



# Test Report: GST160A12-R7B

---

160W AC-DC Reliable Green Industrial Adaptor

## ■ 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

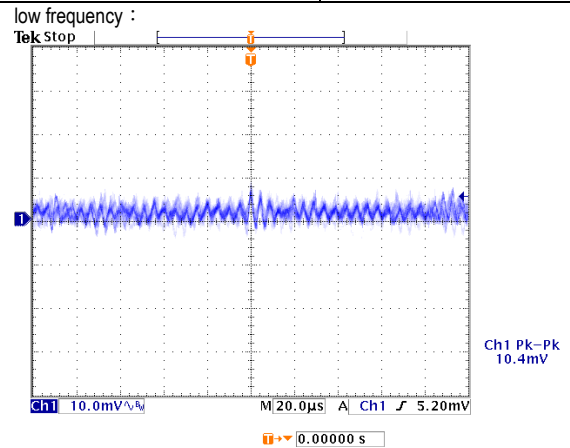
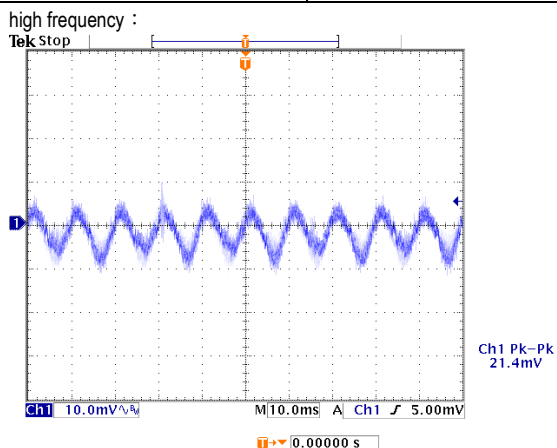
## ■ RELIABILITY TEST

ENVIRONMENT TEST

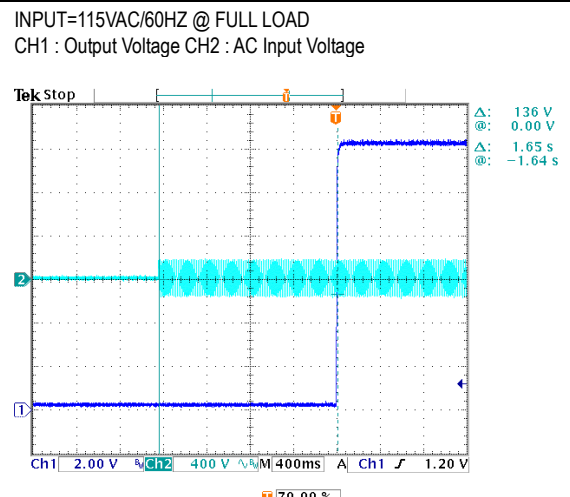
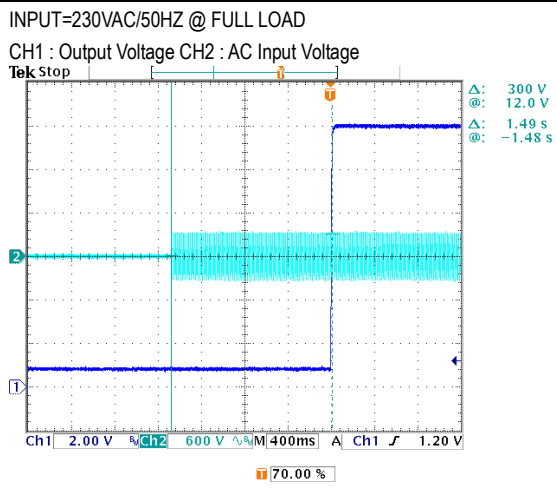
DESIGN VERIFY TEST

OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE(Max) TOLERANCE	V1: -5%~ 5%	I/P: 85VAC /264VAC O/P:FULL/ MIN. LOAD Ta:25°C	V1: -0.017%~ 0.92 %
2	LINE REGULATION (Max)	V1: -1%~ 1%	I/P: 85VAC~ 264VAC O/P:FULL LOAD Ta:25°C	V1: 0%~ 0 %
3	LOAD REGULATION(Max)	V1: -5%~ 5%	I/P: 230VAC O/P:FULL ~MIN LOAD Ta:25°C	V1: -0.017%~ 0.92 %
4	OVER/UNDERSHOOT TEST	< ±5%	I/P: 230VAC O/P:FULL LOAD Ta:25°C	< ±5 %
5	RIPPLE & NOISE(Max)	V1: 80mVp-p	I/P:230VAC O/P:FULL LOAD Ta:25°C	V1: 21.4mVp-p

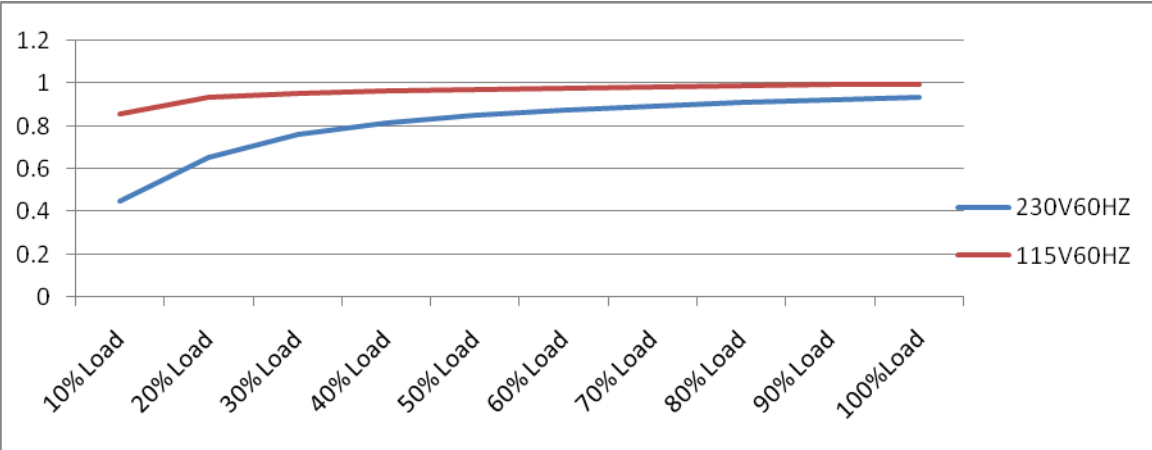


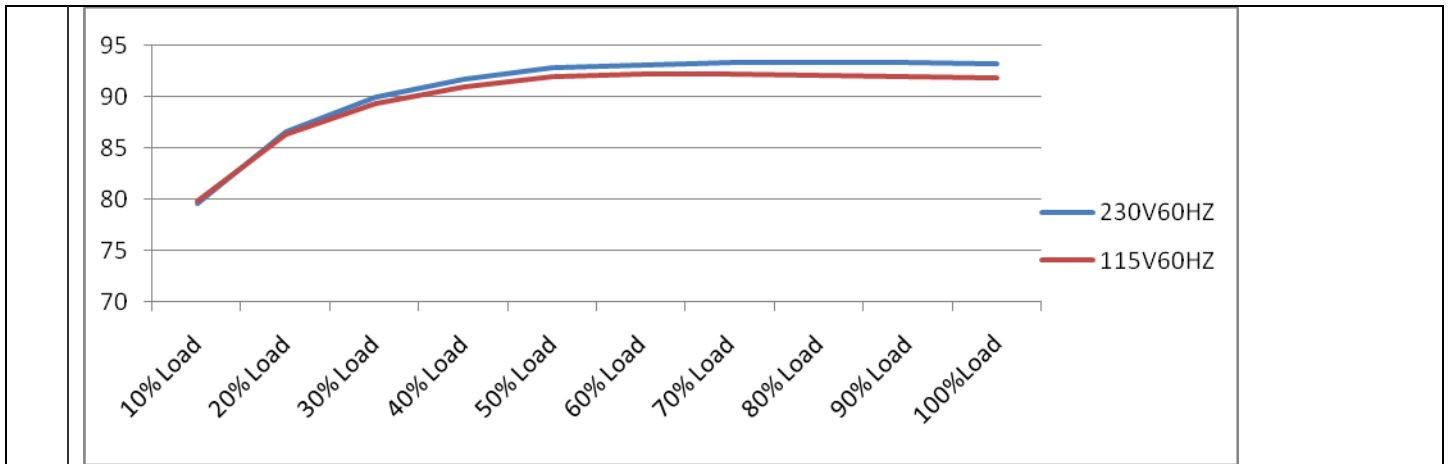
6	SET UP TIME(Max)	230VAC/2000ms 115VAC/2500ms	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 1488ms 115VAC/ 1628ms
---	------------------	--------------------------------	----------------------------------------------------------------	----------------------------------



