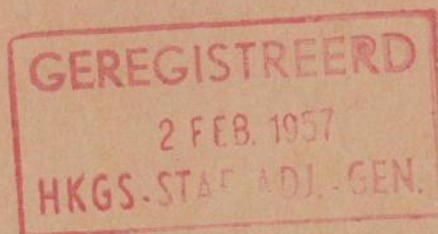


121 A
TM 11-919

DEPARTMENT OF THE ARMY TECHNICAL MANUAL



H5-095

GASOLINE ENGINE
GENERATOR SET
PU-107/U



DEPARTMENT OF THE ARMY • JULY 1953

REGISTREERD
2 FEB. 1957
KGS-STAF ADJ.-GEN.

TECHNICAL MANUAL
GASOLINE ENGINE GENERATOR SET PU-107/U

CHANGES }
No. 1 }

DEPARTMENT OF THE ARMY
WASHINGTON 25, D. C., 15 January 1954

TM 11-919, 9 July 1953, is changed as follows:

2. Forms and Records

b. The following forms * * * engine driven equipment.

(1) Rescinded.

Figure 4. In the legend, item 9, "(C16 through C21)", is changed to (C26).

5. Major Parts and Assemblies

Note. All left and * * * facing the unit.

l. Alternator. The alternator (1, fig. 4) * * * single ball bearing. A compensator assembly for maintaining voltage stability consists of a three-phase transformer (3, fig. 4) and a **compensator capacitor assembly** (9, fig. 4). A wye-delta change * * * of the unit.

b. Alternator.

19. Automatic Controls

d. Alternator.

(2) *Compensator assembly* (fig. 4). A compensator assembly, consisting of a three-phase transformer (3) and a **compensator capacitor assembly** (9), serves as a static voltage regulator by correcting the alternator internal power factor. The compensating transformer * * * of the transformer.

Figure 20. "C16—C17", "C18—C19" and "C20—C21" are changed to read: **CAPACITOR ASSEMBLY C26**. The following note is added to the illustration:

The six capacitors in capacitor assembly C26 should not be replaced individually but always as a matched set of six.

49. Trouble Chart

Symptom	Possible cause	Remedy
6. (Added) Unbalanced phase voltage under balanced load conditions.	Failure of one or more capacitors in compensator capacitor assembly (C26).	Replace entire capacitor assembly (C26).

Figure 63. The callout "C20, C21, C18, C19, C16, C17" is changed to read: **CAPACITOR ASSEMBLY C26**. The following note is added to the illustration:

The six capacitors in capacitor assembly C26 should not be replaced individually but always as a matched set of six.

APPENDIX II

IDENTIFICATION TABLE OF PARTS

Note. The fact that * * * others are Ordnance.

5. Control Panel and Accessories

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
*	* * * *	* * *	*
C22, C23, C24, C25 C26	CAPACITOR * * * part No. CA-472.	For r-f * * * terminals.	3D472 *
C26	CAPACITOR ASSEMBLY, fixed: c/o 6 cap, mtd in steel bracket assy: Okeefe & Merritt part/dwg No. 123923.	Used with compensator transformer assembly for voltage regulation at various loads.	3DEB2E7 *
L3	CHOKE MECHANISM, engine: * * * No. AC-1099A.	Automatic * * * choke.	
*	* * * *	* * *	*

[412.41 (21 Dec 53)]

BY ORDER OF THE SECRETARY OF THE ARMY:

M. B. RIDGWAY,
*General, United States Army,
Chief of Staff.*

OFFICIAL:

WM. E. BERGIN,
*Major General, United States Army,
The Adjutant General.*

DISTRIBUTION:

Active Army:

Tech Svc (1); Tech Svc Bd (1); AFF Bd (ea. Svc Test Sec) (1); AFF (5); AA Comd (2); OS Maj Comd (5); Base Comd (5); MDW (2); Log Comd (5); A (5); CHQ (2); FT (2); Sch (5) except 11 (25); Gen Dep (2); Dep 11 (20) except Sig Sec, Gen Dep (10); Tng Div (2); POE (2), OSD (2); Lab 11 (5); Mil Dist (3); Field Maint Shops 11 (3); Two (2) copies to each of the following T/O & E's: 6-100; 6-300; 7; 11-107; 11-127; 11-128; 11-500A, KA, KB, KC; 11-587; 11-592; 11-597; 44-75; 44-76.

NG: Same as Active Army except one copy to each unit.

USAR: None.

For explanation of distribution formula, see SR 310-90-1.

GASOLINE ENGINE GENERATOR SET PU-107/U

	<i>Paragraph</i>	<i>Page</i>
CHAPTER 1. INTRODUCTION.		
<i>Section I. General.</i>		
Scope	1	1
Forms and records	2	1
<i>II. Description and data.</i>		
Description of Gasoline Engine Generator Set PU-107/U	3	1
Application	4	3
Major parts and assemblies	5	3
Performance characteristics	6	6
Condensed table of specifications	7	6
Tabular data	8	6
CHAPTER 2. OPERATING INSTRUCTIONS.		
<i>Section I. Service upon receipt of equipment.</i>		
Siting	9	8
Preparation of foundation	10	8
Uncrating, unpacking, and checking	11	8
Setting up equipment	12	9
Removal of corrosion preventives	13	10
Connections and interconnections	14	10
Initial lubrication	15	11
Preparation of fuel system and cooling system	16	11
Preparation of storage batteries	17	12
<i>II. Controls and instruments.</i>		
Manual controls	18	13
Automatic controls	19	15
Instruments	20	15
<i>III. Operation under usual conditions.</i>		
Preliminary procedure	21	16
Starting	22	17
Precautions after starting	23	17
Applying load	24	18
Operating procedure	25	18
Stopping	26	19
<i>IV. Operation under unusual conditions.</i>		
Operation in arctic climates	27	20
Operation in desert climates	28	21
Operation in tropical climates	29	21
Operation in high altitudes	30	21
CHAPTER 3. ORGANIZATIONAL MAINTENANCE INSTRUCTIONS.		
<i>Section I. Organizational tools and equipment.</i>		
Catalog reference	31	22
Use and care of tools	32	22
<i>II. Lubrication and preservation.</i>		
Lubricants	33	23
Lubricating periods	34	23
Factory lubricated parts	35	23
Routine lubrication	36	23
Weatherproofing	37	25
Rustproofing	38	25
Painting and refinishing	39	27

III. Preventive maintenance.
 Definition of preventive maintenance 40 27
 Daily maintenance services 41 28
 Weekly maintenance services 42 29
 Monthly maintenance services 43 29
 Semiannual maintenance services 44 29
 Annual maintenance services 45 29
 DA AGO Form 464 services 46 29

IV. Theory and trouble shooting.
 Theory of operation of Gasoline Engine Generator Set PU-107/U 47 35
 Meaning of trouble shooting 48 43
 Trouble chart 49 44

CHAPTER 4. FIELD MAINTENANCE INSTRUCTIONS.

Section I. General.
 Scope 50 52
 Preliminary inspection 51 52

II. Cleaning, stripping, and inspecting.
 Cleaning 52 52
 Stripping 53 52
 Detailed inspection 54 54
 Fits and tolerances 55 78

III. Disassembly.
 Disassembly of alternator 56 78
 Removal of engine 57 80
 Disassembly of engine 58 80

IV. Reassembly.
 Reassembly of engine 59 89
 Reassembly of alternator 60 95
 Installation of subassemblies and accessories 61 95

V. Adjustments and final testing.
 Adjustments prior to final testing 62 99
 Testing and inspection after overhaul 63 102

VI. Refinishing and suppression.
 Painting and weatherproofing 64 102
 Radio-frequency suppression equipment 65 102

CHAPTER 5. SHIPMENT AND LIMITED STORAGE AND DEMOLITION TO PREVENT ENEMY USE.

