Test Report： UHP-200-55

200W Slim Type with PFC Switching Power Supply

■ DESIGN VERIFY TEST

Output Function Test
Input Function Test
Protection Function Test
Component Stress Test

■ SAFETY & E.M.C. TEST

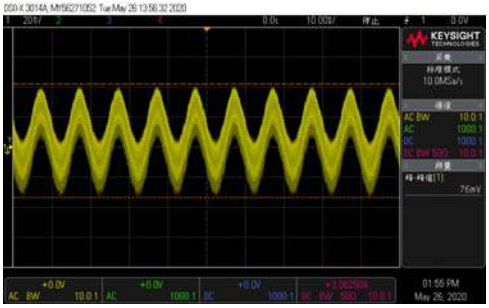
Safety Test
E.M.C. Test

■ RELIABILITY TEST

Environment Test

■ DESIGN VERIFY TEST

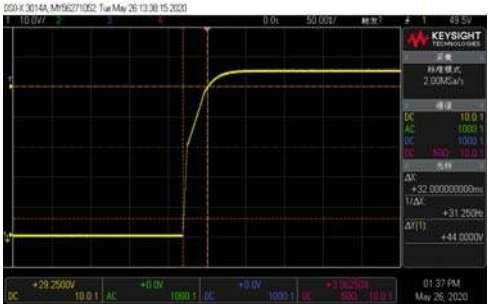
OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE ADJUST RANGE	40V~58V	I/P： 230VAC/115VAC O/P：NO LOAD Ta：25℃	37.40V~ 58.39V/230VAC 37.35V~ 58.39 V/115VAC
2	Peak Load Test	150% peak load capability(100ms)	I/P： 230VAC O/P：150% LOAD Ta：25℃	TEST： OK
3	OUTPUT VOLTAGE TOLERANCE	-1%~1%	I/P： 90VAC /264VAC O/P：FULL/ NO LOAD Ta：25℃	-0.12 % ~0 %
4	LINE REGULATION	-0.3%~0.3%	I/P： 100VAC ~ 264VAC O/P：FULL LOAD Ta：25℃	0% ~ 0.004%
5	LOAD REGULATION	-0.5%~0.5%	I/P： 230VAC O/P：FULL ~NO LOAD Ta：25℃	-0.015%~ 0.11%
6	OVER/UNDERSHOOT TEST	<±5 %	I/P： 230VAC O/P：FULL LOAD Ta：25℃	0.4%
7	RIPPLE & NOISE (Max)	360mVp-p	I/P： 230VAC O/P：FULL LOAD Ta：25℃	76mVp-p /CCH 100%load
	high frequency： 		low frequency： 	
8	SET UP TIME(Max)	230VAC/ 550ms 115VAC/ 3000ms	I/P： 230 VAC I/P： 115 VAC O/P：FULL LOAD Ta：25℃	230VAC/ 432ms 115VAC/ 537ms
	INPUT=230VAC/50HZ @ FULL LOAD CH1： Output Voltage CH2：AC Input Voltage 		INPUT=115VAC/60HZ @ FULL LOAD CH1： Output Voltage CH2：AC Input Voltage 	

