

Supersedes copy dated 4
October 1982. See page i
for details.

TECHNICAL MANUAL UNIT MAINTENANCE MANUAL

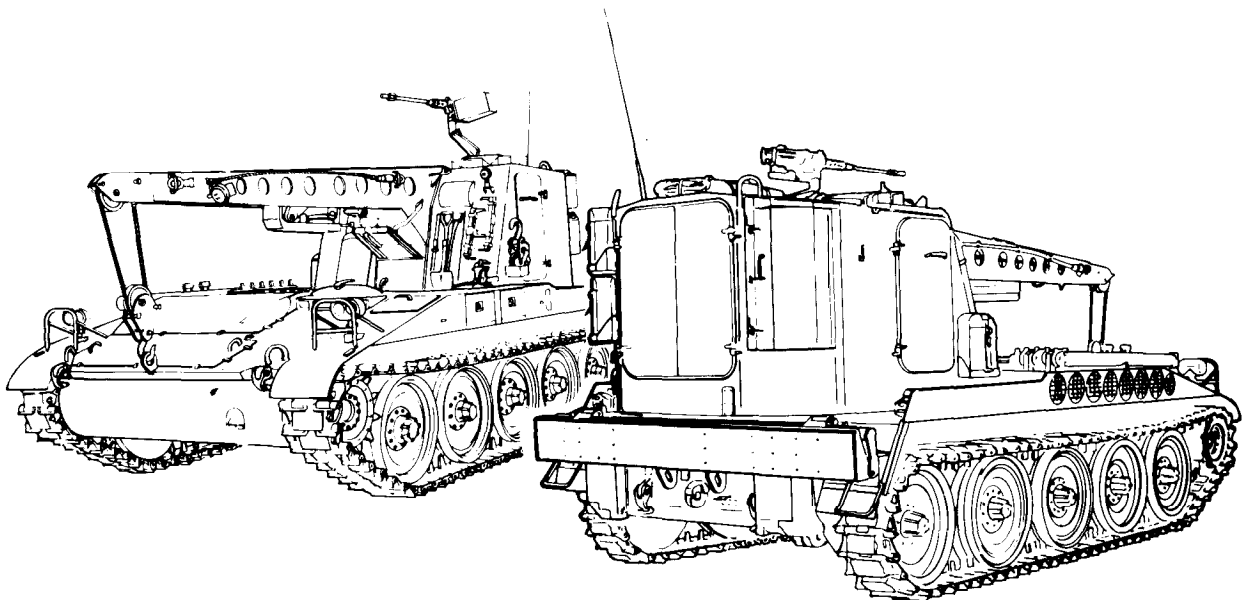
CRANE (CAB) COMPONENTS
RECOVERY VEHICLE,
FULL-TRACKED: LIGHT,
ARMORED, M578
(2350-00-439-6242) (EIC:3LA)

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TECHNICAL MANUAL

No. 9-2350-238-20-2

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D. C., 5 March 1992

UNIT MAINTENANCE MANUAL

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RECOVERY VEHICLE,
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REPORTING 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 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, U.S. Army Armament, Munitions and Chemical Command, ATTN: AMSMC-MAS, Rock Island, IL 61299-6000. A reply will be furnished to you.

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*This manual supersedes crane (cab) components portions of TM 9-2350-238-20, 4 October 1982, including all changes.

