TM 9-2320-211-10-1
T.O. 36A12-1C-421-1

TECHNICAL MANUAL

OPERATION, INSTALLATION AND REFERENCE DATA

OPERATOR LEVEL

TRUCK, CHASSIS: M40A2C, M61A2, M63A2; TRUCK, CARGO: M54A2, M54A2C, M55A2; TRUCK, DUMP: M51A2; TRUCK, TRACTOR: M52A2; TRUCK, WRECKER, MEDIUM: M543A2

DEPARTMENTS OF THE ARMY AND THE AIR FORCE

SEPTEMBER 1980

WARNING

EXHAUST GASES CAN BE DEADLY

Exposure to exhaust gases produces symptoms of headache, dizziness, loss of muscular control, apparent drowsiness, and coma. Permanent brain damage or death can result from severe exposure.

Carbon monoxide occurs in the exhaust fumes of fuel burning heaters and internal combustion engines, and becomes dangerously concentrated under conditions of inadequate ventilation. The following precautions must be observed to insure the safety of personnel whenever fuel burning heater(s) or engine of any vehicle is operated for maintenance purposes or tactical use.

Do not operate heater of engine of vehicle in an enclosed area unless it is adequately ventilated.

Do not idle engine for long periods without maintaining adequate ventilation in personnel compartments.

Do not drive any vehicle with inspection plates or cover plates removed unless necessary for maintenance purposes.

Be alert at all times during vehicle operation for exhaust odors and exposure symptoms. If either are present , immediately ventilate personnel compartments. If symptoms persist, remove affected personnel from vehicle and treat as follows: expose to fresh air; keep warm; do not permit physical exercise; if necessary, administer artifical respiration.

If exposed, seek prompt medical attention for possible delayed onset of acute lung congestion. Administer oxygen if available.

The best defense against exhaust gas poisoning is adequate ventilation.

Use extreme care when removing radiator cap, especially when temperature gage shows above 180°F.

Always wear leather gloves when handling winch cable never allow cable to slip through hands. Do not operate winch with less than four turns of cable drum.

Do not drive truck until the low air pressure warning buzzer is silent and the air pressure gage shows at least 65 PSI. This is the minimum pressure required for safe braking action.

Do not use hand throttle to drive the vehicle.

Do not park truck with front transmission gearshift lever in gear.

When used to carry flammables, explosives, or other hazardous material, equip truck with a fire extinguisher.

If your vehicle class number is greater than the bridge class number, your vehicle is too heavy for the bridge; DO NOT CROSS.

This vehicle has been designed to operate safely and efficiently within the limits specified in this TM. Operation beyond these limits is prohibited IAW AR 70-1 without written approval from the Commander, U.S. Army Tank-Automotive Command, AlT'IN: AMSTA-CM-S, Warren, MI 48397-5000.

TECHNICAL MANUAL
NO. 9-2320-211-10-1

TECHNICAL ORDER
NO. 36A12-lC-421-1

Change

No. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington D. C., 5 ***December 1989***

TECHNICAL MANUAL
OPERATION, INSTALLATION AND REFERENCE DATA
OPERATOR LEVEL
TRUCK, CHASSIS M40A2C, M61A2, M63A2; TRUCK, CARGO: M54A2, M54A2C, M55A2; TRUCK DUMP: M51A2; TRUCK, TRACTOR: M52A2; TRUCK, WRECKER, MEDIUM: M543A2

TM 9-2320-211-10-1/TO 36A12-lC-421-1, dated 5 September 1980, is changed as follows:

1. Change to narrative material is indicated by a vertical bar in the outside margin of the page. Added or revised illustrations are indicated by a vertical bar adjacent to the identification number.

2. Remove old pages and insert new pages as indicated below..

3. File this change sheet in front of the publication for reference purposes.

Remove Pages	Insert Pages
2-1 and 2-2	2-1 and 2-2
4-29 and 4-30	4-29 and 4-30
over and Warning	Cover and Warning

By Order of the Secretary of the Army

CARL E. VUONO
General, United States Army
Chief of Staff

Official:

WILLIAM J. MEEHAN 11
Brigadier General, United States Army
The Adjutant General

Distribution:
To be distributed in accordance with DA Form 12-38-R (Block 209) Operator maintenance requirements for Truck, Cargo, 5-ton, 6x6, Multifuel, M39-series.

TECHNICAL MANUAL
NO. 9-2320-211-10-1
TECHNICAL ORDER
NO. 36A12-1C-421-1

DEPARTMENT OF THE ARMY
A N D
T H E A I R F O R C E
Washington, DC, 5 September 1980

TECHNICAL MANUAL

OPERATION, INSTALLATION AND

REFERENCE DATA

OPERATOR LEVEL

5-TON, 6X6, M39 SERIES TRUCKS
(MULTIFUEL)

Model		NSN without Winch	NSN with Winch
Chassis	M40A2C	2320-00-969-4114	
	M61A2	2320-00-055-9264	2320-00-965-0321
	M63A2	2320-00-226-6251	2320-00-285-3757
Truck, Cargo	M54A2	2320-00-055-9266	2320-00-055-9265
	M54A2C	2320-00-926-0874	2320-00-926-0874
	M55A2	2320-00-073-8476	2320-00-055-9259
Truck, Dump	M51A2	2320-00-055-9262	2320-00-055-9263
Truck, Tractor	M52A2	2320-00-055-9260	2320-00-055-9261
Truck, Wrecker, Medium	M543A2		2320-00-055-9258

Current as of 25 March 1980.

*This manual, together with TM 9-2320-211-10-2, 5 September 1980; -10.3, 5 September 1980; and -10-4, 5 September 1980 supersedes so much of TM 9-2320-211-10, 20 November 1977 as pertains to multifuel vehicles.

REPORTING OF 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 procedure, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publication and Blank Forms) , or DA Form 2028-2 located in the back of this manual direct to: Commander, U.S. Army Tank Automotive Materiel Readiness Command, ATTN: DRSTA-MB, Warren, Michigan 48090. A reply will be furnished to you.

VOLUME 4 OF 4

MAINTENANCE

LIST OF ILLUSTRATIONS

LIST OF TABLES

CHAPTER 1

INTRODUCTION

1-1. SCOPE. This technical manual contains operating instructions for the 5-ton, 6x6, M39 series trucks (figures 1-1 through 1-5) equipped with multifuel engines, and operator level maintenance instructions in accordance with the maintenance allocation chart. Operating instructions for special purpose kits used with these trucks are also included. The purpose of this manual is to give the operator the information he needs for safe, trouble–free operation of the equipment under usual and unusual conditions.

1-2. FORMS AND RECORDS. Maintenance forms, records and reports which are to be used by maintenance personnel at all levels are listed and prescribed by TM 38-750.

