



TEST REPORT: RPS-65-15

65W Single Output Medical Type

■ DESIGN VERIFY TEST

Output Function Test

Input Function Test

Protection Function Test

Component Stress Test

■ SAFETY & E.M.C. TEST

Safety Test

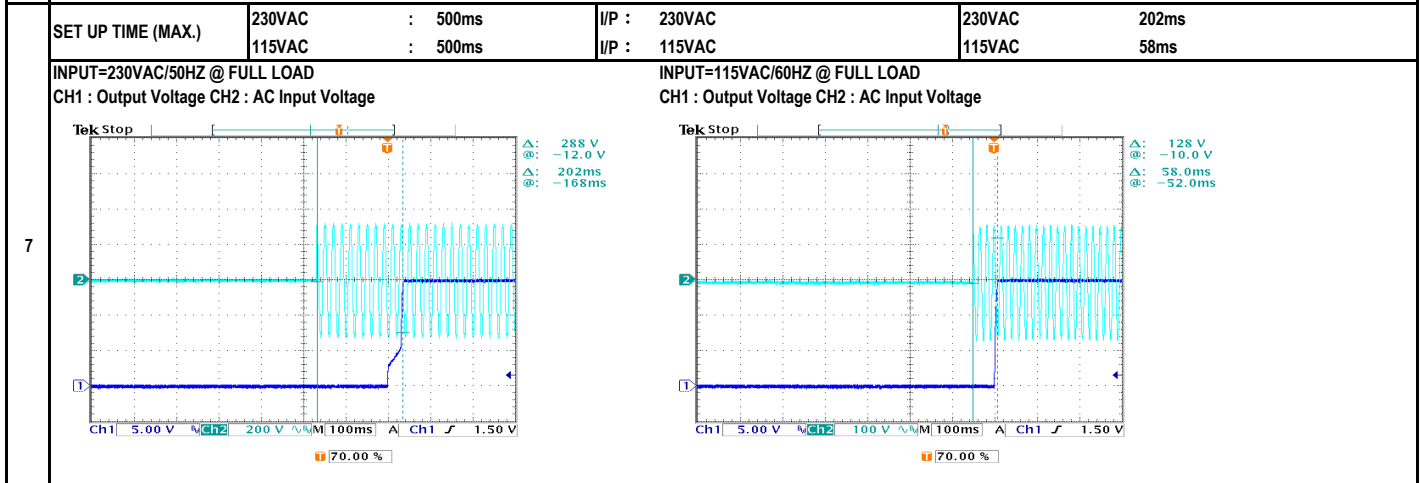
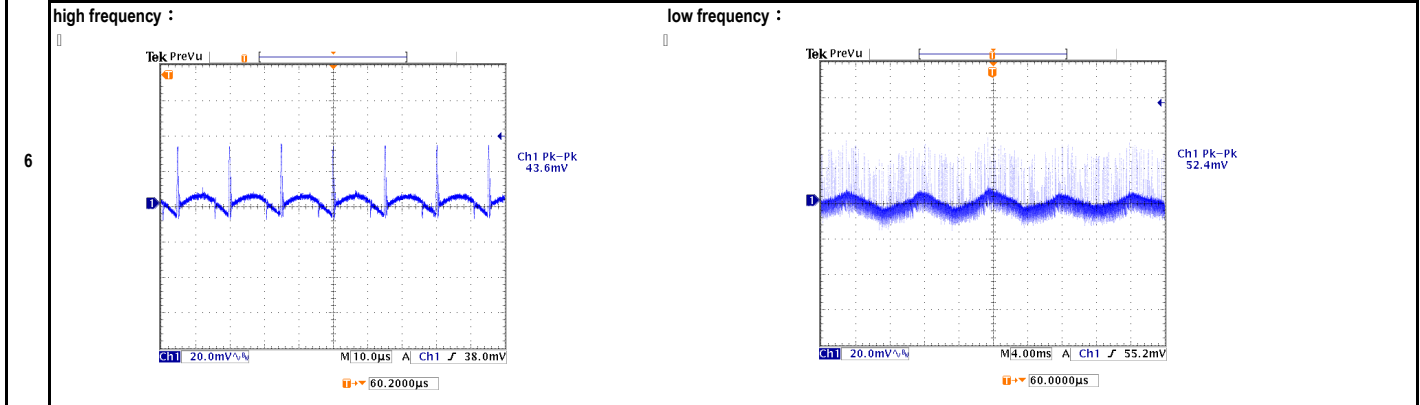
E.M.C. Test

