



Test Report: DHP-1UT-B-24

3200~12800W 1U Distributed Power/Charger System

■ DESIGN VERIFY TEST

Output Function Test
Input Function Test
Control Function Test

■ SAFETY & E.M.C. TEST

Safety Test
E.M.C. Test

■ RELIABILITY TEST

ENVIRONMENT TEST

DESIGN VERIFY TEST

OUTPUT FUNCTION TEST

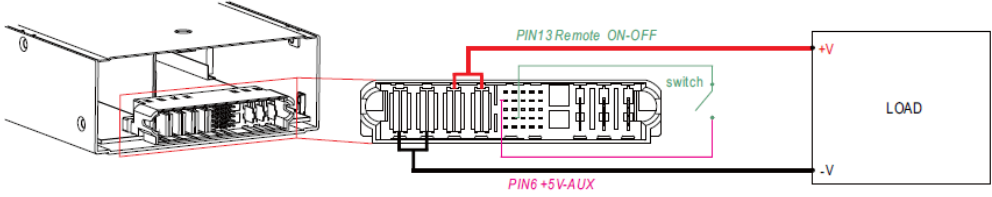
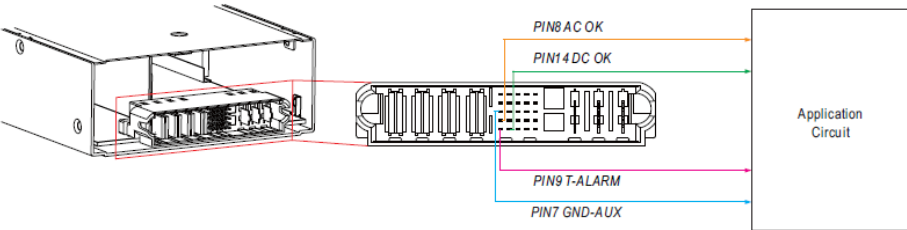
NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	MAX. OUTPUT CURRENT	532A	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	532A
2	MAX. OUTPUT POWER	12768W	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	12768W

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	90VAC~264VAC 127VDC~400VDC	(1) I/P:TESTING O/P:FULL LOAD (2) I/P:DC TESTING(L:+ N:-) O/P: FULL / 50% LOAD (3) I/P:DC TESTING(L:- N:+) O/P: FULL / 50% LOAD (PLEASE CHECK DERATING CURVE) Ta:25°C	(1)168Vac~264Vac/FULL LOAD 85Vac~264Vac/50%LOAD (2)242Vdc~400Vdc/FULL LOAD 108Vdc~400Vdc/50% LOAD (3) 242Vdc~400Vdc/FULL LOAD 107Vdc~400Vdc/50% LOAD
			I/P: LOW-LINE-3V=87 V HIGH-LINE+15%=300 V O/P:FULL/MIN LOAD (PLEASE CHECK DERATING CURVE) ON: 30 Sec OFF: 30 Sec 10MIN (POWER ON/OFF NO DAMAGE)	TEST:OK
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE	I/P:180 VAC ~264 VAC O/P:FULL~MIN LOAD Ta:25°C	TEST: OK
3	INPUT CURRENT (Typ.) per RECTIFIER	230V/ 17 A	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	I =15.32 A/ 230VAC
4	LEAKAGE CURRENT per RECTIFIER	<2 mA / 230 VAC	I/P : 230 VAC O/P : Min LOAD Ta : 25°C	L-FG : 0.96 mA N-FG : 0.96 mA

