



# Test Report: UHP-1500-24

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1500W Conduction Cooling with PFC Switching 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

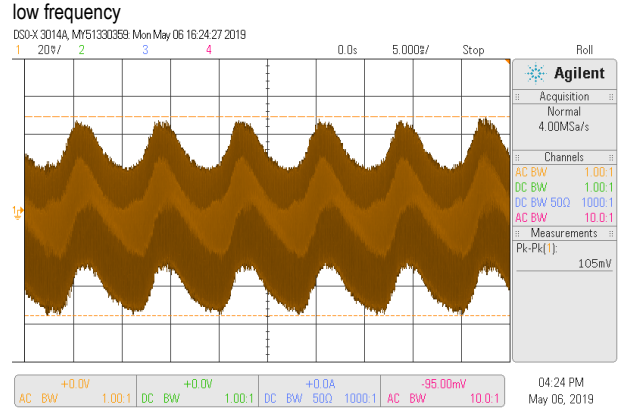
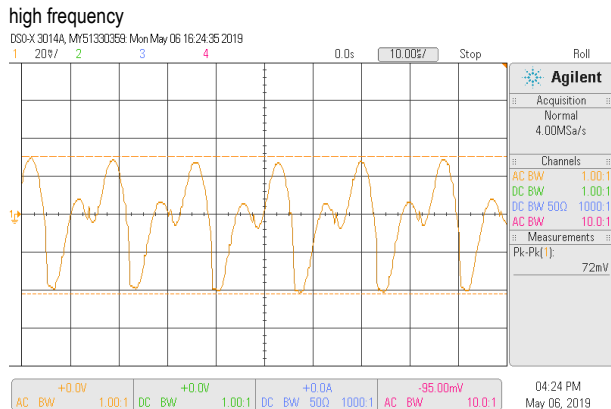
## ■ RELIABILITY TEST

ENVIRONMENT TEST

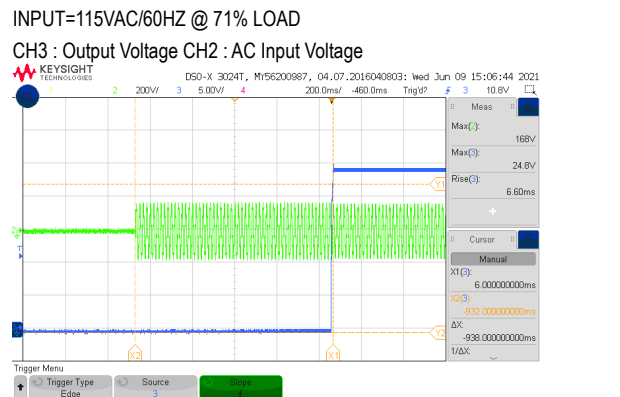
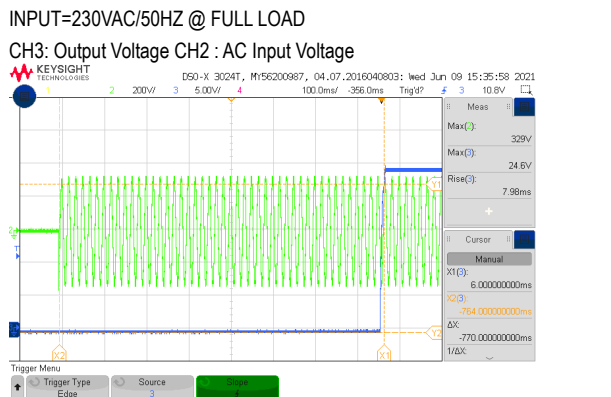
## DESIGN VERIFY TEST

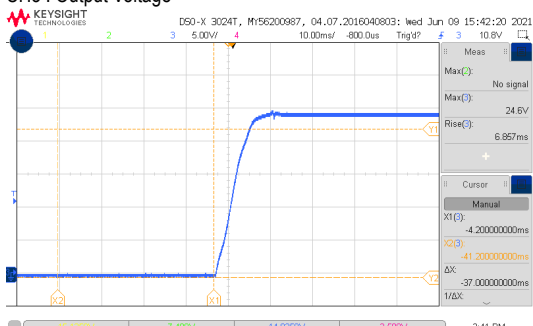
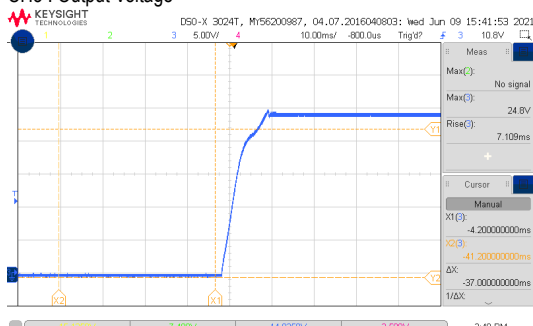
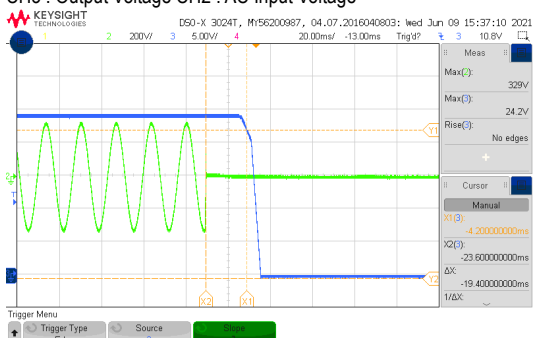
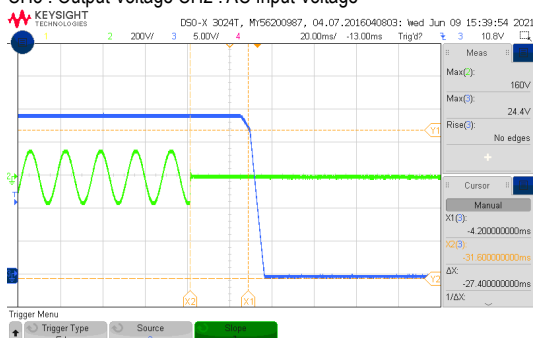
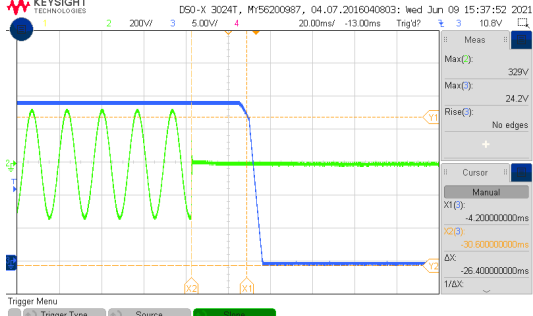
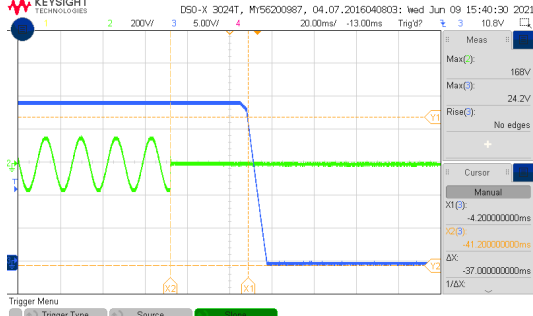
### OUTPUT FUNCTION TEST

