

AC / DC / Generator / Inverter

AC pedestal power	<p>Feb 07 A member of our HR club connected his motorhome to a 50 amp outlet at a recent outing. His wife saw the voltmeter (plugged into a 120v outlet) pegged to the right and unplugged the motorhome. An electrician was called and the neutral wire was burned through and not connected to the neutral strip inside the panel box. Without the neutral connected, between 150 and 240 volts was applied to all electrical appliances. He had to replace everything except the inverter and is trying to get the RV park to reimburse them. If the neutral is open on a 30 amp circuit, nothing would work so this failure would not occur. If he had used an electrical tester on the 20 amp outlet, it would have read “normal” since just the 8awg neutral wire was open. I understand there is a tester available for 50 amp outlets and am considering purchasing one.</p> <p>50 amp electrical problem: Some time ago, this newsletter had an article regarding an open neutral in an RV park power pedestal that burned up both TV’s, microwave, and some electrical appliances that were plugged in. I was pointed to a web site with a tester one might build. Go to www.myrv.com and see his solution.</p>																																								
Campground wiring problem	<p>Aug ’04</p>																																								
Appliance power levels	<p>Aug ’03 Chart of Amps Required by Typical Appliances</p> <p>One of our members requested a chart showing the amps that <i>typical</i> appliances use. These examples come from a variety of sources and please remember that your particular appliances may vary from these averages.</p> <table border="1" style="width: 100%; border-collapse: collapse; margin: 10px 0;"> <thead> <tr> <th style="width: 45%;">Item</th> <th style="width: 10%;">Amps</th> <th style="width: 45%;">Item</th> <th style="width: 10%;">Amps</th> </tr> </thead> <tbody> <tr> <td>Air conditioner (15,000 BTU)</td> <td>12.5</td> <td>Coffee maker</td> <td>9</td> </tr> <tr> <td>Battery charger (up to 3000 watts)</td> <td>6 - 28</td> <td>Toaster</td> <td>10</td> </tr> <tr> <td>Refrigerator</td> <td>3 - 8</td> <td>Electric fry pan</td> <td>10</td> </tr> <tr> <td>Water heater (8 gallon)</td> <td>12.5</td> <td>Blender</td> <td>5.5</td> </tr> <tr> <td>Washer/dryer</td> <td>16</td> <td>Crock pot</td> <td>1.5</td> </tr> <tr> <td>Water pump</td> <td>4</td> <td>Hair dryer (up to 1600 watts)</td> <td>3 - 13</td> </tr> <tr> <td>Microwave</td> <td>8 - 13</td> <td>Hand held vacuum</td> <td>2</td> </tr> <tr> <td>TV</td> <td>2 - 4</td> <td>Iron</td> <td>10</td> </tr> <tr> <td>VCR</td> <td>1</td> <td>Space heater</td> <td>8 - 13</td> </tr> </tbody> </table> <p>Amperage requirements can be calculated for any specific appliance by dividing its wattage rating by the input voltage. For example, a typical sewing machine runs at 125 watts, so 125 divided by 120 volts equals 1 amp. Remember, however, that appliances with high-powered motors and compressors will draw additional amps at startup. For example, an air conditioner can draw three to four times the amps it needs for sustained operation when the compressor begins its cycle. Likewise, depending on the state of your house batteries, initial charging cycles may draw vastly greater amps than a maintenance charge. Finally, when adding up the amps you’re using, don’t forget all the background items that use electricity, such as monitoring systems, lights,</p>	Item	Amps	Item	Amps	Air conditioner (15,000 BTU)	12.5	Coffee maker	9	Battery charger (up to 3000 watts)	6 - 28	Toaster	10	Refrigerator	3 - 8	Electric fry pan	10	Water heater (8 gallon)	12.5	Blender	5.5	Washer/dryer	16	Crock pot	1.5	Water pump	4	Hair dryer (up to 1600 watts)	3 - 13	Microwave	8 - 13	Hand held vacuum	2	TV	2 - 4	Iron	10	VCR	1	Space heater	8 - 13
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	<p>clocks, satellite receivers, computers, printers, shavers, and chargers for things like cell phones and video cameras. All of these necessary conveniences reduce the total amps available to larger appliances.</p>
<p>Battery life & charging</p>	<p>Dec '05; What is the expected life on the Interstate Workaholic? There are many variables. One is how deeply it is discharged each time – the lighter the discharge each time, the longer the life of the battery. The distilled water needs to be maintained at the proper level. The proper level is below the ring – about ¼ of an inch below the ring or 3/8 inch above the plates. Use a battery filler device (Harbor Freight, etc.) to get the proper level of distilled water. Excess water usage is a signal of failure. Under the best of conditions, you should see a life of 5 to 7 years. At a rally, the Interstate folks said you should expect 5 years.</p> <p>05 Imperial – If the coach is not sheltered from the elements, the battery life in hot locations (like Arizona, New Mexico and Nevada) will be shortened to 2 to 3 years.</p> <p>01 Ambassador – The dealer in South Dakota was winterizing the coaches and taking the batteries out to store them in the shop. If the battery isn't properly maintained, it will freeze and crack. Coaches can have troubles where it is too cold.</p> <p>Oct '08. Pierre sent a note (“I have used this for 6 years and haven't had a battery failure. Everyone I have shared this with is also having success”) and copy of an article from FMCA magazine that was mentioned at the pre-rally in Salem. The FMCA Tech & Travel Tips by Robert Bainbridge of Elyria, Ohio reads in part – “Many of us leave our motorhomes plugged in at home to keep the house batteries charged. The chassis battery, however, loses its charge over time The solution costs less than \$4 and will provide a trickle charge to the starting battery.” “At Radio Shack, purchase a four-pack of 6 amp diodes (p/n 276-1661) and a two-pack of 1 ohm resistors (p/n 271-131). The diodes can be connected in parallel for a high charge rate. The banded (cathode) end of the diodes must be connected to the starting battery terminal on the solenoid. The resistor will prevent excessive current draw through the diode in case of a dead starting battery or heavy load such as lowering the leveling jacks.” Editor's note: Connect one resistor in series with the two diodes and use tape or shrink tubing over the wires (not over the components) to prevent shorting. You will also have extra components to share with a friend or keep as a spare. The typical failure mode of a diode is to open (this is good) but be careful where the resistor is located as it may get hot if the two batteries are not close to the same voltage. (Ohms law is [power (watts) = voltage (across the resistor) x current] and [voltage = resistance x current])</p>
<p>DC power & transfer switch</p>	<p>Oct '08 Problem #2 Persistent issues with lack of depth of charge and short service time of the four 6v deep cycle batteries since purchasing the rig used in Feb of '04, prompted installation of new batteries in July of '06. The new batteries not only performed as poorly, but, by April of '08, were actually shutting down on several occasions, even when plugged into 120v shore power. Further diagnosis revealed that the problem was not in the inverter / converter, but farther back in the line in the transfer switch box (left-rear compartment) where loose screws and connections had arced, burned, and overheated and shut down power to the</p>

