

EMERGENCY-LIGHTING FIXTURE

KS-19431

OPERATING METHODS

1. GENERAL

1.01 This section covers the KS-19431 emergency fluorescent lighting fixture which is primarily intended for use with 48-volt central office battery supplies. These fixtures are intended to replace or supplement various commercial emergency incandescent lighting fixtures in telephone central offices.

1.02 The fixture uses semiconductors to convert power from a 48-volt dc source into essentially ac power capable of lighting two 20-watt fluorescent lamps connected in series. The fixture is rated for operation in ambient temperatures ranging from 10° C to 50° C and will start and operate at any input voltage between 39 and 53 volts. A fuse and overtemperature switch are used as protective devices in the fixture circuit.

1.03 *Caution: Voltages in these fixtures have potentials up to 400 volts between parts of the circuit. Every precaution should be observed to avoid any contact with exposed metal*

parts or terminals when the lighting fixture is in operation. Do not allow a test pick to touch two metal parts at the same time or dangerous and destructive short circuits may occur.

1.04 The instructions are based on circuit schematic drawing SD-81715-01. For detailed description of the operation of the fixture, see the corresponding circuit description.

2. TOOLS AND TEST APPARATUS

CODE OR SPEC NO.	DESCRIPTION
TOOLS	
KS-16346 L2	Soldering Copper
—	3-Inch C Screwdriver
—	P-Long-Nose Pliers
TEST APPARATUS	
KS-14510 L1	Volt-Ohm-Milliammeter
—	Voltmeter, DC Weston Model 931, Ranges 300/150/75/30 Volts

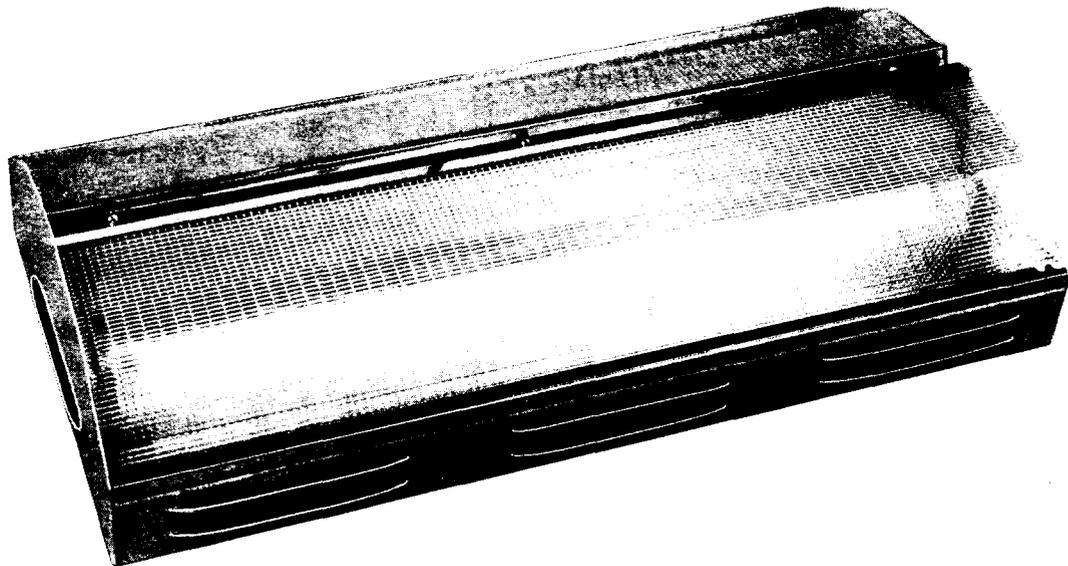


Fig. 1 - KS-19431 Emergency-Lighting Fixture

3. OPERATION

3.01 The lighting fixture operates from an external switch when:

- (a) A 39- to 53-volt dc power source is connected to the fixture input terminals.
- (b) The proper size input fuse and lamp starters are provided.
- (c) Two 20-watt fluorescent lamps are properly seated in the lampholders.

Note: The R2 rheostat is factory adjusted for the correct frequency of operation.

