

J86334A DC POWER DISTRIBUTING FRAME OPERATING METHODS

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3. FUNCTIONAL DESCRIPTION	5	1. GENERAL	
INTRODUCTION	5	1.01 This section describes the physical and functional characteristics and general operation of the J86334A dc power distributing frame (PDF). See Fig. 1.	
A. Initial Preparation of the Power Distributing Frame to Accept Loads	5	1.02 Whenever this section is reissued, the reason(s) for reissue will be given in this paragraph. This issue does not affect the Equipment Test List.	
B. Preparation of the Power Distributing Frame to Accept Additional Load Circuits	10	1.03 The J86334A is a general purpose -48 volt PDF which is used where battery power is obtained from large fuses or circuit breakers on remote power plant battery control boards or converter plants. The power is divided into smaller capacity circuits to provide protective direct current for power equipment frames.	
C. Alarm Conditions and Indications	10	1.04 The J86334A PDF has a maximum discharge capacity of 2100 amperes.	
		1.05 This issue of the section is based on the following schematic diagram (SD): SD-82518-01, Issue 2A: Power Systems—DC Power Distributing Frame, J86334A	
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NOTICE

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If this section is to be used with equipment or apparatus reflecting an earlier or later issue of the SD, reference should be made to the SDs and the corresponding (CDs) to determine the extent of the changes and the manner in which the section may be affected.

1.06 Abbreviations and Acronyms: Refer to Table A for a list of abbreviations and acronyms with applicable terms used in this section.

**TABLE A
ABBREVIATIONS AND ACRONYMS**

ABBREVIATION	TERM
ACO	Alarm Cut-Off
ALM	Alarm
ASSY	Assembly
BAT	Battery
CAP	Capacitor
CB, or CKT BKR	Circuit Breaker
CHG	Charge
CKT	Circuit
CCW	Counterclockwise
CW	Clockwise
F	Fuse (Load)
FF	Fuse Failure
FRM	Frame
LED	Light emitting Diode
SUP	Supply

2. PHYSICAL DESCRIPTION

INTRODUCTION

2.01 The J86334A PDF consists of the following:

- Common Use Power Distributing Frame
- Filter Fuse Panel(s)
- Circuit Breaker Panel(s)
- Control Panel.

A. Common Use Power Distributing Frame

2.02 The common use power distributing frame (See Fig. 1) is 7 feet high, 26 inches wide, and 24 inches deep. The basic frame includes stile strips, base covers with or without appliance outlets, a frame alarm panel (four LEDs wired in

series-parallel), and rear doors to protect personnel and frame circuitry.

B. Filter-Fuse Panel(s)

2.03 The power distributing frame may be equipped with one to five fuse panels. Refer to Table B for a complete list of controls, indications, and fuses. Each fuse panel has 40 load fuse and alarm indicating fuse positions (see Fig. 2). Three large filter capacitors are connected in parallel across the input bus on each fuse panel. The capacitors protect the load by filtering out transients and noise. The battery connection is made at the fuse block bus, and battery return or ground is made at the common ground bus of the filter capacitor bank on the panel. Each of the 40 fuse alarm leads is connected to the common alarm LED which is mounted on the left side of the fuse panel (Fig. 2). Each of the three filter capacitors in the fuse panel is charged through a 20-ampere fuse and monitored by a LED.

C. Circuit Breaker Panel(s)

2.04 The power distributing frame may be equipped with one or two circuit breaker panels. Refer to Table B for a complete list of controls and indicators. Each panel (see Fig. 3) has positions for 12 circuit breakers, and is fed by two -48 volt battery supplies, one for each group of six circuit breakers. The -48 volt return or ground is made at the ground bus bar assembly at the top of the frame. Each circuit breaker panel contains two alarm indication LEDs, one for each group of six circuit breakers.

D. Control Panel

2.05 The control panel consists of LED indicators, control panel wiring, circuit board protection fuses, an alarm cut-off switch (ACO), a CAP CHG TST switch, and two printed circuit boards, CM1 (charge circuit board), and CM2 (alarm circuit board). Refer to Table B for a complete list of controls, indications, and fuses. A charge probe, CP1, is mounted on the front of the control panel (see Fig. 4). The control panel is powered by two separate battery supplies, each of which is fused at the input to the control panel.

