

Instructions For The CG Model ECE 4-A RADIO CONTROL RECEIVER

Manufactured by

CG Electronics Corp

305 Dallas N.E.

ALBUQUERQUE, NEW MEXICO

The CG 4-A receiver was designed primarily for remote control of models for the hobbyist. The CG 4-A receiver works equally well in model aircraft, boats, cars and models of any type that is to be controlled from a remote point. The receiver has been fully flight tested and is reliable, simple to operate, and is economical. The CG 4-A receiver will continue to operate on lower battery voltages where others fail. The receiver was tested on plate batteries as low as 22.5 volts and on filament batteries as low as .9 volts.

The CG 4-A receiver weighs slightly more than one ounce which is ideal for installation in small models. The receiver uses a standard receiving type tube that is inexpensive and available at all radio repair shops. The operating frequency of the receiver is 27.255 Megacycles which requires no operators license.

RELAY

Select your relay carefully because it can cause your radio control system to fail if it is not a good one. Select a good quality relay that has a coil resistance of no less than 5000 ohms and no more than 8000 ohms. The 7250 ohm relay should be adjusted to pull in at 1.5 milliamperes and drop out at 1.1 milliamperes. The 5000 ohm relay should pull in at 2.0 milliamperes and drop out at 1.6 milliamperes. If your relay has a resistance that is between the above values, check the idling current of the receiver, with your relay in the circuit, and adjust it to pull in .3 milliamperes below the idling level. The drop out point should be about .7 milliamperes below the idling level.

The relay in use will have a tendency to arc across the points when connected to the escapement which will eventually weld the points together. This will cause the relay to stick and hold the relay in the "signal on" position giving undesirable control. To prevent this condition connect a 1/2 watt carbon resistor with a value between 400 ohms and 500 ohms across the relay points "X" and "Y" in figure 1. The resistor will not eliminate the arcing but does minimize it to the extent that the points will no longer weld together. CAUTION: Do not put too small a value of resistance across the points as this permits current to flow continuously through the escapement at a value high enough to make the escapement stick in the "signal on" position. A 100 ohm resistor in series with a .1 MFD condenser connected across the points is the recommended method but is too bulky for some installations.

BATTERIES

The CG 4-A receiver can be operated with 67.5 volt batteries if the relay has more than 7000 ohms resistance. If this precaution is not observed the tube in the receiver will be permanently damaged. It is also possible to operate the receiver on 22.5 volts but this is not recommended. The sensitivity is lower on 22.5 volts but is still adequate providing you use a very reliable relay that will operate on the small change of plate current that is available. The recommended voltage for

the "B" batteries is 45 volts. This usually consists of two 22.5 volt hearing aid batteries connected in series, see figure 1. The "B" batteries should be replaced when the voltage drops below 40 volts. At this voltage the batteries are subject to failure.

To measure this voltage turn on the receiver and read the voltage with a meter while the receiver is operating. The filament batteries are checked in the same manner and should not be permitted to go lower than 1.0 volts. If the battery voltage does not remain steady but instead creeps lower, discard them and replace with new batteries of the same voltage.

A fresh pen light cell for the filament supply will usually last for one day's flying with a reasonable rest between flights. With the CG 4-A receiver it is practical to use just one pen light cell for the filament supply particularly in the smaller models as this is a saving in weight.

ANTENNA

The CG 4-A receiver is not normally critical to antenna length. The antenna can be 18 inches to 36 inches long which includes the length of the wire used to connect the receiver to the antenna. A vertical antenna made of music wire and allowed to extend above the fuselage works nicely. A trailing wire will also work satisfactorily providing it is kept clear of the fuselage which contains wiring and push rods.

INSTALLATION (see figure 1)

The CG 4-A receiver can be mounted in any convenient position within the model. The receiver may be but does not have to be shock mounted. It can be mounted with bolts through the four holes in the corners of the base plate or can be cemented to the frame work of the model. Locate the batteries where necessary to balance the model. Keep the escapement batteries as close as possible to the escapement to prevent excessive voltage drop in the wiring. This also applies to the relay as the points are connected in the escapement circuit. All the batteries may be mounted in the same compartment within the model.

Shock mount the relay to prevent interference from vibration caused by the engine. This shock mount may be small rubber bands, Lord mount, or sponge rubber. It may be necessary to shock mount the engine in some installations where vibration is encountered.

TUNING AND TESTING

After the receiver and the accessories have been installed in the model, check the wiring carefully to make certain it is wired correctly. When you are sure the wiring is correct connect a 0 to 3 milliamper meter across the metering jack (see figure 1) and turn on the switch. The current should come up to approximately 1.7 to 2 milliamperes.* At this point it will be necessary to tune the coil, labeled "A" in figure 1, to the transmitter frequency. Keep the transmitter at least 8 feet from the receiving antenna while making all adjustments. Turn on the transmitter and hold the key in the "signal on" position. Now with a small screw driver turn screw "A" first in one direction then in the other direction and watch for a decrease in the plate current. When a decrease in current is noted, tune screw "A" for the lowest reading possible. Key the transmitter a few times to make certain you are tuned to your transmitter. The receiver plate current should decrease each time the transmitter key is depressed.