4. TROUBLES**General**

4.01 Since some unsatisfactory conditions will damage more than one component, all checks listed under a given symptom should be made even though defective components are revealed before the entire check procedure has been completed. To gain access to components, disassemble the lighting fixture as follows. Loosen the six fastening screws of the lens retainers and slip out the plastic lenses. Loosen and remove the four thumbscrews holding the reflectors in place and remove the reflectors. For test purposes, the lamps may be reinserted without the reflectors.

4.02 When making continuity checks, switch off the input power and remove the F1 fuse. Momentarily shunt the capacitors with a 100-ohm resistor to be certain that they are completely discharged. If any charge is left on the capacitors, it may cause inaccuracy in resistance readings. To eliminate additional circuit elements, it may be necessary to disconnect one end of the component before connecting the ohmmeter.

Caution: In making continuity checks, use the ohmmeter portion of the KS-14510 L1 meter. Do not use the X10,000 position for testing semiconductors inasmuch as the higher voltages used may damage them.

4.03 Before disconnecting leads, mark or record the connection.

Caution: Soldering operation on semiconductors shall be done at the lowest possible temperature and in the shortest time prac-

ticable in order to localize the heating effect and thus prevent damaging the semiconductors. Because of its low operating temperature, use the KS-16346 L2 12-watt soldering copper. For the protection of the semiconductors, use the P-long-nose pliers as a heat sink.

4.04 When handling fluorescent lamps, observe the safety precautions as outlined in Section 010-110-003.

Lamps Do Not Light — F1 Fuse Not Open

4.05 Proceed as follows.

- (a) Switch off the dc input power to the lighting fixture and remove the F1 fuse.
- (b) Connect the Weston Model 931 dc voltmeter across the C1 capacitor observing the correct polarity.
- (c) Insert the F1 fuse and switch on the lighting fixture. The meter should indicate the input voltage.
- (d) If the input voltage is correct, check the voltage across the C2 capacitor by disconnecting the negative lead of the dc voltmeter and connecting it to the negative side of the C2 capacitor. The meter should read 8 volts.
- (e) If the voltage across the C2 capacitor is correct, switch off the lighting fixture, remove the F1 fuse, and disconnect the dc voltmeter.
- (f) Make the following continuity checks, observing precaution in 4.02 and 4.03.
 - (1) Check the L1 inductor and T2 transformer for continuity between winding terminals and replace as necessary. Because of normal low resistance of L1 and T2, it is difficult to check them for short circuit.
 - (2) If a defective component is not found, check the Q1 transistor and CR1 diode for short circuits as follows. Using the lowest possible ohm range of the KS-14510 L1 meter, connect the (+) lead of the meter to the emitter or anode of the semiconductor and the (-) lead to the collector or cathode of the semiconductor. The measured resistance should be greater than zero. A zero resistance reading indicates a shorted semiconductor.

Lamps Do Not Light — F1 Fuse Open

4.06 Proceed as follows.

- (a) With a new fuse inserted in the fuseholder, switch on the lighting fixture.
- (b) If the fuse again opens, take a resistance reading across the C1 capacitor immediately after blowing a new fuse.
- (c) *If the resistance is zero*, check the C1 capacitor for short circuit. The measured resistance across the capacitor should be low initially and then should increase as the capacitor charges. If the resistance remains low, the capacitor is shorted.
- (d) *If the resistance is approximately 5 ohms*, check the SW1 thermal switch for short circuit or welded contacts. The switch should reopen in less than 5 minutes after closing. If the switch is not defective, check the Q1

transistor, the SCR1 controlled rectifier, and the CR1 diode for short circuits as follows. Using the lowest possible ohm range of the KS-14510 L1 meter, connect the (+) lead of the meter to the emitter or anode of the semiconductor and the (-) lead to the collector or cathode of the semiconductor. The measured resistance should be greater than zero. A zero resistance reading indicates a shorted semiconductor.

Note: The SCR1 controlled rectifier may indicate high resistance in both directions and still be defective. If fuse again opens after above checks, replace the SCR1 rectifier.

- (e) *If the resistance is greater than 5 ohms*, check the lamps and starters by replacing them. If the trouble is not found, check the SCR1 controlled rectifier, the CR1 diode, and Q1 transistor for short circuits as covered in (d).