Test Report: OWA-200E-24

200W Single Output Moistureproof Adaptor

■ 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

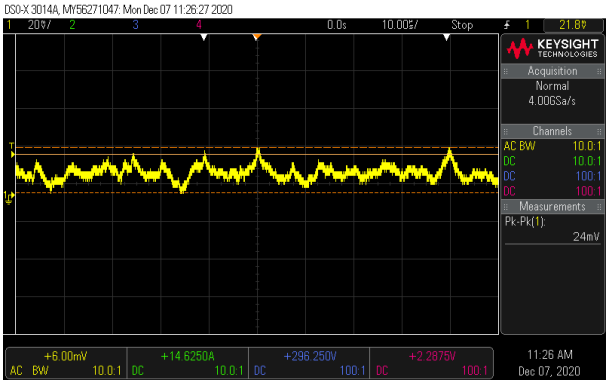
ENVIRONMENT TEST

■ DESIGN VERIFY TEST

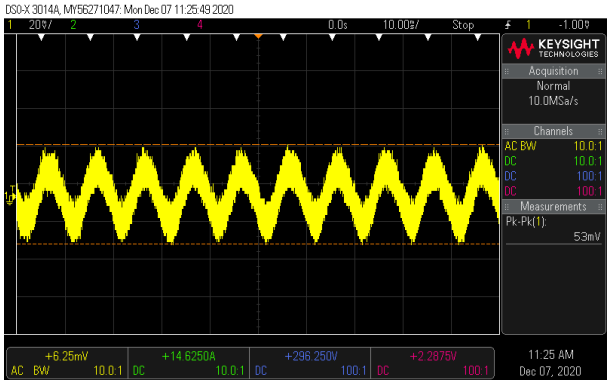
OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE TOLERANCE	V1: -4% ~4% (Max)	I/P:180VAC /264AC O/P:FULL~MIN LOAD Ta:25℃	V1: -1.8%~ 0.33%
2	LINE REGULATION	V1: -0.5% ~ 0.5% (Max)	I/P:180VAC~264AC O/P:FULL LOAD Ta:25℃	V1: 0%~ 0%
3	LOAD REGULATION	V1: -4% ~4% (Max)	I/P: 230 VAC O/P:FULL ~MIN LOAD Ta:25℃	V1: -1.42%~0.67%
4	OVER/UNDERSHOOT TEST	< ±5%	I/P: 230 VAC O/P:FULL LOAD Ta:25℃	TEST: 1.8%
5	RIPPLE & NOISE	V1: 150mVp-p (Max)	I/P: 230 VAC O/P:FULL LOAD Ta:25℃	V1: 53 mVp-p / 100% load

high frequency :



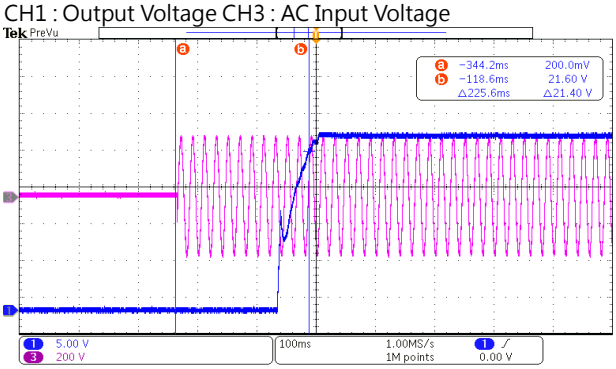
low frequency :

