

**MODIFICATION OF POWER PLANTS AND RECTIFIERS
USING KS-20522 CONTROLLER FOR AMMETER TYPE RELAYS
EQUIPMENT DESIGN REQUIREMENTS
POWER SYSTEMS**

1. GENERAL

SCOPE

1.01 This specification, together with the supplementary information listed herein, covers modification kits containing specific KS-20522 controllers. These controllers are packaged electronic circuits which, when installed, replace the switching functions of power plant or rectifier ammeter relays whose contacts have been subject to excessive pitting and locking in the field. List numbers have been assigned to the kits to cover individual plant or rectifier applications. A kit consists of a controller, protective diodes (if required), mounting hardware, wire, and installation and wiring information.

1.02 The controllers may be connected in any circuits containing ammeter relays provided that the rated values of the controllers are satisfied and proper polarities are observed.

1.03 The controllers are designed to operate in an ambient temperature range from 0° to 50°C, and in a relative humidity range from 0 to 95 percent.

1.04 The controllers are designed to operate over the voltage range of power supplied by the rectifier or plant. These limits are:

MIN VOLTS	NOM VOLTS	MAX VOLTS
10	12	14
20	24	28
40	48	56
116	130	155

Input and output data for the controllers is shown in Table A. For further definition, refer to KS-20522 specification sheet.

TABLE A

KS-20522 LIST NO.	CONTROL INPUT MAX	SUPPLY POWER	HIGH & LOW SWITCHING OUTPUTS (100ma max)
1	320 mV 1 mA	-12 Vdc (nom) 2 watts (max)	+12V (grd)
2	320 mV 1 mA	-24 Vdc (nom) 5.5 watts (max)	+24V (grd)
3	320 mV 1 mA	-48 Vdc (nom) 7 watts (max)	+48V (grd)
4	320 mV 1 mA	-130 Vdc (nom) 16 watts (max)	+130V (grd)
8	320 mV 1 mA	+130 Vdc (nom) 16 watts (max)	-130V (grd)
13	160 mA 8.66 mV	-48 Vdc 7 watts (max)	+48V (grd)

1.05 This specification is reissued:

- (a) To add Lists 4 through 17 to provide additional applications of the modification kits.
- (b) To add Table B.

DESCRIPTION

1.06 A modification kit consists of a specific KS-20522 controller, mounting hardware, wire, installation and wiring information, plus protective diodes if required. The controller, when installed, replaces the switching functions of a power plant or rectifier ammeter relay whose contacts are subject to excessive pitting and locking in the field. The controller consists of an electronic circuit packaged in a separable plastic box 4 inches wide, 3 inches deep, and 6 inches high, and weighs approximately one pound. A power resistor is mounted externally on the package for particular applications. High and low limit adjustments may be made externally with a screwdriver through access holes in one face of the box. Mounting and cabling holes are provided in a detachable end cover. By parting the end cover from the main housing, a field of solder terminals is exposed for various circuit connections. The controller should be mounted within the equipment bay in a location which will provide ease of wiring and adjustment.

1.07 Equipment covered in this specification is summarized in Table B.

2. SUPPLEMENTARY INFORMATION

802-000-000—Power Systems Index
 800-020-001—Checking List—Equipment Design Requirements
 800-020-020—Cross-Reference List—AA Series to Plant Series
 800-600-000—Checking List—General Equipment Requirements
 024-360-201—KS-20522 Controller—Installation and Maintenance Specifications
 032-173-301—Diodes and Transistors—Procedures and Requirements
 KS-20522—Controller

3. DRAWINGS

WE J Drawings listed should be ordered by referring to the prefix and base number and requesting the current dash (-) number.

