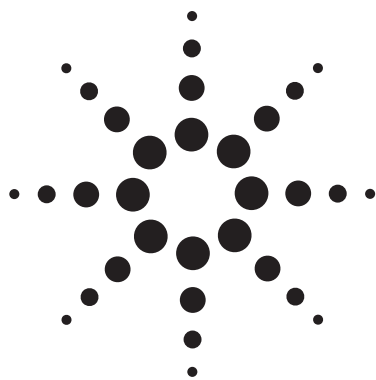




# Agilent E36XX-Series Manual dc Power Supplies

## Data Sheet

- Linear power supply
- Single, dual or triple output
- 10-turn voltage and current controls
- Digital voltage and current meters
- Low noise and excellent regulation



### Affordable, full-featured benchtop power supplies provide excellent performance and flexibility

#### A whole family of low-cost power supplies to meet your needs

The E3600-series of low-cost benchtop power supplies give you the performance of system power supplies without the high price. All E3600 family members give you clean power with dependable regulation and fast transient response. E3600-series single-output models are described on this page. See page 2 for information on dual- and triple-output models.

#### Single-output models

All E3600-series single-output power supplies feature separate digital-panel meters for monitoring voltage and current simultaneously, giving you precise reading and control capability. All models except the E3630A also feature 10-turn potentiometers for accurate adjustment of voltage and current output settings.

With 0.01 percent load and line regulation, these instruments keep the output steady when power line and load changes occur. The low normal-mode noise specification of less than 200 $\mu$ Vrms ensures clean power for precision circuitry.

In all single-output models, either the positive or negative terminal can be connected to ground, providing a positive or negative voltage output. Outputs can also be floated up to 240V from ground.

These instruments also feature adjustable current limits, letting you set the safest current limit without having to short the output.

#### E3610A, E3611A, and E3612A single-output models

These popular 30-watt bench supplies are designed for general laboratory use. The constant-voltage, constant-current output allows operation as either a voltage or current source. The changeover occurs automatically, based on the load. Each of these models has two ranges, allowing more current at a lower voltage. For higher output voltages, supplies can be connected in series.



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#### **E3614A, E3615A, E3616A and E3617A models feature overvoltage protection**

These flexible 60-watt, single-range power supplies can be used as either voltage or current sources. When output terminal voltage increases to a preset shut-down level, an overvoltage protection circuit disables the output to protect the device under test (DUT) from damage. The overvoltage protection feature is easily monitored and adjusted from the front panel.

Using remote sensing capability, these instruments automatically compensate for voltage drop in the load leads, so you get accurate voltage at the DUT.

You can combine multiple units in auto-parallel, auto-series and auto-tracking configurations for greater output voltage or current capacity. Front and rear output terminals allow flexible configuration. Output voltage and current can be controlled with external 0- to 10-volt analog voltage or variable resistance.

#### **Multi-output models**

With multiple supplies in a compact unit, the E3620A and E3630A give you excellent performance while saving space on your bench. Both instruments feature tight 0.01 percent line and load regulation and a low normal-mode noise specification of less than 0.35mV to ensure clean power for precision circuitry. With a common-mode current specification of less than 1uA, both multiple-output power supplies minimize power line current injection.

Like the single-output models in the E3600 series, the E3620A and E3630A feature separate digital panel meters so you can monitor voltage and current simultaneously. They also protect your DUT against overload and short-circuit damage. Smooth turn-on and turn-off transitions keep power spikes out of your circuits.

#### **E3620A dual-output power supply**

The 50-watt E3620A dual-output power supply provides two 0 V to 25 Vdc outputs with the maximum current of 1 A to satisfy most bench requirements. The outputs are completely independent and isolated.

#### **E3630A triple-output power supply**

The 35-watt E3630A triple-output power supply provides three dc outputs: 0 to 6 V with a maximum current of 1 to 2.5A and 0 to 20 V and 0 to -20 V with a maximum current of 0.5A. An autotracking feature lets you use one voltage control to adjust the +20 V and -20 V outputs simultaneously. The outputs track each other to within 1 percent, making it easy to adjust the power supply for circuits requiring balanced voltages.



