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ELECTRONIC SWITCHING SYSTEMS

NO. 3

MISCELLANEOUS POWER CIRCUIT

CHANGES

B. Changes in Apparatus

B.1 Removed	Replaced By
CR9 (0,1) Diode 531A - App Fig. 3	CR9 (0,1) Indicator 29A - App Fig. 3
CR10 (0,1) Diode 531A - App Fig. 3	CR10 (0,1) Indicator 29A - App Fig. 3
CR11 (0,1) Diode 531A - App Fig. 3	CR11 (0,1) Indicator 29A - App Fig. 3
CR12 (0,1) Diode 531A - App Fig. 3	CR12 (0,1) Indicator 29A - App Fig. 3

D. Description of Changes

D.1 Used the 29A indicator, a new apparatus, to replace the arrangement that used an LED, fuse cap, and fuse cartridge.

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MISCELLANEOUS POWER CIRCUIT

CHANGES

B. Changes in Apparatus

B.1 Removed	Replaced By
+C1 (0, 1) Fuse 70E - App Fig. 2	+C1 (0, 1) Fuse 70K - App Fig. 2
+C2 (0, 1) Fuse 70E - App Fig. 2	+C2 (0, 1) Fuse 70K - App Fig. 2
-C1 (0, 1) Fuse 70E - App Fig. 2	-C1 (0, 1) Fuse 70K - App Fig. 2
-C2 (0, 1) Fuse 70E - App Fig. 2	-C2 (0, 1) Fuse 70K - App Fig. 2
+T1 (0) - T1 (0) Fuse 70E - App Fig. 2	+T1 (0) - T1 (0) Fuse 70K - App Fig. 2

D. DESCRIPTION OF CHANGES

D.1 Changed the fuses supplying ±130 volt power to the coin control circuits to a larger amperage (slower to blow.) A blown fuse may now result from a fault between the converters and the coin control, remote test, or loop environment test circuits, but not from a fault on T and R unless it is 1.5 seconds or more.

D.2 Added Equipment Note 204 to explain how the +48 volt power should be multipled to the dial tone first units.

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ELECTRONIC SWITCHING SYSTEMS

NO. 3

MISCELLANEOUS POWER
CIRCUIT

TABLE OF CONTENTS

SECTION I - GENERAL DESCRIPTION

1. PURPOSE OF CIRCUIT

1.01 This circuit mounts dc-to-dc converters that use -48 volt power to provide +24 volt, +48 volt, or ±130 volt power to any circuit needing it. The following are the converter SD numbers:

(a) (+24 V) DC-to-DC Converter (188A/189A) - SD-82340-01.

(b) (+48 V) DC-to-DC Converter (184A) - SD-82341-01.

(c) (±130 V) DC-to-DC Converter (184B) - SD-82342-01.

2. GENERAL DESCRIPTION OF OPERATION

2.01 A set of two paralleled +24 volt converters, one +48 volt converter and one ±130 volt converter, supply power to those circuits requiring A bus voltage. Another set of these converters supplies power to those circuits requiring B bus voltages. The detailed description of operation of each converter may be found in the corresponding CD.

SECTION II - DETAILED DESCRIPTION

1. +24 VOLT POWER

1.01 Each set of paralleled (ORed) +24 volt converters is capable of supplying a total of 16 amperes of regulated power. The five alarm conditions associated with +24 volt power are power alarm, fuse alarm, manual off, no power alarm, and alarm battery alarm.

1.02 A power alarm (PA) condition results in the +24 volt converter-power-alarm scan point saturating, and the light-emitting diode (LED) on the front of the converter turning on. The ALM RESET switch will clear the LED if the PA condition no longer exists. The PA is an indication that the +24 volt converter output voltage is not within the limits of 24.1 ±0.5 volts to 26.9 ±0.5 volts. This alarm condition will also occur momentarily if the converter is in the process of giving a fuse alarm (FA).

1.03 When an FA condition occurs, the +24 V fuse-alarm and the +24 V converter-power-alarm scan points are saturated and the LED on the converter

lights. There are three causes of a FA. These are:

(a) When a +24 volt distribution fuse blows.

(b) When a fuse supplying -48 volts to a +24 volt converter blows.