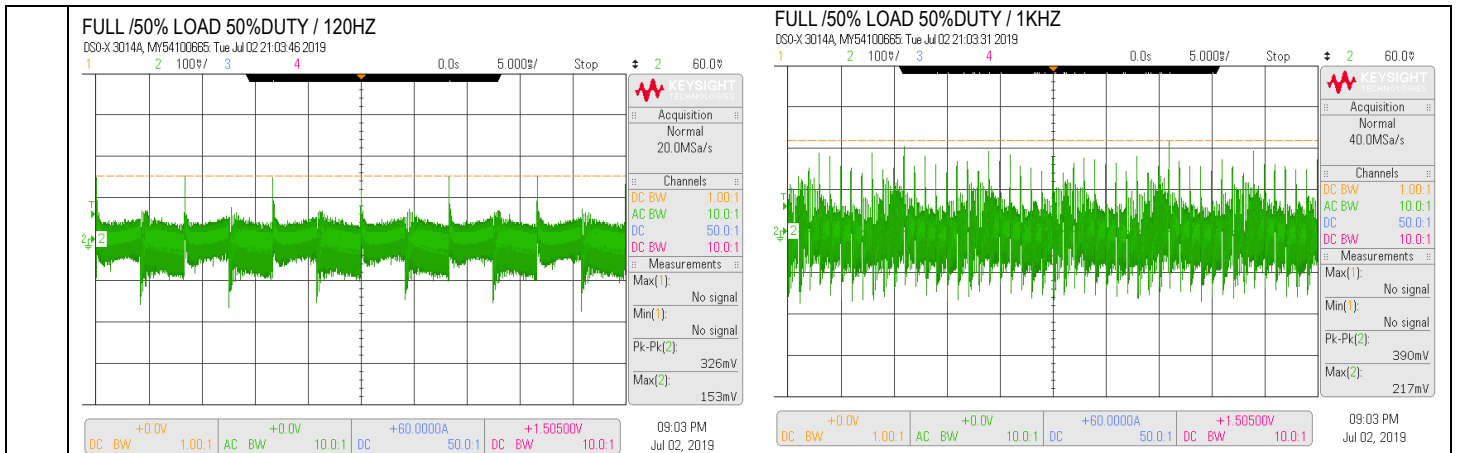
| NO | TEST ITEM                     | SPECIFICATION     | TEST CONDITION  | RESULT  |
|----|-------------------------------|-------------------|---|---|
| 1  | OUTPUT VOLTAGE ADJUST RANGE   | CH1: 24 V~ 28.8 V | I/P 230 VAC<br>I/P 115 VAC<br>O/P MIN LOAD<br>Ta 25 ~ | 23.33V~ 29.58 V/230VAC<br>23.33V~ 29.58 V /115VAC |
| 2  | OUTPUT VOLTAGE(Max) TOLERANCE | V1: 1%~ -1 %      | I/P: 180VAC /264VAC<br>O/P:FULL/ MIN. LOAD<br>Ta:25 ~ | V1: 0.17 %~ -0.17 %                               |
| 3  | LINE REGULATION (Max)         | V1: 0.5%~ -0.5 %  | I/P: 180VAC~ 264VAC<br>O/P:FULL LOAD<br>Ta:25 ~       | V1: 0.05%~ -0.05 %                                |
| 4  | LOAD REGULATION(Max)          | V1: 0.5%~ -0.5%   | I/P: 230VAC<br>O/P:FULL ~MIN LOAD<br>Ta:25 ~          | V1: 0.13 %~ -0.13 %                               |
| 5  | OVER/UNDERSHOOT TEST          | < ±5%             | I/P: 230VAC<br>O/P:FULL LOAD<br>Ta:25 ~               | < 5 %   |
| 6  | RIPPLE & NOISE(Max )          | V1: 240mVp-p      | I/P:230VAC<br>O/P:FULL LOAD<br>Ta:25 ~                | V1: 105mVp-p                                      |



|   |                  |  |  |                                 |
|---|------------------|--|--|---------------------------------|
| 7 | SET UP TIME(Max) | 230VAC/1800ms<br>115VAC/1800ms<br>Derating may be needed under low input voltages. Please check the derating curve and Static characteristics for more details | I/P 230 VAC<br>O/P FULL LOAD<br>I/P 115 VAC<br>O/P 71% LOAD<br>Ta 25 ~ | 230VAC/ 770ms<br>115VAC/ 938 ms |
|---|------------------|--|--|---------------------------------|



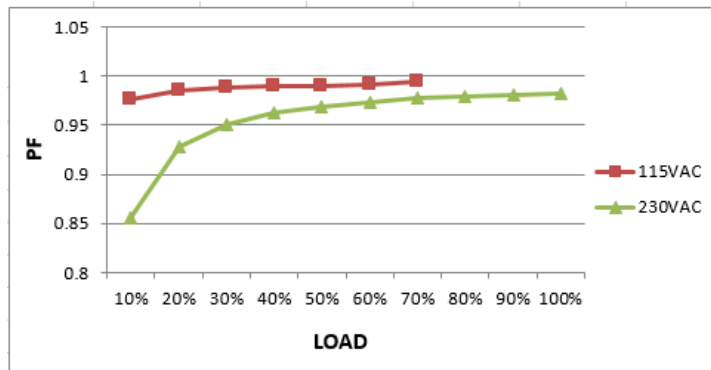
|   |                            |   |   |   |
|---|----------------------------|---|---|---|
| 8   | <b>RISE TIME (Max)</b>     | 230VAC/50ms<br>115VAC/60ms<br>Derating may be needed under low input voltages. Please check the derating curve and Static characteristics for more details                                  | I/P 230 VAC<br>O/P FULL LOAD<br>I/P 115 VAC<br>O/P 71% LOAD<br>Ta 25 ~                                  | 230VAC/ 6.85 ms<br>115VAC/ 7.1 ms   |
| INPUT=230VAC/50HZ @ FULL LOAD<br>CH3 : Output Voltage<br>                          |                            | INPUT=115VAC/50HZ @ 71% LOAD<br>CH3 : Output Voltage<br>  |   |   |
| 9   | <b>HOLD UP TIME (Typ.)</b> | 230、115VAC/10ms at full load<br>230、115VAC/16ms at 75% load<br>Derating may be needed under low input voltages. Please check the derating curve and Static characteristics for more details | I/P 230 VAC<br>O/P FULL LOAD/75% LOAD<br>I/P 115 VAC<br>O/P 71% LOAD/53.2% LOAD<br>Ta 25 ~              | 230VAC/ 19.4 ms at full load<br>230VAC/ 26.4 ms at 75% load<br>115VAC/ 27.4 ms at 71% load<br>115VAC/ 37 ms at 53.2% load |
| INPUT=230VAC/50HZ @ FULL LOAD<br>CH3 : Output Voltage CH2 : AC Input Voltage<br> |                            | INPUT=115VAC/60HZ @ 71% LOAD<br>CH3 : Output Voltage CH2 : AC Input Voltage<br>                         |   |   |
| INPUT=230VAC/50HZ@75% LOAD<br>   |                            | INPUT=115VAC/60HZ@53.2% load<br>  |   |   |
| 10  | <b>DYNAMIC LOAD</b>        | V1: 2400 mVp-p  | I/P: 230VAC<br>O/P:<br>(1)FULL /50% LOAD 50%DUTY / 120HZ<br>(2)FULL /50% LOAD 50%DUTY / 1KHZ<br>Ta:25 ~ | 326mVp-p<br>390mVp-p  |



### INPUT FUNCTION TEST

| NO | TEST ITEM             | SPECIFICATION            | TEST CONDITION   | RESULT  |
|----|-----------------------|--------------------------|--|---|
| 1  | INPUT VOLTAGE RANGE   | 90VAC~264VAC             | I/P:TESTING<br>O/P:FULL LOAD/ Derating Load<br>Ta:25 ~   | 160V~264 V/ FULL LOAD<br>77V~264 V/ Derating Load |
|    |                       |                          | I/P:<br>LOW-LINE-3V=177 V<br>HIGH-LINE+15%=300 V<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) | TEST:OK   |
| 2  | INPUT FREQUENCY RANGE | 47HZ ~63 HZ<br>NO DAMAGE | I/P:90 VAC ~264 VAC<br>O/P:FULL~MIN LOAD<br>Ta:25 ~  | TEST: OK  |
| 3  | INPUT CURRENT (Typ.)  | 230V/ 8A                 | I/P 230 VAC<br>O/P FULL LOAD<br>Ta 25 ~  | I = 7.07A/ 230 VAC                                |
| 4  | LEAKAGE CURRENT       | < 0.75mA / 240 VAC       | I/P 240 VAC<br>O/P Min LOAD<br>Ta 25 ~   | L-FG 0.58 mA<br>N-FG 0.58 mA                      |
| 5  | POWER FACTOR (Typ.)   | 0.95/ 230VAC             | I/P 230 VAC<br>O/P FULL LOAD<br>Ta 25 ~  | PF=0.984 /230 VAC                                 |

