TECHNICAL MANUAL

BASIC HALF-TRACK VEHICLES (WHITE, AUTOCAR, AND DIAMOND T)

CHANGES No. 1

WAR DEPARTMENT
Washington 25, D. C., 8 May 1947

TM 9-710, 23 February 1944, is changed as follows:

1.1 Records (Added.)

a. GENERAL. Forms, records, and reports are designed to serve necessary and useful purposes. Responsibility for the proper execution of these forms rests upon commanding officers of all units operating and maintaining vehicles. It is emphasized, however, that forms, records, and reports are merely aids. They are not a substitute for thorough practical work, physical inspection, and active supervision.

b. AUTHORIZED FORMS. The forms, records, and reports generally applicable to units operating and maintaining these vehicles are listed below with brief explanations of each. No forms other than approved War Department forms will be used in operating and maintaining the vehicles. Pending availability of forms listed, old forms may be used. For a current and complete listing of all forms, see current FM 21-6 (List and Index of War Department Publications).

(1) *War Department Lubrication Order.* War Department Lubrication Order No. 9-710 prescribes lubrication maintenance for this vehicle. A lubrication order is issued with each vehicle and is to be carried with it at all times. Instructions contained therein are mandatory to all users of the equipment and supersede all conflicting lubrication instructions of prior date.

(2) *Standard Form 26 (Driver's Report—Accident—Motor Transportation).* One copy of this form will be kept with vehicle at all times. In case of an accident resulting in injury or property damage, it will be filled out by the driver on the spot or as promptly as practicable thereafter.

* These changes supersede OFSTB 710-1, 1 January 1942; OFSTB 710-22, 17 December 1943; TB ORD 164, 4 June 1942; TB ORD 172, 15 June 1943; TB 9-710-23, 10 January 1944; TB 9-710-24, 10 May 1944; TB 9-710-25, 16 May 1944; TB 9-710-26, 5 September 1944; TB 9-710-28, 22 September 1944; TB 9-710A-20, 27 May 1943, and TB 9-1711-5, 13 March 1944. These changes also supersede so much of TB ORD 12, 12 January 1944; TB ORD 20, 24 January 1944; TB ORD 23, 29 January 1944; TB ORD 28, 3 February 1944; TB ORD 44, 16 February 1944; TB ORD 107, 20 June 1944; TB ORD 126, 19 July 1944; TB ORD 130, 1 August 1944; TB ORD 149, 12 July 1943; TB ORD 155, 13 August 1943; TB ORD 156, 1 July 1943; TB ORD 166, 8 June 1943; TB ORD 161, 28 May 1943; and OFSTB 1700-30, 8 June 1943, as pertains to the matériel covered in this manual.

(3) *WD Form 30 (Report of Claims Officer)*. This form will be used by the claims officer in reporting his investigation of vehicle accidents.

(4) *WD Form 48 (Driver's Trip Ticket and Preventive Maintenance Service Record)*. This form, properly executed, will be furnished driver or operator when his vehicle is dispatched on nontactical missions. The driver and the official user of the vehicle will complete in detail appropriate parts of this form. This form need not be issued for vehicles in convoy or on tactical missions. The reverse side of this form contains the driver's daily and weekly preventive maintenance service schedule, the accomplishment of which is mandatory.

(5) *WD AGO Form 9–68 (Spot Check Inspection Report for Wheeled and Half-Track Vehicles)*. This form is provided as a record for use by commanders and their staff representatives conducting command inspections on this type of equipment.

(6) *WD AGO Form 9–71 (Locator and Inventory Control Card)*. Except when specified otherwise by the War Department, this form will be used as a bin tag, locator card, or inventory control card by all units authorized automotive spare parts.

(7) *WD AGO Form 9–73 (Data for Registration—Motor Vehicle)*. All vehicles will be registered in the War Department Motor Vehicle Central Records Office; Office, Chief of Ordnance, Washington 25, D. C., Attention ORDPQ. Registration will be made by accomplishing this form in accordance with AR 850–10.

