



AC NO: 150/5345-3B

DATE: 21 Apr 72

TAD-494.4

ADVISORY CIRCULAR

DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION

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

1. PURPOSE. This advisory circular describes the specification requirements for an airport lighting control panel for the remote control of airport lighting circuits and is published by the Federal Aviation Administration for the guidance of the public.
2. CANCELLATION. AC 150/5345-3A, Specification for L-821 Airport Lighting Panel for Remote Control of Airport Lighting, dated 20 October 1967, is cancelled.
3. REFERENCES. The following specifications, as referred to hereinafter, of the issues in effect on the date of application for qualification (paragraph 10) apply to this circular. This circular is to govern in case of conflict.
 - a. Copies of Federal Specification TT-E-527b, Enamel, Alkyd, Lustreless, may be obtained from the appropriate Regional General Services Administration Office.
 - b. Copies of the following standard and advisory circulars and additional copies of this circular may be obtained from the Department of Transportation, Distribution Unit, TAD-484.3, Washington, D.C. 20590.
 - (1) FAA-STD-001, Color and Texture of Finishes for National Airspace System Equipment.
 - (2) AC 150/5345-10C, Specification for L-828 Constant Current Regulator with Stepless Brightness Control.
 - (3) AC 150/5345-11, Specification for L-812 Static Indoor Type Constant Current Regulator Assembly; 4KW and 7-1/2KW; with Brightness Control for Remote Operation.

Initiated by: AS-550

- (4) AC 150/5345-21, Specification for L-813 Static Indoor Type Constant Current Regulator Assembly; 4KW and 7-1/2KW; for Remote Operation of Taxiway Lights.
- (5) AC 150/5345-1C, Approved Airport Lighting Equipment.
- (6) AC 150/5340-19, Taxiway Centerline Lighting System.
- (7) AC 150/5340-13B, High Intensity Runway Lighting System. *

4. EXPLANATION OF REVISION. In addition to changes in the text, the following revisions were made:

- a. Substitution of a three-position toggle switch for the three-position snap-action switch for the brightness control of medium intensity runway lighting systems.
- b. Substitution of a six-position rotary switch for the 1,000 ohm potentiometer for the brightness control of high intensity runway lighting systems.
- c. Change in component layout configuration of Figures 1a, 1b, and 1c, to incorporate component change specified in paragraphs 4a and 4b.
- d. Change to Figure 2c case dimensions and the elimination of the formica laminated sheet bonded to the steel plate to form the top panel.
- e. Changes to all wiring diagrams, Figure 3, to incorporate changes specified in paragraphs 4a and 4b.
- f. Changes to Figure 4, panel wiring diagram, to incorporate changes specified in paragraphs 4a and 4b.

5. CONTROL PANEL ARRANGEMENT. The panel consists of a top plate and a case, toggle switches, terminal boards, and brightness control devices as required. Each control panel may have a different arrangement to meet the particular needs of the airport where it is to be used. Locate the toggle switches controlling the equipment associated with a particular runway above the runway's brightness control. Typical panel arrangements are illustrated in Figure 1.

6. ORDERING INFORMATION.

- a. To simplify the ordering of panels for the average airport, it is recommended that one of the typical panels shown in Figure 1 be ordered. These typical panels provide the maximum miscellaneous

* This advisory circular is in the final stage of preparation and should be available by mid-September 1972.

control circuits, taxiway lighting control, and runway lighting control for each size panel. If future expansion of a particular airport is known, order the size panel adequate for this future expansion with only the components for present use installed. The panel layouts as shown in Figure 1 and the case dimensions as shown in Figure 2 shall be considered as standard, but other sizes and configurations may be specified to meet special conditions for a specific airport upon approval from the Federal Aviation Administration, Airports Service, Standards Division, Washington, D.C. 20591.

