



U.S. Department
of Transportation
**Federal Aviation
Administration**

Advisory Circular

Subject: SPECIFICATIONS FOR AIRPORT
LIGHTING CIRCUIT SELECTOR SWITCH

Date: September 14, 2006
Initiated by: AAS-100

AC No: 150/5345-5B
Change:

1. PURPOSE. This advisory circular (AC) contains a specification for a circuit selector switch for use in airport lighting circuits.

2. EFFECTIVE DATE. Effective 6 months after the issue date of this advisory circular, only that equipment qualified in accordance with the specifications contained in this AC will be listed in AC 150/5345-53, Airport Lighting Equipment Certification Program, current edition.

3. CANCELLATIONS. This AC cancels AC 150/5345-5A, Specification for L-847 Circuit Selector Switch, 5,000 Volt 20 Ampere, dated March 23, 1982.

4. PRINCIPAL CHANGES. The following principal changes are contained in this specification.

- a. The addition of an optional L-847 monitoring contact closure feature.
- b. The addition of an optional L-847 door interlock switch.
- c. The "High-Voltage Contact" cycle switching test was changed from 5,000 cycles to 10,000 cycles.

5. METRIC UNITS. To promote an orderly transition to metric units, this specification includes both English and metric dimensions. The metric conversions may not be exact equivalents, and until an official changeover to metric units is effective, the English dimensions will govern.

David L. Bennett
Director Airport Safety and Standards

1. SCOPE AND CLASSIFICATION.

1.1 Scope. This specification covers the requirements for a circuit selector switch to be used for switching the output of a constant current regulator (CCR) to one or more series lighting loops.

1.2 Classification. This specification covers four types, two classes, and two sizes of circuit selector switches:

1.2.1 Type. This specification covers circuit selector switches of the following types:

Type	L-847-1	One circuit control
Type	L-847-2	Two circuit control
Type	L-847-3	Three circuit control
Type	L-847-4	Four circuit control

1.2.2 Classes. This specification covers circuit selector switches of the following classes:

Class A	Designed for indoor installations
Class B	Designed for outdoor installations

1.2.3 Ratings. This specification covers circuit selector switches of the following ratings:

Rating 1	Designed for 6.6 ampere, 5,000 volt circuits
Rating 2	Designed for 20 ampere, 5,000 volt circuits

2. APPLICABLE DOCUMENTS.

2.1 General. The following documents, of the issue in effect on the date of application for qualification, form part of this specification and are applicable to the extent specified herein.

2.2 Federal Aviation Administration (FAA) Documents.

2.2.1 FAA Standard.

FAA-STD-012a	Paint Systems for Equipment
FED-STD-595	Colors Used in Government Procurement

Copies of FAA Standards may be obtained from:

Federal Aviation Administration
ATO-W CM - NAS Documentation Control Center
800 Independence Avenue, SW
Washington, DC 20591
Phone: (202) 548-5502
Fax: (202) 548-5501

Website: <http://www.faa.gov/cm/dcc/>

2.2.2 FAA Advisory Circular.

AC 150/5345-53 Airport Lighting Equipment Certification Program

Copies of FAA ACs may be obtained from:

Department of Transportation
General Services Division
M-45
Washington, DC 20590
Phone: (202) 267-3115, -3161, and -8329

Website:
http://www.faa.gov/airports_airtraffic/airports/resources/advisory_circulars/

2.3 Military Standard.

MIL-STD810C Environmental Test Methods

Copies of Military Standards and Specification Publications may be obtained from:

DAPS/DODSSP
Building 4, Section D
700 Robins Avenue
Philadelphia, PA 19111-5094
Phone: (215) 697-2179
Fax: (215) 697-1460

Website: <http://dodssp.daps.dla.mil/>

3. REQUIREMENTS.

3.1 General Functional Requirements. The circuit selector switch(es) must be capable of switching the output of a constant current regulator to one or more series lighting circuits (loops), as illustrated in figure 1. The selector switch must be controllable locally or from a remote location. External control switches for remote operation are to be supplied by others.

3.2 Environmental Requirements. The circuit selector switch(es) must be designed for operations under the following environmental conditions:

- a. An ambient temperature range of -40° F (-40° C) to + 131° F (+55°)C
- b. A pressure altitude range of sea level to 10,000 feet (3,000 m).
- c. A relative humidity of up to 100 percent from sea level to 10,000 feet (3,000 m) at an ambient temperature of + 131° F (+55°)C -.

