

# ZWS240RC

## RELIABILITY DATA

### 信頼性データ

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\* 試験結果は、代表データではありますが、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.

## 1. MTBF計算値 Calculated Values of MTBF

MODEL : ZWS240RC-24

### (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 $\lambda_G$ 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 prediction of JEITA (RCR-9102B).

Individual failure rates  $\lambda_G$  is given to each part and MTBF is calculated by the count of each part.

<算出式>

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

$\lambda_{equip}$  : 全機器故障率 (故障数 /  $10^6$ 時間)  
Total Equipment Failure Rate (Failure /  $10^6$ Hours)

$\lambda_G$  : 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 /  $10^6$ Hours)

$n_i$  : 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の数  
Number of Different Generic Part Categories

$\pi_Q$  : 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

$$MTBF \approx \underline{\underline{216,512}} \quad \text{時間 (Hours)}$$

## 2. 部品デレーティング Components Derating

MODEL : ZWS240RC-24

### (1) 算出方法 Calculating Method

#### (a) 測定方法 Measuring method

・取付方法 Mounting method	: 標準取付 : A Standard mounting : A	・周囲温度 Ambient temperature	: 50°C
・入力電圧 Input voltage	: 100, 200VAC	・出力電圧、電流 Output voltage & current	: 24V, 10A(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

$$\theta_{j-c} = \frac{T_j(\max) - T_c}{P_j(\max)}$$

$T_c$  : 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

$P_j(\max)$  : 最大接合点(チャンネル)損失  
( $P_{ch}(\max)$ ) Maximum Junction (channel) Dissipation

$T_j(\max)$  : 最大接合点(チャンネル)温度  
( $T_{ch}(\max)$ ) Maximum Junction (channel) Temperature

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

## (2) 部品ダイレーティング表 Component Derating List

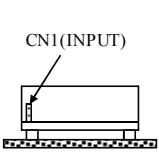
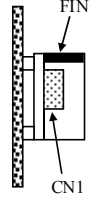
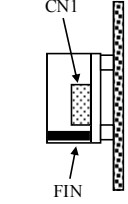
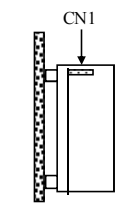
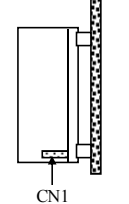
部品番号 Location No.	$V_{in} = 100VAC$	Load = 100%	$T_a = 50^{\circ}C$
Q1 FMW20N60S1HF FUJI ELECTRIC	$T_{ch} (max) = 150^{\circ}C$ Pch = 5.7 W $T_{ch} = T_c + ((\theta_{ch-c}) \times Pch) = 107^{\circ}C$ D.F. = 71.5 %	$\theta_{ch-c} = 0.96^{\circ}C/W$ $\Delta T_c = 52^{\circ}C$	$T_c = 102^{\circ}C$
Q2 FMV12N50ES FUJI ELECTRIC	$T_{ch} (max) = 150^{\circ}C$ Pch = 2.9 W $T_{ch} = T_c + ((\theta_{ch-c}) \times Pch) = 116^{\circ}C$ D.F. = 77.5 %	$\theta_{ch-c} = 1.92^{\circ}C/W$ $\Delta T_c = 61^{\circ}C$	$T_c = 111^{\circ}C$
Q3 FMV12N50ES FUJI ELECTRIC	$T_{ch} (max) = 150^{\circ}C$ Pch = 3.0 W $T_{ch} = T_c + ((\theta_{ch-c}) \times Pch) = 114^{\circ}C$ D.F. = 76.1 %	$\theta_{ch-c} = 1.92^{\circ}C/W$ $\Delta T_c = 58^{\circ}C$	$T_c = 108^{\circ}C$
D51 YG865C15R FUJI ELECTRIC	$T_{ch} (max) = 150^{\circ}C$ Pd = 2.9 W $T_j = T_c + ((\theta_{j-c}) \times Pd) = 118^{\circ}C$ D.F. = 78.9 %	$\theta_{j-c} = 1.75^{\circ}C/W$ $\Delta T_c = 63^{\circ}C$	$T_c = 113^{\circ}C$
D52 YG865C15R FUJI ELECTRIC	$T_j (max) = 150^{\circ}C$ Pd = 3.0 W $T_j = T_c + ((\theta_{j-c}) \times Pd) = 119^{\circ}C$ D.F. = 79.2 %	$\theta_{j-c} = 1.75^{\circ}C/W$ $\Delta T_c = 64^{\circ}C$	$T_c = 114^{\circ}C$
D1 D15XB60H LITE ON	$T_j (max) = 150^{\circ}C$ Pd = 5.9 W $T_j = T_c + ((\theta_{j-c}) \times Pd) = 114^{\circ}C$ D.F. = 75.7 %	$\theta_{j-c} = 1.5^{\circ}C/W$ $\Delta T_c = 55^{\circ}C$	$T_c = 105^{\circ}C$
D2 SF10L60U-7600 SHINDENGEN	$T_j (max) = 150^{\circ}C$ Pd = 1.0 W $T_j = T_c + ((\theta_{j-c}) \times Pd) = 103^{\circ}C$ D.F. = 68.4 %	$\theta_{j-c} = 2.0^{\circ}C/W$ $\Delta T_c = 51^{\circ}C$	$T_c = 101^{\circ}C$
PC101 TLP385 (LED) TOSHIBA	$T_j (max) = 110^{\circ}C$ Pd = 1.5 mW $T_j = T_c + ((\theta_{j-c}) \times Pd) = 79^{\circ}C$ D.F. = 71.9 %	$\theta_{j-c} = 130^{\circ}C/W$ $\Delta T_c = 29^{\circ}C$	$T_c = 79^{\circ}C$

