Département
Tests Energie Mesures

KEYSIGHT TECHNOLOGIES
Authorised Distributor

Keysight Basic Instruments

Issue 4 - 2017

NEW E36300 Series DC Power Supplies
Give your device under test some peace and quiet and get better results.

Products

Keysight E36300 Series programmable DC power supplies are the replacement products for the E3631A

Modern I/O (USB, LAN and GPIB), new 4.3" display and best in class ease of use / user experience
www.keysight.com/find/e36300

Scrap the Toys, Treat Yourself to a Real Oscilloscope!

Keysight's InfiniiVision 1000 X-Series oscilloscopes are engineered to give you quality, industry-proven technology at unbelievably low prices. Find out more: www.keysight.com/find/1000X-Series

6000 X-Series joins distribution portfolio.

The 1GHz to 6GHz 6000 X-series oscilloscopes from the InfiniiVision range is now available in-stock from our distribution partners. Find out more: www.keysight.com/find/6000x-series

Keysight IoT Applied Courseware

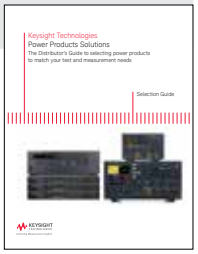
Keysight's ready-to-teach U3800 Series IoT Applied Courseware focuses on teaching practical design and test techniques. The courseware offers students experience with leading-edge tools and software used in industry.
Find out more: www.keysight.com/find/teachIoT

Control. Automate. Simplify.

Keysight Technologies' BenchVue 2017 software for the PC reinvents your bench testing by making it simple to connect, control and build automated tests with your Keysight instruments. With no need to program and an intuitive interface, this expandable software platform will streamline data capturing, measurement analysis and your overall workflow. BenchVue software connects to over 470 Keysight instruments and counting. Find out more: www.keysight.com/find/benchvue

Power Products Solutions selection guide

A guide to over 300 power product solutions to match your test and measurement needs. www.keysight.com/find/PowerBrochureDisty



Keysight & Our Distributor Network

RIGHT *Instrument.* RIGHT *Expertise. Delivered* RIGHT *Now.*

Keysight and our network of Keysight Authorized Distributors have teamed up to provide fast, easy access to the world's largest selection of off-the-shelf T&M instruments. It's the best of both worlds: Keysight's measurement expertise and product breadth combined with speed, convenience and same-day shipping from our distribution partners. It's never been easier to get the right instrument in the right hands, right away.

SPOTLIGHT

Three ways to cut power supply input noise

If you're measuring parameters in devices under test (DUTs) that are sensitive to noise on the DC power input, you'll want to do everything possible to quiet it down. We've got three tips to help you reduce noise.

1. Choose a power supply with low noise

Simple enough—to minimize noise, start at the source. Filtering noise from a power supply can be tough, so you want to choose one that has very low noise to begin with. For example, the low ripple and noise specification of the new Keysight E36300 Series bench power supplies provide quality power for applications requiring a clean and precise signal. See *Table 1*.

A cleaner signal was made possible by modernizing an older technology called SCR pre-regulation to realize an efficient, dense power mesh that doesn't generate a lot of heat. That allows the linearly regulated E36300 Series power supplies to use a moderate heat sink and an efficient, quiet fan.

For cleaner signals, selecting a supply with low RMS and peak-to-peak output voltage noise is a great start, but you can also minimize noise by paying attention to the lead connections to your DUT.

	RMS noise	Peak-to-peak noise
Linearly regulated power supply	~350 µV	~2 mV

Table 1. E36312A Series bench power supplies noise specifications.

2. Shield supply-to-DUT connections

The connections between your supply and DUT can be susceptible to noise pick-up. Different types of interference include inductive coupling, capacitive coupling, and radio frequency interference. The most effective way to reduce noise is to ensure your load and sense connections use shielded two-wire cables.

When you use shielded cable, make sure to connect the shield to earth ground at only one end. For example, connect the shield on the power supply end to earth ground, as shown in *Figure 1*. Neglecting to connect the shield on either end can increase capacitive pick-up.

