

ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

**Artisan Technology Group**
(217) 352-9330 | sales@artisantg.com | artisantg.com

**Full-service, independent repair center**
with experienced engineers and technicians on staff.

**We buy your excess, underutilized, and idle equipment**
along with credit for buybacks and trade-ins.

**Custom engineering**
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

**Expert team | Trust guarantee | 100% satisfaction**

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

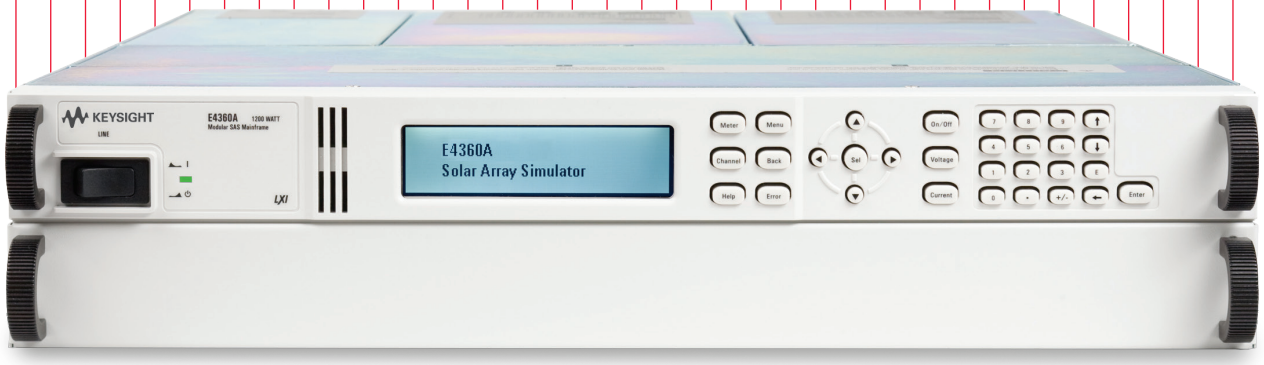
**Visit our website - *Click HERE***

# Keysight E4360

## Modular Solar Array Simulators

### Models: E4360-62A, E4366-68A

Data Sheet




KEYSIGHT TECHNOLOGIES

Unlocking Measurement Insights

- Accurate simulation of any type of solar array
- Small size: up to 2 outputs in 2U of rack space
- High output power – up to 600 W per output
- Fast I-V curve change and fast recovery switching time
- Easy to simulate environmental conditions
- LAN, USB, and GPIB interfaces standard
- Fully compliant to LXI Class C specifications
- Custom turn-key system or individual instruments available

# Solar Array Simulation

## Satellite test applications

Solar panels consisting of multiple solar cells provide power to satellites. They have unique I-V characteristics. Since the output power varies with environmental conditions (temperature, irradiation) and operational conditions (eclipse, spin), a specialized power supply such as the solar array simulator (SAS) must be used for making accurate tests and veryifying the satellite power system.

## Residential photovoltaic (PV) test applications

Solar panels are also used in residential power systems to provide power to homes. Each solar panel output can be connected to a microinverter that converts the DC solar panel output into AC for use in the home. To test microinverters, a solar array simulator is used to verify that the microinverter will track the maximum power point under various environmental conditions (such as sunny conditions, cloudy conditions, shadowing, and different temperatures) and to ensure that the microinverter is reliable and efficient.

As the trend moves toward higher power solar panels and more efficient inverters, there is a need for a specialized DC power source that is reliable, repeatable, scalable, cost effective, and available off the shelf.

Satellite manufacturers need to verify the design of the power bus regulator on the ground. Microinverter and DC power optimizer designers need to verify accuracy and efficiency of the device to gain competitive advantage in the marketplace.

## Keysight Solar Array Simulator

The Keysight Technologies, Inc. E4360 Modular Solar Array Simulator (SAS) is a dual output programmable dc power source that simulates the output characteristics of a solar array. The E4360 SAS is primarily a current source with very low output capacitance and is capable of quickly simulating the I-V curve of different arrays under different conditions (ex. temperature, age etc.). It provides up to 2 outputs and up to 1200 W in a small 2U-high mainframe.

Whether you build your own test system requiring instrument only or if you want a full turn-key system with all the instruments and software integrated and installed – Keysight gives you the flexibility you need. The E4360 SAS is readily available as an off-the-shelf instrument and also is available from Keysight integrated into a full turn-key solar array simulator system configured to your exact specification.

## Multiple simulation modes

The E4360 SAS provides three operating modes, Simulator (SAS), Table and Fixed modes. To accurately simulate the I-V cure of a solar array, use SAS or table modes. When a standard power supply is needed, use fixed mode.

### 1. SAS mode

The E4360 SAS internally generates a 4,096 I-V point table. An internal algorithm is used to approximate an I-V curve. This can be done via the I/O interfaces or from the front panel where a PC is not needed. These four input parameters are needed to establish a curve in this mode:

- $V_{oc}$ - open circuit voltage
- $I_{sc}$ - short circuit current
- $I_{mp}$ - current at the peak power point on the curve
- $V_{mp}$ - voltage at the peak power point on the curve

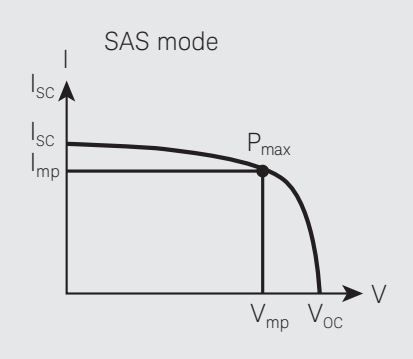



Figure 1. Power supply output characteristic in SAS mode

### 2. Table mode

The I-V curve is determined by a user-defined table of points. A table can have a minimum of 3 points, up to a maximum of 4000 points. A point corresponds to a specific value of I and V. As many as 30 tables may be stored in each of the E4360 SAS built-in volatile and non-volatile memory. The tables (I-V curve) stored in this non-volatile memory will be retained when the power is turned off, while those stored in volatile memory will be erased after power is removed.

Additionally, current and voltage offsets can be applied to the selected table to simulate a change in the operating conditions of the solar array.

### 3. Fixed mode

This is the default mode when the unit is powered on. The unit has the rectangular I-V characteristics of a standard power supply.

## Fast I-V curve changes

The E4360 offers fast curve changes to enable better simulation of solar arrays under various environmental conditions, like eclipse and spin. The resolution of the I-V curve can be set to optimize the I-V curve for resolution or fast curve change. In simulation (SAS) mode and table mode, you can select high resolution which uses a 4,096 point table to generate a smoother I-V curve within 350 msec. For fast I-V curve generation, you can select the 256 point table that quickly generates an I-V curve within 30 msec. All the E4360 SAS in the system can be synchronized to change their I-V curves at the same time using the hardware trigger, such that I-V curves can be changed on up to 100 outputs within 30 msec or 350 msec based on resolution setting.

