

CIRCUIT DESCRIPTION

CD-82604-01
ISSUE: 1
APPENDIX: 7M
DWG ISSUE: 8M
DISTN COD: BM10

POWER SYSTEMS
"LINEAGE" [Ⓢ] 2000 RECTIFIER CIRCUIT
INPUT: 208 OR 240 VOLTS 60 HZ
OUTPUT: 24 VOLTS OR 48 VOLTS
25 OR 50 AMPERES
J85502A&B

CHANGES

D. DESCRIPTION OF CHANGES

- D.1 Note 322 was expanded to include the use of the 205B circuit module for all versions of the J85502B, 50-ampere rectifier.
- D.2 Note 303 was updated for drawing issue 8M.

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POWER SYSTEMS
"LINEAGE" © 2000 RECTIFIER CIRCUIT
INPUT: 208 OR 240 VOLTS 60 HZ
OUTPUT: 24 VOLTS OR 48 VOLTS
25 OR 50 AMPERES
J85502A&B

CHANGES

B. Changes in Apparatus

B.1 Added

CM4 Circuit Module, ED-83115-30, YB Option - App Fig 1

D. Description of Changes

D.1 Added a new CM4; ED83115-30 (option YB), Inrush Control Circuit for use with the 24-volt 50-Ampere (options V,K) J85502B rectifier when this rectifier is used in applications that require inrush current control. When the rectifier is equipped with this option, the input ac source to the rectifier will be turned on only when the input voltage waveform is at its peak (either the positive or negative peak) thereby limiting the inrush input current to a minimum. This inrush circuit has a delay of about 50 milliseconds built into it to allow for any contact bounce associated with the input ac contactor.

D.2 The Option Index table, Notes 302 and 303 were revised to include the Inrush Control circuit feature.

D.3 Note 323 was added.

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CIRCUIT DESCRIPTION

CD-82604-01
ISSUE 1
APPENDIX 4M
DWG ISSUE 5M
DISTN CODE BM10

POWER SYSTEMS
"LINEAGE"* 2000 RECTIFIER CIRCUIT
INPUT: 208 OR 240 VOLTS, 60 HZ
OUTPUT: 24 VOLTS OR 48 VOLTS
25 OR 50 AMPERES
J85502A AND B

CHANGES

B. Changes in Apparatus

B.1 Superseded

C1, C2, C3 Capacitors;
KS-20443, L91, 19000,
Options W, K, ZL - App
Fig 7

CR4 Diode, 60S1
(IR or Microsemi), Option
ZN - App Fig 2

C4, C5 Capacitors;
GE97F3247, 45 μ F; Options
W, K, ZR - App Fig 7

Superseded By

C1, C2, C3 Capacitors;
Sprague 36DE303G060BF2B,
30000, Option W, K, ZM -
App Fig 7

R25 Resistor, KS-14603, L1AD,
1, Option Z0 - App Fig 2

C4, C5 Capacitors;
GE97F5266, 45 μ F Options
W, K, ZS - App Fig 7

B.2 Added

P14, P15, P16 Connectors;
Option ZQ, 65568-103,
BERG - App Fig 2 (FS4)

E1 thru E8 Connectors,
Option ZQ, 640967-2,
AMP - App Fig 2 (FS4)

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Page 1

Option ZQ (App Fig 2).
Resistor- KS-13490,L1:
R8 = 3.3K
R9 = 6.2K
R10 = 3.6K
R13 = 11K
R14 = 6.2K

D. Description of Changes

- D.1 Filter Capacitors C1, C2 and C3 - Option (W, K, ZL), KS-20443,L91, 19000 μ F were replaced by Sprague 36DE303G060BF2B 30,000 μ F-Option (W, K, ZM) to reduce the probability of the capacitors being damaged due to improper operation of the output circuit breaker, CBA1.
- D.2 Flyback diode CR4 - Option ZN on the CM1 Option board is replaced by R25 resistor, KS-14603,L1AD, 1 Ω -Option Z0 to protect flyback diodes CR2 and CR3 from failing short due to improper operation of output circuit-breaker CBA1.
- D.3 Note 303 has been updated for drawing issue 5M.
- D.4 Notes 308 and 317 were revised.
- D.5 Note 320 was added.
- D.6 Option Index table was updated.
- D.7 Sheet Note 1 was added to sheet C3.
- D.8 Reference to option ZP was added to R8, R9, R10, R13, and R14 in App Fig 2.
- D.9 Reference to options ZP and ZQ was added to CM1 in App Fig 2.

