DC-AC INVERTERS

FOR COMMUNICATIONS SITE APPLICATIONS

INVERTER OVERVIEW

DC to AC inverters are devices used to produce alternating current (AC) power from direct current (DC) energy such as from a battery source. AC power is what electric utility companies provide across their grid for residential and commercial customers.

This AC power from the inverter has the advantage in that it can be used to run electrical devices that require AC power at a location where AC utility grid power is not available.

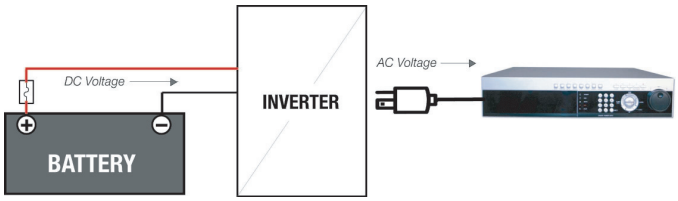


Fig. 1 Basic function of an inverter.

CHOOSING AN INVERTER

Application Requirements

The inverter design must suit the application. The first priority is understanding how much power is required to run the components that will be plugged into the inverter. This will ensure that the inverter chosen is not under-powered, or over-powered for the use intended. An over-rated inverter is not necessarily better, since most inverters are designed to achieve maximum efficiency at the middle to upper end of their output range. Also, the input voltage of the inverter must match the battery or other DC source to which it will be connected.

Location of the input and output connectors, the method of mounting, and whether the inverter will be installed in an equipment rack are all important factors to consider. For example, if the inverter is to be mounted in an equipment rack, you want it to take up as little space as possible, ideally one rack unit (1RU) which is 1.75 inches high. An inverter designed to be mounted in a vehicle, for example, will not integrate easily into a 19-inch equipment rack.

Fig. 2 Inverters intended for use in 19 inch equipment racks should by 1RU to save space.

If the inverter is intended to be installed in an equipment rack as part of a power system, the input connectors, AC outlets, and grounding stud should all be located on the back, close to where the wiring connections need to be made, so that cables do not have to be run around to the front of the rack.

Fig. 3 DC inputs, AC outlets, and grounding studs should be on the back of the inverter so they are close to wiring connections and allow for the shortest cable runs.

Output Power Quality

Sine wave inverters are best for powering sensitive electronics that require a high-quality waveform. They have little inherent harmonic distortion and typically have surge capacities of double or greater the continuous output rating. Modified sine wave inverters are prone to inducing noise into electrical components and should be avoided.

Operating Temperature

Inverters, like most electrical components, have temperature specifications as well. If they are operated outside of those parameters, reliability and performance may degrade. You should look for an inverter that will operate at full power well past 40 degrees C, optimally up to at least 60 degrees C.

Efficiency

Efficiency should be high across a broad range of output levels. Some inverter manufacturers claim high efficiency levels, but they may be measured at or near maximum output where the inverter will rarely operate. Choose an inverter rated for high efficiency over a wide range of load conditions.

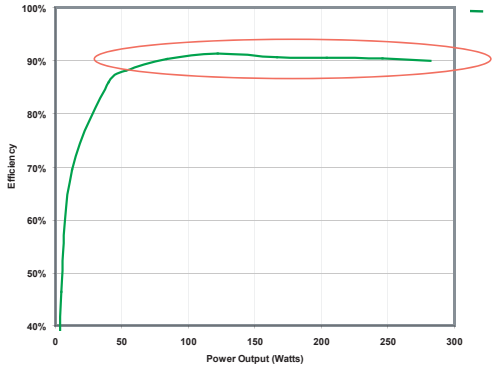


Fig. 4

ICT inverters are designed to run at their highest efficiency across a wide power output range.

No-Load Power Draw

Also referred to as 'idle current draw'. Every inverter will draw some current unless physically disconnected from the battery source. In almost every application there may be times when there is no load present, and the inverter will sit idly waiting to be called on to power a load again. The control circuits of the inverter need some small level of power to 'stay awake' and be able to respond the instant a load is applied. Therefore when choosing an inverter you want the lowest possible number for the no-load power draw specification. This will help prolong the charge level of the battery.