## Specifications

|                                    | E3610A                                                                                                   | E3611A                      | E3612A                       | E3614A                                                                                                                                                                                         | E3615A                         | E3616A       | E3617A         | E3620A                                     | E3630A                                      |
|------------------------------------|----------------------------------------------------------------------------------------------------------|-----------------------------|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|--------------|----------------|--------------------------------------------|---------------------------------------------|
| Features                           | Dual range, 10 turn pots, Constant Voltage (CV), Constant Current (CC) modes.                            |                             |                              | Adjustable overvoltage protection, voltage & resistance programming, remote sense, rear outputs, ten turn pots, CV, CC modes. Multiple supplies can be connected for tracking or higher power. |                                |              |                | Isolated dual outputs, 10 turn pots CV, CL | Tracking, CV, CL (±20 V) CV, CF (+6 V)      |
| Number of outputs                  | 1                                                                                                        |                             |                              |                                                                                                                                                                                                |                                |              |                | 2                                          | 3                                           |
| Number of output Ranges            | 2                                                                                                        | 2                           | 2                            | 1                                                                                                                                                                                              | 1                              | 1            | 1              | 1                                          | 1                                           |
| dc Output Rating                   | 8 V, 3 A<br>15 V, 2 A                                                                                    | 20 V, 1.5 A<br>35 V, 0.85 A | 60 V, 0.5 A<br>120 V, 0.25 A | 8 V, 6 A                                                                                                                                                                                       | 20 V, 3 A                      | 35 V, 1.7 A  | 60 V, 1 A      | 25 V, 1 A<br>25 V, 1 A                     | +6 V, 2.5 A<br>+20 V, 0.5 A<br>-20 V, 0.5 A |
| Load and Line Regulation           | <0.01% + 2 mV                                                                                            |                             |                              |                                                                                                                                                                                                |                                |              |                |                                            |                                             |
| Ripple and Noise (20 Hz to 20 MHz) |                                                                                                          |                             |                              |                                                                                                                                                                                                |                                |              |                |                                            |                                             |
| Normal mode voltage                | <200 µVrms, <2 mVpp                                                                                      |                             |                              | <200 µVrms, <1 mVpp                                                                                                                                                                            |                                |              |                | <350 µVrms, <1.5 mVpp                      |                                             |
| Normal mode current                | <200 µVrms / 1 mApp                                                                                      |                             |                              | <0.02%+ 3 mA                                                                                                                                                                                   | <0.02%+ 1.5 mA                 | <0.02%+ 1 mA | <0.02%+ 0.5 mA | –                                          |                                             |
| Common mode current                | not specified                                                                                            |                             |                              |                                                                                                                                                                                                |                                |              |                | <1 µArms                                   |                                             |
| Transient Response Time:           | <50 µsec following change in output current from full load to half load for output to recover to within: |                             |                              |                                                                                                                                                                                                |                                |              |                |                                            |                                             |
|                                    | 10 mV                                                                                                    |                             |                              | 15 mV                                                                                                                                                                                          |                                |              |                |                                            |                                             |
| Meter Accuracy                     | ±0.5% + 2 counts at 25°C ±5°C                                                                            |                             |                              |                                                                                                                                                                                                |                                |              |                |                                            |                                             |
| Meter Resolution                   |                                                                                                          |                             |                              |                                                                                                                                                                                                |                                |              |                |                                            |                                             |
| Voltage                            | 10 mV                                                                                                    | 100 mV                      | 100 mV                       | 10 mV                                                                                                                                                                                          | 10 mV (0-20 V), 100 mV (>20 V) |              |                |                                            | 10 mA                                       |
| Current                            | 10 mA                                                                                                    | 10 mA                       | 1 mA                         | 10 mA                                                                                                                                                                                          | 10 mA                          | 1 mA         | 1 mA           | 1 mA                                       | 10 mA                                       |
| Isolation                          | 240 Vdc                                                                                                  |                             |                              |                                                                                                                                                                                                |                                |              |                |                                            |                                             |

