Federal Aviation Agency

ADVISORY CIRCULAR

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AIRPORTS

*Cancelled Sec-34

EFFECTIVE:

11/4/63

SUBJECT: SPECIFICATION FOR L-821 AIRPORT LIGHTING PANEL FOR REMOTE CONTROL OF AIRPORT LIGHTING

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1. PURPOSE. This circular describes the subject specification requirements and is published by the Federal Aviation Agency for the guidance of the public. The use of this specification is required for project activity under the Federal-aid Airport Program.

2. CANCELLATION. This advisory circular replaces FAA Specification L-821, "Airport Lighting Panel for Remote Control of Airport Lighting," dated May 15, 1961. No substantive changes have been made to the prior specification in placing it in the Advisory Circular System.

3. DESCRIPTION OF PUBLICATION. The specification requirements presented are for an airport lighting panel for the remote control of airport lighting circuits. The panel consists of a top panel plate and a case, toggle switches, terminal boards, and brightness controls, as required. The number of the various components and the type required to be mounted on the panel shall be as ordered.

4. APPLICABLE SPECIFICATIONS. The following specifications, as referred to hereinafter, of the issues in effect on date of application for qualification (paragraph 11) are applicable to this specification. In case of conflict between this specification and the applicable specification, this specification shall govern.

   a. Federal Specifications. Copies of the Federal specifications may be obtained from the appropriate regional General Services Administration office.

      (1) TT-P-636 - Primer Coating, Alkyd, Wood and Ferrous Metal.

   b. Federal Standard. Copies of Federal standards may be obtained from the appropriate regional General Services Administration office.

      (1) Federal Standard No. 595, Colors.

c. Military Specifications. Copies of Military specifications may be obtained from Armed Service Electro-Standards Agency, Fort Monmouth, New Jersey.

(1) MIL-C-490 - Cleaning and Preparation of Ferrous and Zinc Coated Surfaces for Organic Protective Coatings.

(2) MIL-E-5558 - Enamel, Wrinkle-Finish, for Aircraft Use.

d. Federal Aviation Agency Specifications. Copies of Federal Aviation Agency specifications may be obtained from the Federal Aviation Agency, Distribution Section, HQ-438, Washington, D. C. 20553.

(1) L-812 - Static Indoor Type Constant Current Regulator Assembly; 4 KW and 7½ KW; With Brightness Control for Remote Operation.

(2) L-813 - Static Indoor Type Constant Current Regulator Assembly; 4 KW and 7½ KW; For Remote Operation of Taxiway Lights.

(3) L-828 - Saturable Reactor Type Constant Current Regulator with Stepless Brightness Control.

5. ARRANGEMENT. It is contemplated that each control panel ordered may have a different arrangement to meet the particular needs of the airport where it is to be used. The overall arrangement of devices should be specified on the order. In general, all toggle switches shall be located along the top of the panel and all brightness control devices along the bottom. Also, in general, toggle switches controlling equipment associated with a particular runway shall be located above that runway's brightness control. Figure 1 illustrates typical panel arrangements.

6. ORDERING INFORMATION.

a. Each order for a panel shall specify the following:

(1) Size (1, 2, or 3).

(2) Type ("F" or "S").

(3) Control Voltage (48 volts DC or 120 volts, 50/60 cycles).

(4) Number and Type of Toggle Switches.

(5) Number and Type of Runway Brightness Controls.

(6) Arrangement of Devices on Panel.

b. To simplify the ordering of panels for the average airport, a recommended standard panel may be ordered. This panel provides twelve miscellaneous circuit controls, nine taxiway brightness controls, and up to three runway controls.

c. Figure 4 illustrates the manner in which this panel is to be wired. The panel should be wired and the switches should be rated for either 48 volts DC or 120 volts, 50/60 cycles supply. Thus, to order such a panel, it will merely be necessary to specify:

(1) One airport lighting panel per FAA Specification L-821. The panel shall be Size (1 or 2), Type ("F" or "S"). The panel shall be arranged as shown on Figure 1b and wired as shown on Figure 4 of Specification L-821, except that one, two, or three runway control circuit(s) shall be provided so that when viewing the panel from above, the control circuits (reading from left to right) shall be arranged as specified below:

(a) Left Side - None, High Intensity per Figure 3b, or Medium Intensity per Figure 3a.

