There are 4 receptacle configurations that you will run into in the campgrounds. From the ANSI/NEMA specification WD 6-1997:

*This article was copied from a PUBLIC posting on the **Open Road Forum** by Mel Madsen (MEML) on June 2, 2002. Excellent explanation of a typical Campground Electric Service.* ***Link***

15 Amp - the common duplex receptacle that you have at home and the plugs on the standard extension cords, etc. These are ANSI/NEMA 5-15R and 5-15P and are rated for 125Volts/15Amps. The National Electrical code allows the duplex receptacle to be connected to a 20 Amp breaker even though each receptacle and the plug that goes into it are only rated for 15 Amps; and in your home, several duplex receptacles may be connected to the same breaker (often all the outlets in a room will go to one breaker).

20 Amp - becoming more common in the GFCI protected circuits. The receptacles look much like the 15 Amp ones, except one socket on the receptacle looks like a T laid on its side. These are ANSI/NEMA 5-20R. The 20 Amp plug is an ANSI/NEMA 5-20P and looks much like the common 15 Amp plug, but has one blade rotated 90 degrees. These are rated for 125Volts/20Amps. The 15 Amp and the 20 Amp plugs will plug into the receptacle. Again, these can be connected to a 20 Amp breaker.

30 Amp - obviously designed for RV's. This is the common 30 amp RV connector with one half round pin and two large blades that are angled. The receptacle is an ANSI/NEMA TT-30R, and the plug is an ANSI/NEMA TT-30P. These are rated for 120Volts/30Amps (note that the NEMA rating is not 125 Volts on this configuration - interesting). The TT is for Travel Trailer as it is listed that way in the "Description" column in the NEMA table - I guess that's because there were a lot more travel trailers than motorhomes when this plug was put into use. I have seen these labeled "RV" instead of "TT" in catalogs and on the store shelves. These can be connected to a 30 Amp breaker.

50 Amp - the common four pin configuration used for larger RV's. The receptacles are ANSI/NEMA 14-50R and the plugs are ANSI/NEMA 14-50P. The half round pin is ground, the blade directly across from it is Neutral, and the other two blades each have 120 Volts. If wired per the National Electrical Code, the two 120 Volt feeds are of opposite phases so that you get 240 Volts when you read across them and 120 Volts between each of them and neutral or ground. Each of the two power sockets can be wired to a 50 Amp breaker - for 240Volts, the two breakers are "ganged" (the handles are connected together) or are of a special design with only a single handle. However, some campgrounds may only have 30 or 40 Amp breakers on the power feeds to these

receptacles.

A disclaimer: the National Electrical Code is from the National Fire Protection Association and is not a law. However, almost all community building codes incorporate it into their code. Many amend it in some way. So not every campground - or RV - in the country is wired to the NEC. What follows is based on the NEC, and what I have found in almost every campground I've been in.

New electrical installations will have the 15 or 20 and 30 Amp receptacles with GFCI - either built into the outlet or in the breaker. The 50 Amp receptacle will not have GFCI (but I don't doubt that it's in the future). The requirement for GFCI on outdoor outlets became part of the National Electric Code in the early 70's. So any campgrounds that were built after that time, or had the electrical system upgraded, should have GFCI on the 15 Amp receptacles. The requirement for the 30 Amp outlets to be on GFCI is more recent, but I don't know when it started.

Some comments about items in this thread and some knowledge I've gained from this forum:

If the "cheater" will work, you can bet that the campground wiring is pretty old or not done to the National Electric Code.

From my own experience, and from statements in other threads, you can expect to find outlets incorrectly wired or with a wire not connected sometime in your camping experience. You may also find incorrect receptacles. I've seen receptacles that look a lot like the 30 Amp RV receptacle installed, but one or more of the sockets are not correct and the RV plug won't go in.

From another thread a couple of months ago, it became apparent that many RV's with the 50 Amp plug and cord have a power panel that does not allow for a 240 Volt circuit to be connected - it has two 120 Volt circuits available to the breakers in the panel, but no way to connect a "ganged" breaker or a 240 Volt application. (A forum member had to have an additional panel wired in so he could put in a 240 Volt dryer.) I suspect there are a number of variations on the power panels and main breakers that come in the wide array of RV's that have been manufactured over the years.

