ZWS150B

EVALUATION DATA

型式データ

INDEX

使用記号 Terminology used

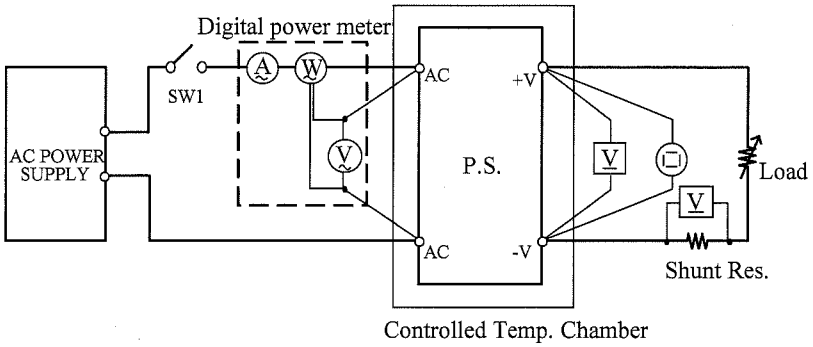
	定義	Definition
Vin	.....	入力電圧 Input voltage
Vout	.....	出力電圧 Output voltage
Iin	.....	入力電流 Input current
Iout	.....	出力電流 Output current
Ta	.....	周囲温度 Ambient temperature
f	.....	周波数 Frequency

