

No load power consumption and efficiency legislation for external power supplies

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This document provides a summary of the requirements of the various bodies which currently define and regulate the no load power consumption and active mode efficiency of external power supplies. A summary of the performance levels of XP Power's products is included for reference.

Two important reasons for wanting to control the power taken by an external power supply are continuity of the energy supply and reduction of environmental impacts. Targets are given for external supplies because of the quantity sold each year, they normally do not have an off button and they are very commonly left plugged into the mains supply.

Many areas of the world are introducing limits for no load power consumption and operating efficiency of external power supplies. In the US there are three main parties, these being; California Energy Commission (CEC), US Congress with its Energy Independence and Security Act (EISA), both of which are mandatory and finally Energy Star which is voluntary. In Europe there is the Energy related Products (ErP) Directive formally known as the Energy using Products (EuP) Directive. Other parts of the world that are enacting legislation are mainly basing their limits on previous Energy Star requirements.



Both CEC and ErP have standardized their requirements with Energy Star to reduce the confusion of multiple limits. In the US, the CEC limits changed on 1st July 2008 and the Energy Star limits changed on 1st Nov 2008. In Europe, the limits changed on 1st Jan, 2009.

The tables within Summary of Limits show the limits imposed by the four bodies. The average efficiency is taken as the mean of individual efficiencies at 25%, 50%, 75% and 100% loads.

A quick reference guide of the performance levels and compliance to the various standards for XP external power supplies is included in this document.

Energy Independence & Security Act 2007 (EISA)

In 2007 the US Congress passed a law effective 1st July, 2008, called the Energy Independence and Security Act of 2007 (EISA). This states that single output external power supplies of less than 250W manufactured on or after 1st July 2008 should meet maximum no load power consumption, and minimum active load efficiency limits with an input of 115 VAC, 60Hz.

These requirements are identical to the 1st July, 2008 CEC limits meaning that any power supply meeting efficiency level IV will comply with the EISA requirements.

There are four exceptions included in the EISA legislation:

- If the power supply is to be used in an application requiring Federal Food and Drug Administration listing and approval as a medical device.
- If the power supply is charging either a detachable battery pack or the internal battery pack of a product which is primarily motor operated.
- If the power supply is to be used for spares for a product that was manufactured before 1st July, 2008.
- If the power supply is to be subsequently exported outside of the US.

ErP Directive 2009/125/EC

This is a frame work Directive for the setting of ecodesign requirements for energy related products. Parts of this are being enacted separately and there is a Commission Regulation No 278/2009 of 6th April 2009 which implements the Directive with regard to no load power and active efficiency of external power supplies.

Article 15, paragraph 2(a) of the Directive states that the volume of sales should be indicatively more than 200,000 units per year within the EU, however we are seeing that some customers are requiring compliant product for much lower quantities than this. Paragraph 2 of the Commission Regulation defines that it is external power supplies used in office equipment and consumer electronics which are covered by the Directive.

California Energy Commission Appliance Efficiency Regulations

Before the US Congress passed the EISA in 2007 the requirement for meeting energy efficiency targets for external power supplies in the USA was largely voluntary except for in California where state law had made it mandatory. The EISA requirements are based on the CEC limits so both are the same.

Energy Star

Energy Star is a body which promotes energy efficiency through use of the energy star logo. Product which meets the minimum requirements can have the blue star logo applied. Meeting the Energy Star requirements is voluntary but there are increasingly more countries around the world who are basing their mandatory requirements on the Energy Star limits.

Until recently, external power supplies have been considered as a product type by Energy Star and the data sheet of a compliant product could display the logo. Although the external power supply itself could not bear the Energy Star logo it did need to be correctly labelled with the energy efficiency level logo.

Recently, Energy Star have decided to remove the external power supply category as they feel that it should be part of the final product type. This means that after the end of 2010 compliant external power supply part numbers will not be listed on the Energy Star website. At the same time, the Energy Star logo must be removed from data sheets.

This makes no change to the external power supply its self which will still need to be tested for energy efficiency and which will still need to be marked with the appropriate energy efficiency logo.

