

# ASSEMBLY MANUAL

For Your

## Kraft Mark III

Single Channel Receiver

26-28 mc



1ST EDITION

25¢

Ace Radio Control

BOX 301

HIGGINSVILLE, MISSOURI

# PARTS LIST FOR MARK III RECEIVER

## RESISTORS

1 27 ohm (Red, Violet, Black)  
 1 4.7K (Yellow, Violet, Red)  
 1 10K (Brown, Black, Orange)  
 2 39K (Orange, White, Orange)  
 1 100K (Brown, Black, Yellow)  
 1 2.2 Meg (Red, Red, Green)

## CAPACITORS

1 2.2 mmf N.P.O.  
 1 47 mmf N.P.O.  
 2 .01 mfd disc  
 1 .001 mfd disc  
 1 1 mfd Cer. Electrolitic  
 1 1 mfd PI Electrolitic  
 2 14 mfd PI Electrolitic

## TRANSISTORS

3 2N1370 or 2N1274  
 (TR-1, TH-2, & TR-3)

## MISCELLANEOUS

1 MARK III PC Board  
 1 MARK III Plastic Box  
 1 Set Instructions

## R.F.C.

1 20 uhy choke

## COIL

1 36t #30 on SPC2

## TRANSFORMER

1 ST - 11

## RELAY

1 Deans 5K

## TUBE

1 6007

## WIRE

10" Red, Black, & Brown  
 24" Antenna Wire  
 12" Solder

Your Ace Kraft Mark III Receiver Kit is a refinement of the original Kraft Audio Receiver. It uses different coupling capacitors and Texas Instrument transistors. This allows a smaller physical size which means it can be housed in a smaller high impact case.

Not only is the Mark III smaller in size, but also more versatile, since it may be used with a greater variety of transmitting equipment. It will be operated by an audio of 300 to 800 cycles per second, and modulation may be as little as 8%.

In theory, your Mark III receiver is a vacuum tube superregen detector, followed by 2 stages of audio amplification via transistors, feeding into a relay coupled transistor -- which pulls in on receipt of the audio modulated signal. It may be used with escapements, in which event the hookup shown in pictorial form in these instructions should be used.

With  $4\frac{1}{2}$  volts of escapement batteries, the use of  $\frac{1}{4}$ " flat rubber is recommended. It also is capable of following fast pulsing, and with a relay this means that almost any actuator may be used. Follow the instructions of the actuator manufacturer for the correct hookup.

Now follow the instructions in the step by step with ultra care and detail. If you do, your Kraft III should provide many hours of fun. Important: Follow step by step -- These instructions have been carefully written and any attempt to bypass or shortcut will usually end in a receiver which does not perform correctly. Any shortcuts and you're on your own!

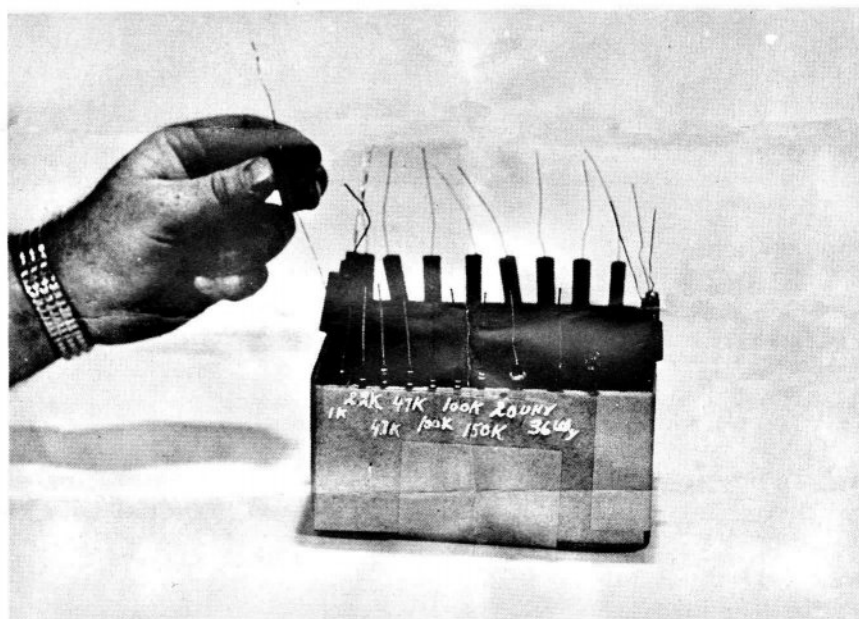
UNPACK YOUR KIT CAREFULLY AND CHECK EACH PART AGAINST THE PARTS LIST. In so doing, you will become acquainted with the parts. If some shortage or parts damage is found, return the parts list with your name and address to Ace Radio Control, Box 301, Higginsville, Missouri for correction.