1. 測定方法 **Evaluation Method**

1. 1 測定回路 Circuit used for determination

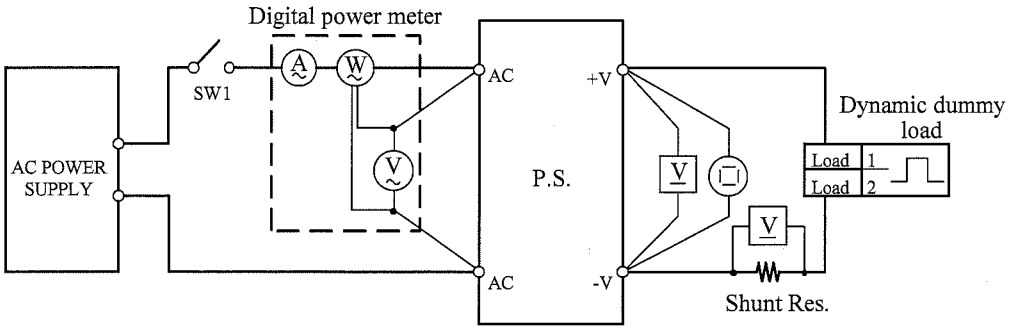
測定回路1 Circuit 1 used for determination

- 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



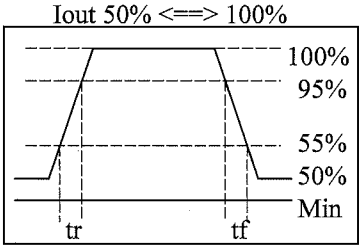
測定回路2 Circuit 2 used for determination

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



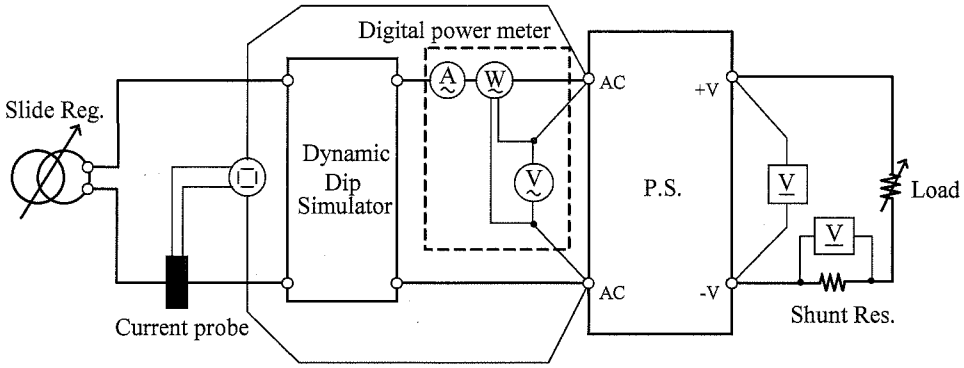
Output current waveform

Iout 50% <==> 100%



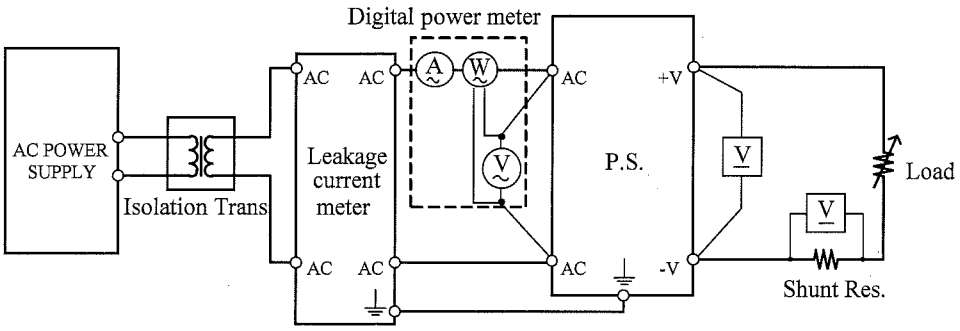
測定回路3 Circuit 3 used for determination

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



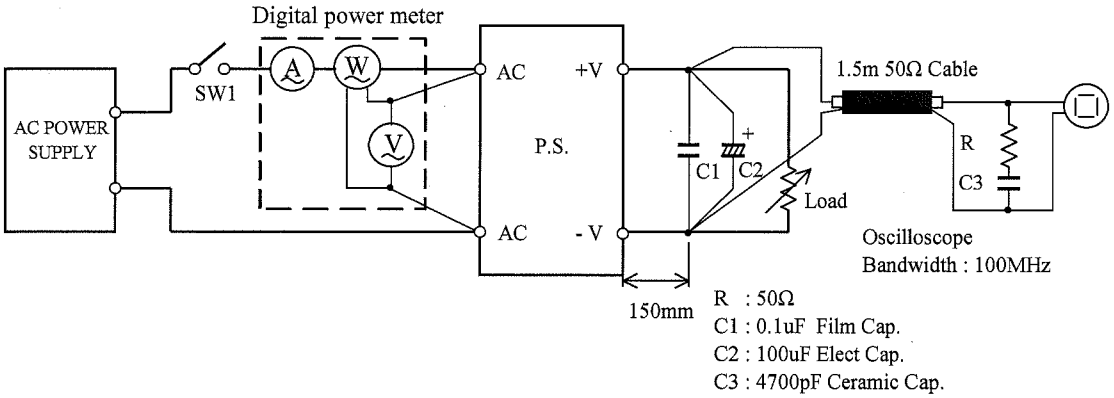
測定回路4 Circuit 4 used for determination

・リーク電流特性　　Leakage current characteristics



測定回路5 Circuit 5 used for determination

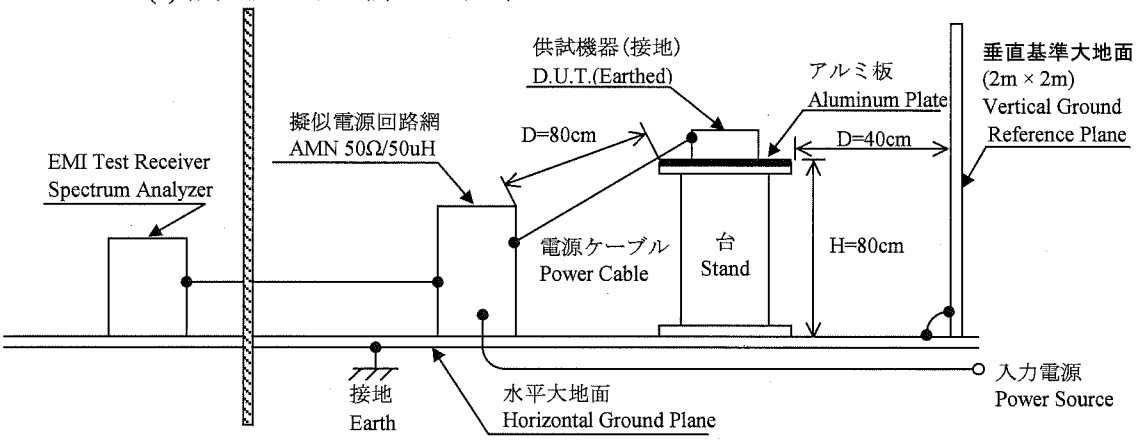
・出力リップル、ノイズ波形　　Output ripple and noise waveform



