



Advisory Circular

Subject: Specifications for Airport
Lighting Circuit Selector Switch

Date: Draft

AC No: 150/5345-5C

Initiated By: AAS-100

Change:

1 1 **Purpose.**

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

4 2 **Effective Date.**

5 Effective 6 months after the issue date of this advisory circular, only that equipment
6 qualified in accordance with the specifications contained in this AC will be listed in AC
7 150/5345-53, *Airport Lighting Equipment Certification Program*.

8 3 **Cancellation.**

9 This AC cancels AC 150/5345-5B, *Specification for L-847 Circuit Selector Switch,*
10 *5,000 Volt 20 Ampere*, dated September 14, 2006.

11 4 **Application.**

12 The Federal Aviation Administration (FAA) recommends the guidance and
13 specifications in this AC for Specifications for Airport Lighting Circuit Selector Switch.
14 In general, use of this AC is not mandatory. However, use of this AC is mandatory for
15 all projects funded with federal grant monies through the Airport Improvement Program
16 (AIP) or with revenue from the Passenger Facility Charges (PFC) Program. See Grant
17 Assistance No. 34, *Policies, Standards, and Specifications*, and PFC Assurance No. 9,
18 *Standards and Specifications*.

19 5 **Principal Changes.**

20 The AC incorporates the following principal changes:

- 21 1. Updated the “Application” paragraph above.
- 22 2. Updated “Applicable Documents” references in Chapter 2.
- 23 3. Provided clarification to language in Chapter 3.
- 24 4. Reformatted Figure 4-1.

25 5. Updated the format of the document in this version, and made minor editorial
26 changes throughout.

27 Hyperlinks (allowing the reader to access documents located on the internet and to
28 maneuver within this document) are provided throughout this document and are
29 identified with underlined text. When navigating within this document, return to the
30 previously viewed page by pressing the “ALT” and “ ← “ keys simultaneously.

31 The figure in this document is a schematic representation and is not to scale.

32 **6 Use of Metrics.**

33 Throughout this AC, U.S. customary units are used followed with “soft” (rounded)
34 conversion to metric units. The U.S. customary units govern.

35 **7 Where to Find this AC.**

36 You can view a list of all ACs at
37 http://www.faa.gov/regulations_policies/advisory_circulars/. You can view the Federal
38 Aviation Regulations at http://www.faa.gov/regulations_policies/faq_regulations/.

39 **8 Feedback on this AC.**

40 If you have suggestions for improving this AC, you may use the [Advisory Circular](#)
41 [Feedback](#) form at the end of this AC.

John R. Dermody
Director of Airport Safety and Standards

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CHAPTER 1. SCOPE AND CLASSIFICATION71 1.1 **Scope.**

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

75 1.2 **Classification.**

76 This specification covers four types, two classes, and two sizes of circuit selector
77 switches:

78 1.2.1 Type.

79 This specification covers circuit selector switches of the following types:

- 80 • Type L-847-1 One circuit control
- 81 • Type L-847-2 Two circuit control
- 82 • Type L-847-3 Three circuit control
- 83 • Type L-847-4 Four circuit control

84 1.2.2 Classes.

85 This specification covers circuit selector switches of the following classes:

- 86 • Class A Designed for indoor installations
- 87 • Class B Designed for outdoor installations

88 1.2.3 Ratings.

89 This specification covers circuit selector switches of the following ratings:

- 90 • Rating 1 Designed for 6.6 ampere, 5,000-volt circuits
- 91 • Rating 2 Designed for 20-ampere, 5,000-volt circuits

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CHAPTER 2. APPLICABLE DOCUMENTS93 2.1 **General.**

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

97 2.2 **Federal Aviation Administration (FAA) Documents.**

98 AC 150/5345-53 *Airport Lighting Equipment Certification Program*

99 Copies of FAA ACs may be obtained from website:

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

101 2.3 **US Department of Transportation (DOT) Standard.**

102 *FAA-STD-012a* *Paint Systems for Equipment*

103 Copies of **this standard** are available for purchase online.

104 2.4 **SAE International Standard.**

105 *SAE-AMS-STD-595* *Colors Used in Government Procurement*

106 Copies of SAE standards may be purchased from website: <https://www.sae.org/>

107 2.5 **Military Standard.**

108 *MIL-STD-810C* *Environmental Test Methods*

109 Copies of Military Standards and Specification Publications may be obtained from
110 website: <https://assist.dla.mil>

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CHAPTER 3. REQUIREMENTS112 3.1 **General Functional Requirements.**

113 The circuit selector switch(es) must be capable of switching the output of a constant
114 current regulator to one or more series lighting circuits (loops), as illustrated in Figure
115 4-1. The selector switch must be **controlled** locally or from a remote location. External
116 control switches for remote operation are to be supplied by others.