P.F vs LOAD



|   |                  |     |   |       |
|---|------------------|-----|---|-------|
| 6 | EFFICIENCY(Typ.) | 95% | I/P:230 VAC<br>O/P:FULL LOAD<br>Ta:25 ~ | 95.3% |
|---|------------------|-----|---|-------|

|  |                      |  |   |              |                  |              |               |               |                  |           |  |
|--|----------------------|--|---|--------------|------------------|--------------|---------------|---------------|------------------|-----------|--|
| EFFICIENCY vs LOAD                         |                      |  |   |              |                  |              |               |               |                  |           |  |
|  |                      |  |   |              |                  |              |               |               |                  |           |  |
| 7  | INRUSH CURRENT(Typ.) | 230V/60A<br>115V/30A<br>COLD START         | <table border="0"> <tr> <td>I/P 230 VAC</td> <td>I=44.9 A/ 230VAC</td> </tr> <tr> <td>I/P 115 VAC</td> <td>T50= 1020 us</td> </tr> <tr> <td>O/P FULL LOAD</td> <td>I=22.7 A/ 115VAC</td> </tr> <tr> <td>Ta 25 ~</td> <td></td> </tr> </table> | I/P 230 VAC  | I=44.9 A/ 230VAC | I/P 115 VAC  | T50= 1020 us  | O/P FULL LOAD | I=22.7 A/ 115VAC | Ta 25 ~   |  |
| I/P 230 VAC                                | I=44.9 A/ 230VAC     |  |   |              |                  |              |               |               |                  |           |  |
| I/P 115 VAC                                | T50= 1020 us         |  |   |              |                  |              |               |               |                  |           |  |
| O/P FULL LOAD                              | I=22.7 A/ 115VAC     |  |   |              |                  |              |               |               |                  |           |  |
| Ta 25 ~                                    |                      |  |   |              |                  |              |               |               |                  |           |  |
| INPUT=230VAC/50HZ @ FULL LOAD              |                      | INPUT=115VAC/60HZ @ FULL LOAD              |   |              |                  |              |               |               |                  |           |  |
| CH1 : AC Input Voltage CH2 : Input current |                      | CH1 : AC Input Voltage CH2 : Input current |   |              |                  |              |               |               |                  |           |  |
|  |                      |  |   |              |                  |              |               |               |                  |           |  |
| 8  | NO LOAD CONSUMPTION  | ---  | <table border="0"> <tr> <td>I/P : 115VAC</td> <td>14.6 W/115VAC</td> </tr> <tr> <td>I/P : 230VAC</td> <td>10.6 W/230VAC</td> </tr> <tr> <td>O/P : NO LOAD</td> <td></td> </tr> <tr> <td>Ta : 25°C</td> <td></td> </tr> </table>               | I/P : 115VAC | 14.6 W/115VAC    | I/P : 230VAC | 10.6 W/230VAC | O/P : NO LOAD |                  | Ta : 25°C |  |
| I/P : 115VAC                               | 14.6 W/115VAC        |  |   |              |                  |              |               |               |                  |           |  |
| I/P : 230VAC                               | 10.6 W/230VAC        |  |   |              |                  |              |               |               |                  |           |  |
| O/P : NO LOAD                              |                      |  |   |              |                  |              |               |               |                  |           |  |
| Ta : 25°C                                  |                      |  |   |              |                  |              |               |               |                  |           |  |

## PROTECTION FUNCTION TEST

| NO | TEST ITEM               | SPECIFICATION   | TEST CONDITION   | RESULT  |
|----|-------------------------|---|--|---|
| 1  | OVER LOAD PROTECTION    | 105%~ 125 %(180VAC~264VAC)<br>60%~70%(90VAC)<br>Protection type :<br>Constant current limiting, unit will shutdown after 5 sec, re-power on to recover. | I/P: 264VAC<br>I/P: 230VAC<br>I/P: 180VAC<br>I/P: 90VAC<br>O/P: TESTING<br>Ta:25 ~ | 110.1%/ 264VAC<br>110.3%/ 230VAC<br>108.7%/180VAC<br>64.5%/90VAC<br>PROTECTION TYPE<br>Constant current limiting, unit will shutdown after 5 sec, re-power on to recover. |
| 2  | OVER VOLTAGE PROTECTION | 30V~35V<br>Protection type :<br>Shut down O/P voltage, re-power on to recover   | I/P: 264VAC<br>I/P: 230VAC<br>I/P: 90VAC<br>O/P: MIN LOAD<br>Ta:25 ~               | 32.44V/ 264VAC<br>32.44V/ 230VAC<br>32.42V/ 90VAC<br>PROTECTION TYPE Shut down O/P voltage, re-power on to recover  |

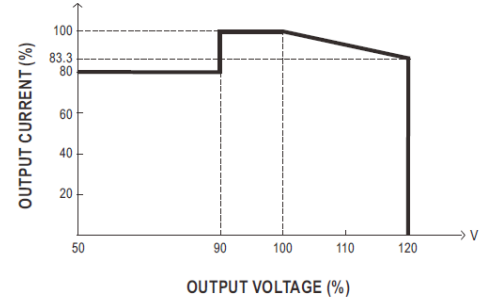
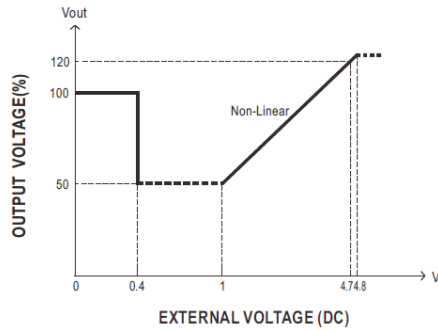
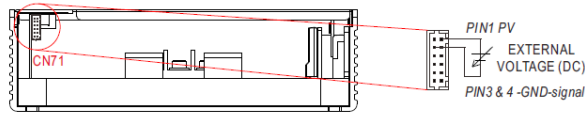
|   |                             |   |  |  |
|---|-----------------------------|---|--|--|
| 3 | OVER TEMPERATURE PROTECTION | Protection type :<br>Shut down O/P voltage, recovers automatically after temperature goes down  | I/P: 264VAC<br>I/P: 90VAC<br>O/P: FULL LOAD            | O.T.P. Active<br>Protection type :<br>Shut down O/P voltage, recovers automatically after temperature goes down    |
| 4 | SHORT PROTECTION            | SHORT EVERY OUTPUT<br>1 HOUR NO DAMAGE<br>Protection type :<br>Constant current limiting, unit will shutdown after 5 sec, re-power on to recover. | I/P: 264VAC<br>I/P: 90VAC<br>O/P: FULL LOAD<br>Ta:25 - | NO DAMAGE<br>PROTECTION TYPE<br>Constant current limiting, unit will shutdown after 5 sec, re-power on to recover. |

### CONTROL FUNCTION TEST

| NO                         | TEST ITEM             | SPECIFICATION   | TEST CONDITION             | RESULT  |               |                     |               |             |              |             |          |                    |
|----------------------------|-----------------------|---|----------------------------|---|---------------|---------------------|---------------|-------------|--------------|-------------|----------|--------------------|
| 1                          | AUXILIARY POWER (AUX) | I/P: 230 VAC<br>O/P: FULL LOAD<br>Ta:25°C<br>Test Result  |                            |   |               |                     |               |             |              |             |          |                    |
|                            |                       |   |                            | <table border="1"> <thead> <tr> <th>AUX</th> <th>TOLERANCE</th> <th>RIPPLE</th> <th>TEST RESULT</th> </tr> </thead> <tbody> <tr> <td>12V / 0.4A</td> <td>10.8~13.2 V</td> <td>150mVp-p</td> <td>11.525 V/ 32 mVp-p</td> </tr> </tbody> </table> | AUX           | TOLERANCE           | RIPPLE        | TEST RESULT | 12V / 0.4A   | 10.8~13.2 V | 150mVp-p | 11.525 V/ 32 mVp-p |
| AUX                        | TOLERANCE             | RIPPLE  | TEST RESULT                |   |               |                     |               |             |              |             |          |                    |
| 12V / 0.4A                 | 10.8~13.2 V           | 150mVp-p  | 11.525 V/ 32 mVp-p         |   |               |                     |               |             |              |             |          |                    |
| 2                          | REMOTE ON/OFF CONTROL | The power supply can be turned ON/OFF individually or along with other units in parallel by using the "Remote ON-OFF" function.   |                            |   |               |                     |               |             |              |             |          |                    |
|                            |                       |   |                            | <table border="1"> <thead> <tr> <th>Remote ON-OFF</th> <th>Power Supply Status</th> </tr> </thead> <tbody> <tr> <td>Short circuit</td> <td>ON</td> </tr> <tr> <td>Open circuit</td> <td>OFF</td> </tr> </tbody> </table>                        | Remote ON-OFF | Power Supply Status | Short circuit | ON          | Open circuit | OFF         |          |                    |
| Remote ON-OFF              | Power Supply Status   |   |                            |   |               |                     |               |             |              |             |          |                    |
| Short circuit              | ON                    |   |                            |   |               |                     |               |             |              |             |          |                    |
| Open circuit               | OFF                   |   |                            |   |               |                     |               |             |              |             |          |                    |
|                            |                       | I/P: 230 VAC<br>O/P: FULL LOAD<br>Ta:25°C<br>Test Result  |                            |   |               |                     |               |             |              |             |          |                    |
|                            |                       | <table border="1"> <thead> <tr> <th>Between ON/OFF and +5V-AUX</th> <th>Power Supply Status</th> </tr> </thead> <tbody> <tr> <td>SW SHORT</td> <td>ON</td> </tr> <tr> <td>SW OPEN</td> <td>OFF</td> </tr> </tbody> </table> | Between ON/OFF and +5V-AUX | Power Supply Status   | SW SHORT      | ON                  | SW OPEN       | OFF         |              |             |          |                    |
| Between ON/OFF and +5V-AUX | Power Supply Status   |   |                            |   |               |                     |               |             |              |             |          |                    |
| SW SHORT                   | ON                    |   |                            |   |               |                     |               |             |              |             |          |                    |
| SW OPEN                    | OFF                   |   |                            |   |               |                     |               |             |              |             |          |                    |