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	<p>converter, thus forcing the rig to run off the batteries until cool-down restored 120v power to the converter. Fix: Replacement of the transfer switch box, reconnect and tighten all connections, installation of four new AGM 6v deep cycle batteries with new heavy duty cables and connectors. Down-time: 2 weeks Cost: \$2,760 -no warranty</p> <p>Nov 02 1999 Navigator, Cummins 450, Roadmaster Chassis <u>Problem:</u> The driver's side 12v power went off, which affected the entire coach, including the fan. Of course, this happened on the hottest day of travel from York, Pennsylvania to home.</p> <p>Problem Resolution: I verified that there was no incoming 12v power at the front run block, so I searched the wiring diagram for any clues as to the point of failure. What I found was two small solenoids in the rear run plate compartment which feed 12v power to the front run plate. Fortunately, I was able to obtain a replacement solenoid at an auto parts store and this fixed the problem.</p>
Electrical power	<p>Apr 08 2006 Navigator Problem 3: We had an electrical problem in a campground. The 50 amp in there post fried it self but appeared to not cause a problem in the coach. When we left I unplugged the electric cord and the coach went black. We found that the solenoid for the cutoff switch located in the coach had stuck off and therefore no power. We held the switch on for three to four seconds and it came back on with no further problems. We had Flagstaff Service Center check things out for us and they are excellent. They are located at 4316 N. Highway 89 in Flagstaff, AZ.</p> <p>Aug 04 Electrical systems: <i>Generator, fuses, circuit breakers, inverter/converter, lights, monitoring systems, transfer switch, batteries</i></p> <p>02 Endeavor – The front air conditioning unit stopped working. Dometic tried to help over the phone, with no luck. The problem was that one leg on the 50 amp cord had shorted out because of a loose terminal in the campground pedestal.</p> <p>03 Endeavor – When the coach's 120V outlets were not functioning, the owner determined that the GFCI circuit breaker had tripped. He attempted to reset the GFCI, but it would continue to trip. Finally, he was advised to check the icemaker outlet (in the compartment behind the refrigerator). The ice maker was causing the GFCI to pop. He switched the icemaker to a non-GFCI outlet and solved the problem. This may have been caused by moisture around the icemaker plug since GFCI is very sensitive to moisture.</p> <p>04 Endeavor – If the neutral and earth ground make contact, the GFCI will trip. Those two wires are common in an icemaker. This is not an electrical problem, but the GFCI will pop.</p> <p>03 Endeavor – The owner experienced problems with his GFCI when he was using a battery charger connected to an outlet in a</p>

