

**J86334B, J86334C, AND J86334D
DC POWER DISTRIBUTING FRAMES
DESCRIPTION AND OPERATION**

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E. Charging Load Circuits Having Capacitive Inputs in +24 Volt, -24 Volt, or +48 Volt PDF	11	1.01 This practice provides a description and general operating procedures for the J86334B, J86334C, and J86334D dc PDF (power distributing frames).	
F. Charging Capacitive Loads Using the ED-82947-30, GR7, Circuit Breaker Panel	11	1.02 This practice is reissued to limit the load fuse of the J86334C PDF to 48 positions per bus or 600 amperes per bus except for the J86334C, L1, which is limited to 300 amperes per bus. Revision arrows are used to emphasize significant changes.	
4. ALARMS	13	1.03 The J86334B and J86334C dc power distributing frames are general purpose PDFs which provide redundant, protected +24 volt, -24 volt, +48	

volt, or -48 volt dc for use in power equipment frames. The J86334D PDF is similar to the J86334B and C except the J86334D has an output of -48 volts only. These frames also provide the following:

- Major and minor alarms
- Visual frame alarms when a major or minor alarm occurs
- A visual panel alarm on either bus when a major or minor alarm occurs
- Major and minor alarm scan points
- A means to cut off minor alarms.

1.04 This issue of the practice is based on SD-82518-02, for the J86334B and J86334C PDF and SD-82619-01, for the J86334D PDF. If this practice is used with equipment or apparatus reflecting earlier or later issues 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 practice may be affected.

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

2. DESCRIPTION

A. General

2.01 The J86334B and J86334C dc power distributing frames (Fig. 1) consist of a single bay cabinet assembly which is approximately 84 inches high, 26 inches wide, with four optional depths either of 12, 18, 21, or 24 inches. The basic frame includes stile strips, base covers with or without appliance outlets, a frame alarm, and protective rear doors. The frame is designed to accommodate a control panel and a combination of fuse, capacitor, or circuit breaker panels, depending on the desired configuration. Blank panels are provided to cover unused portions of the frame. Table B gives a listing of controls, indicators, and fuses used in the J86334B and J86334C dc power distributing frames.

2.02 The J86334D dc power distributing frame (Fig. 2) consists of a single bay cabinet which is approximately 72 inches high, 30 inches wide, and 22 inches deep. The cabinet includes door frame as-

TABLE A
ABBREVIATIONS AND ACRONYMS

ABBREVIATION	TERM
ACO	Alarm Cut-Off
ALM	Alarm
CAP	Capacitor
CB	Circuit Breaker
CD	Circuit Description
CHG	Charge
CKT	Circuit
DS	Diode Photo Emissive
F	Fuse (Load)
FA	Fuse Alarm
FF	Filter Fuse
LED	Light Emitting Diode
S, SW	Switch
SD	Schematic Diagram

semblies, cable and door supports, bifold door assemblies, and bezel assemblies. The frame is designed to accommodate a control panel and from one to four additional panels. Blank panels are provided to cover unused portions of the frame. Table B gives a listing of controls, indicators, and fuses used in the J86334D dc power distributing frame.

2.03 The J86334B dc power distributing frame provides +24 volt, -24 volt, +48 volt, or -48 volt redundant, protected, direct current to the power equipment frames from a battery plant. The frame is equipped with a control panel and from one to five fuse panels (top feed), or one to four fuse panels (bottom feed). The filter fuse panels are equipped with 70-type, 74-type, and KS-19780 fuses. The high current fuse panel is equipped with 30 through 60 ampere fuses. All fuses are selected in accordance with job requirements. The J86334B dc power distributing frame has a maximum discharge capacity of 2500 amperes which is divided equally into a redundant A and B bus arrangement. Each A and B bus is mounted vertically on each of the fuse panels. Interconnection

