Keysight Technologies
6650A Series Single-Output, 500 W DC Power Supplies, GPIB

Speed and accuracy for test optimization

- Fast, low-noise outputs
- Analog control of output voltage and current
- Fan-speed control to minimize acoustic noise
- Built-in measurements and advanced programmable features
- Protection features to ensure DUT safety

Data Sheet

KEYSIGHT TECHNOLOGIES

This series of 500 W linear-regulated DC power supplies is designed to maximize the throughput of DUTs through the manufacturing test process with fast up and down programming time.

Valuable assemblies can be destroyed by a minor component failure that causes a surge of current to flow into the DUT. Fast protection features, including fast crowbar, mode crossover protection, and the ability to connect the protection circuitry of multiple power supplies can increase production yield.

Programming of the DC output and the protection features can be done either from the front panel or using industry standard SCPI commands, via the GPIB. Using the serial link, up to 16 power supplies can be connected through one GPIB address. Test system integration can be further simplified be using the VXIplug&play drivers. The output voltage and current can also be controlled with analog signals. This is helpful for certain types of noisy environments, and also immediate reactions to process changes.

Lab bench use is enhanced by the fan speed control, which helps to minimize acoustic noise.

Specifications

Specifications (at 0 ° to 55 ° unless otherwise specified)		**6651A**	**6652A**	**6653A**	**6654A**	**6655A**	**6651A-J05 Special Order Option**
Number of outputs		1	1	1	1	1	1
GPIB		Yes	Yes	Yes	Yes	Yes	Yes
Output ratings							
Output voltage		0 to 8 V	0 to 20 V	0 to 35 V	0 to 60 V	0 to 120 V	10 V
Output current (40 °C)		0 to 50 A	0 to 25 A	0 to 15 A	0 to 9 A	0 to 4 A	50 A
Maximum current (50 °C/55 °C)		45 A/42.5 A	22.5 A/21.3 A	13.5 A/12.8 A	8.1 A/7.7 A	3.6 A/3.4 A	45 A/42.5 A
Programming accuracy (at 25 °C ± 5 °C)							
Voltage	0.06% +	5 mV	10 mV	15 mV	26 mV	51 mV	6 mV
Current	0.15% +	60 mA	25 mA	13 mA	8 mA	4 mA	60 mA
Ripple and noise from 20 Hz to 20 MHz							
Voltage	rms	300 µV	300 µV	400 µV	500 µV	700 µV	300 µV
	peak-to-peak	3 mV	3 mV	4 mV	5 mV	7 mV	3 mV
Current	rms	25 mA	10 mA	5 mA	3 mA	2 mA	25 mA
Readback accuracy at 25 °C ± 5 °C (percent of reading plus fixed)							
Voltage	0.07% +	6 mV	15 mV	25 mV	40 mV	80 mV	7.5 mV
+Current	0.15% +	67 mA	26 mA	15 mA	7 mA	3 mA	67 mA
–Current	0.35% +	100 mA	44 mA	24 mA	15 mA	7 mA	100 mA
Load regulation							
Voltage		1 mV	2 mV	3 mV	4 mV	5 mV	1 mV
Current		2 mA	1 mA	0.5 mA	0.5 mA	0.5 mA	2 mA
Line regulation							
Voltage		0.5 mV	0.5 mV	1 mV	1 mV	2 mV	0.5 mV
Current		2 mA	1 mA	0.75 mA	0.5 mA	0.5 mA	2 mA
Transient response time		Less than 100 µs for the output voltage to recover to its previous level (within 0.1% of the voltage rating of the supply or 20 mV, whichever is greater) following any step change in load current of up to 50% of the output current rating of the supply					

Supplemental Characteristics (Non-warranted characteristics determined by design and useful in applying the product)	**6651A**	**6652A**	**6653A**	**6654A**	**6655A**	**6651A-J05** Special order option
Average programming resolution						
Voltage	2 mV	5 mV	10 mV	15 mV	30 mV	2.5 mV
Current	15 mA	7 mA	4 mA	2.5 mA	1.25 mA	15 mA
OVP	12 mV	30 mV	54 mV	93 mV	190 mV	16 mV
OVP accuracy	160 mV	400 mV	700 mV	1.2 V	2.4 V	200 mV

