



# Test Report: LOP-600-36

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600W 5"×3" Low Profile Open Frame Power Supply

## ■ 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

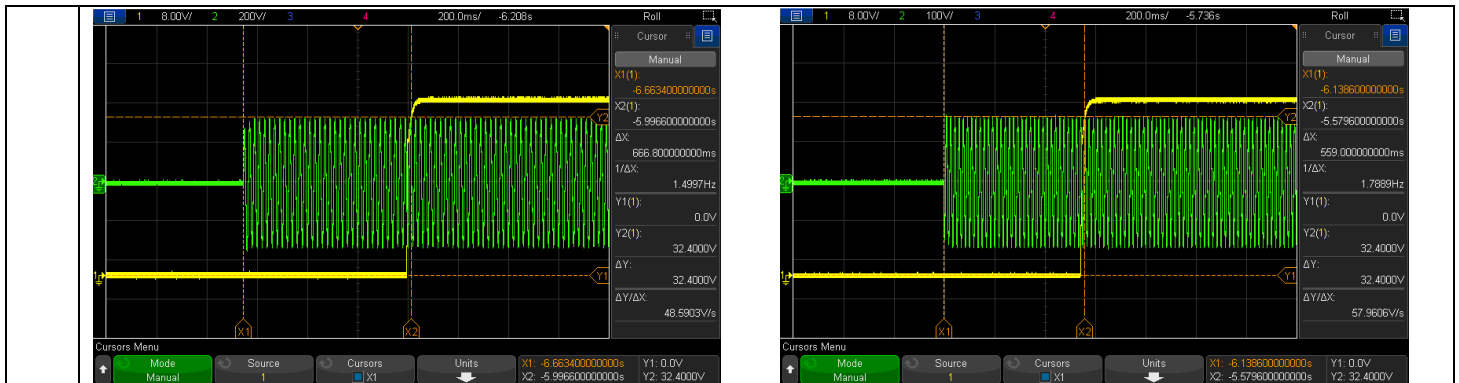
## ■ RELIABILITY TEST

ENVIRONMENT TEST

■ DESIGN VERIFY TEST

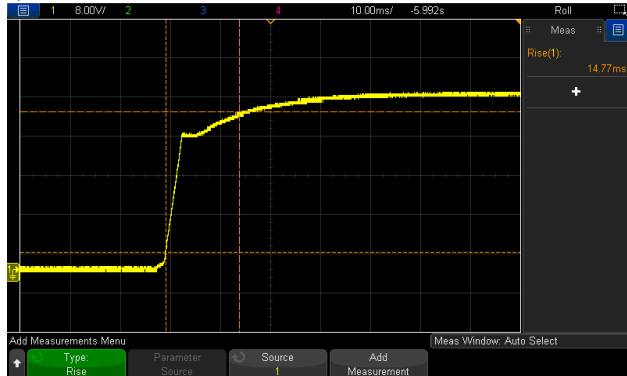
OUTPUT FUNCTION TEST

| NO | TEST ITEM                   | SPECIFICATION  | TEST CONDITION   | RESULT  |
|----|-----------------------------|--|--|---|
| 1  | OUTPUT VOLTAGE ADJUST RANGE | CH1: 34.2V~37.8V   | I/P : 230 VAC<br>I/P : 115 VAC<br>O/P : MIN LOAD<br>Ta : 25°C              | 33.043V~38.902V/230VAC<br>33.043V~38.902V/115VAC<br>33.043~38.902 |
| 2  | OUTPUT VOLTAGE TOLERANCE    | V1: -1% ~ +1%  | I/P: 80VAC~ 264VAC<br>O/P:FULL~ MIN. LOAD<br>Ta:25°C                       | V1: -0.776% ~0.0556%  |
| 3  | LINE REGULATION             | V1: -0.5% ~ +0.5%  | I/P: 80VAC~ 264VAC<br>O/P:FULL LOAD<br>Ta:25°C                             | V1: -0.0056% ~0.0084%   |
| 4  | LOAD REGULATION             | V1: -1% ~ +1%  | I/P: 230VAC<br>O/P:FULL ~MIN LOAD<br>Ta:25°C                               | V1: -0.776% ~0.0556%  |
| 5  | OVER/UNDERSHOOT TEST        | <±5%   | I/P: 230VAC<br>O/P:FULL LOAD / NO LOAD<br>Ta:25°C                          | 2.2%  |
| 6  | RIPPLE & NOISE (Max)        | V1: 250mVp-p   | I/P:230VAC<br>O/P: FULL LOAD<br>Ta:25°C                                    | V1: 149mVp-p / high frequency<br>167mVp-p / low frequency         |
|    |                             | high frequency :   | low frequency :  |   |
|    |                             |  |  |   |
| 7  | SET UP TIME(Max)            | 230VAC/1000ms<br>115VAC/1500ms   | I/P : 230 VAC<br>I/P : 115 VAC<br>O/P : FULL LOAD<br>Ta : 25°C             | 230VAC/ 666.8ms<br>115VAC/ 559.0ms                                |
|    |                             | INPUT=230VAC/50HZ @ FULL LOAD<br>CH1: Output Voltage CH2: AC Input Voltage | INPUT=115VAC/60HZ @ FULL LOAD<br>CH1: Output Voltage CH2: AC Input Voltage |   |