Section I. Shipment and limited storage.
 Preparation for storage or shipment 66 107
 Shipment 67 107

II. Demolition to prevent enemy use.
 Methods of demolition 68 107
 Destruction of components 69 107

APPENDIX I. REFERENCES 108

II. IDENTIFICATION TABLE OF PARTS 109

III. TABLE OF STANDARD NUTS, BOLTS, SCREWS, AND WASHERS 147

INDEX 156

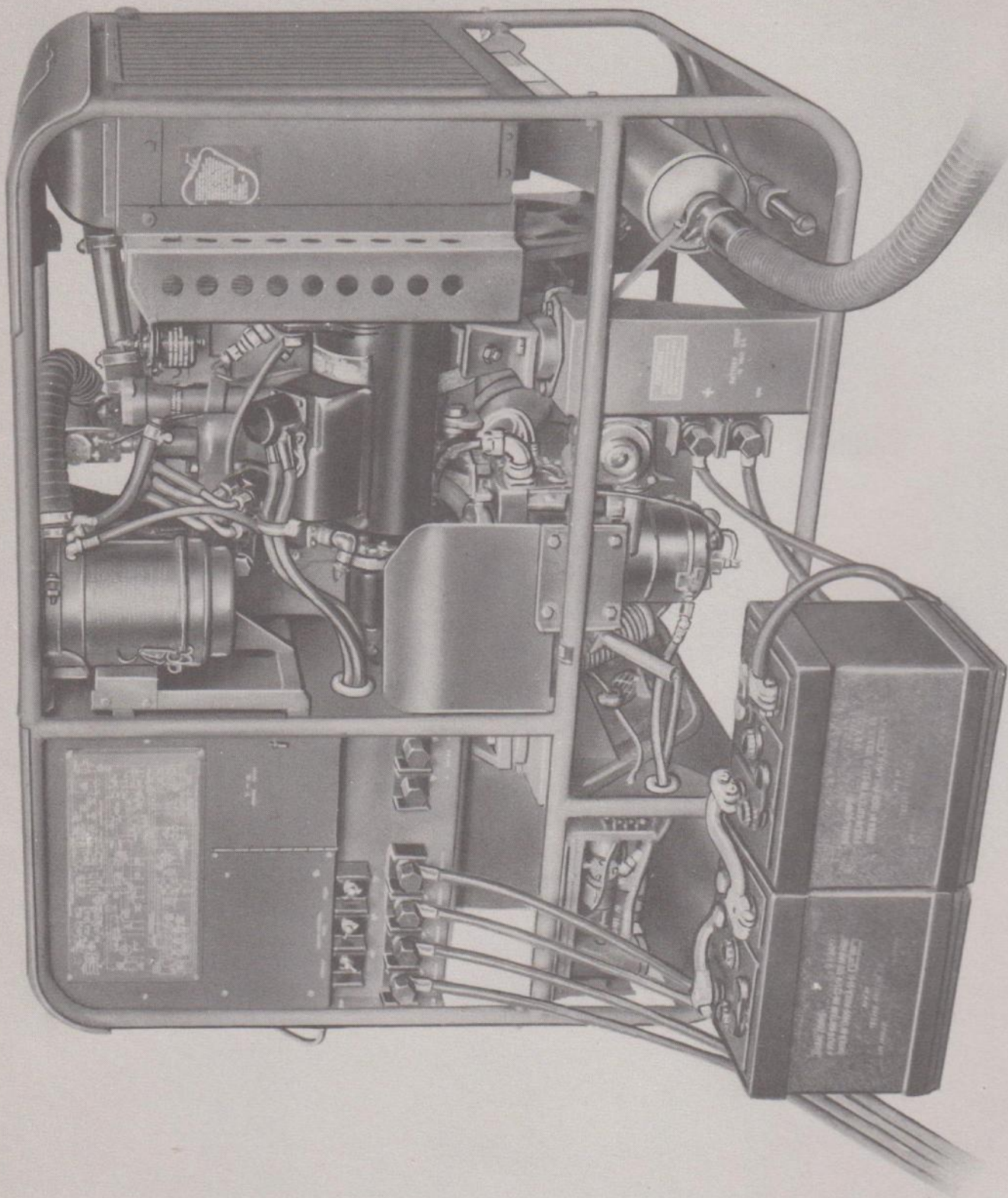


Figure 1. Gasoline Engine Generator Set PU-107/U

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1. Scope

a. These instructions are published for the information and guidance of all personnel to whom Gasoline Engine Generator Set PU-107/U is issued. The instructions include complete information for operating, servicing, maintaining, and overhauling the generator set. Also included is a detailed description of all major parts of the equipment and a discussion of the theory of operation.

b. Appendix I contains a list of current references, including supply manuals, technical manuals, technical bulletins, and other available publications applicable to the equipment. Appendix II contains an identification table of parts for Gasoline Engine Generator Set PU-107/U. Appendix III contains a table of all standard nuts, bolts, screws, and washers used in the equipment that are not special items.

2. Forms and Records

a. The following forms will be used for reporting unsatisfactory conditions of Army equipment and in performing preventive maintenance.

(1) DD Form 6, Report of Damaged or Improper Shipment, will be filled out and forwarded as prescribed in SR 745-45-5 (Army), and AFR 71-4 (Air Force).

(2) DA Form 468, Unsatisfactory Equipment Report, will be filled out and forwarded to the Office

the Chief Signal Officer, as prescribed in SR 700-45-5.

(3) AF Form 54, Unsatisfactory Report, will be filled out and forwarded to Commanding General, Air Materiel Command, Wright-Patterson Air Force Base, Dayton, Ohio, as prescribed in SR 700-45-5 and AFR 65-26.

(4) DA Form 11-260, Operator First Echelon Maintenance Check List for Signal Corps Equipment—Power Units, Reel Units. This form will be used in accordance with instructions appearing on the form. Operations applicable to generator set PU-107/U are listed in paragraph 40.

(5) DA Form 11-261, Second and Third Echelon Maintenance Check List for Signal Corps Equipment—Power Units, Reel Units. This form will be used in accordance with instructions appearing on the form. Operations applicable to Gasoline Engine Generator Set PU-107/U are listed in paragraph 40.

b. The following forms, explained in TM 37-2810, will be used in connection with the operation and maintenance of Signal Corps internal-combustion-engine driven equipment.

(1) DD Form 110 (Vehicle and Equipment Operational Record).

(2) DA Form 460 (Preventive Maintenance Roster).

(3) DA Form 464 (Preventive Maintenance Service and Technical Inspection Work Sheet for Engineer Equipment).

