



Supplemental test data  
(参考資料)

Date of issue: Jul. 23, 2011

## RELIABILITY Data

Model Number: OZ-060-5

Model Name: DC POWER SUPPLY

INPUT: 85V - 264V AC, 50 / 60 Hz

OUTPUT: 5 V 12.0 A

Minimum load : 0W  
Rated load : 60W

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**Nipron Co., Ltd.**

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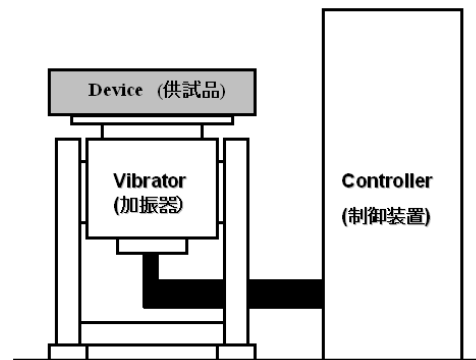
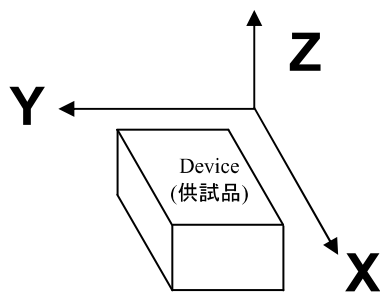
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|       |                        |             |
|-------|------------------------|-------------|
| Model | OZ-060-5               | Judgment    |
| Item  | Vibration Test<br>振動試験 |             |
|       |                        | <b>PASS</b> |

## 1. Test Conditions (試験条件)

|                                |                      |                               |                 |
|--------------------------------|----------------------|-------------------------------|-----------------|
| Ambient Temperature<br>(周囲温度)  | 25°C                 | Vibration Direction<br>(振動方向) | X, Y, Z         |
| Acceleration<br>(加速度)          | 19.6m/s <sup>2</sup> | Vibration Time<br>(振動時間)      | 45 minutes each |
| Vibration Frequency<br>(振動周波数) | 10 - 55Hz            | Sweep Cycle<br>(掃引サイクル)       | 10 cycles       |

## 2. Test Method (試験方法)



### EQUIPMENT USED

| MANUFACTURER     | Controller (制御部) |              | Vibrator (加振部) |        |
|------------------|------------------|--------------|----------------|--------|
| EMIC CORPORATION | MODEL            | F-200-BM-E04 | MODEL          | 903-FN |

## 3. Criteria (判定基準)

1. There shall be no smoke, no fire or no breakdown.  
(発煙、発火、破損なきこと)
2. No output voltage drop with control circuit failure.  
(制御回路の異常による出力電圧の異常なきこと)

## 4. Test Results (試験結果)

Input: 100V AC  
Load: Rated Load

|                      | 5V      | - | Result<br>(結果) |
|----------------------|---------|---|----------------|
| Before Test<br>(試験前) | 4.987V  | - | -              |
| After Test<br>(試験後)  | 4.979 V | - | <b>OK</b>      |

|       |                               |             |
|-------|-------------------------------|-------------|
| Model | OZ-060-5                      | Judgment    |
| Item  | Mechanical Shock Test<br>衝撃試験 |             |
|       |                               | <b>PASS</b> |

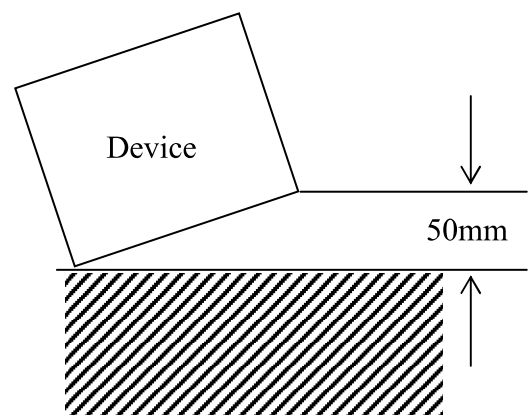
## 1. Test Conditions (試験条件)

Ambient Temperature: 25°C  
(周囲温度)  
Standard: JIS C 60068-2-31  
(規格)  
Height: 50mm  
(高さ)

## 2. Test Method (試験方法)

No failure should be detected by the test that one side of bottom is lifted up (to slant the unit) and, for each of 4 sides, let it fall down 3 times from the position of 50 mm high.