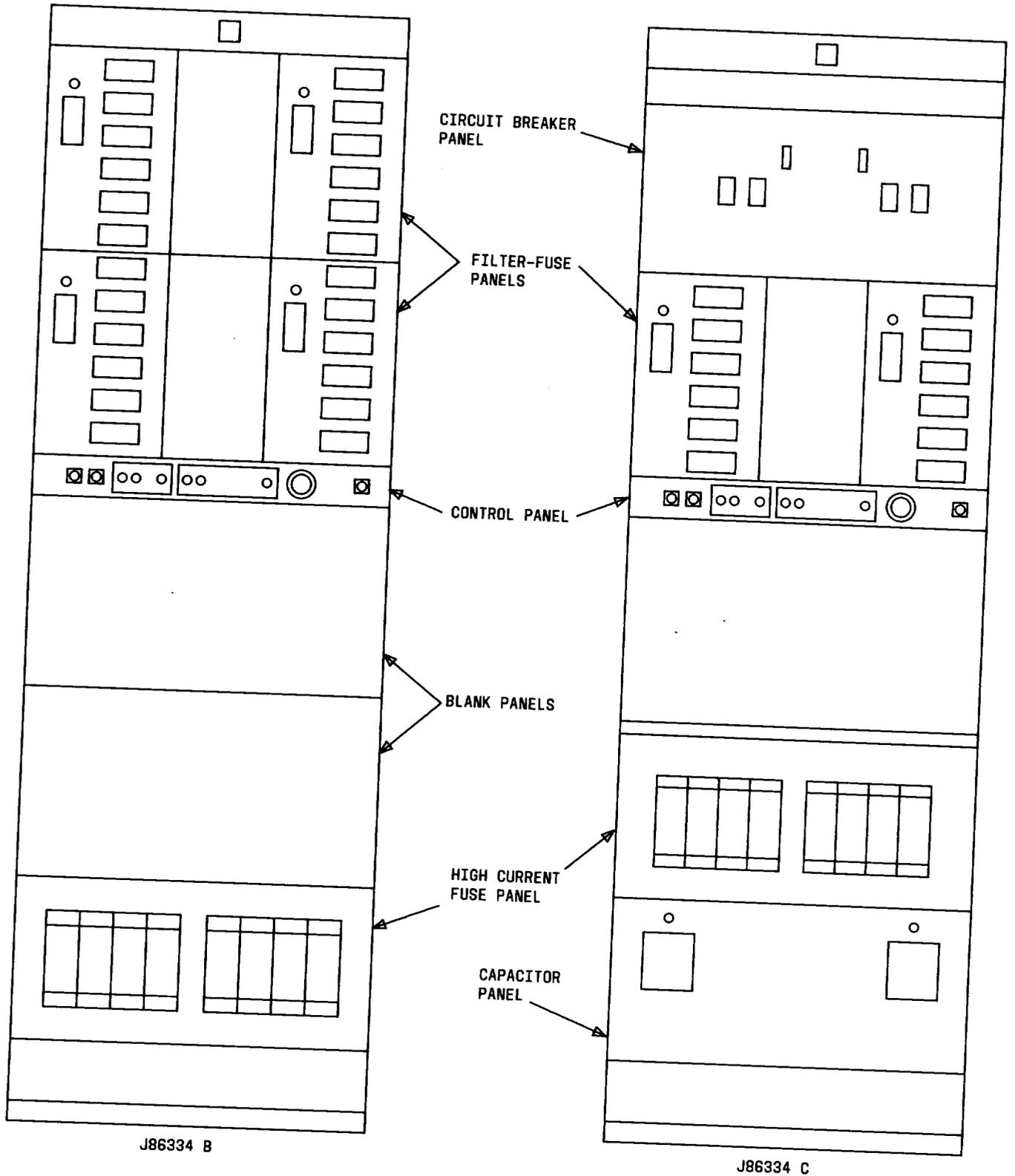


Fig. 1—J86334B and J86334C DC Power Distributing Frame — Typical

◆TABLE B◆

CONTROLS, INDICATORS, AND FUSES

CONTROL, INDICATOR, OR FUSE	LOCATION	TYPE	FUNCTION
FRAME ALARM	Frame Alarm Panel	4 LAMPS	Lights when either a major or minor alarm is generated.
ACO/SW	Control Panel	Pushbutton Switch	Turn off audible and visible minor alarms.
ACO	Control Panel	LED	Lights when minor audible and visible alarm is cut off. Will remain lighted until problem is corrected.
CAP CHG/TEST	Control Panel	Pushbutton Switch	Permits testing of the charge circuit, or when probe is inserted in fuse holder, will cause the load capacitor to charge.
CAP/CHG	Control Panel	LED	Lights when the charge circuit has been activated and extinguishes when the load or test load capacitor is charged.
LOAD/FAULT	Control Panel	LED	Indicates that the charge circuit has been on for 30 seconds and has been turned off.
PRESS FOR/ LAMP TEST	Circuit Breaker Panel	Bulb/ Pushbutton Switch	(1) Permits checking bus fuse and bulb. (2) Indicates when load capacitor has charged.
CHG SW/STEP 1	Circuit Breaker Panel	Toggle Switch	Starts charging cycle of load capacitors.
CHG SW/STEP 2	Circuit Breaker Panel	Toggle Switch	In conjunction with CHG SW/STEP 1 completes the charging cycle of load capacitors.
CHG CKT/FAIL	Circuit Breaker Panel	LED	Lights when a filter fuse FF () blows.
FILTER FUSE/ ALM	Fuse Panels	LED	Indicates that a filter fuse FF () is blown or missing.
PANEL ALM	FUSE PANEL	LED	Indicates that a load fuse F () is blown.
PANEL ALM	Fuse Circuit Breaker Panel	LED	Indicates that a circuit breaker has tripped.
Load Fuse F ()	Fuse Panel		Protects voltage to loads.
Indicator Fuse FA ()	Fuse Panel		Gives a visual indicator that a load fuse F () has operated.
Filter Fuse FF ()	Fuse Panel		Protects filter fuse capacitors.