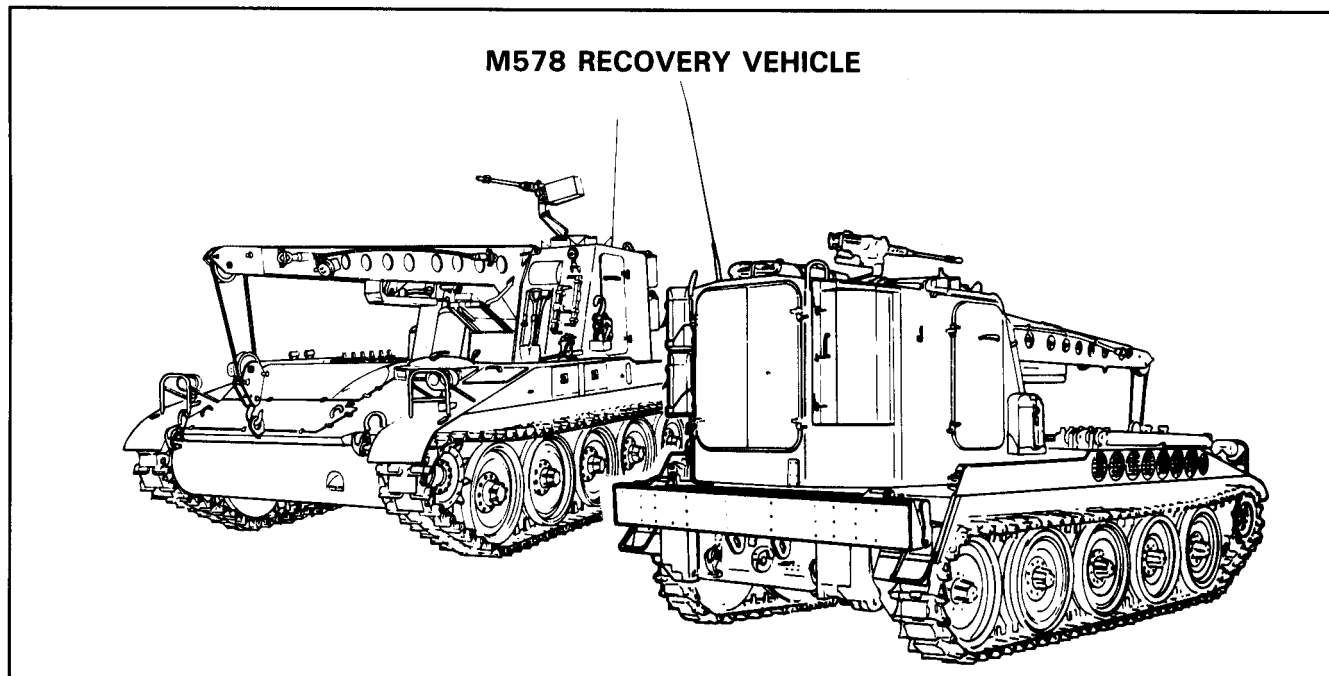
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HOW TO USE THIS MANUAL

This manual (TM 9-2350-238-20-2) contains unit level maintenance procedures for the crane (cab) components of the M578 Recovery Vehicle. This manual is to be used in conjunction with TM 9-2350-238-10 and TM 9-2350-238-24P-2. Chapter 1 contains general information; equipment description and data; and principles of operation. Chapter 2 contains information concerning repair parts, special tools, TMDE, and support equipment; and unit level troubleshooting and maintenance procedures.

Be sure to read and understand maintenance instructions before beginning any maintenance task. Also, read and understand information in chapter 1 and general maintenance procedures on page 2-75 before beginning any maintenance task.



CHAPTER 1

INTRODUCTION

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Section I. GENERAL INFORMATION

1-1. SCOPE.

a. *Type of Manual.* Unit level maintenance.

b. *Model Number and Equipment Name.* M578, light armored, full-tracked recovery vehicle.

c. *Purpose of Equipment.* The vehicle is provided with a boom, winches, and equipment to perform its recovery mission. Special purpose kits are provided to aid recovery operations in cold climates.

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.

a. *Tactical Situations.* Situations may arise in which it is necessary to abandon equipment in the combat zone. All abandoned

equipment must be destroyed to prevent its use by the enemy. The destruction of equipment subject to capture or abandonment in the combat zone will be undertaken only upon authority delegated by a division or higher commander.

b. *Plans.*

(1) Plans for destruction of equipment must be adequate, uniform, and easily carried out in the field.

(2) Destruction must be as complete as the available time, equipment, and personnel will permit. Since complete destruction requires considerable time, priorities must be established so the more essential parts are destroyed first.

(3) The same essential parts must be destroyed on all like units to prevent the enemy from constructing a complete unit from undamaged parts.

1-3. DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE (CONT).