CONTROL FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT												
1	AUXILIARY POWER (AUX)	<p>Auxiliary voltage output, 10.8~13.2V, referenced to GND-AUX (pin7). The maximum load current is 0.8A. This output has the built-in "Oring diodes" and is not controlled by "Remote ON-OFF".</p> <p>Auxiliary voltage output,4.5~5.5V, reference to GND_AUX(pin7).The maximum load current is 0.3A. The output has the built-in "Oring diodes" and is not controlled by the Remote ON/OFF control.</p> <p>I/P: 230 VAC O/P:FULL LOAD Ta:25°C</p> <p>Test Result :</p> <table border="1" data-bbox="507 1937 1340 2065"> <thead> <tr> <th>AUX</th> <th>TOLERANCE</th> <th>RIPPLE</th> <th>TEST RESULT</th> </tr> </thead> <tbody> <tr> <td>12V / 0.8A</td> <td>10.8~13.2 V</td> <td>450mVp-p</td> <td>11.73V /0.8A 226 mVp-p</td> </tr> <tr> <td>5V/0.3A</td> <td>4.5~5.5V</td> <td>150 mVp-p</td> <td>4.71V/0.3A 117 mVp-p</td> </tr> </tbody> </table>	AUX	TOLERANCE	RIPPLE	TEST RESULT	12V / 0.8A	10.8~13.2 V	450mVp-p	11.73V /0.8A 226 mVp-p	5V/0.3A	4.5~5.5V	150 mVp-p	4.71V/0.3A 117 mVp-p		
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<p>2</p> <p>REMOTE ON/OFF CONTROL</p>	<p>The power supply can be turned ON/OFF individually or along with other units by using the "Remote ON-OFF" function.</p>  <table border="1" data-bbox="446 571 893 667"> <thead> <tr> <th>Between Remote ON-OFF and +5V-AUX</th> <th>Power Supply Status</th> </tr> </thead> <tbody> <tr> <td>Switch Short</td> <td>ON</td> </tr> <tr> <td>Switch Open</td> <td>OFF</td> </tr> </tbody> </table> <p>I/P: 230 VAC O/P: FULL LOAD Ta: 25°C</p> <p>Test Result :</p> <table border="1" data-bbox="427 824 976 920"> <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 Remote ON-OFF and +5V-AUX	Power Supply Status	Switch Short	ON	Switch Open	OFF	Between ON/OFF and +5V-AUX	Power Supply Status	SW SHORT	ON	SW OPEN	OFF									
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<p>3</p> <p>REMOTE SENSE</p>	<p>S+ / S- 0.3V~0.5V Compensate voltage drop on the load wiring up to 0.5V.</p>	<p>I/P: 230 VAC O/P: FULL LOAD Ta: 25°C</p> <p>0.3V~0.5V</p>																					
<p>4</p> <p>ALARM SIGNAL output</p>	<p>※ There are 3 alarm signals, DC-OK, AC-OK and T-ALARM, in TTL signal form, on CN1. These signals are isolated from output. The maximum sink current is 10mA.</p>  <table border="1" data-bbox="478 1422 1149 1518"> <thead> <tr> <th>DC-OK signal</th> <th>Power Supply Mode Status</th> <th>Charger Mode Status</th> </tr> </thead> <tbody> <tr> <td>"High" > 3.5~5.5V</td> <td>Vout ≒ 77%±5%</td> <td>Vout ≒ 66%±5%</td> </tr> <tr> <td>"Low" < -0.5~0.5V</td> <td>Vout ≒ 80%±5%</td> <td>Vout ≒ 67%±5%</td> </tr> </tbody> </table> <table border="1" data-bbox="478 1568 957 1664"> <thead> <tr> <th>AC-OK signal</th> <th>Power Supply and Charger Mode Status</th> </tr> </thead> <tbody> <tr> <td>"High" > 3.5~5.5V</td> <td>Input voltage ≒ 87Vrms</td> </tr> <tr> <td>"Low" < -0.5~0.5V</td> <td>Input voltage ≒ 75Vrms</td> </tr> </tbody> </table> <table border="1" data-bbox="478 1713 957 1809"> <thead> <tr> <th>T-ALARM signal</th> <th>Power Supply and Charger Mode Status</th> </tr> </thead> <tbody> <tr> <td>"High" > 3.5~5.5V</td> <td>OFF(OTP or Fan Fail)</td> </tr> <tr> <td>"Low" < -0.5~0.5V</td> <td>ON(Normal Work)</td> </tr> </tbody> </table> <p>1. DC OK SIGNAL For power supply mode High (3.5 ~ 5.5V) : When the Vout ≒ 77%±5%. Low (-0.5 ~ 0.5V) : When the Vout ≒ 80%±5%. The maximum sourcing current is 10mA and only for output. For charger mode High (3.5 ~ 5.5V) : When the Vout ≒ 66%±5%.</p>		DC-OK signal	Power Supply Mode Status	Charger Mode Status	"High" > 3.5~5.5V	Vout ≒ 77%±5%	Vout ≒ 66%±5%	"Low" < -0.5~0.5V	Vout ≒ 80%±5%	Vout ≒ 67%±5%	AC-OK signal	Power Supply and Charger Mode Status	"High" > 3.5~5.5V	Input voltage ≒ 87Vrms	"Low" < -0.5~0.5V	Input voltage ≒ 75Vrms	T-ALARM signal	Power Supply and Charger Mode Status	"High" > 3.5~5.5V	OFF(OTP or Fan Fail)	"Low" < -0.5~0.5V	ON(Normal Work)
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Low (-0.5 ~ 0.5V) : When the $V_{out} \geq 67\% \pm 5\%$. The maximum sourcing current is 10mA and only for output.