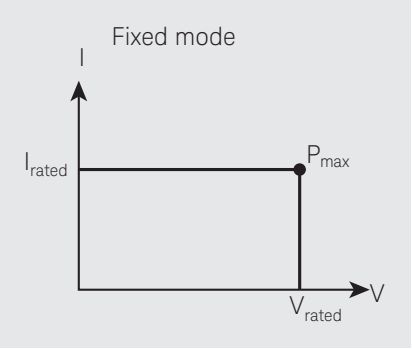



Figure 2. Power supply output characteristic in Fixed mode

## I-V curve list

The E4360 offers a LIST mode that lets you pre-program a LIST of up to 512 I-V curves. Program up to 512 sets of points, where each set of points include curve parameters: $V_{oc}$, $V_{mp}$, $I_{sc}$, and $I_{mp}$. A dwell time of 30 ms to 33,554 seconds with 1 ms resolution can be specified and the E4360 SAS will stay (i.e. dwell) at the set point for the programmed dwell time value. Alternately, the LIST can be paced (advanced to the next set point) by a bus trigger or it can be paced by a trigger signal which enables synchronization of the LIST with an external event. Utilizing I-V curve lists speed up test execution by removing the computer I/O from the process and simplifies I-V curve change more easily simulating the solar array under various conditions.

## Small size

The Keysight E4360 provides up to 1200 W in a small 2U high, 19 inch wide package. It has side air vents, however 1U space is required between the instruments to retain proper cooling.

## Built-in measurement of voltage and current

The E4360 modules come standard with built-in measurement of voltage and current. Measurements can be quickly made on up to 100 outputs in less than 500 msec using the hardware trigger. Additionally, the E4360 can simultaneously data log both voltage and current at 10 readings/s.

## Protection features

To safeguard your device from damage, the E4360 module has over-voltage, over-current, and over-temperature protection. The E4360 can be configured such that a fault condition in one module can be detected within 10 microseconds by other modules so that they can be quickly shut down to avoid hazardous conditions on your DUT.

## Connectivity

The E4360 Modular Solar Array Simulator comes standard with GPIB, 10/100 Base-T Ethernet LAN interfaces, and USB 2.0 interfaces, giving you the flexibility to use your interface of choice today and in the future. The E4360 is fully compliant with the LXI Class C specification.

## Security

When used in systems running GPIB, the LAN and/or USB interfaces can be password protected and disabled for extra security.

## Control from any browser

The built-in web server provides remote access and control of the E4360 via a standard web browser. From the web browser, you can setup, monitor and operate the E4360 remotely.

## Easy parallel operation

Should you need greater output power and current, the E4360 gives you the flexibility to connect similarly rated outputs in parallel. To simplify parallel operation, the E4360 offers a firmware based feature that allows it to treat 2 channels as




Figure 3. Built-in ethernet, USB 2.0, and GPIB interfaces enables easy system connections

a single, synchronized channel. Once configured, all functions (sourcing, programming, measurements, triggering, protection, and status monitoring) behave as if there is a single channel with twice the output current and power capability.

## Plug high power mainframes into standard AC sockets for quick bench checkout

When you first turn on the E4360A Modular SAS mainframe, the mainframe automatically senses the voltage available from the AC line. If the AC line voltage is < 180 Vac, the mainframe automatically scales back the available output power to prevent overloading the AC line cord. The E4360A will limit the mainframe output power to 600 W allowing the high power mainframe to be plugged into any standard outlet. If there is only one module installed then full power will be available from that module. When two modules are installed, the output power of each module would be cut in half (300 W per module). This is very convenient for initial bench checkout of the SAS. It is also very convenient for test development, which is typically done on the bench when DUT is not yet driven to full power.

## Triggering

The E4360 Modular Solar Array Simulator mainframe has hardware trigger in/ trigger out signals which permit the E4360 to be synchronized with external events. For example, all SAS in a system can be synchronized to change their I-V curve, to take a voltage and current measurement, or to start a data logging.

## Drivers

The E4360 comes with both the IVI-COM driver and the System Control Tools.

## Keysight 14360A System Control Tools

The 14360A System Control Tools is a powerful software driver that greatly simplifies the programming and control of a system with multiple E4360A SAS power supplies. It is shipped standard with every E4360 Modular Mainframe – free of cost. There are three components of the 14360A System Control Tools: the system driver, the configuration wizard, and the server control.

## The system driver

The 14360 system driver interfaces with the user's test application and provides the capability for a single function call to control up to 100 E4360 SAS outputs (50 mainframes).

E4360A SAS built-in web server

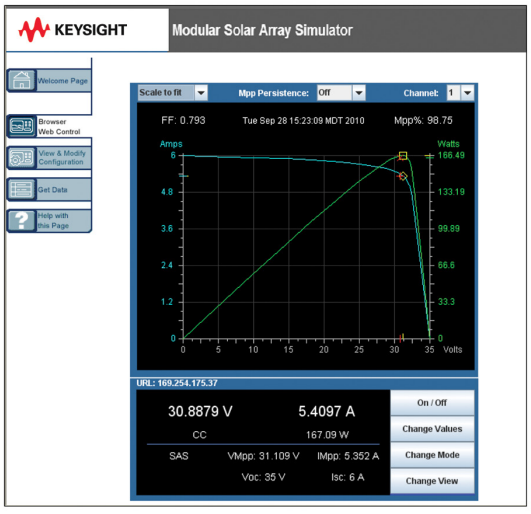



Figure 4. Keysight E4360A built-in web server

The driver functions provide support for many tasks like configuration measurement, and status readback of a system. It enables you to set and measure voltage and current levels, operating modes (Fixed, SAS, Table), protection levels, SAS mode settings ($I_{sc}$, $V_{oc}$, $I_{mp}$, $V_{mp}$) and much more. The driver supports VISA and TCP/IP sockets connection.

## The configuration wizard

The configuration wizard is a graphical user interface (GUI) that lets you easily search for and configure the layout of the E4360 SAS system without writing a single line of code. Simply specify the instrument search parameters, create module groups and segments, and drag and drop modules to desired segments. This wizard generates a configuration file used to initialize the system driver.

## Server control

The server control allows access to the system by multiple applications and an internet browser web monitor for viewing the status of the system.

The server control utilizes a client-server model, enabling a remote PC to communicate with the SAS system PC. Through the use of dual Ethernet cards in the PC running the server control, clients can access the SAS system remotely. Placing the SAS system on its own private network simplifies system maintenance and new system development allowing system configurations to be duplicated.

The web monitor allows you to remotely monitor your system of E4360s. From any web browser, you can view the overall system driver status, the system layout along with module measurement and status, and more. It also provides a linkage to the webGUI that is available for an individual E4360 instrument allowing you to configure and control that instrument. The webGUI can be password protected. This is a great tool for monitoring and troubleshooting a system of E4360s.

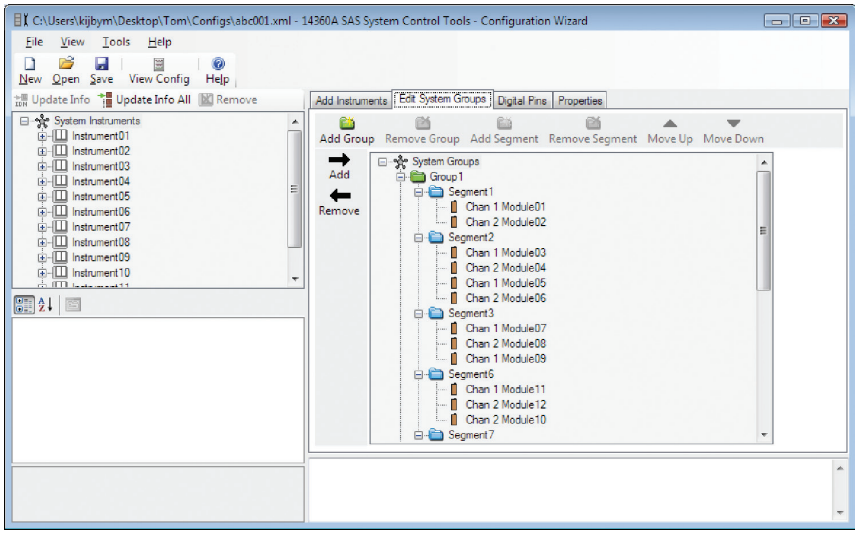


Figure 5. Keysight 14360A system control tools: configuration wizard

## Programming language

The E4360 supports easy-to-use SCPI (Standard Commands for Programmable Instruments).

