



Test Report: NDR-120-24

120W Single Output Industrial DIN RAIL

■ DESIGN VERIFY TEST

Output Function Test

Input Function Test

Protection Function Test

Component Stress Test

■ SAFETY & E.M.C. TEST

Safety Test

E.M.C. Test

■ RELIABILITY TEST

ENVIRONMENT TEST

DESIGN VERIFY TEST

MODEL : NDR-120-24

DVT TEST

OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	RIPPLE & NOISE	V1: 120 mVp-p (Max)	I/P:230VAC O/P:FULL LOAD Ta:25°C	V1: 33.8 mVp-p (Max)	P
2	OUTPUT VOLTAGE ADJUST RANGE	CH1: 24 V~28 V	I/P: 230VAC/115VAC O/P:MIN LOAD Ta:25°C	23.23V~28.71 V/230VAC 23.23V~28.71 V/115VAC	P
3	OUTPUT VOLTAGE TOLERANCE	V1: 1 %~ -1 % (Max)	I/P: 100VAC /264VAC O/P:FULL/ MIN. LOAD Ta:25°C	V1:0.074 %~-0.074%	P
4	LINE REGULATION	V1:0.5 %~ -0.5 % (Max)	I/P: 100VAC~ 264VAC O/P:FULL LOAD Ta:25°C	V1: 0.025%~ -0%	P
5	LOAD REGULATION	V1: 1 %~ -1 % (Max)	I/P: 230VAC O/P:FULL ~MIN LOAD Ta:25°C	V1:0.074 %~-0.074%	P
6	SET UP TIME	230VAC/1200ms (Max) 115VAC/2500ms (Max)	I/P: 230VAC/115VAC O/P:FULL LOAD Ta:25°C	230VAC/731.218ms 115VAC/1584.837ms	P
7	RISE TIME	230VAC/60ms (Max) 115VAC/60ms (Max)	I/P: 230VAC/115VAC O/P:FULL LOAD Ta:25°C	230VAC/ 26.506ms 115VAC/27.797ms	P
8	HOLD UP TIME	230VAC/16ms (TYP) 115VAC/10ms (TYP)	I/P: 230VAC/115VAC O/P:FULL LOAD Ta:25°C	230VAC/59.079ms 115VAC/ 12.462ms	P
9	OVER/UNDERSHOOT TEST	< ±5%	I/P: 230VAC O/P:FULL LOAD Ta:25°C	<5%	P
10	DYNAMIC LOAD	V1: 2400 mVp-p	I/P: 230VAC O/P:(1)FULL /Min LOAD 90%DUTY/1KHZ (2) (1)FULL /Min LOAD 90%DUTY/3KHZ (3)FULL /Min LOAD 90%DUTY/5KHZ (4)FULL /Min LOAD 50%DUTY/120HZ Ta:25°C	281mVp-p 303 mVp-p 291mVp-p 311mVp-p	P

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	90VAC~264VAC 127VDC ~ 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) 65.706V~264V (2) 115.2Vdc~370Vdc/FULL LOAD 115.0Vdc~370Vdc/50% LOAD (3) 115.2Vdc~370Vdc/FULL LOAD 115.1Vdc~370Vdc/50% LOAD	P
			I/P: (1)LOW-LINE-3V=87 V HIGH-LINE+15%=300 V O/P:FULL/MIN LOAD ON: 30 Sec OFF: 30 Sec 10MIN (2)230Vac ON: 0.5 Sec OFF: 0.5 Sec 20MIN (3)230Vac ON:3Sec OFF:3Sec 12HOURS (POWER ON/OFF NO DAMAGE)	TEST:OK	
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE	I/P:100 VAC ~264 VAC O/P:FULL~MIN LOAD Ta:25°C	TEST: OK	P
4	EFFICIENCY	88% (TYP)	I/P:230 VAC O/P:FULL LOAD Ta:25°C	89.07%	P
5	INPUT CURRENT	230V/ 1.3A (Typ) 115V/ 2.25 A (Typ)	I/P: 230 VAC/115VAC O/P:FULL LOAD Ta:25°C	I =0.99A/ 230VAC I =2.07A/ 115VAC	P
6	INRUSH CURRENT	230V/35A (Typ) 115V/20A (Typ) COLD START	I/P:230VAC/115VAC O/P:FULL LOAD Ta:25°C	I =32.437A/ 230VAC I =17.750A/ 115VAC	P