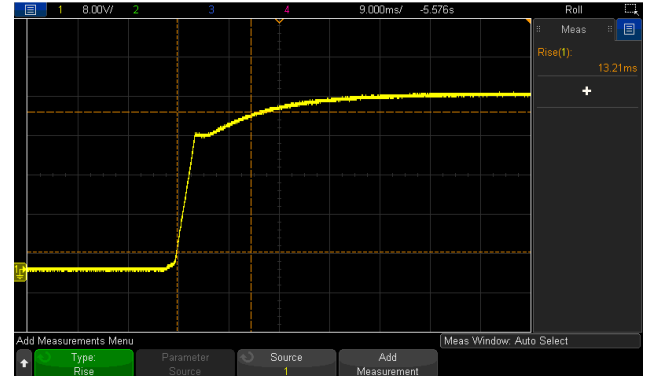


|   |                 |                            |  |                                    |
|---|-----------------|----------------------------|--|------------------------------------|
| 8 | RISE TIME (Max) | 230VAC/50ms<br>115VAC/50ms | I/P : 230 VAC<br>I/P : 115 VAC<br>O/P : FULL LOAD<br>Ta : 25°C | 230VAC/ 14.77ms<br>115VAC/ 13.21ms |
|---|-----------------|----------------------------|--|------------------------------------|

INPUT=230VAC/50HZ @ FULL LOAD  
CH1: Output Voltage

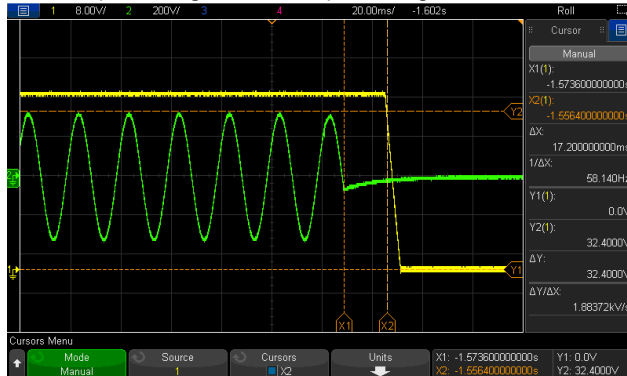


INPUT=115VAC/60HZ @ FULL LOAD  
CH1: Output Voltage

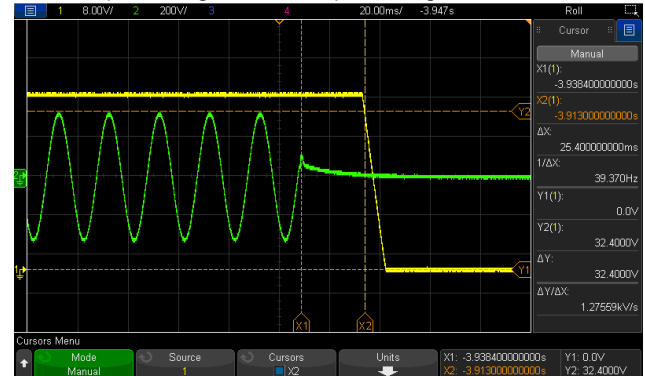


|   |                     |                                   |   |  |
|---|---------------------|-----------------------------------|---|--|
| 9 | HOLD UP TIME (Typ.) | 8ms /600W load<br>12ms /400W load | I/P : 230 VAC<br>O/P : TESTING<br>Ta : 25°C | 17.20ms /600W load<br>25.40ms /400W load |
|---|---------------------|-----------------------------------|---|--|

INPUT=230VAC/50HZ @ 600W load  
CH1: Output Voltage CH2: AC Input Voltage



INPUT=230VAC/50HZ @ 400W load  
CH1: Output Voltage CH2: AC Input Voltage



|    |              |               |   |                      |
|----|--------------|---------------|---|----------------------|
| 10 | DYNAMIC LOAD | V1: 3600mVp-p | I/P: 230VAC<br>O/P:<br>(1) FULL/0% LOAD 50%DUTY / 120HZ<br>(2) FULL/0% LOAD 50%DUTY / 1KHZ<br>Ta:25°C | 640mVp-p<br>520mVp-p |
|----|--------------|---------------|---|----------------------|

FULL /0% LOAD 50%DUTY / 120HZ

FULL /0% LOAD 50%DUTY / 1KHZ

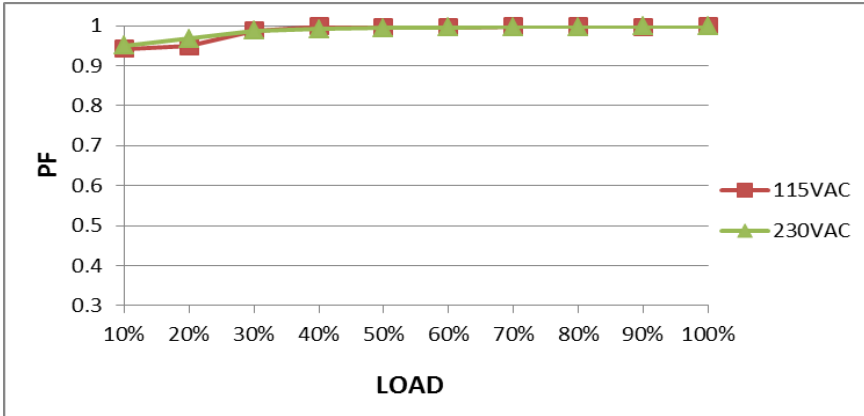
|           |                                |                                     |   |
|-----------|--------------------------------|-------------------------------------|---|
|           |                                |                                     |   |
| <p>11</p> | <p>TRANSIENT RECOVERY TIME</p> | <p>V1: 3600mVp-p<br/>&lt; 500us</p> | <p>I/P: 230VAC<br/>O/P:40% LOAD CHANGE<br/>50%DUTY/120HZ 1.25A/us</p> |
| <p>12</p> | <p>PEAK LOAD</p>               | <p>150% PEAK LOAD@3S</p>            | <p>I/P: 264VAC<br/>I/P: 115VAC<br/>O/P: PEAK LOAD</p>                 |