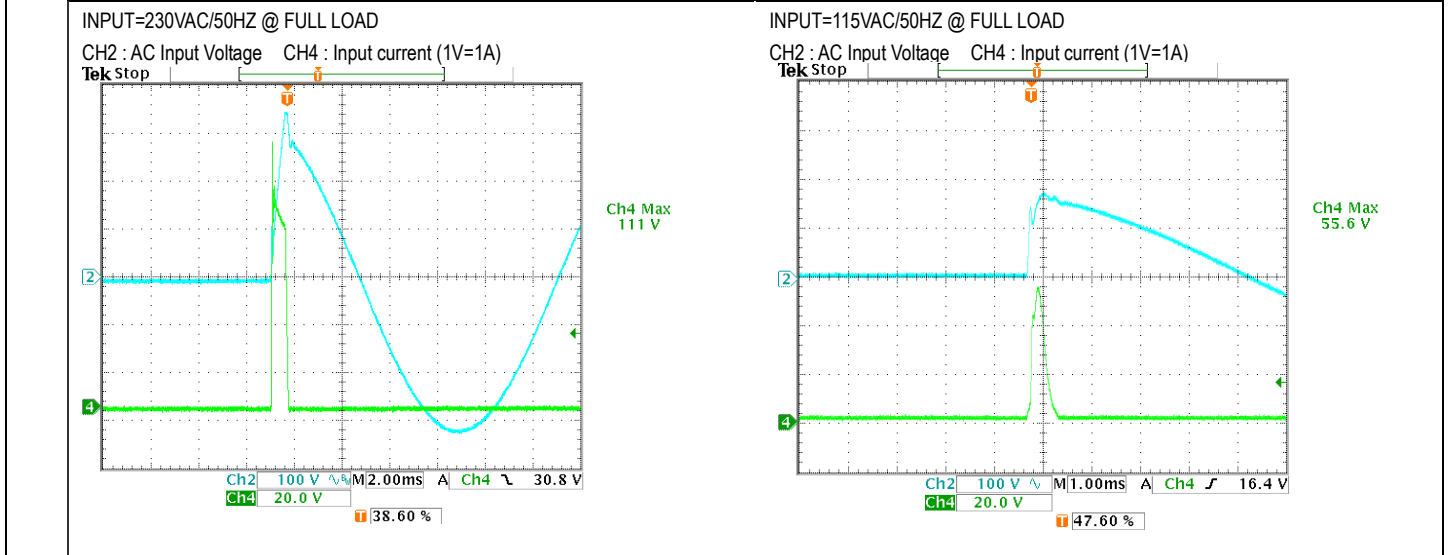
7	RISE TIME (Max) 230VAC/50ms 115VAC/50ms	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 11.4 ms 115VAC/ 13 ms
<p>INPUT=230VAC/50HZ @ FULL LOAD</p> <p>CH1 : Output Voltage</p> <p>Δ: 1.40 V @: 6.68 V Δ: 11.4ms @: 0.00 s</p>		<p>INPUT=115VAC/60HZ @ FULL LOAD</p> <p>CH1 : Output Voltage</p> <p>Δ: 8.76 V @: 1.20 V Δ: 13.0ms @: 0.00 s</p>	
8	HOLD UP TIME (Typ.) 230VAC/20ms 115VAC/20ms	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 28 ms 115VAC/ 27.8 ms
<p>INPUT=230VAC/50HZ @ FULL LOAD</p> <p>CH1 : Output Voltage CH2 : AC Input Voltage</p> <p>Δ: 14.0 V @: 22.0 V Δ: 28.0ms @: -59.2ms</p>		<p>INPUT=115VAC/60HZ @ FULL LOAD</p> <p>CH1 : Output Voltage CH2 : AC Input Voltage</p> <p>Δ: 12.0 V @: 2.00 V Δ: 27.8ms @: -59.2ms</p>	
9	DYNAMIC LOAD V1: 1200mVp-p	I/P: 230VAC O/P: (1)FULL /50% LOAD 50%DUTY / 120HZ (2)FULL /50% LOAD 50%DUTY / 1KHZ Ta:25°C	554mVp-p 548mVp-p
<p>FULL /50% LOAD 50%DUTY / 120HZ</p> <p>Ch1 V 280 Ch1 A -27 Ch1 + 75.4 Ch1 Pk-Pk 554mV</p>		<p>FULL /50% LOAD 50%DUTY / 1KHZ</p> <p>Ch1 V 272n Ch1 A -276i Ch1 +C 72.97 Ch1 Pk-Pk 548mV</p>	

