KEITHLEY
A Tektronix Company

Series 2200 Programmable DC Power Supplies

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Specifications

Specification conditions

This document contains specifications for the Models 2200-20-5, 2200-30-5, 2200-32-3, 2200-60-2, and 2200-72-1 Programmable dc Power Supplies. Specifications are the standards against which the Models 2200-20-5, 2200-30-5, 2200-32-3, 2200-60-2, and 2200-72-1 are tested. Upon leaving the factory, the Models 2200-20-5, 2200-30-5, 2200-32-3, 2200-60-2, and 2200-72-1 meet these specifications. Typical values are not warranted and are provided solely as useful information.

Model-specific specifications

	2200-20-5	**2200-30-5**	**2200-32-3**	**2200-60-2**	**2200-72-1**
DC output rating					
Voltage	0 to 20 V	0 to 30 V	0 to 32 V	0 to 60 V	0 to 72 V
Current	0 to 5 A	0 to 5 A	0 to 3 A	0 to 2.5 A	0 to 1.2 A
Maximum power	100 W	150 W	96 W	150 W	86 W
Load regulation					
Voltage	< 0.01% + 2 mV	< 0.01% + 2 mV	< 0.01% + 2 mV	< 0.01% + 2 mV	< 0.01% + 2 mV
Current	< 0.05% + 0.1 mA	< 0.05% + 0.1.5 mA	< 0.05% + 0.1 mA	< 0.05% + 0.5 mA	< 0.05% + 0.5 mA
Line regulation					
Voltage	< 0.01% + 1 mV	< 0.0% + 1 mV	< 0.01% + 1 mV	< 0.01% + 2 mV	< 0.01% + 1 mV
Current	< 0.05% + 1 mA	< 0.05 % + 1 mA	< 0.05 % + 1 mA	< 0.05 % + 1 mA	< 0.05% + 1 mA
Ripple and noise (20 Hz to 7 MHz)					
Voltage	< 1 mV_{RMS}	< 1 mV_{RMS}	< 1 mV_{RMS}	< 1 mV_{RMS}	< 1 mV_{RMS}
	< 3 mV_{PP}	< 4 mV_{PP}	< 4 mV_{PP}	< 5 mV_{PP}	< 4 mV_{PP}
Current	< 3 mA_{RMS}	< 4 mA_{RMS}	< 3 mA_{RMS}	< 3 mA_{RMS}	< 3 mA_{RMS}
Setting resolution					
Voltage	1 mV	1 mV	1 mV	1 mV	1 mV
Current	0.1 mA	0.1 mA	0.1 mA	0.1 mA	0.1 mA
Setting accuracy (using remote sense, 25°C ±5°C)					
Voltage	± 0.03% + 3 mV	± 0.03% + 3 mV	± 0.03% + 3 mV	± 0.03 % + 6 mV	± 0.03 % + 6 mV
Current	± 0.05% + 2 mA	± 0.05% + 2.5 mA	± 0.05% + 2 mA	± 0.05 % + 1.5 mA	± 0.05 % + 1 mA

Model-specific specifications

	2200-20-5	2200-30-5	2200-32-3	2200-60-2	2200-72-1
Readback resolution					
Voltage	1 mV	1 mV	1 mV	1 mV	1 mV
Current	0.1 mA	0.1 mA	0.1 mA	0.1 mA	0.1 mA
Readback accuracy (25 °C ± 5 °C)					
Voltage	0.02% + 3 mV	0.02% + 3 mV	0.02% + 3 mV	0.02% + 6 mV	0.02% + 5 mV
Current	0.05% + 2 mA	0.05% + 2.5 mA	0.05% + 2 mA	0.05% + 1.5 mA	0.05% + 1 mA

Voltage transient response – settling time		
Load change		<400 µs to within 75 mV following a change from 0.1 A to 1 A
Setting change	Rising	<Setting voltage from 0% to 100%; voltage change from 10% to 90% < 35 ms **NOTE:** Specification does not include command decode time.
	Falling	< Setting voltage from 100% to 0%; voltage change from 90% to 10% < 200 ms **NOTE:** Specification does not include command decode time.

Overvoltage protection					
Range (typical)	1 V to 19 V	1 V to 29 V	1 V to 31 V	1 V to 59 V	1 V to 71 V
Accuracy	± 0.5% + 0.5 V	± 0.5% + 0.5 V	± 0.5% + 0.5 V	± 0.5% + 0.5 V	± 0.5% + 0.5 V
Response time (typical)	<10 ms	<10 ms	<10 ms	<10 ms	<10 ms

General specifications

Communications	**USB:** Type B connector, USB-TMC compatible **GPIB:** IEEE-488.2 compliant
Display	Vacuum fluorescent display
Memory	40 setup memories
List mode	Up to seven lists can be defined, each with up to 80 steps. Each step includes a voltage limit and a current limit. For continuous sequences, each step also includes a duration.
Output, sense, status, and control:	Removable screw terminal block carries the following signals: • Output channel: Duplicates the front panel outputs • Remote sense lines: Connection for remote sense • Control input: Multifunction TTL input, which can function as a trigger input, output control line, or digital input • Status Output: Multifunction TTL output, which can function as a fault indication or digital output
Floating voltage rating	Up to 100 V (dc + peak ac) between protective earth (safety ground) and any output terminal

General specifications (continued)

Power source:	• **110 V ac setting:** 99 V_{RMS} to 132 V_{RMS} • **220 V ac setting:** 198 V_{RMS} to 264 V_{RMS} • **Frequency:** 50/60 Hz • **Power consumption:** 2200-20-5, 2200-32-3, 2200-72-1: 250 V ac; 2200-30-5, 2200-60-2: 350 V
EMC	• **European Union:** EMC directive • **USA:** FCC, CFR Title 47, Part 15, Subpart B, Class A • **Australia:** EMC Framework, demonstrated per Emission Standard AS/NZS 2064 (industrial, scientific, and medical equipment)
Safety	• **European Union:** Low voltage directive • **USA:** Nationally recognized testing laboratory listing UL61010-1-2004 • **Canada:** CAN/CSA C22.2 No. 61010-1 2004
Dimensions	• **With boot:** 4.15 in. × 9.52 in. × 15.12 in. (106 mm high × 242 mm wide × 384 mm deep) • **Without boot:** 3.57 in. × 8.55 in. × 14.24 in. (91 mm high × 218 mm wide × 362 mm deep)
Shipping weight	• **2200-20-5, 2200-32-3, 2200-72-1:** 19.84 lbs (9.0 kg) • **2200-30-5, 2200-60-2:** 21.16 lbs (9.6 kg)
Net weight	• **2200-20-5, 2200-30-5, 2200-32-3, 2200-72-1:** 16.09 lbs (7.3 kg) • **2200-60-2:** 15.43 lbs (7.0 kg)
Environment	• **Altitude:** **Operating:** Up to 2,000 meters above sea level **Storage:** Up to 4,000 meters above sea level • **Operating:** 0 °C to +40 °C, 5% to 95% relative humidity up to +40 °C • **Storage:** –20 °C to +70 °C, 5% to 95% relative humidity up to +40 °C –20 °C to +70 °C, 5% to 60% relative humidity above +40 °C up to +70 °C