



# Test Report: NSP-1000-15

---

1000W AC/DC High Reliable Multi-Industrial Enclosed Type Power Supply

## ■ 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

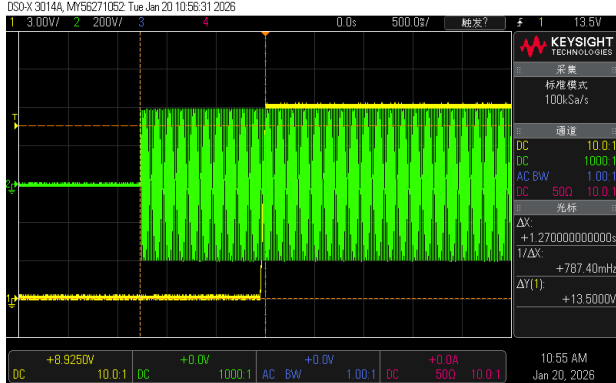
ENVIRONMENT TEST

## DESIGN VERIFY TEST

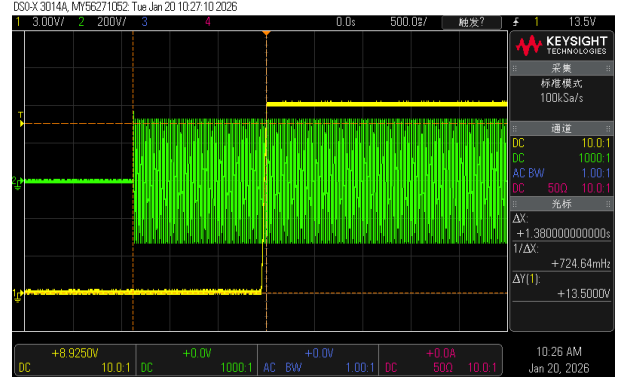
### OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE ADJUST RANGE	CH1: 13.5 V~ 19.0 V	I/P : 230 VAC O/P : MIN LOAD Ta : 25°C	CH1 : 12.8V~19.9 V/230VAC
2	OUTPUT VOLTAGE TOLERANCE	V1: -1%~ 1%	I/P: 85VAC /305VAC O/P:FULL/ MIN. LOAD Ta:25°C	V1: -0.07% ~ + 0.40%
3	LINE REGULATION	V1: -0.5%~ 0.5%	I/P: 85VAC~ 305VAC O/P:FULL LOAD Ta:25°C	V1: -0.00% ~ + 0.07%
4	LOAD REGULATION	V1: -0.5%~ 0.5%	I/P: 230VAC O/P:FULL ~MIN LOAD Ta:25°C	V1: - 0.20%~ +0.27%
5	OVER/UNDERSHOOT TEST	< ± 5%	I/P: 230VAC O/P:FULL LOAD Ta:25°C	3.2 %
6	RIPPLE & NOISE (Max)	V1: 150 mVp-p	I/P: 230 VAC O/P: MIN LOAD—FULL LOAD Ta:25°C	V1: 77mVp-p / 100% load
<p>high frequency :</p>		<p>low frequency :</p>		
7	SET UP TIME(Max)	277VAC/1500ms 230VAC/1500ms 115VAC/2500ms	I/P : 277VAC I/P : 230VAC I/P : 115VAC O/P : FULL LOAD Ta : 25°C	277VAC/ 1270ms 230VAC/ 1380ms 115VAC/ 1910ms

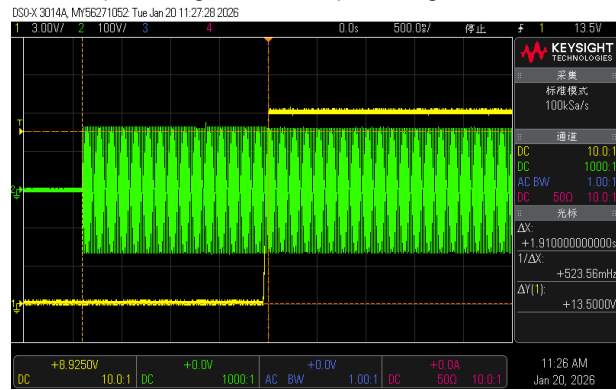
INPUT=277VAC/60HZ @ FULL LOAD  
CH1 : Output Voltage CH2 : AC Input Voltage



INPUT=230VAC/50HZ @ FULL LOAD  
CH1 : Output Voltage CH2 : AC Input Voltage



INPUT=115VAC/60HZ @ FULL LOAD  
CH1 : Output Voltage CH2 : AC Input Voltage



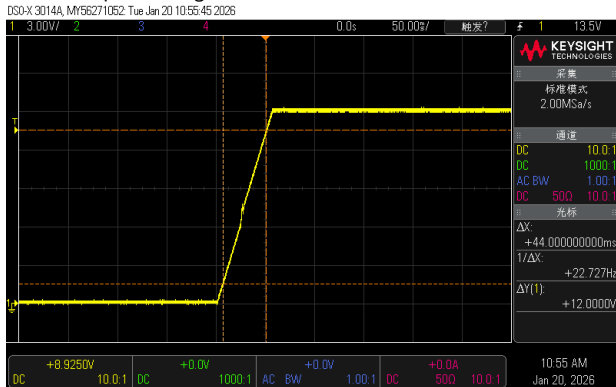
8 RISE TIME (Max)

277VAC/80ms  
230VAC/80ms  
115VAC/80ms

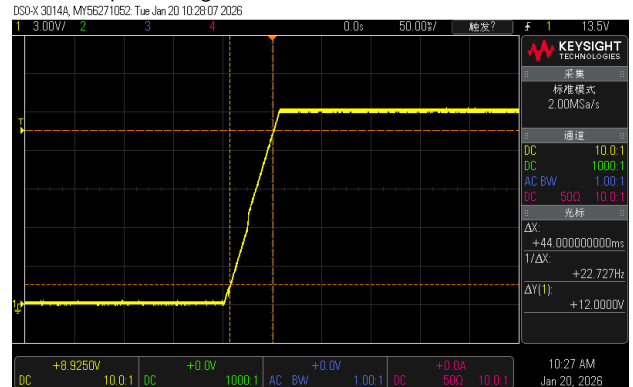
I/P : 277VAC  
I/P : 230VAC  
I/P : 115VAC  
O/P : FULL LOAD  
Ta : 25°C

