



Test Report: XTR-240-24

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

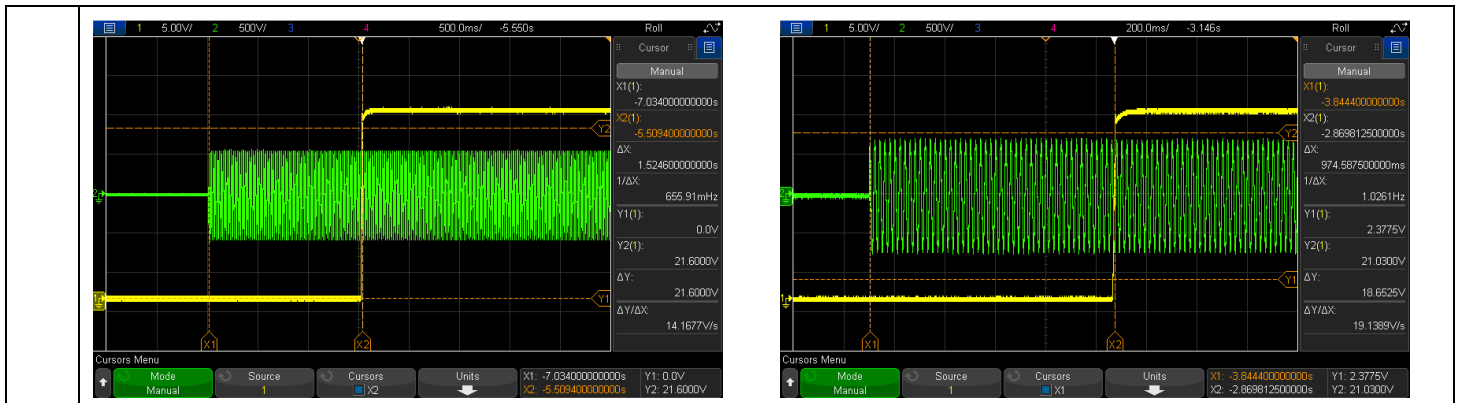
■ RELIABILITY TEST

ENVIRONMENT TEST

■ DESIGN VERIFY TEST

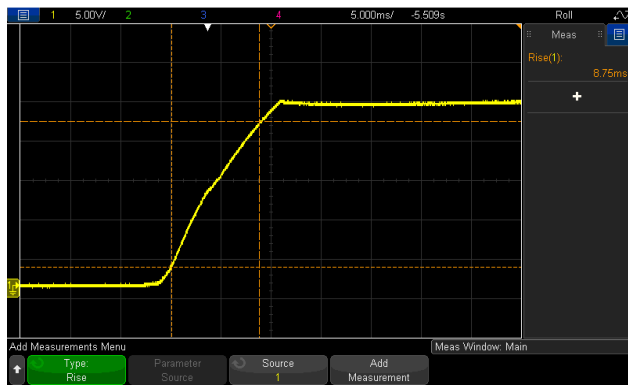
OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE ADJUST RANGE	CH1: 24V~29V	I/P : 400 VAC I/P : 500 VAC O/P : MIN LOAD Ta : 25°C	23.248V~30.335V/400VAC 23.25V~30.335V/500VAC
2	OUTPUT VOLTAGE TOLERANCE	-1.0% ~+1.0%	I/P: 320VAC ~ 600VAC O/P:FULL/ MIN. LOAD Ta:25°C	-0.2536%~0.1123%
3	LINE REGULATION	-0.5% ~+0.5%	I/P: 320VAC~ 600VAC O/P:FULL LOAD Ta:25°C	0%~0.0292%
4	LOAD REGULATION	-1.0% ~+1.0%	I/P: 400VAC O/P:FULL ~MIN LOAD Ta:25°C	-0.2536%~0.1123%
5	OVER/UNDERSHOOT TEST	<±5%	I/P: 400VAC O/P:FULL LOAD/NO LOAD Ta:25°C	2.1% →FULL LOAD 1.3% →NO LOAD
6	RIPPLE & NOISE (Max)	V1: 100mVp-p	I/P: 400VAC O/P:FULL LOAD Ta:25°C	V1: 45mVp-p / high frequency 77mVp-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	1524.6ms/400VAC 974.58ms/500VAC
		INPUT=400VAC/50HZ @ FULL LOAD CH1: Output Voltage CH3: AC Input Voltage	INPUT=500VAC/60HZ @ FULL LOAD CH1: Output Voltage CH3: AC Input Voltage	

