




DRV ENVIRONMENTAL TEST REPORT

Date Released	July 18, 2017	Reference Number	RE-PH17/071
Model No.	73-958-0001 (iHP 12kW Rack)	Manufacturing Site	Laguna
Product Spec Rev	Rev.09	Product Spec Release Date	10-20-2016
BOM Release Date	01-12-2017	Schematic Rev	705-003286-0000 Rev AB
Sample Size	See page 4	Product Rev	EVT

	Name/s	Signature	Date
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Revision Control		
Revision	Change History	Date
A	First Release : iHP 12kW Rack only; Rack and Module Configuration S&V results	07/18/2017

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Test Result Summary and Conclusion

TEST	DRV Result
	(P-Pass / F-Fail / NR-Not Required)
1.0 Mechanical	
1.1 Sinusoidal Vibration	
1.1.1 Operating Sinusoidal Vibration 1(Rack and module Configuration)	P
1.1.2 Operating Sinusoidal Vibration 2(Rack and module Configuration)	P
1.2 Random Vibration	
1.2.1 Non-operating Random Vibration (Rack only)	P
1.2.2 Operating Random vibration(Rack and module Configuration)	P
1.3 Shock	
1.3.1 Non-operating Half-sine Shock (Rack only)	P
1.3.2 Bench Handling(Rack only)	P

Test Report Conclusion	This product had completed the DRV tests as outlined in this report. Based on the test results depicted in this report, the product passed the DRV test.
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References

1. Product Specifications: Rev. 09
2. DRV Test Plan No. QAP-1306/PH Rev. A
3. Design Derating Requirements [920-000114-0000](#)
4. Design Reliability Verification [920-000095-0000](#)
5. Schematic Diagram [705-003286-0000](#) Rev. AB
6. PCB Artwork P/N's: [509-022833-0000](#), [509-021535-0005](#), [509-021699-0006](#), [509-021671-0004](#), [509-022859-0000](#), [509-022858-0001](#), [509-022827-0000](#), [509-022856-0001](#), [509-022668-0001](#), [509-002267-0001](#)

SAMPLE RACK UNIT SUMMARY

Sample Unit #	Serial #	Date Code	Firmware	Product Revision
1	M195SK0008ARP	Year : 2017; Week :02	N/A	EVT
2	M195SK0007ARP	Year : 2017; Week :02	N/A	EVT
3	M195SM0000CARP	Year : 2017; Week :04	N/A	EVT
4	M195SM0000BARP	Year : 2017; Week :04	N/A	EVT
5	M195SM0000MARP	Year : 2017; Week :04	N/A	EVT

SAMPLE MODULES UNIT SUMMARY

Sample Unit #	Serial #	Date Code	Output Voltage	Product Revision
1	K839SK0002EMC	Year : 2017; Week :02	48V	DVT4
2	K839SK0003EMC	Year : 2017; Week :02	48V	DVT4
3	K839SK0004EMC	Year : 2017; Week :02	48V	DVT4
4	K839SK0001EMC	Year : 2017; Week :02	48V	DVT4