If you have a 50 Amp cable on your RV, you should be checking the receptacle before you plug in with a circuit tester or voltmeter. (Or install a power monitor system in your RV that will do it for you.) If the neutral wire is not connected to the receptacle and you plug in, something in your RV will probably "smoke" as, without going into the electrical details, it'll have about 240 Volts applied. Other forum members have been victims; I've seen 3 or 4 50 Amp outlets where the neutral wire had come loose

and was not making contact and I am sure that a previous RV'er left with a problem. It is also wise to throw the breaker in the campground panel before you plug in. That way you can't get the hot pins connected before the neutral is connected, and it don't take long for electricity to do it's damage.

Outlet testing. You can buy an outlet tester that has lights to indicate that the outlet wiring is normal or has problems for less that $5 at a hardware or building supply store. (Or you can buy a voltmeter and learn use it if you don't already know.) You can also buy much more expensive circuit testing devices that do the testing and measure the voltage and/or frequency. But all of them I've seen plug into the standard 15 Amp receptacle. So add a 30 Amp male to 15 Amp female adapter available at RV stores for less than $5 and you can plug the circuit tester into the adapter, and the adapter into the 30 Amp receptacle and check the 30 Amp receptacle. Add the 50 Amp male to 30 Amp female adapter, available at RV stores for $15 to $20, plug the 30 Amp adapter into it, the tester into the 30 Amp adapter and you can test 3 of the 4 wires in the 50 Amp receptacle - ground, neutral and one of the two power leads. Neutral is the critical one for an RV connecting to a 50 Amp receptacle. If the second power lead has no power, some thing(s) in the RV - like one air conditioner - won't work; but if neutral is missing, some thing(s) in the RV will probably need to be repaired or replaced.

GFCI - My simple explanation. The GFCI circuit has electronics in it that measures and compares the currents in the hot and neutral leads. If they are not equal, the circuit trips and removes power. That usually occurs when some power flowing through either the hot or neutral lead finds a path to ground. The tripping action is almost instantaneous and occurs with an extremely small amount of power difference - a few thousandths of an amp.

If I've got anything in this that is not correct, I'm sure some of the other members will point it out and I'll make a correction.

by Mel Madsen

The 30-amp 120-volt 2 pole 3 wire RV service

The **30-amp** **service** for an RV is 120-volt with a 3 prong receptacle and a ***single 30-amp*** dedicated breaker. The 30 AMP is a standard ANSI C73.13, **TT-30P** (plug) / **TT-30R** (receptacle). This designation was made specifically for TRAILERS. Plugs and Receptacles are available at Lowe's, Home Depot, Camping World and Electric Supply houses.

Click on photos to enlarge.

Click on photos to enlarge.

The TT–30 is a 30A, 120-volt recreational vehicle standard sometime it is called simply RV 30. Frequently it is confused for a NEMA 10–30 (see below) with disastrous results. Due to the appearance of the TT-30 plug, many people assume that it is to be wired for 240-volt, but this is a 120-volt device.

This service is very simple to wire just follow the color coding for the connections if marked and use the correct size wire.

The BLACK wire or HOT it is connected to the breaker and to the BRASS colored screw if marked. Some receptacles do not have different color screws in that case attach the black wire at 5 o'clock or right hand side when looking at the BACK of the receptacle (or the 7 o'clock frontal position) the WHITE wire or neutral is connected to the silver screw or opposite side of the

black wire and to the neutral bar in the panel. The BARE or GREEN wire is connected to the "G" screw or the U shaped prong and to the ground bar in the panel. **ALWAYS test for for polarity with a tester before plugging in the RV.**

The above 30-amp 120-volt service will supply 3,600 watts.

It is imperative that the Electric Service used for RV's are wired correctly. DO NOT TRUST anyone, yourself, friends, relatives or ANY Professional Electrician. ALWAYS check out all RV Electric Service BEFORE plugging in the first time. The majority of the mistakes and the most damage to the RV's are made with the incorrect installation of the 120-volt 30 amp Service. For some reason people including Electricians just DON'T GET IT when it comes to the 30-amp 120-volt Service. All you need to do is look at the online Forums where RV's were damaged by incorrect installations.

Many times the 30-amp 120-volt Service is confused with the OLD 3 wire 120/240-volt Appliance Service. Even if you purchase the correct TT-30 receptacle it may get wired incorrectly with 2 HOT lines. It is harder to make mistakes with the 50-amp 120/240-volt installation but people do screw things up. As long as all the wires are connected to the correct terminals and everything checks out it will work.

