


# DRB100-1

## EVALUATION DATA

### 型式データ

| DWG No. CA801-53-01   |           |             |
|---|-----------|-------------|
| APPD  | CHK       | DWG         |
|  | Roger     | Adolph Wang |
| 6/Aug/13  | 19/Jul/13 | 19/Jul/13   |

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## 使用記号 Terminology used

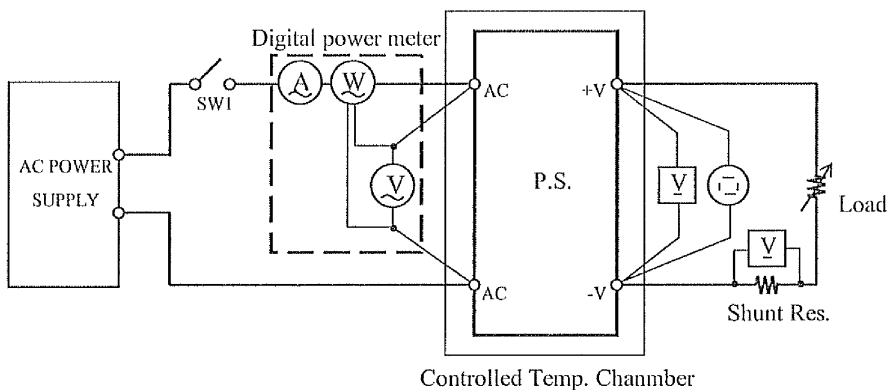
|                  | 定義         | Definition          |
|------------------|------------|---------------------|
| V <sub>in</sub>  | ..... 入力電圧 | Input voltage       |
| V <sub>out</sub> | ..... 出力電圧 | Output voltage      |
| I <sub>in</sub>  | ..... 入力電流 | Input current       |
| I <sub>out</sub> | ..... 出力電流 | Output current      |
| T <sub>a</sub>   | ..... 周囲温度 | Ambient temperature |
| f                | ..... 周波数  | Frequency           |

1. 測定方法 Evaluation Method

1.1 測定回路 Circuit used for determination

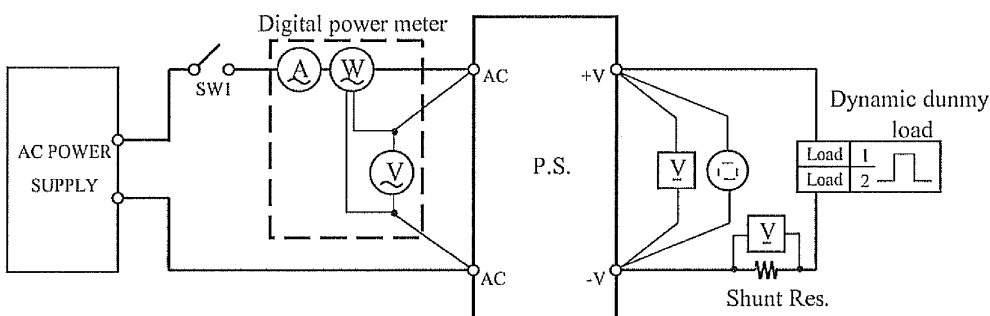
測定回路1 Circuit 1 used for determination

- ・ 静特性 Steady state data
- ・ 過電流保護特性 Over current protection (OCP) characteristics
- ・ 過電圧保護特性 Over voltage protection (OVP) characteristics
- ・ 出力立ち上がり特性 Output rise characteristics
- ・ 出力立ち下がり特性 Output fall characteristics
- ・ 出力保持時間特性 Hold up time characteristics



