Test Report: HLG-240H-C1050

250W Single Output LED Power Supply

■ DESIGN VERIFY TEST

Output Function Test
Input Function Test
Protection Function Test
Component Stress Test

■ SAFETY & E.M.C. TEST

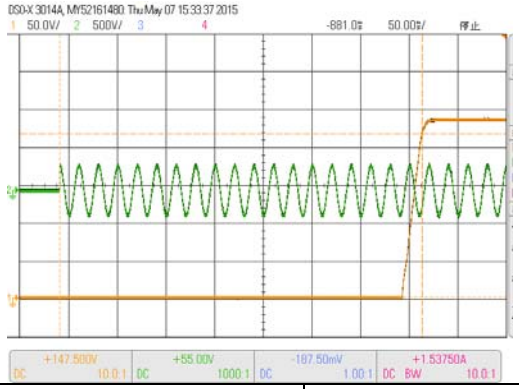
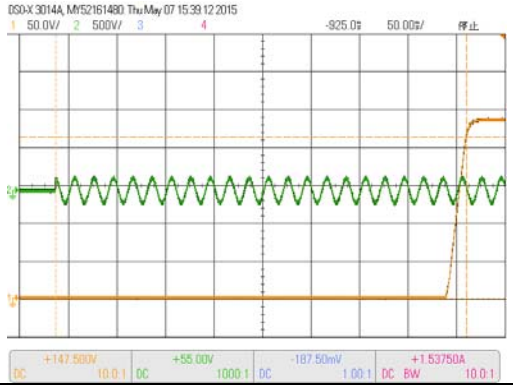
Safety Test
E.M.C. Test

■ RELIABILITY TEST

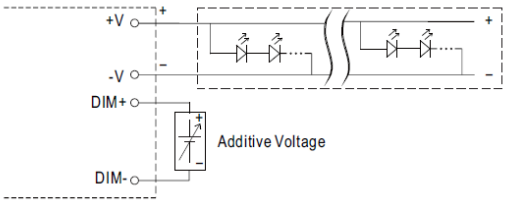
ENVIRONMENT TEST

■ DESIGN VERIFY TEST

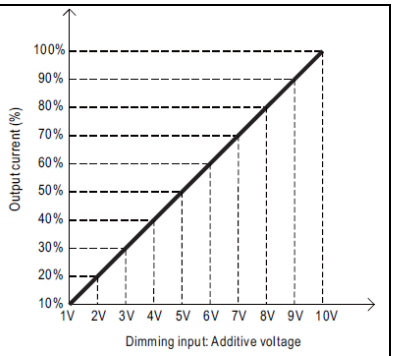
OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	CURRENT TOLERANCE	±5%	I/P: 230 VAC I/P:115VAC O/P:FULL LOAD Ta:25℃	1.055A /230VAC@CV MAX-2V 1.057A /230VAC@CV MIN 1.055A/115VAC@CV MAX-2V 1.057A/115VAC@CV MIN +0.667%
2	CONSTANT CURRENT REGION	CH1: 119V~ 238V	I/P: 230 VAC O/P:FULL LOAD Ta:25℃	0.3V~237 V /230VAC
3	OPEN CIRCUIT VOLTAGE (max.)	241V	I/P: 230 VAC O/P:NO LOAD Ta:25℃	241.5V
4	CURRENT ADJ. RANGE	CH1:525mA~ 1050mA	I/P: 230 VAC I/P:115VAC O/P:CV MIN & CV MAX-2V Ta:25℃	0.438A~ 1.281A /230VAC@CV MAX-2V 0.441A~ 1.28A /230VAC@CV MIN 0.439A~1.281/115VAC@CV MAX-2V 0.441A~1.28 A/115VAC@CV MIN
5	CURRENT RIPPLE	5.0% max. @rated current	I/P: 230 VAC O/P:FULL LOAD Ta:25℃	1.92%
6	SET UP TIME(Max)	230VAC/500 ms 115VAC/1000ms	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25℃	230VAC/ 372ms 115 VAC/423 ms
	INPUT=230VAC/50HZ @ FULL LOAD CH1 : AC Input Voltage CH2 : Output Voltage 		INPUT=115VAC/60HZ @ FULL LOAD CH1 : AC Input Voltage CH2 : Output Voltage 	
7	DIMMING OPERATION **(for B-Type)**	※**3 in 1 dimming function** ※Output constant current level can be adjusted by applying one of the three methodologies between DIM+ and DIM-: 1 ~ 10VDC, or 10V PWM signal or resistance. ※Direct connecting to LEDs is suggested. It is not suitable to be used with additional drivers. ※Dimming source current from power supply: 100μ A (typ.)		

