U.S. Department
of Transportation
Federal Aviation
Administration

Advisory Circular

Subject: Specification for L-884, Power and Control Unit for Land and Hold Short Lighting Systems	**Date:** Draft **Initiated By:** AAS-100	**AC No:** 150/5345-54C **Change:**

1 Purpose.

This advisory circular (AC) contains the Federal Aviation Administration (FAA) standards for Power and Control units for Land and Hold Short Lighting Systems.

2 Effective Date.

Effective six months after the date of this advisory circular, only equipment qualified to this specification will be listed in AC 150/5345-53, *Airport Lighting Equipment Certification Program (ALCEP).*

3 Cancellation.

AC 150/5345-54B, *Specification for L-884 Power and Control Unit for Land and Hold Short Lighting Systems*, dated 9/30/2009, is cancelled.

4 Application.

The Federal Aviation Administration (FAA) recommends the guidelines and standards in this Advisory Circular relating to Specification for the L-884, Power and Control Unit for Land and Hold Short Lighting Systems. In general, use of this AC is not mandatory. However, use of this AC is mandatory for all projects funded with federal grant monies through the Airport Improvement Program (AIP) and with revenue from the Passenger Facility Charges (PFC) Program. See Grant Assurance No. 34, "Policies, Standards, and Specifications," and PFC Assurance No. 9, "Standards and Specifications."

5 Related Documents.

ACs and FAA Orders referenced in the text of this AC do not include a revision letter, as they refer to the latest version.

6 Principal Changes.

The AC incorporates the following principal changes:

1. Changed Location Category waveform requirements from "C1" to "C2" of ANSI/IEEE C62.41-1991, *Recommended Practice on Surge Voltages in Low Voltage AC Power Circuits*, to address. This applies to paragraph 3.4.4 "Lightning Arrestors," item 3, and paragraph 4.2.10 "Surge Test."
2. The format of the document has been updated in this version, and minor editorial changes have been made throughout.

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

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

7 Definitions.

- **Land and Hold Short Operations (LAHSO)** – these operations include landing and holding short of an intersecting runway, an intersecting taxiway, or some other predetermined point on the runway other than on a runway or taxiway.
- **LAHSO Light Bar** – a row of six or seven in-pavement unidirectional pulsing white lights installed in a runway that visually indicates to a pilot the hold short point during a LAHSO operation.
- **Light Unit** – a single light assembly including the fixture, filter, light source, etc.

8 Background.

FAA Order 7110.118, *Land and Hold Short Operations (LAHSO)*, provides operational requirements for lighting systems and other visual navigation aids required to conduct LAHSO.

9 Use of Metrics.

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

10 Where to Find this AC.

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

11 **Feedback on this AC.**

If you have suggestions for improving this AC, you may use the Advisory Circular 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 CLASSIFICATION

1.1 Scope.

This specification contains the requirements for a power and control unit (PCU) used to control and pulse land and hold short lighting systems.

1.2 Classification.

Type L-884 – Power and Control Unit for Land and Hold Short Lighting Systems

1.3 Style.

Two styles Type L-884 are covered by this specification.

Style	Description
I	Indoor Unit
II	Outdoor Unit

1.4 Voltage and Frequency Ratings.

Standard voltages and frequency ratings are as follows:

Standard Voltages (Volts (V) in)	Standard Frequency (Hertz (Hz))
120, 208, 240 V	50, 60 Hz

Other voltages may be used to suit local site availability.

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CHAPTER 2. REFERENCED DOCUMENTS

The following is a list of documents referenced in this AC.

2.1 FAA Advisory Circulars.

FAA Advisory Circulars may be obtained from www.faa.gov/airports/resources/advisory_circulars/

AC 150/5300-13	*Airport Design*
AC 150/5340-30	*Design and Installation Details for Airport Visual Aids*
AC 150/5345-3	*Specification for L-821, Panels for the Control of Airport Lighting*
AC 150/5345-53	*Airport Lighting Equipment Certification Program*
AC 150/5345-56	*Specification for L-890 Airport Lighting Control and Monitoring System (ALCMS)*

