

| DATA SHEET |   | Date      | May.20,1999 |
|------------|---|-----------|-------------|
| Model      | VAF5  | Temp.     | 25 °C       |
| Test       | Static electricity immunity test<br>静電気放電試験 | Humid.    | 44 %Rh      |
|            |   | Tested by | Y.Hirose    |

1. Method — according to EN61000-4-2 —

(1) Points to be applied voltage

電圧印加箇所

1) Input/Output/FG terminal, Enclosure

入力／出力／FG端子, ケース

(2) Testing shall be satisfied at the lower levels given below

印加電圧はレベル1から4まで順次実施(下表参照)

(3) Change the polarity (+/-) of applied voltage

印加極性 +/- の条件でそれぞれ実施

(4) For the time interval between successive single discharges an initial value of 1s. is recommended.

On preselected points at least ten single discharges shall be applied.

1秒以上の間隔で各ポイント10回実施

(5) Contact discharge method

接触放電で実施

Test levels of EN61000-4-2

| Level                  | 1 | 2 | 3 | 4  | X       |
|------------------------|---|---|---|----|---------|
| Contact discharge [kV] | 2 | 4 | 6 | 8  | Special |
| Air discharge [kV]     | 2 | 4 | 8 | 15 | Special |

2. Conditions

(1) Input : AC230V

(2) Output : Rated output

(3) Ambient temp. : 25±10°C

3. Conditions of Acceptability

According to EN50082-2 (EN61000-4-2 Level 2)

EN50082-2(EN61000-4-2 レベル2)を満足すること

4. Result

| No. | Level | Voltage [kV] | Polarity | Terminal to be tested |       |    |        |        |
|-----|-------|--------------|----------|-----------------------|-------|----|--------|--------|
|     |       |              |          | AC(L)                 | AC(N) | FG | OUT(+) | OUT(-) |
| 1   | 1     | 2            | +        | OK                    | OK    | OK | OK     | OK     |
| 2   |       |              | -        | OK                    | OK    | OK | OK     | OK     |
| 3   | 2     | 4            | +        | OK                    | OK    | OK | OK     | OK     |
| 4   |       |              | -        | OK                    | OK    | OK | OK     | OK     |
| 5   | 3     | 6            | +        | OK                    | OK    | OK | OK     | OK     |
| 6   |       |              | -        | OK                    | OK    | OK | OK     | OK     |
| 7   | 4     | 8            | +        | OK                    | OK    | OK | OK     | OK     |
| 8   |       |              | -        | OK                    | OK    | OK | OK     | OK     |

All are satisfactory to item 3: OK

| DATA SHEET |   | Date      | May.20,1999 |
|------------|---|-----------|-------------|
| Model      | VAF505  | Temp.     | 25 °C       |
| Test       | Radiated, radio-frequency, electromagnetic field immunity test<br>放射無線周波電磁界イミュニティ試験 | Humid.    | 44 %Rh      |
|            |   | Tested by | Y.Hirose    |

## 1. Method — according to ENV50140 —

These tests are defined for measuring the effect that electromagnetic radiation has on the equipment connected. The tests shall be made in a shielded enclosure.

対象機器に対する電磁放射の影響を測定する。試験はシールドルームで行われること。

### (1) Frequency band : 80MHz to 1000MHz

周波数範囲 : 80MHz から 1000MHz

### (2) Test levels

試験レベル

Test levels of ENV50140

| Level | Testing field strength V/m |
|-------|----------------------------|
| 1     | 1                          |
| 2     | 3                          |
| 3     | 10                         |
| X     | Special                    |

## 2. Conditions

- (1) Input : AC230V
- (2) Output : Rated output
- (3) Ambient temp. : 25±10°C

## 3. Conditions of Acceptability

According to EN50082-2 (ENV50140 Level 3)  
EN50082-2 (ENV50140 レベル3)を満足すること

## 4. Result

| No. | Level | Testing field strength [V/m] | Result |
|-----|-------|------------------------------|--------|
| 1   | 1     | 1                            | OK     |
| 2   | 2     | 3                            | OK     |
| 3   | 3     | 10                           | OK     |

All are satisfactory to item 3: OK

| DATA SHEET |   | Date      | May.20,1999 |
|------------|---|-----------|-------------|
| Model      | VAF505  | Temp.     | 25 °C       |
| Test       | Electrical fast transient/burst immunity test<br>電氣的ファーストランジエントバースト試験 | Humid.    | 44 %Rh      |
|            |   | Tested by | Y.Hirose    |