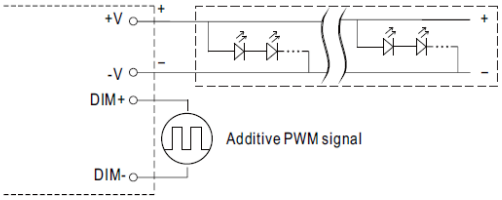
◎ Applying additive 1 ~ 10VDC



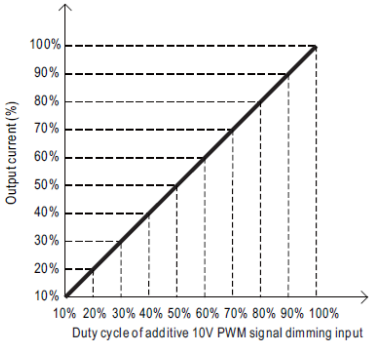
"DO NOT connect "DIM- to -V"



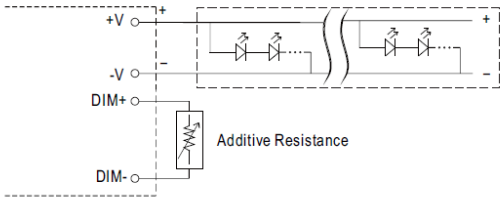
◎ Applying additive 10V PWM signal (frequency range 100Hz ~ 3KHz):



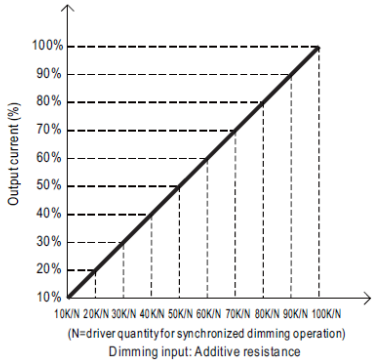
"DO NOT connect "DIM- to -V"



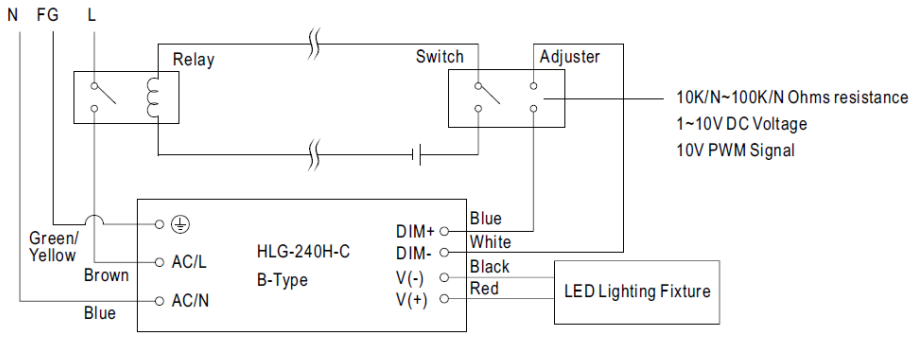
◎ Applying additive resistance:



"DO NOT connect "DIM- to -V"



Note: In the case of turning the lighting fixture down to 0% brightness, please refer to the configuration as follow, or please contact MEAN WELL for other options.



Using a switch and relay can turn ON/OFF the lighting fixture.