(b) Center - None, High Intensity per Figure 3b, or Medium Intensity per Figure 3a.

(c) Right Side - None, High Intensity per Figure 3b, or Medium Intensity per Figure 3a.

7. SIZES AND TYPES.

a. The panel shall be available in two types; Type "F" for mounting flush with the top of a console panel and Type "S" for installation on a flat surface such as a desk top. The panel plate shall be available in three sizes:

(1) Size 1 - 12" high x 12" wide (for Type "F" and Type "S" panels).

(2) Size 2 - 12" high x 16" wide (for Type "F" and Type "S" panels).

(3) Size 3 - 6" high x 16" wide (for Type "F" panels only).

b. The panel plate shall be attached to the case by means of a continuous hinge along its top edge. Case dimensions shall conform to those shown in Figure 2.

8. PERFORMANCE REQUIREMENTS. The control panel shall be designed for continuous indoor service.

9. DETAIL REQUIREMENTS.

a. Panel Plate. The panel plate shall be of sheet steel with a thickness of not less than 0.125 inch (nominal). All switches, card holders, or other equipment shall be suitably positioned on the plate. The top edge of the plate shall be supported for its entire width by a counter hinge. All surface edges shall be beveled. A suitable means shall be provided for lifting up the panel plate on Type "F" panels.

b. Case. The top panel plate shall be mounted on a suitable steel case made of not less than 0.078 inch (nominal) sheet steel. A suitable lug shall be inside the case for attachment of a #6 AWG ground wire.

c. Latch. A latch shall be mounted inside the case to support the panel plate when open. The latch shall be of such length and so constructed that the plate will be held near vertical in the open position, and no part of the plate or its attachments shall project behind the plane of the back of the case during opening and closing.

d. Painting. The case and panel plate shall be cleaned and processed in accordance with any of the grades or types specified in Military Specification MIL-C-490. A primer shall be applied on all surfaces in accordance with Federal Specification TT-P-636. Baked, wrinkled, gray enamel for the final coat on all outside surfaces shall conform to Military Specification MIL-E-5558, Type 1, except that the color shall be Federal Standard 595, color no. 16314. All screw threads shall be free of paint.

e. Wire and Wiring. All wire shall have stranded conductors and shall be plastic insulated. All leads shall be properly trained and cabled and long enough so that there will be adequate spare lead when the plate is raised to the extent permitted by the latch. All panels shall be wired at the factory with terminal connections in accordance with the applicable combination of components.

(1) When the order specifies a 48-volt DC control voltage, the minimum wire size shall be #18 AWG.

(2) When the order specifies a 120-volt, 50/60 cycle control voltage, the minimum wire size shall be #16 AWG, except for high intensity potentiometer brightness control which shall be connected with at least #18 AWG wire.

f. Toggle Switches. Toggle switches are used to turn on and off regulators, beacons, obstruction lights, lighted wind cones, apron lights, etc. They may also be used to control taxiway light intensity or to simultaneously control several circuits.

(1) Toggle switches shall be mounted on the panel plate by means of a hexagon nut above and below the panel plate. An internal-tooth lockwasher and a locking ring shall be used to assure permanent mounting. Multiple-hole switch mounting will be permitted for multiple-unit toggle assemblies.

(2) Screw or solder terminals shall be provided on the switches for connecting leads. Switches shall be sealed to prevent the entry of dust and shall have silver-solid contacts and copper-moving contacts rated for at least 25,000 operations at rated current and voltage. The switches shall be detented to provide positive stiff-switch operation. Switches must have the approval of the Underwriters' Laboratories, Inc.