In order to get your kit to you as quickly as possible, we occasionally have to make a slight parts substitution. These are all carefully checked and will be found to work as satisfactorily as the original parts specified. They will be found to be minor in nature and are mentioned only to avoid confusion.

If you're ready to go, do so by:

1. Lay out all parts so that they are readily available.
2. Have at hand the basic tools you will need: Long nose pliers, side cutters, wire stripping tool for stripping insulation, a 25 or  $37\frac{1}{2}$  watt soldering iron of the Ungar type, solder for printed circuit work of the Ersin type, a tuning wand.

Many kit builders find it helpful to separate the various parts into convenient categories. Moulded egg cartons or muffin tins make nice trays for small parts. Resistors and capacitors may be placed with their lead ends inserted in the edge of a piece of cardboard until they are needed. Values may be written on the cardboard next to each component. The photo gives you an idea of the method which may be used.

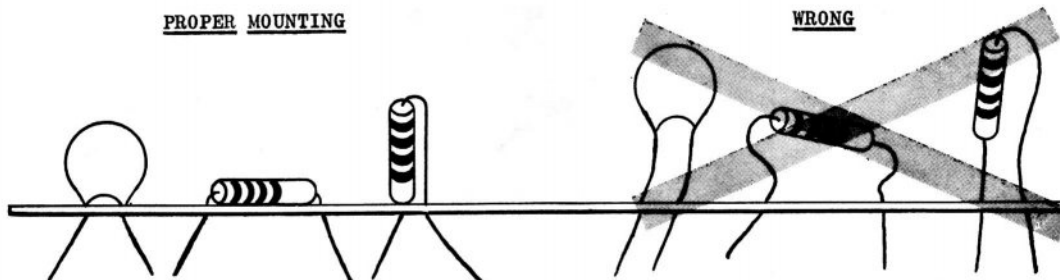


## CIRCUIT BOARD WIRING AND SOLDERING TECHNIQUES

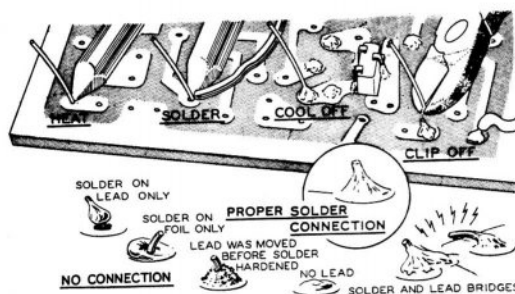
Before attempting any work on the circuit board, buff it lightly with steel wool. Although coated with a flux, perspiration from the hands may cause soldering difficulties. Read the following instructions carefully and study the above figures. It is only necessary to observe a few basic precautions which will insure proper operation of the receiver when it is first hooked up.

Proper mounting of components on the board is essential for good performance. A good general rule to follow is that all components should be mounted as tightly to the board as possible. All leads should be kept short to minimize the effect of stray capacity. The recommended method of mounting is shown above.

Tubular capacitors and resistors will fit properly if the leads are bent to mount in the holes. Generally, disc and tubular capacitors will fit in place with no lead preparation other than making sure the leads are straight. Insert the parts as shown and then bend the leads slightly outward to lock them in place.



SPREAD THE LEADS OF EACH COMPONENT TO KEEP THEM FROM FALLING OUT WHEN THE BOARD IS TURNED OVER.



Your receiver will be assembled in several stages with groups of components being placed on the board and then soldered. When soldering has been completed, diagonal cutters may be used to cut off the excess fairly close to the board.

The actual technique of soldering leads to the PC board is really simple. Position the tip of the soldering iron so that it firmly contacts both the circuit board laminate and the wire to be soldered. Remove the solder as soon as it begins to melt and flow onto the joint. Hold the tip of the iron in place only until the solder begins to flow over the foil. Then, remove the iron. Care must be used to avoid overheating. If a soldering gun MUST be used, use every care to avoid overheating. This can damage the entire project.

