HEWLETT PACKARD

Selecting the Right System Power Source for Precision Current Measurement Applications

Product Overview

HP Models 66312A, 66332A
Dynamic Measurement DC Sources
HP Models 6612B, 6630B Series
System DC Sources

Today's explosion of handheld, battery powered, portable electronic devices has created new demands on system power supplies. A key design challenge for these portable devices is to achieve the most efficient utilization of the battery, a critical resource, thus extending battery life to the utmost. Engineers need more focused solutions, that help them to quickly implement testing requirements for development characterization and production test of these devices.

HP now offers six models of high performance, low power, dc system power sources, to address these growing needs and complement the industry's most complete power product line.

The new HP 66312A and HP 66332A Dynamic Measurement DC Sources are the only focused solutions that provide both stimulus and peak current measurement for testing battery powered devices with pulsed current demands, such as digital cellular phones.

The HP 6632B, HP 6633B, and HP 6634B System DC Power Supplies are direct replacements for the popular *100W* 6630A Series models, with enhanced current measurement capability, new features, and a lower price.

The HP 6612B System DC Power Supply is the smallest, lowest priced full system-capable supply that offers the performance and features of the HP 6600 series. It provides *40W* in a half rack package.

Key features of this series of products:

- ❍ **NEW** high resolution / accuracy current readback down to 0.6 µA / 2.5 µA
- ❍ **NEW** dynamic measurement and analysis of current or voltage waveforms
- ❍ **NEW** lower price
- ❍ **NEW** 40W models in smaller, 3.5" half rack package
- ❍ **NEW** improved display: bright, crisp, easier reading vacuum fluorescent display
- ❍ **NEW** lower acoustic noise with fan speed control
- ❍ **NEW** dual command set: SCPI programming commands, and HP 6630A Series compatibility mode
- ❍ **NEW** RS-232 and HP-IB control
- ❍ Current sink capability for higher speed
- ❍ Low Noise output for sensitive circuitry

Which Product is best for my application?

Major Applications

To quickly identify which model is most appropriate for your application, consult the selection guide to the right. Specific features which address the needs of major applications are highlighted below.

Additional Applications

Since the enhanced 100W HP 6630B Series are form, fit, and function replacements for the proven HP 6630A Series, you can continue to use the new products anywhere you have used the A-version.

In addition, with the new 40W HP 6612B system supply, you can now have all the world-class performance and features of the leading system power supply family, in a smaller package, and at a new low price.

Applications	40W General Purpose HP 6612B	100W General Purpose HP 6630B Series	40W Dynamic Measurement HP 66312A	100W Dynamic Measurement HP 66332A
Telecom Test				
analog cellular phone test	X	X		
digital cellular phone test			X	X
PCS (personal communication services) test			X	
analog transceivers		X		
digital transceivers				X
Portable Battery-Powered Equipment Test				
battery-powered products and assemblies	X	X		
lap top computers	X	X		X
portable medical monitors	X	X		
portable test instruments	X	X		
Component and Subassembly Test				
displays and comp'ts for battery-powered devices	X	X		
battery chargers	X	X		
battery cycling	X	X		
smart I/Cs and devices (especially automotive)			X	X
DC Motor Test				
small brushless dc motors (ex: dc fans)			X	X
disc drives			X	X
motorized sub-assemblies			X	X

Telecom Test

The new HP 66312A and HP 66332A products have been primarily focused on production test for portable and mobile communication devices such as phones and radio transceivers. The trend toward digital transmission schemes is driving the need for measuring peak battery drain currents in the 1A to 5A range. Even if your test needs today are primarily for analog cellular phones, you should consider the dynamic measurement capabilities of these products if you expect to move to digital phones in the near future.

For these applications

you need...	HP offers...
to measure peak amplitude of millisecond current pulses during the transmit mode	dynamic measuring capability to digitize voltage and current waveforms accurately
better low current readback resolution / accuracy	current measurement resolution / accuracy down to 0.6 µA / 2.5 µA
higher productivity from floor space and test set	smaller size, one-box solution
lower test system cost	lower price, one-box solution, that is easier, faster, and less expensive to integrate
the ability to ramp up volume production quickly	1 week delivery

Disk Drive and Control Circuitry Test

The new HP 66312A and HP 66332A products offer features that are ideal for characterizing and testing Hard Disk Drive (HDD) current requirements in laptop and notebook computers. The HDD draws power in bursts, typically less than 3% duty cycle. To conserve battery life for portable applications, elaborate power-management schemes, which switch between active and energy saving modes, cause dynamic current transients. For example, the disc speed has to be brought from idle up to active speed upon demand, typically in milliseconds or less. Resulting power consumption in both the disc drive and the control circuitry can be measured effectively using the dynamic measuring capability of these products.

For these applications

you need...	HP offers...
to measure peak current drain from battery	dynamic measuring capability to digitize voltage and current waveforms accurately
better low current readback resolution / accuracy	current measurement resolution / accuracy down to 0.6 µA / 2.5 µA
the ability to ramp up volume production quickly	1 week delivery

Small DC Motor Test

The new HP 66312A and HP 66332A products deliver the right performance and features for testing dc motors, such as automotive accessory motors and cooling fans. The high peak current drawn at start up for these motors can create a problem. Many of these devices incorporate active current limit circuits for overload protection. The dynamic measurement capability allows you to characterize the peak currents, active current limit dynamics, and power consumption in motors and control circuitry.

