

GXE600

RELIABILITY DATA

信頼性データ

INDEX

| | PAGE |
|--|-------|
| 1. MTBF計算値 Calculated Values of MTBF | 3~4 |
| 2. 部品デレーティング Components Derating | 5~9 |
| 3. 主要部品温度上昇値 Main Components Temperature Rise Δ T List | 10~13 |
| 4. 電解コンデンサ推定寿命計算値 Electrolytic Capacitor Lifetime | 14~17 |
| カバー付きタイプ(オプション) With cover type (Option model) | 18~21 |
| 5. アブノーマル試験 Abnormal Test | 22~24 |
| 6. 振動試験 Vibration Test | 25 |
| 7. ノイズシミュレート試験 Noise Simulate Test | 26 |
| 8. 熱衝撃試験 Thermal Shock Test | 27 |

* 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

Output voltage : 24V, 48V

* 入力電圧が100VACの場合、下記の通り出力デレーティングが必要です。

Output derating is needed when input voltage is 100VAC.

| Vin | Iout : Full load | 24V | 48V |
|-------------------------------|------------------|-------|-------|
| $100 \leq V_{in} < 170VAC$ | 83% | 20.8A | 10.4A |
| $170 \leq V_{in} \leq 265VAC$ | 100% | 25.0A | 12.5A |

Standby supply : 5V 1A (Full load)

1. MTBF計算値 Calculated Values of MTBF

(1) 部品ストレス解析法MTBF Parts stress reliability prediction MTBF

MODEL : GXE600-24

算出方法 Calculating Method

Telcordiaの部品ストレス解析法(*1)で算出されています。

故障率 λ_{ssi} は、それぞれの部品ごとに電気ストレスと動作温度によって決定されます。

Calculated based on parts stress reliability prediction of Telcordia (*1).

Individual failure rate λ_{ssi} is calculated by the electric stress and temperature rise of the each part.

*1: Telcordia document “Reliability Prediction Procedure for Electronic Equipment”
(Document number SR-332, Issue3)

<算出式>

$$MTBF = \frac{1}{\lambda_{equip}} = \frac{1}{\pi_E \sum_{i=1}^m (N_i \cdot \lambda_{ssi})} \times 10^9 \text{時間 (Hours)}$$

$$\lambda_{ssi} = \lambda_{Gi} \cdot \pi_{Qi} \cdot \pi_{Si} \cdot \pi_{Ti}$$

λ_{equip} : 全機器故障率 (FITs) Total equipment failure rate (FITs = Failures in 10^9 Hours)

λ_{Gi} : i 番目の部品に対する基礎故障率 Generic failure rate for the ith part

π_{Qi} : i 番目の部品に対する品質ファクタ Quality factor for the ith part

π_{Si} : i 番目の部品に対するストレスファクタ Stress factor for the ith part

π_{Ti} : i 番目の部品に対する温度ファクタ Temperature factor for the ith part

m : 異なる部品の数 Number of different part types

N_i : i 番目の部品の個数 Quantity of ith part type

π_E : 機器の環境ファクタ Equipment environmental factor

MTBF値 MTBF Values

条件 Conditions

- | | |
|----------------------------------|---------------------------------------|
| • 入力電圧 : 200VAC | • 出力電圧、電流 : 24VDC, Full load |
| Input voltage | Output voltage & current |
| • スタンバイ電圧、電流 : 5VDC, Full load | • 取付方法 : 標準取付A |
| Standby voltage & current | Mounting method : Standard mounting A |
| • 環境ファクタ : G_F (Ground, Fixed) | |
| Environmental factor | |

SR-332, Issue3

MTBF(Ta=25°C) ≒ 511,677 時間 (Hours)

MTBF(Ta=40°C) ≒ 273,828 時間 (Hours)

MTBF(Ta=50°C) ≒ 174,967 時間 (Hours)

(2) 部品点数法MTBF Part count reliability prediction MTBF

MODEL : GXE600-24

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 prediction 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>

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

λ_{equip} : 全機器故障率 (故障数 / 10^6 時間)
Total equipment failure rate (Failure / 10^6 Hours)

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 / 10^6 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 ($\pi_Q=1$)

MTBF値 MTBF Values

G_F : 地上、固定 (Ground, Fixed)

RCR-9102B

MTBF \approx 51,428 時間 (Hours)

2. 部品デレーティング Components Derating

MODEL : GXE600-24

(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 : 50°C Ambient temperature |
| ・入力電圧 : 100, 200VAC Input voltage | ・出力電圧、電流 : 24V, Full load Output voltage & current |
| ・スタンバイ電圧、電流 : 5V, Full load Standby 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

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

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

T_a : 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

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

T_j(max) : 最大接合点(チャネル)温度
 (T_{ch}(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(チャネル)から周囲までの熱抵抗
 (θ_{ch-a}) Thermal Impedance between Junction (channel) and Ambient

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

| 部品番号 Location No. | $V_{in} = 100VAC$ | $I_{out} = Full\ load$ | Standby = Full load | $T_a = 50^{\circ}C$ |
|-------------------------------------|--|------------------------|---|----------------------|
| Q1 STP40N65M2 STMICRO | $T_{ch} (max) = 150^{\circ}C$ $P_{ch} = 5.2\ W$ $T_{ch} = T_c + ((\theta_{ch-c}) \times P_{ch}) = 119.6^{\circ}C$ D.F. = 79.8 % | | $\theta_{ch-c} = 0.5^{\circ}C/W$ $\Delta T_c = 67^{\circ}C$ | $T_c = 117^{\circ}C$ |
| Q2 STP40N65M2 STMICRO | $T_{ch} (max) = 150^{\circ}C$ $P_{ch} = 5.2\ W$ $T_{ch} = T_c + ((\theta_{ch-c}) \times P_{ch}) = 115.6^{\circ}C$ D.F. = 77.1 % | | $\theta_{ch-c} = 0.5^{\circ}C/W$ $\Delta T_c = 63^{\circ}C$ | $T_c = 113^{\circ}C$ |
| Q3 TK20A60W5 TOSHIBA | $T_{ch} (max) = 150^{\circ}C$ $P_{ch} = 1.5\ W$ $T_{ch} = T_c + ((\theta_{ch-c}) \times P_{ch}) = 97.2^{\circ}C$ D.F. = 64.8 % | | $\theta_{ch-c} = 2.78^{\circ}C/W$ $\Delta T_c = 43^{\circ}C$ | $T_c = 93^{\circ}C$ |
| Q4 TK20A60W5 TOSHIBA | $T_{ch} (max) = 150^{\circ}C$ $P_{ch} = 1.6\ W$ $T_{ch} = T_c + ((\theta_{ch-c}) \times P_{ch}) = 100.5^{\circ}C$ D.F. = 67.0 % | | $\theta_{ch-c} = 2.78^{\circ}C/W$ $\Delta T_c = 46^{\circ}C$ | $T_c = 96^{\circ}C$ |
| Q5 TK20A60W5 TOSHIBA | $T_{ch} (max) = 150^{\circ}C$ $P_{ch} = 1.4\ W$ $T_{ch} = T_c + ((\theta_{ch-c}) \times P_{ch}) = 97.9^{\circ}C$ D.F. = 65.3 % | | $\theta_{ch-c} = 2.78^{\circ}C/W$ $\Delta T_c = 44^{\circ}C$ | $T_c = 94^{\circ}C$ |
| Q6 TK20A60W5 TOSHIBA | $T_{ch} (max) = 150^{\circ}C$ $P_{ch} = 1.5\ W$ $T_{ch} = T_c + ((\theta_{ch-c}) \times P_{ch}) = 101.2^{\circ}C$ D.F. = 67.5 % | | $\theta_{ch-c} = 2.78^{\circ}C/W$ $\Delta T_c = 47^{\circ}C$ | $T_c = 97^{\circ}C$ |
| Q51, Q52 IPP076N15N5 INFINEON | $T_j (max) = 175^{\circ}C$ $P_j = 1.2\ W$ $T_j = T_c + ((\theta_{j-c}) \times P_j) = 97.9^{\circ}C$ D.F. = 56.0 % | | $\theta_{j-c} = 0.7^{\circ}C/W$ $\Delta T_c = 47^{\circ}C$ | $T_c = 97^{\circ}C$ |
| Q53, Q54 IPP076N15N5 INFINEON | $T_j (max) = 175^{\circ}C$ $P_j = 1.2\ W$ $T_j = T_c + ((\theta_{j-c}) \times P_j) = 96.9^{\circ}C$ D.F. = 55.4 % | | $\theta_{j-c} = 0.7^{\circ}C/W$ $\Delta T_c = 46^{\circ}C$ | $T_c = 96^{\circ}C$ |
| Q107 TK31V60W TOSHIBA | $T_{ch} (max) = 150^{\circ}C$ $P_{ch} = 1.6W$ $T_{ch} = T_c + ((\theta_{ch-c}) \times P_{ch}) = 99.9^{\circ}C$ D.F. = 66.6% | | $\theta_{ch-c} = 0.52^{\circ}C/W$ $\Delta T_c = 49^{\circ}C$ | $T_c = 99^{\circ}C$ |
| D1 D25XB60 SHINDENGEN | $T_j (max) = 150^{\circ}C$ $P_d = 1.7W$ $T_j = T_c + ((\theta_{j-c}) \times P_d) = 106.7^{\circ}C$ D.F. = 71.2 % | | $\theta_{j-c} = 1.0^{\circ}C/W$ $\Delta T_c = 55^{\circ}C$ | $T_c = 105^{\circ}C$ |
| D2 SCS306AHGC9 ROHM | $T_j (max) = 175^{\circ}C$ $P_d = 1.0\ W$ $T_j = T_c + ((\theta_{j-c}) \times P_d) = 107.2^{\circ}C$ D.F. = 61.3 % | | $\theta_{j-c} = 3.2^{\circ}C/W$ $\Delta T_c = 54^{\circ}C$ | $T_c = 104^{\circ}C$ |
| D3 SCS306AHGC9 ROHM | $T_j (max) = 175^{\circ}C$ $P_d = 1.0\ W$ $T_j = T_c + ((\theta_{j-c}) \times P_d) = 108.2^{\circ}C$ D.F. = 61.9 % | | $\theta_{j-c} = 3.2^{\circ}C/W$ $\Delta T_c = 55^{\circ}C$ | $T_c = 105^{\circ}C$ |

| 部品番号 Location No. | $V_{in} = 100VAC$ $I_{out} = Full\ load$ Standby = Full load $T_a = 50^{\circ}C$ |
|--------------------------------|---|
| A1 BM2P061EK ROHM | $T_j (max) = 150^{\circ}C$ $P_j = 0.5\ W$ $T_j = T_c + ((\theta_{j-c}) \times P_j) = 110.0^{\circ}C$ D.F. = 73.4 % |
| A829 TLV62150ARGTT TI | $T_j (max) = 125^{\circ}C$ $P_j = 0.5\ W$ $T_j = T_c + ((\theta_{j-c}) \times P_j) = 87.3^{\circ}C$ D.F. = 69.9 % |
| PC601 TLP785F TOSHIBA | $T_j (max) = 125^{\circ}C$ $P_d = 3.8\ mW$ $T_j = T_a + ((\theta_{j-a}) \times P_d) = 76.6^{\circ}C$ D.F. = 61.3 % |
| PD501 SML-A12M8TT86 ROHM | $I_f = 2.4\ mA$ Allowable $I_f (max) = 17.4mA$ (at $T_a = 79.0^{\circ}C$) D.F. = 13.8% |