3 OUTPUT VOLTAGE PROGRAMMABLE(PV)

1. Output Voltage Programming (or, PV / remote voltage programming / remote adjust / margin programming / dynamic voltage trim)  
 ※ In addition to the adjustment via the built-in potentiometer, the output voltage can be trimmed by applying EXTERNAL VOLTAGE.

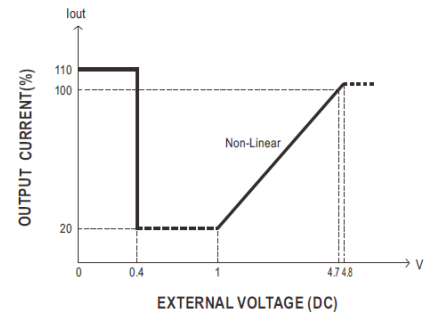
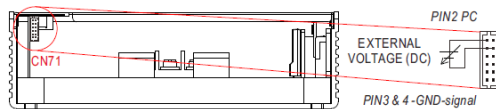


I/P: 230 VAC  
 O/P: FULL LOAD  
 Ta: 25°C  
 TEST RESULT

| MODEL \ PV | <0.4V  | 1V     | 4.7V     | 5V     |
|------------|--------|--------|----------|--------|
| SPEC       | 24V±5% | 12V±5% | 28.8V±5% | 30V±5% |
| Vout       | 24.09V | 132    | 28.8V    | 29.32V |

4 OUTPUT CURRENT PROGRAMMABLE (PC)

2. Output Current Programming (or, PC / remote current programming / dynamic current trim)  
 ※ The output current can be trimmed to 20~100% of the rated current by applying EXTERNAL VOLTAGE.

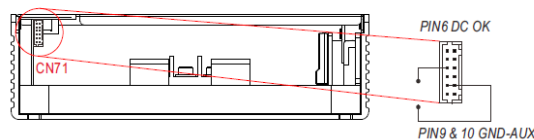


I/P: 230 VAC  
 O/P: TESTING  
 Ta: 25°C

| ADJ V | <0.4V   | 1V     | 4.7V    | 5V      |
|-------|---------|--------|---------|---------|
| SPEC  | 110%±5% | 20%±5% | 100%±5% | 100%±5% |
| TEST  | 110.2%  | 20.09% | 99.93%  | 102.52% |

5 DC OK CONTACT RATINGS

DC-OK signal is a TTL level signal. The maximum sink current is 10mA and the maximum external voltage is 5.6V.



| DC-OK signal     | Power Supply Status |
|------------------|---------------------|
| "High" >4.4~5.5V | ON                  |
| "Low" <-0.5~0.5V | OFF                 |



|                   |                     |  |   |              |                     |                  |           |                   |            |
|-------------------|---------------------|--|---|--------------|---------------------|------------------|-----------|-------------------|------------|
|                   |                     | I/P: 230 VAC<br>O/P: TESTING<br>Ta: 25°C | <table border="1"> <tr> <td>DC-OK signal</td> <td>Power Supply Status</td> </tr> <tr> <td>"High" &gt;4.4~5.5V</td> <td><u>ON</u></td> </tr> <tr> <td>"Low" &lt;-0.5~-0.5V</td> <td><u>OFF</u></td> </tr> </table> | DC-OK signal | Power Supply Status | "High" >4.4~5.5V | <u>ON</u> | "Low" <-0.5~-0.5V | <u>OFF</u> |
| DC-OK signal      | Power Supply Status |  |   |              |                     |                  |           |                   |            |
| "High" >4.4~5.5V  | <u>ON</u>           |  |   |              |                     |                  |           |                   |            |
| "Low" <-0.5~-0.5V | <u>OFF</u>          |  |   |              |                     |                  |           |                   |            |

**COMPONENT STRESS TEST**

| NO | TEST ITEM   | SPECIFICATION                            | TEST CONDITION   | RESULT  |
|----|---|--|--|---|
| 1  | PWM Transistor<br>(D to S) or (C to E) Peak Voltage   | Q903 Rated<br>: 22A/ 650V<br>VGS :   25V | AC ON/OFF<br><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<br>(4) Dynamic Load Full Load/<br>Min. Load 90%Duty/3KHz<br>(5) Dynamic Load Full Load/<br>Min. Load 90%Duty/5KHz<br>(6) Dynamic Load 100% Load/<br>Min. Load 50%Duty/120Hz<br>(7) 0% 400% Load.<br><br>I/P: Low-Line -3V = 177V<br>O/P: (1) Full Load<br>(2) Output Short<br>(3) Dynamic Load Full Load/<br>Min. Load 90%Duty/1KHz<br>(4) Dynamic Load Full Load/<br>Min. Load 90%Duty/3KHz<br>(5) Dynamic Load Full Load/<br>Min. Load 90%Duty/5KHz<br>(6) Dynamic Load 100% Load/<br>Min. Load 50%Duty/120Hz<br>(7) 0% 400% Load.<br>Ta: 25 | VDS:<br>(1) 452V<br>(2) 452V<br>(3) 448V<br>(4) 472V<br>(5) 480V<br>(6) 444V/<br>(7) 440V<br><br>VDS:<br>(1) 480V<br>(2) 460V<br>(3) 480V<br>(4) 480V<br>(5) 480V<br>(6) 468V<br>(7) 440V |
| 2  | P.F.C Transistor<br>(D to S) or (C to E) Peak Voltage | Q 52 Rated<br>31A/ 600V                  | I/P: High-Line +3V = 267 V<br>AC ON/OFF<br>O/P: (1) Full Load<br>(2) Output Short<br>(3) Dynamic Load Full Load/<br>Min. Load 90%Duty/1KHz<br>(4) Dynamic Load Full Load/<br>Min. Load 90%Duty/3KHz<br>(5) Dynamic Load Full Load/<br>Min. Load 90%Duty/5KHz<br>(6) Dynamic Load 100% Load/<br>Min. Load 50%Duty/120Hz<br>(7) 0% 400% Load.<br><br>I/P: Low-Line -3V = 177V<br>AC ON/OFF<br>O/P: (1) Full Load   | VDS:<br>(1) 416V<br>(2) 420V<br>(3) 416V<br>(4) 416V<br>(5) 416V<br>(6) 408V<br>(7) 388V<br><br>VDS:<br>(1) 432V<br>(2) 444V  |