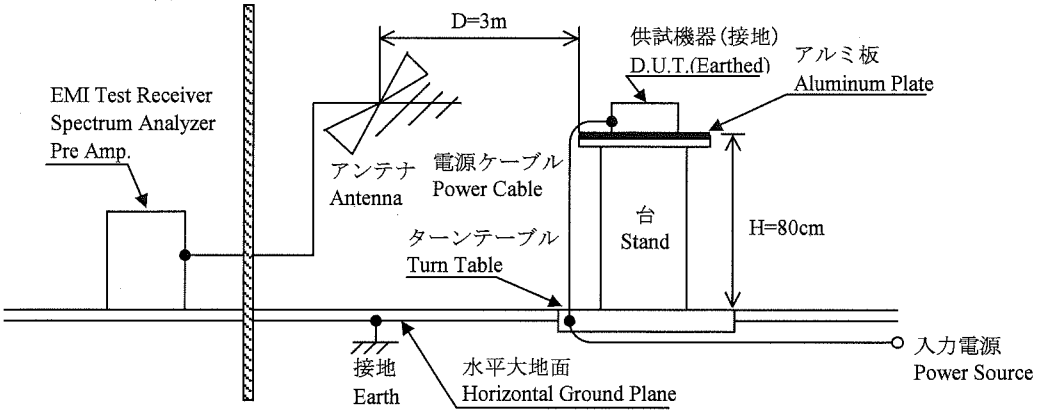
測定構成　Configuration used for determination

・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	TEKTRONIX	TDS3012
2	DIGITAL STORAGE OSCILLOSCOPE	YOKOGAWA ELECT.	DL9040L
3	DIGITAL MULTIMETER	AGILENT	34970A
4	DIGITAL POWER METER	YOKOGAWA ELECT.	WT210
5	CURRENT PROBE	YOKOGAWA ELECT.	701928 / 701930
6	DYNAMIC DUMMY LOAD	TAKASAGO	FK-200L / FK-400L
7	DUMMY LOAD	PCN	RHF250 SIRIES
8	SLIDE REGULATOR	MATSUNAGA	S3-24100
9	CVCF	TAKASAGO	AA2000XG
10	CVCF	KIKUSUI	PCR4000L
11	CVCF	NF	ES10000S
12	LEAKAGE CURRENT METER	HIOKI	3156
13	DYNAMIC DIP SIMULATOR	TAKAMISAWA	PSA-210
14	CONTROLLED TEMP. CHAMBER	ESPEC	SU-641 / SH-240
15	EMI TEST RECEIVER / SPECTRUM ANALYZER	ROHDE & SCHWARZ	ESCI
16	PRE AMP.	SONOMA	310N
17	AMN	SCHWARZBECK	NNLK8121
18	ANTENNA	SCHWARZBECK	CBL6111D

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

5V

1. Regulation - line and load Condition Ta : 25 ℃

Iout \ Vin	85VAC	100VAC	200VAC	265VAC	line regulation	
0%	5.001V	5.001V	5.003V	5.004V	3mV	0.060%
50%	5.000V	5.000V	5.002V	5.003V	3mV	0.060%
100%	4.999V	4.999V	5.001V	5.001V	2mV	0.040%
load	2mV	2mV	2mV	3mV		
regulation	0.040%	0.040%	0.040%	0.060%		

2. Temperature drift Conditions Vin : 100 VAC
Iout : 100 %

Ta	-10℃	+25℃	+50℃	temperature stability	
Vout	5.004V	4.999V	4.996V	8mV	0.160%

3. Start up voltage and Drop out voltage Conditions Ta : 25 ℃
Iout : 100 %

Start up voltage (Vin)	75VAC
Drop out voltage (Vin)	71VAC

12V

1. Regulation - line and load Condition Ta : 25 ℃

Iout \ Vin	85VAC	100VAC	200VAC	265VAC	line regulation	
0%	12.004V	12.004V	12.004V	12.004V	0mV	0.000%
50%	12.003V	12.003V	12.003V	12.004V	1mV	0.008%
100%	12.003V	12.003V	12.003V	12.003V	0mV	0.000%
load	1mV	1mV	1mV	1mV		
regulation	0.008%	0.008%	0.008%	0.008%		

