

**Lightweight Shock and Type I Vibration Test Report
on
UPS Model No. PS3200RM
for
Powerstar Inc.
Gaithersburg, MD**



NU LABORATORIES

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25 February 2014

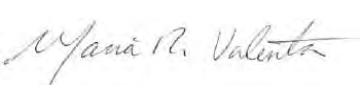

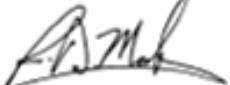
Prepared By	Checked By	Approved By
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25 February 2014	25 February 2014	25 February 2014

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1. PURPOSE OF TEST

The purpose of this test was to demonstrate that the UPS Model No. PS3200RM (herein referred to as the "UPS") complied with the requirements of MIL-S-901D when subjected to a nine (9) blow, Grade A, Class I, Type A, lightweight shock test and with the requirements of MIL-STD-167-1A when subjected to vibration through the frequency range of 4 Hz through 33 Hz in each of the three (3) major axes.

Mounting Location: Hull

Mounting Plane: Base

Mounting Orientation: Unrestricted

2. TESTED FOR

Powerstar Inc.

9073 Shady Grove

Gaithersburg, MD 20877

3. MANUFACTURER'S TYPE OR MODEL NUMBER

UPS

Model Number PS3200RM

Serial Number 02101401T

4. SPECIFICATIONS

4.1 MILITARY

MIL-S-901D (NAVY) Military Specification, Shock Tests, H.I. (High Impact); Shipboard Machinery, Equipment and Systems, Requirements for, dated 17 March 1989

MIL-STD-167-1A (SHIPS) Military Standards Mechanical Vibrations of Shipboard Equipment, dated 2 November 2005

4.2 POWERSTAR INC.

Purchase Order Number 12481

Brochure, Powerstar PS3200rm2u, True online 2KVA/1800W (19.7" deep), undated

Image, Powerstar Inc. PS3200rm2u Stainless Steel, undated

5. NUMBER OF ITEMS TESTED

One (1) UPS

6. SECURITY CLASSIFICATION OF ITEMS

Unclassified

7. DATE TESTS COMPLETED

Shock: 12 February 2014

Vibration: 18 February 2014

8. TEST CONDUCTED BY

NU Laboratories

312 Old Allerton Road

Annandale, NJ 08801

(NAVY Certified Shock Test Facility by NAVSEA INST 9491.1C)

9. TEST WITNESS

Mike Taglia, Powerstar Inc. representative

10. ABSTRACT

The UPS was subjected to a nine (9) blow lightweight shock test in accordance with the referenced test specifications. Visual inspections, performed after each shock blow, revealed discrepancies. Refer to Section 12 for additional information.

The UPS was subjected to vibration through the frequency range of 4 Hz to 33 Hz in each of the three (3) major axes, in accordance with the referenced test specifications. Visual inspections, performed after each axis of vibration, revealed no discrepancies. Refer to Section 13 for additional information.

11. LABORATORY CONDITIONS

Ambient Temperature: 68°F

Relative Humidity: 21%

Atmospheric Pressure: 30.28 in. Hg

Note: cited conditions are averages of all laboratory conditions recorded throughout testing

12. LIGHTWEIGHT SHOCK TEST DESCRIPTION

12.1 ACCEPTANCE CRITERIA

Acceptance criteria were in accordance with paragraph 3.1.10.1 of MIL-S-901D. In addition, the UPS, portions thereof, or the contents of the UPS shall not come adrift or otherwise cause a condition which may create a hazard thereby, causing possible damage to Grade A equipment or injury to personnel operating or manning Grade A equipment.

12.2 PRE-TEST INSPECTION

Upon receipt, a visual inspection performed on the UPS revealed no obvious physical damage or discrepancies. The UPS was weighed and the weights were recorded in the test log. The weight of the UPS was 55.5 pounds.