Next adjust the compensator (labeled "B" in figure 1) in a clock-wise direction as far as possible with no decrease in idling plate current. If a decrease in idling plate current is noted touch the antenna with your finger and watch for an immediate increase in the idling plate current. If the idling plate current does increase when the antenna is touched, the receiver is over compensated.

*using a 8000 ohm relay.

Adjust the compensator in a counter-clockwise direction until this condition is corrected. The compensator will correct for stray wiring in the model, changes in battery voltages, etc. If the installation lacks sensitivity the receiver is under-compensated. This is corrected by turning the compensator in a clock-wise direction.

It may be necessary to re-adjust the relay to get reliable performance. Use the method recommended by the manufacturer of your relay which should be on the relay instruction sheet. Remember the difference between the relay pull in point and the idling point of the receiver should be no less than .2 milliampere for reliable operation.

FLYING

Give the system a good ground check by having someone assist you at the flying field. While your assistant keys the transmitter about once every five seconds, carry the model into the flying field. Walk at your normal speed, holding the model about shoulder height with the equipment turned on. As you walk along listen for the escapement operation or watch the rudder movement. Carry your model for a distance of approximately $\frac{1}{4}$ mile. The equipment should operate reliably over this distance. This ground check is recommended before each flying session.

Assuming that everything is operating satisfactorily you are now ready to start the engine and have the thrill of radio controlled flight.

Check the batteries after every fifth flight. Checking this frequently is not absolutely necessary but may prevent an accident by failure of a battery because even new batteries have been known to fail.

WARRANTY

The CG 4-A receiver is guaranteed against defective parts and workmanship for a period of 30 days from the date of purchase. If for any reason the receiver fails to operate send it directly to the manufacturer for inspection and repair. If the receiver has been tampered with or shows evidence of abuse the warranty is void. The tube is not guaranteed against burnouts or breakage. Enclose 35c for postage and handling with each receiver returned under our warranty. We are not responsible for equipment damaged in shipment.

REPAIR SERVICE

CG Electric Corp. will repair your receiver and check it for a minimum charge of one dollar and thirty-five cents. Send the damaged receiver to: CG Electric Corp., 305 Dallas N.E., Albuquerque, New Mexico. Include one dollar and thirty-five cents with the receiver and if for any reason the charge is to be more, you will be advised before the receiver is repaired.

HINTS FOR THE RC FAN

The following hints are included with this instruction sheet for added RC performance or convenience. The manufacturer of the CG 4-A receiver does not contend that the following circuits are necessary to make the RC equipment operate, but includes them only as an added feature to keep the RC fan informed. These hints will work with any model RC receiver and should be used with this in mind.

Figure 2 is a circuit to eliminate capacity effects of push rods or torque rods, meters, and hands. RFCs are 100 to 500 microhenry RF chokes. Keep all the wiring on the left side of line "C" separate from the wiring on the right side of line "C." This includes the filament batteries.

Figure 3 is another method of eliminating meter capacity. The RFCs are the same as in figure 2 and C is .001 to .01 MFD.

Figure 4 is a method to eliminate using a shorting plug on the model for flying, when the meter is disconnected. R is a $\frac{1}{2}$ watt carbon resistor 500 to 100 ohms. This gives a negligible error in readings.