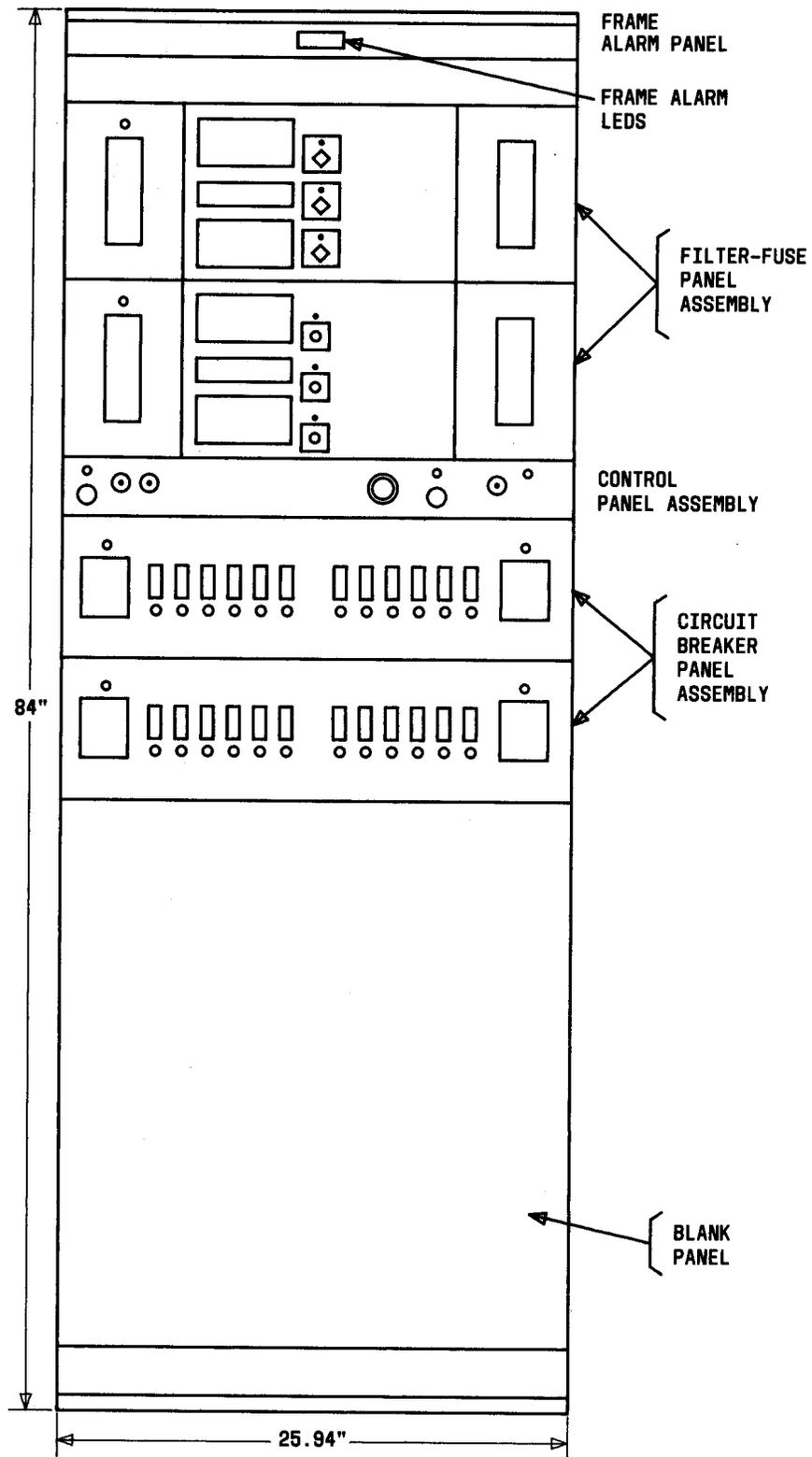


Fig. 1—J86334A DC Power Distributing Frame

TABLE B

CONTROLS, INDICATORS, AND FUSES

NAME	EQUIP. LOCATION	CONTROL INDICATOR OR FUSE	TYPE	FUNCTION
Frame Alarm Panel	-48V PDF	FRAME ALARM	4 Lamps (Series-parallel)	Lights when an alarm has been generated in frame
Control Panel Assy	-48V PDF	ACO	Switch (button)	Turns off audible and visual minor alarms
			LED	Lights when ACO switch is depressed.
		A BAT SUP B BAT SUP	Fuse (70-type) Fuse (70-type)	Protects alarm circuit pack wiring CM1 and CM2.
		CHG PROBE		Used to charge capacitors in filter fuse panels and in external loads.
		CAP CHG TEST CAP CHG	Switch (button) LED	Used to test CAP CHG LED Lights when CAP CHG TEST switch is depressed. Also used to monitor charging of filter and load capacitors.
Control Panel Assy	-48V PDF	CHG CKT	Fuse (70-type)	Protects charge circuit pack CM1.
		CHG CKT FAIL	LED	Lights when CHG CKT fuse operates.
Filter-Fuse Panel Assy		PANEL ALM	LED	Lights when any fuse on the panel operates.
		Load fuse (F1-F40)	74-type	Supply -48 Volts to loads.
		Indicator fuses (F1-F40)	70 P 0.1 Amp	Operate to give visual indication that a load fuse has operated.

TABLE B (Contd)

CONTROLS, INDICATORS, AND FUSES

NAME	EQUIP. LOCATION	CONTROL INDICATOR OR FUSE	TYPE	FUNCTION
Filter-Fuse Panel Assy (Contd)		FF()*	Fuse (74-type)	Protect filter-fuse capacitors.
