

About cooling

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Excessive temperature accounts for 55% of all electronic equipment failure. In fact, it causes more failures than vibration, humidity and dust combined! With effective thermal management planning early in the equipment design, nearly all of these failures could be avoided.

The most common causes of overheating

In part, overheating occurs as a result of the ongoing drive towards miniaturisation. Electronic systems are getting faster, chips are becoming more powerful, and everything is being crammed in to ever smaller spaces. Another problem arises from the mechanical design of systems. The heat generated by components travels via the component mounting into the air-filled interior of the system, and then via the cabinet casing to the outside ambient environment. Clearly, anything which restricts the movement of air within the system - electronic cards, cabling, disk drives, clogged air filters etc. - affects the pressure gradient between the inside and outside of the cabinet. As fan performance figures are usually based on freely ventilated systems, it's easy to overlook the potentially disastrous effect of mechanical restrictions on system cooling and to under-specify the cooling requirements.

Some systems are housed in standard enclosures fitted with standard cooling arrangements. At best, the cooling provided is an adequate compromise. At worst, it's fatal to system reliability. After all, such enclosures are designed without prior knowledge of the system that they are to house.

A final example of the challenges encountered in thermal design concerns the external environment. Any equipment that's operated outside of a controlled environment may be subject to extremes of temperature. In such circumstances, cooling requirements will vary greatly between day and night, summer and winter, or the geographic location of the system.

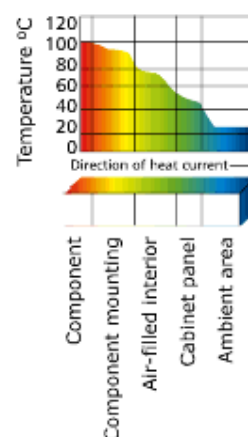
How ebm-papst can help you reap the benefits of optimised cooling

ebm-papst has the experience, the breadth of products and the expertise to help with the design of optimised cooling solutions. Such solutions, whether based on standard or customised cooling components, deliver substantial benefits including:

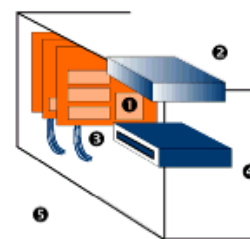
- Lowest lifetime cost
- Lowest noise emission
- Lowest energy consumption
- Lowest environmental impact
- Highest system reliability

Every cooling problem is unique and individual. By talking to ebm-papst in the early design stages, you can ensure that the best individual solution is applied to your individual system.

Heat transfer effect in a cabinet



Sources of heat in equipment



- ❶ Up to 125°C on chip
- ❷ 600W of power supply
- ❸ Active boards
Power = heat
- ❹ Disk drives dramatically restrict air movement
- ❺ High ambient temperatures