### INPUT FUNCTION TEST

| NO | TEST ITEM             | SPECIFICATION  | TEST CONDITION  | RESULT  |
|----|-----------------------|--|---|---|
| 1  | INPUT VOLTAGE RANGE   | 80VAC~264VAC<br>113VDC~ 370VDC<br>   | (1) I/P: TESTING<br>O/P: FULL / 70% LOAD<br>(2) I/P: DC TESTING (L: + N: -)<br>O/P: FULL / 70% LOAD<br>(3) I/P: DC TESTING (L: - N: +)<br>O/P: FULL / 70% LOAD<br>Ta:25°C<br><br>I/P:<br>HIGH-LINE+15%=300V<br>O/P:FULL/MIN LOAD<br>(PLEASE CHECK DERATING CURVE)<br>ON: 30 Sec OFF: 30 Sec 10MIN<br>( POWER ON/OFF NO DAMAGE ) | (1) 67.8V~264V/ FULL LOAD<br>67.8V~264V/ 70% LOAD<br>(2) 96.7Vdc~370Vdc/FULL LOAD<br>96.7Vdc~370Vdc/70% LOAD<br>(3) 96.7Vdc~370Vdc/FULL LOAD<br>96.7Vdc~370Vdc/70% LOAD |
|    |                       |  |   | TEST : OK   |
| 2  | INPUT FREQUENCY RANGE | 47HZ ~63 HZ<br>NO DAMAGE   | I/P:80 VAC ~264 VAC<br>O/P:FULL~MIN LOAD<br>Ta:25°C   | TEST : OK   |
| 3  | INPUT CURRENT (Typ.)  | 230V/ 3.2A<br>115V/ 6.4A   | I/P : 230 VAC<br>I/P : 115 VAC<br>O/P : FULL LOAD<br>Ta : 25°C  | I =2.7386A/ 230VAC<br>I =5.7178A/ 115VAC  |
| 4  | LEAKAGE CURRENT       | Earth leakage current<br><500uA(rms) @ 264VAC<br>touch current <70uA(rms) @ 264VAC | I/P : 264 VAC/60HZ<br>O/P : Min LOAD<br>Ta : 25°C   | 266.2 uA / 264 VAC@ For Earth<br>33.8uA / 264 VAC@For Touch   |
| 5  | NO LOAD CONSUMPTION   | <0.5W  | I/P : 240VAC<br>O/P : NO LOAD<br>Ta : 25°C  | 0.3851W   |

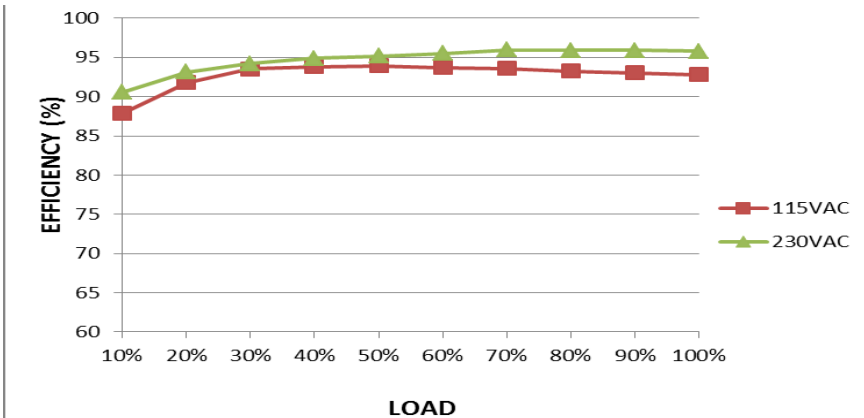
|   |                     |                             |  |                                      |
|---|---------------------|-----------------------------|--|--------------------------------------|
| 6 | POWER FACTOR (Typ.) | 0.95/ 230VAC<br>0.98/115VAC | I/P : 230 VAC<br>I/P : 115 VAC<br>O/P : FULL LOAD<br>Ta : 25°C | PF=0.9981/230VAC<br>PF=0.9982/115VAC |
|---|---------------------|-----------------------------|--|--------------------------------------|

P.F vs LOAD



|   |                  |     |   |        |
|---|------------------|-----|---|--------|
| 7 | EFFICIENCY(Typ.) | 95% | I/P:230 VAC<br>O/P:FULL LOAD<br>Ta:25°C | 95.57% |
|---|------------------|-----|---|--------|