		FILTER FUSE ALM	LED	Lights when FF() operates. *FF1 protects CM1 FF2, FF3 protect CM2. All other FF-designated fuses protect filter-fuse capacitors.
Circuit Breaker Panel Assy	-48V PDF	PANEL ALM	LED	Lights when any one of six load circuit breakers trip. LED on either end of the panel monitors a group of six circuit breakers.
		CB (1-6) CB (1-6)	CKT BKR	Two groups of six each circuit breakers. Each group is fed by a separate -48 volt feeder.

*FF1 protects CM1. FF2, FF3 protect CM1 and CM2. All other FF-designated fuses protect filter-fuse capacitors.

3. FUNCTIONAL DESCRIPTION

INTRODUCTION

3.01 The proper use of the power distributing frame may be approached in separate phases described as follows:

- Initial Preparation of the Power Distributing Frame to Accept a Load
- Preparation of the Power Distributing Frame to Accept Additional Load Circuits
- Alarm Conditions and Indications.

A. Initial Preparation of the Power Distributing Frame to Accept Loads

Caution: Prior to applying a load to any circuit in the power distributing frame, it is necessary to assure that all capacitors, both in the filter fuse panel(s) and in capacitive-type loads, have been charged.

3.02 **Initial Charge of Frame Filter Capacitors:** To initially prepare a filter-fuse panel for loading, proceed as follows:

- (1) Remove all fuses from the fuse panel.

