# TM 11-6625-680-15

**DEPARTMENT OF THE ARMY TECHNICAL MANUAL**

**ORGANIZATIONAL, DS, GS, AND**
**DEPOT MAINTENANCE MANUAL**

# TEST SET, MOTOR-GENERATOR AN/GSM-65

This copy is a reprint which includes current pages from Changes 1 and 2.

**HEADQUARTERS, DEPARTMENT OF THE ARMY**

**MARCH 1966**

## WARNING

**DANGEROUS VOLTAGES EXIST IN THIS EQUIPMENT**

**During testing operations, 115-volts ac is present. Serious injury or death may result from contact with internal connections at switches and transformers.**

**WARNING**

After the dc power source is connected to the 28 vdc input terminals on the front panel of the test set, bind the input dc terminals with electrical insulation tape (NSN 5970-00-296-1625), leaving no bare metal of the binding posts or conductor exposed. Failure to observe this warning can result in severe burns to personnel.

TECHNICAL MANUAL
No. 11-6625-680-15

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *25 March 1966*

# ORGANIZATIONAL DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE

# MANUAL TEST SET, MOTOR-GENERATOR AN/GSM-65

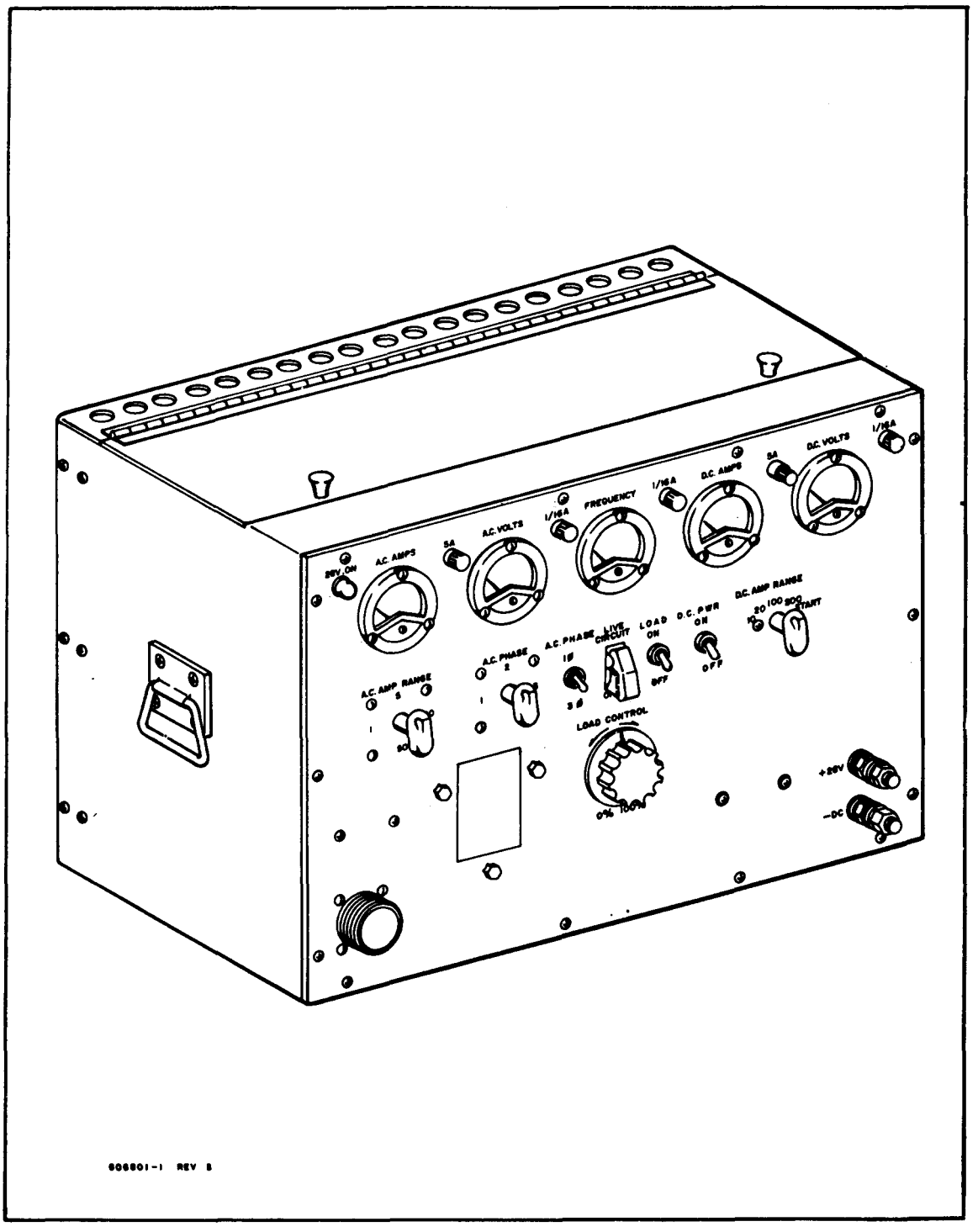



Figure 1-1. Aircraft Motor-Generator Tester

# SECTION I
# INTRODUCTION AND DESCRIPTION

## 1-1. General

**1-2. Scope.** This manual describes Test Set, Motor-Generator AN/GSM-65 (fig. 1-1) and provides instruction for installation operation, maintenance, troubleshooting and calibration of the equipment. It includes the Basic Issue Items List, Maintenance Allocation Charts and an illustrated parts breakdown. All references to Motor-Generator Tester, Type L-1A in this manual apply to Test Set, Motor-Generator AN/GSM-65 procured on contract AF41(608)-34347.

### 1-2.1. Indexes of Publications

*a. DA Pam 310-4.* Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

*b. DA Pam* 310-7. Refer to DA Pam 310-7 to determine whether there are modification work orders (MWO's) pertaining to the equipment

### 1-2.2. Forms and Records

*a. Reports of Maintenance and Unsatisfactory Equipment.* Maintenance forms, records, and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by TM 38-750.

*b. Report of Packaging and Handling Deficiencies. Fill* out and forward DD Form 6 (Report of Packaging and Handling Deficiencies) as prescribed in AR 700-58 (Army)/NAVSUP PUB 378 (Navy)/AFR 71-4 (Air Force)/and MCO P4030.29 (Marine Corps), and DSAR 4145.8.

*c. Discrepancy in Shipment Report (DISREP) (SF 361).* Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38 (Army)/NAVSUPINST 4610.33/AFM 75-18/MCO P4610.19A (Marine Corps), and DSAR 4500.15.

### 1-2.3. Reporting of Errors

The reporting of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications) and forwarded direct to Commander, US Army Electronics Command, ATTN: AMSEL-MA-A, Fort Monmouth, NJ 07703.

**1-3.** The Type L-1A tester, illustrated in figure 1-1, is used to perform systems-under-test test procedures on aircraft inverters to include inverters up to a rated output of 2500 volt-amperes at unity power factor. Additional tester capacity is inherent to a limit of 3000 volt-amperes. Inverter testing is accomplished by performing:

*a.* Tester to inverter cable assembly connections.

*b.* Metering and recording input voltage and current.

*c.* Measuring and recording the values of the inverter-under-test output voltage, current, and frequency.

*d.* An 8th cable (para 1-22) is required for testing the PU-543/A inverter.

### 1-3.1. Items Comprising an Operable Test Set Motor-Generator AN/GSM-65

| Qty | *Nomenclature, part No., and mfr code* |
|---|---|
| | **NOTE** The part number is followed by the applicable 5-digit Federal supply code for manufacturers (FSCM) identified in SB-708-42 and used to identify manufacturer, distributor, or Government agency, etc. |
| | Test Set, Motor-Generator AN/GSM-65 which includes: |
| 1 | Cable Assembly, Special Purpose, Electrical: 506814-13,02106 |
| 1 | Cable Assembly, Special Purpose, Electrical: 506814-11,02106 |
| 1 | Cable Assembly, Special Purpose, Electrical: 506814-9,02106 |
| 1 | Cable Assembly, Special Purpose, Electrical: 506814-7,02106 |
| 1 | Cable Assembly, Special Purpose, Electrical: 506814-5; 02106 |
| 1 | Cable Assembly, Special Purpose, Electrical: 506814-3; 02106 |
| 1 | Cable Assembly, Special Purpose, Electrical: 506814-1,02106 |

## 1-4 Description

**1-5.** The tester, consisting of three major assemblies and seven cable assemblies, is illustrated in figure 1-2, The equipment includes the back cover (1) that affords enclosure protection to the load bank assembly (2) and cabinet assembly (3), which houses the seven cable assemblies (4) and mounts the panel assembly (5).

**1-6. Panel Assembly.** The panel assembly (figure 1-3) mounts all internal components, with exception of autotransformer and load bank, and displays all controls, meters, indicators, and terminals controlling the operation and testing facilities of the tester. The controls and meters consist of: A.C. AMP RANGE selector (21), A.C. PHASE selector (19), A.C. PHASE switch (18) LOAD switch (13), LIVE CIRCUIT switch (16), D.C. PWR switch (12A), D.C. AMP RANGE rotary shunt selector and start switch (12), and LOAD CONTROL autotransformer selector (17); the five meters include A.C. AMPS. meter (2), A.C. VOLTS meter (4), FREQUENCY meter (6), D.C. AMPS meter (8), and D.C. VOLTS meter (10). Indicator lights displayed are red 5A indicator fuse (9) and green 28V. ON indicator (1) Fuses displayed are 5A (3) and 1/16A (5, 7, 11). Cable assembly connector (22), tester name plate (20), and power terminals +28V (14) and —DC (15) complete the panel assembly configuration.

**1-7. Cabinet Assembly.** The cabinet assembly (figure 1-2, 3) provides the main body structure, mounts the autotransformer (6), and encloses the internal components and circuits of the tester attached to the panel assembly (5) A recessed portion within the cabinet top provides storage for the seven cable assemblies (4) used in forming external tester-inverter connections.

**1-8. Load Bank Assembly.** The load bank assembly (2) is attached to the rear of the cabinet assembly to furnish mounting service for three 1.0 KW resistors used to supply an electrical load for an attached inverter-under-test. Heat buildup within the load bank assembly is dissipated by means of convection ventilating holes cut into the top and back of the back cover (1)

## 1-9. Power Requirement

**1-10.** Direct current power source of 28 VDC at 5-KW rating is required by the tester for test of all aircraft inverters up to and limited at maximum output of 2500 volt-amperes.