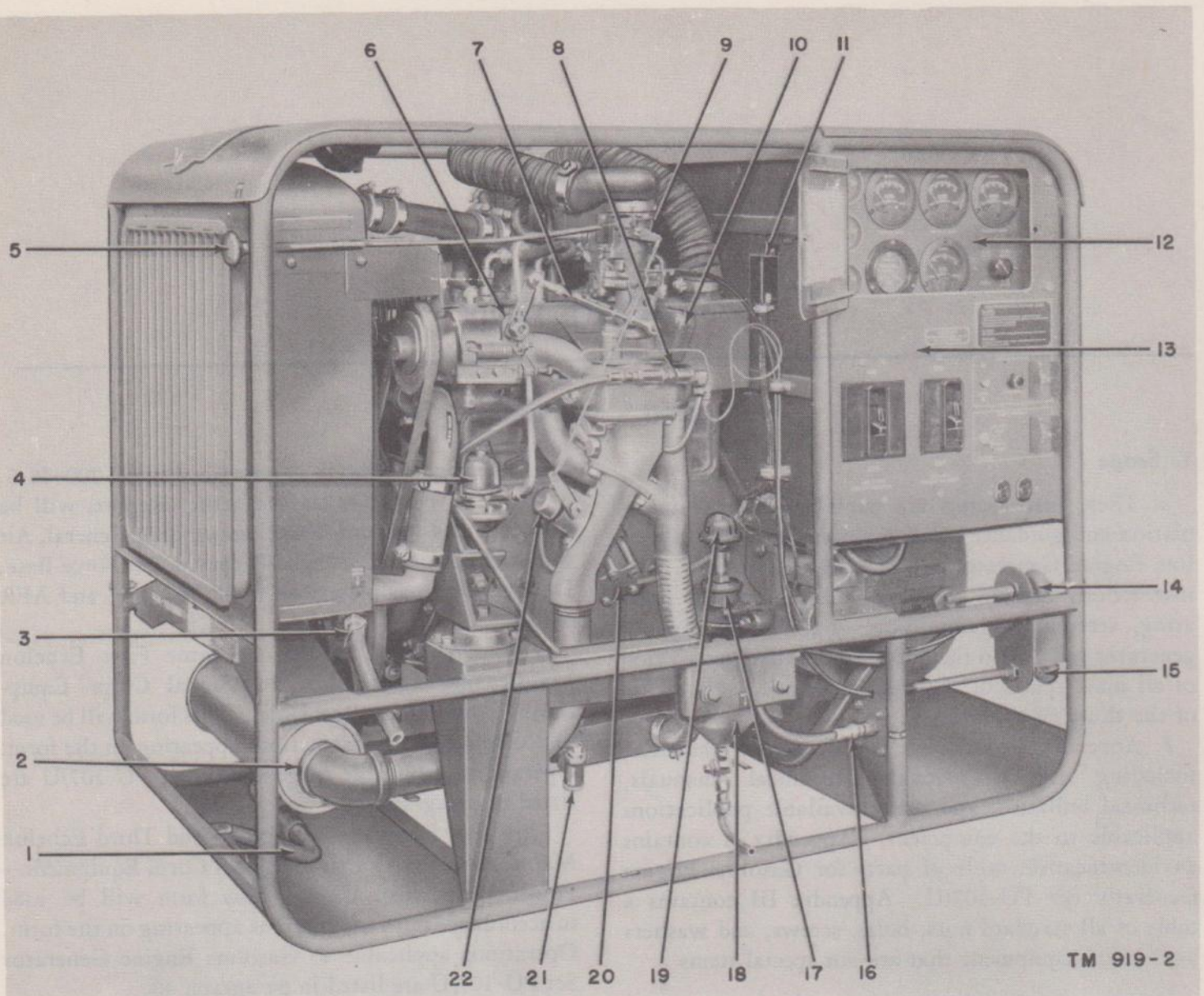
c. Use other forms and records as authorized.

Section II. DESCRIPTION AND DATA

3. Description of Gasoline Engine Generator Set PU-107/U

Gasoline Engine Generator Set PU-107/U consists of a single-bearing, permanent-magnet type alternator

directly coupled to the flywheel of a four-cylinder, four-stroke cycle, gasoline engine. The set also includes a d-c (direct-current) generator, all necessary controls and instruments for regulation of the equipment, and a win-



TM 919-2

Figure 2. Gasoline Engine Generator Set PU-107/U, right view.

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Hand crank (A89). 2. Muffler (A38). 3. Radiator drain (H477). 4. Fuel pump (O-99). 5. Manual choke (O-88). 6. Engine speed governor (O-126). 7. Carburetor-to-governor linkage (O-129). 8. Ventilating control valve (O-73). 9. Carburetor (O-108). 10. Engine overspeed safety governor (O-128). 11. Ten-conductor socket (J2). | <ol style="list-style-type: none"> 12. Instrument panel (A65). 13. Control panel. 14. Primer pump (O-89). 15. Manual throttle (O-90). 16. Auxiliary fuel line adapter (A17). 17. Low-oil-pressure cutoff switch (S2). 18. Fuel filter (O-92). 19. Oil pressure transmitter (E8). 20. Oil pump (O-82). 21. Crankcase drain. 22. Automatic choke (L3). |
|---|---|

terization system designed to facilitate starting the unit in extremely cold ambient temperatures. The entire unit is mounted within a welded tubular frame structure. The generator set is rated as follows:

a. Ten kw (kilowatts) at .8 power factor, 120 volts

ac (alternating current), single-phase, 400 cycles, plus 2.5 kw at 28 volts dc.

b. Ten kw at .8 power factor, 120/208 volts ac, three-phase, 400 cycles, plus 2.5 kw at 28 volts dc.

c. Twelve and one-half kw at .8 power factor, 120 or 208 volts ac, three-phase, 400 cycles.

4. Application

Gasoline Engine Generator Set PU-107/U is intended as a source of power for the operation of Electronic Search Central AN/GSS-1. Also, it may be used as a source of power for transportable or mobile radar and similar Signal Corps electronic equipment.

5. Major Parts and Assemblies

Note. All left and right designations are assumed from the point of an observer standing at the radiator end, facing the unit.

a. ENGINE. The generator set is powered by an automotive-type Willys No. 807532, L-head, four-stroke cycle, four-cylinder, liquid-cooled, gasoline engine. It develops 30 horsepower at 1,714 rpm (revolutions per minute), has a bore of $3\frac{1}{8}$ inches, a stroke of $4\frac{3}{8}$ inches,