2.2 FAA Drawings.

FAA Drawing C-6046	*Frangible Coupling Type I and Type IA, Details*

2.3 FAA Orders.

FAA Orders may be obtained from www.faa.gov/regulations_policies/orders_notices/

FAA Order 7110.118	*Land and Hold Short Operations (LAHSO)*

2.4 Federal Standards.

Federal specifications and standards may be obtained from www.dsp.dla.mil

Federal Standard 595	*Colors Used in Government Procurement*

2.5 American National Standards Institute (ANSI) publications.

ANSI documents may be obtained from www.ansi.org

ANSI C57.12.91	*Standard for Dry-Type Transformers*

2.6 Military Standards.

Military documents may be obtained from http://quicksearch.dla.mil/

MIL-STD-810F	*Environmental Engineering Considerations and Laboratory Tests*

2.7 **National Electrical Manufacturers Association (NEMA) Standards**

www.nema.org

NEMA 250	*Enclosures for Electrical Equipment (1000 volts maximum)*

2.8 **Federal Regulations.**

Copies of Codes of Federal Regulations (CFRs) may be obtained free of charge from https://www.ecfr.gov

Title 47 CFR Part 15	*Radio Frequency Devices*
14 CFR Part 91	*General Operating and Flight Rules*
14 CFR Part 125	*Certification and Operations: Airplanes having a seating capacity of 20 or more passengers or a maximum payload capacity of 6,000 pounds or more; and rules governing persons on board such aircraft*

2.9 **Institute of Electrical and Electronics Engineers (IEEE) Standards**

Copies of IEEE documents may be obtained from http://standards.ieee.org/findstds/

IEEE C62.41	*IEEE Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits*

CHAPTER 3. EQUIPMENT REQUIREMENTS.

3.1 General Requirements.

The L-884 PCU must be designed to power and simultaneously pulse all lights in a LAHSO light bar. A LAHSO light bar is a row of six or seven in-pavement unidirectional pulsing white lights installed in a runway to visually indicate the location of a LAHSO point on a runway (see FAA Order 7110.118, *Land and Hold Short Operations (LAHSO)*, for additional information). See AC 150/5340-30, *Design and Installation Details for Airport Visual Aids*, for detailed equipment installation and light bar location/spacing requirements.

3.2 Environmental Requirements.

3.2.1 Style I, Indoor PCU.

Equipment intended for indoor installation must be designed to operate in the following conditions:

1. Temperature. Any ambient temperature from 0 to 131° Fahrenheit (F) (0 to 55° Celsius (C)).
2. Humidity. Any relative humidity from 10% to 95%.
3. Altitude. Any altitude from zero to 6,600 feet (2000 m).

3.2.2 Style II, Outdoor PCU.

Equipment intended for outdoor installation must be designed to operate properly under the following conditions:

1. **Temperature.** Any ambient temperature from -40 to 131°F (-40 to 55°C).
2. **Humidity.** Any relative humidity from 0% to 100% at an ambient temperature of 131°F (55°C).
3. **Altitude.** Any altitude from zero to 6,600 feet (2000 m).
4. **Windblown Rain.** Exposure to windblown rain from any direction.
5. **Wind.** Exposure to wind speeds up to 100 mph (161 km/hr) from any direction.
6. **Salt-Spray.** Exposure to salt-laden atmosphere.
7. **Sunshine.** Exposure to solar radiation.

3.3 Design Requirements.

3.3.1 Enclosures.

The PCU must be housed in an environmentally appropriate NEMA electrical enclosure. The enclosure must provide suitable space for the manufacturer's equipment design. The PCU must have a hinged access door with provisions for padlocking.

3.3.1.1 **Style I, Indoor PCU.**

Style I PCUs must be housed in a NEMA Style 1 enclosure.

3.3.1.2 **Style II, Outdoor PCU.**

Style II PCUs must be housed in a NEMA Style 4 or 4X enclosure.

Note: A NEMA 4X (stainless steel) enclosure should be used where an additional level of corrosion protection is desirable (example: airports located near coastal areas with salt laden air).