117 3.2 **Environmental Requirements.**

118 The circuit selector switch(es) must be designed for operations under the following
119 environmental conditions:

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

124 3.3 **Enclosures.**

125 All components must be mounted in an enclosure with a hinged access door capable of
126 being padlocked. Class A selector switch enclosures must be designed for wall
127 mounting and be equal to a National Electrical Manufacturers Association (NEMA)
128 **Type 1**. Class B selector switch enclosures must be designed to allow bottom mounting
129 by means of a 2-inch conduit and be equal to a NEMA **Type 4**. All external electrical
130 wiring is to enter the enclosure through conduit. The size of the enclosure must be held
131 to a minimum consistent with good design practices. All high-voltage connections must
132 be made behind a dead front panel **to prevent accessibility** when the enclosure door is
133 opened. **This allows safe** local control operations. The enclosure must be painted in
134 accordance with the applicable section of FAA-STD-012a. Class B enclosures must be
135 painted with aviation orange paint #12197 per **SAE-AMS-STD-595**.

136 3.4 **High-Voltage Contacts.**

137 The circuits must be switched through a series of high-voltage contacts as shown in
138 Figure 4-1. When a circuit is energized, the normally open contacts close first, followed
139 by the opening of the normally closed contact across the constant current regulator input
140 to the switch. The reverse procedure is followed when de-energizing the circuit. The
141 contacts must be rated to interrupt a 6.6-ampere circuit for the Rating 1 switch and a 20-
142 ampere circuit for the Rating 2 switch from a constant current regulated power source
143 having a circuit voltage of up to 5,000 volts. **The contact resistance of the relay switches**
144 **must not exceed 0.1 ohm for the assembly under load at rated current after 10,000**
145 **cycles of switching**. Contact resistance is to be measured at rated current by voltage
146 drop or a milli-ohm meter. All relay/contactors technologies (air, vacuum type, etc.)

147 must not become pitted after cycle testing to the extent of releasing smoke or causing
148 fire.

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

151 3.5 **Switches.**

152 Switches must be provided to permit remote or local control and to make circuit
153 selections. The control switch must provide an OFF, REMOTE, and LOCAL function
154 and be so marked. A switch with the capacity to provide local circuit selection of 1, 2,
155 3, or 4 lighting loops, according to circuit selector switch type, must have markings of
156 S1, S2, S3, and S4 as appropriate. The control switch must function as follows:

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

165 3.6 **Terminals.**

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

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

176 **Note:** Alternate control signals must be appropriately labeled.

177 3.7 **Assembly.**

178 All wire used must have copper conductors of adequate current carrying capacity with
179 insulation suitable for the working voltages encountered. Wires must be properly
180 trained and cabled. If printed circuit boards are used, they must be easily removable for
181 servicing or replacement. The switch assembly must be constructed so parts will
182 **maintain structural integrity** during normal operations.

- 183 3.8 **Nameplate.**
184 A nameplate, permanently and legibly filled with at least the information listed below,
185 must be securely attached to the outside of the enclosure.

186 **CIRCUIT SELECTOR SWITCH**

187 **Manufacturer's name**

188 **Type _____, Rating _____, Class**

- 189 3.9 **Equipment Instruction Manual.**
190 A parts list with installation, maintenance, and repair instructions must be furnished
191 with each assembly. Schematic drawings and necessary illustrations must be provided
192 to indicate clearly the method of installation and the identity and location of all
193 component parts to facilitate field repairs.

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CHAPTER 4. QUALITY ASSURANCE PROVISIONS.

195

4.1 Qualification Procedures.

196

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

197

198

199

4.2 Qualification Tests.

200

All tests contained in paragraph 4.4 are applicable for qualification.

201

4.3 Production Tests.

202

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

203

4.4 Tests.

204

4.4.1 Temperature-Altitude.

205

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:

206

207

208

209

210

Table 4-1. 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	#	

211

- Until temperature stabilizes

212

4.4.2 Humidity.

213

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.

214

215

4.4.3 Examination.

216

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

217

218 4.4.4 Dielectric.

219 Each assembly must withstand the following alternating current voltage for one minute
220 without failure:

- 221 1. High-voltage input and output bushings to ground, 11,000 volts.
- 222 2. Control circuit to ground, 1,500 volts.

223 4.4.5 Load Test.

