



Test Report: GST360A55

360W AC-DC High Reliability Industrial Adaptor

■ 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

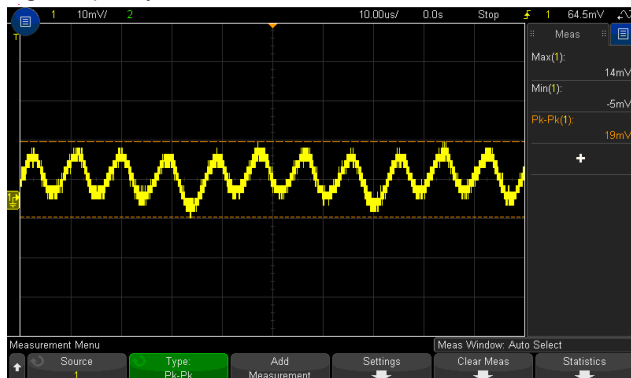
ENVIRONMENT TEST

■ DESIGN VERIFY TEST

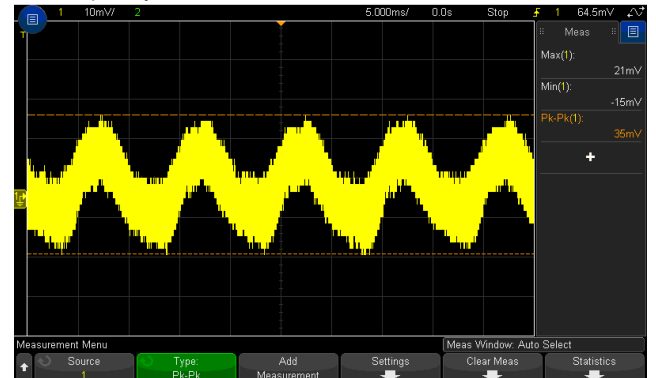
OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE(Max) TOLERANCE	V1: -2.0%~ +2.0 %	I/P: 85VAC /264VAC O/P:FULL/ MIN. LOAD Ta:25°C	V1: -0.11%~0.11%
2	LINE REGULATION (Max)	V1: -1.0%~ +1.0 %	I/P: 85VAC~ 264VAC O/P:FULL LOAD Ta:25°C	V1: 0.02%~ 0.04%
3	LOAD REGULATION(Max)	V1: -2.0%~ +2.0 %	I/P: 230VAC O/P:FULL ~MIN LOAD Ta:25°C	V1: -0.11%~0.11%
4	OVER/UNDERSHOOT TEST	< +5%	I/P: 230VAC O/P:FULL LOAD Ta:25°C	1.10%
5	RIPPLE & NOISE(Max)	V1: 200mVp-p	I/P:230VAC O/P:FULL LOAD Ta:25°C	V1: 35mVp-p

high frequency :

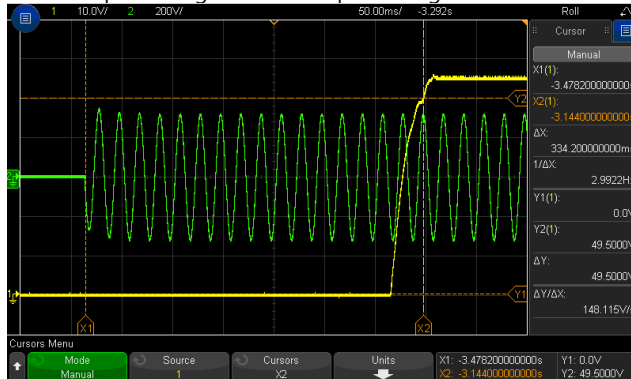


low frequency :

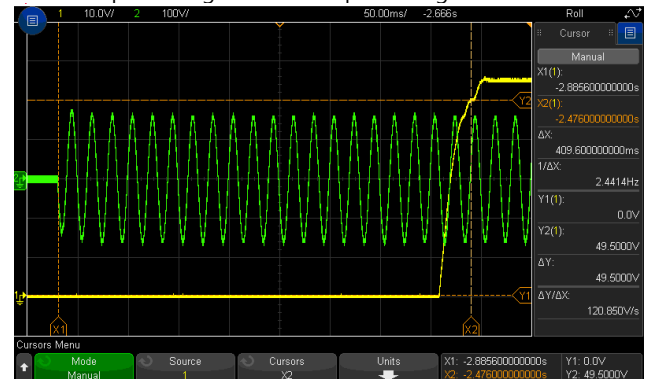


6	SET UP TIME(Max)	230VAC/2000ms 115VAC/2000ms	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/334.2ms 115VAC/409.6ms
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INPUT=230VAC/50HZ @ FULL LOAD
CH1 : Output Voltage CH3 : AC Input Voltage



INPUT=115VAC/60HZ @ FULL LOAD
CH1 : Output Voltage CH3 : AC Input Voltage



7	RISE TIME (Max)	230VAC/50ms 115VAC/50ms	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/28.69ms 115VAC/27.42ms
INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage		INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage		
8	HOLD UP TIME (Typ.)	230VAC/8ms 115VAC/8ms	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/20.2ms 115VAC/20.4ms
INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH3 : AC Input Voltage		INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage CH3 : AC Input Voltage		
9	DYNAMIC LOAD	V1: 5500mVp-p	I/P: 230VAC O/P: (1)FULL/50%LOAD50%DUTY/120HZ (2)FULL/50%LOAD50%DUTY/1KHZ Ta:25°C	450mVp-p 410mVp-p
FULL /50% LOAD 50%DUTY / 120HZ		FULL /50% LOAD 50%DUTY / 1KHZ		



10	TRANSIENT RECOVERY TIME	V1: 5500mVp-p <500us	I/P: 230VAC O/P:40% LOAD CHANGE 50%DUTY/120HZ 1.25A/us	370mVp-p
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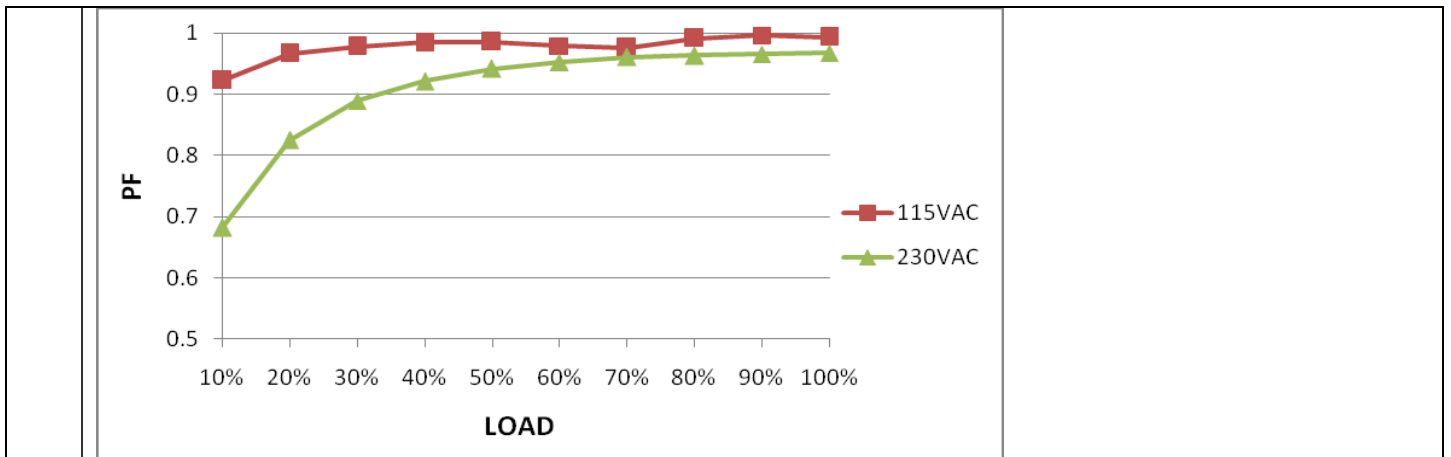
INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	85VAC~264VAC 120VDC~ 370VDC	(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) 76.2V~264V (2)112Vdc~370Vdc/FULL LOAD 112Vdc~370Vdc/50% LOAD (3)112Vdc~370Vdc/FULL LOAD 112Vdc~370Vdc/50% LOAD
			I/P: LOW-LINE-3V=82 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:85VAC ~264 VAC O/P:FULL~MIN LOAD Ta:25°C	TEST: OK
3	INPUT CURRENT (Typ.)	230V/ 2 A 115V/ 3.8 A	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I =1.69A/ 230VAC I =3.37A/ 115VAC
4	LEAKAGE CURRENT	< 1.5mA / 240 VAC	I/P : 240 VAC O/P : Min LOAD Ta : 25°C	0.761 mA
5	NO LOAD CONSUMPTION	< 0.5W	I/P : 230VAC O/P : NO LOAD Ta : 25°C	0.42403W
6	POWER FACTOR (Typ.)	0.95/ 230VAC 0.98/115VAC	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	PF=0.9666/230VAC PF=0.9914/115VAC
	P.F vs LOAD			

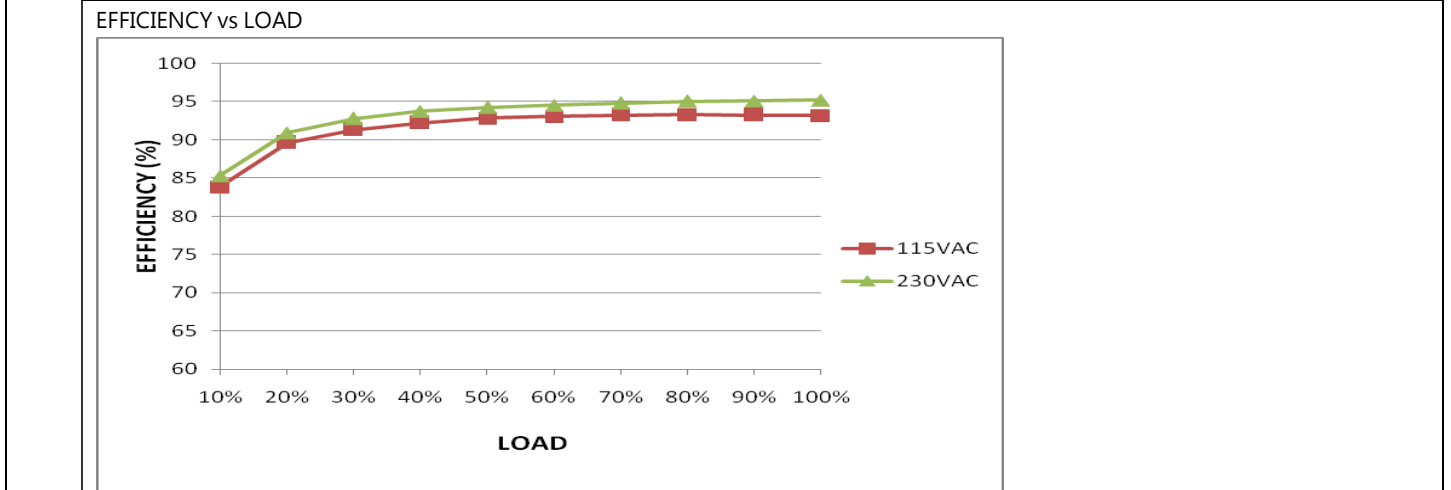


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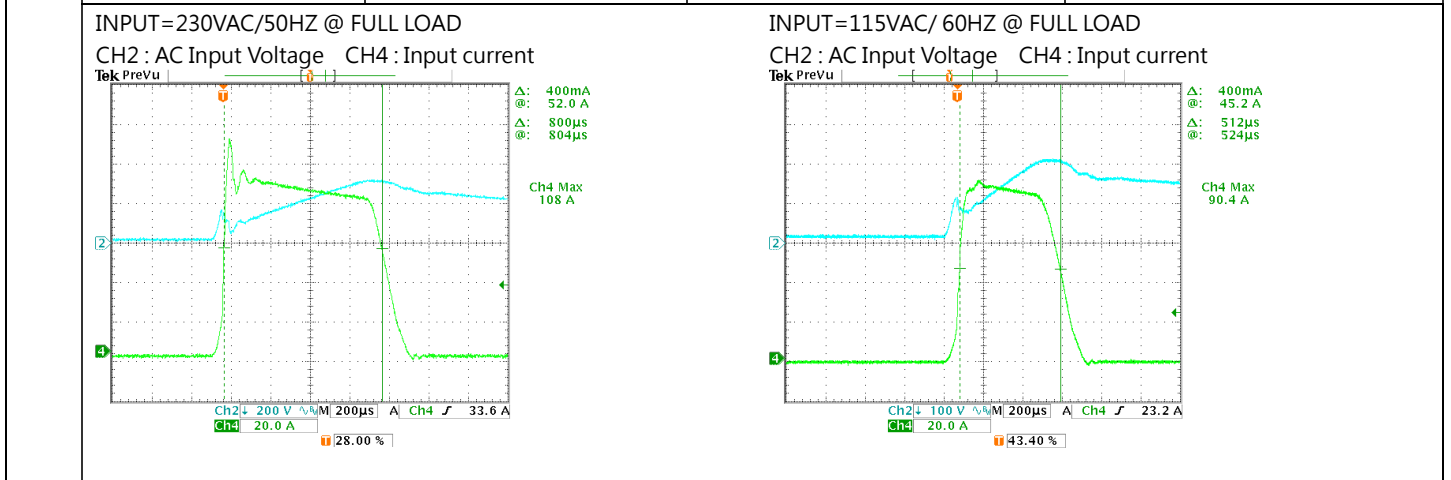
GST360A series



7	EFFICIENCY(Typ.)	95%	I/P:230 VAC O/P:FULL LOAD Ta:25°C	95.29%
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8	INRUSH CURRENT(Typ.)	230V/120A 115V/95A COLD START	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I =108A/ 230VAC I =90.4A/ 115VAC
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PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	135%~150 % Protection type : Shut down o/p voltage, re-power on to recover	I/P: 264VAC I/P: 230VAC I/P: 100VAC O/P:TESTING Ta:25°C	142.29%/ 264VAC 142.14%/ 230VAC 142.14%/100VAC Protection type : shut down o/p Voltage, re-power on to recover
2	OVER VOLTAGE PROTECTION	105% ~ 135% rated output voltage (110.25%~128.25%) Protection type : Shut down o/p voltage, re-power on to recover	I/P: 264VAC I/P: 230VAC I/P: 85VAC O/P:MIN LOAD Ta:25°C	58.8V/ 264VAC 58.8V / 230VAC 58.8V / 85VAC Protection type : Shut down o/p voltage, re-power on to recover
3	OVER TEMPERATURE PROTECTION	Protection type : Shut down o/p voltage, re-power on to recover	I/P: 264VAC I/P: 85VAC O/P:FULL LOAD	O.T.P Active OK Protection type : Shut down o/p voltage, re-power on to recover

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Transistor (D to S) or (C to E) Peak Voltage	Q3/Q4 Rated : 21A/ 600V	AC ON/OFF I/P:High-Line +3V =267V 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. Ta:25°C	Q3 VDS: (1) 439V (2) 451V (3) 435V (4) 443V (5) 439V (6) 439V (7) 468V Q4 VDS: (1) 451V (2) 455V (3) 447V (4) 447V (5) 443V (6) 447V (7) 459V
2	P.F.C Transistor (D to S) or (C to E) Peak Voltage	Q1/Q2 Rated : 18A/ 600V	I/P:High-Line +3V =267 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	Q2 VDS: (1) 500V (2) 484V (3) 496V (4) 492V (5) 492V (6) 492V (7) 480V Q1 VDS: (1) 476V (2) 468V (3) 476V (4) 476V (5) 476V (6) 476V (7) 455V



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			(6)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. Ta:25°C	
3	P.F.C DIODE	D21 Rated : 8 A / 600 V	I/P:High-Line +3V =267 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 Ta:25°C	D21 (1) 523V (2) 494V (3) 510V (4) 523V
4	Diode Peak Voltage	Q100/Q112 Rated : 36A/200V Q152/Q154 Rated : 36 A/200V	AC ON/OFF I/P:High-Line +3V =267 V 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 (9)Before burst Mode Ta:25°C	Q112: VDS: (1) 129.3V (2) 136.0V (3) 134.9V (4) 125.2V (5) 124.4V (6) 138.9V (7) 145.3V (8) 125.2V (9) 126.0V Q152 VDS: (1) 124.8V (2) 135.0V (3) 130.4V (4) 122.3V (5) 122.3V (6) 137.6V (7) 143.2V (8) 123.1V (9) 123.1V Q100: VDS: (1) 141.3V (2) 160.0V (3) 138.0V (4) 137.3V (5) 139.7V (6) 138.1V (7) 156.0V (8) 119.6V (9) 139.7V Q154: VDS: (1) 120.0V (2) 119.9V (3) 120.7V (4) 119.1V (5) 119.9V (6) 119.1V (7) 119.1V (8) 119.1V (9) 119.1V
5	Input Capacitor Voltage	C5 Rated: : 220 μ / 400 V	I/P:High-Line +3V =267V 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)395V (2)417V (3)410V (4)396V
6	Control IC Voltage Test	PWM IC U3 Rated 15.3V-20V PFC IC U1 Rated 11V-20V	AC ON/OFF I/P:High-Line +3V =267 V O/P(1)FULL LOAD (2) Output Short (3)O.L.P (4)O.V.P.	U3 (1) 15.8V (2) 15.8V (3) 15.8V (4) 16.0V (5) 11.6V U102 (1) 11.80V (2) 11.60V (3) 11.60V (4) 11.60V (5) 11.60V



	O/P IC U102 Rated 8-24V	(5)NO LOAD (LOW LINE) Ta:25°C	U1 (1) 15.6V (2) 15.2V (3) 15.2V (4) 15.2V (5) 11.0V	
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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	I/P-O/P: 3.6 KVAC/min I/P-FG: 2.4 KVAC/min Ta:25°C	I/P-O/P:3.88mA I/P-FG:3.59mA NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P:500VDC>100MΩ I/P-FG: 500VDC>100MΩ	I/P-O/P: 600 VDC I/P-FG: 600 VDC Ta:25°C	I/P-O/P: 9999MΩ I/P-FG: 9999MΩ NO DAMAGE