(8) *WD AGO Form 9–74 (Motor Vehicle Operator's Permit)*. This form will be issued by commanders to all operators of vehicles who are qualified to operate the particular vehicles noted on the permit.

(9) *WD AGO Form 9–75 (Daily Dispatching Record of Motor Vehicles)*. This form will be used to keep a daily record of all vehicles dispatched.

(10) *WD AGO Form 9–76 (Request for Work Order)*. This form will be used for requesting repairs, alterations, or other type of work within or between organizations and departments.

(11) *WD AGO Form 9–77 (Job Order Register)*. This form will be used to keep a chronological record of work orders.

(12) *WD AGO Form 13–1 (Automotive Disability Report of Vehicles Disabled More Than 3 Days)*. This form will be accomplished and submitted as directed in current War Department instructions.

(13) *WD AGO Form 460 (Preventive Maintenance Roster)*. This form will be used for scheduling and maintaining a record of motor vehicle maintenance operations (weekly, monthly, quarterly, and semiannually).

(14) *WD AGO Form 461 (Work Sheet for Wheeled and Half-Track Vehicles—Preventive Maintenance Service and Technical Inspection)*. This form will be used for maintenance services and for all technical inspections performed on wheeled or half-track vehicles.

(15) *WD AGO Form 478 (Modification Work Order and Major Unit Assembly Replacement Record and Organizational Equipment File)*. This form will be kept in possession of second echelon personnel and will accompany vehicles upon transfer and evacuation to higher echelon. It will be a record of all modifications made and exchanges of major unit assemblies. Minor repairs, parts, and accessory replacements will not be recorded. In the field, where no filing facilities are available, this form will be kept in a filing jacket.

(16) *WD AGO Form 441 (Monthly Motor Vehicle Summary Report)*. This form will be used to furnish a monthly summary of accidents involving vehicles.

(17) *WD AGO Form 811 (Work Request and Job Order)*. This form will be used by organization maintenance units when requesting repair by a higher echelon repair unit.

3. Differences Among Models

* * * * * * *

c. PERSONNEL CARRIER M3 (FIGS. 5 AND 6). This vehicle has * * * of the vehicle. There is no gun rail or radio mast inside the body of this vehicle, but it has one pedestal, mounting a caliber .30 machine gun, located just behind the center seat of the driver's compartment (fig. **43**). A door is * * * the side seats. A top view may be seen by referring to figure **43**.

d. PERSONNEL CARRIER M3A1 (FIGS. 7, 8, AND 9). This vehicle is * * * the driver's compartment.

e. 81-MM MORTAR CARRIERS M4 AND M4A1 (FIG. **10**). These vehicles carry * * * of the body.

f. 75-MM GUN MOTOR CARRIAGE M3 AND M3A1. Rescinded.

g. 75-MM HOWITZER MOTOR CARRIAGE T30. Rescinded.

h. 105-MM HOWITZER MOTOR CARRIAGE T19. Rescinded.

i. MULTIPLE GUN MOTOR CARRIAGE M13. Rescinded.

j. **Combination** GUN MOTOR CARRIAGE M15A1. This vehicle has * * * position while traveling. **The cannon and two machine guns are mounted at a common level in this vehicle.** This vehicle carries a crew of seven men.

k. MULTIPLE GUN MOTOR CARRIAGE M16 (FIGS. 22 AND 23). This vehicle resembles * * * above changes incorporated. A top view may be seen by referring to figure **47**.

* * * * * * *

Figure 11, RA PD 313990, 75-mm Gun Motor Carriage M3 (Right Front), is rescinded.

Figure 12, RA PD 313991, 75-mm Gun Motor Carriage M3 (Left Front), is rescinded.

Figure 13, RA PD 313992, 75-mm Howitzer Motor Carriage T30 (Right Front), is rescinded.