EFFICIENCY vs LOAD



|   |                      |                                    |  |   |
|---|----------------------|------------------------------------|--|---|
| 8 | INRUSH CURRENT(Typ.) | 230V/80A<br>115V/40A<br>COLD START | I/P : 230 VAC<br>I/P : 115 VAC<br>O/P : FULL LOAD<br>Ta : 25°C | I =67.7A/ 230VAC<br>I =28.6A/ 115VAC<br>T50=1069us/230V |
|---|----------------------|------------------------------------|--|---|

INPUT=230VAC/50HZ @ FULL LOAD  
CH2: AC Input Voltage CH4: Input current



INPUT=115VAC/ 60HZ @ FULL LOAD  
CH2: AC Input Voltage CH4: Input current



### PROTECTION FUNCTION TEST

| NO | TEST ITEM                   | SPECIFICATION  | TEST CONDITION  | RESULT  |
|----|-----------------------------|--|---|---|
| 1  | OVER LOAD PROTECTION        | 105%~ 150%<br>PROTECTION TYPE : Hiccup after 3 sec, recovers automatically after fault condition is removed  | I/P: 264VAC<br>I/P: 230VAC<br>I/P: 115VAC<br>O/P:TESTING<br>Ta:25°C | 136.82%/ 264VAC<br>137.01%/ 230VAC<br>138.92%/ 115VAC<br>PROTECTION TYPE : Hiccup after 3 sec, recovers automatically after fault condition is removed  |
| 2  | OVER VOLTAGE PROTECTION     | 39.6V~46.8V<br>Protection type:<br>Shut down o/p voltage, re-power on to recover   | I/P: 264VAC<br>I/P: 80VAC<br>O/P:MIN LOAD<br>Ta:25°C                | 42.1V/ 264VAC<br>42.3V/ 80VAC<br>Protection type:<br>Shut down o/p voltage, re-power on to recover  |
| 3  | OVER TEMPERATURE PROTECTION | Protection type:<br>Shut down o/p voltage, recovers automatically after temperature goes down (Vin=115Vac);<br>Shut down o/p voltage, re-power on to recover ( Vin=230Vac or FAN LOCK) | I/P: 264VAC<br>I/P: 80VAC<br>O/P:FULL LOAD                          | O.T.P Active OK<br>Protection type :<br>Shut down o/p voltage, recovers automatically after temperature goes down (Vin=115Vac);<br>Shut down o/p voltage, re-power on to recover (Vin=230Vac or FAN LOCK) |
| 4  | SHORT PROTECTION            | SHORT EVERY OUTPUT<br>1 HOUR NO DAMAGE<br>Protection type:<br>Hiccup mode, recovers automatically after fault condition is removed   | I/P: 264VAC<br>I/P: 80VAC<br>O/P: FULL LOAD<br>Ta:25°C              | NO DAMAGE<br>PROTECTION TYPE :<br>Hiccup mode, recovers automatically after fault condition is removed  |

### CONTROL FUNCTION TEST

| NO | TEST ITEM           | SPECIFICATION  | TEST CONDITION                           | RESULT                          |
|----|---------------------|--|--|---------------------------------|
| 1  | EXTERNAL FAN SUPPLY | 12V@0.5A for driving a fan ;<br>tolerance -15% ~ +15% at main output 20% rated current (23CFM) | I/P: 230 VAC<br>O/P: TESTING<br>Ta:25°C  | TEST : <u>-0.116% ~ 0.0746%</u> |
| 2  | REMOTE SENSE        | S+ / S-<br>The remote sensing compensates voltage drop on the load wiring up to 0.5V           | I/P: 230 VAC<br>O/P:FULL LOAD<br>Ta:25°C | TEST : <u>OK</u>                |

### COMPONENT STRESS TEST

| NO | TEST ITEM   | SPECIFICATION                | TEST CONDITION   | RESULT  |
|----|---|------------------------------|--|---|
| 1  | PWM Transistor ( D to S) or (C to E) Peak Voltage | Q2/ Q3<br>Rated:<br>26A/600V | AC ON/OFF<br>I/P: High-Line +3V =267V<br>VDS:<br>O/P: (1)Full Load<br>(2)Output Short<br>(3) Dynamic Load Full Load/<br>Min. Load 90%Duty/1KHz | Q2: Q3:<br>VDS: VDS:<br>(1) 458V (1) 450V<br>(2) 470V (2) 454V<br>(3) 458V (3) 454V<br>(4) 466V (4) 450V<br>(5) 462V (5) 446V |