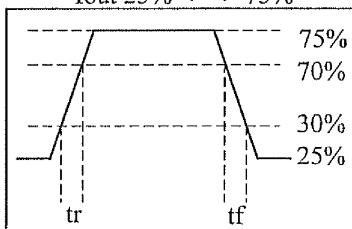
測定回路2 Circuit 2 used for determination

- ・ 過渡応答(負荷急変)特性 Dynamic load response characteristics



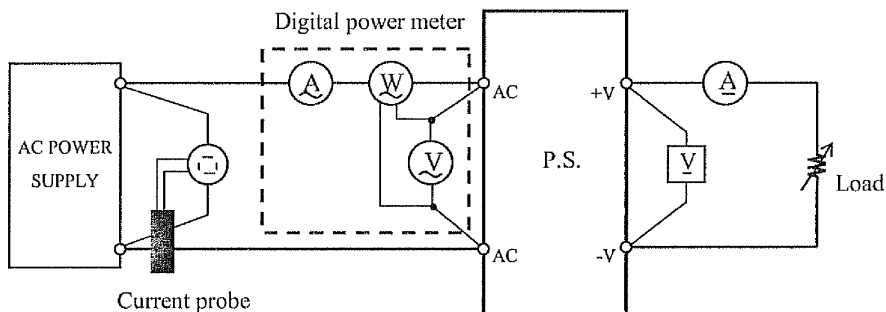
Output current waveform

$I_{out} 25\% \iff 75\%$



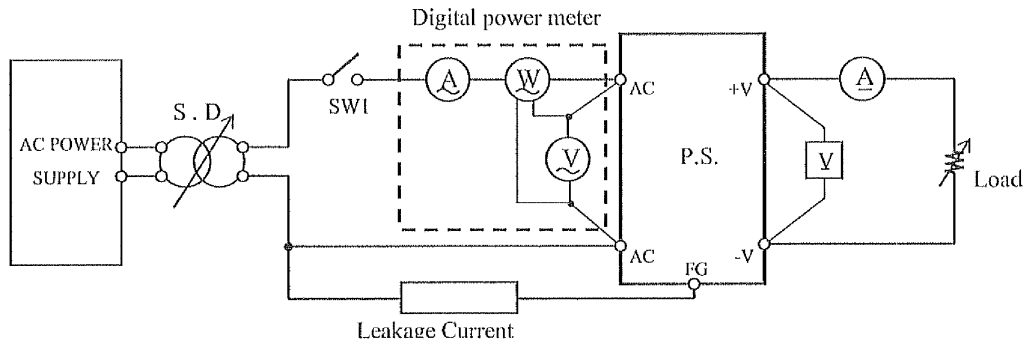
測定回路3 Circuit 3 used for determination

- ・ 入力サージ電流(突入電流)波形 Inrush current waveform



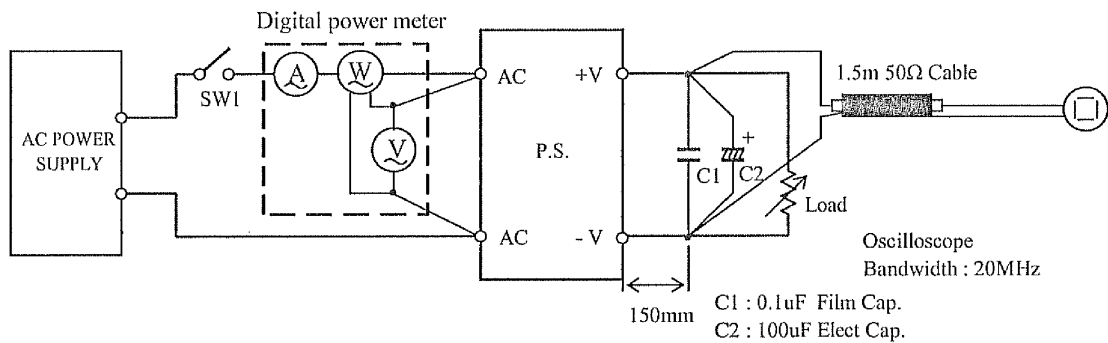
測定回路4 Circuit 4 used for determination

- ・リーク電流特性 Leakage current characteristics



測定回路5 Circuit 5 used for determination

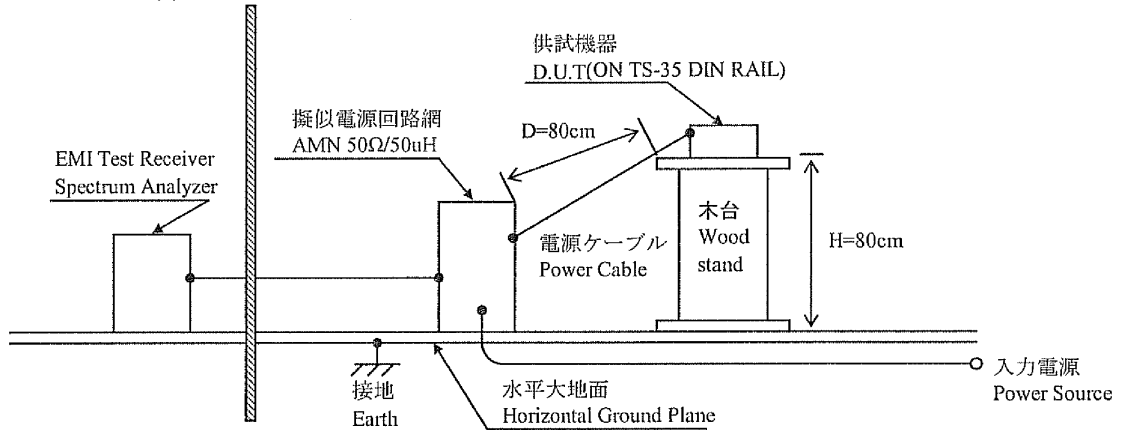
- ・出力リップル、ノイズ波形 Output ripple and noise waveform



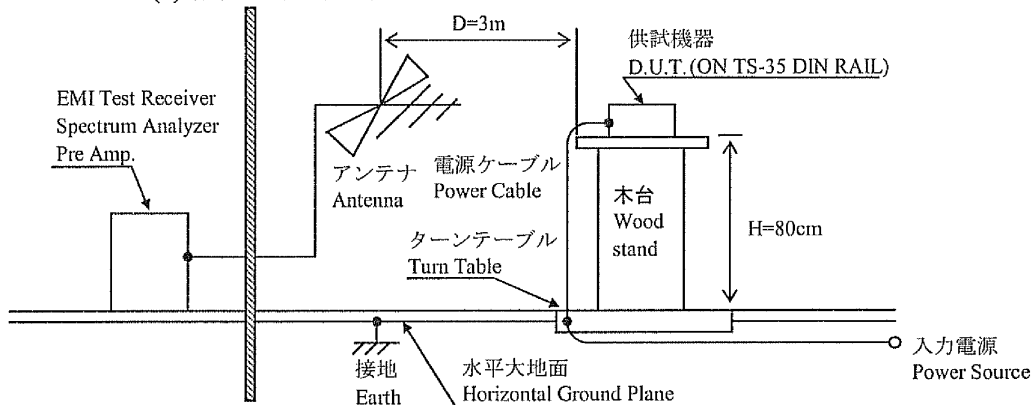
測定構成 Configuration used for determination

- ・EMI特性 Electro-Magnetic Interference characteristics

(a) 雑音端子電圧 (帰還ノイズ) Conducted Emission



(b) 雑音電界強度 (放射ノイズ) Radiated Emission



## 1.2 使用測定機器 List of equipment used

|    | EQUIPMENT USED               | MANUFACTURER    | MODEL NO.     |
|----|------------------------------|-----------------|---------------|
| 1  | DIGITAL STORAGE OSCILLOSCOPE | YOKOGAWA ELECT. | DL2054/DL9040 |
| 2  | DIGITAL MULTIMETER           | AGILENT         | 34970A        |
| 3  | DIGITAL POWER METER          | YOKOGAWA ELECT. | WT210         |
| 4  | CURRENT PROBE                | TEKTRONIX       | 63202         |
| 5  | DC AMPERE METER              | TEKTRONIX       | P5100         |
| 6  | DYNAMIC DUMMY LOAD           | CHROMA          | 63030/63610   |
| 7  | AC SOURCE                    | KIKUSUI         | PCR2000L      |
| 8  | AC SOURCE                    | CHROMA          | 61605         |
| 9  | LEAKAGE CURRENT METER        | SIMPSON         | 228           |
| 10 | CONTROLLED TEMP. CHAMBER     | TABAI-ESPEC     | 63203         |
| 11 | EMI TEST RECEIVER            | ROHDE & SCHWARZ | ESCI-03       |
| 12 | LISN                         | ROHDE & SCHWARZ | ENV216        |
| 13 | BICONICAL ANTENNA            | EMCO            | 63208         |

## 2. 特性データ Characteristics

## 2.1 静特性 Steady state data

(1) 入力・負荷・温度変動／出力起動・遮断電圧

Regulation - line and load, Temperature drift / Start up voltage and Drop out voltage

|     |
|-----|
| 24V |
|-----|

 1. Regulation - line and load Condition Ta : 25 °C

| Iout \ Vin      | 85VAC   | 115VAC  | 230VAC  | 265VAC  | line regulation |        |
|-----------------|---------|---------|---------|---------|-----------------|--------|
| 0%              | 24.172V | 24.168V | 24.167V | 24.168V | 5mV             | 0.021% |
| 50%             | 24.120V | 24.116V | 24.115V | 24.115V | 5mV             | 0.021% |
| 100%            | 24.069V | 24.063V | 24.061V | 24.062V | 8mV             | 0.033% |
| load regulation | 103mV   | 105mV   | 106mV   | 106mV   |                 |        |
|                 | 0.429%  | 0.438%  | 0.442%  | 0.442%  |                 |        |

## 2. Temperature drift

Conditions Vin : 115 VAC  
Iout : 100 %

| Ta   | -10°C   | +25°C   | +55°C   | temperature stability |        |
|------|---------|---------|---------|-----------------------|--------|
| Vout | 24.101V | 24.063V | 23.977V | 124mV                 | 0.517% |

## 3. Start up voltage and Drop out voltage

Conditions Ta : 25 °C  
Iout : 100 %

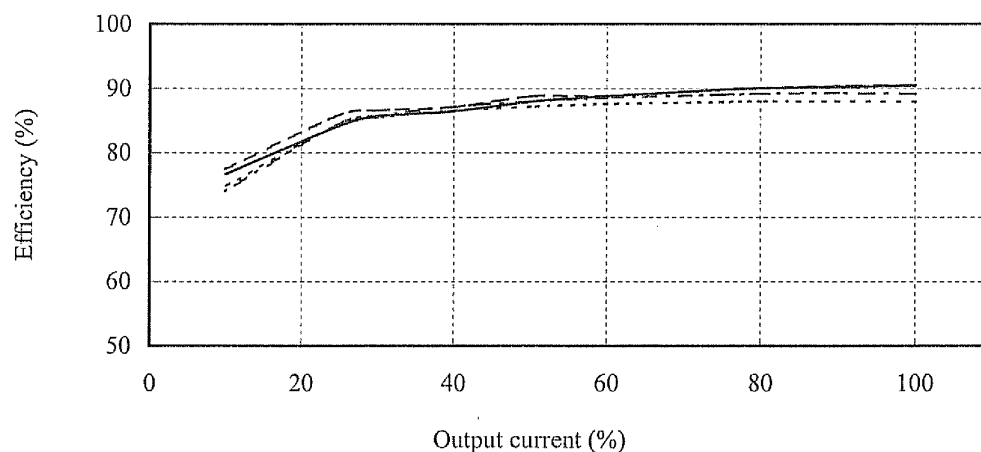
|                        |       |
|------------------------|-------|
| Start up voltage (Vin) | 75VAC |
| Drop out voltage (Vin) | 68VAC |

## (2) 効率対出力電流

Efficiency vs. Output current

 Conditions Vin : 85 VAC -----  
                   : 115 VAC -.-.-.-  
                   : 230 VAC ————  
                   : 265 VAC -.-.-.-  
 Ta : 25 °C

|     |
|-----|
| 24V |
|-----|



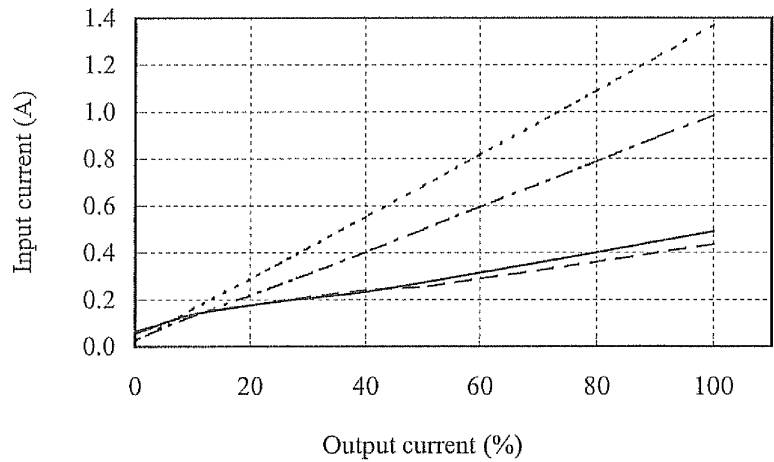
(3) 入力電流対出力電流  
Input current vs. Output current