Do not connect the shield to ground at both ends. Ground loop currents can occur due to the difference in potential between the supply ground and the DUT ground. The ground loop current can produce voltage on the cabling that appears as noise to your DUT, as shown in *Figure 2*.

3. Balance output-to-ground impedance

Common-mode noise is noise generated when common-mode current flows from inside a power supply to earth ground. This produces voltage on impedances to ground, including cable impedance. To minimize the effect of common-mode current, equalize the impedance to ground from the plus and minus output terminals on the power supply. You should also equalize the impedance from the DUT plus and minus input terminals to ground. To accomplish this, use a common-mode choke in series with the output leads and a shunt capacitor from each lead to ground.

To learn more about quieting down your power supply download the Keysight application note *Ten Fundamentals You Need to Know About Your DC Power Supply* (Pub No. 5992-888EN).

Also see Page 3 of this flyer for more details on the E36300 Series bench power supplies.

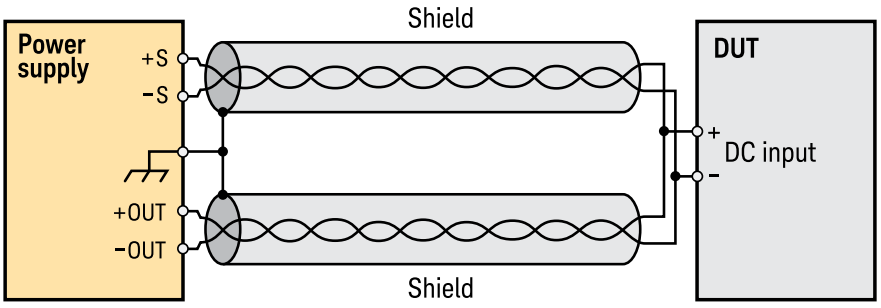


Figure 1. Connect the shield to earth ground only on one end of the cable.

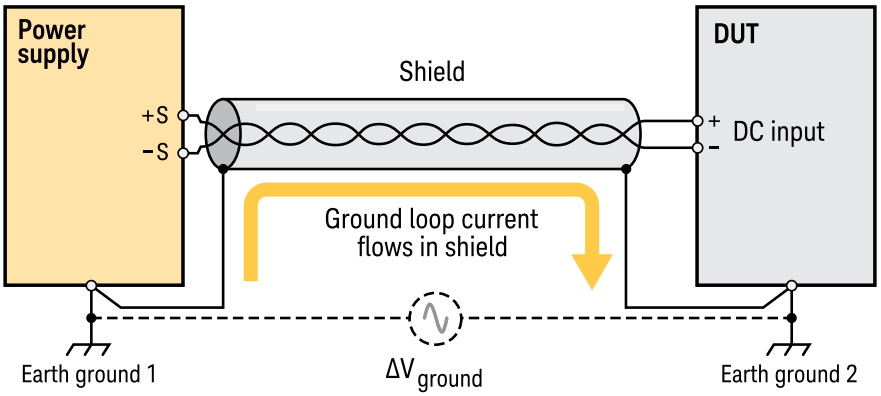


Figure 2. A shield connected improperly results in ground loop current.

NEW E36300 Series DC power supplies

- 4.3" color display that shows voltage and current on all three channels simultaneously
- Programming/readback accuracy as low as 0.03%
- Output ripple and noise: < 2 mVpp/350 uVrms
- Data logging plus output sequencing and coupling
- Front and rear output terminals
- Color-coded channels and individual knobs for voltage and current
- Modern I/O (USB, LAN and GPIB)

BenchVue software enabled

www.keysight.com/find/e36300

Model	E36311A			E36312A			E36313A		
Performance specifications	**80 W**			**80 W**			**160 W**		
Channels	1	2	3	1	2	3	1	2	3
DC output Rating (0 to 40 °C)	0 to 6 V	0 to +25 V	0 to –25 V	0 to 6 V	0 to 25 V	0 to 25 V	0 to 6 V	0 to 25 V	0 to 25 V
	0 to 5 A	0 to 1 A	0 to 1 A	0 to 5 A	0 to 1 A	0 to 1 A	0 to 10 A	0 to 2 A	0 to 2 A

