

# 2500 and 2502 Dual Photodiode Meters

The Models 2500 and 2502 Dual Photodiode Meters can measure and display either photodiode current or optical power for two photodiodes with appropriate user-supplied optical power gain/wavelength calibration factors.

The Model 2502 includes an analog output jack on the rear panel for each channel.

## Measurement Specifications

RANGE	MAXIMUM RESOLUTION	ACCURACY <sup>1,2</sup> 23°C ±5°C ±(% rdg. + offset)	TEMPERATURE COEFFICIENT 0°-18°C & 28°-50°C ±(%rdg. + offset)/°C	DC INPUT IMPEDANCE <sup>3</sup> (Maximum)
2.000000 nA	1 fA	1.00% + 2 pA	0.01 + 200 fA	20 kΩ
20.00000 nA	10 fA	0.40% + 2 pA	0.01 + 200 fA	20 kΩ
200.0000 nA	100 fA	0.30% + 200 pA	0.02 + 20 pA	200 Ω
2.000000 μA	1 pA	0.20% + 200 pA	0.02 + 20 pA	200 Ω
20.00000 μA	10 pA	0.10% + 20 nA	0.01 + 2 nA	2.0 Ω
200.0000 μA	100 pA	0.10% + 20 nA	0.01 + 2 nA	2.0 Ω
2.000000 mA	1 nA	0.10% + 2 μA	0.02 + 200 nA	0.2 Ω
20.00000 mA	10 nA	0.10% + 2 μA	0.02 + 200 nA	0.2 Ω

MAXIMUM INPUT: ±20.0mA.

## Typical Speed and Noise Rejection<sup>4</sup>

DIGITS	READINGS/s		NPLC	NMRR
	GPIB (SCPI)	GPIB (488.1)		
4½	700	900	0.01	—
5½	460	475	0.1	—
6½	58	58	1	60 dB

## Photodiode Voltage Bias Specifications<sup>2</sup>

RANGE	RESOLUTION	ACCURACY 23°C ±5°C + 5 mV)	MAXIMUM CURRENT	LOAD REGULATION <sup>5</sup> 0 to 20 mA	TEMPERATURE COEFFICIENT 150 ppm/°C
0 to ±10V	<400 μV	±(0.15% of setting + 5 mV)	20 mA	< 0.30%, 0 to 20 mA	150 ppm/°C
0 to ±100 V	<4 mV	±(0.3% of setting + 50 mV)	20 mA	< 0.30%, 0 to 20 mA	300 ppm/°C

### NOTES:

- Speed = Normal (1.0 NPLC), Filter On.
- 1 year.
- Measured as  $\Delta V_{in}/\Delta I_{in}$  at full scale (and zero) input currents.
- Dual channel, internal trigger, measure only, display off, Autorange off, Auto Zero off, source delay = 0, filters off, limits off, CALC5 and CALC6 off, 60Hz.
- Measured as  $\Delta V_{in}/\Delta I_{in}$  at full scale (20mA) and zero load currents.
- Noise floor measured as rms (1 standard deviation), 100 samples, Filter off, open (capped) input.
- Specification by design.
- Measured (at input triax) as  $\Delta V_{in}$  at full scale (20mA) vs. zero input currents.

## Analog Output Specifications (2502 only)

**OUTPUT VOLTAGE RANGE<sup>1</sup>:** OUTPUT IS INVERTING: -10V out for positive full scale input +10V out for negative full scale input

**OUTPUT IMPEDANCE:** 1kΩ typical.

RANGE	ACCURACY 23°C ±5°C ±(%output + offset)	TEMPERATURE COEFFICIENT 0°C - 18°C & 28°C - 50°C ±(%output + offset)/°C	RISE TIME Typical (10% to 90%)
2.000000 nA	6.0% + 90mV	0.30% + 7mV	6.1 ms
20.00000 nA	3.0% + 9mV	0.11% + 700μV	6.1 ms
200.0000 nA	6.0% + 90mV	0.30% + 4mV	395 μs
2.000000 μA	3.0% + 9mV	0.11% + 400μV	395 μs
20.00000 μA	6.0% + 90mV	0.30% + 4mV	135 μs
200.0000 μA	2.5% + 9mV	0.11% + 400μV	135 μs
2.000000 mA	6.0% + 90mV	0.30% + 4mV	21 μs
20.00000 mA	2.5% + 9mV	0.11% + 400μV	21 μs

<sup>1</sup>The analog output voltage for each channel is referenced to that channel's floating ground.

## GENERAL

### Typical Noise Floor Measurement Specification<sup>6</sup>

RANGE	TYPICAL NOISE FLOOR RMS (1 STDEV), 100 SAMPLES			
	0.01 NPLC	0.1 NPLC	1.0 NPLC	10 NPLC
2.000000 nA	2 pA	1 pA	40 fA	15 fA
20.00000 nA	2 pA	1 pA	40 fA	15 fA
200.0000 nA	200 pA	100 pA	2 pA	500 fA
2.000000 μA	200 pA	100 pA	2 pA	500 fA
20.00000 μA	20 nA	10 nA	200 pA	50 pA
200.0000 μA	20 nA	10 nA	200 pA	50 pA
2.000000 mA	2 μA	1 μA	25 nA	5 nA
20.00000 mA	2 μA	1 μA	25 nA	5 nA

**SOURCE CAPACITANCE:** Stable to 10.0nF typical.

**INPUT BIAS CURRENT<sup>7</sup>:** 50fA max. @ 23°C.

**INPUT VOLTAGE BURDEN<sup>8</sup>:** 4.0mV max.

**VOLTAGE SOURCE SLEW RATE:** 3.0ms/V typical.

**COMMON MODE VOLTAGE:** 200VDC.

**COMMON MODE ISOLATION:** Typically 10<sup>9</sup>Ω in parallel with 150nF.

**OVERRRANGE:** 105% of measurement range.

**MEMORY BUFFER:** 6000 readings (two 3000 point buffers). Includes selected measured value(s) and time stamp.

**PROGRAMMABILITY:** IEEE-488 (SCPI-1995.0), RS-232, five user-definable power-up states plus factory default and \*RST.

**DIGITAL INTERFACE:**

**Enable:** Active low input.

**Handler Interface:** Start of test, end of test, 3 category bits. +5V @ 300mA supply.

**Digital I/O:** 1 trigger input, 4 TTL/Relay Drive outputs (33V @ 500mA, diode clamped).

**POWER SUPPLY:** 100V/120V/220V/240V ±10%

**LINE FREQUENCY:** 50, 60Hz.

**POWER DISSIPATION:** 60VA.

**WARRANTY:** 1 year.

**EMC:** Complies with European Union Directive 89/336/EEC.

**VIBRATION:** MIL-T-28800F Random Class 3.

**SAFETY:** Complies with European Directive 73/23/EEC.

**WARM-UP:** 1 hour to rated accuracy.

**DIMENSIONS:** 89mm high × 213mm wide × 370mm deep  
(3½ in × 8½ in × 14½ in).

**Bench configuration (with handle and feet):** 104mm high × 238mm wide × 370mm deep (4¼ in × 9¼ in × 14½ in).

**WEIGHT:** 23.1kg (10.5 lbs).

**ENVIRONMENT:**

**Operating:** 0°-50°C, 70% R.H. up to 35°C non-condensing. Derate 3% R.H./°C, 35°-50°C.

**Storage:** -25° to 65°C, non-condensing.

Specifications are subject to change without notice.