


ELC12

EVALUATION DATA

型式データ

| DWG No. V003-53-01A | | |
|--|------------------------|---------------------|
| APPD | CHK | DWG |
|  27-Aug-13 | Motohashi 27/Aug/13 | Ryujun 27/Aug/13 |

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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・低下電圧

Regulation - line and load, Temperature drift

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使用記号 Terminology used

| | 定義 | Definition |
|------|------|---------------------|
| Vin | 入力電圧 | Input voltage |
| Vout | 出力電圧 | Output voltage |
| Iin | 入力電流 | Input current |
| Iout | 出力電流 | Output current |
| Ta | 周囲温度 | Ambient temperature |
| f | 周波数 | Frequency |

※ 当社標準測定条件における結果であり、参考値としてお考え願います。

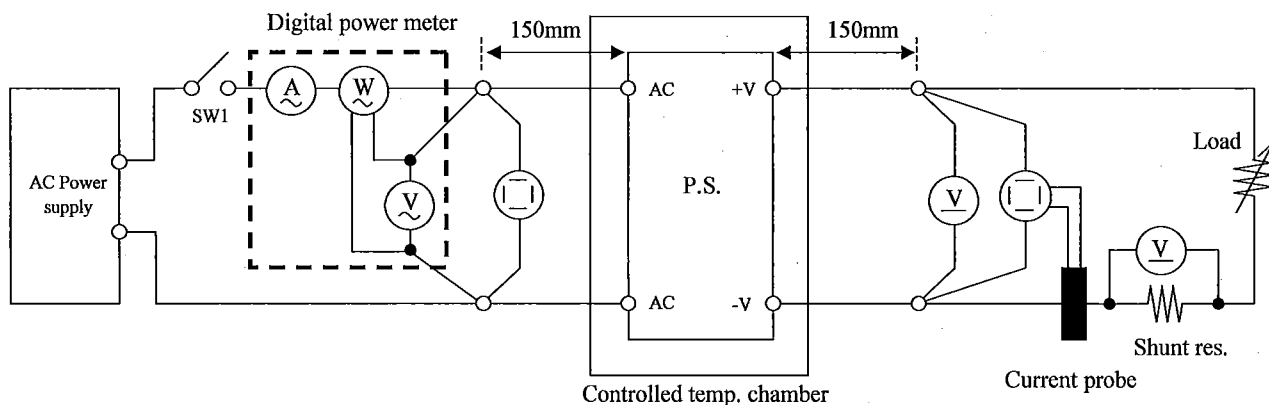
Test results are reference data based on our standard measurement condition.

1. 測定方法 Evaluation Method

1.1 測定回路 Circuit used for determination

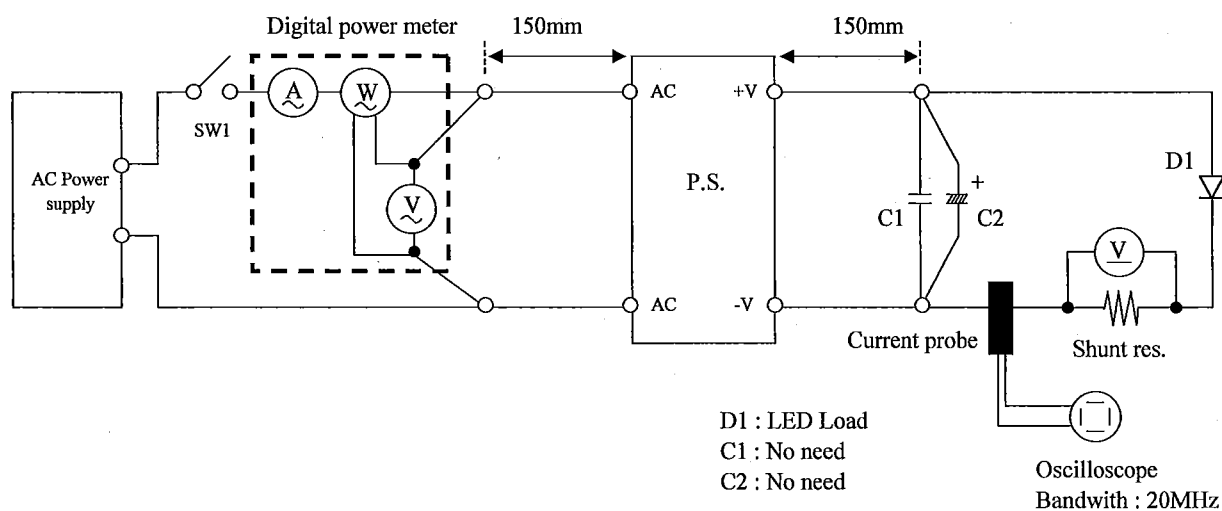
測定回路1 Circuit 1 used for determination

- ・静特性 Steady state data
- ・通電ドリフト特性 Warm up voltage drift characteristics
- ・出力電流対出力電圧特性 Output current vs. Output voltage characteristics
- ・過電圧保護特性 Over voltage protection (OVP) characteristics



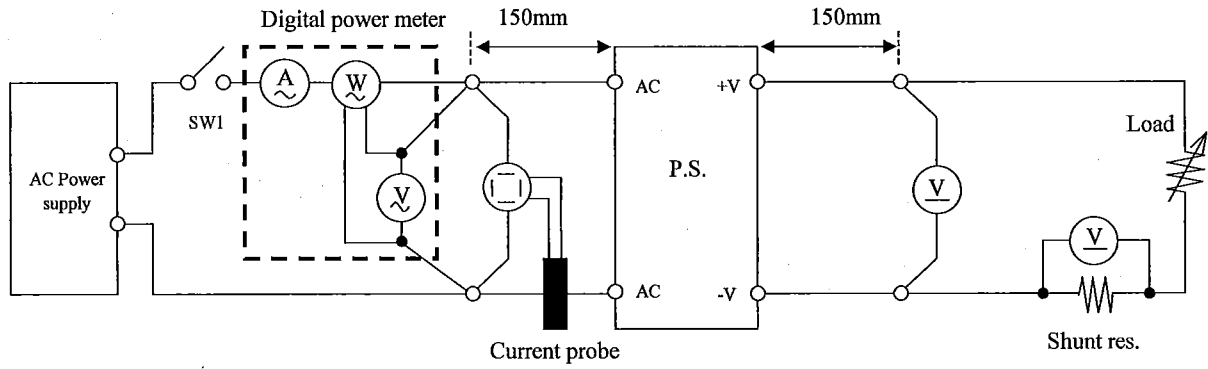
測定回路2 Circuit 2 used for determination

- ・出力立ち上がり特性 Output rise characteristics
- ・出力立ち下がり特性 Output fall characteristics
- ・過渡応答(入力急変)特性 Dynamic line response characteristics
- ・入力電圧瞬停特性 Response to brown out characteristics
- ・出力リップル、ノイズ波形 Output ripple and noise waveform



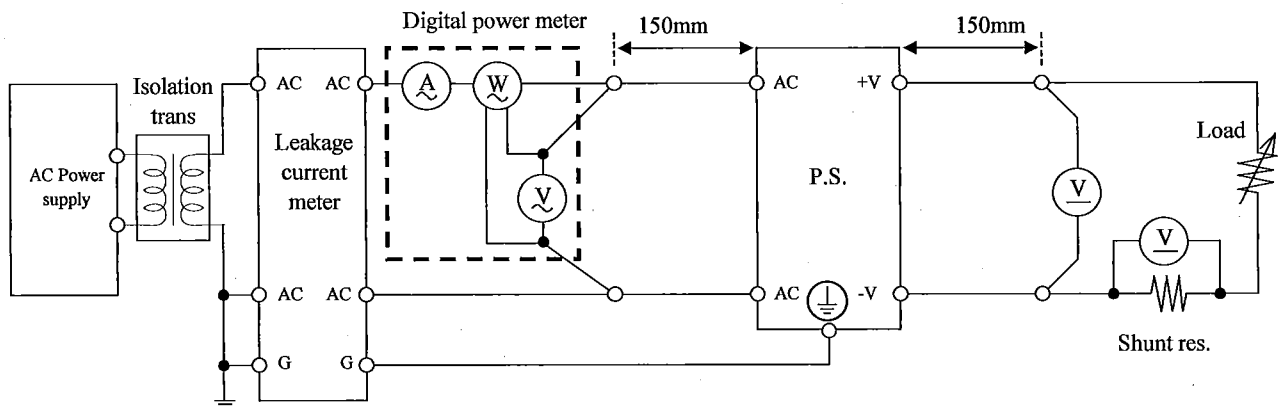
測定回路3 Circuit 3 used for determination

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



測定回路4 Circuit 4 used for determination

- ・リーク電流特性 Leakage current characteristics

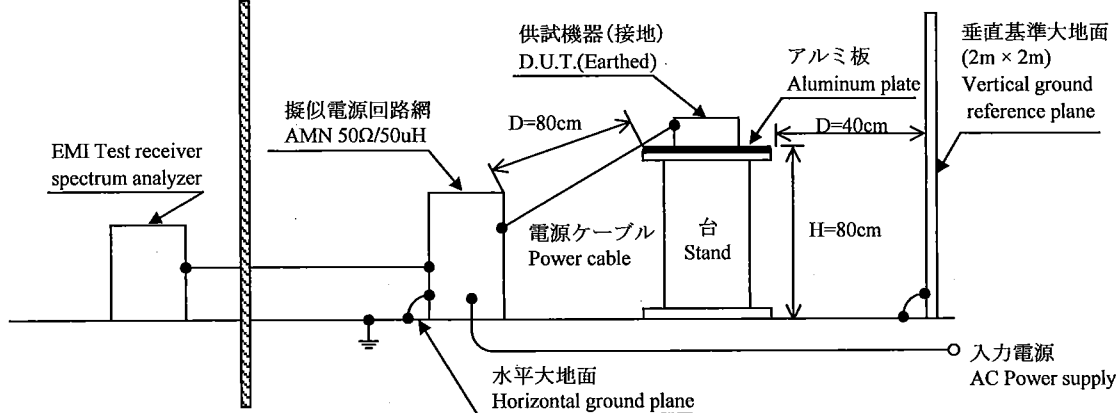


測定構成 Configuration used for determination

•EMI特性 Electro-Magnetic Interference characteristics

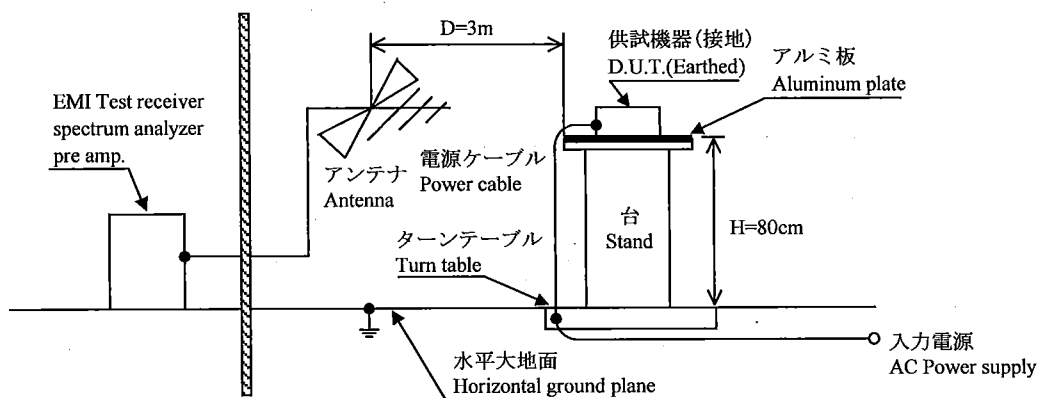
(a) 雑音端子電圧 (帰還ノイズ)

Conducted Emission



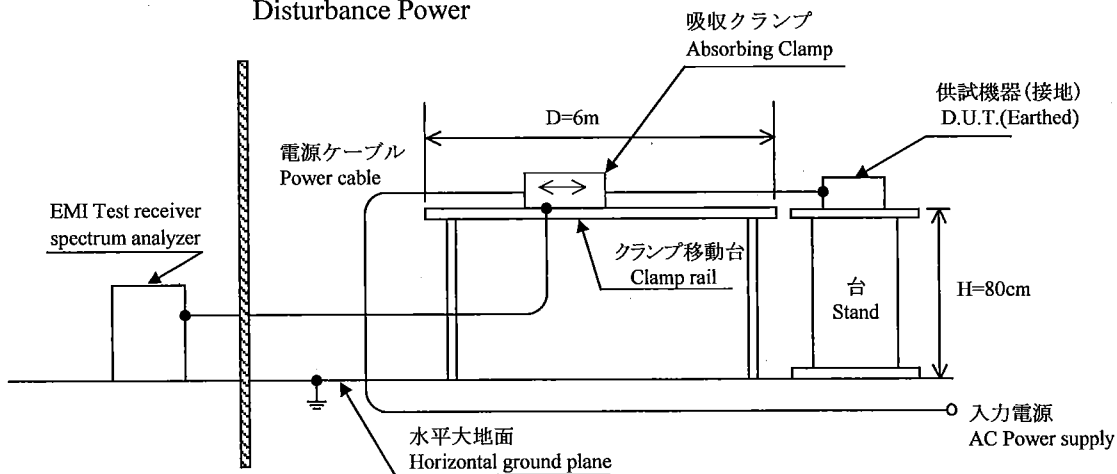
(b) 雑音電界強度 (放射ノイズ)