## 1-11. Principles of Operation.

**1-12.** The Type L-1A tester is designed to test any aircraft inverter, whether single-phase or three-phase delta output, limited to 2500 volt-amperes. Provisions are incorporated to perform test procedures by plugging a designated cable assembly (paragraph 4-3); into the tester connector and connecting the cable assembly to the inverter-under-test.

**1-13.** The inverter is activated by DC-power applied by the tester to the inverter input section by means of the interconnecting cable assembly. Inverter output is returned to the tester through the same cable assembly.

**1-14.** Inverter input voltage and current, supplied by the tester, are indicated for recording by the DC voltmeter and DC ammeter. Outputs from the inverter: amperage, voltage, and frequency are indicated for recording by the AC ammeter, AC voltmeter, and frequency meter, respectively.

**1-15.** Variable electrical load is imposed on the inverter by routing current through the tester load bank, with variable load control settings providing the limits.

**1-16.** A live circuit maintains current to filament or cathode heaters of electronic tubes used in control

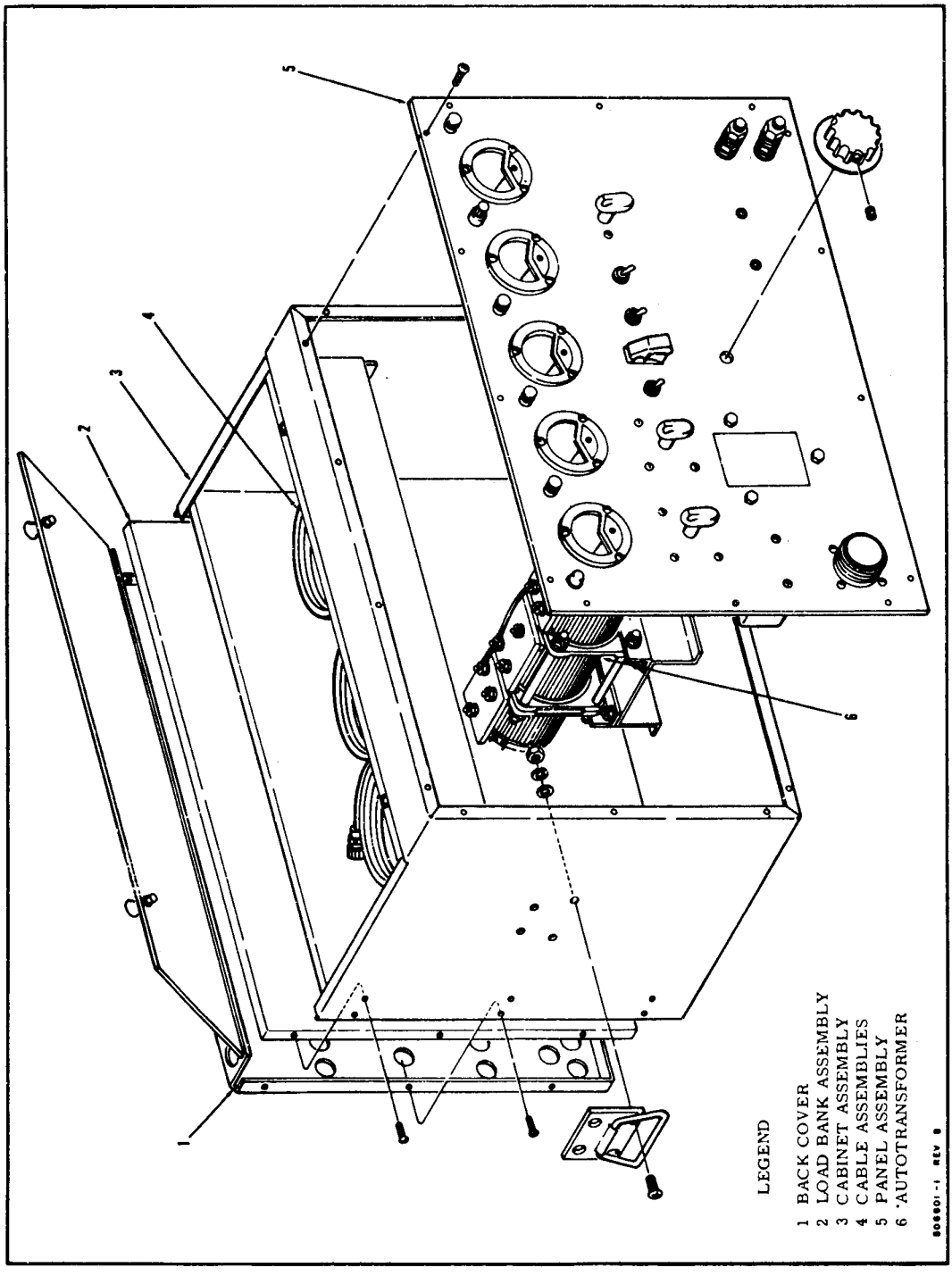
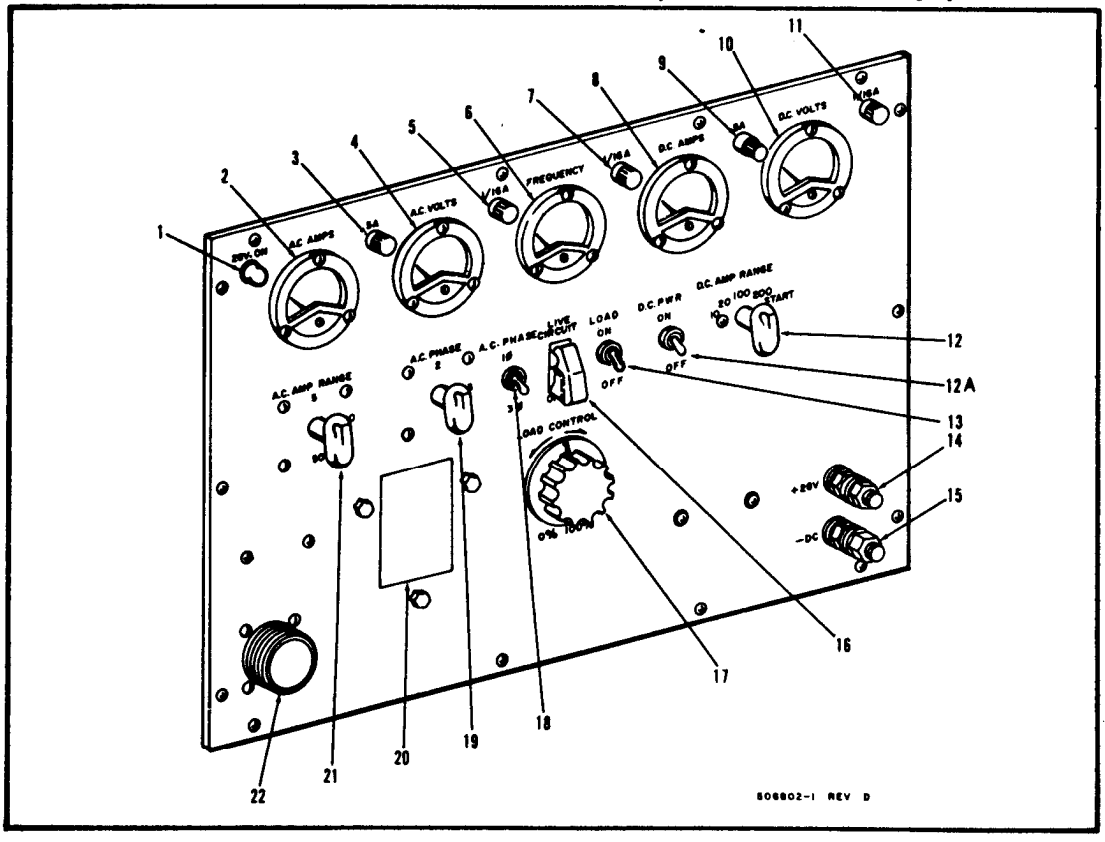



Figure 1-2. Major Assemblies of Tester




1 (GREEN) 28V. ON INDICATOR
2 A.C. AMPS METER
3 5A FUSE
4 A.C. VOLTS METER
5 1/16A FUSE
6 FREQUENCY METER
7 1/16A FUSE
8 D.C. AMPS METER
9 (RED) 5A INDICATOR FUSE
10 D.C. VOLTS METER
11 1/16A FUSE
12 D.C. AMP RANGE ROTARY SHUNT SELECTOR AND START SWITCH
12A D.C. PWR SWITCH
13 LOAD SWITCH
14 +28V POWER TERMINAL
15 -DC POWER TERMINAL
16 LIVE CIRCUIT SWITCH
17 LOAD CONTROL AUTOTRANSFORMER
18 A.C. PHASE SWITCH
19 A.C. PHASE SELECTOR
20 TESTER NAME PLATE
21 A.C. AMP RANGE SELECTOR
22 CABLE ASSEMBLY CONNECTOR

Figure 1-3. Panel Assembly, Front View

circuits of some inverters. The live circuit supplies 28-VDC power to the control terminal of inverters which use 4- or 5- post AN-type terminal block. The live circuit is protected by a 5-AMP cartridge-type fuse with circuit interruption displayed by a red indicator light.

1-17. The live circuit is energized by applying 28-VDC power to the tester, installing the cable assembly connecting the tester to inverter-under-test, positioning live-circuit switch (figure 1-3, 16) to raised position. (Wait approximately 60 seconds before commencing test.) Additional live-circuit control is afforded by an overcenter spring-guard which holds the switch open when the spring-guard is in lowered position,

1-18. Protection to all meters, except the DC ammeter, is afforded by fuses incorporated into the circuits. The DC ammeter circuit includes a sensitive-type relay that provides circuit interruption when a current overload of 110 to 130 percent of capacity is encountered. The excessive current activates the sensitive relay which opens the DC power input to the tester and drops out an interlock circuit.

1-19. Various controls and switches provide specific test settings and tester activation to permit testing the different circuits of inserters for proper values.

1-20. A schematic diagram of the tester is presented in figure 1-4.

