

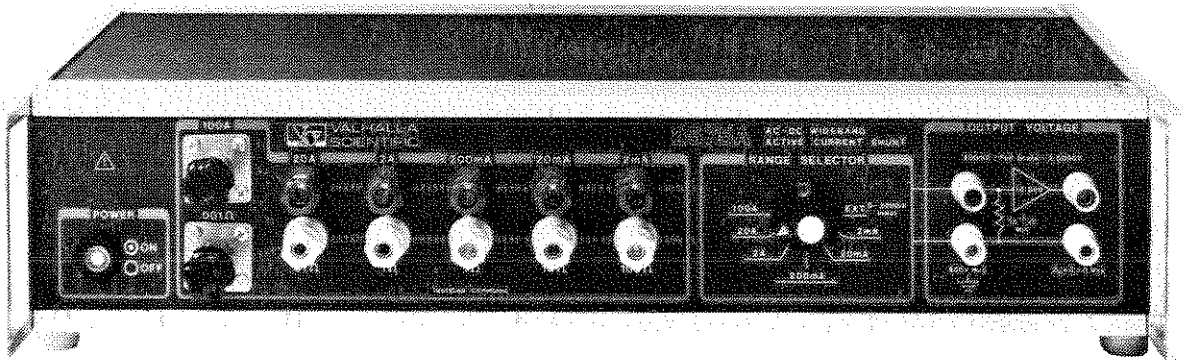
CN 12/87

# 2575 A

## AC-DC Current Shunt

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### Operation and Maintenance Manual



REV. 12/83

#### CERTIFICATION

Valhalla Scientific, Inc. certifies that this instrument was thoroughly tested and inspected and found to meet its published specifications when it was shipped from the factory. Valhalla Scientific, Inc. further certifies that its calibration measurements are traceable to the National Bureau of Standards to the extent allowed by NBS's calibration facility.

#### WARRANTY

The warranty period for this instrument is stated on your invoice and packing list. Please refer to these to determine appropriate warranty dates. We will repair or replace the instrument during the warranty period provided it is returned to Valhalla Scientific, Inc. freight prepaid. No other warranty is expressed or implied. We are not liable for consequential damages. Permission and a return authorization number must be obtained directly from the factory for warranty repair returns. No liability will be accepted if returned without such permission.

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## SPECIFICATIONS

### RANGE AND ACCURACY

RANGE	SHUNT VALUE	DC ACCURACY	AC ACCURACY		MAX INPUT DC/RMS AC
			1KHz	10KHz	
100A	0.001Ω	+0.05%	+0.1%	*	100A
10A	0.01Ω	+0.02%	+0.1%	+0.5%	20A
1A	0.1Ω	+0.02%	+0.1%	+0.1%	2A
100mA	1Ω	+0.01%	+0.1%	+0.1%	0.2A
10mA	10Ω	+0.01%	+0.1%	+0.1%	0.02A
1mA	100Ω	+0.01%	+0.1%	+0.1%	0.002A

\*Not Specified

### AMPLIFIER CHARACTERISTICS

**Amplitude Gain:** 10.000  
**Gain Accuracy:** ±0.01% ±10 μV RTI at DC  
**Frequency Response:** ±0.05% to 10 KHz  
**Input Resistance:** Greater than 10<sup>10</sup> Ohms  
**Output Resistance:** Less than 1 Ohm  
**Maximum Input Voltage:** ±0.3 VDC or Peak AC

### GENERAL INFORMATION

**Temperature Range:** 0 to 50°C  
**Temperature Coefficient:** Less than 0.001% per°C  
**Shunt Voltage Drop:** 100.00 mV for full scale input  
**Power:** 115/230 VAC 50-60 Hz 12 Watts  
 (230 VAC Special Order)  
**Size:** 3.5"H x 17"W x 6"D  
 8.9cm x 43.2cm x 15.2cm  
**Weight:** 8 lbs. (3.6 Kg) Net  
 13 lbs. (5.9 Kg) Shipping

## SECTION I - DESCRIPTION

In the current measurement mode, the 2575 offers six isolated, switch-selectable decade ranges from 1 milliampere to 100 amperes full scale. Each shunt is a four-terminal non-inductive resistance element, insuring a flat frequency response. The three higher rated shunts are forced-air cooled to minimize temperature rise and maximize thermal stability.

The full scale voltage drop across any shunt is 100.00 millivolts at rated current. A buffer amplifier with a precision gain of 10.000 provides a higher level output which is capable of driving thermal transfer standards. The amplifier is available for use with external inputs. Its input impedance is 10,000 megohms.

When used as a set of laboratory standard resistors, the Model 2575 provides six decade value, four-terminal resistors from 0.001 ohm to 100 ohms. Each range is independently adjustable for ease of calibration at time of recertification.