(3) When the order specifies a 48-volt DC control voltage, the switch shall be rated to continuously carry a resistive load of 5 amperes and an inductive load of 3 amperes at 30 volts DC.

(4) When the order specifies a 120-volt AC control voltage, the switch shall be rated to continuously carry a resistive or an inductive load of 10 amperes at 125 volts, 50/60 cycles.

(5) Toggle switches may be either 2 or 3 position. When 2-position switches are ordered, they shall be mounted so that they are off when thrown to the left and on when thrown to the right. Three-position switches shall be so mounted that they are also off when thrown to the left. All switches shall be mounted to operate to the left and right rather than up and down.

(6) In general, it is contemplated that the following types of switches will be used to control the following equipment.

(a) Single Pull Single Throw (SPST) - Individual Specification L-812 and L-813 regulators, beacons, apron lights, wind cone lights, and obstruction lights.

(b) Double Pull Single Throw (DPST) - Individual Specification L-828 regulator.

(c) Single pole, 3 position - Individual Specification L-812 regulators used for taxiway circuits with brightness control.

(d) Multiple pole, 2 position - Master control of a complex of lighting systems (such as taxiways).

(e) Multiple pole, 3 position - Master control of a complex of taxiway systems with brightness control; master control of one runway where several regulators are used to control a complex of lighting systems, all of which are not on at one time.

g. Medium Intensity Runway Lighting Control. Each medium intensity runway lighting control shall consist of a 3-position, rotary, detented, snap-action switch wired to a terminal board and marked as shown on Figure 3a. The switch shall be rated for at least 10,000 operations, switching a 10-ampere inductive load at 30-volts DC or at 115 volts, 50/60 cycles. The control shall also include one SPST on-off toggle switch.

(1) The rotary switch shall be mounted with a suitable pointer knob and dial marking. The dial marking shall consist of the numerals 10, 30, and 100 (corresponding to brightness percent) located opposite the switch positions and reading, in the above order, in a clockwise direction as illustrated in Figure 1b.

h. High Intensity Runway Lighting Control. Each high intensity runway lighting control shall consist of a potentiometer equal to General Radio Company part no. 975KS5G1. This unit consists of a 1,000-ohm potentiometer, a 5-position detent, and a knob. The potentiometer shall be wired to a terminal board marked as shown on Figure 3b. The control shall also include one DPST on-off toggle switch.

(1) Dial marking, part of this specification, shall consist of the numerals 1, 2, 3, 4, and 5 (corresponding to brightness positions) located opposite the detent positions and reading, in the above order, in a clockwise direction as illustrated in Figure 3b.

(2) In some cases, more than one regulator shall be controlled by turning one brightness control knob. When this is desired, the order shall state the number of regulators to be so controlled. The potentiometer control shall be modified, in this event, by ganging an additional potentiometer on the control shaft for each additional regulator. Figure 3c illustrates the wiring of a 3-gang potentiometer control. The principles illustrated in Figure 3c may be applied to ganging of as many as six potentiometers. Ganged regulator control will require that the single throw on-off switch have two poles for every regulator controlled.

(3) When multiple ganging of potentiometers is specified, space requirements will usually necessitate use of Type "F" panels. It may also be necessary to mount the cover plate so that its hinged edge is along the lower part of the case.

i. Terminal Blocks. Terminal blocks shall be rated for at least 10 amperes and 600 volts. Terminal blocks shall be pressure type and capable of holding wires from #19 AWG to #10 AWG. Individual terminals shall be suitably marked in accordance with the wiring diagram furnished with the unit.

j. Marking. Markings for switch designations shall be in characters not less than 3/16 inch or not over 5/16 inch high formed by engraving, etching, or stamping. The characters shall be filled with a permanent, durable white material. The markings shall be placed either on the plate or on small separate plates securely fastened to the plate. Card holders may also be used for toggle switch designation.

k. Code Requirements. The control panel shall comply with all applicable requirements of the National Electrical Code.

l. Wiring Diagram. Three copies of a wiring diagram shall be supplied with each panel.

m. Parts List and Installation Instructions. A component parts list and installation instructions shall be furnished with each control panel. Sufficient drawings or illustrations shall be provided to indicate clearly the method of installation.

n. Nameplate. A nameplate shall be attached to the panel and shall include the following information:

(1) Airport lighting control panel.

