DRJ30

RELIABILITY DATA

信頼性データ

I N D E X

PAGE

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

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

評価負荷条件　　Load conditions

*入力電圧が90VAC未満の場合、下記のとおり出力ディレーティングが必要です。
Output derating is needed when input voltage is less than 90VAC.

Output voltage : 5V, 12V, 24V

Vin	Iout : Full load	5V	12V	24V
90 - 265VAC	100%	4.0A	2.3A	1.25A
85VAC	80%	3.2A	1.84A	1.0A

１．MTBF計算値　Calculated Values of MTBF

MODEL：DRJ30-12-1

(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＞

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

λequip　: 全機器故障率 (故障数／10^6時間)
Total Equipment Failure Rate (Failure／10^6Hours)

λ_G　: i 番目の同属部品に対する故障率 (故障数／10^6時間)
Generic Failure Rate for The ith Generic Part (Failure／10^6Hours)

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 (π_Q=1)
Generic Quality Factor for The ith Generic Part (π_Q=1)

(2) MTBF値　MTBF Values

G_F ： 地上、固定 (Ground, Fixed)

RCR-9102B

MTBF ≒　411,079　時間 (Hours)

２．部品ディレーティング　Components Derating

MODEL：DRJ30

(1) 算出方法　Calculating Method

(a) 測定方法　Measuring method

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

(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

$$\theta j-c = \frac{Tj(max) - Tc}{Pj(max)} \qquad \theta j-l = \frac{Tj(max) - Tl}{Pj(max)}$$

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

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

Pj(max)　:最大接合点(チャネル)損失
(Pch(max))　Maximum Junction (channel) Dissipation

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

θj-c　:接合点(チャネル)からケースまでの熱抵抗
(θch-c)　Thermal Impedance between Junction (channel) and Case

θj-l　:接合点(チャネル)からリードまでの熱抵抗
(θch-l)　Thermal Impedance between Junction (channel) and Lead

θj-a　:接合点から周囲までの熱抵抗
Thermal Impedance between Junction and Ambient

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

MODEL：DRJ30-5-1

部品番号 Location No.	Vin = 100VAC Ta = 55℃ Vo = 5V Io = 4.0A		
A1 ICE3A2065ELJ INFINEON	Tch (max) = 150 ℃ Pch = 0.70 W Tch = Tc + ((θch-c) × Pch) = 104.2 ℃ D.F. = 69.5 %	θch-c = 7.4 ℃/W ΔTc = 44.0 ℃	Tc = 99.0 ℃
D1 DF06M LITE ON	Tj (max) = 150 ℃ Pj = 1.05 W Tj = Tl + ((θj-l) × Pj) = 94.1 ℃ D.F. = 62.7 %	θj-l = 15.0 ℃/W ΔTl = 23.3 ℃	Tl = 78.3 ℃
D51 FCQS30A065 NIHON INTER	Tj (max) = 150 ℃ Pj = 2.40 W Tj = Tc + ((θj-c) × Pj) = 134.9 ℃ D.F. = 89.9 %	θj-c = 1.5 ℃/W ΔTc = 76.3 ℃	Tc = 131.3 ℃
D101 D1F60 SHINDENGEN	Tj (max) = 150 ℃ Pj = 7.7 mW Tj = Tl + ((θj-l) × Pj) = 99.9 ℃ D.F. = 66.6 %	θj-l = 23 ℃/W ΔTl = 44.7 ℃	Tl = 99.7 ℃
D102 CRH01 TOSHIBA	Tj (max) = 150 ℃ Pj = 38.4 mW Tj = Ta + ((θj-a) × Pj) = 83.4 ℃ D.F. = 55.6 %	θj-a = 130 ℃/W ΔTa = 23.4 ℃	Ta = 78.4 ℃
PC102 TLP291(SE (LED) TOSHIBA	Tj (max) = 125 ℃ Pj = 1.96 mW Tj = Tc + ((θj-c) × Pj) = 93.0 ℃ D.F. = 74.4 %	θj-c = 250 ℃/W ΔTc = 37.5 ℃	Tc = 92.5 ℃
PC102 TLP291(SE (TRANSISTOR) TOSHIBA	Tj (max) = 125 ℃ Pj = 2.1 mW Tj = Tc + ((θj-c) × Pj) = 93.0 ℃ D.F. = 74.4 %	θj-c = 250 ℃/W ΔTc = 37.5 ℃	Tc = 92.5 ℃