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CIRCUIT DESCRIPTION

CD-82604-01
ISSUE 1
APPENDIX 3M
DWG ISSUE 4M
DISTN CODE BM10

POWER SYSTEMS
"LINEAGE"® 2000 RECTIFIER CIRCUIT
INPUT: 208 OR 240 VOLTS, 60 HZ
OUTPUT: 24 VOLTS OR 48 VOLTS
25 OR 50 AMPERES
J85502A AND B

A. CHANGED AND ADDED FUNCTIONS

- A.1 Means have been provided to increase the high voltage shut-down levels during the initial charge of batteries.
- A.2 Information on the 125-ampere rectifiers has been deleted and transferred to SD-82659-01.

B. CHANGES IN APPARATUS

<u>E.1</u>	<u>Superseded</u>	<u>Superseded By</u>
	CR1,CR2 Diodes; WP-90160,L1, Options N and ZE - App Fig. 1	CR1,CR2 Diodes; WP-90804,L5, Options N and ZC - App Fig. 1
	CR1,CR2 Diodes; KS-19404,L1, Options K and ZE - App Fig. 1	CR1,CR2 Diodes: KS-19404,L6E, Options K and ZC - App Fig. 1
	FA1,FA2 Fuses; 70B, Option ZH - App Fig. 1	FA1,FA2 Fuses; 70G, Option ZI - App Fig. 1
	J3 Connector, AMP641190-2, Option ZD - App Fig. 1	J3 Connector, AMP102241-1, Option ZE - App Fig. 1
	J4 Connector, AMP640440-8, Option ZD - App Fig. 1	J4 Connector, AMP102241-6, Option ZE - App Fig. 1
	J5 Connector, AMP1-641190-1, Option ZD - App Fig. 1	J5 Connector, AMP102241-9, Option ZE - App Fig. 1
	J6 Connector, AMP1-641190-2, Option ZD - App Fig. 1	J6 Connector, AMP1-102241-0, Option ZE - App Fig. 1

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Superseded

P3 Connector, AMP641126-2,
Option ZD - App Fig. 2

P4 Connector, AMP640456-8,
Option ZD - App Fig. 2

P5 Connector, AMP1-641126-1
Option ZD - App Fig. 2

P6 Connector, AMP1-641126-2
Option ZD - App Fig. 2

R1 Resistor, KS-20616,L1A,
24.6K, Options F,D,ZF -
App Fig. 2

R2 Resistor, KS-20616,L1A,
63.4K, Options K and ZF -
App Fig. 2

R3 Resistor, KS-20616,L1A,
127K, Options N and ZF -
App Fig. 2

R16,R17 Resistors; WP-90033,L1,
100, Option ZF - App Fig. 2

Superseded By

P3 Connector, AMP3-102202-4,
Option ZE - App Fig. 2

P4 Connector, AMP102202-5,
Option ZE - App Fig. 2

P5 Connector, AMP102202-8,
Option ZE - App Fig. 2

P6 Connector, AMP102202-9,
Option ZE, App Fig. 2

R1 Resistor, KS-16311,L4F,
24.6K, Options F and ZG -
App Fig. 2

R2 Resistor, KS-16311,L4F,
62.6K, Options K and ZG -
App Fig. 2

R3 Resistor, KS-16311,L4F,
127K, Options N and ZG -
App Fig. 2

R16,17 Resistors: KS-16311,
L4F, 100, Option ZG - App Fig. 2

B.2 Added

R23 Resistor, WP-90033,
L1, 402, Option ZG - App Fig. 2

R24 Resistor, WP-90033,L1,
432, Option ZK - App Fig. 2

B.3 Removed

K1 Relay, ACC720-8003B, Arrow-Hart,
Options F,W and X - App Fig. 2

K1 Relays, ACC639; ACC430; ACC630; ACC520, Arrow-Hart,
Options F,W,X,R,S - App Fig. 1

W1 Cable, 845369875, Option F - App Fig. 1

W2 Cable, 845369867, Option F - App Fig. 1.

