

All charged up

Know your total load before spec'ing an inverter **By Dean Smallwood**

Inverter shipments have risen sharply since 2005, notes inverter maker Xantrex. The trend is expected to continue as truck owners choose to provide in-cab electrical loads for AC-powered TVs, microwaves and laptops without running the engine. Not only is it convenient to use a device that converts a battery's 12-volt DC power to AC household power, but it's increasingly necessary as more communities adopt strict no-idle regulations.

Most driver comfort features work well with inverters feeding power to them in typical truck configurations. Proper

power consumption management lowers the risk to the truck's batteries, starter and alternator, says Oliver Lafarge, sales director for inverter provider Tundra International.

Using inverter power and 110-volt AC appliances also is more efficient, says Mary Wauls, digital marketing project specialist for DAS Companies. The company offers PowerDrive, MobileSpec and RoadPro power inverters and accessories and also distributes those and other brands such as Cobra to Pilot, Flying J, Love's and Wilco Hess. Cooking and heating are much faster than with 12-volt appliances, Wauls says.

Other benefits of inverters include fuel cost savings and reduced engine wear and tear, says Steve

Carlson, a sales manager for Xantrex. An inverter also can reduce hours of use for a diesel-fired auxiliary power unit without shore power compatibility, reducing maintenance costs and increasing APU life, Carlson says. Installing an inverter also will enhance a truck's resale value, he says.

Going shopping

Picking an inverter with the right specs isn't as simple as it might seem. Sizes range from 300-watt cigarette lighter plug-in devices for occasional users to 5,000-watt units for RVs. Other options for select units include remote control, a USB power port and a graphic display that shows the batteries' state, power consumption and alarm codes.

"Truck drivers need to be able to feed and power their equipment without having to constantly wonder if they will overload and burn their power inverter or put their batteries at risk," Lafarge says.

Carlson says owner-operators should look for an inverter that's compliant with UL (Underwriters Laboratories) standard 458. Such products have "high electrical standards for safety and are designed to withstand the rigors of demanding in-vehicle applications," he says. "Many power products in the aftermarket don't carry the UL listing, which is recommended by many trucking



DAS PowerDrive inverters are available in eight models offering up to three grounded AC outlets and range from 100 to 2,000 watts. The PowerDrive 300 offers 300 watts of continuous AC power output and 600 watts of available surge power.



The Bergstrom Tundra inverter and shore power kit for Nite no-idle systems allows drivers to connect to grid electricity. The kit includes an extension cord and a switching box that automatically detects 110-volt AC power.

industry associations.”

Most inverters sold in travel centers are modified sine wave inverters, Wauls says. They produce a rough approximation of the smooth AC waveform of a more expensive pure sine wave inverter. Different inverters also provide a variety of power outputs, so you should choose a unit that safely can handle all the conveniences you use most often, she says.

To determine adequate power output, add the rated wattage of the in-cab appliances to find the continuous power needed, and add 20 percent more to account for variances. Then round up to the next-highest wattage provided by an inverter. For example, a microwave rated at 1,000 watts, a TV at 250 watts and a laptop at 95 watts would need about 1,600 watts after 20 percent is added. An 1,800-watt inverter would handle the load safely.

Another consideration is surge power – the initial load when a device is powered up, which sometimes is double the continuous power requirement. The inverter’s surge rating should be about double its continuous power rating, so a 1,800-watt inverter would need to handle a short

3,600-watt surge.

The unit’s output efficiency and adequate battery protection also are critical factors. “Some 2,000-watt inverters provide more usable watts than some featuring 2,500 watts,” Lafarge says. A severe battery discharge likely will result in added maintenance and downtime. “The more the inverter is efficient, the better it is for the truck equipment, for the drivers’ accessories, as well as for the inverter itself.”

Choosing the correct appliances also is important, Wauls says. Some electric appliances may not be compatible with the modified sine wave output provided by most inverters.

Installation advice

Installation involves connecting cables to the inverter and the battery bank. Choosing cable gauge, fuses and circuit breakers requires some knowledge of electric power flow to size them correctly, Wauls says. Most tractor-trailers have three or four deep-cycle batteries, and if the inverter is connected incorrectly, the wire end will spark like an arc welder, she says.

Lafarge says the proper materials and techniques are critical to prevent damaging the inverter and the components it powers. “We see too many cases where, to save a few dollars, the inverters are installed with the wrong type or gauge of wiring,” he says. “We also see too many cases where the positive cable is not fused or, if it is, the wrong type or rating is used.”

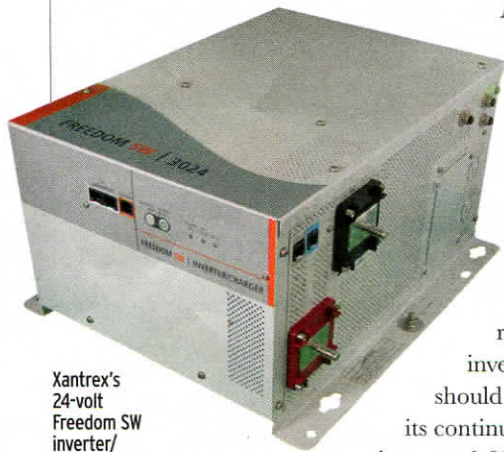
Drivers who self-install an inverter also should understand how to crimp terminals, handle heat shrink tubing and run and secure cables through a wall or floor, Lafarge

says. While installation kits are available, he says many are generic and not suited to all inverters’ wattages.

Wires in kits tend to be short – about 3 feet, Wauls says, so longer cables might be needed. With longer cables, there is a voltage drop between the batteries and the inverter, depending on power demand.

The rule of thumb is no more than a 0.5-volt drop using the maximum wattage, she says. So if resting voltage at the inverter is 14 volts and maximum wattage is drawn, voltage should not drop below 13.5. If this happens, either the cables are too small for the distance or the batteries are growing weak, she says.

Carlson says Xantrex recommends using a truck dealer or an authorized inverter dealer for installation. When factory-installed, Carlson says, owner-operators can be certain “the manufacturer uses the proper size cables, fuses and components for the system.”



Xantrex’s 24-volt Freedom SW inverter/charger is available in two models and is engineered to offer full output at higher temperatures with efficient power factor-corrected charging.



The Whistler Group’s Pro-3000W inverter has three AC outlets and one USB port. It offers surge control to start loads at the continuous rating and voltage protection to shut down when input exceeds 15 volts DC or is less than 10 volts.