Review indicates UPS Systems Inadequacy to Power Energy Star labeled Servers

By UPSonNet
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UPSonNet, a Power Protection information source, review reveals Uninterrupted Power Supply (UPS) incompliance with recent Energy Star server specification, calling users awareness to UPS characteristics before applying Energy Star labeled servers.

Energy Star, a joint program of the U.S. Environmental Protection Agency and U.S. Department of Energy, issued on May 15, 2009, requirements for Computer data center Servers specifications, which according to UPSonNet recent review are not met by more than 90% of North American UPS systems.

Computer Power Supplies draw pulsed current from the mains. The current comprises Fundamental (mains) frequency sinusoidal component and also parasitic higher harmonics which increase input current but do not contribute to the power which the Power Supply delivers.

Volt Ampere figure which represent server's input Total Power, is calculated by multiplying input voltage by total input current (including harmonics).
Watt figure represents the Real Power drawn by the server from the utility, or from UPS batteries, and is calculated by multiplying input voltage by the current of the fundamental frequency component.

Power Factor (PF) is defined as Real to Total Power Ratio, and is generally less than 0.7 for standard server Switch Mode Power Supplies. UPS systems which feed the servers bear accordingly also 0.7 PF rating. Most common UPS ratings are therefore: 700VA/ 490W, 1000VA/700W, 1500VA/1050W, 2000VA/1400W and 3000VA/2100W.

Energy Star program aims to decrease grid pollution by eliminating most input current harmonics, specifying server's Power Factor requirements of at least 0.9 at 50% load and 0.95 at full load. Correspondingly, UPS systems for powering Energy Star labeled equipment should be rated: 700VA/ 665W, 1000VA/950W, 1500VA/1425W, 2000VA/1900W and 3000VA/2850W.

The discrepancy between standard UPS power factor and Energy Star Power Factor requirement may be solved allegedly by selecting a bigger UPS. A standard 1000VA/700W UPS lacks Real Power capacity to feed 950W load as required by 1000VA Energy Star labeled server, but the next UPS rated 1500VA/1050W does.

Such solution satisfies normal requirements, but may fail in certain abnormal cases. UPS systems monitor and control certain parameters such as input, output and battery voltages as well as total load current. Most UPS system do not however sense or control Real Power, do not emit warning signals, and are not able to provide proper protection when Real Power exceeds rating.

Certain instances such as single server failure or added load by unaware operators may increase Real Power beyond UPS rating. The fault may be revealed only upon mains outage, when batteries fail to provide the required backup time. In certain cases, battery charging current in an Online UPS may be diverted to feed the excessive load, disabling correct charging of UPS batteries, affecting also battery health.

Major Brand directory of Single phase On Line North American 120V Rack Mounted UPS systems is presented on UPSonNet website including system's VA and Watt rating. According to the presentation,

Eaton's 9130 UPS designed to provide 0.9 Power Factor is the sole product family complying with Energy Star requirements. Other systems should be evaluated with the manufacturers for Energy Star server applications. For more information visit: www.upsonnet.com

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