



Test Report: NDR-120-12

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-120-12

DVT TEST

OUTPUT FUNCTION TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT | VERDICT |
|----|--------------------------------|--|---|--|---------|
| 1 | RIPPLE & NOISE | V1: 100 mVp-p (Max) | I/P: 230VAC O/P: FULL LOAD Ta: 25°C | V1: 62.4mVp-p (Max) | P |
| 2 | OUTPUT VOLTAGE ADJUST RANGE | CH1: 12 V~ 14 V | I/P: 230VAC/115VAC O/P: MIN LOAD Ta: 25°C | 11.58V~14.59V/230VAC 11.58V~14.59V/115VAC | p |
| 3 | OUTPUT VOLTAGE TOLERANCE | V1: 2 %~ -2 % | I/P: 100VAC /264VAC O/P: FULL/ MIN. LOAD Ta: 25°C | V1: 0.149%~-0.149% | P |
| 4 | LINE REGULATION | V1: 0.5 %~ -0.5 % | I/P: 100VAC~ 264VAC O/P: FULL LOAD Ta: 25°C | V1: - 0.05%~-0% | P |
| 5 | LOAD REGULATION | V1: 1 %~ -1 % | I/P: 230VAC O/P: FULL ~MIN LOAD Ta: 25°C | V1: 0.149%~-0.149% | P |
| 6 | SET UP TIME | 230VAC/1200ms (Max) 115VAC/2500ms (Max) | I/P: 230VAC/115VAC O/P: FULL LOAD Ta: 25°C | 230VAC/ 741.837ms 115VAC/ 1602.112ms | p |
| 7 | RISE TIME | 230VAC/60ms (Max) 115VAC/60ms (Max) | I/P: 230VAC/115VAC O/P: FULL LOAD Ta: 25°C | 230VAC/28.708ms 115VAC/31.980ms | P |
| 8 | HOLD UP TIME | 230VAC/16ms (TYP) 115VAC/10ms (TYP) | I/P: 230VAC/115VAC O/P: FULL LOAD Ta: 25°C | 230VAC/ 57.046ms 115VAC/ 11.775ms | P |
| 9 | OVER/UNDERSHOOT TEST | < ±5% | I/P: 230VAC O/P: FULL LOAD Ta: 25°C | <5% | p |
| 10 | DYNAMIC LOAD | V1: 1200 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 | 492mVp-p(1) 486mVp-p(2) 466mVp-p(3) 534mVp-p(4) | 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) 73.625V~264V (2) 116.7Vdc~370Vdc/FULL LOAD 116.6Vdc~370Vdc/50% LOAD (3) 116.6Vdc~370Vdc/FULL LOAD 116.6Vdc~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 | 85.5% (TYP) | I/P:230 VAC O/P:FULL LOAD Ta:25°C | 85.87% | 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 =1.02A/ 230VAC I =2.10A/ 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 =32.125A/ 230VAC I =17.843A/ 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 | 110.8%/ 264VAC 110.8%/ 230VAC 111.6%/100VAC Protection type : Constant current limiting, recovers automatically after fault condition is removed | P |
| 2 | OVER VOLTAGE PROTECTION | CH:14V~17V | I I/P:264VAC I/P: 230VAC I/P: 90VAC O/P:MIN LOAD Ta:25°C | 16.08V/ 264VAC 16.09V/ 230VAC 16.07V/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



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

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT | VERDICT |
|----|--|---|---|-------------------------------------|---------|
| 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)536V (2)410V (3)534V | P |
| 2 | Diode Peak Voltage | D100 Rated 20A/80V | 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)73.6V (2)70.0V (3)68.0V | P |
| 3 | Input Capacitor Voltage | C5 Rated: 180 μ / 400 V | I/P:High-Line +3V =267 V O/P: (1)Full Load input on/off (2) Min load input on /Off (3)Burn-IN 1Hour Ta:25°C | (1) 362V (2) 362V (3) 360V | P |
| 4 | Control IC Voltage Test | PWM IC U1 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 Ta:25°C | (2) 16.9V (3) 16.9V (4) 16.8V | 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: 3.13mA I/P-FG: 3.61mA O/P-FG: 4.01m A NO DAMAGE | P |
| 2 | ISOLATION RESISTANCE | I/P-O/P:500VDC>100M Ω I/P-FG: 500VDC>100M Ω O/P-FG:500VDC>100M Ω | I/P-O/P: 500 VDC I/P-FG: 500 VDC O/P-FG: 500 VDC Ta:25°C | I/P-O/P: 9999M Ω I/P-FG: 9999M Ω O/P-FG: 9999M Ω NO DAMAGE | P |
| 3 | GROUNDING CONTINUITY | EN 60950 FG(PE) TO CHASSIS OR TRACE < 100 m Ω | 40A / 2min Ta:25°C | 14m Ω BY C.A.S.E | P |
| 4 | LEAKAGE CURRENT | EN 60950 1mA< 240VAC | I/P:264 VAC O/P:Min LOAD Ta:25°C | L-FG:0.45mA N-FG:0.45mA | P |

E.M.C TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT | VERDICT |
|----|-----------|---------------|----------------|--------|---------|
|----|-----------|---------------|----------------|--------|---------|



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 |
| 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 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 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 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



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

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|----|---|--|--|--|---|
| 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 |
| 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 | WangDZ |

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