1-3. EQUIPMENT IMPROVEMENT REPORT AND MAINTENANCE DIGEST (EIR MD) AND EQUIPMENT IMPROVEMENT REPORT AND MAINTENANCE SUMMARY (EIR MS). The quarterly Equipment Improvement Report and Maintenance Digest, T-B 43-0001-39 series, contains valuable field information on the equipment covered in this manual. The information in the TB 43-0001-39 series is compiled from some of the Equipment Improvement Reports that you prepared on the vehicles covered in this manual. Many of these articles result from comments, suggestions, and improvement recommendations that you submitted to the EIR program. The TB 43-0001-39 series contains information on equipment improvements, minor alterations, proposed Modification Work Orders (MWO's) , warranties (if applicable), actions taken on some of your DA form 2080's (Recommended Changes to Publications), and advance information on proposed changes that may affect this manual. In addition, the more maintenance significant articles, including minor alterations, field-fixes, etc, that have a more permanent and continuing need in the field are republished in the Equipment Improvement Report and Maintenance Summary (EIR MS) for TARCOM Equipment (TM 43-0143). Refer to both of these publications (TB 43-0001– 39 series and TM 43-0143) periodically, especially the TB 43-0001-39 series, for the most current and authoritative information on your equipment. The information will help you in doing your job better and will help you in keeping you advised of the latest changes to this manual. Also refer to DA Pam 310-4, index of Technical Publications, and Appendix A, References, of this manual.

1-4. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS. If your truck 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. Tell us why a procedure is hard to perform. Put it on an SF 368 (Quality Deficiency Report). Mail it to us at: Commander, U.S. Army Tank-Automotive Materiel Readiness Command, ATTN: DRSTA-MB, Warren, Michigan 48090. We'll send uou a reply.

1-5. METRIC SYSTEM. The equipment /system described herein is nonmetric and does not require metric common or special tools. Therefore, metric units are not supplied. Tactical instructions, for sake of clarity, will also remain nonmetric.

1-6. DESTRUCTION TO PREVENT ENEMY USE. Follow procedures given in TM 750-244-6 for destruction of Army material to prevent enemy use.

1-7. MANUAL ORGANIZATION . This manual is divided into four volumes. Volumes are divided into chapters and sections depending on the amount of subject material. The content of each volume is as follows:

Volume 1. TM 9-2320-211-10-1
Operation, Installation, and Reference Data

Volume 2. TM 9-2320-211-10-2
Scheduled Maintenance

Volume 3. TM 9-2320-211-10-3
Troubleshooting

Volume 4. TM 9-2320-211-10-4
Maintenance

1-8. VEHICLE/BRIDGE CLASSIFICATION. Refer to table 1-1 and find your vehicle class number. Table columns are marked as follows:

E - Class number of vehicle with no payload.

C - Class number of vehicle with cross country payload.

H - Class number of vehicle with highway payload.

a. Bridges along your route may be marked with a class number. The bridge class number shows the safe capacity of the bridge. If your vehicle class number is equal to or less than the bridge class number, the bridge will hold your vehicle.

WARNING

If your vehicle class number is greater than the bridge class number, your vehicle is too heavy for the bridge; DO NOT CROSS.

b. For more information refer to FM 5-36.

Table 1-1. Vehicle Class Information

Vehicle	Model	NSN	Class Number		
			E	C	H
Cargo	M54A2	2320-00-055-9265	8	14	19
		and 2320-00-055-9266	8	14	19
	M54A2C	2320-00-926-0874	9	15	19
		and 2320-00-761-2854	8	14	19
	M55A2	2320-00-055-9259	10	16	21
		and 2320-00-073-8476	10	16	20
Dump	M51A2	2320-00-055-9263	10	16	22
		and 2320-00-055-9262	10	20	40
Tractor	M52A2	2320-00-055-9261	8	-	-
		and 2320-00-055-9260	7	16	21
Medium Wrecker	M543A2	2320-00-055-9258	17	17	17

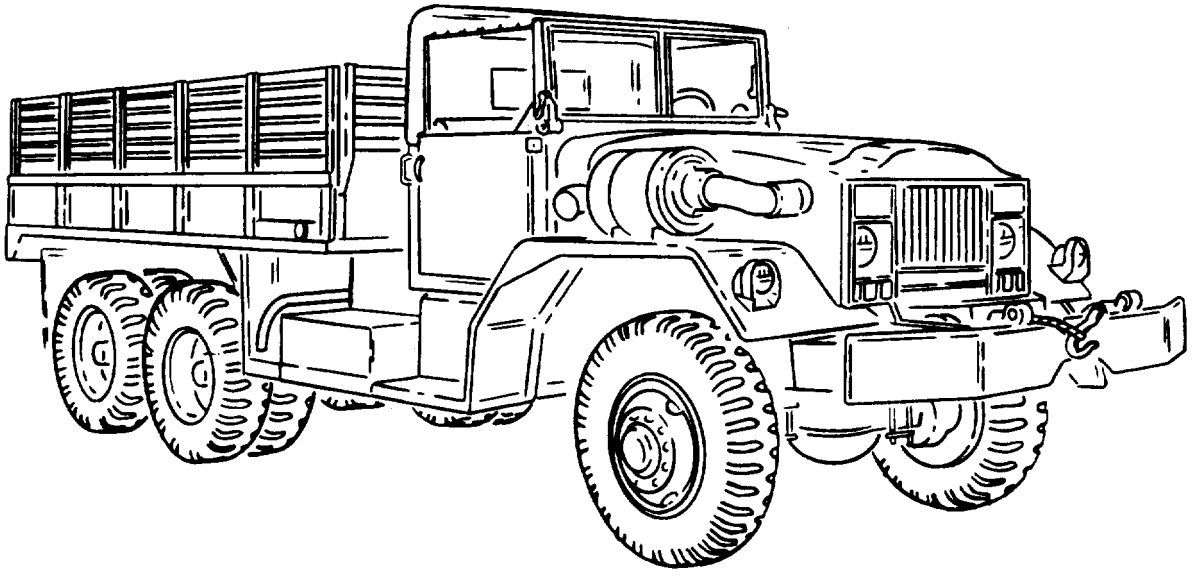

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Figure 1-1. Typical 5-Ton, 6x6, Cargo Truck (M54A2, M54A2C).