|               |                         |   |   |   |               |               |           |           |           |           |           |           |           |           |          |           |         |        |           |           |           |           |           |           |               |               |           |           |          |           |           |           |           |           |           |           |           |          |         |           |           |           |           |           |
|---------------|-------------------------|---|---|---|---------------|---------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|----------|-----------|---------|--------|-----------|-----------|-----------|-----------|-----------|-----------|---------------|---------------|-----------|-----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|----------|---------|-----------|-----------|-----------|-----------|-----------|
|               |                         |   | <p>(2)Output Short<br/> (3)Dynamic Load Full Load/<br/> Min. Load 90%Duty/1KHz<br/> (4)Dynamic Load Full Load/<br/> Min. Load 90%Duty/3KHz<br/> (5)Dynamic Load Full Load/<br/> Min. Load 90%Duty/5KHz<br/> (6)Dynamic Load 100% Load/<br/> Min. Load 50%Duty/120Hz<br/> (7)0% 400% Load.</p> <p>Ta:25 ~</p>  | <p>(3) 428V<br/> (4) 428V<br/> (5) 424V<br/> (6) 424V<br/> (7) 392V</p>   |               |               |           |           |           |           |           |           |           |           |          |           |         |        |           |           |           |           |           |           |               |               |           |           |          |           |           |           |           |           |           |           |           |          |         |           |           |           |           |           |
| 3             | P.F.C DIODE             | D 10 Rated<br>6 A/ 650V   | <p>I/P:High-Line +3V =267 V<br/> AC ON/OFF<br/> O/P: (1)Full Load<br/> (2)Output Short<br/> (3)Dynamic Load Full Load/<br/> Min. Load 90%Duty/5KHz<br/> (4)Dynamic Load 100% Load/<br/> Min. Load 50%Duty/120Hz</p> <p>I/P:Low-Line -3V = 177V<br/> AC ON/OFF<br/> O/P: (1)Full Load<br/> (2)Output Short<br/> (3)Dynamic Load Full Load/<br/> Min. Load 90%Duty/5KHz<br/> (4)Dynamic Load 100% Load/<br/> Min. Load 50%Duty/120Hz</p> <p>Ta:25 ~</p> | <p>(1) 400V<br/> (2) 412V<br/> (3) 396V<br/> (4) 396V<br/> <br/> (1) 412V<br/> (2) 388V<br/> (3) 404V<br/> (4) 392V</p>   |               |               |           |           |           |           |           |           |           |           |          |           |         |        |           |           |           |           |           |           |               |               |           |           |          |           |           |           |           |           |           |           |           |          |         |           |           |           |           |           |
| 4             | Diode Peak Voltage      | <p>Q101 Rated<br/>100A/ 80V</p> <p>Q105 Rated<br/>100A/ 80V</p> <p>Q109 Rated<br/>100A/ 80V</p> <p>Q113 Rated<br/>100A/ 80V</p> | <p>AC ON/OFF</p> <p>I/P:High-Line +3V =267 V<br/> O/P: (1)Full Load<br/> (2)Output Short<br/> (3)Dynamic Load Full Load/<br/> Min. Load 90%Duty/1KHz<br/> (4)Dynamic Load Full Load/<br/> Min. Load 90%Duty/3KHz<br/> (5)Dynamic Load Full Load/<br/> Min. Load 90%Duty/5KHz<br/> (6)Dynamic Load 100% Load/<br/> Min. Load 50%Duty/120Hz<br/> (7)0% 400% Load.<br/> (8).NO LOAD<br/> (9) burst Mode</p> <p>Ta:25 ~</p>                               | <table border="0"> <tr> <td>Q101:<br/>VDS:</td> <td>Q109:<br/>VDS:</td> </tr> <tr> <td>(1) 55.7V</td> <td>(1)58.5 V</td> </tr> <tr> <td>(2) 55.7V</td> <td>(2) 54.4V</td> </tr> <tr> <td>(3) 65.3V</td> <td>(3) 61.7V</td> </tr> <tr> <td>(4) 70.2V</td> <td>(4) 66.5V</td> </tr> <tr> <td>(5)68.2V</td> <td>(5) 64.1V</td> </tr> <tr> <td>(6) 57V</td> <td>(6)56V</td> </tr> <tr> <td>(7) 53.6V</td> <td>(7) 54.4V</td> </tr> <tr> <td>(8) 53.4V</td> <td>(8)54.4 V</td> </tr> <tr> <td>(9) 54.2V</td> <td>(9) 54.4V</td> </tr> <tr> <td>Q105:<br/>VDS:</td> <td>Q113:<br/>VDS:</td> </tr> <tr> <td>(1) 61.4V</td> <td>(1) 63.3V</td> </tr> <tr> <td>(2)60.6V</td> <td>(2) 60.1V</td> </tr> <tr> <td>(3) 70.6V</td> <td>(3) 63.3V</td> </tr> <tr> <td>(4) 72.1V</td> <td>(4) 77.8V</td> </tr> <tr> <td>(5) 73.7V</td> <td>(5) 72.1V</td> </tr> <tr> <td>(6) 54.4V</td> <td>(6)55.2V</td> </tr> <tr> <td>(7) 56V</td> <td>(7) 56.9V</td> </tr> <tr> <td>(8) 54.4V</td> <td>(8) 55.2V</td> </tr> <tr> <td>(9)56.6 V</td> <td>(9) 55.2V</td> </tr> </table> | Q101:<br>VDS: | Q109:<br>VDS: | (1) 55.7V | (1)58.5 V | (2) 55.7V | (2) 54.4V | (3) 65.3V | (3) 61.7V | (4) 70.2V | (4) 66.5V | (5)68.2V | (5) 64.1V | (6) 57V | (6)56V | (7) 53.6V | (7) 54.4V | (8) 53.4V | (8)54.4 V | (9) 54.2V | (9) 54.4V | Q105:<br>VDS: | Q113:<br>VDS: | (1) 61.4V | (1) 63.3V | (2)60.6V | (2) 60.1V | (3) 70.6V | (3) 63.3V | (4) 72.1V | (4) 77.8V | (5) 73.7V | (5) 72.1V | (6) 54.4V | (6)55.2V | (7) 56V | (7) 56.9V | (8) 54.4V | (8) 55.2V | (9)56.6 V | (9) 55.2V |
| Q101:<br>VDS: | Q109:<br>VDS:           |   |   |   |               |               |           |           |           |           |           |           |           |           |          |           |         |        |           |           |           |           |           |           |               |               |           |           |          |           |           |           |           |           |           |           |           |          |         |           |           |           |           |           |
| (1) 55.7V     | (1)58.5 V               |   |   |   |               |               |           |           |           |           |           |           |           |           |          |           |         |        |           |           |           |           |           |           |               |               |           |           |          |           |           |           |           |           |           |           |           |          |         |           |           |           |           |           |
| (2) 55.7V     | (2) 54.4V               |   |   |   |               |               |           |           |           |           |           |           |           |           |          |           |         |        |           |           |           |           |           |           |               |               |           |           |          |           |           |           |           |           |           |           |           |          |         |           |           |           |           |           |
| (3) 65.3V     | (3) 61.7V               |   |   |   |               |               |           |           |           |           |           |           |           |           |          |           |         |        |           |           |           |           |           |           |               |               |           |           |          |           |           |           |           |           |           |           |           |          |         |           |           |           |           |           |
| (4) 70.2V     | (4) 66.5V               |   |   |   |               |               |           |           |           |           |           |           |           |           |          |           |         |        |           |           |           |           |           |           |               |               |           |           |          |           |           |           |           |           |           |           |           |          |         |           |           |           |           |           |
| (5)68.2V      | (5) 64.1V               |   |   |   |               |               |           |           |           |           |           |           |           |           |          |           |         |        |           |           |           |           |           |           |               |               |           |           |          |           |           |           |           |           |           |           |           |          |         |           |           |           |           |           |
| (6) 57V       | (6)56V                  |   |   |   |               |               |           |           |           |           |           |           |           |           |          |           |         |        |           |           |           |           |           |           |               |               |           |           |          |           |           |           |           |           |           |           |           |          |         |           |           |           |           |           |
| (7) 53.6V     | (7) 54.4V               |   |   |   |               |               |           |           |           |           |           |           |           |           |          |           |         |        |           |           |           |           |           |           |               |               |           |           |          |           |           |           |           |           |           |           |           |          |         |           |           |           |           |           |
| (8) 53.4V     | (8)54.4 V               |   |   |   |               |               |           |           |           |           |           |           |           |           |          |           |         |        |           |           |           |           |           |           |               |               |           |           |          |           |           |           |           |           |           |           |           |          |         |           |           |           |           |           |
| (9) 54.2V     | (9) 54.4V               |   |   |   |               |               |           |           |           |           |           |           |           |           |          |           |         |        |           |           |           |           |           |           |               |               |           |           |          |           |           |           |           |           |           |           |           |          |         |           |           |           |           |           |
| Q105:<br>VDS: | Q113:<br>VDS:           |   |   |   |               |               |           |           |           |           |           |           |           |           |          |           |         |        |           |           |           |           |           |           |               |               |           |           |          |           |           |           |           |           |           |           |           |          |         |           |           |           |           |           |
| (1) 61.4V     | (1) 63.3V               |   |   |   |               |               |           |           |           |           |           |           |           |           |          |           |         |        |           |           |           |           |           |           |               |               |           |           |          |           |           |           |           |           |           |           |           |          |         |           |           |           |           |           |
| (2)60.6V      | (2) 60.1V               |   |   |   |               |               |           |           |           |           |           |           |           |           |          |           |         |        |           |           |           |           |           |           |               |               |           |           |          |           |           |           |           |           |           |           |           |          |         |           |           |           |           |           |
| (3) 70.6V     | (3) 63.3V               |   |   |   |               |               |           |           |           |           |           |           |           |           |          |           |         |        |           |           |           |           |           |           |               |               |           |           |          |           |           |           |           |           |           |           |           |          |         |           |           |           |           |           |
| (4) 72.1V     | (4) 77.8V               |   |   |   |               |               |           |           |           |           |           |           |           |           |          |           |         |        |           |           |           |           |           |           |               |               |           |           |          |           |           |           |           |           |           |           |           |          |         |           |           |           |           |           |
| (5) 73.7V     | (5) 72.1V               |   |   |   |               |               |           |           |           |           |           |           |           |           |          |           |         |        |           |           |           |           |           |           |               |               |           |           |          |           |           |           |           |           |           |           |           |          |         |           |           |           |           |           |
| (6) 54.4V     | (6)55.2V                |   |   |   |               |               |           |           |           |           |           |           |           |           |          |           |         |        |           |           |           |           |           |           |               |               |           |           |          |           |           |           |           |           |           |           |           |          |         |           |           |           |           |           |
| (7) 56V       | (7) 56.9V               |   |   |   |               |               |           |           |           |           |           |           |           |           |          |           |         |        |           |           |           |           |           |           |               |               |           |           |          |           |           |           |           |           |           |           |           |          |         |           |           |           |           |           |
| (8) 54.4V     | (8) 55.2V               |   |   |   |               |               |           |           |           |           |           |           |           |           |          |           |         |        |           |           |           |           |           |           |               |               |           |           |          |           |           |           |           |           |           |           |           |          |         |           |           |           |           |           |
| (9)56.6 V     | (9) 55.2V               |   |   |   |               |               |           |           |           |           |           |           |           |           |          |           |         |        |           |           |           |           |           |           |               |               |           |           |          |           |           |           |           |           |           |           |           |          |         |           |           |           |           |           |
| 5             | Input Capacitor Voltage | C5 Rated:<br>220u/450V -55~105 ~  | <p>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</p> <p>Ta:25 ~</p>   | <p>(1) 400V<br/> (2) 392V<br/> (3) 408V<br/> (4) 396V</p>   |               |               |           |           |           |           |           |           |           |           |          |           |         |        |           |           |           |           |           |           |               |               |           |           |          |           |           |           |           |           |           |           |           |          |         |           |           |           |           |           |