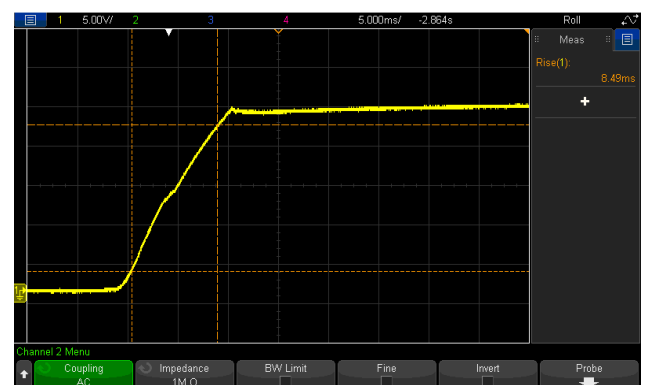


8	RISE TIME (Max)	400VAC/60ms 500VAC/60ms	I/P : 400 VAC I/P : 500 VAC O/P : FULL LOAD Ta : 25°C	8.75ms/400VAC 8.49ms/500VAC
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INPUT=400VAC/50HZ @ FULL LOAD
CH1: Output Voltage

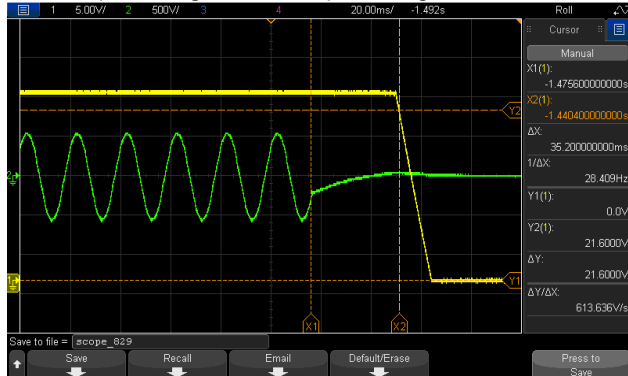


INPUT=500VAC/60HZ @ FULL LOAD
CH1: Output Voltage

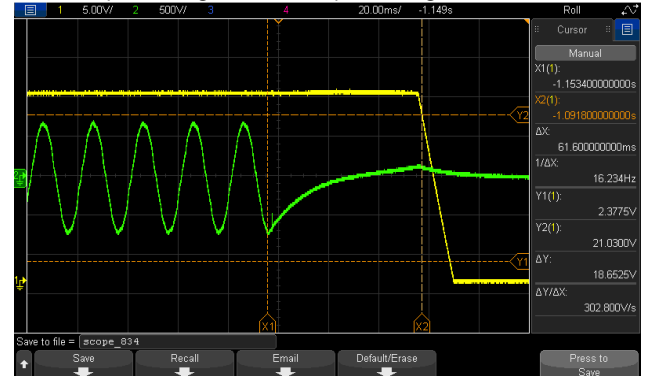


9	HOLD UP TIME (Typ.)	400VAC/20ms 500VAC/40ms	I/P : 400 VAC I/P : 500 VAC O/P : FULL LOAD Ta : 25°C	35.2ms/400VAC 61.6ms /500VAC
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INPUT=400VAC/50HZ @ FULL LOAD
CH1: Output Voltage CH3: AC Input Voltage