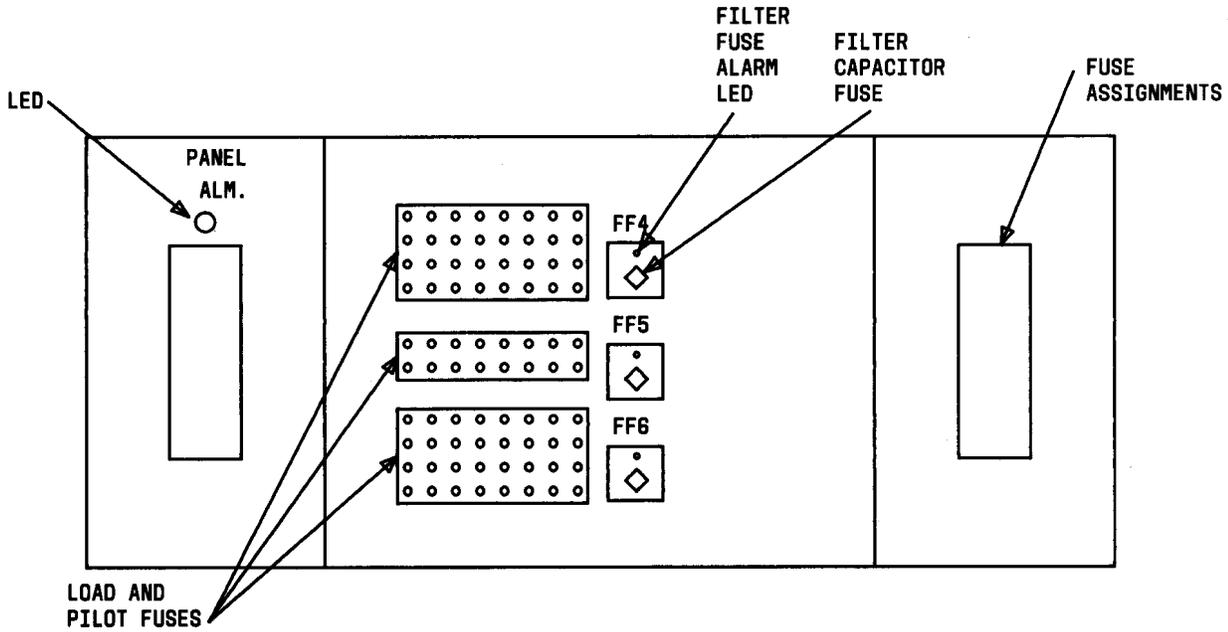


Fig. 2—Filter-Fuse Panel Assembly

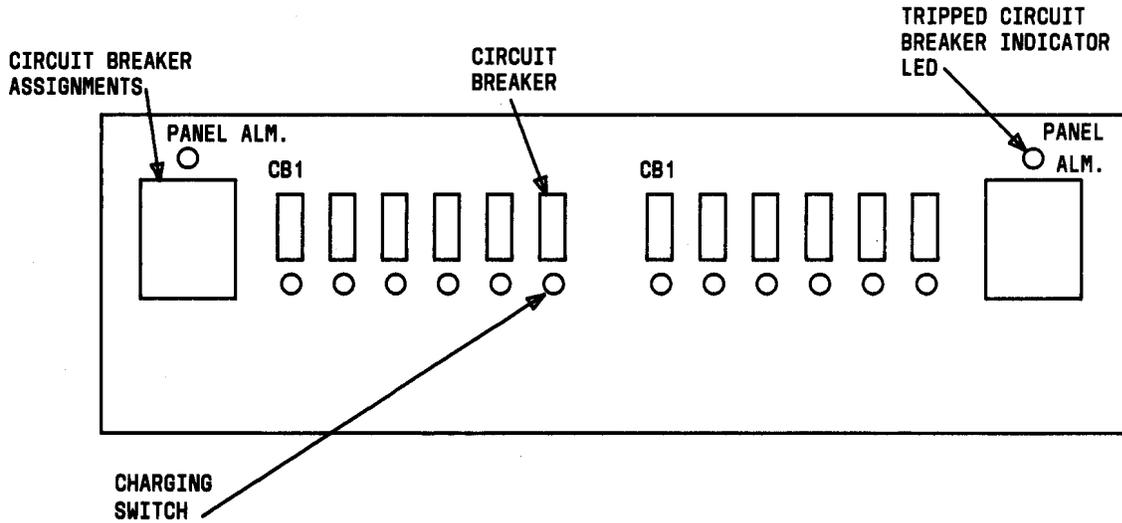


Fig. 3—Circuit Breaker Panel Assembly

- (2) Connect battery power to the panel input bus.
- (3) Remove the charge probe CP1 (see Fig. 4) from the recessed storage location as follows:
 - (a) Pull the probe handle (marked "PULL") out of the control panel.

- (b) When the probe cord has been extended to the desired length, lock the retractable cord assembly by maintaining pressure on the cord while moving it to the left or right.
- (c) Remove protective cover from the probe by holding the body of the probe and turning the cover ccw (see Fig. 5 and 6).