2. Temperature drift Conditions Vin : 100 VAC
Iout : 100 %

Ta	-10℃	+25℃	+50℃	temperature stability	
Vout	11.991V	12.003V	11.994V	12mV	0.100%

3. Start up voltage and Drop out voltage Conditions Ta : 25 ℃
Iout : 100 %

Start up voltage (Vin)	76VAC
Drop out voltage (Vin)	70VAC

24V

1. Regulation - line and load Condition Ta : 25 ℃

Iout \ Vin	85VAC	100VAC	200VAC	265VAC	line regulation	
0%	23.966V	23.966V	23.968V	23.968V	2mV	0.008%
50%	23.967V	23.967V	23.968V	23.968V	1mV	0.004%
100%	23.968V	23.967V	23.969V	23.969V	2mV	0.008%
load	2mV	1mV	1mV	1mV		
regulation	0.008%	0.004%	0.004%	0.004%		

2. Temperature drift Conditions Vin : 100 VAC
Iout : 100 %

Ta	-10℃	+25℃	+50℃	temperature stability	
Vout	23.939V	23.967V	23.963V	28mV	0.117%

3. Start up voltage and Drop out voltage Conditions Ta : 25 ℃
Iout : 100 %

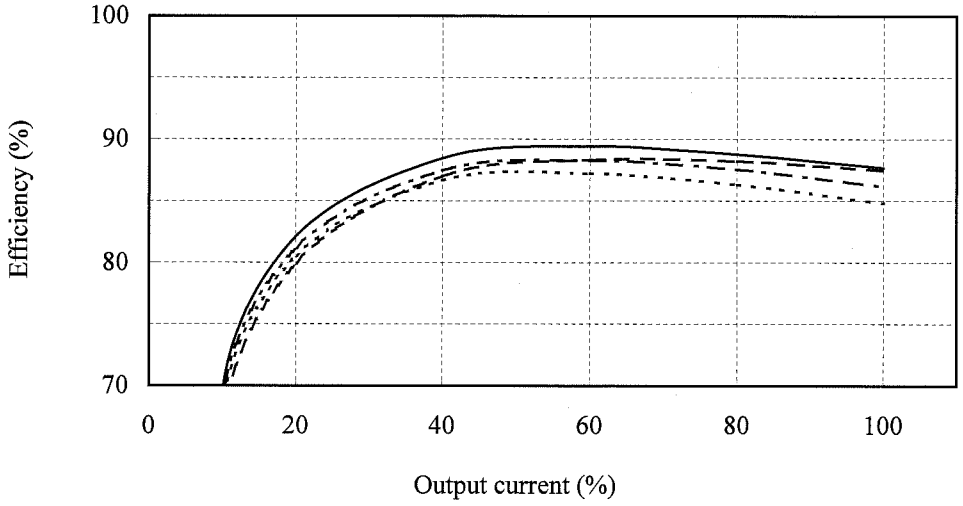
Start up voltage (Vin)	76VAC
Drop out voltage (Vin)	73VAC