■ RELIABILITY TEST

ENVIRONMENT TEST

DESIGN VERIFY TEST
OUTPUT FUNCTION

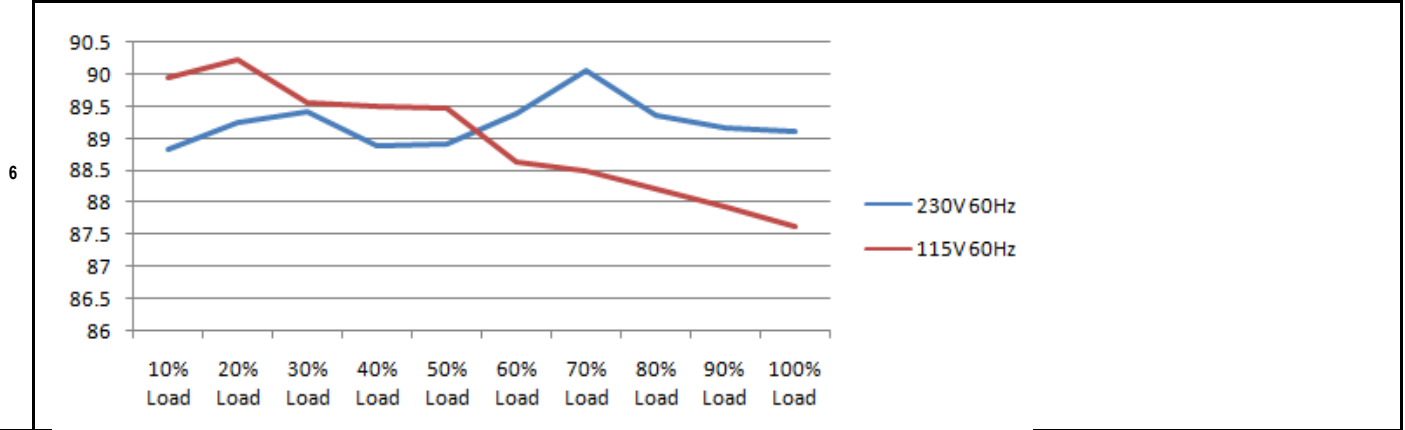
| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT |
|----|--------------------------------|----------------------|--|----------------------|
| 1 | OUTPUT VOLTAGE ADJUST RANGE | CH1: 13.50V ~ 16.50V | I/P : 230VAC O/P: MIN LOAD TA : 25°C | CH1: 13.22V ~ 17.02V |
| 2 | OUTPUT VOLTAGE TOLERANCE (Max) | V1 : 1.0% ~ -1.0% | I/P : 115VAC / 264VAC O/P: FULL / MINLOAD TA= 25°C | V1: 0.33% ~ -0.37% |
| 3 | LINE REGULATION (MAX.) | V1 : 0.5% ~ -0.5% | I/P : 115VAC / 264VAC O/P: FULL LOAD TA : 25°C | V1: 0.04% ~ 0.00% |
| 4 | LOAD REGULATION (MAX.) | V1 : 1.0% ~ -1.0% | I/P : 230VAC O/P: MIN LOAD ~ FULL LOAD TA : 25°C | V1: 0.33% ~ -0.37% |
| 5 | OVER/UNDERSHOOT TEST | < ±5% | I/P : 230VAC O/P: FULL LOAD TA : 25°C | TEST< 4.757 % |
| | RIPPLE & NOISE(Max) | V1 : 120 mVp-p | I/P : 230VAC O/P: FULL LOAD TA : 25°C | V1 : 52.4 mVp-p |



