Test Report: LRS-1200-12

1200W Low Profile Economical Encolsed Type Power Supply

■ DESIGN VERIFY TEST

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

■ SAFETY & E.M.C. TEST

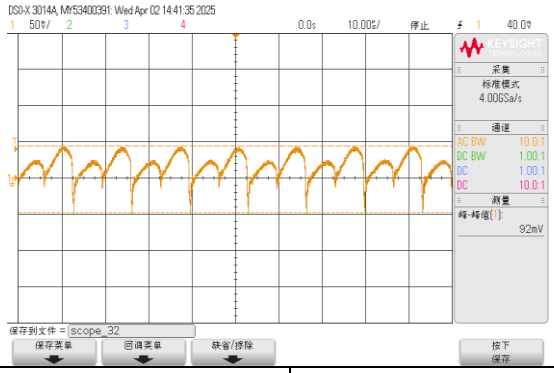
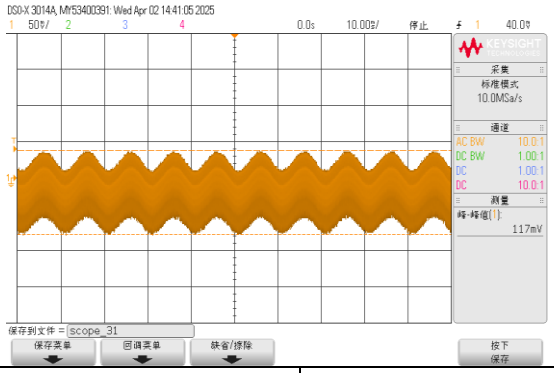
Safety Test
E.M.C. Test

■ RELIABILITY TEST

ENVIRONMENT TEST

■ DESIGN VERIFY TEST

OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE ADJUST RANGE	CH1: 12 V~ 15V	I/P： 230 VAC O/P：MIN LOAD Ta：25℃	11.62V~15.56V/230VAC
2	OUTPUT VOLTAGE TOLERANCE	V1: -1%~ +1 %	I/P: 180VAC /305VAC O/P:FULL/ MIN. LOAD Ta:25℃	V1: 0.08 % ~ +0.17%
3	LINE REGULATION	V1: -0.5%~ +0.5 %	I/P: 180VAC~ 305VAC O/P:FULL LOAD Ta:25℃	V1: 0.00%~ +0.17%
4	LOAD REGULATION	V1: -0.5%~ +0.5%	I/P: 230VAC O/P:FULL ~MIN LOAD Ta:25℃	V1: -0.08%~ +0.17%
5	OVER/UNDERSHOOT TEST	<± 5%	I/P: 230VAC O/P:FULL LOAD Ta:25℃	2.5%
	RIPPLE & NOISE (Max)	V1: 200 mVp-p	I/P: 230 VAC O/P: MIN LOAD—FULL LOAD Ta:25℃	V1: 117 mVp-p / 100% load
	high frequency： 		low frequency： 	
7	SET UP TIME(Max)	277VAC/1500ms 230VAC/1500ms	I/P： 277VAC I/P： 230 VAC O/P：FULL LOAD Ta：25℃	277VAC/ 616ms 230VAC/ 691ms
	INPUT=277VAC/60HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage		INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage	