277VAC/ 44 ms  
230VAC/ 44 ms  
115VAC/ 44 ms

INPUT=277VAC/60HZ @ FULL LOAD  
CH1 : Output Voltage

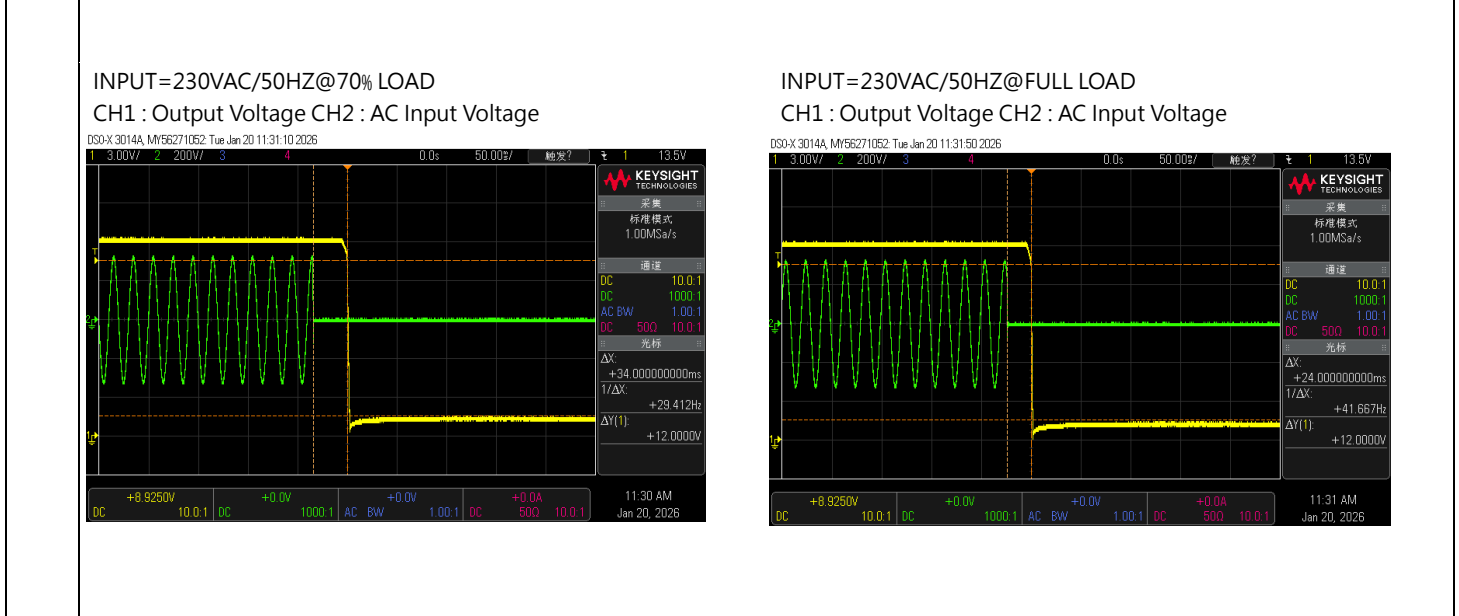
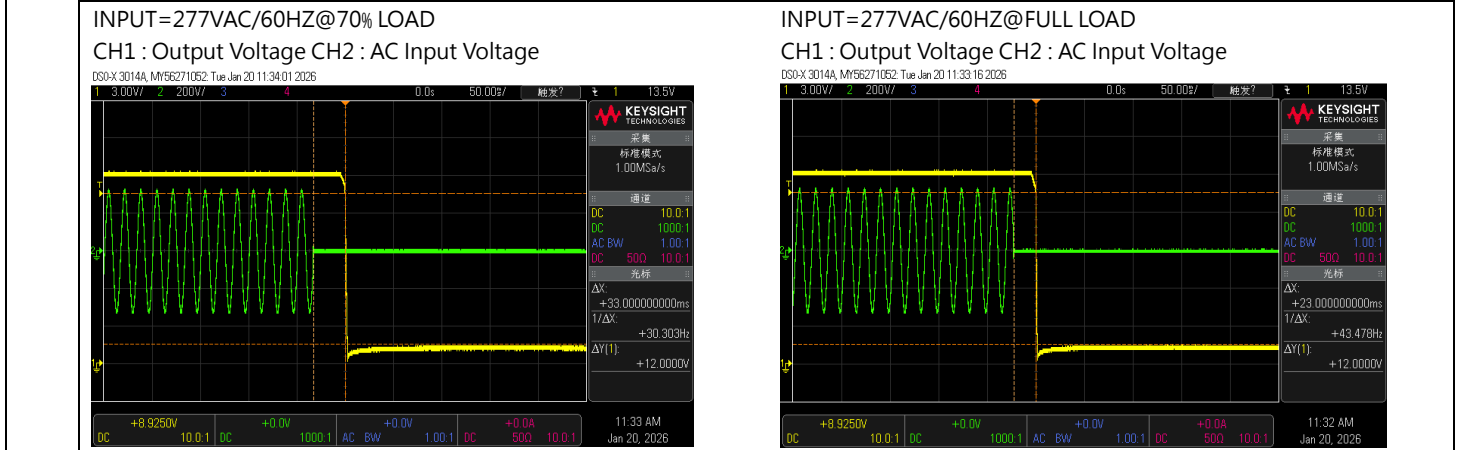


INPUT=230VAC/50HZ @ FULL LOAD  
CH1 : Output Voltage





<p>9 HOLD UP TIME (Typ.)</p>	<p>12ms@70%load 8ms@full load</p>	<p>I/P : 277 VAC I/P : 230VAC I/P : 115 VAC O/P : 70%LOAD/FULL LOAD Ta : 25°C</p>	<p>277VAC: 33ms/23ms 230VAC: 34ms/24ms 115VAC: 31ms/24ms</p>
------------------------------	---------------------------------------	---	--