Specifications, continued

Specifications (at 0 ° to 55 ° unless otherwise specified)		**6651A-J03** Special order option	**6651A-J09** Special order option	**6652A-J03** Special order option	**6653A-J04** Special order option	**6653A-J17** Special order option
Number of outputs		1	1	1	1	1
GPIB		Yes	Yes	Yes	Yes	Yes
Output ratings						
Output voltage		6 V	17 V/20 V	27 V	40 V	30 V
Output current (40 °C)		60 A	30 A/15 A	18.5 A	12.5 A	17.5 A
Maximum current (50 °C/55 °C)		54 A/51 A	27 A/25.5 A 13.5 A/12.75 A	16.65 A/15.72 A	11.25 A/10.6 A	15.75 A/14.87 A
Programming accuracy (at 25 °C ± 5 °C)						
Voltage	0.06% +	5 mV	10 mV	13.5 mV	17.5 mV	15 mV
Current	0.15% +	75 mA	36 mA	25 mA	13 mA	16 mA
Ripple and noise from 20 Hz to 20 MHz						
Voltage	rms	300 µV	300 µV	450 µV	1.6 mV	400 µV
	peak-to-peak	3 mV	4 mV	4.5 mV	5 mV	4 mV
Current	rms	30 mA	13 mA	10 mA	5 mA	6 mA
Readback accuracy at 25 °C ± 5 °C (percent of reading plus fixed)						
Voltage	0.07% +	6 mV	15 mV	20.5 mV	30 mV	25 mV
+Current	0.15% +	80 mA	40 mA	26 mA	15 mA	18 mA
–Current	0.35% +	150 mA	55 mA	44 mA	24 mA	28 mA
Load regulation						
Voltage		1 mV	2 mV	2 mV	3.5 mV	3 mV
Current		6.5 mA	2 mA	1 mA	1 mA	0.5 mA
Line regulation						
Voltage		0.5 mV	0.5 mV	0.5 mV	1 mV	1 mV
Current		2 mA	2 mA	2 mA	0.75 mA	0.75 mA
Transient response time		Less than 100 µs for the output voltage to recover to its previous level (within 0.1% of the voltage rating of the supply or 20 mV, whichever is greater) following any step change in load current of up to 50% of the output current rating of the supply				

Supplemental Characteristics (Non-warranted characteristics determined by design and useful in applying the product)	**6651A-J03** Special order option	**6651A-J09** Special order option	**6652A-J03** Special order option	**6653A-J04** Special order option	**6653A-J17** Special order option
Average programming resolution					
Voltage	2 mV	5 mV	6.75 mV	12 mV	10 mV
Current	18 mA	9 mA	7 mA	4 mA	5 mA
OVP	12 mV	30 mV	30 mV	65 mV	54 mV
OVP accuracy	160 mV	500 mV	400 mV	750 mV	700 mV

Specifications, continued

Specifications (at 0 ° to 55 ° unless otherwise specified)		**6654A-J04** Special order option	**6654A-J05** Special order option	**6654A-J12** Special order option	**6655A-J05** Special order option	Special order option
Number of outputs		1	1	1	1	1
GPIB		Yes	Yes	Yes	Yes	Yes
Output ratings						
Output voltage		70 V	50 V	80 V	150 V	156 V
Output current (40 °C)		7.5 V	10 A	6 A	3.2 A	3 A
Maximum current (50 °C/55 °C)		6.75 A/6.37 A	9 A/8.5 A	5.4 A/5.1 A	2.88 A/2.72 A	2.7 A/2.55 A
Programming accuracy (at 25 °C ± 5 °C)						
Voltage	0.06% +	30 mV	26 mV	35 mV	64 mV	71 mV
Current	0.15% +	7 mA	9 mA	7 mA	3.5 mA	4 mA
Ripple and noise from 20 Hz to 20 MHz						
Voltage	rms	600 µV	500 µV	700 µV	800 µV	900 µV
	peak-to-peak	6 mV	5 mV	7 mV	8 mV	8 mV
Current	rms	5 mA	4 mA	3 mA	2 mA	3 mA
Readback accuracy at 25 °C ± 5 °C (percent of reading plus fixed)						
Voltage	0.07% +	50 mV	40 mV	58 mV	100 mV	110 mV
+Current	0.15% +	6 mA	8 mA	6 mA	2.5 mA	3 mA
–Current	0.35% +	13 mA	17 mA	16 mA	6.5 mA	7.5 mA
Load regulation						
Voltage		4 mV	4 mV	4 mV	6 mV	7 mV
Current		0.5 mA	0.5 mA	0.5 mA	0.5 mA	1 mA
Line regulation						
Voltage		1 mV	1 mV	4.5 mV	2 mV	2 mV
Current		0.5 mA	0.5 mA	0.5 mA	0.5 mA	1 mA
Transient response time		Less than 100 µs for the output voltage to recover to its previous level (within 0.1% of the voltage rating of the supply or 20 mV, whichever is greater) following any step change in load current of up to 50% of the output current rating of the supply				