Radiated Emission



(c) 妨害波電力

Disturbance Power



1.2 使用測定機器 List of equipment used

| | EQUIPMENT USED | MANUFACTURER | MODEL NO. |
|----|---------------------------------------|-----------------|-----------------|
| 1 | DIGITAL STORAGE OSCILLOSCOPE | YOKOGAWA ELECT. | DL1740EL |
| 2 | DIGITAL MULTIMETER | AGILENT | 34970A |
| 3 | DIGITAL POWER METER | YOKOGAWA ELECT. | WT210 |
| 4 | CURRENT PROBE | YOKOGAWA ELECT. | 701932 |
| 5 | DYNAMIC DUMMY LOAD | TAKASAGO | FK-200L |
| 6 | DYNAMIC DUMMY LOAD | KIKUSUI | PLZ-50F |
| 7 | DUMMY LOAD | PCN | RHF250 SIRIES |
| 8 | ISOLATION TRANS | MATSUNAGA | 3WTC-50K |
| 9 | CVCF | KIKUSUI | PCR2000L |
| 10 | CVCF | NF | ES10000S |
| 11 | LEAKAGE CURRENT METER | HIOKI | 3156 |
| 12 | DYNAMIC DIP SIMULATOR | TAKAMISAWA | PSA-210 |
| 13 | CONTROLLED TEMP. CHAMBER | ESPEC | SU-261 / SU-240 |
| 14 | EMI TEST RECEIVER / SPECTRUM ANALYZER | ROHDE & SCHWARZ | ESCI |
| 15 | PRE AMP. | SONOMA | 310N |
| 16 | AMN | SCHWARZBECK | NNLK8121 |
| 17 | ANTENNA | SCHWARZBECK | CBL6111D |
| 18 | ABSORBING CLAMP | LUTHI | MDS-21 |

1.3 評価負荷条件 Load condition

| | | | |
|-------------|----------------|-------|------|
| Iout | | 0.35A | 0.7A |
| Vout : 100% | | 36V | 18V |
| Vout : min | Vin:90~169VAC | 14.4V | 7.2V |
| | Vin:170~265VAC | 18V | 9V |

2.1 静特性 Steady state data

(1) 入力・負荷・温度変動/出力起動・低下電圧

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

0.35A

1. Regulation - line and load

Condition Ta : 25 °C

| Vout \ Vin | 90VAC | 100VAC | 200VAC | 265VAC | line regulation | |
|------------|--------|--------|--------|--------|-----------------|--------|
| 18.0V | 0.344A | 0.344A | 0.344A | 0.344A | 0mA | 0.000% |
| 27.0V | 0.344A | 0.344A | 0.344A | 0.344A | 0mA | 0.000% |
| 36.0V | 0.344A | 0.344A | 0.344A | 0.344A | 0mA | 0.000% |
| load | 0mA | 0mA | 0mA | 0mA | | |
| regulation | 0.000% | 0.000% | 0.000% | 0.000% | | |

2. Temperature drift

Conditions Vin : 100 VAC

Vout : 100 %

| Ta | -10°C | +25°C | +60°C | temperature stability | |
|------|--------|--------|--------|-----------------------|--------|
| Iout | 0.346A | 0.344A | 0.343A | 3mA | 0.857% |

3. Total regulation

(Total regulation of Line reg, Load reg and Temp. drift)

| total regulation | |
|------------------|------|
| 3mA | 0.9% |

4. Start up voltage and Drop out voltage

Conditions Ta : 25 °C

Vout : 100 %

| | |
|------------------------|-------|
| Start up voltage (Vin) | 84VAC |
| Drop out voltage (Vin) | 72VAC |

0.7A

1. Regulation - line and load

Condition Ta : 25 °C

| Vout \ Vin | 90VAC | 100VAC | 200VAC | 265VAC | line regulation | |
|------------|--------|--------|--------|--------|-----------------|--------|
| 9.0V | 0.704A | 0.704A | 0.704A | 0.704A | 0mA | 0.000% |
| 13.5V | 0.704A | 0.704A | 0.704A | 0.704A | 0mA | 0.000% |
| 18.0V | 0.704A | 0.704A | 0.704A | 0.704A | 0mA | 0.000% |
| load | 0mA | 0mA | 0mA | 0mA | | |
| regulation | 0.000% | 0.000% | 0.000% | 0.000% | | |

2. Temperature drift

Conditions Vin : 100 VAC

Vout : 100 %

| Ta | -10°C | +25°C | +60°C | temperature stability | |
|------|--------|--------|--------|-----------------------|--------|
| Iout | 0.708A | 0.704A | 0.700A | 8mA | 1.143% |

3. Total regulation

(Total regulation of Line reg, Load reg and Temp. drift)

| total regulation | |
|------------------|------|
| 8mA | 1.1% |

4. Start up voltage and Drop out voltage

Conditions Ta : 25 °C

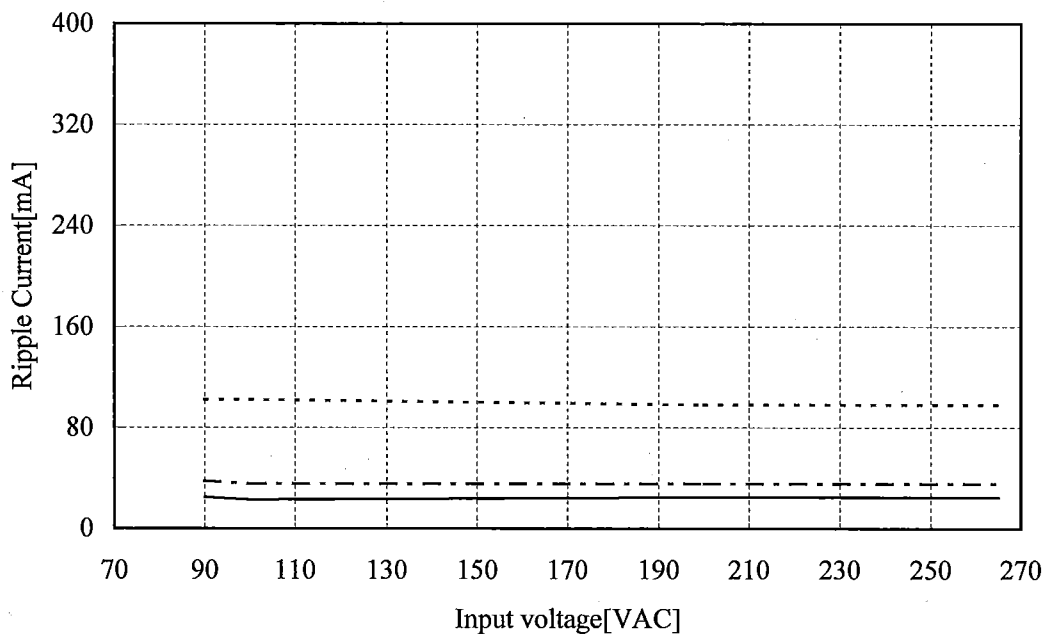
Vout : 100 %

| | |
|------------------------|-------|
| Start up voltage (Vin) | 84VAC |
| Drop out voltage (Vin) | 73VAC |

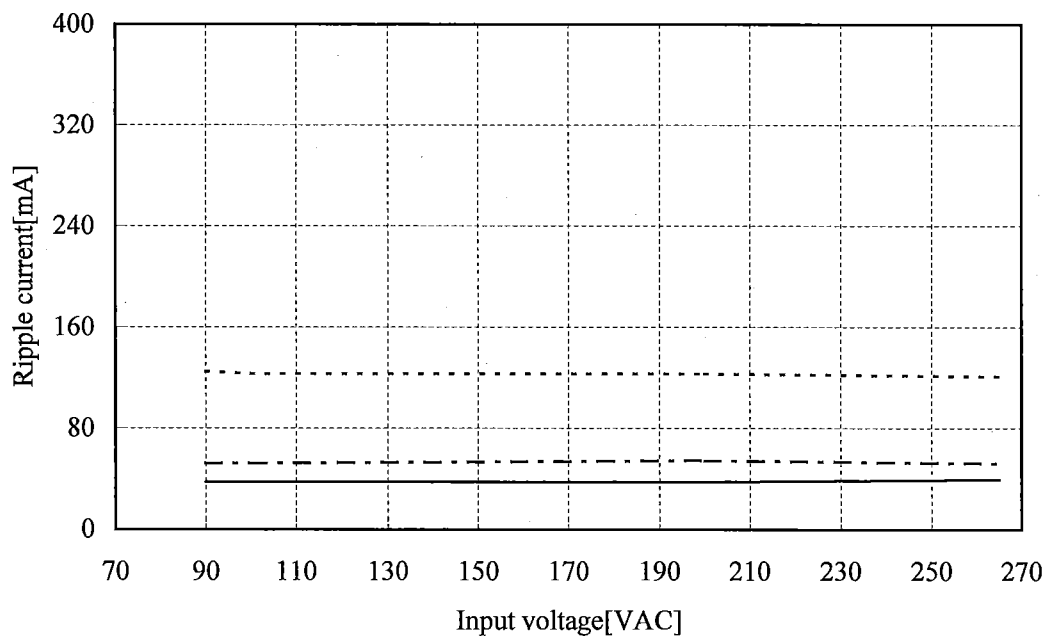
(2) リップル電流対入力電圧
Ripple current vs. Input voltage

Conditions Vout : 100 %
 Ta : -10 °C -----
 25 °C - - - - -
 Vin = 90 - 169VAC ... 60 °C -----
 Vin = 170 - 265VAC ... 50 °C -----

0.35A



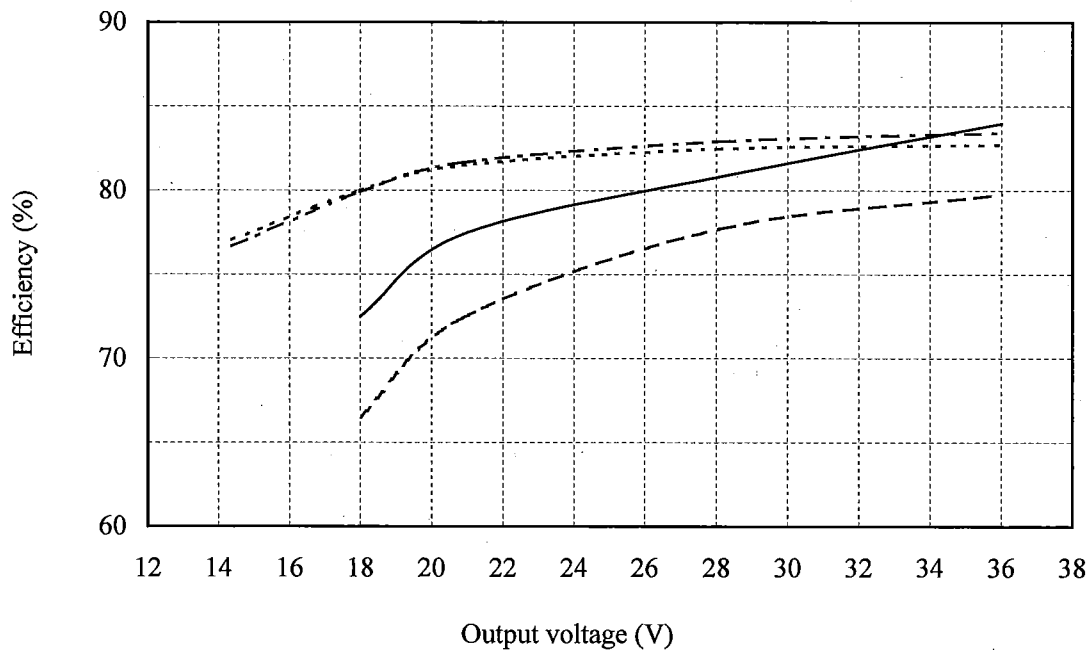
0.7A



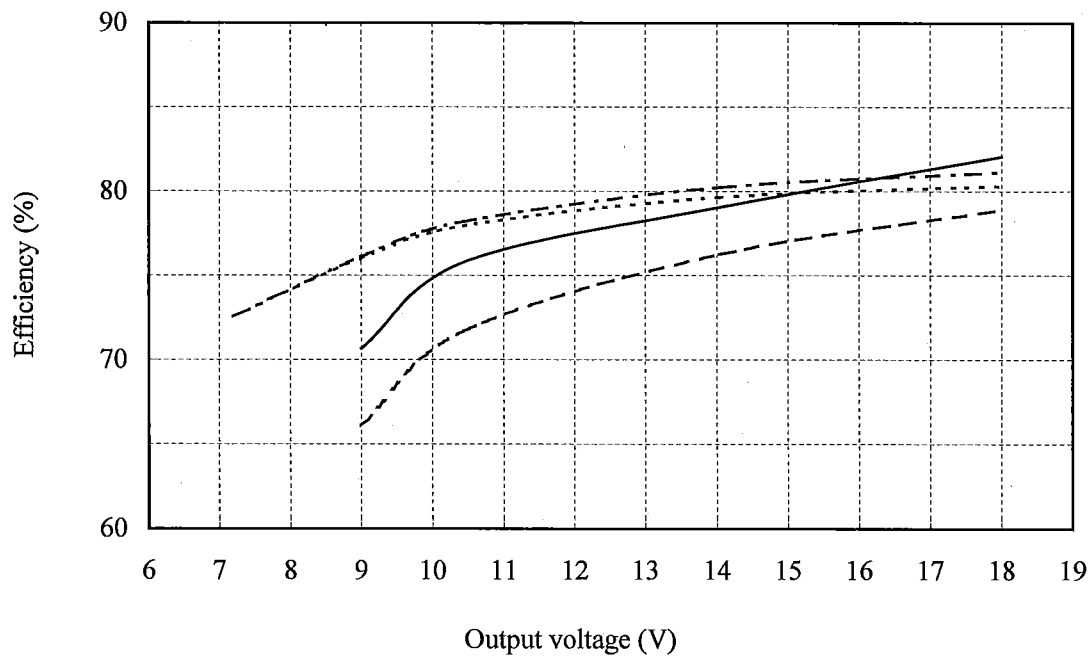
(3) 効率対出力電圧
Efficiency vs. Output voltage

