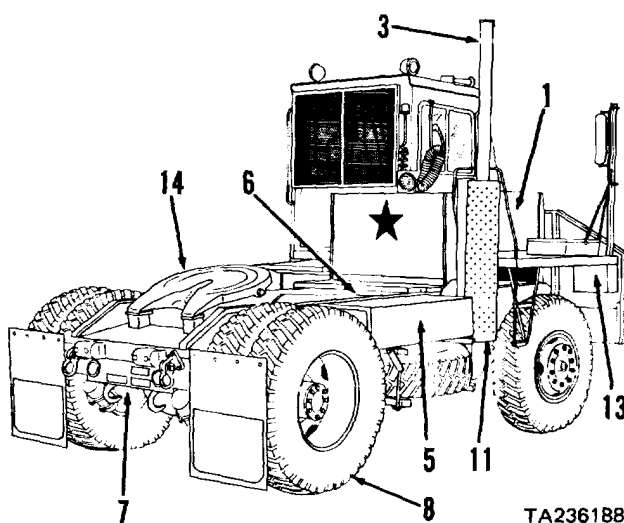
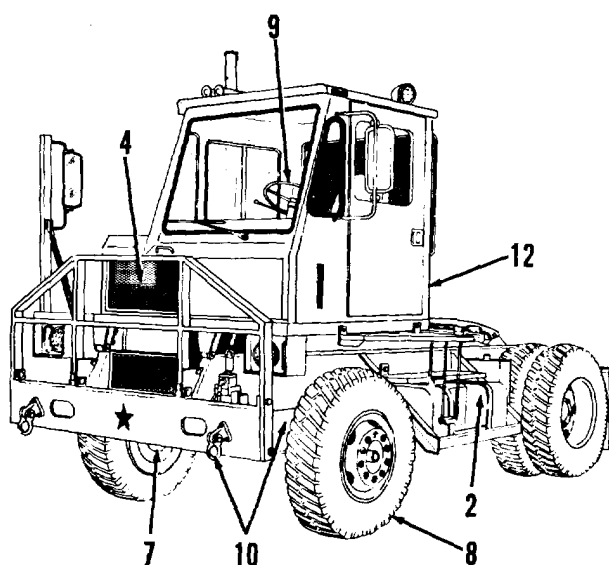
1-14. SAFETY, CARE, AND HANDLING

When performing maintenance procedures, observe all warnings and cautions and take all appropriate safety measures. A summary of the warnings contained in this manual is located on the warning and first aid data page immediately following the cover page.

Section III. PRINCIPLES OF OPERATION

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1-15. YARD TRACTOR



TA236188

1. ENGINE. Diesel engine, internal combustion power unit; engine has no carburetor or electrical ignition system, relies on heat of compressed air alone to ignite fuel; heat of diesel fuel is converted to work in engine cylinders.
2. FUEL SYSTEM. Fuel is pumped from fuel tank into fuel injectors, then sprayed into combustion chamber.
3. EXHAUST SYSTEM. Engine exhaust gases are expelled through muffler and exhaust stack mounted on right side of tractor; muffler aids in quieting engine noise.
4. COOLING SYSTEM. Cools engine by circulating coolant; cooling air is drawn through radiator by belt-driven fan; water pump draws coolant from radiator. Radiator is equipped with coolant recovery system.
5. ELECTRICAL SYSTEM. 12 volt, supplied by four wet-cell batteries in parallel; engine-driven, 90 ampere alternator supplies current. Key switch controls application of power to circuits.
6. POWER TRAIN. Consists of transmission, propeller shaft, differential, and rear axle; transmits motive power from engine to rear wheels.
7. BRAKES. Drum type, operated by air pressure; service brakes controlled by cab brake treadle, independent of parking brake control.

1-15. YARD TRACTOR (CONT)