(4) Spare parts and accessories must be given the same priority as parts installed on the equipment.

c. Methods. To destroy equipment adequately and uniformly, all personnel of the unit must know the plan and priority of destruction and be trained in the methods of destruction.

d. References. Read TM 750-244-6 for information on destruction of mechanical equipment. Read TM 750-244-5-1 for information on destruction of ammunition.

1-4. PREPARATION FOR STORAGE OR SHIPMENT. Administrative storage is restricted to 90 days and must not be extended. Refer to page 2-351 for detailed instructions on administrative storage.

1-5. OFFICIAL NOMENCLATURE, NAMES, AND DESIGNATIONS.

Nomenclature Cross-Reference List.

<i>Common Name</i>	<i>Official Nomenclature</i>
Cab door catch spring	Cab left door flat catch spring
Cab door catch spring	Cab right door flat catch spring
Ground Wire	Ground cable assembly
Rigger's cupola	Commander's cupola
Strap	Marker band

1-6. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR).

If your M578 Recovery Vehicle 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 Form 368 (Product Quality Deficiency Report). Mail it to us at Commander, U.S. Army Armament, Munitions and Chemical Command, ATTN: AMSMC-QAD, Rock Island, IL 61299-6000. We will send you a reply.

1-7. CORROSION PREVENTION AND CONTROL (CPC).

a. Corrosion Prevention and Control (CPC) of Army materiel is a continuing concern. It is important that any corrosion problems with this item be reported so that the problem can be corrected and improvements can be made to prevent the problem in the future.

b. While corrosion is typically associated with rusting of metals, it can also include deterioration of other materials such as rubber and plastic. Unusual cracking, softening, swelling, or breaking of these materials may be a corrosion problem.

c. If a corrosion problem is identified, it can be reported using SF Form 368, Product Quality Deficiency Report. Use of key words such as "corrosion," "rust," "deterioration," or "cracking" will assure that the information is identified as a CPC problem.

d. The form should be submitted to: Commander, U.S. Army Armament, Munitions and Chemical Command, ATTN: AMSMC-QAS/ Customer Feedback Center, Rock Island, IL 61299-6000.

Section II. EQUIPMENT DESCRIPTION AND DATA

1-8. EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES.

a. Purpose. The M578 Recovery Vehicle is used to pick up or tow disabled mechanized equipment, as a crane at repair base, and as a carrying platform for spare parts and maintenance personnel.

b. Capabilities and Features.

CAUTION

Do not ford water which exceeds 42 in. (106.7 cm) in depth. Check for soft mud or sandy bottoms.

(1) The M578 Recovery Vehicle is a light, full-tracked, self-propelled, diesel-powered vehicle with a 30,000 lb (13,620 kg) boom winch and a 60,000 lb (27,240 kg)

tow winch mounted in an armored cab. It is highly mobile and maneuverable and may be air transported. The vehicle is capable of long-range, high-speed operation on improved roads. It can also traverse rough terrain, muddy or marshy ground, snow or ice, and can ford streams of a depth of 42 in. (106.7 cm).

(2) A suspension lockout system and a spade assembly provide a stable platform and increase lifting and winching capabilities of the vehicle. Suspension lockout system, boom, winches, cab, and spade are hydraulically powered.

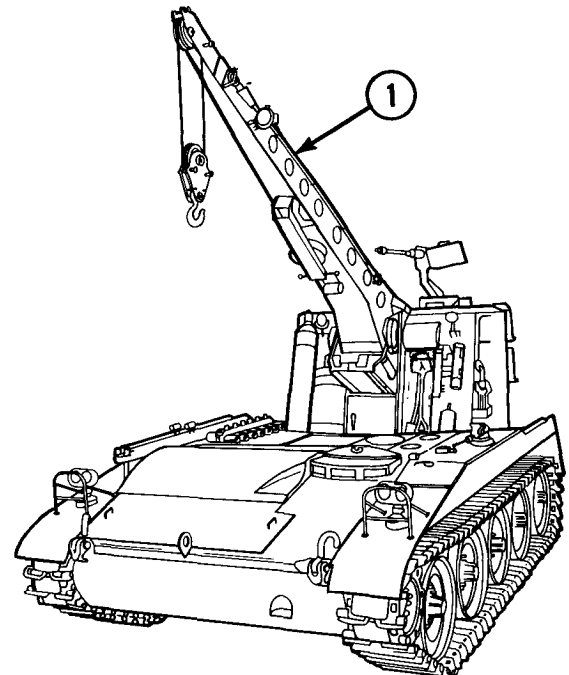
(3) A machine gun mount support is installed on the rigger/gunner cupola to accommodate a Browning M2 .50 caliber machine gun.

