POWER SYSTEMS "LINEAGE" ® 2000 CHARGE AND DISCHARGE CKT 24 OR 48 VOLTS 600 AMPERES MAXIMUM J85500C

CHANGES

A. Changed and Added Functions

A.1 New simpler and less costly controller is added.

A.2 Increased capacity of the plant to 600 amperes from 400 amperes (option P).

B. Changes in Apparatus

B.1 ADDED

Alarm & Meter Panel J85501C,L4, Controller, J Option - App Fig 1

Rectifiers: J85502A,L2, J85502B,L2, J85502C,L2, J Option - App Fig 1

R3 Shunt, A-600-50 EMPRO, F Option - App Fig 1

B.2 REMOVED

TB1.1, TB1.2, TB2 Terminal Blocks - App Fig 2

B.3

Superseded	Superseded By
FILTER CHANNEL PANEL ED-83188-30, GR1 - App Fig 5	FILTER CHANNEL PANEL ED-83188-30, GR1, or ED-83108-30, GR1 - App Fig 5

D. Description of Changes

D.1 The title of the schematic drawing and the circuit description was changed to reflect the change in the plant capacity (400 amperes changed to 600 amperes).

D.2 FS9 was added.

D.3 CADs 4 and 5 were added.

D.4 Option Index table and Supporting Information were updated.

D.5 Reference to options F,G,H, and J added to Circuit Note 102.

D.6 Circuit Note 103 updated for drawing issue 4B.

D.7 Reference to "J855018" added to Circuit Notes 106 and 109.

D.8 Circuit Notes 112 and 115 revised.

D.9 Circuit Note 116, 117, and 118 and Equipment Notes 204 and 205 were added.

D.10 Sheet note 1 added on sheet B6.

D.11 Reference to 37A fuse block was changed from 25A fuse block in Information Note 302.

D.12 Lead designation "GRD" was changed to "RTN" in all FSs and CADs.

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POWER SYSTEMS
"LINEAGE"® 2000 CHARGE AND DISCHARGE CKT
24 OR 48 VOLTS 400 AMPERES MAXIMUM
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A. Changed and Added Functions

A.1 Option L has been added in FS 3 to provide individual shunts for load monitoring the various load circuit breakers.

A.2 Option P has been added in FS 3 to provide individual capacitor charge switches.

A.3 Option U has been added in FS 3 to provide a low-voltage disconnect feature for use with 48-volt (option W) plants only.

B. Changes in Apparatus

B.1 Added

App Fig 4

App Fig 5

S1 Switch, Marquardt 1803.1221 - FS 3, App Fig 1 - P Option

S2 Switch, Oak Switch 399622-L - FS 3, App Fig 1 - P Option

TB5 Terminal Block, Kulka 799-3-KT28-KT30 - FS 3, App Fig 3

B.2

Removed	Replaced By
C1, C2 Capacitor KS-20133 L125, 75,000 μF - FS 3, App Fig 1	C1, C2 Capacitor, Sprague 36DE723G060DF2A, 72,000 μF - FS 3, App Fig 1

F1A, F2A Fuse 70G, 1/2 Ampere - FS 3 - N, W Options	F1A, F2A Fuse 70B, 2 Amperes - FS 3 - N, W Options
R1, R2 Resistor KS-14603 L2AD, 464Ω - FS 3, App Fig 1	R1, R2 Resistor KS-14603 L5CD, 316Ω - FS 3, App Fig 1

D. Description of Changes

D.1 On the drawing, FS 7 and App Fig 5 have been added and designated option P.

D.2 On the drawing, FS 8 and App Fig 4 have been added and designated options U and W.

D.3 Momentary switch S1 has been added in FS 3 and App Fig 1 and has been designated option P.

D.4 Load select switch S2 has been added in FS 3 and App Fig 1 and has been designated option P.

D.5 Terminal block TB5 has been added in FS 3 and App Fig 1.

D.6 In FS 3 and App Fig 1, the code and value of capacitors C1 and C2 have been changed from KS-20133 L125, 75,000 μF to Sprague 36DE723G060DF2A, 72,000 μF.