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	BS EN/EN61000-3-2 GB9254	I/P:230VAC/50HZ O/P:FULL LOAD Ta:25°C	CLASS A
2	CONDUCTION	BS EN/EN55032(CISPR32),FCC PART 15 / CISPR22 ,CNS13438,GB17625.1 EAC TP TC 020,MSIP KN32	I/P : 230 VAC (50HZ)/120 VAC (60HZ) O/P : FULL/50% LOAD Ta : 25°C	CLASS B
3	RADIATION	BS EN/EN55032(CISPR32),FCC PART 15 / CISPR22 ,CNS13438,GB17625.1 EAC TP TC 020,MSIP KN32	I/P : 230 VAC (50HZ)/120 VAC (60HZ) O/P : FULL LOAD/50% LOAD Ta : 25°C	CLASS B
4	E.S.D	BS EN/EN61000-4-2 AIR : 15KV / Contact : 8KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
5	E.F.T	BS EN/EN61000-4-4 INPUT : 1KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
6	SURGE	BS EN/EN61000-4-5 L-N : 1KV L,N-PE : 2KV	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 : GST360A55 1. ROOM AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : FULL LOAD Ta= 27.4 °C 2. HIGH AMBIENT BURN-IN : 2HRS I/P : 230VAC O/P : FULL LOAD Ta= 42.7 °C		



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				ROOM AMBIENT Ta= 27.4°C	HIGH AMBIENT Ta= 42.7 °C
		NO	Position		
		1	LF1	64.6°C	76.8°C
		2	ZR1	64.5°C	76.8°C
		3	Q2	68.7°C	80.8°C
		4	C1	64.3°C	76.7°C
		5	L3	67.2°C	79.5°C
		6	BD2	67.3°C	79.6°C
		7	LF3	66.1°C	78.5°C
		8	C10	67.3°C	79.5°C
		9	L2	66.7°C	78.8°C
		10	BD1	67.8°C	79.9°C
		11	Q1	69.2°C	81.3°C
		12	U1	68.9°C	81.0°C
		13	U3	68.9°C	81.0°C
		14	C41	68.3°C	80.1°C
		15	C5	68.3°C	80.3°C
		16	T1coil	72.0°C	83.7°C
		18	T1core	69.0°C	80.5°C
		19	LF100	61.6°C	74.0°C
		20	C105	64.1°C	76.2°C
		21	L4	69.9°C	82.0°C
		23	T2 coil	72.0°C	83.6°C
		24	T2 core	71.7°C	83.1°C
		25	Q3	72.1°C	84.8°C
		26	Q112	66.3°C	78.5°C
		27	Q152	65.8°C	78.1°C
		28	D20	69.8°C	81.8°C
		29	RTH2	68.0°C	80.1°C
		31	U101	67.3°C	79.3°C
		32	Q100	66.5°C	78.7°C
		33	U5	66.5°C	78.4°C
		36	C102	63.9°C	76.0°C
		37	C114	67.2°C	79.2°C
2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)		I/P : 230 VAC O/P : 141%LOAD Ta : 25°C	TEST : OK
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR		I/P : 264VAC/100VAC 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 40°C/95 %R.H NO DAMAGE		I/P : 272 VAC O/P : FULL LOAD Ta= 40.2°C HUMIDITY= 95 %R.H	TEST : OK
5	TEMPERATURE COEFFICIENT	±0.03%/°C(0~40°C)		I/P : 230 VAC O/P : FULL LOAD	± 0.0068 %/°C(0~40°C)



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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	-30~40°C	1. Thermal shock Temperature : -35°C~ +45°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 C105 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= 40 °C LIFE TIME (3) I/P: 230VAC O/P: 75% LOAD Ta= 40 °C LIFE TIME (4) I/P: 230VAC O/P: 50% LOAD Ta= 40 °C LIFE TIME	(1) 242467HRS (2) 107013.2HRS (3) 158557.6HRS (4) 294400.2HRS
10	MTBF	Conducted by Parts Stress Analysis Prediction 2068.5K hrs min. Telcordia SR-332 (Bellcore) ; 269K hrs min. MIL-HDBK-217F (25°C)	
11	Ongoing Reliability Test	I/P : 230VAC O/P : 80% LOAD TA=50°C Demonstration Mean Time Between Failure : 30,000 hours	

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	Liutt		Wangdz

2020.10.1 TAG-QA-009