



Test Report: XTR-240-48

240W AC/DC 3Ø Input Ultra Slim Industrial DIN Rail Power

■ 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

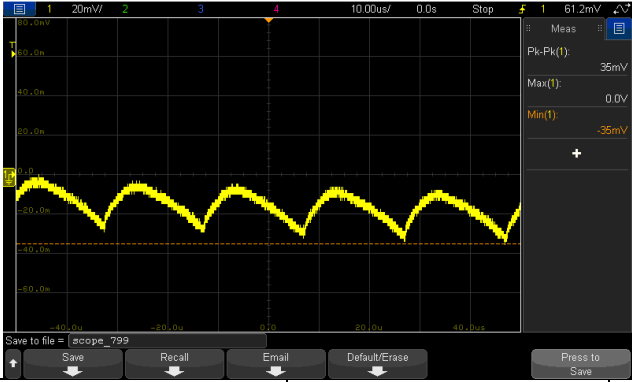
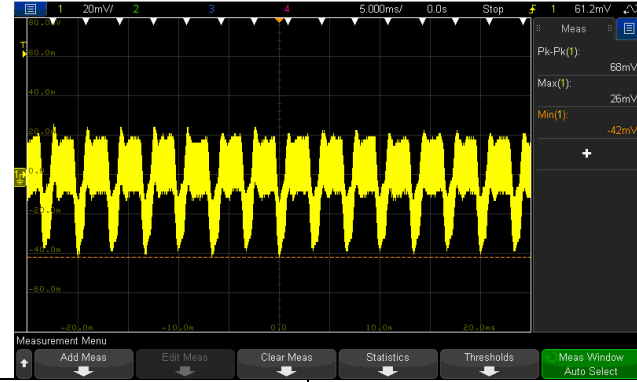
E.M.C. Test