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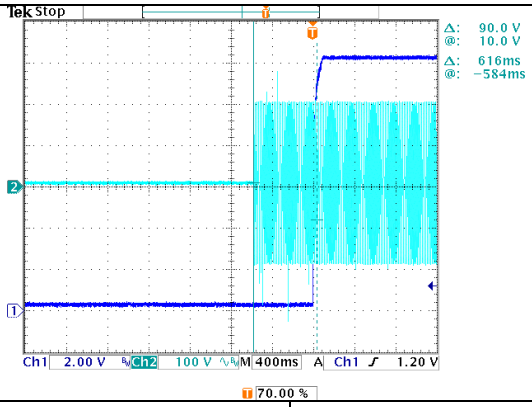
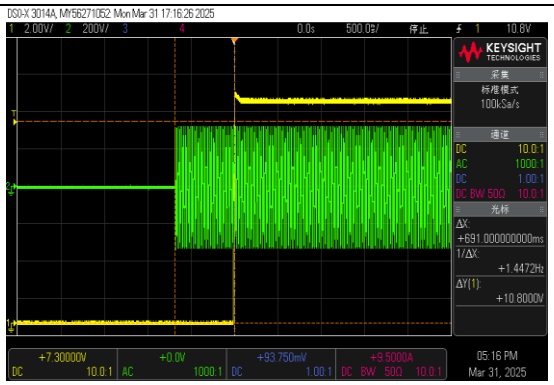
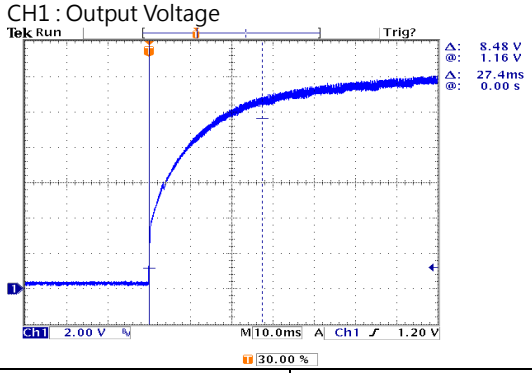
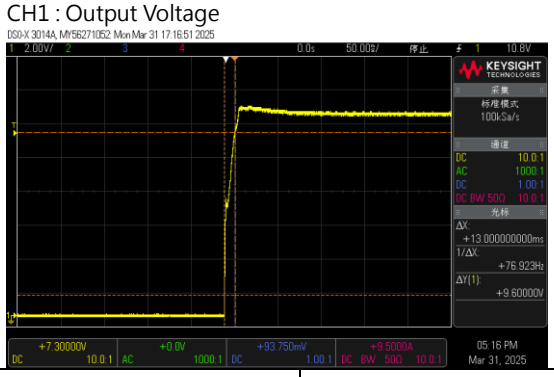
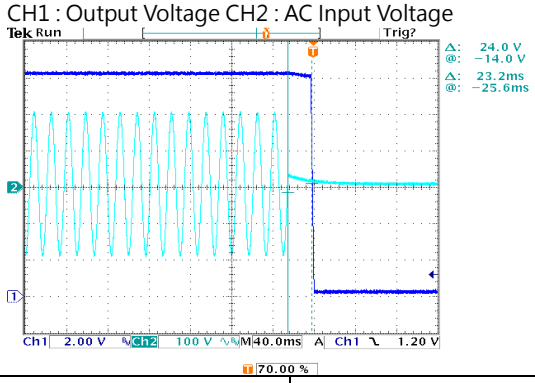
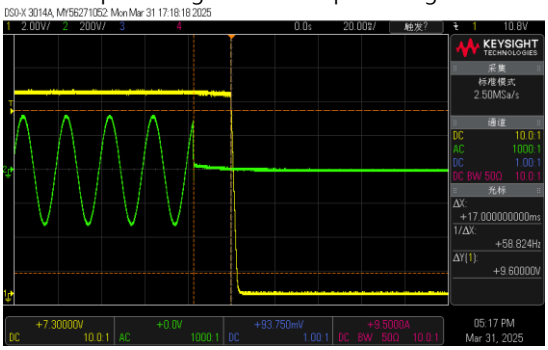
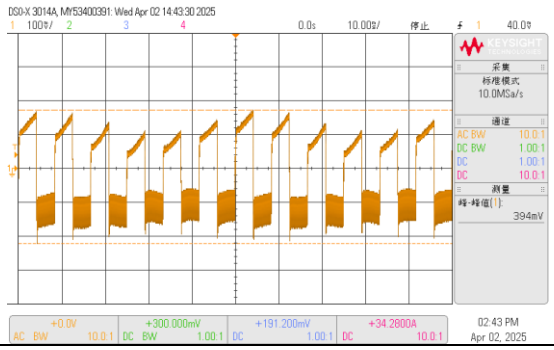
<tr><td></td><td colspan="4"> 