## Firmware updates

The E4360 firmware is stored in FLASH ROM and can be easily updated when new features become available. Firmware can be downloaded into the E4360 over GPIB, LAN, or USB using the supplied firmware update utility program. Firmware updates can be found at **www.keysight.com/find/E4360firmware**.

## Front panel

In addition to full control over its three standard interfaces, the E4360 has a full featured front panel to permit easy manual operation for test prototyping, debugging, and troubleshooting when used in an ATE system. You can have confidence that the E4360 is working properly because you can view the settings and actual output values on both outputs at the same time. Further, all SAS modes can be programmed and controlled from the front panel.

## Analog programming and monitoring

In fixed mode, the output current can be programmed from zero to full scale by an analog voltage of 0 to –4 V.

## Universal AC input

The E4360 has a universal input that operates from 100-240 Vac, 50/60/400 Hz. There are no switches to set or fuses to change when switching from one voltage standard to another. The ac input employs power factor correction. In order to get full output power when a mainframe is configured with two modules, it must be connected to an ac input of ≥ 180 Vac; else output power will be limited to 600 W.

## Quick disconnects

Each power module has quick disconnects for easy system setup and maintenance.

## Rack mount kit

The E3460 is easily rack-mounted using available option 908. This kit provides all the necessary hardware to rack mount one E4360A mainframe in 2U of rack space. This rack mount kit includes front rack ears and rear supports which take the place of standard rack rails and/or slides.

## Custom turn-key system

Keysight offers an affordable full turn-key solar array simulator system with all the instruments, and software integrated and installed. Save valuable system development time by letting Keysight handle all the system design elements. This SAS system is built on the E4360 Modular Solar Array Simulator platform making this system the smallest available on the market. The E4360 modular architecture makes it easy to configure, re-configure, and support this system since modules can be easily moved and replaced. Further the system's components are made up of commercial-off-the-shelf instruments, a standard PC and standard interconnectivity (LAN, USB) for lower cost, easier support, and reduced down time. Keysight will tailor the system to your exact specification. Contact your local Keysight sales office to learn more about our custom systems.

Whether you need spares, want to configure the system yourself or want Keysight to build your system – the E4360 gives you the flexibility to choose the configuration that best meets your test strategy.

## Modification service

While the E4360 Modular Solar Array Simulator will meet most of your needs, Keysight recognizes that these SAS may not match all needs. To better solve your specific problem, Keysight offers a special modification service. This service entails the design and manufacture of a modified version of standard E4360 SAS models. Typical modifications include changes to the maximum output voltage or current within the power ratings. The modified SAS are designed, manufactured, tested, to Keysight's high quality and reliability standards.

While the scope of this service is usually limited to the modification of a standard SAS, our engineers welcome a discussion to determine the feasibility of meeting your specific requirements. Contact your local Keysight sales office with your modification request.



Figure 6. Custom turnkey system

# Performance Specifications for Keysight E4361A and E4362A SAS Modules

Unless otherwise noted, specifications are warranted over the ambient temperature range of 0 to 40 °C and are applicable for Fixed, Simulator, and Table modes

| | | | E4361A | E4362A | E4362A-J01 | E4362A-J02 |
|---|---|---|---|---|---|---|
| **Output ratings** (Simulator and table mode) | | Maximum power | 510 W | 600 W | 594 W | 594 W |
| | | Maximum open circuit voltage ($V_{oc}$) | 65 V | 130 V | 117 V | 120 V |
| | | Maximum voltage point ($V_{mp}$) | 60 V | 120 V | 108 V | 110 V |
| | **Line voltage: 200 V/230 V/240 V** | Maximum short circuit current ($I_{sc}$) | 8.5 A | 5.0 A | 5.5 A | 5.4 A |
| | | Maximum circuit point ($I_{mp}$)[1] | 8.5 A | 5.0 A | 5.5 A | 5.4 A |
| | **Line voltage: 100 V/120 V[4]** | Maximum short Circuit current ($I_{sc}$) | 4.25 A | 2.5 A | 2.75 A | 2.7 A |
| | | Maximum current point ($I_{mp}$)[1] | 4.25 A | 2.5 A | 2.75 A | 2.7 A |
| **Output ratings** (Fixed mode) | **Minimum impedance (ΔV/ΔVl)[1]** | | 0.25 Ω | 1 Ω | 1 Ω | 1 Ω |
| | **Voltage** | | 0 - 60 V | 0 - 120 V | 0 - 108 V | 0 - 110 V |
| | **Line voltage: 200 V/230 V/240 V** | Current | 0 - 8.5 A | 0 - 5.0 A | 0 - 5.5 A | 0 - 5.4 A |
| | **Line voltage: 100 V/120 V[4]** | Current | 0 - 4.25 A | 0 - 2.5 A | 0 - 2.75 A | 0 - 2.7 A |
| **Current derating factor** (from 40 to 55 °C) | | | 0.11 A/°C | 0.069 A/°C | 0.069 A/°C | 0.068 A/°C |
| **Output voltage ripple & noise** (from 20 Hz to 20 MHz with a resistive load, outputs ungrounded, or either output grounded) | | Simulator/table mode | 20 $mV_{rms}$ | 24 $mV_{rms}$ | 24 $mV_{rms}$ | 24 $mV_{rms}$ |
| | | | 125 $mV_{p-p}$ | 195 $mV_{p-p}$ | 195 $mV_{p-p}$ | 195 $mV_{p-p}$ |
| | | Fixed mode (constant voltage) | 24 $mV_{rms}$ | 30 $mV_{rms}$ | 30 $mV_{rms}$ | 30 $mV_{rms}$ |
| | | | 150 $mV_{p-p}$ | 150 $mV_{p-p}$ | 150 $mV_{p-p}$ | 150 $mV_{p-p}$ |
| **Programming accuracy[2,3]** (@ 23 ±5 °C) | | Fixed mode voltage | 0.075% + 25 mV | 0.075% + 50 mV | 0.075% + 50 mV | 0.075% + 50 mV |
| | | Fixed mode current | 0.2% + 20 mA | 0.2% + 10 mA | 0.2% + 11 mA | 0.2% + 11 mA |
| **Readback accuracy[3]** (from front panel or over GPIB with respect to actual output @ 23 ±5 °C) | | Voltage | 0.08% + 25 mV | 0.08% + 50 mV | 0.08% + 50 mV | 0.08% + 50 mV |
| | | +Current | 0.20% + 20 mA | 0.20% + 10 mA | 0.20% + 11 mA | 0.20% + 11 mA |
| | | –Current | 0.35% + 48 mA | 0.35% + 24 mA | 0.35% + 26 mA | 0.35% + 26 mA |
| **Load regulation – fixed mode** (change in output voltage or current for any load change within ratings) | | Constant voltage | 2 mV | 2 mV | 2 mV | 2 mV |
| | | Constant current | 1 mA | 1 mA | 1 mA | 1 mA |
| **Line regulation – fixed mode** (change in output voltage or current for any line voltage change within ratings) | | Constant voltage | 2 mV | 2 mV | 2 mV | 2 mV |
| | | Constant current | 1 mA | 1 mA | 1 mA | 1 mA |

1. There is no maximum impedance restriction. The programmed value for Imp can be less than or equal to $I_{sc}$.
2. In Simulator mode, the output current is related to the readback output voltage by an internal algorithm. In Table mode, the output current is related to the readback output voltage by interpolation between points that are entered by the user.
3. The unit may go out of specification when subjected to RF fields of 3 volts/meter in the frequency range of 26 MHz to 1 GHz.
4. There is no current derating when only one output module is installed in the mainframe.