I/P：230VAC

O/P：DIMMING TEST

TA：25℃

R	10K	20K	30K	40K	50K	60K	70K	80K	90K	100K	OPEN
O/P CURRENT	0.110A	0.213A	0.319A	0.422A	0.523A	0.625A	0.728A	0.826A	0.927A	1.021A	1.056A
%	10.50%	20.26%	30.40%	40.19%	49.84%	59.48%	69.29%	78.67%	88.29%	97.20%	100.54%
V	1V	2V	3V	4V	5V	6V	7V	8V	9V	10V	OPEN

O/P CURRENT	0.111A	0.215A	0.320A	0.425A	0.530A	0.633A	0.737A	0.842A	0.946A	1.051A	1.056A
%	10.56%	20.50%	30.45%	40.48%	50.48%	60.29%	70.19%	80.19%	90.10%	100.10%	100.54%
PWM (100HZ)	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	OPEN
O/P CURRENT	0.101A	0.208A	0.317A	0.422A	0.526A	0.629A	0.731A	0.833A	0.938A	1.041A	1.056A
%	9.62%	19.85%	30.18%	40.18%	50.12%	59.86%	69.57%	79.35%	89.29%	99.10%	100.54%

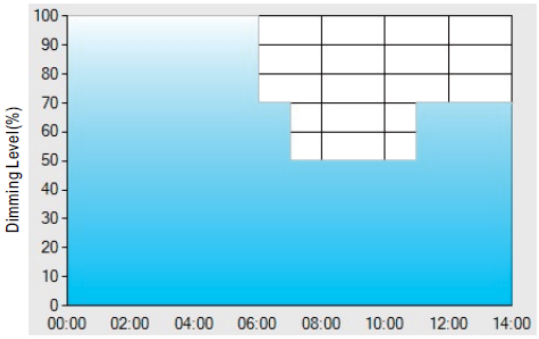
TEST RESULT：OK

8 DIMMING OPERATION **(for Dxx-Type by User definition)**

※Smart timer dimming function (for Dxx-Type by User definition)

MEAN WELL Smart timer dimming primarily provides the adaptive proportion dimming profile for the output constant current level to perform up to 14 consecutive hours. 3 dimming profiles hereunder are defined accounting for the most frequently seen applications. If other options may be needed,please contact MEAN WELL for details.

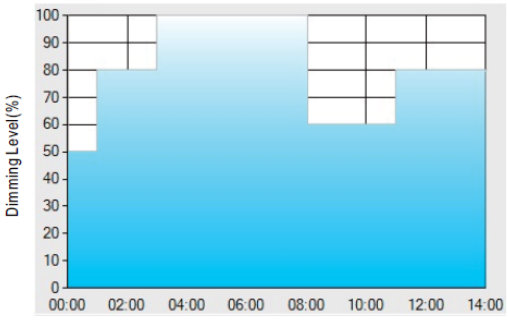
Ex：◎ D01-Type: the profile recommended for residential lighting



Set up for D01-Type in Smart timer dimming software program:

	T1	T2	T3	T4
TIME**	06:00	07:00	11:00	---
LEVEL**	100%	70%	50%	70%

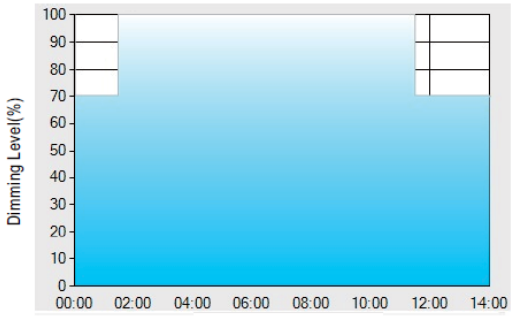
Ex: ◎ D02-Type: the profile recommended for street lighting



Set up for D02-Type in Smart timer dimming software program:

