

# 12V Block Diagram & Diagnostics

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This guide is intended to assist Heartland Owners in understanding the operation of the 12V power distribution system and to troubleshoot when multiple failures occur at the same time.

## **Important Notices**

### **Who created this document?**

This document has been created by Heartland Owners independently of the Heartland RV Company, and is posted to the Heartland Owners Forum as a service to the owner community.

### **Errors and Omissions**

Because the authors are Heartland owners, not engineers or service technicians, it's possible that this document could contain errors or omissions. Readers are advised to also review the manufacturers' product documentation for more complete information and guidance.

### **Limitations on Using this Document**

This document may not be sold. It may not be posted on the internet (other than on the Heartland Owners Forum website) without permission. Other websites may link to the page from which the document may be downloaded, but may not link directly to the document without permission.

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## How to use this guide

This guide is intended to assist Heartland Owners in understanding the 12V systems in their RVs, and to help diagnose 12V failures where **multiple** devices stop working at the same time.

Please note that the goal of this document is to help in the majority of circumstances where **multiple** 12V devices are failing at the same time. It is not comprehensive in that there may be less common causes of failure that are not included. Also note that diagnosis of failures affecting a **single** 12V device are outside the scope of this document.

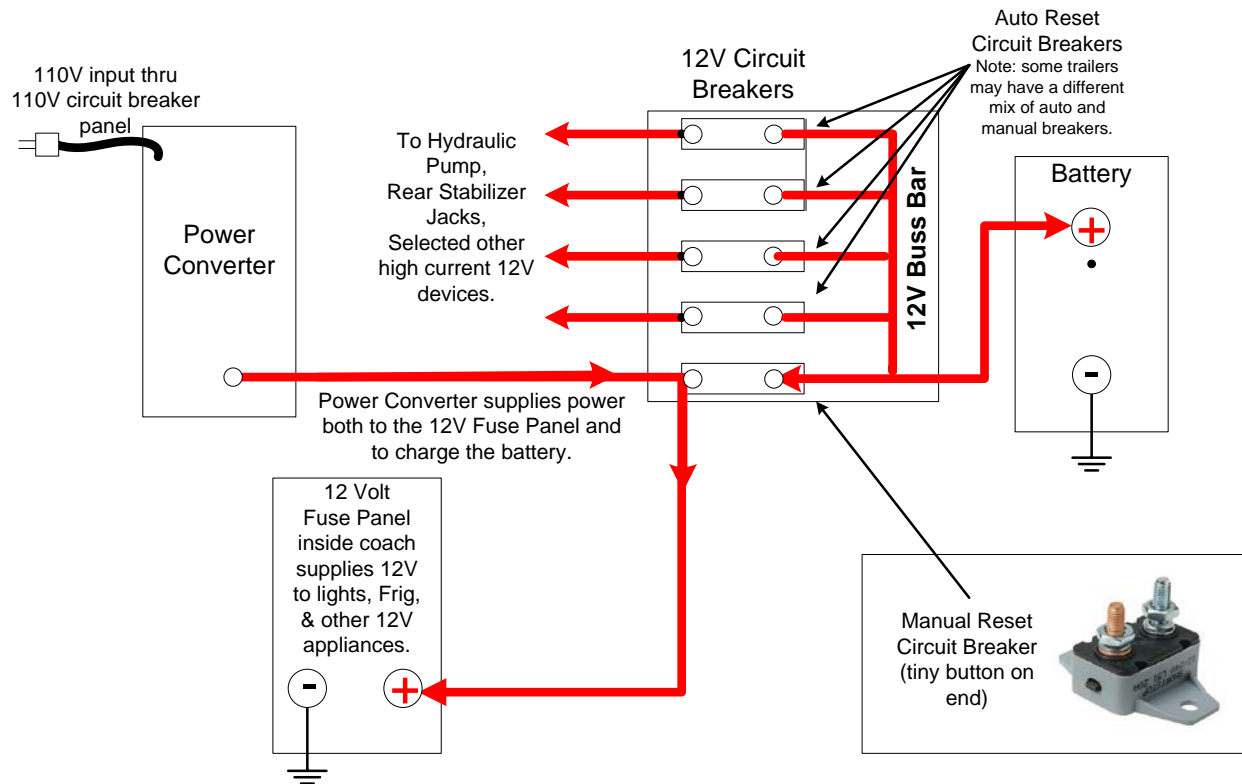
To use the guide, first review the Block Diagram and notes page. Then step through the Diagnostic Pages to isolate the problem.

On the Diagnostic Pages, there are several shapes used. Diamonds indicate a question. Rectangles indicate an action you need to take. Ovals represent a diagnosis or corrective repair action. There are also shaded rectangles that provide background information.

It is assumed that you have a volt meter capable of reading AC and DC voltage levels. If you don't have a volt meter, follow the flow charts as much as possible. Certain problems can be identified without a meter. For other problems, you will need a meter.

**CAUTION: Electricity is dangerous. Many of us are comfortable with checking 110V AC and 12V DC circuits and are confident we can do so without damaging the circuits or causing injury to ourselves. If you're are not comfortable around electrical circuits, you should consider letting a trained technician diagnose and correct the problem.**

## Block Diagram of 12V System Components



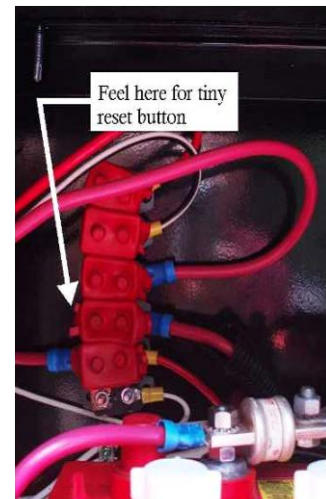
When plugged into shore power, 110V is supplied to the main AC circuit breaker panel inside the RV. One of those circuit breakers supplies power to an outlet, usually found behind the basement wall, into which the Power Converter is plugged.