# Performance Specifications for Keysight E4361A and E4362A SAS Modules (Continued)

Unless otherwise noted, specifications are warranted over the ambient temperature range of 0 to 40 °C and are applicable for Fixed, Simulator, and Table modes

| | | | E4361A-J01 | E4362A-J03 | E4362A-J04 | E4362A-J05 |
|---|---|---|---|---|---|---|
| **Output ratings** (Simulator and table mode) | | Maximum power | 498 W | 598 W | 596 W | 552.5 W |
| | | Maximum open circuit voltage ($V_{oc}$) | 58 V | 108 V | 170 V | 95 V |
| | | Maximum voltage point ($V_{mp}$) | 53.5 V | 99.7 V | 157 V | 87.7 V |
| | **Line voltage: 200 V/230 V/240 V** | Maximum short circuit current ($I_{sc}$) | 9.3 A | 6 A | 3.8 A | 6.3 A |
| | | Maximum current point ($I_{mp}$)[1] | 9.3 A | 6 A | 3.8 A | 6.3 A |
| | **Line voltage: 100 V/120 V[4]** | Maximum short circuit current ($I_{sc}$) | 4.65 A | 3 A | 1.9 A | 3.15 A |
| | | Maximum current point ($I_{mp}$) | 4.65 A | 3 A | 1.9 A | 3.15 A |
| | **Minimum impedance (ΔV/ΔVl)[1]** | | 1 Ω | 1 Ω | 1.72 Ω | 1 Ω |
| **Output ratings** (Fixed mode) | **Voltage** | | 0 - 53.5 V | 0 - 99.7 V | 0 - 157 V | 0 - 87.7 V |
| | **Line voltage: 200 V/230 V/240 V** | Current | 0 - 9.3 A | 0 - 6 A | 0 - 3.8 A | 0 - 6.3 A |
| | **Line voltage: 100 V/120 V[4]** | Current | 0 - 4.65 A | 0 - 3 A | 0 - 1.9 A | 0 - 3.15 A |
| **Current derating factor** (from 40 to 55 °C) | | | 0.12 A/°C | 0.075 A/°C | 0.048 A/°C | 0.079 A/°C |
| **Output voltage ripple & noise** (from 20 Hz to 20 MHz with a resistive load, outputs ungrounded, or either output grounded) | | Simulator/table mode | 20 $mV_{rms}$ | 23 $mV_{rms}$ | 32 $mV_{rms}$ | 22 $mV_{rms}$ |
| | | | 125 $mV_{p-p}$ | 175 $mV_{p-p}$ | 250 $mV_{p-p}$ | 158 $mV_{p-p}$ |
| | | Fixed mode (constant voltage) | 24 $mV_{rms}$ | 28 $mV_{rms}$ | 40 $mV_{rms}$ | 27 $mV_{rms}$ |
| | | | 150 $mV_{p-p}$ | 150 $mV_{p-p}$ | 195 $mV_{p-p}$ | 150 $mV_{p-p}$ |
| **Programming accuracy[2,3]** (@ 23 ±5 °C) | | Fixed mode voltage | 0.075% + 22 mV | 0.075% + 42 mV | 0.075% + 65 mV | 0.075% + 37 mV |
| | | Fixed mode current | 0.2% + 22 mA | 0.2% + 12 mA | 0.2% + 8 mA | 0.2% + 15 mA |
| **Readback accuracy[3]** (from front panel or over GPIB with respect to actual output @ 23 ±5 °C) | | Voltage | 0.08% + 22 mV | 0.08% + 42 mV | 0.08% + 65 mV | 0.08% + 37 mV |
| | | +Current | 0.20% + 23 mA | 0.20% + 12 mA | 0.20% + 8 mA | 0.20% + 15 mA |
| | | –Current | 0.35% + 53 mA | 0.35% + 29 mA | 0.35% + 19 mA | 0.35% + 36 mA |
| **Load regulation – fixed mode** (change in output voltage or current for any load change within ratings) | | Constant voltage | 2 mV | 3 mV | 3 mV | 2 mV |
| | | Constant current | 1 mA | 1 mA | 1 mA | 1 mA |
| **Line regulation – fixed mode** (change in output voltage or current for any line voltage change within ratings) | | Constant voltage | 2 mV | 2 mV | 2 mV | 2 mV |
| | | Constant current | 1 mA | 1 mA | 1 mA | 1 mV |

1. There is no maximum impedance restriction. The programmed value for Imp can be less than or equal to Isc.
2. In Simulator mode, the output current is related to the readback output voltage by an internal algorithm. In Table mode, the output current is related to the readback output voltage by interpolation between points that are entered by the user.
3. The unit may go out of specification when subjected to RF fields of 3 volts/meter in the frequency range of 26 MHz to 1 GHz.
4. There is no current derating when only one output module is installed in the mainframe.