MODEL：DRJ30-5-1

部品番号 Location No.	Vin = 230VAC Ta = 55℃ Vo = 5V Io = 4.0A		
A1 ICE3A2065ELJ INFINEON	Tch (max) = 150 ℃ Pch = 1.21 W Tch = Tc + ((θch-c) × Pch) = 103.0 ℃ D.F. = 68.7 %	θch-c = 7.4 ℃/W ΔTc = 39.0 ℃	 Tc = 94.0 ℃
D1 DF06M LITE ON	Tj (max) = 150 ℃ Pj = 0.52 W Tj = Tl + ((θj-l) × Pj) = 76.2 ℃ D.F. = 50.8 %	θj-l = 15.0 ℃/W ΔTl = 13.4 ℃	 Tl = 68.4 ℃
D51 FCQS30A065 NIHON INTER	Tj (max) = 150 ℃ Pj = 2.40 W Tj = Tc + ((θj-c) × Pj) = 133.4 ℃ D.F. = 88.9 %	θj-c = 1.5 ℃/W ΔTc = 74.8 ℃	 Tc = 129.8 ℃
D101 D1F60 SHINDENGEN	Tj (max) = 150 ℃ Pj = 12.3 mW Tj = Tl + ((θj-l) × Pj) = 93.7 ℃ D.F. = 62.5%	θj-l = 23 ℃/W ΔTl = 38.4 ℃	 Tl = 93.4 ℃
D102 CRH01 TOSHIBA	Tj (max) = 150 ℃ Pj = 44.7 mW Tj = Ta + ((θj-a) × Pj) = 79.0 ℃ D.F. = 52.7 %	θj-a = 130 ℃/W ΔTa = 18.2 ℃	 Ta = 73.2 ℃
PC102 TLP291(SE (LED) TOSHIBA	Tj (max) = 125 ℃ Pj = 1.96 mW Tj = Tc + ((θj-c) × Pj) = 90.7 ℃ D.F. = 72.6 %	θj-c = 250 ℃/W ΔTc = 35.2 ℃	 Tc = 90.2 ℃
PC102 TLP291(SE (TRANSISTOR) TOSHIBA	Tj (max) = 125 ℃ Pj = 2.1 mW Tj = Tc + ((θj-c) × Pj) = 90.7 ℃ D.F. = 72.6 %	θj-c = 250 ℃/W ΔTc = 35.2 ℃	 Tc = 90.2 ℃

MODEL：DRJ30-12-1

部品番号 Location No.	Vin = 100VAC Ta = 55℃ Vo = 12V Io = 2.3A		
A1 ICE3A2065ELJ INFINEON	Tch (max) = 150 ℃ Pch = 0.67 W Tch = Tc + ((θch-c) × Pch) = 113.3 ℃ D.F. = 75.5 %	θch-c = 7.4 ℃/W ΔTc = 53.3 ℃	 Tc = 108.3 ℃
D1 DF06M LITE ON	Tj (max) = 150 ℃ Pj = 1.25 W Tj = Tl + ((θj-l) × Pj) = 105.0 ℃ D.F. = 70.0 %	θj-l = 15.0 ℃/W ΔTl = 31.2 ℃	 Tl = 86.2 ℃
D51 YG865C15R FUJI ELECTRIC	Tj (max) = 150 ℃ Pj = 1.62 W Tj = Tc + ((θj-c) × Pj) = 140.8 ℃ D.F. = 93.9 %	θj-c = 1.75 ℃/W ΔTc = 83.0 ℃	 Tc = 138.0 ℃
D101 D1F60 SHINDENGEN	Tj (max) = 150 ℃ Pj = 58.6 mW Tj = Tl + ((θj-l) × Pj) = 102.0 ℃ D.F. = 68.0 %	θj-l = 23 ℃/W ΔTl = 45.7 ℃	 Tl = 100.7 ℃
D102 CRH01 TOSHIBA	Tj (max) = 150 ℃ Pj = 37.7 mW Tj = Ta + ((θj-a) × Pj) = 86.9 ℃ D.F. = 57.9 %	θj-a = 130 ℃/W ΔTa = 27.0 ℃	 Ta = 82.0 ℃
PC102 TLP291(SE (LED) TOSHIBA	Tj (max) = 125 ℃ Pj = 3.04 mW Tj = Tc + ((θj-c) × Pj) = 100.5 ℃ D.F. = 80.4 %	θj-c = 250 ℃/W ΔTc = 44.7 ℃	 Tc = 99.7 ℃
PC102 TLP291(SE (TRANSISTOR) TOSHIBA	Tj (max) = 125 ℃ Pj = 32.6 mW Tj = Tc + ((θj-c) × Pj) = 107.9 ℃ D.F. = 86.3 %	θj-c = 250 ℃/W ΔTc = 44.7 ℃	 Tc = 99.7 ℃

MODEL：DRJ30-12-1

部品番号 Location No.	Vin = 230VAC Ta = 55℃ Vo = 12V Io = 2.3A		
A1 ICE3A2065ELJ INFINEON	Tch (max) = 150 ℃ Pch = 0.68 W Tch = Tc + ((θch-c) × Pch) = 102.4 ℃ D.F. = 68.3 %	θch-c = 7.4 ℃/W ΔTc = 42.4 ℃	 Tc = 97.4 ℃
D1 DF06M LITE ON	Tj (max) = 150 ℃ Pj = 0.67 W Tj = Tl + ((θj-l) × Pj) = 81.8 ℃ D.F. = 54.5 %	θj-l = 15.0 ℃/W ΔTl = 16.7 ℃	 Tl = 71.7 ℃
D51 YG865C15R FUJI ELECTRIC	Tj (max) = 150 ℃ Pj = 1.62 W Tj = Tc + ((θj-c) × Pj) = 137.6 ℃ D.F. = 91.7 %	θj-c = 1.75 ℃/W ΔTc = 79.8 ℃	 Tc = 134.8 ℃
D101 D1F60 SHINDENGEN	Tj (max) = 150 ℃ Pj = 58.6 mW Tj = Tl + ((θj-l) × Pj) = 92.9 ℃ D.F. = 61.9 %	θj-l = 23 ℃/W ΔTl = 36.6 ℃	 Tl = 91.6 ℃
D102 CRH01 TOSHIBA	Tj (max) = 150 ℃ Pj = 37.7 mW Tj = Ta + ((θj-a) × Pj) = 79.9 ℃ D.F. = 53.3 %	θj-a = 130 ℃/W ΔTa = 20.0 ℃	 Ta = 75.0 ℃
PC102 TLP291(SE (LED) TOSHIBA	Tj (max) = 125 ℃ Pj = 3.04 mW Tj = Tc + ((θj-c) × Pj) = 95.5 ℃ D.F. = 76.4 %	θj-c = 250 ℃/W ΔTc = 39.7 ℃	 Tc = 94.7 ℃
PC102 TLP291(SE (TRANSISTOR) TOSHIBA	Tj (max) = 125 ℃ Pj = 32.6 mW Tj = Tc + ((θj-c) × Pj) = 102.9 ℃ D.F. = 82.3 %	θj-c = 250 ℃/W ΔTc = 39.7 ℃	 Tc = 94.7 ℃

