



Valhalla Scientific, Inc.

Calibration Laboratory

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## 2400 CALIBRATION PROCEDURE

*From 2400 Series Operation Manual*

### 1. Calibration Cycle

- ✦ We recommend that the instrument is calibrated once a year.
- ✦ The user must be aware that occasional overloads (voltage and current) will degrade accuracy.

### 2. Equipment Needed

- ✦ A calibrator that will supply voltage 0.3V-600V and current 15mA-2A at 60Hz with 0.02% accuracy will suffice.

### 3. Preparing for Calibration

- ✦ Remove the hood of the Power Analyzer by loosening 3 screws on the left and the right hand side.
- ✦ Slide the hood over the top on the instrument.
- ✦ Turn the instrument on and allow approximately 30 minutes warm-up time.

### 4. Offset Adjustments and Calibration

- ✦ Figure 1 shows the locations that have to be adjusted.
- ✦ The top amplifiers are the voltage input amplifiers with adjustments U1, U2, U3, and U4.
- ✦ The bottom amplifiers are the current input amplifiers with adjustments I<sub>dc</sub>, I1, I2, I3, I4, I5, and I6.
- ✦ For a 3-Phase Power Analyzer above adjustments must be performed for phase 1, phase 2 and phase 3.
- ✦ Make sure that all scaling factors are set to 1.0000.

**Note: The shields of the amplifiers are on the potential of the corresponding Lo-terminal input.**

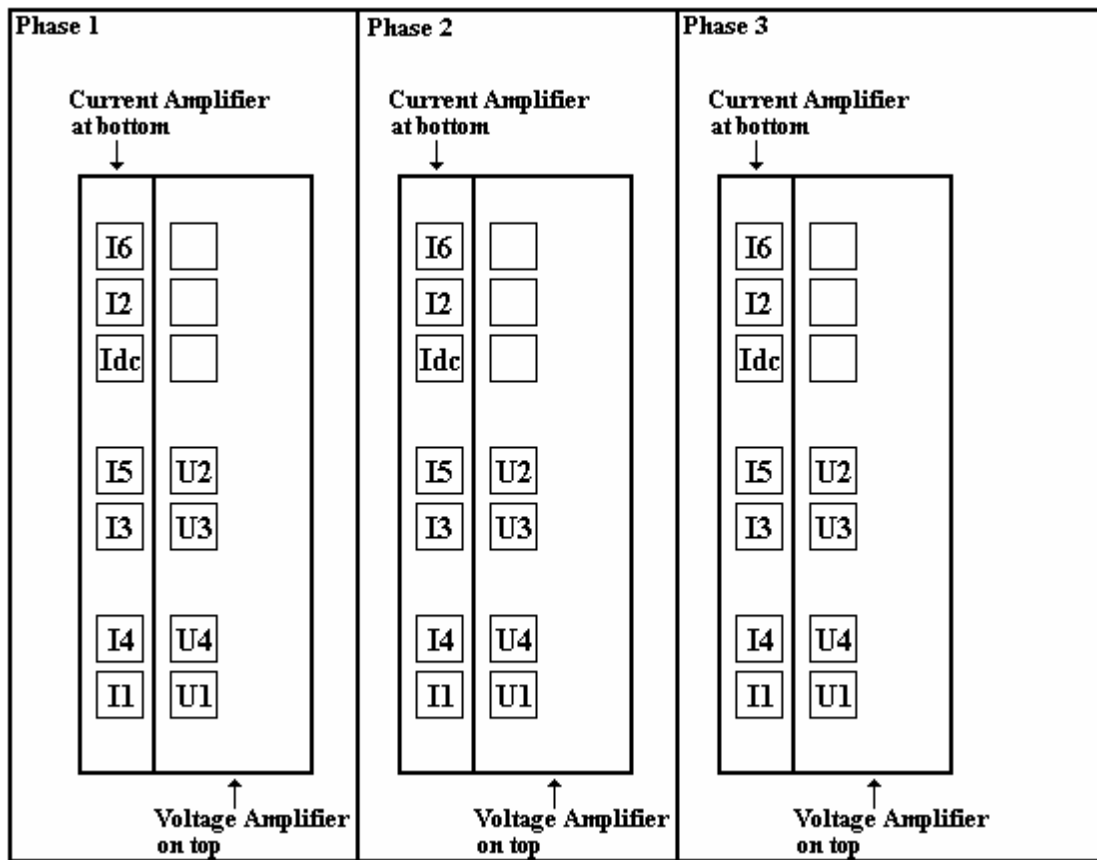


Figure 1: Location of Calibration Adjustments

## 5. Voltage Amplifier Calibration

- ✦ Connect the Voltage inputs in a 3-Phase model in parallel and perform Adjustments on all 3 amplifiers. Apply a 60Hz signal from the calibrator and select voltage synchronization on the Power Analyzer.

| INPUT | RANGE | ADJUSTMENT                        |
|-------|-------|-----------------------------------|
| 1V    | 1V    | Adjust U1 for 1.0000V rms reading |
| 100V  | 100V  | Adjust U2 for 100.00V rms reading |
| 30V   | 30V   | Adjust U3 for 30.000V rms reading |
| 300V  | 300V  | Adjust U4 for 300.00V rms reading |

All other voltage ranges not listed above must now also be within specifications.

## 6. Current Amplifier Offset Adjustment

- ⊕ Leave the current inputs open.
- ⊕ Select 5A input and 15mA current range.
- ⊕ Adjust I<sub>dc</sub> to obtain a minimal reading for the current average value (AVG mA). The reading is typically  $\pm 20\mu\text{A}$ .

## 7. Current Amplifier Calibration

- ⊕ You can connect all three current inputs of a three-phase model in series with your calibrator if the calibrator used is capable of driving the  $3 \times 0.2\Omega$  burden of the 5A inputs.
- ⊕ Apply 60Hz current to the 5A input “IN5A” or the 30A input “IN30A”. Make sure you have selected the correct current input on the Power Analyzer front panel.

| Calibrator                        | Input | Range | Adjustments, rms current        |
|-----------------------------------|-------|-------|---------------------------------|
| 2A (3A)                           | IN30A | 3A    | Adjust I1 for 2.0000A (3.0000A) |
| 50mA                              | IN5A  | 50mA  | Adjust I2 for 50.000mA          |
| Repeat above steps at least once. |       |       |                                 |
| 15mA                              | IN5A  | 15mA  | Adjust I3 for 15.000mA          |
| 150mA                             | IN5A  | 150mA | Adjust I4 for 150.00mA          |
| 1.5A! <b>CAUTION</b>              | IN5A  | 1.5A  | Adjust I5 for 1.5000A           |

**CAUTION:** Drive one input at a time. Your calibrator may exceed its maximum burden voltage.

## 8. Shunt Input Calibration

- ⊕ Apply 60mV/60Hz to the Power Analyzer Shunt input.
- ⊕ Select “SHUNT” on the front panel.
- ⊕ Adjust I<sub>6</sub> for 1.0000A rms reading.

## 9. Power Calibration

- ⊕ Power is the precise product of current and voltage and is also calibrated with above steps.