(c) When the +24 volt converter fails.

1.04 When either of the last two failures occurs, the scan points first indicate a power alarm condition and then a fuse alarm condition. An LED associated with each output fuse will light if the fuse blows. It should be removed before working on the associated loads.

1.05 A manual off condition occurs when the +24 V fuse-alarm scan point saturates, but the +24 V converter-power-alarm scan point remains unsaturated. If an FA condition occurs because the fuse supplying -48 volts to a converter blows or a +24 volt converter fails, the power switch on the front of the converter should be turned off. Thus, the scan points indicate a manual off condition and the LED on the converter lights. Then if the converter needs to be removed, the scan points indicate a normal condition. When the converter is replaced, the manual off condition again exists. After the power switch is turned on and the ALM RESET switch is operated, the LED on the converter will be cleared and the scan points will indicate a normal condition if the converter is functioning properly.

1.06 A power alarm test (PAT) can be done on the +24 volt converters. This verifies that the power alarm circuits are operating properly. The PAT may be initiated either manually or from the processor. The manual PAT is performed from the front of each +24 volt converter by using the ALM TEST switch to force the converter to give a PA visual indication. The +24 V converter-power-alarm scan point may saturate momentarily for 4 ms to 5 ms as the ALM TEST switch is released. The ALM RESET switch clears the LED that should have lighted.

1.07 A PAT is generated by the processor when the PAT relay is operated via a PD point. This should cause the two paralleled +24 volt converters on one side to give a PA. Thus, the scan points should indicate a power alarm condition, but the processor does not detect this as a problem. When the PAT is first initiated, the NPA relay operates and thus saturates the no-power-alarm scan point. If both alarm circuits are functioning properly, the NPA relay will release approximately 1.2 seconds later (the programming should allow 2 seconds), and the no-power-alarm scan point becomes unsaturated. If either of the converters gives no power alarm, the scan point will remain saturated until the PAT relay is released.

1.08 There are two things that cause the alarm-battery-alarm scan point to saturate:

(a) When a fuse that supplies -48 volts to all scan points associated with the miscellaneous power circuit blows.

(b) When a fuse that supplies +24 volts to the +24 volt distribution alarm circuit blows.

2. +48 VOLT POWER

2.01 Each +48 volt converter is capable of supplying 1.8 amperes of regulated power. The three alarm conditions associated with +48 volt power are power alarm, fuse alarm, and manual off.

2.02 When the +48 volt converter output voltage falls below +48 ±1 volts, the +48 V converter-power-alarm scan point saturates and the LED on the converter lights.

2.03 When any +48 volt distribution fuse or fuse supplying -48 volt to a +48 volt converter blows, the +48 V fuse-alarm scan point saturates. Also, the LED on the converter lights.

2.04 When the power switch on the front of the +48 volt converter is turned off, the +48 V converter-manual-off and +48 V converter-power-alarm scan points saturate and the LED on the converter lights. If the LED has been set by an alarm condition, it will clear when the power switch is turned off and then back on, assuming the alarm condition no longer exists. However, the circuits associated with the converter should be taken out of service first.

3. ±130 VOLT POWER

3.01 Each ±130 volt converter is capable of supplying 0.25 amperes, per polarity, of regulated power. A constant 1000-ohm load is applied to both output polarities to increase regulation. Three alarm conditions associated with ±130 volt power are power alarm, fuse alarm, and manual off.

3.02 When a 130 volt converter output voltage falls below 122 ±3 V, the 130 V converter-power-alarm scan point saturates. Also, the LED on the converter lights.

3.03 When any +130 or -130 volt distribution fuse or fuse supplying -48 volts to a 130 volt converter blows, the 130 V fuse-alarm scan point saturates. Also, the LED on the converter lights.

3.04 When the power switch on the front of the 130 volt converter is turned off, the 130 V converter-manual-off and 130 V converter-power-alarm scan points saturate and the LED on the converter lights. If the LED has been set due to an alarm condition, it will clear when the power switch is turned off and then back on, assuming the alarm condition no longer exists. However, the circuits associated with the converter should be taken out of service first.

