CUS90E

RELIABILITY DATA

信頼性データ

CA824-57-01

INDEX

※ 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：CUS90E-12

(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＞

$$MTBF = \frac{1}{\lambda_{equip}} = \frac{1}{\sum_{i=1}^{n} n_i \left(\lambda_G \pi_Q\right)_i} \times 10^6$$ 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 ≒ 162,844 時間 (Hours)

2. 部品ディレーティング　Components Derating

MODEL：CUS90E-12

(1) 算出方法　Calculating Method

(a) 測定方法　Measuring method

・取付方法　:標準取付 : B Mounting method　Standard mounting : B	・周囲温度　:65℃ Ambient temperature
・入力電圧　:100, 230VAC Input voltage	・出力電圧、電流　：12V, 7.5A(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

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

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

Ta　:ディレーティングの始まる周囲温度　一般に25℃
Ambient 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

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

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

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

MODEL：CUS90E-12

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

部品番号 Location No.	Vin = 100VAC	Load = 100%	Ta = 65℃
D1 D25XB60-7000 SHINDENGEN	Tj (max) = 150 ℃ Pd= 2.825 W Tj= Tc+ ((θj-c) × Pd)= 110.6℃ D.F. = 73.8 %	θj-c = 1 ℃/W ΔTc= 42.8 ℃	 Tc= 107.8 ℃
D2 YG981S6R FUJI ELECTRIC	Tj (max) = 150 ℃ Pd = 1.357 W Tj = Tc + ((θj-c) × Pd) = 111.9 ℃ D.F. =74.6 %	θj-c = 4.5 ℃/W ΔTc =40.8 ℃	 Tc= 105.8℃
Q1 FMV20N60S1 FUJI ELECTRIC	Tch (max) = 150 ℃ Pch= 2.349 W Tj= Tc+ ((θch-c) × Pch)= 110.8 ℃ D.F. = 73.9%	θch-c = 2.4 ℃/W ΔTc= 40.2 ℃	Pch (max) = 53 W Tc= 105.2℃
Q2 FMV09N90E FUJI ELECTRIC	Tch (max) = 150 ℃ Pch= 2.936W Tj = Tc + ((θj-c) × Pd) = 116.5 ℃ D.F. =77.7 %	θch-c = 1.5 ℃/W ΔTc= 47.1 ℃	Pch (max) = 85 W Tc= 112.1 ℃
Q51 YG868C08R FUJI ELECTRIC	Tj (max) = 150 ℃ Pd= 1.908 W Tj= Tc+ ((θj-c) × Pd)= 116.3 ℃ D.F. = 77.5 %	θj-c = 2.0 ℃/W ΔTc= 47.5 ℃	 Tc= 112.5 ℃
Q52 YG868C08R FUJI ELECTRIC	Tj (max) = 150 ℃ Pd= 4.042 W Tj= Tc+ ((θj-c) × Pd)= 125.8 ℃ D.F. = 83.9 %	θj-c = 2.0 ℃/W ΔTc= 52.7 ℃	 Tc= 117.7 ℃
A101 TA75S393F(TE85L,F TOSHIBA	Tch (max) = 125 ℃ Pch = 0.05 W Tj = Tc + ((θch-c) × Pch) = 98.4 ℃ D.F. =78.7 %	θch-c = 227.3 ℃/W ΔTc = 22.0 ℃	Pch (max) = 0.2 W Tc= 87.0℃
A102 FA5502M-H1-TE1 FUJI ELECTRIC	Tch (max) = 150 ℃ Pch= 0.17W Tch= Tc+ ((θch-c) × Pch)= 102.7 ℃ D.F. = 68.5 %	θch-c = 50 ℃/W ΔTc= 29.2 ℃	Pch (max) = 0.65 W Tc= 94.2 ℃
A103 M51995AFP CF0J RENESAS	Tch (max) = 150 ℃ Pch= 0.2W Tch= Tc+ ((θch-c) × Pch)= 123.0 ℃ D.F. = 82.0 %	θch-c = 83.3 ℃/W ΔTc= 41.3 ℃	Pch (max) = 1.5 W Tc= 106.3 ℃

MODEL：CUS90E-12

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

部品番号 Location No.	Vin = 230VAC	Load = 100%	Ta = 65℃
D1 D25XB60-7000 SHINDENGEN	Tj (max) = 150 ℃ Pd= 2.825 W Tj= Tc+ ((θj-c) × Pd)= 90.0℃ D.F. = 60.0 %	θj-c = 1 ℃/W ΔTc= 22.2 ℃	 Tc= 87.2 ℃
D2 YG981S6R FUJI ELECTRIC	Tj (max) = 150 ℃ Pd = 1.357 W Tj = Tc + ((θj-c) × Pd) = 107.5 ℃ D.F. =71.7 %	θj-c = 4.5 ℃/W ΔTc =36.4 ℃	 Tc= 101.4℃
Q1 FMV20N60S1 FUJI ELECTRIC	Tch (max) = 150 ℃ Pch= 2.349 W Tj= Tc+ ((θch-c) × Pch)= 105.8 ℃ D.F. = 70.6%	θch-c = 2.4 ℃/W ΔTc= 35.2 ℃	Pch(max) = 53 W Tc= 100.2℃
Q2 FMV09N90E FUJI ELECTRIC	Tch (max) = 150 ℃ Pch= 2.936W Tj = Tc + ((θj-c) × Pd) = 112.5 ℃ D.F. =75.0 %	θch-c = 1.5 ℃/W ΔTc= 43.1 ℃	Pch (max) = 85 W Tc= 108.1 ℃
Q51 YG868C08R FUJI ELECTRIC	Tj (max) = 150 ℃ Pd= 1.908 W Tj= Tc+ ((θj-c) × Pd)= 115.6 ℃ D.F. = 77.1 %	θj-c = 2.0 ℃/W ΔTc= 46.8 ℃	 Tc= 111.8 ℃
Q52 YG868C08R FUJI ELECTRIC	Tj (max) = 150 ℃ Pd= 4.042 W Tj= Tc+ ((θj-c) × Pd)= 125.3 ℃ D.F. = 83.5 %	θj-c = 2.0 ℃/W ΔTc= 52.2 ℃	 Tc= 117.2 ℃
A101 TA75S393F(TE85L,F TOSHIBA	Tch (max) = 125 ℃ Pch = 0.05 W Tj = Tc + ((θch-c) × Pch) = 92.7 ℃ D.F. =74.1 %	θch-c = 227.3 ℃/W ΔTc = 16.3 ℃	Pch (max) = 0.2 W Tc= 81.3℃
A102 FA5502M-H1-TE1 FUJI ELECTRIC	Tch (max) = 150 ℃ Pch= 0.17W Tch= Tc+ ((θch-c) × Pch)= 96.7 ℃ D.F. = 64.5 %	θch-c = 50℃/W ΔTc= 23.2 ℃	Pch (max) = 0.65 W Tc= 88.2 ℃
A103 M51995AFP CF0J RENESAS	Tch (max) = 150 ℃ Pch= 0.2W Tch= Tc+ ((θch-c) × Pch)= 121.7 ℃ D.F. = 81.1 %	θch-c = 83.3 ℃/W ΔTc= 40.0 ℃	Pch (max) = 1.5 W Tc= 105.0 ℃

2. 部品ディレーティング Components Derating

MODEL：CUS90E-12

(1) 算出方法 Calculating Method

(a) 測定方法 Measuring method

・取付方法 :標準取付 : B Mounting method Standard mounting : B	・周囲温度 :65℃ Ambient temperature
・入力電圧 :110, 220VDC Input voltage	・出力電圧、電流 :12V, 7.5A(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

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

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

Ta :ディレーティングの始まる周囲温度 一般に25℃
Ambient 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