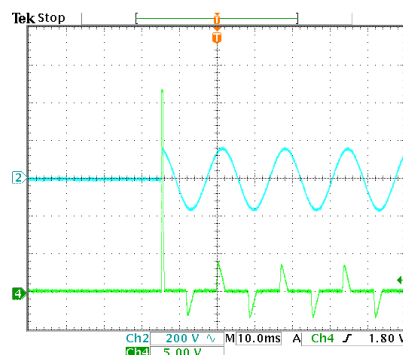
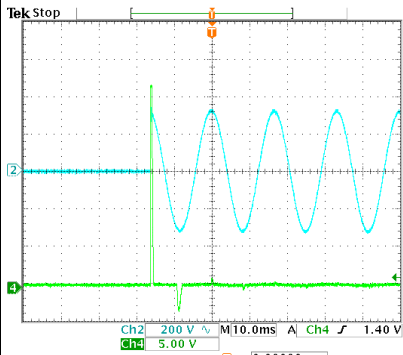
| | | | | |
|----|--|--|---|--|
| 8 | RISE TIME (MAX.) | 230VAC : 30ms 115VAC : 30ms | I/P : 230VAC I/P : 115VAC O/P: FULL LOAD TA: 25°C | 230VAC : 5.6ms 115VAC : 6.0ms |
| | INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage | INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage | | |
| | | | | |
| 9 | HOLD UP TIME (TYP.) | 230VAC : 30ms 115VAC : 12ms | I/P : 230VAC I/P : 115VAC O/P: FULL LOAD TA: 25°C | 230VAC : 64.0ms 115VAC : 12.8ms |
| | INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage | INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage | | |
| | | | | |
| 10 | DYNAMIC LOAD | V1 : 1500 mVp-p | I/P : 230VAC O/P: (1) Full/Min load 50% duty/120HZ (2) Full/Min load 50% duty/1KHZ TA: 25°C | V1: (1). 674.0mv (2). 348.0mv unit:mVp-p |
| | FULL /50% LOAD 50%DUTY / 120HZ | FULL /50% LOAD 50%DUTY / 1KHZ | | |
| | | | | |

INPUT FUNCTION TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT |
|----|---------------------------|----------------------------|--|--|
| 1 | INPUT VOLTAGE RANGE | 80VAC ~ 264VAC | I/P : TESTING O/P : FULL LOAD Ta : 25°C | 72.6VAC ~ 264VAC |
| | | | I/P : LOW-LINE = 77VAC HIGH-LINE = 300VAC O/P : FULL/MIN LOAD ON:30 Sec ; OFF:30 Sec 10MIN (POWER ON/OFF NO DAMAGE) | TEST : OK |
| 2 | INPUT FREQUENCY RANGE | 47HZ ~ 63HZ NO DAMAGE | I/P : 115VAC ~ 264VAC O/P : FULL-MIN LOAD Ta : 25°C | TEST : OK |
| 3 | INPUT CURRENT (TYP.) | 1 / 230VAC 1.5 / 115VAC | I/P : 230VAC I/P : 115VAC O/P : FULL LOAD TA : 25°C | I= 0.656 / 230VAC I= 1.014 / 115VAC |
| 4 | LEAKAGE CURRENT | < 100uA Touch current | I/P : 264VAC O/P : MIN LOAD TA : 25°C | L-FG: 87 uA N-FG: 88 uA |
| 5 | NO LOAD POWER CONSUMPTION | < 0.10W | I/P : 230VAC O/P : MIN LOAD TA : 25°C | < 0.0584 W |
| | EFFICIENCY (TYP.) | 89.0% | I/P : 230VAC O/P : FULL LOAD TA : 25°C | 89.3 % |



| | | | | |
|---|-----------------------|---|--|--|
| 7 | INRUSH CURRENT (TYP.) | 50A / 230VAC 30A / 115VAC twidth= 0 us measured at 50% Ipeak COLD START | I/P : 230VAC I/P : 115VAC O/P : FULL LOAD TA : 25°C | I= 27.20A / 230VAC I= 27.10A / 115VAC |
| | | <p>INPUT=230VAC/50HZ @ FULL LOAD INPUT=115VAC/50HZ @ FULL LOAD</p> <p>CH2 : Input current (1V=1A) CH4 : AC Input Voltage CH2 : Input current (1V=1A) CH4 : AC Input Voltage</p> | | |