12.3 TEST SETUP

Fixture 4C, Platform 3 of MIL-S-901D was attached to the lightweight shock machine using six (6) 3/4"-10 Grade 5 bolts, nuts, and washers torqued to 260 ft-lbs. A gasket was placed on the deck of Fixture 4C, Platform 3 of MIL-S-901D. The UPS was placed on the gasket, oriented in the first major axis of test. The UPS was then clamped to Fixture 4C, Platform 3 of MIL-S-901D using three (3) clamps composed of three (3) 1-inch square clamping bars and six (6) 1/2"-13 Grade 5 threaded rods, eighteen (18) washers, and eighteen (18) nuts. Strips of rubber were placed atop the UPS at the three (3) clamping bar locations. Blocking was welded to Fixture 4C, Platform 3 of MIL-S-901D around the UPS to limit lateral movement. The total weight on the anvil table was 346 pounds. Refer to Table 1 for a breakdown of the test weights.

Table 1: Lightweight Shock Test Weights

UPS	55.5 lbs.
Mounting Hardware	3 lbs.
Three (3) 1-inch Square Clamping Bars	5 lbs.
Fixture 4C, Platform 3 of MIL-S-901D	186 lbs.
One (1) Set of Standoff Channels	83 lbs.
Mounting Hardware	13.5 lbs.
Total Weight on Anvil Table, Fixture 4C, Platform 3 of MIL-S-901D	346 lbs.

The UPS was supplied with 120 VAC, 1-phase, 60 Hz and energized. A light was used as a load to determine if the UPS was functional. The Powerstar representative placed the UPS in the operational condition and directed that shock testing commence. Refer to Figures 1 and 5 for photographs of the shock test setup.

12.4 TEST CONDITIONS

Throughout shock testing, the UPS was energized with 120 VAC, 1-phase, 60 Hz.

12.5 BLOW #1

12.5.1 Conditions: Front-to-Back Axis, 1' hammer height

12.5.2 Observations: A post-blow visual inspection revealed that the bypass cover had become detached but was still located near the switch. Refer to Figure 2 for a photograph. No additional obvious physical damage or discrepancies were noted.

12.5.3 Action: The clamp hardware was retightened. Testing was continued.

12.6 BLOW #2

12.6.1 Conditions: Front-to-Back, 3' hammer height

12.6.2 Observations: A post-blow visual inspection revealed no additional obvious physical damage or other discrepancies.

12.6.3 Action: Testing was continued.

12.7 BLOW #3

12.7.1 Conditions: Front-to-Back, 5' hammer height

12.7.2 Observations: A post-blow visual inspection revealed that the UPS had switched to battery mode and the 120 g breaker had moved down. The Powerstar representative pulled the breaker back up; refer to Figure 3. The UPS reverted from battery mode to AC mode. It was noted that the UPS maintained the load at all times. It was further noted that the battery cover was bent; refer to Figure 4. No additional obvious physical damage or discrepancies were noted. The UPS was noted to operate without discrepancy.

12.7.3 Action: Testing was continued.

12.8 BLOW #4

12.8.1 Conditions: Side-to-Side, 1' hammer height

12.8.2 Observations: A post-blow visual inspection revealed no additional obvious physical damage or other discrepancies.

12.8.3 Action: Testing was continued.

12.9 BLOW #5

12.9.1 Conditions: Side-to-Side, 3' hammer height

12.9.2 Observations: A post-blow visual inspection revealed no additional obvious physical damage or other discrepancies.

12.9.3 Action: Testing was continued.

12.10 BLOW #6

12.10.1 Conditions: Side-to-Side, 5' hammer height

12.10.2 Observations: A post-blow visual inspection revealed no additional obvious physical damage or other discrepancies.

12.10.3 Action: Testing was continued.

12.11 BLOW #7

12.11.1 Conditions: Top-to-Bottom, 1' hammer height

12.11.2 Observations: A post-blow visual inspection revealed no additional obvious physical damage or other discrepancies.

12.11.3 Action: Testing was continued.

12.12 BLOW #8

12.12.1 Conditions: Top-to-Bottom, 3' hammer height

12.12.2 Observations: A post-blow visual inspection revealed no additional obvious physical damage or other discrepancies.

12.12.3 Action: Testing was continued.

12.13 BLOW #9

12.13.1 Conditions: Top-to-Bottom, 5' hammer height

12.13.2 Observations: A post-blow visual inspection revealed that the breaker previously noted to move after Blow #3 had again moved down. The UPS did not switch to battery mode. It was further noted that the UPS became de-energized. Refer to Figure 6 for photographs. The Powerstar representative noted that the UPS had failed.

