Supplying the World – What to Consider when Designing a Power Supply

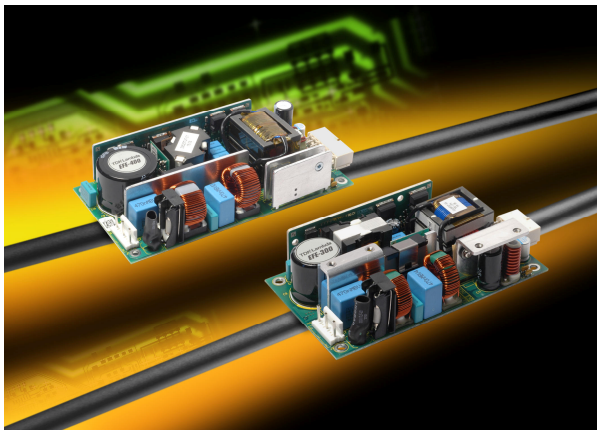
Abstract

Most OEMs see exporting as a key opportunity for growth and profit, but they're also keen to minimise the number of different versions of their products that they have to produce in order to address the needs of world markets. Fortunately, designing a power supply, which will suit almost every country of the world without modification, doesn't have to be difficult. Bob Taylor of TDK-Lambda UK explains.

Introduction

Europe has many Directives which affect the design of a power supply and imposes EN standards on them. These EN (European Norms) standards are derived in the main from IEC (International Electrotechnical Committee) standards. If we then add the National Deviations from the IEC standards, we essentially have the requirements for various countries. In recent years, the IEC member countries have increased, and these countries are adopting IEC standards as their own National Standards with these added special requirements (National Deviations). The Deviations tend to cater for different mains supply voltages, different mains plugs and cables, different branch circuit protection, poor earthing and special marking requirements. The USA and Canada have probably the largest number of National Deviations and tend to promulgate the various component approval programs of their National Test Houses like UL and CSA.

A special case of National Deviations affecting the design of a power supply is for Medical Devices. Power supplies used in such devices must have a much lower earth leakage current for North America (300uA max in normal condition, 500uA max in single fault condition for patient care equipment) than for Europe (500uA in normal condition, 1mA in single fault condition). Again TDK Lambda UK designs for such deviations. North America is the largest market for Medical Devices and must therefore be taken into consideration.



So, selling into various countries worldwide requires compliance with local regulations and TDK Lambda UK has many years experience of doing this. By approving our products to a number of IEC standards and including the National Deviations, TDK-Lambda UK caters for an easier path to selling

into numerous countries. If a power supply has not been assessed to the National Deviations of a country, the customer then has to incur further time and cost to sell his product into certain countries. We can also offer advice and assistance in firstly, incorporating our products into end equipments, and secondly, to selling into many countries. To take this one step further, TDK-Lambda UK takes an active part in the definition of International Standards covering IT, Telecom Equipment, and Medical Devices. This provides us with knowledge of the special requirements of different countries and of any upcoming new requirements. TDK Lambda UK has representation on both National and International Committees for IT and Telecom equipment (EPL/108 & TC108), Medical Devices (CH/062/01 and SC62A) and Power Electronics and Power Supplies (PEL/22, SC22E and TC22).

Moving on to the technical considerations; because of the need for Power Factor Correction (PFC) circuits to reduce harmonics in some countries, power supplies with wide input voltage ranges are commonplace as this is the bonus of such circuits. This means that the variety of mains supply voltages throughout the world is catered for without having to make any adjustments. Even Japan, with its 85V minimum AC mains supply, can be catered for. There is, however, a 'buyer beware' aspect. Before purchasing a power supply, carefully check the operating voltage range and also look for any deratings at the extremes of the input voltage range. Operating and storage temperature range, operating and storage altitude and operating and storage humidity are also important parameters to consider.

Altitude is becoming increasingly important in the market place. The height above sea level affects the ability of a product to operate at high voltages typically found within a power supply. Most power supplies are designed for operation up to 2000 metres above sea level, whereas TDK Lambda UK design for operation up to 3000 metres as standard on a number of products. (Note: Mexico City is for example 2240 metres above sea level). The altitude, or more strictly the reducing air pressure with height above sea level, affects the design of the power supply in that more clearance between operational parts is required to avoid breakdown due to the voltages between these parts. TDK Lambda UK products have at least 14% higher clearances to provide for this.

Operating temperature is another very important consideration, especially in the Middle East and parts of Asia, where a product might have to operate in an unconditioned, hot and humid environment. TDK Lambda UK products are designed for operation up to 70°C with derating above 50°C, usually at 2.5% per °C. Operation in hot environments must be considered carefully and it is wise to check that you are not overstressing the electrolytic capacitors in the power supply. Drying out of these electrolytic capacitors at elevated temperatures will drastically affect the life expectancy of the product. Humidity is usually not too much of a problem providing it is non-condensing for operation. TDK Lambda UK's products cater for 5 to 95% RH non-condensing in both operation and storage.

EMC regulations can also differ between countries and we have our own on-site pre-compliance test facilities to allow us to check out requirements of different countries. We also have access to full compliance testing facilities if required.

Another issue which needs consideration is a worldwide support network. TDK-Lambda UK has sister companies or distributors in many countries capable of providing local assistance and sales to our customers.

Finally, the best advice is to always buy from a supplier with worldwide experience and a proven track record.

For further information

To learn more about the EFE series, please visit:
http://uk.tdk-lambda.com/efe

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