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

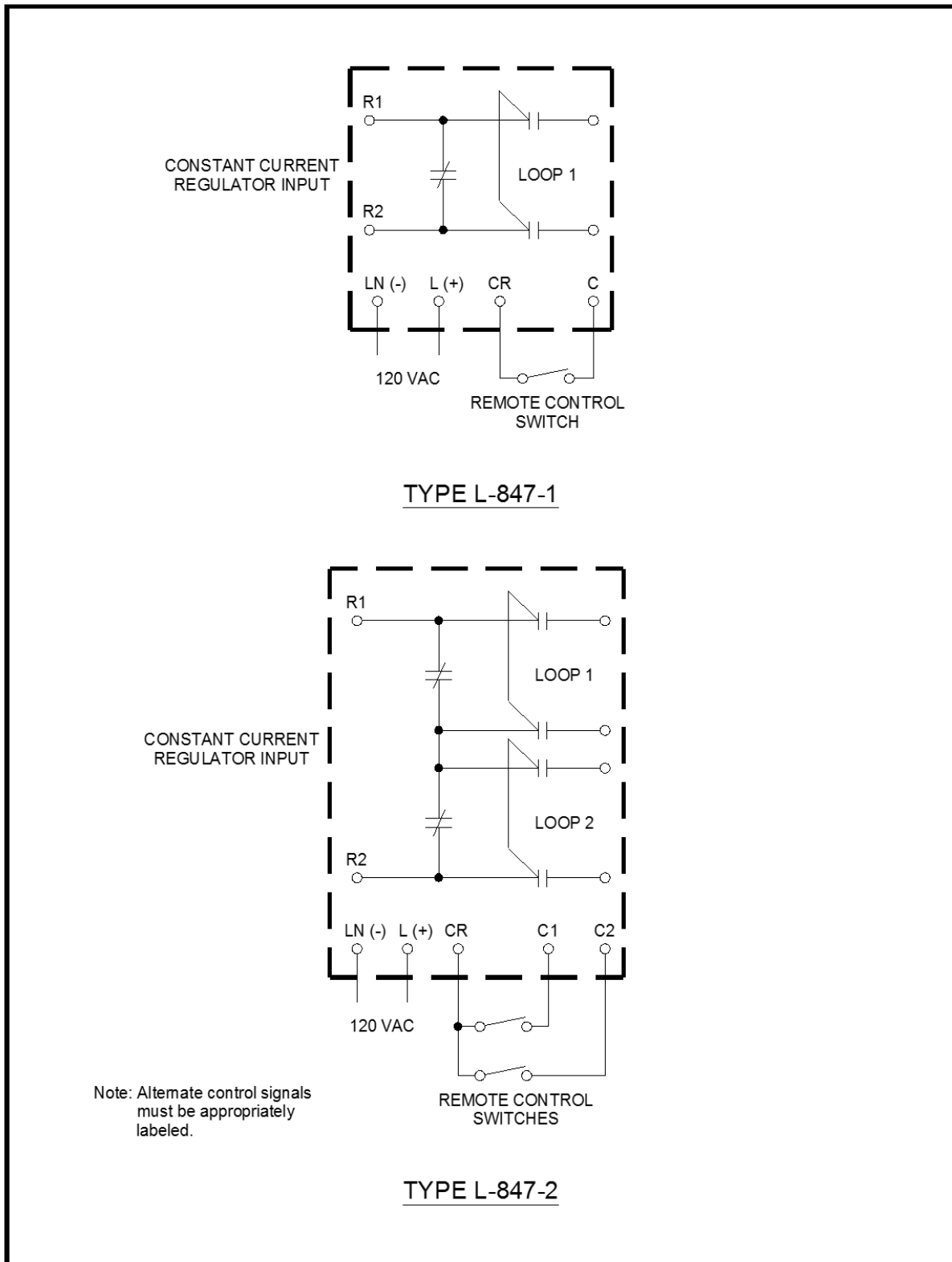
230 4.4.6 Operation.

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

233 **Note:** Alternate control signals must be appropriately labeled.

234

Figure 4-1. Typical Relay Contact Arrangement



235

Advisory Circular Feedback

If you find an error in this AC, have recommendations for improving it, or have suggestions for new items/subjects to be added, you may let us know by (1) mailing this form to Manager, Airport Engineering Division, Federal Aviation Administration ATTN: AAS-100, 800 Independence Avenue SW, Washington DC 20591 or (2) faxing it to the attention of the Office of Airport Safety and Standards at (202) 267-5383.

Subject: AC 150/5345-5C

Date: _____

Please check all appropriate line items:

An error (procedural or typographical) has been noted in paragraph _____ on page _____.

Recommend paragraph _____ on page _____ be changed as follows:

In a future change to this AC, please cover the following subject:
(Briefly describe what you want added.)

Other comments:

I would like to discuss the above. Please contact me at (phone number, email address).

Submitted by: _____

Date: _____