|   |                              |  |   |   |
|---|------------------------------|--|---|---|
| 6 | Control IC Voltage Test      | PWM IC U800 Rated<br>8.85V~ 16V<br><br>PFC IC U401 Rated<br>10.6V~ 21V<br><br>O/P IC U151 Rated<br>8V~ 24V<br><br>MCU IC U701 Rated<br>-0.3V~ 4V | AC ON/OFF<br><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 ~                               | U800:<br>(1) 13.24V<br>(2) 12.68V<br>(3) 12.12V<br>(4) 12.68V<br>(5) 12.44V<br><br>U401:<br>(1) 14.93V<br>(2) 12.28V<br>(3) 12.44V<br>(4) 12.6V<br>(5) 11.88V<br><br>U151:<br>(1) 12.36V<br>(2) 12.52V<br>(3) 11.96V<br>(4) 12.04V<br>(5) 11.88V<br><br>U701:<br>(1) 3.37V<br>(2) 3.12V<br>(3) 3.12V<br>(4) 3.2V<br>(5) 3.16V |
| 8 | TOP SWITCHING STAND BY POWER | U601 Rated<br>11.5A/ 800V  | AC ON/OFF<br><br>I/P:High-Line +3V =267 V<br>O/P: (1)Full Load<br>(2)Remote On/Off<br><br>I/P:Low-Line -3V =177 V<br>O/P: (1)Full Load<br>(2)Remote On/Off<br><br>Ta:25 ~         | U601<br>(1) 550V<br>(2) 546V<br><br>(1) 522V<br>(2) 530 V   |
| 9 | Capacitor Voltage            | C652 Rated 25V<br><br>C682 Rated 25V   | AC ON/OFF<br><br>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><br>Ta:25 ~ | C652: (1) 13.82V<br>(2) 13.42V<br>(3) 13.42V<br>(4) 13.02V<br><br>C682 (1) 15.1V<br>(2) 15.15V<br>(3) 14.26V<br>(4) 14.18V  |

## SAFETY TEST

| NO | TEST ITEM            | SPECIFICATION   | TEST CONDITION   | RESULT   |
|----|----------------------|---|--|--|
| 1  | WITHSTAND VOLTAGE    | I/P-O/P: 3.75KVAC/min<br>I/P-FG :2KVAC/min<br>O/P-FG:1..25KVAC/min  | I/P-O/P: 4.125 KVAC/min<br>I/P-FG: 2.4 KVAC/min<br>O/P-FG:1.5KVAC/min<br>Ta:25 ~ | I/P-O/P: 9.09mA<br>I/P-FG: 7.56mA<br>O/P-FG:8.35mA<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: 500 VDC<br>I/P-FG: 500 VDC<br>O/P-FG: 500 VDC<br>Ta:25 ~                | I/P-O/P: 11.6GΩ<br>I/P-FG: 10.8GΩ<br>O/P-FG: 3.58GΩ<br>NO DAMAGE |
| 3  | GROUNDING CONTINUITY | FG(PE) TO CHASSIS<br>OR TRACE < 100 mΩ                              | 40A / 2min<br>Ta:25 ~  | 13 mΩ  |

## E.M.C TEST

| NO | TEST ITEM  | SPECIFICATION          | TEST CONDITION                                     | RESULT                        |
|----|------------|------------------------|--|-------------------------------|
| 1  | HARMONIC   | EN61000-3-2<br>CLASS A | I/P:230VAC/50HZ<br>O/P:FULL LOAD<br>Ta:25°C        | PASS                          |
| 2  | CONDUCTION | EN55032<br>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                                      | EN55032<br>CLASS A                                 | I/P 230 VAC (50HZ)<br>O/P FULL LOAD<br>Ta 25°C | PASS<br>Test by certified Lab |
| 4 | E.S.D  | EN61000-4-2<br>INDUSTRY<br>AIR: 8KV / Contact: 4KV | I/P 230 VAC/50HZ<br>O/P FULL LOAD<br>Ta 25 ~   | CRITERIA A                    |
| 5 | E.F.T  | EN61000-4-4<br>INDUSTRY<br>INPUT 2KV               | I/P 230 VAC/50HZ<br>O/P FULL LOAD<br>Ta 25 ~   | CRITERIA A                    |
| 6 | SURGE  | IEC61000-6-2<br>INDUSTRY<br>L-N 2KV<br>L,N-PE 4KV  | I/P 230 VAC/50HZ<br>O/P FULL LOAD<br>Ta 25 ~   | CRITERIA A                    |
| 7 | Test by certified Lab      Test Report Prepare |  |  |                               |