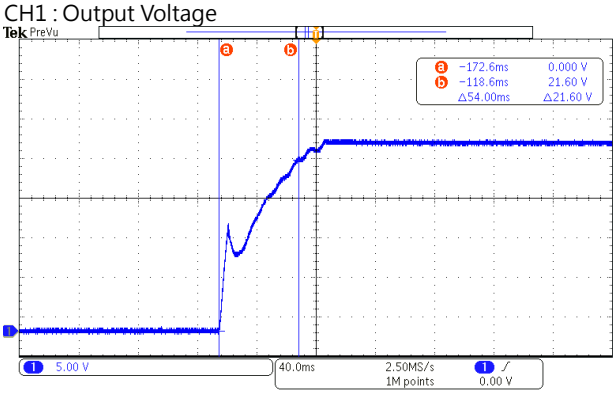
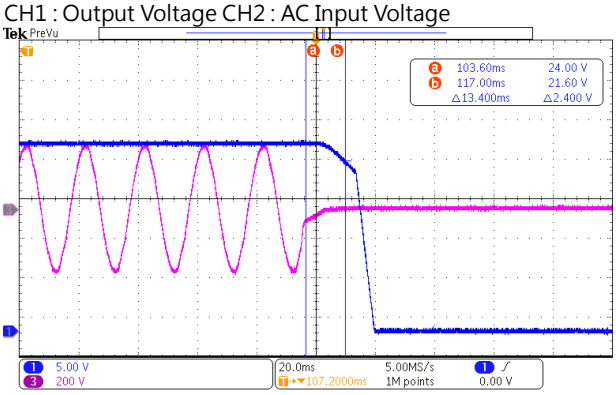
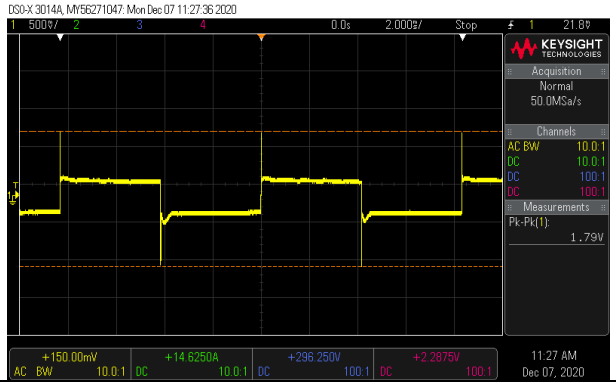
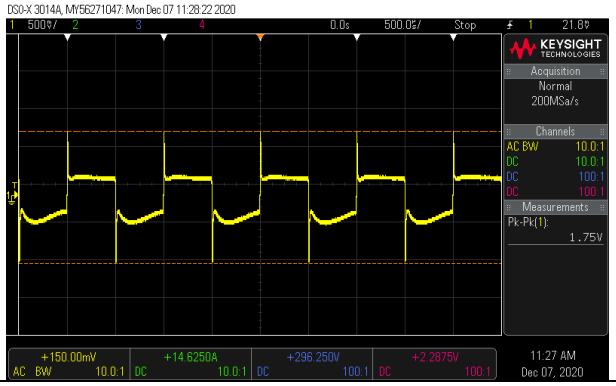