(2) Identification: FAA L-821.

(3) Type _____ Size _____ Voltage _____.

(4) Manufacturer's part no. _____.

(5) Manufacturer's name or trademark.

10. TESTING.

a. Qualification Testing.

(1) The following examination and tests shall be made on a panel of any size or type, including at least one each of the switching components listed under paragraphs 9g and 9h. The panel shall withstand the tests successfully, and the component parts shall meet the detail requirements specified in paragraph 9 of this specification.

(a) Examination. This examination shall be in the form of a checkoff list to certify that the material used, dimensions, component parts, calibration, quantities, etc., are all in accordance with the detail requirements of this specification.

(b) Operation. The panel shall be connected to a pilot-light test board, and each component and switch shall be checked for proper operation.

(c) Dielectric. All terminals on the terminal block shall have a potential of at least 500 volts, r.m.s., 60 cycles, applied for a period of one minute between the terminal and the grounded case. There shall be no breakdown of the insulation.

(d) Other inspections and tests may be made as deemed necessary by the Federal Aviation Agency, Airports Service, Washington, D. C. 20553, to determine compliance with this specification.

b. Production Testing. Each panel shall be inspected and tested by the manufacturer as specified in paragraph 10a above.

11. QUALIFICATION.

a. The manufacturer shall furnish a sample panel with the component parts as specified in paragraphs 9g and 9h to a disinterested testing laboratory to be tested as described in paragraph 10 to obtain certification regarding the ability to manufacture panels meeting the requirements of this specification. The disinterested testing laboratory shall be a laboratory acceptable to the Federal Aviation Agency, Airports Service, Washington, D. C. 20553. The manufacturer shall furnish two copies of the testing laboratory's reports to the Airports Service for review and approval consideration. Upon approval of the test reports which show satisfactory certification of compliance, the Airports Service will list the name of the qualified manufacturer and a description of their panel in Advisory Circular AC 150/5345-1, "Approved Airport Lighting Equipment." The cost of testing shall be borne by the manufacturer offering the material for qualification.

b. If the manufacturer has satisfactory laboratory facilities, the required tests and examination may be performed at the factory, and such tests shall be witnessed by a representative of the Federal Aviation Agency, Airports Service, Washington, D. C. 20553. The manufacturer shall furnish written reports of the tests and inspections.

c. Manufacturers must obtain approval on each size and type of panel to be furnished. However, manufacturers having obtained approval on any size or type panel, in accordance with paragraphs 11a or 11b above, may request approval on any other size or type with the submission of detail drawings for review and approval by the Federal Aviation Agency, Airports Service, Washington, D. C. 20553.

d. Parts list and installation instructions shall be submitted with the above test reports to the Federal Aviation Agency, Airports Service, Washington, D. C. 20553.

12. HOW TO GET THIS PUBLICATION.

a. Order copies of this publication from:

Federal Aviation Agency
Distribution Section, HQ-438
Washington, D. C. 20553

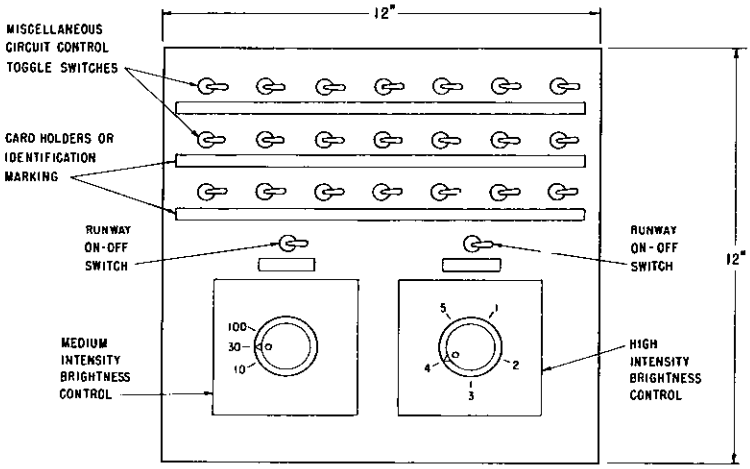
b. Identify the publication in your order as:

FAA Advisory Circular AC 150/5345-3
Specification for L-821 Airport Lighting Panel for
Remote Control of Airport Lighting
Dated 11/4/63

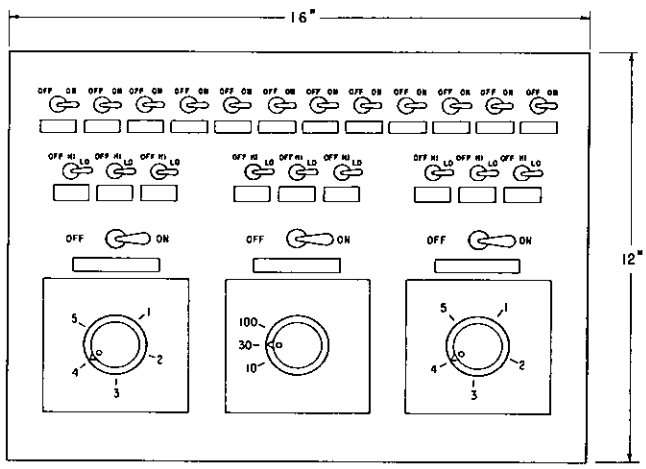
c. There is no charge for this publication.

Charles H Bowers

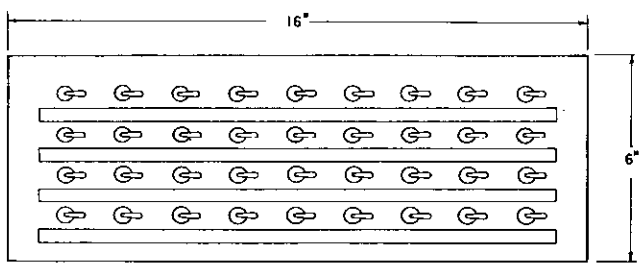