## ■ RELIABILITY TEST

### ENVIRONMENT TEST

| NO | TEST ITEM             | SPECIFICATION  | TEST CONDITION        | RESULT  |    |          |                       |                       |   |     |        |        |   |     |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |    |    |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |     |        |        |    |     |        |        |    |     |        |        |    |      |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |           |        |        |    |        |        |        |
|----|-----------------------|--|-----------------------|---|----|----------|-----------------------|-----------------------|---|-----|--------|--------|---|-----|--------|--------|---|------|--------|--------|---|-----|--------|--------|---|-----|--------|--------|---|-----|--------|--------|---|----|--------|--------|---|-----|--------|--------|---|-----|--------|--------|----|----|--------|--------|----|----|--------|--------|----|----|--------|---------|----|------|--------|--------|----|-----|--------|--------|----|-----|--------|--------|----|-----|--------|--------|----|------|--------|--------|----|----|--------|--------|----|------|--------|--------|----|------|--------|--------|----|-----------|--------|--------|----|--------|--------|--------|
| 1  | TEMPERATURE RISE TEST | MODEL UHP-1500-24 (AMBIENT TEMPERATURE WITH CONDUCTION COOLING)<br>1. ROOM AMBIENT BURN-IN 2 HRS<br>I/P 230VAC O/P FULL LOAD Ta=25 ~<br>2. HIGH AMBIENT BURN-IN 2 HRS<br>I/P 230VAC O/P FULL LOAD Ta= 45 ~ |                       |   |    |          |                       |                       |   |     |        |        |   |     |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |    |    |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |     |        |        |    |     |        |        |    |     |        |        |    |      |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |           |        |        |    |        |        |        |
|    |                       |  |                       | <table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta= 25 ~</th> <th>HIGH AMBIENT Ta= 45 ~</th> </tr> </thead> <tbody> <tr><td>1</td><td>BD1</td><td>72.8 ~</td><td>88.3 ~</td></tr> <tr><td>2</td><td>BD2</td><td>76.9 ~</td><td>92.6 ~</td></tr> <tr><td>3</td><td>ZNR2</td><td>61.6 ~</td><td>76.9 ~</td></tr> <tr><td>4</td><td>LF1</td><td>58.4 ~</td><td>73.4 ~</td></tr> <tr><td>5</td><td>LF2</td><td>64.7 ~</td><td>80.0 ~</td></tr> <tr><td>6</td><td>LF3</td><td>69.9 ~</td><td>85.4 ~</td></tr> <tr><td>7</td><td>C2</td><td>57.4 ~</td><td>72.5 ~</td></tr> <tr><td>8</td><td>T51</td><td>69.9 ~</td><td>88.1 ~</td></tr> <tr><td>9</td><td>T52</td><td>68.5 ~</td><td>90.6 ~</td></tr> <tr><td>10</td><td>L1</td><td>72.3 ~</td><td>88.8 ~</td></tr> <tr><td>11</td><td>L2</td><td>78.1 ~</td><td>97.5 ~</td></tr> <tr><td>12</td><td>L3</td><td>81.9 ~</td><td>101.1 ~</td></tr> <tr><td>13</td><td>C960</td><td>69.4 ~</td><td>86.6 ~</td></tr> <tr><td>14</td><td>Q51</td><td>66.2 ~</td><td>82.3 ~</td></tr> <tr><td>15</td><td>Q65</td><td>67.6 ~</td><td>84.7 ~</td></tr> <tr><td>16</td><td>RY1</td><td>64.1 ~</td><td>80.1 ~</td></tr> <tr><td>17</td><td>C417</td><td>67.4 ~</td><td>84.4 ~</td></tr> <tr><td>18</td><td>C6</td><td>65.4 ~</td><td>82.0 ~</td></tr> <tr><td>19</td><td>C964</td><td>67.8 ~</td><td>84.1 ~</td></tr> <tr><td>20</td><td>C967</td><td>75.6 ~</td><td>86.7 ~</td></tr> <tr><td>21</td><td>T1-1 COIL</td><td>79.2 ~</td><td>97.1 ~</td></tr> <tr><td>22</td><td>T1CORE</td><td>77.7 ~</td><td>96.0 ~</td></tr> </tbody> </table> | NO | Position | ROOM AMBIENT Ta= 25 ~ | HIGH AMBIENT Ta= 45 ~ | 1 | BD1 | 72.8 ~ | 88.3 ~ | 2 | BD2 | 76.9 ~ | 92.6 ~ | 3 | ZNR2 | 61.6 ~ | 76.9 ~ | 4 | LF1 | 58.4 ~ | 73.4 ~ | 5 | LF2 | 64.7 ~ | 80.0 ~ | 6 | LF3 | 69.9 ~ | 85.4 ~ | 7 | C2 | 57.4 ~ | 72.5 ~ | 8 | T51 | 69.9 ~ | 88.1 ~ | 9 | T52 | 68.5 ~ | 90.6 ~ | 10 | L1 | 72.3 ~ | 88.8 ~ | 11 | L2 | 78.1 ~ | 97.5 ~ | 12 | L3 | 81.9 ~ | 101.1 ~ | 13 | C960 | 69.4 ~ | 86.6 ~ | 14 | Q51 | 66.2 ~ | 82.3 ~ | 15 | Q65 | 67.6 ~ | 84.7 ~ | 16 | RY1 | 64.1 ~ | 80.1 ~ | 17 | C417 | 67.4 ~ | 84.4 ~ | 18 | C6 | 65.4 ~ | 82.0 ~ | 19 | C964 | 67.8 ~ | 84.1 ~ | 20 | C967 | 75.6 ~ | 86.7 ~ | 21 | T1-1 COIL | 79.2 ~ | 97.1 ~ | 22 | T1CORE | 77.7 ~ | 96.0 ~ |
| NO | Position              | ROOM AMBIENT Ta= 25 ~  | HIGH AMBIENT Ta= 45 ~ |   |    |          |                       |                       |   |     |        |        |   |     |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |    |    |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |     |        |        |    |     |        |        |    |     |        |        |    |      |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |           |        |        |    |        |        |        |
| 1  | BD1                   | 72.8 ~   | 88.3 ~                |   |    |          |                       |                       |   |     |        |        |   |     |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |    |    |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |     |        |        |    |     |        |        |    |     |        |        |    |      |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |           |        |        |    |        |        |        |
| 2  | BD2                   | 76.9 ~   | 92.6 ~                |   |    |          |                       |                       |   |     |        |        |   |     |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |    |    |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |     |        |        |    |     |        |        |    |     |        |        |    |      |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |           |        |        |    |        |        |        |
| 3  | ZNR2                  | 61.6 ~   | 76.9 ~                |   |    |          |                       |                       |   |     |        |        |   |     |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |    |    |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |     |        |        |    |     |        |        |    |     |        |        |    |      |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |           |        |        |    |        |        |        |
| 4  | LF1                   | 58.4 ~   | 73.4 ~                |   |    |          |                       |                       |   |     |        |        |   |     |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |    |    |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |     |        |        |    |     |        |        |    |     |        |        |    |      |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |           |        |        |    |        |        |        |
| 5  | LF2                   | 64.7 ~   | 80.0 ~                |   |    |          |                       |                       |   |     |        |        |   |     |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |    |    |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |     |        |        |    |     |        |        |    |     |        |        |    |      |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |           |        |        |    |        |        |        |
| 6  | LF3                   | 69.9 ~   | 85.4 ~                |   |    |          |                       |                       |   |     |        |        |   |     |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |    |    |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |     |        |        |    |     |        |        |    |     |        |        |    |      |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |           |        |        |    |        |        |        |
| 7  | C2                    | 57.4 ~   | 72.5 ~                |   |    |          |                       |                       |   |     |        |        |   |     |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |    |    |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |     |        |        |    |     |        |        |    |     |        |        |    |      |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |           |        |        |    |        |        |        |
| 8  | T51                   | 69.9 ~   | 88.1 ~                |   |    |          |                       |                       |   |     |        |        |   |     |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |    |    |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |     |        |        |    |     |        |        |    |     |        |        |    |      |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |           |        |        |    |        |        |        |
| 9  | T52                   | 68.5 ~   | 90.6 ~                |   |    |          |                       |                       |   |     |        |        |   |     |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |    |    |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |     |        |        |    |     |        |        |    |     |        |        |    |      |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |           |        |        |    |        |        |        |
| 10 | L1                    | 72.3 ~   | 88.8 ~                |   |    |          |                       |                       |   |     |        |        |   |     |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |    |    |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |     |        |        |    |     |        |        |    |     |        |        |    |      |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |           |        |        |    |        |        |        |
| 11 | L2                    | 78.1 ~   | 97.5 ~                |   |    |          |                       |                       |   |     |        |        |   |     |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |    |    |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |     |        |        |    |     |        |        |    |     |        |        |    |      |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |           |        |        |    |        |        |        |
| 12 | L3                    | 81.9 ~   | 101.1 ~               |   |    |          |                       |                       |   |     |        |        |   |     |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |    |    |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |     |        |        |    |     |        |        |    |     |        |        |    |      |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |           |        |        |    |        |        |        |
| 13 | C960                  | 69.4 ~   | 86.6 ~                |   |    |          |                       |                       |   |     |        |        |   |     |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |    |    |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |     |        |        |    |     |        |        |    |     |        |        |    |      |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |           |        |        |    |        |        |        |
| 14 | Q51                   | 66.2 ~   | 82.3 ~                |   |    |          |                       |                       |   |     |        |        |   |     |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |    |    |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |     |        |        |    |     |        |        |    |     |        |        |    |      |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |           |        |        |    |        |        |        |
| 15 | Q65                   | 67.6 ~   | 84.7 ~                |   |    |          |                       |                       |   |     |        |        |   |     |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |    |    |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |     |        |        |    |     |        |        |    |     |        |        |    |      |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |           |        |        |    |        |        |        |
| 16 | RY1                   | 64.1 ~   | 80.1 ~                |   |    |          |                       |                       |   |     |        |        |   |     |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |    |    |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |     |        |        |    |     |        |        |    |     |        |        |    |      |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |           |        |        |    |        |        |        |
| 17 | C417                  | 67.4 ~   | 84.4 ~                |   |    |          |                       |                       |   |     |        |        |   |     |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |    |    |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |     |        |        |    |     |        |        |    |     |        |        |    |      |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |           |        |        |    |        |        |        |
| 18 | C6                    | 65.4 ~   | 82.0 ~                |   |    |          |                       |                       |   |     |        |        |   |     |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |    |    |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |     |        |        |    |     |        |        |    |     |        |        |    |      |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |           |        |        |    |        |        |        |
| 19 | C964                  | 67.8 ~   | 84.1 ~                |   |    |          |                       |                       |   |     |        |        |   |     |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |    |    |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |     |        |        |    |     |        |        |    |     |        |        |    |      |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |           |        |        |    |        |        |        |
| 20 | C967                  | 75.6 ~   | 86.7 ~                |   |    |          |                       |                       |   |     |        |        |   |     |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |    |    |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |     |        |        |    |     |        |        |    |     |        |        |    |      |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |           |        |        |    |        |        |        |
| 21 | T1-1 COIL             | 79.2 ~   | 97.1 ~                |   |    |          |                       |                       |   |     |        |        |   |     |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |    |    |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |     |        |        |    |     |        |        |    |     |        |        |    |      |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |           |        |        |    |        |        |        |
| 22 | T1CORE                | 77.7 ~   | 96.0 ~                |   |    |          |                       |                       |   |     |        |        |   |     |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |    |    |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |     |        |        |    |     |        |        |    |     |        |        |    |      |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |           |        |        |    |        |        |        |