|   |   |                                  |  |   |   |
|---|---|----------------------------------|--|---|---|
|   |   |                                  | <p>(4) Dynamic Load Full Load/<br/>Min. Load 90%Duty/3KHz</p> <p>(5) Dynamic Load Full Load/<br/>Min. Load 90%Duty/5KHz</p> <p>(6) Dynamic Load 100% Load/<br/>Min. Load 50%Duty/120Hz</p> <p>(7)0%→400% Load</p> <p>(8) Peak Load</p> <p>Ta:25°C</p>  | <p>(6) 466V</p> <p>(7) 466V</p> <p>(8) 462V</p>   | <p>(6) 450V</p> <p>(7) 450V</p> <p>(8) 446V</p>   |
| 2 | P.F.C Transistor<br>( D to S) or (C to E)<br>Peak Voltage | Q1<br>Rated:<br>52A/600V         | <p>AC ON/OFF</p> <p>I/P: High-Line +3V =267V</p> <p>VDS:</p> <p>O/P: (1)Full Load</p> <p>(2)Output Short</p> <p>(3) Dynamic Load Full Load/<br/>Min. Load 90%Duty/1KHz</p> <p>(4) Dynamic Load Full Load/<br/>Min. Load 90%Duty/3KHz</p> <p>(5) Dynamic Load Full Load/<br/>Min. Load 90%Duty/5KHz</p> <p>(6) Dynamic Load 100% Load/<br/>Min. Load 50%Duty/120Hz</p> <p>(7)0%→400% Load</p> <p>(8) Peak Load</p> <p>Ta:25°C</p> | VDS:  | <p>(1) 446V</p> <p>(2) 446V</p> <p>(3) 450V</p> <p>(4) 442V</p> <p>(5) 446V</p> <p>(6) 450V</p> <p>(7) 438V</p> <p>(8) 470V</p>   |
| 3 | P.F.C DIODE   | D2<br>Rated:<br>6A/ 650V         | <p>I/P: High-Line +3V =267 V</p> <p>AC ON/OFF</p> <p>O/P: (1)Full Load</p> <p>(2)Output Short</p> <p>(3) Dynamic Load Full Load/<br/>Min. Load 90%Duty/5KHz</p> <p>(4) Dynamic Load 100% Load/<br/>Min. Load 50%Duty/120Hz</p> <p>(5) Peak Load</p> <p>Ta:25°C</p>   | <p>(1) 402V</p> <p>(2) 406V</p> <p>(3) 402V</p> <p>(4) 398V</p> <p>(5) 406V</p>   |   |
| 4 | Diode Peak Voltage  | Q101/Q103<br>Rated:<br>90A/ 100V | <p>AC ON/OFF</p> <p>I/P: High-Line +3V =267 V</p> <p><u>VO=Vmax</u></p> <p>O/P: (1)Full Load</p> <p>(2)Output Short</p> <p>(3) Dynamic Load Full Load/<br/>Min. Load 90%Duty/1KHz</p> <p>(4) Dynamic Load Full Load/<br/>Min. Load 90%Duty/3KHz</p> <p>(5) Dynamic Load Full Load/<br/>Min. Load 90%Duty/5KHz</p> <p>(6) Dynamic Load 100% Load/<br/>Min. Load 50%Duty/120Hz</p> <p>(7)0%→400% Load.</p>                         | <p>Q101:<br/><u>VO=Vmax</u></p> <p>VDS:</p> <p>(1) 87.5V</p> <p>(2) 87.5V</p> <p>(3) 87.5V</p> <p>(4) 87.5V</p> <p>(5) 87.5V</p> <p>(6) 88.3V</p> <p>(7) 86.7V</p> <p>(8) 86.7V</p> <p>(9) 87.1V</p> <p>(10) 89.1V</p> <p><u>VO=Vnormal</u></p> | <p>Q103:<br/><u>VO=Vmax</u></p> <p>VDS:</p> <p>(1) 88.5V</p> <p>(2) 88.5V</p> <p>(3) 88.5V</p> <p>(4) 88.5V</p> <p>(5) 87.7V</p> <p>(6) 89.3V</p> <p>(7) 84.5V</p> <p>(8) 84.5V</p> <p>(9) 85.3V</p> <p>(10) 89.3V</p> <p><u>VO=Vnormal</u></p> |

|   |                         |   |   |  |
|---|-------------------------|---|---|--|
|   |                         |   | (8).NO LOAD<br>(9) burst Mode<br>(10) Peak Load<br><u>VO=Vnormal</u><br>O/P: (1) Full Load<br>Ta:25°C   | (1) 84.3V<br>(1) 84.5V   |
| 5 | Input Capacitor Voltage | C5<br>Rated:<br>330μ / 400V   | I/P: High-Line +3V =267V<br>O/P: (1)Full Load input on/off<br>(2) Min load input on /Off<br>(3) Full Load /Min load Change<br>(4) Full load continue<br>Ta:25°C | (1) 398V<br>(2) 396V<br>(3) 398V<br>(4) 398V   |
| 6 | Control IC Voltage Test | PFC /PWM IC U1:<br>Rated : 10.4V~28.7 V<br><br>O/P IC U101<br>Rated : 4.75V~38V | AC ON/OFF<br>I/P: High-Line +3V =267 V<br>O/P: (1) FULL LOAD<br>(2) Output Short<br>(3) O.L.P<br>(4) O.V.P.<br>(5) NO LOAD VRmin (LOW LINE)<br>Ta:25°C          | U1<br>(1) 19.1V<br>(2) 19.1V<br>(3) 19.1V<br>(4) 19.1V<br>(5) 18.9V<br><br>U101<br>(1) 11.7V<br>(2) 11.6V<br>(3) 11.7V<br>(4) 11.7V<br>(5) 11.7V |

