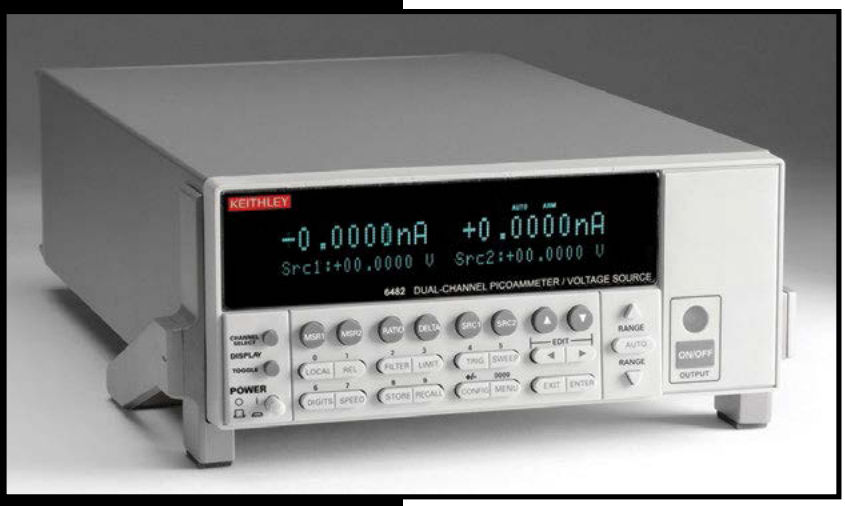
6482

Dual-Channel Picoammeter/ Voltage Source



The Model 6482 Dual-Channel Picoammeter/Voltage Source provides two independent picoammeter/ voltage source channels for a wide range of low-level measurement applications that require dual-channel measurements. Building off of the proven measurement capabilities of Keithley's Model 6485 5½-digit Picoammeter, the Model 6482 adds higher measurement resolution, a second measurement channel, and dual, independent 30V voltage bias sources.

With its dual channel measurement capabilities, the Model 6482 is a great measurement tool for analyzing multi-channel devices, monitoring currents in multiple locations on materials, and recording data from multiple sensors at once. The dual channels facilitate easier control and data aggregation. The greater channel density increases the number of instruments (and channels) that can fit in confined spaces.

- **Dual-channel, 6½-digit measurement capability**
- **Dual ±30V bias sources**
- **Measure currents up to 20mA**
- **Measure currents with 1fA resolution**
- **0–10V analog output for high resolution measurement feedback**
- **Supports assembly process, final testing, parts binning, and specification**
- **3000-point buffer memory on each channel allows data transfer after test completion**
- **Trigger Link for binning and sweep test operations**
- **IEEE-488 and RS-232 interfaces**

APPLICATIONS

- **Manufacturing component test**
- **Dual diode testing**
- **Semiconductor component testing**
- **Multi-pin component testing**
- **Ion beam monitoring**
- **Electron microscopy**

Programmable Limits and Filters

As with most Keithley instruments, the Model 6482's current and voltage limits can be programmed to ensure device protection during critical points, such as start of test. These instruments also provide average and median filters, which can be applied to the data stored in the buffer memory.

Ratio and Delta Measurements

The Model 6482 can provide ratio or delta measurements between the two completely isolated channels. These functions can be accessed via either the front panel or the GPIB interface. For test setups with multiple detectors, this capability enables targeted control capabilities.

Features that Expand Test and Measurement Flexibility

- **Scaled voltage analog output.** The Model 6482 can transmit measurement results to devices such as DMMs, data acquisition boards, oscilloscopes, or strip chart recorders.
- **220V overload protection.** With this high overload protection and a robust design, the Model 6482 can withstand abusive overflows.
- **One-touch front panel design.** Functions can be configured easily with the push of a button - without complicated function menus.
- **Built-in Trigger Link interface.** The Trigger Link interface simplifies synchronizing the Model 6482 with other instruments and voltage sources and combines six independent selectable trigger lines on a single connector for simple, direct control over all instruments in a system.
- **RS-232 and IEEE-488 interfaces.** These interfaces make it easy to integrate the Model 6482 into automated test and measurement systems.
- **Display on/off switch.** For research on light-sensitive components, such as measuring the dark currents of photodiodes, the front panel display can be switched off to avoid introducing light that could significantly reduce the accuracy of the results.
- **REL and LOG functions.** The Model 6482 can make relative readings with respect to a baseline value or display the logarithm of the absolute value of the measured current.
- **Rear panel triax inputs.** Triax inputs ensure premium noise protection. Triax-to-BNC adapters, which are included, allow inexpensive, easy-to-use BNC cables to be employed in situations where noise is less of a concern.

