TM 9-1731K

WAR DEPARTMENT

TECHNICAL MANUAL

ORDNANCE MAINTENANCE

AUXILIARY GENERATOR (HOMELITE MODEL HRUH-28) FOR MEDIUM TANKS M4 AND MODIFICATIONS

MAY 18, 1943

FOR ORDNANCE PERSONNEL ONLY

TECHNICAL MANUAL
No. 9-1731K

WAR DEPARTMENT
Washington, May 18, 1943

ORDNANCE MAINTENANCE

AUXILIARY GENERATOR (HOMELITE MODEL HRUH-28) FOR MEDIUM TANKS M4 AND MODIFICATIONS

Prepared under the direction of the
Chief of Ordnance

(with the cooperation of the Homelite Corporation)

CONTENTS

ORDNANCE MAINTENANCE — AUXILIARY GENERATOR (HOMELITE MODEL HRUH-28) FOR MEDIUM TANKS M4 AND MODIFICATIONS

Section I

INTRODUCTION

1. SCOPE.

a. This manual is published to provide information and guidance for ordnance personnel. It contains detailed instructions for the removal, disassembly, inspection, repair, assembly, and maintenance of the auxiliary generator for the Medium Tanks M4, M4A1, M4A2, M4A3, and M4A4. The information and instructions in this manual are supplementary to that which may be found in the field and technical manuals prepared for the personnel of the using arms.

2. ARRANGEMENT.

a. Section II lists troubles which may develop in the auxiliary generator and their possible causes and remedies. Where possible it is advisable to check these items before the unit is removed from the tank to facilitate speedy repair. Sections III through VIII give instructions for the complete repair and maintenance of the auxiliary generator and are intended for the guidance of ordnance personnel. Photographs showing exploded views of various subassemblies are included in section VI to facilitate identification and to show the correct relationship of related parts. Section IX gives special instructions for operation under extreme weather conditions. This should be made available to the using arms when operation under these conditions is anticipated. Section X gives special data intended for ordnance personnel.

3. DESCRIPTION.

a. The auxiliary generator is an integral, gasoline-engine-driven, direct-current power plant with a capacity of 1,500 watts at 30 volts. The generator is used for charging the tank batteries (figs. 1 and 2). It consists of an electric generator with control box attached, directly coupled to and driven by a gasoline engine. This assembly is mounted on four shock absorbing feet. A metal duct containing the muffler is

