



DRB30-1

RELIABILITY DATA

信頼性データ

DWG No. CA799-57-01		
APPD	CHK	DWG
 26/July, '13	Komatsu H. Iida 26, Jul. '13	 26, Jul. '13

INDEX

	PAGE
1. MTBF計算値 Calculated Values of MTBF	R-1
2. 部品デレーティング Component Derating	R-2～6
3. 主要部品温度上昇値 Main Components Temperature Rise ΔT List	R-7～8
4. 電解コンデンサ推定寿命計算値 Electrolytic Capacitor Lifetime	R-9～10
5. アブノーマル試験 Abnormal Test	R-11～12
6. 振動試験 Vibration Test	R-13
7. ノイズシミュレート試験 Noise Simulate Test	R-14
8. 熱衝撃試験 Thermal Shock Test	R-15
9. 電圧ディップ、瞬停イミュニティ試験	R-16
Voltage Dips, Short Interruptions Immunity Test (SEMI-F47)	

※ 試験結果は、代表データであります。全ての製品はほぼ同等な特性を示します。
従いまして、以下の結果は実力値とお考え願います。

Test results are typical data. Nevertheless the following results are considered to be actual capability data because all units have nearly the same characteristics.

1. MTBF計算値 Calculated Values of MTBF

MODEL : DRB30-24-1

(1) 算出方法 Calculating Method

JEITA (RCR-9102B)の部品点数法で算出されています。
 それぞれの部品ごとに、部品故障率 λ_G が与えられ、各々の点数によって決定されます。
 Calculated based on part count reliability projection of JEITA (RCR-9102B).
 Individual failure rates λ_G is given to each part and MTBF is calculated
 by the count of each part.

<算出式>

$$MTBF = \frac{1}{\lambda_{equip}} = \frac{1}{\sum_{i=1}^n n_i (\lambda_G \pi_Q)_i} \times 10^6 \text{ 時間(Hours)}$$

λ_{equip} : 全機器故障率 (故障数/10⁶時間)
 Total Equipment Failure Rate (Failure/10⁶Hours)

λ_G : i 番目の同属部品に対する故障率 (故障数/10⁶時間)
 Generic Failure Rate for The ith Generic Part (Failure/10⁶Hours)

n_i : i 番目の同属部品の個数
 Quantity of ith Generic Part

n : 異なった同属部品のカテゴリーの数
 Number of Different Generic Part Categories

π_Q : i 番目の同属部品に対する品質ファクタ ($\pi_Q=1$)
 Generic Quality Factor for The ith Generic Part ($\pi_Q=1$)

(2) MTBF値 MTBF Values

G_F : 地上固定 (Ground, Fixed)

RCR-9102B

MTBF \doteq 384,855 時間 (Hours)

2. 部品デレーティング Components Derating

MODEL : DRB30-1

(1) 算出方法 Calculating Method

(a) 測定方法 Measuring method

・取付方法 Mounting method	: 標準取付 Standard mounting	・周囲温度 Ambient temperature	: 55°C
・入力電圧 Input voltage	: 115, 230VAC	・出力電圧、電流 Output voltage & current	: 100%

(b) 半導体 Semiconductors

ケース温度、消費電力、熱抵抗より使用状態の接合点温度を求め
最大定格、接合点温度との比較を求めました。

Compared with maximum junction temperature and actual one which is calculated
based on case temperature, power dissipation and thermal impedance.

(c) IC、抵抗、コンデンサ等 IC, Resistors, Capacitors, etc.

周囲温度、使用状態、消費電力など、個々の値は設計基準内に入っています。

Ambient temperature, operating condition, power dissipation and so on are within
derating criteria.

(d) 熱抵抗算出方法 Calculating method of thermal impedance

$$\theta_{j-c} = \frac{T_j(\max) - T_c}{P_{ch}(\max)} \quad \theta_{j-a} = \frac{T_j(\max) - T_a}{P_{ch}(\max)} \quad \theta_{j-l} = \frac{T_j(\max) - T_l}{P_{ch}(\max)}$$

Tc : デレーティングの始まるケース温度 一般に25°C
Case Temperature at Start Point of Derating; 25°C in General

Ta : デレーティングの始まる周囲温度 一般に25°C
Ambient Temperature at Start Point of Derating; 25°C in General

Tl : デレーティングの始まるリード温度 一般に25°C
Lead Temperature at Start Point of Derating; 25°C in General

Pch(max) : 最大チャネル損失
Maximum Channel Dissipation

Tj(max) : 最大接合点(チャネル)温度
(Tch(max)) Maximum Junction (channel) Temperature

θ_{j-c} : 接合点(チャネル)からケースまでの熱抵抗
(θ_{ch-c}) Thermal Impedance between Junction (channel) and Case