Supplemental Characteristics (Non-warranted characteristics determined by design and useful in applying the product)	**6654A-J04** Special order option	**6654A-J05** Special order option	**6654A-J12** Special order option	**6655A-J05** Special order option	**6653A-J10** Special order option
Average programming resolution					
Voltage	17.5 mV	15 mV	20 mV	37.5 mV	39.5 mV
Current	1.9 mA	2.75 mA	1.7 mA	8 mA	8 mA
OVP	110 mV	93 mV	130 mV	240 mV	250 mV
OVP accuracy	1.4 V	1.2 V	1.6 V	3 V	3.3 V

Supplemental characteristics for all model numbers

DC floating voltage: Output terminals can be floated up to ± 240 VDC from chassis ground

Remote sensing: Up to half the rated output voltage can be dropped in each load lead. The drop in the load leads subtracts from the voltage available for the load.

Command processing time: Average time required for the output voltage to begin to change following receipt of digital data is 20 ms for the power supplies connected directly to the GPIB

Output programming response time: The rise and fall time (10/90% and 90/10%) of the output voltage is less than 15 ms. The output voltage change settles within 1 LSB (0.025% x rated voltage) of final value in less than 60 ms.

Down programming: An active down programmer sinks approximately 20% of the rated output current

Modulation: (Analog programming of output voltage and current)
Input signal: 0 to –5 V
Input impedance: 10 kΩ nominal

AC input: (AC input frequency 47 to 63 Hz)

Voltage	100 VAC	120 VAC	220 VAC	240 VAC
Current	12 A	10 A	5.7 A	5.3 A

Input power: 1,380 VA, 1,100 W at full load; 120 W at no load

GPIB interface capabilities: SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT1, E1, and C0. IEEE-488.2 and SCPI-compatible command set.