## SECTION II - INSTALLATION

The Model 2575 is normally produced for operation from 115 volt, 50-60 Hz power. When specified in the order, it will be provided for operation from 230 volt, 50-60 Hz power sources. Verify that the power requirements of the unit match the available power source before it is connected. When the Model 2575 is used as a bench-top instrument, no special installation procedures are required. If the "RX3" rack mount option is installed, the unit may be mounted in a standard 19 inch equipment rack. Whether used on a bench top or in an equipment rack, precautions must be taken to insure that there is no obstruction to airflow through the fan inlet and outlet. Also, when rack mounted, the ambient temperature must not exceed 50°C when the Model 2575 is in operation.

## SECTION III - OPERATION

To measure the load current, connect the load in series with the front panel terminals of the appropriate current shunt. Note the maximum current limit labels on the panel. To obtain a low resistance connection to the 100 ampere terminals, high-current spade lugs should be attached to the connecting wires. Set the selector switch to the appropriate range. Verify that an external input is not connected to the amplifier input terminals. Connect the measuring device (thermal transfer standard, DVM, etc.) to the output terminals, observing polarity (white terminal is positive). Note that the instrument output is limited to  $\pm 10$  milliamperes, maximum. The output of the instrument is linear and full scale output at rated current on any range is 1.0000 volt  $\pm 0.01\%$ .

It is not necessary that a load connected to one range be disconnected when connecting a load to another range as the selector switch isolates the shunts from one another.

The instrument may be used as an amplifier with a precision gain of 10.000 and 10,000 megohms input impedance over the range of DC to 10 KHz. To use this capability, place the selector switch in the EXT position. Connect the input signal to the amplifier input terminals, observing polarity. Note that the maximum input level is 200 millivolts. The amplifier is linear over the range of DC to 10 KHz and the full scale output is 1.0000 volt  $\pm$  0.01% for an input level of 100 millivolts.

#### SECTION IV - DISASSEMBLY

It will be necessary to remove the covers of the instrument to gain access to the calibration adjustments. Covers are removed by removing four screws through the top rear bezel and then lifting the cover clear.

The front panel circuit board, to which the amplifier and lower rated shunt resistors are mounted, must be removed to remove and replace components or to replace a front panel terminal. The board is attached to the front panel by nuts threaded on the front panel terminals which must be removed to remove the board. The washers under the nuts should be replaced when replacing the board and the nuts tightened securely, since they provide the connection between the terminal and the shunt.

#### SECTION V - CALIBRATION

The Model 2575 should be calibrated, at intervals best determined by the user, with the following procedure. Calibration requires a digital voltmeter with a DC accuracy of 0.005% on the 100 millivolt and 1 volt ranges (Guildline Model 9574, or equivalent) and a current calibrator with current ranges of 100, 10, 1, 0.1, and 0.001 amperes (Valhalla Model 2555A, or equivalent). An alternate to the following calibration procedure is return of the instrument to Valhalla where calibration instruments with accuracies traceable to the U.S. Bureau of Standards are available. Refer to Section IV for removal of covers for access to adjustments.

1. Connect the digital voltmeter to the amplifier input terminals of the Model 2575. Select its 100 millivolt range and allow the manufacturer's recommended time for stabilization after applying power.
2. Place the selector switch in the 100A position.
3. Connect the current calibrator output to the 100A range terminals using high current spade lugs. Set the current calibrator output for 100 amperes and adjust RV1 (see Figure 1) to provide a DVM reading of 100.00 millivolts  $\pm$  50 microvolts.
4. Place the selector switch in the 10A position.

5. Connect the current calibrator output to the 10A range terminals. Set the current calibrator output for 10 amperes and adjust RV2 (see Figure 1) to provide a DVM reading of 100.00 millivolts  $\pm$  20 microvolts.
6. Place the selector switch in the 1A position.
7. Connect the current calibrator output to the 1A range terminals. Set the current calibrator output for 1 ampere and adjust RV3 (see Figure 1) to provide a DVM reading of 100.00 millivolts  $\pm$  20 microvolts.
8. Set the selector switch to the 100mA range.
9. Connect the current calibrator output to the 100mA range terminals. Set the current calibrator output for 100 milliamperes and adjust RV4 for a DVM reading of 100.00 millivolts  $\pm$  10 microvolts.
10. Set the selector switch to the 10mA range.
11. Connect the current calibrator output to the 10mA range terminals. Set the current calibrator output for 10 milliamperes and adjust RV5 for a DVM reading of 100.00 millivolts  $\pm$  10 microvolts.
12. Set the selector switch to the 1mA range.
13. Connect the current calibrator output to the 1mA range terminals. Set the current calibrator output for 1 milliamperes and adjust RV6 for a DVM reading of 100.00 millivolts  $\pm$  10 microvolts.
14. Repeat the above sequence at 1 KHz for the 100A and 10A ranges and 10 KHz for the 1mA through the 10A ranges to verify AC performance.
15. Set the selector switch to the EXT position.
16. Apply 100mV  $\pm$  5 microvolts to the amplifier input terminals. Monitor the amplifier output terminals with the DVM and adjust RV7 for a reading of 1.0000V  $\pm$  100 microvolts.
17. Disconnect all equipment. Calibration is now complete.