1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS. Refer to TM 9-2350-238-10 for location and description of major components not listed below.

a. Boom and Winches (1). The boom and winch assembly includes a boom, boom winch, and tow winch.

(1) The boom is a tapered box-like steel structure pivot mounted at one end to the cab. The outer end of the boom houses a pulley over which the boom winch wire rope travels. Two hydraulic cylinders are attached to the lower edge of the base of the boom. When the hydraulic cylinders are extended the boom is raised. When the cylinders are retracted the boom is lowered.

M578 VEHICLE-LEFT-FRONT VIEW



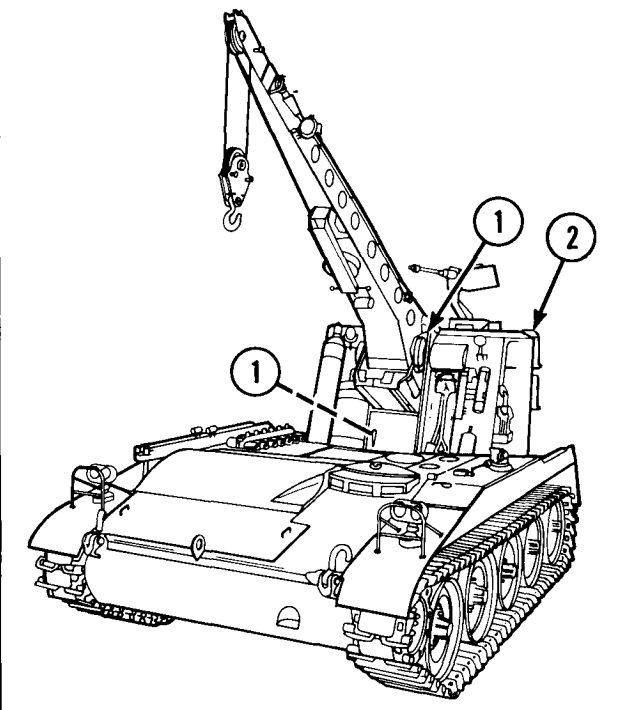
1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (CONT).

(2) The boom winch is mounted on the forward wall of the cab at the base of the boom. A two-way hydraulic motor powers the boom winch. The capacity of the boom winch is 30,000 lb (13,620 kg) with 0.625 in. (1.588 cm) diameter wire cable.

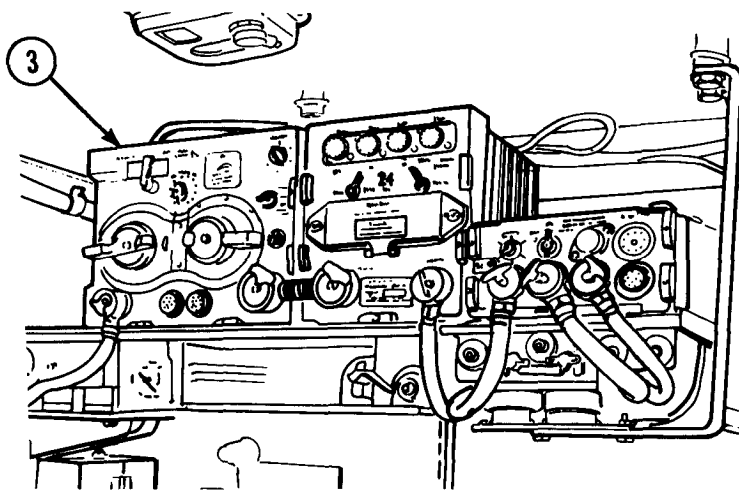
(3) The tow winch is mounted to the forward deck of the cab under the boom winch. The capacity of the tow winch is 60,000 lb (27,240 kg) with 1.00 in. (2.54 cm) diameter wire cable.

b. *Cab (2).* The cab is made of high-tensile steel plates welded into a box-like structure. It supports the boom, boom winch, tow winch, controls, and many of the hydraulic system components and reservoir. The cab can be traversed a full 360 degrees.

