

## 1 Quick Reference

### Introduction to the Instrument

#### Regenerative Power System at a Glance

#### Front Panel at a Glance

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### Regenerative Power System at a Glance

The Keysight Regenerative Power System (RPS) Family includes 3U rack-mountable DC power supplies with performance and features that are optimized for automated test systems. The output and system features are described as follows. The **Models and Options** section describes the features that apply to specific models.

#### Output features

- Full programming capability for the entire range of output voltage and current
- Two-to-one output autoranging for greater flexibility
- Output can operate in voltage priority or current priority mode
- High-speed up and down output programming
- Output resistance programming
- Turn-on/turn-off delays allow output on/off sequencing across multiple units
- Current sharing capability for paralleled outputs
- Protection capability includes over-voltage, over-current, and over-temperature
- Two-quadrant operation provides current sourcing and sinking capability
- 100% rated current-sink capability
- 5 kW and 10 kW rated models

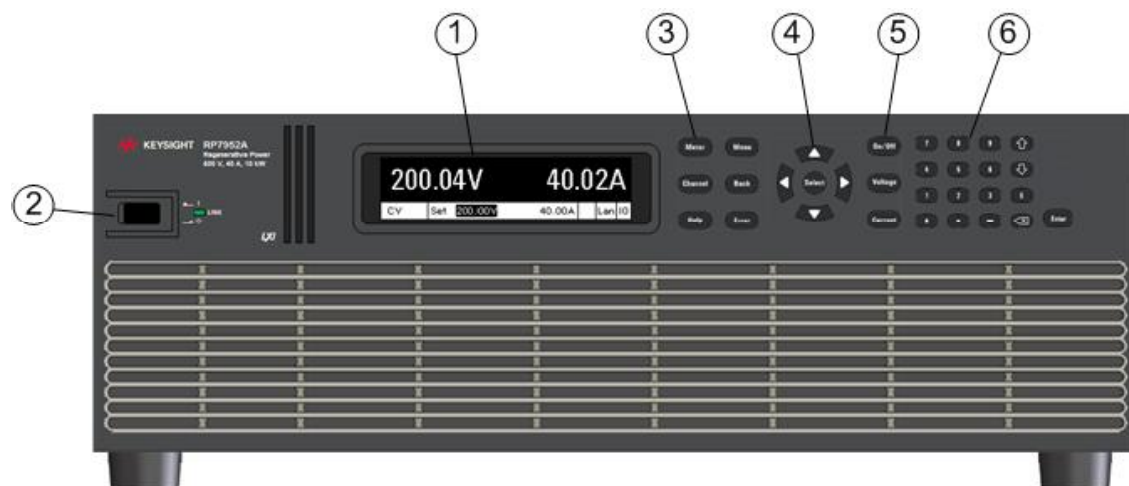
#### Measurement features

- 5.12  $\mu$ s sample rate
- Real-time power measurements
- Amp-Hour and Watt-Hour Measurements
- Digitized measurement capability

### System features

- Save and recall up to 10 instrument states in non-volatile memory
- GPIB (IEEE-488), LAN, and USB remote programming interfaces are built in
- Front panel menu setup for GPIB and LAN parameters
- LXI Core 2011 compliant, including a built-in Web server
- SCPI (Standard Commands for Programmable Instruments) compatibility
- Master-Slave function allows for composite output control and display from one unit
- Bi-directional (regenerative) power mesh returns power to the AC mains when sinking power

### Front Panel at a Glance



### Front Panel Display at a Glance

1	<p>Voltage and current measurements</p> <p>Operating Mode</p> <p>Voltage and current settings</p> <p>Status area</p>
Voltage and current measurements	Displays the actual output voltage and current

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### Specifications and Characteristics

#### Specifications - Keysight RP7900 Regenerative Power Series

#### Supplemental Characteristics - Keysight RP7900 Regenerative Power Series

#### Common Characteristics

#### Output Quadrants

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### Specifications - Keysight RP7900 Regenerative Power Series

Unless otherwise noted, specifications are warranted over the ambient temperature range of 0 to 40°C after a 30-minute warm-up period. Specifications apply at the output terminals, with the sense terminals connected to the output terminals (local sensing).

