TECHNICAL MANUAL

OPERATOR'S, ORGANIZATIONAL, AND DIRECT SUPPORT MAINTENANCE MANUAL INCLUDING REPAIR PARTS AND SPECIAL TOOLS LISTS

BATTERY CHARGING DISTRIBUTION PANEL

(MIL-P-52457)

NSN 6130-00-940-7866

This manual supersedes TM 5-6130-301-13&P, 14 August 1981, including all changes.

HEADQUARTERS, DEPARTMENT OF THE ARMY

5 JULY 1985

CHANGE

No. 5

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Operator's, Organizational, and Direct
Support Maintenance Manual
Including Repair Parts and Special Tools Lists

BATTERY CHARGING DISTRIBUTION PANEL
(MIL-P-52457)
NSN 6130-00-940-7866

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Operator's, Organizational, and Direct
Support Maintenance Manual
Including Repair Parts and
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2-1 through 2-4	2-1 through 2-4
5-7 and 5-8	5-7 and 5-8
C-9 and C-10	C-9 and C-10
C-13 through C-16	C-13 through C-16

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WARNING

HIGH VOLTAGE

is used in the operation of this equipment

DEATH ON CONTACT

may result if personnel fail to observe safety precautions

Do not permit smoking, sparks or open flame in the battery charging area.

Place associated circuit breakers in the "OFF" position before connecting or disconnecting batteries or cables in the circuit.

Do not charge batteries in poorly ventilated areas.

Never work on electronic equipment unless there .is another person nearby who is familiar with the operation and hazards of the equipment and who is competent in administering first aid. When the technician is aided by operators, he must warn them about dangerous areas.

Whenever possible, the power supply to the equipment must be shut off before beginning work on the equipment. Take particular care to ground every capacitor likely to hold a dangerous potential. When working inside the equipment, after the power has been turned off, always ground every part before touching it.

Whenever the nature of the operation permits, keep one hand away from the equipment to reduce the hazard of current flowing through vital organs of the body.

Do not be misled by the term "low voltage." Potentials as low as 50 volts may cause death under adverse conditions.

Personnel operating battery charging distribution panel must be familiar with the contents of TM 9-6140-200-14.

TECHNICAL MANUAL

No. 5-6130-30l-13&P

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DEPARTMENT OF THE ARMY
WASHINGTON, D.C. 5 July 1985

OPERATOR'S, ORGANIZATIONAL, AND DIRECT SUPPORT MAINTENANCE MANUAL INCLUDING REPAIR PARTS AND SPECIAL TOOLS LISTS BATTERY CHARGING DISTRIBUTION PANEL MIL-P-52457 NSN 6130-00-940-7866

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistake or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank forms), or DA Form 2028-2 located in the back of this manual direct to: Commmder, US Army Troop Support Command, ATTN: AMSTR-MCTS, 4300 Goodfellow Blvd., St. Louis, MO 63120-1798. Reply will be furnished to you.

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CHAPTER 1
INTRODUCTION

Section I. GENERAL INFORMATION

1-1. **SCOPE.** This manual is for your use in operating and maintaining the Battery Charging Distribution Panel (Figure 1-1) and provides operator, organizational and direct support maintenance instructions authorized by the Maintenance Allocation Chart in Appendix B. Figure 1-2 is a case separation view of the distribution panel.

a. *Appendix A. - References.* Contains a listing of all fores and technical mauals referenced in this manual.

b. *Appendix B. - Maintinance Allocation Chart.* Contains a maintenance allocation chart which tells what maintenance can be performed by the operator, organization and direct support maintenance personnel, and includes an explanation of maintenance and repair functions.

c. *Appendix C. - Repair Parts and Special Tools List.* Contains a listing Of repair pints required to perform operator, organizational and direct support maintenance. Parts illustrations are included to assist maintenance personnel in location add identification of repair parts.

1.2. **MAINTENANCE FORMS AND RECORDS.** Maintenance Fores and Records that you are required to use are explained in DAPAM 738-750.

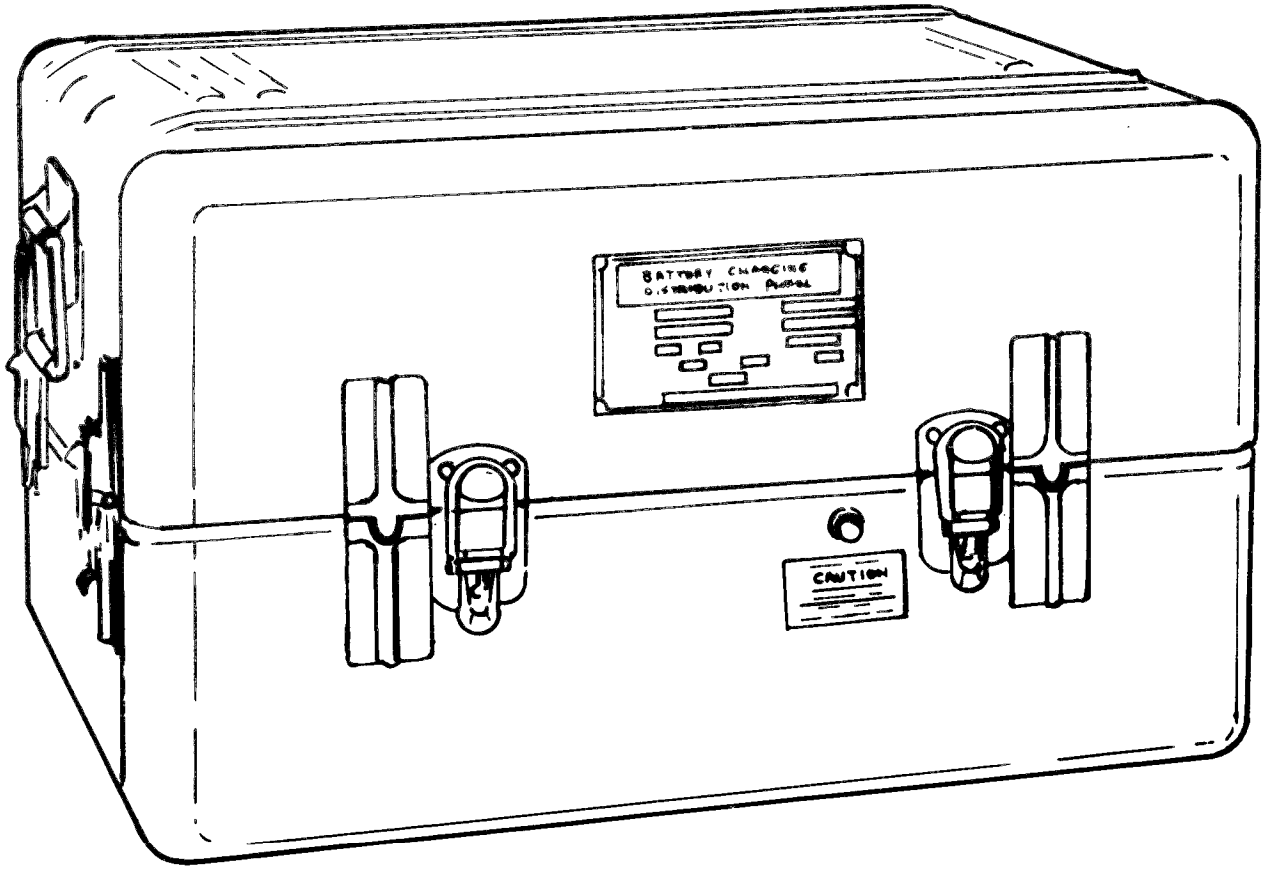


Figure 1-1. Battery Charging Distribution Panel

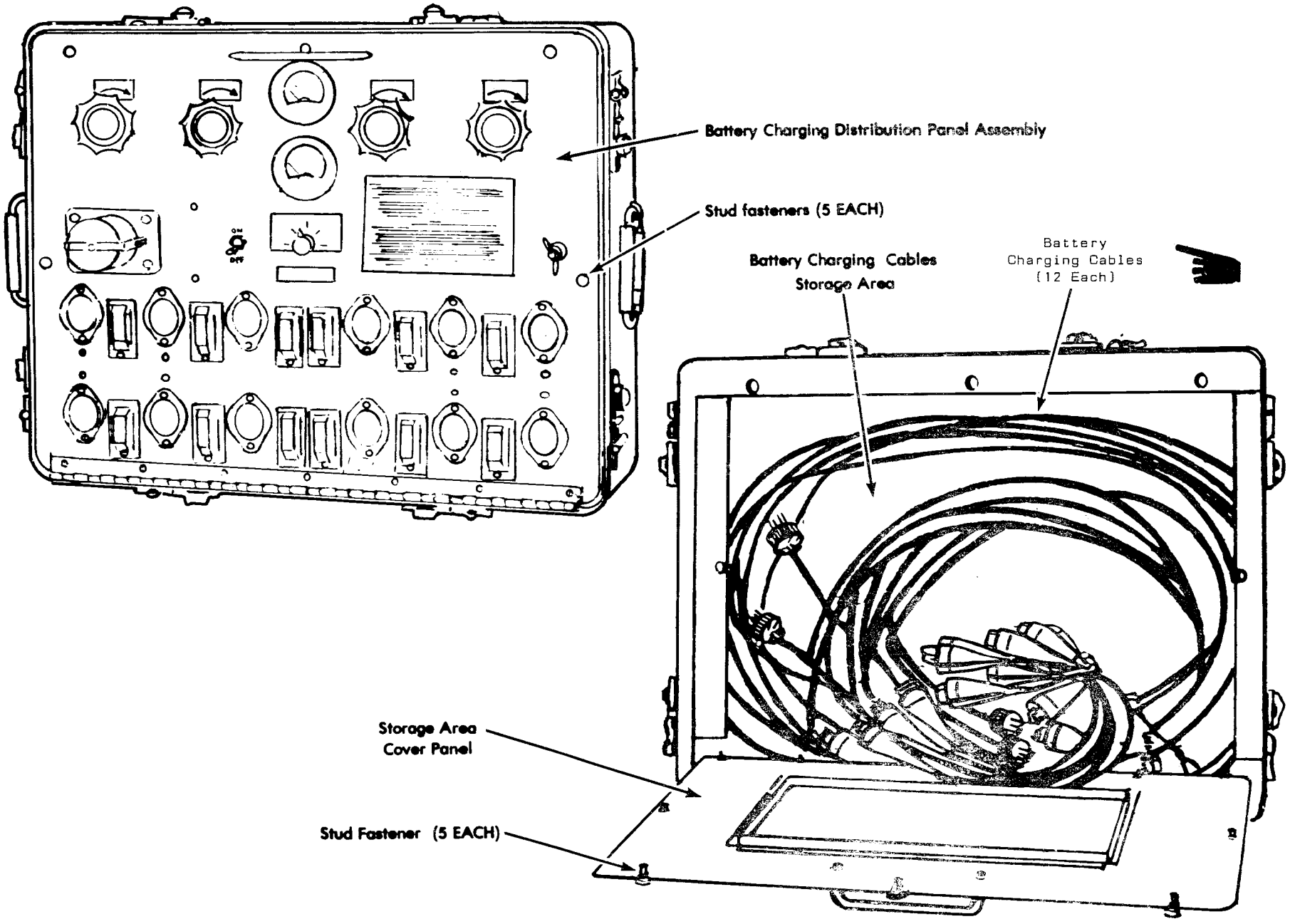


Figure 1-2. Case Separation View of Distribution Panel

1.3. **AMINISTRATIVE STORAGE.** Instructions relating to administrative storage of the battery charging distrtibution panel are included in TM 740-90-1.

1.4. **DESTRUCTION OF ARMY MATERIAL TO PREVENT ENEMY USE.** Refer to TM 750-244-3 for instructionson on destruction of the distribution panel to prevent enemy use.

Section II. DESCRIPTION AND DATA

1.5. **PURPOSE AND USE.** The Battery Charging Distribution Panel is designed to take the output of a 28-volts, direct current power source and distribute that output dc voltage to batteries requiring a charge. The distribution panel can be used to charge lead-acid batteties having a nominal voltage rating of 24-volts, 12-volts and/or 6-volts when proper cabling connections to the distribution panel and battefies are made. Refer to Chapter 2, SectionIII for instructions and procedures for making proper cabling connections and operation of the distribution panel.

CAUTION

Do not charge NICAD batteries with this equipment.

1.6. **DESCRIPTION.** The distribution panel is housed in a water-vapor-proof carrying case which is fabricated from heavy-gauge aluminum. Operation controls, voltage and current indicating meters, receptacle connections, and power distribution system components are mounted on a control panel located in the top portion of the carrying case. The control panel is hinge-mounted to the carrying case and held in place by five (5) aluminum stud fasteners. Releasing these stud fasteners allows the hinge-mounted panel to be raised for easy access to, and maintenance of the power distribution system components. A main power cable assembly, battery connecting cables and jumper cables are stored in the bottom portion of the carrying case. The cable storage area is secured by a hinged panel that is held shut by five (5) aluminum stud fasteners. Releasing the stud fasteners will allow the hinged panel to be opened for easy access to and removal of the cables for use,

NOTE

When not in continual use, cables should be cleaned and kept in the cable storage area of the carrying case to prevent loss or damage.

1.7. **DIFFERENCES BETWEEN MODELS.** This manual applies to all Battery Charging Distribution Panels, MIL-P-52457, NSN 6130-00-940-7866.

1.8. **TABULATED DATA.**

a. *Dimensions and Weights:*

Overall Height	15.5 inches (39.37 centimeters)
Overall Width	12.5 inches (31.75 centimeters)
Overall Length	27.5 inches (69.85 centimeters)
Overall Weight	100 pounds (45.0 kilograms)

b. Input- Power *and Distribution :*

Operating Voltage (Max)	28 volts dc
Operating Current (Max)	100 amps dc

STA 1-12 VOLTS and STA 4-12 VOLTS (Controlled)

Output Voltage(Max) . . . . . .14 voltsdc
Output Current (Max) . . . . . .5 continuous, 7 peak (15 min.)

STA 2-24 VOLTS and STA 3-24 VOLTS (Controlled)

Output Voltage (Max) . . . .28 volts dc
Output Current (Max) . . . . . 5 continuous, 7 peak(15min) amps dc

24 VOLTS UNCONTROLLED RECEPTACLES (8 each, Uncontrolled)

Output Voltage (Max) . . . .28 volts dc
Output Current (Max) . . . . . 10 continuous18 peak (15min) amps dc

Section III. PRINCIPLES OF OPERATION

1.9. GENERAL.

a. To charge a battery, it is necessary to apply a voltage higher than the actual voltage of the battery so that current will flow into the battery cells. This current is a function of the voltage applied above the actual battery voltage and the internal resistance of the cell.

b. The flow of charging current cause heat due to the I^2R losses in the battery. A "trickle" charger provides a low charging current so that such heat cannot become excessive but its use requires a long period of time, For faster charging, such as with this equipment, the current provided is high and it is then up to the operator to see that none of the batteries being charged become overheated in the charging process, (Overheating will cause warpage of the battery plates which will ruin tile battery.)

c. This distubution panel is primarily designed to use the constant potentioal (constant volt) method for charging batteries. Thus when a discharged or partially discharged battery is connected to an uncontrolled station of this distribution panel the initial charging current will be high but the charging currrent will fall off as the state of charge of the battery increases. The controlled stations of the distribution panel are designed to use the constant potential for charging batteries, however, if the constant current method is desired these cent rolled stations may be used by varying the rheostat for that station to keep the charging current Constant.

d. Because battery construction varies, it is impossible to specify a "safe" charging rate for all batteries. However, if the 8-hour discharge rate of the battery is known, the battery may be safely charged using a charging current no higher than its 8-hour discharge current rate. For example, if a battery is rated 40 amp-hours at an 8-hour rate divide the 40 amp-hours by the 8-hour time which gives 5 amperes. This is the safe charging limit for the battery in this example. (A battery rated 40 amp-hours at the 8-hour rate means the battery is capable of providing 5 amperes for 8 hours.)

e. Each of the twelve output receptacles of the distribution panel is connected to a reverse-current diode. This prevents current flow from the battery into the circuitry of the unit. These diodes, their heat sinks, bus bars, and other circuitry and wiring ?of the distribution panel are installed on the underside of the hinged panel.

CHAPTER 2
OPERATING INSTRUCTIONS

Section I. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS

2.1. CONTROLS AND INDICATORS. Personnel responsible for the use and operation of the Battery Charging Distribution Panel must be thoroughly familiar with each control and indicator prior to placing the equipment in service. Figure 2-1 shows the location of the operator controls and indicators and table 2-1 describes the function of each.

Section II. OPERATOR/CREW PREVENTIVE MAINTENANCE CHECKS AND SERVICES

2-2. GENERAL.

a. *Scope.* This section contains instructions for preventive maintenance of the distribution panel. Preventive maintenance means systematic care, inspection, and servicing of equipment to maintain it in sound condition, and to find and correct beginning failures before expensive and time-consuming repairs or replacements are requied.

b. *Resoponsibility.* Preventive maintenance is done by operator personnel. Proper operation and use of equipment is just as important a part of preventive maintenance as are the preventive maintenance inspections and services prescribed in this section. For description of Army preventive maintenance and its organization, refer to DA PAM 738-750.

c. *Frequency of Servicing.* The chief guide for the frequency of preventive maintenance services is the number of hours the batteyr charging distribution panel is operated. Operation under adverse conditions, such as extreme temperature, dust, or water, may require more frequent preventive maintenance services. Daily preventive maintenance services are required to ensure that important parts of the equipment are checked regularly.

2-3. **DAILY PREVENTIVE MAINTENANCE SERVICES.**

a. *General.* Daily preventive maintenance services are listed in table 2-2 and shall be performed by the operator each day the battery charging distribution panel is operated.

b. Intervals.

(1) Before operation (B). These checks and services are to be performed before starting the distribution panel. Be sure to review the warnings in the front of this manual before placing the distribution panel into operation.

(2) During operation (D). These checks and services are to be performed while the distribution panel is in operation. Be sure to keep the Warnings in mind while performing the checks and services. If the distribution panel fails to operate properly, turn to troubleshooting section of this manual to assist you in finding and correcting the malfunction. Use DAPAM 738-750 to report any defects.

(3) After operation (A). These checks and services are performed after operation of the distribution panel. Performing the checks and services assures that the equipment will be ready for operation.

the next time it is used. If the panel fails to operate properly, turn to the troubleshooting section of this manual to assist you in finding and correcting the malfunction. Use DAPAM 738-750 to report any defects.

c. Weekly Preventive Maintenance. Weekly preventive maintenance services shall be performed by the operator every seven days.

d. *Monthly Preventive Maintenance.* Monthly preventive maintenance services shall be performed every 30 days.

e. *Quarterly Preventive Maintenance.* Quarterly preventive maintenance shall be performed every 90 days.

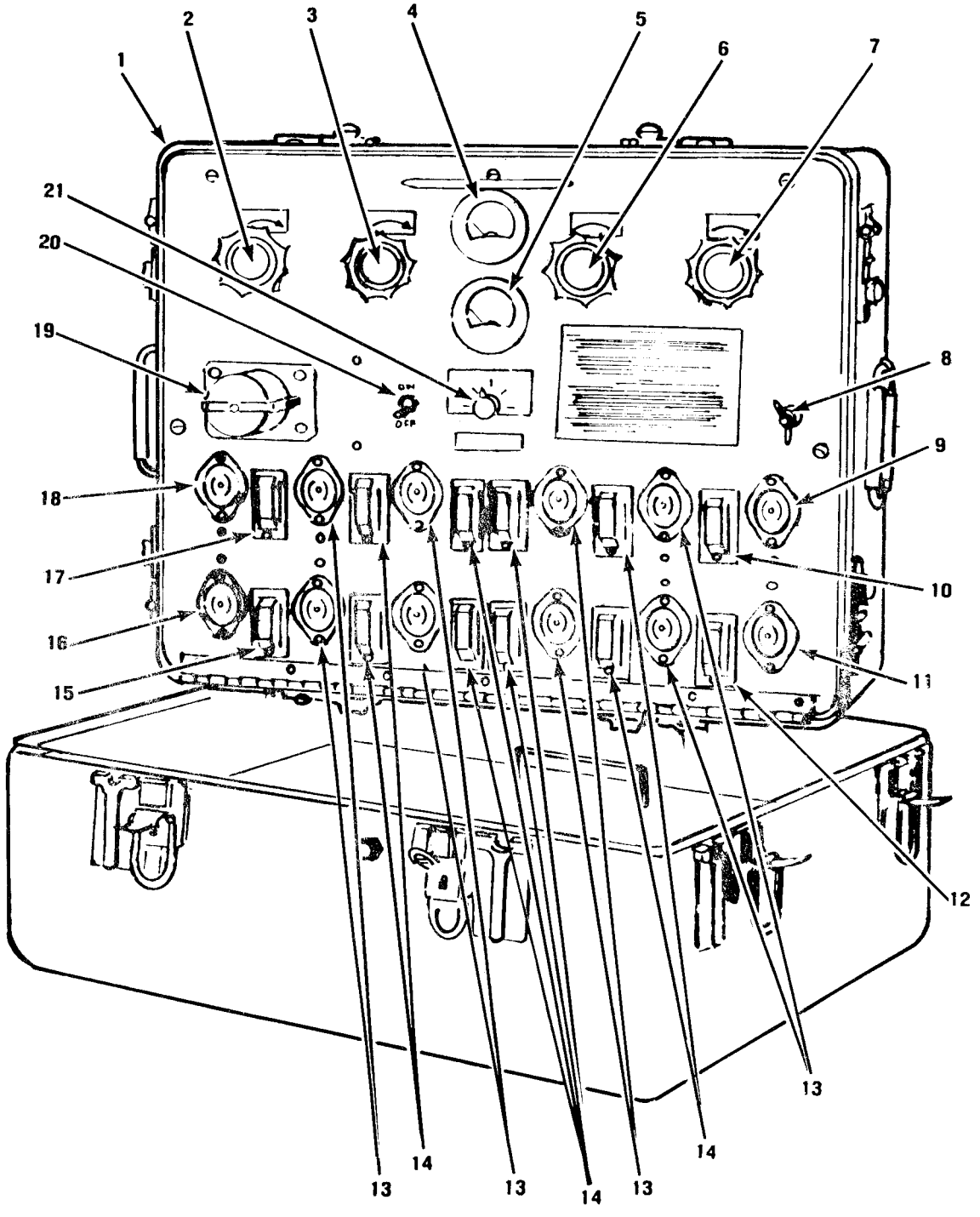


Figure 2-1. Operator Controls and Indicators

TABLE 2-1. OPERATOR CONTROLS AND INDICATORS

NOTE
The callouts on Figure 2-1 relate to key numbers.

