



EK CUSTOMER SERVICE BULLETIN

DATE: FEBRUARY 3, 1975

SUBJECT: Transmitter and receiver ESV calibration

TO: All EK Customer Service Centers.

The ESV meter (M-004, complete assembly) for transmitters using nicads (9.6 volts) is calibrated by first either applying 8.80 volts DC to the meter leads that attach to the on-off switch or 8.37 volts to the lands on the back edge of the PC board. Adjust the 50K pot., (R-018) so that the meter reads halfscale, refer to drawing C-1018 for the schematic. There have been some cases of the calibration pot. opening up with the results of little or no meter indication, check that the rivets are soldered to the mounting lugs opposite side from the resistance element. This completes the transmitter ESV meter calibration, now the meter will indicate full scale at full charge, and at half scale at minimum voltage.

The ESV for receiver batteries (M-006) drawings, schematic (A-186) and parts layout (A-199), are enclosed. The calibration procedure is as follows:

1. With no DC voltage applied, zero the meter movement mechanically with the screw on the meter face.
2. Apply 4.00 volts DC to the ESV and adjust the 1K pot. #1 to indicate "0" (zero) on the meter.
3. Apply 5.00 volts DC, and adjust the other 1K pot. #2 until the meter indicates full scale at 1.0 on the meter scale.
4. Apply 4.40 volts DC, note meter reading it should be 0.4, if not readjust pot. #1 until the meter reads 0.4, this point should be marked by a small piece of red tape.

This completes calibration of the receiver battery ESV, see the attached instruction sheet for using the ESV.

Don D. Downing
Service Manager
EK Products, Inc.

DDD/ss

EXPANDED SCALE VOLTMETER - M-006

WHAT IS AN ESV?

An ESV (Expanded Scale Voltmeter) is a meter that will show a small predetermined voltage difference over a large percentage of the meter face.

NOTE: EK's ESV is designed to be used with 4.8 Volt flight battery packs only.

WHY AN ESV?

The ESV is from 3-5 times more accurate than meters presently available to the hobbyist.

The Ni-cad cell has a rated nominal voltage of 1.2V. In its fully charged condition, the voltage can be 1.35. The cell is considered discharged when the voltage is 1.1V. In a battery pack consisting of four cells, the total change in voltage that can be accurately read is 1.0V ($1.35 - 1.1V = .25V \times 4 \text{ cells} = 1.0V$). Until the introduction of EK's ESV, the meters available could only read this voltage within a very small percentage (10 - 20%) of their meter face. The ESV will read this voltage change over 60% of its meter scale, (.4 - 1 "DC Milliamperes" indicated)

HOW DOES THE ESV WORK?

When the ESV is connected into the charge plug of the receiver battery pack (switch off) it applies an approximate 250 ma load. The indicated meter reading can be taken to determine the state of charge.

USES OF THE ESV:

1. To determine state of charge:

Connect ESV to charge plug of flight batteries and observe meter scale. Note that the meter scale is marked off from "4.0" to "5.0" with a red stripe at "4.4". The red stripe indicates a dead pack while "5.0" or above indicates a fully charged. A good procedure to follow is to stop flying and recharge your batteries when the meter reaches "4.6". At this point, approximately 2/3 of the battery charge has expended.

NOTE: Unplug meter after reading has been taken in order to reduce unnecessary current drain.

2. To determine capacity:

- Charge flight pack 24 hours.
- Plug the ESV into the charge plug and record the starting time.
- When the meter reading decreases to 4.4 (Red Line), record this time.
- Convert the total time span from step B & C into hours and each fraction of an hour into tenths (i.e. 2.1 hours).