Figure 14, RA PD 313993, 75-mm Howitzer Motor Carriage T30 (Left Rear), is rescinded.

Figure 15, RA PD 313994, 105-mm Howitzer Motor Carriage T19 (Left Front), is rescinded.

Figure 16, RA PD 313995, 105-mm Howitzer Motor Carriage T19 (Left Rear), is rescinded.

Figure 17, RA PD 313996, Multiple Gun Motor Carriage M13 (Right Front), is rescinded.

Figure 18, RA PD 313997, Multiple Gun Motor Carriage M15 (Right Front), is rescinded.

Figure 19, RA PD 313998, Multiple Gun Motor Carriage M15 (Left Rear), is rescinded.

Change the legend under figure 20 to read as follows:

Figure 20. Gun support and fuel tank filler caps ***M15A1.***

Change the legend under figure 21 to read as follows:

Figure 21. Turret lock ***M15A1.***

6. Operation of the Vehicle

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f. Stopping the Engine. Turn the ignition switch to the right, or "OFF" position after completing instructions on stopping the vehicle **and close the fuel shutoff cocks immediately.**

6.1. Operation of Engine for Power Supply for Radio When Vehicle Is Not Moving (Added.)

a. On radio-equipped vehicles, an instruction plate is mounted on the instrument panel, the instructions reading as follows: "Run engine to charge battery when battery voltage with radio transmitter load falls below 11.5 volts". Since the transmitter will not function properly on a current supply of lower voltage, the occasion will sometimes arise wherein the engine must be run at sufficient speed to permit the generator to develop the voltage required to maintain radio communication. During such operation of the engine, care must be exercised to prevent damage to the engine from overheating.

b. Whenever it is necessary to operate the engine for the purpose of maintaining radio communication while the vehicle is not moving, watch the heat indicator attentively. If the temperature of the engine rises excessively (200°F or midway on the indicator as between 180° and 220°F), stop the engine. Check every vehicle which has a tendency to overheat (temperature increase above 180°F) as soon as possible, and make the necessary corrections to eliminate the overheating tendency.

Note. Do not continue to run an engine when the heat indicator shows an excessive engine temperature.

c. Engine overheating may be relieved somewhat by facing vehicle into wind, and by opening the hood. Keep shutters open.

Note. Do not operate engine with vehicle at a standstill for the purpose of charging the battery. Replace discharged batteries, which must be recharged from another source.

11. Extreme Cold

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i. General Conditions.

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(5) Full flow oil * * * no special attention. **Drain oil filter cases at reduced intervals when equipped with drain plugs to remove water. It may be necessary to drain filters daily under unusually severe conditions.**

* * * * * * *

(10) (Added). Inspect and test cooling system thermostats to insure proper operation in closing and fully opening the valves, at specific temperature, by removing and immersing element in a vessel of water heated to the specified temperatures.

(11) (Added). Cover radiator cores, hood, and side panel louvers in accordance with atmospheric temperatures.

(12) (Added). Check and tighten cylinder head studs with torque-indicating wrench as prescribed in paragraph 62*b* to prevent liquid leakage past gaskets.

* * * * * * *

l. Starting Precautions (Added). To make sure that the engine will start on the first attempt, proper preparation of the engine is very important. Should the engine fire several times and stop, water vapor (a product of combustion) may form a frost in the combustion chamber and make starting impossible without heating the engine above 32°F.

(1) Before attempting to start, be certain that the throttle button is out ¼ inch, the choke button out all the way, and the clutch pedal depressed in order to ease the starting load. As soon as the engine starts, push the choke button into a position at which the engine operates without stalling.

(2) As the engine warms up, slowly release the clutch and adjust the choke inward. When a temperature of 140°F has been reached, the choke should be all the way in. During the warm-up period, the engine should idle at 800 to 1000 revolutions per minute. Do not place the vehicle in operation under its own power until its operating temperature of 160°F has been reached.