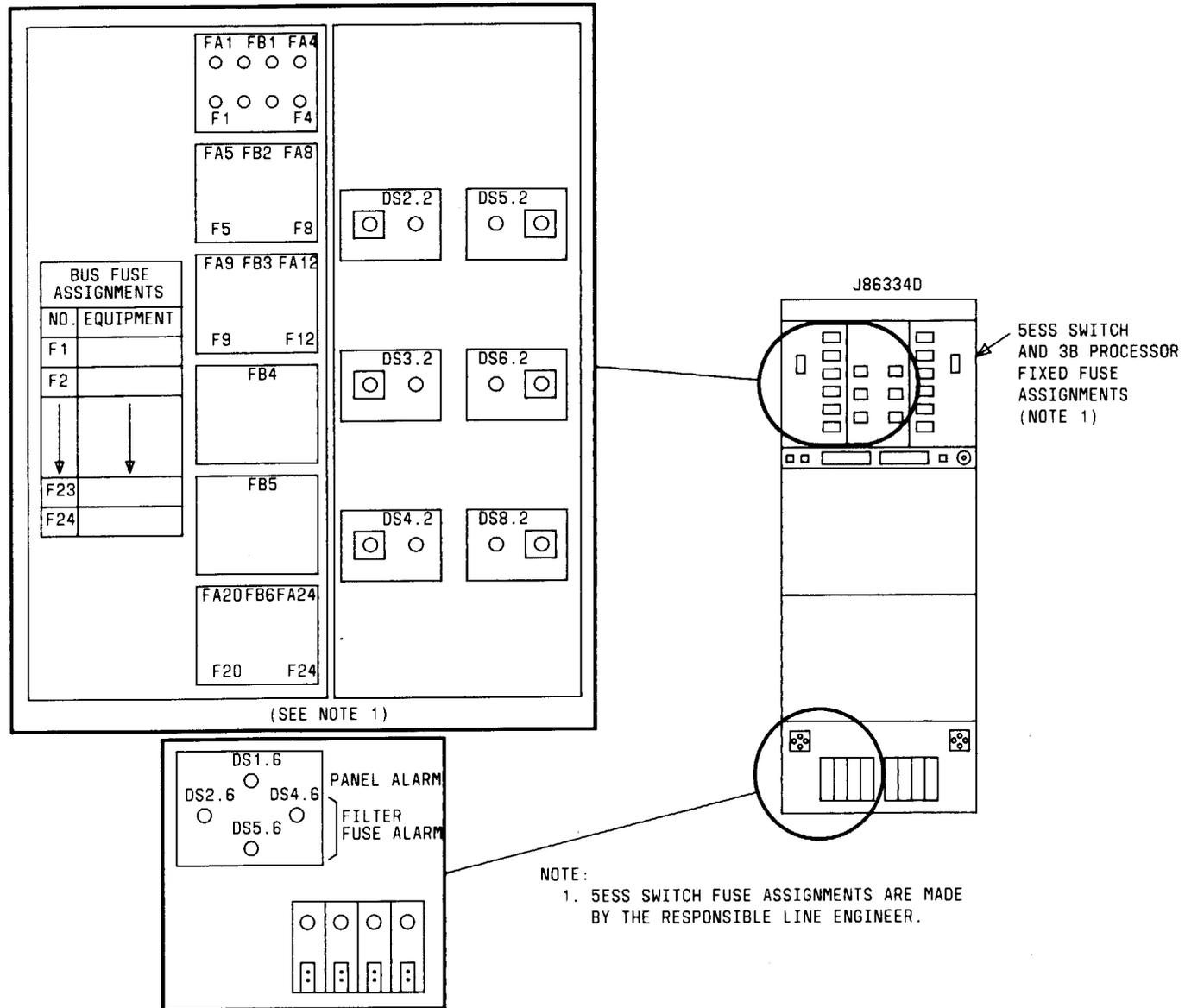


Fig. 2—J86334D DC Power Distributing Frame

from the battery plant to the PDF is at the input bus of each fuse panel.

2.04 The J86334C dc power distributing frame provides +24 volt, -24 volt, +48 volt, or -48 volt redundant, protected, direct current to the power equipment frames from a converter power plant. The frame is top feed only and is equipped with a control panel, a capacitor panel, from one to three fuse panels, and a single circuit breaker panel. The fuse panels provide a maximum of 48 load fuse positions per bus or 600 amperes per bus except for the J86334C, L1, which is limited to 300 amperes per bus. The fuse panels are equipped with 70-type, 74-type, and KS-19870, L6, fuses. All fuses are selected in accordance with job requirements. A bank of energy storage capacitors is required and is mounted at the bottom of the frame. The J86334C dc power distributing frame has a maximum discharge capacity of 1200 amperes which is divided equally into a redundant A and B bus arrangement. Each A and B bus is mounted vertically on the distributing frame and extends the entire length of the frame. The input bus panel located in the top of the distributing frame is designed to terminate four 4/0 cables per bus from the converter frame.