Key	Control or Indicator	Function
1	Battery Charging Distribution Panel	
2	Current Control, INCREASE STA 1	To control charging rate in STA 1 12 VOLTS circuit.
3	Current Control, INCREASE STA 2	To control charging rate in STA 2 24 VOLTS circuit.
4	DC Voltmeter (0-30 VDC)	Indicates value of controlled voltages.
5	DC Ammeter (0-30A)	Indicates value of controlled currents.
6	Current Control, INCREASE STA 3	To control charging rate in STA 3 24 VOLTS circuit.
7	Current Control, INCREASE STA 4	To control charging rate in STA 4 12 VOLTS circuit
8	External GROUND Terminal	For grounding distribution panel.
9	Receptacle, STA 3, 24 VOLTS	For charging 24-volt batteries under controlled conditions.
10	Circuit Breaker, STA 3, 24 VOLTS	Provides overload protection in STA 3 24 VOLTS circuit.
11	Receptacle, STA 4, 12 VOLTS	For charging 12-volt batteries under controlled conditions.
12	Circuit Breaker, STA 4, 12 VOLTS	Provides overload protection in STA 4 12 VOLTS circuit.
13	Receptacle, Uncontrolled 24 VOLTS Charging, 8 Stations	For charging 24-volt batteries under uncontrolled conditions.
14	Circuit Breaker, Uncontrolled 24 VOLTS Charging, 8 Stations	Provides overload protection in adjoining uncontrolled 24 VOLTS circuit.
15	Circuit Breaker, STA 2, 24 VOLTS	Provides overload protection in STA 2, 24 VOLTS Circuit.
16	Receptacle, STA 2, 24 VOLTS	For charging 24-VOLT batteries under controlled conditions.
17	Circuit Breaker, STA 1,12 VOLTS	Provides overload protection in STA 1 12 VOLTS circuit.
18	Receptacle, STA 1, 12 VOLTS	For charging 12-volt batteries under controlled charging rate.
19	Receptacle, 28 VDC Main Power Input	Provision for connecting input power.
20	Switch, Main POWER ON/OFF	Main power switching.
21	Switch, CONTROLLED CHARGING STATION SELECTOR	To obtain DC VOLTS, DC AMPERES meter readings for selected controlled charging connector.

Table 2-2. OPERATOR/CREW PREVENTIVE MAINTENANCE CHECKS AND SERVICES

B–Before
D–During
A–After
Q–Quarterly

Item No.	Interval B	D	A	M	Q	Item To Be Inspected	Procedures Check for and have repaired or ad,justed as necessary	Equipment Is Not Ready If
1	●		●			Battery charging distribution panel case	Visually inspect for broken or damaged case, case latches or case handles.	Case, three (3) each case latches or one or more case handles are broken or damaged
2	●					Distribution panel	Visually inspect distribution panel for damaged or broken rheostats, meters, switches, receptacles, circuit breakers and circuit breaker boots.	Rheostats, meters, switches, receptacles, or circuit breakers are broke or damaged.
		●					Inspect rheostats, meters, switches and circuit breakers for proper operation.	Rheostats, meters, switch and circuit breakers do not operate.
		●					Inspect receptacles for poor connections.	Receptacles have loose connections
					●		Loosen fasteners and lift panel to inspect wiring for loose connections or evidence of overheating or cleanness of component.	Loose connections are left untightened or cause of overheating is not corrected.
	●						Inspect ground lug for loose ground wire connection.	panel is not properly grounded
3	●					Cables	Visually inspect for bent broken or missing plugs and alligator clips, damaged insulation, and corroded alligator clips.	More than half the plugs or alligator clips are broken, bent or missing. Insulation is damaged exposing bare wire.
			●				Clean and inspect cables for damaged insulation and bent, broken or missing plugs or alligator clips.	Insulation is damaged exposing bare wire. PlugS or alligator clips are bent, broken or missing.

Section III. OPERATION UNDER USUAL CONDITIONS

2-4. PRINCIPLES OF OPERATION.

a. To charge a battery, it is necessary to apply a voltage higher than the actual voltage rating of the battery so that current will flow in the battery cells. The amount (rate) of current flow into a battery will depend upon how low the battery charge is; the lower the battery charge, the greater the amount of current flow, Therefore, current flow will be high for a low or completely discharged battery and decrease as the battery charge approaches normal. The flow of charging current causes heat due to the I^2R in the battery. A "trickle" charger provides a low charging current so that such heat cannot become excessive but its use requires a long period of time. For faster charging, such as with this equipment, the current provided is high. It is up to the operator to see that none of the batteries being charged become overheated in the charging process. (Overheating will cause warpage of the battery plates which will ruin the battery.)

b. The battery charging distribution panel (Figure 2-1) uses a constant voltage method of charging batteries. When a discharged or partially discharged battery is connected to any of the eight uncontrolled 24 VOLTS polarized receptacle connectors (13), the initial charging rate (current flow) will be high, but will gradually decrease as the battery approaches its fully charged state. The same is true when a battery is connected to any of the four controlled receptacle connectors (STA 1-12 VOLTS or STA 4-12 VOLTS: STA 2-24 VOLTS or STA 3-24 VOLTS). However, when a battery is connected to one of the controlled receptacles, the operator can control (adjust) the rate of current flow by adjustment of rheostat to maintain a constant charging current rate.

2.5. **OPERATING INSTRUCTIONS.** The battery charging distribution panel is designed for charging 24-volt and 12-volt dc lead-acid batteries. Although not recommended, the distribution panel can also be used to charge 6-volt dc lead-acid batteries when properly connected. Operator controls and indicators are shown in Figure 2-1.

CAUTION

DO NOT attempt to charge NICAD batteries with the battery charging distribution panel.

a. When uncontrolled, a high charging rate (current flow) will generate excessive heat, which if allowed to continue, will warp the the battery plates and ruin the battery. And since battery construction varies, it is impossible to specify a "safe" charging rate to fit all batteries. However, if the 8-hour discharge rate of a battery is known, applying a charging rate no higher than the 8-hour discharge rate will be satisfactory for charging a battery.

NOTE

To determine the 8-hour discharge rate of a battery, divide the ampere-hour rating of the battery by 8. For example, if a battery is rated at 40 ampere- hours, 40 divided by 8 equals 5 amperes. Thus, applying a 5-amp charging rate will satisfactory.

b. The battery charging distribution panel (Figure 2-1) is designed to use the constant potential (constant voltage) method for charging batteries. When a discharged or partially discharged battery is connected to any of the eight uncontrolled 24 VOLTS polarized receptacle connectors (13), the initial charging rate (current flow) will be high, and then begin to decrease as the state of charge in the battery increases to normal.

c. When a discharged or partially discharged battery is connected to any of the controlled receptacle connectors (STA 1, 12 VOLTS; STA 2, 24 VOLTS: STA 3, 24 VOLTS; or STA 4, 12 VOLTS), the initial charging rate (current flow) will also be high, and then begin to decrease as the state of charge in the battery increases to normal. The controlled receptacle connectors, however, provide the capability of applying a "trickle" charge by adjustment of a current control to maintain constant charging current rate.

WARNING

Make sure the charging area is adequately ventilated. The hydrogen gas driven off during charging can cause an explosive mixture in a confined area.

WARNING

Because of the danger of hydrogen gas explosion, a strict ban on smoking or open flame must be enforced in the charging area. If at all possible, an explosion-proof generator or power supply is recommended. If not, try to arrange the generator or power supply on one side of a wall or barrier through which the input cable passes to this equipment on the opposite side of the wall or barrier.

d. Setup this equipment in a clear work area with a generator or power supply delivery 28 to 30 volts de located nearby so that the input power cable will connect this equipment to the power supply. Arrange space for the batteries to be charged so that the equipment cables will reach from the equipment to the batteries with space to allow inspection of the batteries or charge. It is also strongly recommended that wood bridges be constructed to lay over the charging cables so that such cables are not damaged or disconnected as personnel move about the area, checking and connecting batteries. These bridges need only be high enough to clear the cables and wide enough to provide a walk path

(1) Be sure the master power switch (2, figure 2) is off, then connect the input power cable between the generator or power supply and the input connector (1). Consult the manual of the generator or power supply to determine the maximum continuous dc voltage permitted.

(2) Ground the distribution panel by connecting a heavy wire from the ground stud (8, Figure 2-1) to a ground rod assembly NSN 5975-00-878-3791. Refer to FM 20-31 for grounding procedures.

(3) Turn the power switch on. Adjust the generator or power supply to deliver 28 volts (or its maximum if less than 28 volts). Note -if the ambient temperature in the charging area is below freezing (32°F), increase the generator or power supply dc voltage to 30 volts (maximum) provided this does not exceed its operating limits.

WARNING

Always be sure that the circuit breaker concerned is in the OFF position before connecting or disconnecting batteries or cables in the circuit.

2-6. **PREPARATION REQUIREMENTS.** When a battery is received for charging, check each cell with a hydrometer to determine the degree of charge/discharge. After changing, use the hydrometer again as a final check to make sure the battery is fully charged and ready for return to service. A specific gravity reading of 1.280 on the hydrometer indicates a fully charged battery. Readings below this value indicate the degree of discharge. A hydrometer reading of 1.20 indicates a battery should be recharged.

a. As batteries are received for charging, they must be thoroughly cleaned, terminal posts must be dressed to assure a good electrical connection, and each cell must be checked and filled with distilled water as required. Refer to TM 9-6140-200-14 for battery service.

CAUTION

The use of tap water or water from other sources may introduce chemicals, minerals or other undesirable elements which could appreciably shorten battery life or make it unusable.

CAUTION

Allowing a completely discharged battery to stand for an extended period of time (more than a week) may cause the plates to become sulfated and hardened, thereby ruining the battery.

b. After a battery has been cleaned, serviced, and outer surface completely dried, place it in position for charging, making sure all caps have been removed.

NOTE

When not clearly marked on the battery case, the voltage rating of a lead-acid battery can be determined by counting the number of battery cells: 24 volts, 12 cells; 12 volts, 6 cells; 6 volts, 3 cells.

NOTE

While the following instructions minimize the occasions for its use, a hydrometer is the fundamental method of determining charge in a battery. Use the hydrometer in all cases of doubt and also in the final check to determine that the battery is fully charged and ready to release for service. A hydrometer reading of 1.280 indicates a fully charged battery. Readings below this value indicate the degree of discharge. A hydrometer reading of 1.20 indicates the battery should be recharged.

2.7. **BATTERY CHARGING OPERATION (Lead-acid, 24 volts dc).**

a. Select one of the two available controlled 24 volt connectors STA 2 (16, Figure 2-1) or STA 3 (9, Figure 2-l).

b. Check and make sure the circuit breaker switch for the selected 24 volt station is in the OFF position.

c. Select one of the battery charging cables (Figure 1-2) for use in connecting battery to Distribution Panel.

d. Connect red alligator clip on end of battery charging cable to positive (+) battery terminal, and then connect black alligator clip to negative (-) battery terminal.

e. Insert polarized connector on battery charging cable into the selected polarized receptacle connector (9 or 16, Figure 2-1) and then twist the connector clockwise to securely lock in position.

NOTE

If the Distribution Panel is not already in service, it will be necessary to place the POWER ON/OFF SWITCH (20, Figure 2-1) in the ON position to apply operating power. While the Distribution Panel is in continuous service, additional batteries may be connected to or disconnected from the Distribution Panel with the POWER ON/OFF SWITCH in the ON position provided the selected STA CIRCUIT BREAKER is in the OFF position.

f. Press through the plastic cover and set the circuit breaker switch for the selected 24 volts station to the ON position.

g. Position controlled charging station selector to station selected.

h. If the circuit breaker switch holds, turn the rheostat clockwise until the ammeter indicates approximately 7.5 Amperes, and record the time. If the circuit breaker switch does not hold, check connections. If connections are correct, return battery to direct support maintenance.

NOTE

Soft boiling is indicated by small bubbles rising to the surface of the electrolyte allowing the surface to remain mostly smooth.

i. When soft boiling is noted in the battery (2 to 4 minutes), turn the rheostat counterclockwise for a current indication on the ammeter of approximately 5 Amperes, and again record the time.

j. When soft boiling is again observed (usually 5 to 10 minutes), turn the rheostat counterclockwise for a current indication on the ammeter of approximately 2.5 Amperes, and again record the time.

NOTE

If soft boiling is noted within a time frame of less than 5 minutes, shift to the uncontrolled station sooner.

k. After 5 to 10 minutes at this charge rate, turn off the station circuit breaker switch and shift the charge cable connector to any unused, uncontrolled 24 volt charging station for completion of charging.

CAUTION

Hard boiling indicates that a battery is charging at a rate faster than the safe charging current, causing overheating to the point where plates warp, and the battery is rendered unserviceable. Hard boiling is indicated by big bubbles rapidly rising to the surface of the electrolyte, causing violent agitation of the liquid.

1. When the circuit breaker switch for the uncontrolled station is set to on and remains in the ON position, and hard boiling does not occur, the battery is taking a normal charge.

NOTE

If the battery starts to hard boil again, reconnect the battery to the controlled station and continue charging under controlled conditions.

m. Note the time and continue to monitor the battery condition every 10 to 15 minutes until the battery is fully charged.

2-8. **BATTERY CHARGING OPERATION (Lead-acid, 12-volts dc).**

a. Select one of the two available controlled 12 VOLTS stations (STA 1-12 VOLTS) (18, Figure 2-1) or (STA 4-12 VOLTS) (11).

b. Check and make sure the circuit breaker switch for the selected 12 VOLTS station is in the OFF position and the current control for selected 12 VOLTS station (INCREASE STA 1) (2) or (INCREASE STA 4) (7) is turned fully counterclockwise.

c. Select one of the. battery charging cables (Figure 1-2) for use on connecting battery to distribution panel.

d. Connect red alligator clip on end of battery charging cable to positive (+) battery terminal, and then connect the black alligator clip to negative (-) battery terminal.

e. Insert polarized connector of battery charging cable into the selected polarized receptacle connector and twist connector clockwise to securely lock in position.

NOTE

If the distribution panel is not already in service, it will be necessary to place the POWER ON/OFF Switch (20, Figure 2-1) in ON position to apply operating power. While the distribution panel is in continuous service, additional batteries may be connected to or disconnected from the distribution panel with the POWER ON/OFF Switch in ON position.

f. Set CONTROLLED CHARGING STATION SELECTOR Switch (21, Figure 2-1) to STA 1 or STA 4 position, according to which controlled 12 VOLTS station is selected (paragraph 2-8.a.).

CAUTION

NEVER connect or disconnect the battery charging cable connector while a circuit breaker switch is in the ON position.

g. Press through plastic cover and set circuit breaker switch for the selected 12 VOLTS station to ON position. If circuit breaker stitch trips to OFF position, disconnect battery charging cable and battery connections. The distribution panel cannot be used to charge the battery because of dead or shorted cells.

h. When circuit breaker switch is set and remains in the ON position (paragraph 2-8g above), the battery is taking a normal charge. Proceed as follows.

i. Record the time, then check the battery again in one or two minutes to make sure there is no hard boiling of electrolyte.

NOTE

Hard boiling is indicated by big bubbles rapidly rising to the surface of the electrolyte, causing violent agitation of the liquid.

j. If the circuit breaker is still holding, turn the current control (2 or 7, Figure 2-1) clockwise until the ammeter (5) indicates approximately 7.5 amperes. Record the time.

k. When soft boiling is noted in the battery (2 to 4 minutes), turn the current control counterclockwise for a current indication of approximately 5 amperes, and again record the time.

1. When soft boiling is again observed (usually 5 to 10 minutes), turn the current control counterclockwise for a current indication of approximately 2.5 amperes, and again record the time.

m. Continue to charge the battery on the chosen 12-volt controlled station for the time period previously determined in accordance with the instructions set forth in paragraph 2-4a.

2.9 BATTERY CHARGING OPERATION (12-Volt Batteries). The procedures in 2-8a through 1. above, determine whether the battery is of high enough quality to accept a charge. If several 12-volt batteries are to be charged, they may be charged using 24-volt, uncontrolled stations, as follows.

NOTE

Batteries will be charged in combinations of two, using this procedure. Charge any odd battery on a controlled 12-volt station.

a. Perform the procedures of 2-8a through 1. above, for any even number of batteries.

b. Using an inter-battery jumper cable, connect the negative terminal of battery "A" to the positive terminal of battery "B".

c. Connect the red clip lead of a charging cable to the positive terminal battery "A", and the black clip lead to the negative terminal to battery "B".

NOTE

If the two batteries have different amp-hour ratings, the battery with the lower rating will reach "soft" (or "hard") boiling before the other in which case the early-boiling battery will control whether or not the charging may be continued with this setup or whether the one battery will have to be shifted to a controlled station.

d. Refer to paragraph 2-7 and follow the procedures for a 24 volt battery.

2-10. **BATTERY CHARGING OPERATION (6-Volt Batteries).** Although the Battery Charging Distribution Panel is not specifically designed to charge 6-volt batteries, it is possible to do so using procedures similar to those of paragraph 2-9. The more favored method for charging 6-volt batteries is to charge two batteries in series using a 12-volt, controlled station (STA 1 or STA 4). However, four 6-volt batteries maybe connected in series and charged using a 24-volt controlled or uncontrolled station.

NOTE

Batteries will be charged in combinations of two, using this procedure.

a. Charging two 6-volt batteries in series (Figure 2-2).

(1) Using an inter-battery jumper cable, connect the negative terminal of battery "A" to the positive terminal of battery "B".

(2) Connect the red clip lead of a charging cable to the positive terminal of battery "A", and the black clip lead to the negative terminal of battery "B".

NOTE

If the two batteries have different amp-hour ratings, the battery with the lower rating will reach "soft" (or "hard") boiling before the other in which case the early-boiling battery will control whether or not the charging may be continued with this setup or whether the one battery will have to be shifted to a controlled station.

(3) Refer to paragraph 2-8 and follow procedures for a 12-volt battery,

NOTE

Batteries will be charged in combinations of four using the following procedure.

b. Charging four 6-volt batteries in series (Figure 2-3).

(1) Using inter-battery jumper cables, connect the negative terminal of battery "A" to the positive terminal of battery "B", then

(2) Connect the negative terminal of battery "B" to the positive terminal of battery "C", then

(3) Connect the negative terminal of battery "C" to the positive terminal of battery "D".

(4) Connect the red clip of a charging cable to the positive terminal of battery "A", and the black clip lead to the negative terminal of battery "D".

NOTE

If the four batteries have different amp-hour ratings, the battery with the lower rating will reach "soft" (or "hard") boiling before the other in which case the early-boiling battery will control whether or not the charging may be continued with this setup or whether the one battery will have to be shifted to a controlled station.

(5) Refer to paragraph 2-7 and follow the procedures for a 24-volt battery.

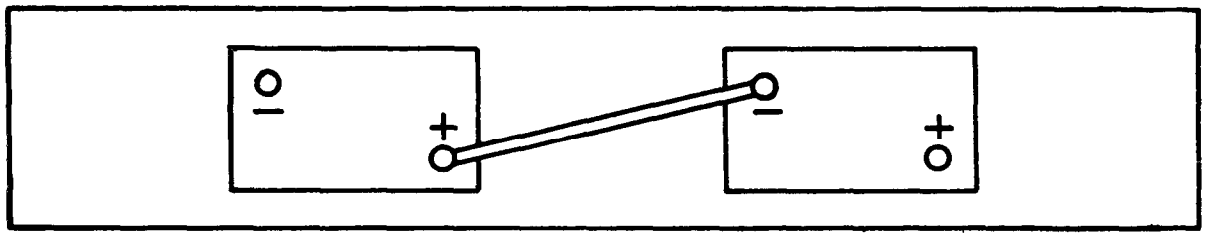


Figure 2-2. Series Connection – Two 6 Volt Batteries or Two 12 Volt Batteries

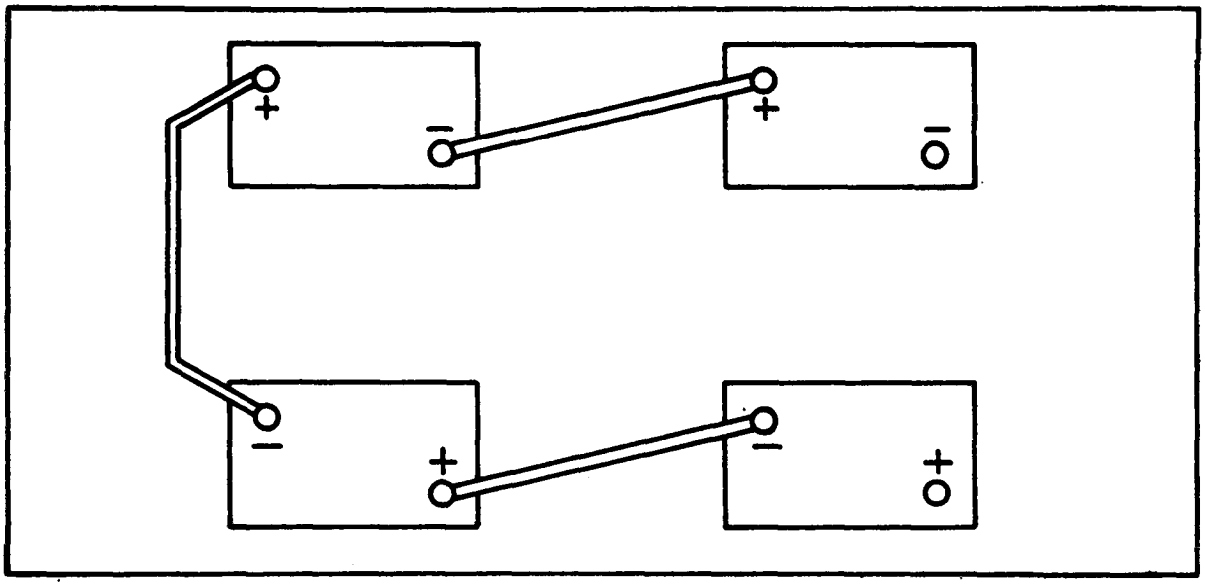


Figure 2-3. Series Connection - Four 6-Volt Batteries

2-11. **CHARGING NICKEL-IRON BATTERIES.** The nickel-iron, or Edison cell is normally very prominently marked as NOT being a common lead-acid battery. Prior to charging nickel-iron batteries, it is desirable to determine their specific gravity. The Edison cell has a normal specific gravity ranging from 1.160 to 1.215. Any value below 1.160 at 60° F means the electrolyte should be replaced with electrolyte (potassium hydroxide) of the proper specific gravity. Once filled with new electrolyte, determine the actual voltage between Edison cell terminals. Then choose a controlled station which can provide that voltage value PLUS at least 2.4 volts dc (3.6 volts dc max). Now, follow the instructions for charging batteries as given in paragraph 2-7 or 2-8.

2-12. **EMERGENCY SHUT-DOWN.** For minor, station emergencies, shut-down procedure is to turn off the circuit breaker associated with the station. To shut the entire unit down, turn off the main power switch (19, Figure 2-1). As a final emergency shut-down procedure, turn off the power source for the Battery Charging Distribution Panel.

Section IV. OPERATION UNDER UNUSUAL CONDITIONS

2-13. **OPERATION IN EXTREME COLD (BELOW 0°F (-18 °C)).** Remove any ice or snow which may have accumulated on the panel or wiring.

CAUTION

Do not bend or king wiring as it becomes brittle with extreme cold.

2-14. **OPERATION UNDER RAINY OR HUMID CONDITIONS.** Humid conditions can cause corrosion and deterioration of electrical components. Keep electrical components and wiring clean and dry.