Conditions Vin : 90 VAC -----
 : 100 VAC - - - - -
 : 200 VAC ————
 : 265 VAC - - - - -
 Ta : 25 °C

0.35A



0.7A

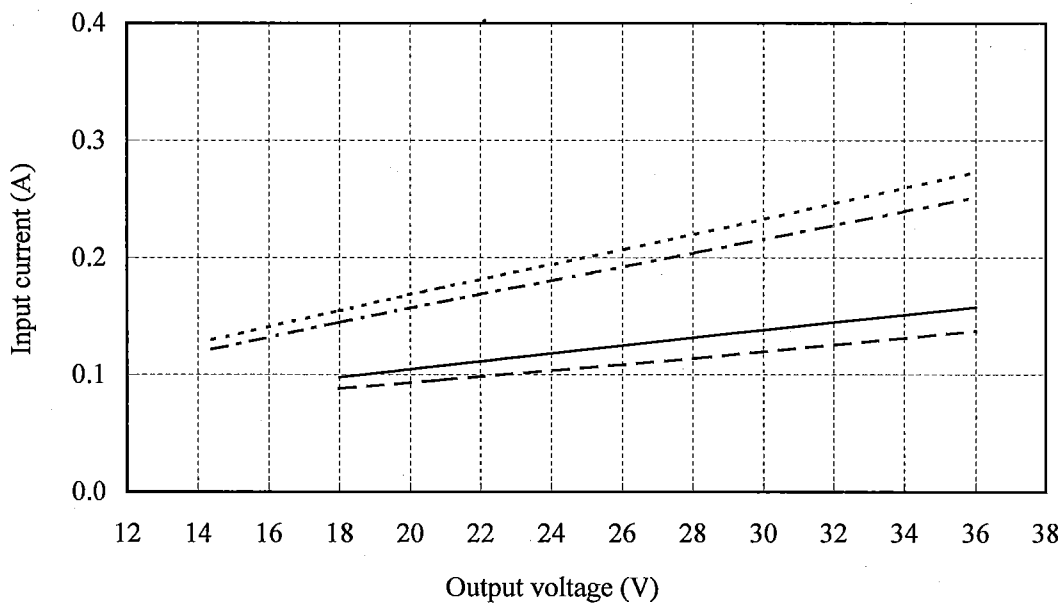


(4) 入力電流対出力電圧

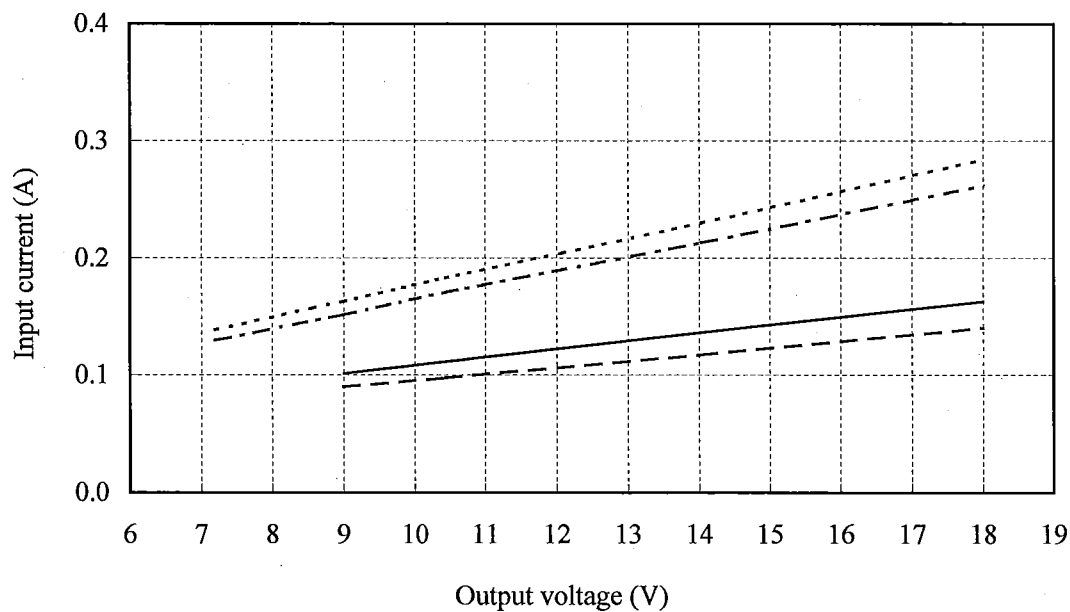
Input current vs. Output voltage

Conditions Vin : 90 VAC -----
 : 100 VAC -----
 : 200 VAC -----
 : 265 VAC -----
 Ta : 25 °C

0.35A



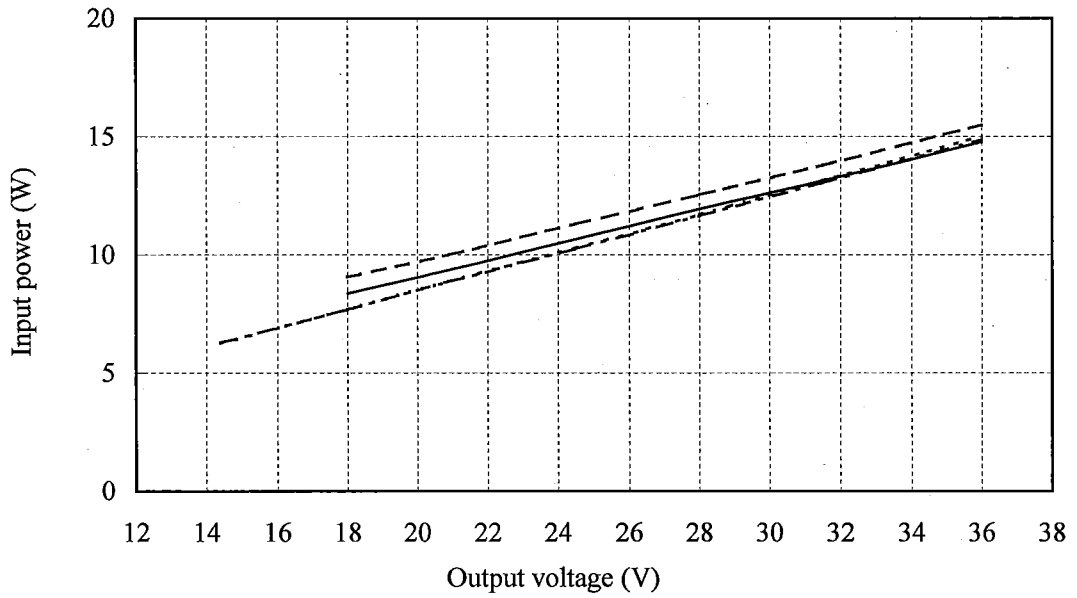
0.7A



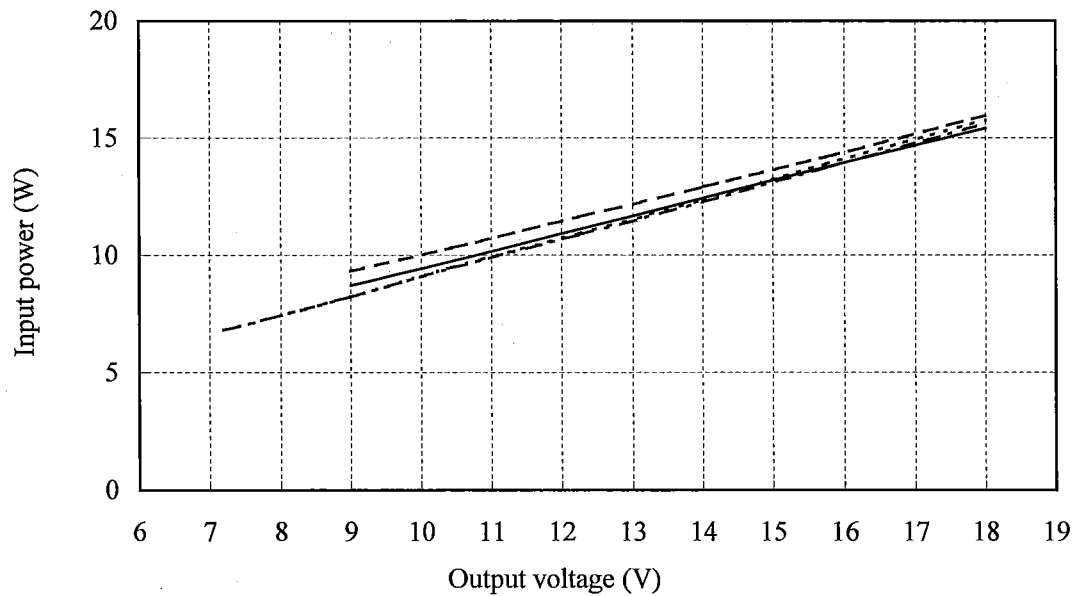
(5) 入力電力対出力電圧
Input power vs. Output voltage

Conditions Vin : 90 VAC -----
 : 100 VAC - - - - -
 : 200 VAC ————
 : 265 VAC - - - - -
 Ta: 25 °C

