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Dual-Channel Picoammeter / Voltage Source Instrument Specifications

SPECIFICATION CONDITIONS

This document contains specifications and supplemental information for the Model 6482 Dual-Channel Picoammeter / Voltage Source instrument. Specifications are the standards against which the Model 6482 is tested. Upon leaving the factory, the Model 6482 meets these specifications. Supplemental and typical values are nonwarranted, apply at 23 °C, and are provided solely as useful information.

The Model 6482 provides two independent picoammeter/voltage source channels for a wide range of measurement applications. The Model 6482 includes an analog output jack on the rear panel for each channel.

Source and measurement accuracies are specified at the Model 6482 terminals under these conditions:

1. 23 °C ± 5 °C, < 70 percent relative humidity
2. After a one-hour warm-up period
3. Speed normal (1 NPLC)
4. A/D autozero enabled
5. Properly zeroed operation
6. Calibration period: One year

MEASUREMENT SPECIFICATIONS¹

Range	Maximum resolution	Accuracy ^{2, 3} 23°C ±5°C ±(% rdg. + offset)	Temperature coefficient 0°–18°C & 28°–50°C ±(%rdg. + offset)/°C	DC input impedance ⁴ (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

¹ Maximum input: ±20.0 mA

² Speed = Normal (1.0 NPLC), filter on

³ One year

⁴ Measured as $\Delta V_{in}/\Delta I_{in}$ at full scale (and zero) input currents

VOLTAGE BIAS SPECIFICATIONS⁵

Range	Resolution	Accuracy 23°C ±5°C	Maximum current	Load regulation ⁶	Temperature coefficient 0°–18°C & 28°–50°C
0 to ±10 V	<400 µV	±(0.15% of setting + 5 mV)	20 mA	< 0.30%, 0 to 20 mA	150 ppm/°C
0 to ±30 V	<4 mV	±(0.3% of setting + 50 mV)	20 mA	< 0.30%, 0 to 20 mA	300 ppm/°C

ANALOG OUTPUT SPECIFICATIONS

Output voltage range (output is inverting):⁷ -10 V out for positive full scale input
+10 V out for negative full scale input

Output impedance: 1 kΩ typical

Range	Accuracy 23°C ±5°C ±(% rdg. + offset)	Temperature coefficient 0°–18°C & 28°–50°C ±(%rdg. + offset)/°C	Typical rise time (10 % to 90 %)
2.000000 nA	6.0% + 90 mV	0.30 % + 7 mV	6.1 ms
20.00000 nA	3.0% + 9 mV	0.11 % + 700 µV	6.1 ms
200.0000 nA	6.0% + 90 mV	0.30 % + 4 mV	395 µs
2.000000 µA	3.0% + 9 mV	0.11 % + 400 µV	395 µs
20.00000 µA	6.0% + 90 mV	0.30 % + 4 mV	135 µs
200.0000 µA	2.5% + 9 mV	0.11 % + 400 µV	135 µs
2.000000 mA	6.0% + 90 mV	0.30 % + 4 mV	21 µs
20.00000 mA	2.5% + 9 mV	0.11 % + 400 µV	21 µs

⁵ One year

⁶ Measured as $\Delta V_{in}/\Delta I_{in}$ at full scale (20 mA) and zero load currents

⁷ The analog output voltage for each channel is referenced to that channel's floating ground

TYPICAL SPEED AND NOISE REJECTION⁸

Digits	Readings per second		NPLC	NMRR
	GPIO (SCPI)	GPIO (488.1)		
4½	700	900	0.01	—
5½	460	475	0.1	—
6½	58	58	1	60 dB

TYPICAL NOISE FLOOR MEASUREMENT SPECIFICATIONS

Range	TYPICAL NOISE FLOOR RMS (1 STDEV), 100 SAMPLES			
	0.01 NPLC	0.1 NPLC	1.0 NPLC	10 NPLC
2.000000 nA	2.5 pA	1.5 pA	45 fA	15 fA
20.00000 nA	2.5 pA	1.5 pA	45 fA	15 fA
200.0000 nA	200 pA	120 pA	2 pA	500 fA
2.000000 µA	200 pA	120 pA	2 pA	500 fA
20.00000 µA	20 nA	12 nA	200 pA	50 pA
200.0000 µA	20 nA	12 nA	200 pA	50 pA
2.000000 mA	2 µA	1.5 µA	25 nA	5 nA
20.00000 mA	2 µA	1.5 µA	25 nA	5 nA

⁸ Dual channel, internal trigger, measure only, display off, autorange off, autozero off, source delay = 0, filters off, limits off, CALC5 and CALC6 off, 60Hz

GENERAL SPECIFICATIONS AND SUPPLEMENTAL INFORMATION

Source capacitance	Stable to 10.0 nf (typical)
Input bias current ⁹	50 fA max. @ 23°C
Input voltage burden ¹⁰	4.0 mv maximum
Voltage source slew rate	3.0 ms/V (typical)
Common mode voltage	200 V DC
Common mode isolation	Typically $10^9 \Omega$ in parallel with 150 nf
Overrange	105 % of measurement range
Memory buffer	6000 readings (two 3000 point buffers). Includes selected measured value(s) and time stamp
Programmability	IEEE-488.2, RS-232, five user-definable power-up states plus factory default and *RST
Output enable connector	Output enable: active low input Input line: SOT (start of test) trigger input
Power supply	100 V, 120 V, 220 V, 240 V ($\pm 10\%$), 50 Hz or 60 Hz, 50 VA maximum
Warranty	1 year
EMC	Conforms to European Union EMC Directive
Vibration	MIL-T-28800F random class 3
Safety	Conforms to European Union Low Voltage Directive
Warm-up	1 hour to rated accuracy
Dimensions	Rack mount: 89 mm high x 213 mm wide x 370 mm deep (3.5 in x 8.4 in x 14.6 in) Bench configuration (with handle and feet): 104 mm high x 238 mm wide x 370 mm deep (4.1 in x 9.4 in x 14.6 in)
Weight	23.1 kg (10.5 lb)
Environment	For indoor use only Altitude: Maximum 6562 ft (2000 m) above sea level Operating: 0 °C to 50 °C, 70 % relative humidity up to 35 °C. Derate 3 % relative humidity/°C, 35 °C to 50 °C Storage: -25 °C to 65 °C

⁹ Specification by design¹⁰ Measured (at input triaxial connector) as ΔV_{in} at full scale (20 mA) versus zero input currents