- b. When viewing the panel from above, arrange the components (reading from left to right) as shown in Figures 1a, 1b, or 1c, to meet your present requirement. Specify each brightness control component, as shown in Figure 3, to control either a high intensity runway lighting system, a medium intensity lighting system, or a taxiway lighting system. See Figure 4 for a wiring diagram and marking of components of Size 2 panel. Use switches rated for either 48-volt DC or 120-volt AC, 50/60 Hz supply. Thus, to order such a panel, specify an L-821 airport lighting panel.
- c. Specify the following information on each order for a panel:
 - (1) Size (1, 2, 3, or 4).
 - (2) Type ("F" or "S").
 - (3) Control voltage (48 volts DC or 120 volts, 50/60 Hz).
 - (4) Number and type of toggle switches.
 - (5) Number and type of runway brightness controls.
 - (6) Arrangements of devices on panel.

7. SIZES AND TYPES. Make the panel 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. Make the panel plate available in four sizes as shown in Figure 1.

8. DETAIL REQUIREMENTS.

- a. Panel Plate. Attach the panel plate to the case by means of a continuous hinge along its top edge. Case dimensions conform to those shown in Figure 2.
 - (1) Sizes 1, 2, 3, and 4. The panel consists of sheet metal with a thickness of not less than 0.125 inches (nominal).

- (2) Size 3 Panel. This panel consists entirely of SPST toggle switches for remote control of miscellaneous lighting systems and is to be used in conjunction with present installed L-821 panels where additional remote control of miscellaneous lights are required and space is available.
- (3) Components. Suitably position on the panel plate all switches, card holders, and other components. Support the top edge of the panel plate for its entire width by a counter hinge. Level all surfaces. Provide a means for lifting up the panel plate on the Type "F" panels.
- b. Case. Mount the top panel plate on a suitable steel case made of not less than 0.078 inch (nominal) sheet steel. Install a suitable lug inside the case for attachment of a #6 AWG ground wire.
- c. Latch. Mount the latch inside the case to support the panel plate when open. Construct the latch of such length that the plate will be held near vertical in the open position and so that no part of the plate or its attachments project behind the plane of the back of the case during opening and closing.
- d. Painting. The color and gloss of the case and panel plate conforms to Federal Aviation Administration Standard FAA-STD-001. Apply a hard lustrless alkyd baked enamel finish having a smooth matte texture. Prepare the surface, application of primer and enamel, including baking procedures, so that the finish surface will meet the water resistance test procedures specified in Federal Specification TT-E-527b.
- e. Wire and Wiring. Use wire having stranded conductors and plastic insulation. 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. Wire all panels at the factory with terminal connections in accordance with the applicable combination of components.
- (1) Use No. 18 AWG minimum wire size when the order specified a 48-volt DC control voltage.
- (2) Use No. 16 AWG minimum wire size when the order specifies a 120-volt, 50/60 H₂ control voltage.
- f. Toggle Switches. Use toggle switches 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) Mount the toggle switches on the panel plate by means of a hexagon nut above and below the panel plate. Use an internal-tooth lockwasher and a locking ring to assure permanent mounting. Multiple-hole switch mounting is permitted for multiple-unit toggle assemblies.
- (2) Provide screw, solder, or push-on type terminals on switches for terminal leads. Seal the switches to prevent the entry of dust. Provide silver-solid contacts and copper-moving contacts rated for at least 25,000 operations at rated current and voltage. Detent the switches to provide positive stiff-switch operation. Switches must have the approval of the Underwriters' Laboratories, Inc.
- (3) When the order specified a 48-volt DC control voltage, use a switch rated to continuously carry a resistive load of five amperes and an inductive load of three amperes at 30 volts DC.
- (4) When the order specifies a 120-volt AC control voltage, use a switch rated to continuously carry a resistive or an inductive load of 10 amperes at 125 volts, 50/60 H_z.
- (5) Toggle switches may have either two or three positions. When two or three-position switches are ordered, mount them so that they are either off or on low intensity setting when thrown to the left and on when thrown to the right. For taxiway brightness control, the three positions of the toggle switch shall be from left to right off-on-on (off, 30 percent, 100 percent); and for the medium intensity runway brightness control, the three positions shall be from left to right on-on-on (10 percent, 30 percent, 100 percent). Mount all switches to operate to the left and right rather than up and down.
- (6) Usually, the following types of switches will be used to control the following equipment:
 - (a) Single Pole Single Throw (SPST) - Individual Specification L-812 and L-813 regulators, beacons, apron lights, wind cone lights, and obstruction lights.