部品番号 Location No.	$V_{in} = 200VAC$	Load = 100%	$T_a = 50^{\circ}C$
Q1 FMW20N60S1HF FUJI ELECTRIC	$T_{ch} (max) = 150^{\circ}C$ $P_{ch} = 2.9 W$ $T_{ch} = T_c + ((\theta_{ch-c}) \times P_{ch}) = 80^{\circ}C$ D.F. = 53.2 %	$\theta_{ch-c} = 0.96^{\circ}C/W$ $\Delta T_c = 27^{\circ}C$	$T_c = 77^{\circ}C$
Q2 FUJI ELECTRIC	$T_{ch} (max) = 150^{\circ}C$ $P_{ch} = 2.9 W$ $T_{ch} = T_c + ((\theta_{ch-c}) \times P_{ch}) = 112^{\circ}C$ D.F. = 74.9 %	$\theta_{ch-c} = 1.92^{\circ}C/W$ $\Delta T_c = 57^{\circ}C$	$T_c = 107^{\circ}C$
Q3 FUJI ELECTRIC	$T_{ch} (max) = 150^{\circ}C$ $P_{ch} = 3.0 W$ $T_{ch} = T_c + ((\theta_{ch-c}) \times P_{ch}) = 110^{\circ}C$ D.F. = 73.3 %	$\theta_{ch-c} = 1.92^{\circ}C/W$ $\Delta T_c = 54^{\circ}C$	$T_c = 104^{\circ}C$
D51 YG865C15R FUJI ELECTRIC	$T_{ch} (max) = 150^{\circ}C$ $P_d = 2.9 W$ $T_j = T_c + ((\theta_{j-c}) \times P_d) = 114^{\circ}C$ D.F. = 75.9 %	$\theta_{ch-c} = 1.75^{\circ}C/W$ $\Delta T_c = 59^{\circ}C$	$T_c = 109^{\circ}C$
D52 YG865C15R FUJI ELECTRIC	$T_j (max) = 150^{\circ}C$ $P_d = 3.0 W$ $T_j = T_c + ((\theta_{j-c}) \times P_d) = 115^{\circ}C$ D.F. = 76.5 %	$\theta_{j-c} = 1.75^{\circ}C/W$ $\Delta T_c = 59^{\circ}C$	$T_c = 109^{\circ}C$
D1 D15XB60H LITE ON	$T_j (max) = 150^{\circ}C$ $P_d = 3.0 W$ $T_j = T_c + ((\theta_{j-c}) \times P_d) = 92^{\circ}C$ D.F. = 61.0 %	$\theta_{j-c} = 1.5^{\circ}C/W$ $\Delta T_c = 37^{\circ}C$	$T_c = 87^{\circ}C$
D2 SF10L60U-7600 SHINDENGEN	$T_j (max) = 150^{\circ}C$ $P_d = 1.2 W$ $T_j = T_c + ((\theta_{j-c}) \times P_d) = 81^{\circ}C$ D.F. = 54.3 %	$\theta_{j-c} = 2.0^{\circ}C/W$ $\Delta T_c = 29^{\circ}C$	$T_c = 79^{\circ}C$
PC101 TLP385 (LED) TOSHIBA	$T_j (max) = 110^{\circ}C$ $P_d = 1.5 mW$ $T_j = T_c + ((\theta_{j-c}) \times P_d) = 77^{\circ}C$ D.F. = 69.7 %	$\theta_{j-c} = 130^{\circ}C/W$ $\Delta T_c = 27^{\circ}C$	$T_c = 77^{\circ}C$

