

COVER STORY

Built for speed



Siemens Desiro rolling stock
(Image courtesy of www.siemens.com/press)

Whether it is for next-generation rolling-stock such as the innovative Desiro trains, or the refurbishment of a piece of rail history, like the Brighton Belle, what rail industry OEMs really need is reliability, speed and flexibility, explains Roger Tall, product specialist at Charcroft Electronics

Finding components which meet the relevant rail safety standards for reliable operation is relatively easy: There is the EN50155 standard for temperature, humidity, shock and vibration and EN45545 for flammability and toxicity. The harder task is specifying components which comply

with these standards and also offer the right set of features to increase overall system performance.

Beyond reliability

Take power supplies for example: The power converters used on the Desiro rolling stock are fully compliant

with both of these rail standards in addition to the EN50121-3-2 standard for electromagnetic compatibility (EMC). This ensures that the supplies provide rugged reliability, whilst additional features help to meet wider design objectives for overall system performance.

These features include IP65 sealing and a patented thermoselective vacuum encapsulation process which eliminates potential hotspots which provides a thermal path for heat dissipation. The wide input voltage range allows the supplies to handle brown-outs and transients and to ensure a smooth, regulated supply without the need for external suppression components. Other integrated features include an active current limit to eliminate the need for ground-loading as protection against spikes and surges.

The same combination of features is also helping in the restoration of the world's most famous electric train, the Art Deco Brighton Belle, which will return to mainline service almost 85 years after she was built.

The need for speed

Many component manufacturers are responding to the rail industry's need for rapid turn-round of customised components by manufacturing samples and production volumes on very short lead-times. The fact that electronic equipment used in the rail sector is expected to have an extremely long service-life makes the need for fast solutions even more important to minimise the time that the

equipment is out of service due to preventative or corrective maintenance.

Components such as silver mica capacitors can combine the speed of UK-based production with the flexibility to tune circuits to a specific frequency. These capacitors are being used in



Compact circuit breakers save space in rolling-stock



Power converter's patented encapsulation process eliminates hot-spots

safety-critical systems such as Train Protection Warning Systems (TPWS) or in RFID circuits for door-entry systems where stability over time and temperature is crucial. A typical lead-time for a UK-manufactured silver mica capacitor is one week and production volumes are supplied within four weeks



sizes, Charcroft suggested an alternative to match the longevity and performance of the original component and provide production volumes on a relatively short lead-time.

The ability to use different configurations and mounting options can give designers the flexibility to reduce the size of an assembly by a few crucial millimeters. As rolling stock continues to be fitted with an increasing number of electronic systems, this small saving can deliver a very real benefit to the OEM. For circuit breakers, this can mean the ability to use panel or DIN-rail mounting in addition to specifying the number of

Space is certainly a factor in the design of the Heating, Ventilation and Air-Conditioning (HVAC) systems used in rolling stock. Here, the ability to handle currents up to 48A enables allows 3/4 inch bi-metal disc thermostats to eliminate the need for

Circuit breakers and thermostats are not the only components to offer a high degree of flexibility, aluminium electrolytic and silver mica capacitors, power converters and magnetic components can all be customised to achieve a specific footprint or electrical parameters.

Through-life management is as crucial for the next generation of rolling stock and trackside electronics as it is for helping heritage trains to return to the track.

Speed is also important when helping to overcome component obsolescence. High-voltage aluminium capacitors, for example, used to be manufactured in a wide range case sizes and variants, but have now diminished to just three of the smaller case sizes. So, when a customer was faced with one of the obsolete case

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