2-15. **OPERATION IN SALT WATER AREAS.** Wipe the Battery Charger Distribution Panel with a clean cloth dampened with clean, fresh water at frequent intervals. Use care not to damage the electrical system with water.

CHAPTER 3
OPERATOR MAINTENANCE INSTRUCTIONS

Section I. LUBRICATION INFORMATION

3-1. The battery charging distribution panel does not require lubrication.

Section II. OPERATOR TROUBLESHOOTING PROCEDURE

3-2. No troubleshooting procedure is required for the battery charging distribution panel by the Operator.

Section III. MAINTENANCE PROCEDURES

3-3. Operator maintenance consists of visual inspection of the battery charging distribution panel, case, and cables for damage.

CHAPTER 4
ORGANIZATIONAL MAINTENANCE

Section I. REPAIR PARTS, SPECIAL TOOLS, TMDE AND SUPPORT REPAIR

4-1. **GENERAL.** This section contains information on the repair parts, tools, and equipment issued to the operator and organizational maintenance personnel for operating and maintaining the battery charging Distribution Panel. Tools and equipment should not be used for purposes other than prescribed and when not in use, should be properly stored.

4-2. **REPAIR PARTS.** Repair parts are listed in Appendix C of this manual.

4-3. **AUTHORIZED COMMON TOOLS AND EQUIPMENT.** Refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit for Common Tools and Equipment.

4-4. **SPECIAL TOOLS AND EQUIPMENT.** Special Tools required to perform organizational maintenance on the battery charging distribution panel are listed in (MAC) Maintenance Allocation Chart Section II. No other special tools and equipment are required.

Section II. SERVICE UPON RECEIPT

4-5. INSPECTION.

a. Check the Battery Charger Distribution Panel data plate for positive identilcation.

b. Make a complete visual inspection of the exterior for evidence of damage which may have occured during shipment.

c. Back out screws and lift panel exposing the components and check for loose wires or components.

4.6 **INSTALLATION INSTRUCTIONS. The** Battery Charger Distribution Panel installation size should be as level as possible and should provide adequate ventilation.

4-7. **INSTALLATION OF SEPARATELY PACKED COMPONENTS.** There are no separately packed components.

Section III. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES

4-8. **PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS).** No PMCS is required. Refer to paragraphs 2-2 and 2-3 for operator Preventive Maintenance Checks and Services.

Section IV. TROUBLESHOOTING PROCEDURE

4-9. GENERAL.

a. *Scope.* This section contains troubleshooting information for locating some of the troubles that may develop in the Battery Charging Distribution Panel. Each malfunction or symptom of trouble given for an individual unit or system is followed by a list of probable causes or tests, and corrective action to remedy the malfunction.

b. *Method.* This technical manual cannot cover all possible troubles and deficiencies that may occur under the many conditions of operation. If a specific trouble, test, or remedy is not covered, isolate the system in which the trouble occurs, and then locate the defective components.

c. *Maintenance Level.* The tests and remedies in this section are governed by the organization level of maintenance.

Table 4-1. Organizational Troubleshooting

NOTE

In all cases check for broken wires or loose connections.

MALFUNCTION PROBABLE CAUSE CORRECTIVE ACTION

1. NO VOLTAGE ON VOLTMETER

No input power (all stations read 0)

Step 1. Check generator or power supply.

Turn on power.

Step 2. Check power cable.

Replace cable if defective.

Step 3. Check main switch power on/off.

Position switch to on.

Replace switch if defective.

Step 4. Check K1 relay.

Replace K1 relay if defective.

Meter circuit open.

Step 1. Check meter switch.

Replace switch if defective.

Step 2. Check meter.

Replace meter if defective.

Table 4-1. Organizational Troubleshooting (Continued)

MALFUNCTION PROBABLE CAUSE CORRECTIVE ACTION
2. NO AMMETER READING
Meter circuit open.
Step 1. Check meter switch.
Replace switch if defective.
Step 2. Check meter.
Replace meter.
Circuit breaker faulty.
Check with ohmeter.
Replace circuit breaker if defective.
Rheostat open.
Check with ohmmeter.
Replace rheostat if defective.
Diode open.
Check with ohmmeter.
Replace diode if defective.
Ammeter shunt open.
Check with ohmmeter.
Replace shunt if defective.
Receptacle assembly faulty.
step 1. Visually check for faulty contacts.
Replace receptacle assembly if defective.
step 2. Check with voltmeter.
Replace receptacle assembly.

Table 4-1. Organization Troubleshooting (Continued)

MALFUNCTION PROBABLE CAUSE CORRECTIVE ACTION
3. UNCONTROLLED STATION DOES NOT CHARGE BATTERY.
Circuit breaker faulty.
Replace circuit breaker.
Diode open.
Check with ohmmeter.
Replace diode.
Receptacle assembly faulty.
Step 1. Visually check for faulty contacts.
Replace receptacle assembly.
Step 2. Check with voltmeter.
Replace receptacle assembly.
4. AMMETER READS HIGH OR ALL BATTERIES BOIL ON UNCONTROLLED STATION.
Input voltage too high.
If this occurs at all stations reduce input voltage.
5. CURRENT CONTROL FAILS TO CONTROL VOLTAGE.
Rheostat shorted.
Clean or replace rheostat.
6. POWER SWITCH WILL NOT CUT POWER.
Relay sticking closed.
Replace relay.
Switch sticking closed.
Replace switch.
7. METER READINGS SHOW SAME AT ALL POSTIONS (WHEN ALL IN USE).
Shorted diode.
Check diode.

Section IV. MAINTENANCE PROCEDURES

4-10. **GENERAL.** Disassembly and reassembly for most of the components of the Battery Charger Distribution Panel generally involves no more than removal of attached hardware, and lifting or sliding the component from the panel.

a. *Disassembly.* (Figure 4-1)

(1) Boot, circuit breaker. Remove two phillips head screws that secure circuit breaker boot (9) and retaining plate and remove circuit breaker boot.

(2) Meters volmeter-ammeter.

(a) Loosen panel fastener screw (1) and open panel (2).

(b) Remove power leads from meter (3) and remove screws and attaching hardware from meter.

(c) Remove meters from panel.

(3) Circuit breaker (top row).

(a) Loosen panel fastener screws (1) and open panel (2).

(b) Remove bus bar connectors ('7).

(c) Remove screw and nut attaching bus bar jumper (8) from bus bars (5).

(d) Remove nuts and washers connecting bus bars (18) to circuit breakers.

(e) Remove screws, nuts, hardware from bus bar supports (4) and remove bus bars (8 and 18).

(f) Remove circuit breaker power lead.

(g) Remove phillip head screws that secure circuit breaker boot (9) and circuit breaker, to panel.

(h) Remove circuit breaker by tilting upward.

(4) Circuit breaker (bottom row).

(a) Loosen fastener screws (1) and open panel (2).

(b) Remove attaching hardware from heat sink bridges (10) and bus bar ground (11).

(c) Remove attaching screws and nuts from bus bar (5).

(d) Remove attaching screw and nut from bus bar jumper (8) and remove bus bar (5).

(e) Remove circuit breaker power lead.

(f) Remove two phillips head screws that secure circuit breaker boot (9) and circuit breaker to panel.

(g) Remove circuit breaker by tilting upward.

(5) Receptacle assembly.

(a) Loosen panel fastener screw (1) and open panel (2).

(b) Remove screws securing receptacle assembly (13) to panel.

(c) Disconnect receptacle leads from ground bus bar and associated circuit breaker.

(d) Remove receptacle assembly from panel.

NOTE

Remove attaching hardware from heat sink bridges and from the bus bars, if applicable, to receptacle assembly being removed.

(6) Diode.

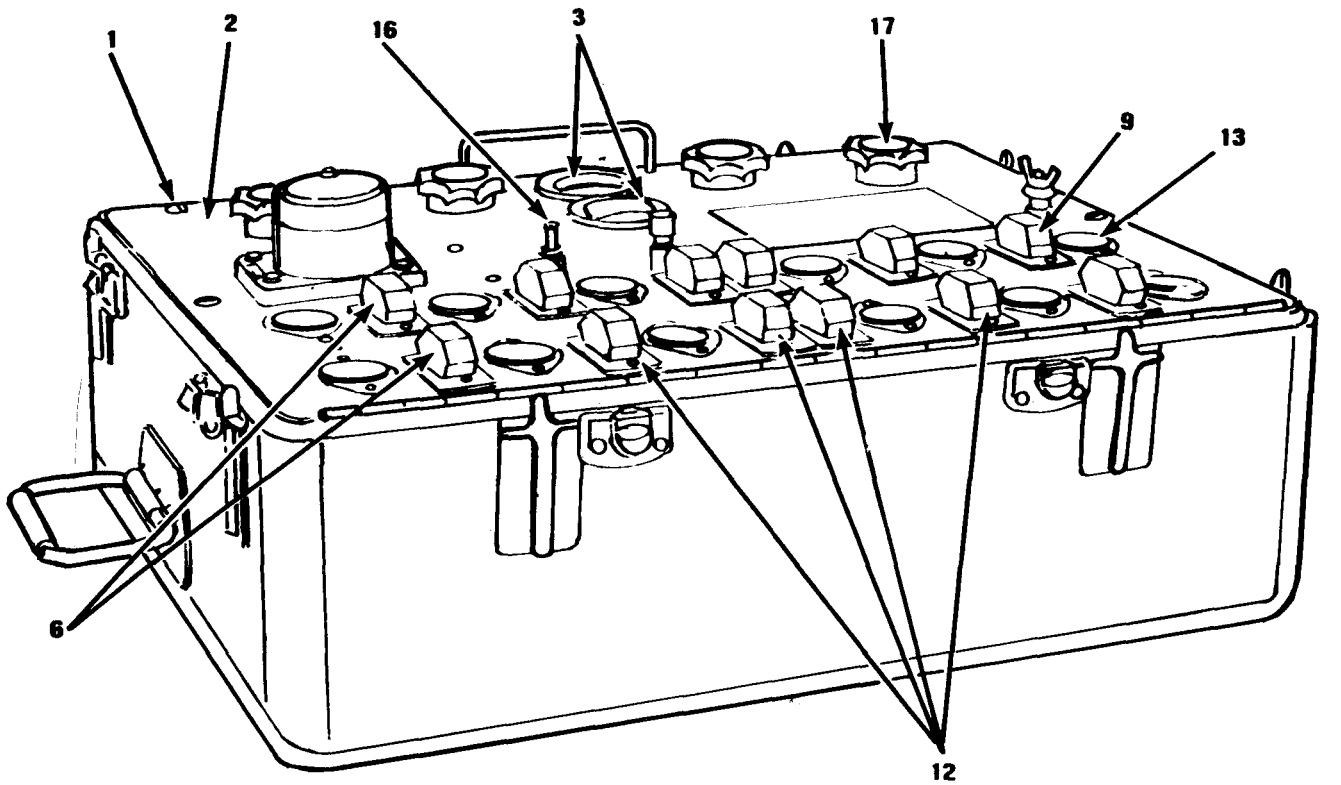
(a) Loosen panel fastener screws (1) and open panel.

(b) Remove receptacle power lead from diode (14).

(c) Remove diode.

NOTE

Remove attaching hardware from heat sinks (10) and remove heat sinks as necessary.



1. Panel Fasteners Screw
2. Panel
3. Meter
4. Bus Bar Supports
5. Bus Bar
6. Circuit Breakers
7. Bus Bar Connectors
8. Bus Bar Jumper
9. Circuit Breaker Boot
10. Attaching Hardware
11. Bus Bar Ground
12. Circuit Breaker, 20 Amp
13. Receptacle
14. Diode
15. Relay, 200 Amp
16. Toggle Switch
17. Control Knob
18. Bus Bar
19. Resistor

Figure 4-1. Panel (Sheet 1 of 2)

(7) Relay.

(a) Loosen panel fastener screws (1) and open panel.

(b) Disconnect and tag leads from relay (Kl).

(c.) Remove bus bar connectors (7).

(d) Remove mounting screws and hardware from relay and remove relay.

(8) Resistor.

(a) Loosen allen head screws on control knob (17) and remove knob.

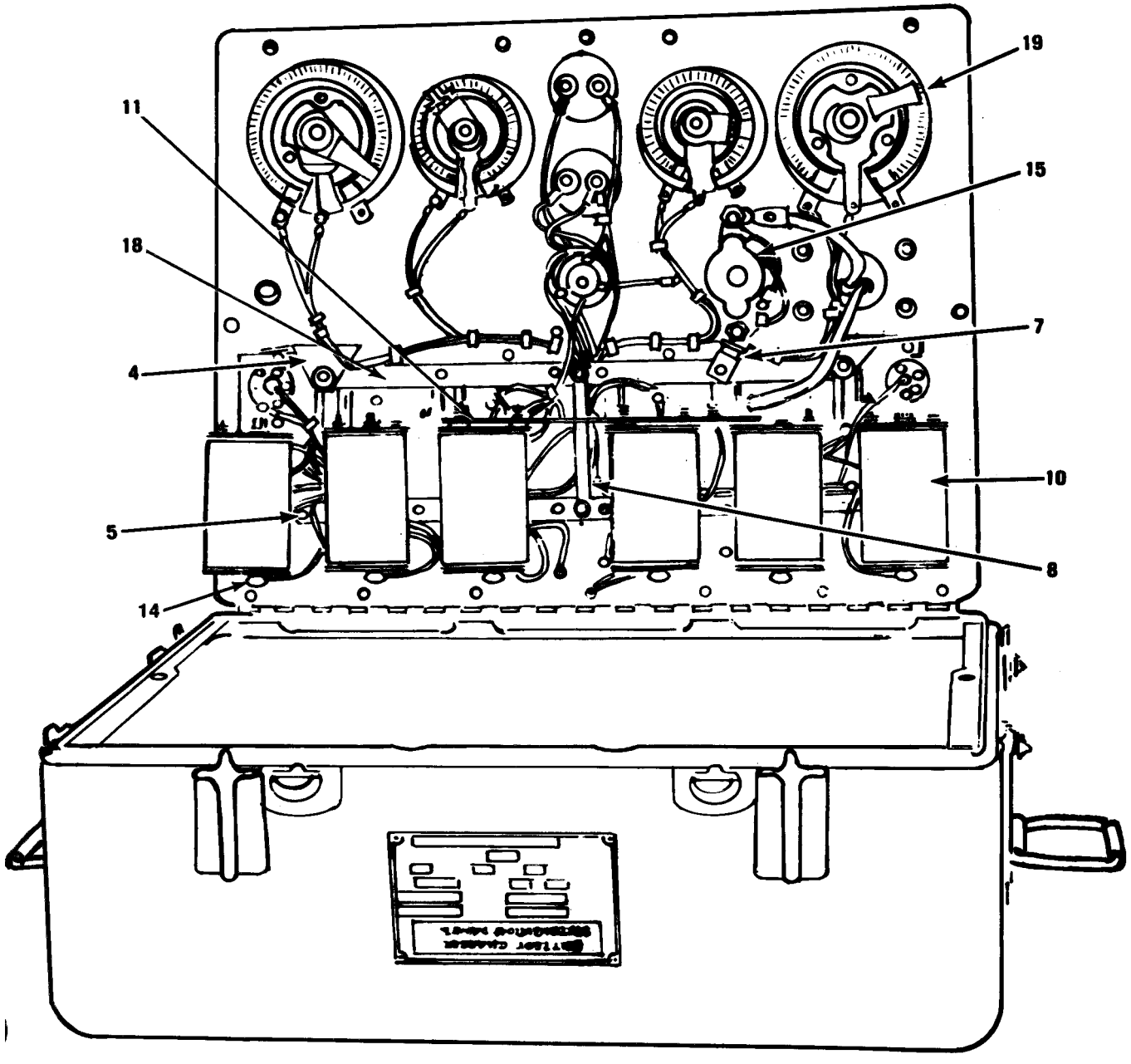


Figure 4-1. Panel *(Sheet 2 of 2)*

(b) Loosen panel fastener screws (1) and open panel (2).

(c) Remove power leads from resistor, variable (19).

(d) Remove resistor mounting screws and remove resistor.

(9) Panel assembly distribution. Disassembly procedure for the Panel Assembly requires removal of components attached to panel.

(10) Bus bar.

(a) Loosen panel fastener screw (1) and open panel (2).

(b) Remove screws, nuts and hardware from bus bar support (4).

(c) Remove nuts and washers connecting bus bar (18) from circuit breakers.

(d) Remove bus bar connector (7). Remove screw and nut attaching jumper bus bar (8) to bus bar (5) and remove bus bar.

(11) Control Knob (Figure 2-1, item 3). Remove allen set screws and remove/replace control knob.

b. *Reassembly*. Reassemble components and hardware in reverse order of disassembly procedure paragraph 4-10a step 1 through 11. Refer to Figure 5-2 for wiring diagram and Table 5-2 for components and wire run list.

4-11. **TEST PROCEDURE.**

a. With no power and no load connected to the Battery Charging Distribution Panel, use an ohmmeter to check front-to-back resistance of each charging station diode in each direction. If the diode fails to show a high resistance in one direction and a lower resistance in the opposite direction, replace diode.

b. Connect a 1 ohm 750 watt resistor (load) between the red and black clips of a charging cable. With the circuit breaker in the OFF position connect the charging cable to the top left uncontrolled charging station receptacle. Connect 28 volt dc to the battery charging distribution panel input connector. Place the power ON/OFF switch in the ON position to apply operating power. Set the circuit breaker associated with the receptacle to the ON position. In 1-25 seconds, the breaker should trip. If the breaker does not trip, replace it. Repeat the procedure for each of the uncontrolled station circuit breakers. Follow the above procedures for the controlled station circuit breakers except that the associated resistor will have to be 2 ohms 300 watt. The circuit breaker should trip in 0-15 seconds.

CHAPTER 5
DIRECT SUPPORT MAINTENANCE

Section I. TROUBLESHOOTING PROCEDURE

5-1. **GENERAL**

a. Scope. This section contains troubleshooting information for locating some of the troubles that may develop in the battery charging distribution panel. Each malfunction or symptom of trouble given is followed by a list of probable causes or tests, and corrective action to remedy the malfunction.

b. *Method.* This techical manual cannot cover all possible troubles and deficiencies that may occur under the many conditions of operation. If a specific trouble test, or remedy is not covered, isolate the system in which the trouble occurs, and then locate the defective component.

c. *Maintenance Level.* The tests and remedies in this section are governed by the direct support level of maintenance.

Table 5-1. DIRECT SUPPORT TROUBLESHOOTING

MALFUNCTION PROBABLE CAUSE CORRECTIVE ACTION
1. WIRING HARNESS FAULTY
Check wires for continuity with ohmmeter.
Repare or replace defective wires.
Replace wiring harness.
2. CABLE ASSEMBLIES FAULTY
Check wires for continuity with ohmmeter.
Repair or replace defective wires.
Replace defective connectors.

Section II. MAINTENANCE PROCEDURES

5-2. **GENERAL.** Disassembly and reassembly for most of the components of the Battery Charger Distribution Panel generally involves no more than removal of attached hardware, and lifting or sliding the component from the panel.

a. Disassembly. (Figure 5-1)

(1) *Boat, circuit breaker.* Remove two phillips head screws that secure circuit breaker boot (9) and retaining plate and remove circuit breaker boot.

(2) *Meters voltmerer-ohmmeter.*

(a) Loosen panel fastener screw (1) and open panel (2).

(b) Remove power leads from meter (3) and remove screws and attaching hardware from meter.

(c) Remove meters from panel.

(3) *Circuit breaker (8 amp top row).*

(a) Loosen panel fastener screws (1) and open panel (2).

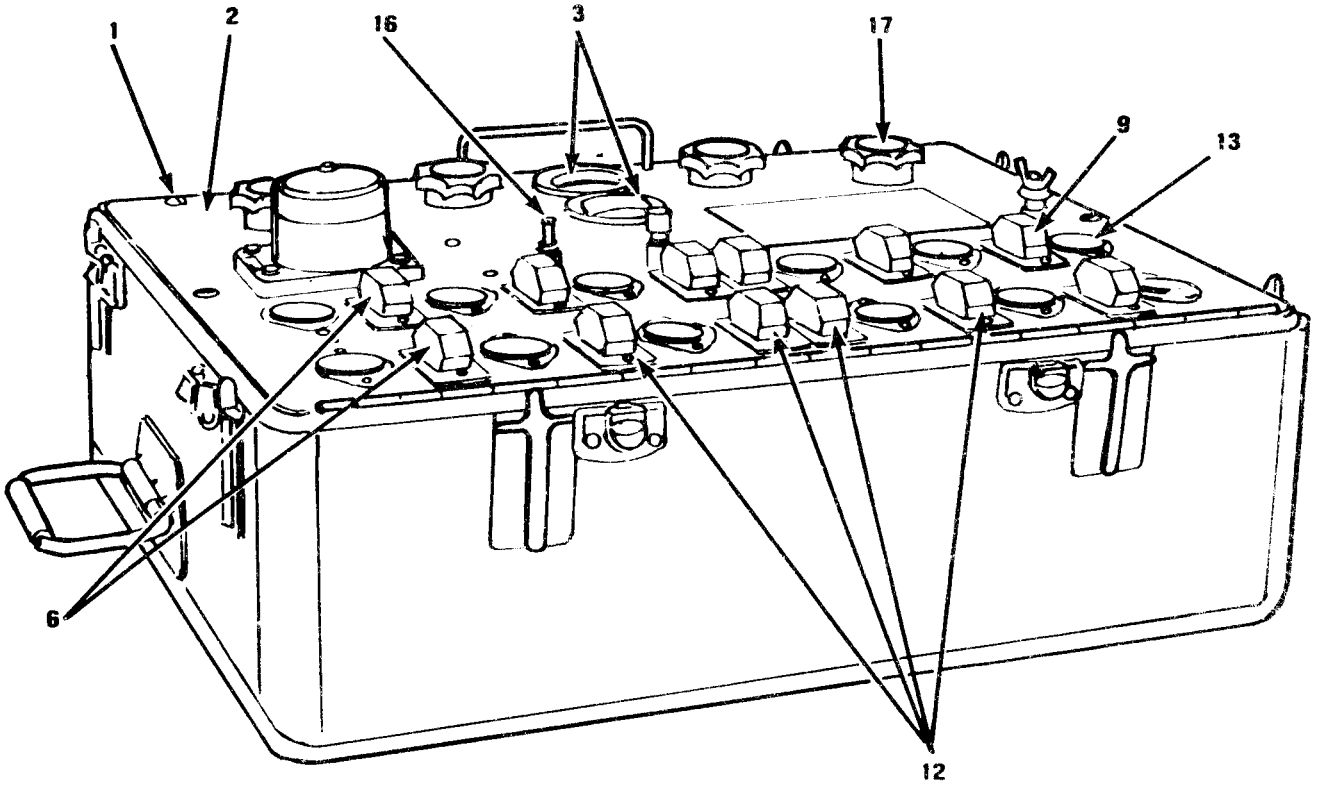
(b) Remove screws, nuts, hardware from bus bar supports (4) and remove bus bars.

(c) Remove nuts and washers connecting bus bars (5) to circuit breakers, 8 amp (6).

(d) Remove bus bar connectors (7).

(e) Remove screw and nut attaching bus bar jumper (8) from bus bars (5) and remove bus bar jumper

(f) Remove circuit breaker power lead.



