




**DESIGN RELIABILITY VERIFICATION REPORT**

<b>Date Released</b>	February 10, 2017	<b>Reference Number</b>	RE-PH17/014
<b>Model No.</b>	<b>73-958-0001</b> (iHP Rack)	<b>Manufacturing Site</b>	Laguna
<b>Product Spec Rev</b>	Rev.08	<b>Product Spec Release Date</b>	06-03-2016
<b>BOM Release Date</b>	01-11-2017	<b>Schematic Rev</b>	AB
<b>Sample Size</b>	See page 4	<b>Product Rev</b>	EVT

	<b>Name/s</b>	<b>Signature</b>	<b>Date</b>
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<b>Revision Control</b>		
<b>Revision</b>	<b>Change History</b>	<b>Date</b>
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**Test Result Summary and Conclusion**

TEST	DRV Result
	(P-Pass / F-Fail / NR-Not Required)
<b>1.0 Reliability Test</b>	
1.1 Electrolytic Capacitor Life Prediction	P
1.2 Opto-coupler CTR Margin Calculation	P
1.3 MTBF Prediction	P
1.4 Component Stress Analysis (DSA / WCSA)	
1.4.1 Thermal Stress Measurement	P
1.4.2 Electrical Stress Measurement	P
<b>2.0 Appendix</b>	

<b>Test Report Conclusion</b>	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 Specification: iHP Product Specification Rev. 08
- 2. DRV Test Plan No. QAP-1306/PH /PH revA
- 3. Design Derating Requirements 920-000114
- 4. Design Reliability Verification 920-000095
- 5. Schematic Diagram 705-003286-0000 Rev.AB
- 6. PCB Artwork P/N's: 509-021534-0005 Rev.AA  
 509-021532-0007 Rev.AC

**SAMPLE UNIT SUMMARY**

Sample Unit #	Serial #	Date Code	Firmware	Product Revision
1	Sample 1	NA	ISO COMM: 03.04.00 PFC: 02.12.00	EVT
2	Sample 2	NA		EVT
3	Sample 3	NA		EVT

**TEST DETAILS**

**1.0 Reliability Test**

**1.1 Electrolytic Capacitor Life Estimation**

<b>Reference Document</b>		Reliability Test Instruction 920-000098		
<b>Test Location</b>		RE Eastwood		
<b>Test Conditions</b>	Input Voltage	380-430Vac	Volts	
	Output Power	9600	Watts	
	Loading Conditions	48V/50A (x4Module)		
	Ambient Temp	30	°C	
	Cooling	Forced Air		
<b>Test Equipment</b>	Description	Model No.	Equip No.	Calibration Due Date
	Chroma DC Source	63203	TM15-023	8/30/2017
			QAE-649	7/23/2017
		63204	QAE-643	7/12/2016
			QAE-423	7/25/2016
	Tektronix Oscilloscope	DPO 5034B	QAE-587	6/3/2017
	Tektronix Current Probe	TCP0020	QAE-583	11/16/2017
	Agilent Data Logger	34970A	TM15-058	3/7/2017
	Keysight Data Logger	34970A	QAE-661	10/22/2017
	Chroma AC Source	61512	TM15-176	9/23/2017
Thermotron Chamber	8800	Asset Tag:1276TET01459		
<b>Test Sample</b>	Serial Nos.	Sample 1, Sample 2		
	Date Code	See page 4		
<b>Product Useful Life / Cap Life Expectancy</b>		10	Years	
<b>Test Results</b>	All capacitor reached the maximum life calculation of 15yrs.			
<b>Test Remarks</b>	Based on above test results, calculated E-cap prediction result meets Life Expectancy requirement. See E-cap Life calculation data on Appendix.			

### 1.2 Opto-coupler CTR Margin Calculation

<b>Reference Document</b>		Reliability Test Instruction 920-000098		
<b>Test Location</b>		RE Eastwood		
<b>Test Conditions</b>	Input Voltage	342Vac	Volts	
	Output Power	12000	Watts	
	Loading Conditions	48V/62.5A (x4Module)		
	Ambient Temp	50	°C	
	Cooling	Forced Air		
<b>Test Equipment</b>	Description	Model No.	Equip No.	Calibration Due Date
	Chroma DC Source	63203	TM15-023	8/30/2017
			QAE-649	7/23/2017
		63204	QAE-643	7/12/2016
			QAE-423	7/25/2016
	Tektronix Oscilloscope	DPO 5034B	QAE-587	6/3/2017
	Tektronix Current Probe	TCP0020	QAE-583	11/16/2017
	Agilent Data Logger	34970A	TM15-058	3/7/2017
	Keysight Data Logger	34970A	QAE-661	10/22/2017
	Chroma AC Source	61512	TM15-176	9/23/2017
Thermotron Chamber	8800	Asset Tag:1276TET01459		
<b>Test Sample</b>	Serial Nos.	Sample 1, Sample 2		
	Date Code	See page 4		
<b>Product Useful Life</b>		10	Years	
<b>Test Results</b>	Opto-coupler U302 and U313 exhibited the Lowest Opto-CTR margin with 78.78%.			
<b>Test Remarks</b>	Based on above test results, calculated CTR Margin result meets Product Useful Life requirement. See Opto-CTR calculation data on Appendix.			