1-21 CONTROLS AND FUNCTIONS (fig. 1-3)

| CONTROL | FUNCTION |
|---|---|
| 28V ON indicator (1) | Glows green when D.C. PWR switch is set to ON. |
| A.C. AMPS meter (2) | Indicates ac output current of tested inverter. |
| 5A fuse (3) | Protects A.C. AMPS meter from overload. |
| A.C. VOLTS meter (4) | Indicates ac output voltage of tested inverter. |
| 1/16 A fuse (5) | Protects A.C. VOLTS meter from overload. |
| FREQUENCY meter (6) | Indicates output frequency of tested inverter. |
| 1/16 A fuse (7) | Protects FREQUENCY meter from overload. |
| D.C. AMPS meter (8) | Monitors dc input current to inverter under test. |
| 5A indicator fuse (9) | Glows red when 5-ampere fuse protecting live circuit opens. |
| D.C. VOLTS meter (10) | Monitors dc input voltage to inverter under test. |
| 1/16 A fuse (11) | Protects D.C. VOLTS meter from overload. |
| D.C. AMP RANGE selector and START switch (12) | Selects D.C. AMPS meter scale as appropriate for inverter under test. START position bypasses meter to protect it from starting current surges. |
| D.C. PWR switch (12A) | Completes 28-volt dc power to test set. |
| LOAD switch (13) | Connects load to inverter circuit under test. |
| +28V (14) and -DC (15) terminals | DC input terminals. |
| LIVE CIRCUIT switch (16) | Completes dc circuit to regulators of inverter under test. |
| LOAD CONTROL autotransformer (17) | Adjusts load (and therefore load current) of inverter under test. |
| A.C. PHASE switch (18) | Completes tester circuits for checking single or 3-phase inverters. |
| A.C. PHASE selector (19) | Selects phase of inverter under test for current and voltage measurements. |
| A.C. AMP RANGE selector (21) | Selects A.C. AMPS meter scale as appropriate for unit under test. |
| Connector (22) | Receptacle for input and output connections to inverter under test. |

1-22. Cable 8

1-23. Cable 8 shown in figure l-5 and used to test the PU-543/A inverter may not be supplied with the tester. Fabricate cable 8 in accordance with the schematic diagram in figure 1-5. Use five AWG 12 cables, at least 36 inches 1, between connector type AN 3106-36-6P (tester end) and connector type AN 3106-24-20S (11-pin connector to the PU-543/A.

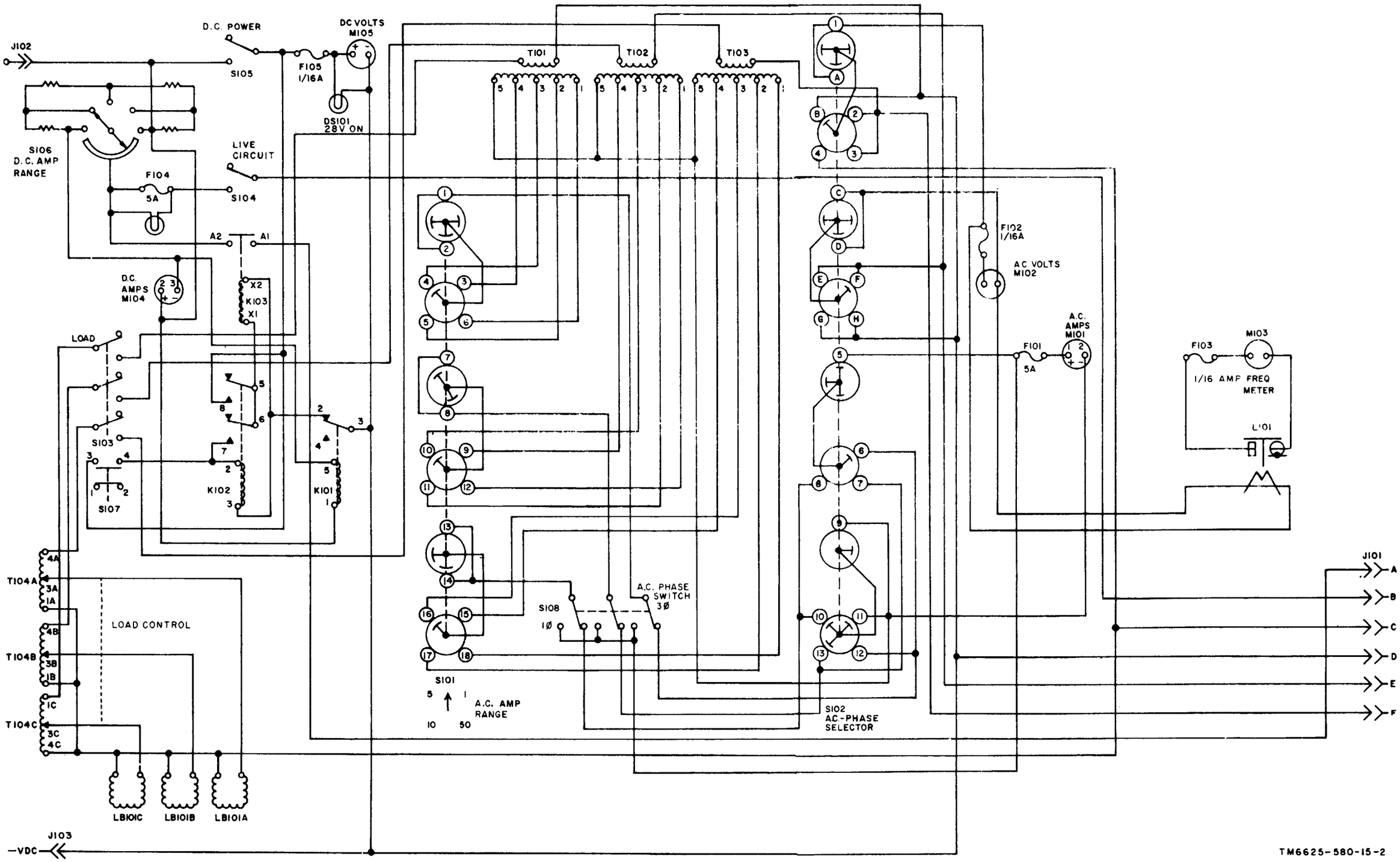



*Figure 1-4. Aircraft motor-generator tester schematic diagram.*

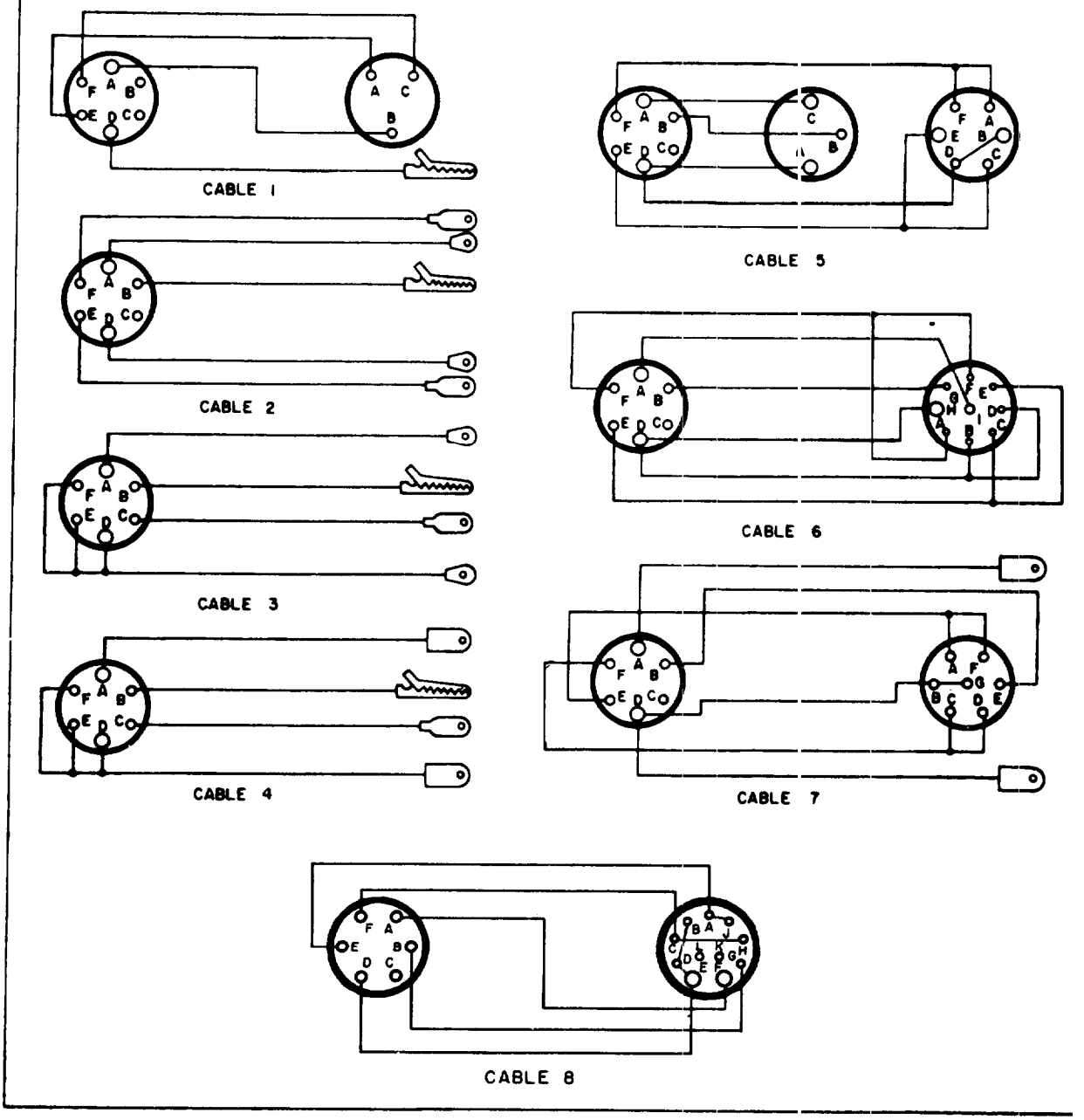



*Figure 1-5. Accessory cables, wiring diagrams.*

## SECTION II

## SPECIAL SERVICE TOOLS

2-1. SPECIAL SERVICE TOOLS.

2-2. No special service tools are required to service and maintain the Aircraft Motor-Generator Tester, Type L-1A.

2-3. HAND TOOLS.

2-4. Ordinary hand tools, normally used by technicians and electricians, are required for routine service, operation, and calibration.

## SECTION III

## PREPARATION FOR USE, STORAGE, OR SHIPMENT

3-1. PREPARATION FOR USE.

3-2. Remove the tester from the shipping crate and packing carton. Remove all shipping protective covers and materials. Open the top cover to the cable-assemblies storage compartment and remove and discard protective material from compartment.

3-3. Visually inspect the tester. for external damage to cabinet, broken meter dial faces, and external damage to the seven cable assemblies. Actuate all switches and controls throughout entire range to verify freedom of movement.