For information on how to test RV Electric Outlets Look at the ***"OUTLET TESTING"*** page.

For *BASIC HOW to WIRE* a 30-amp Service Click on and Print out the following page and hand it to the person installing it.

30-amp 120-volt RV Service

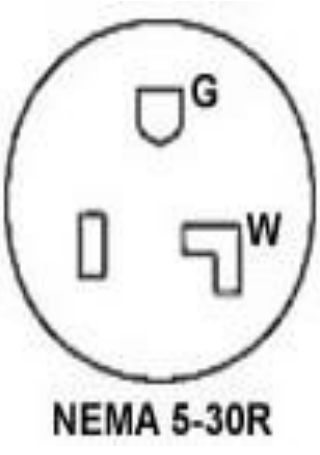
Wire SIZE and voltage Drop calculators (The table is NOT a NEC code just recommendations)

For a 20-amp circuit, use 12-gauge wire. For a 15-amp circuit, you can use 14-gauge wire (in most locales). For a long run, though, you should use the next larger size wire. Here's a quick table for normal situations. Go up a size for more than 100-foot runs, when the cable is in conduit, or ganged with other wires in a place where they can't dissipate heat easily:

For 120 V	*15 amp*	*20 amp*	*30 amp*	*50 amp*	*100 amp*
25 feet	**#14**	**#12**	**#10**	**#8**	**#6**
50 feet	**#12**	**#10**	**#8**	**#6**	**#4**
100 feet	**#10**	**#8**	**#6**	**#4**	**#1**

Wire Size Calculator Voltage Drop Calculator

The following 30-amp Services are also used. Do not confuse any of these with the RV TT-30 Service

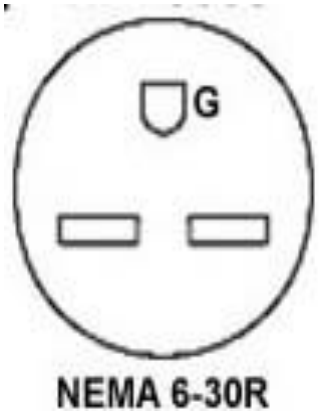


NEMA 5-30R, 2-pole, 3-wire, grounding, rated 30A 120V.

The 5–30 is ***uncommon*** but it is available, twist-locking plugs and receptacles are generally used instead for high-current applications.

This service is wired

	the same as the TT-30 RV service. If you run across this all you need to do is replace the 5-30R with a TT-30R.

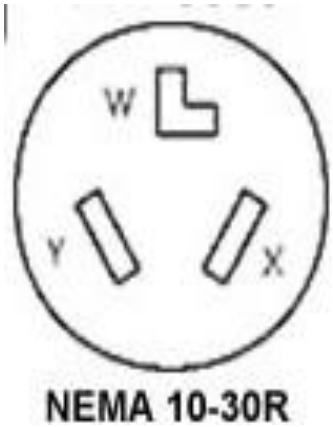


NEMA 6-30R

NEMA 6-30R, 2-pole, 3-wire, grounding, 30A 240V. ***No Neutral.***

Typical uses: welders, large air conditioners (30,000 BTU), kilns, shop machinery, and commercial equipment up to 2HP.

NOT for RV. For more information check out "WELDER Service" on the left.



NEMA 10-30R

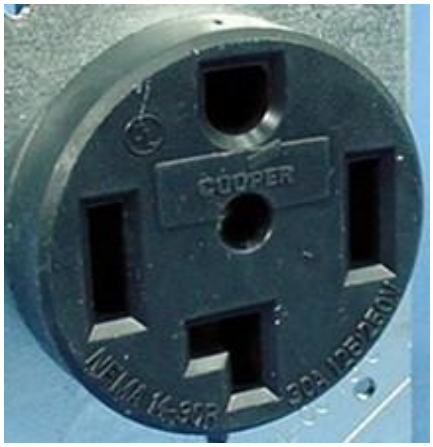
NEMA 10-30R, 3-pole, 3-wire, non-grounding, rated 30A 120/240V ***No Ground***

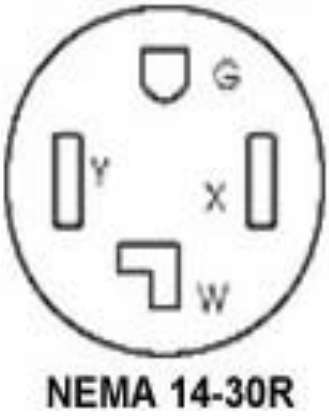
Typically used for older dryers that do not have a ground leg and that require dual voltage: 240V for the heating element and

120V for the controls and drum motor. Frequently confused with the TT-30 service with damaging consequences.