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

MODEL : ZWS240RC-24

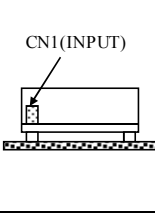
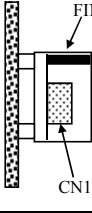
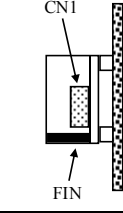
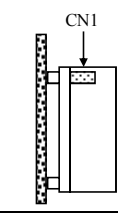
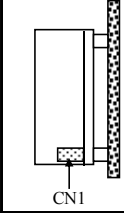
## (1) 測定条件 Measuring Conditions

取付方法 Mounting Method  (標準取付 : A) (Standard Mounting : A)	Mounting A	Mounting B	Mounting C	Mounting D	Mounting E
					
入力電圧 $V_{in}$ Input Voltage	100VAC				
出力電圧 $V_o$ Output Voltage	24VDC				
出力電流 $I_o$ Output Current	10A(100%)				

## (2) 測定結果 Measuring Results

出力デレーティング Output Derating		$\Delta T$ Temperature Rise ( $^{\circ}C$ )				
		$I_o=100\%$				
		$T_a=50^{\circ}C$	$T_a=40^{\circ}C$	$T_a=40^{\circ}C$	$T_a=20^{\circ}C$	$T_a=40^{\circ}C$
部品番号 Location No.	部品名 Part name	取付方向	取付方向	取付方向	取付方向	取付方向
		Mounting A	Mounting B	Mounting C	Mounting D	Mounting E
Q1	MOS FET	52	55	56	64	53
Q2	MOS FET	61	60	67	63	70
Q3	MOS FET	58	56	63	57	68
D51	DIODE	63	68	59	63	69
D52	DIODE	64	68	58	63	70
D1	BRIDGE DIODE	55	61	55	63	56
D2	DIODE	51	54	57	64	52
A101	CHIP IC	45	42	34	48	42
A102	CHIP IC	50	38	43	47	52
A201	CHIP IC	16	12	29	14	33
T1	DRIVE TRANS	45	38	36	50	52
T2	TRANS	69	63	69	65	76
L1	BALUN	39	42	45	60	34
L2	BALUN	40	44	46	59	36
L3	PFC CHOKE COIL	48	52	44	52	47
L51	CHOKE COIL	41	38	43	32	54
C6	E.CAP.	18	13	33	16	23
C7	E.CAP.	14	11	28	10	23
C51	E.CAP.	9	6	20	5	33
C52	E.CAP.	15	12	27	12	36
PC101	PHOTO COUPLER	29	20	37	20	40

(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	Mounting C	Mounting D	Mounting E
					
入力電圧 $V_{in}$ Input Voltage	200VAC				
出力電圧 $V_o$ Output Voltage	24VDC				
出力電流 $I_o$ Output Current	10A(100%)				

(2) 測定結果 Measuring Results

出力デレーティング Output Derating		$\Delta T$ Temperature Rise ( $^{\circ}C$ )				
		$I_o=100\%$				
		$T_a=50^{\circ}C$	$T_a=40^{\circ}C$	$T_a=40^{\circ}C$	$T_a=50^{\circ}C$	$T_a=50^{\circ}C$
部品番号 Location No.	部品名 Part name	取付方向	取付方向	取付方向	取付方向	取付方向
		Mounting A	Mounting B	Mounting C	Mounting D	Mounting E
Q1	MOS FET	27	32	31	42	27
Q2	MOS FET	57	57	64	62	62
Q3	MOS FET	54	53	60	57	60
D51	DIODE	59	62	55	59	61
D52	DIODE	59	62	55	59	63
D1	BRIDGE DIODE	37	41	37	46	37
D2	DIODE	29	34	35	44	30
A101	CHIP IC	35	34	26	42	29
A102	CHIP IC	44	37	40	45	42
A201	CHIP IC	13	13	29	15	27
T1	DRIVE TRANS	34	33	29	45	34
T2	TRANS	67	61	68	65	70
L1	BALUN	15	19	21	34	13
L2	BALUN	20	21	24	36	16
L3	PFC CHOKE COIL	34	39	32	42	32
L51	CHOKE COIL	40	36	42	32	52
C6	E.CAP.	16	13	32	15	19
C7	E.CAP.	13	10	27	10	19
C51	E.CAP.	9	7	20	6	28
C52	E.CAP.	15	12	26	13	31
PC101	PHOTO COUPLER	27	18	36	21	35