PROTECTION FUNCTION TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT |
|----|-------------------------|--|---|--|
| 1 | OVER LOAD PROTECTION | 115% ~ 150% | I/P: 264VAC I/P: 230VAC I/P: 115VAC O/P: TESTING Ta: 25°C | 128.9% 264VAC 135.8% 230VAC 131.3% 115VAC Hiccup Mode |
| 2 | OVER VOLTAGE PROTECTION | 17.25V ~ 20.25V | I/P: 264VAC I/P: 230VAC I/P: 80VAC O/P: MIN LOAD Ta: 25°C | 19.02V 264VAC 19.06V 230VAC 19.06V 80VAC Shut down Re- power ON |
| 3 | SHORT PROTECTION | SHORT EVERY OUTPUT 1 HOUR NO DAMAGE | I/P: 264VAC I/P: 80VAC O/P: FULL LOAD Ta: 25°C | NO DAMAGE Hiccup Mode |

COMPONENT STRESS TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT |
|----|----------------------|---------------------------------------|---|---|
| 1 | PWM Power Transistor | Q1 Rated : 600V 11.0A | I/P : 267VAC VDS : O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C | VIN: 267VAC VDS: (1). 552.00V (2). 504.00V (3). 540.00V |
| 2 | Input Capacitor | C5 Rated : 100uf 400V | I/P : 267VAC O/P : (1)Full Load Turn on /Off (2)Min load Turn on /Off (3)Full Load /Min load Change Ta : 25°C | (1). 360.00V (2). 360.00V (3). 354.00V |
| 3 | Control IC | U1 Rated : 28.0V (max) -0.3V (min) | I/P : 267VAC O/P : (1)Full Load (2)Output Short (3)O.L.P (4)O.V.P (5)Low Line No Load Vo(min) Ta : 25°C | U1 (1). 19.40V (2). 11.00V (3). 20.00V (4). 21.00V (5). 18.60V |
| 4 | O/P Diode | D100 Rated : 100V 20.0A | I/P : 267VAC O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C | (1). 72.40V (2). 59.20V (3). 72.00V |
| 5 | Clamp Diode | D5 Rated : 800V 2.0A | I/P : 267VAC O/P : (1)Full load continue Ta : 25°C | (1). 496.00V |

SAFETY & E.M.C. TEST

SAFETY TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT |
|----|----------------------|--------------------------|--------------------------------------|------------------------------|
| 1 | WITHSTAND VOLTAGE | I/P-O/P : 4.000KVAC /min | I/P-O/P: 4.400KVAC /min Ta : 25°C | I/P-O/P: 1.41mA NO DAMAGE |
| 2 | ISOLATION RESISTANCE | I/P-O/P : 500VDC>100MΩ | I/P-O/P: 500VDC Ta : 25°C/70%RH | I/P-O/P: 9999MΩ NO DAMAGE |

E.M.C. TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT |
|----|------------|------------------------|---|-------------------------------|
| 1 | HARMONIC | EN61000-3-2 CLASS A | I/P : 230VAC /50HZ O/P : FULL LOAD Ta : 25°C | PASS |
| 2 | CONDUCTION | EN55011 CLASS B | I/P : 230VAC /50HZ O/P : FULL LOAD / 50% LOAD Ta : 25°C | PASS Test by certified Lab |

| | | | | |
|---|-----------|---|--|-------------------------------|
| 3 | RADIATION | EN55011 CLASS B | I/P : 230VAC /50HZ O/P : FULL LOAD Ta : 25°C | PASS Test by certified Lab |
| 4 | E.S.D | EN61000-4-2 MEDICAL AIR: 15KV / Contact: 8KV | I/P : 230VAC /50HZ O/P : FULL LOAD Ta : 25°C | CRITERIA A |
| 5 | E.F.T | EN61000-4-4 MEDICAL INPUT: 2KV | I/P : 230VAC /50HZ O/P : FULL LOAD Ta : 25°C | CRITERIA A |
| 6 | SURGE | IEC61000-4-5 MEDICAL L-N:2KV;L/N-PE: 4KV | I/P : 230VAC /50HZ O/P : FULL LOAD Ta : 25°C | CRITERIA A |