3-4. INSTALLATION AND POWER CONNECTION.

3-5. The tester, being movable, may be placed as required to perform assigned test at various installations. Placement limitations are applied only by source of 28-VDC power locations and facilities available to connect aircraft inverters.

**CAUTION**

Ensure 28-VDC power source is open, D.C. PWR ON switch is at OFF position, and D.C. AMP RANGE selector is at START position prior to performing power source connections detailed in paragraph 3-6. Failure to comply can result in damage to equipment.

3-6. Connect 28-VDC power source to the tester power terminals, ensuring matched polarity (+28V, -DC) as marked on tester and power source cables.

3-7. STORAGE.

3-8. No special precautions are required to prepare tester for storage. Storage should be in a clean dry area, sheltered from dust by an adequate cover, and protected from damaging impact. Refer to paragraph 3-10 when preparing tester for extended storage.

3-9. SHIPMENT.

3-10. Adequately cover and protect connectors on the seven cable assemblies and secure the cables in the cable storage compartment with packing material. Protect and crate the tester according to standard commercial packing and shipping procedures. The tester shall be prepared for overseas shipment (or extended storage) by conforming to packaging in accordance with Specification MIL-P-116, method II a. Packing shall conform to Specifications JAN-P-106 or PPP-B-601. Interior packages and exterior shipping containers (packing) shall be marked in accordance with Standards MIL-STD- 129 and MIL-STD-130.

# SECTION IV

# OPERATING INSTRUCTIONS

4-1. PRELIMINARY ADJUSTMENTS.

4-2. Verify mechanical zero setting of each meter (excluding frequency meter) and adjust if necessary. Verify frequency meter at center-set, of 400 cycles "per second, and adjust if required to the center-set position. (Refer to paragraph 7-6.)

4-3. SELECTING SPECIFIC CABLE ASSEMBLY.

**CAUTION**

Ensure correct cable assembly selection as three-phase inverters can be tested on delta output only. Cable assemblies are identified by numbered strips encircling the cables near the large connector. Failure to use correct cable assembly can result in damage to equipment.

4-4. Determine number and rated output of inverter-under-test (whether single-phase or three-phase) and select cable assembly designated in figure 4-1. Verify selection of proper cable assembly by matching the number and type of terminals of the cable assembly to those on the inverter. If the inverter to be tested is not listed in figure 4-1, determine rated output of inverter, then select the cable assembly from list that meets single-phase or three-phase delta output requirement and matches connection points of the inverter. (Refer to inverter handbook of instruction.)

**CAUTION**

To prevent cable damage by heat generated during test, remove all unused cable assemblies from recessed storage space in cabinet top.

4-5. CONNECTING TESTER TO INVERTER-UNDER-TEST.

4-6. Connect tester to inverter-under-test by performing the following procedure:

a. Secure the selected cable assembly to the inverter as detailed in the inverter handbook. Verify inverter requirements for maintaining current to provide heat in control circuits.

b. Ensure switches and controls are positioned as follows:

1. D.C. PWR switch (figure 1-3. 12A) at OFF.

2. LIVE CIRCUIT switch (16) positioned up and energized for inverters requiring heat in control circuits, down end OFF for inverters not requiring 'heat in control circuits. (Refer to paragraphs 1-16 and 1-17.)

3. A.C. PHASE switch (18) at 10 for single-phase inverter, 30 for 3-phase inverter.

4. A.C. PHASE selector (19) at 1.

5. A.C. AMP RANGE selector (21) at 50.

6. D.C. AMP RANGE rotary shunt switch selector (12) at START.

7. LOAD CONTROL autotransformer selector (17) at 0%.

c. Plug the large connector of the cable assembly into the tester connector (22).

4-7. TESTING PROCEDURE.

**Note**

All tests are conducted at tester settings and indications as instructed in the handbook pertaining to the specific inverter-under-test.

4-8. Place the D.C. PWR switch (figure 1-3, 12A) at ON, energizing the tester and the inverter-under-test. The green 28V. ON indicator light (1) should illuminate and the inverter immediately start.

**WARNING**

Do not touch rear of cabinet during test operation. Do not place any equipment on or near rear of cabinet during test operation. Failure to observe this warning can result in severe burn to personnel or fire hazard to equipment.

4-9. Observe the A.C. VOLTS meter (4) and the FREQUENCY meter (6) for correct no-load indications.

4-10. Rotate the D,C. AMP RANGE rotary shunt switch selector (12) and the A. C. AMP RANGE selector (21) to placarded settings one higher than current flow requirements of the inverter. Place LOAD switch (13) to ON.

**Note**

With LOAD CONTROL autotransformer selector at 0% and A.C. AMP RANGE selector at 1 the A.C. AMPS meter will indicate approximately 0.2 AMP (autotransformer excitation current).

| INVERTER NUMBER | RATED OUTPUT | CABLE ASSEMBLY NUMBER |
|---|---|---|
| AN3534-1 | 750 VA 3Ø Delta 115 V | 2 |
| F16-4 | 250 VA 3Ø Delta 115 V | 2 |
| F20-4 | 500 VA 3Ø Delta 115 V | 2 |
| MS25094 | 500 VA 3Ø Delta 115 V | 5 |
| MS25095 | 750 VA 3Ø Delta 115 V | 5 |
| MS25096 | 1500 VA 3Ø Delta 115 V | 7 |
| MS25097 | 2500 VA 3Ø Delta 115 V | 7 |
| MS25161 | 1500 VA 1Ø 115 V | 4 |
| MS25162 | 2500 VA 1Ø 115 V | 4 |
| MS25173 | 250 VA 3Ø Delta 115 V | 2 |
| MS25173 | 250 VA 1Ø 115 V | 3 |
| MS25174 | 500 VA 3Ø Delta 115 V | 2 |
| MS25174 | 500 VA 1Ø 115 V | 3 |
| MS25175 | 750 VA 3Ø Delta 115 V | 2 |
| MS25175 | 750 VA 1Ø 115 V | 3 |
| PU16 | 750 VA 1Ø 115 V | 3 |
| 3011-1 EICOR | 100 VA 3Ø Delta 115 V | 1 |
| 32E03-3-E | 2500 VA 1Ø 115 V | 4 |
| PU-542/A | 100VA 3Ø 115V | 1 |
| | 60VA 1Ø 115V | 1 |
| PU-543/A | 250VA 1Ø Delta 115V | 8 |
| PU-544/A | 750VA 1Ø 115V | 5 |
| | 750VA 3Ø Delta 115V | 5 |
| PU-545/A | 2500VA 1Ø 115V | 7 |
| | 2500VA 3Ø Delta 115V | 7 |

Figure 4-1. Cable Assembly and Inverter Number Selection List

4-11. Rotate A,C. AMP RANGE selector (21) to placarded setting 5, and slowly increase test load to required test values by rotating the LOAD CONTROL autotransformer selector (17) to values stated for the inverter.

4-12. Obtain voltage and current values of individual circuits and record as follows:

a. Three-phase inverter:

1. Set A.C. PHASE switch (18) to 30.

2. Selectively rotate A.C. PHASE selector (19) indicator through engraved ranges 1, 2, and 3 (phase recording).

3. Observe meter indications at each phase point, and record.

b. Single-phase inverter:

1. Set A.C. PHASE switch (18) to 1Ø.

2. Set A.C. Phase Selector (19) to Neutral Position.

3. Observe Meter Indications and Record.

4-13. AFTER–TESTING PROCEDURE.

4-14. Test being completed, rotate the LOAD CONTROL autotransformer selector (figure 1-3, 17) counterclockwise to 0%, and position toggle switches LOAD (13), D.C. PWR (12A), and LIVE CIRCUIT (16) to OFF.

4-15. Remove attached cable assembly and store all cable assemblies in storage compartment. Cover tester when not in use to protect equipment.

## SECTION V

## PERIODIC INSPECTION, MAINTENANCE, AND LUBRICATION

5-1. Scope of Maintenance. The maintenance duties assigned to the operator of the equipment are listed below together with a reference to the paragraphs covering the specific maintenance functions.

5-1.1. Daily preventive maintenance checks and services are covered in paragraph 5-2.4.

5-1.2. Weekly preventive maintenance checks and services are covered in paragraph 5-2.5.

5-1.3. Quarterly preventive maintenance checks and services are covered in paragraph 5-2.6.

5-1.4. Cleaning procedures are covered in paragraph 5-2.7.

5-1.5. Touchup painting Information is covered in paragraph 5-2.10.

5-2. Preventive Maintenance. Preventive maintenance is the systematic care, servicing, and inspection of equipment to prevent the occurrence of trouble, to reduce downt time, and to assure that the equipment is serviceable.

5-2.1. Systematic Care. The procedures given in paragraphs 5-2.4 through 5-2.10 cover routine systematic care and cleaning essential to proper upkeep and operation of the equipnent.

5-2.2. Preventive Maintenance Checks and Services. The preventive maintenance checks and services charts (para 5-2.4 through 5-2.6) outline the functions to be performed at specific intervals. These checks and services are to maintain Army electronic equipment in a combat-ready condition; that is, in good general (physical) condition and in good operating condition. To assist operators in maintaining combat serviceability, the charts indicate what to check, how to check, and what the normal conditions are; the References column lists the illustrations, Paragraphs, or manuals that contain detailed repair or replacement procedures. If the defect cannot be remedied by performing the corrective actions listed, higher echelon maintenance or repair is required. Records and reports of these checks and services must be made in accordance with the requirements set forth in TM 38-750.

5-2.3. Preventive Maintenance Checks and Services Periods. Preventive maintenance checks and services of the equipment are required daily, weekly, and quarterly.

5-2.3.1. Paragraph 5-2.4 specifies the checks and services that must be accomplished daily (at least once each week if the equipment is maintained in a standby condition).

5-2.3.2. Paragraphs 5-2.5 and 5-2.6 specify additional checks and services that must be performed on a weekly and quarterly basis, respectively.