	T1	T2	T3	T4	T5
TIME**	01:00	03:00	8:00	11:00	---
LEVEL**	50%	80%	100%	60%	80%

Ex: ◎ D03-Type: the profile recommended for tunnel lighting

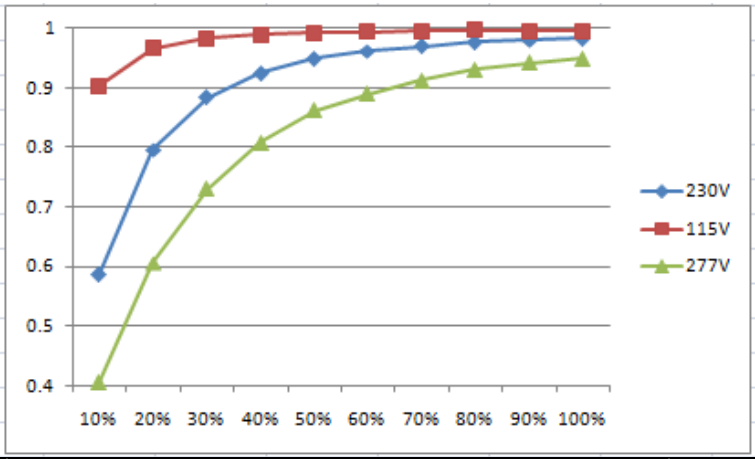


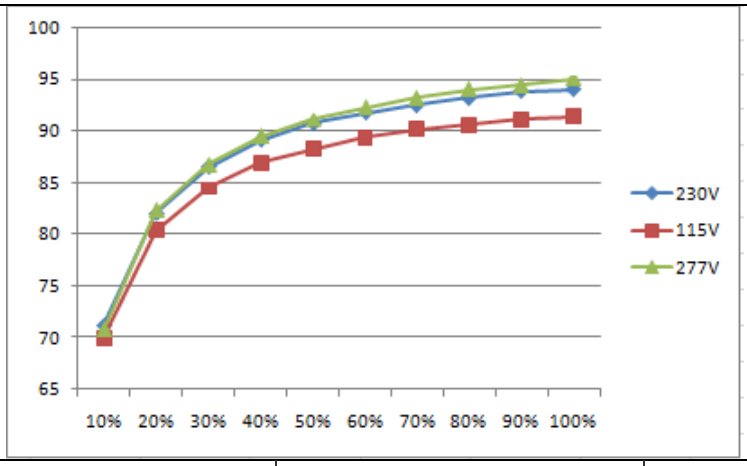
Set up for D03-Type in Smart timer dimming software program:

	T1	T2	T3
TIME**	01:30	11:00	---
LEVEL**	70%	100%	70%

I/P：230VAC
O/P：DIMMING TEST
TA：25℃
TEST RESULT：OK

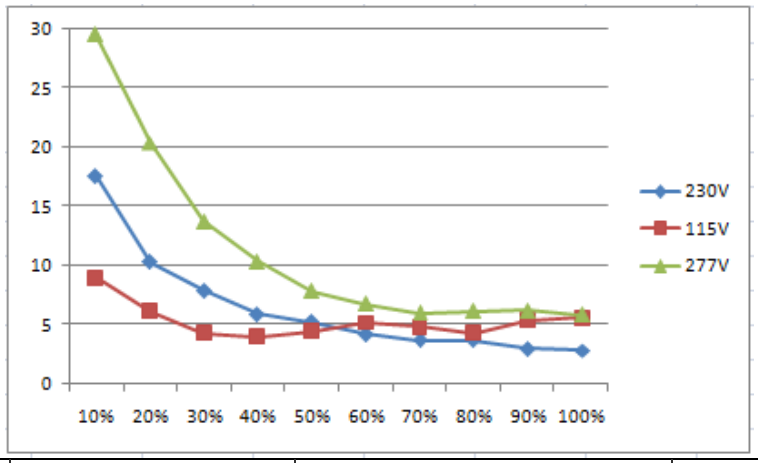
INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	90VAC~305 VAC	I/P:TESTING O/P:FULL LOAD Ta:25℃	67V~305V
			I/P: (1)LOW-LINE-3V=87 V HIGH-LINE+10V=315 V O/P:FULL/MIN LOAD (PLEASE CHECK DERATING CURVE) ON: 30 Sec . OFF: 30 Sec 10MIN (POWER ON/OFF NO DAMAGE) (2) I/P:230Vac ON: 0.5 Sec . OFF: 0.5 Sec 20MIN	(1).TEST:OK (2).TEST :OK
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE	I/P: 100 VAC ~305VAC O/P:FULL~MIN LOAD Ta:25℃	OK
3	INPUT CURRENT (TYP)	277VAC/ 1.1 A 230 VAC/ 1.3 A 115 VAC/ 2.5 A	I/P: 277VAC/230 VAC/115 VAC O/P:FULL LOAD Ta:25℃	I=1.008 A/277VAC I = 1.18A/ 230VAC I = 2.41A/ 115VAC
4	POWER FACTOR(TYP)	0.95/230 VAC FULL LOAD 0.98/115 VAC FULL LOAD 0.92/277 VAC FULL LOAD	I/P: 230 VAC/115VAC/277VAC O/P:FULL LOAD Ta:25℃	PF= 0.975/230V/100%LOAD PF=0.996 /115V/100%LOAD PF= 0.951/277V/100%LOAD
	P.F vs LOAD 			
5	EFFICIENCY (TYP)	93.5 %	I/P: 230 VAC O/P:FULL LOAD Ta:25℃	94.3%
	EFFICIENCY vs LOAD			

