

KS-20522 CONTROLLER HIGH AND LOW LIMIT INSTALLATION AND MAINTENANCE

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1. GENERAL

1.01 This section covers the installation, adjustment, and maintenance of the KS-20522 controllers. The controllers are intended for use with ammeter relays installed in power plants as a replacement for the relay contact functions. They may also be used to monitor and control other power plants where applicable.

1.02 Revision arrows are used to emphasize significant changes. The Equipment Test List is not affected. The reasons for reissuing this section are listed below.

- (a) To delete SD-81631-01, SD-81148-01, and SD-81148-02 drawings
- (b) To list additional applications.

1.03 Table A shows the electrical requirements for the various list numbers of the KS-20522 controller.

1.04 The controller is designed to operate on the dc power available in the power equipment in which it is applied.

2. DESCRIPTION

2.01 The KS-20522 controller is a packaged electronic circuit. It provides high and low adjustable output transistor switches. The adjustable high- and low-limit switch outputs replace the high and low contacts in the ammeter relays.

2.02 In all applications the controllers, like the ammeter relays, connect ground to the controlled circuits when the input signal is below the low switch set point or above the high switch set point value. The low switch set point is adjusted by potentiometer L CONT, and the high switch set point is adjusted by potentiometer H CONT.

2.03 Internal components added at the factory convert the basic 12-volt controller for operation on 24-, 48-, or 130-Vdc power. For 48- or 130-volt units, an additional resistor is mounted on the outside of the case.

2.04 The controller is designed to be mounted in an accessible position for adjustment and wiring on the equipment containing the existing ammeter relay. See Part 4 for information on installation.

2.05 The controller is approximately 3 by 4 by 6 inches in size.

3. APPLICATIONS

3.01 This controller is primarily for use with the following circuits:

- SD-81087-01—Rectifier Circuit, KS-5651-01, 24 and 48 Volts 100 and 200 Amperes

NOTICE

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Bell System except under written agreement

TABLE A
POWER DATA

KS-20522 LIST NO.	CONTROLLER INPUT		SUPPLY POWER		HIGH AND LOW SWITCHING OUTPUTS 100 MA MAXIMUM (NOTE)	EXTERNAL RESISTOR		HYSTERESIS	
	MAXIMUM MV	MAXIMUM MA	VOLTS DC	WATTS MAXIMUM		OHMS	WATTS	HIGH %	LOW %
1	320	1	-12	2	+12V Ground -150V Ground	None		10	2
2	320	1	-24	5.5	+24V Ground	None		10	10
3	320	1	-48	7	+48V Ground	400	30	10	10
4	320	1	-130	16	+130V Ground	1500	30	10	10
8	320	1	-130	16	-130V Ground	1500	30	10	10
13	8.66	160	-48	7	+48V Ground	400	30	10	10
21	50	0.1	-24	5.5	+24V Ground	None	—	10	2
21A*	50	0.1	-24	5.5	+24V Ground	None	—	10	2
22	50	0.1	-24	5.5	+24V Ground	None	—	10	10
22A*	50	0.1	-24	5.5	+24V Ground	None	—	10	10
31	50	0.1	-48	7	+48V Ground	400	30	10	2
31A*	50	0.1	-48	7	+48V Ground	400	30	10	2
32	50	0.1	-48	7	+48V Ground	400	30	10	10
32A*	50	0.1	-48	7	+48V Ground	400	30	10	10

Note: Each output except the List 1 high control is capable of supplying 100 milliamperes to an external load. The List 1 high control input is capable of supplying 10 milliamperes.

* Essentially the same as Lists 21, 22, 31, and 32, respectively, except they do not contain the noise pulse suppression capacitors.