**INPUT FUNCTION TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT																																	
1	INPUT VOLTAGE RANGE	85VAC~264VAC 120VDC~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°C	(1) 73V~264V (2) 112.2Vdc~370Vdc/FULL LOAD 112.1Vdc~370Vdc/50% LOAD (3) 112.2Vdc~370Vdc/FULL LOAD 112.1Vdc~370Vdc/50% LOAD																																	
			I/P: LOW-LINE-3V=82V HIGH-LINE+15%=300V 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:85 VAC ~264 VAC O/P:FULL~MIN LOAD Ta:25°C	TEST: OK																																	
3	INPUT CURRENT (Typ.)	230V/ 1A 115V/ 1.85A	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I=0.683A/ 230VAC I=1.302A/ 115VAC																																	
4	LEAKAGE CURRENT	<0.75 mA / 240 VAC	I/P : 240 VAC O/P : Min LOAD Ta : 25°C	L-FG : 0.469 mA N-FG : 0.469 mA																																	
5	NO LOAD CONSUMPTION	< 0.15W	I/P : 115VAC I/P : 230VAC O/P : NO LOAD Ta : 25°C	< 0.1056 W < 0.1221 W																																	
6	POWER FACTOR (Typ.)	0.93/ 230VAC 0.98/115VAC	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	PF= 0.939/230VAC PF= 0.993/115VAC																																	
<p><b>pf vs LOAD</b></p>  <table border="1"> <caption>Approximate data from pf vs LOAD graph</caption> <thead> <tr> <th>Load (%)</th> <th>230V60HZ pf</th> <th>115V60HZ pf</th> </tr> </thead> <tbody> <tr><td>10%</td><td>0.45</td><td>0.85</td></tr> <tr><td>20%</td><td>0.65</td><td>0.95</td></tr> <tr><td>30%</td><td>0.75</td><td>0.98</td></tr> <tr><td>40%</td><td>0.80</td><td>0.99</td></tr> <tr><td>50%</td><td>0.85</td><td>1.00</td></tr> <tr><td>60%</td><td>0.88</td><td>1.00</td></tr> <tr><td>70%</td><td>0.90</td><td>1.00</td></tr> <tr><td>80%</td><td>0.92</td><td>1.00</td></tr> <tr><td>90%</td><td>0.94</td><td>1.00</td></tr> <tr><td>100%</td><td>0.95</td><td>1.00</td></tr> </tbody> </table>					Load (%)	230V60HZ pf	115V60HZ pf	10%	0.45	0.85	20%	0.65	0.95	30%	0.75	0.98	40%	0.80	0.99	50%	0.85	1.00	60%	0.88	1.00	70%	0.90	1.00	80%	0.92	1.00	90%	0.94	1.00	100%	0.95	1.00
Load (%)	230V60HZ pf	115V60HZ pf																																			
10%	0.45	0.85																																			
20%	0.65	0.95																																			
30%	0.75	0.98																																			
40%	0.80	0.99																																			
50%	0.85	1.00																																			
60%	0.88	1.00																																			
70%	0.90	1.00																																			
80%	0.92	1.00																																			
90%	0.94	1.00																																			
100%	0.95	1.00																																			
7	EFFICIENCY(Typ.)	90%	I/P:230 VAC O/P:FULL LOAD Ta:25°C	92.54 %																																	
<p><b>EFFICIENCY vs LOAD</b></p>																																					