NOT for RV. For more information check out "APPLIANCE Service" on the left.

NEMA 14-30R, 3-pole, 4-wire, grounding, rated 30A 120/240V.





NEMA 14-30R

Typically used for newer dryers that have a grounded plug and that require dual voltage: 240V for the heating element and 120V for the drum motor and controls. If you have an older dryer with a non-grounding plug (that is, a 3-blade plug)

This service can be

used for your RV as long as you make an adapter. It is 30-amp on each leg or 60-amp total at 120-volt.

The 50-amp 120/240-volt 3 pole 4 wire grounding Service

This **50-amp service** has 4 wires with two 120-volt HOT feeds. *It is a misconception that this 50-amp RV service is something special. This service is a STANDARD 120/240 50-amp 3 pole with 4 prongs used for numerous applications.*

From this common service we can draw 120 or 240 volts. Each leg is 50 amps @ 120 volts. 50-amp X 120-volt = 6000 watts. But since there are 2 HOT 120-volt legs at 6000 + 6000 = 12,000 watts to use in the RV or 50-amp X 240-volt = 12,000 watts when used as a 240-volt service.

Almost ALL 50-amp wired RV's use both sides of the service separately as 120 volt on each leg. Only a few mostly high-end coaches utilize the 240-volt from this **same** service.

The 50-amp 3-pole 4-wire service is superior to the 30-amp service because of the total amperage available.

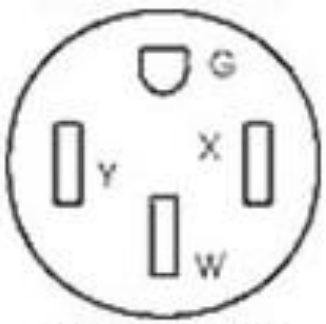
30-amp 120-volt service = 3,600 watts
50-amp 120/240-volt service = 12,000 watts

The half round or U is the ground the one directly below it is the WHITE or neutral and the other two black wires are 180 degrees out of phase with each other are the HOT 120-volt. In reality you have TWO 120 volt split service going into your RV.

Click on photo to enlarge.

Click on photo to enlarge.

50-amp Double Pole Breaker



NEMA 14-50R

X & Y are interchangeable , red and black wires are hot (live) wires , one wire on the X, and the other on the Y. The neutral (white) and the bare ground wire MUST be on there designated connection. I purchased this box at the Home Depot. It is made by Midwest with a DUCK emblem on it.

Shut off the MAIN breaker in the panel. Pull the wires connect all the wires to the outside receptacle or panel first. Insert a double pole 50-amp breaker into your MAIN or sub service box. Connect the red wire to the Y configuration and to one of the screws on the breaker. Connect the black wire to the X and to the other screw on the breaker. The X and Y connections are interchangeable. Connect a white wire to W and to the neutral bar in the service. Connect the ground wire to the G and to the grounding bar in the service.

It is imperative that the Electric Service used for RV's are wired correctly. DO NOT TRUST anyone, yourself, friends, relatives or ANY Professional Electrician. ALWAYS check out all RV Electric Service BEFORE plugging in the first time.

For information on how to test RV Electric Outlets Look at the ***"OUTLET TESTING"*** page.

For *BASIC HOW to WIRE* a 50-amp Service Click on and Print out the following page and hand it to the person installing it.

50-amp 120/240-volt RV Service

Wire SIZE and voltage Drop calculators (The table is NOT a NEC code just recommendations)

For a 20-amp circuit, use 12-gauge wire. For a 15-amp circuit, you can use 14-gauge wire (in most locales). For a long run, though, you should use the next larger size wire. Here's a quick table for normal situations. Go up a size for more than 100-foot runs, when the cable is in conduit, or ganged with other wires in a place where they can't dissipate heat easily:

For 120 V	*15 amp*	*20 amp*	*30 amp*	*50 amp*	*100 amp*
25 feet	**#14**	**#12**	**#10**	**#8**	**#6**
50 feet	**#12**	**#10**	**#8**	**#6**	**#4**
100 feet	**#10**	**#8**	**#6**	**#4**	**#1**

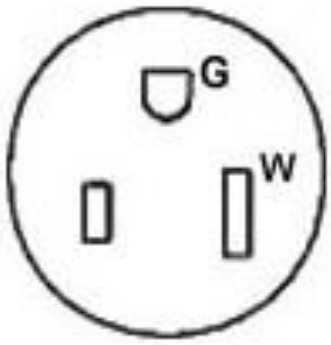
Wire Size Calculator

Electrician Calculators

Most calculations are available here

Voltage Drop Calculator

Other 50-amp Electric Services, used for many applications.



