



Test Report: RSP-2000-48

2000W Power Supply with Single Output

■ 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	VERDICT
1	RIPPLE & NOISE	V1: 300 mVp-p (Max)	I/P: 230VAC O/P: FULL LOAD Ta: 25°C	V1: 90.4 mVp-p (Max)	P
2	OUTPUT VOLTAGE ADJUST RANGE	CH1: 42 V ~ 56 V	I/P: 230 VAC I/P: 180 VAC O/P: MIN LOAD Ta: 25°C	40.560 V ~ 57.72 V / 230 VAC 40.580 V ~ 57.74 V / 180 VAC	P
3	OUTPUT VOLTAGE TOLERANCE	V1: 1% ~ -1 % (Max)	I/P: 180VAC / 264 VAC O/P: FULL / MIN LOAD Ta: 25°C	V1: 0.06 % ~ -0.06 %	P
4	LINE REGULATION	V1: 0.5 % ~ -0.5 % (Max)	I/P: 180 VAC ~ 264 VAC O/P: FULL LOAD Ta: 25°C	V1: 0.012 % ~ -0.012 %	P
5	LOAD REGULATION	V1: 0.5 % ~ -0.5 % (Max)	I/P: 230 VAC O/P: FULL ~ MIN LOAD Ta: 25°C	V1: 0.06 % ~ -0.06 %	P
6	SET UP TIME	230VAC: 1500 ms (Max)	I/P: 230 VAC @ FULL LOAD Ta: 25°C	230VAC/ 1151 ms	P
7	RISE TIME	230VAC: 60 ms (Max)	I/P: 230 VAC @ FULL LOAD Ta: 25°C	230VAC/ 32.6 ms	P
8	HOLD UP TIME	230VAC: 10 ms (TYP) 230VAC: 16 ms (TYP)	I/P: 230 VAC @ FULL LOAD I/P: 230 VAC @ 75% LOAD Ta: 25°C	230VAC/ 18.4 ms 230VAC/ 21.7 ms	p
9	OVER/UNDERSHOOT TEST	< ±5%	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	TEST: <5 %	p
10	DYNAMIC LOAD	V1: 4800 mVp-p	I/P: 230 VAC O/P: FULL / Min LOAD 90% DUTY / 1KHZ Ta: 25°C	808 mVp-p	P

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	180VAC~264 VAC	I/P:TESTING O/P:FULL LOAD Ta:25°C	127 V~264V	P
			I/P: LOW-LINE-3V= 177V HIGH-LINE+15%=300 V O/P:FULL/MIN LOAD ON: 30 Sec . OFF: 30 Sec 10MIN (AC POWER ON/OFF NO DAMAGE)	TEST: OK	
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE	I/P: 180 VAC ~ 264 VAC O/P:FULL~MIN LOAD Ta:25°C	TEST: OK	P
3	POWER FACTOR	0.98 / 230 VAC(TYP)	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	PF= 0.988 / 230 VAC	P
4	EFFICIENCY	92% (TYP)	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	92.12%	P
5	INPUT CURRENT	230V/ 10 A (TYP) 115V/ 16 A (TYP)	I/P: 230 VAC @ full load I/P: 115 VAC @ 80% load Ta:25°C	I = 9.68 A/ 230 VAC I = 15.78 A/ 115 VAC	P
6	INRUSH CURRENT	230V/ 50 A (TYP)	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	I = 42 A/ 230 VAC	P
7	LEAKAGE CURRENT	< 2 mA / 240 VAC	I/P: 240 VAC O/P:Min LOAD Ta:25°C	L-FG: 1 mA N-FG 1 mA :	P

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	105 %~ 125 %	I/P: 230 VAC I/P: 180 VAC O/P:TESTING Ta:25°C	112 %/ 230 VAC 112 %/ 180 VAC Constant Current Limiting, unit will shut down o/p voltage after 5 sec ,re-power on to recover.	P
2	OVER VOLTAGE PROTECTION	CH1: 57.6 V~ 67.2V	I/P: 230 VAC I/P: 115 VAC O/P:MIN LOAD Ta:25°C	62.39 V/ 230 VAC 62.44 V/ 115 VAC Shunt down Re- power ON	P
3	OVER TEMPERATURE PROTECTION	SPEC: NO DAMAGE	I/P: 230 VAC O/P:FULL LOAD	O.T.P. Active Shut down o/p voltage , recovers automatically after temperature goes down	P
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 264 VAC O/P:FULL LOAD Ta:25°C	NO DAMAGE Constant Current Limiting, unit will shut down o/p voltage after 5 sec ,re-power on to recover.	P