8	INRUSH CURRENT(Typ.)	230V/120A 115V/95A COLD START	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I=111A/ 230VAC I=55.6A/ 115VAC
---	----------------------	-------------------------------------	----------------------------------------------------------------	-----------------------------------



### PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	105%~ 150%	I/P: 264VAC I/P: 230VAC I/P: 100VAC O/P: TESTING Ta:25°C	126.96%/ 264VAC 127.73%/ 230VAC 127.22%/100VAC PROTECTION TYPE : Hiccup mode, recovers automatically after fault condition is removed
2	OVER VOLTAGE PROTECTION	12.6V~16.2V	I/P: 264VAC I/P: 230VAC I/P: 90VAC O/P: MIN LOAD Ta:25°C	13.9V/ 264VAC 13.9V/ 230VAC 13.9V/ 90VAC PROTECTION TYPE : Hiccup mode @ 10% load
3	OVER TEMPERATURE PROTECTION	Protection type : Shut down o/p voltage, repower on to recover	I/P: 264VAC I/P: 90VAC O/P: FULL LOAD	O.T.P: Active Protection type : Shut down o/p voltage, repower on to recover
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 264VAC I/P: 90VAC O/P: FULL LOAD Ta:25°C	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	Q5 Rated : 12A/ 500V	I/P:High-Line +3V =267V AC ON/OFF VDS: O/P: (1)Full Load (2)Output Short (3) Full Load Continue Ta:25°C	Q5 VDS: (1) 456V (2) 480V (3) 428V
2	P.F.C Transistor ( D to S) or (C to E) Peak Voltage	Q1 Rated : 13.8A/ 600 V	I/P:High-Line +3V =267V AC ON/OFF VDS: O/P: (1)Full Load (2)Output Short (3) Full Load Continue Ta:25°C	Q1 VDS: (1) 574V (2) 574V (3) 460V
3	P.F.C DIODE	D1 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 = 97V 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) 450V (2) 447V (3) 432V (4) 444V  (1) 426V (2) 424V (3) 432V (4) 428V
4	Diode Peak Voltage	Q101 Rated : 120 A/40 V	I/P:High-Line +3V =267 V AC ON/OFF O/P: (1)Full Load (2)Output Short (3) Full Load Continue Ta:25°C	Q101: VDS: (1)29.6 V (2) 10.4V (3) 29.4V
5	Input Capacitor Voltage	C5 Rated: : 150 μ / 420V 105°C	I/P:High-Line +3V =267 V O/P: (1)Full Load input on/off (2) Min load input on /Off (3)Full Load /Min load Change Ta:25°C	(1)418V (2)418V (3) 410V
6	Control IC Voltage Test	PWM IC U1 Rated : 38V -0.4 V(MIN.)	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. Ta:25°C	U1: (1) 25.0V (2) 20.2V (3) 20.2V (4) 27.6V

### SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P: 3KVAC/min I/P-FG:2KVAC	I/P-O/P: 3.6 KVAC/min I/P-FG:2.4KVAC Ta:25°C	I/P-O/P: 6.94mA I/P-FG:8.07mA NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P:500VDC>100MΩ	I/P-O/P: 500 VDC Ta:25°C	I/P-O/P: 9999MΩ NO DAMAGE