1. Panel Fasteners Screw
2. Panel
3. Meter
4. Bus Bar Supports
5. Bus Bar
6. Circuit Breakers
7. Bus Bar Connectors
8. Bus Bar Jumper
9. Circuit Breaker Boot
10. Attaching Hardware
11. Bus Bar Ground
12. Circuit Breaker, 20 Amp
13. Receptacle
14. Diode
15. Relay, 200 Amp
16. Toggle Switch
17. Control Knob
18. Resistor

Figure 5-1. Panel (Sheet 1 of 2)

(g) Remove phillip head screws that secure circuit breaker boot (9) and circuit breaker, 8 amp (6) to

(h) Remove circuit breaker by tilting upward.

(4) *Circuit breaker (20 Amp bottom row).*

(a) Loosen fastener screws (1) and open panel.

(b) Remove attaching hardware from heat sink bridges (10) and bus bar ground (11) if applicable to circuit breaker being removed.

(c) Remove attaching screws and nuts from bus bar (5).

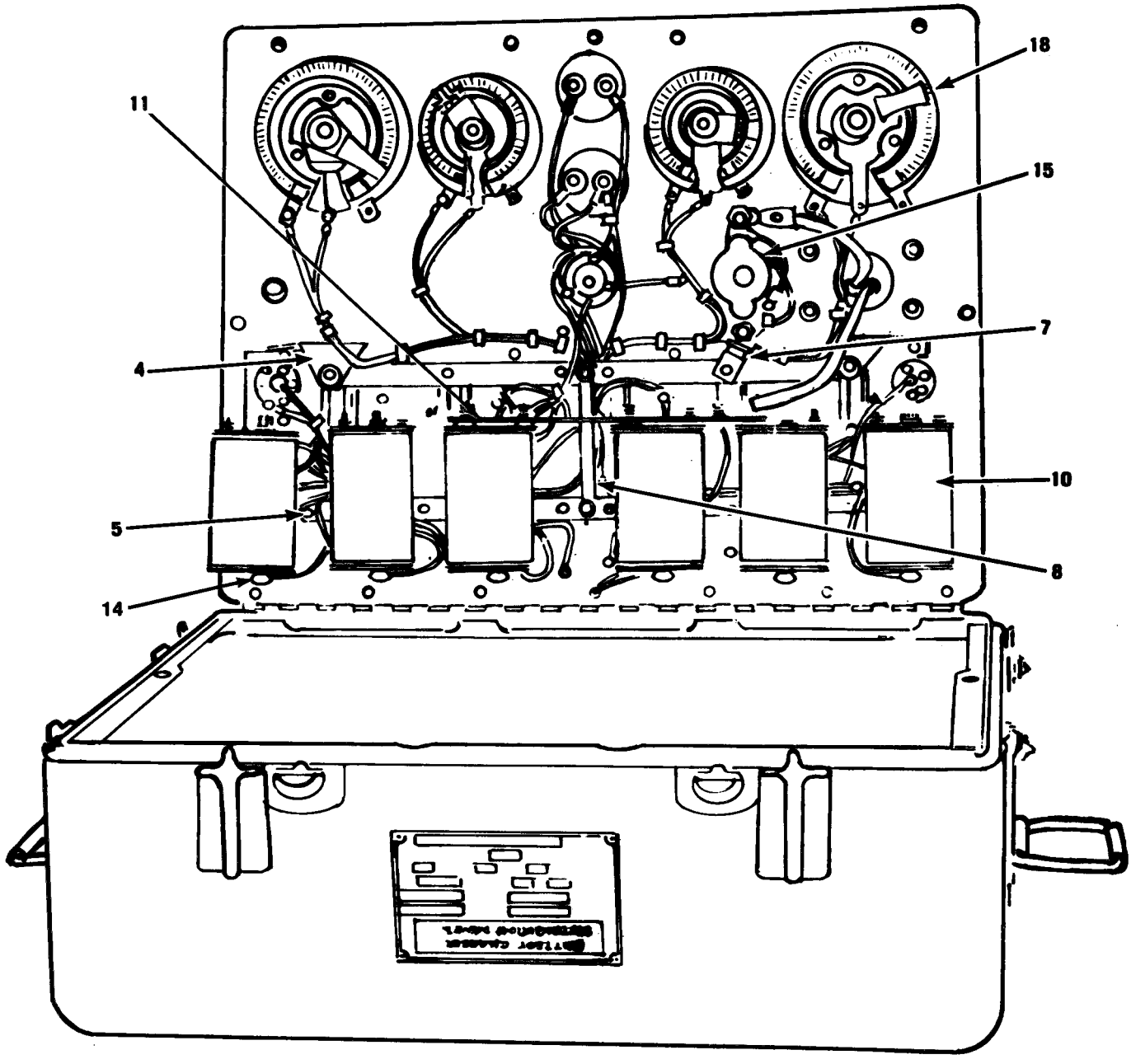


Figure 5-1. Panel (Sheet 2 of 2)

(d) Remove attaching screw and nut from bus bar, jumper (8) and remove bus bar jumper.

(e) Remove circuit breaker power lead.

(f) Remove two phillips head screws that secure boot, circuit breaker (9), retainer plate, circuit breaker, 20 amps (12) to panel.

(g) Remove circuit breaker (20 amp) by tilting upward.

(5) *Receptacle assembly.*

(a) Loosen panel fastener screw (1) and open panel (2).

(b) Remove screws securing receptacle assembly (13) to panel.

(c) Remove two screws that separate receptacle and remove upper half of receptacle.

(d) Loosen two screws from power leads of lower half of receptacle and remove.

NOTE

Remove attaching hardware from heat sink bridges and from the bus bar ground, if applicable, to receptacle assembly being removed.

(6) *Diode.*

(a) Loosen panel fastener screws (1) and open panel.

(b) Remove receptacle power lead from diode (14).

(c) Remove diode.

7. *Relay.*

(a) Loosen panel fastener screws (1) and open panel.

(b) Remove receptacle power lead from relay, 200 Amps (15).

(c) Remove bus bar connectors (7).

(d) Remove wire lead from toggle switch (16) to relay 200 Amp.

(e) Remove mounting screw and hardware from relay and remove relay.

(8) Resistor.

(a) Loosen allen head screws on control knob (17) and remove knob.

(b) Loosen panel fastener screws (1) and open panel.

(c) Remove power leads from resistor, (18).

(d) Remove resistor mounting screws and remove resistor.

(9) Panel assembly distribution. Disassembly procedure for the Panel Assembly requires removal of components attached to panel as listed in Chapter 5.

(10) Case storage. Repair case with plastic mallet to remove dents, use arc weld in accordance with MIL-W-45205 class B, Welding, Inert-Gas, Metal-Arc Aluminum Alloys.

(11) Bus bar.

(a) Loosen panel fastener screw (2) and open panel.

(b) Remove screws, nuts and hardware from bus bar support (4).

(c) Remove nuts and washers connecting bus bar (5) from circuit breaker (6).

(d) Remove bus bar connector (7). Remove screw and nut attaching jumper bus bar (8) to bus bar (5) and remove bus bar.

(12) Wiring harness.

(a) Visually inspect wires for corroded or damaged terminals, burned insulation or other damage.

(b) Check individual wires with ohmmeter for continuity.

(c) If wiring harness has sustained damage and requires repair or replacement, refer to wiring diagram and wire run list.

b. Reassembly. Reassemble components and hardware in reverse order of disassembly procedure paragraph 5-2a, step 1 through 7. Refer to Figure 5-2 for wiring diagram and Table 5-2 for components and wire run list.

5-3. **TEST PROCEDURE.**

a. With no power and no load connected to the Battery Charging Distribution Panel, use an ohmmeter to check front-ho-back resistance of each charging station diode in each direction. If the diode fails to show a high resistance in one direction and a lower resistance in the opposite direction, replace diode.

b. Connect a 1 ohm 50 watt resistor (no load) between the red and black clips of a charging cable. With the circuit breaker in the OFF position connect the charging cable to the top left uncontrolled charging station receptacle. Now set the breaker to its on (UP) position. In 10-25 seconds, the breaker should trip. If the breaker does not trip, replace it. Repeat the procedure for each of the uncontrolled station circuit breakers.

5-4. **GENERAL.** Disassembly and reassembly for most of the components of the battery charger distribution panel generally involves no more than removal of attaching hardware, and lifting or sliding the component from the pad. Disassemble distribution panel only to the extent required to perform necessary repairs.

a. *Cable assembly repair.*

(1) Refer to figures 5-3, 5-4 and 5-5, and repair cable assemblies by splicing or replacing broken or damaged wires.

(2) Replace broken or damaged connectors.

(3) Replace damaged rubber boots.

b. *Storage case.*

(1) Repair with plastic mallet to remove dents. If necessary, arc weld in accordance with MIL-W-45205 class B, Welding, Inert-Gas, Metal-Arc Aluminum Alloys.

(2) Replace broken or damaged handles and latches.

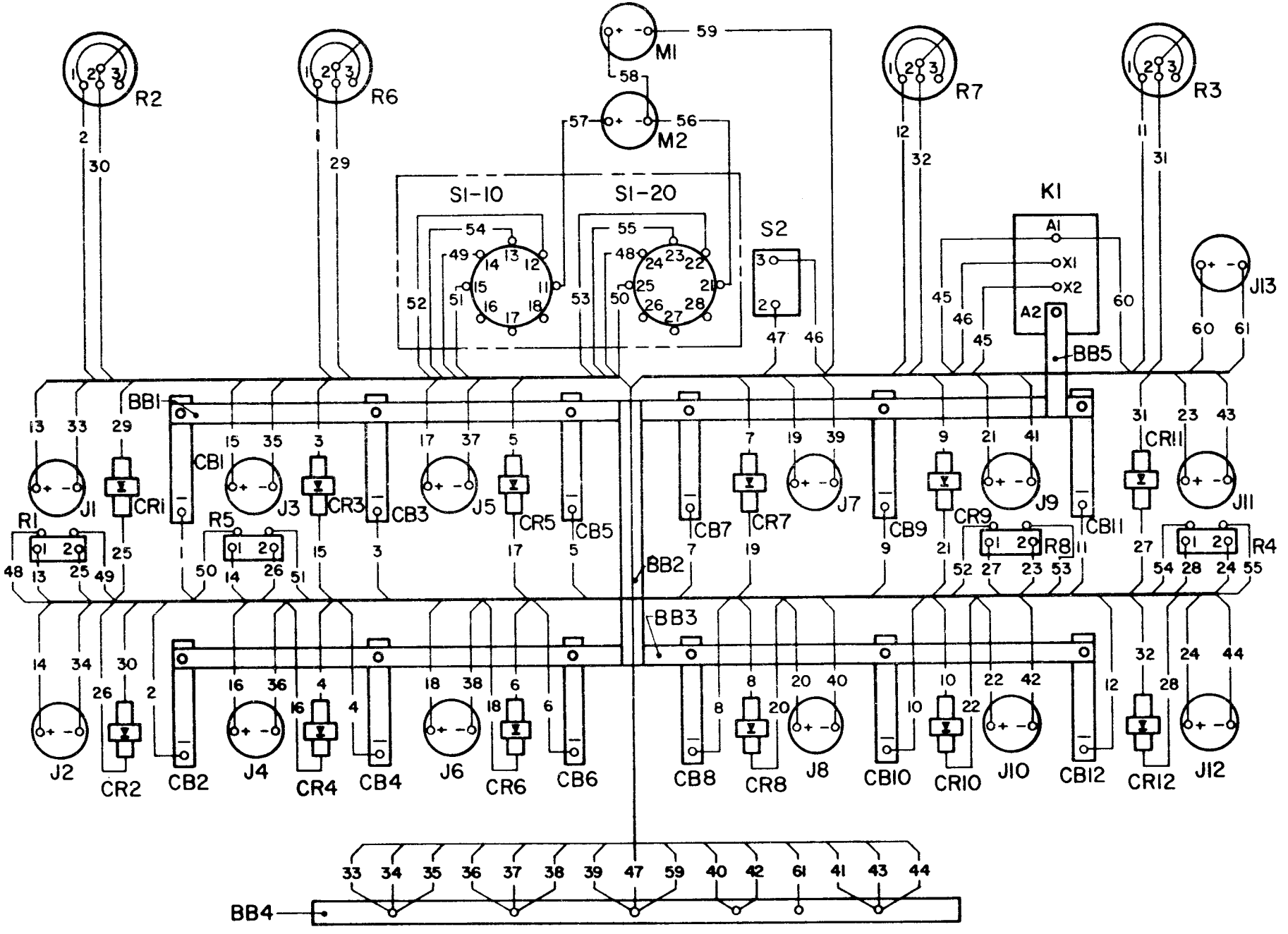


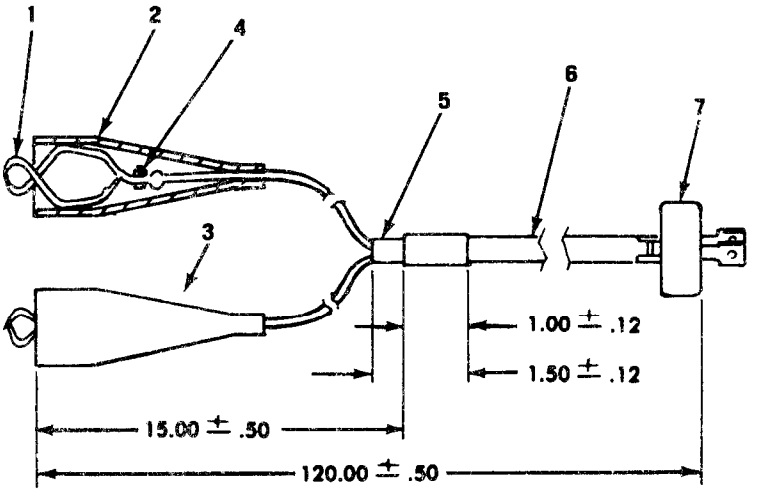
Figure 5-2. Wiring Diagram

LIST OF COMPONENTS			
ELECTRICAL REF DESIGNATION	DESCRIPTION	PART NUMBER	SPECIFICATION
CB1, CB2, CB11, CB12	CIRCUIT BREAKER	13208E4852-1	
CB3 THRU CB10	CIRCUIT BREAKER	13208E4852-2	
CR1 THRU CR12	DIODE	1N2498	MIL-S-19500/134
J1 THRU J12	CONN. RECEP. ELEC.	TYPE WR101F	MIL-C-3767/1
K1	RELAY	MS24171	
M1	VOLTMETER	MR26W030DCYYR	MIL-M-10304/4
M2	AMMETER	MR26W030DCAAR	MIL-M-10304/5
R6, R7	RESISTOR VARIABLE	RP301FD2R0KK	MIL-R-22/9
R2, R3	RESISTOR, VARIABLE	13216E8649	
S1	SWITCH, ROTARY	13216E8650	
R1, R4, R5, R8	SHUNT	MS91586-1	
S2	SWITCH, TOGGLE	MS35058-24	
W1, W3	BUS BAR	13208E4843	
W2	BUS BAR, JUMPER	13208E4847	
W4	BUS BAR, GROUND	13208E4806	
J13	CONNECTOR, RECP.	MS75058	
	ELEC. SLAVE		

NOTE: R2, R3 resistors are 2 ohm, 150W.
R6, R7 resistors are 3 ohm, 250W.

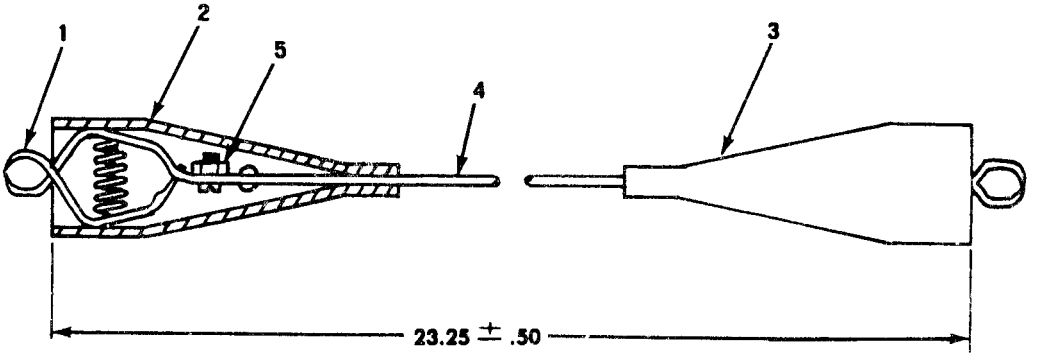
WIRE RUNNING LIST					
WIRE NO.	TERMINATION FROM	TERMINATION TO	WIRE NO.	TERMINATION FROM	TERMINATION TO
1	CB1 (—)	R6-1	31	CR11 (+)	R3-2
2	CB2 (—)	R2-1	32	CR12 (+)	R7-2
3	CB3 (—)	CR3 (+)	33	J1 (—)	W4
4	CB4 (—)	CR4 (+)	34	J2 (—)	W4
5	CB5 (—)	CR5 (+)	35	J3 (—)	W4
6	CB6 (—)	CR6 (+)	36	J4 (—)	W4
7	CB7 (—)	CR7 (+)	37	J5 (—)	W4
8	CB8 (—)	CR8 (+)	38	J6 (—)	W4
9	CB9 (—)	CR9 (+)	39	J7 (—)	W4
10	CB10 (—)	CR10 (+)	40	J8 (—)	W4
11	CB11 (—)	R3-1	41	J9 (—)	W4
12	CB12 (—)	R7-1	42	J10 (—)	W4
13	J1 (+)	R1-1	43	J11 (—)	W4
14	J2 (+)	R5-1	44	J12 (—)	W4
15	J3 (+)	CR3 (—)	45	K1-X2	K1-A1
16	J4 (+)	CR4 (—)	46	S2-1	K1-X1
17	J5 (+)	CR5 (—)	47	S2-2	W4
18	J6 (+)	CR6 (—)	48	R1-1	S1B-3
19	J7 (+)	CR7 (—)	49	R1-2	S1A-3
20	J8 (+)	CR8 (—)	50	R5-1	S1B-4
21	J9 (+)	CR9 (—)	51	R5-2	S1A-4
22	J10 (+)	CR10 (—)	52	R8-1	S1A-1
23	J11 (+)	R3-2	53	R8-2	S1B-1
24	J12 (+)	R4-2	54	R4-1	S1A-2
25	R1-2	CR1 (—)	55	R4-2	S1B-2
26	R5-2	CR2 (—)	56	S1B-14	M2 (—)
27	R8-1	CR11 (—)	57	S1A-14	M2 (+)
28	R4-1	CR12 (—)	58	S1B-14	M1 (+)
29	CR1 (+)	R6-2	59	M1 (—)	W4
30	CR2 (+)	R2-2	60	J13 (+)	K1-A1
			61	J13 (—)	W4

Table 5-2. Components and Wire Run List



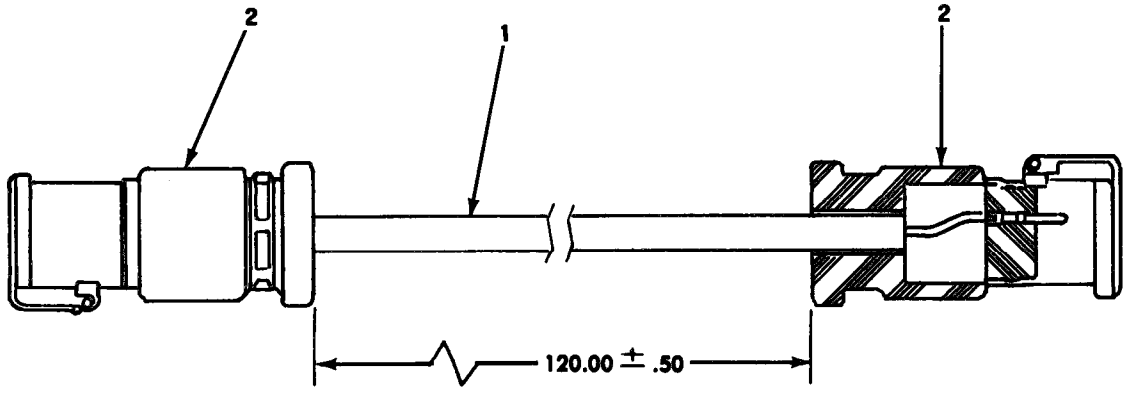
FIND NO.	PART NO.	QTY REQ	NOMENCLATURE
.	W-C-440 TYPC NO 4	2 EA	CLIP, ELECTRICAL, W-C-440
2.	26 RED	1 EA	INSULATOR, RED, W-C-440
3.	26 BLACK	1 EA	INSULATOR, BLACK, W-C-440
4.	MS35649-282	2 EA	NUT, PLAIN, HEXAGON,
5.	603300-1	3.5 IN.	INSULATION, TAPE
6.	CO-02HGF(2/14) 0535	12.0 FT	CABLE, ELECTRICAL, MIL-C-3432
7.	13222E 9894	1 EA	CONNECTOR, PLUG, ELECTRICAL, W-C-596/20

Figure 5-3. Chaging Cable Assy Repairing P/N 13208E 4815



FIND NO.	PART NO.	QTY REQ	NOMENCLATURE
1.	W-C440 TYPC NO 4	2 EA	CLIP, ELECTRICAL, W-C-440
2.	26 RED	1 EA	INSULATOR, RED, W-C-440
3.	26 BLACK	1 EA	INSULATOR, BLACK, W-C-440
4.	CO-01HGFC(1/14)0260	2 FT	CABLE, ELECTRICAL
5.	MS35649-282	2 EA	NUT, PLAIN, HEXAGON

Figure 5-4. Jumper Cable Assy Reparing P/N 13208E 4814



FIND NO.	PART NO.	QTY REQ	NOMENCLATURE
1.	M13486/4-1	12 FT	CABLE, ELECTRICAL, MIL-C-13486/4
2.	MS75057	2 EA	CONNECTOR, PLUG, ELECTRICAL

Figure 5-5. Power Cable Assy Repairing P/N 13208E 4816

(3) Replace worn out or damaged gasket,

c. *Distribution panel repair.*

(1) Replace distribution panel by removing seven phillips head screws, and nuts from hinge.

(2) Repair distribution panel by straightening with a plastic mallet to remove dents. If necessary, arc weld in accordance with MIL-W-45205, class B, Welding, Inert-Gas, Metal-Arc Aluminum Alloys.

d. ***Receptacle repair.***

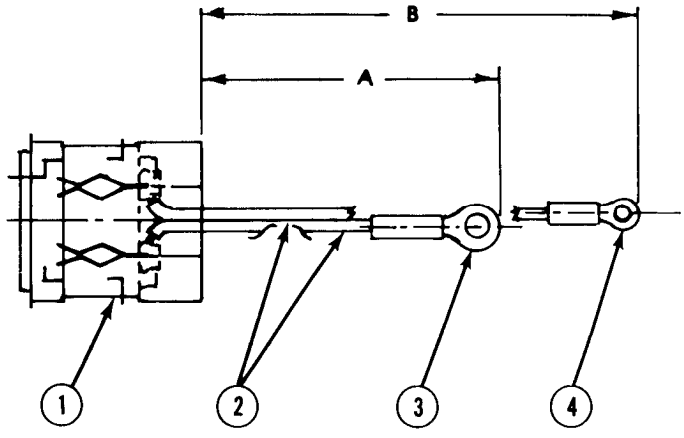
(1) Refer to figure 5-6 and repair broken or damaged wires by splicing or replacing.