## ■ SAFETY& E.M.C. TEST

### SAFETY TEST

| NO | TEST ITEM            | SPECIFICATION   | TEST CONDITION  | RESULT  |
|----|----------------------|---|---|---|
| 1  | WITHSTAND VOLTAGE    | I/P-O/P: 4KVAC/min<br>I/P-FG :2KVAC/min<br>O/P-FG:1.5KVAC/min       | I/P-O/P: 4.4 KVAC/min<br>I/P-FG: 2.4 KVAC/min<br>O/P-FG:1.8 KVAC/min<br>Ta:25°C | I/P-O/P: 1.763mA<br>I/P-FG: 2.37mA<br>O/P-FG:0.808mA<br>NO DAMAGE |
| 2  | ISOLATION RESISTANCE | I/P-O/P:500VDC>100MΩ<br>I/P-FG: 500VDC>100MΩ<br>O/P-FG:500VDC>100MΩ | I/P-O/P: 600 VDC<br>I/P-FG: 600 VDC<br>O/P-FG: 600 VDC<br>Ta:25°C               | I/P-O/P:50GΩ<br>I/P-FG:50GΩ<br>O/P-FG:50GΩ<br>NO DAMAGE           |

### E.M.C TEST

| NO | TEST ITEM  | SPECIFICATION  | TEST CONDITION   | RESULT                        |
|----|------------|--|--|-------------------------------|
| 1  | HARMONIC   | BS EN/EN61000-3-2<br>CLASS A   | I/P:230VAC/50HZ<br>O/P:FULL LOAD<br>Ta:25°C              | PASS                          |
| 2  | CONDUCTION | BS EN/EN55032(CISPR32)<br>Class I: Class B,<br>Class II: Class A<br>BS EN/EN55014(CISPR32)<br>Class I: Class B | I/P : 230 VAC (50HZ)<br>O/P : FULL/50% LOAD<br>Ta : 25°C | PASS<br>Test by certified Lab |



|   |   |  |  |                               |
|---|---|--|--|-------------------------------|
| 3 | RADIATION   | BS EN/EN55032(CISPR32)<br>Class I: Class B,<br>Class II: Class A<br>BS EN/EN55014(CISPR32)<br>Class I: Class B | I/P : 230 VAC (50HZ)<br>O/P : FULL LOAD<br>Ta : 25°C | PASS<br>Test by certified Lab |
| 4 | E.S.D   | BS EN/EN61000-4-2<br>■ MEDICAL<br>AIR : 15KV / Contact : 8KV   | I/P : 230 VAC/50HZ<br>O/P : FULL LOAD<br>Ta : 25°C   | ■ CRITERIA A                  |
| 5 | E.F.T   | BS EN/EN61000-4-4<br>■ INDUSTRY<br>INPUT : 2KV   | I/P : 230 VAC/50HZ<br>O/P : FULL LOAD<br>Ta : 25°C   | ■ CRITERIA A                  |
| 6 | SURGE   | IEC61000-4-5<br>■ INDUSTRY<br>L-N : 2KV<br>L,N-PE : 4KV  | I/P : 230 VAC/50HZ<br>O/P : FULL LOAD<br>Ta : 25°C   | ■ CRITERIA A                  |
| 7 | Test by certified Lab & Test Report Prepare<br>Any contradictions of the test results, please refer to the latest EMC test report |  |  |                               |