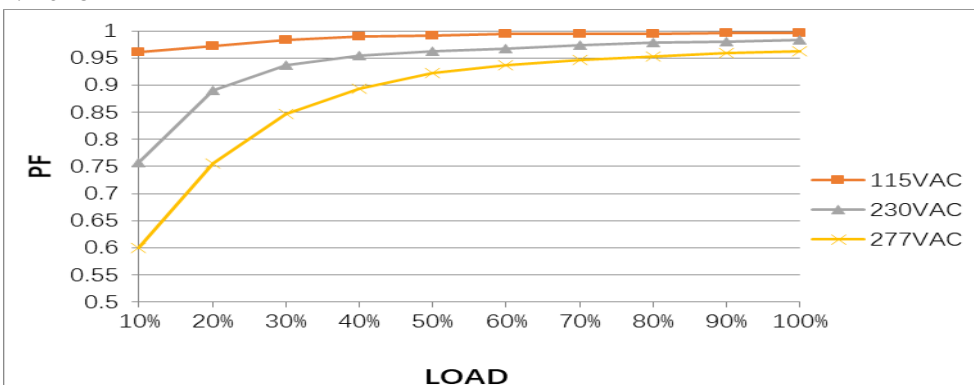


	<p>INPUT=115VAC/60HZ@70% LOAD CH1 : Output Voltage CH2 : AC Input Voltage</p>		<p>INPUT=115VAC/60HZ@FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage</p>	
10	DYNAMIC LOAD	V1: 3000mVp-p	<p>I/P: 230VAC O/P: (1)FULL /50% LOAD 50%DUTY / 120HZ (2)FULL /50% LOAD 50%DUTY / 1KHZ Ta:25°C</p>	<p>241mVp-p 211mVp-p</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	85VAC~305VAC 120VDC~ 431VDC	(1) I/P:TESTING O/P:FULL LOAD (2) I/P:DC TESTING(L:+ N:-) O/P: FULL / 50% LOAD (3) I/P:DC TESTING(L:- N:+) O/P: FULL / 50% LOAD Ta:25°C	(1) 85 V ~ 305V (2) 120 Vdc~431Vdc/FULL LOAD 120Vdc~ 431Vdc/50% LOAD (3) 120Vdc~431Vdc/FULL LOAD 120 Vdc~ 431Vdc/50% LOAD
			I/P: LOW-LINE-3V=82V HIGH-LINE+10V=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:85VAC ~264 VAC O/P:FULL~MIN LOAD Ta:25°C	TEST: OK
3	INPUT CURRENT (Typ.)	277V/ 5A 230V/ 6A 115V/ 12A	I/P : 277VAC I/P : 230VAC I/P : 115VAC O/P : FULL LOAD Ta : 25°C	I =4.00 A/ 277VAC I =4.73 A/ 230VAC I =9.65 A/ 115VAC
4	LEAKAGE CURRENT	Earth leakage current < 350μA(rms)@277VAC	I/P : 277 VAC O/P : Min LOAD Ta : 25°C	L-FG : 187 μA N-FG : 190 μA
		Touch current <100μA (rms)@277 VAC		L-V+ : 76.2μA L-V- : 77.5 μA N-V+ : 76.4 μA N-V- : 77.1 μA
5	POWER FACTOR (Typ.)	0.92/277VAC 0.95/ 230VAC 0.98/ 115VAC	I/P : 277VAC I/P : 230VAC I/P : 115VAC O/P : FULL LOAD Ta : 25°C	PF= 0.963/277VAC PF= 0.983/230VAC PF= 0.995/115VAC

P.F vs LOAD



6	EFFICIENCY(Typ.)	93%	I/P:230 VAC O/P:FULL LOAD Ta:25°C	93.2%																																												
<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>78</td><td>78</td><td>78</td></tr> <tr><td>20</td><td>85</td><td>85</td><td>85</td></tr> <tr><td>30</td><td>89</td><td>89</td><td>89</td></tr> <tr><td>40</td><td>90</td><td>90</td><td>90</td></tr> <tr><td>50</td><td>90</td><td>91</td><td>91</td></tr> <tr><td>60</td><td>90</td><td>92</td><td>92</td></tr> <tr><td>70</td><td>90</td><td>92</td><td>92</td></tr> <tr><td>80</td><td>90</td><td>92</td><td>92</td></tr> <tr><td>90</td><td>90</td><td>92</td><td>92</td></tr> <tr><td>100</td><td>90</td><td>92</td><td>92</td></tr> </tbody> </table>					Load (%)	115VAC (%)	230VAC (%)	277VAC (%)	10	78	78	78	20	85	85	85	30	89	89	89	40	90	90	90	50	90	91	91	60	90	92	92	70	90	92	92	80	90	92	92	90	90	92	92	100	90	92	92
Load (%)	115VAC (%)	230VAC (%)	277VAC (%)																																													
10	78	78	78																																													
20	85	85	85																																													
30	89	89	89																																													
40	90	90	90																																													
50	90	91	91																																													
60	90	92	92																																													
70	90	92	92																																													
80	90	92	92																																													
90	90	92	92																																													
100	90	92	92																																													

7	INRUSH CURRENT(Typ.)	50A/277VAC 40A/230VAC 25A/115VAC COLD START	I/P : 277VAC I/P : 230VAC I/P : 115VAC O/P : FULL LOAD Ta : 25°C	I = 42.4A/ 277VAC T50= 2380us/277V  I = 35.5A/230VAC T50= 2000us/230V  I = 17.8A/ 115VAC T50=1380 us/115V
---	----------------------	--	--	--

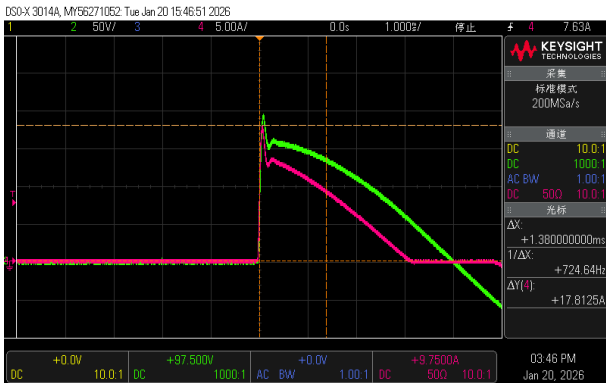
INPUT=277VAC/50HZ @ FULL LOAD  
CH2 : AC Input Voltage CH4 : Input current