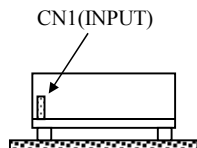


4. 電解コンデンサ推定寿命計算値 Electrolytic Capacitor Lifetime

MODEL : ZWS240RC-24

空冷条件 : 自然空冷 Cooling condition : Convection cooling

取付方向 A  
Mounting A



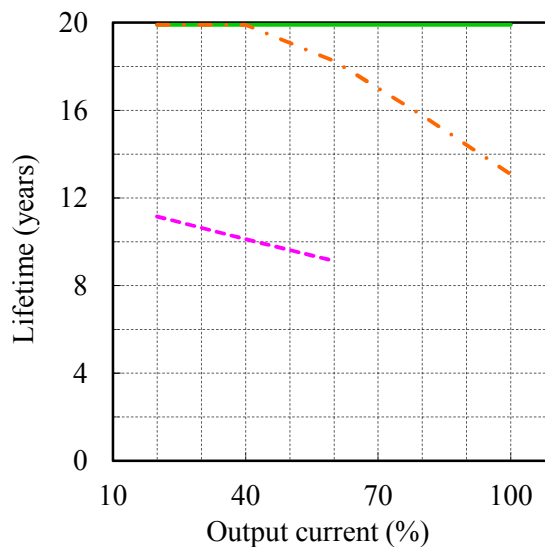
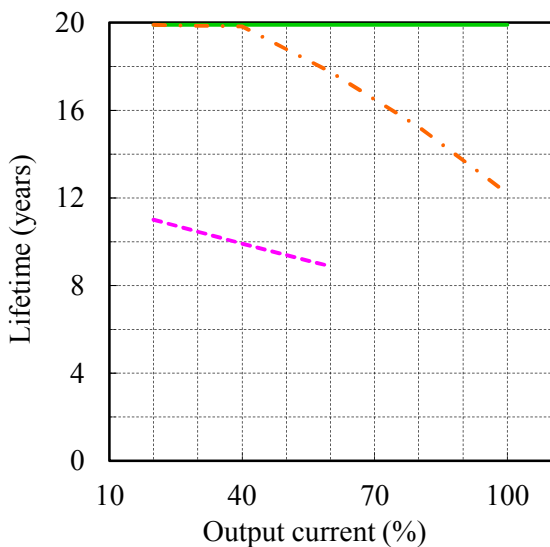
Conditions Ta 40°C ———  
50°C - - - - -  
60°C ·····

Vin = 100VAC

Load	Ta	Lifetime (years)		
		40°C	50°C	60°C
20%		20.0	20.0	11.0
40%		20.0	19.8	9.9
60%		20.0	17.7	8.9
80%		20.0	15.2	-
100%		20.0	12.2	-

Vin = 200VAC

Load	Ta	Lifetime (years)		
		40°C	50°C	60°C
20%		20.0	20.0	11.2
40%		20.0	20.0	10.1
60%		20.0	18.2	9.1
80%		20.0	15.8	-
100%		20.0	13.1	-

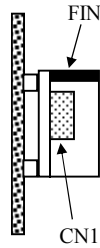


上記推定寿命は、弊社計算方法により算出した値であり、封口ゴムの劣化等の影響を含めておりません。  
The lifetime is calculated based on our method and doesn't include the seal rubber degradation effect etc.