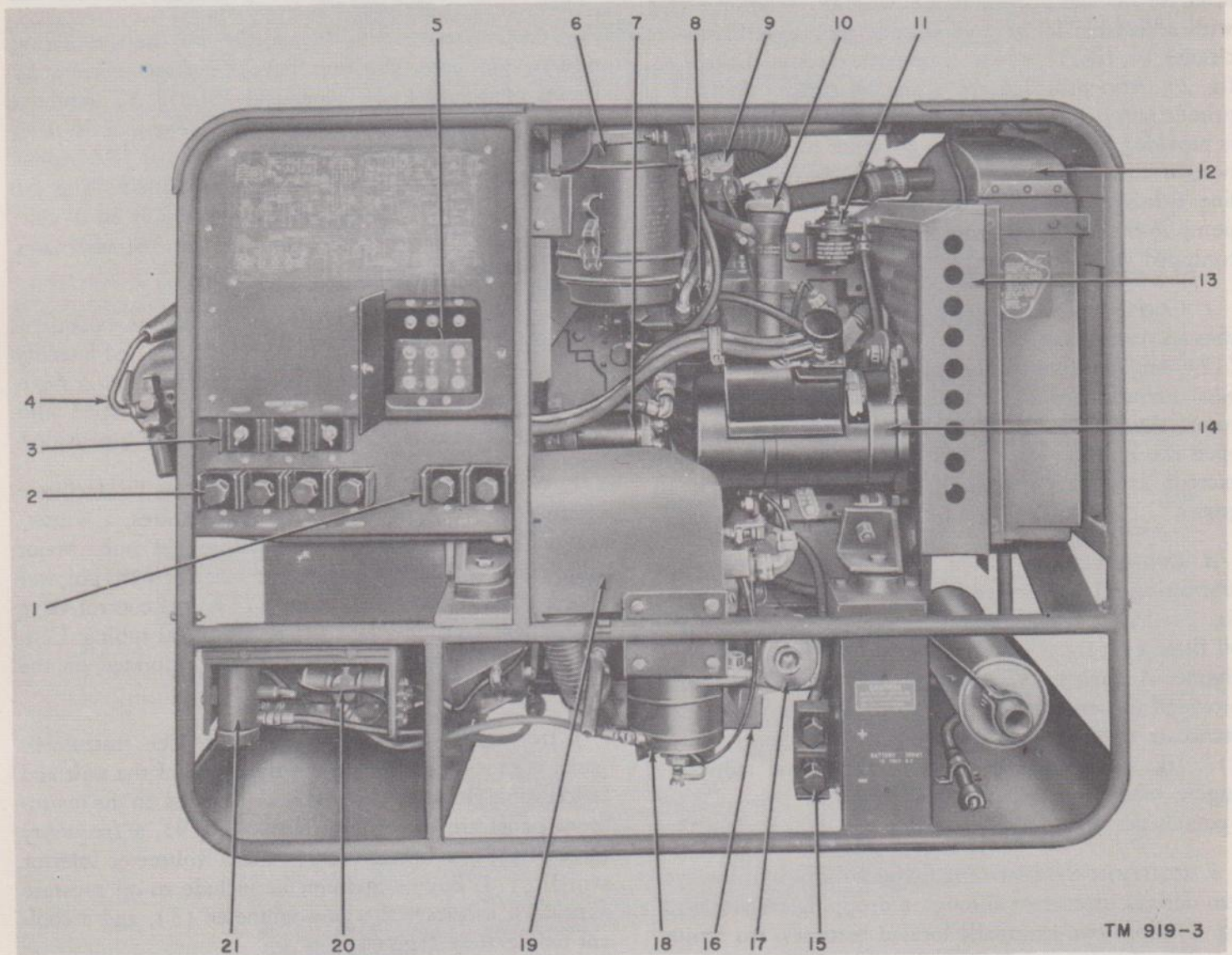


Figure 3. Gasoline Engine Generator Set PU-107/U, left view.

1. D-c output terminals (E16, E17).
2. A-c output terminals (E21 through E24).
3. Remote control terminals (E10 through E12).
4. Fire extinguisher (O-162).
5. Wye-delta change board (TB7).
6. Air cleaner (O-113).
7. Starting motor (B1).
8. Igniter assembly (E6).
9. High-coolant-temperature cutoff switch (S3).
10. Oil filler tube (A5).
11. Oil filter (O-87).
12. Radiator (A39).
13. Fan guard (A41).
14. D-c generator (G1).
15. Battery input terminals (E18, E19).
16. Heat exchanger pan (A61).
17. Heater blower motor (B2).
18. Heater (O-155).
19. Heater shield (A80).
20. Heater fuel control valve (L4).
21. Heater fuel pump (L5).

and a piston displacement of 134.2 cubic inches. The engine is designed for continuous duty, constant-speed operation using fuel conforming to specification MIL-G-3056 and engine oil conforming to specification MIL-O-2104.

b. FUEL SYSTEM (fig. 2). The major components of the fuel system include a disk-type fuel filter (18, fig. 2), a reciprocating-diaphragm fuel pump (4) with a lever for manual operation, a downdraft carburetor (9) with adjustable idling and altitude jets, an oil-bath air cleaner (6, fig. 3), and an automatic electric choke (22, fig. 2). Also provided are a manual choke (5), and a primer pump (14). A manually operated throttle (15) is provided for overriding the governor to permit operation of the engine at idling speeds. An auxiliary fuel line, furnished with the unit, is used to connect the fuel pump to the fuel supply source. (The generator set is not equipped with an integral fuel tank.)

c. COOLING SYSTEM (fig. 3). The cooling system consists essentially of a standard tubular-cell radiator (12), engine-driven water pump, pusher-type fan, bypass thermostat, and an adjustable coolant temperature cutoff switch (9). The switch is set at the factory to open the ignition circuit when the coolant temperature exceeds 200° F. Capacity of the cooling system is 16 quarts.

d. LUBRICATION SYSTEM. Circulation of the engine lubricating oil is provided by a gear-type oil pump (20, fig. 2) driven from a spiral gear on the camshaft. An oil filter (11, fig. 3) is mounted on the left side of the engine. A bayonet-type gage, in the oil filler tube, is provided to permit checking the oil level in the engine crankcase (10, fig. 3). A low-oil-pressure cutoff switch (17, fig. 2) opens the ignition circuit and stops the engine whenever the oil pressure drops below 5 psi (pounds per square inch).

e. IGNITION SYSTEM. The 6-volt battery ignition system derives its current through a dropping resistor (10, fig. 4) from two externally located batteries. An igniter assembly (8, fig. 3), mounted on the left side of the engine, consists of a camshaft-driven distributor, a capacitor, and an ignition coil. The spark plugs and ignition cables are suitably waterproofed and are shielded to prevent radio frequency radiation. An IGNITION MANUAL START—REMOTE START switch (16, fig. 11) is located on the control panel.

f. STARTING SYSTEM. A 12-volt d-c, solenoid-controlled starting motor (7, fig. 3), mounted on the left side of the engine, is energized by two 6-volt batteries connected in series. The starting system also includes a start relay (11, fig. 4), a hold relay (8, fig. 4), and a battery-charging relay (12, fig. 4). A START—STOP switch (15, fig. 11) is located on the control panel. The

batteries are charged by means of a dry-disk selenium rectifier (7, fig. 4) and a transformer (2, fig. 4). A hand crank (1, fig. 2) for manual starting is mounted on the front skid in the lower frame. Facilities are provided, also, for starting and stopping the unit from a remote station. Packaged with the unit is one 6-foot cable for connecting the batteries to the start solenoid, one 6-foot cable for connecting the batteries to ground, and one short cable for the battery-to-battery connection.

g. D-C GENERATOR. In addition to the alternating current produced, the unit develops direct current by means of a 28-volt d-c generator (14, fig. 3) mounted on the left side of the engine. This generator is rated at 2.5 kw at 4,550 rpm (with engine speed at 1,714 rpm) and is belt-driven from the engine crankshaft. The d-c generator voltage is controlled automatically by a voltage regulator (5, fig. 4) mounted on the alternator stator housing.