- SD-81088-01—Rectifier Circuit, J86244A, 12 Volts 200 Amperes
- SD-81115-01—Rectifier Circuit, KS-5651-02, 24 and 48 Volts 100 and 200 Amperes
- SD-81129-01—Rectifier Circuit, J86249A, B, C, and E, 24 and 48 Volts 100 and 200 Amperes
- SD-81242-01—Rectifier Circuit, KS-15689, L1, L2, and L3, 48 Volts 200 Amperes
- SD-81301-01—130-Volt Charge Circuit, 410B Plant
- SD-81317-01—Rectifier Circuit, J86273, 48 Volts 200 Amperes
- SD-81333-01—Generator Start Control and Regulation Circuit, 702C Plant
- SD-81398-01—Rectifier Circuit, J86296, 48 Volts 400 Amperes
- SD-81410-01—Rectifier Circuit, J86295, 48 Volts 200 Amperes

- SD-81463-01—Rectifier Circuit, KS-15885, 130 Volts 100 Amperes
- SD-81627-01—Rectifier Circuit, KS-19210, 24 Volts 400 Amperes
- SD-81628-01—Rectifier Circuit, KS-19211, 24 Volts 800 Amperes
- SD-81629-01—Rectifier Circuit, KS-19212, 24 Volts 1600 Amperes
- SD-81629-02—Rectifier Circuit, KS-19212, 24 Volts 1600 Amperes
- SD-81632-01—Rectifier Circuit, KS-19215, 48 Volts 1600 Amperes
- SD-81632-02—Rectifier Circuit, KS-19215, 48 Volts 1600 Amperes
- SD-81633-01—Rectifier Circuit, KS-19216, 130 Volts 300 Amperes.

3.02 The controller can be connected in any circuits containing ammeter relays provided that the rated values of the controller are satisfied and proper polarities are observed.

3.03 The controller is designed to operate over the voltage range (see Table B) of power supplied by the rectifier or power plant. The polarity of the power source may be either positive or negative.

TABLE B

CONTROLLER VOLTAGE RANGE

MINIMUM VOLTS	NORMAL VOLTS	MAXIMUM VOLTS
10	12	14
20	24	28
40	48	56
116	130	155

3.04 The meter input required for full scale operation of the controller designed to operate with high-voltage shunts is 320 millivolts and 1 milliamperere. Those designed to work with low-voltage shunts require 50 millivolts and 1 milliamperere. Controller, List 13, designed for operation with a magnetic amplifier, requires 8.66 millivolts and 160 milliampereres. When the level of input voltage or current goes beyond either the high or low set point, the controller operates and switches the high or low terminal to ground. The current flowing from the associated external circuit through the closed switch of the controller should not exceed 100 milliampereres.

4. INSTALLATION

4.01 Prior to installation of the controller, the rectifier should be disconnected from the commercial ac power and from the battery.

4.02 The controller is installed and then connected as shown by the drawings for the particular power plant or rectifier involved.

4.03 Installation involves mounting the controller inside of the equipment enclosures containing the ammeter relays and wiring the controller to the existing plant circuitry.

4.04 Power to operate the controller is connected to the positive terminals marked with the correct nominal voltage rating and to the negative terminal marked NEG.

5. ADJUSTMENT

5.01 Each set point is adjustable over the full scale range of the controller.

5.02 Positioning of the set points is accomplished by the shaft rotation of the high and low set point potentiometers, designated H CONT and L CONT, respectively. The rectifier output current is adjusted to the desired value and the corresponding potentiometer turned and set to the position where operation takes place.

5.03 Adjustment of the set points is then accomplished with manual operation of the plant controls until the required settings are obtained.

5.04 For both switch set points, clockwise rotation of the controller potentiometer adjustment increases the operating value setting.

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5.05 The adjustment procedure should be repeated until the desired high and low set point values are obtained.

6. MAINTENANCE

6.01 The controller contains no moving parts or heated filaments; consequently, no maintenance should be required after initial installation and adjustment.

6.02 If a malfunction occurs and no fusing or wiring faults can be discovered, the controller unit should be replaced and the faulty one should be returned for repair.

7. ROUTINE CHECKS

7.01 The only check required is visual observation of the installed unit for cleanliness and to in-

spect the condition of the physical installation and wiring.

7.02 If there is some question about proper operation or adjustment of the controller, the rectifier load current should be adjusted manually and the values at which the controller operates the relays should be observed. If these do not agree with the required values, the controller should be readjusted.

8. TROUBLE CONDITIONS

8.01 In general, the only items likely to become defective are the transistors due to external surges or overloads.

8.02 If no controlling action can be obtained after checking fuses and power input, the controller should be replaced.