E. The battery capacity can now be computed from the following formula:

$$\frac{N \times 250}{C_n} \times 100 = \text{Percent Capacity}$$

When N - total test time (Step D)

Cn - Rated battery capacity in ma hours (i.e. 225 ma, 500 ma, 550 ma)

225 ma for B-047 and B-048

450 ma for "Fat A" cells

500 ma for pencil type packs

550 ma for B-035 (½ sub C)

3. To check for intermittent connections or bad cells:

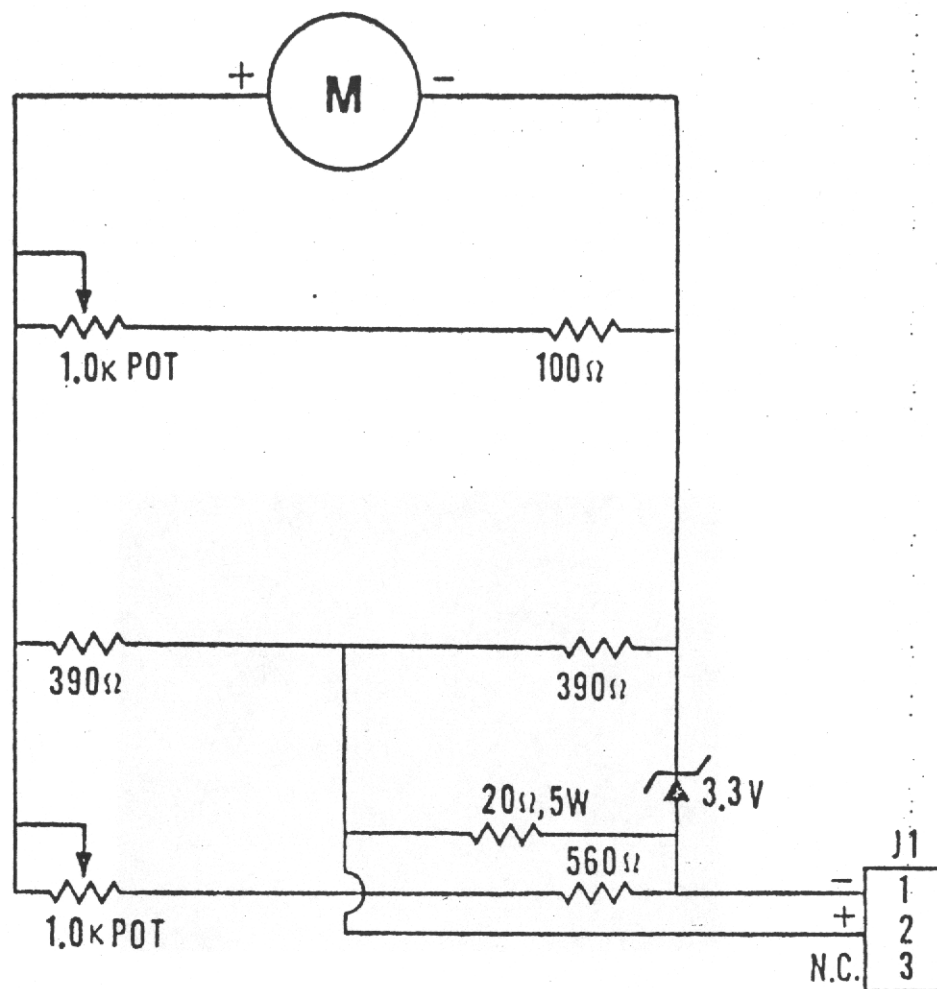
Plug the ESV into the charge plug and tap on the flight pack. Erratic movement of the needle will normally indicate intermittent connections. Faster than normal battery drain will normally indicate a bad cell.

EK's new ESV will prove to be a valuable tool in preventive maintenance of your RC equipment. Constant monitoring of your flight pack should prevent the loss of a plane or weekend of flying.