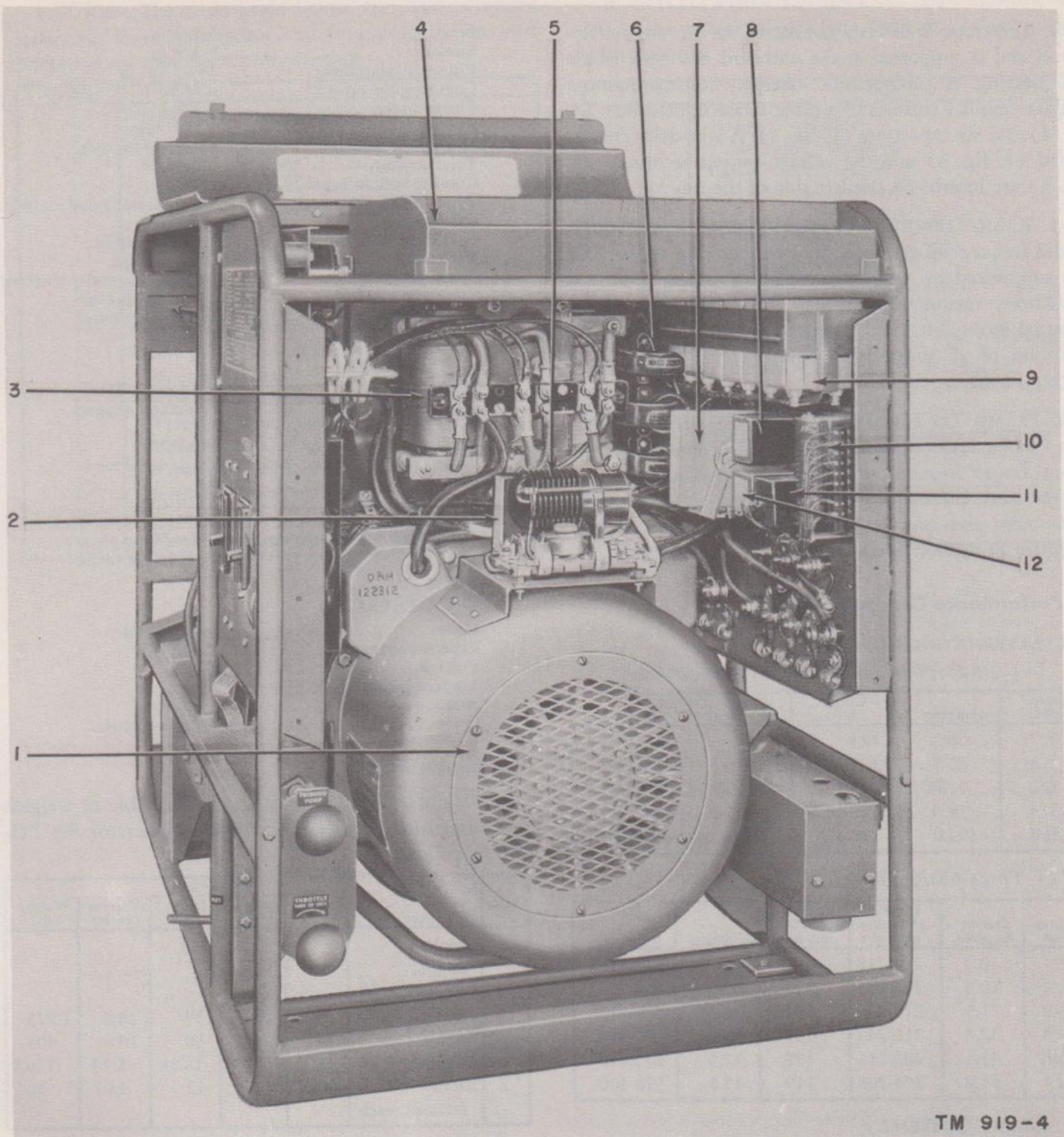
h. EXHAUST SYSTEM (fig. 2). The engine exhaust is carried by rigid pipe to the muffler (2), located laterally across the front of the unit, below the radiator. A flexible exhaust extension tube, 10 feet long, equipped with adapters for ease in attachment to the muffler is provided.

i. WINTERIZATION SYSTEM (fig. 3). To facilitate starting the equipment in low temperatures, a winterization system is incorporated within the unit. Major components of the system include a heater (18), blower motor (17), electric fuel pump (21), fuel control valve (20), heat exchanger pan (16), and metal tubing. Controls for operating this system are incorporated on the control panel (fig. 11).

j. INSTRUMENT PANEL (fig. 11.). The instrument panel is shock-mounted on the right side of the unit and is accessible through a hinged door. Located on the instrument panel are three ammeters (7, 8, 9), a frequency meter (4), a voltmeter (10), and a voltmeter selector switch (11). Engine instruments include an oil pressure gage (5), a battery-charging ammeter (3), and a coolant temperature gage (6).

k. CONTROL PANEL (fig. 11). Located below the instrument panel are the controls necessary to operate the unit. These controls include toggle switches for starting the equipment, an a-c circuit breaker (1), a d-c circuit breaker (2), and a duplex outlet receptacle (17). Controls for the winterization system include a RUN—START toggle switch (13) for starting the heater, an indicator lamp (12), and a circuit breaker (14).

l. ALTERNATOR. The alternator (1, fig. 4) is of the permanent-magnet type with 28 poles, resulting in a frequency of 400 cps (cycles per second) at the synchronous speed of 1,714 rpm. The alternator is rated at 12.5 kw at .8 power factor, 120 or 208 volts, three-phase, 4



TM 919-4

Figure 4. Gasoline Engine Generator Set PU-107/U, rear view.

- | | |
|--|---|
| 1. Alternator (G2). | 7. Battery-charging selenium rectifier (CR2). |
| 2. Battery-charging transformer (T3). | 8. Hold relay (K2). |
| 3. Compensator transformer (T2). | 9. Compensator capacitors (C16 through C21). |
| 4. Tool trays (A74, A76). | 10. Ignition dropping resistor (R1). |
| 5. D-c voltage regulator (VR1). | 11. Start relay (K1). |
| 6. Ammeter current transformers (T4 through T6). | 12. Battery-charging relay (K3). |

c. **TOOLS.** The tools listed below are oiled, wrapped separately in moistureproof and fungiproof paper, and packed in the tool tray within the unit.

Quantity	Item
1	Dresser, ignition contact points.
1	Gage, spark plug and ignition contact points.
1	Hammer, ball peen.
1	Handle, wrench.
1	Bar, sliding, for wrench handle.
1	Oiler, hand.
1	Pliers, combination.
2	Sandpaper, flint.
1	Screw driver.
1	Screw, eye, alternator lifting.
1	Bolt, puller, alternator bearing.
1	Wrench, adjustable.
1	Wrench, box and open end, 3/8 in.
1	Wrench, box and open end, 7/16 in.
1	Wrench, box and open end, 1/2 in.
1	Wrench, box and open end, 9/16 in.
1	Wrench, box and open end, 11/16 in.
1	Wrench, socket, 11/16 in.,
1	Wrench, socket, spark plug, 13/16 in.

d. **INSTALLATION EQUIPMENT.** The following installation equipment is packaged individually and supplied with the unit:

Quantity	Item
1	Adapter, fuel drum.
1	Cable, battery, negative.
1	Cable, battery, positive.
1	Cable, battery-to-battery.
1	Connector, exhaust tubing pipe.
1	Coupling, exhaust tubing lock.
1	Hose, auxiliary fuel line.
1	Tube, flexible exhaust extension.

e. **MISCELLANEOUS EQUIPMENT.** The*following miscellaneous equipment is supplied with the unit:

Quantity	Item
2	Battery, 6-v storage (separately packaged).
1	Bracket, mounting, fire extinguisher.
1	Cover, canvas.
1	Crank, hand.
1	Fire extinguisher.

