



Test Report: HEP-1000-24

1000W Switching Power Supply for Harsh Environment

■ DESIGN VERIFY TEST

Output Function Test

Input Function Test

Protection Function Test

Control Function Test

Component Stress Test

■ SAFETY & E.M.C. TEST

Safety Test

E.M.C. Test

■ RELIABILITY TEST

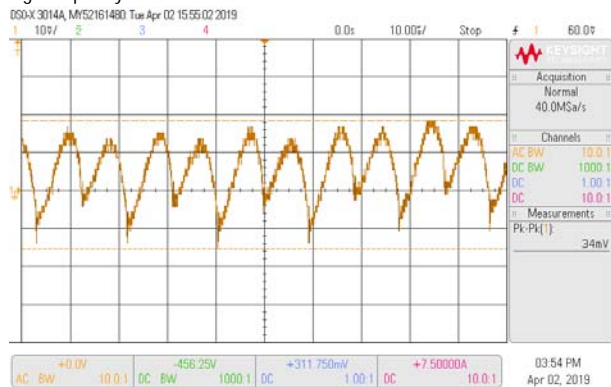
ENVIRONMENT TEST

DESIGN VERIFY TEST

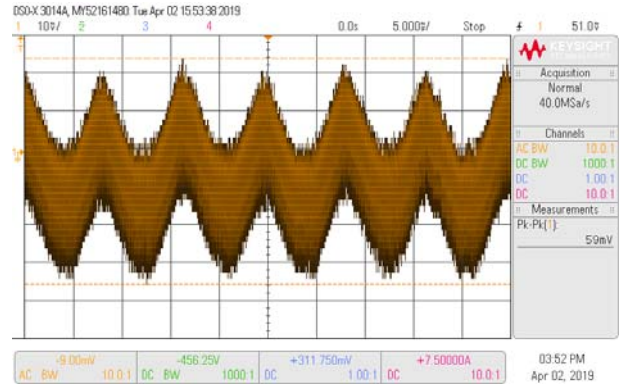
OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE ADJUST RANGE	CH1: 24 V~ 30V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	23.279V~30.679V/230VAC 23.279V~30.677V/115VAC
2	OUTPUT VOLTAGE(Max) TOLERANCE	V1: -1%~ +1%	I/P: 90VAC /305VAC O/P:FULL/ MIN. LOAD Ta:25°C	V1: -0.229%~ 0.229 %
3	LINE REGULATION (Max)	V1: -0.5%~ +0.5%	I/P: 180VAC~ 305VAC O/P:FULL LOAD Ta:25°C	V1: -0.08%~ 0%
4	LOAD REGULATION(Max)	V1: -0.5%~ +0.5%	I/P: 230VAC O/P:FULL ~MIN LOAD Ta:25°C	V1: - 0.166%~0.208 %
5	OVER/UNDERSHOOT TEST	< ±5%	I/P: 230VAC O/P:FULL LOAD Ta:25°C	< 5%
6	RIPPLE & NOISE(Max)	V1: 200mVp-p	I/P:230VAC O/P:FULL LOAD Ta:25°C	V1:59 mVp-p

high frequency :



low frequency :



7	SET UP TIME(Max)	230VAC/1800ms 115VAC/1800ms	I/P : 230 VAC O/P : FULL LOAD I/P : 115 VAC O/P : 71% LOAD Ta : 25°C	230VAC/ 786 ms 115VAC/ 866 ms
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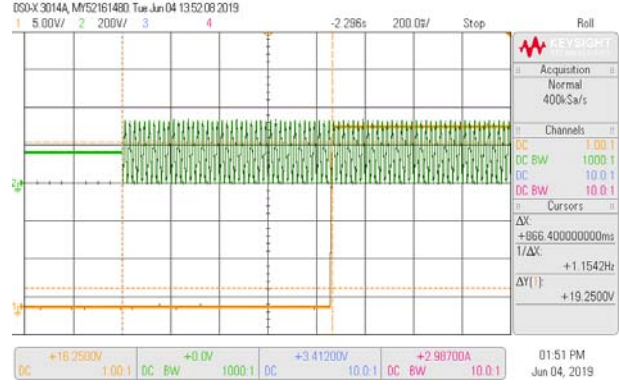
INPUT=230VAC/50HZ @ FULL LOAD