Software driver:
– IVI-COM
– VXIplug&play

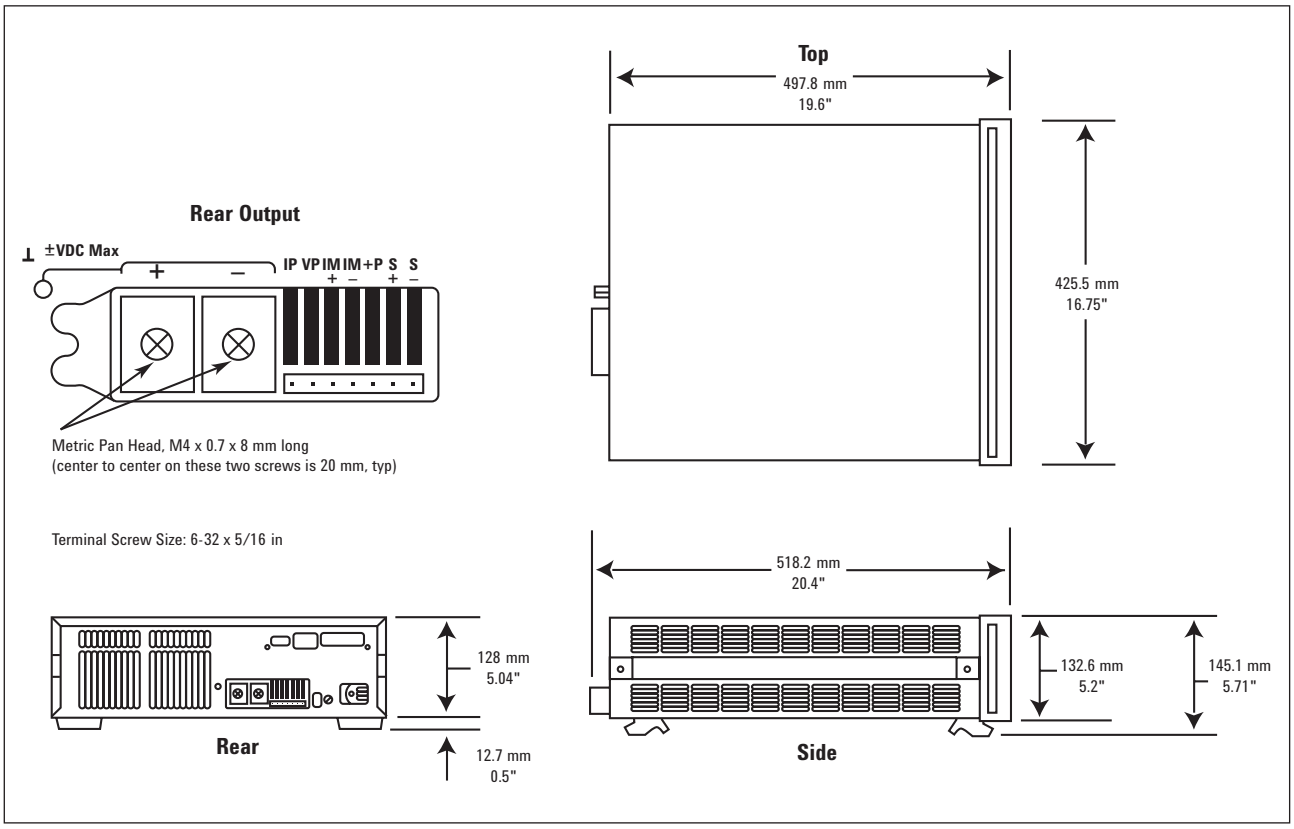
Regulatory compliance: Listed to UL 1244; conforms to IEC 61010-1.

Size: 425.5 mm W x 132.6 mm H x 497.8 mm D
(16.75 in x 5.22 in x 19.6 in)

Weight: Net, 25 kg (54 lb); shipping, 28 kg (61 lb)

Warranty: One year

Keysight Models: 6651A, 6652A, 6653A, 6654A, 6655A



Ordering information

Opt 100 87 to 106 VAC, 47 to 63 Hz
Opt 120 104 to 127 VAC, 47 to 63 Hz
Opt 220 191 to 233 VAC, 47 to 63 Hz
Opt 240 209 to 250 VAC, 47 to 66 Hz

Opt 0L1 Full documentation on CD-ROM and printed user's and programming guides. CD-ROM includes User's Guide, Programming Guide, Service Manual, and Quick Start Guide
Opt 0B3 Printed service manual

Accessories

1CM003A* Rack mount flange kit 132.6 mm H (3U) – two flange brackets

1CP002A* Rack mount flange and handle kit 132.6 mm H (3U) – two brackets and front handles

E3663AC* Support rails for Keysight rack cabinets

p/n 1494-0059 Accessory slide kit

p/n 1252-3698 7-pin analog plug

p/n 1252-1488 4-pin digital plug

p/n 5080-2148 Serial link cable 2 m (6.6 ft)

Application notes

10 Practical Tips You Need to Know About Your Power Products, 5965-8239E

10 Hints for Using Your Power Supply to Decrease Test Time, 5968-6359E

Understanding Linear Power Supply Operation (AN1554), 5989-2291EN

Modern Connectivity–Using USB and LAN I/O Converters (AN 1475-1), 5989-0123EN

Keysight DC Power Supplies for Base Station Testing, 5988-2386EN

*Support rails required

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Published in USA, August 2, 2014
5990-9305EN
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