0.35A



0.7A

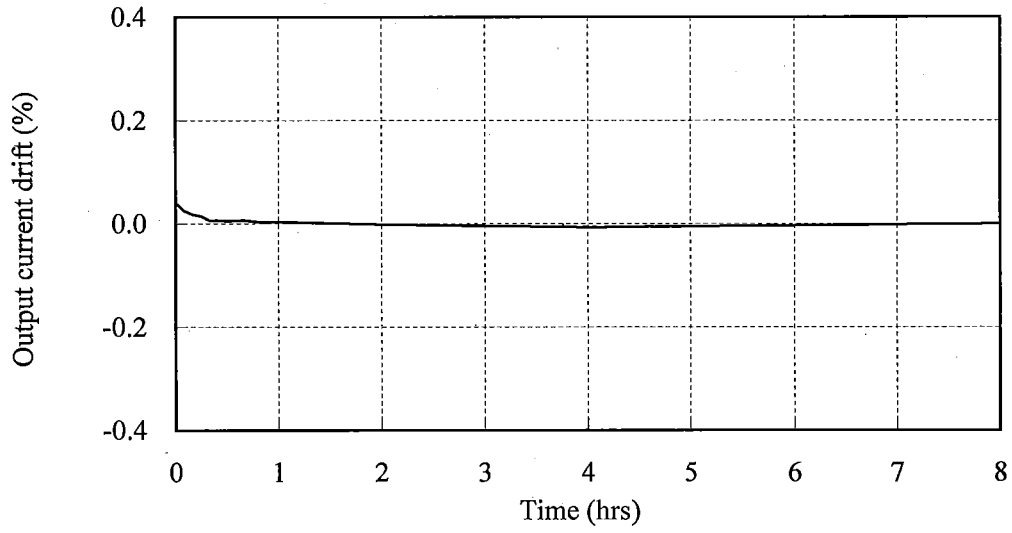


2.2 通電ドリフト特性

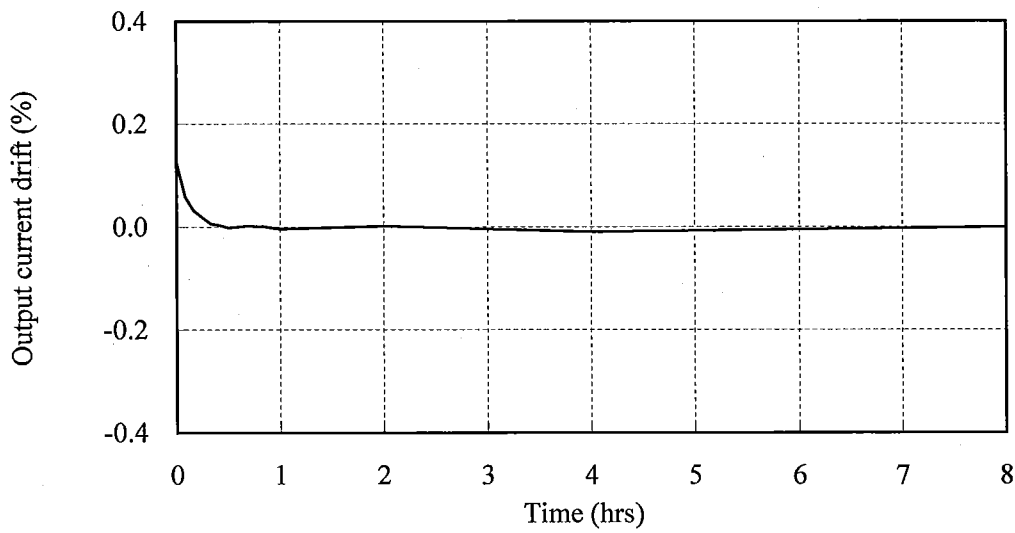
Warm up current drift characteristics

Conditions Vin: 100 VAC
Vout: 100 %
Ta: 25 °C

0.35A



0.7A



2.3 出力電流対出力電圧特性

Output current vs. Output voltage characteristics

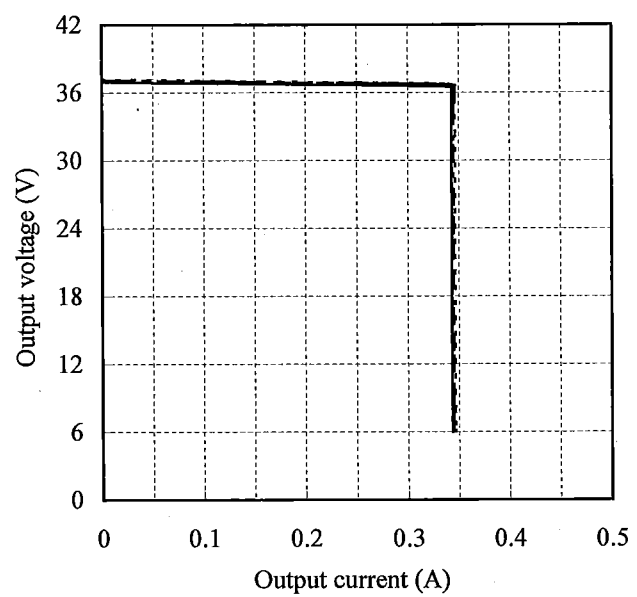
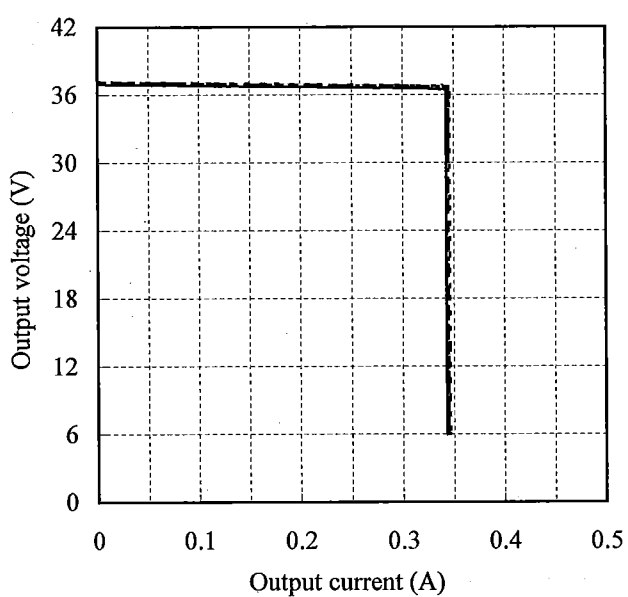
Conditions

- Ta: -10 °C -----
- 25 °C - - - - -
- Vin = 100VAC ... 60 °C ———
- Vin = 200VAC ... 50 °C ———

0.35A

Vin : 100 VAC

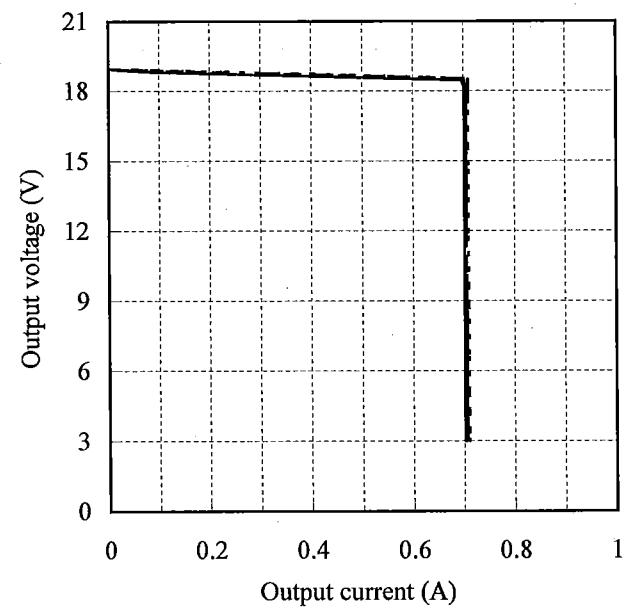
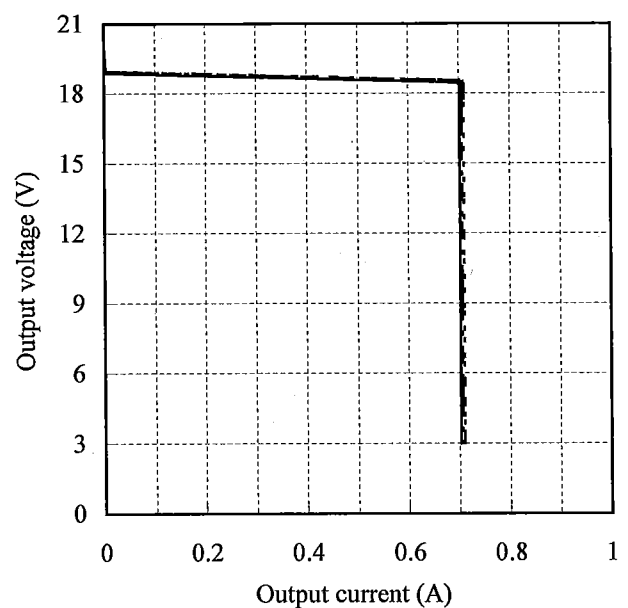
Vin : 200 VAC



0.7A

Vin : 100 VAC

Vin : 200 VAC

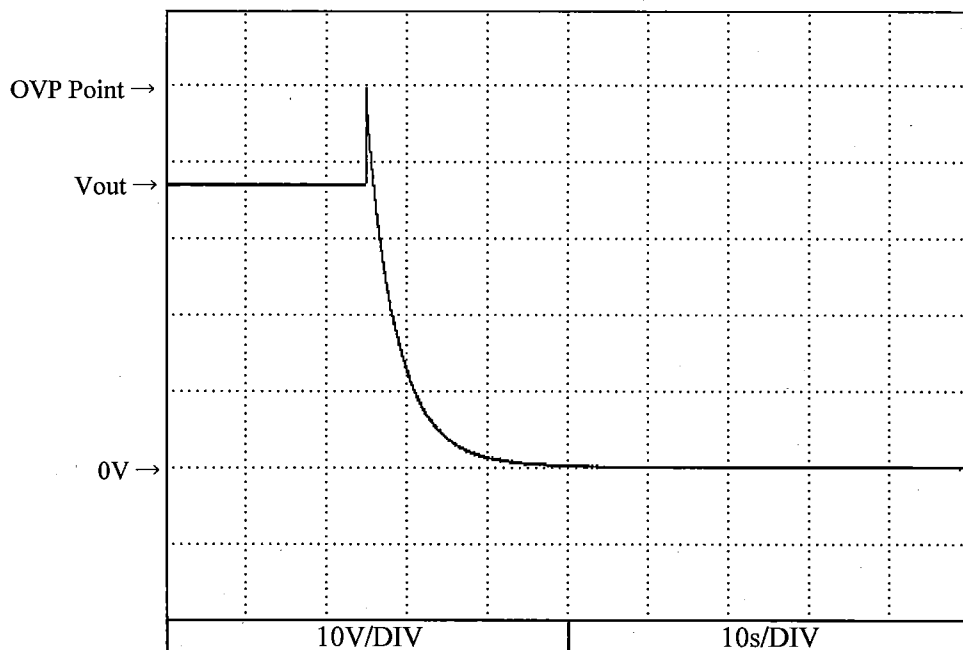


2.4過電圧保護特性

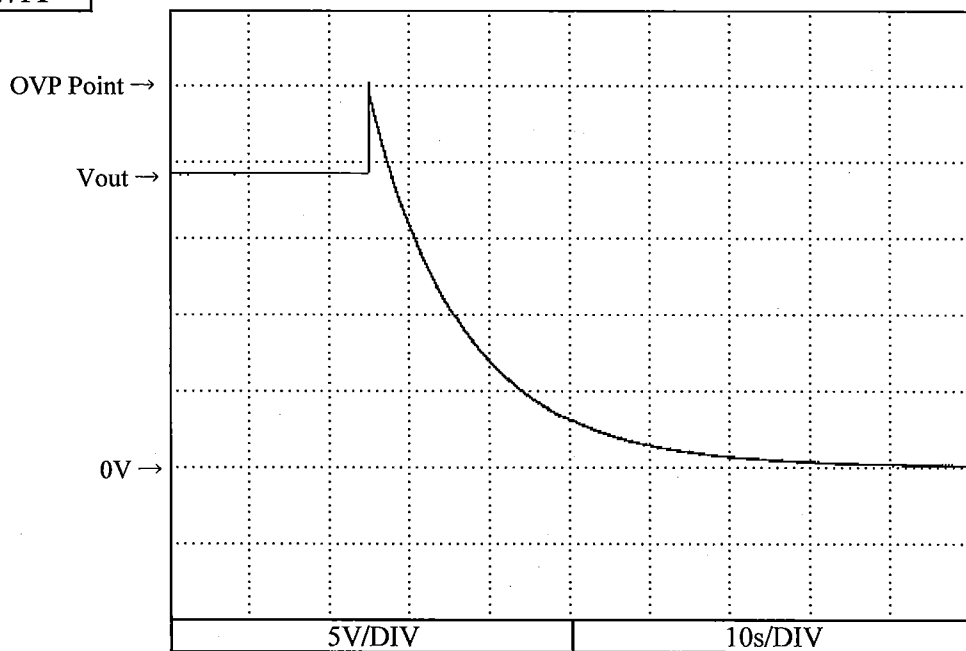
Over voltage protection (OVP) characteristics

Conditions Vin : 100 VAC
Iout : 0 %
Ta : 25 °C

0.35A

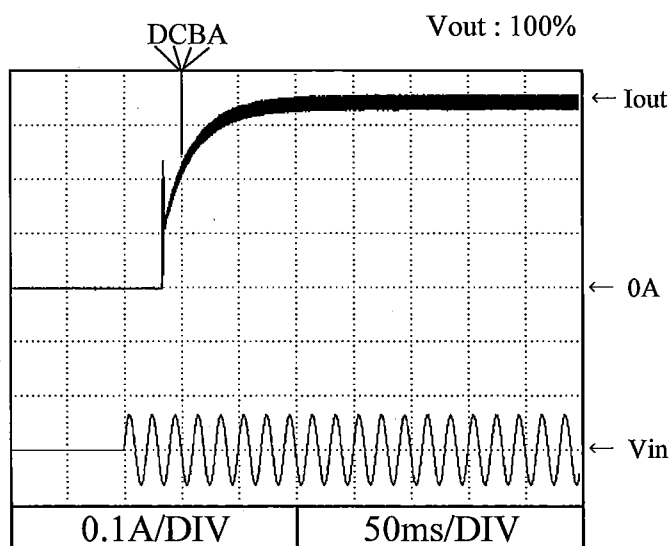
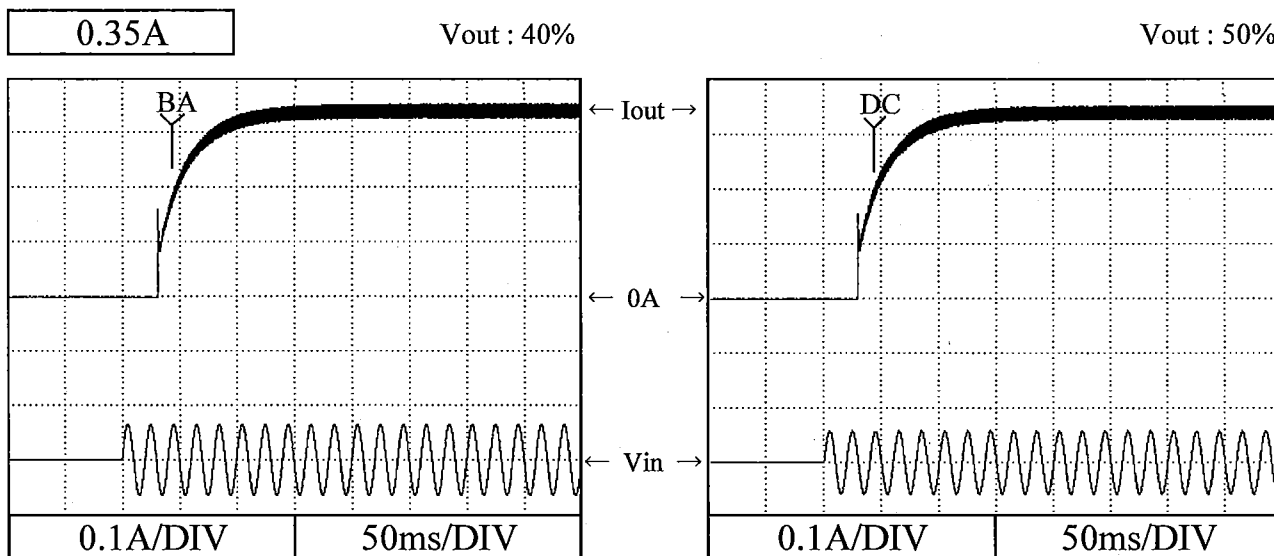