(2) 効率対出力電流

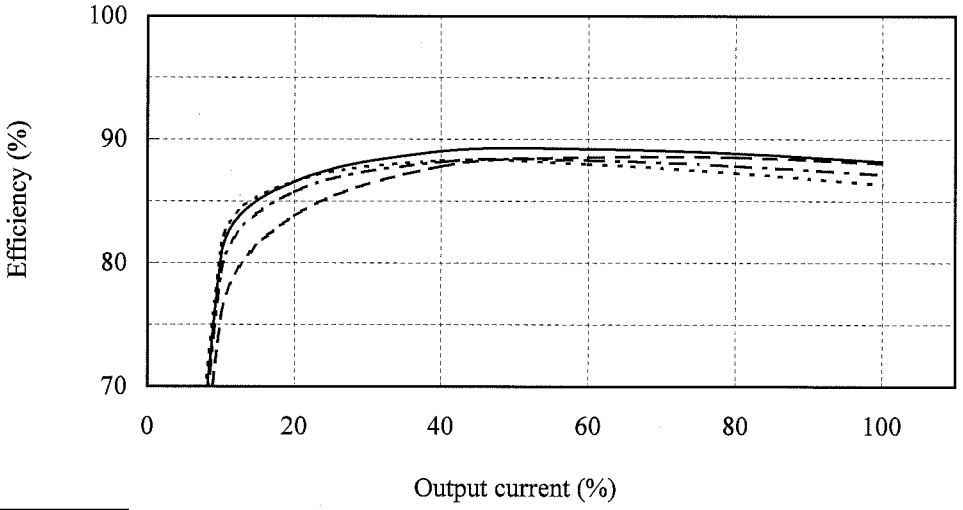
Efficiency vs. Output current

Conditions Vin : 85 VAC ------
: 100 VAC -·-·-·-
: 200 VAC ———
: 265 VAC – – – –
Ta : 25 ℃

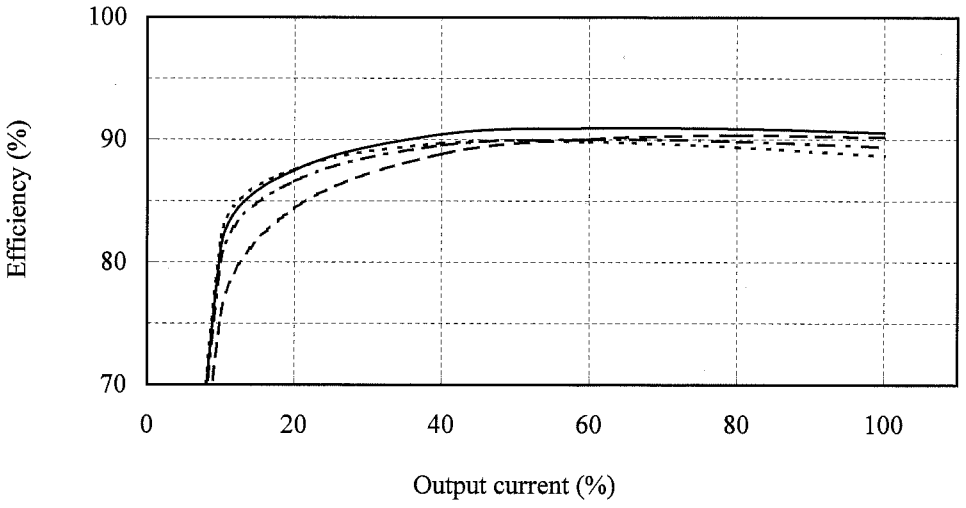
5V



12V



24V



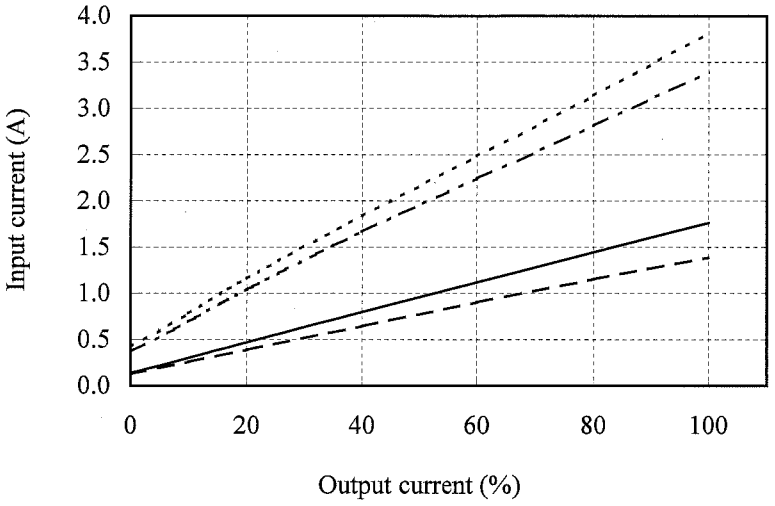
(3) 入力電流対出力電流
Input current vs. Output current

Conditions Vin : 85 VAC ------
: 100 VAC -·-·-·-
: 200 VAC ——
: 265 VAC – – – –
Ta : 25 ℃