INTRODUCTION

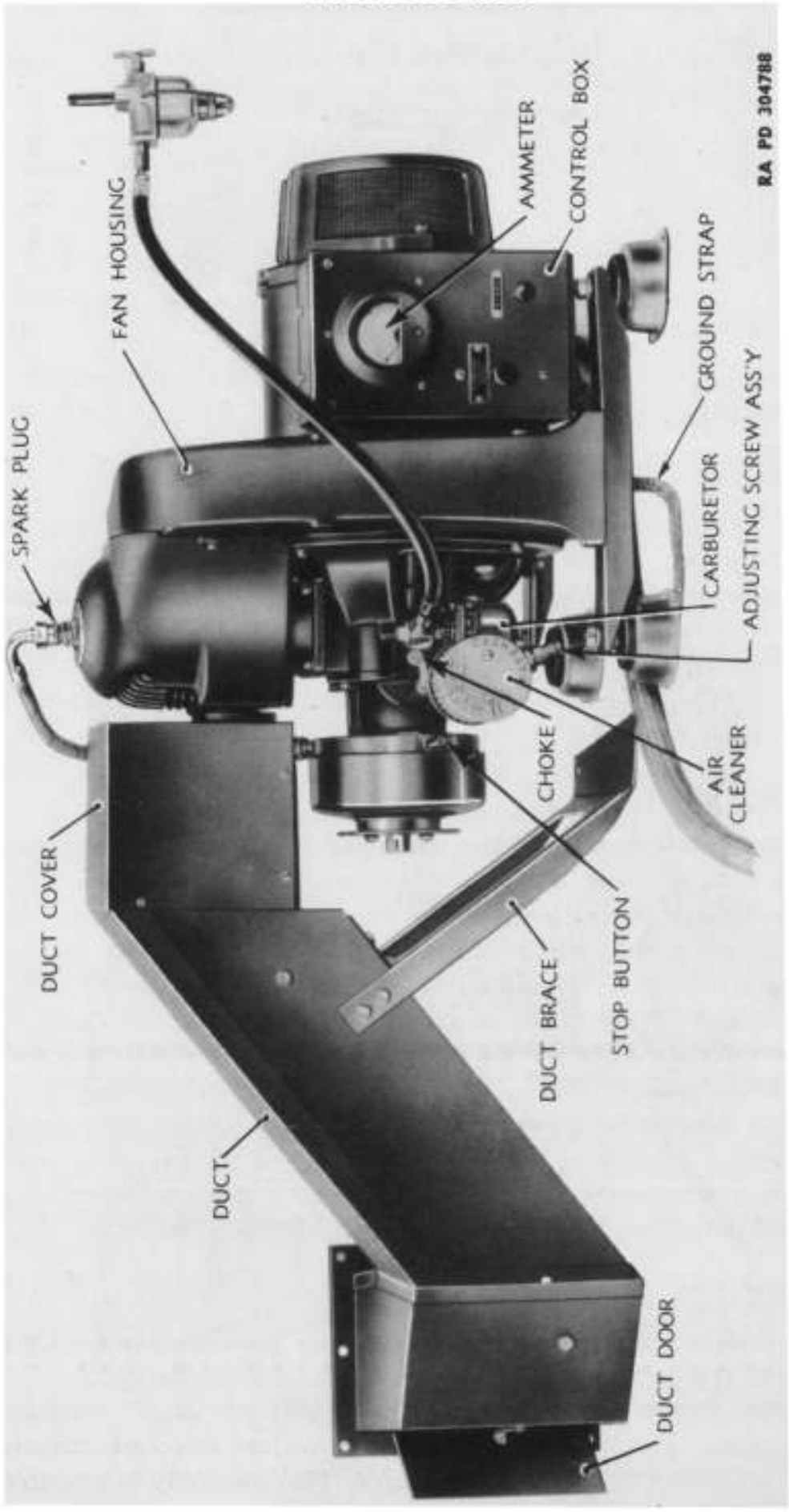

Figure 1 — Auxiliary Generator (Homelite HRUH-28) — Right Side

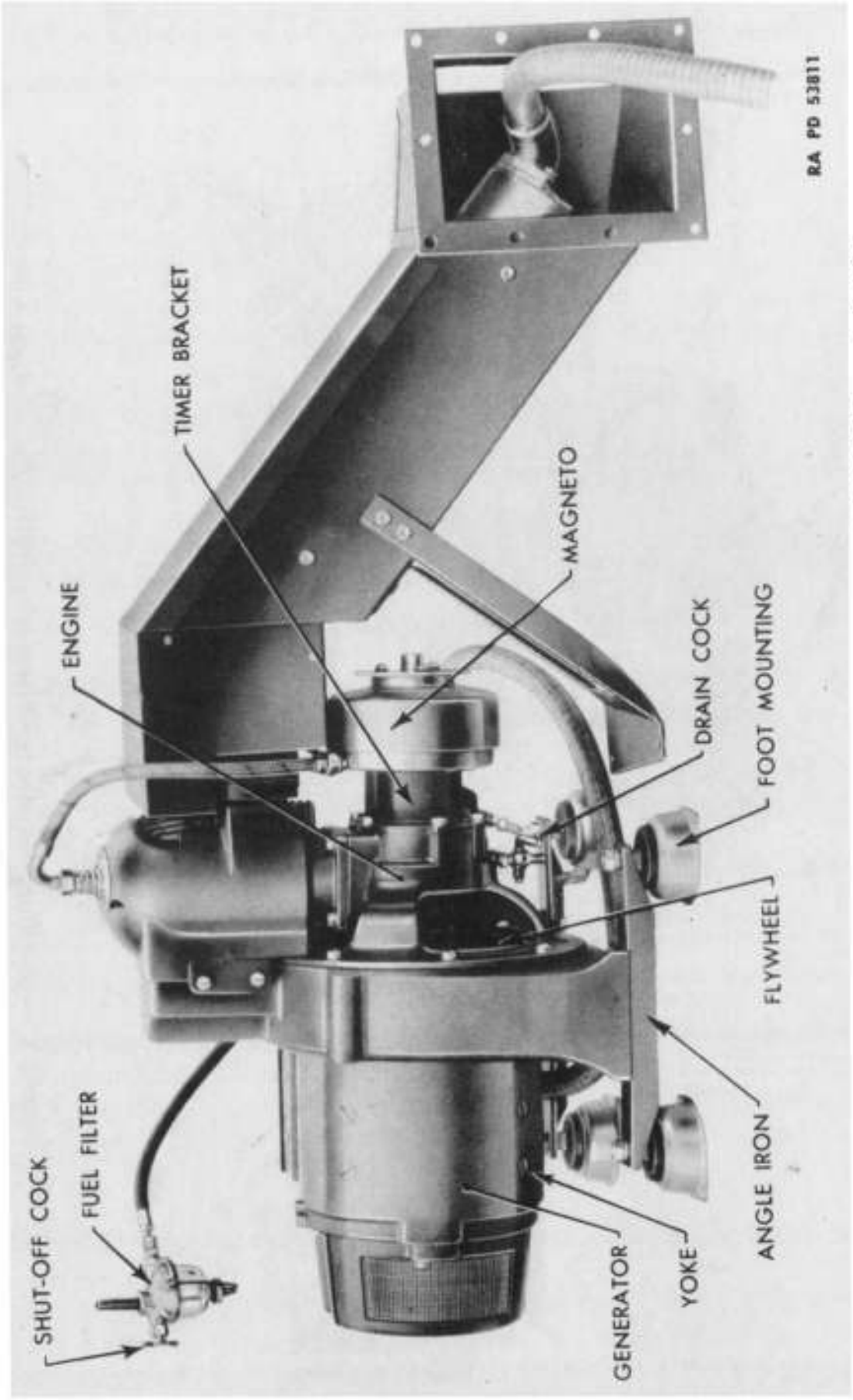

Figure 2 — Auxiliary Generator (Homelite HRUH-28) — Left Side

included with the units used in the M4, M4A1, and M4A2 Tanks for the purpose of carrying off engine heat from the crew compartment in hot weather and as an aid in preheating the main engine compartment in cold weather.

4. DISTINGUISHING CHARACTERISTICS.

a. Three variations of design are found in the auxiliary generators (Homelite Model HRUH-28) furnished for installation in the medium tanks. The M4 and M4A1 Tanks use the unit illustrated in figures 1 and 2. The M4A2 Tank unit is the same as this with a small change in the duct and muffler assembly. The M4A3 and M4A4 Tanks use the same power plant assembly without a duct assembly. Refer to figures 23, 24, and 25 for identification of these ducts and mufflers.

5. DATA.

a. General.

Over-all dimensions (excluding duct):

Height	20 in.
Width	15 in.
Length	21 in.

Weight:

M4, M4A1, M4A2 units, complete with duct	140 lb
M4A3, M4A4 units, with muffler and fittings	125 lb

b. Engine.