θ_{j-a} : 接合点から周囲までの熱抵抗
Thermal Impedance between Junction and air

θ_{j-l} : 接合点からリードまでの熱抵抗
Thermal Impedance between Junction and Lead

(2) 部品デレーティング表 Component Derating List

Model: DRB30-12-1

部品番号 Location No.	Vin = 115VAC Ta = 55°C Load = 100%(Vo: 12V, Io: 2.5A)		
A1 ICE3A2065ELJ INFINEON	Tj (max) = 150 °C Pch = 0.9 W Tj= Tc+ ((θj-c)× Pt) =122.9°C D.F. = 81.94%	θj-c = 6.34 °C/W ΔTc= 62.2°C	Pch (max) = 17 W Tc= 117.2 °C
A202 UPC1093T-E1-AZ RENESAS	Ta (max) = 150 °C Pt = 16.41 mW Pmax = Pt(max) + (Ta - 25°C)×ΔPc/°C =217.9mW D.F. = 7.53%	ΔPc/°C = -3.2mW/°C(Ta>25°C) ΔTa= 26.9°C	Pt(max) = 0.4 W Ta= 81.9 °C
D1 DF06M LITE ON	Tj (max) = 150 °C Pd = 0.5104 W Tj= Tl+ ((θj-l)× Pd) =97.0°C D.F. = 64.64%	θj-l = 15.0 °C/W ΔTl= 34.3°C	Tl= 89.3 °C
D51 STPS20H100CFP ST MICRO	Tj (max) = 175 °C Pd = 1.825 W Tj= Tc+ ((θj-c)× Pd) =148.5°C D.F. = 84.86%	θj-c = 4.0 °C/W ΔTc= 86.2°C	Tc= 141.2 °C
D102 D1F60-5053 SHINDENGEN	Tj (max) = 150 °C Pd = 13.26 mW Tj= Tl+ ((θj-l)× Pd) =99.3°C D.F. = 66.2%	θj-l = 23.0 °C/W ΔTl= 44.0°C	Tl= 99.0 °C
D103 CRH01(TE85L,Q) TOSHIBA	Tj (max) = 150 °C Pd = 1.66 mW Tj= Ta+ ((θj-a)× Pd) =72.2°C D.F. = 48.14%	θj-a = 130.0 °C/W ΔTa= 17.0°C	Ta= 72.0 °C
PC101 PS2861B-1Y-F3-A(L) (TRANSISTOR) RENESAS	Tj (max) = 110 °C Pc = 6.993 mW Pmax = Pc(max) + (Ta - 25°C)×ΔPc/°C =38.3mW D.F. = 18.27%	ΔPc/°C = -1.2mW/°C(Ta>25°C) ΔTa= 38.1°C	Pc (max) = 120.0 mW Ta= 93.1 °C
PC101 PS2861B-1Y-F3-A(L) (LED) RENESAS	Tj (max) = 110 °C Pd = 1.4 mW Pmax = Pd(max) + (Ta - 25°C)×ΔPd/°C =19.1mW D.F. = 7.31%	ΔPd/°C = -0.6mW/°C(Ta>25°C) ΔTa= 38.1°C	Pd (max) = 60.0 mW Ta= 93.1 °C
PC102 PS2861B-1Y-F3-A(L) (TRANSISTOR) RENESAS	Tj (max) = 110 °C Pc = 0.0 mW Pmax = Pc(max) + (Ta - 25°C)×ΔPc/°C =35.6mW D.F. = 0.0%	ΔPc/°C = -1.2mW/°C(Ta>25°C) ΔTa= 40.3°C	Pc (max) = 120.0 mW Ta= 95.3 °C
PC102 PS2861B-1Y-F3-A(L) (LED) RENESAS	Tj (max) = 110 °C Pd = 0.0 mW Pmax = Pd(max) + (Ta - 25°C)×ΔPd/°C =17.8mW D.F. = 0.0%	ΔPd/°C = -0.6mW/°C(Ta>25°C) ΔTa= 40.3°C	Pd (max) = 60.0 mW Ta= 95.3 °C

(2) 部品ディレーティング表 Component Derating List

Model: DRB30-12-1

部品番号 Location No.	Vin = 230VAC Ta = 55°C Load = 100%(Vo: 12V, Io: 2.5A)		
A1 ICE3A2065ELJ INFINEON	Tj (max) = 150 °C Pch = 1.13 W Tj= Tc+ ((θj-c)× Pt) =130.6°C D.F. = 87.04%	θj-c = 6.34 °C/W ΔTc= 68.4°C	Pch (max) = 17 W Tc= 123.4 °C
A202 UPC1093T-E1-AZ RENESAS	Ta (max) = 150 °C Pt = 16.51 mW Pmax = Pt(max) + (Ta - 25°C)×ΔPc/°C =224.6mW D.F. = 7.35%	ΔPc/°C = -3.2mW/°C(Ta>25°C) ΔTa= 24.8°C	Pt(max) = 0.4 W Ta= 79.8 °C
D1 DF06M LITE ON	Tj (max) = 150 °C Pd = 0.2464 W Tj= Tl+ ((θj-l)× Pd) =78.3°C D.F. = 52.2%	θj-l = 15.0 °C/W ΔTl= 19.6°C	Tl= 74.6 °C
D51 STPS20H100CFP ST MICRO	Tj (max) = 175 °C Pd = 1.825 W Tj= Tc+ ((θj-c)× Pd) =148.6°C D.F. = 84.91%	θj-c = 4.0 °C/W ΔTc= 86.3°C	Tc= 141.3 °C
D102 D1F60-5053 SHINDENGEN	Tj (max) = 150 °C Pd = 6.73 mW Tj= Tl+ ((θj-l)× Pd) =97.0°C D.F. = 64.64%	θj-l = 23.0 °C/W ΔTl= 41.8°C	Tl= 96.8 °C
D103 CRH01(TE85L,Q) TOSHIBA	Tj (max) = 150 °C Pd = 1.27 mW Tj= Ta+ ((θj-a)× Pd) =68.3°C D.F. = 45.51%	θj-a = 130.0 °C/W ΔTa= 13.1°C	Ta= 68.1 °C
PC101 PS2861B-1Y-F3-A(L) (TRANSISTOR) RENESAS	Tj (max) = 110 °C Pc = 6.993 mW Pmax = Pc(max) + (Ta - 25°C)×ΔPc/°C =38.5mW D.F. = 18.15%	ΔPc/°C = -1.2mW/°C(Ta>25°C) ΔTa= 37.9°C	Pc (max) = 120.0 mW Ta= 92.9 °C
PC101 PS2861B-1Y-F3-A(L) (LED) RENESAS	Tj (max) = 110 °C Pd = 1.4 mW Pmax = Pd(max) + (Ta - 25°C)×ΔPd/°C =19.3mW D.F. = 7.27%	ΔPd/°C = -0.6mW/°C(Ta>25°C) ΔTa= 37.9°C	Pd (max) = 60.0 mW Ta= 92.9 °C
PC102 PS2861B-1Y-F3-A(L) (TRANSISTOR) RENESAS	Tj (max) = 110 °C Pc = 0.0 mW Pmax = Pc(max) + (Ta - 25°C)×ΔPc/°C =35.6mW D.F. = 0.0%	ΔPc/°C = -1.2mW/°C(Ta>25°C) ΔTa= 40.3°C	Pc (max) = 120.0 mW Ta= 95.3 °C
PC102 PS2861B-1Y-F3-A(L) (LED) RENESAS	Tj (max) = 110 °C Pd = 0.0 mW Pmax = Pd(max) + (Ta - 25°C)×ΔPd/°C =17.8mW D.F. = 0.0%	ΔPd/°C = -0.6mW/°C(Ta>25°C) ΔTa= 40.3°C	Pd (max) = 60.0 mW Ta= 95.3 °C