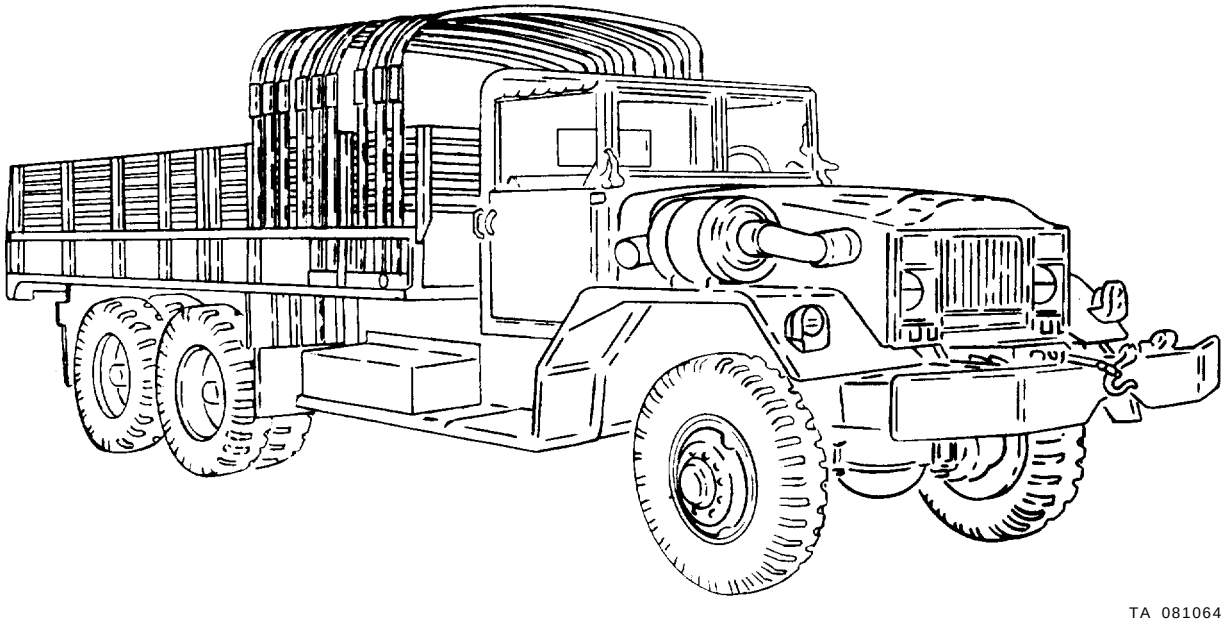

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Figure 1-2. Typical 5-Ton, 6x6, Cargo Truck (M55A2) .

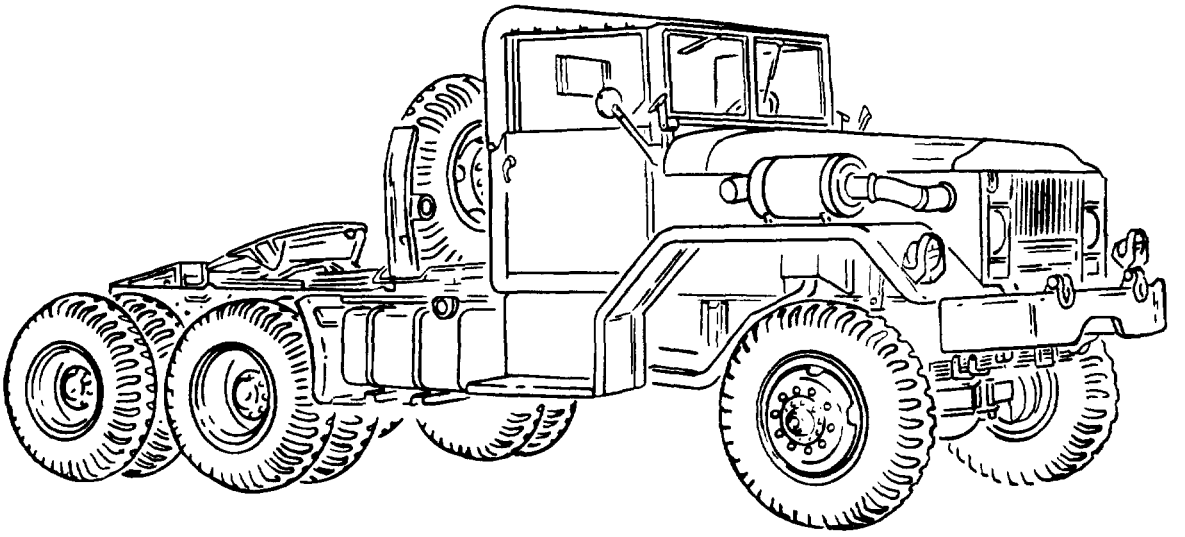

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Figure 1-3. Typical 5-Ton, 6x6, Tractor Truck (M52A2).