2.05 The J86334D dc power distributing frame provides -48 volt redundant, protected, direct current to the power equipment frames from a battery plant. The frame is equipped with a control panel and from one to four fuse panels. A total of 192 load-fuse positions per bus, each fused with a 20-ampere, high-speed 74F fuse, are provided. A special fuse panel is provided for the three inverters in the central processor disk drives for use in the 5ESSTM switching equipment. The fuse panels can consist of 74-type, KS-type, and high current fuse panels. The J86334D dc power distributing frame has a maximum discharge capacity of 1100 amperes which is divided equally into a redundant A and B bus arrangement. Each A and B bus is mounted vertically on each of the fuse panels. Interconnection from the battery plant to the PDF is at the input bus of each fuse panel.

B. Control Panel

2.06 The ED-82947-30, GR10, and ED-83024-30, GR1, control panels (Fig. 3 and Fig. 4, respectively) contain an alarm circuit and, when wired for -48 volt output, a charge circuit module and a charging probe. The control panel wiring is fused by FF1 and FF2 and is powered by two ORed battery sup-

plies. The charge circuit is fused by FF3 and is powered by the parallel source.

(a) **Alarm Circuit:** The alarm circuit provides alarm information, both major and minor, when a fuse or circuit breaker operates in the dc power distributing frame. The audible and visible minor alarm can be turned off at the control panel. A major alarm can be turned off by removing the indicator fuse or operating the tripped circuit breaker to the OFF position.

(b) **Charge Circuit:** The combination of charge circuit module and charging probe is used to charge equipment frame energy storage capacitors and capacitive loads prior to inserting the fuse. The charge probe (Fig. 5) is a hand-hold device for charging capacitors, located both internal and external to the dc power distributing frame. The charge probe is electrically connected through a retractable reel located on the control panel. All circuits and monitors associated with the capacitor charging feature are contained on the control panel. The probe is designed with a built-in safety feature which enables the charge circuit to operate only when the probe is properly inserted into a fuse holder.

C. Fuse Panels

2.07 ED-82947-30, GR3, Filter Fuse Panel:

The 70-type fuse panel has a total of 96 load fuse positions, 48 fuses per bus with fuse ratings from 0.10 to 5.0 amperes, and an energy storage capacitor bank consisting of three electrolytic capacitors per bus. The capacitor bank is required to minimize voltage transients after a load fuse operates. The input power connections are made at the fuse block bus bar and the power returns (or grounds) are made at the common ground bus on the energy storage capacitor bank.

2.08 ED-82947-30, GR2, Filter Fuse Panel:

The 74- and KS-type fuse panels have a total of 48 load fuses and 48 alarm-indicating fuses divided equally into an A and B bus arrangement, with fuse ratings from 1.25 to 30 amperes. An energy storage capacitor bank consisting of three electrolytic capacitors per bus is provided to suppress voltage transients. The input power connections are made at the fuse block bus bar and the power returns (or grounds) are made at the common ground bus on the energy storage capacitor bank.

2.09 ED-82947-30, GR6, High Current Fuse Panel (Battery Plant): The high-current fuse panel, when used in a battery power distributing frame, is equipped with a total of eight load-fuse positions and eight associated alarm fuses divided equally into an A and B bus arrangement, with fuse ratings for 35 to 60 amperes. An energy storage capacitor bank is also provided which consists of three electrolytic capacitors per bus. The input power connections are made at the fuse block bus bar and the power returns (or grounds) are made at the common ground bus on the energy storage capacitor bank. This panel is used only in the J86334B and J86334D dc power distributing frames.

2.10 ED-82947-30, GR5, High Current Fuse Panel (Converter Plant): The high-current fuse panel, when used in a converter power distributing frame, is equipped with a total of eight load-fuse positions and eight associated alarm fuses divided equally into an A and B bus arrangement, with fuse ratings from 35 to 60 amperes. The input power connections are made at the fuse block bus bar and the power returns (or grounds) are made at the common ground bus on the power distributing frame. A capacitor bank is not required. This panel is used only in the J86334C dc power distributing frame.

D. Circuit Breaker Panel

2.11 The ED-82947-30, GR7, circuit breaker panel provides four KS-22012, L37, circuit breaker load positions divided equally into an A and B bus arrangement. This panel is equipped with two identical 2-step charging circuits, one for each bus which contains two circuit breakers each. The input power connections are made at the circuit breaker bus bar and the power returns (or grounds) are made at the common ground bus on the power distributing frame. Energy storage capacitors are not required on this

panel. The circuit breaker panel is used only on the J86334C dc power distributing frame.

2.12 ED-83024-30, GR2, Filter Fuse Panel: This panel provides 48 load-fuse positions and 48 associated alarm-indicating fuse positions divided equally into an '0' and '1' bus arrangement. This panel may be equipped with fuses rated from 1.25 to 30 amperes. Each bus feeds six modified 30B fuse blocks mounted on a 15-inch high panel. Three electrolytic capacitors per bus are provided to minimize the voltage transients should a fuse operate. This panel is used only in the J86334D PDF.