(3) After starting, keep the radiator shutters closed until a temperature of 160°F has been reached. During operation, use control lever to adjust the shutter to the position that provides proper operating temperature. Close the shutter whenever the vehicle is halted long enough to cause the engine to become cold.

m. Operation of Surge Tank in Freezing Weather (Added). When half-track vehicles are operated in freezing weather, water vaporizes from the ethylene-glycol antifreeze solution and condenses in the tube which connects the radiator inlet filler neck to the surge tank. The water becomes trapped and clogs the tube when it freezes. This usually occurs after the engine has stopped. To prevent formation of ice, the following procedure and precautions must be taken.

(1) Prior to the initial filling of the radiator and engine with antifreeze solution, remove radiator filler cap and surge tank cap. After radiator is filled, start engine to remove any air pockets from cooling system and continue to run engine at about 800 revolutions per minute, long enough to bring radiator up to normal operating temperature.

(2) Add antifreeze solution to fill warm radiator to level of filler opening.

(3) Replace radiator filler cap and tighten securely.

(4) Pour 1 quart of antifreeze solution into surge tank.

(5) With engine running and system at normal operating temperature, check depth of solution in surge tank. Add solution, if necessary, to bring depth to 1 inch minimum, 1¾ inches maximum.

(6) Replace and tighten surge tank pressure cap.

(7) After the initial filling, check level of solution in cooling system by removing radiator filler cap. During season that ethylene-glycol is used in cooling system, periodically check level of solution in surge tank by removing surge tank pressure cap. Add solution if necessary, to maintain depth between 1 inch and 1¾ inches.

n. Engine Sludge Formation (Added). (1) Where it is known that an engine is badly sludged, drop the crankcase pan and remove sludge from pan, valve mechanism, and exposed parts. At the same time, clean oil pump screen thoroughly.

(2) When the engine has been operated for an extended period under conditions where cold engine sludge accumulations are being experienced, and a change to high speed or heavy loads is to be anticipated, flush with engine oil (SAE–10), to reduce sludge accumulations, before

vehicle is placed into service where warm engine temperatures are expected. Use the following procedure in flushing.

(*a*) Fill the crankcase to half capacity with new oil.

(*b*) Run the engine at fast idle for ½ hour, with the radiator blanketed in order to assist in warming the oil.

(*c*) Maintain the cooling system between 180°F and 200°F, watching the water temperature and oil pressure gages continuously.

(*d*) Drain crankcase and replace filter element.

16. Gas Contaminated Areas (Superseded.)

There are four types of decontaminating apparatus used on the various ordnance vehicles. Due to manufacturing differences, the apparatuses and brackets are not interchangeable. Care must be taken to reinstall the decontaminating apparatus in the proper bracket. The proper stowage position is: Two to the right rear of car commander, fastened vertically to bulkhead; one to left rear of driver's seat fastened vertically to bulkhead. For complete information on decontamination see FM 17–59.

19. During-Operation Service

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b. PROCEDURES.

* * * * * * *

(1) *Item 27, foot and hand brakes.* Foot brakes must * * * ½-inch free travel. Hand brake must hold vehicle securely on reasonable incline with 1/3-reserve ratchet travel.

* * * * * * *

21. After-Operation and Weekly Service

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b. PROCEDURES.

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(17) *Item 70, steering linkage.* Inspect steering linkage * * * inadequately lubricated parts. **Check steering arm and spindle stud nuts for looseness.**

* * * * * * *

(21) *Item 74, gear oil levels.* After units have * * * Look for leaks. Lubricant should be **level with the** bottom of the filler hole (unit cool).

* * * * * * *

Figure 45, RA PD 314016, Stowage Compartments, Open (75-mm Gun Motor Carriage), is rescinded.

