

Understanding International Electricity

by Travel Smart™

In North America operates on 110/125 volt Alternating Current (AC). However, the majority of the rest of the world operates on 220/250V AC, which is twice the voltage used in North America. This means that when appliances made for use in North America (110/125V) are plugged into a foreign 220/250 volt outlet, the motor goes twice as fast than it was designed to, which will damage or destroy the appliance. In order to use a North American appliance abroad, it is necessary to convert (or step-down) the 220/250 volts with either a converter or transformer.

First, determine if your appliance is **single volt or dual volt**. The rating plate on your appliance will help you determine the voltage and wattage of your appliance. **Single volt (i.e. 110/120V) appliances operate only on 110/120 volts** and require the use of a converter or a transformer when used abroad. **Dual voltage/worldwide voltage appliances (i.e. 100/240V, 110/220V or 120/250V) are capable of being used on 110/120V and 220/250V** and do not require a converter or transformer—all you may need is the proper adapter plug(s). If you are unsure about your appliance, always check with the appliance manufacturer.

There are two types of products for voltage conversion. The conversion device travelers need on their international trip depends on the type and wattage of the appliance being taken overseas to a 220/250 volt country. There are **two distinct types of appliances: Electric and Electronic**.

CONVERTERS

Converters are for single volt Electric products with simple heating devices and/or universal motor products such as garment steamers, irons, curling irons, etc. These products are generally used for short periods of time.

Step-down converters convert 220/250V foreign electricity down to 110/125V domestic electricity by cutting the number of volts flowing into the appliance in half.

The wattage of the appliance being used determines which converter should be used. Check your appliance's rating label for the wattage. If the wattage is not indicated simply multiply the Voltage by the Amperage to determine the wattage: Volts x Amps = Watts (i.e.: 120V x 6A = 720 Watts).

NOTE: Converters are to be used only for short periods of time on the high setting. ALWAYS be sure to check the wattage of your appliances before using any voltage converter or transformer. Step-Down Converters allow North and South American appliances rated 110/125 volts to be used in 220/250 volt countries. Step-down Converters are designed to accommodate appliances with different wattage. **Appliances rated between 0 - 25 watts require a LOW WATTAGE converter and appliances rated over 25 Watts require a HIGH WATTAGE converter.**

Examples of Low Wattage electric appliances (0-25 watts): Most Curling Irons, CD Players, Calculators, Electric Shavers, Radios and Contact Lens Disinfects. Examples of High Wattage Electric appliances (26-2000 watts): Hair Dryers, Irons, Steamers and Heating Pads.

CAUTION: Do Not Use any converter with electronically controlled items using Digital Timing or which have Auto Start or Auto Shut-Off. Do not use a converter with any electronic appliance over 25 watts, any single volt curling iron over 25 watts or hair dryer with an ALCI-ground fault interrupter switch (reset button) on its plug. The ALCI-ground fault interrupter switches found on most hair dryers may contain electronically controlled parts. We would recommend using a dual voltage hair dryer when traveling abroad.

CAUTION: BEWARE THE EUROPEAN BATHROOM SHAVER SOCKET.

There are 110/120V wall outlets found in many European bathrooms. These outlets are **ONLY** for use with low wattage appliances, such as electric shavers, oral hygiene devices, etc. **DO NOT** use your hair dryer or other high wattage appliance with this outlet, even with a converter or transformer. Most hotels will advise you with a warning message on the outlet.

Converters/transformers can also step-up the voltage. Step-up converters/transformers are used to convert 110/125V domestic current up to 220/250V foreign current by increasing the number of volts flowing into the appliance.

TRANSFORMERS

Transformers are for single volt appliances with Electronic circuitry (computer chips or integrated circuits) such as computers, fax machines, answering machines, TV's, power tools, etc. Like converters, transformers can either step-down the voltage or step-up the voltage. These types of appliances and power tools require extra performance and allow for longer, continuous operation. Like converters, the wattage of the appliance being used determines which transformer to use.

NOTE: Transformers are for use with electronic circuitry products i.e., computers, fax machines, typewriters, TV's, stereos, VCRs, power tools, etc. Do not use a converter with these products.

It has never been easier to take your computer or fax machine with you. Since computers and fax machines have electronic circuitry, you should use a transformer with them **ONLY** when traveling internationally. Again, check the rating plate for the wattage of the electronic product and select a transformer with a wattage capacity that is higher than the wattage rating of the computer, fax, etc.

CAUTION: Always check the wattage of the appliance being used. Just like converters, the wattage of the appliance determines which transformer is required. We strongly recommend using a transformer that is rated at least 10% higher than the wattage of the appliance for additional safety. For example, if the appliance is rated 250 watts, we suggest using a 300-Watt Transformer.

Always make sure you consult the manufacturer's instruction booklet for additional information and limitations.

BATTERY CHARGERS

Many battery chargers are dual/worldwide voltage (rated 100-250V). Before using a battery charger in a 220/250V country, it is important to **determine its voltage and wattage**. Please check your charger's rating plate where it reads INPUT AC.

If your charger reads 100-240V or similar, it has the dual voltage feature and a converter/transformer is not needed. Since the charger is capable of operating in all voltage systems, all that is needed is the proper adapter plug(s) to accommodate the outlet.

If the charger reads 120V AC or similar, you need to determine the wattage. You can use any low wattage or dual wattage converter (on the low setting) with a battery charger **only if the charger is under 25 watts**. If the charger is over 25 watts, a step-down transformer must be used. You may also need an adapter plug in addition to the converter/transformer.

Please see the Adapter Plug section for more information on adapter plugs.

WHAT DO I NEED FOR MY MODEM?

When using any kind of modem overseas there are four issues to consider: The physical connection between the modem and the telephone line, the potential existence of a digital telephone system, line noise that could interfere with the modem's signals and a dial tone that may not be recognized by the modem.

The physical connection between the modem and the telephone line is the easiest problem to solve. While the most common telephone jack is the North American RJ11, there are 40 other kinds of outlets, so you may need to purchase a telephone adapter plug.

Digital Telephone Systems - modems communicate using analog or sound signals while some telephone systems use digital signal processing. Sometimes there is a special data port on the telephone, be sure to check you are plugging into an analog port. Plugging into a digital system can damage your modem. Check with the computer manufacturer to see what you will need to plug into a digital system.

Line noise is a problem that can occur in less modernized countries. In most cases, you are at the mercy of the telephone exchange but there are a few tricks that might help reduce the interference. First, try connecting at lower modem speeds. If you usually work at 14,400 bds., try reducing to 9600 bds. or even 2400 bds. Or, you can try working very late at night when there are fewer people using the network.

If the dial tone in the country you are visiting is not recognized by your modem, you will probably need to adjust the communication program that your modem uses. Consult your modem manual for these instructions.

GOING AROUND WITH CYCLES

110/125-volt electricity is generated at 60 Hz (Cycles) Alternating Current. Foreign 220/250 volt electricity is generated at 50 Hz (cycles) Alternating Current. The difference in cycles may cause the motor in a 60 Hz US appliance to operate slower when used on 50 Hz foreign electricity. It will cause clocks and timing circuits using Alternating Current as a timing base to keep incorrect time.

NOTE: Most modern electronic equipment including battery chargers, computers, printers, VCR's, etc. will not be affected by the difference in cycles as these products internally adjust for cycle differences.

Transformers and converters will operate most products, which run either on 50 or 60 Hz, however, transformers and converters do not convert cycles. Products which are solely dependent on 60 Hz for speed control (clocks, turntables, etc.) will run slower operating at 50 Hz. Please check with the appliance manufacturer for proper use.