

Federal Aviation Agency



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AIRPORTS

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SUBJECT : SPECIFICATION FOR L-847 CIRCUIT SELECTOR SWITCH,
5000 VOLT 20 AMPERE

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. DESCRIPTION OF PUBLICATION. The specification requirements presented are for a circuit selector switch capable of connecting the regulated output of a constant current power source to either of two series lighting circuits and simultaneously short circuiting the series lighting circuit that is not to be energized.
3. APPLICABLE SPECIFICATION. The following military specification, as referred to hereinafter, of the issue in effect on the date of application for qualification (paragraph 9) is applicable to this specification. In case of conflict between this specification and the applicable specification, this specification shall govern.
 - a. Military Specification. Copies of the military specification may be obtained from the Armed Service Electro-Standards Agency, Fort Monmouth, New Jersey.
 - (1) MIL-E-5272C - Environmental Testing, Aeronautical and Associated Equipment, General Specification for.
4. MATERIAL AND WORKMANSHIP. All components and materials shall be of industrial quality or better. Workmanship shall be in accordance with high grade commercial practice.
5. SIZE. The overall dimensions of the assembly shall not exceed 26" wide, by 24" deep, by 36" high.

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6. PERFORMANCE REQUIREMENTS.

- a. The assembly shall be capable of connecting the output of a regulated constant current power source to either of two series lighting circuits. When one of the series lighting circuits is connected to the power source, the other series circuit shall be short circuited. The design shall be such that two (or three) switch assemblies may be connected in series to supply four (or six) lighting circuits from a single power source.
- b. The switches shall be capable of remote control through pilot relays and capable of local control through the use of manually operated handles or levers.
- c. Each main switch shall have a normally closed contact for short circuiting a series load input circuit and two normally open contacts for connecting the regulator to a load circuit.
- d. The "normally closed" contact shall short circuit the input terminals from the regulator to the connected load when deenergized under remote control or turned to "OFF" by local manual control. The "normally open" contacts shall connect the load circuit to the regulator when energized under remote control or turned to "ON" by local manual control. When both local controls are placed in the "OFF" position, the output of the regulator and the input to both load circuits shall be short circuited.
- e. The assembly shall be designed and constructed for operation under all weather conditions and at any ambient temperature between -45°F and +120°F.

7. DETAIL REQUIREMENTS.

- a. The assembly shall consist essentially of two solenoid operated power switches, each with a pilot relay enclosed in an oil-filled tank. All wiring shall be completed at the factory.
- b. Main Switches.
 - (1) Each of the two main switches shall have the contact arrangements described in paragraphs 6c and 6d and the contacts shall have an interrupting capacity of 20 amperes at 5000 volts AC when the solenoid is operated. The solenoids for operating the switches shall operate from 120 volts AC and shall have an inrush current of less than 10 amperes and a holding current of less than 1.5 amperes continuously. The switches shall be capable of remote operation or manual operation. Two handles or levers with three positions ("ON," "OFF," and "TOWER") shall be provided for manual operation. The switches and terminals of the assembly shall be marked as specified in paragraph 7h.

- (2) When the operating handle is in the "TOWER" position, the solenoid shall be connected to contacts of the pilot relay through mechanically operated auxiliary contacts on the main switch in order that the switch may be operated from a remote location by application of a 110-volt (AC) signal.
 - (3) When the operating handle is in the "OFF" position, the main contacts shall occupy their normal (solenoid deenergized) positions and the auxiliary contacts shall be open.
 - (4) When the operating handle is in the "ON" position, the "normally closed" contact shall be open and the "normally open" contacts shall be closed.
 - (5) The switch shall be so designed and constructed that in making the change from off (deenergized) to on (energized), the normally open contacts shall close before the normally closed contact opens.
 - (6) The auxiliary contacts shall be operated by the operating handle on the tank and shall be closed only when the handle is in the "TOWER" position.
- c. Pilot Relays. The pilot relay shall be under oil and shall have a coil rating of 115 volts, 60 cycles per second. With an inductive load the contact rating shall be not less than 15 amperes, 120 volts AC.
- d. Tank.
- (1) The tank shall be of all weather construction and shall have a gasketed cover held securely by clamps or bolts. The tank shall have six insulating bushings suitable for use at the maximum rating of the main switches, and four control bushings suitable for use with the pilot relays and control circuit. The main bushings shall be arranged in pairs and each pair shall be protected by a shield across the top and down both sides. The relay and control bushings shall be grouped and protected by a similar shield.
 - (2) The tank shall be of welded construction and of steel not less than 0.090 inch thick. The tank shall have one coat of primer and two coats of finish paint. It shall be provided with two lifting lugs and two brackets for wall mounting and shall be sufficiently stable to be operated when set directly on the floor.