9	RISE TIME (Max)	230VAC/ 80ms 115VAC/ 80ms	I/P： 230 VAC I/P： 115 VAC O/P：FULL LOAD Ta：25℃	230VAC/32ms 115VAC/31ms

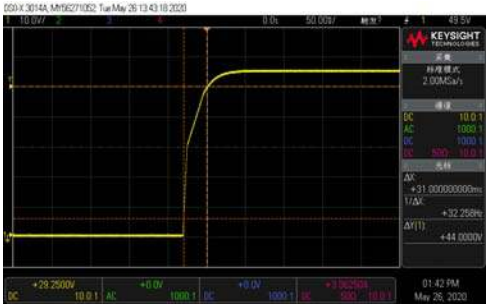
INPUT=230VAC/50HZ @ FULL LOAD

CH1： Output Voltage



INPUT=115VAC/60HZ @ FULL LOAD

CH1： Output Voltage



10	HOLD UP TIME(Typ)	230VAC/ 10ms 115VAC/ 10ms	I/P： 230 VAC I/P： 115 VAC O/P：FULL LOAD Ta：25℃	230VAC/19ms 115VAC/21ms

INPUT=230VAC/50HZ @ FULL LOAD

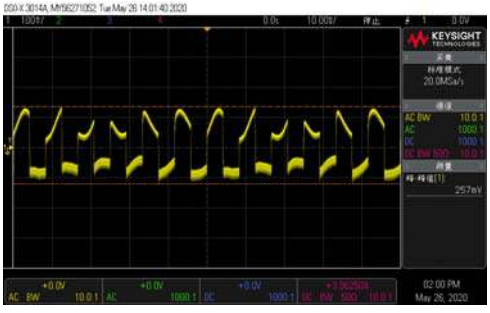
CH1： Output Voltage CH2： AC Input Voltage

INPUT=115VAC/60HZ @ FULL LOAD

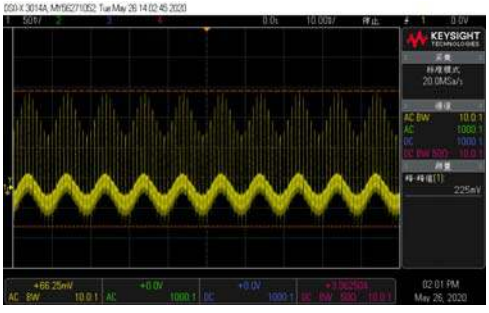
CH1： Output Voltage CH2： AC Input Voltage

11	DYNAMIC LOAD	5500mVp-p	I/P： 230VAC O/P： (1)FULL/50% LOAD 50%DUTY / 120HZ (2)FULL/50% LOAD 50%DUTY / 1KHZ Ta：25℃	 (1) 257mVp-p (2) 225mVp-p

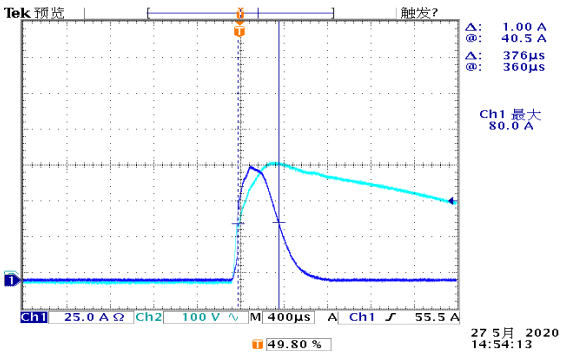
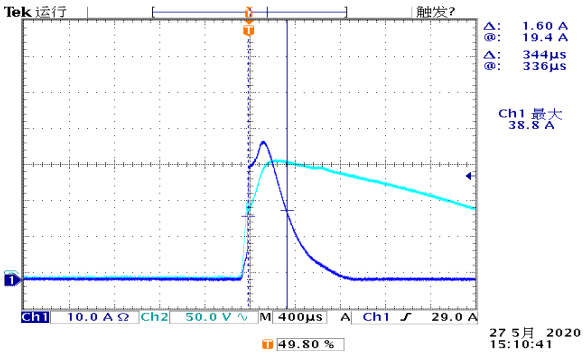
FULL /50% LOAD 50%DUTY / 120HZ



