

## ALTEK MODEL 156 FIELD CALIBRATION PROCEDURE

DOCUMENT#: 1-892 REVISION: A  
DRAWN BY: P.B-GARLICK DATE: MAY 1987  
REVIEWED BY: [Signature] DATE: 1900-194-00  
APPROVED BY: R. Kamitz DATE: 3 FEB 95

**SUGGESTED EQUIPMENT:** Digital Voltmeter with accuracy of  $\pm 0.002\%$  of span (4v) with a 100 Ohm Resistor ( $\pm 0.05\%$  or better). As an alternative, a precision DC ammeter with accuracy of  $\pm 0.02\%$  of span (40mA) may be used directly, which eliminates the 100 Ohm resistor. An adjustable power supply, 72 VDC nominal.

**mA OUTPUT, SOURCE MODE:** Before any adjustments to the model 156 are made, fresh 9 volt batteries (Alkaline, Duracell MN1604 are recommended) should be placed in the unit. Set the left hand switch to mA OUT while observing the LED. The LED should flash once, indicating proper battery voltage. If the LED does not flash, check each battery for proper voltage and correct connection. Set the meter to a range which covers 1-5 VDC with sufficient resolution. Place the 100 Ohm resistor in series with the Model 156 output. The meter will read 1-5 volts corresponding to 10-50 mA through the resistor (see Diagram 1).

**ADJUSTMENTS:** Set the left hand switch to "mA OUT" and the right hand switch to "DIAL". Rotate the knob clockwise until 000 is reached. Adjust the span pot (see Diagram 2) so that the meter reads 5.000 Volts  $\pm 0.1\%$  (4.996 to 5.004 VDC). Move the right hand switch to "100%" and adjust the 100% pot (see note 1) to the same value as the SPAN. Move the right hand switch back to "DIAL" and rotate the knob counterclockwise until it again reads 000. Adjust the ZERO pot so that the meter reads 1.000 Volts  $\pm 0.1\%$  (0.996 to 1.004 VDC). Move the right hand switch to "00.0%" and adjust the 00.0% pot (see note 2) to the same value as the ZERO. Move the right hand switch back to "DIAL" and rotate the knob to 500. Adjust the LINEARITY pot (see note 3) so that the meter reads 3.000 Volts  $\pm 0.1\%$  (2.996 to 3.004 VDC). Check and readjust pots as necessary to obtain desired accuracy. Additional points can be checked to  $\pm 0.1$  ( $\pm 0.004$  VDC) to insure linearity across the entire range. The optional AC ADAPTOR may now be connected and the calibration again checked to insure proper operation of the unit. If connecting the AC ADAPTOR causes the unit to vary more than the specifications allow, it is advised that the Power Supply Effect test should be made.

**2 WIRE SIMULATOR MODE:** To check the two wire mode, disconnect the Model 156 and place the DC power supply in series with the Model 156 and the 100 Ohm resistor. Move the left hand switch to the "2 WIRE" position. the "100%, 00.0%, and DIAL" readings should all be within  $\pm 0.1\%$  ( $\pm 0.004$  VDC) of those found in "SOURCE" mode.

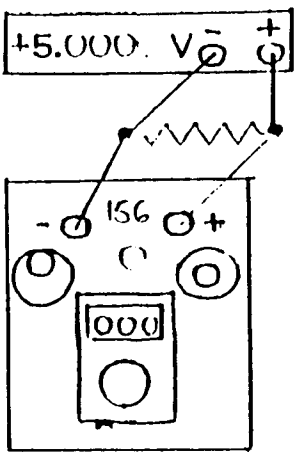


Diagram 1

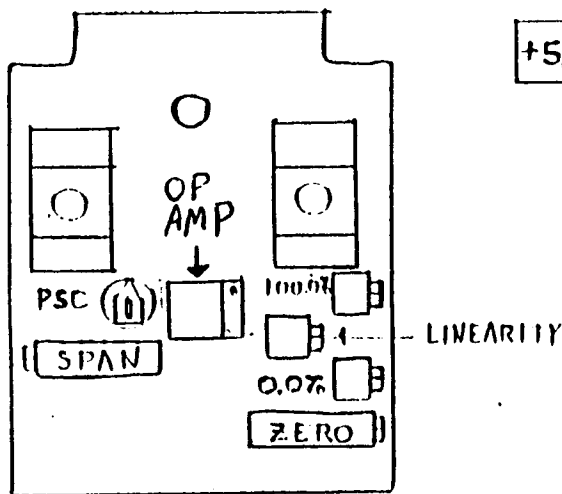


Diagram 2

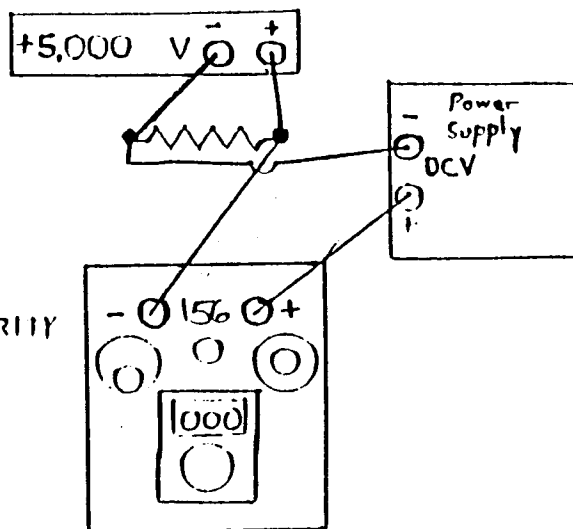


Diagram 3

**POWER SUPPLY EFFECT:** This test is made using the 2 WIRE mode (see above). Set the left hand switch to "2 WIRE" and the right hand switch to "00.0%". Note the meter reading with the power supply set at 72 VDC. Adjust the power supply + or - 10 VDC and note this reading. The two readings should be within  $\pm 0.05\%$  ( $\pm 0.002$  VDC). During routine calibration the power supply compensator should need no adjustment. The pot has been sealed at the factory to avoid accidental movement. If the OP AMP has been replaced or the Model 156 is outside of the above deviation, the power supply compensator (PSC) pot (see note 4) should be adjusted. Using the test above, note the meter readings at both ends of a 10 VDC change of the power supply. Adjust the PSC pot as necessary to within  $\pm 0.05\%$  ( $\pm 0.002$  VDC). If the PSC pot is adjusted the entire calibration procedure MUST be repeated.

If component replacement is required, save and replace the insulating material on the underside of the printed circuit board.

If the unit fails to meet any of its stated specifications after recalibration, it should be returned to the factory for repair.

- Note 1) Board Revision B or higher.
- Note 2) Board Revision E or higher.
- Note 3) Board Revision F or higher.
- Note 4) Board Revision D or higher.