12.13.3 Action: The Powerstar representative restarted the UPS, which was noted to then become energized. The representative requested that Blow #9 be repeated.

12.14 BLOW #9 – REPEAT BLOW

12.14.1 Conditions: Top-to-Bottom, 5' hammer height

12.14.2 Observations: A post-blow visual inspection revealed no additional obvious physical damage or discrepancies.

12.14.3 Action: The Powerstar representative directed that vibration testing commence. Shock testing was complete.

Refer to the Factory Test Records, Figures 2 and 3, and the Shock Test Acceptance Forms, Figures 7 and 8, for additional information.

13. VIBRATION TEST DESCRIPTION

13.1 ACCEPTANCE CRITERIA

Acceptance criteria were in accordance with paragraph 5.1.1 of MIL-STD-167-1A. In addition, acceptability was contingent upon the ability of the UPS to perform its function during and after vibration testing. Minor damage or distortion was permitted during testing, providing such damage or distortion does not in any way impair the ability of the UPS to perform its principal function.

13.2 TEST SETUP

Upon completion of shock testing, the UPS was removed from Fixture 4C, Platform 3 of MIL-S-901D and clamped to a test plate on the vibration machine using four (4) clamps, oriented in the first major axis of test. The UPS was energized with 120 VAC, 1-phase, 60 Hz and placed in the operational condition; no discrepancies were noted. The test load light was attached to the UPS; no discrepancies were noted.

One (1) input accelerometer was attached to the test plate, oriented in the direction of vibration, to record the vibration input and one (1) response accelerometer was attached to the forward right corner on top of the UPS to aid in the detection of response prominences. Refer to Table 2 for the accelerometer locations. Refer to Figures 9 through 11 for photographs of the vibration test setups.

Table 2: Accelerometer Locations

Channel 1 (Input)	Test Plate
Channel 2	Forward Right Corner, Top of UPS

13.3 TEST CONDITIONS

Throughout vibration testing, the UPS was energized with 120 VAC, 1-phase, 60 Hz.

Note: NU Laboratories records peak-to-peak (double amplitude).

13.4 FIRST MAJOR AXIS OF TESTING – VERTICAL

13.4.1 Exploratory

The UPS was vibrated from 4 Hz through 33 Hz with a vibration input of 0.020 ± 0.004 inches (double amplitude) to determine response prominences. The change in frequency was made in discrete intervals of 1 Hz and the vibration was maintained at each frequency for approximately fifteen (15) seconds. No response prominences or other discrepancies were noted. The table input vibration levels and the accelerometer output vibration levels at each frequency were recorded on the Vibration Test Data Sheet, Figure 12.

13.4.2 Variable Frequency

The UPS was vibrated from 4 Hz to 33 Hz with input amplitudes as shown in Table 3. The change in frequency was made in discrete intervals of 1 Hz and the vibration was maintained at each frequency for a period of five (5) minutes. No response prominences or other discrepancies were noted. The table input vibration levels and the accelerometer output vibration levels at each frequency were recorded on the Vibration Test Data Sheet, Figure 12. The UPS was subjected to an operational check; no discrepancies were noted.

Table 3: Variable Frequency Test Amplitudes

Frequency (Hz)	Input Inches (Double Amplitude)
4-15	0.060 ± 0.012
16-25	0.040 ± 0.008
26-33	0.020 ± 0.004

13.4.3 Endurance

Since no response prominences were noted, the endurance vibration was performed at the specified upper frequency of 33 Hz with input amplitude as shown in Table 3 for a period of two (2) hours; refer to Figure 12. Upon completion of the two (2) hour dwell, an external visual inspection revealed no obvious physical damage or discrepancies. The UPS was subjected to an operational check; no discrepancies were noted.