RELIABILITY TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----|--|---|--|---------------------------|---------|--------------|--------|------------------|--------|---|-----|--------|--|--------|--|---|-----|--------|--|--------|--|---|-----|--------|--|---------|--|---|----|--------|--|---------|--|---|----|--------|--|--------|--|---|-----|--------|--|--------|--|---|----|--------|--|--------|--|---|------|---------|--|---------|--|---|------|---------|--|---------|--|----|------|--------|--|--------|--|----|------|--------|--|--------|--|----|------|--------|--|--------|--|----|------|--------|--|--------|--|----|----|--------|--|--------|--|--|
| 1 | TEMPERATURE RISE TEST | MODEL : RPS-65-7.5 1. ROOM AMBIENT BURN-IN : 1.0hrs IP: 230VAC O/P: 100% LOAD TA= 29.6°C 2. HIGH AMBIENT BURN-IN : 1.0hrs IP: 230VAC O/P: 100% LOAD TA= 50.1°C | <table border="1"> <thead> <tr> <th>NO.</th> <th>Positio</th> <th>ROOM AMBIENT</th> <th>29.6°C</th> <th>HIGH AMBIENT Ta:</th> <th>50.1°C</th> </tr> </thead> <tr><td>1</td><td>LF1</td><td>50.5°C</td><td></td><td>68.7°C</td><td></td></tr> <tr><td>2</td><td>LF2</td><td>53.7°C</td><td></td><td>72.7°C</td><td></td></tr> <tr><td>3</td><td>BD1</td><td>83.3°C</td><td></td><td>101.1°C</td><td></td></tr> <tr><td>4</td><td>Q1</td><td>88.8°C</td><td></td><td>106.6°C</td><td></td></tr> <tr><td>5</td><td>C5</td><td>64.0°C</td><td></td><td>82.1°C</td><td></td></tr> <tr><td>6</td><td>C40</td><td>78.5°C</td><td></td><td>96.1°C</td><td></td></tr> <tr><td>7</td><td>T1</td><td>80.9°C</td><td></td><td>98.2°C</td><td></td></tr> <tr><td>8</td><td>D100</td><td>100.9°C</td><td></td><td>117.6°C</td><td></td></tr> <tr><td>9</td><td>D101</td><td>101.8°C</td><td></td><td>117.2°C</td><td></td></tr> <tr><td>10</td><td>C105</td><td>75.1°C</td><td></td><td>94.3°C</td><td></td></tr> <tr><td>11</td><td>C106</td><td>71.9°C</td><td></td><td>91.0°C</td><td></td></tr> <tr><td>12</td><td>C107</td><td>56.3°C</td><td></td><td>74.5°C</td><td></td></tr> <tr><td>13</td><td>L101</td><td>62.0°C</td><td></td><td>79.6°C</td><td></td></tr> <tr><td>14</td><td>U1</td><td>69.9°C</td><td></td><td>87.2°C</td><td></td></tr> </table> | NO. | Positio | ROOM AMBIENT | 29.6°C | HIGH AMBIENT Ta: | 50.1°C | 1 | LF1 | 50.5°C | | 68.7°C | | 2 | LF2 | 53.7°C | | 72.7°C | | 3 | BD1 | 83.3°C | | 101.1°C | | 4 | Q1 | 88.8°C | | 106.6°C | | 5 | C5 | 64.0°C | | 82.1°C | | 6 | C40 | 78.5°C | | 96.1°C | | 7 | T1 | 80.9°C | | 98.2°C | | 8 | D100 | 100.9°C | | 117.6°C | | 9 | D101 | 101.8°C | | 117.2°C | | 10 | C105 | 75.1°C | | 94.3°C | | 11 | C106 | 71.9°C | | 91.0°C | | 12 | C107 | 56.3°C | | 74.5°C | | 13 | L101 | 62.0°C | | 79.6°C | | 14 | U1 | 69.9°C | | 87.2°C | | |
| NO. | Positio | ROOM AMBIENT | 29.6°C | HIGH AMBIENT Ta: | 50.1°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | LF1 | 50.5°C | | 68.7°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | LF2 | 53.7°C | | 72.7°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | BD1 | 83.3°C | | 101.1°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | Q1 | 88.8°C | | 106.6°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | C5 | 64.0°C | | 82.1°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | C40 | 78.5°C | | 96.1°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | T1 | 80.9°C | | 98.2°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | D100 | 100.9°C | | 117.6°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | D101 | 101.8°C | | 117.2°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | C105 | 75.1°C | | 94.3°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | C106 | 71.9°C | | 91.0°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | C107 | 56.3°C | | 74.5°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13 | L101 | 62.0°C | | 79.6°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 | U1 | 69.9°C | | 87.2°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | OVER LOAD BURN-IN TEST | NO DAMAGE 1 HOUR (MIN) | I/P : 230VAC O/P : 129% LOAD Ta : 25°C | TEST : OK | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | LOW TEMPERATURE TURN ON TEST | NO DAMAGE 1 HOUR (MIN) | I/P : 264VAC / 115VAC O/P : FULL LOAD Ta : -30.0°C | TEST : OK | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TEST | AFTER 12 HOURS IN CHAMBER ON CONTROL 50°C NO DAMAGE | I/P : 272VAC O/P : FULL LOAD Ta : 50°C HUMIDITY= 95.0% RH | TEST : OK | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | TEMPERATURE COEFFICIENT | ±0.03% /°C(0~50°C) | I/P : 230VAC O/P : FULL LOAD | ±0.0140% /°C(0~50°C) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | STORAGE TEMPERATURE TEST | 1. Thermal shock Temperature : -40°C ~ +85°C 2. Temperature change rate : 25°C / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 5 CYCLE 5. Input/Output condition : STATIC | | TEST : OK | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | THERMAL SHOCK TEST | 1. Thermal shock Temperature : -35°C ~ +55°C 2. Temperature change rate : 25°C / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 10 CYCLE 5. Input/Output condition : 230VAC Full Load AC ON/OFF test turn on 58sec ; turn off 2sec | | TEST : OK | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | VIBRATION TEST | 1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10~500Hz (4) Acceleration : 2G (5) Test Time : 60min in each axis (X.Y.Z) (6) Ta : 25°C | | TEST : OK | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