Figure 46 RA PD 314017, Stowage Compartments, Open (Multiple Gun Motor Carriage M15), is rescinded.

37. Run-In Test Procedures

a. PRELIMINARY SERVICE.

* * * * * * *

(6) *Accessories and belts.* See that accessories such as carburetor, generator, regulator, cranking motor, distributor, water pump, fan, and oil filters are securely mounted, and that fan and generator drive belts are in good condition and adjusted to have **3/4-inch finger pressure** deflection.

* * * * * * *

(8) *Tires.* Inspect for flat * * * embedded in tread. Proper pressure is **55** pounds. Remove stones or debris from tracks and track suspensions.

* * * * * * *

(22) *Instruments.*

(*a*) *Oil gage.* (Superseded.) Immediately after engine starts, observe if oil pressure is satisfactory. The correct oil pressures in a new WHITE 160 AX engine are as follows:

Oil temperature (degree Fahrenheit)	*Engine speed (RPM)*	*Oil pressure (psi)* OE 10	OE 30
180	3000	28	33
180	800	12	17
180	350	4	7.5

The oil pressure in a worn engine still in serviceable condition may be expected to read 30 percent lower than the pressures indicated above.

* * * * * * *

b. RUN-IN TEST.

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(3) *Brakes, foot and hand.* Test service brakes * * * 1/3 reserve travel. Parking brake must hold vehicle on a reasonable incline with **1/3**-ratchet travel in reserve.

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Section X (Superseded)

ORGANIZATIONAL SPARE PARTS, TOOLS AND EQUIPMENT

38. Organizational Spare Parts, Tools, and Equipment

a. Spare Parts. A set of organizational spare parts is supplied to the using arm for field replacement of those parts most likely to become worn, broken or otherwise unserviceable.

b. Tools and Equipment. A set of organizational tools and equipment is supplied to the using arm for maintaining and using the matériel. This set contains items required for disassembly, assembly, cleaning, and preserving the Half-Track Vehicles (White, Autocar, and Diamond T). Tools and equipment should not be used for purposes other than prescribed and, when not in use, should be properly stored in the chest and/or roll provided for them.

c. List of Spare Parts, Tools, and Equipment. Spare parts, tools, and equipment supplied for Half-Track Vehicles (White, Autocar, and