E36100 Series programmable DC power supplies

- Five models provide up to 5 A or 100 V in a 2U ¼-form factor
- Excellent accuracy in programming and readback power your DUT with confidence
- Standard LAN (LXI Core) and USB connectivity allow computer control
- Intuitive on-screen menu enables you to finish manual tasks quickly
- High-contrast OLED display lets you view from anywhere on your bench

BenchVue software enabled

www.keysight.com/find/e36100

Model	Voltage	Current	Power
E36102A	6 V	5 A	30 W
E36103A	20 V	2 A	40 W
E36104A	35 V	1 A	35 W
E36105A	60 V	0.6 A	36 W
E36106A	100 V	0.4 A	40 W

Keysight Technologies' new look builds on tradition of unsurpassed quality, craftsmanship

Keysight products are transitioning to a new look in 2017 incorporating leading-edge materials, a modern vision and environmental stewardship.

www.keysight.com/find/newlook

BenchVue control, automation & analysis software

BenchVue software for the PC makes it simple to connect, record and achieve results across multiple instruments with no programming.

- Configure the most commonly used controls and measurements from instruments
- Visualize multiple measurements simultaneously
- Easily log and export data and screen images in just a few clicks for faster analysis
- Create automated test sequences fast with minimal instrument knowledge

Download a free 30-day trial today at www.keysight.com/find/benchvue

Look for this icon throughout this flyer to identify BenchVue enabled instruments (500 Keysight instruments, and counting).

33500B and 33600A Series waveform generators

- Generate True*form* arbitrary waveforms with less jitter, more fidelity and greater resolution
- Modulation: AM/FM, FSK, PWM

BenchVue software enabled

www.keysight.com/find/trueform

Model	Description	Channels	Frequency range	Pulse	Arbitrary waveforms			
					Std/Opt arb	# bits	Sample rate	Memory/Channel
33509B **33510B**	Exclusive True*form* waveform technology with <40 ps jitter and <0.04% THD.	1 2	20 MHz	20 MHz	Opt	16	160 MSa/s	1 M Standard, 16 M Optional
33511B **33512B**		1 2			Std			
33519B **35520B**		1 2	30 MHz	30 MHz	Opt		250 MSa/s	
33521B **33522B**		1 2			Std			
33611A	Exclusive True*form* waveform technology at higher frequency ranges with <1 ps jitter <0.03% THD.	1	80 MHz	80 MHz	Std	14	660 MSa/s	4 M Standard, 64 M Optional
33612A		2						
33621A		1	120 MHz	100 MHz			1 GSa/s	
33622A		2						

InfiniiVision oscilloscopes

- Up to 1,000,000 waveforms/sec update rate
- MegaZoom IV responsive, uncompromised smart memory
- Multiple instrument functionality
- Upgradable: bandwidth, MSO, serial analysis, built-in WaveGen function generator, or digital voltmeter and counter
- **Training Signals, DVM and Counter are now standard features!**

BenchVue software enabled

Model	Description	Bandwidth	Channels	Sample rate	Memory depth	Standard warranty	Calibration period	Special triggers	Built-in instruments*
1000 X-Series	Basic R&D bench – 50,000 wfms/s update rate – 7-inch display – Serial bus options	50 MHz to 100 MHz	2	Up to 2 GSa/s	Up to 1 Mpts	3 years	5 years	Serial protocol	Frequency response analyzer, protocol analyzer, 20 MHz FG, 5-digit counter, 3-digit DVM
2000 X-Series	Basic R&D bench – 50,000 wfms/s update rate – 8.5-inch display – Serial bus options	70 MHz to 200 MHz	2, 2+8, 4, 4+8	Up to 2 GSa/s	Up to 1 Mpts	5 years	2 years	Serial protocol	Protocol analyzer, 20 MHz FG, 5-digit counter, 3-digit DVM
3000T X-Series	Everything the 2000X has plus – 1,000,000 wfms/s update rate – Advanced math and power analysis – Capacitive touch screen	100 MHz to 1 GHz	2, 2+16, 4, 4+16	Up to 5 GSa/s	4 Mpts and segmented memory standard	3 years	3 years	Near Field Communi-cation (NFC) Trigger, Serial protocol, Zone touch	Protocol analyzer, 20 MHz AWG, 8-digit counter and totalizer, 3-digit DVM
4000 X-Series	Everything the 3000T has plus – 12.1-inch capacitive touch screen – FFT, USB 2.0 pre-compliance – Up to four active probes	200 MHz to 1.5 GHz					2 years		Protocol analyzer, dual 20 MHz AWG, 5-digit counter, 3-digit DVM
6000 X-Series	Everything the 4000X has plus – 450,000 wfms/s update rate – Multi-touch display – Voice control – Jitter and real-time eye diagram analysis	1 GHz to 6 GHz		Up to 20 GSa/s				Serial protocol Zone touch	Protocol analyzer, dual 20 MHz AWG, 10-digit counter and totalizer, 3-digit DVM