0.7A



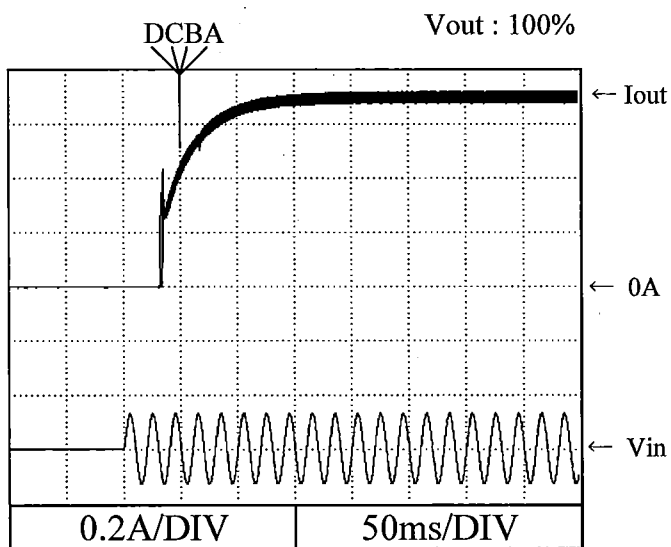
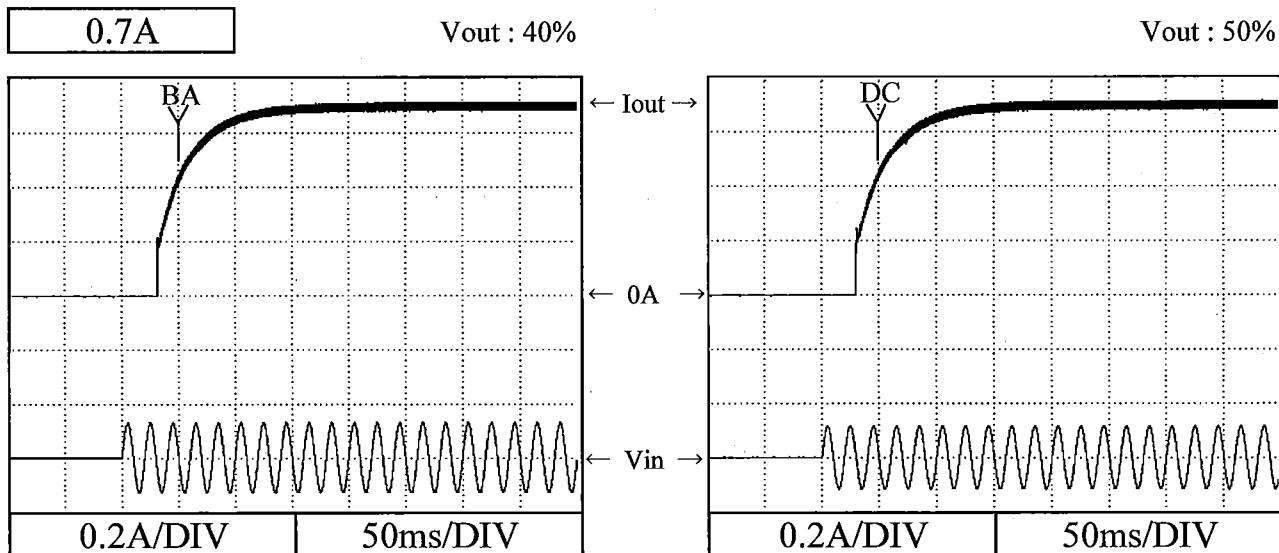
2.5 出力立ち上がり特性
Output rise characteristics

Conditions Vin : 90 VAC (A)
100 VAC (B)
200 VAC (C)
265 VAC (D)
Ta : 25 °C



2.5 出力立ち上がり特性
Output rise characteristics

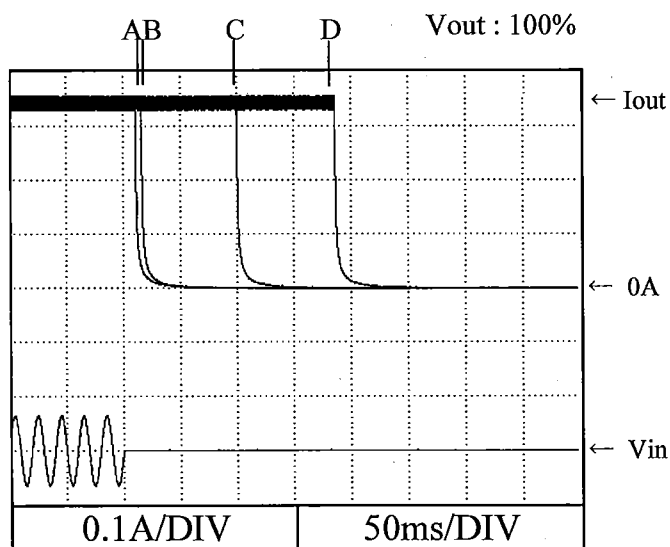
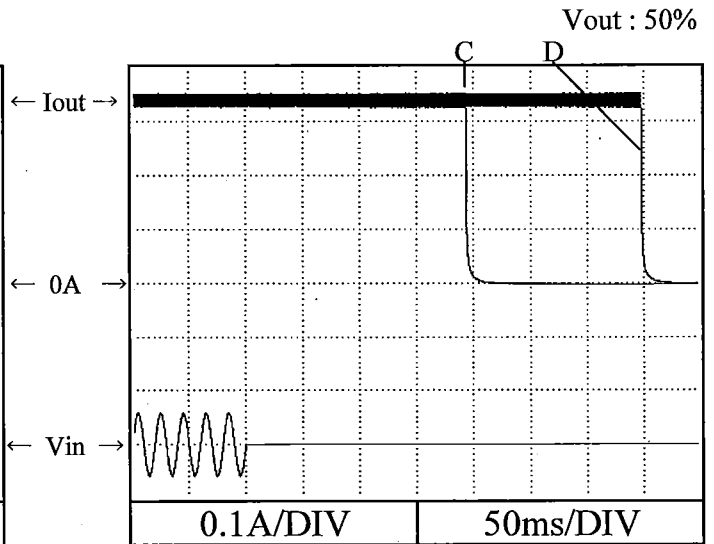
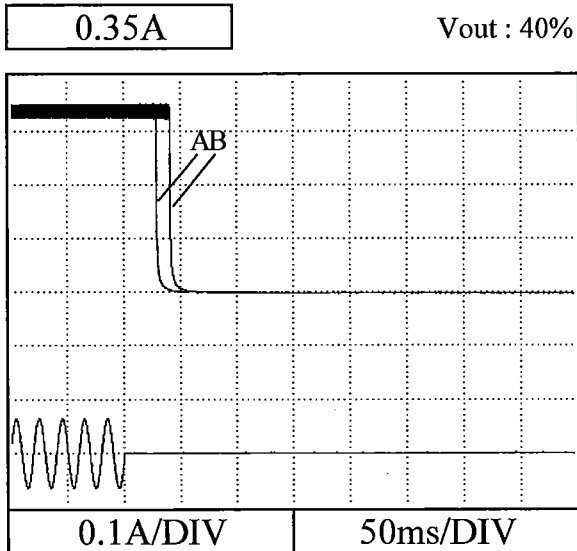
Conditions Vin : 90 VAC (A)
100 VAC (B)
200 VAC (C)
265 VAC (D)
Ta : 25 °C



2.6 出力立ち下がり特性

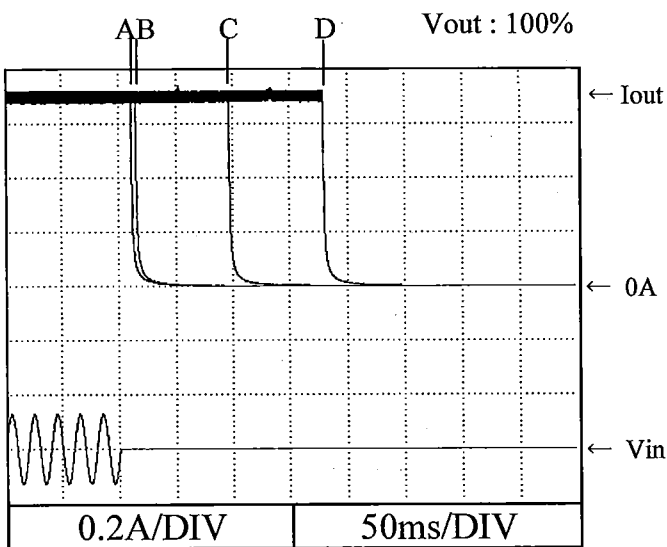
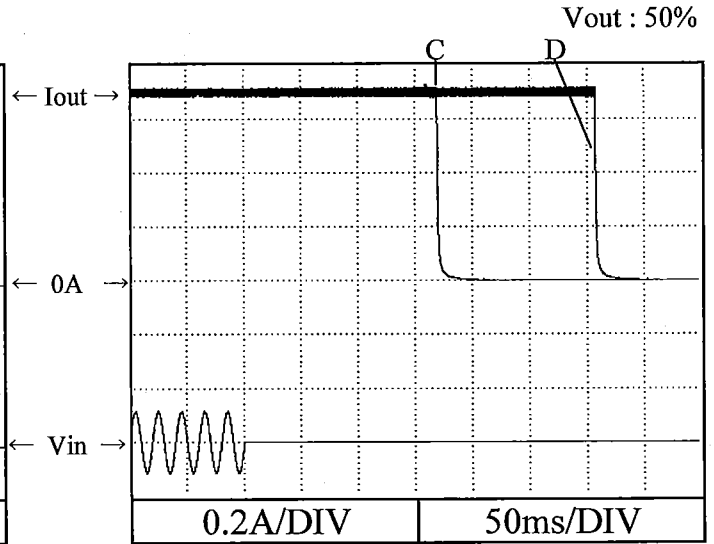
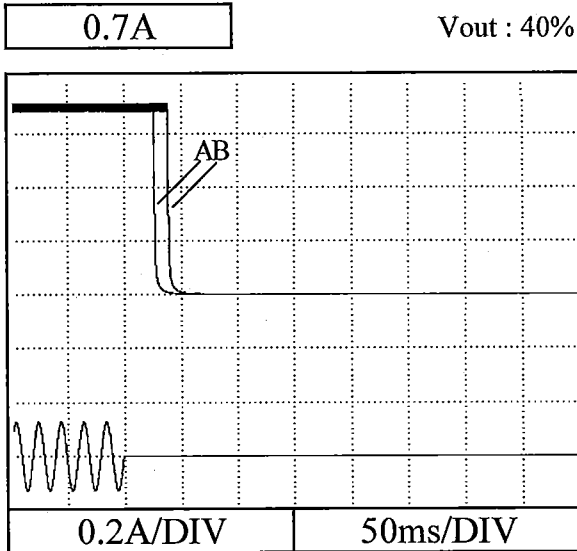
Output fall characteristics

Conditions Vin : 90 VAC (A)
 100 VAC (B)
 200 VAC (C)
 265 VAC (D)
 Ta : 25 °C



2.6 出力立ち下がり特性
Output fall characteristics

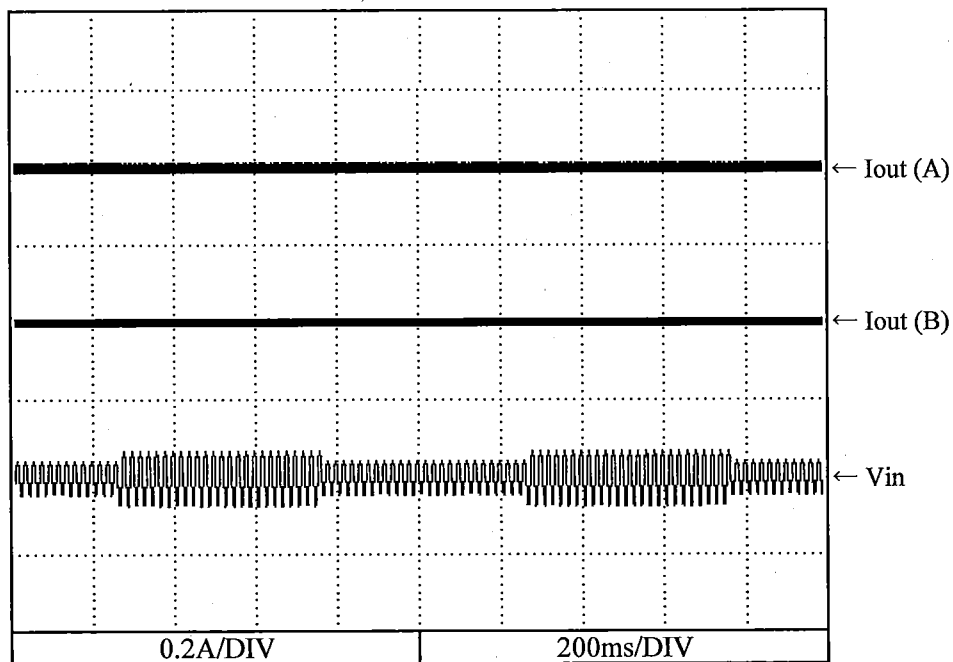
Conditions Vin : 90 VAC (A)
100 VAC (B)
200 VAC (C)
265 VAC (D)
Ta : 25 °C