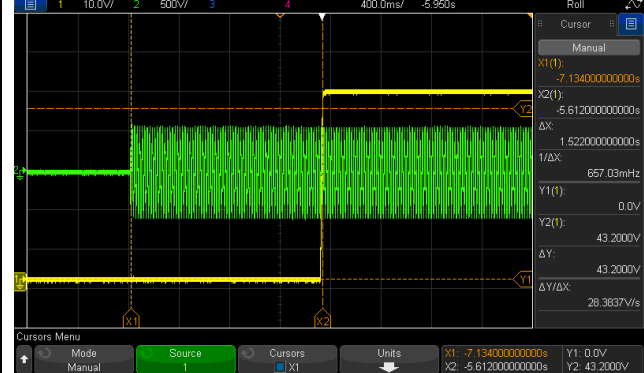
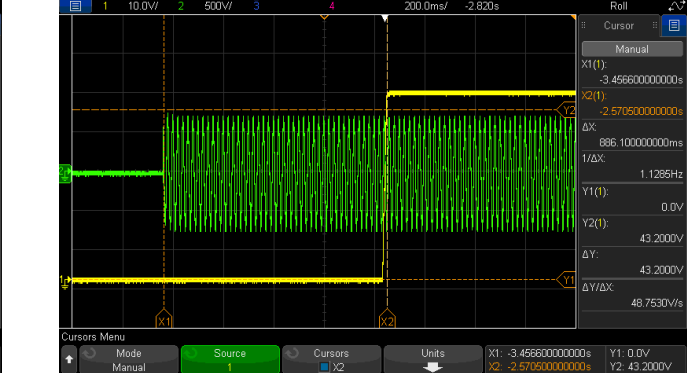
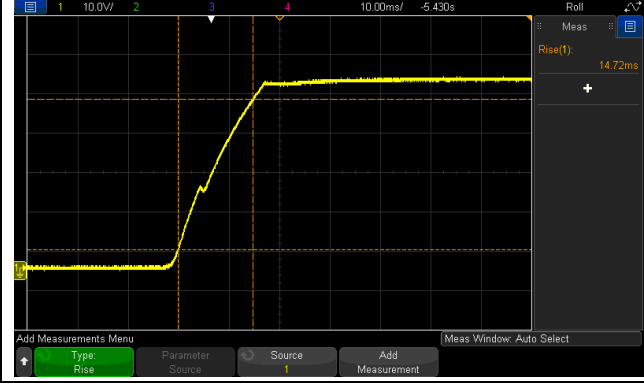
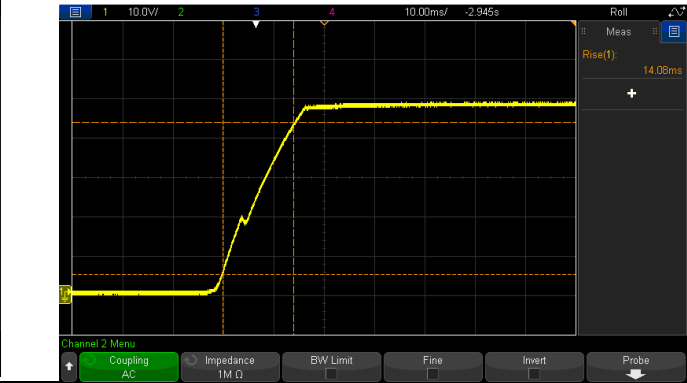
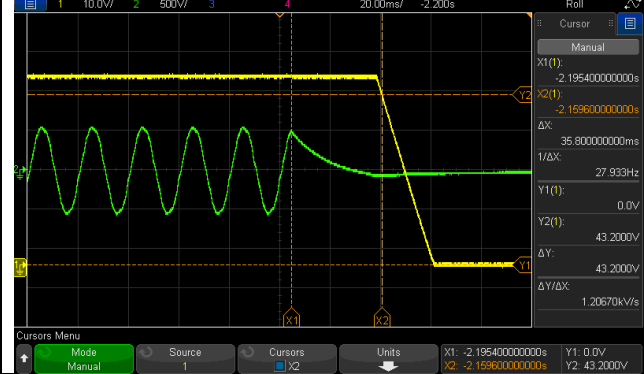