## ■ RELIABILITY TEST

### ENVIRONMENT TEST

| NO | TEST ITEM             | SPECIFICATION  | TEST CONDITION           | RESULT  |    |          |                          |                          |   |      |        |        |   |     |        |        |   |    |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |    |    |        |        |    |     |        |        |    |      |        |        |
|----|-----------------------|--|--------------------------|---|----|----------|--------------------------|--------------------------|---|------|--------|--------|---|-----|--------|--------|---|----|--------|--------|---|------|--------|--------|---|-----|--------|--------|---|-----|--------|--------|---|----|--------|--------|---|----|--------|--------|---|----|--------|--------|----|----|--------|--------|----|-----|--------|--------|----|------|--------|--------|
| 1  | TEMPERATURE RISE TEST | MODEL : LOP-600-54<br>1. ROOM AMBIENT BURN-IN : 2 HRS<br>I/P : 230VAC O/P : FULL LOAD Ta= 28.3 °C<br>2. HIGH AMBIENT BURN-IN : 2 HRS<br>I/P : 230VAC O/P : FULL LOAD Ta= 50.7 °C |                          |   |    |          |                          |                          |   |      |        |        |   |     |        |        |   |    |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |    |    |        |        |    |     |        |        |    |      |        |        |
|    |                       |  |                          | <table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta= 28.3 °C</th> <th>HIGH AMBIENT Ta= 50.7 °C</th> </tr> </thead> <tbody> <tr><td>1</td><td>ZNR1</td><td>33.0°C</td><td>56.4°C</td></tr> <tr><td>2</td><td>LF1</td><td>33.0°C</td><td>55.6°C</td></tr> <tr><td>3</td><td>C2</td><td>32.0°C</td><td>55.2°C</td></tr> <tr><td>4</td><td>RTH1</td><td>35.1°C</td><td>58.4°C</td></tr> <tr><td>5</td><td>LF2</td><td>36.7°C</td><td>60.0°C</td></tr> <tr><td>6</td><td>BD1</td><td>49.3°C</td><td>72.6°C</td></tr> <tr><td>7</td><td>L1</td><td>51.3°C</td><td>74.0°C</td></tr> <tr><td>8</td><td>C8</td><td>42.0°C</td><td>65.2°C</td></tr> <tr><td>9</td><td>Q1</td><td>51.3°C</td><td>74.5°C</td></tr> <tr><td>10</td><td>D2</td><td>51.0°C</td><td>74.2°C</td></tr> <tr><td>11</td><td>RY1</td><td>39.0°C</td><td>61.1°C</td></tr> <tr><td>12</td><td>RTH3</td><td>47.4°C</td><td>71.1°C</td></tr> </tbody> </table> | NO | Position | ROOM AMBIENT Ta= 28.3 °C | HIGH AMBIENT Ta= 50.7 °C | 1 | ZNR1 | 33.0°C | 56.4°C | 2 | LF1 | 33.0°C | 55.6°C | 3 | C2 | 32.0°C | 55.2°C | 4 | RTH1 | 35.1°C | 58.4°C | 5 | LF2 | 36.7°C | 60.0°C | 6 | BD1 | 49.3°C | 72.6°C | 7 | L1 | 51.3°C | 74.0°C | 8 | C8 | 42.0°C | 65.2°C | 9 | Q1 | 51.3°C | 74.5°C | 10 | D2 | 51.0°C | 74.2°C | 11 | RY1 | 39.0°C | 61.1°C | 12 | RTH3 | 47.4°C | 71.1°C |
| NO | Position              | ROOM AMBIENT Ta= 28.3 °C   | HIGH AMBIENT Ta= 50.7 °C |   |    |          |                          |                          |   |      |        |        |   |     |        |        |   |    |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |    |    |        |        |    |     |        |        |    |      |        |        |
| 1  | ZNR1                  | 33.0°C   | 56.4°C                   |   |    |          |                          |                          |   |      |        |        |   |     |        |        |   |    |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |    |    |        |        |    |     |        |        |    |      |        |        |
| 2  | LF1                   | 33.0°C   | 55.6°C                   |   |    |          |                          |                          |   |      |        |        |   |     |        |        |   |    |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |    |    |        |        |    |     |        |        |    |      |        |        |
| 3  | C2                    | 32.0°C   | 55.2°C                   |   |    |          |                          |                          |   |      |        |        |   |     |        |        |   |    |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |    |    |        |        |    |     |        |        |    |      |        |        |
| 4  | RTH1                  | 35.1°C   | 58.4°C                   |   |    |          |                          |                          |   |      |        |        |   |     |        |        |   |    |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |    |    |        |        |    |     |        |        |    |      |        |        |
| 5  | LF2                   | 36.7°C   | 60.0°C                   |   |    |          |                          |                          |   |      |        |        |   |     |        |        |   |    |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |    |    |        |        |    |     |        |        |    |      |        |        |
| 6  | BD1                   | 49.3°C   | 72.6°C                   |   |    |          |                          |                          |   |      |        |        |   |     |        |        |   |    |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |    |    |        |        |    |     |        |        |    |      |        |        |
| 7  | L1                    | 51.3°C   | 74.0°C                   |   |    |          |                          |                          |   |      |        |        |   |     |        |        |   |    |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |    |    |        |        |    |     |        |        |    |      |        |        |
| 8  | C8                    | 42.0°C   | 65.2°C                   |   |    |          |                          |                          |   |      |        |        |   |     |        |        |   |    |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |    |    |        |        |    |     |        |        |    |      |        |        |
| 9  | Q1                    | 51.3°C   | 74.5°C                   |   |    |          |                          |                          |   |      |        |        |   |     |        |        |   |    |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |    |    |        |        |    |     |        |        |    |      |        |        |
| 10 | D2                    | 51.0°C   | 74.2°C                   |   |    |          |                          |                          |   |      |        |        |   |     |        |        |   |    |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |    |    |        |        |    |     |        |        |    |      |        |        |
| 11 | RY1                   | 39.0°C   | 61.1°C                   |   |    |          |                          |                          |   |      |        |        |   |     |        |        |   |    |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |    |    |        |        |    |     |        |        |    |      |        |        |
| 12 | RTH3                  | 47.4°C   | 71.1°C                   |   |    |          |                          |                          |   |      |        |        |   |     |        |        |   |    |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |    |    |        |        |    |     |        |        |    |      |        |        |