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	105%~130% RATED OUTPUT POWER	I/P: 264VAC I/P: 230VAC I/P: 100VAC O/P:TESTING Ta:25°C	113.8%/ 264VAC 113.5%/ 230VAC 114.0%/100VAC Protection type : Constant current limiting, recovers automatically after fault condition is removed	P
2	OVER VOLTAGE PROTECTION	CH:29V~33V(Typ)	I I/P:264VAC I/P: 230VAC I/P: 90VAC O/P:MIN LOAD Ta:25°C	30.75V/ 264VAC 30.71V/ 230VAC 30.68V/90VAC Protection type : Shut down o/p voltage, re-power on to recover	P
3	OVER TEMPERATURE PROTECTION	NO DAMAGE	I/P: 230 VAC O/P:FULL LOAD	O.T.P. Active Shut down o/p voltage, re-power on to recover	P
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 264VAC O/P: FULL LOAD Ta:25°C	NO DAMAGE Constant Current Limiting	P

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
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1	Power Transistor (D to S) or (C to E) Peak Voltage	Q1 Rated 11 A/600 V	I/P:High-Line +3V =267V O/P: (1)Full Load input on/off (2)Output Short (3) Full Load Continue Ta:25°C	(1) 518V (2) 392V (3) 514V	P
2	Diode Peak Voltage	D100 Rated 20A/ 150V	I/P:High-Line +3V =267 V O/P: (1)Full Load input on/off (2)Output Short (3) Full Load Continue Ta:25°C	(1)126V (2)107V (3)120V	P
3	Input Capacitor Voltage	C5 Rated: 180 μ / 400V	I/P:High-Line +3V =267 V O/P: (1)Full Load input on/off (2) Min load input on /Off Ta:25°C	(1)362V (2)362V	P
4	Control IC Voltage Test	PWM IC U1 1380 Rated 28 V(MAX.) 9 V(MIN.)	I/P:High-Line +3V =267 V O/P:(1)FULL LOAD (2) Output Short (3)NO LOAD VR 下限.LOW LINE Ta:25°C	(2) 17.5V (3) 17.1V (4) 16.7V	P

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	WITHSTAND VOLTAGE	EN 60950 I/P-O/P: 3KVAC/min I/P-FG: 2 KVAC/min O/P-FG:0.5KVAC/min	I/P-O/P: 3.6 KVAC/min I/P-FG: 2.4 KVAC/min O/P-FG:0.6 KVAC/min Ta:25°C	I/P-O/P: 3.212mA I/P-FG: 3.72mA O/P-FG: 3.96mA 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	I/P-O/P: 9999MΩ I/P-FG: 9999MΩ O/P-FG: 9999MΩ NO DAMAGE	P
3	GROUNDING CONTINUITY	EN 60950 FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40A / 2min Ta:25°C	15mΩ BY CASE	P
4	LEAKAGE CURRENT	EN 60950 1mA< 240VAC	I/P:264 VAC O/P:Min LOAD Ta:25°C	L-FG: 0.30mA N-FG:0.31mA	P

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
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120W Single Output Industrial DIN RAIL **NDR-120** series

1	HARMONIC	BS EN/EN61000-3-2 CLASS A	I/P:230VAC/50HZ O/P:100%LOAD Ta:25°C	PASS	P
2	E.S.D	BS EN/EN61000-4-2 INDUSTRY AIR:8KV / Contact:4KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A	P
3	E.F.T	BS EN/EN61000-4-4 INDUSTRY INPUT: 2KV	I/P: 230VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A	P
4	SURGE	BS EN/EN61000-4-5 INDUSTRY L-N :2KV L,N-PE:4KV	I/P: 230VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A	P