(2) Replace damaged or broken receptacles.

e. **Wiring repair.**

(1) Refer to figures 5-7 and 5-8 of broken or damaged wires by splicing or replacing wires.

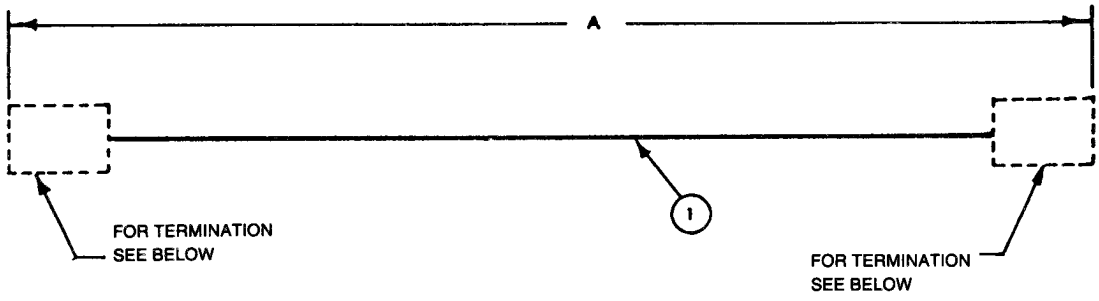
(2) Replace broken or damaged terminals.



RECEPTACLE NO.	PART NUMBER	DWG DASH NO.	WIRE NO. (+) LEAD	DIM A (+) LEAD REF	MARKING (+) LEAD		WIRE NO. (-) LEAD	DIM B (-) LEAD REF	MARKING (-) LEAD	
					FROM	TO			FROM	TO
J1	13216E 5264	-1	13	5.25	J1(+)	R1-1	33	9.25	J1(-)	BB4
J2	13216E 5264	-2	14	5.25	J2(+)	R5-1	34	10.00	J2(-)	BB4
J3	13216E 5264	-3	15	4.25	J3(+)	CR31(-)	35	5.25	J3(-)	BB4
J4	13216E 5264	-4	16	5.75	J4(+)	CR41(-1)	36	7.50	J4(-)	BB4
J5	13216E 5264	-5	17	4.25	J5(+)	CR5(-)	37	4.00	J5(-)	BB4
J6	13216E 5264	-6	18	5.75	J6(+)	CR6(-)	38	7.25	J6(-)	BB4
J7	13216E 5264	-7	19	6.00	J7(+)	CR7(-)	39	6.00	J7(-)	BB4
J8	13216E 5264	-8	20	5.75	J8(+)	CR8(-)	40	7.00	J8(-)	BB4
J9	13216E 5264	-9	21	4.25	J9(+)	CR9(-)	41	5.00	J9(-)	BB4
J10	13216E 5264	-10	22	5.75	J10(+)	CR10(-)	42	7.00	J10(-)	BB4
J11	13216E 5264	-11	23	4.25	J11(+)	R8-2	43	7.25	J11(-)	BB4
J12	13216E 5262	-12	24	6.00	J12(+)	R4-2	44	8.00	J12(-)	BB4

REPAIR MATERIALS			
FIND NO.	PART NO.	QTY REQ	NOMENCLATURE
1	13222E 9872	AR	OUTLET, BASE, FEMALE
2	M5086/1-14-9	AR	CABLE, ELECTRICAL, MIL-W-5086
3	MS25036-154	AR	TERMINAL, LUG
4	MS25036-153	AR	TERMINAL, LUG

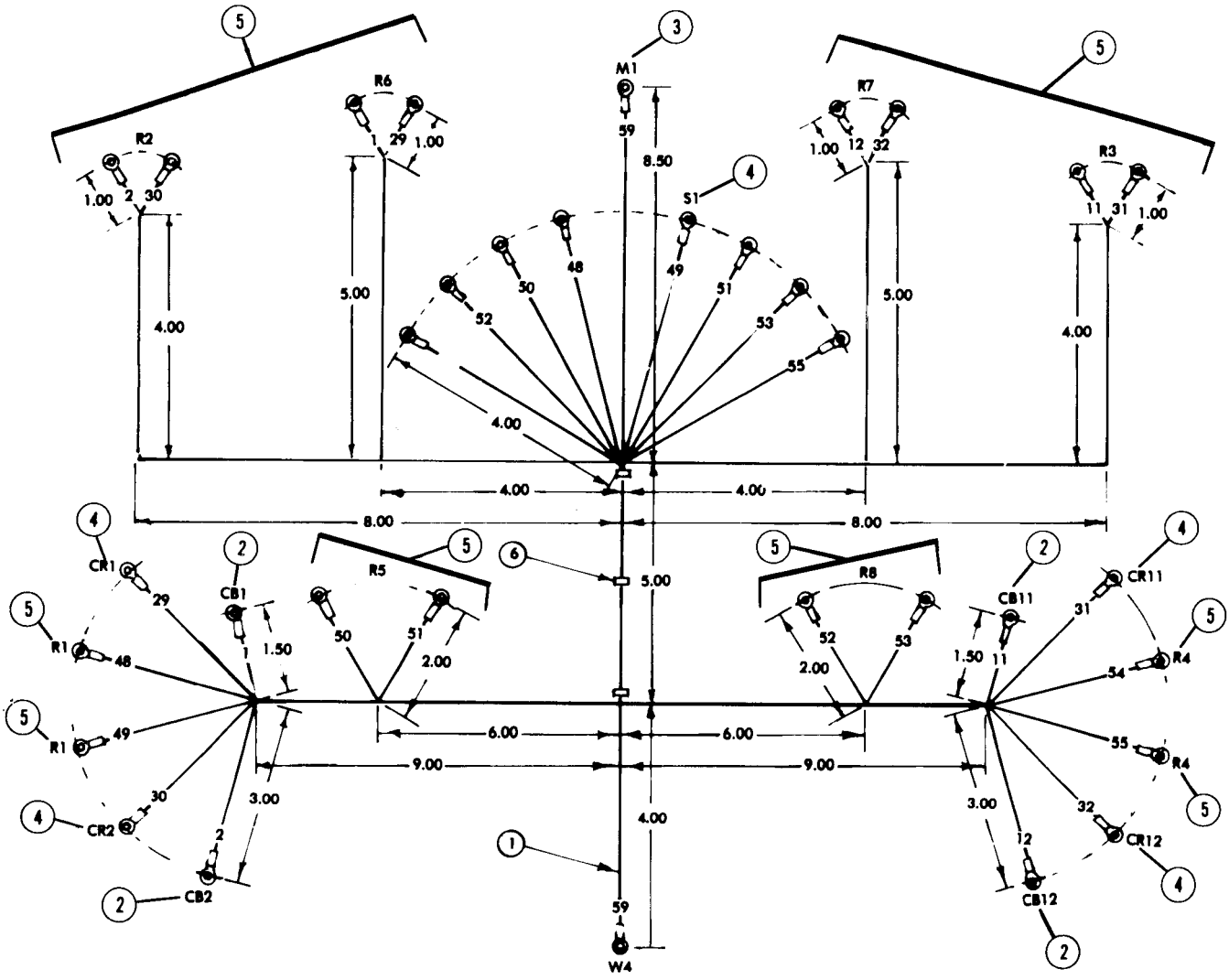
Figure 5-6. Receptacle Assy Repair P/N 13216E 5264



WIRING REPAIR MATERIAL		
PART NO.	REQ. QTY.	NOMENCLATURE
M5086/1-14-9	AR	CABLE, ELECTRICAL, MIL-W-5086
MS25036-108	AR	TERMINAL, LUG
MS25036-154	AR	TERMINAL, LUG
MS25036-106	AR	TERMINAL, LUG
MS25036-110	AR	TERMINAL, LUG
MS25036-153	AR	TERMINAL, LUG

PART NO.	DASH NO.	WIRE NO.	MARKING DESIGNATION				DIMENSION A REF
			TERM FIND NO.	FROM	TERM FIND NO.	TO	
1320SE 4829	-1	3	2	CB3(-)	4	CR3(+)	4.00
1320SE 4829	-2	4	2	CB4(-)	4	CR(+)	4.00
1320SE 4829	-3	5	2	CB5(-)	4	CR5(+)	4.00
1320SE 4829	-4	6	2	CB6(-)	4	CR5(+)	4.00
1320SE 4829	-5	7	2	CB7(-)	4	CR7(+)	4.00
1320SE 4829	-6	8	2	CB8(-)	4	CR8(+)	4.00
1320SE 4829	-7	9	2	CB9(-)	4	CR9(+)	4.00
1320SE 4829	-8	10	2	CB10(-)	4	CR10(+)	4.00
1320SE 4829	-9	25	3	R1-2	3	CR1(-)	4.00
1320SE 4829	-10	26	3	R5-2	3	CR2(-)	6.75
1320SE 4829	-11	27	3	R8-1	3	CR11(-)	6.00
1320SE 4829	-12	28	3	R4-1	3	CR12(-)	6.00
1320SE 4829	-13	45	4	K1-X2	5	K1-A1	3.00
1320SE 4829	-14	46	4	S2-3	4	K1-X1	4.00
1320SE 4829	-15	47	4	S2-2	6	M4	8.00
1320SE 4829	-16	56	4	S1-21	3	M2(-)	5.00
1320SE 4829	-17	57	4	S1-11	3	M2(+)	5.00
1320SE 4829	-18	58	3	M2(-)	3	M1(+)	8.00

Figure 5-7. *Wiring Repair and Routing PIN* 7238E 4829



WIRING REPAIR MATERIAL			
FIND NO.	PART NO.	REQ. QTY	NOMENCLATURE
1	M5086/1-14-9	AR	CABLE, ELECTRICAL, MIL-W-5086
2	MS25036-108	AR	TERMINAL, LUG
3	MS25036-154	AR	TERMINAL, LUG
4	MS 25036-153	AR	TERMINAL, LUG
5	MS25036-106	AR	TERMINAL, LUG
6	MS3367-1-9	AR	STRAP, CABLE, ADJUSTING

Figure 5-8. Wiring repair and routing P/N 13208E 4830 (Sheet 1 of 2)

PART NO	MARKING DESIGNATION					APPROXIMATE LENGTH
	WIRE NO	FROM	TERM FIND NO	TO	TERM FIND NO	
13208E 4830	1	CB1 (-)	2	R6-1	5	25.50 IN
13208E 4830	2	CB2 (-)	2	R2-1	5	30.00 IN
13208E 4830	11	CB11 (-)	2	R3-1	5	28.50 IN
13208E 4830	12	CB12 (-)	2	R7-1	5	27.00 IN
13208E 4830	29	CR1 (+)	4	R6-2	5	27.00 IN
13208E 4830	30	CR2 (+)	4	R2-2	5	30.00 IN
13208E 4830	31	CR11 (+)	4	R3-2	5	30.00 IN
13208E 4830	32	CR12 (+)	4	R7-2	5	27.00 IN
13208E 4830	48	R1-1	5	S1-20-24	4	21.00 IN
13208E 4830	49	R1-2	5	S1-10-14	4	21.00 IN
13208E 4830	50	R5-1	5	S1-20-25	4	17.00 IN
13208E 4830	51	R5-2	5	S1-10-15	4	17.00 IN
13208E 4830	52	R8-1	5	S1-10-12	4	17.00 IN
13208E 4830	53	R8-2	5	S1-20-22	4	17.00 IN
13208E 4830	54	R4-1	5	S1-10-13	4	21.00 IN
13208E 4830	55	R4-2	5	S1-20-23	4	21.00 IN
13208E 4830	59	M1 (-)	3	BB4	5	17.50 IN

FIGURE 5-8. Wiring Repair and Routing P/N 13208E 4830 (Sheet 2 of 2)

APPENDIX A
REFERENCES

A-1. Fire Protection

TB 5-4200-200-10	Hand Portable Fire Extinguishers Approved for Army Users

A-2. Painting

TM 43-0139	Painting Instructions for Field Use

A-3. 'Maintenance

FM 20-31	Electrical Power Generation in the Field
FM 21-11	First Aid for Soldiers
TB MED 251	Noise and Conservation of Hearing
TM 9-237	Welding Theory and Application
TM 9-6140-200-14	Batteries, Storage, Lead-acid type
DAPAM 738-750	The Army Maintenance Management System (TAMMS)
TM 55-1500-323-25	Installation Practice for Aircraft Wiring

A-4. Destruction

TM 750-244-3	Procedures for Destruction of Equipment to Prevent Enemy Use

A-5. Shipment and Storage

TM 740-90-1	Administrative Storage of Equipment

APPENDIX B
MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

B-1. **GENERAL.**

a. This section provides a general explanation of all maintenance and repair functions authorized at various mAINTENANCE levels.

b. The Maintenance Allocation Chart (MAC) in Section II designates overall responsibility for the performance of maintenance functions on the identified end item or component. The implementation of the maintenance functions upon the end item or component will be consistent with the assigned maintenance functions.

c. Section III lists the special tools and test equipment required for each maintenance function as referenced from Section II.

B-2. **MAINTENANCE FUNCTIONS.**

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical and/or electrical characteristics with established standards through examination.

b. Test. To verify serviceability and detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep an item in proper operating condition; i.e., to clean (decontaminate), to preserve, to drain, to paint, or to replenish fuel, lubricants, hydraulic fluids, or compressed air supplies.

d. Adjust. To maintain, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to specified parameters.

e. Align. To adjust specified variable elements of an item to bring about optimum or desired performance.

f. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test measuring and diagnostic equipments used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. Install. The act of emplacing, seating, or fixing into position an item, part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

h. *Replace. The* act of substituting a serviceable like type part, subassembly, or module (component or assembly) for an unserviceable counterpart.

i. Repair. The application of maintenance services (inspect, test, service, adjust, align, calibrate, or replace) or other maintenance actions (welding, grinding, riveting, straightening, facing, remachining, or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), and item, or system.

j. Overhaul. That maintenance effort (service/actions) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards (i.e., DMWR) in appropriate technical

publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

k. *Rebuild*. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours/miles, etc.) considered in classifying Army equipments or components.

B-3. **COLUMN ENTRIES USED IN THE MAC.**

a. *Column 1, Group* Number. Column 1 lists group numbers, the purpose of which is to identify components, assemblies, subassemblies, and modules with the next higher assembly.

b. *Column 2, Component/Assembly*. Column 2 contains the names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. *Column 3, Maintenance Functions*. Column 3 lists the functions to be performed on the tern listed in Column 2. (For detailed explanation of these functions, see Paragraph B-2).

d. *Column 4, Maintenance Level*. Column 4 specifies, by the listing of a work time figure in the appropriate subcolumn(s), the lowest level of maintenance authorized to perform the function listed in Column 3. This figure represents the active time required to perform the maintenance function at the indicated level of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance levels, appropriate work time figures will be shown for each level. The number of manhours specified by the work time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to serviceable condition under typical field operating conditions. This time includes preparation time, troubleshooting time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. The symbol designations for the various maintenance levels are as follows:

C ..... Operator or Crew
O .....Organization maintenance
F ..... Direct support maintenance
H. ..... Genral support maintenance
D ..... Depot maintenance

e. Column 5, *Tools and Equipment*. Column 5 specifies, by code, those common tool sets (not individual tools) and special tools, test, and support equipment required to perform the designated function.

f. *Column* 6, *Remarks*. This column shall contain a letter code in alphabetical order which shall be keyed to the remarks contained in Section IV.

B-4. COLUMN ENTRIES USED IN TOOL AND TEST EQUIPMENT REQUIREMENTS.

a. *Column 1, Tool or Test Equipment Reference Code*. The tool and test equipment reference code correlates with a maintenance function on the identified end item or component.

b. *Column* 2, *Maintenance Level*. The lowest level of maintenance authorized to use the tool or test equipment.

c. Column 3, *Nomenclature*. Name or identification of the tool or test equipment.

d. Column *4, National/NATO Stock Number*. The National or NATO stock number of the tool or test equipment.

e. Column 5, *Tool Number*. The manufacturer's part number.

B-5. EXPLANATION OF COLUMNS IN SECTION IV.

a. *Refererence Code.* The code scheme recorded in Column 6, Section II.

b.Remarks. This column lists information pertinent to the maintenance function being performed as indicated ON the MAC, Section II.

Section II. MAINTENANCE ALLOCATION CHART

Battery Charging Distribution Panel
MIL-P-52457
NSN 6130-00-940-7866

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	MAINTENANCE LEVEL C	O	F	H	D	(5) TOOLS AND EQUIPMENT	(6) REMARKS
01	Cables	Inspect	0.1					1	
		Test		0.1	0.5				
		Replace		0.2					
		Repair			1.0				
0101	Case Storage	Inspect	0.1						
		Reapir			0.7				
02	Panel Assembly Distribution	Inspect	0.1		5.0			1,2	
		Repair			1.0				
0201	Meters	Insepect	0.1						
		Test		0.1				2	
		Replace		0.5					
0202	Knob, Control	Inspect	0.1						
		Replace		0.1					
0203	Circuit Breakers	Inspect	0.1						
		Test		0.2				2	
		Replace		1.0					
0204	Receptacle Assembly	Inspect	0.1						
		Test		0.2				2	
		Replace		0.5					
		Repair			1.0				
0205	Diode	Inspect	0.1						
		Test		0.2				1,2	
		Replace		0.5					
0206	Relay	Inspect	0.1						
		Test		0.2				1,2	
		Replace		0.5					
0207	Resistor	Inspect	0.1						
		Test		0.2				1	
		Replace		0.5					
0208	Boot	Inspect	0.1						
		Replace		0.2					

Section II. MAINTENANCE ALLOCATION CHART (Continued)

Battery Charging Distribution Panel
MIL-P-52457
NSN 6130-00-940-7866

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	MAINTENANCE LEVEL C	O	F	H	D	(5) TOOLS AND	(6) REMARKS
0209	Bus bar	Inspect Replace	0.1	 0.5					
0210	Wiring Harness	Inspect Test Replace Repair	0.1		 0.5 5.0 1.0			 1	

Section III. TOOL AND TEST REQUIREMENTS

(1) REF. NO.	(2) MAINT. CAT.	(3) NOMENCLATURE	(4) NATIONAL STOCK NUMBER	(5) TOOL NO.
1	O	Ohmmeter	6625-00-581-2466 or equal	148B
2	O	Multimeter	6625-00-581-2036 or equal	AN/UMR105

APPENDIX C
REPAIR PARTS AND SPECIAL TOOLS LIST

Section I. INTRODUCTION

C-1. **SCOPE.** This manual lists spares and repair parts; special tools; special test, measurement, and diagnostic equipment (TMDE), and other special support equipment required for performance of operator, organizational, and direct support maintenance of the Distribution Panel. It authorizes the requisitioning and issue of spares and repair parts as indicated by the source and maintenance codes.

C-2. **GENERAL.** This Repair Parts and Special Tools List is divided into the following sections:

a. *Section II. Repair Parts List.* A list of spares and repair parts authorized for use in the performance of maintenance. The list also includes parts which must be removed for replacement of the authorized parts. Parts lists are composed of functional groups in numeric sequence, with the parts in each group listed in figure and item number sequence. Bulk materials are listed in NSN sequence.

b. *Section III. Special Tools List. Not applicable.*

c. *Section IV. National Stock Number and Part Number Index.* A list, in National Item Identification Number (NIIN) sequence of all National Stock Numbers (NSN) appearing in the listings, followed by a list, in alphametic sequence, of all part numbers appearing in the listings. National stock numbers and part numbers are cross-referenced to each illustration figure and item number appearance. This index is followed by a cross--reference list of reference designators to figure and item numbers.

C-3. **EXPLANATION OF COLUMNS.**

a. *Illustration.* This column is divided as follows:

(1) Figure Number. Indicates the figure number of the illustration on which the item is shown.

(2) Item Number. The number used to identify each item called out in the illustration.

b. Source, Maintenance and Recoverability Codes (SMR).

(1) Source Code. Source codes indicate the manner of acquiring support items for maintenance, repair of overhaul of end items. Source codes are entered in the frost and second positions of the Uniform SMR Code format as follows:

Code	Definition
PA	Item procured and stocked for anticipated or known usage.
PD	Item procured and stocked for insurance purpose because essentiality dictates that a minimum quantity be available in the supply system.
PC	Item procured and stocked and which otherwise would be coded PA except that it is deteriorative in nature.
PD	Support item, excluding support equipment, procured for initial issue or outfitting and stocked only for subsequent or additional initial issues or outfittings. Not subject to automatic replenishment.
PE	Support equipment procured and stocked for initial issue or outfitting to specified maintenance repair activities.

Code	Definition
PF	Support equipment which will not be stocked but which will be centrally procured on demand.
PG	Item procured and stocked to provide for sustained support for the life of the equipment. It is applied to an item peculiar to the equipment which, because of probable discontinuance or shutdown of production facilities, would prove uneconomical to reproduce at a later time.
KD	An item of a depot overhaul/repair kit and not purchased separately. Depot kit defined as a kit that provides items required at the time of overhaul or repair.
KF	An item of a maintenance kit and not purchased separately. Maintenance kit defined as a kit that provides an item that can be replaced at organizational or intermediate levels of maintenance.
KB	Item included in both a depot overhaul/repair kit and a maintenance kit.
MO	Item to be manufactured or fabricated at organizational level.
MF	Item to be manufactured or fabricated at the direct support maintenance level.
MH	Item to be manufactured or fabricated at the general support maintenance level.
MD	Item to be manufactured or fabricated at the depot maintenance level.
AO	Item to be assembled at organizational level.
AF	Item to be assembled at the direct support maintenance level.
AH	Item to be assembled at general support maintenance level.
AD	Item to be assembled at depot maintenance level.
XA	Item is not procured or stocked because the requirements for the item will result in the replacement of the next higher assembly.
XB	Item is not procured or stocked. If not available through salvage, requisition.
X C	Installation drawing, diagram, instruction sheet, field service drawing, that is identified by manufacturer's part number.
XD	A support item that is not stocked. When required, item will be procured through normal supply channels.

NOTE

Cannibalization or salvage maybe used as a source of supply for any items source coded above except those coded XA and aircraft support items as restricted by AR 700-42.

(2) Maintenance Code. Maintenance codes are assigned to indicate the levels of maintenance authorized to USE and REPAIR support items. The maintenance codes are entered in the third and fourth positions of the Uniform SMR Code format as follows:

(a) The maintenance code entered in the third position will indicate the lowest maintenance level authorized to remove, replace and use the support item. The maintenance code entered in the third position will indicate one of the following levels of maintenance:

Code	Application/Explanation
C	Crew or operator maintenance performed within organizational maintenance.
O	Support item is removed, replaced, used at the organizational level.
F	Support item is removed, replaced, used at the direct support level.
H	Support item is removed, replaced, used at the general support level.
D	Support items that are removed, replaced, used at depot, mobile depot, or specialized repair activity only.