Hi Pot Test Procedure

1. P- PE at 3400Vdc, 6 sec dwell time, 5mA max trip current, 500V/s
2. P- ISOCOM, MOD1, MOD2, MOD3, MOD4, MOD5, MOD6,MOD7, MOD8 at 3400Vdc, 6 sec dwell time, 5mA max trip current, 500V/s
3. ISOCOM - MOD1, MOD2, MOD3, MOD4, MOD5, MOD6,MOD7, MOD8 at 1800Vac, 6 sec dwell time, 5mA max trip current, 500V/s
4. MOD1 - MOD2, MOD3, MOD4, MOD5, MOD6,MOD7, MOD8 at 1800Vac, 6 sec dwell time, 5mA max trip current, 500V/s
5. MOD2 – MOD1, MOD3, MOD4, MOD5, MOD6,MOD7, MOD8 at 1800Vac, 6 sec dwell time, 5mA max trip current, 500V/s
6. MOD3 - MOD2, MOD1, MOD4, MOD5, MOD6,MOD7, MOD8 at 1800Vac, 6 sec dwell time, 5mA max trip current, 500V/s
7. MOD4 - MOD2, MOD3, MOD1, MOD5, MOD6,MOD7, MOD8 at 1800Vac, 6 sec dwell time, 5mA max trip current, 500V/s
8. MOD5 - MOD2, MOD3, MOD4, MOD1, MOD6,MOD7, MOD8 at 1800Vac, 6 sec dwell time, 5mA max trip current, 500V/s
9. MOD6 - MOD2, MOD3, MOD4, MOD5, MOD1,MOD7, MOD8 at 1800Vac, 6 sec dwell time, 5mA max trip current, 500V/s
10. MOD7 - MOD2, MOD3, MOD4, MOD5, MOD6,MOD1, MOD8 at 1800Vac, 6 sec dwell time, 5mA max trip current, 500V/s
11. MOD8 - MOD2, MOD3, MOD4, MOD5, MOD6,MOD7, MOD1 at 1800Vac, 6 sec dwell time, 5mA max trip current, 500V/s

TEST DETAILS

1.0 Mechanical Test

1.1 Sinusoidal Vibration

1.1.1 Operating Sinusoidal Vibration 1 (Rack and module configuration)

Reference Document		Mechanical Test Instruction 920-000096-0000 Rev.AF / MIL-STD-810G Method 528 Procedure I (Type1)			
Test Location		RE Cavite			
Test Conditions	Load	Full Load (12kW)			
	Line	480	Vac / Three Phase		
	Exploratory Vibration test				
	Amplitude	0.01	in		
	Frequency Range	4 to 33 (actual used 5 to 33)		Hz	
	Sweep Rate	Discrete 1 Hz interval, 15 sec per interval			
		0.067	Hz/sec		
	Variable Frequency test				
	PSD Profile	Frequency Range, Hz		Amplitude, Inch	
		4 to 15		0.030 +/-0.006	
		16 to 25		0.020 +/-0.004	
	Sweep Rate	26 to 33		0.010 +/-0.002	
		Discrete 1 Hz interval, 5 min per interval			
		Direction 3 mutually perpendicular axis			
	Duration of endurance test	Number of endurance test frequencies		Test time duration at each endurance test frequency	Total time
1		2 hours	2 hours		
2		1 hour	2 hours		
3		40 minutes	2 hours		
4		40 minutes	2 hours, 40		
n>2		40 minutes	40 x n minutes		
Resonant Frequency	X – axis		No significant response prominence		
	Y – axis		No significant response prominence		
	Z – axis		No significant response prominence		
Test Sample	Serial Nos.	Rack: Sample #3,4 Module: Sample#1,2,3,4			
	Date Code	See page 4			
Test Equipment	Description	Model No.	Equipment No.	Calibration Due Date	
	Dongling Vibration System	DA-40	N/A	N/A	
	Accelerometer	Dytran 3030B5	SN: 8255	18 SEP 17	
	Grid	NA	NA	NA	
	DMM	HP34401A	007322	12 SEP 17	
	Dielectric Analyzer	Vitrex 944i	005842	16 DEC 17	
	Data Logger	Graphtec GL820	010452	12 OCT 17	

	Electronic Load	CHROMA63203	010348	03 AUG 17
	Electronic Load	CHROMA63203	010999	05 OCT17
	Electronic Load	CHROMA63203	010366	28 APR 18
	Electronic Load	CHROMA63203	080389	03 AUG 17
	Electronic Load	CHROMA63203	010893	22 AUG 17
	Electronic Load	CHROMA63203	010394	03 AUG 17
	Electronic Load	CHROMA63203	010346	03 AUG 17
	Electronic Load	CHROMA63203	005814	08 DEC 17
Test Result	Visual	Sample#3 was found with defective riveted nut of UUT's top cover Bugzilla#25811 was release to document the issue. Please refer to attachment 2 nd Inspection Sample#4 No deviation found before and after test		
	Functional	No deviation found before and after test		
	Mechanical	No deviation found before and after test		
	Hi-Pot Test	Passed		
Test Remarks	Based on above test results, sample product passed Operating Sinusoidal Vibration 1 MIL-STD-810G Method 528 Procedure I (Type1) test. See test data on Appendix.			