# Supplemental Characteristics for Keysight E4361A and E4362A SAS Modules

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

| | | E4361A | E4362A | E4362A-J01 | E4362A-J02 |
|---|---|---|---|---|---|
| **Output current ripple & noise** (from 20 Hz to 20 MHz with a resistive load, outputs ungrounded, or either output grounded) | Simulator/table mode | 4 $mA_{rms}$ | 4 $mA_{rms}$ | 4 $mA_{rms}$ | 4 $mA_{rms}$ |
| | | 32 $mA_{p-p}$ | 32 mAp-p | 32 $mA_{p-p}$ | 32 $mA_{p-p}$ |
| | Fixed mode (constant current) | 2.5 $mA_{rms}$ | 2.5 $mA_{rms}$ | 3 $mA_{rms}$ | 3 $mA_{rms}$ |
| | | 19 $mA_{p-p}$ | 19 $mA_{p-p}$ | 20 $mA_{p-p}$ | 20 $mA_{p-p}$ |
| **Output programming range** (maximum programmable values) | Simulator/table mode voltage | 0 - 65 V | 0 - 130 V | 0 - 117 V | 0 - 120 V |
| | Fixed mode voltage | 0 - 61.5 V | 0 - 123 V | 0 - 110.7 V | 0 - 112.8 V |
| **Line voltage: 200 V/230 V/240 V** | Current | 0 - 8.66 A | 0 - 5.1 A | 0 - 5.61 A | 0 - 5.51 A |
| **Line voltage: 100 V/120 V**[1] | Current | 0 - 4.33 A | 0 - 2.55 A | 0 - 2.81 A | 0 - 2.75 A |
| | Overvoltage protection | 0 - 74 V | 0 -140 V | 0 -127 V | 0 -129 V |
| | Overcurrent limit | 0 - 10.6 A | 0 - 6.25 A | 0 - 6.88 A | 0 - 6.75 A |
| **Programming resolution** (average values) | Voltage | 19 mV | 37 mV | 35 mV | 35 mV |
| | Current | 2.7 mA | 1.6 mA | 1.8 mA | 1.7 mA |
| | Overvoltage protection | 325 mV | 600 mV | 575 mV | 575 mV |
| | Overcurrent limit | 46 mA | 27 mA | 31 mA | 30 mA |
| **Programming accuracy** | Overvoltage protection | 0.65 V | 1.2 V | 1.1 V | 1.1 V |
| | Overcurrent limit | 0.5% + 215 mA | 0.5% + 125 mA | 0.5% + 140 mA | 0.5% + 135 mA |
| | Current monitor (referenced to P common) | 1.0% + 130 mA | 1.0% + 75 mA | 1.0% + 85 mA | 1.0% + 81 mA |
| **Fixed mode analog Current programming** | Analog programming | 1.0% + 5.5 mA | 1.0% + 3.2 mA | 1.0% + 3.5 mA | 1.0% + 3.4 mA |
| | $+I_p$ to $-I_p$ differential input (0 to full scale) | 0 to -4 V | 0 to -4 V | 0 to -4 V | 0 to -4 V |
| | Max. common mode voltage (referenced to +OUT) | ±18 V | ±18 V | ±18 V | ±18 V |
| | Nominal Input Impedance | 20 kΩ | 20 kΩ | 20 kΩ | 20 kΩ |
| **Drift/temperature stability** (change in output over 8 hours under constant load, line, and ambient, following a 30 minute warmup) | Voltage | 0.04% + 1 mV | 0.04% + 2 mV | 0.04% + 2 mV | 0.04% + 2 mV |
| | Current | 0.1% + 0.85 mA | 0.1% + 0.5 mA | 0.1% + 0.55 mA | 0.1% + 0.54 mA |
| **Temperature coefficients** (output change per °C) | Voltage | 0.01% + 325 µV | 0.01% + 650 µV | 0.01% + 650 µV | 0.01% + 650 µV |
| | Current | 0.025% + 215 µA | 0.025% + 125 µA | 0.025% + 140 µA | 0.025% + 135 µA |
| **Output capacitance** | | < 100 nF | < 50 nF | < 50 nF | < 50 nF |
| **Maximum reverse diode current** (with fans running) | | 8.5 A | 5.0 A | 5.5 A | 5.4 A |

1. There is no current derating when only one output module is installed in the mainframe.

# Supplemental Characteristics for Keysight E4361A and E4362A SAS Modules (Continued)

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

| | | E4361A-J01 | E4362A-J03 | E4362A-J04 | E4362A-J05 |
|---|---|---|---|---|---|
| **Output current ripple & noise** (from 20 Hz to 20 MHz with a resistive load, outputs ungrounded, or either output grounded) | Simulator/table mode | 4 $mA_{rms}$ | 4 $mA_{rms}$ | 4 $mA_{rms}$ | 4 $mA_{rms}$ |
| | | 32 $mA_{p-p}$ | 32 $mA_{p-p}$ | 32 $mA_{p-p}$ | 32 $mA_{p-p}$ |
| | Fixed mode (constant current) | 2.5 $mA_{rms}$ | 2.5 $mA_{rms}$ | 2.5 $mA_{rms}$ | 2.5 $mA_{rms}$ |
| | | 19 $mA_{p-p}$ | 19 $mA_{p-p}$ | 19 $mA_{p-p}$ | 19 $mA_{p-p}$ |
| **Output programming range** (maximum programmable values) | Simulator/table mode Voltage | 0 - 58 V | 0 - 108 V | 0 - 170 V | 0 - 95 V |
| | Fixed mode voltage | 0 - 54.8 V | 0 - 102.2 V | 0 - 161 V | 0 - 89.9 V |
| **Line voltage: 200 V/230 V/240 V** | Current | 0 - 9.5 A | 0 - 6.12 A | 0 - 3.875 A | 0 - 6.42 A |
| **Line voltage: 100 V/120 V**[1] | Current | 0 - 4.75 A | 0 - 3.06 A | 0 - 1.938 A | 0 - 3.21 A |
| | Overvoltage protection | 0 - 66.7 V | 0 - 117.3 V | 0 - 181.3 V | 0 -103.9 V |
| | Overcurrent limit | 0 - 11.6 A | 0 - 7.5 A | 0 - 4.75 A | 0 - 7.9 A |
| **Programming resolution** (average values) | Voltage | 17 mV | 31 mV | 48 mV | 27 mV |
| | Current | 3.0 mA | 1.9 mA | 1.2 mA | 2 mA |
| | Overvoltage protection | 295 mV | 510 mV | 785 mV | 452 mV |
| | Overcurrent limit | 52 mA | 32 mA | 22 mA | 34 mA |
| **Programming accuracy** | Overvoltage protection | 0.6 V | 1.0 V | 1.56 V | 0.9 V |
| | Overcurrent limit | 0.5% + 235 mA | 0.5% + 150 mA | 0.5% + 100 mA | 0.5% + 159 mA |
| | Current monitor (referenced to P common) | 1.0% + 140 mA | 1.0% + 90 mA | 1.0% + 60 mA | 1.0% + 96 mA |
| **Fixed mode analog current programming** | Analog programming | 1.0% + 6 mA | 1.0% + 3.9 mA | 1.0% + 2.5 mA | 1.0% + 4.1 mA |
| | $+I_p$ to $-I_p$ differential Input (0 to full scale) | 0 to -4 V | 0 to -4 V | 0 to -4 V | 0 to -4 V |
| | Max. common mode voltage (referenced to +OUT) | ±18 V | ±18 V | ±18 V | ±18 V |
| | Nominal input impedance | 20 kΩ | 20 kΩ | 20 kΩ | 20 kΩ |
| **Drift/temperature stability** (change in output over 8 hours under constant load, line, and ambient, following a 30 minute warmup) | Voltage | 0.04% + 0.9 mV | 0.04% + 1.7 mV | 0.04% + 2.6 mV | 0.04% + 1.5 mV |
| | Current | 0.1% + 0.93 mA | 0.1% + 0.6 mA | 0.1% + 0.4 mA | 0.1% + 630 µA |
| **Temperature coefficients** (output change per °C) | Voltage | 0.01% + 290 µV | 0.01% + 540 µV | 0.01% + 850 µV | 0.01% + 475 µV |
| | Current | 0.025% + 235 µA | 0.025% + 150 µA | 0.025% + 100 µA | 0.025% + 159 µA |
| **Output capacitance** | | < 100 nF | < 50 nF | < 50 nF | < 100 nF |
| **Maximum reverse diode current** (with fans running) | | 9.3 A | 6 A | 3.8 A | 6.3 A |

