



# Test Report: WDR-120-12

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120W Single Output Industrial DIN RAIL 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	VERDICT
1	RIPPLE & NOISE	V1 : 120 mVp-p (Max)	I/P : 400VAC O/P : FULL LOAD Ta : 25°C	V1 : 70 mVp-p (Max)	P
2	OUTPUT VOLTAGE ADJUST RANGE	CH1 : 12 V ~ 15 V	I/P : 400 VAC I/P : 230 VAC O/P : MIN LOAD Ta : 25°C	11.12 V~ 15.51 V/ 400 VAC 11.1 V~ 15.52 V/ 230 VAC	P
3	OUTPUT VOLTAGE TOLERANCE	V1 : 1.5%~ 1.5 % (Max)	I/P : 200 VAC / 550 VAC O/P : FULL/ MIN LOAD Ta : 25°C	V1 : 0.15 %~ -0.15 %	P
4	LINE REGULATION	V1 : 0.5%~ 0.5 % (Max)	I/P : 200 VAC ~ 550 VAC O/P : FULL LOAD Ta : 25°C	V1 : 0 %~ 0 %	P
5	LOAD REGULATION	V1 : 0.5%~ 0.5 % (Max)	I/P : 400 VAC O/P : FULL ~MIN LOAD Ta : 25°C	V1 : 0.15 %~ -0.15 %	P
6	SET UP TIME	400VAC : 2000 ms (Max) 230VAC : 2000 ms(Max)	I/P : 400 VAC I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	400VAC/ 382 ms 230VAC/ 339 ms	P
7	RISE TIME	400VAC : 70 ms (Max) 230VAC : 70 ms (Max)	I/P : 400 VAC I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	400VAC/ 26 ms 230VAC/ 13.4 ms	P
8	HOLD UP TIME	400VAC : 50 ms (TYP) 230VAC : 10 ms (TYP)	I/P : 400 VAC I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	400VAC/ 54 ms 230VAC/ 12.6 ms	P
9	OVER/UNDERSHOOT TEST	< ±5%	I/P : 400 VAC O/P : FULL LOAD Ta : 25°C	TEST : < 5 %	P
10	DYNAMIC LOAD	V1 : 1200 mVp-p	I/P : 400 VAC O/P : FULL /Min LOAD 90%DUTY/ 1KHZ Ta : 25°C	411 mVp-p	P

### INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	180VAC ~ 550 VAC	I/P : TESTING O/P : FULL LOAD Ta : 25°C  I/P : LOW-LINE-3V= 177 V HIGH-LINE+10V= 560 V O/P : FULL/MIN LOAD ON : 30 Sec. OFF : 30 Sec 10MIN ( AC POWER ON/OFF NO DAMAGE )	150 V~550V  TEST : OK	P
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE	I/P : 180 VAC ~ 550 VAC O/P : FULL-MIN LOAD Ta : 25°C	TEST : OK	P
3	EFFICIENCY	89.5 % (TYP)	I/P : 400 VAC O/P : FULL LOAD Ta : 25°C	89.92 %	P
4	INPUT CURRENT	400V/ 0.7 A (TYP) 230V/ 1.2 A (TYP)	I/P : 400 VAC I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	I = 0.693 A/ 400 VAC I = 0.99 A/ 230 VAC	P
5	INRUSH CURRENT	400V/ 50 A (TYP)  COLD START	I/P : 400 VAC O/P : FULL LOAD Ta : 25°C	I = 42.6 A/ 400 VAC	P
6	LEAKAGE CURRENT	< 3.5 mA / 530 VAC	I/P : 530 VAC O/P : Min LOAD Ta : 25°C	L-FG : 0.95 mA N-FG : 0.95 mA	P

### PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	105 % ~ 130 %	I/P : 400 VAC I/P : 230 VAC O/P : TESTING Ta : 25°C	117 %/ 400 VAC 117 %/ 230 VAC Constant Current Limiting	P
2	OVER VOLTAGE PROTECTION	CH1 : 16 V ~ 18 V	I/P : 400 VAC I/P : 230 VAC O/P : MIN LOAD Ta : 25°C	16.78 V/ 400 VAC 17.03 V/ 230 VAC Shut down Re- power ON	P
3	OVER TEMPERATURE PROTECTION	SPEC : TSW1 : 105 ± 5°C O.T.P. NO DAMAGE	I/P : 400 VAC O/P : FULL LOAD	O.T.P. Active Shut down o/p voltage , recovers automatically after temperature goes down	P
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P : 550 VAC O/P : FULL LOAD Ta : 25°C	NO DAMAGE Constant Current Limiting	P

### CONTROL FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	DC OK SIGNAL	Relay contact rating(max.) : 30V / 1A resistive	I/P: 400 VAC O/P:FULL LOAD	OK	P

### COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	Power Transistor (D to S) or (C to E) Peak Voltage	Q1 Rated : STP7N95K3 7A/950V	I/P : High-Line +3V = 553 V O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C	(1) 740 V (2) 688 V (3) 528 V	P
2	Diode Peak Voltage	Q102 Rated : FDP3632 80A/100V	I/P : High-Line +3V = 553 V O/P : (1)Full Load Turn on (2)Output Short (3)Full load continue Ta : 25°C	(1) 98 V (2) 98 V (3) 76.8 V	P
3	Input Capacitor Voltage	C5 Rated : 120u/400V 105°C VZ	I/P : High-Line +3V = 553 V O/P : (1)Full Load Turn on /Off (2) Min load Turn on /Off (3)Full Load /Min load Change Ta : 25°C	(1) 370.4 V (2) 383.1 V (3) 379.6 V	P
4	Control IC Voltage Test	U 1 Rated : NCP1377DR2G 8.2V~18V	I/P : High-Line +3V = 553 V O/P : (1)Full Load Turn on /Off (2) Min load Turn on /Off (3)Full Load /Min load Change Ta : 25°C	(1) 14.74 V (2) 14.7 V (3) 14.73 V	P