1.1.2 Operating Sinusoidal Vibration 2 (Rack and module configuration)

Reference Document		Mechanical Test Instruction 920-000096-0000 Rev.AF / NEBS Office Vibration Environment, Alternate Procedure		
Test Location		RE Cavite		
Test Conditions	Load	Full Load (12kW)		
	Line	480	Vac / Three Phase	
	Acceleration	1	G	
	Frequency Range	5-100	Hz	
	Sweep Rate	0.25	Oct /min	
	Sweep duration	1	Sweep / axis	
	Direction	3 mutually perpendicular axis		
Test Sample	Serial Nos.	Rack: Sample #4 Modules: Sample#1,2,3,4		
	Date Code	See page 4		
Test Equipment	Description	Model No.	Equipment No.	Calibration Due Date
	Dongling Vibration System	DA-40	N/A	N/A
	Accelerometer	Dytran 3030B5	SN: 8255	18 SEP 17
	Grid	NA	NA	NA
	DMM	HP34401A	007322	12 SEP 17
	Dielectric Analyzer	Vitrex 944i	005842	16 DEC 17
	Data Logger	Graphtec GL820	010452	12 OCT 17
	Electronic Load	CHROMA63203	010348	03 AUG 17
	Electronic Load	CHROMA63203	010999	05 OCT17
	Electronic Load	CHROMA63203	010366	28 APR 18
	Electronic Load	CHROMA63203	080389	03 AUG 17
	Electronic Load	CHROMA63203	010893	22 AUG 17
	Electronic Load	CHROMA63203	010394	03 AUG 17
	Electronic Load	CHROMA63203	010346	03 AUG 17
Electronic Load	CHROMA63203	005814	08 DEC 17	
Test Result	Visual	No deviation before and after test		
	Functional	No deviation before and after test		
	Mechanical	No deviation before and after test		
	Hi-Pot Test	Passed		
Test Remarks	Based on above test results, sample product passed Operating Sinusoidal Vibration 2 NEBS Office Vibration Environment, Alternate Procedure test. See test data on Appendix.			

1.2 Random Vibration

1.2.1 Non-operating Random Vibration (Rack only)

Reference Document		Mechanical Test Instruction 920-000096-0000 Rev.AF		
Test Location		RE Cavite		
Test Conditions	Acceleration	1.87	gRMS	
	Duration	30	mins	
	Frequency Range	10 to 500	Hz	
	Direction	Three orthogonal axes		
	PSD Profile		Frequency	Slope (db/oct)
		10 Hz	--	0.009 g ² /Hz
		200 Hz	-2.66	0.009 g ² /Hz
		500 Hz	--	0.004 g ² /Hz
Test Sample	Serial Nos.	Sample #1		
	Date Code	See page 4		
Test Equipment	Description	Model No.	Equipment No.	Calibration Due Date
	Dongling Vibration System	DA-40	N/A	N/A
	Accelerometer	Dytran 3030B5	SN: 8255	18 SEP 17
	Grid	NA	NA	NA
	DMM	HP34401A	007322	12 SEP 17
	Dielectric Analyzer	Vitrex 944i	005842	16 DEC 17
	Data Logger	Graphtec GL820	010452	12 OCT 17
	Electronic Load	CHROMA63203	010348	03 AUG 17
	Electronic Load	CHROMA63203	010999	05 OCT17
	Electronic Load	CHROMA63203	010366	28 APR 18
	Electronic Load	CHROMA63203	080389	03 AUG 17
	Electronic Load	CHROMA63203	010893	22 AUG 17
	Electronic Load	CHROMA63203	010394	03 AUG 17
	Electronic Load	CHROMA63203	010346	03 AUG 17
	Electronic Load	CHROMA63203	005814	08 DEC 17
Test Result	Visual	No deviation before and after test		
	Functional	<p>No deviation before test</p> <p>Rack unit unable to power up after test LED indicator on front panel did not lit Fans not functioning Only ISOCOM LED indicator lit</p> <p>2nd Run 02/15/2017 Sample#5 Sample treatment : D.E. place fix on affected area (refer to attachment)</p> <p>No deviation before and after test</p>		

