
Output Characteristic

General

The power supply can operate in either CV (constant voltage) or CC (constant current) over its voltage and current ratings (see Table 1-1). The operating locus is shown by the Output Characteristic Curve in Table 1-2. The operating point is determined by the voltage setting (V_o), the current setting (I_o), and the load impedance. Two operating points are shown. Point 1 is defined by the load line cutting the operating locus in the constant-voltage region. This region defines the CV mode. Point 2 is defined by the load line cutting the operating locus in the constant-current region. This region defines the CC mode.

Downprogramming

The power supply can sink current for more rapid downprogramming in the CV mode. For Series 664xA and 665xA supplies, this capability is defined by the second quadrant area ($-I_o$) of the Output Characteristic Curve. These supplies can sink about 20% of their maximum rated positive output current. For Series 667xA, 668xA, and 669xA power supplies, this is an uncharacterized current-sinking area that provides a limited downprogramming capability.

Specifications and Supplemental Characteristics

Tables 1-1 through 1-4 list the specifications and supplemental characteristics for the Series 664xA, 665xA, 667xA, 668xA, and 669xA power supplies. The organization is as follows:

<u>Series</u>	<u>Specifications</u>	<u>Characteristics</u>
6641A-6645A	Table 1-1a	Table 1-1b
6651A-6655A	Table 1-2a	Table 1-2b
6671A-6675A	Table 1-3a	Table 1-3b
6680A-6684A	Table 1-4a	Table 1-4b
6690A-6692A	Table 1-5a	Table 1-5b

Specifications are performance parameters warranted over the specified temperature range.

Supplemental Characteristics are not warranted but are descriptions of performance determined either by design or type testing.

Table 1-1 a. Performance Specifications for Series 664xA ¹

Parameter	Agilent Model Number				
	6641A	6642A	6643A	6644A	6645A
Output Ratings					
Voltage:	0-8V	0-20V	0-35V	0-60V	0-120V
Current: @40 °C	0-20A	0-10A	0-6A	0-3.5A	0-1.5A
Current: @50 °C	0-18A	0-9A	0-5.4A	0-3.2A	0-1.4A
Current: @55 °C	0-17A	0-8.5A	0-5.1A	0-3.0A	0-1.4A
Programming Accuracy (@25 ±15°C)					
Voltage: ²0.06%+	5mV	10mV	15mV	26mV	51mV
Current: 0.15%+	26mA	13mA	6.7mA	4.1mA	1.7mA
Ripple & Noise (from 20Hz to 20MHz without output ungrounded, or with either output terminal grounded)					
Constant Voltage: rms	300 µV	300 µV	400 µV	500 µV	700 µV
Constant Voltage: p-p	3mV	3mV	4mV	5mV	7mV
Constant Current: rms	10mA	5mA	3mA	1.5mA	1mA
Readback Accuracy (from front panel or over GPIB with respect to actual output @25 ±5°C)					
Voltage: ²0.07%+	6mV	15mV	25mV	40mV	80mV
+Current: 0.15%+	18mA	9.1mA	5mA	3mA	1.3mA
-Current: 0.35%+	40mA	20mA	12mA	6.8mA	2.9mA
Load Regulation (change in output voltage or current for any load change within ratings)					
Voltage	1mV	2mV	3mV	4mV	5mV
Current:	1mA	0.5mA	0.25mA	0.25mA	0.25mA
Line Regulation (change in output voltage or current for any line change within ratings)					
Voltage:	0.5mV	0.5mV	1mV	1mV	2mV
Current:	1mA	0.5mA	0.25mA	0.25mA	0.25mA
Transient Response Time (for the output voltage to recover to its previous level (within 0.1% of the rated voltage or 20mV, whichever is greater) following any step change in load current up to 50% of the rated current.)	<100 µs				
AC Input Ratings (selectable via internal switching-see Appendix C)					
Nominal line voltage:	100, 120, 220, 240Vac (-13%, +6%) 230Vac ³ (-10%, +10%)				
Frequency:	50/60Hz				
Output Terminal Isolation	±240Vdc (maximum, from chassis ground)				
Notes: ¹ For Supplemental Characteristics, see Table 1-1b. ² Specification may degrade slightly when unit is subjected to an RF field ≥3V/meter. ³ For 230Vac operation, unit is internally set to 240Vac.					