DC OK is associated with battery low protection.

I/P: 230 VAC
O/P: FULL LOAD

Ta: 25°C

Test Result :

Vout	DC OK SIGNAL
$V_{out} \leq 72\%$	4.9612V
$V_{out} \geq 85\%$	0.0081V

2. T-ALARM

High (3.5 ~ 5.5V) : When the internal temperature exceeds the limit of temperature alarm, or when Fan fails.

Low (-0.5 ~ 0.5V) : When the internal temperature is normal, and when Fan works normally.

The maximum sourcing current is 10mA and only for output

I/P: 230 VAC
O/P: FULL LOAD

Ta: 25°C

Test Result :

P.SU STATUS	Vo	T-ALARM SPEC	T-ALARM TEST
NORMAL	100%±2%	-0.5 ~ 0.5V	0.0081v
OTP	0V	3.5~5.5V	4.961V
FAN LOCK	0V	3.5~5.5V	4.961V

3. AC OK

The maximum sourcing current is 10mA and only for output.

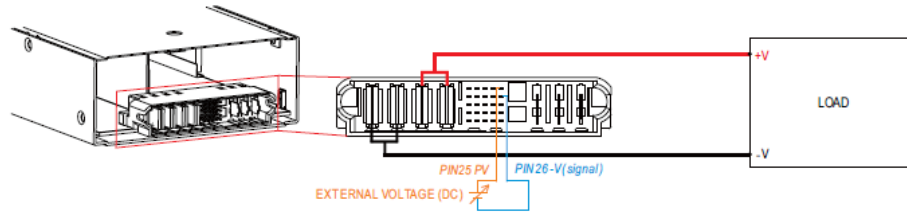
Low (-0.5 ~ 0.5V) : When the input voltage is $\leq 75V_{rms}$.

High (3.5 ~ 5.5V) : When the input voltage is $\geq 87V_{rms}$.

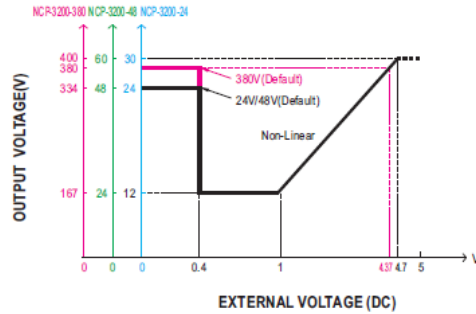
Vout	AC OK SIGNAL
$AC \geq 87V_{rms}$	4.9612V
$AC \leq 75V_{rms}$	0.0081v

5 OUTPUT VOLTAGE PROGRAMMABLE (PV)

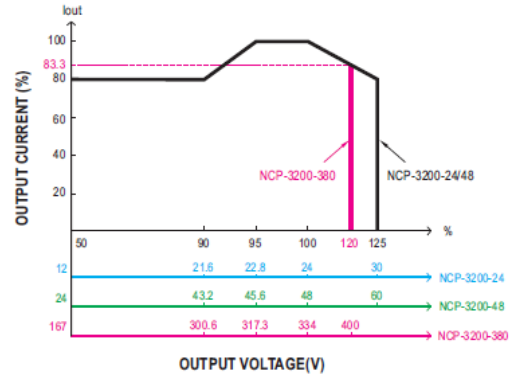
※ In addition to the adjustment via the built-in potentiometer, the output voltage can be trimmed to 50~125%(24/48V models) or 50~120%(380V model) of the nominal voltage by applying EXTERNAL VOLTAGE.