(2) 部品ディレーティング表 Component Derating List

Model: DRB30-24-1

部品番号 Location No.	Vin = 115VAC Ta = 55°C Load = 100%(Vo: 24V, Io: 1.25A)		
A1 ICE3A2065ELJ INFINEON	Tj (max) = 150 °C Pch = 0.9 W Tj= Tc+ ((θj-c)× Pt) =124.0°C D.F. = 82.67%	θj-c = 6.34 °C/W ΔTc= 63.3°C	Pch (max) = 17 W Tc= 118.3 °C
A202 UPC1093T-E1-AZ RENESAS	Ta (max) = 150 °C Pt = 43.4 mW Pmax = Pt(max) + (Ta - 25°C)×ΔPc/°C =230.7mW D.F. = 18.81%	ΔPc/°C = -3.2mW/°C(Ta>25°C) ΔTa= 22.9°C	Pt(max) = 0.4 W Ta= 77.9 °C
D1 DF06M LITE ON	Tj (max) = 150 °C Pd = 0.3712 W Tj= Tl+ ((θj-l)× Pd) =95.9°C D.F. = 63.91%	θj-l = 15.0 °C/W ΔTl= 35.3°C	Tl= 90.3 °C
D51 YG902C2R FUJI ELECTRIC	Tj (max) = 150 °C Pd = 1.1875 W Tj= Tc+ ((θj-c)× Pd) =125.7°C D.F. = 83.77%	θj-c = 3.5 °C/W ΔTc= 66.5°C	Tc= 121.5 °C
D102 D1F60-5053 SHINDENGEN	Tj (max) = 150 °C Pd = 24.4 mW Tj= Tl+ ((θj-l)× Pd) =97.9°C D.F. = 65.24%	θj-l = 23.0 °C/W ΔTl= 42.3°C	Tl= 97.3 °C
D103 CRH01(TE85L,Q) TOSHIBA	Tj (max) = 150 °C Pd = 5.88 mW Tj= Ta+ ((θj-a)× Pd) =72.2°C D.F. = 48.11%	θj-a = 130.0 °C/W ΔTa= 16.4°C	Ta= 71.4 °C
PC101 PS2861B-1Y-F3-A(L) (TRANSISTOR) RENESAS	Tj (max) = 110 °C Pc = 4.93 mW Pmax = Pc(max) + (Ta - 25°C)×ΔPc/°C =44.2mW D.F. = 11.16%	ΔPc/°C = -1.2mW/°C(Ta>25°C) ΔTa= 33.2°C	Pc (max) = 120.0 mW Ta= 88.2 °C
PC101 PS2861B-1Y-F3-A(L) (LED) RENESAS	Tj (max) = 110 °C Pd = 1.06 mW Pmax = Pd(max) + (Ta - 25°C)×ΔPd/°C =22.1mW D.F. = 4.8%	ΔPd/°C = -0.6mW/°C(Ta>25°C) ΔTa= 33.2°C	Pd (max) = 60.0 mW Ta= 88.2 °C
PC102 PS2861B-1Y-F3-A(L) (TRANSISTOR) RENESAS	Tj (max) = 110 °C Pc = 0.0 mW Pmax = Pc(max) + (Ta - 25°C)×ΔPc/°C =40.4mW D.F. = 0.0%	ΔPc/°C = -1.2mW/°C(Ta>25°C) ΔTa= 36.3°C	Pc (max) = 120.0 mW Ta= 91.3 °C
PC102 PS2861B-1Y-F3-A(L) (LED) RENESAS	Tj (max) = 110 °C Pd = 0.0 mW Pmax = Pd(max) + (Ta - 25°C)×ΔPd/°C =20.2mW D.F. = 0.0%	ΔPd/°C = -0.6mW/°C(Ta>25°C) ΔTa= 36.3°C	Pd (max) = 60.0 mW Ta= 91.3 °C