MODEL：DRJ30-24-1

部品番号 Location No.	Vin = 100VAC　Ta = 55℃ Vo = 24V　Io = 1.25A		
A1 ICE3A2065ELJ INFINEON	Tch (max) = 150 ℃ Pch = 0.73 W Tch = Tc + ((θch-c) × Pch) = 119.2 ℃ D.F. = 79.5 %	θch-c = 7.4 ℃/W ΔTc = 58.8 ℃	Tc = 113.8 ℃
D1 DF06M LITE ON	Tj (max) = 150 ℃ Pj = 0.71 W Tj = Tl + ((θj-l) × Pj) = 98.4 ℃ D.F. = 65.6 %	θj-l = 15.0 ℃/W ΔTl = 32.7 ℃	Tl = 87.7 ℃
D51 YG902C2R FUJI ELECTRIC	Tj (max) = 150 ℃ Pj = 1.19 W Tj = Tc + ((θj-c) × Pj) = 124.4 ℃ D.F. = 82.9 %	θj-c = 3.5 ℃/W ΔTc = 65.2 ℃	Tc = 120.2 ℃
D101 D1F60 SHINDENGEN	Tj (max) = 150 ℃ Pj = 22.9 mW Tj = Tl + ((θj-l) × Pj) = 104.9 ℃ D.F. = 69.9 %	θj-l = 23 ℃/W ΔTl = 49.4 ℃	Tl = 104.4 ℃
D102 CRH01 TOSHIBA	Tj (max) = 150 ℃ Pj = 27.8 mW Tj = Ta + ((θj-a) × Pj) = 87.0 ℃ D.F. = 58.0 %	θj-a = 130 ℃/W ΔTa = 28.4 ℃	Ta = 83.4 ℃
PC102 TLP291(SE (LED) TOSHIBA	Tj (max) = 125 ℃ Pj = 1.76 mW Tj = Tc + ((θj-c) × Pj) = 96.1 ℃ D.F. = 76.9 %	θj-c = 250 ℃/W ΔTc = 40.7 ℃	Tc = 95.7 ℃
PC102 TLP291(SE (TRANSISTOR) TOSHIBA	Tj (max) = 125 ℃ Pj = 18.8 mW Tj = Tc + ((θj-c) × Pj) = 100.4 ℃ D.F. = 80.3 %	θj-c = 250 ℃/W ΔTc = 40.7 ℃	Tc = 95.7 ℃

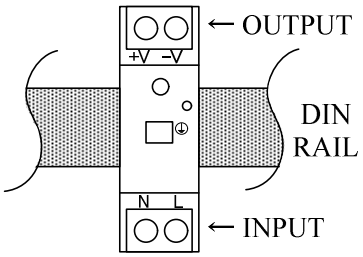
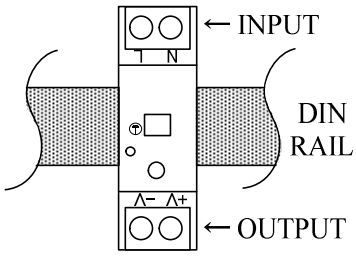
MODEL：DRJ30-24-1

部品番号 Location No.	Vin = 230VAC Ta = 55℃ Vo = 24V Io = 1.25A		
A1 ICE3A2065ELJ INFINEON	Tch (max) = 150 ℃ Pch = 0.67 W Tch = Tc + ((θch-c) × Pch) = 114.6 ℃ D.F. = 76.4 %	θch-c = 7.4 ℃/W ΔTc = 54.6 ℃	Tc = 109.6 ℃
D1 DF06M LITE ON	Tj (max) = 150 ℃ Pj = 1.32 W Tj = Tl + ((θj-l) × Pj) = 92.7 ℃ D.F. = 61.8 %	θj-l = 15.0 ℃/W ΔTl = 17.9 ℃	Tl = 72.9 ℃
D51 YG902C2R FUJI ELECTRIC	Tj (max) = 150 ℃ Pj = 1.19 W Tj = Tc + ((θj-c) × Pj) = 122.9 ℃ D.F. = 81.9 %	θj-c = 3.5 ℃/W ΔTc = 63.7 ℃	Tc = 118.7 ℃
D101 D1F60 SHINDENGEN	Tj (max) = 150 ℃ Pj = 22.9 mW Tj = Tl + ((θj-l) × Pj) = 98.0 ℃ D.F. = 65.3 %	θj-l = 23 ℃/W ΔTl = 42.5 ℃	Tl = 97.5 ℃
D102 CRH01 TOSHIBA	Tj (max) = 150 ℃ Pj = 27.8 mW Tj = Ta + ((θj-a) × Pj) = 80.9 ℃ D.F. = 53.9 %	θj-a = 130 ℃/W ΔTa = 22.3 ℃	Ta = 77.3 ℃
PC102 TLP291(SE (LED) TOSHIBA	Tj (max) = 125 ℃ Pj = 1.76 mW Tj = Tc + ((θj-c) × Pj) = 93.5 ℃ D.F. = 74.8 %	θj-c = 250 ℃/W ΔTc = 38.1 ℃	Tc = 93.1 ℃
PC102 TLP291(SE (TRANSISTOR) TOSHIBA	Tj (max) = 125 ℃ Pj = 18.8 mW Tj = Tc + ((θj-c) × Pj) = 97.8 ℃ D.F. = 78.2 %	θj-c = 250 ℃/W ΔTc = 38.1 ℃	Tc = 93.1 ℃