1. The total weight of a style II PCU must not exceed 100 pounds (lbs) (45 kilogram (kg)).
2. When style II PCUs are installed per the manufacturer's instructions, the top of the unit must not be higher than 42 inches (1.06 meter) above ground level.
3. Style II outdoor PCUs designed for installation inside the runway safety area (RSA) and taxiway safety area (TSA) must:
   a. not be higher than 30 inches (0.76 meter (m)) above ground level (measured from the top of the cabinet).
   b. not exceed 75 lbs. (34 kg),
   c. be installed with frangible couplings per FAA drawing C-6046, *Frangible Coupling Type I and Type IA, Details* or a coupling provided by the manufacturer with equivalent performance.
   d. use frangible coupling and mounting flanges designed for 2 inch (51 millimeters) electrical metallic tubing (EMT).
   e. use a suitable base for mounting the equipment on a concrete pad (see AC 150/5340-30 for additional installation information).

Note: See AC 150/5300-13, *Airport Design,* for detailed additional information about the RSA/TSA and additional requirements about frangible coupling maximum height above grade.

4. Any external plastic parts (for example, a housing for a photocell, plastic nameplates) used on a Style II PCU enclosure must be resistant to material degradation caused by exposure to solar radiation.

3.3.1.3 **Size.**

The PCU enclosure must not exceed the following maximum dimensions: width 24 in. (0.61 m), height 36 inches (0.92 m), and depth 9 inches (23 centimeters (cm)).

3.3.1.4 **Painting and Finishing.**

1. The inside and outside of the PCU enclosure must be protected against corrosion by at least one prime coat (or other suitable preparatory processes) and one finish coat.

2. Paint used for the primer coating must be compatible with the cabinet base metal or any conversion coatings.

3. Paint for the finish coat must be any high-quality paint compatible with the primer coat.

4. The color of the outside finish coat for all PCUs must be international orange, color No. 12197, Federal Standard 595 or equivalent. The outside painted surface of the enclosure must be free of scratches, blemishes, and chipping.

Note: The PCU enclosure may be finished with powder coatings that provide an equivalent level of corrosion protection and meet the color requirements.

3.3.2 Control Cabinet.

The control circuits, relays, sensing devices, control terminal block, remote/local control switch or keypad, and other low voltage control components must be protected from the environment per paragraph 3.2. Protection may be provided by the main enclosure or an additional cabinet/compartment installed inside the PCU. All low voltage control components must be easily accessible to maintenance personnel.

3.3.3 Switches.

1. Each PCU must be designed with a local control switch and an input power switch.

2. Both switches must be located inside the enclosure.

Note: For Style I PCUs only, the manufacturer may offer an optional REMOTE/LOCAL control switch that is mounted on the exterior of the enclosure.

3. The switches must have a contact rating of 125% of the maximum PCU load current and must be rated to meet the circuit voltage requirements.

4. All switches installed for Style II PCUs must be designed for outdoor applications.

3.3.3.1 **PCU Local Control Switch (Output Power).**

The local control switch must energize and de-energize the PCU output power.

1. The PCU local control switch must be clearly and permanently marked to indicate the local control settings.

2. The switch positions must include:

- REMOTE
- OFF
- B3 (4.1 A)
- B4 (5.2A)
- B5 (6.6 A)

3. When the local control switch is in the "OFF" position or set to any of the brightness steps, the local setting must override the "ON/OFF" switch on the L-821 remote control panel (or equivalent Airfield Lighting Computerized Monitor System (ALCMS), Type L-890) and the PCU's automatic intensity (brightness) control system.

4. The PCU must be designed with a method (input/output on a terminal strip or serial data link) that is used to send the status of the PCU local control switch to the airport traffic control tower (ATCT).

5. When connected, a "TOWER CONTROL" light must illuminate on the L-821 LAHSO display panel in the ATCT (or a similar indication on the L-890 equipment touchscreen display) when the local control switch on the PCU is set to "REMOTE."

6. A "FIELD CONTROL" light must illuminate on the L-821 panel in the ATCT (or a similar indication on the ALCMS touchscreen panel) whenever the local control switch is at a setting other than "REMOTE." If a relay is used for this function, the "FIELD CONTROL" light must be illuminated when the relay is de-energized.

3.3.3.2 **PCU Alternating Current (AC) Input Power Switch.**

The PCU AC input power switch must be located inside the PCU enclosure to de-energize input power to the unit for maintenance. The switch must be designed so that when it is operated by maintenance personnel, the input power to the PCU is disconnected (the switch must have a provision for locking) and the unit is completely de-energized. The input power switch must be permanently and clearly marked to indicate when the PCU is "ON" (energized) or "OFF" (de-energized).