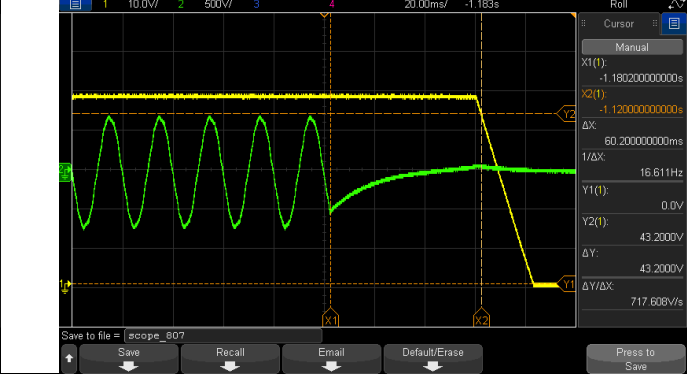
■ RELIABILITY TEST

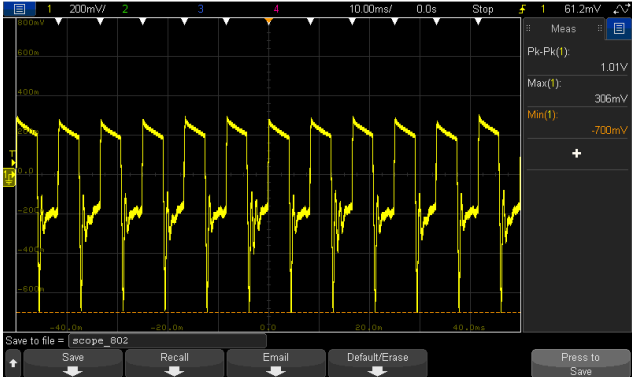
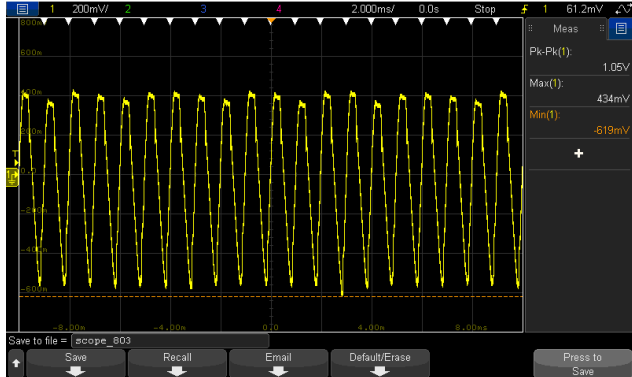
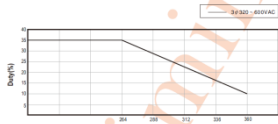
ENVIRONMENT TEST