Cole Morrow, Director
Airports Service



(a) TYPICAL LAYOUT - SIZE 1 PANEL

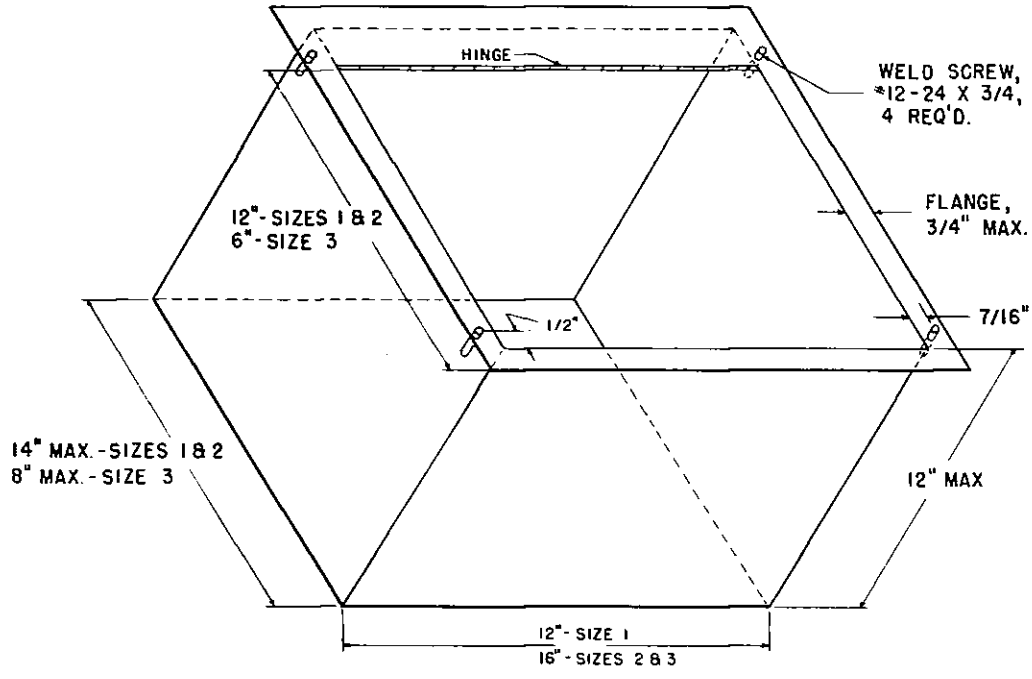


(b) TYPICAL LAYOUT - SIZE 2 PANEL

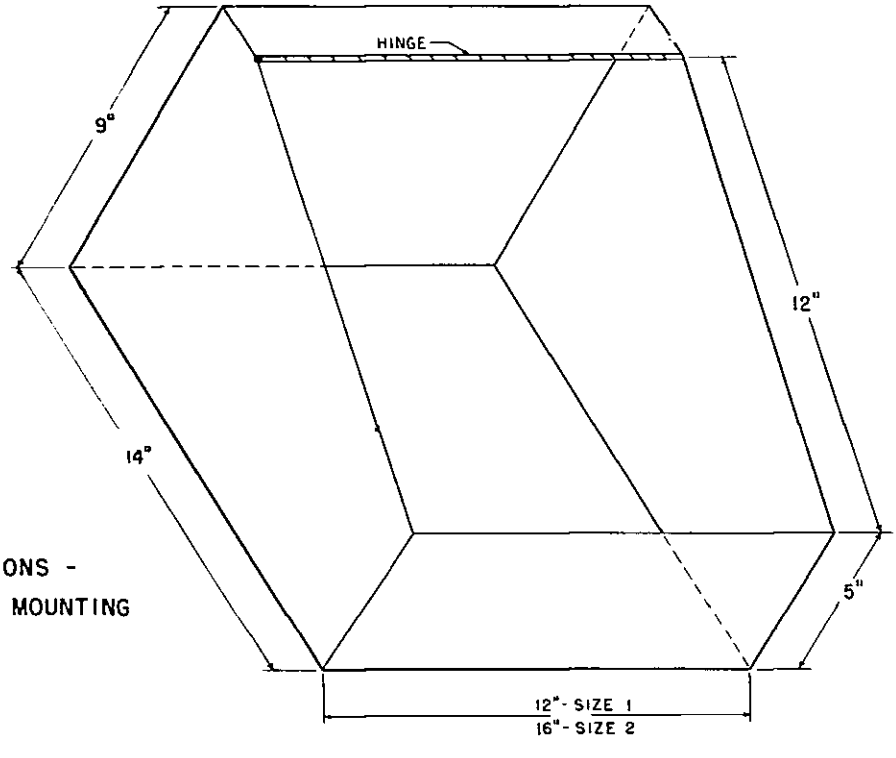


(c) TYPICAL LAYOUT - SIZE 3 PANEL

FIGURE 1. PANEL LAYOUT