M578 VEHICLE-LEFT-FRONT VIEW

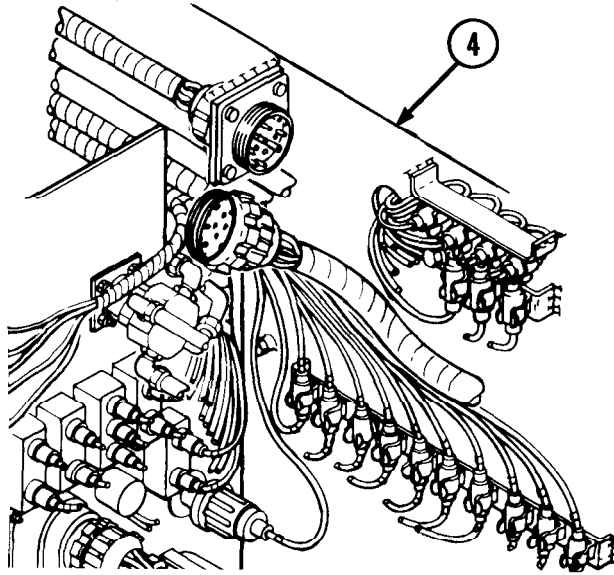


M578 VEHICLE-COMMUNICATIONS EQUIPMENT



c. *Communications Equipment (3).* The communications equipment installed on the recovery vehicle consists of radio set, amplifier, power supply, intercommunication set, and antenna. For information on communica-

tion equipment, refer to TM 9-2350-238-10, TM 11-291, TM 11-5820-401-10-1, TM 11-5820-401-10-2, TM 11-5820-401-20-1, and TM 11-5820-401-20-2.

M578 VEHICLE-ELECTRICAL COMPONENTS

d. Electrical System (4). The electrical system includes batteries, master relay, generator, voltage regulator, starter and solenoid, neutral position switch and starter control relay, instrument and switch panels, circuit breakers, vehicle lighting, warning switches and transmitters, and wiring harnesses and leads. Electrical power is provided by a 24-volt, 300-ampere generator and four series-parallel-connected, 12-volt storage batteries. Output of the generator is controlled by a solid state voltage regulator. Electrical components are controlled by switches located in the driver's compartment. Leads and wiring harnesses distribute current to all electrical components. A slave receptacle allows connection of the vehicle electrical system to another power source.

(1) Four 12-volt batteries are connected in series-parallel to produce 24 volts, and to provide electrical power to start and operate the vehicle.

(2) The batteries transmit power through contacts in the master relay. When the master switch is on, the master relay is energized and power is available to all circuits in the vehicle.

(3) The 300-ampere, 24-volt dc generator operates whenever the engine is running. It provides electrical power to re-charge the batteries and operate the vehicle.

(4) The voltage regulator controls the output voltage and current of the generator. It is a solid state unit and is not adjustable. Circuit breakers protect the generator from electrical overload.

(5) The starter is a direct cranking, non-reversible, 24-volt unit. It is actuated by a two-coil starter motor solenoid mounted on the starter.

(6) The neutral position switch closes when the transmission shift lever is in neutral position. This completes the circuit for the starter control relay to supply battery power to the two starter windings when the start switch is pressed.

1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (CONT).

(7) The instrument and switch panels contain the switches, indicator lights, and gages required for operation of the vehicle. Refer to TM 9-2350-238-10 for description of the separate items on each panel.