5-2.4. Daily Preventive Maintenance, Checks and Services Chart.

| Sequence No. | Items to be inspected | Procedure | |
|---|---|---|---|
| 1 | Completeness ..... | Check the completeness of the equipment. | Appendix II, figure 1-1 |
| 2 | Exterior surfaces. | Clean the exterior surfaces, including the front panel of the test set and meter glass. Check meter glass for cracks. | Paragraph 5-2.7 |
| 3 | Cable assemblies. | Check the cable assemblies for security of connection to the test set and tightness of connectors on the cable. | Figures 1-2 1-5 |
| 4 | Controls and indicators. | While making operational checks (5 below), observe that the mechanical action of each knob and switch is smooth and free from internal and external binding, and there is no excessive looseness. Check meter for sticking or bent pointer. Check indicator lamp for proper damaged lens. | |
| 5 | Operation ..... | During normal operation of the test set, check meters for proper zero adjustment. | Paragraph 5-4 |

5-2.5. Weekly Preventive Maintenance Checks and Services Chart.

| Sequence No. | Items to be inspected | Procedure | References |
|---|---|---|---|
| 1 | Exterior surfaces. | Inspect exposed metal surfaces for rust and corrosion. Touchup paint as required. | Paragraph 5-2.10. |
| 2 | Cable assemblies. | Inspect cables for cracked, chafed, or frayed insulation. Inspect connectors for damage or defects; replace or repair as necessary. | None. |

5-2.6. Quarterly Preventive Maintenance Checks and Services Chart.

| Sequence No. | Items to be inspected | Procedure | References |
|---|---|---|---|
| 1 | Completeness ..... | See that all publications are complete, serviceable, and current. | DA Pam 310-4. |
| 2 | Modifications ..... | Check DA Pam 310-4 to determine the existence of applicable MWO's. Check the equipment to determine if MWO's have been performed. All URGENT MWO's must be applied immediately. NORMAL MWO's must be scheduled. | TM 38-750, DA Pam 310-4. |

5-2.7. CLEANING. Inspect the exterior of the equipment. The exterior surfaces should be free of dust, dirt, grease, and fungus . Remove dust and loose dirt with a clean soft cloth.

Warning: Cleaning compound is flammable and its fumes are toxic. provide adequate ventilation; do not use near a flame.

5-2.8. Remove grease, fungus, and ground-in dirt from the equipment using a cloth dampened (not wet) with Cleaning Compound (Federal stock No. 7930-395-9542).

Caution: Do not press on the meter face (glass) when cleaning; the meter may become damaged.

5-2.9. Clean the front panel, meter, and control knobs and switches use a clean soft cloth. If necessary, dampen the cloth with water; mild soap may be used for more effective cleaning.

5-2.10. TOUCHUP PAINTING. Remove rust and corrosion from metal surfaces by lightly sanding them with fine sandpaper. Brush two thin coats of paint on the bare surfaces to protect them from further corrosion. Use zinc chromate primer and enamel (Federal Standard 595). Refer to the applicable cleaning and refinishing practices specified in TM 9-213.

5-3. LUBRICATION. No lubrication is required.

5-4. ADJUSTMENTS. To adjust meters, turn the power switch to OFF. Using a small screwdriver, adjust the meter zero adustment screws so that the meters indicate zero.

# SECTION VI

# TROUBLESHOOTING

6-1. TROUBLESHOOTING.

6-2. The following troubleshooting chart (figure 6-1) is fashioned to present trouble and malfunction conditions that make the tester inoperable. Probable cause and remedial procedure are given to act as guides for corrective action. See figure 1-3 for location of tester controls and switches, and figure 1-4 for schematic diagram.

| TROUBLE | PROBABLE CAUSE | REMEDY |
|---|---|---|
| Inverter-under-test will not start | DC-power source to inverter interrupted | Ensure DC-power is available to inverter |
| | Selected cable assembly not correctly installed | Verify selection of proper cable assembly, and ensure cable assembly is correctly installed |
| | D.C. AMP RANGE rotary shunt switch S106 selector (12) not properly positioned | Position D.C. AMP RANGE rotary shunt switch selector at START |
| | Defective 1TB1-2 microswitch S107 located on back of D.C. AMP RANGE rotary shunt switch S106 (Refer to IPB T.O. 33D2-4-11-34 for location) | Remove, check, and replace microswitch if defective |
| | Defective 42RJ1000VG SIL relay K102 (Refer to IPB T.O. 33D2-4-11-34 for location) | Remove, check, and replace relay if defective |
| | Live circuit to control circuits of some inverters not energized | Verify requirements of inverter, and perform procedure detailed in paragraph 4-6 |
| | Defective inverter | Troubleshoot inverter starting circuit as directed in specific inverter handbook |

Figure 6-1. Troubleshooting Chart (Sheet 1 of 2)

| TROUBLE | PROBABLE CAUSE | REMEDY |
|---|---|---|
| 28-VDC circuit energized but 28V. ON indicator light DS101 (1) not illuminated | 1/16A fuse F105 blown | Replace 1/16A fuse |
| Live circuit does not energize. Correct cable assembly properly installed | Live circuit fuse F104 blown and indicator light (9) not illuminated | Verify correctness of procedure to point of test. Replace fuse in FUSE holder and replace 5A indicator light bulb if blown |
| Inverter stops when D.C. AMP RANGE rotary shunt switch S106 selector (12) is moved | D.C. AMP RANGE rotary shunt switch S106 has been rotated to wrong position, overloading the circuit to the D.C. AMPS meter M104 (8) | Verify current limits of inverter and perform procedure detailed in paragraph 4-6b. Continue testing procedure, and ensure D.C. AMP RANGE rotary shunt switch selector is positioned only at correct settings. Ensure LOAD CONTROL autotransformer T104 (17) is within proper rotational range from 0%. |
| Meters not indicating when tester and inverter are energized: | | |
| A.C. AMPS meter M101 (2) | Blown fuse F101 (3) | Replace fuse |
| A.C. VOLTS meter M102 (4) | Blown fuse F102 (5) | Replace fuse |
| D.C. VOLTS meter M105 (10) | Blown fuse F105 (11) | Replace fuse |
| Green 28V. ON indicator light DS101 (1) not illuminated when D.C. PWR switch S105 (12A) is positioned at ON, and inverter is operating | Green 28V. ON indicator light DS101 bulb blown | Replace indicator light bulb |

Figure 6-1. Troubleshooting Chart (Sheet 2 of 2)

# SECTION VII

## DEPOT INSPECTION STANDARDS

7-1. GENERAL. The Type L-1A Aircraft Motor-Generator Tester is not calibrated as a unit since the indicating meters operate independently, accordant to tester switching, and test levels at outputs of different inverters. Meters are not calibrated by complete laboratory procedures and first standards, but are comparison checked with a comparable meter of accepted known standard accuracy. Periodic comparison check (calibration) is on a 90 calendar-day basis. Should erratic meter indications and recordings be evident, perform comparison check of erratic meter as required. See figure 7-1 for list of meters and related data.

7-2. CHECKING METERS.

7-3. Meters are comparison-checked when the tester and inverter-under-test are interconnected, and panel assembly is loosened and access acquired to panel back.

**WARNING**

The interconnected tester- inverter, when energized, developes voltage at a dangerous potential. Do not perform meter connections detailed in paragraphs 7-4 through 7-8 with the tester in energized mode. Exercise extreme caution when performing adjustments to prevent forming loop contacts with both hands. Failure to comply may result in serious injury to personnel.

7-4. VOLTMETERS. Voltmeters are comparison checked with a standard voltmeter. Connect same range and type standard voltmeter in parallel to installed voltmeter on the tester, start tester and inverter and adjust to a fixed value. (Refer to Section IV.) Perform comparison check and ensure both voltmeters indicate at same value, ±2%. M voltmeter-under-test is defective, refer to paragraph 7-8.

7-5. AMMETERS. Ammeters are comparison checkd with a standard ammeter. Connect same range and type standard ammeter in series to installed ammeter on the tester, start tester and inverter and ad-. just to a fixed value. (Refer to Section IV.) Perform comparison check and ensure both ammeters indicate at same value, ±2%. If ammeter-under-test is defective, refer to paragraph 7-8.

7-6. FREQUENCY METER AND PAIRED REACTOR. The frequency meter and reactor (frequency transducer) are a matched pair and are comparison checked with a similar standard frequency meter and paired reactor. Connect the similar standard pair in parallel to installed frequency meter and reactor on the tester. Start tester and inverter and adjust until inverter output is obtained at 400 cycles per second (CPS) at 115 VAC as indicated on the standard frequency meter. Perform comparison check and ensure both frequency meters indicate at same value of 400 CPS, ±1 CPS at 400 CPS and ±2 CPS at ends of range. If frequency meter and paired reactor-under-test are defective, refer to paragraph 7-8.

| NOMENCLATURE | PART NO. MOD NO. | APPLICATION | RANGE | ACCURACY (FULL SCALE VALUE) |
|---|---|---|---|---|
| AC AMMETER | MRL PART NO. 506811-1 | Measures Inverter AC current output | 1, 5, 10, 50 AMP | 2% |
| AC VOLTMETER | Weston 2534 | Measures Inverter AC power output | 0 to 150V | 2% |
| FREQUENCY METER (Matched pair with REACTOR) | Weston 2531 (9887) | Measures frequency of inverter AC output | 390 to 410 CPS | ±1 ∿ at 400 ±2 ∿ at ends |
| DC VOLTMETER | Weston 2531 | Measures tester DC power application | 0 to 50V | 2% |
| DC AMMETER | MRL Part NO. 506812-1 | Measures tester DC current application | 0, 10, 20, 100, 200 AMP | 2% |

Figure 7-1. Meter Data

7-7. REPLACING METERS.

7-8. Defective meters are removed from the tester panel assembly and replaced with a meter that is known to be accurate. Replaced meters are returned through cognizant service supply channels.

# APPENDIX I

## REFERENCES

Following is a list of applicable references available to maintenance personnel concerned with the test set:

| | |
|---|---|
| DA Pamphlet 310-4 | Index of Technical Manuals, Technical Bulletine, Supply Bulletins, Lubrication Orders, and Modification Work Orders. |
| TB SIG 355-1 | Depot Inspection Standard for Repaired Signal Equipment. |
| TB SIG 355-2 | Depot Inspection Standard for Refinishing Repaired Signal Equipment. |
| TB SIG 355-3 | Depot Inspection Standard for Moisture and Fungus Resistant Treatment. |
| TM 9-213 | Painting Instructions for Field Use |
| TM 11-5057 | Frequency Meter AN/USM-26 |
| TM 11-5527 | Multimeters TS-352/U, TS-352A/U, and TS-352B/U |
| TM 11-6625-203-12 | Multimeters AN/URM-105, AN/UJRM-105A, and AN/URM-105B, including Multimeter ME-77/U. |
| TM 38-750 | Army Equipment Record Procedures. |

# APPENDIX III

## MAINTENANCE ALLOCATION CHART

## Section I. INTRODUCTION

### A3-1. General

This appendix provides a summary of the maintenance operations covered in the equipment literature for Test Set, Motor-Generator AN/GSM-65. It authorizes levels of maintenance for specific maintenance functions on repairable items and components and the tools and equipment required to perform each function. This appendix may be used as an aid in planning maintenance operations.