Use only the amount of solder required. Excessive solder increases the prospect of having a bridge between foil lands or plugging holes which should be left for future components. If solder is flowed between two adjacent pieces of copper, it may be removed by heating with the iron and then brushing away quickly with a soft cloth. In the event that a hole is filled, apply heat from the iron and clear by immediately pushing the lead of a resistor through the hole from the opposite side and withdrawing the lead before the solder hardens. Do not force. In cases where the foil does become damaged, repairs can generally be made with little difficulty. A break in the foil can be rejoined with a small piece of bare wire.

1-2-3, LET'S GO--

The following steps are in a logical 1-2-3 order to enable you to complete your receiver with the least possible confusion. Read each step or component placement guide before beginning the actual work. Also, it is well to read ahead a few numbers to familiarize yourself with the general operation. When the step is completed, check it off in the ( ). This will help to prevent errors if there is an interruption in your building. Some builders also like to mark each step in colored pencil on the Pictorial as it is added.

The steps directing the installation of resistors include color codes to minimize error.

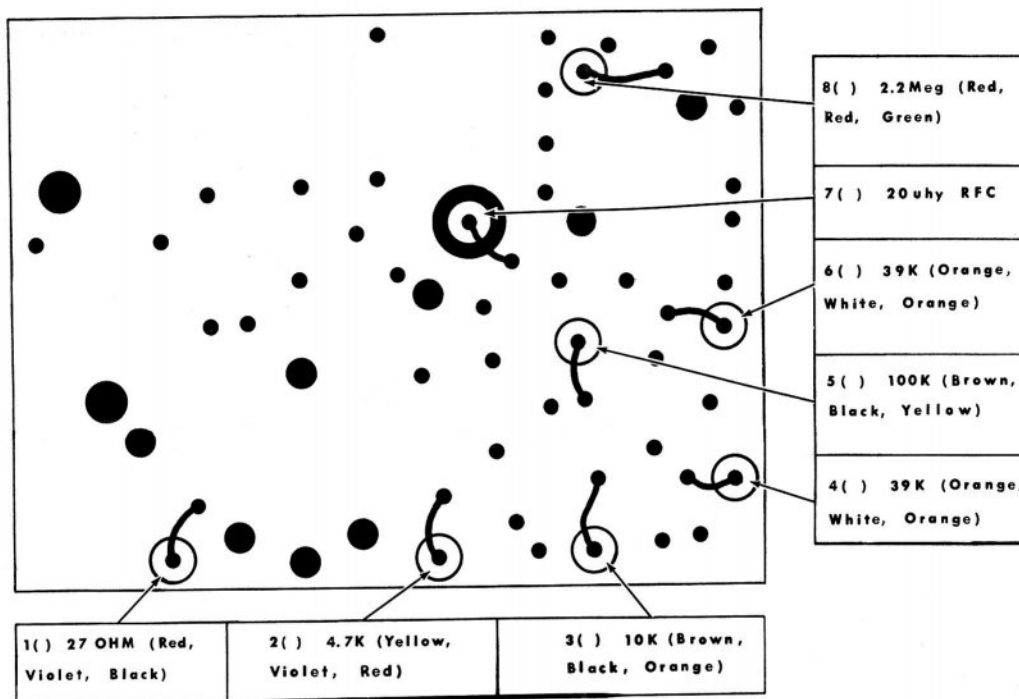
#### STEP - BY - STEP ASSEMBLY

#### Board Assembly

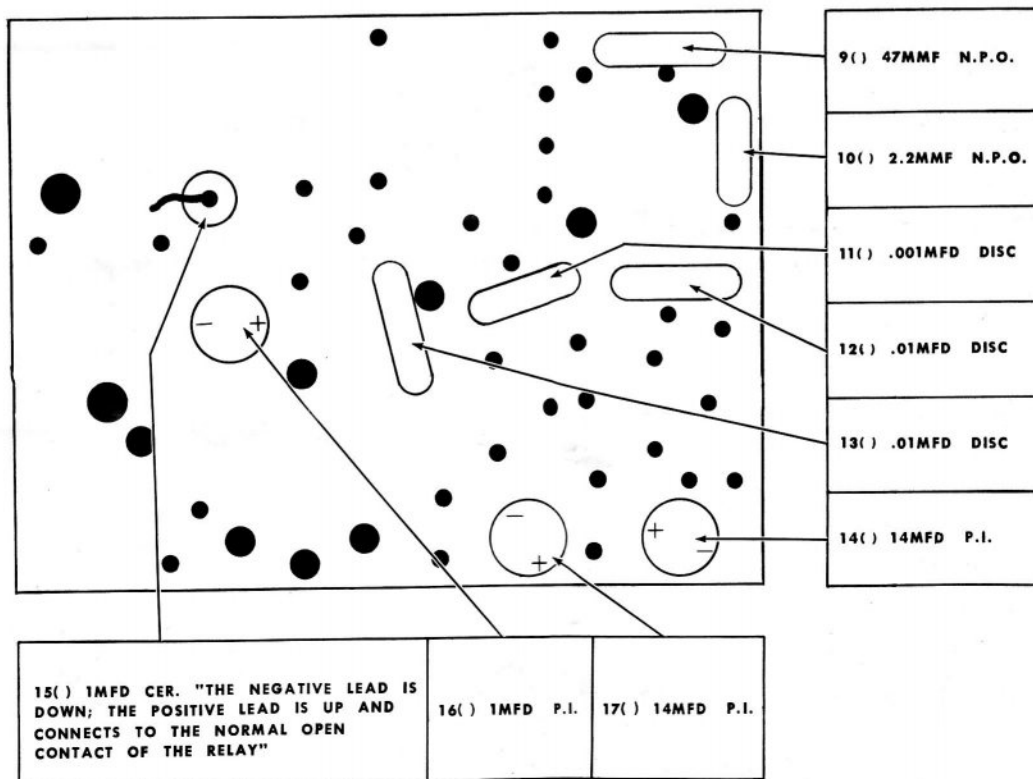
( ) Orient the circuit board as shown with the copper side down.

Now follow the steps in Pictorials 1, 2, & 3.

