

ENERGY STAR® for UPS – PPDS Comparison Tool – APC by Schneider Electric Comments

Jim Spitaels – May 1, 2012

Introduction

Thank you for allowing APC by Schneider Electric to provide input into the ENERGY STAR for UPS Power and Performance Data Sheet (PPDS) Comparison Tool and the PPDS itself. In general our comments reinforce and elaborate upon the input we provided during the April 25th webinar. We look forward to continued productive dialog with EPA on the PPDS and the comparison tool.

Design Best Practices

We have designed numerous similar tools ourselves and would like to share the following design best practices with EPA and its consultants.

- 1. Design for your audience**
Given that EPA intends to have a single tool to be used globally by both consumers and engineers, it is important to keep things easy enough for ordinary people, yet powerful enough for experts.
- 2. Ask simple questions**
Keep the phrasing and terminology simple and familiar so that every user can answer every question accurately and without frustration or guesswork.
- 3. Ask as few questions as possible and order them to quickly narrow down the results**
Users want quick answers and may not answer all the questions, so the first few should be the most important.
- 4. Only ask relevant questions and provide relevant selections**
Hiding irrelevant questions and answers streamlines the user experience and avoids confusion.
- 5. Select good defaults**
Every question should have a default answer (ideally dependent upon prior answers) so that users don't have to answer every question every time and users who don't know how to answer a question can just skip it.
- 6. Allow the user to make selections, not input numbers**
Use check boxes and radio buttons rather than open ended ranges.
- 7. Always provide results**
Either pop-up an error if a user makes a selection that prevents at least one result from displaying or ignore the user's selection that disqualified all the results (and inform them which selection(s) you have nullified).

Specific Recommendations

We suggest that the Comparison Tool present these questions in the order given below.

Question 1

Label: UPS type

Type: Radio buttons (choose 1)

Choices: Consumer, Commercial, Data Center, Rotary, DC Rectifier

Default: Consumer

Question 2

Label: Site voltage

Type: Check boxes (choose many)

Choices: Show the appropriate subset based on the prior question and/or the existence of qualified products:
100, 120, 200, 208, 230, 277, 400, 480, 600

Default: 120V (if Consumer), 208V (if Commercial), 277V (if DC Rectifier), 480V (if Data Center or Rotary)

Question 3

Label: Power rating

Type: Check boxes (choose many)

Choices: Show the appropriate subset based on the prior questions and/or the existence of qualified products:
<200W, 200-500W, 500-1000W, 1000-2000W, 2000-5000W, 5-10kW, 10-20kW, 20-50kW, 50-100kW,
100-200kW, >200kW

Default: 200-500W (if Consumer), 1000-2000W (if Commercial), 10-20kW (if DC Rectifier), >200kW (if Data Center or Rotary)

Question 4

Applicability: Only for Consumer and Commercial (as Data Center, RUPS and DC Rectifiers usually use external batteries and DRUPS uses diesel)

Label: Run time at full load

Type: Check boxes (choose many)

Choices: Show the appropriate subset based on the prior questions and/or the existence of qualified products:
<5 minutes, 5-10 minutes, 10-30 minutes, > 30 minutes

Default: < 5 minutes (if Consumer), 5-10 minutes (if Commercial)

Question 5

Applicability: Only for Commercial and Data Center (as Consumers don't care and it's not relevant to rotary or DC Rectifiers)

Label: Topology

Type: Check boxes (choose many)

Choices: Show the appropriate subset based on the prior questions and/or the existence of qualified products:
Standby (VFD), Line Interactive (VI), Double Conversion (VFI)

Default: Line Interactive (if Commercial), Double Conversion (if Data Center)

If desired, the following questions may also be presented to the user.