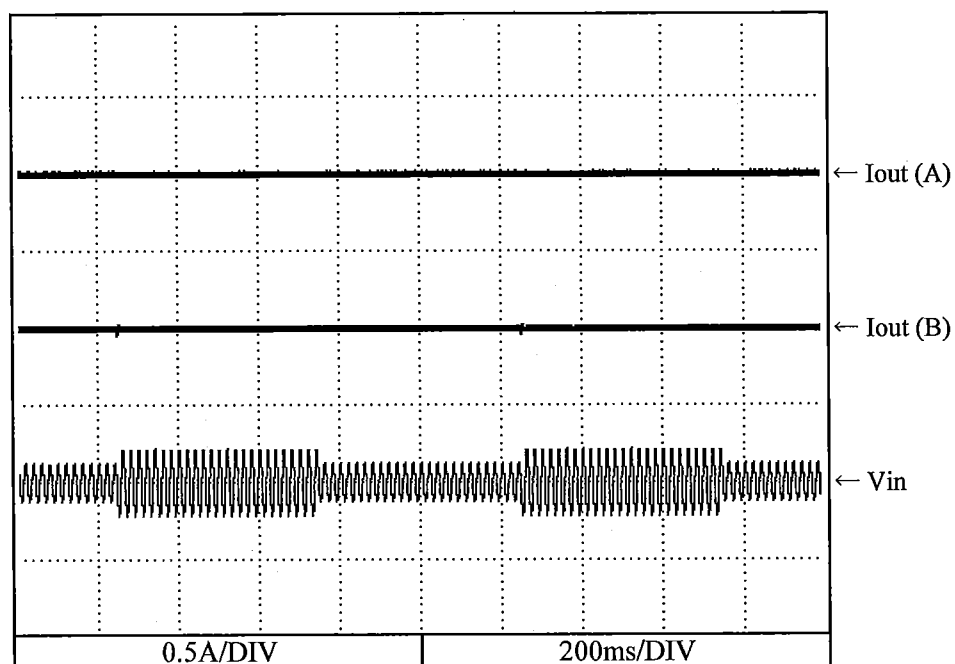
2.7 過渡応答(入力急変)特性
Dynamic line response characteristics

Conditions Vin : 90 VAC ↔ 132 VAC(A)
170 VAC ↔ 265 VAC(B)
Vout : 100 %
Ta : 25 °C