Summary of Limits

Energy Star (Nov 1st, 2008 limits) & ErP (April 2011 limit)

No load power limits	
Rated power	No load consumption
0W to <50W (≤ 51 W)	0.3W
≥ 50 W to 250W (> 51 W)	0.5W

Figures in () are for ErP limits

Active mode power limits, O/P < 6 V	
Rated power	Average efficiency
0W to 1W	$\geq 0.497 \times \text{rated power} + 0.067$
>1W to ≤ 49 W (≤ 51 W)	$\geq [0.0750 \times \text{Ln}(\text{Rated power})] + 0.561$
>49W (> 51 W)	≥ 0.86

Active mode power limits, O/P ≥ 6 V	
Rated power	Average efficiency
0W to 1W	$\geq 0.48 \times \text{rated power} + 0.14$
>1W to ≤ 49 W (≤ 51 W)	$\geq [0.0626 \times \text{Ln}(\text{Rated power})] + 0.622$
>49W (> 51 W)	≥ 0.87

In addition, Energy Star power supplies with an input power of 100 W and above must have minimum power factor of 0.9 at 115 VAC 60 Hz.

California Energy Commission (July 1st, 2008 limits), EISA (2007 limits) & ErP (April 2010 limit)

No load power limits	
Rated power	No load consumption
All	0.5W

Figures in () are for ErP limits

Active mode power limits	
Rated power	Average efficiency
0W to 1W (<1 W)	0.5 x Rated power
>1W to 49W (≤ 51 W)	$\geq [0.09 \times \text{Ln}(\text{Rated power})] + 0.5$
>49W (> 51 W)	≥ 0.85

Measurement Technique

The US Environmental Protection Agency (EPA) has devised a procedure for measuring the no load power consumption and active mode efficiency of external supplies. This procedure has been adopted as an acceptable test method to demonstrate compliance with Energy Star, California Energy Commission, EISA and the ErP. The document can be found on the www.energystar.gov website and is titled "Test Method for Calculating the Energy Efficiency of Single-Voltage Ac-Dc and Ac-Ac Power Supplies" and is dated 11th August, 2004. This document sets out a standardized test method including test room conditions, accuracy of measuring instruments, quality of applied mains voltage and accuracy of load conditions. The document also details the information that is required for the test report.


Marking Requirements

To demonstrate compliance with the Energy Star and CEC requirements a mark must be placed on the product. The mark is made up of a Roman numeral and should now be a minimum of IV to show compliance with current requirements of CEC and EISA or a V to show compliance with Energy Star.

XP Power's Strategy

XP Power is an Energy Star partner with an approved certification facility. All of our current catalog products meet the requirements of the CEC, EISA and current ErP no load power consumption and active efficiency limits. Many of our products also meet the requirements of Energy Star Level 5 or future ErP limits. Compliance to the requirements is detailed in the individual datasheets and in the following summary sheet. While it is apparent that not all applications and equipment that utilize our external power supplies need to comply with these environmental standards, we have a policy of continuous improvement of our product line in terms of no load power consumption and active efficiency with new product introductions complying with the latest requirements. We are also introducing very low standby power component power supplies with ever increasing efficiency to support energy efficiency in all types of equipment.

XP Power's External Power Supplies Efficiency Levels

 : Indicates level IV and compliance with CEC2008, EISA2007 & ErP Step 1

 : Indicates level V and compliance with Energy Star, CEC2008, EISA2007 and ErP Step 2

	3.3 V	5 V	8 V	9 V	12 V	12.5 V	13 V	15 V	16 V	18 V	19 V	20 V	24 V	27 V	30 V	36 V	48 V
AEB36																	
AEB45																	
AEB70																	
AEB100																	
AEL15																	
AEL20																	
AEL40																	
AEL60																	
AEL80																	
AEF100																	
AEF120																	
AEF150																	
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AHM180																	
AHM250																	
AMD150																	
AML120																	
AML180																	
PDM30																	
AEM60																	
AMM90																	
AMM120																	
AMM150																	
AFM45																	
AFM60																	
AFM120																	
VEH40																	
VEH60																	
VEP08																	
VEP15																	
VEP24																	

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