### A3-2. Explanation of Format

a. Group number. Group numbers correspond to the reference designation prefix assigned in accordance with MIL-STD-16. They indicate the relation of listed items to the next higher assembly.

b. Component Assembly Nomenclature. This column lists the item names of component units, assemblies, subassemblies, and modules on which maintenance is authorized.

c. Maintenance Function. This column indicates the maintenance level at which performance of the specific maintenance function is authorized. Authorization to perform a function at any level also includes authorization to perform that function at higher levels. The digits used represent the various maintenance levels as follows:

| Digit | Maintenance Category (or level) |
|---|---|
| 1 | Operator's |
| 2 | Organizational |
| 3 | Direct support |
| 4 | General support |
| 5 | Depot |

d. Tools and Equipment. The numbers appearing in this column refer to specific tools and equipment which are identified by these numbers in Section III.

e. Remarks. Self explanatory.

A3-3. Explanation of Tools Chart Format

The columns in the tool and test equipment requirements chart are as follows :

a. Tools Required for Maintenance Functions. This column lists tools, test, and maintenance equipment required to perform the maintenance functions.

b. Maintenance Category. The dagger (†) symbol indicates the categories normally allocated the facility.

c. Tool Code. This column lists the tool code assigned.

A3-4. Maintenance by Using Organizations

When this equipment is used by signal service organizations organic to theater headquarters or communication zones to provide theater communications, those maintenance functions allocated up to and including general support are authorized to the organization operating this equipment.

SECTION II. MAINTENANCE ALLOCATION CHART

| GROUP NUMBER | COMPONENT ASSEMBLY NOMENCLATURE | MAINTENANCE FUNCTIONS | | | | | | | | | | | TOOLS AND EQUIPMENT | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | INSPECT | TEST | SERVICE | ADJUST | ALIGN | CALIBRATE | INSTALL | REPLACE | REPAIR | OVERHAUL | REBUILD | | |
| I | TEST SET MOTOR-GENERATOR AN/GSM-65 | 2 | | 2 | | | | | | | | | | |
| | | | | | 2 | | | | | | | | 6 | |
| | | | 2 | | | | | | | | | | 3 | |
| | | | | | | | | | | 2 | | | 6 | Cables, fuses, knobs, lamps |
| | | | | | | | | | | 4 | | 4 | 5 | |
| | | | 4 | | | | 4 | | | | | | 1,2,4,5 | |
| | | | | | | | | | | | 5 | | 1,2,4,5 | |
| IA | CABLE ASSEMBLIES | | | | | | | | 2 | 2 | | | 6 | Clips, clamps, markers and terminal lugs |
| | | | | | | | | | | 4 | | | 5 | |
| IB | TESTER ASSEMBLY | 2 | | 2 | | | | | | | | | | |
| | | | | | 2 | | | | | | | | 6 | |
| | | | 2 | | | | | | | | | | 3 | |
| | | | 4 | | | | | | | | | | 1,2,4,5 | |
| | | | | | | | | | | 2 | | | 6 | Boots, guard fuse, knob, and lamp |
| | | | | | | | | | | 4 | | | 5 | |
| | | | | | | | | 4 | | | | 4 | 1,2,4,5 | |
| | | | | | | | | | | | 5 | | 5 | |

SECTION III. ALLOCATION OF TOOLS AND EQUIPMENT FOR MAINTENANCE FUNCTIONS

| TOOLS REQUIRED FOR MAINTENANCE FUNCTIONS | MAINTENANCE CATEGORY O/C | O | DS | GS | D | TOOL CODE | REMARKS |
|---|---|---|---|---|---|---|---|
| AN/GSM-65 (continued) | | | | | | | |
| AMMETER, PANEL FSN 6625-089-5645 | | | | / | / | 1 | |
| FREQUENCY METER, AN/USM-26A | | | | / | / | 2 | |
| MULTIMETER AN/URM-105B | | / | | / | / | 3 | |
| MULTIMETER TS-352/U | | | | / | / | 4 | |
| TOOL KIT TK-100/U | | | | / | / | 5 | |
| TOOL KIT TK-105/U | | / | | | | 6 | |

APPENDIX IV

ILLUSTRATED PARTS BREAKDOWN

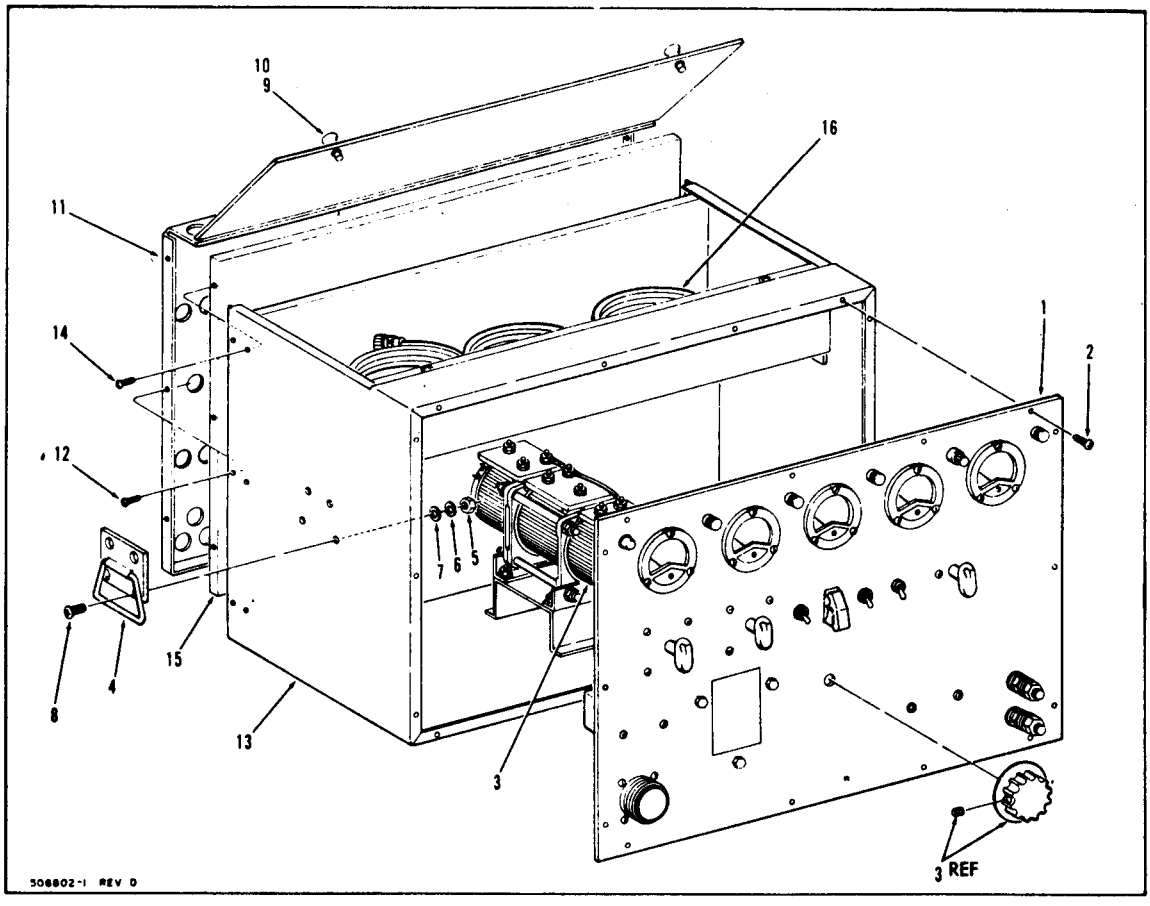



Figure A4-1 Aircraft Motor-Generator Tester, Type L-1A

| FIG. & INDEX NO. | PART NUMBER | 1 2 3 4 5 67DESCRIPTION | UNITS PER ASSY | USABLE ON CODE |
|---|---|---|---|---|
| 1- | | TESTER, AIRCRAFT MOTOR-GENERATOR . . . | 1 | |
| -1 | | PANEL ASSY . . . . . | 1 | |
| | | (ATTACHING PARTS) | | |
| -2 | | . SCREW . . . . . | 14 | |
| | | . TERMINAL LUG (74829) | 2 | |
| | | . TERMINAL LUG (92219) | 2 | |

| FIG. & INDEX NO. | PART NUMBER | 1 2 3 4 5 6 7 DESCRIPTION | UNITS PER ASSY | USABLE ON CODE |
|---|---|---|---|---|
| | | . TERMINAL LUG (74829) | 4 | |
| | | . TERMINAL LUG (92219) | 1 | |
| | | . TERMINAL LUG (79061) | 5 | |
| | | . TERMINAL LUG (79061) | 3 | |
| | | . TERMINAL LUG (79061) | 12 | |
| | | . TERMINAL LUG (79061) | 45 | |
| | | . TERMINAL LUG (79061) | 12 | |
| | | . TERMINAL LUG (79061) | 7 | |
| | | . TERMINAL LUG (79061) | 14 | |
| | | . TERMINAL LUG (79061) | 5 | |
| -3 | | TRANSFORMER, VARIABLE, POWER . . . (88422) | 1 | |
| | | (ATTACHING PARTS) | | |
| | | NUT . . . . . | 4 | |
| | | . WASHER, LOCK . . . . . | 4 | |
| | | . WASHER . . . . . | 4 | |
| | | . S CREW . . . . . | 4 | |
| | | ---*--- | | |
| -4 | | . HANDLE, BAIL (57068) . . . . . | 2 | |
| | | (ATTACHING PARTS) | | |
| -5 | | . NUT . . . . . | 8 | |
| -6 | | . WASHER, LOCK . . . . . | 8 | |
| -7 | | WASHER . . . . . | 8 | |
| -8 | | SCREW . . . . . | 8 | |
| | | ---*--- | | |
| | | . CABINET, ELECTRICAL EQUIPMENT . . . | 1 | |
| -9 | | . . STUD, FRICTION CATCH (99466) . . . . . | 2 | |
| -10 | | . . RECEPTACLE, FRICTION CATCH . . . . STUD (99466) | 2 | |
| -11 | | . . COVER, ELECTRICAL DUMMY LOAD . . (ATTACHING PARTS) | 1 | |
| -12 | | . . SCREW . . . . . | 12 | |
| | | ---*-- | | |
| -13 | | . CABINET, ELECTRICAL EQUIPMENT . . . (ATTACHING PARTS) | 1 | |
| -14 | | . SCREW . . . . . | 6 | |
| | | ---*--- | | |
| -15 | | . DUMMY LOAD, ELECTRICAL (22901) . . . | 1 | |
| -16 | | . CABLE ASSY GROUP . . . . | 1 | |
| 2- | | PANEL ASSY, TESTER CONTROL | 1 | |
| -1 | | . LAMPHOLDER, PILOT LIGHT (96312) . . . . | 1 | |
| -2 | | . LAMP, INCANDESCENT (24446) . . . . . | 1 | |
| -3 | | . AMMETER . . . . . | 1 | |
| -4 | | . VOLTMETER (65092 ) . . . . . | 1 | |
| -5 | | . FREQUENCY METER (65092) . . . . . | 1 | |
| -6 | | . AMMETER . . . . . | 1 | |
| -7 | | . VOLTMETER (65092) . . . . . | 1 | |
| | | (ATTACHING PARTS FOR ITEMS -3, -4, -5, -6, and -7) | | |
| | | . NUT . . . . . | 15 | |
| | | . WASHER, LOCK . . . . . | 15 | |