- (c) Rotary Switch-Single Deck-Six Positions - 60° Angle Throw. Individual Specification L-828 regulators for high intensity runway lighting circuits with five steps of brightness. The switch, with a jumper installed between positions No. one and No. six, uses five positions of brightness. The switch is rated to break one ampere at 115 volts AC resistive circuit and to carry five amperes with life expectancy of 100,000 mechanical cycles of operation.
- g. Medium Intensity Runway Lighting Control. Each medium intensity runway lighting control consists of a single-pole, three-position switch and a single-pole, single-throw switch wired to a terminal block and marked as shown in Figure 3a. Use a single-pole, three-position switch conforming to Cutler-Hammer, Catalog No. 8860K4, and a single-pole, single-throw switch conforming to Cutler-Hammer, Catalog No. 8801K22, or an approved equal. Mount each of the switches so that operation will be from the left to right. The three-position switch markings consist of the numerals 10, 30, and 100 (corresponding to brightness percent) and the single-pole, single-throw switch marking consists of "off-on". The markings are located opposite each switch position and shall read in the above order as illustrated in Figure 1a.
- h. Taxiway Edge Lighting Control. Each taxiway lighting control consists of a single-pole, three-position switch and a single-pole, single-throw switch wired to a terminal block and marked as shown in Figure 3b. Use a single-pole, three-position switch conforming to Cutler-Hammer, Catalog No. 8860K4, and a single-pole, single-throw switch conforming to Cutler-Hammer, Catalog No. 8801K22, or an approved equal. Mount each of the switches so that operation will be from the left to right. The three-position switch markings consist of the following: OFF-30-100, (corresponding to brightness percent) and the single-pole, single-throw switch markings consist of "off-on". The markings are located opposite each switch position and shall read in the above order as illustrated in Figure 1b.
- i. Taxiway Centerline Lighting Control. Each taxiway centerline lighting intensity control consists of the same components, switch marking, and terminal board connections as specified in paragraph 8h. For further information regarding taxiway centerline lighting see current Advisory Circular 150/5340-19, Taxiway Centerline Lighting System.
- j. Standby Power Remote Control. Each standby remote control consists of a SPST toggle switch conforming to Cutler-Hammer, Catalog No. 8801K22, or an approved equal and a red pilot lamp and holder to indicate the emergency power supply is on, wired to a terminal block, and marked as shown in Figure 3e.

- k. High Intensity Runway Lighting Control. Each high intensity lighting control consists of a six-position rotary type switch, knob and a single pole single throw (SPST) on-off toggle switch. Wire the SPST toggle switch and the six-position rotary switch to the terminal board as marked in Figure 3c. The six-position dial marking consists of numerals 1, 2, 3, 4, and 5 (corresponding to brightness steps) located opposite the detented positions and reading, in the above order, in a clockwise direction as illustrated in Figure 1. Use a Grayhill Inc., six-position rotary switch with a jumper installed between position No. one and No. six, conforming to Catalog No. 45001-6N or an approved equal. See Figure 3c for 48-volt DC remote control wiring diagram. For further information on 48-volt DC control, ganging of controls and methods of using mixed control components (1,000 ohm pots and five step rotary switches) see current Advisory Circular 150/5340-13B, High Intensity Runway Lighting System.
- l. Terminal Blocks. Use terminal blocks rated for at least 10 amperes and 600 volts. Use pressure type terminal blocks capable of holding wires from No. 19 AWG to No. 10 AWG. Identify the individual terminals with permanent marks in accordance with the wiring diagram furnished with the unit.
- m. Marking. Mark the switch designations in characters not less than 3/16-inch or not over 5/16-inch high formed by engraving, etching, or stamping. Fill the characters with a permanent, durable white material. Place the markings either on the plate or on small separate plates securely fastened to the plate. Card holders may also be used for toggle switch designation.
- n. Code Requirements. Design each control panel to comply with all applicable requirements of the National Electrical Code.
- o. Wiring Diagram. Supply three copies of a wiring diagram with each panel.
- p. Parts List and Installation Instructions. Furnish a component parts list and installation instructions with each control panel. Provide sufficient drawings or illustrations to indicate clearly the method of installation.
- q. Nameplate. Attach a nameplate to the panel and include the following information thereon:
- (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.

