Thursday, January 21, 2016

Department of Energy Level VI energy efficiency standards for external power supplies

I recently received a question from one of our sales people about to what extent the new Department of Energy's Level VI will affect our customers, and asked me to comment on it. As usual with my blogs, let us look at the background.

The power supply industry, in particular those who manufacture external or adapter power supplies, has been aware of the US Department of Energy's legislation on the efficiency standards for External Power Supplies (EPS). This legislation was made final on April 11, 2014 and comes into effect February 10, 2016. The intent is to reduce waste energy both from off-load operation and normal operation.

Details of this lengthy, but detailed, final ruling can be found on this link: http://www.regulations.gov/#!documentDetail;D=EERE-2008-BT-STD-0005-0219

I remember many years back when energy efficiency standards for power supplies were first discussed. Initially the reaction was "it is only a few Watts, why bother", but with the staggering number of external power supplies now being used (and it is expected to grow in future years) those few Watts soon adds up to billions of dollars in electricity and the associated environmental pollution.

Most people leave their laptop/tablet/phone chargers plugged in 24 hours a day, and that applies to numerous gaming consoles and other electronic equipment. Power supplies continue to draw power when not supplying load and legislation has been introduced to set (decreasing) limits year on year by multiple bodies. In addition that legislation has gradually increased the minimum operating efficiency – this is measured at four loading levels; 25, 50, 75, and 100 percent of maximum rated output current.

There has been though, some debate and confusion about what types of EPSs are actually covered by the legislation. This is significant as the DoE ruling forbids the imports of these types of power supplies after the February deadline if they do not meet the new efficiency standards. It is made clear that EPSs for some medical applications (those requiring FDA approval and listing) are exempt. Spares are also excluded from the import ban.

Looking at the final ruling web-link provided above, it states in section III General Discussion, B. Product Classes and Scope of Coverage, 1. General:

An "external power supply" is an external power supply circuit that is used to convert householdelectric current into DC current or lower-voltage AC current to operate a consumer product.

1. Is designed to convert line voltage AC input into lower voltage AC or DC output;
2. is able to convert to only one AC or DC output voltage at a time;
3. is sold with, or intended to be used with, a separate end-use product that constitutes the primary load;
4. is contained in a separate physical enclosure from the end-use product;
5. is connected to the end-use product via a removable or hard-wired male/female electrical connection, cable, cord, or other wiring; and
6. has nameplate output power that is less than or equal to 250 watts.

Section 2: Definition of Consumer Product" is where the DoE noted that some companies have made comments questioning the vagueness of the term. Schneider Electric commented that the definition of

consumer product is "virtually unbounded" and "provides no definitive methods to distinguish commercial or industrial products from consumer products."

The DoE ruling refers to an EPCA (Energy Policy and Conservation) document that defines a consumer product as:

"any article of a type that consumes or is designed to consume energy and which, to any significant extent, is distributed in commerce for personal use or consumption by individuals." For clarification, manufacturers are advised to consult this document:

https://www1.eere.energy.gov/buildings/appliance_standards/pdfs/cce_faq.pdf

To answer our salesperson's question - one thing is for sure, embedded (installed internally to the end equipment) and DIN rail power supplies are not affected by this legislation. It only applies to EPSs that are contained in a separate physical enclosure from the end-use product.

Does this affect an EPS designed for and sold for use with commercial or industrial products? I think there will still be some debate on that, but there is strong evidence in the final ruling that they are not covered and hence exempt. The document refers to "household electric current", "personal use" and "consumption by individuals". It is very clear that if an EPS manufacturer is producing a product that could likely end up in your home, it has to abide with the legislation.

As a note, TDK-Lambda has launched a number of external power supplies that comply with Level VI efficiency standards. TDK-Lambda's new industrial products also have low off-load power draws and efficiencies in excess of 90%.

Power Guy