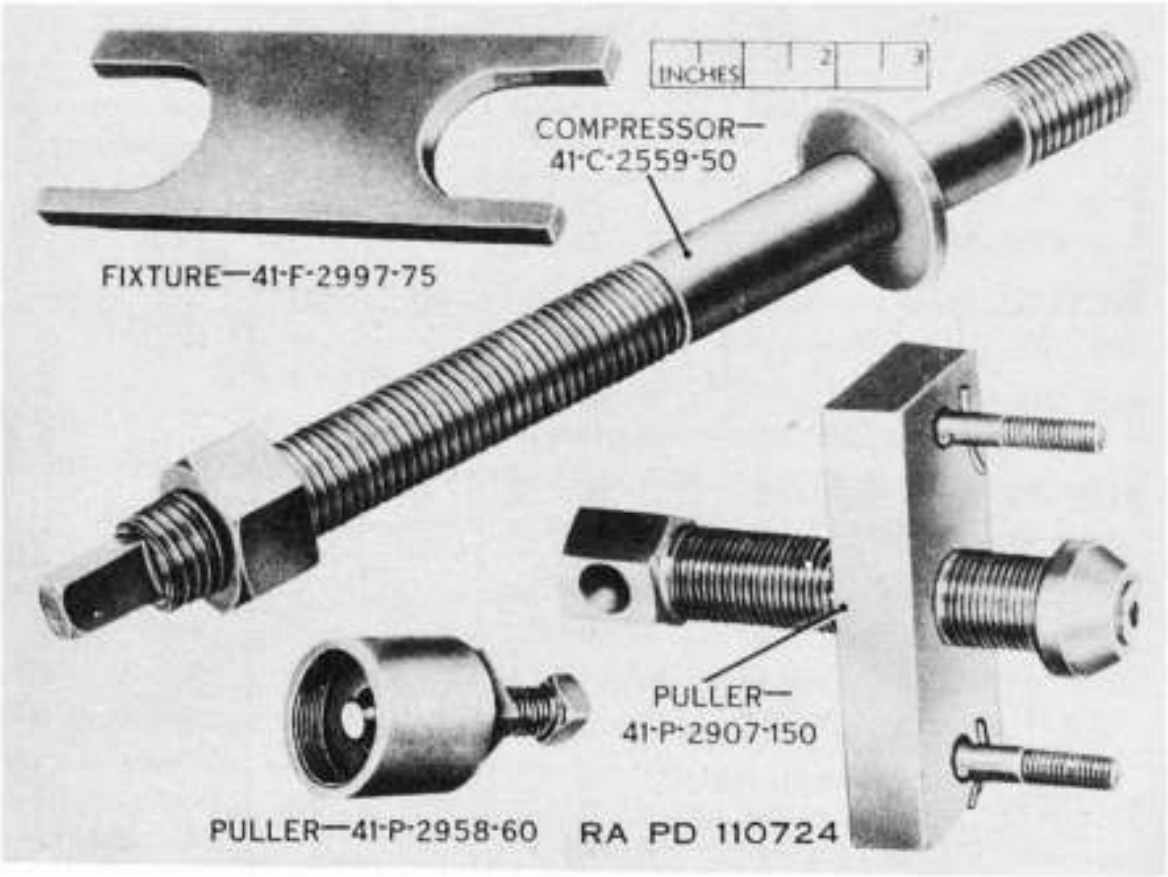

Figure 49. Specially designed tools.

Diamond T) are listed in WD Catalog ORD 7 SNL G–102 which is the authority for requisitioning replacements. ORD 7 SNL G–102 is divided into volumes, one for each vehicle, as indicated below. Reference should be made to the appropriate volume.

Volume 1 Car, half-track, M2
Volume 2 Car, half-track, M2A1
Volume 3 Carrier, personnel, half-track, M3
Volume 4 Carrier, personnel, half-track, M3A1
Volume 5 Carrier, 81-mm mortar, half-track, M4
Volume 6 Carrier, 81-mm mortar, half-track, M4A1
Volume 14 Carriage, motor, multiple gun, M16
Volume 15 Carrier, 81-mm mortar, half-track, M21
Volume 16 Carriage, motor, combination gun, M15A1

Figure 49, RA PD 314020, Special Tools, is rescinded and the following substituted therefor:

39. Specially Designed Tools and Equipment

Certain tools and equipment listed in WD Catalog ORD 7 SNL G–102 are designed for maintenance, repair, and general use with these half-track vehicles. These tools and equipment are listed below for information only. This list is not to be used for requisitioning replacements.

Item	Identifying Number	References		Use
		Fig.	Par.	
COMPRESSOR, suspension volute spring.	41–C–2559–50 A157251	49	118	Bogie lower roller replacement.
EYE, lifting, threaded end ½–20NF–2.	41–E–628–500 A7080449		67	Engine replacement.
FIXTURE, bogie arm, holding	41–F–2997–75 B248218	49	117	Track replacement.
PULLER, fan hub, lower ..	41–P–2907–150 B295994	49		
PULLER, water pump impeller	41–P–2958–60 A380213	49		
WRENCH, socket, engine oil filter nut, hex. opng., w/ hole for pin handle, size of opng. 1 in., length over-all 8 in.	41–W–2609–700 A7080446		65	Oil filter replacement.
WRENCH, tubular, *pronged* sgle-*end.*, O.D. 3½ in., I.D. 3⅛ in., length 3 in., 4 prongs.	41–W–3737–205 A7080445		119	Track roller bearing replacement.