**1.3 MTBF Prediction**

<b>Reference Document</b>		Reliability Test Instruction 920-000098		
<b>Test Location</b>		RE Eastwood		
<b>MTBF Method</b>		Telcordia Issue 3, Method I Case 3 MTBF XLS Calculator ver 2.1		
<b>Test Conditions</b>	Input Voltage	380-480Vac	Volts	
	Output Power	12000	Watts	
	Loading Conditions	48V/62.5A (x4Module)		
	Ambient Temp	25	°C	
	Cooling	Forced Air		
<b>Test Equipment</b>	Description	Model No.	Equipment No.	Calibration Due Date
	Chroma DC Source	63203	TM15-023	8/30/2017
			QAE-649	7/23/2017
		63204	QAE-643	7/12/2016
			QAE-423	7/25/2016
	Tektronix Oscilloscope	DPO 5034B	QAE-587	6/3/2017
	Tektronix Current Probe	TCP0020	QAE-583	11/16/2017
	Agilent Data Logger	34970A	TM15-058	3/7/2017
	Keysight Data Logger	34970A	QAE-661	10/22/2017
	Chroma AC Source	61512	TM15-176	9/23/2017
Thermotron Chamber	8800	Asset Tag:1276TET01459		
<b>Test Sample</b>	Serial Nos.	Sample 1, Sample 2		
	Date Code	See page 4		
<b>MTBF Requirement</b>		400	KHours	
<b>Test Results</b>	<b>AC LINE (Volts)</b>	<b>AMBIENT TEMP (°C)</b>	<b>MTBF (Khrs)</b>	
	380	25	1346	
	480	25	1303	
<b>Test Remarks</b>	Based on above test results, calculated MTBF prediction result meet MTBF requirement. See MTBF calculation data on Appendix.			

## 1.4 Component Stress Analysis

### 1.4.1 Thermal Stress Measurement

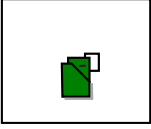
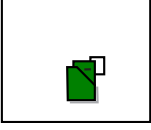
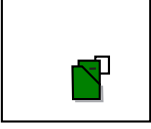
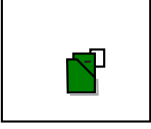
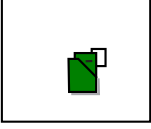
<b>Reference Document</b>		Reliability Test Instruction 920-000098		
<b>Test Location</b>		RE Eastwood		
<b>Test Conditions</b>	Input Voltage	342-528Vac	Volts	
	Output Power	12000	Watts	
	Loading Condition	48V/62.5A (x4Module) 48V/0A ( Standby)		
	Ambient Temp	50	°C	
	Cooling	Forced Air		
<b>Test Equipment</b>	<b>Description</b>	<b>Model No.</b>	<b>Equipment No.</b>	<b>Calibration Due Date</b>
	Chroma DC Source	63203	TM15-023	8/30/2017
			QAE-649	7/23/2017
		63204	QAE-643	7/12/2016
			QAE-423	7/25/2016
	Agilent Data Logger	34970A	TM15-058	3/7/2017
	Keysight Data Logger	34970A	QAE-661	10/22/2017
	Chroma AC Source	61512	TM15-176	9/23/2017
Thermotron Chamber	8800	Asset Tag:1276TET01459		
<b>Test Sample</b>	Serial Nos.	Sample 2		
	Date Code	See page 4		
<b>Test Results</b>	No issue found. All components are within Artesyn Component Thermal Derating Requirement.			
<b>Test Remarks</b>	Based on the above test results, the product <b>passed</b> the Thermal Derating CSA / WCSA. See CSA test data on Appendix.			



### 1.4.2 Electrical Stress Measurement

<b>Reference Document</b>		Reliability Test Instruction 920-000098		
<b>Test Location</b>		RE Eastwood		
<b>Test Conditions</b>	Input Voltage	380-430Vac	Volts	
	Output Power	12000	Watts	
	Loading Condition	48V/62.5A (x4Module)		
	Ambient Temp	25	°C	
	Cooling	Forced Air		
<b>Test Equipment</b>	Description	Model No.	Equipment No.	Calibration Due Date
	Chroma DC Source	63203	TM15-023	8/30/2017
			QAE-649	7/23/2017
		63204	QAE-643	7/12/2016
			QAE-423	7/25/2016
	Tektronix Oscilloscope	DPO 5034B	QAE-587	6/3/2017
	Tektronix Current Probe	TCP0020	QAE-583	11/16/2017
Variac	N/A	N/A	N/A	
<b>Test Sample</b>	Serial Nos.	Sample 1		
	Date Code	See page 4		
<b>Test Results</b>	No issue found. All components are within Artesyn Component Electrical Derating Requirement.			
<b>Test Remarks</b>	Based on the above test results, the product passed the Electrical Derating CSA / WCSA. See CSA test data on Appendix.			

**Appendix**

Attachment	Revision	File Name
	Rev A	73-958-0001 EVT E-cap Life Calculator Rev16.1.xls
	Rev A	73-958-0001 EVT Opto CTR Calculation.xls
	Rev A	73-958-0001 EVT DSA .xls
	Rev A	73-958-0001 EVT MTBF@ 380Vac revA.xls
	Rev A	73-958-0001 EVT MTBF@ 480Vac revA.xls