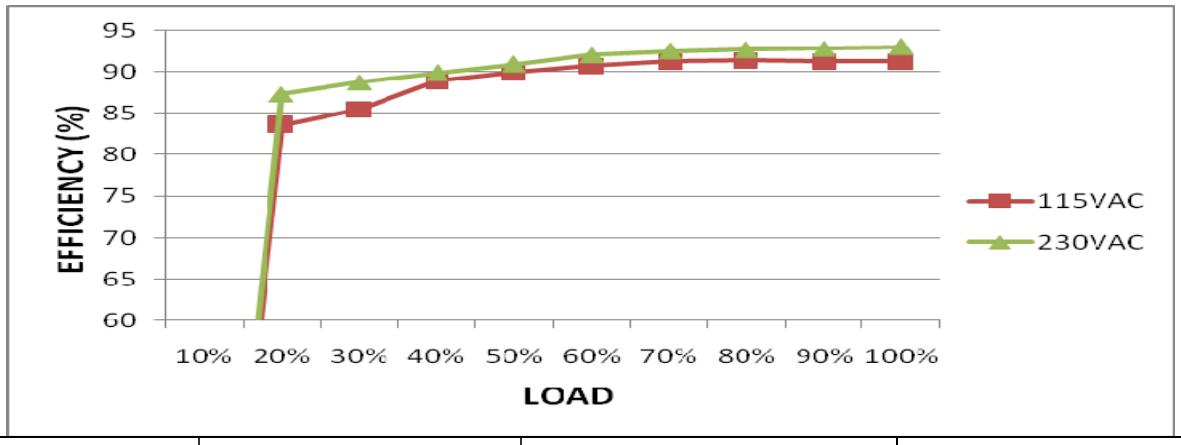
FULL /50% LOAD 50%DUTY / 1KHZ



INPUT FUNCTION TEST

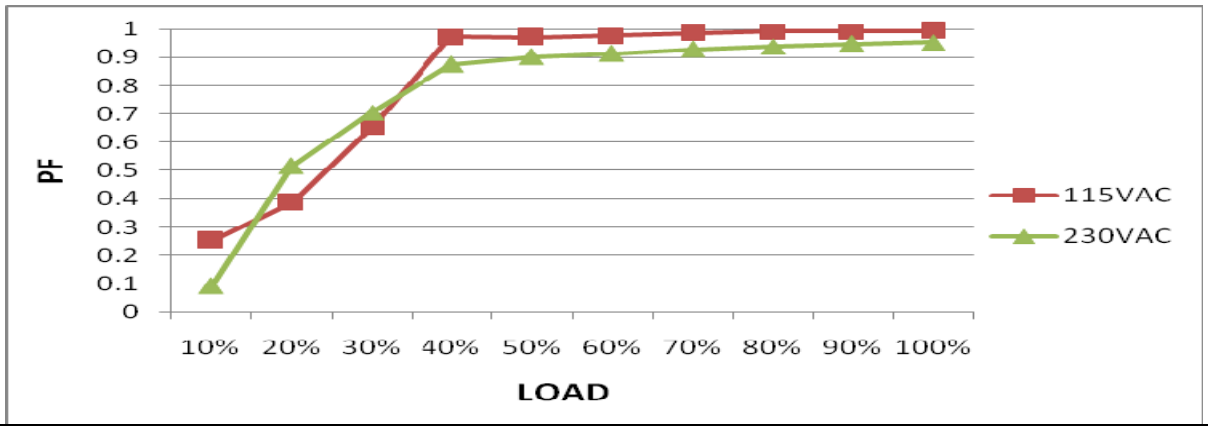
NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	90VAC~264VAC	I/P：TESTING O/P：FULL LOAD Ta：25℃	87 V~ 300 V
			I/P：LOW-LINE-3V=87 V HIGH-LINE+15%=300 V O/P：FULL/NO LOAD ON：30 Sec OFF：30 Sec 10MIN (POWER ON/OFF NO DAMAGE)	TEST： OK
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE	I/P： 90 VAC ~264 VAC O/P：FULL~NO LOAD Ta：25℃	TEST： OK
3	Withstand 300VAC Surge Test	300VAC input for 5 seconds No damage	I/P： 300VAC O/P：FULL LOAD Ta：25℃	TEST： OK
4	AC CURRENT	2.2A/115VAC 1.1A/230VAC	I/P： 115 VAC I/P： 230 VAC O/P：FULL LOAD Ta：25℃	I = 0.95A/ 115VAC I = 1.88A/ 230VAC
5	LEAKAGE CURRENT	< 0.75mA / 240VAC	I/P： 240 VAC O/P：NO LOAD Ta：25℃	L-FG：0.135mA N-FG：0.145mA
6	NO LOAD CONSUMPTION	---	I/P：115VAC I/P：230VAC O/P：NO LOAD Ta：25℃	1.37 W/115VAC 1.46 W/230VAC
7	INRUSH CURRENT(Typ)	230V/ 80A 115V/ 40A Twidth = us measured at 50% Ipeak COLD START	I/P： 230 VAC/115VAC O/P：FULL LOAD Ta：25℃	I = 80 A/ 230VAC I = 38.8 A/ 115VAC
	INPUT=230VAC/50HZ @ FULL LOAD CH2：Input current CH1：AC Input Voltage 		INPUT=115VAC/60HZ @ FULL LOAD CH2：Input current CH1：AC Input Voltage 	
8	EFFICIENCY(Typ)	94%	I/P： 230VAC O/P：FULL LOAD Ta：25℃	94.35%