1. Method — according to EN61000-4-4 —
  - (1) Points to be applied voltage  
電圧印加箇所
    - 1) Between input terminal(L) and ground plane  
入力端子(L) — グラントプレーン間
    - 2) Between input terminal(N) and ground plane  
入力端子(N) — グラントプレーン間
    - 3) Between FG terminal and ground plane  
FG端子 — グラントプレーン間
    - 4) Between output terminal and ground plane  
出力端子 — グラントプレーン間
  - (2) Testing shall be satisfied at the lower levels given below  
印加電圧はレベル1から4まで順次実施(下表参照)
  - (3) Change the polarity (+/-) of applied voltage  
印加極性 +/- の条件でそれぞれ実施
  - (4) The period of applied voltage is 1 minute  
電圧印加時間は1分間

Test levels of EN61000-4-4

| Level                 | 1   | 2 | 3 | 4   | X       |
|-----------------------|-----|---|---|-----|---------|
| Voltage peak [kV]     | 0.5 | 1 | 2 | 4   | Special |
| Repetition rate [kHz] | 5   | 5 | 5 | 2.5 | Special |

2. Conditions
  - (1) Input : AC230V
  - (2) Output : Rated output
  - (3) Ambient temp. : 25±10°C
3. Conditions of Acceptability  
According to EN50082-2 (EN61000-4-4 Level 3)  
EN50082-2(EN61000-4-4 レベル3)を満足すること
4. Result

| No. | Level | Voltage [kV] | Polarity | Terminal to be tested |       |    |        |        |
|-----|-------|--------------|----------|-----------------------|-------|----|--------|--------|
|     |       |              |          | AC(L)                 | AC(N) | FG | OUT(+) | OUT(-) |
| 1   | 1     | 0.5          | +        | OK                    | OK    | OK | OK     | OK     |
| 2   |       |              | -        | OK                    | OK    | OK | OK     | OK     |
| 3   | 2     | 1            | +        | OK                    | OK    | OK | OK     | OK     |
| 4   |       |              | -        | OK                    | OK    | OK | OK     | OK     |
| 5   | 3     | 2            | +        | OK                    | OK    | OK | OK     | OK     |
| 6   |       |              | -        | OK                    | OK    | OK | OK     | OK     |
| 7   | 4     | 4            | +        | OK                    | OK    | OK | OK     | OK     |
| 8   |       |              | -        | OK                    | OK    | OK | OK     | OK     |

All are satisfactory to item 3: OK

| DATA SHEET |                                | Date      | May.20,1999 |
|------------|--------------------------------|-----------|-------------|
| Model      | VAF5                           | Temp.     | 25 °C       |
| Test       | Surge immunity test<br>サージ免疫試験 | Humid.    | 44] %Rh     |
|            |                                | Tested by | Y.Hirose    |

## 1. Method — according to EN61000-4-5 —

### (1) Points to be applied voltage

電圧印加箇所

— Line to line (ライン - ライン間 : ノーマル) —

1) Between input terminal (L) and input terminal (N)

入力端子(L) - 入力端子(N)

— Line to FG (ライン - FG間 : コモン) —

2) Between input terminal (L) and FG terminal

入力端子(L) - FG端子

3) Between input terminal (N) and FG terminal

入力端子(N) - FG端子

### (2) Test at the selected levels shown below

印加電圧(レベル)は、下表に従う

### (3) Change the polarity (+/-) of applied voltage

印加極性 +/- の条件でそれぞれ実施

### (4) Number of tests : Six positive and six negative at selected points.

試験の回数 : それぞれの印加箇所、正負各6回試験する

### (5) Repetition rate : maximum 1/min.

繰り返し速度 : 最大1回/分 (1分以上の間隔をおく)

Test levels of EN61000-4-5

| Level             | 1   | 2 | 3 | 4 | X       |
|-------------------|-----|---|---|---|---------|
| Test voltage [kV] | 0.5 | 1 | 2 | 4 | Special |

## 2. Conditions

(1) Input : AC230V

(2) Output : Rated output

(3) Ambient temp. : 25±10°C

## 3. Conditions of Acceptability

Line to line : According to EN50082-2 (EN61000-4-5 Level 3)

ライン - ライン間 (ノーマル) : EN50082-2(EN61000-4-5 レベル3)を満足すること

Line to earth : According to EN50082-2 (EN61000-4-5 Level 4)

ライン - FG間 (コモン) : EN50082-2(EN61000-4-5 レベル4)を満足すること

## 4. Result

| No. | Voltage [kV] | Polarity | Line (L) - Line (N) |
|-----|--------------|----------|---------------------|
| 1   | 0.5          | +        | OK                  |
| 2   |              | -        | OK                  |
| 3   | 1            | +        | OK                  |
| 4   |              | -        | OK                  |
| 5   | 2            | +        | OK                  |
| 6   |              | -        | OK                  |

| No. | Voltage [kV] | Polarity | Line (L) - FG | Line (N) - FG |
|-----|--------------|----------|---------------|---------------|
| 1   | 1            | +        | OK            | OK            |
| 2   |              | -        | OK            | OK            |
| 3   | 2            | +        | OK            | OK            |
| 4   |              | -        | OK            | OK            |
| 5   | 4            | +        | OK            | OK            |
| 6   |              | -        | OK            | OK            |

