JAMECO ELECTRONICS

Jameco SKU Number: 2104874

MEAN WELL

150W Single Output Switching Power Supply

NES-150 series

■ Features :

- AC input range selectable by switch
- Protections: Short circuit / Overload / Over voltage
- Cooling by free air convection
- LED indicator for power on
- 100% full load burn-in test
- High efficiency, long life and high reliability
- 2 years warranty

SPECIFICATION

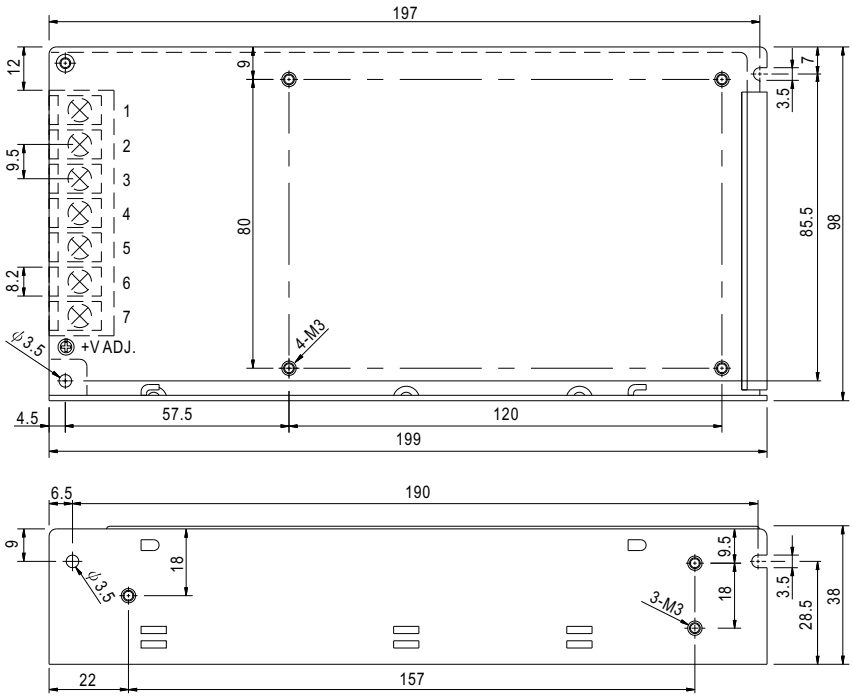
MODEL		NES-150-3.3	NES-150-5	NES-150-7.5	NES-150-9	NES-150-12	NES-150-15	NES-150-24	NES-150-48
OUTPUT	DC VOLTAGE	3.3V	5V	7.5V	9V	12V	15V	24V	48V
	RATED CURRENT	30A	26A	20A	16.7A	12.5A	10A	6.5A	3.3A
	CURRENT RANGE	0 ~ 30A	0 ~ 26A	0 ~ 20A	0 ~ 16.7A	0 ~ 12.5A	0 ~ 10A	0 ~ 6.5A	0 ~ 3.3A
	RATED POWER	99W	130W	150W	150W	150W	150W	156W	158.4W
	RIPPLE & NOISE (max.) Note.2	80mVp-p	80mVp-p	120mVp-p	120mVp-p	120mVp-p	120mVp-p	120mVp-p	200mVp-p
	VOLTAGE ADJ. RANGE	3.2 ~ 3.5V	4.75 ~ 5.5V	7.13 ~ 8.3V	8.55 ~ 9.9V	11.4 ~ 13.5V	14.25 ~ 16.5V	22.8 ~ 27.6V	45.6 ~ 52.8V
	VOLTAGE TOLERANCE Note.3	±3.0%	±2.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%
	LINE REGULATION Note.4	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%
	LOAD REGULATION Note.5	±2.0%	±1.0%	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%
	SETUP, RISE TIME Note.7	800ms, 20ms/230VAC 1200ms, 30ms/115VAC at full load							
	HOLD UP TIME (Typ.)	24ms/230VAC 20ms/115VAC at full load							
INPUT	VOLTAGE RANGE	90 ~ 132VAC / 180 ~ 264VAC selected by switch 254 ~ 373VDC							
	FREQUENCY RANGE	47 ~ 63Hz							
	EFFICIENCY (Typ.)	73%	78%	80%	83%	83%	83%	86%	86%
	AC CURRENT (Typ.)	3A/115VAC 2A/230VAC							
	INRUSH CURRENT (Typ.)	COLD START 45A/230VAC							
	LEAKAGE CURRENT	<2mA / 240VAC							
PROTECTION	OVERLOAD	110 ~ 150% rated output power							
		Protection type : Hiccup mode, recovers automatically after fault condition is removed							
	OVER VOLTAGE	3.8 ~ 4.65V	5.75 ~ 6.75V	8.6 ~ 10.1V	10.4 ~ 12.2V	13.8 ~ 16.2V	17.25 ~ 20.25V	27.6 ~ 32.4V	55.2 ~ 62.4V
		Protection type : Hiccup mode, recovers automatically after fault condition is removed							
ENVIRONMENT	WORKING TEMP.	-20 ~ +60℃ (Refer to output load derating curve)							
	WORKING HUMIDITY	20 ~ 90% RH non-condensing							
	STORAGE TEMP., HUMIDITY	-40 ~ +85℃, 10 ~ 95% RH							
	TEMP. COEFFICIENT	±0.03%/℃ (0 ~ 50℃)							
	VIBRATION	10 ~ 500Hz, 2G 10min./1cycle, period for 60min. each along X, Y, Z axes							
SAFETY & EMC (Note 6)	SAFETY STANDARDS	UL60950-1, TUV EN60950-1 Approved							
	WITHSTAND VOLTAGE	I/P-O/P:3KVAC I/P-FG:1.5KVAC O/P-FG:0.5KVAC							
	ISOLATION RESISTANCE	I/P-O/P, I/P-FG, O/P-FG:100M Ohms/500VDC 70% RH							
	EMI CONDUCTION & RADIATION	Compliance to EN55022 (CISPR22) Class B							
	HARMONIC CURRENT	Compliance to EN61000-3-2,-3							
	EMS IMMUNITY	Compliance to EN61000-4-2, 3, 4, 5, 6, 8,11, ENV50204, EN55024, EN61000-6-1, heavy industry level, criteria A							
OTHERS	MTBF	433.3Khrs min. MIL-HDBK-217F (25℃)							
	DIMENSION	199*98*38mm (L*W*H)							
	PACKING	0.7Kg; 30pcs/22Kg/1.24CUFT							