0.35A



0.7A



2.8 入力電圧瞬停特性

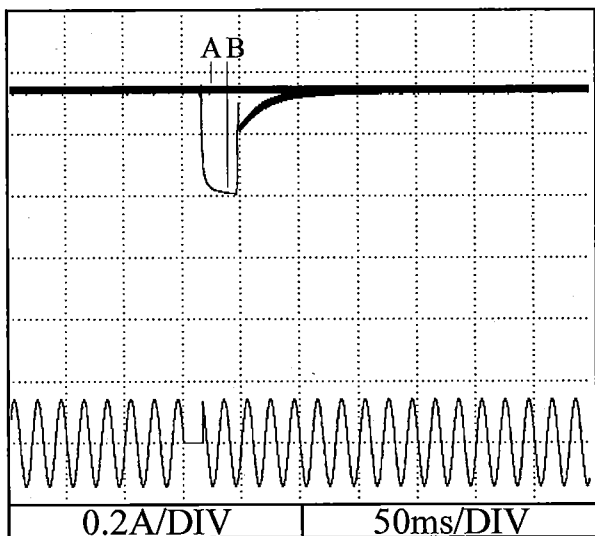
Response to brown out characteristics

Conditions Vout : 100 %
Ta : 25 °C

0.35A

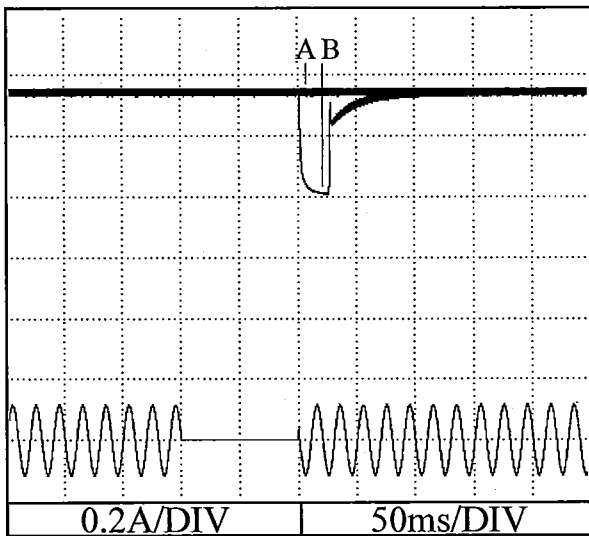
Vin : 100VAC

A = 15ms
B = 16ms



Vin : 200VAC

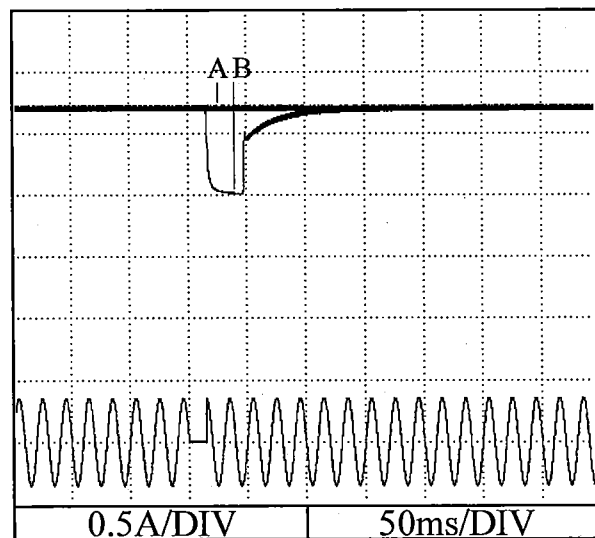
A = 98ms
B = 99ms



0.7A

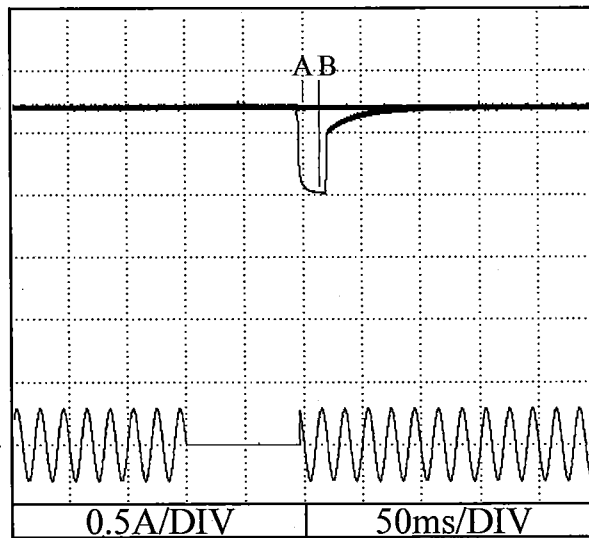
Vin : 100VAC

A = 15ms
B = 16ms



Vin : 200VAC

A = 96ms
B = 97ms

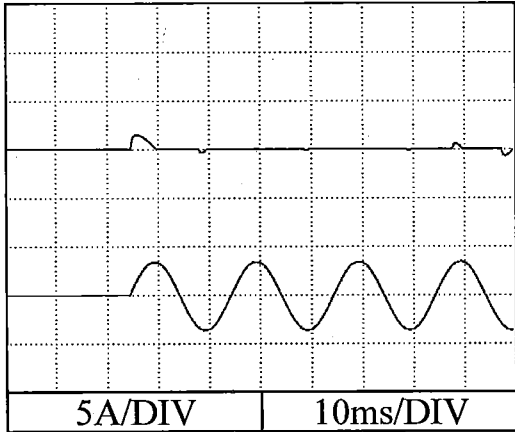


2.9 入力サージ電流 (突入電流) 波形
Inrush current waveform

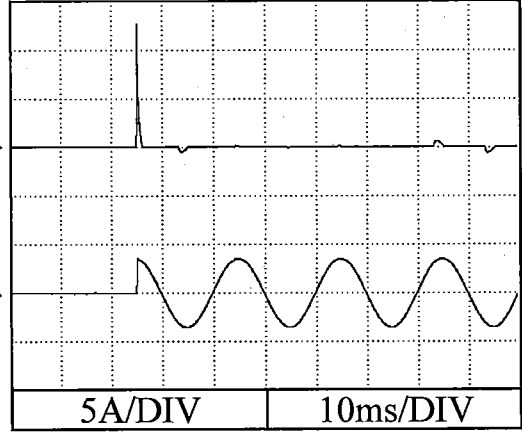
0.35A

Conditions Vin : 100 VAC
Vout : 100 %
Ta : 25 °C

Switch on phase angle of input AC voltage
 $\phi = 0^\circ$

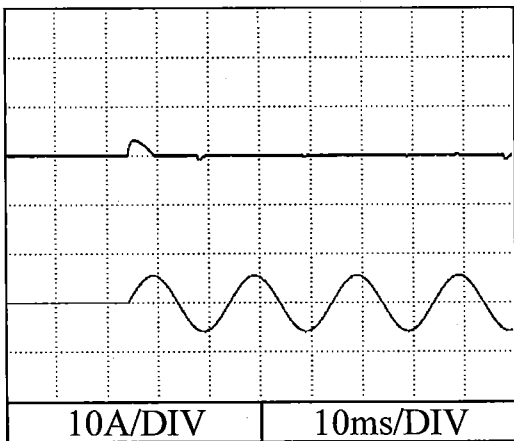


Switch on phase angle of input AC voltage
 $\phi = 90^\circ$

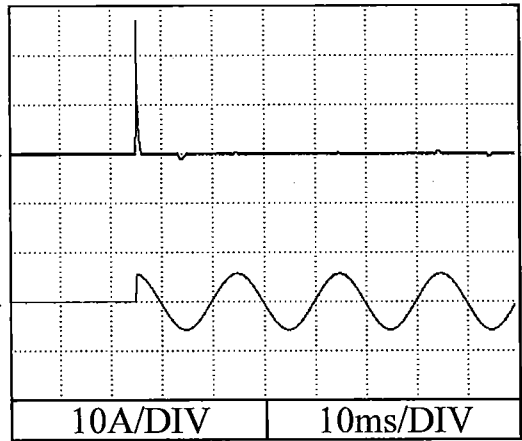


Conditions Vin : 200 VAC
Vout : 100 %
Ta : 25 °C

Switch on phase angle of input AC voltage
 $\phi = 0^\circ$



Switch on phase angle of input AC voltage
 $\phi = 90^\circ$



2.10 入力電流波形

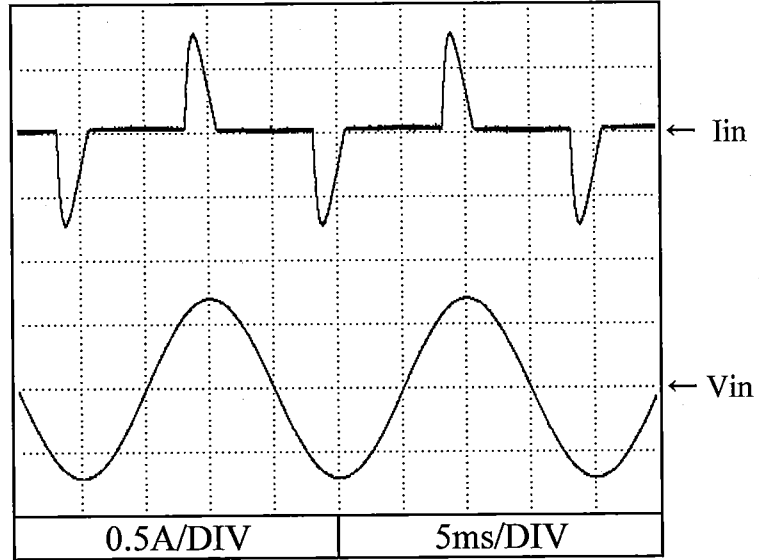
Input current waveform

Conditions Vout : 100 %

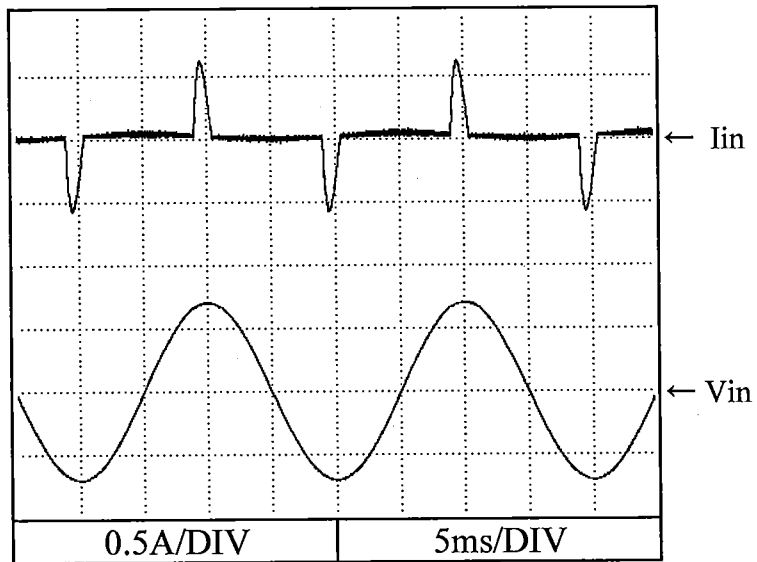
Ta : 25 °C

0.35A

Vin : 100 VAC



Vin : 200 VAC



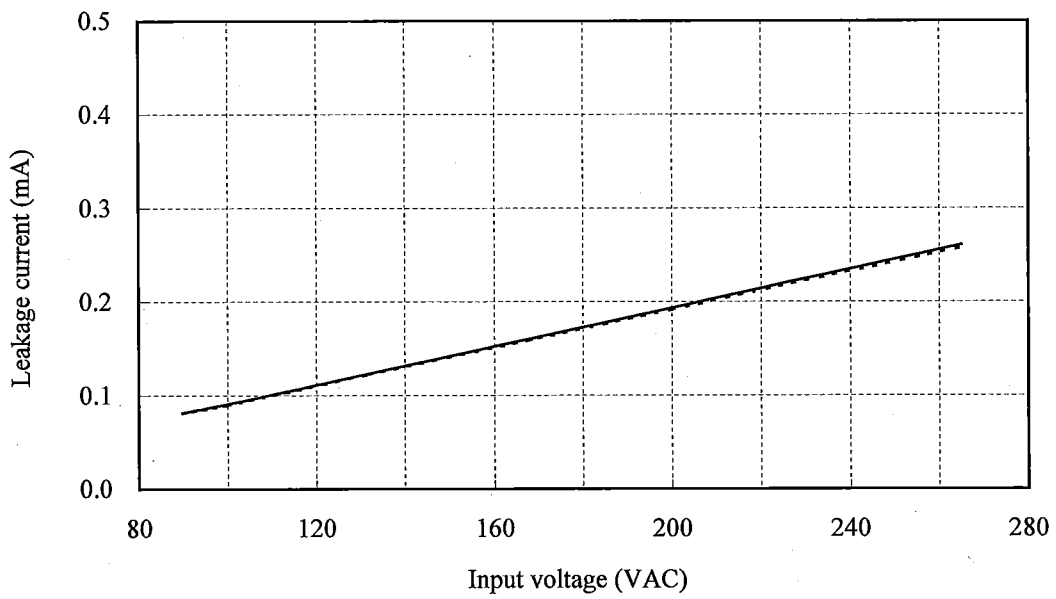
2.11 リーク電流特性

Leakage current characteristics

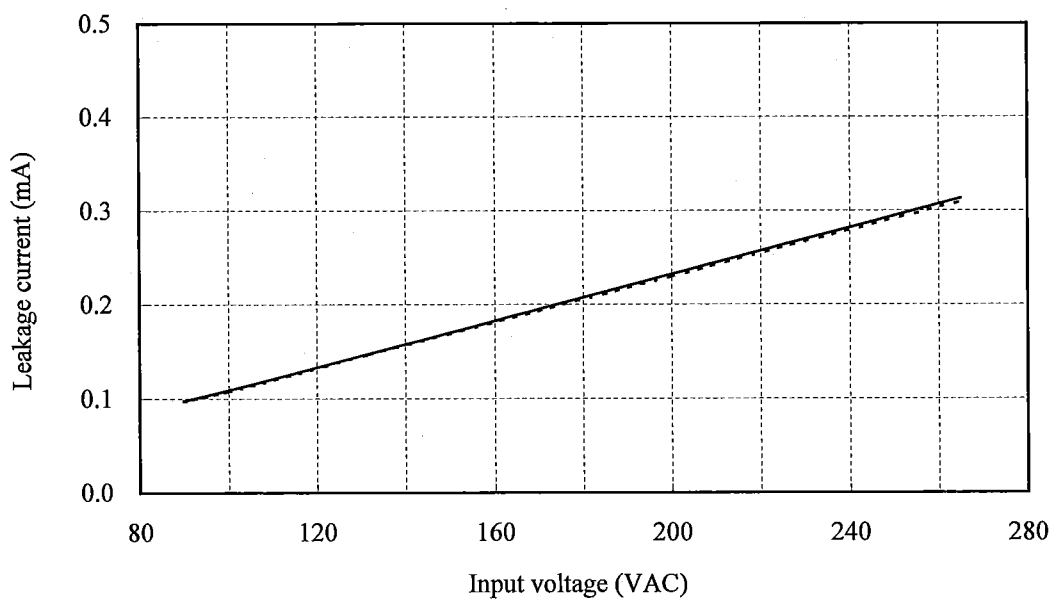
Conditions Vout : min -----
100 % -----
Ta : 25 °C
Equipment used : 3156 (HIOKI)

0.35A

f: 50 Hz



f: 60 Hz

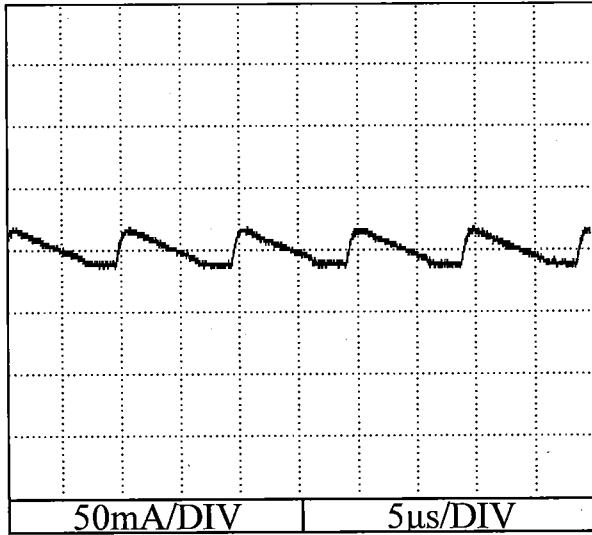


2.12 出力リップル、ノイズ波形
Output ripple and noise waveform

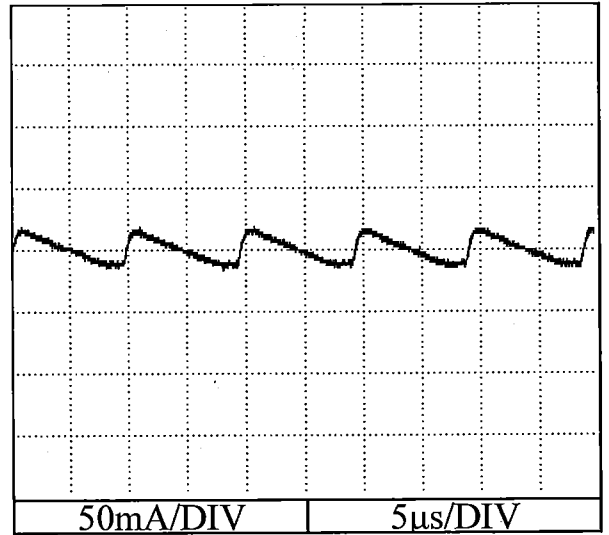
Conditions Vout : 100 %
Ta : 25 °C

0.35A

Vin : 100VAC

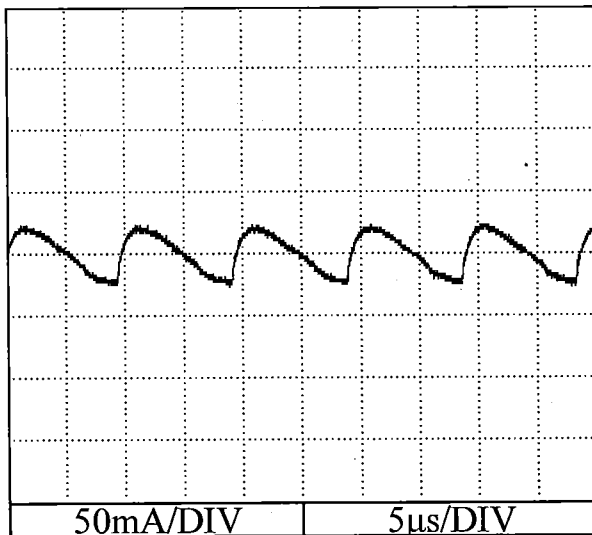


Vin : 200VAC

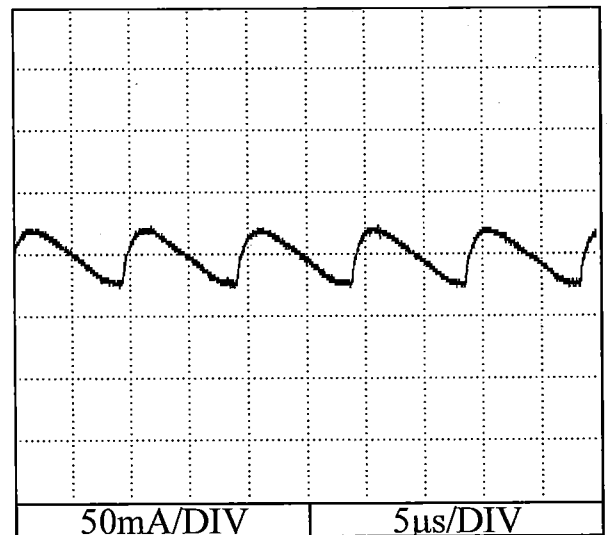


0.7A

Vin : 100VAC



Vin : 200VAC



2.13 EMI特性

Electro-Magnetic Interference characteristics

Conditions Vin : 200 VAC
 Vout : 100 %
 Ta : 25 °C

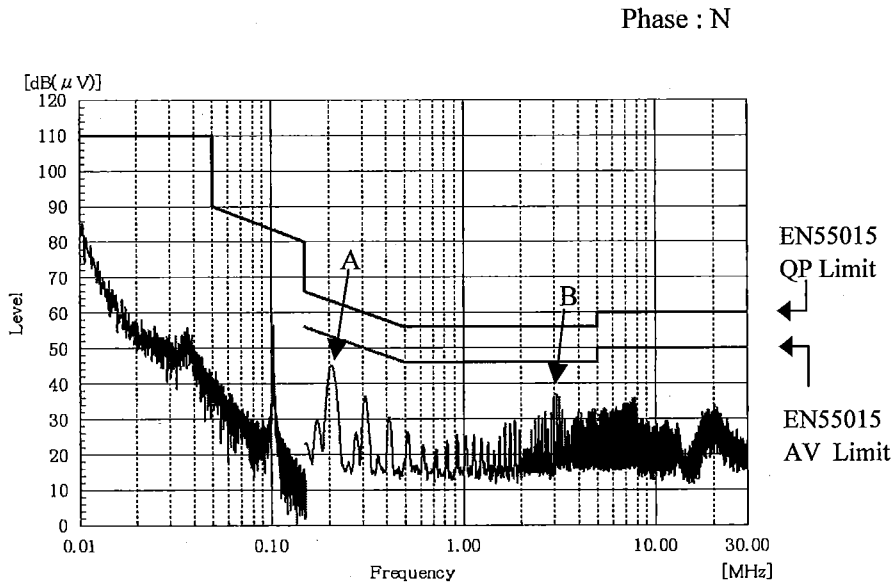
雑音端子電圧

Conducted Emission

0.35A

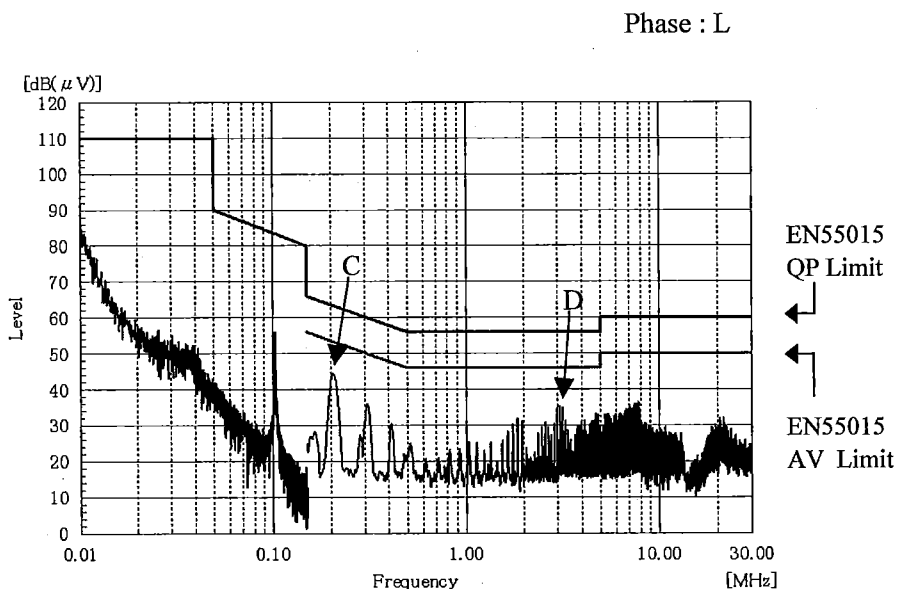
| Point A (0.21MHz) | | |
|----------------------|--------------|----------------|
| Ref. Data | Limit (dBuV) | Measure (dBuV) |
| QP | 63.3 | 43.1 |
| AV | 53.3 | 30.5 |

| Point B (3.08MHz) | | |
|----------------------|--------------|----------------|
| Ref. Data | Limit (dBuV) | Measure (dBuV) |
| QP | 56.0 | 33.0 |
| AV | 46.0 | 22.1 |



| Point C (0.21MHz) | | |
|----------------------|--------------|----------------|
| Ref. Data | Limit (dBuV) | Measure (dBuV) |
| QP | 63.1 | 30.8 |
| AV | 53.1 | 17.7 |

| Point D (3.19MHz) | | |
|----------------------|--------------|----------------|
| Ref. Data | Limit (dBuV) | Measure (dBuV) |
| QP | 56.0 | 31.2 |
| AV | 46.0 | 21.8 |



EN55022-B,VCCI-B,CISPR22-B,FCC-Bの限界値はEN55015の限界値と同じ(150kHz以上)
 Limit of EN55022-B,VCCI-B,CISPR22-B,FCC-B are same as its EN55015.(more than 150kHz)

表示はピーク値

Indication is peak values.