## Supplemental Characteristics

|                                |                                                                                                                  |                                                            |                 |               |                 |                                      |                                     |
|--------------------------------|------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|-----------------|---------------|-----------------|--------------------------------------|-------------------------------------|
| Control Mode                   | CV/CC                                                                                                            |                                                            |                 |               |                 | CV/CL                                | CV/CL<br>(±20 V)<br>CV/CF<br>(+6 V) |
| Temperature Coefficient per °C |                                                                                                                  |                                                            |                 |               |                 |                                      |                                     |
| Voltage                        | <0.02% + 1 mV                                                                                                    | <0.02% + 500 µV                                            |                 |               |                 | <0.02% + 1 mV                        |                                     |
| Current                        | <0.02% + 2 mA                                                                                                    | <0.02% + 3 mA                                              | <0.02% + 1.5 mA | <0.02% + 1 mA | <0.02% + 0.5 mA | —                                    |                                     |
| Output Drift                   |                                                                                                                  |                                                            |                 |               |                 |                                      |                                     |
| Voltage                        | Less than 0.1% + 5 mV total drift for 8 hours after an initial warm-up of 30 minutes.                            |                                                            |                 |               |                 |                                      |                                     |
| Current                        | Less than 0.1% + 10 mA total drift for 8 hours after an initial warm-up of 30 minutes.                           |                                                            |                 |               |                 |                                      |                                     |
| Temperature Range              |                                                                                                                  |                                                            |                 |               |                 |                                      |                                     |
|                                | 0 to 40°C for full rated output.<br>Derate output current 1% per °C between 40°C and 55°C                        |                                                            |                 |               |                 | Derate output current<br>3.3% per °C |                                     |
| Cooling                        | Convection cooling                                                                                               |                                                            |                 |               |                 |                                      |                                     |
| Isolation                      | ±240 Vdc                                                                                                         |                                                            |                 |               |                 |                                      |                                     |
| AC Input                       | 100 Vac ±10%, 47– 63 Hz (opt. 0E9)<br>115 Vac ±10%, 47– 63 Hz (std)<br>230 Vac ±10%, 47– 63 Hz (opt. 0E3)        |                                                            |                 |               |                 |                                      |                                     |
| Weight                         | 3.8 kg (8.4 lb.) net,<br>5.1 kg (11.3 lbs) shipping                                                              | 5.5 kg (12.1 lb.) net, 6.75 kg (14.9 lbs) shipping         |                 |               |                 |                                      | Same as<br>E3610A                   |
| Size                           | 91 mm H x 213 mm W x 319 mm D<br>3.6" H x 8.4" W x 12.6" D                                                       | 91 mm H x 213 mm W x 373 mm D<br>3.6" H x 8.4" W x 14.7" D |                 |               |                 |                                      |                                     |
| Warranty                       | 1 year                                                                                                           |                                                            |                 |               |                 |                                      |                                     |
| Product Regulation             | Certified to CSA 22.2 No. 231; conforms to IEC 1010-1; carries CE mark; complies with CISPR-11, Group 1, Class A |                                                            |                 |               |                 |                                      |                                     |

## Ordering Information

### E3600-Series Power Supplies

E3610A 30-Watt Power Supply  
E3611A 30-Watt Power Supply  
E3612A 30-Watt Power Supply  
E3614A 48-Watt Power Supply  
E3615A 60-Watt Power Supply  
E3616A 60-Watt Power Supply  
E3617A 60-Watt Power Supply  
E3620A Dual-output Power Supply  
E3630A Triple-output Power Supply

### Accessories included

Operating and service manuals and  
AC power cord

### Power Options

Opt. 0E3 230 Vac  $\pm 10\%$   
Opt. 0EM 115 Vac  $\pm 10\%$   
Opt. 0E9 100 Vac  $\pm 10\%$

### Other Options

Opt. 1CM Rack-mount kit\* (E3614A, E3615A,  
E3616A, E3617A, E3620A)  
Opt. 0L2 Extra Manual

### Extra manual sets

E3610A/11A/12A Manual  
(P/N 5959-5304)  
E3614A/15A/16A/17A Manual  
(P/N 5959-5310)  
E3620A Manual  
(P/N E3620-90001)  
E3630A Manual  
(P/N 5959-5329)

### Rack Mount Kits\*

**E3610A/11A/12A/30A**  
(P/N 5063-9767)

### E3614A/15A/16A/17A/20A

To rack mount instruments side by side  
Lock-link Kit (P/N 5061-9694)  
Flange Kit (P/N 5063-9212)

To rack mount one or two instruments in a  
sliding support shelf  
Support Shelf (P/N 5063-9255)  
Slide Kit (P/N 1494-0015) required for  
support shelf

For a single instrument, also order filler  
panel (P/N 5002-3999)

\*Rackmounting with 1CM or lock-link/flange kit requires  
Agilent or customer supplied support rails  
Agilent Support Rails - E3663AC

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