NOTE

1. All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25℃ of ambient temperature.
2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1uf & 47uf parallel capacitor.
3. Tolerance : includes set up tolerance, line regulation and load regulation.
4. Line regulation is measured from low line to high line at rated load.
5. Load regulation is measured from 0% to 100% rated load.
6. The power supply is considered a component which will be installed into a final equipment. The final equipment must be re-confirmed that it still meets EMC directives.
7. Length of set up time is measured at cold first start. Turning ON/OFF the power supply very quickly may lead to increase of the set up time.

■ Mechanical Specification

Case No. 902 Unit:mm

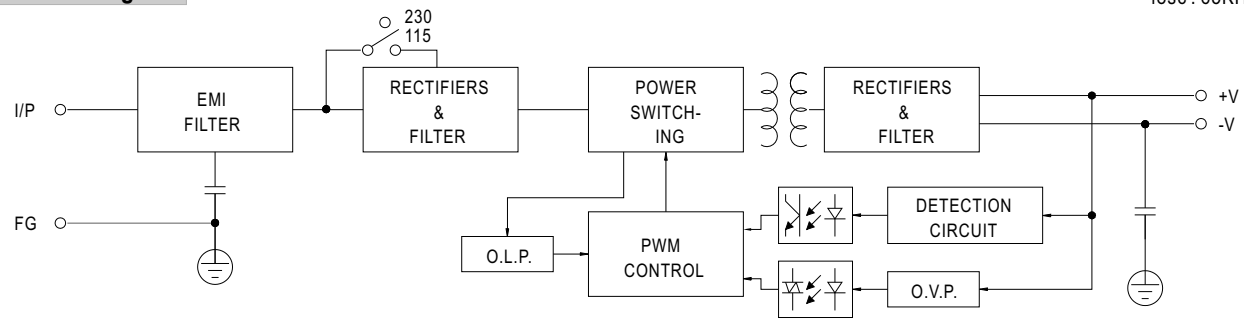


Terminal Pin No. Assignment

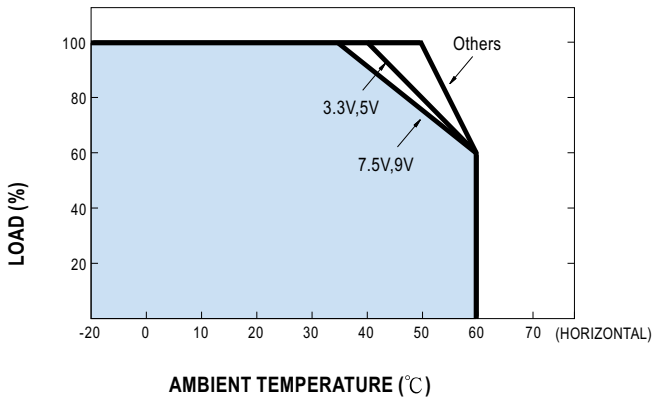
Pin No.	Assignment	Pin No.	Assignment
1	AC/L	4,5	DC OUTPUT -V
2	AC/N	6,7	DC OUTPUT +V
3	FG ⏚		