NEMA 5-50R

NEMA 5-50R, 2-pole, 3-wire, grounding, rated 50A 120V.

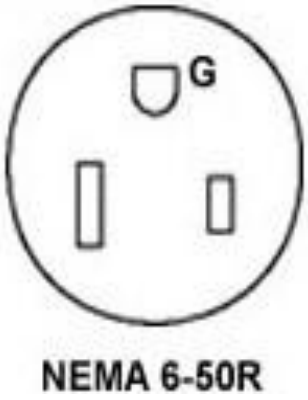
The 5–50 120-volt service is ***uncommon,*** twist-locking plugs and receptacles are generally used for this type of high-current applications.

This is a 120-volt service not a 120/240-volt service we normally associate with 50-amp.

This service is wired the same as the TT-30

120V except for the larger 50-amp Single Pole breaker.

NEMA 6-50R, 2-pole, 3-wire, grounding, rated 50A 240V ***No Neutral***

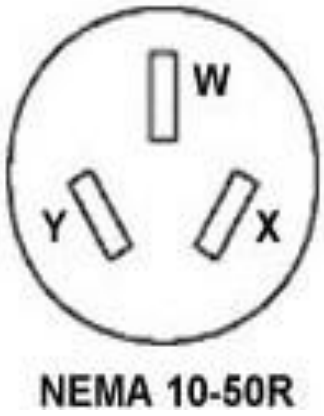


NEMA 6-50R

For welders, large air conditioners, kilns, commercial kitchen equipment and shop machinery.

NOT for RV. For more information check out "WELDER Service" on the left.

NEMA 10-50R, 3-pole, 3-wire, non-grounding, 50A 120/240V ***No Ground***



NEMA 10-50R

For older ranges that are non-grounded and that require dual voltage: 240V for the heating elements and 120V for lighting/clock/controls.

NOT for RV. For

more information check out "APPLIANCE Service" on the left.

Do not trust any installation done by anyone including yourself or a professional.

Everyone should have the following testers as a minimum for checking the Service. They can be purchased from Lowe's, Home Depot, Camping World or elsewhere for a reasonable price. If you do not know how to use them ASK and learn. Forums and campground neighbors are a great source for getting information.

Voltmeter/Multi-Tester

or a cheap Multi-Tester

3-Wire Circuit Analyzer

Plug in voltmeter

The readings on RV friendly receptacles.

For the 50-amp 120/240-volt 3 pole 4 wire grounding service		For the 30-amp 120-volt 2 pole 3 wire RV service	
 **14-50R**	The voltage between Y and X should be 240-Volt, X and W 120-Volt, Y and W 120-Volt, X and G 120-volt, Y and G 120-volt, W and G 0-Volt	 **TT-30R**	The voltage between the Hot lead at 7 o'clock and W 120-volt, Hot lead and G 120-volt, W and G 0-volt

Protecting the RV from spikes, low voltage and bad wiring

The best way to protect the RV is to install a Surge Protector. They are available as

a hardwired or a portable unit. Low voltage protection is available with an Autoformer. The merits or shortcomings of these products are discussed on RV Forums. They are available from Camping World or other Dealers.

Surge Protector **Surge Guard** **Autoformer**

Testing Campground and other RV Electric Service.

Lot has been said on various Forums about testing Campground outlets before plugging in. Even RV's equipped with Surge Guards could benefit from performing a simple test to determine the condition of the Electric Service. RV's without Surge Guard protection will get hit with a bad outlet sooner or later so testing should be a first chore performed when hooking up to a new Electric outlet.

Some Campgrounds advertise 50-amp Electric Service but in reality they misrepresent what they offer. ***A TRUE 50-amp Service is 120/240 Volt*.** In this Service the HOT leads (X & Y) come from L1 and L2 so when you check it the voltage between **X and Y should be 240-Volt, X and W 120-Volt, Y and W 120-Volt, X and G 120-volt, Y and G 120-volt, W and G 0-Volt.** This service provides 12,000 watts.