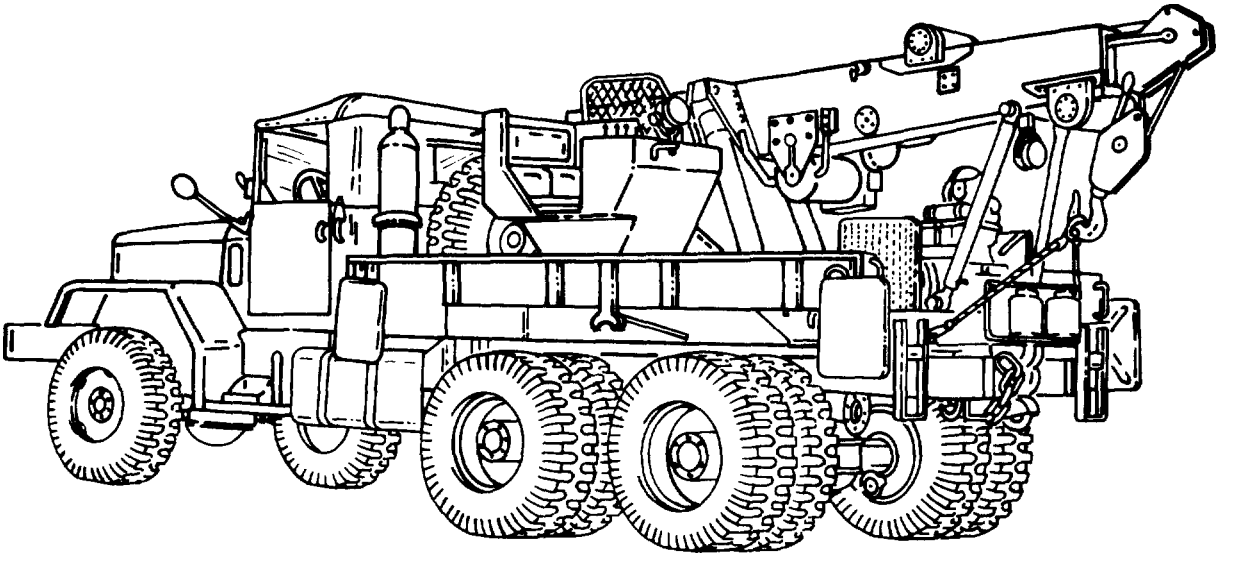

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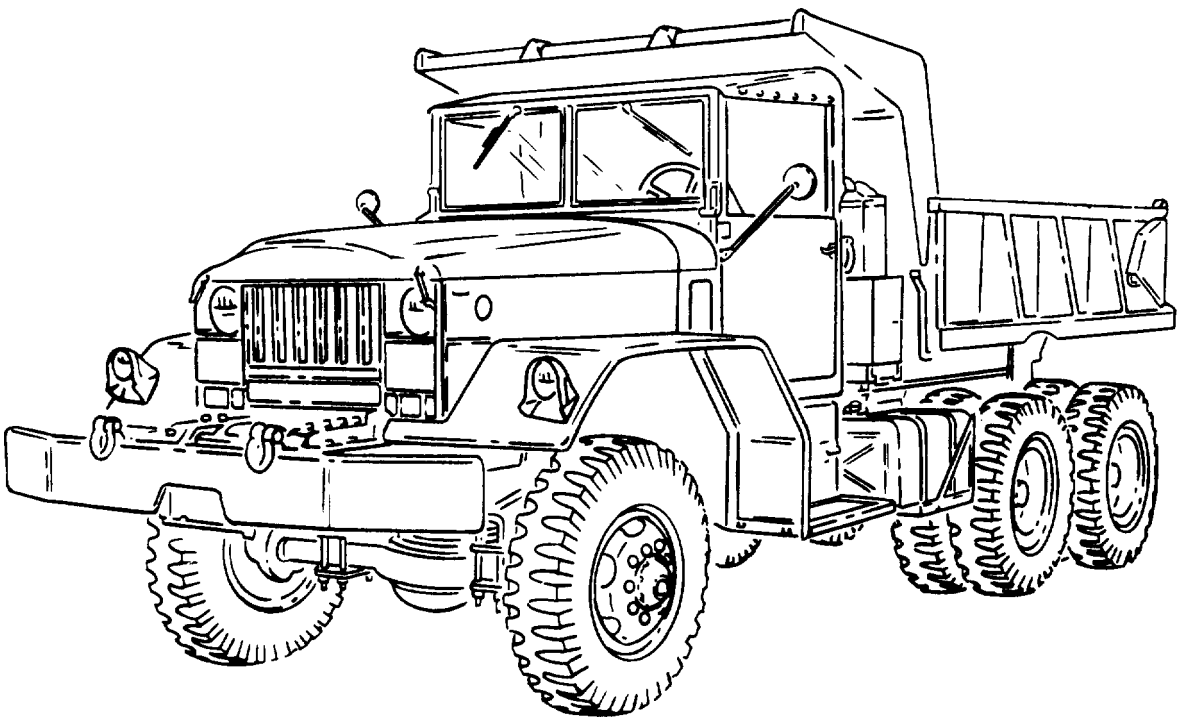
Figure 1-4. Typical 5-Ton, 6x6, Medium Wrecker Truck (M543A2).



TA 081044

Figure 1-5. Typical 5-Ton, 6x6, Dump Truck (M51A2) .

CHAPTER 2

DESCRIPTION AND DATA

Section 1. FUNCTIONAL DESCRIPTION

2-1. GENERAL. The 5-ton, 6x6, M39 series trucks are tactical trucks, designed for use on all types of roads, highways, and cross-country terrain. They will ford hard bottom water crossings up to 30 inches deep without special fording equipment. Three basic wheelbase chassis are available for mounting various body types, (cargo, dump, medium wrecker and tractor) . The following paragraphs are provided to give the operator an overall understanding of the equipment and its main functions. The descriptive text is keyed to an overall equipment block diagram , which shows each functional group of the equipment as a block. Arrows are used to show the flow of power to and from each functional block on the diagram.

WARNING

This vehicle has been designed to operate safely and efficiently within the limits specified in this TM. Operation beyond these limits is prohibited IAW AR 70-1 without written approval from the Commander, U.S. Army Tank-Automotive Command, ATTN: AMSTA-CM-S, Warren, MI 48397-5000.

2-2. OVERALL EQUIPMENT FUNCTIONAL DESCRIPTION. (See Fig. 2-1.)

a. Engine The engine supplies power to move the truck and operate equipment

b. Clutch . The clutch by means of mechanical linkage, joins power produced by the engine, to the transmission. The clutch also separates power from the transmission when not needed, or while shifting transmission gears.

c. Electrical System. The 24 volt electrical system supplies electrical current to start the engine, operate lights, equipment and accessories, and to charge the batteries.

d. Fuel System. The fuel system stores fuel in the tanks, delivers fuel to the engine, as required, and returns excess fuel to the tanks.

e. Cooling Svstem. The cooling system removes excess heat produced while the engine is running, and keeps the engine at normal operating temperature. The cooling system also supplies heat to warm the cab or personnel compartment, when required.

f. Exhaust System. The exhaust system collects and removes exhaust gases produced when the engine is operating.

. Transmission System. The transmission system gives the operator a choice of five forward gear combinations (speeds) , reverse, and neutral position for best operation of the truck at all speeds and conditions.

h. Transfer System. The transfer system sends power from the transmission to the propeller shafts to drive the front and rear wheels. The system gives an additional gear combination (speed) for each transmission speed.

i. Transmission Power Takeoff System. This system sends power to the propeller shafts to operate auxiliary equipment.

j. Transfer Power Takeoff System. This system sends power from the transfer unit to the propeller shafts to operate auxiliary equipment and accessories.

k. Propeller Shafts. Propeller shafts are used to send power from the transmission to the transfer system and from the transfer system to the axles. Propeller shafts also send power from the power takeoff assemblies to auxiliary equip-merit and accessories.

1. Steering System. When the operator turns the steering wheel, the steering system sends this action to the front wheels. This system controls the direction of the truck while in motion.

m. Compressed Air System. The compressed air system provides air for service use and also for a power assist to the hydraulic brake system.

n. Brakes System, When the operator steps on service brake pedal, the brakes system slows down or stops the truck. A handbrake, when set to up position by the operator, is used for parking the truck.

o. Axles, Wheels, and Hubs. The axles support the weight of the truck and sends power to the hubs and wheels.

p. Auxiliary Equipment and Accessories. These components do required tasks, such as pulling, lifting, heating, and towing.

Section II. PHYSICAL DESCRIPTION

2-3. GENERAL. The following paragraphs describe systems, units and components of the various trucks. The diagrams show the location of these items on the vehicle.

2-4. OVERALL EQUIPMENT PHYSICAL DESCRIPTION .

a. Engine. M39 series trucks are equipped with US Army LDS 465-1 and LDS 465-1A six-cylinder, in-line, liquid-cooled, multifuel engines. The multifuel engine (fig. 2-2 and 2-3) uses the fuel injection compression-ignition principle which permits the use of various grades of fuel. Refer to table 2-6 for fuel grades to be used.