	Mechanical	<p>No deviation before test Found Ejected flat wire on ISOCOMM side after test Bugzilla#25815 was release to document the issue.</p> <p>2nd Run 02/15/2017 Sample#5 Sample treatment : D.E. place fix on affected area (refer to attachment)</p> <p>No deviation before and after test</p>
	Hi-Pot Test	Passed
Test Remarks	Based on above test results, sample product passed Non-Operating Random Vibration test. See test data on appendix.	

1.2.2 Operating Random Vibration (Rack and module configuration)

Reference Document		Mechanical Test Instruction 920-000096-0000 Rev.AF / IPC-9592B Class I			
Test Location		RE Cavite			
Test Conditions	Load	Full Load (12kW)			
	Line	480	Vac / Three phase		
	Acceleration	0.71	gRMS		
	Frequency Range	10-500	Hz		
	Duration	30	min		
	Direction	3 mutually perpendicular axis			
	PSD Profile		Frequency	Slope (db/oct)	PSD (g²/Hz)
			10 Hz	5.938	0.000229 g ² /Hz
		30 Hz	--	0.0021 g ² /Hz	
		200 Hz	-11.87	0.0021 g ² /Hz	
		500 Hz	--	0.000054 g ² /Hz	
Test Sample	Serial Nos.	Rack: Sample #2 Module: Sample#1,2,3,4			
	Date Code	See page 4			
Test Equipment	Description	Model No.	Equipment No.	Calibration Due Date	
	Dongling Vibration System	DA-40	N/A	N/A	
	Accelerometer	Dytran 3030B5	SN: 8255	18 SEP 17	
	Grid	NA	NA	NA	
	DMM	HP34401A	007322	12 SEP 17	
	Dielectric Analyzer	Vitrex 944i	005842	16 DEC 17	
	Data Logger	Graphtec GL820	010452	12 OCT 17	
	Electronic Load	CHROMA63203	010348	03 AUG 17	
	Electronic Load	CHROMA63203	010999	05 OCT17	
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	Electronic Load	CHROMA63203	080389	03 AUG 17	
	Electronic Load	CHROMA63203	010893	22 AUG 17	
	Electronic Load	CHROMA63203	010394	03 AUG 17	
	Electronic Load	CHROMA63203	010346	03 AUG 17	
	Electronic Load	CHROMA63203	005814	08 DEC 17	
Test Result	Visual	No deviation before test			

	Functional	<p>No deviation before test Captured highest Vout drift of 50.3Vdc from Slot#4 48V module during test, 3rd axis dwell, Y axis</p> <p>2nd Run 02/02/2017 Sample#2 D.E. recommend use of remote sense during operating mode No deviation before and after test</p>
	Mechanical	No deviation before and after test
	Hi-Pot Test	Passed
Test Remarks	Based on above test results, sample product passed Operating Random Vibration IPC-9592B Class I test. See test data on appendix.	

1.3 Shock Test

1.3.1 Non-operating Half-sine Shock (Rack only)

Reference Document		Mechanical Test Instruction 920-000096-0000 Rev.AF			
Test Location		RE Cavite			
	Acceleration	30	G		
	Duration	11	msec		
	Pulse	Half sine			
	No. of Shock	3 shocks on each of 6 faces			
Test Sample		Sample #1			
		Date Code	See page 4		
Test Equipment		Description	Model No.	Equipment No.	Calibration Due Date
		Dongling Vibration System	DA-40	N/A	N/A
		Accelerometer	Dytran 3030B5	SN: 8255	18 SEP 17
		Grid	NA	NA	NA
		DMM	HP34401A	007322	12 SEP 17
		Dielectric Analyzer	Vitrex 944i	005842	16 DEC 17
		Data Logger	Graphtec GL820	010452	12 OCT 17
		Electronic Load	CHROMA63203	010348	03 AUG 17
		Electronic Load	CHROMA63203	010999	05 OCT17
		Electronic Load	CHROMA63203	010366	28 APR 18
		Electronic Load	CHROMA63203	080389	03 AUG 17
		Electronic Load	CHROMA63203	010893	22 AUG 17
		Electronic Load	CHROMA63203	010394	03 AUG 17
		Electronic Load	CHROMA63203	010346	03 AUG 17
		Electronic Load	CHROMA63203	005814	08 DEC 17
Test Result		No deviation before test			
		Visual	<p>2nd Run 02/13/2017 Sample#5 Seen with dents on bulk cap board, PFC cover and PFC board insulators and tilted HTSK prior to test. Please refer to attachment Bugzilla#25811 was release to document the issue.</p>		
		Functional	No deviation before and after test		