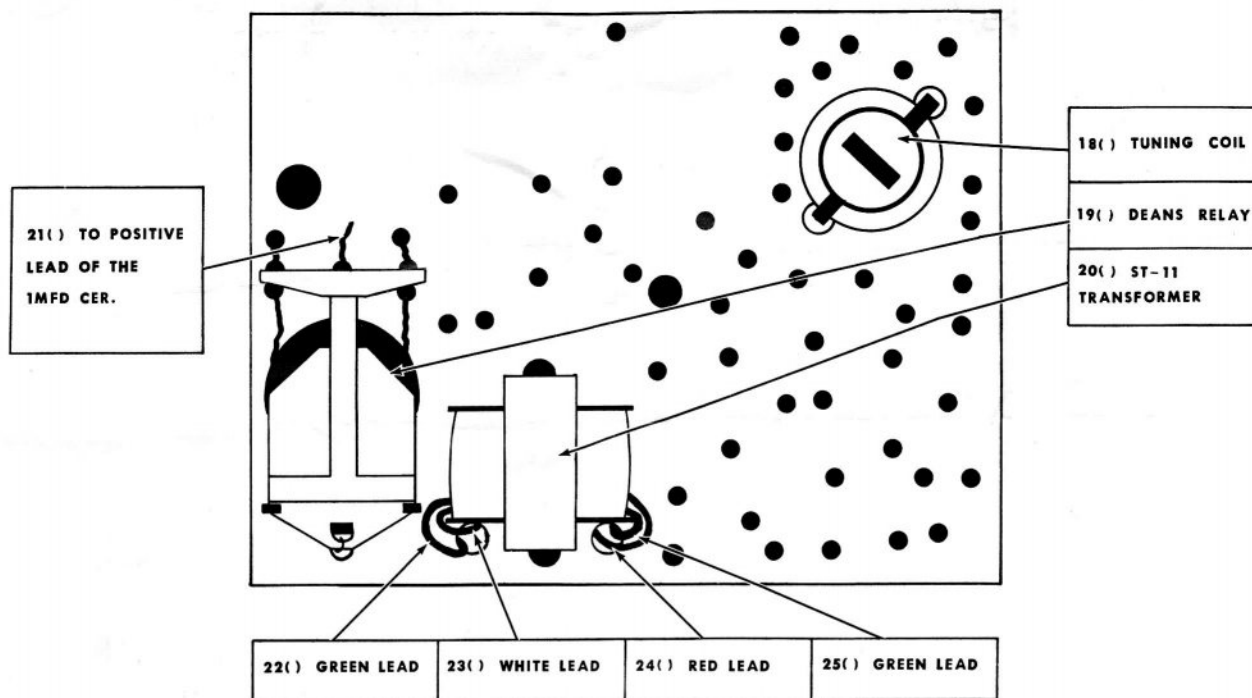
### PICTORIAL 1



### PICTORIAL 2

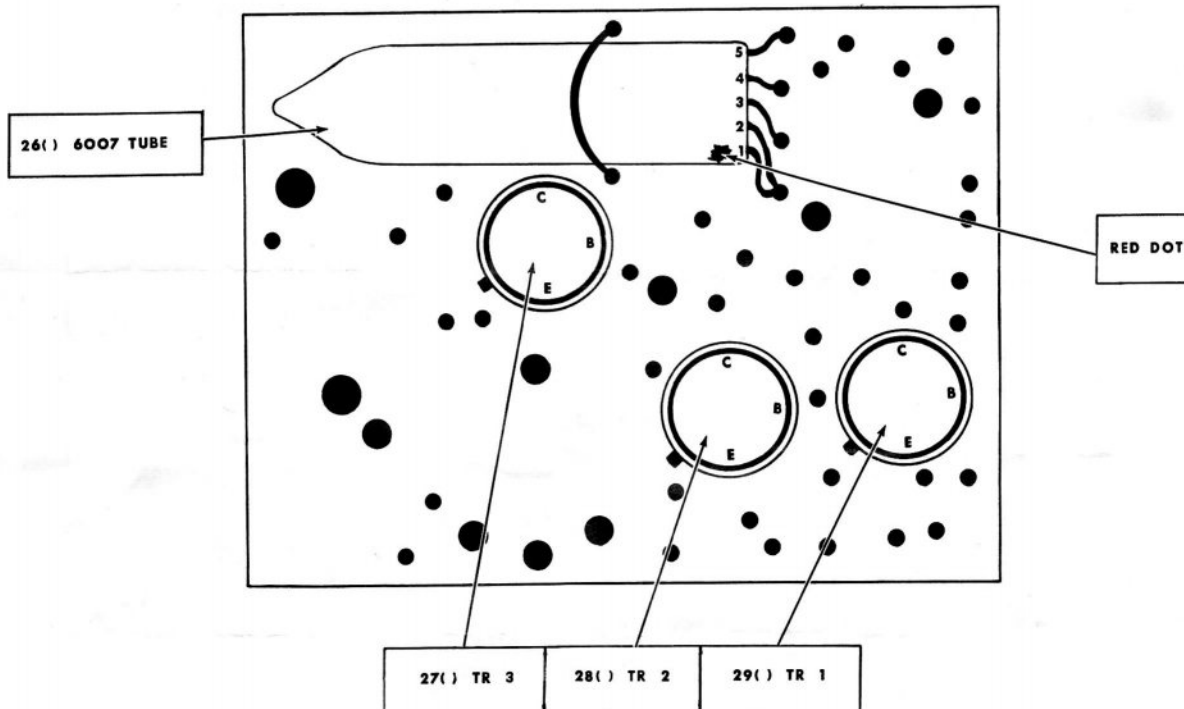


### PICTORIAL 3



When you receive your receiver kit the tuning coil has been wound with Solder-Eze wire which, by applying the soldering iron and solder, the insulation melts and the wire may be soldered to the lug.  
Refer to pictorial 5 to see which lands the ST - 11 transformer leads solder to.

### PICTORIAL 4



When soldering the tube and the transistors be careful not to apply excess heat or damage may result. Apply the iron to the copper land to be soldered then flow the solder over the lead. For ease of soldering, tin the leads of the tube and the transistors before attempting to solder to the board.