9. TESTING.

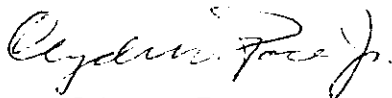
- a. Qualification Testing. Make the following examination and tests on a panel of any size or type, including at least one each of the switching components listed under paragraphs 8g and 8h. Each panel is to withstand the tests successfully, and the component parts are to meet the detail requirements specified in paragraph 8 of this specification.
 - (1) Examination. In this examination use the form of a checkoff list to certify that the material used, dimensions, component parts, calibration, quantities, etc., are in accordance with the detail requirements of this specification.
 - (2) Operation. Connect the panel to a pilot-light test board, and check each component and switch for proper operation.
 - (3) Dielectric. Subject all terminals on the terminal block to a potential of at least 500 volts, r.m.s., 60 Hz, applied for a period of one minute between the terminal and the grounded case. No breakdown of the insulation will be acceptable.
 - (4) Other inspections and tests may be made as deemed necessary by the Federal Aviation Administration, Airports Service, Standards Division, Washington, D.C. 20591, to determine compliance with this specification.
- b. Production Testing. Each panel is to be inspected and tested by the manufacturer as specified in paragraph 9a above.

10. QUALIFICATION.

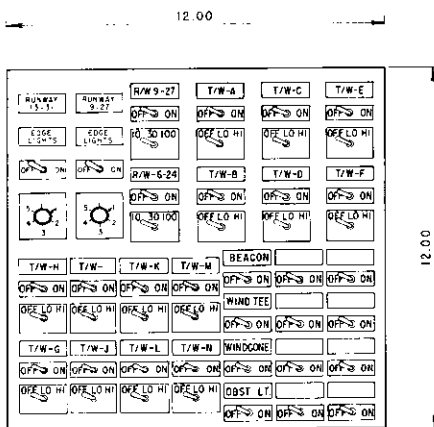
- a. Each manufacturer is to furnish a sample panel with the component parts as specified in paragraphs 8g and 8h to a disinterested testing laboratory to be tested as described in paragraph 9 to obtain certification regarding the ability to manufacture panels meeting the requirements of this specification. The disinterested

testing laboratory is to be a laboratory acceptable to the Federal Aviation Administration, Airports Service, Standards Division, Washington, D.C. 20591. The manufacturer is to furnish two copies of the testing laboratory's report to the Airports Service, Attention: AS-500, 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 150/5345-1C, Approved Airport Lighting Equipment. The cost of testing is to be borne by the manufacturer offering the material for qualification.