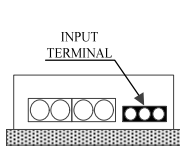
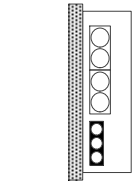
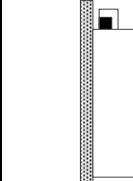
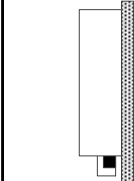
| 部品番号 Location No. | $V_{in} = 200VAC$ $I_{out} = Full\ load$ $Standby = Full\ load$ $T_a = 50^{\circ}C$ | |
|-------------------------------------|--|---|
| Q1 STP40N65M2 STMICRO | $T_{ch} (max) = 150^{\circ}C$ $P_{ch} = 3.5\ W$ $T_{ch} = T_c + ((\theta_{ch-c}) \times P_{ch}) = 94.8^{\circ}C$ D.F. = 63.2 % | $\theta_{ch-c} = 0.5^{\circ}C/W$ $\Delta T_c = 43^{\circ}C$ $T_c = 93^{\circ}C$ |
| Q2 STP40N65M2 STMICRO | $T_{ch} (max) = 150^{\circ}C$ $P_{ch} = 3.5\ W$ $T_{ch} = T_c + ((\theta_{ch-c}) \times P_{ch}) = 91.8^{\circ}C$ D.F. = 61.2 % | $\theta_{ch-c} = 0.5^{\circ}C/W$ $\Delta T_c = 40^{\circ}C$ $T_c = 90^{\circ}C$ |
| Q3 TK20A60W5 TOSHIBA | $T_{ch} (max) = 150^{\circ}C$ $P_{ch} = 1.6\ W$ $T_{ch} = T_c + ((\theta_{ch-c}) \times P_{ch}) = 99.5^{\circ}C$ D.F. = 66.4 % | $\theta_{ch-c} = 2.78^{\circ}C/W$ $\Delta T_c = 45^{\circ}C$ $T_c = 95^{\circ}C$ |
| Q4 TK20A60W5 TOSHIBA | $T_{ch} (max) = 150^{\circ}C$ $P_{ch} = 1.9\ W$ $T_{ch} = T_c + ((\theta_{ch-c}) \times P_{ch}) = 103.3^{\circ}C$ D.F. = 68.9 % | $\theta_{ch-c} = 2.78^{\circ}C/W$ $\Delta T_c = 48^{\circ}C$ $T_c = 98^{\circ}C$ |
| Q5 TK20A60W5 TOSHIBA | $T_{ch} (max) = 150^{\circ}C$ $P_{ch} = 1.9\ W$ $T_{ch} = T_c + ((\theta_{ch-c}) \times P_{ch}) = 103.3^{\circ}C$ D.F. = 68.9 % | $\theta_{ch-c} = 2.78^{\circ}C/W$ $\Delta T_c = 48^{\circ}C$ $T_c = 98^{\circ}C$ |
| Q6 TK20A60W5 TOSHIBA | $T_{ch} (max) = 150^{\circ}C$ $P_{ch} = 2.0\ W$ $T_{ch} = T_c + ((\theta_{ch-c}) \times P_{ch}) = 104.6^{\circ}C$ D.F. = 69.8 % | $\theta_{ch-c} = 2.78^{\circ}C/W$ $\Delta T_c = 49^{\circ}C$ $T_c = 99^{\circ}C$ |
| Q51, Q52 IPP076N15N5 INFINEON | $T_j (max) = 175^{\circ}C$ $P_j = 1.4\ W$ $T_j = T_c + ((\theta_{j-c}) \times P_j) = 107.0^{\circ}C$ D.F. = 61.2 % | $\theta_{j-c} = 0.7^{\circ}C/W$ $\Delta T_c = 56^{\circ}C$ $T_c = 106^{\circ}C$ |
| Q53, Q54 IPP076N15N5 INFINEON | $T_j (max) = 175^{\circ}C$ $P_j = 1.4\ W$ $T_j = T_c + ((\theta_{j-c}) \times P_j) = 107.0^{\circ}C$ D.F. = 61.2 % | $\theta_{j-c} = 0.7^{\circ}C/W$ $\Delta T_c = 56^{\circ}C$ $T_c = 106^{\circ}C$ |
| Q107 TK31V60W TOSHIBA | $T_{ch} (max) = 150^{\circ}C$ $P_{ch} = 1.6W$ $T_{ch} = T_c + ((\theta_{ch-c}) \times P_{ch}) = 87.9^{\circ}C$ D.F. = 58.6% | $\theta_{ch-c} = 0.52^{\circ}C/W$ $\Delta T_c = 37^{\circ}C$ $T_c = 87^{\circ}C$ |
| D1 D25XB60 SHINDENGEN | $T_j (max) = 150^{\circ}C$ $P_d = 0.4W$ $T_j = T_c + ((\theta_{j-c}) \times P_d) = 86.4^{\circ}C$ D.F. = 57.6 % | $\theta_{j-c} = 1.0^{\circ}C/W$ $\Delta T_c = 36^{\circ}C$ $T_c = 86^{\circ}C$ |
| D2 SCS306AHGC9 ROHM | $T_j (max) = 175^{\circ}C$ $P_d = 2.0\ W$ $T_j = T_c + ((\theta_{j-c}) \times P_d) = 94.4^{\circ}C$ D.F. = 54.0 % | $\theta_{j-c} = 3.2^{\circ}C/W$ $\Delta T_c = 38^{\circ}C$ $T_c = 88^{\circ}C$ |
| D3 SCS306AHGC9 ROHM | $T_j (max) = 175^{\circ}C$ $P_d = 2.0\ W$ $T_j = T_c + ((\theta_{j-c}) \times P_d) = 95.4^{\circ}C$ D.F. = 54.6 % | $\theta_{j-c} = 3.2^{\circ}C/W$ $\Delta T_c = 39^{\circ}C$ $T_c = 89^{\circ}C$ |

| 部品番号 Location No. | $V_{in} = 200VAC$ | $I_{out} = Full\ load$ | Standby = Full load | $T_a = 50^{\circ}C$ |
|--------------------------------|---|---|---------------------|---------------------|
| A1 BM2P061EK ROHM | $T_j (max) = 150^{\circ}C$ $P_j = 0.5\ W$ $T_j = T_c + ((\theta_{j-c}) \times P_j) = 108.0^{\circ}C$ D.F. = 72.0 % | $\theta_{j-c} = 26^{\circ}C/W$ $\Delta T_c = 45^{\circ}C$ | | $T_c = 95^{\circ}C$ |
| A829 TLV62150ARGTT TI | $T_j (max) = 125^{\circ}C$ $P_j = 0.5\ W$ $T_j = T_c + ((\theta_{j-c}) \times P_j) = 87.3^{\circ}C$ D.F. = 69.9 % | $\theta_{j-c} = 4.5^{\circ}C/W$ $\Delta T_c = 35^{\circ}C$ | | $T_c = 85^{\circ}C$ |
| PC601 TLP785F TOSHIBA | $T_j (max) = 125^{\circ}C$ $P_d = 3.8\ mW$ $T_j = T_a + ((\theta_{j-a}) \times P_d) = 74.6^{\circ}C$ D.F. = 59.7 % | $\theta_{j-a} = 416.7^{\circ}C/W$ $\Delta T_a = 23^{\circ}C$ | | $T_a = 73^{\circ}C$ |
| PD501 SML-A12M8TT86 ROHM | $I_f = 2.4\ mA$ Allowable $I_f (max) = 17.8mA$ (at $T_a=78.0^{\circ}C$) D.F. = 13.5% | $\Delta T_c = 28^{\circ}C$ | | $T_c = 78^{\circ}C$ |

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

MODEL : GXE600-24

(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 |
|--|---|---|--|---|
| |  |  |  |  |
| 入力電圧 V_{in} Input Voltage | 100VAC | | | |
| 出力電圧 V_{out} Output Voltage | 24VDC | | | |
| 出力電流 I_{out} Output Current | Full load | | | |
| スタンバイ電圧、電流 Standby Voltage & Current | 5VDC , Full load | | | |