2.13 ED-83024-30, GR3, High Current Fuse Panel: This panel provides eight load-fuse positions and associated alarm-indicating fuses divided equally into an '0' and '1' bus arrangement. This panel may be equipped with fuses rated from 35 to 60 amperes. Each bus feeds four KS-16364, L6, fuse blocks mounted on a 12-inch high panel. Three electrolytic capacitors per bus are provided to minimize the voltage transients should a fuse operate. This panel is used only in the J86334D PDF.♦

3. OPERATION - CHARGING CAPACITORS

A. Initial Preparation

3.01 Warning: *Prior to applying a load to any circuit in the power distributing frame, it is necessary to assure that all capacitors, both in the fuse panels and in capacitive loads, have been charged. This admonishment pertains to Part 3.*

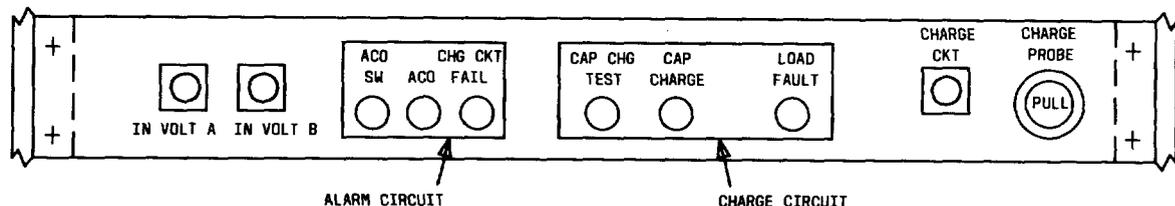


Fig. 3—Control Panel Assembly for J86334B and J86334C

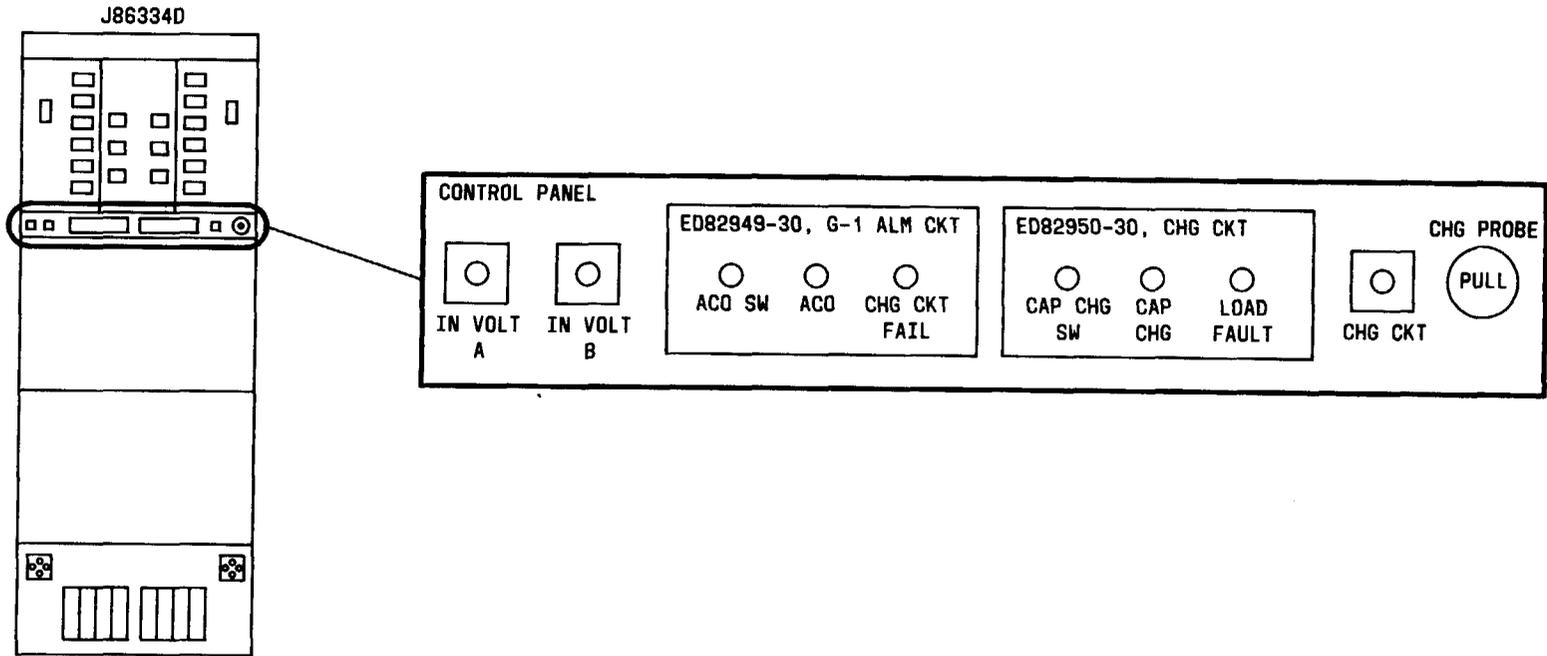


Fig. 4—Control Panel Assembly for J86334D

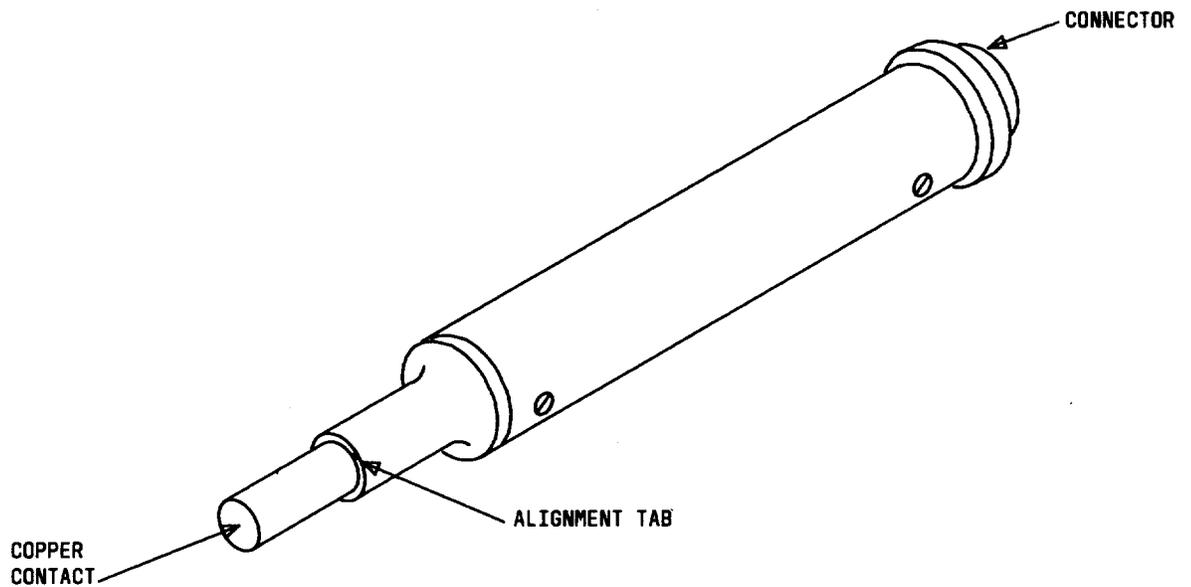


Fig. 5—Charge Probe

3.02 To prepare the power distributing frame for charging capacitors or charging load circuits having capacitive inputs, proceed as follows:

- (1) **Warning: Removal of the control panel, FF1 and FF2 fuses will disable the minor alarm, ACO circuit, frame alarm, and charge circuit.**

Remove all load, indicating, and filter fuses from the panel.

- (2) Assure that power is applied to the fuse panel.
- (3) For a -48 volt power distributing frame, remove the charge probe from the recessed storage location in the control panel, extend the cord to the desired length, and remove the protective cover from the probe.
- (4) For the +24 volt, -24 volt, or +48 volt power distributing frame, obtain a capacitor charging tool such as the 783A.

B. Charging Fuse Panel Energy Storage Capacitors in -48 Volt PDF

3.03 To charge fuse panel energy storage capacitors in 70-, 74-, or KS-type, or high-current fuse panels on either bus, proceed as follows:

- (1) Test the charge circuit by pressing the CAP CHG /TEST switch on the control panel.

Requirement: The CAP/CHG LED lights and remains lit for approximately 1 second.

- (2) Insert the charge probe into any FF() fuse holder.

- (3) **Warning: If the CAP/ CHG LED extinguishes but the LOAD/FAULT LED lights, the capacitor has not been charged. A short circuit, overload, or other condition will cause the capacitor not to charge.**

Press and hold CAP CHG/TEST switch while observing CAP/CHG LED.

Requirement: CAP/CHG LED lights, then gradually extinguishes. LOAD/FAULT LED is **not** lighted.

- (4) **Warning:** *The fuse must be installed within approximately 10 seconds or the capacitor will have discharged to a voltage level which could cause the fuse to operate.*

When the CAP/CHG LED is extinguished, release the CAP CHG/TEST switch, remove the charge probe, and immediately insert the load fuse into the fuse holder.

- (5) Repeat Steps (2) through (4) for each FF() fuse on the panel.
- (6) Restore charge probe to its storage location in the control panel.

C. Charging Fuse Panel Energy Storage Capacitors in +24 Volt, -24 Volt, or +48 Volt Converter PDF

3.04 To charge fuse panel filter capacitors in 70-, 74-, or KS-type, or high-current fuse panels on either bus, proceed as follows:

- (1) Insert the 783A charging tool, or equivalent, into any FF() fuse holder on the panel while observing the charging tool bulb.

Requirement: Bulb on charging tool lights, then gradually extinguishes.

- (2) **Warning:** *The fuse must be installed within approximately 10 seconds or the capacitor will have discharged to a voltage level which could cause the fuse to operate.*

When bulb on charging tool is extinguished, remove the charging tool from the fuse holder and install a fuse in the fuse holder.

- (3) Repeat Steps (1) and (2) for each FF() fuse on the panel.