1. There is no current derating when only one output module is installed in the mainframe.

# Supplemental Characteristics for Keysight E4361A and E4362A SAS Modules (Continued)

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

| | | E4361A | E4362A | E4362A-J01 | E4362A-J02 |
|---|---|---|---|---|---|
| **Output current settling time** (output recovery to within 1.5 A of an operating point on the I-V curve (V < 90% of VMP) after switching from a short circuit to a fixed load) | | < 5 µs | < 5 µs | < 5 µs | < 5 µs |
| **Maximum capacitive load** (for stable operation) | Simulator/table mode | 2000 µF | 2000 µF | 2000 µF | 2000 µF |
| | Fixed mode | 2000 µF | 2000 µF | 2000 µF | 2000 µF |
| **Load lead drop with remote sensing** | Simulator/table mode | Up to 2 volts + ($V_{oc}$ - $V_{mp}$) | Up to 2 volts + ($V_{oc}$ - $V_{mp}$) | Up to 2 volts + ($V_{oc}$ - $V_{mp}$) | Up to 2 volts + ($V_{oc}$ - $V_{mp}$) |
| | Fixed mode | Up to 2 volts total | Up to 2 volts total | Up to 2 volts total | Up to 2 volts total |
| **Current sinking capability** | Simulator/table mode | 500 mA | 500 mA | 500 mA | 500 mA |
| | Fixed mode | 440 mA | 440 mA | 440 mA | 440 mA |
| **Voltage programming rise/fall time** (time for output to change from 90% to 10% or 10% to 90% of its total excursion) | | < 8 ms | < 8 ms | < 8 ms | < 8 ms |
| **Voltage programming settling time** (time for output change to settle within 0.1% of the rating of the unit; either 60 mV or 120 mV) | | 25 ms typical | 25 ms typical | 25 ms typical | 25 ms typical |
| **Monotonicity** | | Output is monotonic over entire rated voltage, current, temperature range | | | |
| **Auto-parallel configuration** | | Up to 4 outputs | Up to 4 outputs | Up to 4 outputs | Up to 4 outputs |
| **Series and shunt switching frequency** (switching frequency is controlling by a customer-supplied external series or shunt FET connected to the output) | | 50 kHz maximum[1] | 50 kHz maximum[1] | 50 kHz maximum[1] | 50 kHz maximum[1] |
| **Output terminal isolation** (maximum, from chassis ground) | | ±240 Vdc | ±240 Vdc | ±240 Vdc | ±240 Vdc |
| **Recommended calibration interval** | | 1 year | 1 year | 1 year | 1 year |

1. Higher switching frequencies may be possible given the right load conditions consisting of but not necessarily limited to the inductance of the load cable to the shunt switch and the on/off edge rate of the shunt switch.

# Supplemental Characteristics for Keysight E4361A and E4362A SAS Modules

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

| | | E4361A-J01 | E4362A-J03 | E4362A-J04 | E4362A-J05 |
|---|---|---|---|---|---|
| **Output current settling time** (output recovery to within 1.5 A of an operating point on the I-V curve (V < 90% of VMP) after switching from a short circuit to a fixed load) | | < 5 µs | < 5 µs | < 5 µs | < 5 µs |
| **Maximum capacitive load** (for stable operation) | Simulator/table mode | 2000 µF | 2000 µF | 2000 µF | 2000 µF |
| | Fixed mode | 2000 µF | 2000 µF | 2000 µF | 2000 µF |
| **Load lead drop with remote sensing** | Simulator/table mode | Up to 2 volts + ($V_{oc}$ - $V_{mp}$) | Up to 2 volts + ($V_{oc}$ - $V_{mp}$) | Up to 2 volts + ($V_{oc}$ - $V_{mp}$) | Up to 2 volts + ($V_{oc}$ - $V_{mp}$) |
| | Fixed mode | Up to 2 volts total | Up to 2 volts total | Up to 2 volts total | Up to 2 volts total |
| **Current sinking capability** | Simulator/table mode | 560 mA | 560 mA | 400 mA | 560 mA |
| | Fixed mode | 440 mA | 440 mA | 340 mA | 440 mA |
| **Voltage programming rise/fall time** (time for output to change from 90% to 10% or 10% to 90% of its total excursion) | | < 8 ms | < 8 ms | < 8 ms | < 8 ms |
| **Voltage programming settling time** (time for output change to settle within 0.1% of the rating of the unit; either 60 mV or 120 mV) | | 25 ms typical | 25 ms typical | 25 ms typical | 25 ms typical |
| **Monotonicity** | | Output is monotonic over entire rated voltage, current, temperature range | | | |
| **Auto-parallel configuration** | | Up to 4 outputs | Up to 4 outputs | Up to 4 outputs | Up to 4 outputs |
| **Series and shunt switching frequency** (switching frequency is controlling by a customer-supplied external series or shunt FET connected to the output) | | 50 kHz maximum[1] | 50 kHz maximum[1] | 45 kHz maximum[1] | 50 kHz maximum[1] |
| **Output terminal isolation** (maximum, from chassis ground) | | ±240 Vdc | ±240 Vdc | ±240 Vdc | ±240 Vdc |
| **Recommended calibration interval** | | 1 year | 1 year | 1 year | 1 year |

1. Higher switching frequencies may be possible given the right load conditions consisting of but not necessarily limited to the inductance of the load cable to the shunt switch and the on/off edge rate of the shunt switch.