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

MODEL : DRJ30-5-1

(1) 測定条件 Measuring Conditions

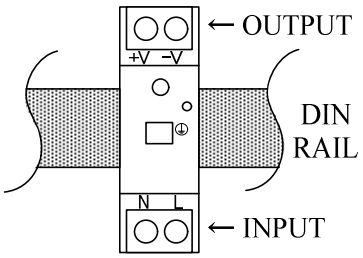
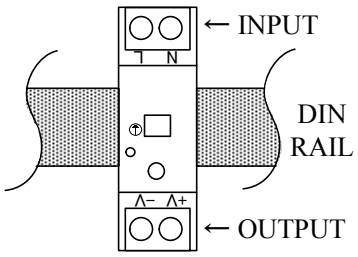
取付方法 Mounting Method (標準取付 : A) (Standard Mounting : A)	Mounting A 		Mounting B 	
入力電圧 Vin Input Voltage	100VAC	230VAC	100VAC	230VAC
出力電圧 Vo Output Voltage	5VDC			
出力電流 Io Output Current	4.0A(100%)			

(2) 測定結果 Measuring Results

		ΔT Temperature Rise (℃)			
出力ディレーティング Output Derating		Io=100 %			
		Ta=55℃		Ta=45℃	
部品番号 Location No.	部品名 Part name	取付方向 : Mounting A		取付方向 : Mounting B	
		Vin : 100VAC	Vin : 230VAC	Vin : 100VAC	Vin : 230VAC
A1	IPD	44.0	39.0	39.2	36.3
D1	BRIDGE DIODE	23.3	13.4	33.8	23.4
D51	S.B.D.	76.3	74.8	68.1	67.3
D101	DIODE	44.7	38.4	45.5	40.7
D102	DIODE	23.4	18.2	26.9	22.3
PC102	PHOTO COUPLER	37.5	35.2	28.3	27.7
T1	TRANS	45.1	43.3	42.5	41.7
L1	BALUN COIL	23.9	11.4	39.5	27.1
L51	CHOKE COIL	35.3	33.6	32.8	31.9
C5	E.CAP.	15.7	11.0	22.1	16.9
C6	E.CAP.	32.0	28.6	24.2	22.1
C51	E.CAP.	40.1	37.9	37.3	36.0
C71	E.CAP.	19.8	18.3	19.2	18.0

MODEL : DRJ30-12-1

(1) 測定条件 Measuring Conditions

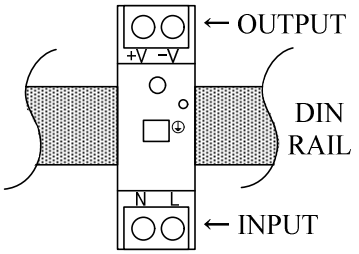
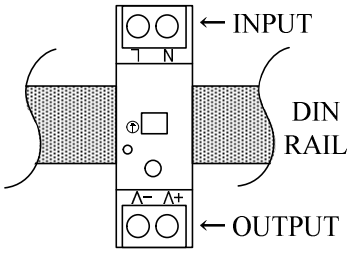
	Mounting A		Mounting B	
取付方法 Mounting Method (標準取付 : A) (Standard Mounting : A)				
入力電圧 Vin Input Voltage	100VAC	230VAC	100VAC	230VAC
出力電圧 Vo Output Voltage	12VDC			
出力電流 Io Output Current	2.3A(100%)			

(2) 測定結果 Measuring Results

		ΔT Temperature Rise (℃)			
出力ディレーティング Output Derating		Io=100 %			
		Ta=55℃		Ta=45℃	
部品番号 Location No.	部品名 Part name	取付方向 : Mounting A		取付方向 : Mounting B	
		Vin : 100VAC	Vin : 230VAC	Vin : 100VAC	Vin : 230VAC
A1	IPD	53.3	42.4	46.4	37.9
D1	BRIDGE DIODE	31.2	16.7	40.8	25.3
D51	S.B.D.	83.0	79.8	71.7	69.9
D101	DIODE	45.7	36.6	45.2	37.5
D102	DIODE	27.0	20.0	29.8	23.9
PC102	PHOTO COUPLER	44.7	39.7	35.8	33.1
T1	TRANS	49.2	44.7	49.4	47.6
L1	BALUN COIL	35.0	14.7	49.6	28.3
L51	CHOKE COIL	30.5	28.0	27.9	26.4
C5	E.CAP.	20.2	13.3	26.1	18.8
C6	E.CAP.	36.4	29.9	26.0	22.6
C51	E.CAP.	38.6	35.2	36.8	35.1
C71	E.CAP.	21.0	18.2	20.2	18.8