◎ For Remote Sense / Local Sense, please refer to "Voltage Drop Compensation" section.



◎ For power supply mode
 ◎ The 100% output voltage is 24/48/334V.



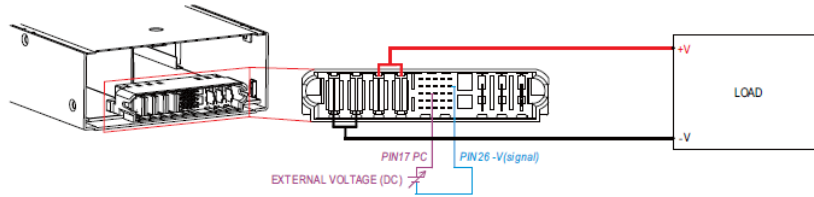
◎ The rated current should change with the Output Voltage Programming accordingly.
 ◎ The 100% output current is 133/67/9.6A.
 ◎ For Remote Sense / Local Sense, please refer to "Voltage Drop Compensation" section.

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

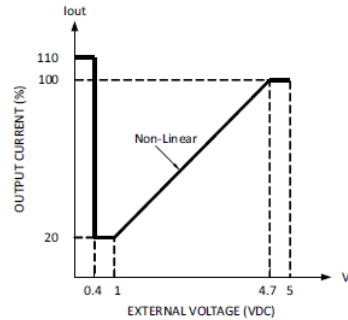
PV	<0.3V	1V	3.435V	4.7V	5V
MODEL					
SPEC	24V±5%	12V±5%	24V±5%	30V±5%	30V±5%
Vout	24.03V	12.063V	24.068V	30.47V	30.99V

6 Constant Current Level Programming

※ The constant current level can be trimmed to 20~100% of the rated current by applying EXTERNAL VOLTAGE.
 ※ If setting output current to a much lower level, as output status turns to constant current mode, it might cause higher current ripple under such condition.



- For Remote Sense / Local Sense, please refer to "Voltage Drop Compensation" section.
- Output will shut down after O/P voltage is below < 80% of Vset for 5 sec, re-power on to recover.



- The 100% output current is 133/67/9.6A.
- Notice the output power do not over rated power (max.)

I/P: 230 VAC

O/P: FULL LOAD

Ta: 25°C

TEST RESULT :

	PC	<0.3V	1V	2.388V	4.7V	5V
MODEL						
SPEC		110%±10%	20%±10%	50%±10%	100%±10%	100%±10%
lout		107.52%	18.95%	49.25%	99.25%	101.5%

7 CURRENT SHARING

Maximum 10 rack shelves in parallel
 CURRENT SHARING TOLERANCE < ±10%

I/P : 230 VAC

O/P : 90%/50% LOAD

Ta : 25°C

TEST RESULT :

NO	50% LOAD	90% LOAD	NO	50% LOAD	90% LOAD	NO	50% LOAD	90% LOAD	NO	50% LOAD	90% LOAD
0	66.40	120.30	10	66.50	120.20	20	66.30	120.10	30	66.40	120.00
1	66.40	120.30	11	66.30	120.30	21	66.50	119.90	31	66.40	120.10
2	66.60	120.10	12	66.50	120.00	22	66.40	120.10	32	66.60	120.30
3	66.30	119.90	13	66.40	120.10	23	66.50	120.20	33	66.30	120.10
4	66.50	120.00	14	66.50	120.10	24	66.60	120.20	34	66.50	120.20
5	66.50	120.10	15	66.60	120.10	25	66.60	120.00	35	66.50	120.30
6	66.60	120.00	16	66.50	120.20	26	66.50	120.30	36	66.60	120.30
7	66.50	120.20	17	66.50	120.20	27	66.60	120.20	37	66.50	120.00
8	66.40	120.10	18	66.50	120.10	28	66.30	120.20	38	66.40	120.30
9	66.40	119.90	19	66.40	119.90	29	66.50	120.00	39	66.40	120.10