CONTROL FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT																						
1	AUX ILIARY POWER (AUX)	5V @ 0.3A (4.5V~ 5.5V) 12V @ 0.8A (10.6V~13.2V)	I/P: 230 VAC O/P:FULL LOAD Ta:25℃	5.175V 11.468V	P																						
2	REMOTE ON/OFF	ON/OFF/+5V-AUX SHORT : POWER OFF ON/OFF/+5V-AUX OPEN : POWER ON	I/P: 230 VAC O/P:FULL LOAD Ta:25℃	SHORT : POWER OFF OPEN : POWER ON	P																						
3	REMOTE SENSE	Compensate voltage drop on the load wiring up to 0.5V	I/P: 230 VAC O/P:FULL LOAD Ta:25℃	>0.5 V	P																						
4	DC OK Signal	HIGH:VOUT ≤ 80±6%Vout LOW:VOUT ≥ 80±6%Vout	I/P: 230 VAC O/P:FULL LOAD Ta:25℃	HIGH : 5.338 V, VO ≤ 80 %Vout LOW: 0V, VO ≥ 84 %Vout	P																						
5	OUTPUT VOLTAGE PROGRAMMABLE(PV)	DC<0.4V Vo/p=100%±3% DC=1V Vo/p=40%±3% DC=2V Vo/p=60%±3% DC=3V Vo/p=80%±3% DC=4V Vo/p=100%±3% DC=4.7V Vo/p=115%±3%	I/P: 230 VAC <table><tr><td>PV=</td><td><0.4V</td><td>1V</td><td>2V</td><td>3V</td><td>4V</td><td>4.7V</td></tr><tr><td>Vout=</td><td>100.2%</td><td>41.66%</td><td>59.10%</td><td>78.56%</td><td>99.97%</td><td>115.8%</td></tr><tr><td>LOAD</td><td>0~100% load</td><td>0~100% load</td><td>0~100% load</td><td>0~100% load</td><td>0~100% load</td><td>0~85.7% load</td></tr></table> Ta:25℃			PV=	<0.4V	1V	2V	3V	4V	4.7V	Vout=	100.2%	41.66%	59.10%	78.56%	99.97%	115.8%	LOAD	0~100% load	0~100% load	0~100% load	0~100% load	0~100% load	0~85.7% load	P
PV=	<0.4V	1V	2V	3V	4V	4.7V																					
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LOAD	0~100% load	0~100% load	0~100% load	0~100% load	0~100% load	0~85.7% load																					
6	OVER TEMP WARNING	T-ALARM TSW1 & TSW2 short(0~0.5V) TSW1 or TSW2 open(4.5V~5.5V)	I/P: 230 VAC O/P:FULL LOAD Ta:25℃	TSW1 & TSW2 short : 0 V TSW1 or TSW2 open : 5.346 V	P																						
7	FAN SPEED CONTROL	<table><tr><td>Fan Speed</td><td>Load</td><td>PWM Duty</td></tr><tr><td>LOW</td><td>0%</td><td>10% ± 5%</td></tr><tr><td>HIGH</td><td>100%</td><td>90% ± 5%</td></tr></table>	Fan Speed	Load	PWM Duty	LOW	0%	10% ± 5%	HIGH	100%	90% ± 5%	I/P: 230 VAC O/P:TESTING Ta:25℃	<table><tr><td>Fan Speed</td><td>Load</td><td>PWM Duty</td></tr><tr><td>LOW</td><td>0%</td><td>10.12%</td></tr><tr><td>HIGH</td><td>100%</td><td>90%</td></tr></table>	Fan Speed	Load	PWM Duty	LOW	0%	10.12%	HIGH	100%	90%	P				
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HIGH	100%	90%																									
8	CURRENT SHARING	PSU1-PSU2 < 10%	I/P : 230 VAC O/P : 100%/50% LOAD Ta : 25℃	O/P : 100% LOAD PSU1 : 42A PSU2 : 42A PSU3 : 42A PSU4 : 42A O/P : 50% LOAD PSU1 : 20.4A PSU2 : 21.5A PSU3 : 21.1A PSU4 : 21.1A	P																						