MODEL : DRJ30-24-1

(1) 測定条件 Measuring Conditions

	Mounting A		Mounting B	
取付方法 Mounting Method (標準取付 : A) (Standard Mounting : A)				
入力電圧 Vin Input Voltage	100VAC	230VAC	100VAC	230VAC
出力電圧 Vo Output Voltage	24VDC			
出力電流 Io Output Current	1.25A(100%)			

(2) 測定結果 Measuring Results

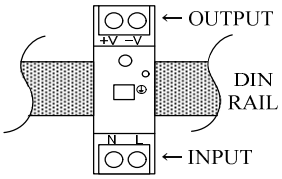
		ΔT Temperature Rise (℃)			
出力ディレーティング Output Derating		Io=100%			
		Ta=55℃		Ta=45℃	
部品番号 Location No.	部品名 Part name	取付方向 : Mounting A		取付方向 : Mounting B	
		Vin : 100VAC	Vin : 230VAC	Vin : 100VAC	Vin : 230VAC
A1	IPD	58.8	54.6	50.9	50.9
D1	BRIDGE DIODE	32.7	17.9	41.4	27.2
D51	DIODE	65.2	63.7	55.3	56.4
D101	DIODE	49.4	42.5	46.3	43.1
D102	DIODE	28.4	22.3	29.4	25.6
PC102	PHOTO COUPLER	40.7	38.1	31.4	31.8
T1	TRANS	52.0	48.3	49.4	49.4
L1	BALUN COIL	37.7	15.6	51.2	28.8
L51	CHOKE COIL	23.3	21.8	21.5	22.1
C5	E.CAP.	20.6	14.3	25.7	20.6
C6	E.CAP.	38.0	34.5	25.8	25.8
C51	E.CAP.	31.8	29.9	27.4	28.4
C71	E.CAP.	17.8	15.5	14.9	15.0

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

MODEL : DRJ30

冷却条件：自然空冷　　**Cooling condition : Convection cooling**

取付方向 A
Mounting A

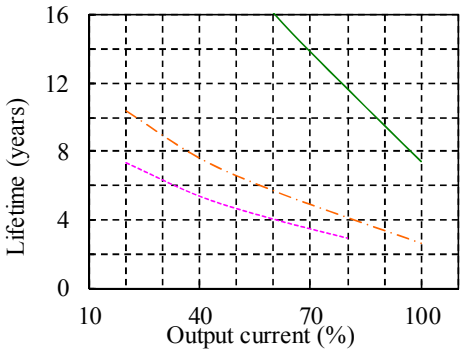


Conditions　Ta　40℃ :
55℃ :
60℃ :

5V

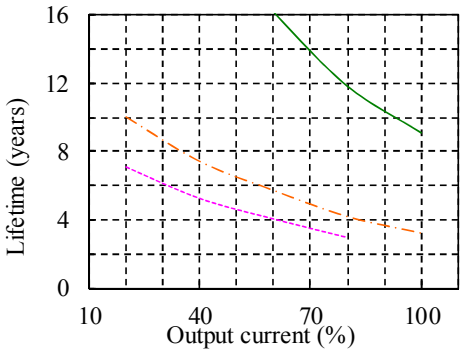
Vin = 100VAC

Load \ Ta	Lifetime (years) 40℃	55℃	60℃
20%	20.0	14.9	10.5
40%	20.0	6.7	4.7
60%	12.0	4.2	3.0
80%	7.5	2.7	1.9
100%	4.5	1.6	-



Vin = 230VAC

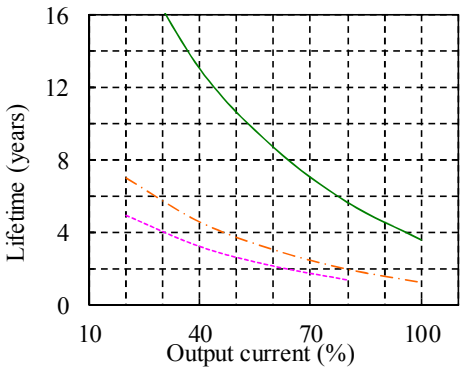
Load \ Ta	Lifetime (years) 40℃	55℃	60℃
20%	20.0	10.4	7.3
40%	20.0	6.9	4.8
60%	12.4	4.4	3.1
80%	8.2	2.9	2.1
100%	5.2	1.8	-



12V

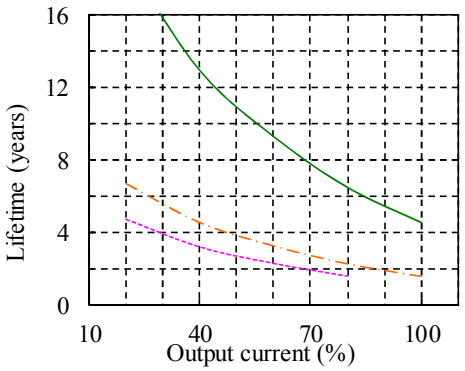
Vin = 100VAC

Load \ Ta	Lifetime (years) 40℃	55℃	60℃
20%	20.0	7.0	5.0
40%	13.1	4.6	3.3
60%	8.7	3.1	2.2
80%	5.7	2.0	1.4
100%	3.6	1.3	-



Vin = 230VAC

Load \ Ta	Lifetime (years) 40℃	55℃	60℃
20%	20.0	6.7	4.8
40%	13.0	4.6	3.2
60%	9.3	3.3	2.3
80%	6.5	2.3	1.6
100%	4.6	1.6	-



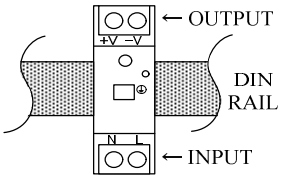
上記推定寿命は、弊社計算方法により算出した値であり、封口ｺﾞﾑの劣化等の影響を含めておりません。
The lifetime is calculated based on our method and doesn't include the seal rubber degradation effect etc.
電解コンデンサの寿命は15年が上限となります。
The upper limit of the Electolytic Capacitors lifetime are 15 years.