■ Block Diagram

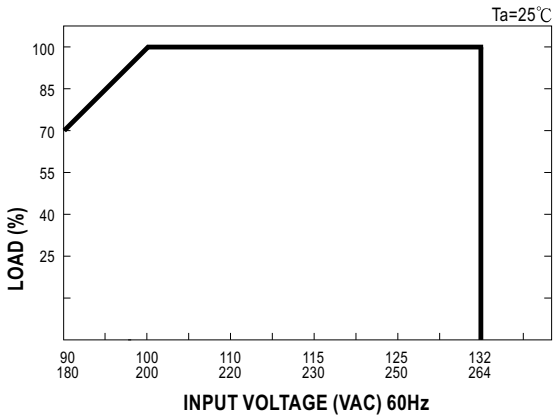
fosc : 65KHz



■ Derating Curve



■ Static Characteristics



MODEL：NES-150-5

OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	RIPPLE & NOISE	V1: 80 mVp-p (Max)	I/P: 230 VAC O/P:FULL LOAD Ta:25℃	V1: 50 mVp-p (Max)	P
2	OUTPUT VOLTAGE ADJUST RANGE	CH1: 4.75 V~ 5.5 V	I/P: 230 VAC I/P: 115 VAC O/P:MIN LOAD Ta:25℃	4.651V~ 5.62 V/ 230VAC 4.651V~ 5.62 V/ 115VAC	P
3	OUTPUT VOLTAGE TOLERANCE	V1: -2 %~ 2 % (Max)	I/P: 200 VAC / 264 VAC O/P:FULL/ 0 % LOAD Ta:25℃	V1: -0.14 %~ 0.12 %	P
4	LINE REGULATION	V1:-0.5 %~ 0.5 % (Max)	I/P: 200 VAC ~ 264 VAC O/P:FULL LOAD Ta:25℃	V1: 0 %~ 0 %	P
5	LOAD REGULATION	V1: -1 %~ 1 % (Max)	I/P:230 VAC O/P:FULL ~MIN LOAD Ta:25℃	V1:-0.24%~ 0 %	P
6	SET UP TIME	230 VAC/800 ms (Max) 115 VAC/1200 ms (Max)	I/P:230 VAC I/P:115 VAC O/P:FULL LOAD Ta:25℃	230VAC/ 345.987 ms 115VAC/ 351.444 ms	P
7	RISE TIME	230 VAC/20 ms (Max) 115 VAC/30 ms (Max)	I/P:230 VAC I/P:115 VAC O/P:FULL LOAD Ta:25℃	230VAC/ 3.2 ms 115VAC/ 3.243 ms	P
8	HOLD UP TIME	230 VAC/ 24 ms (TYP) 115 VAC/ 20 ms (TYP)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25℃	230VAC/ 28.604 ms 115VAC/ 25.212 ms	P
9	OVER/UNDERSHOOT TEST	< ±5%	I/P: 230 VAC O/P:FULL LOAD Ta:25℃	TEST: 0.8 %	P
10	DYNAMIC LOAD	V1: 1000 mVp-p	I/P: 230 VAC O/P:FULL /Min LOAD 90%DUTY/1KHZ Ta:25℃	300 mVp-p	P

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	180VAC~ 264 VAC	I/P:TESTING O/P:FULL LOAD Ta:25℃	150 V~ 264 V	P
			I/P: LOW-LINE-3V= 173 V HIGH-LINE+15%= 300 V O/P:FULL/MIN LOAD ON: 30 Sec . OFF: 30 Sec 10MIN (AC POWER ON/OFF NO DAMAGE)	TEST: OK	
2	INPUT FREQUENCY RANGE	47 HZ ~ 63 HZ NO DAMAGE OSC	I/P: 200 VAC ~ 264 VAC O/P:FULL~MIN LOAD Ta:25℃	TEST: OK	P
3	EFFICIENCY	77 % (TYP)	I/P: 230 VAC O/P:FULL LOAD Ta:25℃	79.52%	P
4	INPUT CURRENT	230 V/ 3 A (TYP) 115 V/ 2 A(TYP)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25℃	I = 1.373 A/ 230 VAC I = 2.458A/ 115 VAC	P
5	INRUSH CURRENT	230 V/ 45 A(TYP) COLD START	I/P:230 VAC O/P:FULL LOAD Ta:25℃	I = 41.593A/ 230 VAC	P
6	LEAKAGE CURRENT	< 2 mA / 240 VAC	I/P:264 VAC O/P:Min LOAD Ta:25℃	L-FG: 1.5 mA N-FG: 1.1 mA	P

