

MODEL : USP-500-12

OUTPUT FUNCTION TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT | VERDICT |
|----|-----------------------------|---|---|--|---------|
| 1 | RIPPLE & NOISE | V1: 100 mVp-p (Max) | I/P: 230VAC O/P:FULL LOAD Ta:25°C | V1: 18 mVp-p (Max) | P |
| 2 | OUTPUT VOLTAGE ADJUST RANGE | CH1: 10.8V-13.2 V | I/P: 230 VAC I/P: 115 VAC O/P:MIN LOAD Ta:25°C | 10.18 V- 13.99 V/ 230 VAC 10.18 V- 13.99 V/ 115 VAC | P |
| 3 | OUTPUT VOLTAGE TOLERANCE | V1: 2 %- -2 % (Max) | I/P: 100 VAC / 264 VAC O/P:FULL/ MIN LOAD Ta:25°C | V1: 0.15 %- -0.15 % | P |
| 4 | LINE REGULATION | V1: 0.5 %- -0.5 % (Max) | I/P: 100 VAC ~ 264 VAC O/P:FULL LOAD Ta:25°C | V1: 0.05 %- -0.05 % | P |
| 5 | LOAD REGULATION | V1:1 %- -1 % (Max) | I/P: 230 VAC O/P:FULL ~MIN LOAD Ta:25°C | V1: 0.1 %- -0.1 % | P |
| 6 | SET UP TIME | 230VAC: 1500 ms (Max) 115VAC 3100 ms (Max) | I/P: 230 VAC O/P:FULL LOAD Ta:25°C | 230VAC/ 817 ms 115VAC/ 1634 ms | P |
| 7 | RISE TIME | 230VAC: 80 ms (Max) 115VAC 80 ms (Max) | I/P: 230 VAC O/P:FULL LOAD Ta:25°C | 230VAC/ 61 ms 115VAC/ 60 ms | P |
| 8 | HOLD UP TIME | 230VAC: 20 ms (TYP) 115VAC 20 ms (TYP) | I/P: 230 VAC O/P:FULL LOAD Ta:25°C | 230VAC/ 24.9 ms 115VAC/ 27.3 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 /Min LOAD 90%DUTY/1KHZ Ta:25°C | 709 mVp-p | P |

INPUT FUNCTION TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT | VERDICT |
|----|-----------------------|---|--|--|---------|
| 1 | INPUT VOLTAGE RANGE | 100VAC-264 VAC | I/P:TESTING O/P:FULL LOAD Ta:25°C | 76 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: 90 VAC ~ 264 VAC O/P:FULL-MIN LOAD Ta:25°C | TEST: OK | P |
| 3 | POWER FACTOR | 0.95 / 230 VAC(TYP) 0.98 / 115 VAC(TYP) | I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C | PF= 0.972 / 230 VAC PF= 0.996 / 115 VAC | P |
| 4 | EFFICIENCY | 90 % (TYP) | I/P: 230 VAC O/P:FULL LOAD Ta:25°C | 90.1 % | P |
| 5 | INPUT CURRENT | 230V/ 2.6 A (TYP) 115V/ 6 A (TYP) | I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C | I = 2.51 A/ 230 VAC I = 5.06 A/ 115 VAC | P |
| 6 | INRUSH CURRENT | 230V/ 50 A (TYP) 115V/ 30 A(TYP) COLD START | I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C | I = 46 A/ 230 VAC I = 23 A/ 115 VAC | P |
| 7 | LEAKAGE CURRENT | < 2 mA / 240 VAC | I/P: 254 VAC O/P:Min LOAD Ta:25°C | L-FG: 1.35 mA N-FG: 1.35 mA | P |

PROTECTION FUNCTION TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT | VERDICT |
|----|-----------------------------|---|--|--|---------|
| 1 | OVER LOAD PROTECTION | 105 %~ 130 % | I/P: 230 VAC I/P: 115 VAC O/P: TESTING Ta:25°C | 115 %/ 230 VAC 115 %/ 115 VAC Constant Current Limiting unit will shut down o/p voltage after 3sec Re-power on to recover | P |
| 2 | OVER VOLTAGE PROTECTION | CH1: 13.5 V~ 16V | I/P: 230 VAC I/P: 115 VAC O/P: MIN LOAD Ta:25°C | 14.7 V/ 230 VAC 14.7 V/ 115 VAC Shunt 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: 264 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 3sec Re-power on to recover | P |