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

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

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

MODEL：CUS90E-12

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

部品番号 Location No.	Vin = 110VDC	Load = 100%	Ta = 65℃
D1 D25XB60-7000 SHINDENGEN	Tj (max) = 150 ℃ Pd= 2.825 W Tj= Tc+ ((θj-c) × Pch)= 111.8℃ D.F. = 74.6 %	θj-c = 1 ℃/W ΔTc= 44 ℃	 Tc= 109.0 ℃
D2 YG981S6R FUJI ELECTRIC	Tj (max) = 150 ℃ Pd = 1.357 W Tj = Tc + ((θj-c) × Pd) = 110.5 ℃ D.F. =73.7 %	θj-c = 4.5 ℃/W ΔTc =39.4 ℃	 Tc= 104.4℃
Q1 FMV20N60S1 FUJI ELECTRIC	Tch (max) = 150 ℃ Pch= 2.349 W Tj= Tc+ ((θch-c) × Pch)= 109.3 ℃ D.F. = 72.9%	θch-c = 2.4 ℃/W ΔTc= 38.7 ℃	Pch (max) = 53 W Tc= 103.7℃
Q2 FMV09N90E FUJI ELECTRIC	Tch (max) = 150 ℃ Pch= 2.936W Tj = Tc + ((θj-c) × Pch) = 115.3 ℃ D.F. =76.9 %	θch-c = 1.5 ℃/W ΔTc= 45.9 ℃	Pch (max) = 85 W Tc= 110.9 ℃
Q51 YG868C08R FUJI ELECTRIC	Tj (max) = 150 ℃ Pd= 1.908 W Tj= Tc+ ((θj-c) × Pd)= 116.1 ℃ D.F. = 77.4 %	θj-c = 2.0 ℃/W ΔTc= 47.3 ℃	 Tc= 112.3 ℃
Q52 YG868C08R FUJI ELECTRIC	Tj (max) = 150 ℃ Pd= 4.042 W Tj= Tc+ ((θj-c) × Pd)= 125.5 ℃ D.F. = 83.7 %	θj-c = 2.0 ℃/W ΔTc= 52.4 ℃	 Tc= 117.4 ℃
A101 TA75S393F(TE85L,F TOSHIBA	Tch (max) = 125 ℃ Pch = 0.05 W Tj = Tc + ((θch-c) × Pch) = 98.2 ℃ D.F. =78.5 %	θch-c = 227.3 ℃/W ΔTc = 21.8 ℃	Pch (max) = 0.2 W Tc= 86.8℃
A102 FA5502M-H1-TE1 FUJI ELECTRIC	Tch (max) = 150 ℃ Pch= 0.17W Tch= Tc+ ((θch-c) × Pch)= 102.6 ℃ D.F. = 68.4 %	θch-c = 50℃/W ΔTc= 29.1 ℃	Pch (max) = 0.65 W Tc= 94.1 ℃
A103 M51995AFP CF0J RENESAS	Tch (max) = 150 ℃ Pch= 0.2W Tch= Tc+ ((θch-c) × Pch)= 122.5 ℃ D.F. = 81.7 %	θch-c = 83.3 ℃/W ΔTc= 40.8 ℃	Pch (max) = 1.5 W Tc= 105.8 ℃

MODEL：CUS90E-12

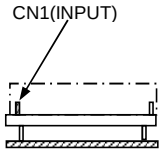
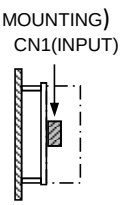
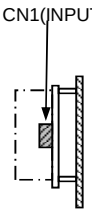
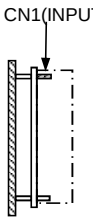
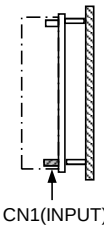
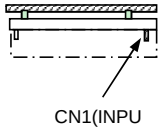
(2) 部品ディレーティング表 Component Derating List

部品番号 Location No.	Vin = 220VDC	Load = 100%	Ta = 65℃
D1 D25XB60-7000 SHINDENGEN	Tj (max) = 150 ℃ Pd= 2.825 W Tj= Tc+ ((θj-c) × Pch)= 93.7℃ D.F. = 62.5 %	θj-c = 1 ℃/W ΔTc= 25.9 ℃	 Tc= 90.9 ℃
D2 YG981S6R FUJI ELECTRIC	Tj (max) = 150 ℃ Pd = 1.357 W Tj = Tc + ((θj-c) × Pd) = 107.3 ℃ D.F. =71.5 %	θj-c = 4.5 ℃/W ΔTc =36.2 ℃	 Tc= 101.2℃
Q1 FMV20N60S1 FUJI ELECTRIC	Tch (max) = 150 ℃ Pch= 2.349 W Tj= Tc+ ((θch-c) × Pch)= 105.1 ℃ D.F. = 70.1%	θch-c = 2.4 ℃/W ΔTc= 34.5 ℃	Pch (max) = 53 W Tc= 99.5℃
Q2 FMV09N90E FUJI ELECTRIC	Tch (max) = 150 ℃ Pch= 2.936W Tj = Tc + ((θj-c) × Pch) = 112.3 ℃ D.F. =74.9 %	θch-c = 1.5 ℃/W ΔTc= 42.9 ℃	Pch (max) = 85 W Tc= 107.9 ℃
Q51 YG868C08R FUJI ELECTRIC	Tj (max) = 150 ℃ Pd= 1.908 W Tj= Tc+ ((θj-c) × Pd)= 115.9 ℃ D.F. = 77.3 %	θj-c = 2.0 ℃/W ΔTc= 47.1 ℃	 Tc= 112.1 ℃
Q52 YG868C08R FUJI ELECTRIC	Tj (max) = 150 ℃ Pd= 4.042 W Tj= Tc+ ((θj-c) × Pd)= 125.5 ℃ D.F. = 83.7 %	θj-c = 2.0 ℃/W ΔTc= 52.4 ℃	 Tc= 117.4 ℃
A101 TA75S393F(TE85L,F TOSHIBA	Tch (max) = 125 ℃ Pch = 0.05 W Tj = Tc + ((θch-c) × Pch) = 93.7 ℃ D.F. =74.9 %	θch-c = 227.3 ℃/W ΔTc = 17.3 ℃	Pch (max) = 0.2 W Tc= 82.3℃
A102 FA5502M-H1-TE1 FUJI ELECTRIC	Tch (max) = 150 ℃ Pch= 0.17W Tch= Tc+ ((θch-c) × Pch)= 98 ℃ D.F. = 65.3 %	θch-c = 50 ℃/W ΔTc= 24.5 ℃	Pch (max) = 0.65 W Tc= 89.5 ℃
A103 M51995AFP CF0J RENESAS	Tch (max) = 150 ℃ Pch= 0.2W Tch= Tc+ ((θch-c) × Pch)= 121.7 ℃ D.F. = 81.1 %	θch-c = 83.3 ℃/W ΔTc= 40.1 ℃	Pch (max) = 1.5 W Tc= 105.1 ℃

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

MODEL : CUS90E-12

(1) 測定条件 Measuring Conditions

	Mounting A	Mounting B	Mounting C	Mounting D	Mounting E	Mounting F
取付方法 Mounting Method (標準取付 : B) (Standard Mounting : B)						
入力電圧 Vin Input Voltage	100VAC					
出力電圧 Vo Output Voltage	12VDC					
出力電流 Io Output Current	7.5A(100%)					

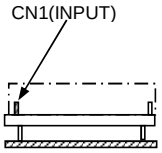
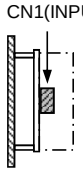
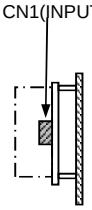
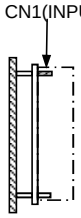
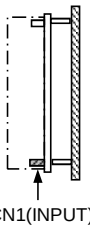
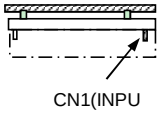
(2) 測定結果 Measuring Results

		ΔT Temperature Rise (℃)					
出力ディレーティング Output Derating		Io=100 %					
		Ta=50℃	Ta=50℃	Ta=50℃	Ta=50℃	Ta=50℃	Ta=50℃
部品番号 Location No.	部品名 Part name	取付方向 Mounting A	取付方向 Mounting B	取付方向 Mounting C	取付方向 Mounting D	取付方向 Mounting E	取付方向 Mounting F
C8	E.CAP.	18	22	16	27	16	25
C9	E.CAP.	18	21	15	25	16	23
C51	E.CAP.	31	29	29	27	40	32
C52	E.CAP.	28	27	30	25	38	31
Q51	S.B.D	46	48	43	46	50	49
Q52	S.B.D	53	53	50	53	56	56
A102	IC	27	29	24	33	24	34
A103	IC	47	41	46	48	50	56
T1 WINDING	T1 WINDING	55	53	50	57	56	59
L51 WINDING	INDUCTOR	48	45	50	48	54	51
Q1	MOSFET	43	40	44	48	47	52
Q2	MOSFET	50	47	44	53	50	55

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

MODEL : CUS90E-12

(1) 測定条件 Measuring Conditions

	Mounting A	Mounting B	Mounting C	Mounting D	Mounting E	Mounting F
取付方法 Mounting Method (標準取付 : B) (Standard Mounting : B)						
入力電圧 Vin Input Voltage	230VAC					
出力電圧 Vo Output Voltage	12VDC					
出力電流 Io Output Current	7.5A(100%)					

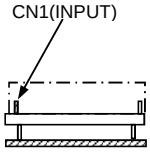
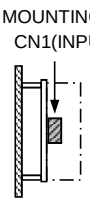
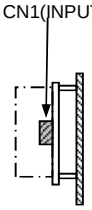
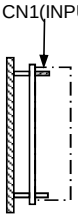
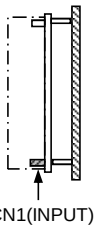
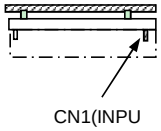
(2) 測定結果 Measuring Results