**MODEL : ZWS240RC-24**

空冷条件：自然空冷 **Cooling condition: Convection cooling**

取付方向 B  
Mounting B



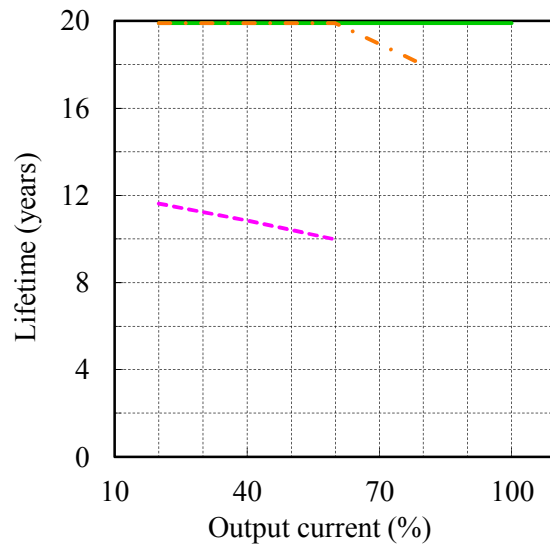
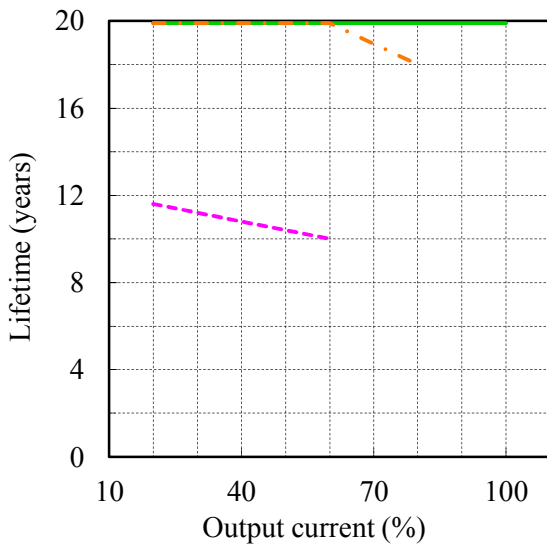
Conditions Ta 40°C ———  
50°C - - - -  
60°C ·····

Vin = 100VAC

Load	Ta	Lifetime (years)		
		40°C	50°C	60°C
20%		20.0	20.0	11.6
40%		20.0	20.0	10.8
60%		20.0	20.0	10.0
80%		20.0	18.0	-
100%		20.0	-	-

Vin = 200VAC

Load	Ta	Lifetime (years)		
		40°C	50°C	60°C
20%		20.0	20.0	11.6
40%		20.0	20.0	10.8
60%		20.0	20.0	10.0
80%		20.0	18.0	-
100%		20.0	-	-

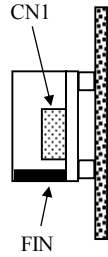


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MODEL : ZWS240RC-24

空冷条件：自然空冷 Cooling condition: Convection cooling

取付方向 C  
Mounting C



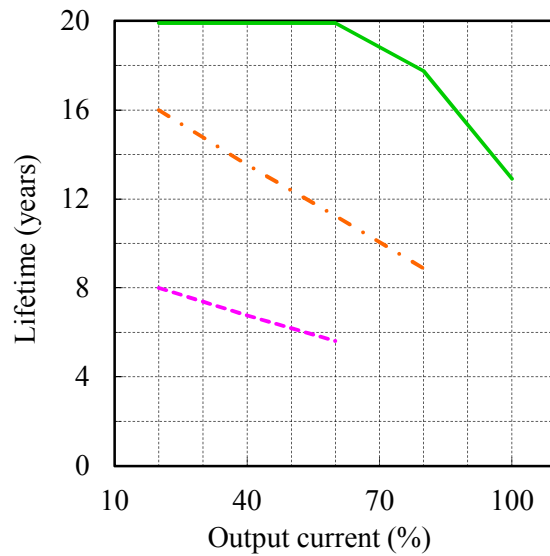
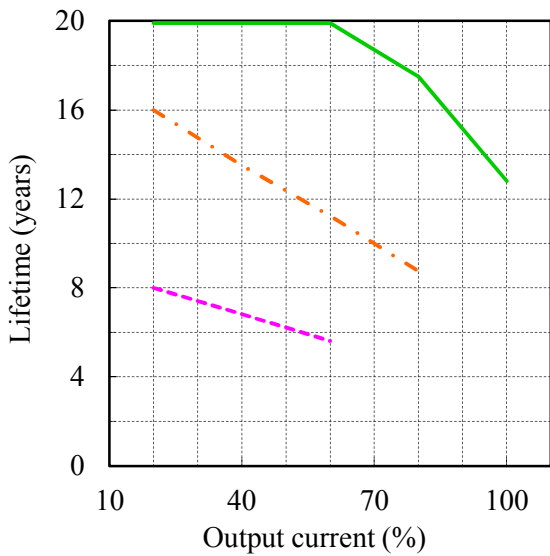
Conditions Ta 40°C ———  
50°C - - - -  
60°C ·····