CH1 : Output Voltage CH2 : AC Input Voltage

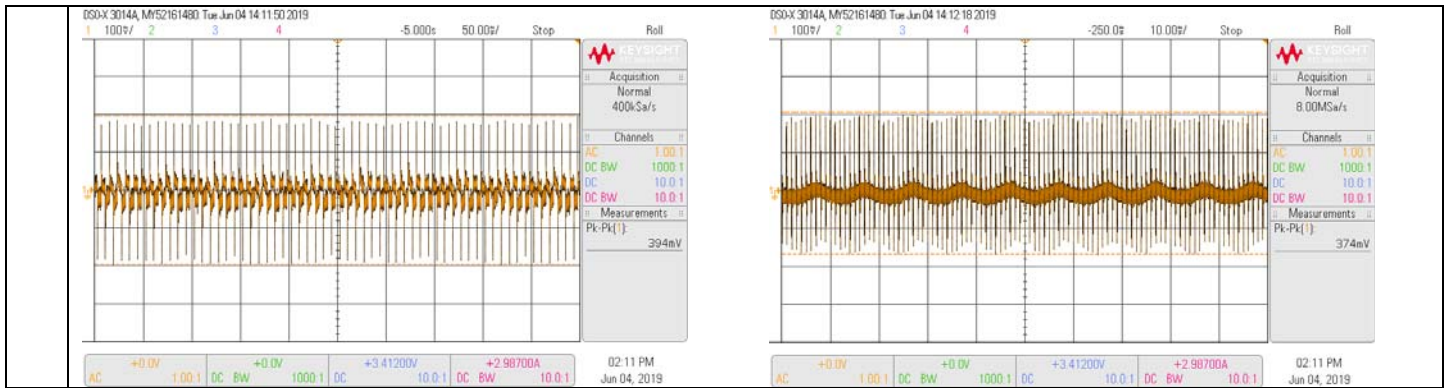


INPUT=115VAC/60HZ @ 71% LOAD

CH1 : Output Voltage CH2 : AC Input Voltage



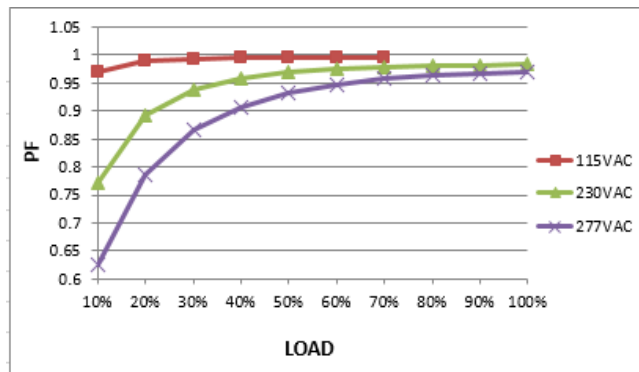
<p>8</p> <p>RISE TIME (Max)</p>	<p>230VAC/80ms 115VAC/80ms</p>	<p>I/P : 230 VAC O/P : FULL LOAD I/P : 115 VAC O/P : 71% LOAD Ta : 25°C</p>	<p>230VAC/ 10.4 ms 115VAC/ 8.9 ms</p>
<p>INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage</p>		<p>INPUT=115VAC/60HZ @ 71% LOAD CH1 : Output Voltage</p>	
<p>9</p> <p>HOLD UP TIME (Typ.)</p>	<p>230VAC/12ms 230VAC/16ms at 75% load</p>	<p>I/P : 230 VAC O/P : 100% LOAD I/P : 230VAC O/P : 75% LOAD Ta : 25°C</p>	<p>230VAC/ 29ms 230VAC/ 30.2 ms</p>
<p>INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage</p>		<p>INPUT=115VAC/60HZ @ 71% LOAD</p>	
<p>10</p> <p>DYNAMIC LOAD</p>	<p>V1: 2400mVp-p</p>	<p>I/P: 230VAC O/P: (1)FULL /50% LOAD 50%DUTY / 120HZ (2)FULL /50% LOAD 50%DUTY / 1KHZ Ta:25°C</p>	<p>394mVp-p 374mVp-p</p>
<p>FULL /50% LOAD 50%DUTY / 120HZ</p>		<p>FULL /50% LOAD 50%DUTY / 1KHZ</p>	



INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	90VAC~305VAC	I/P:TESTING O/P:FULL LOAD/ Derating Load Ta:25°C	158V~305V / FULL LOAD 78V~305V/ Derating Load
			I/P: LOW-LINE-3V=87 V HIGH-LINE+15%=315 V O/P:FULL/MIN LOAD (PLEASE CHECK DERATING CURVE) ON: 30 Sec OFF: 30 Sec 10MIN (POWER ON/OFF NO DAMAGE)	TEST:OK
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE	I/P:90 VAC ~305 VAC O/P:FULL-MIN LOAD Ta:25°C	TEST: OK
3	INPUT CURRENT (Typ.)	277V/ 4.5A 230V/ 5.3A 115V/ 10.1A	I/P : 230 VAC O/P : FULL LOAD I/P : 115 VAC O/P : 71% LOAD Ta : 25°C	I=3.97A/ 277VAC I=4.72A/ 230VAC I=6.71A/ 115VAC
4	LEAKAGE CURRENT	<0.75 mA / 240 VAC	I/P : 240 VAC O/P : Min LOAD Ta : 25°C	L-FG : 0.49 mA N-FG : 0.5 mA
5	POWER FACTOR (Typ.)	0.93/ 277VAC 0.95/ 230VAC 0.99/115VAC	I/P : 230 VAC O/P : FULL LOAD I/P : 115 VAC O/P : 71% LOAD Ta : 25°C	PF=0.967/277VAC PF=0.982/230VAC PF=0.996/115VAC

P.F vs LOAD



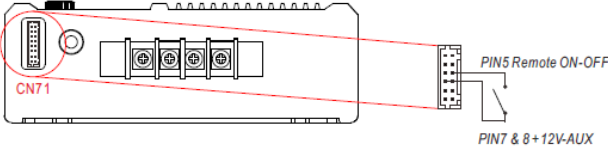
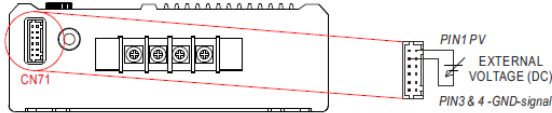
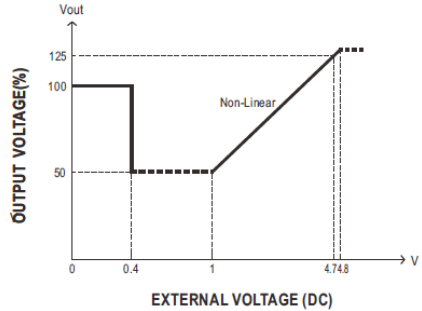
6	EFFICIENCY(Typ.)	95%	I/P:230 VAC O/P:FULL LOAD Ta:25°C	95.33%																																												
<p>EFFICIENCY vs LOAD</p> <table border="1"> <caption>Efficiency vs Load Data</caption> <thead> <tr> <th>LOAD (%)</th> <th>115VAC (%)</th> <th>230VAC (%)</th> <th>277VAC (%)</th> </tr> </thead> <tbody> <tr><td>10%</td><td>87.5</td><td>88.5</td><td>87.0</td></tr> <tr><td>20%</td><td>92.0</td><td>93.0</td><td>92.5</td></tr> <tr><td>30%</td><td>93.5</td><td>94.5</td><td>94.0</td></tr> <tr><td>40%</td><td>94.0</td><td>95.0</td><td>94.5</td></tr> <tr><td>50%</td><td>94.5</td><td>95.5</td><td>95.0</td></tr> <tr><td>60%</td><td>94.5</td><td>95.5</td><td>95.0</td></tr> <tr><td>70%</td><td>94.0</td><td>95.5</td><td>95.0</td></tr> <tr><td>80%</td><td>94.5</td><td>95.5</td><td>95.0</td></tr> <tr><td>90%</td><td>94.5</td><td>95.5</td><td>95.0</td></tr> <tr><td>100%</td><td>94.5</td><td>95.5</td><td>95.0</td></tr> </tbody> </table>					LOAD (%)	115VAC (%)	230VAC (%)	277VAC (%)	10%	87.5	88.5	87.0	20%	92.0	93.0	92.5	30%	93.5	94.5	94.0	40%	94.0	95.0	94.5	50%	94.5	95.5	95.0	60%	94.5	95.5	95.0	70%	94.0	95.5	95.0	80%	94.5	95.5	95.0	90%	94.5	95.5	95.0	100%	94.5	95.5	95.0
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7	INRUSH CURRENT(Typ.)	230V/40A COLD START	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	I =39.9A/ 230VAC T50= 1760 us/230V																																												
<p>INPUT=230VAC/50HZ @ FULL LOAD CH2 : AC Input Voltage CH4 : Input current</p> <p>030-X3024A, MY55140430 Thu Jun 06 15:08:10 2019</p> <p>0s 1.000μs Stop # 4 11.4A</p> <p>Acquisition: Peak Detect 1.00MSa/s</p> <p>Channels: DC 1.00:1, DC 100:1, DC 100:1, DC 10.0:1</p> <p>Measurements: Max(2): 330V, Max(4): 39.9A</p> <p>03:07 PM Jun 06, 2019</p>																																																