(2) 部品デレーティング表 Component Derating List

Model: DRB30-24-1

部品番号 Location No.	Vin = 230VAC Ta = 55°C Load = 100%(Vo: 24V, Io: 1.25A)		
A1 ICE3A2065ELJ INFINEON	Tj (max) = 150 °C Pch = 1.13 W Tj= Tc+ ((θj-c)× Pt) =127.2°C D.F. = 84.78%	θj-c = 6.34 °C/W ΔTc= 65.0°C	Pch (max) = 17 W Tc= 120.0 °C
A202 UPC1093T-E1-AZ RENESAS	Ta (max) = 150 °C Pt = 43.0 mW Pmax = Pt(max) + (Ta - 25°C)×ΔPc/°C =238.7mW D.F. = 18.01%	ΔPc/°C = -3.2mW/°C(Ta>25°C) ΔTa= 20.4°C	Pt(max) = 0.4 W Ta= 75.4 °C
D1 DF06M LITE ON	Tj (max) = 150 °C Pd = 0.1792 W Tj= Tl+ ((θj-l)× Pd) =77.4°C D.F. = 51.59%	θj-l = 15.0 °C/W ΔTl= 19.7°C	Tl= 74.7 °C
D51 YG902C2R FUJI ELECTRIC	Tj (max) = 150 °C Pd = 1.1875 W Tj= Tc+ ((θj-c)× Pd) =125.1°C D.F. = 83.37%	θj-c = 3.5 °C/W ΔTc= 65.9°C	Tc= 120.9 °C
D102 D1F60-5053 SHINDENGEN	Tj (max) = 150 °C Pd = 6.13 mW Tj= Tl+ ((θj-l)× Pd) =95.3°C D.F. = 63.56%	θj-l = 23.0 °C/W ΔTl= 40.2°C	Tl= 95.2 °C
D103 CRH01(TE85L,Q) TOSHIBA	Tj (max) = 150 °C Pd = 3.92 mW Tj= Ta+ ((θj-a)× Pd) =67.7°C D.F. = 45.14%	θj-a = 130.0 °C/W ΔTa= 12.2°C	Ta= 67.2 °C
PC101 PS2861B-1Y-F3-A(L) (TRANSISTOR) RENESAS	Tj (max) = 110 °C Pc = 4.93 mW Pmax = Pc(max) + (Ta - 25°C)×ΔPc/°C =45.5mW D.F. = 10.84%	ΔPc/°C = -1.2mW/°C(Ta>25°C) ΔTa= 32.1°C	Pc (max) = 120.0 mW Ta= 87.1 °C
PC101 PS2861B-1Y-F3-A(L) (LED) RENESAS	Tj (max) = 110 °C Pd = 1.06 mW Pmax = Pd(max) + (Ta - 25°C)×ΔPd/°C =22.7mW D.F. = 4.66%	ΔPd/°C = -0.6mW/°C(Ta>25°C) ΔTa= 32.1°C	Pd (max) = 60.0 mW Ta= 87.1 °C
PC102 PS2861B-1Y-F3-A(L) (TRANSISTOR) RENESAS	Tj (max) = 110 °C Pc = 0.0 mW Pmax = Pc(max) + (Ta - 25°C)×ΔPc/°C =41.5mW D.F. = 0.0%	ΔPc/°C = -1.2mW/°C(Ta>25°C) ΔTa= 35.4°C	Pc (max) = 120.0 mW Ta= 90.4 °C
PC102 PS2861B-1Y-F3-A(L) (LED) RENESAS	Tj (max) = 110 °C Pd = 0.0 mW Pmax = Pd(max) + (Ta - 25°C)×ΔPd/°C =20.8mW D.F. = 0.0%	ΔPd/°C = -0.6mW/°C(Ta>25°C) ΔTa= 35.4°C	Pd (max) = 60.0 mW Ta= 90.4 °C

3. 主要部品温度上昇値 Main Components Temperature Rise ΔT List

MODEL : DRB30-1

(1) 測定条件 Measuring Conditions

取付方法 Mounting Method (標準取付) (Standard Mounting)	Standard Mounting	
入力電圧 V_{in} Input Voltage	115VAC	
出力電圧 V_o Output Voltage	12VDC	24VDC
出力電流 I_o Output Current	2.5A(100%)	1.25A(100%)

(2) 測定結果 Measuring Results

出力デレーティング Output Derating 部品番号 Location No. 部品名 Part name		ΔT Temperature Rise ($^{\circ}C$)	
		Io=100 %	
		Ta=55 $^{\circ}C$	
		取付方向	
		Standard Mounting	
		12VDC	24VDC
A1	IC	62.2	63.3
A201	CHIP IC	26.9	22.9
C5	E.CAP.	14.7	15.1
C6	E.CAP.	33.4	32.7
C51	E.CAP.	31.5	24.7
D1	BRIDGE DIODE	34.3	35.3
D51	DIODE	86.2	66.5
L1	BALUN COIL	31.5	32.3
L52	CHOKE COIL	39.0	27.4
PC101	PHOTO COUPLER	38.1	33.2
PC102	PHOTO COUPLER	40.3	36.3
T1	TRANSFORMER	48.1	45.7