Specification	RP7951A /RP7961A	RP7952A /RP7962A	RP7953A/RP7963A
DC Ratings Voltage source: Current source and sink: Power:	0 to 500 V 0 to $\pm 20$ A 5 kW	0 to 500 V 0 to $\pm 40$ A 10 kW	0 to 950 V 0 to $\pm 20$ A 10 kW
Output ripple & noise <sup>1</sup> CV rms: CV peak-to-peak:	500 mV 100 mV	500 mV 100 mV	1 V 200 mV
Load regulation Voltage: Current:	30 mV 9 mA	30 mV 17 mA	60 mV 9 mA
Voltage programming accuracy <sup>2</sup>	0.03% + 60 mV	0.03% + 60 mV	0.03% + 120 mV
Voltage measurement accuracy <sup>2</sup>	0.03% + 80 mV	0.03% + 80 mV	0.03% + 160 mV
Current programming & measurement accuracy <sup>2</sup>	0.1% + 12 mA	0.1% + 24 mA	0.1% + 12 mA
Transient response <sup>3</sup> Recovery Time: Settling band:	500 $\mu$ s 1.25 V	500 $\mu$ s 1.25 V	500 $\mu$ s 2.375 V

<sup>1</sup> From 20 Hz to 20 MHz with resistive load, terminals ungrounded, or either terminal grounded

<sup>2</sup> At 25°C  $\pm 5^\circ$ C after a 30 minute warm-up; measurement NPLC=1; valid for 1 year, see [Calibration Interval](#)

<sup>3</sup> Time to recover to within the settling band following a step change from 50% to 100% of full load

## Supplemental Characteristics - Keysight RP7900 Regenerative Power Series

Supplemental characteristics are not warranted but are descriptions of performance determined either by design or by type testing. Supplemental characteristics are typical unless otherwise noted.

Characteristic	RP7951A /RP7961A	RP7952A /RP7962A	RP7953A/RP7963A
Voltage programming Range: Resolution:	0 to 510 V 10.5 mV	0 to 510 V 10.5 mV	0 to 969 V 21 mV
Current programming Range: Resolution:	-20.4 A to 20.4 A 290 $\mu$ A	-40.8 A to 40.8 A 580 $\mu$ A	-20.4 A to 20.4 A 286 $\mu$ A
Resistance programming Range: Resolution:	0 to 36 $\Omega$ 280 $\mu\Omega$	0 to 18 $\Omega$ 140 $\mu\Omega$	0 to 72 $\Omega$ 560 $\mu\Omega$
Output current noise <sup>1</sup> CC rms:	200 mA	200 mA	200 mA
Voltage rise time (High bandwidth) <sup>2</sup> 10% to 90% step value: Settling time: <sup>4</sup>	1 ms 6 ms	1 ms 6 ms	1 ms 6 ms
Voltage rise time (Low bandwidth) <sup>2</sup> 10% to 90% step value: Settling time: <sup>4</sup>	15 ms 50 ms	15 ms 50 ms	15 ms 50 ms
Voltage fall time (High bandwidth) <sup>3</sup> 90% to 10% step value: Settling time: <sup>4</sup>	1 ms 6 ms	1 ms 6 ms	1 ms 6 ms
Voltage fall time (Low bandwidth) <sup>3</sup> 90% to 10% step value: Settling time: <sup>4</sup>	15 ms 50 ms	15 ms 50 ms	15 ms 50 ms
Current rise time <sup>2</sup> 10% to 90% step value:	2 ms	2 ms	2 ms
Maximum slew rate Voltage: Current:	200 kV/s 1.6 kA/s	200 kV/s 3.2 kA/s	400 kV/s 1.6 kA/s
Small signal programming bandwidth Voltage @ 3dB with no load: Current with output shorted:	500 Hz 40 Hz	500 Hz 40 Hz	500 Hz 40 Hz
Line regulation Voltage: Current:	< 10 mV < 290 $\mu$ A	< 10 mV < 580 $\mu$ A	< 20 mV < 290 $\mu$ A
Reactive loads Capacitance: Inductance: <sup>5</sup>	80 $\mu$ F/800 $\mu$ F 5 $\mu$ H	160 $\mu$ F/1600 $\mu$ F 5 $\mu$ H	40 $\mu$ F/400 $\mu$ F 5 $\mu$ H
Input current per phase 200 VAC input: 400 VAC input:	17.3 A 8.66 A	35 A 17.3 A	35 A 17.3 A

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<sup>1</sup> From 20 Hz to 20 MHz with resistive load, terminals ungrounded, or either terminal grounded

<sup>2</sup> With full resistive load and a step change from 0.1% to 100% of rated output