</td></tr>
<tr><td>8</td><td>RISE TIME (Max)</td><td>277VAC/70ms
230VAC/70ms</td><td>I/P： 277VAC
I/P： 230 VAC
O/P：FULL LOAD
Ta：25℃</td><td>277VAC/ 27.4ms
230VAC/13 ms</td></tr>
<tr><td></td><td colspan="2">INPUT=277VAC/60HZ @ FULL LOAD
CH1 : Output Voltage
 
</td><td colspan="2">INPUT=230VAC/50HZ @ FULL LOAD
CH1 : Output Voltage
 
</td></tr>
<tr><td>9</td><td>HOLD UP TIME (Typ.)</td><td>277VAC/10ms
230VAC/10ms</td><td>I/P： 277VAC
I/P： 230 VAC
O/P：FULL LOAD
Ta：25℃</td><td>277VAC/ 23.2ms
230VAC/ 17ms</td></tr>
<tr><td></td><td colspan="2">INPUT=277VAC/60HZ @ FULL LOAD
CH1 : Output Voltage CH2 : AC Input Voltage
 
</td><td colspan="2">INPUT=230VAC/50HZ @ FULL LOAD
CH1 : Output Voltage CH2 : AC Input Voltage
 
</td></tr>
<tr><td>10</td><td>DYNAMIC LOAD</td><td>V1: 1200mVp-p</td><td>I/P: 230VAC
O/P:
(1)FULL /50% LOAD 50%DUTY / 120HZ
(2)FULL /50% LOAD 50%DUTY / 1KHZ
Ta:25℃</td><td>

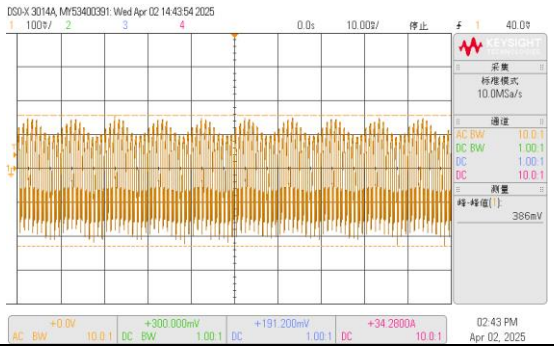
394mVp-p

386mVp-p</td></tr>
</table>

FULL /50% LOAD 50%DUTY / 120HZ



FULL /50% LOAD 50%DUTY / 1KHZ

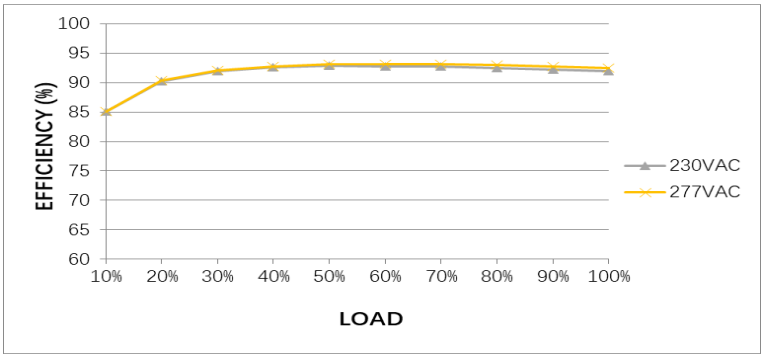


INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	180VAC~305VAC 255VDC~ 431VDC	(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 Ta:25℃	(1) 177V~300V (2) 255 Vdc~ 431Vdc/FULL LOAD 255Vdc~431 Vdc/50% LOAD (3) 255Vdc~ 431Vdc/FULL LOAD 255Vdc~ 431Vdc/50% LOAD
			I/P: LOW-LINE-3V=177 V HIGH-LINE+10V=315V 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 ~305 VAC O/P:FULL~MIN LOAD Ta:25℃	TEST: OK
3	INPUT CURRENT (Typ.)	277V/ 5A 230V/ 7A	I/P： 277VAC I/P： 230VAC O/P：FULL LOAD Ta：25℃	I =4.41A/ 277VAC I =5.24A/ 230VAC
4	LEAKAGE CURRENT	< 2mA / 277VAC < 7.07mA (Peak)/ 277 VAC < 2mA / 240 VAC < 7.07mA (Peak)/ 240 VAC	I/P：277 VAC I/P：240 VAC O/P：Min LOAD Ta：25℃	277VAC L-FG：0.347mA N-FG：0.347 mA L-FG： 0.663mA(Peak) N-FG： 0.656mA(Peak) 240VAC: L-FG：0.345mA N-FG：0.347mA L-FG： 0.612mA(Peak) N-FG： 0.617mA(Peak)