The Power Converter converts 110V AC into 12V DC power to both charge the battery, and to supply power directly to the 12V main Fuse Panel inside the RV.

In order to charge the battery, the output of the Power converter goes through one of the 12V automotive style circuit breakers located on a buss bar near the battery.

The other 12V Circuit Breakers supply power to high current devices like the Hydraulic Pump, Rear Stabilizer Jacks, Power Cord Reel, and electric slide-outs.

Intermittent tripping of the auto-reset circuit breakers, especially the one for the Hydraulic Pump, may indicate a weak breaker that needs to be replaced.



12V Circuit Breakers near the battery.

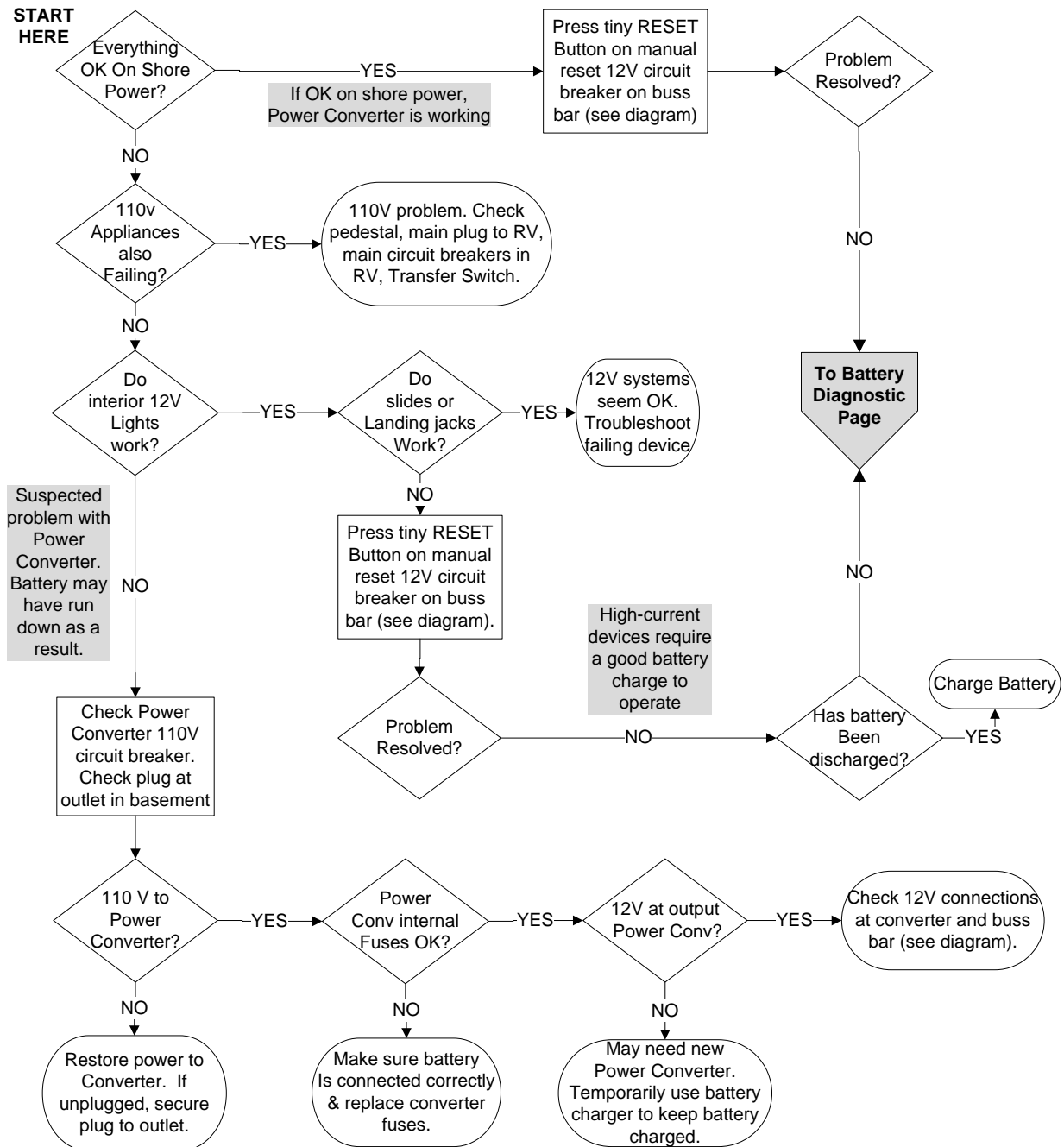
## **Failure of 12V Lights and other 12V Systems when Shore Power is Disconnected**

If the 12V lights and other 12V systems lose battery power after disconnecting from shore power, it's often because the Manual Reset Circuit Breaker on the buss bar near the battery has tripped. If this circuit breaker trips, the battery no longer gets any charge from the power converter and will run down, causing failure of 12V systems. When plugged into shore power, the battery charging problem is masked because 12V power is also supplied by the Power Converter.

## Troubleshooting Flow Chart – Start Page

For use when multiple 12V appliances and devices are failing.

**BATTERY CUTOFF MUST BE ON, SHORE POWER CONNECTED.**



## Troubleshooting Flowchart – Battery Diagnosis

**BATTERY CUTOFF MUST BE ON, SHORE POWER CONNECTED.**