Dual-channel picoammeter/voltage source

LOW LEVEL MEASURE & SOURCE

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Dual-Channel Picoammeter/ Voltage Source

Ordering Information

6482 Dual Channel Picoammeter/Voltage Source (120V line power voltage)

6482/E Dual Channel Picoammeter/Voltage Source (220-240V line power voltage)

6482/J Dual Channel Picoammeter/Voltage Source (100V line power voltage)

Accessories Supplied

7078-TRX-BNC Triax-to-BNC Connector (2×)

ACCESSORIES AVAILABLE

CABLES

237-ALG-*	Low Noise Triax Cable with Alligator Clips
4802-10	Low Noise BNC Input Cable, 3m (10 ft)
4803	Low Noise Cable Kit
7007-1	Shielded IEEE-488 Cable, 1m (3.3 ft)
7007-2	Shielded IEEE-488 Cable, 2m (6.6 ft)
7007-4	Shielded IEEE-488 Cable, 4m (13.1 ft)
7078-TRX-*	3-Slot Triax Cable
7009-5	RS-232 Cable
7754-3	BNC to Alligator Cable, 0.9m (3 ft)
8607	Banana Cable set for Analog Output
8501-1	Trigger Link Cable with Male Micro-DIN Connectors at each End, 1m (3.3 ft)
8501-2	Trigger Link Cable with Male Micro-DIN Connectors at each End, 2m (6.6 ft)
8503	DIN-to-BNC Trigger Cable

ADAPTERS

237-TRX-BAR	3-lug Triax Barrel
7078-TRX-BNC	Female BNC to 3-Slot Male Triax for connecting BNC cable into triax fixture
CS-565	BNC Barrel

RACK MOUNT KITS

4288-1	Single Fixed Rack Mounting Kit
4288-2	Dual Fixed Rack Mounting Kit

GPIB INTERFACES

KPCI-488LPA	IEEE-488 Interface/Controller for the PCI Bus
KUSB-488B	IEEE-488 USB-to-GPIB Interface Adapter

SERVICES AVAILABLE

6482-3Y-EW	1 Year Factory Warranty extended to 3 years from date of shipment
6482-5Y-EW	1 Year Factory Warranty extended to 3 years from date of shipment
C/6482-3Y-DATA	3 (Z-540-1 compliant) calibrations within 3 years of purchase for Model 6482
C/6482-5Y-DATA	5 (Z-540-1 compliant) calibrations within 5 years of purchase for Model 6482
C/6482-3Y-ISO	3 (ISO-17025 accredited) calibrations within 3 years of purchase for Model 6482
C/6482-5Y-ISO	5 (ISO-17025 accredited) calibrations within 5 years of purchase for Model 6482

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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° ± 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 SPECIFICATIONS[1]

Range	Maximum Resolution	Accuracy [1, 2] 23° ±5°C ±(% rdg + offset)	Temperature Coefficient 0°–18°C & 28°–50°C ±(%rdg + offset)/°C	DC Input Impedance[3] (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

VOLTAGE BIAS SPECIFICATIONS

Range	Resolution	Accuracy 23°C ±5°C	Maximum Current	Load Regulation [4]	Temperature Coefficient
±10 V	<400 µV	±(0.15% of setting + 5 mV)	20 mA	< 0.30%, 0 to 20 mA	150 ppm/°C
±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)[2]: –10V out for positive full scale input, +10V out for negative full scale input.

OUTPUT IMPEDANCE: 1kΩ 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

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

TYPICAL SPEED AND NOISE REJECTION

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

GENERAL

SOURCE CAPACITANCE: Stable to 10.0nF (typical).

INPUT BIAS CURRENT[5]: 50fA max. @ 23°C.

INPUT VOLTAGE BURDEN[6]: 4.0mV maximum.

VOLTAGE SOURCE SLEW RATE: 3.0ms/V (typical).

COMMON MODE VOLTAGE: 200VDC.

COMMON MODE ISOLATION: Typically $10^9\Omega$ in parallel with 150nF.

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: 100V, 120V, 220V, 240V (±10%), 50Hz or 60Hz, 50VA 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: 89mm high × 213mm wide × 370mm deep (3.5 in. × 8.4 in. × 14.6 in.).

Bench Configuration (with handle and feet): 104mm high × 238mm wide × 370mm deep (4.1 in. × 9.4 in. × 14.6 in.).

WEIGHT: 23.1kg (10.5 lb.).

ENVIRONMENT: For indoor use only.

Altitude: Maximum 2000m (6562 ft.) above sea level.

Operating: 0° to 50°C, 70 % relative humidity up to 35°C. Derate 3% relative humidity/°C, 35° to 50°C.

Storage: –25° to 65°C.

NOTES

1. Speed = Normal (1.0 NPLC), filter on.
2. One year.
3. Measured as DVin/ΔIin at full scale (and zero) input currents.
4. Measured as DVin/ΔIin at full scale (20mA) and zero load currents.
5. Specification by design.
6. Measured (at input triaxial connector) as DVin at full scale (20mA) versus zero input currents.