5	EFFICIENCY(Typ.)	91%	I/P:230 VAC O/P:FULL LOAD Ta:25℃	91.89%

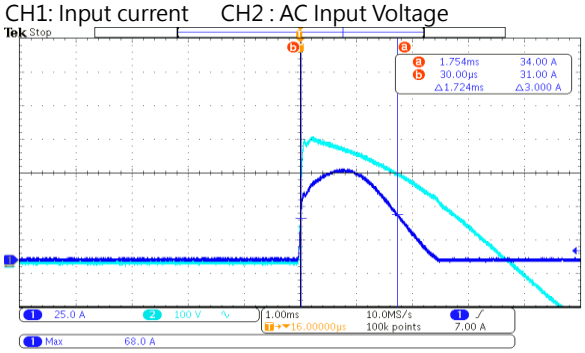
EFFICIENCY vs LOAD



6	INRUSH CURRENT(Typ.)	277V/75A 230V/60A COLD START	I/P： 277VAC I/P： 230 VAC O/P：FULL LOAD Ta：25℃	I =68A/ 277VAC T50=1724us/277VAC I =46A/ 230VAC T50=2020us/30VAC

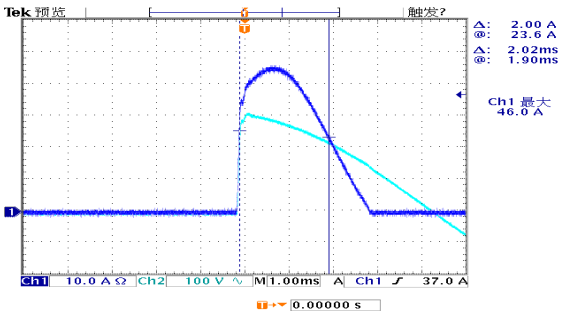
INPUT=277VAC/50HZ @ FULL LOAD

CH1: Input current CH2 : AC Input Voltage



INPUT=230VAC/50HZ @ FULL LOAD

CH1: Input current CH2 : AC Input Voltage



PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	Protection type: 1、Output power >105% rated for more than 5 seconds then shut down o/p voltage, re-power on to recover 2、Constant current limiting for output power >150% rated for more than 5 seconds and then shut down o/p voltage, re-power on to recover	I/P: 305VAC I/P: 230VAC I/P: 180VAC O/P:TESTING Ta:25℃	119.56%/ 305VAC 119.56%/ 230VAC 119.56%/180VAC Protection type: 1、Output power >105% rated for more than 5 seconds then shut down o/p voltage, re-power on to recover 2、Constant current limiting for output power >150% rated for more than 5 seconds and then shut down o/p voltage, re-power on to recover

2	OVER VOLTAGE PROTECTION	16V~20V	I/P: 305VAC I/P: 230VAC I/P: 180VAC O/P:MIN LOAD Ta:25℃	17.1V/ 305VAC 17.3V/ 230VAC 17.3V/ 180VAC Protection type: Shut down o/p voltage, re-power on to recover
3	OVER TEMPERATURE PROTECTION	NO DAMAGE	I/P: 305VAC I/P: 180VAC O/P:FULL LOAD	O.T.P. Active Protection type : Shut down o/p voltage, re-power on to recover

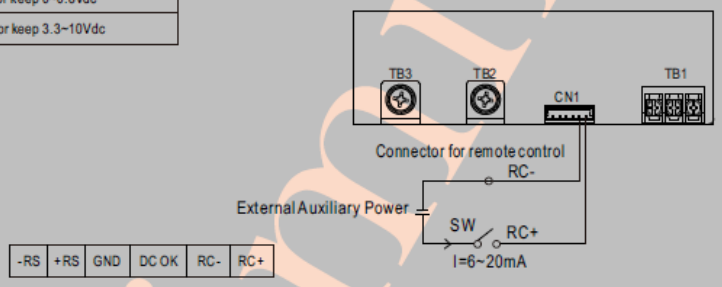
CONTROL FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	REMOTE CONTROL			

2. Remote Control

The PSU can be turned ON/OFF by using the "Remote Control" function with external switch and auxiliary power.