<sup>3</sup> With no load and a step change from 100% to 0.1% of rated output

<sup>4</sup> From start of voltage change to within 0.1% of final step value

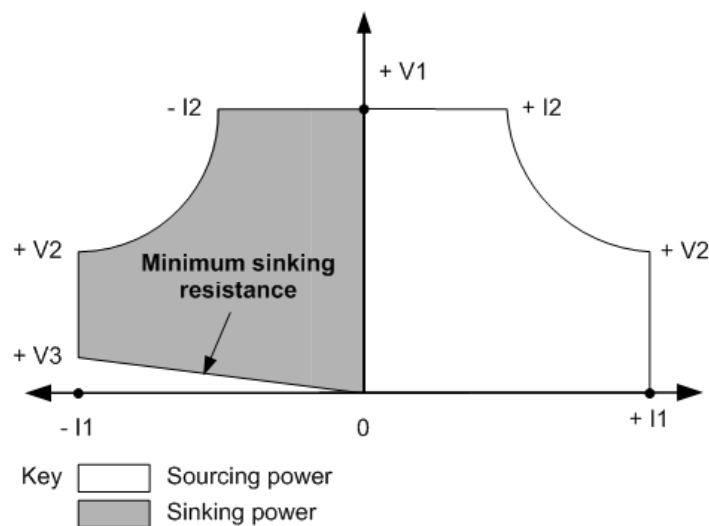
<sup>5</sup> Equivalent to 10 feet of load leads

## Common Characteristics

Common Characteristic	All Models
Command Processing Time	≤ 1 ms from receipt of command to start of output change. Applies to simple settings commands over the GPIB interface (see <a href="#">Command Processing Times</a> )
Digital Port Max voltage rating:  Pins 1 & 2 as FLT:  Pins 1-7 as outputs:  Pins 1-7 as inputs:  Pin 8:	+16.5 VDC/- 5 VDC between pins  Maximum low-level output voltage = 0.5 V @ 4 mA Maximum low-level sink current = 4 mA Typical high-level leakage current = 1 mA @ 16.5 VDC  Maximum low-level output voltage = 0.5 V @ 4 mA; 1 V @ 50 mA; 1.75 V @ 100 mA Maximum low-level sink current = 100 mA Typical high-level leakage current = 0.8 mA @ 16.5 VDC  Maximum low-level input voltage = 0.8 V Minimum high-level input voltage = 2 V Typical low-level current = 2 mA @ 0 V (internal 2.2k pull-up) Typical high-level leakage current = 0.12 mA @ 16.5 VDC  Pin 8 is common (internally connected to chassis ground)
Computer Interfaces LXI LAN USB GPIB	LXI Core 2011 compliant 10 Mb, 100 Mb, 1 Gb LAN USB 2.0 (USB-TMC488 protocol) SCPI - 1993, IEEE 488.2 compliant interface (optional)
Regulatory Compliance EMC:  Safety:	Complies with European EMC Directive for test and measurement products Complies with Australian standard and carries C-Tick mark This ISM device complies with Canadian ICES-001 Cet appareil ISM est conforme à la norme NMB-001 du Canada  Complies with European Low Voltage Directive and carries the CE-marking. Conforms to US and Canadian safety regulations.  Declarations of Conformity for this product may be downloaded from the Web. Go to <a href="http://regulations.corporate.keysight.com">http://regulations.corporate.keysight.com</a> and click on "Declarations of Conformity."
Environmental Operating environment: Temperature range:  Relative humidity: Altitude: Storage temperature:	Indoor use, installation category II (for AC input), pollution degree 2 0°C to 55°C (Maximum continuous power available is derated at 1% of rating per degree C from 40°C to 55°C) 95% or less (non-condensing) Up to 2000 meters -30°C to 70°C

Common Characteristic	All Models
Acoustic Noise Maximum fan speed: At idle:	TBD
Output Terminal Isolation:	No output terminal may be more than $\pm 950$ VDC from any other terminal or chassis ground.
AC Input Phase and range:  Input current/phase: Power Factor: Fuse:	3 phase; 200–208 VAC input, $\pm 10\%$ 3 phase; 400–480 VAC input, $\pm 10\%$ Refer to <a href="#">Supplemental Characteristics</a> 0.99 @ nominal input and rated power Internal fuse - not user accessible
Typical Weight	RP7951A/RP7961A : 60 lbs. (27.3 kg) RP7952A/RP7962A: 70 lbs. (31.8 kg)

### Output Quadrants



	RP7951A /RP7961A	RP7952A /RP7962A	RP7953A RP7963A
+ V1	500 V	500 V	950 V
+ V2	250 V	250 V	475 A
+ V3	<td> V	<td> V	<td> V
+/- !1	20 A	40 A	20 A
+/- !2	10 A	20 A	10 A
Minimum sinking resistance	<td> mΩ	<td> mΩ	<td> mΩ

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### Dimensions

