



**DESIGN RELIABILITY VERIFICATION REPORT**

<b>Date Released</b>	August 4, 2016	<b>Reference Number</b>	RE-PH16/115
<b>Model No.</b>	73-936-0250 (iHP module)	<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>	07/21/2016	<b>Schematic Rev</b>	AA
<b>Sample Size</b>	See page 4	<b>Product Rev</b>	DVT

	<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>
A	First Release	08/04/2016

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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 Component Stress Analysis (DSA / WCSA)	
1.3.1 Thermal Stress Measurement	P
1.3.2 Electrical Stress Measurement	P
<b>2.0 Robustness Test</b>	
2.1 High Temperature Stress Test (HTST)	<b>Survive</b>
<b>3.0 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 <b>passed</b> the DRV test.
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**References:**

1. Product Specifications: iHP Product Specificaton Rev.08
2. DRV Test Plan No. QAP-1146/PH revD
3. Design Derating Requirements [920-000114](#)
4. Design Reliability Verification [920-000095](#)
5. Schematic Diagram [705-003243-0000](#) Rev.AA
6. PCB Artwork P/N's: [509-022292-0002](#) Rev.A

**SAMPLE UNIT SUMMARY**

Sample Unit #	Serial #	Date Code	Firmware	Product Revision
1	L423RS0001BVP	n/a	04.04	BV
2	L423RQ0001BUP	n/a	04.04	BU
3	L423RS0002BVP	n/a	04.04	BV

**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	380-480Vac	Volts	
	Output Power	2400 (80% FL)	Watts	
	Loading Conditions	250V/9.6A		
	Ambient Temp	30	°C	
	Cooling	Forced Air		
<b>Test Equipment</b>	Description	Model No.	Equip No.	Calibration Due Date
	Chroma	63204	QAE-643	6/12/2017
	Tektronix Oscilloscope	DPO 5034B	QAE-587	6/8/2017
	HP	401A	QAE-222	1/7/2017
	Chroma	62150H-1000S	QAE-533	9/15/2016
	ESPEC Chamber	PSL-2K	QAE-231	4/15/2017
<b>Test Sample</b>	Serial Nos.	Sample 1, Sample 2		
	Date Code	See page 4		
<b>Product Useful Life / Cap Life Expectancy</b>		87,600	Hours	
<b>Test Results</b>	All E-cap meets life requirements			
<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	3000	Watts	
	Loading Conditions	250V/12A		
	Ambient Temp	50	°C	
	Cooling	Forced Air		
<b>Test Equipment</b>	Description	Model No.	Equip No.	Calibration Due Date
	Chroma	63204	QAE-643	6/12/2017
	Tektronix Oscilloscope	DPO 5034B	QAE-587	6/8/2017
	HP	401A	QAE-222	1/7/2017
	Chroma	62150H-1000S	QAE-533	9/15/2016
	ESPEC Chamber	PSL-2K	QAE-231	4/15/2017
<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>	<p>All OPTO coupler meet life requirement.</p> <p>Refer to the attachment at the appendix section for details.</p>			
<b>Test Remarks</b>	Passed			

### 1.3 Component Stress Analysis

#### 1.3.1 Thermal Stress Measurement

<b>Reference Document</b>		Reliability Test Instruction 920-000098		
<b>Test Location</b>		RE Eastwood		
<b>Test Conditions</b>	Input Voltage	342/519Vac	Volts	
	Output Power	3000	Watts	
	Loading Condition	250V/1A		
	Ambient Temp	50	°C	
	Cooling	Forced Air		
<b>Test Equipment</b>	Description	Model No.	Equipment No.	Calibration Due Date
	Chroma	63204	QAE-643	6/12/2017
	ESPEC Chamber	PSL-2K	QAE-231	4/15/2017
	HP	401A	QAE-222	1/7/2017
	Chroma	62150H-1000S	QAE-533	9/15/2016
<b>Test Sample</b>	Serial Nos.	Sample 1, Sample 2		
	Date Code	See page 4		
<b>Test Results</b>	All components are found within Artesyn Component Thermal Derating Requirement.			
<b>Test Remarks</b>	Based on the above test results, the product passed the Thermal Derating CSA / Worst-Case CSA. See CSA test data on Appendix.			

**1.3.2 Electrical Stress Measurement**

<b>Reference Document</b>		Reliability Test Instruction 920-000098		
<b>Test Location</b>		RE Eastwood		
<b>Test Conditions</b>	Input Voltage	400Vdc	Volts	
	Output Power	3000	Watts	
	Loading Condition	250V/12.0A		
	Ambient Temp	25	°C	
	Cooling	Forced Air		
<b>Test Equipment</b>	Description	Model No.	Equipment No.	Calibration Due Date
	Chroma	63204	QAE-643	6/12/2017
	Tektronix Oscilloscope	DPO 5034B	QAE-587	6/8/2017
	HP	401A	QAE-222	1/7/2017
	Chroma	62150H-1000S	QAE-533	9/15/2016
<b>Test Sample</b>	Serial Nos.	Sample 1, Sample 2		
	Date Code	See page 4		
<b>Test Results</b>	All components are found within Artesyn Component Electrical Derating Requirement.			
<b>Test Remarks</b>	Based on the above test results, the product passed the Electrical Derating CSA / Worst-Case CSA. See CSA test data on Appendix.			

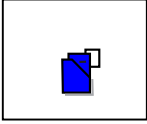
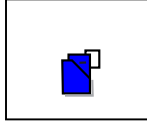
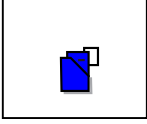


## 2.0 Robustness Test

### 2.1 High Temperature Stress Test (HTST)

<b>Reference Document</b>		Robustness Test Instruction 920-000099-0000		
<b>Test Location</b>		RE Eastwood		
<b>Test Conditions</b>	Input Voltage	400Vdc (4days)	Volts	
	Output Power	3000	Watts	
	Ambient Temperature	50+15+15	°C	
	Cooling	Forced Air by system box (Fan 19.8cfm)		
<b>Test Equipment</b>	Description	Model No.	Equipment No.	Calibration Due Date
	Chroma	63204	QAE-424	6/26/2016
	ESPEC Chamber	PSL-2K	QAE-231	4/15/2016
	HP	401A	QAE-222	1/7/2017
	Chroma	62150H-1000S	QAE-533	9/15/2016
<b>Test Sample</b>	Serial No.	Sample 3		
	Date Code	See page 4		
<b>1.) Load Cycling Test</b>	Output Loading	Min Load	0	A
		Full Load	62.5	A
	Cycling Sequence	16 hours FL, 8 hours ML		
	Duration	96 hours		
<b>2.) Output Short Circuit Test</b>	Input Line	On all the time		
	Output	ML then, short output to common, repeat 10X.		
<b>Test Results</b>	The unit was able to operate only up to 74.5°C with OTP disabled.			
<b>Failure Analysis (Yes/NR)</b>	N/A			
<b>Test remarks</b>	Based on above test results, sample unit survived HTST.			

**Appendix**

Attachment	Revision	File Name
	Rev A	73-936-0250 DVT E-cap Life Calculator revA.xlsx
	Rev A	73-936-0250 DVT WCSA revA.xlsx
	Rev A	73-936-0250 OPTO CTR revA.xlsx