3. 主要部品温度上昇値 Main Components Temperature Rise ΔT List

MODEL : DRB30-1

(1) 測定条件 Measuring Conditions

取付方法 Mounting Method (標準取付) (Standard Mounting)	Standard Mounting	
入力電圧 V_{in} Input Voltage	230VAC	
出力電圧 V_o Output Voltage	12VDC	24VDC
出力電流 I_o Output Current	2.5A(100%)	1.25A(100%)

(2) 測定結果 Measuring Results

出力ディレーティング Output Derating		ΔT Temperature Rise ($^{\circ}C$)	
		取付方向 Standard Mounting	
部品番号 Location No.	部品名 Part name	12VDC	24VDC
		Io=100 %	
		Ta=55 $^{\circ}C$	
		取付方向	
		Standard Mounting	
		12VDC	24VDC
A1	IC	68.4	65.0
A201	CHIP IC	24.8	20.4
C5	E.CAP.	11.0	10.8
C6	E.CAP.	33.3	31.5
C51	E.CAP.	29.5	22.3
D1	BRIDGE DIODE	19.6	19.7
D51	DIODE	86.3	65.9
L1	BALUN COIL	15.1	15.1
L52	CHOKE COIL	38.2	25.6
PC101	PHOTO COUPLER	37.9	32.1
PC102	PHOTO COUPLER	40.3	35.4
T1	TRANSFORMER	46.8	44.1

4. 電解コンデンサ推定寿命計算値 Electrolytic Capacitor Lifetime

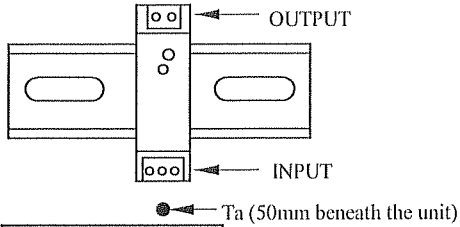
MODEL : DRB30-12-1

空冷条件 : 自然空冷

Cooling condition : Convection cooling

標準取付

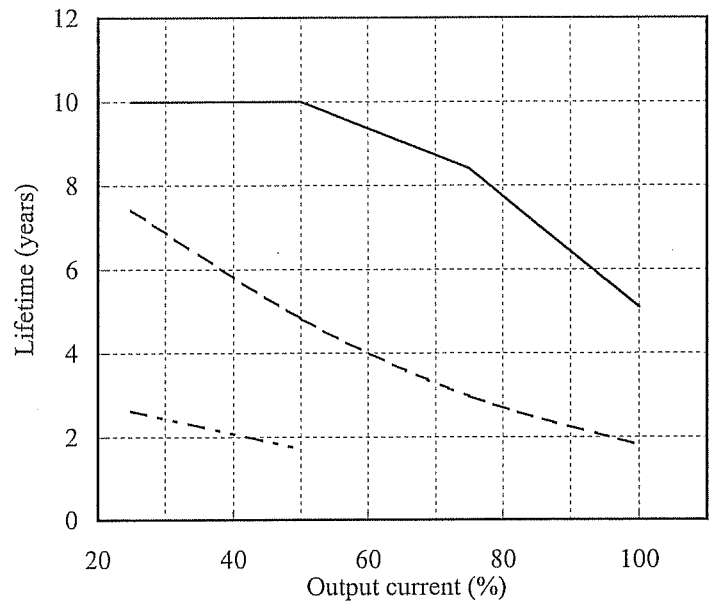
Standard Mounting



Vin=115VAC

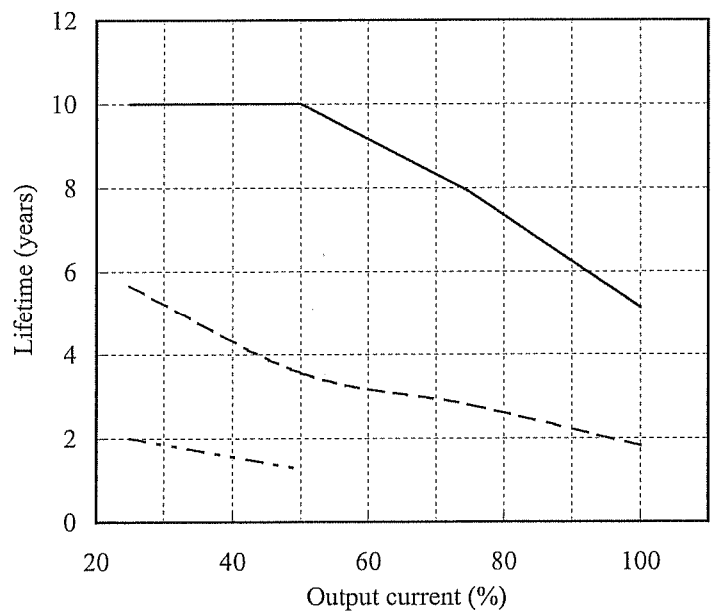
Load (%)	Lifetime (years)		
	Ta=40°C	Ta=55°C	Ta=70°C
25	10.0	7.4	2.6
50	10.0	4.8	1.7
75	8.4	3.0	-
100	5.1	1.8	-

Conditions Ta 40°C : ———
55°C : - - - -
70°C : - · - · -



Vin=230VAC

Load (%)	Lifetime (years)		
	Ta=40°C	Ta=55°C	Ta=70°C
25	10.0	5.7	2.0
50	10.0	3.6	1.3
75	7.9	2.8	-
100	5.1	1.8	-