		ΔT Temperature Rise (℃)					
出力ディレーティング Output Derating		Io=100 %					
		Ta=50℃	Ta=50℃	Ta=50℃	Ta=50℃	Ta=50℃	Ta=50℃
部品番号 Location No.	部品名 Part name	取付方向 Mounting A	取付方向 Mounting B	取付方向 Mounting C	取付方向 Mounting D	取付方向 Mounting E	取付方向 Mounting F
C8	E.CAP.	15	16	14	23	13	20
C9	E.CAP.	16	17	14	23	15	20
C51	E.CAP.	31	29	29	27	39	31
C52	E.CAP.	29	26	30	25	37	31
Q51	S.B.D	46	47	42	46	49	48
Q52	S.B.D	54	52	49	53	55	55
A102	IC	24	23	21	30	21	30
A103	IC	46	40	44	47	47	53
T1 WINDING	T1 WINDING	55	52	49	57	55	58
L51 WINDING	INDUCTOR	48	45	50	48	52	51
Q1	MOSFET	39	35	39	43	40	46
Q2	MOSFET	47	43	41	50	45	50

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

MODEL : CUS90E-12

(1) 測定条件 Measuring Conditions

取付方法 Mounting Method (標準取付 : B) (Standard Mounting : B)	Mounting A	Mounting B	Mounting C	Mounting D	Mounting E	Mounting F
						
入力電圧 Vin Input Voltage	110VDC					
出力電圧 Vo Output Voltage	12VDC					
出力電流 Io Output Current	7.5A(100%)					

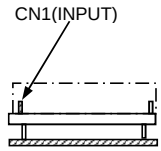
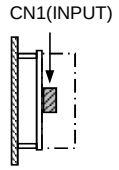
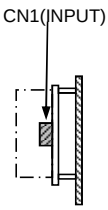
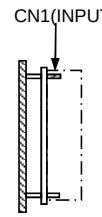
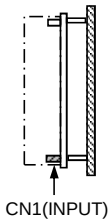
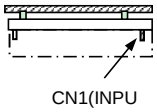
(2) 測定結果 Measuring Results

		ΔT Temperature Rise (℃)					
出力ディレーティング Output Derating		Io=100 %					
		Ta=50℃	Ta=50℃	Ta=50℃	Ta=50℃	Ta=50℃	Ta=50℃
部品番号 Location No.	部品名 Part name	取付方向 Mounting A	取付方向 Mounting B	取付方向 Mounting C	取付方向 Mounting D	取付方向 Mounting E	取付方向 Mounting F
C8	E.CAP.	18	22	21	26	16	25
C9	E.CAP.	18	21	17	25	16	23
C51	E.CAP.	31	29	31	27	39	32
C52	E.CAP.	29	27	31	25	37	32
Q51	S.B.D	45	47	44	46	50	49
Q52	S.B.D	53	52	51	53	55	56
A102	IC	27	29	26	33	24	34
A103	IC	47	41	48	47	50	56
T1 WINDING	T1 WINDING	55	53	52	56	56	59
L51 WINDING	INDUCTOR	48	44	51	48	53	51
Q1	MOSFET	42	39	49	47	46	51
Q2	MOSFET	49	46	48	52	49	54

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

MODEL : CUS90E-12

(1) 測定条件 Measuring Conditions

	Mounting A	Mounting B	Mounting C	Mounting D	Mounting E	Mounting F
取付方法 Mounting Method (標準取付 : B) (Standard Mounting : B)						
入力電圧 Vin Input Voltage	220VDC					
出力電圧 Vo Output Voltage	12VDC					
出力電流 Io Output Current	7.5A(100%)					

(2) 測定結果 Measuring Results

出力ディレーティング Output Derating		ΔT Temperature Rise (℃) Io=100 %					
		Ta=50℃	Ta=50℃	Ta=50℃	Ta=50℃	Ta=50℃	Ta=50℃
部品番号 Location No.	部品名 Part name	取付方向 Mounting A	取付方向 Mounting B	取付方向 Mounting C	取付方向 Mounting D	取付方向 Mounting E	取付方向 Mounting F
C8	E.CAP.	15	17	20	23	14	21
C9	E.CAP.	16	17	16	23	15	21
C51	E.CAP.	31	29	30	27	39	31
C52	E.CAP.	29	27	31	25	36	31
Q51	S.B.D	45	47	44	46	49	49
Q52	S.B.D	53	52	51	53	55	55
A102	IC	24	25	24	31	22	31
A103	IC	46	40	46	47	47	54
T1 WINDING	T1 WINDING	54	52	51	56	55	58
L51 WINDING	INDUCTOR	47	45	51	48	52	51
Q1	MOSFET	38	35	40	42	39	45
Q2	MOSFET	46	43	43	50	45	50

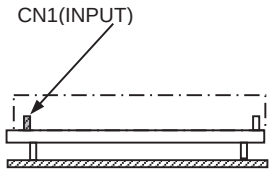
4. 電解コンデンサ推定寿命計算値　**Electrolytic Capacitor Lifetime**

MODEL : CUS90E-12

空冷条件：自然空冷

Cooling condition : Convection cooling

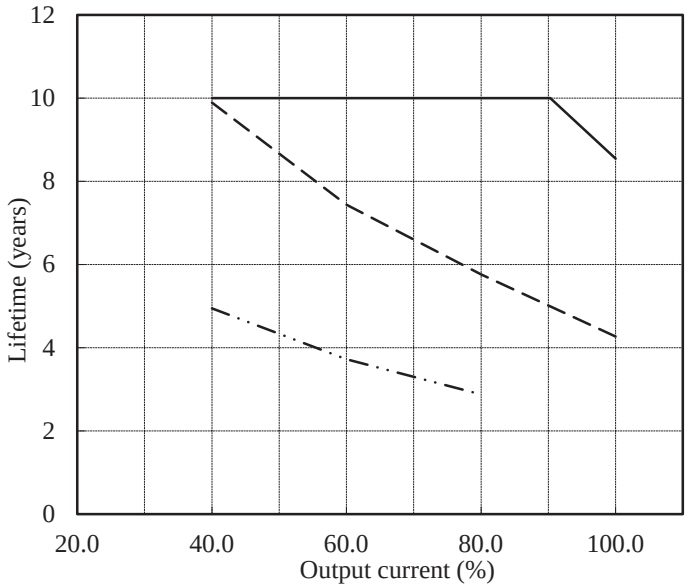
取付方向 A
Mounting A



Conditions　Ta　40℃ : ——
50℃ : – – –
60℃ : —·—

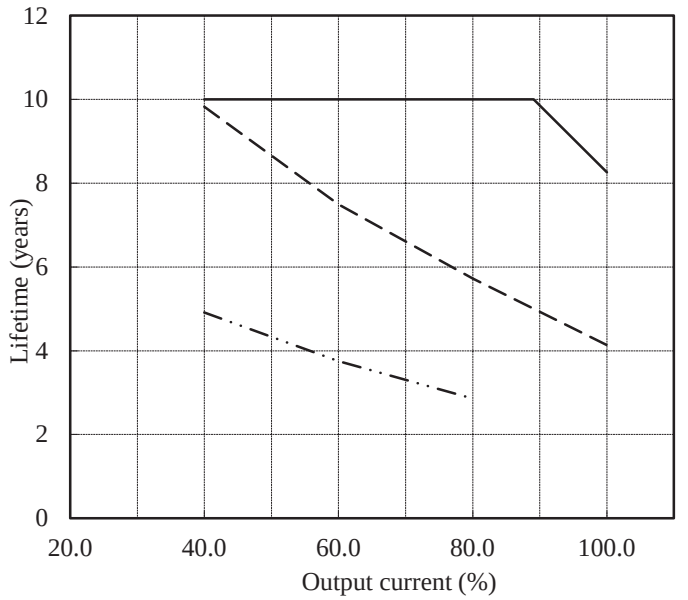
Vin=100VAC

Load (%)	Lifetime (years)		
	Ta= 40℃	Ta= 50℃	Ta= 60℃
40	10.0	9.9	4.9
60	10.0	7.4	3.7
80	10.0	5.8	2.9
100	8.6	4.3	— —



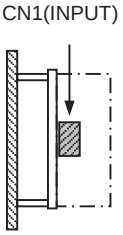
Vin=230VAC

Load (%)	Lifetime (years)		
	Ta= 40℃	Ta= 50℃	Ta= 60℃
40	10.0	9.8	4.9
60	10.0	7.5	3.7
80	10.0	5.7	2.9
100	8.3	4.1	— —