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|----|------------------------------|--|-----------------|------------|-----------|--------------------|-------------|
| 9 | CAPACITOR LIFE CYCLE | :SUPPOSE C106 IS THE MOST CRITICAL COMPONENT | | | | | |
| | | (1) I/P : 230VAC | O/P : FULL LOAD | Ta= 25.0°C | LIFE TIME | (1). | 158118 HRS |
| | | (2) I/P : 230VAC | O/P : FULL LOAD | Ta= 50.0°C | LIFE TIME | (2). | 17782.8 HRS |
| | | (3) I/P : 230VAC | O/P : 75% LOAD | Ta= 50.0°C | LIFE TIME | (3). | 44588.4 HRS |
| | | (4) I/P : 230VAC | O/P : 50% LOAD | Ta= 50.0°C | LIFE TIME | (4). | 158118 HRS |
| 10 | MTBF | MIL-HDBK-217F TOTAL FAILURE RATE : 959.1 KHRS | | | | | |
| 11 | DMTBF /Accelerated Life test | Demonstration Mean Time Between Failure (Expected Life): Above | | | | 30000HRS @ TA 50°C | |

| | | | |
|-------------|--------|--------|----------|
| TEST RESULT | TESTER | REVIEW | APPROVAL |
| PASS | FRANK | GESG | WANGDZ |

2007/3/20 A50-S014