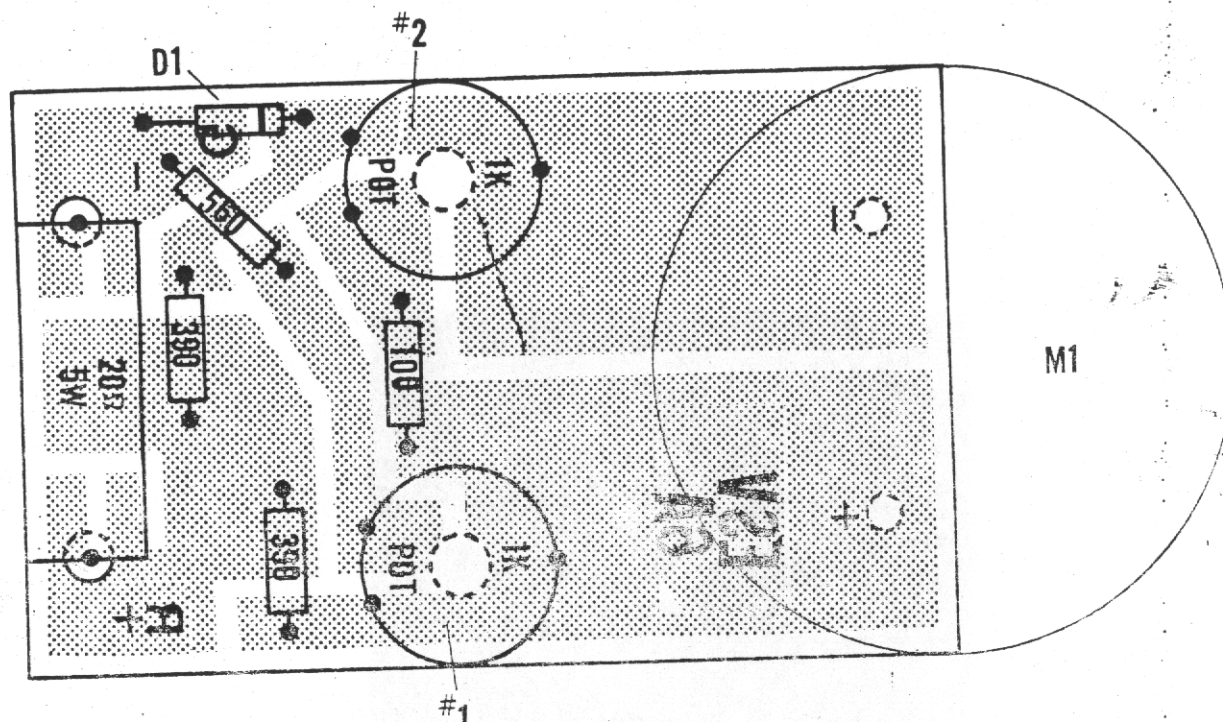
Happy Flying !

SPECIAL NOTES:

1. Care should be taken not to expose the ESV to extreme temperatures.
2. The ESV is a delicate instrument. As such, EK PRODUCTS cannot be responsible for misuse, abusive handling, or alterations for other uses.



SCALE	NONE	REVISIONS	BY	DATE
DATE	2 27 74	ALL 1.0k POT VALUES CHANGE	BY	10-10-74
DESCRIPTION	FIXED RESISTOR VALUES CHANGE		BY	6-17-74
APPROVED				
TITLE			NO.	
ESV-6A EXPANDED SCALE VOLT METER			A-186	



VIEW: COMPONENT SIDE

NOTES:

1. UNLESS OTHERWISE SPECIFIED:
ALL RESISTANCE VALUES ARE IN OHMS.
2. DIODE D1 IS A 1N746A (D-005).
3. METER M1 IS 0-1MA METER MOVEMENT (M-005).

EK PRODUCTS			
3233 W. EULESS BLVD., HURST, TEXAS 76053			
DRAWN	SCALE	REVISIONS	DATE
BEC	2:1		
CHECKED			
APPROVED			
DATE			
6-19-74			
TITLE			NO.
PARTS LOCATION - EXPANDED SCALE VOLTMETER - M-006			A-199