(b) The maintenance code in the fourth position indicates whether the item is to be repaired and identifies the lowest. maintenance level with the capability to perform complete repair (i.e., all authorized maintenance functions). This position will contain one of the following maintenance codes:

Code	Application/Explanation
o	The lowest maintenance level capable of complete repair of the support item is the organizational level.
F	The lowest maintenance level capable of complete repair of the support item is the direct support level.
H	The lowest maintenance level capable of complete repair of the support item is the general support level.
D	The lowest maintenance level capable of complete repair of the support item is the depot level.
L	Repair restricted to designated specialized repair activity.
z	Nonreparable. No repair is authorized.
B	No repair is authorized. The item maybe reconditioned by adjusting, lubricating, etc., at the user level. No parts or special tools are procured for the maintenance of this item.

(3) Recoverability Code. Recoverability codes are assigned to support items to indicate the disposition action on unserviceable items. The recoverability code is entered in the fifth position of the Uniform SMR Code format as follows:

Recoverability Code	Definition
Z	Nonreparable item. When unserviceable, condemn and dispose at the level indicated in position 3.
0	Reparable item. When economically reparable, condemn and dispose at organizational level.
F	Reparable item. When uneconomically reparable, condemn and dispose at the direct support level.
H	Reparable item. When uneconomically reparable, condemn and dispose at the general support level.
D	Reparable item. When beyond lower level repair capability, return to depot. Condemnation and disposal not authorized below depot level.
L	Reparable item. Repair, condemnation and disposal not authorized below depot/specialized repair activity level.
A	Item requires special handling or condemnation procedures because of specific reasons (i.e., precious metal content, high dollar value, critical material or hazardous material). Refer to appropriate manuals/directives for specific instructions.

c. *National Stock Number.* This column indicates the National Stock Number assigned to the item and which will be used for requisitioning purposes.

d. *Description.* ***This*** column indicates the Federal item name and any additional description of the item required. Assembly components and subassemblies are indented under major assemblies. The abbreviation "w/e", when used as a part of the nomenclature, indicates the Federal Stock Number which includes all armament, equipment, accessories, and repair parts issued with the item. A part number or other reference number is followed by the applicable five-digit National Supply Code for manufacturers in parentheses. Repair parts quantities included in kits and sets are shorn in front of the repair part name. Material required for manufacture or fabrication is identified.

e. *Unit of Measure (U/M).* A 2-character alphabetic abbreviation indicating the amount or quantity of the item upon which the allowances are based; e.g., ft., ea., pr., etc.

f. *Quantity Incorporated* in *Unit*. This column indicates the quantity of the item used in the assembly group. A "V" appearing in this column in lieu of a quantity indicates that a definite quantity cannot be indicated (e.g., shims, spacers, etc.)

g. Illustration. This column is divided as follows:

(1) Figure number. Indicates the figure number of the illustration in which the item is shown.

(2) Item number. Indicates the callout number used to reference the item in the illustration.

C-4. **SPECIAL INFORMATION.**

a. Repair parts mortality has been based on 2,000 hours of operation per year,

b. Parts which require manufacture or assembly at a category higher than that authorized for installation will indicate in the source column the higher category.

c. Action change codes indicated in the left-hand margin of the listing page denote the following:

N .....Indicates an added item note included in previous publications.
F ..... Indicates a change in NSN only.
C .....Indicates a change in data.

C-5. HOW TO LOCATE REPAIR PARTS.

a. When *National Stock Number or Reference Number is Unknown.*

(1) Using the Table of Contents, determine the assembly group within which the repair part belongs. This is necessary since illustrations are prepared for assembly groups and listings are divided into the same groups.

(2) Find the illustration covering the assembly group to which the repair part belongs.

(3) Identify the repair part on the illustration and note the illustration *figure* and item number of the repair part.

(4) Using the Repair Parts Listing, find the assembly to which the repair part belongs and locate the illustration figure and item number noted on the illustration.

b. When *National Stock Number or Reference Number is Known.*

(1) Using the Index of National Stock Numbers and Reference Numbers, find the pertinent National Stock Number or Reference Number. This index is in ascending NSN sequence followed by a list of Reference Numbers in alpha-numeric sequence, cross-referenced to the illustration figure number and the item number.

(2) Using the Repair Part Listing, find the assembly group of the repair part and the illustration figure number and item number referenced in the Index of National Stock Numbers and Reference Numbers.

c. When *the National Stock Number or Reference Number is Known and the Repair Parts is not Illustrated.*

(1) Using the Index of National Stock Numbers and Reference Numbers, find the pertinent National Stock Number or Reference Number in the section titled Items not Illustrated and note the group number. This section of the index is in ascending NSN sequence followed by a list of Reference Numbers in alpha-numeric sequence, cross-referenced to assembly group number.

(2) Using the Table of Content, locate the assembly group number and page number.

(3) Using the applicable group number and page number, locate the pertinent Stock Number or Reference Number in the Repair Parts Listing, Items which are not illustrated are listed at the end of the assembly group to which they belong.

C-6. **ABBREVIATIONS.**

Abbreviation	Explanation
AR	as required
ea	each
mtg	mounting

C-7. **FEDERAL SUPPLY CODES FOR MANUFACTURERS.**

Code	Explanation
07661	Fourdee Division, Emerson Electric Co.
81349	Military Specifications
96906	Military Standards
97403	Army Engineering and Research Laboratories

C-8. **RECOMMENDATIONS FOR MAINTENANCE PUBLICATION IMPROVEMENTS.** Reports 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 DA Publications) and forwarded directly to Commanding General, U.S. Army Troop Support Command, ATTN: AMSTR-MPS, 4300 Goodfellow Boulevard, St. Louis, Missouri 63120-1798.

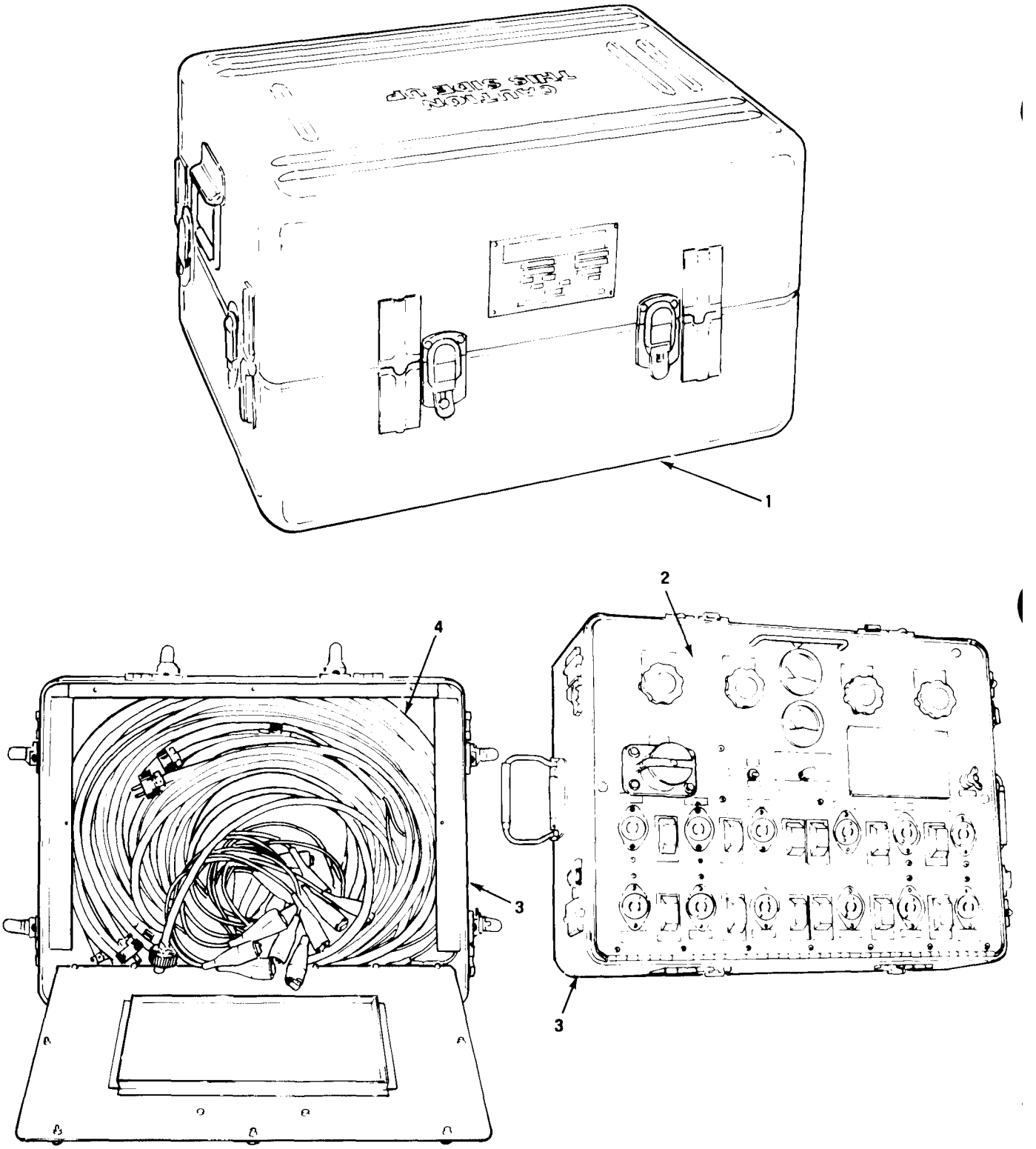


Figure C-1. Battery Charging Distribution Panel Assembly

(1) ILLUSTRATION (9) FIG. NO.	(10) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION	(7) U/M	(8) QTY INC IN UNIT
C-1	1	PBFFF	6130-00-940-7866	97403	13208E4850	CHARGER, BATTERY	EA	1
C-1	2	XAFFF		97403	13208E4840	DISTRIBUTION PANEL	EA	1
C-1	3	PBFFF	6110-01-127-2479	97403	13208E4849	CASE, POWER DISTRIBUTION	EA	1
C-1	4	AFFFF		81996	MCFG001RAW	CABLES, ASSEMBLY	EA	1

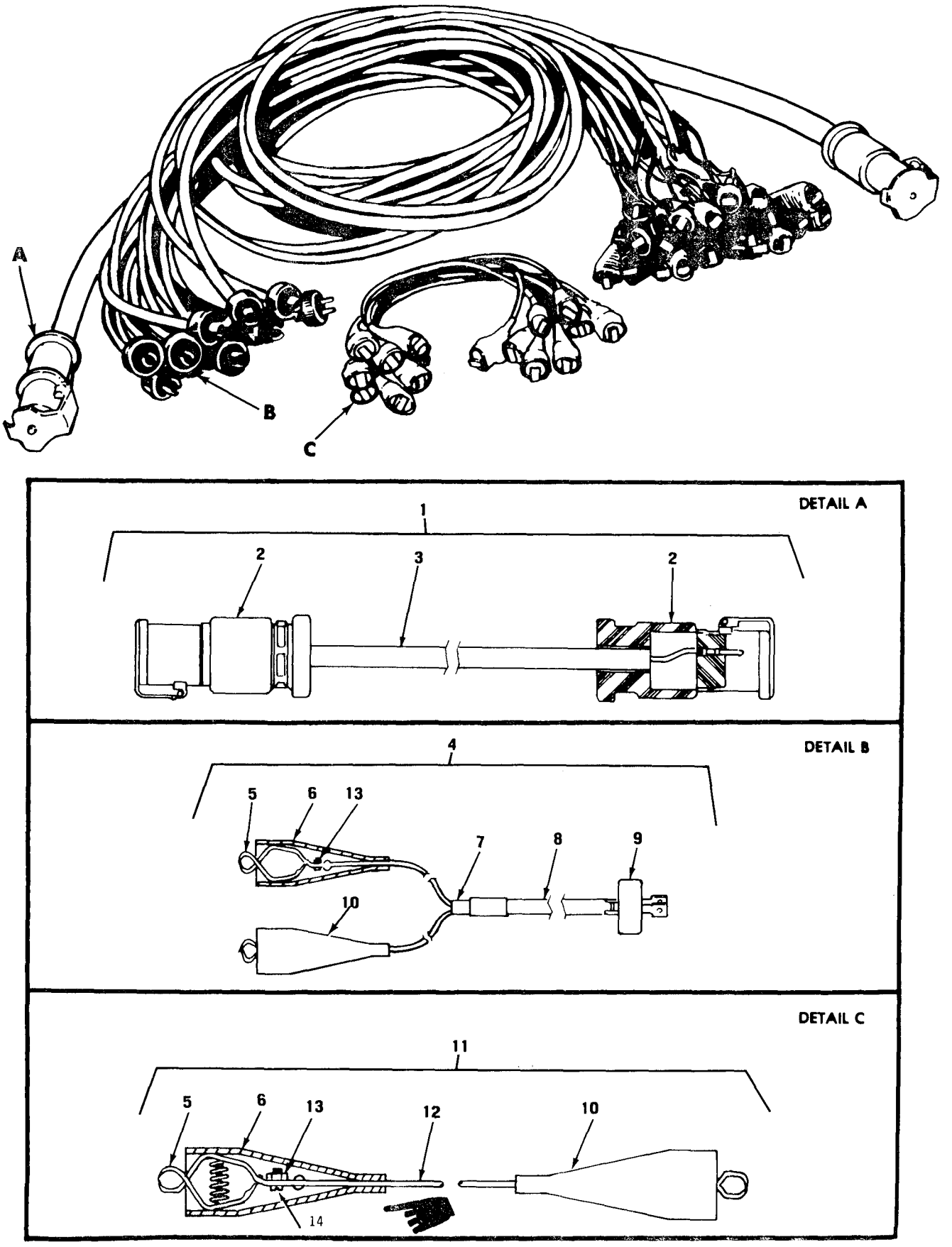


Figure C-2. Cables Assembly

(1) ILLUSTRATION (A) FIG. NO.	(B) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION	(7) U/M	(8) QTY INC IN UNIT
C-2		AFFFF		81996	MCFG001RAW	CABLES ASSEMBLY	EA	1
C-2	1	PAOFF	5995-00-123-0108	97403	13208E4816	CABLE ASSEMBLY, SPECIAL	EA	1
C-2	2	PAFZZ	5935-00-493-5854	96906	MS75057-1	CONNECTOR, PLUG	EA	2
C-2	3	PAFZZ	6145-00-181-9782	81349	M13486/4-1	CABLE, ELECTRICAL SPECIAL	FT	12
C-2	4	PAOFF	6150-00-204-8350	97403	13208E4815	CABLE ASSEMBLY, POWER	EA	12
C-2	5	PAFZZ	5999-01-N78-3307	81348	W-C440TYPON04	CLIP, ELECTRICAL	EA	44
C-2	6	PAFZZ	5975-00-241-6636	76545	W-C-440	INSULATOR, RED	EA	22
C-2	7	PAFZZ	5970-00-471-1941	81349	603300-1	INSULATION, TAPE	A/R	12
C-2	8	PAFZZ	6145-01-N78-3309	81349	MIL-C-3432	CABLE, ELECTRICAL	FT	V
C-2	9	PFFZZ	5935-01-012-3065	97403	1322E9894	CONNECTOR, PLUG ELECTRICAL	EA	12
C-2	10	PAFZZ	5975-00-988-0649	81348	W-C-440	INSULATOR, BLACK	EA	22
C-2	11	PAOFF	6150-00-125-8457	97403	13208E4814	CABLE, JUMPER	EA	10
C-2	12	PAFZZ	6145-01-N78-3306	81349	MIL-C-3432	CABLE, ELECTRICAL	FT	V
C-2	13	PAFZZ	5310-00-934-9757	96906	MS-35649-282	NUT, PLAIN HEXAGON	EA	2
C-2	14	PAFZZ	5305-00-984-6195	96906	MS-35206-245	SCREW, 8-32 X 1/2 LGT.	EA	44

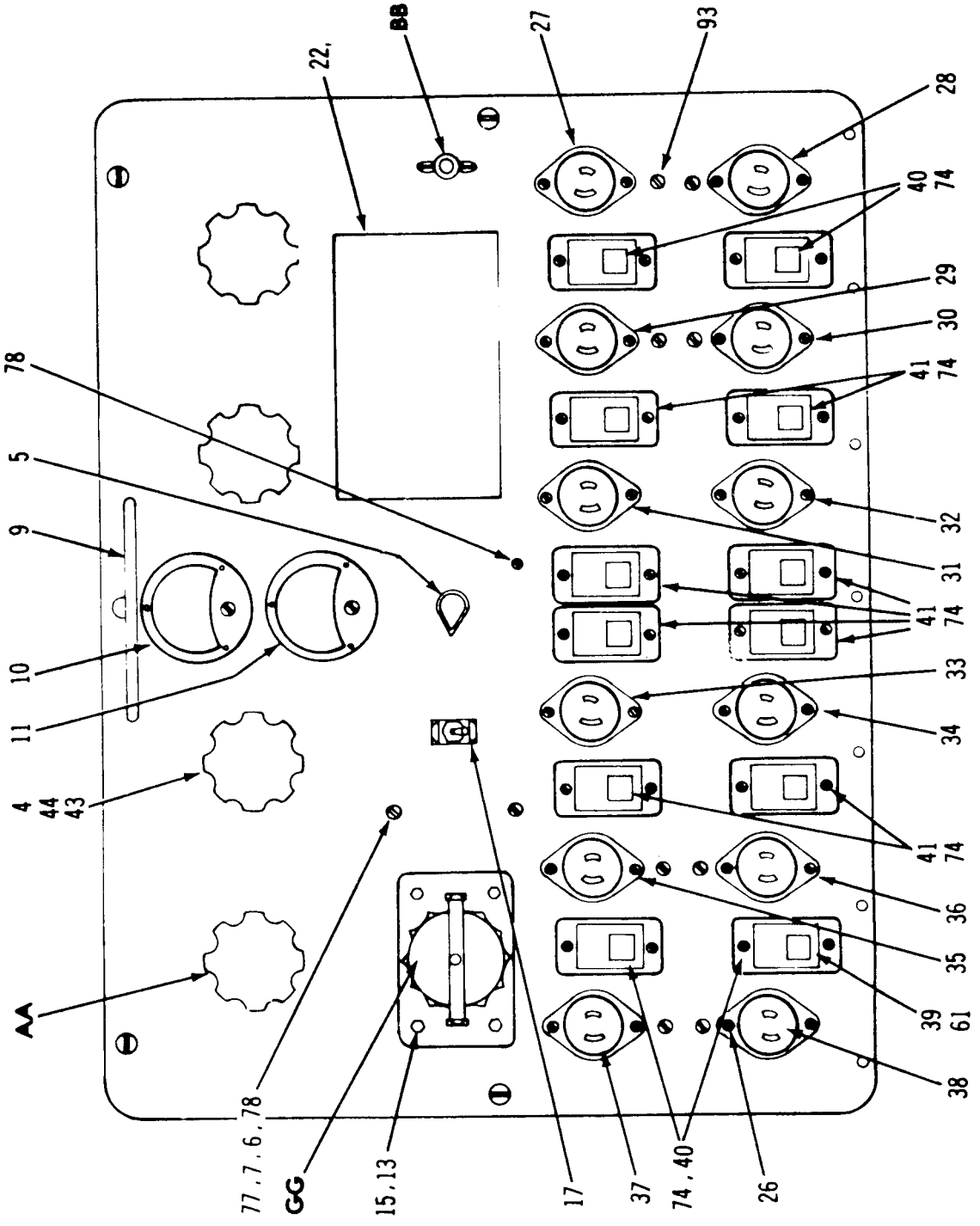


Figure C-3. Distribution Panel Assembly (Sheet 1 of 3)

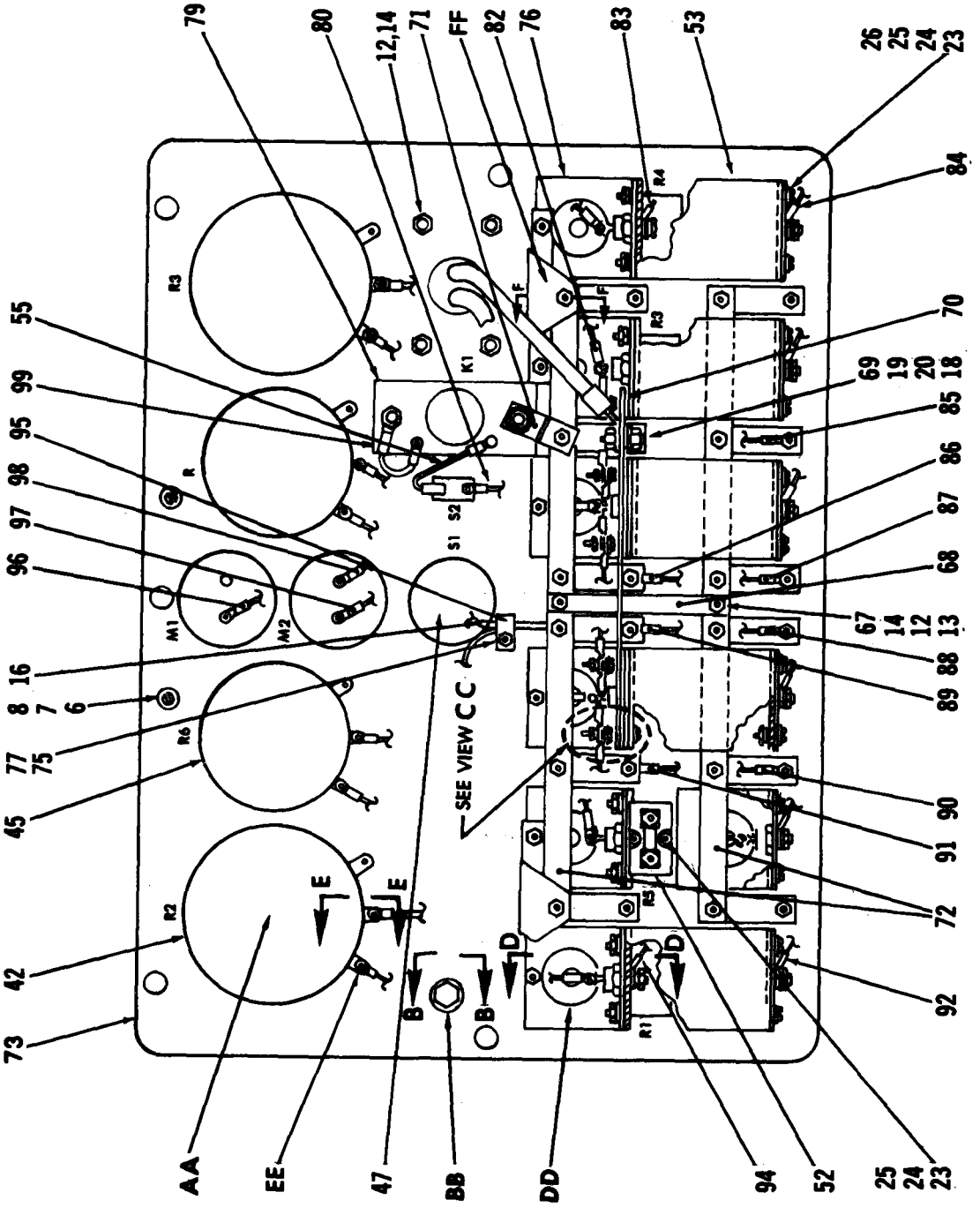


Figure C-3. Distribution Panel Assembly (Sheet *2* of 3)