4. 電解コンデンサ推定寿命計算値 Electrolytic Capacitor Lifetime

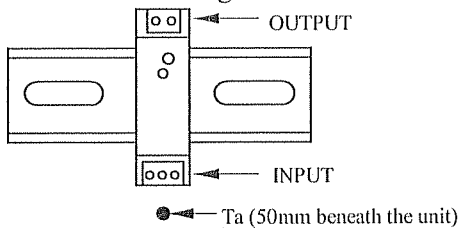
MODEL : DRB30-24-1

空冷条件 : 自然空冷

Cooling condition : Convection cooling

標準取付

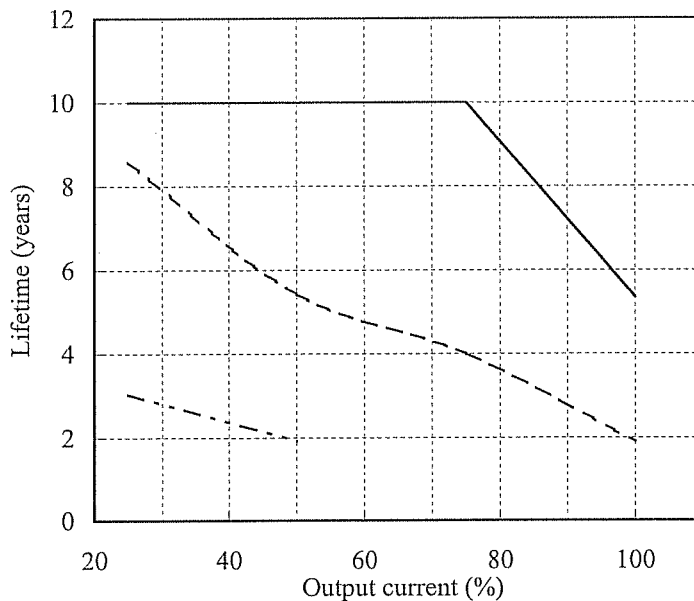
Standard Mounting



V_{in}=115VAC

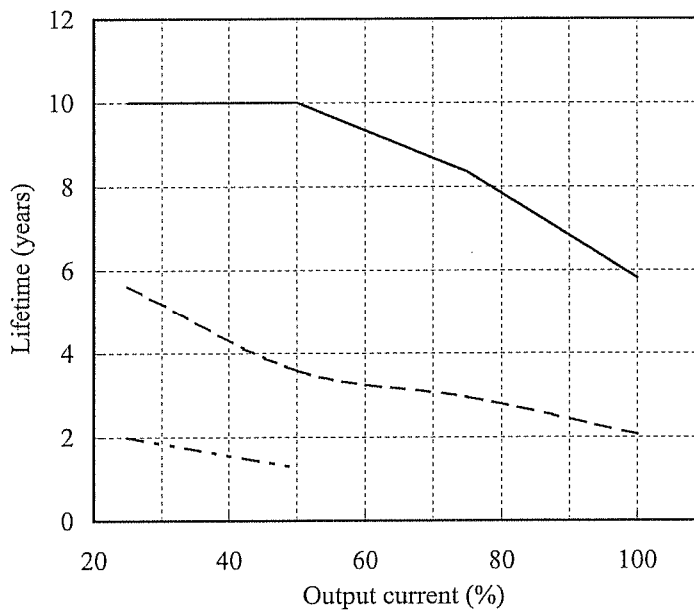
Load (%)	Lifetime (years)		
	Ta= 40°C	Ta= 55°C	Ta= 70°C
25	10.0	8.6	3.0
50	10.0	5.4	1.9
75	10.0	4.0	-
100	5.4	1.9	-

Conditions Ta 40°C : ———
55°C : - - - -
70°C : ·····



V_{in}=230VAC

Load (%)	Lifetime (years)		
	Ta= 40°C	Ta= 55°C	Ta= 70°C
25	10.0	5.6	2.0
50	10.0	3.6	1.3
75	8.3	3.0	-
100	5.8	2.1	-



5. アブノーマル試験 Abnormal Test

MODEL :DRB30-24-1

(1) 試験条件 Test Conditions

Input : 230VAC Output : 24V, 1.25A Ta : 25°C

(2) 試験結果 Test Results

(Da : Damaged)

No.	Test position		Test mode		Test result											記事 Note	
	部品No. Location No.	試験端子 Test point	ショート Short	オープン Open	a	b	c	d	e	f	g	h	i	j	k		l
					発火 Fire	発煙 Smoke	破裂 Burst	異臭 Smell	赤熱 Red hot	破損 Damaged	ヒューズ断 Fuse blown	OVP	OCP	出力断 No output	変化なし No change		その他 Others
1	D1	AC-AC	○								○			○			Da : F1
2		DC-DC	○							○	○			○			Da : F1,D1
3		AC-DC	○							○	○			○			Da : F1,D1
4		AC		○										○			
5		DC		○										○			
6	D51	A-K	○											○		○	A1 : latched off
7		A/K		○										○		○	A1 : latched off
8	D102	A-K	○										○	○			A1 : latched off
9		A/K		○											○		
10	T1	1-5	○											○			
11		2-4	○											○			A1 : On/Off
12		6,7-8,9	○											○		○	A1 : latched off
13		1/5		○										○			
14		2/4		○										○			A1 : On/Off
15	6,7/8,9		○										○		○	A1 : latched off	
16	C5		○							○	○			○			Da: F1,D1
17				○												○	Vo:unstable
18	C51		○											○			A1 : latched off
19				○												○	Output-ripple increase
20	C101		○											○			
21				○											○		
22	C201		○											○			A1 : latched off
23				○												○	Effi. Down
24	C209		○											○			A1 : latched off
25				○											○		
26	R104		○												○		
27	R105		○												○		
28	R201		○												○		
29				○												○	Effi. Down