Unit : A

CHARGER MODE

OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT																																											
1	BOOST CHARGE VOLTAGE	28.8V±0.24V	I/P : 230 VAC O/P : CV MODE Ta : 25°C	28.788 V																																											
2	FLOAT CHARGE VOLTAGE	27.6V±0.24V	I/P : 230 VAC O/P : CV MODE Ta : 25°C	27.58V																																											
3	OUTPUT CURRENT	440A±3%	I/P : 230 VAC O/P : CV MODE Ta : 25°C	436A																																											
4	Charging Curve	<p>※ By default, the unit operates in power supply mode, and it can be configured to charger mode by PMBus, CANBus or SBP-001.</p> <p>※ By factory default, this charger performs the default curve which can be programmed via PMBus and CANBus.</p> <p>※ To accommodate the parameters of the charging curve, SBP-001, the smart battery charging programmer designed by MEAN WELL, and a personal computer are needed. Please contact MEAN WELL for details.</p> <p>※ 2 stage charging curve</p> <p>※ 3 stage charging curve (default)</p> <p>Color of LED Loading Indicator Status Indicator</p> <p>Charger fail if charging time exceed charging timeout</p> <table border="1"> <thead> <tr> <th>State</th> <th>NCP-3200-24</th> <th>NCP-3200-48</th> </tr> </thead> <tbody> <tr> <td>Constant Current</td> <td>110A</td> <td>55A</td> </tr> <tr> <td>Vboost</td> <td>28.8V</td> <td>57.6V</td> </tr> </tbody> </table> <p>☉ Suitable for lead-acid batteries (flooded, Gel and AGM) and Li-ion batteries (lithium iron and lithium manganese).</p> <p>☉ Embedded 2 stage charging curves</p> <table border="1"> <thead> <tr> <th>MODEL</th> <th>Description</th> <th>CC(default)</th> <th>Vboost</th> </tr> </thead> <tbody> <tr> <td rowspan="4">24V</td> <td>Default, programmable</td> <td rowspan="4">110A</td> <td>28.8</td> </tr> <tr> <td>Pre-defined, gel battery</td> <td>28</td> </tr> <tr> <td>Pre-defined, flooded battery</td> <td>28.4</td> </tr> <tr> <td>Pre-defined, AGM battery</td> <td>29</td> </tr> <tr> <td rowspan="4">48V</td> <td>Default, programmable</td> <td rowspan="4">55A</td> <td>57.6</td> </tr> <tr> <td>Pre-defined, gel battery</td> <td>56</td> </tr> <tr> <td>Pre-defined, flooded battery</td> <td>56.8</td> </tr> <tr> <td>Pre-defined, AGM battery</td> <td>58</td> </tr> </tbody> </table> <p>※ LED Status Indicators (for charger mode)</p> <table border="1"> <thead> <tr> <th>LED</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>● Green</td> <td>Float (stage 3)</td> </tr> <tr> <td>● Orange</td> <td>Charging (stage 1 or stage 2)</td> </tr> <tr> <td>● Red</td> <td>The LED will present a constant red light when the abnormal status (OTP, OLP, fan fail and charging timeout) arises.</td> </tr> <tr> <td>● Red (Flashing)</td> <td>The LED will flash with the red light when the internal temperature reaches 60°C; under this condition, the unit still operates normally without entering OTP. (In the meantime, an alarm signal will be sent out through the PMBus/CANBus interface.)</td> </tr> </tbody> </table>		State	NCP-3200-24	NCP-3200-48	Constant Current	110A	55A	Vboost	28.8V	57.6V	MODEL	Description	CC(default)	Vboost	24V	Default, programmable	110A	28.8	Pre-defined, gel battery	28	Pre-defined, flooded battery	28.4	Pre-defined, AGM battery	29	48V	Default, programmable	55A	57.6	Pre-defined, gel battery	56	Pre-defined, flooded battery	56.8	Pre-defined, AGM battery	58	LED	Description	● Green	Float (stage 3)	● Orange	Charging (stage 1 or stage 2)	● Red	The LED will present a constant red light when the abnormal status (OTP, OLP, fan fail and charging timeout) arises.	● Red (Flashing)	The LED will flash with the red light when the internal temperature reaches 60°C; under this condition, the unit still operates normally without entering OTP. (In the meantime, an alarm signal will be sent out through the PMBus/CANBus interface.)	PASS
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SAFETY & E.M.C. TEST