3.3 Enclosures. All components must be mounted in an enclosure with a hinged access door capable of being padlocked. Class A selector switch enclosures must be designed for wall mounting and be equal to a National Electrical Manufacturers Association (NEMA) type 1. Class B selector switch enclosures must be designed to allow bottom mounting by means of a 2-inch conduit and be equal to a NEMA type 4. All external electrical wiring is to enter the enclosure through conduit. The size of the enclosure must be held to a minimum consistent with good design practices. All high-voltage connections must be made behind a dead front panel so as to be inaccessible when the enclosure door is opened to allow local control operations. The enclosure must be painted in accordance with the applicable section of FAA-STD-012a. Class B enclosures must be painted with aviation orange paint # 12197 per FED-STD-595.

3.4 High-Voltage Contacts. The circuits must be switched through a series of high-voltage contacts as shown in figure 1. When a circuit is to be energized, the normally open contacts close first, followed by the opening of the normally closed contact across the constant current regulator input to the switch. The reverse procedure is followed when de-energizing the circuit. The contacts must be rated to interrupt a 6.6-ampere circuit for the Rating 1 switch and a 20-ampere circuit for the Rating 2 switch from a constant current regulated power source having a circuit voltage of up to 5,000 volts. After 10,000 cycles of switching, the assembly under load at rated current, the contact resistance of the relay switches must not exceed 0.1 ohm. Contact resistance is to be measured at rated current by voltage drop or a milli-ohm meter. All relay/contactors technologies (air, vacuum type, etc.) must not become pitted after cycle testing to the extent of releasing smoke or causing fire.

- a. An optional monitoring contact closure for each L-847 output may be specified, which closes dry contacts for any L-847 output that is activated.

3.5 Switches. Switches must be provided to permit remote or local control and to make circuit selections. The control switch must provide an OFF, REMOTE, and LOCAL function and be so marked. A switch with the capacity to provide local circuit selection of 1, 2, 3, or 4 lighting loops, according to circuit selector switch type, must have markings of S1, S2, S3, and S4 as appropriate. The control switch must function as follows:

- a. When the control switch is in the REMOTE position, the internal control circuitry must allow single or multiple circuit selection to be made from a remote location.
- b. When the control switch is in the OFF position, the input from the constant current regulator is short-circuited and unavailable for the lighting circuits.
- c. When the control switch is in the LOCAL position, lighting circuit selections can be made locally.
- d. An optional door interlock switch may be specified that de-energizes the output of all constant current regulators when the L-847 door is opened.

3.6 Terminals. Suitable terminals must be provided for the high-voltage connections from the constant current regulator and to the lighting circuits. Terminals or a terminal strip must be provided for the control connections. The terminals must be marked as follows:

- a. The input terminals for connections from the constant current regulator must be labeled "R1" and "R2."
- b. The output terminals for the lighting circuit(s) must be labeled "Loop 1, Loop 2", etc.
- c. The terminals provided for control circuits must be labeled as follows: "L" and "LN" for 120 AC input voltage OR 24/48 volts DC input voltage; "CR, C, CI", etc. for remote control switch(es).

Note: Alternate control signals must be appropriately labeled.

3.7 Assembly. All wire used must have copper conductors of adequate current carrying capacity with insulation suitable for the working voltages encountered. Wires must be properly trained and cabled. If printed circuit boards are used, they must be easily removable for servicing or replacement. The switch assembly must be constructed so parts will not work loose during normal operations.

3.8 Nameplate. A nameplate, permanently and legibly filled in with at least the information listed below, must be securely attached to the outside of the enclosure.

CIRCUIT SELECTOR SWITCH

Manufacturer's name

Type_____ , Rating_____, Class

3.9 Equipment Instruction Manual. A parts list with installation, maintenance, and repair instructions must be furnished with each assembly. Schematic drawings and necessary illustrations must be provided to indicate clearly the method of installation and the identity and location of all component parts to facilitate field repairs.

4. QUALITY ASSURANCE PROVISIONS.

4.1 Qualification Procedures. Procedures for obtaining qualification approval for equipment to be furnished for Federal grant assistance programs at airports are contained in the current edition of AC 150/5345-53, Airport Lighting Equipment Certification Program.