(Da : Damaged)

No.	Test position		Test mode		Test result											記事 Note	
	部品No.	試験端子 Test point	ショート Short	オープン Open	a	b	c	d	e	f	g	h	i	j	k		l
					発火 Fire	発煙 Smoke	破裂 Burst	異臭 Smell	赤熱 Red hot	破損 Damaged	ヒューズ断 Fuse blown	OVP	OCP	出力断 No output	変化なし No change		その他 Others
30	A1	1-2	○											○		A1 : On/Off	
31		1-3	○											○		A1 : latched off	
32		1-4,5	○							○	○			○		Da:F1,A1,Z101,Z102,Z105,R107	
33		1-6	○												○		
34		1-7	○							○				○		Da: A1	
35		1-8	○											○		A1 : latched off	
36		2-3	○											○			
37		2-4,5	○							○	○			○		Da:F1,D1,A1,Z101,Z103	
38		2-6	○											○			
39		2-7	○											○		A1 : latched off	
40		2-8	○											○			
41		3-4,5	○							○	○			○		Da: F1,D1,Z101,A1,R107	
42		3-6	○												○		
43		3-7	○											○			
44		3-8	○												○	Vo:drop 24V->23V	
45		4-5	○												○	4pin&5pin is same (drain pin)	
46		4,5-6	○							○	○			○		Da: F1,D1,Z101,Z105,A1,R107	
47		4,5-7	○							○	○			○		Da:F1,A1,Z104	
48		4,5-8	○							○	○			○		Da:F1	
49		6-7	○											○			
50		6-8	○												○		
51		7-8	○											○			
52		1		○											○		
53		2		○										○			
54		3		○										○		A1 : latched off	
55		4		○											○		
56		5		○											○		
57		6		○											○		
58		7		○										○			
59		8		○										○			
60		A202	A-K	○												○	Vo down
61	A-Ref		○									○		○			
62	K-Ref		○												○	Vo down	
63	A			○								○		○			
64	K			○								○		○			
65	Ref			○								○		○			

6. 振動試験 Vibration Test

MODEL : DRB30-1

(1) 振動試験種類 Vibration Test Class

掃引振動数耐久試験 Frequency variable endurance test

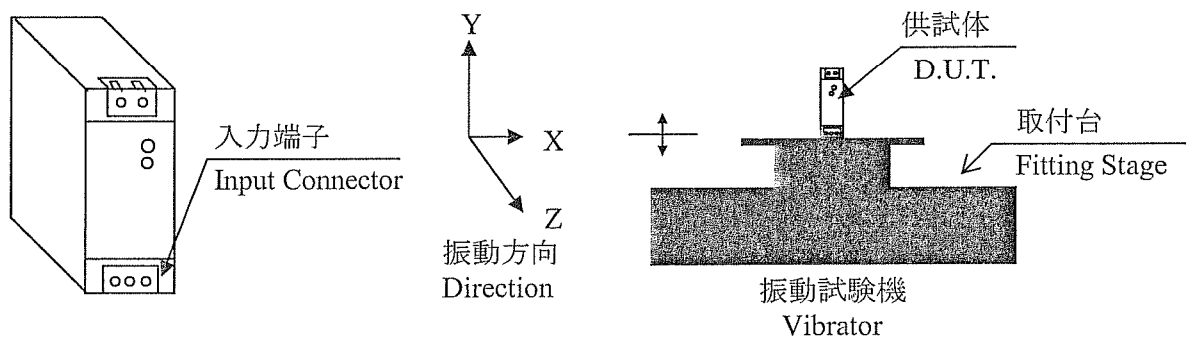
(2) 使用振動試験装置 Equipment Used

・制御部	: DP550	・加振部	: V870
Controller	DP CORP USA	Vibrator	LDS CORP. UK

(3) 試験条件 Test Conditions

・周波数範囲	: 10~55Hz	・振動方向	: X, Y, Z
Sweep frequency		Direction	
・掃引時間	: 1.0分間	・試験時間	: 各方向共 1時間
Sweep time	1.0min	Sweep count	1 hour each
・加速度	: 一定 19.6m/s ² (2G)		
Acceleration	Constant		

(4) 試験方法 Test Method



(5) 判定条件 Judging Conditions

- 1.破壊しない事
Not to be broken
- 2.試験後の特性は初期値から変動していない事
Characteristic to be within regulation specification after the test.