3.3.4 Components.

All PCU components must be suitable for their function and must not be operated more than the component manufacturer's recommended rating.

3.3.4.1 **Transformer Temperature Rise.**

The average temperature rise of the primary power transformer windings must be rated at 176°F (80°C). The transformer must not exceed the specified temperature rise when the PCU is operated continuously at its maximum load at 131°F (55°C).

Note: The temperature rise requirements in this paragraph are applicable only to the primary power transformer used within the PCU to generate internal voltages necessary for operation of internal circuitry.

3.4 Electrical Requirements.

3.4.1 Input Voltage.

The PCU must be designed to operate from any standard utility single-phase alternating current service voltage of less than 600 volts, at power line frequencies of 50 or 60 Hz. See paragraph 1.4 for standard voltages and frequency.

3.4.2 Output Current.

3.4.2.1 Pulse Rate.

The output current of the PCU must continuously alternate between "ON" and "OFF" to simultaneously pulse all the LAHSO light fixtures.

1. The "ON" cycle duration must be 1.72 seconds (±0.1 seconds).
2. The "OFF" cycle duration must be 0.46 seconds (±0.1 seconds).
3. The light units in the LAHSO light bar must always simultaneously pulse – the tolerance applies to the entire light bar inclusive of all light units.

3.4.2.2 Peak Current.

The PCU must be designed to develop an output current during the "ON" cycle within the allowable ranges per Table 3-1, while powering any load between no load (short circuit) and full (rated) load. Once the maximum output current is reached, the current must not fall below the "allowable range" in Table 3-1 until the beginning of the "OFF" cycle. The output current during the "OFF" cycle must be 1.0 ampere (A), (± 0.5 A) for all intensity steps.

Table 3-1. PCU Peak Output Current (Amperes RMS).

Step	Nominal Output	Allowable Range
5	6.6 A	6.40 – 6.70 A
4	5.2 A	5.04 – 5.36 A
3	4.1 A	3.98 – 4.22 A
2	Not Used	--
1	Not Used	--

3.4.2.3 Output Current Surge Limitation.

Switching the PCU "ON" and "OFF," changing brightness steps, or shorting the load must not produce output transients or surges that will damage the LAHSO light fixture lamps. If a time delay is used, the delay

between the PCU being switched "ON" to the delivery of current to the LAHSO light bar must not exceed 2.0 seconds.

3.4.3 Loss of Power.

In the event of a loss of AC input power, the PCU must resume normal operation within 5.0 seconds after the restoration of input power.

3.4.4 Lightning Arresters.

Lightning arresters must be provided for each PCU.

1. The arresters must be provided for both the AC power input and output field lighting circuit.
2. The ground side of the arresters must be connected to the grounding lug of the enclosure or another suitable location.
3. The arresters must be designed to withstand the waveforms detailed in Table 4, Location Category C2 of ANSI/IEEE C62.41-1991, *Recommended Practice on Surge Voltages in Low Voltage AC Power Circuits*, standard 1.2/50 microsecond (µS) — 8/20 µS combination wave. Peak voltage is 10 kilovolts, peak current is 5 kilo amps with a nominal ratio of peak open circuit voltage to peak short circuit current of 2 ohms.
4. PCU control, monitoring and serial data lines (if used) must be protected per subparagraph 3 above.

3.4.5 Electromagnetic Interference.

1. The PCU is considered to be an unintentional radiator and must minimize radiated/conducted electromagnetic interference to other FAA equipment such as computers, radars, instrument landing systems, radio receivers, very high frequency omnidirectional radio ranges, global positioning system units, etc., that may be located on or near an airport, or use the same power supply. Any electromagnetic interference that degrades, obstructs, or repeatedly interrupts the desired performance of electronic equipment in the airport environment is unacceptable.
2. The PCU power line conducted signal must be within the limits in Title 47 CFR Part 15.107.
3. The PCU radiated signal emissions must be within the limits in Title 47 CFR Part 15.109.

3.4.6 Terminal Block.

1. Pressure-style terminal blocks with a suitable voltage rating must be installed in the PCU cabinet for the connection of external wiring associated with monitoring and remote control.
2. Terminal blocks must accommodate No. 12 to No. 20 AWG wire with insulation rating up to 600 V.
3. Two spare positions must be provided for each terminal bock.