CHAPTER 2

OPERATING INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF EQUIPMENT

9. Siting

Consider the following factors when selecting a site for the installation and operation of Gasoline Engine Generator Set PU-107/U.

a. RELATION TO LOAD. Locate the generator set as near as possible to the electrical load. Excessively long cables from the unit to the load increase line resistance and cause a definite voltage drop.

b. OUTDOOR INSTALLATION. When the unit is to be operated outdoors, select a site that is reasonably dry and solid enough to support the weight of the unit (1,225 pounds). No special foundation is necessary; however, the unit should be operated in as near a level position as possible. If the terrain is soft or muddy, make a foundation out of planks or other similar material. Provide some form of shelter to protect the equipment from the elements.

c. INDOOR INSTALLATION. When the unit is to be operated within a building or inclosure, set the unit so that the radiator is facing a door, window, or other opening through which the hot-air blast from the engine may pass outdoors. If possible, attach a canvas duct to the radiator grill and attach the other end of the duct to the building opening. Connect the flexible exhaust tubing to the muffler outlet and extend the free end of the exhaust tubing to the outside of the building or shelter. Make sure that all exhaust connections are gastight. *Carbon monoxide fumes from a gasoline engine are extremely dangerous and, when inhaled, may cause serious illness or death.* Provide not less than 2 feet of space on all sides of the unit to facilitate working on and operating the equipment.

d. LOCATION OF FUEL SUPPLY. If the unit is to be operated indoors, locate the fuel supply tank outside the inclosure within easy range of the 20-foot long fuel line furnished with the equipment. Do not locate the tank more than 6 feet below the level of the engine fuel pump.

10. Preparation of Foundation

No special foundation is necessary; however, the generator set should be placed on a firm, level surface capable of supporting weight exceeding 1,225 pounds. The base of the packing crate will serve as a temporary foundation in mud or snow.

11. Uncrating, Unpacking, and Checking

Gasoline Engine Generator Set PU-107/U is shipped in three packages. The unit, including all spare parts, tools, and installation equipment, is contained in one large crate. The two batteries are packed in separate boxes.

Note. The bottom of the unit crate is constructed to form a skid and can be used for sliding the unit short distances.

a. UNCRATING AND UNPACKING. Before uncrating and unpacking, place the unit near the site where it will be operated. Uncrate the unit with care to avoid damage. Use a nail puller and other appropriate tools. Be sure to remove all packages and parts within the crate or they may be accidentally discarded with the packing material. When prepared for overseas shipment, the unit is inclosed in waterproof paper and a vaporproof barrier. When prepared for domestic shipment, the vaporproof barrier is not used. Uncrate and unpack the equipment as follows:

- (1) Remove the top and sides of the large crate.
- (2) Remove the instruction books located on top of the unit.
- (3) Remove the waterproof paper and vaporproof barrier sealed around the bottom of the unit.
- (4) Remove the canvas cover inclosing the entire unit.
- (5) Remove all the packaged installation equipment located in the bottom of the lower frame.
- (6) Remove the nuts from the four bolts that secure the unit to the base of the crate. The generator set now can be moved.

(7) Unpack the spare parts and tools (packaged individually in the tool tray in the rear of the unit) only as required.

(8) Do not uncrate the batteries until the unit has been set up for operation.

b. CHECKING. A list of all spare parts and tools packed with the equipment is mounted on the under side of the tool tray cover. Check to be sure the equipment is complete and has not been damaged in shipment and handling.

(1) Check the tools, spare parts, installation equipment, and all major components with the packing lists.

(2) Inspect the over-all unit carefully for damage. Give particular attention to the following: Examine the carburetor, igniter assembly, air cleaner, and fuel pump for dents and breakage. Check the fuel line from the fuel pump to the carburetor for loose connections and kinks. Examine the instruments and controls for damage. Check all wiring for torn insulation and broken wires. If any damage is noted or if the equipment does not check with the packing lists, fill out and forward DD Form 6.

12. Setting Up Equipment

After a suitable location has been chosen (par. 9) and the equipment has been checked (par. 11*b*), set up the unit for operation as follows:

a. MOUNTING ON FOUNDATION. When preparing for permanent indoor installation, bolt the unit down solidly to the floor. Four holes are located in the mounting pads on the bottom four corners of the lower frame. Mount the unit to the floor with 1/2-inch bolts or lag screws

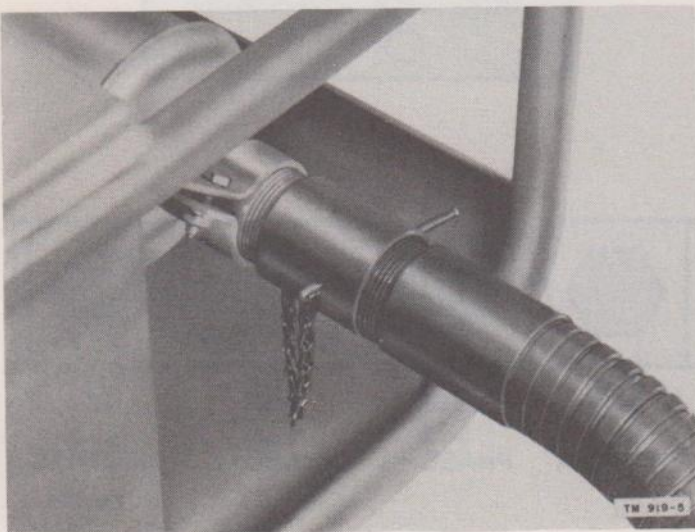


Figure 5. Exhaust tube connection to muffler.

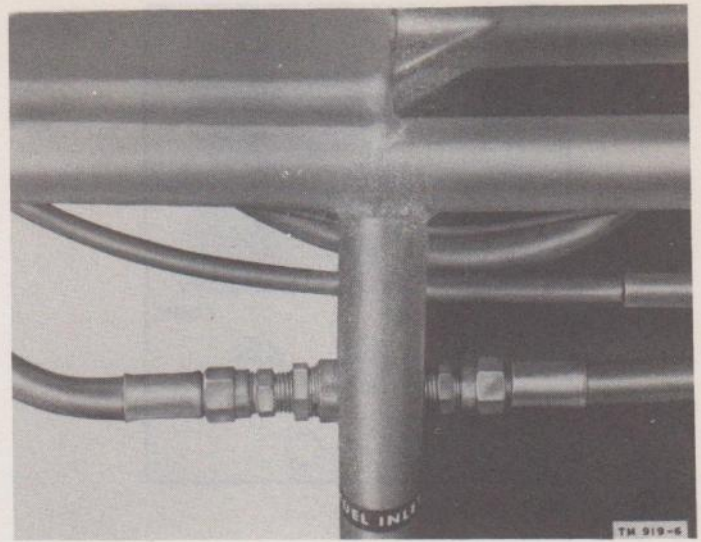


Figure 6. Fuel supply hose connection.

of required length. For outdoor installation, locate the unit on level ground. If this is impossible, the alternator end of the unit must be the lower end. At no time should the generator set be operated in a position more than 10° off level, longitudinally or laterally.

b. CONNECTING EXHAUST TUBE. For indoor operation connect the exhaust extension tube to the muffler as shown in figure 5. Extend the tube to an exterior wall using the most direct route with as few turns as possible. All connections must be gastight. Pitch the tube downward so all condensate will drain out. If the tubing passes through an inflammable wall, install appropriate fireproof insulation.