6	SET UP TIME (Max)	230VAC/ 500ms	I/P: 230 VAC O/P:FULL LOAD Ta:25℃ 使用 **LEDH MODE TEST**	230VAC/225.6ms

INPUT=230VAC/50HZ @ FULL LOAD

CH1 : Output Voltage CH3 : AC Input Voltage

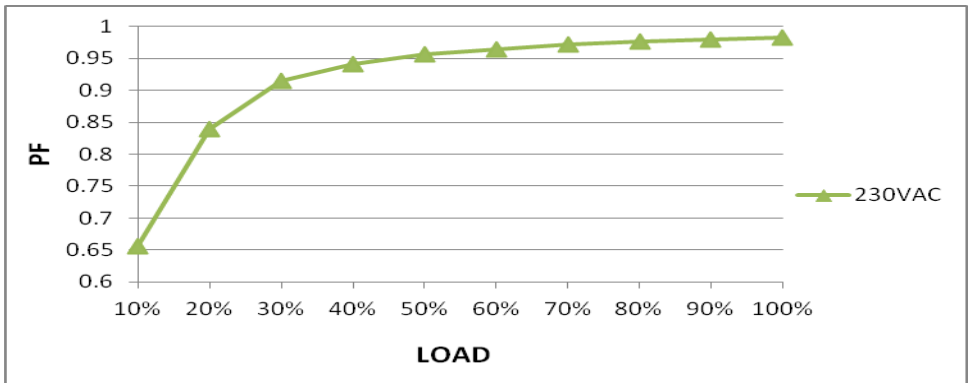


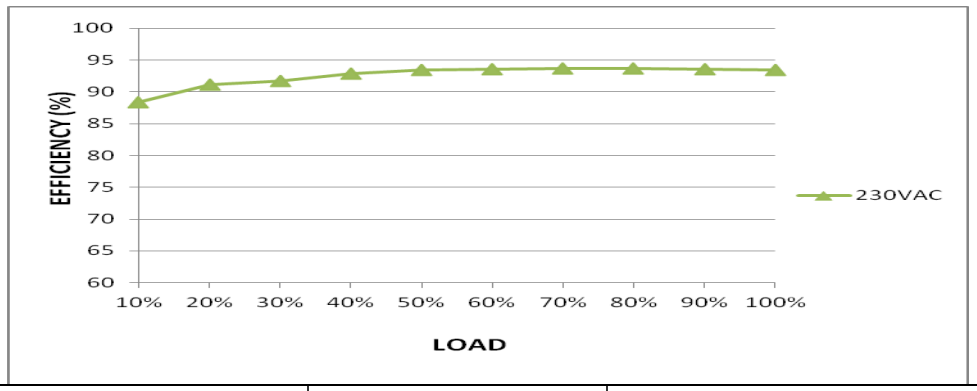
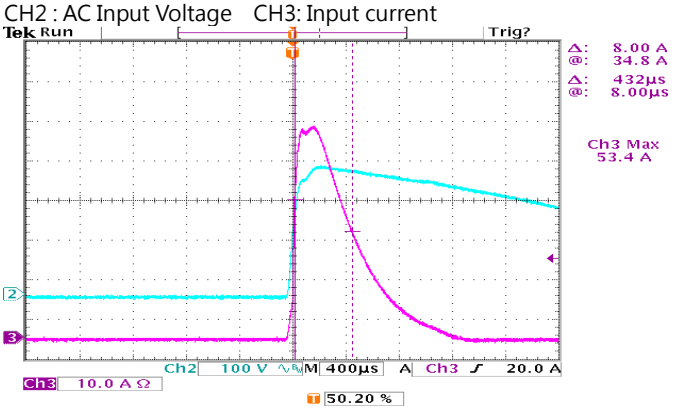
7	RISE TIME (Max)	230VAC/80ms	I/P: 230 VAC O/P:FULL LOAD Ta:25℃ 使用 **LEDH MODE TEST**	230VAC/ 54ms
8	INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage 			
9	HOLD UP TIME (Typ)	230VAC/10ms	I/P: 230 VAC O/P:FULL LOAD Ta:25℃ 使用 **LEDH MODE TEST**	230VAC/ 13.4ms
	INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage 			
10	DYNAMIC LOAD	V1: 2400mVp-p	I/P: 230VAC O/P: (1)FULL /50% LOAD 50%DUTY / 120HZ (2)FULL /50% LOAD 50%DUTY / 1KHZ Ta:25℃	1790mVp-p FULL /50% LOAD 50%DUTY / 120HZ 1750mVp-p FULL /50% LOAD 50%DUTY / 1KHZ
	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	180VAC~264VAC 254VDC~ 370VDC	(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℃	(1) 177V~267VAC (2) 242Vdc~370Vdc/FULL LOAD (3) 242Vdc~370Vdc/FULL LOAD
			I/P: LOW-LINE-3V=177 VAC HIGH-LINE+15%=300 VAC 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: 180 VAC ~264VAC O/P:FULL~MIN LOAD Ta:25℃	OK
3	INPUT CURRENT (TYP)	230 VAC/ 1.1A	I/P: 230 VAC O/P:FULL LOAD Ta:25℃	I = 0.93A/ 230VAC
4	NO LOAD POWER CONSUMPTION	<0.15W	I/P: 230 VAC O/P:NO LOAD Ta:25℃	0.1280W/230V
5	POWER FACTOR(TYP)	0.96 /230 VAC FULL LOAD	I/P: 230 VAC O/P:FULL LOAD Ta:25℃	PF= 0.983/230V/100%LOAD

P.F vs LOAD



6	EFFICIENCY (TYP)	93%	I/P: 230VAC O/P: 100%Load Ta:25℃	93.44%
	EFFICIENCY vs LOAD 			
7	INRUSH CURRENT (TYP)	230 V/65 A (twidth=550us measured at 50% Ipeak) COLD START	I/P: 230 VAC O/P:FULL LOAD Ta:25℃	`I =53.4 A/ 230VAC T50=432us
	INPUT=230VAC/50HZ @ FULL LOAD CH2 : AC Input Voltage CH3: Input current 			

ROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER CURRENT PROTECTION	105%~150%	I/P: 267VAC I/P: 230VAC I/P: 180AC O/P:TESTING Ta:25℃	131%/ 267VAC 130.9%/ 230VAC 126.8%/180VAC PROTECTION TYPE : Hiccup mode, recovers automatically after fault condition is removed

2	OVER VOLTAGE PROTECTION	V1: 27 V~34V	I/P: 267VAC I/P: 230VAC I/P: 180AC O/P:TESTING Ta:25℃	29.3V/ 267VAC 29.2V/ 230VAC 29.5V/ 180VAC PROTECTION TYPE : Shut down o/p voltage, re-power on to recover
3	OVER TEMPERATURE PROTECTION	NO DAMAGE	I/P: 267 VAC I/P: 180VAC O/P:FULL LOAD	O.T.P. Active PROTECTION TYPE : Shut down o/p voltage, re-power on to recover
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 267VAC I/P: 180VAC O/P: FULL LOAD Ta:25℃	NO DAMAGE PROTECTION TYPE : Hiccup mode, recovers automatically after fault condition is removed

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Transistor (D to S) or (C to E) Peak Voltage	Q73 Rated 11A/ 600V	AC ON/OFF I/P:High-Line +3V =267V 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. I/P:Low-Line -3V = 177V 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℃	 VDS: (1) 446V (2) 450V (3) 454V (4) 450V (5) 450V (6) 450V (7) 466V VDS: (1) 446V (2) 446V (3) 442V (4) 450V (5) 450V (6) 442V (7) 450V

2	P.F.C Transistor (D to S) or (C to E) Peak Voltage	Q1 Rated 26A/ 600 V	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 100% Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. I/P:Low-Line -3V =177V 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℃	 VDS: (1) 503V (2) 446V (3) 503V (4) 511V (5) 503V (6) 499V (7) 446V VDS: (1) 499V (2) 426V (3) 503V (4) 499V (5) 499V (6) 495V (7) 458V
3	P.F.C DIODE	D 5 Rated 9A/ 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/5KHz (4)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz I/P:Low-Line -3V = 177V 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℃	 (1) 482V (2) 453V (3) 499V (4) 474V (1) 426V (2) 414V (3) 426V (4) 426V
4	Diode Peak Voltage	Q101 Rated 100A/ 80V Q100 Rated	AC ON/OFF I/P:High-Line +3V =267 V O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/	Q101: VDS: (1) 53.9V (2) 7.6V (3) 54.3V

		100A/ 80V	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℃	 (4) 53.5V (5) 54.3V (6) 53.9V (7) 7.2V (8) 54.7V Q100: VDS: (1) 55.5V (2) 8.4V (3) 55.1V (4) 55.5V (5) 55.1V (6) 56.3V (7) 9.2V (8) 53.5 V
5	Input Capacitor Voltage	C5 Rated: 100μ / 450V	I/P:High-Line +3V =267V 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℃	 (1) 426V (2) 422V (3) 426V (4) 418V
6	Control IC Voltage Test	U2 Rated -0.3V~20V U1 Rated -0.3V~ 35V	AC ON/OFF I/P:High-Line +3V =267 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℃	 U1: (1) 16.5V (2) 16.7V (3) 17.9V (4) 15.9V (5) 16.5V U2: (1) 16.7V (2) 16.5V (3) 16.8V (4) 16.3V (5) 14.5V

■ SAFETY & EMC TEST

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P: 4.2KVAC/min	I/P-O/P: 4.5KVAC/min Ta:25℃	I/P-O/P: 1.347 mA NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P:500VDC>100MΩ	I/P-O/P: 500 VDC Ta:25℃	I/P-O/P: 9999MΩ NO DAMAGE
3	LEAKAGE CURRENT	0.25mA / 240VAC	I/P: 240 VAC O/P:Min LOAD Ta:25℃	L-FG: 0.061mA N-FG:. 0.053mA