4. Individual terminals must be identified with permanent markings that match the wiring diagram furnished by the manufacturer with the equipment.

3.5 **Control Requirements.**

3.5.1 General Requirement.

The PCU must have the capability to control operational functions locally and/or remotely. The local control must be located in the PCU. A remote control panel must be located in the ATCT. All control panels must be per AC 150/5345-3, *Specification for L-821, Panels for Control of Airport Lighting*. For ALCMS systems, all controls and panels must be per AC 150/5345-56, *Specification for L-890 Airport Lighting Control and Monitoring System (ALCMS)*.

3.5.2 Intensity (Brightness) Control.

When the PCU local control switch is set to the "REMOTE" position, the PCU must automatically select the intensity of the LAHSO light bar. The PCU must be capable of receiving input control signals from a photocell/sensor that detects the outdoor ambient light intensity and a current sensor that detects the current (step) of the runway edge lights installed on the same runway as the LAHSO light bar.

1. Based on the outdoor ambient background illumination falling on the photocell, the PCU must be automatically set in day mode or night mode.
2. In day mode, the system intensity must be set to step 5 (6.6 A).
3. In night mode, the intensity selection is dependent on the intensity setting of the runway edge lights and must be per Table 3-2 in paragraph 3.5.3.
4. If the PCU local control switch is set to "OFF" or a brightness step, the local control setting must override all automatic intensity controls per paragraph 3.3.3.1, subparagraph 3.

3.5.3 Photoelectric Control.

1. The photocell must be installed outdoors and face north.
2. The PCU must automatically set the intensity to the specified day mode setting when the illumination on the photocell rises to 55 (±5) foot-candles (592 (±60) lux), and to night mode settings when the illumination drops to 30 (±5) foot-candles (323 (±32) lux).
3. An intensity setting transition time delay of 45 to 75 seconds must be incorporated into the PCU to prevent intermittent switching that is due to stray light or temporary shadows.
4. For a Style II PCU, the photocell must be externally attached to the enclosure.
5. The photocell mounting method must allow the photocell to be turned 360 degrees in azimuth.

6. The photocell must have locking provisions to prevent it from moving out of position when exposed to the wind velocity per paragraph 3.2.2.

7. A photocell must be provided with each Style I PCU. The purchaser is responsible for installing the photocell remotely per the manufacturer's instructions.

8. In the event of the photoelectric cell or a photoelectric control circuit failure, the PCU must revert to the highest intensity step: step 5 (6.6 A).

Note: A photoelectric control circuit failure is defined as a non-communication or miscommunication of information (for example, the photocell incorrectly identifies daytime as night).

Table 3-2. LAHSO Light Bar Intensity Steps (amperes).

Day Mode			Night Mode	
MIRL/HIRL Light Intensity	**LAHSO Light Bar with MIRL**	**LAHSO Light Bar with HIRL**	**LAHSO Light Bar with MIRL**	**LAHSO Light Bar with HIRL**
5	--	5 (6.6 A)	--	5 (6.6 A)
4	--	5 (6.6 A)	--	5 (6.6 A)
3	5 (6.6 A)	5 (6.6 A)	4 (5.2 A)	4 (5.2 A)
2	5 (6.6 A)	5 (6.6 A)	3 (4.1 A)	3 (4.1 A)
1	5 (6.6 A)	5 (6.6 A)	3 (4.1 A)	3 (4.1 A)
Off	5 (6.6 A)	5 (6.6 A)	3 (4.1 A)	3 (4.1 A)

Note: The table is based on the intensity selections of the runway edge lighting system installed on the same runway as the LAHSO light bar. Runway edge lighting systems are described in AC 150/5340-30.

3.5.4 Monitoring.

The PCU must be designed with internal self-monitoring capabilities.

1. The monitor must detect the status of the PCU ("ON", "OFF", etc.), LAHSO light bar circuit (lights on, lights off, current intensity step, etc.), and each light unit (on or not on when required to be on or off) in the system.

2. The monitor must operate at all lighting intensity steps and when the PCU is controlled remotely or locally.

3. The monitor outputs must be connected to a terminal block to facilitate external connections, and must operate properly when connected to a circuit with a minimum round-trip length of 20,000 feet (3,000 m) using No. 19 AWG wire.