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

MODEL : DRJ30

冷却条件：自然空冷　　**Cooling condition : Convection cooling**

取付方向 A
Mounting A

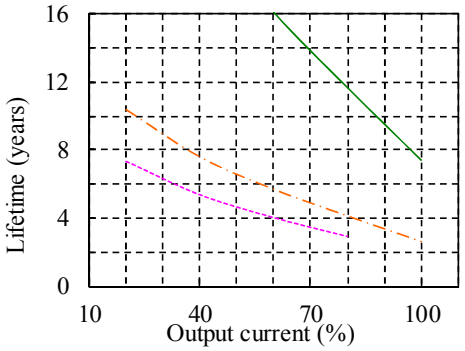


Conditions　Ta　40℃ :
55℃ :
60℃ :

24V

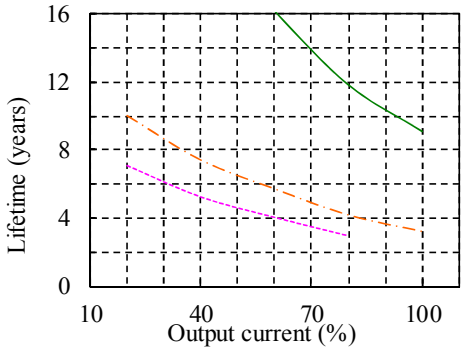
Vin = 100VAC

Load \ Ta	Lifetime (years) 40℃	55℃	60℃
20%	20.0	10.4	7.3
40%	20.0	7.6	5.4
60%	20.0	5.7	4.0
80%	11.7	4.1	2.9
100%	7.4	2.6	-



Vin = 230VAC

Load \ Ta	Lifetime (years) 40℃	55℃	60℃
20%	20.0	10.0	7.1
40%	20.0	7.4	5.2
60%	20.0	5.7	4.0
80%	11.8	4.2	3.0
100%	9.1	3.2	-



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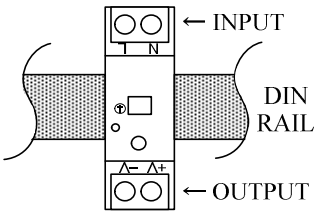
電解コンデンサの寿命は15年が上限となります。
The upper limit of the Electolytic Capacitors lifetime are 15 years.

MODEL : DRJ30

冷却条件：自然空冷　　**Cooling condition : Convection cooling**

取付方向 B
Mounting B

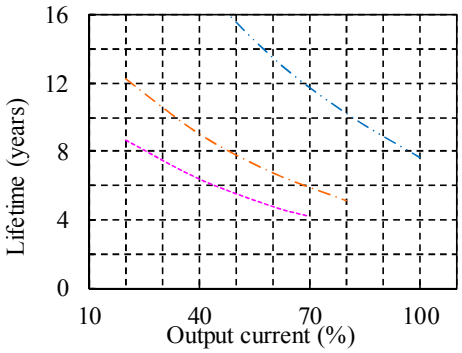


Conditions　Ta　45℃ :
55℃ :
60℃ :

5V

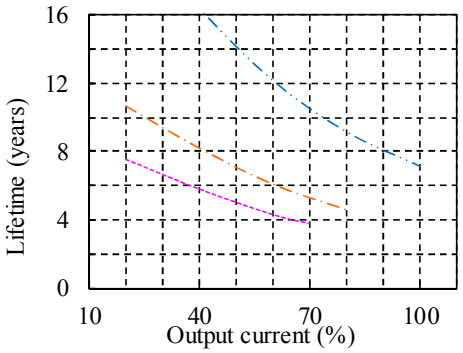
Vin = 100VAC

Load \ Ta	Lifetime (years) 45℃	55℃	60℃
20%	20.0	20.0	10.8
40%	14.2	7.1	5.0
60%	9.3	4.6	3.3
80%	6.0	3.0	-
100%	3.9	-	-



Vin = 230VAC

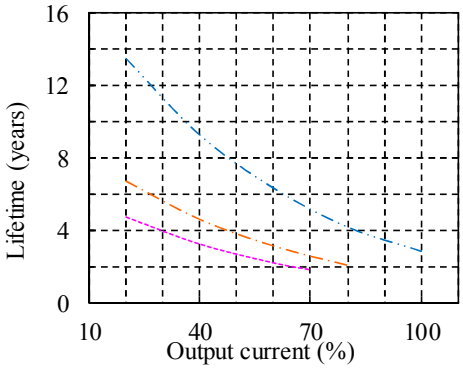
Load \ Ta	Lifetime (years) 45℃	55℃	60℃
20%	20.0	11.1	7.8
40%	14.6	7.3	5.2
60%	9.5	4.7	3.4
80%	6.3	3.2	-
100%	4.2	-	-