|   |   | NO  | Position | ROOM AMBIENT Ta= 28.3 °C   | HIGH AMBIENT Ta= 50.7°C |
|---|---|---|----------|--|-------------------------|
|   |   | 13  | Q3       | 50.4°C   | 74.1°C                  |
|   |   | 14  | Q4       | 49.7°C   | 73.3°C                  |
|   |   | 15  | C5       | 44.4°C   | 66.7°C                  |
|   |   | 16  | T1coil   | 70.2°C   | 93.9°C                  |
|   |   | 17  | T1core   | 41.7°C   | 65.1°C                  |
|   |   | 18  | TSW1     | 38.1°C   | 62.3°C                  |
|   |   | 19  | Q102     | 46.5°C   | 71.2°C                  |
|   |   | 20  | Q103     | 47.7°C   | 72.7°C                  |
|   |   | 21  | C103     | 34.8°C   | 58.8°C                  |
|   |   | 22  | C104     | 38.7°C   | 62.4°C                  |
|   |   | 23  | C102     | 37.4°C   | 61.2°C                  |
|   |   | 24  | C120     | 39.6°C   | 63.1°C                  |
|   |   | 25  | L100     | 37.0°C   | 60.7°C                  |
|   |   | 26  | C125     | 39.9°C   | 63.7°C                  |
|   |   | 27  | D103     | 40.5°C   | 64.6°C                  |
|   |   | 28  | C37      | 43.2°C   | 66.6°C                  |
|   |   | 29  | U1       | 43.0°C   | 65.9°C                  |
|   |   | 30  | Q8       | 29.3°C   | 52.0°C                  |
|   |   | 31  | U103     | 35.9°C   | 58.6°C                  |
|   |   | 32  | RG100    | 41.9°C   | 65.4°C                  |
|   |   | 33  | U4       | 35.9°C   | 59.3°C                  |
|   |   | 34  | R122     | 39.9°C   | 62.9°C                  |
|   |   | 35  | D105     | 37.3°C   | 59.9°C                  |
|   |   | 36  | R3       | 41.9°C   | 65.0°C                  |
|   |   | 37  | D1       | 35.9°C   | 58.3°C                  |
|   |   | 38  | Q108     | 34.7°C   | 58.1°C                  |
|   |   | 39  | U101     | 34.5°C   | 57.4°C                  |
|   |   | 40  | R101     | 40.2°C   | 65.3°C                  |
|   |   | 41  | R105     | 39.4°C   | 63.6°C                  |
|   |   | 42  | D20      | 31.8°C   | 55.7°C                  |
|   |   | 43  | Q7       | 31.6°C   | 54.5°C                  |
|   |   | 44  | C60      | 29.5°C   | 52.2°C                  |
| 2 | OVER LOAD BURN-IN TEST  | NO DAMAGE<br>1 HOUR ( MIN )   |          | I/P : 230 VAC<br>O/P : 129.4%LOAD<br>Ta : 25°C                     | TEST : OK               |
| 3 | LOW TEMPERATURE<br>TURN ON TEST                                   | TURN ON AFTER 2 HOUR  |          | I/P : 264VAC/115VAC<br>O/P : 100%LOAD<br>Ta= -45°C                 | TEST : OK               |
| 4 | HIGH HUMIDITY<br>HIGH TEMPERATURE<br>HIGH VOLTAGE<br>TURN ON TEST | AFTER 12 HOURS<br>IN CHAMBER ON<br>CONTROL 50 °C/95 %R.H<br>NO DAMAGE |          | I/P : 272 VAC<br>O/P : FULL LOAD<br>Ta= 50 °C<br>HUMIDITY= 95 %R.H | TEST : OK               |
| 5 | TEMPERATURE<br>COEFFICIENT  | ± 0.03%/°C(0~50°C)  |          | I/P : 230 VAC<br>O/P : FULL LOAD                                   | ±0.006%/°C(0~50°C)      |



|    |                          |   |   |
|----|--------------------------|---|---|
| 6  | STORAGE TEMPERATURE TEST | -40~85°C  | 1. Thermal shock Temperature : -45°C~ +90°C<br>2. Temperature change rate : 25°C / MIN<br>3. Dwell time low and high temperature : 30 MIN/EACH<br>4. Total test cycle : 10 CYCLE<br>5. Input/output condition : STATIC  |
| 7  | THERMAL SHOCK TEST       | -40~50°C  | 1. Thermal shock Temperature : -45°C~ +55°C<br>2. Temperature change rate : 25°C / MIN<br>3. Dwell time low and high temperature : 30 MIN/EACH<br>4. Total test cycle : 16 CYCLE<br>5. Input/output condition :<br>15cycle:230V/ FULL LOAD AC ON 3sec/AC OFF 1sec TEST<br>1cycle:230V/ FULL LOAD Burn In Test |
| 8  | VIBRATION TEST           | 10 ~ 500Hz, 2G 10min./1cycle, 60min. each along X, Y, Z axes  | 1 Carton & 1 Set<br>(1) Waveform : Sine Wave<br>(2) Frequency : 10~500Hz<br>(3) Sweep Time : 12min/sweep cycle<br>(4) Acceleration : 3G<br>(5) Test Time : 180min in each axis (X.Y.Z)<br>(6) Ta : 25°C   |
| 9  | CAPACITOR LIFE CYCLE     | SUPPOSE C102 IS THE MOST CRITICAL COMPONENT<br>(1) I/P : 230VAC O/P : FULL LOAD Ta= 25 °C LIFE TIME<br>(2) I/P : 230VAC O/P : FULL LOAD Ta= 50 °C LIFE TIME<br>(3) I/P : 230VAC O/P : 75% LOAD Ta= 50 °C LIFE TIME<br>(4) I/P : 230VAC O/P : 50% LOAD Ta= 50 °C LIFE TIME | (1) 1550753.7HRS<br>(2) 250515.1HRS<br>(3) 360491.8HRS<br>(4) 452657.3HRS   |
| 10 | MTBF                     | Conducted by Parts Stress Analysis Prediction<br>1963.2K hrs min. Telcordia SR-332 (Bellcore);310.9K hrs min. MIL-HDBK-217F (25°C)  |   |
| 11 | Ongoing Reliability Test | I/P : 230VAC O/P : FULL LOAD TA=50°C<br>Demonstration Mean Time Between Failure : 30,000 hours  |   |

| TEST RESULT | TESTER | REVIEW | APPROVAL |
|-------------|--------|--------|----------|
| PASS        | Yuwei  | Liutt  | Wangdz   |

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