Federal Aviation Agency

REF.

ADVISORY CIRCULAR

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	AIRPORTS
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SUBJECT: SPECIFICATION FOR L-813 STATIC INDOOR TYPE CONSTANT CURRENT REGULATOR ASSEMBLY; 4KW AND 7½KW; FOR REMOTE OPERATION OF TAXIWAY LIGHTS

1. PURPOSE. This circular describes the subject specification requirements for a static indoor constant current regulator. The specification is for the guidance of the public, and its use is required for project activity under the Federal-aid Airport Program.

2. CANCELLATION. This advisory circular replaces Federal Aviation Agency Specification L-813, "Static Indoor Type Constant Current Regulator Assembly; 1½, 2½, and 4KW; For Remote Operation of Taxiway Lights", dated November 1, 1960, and Amendment No. 1, dated February 15, 1961, without substantive change.

3. SCOPE OF SPECIFICATION. The specification requirements presented are for a 4KW and 7½KW static indoor type constant current regulator to supply a 6.6 ampere series circuit for use on airport taxiway lighting installations. The unit consists of five primary voltage taps, an electrically operated contactor, overload protection, an input transformer and/or insulating transformer, a resonant circuit constant current network, an open circuit protective device, and lightning arrestors for the output circuit. All component parts shall be enclosed in a metal housing.

4. APPLICABLE SPECIFICATION. Specification L-833, "Individual Lamp Series-to-Series Type Insulating Transformer for 600 Volt or 3000 Volt Series Circuits", of the issue in effect on the date of application for qualification (see paragraph 10), applies to this circular. This circular shall govern in case of conflict.

5. SOURCE OF APPLICABLE SPECIFICATION. Obtain copies of Specification L-833 from the Federal Aviation Agency, Distribution Section, HQ-438, Washington, D. C. 20553.

6. SIZES. The regulator shall be built in two sizes. In both sizes, the primary shall be rated at 240 volts, single phase, 60 cycles, and the secondary at 6.6 amperes.

   a. Size I - 4KW

   b. Size II - 7½KW

7. PERFORMANCE REQUIREMENTS.

   a. Regulation.

      (1) The regulator assembly shall deliver its specified KW output to a unity power factor load when connected to a 240 volt, 60 cycle supply through the 100% primary voltage tap. When so connected, the output current shall be within 3% of 6.6 amperes from full load to short circuit.

      (2) The output current of the regulator shall not exceed 6.8 amperes when operating from a supply voltage of 240 volts, 60 cycles at normal temperature and supplying loads from 50% to 100% through insulating transformers, such as Specification L-833, with 30% open-circuited secondaries.

   b. Overall Efficiency. The overall efficiency of the regulator, when it is operated at rated voltage, 100% power factor, full load, 70°F, shall not be less than 90%.

   c. Primary Power Factor. The primary power factor of the regulator shall be not less than 90%, when it is operated at rated voltage, 100% power factor, full load, 70°F.

   d. Temperature Rise. The temperature rise shall not exceed 55°C for Class A insulation or 80°C for Class B insulation in continuous operation for any load from no load to full load.

   e. Temperature Limits. The unit shall be designed and constructed for continuous service at any ambient temperature from a minimum of -45°F to a maximum of +120°F at sea level.

8. DETAIL REQUIREMENTS.

   a. Rating. The regulator shall supply 6.6 amperes to a series lighting load equal to its KW rating. The primary shall be 240 volts, single phase, 60 cycles and shall be provided with taps for 250, 230, 220,

and 208 volts from which the proper tap may be selected for various supply voltages. The regulator shall be rated and connected for either grounded or ungrounded power supply.

NOTE: If so stated on the order, the regulator may be rated and supplied for 50 cycle input. This should be reflected in the rating of the regulator and in the marking of its nameplate.

b. Input Transformer. An input transformer of suitable rating shall be supplied to provide the voltage most suitable for the resonant circuit network (except that this voltage shall not exceed 650 volts and shall not be so low that the secondary current at rated load will exceed 7.5 amperes for Size I and 14.2 amperes for Size II). If this transformer is the single-winding type, a separate two-winding insulating transformer must be used to separate the line and load.

c. Constant Current Network. The constant current network shall have no moving parts and shall utilize a resonant circuit to produce a constant current of the value specified in paragraph 8a when the proper voltage and frequency are supplied to the regulator. The open-circuit voltage shall not exceed 200% of the rated load voltage.

d. Control Equipment.

(1) A 2-pole, 250 volt, magnetically operated contactor with operating coil rated 120 volts, 60 cycles shall be supplied. This contactor shall be rated not less than 25 amperes for Size I and 50 amperes for Size II. Two suitable fuses shall be provided and located ahead of the contactor.

(2) An automatic open-circuit protective device shall be supplied to prevent damage in the event that an open circuit develops in the secondary. The protective device shall de-energize the regulator in less than 2 seconds after secondary open circuit occurs and shall reset automatically when the power contactor control switch is opened.

e. Terminal Boards and Wiring.