12V

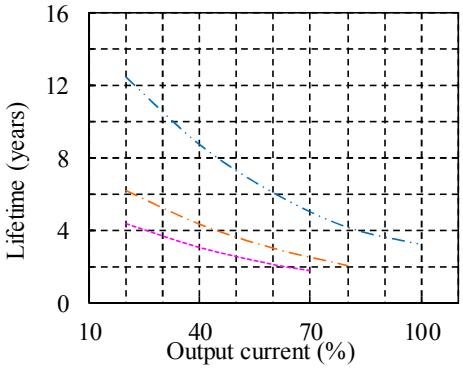
Vin = 100VAC

Load \ Ta	Lifetime (years) 45℃	55℃	60℃
20%	13.5	6.8	4.8
40%	9.3	4.6	3.3
60%	6.4	3.2	2.3
80%	4.2	2.1	-
100%	2.9	-	-



Vin = 230VAC

Load \ Ta	Lifetime (years) 45℃	55℃	60℃
20%	12.5	6.2	4.4
40%	8.8	4.4	3.1
60%	6.1	3.1	2.2
80%	4.2	2.1	-
100%	3.3	-	-



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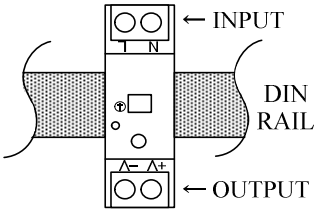
The upper limit of the Electolytic Capacitors lifetime are 15 years.

MODEL : DRJ30

冷却条件：自然空冷　　**Cooling condition : Convection cooling**

取付方向 B
Mounting B

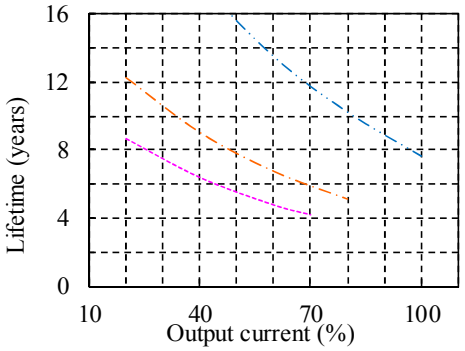


Conditions　Ta　45℃ :
55℃ :
60℃ :

24V

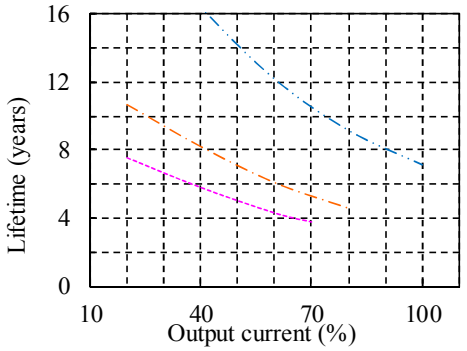
Vin = 100VAC

Load \ Ta	Lifetime (years) 45℃	55℃	60℃
20%	20.0	12.3	8.7
40%	20.0	9.0	6.4
60%	13.5	6.8	4.8
80%	10.2	5.1	-
100%	7.7	-	-



Vin = 230VAC

Load \ Ta	Lifetime (years) 45℃	55℃	60℃
20%	20.0	10.7	7.5
40%	20.0	8.2	5.8
60%	12.2	6.1	4.3
80%	9.2	4.6	-
100%	7.1	-	-



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The upper limit of the Electolytic Capacitors lifetime are 15 years.

５．アブノーマル試験　Abnormal Test

MODEL：DRJ30-24-1

(1) 試験条件　Test Conditions

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

(2) 試験結果　Test Results

(Da : Damaged)

No.	Test position		Test mode		Test result													
					a	b	c	d	e	f	g	h	i	j	k	l		
	部品No. Location No.	試験端子 Test point	ショート Short	オープン Open	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	記事 Note	
1	A1	1-2	○											○				
2		1-3	○												○			
3		1-4, 1-5	○							○	○			○			Da : F1,D1,A1,Z101	
4		1-6	○												○			
5		1-7	○							○				○			Da : A1	
6		1-8	○											○				
7		2-3	○											○				
8		2-4, 2-5	○							○	○			○			Da : F1,D1,A1,Z102	
9		2-6	○												○			
10		2-7	○											○				
11		2-8	○											○				
12		3-4,3-5	○							○	○			○			Da : F1,D1,A1,Z103	
13		3-6	○												○			
14		3-7	○											○				
15		3-8	○												○			
16		4-5	○												○			
17		4-6, 5-6	○												○			
18		4-7, 5-7	○							○	○			○			Da : F1,D1,A1,Z104	
19		4-8, 5-8	○							○	○			○			Da : F1,D1	
20		6-7	○												○			
21		6-8	○												○			
22		7-8	○											○				
23		1		○											○			
24		2		○								○		○				
25		3		○						○				○			Da : A1	
26		4		○											○			
27		5		○											○			
28		6		○											○			
29		7		○										○				
30		8		○										○				

(Da : Damaged)