(2) 測定結果 Measuring Results

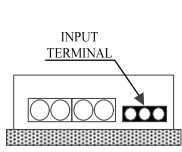
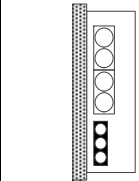
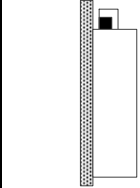
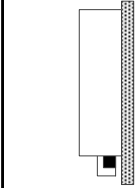
| 出力ディレーティング Output Derating | | ΔT Temperature Rise ($^{\circ}C$) | | | |
|-------------------------------|------------------|---|---------------------|---------------------|---------------------|
| | | Iout = Full load | | | |
| | | Ta = 50 $^{\circ}C$ | Ta = 50 $^{\circ}C$ | Ta = 45 $^{\circ}C$ | Ta = 50 $^{\circ}C$ |
| 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 |
| Q1 | MOS FET | 67 | 64 | 63 | 66 |
| Q2 | MOS FET | 63 | 60 | 58 | 62 |
| Q3 | MOS FET | 43 | 33 | 34 | 47 |
| Q4 | MOS FET | 46 | 39 | 39 | 46 |
| Q5 | MOS FET | 44 | 35 | 36 | 49 |
| Q6 | MOS FET | 47 | 40 | 40 | 47 |
| Q51 | MOS FET | 47 | 42 | 47 | 33 |
| Q52 | MOS FET | 45 | 42 | 46 | 32 |
| Q53 | MOS FET | 46 | 43 | 45 | 33 |
| Q54 | MOS FET | 46 | 44 | 47 | 33 |
| Q107 | MOS FET | 49 | 45 | 44 | 57 |
| D1 | BRIDGE DIODE | 55 | 50 | 51 | 51 |
| D2 | S.B.D. | 54 | 50 | 50 | 52 |
| D3 | S.B.D. | 55 | 51 | 51 | 54 |
| D605 | S.B.D. | 50 | 53 | 45 | 54 |
| A1 | IPD | 47 | 49 | 43 | 57 |
| A302 | IC | 27 | 25 | 25 | 36 |
| A801 | IC | 34 | 45 | 33 | 30 |
| A826 | IC | 27 | 39 | 26 | 25 |
| A829 | IC | 35 | 45 | 27 | 33 |
| T1 | TRANS | 64 | 58 | 63 | 58 |
| T2 | TRANS | 36 | 33 | 30 | 40 |
| T3 | CURRENT TRANS | 33 | 32 | 24 | 35 |

| 出力デレーティング Output Derating | | ΔT Temperature Rise (°C) | | | |
|------------------------------|------------------|--------------------------|--------------------|--------------------|--------------------|
| | | Iout = Full load | | | |
| | | Ta = 50°C | Ta = 50°C | Ta = 45°C | Ta = 50°C |
| 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 |
| T4 | TRANS | 37 | 41 | 37 | 38 |
| T5 | TRANS | 39 | 40 | 36 | 42 |
| L1 | BALUN | 60 | 51 | 60 | 53 |
| L2 | BALUN | 60 | 51 | 59 | 52 |
| L3 | CHOKE COIL | 61 | 53 | 53 | 53 |
| L4 | CHOKE COIL | 61 | 53 | 51 | 60 |
| L23 | CHOKE COIL | 44 | 38 | 51 | 37 |
| L51 | CHOKE COIL | 55 | 46 | 57 | 45 |
| L816 | CHOKE COIL | 33 | 43 | 26 | 31 |
| C10 | E.CAP. | 25 | 22 | 20 | 30 |
| C11 | E.CAP. | 27 | 22 | 22 | 33 |
| C12 | E.CAP. | 27 | 24 | 23 | 34 |
| C13 | E.CAP. | 30 | 24 | 25 | 37 |
| C14 | E.CAP. | 28 | 22 | 23 | 36 |
| C21 | E.CAP. | 16 | 20 | 12 | 35 |
| C51 | E.CAP. | 22 | 19 | 31 | 14 |
| C52 | E.CAP. | 26 | 20 | 32 | 17 |
| C53 | E.CAP. | 27 | 26 | 27 | 20 |
| C54 | E.CAP. | 23 | 19 | 32 | 16 |
| C61 | E.CAP. | 22 | 27 | 18 | 26 |
| C63 | E.CAP. | 20 | 28 | 17 | 27 |
| PC601 | PHOTO COUPLER | 25 | 29 | 21 | 36 |
| PD501 | LED | 29 | 26 | 33 | 26 |

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

MODEL : GXE600-24

(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 |
| |  |  |  |  |
| 入力電圧 V_{in} Input Voltage | 200VAC | | | |
| 出力電圧 V_{out} Output Voltage | 24VDC | | | |
| 出力電流 I_{out} Output Current | Full load | | | |
| スタンバイ電圧、電流 Standby Voltage & Current | 5VDC , Full load | | | |

(2) 測定結果 Measuring Results

| 出力ディレーティング Output Derating | | ΔT Temperature Rise ($^{\circ}C$) | | | |
|-------------------------------|------------------|---|---------------------|---------------------|---------------------|
| | | Iout = Full load | | | |
| | | Ta = 50 $^{\circ}C$ | Ta = 50 $^{\circ}C$ | Ta = 45 $^{\circ}C$ | Ta = 50 $^{\circ}C$ |
| 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 |
| Q1 | MOS FET | 43 | 40 | 40 | 43 |
| Q2 | MOS FET | 40 | 38 | 37 | 40 |
| Q3 | MOS FET | 45 | 34 | 37 | 54 |
| Q4 | MOS FET | 48 | 38 | 42 | 52 |
| Q5 | MOS FET | 48 | 37 | 39 | 56 |
| Q6 | MOS FET | 49 | 39 | 43 | 53 |
| Q51 | MOS FET | 56 | 49 | 55 | 40 |
| Q52 | MOS FET | 55 | 48 | 55 | 39 |
| Q53 | MOS FET | 56 | 50 | 53 | 40 |
| Q54 | MOS FET | 55 | 51 | 55 | 39 |
| Q107 | MOS FET | 37 | 33 | 33 | 44 |
| D1 | BRIDGE DIODE | 36 | 31 | 32 | 34 |
| D2 | S.B.D. | 38 | 34 | 35 | 37 |
| D3 | S.B.D. | 39 | 35 | 35 | 39 |
| D605 | S.B.D. | 48 | 50 | 43 | 54 |
| A1 | IPD | 45 | 45 | 41 | 56 |
| A302 | IC | 25 | 22 | 22 | 33 |
| A801 | IC | 36 | 48 | 35 | 33 |
| A826 | IC | 28 | 41 | 27 | 27 |
| A829 | IC | 35 | 44 | 27 | 36 |
| T1 | TRANS | 75 | 66 | 74 | 70 |
| T2 | TRANS | 35 | 30 | 28 | 41 |
| T3 | CURRENT TRANS | 33 | 31 | 24 | 39 |

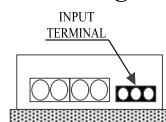
| 出力デレージング Output Derating | | ΔT Temperature Rise (°C) | | | |
|-----------------------------|------------------|--------------------------|--------------------|--------------------|--------------------|
| | | Iout = Full load | | | |
| | | Ta = 50°C | Ta = 50°C | Ta = 45°C | Ta = 50°C |
| 部品番号 Location 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 |
| T4 | TRANS | 36 | 39 | 36 | 41 |
| T5 | TRANS | 39 | 39 | 36 | 45 |
| L1 | BALUN | 33 | 25 | 34 | 27 |
| L2 | BALUN | 36 | 27 | 34 | 30 |
| L3 | CHOKE COIL | 45 | 37 | 38 | 40 |
| L4 | CHOKE COIL | 44 | 37 | 36 | 46 |
| L23 | CHOKE COIL | 28 | 22 | 31 | 22 |
| L51 | CHOKE COIL | 62 | 51 | 64 | 53 |
| L816 | CHOKE COIL | 33 | 41 | 25 | 34 |
| C10 | E.CAP. | 21 | 18 | 17 | 29 |
| C11 | E.CAP. | 22 | 17 | 18 | 29 |
| C12 | E.CAP. | 24 | 18 | 19 | 31 |
| C13 | E.CAP. | 24 | 18 | 19 | 31 |
| C14 | E.CAP. | 23 | 17 | 18 | 30 |
| C21 | E.CAP. | 15 | 18 | 13 | 35 |
| C51 | E.CAP. | 25 | 20 | 33 | 14 |
| C52 | E.CAP. | 29 | 20 | 33 | 19 |
| C53 | E.CAP. | 28 | 27 | 29 | 21 |
| C54 | E.CAP. | 25 | 18 | 33 | 16 |
| C61 | E.CAP. | 23 | 28 | 19 | 27 |
| C63 | E.CAP. | 20 | 24 | 18 | 27 |
| PC601 | PHOTO COUPLER | 23 | 26 | 19 | 35 |
| PD501 | LED | 28 | 30 | 34 | 25 |

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

MODEL : GXE600

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 : ·····

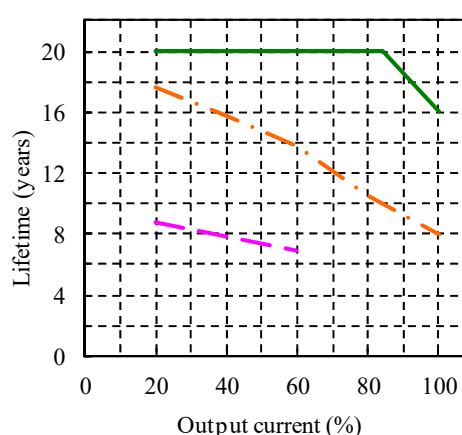
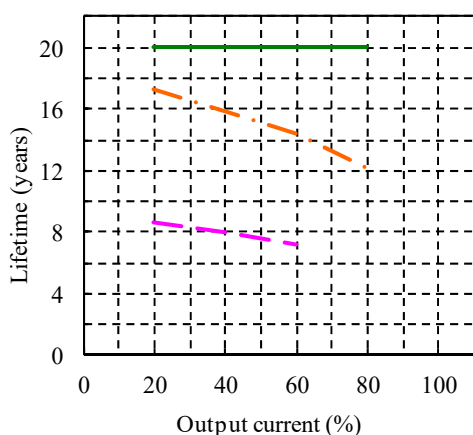
24V

Vin = 100VAC

| Load | Lifetime (years) | | |
|------|------------------|------|------|
| | 40°C | 50°C | 60°C |
| 20% | 20.0 | 17.2 | 8.6 |
| 40% | 20.0 | 15.8 | 7.9 |
| 60% | 20.0 | 14.4 | 7.2 |
| 80% | 20.0 | 12.2 | - |
| 100% | - | - | - |

Vin = 200VAC

| Load | Lifetime (years) | | |
|------|------------------|------|------|
| | 40°C | 50°C | 60°C |
| 20% | 20.0 | 17.6 | 8.8 |
| 40% | 20.0 | 15.8 | 7.9 |
| 60% | 20.0 | 13.8 | 6.9 |
| 80% | 20.0 | 10.5 | - |
| 100% | 16.1 | 8.0 | - |