### ■ SAFETY & E.M.C. TEST

#### SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	WITHSTAND VOLTAGE	I/P-O/P : 3 KVAC/min I/P-FG : 2 KVAC/min O/P-FG : 0.5 KVAC/min O/P-DCOK : 0.5 KVAC/min	I/P-O/P : 3.6 KVAC/min I/P-FG : 2.4 KVAC/min O/P-FG : 0.6 KVAC/min O/P-DCOK : 0.6KVAC/min Ta : 25°C	I/P-O/P : 5.62 mA I/P-FG : 4.36 mA O/P-FG : 3.67 mA O/P-DCOK : 0.022 mA NO DAMAGE	P
2	ISOLATION RESISTANCE	I/P-O/P : 500VDC>100MΩ I/P-FG : 500VDC>100MΩ O/P-FG : 500VDC>100MΩ	I/P-O/P : 500 VDC I/P-FG : 500 VDC O/P-FG : 500 VDC Ta : 25°C/70% RH	I/P-O/P : 7.71 GΩ I/P-FG : 5.75 GΩ O/P-FG : 30 GΩ NO DAMAGE	P
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40 A / 2min Ta : 25°C /70% RH	28 mΩ	P
4	APPROVAL	TUV : Certificate NO : UL : File NO : E215312			P

## E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	HARMONIC	EN61000-3-2 CLASS A	I/P : 400/240/220 VAC/50HZ O/P : 100/75/50/25% LOAD Ta : 25°C	PASS	P
2	CONDUCTION	EN55022 EN55011 CLASS B	I/P : 400 VAC (50HZ)/115V60HZ O/P : FULL/50% LOAD Ta : 25°C	PASS Test by certified Lab	P
3	RADIATION	EN55022 EN55011 CLASS B	I/P : 400 VAC (50HZ)/115V60HZ O/P : FULL LOAD Ta : 25°C	PASS Test by certified Lab	P
4	E.S.D	EN61000-4-2 INDUSTRY AIR : 8KV / Contact : 4KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A	P
5	E.F.T	EN61000-4-4 INDUSTRY INPUT : 2KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A	P
6	SURGE	IEC61000-4-5 INDUSTRY L-N : 2KV L,N-PE : 4KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A	P
7	Test by certified Lab & Test Report Prepare				

## RELIABILITY TEST

### ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	TEMPERATURE RISE TEST	MODEL : WDR-120-24 1. ROOM AMBIENT BURN-IN : 0.5 HRS I/P : 400VAC O/P : FULL LOAD Ta= 25.6 °C 2. HIGH AMBIENT BURN-IN : 4 HRS I/P : 400VAC O/P : FULL LOAD Ta= 61.1 °C			P

2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR ( MIN )	I/P : 400 VAC O/P : 114 % LOAD Ta : 25°C	TEST : OK	P
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 550VAC/100VAC O/P : 100 % LOAD Ta= -30 °C	TEST : OK	P
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 60 °C NO DAMAGE	I/P : 560 VAC O/P : FULL LOAD Ta= 60 °C HUMIDITY= 95 %R.H	TEST : OK	P
5	TEMPERATURE COEFFICIENT	± 0.03 % (0~50°C)	I/P : 400 VAC O/P : FULL LOAD	± 0.003 % (0~50°C)	P
6	STORAGE TEMPERATURE TEST	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 : 5 CYCLE 5. Input/Output condition : STATIC		OK	P
7	THERMAL SHOCK TEST	1. Thermal shock Temperature : -30°C ~ +55°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 : 400VAC/Full Load AC ON/OFF TEST turn on 58sec ; turn off 2sec		OK	P
8	VIBRATION TEST	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10~500Hz (3) Sweep Time : 10min/sweep cycle (4) Acceleration : 2G (5) Test Time : 60min in each axis (X.Y.Z) (6) Ta : 25°C		TEST : OK	P
9	CAPACITOR LIFE CYCLE	WDR-120-24:SUPPOSE C106 IS THE MOST CRITICAL COMPONENT (1) I/P : 400VAC O/P : FULL LOAD Ta= 25 °C LIFE TIME (2) I/P : 400VAC O/P : FULL LOAD Ta= 60 °C LIFE TIME (3) I/P : 400VAC O/P : 75% LOAD Ta= 60 °C LIFE TIME		(1) 289302.5HRS (2) 27200.4HRS (3) 48077.9HRS	P
10	MTBF	Conducted by Parts Stress Analysis Prediction 1509.6K hrs min. Telcordia SR-332 (Bellcore) ; 268.1K hrs min. MIL-HDBK-217F (25°C)			P

DATE	SAMPLE	TEST RESULT	TESTER	APPROVAL
2009/11/3	RD SAMPLE	PASS	SANFORD SU	VINCENT TSENG
2009/12/17	W0911C65	PASS	SANFORD SU	VINCENT TSENG

2009/08/04 A50-F023