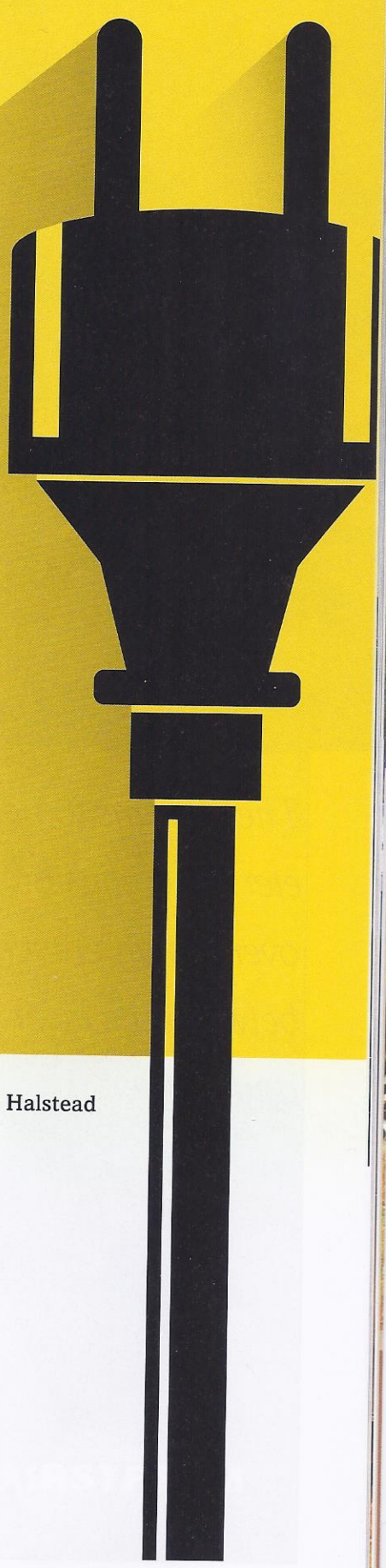
TRUE CONFESSIONS: WHY YOUR AIRSTREAM IS AC/DC



By Terry Halstead

Owners of later model Airstream trailers and motor homes may have heard some confusing terms regarding the electrical systems of their RVs. This can lead to utter bafflement when you try to do (what should be) simple things, such as adding more battery capacity, using the factory-installed inverter, considering a solar upgrade, or diagnosing a problem.

Your Airstream has two electrical systems, one for 120 volt AC power (just like the power in your house) and one for 12 volt DC power (from the battery).

The 120 volt AC system in your Airstream is functional when the trailer or motorhome is plugged in. It powers the air conditioner, microwave, television, standard electrical outlets, and the refrigerator (when running in electric mode). It also goes to the power converter, which turns some of that 120 volt AC power into 12 volt DC power. This is used to charge the battery.

The 12 volt DC system is driven by the batteries, and it is responsible for powering everything else in the Airstream, including lights, water pump, furnace, "cigarette lighter" 12 volt outlets and USB outlets, fans, refrigerator (when running in gas mode), propane leak detector, stereo/DVD player, breakaway switch, etc.

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Most power consuming appliances in the Airstream run on 12 volt power so that they can run off the battery and therefore be used anytime. That's convenient for roadside stops and overnights without hookups. Since the 12 volt battery is kept topped up by the 120 volt power converter, it will never run out of power as long as the trailer is plugged in. Only when the trailer is unplugged will appliances be working solely on battery power, and with a little conservation, battery power can last for days.

There seems to be eternal confusion over the difference between the inverter and converter. Both of these deal with both 12 volt and 120 volt systems, but in completely opposite manners. As noted earlier, the CONverter uses 120 volts AC, and converts it into 12 volts DC. Every modern Airstream has one of these.

The INverter does the reverse: it turns 12 volts DC into 120 volts AC. That allows you to run AC-powered appliances (like laptop computers) off the Airstream batteries for a while, using special outlets that are connected to the inverter. If your Airstream has a factory-installed inverter, you'll probably see a few outlets with "Inverter" labels on them.

Most converters in modern Airstream trailers are located within a more-or-less common housing, co-existing with the 12 volt fuses and 120 volt circuit breakers, in one compact package. These converters are simple, reliable, and rugged, and acceptable for most uses in RVs. The downside of these workhorses is that they are, well, simple. Their fixed voltage output can shorten the long-term lifespan of the batteries they are responsible for maintaining.

If a trailer or motorhome is constantly plugged in to shore power with this type of converter, the converter keeps pumping out charging voltage even though the batteries are fully charged. This can lead to the water in the batteries evaporating. The manufacturer suggests regularly checking the level in the

Parallax power converters like the one above have been standard equipment in most Airstreams for years. This device combines a power converter, battery charger, AC breaker panel, and DC fuse panel in a single unit.

batteries and topping it up with distilled water at least once a week in hot weather. Since most people don't do that, the batteries tend to fail prematurely.

Leaving the trailer unplugged is not a solution. Eventually the batteries will go flat and that will lead to "sulfation" of the internal battery plates, which can irreparably damage them. In other words, let the batteries go dead too many times and they will never hold a charge again.

A simple workaround is to set the Use/Store switch to "Store" most of the time, which removes the batteries from the charging circuit and helps prevent them from being overcharged. A possible routine would be to visit the trailer or motor home, flip the switch to "Use" to allow charging, then back to "Store" a day

or two later. Trailer owners have an easier time of this, generally only having to visit their trailers monthly to do this. Motorhome owners, because of how their systems are more interconnected, would need to perform more frequent visits to maintain battery charge.

Another option would be to find a heavy duty 24 hour timer and set it to turn on power to the RV once a day for an hour or so. But for long term storage, such as over the winter, the best solution is to disconnect the batteries and remove them. You can put the batteries in a your garage attached to a dedicated battery maintainer (such as Battery Tenders or CTEK brands). Note that a battery maintainer is somewhat different from a simple charger, so look for one that is specifically designed to keep batteries topped up during storage.

This approach has the added advantage of keeping the batteries close to home, where you can check on their water level regularly, and it's ideal if you store the Airstream in a location that lacks a power outlet. Of course, without batteries the Airstream will be utterly without power. The power converter/charger is designed with the expectation that a battery is in the electrical circuit, so you should not plug in the Airstream until the batteries are reinstalled. Reinstallation is easily done when springtime comes, as part of your de-winterizing procedure.

A more involved option, which is outside the scope of the Tech Tips series, is to replace the single stage converter with a more sophisticated multi-stage converter. For those of us who are electrically inept, but still want the benefits of a multi-stage converter installation, an appointment with your local RV shop or Airstream dealership should put you and your batteries on the path to electrical enlightenment.

In our next discussion we'll explain power transfer switches, Ground Fault Circuit Interrupters and basic electrical maintenance, and demystify other aspects of your Airstream's electrical system.