13.1 SECOND MAJOR AXIS OF TESTING – FRONT-TO-BACK

13.1.1 Exploratory

The UPS was vibrated from 4 Hz through 33 Hz with a vibration input of 0.020 ± 0.004 inches (double amplitude) to determine response prominences. The change in frequency was made in discrete intervals of 1 Hz and the vibration was maintained at each frequency for approximately fifteen (15) seconds. No response prominences or other discrepancies were noted. The table input vibration levels and the accelerometer output vibration levels at each frequency were recorded on the Vibration Test Data Sheet, Figure 13. The UPS was subjected to an operational check; no discrepancies were noted.

13.1.2 Variable Frequency

The UPS was vibrated from 4 Hz to 33 Hz with input amplitudes as shown in Table 3. The change in frequency was made in discrete intervals of 1 Hz and the vibration was maintained at each frequency for a period of five (5) minutes. No response prominences or other discrepancies were noted. The table input vibration levels and the accelerometer output vibration levels at each frequency were recorded on the Vibration Test Data Sheet, Figure 13.

13.1.3 Endurance

Since no response prominences were noted, the endurance vibration was performed at the specified upper frequency of 33 Hz with input amplitude as shown in Table 3 for a period of two (2) hours; refer to Figure 13. Upon completion of the two (2) hour dwell, an external visual inspection revealed no obvious physical damage or discrepancies. The UPS was subjected to an operational check; no discrepancies were noted.

13.2 THIRD MAJOR AXIS OF TESTING – SIDE-TO-SIDE

13.2.1 Exploratory

The UPS was vibrated from 4 Hz through 33 Hz with a vibration input of 0.020 ± 0.004 inches (double amplitude) to determine response prominences. The change in frequency was made in discrete intervals of 1 Hz and the vibration was maintained at each frequency for approximately fifteen (15) seconds. No response prominences or other discrepancies were noted. The table input vibration levels and the accelerometer output vibration levels at each frequency were recorded on the Vibration Test Data Sheet, Figure 14.

13.2.2 Variable Frequency

The Valve was vibrated from 4 Hz to 33 Hz with input amplitudes as shown in Table 3. The change in frequency was made in discrete intervals of 1 Hz and the vibration was maintained at each frequency for a period of five (5) minutes. No response prominences or other discrepancies were noted. The table input vibration levels and the accelerometer output vibration levels at each frequency were recorded on the Vibration Test Data Sheet, Figure 14.

13.2.3 Endurance

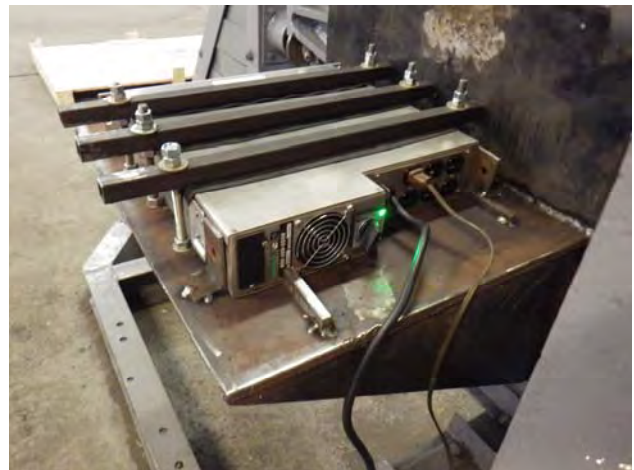
Since no response prominences were noted, the endurance vibration was performed at the specified upper frequency of 33 Hz with input amplitude as shown in Table 3 for a period of two (2) hours; refer to Figure 14. Upon completion of the two (2) hour dwell, an external visual inspection revealed no obvious physical damage or discrepancies.

14. DISPOSITION OF TEST ITEM

Upon completion of testing, the UPS was returned to Powerstar Inc.



