

CALIBRATION DATA 209A

- A. Check for zero adjust balance at zero between positive and negative D.C. Volts on 3 Volt range - No Voltage applied to input. Over 1 DIV. SHIFT MEANS A GASSY 6SN7 OR VOLTAGE UNBALANCE - SEE SEC. I.
- B. Check for ohm meter operation and battery contact. (Meter should read full scale, and return to zero upon shorting input terminals.) Check ohms and zero adj. controls for proper operation.
- C. Check XI Meg ohms for leakage or gassy 6SN7 tube. Gassy tube makes meter backup on scale 15 divisions or more.
- D. Calibrate Mils:  
Apply 2.5 mils DC to mils input jacks. Meter usually reads a little high. Add resistor in series with 470 ohm calibration spool until 2.5 mils reads properly.  
Check all ranges. Tolerance 1 1/2 divisions  $\pm$
- E. Check Capacity:  
Use .5 Mfd capacitor (standard checked value) if reads improperly change 6SJ7 tube. Tolerance 1 division  $\pm$
- F. Check all ohms ranges at center scale, after properly zero and ohms adjusting meter to zero and full scale respectively. Any error will be due to improper meter curve, meter sensitivity, or divider resistor out of tolerance.
- G. Check LOW Ohms ranges - which is scale divided by 10, (i.e. 10 ohms reads at 100 on scale.)
- H. Cancel Normal (RMS) and Peak to Peak AC diode potentials, using pots R51 for RMS and R50 for Peak to Peak, both on 3 volt AC ranges - If not enough control is obtainable, correct resistor networks in series with pots R51 for Normal RMS, and R50 for Peak to Peak. Keep total network resistance, including pots, at one and one half megohms minimum.
- I. Before leaving this section, check once again for zero shift between positive and negative DC Volts on 3 Volt range. If shift is greater than one Div. - Check the B  $\neq$  supply at power supply filter. If greater than 5 Volts difference of potential between positive and negative to ground exists, balance the Voltages by correcting resistors R45 or R57 - whichever is necessary. The potential should be between 90 and 100 Volts depending on line Voltage. Rereck and set AC diode cancellation pots R50 and R51.
- J. Calibrate DC Negative Volts:  
Apply 2.5 Volts negative DC (positive to ground) on 3 Volt range. Adjust pot. R40 until meter reads 2.5 Volts. Check all ranges, and split difference between high and low readings on all ranges. Tolerance 1 1/2 divisions.

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(continued)

- K. Any range off greater than 1 1/2 divisions tolerance can be corrected by changing the resistor on the ground or low side of the divider network.
- (This correction is done on negative DC because AC is also read on the same position of internal switching.) Do not change the resistor on 3 Volt range, except in extreme cases.
- L. Positive DC Volts:  
Check all ranges, compromising between negative and positive, if necessary, but do not change divider for DC positive alone.
- M. DC Center Scale:  
Apply 1.5 Volts positive, then negative to check 3V range calibration. Should zero adjust at center zero be insufficient, change or parallel R20 33K resistor, until proper control of plus or minus 2 div. minimum adjust swing is attained.
- N. Calibrate AC Volts: RMS (Normal)  
Check zero adjust balance between 3 Volt range and high ranges. Adjust diode balancing potential pot R51, if necessary. Set selector switch to AC Peak to Peak Volts: - Check zero adjust balance between 3V range and high ranges on Peak to Peak AC.
- O. Return AC selector switch to RMS (Normal)  
Apply 2.5 Volts AC and adjust pot. R39 so AC Volts reads 1 Div. low, at 2.5 AC point on 3V. AC ONLY scale. Check all AC ranges at approximately 3/4 scale and split high and low difference, if necessary. Tolerance = 2 divisions.
- P. Apply 250 Volts AC RMS to probe and check for stable reading. Any serious fluctuation other than normal line, would mean diode breakdown (6AL5) or cable leakage.
- Q. Return AC selector switch to Peak to Peak.  
Apply 2.5 Volts AC Peak to Peak Voltages, on 3 Volts AC only scale. Tolerance = minus 5 div. (This is due to diode curve error.)
- R. Should proper calibration be impossible, it may be necessary to change resistors R48 and R49 on RMS (Normal) or resistors R43 and R44 on Peak to Peak. This would usually be only necessary where insufficient sensitivity is obtainable, and meter reads too low.
- S. Check 1200 Volt RMS Range at special Volt pin jacks. Apply 800 Volts RMS and adjust R4, if reading too high, or R3 if meter reads low - if impossible to correctly calibrate on above procedure, check C1 or 6x5 V2. Tolerance  $\pm$  2 divisions.