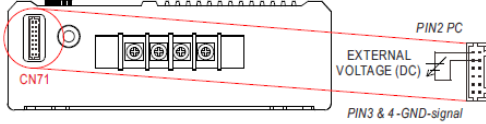
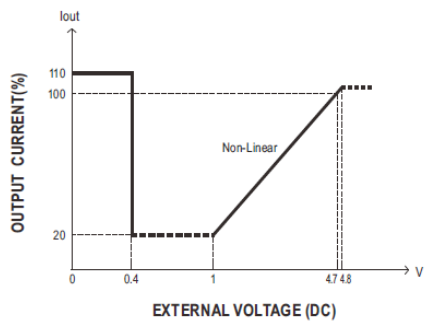
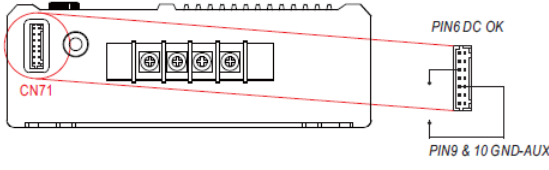
PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	105%~ 125% PROTECTION TYPE : Constant current limiting,unit will shutdown after 5 sec,re-power on to recover.	I/P: 305VAC I/P: 230VAC I/P: 180VAC O/P:TESTING Ta:25°C	109.3%/ 305VAC 110.42%/ 230VAC 110.42%/180VAC PROTECTION TYPE : Constant current limiting,unit will shutdown after 5 sec,re-power on to recover.
2	OVER VOLTAGE PROTECTION	30V~35V Protection type : Shut down O/P voltage,re-power on to recover.	I/P: 305VAC I/P: 230VAC I/P: 90VAC O/P:MIN LOAD Ta:25°C	32.14V/ 305VAC 32.198V/ 230VAC 31.996V/ 90VAC PROTECTION TYPE : Shut down O/P voltage,re-power on to recover.
3	OVER TEMPERATURE PROTECTION	Protection type : Shut down O/P voltage,, recovers automatically after temperature goes down	I/P: 305VAC O/P:FULL LOAD I/P: 90VAC O/P:60% LOAD	O.T.P. Active Protection type :Shut down O/P voltage,, recovers automatically after temperature goes down
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE PROTECTION TYPE : Constant current limiting,unit will shutdown after 5 sec,re-power on to	I/P: 305VAC I/P: 90VAC O/P: FULL LOAD Ta:25°C	NO DAMAGE PROTECTION TYPE : Constant current limiting,unit will shutdown after 5 sec,re-power on to recover.