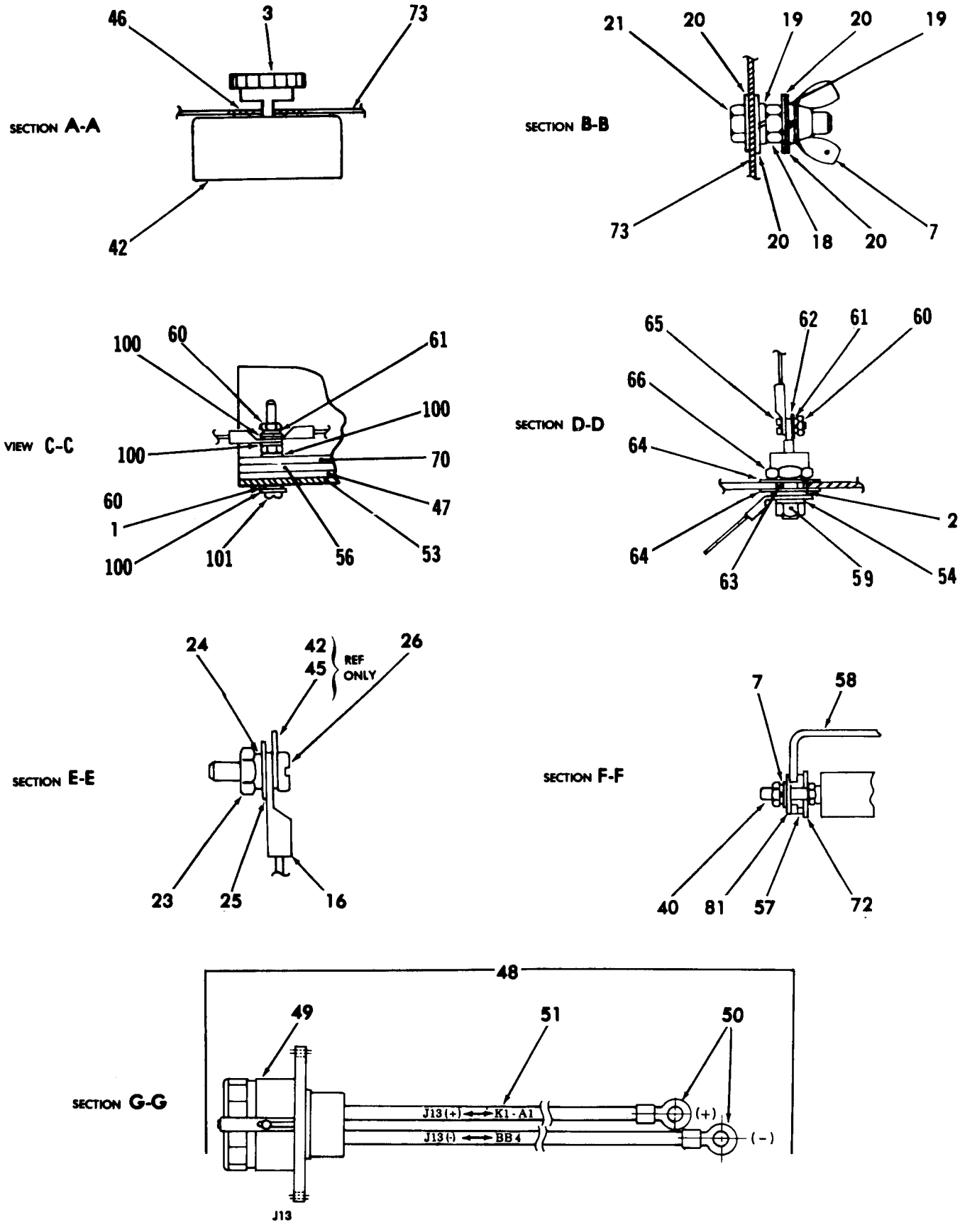


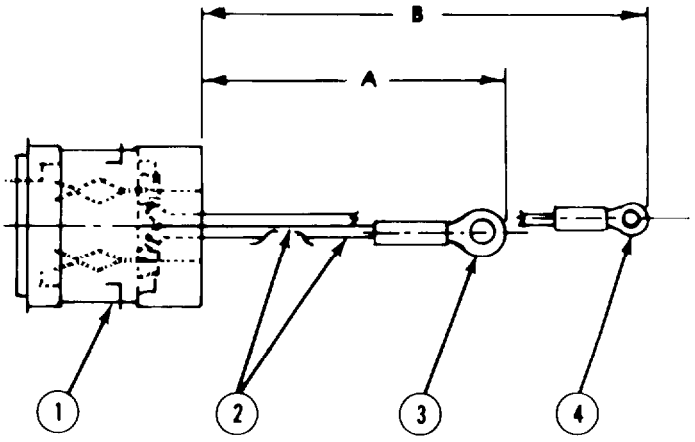
Figure C-3. Distribution Panel Assembly (Sheet 3 of 3)

(1) ILLUSTRATION (9) FIG. NO.	(10) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSOM	(5) PART NUMBER	(6) DESCRIPTION	(7) U/M	(8) QTY INC IN UNIT
C-3		XAFFF		97403	13208E4840	DISTRIBUTION PANEL	EA	1
C-3	1	PAFZZ	5970-01-176-8952	97403	13216E8653-2	SLEEVING, FLANGED	EA	5
C-3	2	PAFZZ	5310-00-177-1156	81352	AN961-416T	WASHER, FLAT	EA	12
C-3	3	PAOZZ	5355-00-226-4244	96906	13216E5259	KNOB, CONTROL	EA	2
C-3	4	PAOZZ	5355-00-226-4244	96906	MS91531-4N2B	KNOB, CONTROL	EA	2
C-3	5	PAOZZ	5355-00-616-9604	96906	MS91528-1P28	KNOB, CONTROL	EA	1
C-3	6	PAFFF	5310-00-809-8546	96906	MS27183-8	WASHER, FLAT	EA	17
C-3	7	PAFZZ	5305-00-989-7435	96906	MS35338-43	SCREW, MACHINE	EA	2
C-3	8	PAFZZ	5305-00-989-7435	96906	MS35207-264	SCREW, MACHINE	EA	2
C-3	9	PAFZZ	5340-00-121-1770	07661	13208E4827	HANDLE	EA	1
C-3	10	PAFZZ	6625-00-706-1018	81349	MR26W030DCUR	VOLTMETER	EA	1
C-3	11	PAFZZ	6625-00-069-0685	97403	13222E1493	AMMETER	EA	1
C-3	12	PAFZZ	5310-00-761-6882	96906	MS51967-2	NUT, PLAIN HEXAGON	EA	6
C-3	13	PAFZZ	5310-00-809-4058	96906	MS27183-10	WASHER, FLAT	EA	10
C-3	14	PAFZZ	5310-00-045-4007	96906	MS35338-44	WASHER, LOCK	EA	6
C-3	15	PAFZZ	5305-00-225-3839	96906	MS90725-8	SCREW, CAP HEXAGON	EA	4
C-3	16	MFFFF	6310-00-494-9582	97403	13208E4830	WIRING HARNESS	EA	1
C-3	17	PAFZZ	5930-00-6831-1628	96906	MS24523-22	SWITCH, TOGGLE	EA	1
C-3	18	PAFZZ	5310-00-732-0558	96906	MS51967-8	NUT, PLAIN, HEXAGON	EA	2
C-3	19	PAFZZ	5310-00-637-9541	96906	MS35338-46	WAHSER, LOCK	EA	3
C-3	20	PAFZZ	5310-00-080-6004	96906	MS27183-14	WASHER, FLAT	EA	6
C-3	21	PAFZZ	5305-000-269-3213	96906	MS90725-62	SCREW, CAP HEXAGON	EA	1
C-3	22	MDFZZ		97403	13208E4837	PLATE IDENTIFICATION	EA	1
C-3	23	PAFZZ	5310-00-934-9757	96906	MS35649	NUT, PLAIN HEXAGON	EA	61
C-3	24	PAFZZ	5310-00-045-3299	96906	MS35338-42	WASHER, LOCK	EA	61
C-3	25	PAFZZ	5310-00-809-8544	96906	MS27183-7	WASHER, LOCK	EA	61
C-3	26	PAFZZ	5305-00-984-6194	96906	MS35206-246	SCREW, MACHINE	EA	V
C-3	27	PAFFF	5935-01-N78-2434	97403	13216E5264	CABLE ASSEMBLY	EA	1
C-3	28	PAFFF	6150-01-112-9819	97403	13216E5264-2	CABLE ASSEMBLY	EA	1
C-3	29	PAFFF	6150-01-111-1707	97403	13216E5264-3	CABLE ASSEMBLY	EA	1

(1) ILLUSTRATION (9) FIG. NO.	(10) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSOM	(5) PART NUMBER	(6) DESCRIPTION	(7) U/M	(8) QTY INC IN UNIT
C-3	30	PAFFF	6150-00-111-1708	97403	13216E5264-5	CABLE ASSEMBLY	EA	1
C-3	31	PAFFF	6150-01-125-1361	97403	13216E5264-5	CABLE ASSEMBLY	EA	1
C-3	32	PAFFF	6150-00-111-1709	97403	13216E5264-6	CABLE ASSEMBLY	EA	1
C-3	33	PAFFF	6150-00-111-1710	97403	13216E5264-7	CABLE ASSEMBLY	EA	1
C-3	34	PAFFF	6150-01-000-1711	97403	13216E5264-8	CABLE ASSEMBLY	EA	1
C-3	35	PAFFF	6150-01-111-1712	97403	13216E5264-9	CABLE ASSEMBLY	EA	1
C-3	36	PAFFF	6150-01-125-2773	97403	13216E5264-10	CABLE ASSEMBLY	EA	1
C-3	37	PAFFF	6150-01-111-1713	97403	13216E5264-12	CABLE ASSEMBLY	EA	1
C-3	38	PAFFF	6150-01-125-2772	97403	13216E5264-12	CABLE ASSEMBLY	EA	1
C-3	39	PAFZZ	5305-00-984-4984	96906	MS35206-227	SCREW, MACHINE	EA	24
C-3	40	PAFZZ	5925-00-132-2207	97403	13208E4852-1	CIRCUIT BREAKER	EA	4
C-3	41	PAFZZ	5925-00-128-9106	97403	13208E4852-2	CIRCUIT BREAKER	EA	8
C-3	42	PAFZZ	5905-00-221-8111	97403	13216E8649	RESISTOR, VARIABLE	EA	2
C-3	43	PAFZZ	5310-00-595-7237	96906	MS35333-42	WASHER, LOCK	EA	2
C-3	44	PAFZZ	5310-00-159-6321	96906	MS25082-20	NUT, PLAIN, HEXAGON	EA	2
C-3	45	PAFZZ	5905-00-810-0700	81349	RP301FD2ROKK	RESISTOR, VARIABLE	EA	2
C-3	46	PAFZZ	5305-00-782-8408	96906	MS24693	SCREW, MACHINE	EA	4
C-3	47	PAFZZ	5930-00-259-4646	96906	MS25002-2	SWITCH, ROTARY	EA	1
C-3	48	PAFFF	5935-01-N73-9316	97403	13216E5263	CONNECTOR, RECEPTACLE	EA	1
C-3	49	PAFZZ	5935-00-295-6403	96906	MS75058-1	CONNECTOR, RECEPTACLE	EA	1
C-3	50	PAFZZ	5940-00-113-8191	96906	MS25036-127	TERMINAL, LUG	EA	1
C-3	51	PAFZZ	6145-00-578-6596	81349	MS086/2-2-9	WIRE, ELECTRICAL	FT	V
C-3	52	PAFZZ	6625-00-68A-8095	96906	MS91586-1	STUNT, INSTRUMENT	EA	4
C-3	53	PBFZZ	5999-01-178-4339	97403	13208E4831	BRIDGE, HEAT SINK	EA	6
C-3	54	PAFZZ	5310-00-942-5709	96906	MS35335-89	WASHER, LOCK	EA	12
C-3	55	MFFFF	6150-00-120-0184	97403	13208E4829-14	LEAD, ELECTRICAL	EA	1
C-3	56	PAFZZ	5310-01-106-9562	97403	13216E8652	WASHER, NON-METALLIC	EA	5
C-3	57	PAFZZ	5970-01-112-3107	97403	13216E8653-1	SLEEVING, FLANGED	EA	2
C-3	58	XAFZZ		07661	13216E8654	SUPPORT, BUS BAR	EA	2
C-3	59	PAFZZ	5310-00-582-6089	81348	FF-N-836	NUT, PLAIN HEXAGON	EA	12
C-3	60	PAFZZ	5310-00-934-9747	96906	MS35649-262	NUT, PLAIN HEXAGON	EA	22

(1) ILLUSTRATION (9) FIG. NO.	(10) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSOM	(5) PART NUMBER	(6) DESCRIPTION	(7) U/M	(8) QTY INC IN UNIT
C-3	61	PAFZZ	5310-00-045-4007	96906	MS35338-41	WASHER, LOCK	EA	41
C-3	62	PAFZZ	5310-00-983-8483	96906	MS27183-5	WASHER, FLAT	EA	12
C-3	63	XBFZZ	5970-00-143-4482	97403	13216E5262	INSULATOR, BUSHINGS	EA	12
C-3	64	PAFZZ	5970-00-246-4890	97403	13216E5261	INSULATOR, WASHER	EA	24
C-3	65	PAFZZ	5305-00-889-3000	96906	MS35206-230	SCREW, MACHINE	EA	12
C-3	66	PAFZZ	5961-00-752-5395	81349	JAN1N1184	SEMICONDUCTOR, DEVICE	EA	12
C-3	67	PAFZZ	5305-00-068-0502	96906	MS90725-6	SCREW CAP HEXAGON	EA	2
C-3	68	PBFZZ	6150-00-122-4553	97403	13208E4847	BUS BAR JUMPER	EA	1
C-3	69	PAFZZ	5305-00-269-3209	96906	MS90725-58	SCREW, CAP HEXAGON	EA	1
C-3	70	PBFZZ	6150-00-124-5910	97403	13208E4836	BUS, CONDUCTOR	EA	1
C-3	71	XBFZZ	6150-00-179-7913	97403	13208E4844	BUS, CONDUCTOR	EA	1
C-3	72	PBFZZ	6150-00-122-4554	97403	13208E4843	BUS, CONDUCTOR	EA	2
C-3	73	XBFZZ		97403	13208E4817	PANEL, DISRIBUTION	EA	1
C-3	74	PAOZZ	5925-00-992-8396	97403	13217E3587	BOOT, DUST, AND MOISTURE	EA	12
C-3	75	PAFZZ	5310-00-543-4717	96906	MS35425-28	PLAIN, WING	EA	1
C-3	76	PBFZZ	5999-01-178-4157	97403	13208E4828	HEAT SINK, PLATE	EA	12
C-3	77	PAFZZ	5310-00-934-9758	96906	MS35649-202	NUT, PLAIN HEXAGON	EA	3
C-3	78	PAFZZ	5305-00-984-6210	96906	MS35206-263	SCREW, MACHINE	EA	3
C-3	79	PAFZZ	5945-00-660-9315	96906	MS24171-D1	RELAY, ELECTROMAGNETIC	EA	1
C-3	80	MFFFF	5310-00-809-4058	97403	13208E4829-15	LEAD, ELECTRICAL	EA	1
C-3	81	PAFZZ	5310-00-934-9737	97403	13216E8652	WASHER, NONMETALLIC	EA	2
C-3	82	MFFFF	6150-00-121-0542	97403	13208E4829-1	LEAD, ELECTRICAL	EA	1
C-3	83	MFFFF	6150-00-121-0543	97403	13208E4929-12	LEAD, ELECTRICAL	EA	1
C-3	84	MFFFF	6150-00-121-0544	97403	13208E4829-12	LEAD, ELECTRICAL	EA	1
C-3	85	MFFFF	6150-00-120-0186	97403	13208E4829-8	LEAD, ELECTRICAL	EA	1
C-3	86	MFFFF	6150-00-120-0187	97403	13208E4829-5	LEAD, ELECTRICAL	EA	1
C-3	87	MFFFF	6150-00-120-0188	97403	13208E4829-4	LEAD, ELECTRICAL	EA	1
C-3	88	MFFFF	6150-00-121-0547	97403	13208E4829-6	LEAD, ELECTRICAL	EA	1
C-3	89	MFFFF	6150-00-120-0191	97403	13208E4829-3	LEAD, ELECTRICAL	EA	1
C-3	90	MFFFF	6150-00-120-0194	97403	13208E4829-2	LEAD, ELECTRICAL	EA	1
C-3	91	MFFFF	6150-00-120-0197	97403	13208E4829-1	LEAD, ELECTRICAL	EA	1

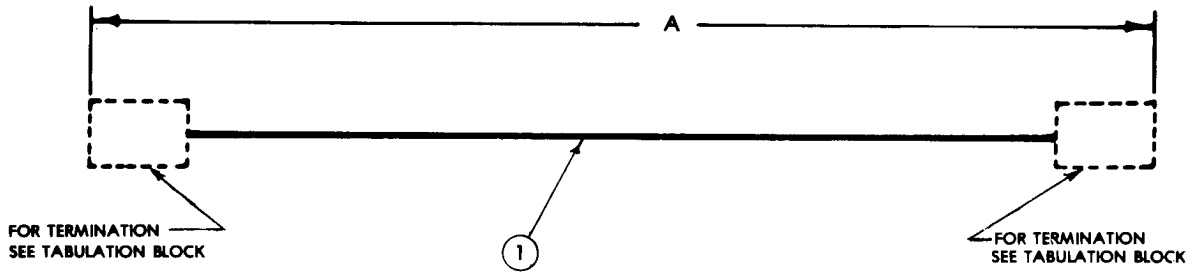
(1) ILLUSTRATION (9) FIG. NO.	(10) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSOM	(5) PART NUMBER	(6) DESCRIPTION	(7) U/M	(8) QTY INC IN UNIT
C-3	92	MFFFF	6150-00-120-0198	97403	13208E4829-10	LEAD, ELECTRICAL	EA	1
C-3	93	PAFZZ	5305-00-9846196	96906	MS35206-248	SCREW, MACHINE	EA	8
C-3	94	MFFFF	6150-00-120-0199	97403	13208E4829-9	LEAD, ELECTRICAL	EA	1
C-3	95	PAFZZ	5340-00-934-9784	96906	MS25281-F9	CLAMP, LOOP	EA	1
C-3	96	MFFFF	6150-00-120-0177	97403	13208E4828-18	LEAD, ELECTRICAL	EA	1
C-3	97	MFFFF	6150-00-120-0180	97403	13208E4829-17	LEAD, ELECTRICAL	EA	1
C-3	98	MFFFF	6150-00-120-0181	97403	13208E4829-16	LEAD, ELECTRICAL	EA	1
C-3	99	MFFFF	6150-00-120-0183	97403	13208E4829-16	LEAD, ELECTRICAL	EA	1
C-3	100	PAFZZ	5310-00-082-1404	96906	MS27183-6	WASHER, FLAT	EA	1
C-3	101	PAFZZ	5305-00-984-6221	96906	MS35206-234	SCREW, MACHINE	EA	5



BASIC PART NUMBER	DWG DASH NO	WIRE NO (+) LEAD	DIM A (+) LEAD REF	WIRE NO (-) LEAD	DIM B (-) LEAD REF
13216E 5264	1	13	5.25	33	9.25
13216E 5264	2	14	5.25	34	10.00
13216E 5264	3	15	4.25	35	5.25
13216E 5264	4	16	5.75	36	7.50
13216E 5264	5	17	4.25	37	4.00
13216E 5264	6	18	5.75	38	7.25
13216E 5264	7	19	6.00	39	6.00
13216E 5264	8	20	5.75	40	7.00
13216E 5264	9	21	4.25	41	5.00
13216E 5264	10	22	5.75	42	7.00
13216E 5264	11	23	4.25	43	7.25
13216E 5262	12	24	6.00	44	8.00

Figure C-4. Receptacle Assembly

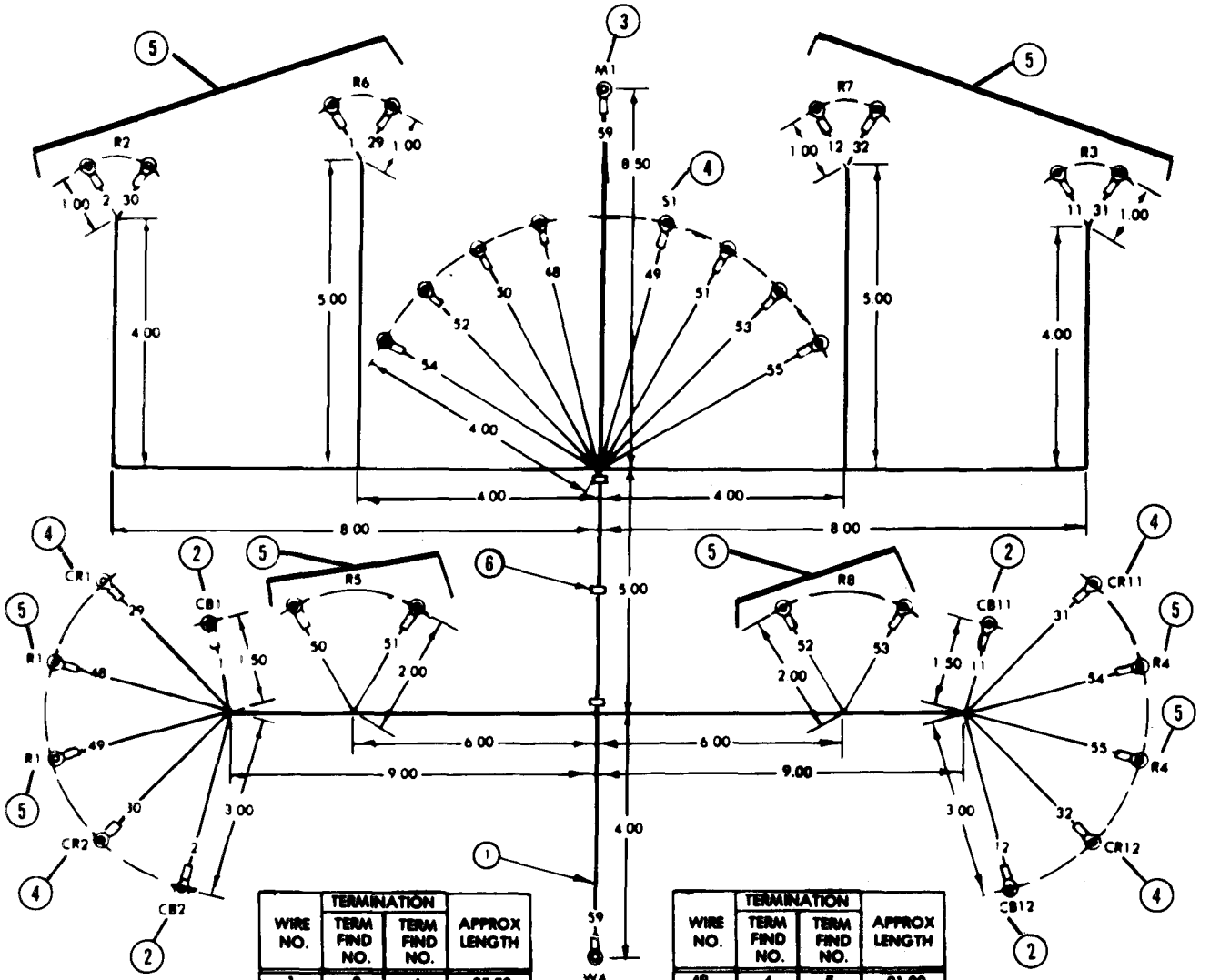
(1) ILLUSTRATION (9) FIG. NO.	(10) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSOM	(5) PART NUMBER	(6) DESCRIPTION	(7) U/M	(8) QTY INC IN UNIT
C-4		XAFFF		81349		RECEPTACLE ASSEMBLY	EA	1
C-4	1	PFFZZ		97403	13222E9872	• OUTLET, BASE FEMALE	EA	12
C-4	2	PAFZZ	6145-00-578-7516	81349	M5086/1-14-9	• WIRE, ELECTRICAL	FT	REF
C-4	3	PAFZZ	5940-00-230-0515	96906	MS25036-154	• TERMINAL LUG	EA	REF
C-4	4	PAFZZ	5940-00-143-4774	96906	MS25036-153	• TERMINAL LUG	EA	REF