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	<p>bay. It blew the GFCI.</p>
Generator problems	<p>Dec '05; 00 Endeavor – When the ground wire on the generator was not tightened sufficiently to the chassis, it wouldn't start. Also, his batteries were fried when parked and plugged in. The charger was just boiling the batteries. One member suggested that he may have a bad board in the inverter and should discuss the problem with the manufacturer. It was also stated that you have to keep a close check on the water level in your batteries, even if the unit is parked and generally on a “float” charge. (See additional comments under the <i>Batteries</i> section below.)</p> <p>02 Endeavor – He questioned if anyone ever turns the charger off when the rig is plugged in for a week or two. Most have never turned the inverter off. You shouldn't have to turn it off.</p> <p>03 Endeavor – In an Onan seminar, he was told the worst thing you could do to a generator is not run it. Don't let it sit idle. Never slide the generator out when it is running. It is designed to run with the slide in and the compartment closed. The specs from Onan recommend running the generator at least once a month for at least ½ hour with a 50% load. This is even more important in wet climates than dry.</p> <p>02 Endeavor – He uses both air conditioning systems when he is running the generator for a load. His generator doesn't slide out, but would opening the front cover affect it or do any good? It shouldn't make a difference, because all the air intakes are under the generator.</p> <p>Another participant had never replaced the air intake filter in his generator. The service representative said they had experienced problems with the method suggested in some service manuals to take the filter out, shake it and blow it with air, then put it back in. He wanted to know if anyone had done that. The feeling was that filters are not too expensive and it was worth the cost to replace them, based on hours or time expired.</p> <p>00 Endeavor – He went under the coach and noticed the back end of his generator was hanging down. The two metal supports that were welded to the frame at the back of the diesel generator had broken at the welds. He contacted Freightliner and Monaco, but each blamed the other. He finally went to Home Depot and got some angle iron, pulled the generator back in place and bolted it on.</p> <p>00 Endeavor – From the day he bought his coach, he could smell diesel at the front end of the unit. He pulled the generator out and took the cowling off. The return fuel line was next to the belt that drives the water pump and that belt had rubbed a hole in the return fuel line. He cut the line, put a splice in and moved the line away from the water pump belt.</p>
GFCI problems	<p>Aug '04; Nov '09 2007 Imperial</p>