		recover.		
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CONTROL FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT																				
1	AUXILIARY POWER (AUX)	I/P: 230 VAC O/P:FULL LOAD Ta:25°C Test Result :																						
				<table border="1"> <thead> <tr> <th>AUX</th> <th>TOLERANCE</th> <th>RIPPLE</th> <th>TEST RESULT</th> </tr> </thead> <tbody> <tr> <td>12V / 0.5A</td> <td>10.8-13.2 V</td> <td>150mVp-p</td> <td>11.76V/32.7mvp-p</td> </tr> </tbody> </table>	AUX	TOLERANCE	RIPPLE	TEST RESULT	12V / 0.5A	10.8-13.2 V	150mVp-p	11.76V/32.7mvp-p												
AUX	TOLERANCE	RIPPLE	TEST RESULT																					
12V / 0.5A	10.8-13.2 V	150mVp-p	11.76V/32.7mvp-p																					
2	REMOTE ON/OFF CONTROL	The power supply can be turned ON/OFF individually or along with other units in parallel by using the "Remote ON-OFF" function.  I/P: 230 VAC O/P:FULL LOAD Ta:25°C Test Result :		<table border="1"> <thead> <tr> <th>Remote ON-OFF</th> <th>Power Supply Status</th> </tr> </thead> <tbody> <tr> <td>Short circuit</td> <td>ON</td> </tr> <tr> <td>Open circuit</td> <td>OFF</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Between ON/OFF and +5V-AUX</th> <th>Power Supply Status</th> </tr> </thead> <tbody> <tr> <td>SW SHORT</td> <td>ON</td> </tr> <tr> <td>SW OPEN</td> <td>OFF</td> </tr> </tbody> </table>	Remote ON-OFF	Power Supply Status	Short circuit	ON	Open circuit	OFF	Between ON/OFF and +5V-AUX	Power Supply Status	SW SHORT	ON	SW OPEN	OFF								
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SW OPEN	OFF																							
3	OUTPUT VOLTAGE PROGRAMMABLE(PV)	※ In addition to the adjustment via the built-in potentiometer, the output voltage can be trimmed by applying EXTERNAL VOLTAGE.  I/P: 230 VAC O/P:FULL LOAD Ta:25°C TEST RESULT :		 <table border="1"> <thead> <tr> <th>PV</th> <th><0.4V</th> <th>1V</th> <th>4.7V</th> <th>4.8V</th> </tr> </thead> <tbody> <tr> <td>MODEL</td> <td><0.4V</td> <td>1V</td> <td>4.7V</td> <td>4.8V</td> </tr> <tr> <td>SPEC</td> <td>24V±5%</td> <td>12V±5%</td> <td>30V±5%</td> <td>30.48V±5%</td> </tr> <tr> <td>Vout</td> <td>23.95V</td> <td>11.88V</td> <td>29.91V</td> <td>30.45V</td> </tr> </tbody> </table>	PV	<0.4V	1V	4.7V	4.8V	MODEL	<0.4V	1V	4.7V	4.8V	SPEC	24V±5%	12V±5%	30V±5%	30.48V±5%	Vout	23.95V	11.88V	29.91V	30.45V
PV	<0.4V	1V	4.7V	4.8V																				
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Vout	23.95V	11.88V	29.91V	30.45V																				