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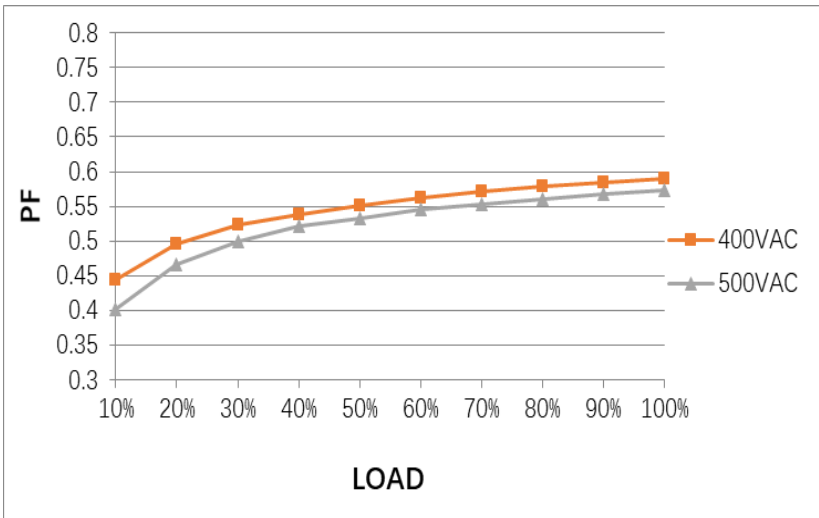


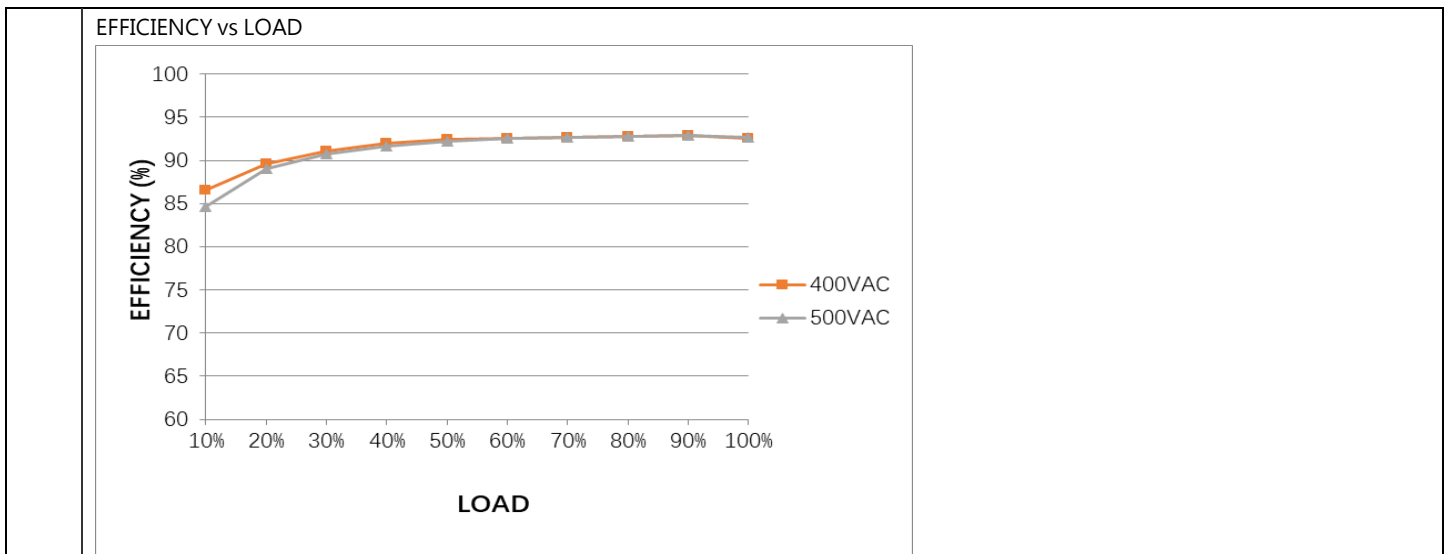
10	DYNAMIC LOAD	V1: 2400 mVp-p	I/P: 400VAC O/P: (1) FULL / MIN LOAD 50%DUTY / 120HZ (2) FULL / MIN LOAD 50%DUTY /	(1) 760mVp-p (2) 800mVp-p
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			1KHZ Ta:25°C	
FULL / MIN LOAD 50%DUTY / 120HZ		FULL / MIN LOAD 50%DUTY / 1KHZ		
11	PEAK LOAD 开机&循环	<p>1) PEAK LOAD@5S</p> <p>2) PEAK LOAD 循环</p> <p>For example (24V model): $300 \times 0.800V = 240W$ $P_{in} = P_{out} + 240W$ $P_{in} = 300W$ $I = 1.25A$ $T = 5 \text{ sec}$ $T_{off} = 10 \text{ sec}$ $P_{in} = 1.25 \times 240 = 300W$ $P_{in} = 228W$</p>	<p>I/P: 600VAC</p> <p>I/P: 400VAC</p> <p>I/P: 320VAC</p> <p>O/P: PEAK LOAD</p>	<p>TEST :</p> <p>I/P=600VAC : <u>OK</u></p> <p>I/P=400VAC : <u>OK</u></p> <p>I/P=320VAC : <u>OK</u></p>