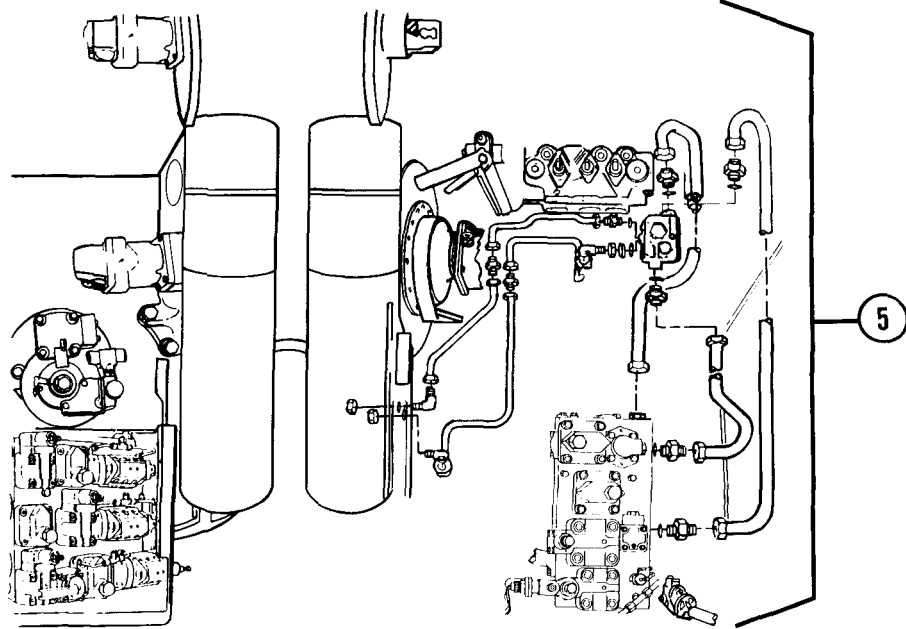
(8) Thermal break, automatic reset, 15-ampere and 20-ampere circuit breakers protect the vehicle components and circuits.

(9) The service headlamps are set for high or low beam by the dimmer switch. The two headlamps are combination units. Each headlamp consists of an incandescent driving lamp, blackout driving lamp, and blackout marker lamp. The taillights are combination units. The right taillight consists of a blackout stoplight and marker light. The left taillight consists of a service taillight, service stoplight, and blackout marker light. The dome lights are a standard combination blackout and service light. The flasher assembly turns the flasher signal headlight on and off repeatedly when the FLASHER SIGNAL switch is in the ON position. Operation of the flasher signal headlight is indicated by the indicator lamp in the cab. The two floodlights are controlled by the FLOODLIGHTS switch in the cab.

(10) When the brake foot pedal is depressed, the brake warning sensitive switch roller guide is released, causing the switch contacts to close. Closing the switch contacts causes the service stoplight or blackout stoplight to light. The engine low oil pressure

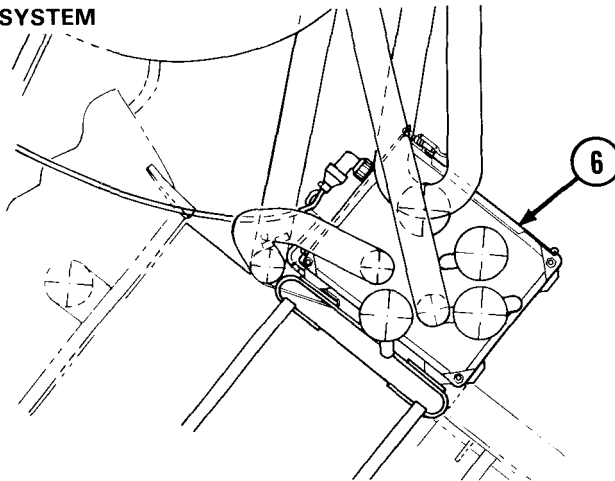
warning switch opens at 9 to 13 psi (62 to 90 kPa) on increasing pressure. When the switch is closed, a circuit is completed to light the warning light and cause the warning horn to sound. The engine oil pressure transmitter is a variable resistance unit. It gives a reading on the engine oil pressure indicator. The engine oil temperature warning switch closes at 300°F to 310°F (149°C to 155°C) on increasing temperature. When the switch is closed, a circuit is completed that causes the warning light to light and the warning horn to sound. The transmission oil temperature transmitter is a variable resistance unit. It gives a reading on the transmission oil temperature indicator. The transmission oil pressure transmitter is a variable resistance unit. It gives a reading on the transmission oil pressure indicator. The fuel level transmitter is a sparkproof, float-operated variable resistance unit. It gives a reading on the fuel level indicator.