4	OUTPUT CURRENT PROGRAMMABLE (PC)	<p>※ The output current can be trimmed to 20~100% of the rated current by applying EXTERNAL VOLTAGE.</p>   <p>I/P: 230 VAC O/P: TESTING Ta: 25°C</p> <table border="1" data-bbox="507 728 1508 831"> <tr> <td>ADJ V</td> <td><0.4V</td> <td>1V</td> <td>4.7V</td> <td>4.8V</td> </tr> <tr> <td>SPEC</td> <td>110%±5%</td> <td>20%±5%</td> <td>100%±5%</td> <td>100%±5%</td> </tr> <tr> <td>TEST</td> <td>107.83%</td> <td>19.69%</td> <td>97.95%</td> <td>100.31%</td> </tr> </table>	ADJ V	<0.4V	1V	4.7V	4.8V	SPEC	110%±5%	20%±5%	100%±5%	100%±5%	TEST	107.83%	19.69%	97.95%	100.31%
ADJ V	<0.4V	1V	4.7V	4.8V													
SPEC	110%±5%	20%±5%	100%±5%	100%±5%													
TEST	107.83%	19.69%	97.95%	100.31%													
5	DC-OK SIGNAL	<p>DC-OK signal is a TTL level signal. The maximum source current is 10mA and the maximum external voltage is 5.5V.</p>  <table border="1" data-bbox="1157 918 1524 1019"> <thead> <tr> <th>DC-OK signal</th> <th>Power Supply Status</th> </tr> </thead> <tbody> <tr> <td>"High" >4.4~5.5V</td> <td>ON</td> </tr> <tr> <td>"Low" <-0.5~0.5V</td> <td>OFF</td> </tr> </tbody> </table> <p>I/P: 230VAC O/P: FULL LOAD Ta: 25°C</p> <table border="1" data-bbox="507 1176 1189 1274"> <thead> <tr> <th>DC-OK signal</th> <th>Power Supply Status</th> </tr> </thead> <tbody> <tr> <td>"High" >4.5~5.5V</td> <td>ON(5.05v)</td> </tr> <tr> <td>"Low" <-0.5~0.5V</td> <td>OFF(-0.142V)</td> </tr> </tbody> </table>	DC-OK signal	Power Supply Status	"High" >4.4~5.5V	ON	"Low" <-0.5~0.5V	OFF	DC-OK signal	Power Supply Status	"High" >4.5~5.5V	ON(5.05v)	"Low" <-0.5~0.5V	OFF(-0.142V)			
DC-OK signal	Power Supply Status																
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DC-OK signal	Power Supply Status																
"High" >4.5~5.5V	ON(5.05v)																
"Low" <-0.5~0.5V	OFF(-0.142V)																

CHARGER MODE

OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	BOOST CHARGE VOLTAGE	28.8V ± 0.24 V	I/P: 230 VAC O/P: BAT. LOAD Ta: 25°C	28.76V
2	FLOAT CHARGE VOLTAGE	27.6 V± 0.24 V	I/P: 230 VAC O/P: BAT. LOAD Ta: 25°C	27.62V
3	OUTPUT CURRENT	35A ± 0.88 A	I/P: 230 VAC O/P: BAT. LOAD Ta: 25°C	34.46A

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT CURRENT (TYP)	277 V/ 4.5 A 230 V/ 5.3 A 115 V/ 10.1 A	I/P: 277 VAC I/P: 230 VAC I/P: 115 VAC	I = 3.14A/ 277VAC I = 3.68A/ 230VAC I = 7.32A/ 115VAC

			O/P: C.V MODE-1V Ta:25°C	
2	POWER FACTOR (TYP)	0.93/ 277 VAC 0.95/ 230 VAC 0.99/ 115 VAC	I/P: 277VAC I/P: 230 VAC I/P: 115 VAC O/P: C.V MODE-1V Ta:25°C	PF=0.96/ 277VAC PF=0.992/ 230VAC PF=0.999/ 115VAC
3	EFFICIENCY (TYP)	95%	I/P: 230 VAC O/P: C.V MODE-1V Ta:25°C	95.84%

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Transistor (D to S) or (C to E) Peak Voltage	Q903 Rated 16A/ 650V VGS ± 30V	AC ON/OFF I/P:High-Line +3V =308V VDS: O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4)Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (5)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (6)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. Ta:25°C	VDS: (1) 514V (2) 522V (3) 518V (4) 518V (5) 518V (6) 522V (7) 522V
2	P.F.C Transistor (D to S) or (C to E) Peak Voltage	Q51 Rated 16A/ 650V	I/P:High-Line +3V =308V AC ON/OFF O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4)Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (5)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (6)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. Ta:25°C	VDS: (1) 446V (2) 450V (3) 446V (4) 454V (5) 450V (6) 437V (7) 454V
3	P.F.C DIODE	D14 Rated 8A/ 650V	I/P:High-Line +3V =308V AC ON/OFF O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (4)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz Ta:25°C	(1) 397V (2) 397V (3) 385V (4) 397V
4	Diode Peak Voltage	Q101 Rated 111 A/ 80V	AC ON/OFF I/P:High-Line +3V =308V O/P: (1)Full Load	Q101: VDS: (1) 57V