RELIABILITY TEST

ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT																																																								
1	TEMPERATURE RISE TEST	MODEL : NDR-120-12 1. ROOM AMBIENT BURN-IN : 1HRS I/P : 230VAC O/P : FULL LOAD Ta=31.0°C 2. HIGH AMBIENT BURN-IN : 1 HRS I/P : 230VAC O/P : FULL LOAD Ta=48.8°C	<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta=32.0°C</th> <th>HIGH AMBIENT Ta=48.8°C</th> </tr> </thead> <tbody> <tr><td>1</td><td>U1</td><td>63.6°C</td><td>80.2°C</td></tr> <tr><td>2</td><td>U107</td><td>63.0°C</td><td>79.4°C</td></tr> <tr><td>3</td><td>C5</td><td>61.0°C</td><td>77.7°C</td></tr> <tr><td>4</td><td>Q1</td><td>71.2°C</td><td>88.9°C</td></tr> <tr><td>5</td><td>T1</td><td>87.7°C</td><td>104.4°C</td></tr> <tr><td>6</td><td>C105</td><td>77.7°C</td><td>94.5°C</td></tr> <tr><td>7</td><td>D5</td><td>105.3°C</td><td>107.9°C</td></tr> <tr><td>8</td><td>C36</td><td>82.3°C</td><td>98.4°C</td></tr> <tr><td>9</td><td>BD1</td><td>62.7°C</td><td>78.8°C</td></tr> <tr><td>10</td><td>D100</td><td>76.3°C</td><td>93.1°C</td></tr> <tr><td>11</td><td>D101</td><td>82.3°C</td><td>98.9°C</td></tr> <tr><td>12</td><td>RTH2</td><td>82.3°C</td><td>98.9°C</td></tr> <tr><td>13</td><td>LF2</td><td>87.5°C</td><td>103.4°C</td></tr> </tbody> </table>	NO	Position	ROOM AMBIENT Ta=32.0°C	HIGH AMBIENT Ta=48.8°C	1	U1	63.6°C	80.2°C	2	U107	63.0°C	79.4°C	3	C5	61.0°C	77.7°C	4	Q1	71.2°C	88.9°C	5	T1	87.7°C	104.4°C	6	C105	77.7°C	94.5°C	7	D5	105.3°C	107.9°C	8	C36	82.3°C	98.4°C	9	BD1	62.7°C	78.8°C	10	D100	76.3°C	93.1°C	11	D101	82.3°C	98.9°C	12	RTH2	82.3°C	98.9°C	13	LF2	87.5°C	103.4°C		P
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2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 230 VAC O/P : 108% LOAD Ta : 25°C	TEST : OK	P																																																								
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 264VAC/100VAC O/P : 100 % LOAD Ta= -20°C	TEST : OK	P																																																								



120W Single Output Industrial DIN RAIL **NDR-120** series

4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 50°C NO DAMAGE	I/P : 272 VAC O/P : FULL LOAD Ta=50°C HUMIDITY= 95 %R.H	TEST : OK	P
5	TEMPERATURE COEFFICIENT	±0.03%/°C (0~50°C)	I/P : 230 VAC O/P : FULL LOAD	0%/°C (0~50°C)	P
6	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature : -40°C~ +85°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 : -20°C~ +70°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 : 230VAC/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 : 12min/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	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=50°C LIFE TIME (3) I/P : 230VAC O/P : 75% LOAD Ta=50°C LIFE TIME (4) I/P : 230VAC O/P : 50% LOAD Ta=50°C LIFE TIME		(1) 98990HRS (2) 18794HRS (3) 39950HRS (4) 72914HRS	P
10	MTBF	2636.8K hrs min. Telcordia SR-332 (Bellcore) ; 453.3K hrs min. MIL-HDBK-217F (25°C)			P
11	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure (Expected Life): Above 50,000 hours @ TA 50°C			P

SAMPLE	TESTER	APPROVAL
PRODUCT SAMPLE	FRANK	WANGDEZHAO

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