INPUT=230VAC/50HZ @ FULL LOAD  
CH2 : AC Input Voltage CH4 : Input current



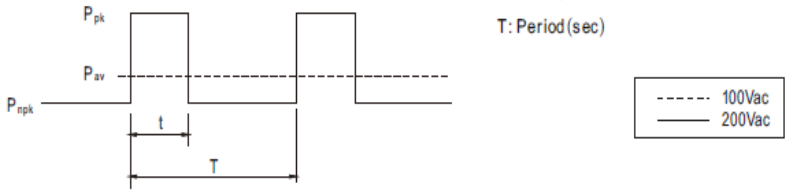
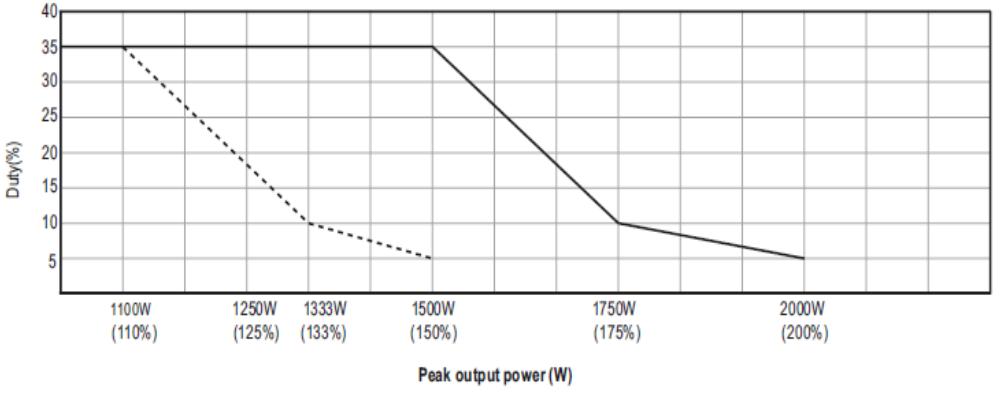
INPUT=115VAC/50HZ @ FULL LOAD  
CH2 : AC Input Voltage CH4 : Input current

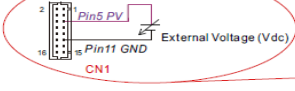
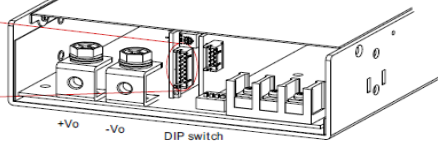
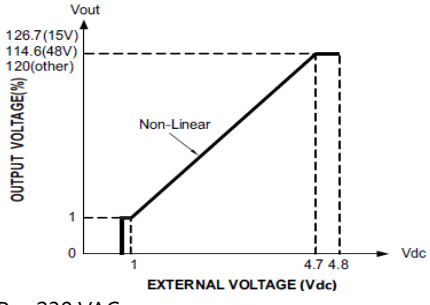
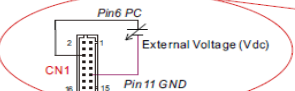
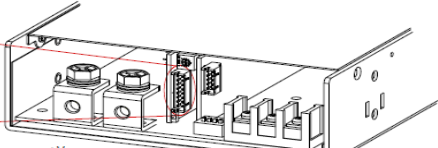
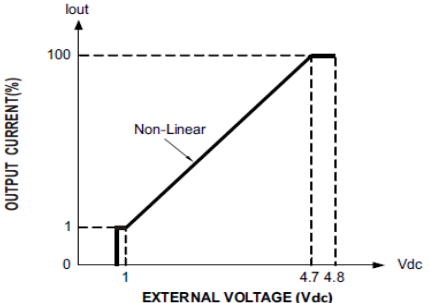


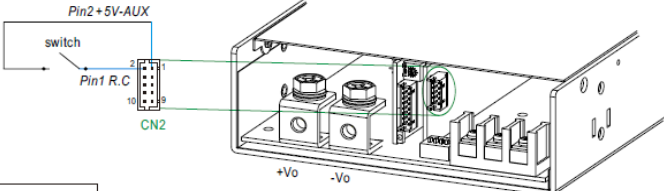
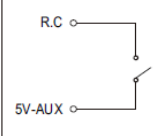
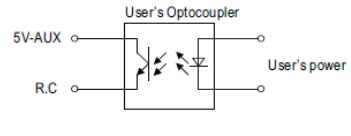
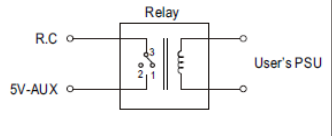
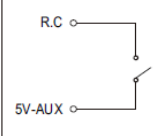
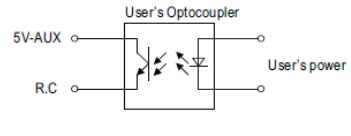
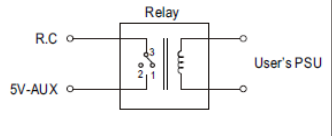
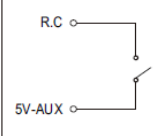
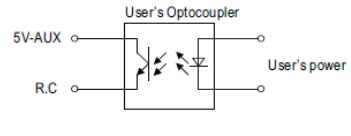
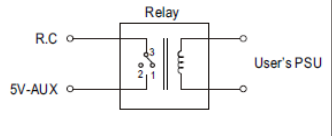
### PROTECTION FUNCTION TEST

















































NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	105 % ~ 200 %	I/P: 305VAC I/P: 230VAC I/P: 85VAC O/P:TESTING Ta:25°C	107.8%/ 305VAC 107.8%/ 230VAC 107.8%/ 85VAC Protection type : <b>Peak Load Mode :</b> From 105% to 200% of rated output power, unit will shut down after 5 seconds of continuous operation. AC repower on to recover. At >200% of rated output power, constant current limiting is activated. Unit will shut down after 5 seconds of continuous operation. AC repower on to recover.  <b>Current Limiting Mode:</b> Constant current limiting, recovers automatically after abnormal condition is removed
2	OVER VOLTAGE PROTECTION	20V~25V	I/P: 305VAC I/P: 230VAC I/P: 85VAC O/P:MIN LOAD Ta:25°C	22.3V/ 305VAC 22.3V/ 230VAC 22.3V/ 85VAC Protection type : Shut down and latch off output voltage, re-power on to recover
3	OVER TEMPERATURE PROTECTION	NO DAMAGE	I/P: 305VAC I/P: 85VAC O/P:FULL LOAD	O.T.P. Active Protection type : Shut down output voltage, recovers automatically after temperature goes down
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE Protection type :	I/P: 305VAC I/P: 85VAC O/P: FULL LOAD Ta:25°C	NO DAMAGE Protection type : <b>Peak Load Mode:</b> Constant current limiting, unit will shut down after 5 Sec, AC repower on to recover.  <b>Current Limiting Mode:</b> Constant current limiting, recovers automatically after abnormal condition is removed.