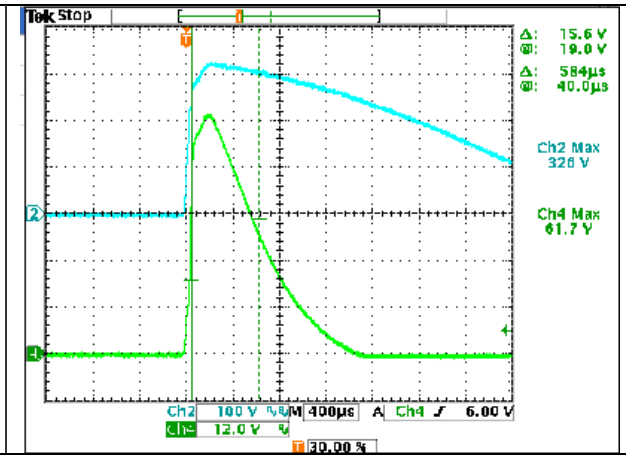


6	TOTAL HARMONIC DISTORTION	Total harmonic distortion will be lower than 20% when output loading is 50% or higher at 230VAC / 115VAC Total harmonic distortion will be lower than 20% when output loading is 75% or higher at 277VAC	I/P： 230VAC I/P： 115VAC O/P：50% LOAD Ta：25℃ I/P： 277VAC O/P：75% LOAD Ta：25℃	THD： 3.5 % THD： 5.12 % THD： 6.32 %

THD&LOAD



7	INRUSH CURRENT (TYP)	230 V/ 75A COLD START (twidth= 700us measured at 50% Ipeak) COLD START	I/P: 230 VAC O/P:FULL LOAD Ta:25℃	I = 61.7A/ 230VAC T50= 584 us
	INPUT=230VAC/50HZ @ FULL LOAD CH2 : AC Input Voltage CH4 : Input current (1V=1A)			



ROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER VOLTAGE PROTECTION	V1: 250V~ 275 V	I/P: 305VAC I/P: 230VAC I/P: 90VAC O/P:MIN LOAD Ta:25℃	263.02V/ 305VAC 263.02V/ 230VAC 262.91V/ 90VAC PROTECTION TYPE： Shut down and latch off o/p voltage, re-power on to recover
2	OVER TEMPERATURE PROTECTION	SPEC: NO DAMAGE	I/P: 305 VAC I/P: 90 VAC O/P:FULL LOAD	O.T.P. Active PROTECTION TYPE： Shut down o/p voltage, recovers automatically after temperature goes down
3	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 305VAC I/P: 90 VAC O/P: FULL LOAD Ta:25℃	NO DAMAGE PROTECTION TYPE： Constant current limiting, recovers automatically after fault condition is removed

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	P.F.C Transistor **(D to S) or (C to E)** Peak Voltage	Q1Rated 600V/19A	I/P:High-Line +3V =308V AC ON/OFF VDS: O/P: (1)Full Load (2)Output Short (3)FULL LOAD CONTINUE I/P:Low-Line -3V = 107V AC ON/OFF VDS O/P: (1)Full Load (2)Output Short (3)FULL LOAD CONTINUE Ta:25℃	 VDS: (1)521V (2)489V (3)517V VDS: (1)513V (2)501V (3)501V