Summary

While there are a lot of choices available for inverters, make sure the design, form, function and performance all match the application that it will be used for. Choosing the right inverter for the task will return many benefits in terms of ease of installation, reliability, functionality and price/performance.

TYPICAL LOADS FOUND AT DC POWERED COMMUNICATIONS SITES

Communications site applications usually require an inverter when there are devices in the site that require 120 volts AC to operate. These devices require clean, sine wave power, and typically they require anywhere from 10 watts to 200 watts to operate. Many of these devices come with a wide-ranging AC transformer (100-240VAC typical) that can be plugged into the Site Inverter 300's NEMA 5-15R outlets, making the Site Inverter 300 a solution for International regions.

Figure 5 shows a list of common AC devices found at communications sites and their typical power draw requirements:

AC COMPONENT	TYP. POWER CONSUMPTION
Multiplexers and Termination Units	10W-60W
Radio Indoor Unit (IDU)	10W-50W
PoE Camera and Sensor Bridge	115W
Perimeter Security System	170W
Digital Video Recorder (DVR)	20W - 40W
5-Zone Fire Alarm Panel	115W
Remote Terminal Unit (RTU)	1W - 50W
Laptop Computer	40W
Security Gateway/Firewall	20W
Communications Server	100-300W

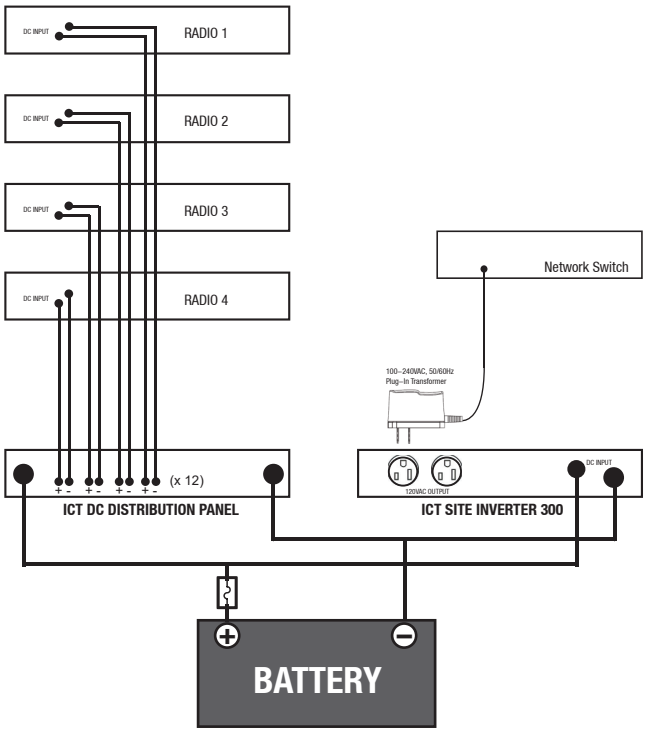
For powering AC components at a 12, 24 or 48 volt DC communications site such as links, multiplexers, PoE bridges, alarms and monitoring equipment, security systems and digital video recorders, access control systems, or laptops and test equipment, the ICT SITE INVERTER 300 system provides a mission-specific solution with the best features, form factor, and price performance available today.

Designed specifically for this task, the ICT system features:

- 1RU rack mounting
- Compact design allows 1, 2 or 3 inverters to be mounted on a single 1RU rack tray
- True sine wave power output with less than 3% total harmonic distortion
- 90 to 91% efficiency across a wide power output range
- Less than 4 watts of no-load power draw
- Full power output from -20C to +60C
- All connectors mounted on the back, close to where wiring connections are

The following diagram illustrates how the ICT Site Inverter 300 integrates into a 12, 24 or 48 volt DC communications site power system to provide ultra-clean power for 120 volt AC components:

Fig. 6 The ICT Site Inverter 300 can be easily integrated into a DC powered communications site to provide 120 volts of AC power for devices such as network switches or routers when AC grid power is not accessible.



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