### CONTROL FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PEAK POWER	<p>■ <b>Function Manual</b></p> <p><b>1. Peak Power</b></p> $P_{av} = \frac{P_{pk} \times t + P_{rpk} \times (T-t)}{T} \leq P_{rated}$ $Duty = \frac{t}{T} \times 100\% \leq 35\%$ $t \leq 5 \text{ sec}$   <p><b>For example (24V model)</b>  <math>V_{in}=220Vac, Duty\_max=5\%</math>  <math>P_{av}=P_{rated}=1000W</math>  <math>P_{pk}=2000W</math>  <math>t \leq 5sec</math>  <math>T \geq \frac{5sec}{5\%} = 100sec</math>  <math>P_{rpk} \leq \frac{TP_{av}-tP_{pk}}{T-t} = 947.4W</math></p> <p>Note: When the output voltage is adjusted to the upper limit, the peak power is 150% of rated power</p>		
<p>I/P: 100/200 VAC  O/P: PEAK LOAD  Ta: 25°C  TEST RESULT : OK</p>				

<p>2</p> <p>OUTPUT VOLTAGE PROGRAMMABLE(PV)</p>	<p><b>2. Output Voltage Programming(P.V)</b></p> <p>(1)Default by potentiometer (SVR)          (a)Set DIP switch position-3 to OFF(refer to the illustration on the right).          (b)Output voltage can be trimmed by SVR.</p> <p>(2)By Output Voltage Programming          (a)Set DIP switch position-3 to ON(refer to the illustration on the right).          (b)The output voltage can be trimmed to 0~120% by applying EXTERNAL VOLTAGE between PV and GND on CN1.</p>    <p>I/P: 230 VAC          O/P:FULL LOAD          Ta:25°C          TEST RESULT : PASS</p> <table border="1" data-bbox="502 974 1540 1153"> <tr> <td>External voltage(DC)</td> <td>&lt;0.4V</td> <td>1V</td> <td>2.442V</td> <td>4.7V</td> <td>4.8V</td> </tr> <tr> <td>SPEC(%)</td> <td>0%</td> <td>0%~6%</td> <td>50%±5%</td> <td>126.7%±5%</td> <td>126.7%±5%</td> </tr> <tr> <td>Vout(%)</td> <td>0%</td> <td>0.164V(1.09%)</td> <td>7.49V(49.93%)</td> <td>18.99V(126.60%)</td> <td>19.49V(129.93%)</td> </tr> </table>	External voltage(DC)	<0.4V	1V	2.442V	4.7V	4.8V	SPEC(%)	0%	0%~6%	50%±5%	126.7%±5%	126.7%±5%	Vout(%)	0%	0.164V(1.09%)	7.49V(49.93%)	18.99V(126.60%)	19.49V(129.93%)
External voltage(DC)	<0.4V	1V	2.442V	4.7V	4.8V														
SPEC(%)	0%	0%~6%	50%±5%	126.7%±5%	126.7%±5%														
Vout(%)	0%	0.164V(1.09%)	7.49V(49.93%)	18.99V(126.60%)	19.49V(129.93%)														
<p>3</p> <p>OUTPUT CURRENT PROGRAMMABLE (PC)</p>	<p><b>3. Output Current Programming(P.C)</b></p> <p>(1)Default Overload Protection(OLP) value          (a)Set DIP switch position-2 to OFF(refer to the illustration on the right).          (b)Output current is set default value.</p> <p>(2)By Constant Current Level Programming          (a)Set DIP switch position-2 to ON(refer to the illustration on the right).          (b)The constant current level can be trimmed to 0~100% of the rated current by applying EXTERNAL VOLTAGE between PC and GND on CN1.</p>    <p>I/P: 230 VAC          O/P:TESTING          Ta:25°C</p> <table border="1" data-bbox="502 1881 1540 2027"> <tr> <td>External voltage(DC)</td> <td>&lt;0.4V</td> <td>1V</td> <td>2.831V</td> <td>4.7V</td> <td>4.8V</td> </tr> <tr> <td>SPEC(%)</td> <td>0%</td> <td>0%~6%</td> <td>50%±5%</td> <td>100%±5%</td> <td>100%±5%</td> </tr> <tr> <td>Iout(%)</td> <td>0%</td> <td>1.04%</td> <td>51.12%</td> <td>101.95%</td> <td>101.95%</td> </tr> </table>	External voltage(DC)	<0.4V	1V	2.831V	4.7V	4.8V	SPEC(%)	0%	0%~6%	50%±5%	100%±5%	100%±5%	Iout(%)	0%	1.04%	51.12%	101.95%	101.95%
External voltage(DC)	<0.4V	1V	2.831V	4.7V	4.8V														
SPEC(%)	0%	0%~6%	50%±5%	100%±5%	100%±5%														
Iout(%)	0%	1.04%	51.12%	101.95%	101.95%														

<p>4</p> <p>REMOTE CONTROL</p>	<p><b>4.Remote Control</b></p> <p>※ The power supply can be turned ON/OFF individually or along with other units by using the "Remote Control" function with external switch, potocoupler or relay.</p>  <table border="1" data-bbox="531 542 970 631"> <tr> <th>PSU Vo Status</th> <th>Between +5V-AUX(Pin 2) and R.C(Pin 1)</th> </tr> <tr> <td>Power ON</td> <td>Switch Short</td> </tr> <tr> <td>Power OFF</td> <td>Switch Open</td> </tr> </table> <table border="1" data-bbox="531 656 1394 880"> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td>R.C. by external switch.</td> <td>R.C. by user's optocoupler control module.</td> <td>R.C. by user's Relay control module.</td> </tr> </table> <p>I/P: 230 VAC O/P:FULL LOAD Ta:25°C Test Result : PASS</p> <table border="1" data-bbox="507 1025 1230 1144"> <tr> <th>Between +5V-AUX(Pin2) and R.C(Pin1)</th> <th>Power Supply Status</th> </tr> <tr> <td>SW SHORT</td> <td>ON</td> </tr> <tr> <td>SW OPEN</td> <td>OFF</td> </tr> </table>	PSU Vo Status	Between +5V-AUX(Pin 2) and R.C(Pin 1)	Power ON	Switch Short	Power OFF	Switch Open				R.C. by external switch.	R.C. by user's optocoupler control module.	R.C. by user's Relay control module.	Between +5V-AUX(Pin2) and R.C(Pin1)	Power Supply Status	SW SHORT	ON	SW OPEN	OFF
PSU Vo Status	Between +5V-AUX(Pin 2) and R.C(Pin 1)																		
Power ON	Switch Short																		
Power OFF	Switch Open																		
																			
