M-494.4

CHANGE

AC NO: 150/5345-49 CHG 1

DATE: 8/15/78

ADVISORY CIRCULAR

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

SUBJECT: CHANGE 1 TO ADVISORY CIRCULAR 150/5345-49, SPECIFICATION L-854, RADIO CONTROL EQUIPMENT

1. PURPOSE. This change transmits page changes to the basic advisory circular.

2. EXPLANATION OF CHANGES. The requirement that the transmitter and receiver for the Type II system operate on AM in the 150-175 MHz band has been revised to specify that they operate on FM in the 150-174 MHz and/or 450-512 MHz bands.

3. HOW TO OBTAIN THIS CHANGE. Additional copies of Change 1 to AC 150/5345-49, Specification L-854, Radio Control Equipment, may be obtained, free of charge, from the Department of Transportation, Publications Section, M-443.1, Washington, D.C. 20590. FAA field personnel may obtain copies from their respective regional Distribution Officers.

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SPECIFICATION L-854, RADIO CONTROL EQUIPMENT

1. SCOPE AND CLASSIFICATION.

1.1 Scope. - This specification covers the equipment requirements for radio control systems to be used for remote control of airport lighting facilities from aircraft, from a ground location, or from both. The basic system elements include radio receivers, radio transmitters, encoders, and decoders.

1.2 Classification. - Three types of systems are covered by this specification as follows:

Type I - Air-to-ground (consists of an AM receiver and a Style A decoder)

* Type II - Ground-to-ground (consists of an FM transmitter, an FM receiver, an encoder, and a Style B decoder) *

* Type III - Air-to-ground, plus ground-to-ground (consists of an FM transmitter, an AM receiver, an FM receiver, an encoder, a Style A decoder and a Style B decoder) *

2. APPLICABLE DOCUMENTS.

2.1 FAA Advisory Circular. -

AC 150/5345-1 Approved Airport Lighting Equipment

2.2 Federal Communications Commission (FCC) Rules and Regulations. -

Part 15 Radio Frequency Devices

Part 89 Public Safety Radio Service

(Copies of FAA advisory circulars may be obtained, free of charge, from * the Department of Transportation, Publications Section, M-443.1, Washington, * D.C. 20590.)

(FCC Rules and Regulations may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402.)

3. REQUIREMENTS.

3.1 General. - Each radio control system shall be complete in accordance with all specification requirements and shall include the basic components as listed in 1.2. Each set of equipment shall be tuned and adjusted for operation at the frequency specified by the purchaser.

3.2 Environmental Conditions. - The equipment shall be designed and constructed to operate in the following indoor or outdoor environmental conditions as specified by the purchaser.

3.2.1 Indoor Conditions. - Indoor conditions shall be as follows:

(a) Temperature. Temperature range of -20° C. to $+55^{\circ}$ C.

(b) Humidity. Relative humidity up to 95%.

3.2.2 Outdoor Conditions.- Outdoor conditions shall be as follows:

(a) Temperature. Temperature range of -55° C. to $+55^{\circ}$ C.

(b) Humidity. Relative humidity up to 100%.

(c) Wind. Wind speeds up to 100 mph (87 knots).

(d) Precipitation. Exposure to rain, hail, snow, or sleet.

3.3 Operating Requirements.- The radio control equipment will be used to operate airport lighting facilities in the following manner:

(a) Air-to-ground System. The lighting facility will be operated from aircraft by clicking the microphone button a specified number of times within a 5-second period as follows:

3 clicks - lighting system energized on the low brightness step.

5 clicks - lighting system energized on the medium brightness step.

7 clicks - lighting system energized on the high brightness step.

After the system is energized on a brightness step, any other brightness step may be selected by clicking the "mike" button the specified number of times. The system shall shut off automatically 15 minutes after the last brightness step operation.

(b) Ground-to-ground System. The ground-to-ground system is intended for operating lighting systems from an airport control tower, and the basic system can perform a maximum of 8 separate control functions. Additional control functions, in multiples of 8, can be obtained by the addition of decoder modules and associated parts.