Conditions Vin : 85 VAC -----  
: 115 VAC -.-.-.-  
: 230 VAC ————  
: 265 VAC - - - -  
Ta : 25 °C

24V

Io: 0%

| Vin    | Input current |
|--------|---------------|
| 85VAC  | 0.021A        |
| 115VAC | 0.029A        |
| 230VAC | 0.057A        |
| 265VAC | 0.066A        |



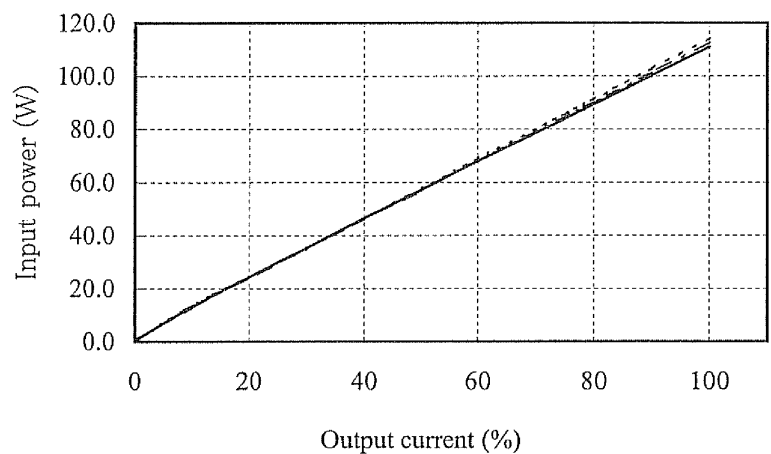
(4) 入力電力対出力電流  
Input power vs. Output current

Conditions Vin : 85 VAC -----  
: 115 VAC -.-.-.-  
: 230 VAC ————  
: 265 VAC - - - -  
Ta : 25 °C

24V

Io: 0%

| Vin    | Input power |
|--------|-------------|
| 115VAC | 0.25W       |
| 230VAC | 0.40W       |

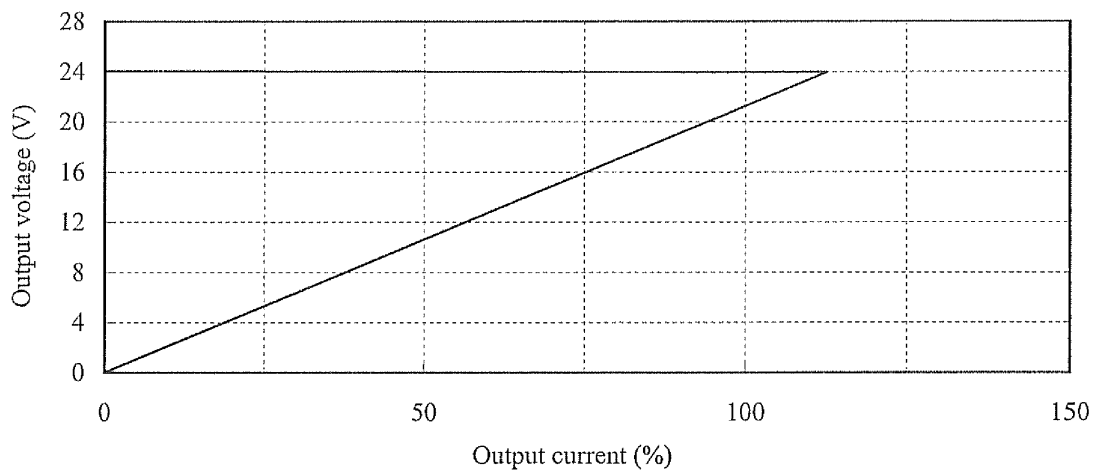


2.2 過電流保護特性

Over current protection (OCP) characteristics

Conditions Vin : 85 VAC -----  
 : 115 VAC -.-.-.-  
 : 230 VAC \_\_\_\_\_  
 : 265 VAC - - - - -  
 Ta : 25 °C