(1) Three separate suitable terminal boards shall be provided. One each for the input, output, and control circuits with terminals labeled as follows:

(a) S_1 and S_2 - input

(b) L_1 and L_2 - output

(c) N (neutral) and CC (control circuit)

(2) A separate grounding lug shall be provided for grounding the case, and this lug shall accommodate AWG No. 6 to No. 8 wire.

(3) The regulator shall be completely wired.

f. Housing. The entire unit shall be mounted in a self-supporting sheet metal enclosure, the exact shape of which is optional providing other requirements are met. A separate accessible compartment in the housing shall be provided to house the protective device, the primary control, and the terminal boards. All relays, terminals, and associated wiring shall be readily accessible. Overall dimensions shall not exceed 36 inches high, 22 inches wide, or 22 inches deep for Size I, and 48 inches high, 24 inches wide, or 22-1/8 inches deep for Size II.

g. Wiring Diagram. A wiring diagram shall be permanently mounted inside the control cabinet. It shall be legible and readily accessible.

h. Painting and Finish. The inside and outside of the housing shall be bonderized, given one prime coat and one finish coat of weatherproof paint. The outside of the housing shall be given a touchup after final assembly.

i. Nameplate. A nameplate, permanently and legibly filled in with at least the following information, shall be securely attached to the outside of the regulator housing. Operating instructions, if needed, may be on this same plate.

(1) Constant Current Regulator, Static Type

(2) 60 Cycles ___KW, 240 Primary Volts, 6.6 Secondary Amperes

(3) Single Phase

(4) Manufacturer's Part No. _____

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

k. Lightning Arrestors. Two, 3KV lightning arrestors shall be installed across the output terminals of the regulator, one connecting each of the two legs of the output circuit to ground. The ground side of the arrestors shall be connected to the grounding lug on the regulator case. The arrestors shall be mounted inside the regulator case. The arrestors shall be disconnected for all high voltage testing of the regulator.

9. TESTING.

a. Qualification Testing. In addition to the tests described in paragraph 9b, the production model shall be tested as follows:

(1) The temperature rise shall be determined by the resistance method and shall apply at any load, from no load to full load, at unity power factor.

(2) The output current shall be tested for operation with open-circuited insulating transformers in the circuit at 50% load and 100% load as described in paragraph 7a(2).

(3) With 240 volts connected to the primary for 100% voltage, and unity power factor load on the secondary, the overall efficiency and power factor, tested at rated full load, shall not be less than the values specified in paragraphs 7b and 7c.

b. Production Testing. The following tests shall be made on each regulator after final assembly, and each regulator shall withstand the following tests successfully:

(1) 1500 volts for one minute between supply terminals and frame.

(2) The following voltages shall be applied for one minute between load terminals and frame with supply terminals connected to the frame.

(a) 3000 volts for Size I

(b) 5000 volts for Size II

(3) The output current required in paragraph 7a(1) shall be tested with output short circuited through an ammeter and with a constant connected unity power factor load equal to the KW rating of the regulator.

(4) The primary voltage compensation taps shall be checked.

(5) Operate open circuit (protective relay blocked) for two minutes.

(6) The primary control shall be checked for proper operation.

(7) All protective devices shall be tested for proper operation and, where required, for reset.

c. 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.

10. QUALIFICATION.

a. The manufacturer shall furnish a sample regulator to a disinterested testing laboratory acceptable to the Federal Aviation Agency, Airports Service, Washington, D. C. 20553, to be tested as described in paragraph 9 to obtain certification regarding the ability to manufacture regulators meeting the requirements of this specification. The manufacturer shall furnish two copies of the test report to the Airports Service for review and approval consideration. The cost of testing shall be borne by the manufacturer offering the equipment for approval.

b. If the manufacturer has satisfactory laboratory facilities, the above tests may be performed at the factory and such tests shall be witnessed by a representative of the Federal Aviation Agency, Airports Service, Washington, D. C. 20553. Two written reports of these tests shall be furnished by the manufacturer.

c. In addition to the tests performed by the above disinterested testing laboratory or the manufacturer, a component parts list, drawings, and installation and maintenance instructions shall be submitted to the Federal Aviation Agency, Airports Service, Washington, D. C. 20553, for review and approval.

d. Upon approval of the disinterested testing laboratory's or manufacturer's test reports and the additional data required in paragraph 10c which have shown satisfactory conformance to specification requirements, the Airports Service will list the name of the qualified manufacturer and a description of their regulator in Advisory Circular No. 150/5345-1, "Approved Airport Lighting Equipment".

e. At any time 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.

11. HOW TO GET THIS PUBLICATION. Obtain additional copies of this circular, AC 150/5345-21, "Specification for L-813 Static Type Constant Current Regulator Assembly; 4KW and 7½KW; For Remote Operation of Taxiway Lights", from the Federal Aviation Agency, Distribution Section, HQ-438, Washington, D. C. 20553.

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