- e. Circuit. The circuit shall be so arranged that power for operation of the solenoids is independent of the power supplied from the remote control, except that both sources shall have a common ground or neutral.
- f. Hardware. All hardware used outside of the tank shall be of stainless steel or silicon bronze.
- g. Construction. The assembly shall be constructed so that no parts will work loose in service. It shall be built to withstand impacts, vibrations, and other conditions the equipment might be subjected to during shipping, storage, installation, and service.
- h. Markings. Terminals shall be permanently marked by stamping or stencilling on the tank.
 - (1) The assembly input terminals to be connected to the regulator shall be labeled "RA" and "RB", respectively.
 - (2) The four output terminals for load circuit No. 1 and load circuit No. 2 shall be labeled 1, 1 and 2, 2, respectively.
 - (3) The four terminals to be provided for remote control shall be labeled LN, R1, R2, and L1; where, LN is the common terminal for pilot relays 1 and 2, R1 and R2 are the remaining terminals of the two pilot relays, and L1 is the terminal that receives the power required to operate the main switch.
 - (4) The manual handle controlling switch No. 1 shall be labeled "R1", and the other handle for switch No. 2 shall be labeled "R2".
- i. Nameplate. A nameplate, permanently and legibly filled in with at least the information listed below, shall be securely attached to the outside of the tank. The same, or a separate plate shall contain a diagram showing installation connections and a schematic diagram showing internal connections.

CIRCUIT SELECTOR SWITCH
TWO CIRCUIT

5000 Volt, 20 Ampere Load Capacity
120 Volt, 60 Cycle Control Circuit
Serial No. _____ FAA Specification L-847
Gallons of Oil _____

- j. Parts List and Installation Instructions. A parts list and installation instructions shall be furnished with each assembly. Sufficient drawings or illustrations shall be provided to indicate clearly the method of installation and maintenance, and the location of all component parts.

8. SAMPLES AND TESTS.

- a. Sample. The manufacturer shall furnish a sample circuit selector switch to a disinterested testing laboratory to be tested as described in paragraph 8b.

b. Testing.

(1) Qualification Testing.

- (a) The main switches of the assembly shall be subjected to an operational test of 5000 cycles under a load of 20 amperes, 5000 volts using the remote control circuitry. The switches shall then be examined for evidence of any damage and to determine if they are satisfactory for the intended application.
- (b) The tank shall be subjected to an internal pressure of ten pounds per square inch. The tank shall not leak nor be damaged by this test.
- (c) The assembly shall be subjected to a low temperature test in accordance with Military Specification MIL-E-5272C. Procedure 1: The assembly shall be operated at no load to determine if the remote and manual controls and main switches operate satisfactorily.
- (d) The assembly shall be subjected to all production tests outlined under paragraph 8b(2).

(2) Production Testing.

- (a) Examination. Each assembly shall be inspected to assure compliance with the requirements specified herein with respect to materials, workmanship, and marking. Each assembly shall be examined to determine that the dimensions are within the limits specified.
- (b) Dielectric. Each assembly shall withstand the following rms 60 cycle voltage for one minute without failure.
1. Input bushings to ground, control circuit, and output circuit - 11,000 volts.

2. Output bushings to ground, control circuit, and input circuit - 11,000 volts.

3. Control circuit to ground, input circuit, and output circuit - 1500 volts.

(c) Operation. Each assembly shall be tested at no load to determine that the remote control circuit, the manual control circuit, and the main switches operate satisfactorily.

(d) Leakage. Each assembly shall be tested to determine that all welds and gasketed seals are oiltight and weathertight.

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

(4) The manufacturer shall certify that all components and materials will operate satisfactorily within the ambient temperature limits specified.

9. QUALIFICATION.

- a. The manufacturer shall furnish a circuit selector switch to a disinterested testing laboratory to be tested as described in paragraph 8 to obtain certification regarding the ability to manufacture equipment 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 test reports which show satisfactory certification of compliance, the Airports Service will list the name of the qualified manufacturer and a description of their equipment in the "Approved Airport Lighting Equipment" publication. The cost of the testing shall be borne by the manufacturer offering the equipment for qualification.
- b. At anytime after approval has been granted under the above conditions, a certified copy of factory test reports on the latest production run of equipment produced under this specification shall be made available by the manufacturer upon written request by the Federal Aviation Agency, Airports Service, Washington, D. C. 20553.