

MODEL : HRP-600-12

OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	RIPPLE & NOISE	V1 : 120 mVp-p (Max)	I/P : 230VAC O/P : FULL LOAD Ta : 25°C	V1 : 50.4 mVp-p (Max)	P
2	OUTPUT VOLTAGE ADJUST RANGE	CH1 : 10.2 V~ 13.8 V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	9.03 V~ 14.27 V / 230 VAC 9.03 V~ 14.27 V / 115 VAC	P
3	OUTPUT VOLTAGE TOLERANCE	V1 : 1 %~ -1 % (Max)	I/P : 100 VAC / 264 VAC O/P : FULL/ MIN LOAD Ta : 25°C	V1 : 0.08 %~ -0.24 %	P
4	LINE REGULATION	V1 : 0.3 %~ -0.3 % (Max)	I/P : 100 VAC ~ 264 VAC O/P : FULL LOAD Ta : 25°C	V1 : 0 %~ 0 %	P
5	LOAD REGULATION	V1 : 0.5 %~ -0.5 % (Max)	I/P : 230 VAC O/P : FULL -MIN LOAD Ta : 25°C	V1 : 0.16 %~ -0.08 %	P
6	SET UP TIME	230VAC : 1800 ms (Max) 115 VAC : 3600 ms (Max)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 1250 ms 115VAC/ 2500 ms	P
7	RISE TIME	230VAC : 50 ms (Max) 115VAC : 50 ms (Max)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 20 ms 115VAC/ 20 ms	P
8	HOLD UP TIME	230VAC : 16 ms (TYP) 115VAC : 16 ms(TYP)	I/P : 230 VAC I/P : 115VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 24.8 ms 115VAC/ 18.8 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 : 1200 mVp-p	I/P : 230 VAC O/P : FULL /50% LOAD 50%DUTY / 1KHZ Ta : 25°C	366 mVp-p	P

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	85VAC~264 VAC	I/P : TESTING O/P : FULL LOAD Ta : 25°C	67 V~264V	P
			I/P: LOW-LINE-3V=87 V HIGH-LINE+15%=300 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 OSC	I/P : 100 VAC ~ 264 VAC O/P : FULL-MIN LOAD Ta : 25°C	TEST : OK	P
3	POWER FACTOR	0.94 / 230 VAC(TYP) 0.99 / 115 VAC(TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	PF= 0.951 / 230 VAC PF= 0.994 / 115 VAC	P
4	EFFICIENCY	88% (TYP)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	88.5 %	P
5	INPUT CURRENT	230V/ 3.6 A (TYP) 115V/ 7.6 A (TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I = 3.31 A/ 230 VAC I = 6.56 A/ 115 VAC	P
6	INRUSH CURRENT	230V/ 70 A (TYP) 115V/ 35 A(TYP) COLD START	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I = 65 A/ 230 VAC I = 27.4 A/ 115 VAC	P
7	LEAKAGE CURRENT	< 1.2 mA/ 240 VAC	I/P : 264 VAC O/P : Min LOAD Ta : 25°C	L-FG : 0.5 mA N-FG : 0.5 mA	P

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	105 %~ 135 %	I/P : 230 VAC I/P : 115 VAC O/P : TESTING Ta : 25°C	121.5%/ 230 VAC 121.5%/ 115 VAC Constant current limiting, recovers automatically after fault condition is removed	P
2	OVER VOLTAGE PROTECTION	CH1 : 14.4V~ 16.8 V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	15.9V/ 230 VAC 15.9V/ 115 VAC Shut down Re- power ON	P
3	OVER TEMPERATURE PROTECTION	SPEC : Shut down o/p voltage, recovers automatically after temperature goes down	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, recovers automatically after fault condition is removed	P

CONTROL FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	DC OK SIGNAL	PSU turn on : 3.3 – 5.6V ; PSU turn off : 0 – 1V	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	PSU turn on : 5.183 V PSU turn off : 0.007 V	P
2	REMOTE SENSE	>0.3V	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	➤ 0.3 V	P
3	FAN ON/OFF control test	Rated Power : 50% LOAD FAN ON 15% LOAD FAN OFF	I/P : 230 VAC O/P : TESTING Ta : 25°C	> 28 %LOAD FAN ON < 21 %LOAD FAN OFF	P

ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT																																																																																																				
1	TEMPERATURE RISE TEST	MODEL : HRP-600-12 1. ROOM AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : FULL LOAD Ta= 25 °C 2. HIGH AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : FULL LOAD Ta= 50 °C	<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta= 25 °C</th> <th>HIGH AMBIENT Ta=50 °C</th> </tr> </thead> <tbody> <tr><td>1</td><td>BD1</td><td>34.9°C</td><td>60.3°C</td></tr> <tr><td>2</td><td>L3</td><td>34.0°C</td><td>58.8°C</td></tr> <tr><td>3</td><td>Q1</td><td>32.6°C</td><td>58.1°C</td></tr> <tr><td>4</td><td>C5</td><td>31.6°C</td><td>56.5°C</td></tr> <tr><td>5</td><td>D1</td><td>43.8°C</td><td>69.0°C</td></tr> <tr><td>6</td><td>C18</td><td>31.5°C</td><td>56.9°C</td></tr> <tr><td>7</td><td>TSW1</td><td>31.7°C</td><td>57.4°C</td></tr> <tr><td>8</td><td>C61</td><td>29.2°C</td><td>84.3°C</td></tr> <tr><td>9</td><td>U1</td><td>30.8°C</td><td>56.1°C</td></tr> <tr><td>10</td><td>T1</td><td>58.1°C</td><td>84.9°C</td></tr> <tr><td>11</td><td>T2</td><td>31.2°C</td><td>56.6°C</td></tr> <tr><td>12</td><td>Q3</td><td>51.1°C</td><td>82.9°C</td></tr> <tr><td>13</td><td>Q100</td><td>45.0°C</td><td>72.3°C</td></tr> <tr><td>14</td><td>L100</td><td>60.2°C</td><td>87.8°C</td></tr> <tr><td>15</td><td>C106</td><td>33.7°C</td><td>59.7°C</td></tr> <tr><td>16</td><td>C150</td><td>41.4°C</td><td>67.6°C</td></tr> <tr><td>17</td><td>RG1</td><td>36.7°C</td><td>63.1°C</td></tr> <tr><td>18</td><td>TSW2</td><td>52.2°C</td><td>79.4°C</td></tr> <tr><td>19</td><td>C251</td><td>31.6°C</td><td>57.3°C</td></tr> <tr><td>20</td><td>C235</td><td>29.7°C</td><td>55.1°C</td></tr> <tr><td>21</td><td>Q103</td><td>41.9°C</td><td>68.4°C</td></tr> <tr><td>22</td><td>D22</td><td>39.6°C</td><td>66.2°C</td></tr> <tr><td>24</td><td>TVS</td><td>48.2°C</td><td>75.1°C</td></tr> <tr><td>25</td><td>R153</td><td>47.9°C</td><td>73.7°C</td></tr> </tbody> </table>	NO	Position	ROOM AMBIENT Ta= 25 °C	HIGH AMBIENT Ta=50 °C	1	BD1	34.9°C	60.3°C	2	L3	34.0°C	58.8°C	3	Q1	32.6°C	58.1°C	4	C5	31.6°C	56.5°C	5	D1	43.8°C	69.0°C	6	C18	31.5°C	56.9°C	7	TSW1	31.7°C	57.4°C	8	C61	29.2°C	84.3°C	9	U1	30.8°C	56.1°C	10	T1	58.1°C	84.9°C	11	T2	31.2°C	56.6°C	12	Q3	51.1°C	82.9°C	13	Q100	45.0°C	72.3°C	14	L100	60.2°C	87.8°C	15	C106	33.7°C	59.7°C	16	C150	41.4°C	67.6°C	17	RG1	36.7°C	63.1°C	18	TSW2	52.2°C	79.4°C	19	C251	31.6°C	57.3°C	20	C235	29.7°C	55.1°C	21	Q103	41.9°C	68.4°C	22	D22	39.6°C	66.2°C	24	TVS	48.2°C	75.1°C	25	R153	47.9°C	73.7°C		P
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2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 230 VAC O/P : 120 % LOAD Ta : 25°C	TEST : OK	P																																																																																																				
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 230 VAC O/P : 100 % LOAD Ta= -40 °C	TEST : OK	P																																																																																																				
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 °C HUMIDITY= 95 %R.H	TEST : OK	P																																																																																																				
5	TEMPERATURE COEFFICIENT	± 0.03 % (0-50°C)	I/P : 230 VAC O/P : FULL LOAD	± 0.006 % (0-50°C)	P																																																																																																				
6	VIBRATION TEST	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10-500Hz (3) Sweep Time : 10min/sweep cycle (4) Acceleration : 5G (5) Test Time : 1 hour in each axis (X.Y.Z) (6) Ta : 25°C		TEST : OK	P																																																																																																				

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 : 6.17 mA I/P-FG : 5.67 mA O/P-FG : 4.54 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 / 70%RH	I/P-O/P : 11.8 GΩ I/P-FG : 9.35 GΩ O/P-FG : 6.71 GΩ NO DAMAGE	P
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40 A / 2min Ta : 25°C / 70%RH	19 mΩ	P

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	HARMONIC	EN61000-3-2,-3 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 B	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	HRP-600-12 : SUPPOSE C 106	IS THE MOST CRITICAL COMPONENT		
		I/P : 230VAC O/P : FULL LOAD Ta= 25 °C	LIFE TIME= 1830800 HRS		
		I/P : 230VAC O/P : FULL LOAD Ta= 50 °C	LIFE TIME= 301969 HRS		
		I/P : 230VAC O/P : 75% LOAD Ta= 50 °C	LIFE TIME= 388321 HRS		
		I/P : 230VAC O/P : 50% LOAD Ta= 50 °C	LIFE TIME= 467332 HRS		P
2	MTBF	MIL-HDBK-217F NOTICES2 PARTS COUNT TOTAL FAILURE RATE : 140.6K HRS			P
3	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure(Expected Life) : 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	Q4 Rated 20A/500V	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on (2) Output Short Ta : 25°C	(1) 461 V (2) 457 V	P
2	Diode Peak Voltage	Q100 Rated 60A/60V Q103 Rated 80A/75V	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on (2)Output Short Ta : 25°C	(1) 50.5 V (2) 50.5 V (1) 69.6 V (2) 70.4 V	P
3	Input Capacitor Voltage	C5 Rated 470u/400V 105°C	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) 385 V (2) 377 V (3) 393 V	P
4	Control IC Voltage Test	U1 Rated 10V~20V	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on /Off (2) Min load Turn on /Off Ta : 25°C	(1) 14.6 V (2) 14.5 V	P
5	P.F.C Transistor (D to S) or (C to E) Peak Voltage	Q1 Rated 20A/500V	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on (2) Output Short Ta : 25°C	(1) 369 V (2) 369 V	P

TEST RESULT	TESTER	APPROVAL
PASS	SANFORD SU	VINCENT TSENG

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