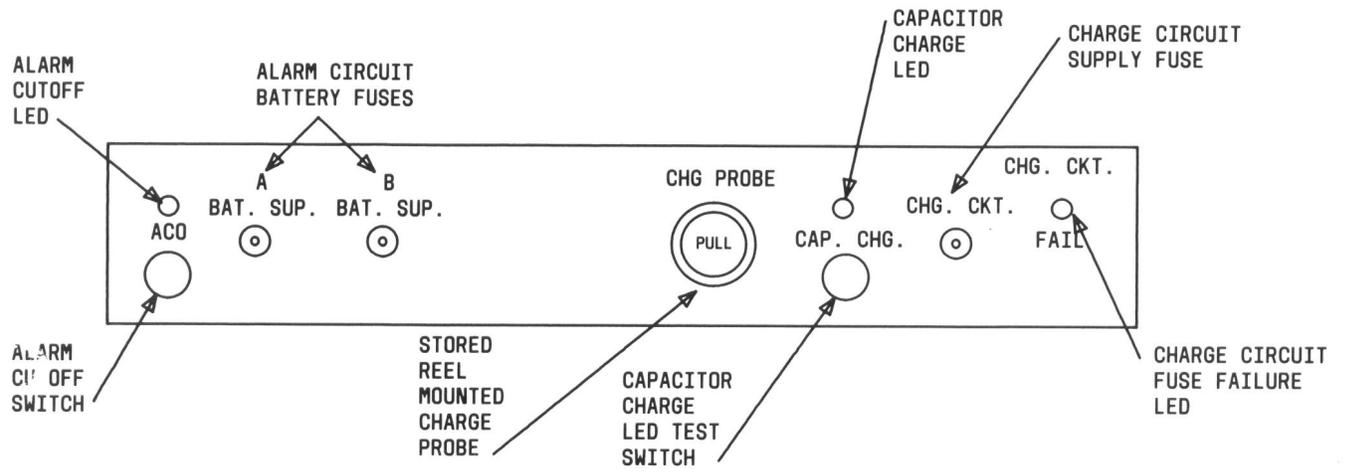


Fig. 4—Control Panel Assembly



Fig. 5—CP1 Charging Probe

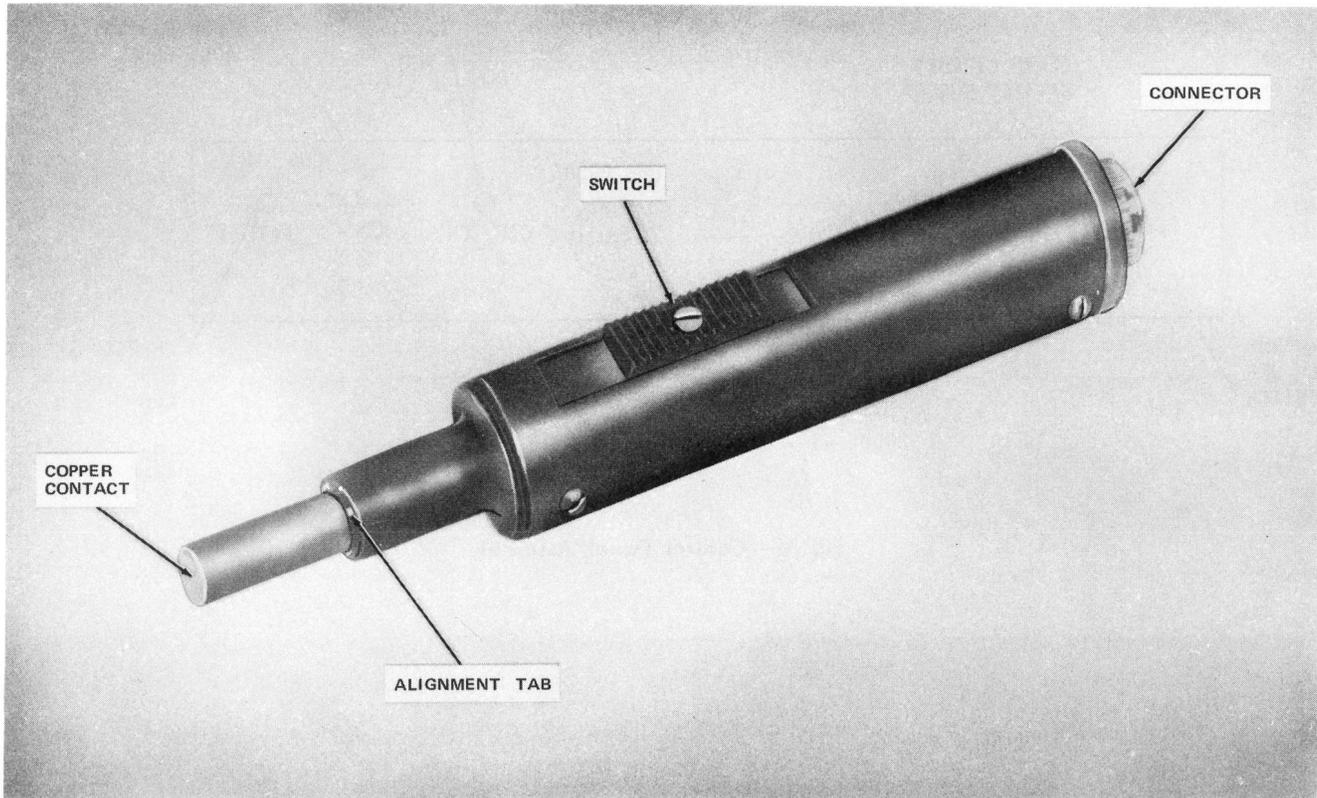


Fig. 6—CP1 Charging Probe With Protective Cover Removed

- (4) Test the CAP CHG LED by pressing the CAP CHG switch on the control panel.

Requirement: The CAP CHG LED lights.

Note: If this requirement is not met, check FF1, FF2, and FF3 fuses, CAP CHG LED, and CM1 circuit pack.

- (5) Insert the charge probe into one fuse holder FF() as follows:
- (a) Align the alignment tabs on the charge probe with the slots on the fuse holder.
 - (b) Push the probe into the fuse holder until the probe bottoms out.
 - (c) Rotate the probe one-fourth turn cw. The alignment tabs will lock the probe into the holder.

Warning: Short circuit exists if CAP CHG LED is not extinguished during operation of the charge probe switch.

- (6) Charge the filter-fuse capacitor as follows:

- (a) Push the switch on the probe toward fuse holder.

Requirement: The CAP CHG LED lights, then is gradually extinguished.

- (b) Release the slide switch on the probe.
- (7) Remove the probe by rotating the probe one-fourth turn cw and then pulling the probe directly out of the fuse holder.
- (8) Install the 74-type fuse in the fuse holder.

Warning: The fuse must be inserted within approximately 15 seconds. Otherwise, the capacitor just charged

will have discharged, and when the fuse is installed, the capacitor will attempt to charge through the fuse and will blow the fuse.

- (9) Repeat (5) through (8) for each fuse FF() position on the panel.

3.03 Charging Capacitive-Type Loads Protected by Fuses: To charge input capacitors in capacitive-type loads which are fused by fuses F(), proceed as follows:

Warning: Short circuit exists if CAP CHG LED is not extinguished during operation of the charge probe switch.

- (1) Test the CAP CHG LED by pressing the CAP CHG switch on the control panel.

Requirement: The CAP CHG LED lights. If this requirement is not met, check FF1, FF2, and FF3 fuses, CAP CHG LED, and CM1 circuit pack.