Table 1-1b. Supplemental Characteristics for Series 664xA ¹

Parameter	Agilent Model Number				
	6641A	6642A	6643A	6644A	6645A
Output Programming Range (maximum programmable values)					
Voltage:	8.190V	20.475V	35.831V	61.425V	122.85V
Current:	20.475A	10.237A	6.142A	3.583A	1.535A
Overvoltage Protection (OVP):	8.8V	22.0V	38.5V	66.0V	132.0V
Average Resolution					
Voltage:	2mV	5mV	10mV	15mV	30mV
Current:	6mA	3mA	2mA	1.2mA	0.5mA
Overvoltage Protection (OVP):	13mV	30mV	54mV	93mV	190mV
Accuracy					
Overvoltage Protection (OVP):	160mV	400mV	700mV	1.2V	2.4V
Analog Programming (VP):* 0.36%+	6mV	15mV	27mV	45mV	90mV
Analog Programming (IP):* 7.6%+ 18mA 9.2mA 1.5%+	5.5mA	3.2mA	1.4mA		
Current Monitor (+IM):* 7.7%+ 65mA 32mA 1.6%+	8.1mA	7.1mA	1.8mA		
*Referenced to supply output					
Drift Temperature Stability (following a 30-minute warmup, change in output over 8 hours under constant line, load, and ambient temperature)					
Voltage: 0.02%+	0.4mV	1mV	2mV	3mV	6mV
Current: 0.02%+	16mA	6mA	3mA	2mA	1mA
Temperature Coefficients (change per °C)					
Voltage: 60ppm+	0.1mV	0.2mV	0.3mV	0.5mV	1.1mV
+Current: 95ppm+	0.82mA	0.41mA	0.18mA	0.12mA	0.04mA
Voltage Readback: 60ppm+	0.2mV	0.5mV	0.75mV	1.3mV	2.6mV
+Current Readback: 95ppm+	1.2mA	0.62mA	0.33mA	0.20mA	0.08mA
--Current Readback: 110ppm+	1.2mA	0.62mA	0.33mA	0.20mA	0.08mA
Overvoltage Protection (OVP): 200ppm+	1.6mV	3.3mV	5mV	13mV	24mV
Analog Programming (VP): 60ppm+	0.1mV	0.25mV	0.4mV	0.7mV	1.25mV
Analog Programming (IP): 90ppm+	0.56mA	0.28mA	0.17mA	0.1mA	0.04mA
Current Monitor (+IM): 75ppm+	0.61mA	0.3mA	0.06mA	0.06mA	0.02mA
Maximum Input Power:	480VA; 400W, 60W with no load				
Notes: ¹ For Performance Specifications, see Table 1-1a.					

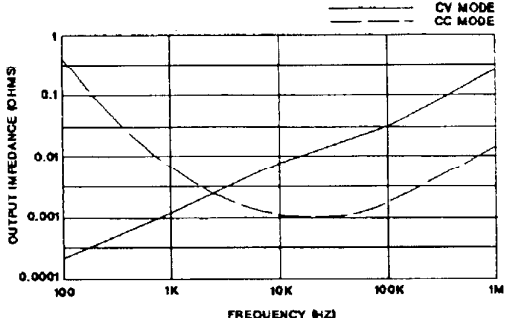
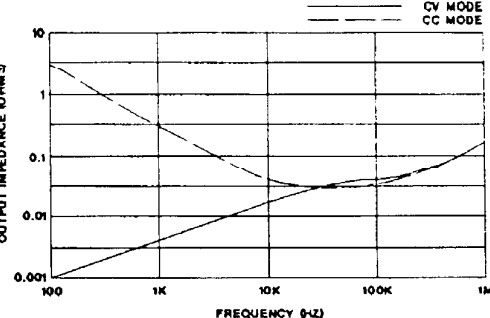
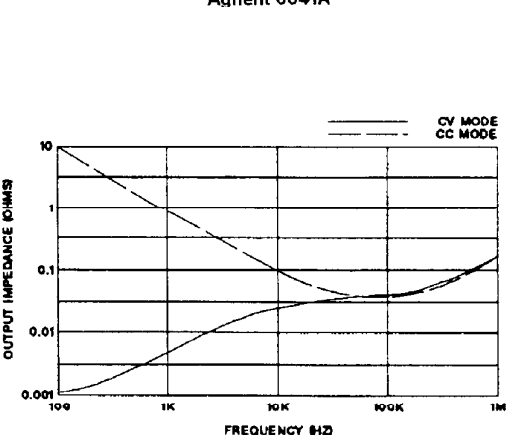
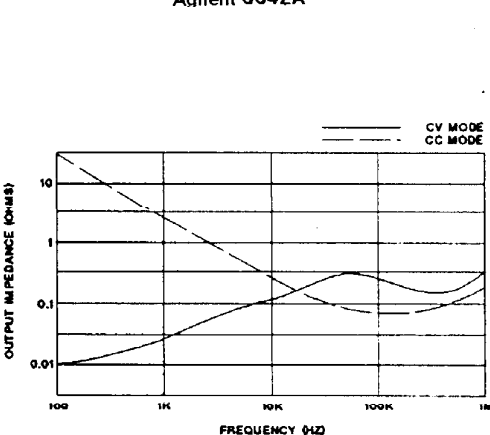
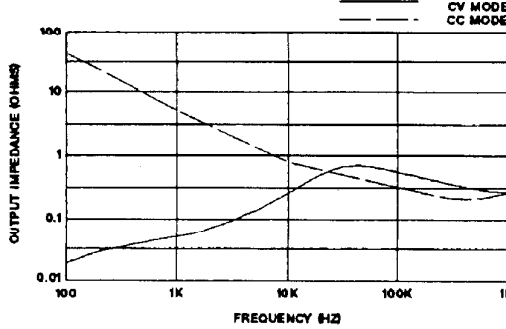
Table 1-1b. Supplemental Characteristics for Series 664xA (continued)