24V



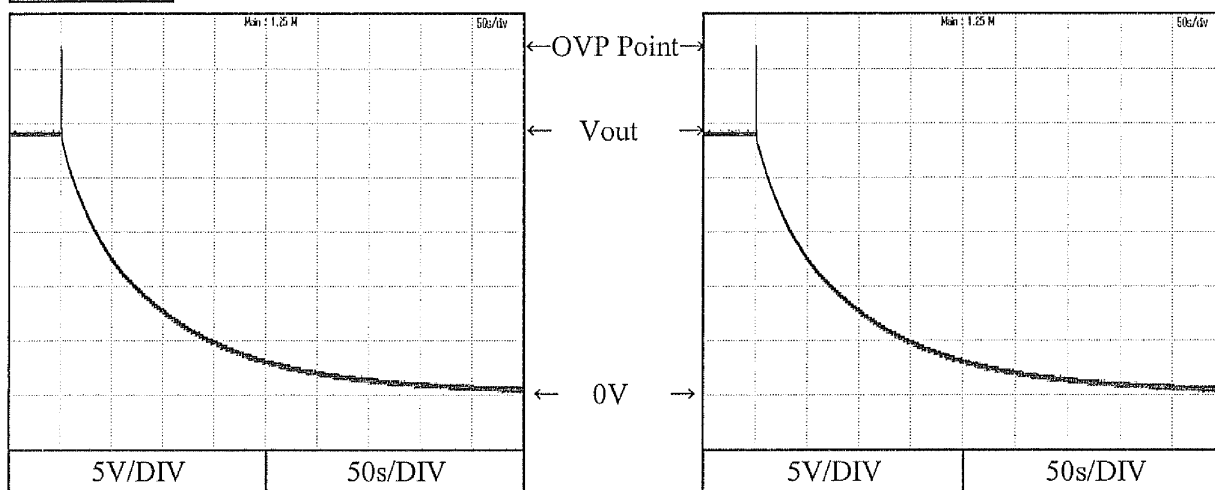
2.3 過電圧保護特性

Over voltage protection (OVP) characteristics

Conditions Vin : 115 VAC  
 Iout : 0 %  
 Ta : 25 °C

Conditions Vin : 230 VAC  
 Iout : 0 %  
 Ta : 25 °C

24V

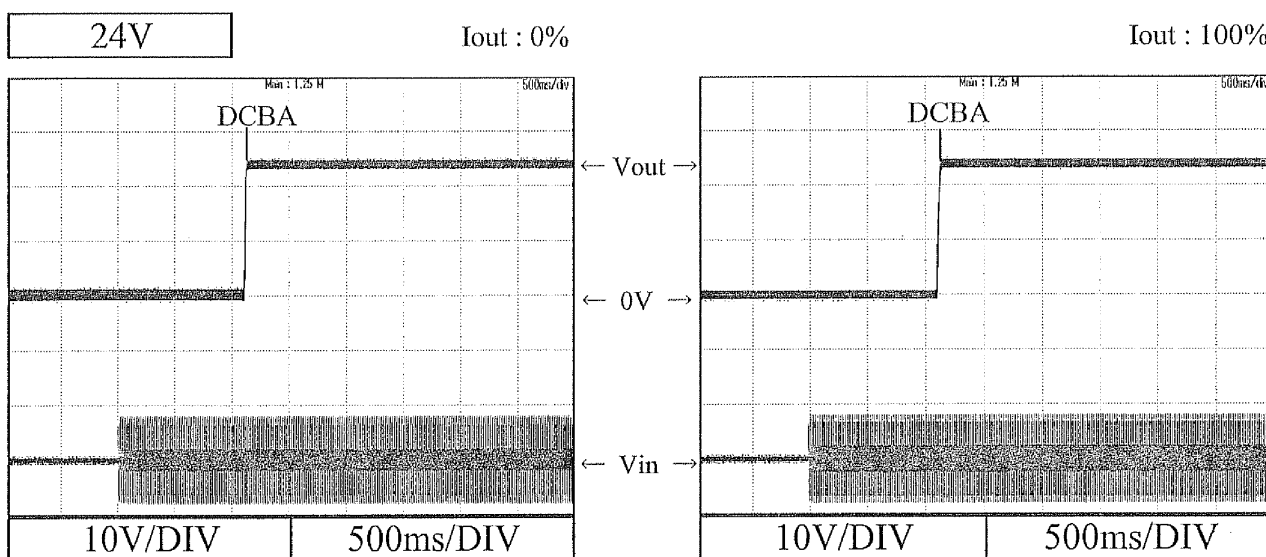




2.4 出力立ち上がり特性

Output rise characteristics

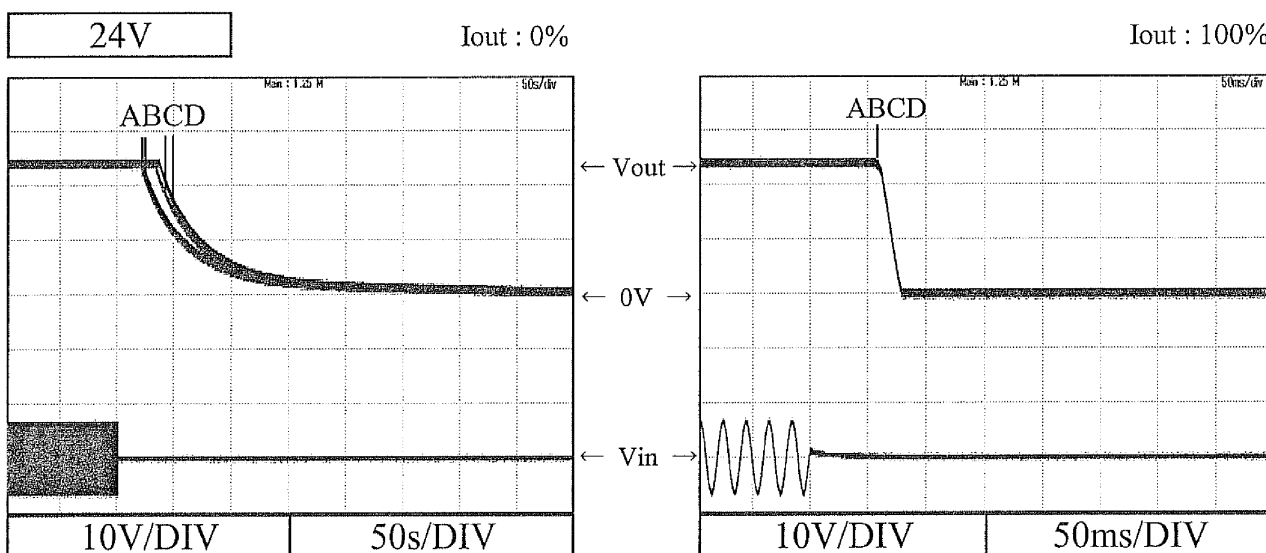
Conditions Vin : 85 VAC (A)  
 115 VAC (B)  
 230 VAC (C)  
 265 VAC (D)  
 Ta : 25 °C



2.5 出力立ち下がり特性

Output fall characteristics

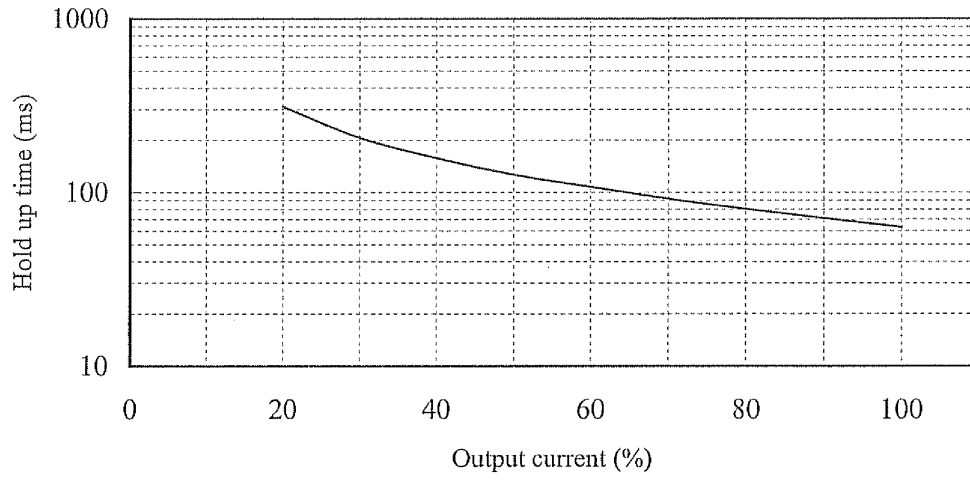
Conditions Vin : 85 VAC (A)  
 115 VAC (B)  
 230 VAC (C)  
 265 VAC (D)  
 Ta : 25 °C



