

UPS AMBIENT TEMPERATURE

UPSs are designed for 35°- 40°C max ambient temperature.(Refer to UPS standard IEC 62040-3)
Only some “industrial application designed” UPSs can stand 45°C or 50°C ambient temperature. This feature is related to the harsh environment where the UPS could be installed (production plant). But those units are generally small power units (up to 80 kVA...) related to the industrial application power demand that is the supply of the Process control. There are no high power static UPSs on the market that can stand such high temperatures.

There are 2 difficulties to face when the inside temperature of the UPS increases:

1/ some components can arrive at the limit of temperature and break or will not work correctly anymore.

- For any UPS, there is a temperature difference between the ambient temperature and the internal temperature in the UPS. This Delta temperature is related to the energy losses of the ups power conversion bridges. Generally this delta temperature is around 15 or 20°C depending on how the UPS design permits to evacuate the heat losses related to the power losses.
- One of the most temperature sensitive component on the UPS is generally the Display (mimic panel) mounted on the door. With the increase of the temperature it will no more be possible to read any information.
- More critical components are the IGBT drivers that generally cannot stand More than 60°C. Those printed circuit boards are generally located in the upper part of the UPSs where the temperature is generally higher than on the bottom part.

2/ some components will have their life time dramatically reduced. (This could be acceptable if the time where the temperature is high, is short in regard to the nominal lifetime)

- Generally we can consider that the life time of the components is divided by 2 every 10°C above nominal conditions.
- In the UPS the components that are generally impacted by this lifetime reduction are the capacitors & the cooling turbines.

As synthesis we can tell the following:

There is no High power static UPS on the market that can stand 50°C ambient temperature.

Designing such kind of UPS would request huge oversizing to reduce the delta temperature between the ambient and the internal temperature. This oversizing would impact dramatically the size of the UPS and air ducts. The Price of such units would be impacted accordingly.

Of course the constraint that in some cases the ambient temperature can reach 50°C is a true concern. It is even worst when the UPS is installed in a container or in a schelter with limited air volume inside the room. In this case when the cooling system fails, the temperature in the schelter will increase rapidly. In this case, the solution that is generally applied is a redundant cooling solution that is the best technico-economical compromise to avoid temperature increase in the UPS environment.

Frank Weinbissinger
Western Europe Competence Center
Project Business Dvpt Director