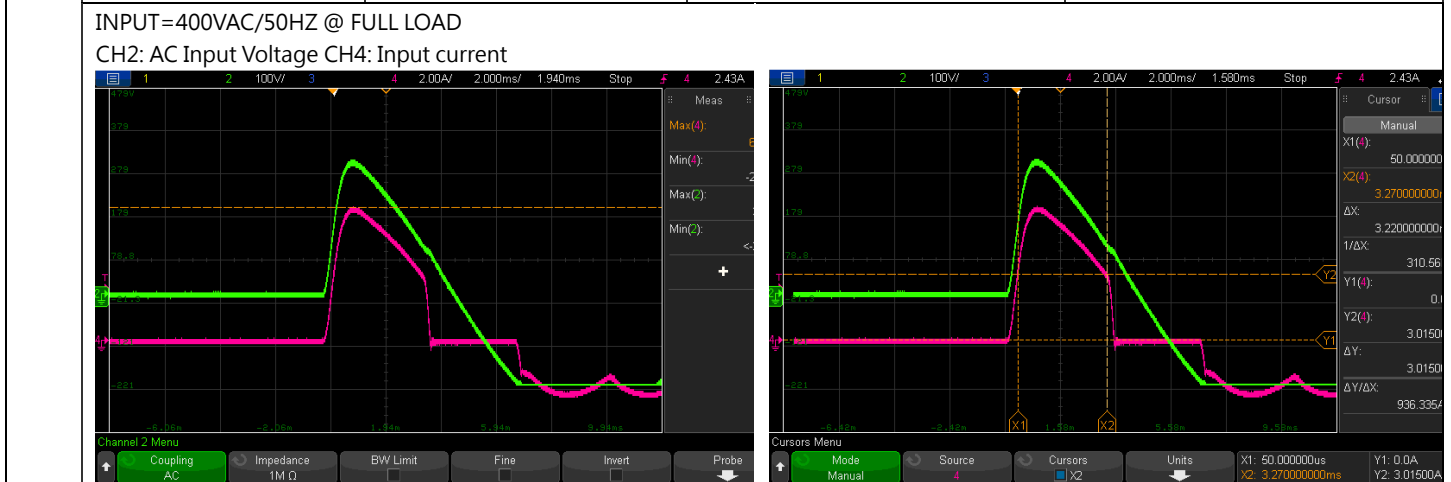
INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	<p>320VAC~600VAC (Dual phase operation possible in connecting L1,L3,FG or L2,L3,FG)</p> <p>450VDC~800VDC/ FULL LOAD(L3:+ L1:-)</p> <p>OUTPUT DERATING VS INPUT VOLTAGE</p> <p>Note : When the dual phase input voltage is between 320-380Vac and ambient temperature is</p>	<p>(1) I/P:TESTING O/P:FULL LOAD</p> <p>Dual phase DC Input :</p> <p>(2) I/P:DC TESTING(L3:+ L1:-) O/P: FULL LOAD Ta:25°C</p> <p>I/P: LOW-LINE-3V=317 V HIGH-LINE+10V=610 V</p> <p>O/P:FULL/MIN LOAD (PLEASE CHECK DERATING CURVE) ON: 30 Sec OFF: 30 Sec 10MIN (POWER ON/OFF NO DAMAGE)</p>	<p>(1) 261.48Vac~600Vac/ FULL LOAD</p> <p>Dual phase DC Input :</p> <p>(2) 350.8Vdc~800Vdc/FULL LOAD @ Dual phase operation L1,L3,FG or L2,L3,FG</p> <p>TEST: OK</p>