D. Charging Load Circuits Having Capacitive Inputs in -48 Volt PDF

3.05 To charge load circuits having capacitive inputs in 74- or KS-type, or high-current fuse panels on either bus, proceed as follows:

- (1) Test charge circuit by pressing the CAP CHG/TEST switch on the control panel.

Requirement: The CAP/CHG LED will light and remain lighted for approximately 1 second.

- (2) Insert the charge probe into the indicating F() fuse holder.

- (3) **Warning:** *If the CAP/CHG LED extinguishes but the LOAD/FAULT LED lights, the capacitor has not been charged. A short circuit, overload, or other conditions will cause the capacitor not to charge.*

Press and hold the CAP CHG/TEST switch while observing the CAP/CHG LED.

Requirement: CAP/CHG LED lights and gradually extinguishes. LOAD/FAULT LED is not lighted.

- (4) When the CAP/CHG LED is extinguished, proceed as follows:

- (a) Install the load fuse.
- (b) Release the CAP CHG/TEST switch.
- (c) Remove the charge probe.
- (d) Install the indicating fuse.

- (5) Repeat from Step (2) for each additional F() fuse on the panel.

- (6) Restore charge probe to its storage location in the control panel.

3.06 To charge load circuits having capacitive inputs in 70-type or high-current fuse panels on either bus, proceed as follows:

- (1) Test charge circuit by pressing the CAP CHG/TEST switch on the control panel.

Requirement: The CAP/CHG LED will light and remain lighted for approximately 1 second.

- (2) Insert the charge probe into the indicating F() fuse holder.

- (3) **Warning:** *If the CAP/CHG LED extinguishes but the LOAD/FAULT LED*

lights, the capacitor has not been charged. A short circuit, overload, or other conditions will cause the capacitor not to charge.

Press and hold the CAP CHG/TEST switch while observing the CAP/CHG LED.

Requirement: CAP/CHG LED lights and gradually extinguishes. LOAD/FAULT LED is not lighted.

(4) **Warning: The load fuse must be installed within approximately 10 seconds or the capacitor will have discharged to a voltage level which could cause the fuse to operate.**

When the CAP/CHG LED is extinguished, proceed as follows:

- (a) Release the CAP CHG/TEST switch.
- (b) Remove the charge probe.
- (c) Install the load fuse.
- (5) Repeat from Step (2) for each additional F() fuse on the panel.
- (6) Restore charge probe to its storage location in the control panel.◆

E. Charging Load Circuits Having Capacitive Inputs in ◆+24 Volt, -24 Volt, or +48 Volt◆ PDF

3.07 To charge load circuits having capacitive inputs in 74- or KS-type, or high-current fuse panels on either bus, proceed as follows:

- (1) Insert the 783A, or equivalent, charging tool into any indicating F() fuse holder on the panel while observing the bulb on the charging tool.

Requirement: The bulb on charging tool lights, then gradually extinguishes.

(2) **Warning: The load fuse must be installed within approximately 10 seconds or the capacitor will have discharged to a voltage level which could cause the fuse to operate.**

When the bulb on the charging tool is extinguished, proceed as follows:

- (a) Install the load fuse.
 - (b) Disconnect the charging tool.
 - (c) Install the indicating fuse.
 - (3) Repeat from Step (1) for each additional load fuse F() on the panel.
- 3.08** To charge load circuits having capacitive inputs in 70-type or high-current fuse panels on either bus, proceed as follows:

- (1) Insert the 783A, or equivalent, charging tool into any indicating F() fuse holder on the panel while observing the bulb on the charging tool.

Requirement: The bulb on charging tool lights, then gradually extinguishes.

(2) **Warning: The load fuse must be installed within approximately 10 seconds or the capacitor will have discharged to a voltage level which could cause the fuse to operate.**

When the bulb on the charging tool is extinguished, proceed as follows:

- (a) Disconnect the charging tool.
- (b) Install the indicating fuse.
- (3) Repeat from Step (1) for each additional load fuse F() on the panel.

F. Charging Capacitive Loads Using the ED-82947-30, GR7, Circuit Breaker Panel

3.09 To precharge capacitive loads using the ED-82947-30, GR7, circuit breaker panel, proceed as follows:

- (a) Test the circuit breaker panel as follows:
 - (1) Insure that all circuit breakers are off and that both panel and indicator fuses are installed.

- (2) Depress PRESS FOR/LAMP TEST push-button on Bus (A).

Requirement: PRESS FOR/LAMP TEST indicator lights.

- (3) Release PRESS FOR/LAMP TEST push-button.
- (4) Depress PRESS FOR/LAMP TEST push-button on Bus (B).

Requirement: PRESS FOR/LAMP TEST indicator lights.

- (5) Release PRESS FOR/LAMP TEST push-button.

Note: If either or both lamps do not light, check for blown fuse, broken wire, or bad indicator lamp.

- (b) Charge load capacitors in Bus A as follows:

- (1) Assure that load is connected to circuit breaker CB3 and that CB3 is off.
- (2) Depress CHG SW/STEP 1 toggle switch (S4) while observing LAMP/TEST indicator (DS3).