R.C. by external switch.	R.C. by user's optocoupler control module.	R.C. by user's Relay control module.																	
Between +5V-AUX(Pin2) and R.C(Pin1)	Power Supply Status																		
SW SHORT	ON																		
SW OPEN	OFF																		
<p>5</p> <p>REMOTE SENSE</p>	<table border="1"> <tr> <td>S+ / S-&gt;0.5V Compensate voltage drop on the load wiring up to 0.5V.</td> <td>I/P: 230 VAC O/P:FULL LOAD Ta:25°C</td> <td>&gt; 0.5V</td> </tr> </table>	S+ / S->0.5V Compensate voltage drop on the load wiring up to 0.5V.	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	> 0.5V															
S+ / S->0.5V Compensate voltage drop on the load wiring up to 0.5V.	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	> 0.5V																	
<p>6</p> <p>AUXILIARY POWER</p>	<p>1.Auxiliary voltage output, 10.2~13.8V, referenced to GND-AUX (pin2). The maximum load current is 0.8A. This output has the built-in "Oring diodes" and is not controlled by "Remote ON-OFF".</p> <p>2.Auxiliary voltage output, 4.25~5.75V, referenced to GND-AUX (pin2). The maximum load current is 0.3A. This output has the built-in "Oring diodes" and is not controlled by "Remote ON-OFF"</p> <p>I/P: 230 VAC O/P:FULL LOAD Ta:25°C Test Result : PASS</p> <table border="1" data-bbox="588 1659 1425 1805"> <tr> <th>AUX</th> <th>TOLERANCE</th> <th>RIPPLE</th> <th>TEST RESULT</th> </tr> <tr> <td>12V / 0.8A</td> <td>10.2~13.8V</td> <td>450mVp-p</td> <td>11.72V/ 80mV</td> </tr> <tr> <td>5V / 0.2A</td> <td>4.25~5.75V</td> <td>150mVp-p</td> <td>4.74V/51mV</td> </tr> </table>	AUX	TOLERANCE	RIPPLE	TEST RESULT	12V / 0.8A	10.2~13.8V	450mVp-p	11.72V/ 80mV	5V / 0.2A	4.25~5.75V	150mVp-p	4.74V/51mV						
AUX	TOLERANCE	RIPPLE	TEST RESULT																
12V / 0.8A	10.2~13.8V	450mVp-p	11.72V/ 80mV																
5V / 0.2A	4.25~5.75V	150mVp-p	4.74V/51mV																
<p>7</p> <p>DC OK SIGNAL</p>	<p>I/P:230VAC O/P: FULL LOAD Ta:25°C TEST : OK</p>																		

8	LED Status indicators	<p>※ LED Status Indicators</p> <table border="1" data-bbox="507 300 1538 1077"> <thead> <tr> <th data-bbox="507 300 978 342">Description</th> <th colspan="3" data-bbox="978 300 1538 342">Output of alarm</th> </tr> </thead> <tbody> <tr> <td data-bbox="507 342 978 423">Normal operation</td> <td data-bbox="978 342 1230 423">Green : Steadily lit</td> <td data-bbox="1230 342 1321 423"></td> <td data-bbox="1321 342 1538 423"></td> </tr> <tr> <td data-bbox="507 423 978 504">Remote off</td> <td data-bbox="978 423 1230 504">Red : Steadily lit</td> <td data-bbox="1230 423 1321 504"></td> <td data-bbox="1321 423 1538 504"></td> </tr> <tr> <td data-bbox="507 504 978 584">Internal over-temperature</td> <td data-bbox="978 504 1230 584">Orange : 1 Blink/Pause</td> <td data-bbox="1230 504 1321 584"></td> <td data-bbox="1321 504 1538 584"></td> </tr> <tr> <td data-bbox="507 584 978 665">Overload/Short</td> <td data-bbox="978 584 1230 665">Red : 1 Blink/Pause</td> <td data-bbox="1230 584 1321 665"></td> <td data-bbox="1321 584 1538 665"></td> </tr> <tr> <td data-bbox="507 665 978 745">Over voltage</td> <td data-bbox="978 665 1230 745">Red : 2 Blink/Pause</td> <td data-bbox="1230 665 1321 745"></td> <td data-bbox="1321 665 1538 745"></td> </tr> <tr> <td data-bbox="507 745 978 826">Over temperature</td> <td data-bbox="978 745 1230 826">Red : 3 Blink/Pause</td> <td data-bbox="1230 745 1321 826"></td> <td data-bbox="1321 745 1538 826"></td> </tr> <tr> <td data-bbox="507 826 978 907">Fan fail</td> <td data-bbox="978 826 1230 907">Red : 4 Blink/Pause</td> <td data-bbox="1230 826 1321 907"></td> <td data-bbox="1321 826 1538 907"></td> </tr> <tr> <td data-bbox="507 907 978 987">AC under voltage</td> <td data-bbox="978 907 1230 987">Red : 5 Blink/Pause</td> <td data-bbox="1230 907 1321 987"></td> <td data-bbox="1321 907 1538 987"></td> </tr> <tr> <td data-bbox="507 987 978 1077">Others (Note)</td> <td data-bbox="978 987 1230 1077">Red : 6 Blink/Pause</td> <td data-bbox="1230 987 1321 1077"></td> <td data-bbox="1321 987 1538 1077"></td> </tr> </tbody> </table> <p data-bbox="507 1093 1538 1144">Note: 1. Others include hardware fault etc. 2. In PC mode, both OLP and SCP operate in constant current limiting, with the indicator steadily lit green.</p> <p data-bbox="507 1189 667 1323">I/P:230VAC O/P:FULL LOAD Ta:25°C TEST : PASS</p>			Description	Output of alarm			Normal operation	Green : Steadily lit			Remote off	Red : Steadily lit			Internal over-temperature	Orange : 1 Blink/Pause			Overload/Short	Red : 1 Blink/Pause			Over voltage	Red : 2 Blink/Pause			Over temperature	Red : 3 Blink/Pause			Fan fail	Red : 4 Blink/Pause			AC under voltage	Red : 5 Blink/Pause			Others (Note)	Red : 6 Blink/Pause		
Description	Output of alarm																																											
Normal operation	Green : Steadily lit																																											
Remote off	Red : Steadily lit																																											
Internal over-temperature	Orange : 1 Blink/Pause																																											
Overload/Short	Red : 1 Blink/Pause																																											
Over voltage	Red : 2 Blink/Pause																																											
Over temperature	Red : 3 Blink/Pause																																											
Fan fail	Red : 4 Blink/Pause																																											
AC under voltage	Red : 5 Blink/Pause																																											
Others (Note)	Red : 6 Blink/Pause																																											
9	FAN NOISE (Typ.)	<p>10% load @18 dB 70% load @24 dB</p> <p>Built-in intelligent fan speed control detect by PSU' S internal temperature</p>	<p>I/P : 230 VAC O/P : TESTING Ta : 25°C</p>	<p>10% load: 16.03dB 70% load: 21.19dB</p>																																								

### COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Transistor ( D to S) or (C to E) Peak Voltage	Q53 Rated: 650V/33.7A	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. (8)0%~150%LOAD (9)0%LOAD~SHORT  I/P:Low-Line -3V = 82V 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) 440V (2) 452V (3) 444V  (4) 440V (5) 440V (6) 444V (7) 444V (8) 24.1V (9) 46.2V  VDS: (1) 464V (2) 464V (3) 460V (4) 460V (5) 460V (6) 460V (7) 460V
2	Diode Peak Voltage	Q100 Rated: 370A/80V  Q103 Rated: 370A/80V	AC ON/OFF I/P:High-Line +3V =308 V 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. (8).NO LOAD Ta:25°C	Q100: VDS: (1) 60.0V (2) 60.4V (3) 63.7V  (4) 60.0V (5) 60.0V (6) 63.3V (7) 64.1V (8) 62.9V

				Q103: VDS: (1) 60.4V (2) 60.4V (3) 63.7V (4) 60.4V (5) 60.4V (6) 63.3V (7) 63.3V (8) 62.5V
3	Input Capacitor Voltage	C5 Rated: 470μ/450V Surge voltage: 495V	I/P:High-Line +3V =308V O/P: (1)Full Load input on/off (2) Min load input on /Off (3)Full Load /Min load Change (4)Full load continue Ta:25°C	(1)448V (2)436V (3)456V (4)450V
4	Control IC Voltage Test	PWM IC U500 Rated 8V~ 30 V  PFC IC U1 Rated 11.9V~ 25V  O/P IC U100 Rated 4.2 V~ 30 V	AC ON/OFF I/P:High-Line +3V =308 V 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	U500 (1) 18.3V (2) 18.5V (3) 18.5V (4) 18.1V (5) 18.3V  U1 (1) 12.5V (2) 12.5V (3) 12.5V (4) 12.5V (5) 13.1V  U100 (1) 17.9V (2) 17.7V (3) 18.5V (4) 17.9V (5) 17.7V

■ SAFETY& E.M.C. TEST

**SAFETY TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P: 4 K VAC/min I/P-FG : 2 K VAC/min O/P-FG: 1.5 KVAC/min	I/P-O/P: 4.4 KVAC/min I/P-FG: 2.4 KVAC/min O/P-FG: 1.8 KVAC/min Ta:25°C	I/P-O/P: 3.658 mA I/P-FG: 4.63 mA O/P-FG: 2.159 mA NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P: 500 VDC>100MΩ I/P-FG: 500 VDC>100MΩ O/P-FG: 500 VDC >100MΩ	I/P-O/P: 500 VDC I/P-FG: 500 VDC O/P-FG: 500 VDC Ta:25°C	I/P-O/P: >9999 MΩ I/P-FG: >9999 MΩ O/P-FG: >9999 MΩ NO DAMAGE
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40A / 2min Ta:25°C	13 mΩ