PSU Vo status	Between RC-(pin5) and RC+(pin6)
Power ON	SW open or keep 0~0.8Vdc
Power OFF	SW short or keep 3.3~10Vdc



I/P: 230 VAC

O/P:FULL LOAD

Ta:25℃

Test Result：

Between ON/OFF	Power Output Status
SW OFF（0~0.8V）	ON
SW ON （3.3~10V）	OFF

4. Peak Power

$$P_{av} = \frac{P_{pk} \times t + P_{npk} \times (T-t)}{T} \leqslant P_{rated}$$

$$Duty = \frac{t}{T} \times 100\% \leqslant 35\%$$

$t \leqslant 5$ sec

P_{av}: Average output power (W)

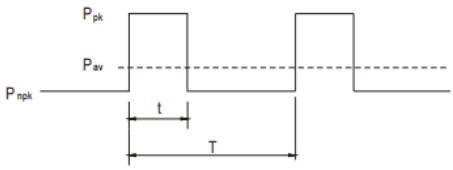
P_{pk} : Peak output power (W)

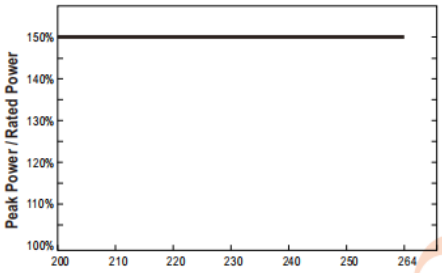
P_{npk} : Non-peak output power (W)

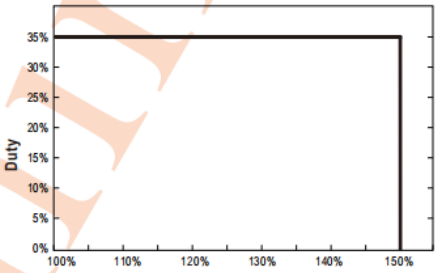
P_{rated} : Rated output power (W)

t : Peak power width (sec)

T: Period (sec)







I/P: 200/305 VAC

O/P:PEAK LOAD (1Hour NO DAMGE)

Ta:25℃

Test Result：OK

3	REMOTE SENSE	S+ / S- Compensate voltage drop on the load wiring up to 0.3V.	I/P: 230 VAC O/P:FULL LOAD Ta:25℃	> 0.3 V
4	DC OK Signal	1. PSU ON 3.3V~5.6V 2. PSU OFF 0V~1V	I/P:230VAC O/P:FULL LOAD Ta:25℃	TEST : OK
5	FAN NOISE(Typ.)	Built-in intelligent fan speed control detect by PSU'S internal temperature 10% load with Ta=25℃ 45dB 70% load with Ta=25℃ 53dB I/P:230VAC O/P:10%Load/70%Load Ta:25℃ TEST : 43.81dB/10%load 50.44dB/70%load		

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Transistor (D to S) or (C to E) Peak Voltage	Q4 Rated 41A/ 600V	AC ON/OFF I/P:High-Line +3V =308V VDS: O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4)Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (5)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (6)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. I/P:Low-Line -3V = 177V O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4)Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (5)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (6)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. Ta:25℃	 VDS: (1) 500V (2) 508V (3) 508V (4) 500V (5) 500V (6) 504V (7) 508V VDS: (1) 496V (2) 512V (3) 496V (4) 496V (5) 496V (6) 512V (7) 512V

