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CAUTION: Don't Judge An Inverter By Its Package!

When was the last time you shopped for an inverter?

By Don Wilson

High Frequency Inverter | Transformer Based Inverter

Today's inverters come in a plethora of sizes, topologies and option packages, so it's often challenging to determine which alternative is best suited to your unique needs. Let's briefly review some of the key considerations to help you navigate confidently through the buying process.

SLEEK AND LIGHT...OR BIG AND HEAVY?

First, what might you assume if you saw two 1000W inverters and one is a sparse 16 lbs., sleek with a low profile … while the other is a large, 50 lbs. heavyweight in a sheet metal box? Might you conclude that the smaller, lightweight version represents "newer technology," or would you think it's cheaper, disposable and lower quality than the heavier weight competitor?

Take it from Tech Doctor: in Inverter World, size and packaging can be very deceiving!

Without understanding the distinctions of each, you may make some inaccurate assumptions based on your preconceived notions. In our example, you may be looking at a low-frequency inverter and comparing it to a high-frequency inverter. The standard constant rate output will likely be identical on both, but there will be some differences in operation outside the normal wattage output.

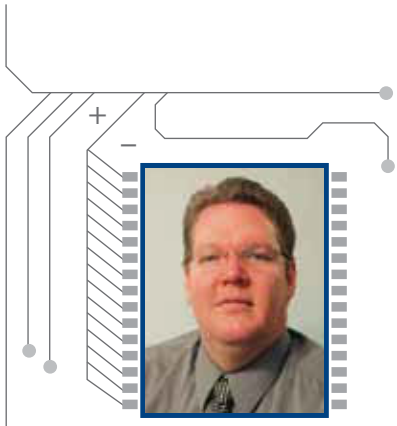
Low-frequency inverters use high-speed switches to invert (or change) the DC to AC, but drive these switches at the same frequency as the AC sine wave which is 60 Hz (60 times per second). This requires the inverter's transformer to work a bit harder, plus demands it to be larger and heavier, thus the result is a bigger, beefier package. High-frequency models typically drive the switches at a frequency closer to 50 KHz (50,000 times per second) or higher, thus allowing for a smaller, more efficient transformer and overall smaller package. However, that efficiency comes with a price. High-frequency inverters typically surge at a lower rate, or for shorter periods of time than its low-frequency counterparts.

The moral of this example is straightforward: don't make quick assumptions based solely on size and shape. Take the time to get the facts, compare the differences and then make an educated analysis.

Automatic Power Switching

An important consideration is whether or not the inverter has a built-in transfer switch. If you have an inverter without this feature, it may be possible to add an external transfer switch.

What's the big advantage of a transfer switch? It allows usage of grid power when it's available. These inverters have AC IN circuits that, when fed with AC voltage, bypass the inverter circuit --effectively turning the inverter off-- and feed it to the output. This prevents battery power from being used while AC is available, especially beneficial when you are trying to charge those batteries up! In many installations this allows for the usage of a smaller charger or converter in the system, since the inverter is no longer drawing DC current.



TECH DOCTOR DON WILSON *has worked in technical capacities in the automotive, RV and marine fields and for the military since 1989 and has extensive experience in designing and troubleshooting onboard electrical systems. A former customer service manager dealing with electronic issues, Wilson currently serves as a technical instructor for the RV industry's RVIA Trouble Shooter Clinics and is a full-time sales application specialist for Xantrex Technology.*

CHARGE IT!

Are you considering an inverter with a built-in charger?

Chargers use many of the same components as inverters, so purchasing one with an integrated charger can ultimately save money in the long haul. In this scenario, the AC is transferred to the output, but also feeds a charger. This type of system requires careful thought and planning, since the input current will be higher than the output.

For example: if the inverter loads are drawing 10 Amps, and the AC input is on, 10 Amps of input would transfer directly to the output, but some additional amperage will be needed for the charger. Some of these chargers can draw more than 20 Amps which would require higher AC input, perhaps 30 Amps or more.

Many of these types of inverters have automatic power sharing abilities which limit how much current the charger takes to prioritize the downstream loads without overloading the input. In the above example, if the input is set to 30 Amps, and the output load increased to 15 Amps, the charger feed would automatically de-rate to a 15 Amp celing to prevent tripping of a 30 Amp input breaker.

STACKING THE ODDS FOR SUCCESS

I am asked occasionally about operation of 240V applications such as a dryer. Can all inverters operate 240V applications? The answer is YES, but only IF the inverter was designed as "series-stackable." Some inverters can stack to produce split-phase (120/240).

Maybe you already have an inverter/charger, but now you need more power. Can you add another inverter/charger to your system? Again – YES it is possible, but only with select inverter/chargers that feature a built-in, parallel stacking feature. For example, two inverter/chargers with a parallel stacking feature can work in synergy to provide up to twice the rated current and charging output, thus allowing you to expand your onboard AC power system!

Caution: Keep in mind, NOT all inverters are series and parallel-stacking inverters. Be sure to understand the specific features and characteristics of your product of choice to avoid damaging the inverter's internal components.

THE BIG DECISION

We've scratched the surface of inverter analysis with the goal to open your eyes to a few major considerations worth analysis in the buying process.

When selecting an inverter, take the time to educate yourself. Study all of the qualified available options (including automatic generator starting, or energy management). Clearly understand the pros and cons of each and then weigh it against your specific application requirements.

Hopefully, these tips will aid you in making the best possible decision so you can enjoy a trouble-free electrical management system and an excellent return on your inverter investment.

WE WELCOME YOUR QUESTIONS FOR TECH DOCTOR!

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Over the years of running a mobile RV repair service, having a dedicated place to access service manuals for all the different appliances and components found on RVs was something that I always had a desire to create.

I hope this resource makes your RV repairs easier, as it has mine, but please be careful and follow proper safety practices when attempting to repair your own RV.

If in doubt, please consult with a professional RV technician!

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