Removed Cont'd

CR1, CR2 Diodes IN-2057; IN4047, Option F - App Fig. 1

R4 Potentiometer, 35405-701, Bourns, Option F - App Fig. 1

Q1 Thyristor, MAC25-10, Motorola, Option F - App Fig. 1

T2 Transformer, 2291D, Option X - App Fig. 1

App Fig. 8, 9, and 10

D. DESCRIPTION OF CHANGES

D.1 Resistor R25 was added on the CM1 option board to increase the backup high voltage shutdown level to 32 volts, option V, or 62 volts, option W, for the period of the initial battery charge. During normal operation, the R25 is shorted out by the 2J option connector. To disable the selective high voltage shutdown for the period of the initial charge, the Q and T option straps were changed to option connectors which are removed as required.

D.2 To improve the rectifier reliability under the EMP conditions; the CR1, CR2 diodes have been changed.

D.3 The V+, V- fuses have been reduced from 2A to 1/2A. This provides protection against damage in the rectifier when it is being operated improperly.

D.4 To improve the accuracy of the CM3 digital meter, five resistors have been changed and one has been added on the CM1 option board.

D.5 To improve reliability, the P3-P6 and J3-J6 connectors have been changed. The change will be initially applied to 125-ampere rectifiers only.

D.6 The wire sizes of the output leads, as specified on CAD3 and CAD4, have been increased and Note 206 has been added to specify the wire type.

D.7 Notes 302, 308, 311, 312 and 317 have been modified.

D.8 Note 205 has been deleted.

D.9 The title was changed by addition of LINEAGE[®] 2000.

D.10 Note 318 has been revised.

CIRCUIT DESCRIPTION

CD-82604-01
ISSUE 1
APPENDIX 2A
DWG ISSUE 3A
DISTN CODE 1M99

POWER SYSTEMS
RECTIFIER CIRCUIT
INPUT: 120, 208, or 240 VOLTS, 60 Hz
OUTPUT: 24 VOLTS OR 48 VOLTS
25, 50, OR 125 AMPERES
J85502

B. Changes in Apparatus

Replaced By

B.1 Removed

C4 and C5 Capacitors,
61L881,15,GE,Options
V,F - App Fig 8

C4 and C5 Capacitors,
61L882,18,GE,Options
V,F - App Fig 8

L1 Inductor, 1126F,
Options V,F - App
Fig 8

L1 Inductor, 1126H,
Options V,F - App
Fig 8

R4 Potentiometer, Bourns
3540S-701-102, 1K,
Option F - App
Fig 1

R4 Potentiometer, Bourns
3540S-701-152, 1.5K,
Option F - App Fig 1

B.2 Added

R1 Resistor,KS-8512,L8A,
200 ohms, Option F -
App Fig 1

D. Description of Changes

D.1 To improve the stability of the 125-Ampere 24-volt
rectifiers at light loads, the C4 and C5 capacitors
and the L1 inductor was changed.

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Page 1

- D.2 To improve the stability of the 125-Ampere rectifiers at light loads, the R1 bleeder resistor was added.
- D.3 To increase the output voltage adjustment range of the 125 ampere rectifiers, the R4 potentiometer was changed from 1000 to 1500 ohms.
- D.4 Notes 203 and 204 were modified.