Requirement: PRESS FOR/LAMP TEST indicator lights, then gradually dims.

- (3) While holding CHG SW/STEP 1 toggle switch depressed, depress CHG SW/STEP 2 toggle switch (S5) and hold depressed until PRESS FOR/LAMP TEST indicator is extinguished.
- (4) Operate CB3 to ON.
- (5) Release CHG SW/STEP 1 and CHG SW/STEP 2 toggle switches.
- (6) Assure that load is connected to circuit breaker CB4 and that CB4 is off.
- (7) Depress CHG SW/STEP 1 toggle switch (S6) while observing PRESS FOR/LAMP TEST indicator (DS3).

Requirement: PRESS FOR/LAMP TEST indicator lights, then gradually dims.

- (8) While holding CHG SW/STEP 1 toggle switch depressed, press CHG SW/STEP 2 toggle switch (S5) and hold depressed until lamp indicator is extinguished.
- (9) Operate CB4 to ON.
- (10) Release CHG SW/STEP 1 and CHG SW/STEP 2 toggle switches.

- (c) Charge load capacitors in Bus (B) as follows:

- (1) Assure that load is connected to circuit breaker CB1 and that CB1 is off.
- (2) Depress CHG SW/STEP 1 toggle switch (S1) while observing PRESS FOR/LAMP TEST indicator (DS1).

Requirement: PRESS FOR/LAMP TEST indicator lights, then gradually dims.

- (3) While holding CHG SW/STEP 1 toggle switch depressed, depress CHG SW/STEP 2 toggle switch (S2) and hold depressed until PRESS FOR/LAMP TEST indicator is extinguished.
- (4) Operate CB1 to ON.
- (5) Release CHG SW/STEP 1 and CHG SW/STEP 2 toggle switches.
- (6) Assure that load is connected to circuit breaker CB2 and that CB2 is off.
- (7) Depress CHG SW/STEP 1 toggle switch (S3) while observing PRESS FOR/LAMP TEST indicator (DS1).

Requirement: PRESS FOR/LAMP TEST indicator lights, then gradually dims.

- (8) While holding CHG SW/STEP 1 toggle switch depressed, press CHG SW/STEP 2 toggle switch (S2) and hold depressed until lamp indicator is extinguished.
- (9) Operate CB2 to ON.

- (10) Release CHG SW/STEP 1 and CHG SW/STEP 2 toggle switches.

4. ALARMS

- 4.01** The alarm circuit module located in the control panel assembly, monitors the status of the fuses and circuit breakers. The circuit board wiring is protected by fuses FF2 and FF3.
- 4.02** The alarm circuit module 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.
- 4.03** A major alarm occurs when a load fuse operates on a fuse panel or a circuit breaker trips on the circuit breaker panel. A major alarm can be silenced by removing the operated fuse or manually setting the tripped circuit breaker to OFF. A major alarm causes the FRAME ALM lamp on the frame to

light, indicating that an alarm has been issued. A minor alarm occurs when a filter fuse operates on a fuse or capacitor panel or an indicator fuse operates on the circuit breaker panel. A minor alarm is also given when either of the alarm circuit protection fuses (FF1, FF2, or FF3), on the control panel operates. A minor alarm causes the FRAME ALM lamp on the frame to light, indicating that an alarm has been issued. Minor alarms can be silenced by operating the alarm cutoff ACO/SW or by removing the operated fuse.

4.04 The ACO/SW is a switch with an associated ACO indicating diode. Activating the ACO/SW switch will cut off the audible and visual alarms, and the ACO LED will remain lighted until the problem is corrected.

4.05 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	ALARM INDICATOR	REASON FOR ALARM	ALARM CUT-OFF
Major	(1) PANEL ALM lighted (2) FRAME ALM lighted	Load fuse in 70-type fuse panel operated	Remove operated load fuse.
Major	(1) PANEL ALM lighted (2) Indicator fuse FA () operated (3) FRAME ALM lighted	Load fuse in 74-, or KS-type, or high current fuse panel, or capacitor bank operated	Remove operated indicating fuse.
Major	(1) FRAME ALM lighted (2) PANEL ALM LED lighted	Circuit breaker tripped	Operate tripped circuit breaker to OFF.
Minor	(1) FILTER FUSE ALM LED lighted (2) FRAME ALM lighted	Filter fuse FF () operated 70-, 74-, KS, or high current fuse panel or capacitor bank panel.	Operate ACO/SW.*
Minor	(1) FRAME ALM lamp lighted (2) CHG CKT/FAIL LED lighted (3) Indicating fuse F1A or F2A operated on Circuit Breaker Panel	F1 or F2 in Circuit Breaker Panel operated	Operate ACO/SW.*
Minor	(1) CHG CKT/FAIL LED lighted (2) FRAME ALM lamp lighted	FF3 in control panel operated (Charge circuit failure)	Operate ACO/SW.*
Minor	FRAME ALM lamp lighted	FF1 or FF2 in Control Panel operated	Operate ACO/SW.*

* The ACO LED will remain lighted until the problem is corrected or the operated fuse is removed.