For these applications

you need...	HP offers...
to measure dynamic current drain from battery	dynamic measuring capability to digitize voltage and current waveforms
burnout protection to prevent damage to DUT	active current limit, allows restart after fault removal
lower test system cost	lower price, one-box solution, that is easier, faster, and less expensive to integrate
the ability to ramp up volume production quickly	1 week delivery

Portable Equipment & Sub-assembly Testing

The new 40W HP 6612B system supply and the enhanced 100W HP 6630B Series are ideally suited to testing of battery powered equipment with energy saver or “sleep” modes for enhanced battery life. The enhanced measurement capability allows you to characterize the peak currents, active current limit dynamics, and power consumption in motors and control circuitry.

For these applications

you need...	HP offers...
better low current readback resolution and accuracy to improve production yield (reject fewer good products)	current measurement resolution / accuracy down to 0.6 µA / 2.5 µA
higher productivity from floor space and test set	smaller size, one-box solution
lower test system cost	lower price, one-box solution, that is easier, faster, and less expensive to integrate
the ability to ramp up volume production quickly	1 week delivery

Common Questions and Answers:

Q *Are these units intended for system or bench applications?*

A These units have all the features and performance necessary for demanding ATE applications. While primarily focused on system applications, these units have additional features such as a knob and front panel binding posts (binding posts optional on 100W models) to provide superior convenience for bench operation, as well.

Q *What is the difference between "precision" and "dynamic" current measurement?*

A The System DC Sources have highly accurate shunts combined with 16-bit measurement capabilities, so that currents in the µA region can be accurately measured. In addition, the Dynamic Measurement DC Sources have the capability to make triggered measurements of output voltage or current waveforms, and to analyze the following values from the waveform: minimum; peak; low state average; high state average; and rms values.

Q *How does the dynamic current measurement capability work?*

A The dynamic measurement system digitizes the output waveform. Both the sampling rate and the total number of points can be controlled over the HP-IB interface. The complete waveform consisting of up to 4096 values of voltage or current can be downloaded over the HP-IB for additional analysis. The front panel can also display these internally calculated parameter values. However, values displayed on the front panel are calculated from a total of 2048 readings taken at a 15.6 µs sample rate. These sampling parameters are chosen to allow frequent update of the front panel meter.

Q *Do these supplies have more than one current measurement range? How do I switch between them?*

A Yes, these models feature two 16-bit current measurement ranges. The high range covers the full output, with an LSB of approximately 156 µA for 5A outputs, or 62 µA for the 2A output. All models have a low range of 20.0 mA full scale, with an LSB of 0.6 µA. You can select either the high or low range, or autoranging between the two. With autoranging, range switching is triggered whenever the current crosses above/below 20.0 mA.

Q *Can I control the current sink limit (downprogramming) for these supplies?*

A Yes, on the 100W units, the maximum negative current tracks the value programmed for the positive value. However, the downprogramming capability for the 40W models is limited to 1.0A and it does not track the positive programmed value. This capability allows the 100W units to function as a constant current load in some applications, such as battery cycling.

Q *How fast can this supply respond to a command and generate a full scale output?*

A The command processing time has been reduced to <4 ms. Like the 6630A Series, the 6630B Series products have a fast/slow mode switch on the rear panel. In the fast mode, the output can slew from 10% to 90% within 400 µs. Use of the fast mode degrades noise performance somewhat (from 3 mV to 10 mV on the 6632B). The 40W models do not offer a fast/slow mode switch, however their transition time is approximately 2 ms.

Q *Will the new B-versions have the same programming language as the A-versions, or will they offer SCPI language?*

A The short answer is yes! All of the models in this new family have the dual command sets so that they can respond to either format. The language format can be changed either by software command or from the front panel. When the unit is turned off, the current language mode is stored in non-volatile memory. As a result, the unit will wake up in whatever language was used last. This enables you to preserve your investment in software developed for the 6630A Series supplies.

Q *Do these units have RS-232 programming capability?*

A Yes, all the functions of these products can be controlled either via HP-IB or RS-232.

Q *Do these units have fan-cooling?*

A Yes, but unlike the 6630A Series versions, the fan is speed controlled for greatly reduced acoustic noise, when the ambient temperature does not require full cooling capability.

For Further Information:

Complete technical information and specifications on the products in this series is contained in two data sheets: one for the HP 6612B and HP 6630B Series System DC Sources (HP p/n 5965-2878), and one for the HP 66312A and HP 66332A Dynamic Measurement DC Sources (HP p/n 5965-1679).

For more information about Hewlett-Packard power supplies, please ask your local Hewlett-Packard Sales Representative for a copy of the HP Power Products Catalog, HP p/n 5964-6035.

To obtain any of these publications, or for more information on Hewlett-Packard Test & Measurement products, applications or services, please call your local Hewlett-Packard sales offices.

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