- (2) On the same fuse panel in which the filter fuse capacitors are charged, insert the charge probe into the indicator (top) fuse position which serves fuse F().
- (3) Charge the capacitive-type load input capacitors by pushing the switch on the charge probe toward the fuse holder.

Requirement: The CAP CHG LED lights, then is gradually extinguished.

- (4) Before releasing the slide switch on the probe, install the load fuse.
- (5) Release the slide switch and remove the probe by rotating the probe one-fourth turn ccw and then pulling the probe directly out of the fuse holder.
- (6) Install the indicator fuse in the position above the load fuse which was just installed.
- (7) Repeat (2) through (7) for each load fuse F() on the fuse panel.

3.04 Rewinding the Charge Probe Cord: After the load fuses have been installed,

the charge probe may be restored in its holder in the control panel by the following procedure:

- (1) Replace the protective cover by carefully engaging the threads on the cover with the threads on the body of the probe.
- (2) Hold the body of the probe and turn the cover cw until it is tight.
- (3) Grasp the probe and pull away from the control panel, allowing the cord assembly locking mechanism to release.
- (4) While holding the probe, guide it back into the holder, letting the spring force do the pulling.

3.05 Charging Capacitive-Type Loads Protected by Circuit Breakers: To precharge capacitive loads, proceed as follows:

Caution: Loads which have input filter capacitors must be precharged prior to operating any occupied circuit breaker to ON.

Warning: Short circuit exists if CAP CHG LED is not extinguished during operation of the CKT BKR CHG switch.

- (1) Test the CAP CHG LED by pressing the CAP CHG switch on the control panel.

Requirement: The CAP CHG LED lights.

Note: If this requirement is not met, check FF1, FF2, and FF3 fuses, CAP CHG LED, and CM1 circuit pack.

- (2) At the first circuit breaker to be operated, press the charge button on the circuit breaker and observe the CAP CHG LED on the control panel.