*Some features are optional at additional cost.

InfiniiVision software applications

Serial protocols and triggering	Features
I^2C, SPI, RS232, UART, USB 2.0, CAN, CXPI, LIN, FlexRay, Audio, MIL-STD 1553, ARINC 429, and more	Dual-channel WaveGen, jitter, real-time eye diagram, integrated voltmeter, 10-digit counter, mask limits, USB signal quality, video/TV, FPGA dynamic probe, power analysis, frequency response analysis via Bode plot, near field communication testing, and more.

See the complete list of apps at http://www.keysight.com/find/scope-apps

34970A / 34972A data acquisition switch units

- Low-cost, 3-slot unit with 6½ digit DMM and built-in signal conditioning
- Choose from 8 plug-in modules, up to 120 1-wire (60 2-wire) channels or 96 cross points
- 34972A has built-in Web interface

BenchVue software enabled

www.keysight.com/find/daq

34970A/72A models

Modules	Key specifications
34901A/02A/08A multiplexers	Up to 300 V, 16, 20, or 40 channels
34903A general-purpose switch	300 V, 20 actuator channels
34904A matrix	4x8 matrix
34905A/06A RF switches	2 GHz dual, 50 and 75 Ω
34907A multi-function	DIO, DAC, totalizer

Digital Multimeters | www.keysight.com/find/dmm

True*volt* digital multimeters (DMMs)