MODEL : CUS90E-12

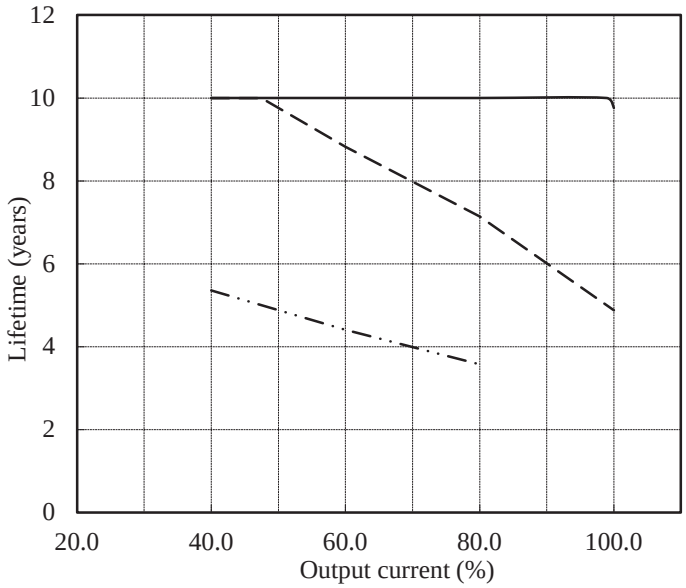
取付方向 B
Mounting B



Conditions Ta 40℃ : ——
50℃ : – – –
60℃ : —·—

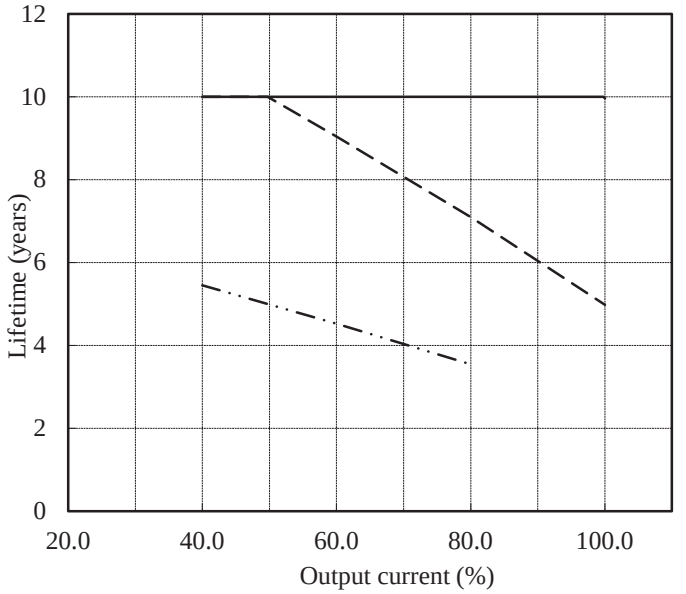
Vin=100VAC

Load (%)	Lifetime (years)		
	Ta= 40℃	Ta= 50℃	Ta= 60℃
40	10.0	10.0	5.4
60	10.0	8.8	4.4
80	10.0	7.1	3.6
100	9.8	4.9	— —

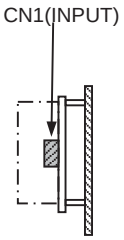


Vin=230VAC

Load (%)	Lifetime (years)		
	Ta= 40℃	Ta= 50℃	Ta= 60℃
40	10.0	10.0	5.5
60	10.0	9.0	4.5
80	10.0	7.1	3.5
100	10.0	5.0	— —



MODEL : CUS90E-12

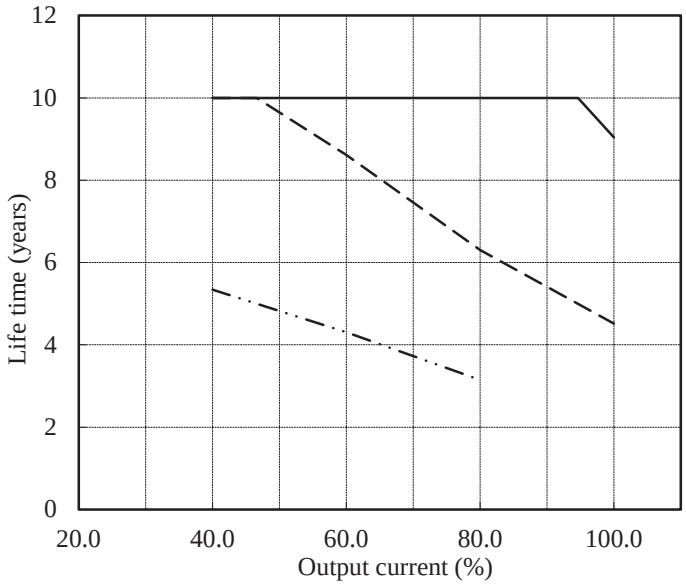


取付方向 C
Mounting C

Conditions Ta 40℃ : ——
50℃ : — — —
60℃ : — · · —

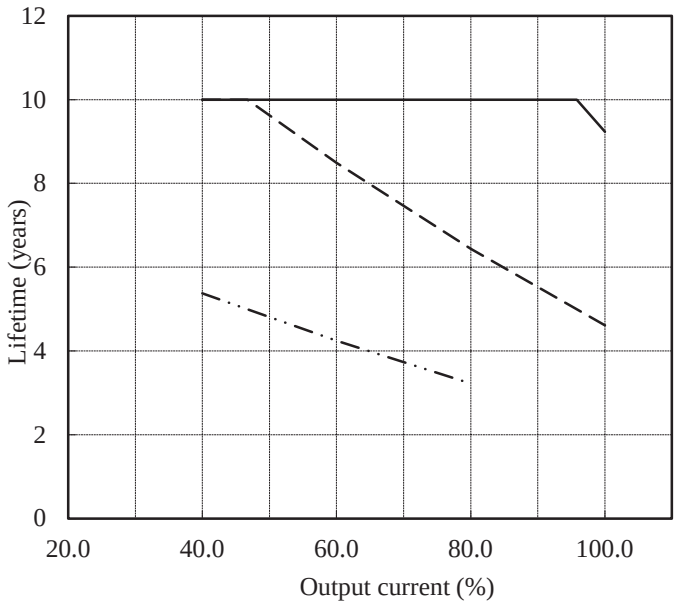
Vin=100VAC

Load (%)	Lifetime (years)		
	Ta= 40℃	Ta= 50℃	Ta= 60℃
40	10.0	10.0	5.3
60	10.0	8.6	4.3
80	10.0	6.3	3.2
100	9.0	4.5	— —



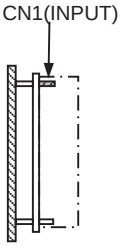
Vin=230VAC

Load (%)	Lifetime (years)		
	Ta= 40℃	Ta= 50℃	Ta= 60℃
40	10.0	10.0	5.4
60	10.0	8.5	4.2
80	10.0	6.4	3.2
100	9.2	4.6	— —



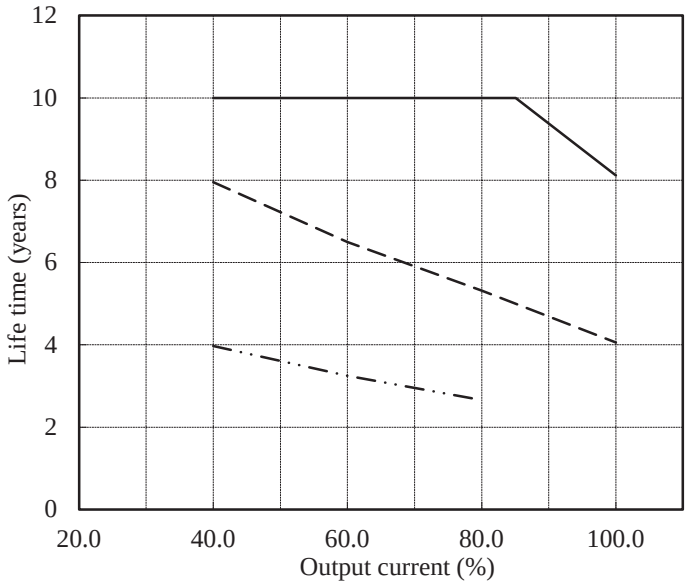
MODEL : CUS90E-12

取付方向 D
Mounting D



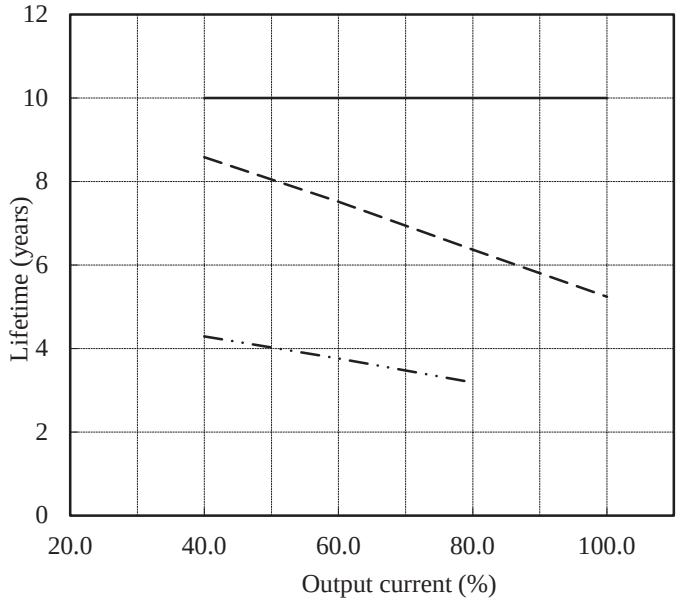
Vin=100VAC

Load (%)	Lifetime (years)		
	Ta= 40℃	Ta= 50℃	Ta= 60℃
40	10.0	8.0	4.0
60	10.0	6.5	3.3
80	10.0	5.3	2.7
100	8.1	4.1	— —