Type	Single-cylinder, air-cooled, 2-cycle
Bore	2⅜ in.
Stroke	2⅛ in.
Speed	3,400 to 3,700 rpm
Fuel consumption	1 gal gas every 2 hr under full load; suitable for operation on 80 to 100 octane fuel
Ignition	High-tension Wico magneto; moistureproof and dustproof
Lubrication	Pressure vapor oil system (Oil mixed with gasoline is forced to all moving parts by crankcase compression.)
Carburetor	Tillotson float-feed type
Spark plug	Champion HO-14S
Governor	Automatic; built-in mechanical type; fully enclosed; self-lubricating, requires no adjustment
Cylinder and piston	Aluminum alloy (Cylinder has cast-iron liner shrunk to fit.)
Bearings	Ball bearings on crankshaft, timer shaft, flywheel, and crank end of connecting rod
Connecting rod	Steel; drop-forged and heat-treated; ball bearing at crank end

Crankshaft.....Steel; drop-forged and heat-treated; counterweighted to eliminate vibration
Valve.....1; independent rotary disk type; self-grinding, requires no adjustment; part of governor
Crankcase and fan housing.....Cast-iron
Starting.....By motorizing generator with battery or manual with rope on starting plate
Mounting.....4 shock-absorbing feet

c. Generator.