(底部の片側を持ち上げ(ユニットを傾けること)、4面それぞれに対して、高さ50mmの位置から3回落とし異常がないこと。)



## 3. Criteria (判定基準)

1. There shall be no smoke, no fire or no breakdown.  
(発煙、発火、破損なきこと)
2. No output voltage drop with control circuit failure.  
(制御回路の異常による出力電圧の異常なきこと)

## 4. Test Results (試験結果)

Input: 100V AC  
Load: Rated Load

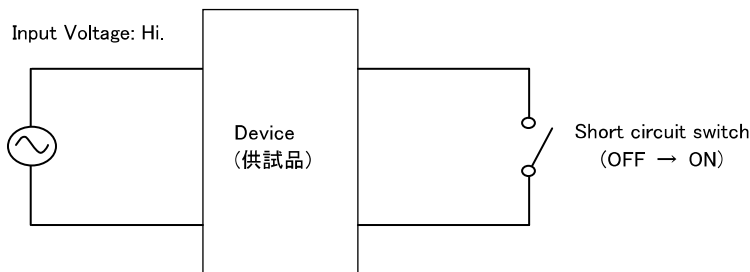
|                      | 5V      | - | Result<br>(結果) |
|----------------------|---------|---|----------------|
| Before Test<br>(試験前) | 4.983 V | - | -              |
| After Test<br>(試験後)  | 4.983 V | - | <b>OK</b>      |

|       |                                     |          |
|-------|-------------------------------------|----------|
| Model | OZ-060-5                            | Judgment |
| Item  | Output Short Circuit Test<br>出力短絡試験 |          |

## 1. Test Conditions (試験条件)

Ambient Temperature: 25°C  
(周囲温度)  
Input Voltage: 100V AC  
(入力電圧)  
Load: Not applied  
(負荷)

## 2. Test Method (試験方法)



## 3. Criteria (判定基準)

There shall be no smoke, no fire or no breakdown.  
(発煙、発火、破損なきこと)

## 4. Test Results (試験結果)

Input: 100V AC  
Load: Rated Load

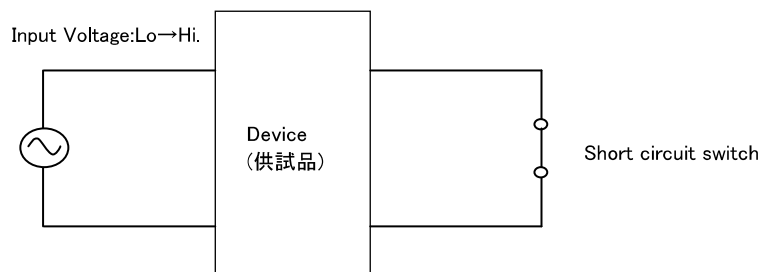
|                      | 5V      | - | Result<br>(結果) |
|----------------------|---------|---|----------------|
| Before Test<br>(試験前) | 4.988 V | - | -              |
| After Test<br>(試験後)  | 4.985 V | - | <b>OK</b>      |

|       |                                       |          |
|-------|---------------------------------------|----------|
| Model | OZ-060-5                              | Judgment |
| Item  | Output Short-Startup Test<br>出力短絡起動試験 |          |

## 1. Test Conditions (試験条件)

Ambient Temperature: 25°C  
(周囲温度)  
Input Voltage: 100V AC  
(入力電圧)  
Load: Not applied  
(負荷)

## 2. Test Method (試験方法)



## 3. Criteria (判定基準)

There shall be no smoke, no fire or no breakdown.  
(発煙、発火、破損なきこと)

## 4. Test Results (試験結果)

Input: 100V AC  
Load: Rated Load

|                      | 5V      | - | Result<br>(結果) |
|----------------------|---------|---|----------------|
| Before Test<br>(試験前) | 4.985 V | - | -              |
| After Test<br>(試験後)  | 4.983 V | - | <b>OK</b>      |

|       |                                     |  |             |
|-------|-------------------------------------|--|-------------|
| Model | OZ-060-5                            |  | Judgment    |
| Item  | Isolation Resistance Test<br>絶縁抵抗試験 |  | <b>PASS</b> |

## 1.Test Conditions (試験条件)

Ambient Temperature: 25°C  
(周囲温度)  
Input Voltage: Not applied  
(入力電圧)  
Load: Not applied  
(負荷)

## 2.Test Method (試験方法)

1. 50MΩ(min) between AC input and FG / DC outputs .  
(AC 入力 対 FG および DC 出力間で 50MΩ 以上であること)
2. 50MΩ(min) between DC outputs and FG.  
(DC 出力 対 FG 間で 50MΩ 以上であること)

Note: measured with a 500 V DC megohm meter.  
(但し、DC500V のメガオームメーターでの測定)

## 3.Criteria (判定基準)

1. There shall be no smoke, no fire or no breakdown.  
(発煙、発火、破損なきこと)
2. No output voltage drop with control circuit failure.  
(制御回路の異常による出力電圧の異常なきこと)

## 4.Test Results (試験結果)

Input:100V AC  
Load: Rated Load

|                      | 5V      | - | Result<br>(結果) |
|----------------------|---------|---|----------------|
| Before Test<br>(試験前) | 4.981 V | - | -              |
| After Test<br>(試験後)  | 4.980 V | - | <b>OK</b>      |

|       |   |  |             |
|-------|---|--|-------------|
| Model | OZ-060-5  |  | Judgment    |
| Item  | Isolation Withstand Voltage Test (High-Pot Test)<br>絶縁耐電圧試験 |  | <b>PASS</b> |

## 1. Test Conditions (試験条件)

Ambient Temperature: 25°C  
(周囲温度)  
Input Voltage: Not applied  
(入力電圧)  
Load: Not applied  
(負荷)

## 2. Test Method (試験方法)

1 minutes at 1.5kV AC between AC input and interconnected FG / DC outputs.  
(AC 入力 対 FG および DC 出力間で AC1.5kV を 1 分間印加すること)

## 3. Criteria (判定基準)

1. There shall be no smoke, no fire or no breakdown.  
(発煙、発火、破損なきこと)
2. No output voltage drop with control circuit failure.  
(制御回路の異常による出力電圧の異常なきこと)

## 4. Test Results (試験結果)

Input: 100V AC  
Load: Rated Load

|                      | 5V      | - | Result<br>(結果) |
|----------------------|---------|---|----------------|
| Before Test<br>(試験前) | 4.990 V | - | -              |
| After Test<br>(試験後)  | 4.895 V | - | <b>OK</b>      |

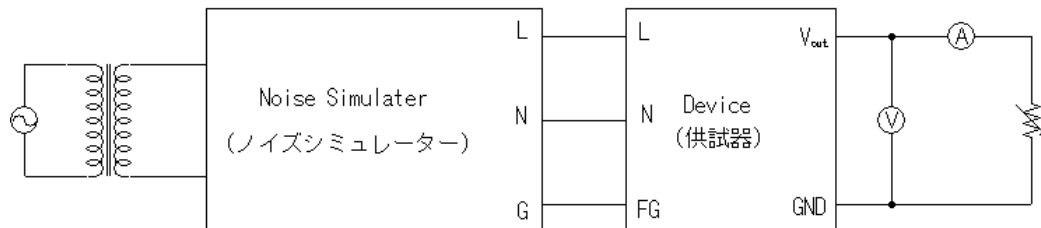


|       |   |             |
|-------|---|-------------|
| Model | OZ-060-5                                | Judgment    |
| Item  | Line Noise Tolerance Test<br>ラインノイズ耐力試験 |             |
|       |   | <b>PASS</b> |

## 1. Test Conditions (試験条件)

|                               |                   |                          |               |
|-------------------------------|-------------------|--------------------------|---------------|
| Ambient Temperature<br>(周囲温度) | 25°C              | Noise Voltage<br>(ノイズ電圧) | ±1kV          |
| Input Voltage<br>(入力電圧)       | 100V AC           | Pulse Width<br>(パルス幅)    | 100, 1000ns   |
| Load<br>(負荷)                  | Rated Load        | Phase<br>(位相)            | 0° - 360°     |
| Test Mode<br>(テストモード)         | Normal and Common | Test Time<br>(試験時間)      | 1 minute each |

## 2. Test Method (試験方法)



### EQUIPMENT USED

|                                       |                     |         |
|---------------------------------------|---------------------|---------|
| MANUFACTURER                          | Simulator (シミュレーター) |         |
| NOISE LABORATORY CO., LTD<br>(ノイズ研究所) | MODEL               | INS-420 |

## 3. Criteria (判定基準)

1. There shall be no smoke, no fire or no breakdown.  
(発煙、発火、破損なきこと)
2. No output voltage drop with control circuit failure.  
(制御回路の異常による出力電圧の異常なきこと)

## 4. Test Results (試験結果)

| Test Mode | Pulse Width | Polarity | Voltage | Result |
|-----------|-------------|----------|---------|--------|
| Normal    | 100ns       | +        | 1kV     | OK     |
|           |             | -        |         | OK     |
| Common    | 1000ns      | +        |         | OK     |
|           |             | -        |         | OK     |

|       |                |          |
|-------|----------------|----------|
| Model | OZ-060-5       | Judgment |
| Item  | MTBF<br>平均故障間隔 |          |

**PASS**

EIAJ RCR-9102 calculate the number by the MTBF EIAJ calculation criteria of stabilized direct current power supply.  
(EIAJ RCR-9102 直流安定化電源の MTBF EIAJ 推奨算出基準に基づき計算する。)

$\lambda_{EQUIP}$  : failure rate of all the device[number of failure units/ $10^6$  hours]  
( $\lambda_{EQUIP}$  : 全機器故障率[故障数/ $10^6$  時間])

$\lambda_G$  : congeneric failure rate for the congeneric parts of at the line of i  
[number of failure units/ $10^6$  hours]  
( $\lambda_G$  : i 番目の同属部品に対する同属故障率[故障数/ $10^6$  時間])

$\pi_Q$  : quality factor for congeneric parts at the line i  
( $\pi_i$  : i 番目の同属部品に対する品質ファクタ)

$N_i$  : number of units of congeneric parts at the line i  
( $N_i$  : i 番目の同属部品の個数)

n : number of categories in different congeneric parts in the device  
(n : 機器内の異なった同属部品のカテゴリの数)

It is adapted ground and fixation and the environment signs G<sub>F</sub> as a general condition in failure rate of parts  $\lambda_G$   
(部品故障率  $\lambda_G$  は、一般的条件として、地上・固定環境記号 G<sub>F</sub> を採用した。)

$$\begin{aligned} \text{MTBF(Hours)} &= (1 / \lambda_{EQUIP}) \times 10^6 \\ &= [1 / \sum_{i=1}^n N_i (\lambda_G)_i] \times 10^6 \\ &= 387293.67 \end{aligned}$$

MTBF : 387,293 hours  
(MTBF: 387,293 時間)