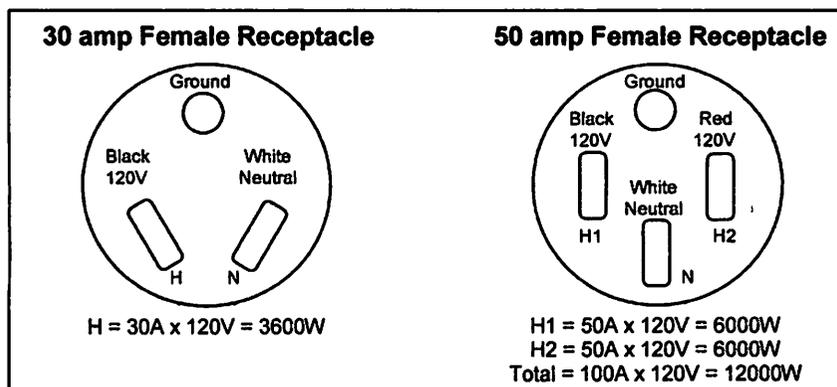


UNDERSTANDING, MONITORING, AND PROTECTING THE RV ELECTRICAL SYSTEM



PROBLEMS

- **Power Surges – Least Common Problem for RV's**
 - Electrical storms; Failed power company equipment; Man-made interference
 - 600 Volts or more – Instantaneous Spike, **NOT** Continuous
 - Can destroy ALL electronics
- **Lower than Normal Voltage – Most Common Problem for RV's**
 - Continuous Voltage at or under 104 Volts
 - Higher amperage, more heat and slower running equipment
 - Can burn out Electric motors, AC's, TV's, Refrigerator, Furnace, Water Heater
- **Higher than Normal Voltage – Not a Power Surge**
 - Continuous Voltage at or over 132 Volts
 - Burn out or cause premature failure of lights, refrigerator heating element, sensitive electronics
 - Not as common in US, More common in Mexico, Canada, Rallies
- **Open or Lost Neutral - Not a Power Surge**
 - Loss of Neutral Line or improperly wired Power Pedestal
 - Continuous Voltage at 240 Volts – Most common after Load is applied
 - Can destroy ALL electronics
- **Reverse Polarity**
 - Hot & Neutral lines are wired in reverse
 - Can damage equipment, motors, etc. designed to operate on proper polarity
- **Open or No Ground**
 - Ground wire not connected or improperly connected
 - Can cause serious injury including electrocution

SOLUTIONS

- **Meters** – Not protection, only information. What is happening now
- **Surge Protectors** – Protect from Surge only - Know what a Surge is
- **Boosters / Transformers / Autoformers** - Not Protection, Boosts low voltage & Surge only
- **Voltage Protectors** – High & Low Voltage, Open Neutral, Open Ground, Reverse Polarity, Surge
- **Additional Power Sources** – Generator, Inverter, Propane

BEFORE YOU TRIP A BREAKER

- | | | | |
|--------------------------------|------------|----------------------|------------|
| ▪ Air Conditioner (x no. used) | 12-16 amps | Television | 1-4 amps |
| ▪ Refrigerator | 5-8 amps | Electric Frying Pan | 6-12 amps |
| ▪ Electric Water Heater | 9-13 amps | Iron | 5-10 amps |
| ▪ Microwave Oven | 8-13 amps | Computer | 2-3 amps |
| ▪ Electric Coffee Pot | 5-8 amps | Washer/Dryer | 14-16 amps |
| ▪ Toaster | 7-10 amps | Space Heater | 8-13 amps |
| ▪ Hair Dryer | 5-12 amps | Light Bulb (60 watt) | < 1 amp |

TRUE STORY – A POSSIBLE OPEN GROUND

Your RV can kill you. Not just in a traffic accident, but by merely stepping into it.

July 24, 2011

MUNCIE, Ind. (AP)

A Muncie teen died early last Sunday after being electrocuted by his family's RV. David L. Boyle III, 18, was pronounced dead at IU Health Ball Memorial Hospital shortly after he was shocked, according to Delaware County Coroner Scott Hahn.

Hahn said a camper behind the residence became energized after an electrical wire was run from the house to the camper. "When they would go (into the camper), they would feel a little jolt, so they wrapped the door knob in electrical tape so when they turned it, they wouldn't get shocked," Hahn said.

Boyle, who Hahn said was barefoot, was electrocuted as he stepped from the wet ground onto the camper's metal step. "It caused an arrhythmia in (Boyle's) heart," Hahn said.

Shock from an Open Ground

Anytime you feel a shock or even a tingle while touching the body or doorknob of an RV, it's a warning that the vehicle has a hot-skin condition. The same goes for any sort of power tool or appliance; you should NEVER feel a shock or tingle. If you do feel a tingle it means there's at least 30 volts AC on the chassis and body of the vehicle. And as little as 30 or 40 AC volts through your heart can cause it to go into fibrillation. Without intervention from emergency rescue personnel, you'll almost certainly die from electrocution."

Why this accident happened

It is suspected that they plugged the RV into a non-grounded power outlet or extension cord with a broken-off ground pin. That allowed the body of the RV to drift up to 100 volts or so. That's why they put electrical tape on the doorknob; they were feeling an electrical tingle on the knob earlier that week which wasn't enough to cause electrocution since they were most likely wearing shoes. But they didn't realize that the entire RV body was hot-skin energized, and the boy was standing in bare feet on the wet ground while touching a hot-skin RV which completed the electrical circuit. His heart went into fibrillation, and he died from coronary arrest.

If you ever feel of any kind of electric shock or jolt from your RV you should always unplug from shore power and examine all ground connections. NEVER accept feeling a shock from your RV. It could kill you the next time.