2	PWM Transistor (D to S) or (C to E) **Peak Voltage**	Q3 Rated 20A/600V	I/P:High-Line +3V =308V AC ON/OFF VDS: O/P: (1)Full Load (2)Output Short (3)FULL LOAD CONTINUE I/P:Low-Line -3V = 107V AC ON/OFF VDS O/P: (1)Full Load (2)Output Short (3)FULL LOAD CONTINUE Ta:25℃	 VDS: (1)477V (2)497V (3)477V VDS: (1)476V (2)501V (3)465V
3	Diode Peak **Voltage**	D102 Rated 3A/400V D103 Rated 3A/400V	I/P:High-Line +3V = 308 V AC ON/OFF VDS: O/P: (1)Full Load (2)Output Short (3)FULL LOAD CONTINUE VDS: (1)Full Load (2)Output Short (3)FULL LOAD CONTINUE Ta:25℃	D102: VDS: (1)244V (2)30.2V (3)242V D103: VDS: (1)246V (2)38.2V (3)243V
4	**Input Capacitor Voltage**	C5 Rated: 150u/450V SURGE POWER :495V	I/P:High-Line +3V =308 V O/P: (1)Full Load input on/off (2) Min load input on /Off (3)Full Load /Min load Change Ta:25℃	(1)466V (2)454V (3)446V
5	**Control IC Voltage Test**	PWM IC U70 Rated 8.85V~16V	I/P:High-Line +3V =308 V AC ON/OFF O/P(1)FULL LOAD (2) Output Short (3)O.L.P (4)O.V.P. (5)NO LOAD (LOW LINE) Ta:25℃	(1) 15.5V (2) 15.5V (3) 15.3V (4) 15.5V (5) 14.5V

■ SAFETY & EMC TEST

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	IEC60950-1 I/P-O/P: 3.75KVAC/min I/P-FG: 2 KVAC/min<4.5mA O/P-FG:1.5KVAC/min	I/P-O/P: 4.125 KVAC/min I/P-FG: 2.4 KVAC/min O/P-FG: 1.8 KVAC/min Ta:25℃	I/P-O/P: 4.02mA I/P-FG: 3.92mA O/P-FG: 3.15mA 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℃	I/P-O/P: 30GΩ I/P-FG: 12.4G Ω O/P-FG:30 G Ω NO DAMAGE

3	GROUNDING CONTINUITY	IEC60950-1 FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40A / 2min Ta:25℃	30MΩ
4	LEAKAGE CURRENT	IEC60950-1 < 0.75mA / 277VAC	I/P: 277 VAC O/P:Min LOAD Ta:25℃	L-FG: .0.26mA N-FG:. 0.28mA

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	EN61000-3-2 CLASS A CLASS C	I/P: 230VAC/50HZ O/P:FULL LOAD Ta:25℃	PASS
2	CONDUCTION	EN55015 CLASS B	I/P: 230 VAC (50HZ) O/P:FULL/50% LOAD Ta:25℃	PASS Test by certified Lab
3	RADIATION	EN55015 CLASS B	I/P: 230 VAC (50HZ) O/P:FULL LOAD Ta:25℃	PASS Test by certified Lab
4	E.S.D	EN61000-4-2 LIGHT INDUSTRY AIR:8KV / Contact:4KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25℃	CRITERIA A
5	E.F.T	EN61000-4-4 INDUSTRY INPUT: 2KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25℃	CRITERIA A
6	SURGE	IEC61000-4-5 INDUSTRY L-N :2KV L,N-PE:4KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25℃	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

