

Keysight Technologies

# Migrating the E3631A to the Next-Generation E36300 Series Power Supplies

Application Note



Unlocking Measurement Insights

## Overview

Keysight Technologies, Inc. released the new E36300 Series power supplies as a compatible replacement for the E3631A. You now have a choice of three models E36311A, E36312A and E36313A depending on your power supply requirements. This application note provides a comparison between the new E36300 Series versus the E3631A.

## Features and Specifications

The new E36300 Series power supplies has a 4.3-inch LCD color display and color-coded channels. The color display and color-coded channels provides you with an easy-to-read display.



Figure 1a. In normal view, all three channel settings display simultaneously the measurement values.

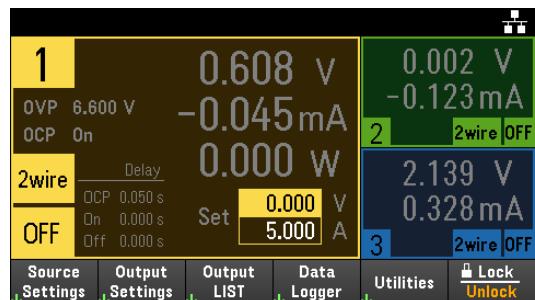


Figure 1b. In meter view, the E36300 Series displays an enlarged view of the selected channel with a lot more details, including the measured power, OVP/OCP condition and delays. The other two channels display the measured voltage/current.



Figure 2. The E3631A only displays one channel setting (current and voltage) at one time.

E3631A and E36300 Series power supplies has the three channels output at the front panel; however, the E36312A and E36313A has an additional three channels output at the rear panel. This feature provides you the flexibility to choose either front or rear panel output to fit your application requirements.

Both power supplies also have a different connectivity interface. By default, E3631A is built with RS-232 and GPIB; while E36300 Series is built with a USB interface. The default LAN port is available for E36312A and E36313A. The GPIB connectivity interface is an optional and a user installable for E36312A and E36313A. You can place an order anytime when the GPIB connectivity interface becomes necessary for your applications.

In addition, the E36312A and E36313A are built in with the front panel USB port which enables data logging and allows you to transfer or store the data from instrument to the USB easily and quickly. You also can save the captured screen to either a bitmap (\*.bmp) or portable network graphics (\*.png) file. The logged data can also be exported to a CSV file for use in reports.

Furthermore, it also built with the Kensington lock slot which secure your power supply and prevents theft or misplacement. A banana binding post is a standard default option. For extra safety, you may choose the recessed binding post which allows complete insulation of front panel connections.

Table 1. Comparison of the E3631A and E36300 Series power supplies

Attributes	Current Power Supply		New Power Supplies	
	E3631A	E36311A	E36312A	E36313A
Display	Fluorescent		4.3-inch LCD color	
Color-coded channels	Not applicable		Yes	
Individual knobs for voltage and current	Not applicable		Yes	
Kensington lock slot	Not applicable		Yes	
RS-232	Yes		Not applicable	
USB port for communication	Not applicable		Yes	
LAN (LXI)	Not applicable	Not applicable	Yes	Yes
3 channels output at front and rear panel	No (Only front)	No (Only front)	Yes	Yes
GPIB	Yes	Not applicable	Yes, optional	Yes, optional
Digital I/O port	Not applicable	Not applicable	Yes	Yes
USB port for data logging/data storage	Not applicable	Not applicable	Yes	Yes
Rear earth ground reference	Not applicable	Not applicable	Yes	Yes
Recessed binding post	Not applicable	Yes, pre-order	Yes, pre-order	Yes, pre-order

Both power supplies have the same height, width and it is compliance to the standard rack system. You can replace your existing E3631A with E36300 Series power supplies, or mount the E36300 Series power supplies on a standard test rack system with optional rackmount kits.