DESIGN VERIFY TEST

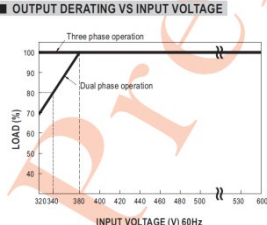
OUTPUT FUNCTION TEST

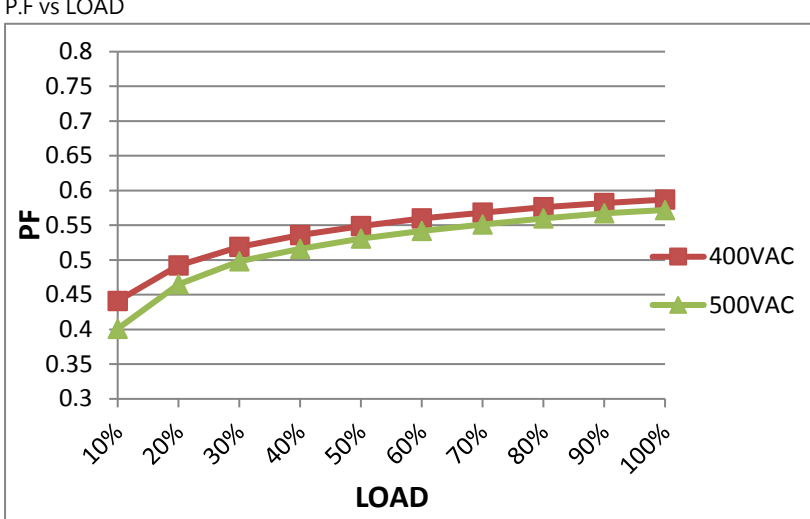
NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE ADJUST RANGE	CH1: 48V~55V	I/P : 400 VAC I/P : 500 VAC O/P : MIN LOAD Ta : 25°C	46.324V~56.75V/400VAC 46.329V~56.75V/500VAC
2	OUTPUT VOLTAGE TOLERANCE	-1.0% ~+1.0%	I/P: 320VAC ~ 600VAC O/P:FULL/ MIN. LOAD Ta:25°C	-0.069 % ~0.0271%
3	LINE REGULATION	-0.5% ~+0.5%	I/P: 320VAC~ 600VAC O/P:FULL LOAD Ta:25°C	-0.0416% ~0.017%
4	LOAD REGULATION	-1.0% ~+1.0%	I/P: 400VAC O/P:FULL ~MIN LOAD Ta:25°C	-0.069 % ~0.0271%
5	OVER/UNDERSHOOT TEST	<±5%	I/P: 400VAC O/P:FULL LOAD/NO LOAD Ta:25°C	1.3% →FULL LOAD 2.1% →NO LOAD
6	RIPPLE & NOISE (Max)	V1: 120mVp-p	I/P: 400VAC O/P:FULL LOAD Ta:25°C	V1: 35mVp-p / high frequency 68mVp-p / low frequency
high frequency :  low frequency : 				
7	SET UP TIME(Max)	400VAC/2000ms 500VAC/1500ms	I/P : 400 VAC I/P : 500 VAC O/P : FULL LOAD Ta : 25°C	400VAC/1522ms 500VAC/886.1ms
INPUT=400VAC/50HZ @ FULL LOAD CH1: Output Voltage CH2: AC Input Voltage			INPUT=500VAC/60HZ @ FULL LOAD CH1: Output Voltage CH2: AC Input Voltage	