CONTROL FUNCTION TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT | VERDICT |
|----|----------------|--|---|---|---------|
| 1 | REMOTE CONTROL | RC+/RC-: 0~0.8V POWER ON RC+/RC-: 4~10V POWER OFF | I/P: 230 VAC O/P: FULL LOAD Ta:25°C | RC+/RC-: 0~1.3V POWER ON RC+/RC-: 1.4V~10V POWER OFF | P |
| 2 | REMOTE SENSE | >0.25V | I/P: 230 VAC O/P: FULL LOAD Ta:25°C | > 0.3V | P |
| 3 | DC-OK SIGNAL | PSU turn on : 3.3V~5.6V PSU turn off : 0V~1V | I/P: 230 VAC O/P: FULL LOAD Ta:25°C | PSU turn on : 5.21V PSU turn off : 0V | P |

ENVIRONMENT TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT | VERDICT |
|----|---|--|--|---------------|---------|
| 1 | TEMPERATURE RISE TEST | MODEL : USP-500-24 WITH FAN 1. ROOM AMBIENT BURN-IN : 1 HRS I/P: 230VAC O/P: FULL LOAD Ta= 35.5 °C 2. HIGH AMBIENT BURN-IN : 2 HRS I/P: 230VAC O/P: FULL LOAD Ta= 55.1 °C | | | P |
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| 2 | OVER LOAD BURN-IN TEST | NO DAMAGE 1 HOUR (MIN) | I/P: 230 VAC O/P: 114 % 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= -20°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 %(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:2G (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: 1.5 KVAC/min O/P-FG: 0.5 KVAC/min | I/P-O/P: 3.6 KVAC/min I/P-FG: 1.8 KVAC/min O/P-FG: 0.6 KVAC/min Ta:25°C | I/P-O/P: 9.58 mA I/P-FG: 7.9 mA O/P-FG: 8.73 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 | I/P-O/P: 3 GΩ I/P-FG: 1.4 GΩ O/P-FG: 5 GΩ NO DAMAGE | P |
| 3 | GROUNDING CONTINUITY | FG(PE) TO CHASSIS OR TRACE < 100 mΩ | 40 A / 2min Ta:25°C | 10 mΩ | P |
| 4 | APPROVAL | TUV: Certificate NO : R 50112380 UL: File NO : E183223 | | | 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 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 | USP-500-24 WITH FAN : SUPPOSE C105 IS THE MOST CRITICAL COMPONENT I/P: 230VAC O/P:FULL LOAD Ta= 25°C LIFE TIME= 432640 HRS I/P: 230VAC O/P:FULL LOAD Ta= 50°C LIFE TIME= 148835 HRS | | | P |
| 2 | MTBF | MIL-HDBK-217F NOTICES2 PARTS COUNT TOTAL FAILURE RATE: 129.8K HRS | | | P |
| 3 | DMTBF/Accelerated Life Test | Demonstration Mean Time Between Failure : Above 30,000 hours @ TA 45°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 | Q3 Rated SPW20N60C3 20.7A/650V | I/P:High-Line +3V = 267 V O/P: (1)Full Load Turn on (2) Full Load (3)Output Short Ta:25°C | (1) 434 V (2) 434 V (3) 448 V | P |
| 2 | Diode Peak Voltage | Q100 Rated FDP047AN08A0 80A/75V Q108 STP60NF06L 60A/60V | I/P:High-Line +3V = 267 V O/P: (1)Full Load Turn on (2) Full Load (3)Output Short Ta:25°C | (1) 49 V (2) 49 V (3) 47 V (1) 48 V (2) 48 V (3) 48 V | P |
| 3 | Input Capacitor Voltage | C5 Rated 150u/450V 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) 396 V (2) 398 V (3) 398 V | P |
| 4 | Control IC Voltage Test | U1 Rated CM6800GIP : 18V | 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) 13.5 V (2) 14 V (3) 14 V | P |
| 5 | PFC Power Transistor (D to S) or (C to E) Peak Voltage | Q2 Rated SPW20N60C3 20.7A/650V | I/P:High-Line +3V = 267 V O/P: (1)Full Load Turn on (2) Full Load (3)Output Short Ta:25°C | (1) 460 V (2) 460 V (3) 464 V | P |

| DATE | SAMPLE | TEST RESULT | TESTER | APPROVAL |
|------------|----------------------------|-------------|---------------|----------|
| 2007/6/14 | RD SAMPLE | PASS | VINCENT TSENG | MAX LIN |
| 2007/8/10 | PRODUCT SAMPLE W0707A39 | PASS | VINCENT TSENG | MAX LIN |
| 2007/11/16 | PRODUCT SAMPLE W0710C59 | PASS | VINCENT TSENG | MAX LIN |

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