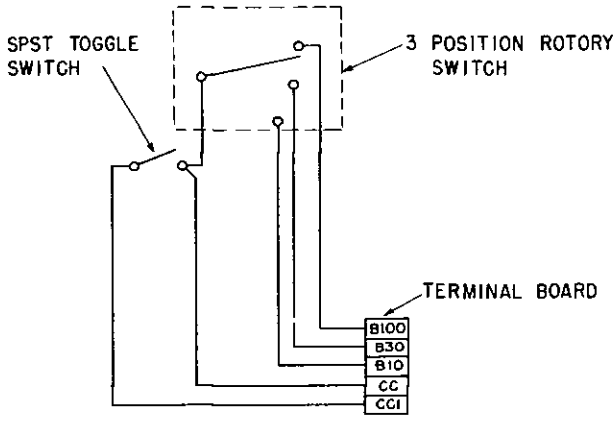


(a) CASE DIMENSIONS - TYPE "F" FOR FLUSH MOUNTING

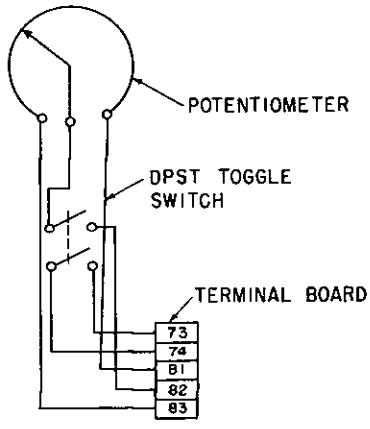


(b) CASE DIMENSIONS - TYPE "S" FOR SURFACE MOUNTING

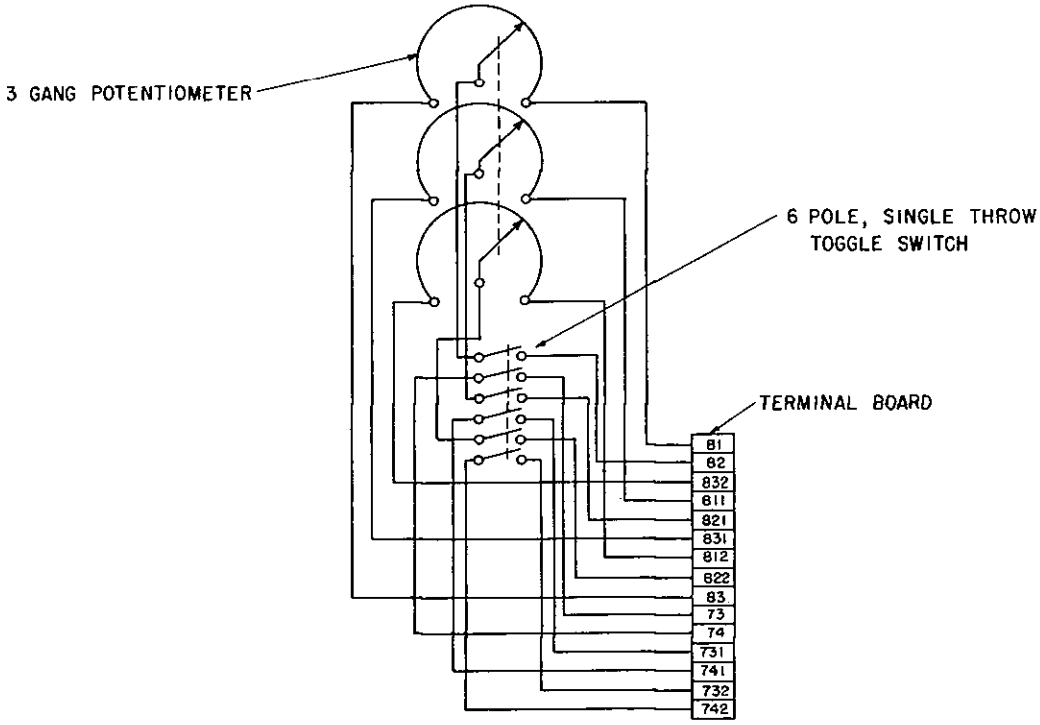
FIGURE 2. CASE DIMENSIONS



