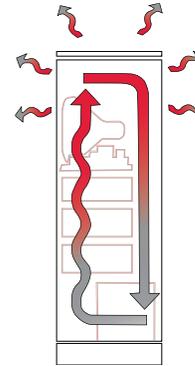


### Conductive Cooling

This is a passive way to cool electronics. It simply allows the heat to radiate through the cabinet walls.

Conductive cooling works well with electronics systems that have small heat loads (<50 W) and cool air around the enclosure (<78 F/25 C).

If heat is an issue, one option within this type of cooling is to increase cabinet size to create more surface area to speed the transfer of heat. However, growing cabinet size is often not a practical solution because of space limitations and the greater heat loads associated with today's high-power electronics.

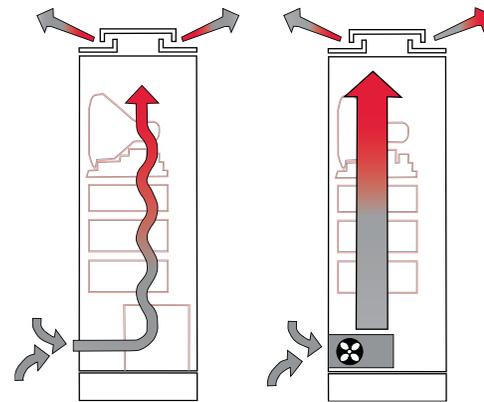


### Fresh Air Cooling

This is an active way to manage heat in electronics applications. This type of cooling ventilates fresh air through the cabinet, exhausting heat away from the hot components.

Fresh air cooling may be used when the electronics system is deployed in a relatively clean and cool environment such as an office building, data networking center or light-duty factory. Options for cooling electronic enclosures with fresh air include filter fans, fan trays, motorized impellers and packaged blowers.

Fresh air cooling is known as an “open-loop system” because no significant seal is maintained to protect electronic components from harmful elements such as dirt, water, metal filings and corrosive fumes.



### Protective Cooling

This is another active way to cool electrical components. This type of thermal management maintains the seal of the enclosure—using an air conditioner or heat exchanger as examples—to remove heat from inside the electronics cabinet.

Protective cooling is generally required when the electronics application:

- (1) operates in high temperatures, typically over 95 F/35 C,
- (2) is deployed in a harsh environment such as an outdoor telecom base station, wastewater treatment plant, metal working operation, oil rig platform, paper mill, foundry and/or
- (3) generates a high heat load from its own components, usually more than 500 W.

Options for protective cooling include air conditioners, air-to-air heat exchangers, air-to-water heat exchangers, thermo-electric coolers and vortex coolers.

Protective cooling is known as a “closed-loop system” because the seal of the electrical cabinet is maintained, allowing no elements which can damage the electronics inside the enclosure.