Equipment

J86244A-()—Rectifier, Semiconductor-Type—Automatic Regulation, 12 Volts, 200 Amperes
 J86249A-()—48-Volt, 100 Ampere, Regulated Metallic Rectifier
 J86249B-()—24-Volt, 100 Ampere, Regulated Metallic Rectifier
 J86249C-()—24-Volt, 200 Ampere, Regulated Metallic Rectifier
 J86249E-()—24- or 48-Volt Control Panel for J86249A, B or C
 J86273A-()—Rectifier Unit, Metallic Type, Automatic Regulation 48 Volts, 200 Amperes
 J86273B-()—Additional Equipment for Voltage Regulated Operation of J86273A
 J86284K-()—100- to 200-Ampere, 130 Volt Rectifier Charging Unit
 J86284L-()—100- to 200-Ampere, 130 Volt Rectifier Charging Unit
 J86295A-()—Rectifier Unit, Semiconductor Type, Automatic Regulation, 48 Volts, 200 Amperes
 J86295B-()—Additional Equipment for 23- to 27-Cell Voltage Regulated Operation of J86295A
 J86296A-()—Rectifier Unit, Semiconductor Type, Automatic Regulation, 48 Volts, 400 Amperes
 J86296B-()—Additional Equipment for 23- to 27-Cell Voltage Regulated Operation of J86296A
 J86296E-()—Metering and Control Panel Supply for J86296A Rectifier
 J86465A-()—Originating Bay for Cabinet-Mounted 63-Cell Plants
 J86465B-()—Originating Bay for Cabinet-Mounted 66-Cell Plants
 J86465C-()—Originating Bay for Cabinet-Mounted 70-Cell Plants
 J86465D-()—Common Control Units for 63-, 66-, and 70-Cell Plants, Cabinet and Relay Rack Mounted
 J86465K-()—Originating Bay for Relay-Rack-Mounted 63-Cell Plants
 J86465L-()—Originating Bay for Relay-Rack-Mounted 66-Cell Plants
 J86741A-()—Modification of Power Plants and

TABLE B
KITS AVAILABLE FOR MODIFICATION OF AMMETER RELAYS

J86741A LIST NO.	MODIFIES AMMETER RELAY FURNISHED IN SPECIFICATION	EQUIPMENT AND WIRING PER	EQUIPMENT FURNISHED IN THE KIT			SEE NOTE
			CONTROLLER KS-20522		DIODE 446F	
			LIST NO.	QTY	QTY	
1	J86244A	SD-81088-01 FIG.D & FIG.2 "E" OPT	1	1	1	A
2	J86465D	SD-81301-01 FIG.17 & "Y" OPT	4	1	—	A,B
3	J86465D	SD-81301-01 FIG.17 & "Z" OPT	8	1	—	A,B
4	J86296E	SD-81398-01 FIG.1 & "A" OPT	13	1	2	A,C
5	J86296B	SD-81398-01 FIG.2 & "A" OPT	13	1	2	A,D
6	J86295A	SD-81410-01 FIG.6 & FIG.1 "ZB" OPT	13	1	2	A
7	J86295B	SD-81410-01 FIG.6 & FIG.2 "ZA" OPT	13	1	2	A,E
8	J86284K	SD-81333-01 FIG.18 "X" & "ZH" OPT	2	1	—	A
	J86284L		2	1	—	A
9	J86284K	SD-81333-01 FIG.18, "Y" & "ZH" OPT	3	1	—	A
	J86284L		3	1	—	A
10	J86249A	SD-81129-01 FIG.5 & "Z" OPT	3	1	2	A
11	J86249B	SD-81129-01 FIG.5 & "Y" OPT	2	1	2	A
12	J86249C	SD-81129-01 FIG.5 & "X" OPT	2	1	2	A
13	J86249E	SD-81129-01 FIG.5 & "Z" OPT	3	1	2	A,F
14	J86249E	SD-81129-01 FIG.5 & "Y" OPT	2	1	2	A,F
15	J86249E	SD-81129-01 FIG.5 & "X" OPT	2	1	2	A,F
16	J86273A	SD-81317-01 FIG.5 & FIG.1 "R" OPT	13	1	2	A
17	J86273B	SD-81317-01 FIG.5 & FIG.2 "S" OPT	13	1	2	A,G

NOTES: A. THE MODIFICATION KITS ALSO FURNISH MOUNTING HARDWARE, WIRE, WIRING AND INSTALLATION INFORMATION.

B. J86465D IS PART OF J86465A, B, C, K AND L POWER BAYS.

C. J86296E IS PART OF J86296A RECTIFIER

D. J86296B IS PART OF J86296A RECTIFIER

E. J86295B IS PART OF J86295A RECTIFIER

F. J86249E IS PART OF J86249A, B AND C RECTIFIER

G. J86273B IS PART OF J86273A RECTIFIER

Rectifiers using KS-20522 Controller
for Ammeter Type Relays

Circuits

- SD-81088-01—Rectifier Circuit—Semiconductor Type Automatic Regulation, 12 Volts, 200 Amperes
- SD-81301-01—400-Type Plants—130-Volt Charge Circuit, Positive and Negative—63-, 66-, or 70-Cell Batteries—410B Plant
- SD-82023-01—KS-20522 Controller Plant Applications
- SD-81129-01—Rectifier Circuit, Metallic Type, Automatic Regulation, 24 and 48 volts, 100 and 200 Amperes
- SD-81317-01—Rectifier Circuit, Metallic Type, Automatic Regulation, 48 volts 200 Amperes
- SD-81333-01—Generator Start Control and Regulation Circuit, Automatic Start Control, 702C Plant
- SD-81398-01—Rectifier Circuit, Semiconductor Type, Automatic Regulation, 48 Volts 400 Amperes
- SD-81410-01—Rectifier Circuit, Semiconductor Type, Automatic Regulation, 48 Volts 200 Amperes

