
HP 34397A DC-to-AC Power Inverter

115 Vac/230 Vac (*Option 0E3*)

User's Guide

This guide contains information for the following power inverters:

- 115 Vac Output: HP 34397A DC-to-AC Power Inverter
- 230 Vac Output: HP 34397A (*Option 0E3*) DC-to-AC Power Inverter

Part Number 34397-90001
May 1995

For Safety information, Warranties, and Regulatory information,
see the pages at the back of this manual.

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HP 34397A DC-to-AC Power Inverter

This guide contains information for the following power inverters:

- 115 Vac Output: HP 34397A DC-to-AC Power Inverter
- 230 Vac Output: HP 34397A (*Option 0E3*) DC-to-AC Power Inverter

The HP 34397A is a dc-to-ac power inverter which uses a 10.5 Vdc to 15 Vdc input to generate a 115 Vac output (*230 Vac with Option 0E3*). The input source can be either a 12 volt battery or an automobile cigarette lighter connection. The ac output from the power inverter is a “quasi-sine wave” which you can use with most HP Basic Instruments.

Both versions of the HP 34397A include adapter clip leads for connection to a 12 volt battery. Option 0E3 (230 Vac) also includes a power cord.

Battery Power Consumption

Most instruments have a power rating which is expressed in *VA max*. The actual power consumption will be less than the power rating. The HP 34397A will provide enough power for most instruments with a power rating of 150 VA max or less. The following table shows several HP instruments with their battery power drain. *The values shown are approximate values.*

Battery Power Consumption

| HP Instrument | Power Drain (Watts) | Current @ 11.5 Volts (Amps) |
|---------------------------------------|---------------------|-----------------------------|
| HP 33120A Function Generator | 32 | 2.8 |
| HP 34401A Multimeter | 15 | 1.2 |
| HP 34420A Nano Volt / Micro Ohm Meter | 15 | 1.2 |
| HP 53131A Universal Counter | 40 | 3.5 |
| HP 54601B Oscilloscope | 54 | 4.7 |
| HP 54610B Oscilloscope | 75 | 6.5 |
| HP E3614A/15A/16A/17A Power Supplies | 12/125 | 1/11 |
| HP E3620A Power Supply * | 12/110 | 1/9.6 |
| HP E3630A Power Supply * | 12/85 | 1/7.4 |

* For the power supplies listed above, the first number is idle condition with no power output; The second number is with maximum power output.

Connection to a Battery

To connect the power inverter to a 12 volt battery, use the adapter clips provided. First, connect the adapter clips to the battery. Connect the *Red* lead to the *Positive (+)* terminal on the battery. Connect the *Black* lead to the *Negative (-)* terminal on the battery.

CAUTION

Reverse Polarity Connection May Damage the Power Inverter.

If the polarity of the adapter leads is reversed, a replaceable fuse on the adapter may open and the HP 34397A may be damaged. Do not use the HP 34397A with positive ground vehicles or electrical systems.

Next, connect the adapter leads to the power inverter. Verify that the instrument's power-line voltage matches the output voltage from the power inverter. Plug the instrument into the power inverter.

You can use the HP 34397A with any 12 volt battery which delivers sufficient current for the instrument's power requirement. A 6 volt battery will not operate the power inverter. A 24 volt battery will damage the power inverter.

Connection to an Automobile Cigarette Lighter

You can plug the power inverter directly into the cigarette lighter connector of an automobile. The tip of the supplied adapter is the *Positive (+)* terminal and the side contact is the *Negative (-)* terminal. The earth ground contact of the ac power cord is connected to the negative terminal of the cigarette lighter plug.

Verify that the instrument's power-line voltage matches the output voltage from the power inverter. Plug the instrument into the power inverter.

When the load of the instrument is greater than 50 watts, the wires to the cigarette lighter may not supply adequate power. In this case, the power inverter will cycle on and off or it may turn on only momentarily.