6	VIBRATION TEST	1 Carton & 1 Set (1) Waveform: Sine Wave (2) Frequency: 10~500Hz (3) Sweep Time: 10min/sweep cycle (4) Acceleration: 2G (5) Test Time: 1 hour in each axis (X.Y.Z) (6) Ta: 25°C	TEST : OK	P
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SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	WITHSTAND VOLTAGE	I/P-O/P: 3 KVAC/min I/P-FG: 2 KVAC/min O/P-FG: 0.5 KVAC/min	I/P-O/P: 3.6 KVAC/min I/P-FG: 2.4 KVAC/min O/P-FG: 0.6 KVAC/min Ta: 25°C	I/P-O/P: 12.60 mA I/P-FG: 10.20 mA O/P-FG: 11.32 mA NO DAMAGE	P
2	ISOLATION RESISTANCE	I/P-O/P: 500VDC > 100MΩ I/P-FG: 500VDC > 100MΩ O/P-FG: 500VDC > 100MΩ	I/P-O/P: 500 VDC I/P-FG: 500 VDC O/P-FG: 500 VDC Ta: 25°C	I/P-O/P: 21.4 GΩ I/P-FG: 18.2 GΩ O/P-FG: 26 GΩ NO DAMAGE	P
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40 A / 2min Ta: 25°C	6 mΩ	P

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	HARMONIC	EN61000-3-2 CLASS A	I/P: 230 VAC/50HZ O/P: FULL LOAD Ta: 25°C	PASS	P
2	CONDUCTION	EN55022 CLASS B	I/P: 230 VAC (50HZ) O/P: FULL/50% LOAD Ta: 25°C	PASS Test by certified Lab	P
3	RADIATION	EN55022 CLASS A	I/P: 230 VAC (50HZ) O/P: FULL LOAD Ta: 25°C	PASS Test by certified Lab	P
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	P
5	E.F.T	EN61000-4-4 INDUSTRY INPUT: 2KV	I/P: 230 VAC/50HZ O/P: FULL LOAD Ta: 25°C	CRITERIA A	P
6	SURGE	IEC61000-4-5 INDUSTRY L-N : 2KV L,N-PE: 4KV	I/P: 230 VAC/50HZ O/P: FULL LOAD Ta: 25°C	CRITERIA A	P
7	Test by certified Lab & Test Report Prepare				

M.T.B.F & LIFE CYCLE CALCULATION

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	CAPACITOR LIFE CYCLE	RSP-2000-24 : SUPPOSE C110 I/P: 230VAC O/P:FULL LOAD Ta= 25 °C LIFE TIME=595726 HRS I/P: 230VAC O/P:FULL LOAD Ta= 50 °C LIFE TIME=98887 HRS I/P: 230VAC O/P:75% LOAD Ta= 50 °C LIFE TIME=173473 HRS I/P: 230VAC O/P:50% LOAD Ta= 50 °C LIFE TIME=259367 HRS	IS THE MOST CRITICAL COMPONENT		P
2	MTBF	Conducted by Parts Stress Analysis Prediction 159K hrs min. Telcordia SR-332 (Bellcore) ; 46.3K hrs min. MIL-HDBK-217F (25°C)			P
3	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure : Above 50,000 hours @ TA 50°C			P

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	Power Transistor (D to S) or (C to E) Peak Voltage	Q900 Rated 22A/600V	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C	(1) 460 V (2) 454 V (3) 444 V	P
2	Diode Peak Voltage	Q100 Rated 65A/200V	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C	(1) 198 V (2) 147 V (3) 198 V	P
		Q103 Rated 65A/200V	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C	(1) 198 V (2) 106 V (3) 161 V	P
3	Input Capacitor Voltage	C5 Rated 330u/400V	I/P:High-Line +3V = 267 V O/P: (1)Full Load Turn on /Off (2) Min load Turn on /Off (3)Full Load /Min load Change Ta:25°C	(1) 377.64 V (2) 378.56 V (3) 386.24 V	P
4	Control IC Voltage Test	U2 Rated 8.4V~14.5V	I/P:High-Line +3V = 267 V O/P: (1)Full Load Turn on /Off (2) Min load Turn on /Off (3)Full Load /Min load Change Ta:25°C	(1) 13.051 V (2) 11.868 V (3) 13.204 V	P
5	Power Transistor (D to S) or (C to E) Peak Voltage	Q603 Rated 22A/650V	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C	(1) 464 V (2) 456 V (3) 442 V	P

DATE	SAMPLE	TEST RESULT	TESTER	APPROVAL
2011/8/22	RD SAMPLE	PASS	SANFORD SU	VINCENT TSENG
2011/9/6	PRODUCT SAMPLE	PASS	SANFORD SU	VINCENT TSENG
2011/10/19	PRODUCT SAMPLE W1110B21	PASS	SANFORD SU	VINCENT TSENG

2003/12/12 A50-F023



2000W Power Supply with Single Output **RSP-2000** series