Vin = 100VAC

Load	Ta	Lifetime (years)		
		40°C	50°C	60°C
20%		20.0	16.0	8.0
40%		20.0	13.5	6.8
60%		20.0	11.2	5.6
80%		17.5	8.7	-
100%		12.8	-	-

Vin = 200VAC

Load	Ta	Lifetime (years)		
		40°C	50°C	60°C
20%		20.0	16.0	8.0
40%		20.0	13.5	6.8
60%		20.0	11.2	5.6
80%		17.7	8.9	-
100%		12.9	-	-

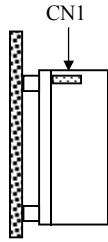


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The lifetime is calculated based on our method and doesn't include the seal rubber degradation effect etc.

MODEL : ZWS240RC-24

空冷条件：自然空冷 Cooling condition: Convection cooling

取付方向 D  
Mounting D



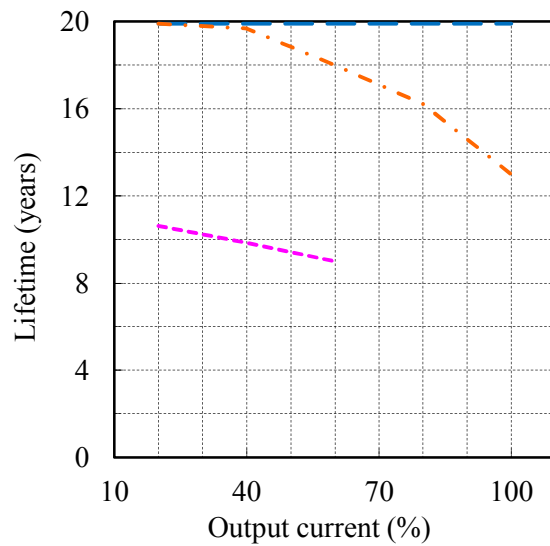
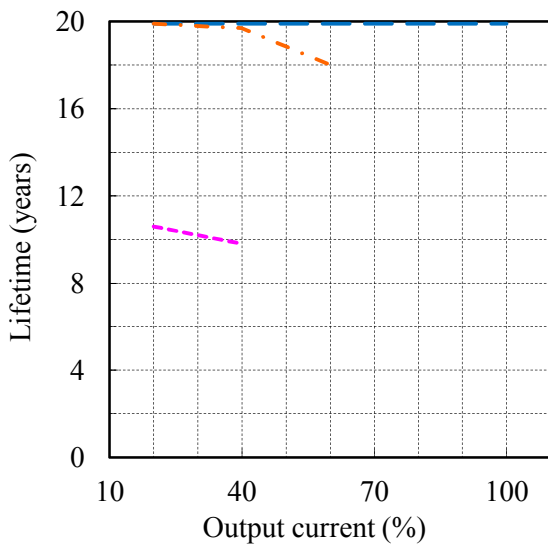
Conditions Ta 20°C - - - -  
50°C - · - · -  
60°C - · · · ·

Vin = 100VAC

Load	Ta	Lifetime (years)		
		20°C	50°C	60°C
20%		20.0	20.0	10.6
40%		20.0	19.7	9.8
60%		20.0	18.0	-
80%		20.0	-	-
100%		20.0	-	-

Vin = 200VAC

Load	Ta	Lifetime (years)		
		20°C	50°C	60°C
20%		20.0	20.0	10.6
40%		20.0	19.7	9.8
60%		20.0	18.0	9.0
80%		20.0	16.2	-
100%		20.0	13.0	-

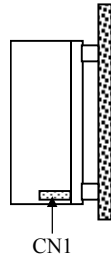


上記推定寿命は、弊社計算方法により算出した値であり、封口ゴムの劣化等の影響を含めておりません。  
The lifetime is calculated based on our method and doesn't include the seal rubber degradation effect etc.