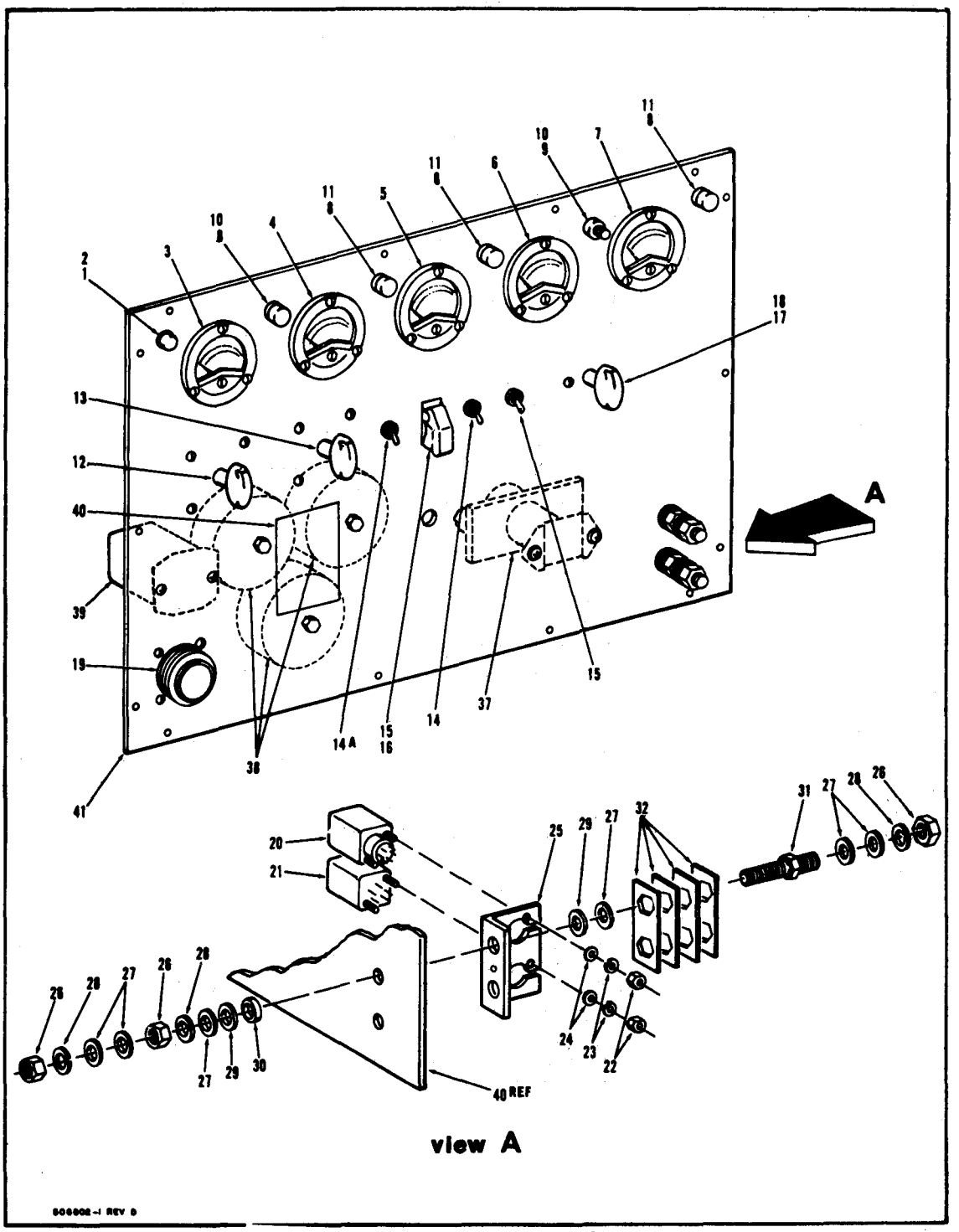



Figure A4-2 **Panel Assembly, Tester Control**

| FIG. & INDEX NO. | PART NUMBER | 1 2 3 4 5 6 7 DESCRIPTION | UNITS PER ASSY | USABLE ON CODE |
|---|---|---|---|---|
| | | WASHER | 15 | |
| | | . SCREW | 15 | |
| | | ---*--- | | |
| -8 | | FUSEHOLDER (71400) | 4 | |
| -9 | | FUSEHOLDER (71400) | 1 | |
| -10 | | . FUSE (71400) | 2 | |
| -11 | | . FUSE (71400) | 3 | |
| -12 | | . SWITCH, ROTARY (82121) | 1 | |
| -13 | | . SWITCH, ROTARY (82121) | 1 | |
| | | (ATTACHING PARTS FOR ITEMS -12 and 13) | | |
| | | . WASHER, LOCK | 8 | |
| | | WASHER | 8 | |
| | | . SCREW | 8 | |
| | | ---*--- | | |
| -14 | | . SWITCH, TOGGLE (15605) | 1 | |
| -14A | | . SWITCH, TOGGLE (04009) | 1 | |
| -15 | | . SWITCH, TOGGLE (15605) | 2 | |
| -16 | | . GUARD, SWITCH (15605) | 1 | |
| -17 | | . KNOB, SWITCH (80647) | 1 | |
| -18 | | . SWITCH, ROTARY (DC CURRENT SWITCH AND SHUNT) | 1 | |
| | | (ATTACHING PARTS) | 1 | |
| | | . NUT | 2 | |
| | | . WASHER, LOCK | 2 | |
| | | WASHER | 2 | |
| | | . SCREW | 2 | |
| | | ---*--- | | |
| -19 | | . CONNECTOR, RECEPTACLE, ELECTRICAL (02660) | 1 | |
| | | (ATTACHING PARTS) | | |
| | | . NUT | 4 | |
| | | . WASHER, LOCK | 4 | |
| | | . WASHER | 4 | |
| | | . SCREW | 4 | |
| | | ---*--- | | |
| -20 | | . RELAY, ARMATURE (78277) | 1 | |
| -21 | | . RELAY, ARMATURE (78277) | 1 | |
| | | (ATTACHING PARTS FOR ITEMS -20 and -21) | | |
| -22 | | . NUT | 4 | |
| -23 | | . WASHER, LOCK | 4 | |
| -24 | | . WASHER | 4 | |
| | | ---*--- | | |
| -25 | | BRACKET, ANGLE | 1 | |
| | | (ATTACHING PARTS) | | |
| -26 | | . NUT | 6 | |
| -27 | | . WASHER | 12 | |
| -28 | | . WASHER, LOCK | 6 | |
| -29 | | . WASHER, INSULATOR | 4 | |
| -30 | | . INSULATOR, SLEEVE (16784) | 2 | |
| -31 | | . STUD, TERMINAL | 2 | |
| | | ---*--- | | |
| -32 | | . INSULATOR, PLATE | 4 | |
| -33 | | | | |

| FIG. & INDEX NO. | PART NUMBER | 1 2 3 4 5 6 7 DESCRIPTION | UNITS PER ASSY | USABLE ON CODE |
|---|---|---|---|---|
| -34 | | | | |
| -35 | | | | |
| -36 | | | | |
| -37 | | POWER RELAY (15605) . . . . . | 1 | |
| | | (ATTACHING PARTS) | | |
| | | . NUT . . . . . | 2 | |
| | | WASHER, LOCK . . . . . | 2 | |
| | | WASHER . . . . . | 2 | |
| | | SCREW . . . . . | 2 | |
| | | ---*--- | | |
| -38 | | . TRANSFORMER, CURRENT . . . . . | 3 | |
| | | (ATTACHING PARTS) | | |
| | | NUT . . . . . | 3 | |
| | | WASHER, LOCK . . . . . | 3 | |
| | | WASHER . . . . . | 3 | |
| | | SCREW . . . . . | 3 | |
| | | PLATE, MOUNTING, TRANSFORMER . . | 1 | |
| | | ---* --- | | |
| -39 | | . REACTOR (65092) . . . . . | 1 | |
| | | (ATTACHING PARTS) | | |
| | | NUT . . . . . | 2 | |
| | | WASHER, LOCK . . . . . | 2 | |
| | | . WASHE R . . . . . | 2 | |
| | | . SCREW . . . . . | 2 | |
| | | ---*--- | | |
| -40 | | PLATE, IDENTIFICATION . . . . . | 1 | |
| -41 | | . PANEL . . . . . | 1 | |
| 3- | | CABLE ASSEMBLIES . . . . . | RE F | |
| -1 | | CABLE ASSY, SP, ELEC . . . . . | 1 | A |
| | | BRANCHED, NO. 1 | | |
| -2 | | . CABLE ASSY, SP, ELEC . . . . . | 1 | B |
| | | BRANCHED, NO. 2 | | |
| -3 | | . CABLE ASSY, SP, ELEC . . . . . | 1 | C |
| | | BRANCHED, NO. 3 | | |
| -4 | | . CABLE ASSY, SP, ELEC . . . . . | 1 | D |
| | | BRANCHED, NO. 4 | | |
| -5 | | CABLE ASSY, SP, ELEC . . . . . | 1 | E |
| | | BRANCHED, NO. 5 | | |
| -6 | | . CABLE ASSY, SP, ELEC . . . . . | 1 | F |
| | | BRANCHED, NO. 6 | | |
| -7 | | . CABLE ASSY, SP, ELEC . . . . . | 1 | G |
| | | BRANCHED, NO. 7 | | |
| -8 | | CONNECTOR, PLUG, ELEC . . . . . | 1 | ABCDEFG |
| | | (02660) | | |
| -9 | | . . CLAMP, CABLE, ELEC CONN . . . . . | 1 | ABCDEFG |
| | | (71468) | | |
| -10 | | . . CLIP, ELEC (76545) . . . . . | 1 | ABCD |
| -11 | | . . INSULATOR, BLK, INS SLV ELEC . . . . | 1 | ABCD |
| | | (76545) | | |
| -12 | | . . TERMINAL (18342) . . . . . | 2 | B |
| | | . . TERMINAL (18342) . . . . . | 2 | C |
| -13 | | . . TERMINAL LUG (18342) . . . . . | 2 | B |
| | | . . TERMINAL LUG (18342) . . . . . | 1 | C |
| -14 | | . . TERMINAL LUG (18342) . . . . . | 1 | D |