4. The voltage for the monitor external output must not exceed 120 V. A serial data output port for monitoring may be provided at the request of the purchaser in addition to the terminal block.
5. A visual indication must be provided on the monitor to indicate which fault has occurred (except for the loss of input power to the PCU per paragraph 3.5.4, subparagraph 7a.
6. A PCU-on indicator light must be provided to indicate when the unit is energized.
7. If any of the system faults described below occur, a fault light must be displayed for the affected LAHSO light bars on the LAHSO control panel in the ATCT. Upon initial detection of a fault, the monitor must delay the specified amount of time before indicating the fault. The fault and time delay requirements are as follows:
   a. Loss of input power to the PCU. (1.0 second, tolerance: -0, +0.5 second).
   b. Shutdown of the PCU due to operation of any protective circuits. (1.0 second, tolerance: -0, +0.5 second)
   c. A failure of the PCU to pulse the light fixtures. (5 seconds, tolerance: -0, +1.0 second)
   d. A failure of two or more lamps in a LAHSO light bar. (5 seconds, tolerance: -0, +1.0 second).

3.6 **General Requirements.**

3.6.1 Wiring Diagram.

A wiring diagram must be permanently mounted in an unobstructed viewing location in the PCU. The wiring diagram must be protected from dirt, dust, and moisture.

3.6.2 Warning Label.

A plate or decal must be affixed to the front of the control cabinet door warning maintenance personnel to remove input and control power before opening the cabinet. For Style II systems, the warning label must resist fading due to sun exposure.

3.6.3 Nameplate.

A nameplate with the information below must be securely attached to the front of the PCU enclosure. If the nameplate is attached to a readily removable surface, such as a cover, the serial number must be duplicated in a permanent conspicuous place elsewhere on the PCU. For Style II systems, the nameplate must resist fading due to sun exposure.

Land and hold short light power and control unit, single phase.

Input: _____Volts _____Hertz _____Amperes.

Control: _____Volts _____Hertz.

Output: _____kW at _____Amperes.

Output Current: ____/____/____Amperes.

Identification: FAA-L-884 _____Serial No.

3.6.4 Instruction Book.

An instruction book containing at least the following information must be furnished with each PCU:

1. Complete schematic and wiring diagrams showing all components cross-indexed to the parts list.
2. Complete parts list with applicable rating and characteristics of each part and with the component manufacturer's name and part number.
3. Installation instructions.
4. Maintenance instructions.
5. Troubleshooting charts.
6. Theory of operation.
7. Software User’s Manual. (If user accessible software is used in the system design.)

CHAPTER 4. EQUIPMENT QUALIFICATION PROCEDURES

4.1 Qualification Procedures.

Procedures for qualifying equipment to be furnished under the Federal grant assistance program for airports may be found in AC 150/5345-53, *Airport Lighting Equipment Certification Program*.

4.2 Qualification Tests.

The following tests must be performed on each unit submitted for qualification to demonstrate compliance with the specification.

4.2.1 Visual Examination.

The equipment must be examined for compliance with the requirements in this specification for size, weight, materials, finish, and quality of workmanship.

4.2.2 High Temperature Test.

A high temperature test must be conducted per MIL-STD-810F, Method 501.4, Procedure II.

For Style I and II, the equipment must be subjected to a temperature of +131°F (55°C), for 4 hours after temperature stabilization. The test unit must be operated throughout this test and perform all specified functions. Any deterioration in materials or performance must be cause for test failure.

4.2.3 Low Temperature Test.

A low temperature test must be conducted per MIL-STD-810F, Method 502.4, Procedure II.

1. Style I PCUs must be subjected to a 24-hour soak at 0°F (32°C). The test unit must be operated on the first and last cycles of this test and perform all specified functions. Any deterioration in materials or performance will be cause for test failure and equipment rejection.
2. Style II PCUs must be subjected to a 24-hour soak at -40°F (-40°C), ±5°F. The test unit must be operated on the first and last cycles of this test and perform all specified functions. Any deterioration in materials or performance must be cause for test failure and equipment rejection.

4.2.4 Humidity Test.

Subject Type I and II PCUs to a humidity test per MIL-STD-810F, Method 507.4 as modified below:

1. The equipment must be subjected to three cycles (48-hour cycle) per Method 507.4, Figure 507.4-1.
2. The maximum temperature permitted during the 48-hour cycles is +131°F (+55°C).