On a FAKE 50-amp they use L1 or L2 for BOTH side (X & Y) of the HOT leads therefore the voltage between **X and Y will be 0-Volt, X and W 120-Volt, Y and W 120-Volt, X and G 120-volt, Y and G 120-volt, W and G 0-Volt**. This service will give you 6,000 watts it is better than 30-amp with 3,600 watts but it is ***NOT a TRUE or CORRECTLY WIRED 50-amp service.***

Look at these YouTube Videos for more information on Multimeters.

Multimeter Basics 50-amp **Multimeters** **How to use a Multimeter**

Make sure you check for this misrepresentation BEFORE you start to run too many appliances in your RV or if you encounter problems.

Before I plug my RV into any electric service for the first time, I check both legs of the 50-amp outlet also the 30-amp outlet for voltage and correct wiring. This WILL NOT protect my RV from spikes or other mishaps after I plug in, that's the job of the Surge Guard.

30-amp outlet tester ***50-amp outlet tester***

To get a better reading on Campground outlets it is recommended that an additional test be performed

Under Load

Open Neutral

The following was copied with the authors (Daryl Daughters) permission from the Newmarowners Yahoo Group Read why it is so important to check the Campground service before you plug in. Even with checking for Voltage, correct circuit wiring and having a Surge

Protector things can go wrong.

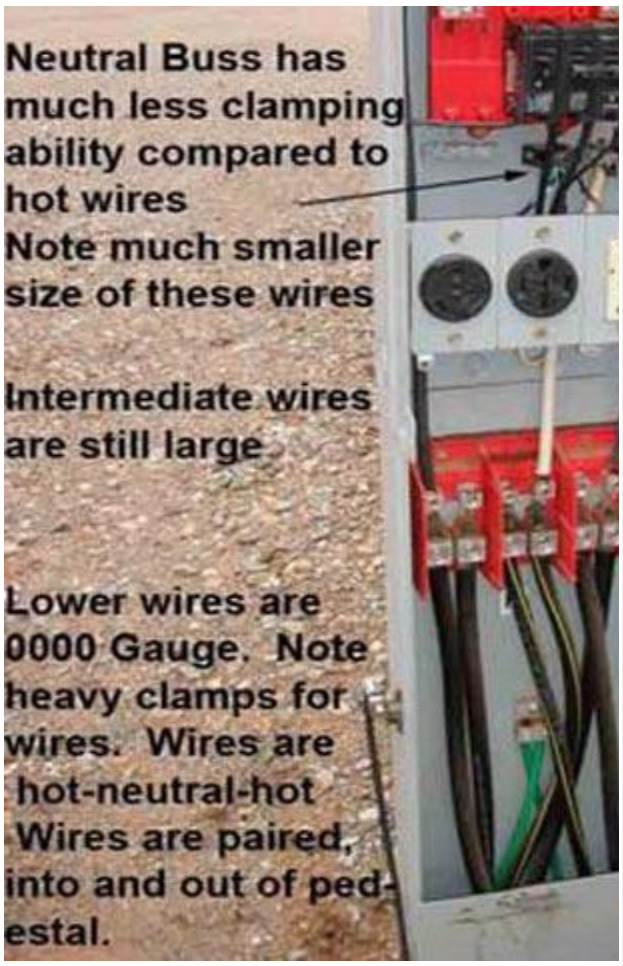
We've had discussions in the past about the dangers of an open neutral when using 50-amp power. When the neutral line opens, there is no zero-volt reference for the two hot 50-amp lines, and it's possible to have 240 volts applied to half the stuff in your RV. The campground owner where we are staying knows that I'm "into" electricity, and she came to me for help after another camper had an electrical fire. He had smoke coming out of his converter (makes 12 VDC from 120 VDC) and his microwave. He had disconnected power and the campground owner had shut off electricity in that part of the campground.