			(2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4)Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (5)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (6)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. (8).NO LOAD Ta:25°C	(2) 58.2V (3) 57.4V (4) 58.2V (5) 58.6V (6) 58.2V (7) 58.2V (8)57.8V	
5	Input Capacitor Voltage	C5 Rated: : 220 μ / 450 V 105 °C / TXW Series	I/P:High-Line +3V =308V O/P: (1) Min load continue (2)Full load continue Ta:25°C	(1)429V (2)441V	
6	Control IC Voltage Test	PWM IC U800 Rated 8.85 V~ 16V PFC IC U401 Rated 10.6V~ 21 V O/P IC U101Rated 8V ~24 V MCU IC U701 Rated 2V~ 3.6V AUX IC U601 Rated 10.5V~25V	AC ON/OFF I/P:High-Line +3V =308V O/P(1)FULL LOAD (2) Output Short (3)O.L.P (4)O.V.P. (5)NO LOAD VRmin(LOW LINE) Ta:25°C	U800 (1) 14.96V (2) 13.71V (3) 14.27V (4) 12.58V (5) 12.42V U401 (1) 13.55V (2) 13.31V (3) 13.47V (4) 12.58V (5) 12.26V U101 (1) 13.95V (2) 13.39V (3) 13.79V (4) 12.18V (5) 11.94V	U701 (1) 3.33V (2) 3.35V (3) 3.35V (4) 3.33V (5) 3.17V U601 (1) 16.72V (2) 13.66V (3) 13.58V (4) 13.34V (5) 13.1V
8	TOP SWITCHING STAND BY POWER	U601 Rated 3.5 A/ 800 V	AC ON/OFF I/P:High-Line +3V =308V O/P: (1)Full Load (2)Remote On/Off I/P:Low-Line -3V =177V O/P: (1)Full Load (2)Remote On/Off Ta:25°C	U601 (1) 568V (2) 572V (1) 512V (2) 536V	

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P: 3KVAC/min I/P-FG :2KVAC/min O/P-FG:1.25KVAC/min	I/P-O/P: 3.6 KVAC/min I/P-FG: 2.4 KVAC/min O/P-FG:1.5 KVAC/min Ta:25°C	I/P-O/P: 7.74mA I/P-FG: 7.97mA O/P-FG: 6.49mA NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P:500VDC>100M Ω I/P-FG: 500VDC>100M Ω O/P-FG:500VDC>100M Ω	I/P-O/P: 500 VDC I/P-FG: 500 VDC O/P-FG: 500 VDC Ta:25°C	I/P-O/P: 14.8G Ω I/P-FG: 6.59G Ω O/P-FG: 6.52G Ω NO DAMAGE
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 m Ω	40A / 2min Ta:25°C	22 m Ω

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	EN61000-3-2 CLASS A	I/P:230VAC/50HZ O/P:FULL LOAD Ta:25°C	PASS
2	CONDUCTION	EN55032 CLASS B	I/P : 230 VAC (50HZ) O/P : FULL/50% LOAD Ta : 25°C	PASS Test by certified Lab
3	RADIATION	EN55032 CLASS B	I/P : 230 VAC (50HZ) O/P : FULL LOAD Ta : 25°C	PASS Test by certified Lab
4	E.S.D	EN61000-4-2 INDUSTRY AIR: 8KV / Contact: 4KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
5	E.F.T	EN61000-4-4 INDUSTRY INPUT : 2KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
6	SURGE	IEC61000-6-2 INDUSTRY L-N : 2KV L,N-PE : 4KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
7	Test by certified Lab & Test Report Prepare. Any contradictions of the test results, please refer to the latest EMC test report.			