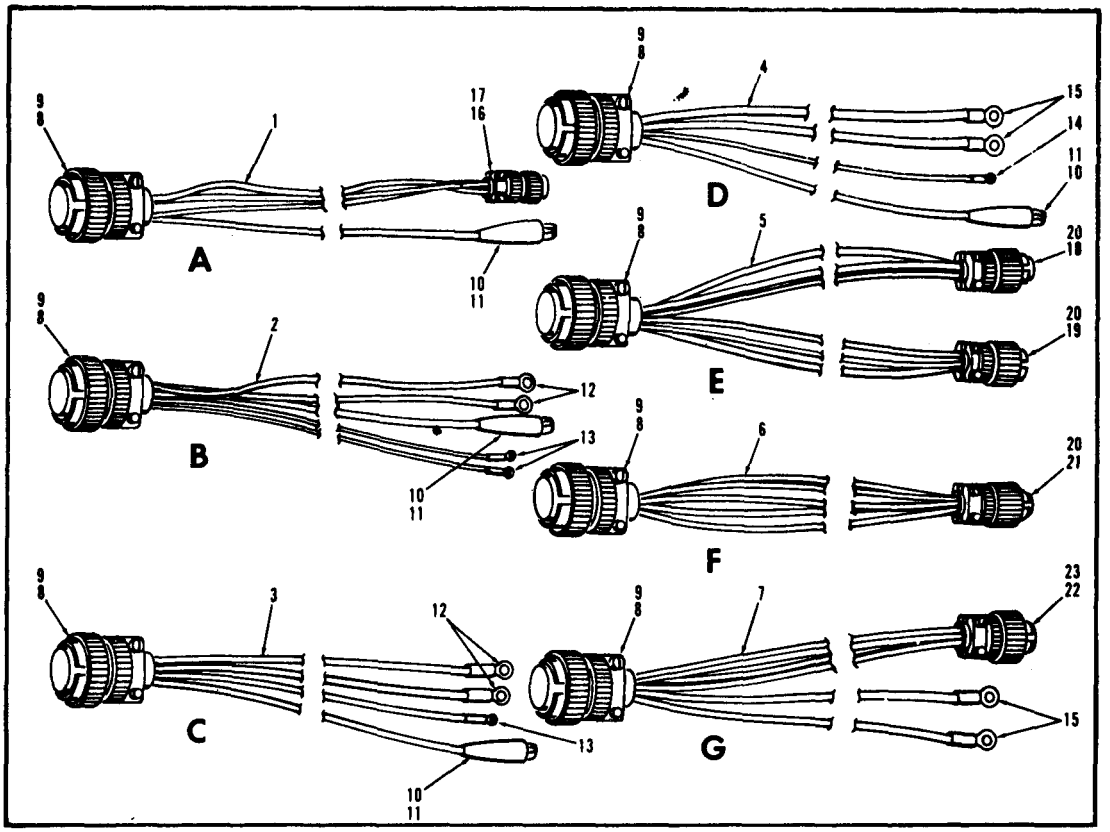



Figure A4-3 Cable Assemblies

| FIG. & INDEX NO. | PART NUMBER | 1 2 3 4 5 6 7 DESCRIPTION | UNITS PER ASSY | USABLE ON CODE |
|---|---|---|---|---|
| -15 | | . . TERMINAL LUG (18342) . . . . . | 2 | D |
| | | ... TERMINAL LUG (18342) . . . . . | 2 | G |
| -16 | | . . CONNECTOR, PLUG, ELEC (02660) . . . | 1 | A |
| -17 | | . . CLAMP, CABLE, ELEC CONN (71468) . . . | 1 | A |
| -18 | | . . CONNECTOR, PLUG, ELEC (02660) . . . . . | 1 | E |
| -19 | | . . CONNECTOR, PLUG, ELEC (02660) . . . . . | 1 | E |
| -20 | | . . CLAMP, CABLE, ELEC CONN (71468) . . . | 2 | E |
| | | . CLAMP, CABLE, ELEC CONN (71468) . . . | 1 | F |
| -21 | | . . CONNECTOR, PLUG, ELEC (02660) . . . . . | 1 | F |
| -22 | | . . CONNECTOR, PLUG, ELEC (02660) . . . . . | 1 | G |
| -23 | | . . CLAMP, CABLE, ELEC CONN (71468) . . . | 1 | G |

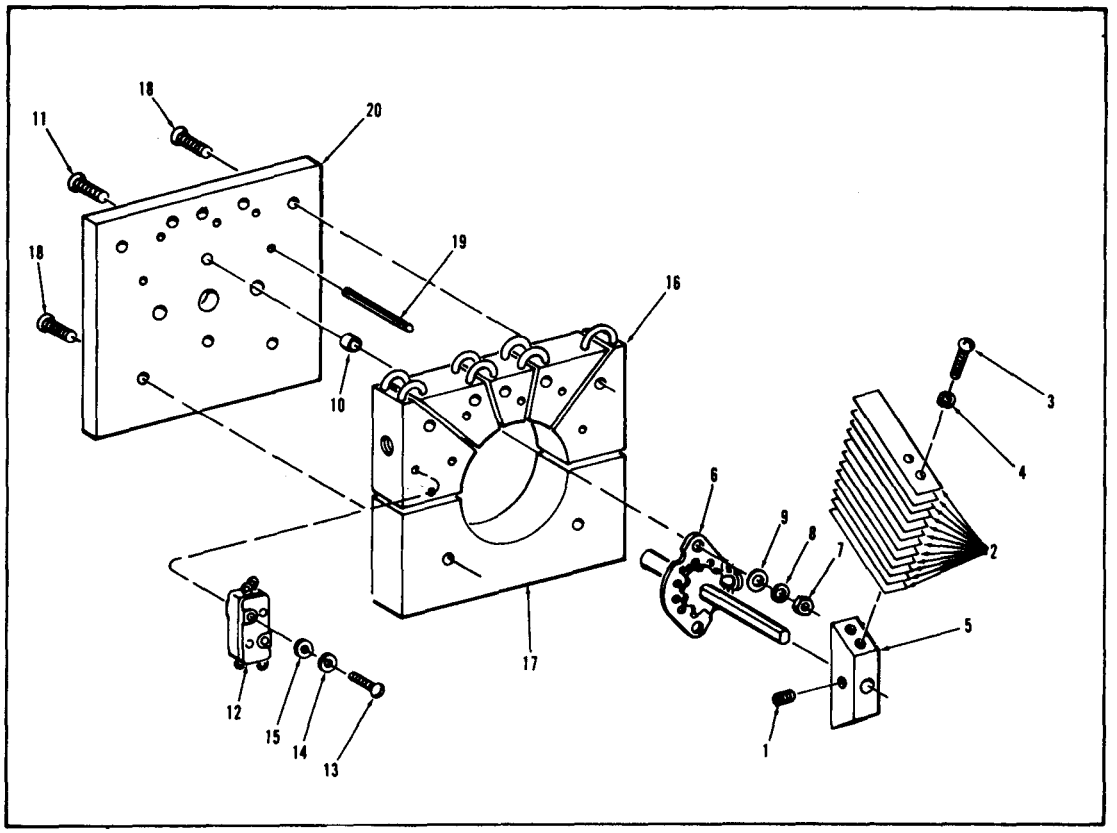



Figure A4-4 Switch Assembly, Rotary

| FIG. & INDEX NO. | PART NUMBER | 1 2 3 4 5 6 7 DESCRIPTION | UNITS PER ASSY | USABLE ON CODE |
|---|---|---|---|---|
| 4- | | SWITCH ASSY, ROTARY . . . . . | 1 | |
| | | CONTACT ASSY, ELECTRICAL . . . . . (ATTACHING PART) | 1 | |
| -1 | | SE TSCREW . . . . . | 1 | |
| | | ---*--- | | |
| -2 | | . . CONTACT, ELECTRICAL . . . . . (ATTACHING PARTS) | 24 | |
| -3 | | . . SCREW . . . . . | 4 | |
| -4 | | . . WASHER, LOCK . . . . . | 4 | |
| -5 | | . . HOLDER, ELECTRICAL CONTACT . . . . BRUSH | 1 | |
| | | ---*--- | | |
| -6 | | DETENT, SWITCH (71590) . . . . . | 1 | |

| FIG. & INDEX NO. | PART NUMBER | 1 2 3 4 5 6 7 DESCRIPTION | UNITS PER ASSY | USABLE ON CODE |
|---|---|---|---|---|
| | | (ATTACHING PARTS) | | |
| -7 | | NUT | 2 | |
| -8 | | WASHER, LOCK | 2 | |
| -9 | | WASHER | 2 | |
| -10 | | SPACER, SLEEVE | 2 | |
| -11 | | SCREW | 2 | |
| | | ---*--- | | |
| -12 | | SWITCH, SENSITIVE (17479) | 1 | |
| | | (ATTACHING PARTS) | | |
| -13 | | SCREW | 2 | |
| -14 | | WASHER, LOCK | 2 | |
| -15 | | WASHER | 2 | |
| | | ---*--- | | |
| -16 | | CONTACT ASSY, ELECTRICAL | 1 | |
| -17 | | CONTACT, ELECTRICAL | 1 | |
| | | (ATTACHING PARTS FOR ITEMS -16 and -17) | | |
| -18 | | SCREW | 7 | |
| -19 | | PIN, SPRING (76962) | 5 | |
| | | ---*--- | | |
| -20 | | BASE, SWITCH | 1 | |

**By Order of the Secretary of the Army:**

**HAROLD K. JOHNSON,**
***General, United States Army,***
***Chief of Staff.***

**Official:**

**J. C. LAMBERT,**
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***The Adjutant General.***

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