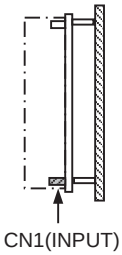
Vin=230VAC

Load (%)	Lifetime (years)		
	Ta= 40℃	Ta= 50℃	Ta= 60℃
40	10.0	8.6	4.3
60	10.0	7.5	3.8
80	10.0	6.4	3.2
100	10.0	5.2	— —



MODEL : CUS90E-12

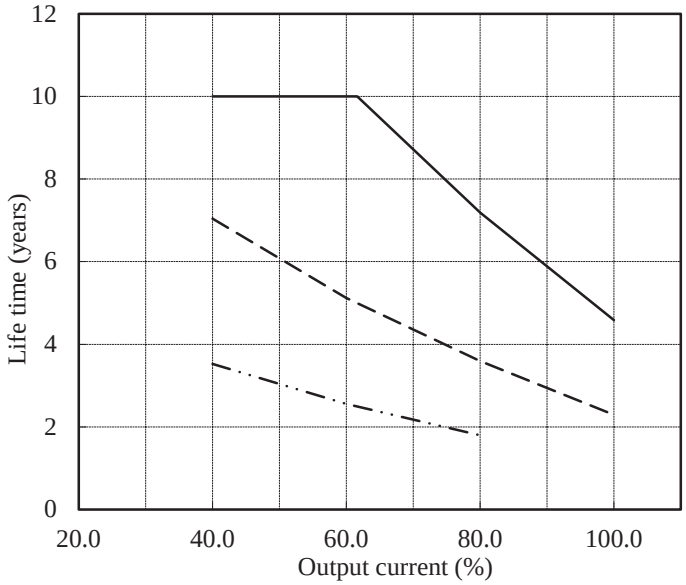
取付方向 E
Mounting E



Conditions Ta 40℃ : ——
50℃ : — — —
60℃ : — · · —

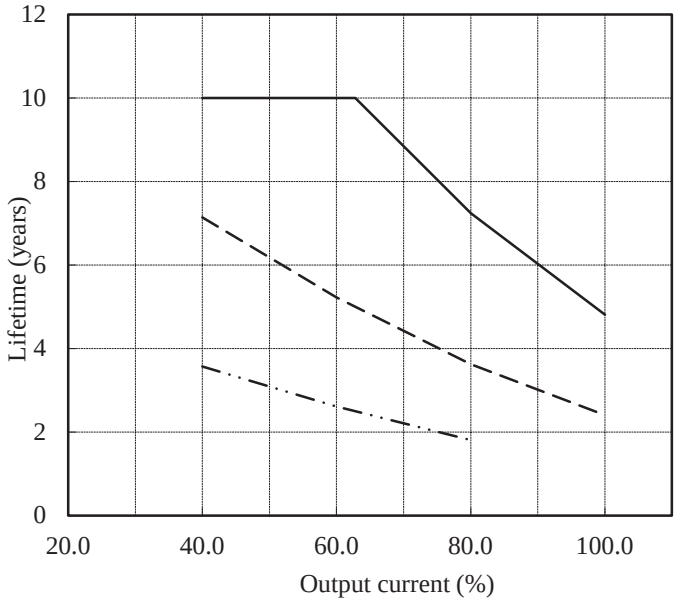
Vin=100VAC

Load (%)	Lifetime (years)		
	Ta= 40℃	Ta= 50℃	Ta= 60℃
40	10.0	7.0	3.5
60	10.0	5.1	2.6
80	7.2	3.6	1.8
100	4.6	2.3	— —



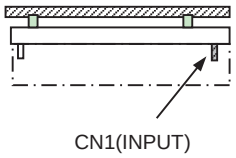
Vin=230VAC

Load (%)	Lifetime (years)		
	Ta= 40℃	Ta= 50℃	Ta= 60℃
40	10.0	7.1	3.6
60	10.0	5.2	2.6
80	7.2	3.6	1.8
100	4.8	2.4	— —



MODEL : CUS90E-12

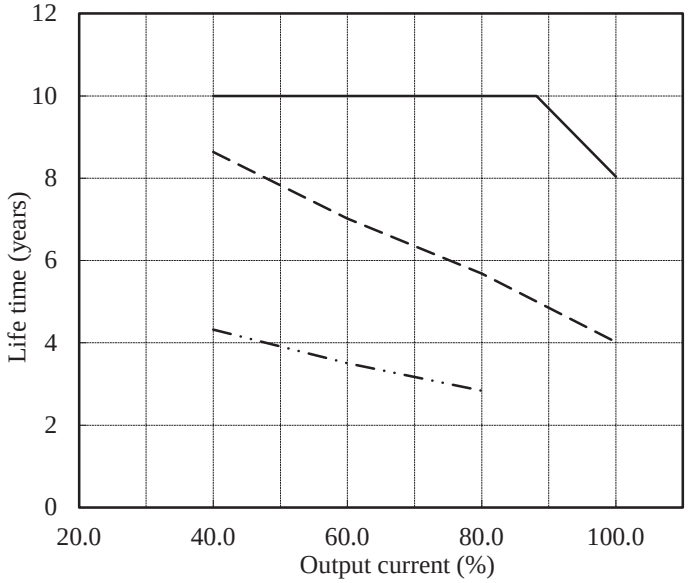
取付方向 F
Mounting F



Conditions Ta 40℃ : ——
50℃ : — — —
60℃ : — · · —

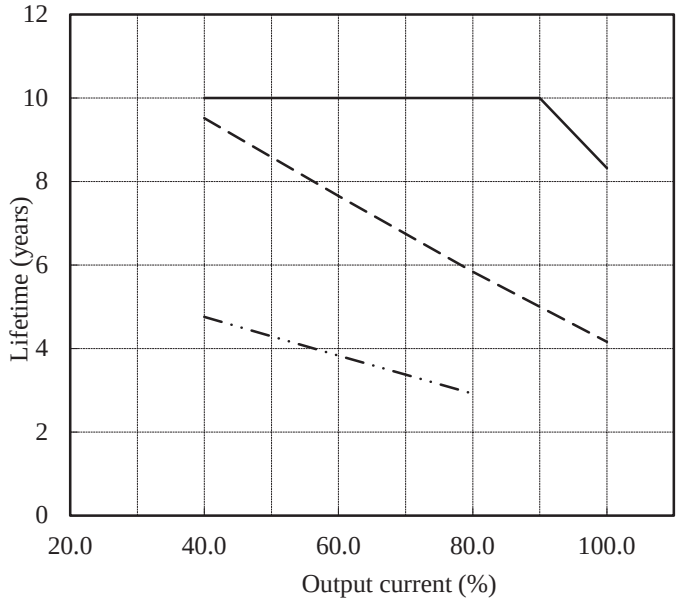
Vin=100VAC

Load (%)	Lifetime (years)		
	Ta= 40℃	Ta= 50℃	Ta= 60℃
40	10.0	8.6	4.3
60	10.0	7.0	3.5
80	10.0	5.7	2.8
100	8.0	4.0	— —



Vin=230VAC

Load (%)	Lifetime (years)		
	Ta= 40℃	Ta= 50℃	Ta= 60℃
40	10.0	9.5	4.8
60	10.0	7.7	3.8
80	10.0	5.8	2.9
100	8.3	4.2	— —



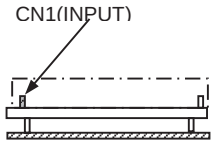
4. 電解コンデンサ推定寿命計算値　**Electrolytic Capacitor Lifetime**