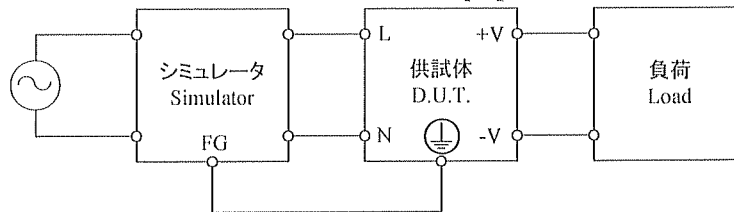
(6) 試験結果 Test Results

合格 OK

7. ノイズシミュレート試験 Noise Simulate Test

MODEL : DRB30-1

(1) 試験回路及び測定器 Test Circuit and Equipment



シミュレータ : INS-400L (ノイズ研究所)
 Simulator : (Noise Laboratory Co.,LTD)

(2) 試験条件 Test Conditions

・入力電圧 Input voltage	: 115, 230VAC	・ノイズ電圧 Noise level	: 0~2kV
・出力電圧 Output Voltage	: 定格 Rated	・位相 Phase	: 0~360 deg
・出力電流 Output current	: 0, 100%	・極性 Polarity	: +, -
・周囲温度 Ambient temperature	: 25°C	・印加モード Mode	: コモン、ノーマル Common, Normal
・パルス幅 Pulse width	: 50~1000ns	・トリガ選択 Trigger select	: Line

(3) 判定条件 Judging Conditions

- 1.破壊しない事
Not to be broken
- 2.出力がダウンしない事
Not to be shut down output
- 3.その他異常のない事
No other out of orders

(4) 試験結果 Test Results

合格 OK

8. 熱衝撃試験 Thermal Shock Test

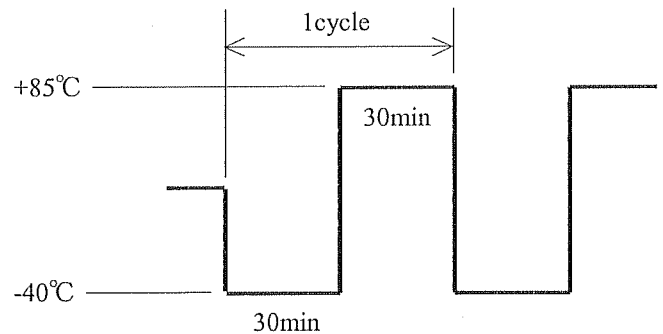
MODEL : DRB30-1

(1) 使用計測器 Equipment Used

TSA-101S-W : ESPEC

(2) 試験条件 Test Conditions

- ・電源周囲温度 : -40°C ⇔ 85°C
Ambient Temperature
- ・試験時間 : 図参照
Test Time Refer to Dwg.
- ・試験サイクル : 100 サイクル
Test Cycle 100 Cycles
- ・非動作
Not Operating



(3) 試験方法 Test Method

初期測定の後、供試品を試験槽に入れ、上記サイクルで試験を行う。100サイクル後に、供試品を常温常湿下に1時間放置し、出力に異常がない事を確認する。

Before testing, check if there is no abnormal output, then put the D.U.T. in testing chamber, and test it according to the above cycle. 100 cycles later, leave it for 1 hour at the room temperature, then check if there is no abnormal output.

(4) 判定条件 Judging Conditions

1. 破壊しない事
Not to be broken
2. 試験後の特性は初期値から変動していない事
Characteristic to be within regulation specification after the test.

(5) 試験結果 Test Results

合格 OK

9. Voltage Dips, Short Interruptions Immunity Test (SEMI-F47)

MODEL : DRB30-1

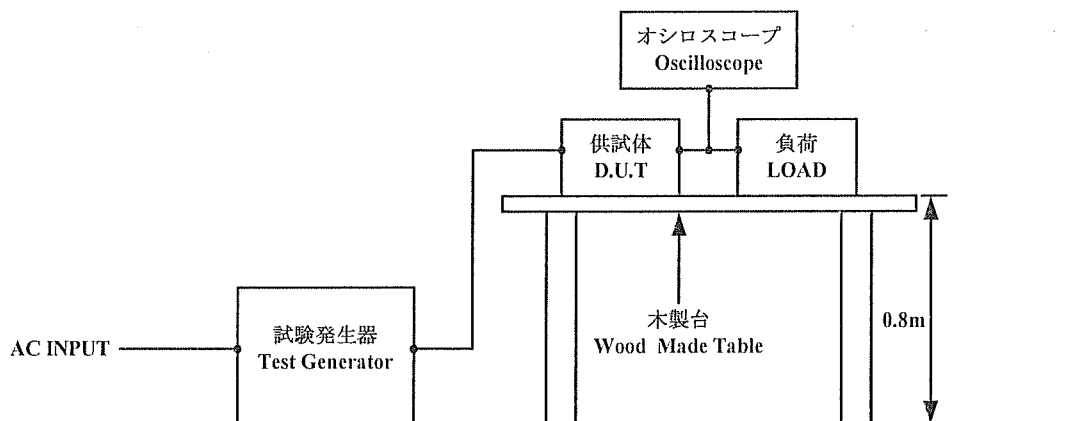
(1) 使用計測器 Equipment Used

試験発生器 : PCR2000L (KIKUSUI)
Test Generator

(2) 試験条件 Test Conditions

・入力電圧	: 200VAC	・出力電圧	: 定格
Input Voltage		Output Voltage	Rated
・出力電流	: 100%	・周囲温度	: 25°C
Output Current		Ambient Temperature	
・試験回数	: 3回	・試験間隔	: 10秒以上
Number of Tests	3 times	Test interval	More than 10 seconds

(3) 試験方法及び印加箇所 Test Method and Device Test Point



(4) 判定条件 Judging Conditions

- 試験後の出力電圧は初期値から変動していない事。
Output voltage to be within output voltage regulation specification after the test.
- 発煙／発火なき事。
Smoke and fire do not occur.

(5) 試験結果 Test Result

Test Level	Dip rate	Continue Time	DRB30-* -1
50%	50%	50~200ms	PASS
70%	30%	200~500ms	PASS
80%	20%	500~1000ms	PASS
50%	50%	1000ms	PASS