2.13 EMI特性

Electro-Magnetic Interference characteristics

Conditions Vin : 200 VAC
 Vout : 100 %
 Ta : 25 °C

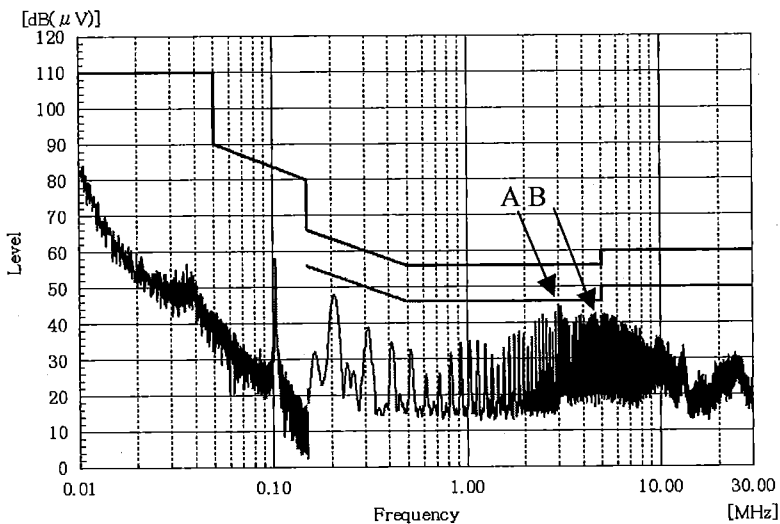
雑音端子電圧

Conducted Emission

0.7A

| Point A (2.99MHz) | | |
|----------------------|--------------|----------------|
| Ref. Data | Limit (dBuV) | Measure (dBuV) |
| QP | 56.0 | 37.8 |
| AV | 46.0 | 29.4 |

| Point B (4.54MHz) | | |
|----------------------|--------------|----------------|
| Ref. Data | Limit (dBuV) | Measure (dBuV) |
| QP | 56.0 | 40.8 |
| AV | 46.0 | 34.3 |

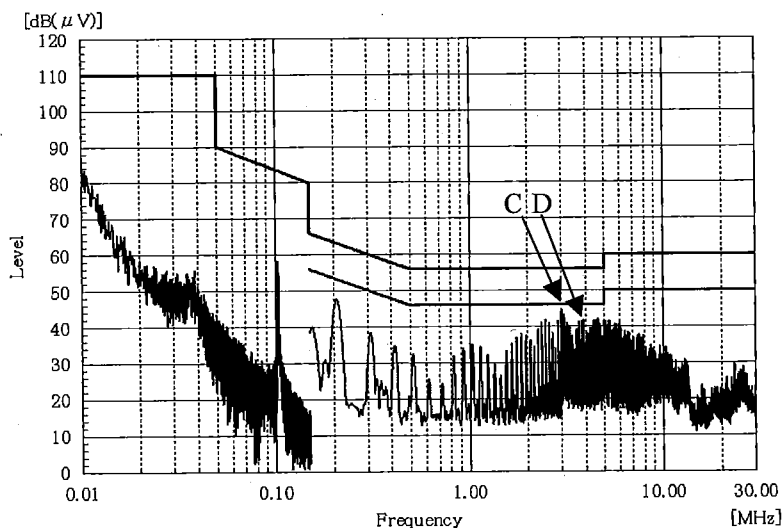


Phase : N

EN55015
QP Limit
←
←
EN55015
AV Limit

| Point C (2.99MHz) | | |
|----------------------|--------------|----------------|
| Ref. Data | Limit (dBuV) | Measure (dBuV) |
| QP | 56.0 | 41.0 |
| AV | 46.0 | 32.4 |

| Point D (3.82MHz) | | |
|----------------------|--------------|----------------|
| Ref. Data | Limit (dBuV) | Measure (dBuV) |
| QP | 56.0 | 39.9 |
| AV | 46.0 | 34.2 |



Phase : L

EN55015
QP Limit
←
←
EN55015
AV Limit

EN55022-B, VCCI-B, CISPR22-B, FCC-Bの限界値はEN55015の限界値と同じ(150kHz以上)
 Limit of EN55022-B, VCCI-B, CISPR22-B, FCC-B are same as its EN55015.(more than 150kHz)

表示はピーク値
 Indication is peak values.

2.13 EMI特性

Electro-Magnetic Interference characteristics

Conditions Vin : 100 VAC

Vout : 100 %

Ta : 25 °C

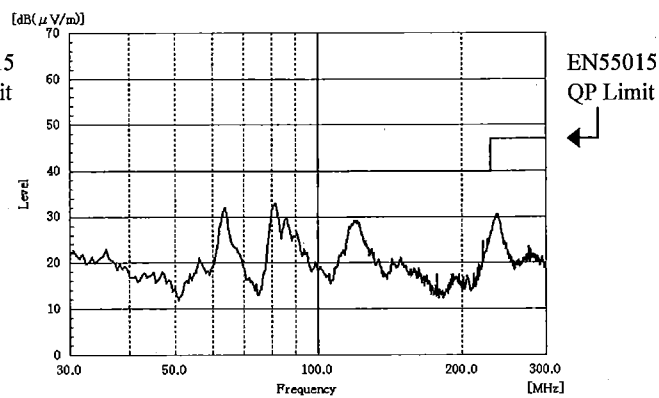
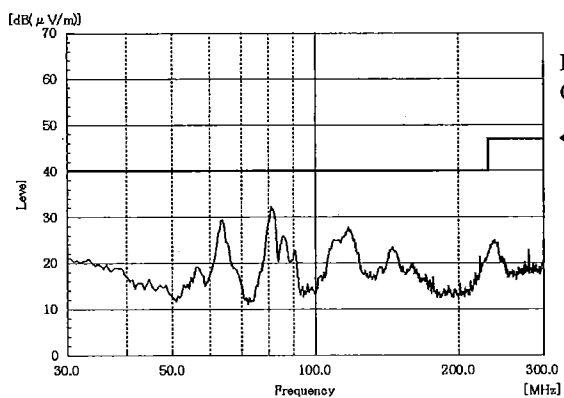
雑音電界強度

Radiated Emission

0.35A

HORIZONTAL

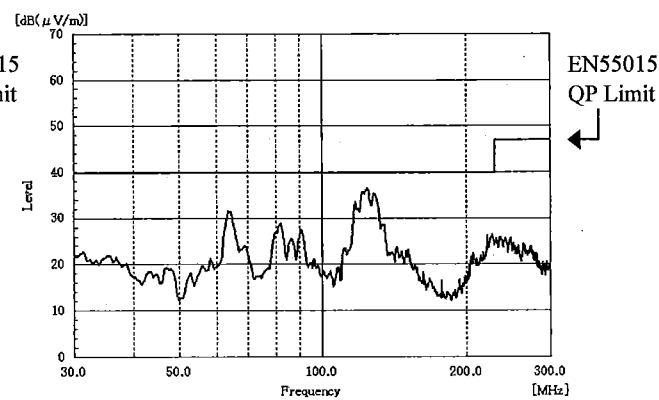
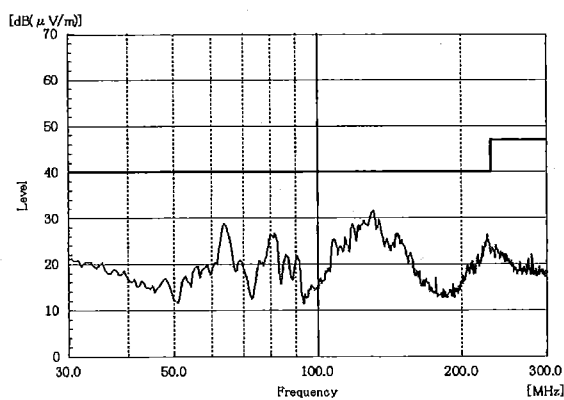
VERTICAL



0.7A

HORIZONTAL

VERTICAL



EN55022-B,VCCI-B,CISPR22-B,FCC-Bの限界値はEN55015の限界値と同じ
Limit of EN55022-B, VCCI-B, CISPR22-B, FCC-B are same as its EN55015.

表示はピーク値

Indication is peak values.

2.13 EMI特性

Electro-Magnetic Interference characteristics

Conditions Vin : 100 VAC

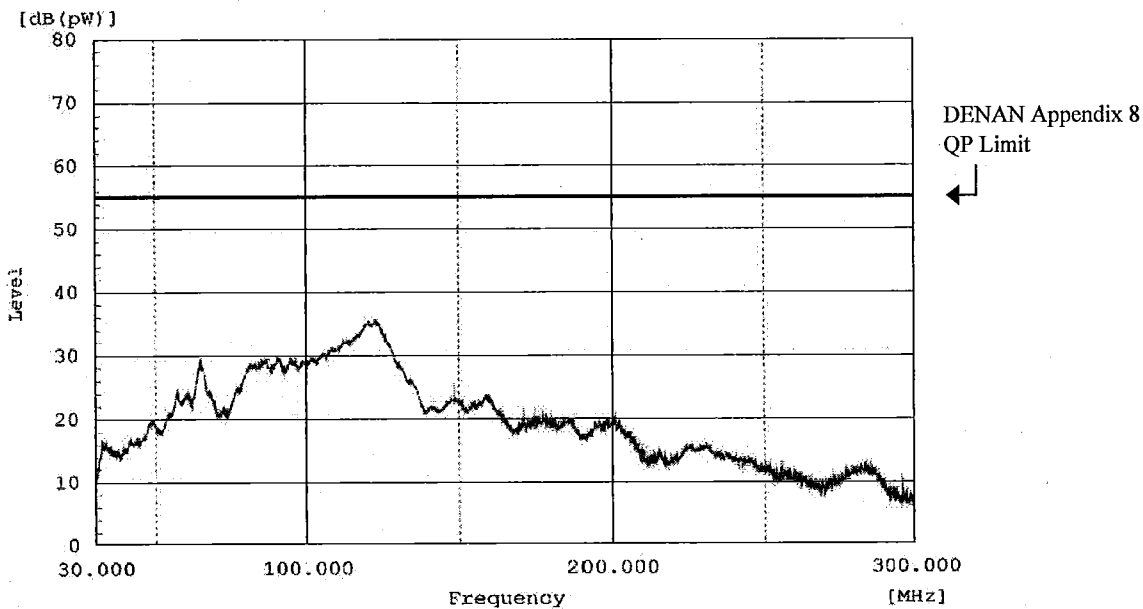
Vout : 100 %

Ta : 25 °C

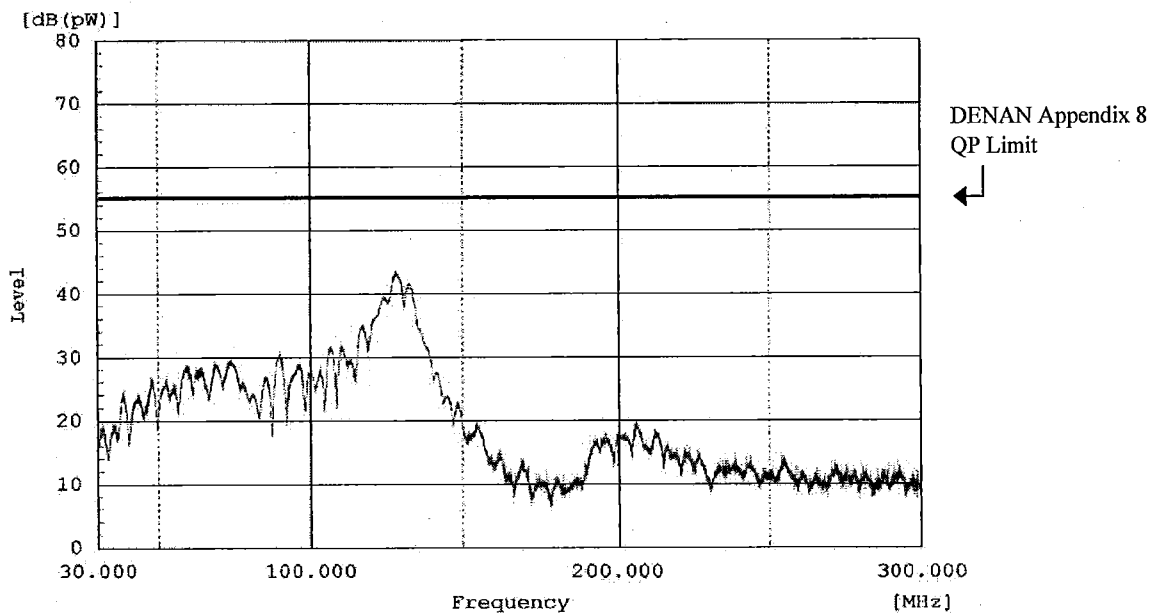
妨害波電力

Disturbance Power

0.35A



0.7A



表示はピーク値
Indication is peak values.