ENVIRONMENT TEST

<table>
<tr><th>NO</th><th>TEST ITEM</th><th>SPECIFICATION</th><th>TEST CONDITION</th><th>RESULT</th></tr>
<tr><td>1</td><td>TEMPERATURE RISE TEST</td><td colspan="3">MODEL： HLG-240H-C700
1. ROOM AMBIENT BURN-IN：3 HRS
I/P： 230VAC O/P： FULL LOAD Ta= 29.2 ℃
2. HIGH AMBIENT BURN-IN： 6 HRS
I/P： 230VAC O/P： FULL LOAD Ta= 55.7 ℃
<table>
<tr><th>NO</th><th>Position</th><th>ROOM AMBIENT</th><th>HIGH AMBIENT</th></tr>
<tr><td>1</td><td>BD1</td><td>65.7℃</td><td>89.0℃</td></tr>
<tr><td>2</td><td>C14</td><td>62.6℃</td><td>86.3℃</td></tr>
<tr><td>3</td><td>LF2</td><td>61.6℃</td><td>84.8℃</td></tr>
<tr><td>4</td><td>Q1</td><td>64.7℃</td><td>88.6℃</td></tr>
<tr><td>5</td><td>D3</td><td>63.9℃</td><td>87.7℃</td></tr>
<tr><td>6</td><td>L2</td><td>62.2℃</td><td>85.9℃</td></tr>
<tr><td>7</td><td>L1</td><td>63.5℃</td><td>88.6℃</td></tr>
<tr><td>8</td><td>D2</td><td>63.9℃</td><td>87.7℃</td></tr>
<tr><td>9</td><td>TSW1</td><td>62.2℃</td><td>85.9℃</td></tr>
<tr><td>10</td><td>Q4</td><td>63.6℃</td><td>87.4℃</td></tr>
<tr><td>11</td><td>C5</td><td>61.6℃</td><td>84.9℃</td></tr>
<tr><td>12</td><td>C35</td><td>63.9℃</td><td>86.9℃</td></tr>
<tr><td>13</td><td>C37</td><td>63.9℃</td><td>86.9℃</td></tr>
<tr><td>14</td><td>D102</td><td>63.9℃</td><td>87.5℃</td></tr>
<tr><td>15</td><td>T1</td><td>81.1℃</td><td>101.8℃</td></tr>
<tr><td>16</td><td>C201</td><td>61.3℃</td><td>85.2℃</td></tr>
<tr><td>17</td><td>C102</td><td>60.2℃</td><td>83.9℃</td></tr>
<tr><td>18</td><td>U1</td><td>61.3℃</td><td>84.9℃</td></tr>
<tr><td>19</td><td>D101</td><td>71.9℃</td><td>96.6℃</td></tr>
<tr><td>20</td><td>U201</td><td>63.5℃</td><td>88.0℃</td></tr>
</table></td></tr>
<tr><td>2</td><td>LOW TEMPERATURE
TURN ON TEST</td><td>TURN ON AFTER 2 HOUR</td><td>I/P： 305VAC/110VAC
O/P： 100 % LOAD
Ta= -40℃</td><td>TEST：OK</td></tr>
<tr><td>3</td><td>HIGH HUMIDITY
HIGH TEMPERATURE
HIGH VOLTAGE
TURN ON TEST</td><td>AFTER 12 HOURS
IN CHAMBER ON
CONTROL 60 ℃
NO DAMAGE</td><td>I/P： 305 VAC
O/P：FULL LOAD
Ta= 60 ℃
HUMIDITY= 95 %R.H</td><td>TEST：OK</td></tr>
<tr><td>4</td><td>TEMPERATURE
COEFFICIENT</td><td>± 0.03 %/℃(0~60℃)</td><td>I/P： 230 VAC
O/P：FULL LOAD</td><td>± 0.011 %/℃(0~60℃)</td></tr>
<tr><td>5</td><td>STORAGE TEMPERATURE TEST</td><td colspan="2">1. Thermal shock Temperature： -45℃~ +90℃
2. Temperature change rate ：25℃ / MIN
3. Dwell time low and high temperature ： 30 MIN/EACH
4. Total test cycle：5 CYCLE
5. Input/Output condition： STATIC</td><td>OK</td></tr>
</table>

6	THERMAL SHOCK TEST	1. Thermal shock Temperature： -45℃~ +65℃ 2. Temperature change rate ：25℃ / 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	OK
7	VIBRATION TEST	1 Carton & 1 Set (1) Waveform： Sine Wave (2) Frequency：10~500Hz (3) Sweep Time：12min/sweep cycle (4) Acceleration：5G (5) Test Time：72min in each axis (X.Y.Z) (6) Ta：25℃	TEST：OK
8	CAPACITOR LIFE CYCLE	HLG-240H-C700:SUPPOSE C102 IS THE MOST CRITICAL COMPONENT (1 I/P： 230VAC O/P：FULL LOAD Tc=75℃ LIFE TIME (2 I/P： 230VAC O/P：75% LOAD Tc=75℃ LIFE TIME (3 I/P： 230VAC O/P：50% LOAD Tc=75℃ LIFE TIME	(1) 85205 HRS (2) 86966 HRS (3) 91020 HRS
9	MTBF	Conducted by Parts Stress Analysis Prediction 180K hrs min. MIL-HDBK-217F (25℃)	
10	Ongoing Reliability Test	I/P：230VAC O/P：FULL LOAD TA=50℃ Demonstration Mean Time Between Failure : 62,000 hours	

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

12.10.30 A50-F031