# Keysight E4360A Modular SAS Mainframe

## Supplemental characteristics

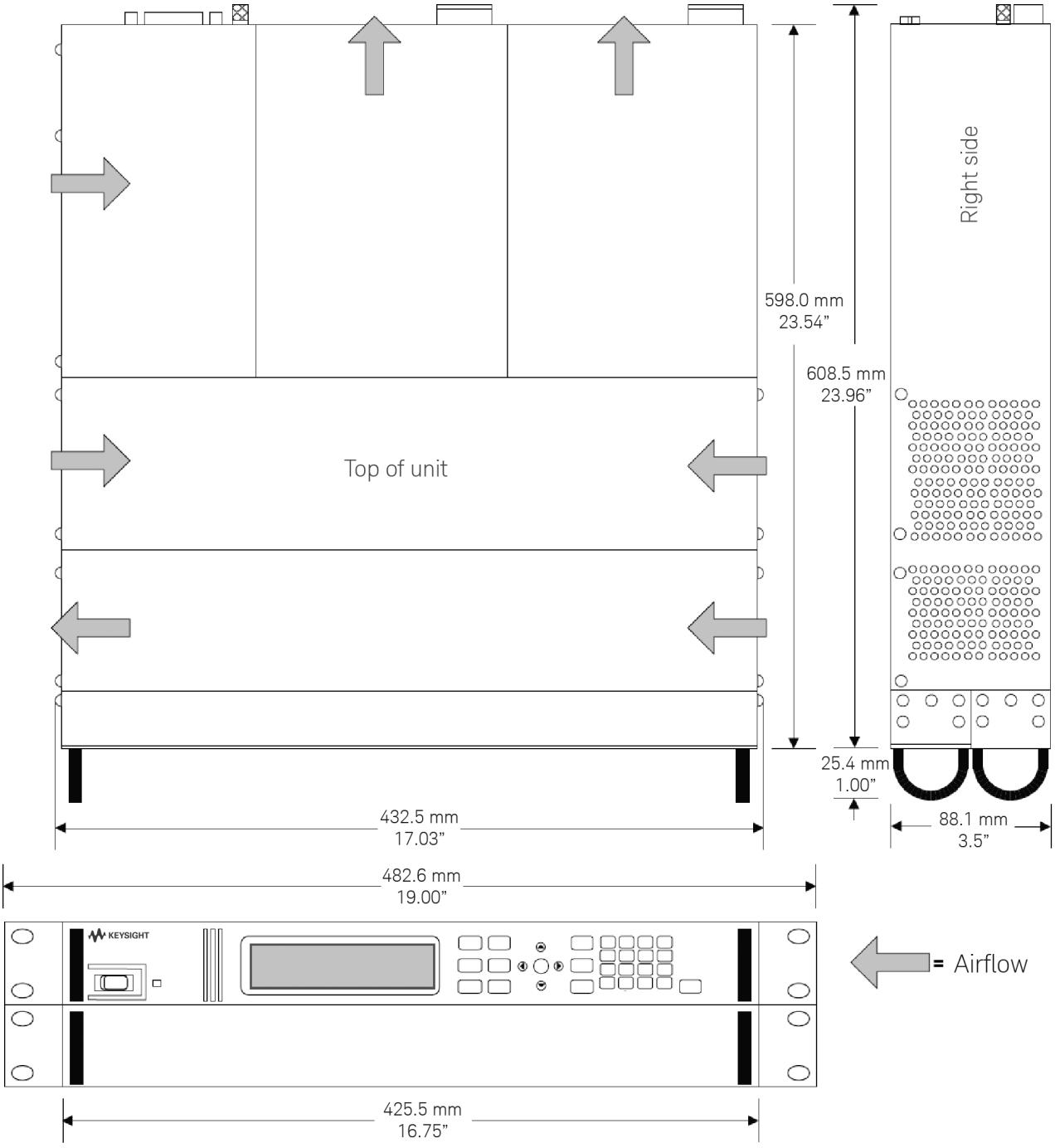
| | | E4360A |
|---|---|---|
| **Maximum total output power** (= sum of total module output power) | | 1200 W |
| **AC mains** | Nominal input ratings | 100/120/220/240 VAC; 50/60/400 Hz |
| | Input range | 86 VAC – 264 VAC |
| | Power consumption | 2000 VA (mainframe has power factor correction) |
| | AC line spike ratings | 1 kV typical |
| | Fuse | 15 A/250 VAC bib-time delay (Keysight p/n 2110-0054) |
| | 100/120 VAC note | AC mains circuits rated at nominal 100-120 VAC cannot supply enough current to power the E4360A mainframe when two output modules are installed. In this case, internal circuits will limit the output current of the modules to one half of their rating. For a single installed module, full output current will be available at nominal 100-120 VAC |
| **Savable states** | Memory locations: | 2 (0 and 1) |
| | Pre-stored state: | 0 |
| **Command processing time** | | ≤ 1 ms from receipt of command to start of output change |
| **Protection response characteristics** | INH input | 5 µs from receipt of inhibit to start of shutdown |
| | Fault on coupled outputs | < 10 µs from receipt of fault to start of shutdown |
| **Interface capabilities** | GPIB | SCPI - 1993, IEEE 488.2 compliant interface |
| | LXI compliance | Class C |
| | USB 2.0 | Requires Keysight IO Library version M.01.01 and up, or 14.0 and up |
| | 10/100 LAN | Requires Keysight IO Library version L.01.01 and up, or 14.0 and up |
| | Built-in Web server | Requires Internet Explorer 5+ or Netscape 6.2+ |
| **Environmental conditions** | Operating environment | Indoor use, installation category II (for AC input), pollution degree 2 |
| | Temperature range | 0 to 55 °C (current is derated 1% per °C above 40°C ambient temperature) |
| | Relative humidity | Up to 95% |
| | Altitude | Up to 2000 meters |
| | Storage temperature | –30 to 70 °C |
| | LED statement | Any LEDs used in this product are Class 1 LEDs as per IEC 825-1 |

# Keysight E4360A Modular SAS Mainframe (Continued)

## Supplemental characteristics (continued)

| | | E4360A |
|---|---|---|
| **Regulatory compliance** | EMC | Complies with the European EMC directive for Class A test and measurement products. |
| | | Complies with the Australian standard and carries the C-Tick mark. |
| | | This ISM device complies with Canadian ICES-001. |
| | | Cet appareil ISM est conforme à la norme NMB-001 du Canada. |
| | | Electrostatic discharges greater than 1 kV near the I/O connectors may cause the unit to reset and require operator intervention |
| | Safety | Complies with the European Low Voltage Directive and carries the CE-marking. |
| | | Complies with the US and Canadian safety standards for test and measurement products |
| **Acoustic noise declaration** | This statement is provided to comply with the requirements of the German Sound Emission Directive, from 18 January 1991. | Sound Pressure Lp < 70 dB(A), At Operator Position, Normal Operation, According to EN 27779 (Type Test). Schalldruckpegel Lp <70 dB(A) Am Arbeitsplatz, Normaler Betrieb, Nach EN 27779 (Typprüfung). |
| **Dimensions** | Height | 88.1 mm (3.5 in.) |
| | Width | 432.5 mm (17.03 in.) |
| | Depth | 633.9 mm (24.96 in.) |
| **Net weight** | Mainframe with 2 modules | 38.4 lbs (17.6 kg) |
| | Single output module | 7.2 lbs (3.3 kg) |

## Outline diagram



# Ordering Information

## The E4360A Modular Solar Array Simulator (SAS) is available 2 ways:

(1) You can order an E4360A mainframe and various modules as separate products. (See steps below.) Each item will arrive in a separate box so that you can assemble the SAS yourself when you need to.

(2) You can order an E4366A, E4367A, or E4368A which is a preconfigured SAS that is shipped as a fully assembled multiple-output SAS. (See page 18 for E4367A and E4368A ordering information.)

When ordering the E4360 SAS as a mainframe and modules, follow these steps:

### Step 1:

Select the E4360A mainframe.

### Step 2:

Select the appropriate documentation and line cord options.

### Step 3:

Order up to 2 modules. Note that each mainframe has 2 module slots to hold modules. Each module occupies one module slot.

### Step 4:

For proper operation, you must fill any empty module slots with a filler panel. When configuring a mainframe with less than 2 filled module slots, you MUST order a Filler Panel Kit (Option FLR or E4369A). Each kit contains 1 filler panel to fill one empty module slot.

### Step 5:

If you will be rack mounting your E4360 SAS, you MUST order the Rack Mount Kit.

## Mainframe

**E4360A** Modular Solar Array Simulator Mainframe, 1200 W
Holds up to 2 modules

## Available options to the E4360A mainframe

**Opt 908** Rack Mount Kit
Required for rack mounting. Standard rack mount hardware will not work.

**Opt FLR** Filler Panel Kit
Required when you have only 1 module in a mainframe. Each filler panel kit contains one filler panel.
This filler panel kit is also orderable as product E4369A.

**Opt 0L1** Full documentation on CD-ROM and printed Users Guide

**Opt 0B0** Full documentation on CD-ROM only. No printed documentation package.

**Opt 0L2** Extra copy of standard printed documentation package

**Opt 900** Power Cord, United Kingdom

**Opt 901** Power Cord, Australia, New Zealand

**Opt 902** Power Cord, Europe

**Opt 903** Power Cord, USA, Canada – 120 V
Note: The maximum output power is limited to 600 W at 100/120 Vac. To achieve full output power of 1200 W, you must use option 904 and operate at 220/240 Vac.