Front of the UPS when Energized



Back of the UPS when Energized



**Shock Test Setup, Front-to-Back Axis
Figure 1**



Post-Blow #1, Detached Bypass Cover
Figure 2



Post-Blow #3, Breaker Moved Back into Position
Figure 3



Post-Blow #3, Bent Battery Cover
Figure 4



Shock Test Setup, Side-to-Side and Top-to-Bottom Axes
Figure 5



Breaker Switch in the Down Position



Back of UPS; All Lights De-illuminated




Load Light De-illuminated



Front of UPS; All Lights De-illuminated

**Post-Blow #9, Bent Battery Cover
Figure 6**

FACTORY TEST RECORD: CLASS H SHOCK										DATE	TEST #
1. ITEM NAME OF EQUIPMENT SHOCK TESTED UPS Model No. PS3200RM										12 February 2014	12069.1
2. RATING (MW VOLTS, GPM, CFM, ETC.)											
3. MAJOR PARTS											
PUMP, ETC.	TESTED FOR	ADDRESS	GOV DWG NO.	IDENTIFYING #							
	Powersoft Inc.	9075 Shady Grove									
		Calderbury, MD 20817									
MOTOR, ETC.	MANUFACTURER	ADDRESS	GOV DWG NO.	IDENTIFYING #							
STARTER, ETC.	MANUFACTURER	ADDRESS	GOV DWG NO.	IDENTIFYING #							
4. CONTRACT NO.	CONTRACTOR	ADDRESS									
5. TYPE OF SHOCK TEST <input checked="" type="checkbox"/> ASSEMBLY <input type="checkbox"/> SUB-ASSEMBLY <input type="checkbox"/> PART											
6. TOTAL WEIGHT OF ASSEMBLY TESTED											
85.5 pounds											
7. WEIGHT CLASSIFICATION OF ITEM											
<input checked="" type="checkbox"/> LIGHT <input type="checkbox"/> MEDIUM											
8. APPLICABLE MOUNTING EXTENSION SPECIFICATION (MIL-STD-883C)											
<input type="checkbox"/> FIG 7 <input type="checkbox"/> FIG 8 <input type="checkbox"/> FIG 9 <input type="checkbox"/> FIG 10 <input type="checkbox"/> FIG 11 <input type="checkbox"/> FIG 12 <input type="checkbox"/> FIG 13 <input type="checkbox"/> FIG 14 <input type="checkbox"/> FIG 15 <input type="checkbox"/> FIG 16 <input type="checkbox"/> FIG 17 <input type="checkbox"/> FIG 18 <input type="checkbox"/> FIG 19											
9. FOR LIGHTWEIGHT ITEMS											
BLOW	DROP	AXIS	DAMAGE INCURRED	BLOW	DROP	AXIS	DAMAGE INCURRED				
1	1'	Front-to-Back	Refer to report	7	1'	Top-to-Bottom	No damage noted				
2	3'	Front-to-Back	No damage noted	8	3'	Top-to-Bottom	No damage noted				
3	5'	Front-to-Back	Refer to report	9	5'	Top-to-Bottom	Refer to report				
4	1'	Side-to-Side	No damage noted	9 (weird)	5'	Top-to-Bottom	No damage noted				
5	3'	Side-to-Side	No damage noted								
6	5'	Side-to-Side	No damage noted								
REMARKS											
10. FOR MEDIUM WEIGHT ITEMS											
BLOW	GROUP	HAMMER DROP	DAMAGE INCURRED	BLOW	GROUP	HAMMER DROP	DAMAGE INCURRED				
TOTAL WEIGHT ON ANY TABLE											
SAC pounds											
TEST LABORATORY											
NU Laboratories											
ADDRESS											
312 Old Allerton Road, Annandale, NJ 08601											
TEST ENGINEER											
											

Factory Test Record
Figure 7

Shock Test Acceptance Form

1. The item identified below has met the requirements of MIL-S-901, based upon:

- ☒ Shock test of the item identified below.
☐ Shock Test Extension

2. Description: UPS Model No. PS3200RM

3. Manufacturer: Powerstar Inc.

4. Model/Part No.: Model Number PS3200RM

5. Size/Capacity: _____

6. Drawing No., Revision & Date: _____

7. Ship: _____

8. Ship System/Service: _____

9a. Qualification Submittal Reference Document No., Revision & Date: MIL-S-901D dated 17 March 1989

9b. Shock Test Facility, Report No., Revision & Date: NU Laboratories, Report No. 12069.1 dated 25 February 2014