All are satisfactory to item 3: OK

| DATA SHEET |  | Date      | May.20,1999 |
|------------|--|-----------|-------------|
| Model      | VAF505   | Temp.     | 25 °C       |
| Test       | Immunity to conducted disturbances, induced by radio-frequency fields<br>伝導性無線周波数電磁界イミュニティ試験 | Humid.    | 44 %Rh      |
|            |  | Tested by | Y.Hirose    |

1. Method — according to ENV50141 —

(1) Points to be applied signals

信号印加箇所

1) Between input terminal(L) and terminal(N)

入力端子(L) — 入力端子(N)間

(2) Testing shall be satisfied at the lower levels given below

印加信号はレベル1から3まで順次実施(下表参照)

Test levels of ENV50141

| No. | Level | Frequency range 150kHz - 80MHz |       |
|-----|-------|--------------------------------|-------|
|     |       | Voltage level (e.m.f.)         |       |
|     |       | Vo[dB( $\mu$ V)]               | Vo[V] |
| 1   | 1     | 120                            | 1     |
| 2   | 2     | 130                            | 3     |
| 3   | 3     | 140                            | 10    |
| 4   | X     | Special                        |       |

2. Conditions

- (1) Input : AC230V  
 (2) Output : Rated output  
 (3) Ambient temp. : 25 $\pm$ 10°C

3. Conditions of Acceptability

According to EN50082-2 (ENV50141 Level 3) - IEC61000-4-6  
 EN50082-2(ENV50141 レベル3) - IEC61000-4-6を満足すること

4. Result

| No. | Frequency range 150kHz - 80MHz |                        |       | Result |
|-----|--------------------------------|------------------------|-------|--------|
|     | Level                          | Voltage level (e.m.f.) |       |        |
|     |                                | Vo[dB(μ V)]            | Vo[V] |        |
| 1   | 1                              | 120                    | 1     | OK     |
| 2   | 2                              | 130                    | 3     | OK     |
| 3   | 3                              | 140                    | 10    | OK     |

All are satisfactory to item 3: OK

| DATA SHEET |  | Date      | May.20,1999 |
|------------|--|-----------|-------------|
| Model      | VAF505   | Temp.     | 25 °C       |
| Test       | Voltage dips, short interruptions and voltage variations immunity test<br>電圧ディップ・一時瞬断・変動試験 | Humid.    | 44 %Rh      |
|            |  | Tested by | Y.Hirose    |

## 1. Method — according to EN61000-4-11 —

These tests are defined for evaluating the immunity of switching power supply when subjected to voltage dips, short interruptions and voltage variations.

この試験は、AC入力電圧に電圧低下、一時的遮断及び電圧変動が発生した場合の電源出力特性を評価する。

### (1) Voltage dips test

#### 電圧低下試験

##### Specification 1

- 1) Test level : 30% reduction of input voltage  
試験レベル：入力電圧の30%低下
- 2) The period of dips is 10mS  
低下時間は10mS
- 3) The test shall be made by starting at 0° and 180°, respectively  
試験はそれぞれ0°と180°から開始して行う
- 4) Numbers of tests : 3 times at 0° and 180°  
試験回数：各位相で3回
- 5) Interval : 10s min  
試験間隔：10秒以上

##### Specification 2

- 1) Test level : 60% reduction of input voltage  
試験レベル：入力電圧の60%低下
- 2) The period of interruptions is 100mS  
遮断時間は100mS
- 3) Number of tests : 3 times  
試験の回数：3回
- 4) Interval : 10s min  
試験間隔：10秒以上

### (2) Short interruptions test : 一時的遮断試験

- 1) Test level : 95% reduction of input voltage  
試験レベル：入力電圧の95%低下
- 2) The period of interruptions is 5000mS  
遮断時間は5000mS
- 3) Number of tests : 3 times  
試験の回数：3回
- 4) Interval : 10s min  
試験間隔：10秒以上

### (3) Voltage variations test : 電圧変動試験

- 1) Test level : ±10% variation of input voltage  
試験レベル：入力電圧の±10%変動
- 2) The period of variation is 15 minutes  
変動時間は15分間

## 2. Conditions

- (1) Input : AC230V
- (2) Output : Rated output
- (3) Ambient temp. : 25±10°C

## 3. Conditions of Acceptability

According to EN50082-2 (EN61000-4-11)  
EN50082-2 (EN61000-4-11) を満足すること

## 4. Result

- (1) Voltage dips : OK
- (2) Short interruptions : OK
- (3) Voltage variations : OK

All are satisfactory to item 3: OK