(11) Vehicle components are connected with single wire leads or multiple lead wiring harnesses. All wiring is standard ordnance waterproof cable. Connections are made by waterproof, rubber, single wire quick-disconnect connectors, plug-receptacle, connectors, or solderless waterproof terminals. All leads are identified by a marker band attached to the wire and stamped with a circuit number. The socket and pin contacts of the connectors are identified by upper case letters of the alphabet, stamped on the connector insert.

M578 VEHICLE-HYDRAULIC COMPONENTS

e. *Hydraulic System (5).* The M 578 Recovery Vehicle has an open-center type hydraulic system. This means that the hydraulic fluid continuously circulates through the main hydraulic supply lines. When no hydraulic subsystem is being used, the hydraulic fluid pressure in the main supply lines is near zero. When a subsystem is used, hydraulic fluid

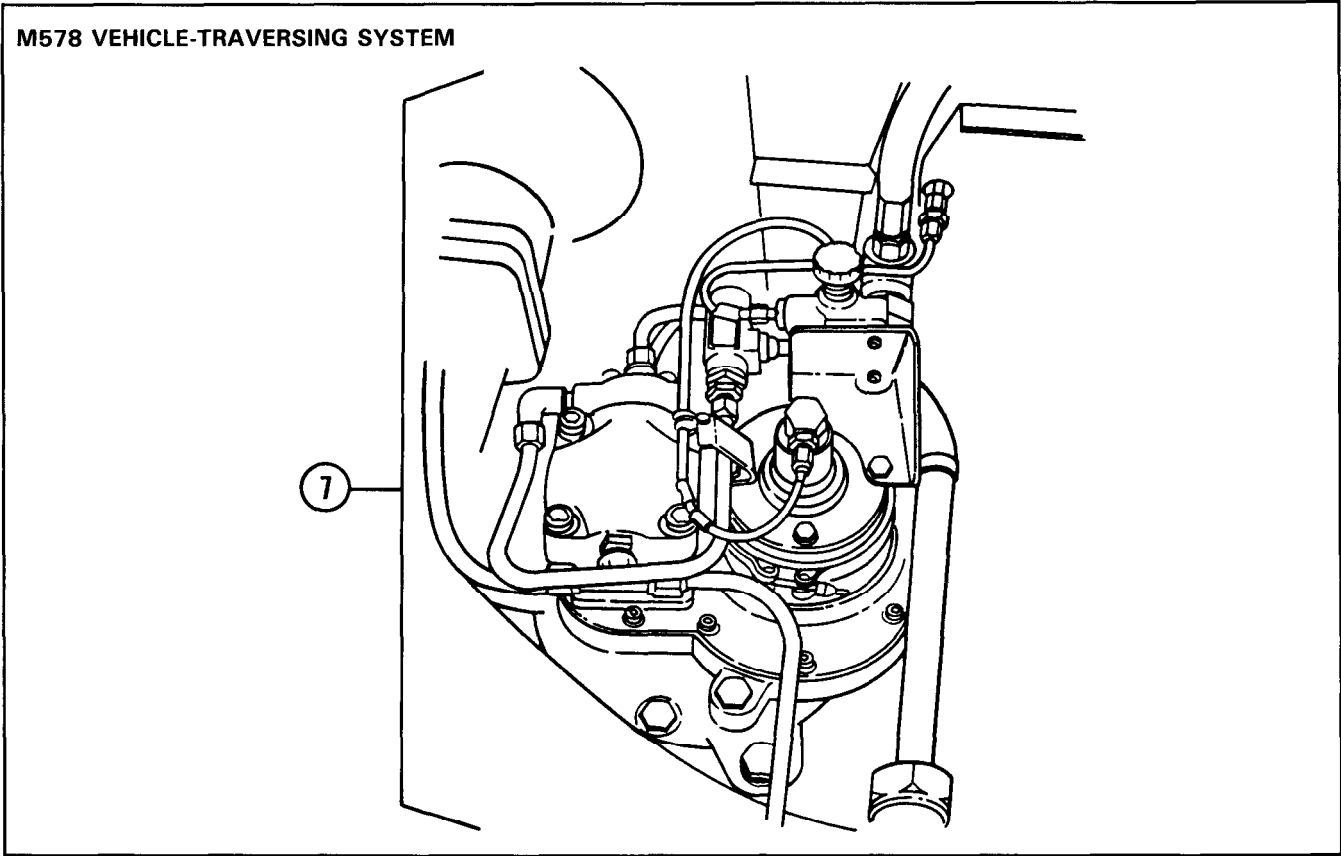
from the main supply lines is diverted through the subsystem. Hydraulic fluid pressure builds up within the subsystem to a level high enough for the subsystem to function. Preset pressure relief or pressure reducing valves protect the subsystem from too much pressure,