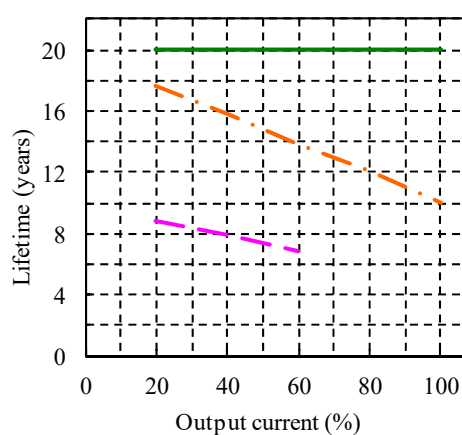
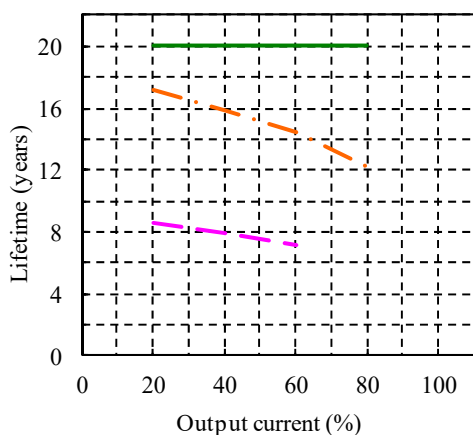
48V

Vin = 100VAC

| Load | Lifetime (years) | | |
|------|------------------|------|------|
| | 40°C | 50°C | 60°C |
| 20% | 20.0 | 17.2 | 8.6 |
| 40% | 20.0 | 15.8 | 7.9 |
| 60% | 20.0 | 14.4 | 7.2 |
| 80% | 20.0 | 12.2 | - |
| 100% | - | - | - |

Vin = 200VAC

| Load | Lifetime (years) | | |
|------|------------------|------|------|
| | 40°C | 50°C | 60°C |
| 20% | 20.0 | 17.6 | 8.8 |
| 40% | 20.0 | 15.8 | 7.9 |
| 60% | 20.0 | 13.8 | 6.9 |
| 80% | 20.0 | 12.1 | - |
| 100% | 20.0 | 10.1 | - |



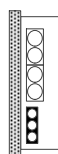
上記推定寿命は、弊社計算方法により算出した値であり、封口ゴムの劣化等の影響を含めておりません。
The lifetime is calculated based on our method and doesn't include the seal rubber degradation effect etc.

MODEL : GXE600

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

取付方向 B
Mounting B

24V



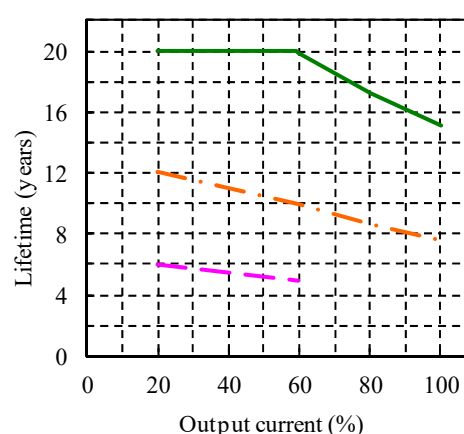
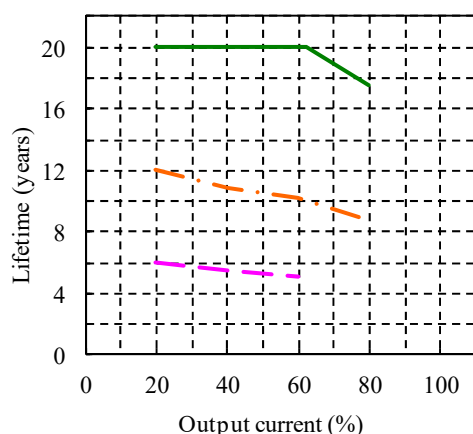
Conditions Ta 40°C : —
50°C : - - -
60°C : - - -

Vin = 100VAC

| Load \ Ta | Lifetime (years) | | |
|-----------|------------------|------|------|
| | 40°C | 50°C | 60°C |
| 20% | 20.0 | 12.1 | 6.0 |
| 40% | 20.0 | 10.9 | 5.4 |
| 60% | 20.0 | 10.2 | 5.1 |
| 80% | 17.6 | 8.8 | - |
| 100% | - | - | - |

Vin = 200VAC

| Load \ Ta | Lifetime (years) | | |
|-----------|------------------|------|------|
| | 40°C | 50°C | 60°C |
| 20% | 20.0 | 12.1 | 6.0 |
| 40% | 20.0 | 11.0 | 5.5 |
| 60% | 19.9 | 10.0 | 5.0 |
| 80% | 17.2 | 8.6 | - |
| 100% | 15.1 | 7.5 | - |



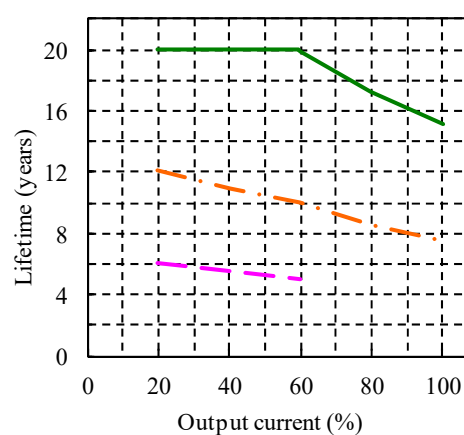
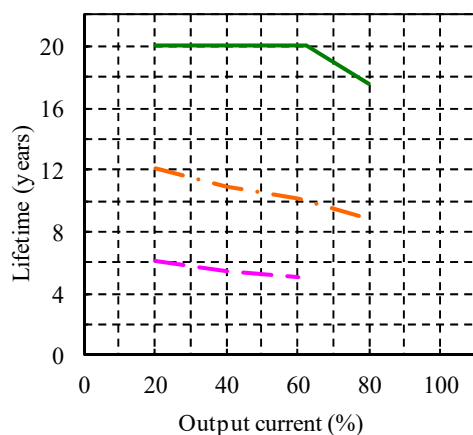
48V

Vin = 100VAC

| Load \ Ta | Lifetime (years) | | |
|-----------|------------------|------|------|
| | 40°C | 50°C | 60°C |
| 20% | 20.0 | 12.1 | 6.0 |
| 40% | 20.0 | 10.9 | 5.4 |
| 60% | 20.0 | 10.2 | 5.1 |
| 80% | 17.6 | 8.8 | - |
| 100% | - | - | - |

Vin = 200VAC

| Load \ Ta | Lifetime (years) | | |
|-----------|------------------|------|------|
| | 40°C | 50°C | 60°C |
| 20% | 20.0 | 12.1 | 6.0 |
| 40% | 20.0 | 11.0 | 5.5 |
| 60% | 19.9 | 10.0 | 5.0 |
| 80% | 17.2 | 8.6 | - |
| 100% | 15.1 | 7.5 | - |



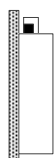
上記推定寿命は、弊社計算方法により算出した値であり、封口ゴムの劣化等の影響を含めておりません。
The lifetime is calculated based on our method and doesn't include the seal rubber degradation effect etc.

MODEL : GXE600

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

取付方向 C
Mounting C

24V



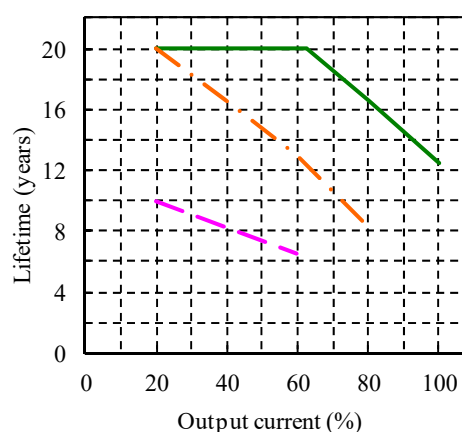
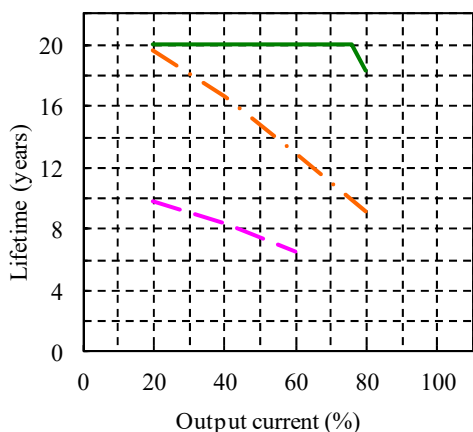
Conditions Ta 40°C : —
50°C : - - -
60°C : - · - · -

Vin = 100VAC

| Load | Lifetime (years) | | |
|------|------------------|------|------|
| | 40°C | 50°C | 60°C |
| 20% | 20.0 | 19.6 | 9.8 |
| 40% | 20.0 | 16.6 | 8.3 |
| 60% | 20.0 | 13.0 | 6.5 |
| 80% | 18.3 | 9.2 | - |
| 100% | - | - | - |

Vin = 200VAC

| Load | Lifetime (years) | | |
|------|------------------|------|------|
| | 40°C | 50°C | 60°C |
| 20% | 20.0 | 20.0 | 10.0 |
| 40% | 20.0 | 16.5 | 8.3 |
| 60% | 20.0 | 13.0 | 6.5 |
| 80% | 16.5 | 8.3 | - |
| 100% | 12.5 | - | - |



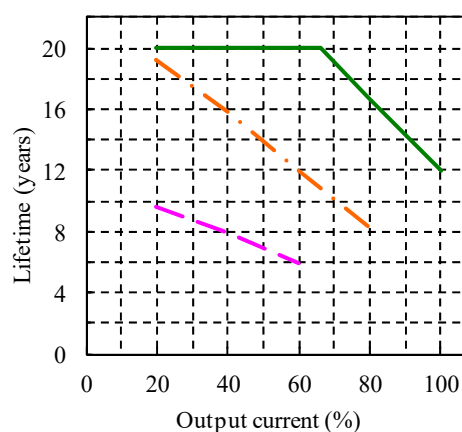
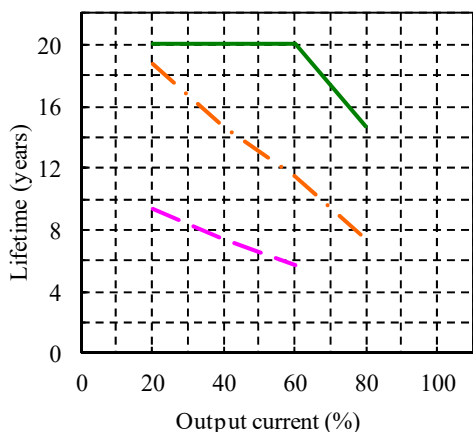
48V

Vin = 100VAC

| Load | Lifetime (years) | | |
|------|------------------|------|------|
| | 40°C | 50°C | 60°C |
| 20% | 20.0 | 18.8 | 9.4 |
| 40% | 20.0 | 14.7 | 7.4 |
| 60% | 20.0 | 11.4 | 5.7 |
| 80% | 14.7 | 7.4 | - |
| 100% | - | - | - |

Vin = 200VAC

| Load | Lifetime (years) | | |
|------|------------------|------|------|
| | 40°C | 50°C | 60°C |
| 20% | 20.0 | 19.2 | 9.6 |
| 40% | 20.0 | 15.8 | 7.9 |
| 60% | 20.0 | 12.0 | 6.0 |
| 80% | 16.7 | 8.3 | - |
| 100% | 12.0 | - | - |



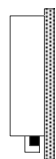
上記推定寿命は、弊社計算方法により算出した値であり、封口ゴムの劣化等の影響を含めておりません。
The lifetime is calculated based on our method and doesn't include the seal rubber degradation effect etc.