### E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	BS EN/EN61000-3-2,GB9254 CLASS A	I/P:230VAC/50HZ O/P:FULL LOAD Ta:25°C	PASS
2	CONDUCTION	BS EN/EN55032(CISPR32), FCC PART 15 / CISPR22 CAN ICES-3(B)/NMB-3(B),CNS13438,GB17625.1 EAC TP TC 020,MSIP KN32 CLASS B	I/P : 230 VAC (50HZ) O/P : FULL/50% LOAD Ta : 25°C	PASS Test by certified Lab
3	RADIATION	BS EN/EN55032(CISPR32), FCC PART 15 / CISPR22 CAN ICES-3(B)/NMB-3(B),CNS13438,GB17625.1 EAC TP TC 020,MSIP KN32 CLASS B	I/P : 230 VAC (50HZ) O/P : FULL LOAD Ta : 25°C	PASS Test by certified Lab
4	E.S.D	BS EN/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	BS EN/EN61000-4-4 INPUT : 2KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
6	SURGE	BS EN/EN61000-4-5 L-N : 1KV L,N-PE : 2KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
7	Test by certified Lab & Test Report Prepare			

## RELIABILITY TEST

### ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	TEMPERATURE RISE TEST	MODEL : GST160A12-R7B 1. ROOM AMBIENT BURN-IN : 1HRS I/P : 230VAC O/P : FULL LOAD Ta= 21.3 °C 2. HIGH AMBIENT BURN-IN : 1HRS I/P : 230VAC O/P : FULL LOAD Ta= 52.8°C		

		NO	Position	ROOM AMBIENT Ta= 21.3 °C	HIGH AMBIENT Ta= 52.8 °C
		1	LF1	43.6°C	74.6°C
		2	LF2	47.0°C	78.0°C
		3	L1	49.3°C	79.9°C
		4	L2	50.1°C	80.9°C
		5	D2	50.7°C	81.3°C
		6	C5	51.8°C	82.2°C
		7	RTH2	53.7°C	84.7°C
		8	T1 芯	60.9°C	91.1°C
		9	C101	62.3°C	92.9°C
		10	C102	64.5°C	94.9°C
		11	BD1	51.6°C	82.1°C
		12	Q1	51.1°C	81.7°C
		13	D1	51.8°C	82.4°C
		14	Q6	51.7°C	82.3°C
		15	Q5	52.2°C	83.0°C
		16	Q101	57.0°C	87.6°C
		17	Q102	58.0°C	88.8°C
		18	U1	57.8°C	88.0°C
		19	T1Coil	56.5°C	86.7°C
		20	C13	71.5°C	99.3°C
		21	ZNR1	45.9°C	77.0°C
		22	C11	50.1°C	80.7°C
		23	R5	50.7°C	81.2°C
		24	C81	54.0°C	84.4°C
		25	U101	59.4°C	89.4°C
2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)		I/P : 230 VAC O/P : 130 % LOAD Ta : 25°C	TEST : OK
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR		I/P : 264VAC/100VAC O/P : 100 % LOAD Ta= -35 °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= 50.4 °C HUMIDITY= 95 %R.H	TEST : OK
5	TEMPERATURE COEFFICIENT	± 0.03 %/°C (0-50°C)		I/P : 230 VAC O/P : FULL LOAD	± 0.0083 %/°C (0-50°C)
6	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature : -20°C ~ +85°C 2. Temperature change rate : 25°C / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 5 CYCLE 5. Input/Output condition : STATIC			OK
7	THERMAL SHOCK TEST	1. Thermal shock Temperature : -30°C ~ +70°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 : 230VAC/Full Load AC ON/OFF TEST turn on 58sec : turn off 2sec			OK





8	VIBRATION TEST	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10~500Hz (3) Sweep Time : 12min/sweep cycle (4) Acceleration : 2G (5) Test Time : 60min in each axis (X.Y.Z) (6) Ta : 25°C	TEST : OK
9	CAPACITOR LIFE CYCLE	SUPPOSE C 102 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) 154993HRS (2) 29620HRS (3) 67945HRS (4) 132990HRS
10	MTBF	2205.4K hrs min. Telcordia SR-332 (Bellcore) ; 236.4K hrs min. MIL-HDBK-217F (25°C)	
11	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure (Expected Life): Above30,000 hours @ TA 50°C	

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	FRANK	GESG	wangdz

2007/3/20 A50-S014