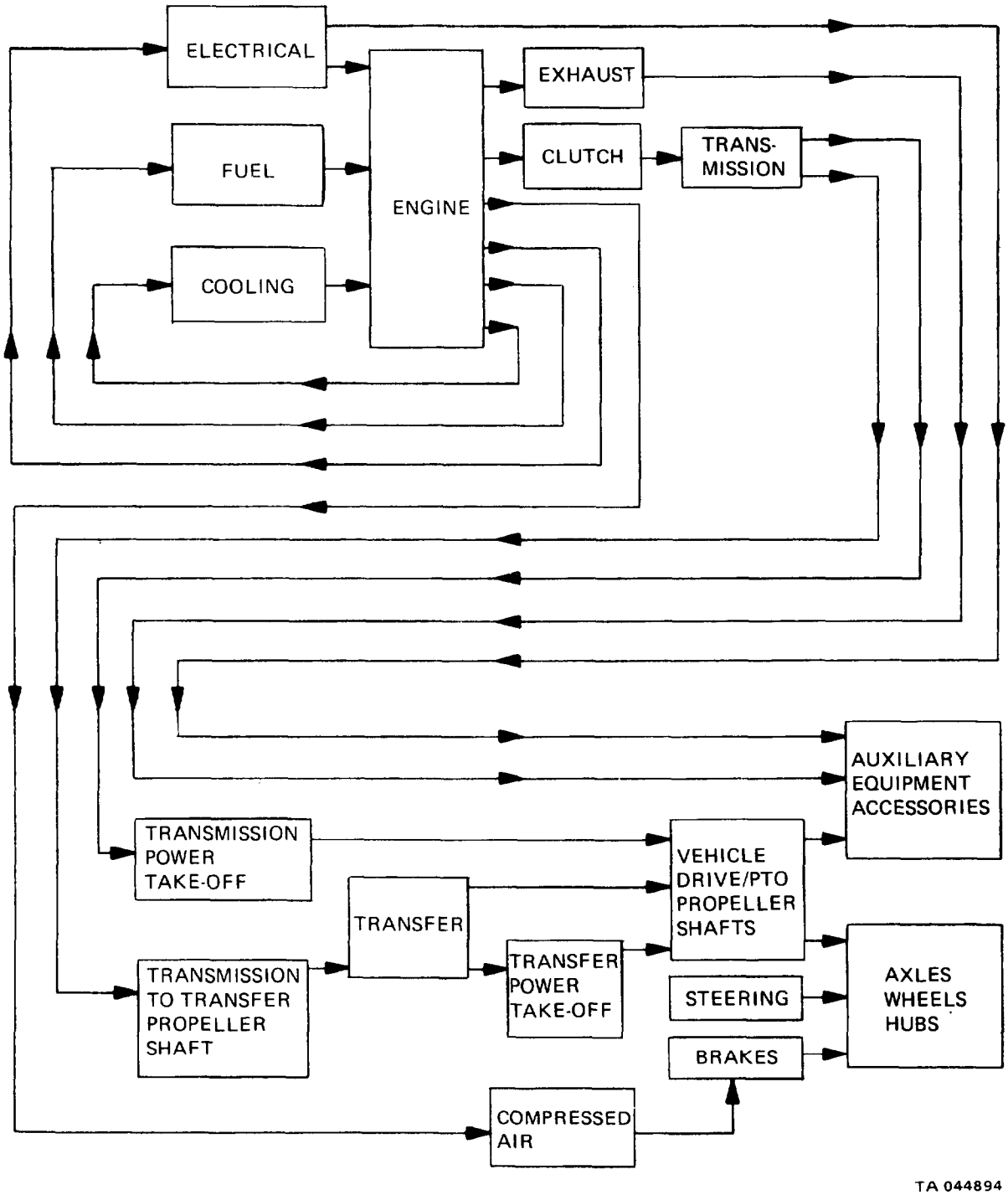
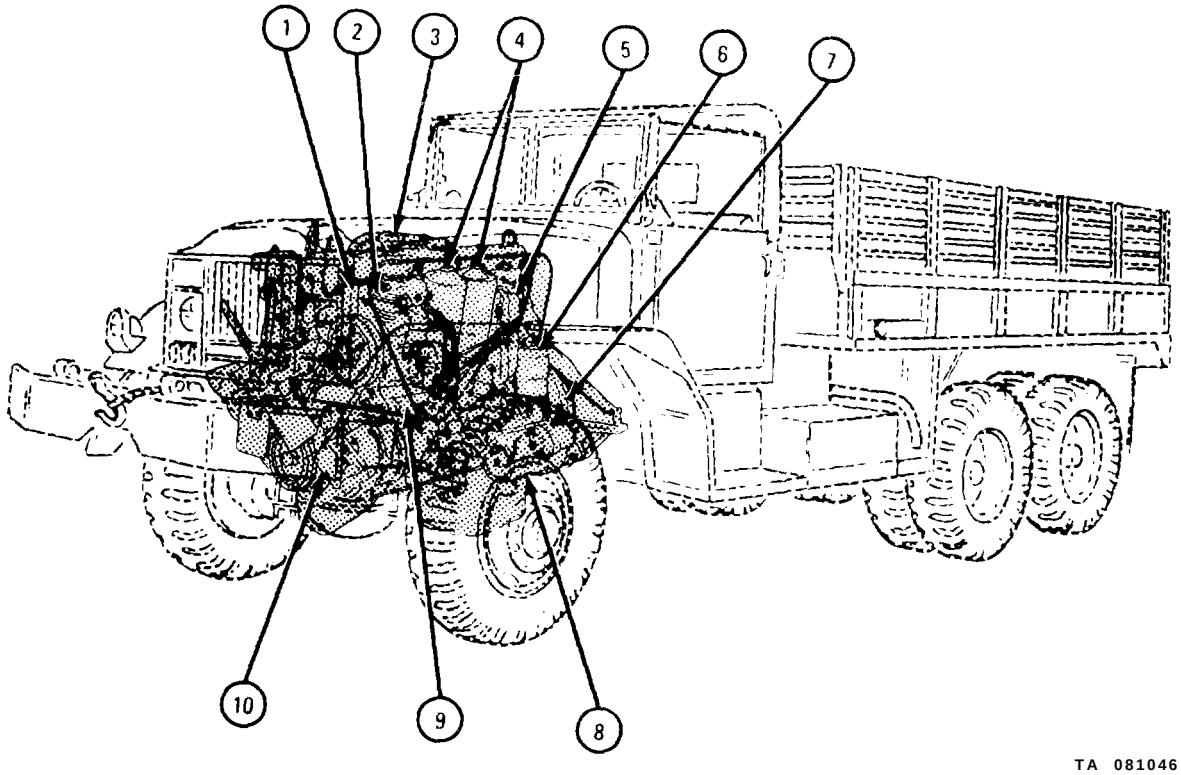
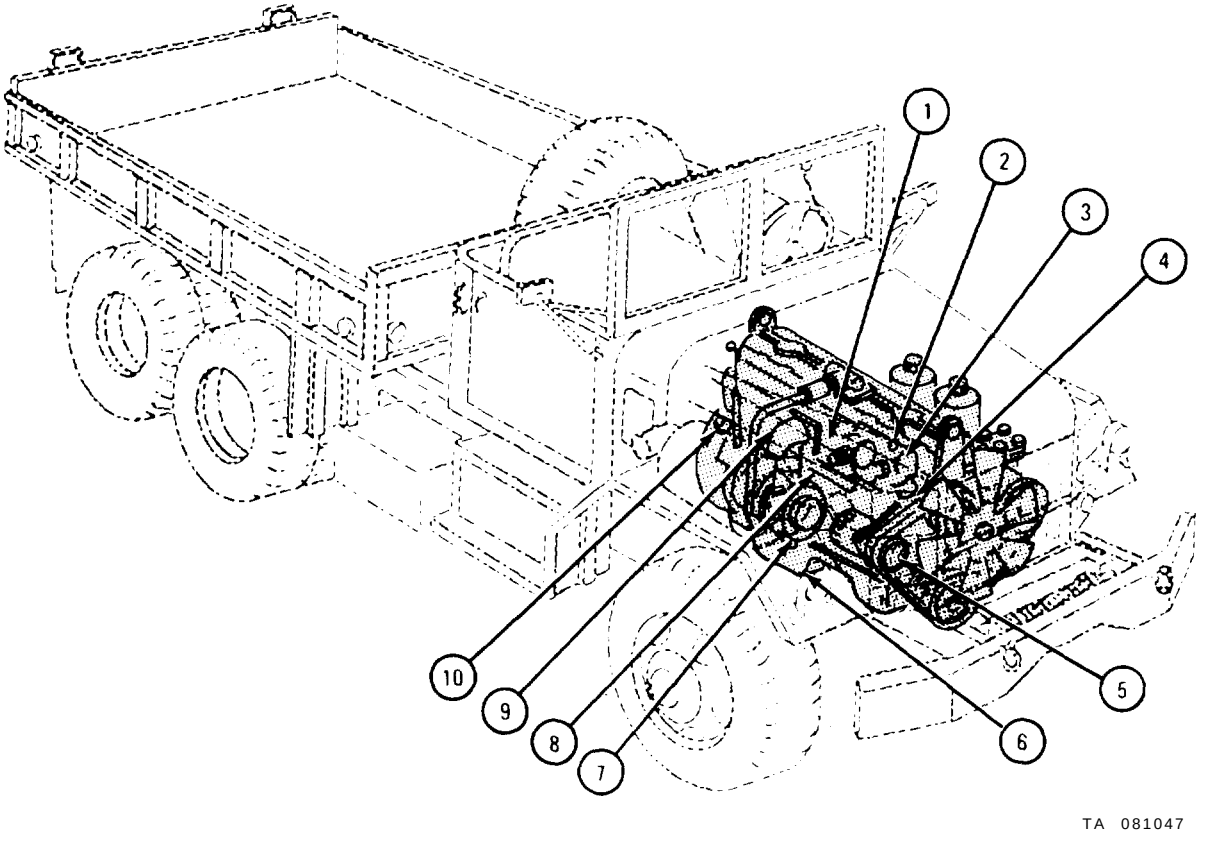