2.6 出力保持時間特性  
Hold up time characteristics

Conditions Vin : 115 VAC -----  
230 VAC ————  
Ta : 25 °C

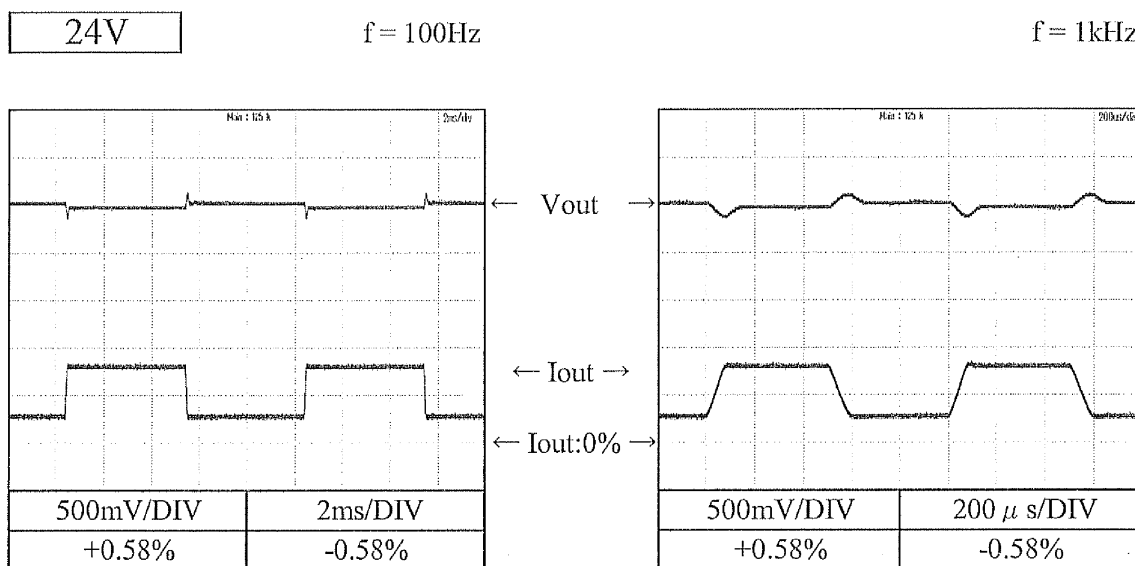
24V



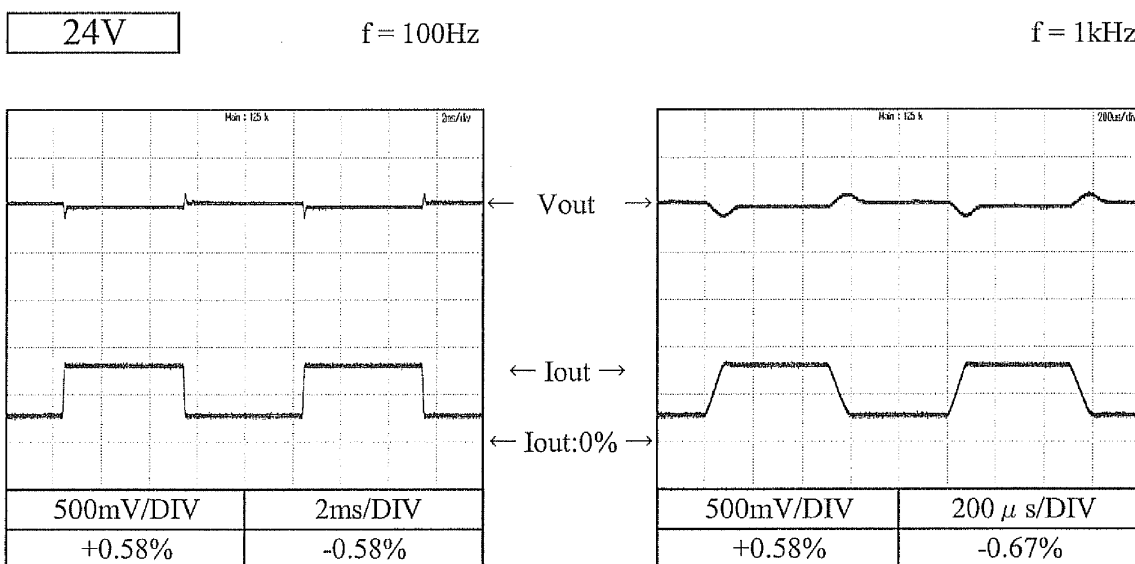
2.7 過渡応答（負荷急変）特性

Dynamic load response characteristics

Conditions Vin : 115 VAC  
 Iout : 25 % ↔ 75 %  
 (tr = tf = 75us)  
 Ta : 25 °C



Conditions Vin : 230 VAC  
 Iout : 25 % ↔ 75 %  
 (tr = tf = 75us)  
 Ta : 25 °C



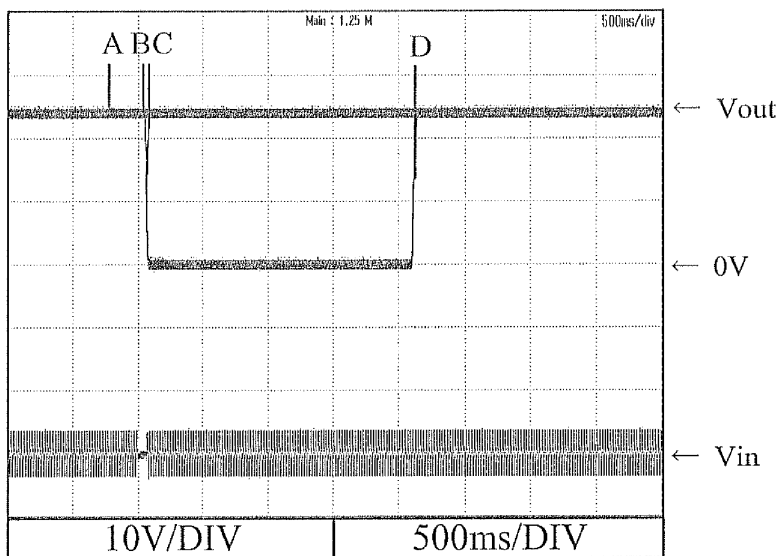
2.8 入力電圧瞬停特性

Response to brown out characteristics

Conditions Vin : 115 VAC  
Iout : 100 %  
Ta : 25 °C

24V

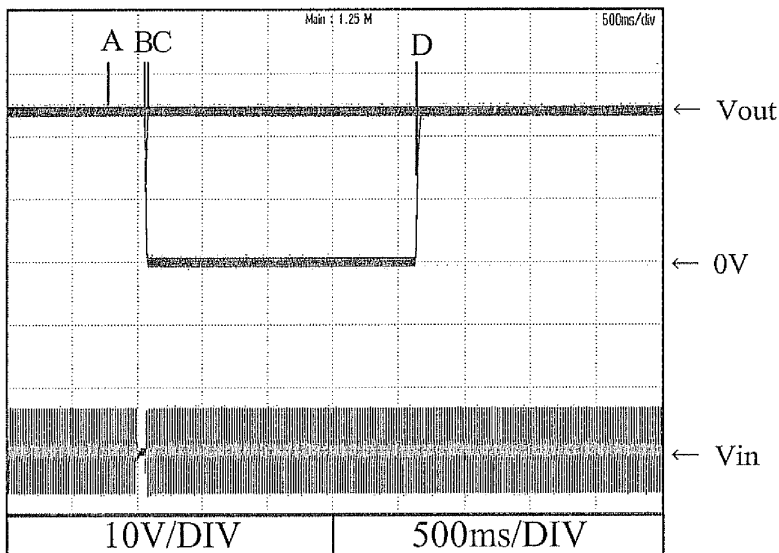
A = 58ms  
B = 59ms  
C = 68ms  
D = 69ms