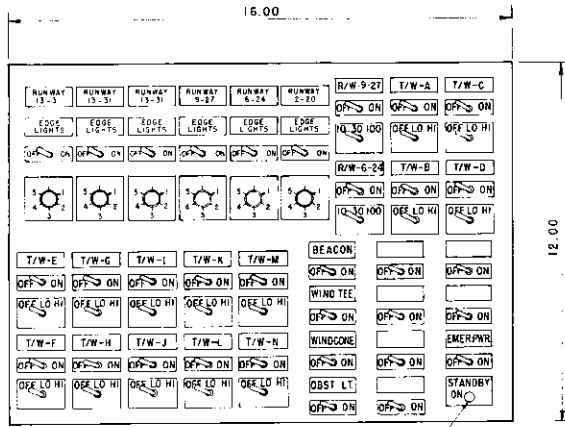
- b. If the manufacturer has satisfactory laboratory facilities, the required tests and examination may be performed at the factory, and such tests are to be witnessed by a representative of the Federal Aviation Administration, Airports Service, Standards Division, Washington, D.C. 20591. The manufacturer is to furnish written reports of the tests and inspections.
- c. Manufacturers must obtain approval of each size and type of panel to be furnished. However, manufacturers having obtained approval on any size or type panel, in accordance with paragraphs 10a or 10b above, may request approval on any other size or type with the submission of detail drawings for review and approval to the Federal Aviation Administration, Airports Service, Attention: AS-500, Washington, D.C. 20591.
- d. Each manufacturer is to submit a parts list and installation instructions with the above test reports to the Federal Aviation Administration, Airports Service, Attention: AS-500, Washington, D.C. 20591



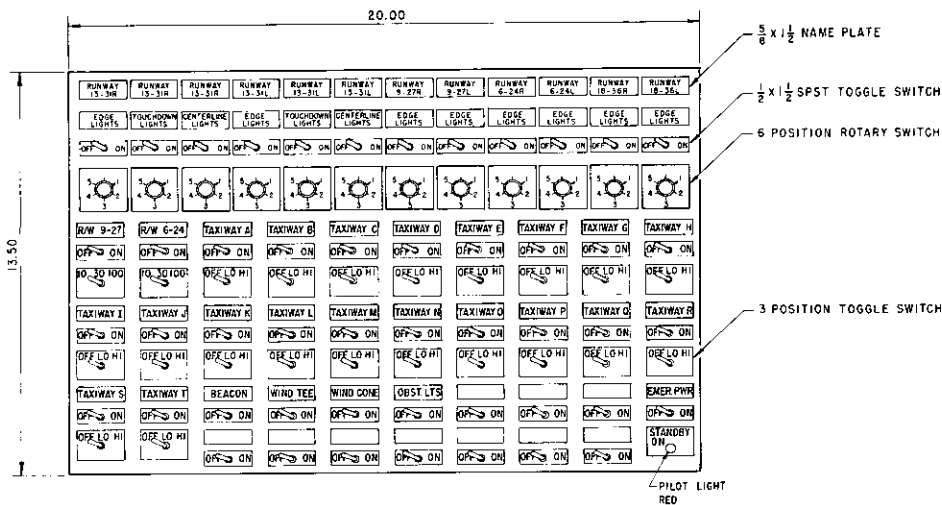
CLYDE W. PACE, JR.
Acting Director, Airports Service