MODEL : ZWS240RC-24

空冷条件：自然空冷 Cooling condition: Convection cooling

取付方向 E  
Mounting E



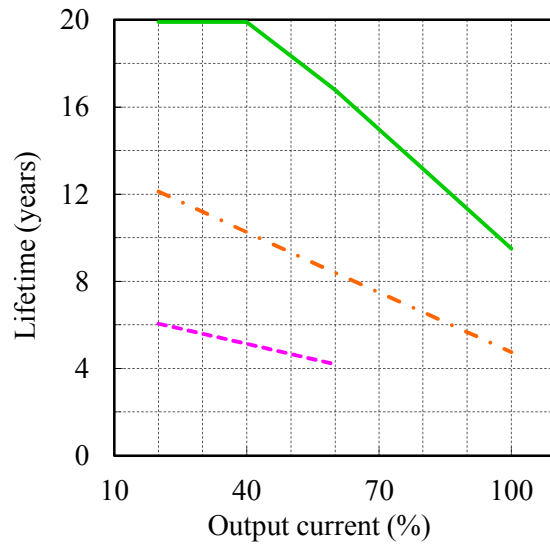
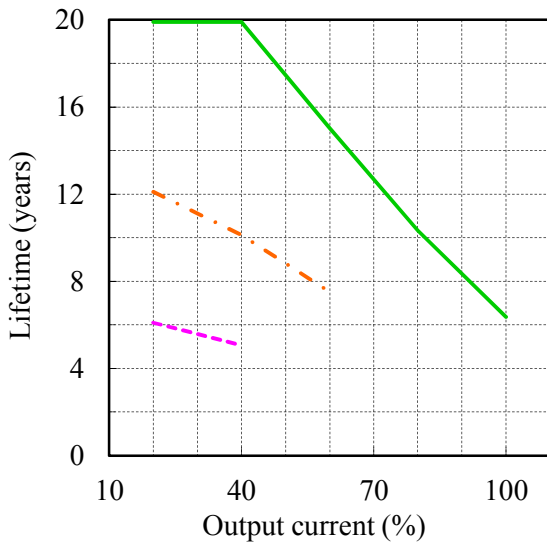
Conditions Ta 40°C ———  
50°C - - - -  
60°C ·····

V<sub>in</sub> = 100VAC

Load	Ta	Lifetime (years)		
		40°C	50°C	60°C
20%		20.0	12.1	6.1
40%		20.0	10.1	5.1
60%		15.0	7.5	-
80%		10.3	-	-
100%		6.4	-	-

V<sub>in</sub> = 200VAC

Load	Ta	Lifetime (years)		
		40°C	50°C	60°C
20%		20.0	12.1	6.1
40%		20.0	10.3	5.1
60%		16.8	8.4	4.2
80%		13.2	6.6	-
100%		9.5	4.8	-



上記推定寿命は、弊社計算方法により算出した値であり、封口ゴ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.

5. アブノーマル試験 Abnormal Test

MODEL : ZWS240RC-24

(1) 試験条件 Test Conditions

Input : 265VAC Output : 24V, 10A 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 発火 Fire	b 発煙 Smoke	c 破裂 Burst	d 異臭 Smell	e 赤熱 Red hot	f 破損 Damaged	g ヒューズ断 Fuse blown	h OVP	i OCP	j 出力断 No output	k 変化なし No change		l その他 Others
1	Q1	D-S	○							○	○			○		FUSE : F1 Da : Q1	
2		D-G	○								○			○		FUSE : F1	
3		G-S	○													○	力率低下 Power Factor Decrease
4		D		○												○	力率低下 Power Factor Decrease
5		S		○												○	力率低下 Power Factor Decrease
6		G		○							○	○			○		FUSE : F1 Da : Q1
7	Q2	D-S	○							○	○			○		FUSE : F1 Da : Q2,Q3,D108,Q108	
8		D-G	○											○			
9		G-S	○											○			
10		D		○										○			
11		S		○										○			
12		G		○										○			
13	Q3	D-S	○											○			
14		D-G	○											○			
15		G-S	○											○			
16		D		○										○			
17		S		○										○			
18		G		○										○			
19	D51	A-K	○											○			
20		A		○										○			
21		K		○										○			
22	D52	A-K	○											○			
23		A		○										○			
24		K		○										○			
25	D53	A-K	○											○			
26		A		○										○			
27		K		○										○			

( 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
28	D1	AC-AC	○								○			○			FUSE : F1
29		DC-DC	○								○			○			FUSE : F1
30		AC-DC	○								○			○			FUSE : F1
31		AC		○										○			
32		DC			○									○			
33	D2	A-K	○							○	○			○			FUSE : F1 Da : Q1
34		A		○						○	○			○			FUSE : F1 Da : Q1
35	D106	A-K	○										○	○			
36		A		○												○	入力電力増加 Input Power Increase
37	D108	A-K	○										○	○			
38		A		○												○	入力電力増加 Input Power Increase
39	C6		○								○			○			FUSE : F1
40				○							○	○		○			FUSE : F1 Da : Q1
41	C52		○										○	○			
42					○											○	出力リップル増加 Output Ripple Increase
43	T1	1-2	○											○			
44		3-4	○											○			
45		7-8	○											○			
46		1/2		○										○			
47		3/4		○										○			
48	T2	7/8		○										○			
49		1-2	○											○			
50		4-6	○											○			
51		7,8,9-10,11,12	○											○			
52		1/2		○										○			
53		4/6		○										○			
54		7,8,9/10,11,12		○										○			