Optional Question 1

Applicability: Only for Commercial (as other types generally aren't rack mountable or are always rack mounted)

Label: Form factor

Type: Check boxes (choose many)

Choices: Tower, Rack mount

Default: Tower

Optional Question 2

Applicability: Only for Commercial and Data Center (as other types are single normal mode)

Label: Eco mode required

Type: Radio button (choose 1)

Choices: Yes, No

Default: No

Optional Question 3

Applicability: Only for Commercial and Data Center (as other types aren't modular or are always modular)

Label: Modular UPS required

Type: Radio button (choose 1)

Choices: Yes, No

Default: No

Optional Question 4

Label: Manufacturer

Type: Check boxes (choose many)

Choices: Show the appropriate list based on the existence of qualified products

Default: All check boxes selected

PPDS and Test Reporting Template Comments

We have reviewed the PPDS content as reflected in the selection tool and have the following suggestions:

- To simplify the Comparison tool, the PPDS should list the intended application of AC Static UPSs (e.g. Consumer, Commercial or Data Center)
- Similarly, the form factor of AC Static UPSs (e.g. tower, rack mount or convertible) and the U height of rack mountable UPSs should be listed on the PPDS.
- Use the following terminology for outlets: Total Outlet Quantity, UPS Protected Outlet Quantity, and Surge Protected Outlet Quantity.
- Supported nominal input and output voltage and frequency combinations should be listed in addition to or in place of the ranges that now appear on the PPDS. These are needed by users and by the Comparison Tool and it shouldn't be assumed that all nominals within the ranges are supported.
- The unit of Test Input Frequency should be Hz.
- The unit of Test Output Voltage should be V rms.
- All efficiencies should be displayed as percentages with 1 decimal place of resolution (e.g. 96.7%) as this format is more commonly used than decimal efficiency.
- The unit for Total Input Power at 0% Load should be W for values below 1000 W and kW otherwise.
- The term "Active Power" should be "Active Power Rating"
- The term "Apparent Power" should be "Apparent Power Rating"
- The units for Energy Measurement Meter-only Accuracy and Energy Measurement Metering System Accuracy should be %.
- In the Metering section, the term "Output Power" should be "Output Active Power"
- Whether the meter is bundled or integral should appear on the PPDS.
- If the meter is bundled, the manufacturer and model of the meter should appear on the PPDS.
- The term "Data Available via Web Browser" should be replaced with "HTTP" and "HTTPS" protocol support declarations just below SNMP.
- The terms "User Meter-interface Software" and "Web Browser Application URL" are unclear to us.
- The term "Internal" in reference to the energy storage device is ambiguous as the batteries are often in separate enclosures from the UPS. We therefore suggest Integral, Included or Supplied as possible alternatives.
- The physical separability question should be replaced with a declaration of the maximum distance the batteries can be located away from the UPS in meters or the item should be eliminated as nearly all data center UPSs allow batteries to be remotely located and almost no other types allow them to be further away than the next rack.
- The runtime declarations should specify resistive loading (e.g. Runtime at 100% Resistive Load).
- The additional instructions URL should be for performing the entire test, not just the energy storage portions.
- Clarification is needed to determine if the Energy Storage System URL is intended to be the UPS manufacturer's web site or the battery vendor's web site.

- Clarification is needed as to whether the dimensions are of only the UPS enclosure or of the UPS and the battery enclosures. Perhaps this section should be eliminated or only required for UPSs with internal batteries.
- The recycling section is ambiguous as it is unclear whether the take back program applies to the UPS, the batteries or both.
- Footnotes should be used on nearly all sections to denote that the majority of the data is manufacturer declared, not CB verified.
- The URL for product's web page should be listed on the PPDS.
- To be consistent with IEC 62040-3, the term "stabilization time" should be used in place of "rise time" and the value documented on the PPDS and the Test Reporting Template. It should also be used in the Test Procedure.
- The manufacturer, model number, serial number and calibration due date for each piece of test equipment should be recorded on the Test Reporting Template (e.g. AC source, energy meter, load, current transducers, etc.).
- As all UPSs must be tested in their lowest input dependency mode, this section should come first on the Test Reporting Template and performance values in this mode should appear first on the PPDS.

Conclusion

Thank you again for allowing APC by Schneider Electric to provide input into the ENERGY STAR for UPS PPDS Comparison Tool and the PPDS.

Please contact Jim Spitaels via email at jspitael@apcc.com with any questions or concerns you may have regarding these comments or any of our earlier presentations or correspondence.