CAUTION***The Measuring Instrument MUST be Connected to Earth Ground.***

Using a battery or vehicle to power the HP 34397A will result in a floating ground terminal in the power cord. Should a fault occur in the measuring instrument, the negative terminal or the vehicle chassis may become hazardous. Be sure to connect the measuring instrument to earth ground for safety. The connecting wire gage must be sized for the possible fault current, but no smaller than 18 AWG (U.S.).

If the measuring instrument does not provide a connection for earth ground, connect the negative terminal of the battery or the vehicle chassis to earth ground. You can establish an earth ground by connecting to a clean copper or steel rod driven into the ground; the rod should have a diameter of at least 0.5 inches (12.7 mm) and a length of at least 12 inches (0.3 m). If the ground is dry, moisten the surrounding soil to enhance rod-to-earth conductivity. Alternately, you can make a connection to a copper cold water pipe at the point where it enters the ground.

CAUTION***Do Not Connect to AC Distribution Wiring.***

The HP 34397A's outer case is connected to the ground conductor of the ac power cord and to the negative side of the dc input. The power inverter is intended to be used with instruments or electrical equipment connected directly to the ac output. Do not connect the power inverter to household or RV distribution wiring. Do not connect the power inverter to any ac circuit in which the neutral conductor is connected to earth ground or to the negative terminal of a dc (battery) source.

CAUTION***Rechargeable Appliances.***

Certain rechargers for small batteries can be damaged if connected to the HP 34397A. Small battery-operated appliances, such as flashlights and razors, that can be plugged directly into an ac receptacle to recharge may be damaged or present a hazard if connected to the HP 34397A.

Certain rechargers for battery packs used in hand power tools may be damaged or present a hazard if connected to the HP 34397A. These products usually have a warning label stating that dangerous voltages are present at the battery terminals.

Operating Environment

For best operation, the power inverter should be placed on a flat surface. It should be used only in locations that meet the following requirements:

- **Dry:** Do not allow water or other liquids to drip or splash on the power inverter.
- **Cool:** The ambient air temperature should be between 32°F and 100°F (0°C - 40°C). Do not place the power inverter near a heating vent or a heat generator. Avoid placing the power inverter in direct sunlight.
- **Well-Ventilated:** Allow several inches of clearance around the power inverter to allow adequate air flow to cool the product. You can continuously operate the power inverter up to 100 Watts. A cooling fan is recommended when operating at 100 Watts and above. If the ambient air temperature is cool enough or if sufficient cooling is provided, you can safely operate the power inverter up to 140 Watts.

CAUTION

The Outer Case Will Get HOT.

The case of the HP 34397A acts as a heat sink to dissipate internally generated heat. The higher the power drawn from the battery, the higher the power inverter's case temperature. Do not place the inverter on or near materials that can be affected by high temperatures. Materials such as plastic or vinyl may distort due to the temperatures of the power inverter's case. Case temperatures will increase by about 30°F (15°C) over ambient temperature when powering an HP 54601A Oscilloscope.

The power inverter is protected against overload. If the measuring instrument requires too much power, the power inverter will get very hot and will turn off. Once the power inverter cools to below 120°F (50°C), it will start up again and repeat the cycle. When using loads of unknown power level, be sure to check the power inverter regularly. If the power inverter is too hot to touch, the load is excessive and may cause the power inverter to shut down. Use caution when handling the power inverter if you have connected a load with unknown power consumption.

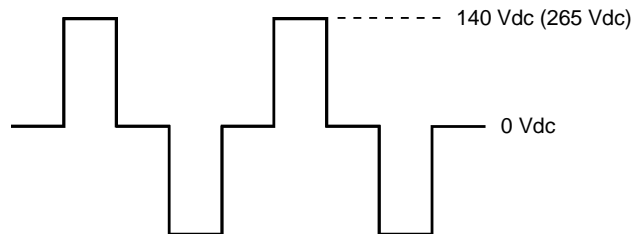
Instrument Noise

Because of the “quasi-sine wave” output, the ac output of the power inverter might induce noise in the measuring instrument. The power inverter is shielded and filtered to minimize noise, but some noise may still appear in the measuring instrument. To minimize noise, position the instrument as far from the power inverter and power cord as possible. You should also position the power cord away from the measurement test leads.