Conditions Vin : 230 VAC  
Iout : 100 %  
Ta : 25 °C

24V

A = 57ms  
B = 59ms  
C = 68ms  
D = 69ms

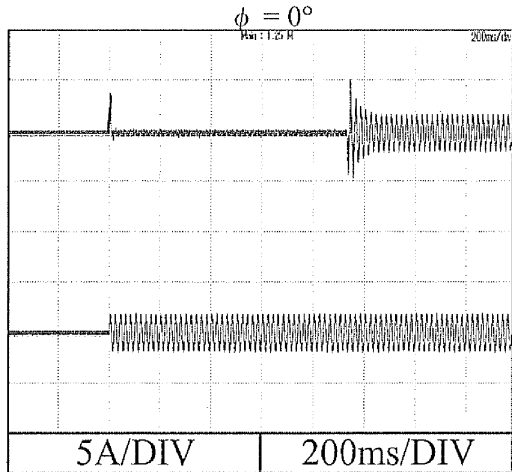


2.9 入力サージ電流（突入電流）波形  
Inrush current waveform

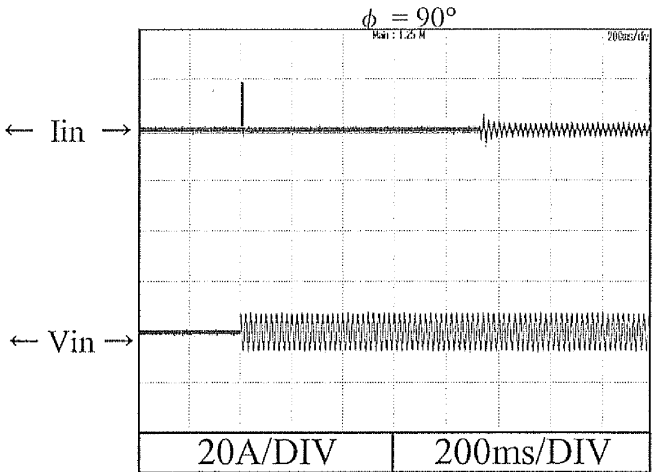
24V

Conditions Vin : 115 VAC  
Iout : 100 %  
Ta : 25 °C

Switch on phase angle of input AC voltage

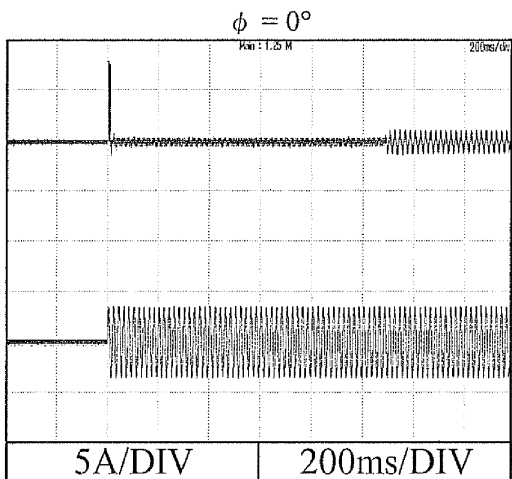


Switch on phase angle of input AC voltage

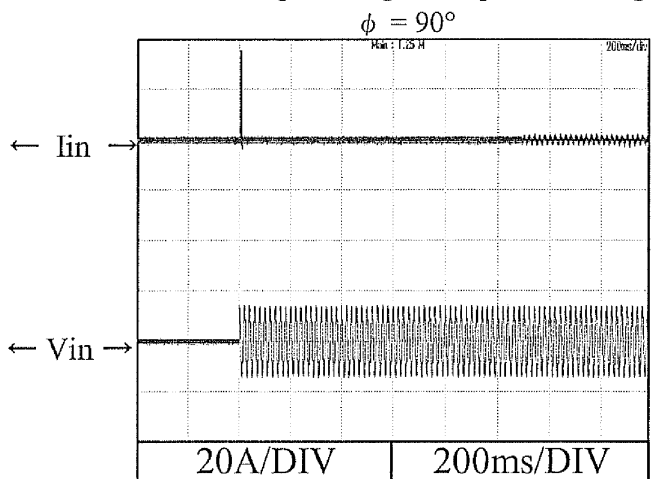


Conditions Vin : 230 VAC  
Iout : 100 %  
Ta : 25 °C

Switch on phase angle of input AC voltage



Switch on phase angle of input AC voltage

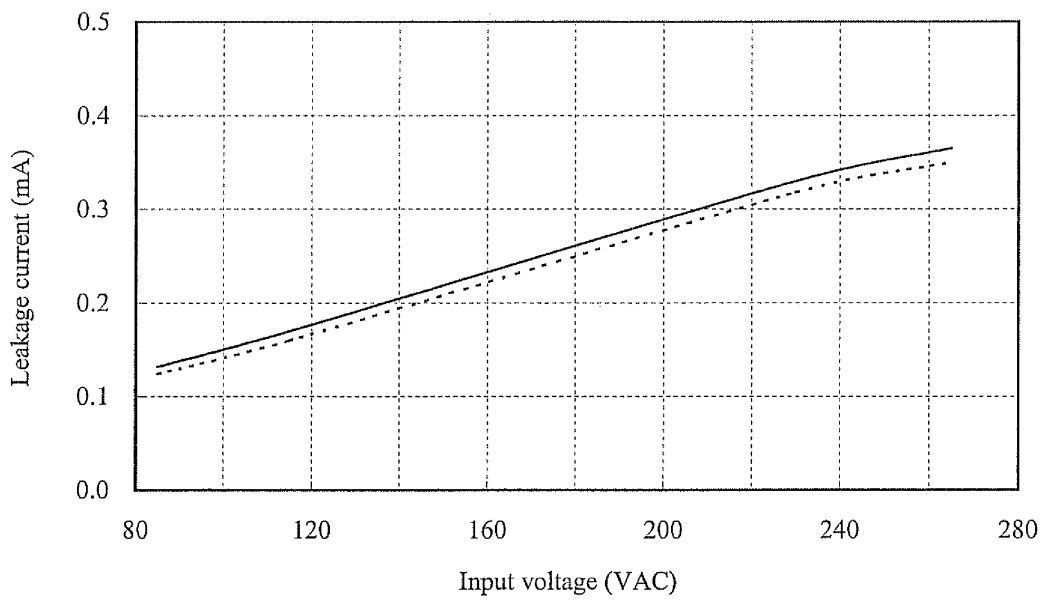


2.10 リーク電流特性  
Leakage current characteristics

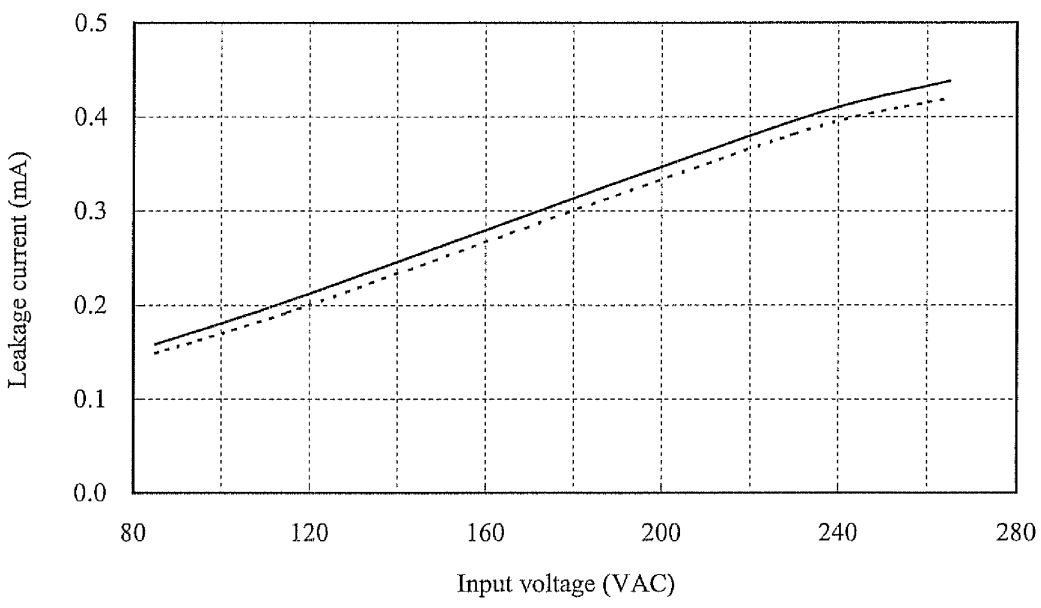
Conditions Iout : 0 % -----  
                  100 % ——  
                  Ta : 25 °C  
Equipment used : 228 (Simpson)

24V

f : 50 Hz



f : 60 Hz



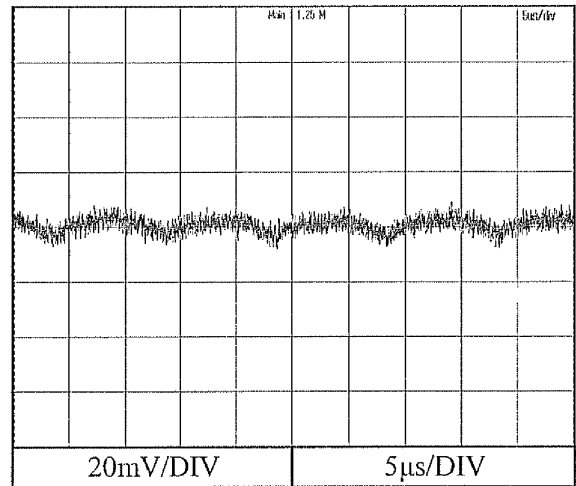
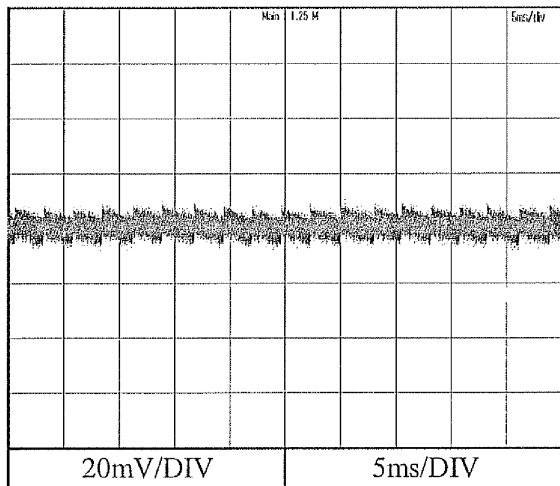
2.11 出力リップル、ノイズ波形  
Output ripple and noise waveform