		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) 281.96Vac~600Vac/ FULL LOAD@ Dual phase operation L1,L3,FG or L2,L3,FG (2) 281.66Vac~600Vac/ 70% LOAD@ Dual phase operation L1,L3,FG or L2,L3,FG (3) 281.95 Vac~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/ 0.69 A 500V/ 0.6 A	I/P : 400 VAC I/P : 500 VAC O/P : FULL LOAD Ta : 25°C	TEST: <table border="1"> <thead> <tr> <th></th> <th>400VAC</th> <th>500VAC</th> </tr> </thead> <tbody> <tr> <td>L1</td> <td>0.606A</td> <td>0.547A</td> </tr> <tr> <td>L2</td> <td>0.539A</td> <td>0.499A</td> </tr> <tr> <td>L3</td> <td>0.547A</td> <td>0.338A</td> </tr> </tbody> </table>		400VAC	500VAC	L1	0.606A	0.547A	L2	0.539A	0.499A	L3	0.547A	0.338A																					
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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 : 0.274mA(Peak)→62368																																	
5	NO LOAD CONSUMPTION	<2.5 W	I/P : 400 VAC I/P : 500 VAC O/P : NO LOAD Ta : 25°C	1.8037W/400VAC 2.0622W/500VAC																																	
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 border="1"> <thead> <tr> <th></th> <th>400VAC</th> <th>500VAC</th> </tr> </thead> <tbody> <tr> <td>L1</td> <td>0.5649</td> <td>0.5739</td> </tr> <tr> <td>L2</td> <td>0.5633</td> <td>0.5889</td> </tr> <tr> <td>L3</td> <td>0.5693</td> <td>0.5753</td> </tr> </tbody> </table>		400VAC	500VAC	L1	0.5649	0.5739	L2	0.5633	0.5889	L3	0.5693	0.5753																					
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7	EFFICIENCY(Typ.)	92.5%	I/P: 400 VAC O/P:FULL LOAD Ta:25°C	92.67%																																	



8	INRUSH CURRENT(Typ.)	400V/10A COLD START	I/P : 400 VAC O/P : FULL LOAD Ta : 25°C	I = 6.15A / 400VAC T50= 3220 us/400V
	INPUT=400VAC/50HZ @ FULL LOAD CH2: AC Input Voltage CH4: Input current			



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 : 131.92%/600VAC 132.41%/400VAC 132.27%/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	30V~36V Protection type: Hiccup mode, recovers automatically after fault condition is removed.	I/P: 600VAC I/P: 320VAC O/P:MIN LOAD Ta:25°C	33.5V/ 600VAC 33.5V/ 320VAC 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/ Min. Load 90%Duty/5KHz	Q3 Q4 VDS: VDS: Vo=Vmax Vo=Vmax (1) 840V (1) 819V (2) 847V (2) 833V (3) 901V (3) 844V (4) 894V (4) 852V (5) 894V (5) 844V (6) 901V (6) 852V (7) 853V (7) 840V (8) 847V (8) 826V