Theory of Operation

The power inverter converts battery power to ac voltage in two stages. The first stage is a dc-to-dc converter which raises the low voltage at the inverter input to 140 Vdc (265 Vdc for Option 0E3). The second stage is the inverter stage which converts the high-voltage dc to an ac voltage.

The ac output waveform from the power inverter is a “quasi-sine wave” or “modified sine wave.” It is a stepped waveform that is designed to have similar characteristics to the sine wave shape of utility power (see below). This waveform is suitable for most ac loads, including switching power supplies used in electronic equipment, transformers, and motors.



Modified Sine Wave Output

The output from the power inverter is designed to have an RMS voltage of 115 volts (230 volts for Option 0E3). To accurately measure the output, you should use an RMS-responding meter such as the HP 973A, HP 974A, or HP 34401A. When using an average-responding meter, multiply the reading by 1.12 to get the RMS value of the output.

Specifications

| | |
|--|---|
| <p>Output Power (maximum) Continuous: 100 Watts 5 Minutes: 200 Watts Surge: 400 Watts</p> <p>Output Voltage 115 V \pm 5% 230 V \pm 5% (Option 0E3)</p> <p>Output Frequency 60 Hz \pm 0.06 Hz 50 Hz \pm 0.05 Hz (Option 0E3)</p> <p>Output Waveform Quasi-sine wave</p> | <p>Input Voltage 10.5 volts to 15 volts</p> <p>Efficiency 85% to 95% depending on load</p> <p>Dimensions (W x H x D) 4.8 in. x 1.5 in. x 4.5 in. (123 mm x 38 mm x 115 mm)</p> <p>Weight 1 lb (600 g)</p> |
|--|---|

Maintenance

To replace the fuse in the clip lead adapter, remove the fuse with a pair of pliers. Replace the fuse only with a 15 amp 32 volt fuse.

Other than the fuse, the HP 34397A contains no user-serviceable parts.

DECLARATION OF CONFORMITY

according to ISO / IEC Guide 22 and EN 45014

Manufacturer's Name: Hewlett-Packard Company
Loveland Manufacturing Center

Manufacturer's Address: 815 14th Street S.W.
Loveland, Colorado 80537 U.S.A.

declares, that the product

Product Name: 115 Vac / 230 Vac DC-to-AC Power Inverter

Model Number: HP 34397A

Product Options: All Options

conforms to the following Product Specifications:

Safety: IEC 1010-1 (1990) Incl. Amend 1 (1992) / EN61010 (1993)
CSA C22.2 #1010.1 (1992)
UL 3111

EMC: CISPR 11:1990 / EN55011 (1991): Group 1, Class A
IEC 801-2:1991 / EN50082-1 (1992): 4 kV CD, 8 kV AD
IEC 801-3:1984 / EN50082-1 (1992): 3 V/m

Supplementary Information: The product herewith complies with the requirements of the Low Voltage Directive 73 / 23 / EEC and the EMC Directive 89 / 336 / EEC (inclusive 93 / 68 / EEC) and carries the "CE" mark accordingly.

Loveland, Colorado March 1, 1995


Jim White, QA Manager

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New editions are complete revisions of the manual. Update packages, which are issued between editions, may contain additional information and replacement pages which you merge into the manual. The dates on this page change only when a new edition is published.

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Safety Information

Do not install substitute parts or perform any unauthorized modification to the product. Return the product to an HP Sales and Service Office for service and repair to ensure that safety features are maintained.

Safety Symbols

Warning

Calls attention to a procedure, practice, or condition, that could possibly cause bodily injury or death.

Caution

Calls attention to a procedure, practice, or condition that could possibly cause damage to equipment or permanent loss of data.

Warning

No operator serviceable parts inside. Refer servicing to service-trained personnel.

Warning

For continued protection against fire, replace the line fuse only with a fuse of the specified type and rating.