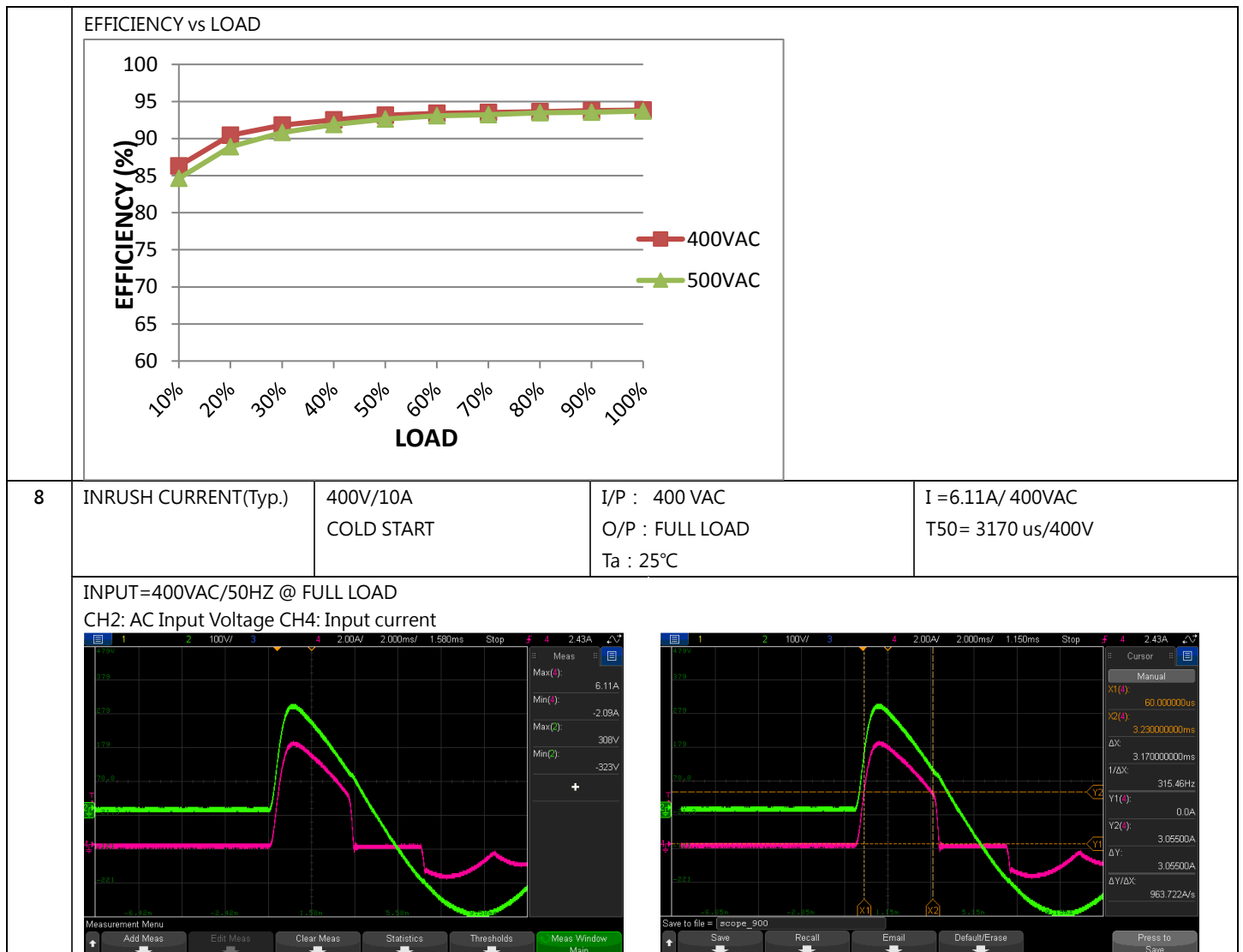
				
8	RISE TIME (Max)	400VAC/60ms 500VAC/60ms	I/P : 400 VAC I/P : 500 VAC O/P : FULL LOAD Ta : 25°C	14.72ms/400VAC 14.08ms/500VAC
	INPUT=400VAC/50HZ @ FULL LOAD CH1: Output Voltage		INPUT=500VAC/60HZ @ FULL LOAD CH1: Output Voltage	
9	HOLD UP TIME (Typ.)	400VAC/20ms 500VAC/40ms	I/P : 400 VAC I/P : 500 VAC O/P : FULL LOAD Ta : 25°C	35.8ms/400VAC 60.2ms/500VAC
	INPUT=400VAC/50HZ @ FULL LOAD CH1: Output Voltage CH2: AC Input Voltage		INPUT=500VAC/60HZ @ FULL LOAD CH1: Output Voltage CH2: AC Input Voltage	
10	DYNAMIC LOAD	V1: 4800 mVp-p	I/P: 400VAC O/P: (1) FULL / MIN LOAD 50%DUTY / 120HZ (2) FULL / MIN LOAD 50%DUTY /	(1) 1010 mVp-p (2) 1050mVp-p

			1KHZ Ta:25°C	
	FULL /MIN LOAD 50%DUTY / 120HZ		FULL / MIN LOAD 50%DUTY / 1KHZ	
				
11	PEAK LOAD 开机&循环	1) PEAK LOAD@5S 2) PEAK LOAD 循环  For example (24V model): $V_{in} = 400V$, Duty_max = 10% $P_{in} = P_{out} = 240W$ $P_{in} = 380W$ $t = 5\text{sec}$ $T \leq \frac{5\text{sec}}{10\%} \geq 50\text{sec}$ $P_{in} = \frac{TP_{in} + 1P_{in}}{T}$ $P_{in} < 220W$	I/P: 600VAC I/P: 400VAC I/P: 320VAC O/P: PEAK LOAD	TEST : I/P=600VAC : <u>OK</u> I/P=400VAC : <u>OK</u> I/P=320VAC : <u>OK</u>

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	320VAC~600VAC (Dual phase operation possible in connecting L1,L3,FG or L2,L3,FG) 450VDC~800VDC/ FULL LOAD(L3: + L1:-)  Note : When the dual phase input voltage is between 320-380Vac and ambient	(1) I/P:TESTING O/P:FULL LOAD Dual phase DC Input : (2) I/P:DC TESTING(L3: + L1:-) O/P: FULL LOAD Ta:25°C I/P: LOW-LINE-3V=317 V HIGH-LINE+10V=610 V O/P:FULL/MIN LOAD (PLEASE CHECK DERATING CURVE) ON: 30 Sec OFF: 30 Sec 10MIN (POWER ON/OFF NO DAMAGE)	(1) 313.49Vac~600Vac/ FULL LOAD Dual phase DC Input : (2) 358Vdc~800Vdc/FULL LOAD @ Dual phase operation L1,L3,FG or L2,L3,FG TEST: OK