Warning: Carbon monoxide is deadly poisonous. Inhaling exhaust gases may be fatal.

c. CONNECTING FUEL HOSE. Connect the 20-foot fuel hose to the coupling assembly located near the fuel filter on the right side of the unit as shown in figure 6. Connect the opposite end to the fuel drum adapter. Mount the adapter in an externally located fuel container. Be sure all connections are tight.

d. INSTALLING RADIATOR DUCT. The radiator grill is constructed with a channel flange around the outside edge. For indoor operation, attach a canvas duct to the flange. Use a window or make an opening in an exterior wall and attach the outlet end of the duct. This opening must be at least as large as the radiator grill flange. This will remove the hot blast of air caused by engine operation.

e. INSTALLING FIRE EXTINGUISHER. The fire extinguisher, mounting bracket, and hardware are shipped with the equipment but unassembled to the unit. Mounting holes have been drilled in the rear upper frame panel for mounting the fire-extinguisher bracket. Bolt the bracket to the unit and mount the fire extinguisher in the bracket.

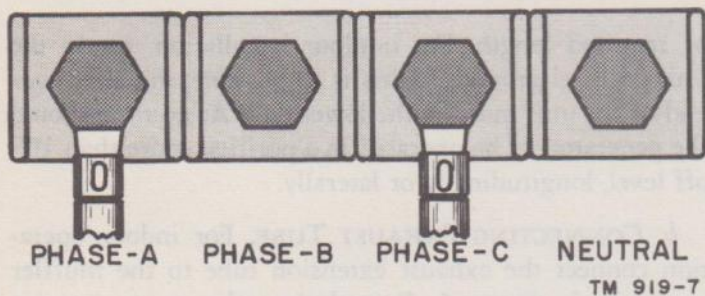
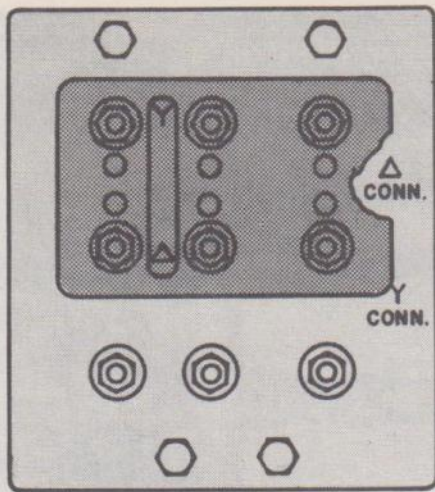


Figure 7. 120-volt, single-phase connections (delta).

13. Removal of Corrosion Preventives

Corrosion preventives are for permanent protection and must not be removed. There are no protective seals installed on the unit.

14. Connections and Interconnections

All internal connections for the operation of the generator set are made at the factory and no additional connections within the unit are needed. Make a-c output connections, d-c output connections, remote start connections, and battery connections as follows:

a. **A-C OUTPUT CONNECTIONS.** The wye-delta change board and the output terminals are located on the left side of the unit. Sight through the *window* in the change board door to check the a-c output rating in which the generator set is connected. The symbol of the rated load will be either Y (wye) or Δ (delta). To change the voltage connections, open the change board door and remove the six nuts and washers that secure the jumper board to the terminal board. For 120-volt, single-phase, 10-kw operation, connect the jumper board in the delta position. Connect cables from the load to output terminals marked PHASE-A and PHASE-C. Use #0 AWG (American Wire Gauge) cable. For 120/208-volt, three-phase, 12.5-kw operation, connect the jumper board in

the wye position. Connect cables from the load to output terminals marked PHASE-A, PHASE-B, PHASE-C, and NEUTRAL (if required). Use #4 AWG cable. Figures 7 and 8 show the proper delta and wye connections.

Warning: Never attempt to change the output rating with the unit in operation.

b. **D-C OUTPUT CONNECTIONS.** A d-c load of 2.5 kw at 28 volts may be connected to the unit at any time that the total a-c load is not in excess of 10 kw, three-phase or single-phase. Connect the d-c load to the positive (+) and negative (-) output terminals located adjacent to the a-c output terminals on the left side of the unit. Use #0 AWG cable.

c. **REMOTE CONTROL CONNECTIONS.** Three remote control terminals are located on the left side of the unit, above the a-c output terminals. The terminals are marked COMMON, STOP, and START. By using a three-conductor cable, #14 AWG or larger, the remote location may be extended up to 150 feet. To operate the unit from a remote location, it will be necessary to install a start-stop switch at the remote point. With a single-pole, double-throw, center-off toggle switch, make the following connections:

(1) Connect the cable from the stop terminal on the switch to the remote STOP terminal on the unit.

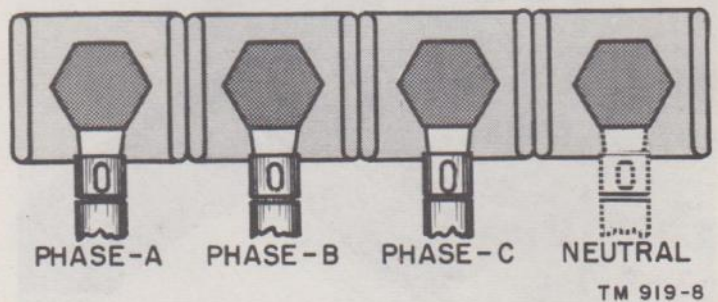
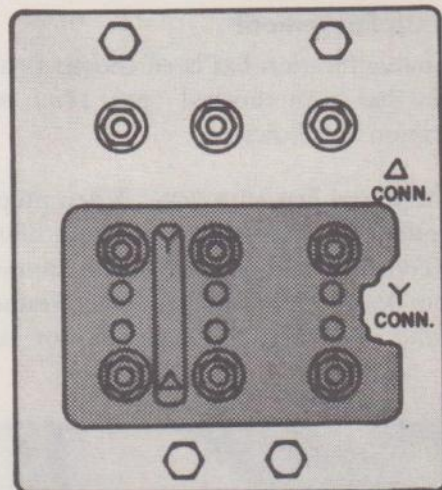
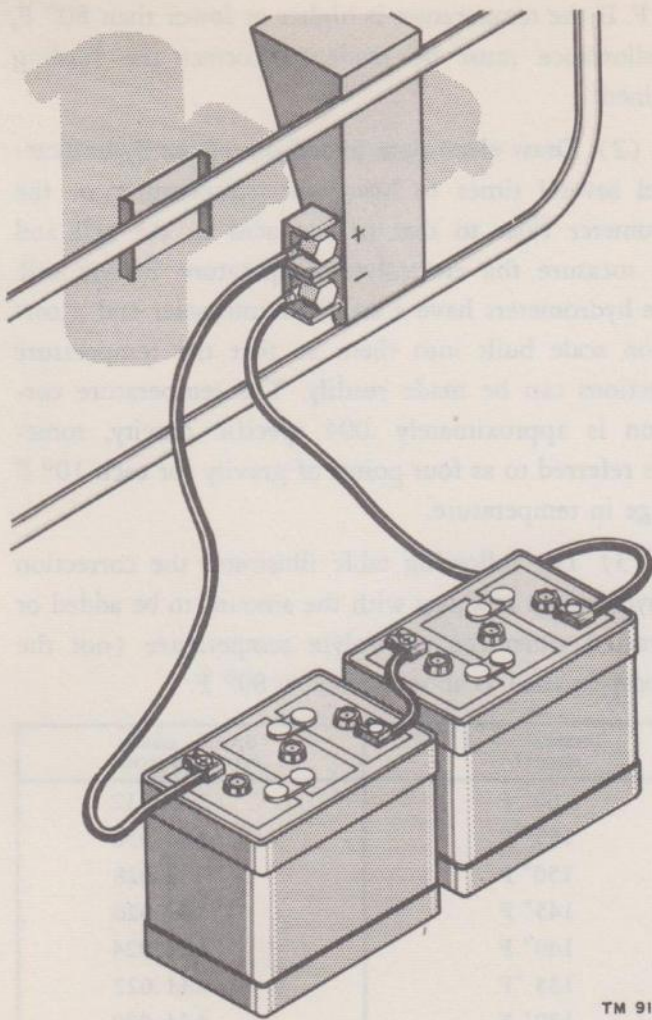


Figure 8. 120/208-volt, three-phase connections (wye).