MODEL : CUS90E-12

空冷条件：自然空冷

Cooling condition : Convection cooling

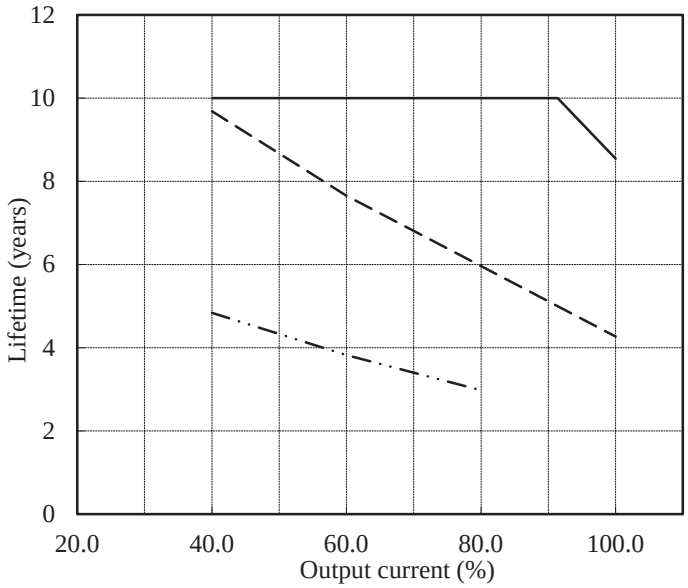
取付方向 A
Mounting A



Conditions　Ta　40℃ : ——
50℃ : – – –
60℃ : —·—

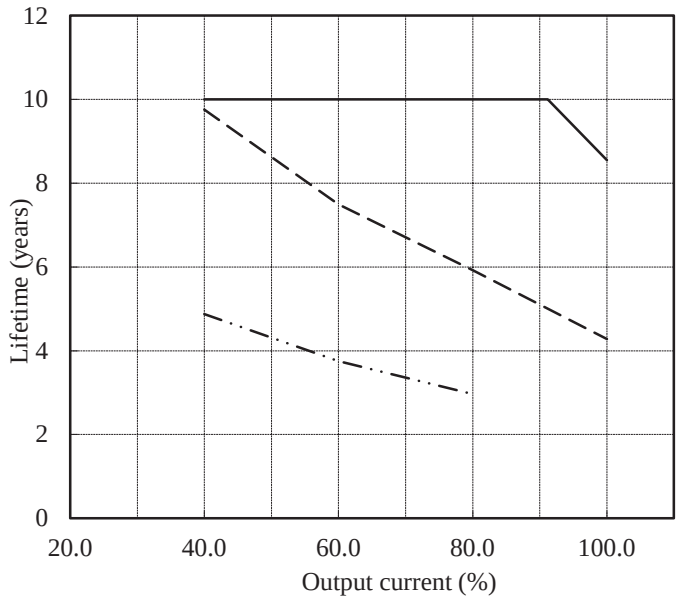
Vin=110VDC

Load (%)	Lifetime (years)		
	Ta= 40℃	Ta= 50℃	Ta= 60℃
40	10.0	9.7	4.8
60	10.0	7.7	3.8
80	10.0	6.0	3.0
100	8.6	4.3	— —



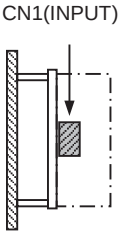
Vin=220VDC

Load (%)	Lifetime (years)		
	Ta= 40℃	Ta= 50℃	Ta= 60℃
40	10.0	9.8	4.9
60	10.0	7.5	3.7
80	10.0	5.9	3.0
100	8.6	4.3	— —



MODEL : CUS90E-12

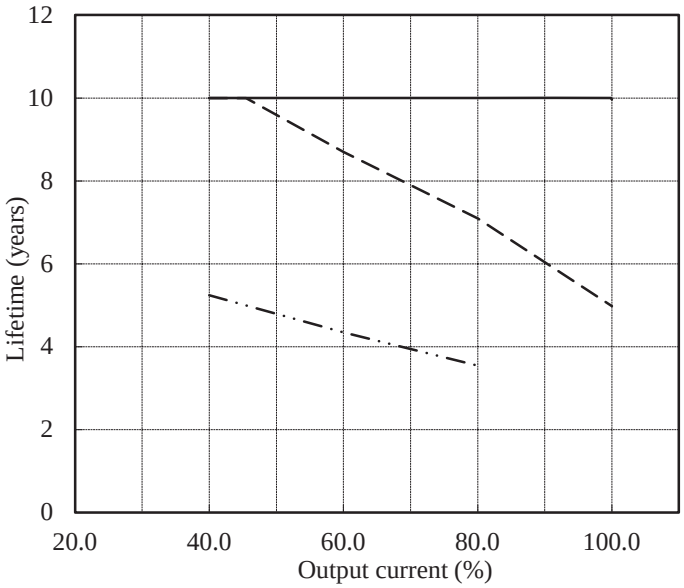
取付方向 B
Mounting B



Conditions Ta 40℃ : ——
50℃ : – – –
60℃ : —·—

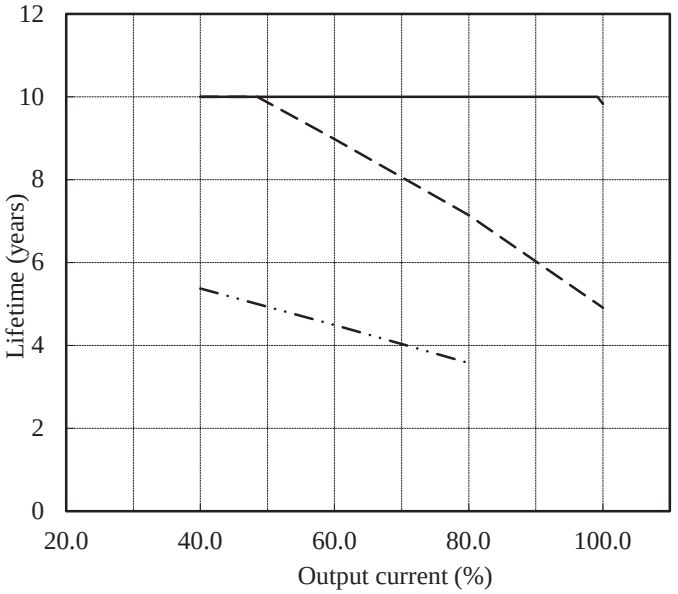
Vin=110VDC

Load (%)	Lifetime (years)		
	Ta= 40℃	Ta= 50℃	Ta= 60℃
40	10.0	10.0	5.2
60	10.0	8.7	4.3
80	10.0	7.1	3.5
100	9.9	5.0	— —

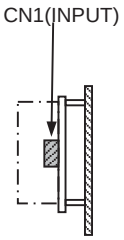


Vin=220VDC

Load (%)	Lifetime (years)		
	Ta= 40℃	Ta= 50℃	Ta= 60℃
40	10.0	10.0	5.4
60	10.0	9.0	4.5
80	10.0	7.1	3.6
100	9.8	4.9	— —



MODEL : CUS90E-12

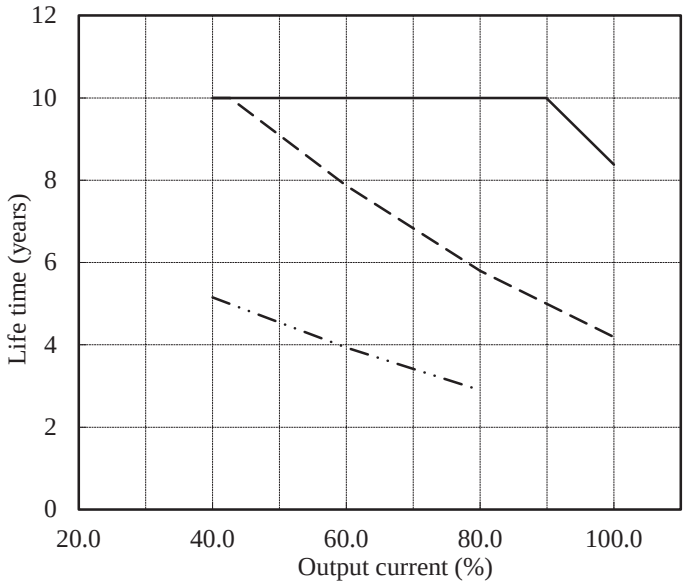


取付方向 C
Mounting C

Conditions Ta 40℃ : ——
50℃ : — — —
60℃ : — · · —

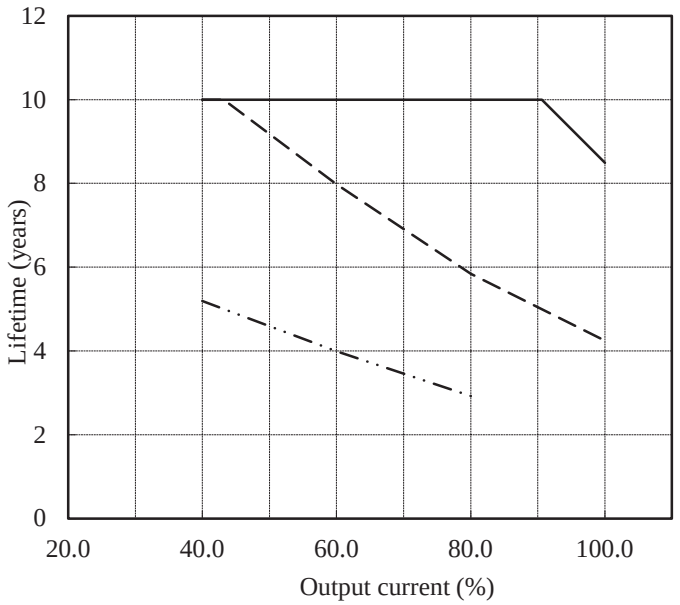
Vin=110VDC

Load (%)	Lifetime (years)		
	Ta= 40℃	Ta= 50℃	Ta= 60℃
40	10.0	10.0	5.2
60	10.0	7.9	3.9
80	10.0	5.8	2.9
100	8.4	4.2	— —