**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 EN55014-1 EN55011	I/P : 230 VAC (50HZ) O/P : FULL/50% LOAD Ta : 25°C	PASS Test by certified Lab
3	RADIATION	EN55032 EN55014-1 EN55011	I/P : 230 VAC (50HZ) O/P : FULL LOAD Ta : 25°C	PASS Test by certified Lab
4	E.S.D	EN61000-4-2 AIR : 15KV / Contact : 8KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
5	E.F.T	EN61000-4-4 INPUT : 2KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
6	SURGE	IEC61000-4-5 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 : NSP-1000-12 1. ROOM AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : FULL LOAD Ta=27.4 °C 2. HIGH AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : FULL LOAD Ta=62.8 °C																																																																																																										
				<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta=27.4 °C</th> <th>HIGH AMBIENT Ta=62.8 °C</th> </tr> </thead> <tbody> <tr><td>1</td><td>LF2</td><td>35.3°C</td><td>70.7°C</td></tr> <tr><td>2</td><td>BD1</td><td>56.7°C</td><td>92.1°C</td></tr> <tr><td>3</td><td>Q1</td><td>53.9°C</td><td>89.3°C</td></tr> <tr><td>4</td><td>D4</td><td>51.2°C</td><td>86.6°C</td></tr> <tr><td>5</td><td>L1</td><td>42.6°C</td><td>78.0°C</td></tr> <tr><td>6</td><td>C5</td><td>37.0°C</td><td>72.4°C</td></tr> <tr><td>7</td><td>U1</td><td>42.8°C</td><td>78.2°C</td></tr> <tr><td>8</td><td>U2</td><td>49.2°C</td><td>84.6°C</td></tr> <tr><td>9</td><td>Q50</td><td>53.0°C</td><td>88.4°C</td></tr> <tr><td>10</td><td>Q51</td><td>53.1°C</td><td>88.5°C</td></tr> <tr><td>11</td><td>Q52</td><td>49.7°C</td><td>85.1°C</td></tr> <tr><td>12</td><td>Q53</td><td>50.7°C</td><td>86.1°C</td></tr> <tr><td>13</td><td>L3</td><td>77.5°C</td><td>112.9°C</td></tr> <tr><td>14</td><td>T1</td><td>79.7°C</td><td>115.1°C</td></tr> <tr><td>15</td><td>D100</td><td>72.2°C</td><td>107.6°C</td></tr> <tr><td>16</td><td>L100</td><td>68.4°C</td><td>103.8°C</td></tr> <tr><td>17</td><td>C110</td><td>61.5°C</td><td>96.9°C</td></tr> <tr><td>18</td><td>U100</td><td>85.8°C</td><td>121.2°C</td></tr> <tr><td>19</td><td>Q102</td><td>70.7°C</td><td>106.1°C</td></tr> <tr><td>20</td><td>R118</td><td>82.2°C</td><td>117.6°C</td></tr> <tr><td>21</td><td>RTH5</td><td>37.3°C</td><td>72.7°C</td></tr> <tr><td>22</td><td>RTH6</td><td>44.0°C</td><td>79.4°C</td></tr> <tr><td>23</td><td>RT31</td><td>55.9°C</td><td>91.3°C</td></tr> <tr><td>24</td><td>RT32</td><td>46.8°C</td><td>82.2°C</td></tr> <tr><td>25</td><td>C14</td><td>36.6°C</td><td>72.0°C</td></tr> </tbody> </table>	NO	Position	ROOM AMBIENT Ta=27.4 °C	HIGH AMBIENT Ta=62.8 °C	1	LF2	35.3°C	70.7°C	2	BD1	56.7°C	92.1°C	3	Q1	53.9°C	89.3°C	4	D4	51.2°C	86.6°C	5	L1	42.6°C	78.0°C	6	C5	37.0°C	72.4°C	7	U1	42.8°C	78.2°C	8	U2	49.2°C	84.6°C	9	Q50	53.0°C	88.4°C	10	Q51	53.1°C	88.5°C	11	Q52	49.7°C	85.1°C	12	Q53	50.7°C	86.1°C	13	L3	77.5°C	112.9°C	14	T1	79.7°C	115.1°C	15	D100	72.2°C	107.6°C	16	L100	68.4°C	103.8°C	17	C110	61.5°C	96.9°C	18	U100	85.8°C	121.2°C	19	Q102	70.7°C	106.1°C	20	R118	82.2°C	117.6°C	21	RTH5	37.3°C	72.7°C	22	RTH6	44.0°C	79.4°C	23	RT31	55.9°C	91.3°C	24	RT32	46.8°C	82.2°C	25	C14	36.6°C	72.0°C
NO	Position	ROOM AMBIENT Ta=27.4 °C	HIGH AMBIENT Ta=62.8 °C																																																																																																									
1	LF2	35.3°C	70.7°C																																																																																																									
2	BD1	56.7°C	92.1°C																																																																																																									
3	Q1	53.9°C	89.3°C																																																																																																									
4	D4	51.2°C	86.6°C																																																																																																									
5	L1	42.6°C	78.0°C																																																																																																									
6	C5	37.0°C	72.4°C																																																																																																									
7	U1	42.8°C	78.2°C																																																																																																									
8	U2	49.2°C	84.6°C																																																																																																									
9	Q50	53.0°C	88.4°C																																																																																																									
10	Q51	53.1°C	88.5°C																																																																																																									
11	Q52	49.7°C	85.1°C																																																																																																									
12	Q53	50.7°C	86.1°C																																																																																																									
13	L3	77.5°C	112.9°C																																																																																																									
14	T1	79.7°C	115.1°C																																																																																																									
15	D100	72.2°C	107.6°C																																																																																																									
16	L100	68.4°C	103.8°C																																																																																																									
17	C110	61.5°C	96.9°C																																																																																																									
18	U100	85.8°C	121.2°C																																																																																																									
19	Q102	70.7°C	106.1°C																																																																																																									
20	R118	82.2°C	117.6°C																																																																																																									
21	RTH5	37.3°C	72.7°C																																																																																																									
22	RTH6	44.0°C	79.4°C																																																																																																									
23	RT31	55.9°C	91.3°C																																																																																																									
24	RT32	46.8°C	82.2°C																																																																																																									
25	C14	36.6°C	72.0°C																																																																																																									
2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR ( MIN )	I/P : 230 VAC O/P : 115 % LOAD Ta : 25°C	TEST : OK																																																																																																								
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 305VAC/100VAC O/P : 60%/ 100 % LOAD Ta= -45/-35 °C	TEST : OK																																																																																																								



4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 60 °C/95 %R.H NO DAMAGE	I/P : 315 VAC O/P : FULL LOAD Ta= 65 °C HUMIDITY= 95 %R.H	TEST : OK
5	TEMPERATURE COEFFICIENT	±0.03 %/°C(0~60°C)	I/P : 230 VAC O/P : FULL LOAD	±0.0023 %/°C(0~60°C)
6	STORAGE TEMPERATURE TEST	-40~85°C	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	
7	THERMAL SHOCK TEST	-30~60°C	1. Thermal shock Temperature : -35°C~ +65°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	
8	VIBRATION TEST	10 ~ 500Hz, 2G 10min./1cycle, 60min. each along X, Y, Z axes	(1) Waveform : Sine Wave (2) Frequency : 10~500Hz (3) Sweep Time : 10min/sweep cycle (4) Acceleration : 3G (5) Test Time : 180min in each axis (X.Y.Z) (6) Ta : 25°C	
9	CAPACITOR LIFE CYCLE	SUPPOSE C110 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=60 °C LIFE TIME (3) I/P : 230VAC O/P : 75% LOAD Ta=60 °C LIFE TIME (4) I/P : 230VAC O/P : 50% LOAD Ta=60 °C LIFE TIME	(1) 345915HRS (2) 17538HRS (3) 145871HRS (4) 244889HRS	
10	MTBF	Conducted by Parts Stress Analysis Prediction 910.8K hrs min. Telcordia SR-332 (Bellcore) ; 87.5K 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 : 50,000 hours		

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	WUWQIN/ZHOUBIAO	WENF	WUWQ

2020.10.1 TAG-QA-009