Conditions Vin : 115 VAC  
Ta : 25 °C

24V

Iout : 0%

Iout : 100%

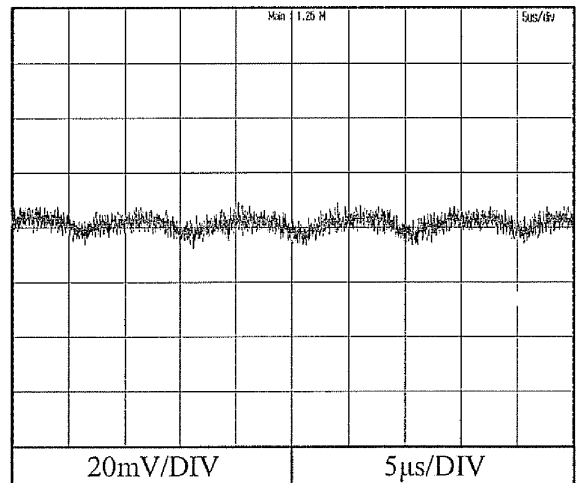
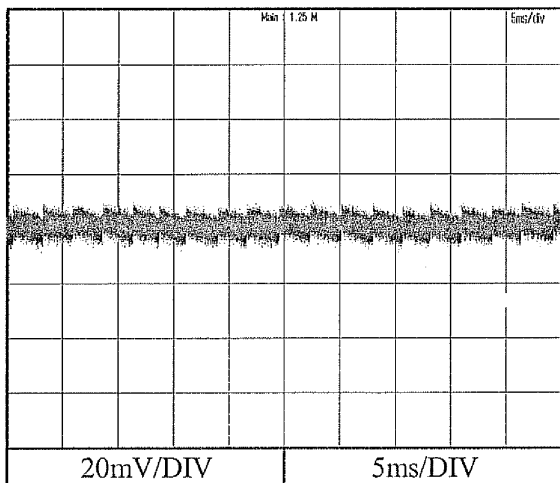


Conditions Vin : 230 VAC  
Ta : 25 °C

24V

Iout : 0%

Iout : 100%



2.12 EMI 特性

Electro-Magnetic Interference characteristics

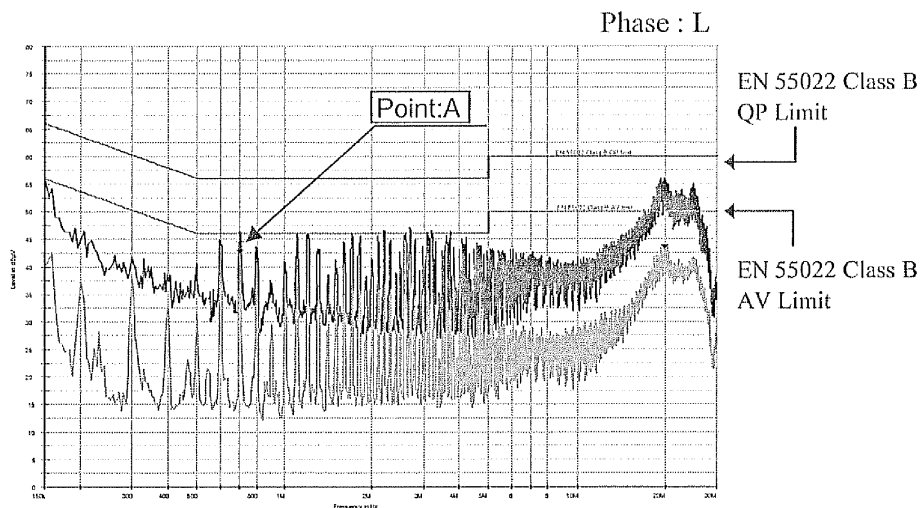
Conditions Vin : 115 VAC  
Iout : 100 %  
Ta : 25 °C

雑音端子電圧

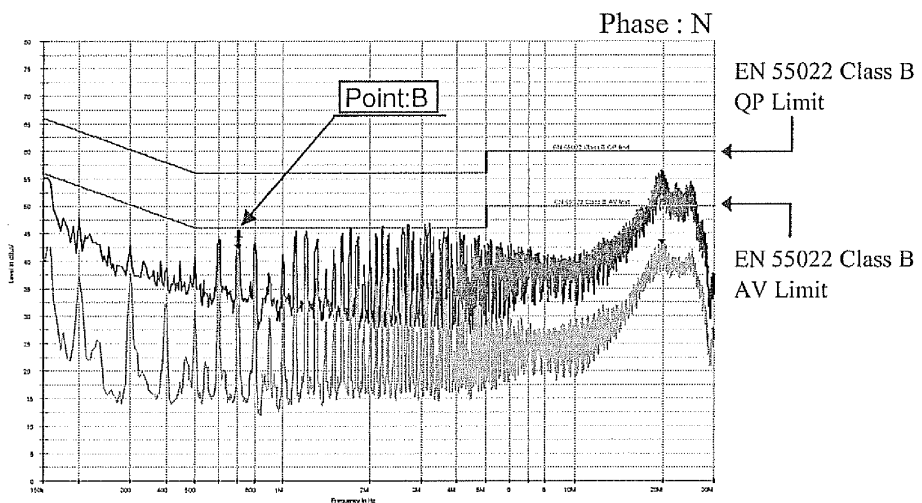
Conducted Emission

24V

| Point A<br>(0.708MHz) |              |                |
|-----------------------|--------------|----------------|
| Ref. Data             | Limit (dBuV) | Measure (dBuV) |
| QP                    | 56.0         | 43.5           |
| AV                    | 46.0         | 41.9           |



| Point B<br>(0.708MHz) |              |                |
|-----------------------|--------------|----------------|
| Ref. Data             | Limit (dBuV) | Measure (dBuV) |
| QP                    | 56.0         | 43.6           |
| AV                    | 46.0         | 41.6           |



EN55011-B,VCCI-B,FCC-Bの限界値はEN55022 class Bの限界値と同じ  
Limit of EN55011-B,VCCI-B,FCC-B are same as its EN55022 class B.



2.12 EMI 特性

Electro-Magnetic Interference characteristics

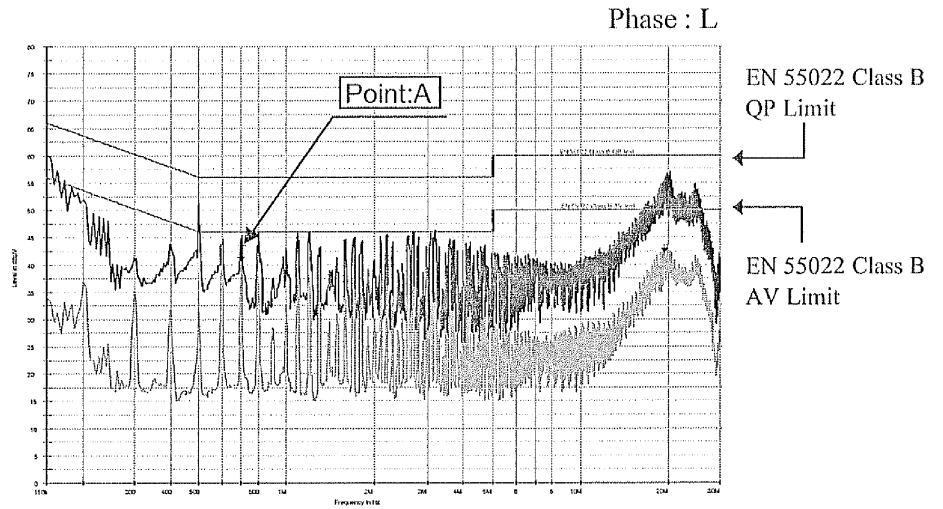
Conditions Vin : 230 VAC  
Iout : 100 %  
Ta : 25 °C