(a) WIRING DIAGRAM - MEDIUM INTENSITY RUNWAY LIGHTING CONTROL



(b) WIRING DIAGRAM - HIGH INTENSITY RUNWAY LIGHTING CONTROL



(c) WIRING DIAGRAM - HIGH INTENSITY RUNWAY LIGHTING CONTROL FOR 3 REGULATORS

FIGURE 3. WIRING DIAGRAMS

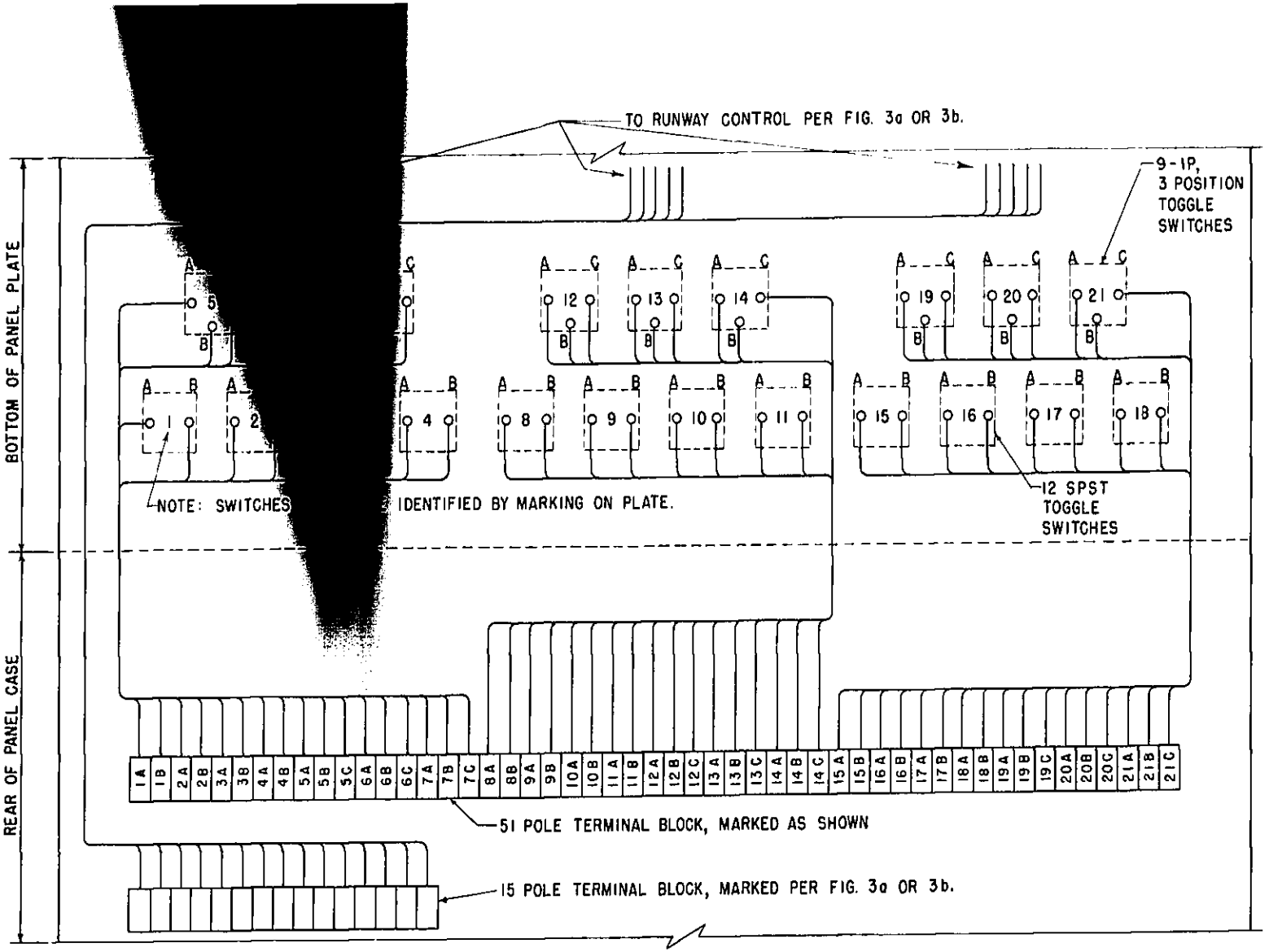


FIGURE 4. PANEL WIRING DIAGRAM