10. Previous Shock Test Approval Reference (if this form conveys shock test extension approval):

11. Test Category: ☒ Lightweight ☐ Medium Weight ☐ Heavyweight ☐ Alternate Vehicle

12. Shock Grade: ☒ A ☐ B

13. Equipment Class: ☒ I ☐ II ☐ I/II ☐ III

14. Shock Test Type: ☒ A ☐ B ☐ C

15. Mounting Location: ☐ Deck ☒ Hull ☐ Shell ☐ Frame ☐ Mast ☐ Wetted Surface ☐ Fluid Loaded Hull

16. Equipment Mounting Plane:

☒ Base ☐ Front/Face ☐ Back
☐ Top ☐ Other: _____

17. Mounting Orientation of Item Aboard Ship:

☒ Unrestricted ☐ Vertical Axis Specified ☐ Restricted: _____

18. Remarks/Approval Limitations:

19. Approved:

Equipment Approval Authorized Signature Approval Activity Approval Date

Shock Approval Authorized Signature Approval Activity Approval Date

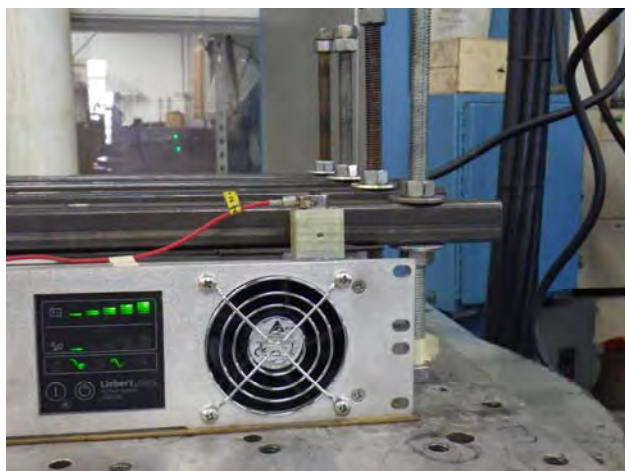
Shock Test Acceptance Form Figure 8



Vertical Axis, Load Light Illuminated



Channel 1 (Input) Accelerometer, Test Plate



Channel 2 Accelerometer, Right Corner, Top of UPS



Front of the UPS when Energized



Back of the UPS when Energized

**Vibration Test Setup, Vertical Axis
Figure 9**



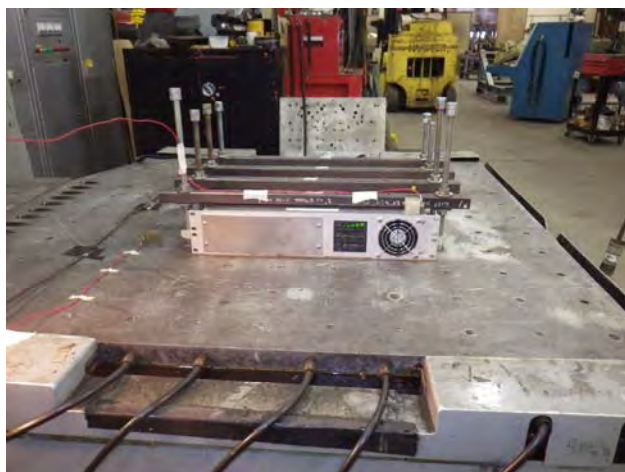
Front of the UPS when Energized



Back of the UPS when Energized



**Vibration Test Setup, Front-to-Back Axis
Figure 10**



Front of the UPS when Energized



Back of the UPS when Energized




**Vibration Test Setup, Side-to-Side Axis
Figure 11**

EXPLORATORY FREQUENCY				VARIABLE FREQUENCY		
Hz	INPUT	CH. 1	CH. 2	INPUT	CH. 1	CH. 2
4	.020	.020		.060	.059	
5	.020	.019		.060	.059	
6	.020	.019		.060	.059	
7	.020	.019		.060	.059	
8	.020	.019		.060	.060	
9	.020	.019		.060	.060	
10	.020	.019		.060	.060	
11	.020	.020		.060	.061	
12	.020	.020		.060	.061	
13	.020	.020		.060	.061	
14	.020	.020		.060	.061	
15	.020	.020		.060	.060	
16	.020	.020		.040	.039	
17	.020	.020		.040	.040	
18	.020	.020		.040	.040	
19	.020	.020		.040	.040	
20	.020	.020		.040	.040	
21	.020	.020		.040	.040	
22	.020	.020		.040	.040	
23	.020	.020		.040	.041	
24	.020	.020		.040	.042	
25	.020	.021		.040	.046	
26	.020	.022		.020	.026	
27	.020	.026		.020	.026	
28	.020	.028		.020	.026	
29	.020	.030		.020	.025	
30	.020	.025		.020	.024	
31	.020	.022		.020	.022	
32	.020	.022		.020	.021	
33	.020	.021		.020	.021	
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						
49						
50						
Res. _____ Hz						