		temperature is between-10C--40C, the power supply may experience hiccup at cold start. The power supply will start up normally after 5~10 seconds.	Dual phase operation : I/P: TESTING O/P: FULL LOAD / 70% LOAD/80% LOAD	(1) 317.46Vac~600Vac/ FULL LOAD@ Dual phase operation L1,L3,FG or L2,L3,FG (2) 270.13Vac~600Vac/ 70% LOAD@ Dual phase operation L1,L3,FG or L2,L3,FG (3) 299.93Vac~600Vac/ 80% LOAD@ Dual phase operation L1,L3,FG or L2,L3,FG																																	
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE	I/P: 320VAC~ 600VAC O/P:FULL~MIN LOAD Ta:25°C	TEST: OK																																	
3	INPUT CURRENT (Typ.)	400V/ 0.69A 500V/ 0.6A	I/P : 400 VAC I/P : 500 VAC O/P : FULL LOAD Ta : 25°C	TEST: <table><tr><td></td><td>400VAC</td><td>500VAC</td></tr><tr><td>L1</td><td>0.522A</td><td>0.455A</td></tr><tr><td>L2</td><td>0.499A</td><td>0.386A</td></tr><tr><td>L3</td><td>0.482A</td><td>0.443A</td></tr></table>		400VAC	500VAC	L1	0.522A	0.455A	L2	0.499A	0.386A	L3	0.482A	0.443A																					
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4	LEAKAGE CURRENT	< 2 mA / 530 VAC	I/P : 530 VAC O/P : Min LOAD Ta : 25°C	L1,L2,L3-FG : 0.644mA(Peak)→62368																																	
5	NO LOAD CONSUMPTION	<2.5 W	I/P : 400 VAC I/P : 500 VAC O/P : NO LOAD Ta : 25°C	2.1846W/500V 1.8078W/400V																																	
6	POWER FACTOR (Typ.)	PF=0.53 /400VAC PF=0.52/500VAC	I/P : 400 VAC I/P : 500 VAC O/P : FULL LOAD Ta : 25°C	TEST: <table><tr><td></td><td>400VAC</td><td>500VAC</td></tr><tr><td>L1</td><td>0.6351</td><td>0.5996</td></tr><tr><td>L2</td><td>0.6328</td><td>0.6012</td></tr><tr><td>L3</td><td>0.6303</td><td>0.5930</td></tr></table>		400VAC	500VAC	L1	0.6351	0.5996	L2	0.6328	0.6012	L3	0.6303	0.5930																					
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P.F vs LOAD <table><caption>P.F vs LOAD Data</caption><thead><tr><th>LOAD</th><th>400VAC P.F</th><th>500VAC P.F</th></tr></thead><tbody><tr><td>10%</td><td>0.44</td><td>0.40</td></tr><tr><td>20%</td><td>0.50</td><td>0.46</td></tr><tr><td>30%</td><td>0.53</td><td>0.49</td></tr><tr><td>40%</td><td>0.55</td><td>0.51</td></tr><tr><td>50%</td><td>0.56</td><td>0.52</td></tr><tr><td>60%</td><td>0.57</td><td>0.53</td></tr><tr><td>70%</td><td>0.58</td><td>0.54</td></tr><tr><td>80%</td><td>0.59</td><td>0.55</td></tr><tr><td>90%</td><td>0.60</td><td>0.56</td></tr><tr><td>100%</td><td>0.60</td><td>0.58</td></tr></tbody></table>					LOAD	400VAC P.F	500VAC P.F	10%	0.44	0.40	20%	0.50	0.46	30%	0.53	0.49	40%	0.55	0.51	50%	0.56	0.52	60%	0.57	0.53	70%	0.58	0.54	80%	0.59	0.55	90%	0.60	0.56	100%	0.60	0.58
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100%	0.60	0.58																																			
7	EFFICIENCY(Typ.)	93.5%	I/P: 400 VAC O/P:FULL LOAD Ta:25°C	93.87%																																	



PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	OLP : 105%~ 150% rated power Protection type: 105%~150% rated output power for more than 5 sec then constant current limiting without shutdown at rate current when Vo=30%~100%.	I/P: 600VAC I/P: 400VAC I/P: 320VAC O/P: TESTING Ta:25°C	OLP : 118.96%/600VAC 119.70%/400VAC 119.78%/320VAC Protection type: 105%~150% rated output power for more than 5 sec then constant current limiting without shutdown at rate current when Vo=30%~100%.

2	OVER VOLTAGE PROTECTION	56V~65V Protection type: Hiccup mode, recovers automatically after fault condition is removed.	I/P: 600VAC I/P: 320VAC O/P:MIN LOAD Ta:25°C	61.3V/320V 61.3V/600V Protection type: Hiccup mode, recovers automatically after fault condition is removed.
3	OVER TEMPERATURE PROTECTION	Protection type: Shut down o/p voltage or hiccup mode, recovers automatically after temperature goes down	I/P: 600VAC I/P: 320VAC O/P:FULL LOAD	TEST: <u>OK</u> O.T.P Active Protection type : Shut down o/p voltage or hiccup mode, recovers automatically after temperature goes down
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE Protection type: Constant current limiting with auto-recovery after fault condition is removed.	I/P: 600VAC I/P: 320VAC O/P: FULL LOAD Ta:25°C	NO DAMAGE Protection type: Constant current limiting with auto-recovery after fault condition is removed.

