Inverter cooling fan problems

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Inverters need fans to draw in cool air into the inverter component housing and expel the warm air through the device’s ventilation ports. Three types of fans are typically fitted by inverter manufacturers: continuous fans, load-controlled fans, and thermally controlled fans.

Inverter fans can become noisy if the fan motor becomes worn due to overuse, when the load placed on the inverter is too high, or when the temperature in the inverter remains too high despite the fan running at full speed. Dust on the fan blades or air intake also causes the fans to be noisy.

An inverter is designed for chopping, inverting, and adjusting incoming direct current (DC) into a pure sine wave alternating current (AC). This current manipulation and wave modulation is energy-intensive and causes heat to be generated in the inverter circuitry and components.

The active components of the inverter are located on large aluminum heat sinks fixed to the aluminum inverter cover to help dissipate the heat. Cooling fans draw cool are into the inverter housing to help cool the internal components and circuits.

An inverter must be installed in a space where the heat can easily be dissipated through the heatsink and cooling fans. At least one foot of space must be available on all sides and above the inverter housing to facilitate airflow.

The cable connections from the battery bank must be short and thick enough to minimize resistance and voltage drop. The cable connections to the battery and inverter terminals must also be very tight and free of corrosion.

Poor or corroded cable connections can often manifest in a noisy inverter. The battery bank state of charge (SOC) must also be sufficient to power the inverter with enough DC to meet the AC load demand.

The depths of discharge range (DOD) on Li-ion batteries or deep cycle gel batteries can be as low as twenty or thirty percent. Still, on lead-acid batteries, the DOD should not fall below fifty percent to prevent chemical degradation of the battery.

An insufficient battery state of charge can also cause the inverter and cooling fans to run noisily. As the inverter housing can become static and draw in the air via the air intake ducts, dust buildup can act like an insulator preventing the efficient cooling of the inverter.

Continuous fans are the cheapest and designed to run whenever the inverter is switched on, even when there is no load demand. They drain the battery bank and become worn out due to continual running much faster than

other types of inverter fans.

Load-controlled fans will run when there is an AC load demand on the inverter and will increase fan speed as the load increases. The fans will run continuously when the AC load on the inverter is at or above 80% of the maximum output rating.

Thermally controlled cooling fans are linked to a thermocouple that measures the temperature inside the inverter housing and controls fan speed. They are more expensive but will last longer due to their controlled use.

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