(a) TYPICAL LAYOUT - SIZE 1 PANEL



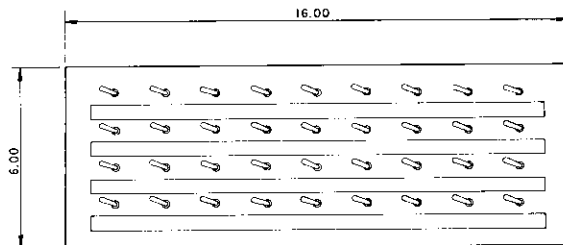
(b) TYPICAL LAYOUT - SIZE 2 PANEL



(c) TYPICAL LAYOUT - SIZE 4 PANEL

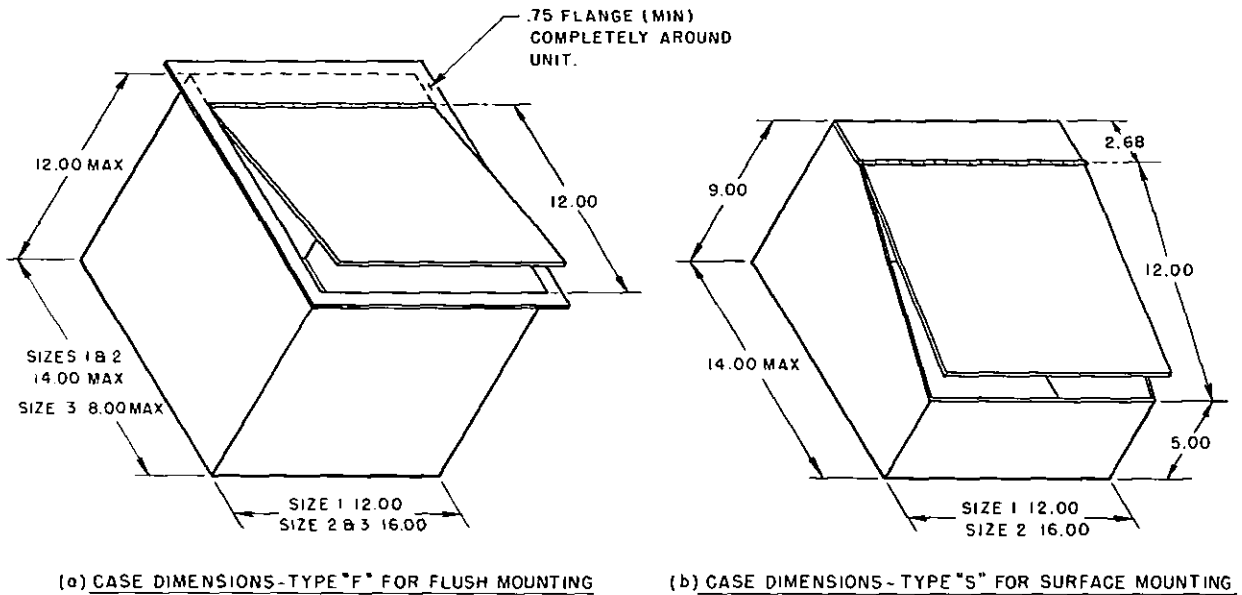
NOTE:

1. ALL LETTERS TO BE .188 HIGH (MIN)
2. ALL TOLERANCES ON DIMENSIONS OF PANELS ARE +0 AND -.031



(d) TYPICAL LAYOUT - SIZE 3 PANEL

FIGURE 1. TYPICAL PANEL LAYOUT



NOTE:
ALL TOLERANCES ON DIMENSIONS IN VIEWS (a)(b)&(c)
ARE +0 AND -.031

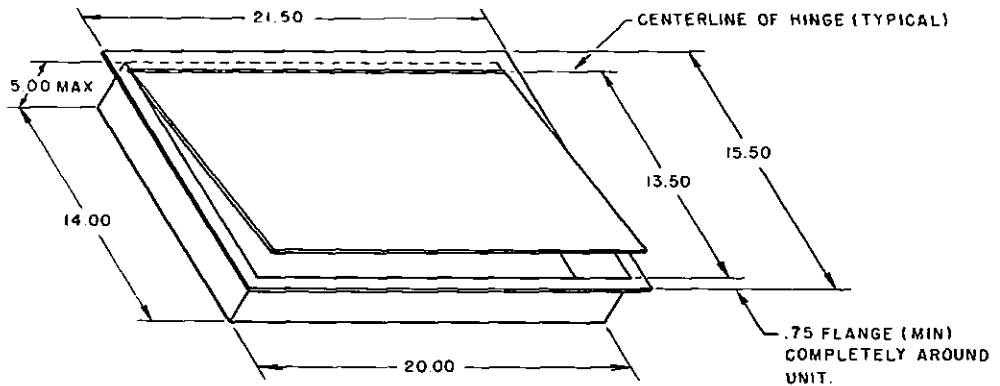
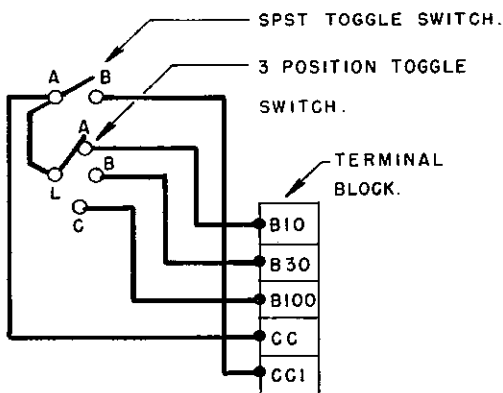
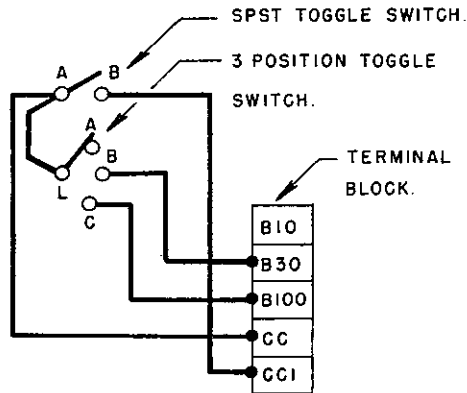


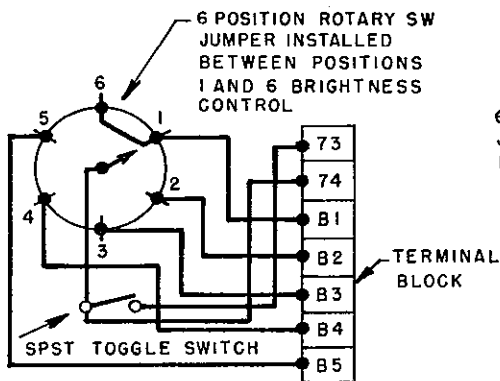
FIGURE 2. CASE DIMENSIONS



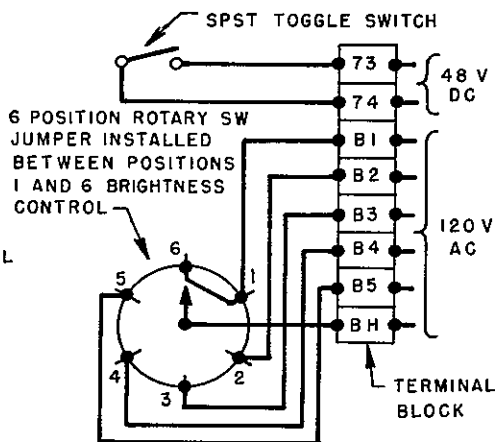
(a) WIRING DIAGRAM-MEDIUM INTENSITY RUNWAY



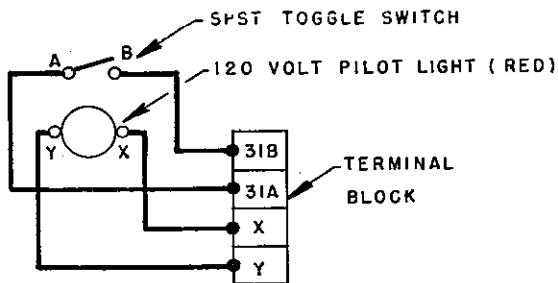
(b) WIRING DIAGRAM-TAXIWAY LIGHTING CONTROL