EFFICIENCY vs LOAD



9	POWER FACTOR	0.98/ 115VAC 0.94/ 230VAC	I/P： 115 VAC I/P： 230 VAC O/P：FULL LOAD Ta：25℃	PF= 0.994/ 115VAC PF= 0.96/ 230VAC

P.F vs LOAD



PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER CURRENT PROTECTION	110%~140%	I/P： 110VAC I/P： 230VAC I/P： 264VAC O/P：TESTING Ta：25℃	130.28%/ 110VAC 130.67%/ 230VAC 130.64%/ 264VAC ■ Hiccup mode, recovers automatically after fault condition is removed
2	OVER VOLTAGE PROTECTION	60V~69V	I/P： 90VAC I/P： 230VAC I/P： 264VAC O/P：NO LOAD Ta：25℃	64.4V/ 90VAC 64.0V/ 230VAC 63.6V/ 264VAC ■ Shut down o/p voltage，re-power on to recover
3	OVER TEMPERATURE PROTECTION	NO DAMAGE	I/P： 100VAC I/P： 230VAC I/P： 264VAC O/P：FULL LOAD	O.T.P. Active ■ Shut down o/p voltage or Hiccup mode，recovers automatically after temperature goes down

CONTROL FUNCTION TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT
1	REDUNDANT CONTROL	For parallel connection protection:For parallel applications,when one PSU can not work,the another one will be automatically enabled.This can preven the system crash,and provide the reliability of system	I/P： 230VAC O/P： FULL LOAD Ta： 25℃	TEST : OK
2	DCOK CONTACT RATINGS	15VDC/10mA RESISTIVE LOAD	I/P:230VAC O/P:FULL LOAD Ta:25℃	TEST : OK

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Transistor (D to S) or (C to E) **Peak Voltage**	Q6 Rated 18A/500V	I/P:High-Line +3V =267V AC ON/OFF 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 FULL Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. I/P:Low-Line -3V = 87V 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 FULL Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load.	VDS: (1) 466V (2) 450V (3) 462V (4) 458 V (5) 466V (6) 474V (7) 442V VDS: (1) 433V (2) 433V (3) 434V (4) 434V (5) 434V (6) 434V (7) 434V
2	Diode Peak **Voltage**	Q100 Rated 33A/150V	I/P:High-Line +3V =267 V 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 FULL Load/	Q100: Q102： VDS: VDS： (1) 141V (1) 143V (2) 20.5V (2) 26.6V (3) 141V (3) 143V49 (4) 141V (4) 143V (5) 141V (5) 143V (6) 141V (6) 143V

			Min. Load 50%Duty/120Hz (7)0%→400% Load. (8).NO LOAD	 (7) 143V (7) 151V (8) 131V (8) 133V
3	P.F.C Transistor (D to S) or (C to E) **Peak Voltage**	Q1 Rated 26A/600V	I/P:High-Line +3V =267 V 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 FULL Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. I/P:Low-Line -3V = 87V 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 FULL Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. Ta:25℃	 VDS: (1) 539V (2) 515V (3) 539V (4) 539V (5) 539V (6) 539V (7) 519V VDS: (1) 499V (2) 499V (3) 499V (4) 499V (5) 499V (6) 499V (7) 499V
4	**Input Capacitor Voltage**	C5 Rated: 100u/450V	I/P:High-Line +3V =267V O/P: (1)Full Load (2) No Load (3)Full Load /No Load Change (4)Full load continue	 (1) 450V (2) 449V (3) 426V (4) 426V
5	**Control IC Voltage Test**	PWM IC U1Rated 0.4V ~38 V O/P IC U101Rated 8 V ~24V	I/P:High-Line +3V =267 V AC ON/OFF O/P(1)FULL LOAD (2) Output Short (3)O.L.P (4)O.V.P. (5)NO LOAD VR .LOW LINE	 U1 U101 (1) 31.3V 13.4V (2) 20.3V 2.26V (3) 21.9V 12.4V (4) 26.9V 12.4V (5) 22.4V 11.5V
6	VCC Diode Peak Voltage	D80 Rated: 1.1A/200V D140 Rated: 1.1A/200V	I/P: High-Line +3V = 267VAC O/P: (1) FULL Load (2) Output Short (3) NO Load (4) Dynamic Load Full Load/ Min. Load 90%Duty/1KHz	 D80 D140 (1) 110.7V 91.9 V (2) 102.7V 100.7V (3) 118.0V 109.6V (4) 128.9V 82.5V