BASIC PART NUMBER	DASH NO.	WIRE NO.	MARKING DESIGNATION		DIMENSION A REF.
			TERM FIND NO.	TERM FIND NO.	
13208E 4829	-1	W3	2	4	4.00
13208E 4829	-2	W4	2	4	4.00
13208E 4829	-3	W5	2	4	4.00
13208E 4829	-4	W6	2	4	4.00
13208E 4829	-5	W7	2	4	4.00
13208E 4829	-6	W8	2	4	4.00
13208E 4829	-7	W9	2	4	4.00
13208E 4829	-8	W10	2	4	4.00
13208E 4829	-9	W25	3	3	4.00
13208E 4829	-10	W26	3	3	6.25
13208E 4829	-11	W27	3	3	6.00
13208E 4829	-12	W28	3	3	6.00
13208E 4829	-13	W45	4	5	3.00
13208E 4829	-14	W46	4	4	4.00
13208E 4829	-15	W47	4	6	8.00
13208E 4829	-16	W56	4	3	5.88
13208E 4829	-17	W57	4	3	5.88
13208E 4829	-18	W58	3	3	8.00

Figure C-5. Lead Electrical

(1) ILLUSTRATION		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(9) FIG. NO.	(10) ITEM NO.	SMR CODE	NATIONAL STOCK NUMBER	FSOM	PART NUMBER	DESCRIPTION	U/M	QTY INC IN UNIT
C-5		MFFFF		97403	13208E4829	•LEADELECTRICAL	EA	V
C-5		PAFZZ	6145-00-578-7516	81349	M5086/1-14-9	•WIRE,ELECTRICAL	FT	V



WIRE NO.	TERMINATION TERM FIND NO.	TERM FIND NO.	APPROX LENGTH
1	2	4	25.50
2	2	4	30.00
11	2	4	28.50
12	2	4	27.00
29	5	4	27.00
30	5	4	30.00
31	5	4	30.00
32	5	4	27.00
48	4	5	21.00

WIRE NO.	TERMINATION TERM FIND NO.	TERM FIND NO.	APPROX LENGTH
49	4	5	21.00
50	4	5	17.00
51	4	5	17.00
52	4	5	17.00
53	4	5	17.00
54	4	5	21.00
55	4	5	21.00
59	3	4	17.50

Figure C-6. Wiring HARNESS

(1) ILLUSTRATION (9) FIG. NO.	(10) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSOM	(5) PART NUMBER	DESCRIPTION	(7) U/M	(8) QTY INC IN UNIT
C-6		MFFFF	6130-00-494-9582	97403	13208E4830	•WIRING HARNESS	EA	1
C-6	1	PAFZZ	6145-00578-7516	31349	M5086/1-14-9	••WIRE, ELECTRICAL	EA	V
C-6	2	PAFZZ	5940-00-143-4780	96906	MS25036-108	••TERMINAL LUG	EA	REF
C-6	3	PAFZZ	5940-00-230-0515	96906	MS25036-154	••TERMINAL LUG	EA	REF
C-6	4	PAFZZ	5940-00-143-4774	96906	MS25036-153	••TERMINAL LUG	EA	REF
C-6	5	PAFZZ	5940-00-283-5280	96906	MS25036-106	••TERMINAL LUG	EA	REF
C-6	6		5975-00-074-2072		MS3367-1-9	••STRAP, TIEDOWN	EA	V

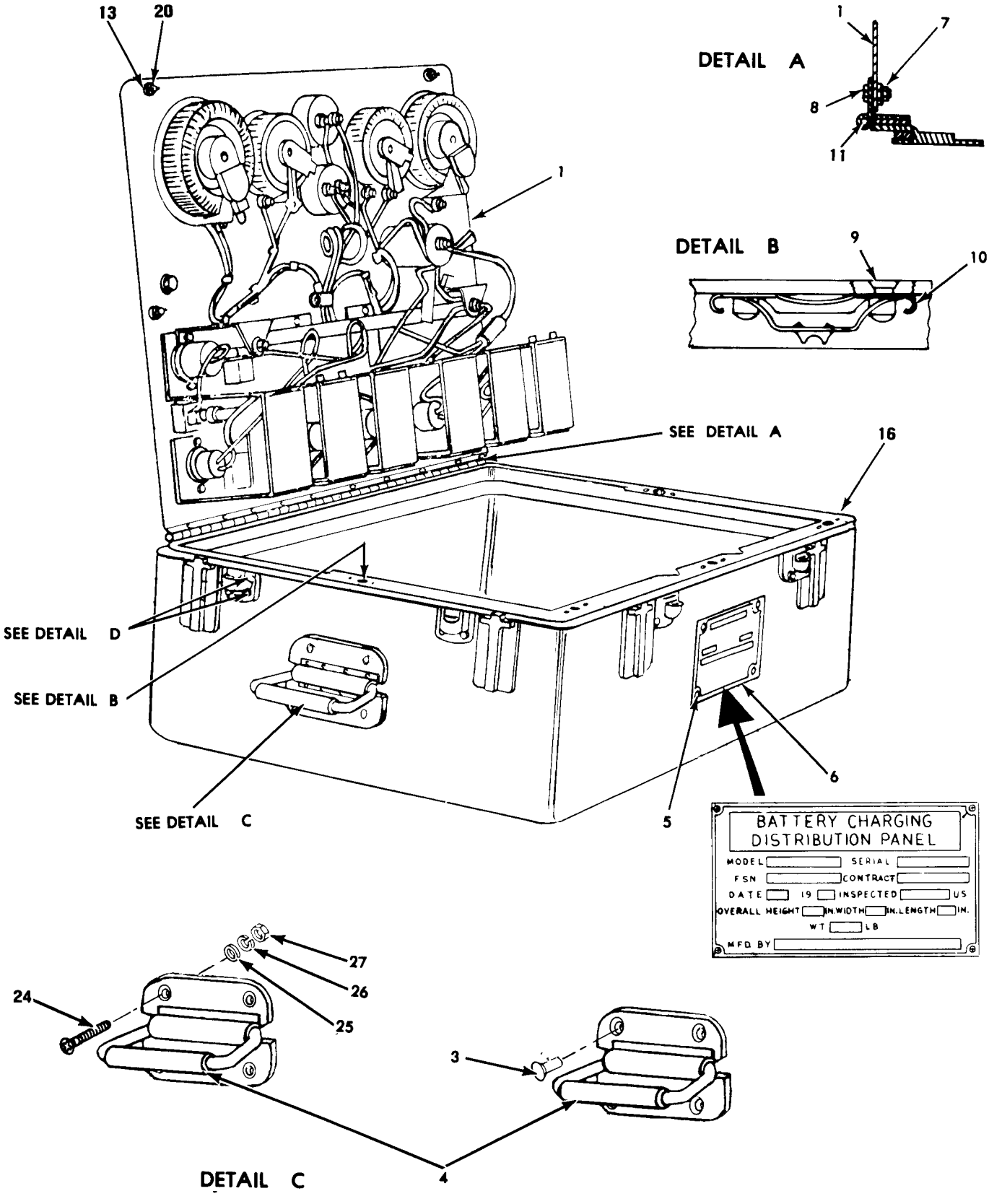


Figure C-7. Case Combination (Sheet 1 of 2)

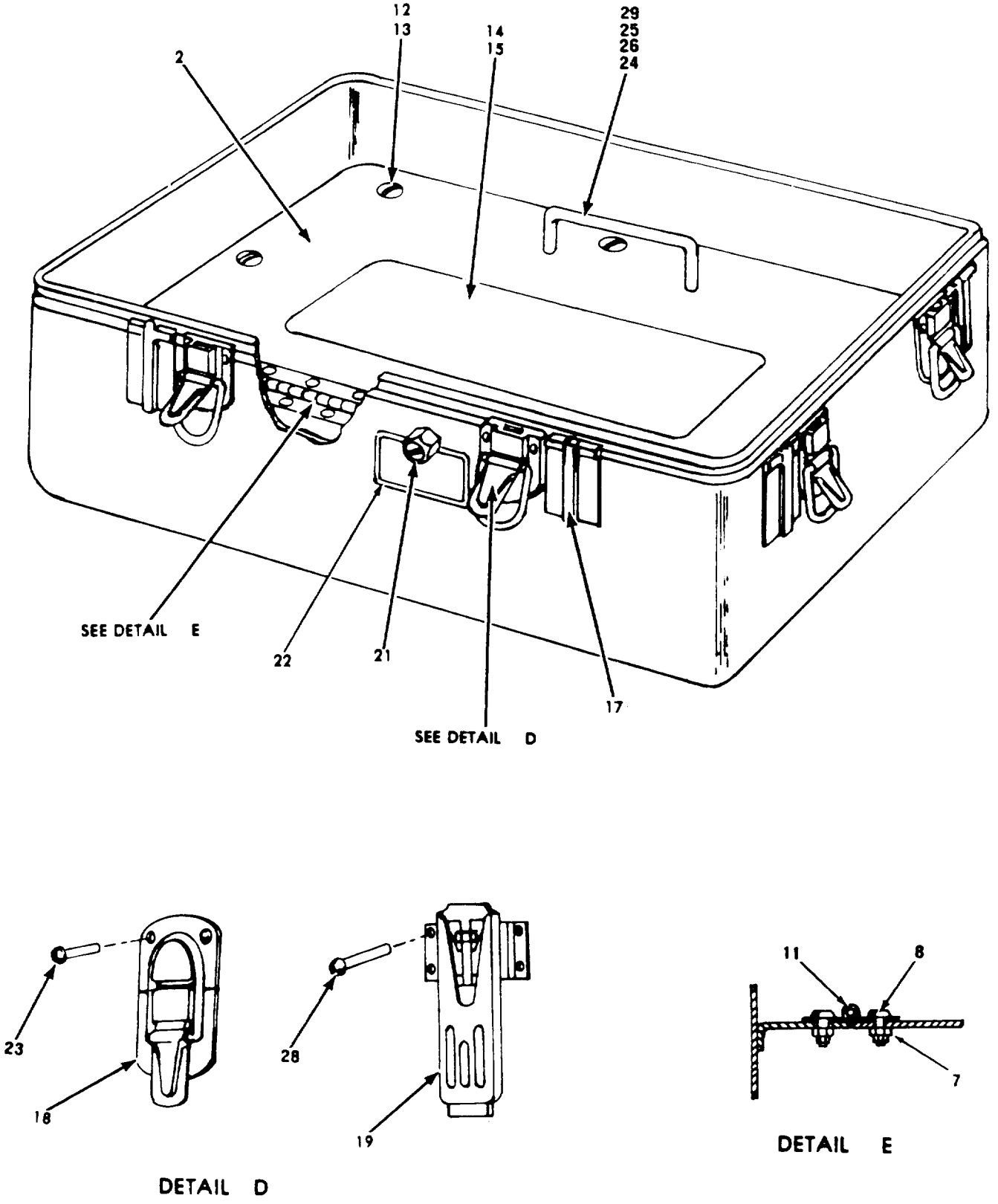


Figure C-7. Case Combination (Sheet 2 of 2)

(1) ILLUSTRATION (A) FIG. NO.	(B) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION	(7) U/M	(8) QTY INC IN UNIT
C-7		PBFFF	6110-01-127-2479	97403	13208E4849	CASE, POWER DISTRIBUTION ASSEMBLY	EA	1
C-7	1	XAFFF		97403	13208E4840	DISTRIBUTION PANEL	EA	1
C-7	2	XAFFF		97403	13208E4818	PANEL, STORAGE	EA	1
C-7	3	PAFZZ	5320-00-543-3478	96906	MS20426A6-8	RIVET	EA	12
C-7	4	PAFZZ	5340-00-682-1502	96906	MS35791-2	HANDLE, BAIL	EA	2
C-7	5	PAFZZ	5320-00-721-5210	96906	MS20470AA	RIVET	EA	4
C-7	6	MDFZZ		97403	13208E4839	PLATE	EA	1
C-7	7	PAFZZ	5310-00-889-2549	96906	MS21045-08	NUT, SELF-LOCKING	EA	8
C-7	8	PAFZZ	5305-00-984-6193	96906	MS35206-242	SCREW, MACHINE	EA	21
C-7	9	PAFZZ	5320-00-117-6963	96906	MS2042644-6	RIVET, SOLID	EA	2
C-7	10	PAFZZ	5325-00-282-7471	97403	13213E5164	RECEPTACLE TURNLOCK	EA	8
C-7	11	PAFZZ	5340-01-053-7127	96906	MS35823-2A	HINGE, BUTT	EA	1
C-7	12	PAFZZ	5325-00-619-2951	97403	13213E5163-8	STUD, FASTENER	EA	20
C-7	13	PAFZZ	5365-00-838-0422	97403	13213E5162	RING, RETAINING	EA	5
C-7	14	MDFZZ		97403	13216E8651	PLATE INFORMATION	EA	1
C-7	15	PAFZZ	8040-00-290-4301	81348	MMM-A-1617	ADHESIVE	EA	V
C-7	16	PAFZZ	5330-01-178-8254	19178	ZSP5-513	GASKET, RUBBER	EA	1
C-7	17	PAFZZ	9535-01-N78-2436	19178	ZSP2-227C1	SHEARLOCK PLATE	EA	8
C-7	18	PAFZZ	5340-01-177-7993	19178	D14167	LATCH ASSEMBLY	EA	8
C-7	19	PAFZZ	5340-01-777-7992	19178	HC-104HL-300-A	LATCH ASSEMBLY	EA	8
C-7	20	PAOZZ	5325-00-337-6575	97403	13213E5163-7	STUD, TURNLOCK FASTENER	EA	5
C-7	21	PAFZZ	4820-00-906-1039	96906	MS18014-1	VALVE, PRESSURE	EA	1
C-7	22	PAFZZ	9905-00-48-4127	19178	120HA20	DECAL	EA	1
C-7	23	PAFZZ	5320-00-117-6963	96906	MS20426A4-6	RIVET, SOLID	EA	20
C-7	24	PAFZZ	5305-00-071-1323	96906	MS51960-66	SCREW, MACHINE	EA	10
C-7	25	PAFZZ	5310-00-809-8546	96906	MS27183-8	WASHER, FLAT	EA	12
C-7	26	PAFZZ	5310-00-045-3296	96906	MS35338-43	WASHER, LOCK	EA	12
C-7	27	PAFZZ	5310-00-934-9751	96906	MS35650-302	NUT, PLAIN HEXAGON	EA	20
C-7	28	PAFZZ	5320-00-619-4028	96906	MS20426A4-5	RIVET, SOLID	EA	32
C-7	29	PAFZZ	5340-00-121-7770	97403	13208E4827	HANDLE, BOW	EA	1

APPENDIX D

COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LISTS

Section I. INTRODUCTION

D-1. SCOPE.

This appendix lists components of end item and basic issue items for the equipment to help you inventory items required for safe and efficient operation.

D-2. GENERAL.

The Components of End Items and Basic Issue Items lists are divided into the following sections:

a. Section II, Components of End Item. This listing is for informational purposes only, and is not authority to requisition replacements. These items are part of the end item, but are removed and separately packaged for transportation or shipment. As part of the end item, these items must be with the end item whenever it is issued or transferred between property accounts. Illustrations are furnished to assist you in identifying the items.

b. Section III, Basic Issue Items. These are the minimum essential items required to place the equipment in operation, to operate it, and to perform emergency repairs. Although shipped separately packaged, BII must be with the equipment during operation and whenever it is transferred between property accounts. The illustrations will assist you with hard-to-identify items. This manual is your authority to request/requisition replacement BII, based on TOE/MTOE authorization of the end item.

D-3. EXPLANATION OF COLUMNS.

The following provides an explanation of columns found in the tabular listings.

a. Column (1), Illustration Number (Illus Number). This column indicates the number of the illustration in wtich the item is shown.

b. Column (2), National Stock Number. Indicates the National stock number assigned to the item and will be used for requisitioning purposes.

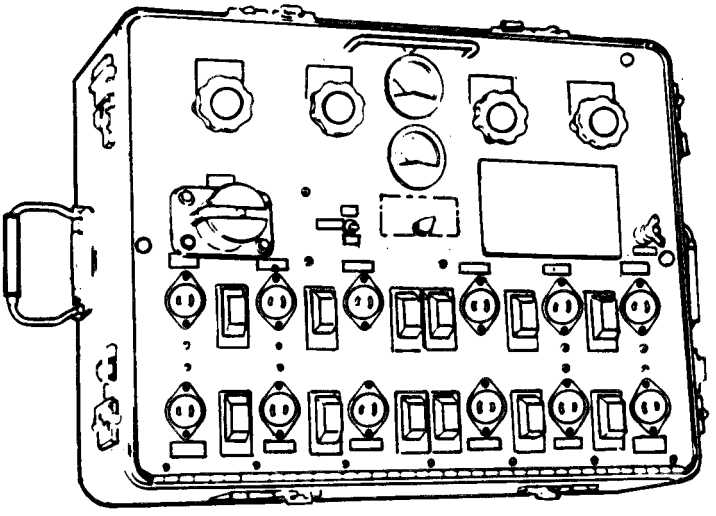
c. *Column (3), Description.* Indicates the Federal item name and, if required, a minimum description to identify and locate the item. The last line for each item indicates the FSCM (in parentheses) followed by the part number. If item needed differs for different models of this equipment, the model is shown under the Usable On Code heading in this column. These codes are identified as:

(not applicable)

d. *Column (4), Unit Measure (U/M).* Indicates the measure used in performing the actual operational/maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea., in., pr).

e. *Column (5), Quantity Required (Qty Rqr).* Indicates the quantity of the item authorized to be used with/on the equipment.

Section II. COMPONENT OF END ITEM



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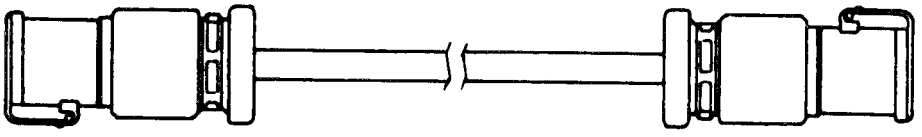

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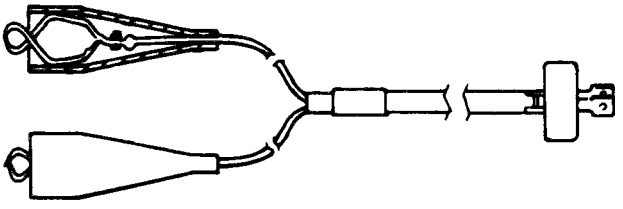

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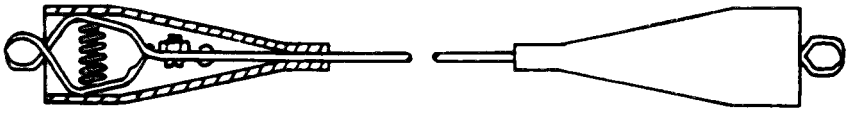

Figure C-2. Cables Assembly

SECTION II. COMPONENTS OF END ITEM (CONTD)

(1) ILLUSTRATION NUMBER	(2) NSN	(3) DESCRIPTION FSCM & PART NUMBER	(4) U/M	(5) QTY REQ'D
1	6130-00-940-7866	BATTERY CHARGING DISTRIBUTION PANEL (97403) 13208E4850	EA	1
2	5995-00-123-0108	CABLE, ASSEMBLY, SPECIAL (97403) 13208E4816	EA	1
3	6150-00-122-4551	CABLE ASSEMBLY, POWER (97403) 13208E4815	EA	12
4	6150-00-125-8457	CABLE ASSEMBLY, JUMPER (97403) 13208E4814	EA	10

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NOT APPLICABLE

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BE EXACT. . .PIN-POINT WHERE IT IS

PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO	IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
6	2-1 a			In line 6 of paragraph 2-1a the manual states the engine has 6 Cylenders. The engine on my set only has 4 Cylenders. Change the manual to show 4 Cylenders.
B1		4-3		Callout 16 on figure 4-3 is pointing at a bolt. In key to figure 4-3, item 16 is called a shim - Please correct one or the other.
125	line 20			I ordered a gasket, item 19 on figure B-16 by NSN 2910-00-762-3001. I got a gasket but it doesn't fit. Supply says I got what I ordered, so the NSN is wrong. Please give me a good NSN

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FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)

DATE SENT

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 5-6130-301-13&P	5 July 1985	Battery Charging Distribution Panel (MIL-P-52457)

BE EXACT. . .PIN-POINT WHERE IT IS

PAGE NO.	PARA-GRAPH	FIGURE NO	TABLE NO

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

PRINTED NAME. GRADE OR TITLE. AND TELEPHONE NUMBER

SIGN HERE:

DA FORM 1 JUL 79 **2028-2**

PREVIOUS EDITIONS ARE OBSOLETE.

DRSTS-M Overprint 2, 1 Nov 80.

P.S.--IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

REVERSE OF DA FORM 2028-2 Reverse of DRSTS-M Overprint 2, 1 Nov 80

TEAR ALONG PERFORATED LINE

FILL IN YOUR UNIT'S ADDRESS

FOLD BACK

DEPARTMENT OF THE ARMY

POSTAGE AND FEES PAID
DEPARTMENT OF THE ARMY
DOD 314

U.S. MAIL

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE $300

COMMANDER
US ARMY TROOP SUPPORT COMMAND
ATTN: AMSTR-MPS
4300 GOODFELLOW BOULEVARD
ST. LOUIS, MO 63120-1798

The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigram = .035 ounce
1 dekagram = 10 grams = .35 ounce
1 hectogram = 10 dekagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	*To*	*Multiply by*	*To change*	*To*	*Multiply by*
inches	centimeters	2.540	ounce-inches	newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29,573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	newton-meters	1.356	metric tons	short tons	1.102
pound-inches	newton-meters	.11296			

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

PIN: 050233-005