Table 2. Dimension for E3631A and E36300 Series power supplies

	E3631A	E36311A	E36312A	E36313A
Height (mm)	133	133	133	133
Width (mm)	213	213	213	213
Depth (mm)	348	364	367	367



Figure 3. Physical appearance

## Performance specifications and enhancements on E36300A Series power supplies

Table 3 provides a comparison of specifications between these power supplies so you can easily determine which device best fits your requirements.

The new E36300A Series power supplies has improved voltage, current programming and readback accuracy functionality which can easily provide you with a precise reading for clean voltage and current.

Table 3. Comparison of performance specifications

	E3631A			E36311A			E36312A			E36313A																	
<b>Performance Specifications</b>																											
Power Output	80W			80W			80W			160W																	
DC output Rating (0 to 40 °C)	1	2	3	1	2	3	1	2	3	1	2	2															
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 +6 V	0 to 25 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 5 A	0 to 1 A	0 to 1 A	0 to 10 A	0 to 2 A	0 to 2 A	0 to 2 A															
<b>Load regulation ± (% of output + offset)</b>																											
Voltage	<0.01% +2 mV						<0.01% +4 mV																				
Current	<0.01% +250 µA						<0.01% +500 µA																				
<b>Line regulation ± (% of output + offset)</b>																											
Voltage	<0.01% +2 mV			<0.01% +1 mV						<0.01% +500 µA																	
Current	<0.01% +250 µA						<0.01% +500 µA																				
<b>Output Ripple and noise (20 Hz to 20 MHz)</b>																											
Normal Mode Voltage	<350 µVrms/2 mVpp						<1 mVrms/5 mVpp																				
<b>Accuracy(1) 12 months (25 °C + 5 °C)</b>																											
<b>Programming accuracy ± (% of output + offset)</b>																											
Voltage	0.1%+ 5 mV	0.05%+20 mV	0.1%+ 5 mV	0.05%+20 mV	0.03%+ 2 mV	0.03%+5 mV	0.03%+3 mV	0.03%+5 mV	0.03%+5 mV	0.03%+5 mV	0.03%+5 mV	0.03%+5 mV															
Current	0.2%+ 10mA	0.15%+4mA	0.1%+ 10 mA	0.1%+4 mA	0.04%+3 mA	0.04%+2 mA	0.05%+4 mA	0.04%+3 mA	0.05%+5 mA	0.04%+3 mA	0.04%+3 mA	0.04%+3 mA															
<b>Readback(2) accuracy ± (% of output + offset)</b>																											
Voltage	0.1%+ 5 mV	0.05%+10 mV	0.1%+ 5 mV	0.05%+10 mV	0.04%+ 2 mV	0.04%+5 mV	0.04%+3 mV	0.03%+5 mV	0.03%+5 mV	0.03%+5 mV	0.03%+5 mV	0.03%+5 mV															
Current	0.2%+ 10 mA	0.15%+4 mA	0.1%+ 10 mA	0.1%+4 mA	0.04%+3 mA	0.04%+2 mA	0.05%+5 mA	0.04%+3 mA	0.05%+5 mA	0.04%+3 mA	0.04%+3 mA	0.04%+3 mA															
<b>Load transient recovery time</b>																											
(Time to recover to within the settling band following a load change from 50% to 100% and from 100% to 50% of full load)																											
Voltage settling band	15 mV						30 mV																				
Time	< 50 µS																										

## New Features on E36300 Series Power Supplies

### Protection functions

Each output channels for the E36300 Series power supplies is built with the protection with Over Voltage Protection (OVP), Over Current Protection (OCP), and Over Temperature Protection (OTP). These protection functions will prevent the fault occurs on the output and damage the DUT.

### E3631A mode

The E3631A mode is a feature in the new E36300 Series power supplies which allows you to use the programming codes that you have created in the previous applications in the old E3631A power supply model.