I talked to the camper, and he said that the microwave started smoking shortly after he turned on the electric heating element for his water heater. I turned the power back on for that part of the campground and checked the power pedestal, and the voltages were fine. I suspected an open neutral problem because the microwave smoking was related to turning on the water heater heating element, and there should be only a very minor correlation. I used my test adapter, which plugs into a 50-amp outlet and has two regular outlets, each connected to one of the hot lines. I tested the voltage with a 1500 watt heater, and the voltages remained good. We then turned off all the breakers in the motorhome except for two circuits where we could be sure that only outlets that we could control would receive power.
We applied power to the motorhome and plugged a heater in while measuring the voltage between neutral and ground on one of the un-powered motorhome outlets, We read about two volts. I also had a voltmeter connected to the power pedestal so I could isolate where the open neutral was if we could get it to occur, and between neutral and ground I also read about 2 volts. After several minutes without a failure we added a second heater inside the motorhome. About a minute or two later the failure occurred, and there was 80 volts between neutral and ground at the un-powered outlet in the motorhome, and about the same at the power pedestal. This means that with the two heaters on, anything on the other hot line would be getting about 200 volts.

Since the voltage was bad at the power pedestal, the problem was not with the motorhome.

We then talked to the campground owner and got permission to open the power pedestal. All the wires going to the neutral buss were discolored, and the insulation had either burned or melted.

http://www.myrv.us/electric/



The power pedestal is less than a year old. It was made by Milbank, which is probably the most common manufacturer of power pedestals. As you can see from the photos, the hot and neutral lines coming into the pedestal are large (0000 gauge), and the clamps for these wires are also very large. There are secondary large wires that carry the hot lines to the circuit breakers, and these clamps are also large. The problem is that the neutral buss is way too small, and it's not thick enough to be able to apply sufficient torque to the neutral wires without stripping the threads. This is what leads to so many open neutral failures.

Another important thing here is that the failure did not occur with only one 1500 watt heater -- it took two 1500 watt heaters and some time. This means that any electrical protection device would not have caught the failure before power was applied to the motorhome because they don't apply any load. My test adapter that lets me test voltage using a hair dryer for a load is also insufficient. I'm going to need to plug in as many hair dryers or heaters as needed to at least equal the current I expect to draw with the motorhome, and then leave the load on for a few minutes to make sure enough heating of the pedestal connections has occurred.

An electrical protection device would have cut power off after the failure had occurred, which possibly could have reduced the failures in the motorhome if the failures were over heating due to the higher voltage, and not the higher voltage immediately destroying solid state devices. Power supplies for electronic equipment might be able to last long enough to survive if the power was cut fast enough to prevent over heating.

The obvious question is what can we do to protect ourselves. If you only plug into 30-amp power you're significantly safer because an open neutral will almost always only result in lower voltage. Someone previously suggested plugging into two 30-amp adapters, hoping that they would both be the same phase. The campground we're in is wired correctly, with the hot lines reversed at every other pedestal. Doing that somewhat equalizes the current from campers that use 30 amp power. It also means that adjacent 30-amp outlets are wired out-of-phase, and an open neutral could result in 240 volts being applied to half your motorhome. You'd have a better chance of not losing the neutral line if your adapter to allow you to connect to two 30-amp outlets uses both neutrals, but you could still get hit if your motorhome neutral opens, or the campground neutral opens before the power pedestals. Making an adapter that only uses one leg of the 50-amp power would save you from open neutrals that are in your pedestal or your motorhome (but not before your pedestal). Doing this would also increase the current in the neutral line, which likely would induce more neutral line failures. Normally only the difference in current between the two hot lines winds up flowing in the neutral line (i.e. if you're drawing 30 amps on one hot line and 20 in the other, the neutral line would be carrying 10 amps).

I think the best way is to test the outlet with more current than you are going to draw for at least several minutes. Having an electrical protection system would add protection for things that get destroyed from over heating, but they also have a relatively high failure rate, so you might want one that plugs in rather than being hard-wired.

-- *Daryl Daughters, 2002 MADP, Fulltiming for over 5 years, and still having lots of fun*

Additional comments and Q & A concerning the above discussion.

Q: Would putting a Hughes Auto former in line prevent this from happening as it's supposed to monitor high voltage as well as low voltage and act accordingly.

A: I don't think so because the Hughes Autoformer voltage correction range is much less than what happens when the neutral opens.

This open neutral issue is a serious potential problem every time we connect to a 50-amp outlet. In this case I was able to prove that the damage done to the camper's motorhome was caused by

the power pedestal, and the campground owner is going to have to pay for the damages, and at this point, the owner does plan to pay for the damages or get the campground's insurance company to pay for the damages, or recover the cost from Milbank, the company that made the power pedestal. I don't think Milbank is going to pay because they have a sticker on the inside of the panel door that lists lots of information about the pedestal, and also says:

"Shipping tends to loosen bolted connections. Check and tighten all hardware before energizing unit"

That throws the responsibility back to the campground owner, or the electrician who installed the pedestal less than a year ago. The campground owner is a nice person, and I expect the campground will either absorb the cost or get their insurance company to pay for the repairs. I'm guessing there will be a lot of finger pointing today.