TM 919-9

Figure 9. Battery connections.

(2) Connect the cable from the start terminal on the switch to the remote START terminal on the unit.

(3) Connect the cable from the center terminal on the switch to the remote COMMON terminal on the unit.

d. BATTERY CONNECTIONS. Two terminals for connecting the battery cables are located on the left side of the unit. After preparing the batteries for use as instructed in paragraph 17, position the batteries near the unit and connect them in series as follows: Attach the battery jumper cable from the negative post of one battery to the positive post of the other battery. Connect a cable from the positive (+) terminal on the unit to the battery with the *open* positive post. Connect a cable from the negative (-) terminal on the unit to the battery with the *open* negative post. Figure 9 shows the proper battery connections.

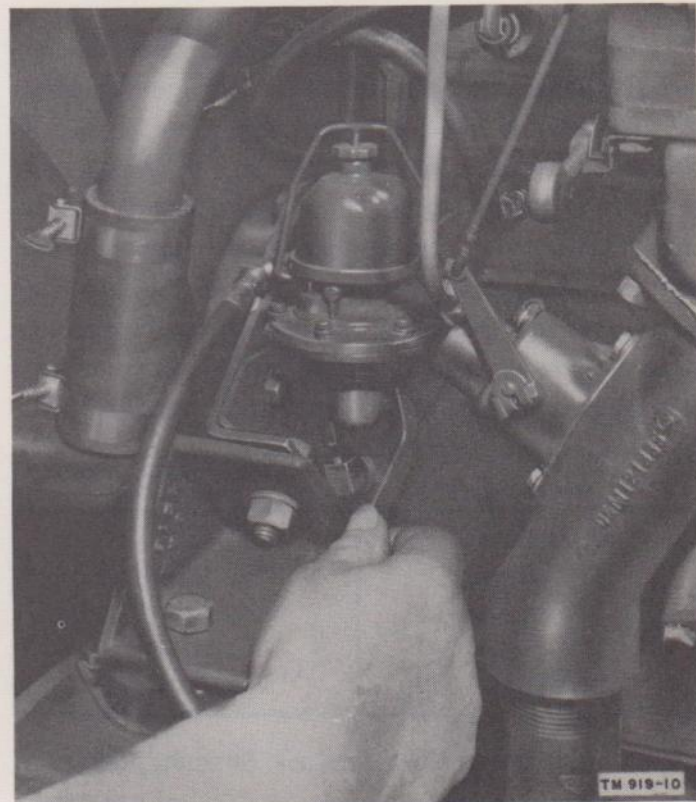
15. Initial Lubrication

Check the crankcase oil drain valve to be sure it is closed. Remove the cap from the oil-filler tube and fill

the crankcase with oil as specified in the lubrication chart (fig. 16). The capacity of the lubrication system is 4 quarts. Unfasten the two clamps on the air cleaner and remove the bowl. Clean the bowl with Solvent, dry-cleaning (SD) and fill to the normal oil level mark with oil as specified in the lubrication chart. The remainder of the unit is factory-lubricated and does not require initial preparation.

16. Preparation of Fuel System and Cooling System

a. Connect the fuel supply to the unit as instructed in paragraph 12c. Manually crank the engine a few times to make sure that all parts move freely. Operate the hand lever on the fuel pump (fig. 10) to see if it operates freely. If the fuel pump hand lever cannot be moved, crank the engine one complete revolution. If the engine camshaft is in a position where the fuel pump arm is held up by the cam, the fuel pump hand lever cannot be operated. When the fuel pump hand lever can be moved freely, move it up and down until pressure built up within the fuel system prevents further operation of the hand lever. Now push the hand lever down and leave it there. The fuel pump will not operate unless this handle is in the down position. Set the air-inlet gage, on the air cleaner, at the correct position for the temperature in which the unit is to be operated (above 50° F, or below 50° F).



TM 919-10

Figure 10. Priming fuel pump.

b. Check the coolant drain cocks on the radiator and on the winterization heater. They must be closed. Fill the cooling system with clean water for use in temperatures above 32° F. In temperatures of 32° F, or lower, add antifreeze in accordance with current directives. The liquid capacity of the cooling system is 16 quarts.

17. Preparation of Storage Batteries

a. INITIAL PREPARATION. The two 6-volt lead-acid storage batteries are shipped in a dry-charged condition. The manufacturer's instructions for preparing the batteries are lettered on each battery. Additional instructions follow:

(1) Remove or destroy any sealing device which may have been used to close or restrict the vent openings.

(2) Fill the cells to 1/2 inch above the separators with electrolyte (sulfuric acid diluted with distilled water). The electrolyte should have a specific gravity of 1.280 at a temperature of 80° F.

Warning: When preparing the electrolyte, add the acid slowly to the water. *Never add water to the acid.*

(3) Allow the batteries to stand from 1 to 4 hours. Check the level of the electrolyte in the cells and, if necessary, add more electrolyte.

b. CHARGING PROCEDURE. If possible, give the batteries a freshening charge as follows: Charge the battery at 8 amperes at an electrolyte temperature of 80° F. Charge until three consecutive readings of voltage and/or specific gravity at 1/2-hour intervals show no increase. During the charging period, the temperature of the electrolyte should not exceed 115° F. The following table gives the specific gravity values for batteries in various states of charge. All the values shown are for electrolyte at the correct filling height and at 80° F.

State of charge	Standard specific gravity in temperate climates
Fully charged.	1.280
75% charged.	1.230
50% charged.	1.180
25% charged.	1.130
Discharged.	1.080

c. TEMPERATURE CHANGES OF SPECIFIC GRAVITY.

(1) The hydrometer readings will be correct only when the electrolyte in the battery is at a temperature of

80° F. If the temperature is higher or lower than 80° F, an allowance must be made to correct the reading obtained.

(2) Draw electrolyte in and out of the hydrometer barrel several times to bring the temperature of the hydrometer float to that of the acid in the cell and then measure the electrolyte temperature in the cell. Some hydrometers have a small thermometer and a correction scale built into them so that the temperature corrections can be made readily. The temperature correction is approximately .004 specific gravity, sometimes referred to as four points of gravity for each 10° F change in temperature.

(3) The following table illustrates the correction for hydrometer readings with the amount to be added or subtracted when the electrolyte temperature (not the air temperature) is above or below 80° F.

Temperature of electrolyte	Specific gravity correction factor
160° F	Add .032
155° F	Add .030
150° F	Add .028
145° F	Add .026
140° F	Add .024
135° F	Add .022
130° F	Add .020
125° F	Add .018
120° F	Add .016
115° F	Add .014
110° F	Add .012
105° F	Add .010
100° F	Add .008
95° F	Add .006
90° F	Add .004
85° F	Add .002
80° F	.000
75° F	Subtract .002
70° F	Subtract .004
65° F	Subtract .006
60° F	Subtract .008
55° F	Subtract .010
50° F	Subtract .012
45° F	Subtract .014
40° F	Subtract .016
35° F	Subtract .018
30° F	Subtract .020
25° F	Subtract .022
20° F	Subtract .024
15° F	Subtract .026
10° F	Subtract .028