(c) WIRING DIAGRAM-HIGH INTENSITY RUNWAY LIGHTING CONTROL



(d) 48 VOLT DC CONTROL FOR HIGH INTENSITY RUNWAY LTS



(e) WIRING DIAGRAM STANDBY POWER CONTROL

FIGURE 3. WIRING DIAGRAM

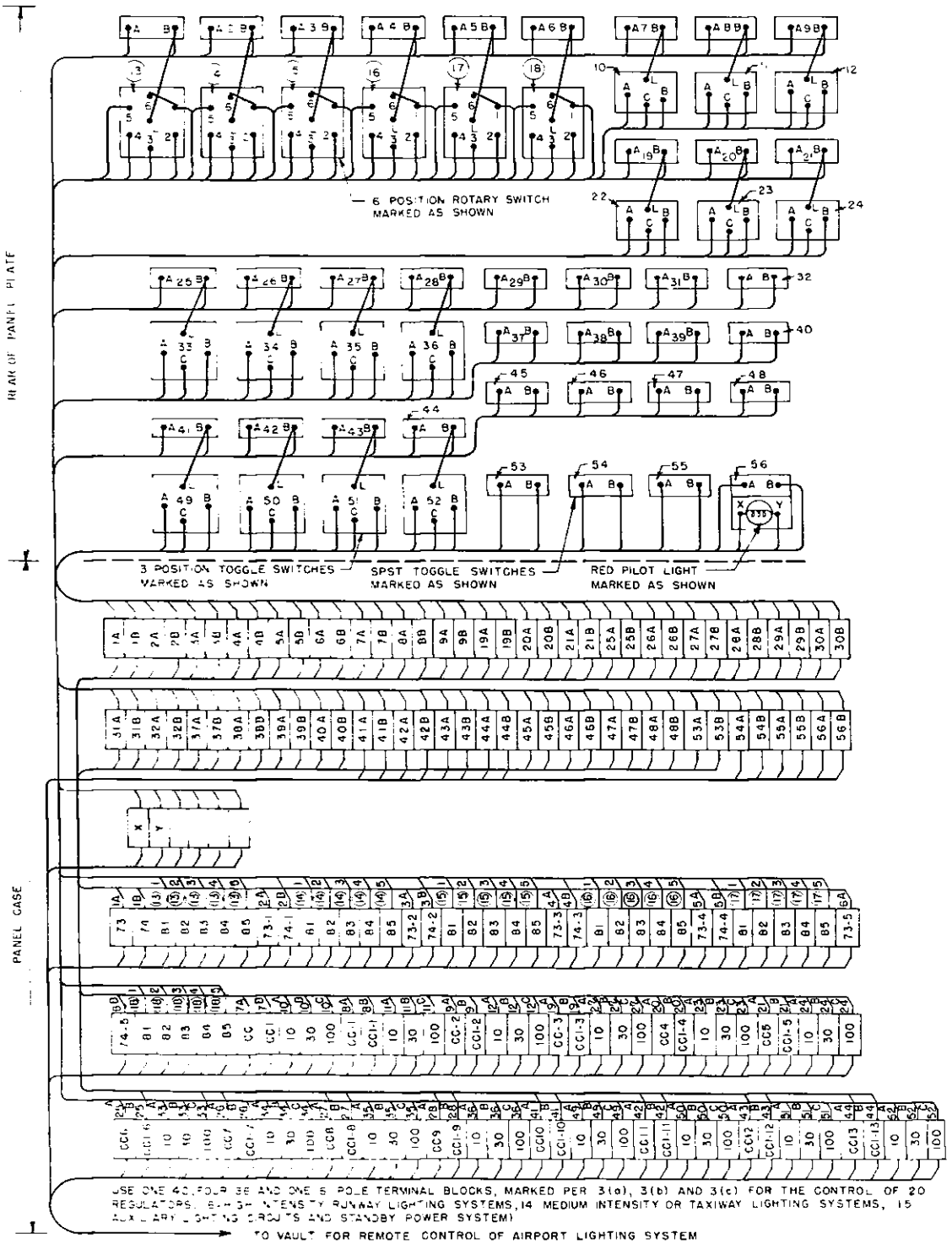


FIGURE 4. TYPICAL WIRING DIAGRAM FOR FIGURE 1, SIZE 2 PANEL