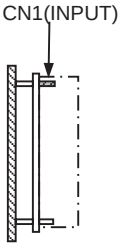
Vin=220VDC

Load (%)	Lifetime (years)		
	Ta= 40℃	Ta= 50℃	Ta= 60℃
40	10.0	10.0	5.2
60	10.0	8.0	4.0
80	10.0	5.8	2.9
100	8.5	4.2	— —



MODEL : CUS90E-12

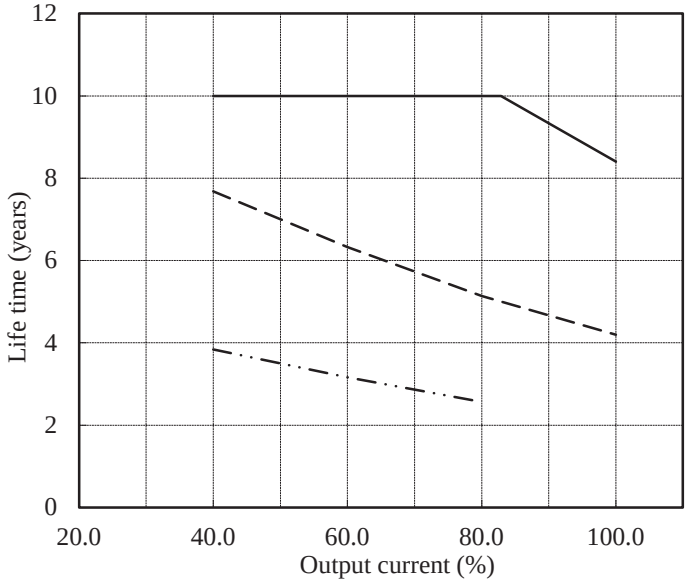
取付方向 D
Mounting D



Conditions Ta 40℃ : ——
50℃ : – – –
60℃ : –·–

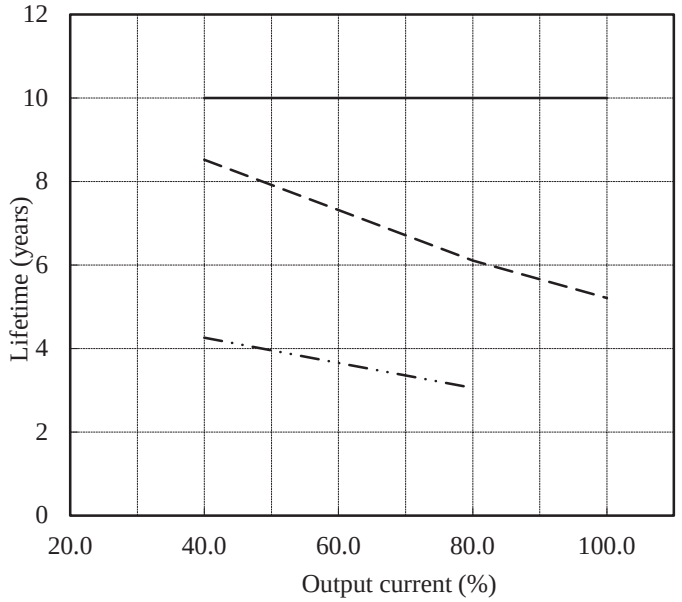
Vin=110VDC

Load (%)	Lifetime (years)		
	Ta= 40℃	Ta= 50℃	Ta= 60℃
40	10.0	7.7	3.8
60	10.0	6.3	3.2
80	10.0	5.1	2.6
100	8.4	4.2	— —



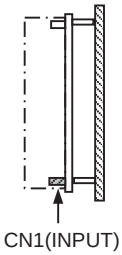
Vin=220VDC

Load (%)	Lifetime (years)		
	Ta= 40℃	Ta= 50℃	Ta= 60℃
40	10.0	8.5	4.3
60	10.0	7.3	3.7
80	10.0	6.1	3.1
100	10.0	5.2	— —



MODEL : CUS90E-12

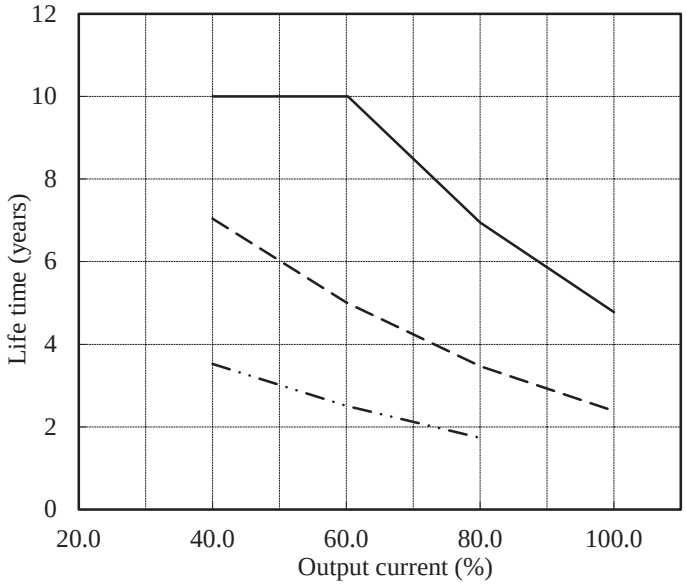
取付方向 E
Mounting E



Conditions Ta 40℃ : ——
50℃ : — — —
60℃ : — · · —

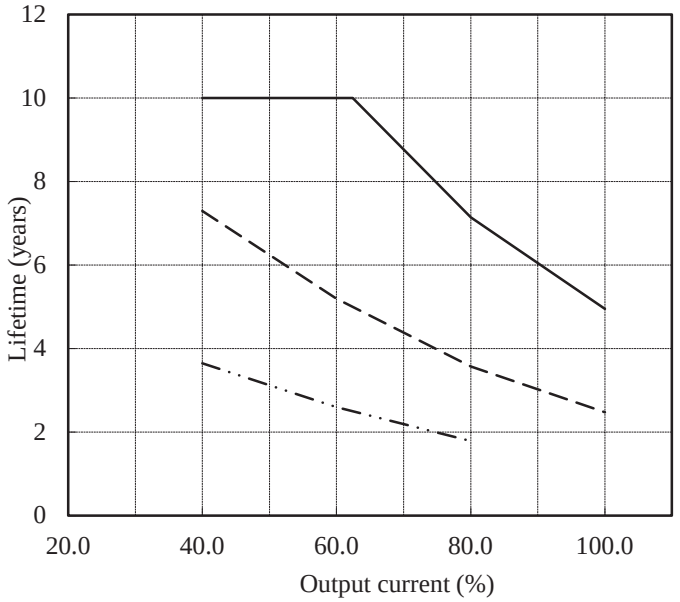
Vin=110VDC

Load (%)	Lifetime (years)		
	Ta= 40℃	Ta= 50℃	Ta= 60℃
40	10.0	7.0	3.5
60	10.0	5.0	2.5
80	6.9	3.5	1.7
100	4.8	2.4	— —



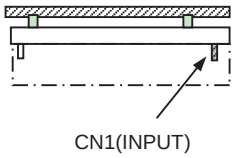
Vin=220VDC

Load (%)	Lifetime (years)		
	Ta= 40℃	Ta= 50℃	Ta= 60℃
40	10.0	7.3	3.6
60	10.0	5.2	2.6
80	7.1	3.6	1.8
100	4.9	2.5	— —



MODEL : CUS90E-12

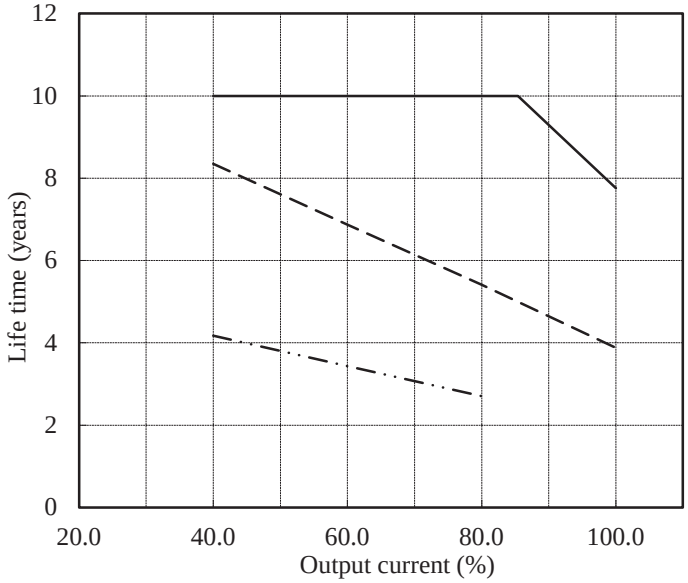
取付方向 F
Mounting F



Conditions Ta 40℃ : ——
50℃ : — — —
60℃ : — · · —

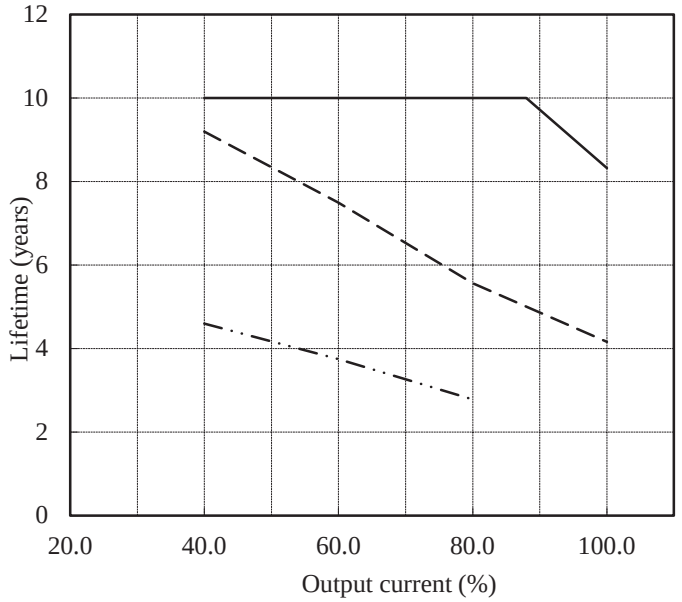
Vin=110VDC

Load (%)	Lifetime (years)		
	Ta= 40℃	Ta= 50℃	Ta= 60℃
40	10.0	8.3	4.2
60	10.0	6.9	3.4
80	10.0	5.4	2.7
100	7.8	3.9	— —



Vin=220VDC

Load (%)	Lifetime (years)		
	Ta= 40℃	Ta= 50℃	Ta= 60℃
40	10.0	9.2	4.6
60	10.0	7.5	3.7
80	10.0	5.6	2.8
100	8.3	4.2	— —



MODEL :CUS90E-12

(1) 試験条件 Test Conditions

Input : 230VAC Output : 12V, 7.5A 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		
No.	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	Q1	D-G	○							○	○			○			Da: Z101	
2		D-S	○								○			○				
3		G-S	○													○	Input power increase	
4		D		○										○				
5		S		○										○				
6		G		○						○	○			○			Da: Q1	
7	Q2	D-G	○							○	○			○			Da: Z104	
8		D-S	○								○			○				
9		G-S	○											○				
10		D		○										○				
11		S		○										○				
12		G		○						○	○			○			Da: Q2	
13	SR1	C~G	○													○	Input power increase	
14		C~A	○													○	Input power increase	
15		A~G	○												○			
16		A		○												○	Input power increase	
17		C		○												○	Input power increase	
18		G		○												○	Input power increase	
19	D1	AC~AC	○								○			○				
20		DC~DC	○								○			○				
21		AC		○										○				
22		DC		○										○				
23	Q51		○											○				
24				○										○				
25	Q52		○											○				
26				○										○				
27	T1	1~3	○											○				
28		1~2	○								○			○				
29		2~4	○											○				
30		2~3	○											○				
31		3~4	○							○				○			Da:A102,A103,D110,D111	
32		4~5	○													○	Output Hiccup	
33		5~6	○											○				
34		7,8~9,10	○											○				
35		9,10~11	○											○				
36		11~12	○												○			
37		7,8~12	○												○			
38		1~3		○										○				
39		2~4		○												○	Output Hiccup	
40		5~6		○										○				
41		7,8~9,10		○										○				
42		11~12		○											○			
43	C8(C9)		○								○			○				
44				○						○	○			○			Da:Q1	
45	C51(C52, C53)		○											○				
46				○												○	Output ripple and noise increase	

6. 振動試験 Vibration Test

MODEL：CUS90E-12

(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

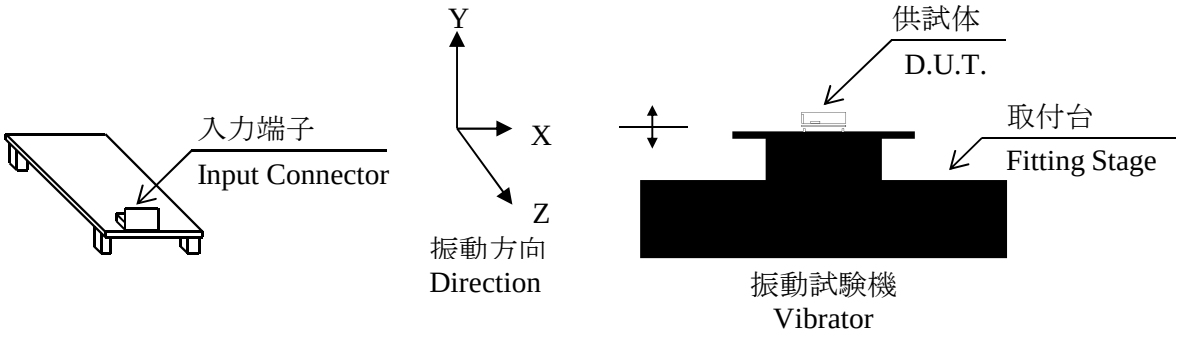
・制御部 Controller : DP550 DP CORP USA

・加振部 Vibrator : V870 LDS CORP. UK

(3) 試験条件 Test Conditions

・周波数範囲 Sweep frequency	: 10～150Hz	・振動方向 Direction	: X, Y, Z
・掃引時間 Sweep time	: 8.0分間 8.0min	・試験時間 Sweep count	: 各方向共 160分間 160 min each
・加速度 Acceleration	: 一定 9.8m/s^2 (1.0g) Constant		

(4) 試験方法 Test Method



(5) 判定条件 Acceptable 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.

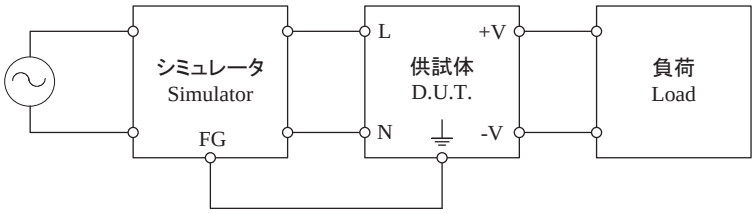
(6) 試験結果 Test Results

合格 OK

7. ノイズシミュレート試験 Noise Simulate Test

MODEL：CUS90E-12

(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	: 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.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

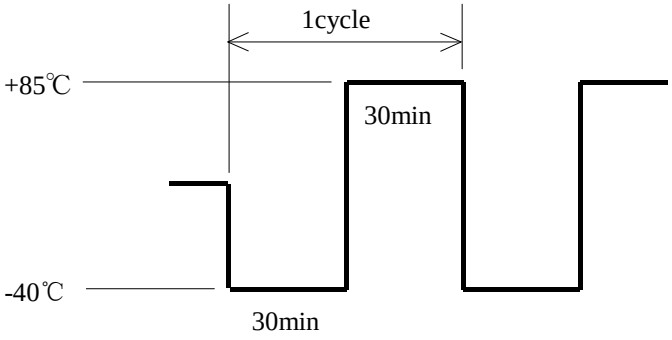
MODEL：CUS90E-12

(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℃ ⇔ 85℃
Ambient Temperature
・試験時間 :図参照
Test Time Refer to Dwg.
・試験サイクル ： 350 サイクル
Test Cycle 350 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。350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. 350 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

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