Figure 2-1. Overall Equipment Block Diagram.



1. Cylinder head
2. Air compressor
3. Oil filler cap
4. Oil filter
5. Oil cooler
6. Fuel filter
7. Flywheel housing
8. Starter
9. Crankcase
10. Hydraulic pump (steering system)

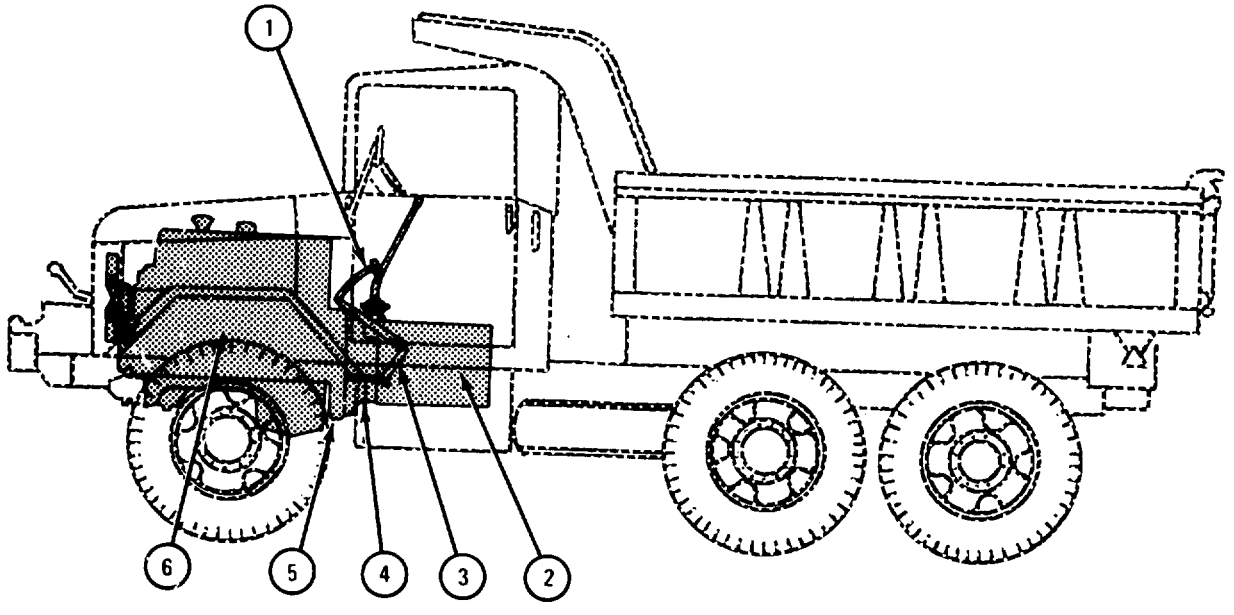
Figure 2-2. Engine Components Location (Left Side).



1. Intake manifold
2. Water temperature sending unit
3, Thermostat housing
4. Water pump
5. Generator
6. Oil pan
7. Turbocharger
8. Exhaust manifold
9, Manifold heater
10. Oil pressure sending unit

Figure 2-3. Engine Components Location (Right Side) .

b . Clutch. The clutch (fig. 2-4) is a single plate, dry disk type. The purpose of the clutch is to separate the engine from the transmission when shifting gears. The disk of the clutch is joined to the engine flywheel. A pressure plate is joined to the input shaft of the transmission. When the clutch pedal is up, the pressure plate is forced against the disk on the flywheel and turns with the flywheel. Pushing the clutch pedal down separates the transmission by separating the pressure plate from the disk. When the transmission is separated from the engine, the transmission gears can be shifted.