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	110 %~ 150 %	I/P: 230 VAC I/P: 115 VAC O/P:TESTING Ta:25℃	115 %/ 230 VAC 114 %/ 115 VAC Hiccup Mode	P
2	OVER VOLTAGE PROTECTION	CH1: 5.75 V~ 6.75 V	I/P: 230 VAC I/P: 115 VAC O/P:MIN LOAD Ta:25℃	6.06 V/ 230 VAC 6.06 V/ 115 VAC Hiccup Model	P
3	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 264 VAC O/P: Full LOAD Ta:25℃	NO DAMAGE Hiccup Mode	P

ENVIRONMENT TEST

<table>
<tr><th>NO</th><th>TEST ITEM</th><th>SPECIFICATION</th><th>TEST CONDITION</th><th>RESULT</th><th>VERDICT</th></tr>
<tr><td>1</td><td>TEMPERATURE RISE TEST</td><td colspan="3">MODEL： NES-150-5V
1. ROOM AMBIENT BURN-IN： 1.5 HRS
I/P: 230 VAC O/P: FULL LOAD Ta= 27.1 ℃
2. HIGH AMBIENT BURN-IN： 2 HRS
I/P: 230 VAC O/P: FULL LOAD Ta= 43.5 ℃
<table>
<tr><th>NO</th><th>Position</th><th>P/N</th><th>ROOM AMBIENT Ta=27.1 ℃</th><th>HIGH AMBIENT Ta=43.5℃</th></tr>
<tr><td>1</td><td>C5</td><td>330U/200V 105℃ HP</td><td>73.8℃</td><td>79.1℃</td></tr>
<tr><td>2</td><td>D1</td><td>BYV26EGP 1A/1KV</td><td>106.6℃</td><td>114.8℃</td></tr>
<tr><td>3</td><td>BD1</td><td>KBJ608G 6A/800V</td><td>82.1℃</td><td>87.9℃</td></tr>
<tr><td>4</td><td>LF1</td><td>LF-058</td><td>60.0℃</td><td>65.2℃</td></tr>
<tr><td>5</td><td>R3</td><td>150K/2W</td><td>107.7℃</td><td>107.9℃</td></tr>
<tr><td>6</td><td>ZD1</td><td>P1.5KE440A</td><td>102.8℃</td><td>110.2℃</td></tr>
<tr><td>7</td><td>ZD3</td><td>P6KE200A</td><td>97.5℃</td><td>106.7℃</td></tr>
<tr><td>8</td><td>U1</td><td>P1216AP06</td><td>91.8℃</td><td>102.4℃</td></tr>
<tr><td>9</td><td>Q1</td><td>2SK2082 9A/900V</td><td>99.7℃</td><td>109.3℃</td></tr>
<tr><td>10</td><td>D60</td><td>SBL3060PT 30A/60V</td><td>107.1℃</td><td>114.1℃</td></tr>
<tr><td>11</td><td>T1 COIL</td><td>TF-1599</td><td>107.0℃</td><td>114.6℃</td></tr>
<tr><td>12</td><td>C10</td><td>220U/35V 105℃ GL</td><td>85.4℃</td><td>95.4℃</td></tr>
</table></td><td>P</td></tr>
<tr><td>2</td><td>OVER LOAD BURN-IN TEST</td><td>NO DAMAGE
1 HOUR (MIN)</td><td>I/P: 230 VAC
O/P: 117%LOAD
Ta:25℃</td><td>TEST：OK</td><td>P</td></tr>
<tr><td>3</td><td>LOW TEMPERATURE
TURN ON TEST</td><td>TURN ON AFTER 2 HOUR</td><td>I/P: 230 VAC
O/P: 100% LOAD
Ta= -25 ℃</td><td>TEST：OK</td><td>P</td></tr>
<tr><td>4</td><td>HIGH HUMIDITY
HIGH TEMPERATURE
HIGH VOLTAGE
TURN ON TEST</td><td>AFTER 12 HOURS
IN CHAMBER ON
CONTROL 40℃
NO DAMAGE</td><td>I/P: 272 VAC
O/P:FULL LOAD
Ta= 40℃
HUMIDITY= 95 %R.H</td><td>TEST：OK</td><td>P</td></tr>
<tr><td>5</td><td>TEMPERATURE
COEFFICIENT</td><td>± 0.03 %(0~50℃)</td><td>I/P: 230 VAC
O/P:FULL LOAD</td><td>± 0.01 %(0~50℃)</td><td>P</td></tr>
<tr><td>6</td><td>VIBRATION TEST</td><td colspan="2">1 Set
(1) Waveform: Sine Wave
(2) Frequency:10~500Hz
(3) Sweep Time:10min/sweep cycle
(4) Acceleration:5G
(5) Test Time:1 hour in each axis (X.Y.Z)
(6) Ta:25℃</td><td>TEST： OK</td><td>P</td></tr>
</table>