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CIRCUIT DESCRIPTION

CD-82604-01
ISSUE 1
APPENDIX 1B
DWG ISSUE 2E
DISTN CODE 1M99

POWER SYSTEMS
RECTIFIER CIRCUIT
INPUT: 120, 208, or 240 VOLTS, 60 Hz
OUTPUT: 24 VOLTS OR 48 VOLTS
25, 50, OR 125 AMPERES
J85502

A. CHANGED AND ADDED FUNCTIONS

- A.1 The circuit has been changed from originally planned 100A to 125A rectifiers. (Option F).
- A.2 The circuit provides for connections to the LINEAGE 2000 Remote Access System.
- A.3 A 3-pole contactor and a switch have been added to allow the J85502 rectifier's 208/240 line voltage options to be changed in the field.

B. CHANGES IN APPARATUS

- B.1 Added
APP FIG 1:

CR1 and CR2 Diodes, WP-90160,L1, Option N
CR1 and CR2 Diodes, KS-19404,L1, Option K
CR1 and CR2 Diodes, IN-2057 or IN-4047, Option F
K1 Relay, ACC430-8072C, Arrow Hart, Options F,V,R,S

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K1 Relay, ACC630-8031C, Arrow Hart, Options F,W,R,S
K1 Relay, ACC520-8001B, Arrow Hart, Options F,V,X
K1 Relay, ACC720-8003B, Arrow Hart, Options F,W,X
W1 Cable Assembly, 845369875, Option F
T2 Transformer, 2291D, Option X
Q1 Thyristor, MAC25-10 Motorola, Option F
S3 Switch, 82611P, Arrow Hart, Option A

APP FIG 3:

W2 Cable Assembly, 845369867, Option F

APP FIG 8, Options V, F

APP FIG 9, Options W, F

APP FIG 10, Options F, G, W

B.2 Superseded

Superseded By

APP FIG 1, K1 Relays,
Struthers-Dunn, Option B

APP FIG 1, K3 Relay,
ACC 230-8060C, Arrow Hart,
Option A

APP FIG 2, R1 Resistor,
KS-20616,L1A, 30.9K,
Option E

APP FIG 2, R1 Resistor,
KS-20616,L1A, 24.6K,
Option D

APP FIG 6, C5 Capacitor,
97F3247,45, GECo

APP FIG 6, C5 Capacitor,
97F5205,35, GECo

D. Description of Changes

D.1 Changes the drawing title to include 120V input and 125A output.

D.2 FS1 and Notes 204 and 205 updated to add terminal numbering option information. Changed the terminal numbering of the 50 and 125A rectifiers' T1 transformers.

D.3 FS3 (Option A) added to change the 208/240V line voltage options of the J85502 rectifiers in the field. FS3 is rated standard and FS1 MFR DISC for rectifiers other than 120V input, 125A.

- D.3.1 CAD2 updated.
- D.3.2 CAD5 and CAD6 added.
- D.3.3 Note 318 added.
- D.4 APP FIG 1: changed the Q1 thyristor to improve reliability and manufacturability. Note 304 updated to reflect this.
- D.5 APP FIG 2: added diode option information.
- D.6 APP FIG 2: changed the R1 resistor to 26.4k (Option D, Standard); the old resistor was rated MD (Option E). Note 303 updated to add this option information. This is to provide metering for the 125A rectifier.
- D.7 APP FIGs 1 and 3, FS1, Notes 302, 305, 311 and 312 updated, and APP FIGs 8, 9, and 10 added to add 125A 24V (Option F, V) and 48V (Option F, W) rectifier information.
- D.8 APP FIG 6: changed the C5 capacitor to correct operational problems.
- D.9 Note 308 updated and Note 317 added to provide application information of the CMI option board.

F. CHANGES IN CD SECTIONS

- F.1 To Section III, paragraph 1.03 add the following to the "Line-to-Line voltage:" table:

Nominal	Allowable Limits
120	106 through 127 Options F and X
- F.2 To Section III, paragraph 3.02 add "(c) LINEAGE 2000 Remote Access System."
- F.3 To Section III, add paragraph "3.20 Provides for the line voltage selection on the field by means of the S3 208V-240V selector switch mounted behind the front panel."
- F.4 To Section III, paragraph 4.02 add "(c) SD-824645-01 LINEAGE 2000 Remote Access System."

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POWER SYSTEMS
 RECTIFIER CIRCUIT
 INPUT: 208 OR 240 VOLTS, 60 Hz
 OUTPUT: 24 OR 48 VOLTS
 25, 50 or 100 AMPERES
 J85502

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TABLE OF CONTENTS	PAGE
<u>SECTION I - GENERAL DESCRIPTION</u>	1
<u>1. PURPOSE OF CIRCUIT</u>	1
<u>2. GENERAL DESCRIPTION OF OPERATION</u>	1
RECTIFIER CIRCUIT.	1
FERROCONTROL CIRCUITS.	1
AUXILIARY POWER SUPPLY	1
CURRENT LIMIT CIRCUIT.	1
WALK-IN CIRCUIT.	2
HIGH-VOLTAGE SHUTDOWN CIRCUITS	2
REMOTE SHUTDOWN CIRCUIT.	2
FUSE ALARM CIRCUITS.	2
RESTART CIRCUIT.	2
DIGITAL METER CIRCUIT.	2
CONTROL BOARD.	2
OPTION BOARD	2
<u>SECTION II - DETAILED DESCRIPTION</u>	2
<u>1. RECTIFIER CIRCUIT</u>	2
<u>2. FERROCONTROL CIRCUITS</u>	3
<u>SECTION III - REFERENCE DATA</u>	3
<u>1. WORKING LIMITS</u>	3
<u>2. FUNCTIONAL DESIGNATIONS</u>	4
<u>3. FUNCTIONS</u>	4
<u>4. CONNECTING CIRCUITS</u>	5
<u>5. TAKING EQUIPMENT OUT OF SERVICE</u>	5

SECTION I - GENERAL DESCRIPTION

1. PURPOSE OF CIRCUIT

1.01 This rectifier circuit charges and floats storage batteries by providing regulated dc power from an ac source.

1.02 The ferroresonant rectifier converts an ac input voltage into a filtered and regulated dc output voltage of either 24 or 48 volts, of either polarity, at any current between zero and the rated output current.

2. GENERAL DESCRIPTION OF OPERATION

RECTIFIER CIRCUIT

2.01 The rectifier consists of a ferroresonant transformer, two rectifying diodes, dc filter capacitors, and a filter inductor. The dc output is obtained by connecting the secondary winding of the transformer to the full-wave rectifier feeding the output filter.

FERROCONTROL CIRCUITS

2.02 The ferrocontrol circuit consists of an ac capacitor, an ac inductor, a triac, a triac firing circuit, and an error amplifier. The triac's switching action simulates the transformer's saturation at flux levels below magnetic saturation and thereby controls the transformer's output voltage. The error amplifier senses the output voltage of the rectifier and compares it with a reference. The error voltage is the difference between the output voltage and the reference voltage. The error voltage is then amplified and compared with a synchronizing signal obtained from the secondary winding of the transformer. The comparator output signal fires the triac sooner or later in the half-cycle, depending on the magnitude of the error voltage. The sensed output voltage is thereby regulated for changes in load, line voltage and frequency, and temperature.

AUXILIARY POWER SUPPLY

2.03 The auxiliary power supply consists of a conventional transformer,

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rectifying diodes, filter capacitors, and series transistor regulators. This power supply furnishes the + and - 12 volts that power the control circuitries and the -27 volts that energize the relays for the alarm circuits. The + and - 5 volt supplies, derived from the regulated + and - 12 volts supplies, consist of positive and negative 3-terminal series voltage regulators and filter capacitors.

CURRENT-LIMIT CIRCUIT

2.04 The current-limit circuit limits the output of the rectifier under overcurrent conditions. This circuit consists of an operational amplifier, a zener diode, and a potentiometer. When the output current increases above a set limit, the operational amplifier overrides the voltage regulating error voltage (2.02) and decreases the output voltage of the rectifier.

WALK-IN CIRCUIT

2.05 This circuit consists of an RC network that controls the ramping up of the rectifier after the power switch has been turned ON. The walk-in circuit is reset each time the rectifier's K1 input contactor releases.

HIGH-VOLTAGE SHUTDOWN CIRCUIT

2.06 Three separate high-voltage shutdown circuits are provided. The first circuit, called selective, selectively accepts a high-voltage signal from the plant. The second and third circuits, called adjustable and backup respectively, sense the output voltage of the rectifier and, when this voltage exceeds the specified value, shut the rectifier off. Operation of the selective high-voltage shutdown circuit depends on two conditions. First, the rectifier must deliver at least five percent of its rated output current, and second, the rectifier must receive a high-voltage shutdown signal from the plant. If no signal is available from the plant (T or Q Option) then the adjustable high-voltage shutdown circuit takes the place of the plant high-voltage shutdown circuit.

REMOTE SHUTDOWN CIRCUIT

2.07 This circuit consists of a relay and a current-limiting resistor. Presence of a ground signal on the relay coil shuts the rectifier off and its absence allows the rectifier to restart.

FUSE ALARM CIRCUITS

2.08 The internal V+ and V- are guarded by alarm fuses. When the fuse alarm circuits operate, they activate the RFA relay, which shuts the rectifier down.

RESTART CIRCUIT

2.09 The restart circuit restarts the rectifier with an external signal. The restart circuit is a one-shot multivibrator that switches states when the restart signal is applied. The multivibrator output turns off the transistor that holds the RFA relay on. Then the rectifier restarts and stays on if the original cause of the shutdown has been cleared. The rectifier will try to restart once for each application of the external restart signal.

DIGITAL METER CIRCUIT

2.10 The CM3 digital meter circuit pack, J option, displays the rectifier's output current, output voltage, or battery voltage, selected by a 3-position switch.

CONTROL BOARD

2.11 The circuits listed below are located on the CM2 circuit pack, 205A Control Board circuit module:

- (a) local power supplies
- (b) feedback regulator, ferrocontrol
- (c) walk-in circuit
- (d) current limit circuit
- (e) high-voltage shutdown circuits
- (f) remote shutdown circuit
- (g) restart circuit
- (h) fuse alarm circuit
- (i) isolated current measuring circuit.

OPTION BOARD

2.12 The CM1 Option Board, FS2, serves as an interface between the CM2 and CM3 circuit packs and the cabinet-mounted components. It also contains certain optional components and all the wiring straps of the rectifier. The CM1 Option Board is manufactured with all optional resistors and straps in place. Superfluous straps and resistors must be removed before the rectifier is placed in service.

SECTION II - DETAILED DESCRIPTION

1. RECTIFIER CIRCUIT

1.01 Ferroresonant transformer T1 isolates the output of the rectifier from the ac input source and provides the required voltage level at the output terminals. The primary winding of T1 is connected to the ac input source through make-contacts 5-3 and 4-4 of input contactor K1.

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1.02 The output winding of T1 is connected to CR1 and CR2.

1.03 The C1 and C2 capacitors and the L2 inductor filter the output of the full-wave center-tap rectifier. The CR2 diode on the CM1 option board is in parallel with the L2 inductor and provides a path for the inductor current when the CBA1 circuit breaker opens, thus inhibiting the appearance of the inductive kick.

1.04 The total output current passes through the R3 shunt, which provides a signal for the output current meter. If the rectifier is not equipped with a meter, the output current can be measured with an external dc millivoltmeter connected to the shunt terminals. Bleeder resistor R2 discharges the output filter capacitors when the rectifier is turned off and disconnected from the battery.

1.05 Setting the S1 POWER switch to the ON position applies power to the rectifier circuit. The switch closure operates the K2 relay from the +27 volt auxiliary supply located on the CM2 circuit pack. The +27 supply is routed to terminal A of the K2 relay through the S1 switch. Terminal 7 of connector J2 connects to the ground of the +27 supply through break-contacts 12-13 of the TR relay and break-contacts 6-7 of the RPA2 relay on CM2. The CR1 diode on the CM1 Option Board suppresses the transient voltage across the coil of the K2 relay.

1.06 When K2 operates, its make-contacts 4 and 7 close and connect the ac input voltage across the coil of input contactor K1. When K1 operates, it connects the primary winding of transformer T1 to the ac input source through its make-contacts 5-3 and 5-4.

1.07 The DS2 POWER light emitting diode (LED), in series with the RA current-limiting resistor on the FS2 Option Board, is in parallel with the coil of the K2 relay. Therefore, the POWER light is on whenever the K1 contactor is closed and the ac line is applied to the primary winding of the T1 transformer.

1.08 The S2 RECT TEST switch is used to check the rectifier's ability to regulate. When the switch is moved to the NL position, the output of the rectifier should decrease; with the switch in the FL position, the output should increase.

1.09 The T2 transformer is the source of the rectifier's internal power supplies.

1.10 Contacts A-0 of the V2 relay interrupt the power to the Digital Meter when the rectifier is off.

FERROCONTROL CIRCUITS

1.11 An ordinary ferroresonant transformer is capable of regulating its output voltage to a fixed value, compensating for line and load variations. A controlled ferroresonant transformer provides a controllable regulated output voltage. Controllability is achieved by means of the ferrocontrol circuit.

1.12 The control circuit for the T1 ferroresonant transformer consists of capacitor C3, inductor L1, and triac (bidirectional thyristor) O1. When the O1 triac turns on, the L1 inductor is placed in parallel with the C3 capacitor. The resonant discharge that results reverses the capacitor voltage. This action simulates saturation of the T1 transformer and thus limits its output voltage. By varying the timing of the O1 gate pulses, and thus the timing of the O1 turn-on, the level of the T1 output voltage can be controlled. The gate pulses are generated in the CM2 circuit pack and controlled by the feedback amplifier.

1.13 The C2 capacitor and R1 resistor on the CA1 component assembly form a snubber network across O1 to reduce the rate of rise of voltage when O1 turns off. The C1 capacitor suppresses noise at the gate of the triac. The C3 capacitor reduces the RF emissions of the rectifier.

1.14 Terminals 9 and 10 of the T1 transformer furnish a voltage that is used to synchronize the triac gate pulses with the voltage developed by the transformer.

SECTION III - REFERENCE DATA

1. WORKING LIMITS

1.01 Ambient Temperature

Normal: 50° to 100° F
 Short term: 75° to 120° F
 (Short term refers to a period of not more than 72 consecutive hours and a total of not more than 15 days in one year.)

- 1.02 Relative Humidity
10% through 90%, noncondensing
- 1.03 Input Requirements
Phases: single phase, no neutral
Frequency: 57 through 63 Hz
Line-to-Line voltage:
- | Nominal | Allowable Limits |
|---------|----------------------------|
| 208 | 184 through 220 (Option S) |
| 240 | 212 through 254 (Option O) |
- Fusing and Wire Size:
Refer to Note 311 on SD-82604-01-D2.

1.04 Output
The output voltage is adjustable as follows:

Option	Full Load	Max at No Load
W	43 to 54 volts	60 volts
V	21.5 to 28 volts	39 volts

Voltage regulation is $\pm 1/2\%$ for line, load, and temperature changes.

- 1.05 Electrical Noise:
Electrical noise is less than 32 dBNC when measured at the terminals of a battery which has an ampere-hour capacity of four times the rectifier rating.
- 1.06 Radio Frequency Interference
The rectifier meets the FCC Part 15J requirements for class A equipment.

2. FUNCTIONAL DESIGNATIONS

- 2.01 Circuit Breaker
- | Designation | Meaning |
|-------------|------------------------|
| CBA1 | Output circuit breaker |
- 2.02 Relays
- | Designation | Meaning |
|-------------|--|
| RFA1, RFA2 | Rectifier failure, shutdown and lock out of operation, due to a high-voltage condition, a connector not mating properly, fuse has operated |
| K1 | Contactors for supplying ac input power |
| K2 | Relay to operate main contactor |
| TR | Remote shutdown. |

- 2.03 Switches
- | Designation | Meaning |
|------------------------|--|
| POWER | Main power switch OFF-ON |
| RECT TEST | No-load, full-load regulation test switch |
| Rect V/AMPS/
BATT V | Output current, output voltage, or battery voltage selector. |

3. FUNCTIONS OF THE J85502 RECTIFIER CIRCUIT

- 3.01 The J85502 rectifier circuit charges and floats lead-acid batteries at 2.17 volts per cell, with an up to 2-volt battery feeder loop drop, and with the following number of cells:
- (a) 12 cells, Option V
 - (b) 24 cells, Option W
- 3.02 Provides for connections to a
- (a) conventional power plant
 - (b) LINEAGE™ 2000 power plant.
- 3.03 Provides for turning the rectifier on or off manually by operating the POWER switch.
- 3.04 Provides the POWER light to indicate that the K1 line contactor is closed and that the ac line is applied to the power transformer. Provides for manually setting the output voltage by means of the OUTPUT VOLTS ADJ potentiometer.
- 3.05 Increases its output current gradually at turn-on.
- 3.06 Limits its output current:
- (a) inherently to approximately 125% of full load if the output is shorted;
 - (b) electronically to an adjustable 90% to 110% of full load.
- 3.07 Provides the RECT TEST switch to test that the feedback regulator is working.
- 3.08 Provides the REC+ and REC- test jacks to observe the output voltage at the point of regulation.
- 3.09 Provides two meter options:
- (a) digital meter, Option J, for measuring:

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- (1) output current at 2% initial accuracy
- (2) output voltage at 1% initial accuracy
- (3) battery voltage at 1% initial accuracy.

(b) No meter provided. The output current is measured with an external millivoltmeter connected across the R3 shunt or read at the LINEAGE™ 2000 MCS display.

3.10 Transfers automatically to internal voltage sensing if an external sensing lead, R+ or R-, opens. The ZA internal sensing option is provided for applications where external sensing is impractical.

3.11 Provides for an automatic reduction of output voltage if both internal and external sensing circuits fail.

3.12 Shuts down and locks out on high voltage if:

(a) the rectifier is delivering output current and receives a high-voltage shutdown signal from the plant. This is called the selective high-voltage shutdown.

(b) The output voltage increases to 27.5 volts (Option V) or 55 volts (Option W). This is called the adjustable internal selective high-voltage shutdown, (Options T and C) and is used when the plant does not provide a high-voltage shutdown signal.

(c) the output voltage increases to

- (1) 29.9 volts, Option V
- (2) 59.9 volts, Option W

This is called the backup high-voltage shutdown.

3.13 Shuts down and locks out if a fuse fails.

3.14 Provides for shutting down the rectifier remotely.

3.15 Provides for restarting the rectifier remotely.

3.16 Provides for visual and remote indications of the rectifier failure.

3.17 Provides isolation between the rectifier input and output.

3.18 Provides an optional output circuit breaker which closes its alarm terminals when the breaker has tripped.

3.19 Interfaces directly with both conventional and LINEAGE™ 2000 MCS battery plants.

4. CONNECTING CIRCUITS

4.01 Connecting circuit information can be found in the Equipment Design Requirements Practice (RD2 - Series) of the specific plant.

4.02

(a) SD-82588-01 LINEAGE™ 2000 MCS Controller

(b) SD-82602-01 LINEAGE™ 2000 Charge and Discharge Circuit

5. TAKING EQUIPMENT OUT OF SERVICE

5.01 To take the rectifier out of service, move the CB1A circuit breaker to the OFF position, remove the ac input fuses, and disconnect the J2A connector.

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