2	P.F.C Transistor (D to S) or (C to E) Peak Voltage	Q1 Rated 41A/ 600V	I/P:High-Line +3V =308 V AC ON/OFF O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4)Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (5)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (6)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. I/P:Low-Line -3V =177V AC ON/OFF O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4)Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (5)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (6)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. Ta:25℃	VDS: (1)472V (2)460V (3)468V (4)472V (5)472V (6)464V (7)460V VDS: (1)472V (2)472V (3)468V (4)468V (5)468V (6)472V (7)472V
3	P.F.C DIODE	D3 Rated 10 A/ 650V	I/P:High-Line +3V =308 V AC ON/OFF O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (4)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz I/P:Low-Line -3V = 177V AC ON/OFF O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (4)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz Ta:25℃	(1) 448V (2) 444V (3) 448V (4) 448V (1) 448V (2) 448V (3) 448V (4) 456V

4	Diode Peak Voltage	Q100 Rated 130A/ 60V Q104 Rated 130A/ 60V	AC ON/OFF I/P:High-Line +3V =308V O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4)Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (5)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (6)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. (8)NO LOAD Ta:25℃	Q100: VDS: (1) 42.1V (2) 16.2V (3) 43.0V (4) 42.6V (5) 43.0V (6) 53.1V (7) 52.3V (8) 37.8V Q104: VDS: (1) 43.8V (2) 16.7V (3) 47.0V (4) 46.2V (5) 46.2V (6) 53.5V (7) 52.3V (8) 38.2V
5	Input Capacitor Voltage	C5 Rated: 330μ/ 450 V Surge voltage: 500 V	I/P:High-Line +3V =308V O/P: (1)Full Load input on/off (2) Min load input on /Off (3)Full Load /Min load Change (4)Full load continue Ta:25℃	(1)440V (2)428V (3)448V (4)440V
6	Control IC Voltage Test	PWM IC U2 Rated 8.9 V~ 15.5 V PFC IC U1 Rated -0.3V~ 26V O/P IC U102 Rated 3V~ 32V AUX IC U300 Rated 0V~50V	AC ON/OFF I/P:High-Line +3V =308 V O/P(1)Full Load (2) Output Short (3)O.L.P (4)O.V.P. (5)No Load VR min (Low Line) Ta:25℃	U2 (1) 13.5V (2) 13.7V (3) 13.5V (4) 13.5V (5) 13.5V U1 (1) 13.5V (2) 13.7V (3) 13.5V (4) 13.5V (5) 13.5V

				U102 (1) 10.9V (2) 10.9V (3) 10.9V (4) 10.9V (5) 10.9V U300 (1) 13.5V (2) 13.7V (3) 13.5V (4) 13.5V (5) 13.5V
7	TOP SWITCHING STAND BY POWER	U300 Rated 1 A/ 730V	AC ON/OFF I/P:High-Line +3V =308V O/P: (1)Full Load (2)Remote On/Off I/P:Low-Line -3V =177 V O/P: (1)Full Load (2)Remote On/Off Ta:25℃	 308V (1) 539 V (2) 523V 177V (1) 515V (2) 523V

■ SAFETY& E.M.C. TEST

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P: 4.2 K VAC/min I/P-FG : 2.1 K VAC/min O/P-FG: 1.25 KVAC/min	I/P-O/P: 4.62 KVAC/min I/P-FG: 2.52 KVAC/min O/P-FG: 1.5 KVAC/min Ta:25℃	I/P-O/P: 2.68 mA I/P-FG: 2.73 mA O/P-FG: 2.48 m A NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P: 500 VDC>100MΩ I/P-FG: 500 VDC>100MΩ O/P-FG: 500 VDC >100MΩ	I/P-O/P: 500 VDC I/P-FG: 500 VDC O/P-FG: 500 VDC Ta:25℃	I/P-O/P: >9999 MΩ I/P-FG: >9999 MΩ O/P-FG: >9999 MΩ NO DAMAGE
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40A / 2min Ta:25℃	11mΩ

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	EN61000-3-2 CLASS C	I/P:230VAC/50HZ O/P:FULL LOAD Ta:25℃	PASS
2	CONDUCTION	EN55032 CLASS A	I/P : 230 VAC (50HZ) O/P : FULL/50% LOAD Ta : 25℃	PASS Test by certified Lab
3	RADIATION	EN55032 CLASS A	I/P : 230 VAC (50HZ) O/P : FULL LOAD Ta : 25℃	PASS Test by certified Lab
4	E.S.D	EN61000-4-2 AIR : 8KV / Contact : 4KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25℃	CRITERIA A
5	E.F.T	EN61000-4-4 INPUT : 2KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25℃	CRITERIA A
6	SURGE	EN61000-6-2 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

