

The Reliability Challenge

Take the example of a power supply which was used to drive an on-board Train Protection and Warning System (TPWS). Although the original unit provided a good fit for the system's electrical and mechanical specifications, concerns over its operational reliability soon began to surface and a more reliable alternative was needed urgently.

The original approach was to use three different variants of an open-frame power supply to cover input voltages of 24V, 72V and 100V. To provide protection against vibration, water, dust and other potential contaminants, the open-frame supply was enclosed in a metal case with wires connecting the printed circuit board to the outside world.

With reliability at the core of the challenge, the starting point for the replacement unit was a 150W PCMDS150WK-IP65 DC-DC converter manufactured by MTM Power. The standard version of this supply features patented thermoselective vacuum encapsulation and an IP65 rating for maximum protection against external contaminants.

The thermoselective vacuum encapsulation process completely and permanently encapsulates the power supply to create a cemented joint to provide an inseparable link between the potting material and the components. This ensures that ageing, heat, cold, rapid temperature changes and other environmental influences do not result in delamination, cracking or air pockets which can compromise reliability and potentially lead to failure.

The combination of the patented encapsulation process and the IP65 rating eliminated the hand-assembly which was required to protect the original open-frame unit. This enabled the PCMDS150WK-IP65 to also provide a 20% reduction in the overall unit cost of each supply.

In addition to successfully overcoming the main reliability challenge, the replacement was also able to deliver additional benefits. The standard unit's nominal input ranges of 24V (16.8V to 33.6V) and 110V (50.4 to 154V) were sufficient to cover the three input voltages required by the system.

This allowed the OEM to replace the three original versions of the open-frame supply with just two PCMDS150 variants. A secondary circuit, with fully independent isolation and regulation, was also added to the supply to provide a 40V rail for use as a reset operating independently of the 12V board net.

To provide assured reliability for operation in the rail environment the new supply was fully tested for compliance to EN50155 and EN50121-3-2 by the manufacturer. A built-in heat-sink further improved reliability by eliminating the need for external cooling fans which are often a cause of failure in power supplies.

Charcroft - Challenge Accepted

Charcroft Electronics Ltd

E sales@charcroft.com T 01591 610408 W charcroft.com

Dol-y-Coed Llanwrtyd Wells Powys LD5 4TH

Company Registration number: 1181853 England VAT Number GB104 5791 80