(c) Air-to-ground Plus Ground-to-ground System. The dual system will be used where there is a part-time airport control tower. When the control tower is in operation, the lighting facility will be controlled through the ground-to-ground unit with the air-to-ground unit deactivated. When the control tower is not in operation, the lighting facility will be controlled by the air-to-ground unit. Transfer of control to and from the air-to-ground unit will be accomplished through the ground-to-ground unit.

3.4 Design Requirements.

3.4.1 General. - The equipment shall be type accepted in accordance with Federal Communications Commission (FCC) Rules and Regulations; Part 15 for a receiver and Part 89 for a transmitter.

3.4.2 Power Input. - The equipment shall be designed to operate from 120 VAC, ±15%, 60 Hz. Power for the encoder and decoders may be taken from the associated transmitter or receiver.

3.4.3 Receiver. - The receiver shall conform to the following requirements:

* (a) Type. Fixed frequency superheterodynes, amplitude modulated for the Type I system and frequency modulated for the Type II system.

(b) Frequency. 118-136 MHz band for the Type I system; 150-174 MHz and/or 450-512 MHz band for the Type II systems. A Type III system uses both Type I and Type II receivers. Frequency tolerance shall be 0.003%. The exact frequency shall be specified by the purchaser.

(c) Sensitivity. For AM, 5 microvolts or less for a 10 dB signal plus noise-to-noise ratio, (S+N)/N; for FM, 5 microvolts or less for 20 dB of quieting. A sensitivity adjustment shall be provided. *

(d) Selectivity. Bandwidth of not less than ±9.0 kHz from the assigned frequency at 6 dB attenuation and a bandwidth of not more than ±40 kHz from the assigned frequency at 60 dB attenuation. Spurious signals shall be not less than 50 dB below the desired signal.

(e) Fidelity. Output uniform within ±2 dB from 300 Hz to 2450 Hz.

(f) Antenna Impedance. Nominal 50 ohms unbalanced.

* (g) Output. For an FM receiver, audio output of zero dBm or more into a 600 ohm load with signal input of 5 microvolts having deviation of 1.2 kHz at 1000 Hz. For an AM receiver, pulses resulting from bursts of radio frequency energy shall have sufficient output to drive a Type I decoder when the input signal is 5 microvolts or more. *

3.4.4 Transmitter. -The transmitter shall conform to the following requirements:

* (a) Type. Fixed frequency, frequency modulated.

(b) Frequency. 150-174 MHz and/or 450-512 MHz band with a frequency tolerance of 0.00025%. The exact frequency will be specified by the purchaser. *

(c) Power Output. Not less than 1 watt nor more than 3 watts.

* (d) Modulation. Capable of frequency deviation of ±2.5 kHz with an input of -10 dBm within the frequency band of 300 Hz to 2450 Hz. *

(e) Output Impedance. Nominal 50 ohms unbalanced.

(f) Input Impedance. 600 ohms.

3.4.5 Decoders.

3.4.5.1 General. - The Style A decoder shall decode a series of electrical pulses, such as generated by clicking a transmitter microphone, to control the desired function while the Style B decoder detects a series of 3 tone burst characters per control function or address. The decoders shall not respond to signal elements of less than 50 milliseconds and shall not require signal elements of more than 100 milliseconds.

3.4.5.1.1 Output Relays. -Output relays shall be the plug-in type having SPST NO contacts rated at 3 amps, 120 VAC, resistive and shall have a mechanical life of 100,000 cycles or more.

3.4.5.1.2 Output Terminals. - Output terminals shall be a screw-type barrier terminal strip rated not less than 250 VAC.

3.4.5.1.3 Input Terminals. -When the decoder or decoders are installed in an enclosure with a receiver, the input terminals are not required. When the decoder or decoders are installed in a separate enclosure, use a screw-type barrier terminal strip of proper voltage rating and size.

U.S. GOVERNMENT PRINTING OFFICE: 1978-261-264/257