4. MISCELLANEOUS POWER FAILURE

4.01 The miscellaneous-power-failure - bus-A scan point saturates when any other scan point associated with the converters, previously described, on side 0 is saturated.

4.02 The miscellaneous-power-failure - bus-B scan point satures when any other scan point associated with the converters, previously described, on side 1 is saturated.

5. -48 VOLT POWER

5.01 Each converter has an associated -48 volt fuse. Each +24 volt converter is supplied by a Buss ABS 10 A fuse. A 70F (0.25 A) fuse in parallel with the Buss fuse is used to indicate the 10 A fuse being blown. Each +48 volt converter is supplied by a 70D (5 A) fuse. Each ±130 volt converter is supplied by a 70D (5 A) fuse. Each PAT relay is separately fused by a 70E (0.18 A) fuse. Two 70F (0.18 A) fuses supply scan point power.

SECTION III - REFERENCE DATA

1. WORKING LIMITS

1.01 The dc-to-dc converters in the miscellaneous power circuit are designed to operate from -48 volt power within the given range of -42.75 to -52.5 volts.

1.02 The +24 volt power supplied at the output of the distribution fuses is +25.4 ±1.4 volts.

1.03 The +48 volt power supplied at the output of the distribution fuses is +51.3 ±0.7 volts.

1.04 The ±130 volt power supplied at the output of the distribution fuses is ±128.9 ±3.1 volts.

2. FUNCTIONAL DESIGNATIONS

2.01 Relay

Designation	Meaning
FA(0,1)	±130 Volt Fuse Alarm
+48FA(0,1)	+48 Volt Fuse Alarm
24FA(0,1)	+24 Volt Fuse Alarm
PAT(0,1)	+24 Volt Converter Power Alarm Test
NPA(0,1)	+24 Volt Converter No Power Alarm

3. FUNCTION

3.01 The miscellaneous power circuit converts -48 volt power to regulated +24 volt, +48 volt, and ±130 volt power. It is then fused and distributed to other circuits.

4. CONNECTING CIRCUITS

4.01 When these circuits are listed on the keysheets, the connecting circuit information thereon is to be followed.

(a) Dial Tone First Coin Line Circuit - SD-3H205-01.

(b) Control Frame Circuit - SD-3H902-01.

(c) Miscellaneous Frame Circuit - SD-3H903-01.

(d) Test Frame Circuit - SD-3H904-01.

(e) Processor Frame Circuit - SD-1C910-01.

(f) Maintenance Frame Circuit - SD-1C912-01.

(g) Charge and Discharge Circuit (151 Power Plant) - SD-82304-01.

(h) 881A Ringing and Tone Plant - SD-92255-01.

5. MANUFACTURING TESTING REQUIREMENTS

Intermediate

5.01 None.

End Requirements

5.02 This circuit should be tested to verify that it is wired in accordance with the schematic and wiring drawings, that the specifications of the circuit requirements table are met, and that the circuit is capable of performing all functions stated in this circuit description.

6. TAKING EQUIPMENT OUT OF SERVICE

6.01 The +24 volt (188A), +48 volt (184A), and ±130 volt (184B) converters each have a power switch on the front. Before turning the power switch of a particular converter off, the associated circuits that it powers should be taken out of service via the TTY. Normally all even-numbered circuits are powered by bus A (circuit 0) and all odd-numbered circuits are powered by bus B (circuit 1). The switch can then be turned off and the converter unplugged. Since the +24 volt rectifier and filter unit (189A) has no power switch, the power switch on the 188A power unit should be turned off before removing either unit. If a +24 volt fuse alarm condition occurs, the power switch should be turned off. When this condition has been corrected, the power switch may be turned on.

6.02 Before turning off a +24 volt power unit, the SYC and any other circuit associated with that side should be taken out of service. This may include the TOUCH-TONE* receiver circuits, FCG circuits, TOUCH-TONE station test circuit, and line insulation test circuit.

6.03 Before turning off a +48 volt power unit, the associated side of the ringing and tone plant and dial tone first coin line circuits should be taken out of service.

6.04 Before turning off a ±130 volt power unit, the associated FCG and coin control circuits should be taken out of service.

SECTION IV - REASONS FOR REISSUE

D. Description of Changes

D.1 Provided complete CD information.

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