4. EQUIPMENT

J86741A—AT&TCo Std—Modification of Power Plants and Rectifiers Using KS-20522 Controller for Ammeter-Type Relays

Equipment—J86741A-()

- List 1**—Kit for field modification of ammeter relay used in J86244A, 12 volt, 200 ampere semiconductor type rectifier, per SD-81088-01, Fig. D and Fig. 2, "E" option.
- List 2**—Kit for field modification of ammeter relay used in J86465D common control unit, cabinet or relay mounted — 130 volt, 410B power plants, per SD-81301-01, Fig. 17, "Y" option. (See note A.)
- List 3**—Kit for field modification of ammeter relay used in J86465D common control unit, cabinet or relay rack mounted, +130 Volt, 410B power plants, per SD-81301-01, Fig. 17, "Z" option. (See note A.)
- List 4**—Kit for field modification of ammeter relay used in J86296E, metering and control panel for J86296A, 48-Volt, 400-ampere rectifier per SD-81398-01, Fig. 1, "A" option.
- List 5**—Kit for field modification of ammeter relay used in J86296B, control panel equipment for J86296A rectifier, per SD-81398-01, Fig. 2, "A" option.
- List 6**—Kit for field modification of ammeter relay used in J86295A, 48-volt, 200-ampere rectifier, per SD-81410-01, Fig. 6 and Fig. 1, "ZB" option.
- List 7**—Kit for field modification of ammeter relay used in J86295B, control panel equipment for J86295A rectifier per SD-81410-01, Fig. 6 and Fig. 2, "ZA" option.
- List 8**—Kit for field modification of ammeter relay used in J86284K or J86284L, 100- to 200-ampere, 130-volt rectifier charging unit (702C power plant), for 24-volt control, per SD-81333-01, Fig. 18, "X" & "ZH" option.
- List 9**—Kit for field modification of ammeter relay used in J86284K or J86284L, 100- to 200-ampere, 130-volt rectifier charging unit (702C power plant), for 48-volt control, per SD-81333-01 Fig. 18 "Y" & "ZH" option.
- List 10**—Kit for field modification of ammeter relay used in J86249A, 48-volt, 100-ampere rectifier, per SD-81129-01, Fig. 5 & "Z" option.
- List 11**—Kit for field modification of ammeter relay used in J86249B, 24-volt, 100-ampere rectifier, per SD-81129-01, Fig. 5 & "Y" option.
- List 12**—Kit for field modification of ammeter relay used in J86249C, 24-volt 200-ampere rectifier, per SD-81129-01, Fig. 5 & "X" option.
- List 13**—Kit for field modification of ammeter relay used in J86249E, List 3, 48-volt, 100-ampere electronic output control for J86249A rectifier, 302A power plant, per SD-81129-01, Fig. 5 "Y" & "Z" option.
- List 14**—Kit for field modification of ammeter relay used in J86249E, List 3, 24-volt, 100-ampere electronic output control for J86249B rectifier, 302A power plant, per SD-81129-01, Fig. 5 & "Y" option.
- List 15**—Kit for field modification of ammeter relay used in J86249E, List 3, 24-volt, 200-ampere electronic output control for J86249C rectifier, 302A power plant, per SD-81129-01, Fig. 5 & "X" option.
- List 16**—Kit for field modification of ammeter relay used in J86273A, 48-volt, 200-ampere rectifier, per SD-81317-01, Fig. 5 and Fig 1, "R" option.
- List 17**—Kit for field modification of ammeter relay

used in J86273B, control panel equipment for voltage regulated operation of J86273A rectifier per SD-81317-01, Fig. 5 and Fig. 2, "S" option.

Note

- A. J86465D common control unit is a part of J86465A, B, C, K and L power bays.

Bell Telephone Laboratories, Incorporated

Dept 2433-DHS

WE Dept 81440-UAL-RB