**Opt 904** Power Cord, USA, Canada – 240 V

**Opt 906** Power Cord, Switzerland

**Opt 912** Power Cord, Denmark

**Opt 917** Power Cord, India

**Opt 918** Power Cord, Japan

**Opt 919** Power Cord, Israel

**Opt 920** Power Cord, Argentina

**Opt 921** Power Cord, Chile

**Opt 922** Power Cord, China

**Opt 923** Power Cord, South Africa

**Opt 927** Power Cord, Brazil, Philippine, Thailand

**Opt 931** Power Cord, Taiwan

**Opt 932** Power Cord, Cambodia

## Modules

**E4361A** Solar Array Simulator dc Module 65 V, 8.5 A, 510 W

**E4362A** Solar Array Simulator dc Module 130 V, 5 A, 600 W

## Available options to the E4360A modules

**Opt 1A7** ISO 17025 Calibration Certificate

**Opt A6J** ANSI/NCSL Z540 Calibration Certificate

**Opt UK6** Commercial calibration with test results data

# Ordering Information

## E4366A, E4367A and E4368A preconfigured mainframes

These model numbers are preconfigured mainframes that are shipped as a fully tested and assembled instrument. Each system consists of one mainframe and two modules. The E4367A consists of an E4360A mainframe and two E4361A low voltage modules. The E4368A consists of an E4360A mainframe and two E4362A high voltage modules. The E4366A consists of an E4360A mainframe and two special option modules.

If you prefer to purchase a Modular Solar Array Simulator mainframe and modules as separate pieces, see page 17.

# Related Literature

*Keysight E4360 Modular Solar Array Simulators,* Data Sheet

*Keysight Solar Array Simulator Turnkey System*

*E4360 Modular Solar Array Simulator,* User Guide

*14360A System Control Tools,* User's Guide

## Preconfigured mainframes

**E4367A** Configured E4360A SAS Mainframe with 2 E4361A Modules
**E4368A** Configured E4360A SAS Mainframe with 2 E4362A Modules

## Available options to the E4367A and E4368A mainframes

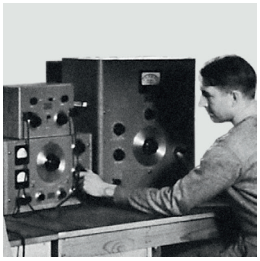
**Opt 908** Rack Mount Kit
Required for rack mounting. Standard rack mount hardware will not work.
**Opt FLR** Filler Panel Kit
Required when you have only 1 module in a mainframe. Each filler panel kit contains one filler panel.
This filler panel kit is also orderable as product E4369A.
**Opt 0L1** Full documentation on CD-ROM and printed Users Guide
**Opt 0B0** Full documentation on CD-ROM only. No printed documentation package.
**Opt 0L2** Extra copy of standard printed documentation package
**Opt 900** Power Cord, United Kingdom
**Opt 901** Power Cord, Australia, New Zealand
**Opt 902** Power Cord, Europe
**Opt 903** Power Cord, USA, Canada – 120 V
Note: The maximum output power is limited to 600 W at 100/120 Vac. To achieve full output power of 1200 W, you must use option 904 and operate at 220/240 Vac.
**Opt 904** Power Cord, USA, Canada – 240 V
**Opt 906** Power Cord, Switzerland
**Opt 912** Power Cord, Denmark
**Opt 917** Power Cord, India
**Opt 918** Power Cord, Japan
**Opt 919** Power Cord, Israel
**Opt 920** Power Cord, Argentina
**Opt 921** Power Cord, Chile
**Opt 922** Power Cord, China
**Opt 923** Power Cord, South Africa
**Opt 927** Power Cord, Brazil, Philippine, Thailand
**Opt 931** Power Cord, Taiwan
**Opt 932** Power Cord, Cambodia

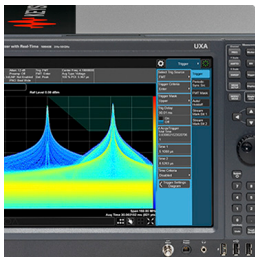
## Available options to the E4367A and E4368A modules

**Opt 1A7** ISO 17025 Calibration Certificate
**Opt A6J** ANSI/NCSL Z540 Calibration Certificate
**Opt UK6** Commercial calibration with test results data

## Evolving Since 1939

Our unique combination of hardware, software, services, and people can help you reach your next breakthrough. We are unlocking the future of technology.
From Hewlett-Packard to Agilent to Keysight.







myKeysight

myKeysight
www.keysight.com/find/mykeysight
A personalized view into the information most relevant to you.

http://www.keysight.com/find/emt_product_registration
Register your products to get up-to-date product information and find warranty information.

KEYSIGHT SERVICES
*Accelerate Technology Adoption.*
*Lower costs.*

Keysight Services
www.keysight.com/find/service
Keysight Services can help from acquisition to renewal across your instrument's lifecycle. Our comprehensive service offerings—one-stop calibration, repair, asset management, technology refresh, consulting, training and more—helps you improve product quality and lower costs.

CALIBRATION UP TO 10 YEARS WARRANTY
ASSURANCE PLANS

Keysight Assurance Plans
www.keysight.com/find/AssurancePlans
Up to ten years of protection and no budgetary surprises to ensure your instruments are operating to specification, so you can rely on accurate measurements.

Keysight Channel Partners
www.keysight.com/find/channelpartners
Get the best of both worlds: Keysight's measurement expertise and product breadth, combined with channel partner convenience.

www.keysight.com/find/E4360

For more information on Keysight Technologies' products, applications or services, please contact your local Keysight office. The complete list is available at:
www.keysight.com/find/contactus

**Americas**

| | |
|---|---|
| Canada | (877) 894 4414 |
| Brazil | 55 11 3351 7010 |
| Mexico | 001 800 254 2440 |
| United States | (800) 829 4444 |

**Asia Pacific**

| | |
|---|---|
| Australia | 1 800 629 485 |
| China | 800 810 0189 |
| Hong Kong | 800 938 693 |
| India | 1 800 11 2626 |
| Japan | 0120 (421) 345 |
| Korea | 080 769 0800 |
| Malaysia | 1 800 888 848 |
| Singapore | 1 800 375 8100 |
| Taiwan | 0800 047 866 |
| Other AP Countries | (65) 6375 8100 |

**Europe & Middle East**

| | |
|---|---|
| Austria | 0800 001122 |
| Belgium | 0800 58580 |
| Finland | 0800 523252 |
| France | 0805 980333 |
| Germany | 0800 6270999 |
| Ireland | 1800 832700 |
| Israel | 1 809 343051 |
| Italy | 800 599100 |
| Luxembourg | +32 800 58580 |
| Netherlands | 0800 0233200 |
| Russia | 8800 5009286 |
| Spain | 800 000154 |
| Sweden | 0200 882255 |
| Switzerland | 0800 805353<br>Opt. 1 (DE)<br>Opt. 2 (FR)<br>Opt. 3 (IT) |
| United Kingdom | 0800 0260637 |

For other unlisted countries:
www.keysight.com/find/contactus
(BP-9-7-17)

DEKRA Certified
ISO9001 Quality Management System

www.keysight.com/go/quality
Keysight Technologies, Inc.
DEKRA Certified ISO 9001:2015
Quality Management System

KEYSIGHT TECHNOLOGIES
Unlocking Measurement Insights

This information is subject to change without notice.
© Keysight Technologies, 2017
Published in USA, December 1, 2017
5989-8485EN
www.keysight.com

**Artisan Technology Group** is an independent supplier of quality pre-owned equipment

## Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

## We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

## Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP