Jameco Part Number 1953735

120W Single Output Industrial DIN RAIL Power Supply DRH-120 series

Features :

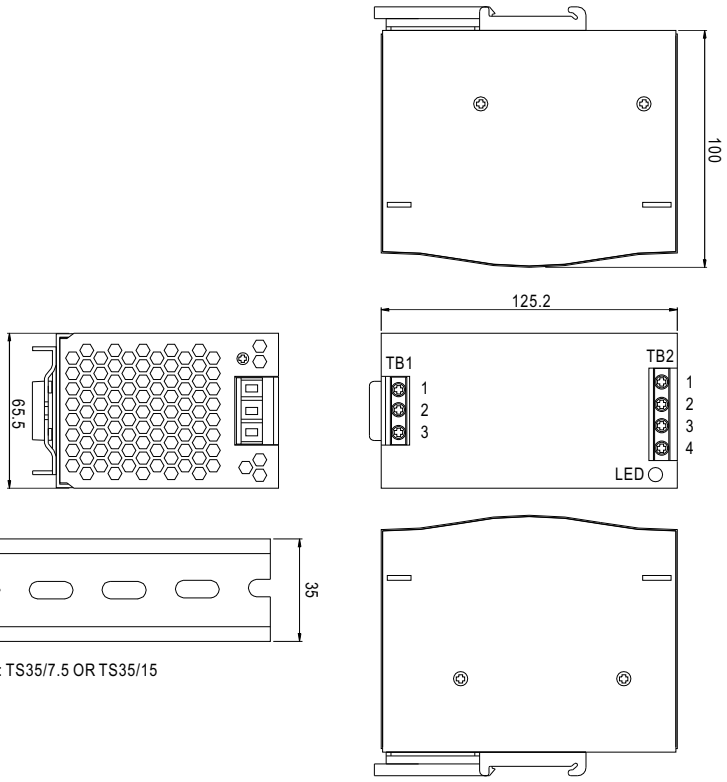
- Protections: Short circuit / Overload / Over voltage / Over temperature
- Cooling by free air convection
- Built-in constant current limiting circuit
- Can be installed on DIN rail TS-35/7.5 or 15
- EN61000-6-2(EN50082-2) industrial immunity level
- 100% full load burn-in test
- Fixed switching frequency at 70KHz
- 3 years warranty

SPECIFICATION

MODEL		DRH-120-24	DRH-120-48
OUTPUT	DC VOLTAGE	24V	48V
	RATED CURRENT	5A	2.5A
	CURRENT RANGE	0 ~ 5A	0 ~2.5A
	RATED POWER	120W	120W
	RIPPLE & NOISE (max.) Note.2	80mVp-p	80mVp-p
	VOLTAGE ADJ. RANGE	24 ~ 28V	48 ~ 55V
	VOLTAGE TOLERANCE Note.3	±1.0%	±1.0%
	LINE REGULATION	±0.5%	±0.5%
	LOAD REGULATION	±0.5%	±0.5%
	SETUP, RISE, HOLD UP TIME	1700ms, 120ms, 16ms/400VAC 1000ms, 120ms, 30ms/500VAC at full load	
INPUT	VOLTAGE RANGE	340 ~ 550VAC 480 ~ 780VDC	
	FREQUENCY RANGE	47 ~ 63Hz	
	EFFICIENCY (Typ.)	85%	86%
	AC CURRENT	0.65A/400VAC 0.6A/500VAC	
	INRUSH CURRENT (max.)	COLD START 50A	
	LEAKAGE CURRENT	<3.5mA / 530VAC	
PROTECTION	OVERLOAD	105 ~ 160% rated output power	
		Protection type : Constant current limiting, recovers automatically after fault condition is removed	
	OVER VOLTAGE	30 ~ 36V	59 ~ 66V
		Protection type : Shut down o/p voltage, re-power on to recover	
	OVER TEMPERATURE	85℃±5℃ (TSW) detect on heatsink of power switch	
		Protection type : Shut down o/p voltage, recovers automatically after temperature goes down	
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	Component: 10 ~ 500Hz, 2G 10min./1cycle, 60min. each along X, Y, Z axes; Mounting clip: Compliance to IEC60068-2-6	
SAFETY & EMC (Note 4)	SAFETY STANDARDS	UL60950-1 approved, IEC60950-1 CB approved by SIQ	
	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	
	EMI CONDUCTION & RADIATION	Compliance to EN55011 (CISPR11), EN55022 (CISPR22), EN61204-3 Class B	
	EMS IMMUNITY	Compliance to EN61000-4-2,3,4,5,6,8,11, ENV50204, EN61204-3, EN61000-6-2 (EN50082-2), heavy industry level, criteria A	
OTHERS	MTBF	178.7Khrs min. MIL-HDBK-217F (25℃)	
	DIMENSION	65.5*125.2*100mm (W*H*D)	
	PACKING	0.75Kg; 20pcs/16Kg/1.29CUFT	
NOTE	1. All parameters NOT specially mentioned are measured at 400VAC 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. 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.		

■ Mechanical Specification

Case No.921A Unit:mm



ADMISSIBLE DIN-RAIL: TS35/7.5 OR TS35/15

Terminal Pin No. Assignment (TB1)

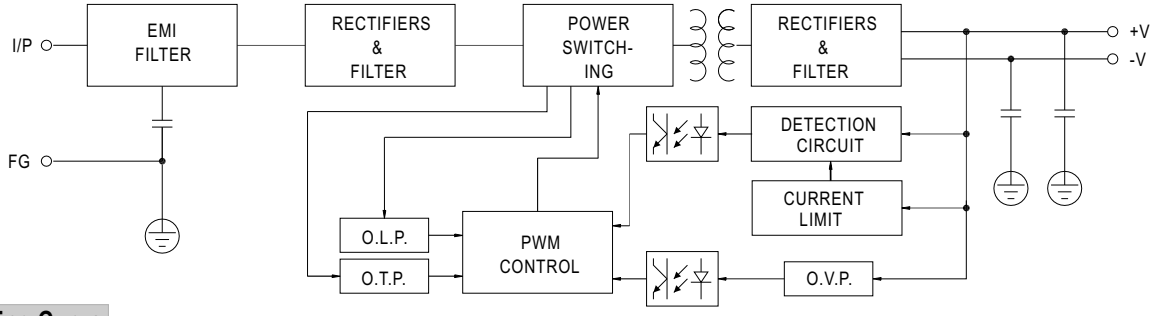
Pin No.	Assignment
1	FG ⏚
2	AC/N(L2)
3	AC/L(L1)

Terminal Pin No. Assignment (TB2)

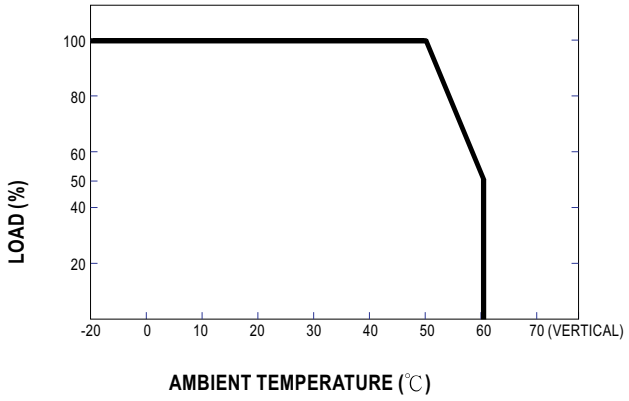
Pin No.	Assignment
1,2	DC OUTPUT +V
3,4	DC OUTPUT -V

■ Block Diagram

fosc : 70KHz



■ Derating Curve



MODEL：DRH-120-48

OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	RIPPLE & NOISE	V1: 80 mVp-p (Max)	I/P: 400 VAC O/P:FULL LOAD Ta:25℃	V1: 25 mVp-p (Max)	P
2	OUTPUT VOLTAGE ADJUST RANGE	CH1: 48 V~ 55 V	I/P: 400 VAC I/P: 500 VAC O/P:MIN LOAD Ta:25℃	41.06V~59.26V/ 400VAC 41.06V~59.26V/ 500 VAC	P
3	OUTPUT VOLTAGE TOLERANCE	V1: 1 %~ -1 % (Max)	I/P: 340VAC / 550 VAC O/P:FULL/ MIN % LOAD Ta:25℃	V1: 0.1%~ -0.1%	P
4	LINE REGULATION	V1: 0.5 %~ -0.5 % (Max)	I/P: 340 VAC ~ 550 VAC O/P:FULL LOAD Ta:25℃	V1: 0.1%~ -0.1%	P
5	LOAD REGULATION	V1: 0.5 %~ -0.5\ % (Max)	I/P: 400 VAC O/P:FULL ~MIN LOAD Ta:25℃	V1: 0.05 %~ -0.05 %	P
6	SET UP TIME	400 VAC/ 1700 ms (Max) 500 VAC/ 1000 ms (Max)	I/P: 400 VAC I/P: 500 VAC O/P:FULL LOAD Ta:25℃	400 VAC/ 1140 ms 500 VAC/ 724 ms	P
7	RISE TIME	400 VAC/ 120 ms (Max) 500 VAC/ 120 ms (Max)	I/P: 400 VAC I/P: 500 VAC O/P:FULL LOAD Ta:25℃	400 VAC/ 70 ms 500 VAC/ 70 ms	P
8	HOLD UP TIME	400 VAC/ 16 ms (TYP) 500 VAC/ 30 ms (TYP)	I/P: 400 VAC I/P: 500 VAC O/P:FULL LOAD Ta:25℃	400 VAC/ 20 ms 500 VAC/ 40 ms	P
9	OVER/UNDERSHOOT TEST	< ±5%	I/P: 400 VAC O/P:FULL LOAD Ta:25℃	TEST: <5 %	P
10	DYNAMIC LOAD	V1: 4800 mVp-p	I/P: 400 VAC O/P:FULL /Min LOAD 90%DUTY/1KHZ Ta:25℃	231mVp-p	P

INPUT FUNCTION TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	340VAC~ 550 VAC	I/P:TESTING O/P:FULL LOAD Ta:25℃	260V~ 550 V	P
			I/P: LOW-LINE-3V= 337 V HIGH-LINE+15%= 632 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: 340VAC ~ 550 VAC O/P:FULL~MIN LOAD Ta:25℃	TEST: OK	P
3	EFFICIENCY	86 % (TYP)	I/P: 400 VAC O/P:FULL LOAD Ta:25℃	86.2%	P
4	INPUT CURRENT	400 V/ 0.65 A(TYP) 500 V/ 0.6 A (TYP)	I/P: 400 VAC I/P: 500 VAC O/P:FULL LOAD Ta:25℃	I = 0.52 A/ 400 VAC I = 0.48 A/ 500 VAC	P
5	INRUSH CURRENT	400V/ 50 A (TYP) COLD START	I/P: 400 VAC O/P:FULL LOAD Ta:25℃	I = 28 A/ 400 VAC	P
6	LEAKAGE CURRENT	< 3.5 mA / 530VAC	I/P: 530 VAC O/P:Min LOAD Ta:25℃	L-FG: 1.2 mA N-FG: 1.2 mA	P

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	105 %~ 160 %	I/P: 400 VAC I/P: 500 VAC O/P:TESTING Ta:25℃	132 %/ 400 VAC 151 %/ 500 VAC Constant Current Limiting	P
2	OVER VOLTAGE PROTECTION	CH1: 59 V~ 66 V	I/P: 400 VAC I/P: 500 VAC O/P:MIN LOAD Ta:25℃	63V/ 400 VAC 63V/ 500 VAC Shunt down Re- power ON	P
3	OVER TEMPERATURE PROTECTION	SPEC: 85± 5℃ O.T.P. NO DAMAGE	I/P: 400 VAC O/P:FULL LOAD	O.T.P. Active Shut down o/p volotage，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℃	NO DAMAGE Constant Current Limiting	P

ENVIRONMENT TEST

<table>
<tr><th>NO</th><th>TEST ITEM</th><th>SPECICATION</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：DRH-120-24
1. ROOM AMBIENT　BURN-IN：1.5 HRS
I/P: 400 VAC　O/P: FULL LOAD　Ta= 35 ℃
2. HIGH AMBIENT　BURN-IN：2 HRS
I/P: 400 VAC　O/P: FULL LOAD　Ta= 46.9 ℃
<table>
<tr><th>NO</th><th>Position</th><th>P/N</th><th>ROOM AMBIENT Ta= 35 ℃</th><th>HIGH AMBIENT Ta= 46.9 ℃</th></tr>
<tr><td>1</td><td>L106</td><td>TR-561</td><td>56.0℃</td><td>76.9℃</td></tr>
<tr><td>2</td><td>D4</td><td>BY228 5A/1.5KV PH</td><td>68.5℃</td><td>87.2℃</td></tr>
<tr><td>3</td><td>LF1</td><td>TR-560</td><td>55.3℃</td><td>75.7℃</td></tr>
<tr><td>4</td><td>D100</td><td>SF20NC15M 150V/20A SHI</td><td>66.3℃</td><td>87.0℃</td></tr>
<tr><td>5</td><td>C114</td><td>1500U/35V NCC 105℃ KY</td><td>72.7℃</td><td>92.8℃</td></tr>
<tr><td>6</td><td>T1 COIL</td><td>TF-1275</td><td>86.4℃</td><td>107.1℃</td></tr>
<tr><td>7</td><td>U1</td><td>2842 ON</td><td>81.2℃</td><td>101.9℃</td></tr>
<tr><td>8</td><td>Q8</td><td>TIP122 5A/100V FAIR</td><td>54.6℃</td><td>75.1℃</td></tr>
<tr><td>9</td><td>C71</td><td>100U/50V NCC 105℃ KY</td><td>54.2℃</td><td>75.8℃</td></tr>
<tr><td>10</td><td>LF2</td><td>TR-277</td><td>47.6℃</td><td>67.3℃</td></tr>
<tr><td>11</td><td>Q7</td><td>C5353 3A/800V TOS</td><td>57.8℃</td><td>77.5℃</td></tr>
<tr><td>12</td><td>D33</td><td>SF5408 3A/1KV TEL</td><td>75.2℃</td><td>96.5℃</td></tr>
<tr><td>13</td><td>Q36</td><td>K2850 6A/900V FUJI</td><td>63.9℃</td><td>85.5℃</td></tr>
<tr><td>14</td><td>J2</td><td>錳銅線</td><td>95.9℃</td><td>116.5℃</td></tr>
<tr><td>15</td><td>C5</td><td>68U/400V RUB 105℃ KXW</td><td>51.7℃</td><td>70.2℃</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: 400VAC
O/P: 124 % 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: 400VAC
O/P: 100 % LOAD
Ta= -20 ℃</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 50 ℃
NO DAMAGE</td><td>I/P: 567 VAC
O/P:FULL LOAD
Ta= 50 ℃
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: 400 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 Carton & 1 Set
(1) Waveform: Sine Wave
(2) Frequency:10~500Hz
(3) Sweep Time:10min/sweep cycle
(4) Acceleration:2G
(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	SPECICATION	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: 6.44mA I/P-FG: 4.52 mA O/P-FG: 6.34 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: 30 GΩ I/P-FG: 16 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℃	6 mΩ	P
4	APPROVAL	TUV: Certificate NO ： UL: File NO ：E 183223			P

E.M.C TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	HARMONIC	EN61000-3-2 CLASS A	I/P: 400 VAC/50HZ O/P:FULL LOAD Ta:25℃	PASS	P
2	CONDUCTION	EN55022 CLASS A	I/P: 380 VAC (50HZ) O/P:FULL/50% LOAD Ta:25℃	PASS Test by certified Lab	P
3	RADIATION	EN55022 CLASS A	I/P: 380 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: 380 VAC/50HZ O/P:FULL LOAD Ta:25℃	CRITERIA A	P
5	E.F.T	EN61000-4-4 INDUSTRY INPUT: 2KV	I/P: 380 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: 380 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	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	CAPACITOR LIFE CYCLE	SUPPOSE C114 IS THE MOST CRITICAL COMPONENT I/P: 400VAC O/P:FULL LOAD Ta= 25 ℃ LIFE TIME= 223363 HRS I/P: 400VAC O/P:FULL LOAD Ta= 50 ℃ LIFE TIME= 22372 HRS			P
2	MTBF	MIL-HDBK-217F NOTICES2 PARTS COUNT TOTAL FAILURE RATE: 178.7KHRS			P

COMPONENT STRESS TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	Power Transistor (D to S) or (C to E) **Peak Voltage**	Q 30 Rated 2SK2850 : 900 V 6 A	I/P:High-Line +3V =553V O/P: (1)Full Load Turn on (2) Full Load (3)Output Short Ta:25℃	(1) 618 V (2) 538 V (3) 384 V	P
2	Diode Peak **Voltage**	D 100 Rated SF20LC30 : 300 V 20 A	I/P:High-Line +3V =553V O/P: (1)Full Load Turn on (2) Full Load (3)Output Short Ta:25℃	(1) 258 V (2) 266 V (3) 200 V	P
3	**Input Capacitor Voltage**	C 5 Rated : 68 u / 400 V 105℃	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 (4)Burn-IN 1 Hour Ta:25℃	(1) 422 V (2) 392 V (3) 392 V (4) 392 V	P
4	**Control IC Voltage Test**	U1 Rated UC2842 : 30 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 (4) Output Short Ta:25℃	(1) 21.6 V (2) 21.2 V (3) 20.7 V (4) 20.3 V	P

DATE	SAMPLE	TEST RESULT	TESTER	APPROVAL
2004/12/23	RD SAMPLE	PASS	VINCENT TSENG	MAX LIN
2005/4/11	PRODUCT SAMPLE W0501E43	PASS	VINCENT TSENG	MAX LIN

2003/12/12 A50-F023