■ SAFETY & E.M.C. TEST

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-FG: 2.0 KVAC/min I/P-O/P: 3.75 KVAC/min O/P-FG: 1.25 KVAC/min	I/P-FG: 2.4 KVAC/min I/P-O/P: 4.125 KVAC/min O/P-FG: 1.5 KVAC/min Ta:25℃	I/P-FG: 1.92mA I/P-O/P: 2.16mA O/P-FG: 1.90mA NO DAMAGE
2	ISOLATION RESISTANCE	I/P-FG: 500VDC>100MΩ I/P-O/P:500VDC>100MΩ O/P-FG:500VDC>100MΩ	I/P-FG: 500 VDC I/P-O/P: 500 VDC O/P-FG: 500 VDC Ta:25℃	I/P-FG: >9999MΩ I/P-O/P: >8750MΩ O/P-FG: >9999MΩ NO DAMAGE
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40A / 2min Ta:25℃	5 mΩ

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	EN61000-3-2	I/P：230VAC/50HZ O/P：FULL/75% LOAD Ta：25℃	PASS
2	CONDUCTION	EN55015 CLASS B	I/P：230 VAC (50HZ) O/P：FULL LOAD Ta：25℃	PASS Test by certified Lab
3	RADIATION	EN55015 CLASS B	I/P：230 VAC (50HZ) O/P：FULL LOAD Ta：25℃	PASS Test by certified Lab
4	E.S.D	EN61000-4-2 HEAVY INDUSTRY AIR：8KV Contact：4KV	I/P：230 VAC/50HZ O/P：FULL LOAD Ta：25℃	CRITERIA
5	E.F.T	EN61000-4-4 HEAVY INDUSTRY INPUT：2KV	I/P： 230VAC/50HZ O/P：FULL LOAD Ta：25℃	CRITERIA
6	SURGE	EN61000-4-5 HEAVY INDUSTRY L-N：2KV L,N-PE：4KV	I/P： 230VAC/50HZ O/P：FULL LOAD L-N：2KV L,N-PE：4KV Ta：25℃	CRITERIA
7	Test by certified Lab ＆ Test Report Prepare			