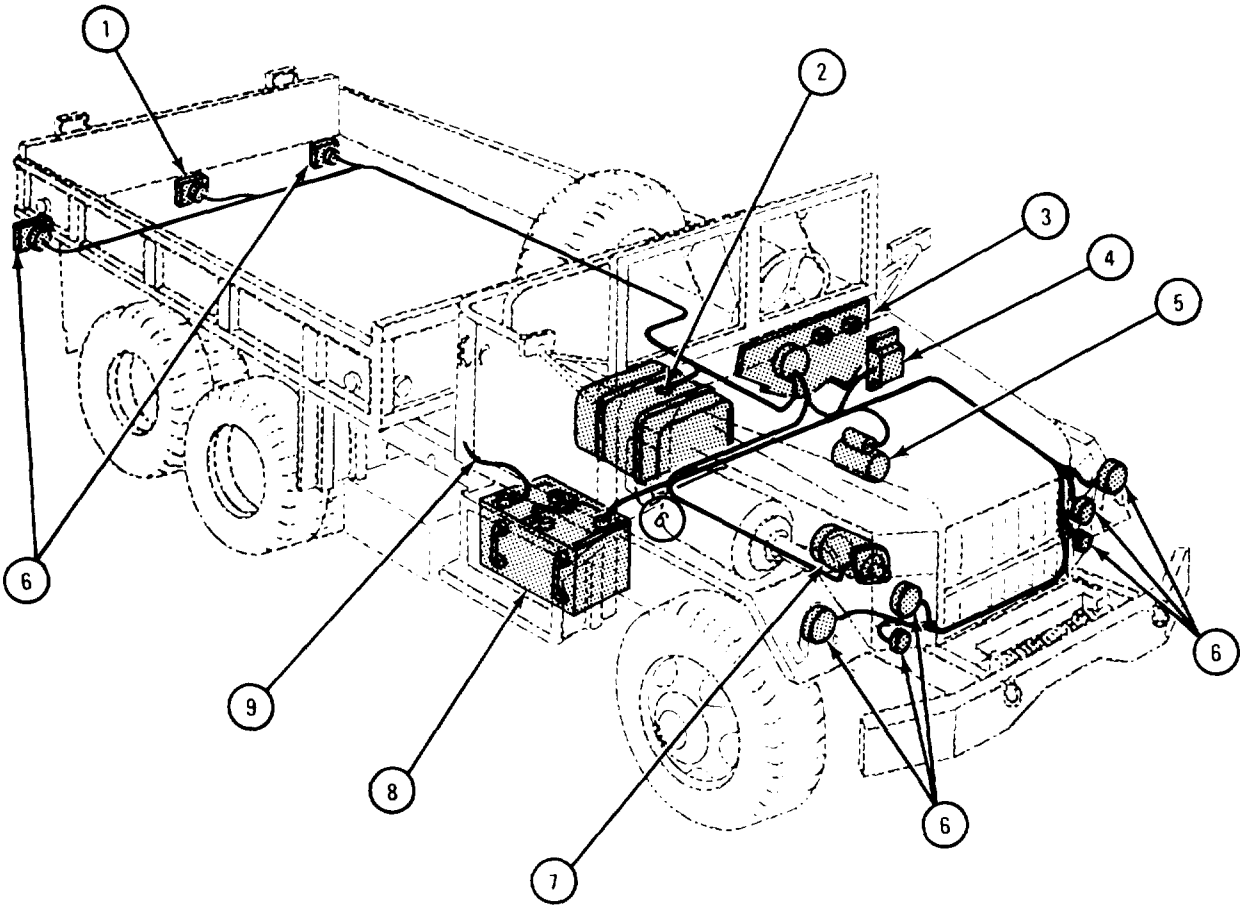


TA 081048

1. Clutch pedal
2. Transmission
3. Clutch linkage
4. Clutch
5. Flywheel housing
6. Engine

Figure 2-4. Clutch Components Location.

c. Electrical System. The electrical system (fig. 2-5) is a 24-volt dc negative ground system. Two 12-volt storage batteries are connected in series to provide 24 volts. The engine starter motor operates directly from the 24-volt source. The system uses a belt-driven, 24-volt generator. A battery generator indicator is found on the instrument panel. Wiring harnesses are used to carry current to operate equipment and accessories. Circuit breakers are included to protect circuits from overload.

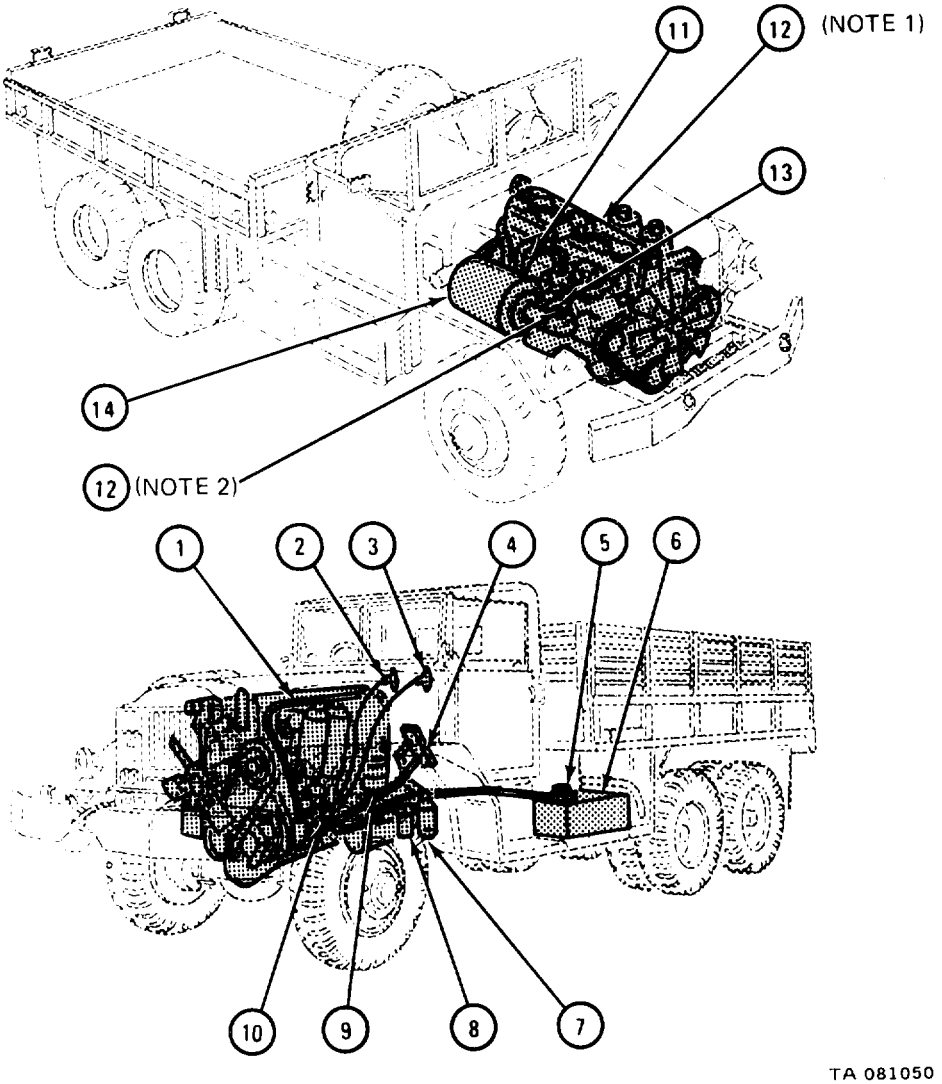


TA 081049

1. Trailer electrical coupling
2. Fuel level sending unit
3. Driver's cent rols and indicators
4. Regulator
5. Starter motor
6. Lights
7. Generator
8. Batteries
9. Battery ground strap

Figure 2-5. Electrical System Components Location.