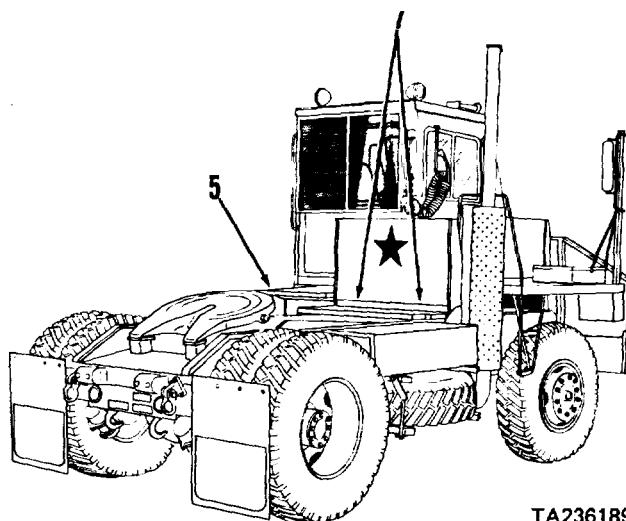
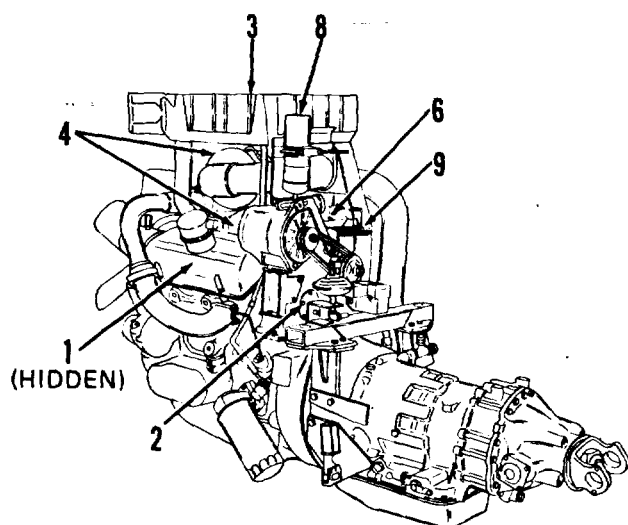
8. **WHEELS.** Six 12:00 x 20, 16 ply tires plus spare; dual mounted rear tires; all tires and wheels same size.
9. **STEERING SYSTEM.** Includes steering wheel and column, steering gear, and hydraulic system for power assist.
10. **FRAME AND TOWING ATTACHMENTS.** Two flange beams extend the length of tractor; tow shackles and tie down hooks at front and rear of tractor are included.
11. **SPRINGS AND SHOCK ABSORBERS.** Two shock absorbers and two leaf spring assemblies, located at left and right front axle.
12. **CAB AND BODY.** Fully enclosed cab rubber mounted to cab deck; deck attached to frame by two pivot pins at front and two hydraulic latches at rear.
13. **ACCESSORIES.** Includes windshield washer and wiper, rearview mirrors, air horn, cab heater, and winterization system heaters.
14. **HYDRAULIC SYSTEMS.** Three hydraulic systems: fifth wheel hydraulic system to raise and lower fifth wheel boom, cab tilt hydraulic system to tilt and lower cab deck, and steering hydraulic system for power assist.

1-16. ENGINE

318 cubic inch, 6 cylinder, overhead 4-valve, 2 cycle diesel engine; engine-mounted oil filter and external oil filter remove impurities from engine lubrication system. engine oil sampling valve permits sampling of used engine oil for laboratory analysis. Engine provides mounting facilities for fan, air compressor, alternator, and power steering pump.

NOTE

Refer to TM 9-2815-205-34, Diesel Engine Maintenance Manual,, for detailed description of engine system.



TA236189

1. **FUEL INJECTORS.** Six-injectors spray atomized fuel under pressure into combustion chamber.
2. **FUEL PUMP.** Engine driven, mechanical gear pump draws fuel from supply tank through primary and secondary fuel filters and sends fuel under pressure to fuel injectors.

1-17. FUEL SYSTEM (CONT)

3. **AIR CLEANER AND RESTRICTION INDICATOR.** Air cleaner traps dust and dirt from air and sends filtered air to turbocharger; restriction indicator, mounted on right instrument panel, monitors resistance to air flow due to trapped particles and displays red band when preset restriction level is reached.
4. **TURBOCHARGER AND BLOWER ASSEMBLY.** Blower assembly, mounted on top of engine block, uses two double-lobed rotors to deliver fresh air from turbocharger to engine; turbocharger, driven by engine exhaust gases, delivers amount of air that engine requires for combustion, determined by amount of engine exhaust.
5. **FUEL TANK.** 50 gallon capacity; mounted on left side of frame.
6. **GOVERNOR.** Mechanical, limiting-speed type governor, mounted on flywheel housing of engine, controls engine-idle speed and limits maximum engine operating speed.
7. **FUEL FILTERS.** Primary and secondary fuel filters remove impurities from fuel system.
8. **ENGINE STARTING AID.** Includes quick start switch, ether cylinder, ether solenoid, and tubing; aids engine starting in cold weather. When switch is operated, electrically-operated solenoid valve injects pre-measured shot of highly volatile ether into air intake system. Replaceable cylinder supplies ether.
9. **ACCELERATOR AND THROTTLE LINKAGE.** Controls engine speed through operation of accelerator pedal transmitted by linkage to engine governor.

1-18. EXHAUST SYSTEM

1. **MUFFLER.** Muffles engine noise; mounted vertically at right side of vehicle.
2. **EXHAUST PIPES.** Channel engine exhaust smoke and combustion by-products from engine turbocharger to muffler.

1-19. COOLING SYSTEM