No.	Test position		Test mode		Test result												
					a	b	c	d	e	f	g	h	i	j	k	l	
	部品No. Location No.	試験端子 Test point	ショート Short	オープン Open	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	記事 Note
31	D1	AC-AC	○							○	○			○			Da : F1
32		DC-DC	○							○	○			○			Da : F1,D1
33		AC-DC	○							○	○			○			Da : F1,D1
34		AC		○										○			
35		DC		○										○			
36	D51	A-K	○											○			
37		A		○											○		
38		K		○										○			
39	D101	A-K	○											○			
40		A/K		○											○		
41	D102	A-K	○											○			
42		A/K		○										○			
43	T1	1-5	○											○			
44		2-4	○											○			
45		1-2								○	○			○			Da : F1,D1,A1
46		2-3	○							○	○			○			Da : F1,D1,A1
47		3-4	○							○	○			○			Da : F1,D1,A1
48		4-5								○	○			○			Da : F1,D1
49		7-8	○											○			
50		1		○										○			
51		2		○						○				○			Da : A1,Z103,R107,R108
52		3		○											○		
53		4		○						○				○			Da : A1,Z103,R107,R108
54		5		○										○			
55		6		○											○		
56		7		○											○		
57		8		○											○		
58		9		○											○		
59	L51		○													○	出力リプル増加 Output ripple increase
60				○										○			
61	C5		○							○	○			○			Da: F1,D1
62				○												○	入力電力増加 Input power increase
63	C51		○											○			
64				○												○	出力リプル増加 Output ripple increase
65	C71		○											○			
66				○												○	出力リプル増加 Output ripple increase

６．振動試験　Vibration Test

MODEL：DRJ30-24-1

(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

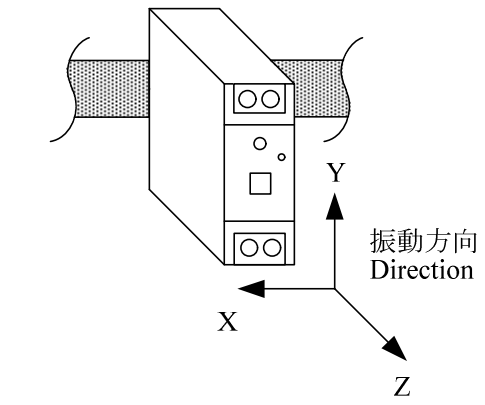
IMV (株) 製 IMV CORP	・制御部　: RC-1120 Controller	・加振部　: VS-1031-200 Vibrator

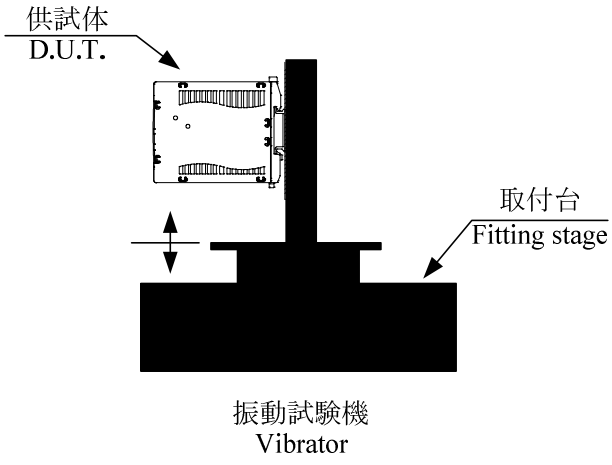
(3) 試験条件　Test Conditions

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

(4) 試験方法　Test Method

DINレール取付状態
State of mounting on DIN RAIL





(5) 判定条件　Acceptable Conditions

1. 破壊しない事
   Not to be broken.
2. 試験後の出力に異常がない事
   No abnormal output after test.

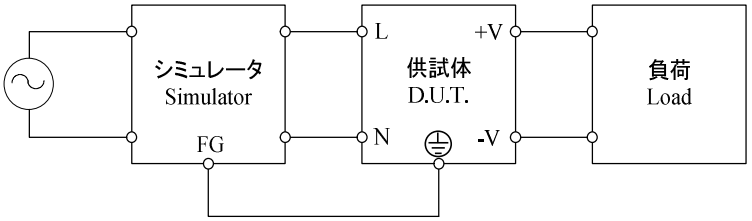
(6) 試験結果　Test Results

合格　OK

7. ノイズシミュレート試験　Noise Simulate Test

MODEL：DRJ30-24-1

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



シミュレータ：INS-4320(A)　（ノイズ研究所）
Simulator　(Noiseken)

(2) 試験条件　Test Conditions

・入力電圧 Input voltage	: 100, 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℃	・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　Acceptable Conditions

1. 試験中、5%を超える出力電圧の変動のない事
   The regulation of output voltage must not exceed 5% of initial value during test.
2. 試験後の出力電圧は初期値から変動していない事
   The output voltage must be within the regulation of specification after the test.
3. 発煙・発火のない事
   Smoke and fire are not allowed.

(4) 試験結果　Test Results

合格　OK

８．熱衝撃試験　Thermal Shock Test

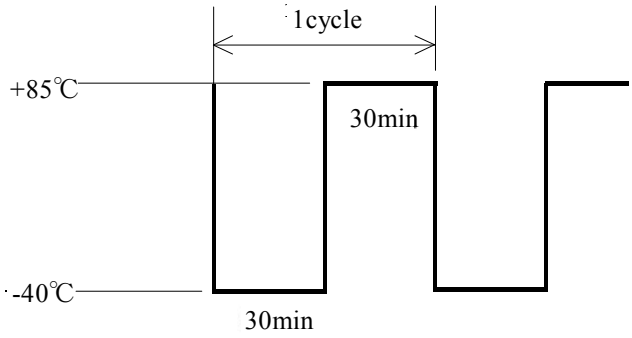
MODEL：DRJ30-24-1

(1) 使用計測器　Equipment Used

TSV-40ht　　: ESPEC

(2) 試験条件　Test Conditions

・電源周囲温度　　:-40℃ ⇔ 85℃
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　Acceptable Conditions

試験後の出力に異常がない事
No abnormal output after test.

(5) 試験結果　Test Results

合格　OK