CONTROL FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	DC OK CONTACT RATINGS	30VDC/1A , 30VAC/0.5A RESISTIVE LOAD	I/P:400VAC O/P:FULL LOAD Ta:25°C	TEST : <u>OK</u>
2	PARALLEL(optional)	Up to 960W (3+1), please refer to the Instruction manual	I/P: TESTING O/P: TESTING LOAD Ta:25°C	TEST : <u>OK</u>

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 : 950 V/14A	AC ON/OFF I/P:High-Line =700V Vo=Vomax 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/	Q3 Q4 Vo=Vomax Vo=Vomax VDS: VDS: (1) 870V (1) 831V (2) 886V (2) 823V (3) 870V (3) 823V (4) 871V (4) 823V (5) 871V (5) 823V (6) 871V (6) 831V (7) 879V (7) 831V (8) 871V (8) 831V

			Min. Load 90%Duty/5KHz (6)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. (8) Peak Load <u>VO=Vnormal</u> O/P: (1)Full Load Ta:25°C	Vo=Vnormal (1) 831V	Vo=Vnormal (2) 823V
2	Diode Peak Voltage	Q100 Rated: 20A/ 300V	AC ON/OFF I/P:High-Line =700 V <u>VO=Vomax</u> 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)Peak Load <u>VO=Vnormal</u> O/P: (1)Full Load Ta:25°C	Q100: <u>VO=Vomax</u> VDS: (1) 221V (2) 259V (3) 223V (4) 221V (5) 220V (6) 213V (7) 286V (8) 237V (9) 231V <u>VO=Vnormal</u> (1) 243V	
3	Input Capacitor Voltage	C5/C6 Rated: 150 μ/ 450 V	I/P: High-Line +3V =603V O/P: (1)Full Load input on/off (2) Min load input on /Off (3) Full Load /Min load Change (4) Full load continue (5) Peak Load on/off (6) Peak Load continue Ta:25°C	C5 (1) 423V (2) 423V (3) 427V (4) 423V (5) 427V (6) 427V	C6 (1) 423V (2) 423V (3) 423V (4) 419V (5) 423V (6) 419V
4	Control IC Voltage Test	PWM IC U1 Rated: 9.4~28V IC U105 Rated: 3 V ~30 V IC U103 Rated: 3.3V~36V	AC ON/OFF I/P:High-Line =700V O/P(1)FULL LOAD (2) Output Short (3)O.L.P (4)O.V.P. (5)NO LOAD VRmin(LOW LINE) Ta:25°C	U1 (1) 19.1V (2) 19.4V (3) 19.4V (4) 19.2V (5) 19.2V	U105/U103 (1) 11.7V (2) 11.8V (3) 11.7V (4) 11.6V (5) 9.8V

5	Clamp Diode Peak Voltage	D37/D38 Rated : 1A/620V	AC ON/OFF I/P : High-Line = 700 V O/P : (1) Dynamic Load 90%Duty/1KHz (2)Full load continue Ta : 25°C	D37 (1) 376V (2) 372V	D38 (1) 360V (2) 356V
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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: 4.87KVAC/min I/P-FG :2.5KVAC/min O/P-FG:0.5KVAC/min O/P-DC OK: 0.5 KVAC/min	I/P-O/P: 5.357KVAC/min I/P-FG: 3 KVAC/min O/P-FG:0.6 KVAC/min O/P-DC OK: 0.6 KVAC/min Ta:25°C	I/P-O/P: 9.87 mA I/P-FG: 8.54 mA O/P-FG: 10.79 mA O/P-DC OK: 0.008 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: 600 VDC I/P-FG: 600 VDC O/P-FG: 600 VDC Ta:25°C	I/P-O/P: 50 GΩ I/P-FG: 50 GΩ O/P-FG: 50 GΩ NO DAMAGE
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40A / 2min Ta:25°C	7 mΩ