Requirement: The CAP CHG LED lights; then is gradually extinguished.

Note: If this requirement is not met, check for a short circuit in the load circuit.

- (3) When the CAP CHG LED on the control panel is extinguished, operate the associated

circuit breaker to ON and release the charge button.

- (4) Repeat (2) and (3) for each circuit breaker which will connect a load to the frame.

B. Preparation of the Power Distributing Frame to Accept Additional Load Circuits

3.06 To add capacitive-type loads to an operating filter-fuse panel, proceed as follows:

- (1) Insure that the new load circuit has been wired in accordance with existing regulations.
- (2) Test the CAP CHG LED by pressing the CAP CHG switch on the control panel.

Requirement: The CAP CHG LED lights.

Note: If this requirement is not met, check FF1, FF2, and FF3 fuses, CAP CHG LED, and CM1 circuit pack.

- (3) Remove the charge probe CP1 (see Fig. 4) from the recessed storage location as follows:
 - (a) Pull the probe handle (marked "PULL") out of the control panel.
 - (b) When the probe cord has been extended to the desired length, lock the retractable cord assembly by maintaining pressure on the cord while moving it to the left or right.
 - (c) Remove the protective cover from the probe by holding the body of the probe and turning the cover ccw (see Fig. 5 and 6).
- (4) Insert the charge probe into the indicator fuse (top) position which serves the selected load fuse F() as follows:
 - (a) Align the alignment tabs on the charge probe with the slots on the indicator fuse holder.
 - (b) Push the probe into the fuse holder until the probe bottoms out.
 - (c) Rotate the probe one-fourth turn cw. The alignment tabs will lock the probe into the fuse holder.

Warning: Short circuit exists if CAP CHG LED is not extinguished during operation of the charge probe switch.

- (5) Charge the capacitive-type load input capacitors by pushing the switch on the charge probe toward the fuse holder.

Requirement: The CAP CHG LED lights, then is gradually extinguished.

Note: If the CAP CHG LED fails to light, check FF1, FF2, and FF3 fuses, CAP CHG LED, and CM1 circuit pack.

- (6) Before releasing the slide switch on the probe, install the load fuse F().
- (7) Release the slide switch and remove the probe by rotating the probe one-fourth turn ccw and then pulling the probe directly out of the fuse holder.
- (8) Install the indicator fuse in the position above the load fuse which was just installed.
- (9) Repeat (1) through (5) for each load fuse which is to be added to the panel.
- (10) Restore the charge probe by the procedure in paragraph 3.04.

3.07 Adding Load to Circuit Breaker Panel: To add a load to an operating circuit breaker panel, proceed as in paragraph 3.05.

C. Alarm Conditions and Indications

3.08 The alarm circuit pack CM2, located in the control panel assembly, monitors the status of the load fuses and circuit breakers. The circuit board wiring is protected by fuses FF2 and FF3.

3.09 The CM2 provides alarm information when a fuse or circuit breaker operates in the frame. Relay contact closures are provided for communicating audible, visual, and status information to the office. The signals to the office indicate whether the alarms are major or minor.

3.10 Table C shows the alarm functions resulting from trouble conditions. These functions include the indication of a trouble condition, its cause, and means for silencing the alarm until the trouble can be corrected.

TABLE C

ALARM FUNCTIONS

ALARM INDICATOR	REASON FOR ALARM	ALARM SENT	ALARM CUT-OFF
Indicating fuse operates. PANEL ALM LEDs light. FRAME ALM lamp lights	Load fuse F() operated	Major	Remove indicating fuse.
Circuit breaker in "trip" position. PANEL ALM LEDs light. FRAME ALM lamp lights	Circuit breaker tripped	Major	Operate circuit breaker to OFF.
FF() LED lights. FRAME ALM LED lights	Filter-fuse FF() operated	Minor	Push ACO key (ACO LED stays on until problem is corrected).
FF1 fuse operates. CHG CKT FAIL LED lights. FRAME ALM lamp lights	Charge circuit failed (short)	Minor	Remove FF1 indicating fuse or Press ACO key (ACO LED stays on until the problem is corrected or remove FF1).
FF2 and/or FF3 fuses operate (fuse tip protruding through fuse cap)	Fault in control panel wiring (CM1, CM2 circuit pack)	No alarm sent	No alarm sent.