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	TEMPERATURE RISE TEST	MODEL : LRS-1200-12 1. ROOM AMBIENT BURN-IN : 2HRS I/P : 230VAC O/P : FULL LOAD Ta= 32.7℃ 2. HIGH AMBIENT BURN-IN : 2HRS I/P : 230VAC O/P : FULL LOAD Ta= 48.6℃		

NO	Position	ROOM AMBIENT Ta=32.7℃	HIGH AMBIENT Ta=48.6 ℃
1	RTH1	40.0℃	56.1℃
2	BD1	80.3℃	96.0℃
3	Q1	71.3℃	88.1℃
4	D3	68.2℃	85.1℃
5	L1	72.5℃	88.8℃
6	U1	53.2℃	69.6℃
7	U2	53.6℃	71.7℃
8	C6	49.8℃	66.6℃
9	L3	61.1℃	80.8℃
10	Q3	64.5℃	84.9℃
11	Q4	69.4℃	91.0℃
12	C94	54.5℃	73.3℃
13	T1	75.7℃	97.4℃
14	T2	57.0℃	75.9℃
15	U300	60.7℃	77.0℃
16	C321	56.1℃	73.5℃
17	C403	53.6℃	72.6℃
18	C104	78.2℃	93.7℃
19	U100	89.3℃	102.1℃
20	U101	55.5℃	73.5℃
21	U102	59.5℃	76.8℃
22	Q101	88.1℃	105.5℃
23	Q104	91.6℃	106.1℃
24	R125	87.5℃	104.3℃
25	J112	87.8℃	103.7℃
26	C111	72.7℃	90.2℃
27	C106	69.5℃	86.4℃
28	C114	59.7℃	78.5℃
29	RTH3	67.3℃	85.2℃
30	RTH4	65.1℃	82.4℃
31	TC	58.8℃	77.9℃

2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P： 230 VAC O/P： 115 % LOAD Ta：25℃	TEST：OK
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P： 305VAC/200VAC O/P： 100 % LOAD Ta=-35 ℃	TEST：OK
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 50 ℃/95 %R.H NO DAMAGE	I/P： 315 VAC O/P：FULL LOAD Ta= 50 ℃ HUMIDITY= 95 %R.H	TEST：OK
5	TEMPERATURE COEFFICIENT	± 0.03 %/℃(0~30℃)	I/P： 230 VAC O/P：FULL LOAD	± 0.0048 %/℃(0~30℃)
6	STORAGE TEMPERATURE TEST	-40~85℃	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：10 CYCLE 5. Input/output condition： STATIC	
7	THERMAL SHOCK TEST	-30~45℃	1. Thermal shock Temperature： -35℃~ +50℃ 2. Temperature change rate ：25℃ / 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, 3G 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：4G (5) Test Time：180min in each axis (X.Y.Z) (6) Ta：25℃	
9	CAPACITOR LIFE CYCLE	SUPPOSE C111 IS THE MOST CRITICAL COMPONENT (1) I/P： 230VAC O/P：FULL LOAD Ta=25 ℃ LIFE TIME (2) I/P： 230VAC O/P：FULL LOAD Ta=45 ℃ LIFE TIME (3) I/P： 230VAC O/P：75% LOAD Ta=45 ℃ LIFE TIME (4) I/P： 230VAC O/P：50% LOAD Ta=45 ℃ LIFE TIME		(1) 500000HRS (2) 41588HRS (3) 284426HRS (4) 1199416HRS
10	MTBF	Conducted by Parts Stress Analysis Prediction 924.6K hrs min. Telcordia SR-332 (Bellcore) ; 93.2K hrs min. MIL-HDBK-217F (25℃)		
11	Ongoing Reliability Test	I/P：230VAC O/P：FULL LOAD TA=50℃ Demonstration Mean Time Between Failure : 30,000 hours		

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	WUWQIN/ZHOUBIAO	WENF	WUWQ

2020.10.1 TAG-QA-009