

SECTION V 2575A CALIBRATION

5-1. General

The Model 2575A should be calibrated at regular intervals to ensure continued accuracy. This interval may be determined by usage; however the instrument has a factory calibration interval of 12 months.

5-2. Required Test Equipment

- a) Digital Voltmeter with a DC accuracy of at least 0.005% and ranges of 200mV and 2V (HP3458A or equivalent)
- b) DC Voltage Source 0.001% accuracy (Valhalla 2701C or equivalent)
- c) Current Calibrator with ranges of 100A, 10A, 1A, .1A, .01A and .001A (Valhalla 2555A or equivalent)
- d) Precision Resistors with known values to within $\pm 0.003\%$

<u>Value</u>	<u>Current Rating</u>
0.001 Ω	100A
0.01 Ω	10A
0.1 Ω	1A
1 Ω	100mA
10 Ω	10mA
100 Ω	1mA

5-3. Description of Procedure

The Valhalla Model 2575A is calibrated using a stable source of DC current (the Valhalla Model 2555A) and a highly accurate DC voltmeter. It may be noted that the accuracy of the 2555A is not as high as the 2575A. By using the current source as a *transfer standard* (transfers the accuracy of the standard resistors), the shunt may be calibrated to a tolerance that nears the uncertainty of the standard resistor used. For this reason, the results of the calibration depend to a great deal upon the quality of the standard resistors used. A typical calibration setup is shown in Figures 5-1 and 5-2.

In Figure 5-1, the current source is adjusted to produce a precise value of current by measuring the voltage drop across the standard resistor which has a known value.

For example to adjust the current source to produce exactly 100 Amps, the voltage across the .001 Ω resistor is measured. The current source is adjusted until the reading on the voltmeter reflects that of

the standard resistor (using Ohm's Law: $V=IR$). The output of the current source is now a precise 100.00 Amps.

The leads are then moved as shown in Figure 5-2 to the Model 2575A 100A shunt terminals. The voltage at the output terminals is monitored with the precision voltmeter. The appropriate potentiometer is adjusted for a reading of exactly 100.00mV, indicating that the shunt is now trimmed to a precise value (i.e. 0.0010000 ohms).

5-4. DC Calibration

The calibration adjustments are made using potentiometer adjustments located inside the 2575A. One adjustment for each shunt is provided, as well as one for the buffer amplifier. Adjustments are accessed by removing the top front bezel, and the top cover. For maximum stability, the cover should be kept in place as much as is practical. Potentiometer placement is shown on the board itself and on drawing number 2575-600 at the back of this manual.

Apply AC power and allow the 2575A to warm-up for at least 15 minutes in a stable environment with the covers in place before proceeding.

5-4-1. Amplifier Adjustment

- 1) Set the 2575A Range Selector to "EXT".
- 2) Connect the DC voltage source at 100mV to the *left* set of "Output Voltage" terminals of the 2575A. These terminals also serve as the amplifier input terminals.
- 3) Connect the voltmeter to the *right* set of "Output Voltage" terminals.
- 4) Adjust RV7 until the voltmeter reads 1.00000 volt.
- 5) Reverse the polarity of the input voltage and balance RV7 for an equal deviation at both input polarities. Both readings must be within $\pm 200\mu V$.

5-4-2. Shunt Adjustments

- 1) Connect the calibration equipment as shown in Figure 5-1 using the desired values shown in Table 5-1.
- 2) Adjust the value of the current source until the output is exactly equal to the Test Current shown in Table 5-1. This is calculated using Ohm's Law: $V=IR$.

Where:

R = the precise value of the standard resistor

I = the value of test current shown in Table 5-1

V = the voltage across the standard resistor

100 Amp Shunt Example:

R = 0.0010270 Ω

I = 100.00 amps

V = .10270 volts

The current source should be adjusted until the voltmeter reads 0.10270 volts. The current source has now been trimmed to produce a precise 100 amps.

- 3) Make the connections as shown in Figure 5-2.
- 4) Adjust the appropriate potentiometer of the 2575A for a voltmeter reading of 100.00mV.

All shunts are calibrated using the same procedure as was used above for the 100 amp shunt, but the values shown in Table 5-1 are substituted accordingly. The shunts may be calibrated in any order desired.

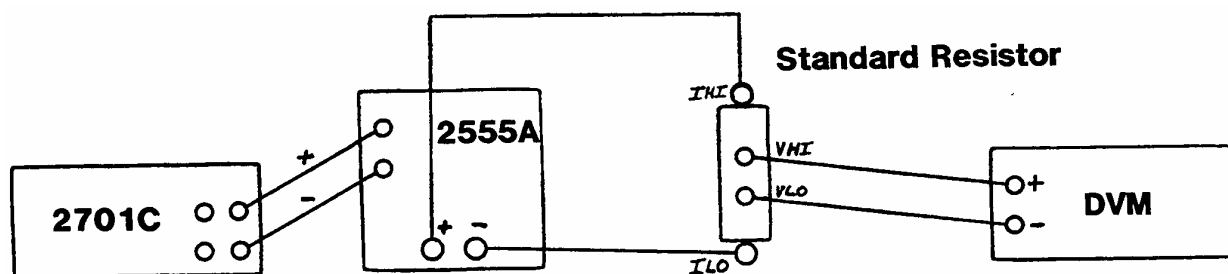
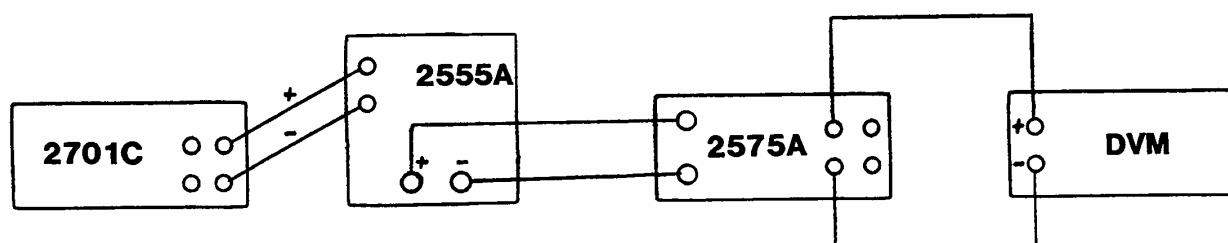
5-5. AC Calibration

The AC frequency response of this instrument is inherent in its design and requires no periodic adjustments. The frequency response *should* be checked whenever a repair is made to the amplifier or to any shunt resistor. If you should doubt the integrity of your instrument, please contact the factory.

Table 5-1. Calibration Variables

2575A Range	2555A Range	Standard Resistor	Test Current ^[1]	Adjust	DVM Reading
100A	100A	0.001 Ω	100 Amps	RV1	100.00mV
20A	20A	0.01 Ω	10 Amps	RV2	100.00mV
2A	2A	0.1 Ω	1 Amp	RV3	100.00mV
200mA	200mA	1 Ω	100 mAmps	RV4	100.00mV
20mA	20mA	10 Ω	10 mAmps	RV5	100.00mV
2mA	2mA	100 Ω	1 mAmp	RV6	100.00mV

[1] The test current should be verified and adjusted as necessary using the standard resistors as a reference prior to making any adjustment on the 2575A. (See Section 5-4.)

**Figure 5-1. Test Current Verification and Adjustment****Figure 5-2. Model 2575A Calibration Setup**