|   |   |  |  |                      |        |         |
|---|---|--|--|----------------------|--------|---------|
|   |   |  | 23   | T2-1 COIL            | 84.6 ~ | 101.3 ~ |
|   |   |  | 24   | T2CORE               | 79.6 ~ | 95.9 ~  |
|   |   |  | 25   | C114                 | 63.7 ~ | 80.2 ~  |
|   |   |  | 26   | C115                 | 60.2 ~ | 76.5 ~  |
|   |   |  | 27   | C122                 | 63.0 ~ | 79.6 ~  |
|   |   |  | 28   | C123                 | 66.0 ~ | 82.5 ~  |
|   |   |  | 29   | RTH4                 | 67.2 ~ | 82.4 ~  |
|   |   |  | 30   | RTH5                 | 69.9 ~ | 88.1 ~  |
|   |   |  | 31   | RTH21                | 69.3 ~ | 90.6 ~  |
|   |   |  | 32   | Q102                 | 69.0 ~ | 83.8 ~  |
|   |   |  | 33   | Q106                 | 74.1 ~ | 90.6 ~  |
|   |   |  | 34   | Q111                 | 68.5 ~ | 82.9 ~  |
|   |   |  | 35   | Q113                 | 69.3 ~ | 83.7 ~  |
|   |   |  | 36   | Q901                 | 79.6 ~ | 108.2 ~ |
|   |   |  | 37   | Q904                 | 81.5 ~ | 99.7 ~  |
|   |   |  | 38   | D14                  | 77.4 ~ | 94.3 ~  |
|   |   |  | 39   | D10                  | 69.5 ~ | 86.2 ~  |
|   |   |  | 40   | U153                 | 68.1 ~ | 83.6 ~  |
|   |   |  | 41   | U151                 | 66.3 ~ | 83.1 ~  |
|   |   |  | 41   | D7                   | 64.0 ~ | 80.6 ~  |
|   |   |  | 42   | U401                 | 63.2 ~ | 80.0 ~  |
|   |   |  | 43   | T601                 | 73.7 ~ | 90.3 ~  |
|   |   |  | 44   | C682                 | 70.8 ~ | 87.6 ~  |
|   |   |  | 45   | C652                 | 73.0 ~ | 89.4 ~  |
|   |   |  | 46   | RG61                 | 70.8 ~ | 87.7 ~  |
|   |   |  | 47   | U701                 | 66.2 ~ | 82.5 ~  |
|   |   |  | 48   | RG52                 | 55.1 ~ | 71.1 ~  |
|   |   |  | 49   | C632                 | 68.8 ~ | 84.4 ~  |
|   |   |  | 50   | RG65                 | 70.2 ~ | 86.2 ~  |
|   |   |  | 51   | U900                 | 64.1 ~ | 79.9 ~  |
|   |   |  | 52   | U601                 | 69.0 ~ | 84.6 ~  |
| 2 | OVER LOAD BURN-IN TEST  | NO DAMAGE<br>1 HOUR ( MIN )  | I/P 230 VAC<br>O/P 110 LOAD<br>Ta 25 ~   | TEST OK              |        |         |
| 3 | LOW TEMPERATURE<br>TURN ON TEST                                   | TURN ON AFTER 2 HOUR   | I/P 264VAC/180VAC<br>O/P 100 LOAD<br>Ta= -35 ~/-30 ~   | 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 ~/95 %R.H<br>NO DAMAGE | I/P 272 VAC<br>O/P FULL LOAD<br>Ta= 50 ~<br>HUMIDITY= 95 %R.H  | TEST OK              |        |         |
| 5 | TEMPERATURE<br>COEFFICIENT  | ± 0.03 %/ -(0-45 ~)  | I/P 230 VAC<br>O/P FULL LOAD   | ± 0.005 %/ -(0-45 ~) |        |         |
| 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       | -30~45°C  | 1. Thermal shock Temperature : -35°C~ +50°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, 5G 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 6G<br>(5) Test Time 180min in each axis (X.Y.Z)<br>(6) Ta 25°C   |
| 9  | CAPACITOR LIFE CYCLE     | SUPPOSE C123 IS THE MOST CRITICAL COMPONENT<br>(1) I/P 230VAC O/P FULL LOAD Ta= 25 ~ LIFE TIME<br>(2) I/P 230VAC O/P FULL LOAD Ta= 45 ~ LIFE TIME<br>(3) I/P 230VAC O/P 75% LOAD Ta= 45 ~ LIFE TIME<br>(4) I/P 230VAC O/P 50% LOAD Ta= 45 ~ LIFE TIME | (1) 185636HRS<br>(2) 62091HRS<br>(3) 126459HRS<br>(4) 234220HRS   |
| 10 | MTBF                     | Conducted by Parts Stress Analysis Prediction<br>181.47K hrs min. Telcordia SR-332 (Bellcore) ; 56.72K hrs min. MIL-HDBK-217F (25 ~)  |   |
| 11 | Ongoing Reliability Test | I/P 230VAC O/P FULL LOAD TA=50°C<br>Demonstration Mean Time Between Failure : 50,000 hours  |   |

| TEST RESULT | TESTER     | REVIEW     | APPROVAL      |
|-------------|------------|------------|---------------|
| PASS        | DANIEL GAO | SANFORD SU | VINCENT TSENG |

2018.4.30 GP-A50-F010