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	EN61000-3-2 CLASS C	I/P: 230VAC/50HZ O/P:FULL LOAD Ta:25℃	PASS
2	CONDUCTION	EN55032 CLASS B	I/P: 230 VAC (50HZ) O/P:FULL/50% LOAD Ta:25℃	PASS Test by certified Lab
3	RADIATION	EN55032 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 LIGHT INDUSTRY AIR：8KV / Contact：4KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25℃	CRITERIA A
5	E.F.T	EN61000-4-4 LIGHT INDUSTRY INPUT: 1KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25℃	CRITERIA A
6	SURGE	IEC61000-4-5 INDUSTRY L-N :2KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25℃	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

<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： OWA-200U-24
1. ROOM AMBIENT BURN-IN：2 HRS
I/P： 230VAC O/P： FULL LOAD Ta=23.5 ℃
2. HIGH AMBIENT BURN-IN： 2 HRS
I/P： 230VAC O/P： FULL LOAD Ta=48.3 ℃
<table>
<tr><th>NO</th><th>Position</th><th>ROOM AMBIENT Ta=23.5℃</th><th>HIGH AMBIENT Ta=48.3℃</th></tr>
<tr><td>1</td><td>U3</td><td>55.7℃</td><td>76.4℃</td></tr>
<tr><td>2</td><td>BD1</td><td>59.9℃</td><td>81.5℃</td></tr>
<tr><td>3</td><td>C1</td><td>56.4℃</td><td>75.3℃</td></tr>
<tr><td>4</td><td>Q1</td><td>60.4℃</td><td>82.4℃</td></tr>
<tr><td>5</td><td>U1</td><td>58.9℃</td><td>80.7℃</td></tr>
<tr><td>6</td><td>U2</td><td>62.7℃</td><td>84.6℃</td></tr>
<tr><td>7</td><td>C35</td><td>59.3℃</td><td>81.5℃</td></tr>
<tr><td>8</td><td>Q50</td><td>61.9℃</td><td>84.0℃</td></tr>
<tr><td>9</td><td>T1</td><td>72.0℃</td><td>95.1℃</td></tr>
<tr><td>10</td><td>C5</td><td>58.4℃</td><td>80.3℃</td></tr>
<tr><td>11</td><td>U101</td><td>64.7℃</td><td>88.1℃</td></tr>
<tr><td>12</td><td>Q100</td><td>57.6℃</td><td>81.4℃</td></tr>
<tr><td>13</td><td>Q101</td><td>62.6℃</td><td>86.5℃</td></tr>
<tr><td>14</td><td>C115</td><td>53.2℃</td><td>76.2℃</td></tr>
<tr><td>15</td><td>C105</td><td>52.0℃</td><td>75.3℃</td></tr>
<tr><td>16</td><td>C106</td><td>53.8℃</td><td>77.2℃</td></tr>
<tr><td>17</td><td>RTH5</td><td>60.8℃</td><td>82.9℃</td></tr>
<tr><td>18</td><td>TC</td><td>54.9℃</td><td>75.9℃</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：123 % 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/180VAC
O/P： 100 % LOAD
Ta= -45 ℃</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 45 ℃
NO DAMAGE</td><td>I/P： 264VAC
O/P：FULL LOAD
Ta= 45 ℃
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>± 0.001 %/℃(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：10CYCLE 5. Input/Output condition： STATIC
7	THERMAL SHOCK TEST	-40~45℃	1. Thermal shock Temperature： -45℃~ +50℃ 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	SUPPOSE C105 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=45 ℃ LIFE TIME (3) I/P： 230VAC O/P：75% LOAD Ta=45 ℃ LIFE TIME (4) I/P： 230VAC O/P：50% LOAD Ta=45 ℃ LIFE TIME	(1) 406639HRS (2) 112019HRS (3) 219086HRS (4) 341519 HRS
10	MTBF	Conducted by Parts Stress Analysis Prediction 2677.8K hrs min. Telcordia SR-332 (Bellcore)； 267.6K hrs min. MIL-HDBK-217F (25℃)	
11	Ongoing Reliability Test	I/P：230VAC O/P：FULL LOAD TA=50℃ Demonstration Mean Time Between Failure：50,000 hours	

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	WUWQ/HUANGMK	WENF	LINKX

2018.4.30

GP-A50-F010