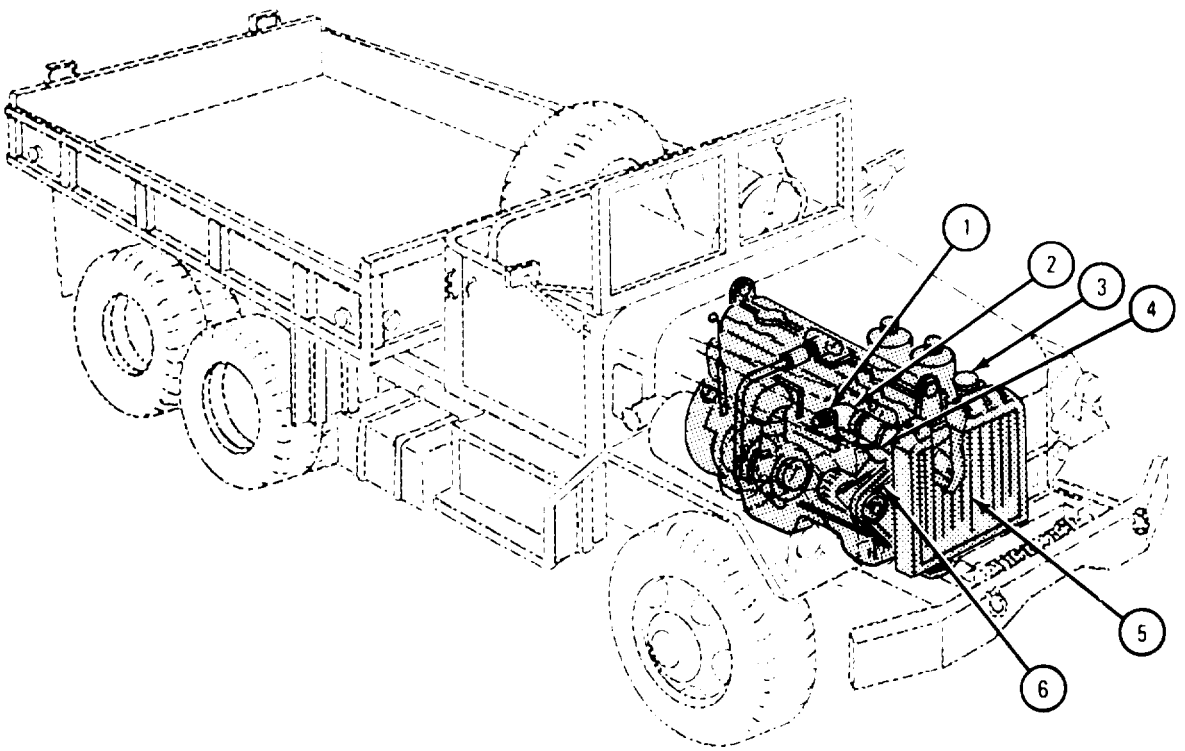
d. Fuel and Air Intake System. The fuel and air intake system (fig. 2-6) includes an intake manifold flame heater, air cleaner, fuel tanks, fuel supply pump, primary, secondary, and final fuel filters, injection pump, nozzle, fuel lines and fittings, accelerator pedal and linkage, engine stop, and hand throttle.



1. Fuel injector nozzles and holder
2. Engine stop control
3. Hand throttle
4. Accelerator pedal and linkage
5. Fuel supply pump
6. Fuel tank
7. Secondary fuel filter
8. Primary fuel filter
9. Final fuel filter
10. Injection pump
11. Intake manifold flame heater
12. Flame heater pump
    (Note 1: On late model trucks)
    (Note 2: On early model trucks)
13. Turbosupercharger
14. Air cleaner

Figure 2-6. Fuel and Air Intake System Components Location.

e. Cooling System. The cooling system (fig. 2-7) is a sealed-type system made up of the radiator, fan, drive belts, thermostat, water pump, temperature gage, and pressure filler cap.

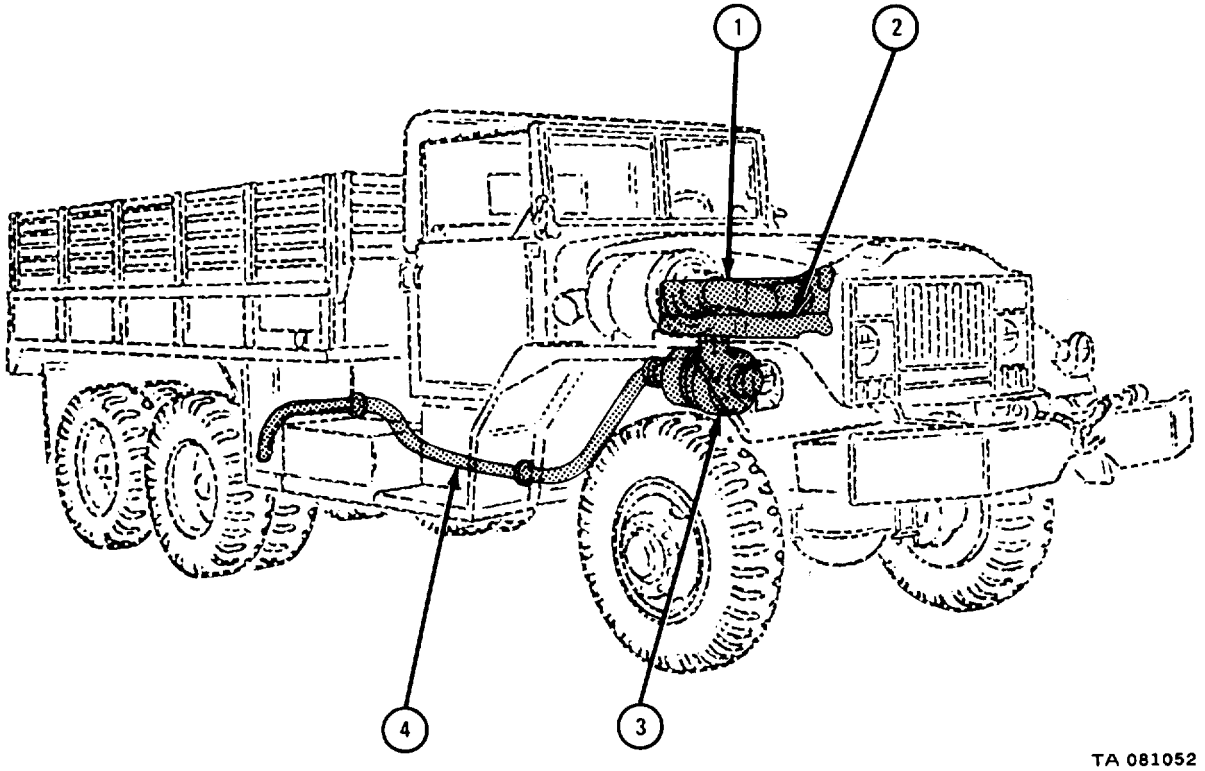


1. Water temperature sending unit
2. Thermostat housing
3. Pressure filler cap
4. Water pump drive belts
5. Radiator /shroud
6. Fan and drive belts

Figure 2-7. Cooling System Components Location.

f. Exhaust System. The exhaust gases of the engine pass from the exhaust manifold into the turbo- supercharger. The pressurized gases drive the turbo-charger and then pass into the exhaust pipe assembly.

(1) Horizontal exhaust system. The horizontal exhaust system (fig. 2-8) consists of three sections and extends back along the right side of the truck to the outlet located in front of the right rear tandem wheels.



1. Air intake manifold
2. Exhaust manifold
3. Turbosupercharger
4. Exhaust piping

Figure 2-8. Horizontal Exhaust System Components Location.