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	WITHSTAND VOLTAGE	I/P-O/P: 3 KVAC/min I/P-FG: 1.5 KVAC/min O/P-FG: 0.5 KVAC/min	I/P-O/P: 3.6 KVAC/min I/P-FG: 1.8 KVAC/min O/P-FG: 0.6 KVAC/min Ta:25℃	I/P-O/P: 7.56 mA I/P-FG: 5.98mA O/P-FG: 6.64 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℃	I/P-O/P: 9 .999G Ω I/P-FG: 28.1G Ω O/P-FG: 19999G Ω NO DAMAGE	P
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40 A / 2min Ta:25℃	8 mΩ	P
4	APPROVAL	TUV: Certificate NO : UL: File NO :			N/A

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	HARMONIC	EN61000-3-2 CLASS A	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25℃	PASS	P
2	CONDUCTION	EN55022 CLASS B	I/P: 230 VAC (50HZ) O/P:FULL/50% LOAD Ta:25℃	PASS Test by certified Lab	P
3	RADIATION	EN55022 CLASS B	I/P: 230 VAC (50HZ) O/P:FULL LOAD Ta:25℃	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℃	CRITERIA A	P
5	E.F.T	EN61000-4-4 INDUSTRY INPUT: 2KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25℃	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℃	CRITERIA A	P
7	Test by certified Lab & Test Report Prepare				

M.T.B.F & LIFE CYCLE CALCULATION

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	CAPACITOR LIFE CYCLE	SUPPOSE C64 IS THE MOST CRITICAL COMPONENT I/P: 230 VAC O/P:FULL LOAD Ta= 25 ℃ LIFE TIME= 38043 HRS I/P: 230 VAC O/P:FULL LOAD Ta= 40 ℃ LIFE TIME= 20226 HRS			P
2	MTBF	MIL-HDBK-217F NOTICES2 PARTS COUNT TOTAL FAILURE RATE: 244K HRS			P
3	ORT (Ongoing Reliability test)	NES-150-24:I/P：230VAC O/P：FULL LOAD TA=50℃ Sample=10pcs TEST TIME=576HRS			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 2SK2082 : 900V / 9 A	I/P:High-Line +3V =267 V O/P: (1)Full Load Turn on (2) Full Load (3)Output Short Ta:25℃	(1) 872 V (2) 864 V	P
2	Diode Peak Voltage	D60 Rated D83-004 : 40 V / 30 A	I/P:High-Line +3V =267 V O/P: (1)Full Load Turn on (2) Full Load (3)Output Short Ta:25℃	(1) 30.2 V (2) 30 V	P
3	Clamp Diode Peak Voltage	D1 Rated HER208 :1K V / 1 A	I/P:High-Line +3V =267 V O/P: (1)Full Load (2) Dynamic Load 90%Duty/1KHz Ta:25℃	(1) 752 V	P
4	Input Capacitor Voltage	C5 Rated CAPXON: 330u /200 V 105℃/ HP Series	I/P:High-Line +3V =267 V O/P: (1)Full Load Turn on /Off (2) Min load Turn on /Off (3)Full Load /Min load Change Ta:25℃	(1) 182 V (2) 172 V (3) 185 V	P
5	Control IC Voltage Test	U1 Rated NCP 1216A : 16 V	I/P:High-Line +3V =267 V O/P: (1)Full Load Turn on /Off (2) Min load Turn on /Off (3)Full Load /Min load Change Ta:25℃	(1) 13.6 V (2)14.3 V (3)13.1 V (4)9.3 V	P

DATE	SAMPLE	TEST RESULT	TESTER	APPROVAL
2007/4/19	RD SAMPLE	PASS	VINCENT TSENG	MAX LIN

2003/12/12 A50-F023