## 6. 振動試験 Vibration Test

MODEL : ZWS240RC-24

### (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

EMIC (株) 製  
EMIC CORP.

・制御部 : F-400-BM-E47  
Controller

・加振部 : 905-FN  
Vibrator

### (3) 試験条件 Test Conditions

・ 周波数範囲 : 10~55Hz

Sweep frequency

・ 掃引時間 : 1.0分間

Sweep time 1.0min

・ 加速度 : 一定 19.6m/s<sup>2</sup> (2G)

Acceleration Constant

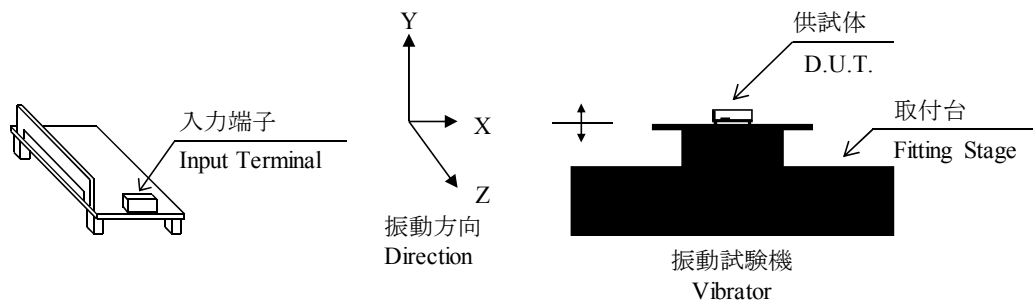
・ 振動方向 : X, Y, Z

Direction

・ 試験時間 : 各方向共 1時間

Sweep count 1 hour each

### (4) 試験方法 Test Method



### (5) 判定条件 Acceptable Conditions

1. 破損しない事

Not to be broken.

2. 試験後の出力に異常がない事

No abnormal output voltage after test.

### (6) 試験結果 Test Results

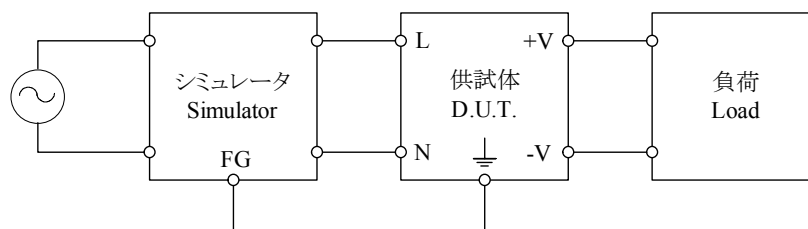
合格 OK



## 7. ノイズシミュレート試験 Noise Simulate Test

MODEL : ZWS240RC-24

## (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 (Noise Laboratory Co.,LTD)

## (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°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 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

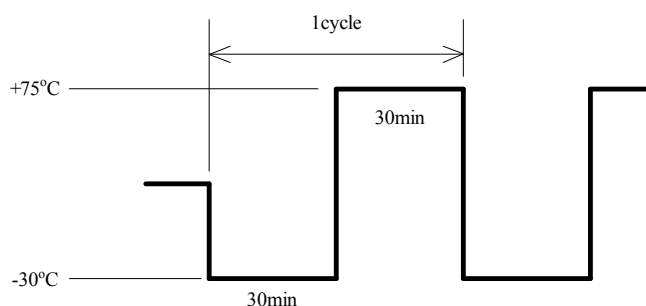
MODEL : ZWS240RC-24

### (1) 使用冷熱衝撃装置 Equipment Used (Thermal Shock Chamber)

ESPEC(株) 製 TSA-71H-W  
ESPEC CORP.

### (2) 試験条件 Test Conditions

- ・ 電源周囲温度 : -30°C ⇔ 75°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 Acceptable Conditions

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

### (5) 試験結果 Test Results

合格 OK