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	<p>Problem: When we park in any Ill. state park we can not use the 30 amp receptacle which are ground faulted. I was told by a then Monaco Tech. that the units were wired so as not to be able to hook up to a ground fault receptacle. I have heard since that it is not true. Does anyone else have this problem?</p>
<p style="text-align: center;">Inverter</p>	<p><i>Aug 04 Inverter</i></p> <p>04 Imperial – The coach has an inverter with the quiet time automatic setting. When the inverter is set on automatic and the batteries get too low (60% or less), the automatic trigger is set to turn the generator on, but he keeps getting an error light because of the 7:00 am quiet time setting. He has to reset all the settings and then when the quiet time is over, the generator comes on. He wanted to know if this was normal or was there a way to avoid the error message. The answer is that the error condition is normal whenever a quiet time setting prevents an automatic generator start due to low batteries.</p> <p>04 Scepter – This owner experienced the same error condition due to quiet time conflicts, so he disabled the automatic start function. Now, when he wants the generator to run, he starts it manually.</p> <p>02 Endeavor – He suggested that the owner change the discharge setting to 55% or even 50%, instead of the higher preset, to give more time before the generator would need to be run to recharge the batteries. Per Xantrex, a 50% setting is acceptable.</p> <p>01 Endeavor – Is the output from the inverter adjustable? His is running at about 128 volts without a load. They have damaged his wife’s medical equipment using it on the inverter and had to replace that equipment. The Norcold representative also commented that the fridge doesn’t like inverters due to the sine waves. (This is also true of most microwave ovens.) The problem here is not the voltage, but the modified sine wave emitted by most inverters. Some medical equipment is very sensitive to anything but a true sine wave, as found in household current.</p> <p>03 Endeavor – He has a Xantrex inverter and gets inconsistent voltage readings from his plug-in voltage meter and the voltage monitor on his surge protector. He would get readings ranging from 120 to 130 depending on the source. He called Xantrex, and the engineers there said a voltage meter reading of 130 is suspect because the inverter is actually putting out 120. In short, you need a voltmeter specifically designed to cope with the sine waves put out by an inverter.</p> <p>05 Imperial – There are RMS volt meters that can correctly read the inverter output. Regular power puts out a rounded curve sine wave, but most inverters put out a sine wave clipped at the top and the bottom of the curve.</p> <p>96 Navigator – Voltage Commander or Power Commander reads the voltage in a park. It reads the peak voltage and is not a true RMS voltmeter. He stated that generators and most inverters do not consistently produce a true sine wave. However, there are inverters capable of producing a true sine wave. In short, with true sine wave output, you will get an accurate reading from any good voltage meter.</p>

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	<p>Finally, a question arose from the inverter seminar regarding the proper setting of on/off switches on the inverters used by HR. The answer is that Heart inverters can be kept in either the on or off position, but Trace inverters must always be in the on position for the remote control switch to function.</p>
Inverter failure	<p>Nov '02 2000 Endeavor, CAT 330, Freightliner Chassis <u>Problem:</u> I accidentally allowed the back compartment door on the passenger side to slam closed. My wife called out to me that the power to the front TV and microwave went off. I opened the compartment and knocked on the side of the inverter and she said the power came back on.</p> <p>Problem Resolution: We were just a couple of days away from the International Rally at Gillette, so I waited to talk to the technician at the rally. When the technician checked the inverter, he found the main (RED) battery lead at the back of the inverter extremely loose. This looseness allowed the electromagnetic switch that controls the driver's side AC power to disconnect. (That electromagnetic switch is located in the power transfer switch, where the shore power cord terminates.) Feb. '05</p>
Inverter on/off settings	Aug '04
Inverter output readings	Aug '04
Inverter quiet time settings	Aug '04
Power failure – loose connection	Nov '02
Power transfer switch failure	Aug '02
Trace issues *	<p>Feb 05 2000 Endeavor, Cat 330, Freightliner Chassis</p> <p><u>Problem:</u> Our TRACE Inverter, Model: L1512SB-B20D (Manufacture Date 3/24/00) had never functioned properly. When external (including generator) power was applied, the inverter charger would go to 14.5 VDC - Bulk charge for 1 to 1.5 hours even when the house batteries were fully charged. For example, if we were plugged into shore power for several days and there was a short interruption of power, the inverter/charger would go back to the 14.5 VDC Bulk charge and stay there for at least an hour. My first set of house batteries lasted just 3 years and I think I was "cooking" them every time I hooked up to shore power.</p> <p>Problem Resolution: I found out that Trace recognized this as a problem and they designed a firmware/software fix for it. They did not send out a recall, but they do agree to provide the fix under an informal 5 year warranty, if an owner files a complaint about the inverter overcharging the batteries. I contacted a Trace certified warranty repair center - Solatron Technologies at 15663 Village Drive, Victorville, CA 92394, (888) 647-6527. I took my motorhome to Solatron Technologies and in about 1.5 hours, the fix was installed. Solatron charged me about \$100 to remove and reinstall the inverter, but the parts were under warranty. Since I</p>