■ RELIABILITY TEST

ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	TEMPERATURE RISE TEST	MODEL : HEP-1000-24 1. ROOM AMBIENT BURN-IN : 1.5 HRS I/P : 230VAC O/P : FULL LOAD Ta= 25 °C 2. HIGH AMBIENT BURN-IN : 3 HRS I/P : 230VAC O/P : FULL LOAD Ta= 50 °C		

		NO	Position	ROOM AMBIENT Ta= 25 °C	HIGH AMBIENT Ta= 50°C
		1	BD2	75.3°C	98.5°C
		2	BD1	76.0°C	99.1°C
		3	LF3	68.8°C	92.4°C
		4	ZNR2	66.1°C	89.6°C
		5	C13	70.0°C	93.4°C
		6	C2	65.1°C	88.6°C
		7	D10	76.2°C	100.1°C
		8	Q51	70.7°C	94.1°C
		9	Q65	72.5°C	95.7°C
		10	T51	71.3°C	95.0°C
		11	T52	70.3°C	94.0°C
		12	C417	63.8°C	89.9°C
		13	C8	67.7°C	91.6°C
		14	C964	70.1°C	93.9°C
		15	L2	70.7°C	94.8°C
		16	L3	76.4°C	102.2°C
		17	Q901	72.5°C	97.0°C
		18	Q903	71.9°C	96.6°C
		19	T1	74.5°C	99.9°C
		20	T1core	72.5°C	97.7°C
		21	T2	73.0°C	98.0°C
		22	T2core	71.7°C	96.5°C
		23	Q103	74.8°C	100.0°C
		24	Q113	75.5°C	100.7°C
		25	C114	74.3°C	99.3°C
		26	C118	73.2°C	98.2°C
		27	LF10	75.7°C	101.0°C
		28	U601	78.5°C	99.3°C
		29	U100	71.8°C	96.2°C
		30	RT21	67.3°C	90.3°C
		31	RTH4	69.6°C	93.5°C
		32	RTH5	70.1°C	93.9°C
		33	RG61	78.8°C	103.8°C
		34	T601	79.9°C	104.3°C
		35	C652	74.5°C	98.6°C
2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)		I/P : 230 VAC O/P : 107 % LOAD Ta : 25°C	TEST : OK
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR		I/P : 264VAC/180VAC/90VAC O/P : 100 % / 65% LOAD Ta= -45 °C	TEST : OK
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 50°C NO DAMAGE		I/P : 272 VAC O/P : FULL LOAD Ta= 50°C HUMIDITY= 95 %R.H	TEST : OK
5	TEMPERATURE COEFFICIENT	± 0.03 %/°C (0-50°C)		I/P : 230 VAC O/P : FULL LOAD	± 0.001%/°C (0-50°C)
6	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature : -45°C~ +90°C 2. Temperature change rate : 25°C / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 10 CYCLE 5. Input/Output condition : STATIC			OK



7	THERMAL SHOCK TEST	1. Thermal shock Temperature : -45°C~ +55°C 2. Temperature change rate : 25°C / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 16 CYCLE 5. Input/Output condition : 15cycle:230V/ FULL LOAD AC ON 3sec/AC OFF 1sec TEST 1cycle:230V/ FULL LOAD Burn In Test	OK
8	VIBRATION TEST	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10-500Hz (3) Sweep Time : 12min/sweep cycle (4) Acceleration : 10G (5) Test Time : 72min in each axis (X.Y.Z) (6) Ta : 25°C	TEST : OK
9	CAPACITOR LIFE CYCLE	SUPPOSE C120 IS THE MOST CRITICAL COMPONENT (1) I/P : 230VAC O/P : FULL LOAD Ta= 25°C LIFE TIME (2) I/P : 230VAC O/P : FULL LOAD Ta= 50°C LIFE TIME (3) I/P : 230VAC O/P : 75% LOAD Ta= 50°C LIFE TIME (4) I/P : 230VAC O/P : 50% LOAD Ta= 50°C LIFE TIME	(1) 100217HRS (2) 17716HRS (3) 54180HRS (4) 114992HRS
10	MTBF	Conducted by Parts Stress Analysis Prediction 197.9K hrs min. Telcordia SR-332 (Bellcore) ; 52.32K hrs min. MIL-HDBK-217F (25°C)	
11	Ongoing reliability test	I/P : 230VAC O/P : FULL LOAD TA=50 °C Demonstration Mean Time Between Failure : 55000 hours	

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	DANIEL GAO	SANFORD SU	VINCENT TSENG

2018.4.30 GP-A50-F010