雑音端子電圧

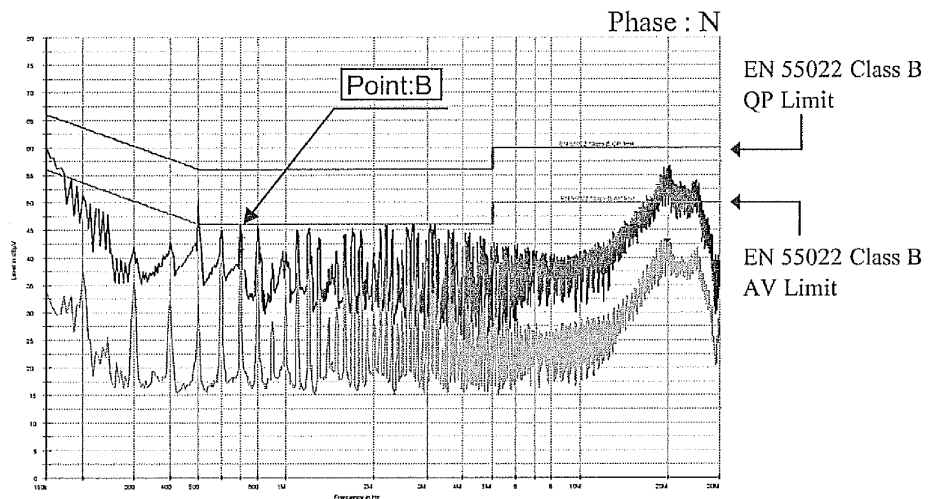
Conducted Emission

24V

| Point A<br>(0.708MHz) |              |                |
|-----------------------|--------------|----------------|
| Ref. Data             | Limit (dBuV) | Measure (dBuV) |
| QP                    | 56.0         | 43.6           |
| AV                    | 46.0         | 41.1           |



| Point B<br>(0.708MHz) |              |                |
|-----------------------|--------------|----------------|
| Ref. Data             | Limit (dBuV) | Measure (dBuV) |
| QP                    | 56.0         | 43.6           |
| AV                    | 46.0         | 41.2           |



EN55011-B,VCCI-B,FCC-Bの限界値はEN55022 class Bの限界値と同じ  
Limit of EN55011-B,VCCI-B,FCC-B are same as its EN55022 class B.

2.12 EMI 特性

Electro-Magnetic Interference characteristics

Conditions Vin : 115 VAC

Io : 100 %

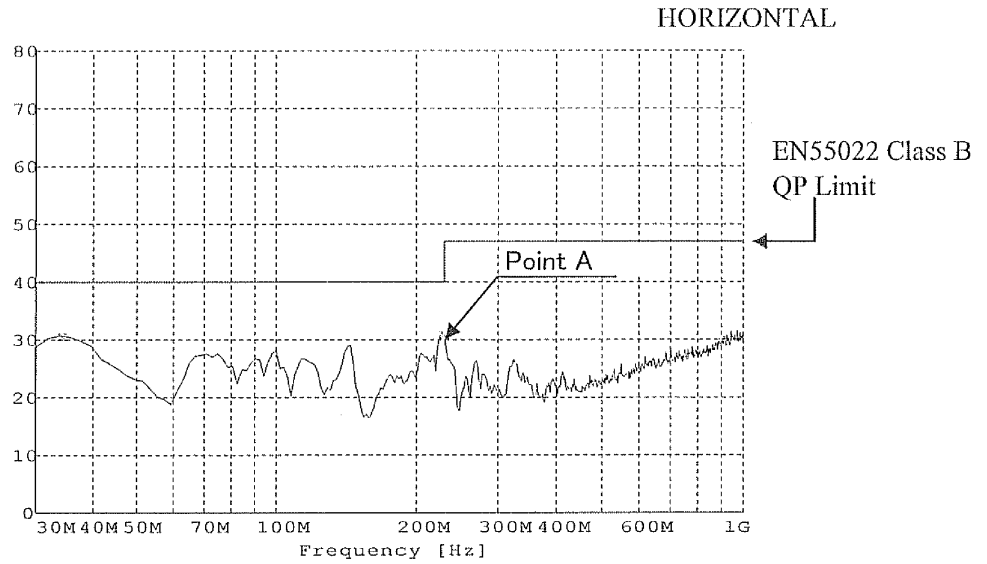
Ta : 25 °C

雑音電界強度

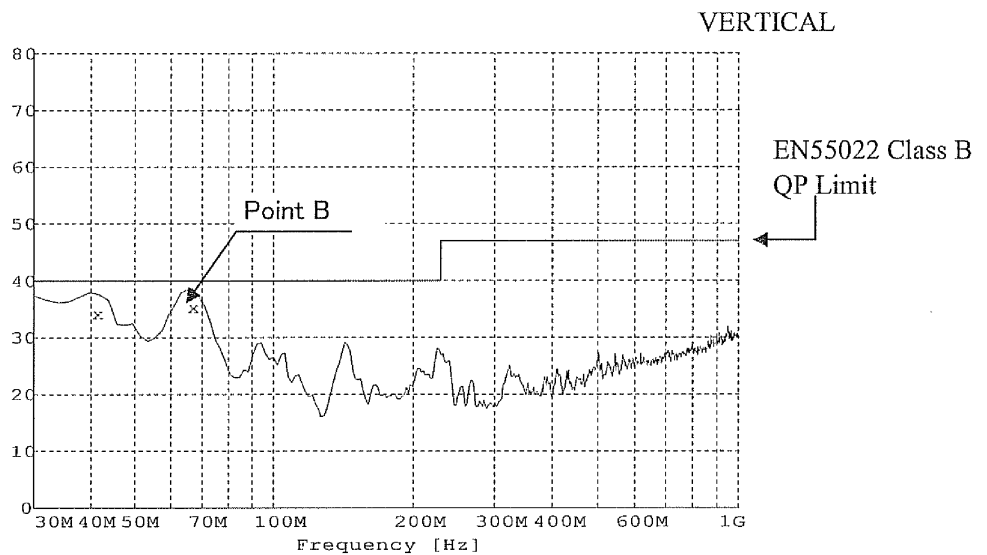
Radiated Emission

24V

| Point A<br>(228MHz) |                 |                   |
|---------------------|-----------------|-------------------|
| Ref.<br>Data        | Limit<br>(dBuV) | Measure<br>(dBuV) |
| H                   | 40.0            | 31.1              |



| Point B<br>(66.4MHz) |                 |                   |
|----------------------|-----------------|-------------------|
| Ref.<br>Data         | Limit<br>(dBuV) | Measure<br>(dBuV) |
| V                    | 40.0            | 35.3              |



2.12 EMI 特性

Electro-Magnetic Interference characteristics

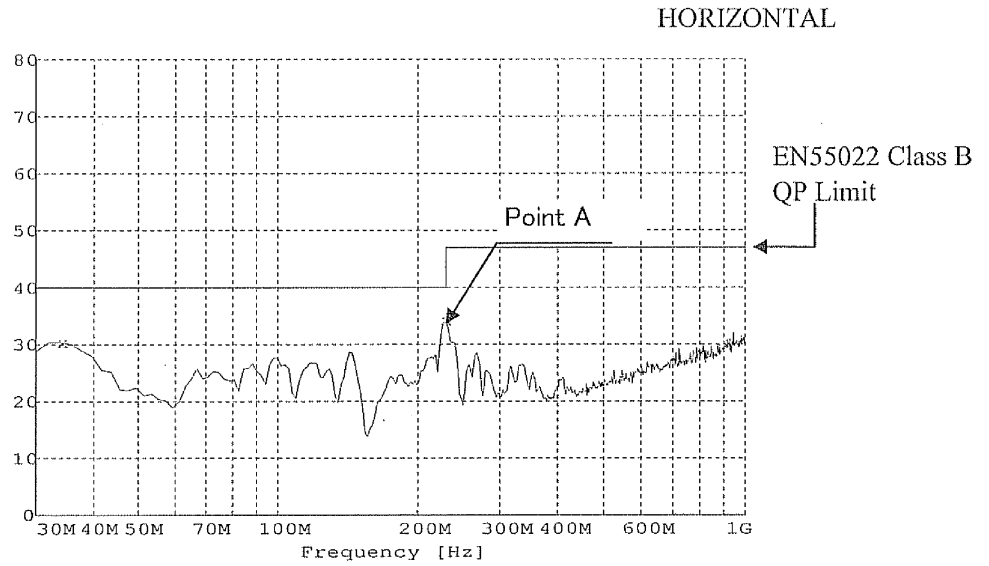
Conditions Vin : 230 VAC  
Io : 100 %  
Ta : 25 °C

雑音電界強度

Radiated Emission

24V

| Point A<br>(228MHz) |                 |                   |
|---------------------|-----------------|-------------------|
| Ref.<br>Data        | Limit<br>(dBuV) | Measure<br>(dBuV) |
| H                   | 40.0            | 34.2              |



| Point B<br>(34.9MHz) |                 |                   |
|----------------------|-----------------|-------------------|
| Ref.<br>Data         | Limit<br>(dBuV) | Measure<br>(dBuV) |
| V                    | 40.0            | 36.8              |

