

Power Adapters for Foreign Travel

Introduction

At the start of a bus tour of Italy, a group of elderly American tourists mentioned that they couldn't get one of their electronic devices to work. I told them; "Don't plug anything in! Bring everything down to the hotel lobby and I will sort it out." When I got the lobby, they were madly plugging everything they owned into an adapter and had blown up every electronic device they owned. The article is intended to spare others the same fate.

The problem is that North America uses: 120 Volts, 60 Hertz
 Europe & others use: 220 Volts 50 Hertz

Avoiding the problem completely.

The best solution is to travel only with devices that are universal with respect to voltage and frequency. This is best determined by looking at the label on each device. A universal device, will say something like:

Input: 100 – 240 Volts, 50 – 60 Hz

The allowable input voltage for these devices includes the voltages used in all countries of the world. (In practice, we design for a slightly wider range of voltage and frequency than that listed above.) Fortunately, most newer devices are designed for universal power.

In the case of a universal device, you need only a "Plug adapter." These adapters come either as a set of individual adapters or a cube from which you can extend the adapter needed.



Plug Adapters

Note that:

These plug adapters, except UK adapters, come with and without the third ground pin. Some adapters accept only North American and European plugs, while others are universal. You should inquire as to which adapters are needed for the countries you will be visiting.

Voltage adapters sold in stores

Voltage adapter come in two very different types, although they may look the same. Although I do not recommend them, you can even buy voltage adapters that contain both types and the user must be knowledgeable enough to select the type to be used. The problem is in knowing which type of adapter to use for each device.

For the material below think:

Transformers are heavy in weight for their size and may be cube shaped.

Electronic devices are lighter in weight for their size and may be rectangular in shape.

Electronic voltage adapters

These voltage adapters are usually light in weight and may have openings for cooling. Internally, they resemble an electronic light dimmer, with a fixed setting. The label usually reads:

For heating devices only Up to 1500 Watts

Heating devices include immersion heaters, incandescent light bulbs, dumb coffee pots, and things without electronics or internal transformers. Simply put, these adapters are useful for most of what we don't travel with and would not be allowed on cruise ships.

The output of these adapters may be 120 Volts RMS, but it is not a sine wave and usually has a direct current (DC) component. **If you plug a transformer-based device into this adapter, the transformer will burn out extremely quickly.** (This is what happened to my fellow travelers in Italy, because they asked some “kid” in a store what they needed.)

Transformer-based voltage adapters

These voltage devices are usually heavier in weight and adapters of the same size as the electronic adapters may be useful up to only 50 VA (Watts). Larger transformer are available, but are probably too heavy to put in your luggage.

The output of these adapters is a true 120 Volt sine wave, but still at 50 Hz. They will work with transformer-based devices. However, if your device exceeds the power rating of the adapter, the adapter will burn out quickly. Using 50 Hz on a North American, transformer-based device will make its transformer a little warmer than usual, but probably do no harm.

Remember: Heavy adapter for heavy device with a transformer
 Light adapter for essentially nothing useful