D.7 In FS 3, the code and value of fuses F1A and F2A have been changed from 70G, 1/2 ampere to 70B, 2 amperes.

D.8 In FS 3 and App Fig 1, the code and value of resistors R1 and R2 have been changed from KS-14603 L2AD, 464 ohms to KS-14603 L5CD, 316 ohms.

D.9 On the drawing, FS 3 and App Fig 1 have been changed by the addition of the KS-22010 and the KS-22012 circuit breaker circuits.

D.10 Circuit Note 102 has been changed by the addition of options U, P, L, and K.

D.11 Circuit Note 103 has been changed by the addition of options L and K under "AVAILABLE."

D.12 Circuit Note 115, regarding shunt lead connections, has been added on the drawing.

D.13 The Option Index table has been changed by the addition of options U, P, L, and K.

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POWER SYSTEMS
LINEAGE® 2000 CHARGE AND DISCHARGE CKT
24 OR 48 VOLTS 400 AMPERES MAXIMUM
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CHANGES

B. Changes in Apparatus

B.1 Added

C1 and C2 Capacitors,
KS-20133,L125, 75,000, N,W Options - App Fig 1

F1 and F2 Fuses,
KS-19780, L6,30A, N,W
Options - App Fig 1

F1A- and F2A- Fuses,
70B, 2A E/W 18A Fuse
Holder, N,W Options - App Fig 1

AL2- Resistor, KS-20289, L1A,
1000, N,W Options - App Fig 1

R1- and R2- Resistor, KS-14603,L2AD,
464, N,W Options - App Fig 1

App Fig 3, FS5 (M,W Options)

FS6 (N,W Options)

B.2 Superseded	Superseded By
LOAD Fuse Holder, 25A Fuse Block - App Fig 1	LOAD Fuse Holder, 37A Fuse Block - App Fig 1

D. Description of Changes

D.1 Option Index table added.

D.2 Circuit Note 102 revised by addition of M and N options.

D.3 Circuit Note 108 expanded.

D.4 Circuit Notes 111 through 114 were added.

D.5 Equipment Notes 201 through 203 were added.

D.6 Information Notes 305 through 307 were added.

D.7 Information Note 302 changed to reference 37A Fuse Block instead of 25A.

D.8 CAD3 (M,W options) was added.

D.9 In FS3, references to Circuit Note 114, option N, ED-82947-30, GI, option W, and ED-83182-30,G5 were added.

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SECTION I - GENERAL DESCRIPTION

1. PURPOSE OF CIRCUIT

1.01 This circuit provides a 24-cell (W option) or 12-cell (Z option) controlled float and recharge power plant. It also provides for a Low Battery Voltage Disconnect Circuit (T option) whenever power has failed and the battery is going into deep discharge. When power is restored, the battery is automatically reconnected.

2. GENERAL DESCRIPTION OF OPERATION

2.01 The rectifiers are set to float the batteries and recharge them as required. Other values of float voltages can be accommodated by a coding switch in the controller. There are several backup systems in the plant that will monitor the battery and send alarms for high or low voltages. If the battery voltage exceeds the upper limit of 53.00 ±0.5V (W option) or 26.75 ±0.25V (Z option), the plant will send a high-voltage shutdown to all rectifiers and send out a major alarm. The rectifiers with output current greater than 10% of rating will shut down; after shutdown the HV disappears, a minor alarm is sent, and the controller's RFA LED will light. If any distribution fuse or circuit breaker operates, a major alarm is sent and the controller's fuse alarm major LED will light.

Major alarms are also sent when the battery voltage drops to 51.25 ±0.5V (W option) or 25.50 ±0.25V (Z option). For this low voltage condition, the controller's BD LED will light and the following alarms will be sent out: SI(A), D, BD, PMJ, and PMJV. If there is a power failure and the voltage continues to drop, the battery will be removed from the plant (T option) at 43.1 ±0.25V.

SECTION II - DETAILED DESCRIPTION

1. RECTIFIERS

1.01 FS1 illustrates a general-type rectifier with its associated leads. The plant has the ability to accept all codes of J-coded ferroresonant rectifiers ranging in size from 25 to 200A. The plant is also equipped to handle future series of rectifiers both single- and three-phase. The plant can work with a combination of up to six rectifiers. The standard rectifier connections between the plant and the rectifier are as indicated below:

Designation	Meaning
B	Main rectifier charging lead to battery.
G	Main rectifier ground lead to battery.
BAT	Provides battery to the rectifier. This battery supply is needed for operation of rectifier alarms.

Designation	Meaning
HV	Whenever the battery exceeds the limits because of high voltage, the voltage monitor in the control unit shuts down the rectifier.
RB/RG	The rectifier senses the battery voltage over these leads. The RB and RG leads are converted to R+ and R- in the rectifier.
RFA/RFAR	When a rectifier fails, its RFA relay provides a closure that operates the RFA relay in the controller.
RS/RSR	When a rectifier fails because of high voltage, the controller makes one attempt to start a rectifier over the RS lead. The RS relay in the controller operates.
TR/TRR	Remote shutdown from engine control.
CB/CBR	Circuit Breaker trip alarm.
LOA/LOAR	A low voltage signal from the rectifier provides a closure which operates the RFA relay in the controller.

2. CHARGE/DISCHARGE, CHARGE GROUND AND DISCHARGE GROUND BUS BARS

2.01 FS2 shows the possible combinations of battery arrangements. The Charge/Discharge Bus, the Charge Ground and Discharge Ground Bus and the Shunt can be mounted in the controller bay or external to the controller depending on the option chosen. The plant shunt can vary in size from 50 to 400A.

3. DISCHARGE CIRCUIT

3.01 FS3 shows the discharge circuit which consists of circuit breakers and/or fuses. The load is connected to these circuit breakers or fuses. If either should operate, a major alarm is transmitted through the FAJ lead to the controller (SD-82646-01). The circuit breakers will transmit an alarm only in the tripped position; this allows for turning off selected loads without having to disconnect the alarm leads.

4. LOW VOLTAGE BATTERY DISCONNECT CIRCUIT

4.01 FS4 shows the disconnect circuit that is used when the T option is applied. The battery is connected to the Charge Discharge Bus through the K1 contactor. In the event of a power failure, the rectifiers will lose power and the battery will begin to discharge. The monitor circuit, ED-83104-30, will monitor the battery voltage at the Charge Discharge Bus and, when the voltage reaches 43.1 ±0.25V, it will remove the operate voltage from K1's coil. This will remove the battery from the plant. When power is restored and the rectifiers turn on, the monitor circuit will re-energize the K1 contactor and reconnect the battery.

SECTION III - REFERENCE DATA

1. WORKING LIMITS

1.01 Input requirements for the rectifiers.

Phase: Three-phase or single-phase

Frequency: 57 through 63 cycles

Input voltage:

Nominal Tap (Volts)	Allowable Limits (Volts)
208	184 through 220
240	212 through 254

2. FUNCTIONAL DESIGNATIONS

2.01 LEADS

Designation	Meaning
RB	Regulation Battery
RG	Regulation Ground
TR	Remote Shutdown
RSR	Restart Return
RS	Restart
BAT	Battery to Rectifier
HV	High Voltage
CB	Circuit Breaker
LOA	Low Output Alarm
RFA	Rectifier Failure Alarm
CBR	Circuit Breaker Return
LOAR	Low Output Alarm Return
RFAR	Rectifier Failure Alarm Return
TRR	Remote Shutdown Return

3. FUNCTIONS

3.01 (a) Equipped for either circuit breaker and/or fuses for load distribution.

(b) Ability to accept combinations of rectifier sizes.

(c) Ability to control up to six rectifiers.

DEPT 52481-FPH-TGG

4. CONNECTING CIRCUITS

4.01 SD-82646-01 Controller
SD-82604-01 Rectifier
SD-82605-01 Rectifier

5. MANUFACTURING TESTING REQUIREMENTS

5.01 None.