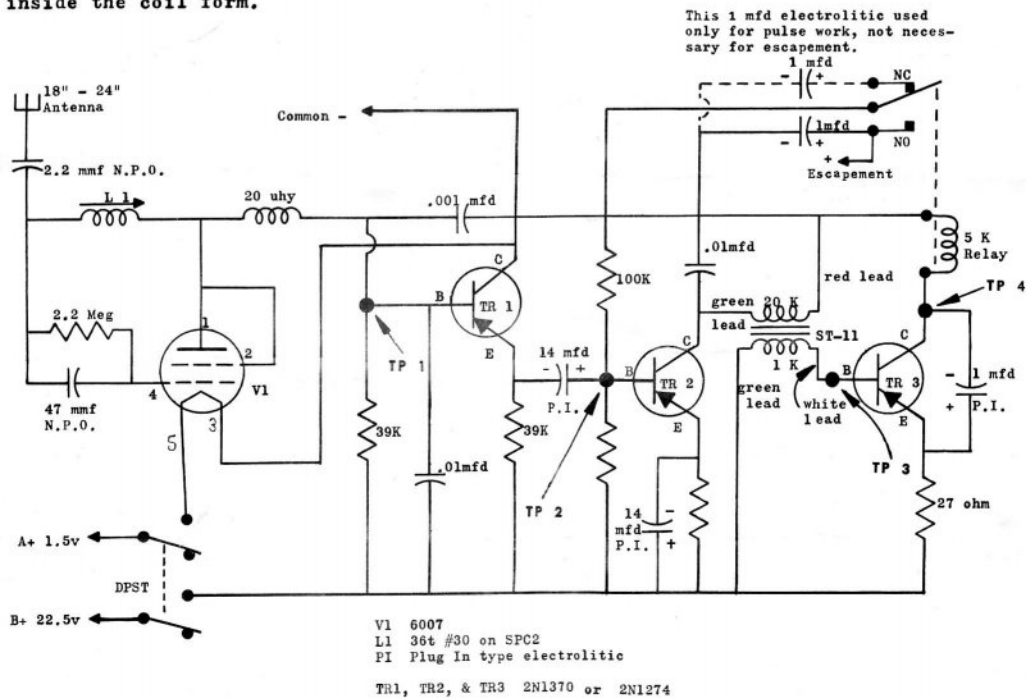
After the tube has been soldered in place, it is recommended that a small piece of foam rubber be inserted between the tube and the board to act as a cushion for the tube. After this is installed solder a piece of wire over the tube between the two holes provided as shown in pictorial 4.

**PICTORIAL 5**

This completes the building of the Kraft Mark III single channel receiver and before mounting it in the special screened plastic case it would be advisable to test it. After hooking up the receiver to the batteries as shown in the pictorial wiring installation diagram, insert a 0 to 10 ma meter in the B+ lead. Now tune the receiver as follows ; with no signal from the transmitter the idle current will be about 1 ma and unsteady, with carrier on tune the tuning slug in the coil until the idle current drops slightly and is considerably quited. Upon receipt of a modulated carrier of at least 85% in a range of 300 to 800 cps the current will rise to approximately 4 ma.

After the receiver has been tested and is working properly it is then mounted in the plastic case. Before mounting the receiver, the appropriate holes for the wire lead outs and the tuning slug should be drilled. This may be done with a low speed drill press using oil on the bit.

After the receiver has been finally tuned, it is desirable to apply a generous coat of cement such as Comet or Duco on the coilform and bottom holder. This will pot the coil and make it less susceptible to hard landings. Do NOT cement the slug inside the coil form.



If your receiver is inoperative, begin checking by using a crystal headset or as sensitive a headset as possible at the various bases of each of the transistors. A check of the drawing will show which lead to touch. Use a .01 to .05 capacitor in series with the headset. Fasten one side of the headset to the B- and use the other side as a probe. There should be a hiss at the first stage indicating superregeneration. This should get louder as you go through TP1. Still louder as you go through TP2, and be loudest of all at TP3. In the event that it is present at the first stage and not the third, the second is inoperative. Check for loose connections.

In the event that you are unable to trouble-shoot and repair your Kraft receiver, all Ace R/C kits should be returned to our Service Center, 837 Eastern Avenue, Schenectady, New York, where they will be serviced for a minimum fee of \$2.00 plus any components which require replacing and plus return postage.



RECEIVER RELAY HAS A 1mf ELECTROLYTIC CAPACITOR ACROSS N.O. CONTACT AND RELAY FRAME FOR ARC SUPPRESSION..BE SURE TO HOOK UP ESCAPEMENT OR ACTUATOR BATTERIES WITH POLARITY AS SHOWN.

