

## IP65 Power Supplies

### What is IP65?

The IP codes and testing procedures are defined in the norms of IEC60529 and EN60529 “Degree of Protection provided by enclosures (IP Code)”.

The IP Code number is composed according to the following standard:

- IP stands for Ingress Protection
- The first number describes the protection against foreign objects
- The second number describes the protection against water IP65 therefore:  
6 = Protection against dust & foreign objects  
5 = Protection against water jets from all directions

In industrial applications, there is a demand for DC Power Supplies to be assembled in IP65 enclosures for a wide range of applications.

This presents problems that are not easily solved or understood by most design engineers. The accumulation of heat in an IP65 enclosure is potentially damaging to the electrical and electronic components inside. It is therefore important that system designers are aware of temperature implications of their designs.

### Enclosure Temperature Rise and Heat Input:

The enclosure temperature rise is not dependent on the ambient temperature, rather the temperature rise for a given enclosure and heat input. For any temperature rise calculation, the heat generated within the enclosure must be known. This information can be obtained from the specifications of the power supply (and other components) that are mounted in the enclosure.

### Enclosure Surface Area:

The physical size of the enclosure will be the primary factor in determining its ability to dissipate heat. The larger the surface area of the enclosure, the lower the temperature rise due to the heat generated within it.

### Circulating Fans:

The use of circulating fans in an enclosure will improve heat dissipation by a much as 10%. Circulating fans are employed to eliminate **hot spots** inside the enclosure. Many of our power supplies that would be used in IP65 enclosures are equipped with their own fans, thus simplifying design.

### Conduction Cooling:

In some applications, a power supply that has its heatsink, directly mounted to the enclosure's surface is another way of dissipating heat via conduction cooling ... see **Fig 2**

Enclosure material has little effect on enclosure temperature rise. Although most IP65 enclosures use painted steel, non-metallic enclosures have similar heat transfer characteristics.

### Thermal Management Design Guide:

Design guidelines and technical papers are available from a range of established enclosure manufacturers.

Amtext would be happy to assist you with any project design requiring an **IP65 Power Supply** solution.

### Note:

*The above information is only aimed at highlighting the issues that need to be addressed when using power supplies in IP65 enclosures. Each application is unique and needs complete analysis to ensure system reliability.*



Fig. 1

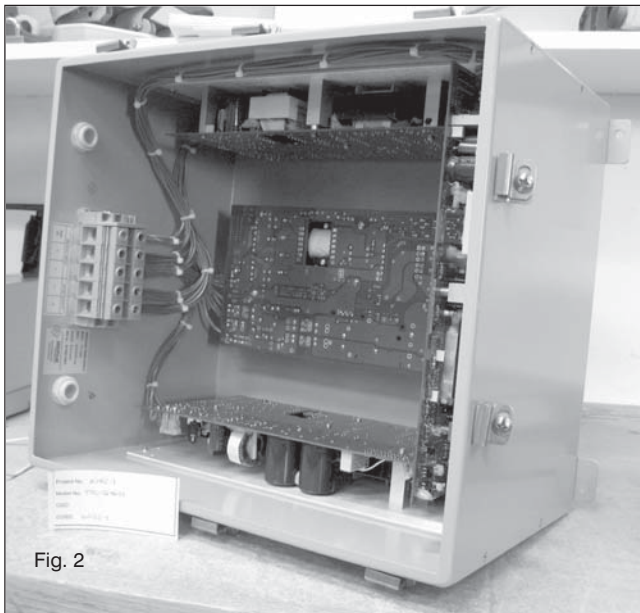


Fig. 2

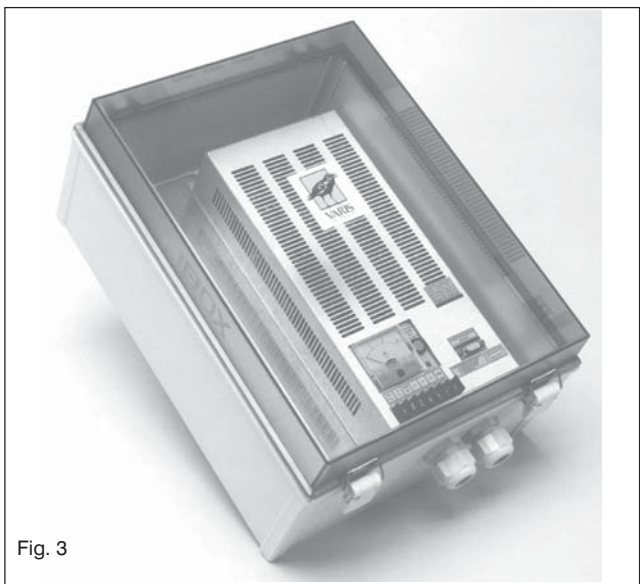


Fig. 3