

MODEL : HRP-150-36

OUTPUT FUNCTION TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT | VERDICT |
|----|-----------------------------|---|--|--|---------|
| 1 | RIPPLE & NOISE | V1 : 200 mVp-p (Max) | I/P : 230VAC O/P : FULL LOAD Ta : 25°C | V1 : 70 mVp-p (Max) | P |
| 2 | OUTPUT VOLTAGE ADJUST RANGE | CH1 : 28.8V ~39.6 V | I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C | 26.41 V~ 42.89 V/ 230 VAC 26.41 V~ 42.89 V/ 115 VAC | P |
| 3 | OUTPUT VOLTAGE TOLERANCE | V1 : 1.5 %~ -1.5 % (Max) | I/P : 100 VAC / 264 VAC O/P : FULL/ MIN LOAD Ta : 25°C | V1 : 0.03 %~ -0.03 % | P |
| 4 | LINE REGULATION | V1 : 0.2 %~ -0.2 % (Max) | I/P : 100 VAC ~ 264 VAC O/P : FULL LOAD Ta : 25°C | V1 : 0.02 %~ -0.02 % | P |
| 5 | LOAD REGULATION | V1 : 0.5 %~ -0.5 % (Max) | I/P : 230 VAC O/P : FULL ~MIN LOAD Ta : 25°C | V1 : 0.02 %~ -0.02 % | P |
| 6 | SET UP TIME | 230VAC : 3000 ms (Max) 115 VAC : 3000 ms (Max) | I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C | 230VAC/ 1002 ms 115VAC/ 1002 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/ 13 ms 115VAC/ 12 ms | P |
| 8 | HOLD UP TIME | 230VAC : 16 ms (TYP) 115VAC : 16 ms (TYP) | I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C | 230VAC/ 28 ms 115VAC/ 26 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 : 3600 mVp-p | I/P : 230 VAC O/P : FULL /Min LOAD 90%DUTY/1KHZ Ta : 25°C | 706 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 | 72 V~264V | P |
| | | | I/P : LOW-LINE-3V= 97 V 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 OSC | I/P : 100 VAC ~ 264 VAC O/P : FULL-MIN LOAD Ta : 25°C | TEST : OK | P |
| 3 | POWER FACTOR | 0.95 / 230 VAC(TYP) 0.99 / 115 VAC(TYP) | I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C | PF= 0.977 / 230 VAC PF= 0.998 / 115 VAC | P |
| 4 | EFFICIENCY | 89% (TYP) | I/P : 230 VAC O/P : FULL LOAD Ta : 25°C | 89.9 % | P |
| 5 | INPUT CURRENT | 230V/ 1.3 A (TYP) 115V/ 2.3 A (TYP) | I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C | I = 0.78 A/ 230 VAC I = 1.57 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 = 70 A/ 230 VAC I = 35 A/ 115 VAC | P |
| 7 | LEAKAGE CURRENT | < 1 mA / 240 VAC | I/P : 264 VAC O/P : Min LOAD Ta : 25°C | L-FG : 0.14 mA N-FG : 0.1 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 | 118% / 230 VAC 118% / 115 VAC Constant Current Limiting | P |
| 2 | OVER VOLTAGE PROTECTION | CH1 : 41.4 V~48.6 V | I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C | 45 V / 230 VAC 45 V / 115 VAC Shut down Re- power ON | P |
| 3 | OVER TEMPERATURE PROTECTION | SPEC : TSW1 : 85 ± 5°C O.T.P. TSW2 : 100 ± 5°C O.T.P. 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 | P |

CONTROL FUNCTION TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT | VERDICT |
|----|--------------|---------------|---|--------|---------|
| 1 | REMOTE SENSE | >0.3V | I/P : 230 VAC O/P : FULL LOAD Ta : 25°C | >0.3V | P |

ENVIRONMENT TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT | VERDICT |
|----|---|---|--|-------------------|---------|
| 1 | TEMPERATURE RISE TEST | MODEL : HRP-150-24 1. ROOM AMBIENT BURN-IN : 1.5 HRS I/P : 230VAC O/P : FULL LOAD Ta=24.2 °C 2. HIGH AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : FULL LOAD Ta=41 °C | | | P |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| 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 40 °C NO DAMAGE | I/P : 272 VAC O/P : FULL LOAD Ta= 40 °C HUMIDITY= 95 %R.H | TEST : OK | P |
| 5 | TEMPERATURE COEFFICIENT | ± 0.04 %(0~50°C) | I/P : 230 VAC O/P : FULL LOAD | ± 0.005 %(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 : 3.61 mA I/P-FG : 1.72 mA O/P-FG : 1.73 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 : 30 GΩ I/P-FG : 22.5 GΩ O/P-FG : 30 GΩ NO DAMAGE | P |
| 3 | GROUNDING CONTINUITY | FG(PE) TO CHASSIS OR TRACE < 100 mΩ | 40 A / 2min Ta : 25°C / 70%RH | 2 mΩ | P |
| 4 | APPROVAL | TUV : Certificate NO : R50147701 UL : File NO : E183223 | | | 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 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-150-24 : SUPPOSE C105 | IS THE MOST CRITICAL COMPONENT | | P |
| | | I/P : 230VAC O/P : FULL LOAD | Ta= 25 °C LIFE TIME= 266321 HRS | | |
| | | I/P : 230VAC O/P : FULL LOAD | Ta= 40 °C LIFE TIME= 106722 HRS | | |
| 2 | MTBF | MIL-HDBK-217F NOTICES2 PARTS COUNT TOTAL FAILURE RATE : 238.8K HRS | | | P |
| 3 | DMTBF/Accelerated Life Test | Demonstration Mean Time Between Failure : Above 50,000 hours @ TA 40°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 | Q 3 Rated 2SK4106 12A/500V | I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on (2) Output Short Ta : 25°C | (1) 456 V (2) 266 V | P |
| 2 | Diode Peak Voltage | Q101 Rated FMX-12SL 10A/200V Q103 Rated SF20LC30 20A/300V | I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on (2)Output Short O/P : (1)Full Load Turn on (2)Output Short Ta : 25°C | (1) 193 V (2) 119 V (1) 247 V (2) 258 V | P |
| 3 | PFC Transistor (D to S) or (C to E) Peak Voltage | Q1 Rated : IRFP460A 20A/500V | I/P : High-Line +3V = 267 V O/P : (1)Full Load (2) Dynamic Load 90%Duty/1KHz Ta : 25°C | (1) 444 V (2) 442 V | P |
| 4 | Input Capacitor Voltage | C5 Rated 100u/400V 105°C KMG | 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) 376.6 V (2) 376.9 V (3) 376.9 V | P |
| 5 | Control IC Voltage Test | U 2 Rated FAN4801 : 12V~30V | 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) 15.4 V (2) 14.5 V (3) 15.4 V | P |

| DATE | SAMPLE | TEST RESULT | TESTER | APPROVAL |
|-----------|----------------------------|-------------|------------|---------------|
| 2008/12/1 | RD SAMPLE | PASS | SANFORD SU | VINCENT TSENG |
| 2009/3/25 | PRODUCT SAMPLE W0505B06 | PASS | SANFORD SU | VINCENT TSENG |
| 2009/6/16 | PRODUCT SAMPLE W0905A31 | PASS | SANFORD SU | VINCENT TSENG |

2003/12/12 A50-F023