BenchVue software enabled

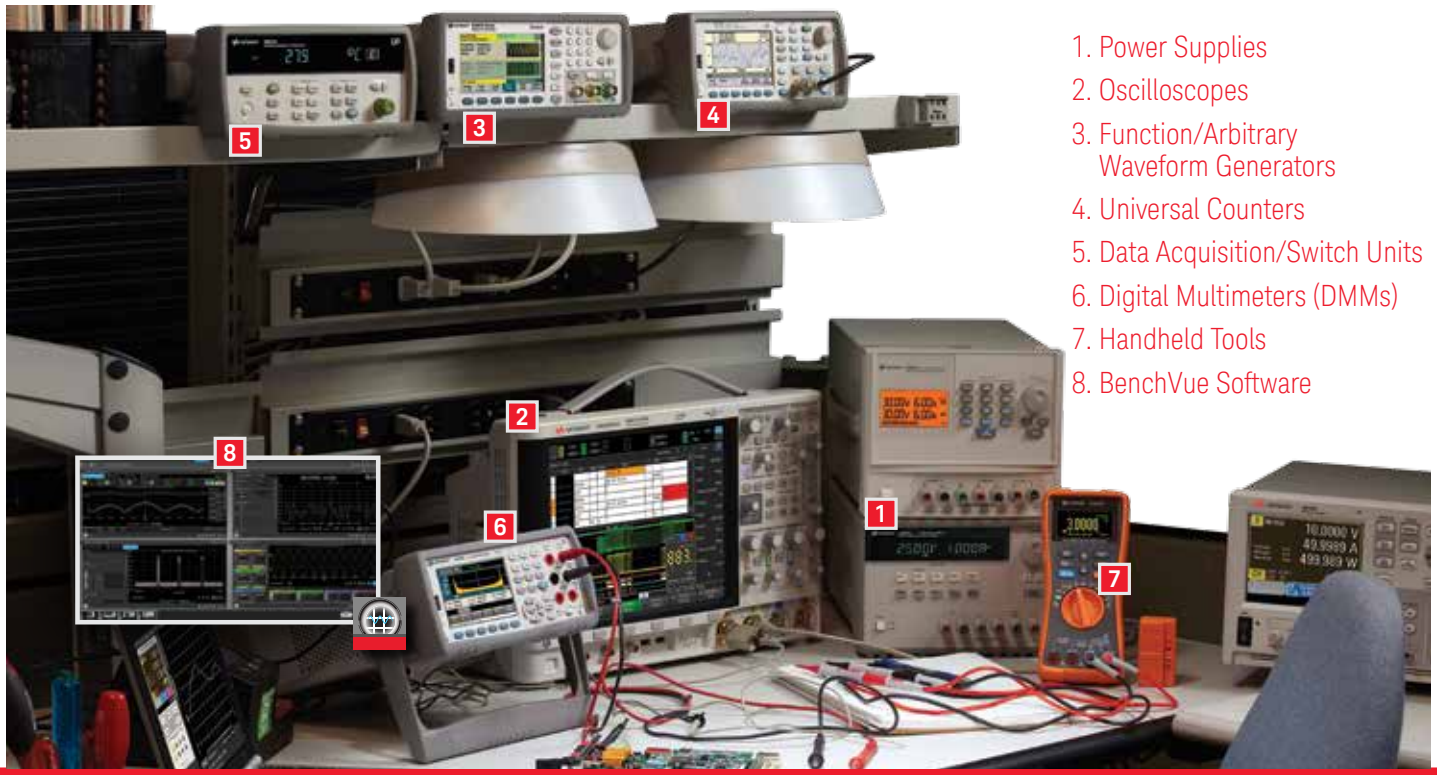
www.keysight.com/find/truevolt

- 6½ digit 7½ digit performance
- Graphical capabilities such as trend and histogram charts
- Measure very low current, 1 µA range with pA resolution, allowing measurements on very low power devices
- Auto calibration to compensate for temperature drift
- Basic measurements: DCV, ACV, DCI, ACI, 2- and 4-wire resistance, frequency, period, continuity, diode, temperature, capacitance

Model	Description	Digits of resolution	Max reading rate at 4½ digits (rdgs/s)	Built-in PC interfaces
34460A	New industry standard. Display DMM results in ways you never have before and measure with unquestioned True*volt* confidence.	6½	300	USB; optional GPIB, LAN
34461A			1,000	USB, LAN; optional GPIB
34465A	More measurements, higher speed, better accuracy, and more memory than the 34461A.	6½	5,000; optional 50,000	USB, LAN; optional GPIB
34470A		7½		

The Keysight Bench

Only Keysight delivers the industry's largest selection of bench instruments and groundbreaking BenchVue software – the zero-programming way to view, capture, and export the data you collect from your bench.



1. Power Supplies
2. Oscilloscopes
3. Function/Arbitrary Waveform Generators
4. Universal Counters
5. Data Acquisition/Switch Units
6. Digital Multimeters (DMMs)
7. Handheld Tools
8. BenchVue Software

For more information or to place an order contact:

ES Département Tests Energie Mesures

Equipements Scientifiques
Département Tests Energie Mesures
127 Rue de Buzenval
92380 GARCHES
Tel: 01 47 95 99 45
Fax: 01 47 01 16 22

Email: tem@es-france.com
Web: www.es-france.com

STANDARD 3 YR WARRANTY

Get Greater Reliability– Standard

You've come to expect the highest quality from Keysight. We stand behind our products with a three-year warranty that's standard on all instruments, worldwide.

www.keysight.com/find/ThreeYearWarranty

KEYSIGHT TECHNOLOGIES
Authorised Distributor

Technical data and pricing subject to change without notice.

Published in USA, August 1, 2017
5992-0112EEE
www.keysight.com