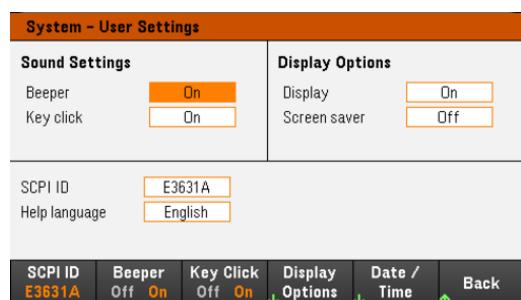


Figure 4. In E3631A mode, E36300 Series power supplies will have a compatible mode for the E3631A programming code.

### BenchVue Software

The E36300A Series is supported by BenchVue software. The software for the PC makes it simple to connect, record and achieve results across multiple instruments with no programming knowledge. The software enables you to:

- Configure the commonly used controls and measurement from instruments
- Visualize the outputs of multiple power supplies simultaneously
- Log data, capture screen shots, and save a system state
- Recall a past state of your bench to replicate results
- Export measurement data in desired format fast
- Monitor and control your bench from mobile devices
- Quickly access manuals, drivers, FAQs and videos



Figure 5. BenchVue software for your E36300 Series power supplies.

## Digital Port for the E36312A and E36313A

The E36312A and E36313A have digital I/O port on the rear panel. The digital port consists of four I/O pins to access the various control functions.

- Bi-directional digital I/O

You can configure the three I/O pins for general purpose bi-directional digital inputs and outputs. The digital I/O can be used to control both relay circuits as well as digital interface circuits.

- Digital input

You can configure the three I/O pins as digital input only.

- Fault/inhibit system protection

This feature can protect your device under test by accepts a TTL feedback signal from your test system or device under test to disable the output.

- Trigger input/output

You can use any of the digital control pins as a trigger input/output and all pins are referenced to the signal common pin.

For the trigger input pin, you can apply either a negative-going or positive-going pulse to trigger the instrument. You can configure the data logger and the output list to be triggered by external trigger signals. Simply select DIO Trigger In as the trigger source when configuring the data logger and output list. This will enable input trigger signals on the configured digital pins. A trigger is generated when an external signal that meets the signal criteria is applied to any configured trigger input pin.

For trigger output pin, a 10-microsecond trigger pulse will be generated when a triggered event has occurred on the instrument. Trigger out signals can be generated when configuring the voltage and current in the output List. If you set the trigger source to DIO Trigger In when configuring the Output List an output trigger signal will be generated on the configured digital pin.

- Output couple controls

You can use digital control pins one through three for this function. You can synchronize the output on/off sequence across units when you connect multiple E36300A Series power supplies together.

## Data logger for the E36312A and E36313A

The E36312A and E36313A have data logger function which allows you to view and log the output voltage and current data for up to 30,000 hours. You can collect and analyze the data in a convenient and easy way as all three channels output data can be simultaneously viewed and logged.



Figure 6. You can log and view all three channels output in simultaneous. Here is the voltage of output 1, output 2 and output 3 which are captured over 30 seconds.

## Output sequencing and output LIST mode for E36312A and E36313A

The built-in output sequencing capability allows you to create flexible and easy-to-use test sequences that automates the output. It is well-suited for those who have minimal programming skills. Each channel on the E36312A/E36313A units can be individually set to turn on or turn off with delay sequences.

The output list mode lets you generate complex sequences of output changes with rapid, precise timing which may be synchronized with internal or external signals. The list can also trigger on internal or external events and be repeated. Once the list of commands is stored in the power supply, the entire list is executed by a single command. This reduces your command processing time and simplifies code.

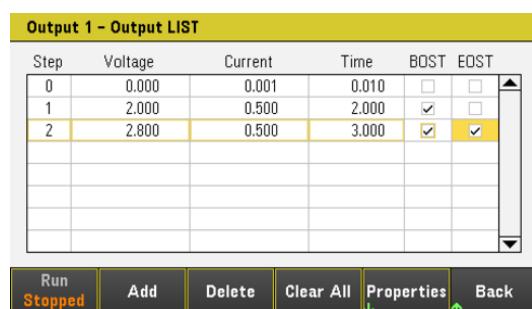


Figure 7. You can use the output list mode to perform the outputs by sequences.