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	<p>had this fix installed, my inverter/charger goes to 13.5 VDC - Float charge every time I go on shore power.</p> <p>Editor's Note: Our 2000 Endeavor has the same problem as Jerry's, so I called Xantrex (which has purchased Trace) at (360) 435-8826 and spoke to Michael in technical support. He said their computer had no record of the problem/resolution described by Jerry, but when I pressed the matter (and told him I was going to publish Jerry's account), he checked with someone else and then acknowledged that "a few" of these now discontinued Trace models did have the problem described above. He also agreed to supply the needed parts under an informal 5 year warranty, if I would take the coach to one of their authorized service centers, such as Solatron Technologies. The point is, you need be specific and persistent to get Xantrex to warranty the parts for this fix.</p> <p>Feb '07. 2000 Endeavor, Cat 330 engine Problem: The RC-9 remote (connected to Trace Legend Series I inverter) display LED's kept bouncing (12.5v to 14v to 13v, etc. and "bulk to float"), especially when the heater was on. The voltage indication, bulk charge and % charge LED's would not stay stable. Solution: At the FMCA rally, Zantrex was there working on Trace products. This is a known problem which cost \$35 to fix but one could get the parts cheaper at Radio Shack. Get a ferrite core (Radio Shack # 273-105 for \$5.00) and wrap the signal cable around the ferrite several times very close to the connector at the inverter jack. Then tape the ferrite in place. The ferrite adds impedance to the wire and stops the LED's from bouncing around.</p>
Transfer switch	<p>Jun '07 2005 Imperial, Roadmaster Chassis, Cummins 400HP Problem: All ac electrical power went out in coach. Tried the generator and still no ac. In the process of trying to locate the problem, all dc electrical power went out.</p> <p>The inverter was on. I had been using the light over the vanity before finding there was no ac. The second time I went to check the breakers in the bedroom, there were no lights. I don't think the batteries were dead. The side of the outlet that the refer is plugged into was the only ac in the coach</p> <p>Solution: The disconnect solenoid and automatic transfer switch had to be replaced. Still do not know what caused problem but the cost was \$1400.00</p> <p>Nov '07 2000 Endeavor, 330 Cat, Freightliner Chassis Problem: When our coach was less than a year old, the transfer switch self-destructed while it was plugged into a 30 amp circuit. While the unit fused internally, no damage was done inside the coach. The transfer switch was replaced under warranty with an identical unit (Part # 19-2847). This June, we were plugged into a 50 amp circuit in an Arizona RV park and the original equipment transfer switch melted down again. Unfortunately, the power surge in this incident fried our microwave-convection oven, DVD/VCR, satellite dish, 1500 watt inverter and computer printer. The coach was drivable, but completely unusable.</p>

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How was it resolved and what did it cost?

We have Progressive full-timer's insurance on the coach, but we were skeptical that they would cover the kind of damage this incident created. Fortunately, we were wrong. With the exception of the transfer switch itself, which was considered a mechanical failure, Progressive covered the \$3600 repair bill for all of the ruined electrical components. The remaining \$400 for a new transfer switch and its installation was a small price to pay for getting us back on the road. Incidentally, the new transfer switch is a bigger, beefier model in a metal case, compared to the plastic-cased, high failure item used by Holiday Rambler. In fact, we have been told by an HR dealer, who has seen a number of transfer switch failures, that the original equipment unit for a 2000 Endeavor has a one-in-ten failure rate.

Mar '10 Generator/shore power router switch failure., 2005 Neptune

During a recent dry camping outing we were using the generator for a period of time and then went to dinner at another rig. Upon our return we restarted the generator but were unable to get AC, 120 voltage in the coach. We of course had 12 volts. The generator went right down to idle. Next day, with the help of fellow HR owners and campers, it was determined that the generator was indeed producing AC power at 120 volts. Following the AC flow to the next junction, which is the power router switch box, low and behold, AC in but not out.

My coach has an IOTA Auto Transfer Switch and has a 1-800 number on the box. A call was placed by cell phone to IOTA and they determined that the switch module had failed. Since the coach was fairly new they stated they would mail a new module that same day. FREE. Upon my return home the module had already arrived. I installed it and works just great again. 1-800 numbers work wonders.