The camper that had the problems assumed that the failures in his motorhome was caused by a power surge. Without someone with the knowledge, tools, and permission to investigate the issue, the camper likely would have had to absorb the repair costs. He didn't even think it was the campground that caused the problem.

Q: Why is the 30 amp circuit immune from high voltage when the neutral fails?

A: It's not totally immune, it depends on where the neutral physically opens. Below is referring to 30 amp or 20 amp power, NOT 50-amp power.

If the open neutral occurs BEFORE your pedestal, and there are other RV's connected to that same neutral line AFTER your pedestal, AND they are using the other hot line phase, then you could get excessive voltage. This is not very likely to happen for a couple of reasons. First, typically the power and neutral wires going into your pedestal are large, and because of this, the electrical clamp mechanism for these in the pedestal are large, and are usually trouble free. This makes an open neutral before your pedestal unlikely (it could happen if someone is digging a hole with a backhoe and they cut the neutral line but not the hot lines). Second, many campgrounds have only 30 amp power, and it's likely that only one hot phase is being used on the neutral line you're using. If there is only one hot phase being used with your neutral, then the voltage can only drop, not increase.

If an open neutral occurs AFTER your pedestal it won't affect your pedestal (you still have a good neutral).

If the open neutral occurs IN your pedestal, you're safe because you're then only getting one hot line, and there's not a return path for the electricity, so there would be no current flow and no damage.

Q: We still have a 30A MH and I am beginning to think I want to stay with 30A

A: 30-amp power is definitely safer. If you have a 50 amp motorhome you can use an adapter that lets you connect to 30 amp. Some people use 30 amp all the time unless they know they're going to need more power.

You could make an adapter that connects to only one side of a 50-amp outlet, but feeds both sides of your power cord. That would give you 50 amps instead of the 100 amps you actually get with full 50-amp power (because normal RV 50-amp power is two 50-amp lines). This should be about as safe as 30 amp and you get 20 additional amps.
It's safer because you are only receiving power from one of the two phases, and if the neutral in the pedestal opens, all that will happen is that you will lose voltage, which rarely would cause a problem.
Jim Epting on the *Newmar Owners Yahoo Group* came up with this idea.

Q*: Is this a good place for a progressive or other EMS unit that would control spikes?*

A: The open neutral failure is not a spike issue, and the varistors they use are typically 600 volt. The open neutral only creates 240 volts.

Q: In other words there is NO protection to prevent this from happening, other then doing the pre hook-up test you perform? Correct?

A*:* The pre hook-up test with a heavy load is the best way.

I've been against the Electrical Management Systems (EMS) because they don't test the pedestal under a load, and they can't cut the power fast enough to protect electronic equipment, but I'm beginning to believe that they may be useful. This open neutral was caused by a bad connection at the neutral buss in the pedestal, and when it failed, it first partially failed before it failed enough to burn stuff up. A well-designed EMS might be able to cut power fast enough to save some items from failing. The camper in this situation started having strange things happening with his power, like a fan ran much faster than normal for a few seconds, almost 24 hours before there was the major failures. An EMS should cut the power when this happened, but then they normally automatically re-apply the power when the voltage is good, which in this case was whenever there wasn't heavy current being drawn. You'd need to realize that power was cut and immediately turn off the main breaker until you figure out why power was cut, but how are you going to do this? It could have been a minor power surge or voltage drop that was harmless and there's no easy way to tell if it was an open neutral problem, which is always very serious.

We have a 4.5 cubic foot electric refrigerator, and because of this we leave our 2000 watt inverter on standby all the time. We occasionally lose power and never realize that we lost power until we see that one of the electric clocks is ahead of where it should be (clocks often run faster on inverter power). I don't think the EMS's set off any type of alarm when they decide to drop power (anyone know for sure?).

Q: By the way do you have an EE background? Sounds like you do

A: Yes, I have a degree in Electrical and Electronic Engineering (EEE).
I worked 25 years for General Dynamics designing and testing mostly missiles, followed by 8 years at a small microwave equipment company.

-- Daryl Daughters

http://www.myrv.us/electric/

This should induce all of us to check the Service including checking it under load.