M578 VEHICLE-AIR PURIFIER SYSTEM

f. *Gas-particulate Filter (6).* The gas-particulate filter is used with face masks to protect crew members from toxic gases and dusty conditions. One filter is mounted in the

cab on the boom cylinder and a second filter is mounted on the floor board in the driver's compartment.

1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (CONT).



g. *Traversing System (7).* The traversing system consists of a two-way hydraulic motor, hydraulically released brake, and planetary gear drive unit. The direction and speed of traversing is controlled by the winch operator using a foot pedal. When operating the tow winch, the level wind traversing system automatically traverses the cab so that the wire rope winds evenly on the winch drum. The winch operator can override the level wind traversing system by using the foot pedal.

1-10. EQUIPMENT DATA. The following tabulated data is for guidance of unit maintenance. Refer to TM 9-2350-238-10 for information concerning the general characteristics and performance of the M578 recovery vehicle.

a. Crew.	
Number	2
b. Electrical System.	
(1) Circuit breakers	
(a) Type	Thermal-break automatic reset
(b) Rating (quantity)	.15A (10)
	20A (1)
	30A (1)
	60A (1)

- (2) Wiring
 - (a) Type Standard ordnance waterproof cabling
 - (b) Circuits Standard ordnance single wire, ground return

c. Hydraulic System.

- (1) System pressure 0 to 2000 psi (0 to 13,790 kPa)
- (2) 8 GPM pump
 - (a) Type Dual vane
 - (b) Output (1350 to 1450 rpm) 7.6 gpm at 2000 psi (28.8 l/min at 13,790 kPa)
- (3) 80 GPM pump (dual section)
 - (a) Type Dual vane
 - (b) Output (each section at 1350 to 1450 rpm)
 - 1 Maximum 52 gpm at 0 psi (197 l/min at 0 kPa)
 - 2 Minimum 42 gpm at 2000 psi (159 l/min at 13,790 kPa)
- (4) Spade cylinders
 - (a) Number 2
 - (b) Type Double-acting

d. Boom Winch.

- (1) Wire rope diameter 0.625 in. (1.588 cm)
- (2) Wire rope length 220 ft (67m)
- (3) Line pull 30,000 lb (13,620 kg)

e. Tow Winch.

- (1) Wire rope diameter 1.0 in. (2.5 cm)
- (2) Wire rope length 230 ft. (70m)
- (3) Line pull 60,000 lb(27,240 kg)

f. Cab.

- (1) Hydraulically operated
- (2) Traverses both clockwise and counterclockwise through 360°

Section III. PRINCIPLES OF OPERATION

1-11. GENERAL.

a. M578 Recovery Vehicle.

(1) The M578 Recovery Vehicle is a fully-tracked, self-propelled recovery vehicle with a 30,000 lb (13,620 kg) boom winch and a 60,000 lb (27,240 kg) tow winch mounted in an armored cab. The vehicle is

used to pick up or tow disabled mechanical equipment, such as a crane at repair bases, and as a carrying platform for spare parts and maintenance personnel. The vehicle is highly mobile and maneuverable and may be transported in a large cargo aircraft.