■ RELIABILITY TEST

ENVIRONMENT TEST

<table>
<tr><th>NO</th><th>TEST ITEM</th><th>SPECIFICATION</th><th>TEST CONDITION</th><th>RESULT</th></tr>
<tr><td>1</td><td>TEMPERATURE RISE TEST</td><td colspan="3">MODEL： UHP-200-55
1. ROOM AMBIENT BURN-IN： 2HRS
I/P： 230VAC O/P： FULL LOAD Ta=27.7 ℃
2. HIGH AMBIENT BURN-IN： 2HRS
I/P： 230VAC O/P： FULL LOAD Ta=51.8 ℃
<table>
<tr><th>NO</th><th>Position</th><th>ROOM AMBIENT Ta=27.7 ℃</th><th>HIGH AMBIENT Ta=51.8 ℃</th></tr>
<tr><td>1</td><td>RT1</td><td>59.2℃</td><td>78.6℃</td></tr>
<tr><td>2</td><td>ZR1</td><td>43.3℃</td><td>68.6℃</td></tr>
<tr><td>3</td><td>BD1</td><td>52.9℃</td><td>78.0℃</td></tr>
<tr><td>4</td><td>Q1</td><td>54.9℃</td><td>80.1℃</td></tr>
<tr><td>5</td><td>L1</td><td>48.3℃</td><td>74.0℃</td></tr>
<tr><td>6</td><td>C5</td><td>47.9℃</td><td>73.4℃</td></tr>
<tr><td>7</td><td>C81</td><td>46.3℃</td><td>71.9℃</td></tr>
<tr><td>8</td><td>C13</td><td>50.4℃</td><td>75.9℃</td></tr>
<tr><td>9</td><td>Q5</td><td>54.4℃</td><td>80.6℃</td></tr>
<tr><td>10</td><td>Q6</td><td>50.5℃</td><td>76.4℃</td></tr>
<tr><td>11</td><td>D1</td><td>53.8℃</td><td>80.2℃</td></tr>
<tr><td>12</td><td>R5</td><td>51.2℃</td><td>76.9℃</td></tr>
<tr><td>13</td><td>T1core</td><td>61.3℃</td><td>87.0℃</td></tr>
<tr><td>14</td><td>Q102</td><td>49.8℃</td><td>76.4℃</td></tr>
<tr><td>15</td><td>Q100</td><td>49.4℃</td><td>76.0℃</td></tr>
<tr><td>16</td><td>U101</td><td>47.4℃</td><td>73.6℃</td></tr>
<tr><td>17</td><td>Q201</td><td>47.2℃</td><td>73.6℃</td></tr>
<tr><td>18</td><td>U1</td><td>48.2℃</td><td>73.7℃</td></tr>
<tr><td>19</td><td>C105</td><td>46.6℃</td><td>72.6℃</td></tr>
<tr><td>20</td><td>C107</td><td>47.3℃</td><td>73.5℃</td></tr>
<tr><td>21</td><td>C140</td><td>46.3℃</td><td>72.4℃</td></tr>
<tr><td>22</td><td>TSW1</td><td>45.5℃</td><td>71.1℃</td></tr>
<tr><td>23</td><td>TC</td><td>41.0℃</td><td>67.0℃</td></tr>
</table></td></tr>
<tr><td>2</td><td>OVER LOAD BURN-IN TEST</td><td>NO DAMAGE
1 HOUR (MIN)</td><td>I/P： 230 VAC
O/P：127.7%LOAD
Ta：25℃</td><td>TEST：OK</td></tr>
<tr><td>3</td><td>LOW TEMPERATURE
TURN ON TEST</td><td>TURN ON AFTER 2 HOUR</td><td>I/P： 264VAC/110VAC
O/P：100% LOAD
Ta= -35℃</td><td>TEST：OK</td></tr>
<tr><td>4</td><td>HIGH HUMIDITY
HIGH TEMPERATURE
HIGH VOLTAGE
TURN ON TEST</td><td>AFTER 12 HOURS
IN CHAMBER ON
CONTROL 50℃ / 95 %R.H
NO DAMAGE</td><td>I/P： 272 VAC
O/P：FULL LOAD
Ta= 50℃
HUMIDITY= 95 %R.H</td><td>TEST：OK</td></tr>
<tr><td>5</td><td>TEMPERATURE
COEFFICIENT</td><td>± 0.03 %/℃ (0~50℃)</td><td>I/P： 230 VAC
O/P：FULL LOAD</td><td>± 0.008%/℃ (0~50℃)</td></tr>
</table>

6	STORAGE TEMPERATURE TEST	-40~85℃	1. Thermal shock Temperature： -45℃~ +90℃ 2. Temperature change rate ：25℃ / 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	-30~50℃	1. Thermal shock Temperature： -35℃~ +55℃ 2. Temperature change rate ：25℃ / 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, 5G 10min./1cycle, 60min. each along X, Y, Z axes	1 Carton & 1 Set (1) Waveform： Sine Wave (2) Frequency：10~500Hz (3) Sweep Time：12min/sweep cycle (4) Acceleration：6G (5) Test Time：180min in each axis (X.Y.Z) (6) Ta：25℃
9	CAPACITOR LIFE CYCLE	UHP-200-55：SUPPOSE C107 IS THE MOST CRITICAL COMPONENT (1) I/P： 230VAC O/P：FULL LOAD Ta= 25 ℃ LIFE TIME (2) I/P： 230VAC O/P：FULL LOAD Ta=50 ℃ LIFE TIME (3) I/P： 230VAC O/P：75% LOAD Ta=50 ℃ LIFE TIME (4) I/P： 230VAC O/P：50% LOAD Ta=50 ℃ LIFE TIME	(1) 909305HRS (2) 138969HRS (3) 220543HRS (4) 2955694HRS
10	MTBF	Conducted by Parts Stress Analysis Prediction 257K hrs min. MIL-HDBK-217F (25℃)	
11	Ongoing Reliability Test	I/P：230VAC O/P：FULL LOAD TA=50℃ Demonstration Mean Time Between Failure : 30,000 hours	

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	WUWQ/HUANGMK	WENF	LIUWY

2018.4.30 GP-A50-F010