MODEL : GXE600

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

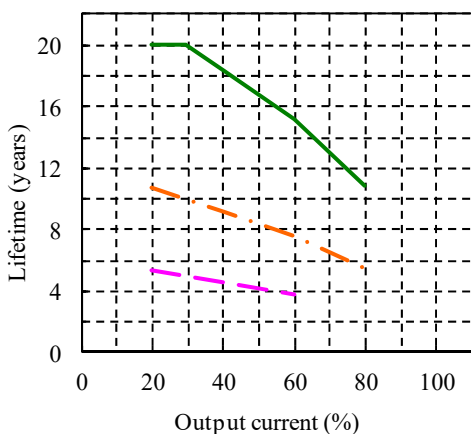
取付方向 D
Mounting D

24V



Vin = 100VAC

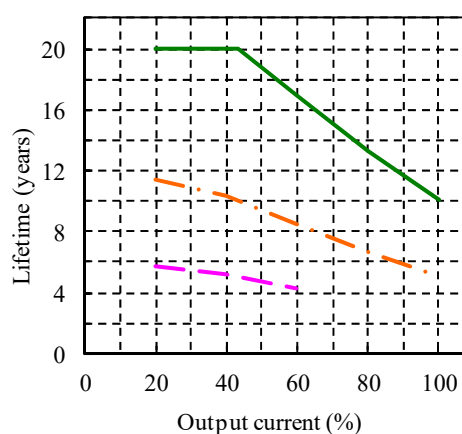
| Load | Ta | Lifetime (years) | | |
|------|----|------------------|------|------|
| | | 40°C | 50°C | 60°C |
| 20% | | 20.0 | 10.7 | 5.4 |
| 40% | | 18.4 | 9.2 | 4.6 |
| 60% | | 15.2 | 7.6 | 3.8 |
| 80% | | 10.9 | 5.5 | - |
| 100% | | - | - | - |



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

Vin = 200VAC

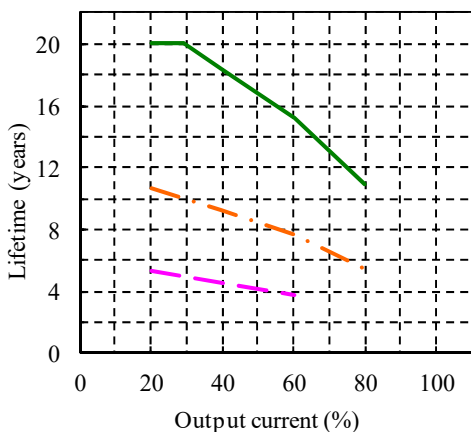
| Load | Ta | Lifetime (years) | | |
|------|----|------------------|------|------|
| | | 40°C | 50°C | 60°C |
| 20% | | 20.0 | 11.4 | 5.7 |
| 40% | | 20.0 | 10.3 | 5.2 |
| 60% | | 17.0 | 8.5 | 4.3 |
| 80% | | 13.3 | 6.6 | - |
| 100% | | 10.1 | 5.1 | - |



48V

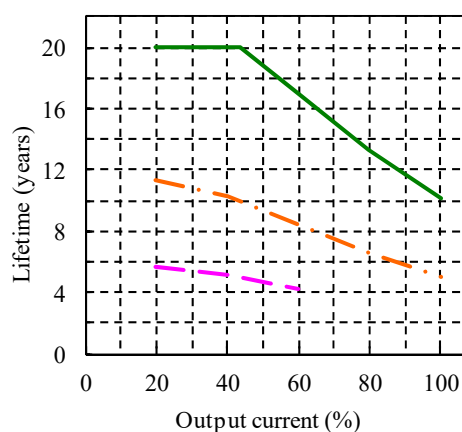
Vin = 100VAC

| Load | Ta | Lifetime (years) | | |
|------|----|------------------|------|------|
| | | 40°C | 50°C | 60°C |
| 20% | | 20.0 | 10.7 | 5.4 |
| 40% | | 18.4 | 9.2 | 4.6 |
| 60% | | 15.2 | 7.6 | 3.8 |
| 80% | | 10.9 | 5.5 | - |
| 100% | | - | - | - |



Vin = 200VAC

| Load | Ta | Lifetime (years) | | |
|------|----|------------------|------|------|
| | | 40°C | 50°C | 60°C |
| 20% | | 20.0 | 11.4 | 5.7 |
| 40% | | 20.0 | 10.3 | 5.2 |
| 60% | | 17.0 | 8.5 | 4.3 |
| 80% | | 13.3 | 6.6 | - |
| 100% | | 10.1 | 5.1 | - |



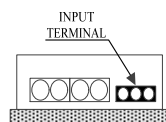
上記推定寿命は、弊社計算方法により算出した値であり、封口ゴムの劣化等の影響を含めておりません。
The lifetime is calculated based on our method and doesn't include the seal rubber degradation effect etc.

MODEL : GXE600/A

カバー付きタイプオプション With cover type (Option model)

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 : - · - · -

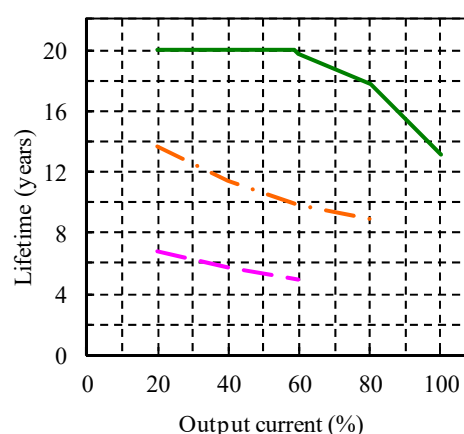
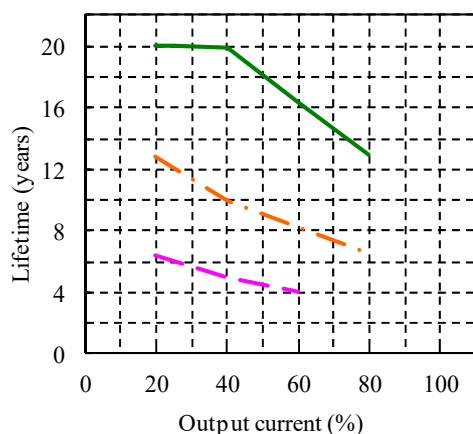
24V

Vin = 100VAC

| Load | Ta | Lifetime (years) | | |
|------|----|------------------|------|------|
| | | 40°C | 50°C | 60°C |
| 20% | | 20.0 | 12.8 | 6.4 |
| 40% | | 19.9 | 10.0 | 5.0 |
| 60% | | 16.4 | 8.2 | 4.1 |
| 80% | | 13.0 | 6.5 | - |
| 100% | | - | - | - |

Vin = 200VAC

| Load | Ta | Lifetime (years) | | |
|------|----|------------------|------|------|
| | | 40°C | 50°C | 60°C |
| 20% | | 20.0 | 13.6 | 6.8 |
| 40% | | 20.0 | 11.4 | 5.7 |
| 60% | | 19.8 | 9.9 | 4.9 |
| 80% | | 17.7 | 8.9 | - |
| 100% | | 13.1 | - | - |



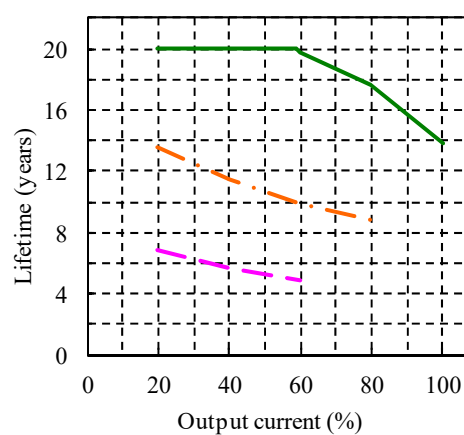
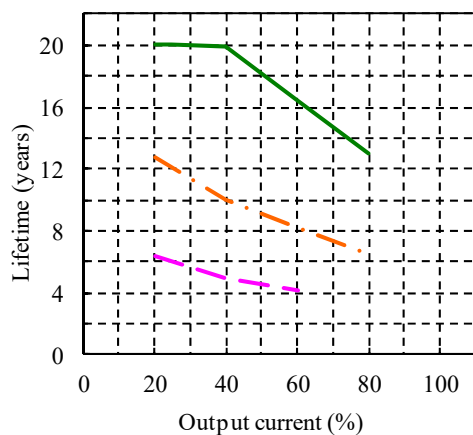
48V

Vin = 100VAC

| Load | Ta | Lifetime (years) | | |
|------|----|------------------|------|------|
| | | 40°C | 50°C | 60°C |
| 20% | | 20.0 | 12.8 | 6.4 |
| 40% | | 19.9 | 10.0 | 5.0 |
| 60% | | 16.4 | 8.2 | 4.1 |
| 80% | | 13.0 | 6.5 | - |
| 100% | | - | - | - |

Vin = 200VAC

| Load | Ta | Lifetime (years) | | |
|------|----|------------------|------|------|
| | | 40°C | 50°C | 60°C |
| 20% | | 20.0 | 13.6 | 6.8 |
| 40% | | 20.0 | 11.4 | 5.7 |
| 60% | | 19.8 | 9.9 | 4.9 |
| 80% | | 17.7 | 8.9 | - |
| 100% | | 13.9 | - | - |



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 : GXE600/A

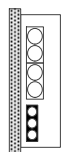
カバー付きタイプオプション With cover type (Option model)

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

取付方向 B

Mounting B

24V



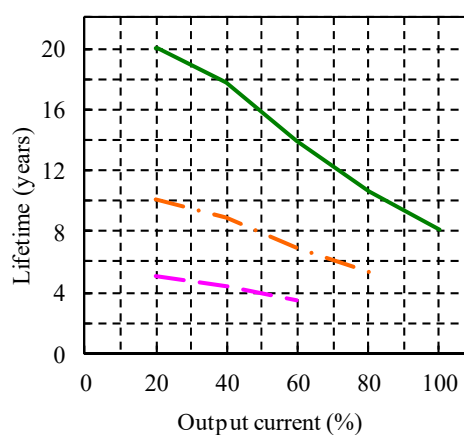
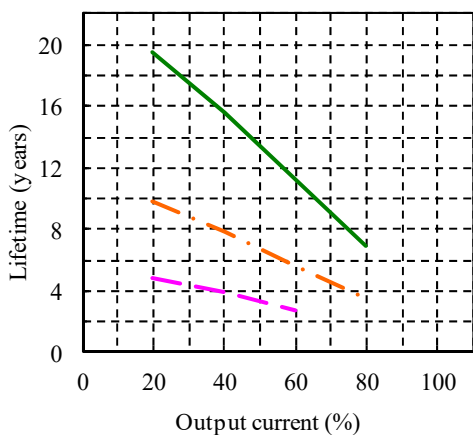
Conditions Ta 40°C : —
50°C : - - -
60°C : - · - · -

Vin = 100VAC

| Load | Lifetime (years) | | |
|------|------------------|------|------|
| | 40°C | 50°C | 60°C |
| 20% | 19.5 | 9.8 | 4.9 |
| 40% | 15.6 | 7.8 | 3.9 |
| 60% | 11.2 | 5.6 | 2.8 |
| 80% | 6.9 | 3.5 | - |
| 100% | - | - | - |

Vin = 200VAC

| Load | Lifetime (years) | | |
|------|------------------|------|------|
| | 40°C | 50°C | 60°C |
| 20% | 20.0 | 10.0 | 5.0 |
| 40% | 17.7 | 8.9 | 4.4 |
| 60% | 13.9 | 6.9 | 3.5 |
| 80% | 10.7 | 5.3 | - |
| 100% | 8.1 | - | - |



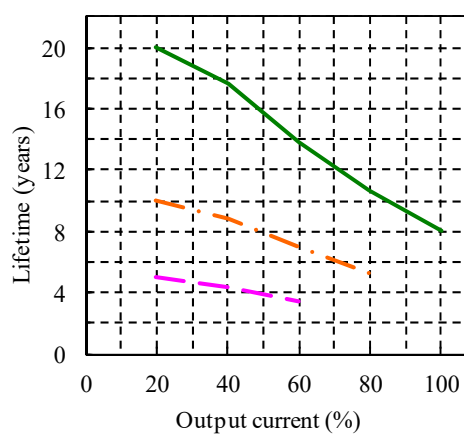
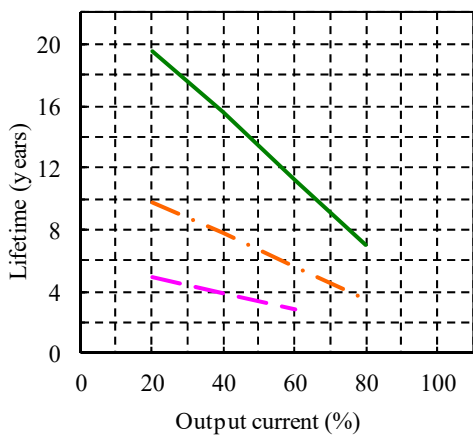
48V

Vin = 100VAC

| Load | Lifetime (years) | | |
|------|------------------|------|------|
| | 40°C | 50°C | 60°C |
| 20% | 19.5 | 9.8 | 4.9 |
| 40% | 15.6 | 7.8 | 3.9 |
| 60% | 11.2 | 5.6 | 2.8 |
| 80% | 6.9 | 3.5 | - |
| 100% | - | - | - |

Vin = 200VAC

| Load | Lifetime (years) | | |
|------|------------------|------|------|
| | 40°C | 50°C | 60°C |
| 20% | 20.0 | 10.0 | 5.0 |
| 40% | 17.7 | 8.9 | 4.4 |
| 60% | 13.9 | 6.9 | 3.5 |
| 80% | 10.7 | 5.3 | - |
| 100% | 8.1 | - | - |



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.

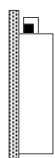
MODEL : GXE600/A

カバー付きタイプオプション **With cover type (Option model)**

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

取付方向 C
Mounting C

24V



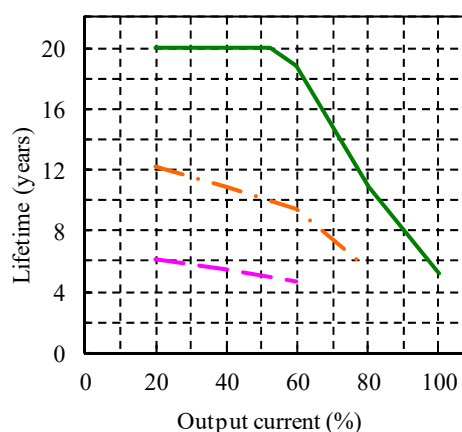
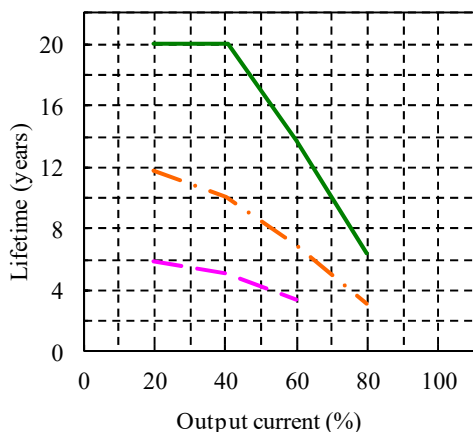
Conditions Ta 40°C : —
50°C : - - -
60°C : - - -

Vin = 100VAC

| Load | Ta | Lifetime (years) | | |
|------|----|------------------|------|------|
| | | 40°C | 50°C | 60°C |
| 20% | | 20.0 | 11.8 | 5.9 |
| 40% | | 20.0 | 10.1 | 5.0 |
| 60% | | 13.8 | 6.9 | 3.4 |
| 80% | | 6.4 | 3.2 | - |
| 100% | | - | - | - |

Vin = 200VAC

| Load | Ta | Lifetime (years) | | |
|------|----|------------------|------|------|
| | | 40°C | 50°C | 60°C |
| 20% | | 20.0 | 12.3 | 6.1 |
| 40% | | 20.0 | 10.9 | 5.4 |
| 60% | | 18.8 | 9.4 | 4.7 |
| 80% | | 10.9 | 5.4 | - |
| 100% | | 5.3 | - | - |



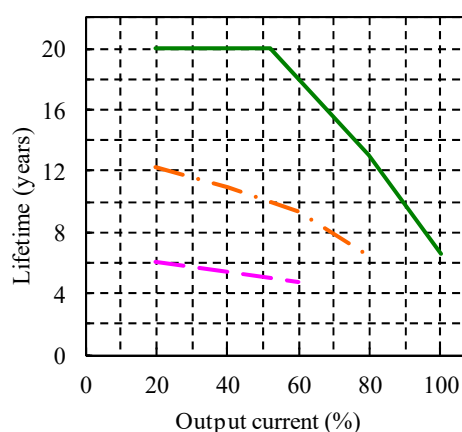
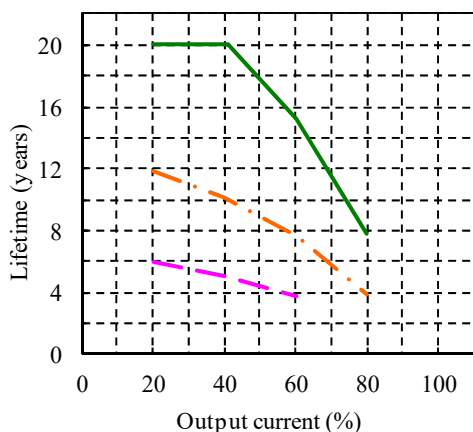
48V

Vin = 100VAC

| Load | Ta | Lifetime (years) | | |
|------|----|------------------|------|------|
| | | 40°C | 50°C | 60°C |
| 20% | | 20.0 | 11.8 | 5.9 |
| 40% | | 20.0 | 10.1 | 5.0 |
| 60% | | 15.2 | 7.6 | 3.8 |
| 80% | | 7.7 | 3.9 | - |
| 100% | | - | - | - |

Vin = 200VAC

| Load | Ta | Lifetime (years) | | |
|------|----|------------------|------|------|
| | | 40°C | 50°C | 60°C |
| 20% | | 20.0 | 12.3 | 6.1 |
| 40% | | 20.0 | 10.9 | 5.4 |
| 60% | | 20.0 | 9.4 | 4.7 |
| 80% | | 13.0 | 6.5 | - |
| 100% | | 6.6 | - | - |



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.

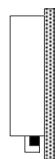
MODEL : GXE600/A

カバー付きタイプオプション **With cover type (Option model)**

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

取付方向 D
Mounting D

24V



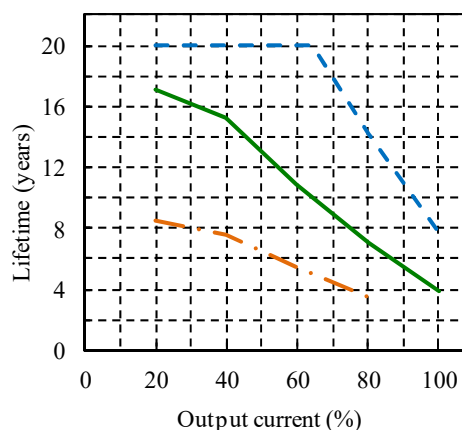
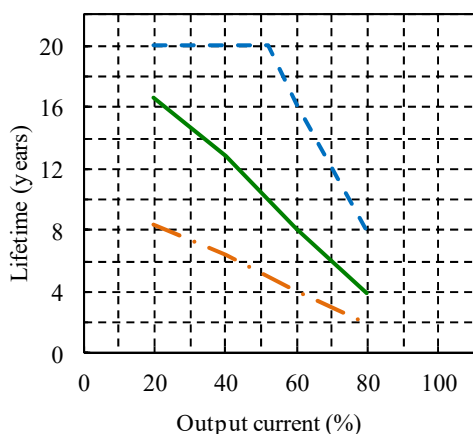
Conditions Ta 30°C : - - - -
40°C : ————
50°C : - · - · -

Vin = 100VAC

| Load | Ta | Lifetime (years) | | |
|------|----|------------------|------|------|
| | | 30°C | 40°C | 50°C |
| 20% | | 20.0 | 16.6 | 8.3 |
| 40% | | 20.0 | 12.8 | 6.4 |
| 60% | | 16.2 | 8.1 | 4.1 |
| 80% | | 7.9 | 4.0 | 2.0 |
| 100% | | - | - | - |

Vin = 200VAC

| Load | Ta | Lifetime (years) | | |
|------|----|------------------|------|------|
| | | 30°C | 40°C | 50°C |
| 20% | | 20.0 | 17.1 | 8.6 |
| 40% | | 20.0 | 15.2 | 7.6 |
| 60% | | 20.0 | 10.9 | 5.4 |
| 80% | | 14.1 | 7.1 | 3.5 |
| 100% | | 7.7 | 3.9 | - |



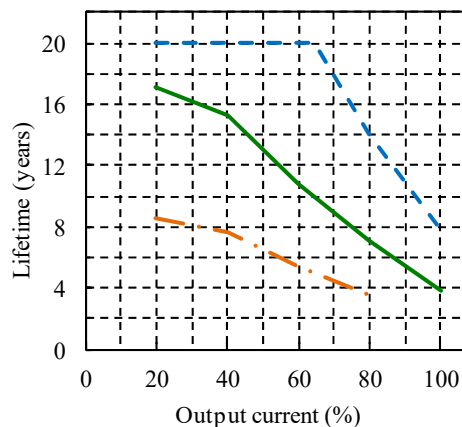
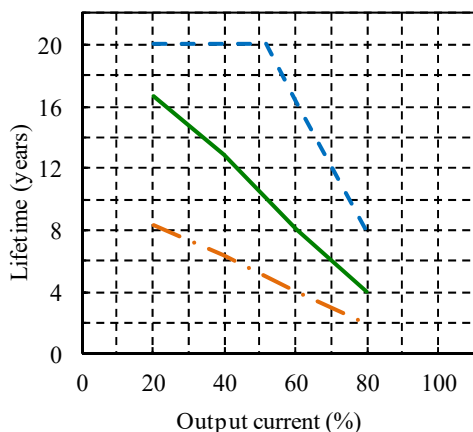
48V

Vin = 100VAC

| Load | Ta | Lifetime (years) | | |
|------|----|------------------|------|------|
| | | 30°C | 40°C | 50°C |
| 20% | | 20.0 | 16.6 | 8.3 |
| 40% | | 16.2 | 12.8 | 6.4 |
| 60% | | 16.2 | 8.1 | 4.1 |
| 80% | | 7.9 | 4.0 | 2.0 |
| 100% | | - | - | - |

Vin = 200VAC

| Load | Ta | Lifetime (years) | | |
|------|----|------------------|------|------|
| | | 30°C | 40°C | 50°C |
| 20% | | 20.0 | 17.1 | 8.6 |
| 40% | | 20.0 | 15.2 | 7.6 |
| 60% | | 20.0 | 10.9 | 5.4 |
| 80% | | 14.1 | 7.1 | 3.5 |
| 100% | | 7.7 | 3.9 | - |



上記推定寿命は、弊社計算方法により算出した値であり、封ロ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 : GXE600-48

(1) 試験条件 Test Conditions

Input : 265VAC Output : 48V, Full load Standby : 5V, Full load 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 | OPP | 出力断 No output | 変化なし No change | | その他 Others |
| 1 | Q1 | D-S | ○ | | | | | | | | ○ | | | ○ | | | Da:F1 |
| 2 | | D-G | ○ | | | | | | | ○ | ○ | | | ○ | | | Da:F1,Q1 |
| 3 | | G-S | ○ | | | | | | | | | | | | | | ○ 入力電力増加 Input power increase |
| 4 | | D | | ○ | | | | | | | | | | | | | ○ 入力電力増加 Input power increase |
| 5 | | S | | ○ | | | | | | | | | | | | | ○ 入力電力増加 Input power increase |
| 6 | | G | | ○ | | | | | | | ○ | ○ | | | ○ | | Da:F1,Q1 |
| 7 | Q2 | D-S | ○ | | | | | | | | ○ | | | ○ | | | Da:F1 |
| 8 | | D-G | ○ | | | | | | | ○ | ○ | | | ○ | | | Da:F1,Q2 |
| 9 | | G-S | ○ | | | | | | | | | | | | | | ○ 入力電力増加 Input power increase |
| 10 | | D | | ○ | | | | | | | | | | | | | ○ 入力電力増加 Input power increase |
| 11 | | S | | ○ | | | | | | | | | | | | | ○ 入力電力増加 Input power increase |
| 12 | G | | ○ | | | | | | | ○ | ○ | | | ○ | | Da:F1,Q2 | |
| 13 | Q3 | D-S | ○ | | | | | | | | | | | ○ | ○ | | |
| 14 | | D-G | ○ | | | | | | | ○ | | | | ○ | ○ | | Da:Q3 |
| 15 | | G-S | ○ | | | | | | | | | | | | | | ○ 出力電圧低下 Output voltage decrease |
| 16 | | D | | ○ | | | | | | | | | | | | | ○ 出力電圧低下 Output voltage decrease |
| 17 | | S | | ○ | | | | | | | ○ | | | | ○ | | Da:Q3,R117,R118,A501 |
| 18 | G | | ○ | | | | | | | | | | | ○ | ○ | | |
| 19 | Q4 | D-S | ○ | | | | | | | | | | | ○ | ○ | | |
| 20 | | D-G | ○ | | | | | | | ○ | | | | ○ | ○ | | Da:Q4 |
| 21 | | G-S | ○ | | | | | | | | | | | | | | ○ 出力電圧低下 Output voltage decrease |
| 22 | | D | | ○ | | | | | | | | | | | | | ○ 出力電圧低下 Output voltage decrease |
| 23 | | S | | ○ | | | | | | | ○ | | | | ○ | | Da:Q4,R120,R121A501 |
| 24 | | G | | ○ | | | | | | | | | | | ○ | ○ | |

(Da: Damaged)

| No. | Test position | | Test mode | | Test result | | | | | | | | | | | 記事 Note | | |
|--------------|---------------|--------|-----------|------|-------------|-------|-------|---------|---------|------------|-------|-----|-----|-----------|-----------|------------|----------------|-----------------------------------|
| | 部品No. | 試験端子 | ショート | オープン | a | b | c | d | e | f | g | h | i | j | k | | l | |
| | | | | | 発火 | 発煙 | 破裂 | 異臭 | 赤熱 | 破損 | ヒューズ断 | OVP | OCP | 出力断 | 変化なし | | その他 | |
| Location No. | Test point | Short | Open | Fire | Smoke | Burst | Smell | Red hot | Damaged | Fuse blown | | | | No output | No change | Others | | |
| 25 | Q5 | D-S | ○ | | | | | | | | | | | ○ | ○ | | | |
| 26 | | D-G | ○ | | | | | | | ○ | | | | ○ | ○ | | Da: Q5 | |
| 27 | | G-S | ○ | | | | | | | | | | | | | | ○ | 出力電圧低下 Output voltage decrease |
| 28 | | D | | ○ | | | | | | | | | | | | | ○ | 出力電圧低下 Output voltage decrease |
| 29 | | S | | ○ | | | | | | ○ | | | | | ○ | | | Da: Q5,R123,R124,A502 |
| 30 | | G | | ○ | | | | | | | | | | | ○ | ○ | | |
| 31 | | Q6 | D-S | ○ | | | | | | | | | | | ○ | ○ | | |
| 32 | D-G | | ○ | | | | | | | ○ | | | | ○ | ○ | | Da: Q6 | |
| 33 | G-S | | ○ | | | | | | | | | | | | | | ○ | 出力電圧低下 Output voltage decrease |
| 34 | D | | | ○ | | | | | | | | | | | | | ○ | 出力電圧低下 Output voltage decrease |
| 35 | S | | | ○ | | | | | | ○ | | | | | ○ | | | Da: Q6,R126,R127,A502 |
| 36 | G | | | ○ | | | | | | | | | | | ○ | ○ | | |
| 37 | Q51 | D-S | ○ | | | | | | | ○ | | | | ○ | ○ | | Da: Q53 | |
| 38 | | D-G | ○ | | | | | | | ○ | | | | ○ | ○ | | Da: Q51 | |
| 39 | | G-S | ○ | | | | | | | | | | | ○ | ○ | | | |
| 40 | | D | | ○ | | | | | | | | | | | | | ○ | 出力電圧低下 Output voltage decrease |
| 41 | | S | | ○ | | | | | | ○ | | | | ○ | ○ | | | Da: Q51 |
| 42 | | G | | ○ | | | | | | ○ | | | | ○ | ○ | | | Da: Q53 |
| 43 | Q53 | D-S | ○ | | | | | | | ○ | | | | ○ | ○ | | Da: Q51 | |
| 44 | | D-G | ○ | | | | | | | ○ | | | | ○ | ○ | | Da: Q53 | |
| 45 | | G-S | ○ | | | | | | | | | | | ○ | ○ | | | |
| 46 | | D | | ○ | | | | | | | | | | | | | ○ | 出力電圧低下 Output voltage decrease |
| 47 | | S | | ○ | | | | | | ○ | | | | ○ | ○ | | | Da: Q53 |
| 48 | | G | | ○ | | | | | | ○ | | | | ○ | ○ | | | Da: Q51 |
| 49 | Q107 | D-S | ○ | | | | | | | | | | | | | ○ | | |
| 50 | | D-G | ○ | | | | | | | | | | | | | ○ | | |
| 51 | | G-S | ○ | | | | | | | ○ | | | | ○ | | | | Da: TFR1 |
| 52 | | D | | ○ | | | | | | ○ | | | | ○ | | | | Da: TFR1 |
| 53 | | S | | ○ | | | | | | ○ | | | | ○ | | | | Da: TFR1 |
| 54 | | G | | ○ | | | | | | ○ | | | | ○ | | | | Da: TFR1 |
| 55 | D1 | AC-AC | ○ | | | | | | | | ○ | | | ○ | | | Da: F1 | |
| 56 | | DC-DC | ○ | | | | | | | | ○ | | | ○ | | | Da: F1 | |
| 57 | | AC-DC | ○ | | | | | | | | ○ | | | ○ | | | Da: F1 | |
| 58 | | AC | | ○ | | | | | | | | | | | | ○ | | |
| 59 | | DC (+) | | ○ | | | | | | | | | | | | ○ | | |
| 60 | | DC (-) | | ○ | | | | | | | | | | | | ○ | | |
| 61 | D2 | A-K | ○ | | | | | | | | ○ | | | ○ | | | Da: F1 | |
| 62 | | A/K | ○ | | | | | | | ○ | ○ | | | ○ | | | Da: F1, Q1 | |
| 63 | D605 | A-K | ○ | | | | | | | ○ | ○ | | | ○ | | | Da: F3,A1,R233 | |
| 64 | | A/K | ○ | | | | | | | | | | | ○ | | | | |

(Da : Damaged)

| No. | Test position | | Test mode | | Test result | | | | | | | | | | | 記事 Note | |
|--------------|---------------|-------|-----------|------|-------------|-------|-------|---------|---------|------------|-------|-----|-----------|-----------|--------|--|-----------------------------------|
| | 部品No. | 試験端子 | ショート | オープン | a | b | c | d | e | f | g | h | i | j | k | | l |
| | | | | | 発火 | 発煙 | 破裂 | 異臭 | 赤熱 | 破損 | ヒューズ断 | OVP | OCP | 出力断 | 変化なし | | その他 |
| Location No. | Test point | Short | Open | Fire | Smoke | Burst | Smell | Red hot | Damaged | Fuse blown | | | No output | No change | Others | | |
| 65 | T1 | 1-2 | ○ | | | | | | | | | | ○ | ○ | | | |
| 66 | | 3-4 | ○ | | | | | | | | | | ○ | ○ | | | |
| 67 | | 4-5 | ○ | | | | | | | | | | ○ | ○ | | | |
| 68 | | 3-5 | ○ | | | | | | | | | | ○ | ○ | | | |
| 69 | | 1/2 | | ○ | | | | | | | | | | | ○ | | |
| 70 | | 3 | | ○ | | | | | | | | | | | | ○ | 出力電圧低下 Output voltage decrease |
| 71 | | 4 | | ○ | | | | | | | | | | | | ○ | 出力電圧低下 Output voltage decrease |
| 72 | | 5 | | ○ | | | | | | | | | | | ○ | | |
| 73 | | T2 | 1-2 | ○ | | | | | | ○ | ○ | | | ○ | | | Da:F3,A1,R233 |
| 74 | | | 2-3 | ○ | | | | | | ○ | ○ | | | ○ | | | Da:F3,A1,R233 |
| 75 | 1-3 | | ○ | | | | | | | | | | | ○ | | | |
| 76 | 3-4 | | ○ | | | | | | | | ○ | | | ○ | | | Da:F3 |
| 77 | 4-5 | | ○ | | | | | | | | | | | ○ | | | |
| 78 | 6-7 | | ○ | | | | | | | ○ | ○ | | | ○ | | | Da:F3,A1,R233 |
| 79 | 9-10 | | ○ | | | | | | | | | | | ○ | | | |
| 80 | 1/3 | | | ○ | | | | | | | | | | | ○ | | |
| 81 | 2 | | | ○ | | | | | | | | | | | | ○ | |
| 82 | 4/5 | | | ○ | | | | | | ○ | | | | ○ | | | Da:TFR1 |
| 83 | 6/7 | | ○ | | | | | | | | | | ○ | | | | |
| 84 | 9/10 | | ○ | | | | | | | | | | ○ | | | | |
| 85 | T3 | 1-2 | ○ | | | | | | | | | | | | ○ | | |
| 86 | | 3-4 | ○ | | | | | | | | | | | | ○ | | |
| 87 | | 1/2 | | ○ | | | | | | ○ | | | ○ | ○ | | Da:Q3,Q4 | |
| 88 | | 3/4 | | ○ | | | | | | | | | | | ○ | | |
| 89 | T4 | 1-2 | ○ | | | | | | | | | | | | ○ | 出力電圧低下 Output voltage decrease | |
| 90 | | 3-4 | ○ | | | | | | | | | | | | ○ | 出力電圧低下 Output voltage decrease | |
| 91 | | 5-6 | ○ | | | | | | | | | | | | ○ | 出力電圧低下 Output voltage decrease | |
| 92 | | 7-8 | ○ | | | | | | | | | | | | ○ | 出力電圧低下 Output voltage decrease | |
| 93 | | 1/2 | | ○ | | | | | | | | | | | ○ | 出力電圧低下 Output voltage decrease | |
| 94 | | 3/4 | | ○ | | | | | | | | | | | ○ | | |
| 95 | | 5/6 | | ○ | | | | | | | | | | | ○ | | |
| 96 | | 7/8 | | ○ | | | | | | | | | | | ○ | 出力電圧低下 Output voltage decrease | |
| 97 | C51 | | ○ | | | | | | | | | | ○ | ○ | | | |
| 98 | | | ○ | | | | | | | | | | | | ○ | | |
| 99 | C919 | | ○ | | | | | | | | | | | | ○ | Standby supply : 出力断 Standby supply : No output | |
| 100 | | | ○ | | | | | | | | | | | | ○ | | |

6. 振動試験 Vibration Test

MODEL : GXE600-48

(1) 振動試験種類 Vibration Test Class

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

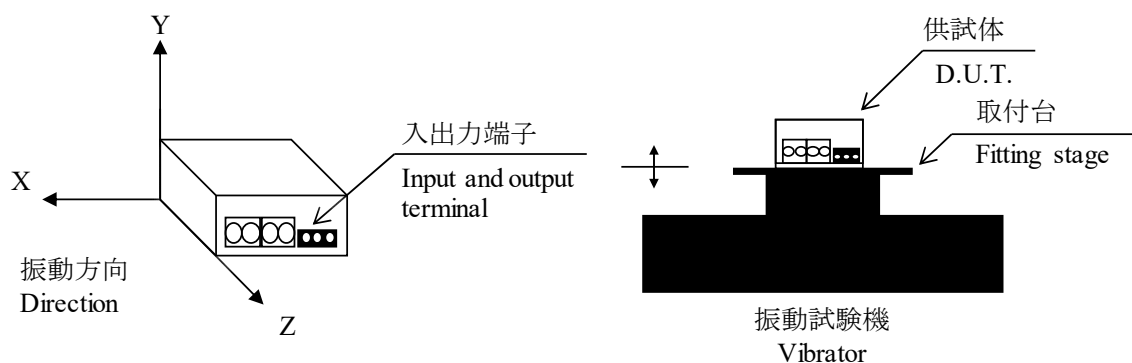
(2) 使用振動試験装置 Equipment Used

IMV CORP. EM2201

(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 | | |

(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 after test.

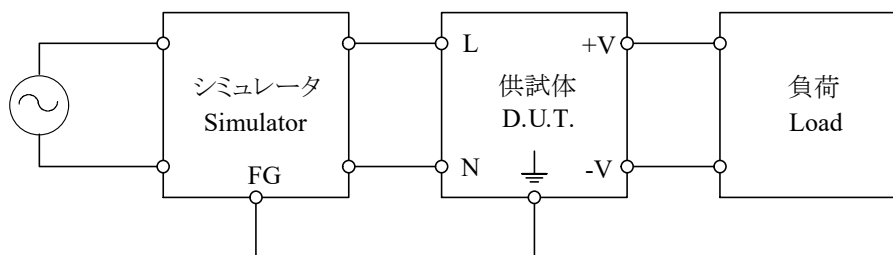
(6) 試験結果 Test Results

合格 OK

7. ノイズシミュレート試験 Noise Simulate Test

MODEL : GXE600-48

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



シミュレータ :INS-AX2-450TH (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 Nominal | • 位相 Phase | : 0 - 360 deg |
| • 出力電流 Output current | : 0%、Full load | • 極性 Polarity | : +、- |
| • スタンバイ電圧 Standby voltage | : 5VDC | • 印加モード Mode | : コモン、ディファレンシヤル Common, Differential |
| • スタンバイ電流 Standby current | : 0%、Full load | • パルス幅 Pulse width | : 50 - 1000ns |
| • 周囲温度 Ambient temperature | : 25°C | • トリガ選択 Trigger select | : Line |

GXEの各種機能は、工場出荷時の設定です。詳細は取扱説明書をご参照ください。
 The various functions of the GXE are factory default settings. Refer to Instruction Manual.

(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

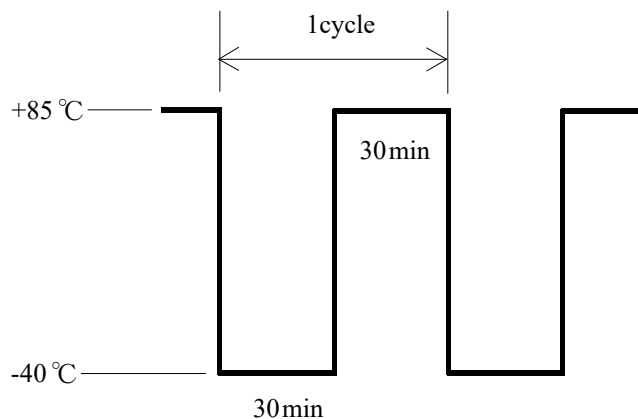
MODEL : GXE600-48

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

ESPEC(株) 製 TSA-73EH
ESPEC CORP.

(2) 試験条件 Test Conditions

- 電源周囲温度 : $-40^{\circ}\text{C} \leftrightarrow 85^{\circ}\text{C}$
Ambient Temperature
- 試験時間 : 図参照
Test Time Refer to Dwg.
- 試験サイクル : 700 サイクル
Test Cycle 700 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。700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. 700 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