## Auto Series/parallel mode for the E36312A and E36313A

Channels 2 and 3 for the E36312A and E36313A can be set to series or parallel mode to double the output voltage (up to 50 volts) or current (up to 4 amps for E36313A) respectively just with a button setting. The setting is performed through the front panel display with graphical user interface instructions. It helps you save the time as no external wiring between channels is required for the connection.

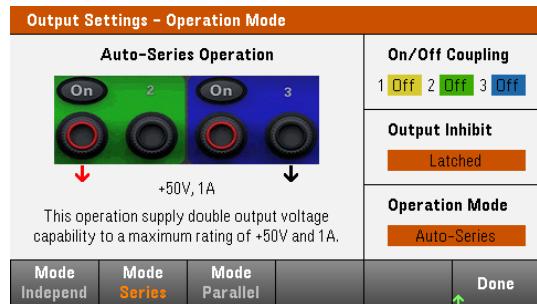


Figure 8. Auto-Series operation to double the output voltage to 50 V.

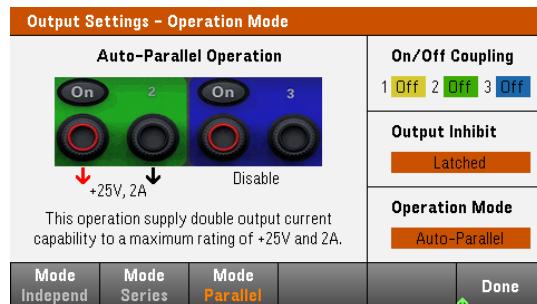


Figure 9. Auto-parallel operation to double the output current to 2 A. Electrically isolated outputs for the E36312A and E36313A. The three outputs for the E36312A/E36313A are electrically isolated from each other and from ground. This feature helps to minimize the interference between circuits-under-test.

**H3 Remote control through web browser for the E36312A and E36313A**  
With the E36312A and E36313A you can control and monitor the instrument via LAN with a simulated front panel with the instrument's web interface.

Figure 9. You can use control your E36300 Series power supplies anywhere using LAN via a web browser

Needs a short/brief summary as a wrap up.

Example of SA:

The E36300 Series power supplies is a compatible replacement for the E3631A with significant performance enhancements and new features. You can migrate from E3631A to the E36300 series easily because all the functionality in the E3631A is identical in the E36300. Furthermore, you will benefit from the easy-to-use enhancements and new features by switching to the new E36300 series power supplies.

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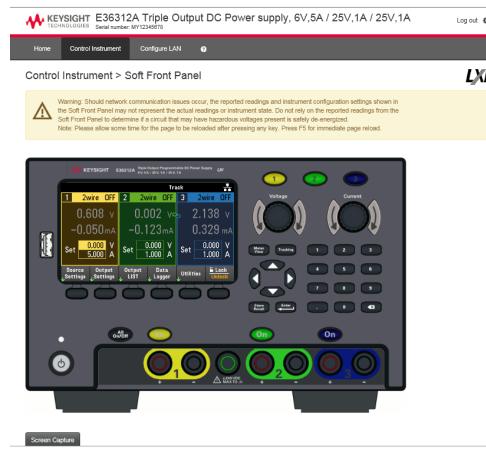
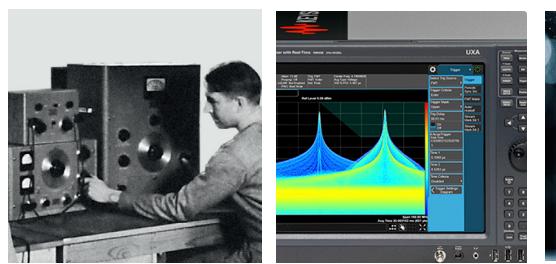


Figure 10. You can use control your E36300 Series power supplies anywhere using LAN via a web browser

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Published in USA, December 1, 2017  
5992-2381EN  
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