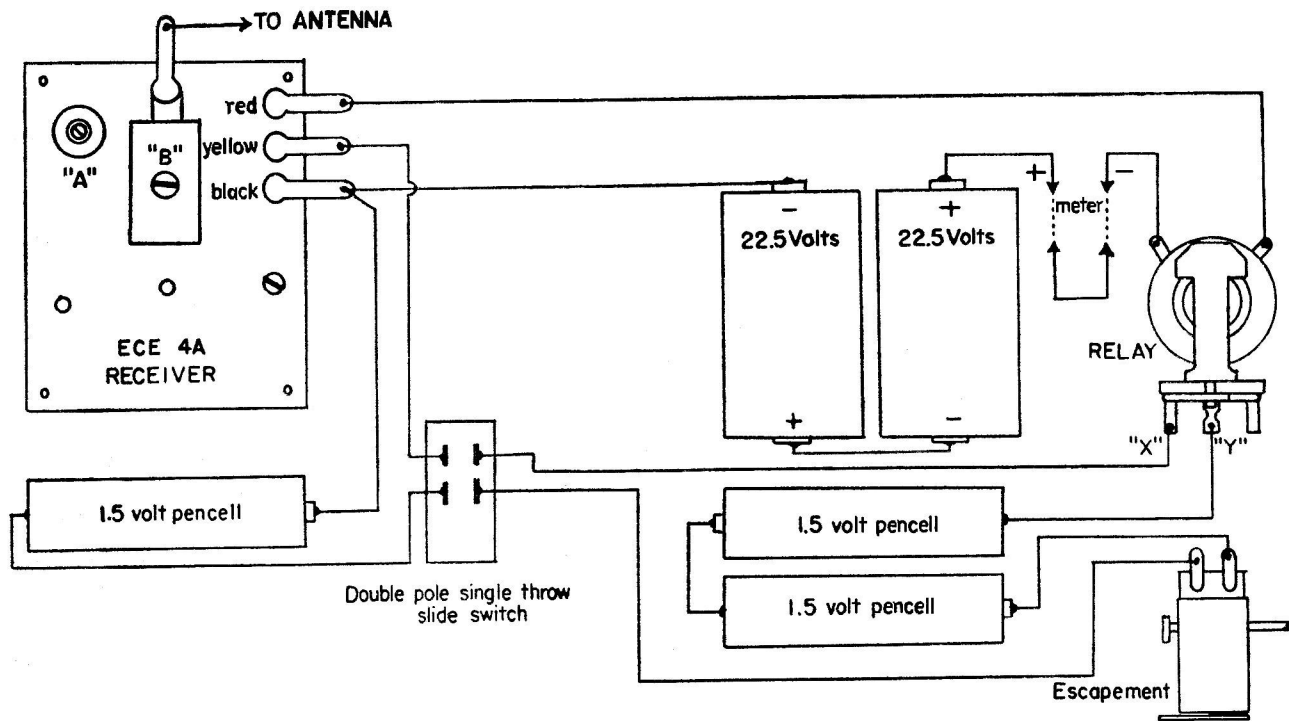


FIGURE No.1

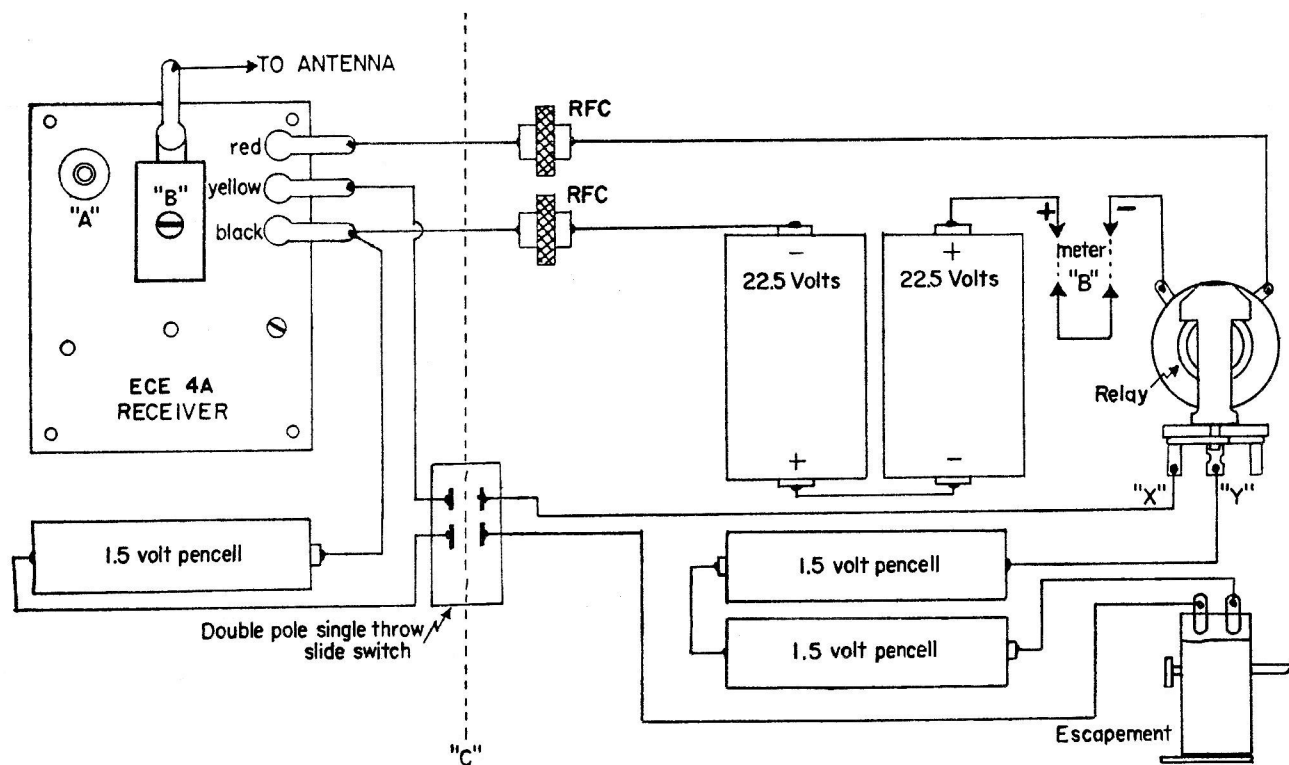


FIGURE No.2

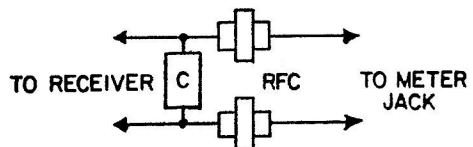


FIGURE No.3

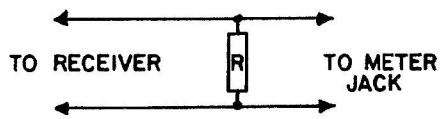


FIGURE No.4