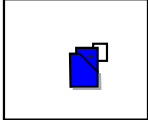
	Mechanical	<p>No deviation before test</p> <p>1st Run After test results: Seen with Dents on bulk cap board insulator from solder leads Seen with Dent on insulator from ISOCOMM mounting screw Seen with Dent on insulator from AC interconnect board solder lead Bugzilla#25812 was released to document the issue</p> <p>2nd Run 02/14/2017 Sample#5 Sample treatment: Add rubber footer on solder side of bulk cap board and Ac interconnect board Result : Still found with dent issues</p> <p>3rd Run 02/16/2017 Sample#5 Sample treatment: Additional rubber footer on solder side of bulk cap board No deviation after test</p>
	Hi-Pot Test	Passed
Test Remarks	Based on above test results, sample product passed Non-operating Half-Sine Shock test. See test data on appendix.	

1.3.2 Bench Handling (Rack only)

Reference Document		Mechanical Test Instruction 920-000096-0000 Rev.AF / Product Specification Item 3.0 MIL-STD-810G Method 516.6 Procedure VI		
Test Location		RE Cavite		
Test Conditions	Procedure	<p>Step 1. Following a functional and physical checkout, configure the item as it would be for servicing, e.g., with the chassis and front panel assembly removed from its enclosure. Position the test item as it would be for servicing. Generally, the test item will be non-operational during the test.</p> <p>Step 2. Using one edge as a pivot, lift the opposite edge of the chassis until one of the following conditions occurs (whichever occurs first).</p> <p>a. The lifted edge of the chassis has been raised 100 mm (4 in) above the horizontal bench top.</p> <p>b. The chassis forms an angle of 45° with the horizontal bench top.</p> <p>c. The lifted edge of the chassis is just below the point of perfect balance. Let the chassis drop back freely to the horizontal bench top. Repeat using other practical edges of the same horizontal face as pivot points, for a total of four drops.</p> <p>Step 3. Repeat Step 2 with the test item resting on other faces until it has been dropped for a total of four times on each face on which the test item could be placed practically during servicing.</p> <p>Step 4. Visually inspect the test item.</p>		
Test Sample	Serial Nos.	Sample #5		
	Date Code	See page 4		
Test Equipment	Description	Model No.	Equipment No.	Calibration Due Date
	Bench table	NA	NA	NA
	Metallic Ruler	NA	NA	NA
	Grid	NA	NA	NA
	DMM	HP34401A	007322	12 SEP 17
	Dielectric Analyzer	Vitrex 944i	005842	16 DEC 17
	Data Logger	Graphtec GL820	010452	12 OCT 17
	Electronic Load	CHROMA63203	010348	03 AUG 17
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	Electronic Load	CHROMA63203	010394	03 AUG 17
	Electronic Load	CHROMA63203	010346	03 AUG 17
Electronic Load	CHROMA63203	005814	08 DEC 17	
Test Result	Visual	No deviation before and after test		

	Functional	No deviation before and after test
	Mechanical	No deviation before and after test
	Hi-Pot Test	Passed
Test Remarks	Based on above test results, sample product passed Bench handling test. See test data on appendix.	

Appendix

Attachment	Revision	File Name
	Rev A	73-958-0001 EVT Mechanical set-up.pdf