VIBRATION TEST DATA SHEET

JOB NO. 12069
 DATE 2/17/14
 AXIS Vertical


NU LABORATORIES
 312 OLD ALLERTON RD., ANNANDALE, NJ
 08801 (908) 713-9300

NOTE: RECORDED DATA IS DOUBLE AMPLITUDE

ENDURANCE		
Hz	INPUT	DURATION
33	.020	2 hrs.

TEST ARTICLE IDENTIFICATION:

UPS
m/wth PS3200RM24

TESTED FOR:

Powerstar


ACCELEROMETER LOCATIONS	
INPUT	last plate.
CH. 1	TOP / RT CORNER. UPS
CH. 2	
CH. 3	

REMARKS:

TEST ENGINEER: [Signature]

SHEET: 1

Vibration Test Data Sheet, Vertical Axis
Figure 12

EXPLORATORY FREQUENCY				VARIABLE FREQUENCY			VIBRATION TEST DATA SHEET																	
Hz	INPUT	CH. 1	CH. 2	INPUT	CH. 1	CH. 2																		
4	.020	.020		.060	.059		JOB NO. <u>12069[#]</u> DATE <u>2/17/14</u> AXIS <u>Front to Back</u>  NU LABORATORIES 312 OLD ALLERTON RD., ANNANDALE, NJ 08801 (908) 713-9300																	
5	.020	.020		.060	.060																			
6	.020	.020		.060	.061																			
7	.020	.020		.060	.059																			
8	.020	.020		.060	.060																			
9	.020	.020		.060	.060																			
10	.020	.020		.060	.060																			
11	.020	.020		.060	.060																			
12	.020	.020		.060	.060																			
13	.020	.020		.060	.060																			
14	.020	.020		.060	.060		NOTE: RECORDED DATA IS DOUBLE AMPLITUDE ENDURANCE <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Hz</th> <th>INPUT</th> <th>DURATION</th> </tr> </thead> <tbody> <tr> <td>33</td> <td>.020</td> <td>2 hrs</td> </tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>			Hz	INPUT	DURATION	33	.020	2 hrs									
Hz	INPUT	DURATION																						
33	.020	2 hrs																						
15	.020	.020		.040	.040																			
16	.020	.020		.040	.040																			
17	.020	.020		.040	.040																			
18	.020	.020		.040	.040																			
19	.020	.020		.040	.040																			
20	.020	.020		.040	.040																			
21	.020	.020		.040	.040																			
22	.020	.020		.040	.040																			
23	.020	.020		.040	.040																			
24	.020	.020		.040	.040		TEST ARTICLE IDENTIFICATION: UPS m/w [#] P53200RM24																	
25	.020	.020		.040	.040																			
26	.020	.020		.020	.020																			
27	.020	.020		.020	.020																			
28	.020	.020		.020	.020																			
29	.020	.020		.020	.020																			
30	.020	.020		.020	.020																			
31	.020	.020		.020	.020																			
32	.020	.020		.020	.020																			
33	.020	.020		.020	.020																			
34							TESTED FOR: Power Star																	
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44							ACCELEROMETER LOCATIONS <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>INPUT</th> <th> </th> </tr> </thead> <tbody> <tr> <td>CH. 1</td> <td>test plate</td> </tr> <tr> <td>CH. 2</td> <td>top/rt corner Front - UPS</td> </tr> <tr> <td>CH. 3</td> <td> </td> </tr> </tbody> </table>			INPUT		CH. 1	test plate	CH. 2	top/rt corner Front - UPS	CH. 3								
INPUT																								
CH. 1	test plate																							
CH. 2	top/rt corner Front - UPS																							
CH. 3																								
45																								
46																								
47																								
48																								
49																								
50																								
	Res. _____	Hz																						