3. The unit under test must be operated at the test measurement windows indicated in Method 507.4, Figure 507.4-1 for each 48-hour cycle.

4. The unit under test must perform all specified functions when operated per paragraph 4.2.11. Any deterioration in materials or performance must be cause for test failure and equipment rejection.

4.2.5 Rain Test.

This test only applies to the Style II PCU. A wind-blown rain test must be conducted per MIL-STD-810F, Method 506.4, Procedure I, with a rain rate of 5.2 inches/hr (13 cm/hr). The test duration must be 30 minutes per side. Any deterioration of system performance or excessive accumulation of water in the PCU enclosure must be cause for test failure and equipment rejection.

4.2.6 Solar Radiation (sunshine) Test.

This test only applies to Style II PCUs with plastic or other non-metallic external parts.

1. A sunshine test must be conducted per MIL-STD-810F, Method 505.4, Procedure II.

2. The material to be tested must be subjected to a minimum of 56 cycles. The test unit must operate and perform all specified functions after this test. Any evidence of deterioration or alteration of the test unit's performance must be cause for rejection.

Note: Alternatively, a manufacturer may submit a certificate of compliance (C of C) from the plastics manufacturer for third party testing body consideration in lieu of testing per this paragraph. The C of C must attest that the plastic material has met all the requirements of this paragraph.

4.2.7 Transformer Temperature Rise Test.

1. For the equipment under test, determine that the temperature rise of the PCU primary power transformer (see note in paragraph 3.3.4.1) will not exceed its maximum operating or insulation temperature rating.

2. Use test methods with actual loading per IEEE C57.12.91-2001, Section 11, Temperature Test.

Note: Alternatively, a manufacturer may submit a C of C from the transformer manufacturer for third party testing body consideration in lieu of testing per this paragraph. The C of C must attest that the transformer has met all the requirements of this paragraph.

4.2.8 Dielectric Test.

Test the equipment capability to withstand the following 50 or 60 Hz alternating current (AC) root mean square (RMS) test voltages referenced to ground for one minute without failure:

Note: Low voltage components of the unit under test not designed to meet the requirements of this test must be disconnected (example: single circuit board computer).

1. Lightning arresters must be disconnected for the test.
2. 120, 208, and 240-volt input circuit to ground – 2,000 V AC.
3. 480-volt input circuit to ground – 2,000 V AC.
4. Control circuit 120-volt control circuits to ground – 1,000 V AC
5. 48-volt control circuits to ground – 500 V AC.
6. Output circuit to ground – 2,000 V AC.
7. The minimum insulation resistance for this test must be 50 meg-ohms

4.2.9 Electromagnetic Interference Test.

The test unit must be verified for conformance with the electromagnetic interference requirements in paragraph 3.4.5.

1. Conducted Emission Limits:

Frequency of emission (MHz)	**Conducted Limit (dBμV)**	
	Quasi - Peak	**Average**
0.15 - 0.5	79	66
0.5 - 30	73	60

2. Radiated Emission Limits:

Frequency of Emission	**Field Strength (MHz)**
	(micro volts (μV) /meter)
30 - 88	100
88 - 216	150
216 - 960	200
Above 960	500

4.2.10 Surge Test.

Note: The equipment might be damaged by the following test, perform only after all other testing is complete.

Subject the equipment power line and control line inputs to the requirements in Table 4, Location Category C2 of ANSI/IEEE C62.41-1991, *Recommended Practice on Surge Voltages in Low Voltage AC Power Circuits*, standard 1.2/50 microsecond (μS) — 8/20

µS combination wave. Peak voltage is 10 kilovolts, peak current is 5 kilo amps with a nominal ratio of peak open circuit voltage to peak short circuit current of 2 ohms.

4.2.11 Operational Test.

An operational test must be performed to demonstrate compliance with all operating requirements specified in this AC.

1. System correctly pulses (ON/OFF times) the lights per the pulse rate in paragraph 3.4.2.1.
2. System operates with a photocell/current sensor per paragraphs 3.5.2, 3.5.3, and Table 4-2.
3. System monitoring data is performed and displayed per paragraphs 3.5.4, subparagraphs 1 through 7.

CHAPTER 5. PRODUCTION TEST REQUIREMENTS

5.1 Production Tests.

The following tests must be conducted on each PCU.