			<p>(6)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. (8) Peak Load</p> <p><u>VO= Vnormal</u> O/P: (1)Full Load Ta:25°C</p>	<p>Vo=Vnormal (1) 880V</p>	<p>Vo=Vnormal (1) 848V</p>
2	Diode Peak Voltage	<p>Q100 Rated : 100 A/ 150V</p>	<p>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</p> <p><u>VO= Vnormal</u> O/P: (1)Full Load Ta:25°C</p>	<p>Q100: <u>VO=Vomax</u> VDS: (1) 89V (2) 106V (3) 115V (4) 114V (5) 113V (6) 114V (7) 123V (8) 105V (9) 121V</p> <p><u>VO= Vnormal</u> (1) 113.9V</p>	
3	Input Capacitor Voltage	<p>C5/C6 Rated: 150µ / 450V</p>	<p>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</p> <p>Ta:25°C</p>	<p>C5 (1) 417V (2) 417V (3) 417V (4) 417V (5) 417V (6) 417V</p>	<p>C6 (1) 417V (2) 417V (3) 417V (4) 417V (5) 417V (6) 413V</p>
4	Control IC Voltage Test	<p>PWM IC U1 Rated: 9.4~28V</p> <p>O/P IC U101 Rated: 4.2V ~ 35V</p> <p>IC U105 Rated: 3V ~30 V</p> <p>IC U103 Rated: 3.3V~36V</p>	<p>AC ON/OFF</p> <p>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)</p> <p>Ta:25°C</p>	<p>U1 (1) 19.2V (2) 19.3V (3) 19.3V (4) 19.3V (5) 19.3V</p>	<p>U101/ U105/U103 (1) 11.7V (2) 11.7V (3) 11.7V (4) 11.7V (5) 11.7V</p>

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) 379V (2) 367V	D38 (1) 364V (2) 361V
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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: 8.49 mA I/P-FG: 7.86 mA O/P-FG: 10.05 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	9 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

6	SURGE	BS EN/ EN61000-4-5 Line-Line : 2KV Line-Earth : 4KV	I/P : 400 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 : XTR-240-24 1. ROOM AMBIENT BURN-IN : 2 HRS I/P : 400VAC O/P : FULL LOAD Ta= 25.2 °C 2. HIGH AMBIENT BURN-IN : 2 HRS I/P : 400VAC O/P : FULL LOAD Ta= 60.4 °C																																																																																																										
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		NO	Position	ROOM AMBIENT Ta= 25.2°C	HIGH AMBIENT Ta= 60.4°C
		26	U3	62.7°C	94.8°C
		27	Q100	61.9°C	93.6°C
		28	R100	72°C	99.2°C
		29	C107	71°C	100°C
		30	C110	70.5°C	97.8°C
		31	Q200	66.1°C	100.6°C
		32	J102	70.7°C	102.3°C
		33	U103	72.3°C	101.2°C
		34	U102	71.3°C	101.5°C
		35	TB2	64.4°C	89.9°C
		36	D38	76.4°C	104.3°C
		37	U101	79.7°C	105.5°C
		38	Q109	66.6°C	97.3°C
		39	D72	68.9°C	103.6°C
		40	U1	67.8°C	102.1°C
		41	D37	74.8°C	103.9°C
		42	R40	69.2°C	102.9°C
		43	U105	59°C	89.2°C
		44	D7	64°C	92.6°C
2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)		I/P : 400 VAC O/P : 130.0% 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	± 0.013 %/°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 C171 IS THE MOST CRITICAL COMPONENT (1) I/P : 400VAC O/P : FULL LOAD Ta= 25.2 °C LIFE TIME (2) I/P : 400VAC O/P : FULL LOAD Ta= 60.4 °C LIFE TIME (3) I/P : 400VAC O/P : 75% LOAD Ta= 60.4 °C LIFE TIME (4) I/P : 400VAC O/P : 50% LOAD Ta= 60.7 °C LIFE TIME	(1) 215752.6 HRS (2) 17670.1 HRS (3) 51030.4 HRS (4) 77367.7 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