4.2 Qualification Tests. All tests contained in paragraph 4.4 are applicable for qualification.

4.3 Production Tests. The following tests are applicable for all production units: 4.4.3, 4.4.4, and 4.4.6.

4.4 Tests.

4.4.1 Temperature-Altitude. The test must be in accordance with Procedure I, Method 504.1, of MIL-STD-810C for equipment in Category 2. The equipment must be tested at atmospheric pressures corresponding to sea level and 10,000 feet (3,000 m) altitude at both -67°F (-55° C) and +131°F (+55° C). Make the following step substitutions to Table 504.1-11, Category 2, for this test:

Table 1. Specifications for Temperature and Altitude Testing

STEP		1a	1b	2	3	6	7	10
Temp	(°F)	77	-67	-67	-67	131	131	131
	(°C)	25	-55	-55	-55	55	55	55
Alt	(ft)	10,000	Site	Site	10,000	Site	Site	10,000
Time	(hr)	1	4	--	--	16	#	

- Until temperature stabilizes

4.4.2 Humidity. The test must be in accordance with Procedure I, Method 507.1, of MIL-STD-810C except that a total of two complete cycles (48 hours) will be required.

4.4.3 Examination. Each assembly must be inspected to assure compliance with the requirements specified herein with respect to materials, workmanship, and marking.

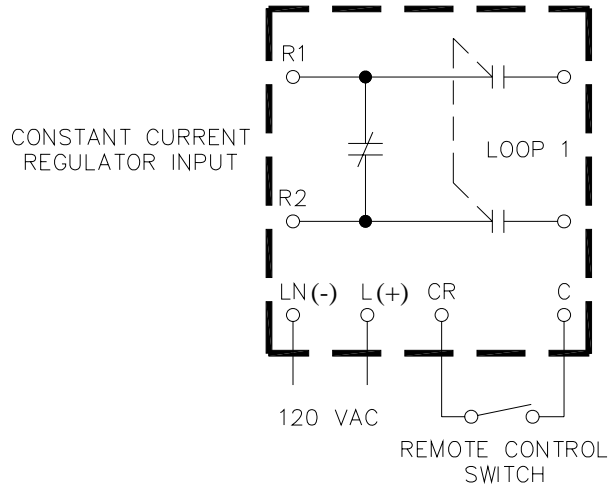
4.4.4 Dielectric. Each assembly must withstand the following alternating current voltage for one minute without failure:

- a. High-voltage input and output bushings to ground, 11,000 volts.
- b. Control circuit to ground, 1,500 volts.

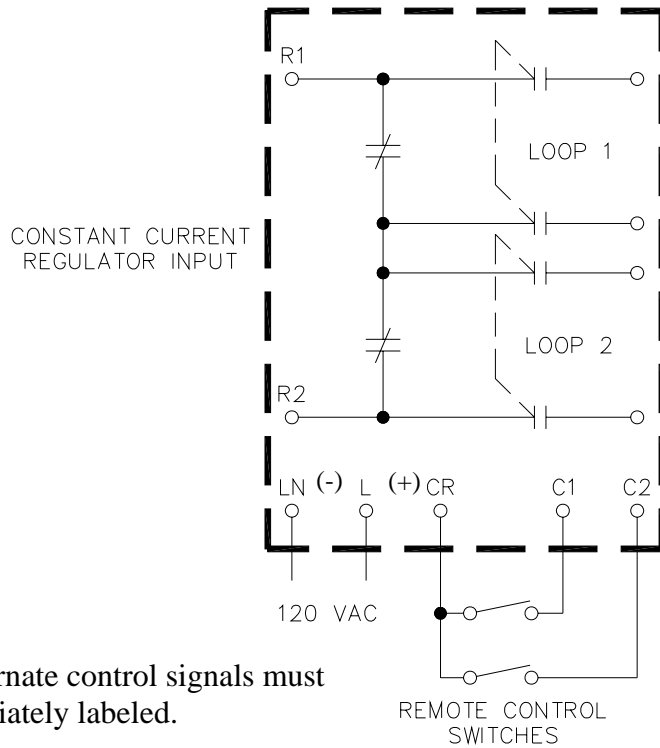
4.4.5 Load Test. The circuit selector switch must be subjected to an operational test to demonstrate that the equipment will meet the requirements of paragraph 3.4. Rating 1 equipment must be tested by switching a fully loaded circuit of a 30 kW constant current regulator. Rating 2 equipment must be tested by switching a fully loaded circuit of a 70 kW constant current regulator. Multiple circuit selector switches must be tested with one circuit loaded and the others short-circuited during the test.

4.4.6 Operation. Each assembly must be tested to verify that the remote control circuit, the local control circuit, and the relay switches operate satisfactorily.

Note: Alternate control signals must be appropriately labeled.



TYPE L-847-1



Note: Alternate control signals must be appropriately labeled.

TYPE L-847-2

Figure 1. Typical Relay Contact Arrangement

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