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P: 3KVAC/min I/P-FG: 2KVAC/min O/P-FG: 1.5KVDC/min	I/P-O/P: 3.6 KVAC/min I/P-FG: 2.4 KVAC/min O/P-FG: 1.8KVDC/min Ta:25°C	I/P-O/P: 12.04 mA I/P-FG: 10.73mA O/P-FG: 0.002 mA NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P: 500VDC>100MΩ I/P-FG: 500VDC>100MΩ O/P-FG: 500VDC>100MΩ	I/P-O/P: 500 VDC I/P-FG: 500 VDC O/P-FG: 500 VDC Ta:25°C	I/P-O/P: 13 GΩ I/P-FG: 2.86GΩ O/P-FG: 5 GΩ NO DAMAGE
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40A / 2min Ta:25°C	25mΩ

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	EN61000-3-2 CLASS A	I/P: 230VAC/50HZ O/P: 100% LOAD Ta: 25°C	PASS
2	CONDUCTION	EN55022 CLASS B	I/P : 230 VAC (50HZ) O/P : FULL/50% LOAD Ta : 25°C	PASS Test by certified Lab
3	RADIATION	EN55022 CLASS A	I/P : 230 VAC (50HZ) O/P : FULL LOAD Ta : 25°C	PASS Test by certified Lab
4	E.S.D	EN61000-4-2 INDUSTRY AIR : 8KV / Contact : 4KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
5	E.F.T	EN61000-4-4 INDUSTRY INPUT : 2KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
6	SURGE	IEC61000-6-2 INDUSTRY L-N : 2KV L,N-PE : 4KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
7	Test by certified Lab & Test Report Prepare Any contradictions of the test results, please refer to the latest EMC test report.			

■ RELIABILITY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT																																																																																																																												
1	TEMPERATURE RISE TEST	MODEL : DHP-1UT-B-24 1. ROOM AMBIENT BURN-IN : 1 HRS I/P : 230VAC O/P : FULL LOAD Ta= 25 °C 2. HIGH AMBIENT BURN-IN : 1 HRS I/P : 230VAC O/P : FULL LOAD Ta= 50 °C																																																																																																																														
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2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 230 VAC O/P : 110%LOAD Ta : 25°C	TEST : OK																																																																																																																												



3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 264VAC/180VAC O/P : 80 %LOAD Ta= -35 °C	TEST : OK
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 50 °C/95 %R.H NO DAMAGE	I/P : 272 VAC O/P : FULL LOAD Ta= 50°C HUMIDITY= 95 %R.H	TEST : OK
5	TEMPERATURE COEFFICIENT	± 0.03 %/°C(0~50°C)	I/P : 230 VAC O/P : FULL LOAD	± 0.015 %/°C(0~50°C)
6	STORAGE TEMPERATURE TEST	-40~85°C	1. Thermal shock Temperature : -45°C~ +90°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 : STATIC	
7	THERMAL SHOCK TEST	-20~50°C	1. Thermal shock Temperature : -25°C~ +55°C 2. Temperature change rate : 25°C / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 16 CYCLE 5. Input/Output condition : 15cycle:230V/ FULL LOAD AC ON 3sec/AC OFF 1sec TEST 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 (1) Waveform : Sine Wave (2) Frequency : 10~500Hz (3) Sweep Time : 10min/sweep cycle (4) Acceleration : 3G (5) Test Time : 180min in each axis (X.Y.Z) (6) Ta : 25°C	
9	CAPACITOR LIFE CYCLE	SUPPOSE C121 IS THE MOST CRITICAL COMPONENT (1) I/P : 230VAC O/P : FULL LOAD Ta= 25 °C LIFE TIME (2) I/P : 230VAC O/P : FULL LOAD Ta= 50 °C LIFE TIME (3) I/P : 230VAC O/P : 75% LOAD Ta= 50 °C LIFE TIME (4) I/P : 230VAC O/P : 50% LOAD Ta= 50 °C LIFE TIME	(1) 65469.7HRS (2) 19873.2HRS (3) 64152.9HRS (4) 190032.2HRS	
10	MTBF	Conducted by Parts Stress Analysis Prediction 3698.9K hrs min. Telcordia SR-332 (Bellcore) ; 818.3K hrs min. MIL-HDBK-217F (25°C)		
11	Ongoing Reliability Test	I/P : 230VAC O/P : FULL LOAD TA=50°C Demonstration Mean Time Between Failure : 50,000 hours		

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

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