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	BS EN/EN61000-3-2 CLASS A	I/P: 400VAC/50HZ O/P:FULL LOAD Ta:25°C	PASS
2	CONDUCTION	BS EN/EN55032(CISPR32) / BS EN/EN61204-3 / CNS15936 CLASS B	I/P : 400 VAC (50HZ) O/P : FULL/50% LOAD Ta : 25°C	PASS Test by certified Lab
3	RADIATION	BS EN/EN55032(CISPR32) / BS EN/EN61204-3 / CNS15936 CLASS B	I/P : 400 VAC (50HZ) O/P : FULL LOAD Ta : 25°C	PASS Test by certified Lab
4	E.S.D	BS EN/ EN61000-4-2 AIR : 15KV / Contact : 8KV	I/P : 400 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
5	E.F.T	BS EN/ EN61000-4-4 INPUT : 4KV	I/P : 400 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A

			NO	Position	ROOM AMBIENT Ta= 26.2°C	HIGH AMBIENT Ta= 60.2°C
			24	R50	63.5°C	99.6
			25	C72	58.6°C	94.8
			26	Q70	62.2°C	98.2
			27	T1 Coil	72.1°C	108.3
			28	T1 Core	64.8°C	101
			29	C200	53.2°C	90.9
			30	Q100	70.7°C	106.5
			31	Q101	72.1°C	107.2
			32	R102	58.6°C	94.9
			33	C107	58.5°C	92.4
			34	C205	54.8°C	91.6
			35	Q200	56.3°C	94.4
			36	U103	66.6°C	102.5
			37	Q102	61.7°C	96.9
			38	U102	71.5°C	104.7
			39	J102	57.6°C	93.9
			40	D41	56°C	92.8
			41	D72	56.4°C	92.7
			42	D39	57.3°C	94.4
			43	R40	56.9°C	93.6
			44	U1	64.9°C	101.9
			45	D5	59.6°C	100.4
			46	U105	50°C	86.5
47	Q109	53.8°C	90.2			
48	C110	57.3°C	91.8			
49	TB2	44.5°C	80.4			
2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 400 VAC O/P : 119.78% LOAD Ta : 25°C		TEST : OK	
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 600VAC/380VAC O/P : 100% LOAD Ta= -40 °C		TEST : OK	
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 60 °C/95 %R.H NO DAMAGE	I/P : 600 VAC O/P : FULL LOAD Ta= 60 °C HUMIDITY= 95 %R.H		TEST : OK	
5	TEMPERATURE COEFFICIENT	± 0.03 %/°C(0~60°C)	I/P : 400 VAC O/P : FULL LOAD		± 0.01 %/°C(0~60°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	-40~60°C	1. Thermal shock Temperature : -45°C~ +65°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:400V/ FULL LOAD AC ON 3sec/AC OFF 1sec TEST 1cycle:400V/ 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 C107 IS THE MOST CRITICAL COMPONENT (1) I/P : 400VAC O/P : FULL LOAD Ta= 26.2 °C LIFE TIME (2) I/P : 400VAC O/P : FULL LOAD Ta= 60.2 °C LIFE TIME (3) I/P : 400VAC O/P : 75% LOAD Ta= 60.3 °C LIFE TIME (4) I/P : 400VAC O/P : 50% LOAD Ta= 60.6 °C LIFE TIME	(1) 733311.2 HRS (2) 60057.9 HRS (3) 102917.1 HRS (4) 163814.6 HRS
10	MTBF	Conducted by Parts Stress Analysis Prediction 1432.3K hrs min. Telcordia SR-332 (Bellcore) ; 191.5K hrs min. MIL-HDBK-217F (25°C)	
11	Ongoing Reliability Test	I/P : 400VAC O/P : FULL LOAD TA=50°C Demonstration Mean Time Between Failure :50,000 hours	

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	YUWEI	LIUTT	WANGZD

2020.10.1 TAG-QA-009