REMARKS:

TEST ENGINEER: John Wey

SHEET: 2

Vibration Test Data Sheet, Front-to-Back Axis
Figure 13

CALCULATOR FREQUENCY			VARIABLE FREQUENCY			
Hz	INPUT	CH. 1	CH. 2	INPUT	CH. 1	CH. 2
4	.020	.020		.060	.058	
5	.020	.020		.060	.060	
6	.020	.020		.060	.059	
7	.020	.020		.060	.059	
8	.020	.020		.060	.060	
9	.020	.020		.060	.060	
10	.020	.020		.060	.061	
11	.020	.020		.060	.060	
12	.020	.021		.060	.060	
13	.020	.020		.060	.060	
14	.020	.020		.060	.060	
15	.020	.020		.060	.060	
16	.020	.020		.040	.040	
17	.020	.020		.040	.040	
18	.020	.020		.040	.040	
19	.020	.020		.040	.040	
20	.020	.020		.040	.040	
21	.020	.020		.040	.040	
22	.020	.020		.040	.041	
23	.020	.020		.040	.041	
24	.020	.020		.040	.041	
25	.020	.020		.040	.041	
26	.020	.020		.020	.020	
27	.020	.020		.020	.020	
28	.020	.020		.020	.020	
29	.020	.020		.020	.020	
30	.020	.020		.020	.020	
31	.020	.020		.020	.020	
32	.020	.021		.020	.020	
33	.020	.021		.020	.020	
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						
49						
50						
Res. _____ Hz						

VIBRATION TEST DATA SHEET

JOB NO. 12069
DATE 2/18/14
AXIS side to side

NU
NU LABORATORIES
312 OLD ALLERTON RD., ANNANDALE, NJ
08801 (908) 713-9300

NOTE: RECORDED DATA IS DOUBLE AMPLITUDE

ENDURANCE		
Hz	INPUT	DURATION
32	.020	2 HR

TEST ARTICLE IDENTIFICATION:
UPS
M/N PS2300RM24

TESTED FOR:
Powerstar

ACCELEROMETER LOCATIONS	
INPUT	<u>Test Plate</u>
CH. 1	<u>Top, Right, front corner</u>
CH. 2	<u> </u>
CH. 3	<u> </u>

REMARKS:

TEST ENGINEER: John Wang

SHEET: 3

Vibration Test Data Sheet, Side-to-Side Axis
Figure 14

LIST OF APPARATUS

Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Thermometer/ Hygrometer	Radio Shack	63-855	006	08/09/13	08/09/14
Barometer	B&K	UZ001	BAR003	04/23/13	04/23/14
Torque Wrench	Utica	TCI-150FRN	MD6973	09/13/13	09/13/14
Shaker	Unholtz-Dickie	T1000-20	357	Functional	
Lightweight Shock Machine	New England Trawler	10-T-2145-L-ALT	N/A	Functional	
Accelerometer	Endevco	2221D	EY59	07/01/13	07/01/14
Accelerometer	Endevco	2221D	EM03	07/01/13	07/01/14
Charge Amplifier	Endevco	2721B	EW80	05/08/13	05/08/14
Charge Amplifier	Endevco	2721B	EW67	05/08/13	05/08/14
Power Supply	Endevco	4221A	8015	05/08/13	05/08/14
Vibration Controller	Data Physics	DP560	5256	09/06/13	09/06/14
1 Hour Timer	Gra-Lab	165	739	08/30/13	08/30/14
Platform Scale	Fairbanks Morse	1224A	G-511397	01/13/14	01/13/15
Balance Scale	Ohaus	1225	EL-330	01/31/14	01/31/15
25HP Variable Speed Drive	Durapulse	GS3-2025	T425001	Functional	
All calibrations are traceable to the National Institute of Standards and Technology. Procedures satisfy the requirements set forth in ANSI-Z540-1 and/or MIL-STD-45662A. Calibration records are on file at NU Laboratories.					
All weights and scales are traceable to the State of NJ Office of Weights and Measures (NJSA 51:1-61; NJAC 13:17E-1.2)					