



Test Report: LRS-1200-24

1200W Low Profile Economical Enclosed 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

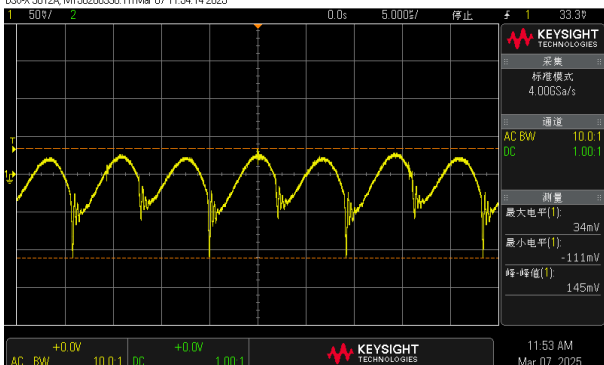
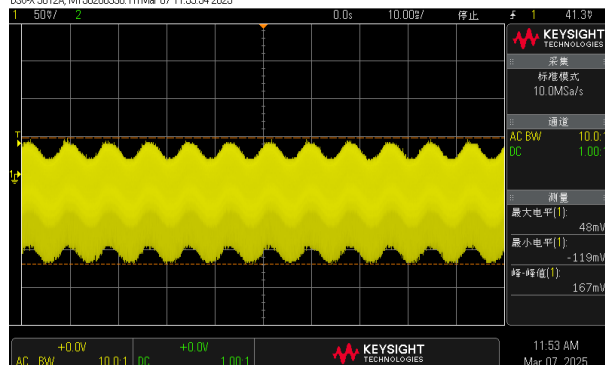
E.M.C. Test

■ RELIABILITY TEST

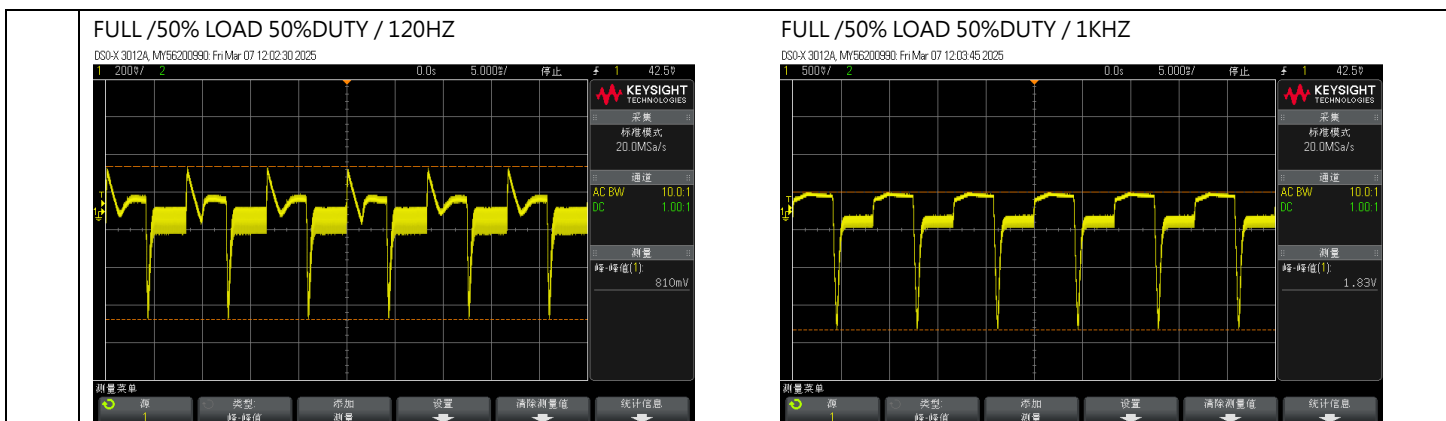
ENVIRONMENT TEST

■ DESIGN VERIFY TEST

OUTPUT FUNCTION TEST

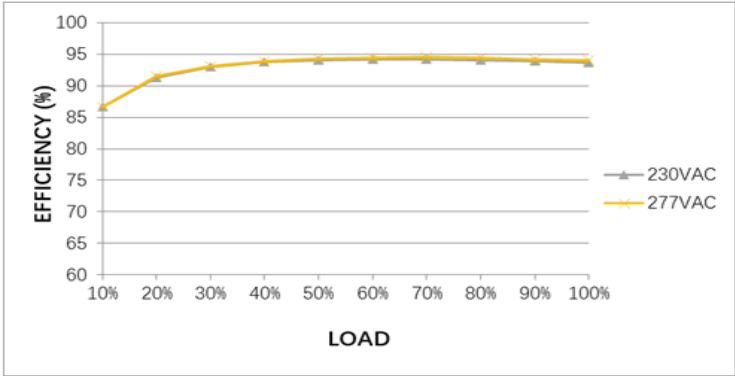
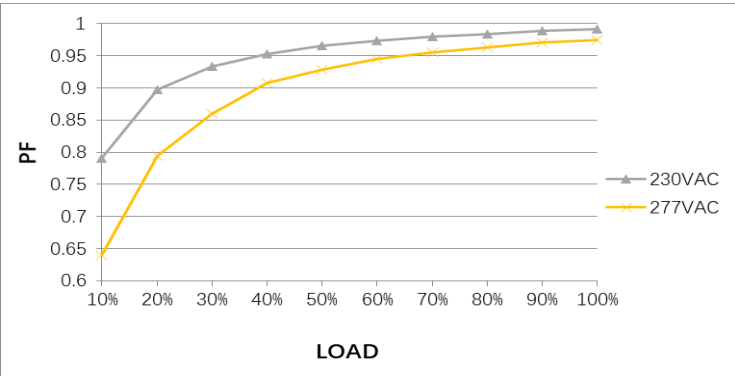
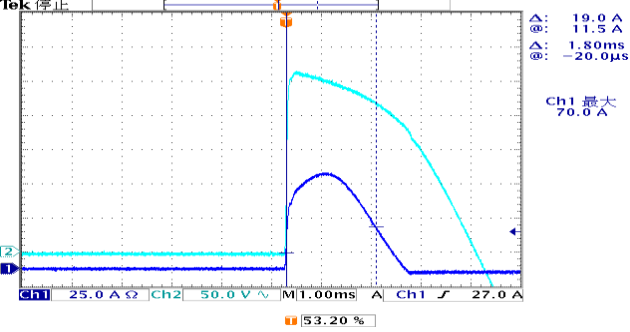
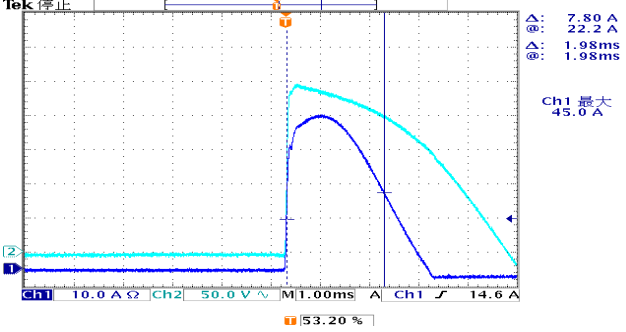
NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE ADJUST RANGE	CH1: 24V~28V	I/P : 230 VAC O/P : MIN LOAD Ta : 25°C	23.48V~28.56V/230VAC
2	OUTPUT VOLTAGE TOLERANCE	V1: 1.0%~ -1.0%	I/P: 180VAC /305VAC O/P:FULL/ MIN. LOAD Ta:25°C	V1: -0.05%~ 0.13 %
3	LINE REGULATION	V1: 0.5%~- 0.5%	I/P: 180VAC~ 305VAC O/P:FULL LOAD Ta:25°C	V1: -0.05%~ 0%
4	LOAD REGULATION	V1: 0.5%~- 0.5%	I/P: 230VAC O/P:FULL ~MIN LOAD Ta:25°C	V1: -0.13%~0%
5	OVER/UNDERSHOOT TEST	<± 5%	I/P: 230VAC O/P:FULL LOAD Ta:25°C	4 %
6	RIPPLE & NOISE (Max)	V1:240mVp-p	I/P: 230 VAC O/P: MIN LOAD—FULL LOAD Ta:25°C	V1: 167mVp-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°C	277VAC/ 600ms 230VAC/ 696ms
INPUT=277VAC/60HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage			INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage	

	Ch1 5.00 V Ch2 100 V M 400ms A Ch1 2.40 V 70.00 %	Δ: 106 V Δ: 10.0 V Δ: 600ms Δ: -576ms	Ch1 5.00 V Ch2 200 V M 400ms A Ch1 2.40 V 70.00 %	Δ: 320 V Δ: 4.00 V Δ: 696ms Δ: -688ms
8	RISE TIME (Max)	277VAC/70ms 230VAC/70ms	I/P : 277VAC I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	277VAC/ 22.6ms 230VAC/24.6 ms
INPUT=277VAC/60HZ @ FULL LOAD CH1 : Output Voltage		INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage		
KEYSIGHT TECHNOLOGIES 设置 标准模式 20.0MS/s 通道 DC BW 1.001 DC 10.01 AC 10.01 AC BW 10.01 光标 ΔX: +22.60000000ms 1/ΔX: +44.248Hz ΔY(L): +19.250V 光标设置菜单 模式 手动 光标 X1: -7.00000000ms Y1: 2.375V X2: 15.80000000ms Y2: 21.625V		KEYSIGHT TECHNOLOGIES 设置 标准模式 10.0MS/s 通道 DC BW 1.001 DC 10.01 AC 10.01 AC BW 10.01 光标 ΔX: +24.60000000ms 1/ΔX: +40.650Hz ΔY(L): +19.250V 光标设置菜单 模式 手动 光标 X1: -7.20000000ms Y1: 2.375V X2: 17.40000000ms Y2: 21.625V		
9	HOLD UP TIME (Typ.)	277VAC/10ms 230VAC/10ms	I/P : 277VAC I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	277VAC/ 21.6ms 230VAC/ 18.4ms
INPUT=277VAC/60HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage		INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage		
Ch1 5.00 V Ch2 100 V M 40.0ms A Ch1 2.40 V 70.00 %		Ch1 5.00 V Ch2 200 V M 40.0ms A Ch1 2.40 V 70.00 %		
10	DYNAMIC LOAD	V1:2400mVp-p	I/P: 230VAC O/P: (1)FULL /50% LOAD 50%DUTY / 120HZ (2)FULL /50% LOAD 50%DUTY / 1KHZ Ta:25°C	810mVp-p 1830mVp-p



INPUT FUNCTION TEST

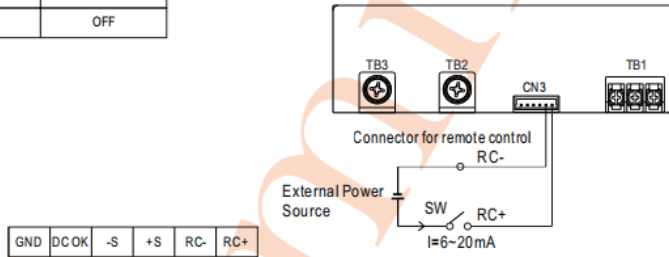
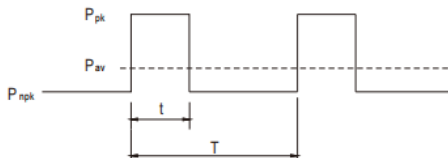
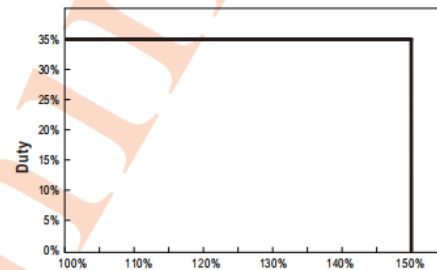
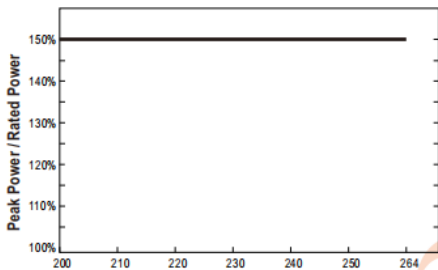
NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	180VAC~305VAC 255VDC~ 431VDC	(1) I/P: TESTING O/P: FULL LOAD (2) I/P: DC TESTING (L: + N:-) O/P: FULL / 50% LOAD (3) I/P: DC TESTING (L: - N: +) O/P: FULL / 50% LOAD Ta:25°C	(1) 177 V~ 308V (2) 255 Vdc~ 431 Vdc/FULL LOAD 255Vdc~ 431Vdc/50% 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°C	TEST: OK
3	INPUT CURRENT (Typ.)	277V/5A 230V/7A	I/P : 277 VAC I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	I =4.69A/ 277VAC I =5.58A/ 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°C	277VAC L-FG : 0.356mA N-FG : 0.354mA L-FG : 0.706mA(Peak) N-FG : 0.698mA(Peak) 240VAC: L-FG : 0.384mA N-FG : 0.368 mA L-FG : 0.719mA(Peak) N-FG : 0.712mA(Peak)

5	EFFICIENCY(Typ.)	93%	I/P:230 VAC O/P:FULL LOAD Ta:25°C	93.68%
	EFFICIENCY vs LOAD 			
6	POWER FACTOR(TYP)	0.95/230 VAC 0.93/277 VAC	I/P: 230 VAC/277VAC O/P:FULL LOAD Ta:25°C	PF= 0.992/230V PF= 0.975/277V
	P.F vs LOAD 			
7	INRUSH CURRENT(Typ.)	277V/75A 230V/60A COLD START	I/P : 277 VAC I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	I =70A/277VAC T50=1800us/277VAC I =45A/ 230VAC T50=1980us/277VAC
	INPUT=277VAC/50HZ @ FULL LOAD CH2 : AC Input Voltage CH1 : Input current  INPUT=230VAC/50HZ @ FULL LOAD CH2 : AC Input Voltage CH1 : Input current 			

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°C	115.6%/ 305VAC 115.5%/ 230VAC 115.6%/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	29V~36V	I/P: 305VAC I/P: 230VAC I/P: 180VAC O/P:MIN LOAD Ta:25°C	31.8V/ 305VAC 31.8V/ 230VAC 31.8V/ 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. <table><tr><td>Between RC+(pin6) and RC-(pin5)</td><td>Output Status</td></tr><tr><td>SW OFF (0 ~ 0.8V)</td><td>ON</td></tr><tr><td>SW ON (4 ~ 10V)</td><td>OFF</td></tr></table>  I/P: 230 VAC O/P:FULL LOAD Ta:25°C Test Result : <table><tr><td>Between ON/OFF</td><td>Power Output Status</td></tr><tr><td>SW OFF (0~0.8V)</td><td>ON</td></tr><tr><td>SW ON (3.3~10V)</td><td>OFF</td></tr></table>	Between RC+(pin6) and RC-(pin5)	Output Status	SW OFF (0 ~ 0.8V)	ON	SW ON (4 ~ 10V)	OFF	Between ON/OFF	Power Output Status	SW OFF (0~0.8V)	ON	SW ON (3.3~10V)	OFF		
Between RC+(pin6) and RC-(pin5)	Output Status															
SW OFF (0 ~ 0.8V)	ON															
SW ON (4 ~ 10V)	OFF															
Between ON/OFF	Power Output Status															
SW OFF (0~0.8V)	ON															
SW ON (3.3~10V)	OFF															
2	PEAK POWER	4. Peak Power $P_{av} = \frac{P_{pk} \times t + P_{npk} \times (T-t)}{T} \leq P_{rated}$$Duty = \frac{t}{T} \times 100\% \leq 35\%$$t \leq 5 \text{ 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°C 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°C	> 0.3V
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°C	TEST : OK
5	FAN NOISE(Typ.)	Built-in intelligent fan speed control detect by PSU'S internal temperature 10% load with Ta=25°C 45dB 70% load with Ta=25°C 53dB I/P:230VAC O/P:10%Load/70%Load Ta:25°C TEST : 43.36dB/10%load 47.90dB/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°C	VDS: (1) 529V (2) 537V (3) 529V (4) 533V (5) 537V (6) 533V (7) 541V VDS: (1) 525V (2) 549V (3) 525V (4) 529V (5) 537V (6) 533V (7) 549V

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°C	VDS: (1) 491V (2) 483V (3) 495V (4) 495V (5) 495V (6) 491V (7) 483V VDS: (1) 495V (2) 503V (3) 495V (4) 487V (5) 495V (6) 499V (7) 499V
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°C	(1) 446V (2) 454V (3) 446V (4) 446V (1) 454V (2) 462V (3) 456V (4) 456V

4	Diode Peak Voltage	Q100 Rated 120A/100 V Q104 Rated 120A/100V	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°C	Q100: VDS: (1) 74.8V (2) 77.2V (3) 76.4V (4) 75.6V (5) 79.6V (6) 80.4V (7) 79.6V (8) 65.1V Q104: VDS: (1) 72.4V (2) 78.8V (3) 74V (4) 73.2V (5) 78V (6) 78V (7) 77.2V (8) 65.1V
5	Input Capacitor Voltage	C5 Rated: 330μ/ 450 V Surge voltage:500V	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°C	(1)433V (2)433V (3)449V (4) 437V
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°C	U2 (1) 13.79V (2) 13.79V (3) 13.87V (4) 13.71V (5) 13.63V U1 (1) 13.79V (2) 13.79V (3) 13.87V (4) 13.71V (5) 13.63V

				U102 (1) 14.78V (2) 14.78V (3) 14.78V (4) 14.78V (5) 14.7V U300 (1) 13.79V (2) 13.79V (3) 13.87V (4) 13.71V (5) 13.63V
7	TOP SWITCHING STAND BY POWER	U300 Rated 1.0A/ 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°C	(1) 546V (2) 542 V (1) 558V (2) 546V

■ 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°C	I/P-O/P: 2.752 mA I/P-FG: 2.567 mA O/P-FG: 2.428 mA 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°C	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°C	11 mΩ

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	EN55032 CLASS A	I/P : 230 VAC (50HZ) O/P : FULL/50% LOAD Ta : 25°C	PASS Test by certified Lab
3	RADIATION	EN55032 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 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 INPUT : 2KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	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°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

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°C 2. HIGH AMBIENT BURN-IN : 2HRS I/P : 230VAC O/P : FULL LOAD Ta= 48.6°C																																																																																																																																		
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2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 230 VAC O/P : 115 % LOAD Ta : 25°C	TEST : OK
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 305VAC/200VAC O/P : 100 % 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 : 315 VAC O/P : FULL LOAD Ta=50 °C HUMIDITY= 95 %R.H	TEST : OK
5	TEMPERATURE COEFFICIENT	± 0.03 %/°C(0~30°C)	I/P : 230 VAC O/P : FULL LOAD	± 0.0032 %/°C(0~30°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	-30~50°C	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 : 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°C	
9	CAPACITOR LIFE CYCLE	SUPPOSE C111 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=45 °C LIFE TIME (3) I/P : 230VAC O/P : 75% LOAD Ta=45 °C LIFE TIME (4) I/P : 230VAC O/P : 50% LOAD Ta=45 °C 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°C)		
11	Ongoing Reliability Test	I/P : 230VAC O/P : FULL LOAD TA=50°C Demonstration Mean Time Between Failure : 30,000 hours		

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	WUWQIN/ZHOUBIAO	WENF	WUWQ

2020.10.1 TAG-QA-009