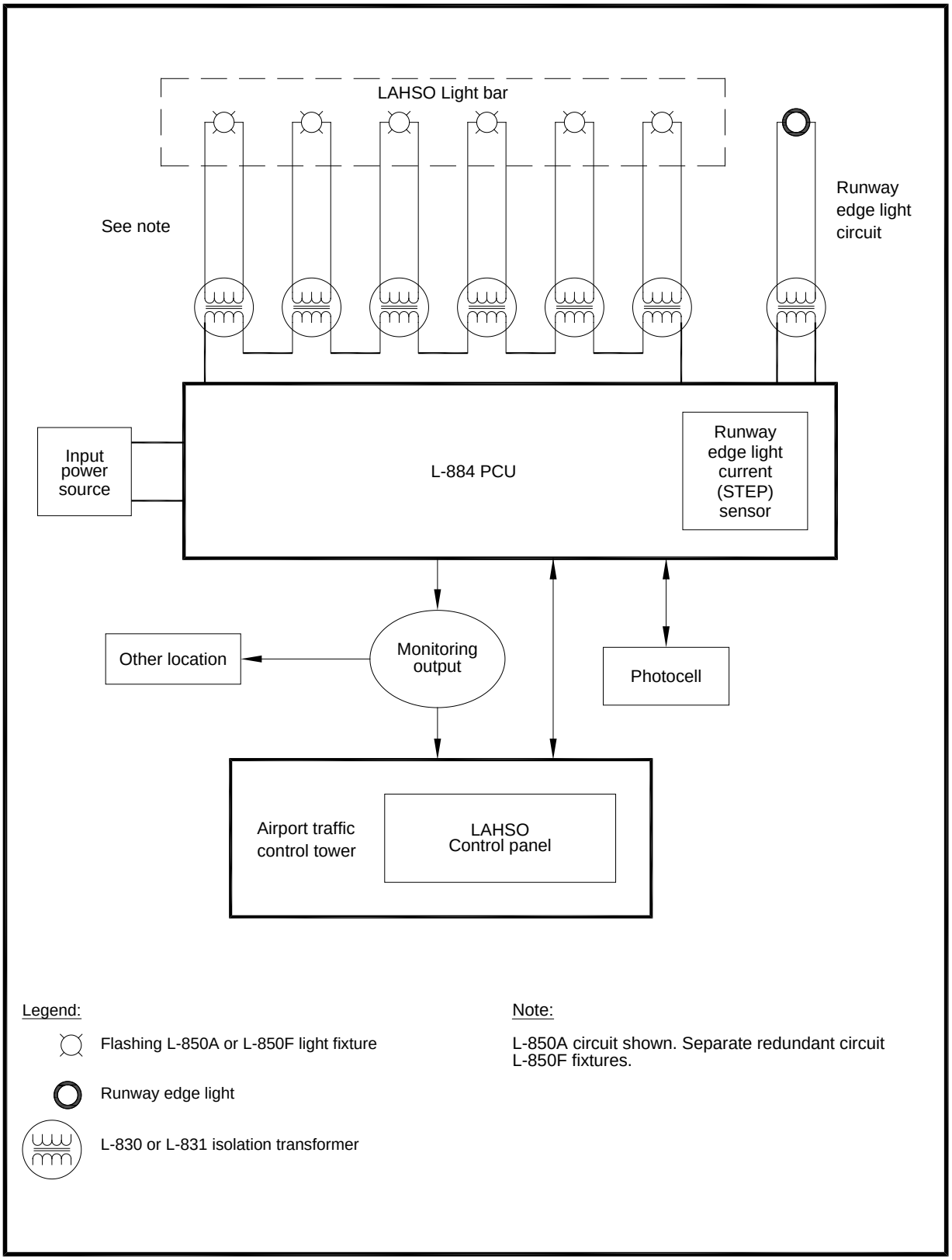
5.1.1 Visual Examination.

The equipment must be examined for compliance with the requirements on materials, finish, and quality of workmanship.

5.1.2 Operational Test.

An operational test must be performed to demonstrate compliance with all operating requirements specified in this AC.

579 **Figure 5-1. Typical Block Diagram for Land And Hold Short Lighting System**



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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 150/5345-54C 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: _____

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