

3

CROSSBAR SYSTEMS  
NO. 3 AND 5A  
POSITIVE AND NEGATIVE 130 VOLT  
POWER PLANT  
CIRCUIT  
6 OR 12 AMP CAPACITY  
(3 OR 6 AMP PER POLARITY)  
USING DC TO DC CONVERTERS

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SECTION I - GENERAL DESCRIPTION1. PURPOSE OF CIRCUIT

1.01 This circuit provides up to 2 amperes of positive 130 volts direct current and 2 amperes of negative 130 volts direct current to power loads as required.

2. GENERAL DESCRIPTION OF OPERATION

2.01 This power plant is available in configurations having a maximum output current capacity of 6 or 12 amperes.

2.02 The 6-ampere plant (3 amperes per polarity) includes a maximum of three positive and negative 130-volt (dual-polarity) dc-to-dc converters, and is intended for use in the No. 3 crossbar 200-400 and 200-800 line applications. The 12-ampere plant (6 amperes per polarity) contains a maximum of six converters, and is designed for use in the No. 5A crossbar system, the No. 3 crossbar 200-1200 line application, or in applications not associated with the Crossbar No. 3 or 5A Switching Systems.

2.03 Each converter is capable of simultaneously delivering one ampere of positive 130-volt direct current and one ampere of negative 130-volt direct current. Since the converters are of the dual-polarity type, the unused capacity of one polarity may be utilized to increase the capacity of the opposite polarity. For example: a plant having a capacity of 6 amperes per polarity may have a positive 130-volt load requirement of only 0.5 amperes. In such a case the negative 130-volt output could deliver up to 11.5 amperes.

2.04 Alarm lamps +130 volts FA and -130 volts FA provide a visible alarm indication when an associated output distribution fuse operates. A major alarm indication is also sent to the office alarm circuit via the D1 lead.

2.05 Failure of one or more converters sends a minor alarm to the office alarm circuit on the A1 lead. If two or more converters fail, a major alarm indication is sent via the D3 lead in addition to the minor alarm indication on the A1 lead.

SECTION II - DETAILED DESCRIPTION1. CIRCUIT BREAKDOWN

1.01 This circuit consists of the following subcircuits:

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- (a)  $\pm$ 130 Volt Converter Circuit
- (b) Alarm Circuit
- (c) Distribution Circuit

## 2. $\pm$ 130 VOLT CONVERTER CIRCUIT - FS1

2.01 This portion of the power plant consists of from one to six positive and negative 130-volt (dual polarity) converters. The positive and negative outputs from each converter are connected to the positive and negative bus bars, respectively, on the distribution fuse panel. The ground (or common) lead from each converter is connected to the ground bar on the distribution fuse panel.

2.02 Failure of any converter places ground on lead A- to activate an external alarm. Ground is also placed on the B- lead to the converter alarm circuit.

2.03 When a converter fails, its CONVERTER FAIL lamp is illuminated, unless failure is due to loss of input power.

## 3. ALARM CIRCUIT - FS2

3.01 Failure of a converter places ground on the A1 lead to extend a minor alarm to the office alarm circuit.

3.02 Failure of a converter also places ground on the associated B- lead, which serves as an input to the converter alarm circuit, circuit pack CA. When two or more inputs to circuit pack CA are at ground potential, transistors Q1 and Q2 are biased into conduction, energizing relay K1. Closed contacts of K1 supply ground on the D3 lead to extend a major alarm indication to the office alarm circuit.

3.03 Operation of a distribution fuse and its associated PF pilot fuse places 130 volts on the alarm terminal, operating the corresponding  $\pm$ 130 volts FA or -130 volts FA alarm relay on circuit pack FA. Closed relay contacts supply ground to light the appropriate alarm lamp. Relay contacts also supply ground on the D1 lead to extend a major alarm to the office alarm circuit.

## 4. DISTRIBUTION CIRCUIT - FS3

4.01 The dual-polarity converters feed their positive and negative 130-volt direct current output to the distribution circuit for connection to loads as required.

4.02 Pin jacks J1 through J4 provide test points for monitoring both positive and negative 130-volt dc output voltages.

4.03 When a distribution fuse operates, an associated pilot fuse (designated PF) also operates, placing 130 volts on the alarm terminal, and energizing the appropriate fuse alarm relay. Operation of either the  $\pm$ 130 volts FA relay or the -130 volts FA relay will cause the alarm indications described in 3.03.

## SECTION III - REFERENCE DATA

### 1. WORKING LIMITS

#### 1.01 Input

-44 to -52V DC

#### 1.02 Output

$\pm$ 130V and -130V DC

#### 1.03 Alarm Battery

26.7 to 62.4V DC

### 2. FUNCTIONAL DESIGNATIONS

#### 2.01 Circuit Packs

<u>Designation</u>	<u>Meaning</u>
CA	Converter Alarm Circuit
FA	Fuse Alarm Circuit

#### 2.02 Converters

<u>Designation</u>	<u>Meaning</u>
$\pm$ 130V G-	Dual Polarity dc-to-dc Converter

#### 2.03 Jacks

<u>Designation</u>	<u>Meaning</u>
$\pm$ 130V	$\pm$ 130 Volt Test Jack
-130V	-130 Volt Test Jack
GRD	Ground Test Jack

#### 2.04 Lamps

<u>Designation</u>	<u>Meaning</u>
$\pm$ 130V FA	Fuse Alarm Lamp
-130V FA	Fuse Alarm Lamp

2.05 Resistors

<u>Designation</u>	<u>Meaning</u>
+130V FA	Fuse Alarm Resistor
-130V FA	Fuse Alarm Resistor

3. FUNCTIONS

3.01 To provide up to 6 amperes of positive 130-volt direct current to power loads as required.

3.02 To provide up to 6 amperes of negative 130-volt direct current to power loads as required.

3.03 To extend a minor alarm indication to the office alarm circuit if one or more converters fail, and a major alarm indication if two or more converters fail.

3.04 To extend a major alarm indication to the office alarm circuit and light an alarm lamp on the  $\pm 130$  volt distribution fuse panel if a distribution fuse and its associated pilot fuse operate.

4. CONNECTING CIRCUITS

4.01 This circuit operates in conjunction with the following circuits:

- (a) Negative 48-Volt Power Plant - Control, Alarm, Charge and Discharge Circuit - SD-26452-01.

5. MANUFACTURING TESTING REQUIREMENTS

5.01 This circuit shall be capable of performing all the functions specified in this Circuit Description.

6. REMOVING EQUIPMENT FROM SERVICE

6.01 Follow the procedure described in BSP 167-482-301 to remove a converter from service.

SECTION IV - REASONS FOR REISSUED. Description of Changes

- D.01 Circuit title is changed to all reference to crossbar No. 5A.
- D.02 Fuse numbering in FS3 is revised.
- D.03 Notes 109, 201, and 303 are added.
- D.04 Notes 108 and 302 are revised.
- D.05 CAD 1, arrangement for three converters is rated Mfr Disc.
- D.06 CAD 2, arrangement for six converters is added.
- D.07 Sheet 3, Note 3, is removed.

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