Rating.....1,500 watts, d-c, 30 volts; shunt-wound for battery charging
Armature....Shaft, high carbon steel; core, laminated, impregnated and baked to give high resistance to oil, moisture, and abrasive dust
Field coils.....Impregnated and baked same as armature
Frame .....Steel
Mounting.....Armature shaft keyed directly to engine shaft
Bearing .....Ball
Brush holders.....Mounted on adjustable ring, easily accessible
Commutator.....V-ring construction, hard drawn copper
Control box.....Mounted on generator; contains starting switch, circuit breaker, ammeter, and condenser

6. MAINTENANCE ALLOCATION.

a. The using arms is authorized to perform the following operations:

(1) Clean and adjust spark plugs.
(2) Clean adapter.
(3) Clean and adjust contact points.
(4) Clean brushes and brush holders.
(5) Replace brushes and brush springs (when necessary).
(6) Clean commutator.
(7) Check connections and mountings.
(8) Clean sediment bowl and screen.
(9) Service fuel line.
(10) Remove the auxiliary generator from the tank.

b. All other work outlined in this manual will be done by trained ordnance personnel.

Section II

TROUBLE SHOOTING

7. GENERAL.

a. As an aid in locating and repairing troubles which may develop in the unit, check lists as in paragraphs 8 and 9 have been compiled. It is advisable, when possible, to check the auxiliary generator for minor difficulties before removal from tank. This is particularly true of engine troubles caused by defective spark plugs or faulty carburetor or magneto adjustment.

8. ENGINE CHECK LIST.

a. Troubles are: fails to start, hard to start, runs and stops, not up to speed (3,400 to 3,700 rpm), overheats, and loss of power. In locating engine trouble, it is always advisable to install a new spark plug first to see if this corrects difficulty. If it does not, leave new plug in while checking further.

b. Fails to Start.

Possible Cause	Possible Remedy
Carbon or lead deposit across points.	Remove and clean.
Points badly worn.	Replace.
Wrong type.	Use Champion HO-14S.
Cracked or dirty porcelain.	Replace.
Points too wide or too close.	Adjust to 0.025 inch.
Adapter holes plugged.	Remove and clean.

c. Starts, Then Stops.

No fuel in tank.	Fill.
Shut-off cock on fuel filter closed or clogged.	Open or clean.
Strainer in fuel filter clogged.	Remove bowl and clean.
Fuel line clogged.	Clean out.
Water or dirt in fuel.	Drain and clean.

d. Fails to Run up to Speed.

Improper adjustment.	See paragraph 13 c.
Strainer clogged.	Remove and clean.
Nozzle clogged.	Remove and clean.

Possible Cause	Possible Remedy
Float stuck.	Remove bowl cover and clean.
Float needle worn.	Replace.
Water in float needle chamber.	Drain.
e. Runs Irregularly or Misses.	
Contact points out of adjustment.	Adjust to 0.020 inch (par. 13 **b**).
Contact points pitted.	Dress or replace (par. 13 **b**).
Broken, high-tension cable.	Replace.
Loose connections.	Tighten.
Coil defective.	Replace (par. 18 **a** (4)).
Magnet weak.	Replace.
Capacitors defective.	Replace.
f. Overheats.	
Cylinder ports clogged.	Remove cylinder and scrape (par. 13 **e**).
Piston and cylinder heads leaded or carbonized.	Remove cylinder and scrape (par. 13 **e**).
Muffler clogged.	Replace (par. 18 **o**).
Flexible tail pipe clogged.	Replace.
Spark plug adapter clogged.	Clean or replace.

9. GENERATOR CHECK LIST.

a. Fails to Generate Full or No Current.	
Loose connections in control box.	Tighten.
Defective switch in Homelite control box.	Replace.
Loose connections at regulator control box.	Tighten.
Loose or corroded connections at battery (or dead battery).	Tighten or replace.
Dirty commutator.	Clean (par. 14 **b**).
Worn out brushes.	Replace (par. 14 **c**).
Brushes stuck in holders.	Loosen.
Brushes not properly seated.	Replace or adjust (par. 14 **c**).
Short circuit in system.	Check connections.
Shorted field coil.	Replace (par. 16 **b**).
Open or shorted wiring in armature.	Replace (par. 16 **c**).
b. Fails to Generate Current.	
Brushes stuck in holders.	Loosen.
Worn out brushes.	Replace (par. 14 **c**).