Parameter	Agilent Model Number				
	6641A	6642A	6643A	6644A	6645A
Maximum AC Line Current Ratings 100Vac nominal: 120Vac nominal: 220Vac nominal: 230Vac nominal: 240Vac nominal:	4.4 Arms 3.8 Arms 2.2 Arms 2.1 Arms 2.0 Arms				
Maximum Reverse Bias Current:	With AC input power applied and the dc output reverse biased by an external dc source, the supply will continuously withstand without damage a current equal to its output current rating (see Table 1-1a).				
Remote Sensing Capability Voltage Drop Per Lead: Load Regulation: Load Voltage:	Upto 1/2 of rated output voltage. Add 3mV to spec (see Table 1-1a) for each 1-volt change in the + output lead due to load current changes. Subtract voltage drop in load leads from specified output voltage rating.				
Command Processing Time (Average time for output voltage to change after receipt of digital data when the supply is connected directly to the GPIB Bus):	20ms				
Down programmer Current Capability (±15%):	5.8A	2.5A	1.5A	0.9A	0.7A
Output Voltage Programming Response Time Rise/Fall Time (time for output to change from 90% to 10% or from 10% to 90% of its total excursion): Settling Time (time for output change to settle within 1 LSB (0.025% x rated voltage) of its final value):	<15ms <60ms				
Monotonicity:	Output is monotonic over entire rated voltage, current, and temperature range.				
Auto-Parallel Configuration:	Upto 3 identical models				
Analog Programming (IP & VP) Input Signal:* Input Impedance: *Signal source must be isolated.	0 to 5V 10k Ω, nominal				
Current Monitor Output (+IM):	0 to 5V represents zero to full-scale current output				
Savable States Nonvolatile Memory Locations: Nonvolatile Memory Write Cycles: Prestored State (factory default):	5 (0 through 4) 40,000, typical Location 0				
Notes: ¹ For Performance Specifications, see Table 1-1a.					

Table 1-1b. Supplemental Characteristics for Series 664xA (continued) ¹

Parameter	All Models																								
Digital Port Characteristics	(see Table 1-5)																								
GPIB Interface Capabilities	(see Table 1-5)																								
Serial Link Capabilities	(see Table 1-5)																								
Recommended Calibration Interval:	1 year																								
Safety Compliance Complies with: Designed to comply with:	CSA 22.2 No. 231, IEC 348 UL 1244																								
RFI Suppression (complies with):	CISPR-II, Group 1, Class B																								
Dimensions Width: Height (including removable feet): Depth (including safety cover):	425.5 mm (16.75 in) 88.1 mm (3.5 in) 439 mm (17.3 in)																								
Note 1: For Performance Specifications, see Table 1-a.																									
Weight Net: Shipping:	14.2 kg (31.4 lb) 16.3 kg (36 lb)																								
Output Characteristic Curve:																									
<table border="1"> <caption>Maximum Rated Output</caption> <thead> <tr> <th>Agilent Model</th> <th>Vout</th> <th>Iout</th> <th>-Iout</th> </tr> </thead> <tbody> <tr> <td>6641A</td> <td>8 V</td> <td>20 A</td> <td>5.8 A</td> </tr> <tr> <td>6642A</td> <td>20 V</td> <td>10 A</td> <td>2.5 A</td> </tr> <tr> <td>6643A</td> <td>35 V</td> <td>6 A</td> <td>1.5 A</td> </tr> <tr> <td>6644A</td> <td>60 V</td> <td>3.5 A</td> <td>0.9 A</td> </tr> <tr> <td>6645A</td> <td>120 V</td> <td>1.5 A</td> <td>0.75 A</td> </tr> </tbody> </table>		Agilent Model	Vout	Iout	-Iout	6641A	8 V	20 A	5.8 A	6642A	20 V	10 A	2.5 A	6643A	35 V	6 A	1.5 A	6644A	60 V	3.5 A	0.9 A	6645A	120 V	1.5 A	0.75 A
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6645A	120 V	1.5 A	0.75 A																						
70-210X																									
Notes: ¹ For Performance Specifications, see Table 1-a.																									

Table 1-1b. Supplemental Characteristics for Series 664xA (continued)

Parameter	All Models
Output Impedance Curves (Typical):	
 <p>Agilent 6641A</p>	 <p>Agilent 6642A</p>
 <p>Agilent 6643A</p>	 <p>Agilent 6644A</p>
 <p>Agilent 6645A</p>	
<p>Notes: ¹For Performance Specifications, see Table 1-1a.</p>	