5V

Io: 0%

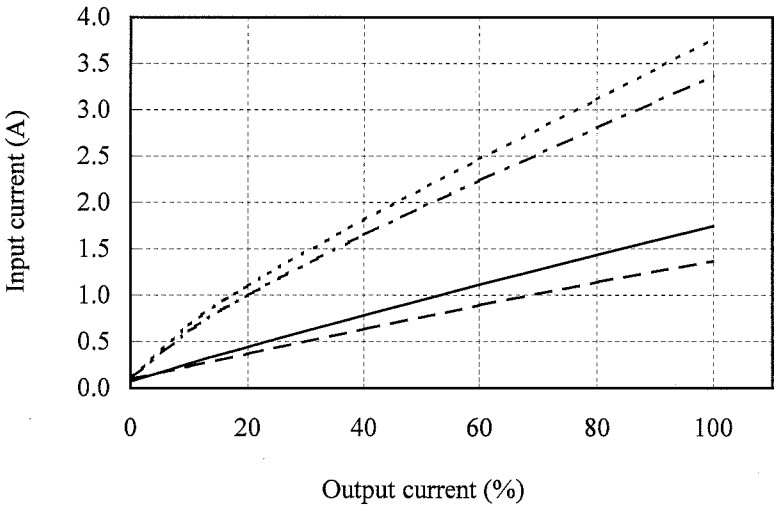
Vin	Input current
85VAC	0.42A
100VAC	0.37A
200VAC	0.14A
265VAC	0.12A



12V

Io: 0%

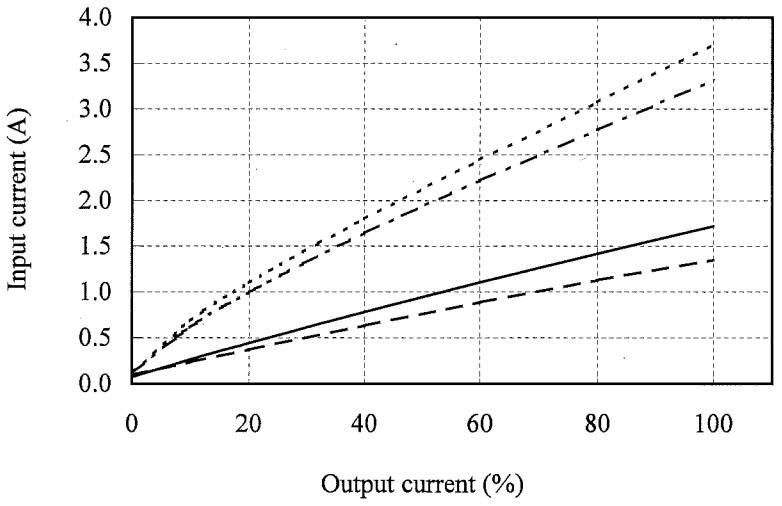
Vin	Input current
85VAC	0.11A
100VAC	0.10A
200VAC	0.07A
265VAC	0.10A



24V

Io: 0%

Vin	Input current
85VAC	0.12A
100VAC	0.12A
200VAC	0.07A
265VAC	0.10A



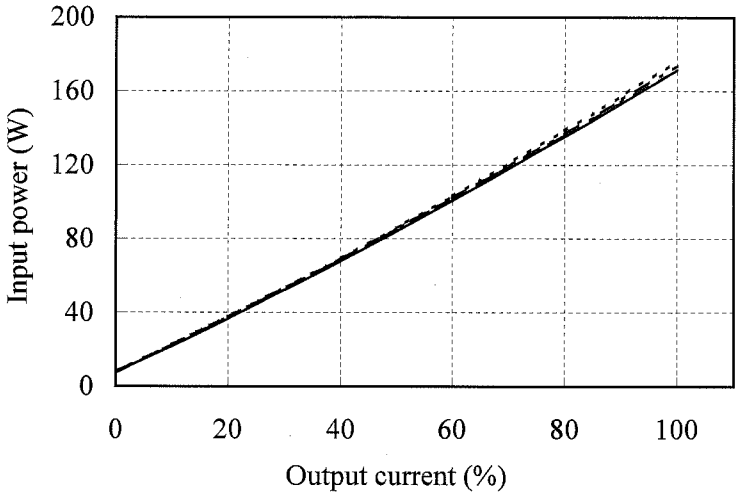
(4) 入力電力対出力電流
Input power vs. Output current

Conditions Vin : 85 VAC
: 100 VAC
: 200 VAC
: 265 VAC
Ta : 25 ℃

5V

Io: 0%

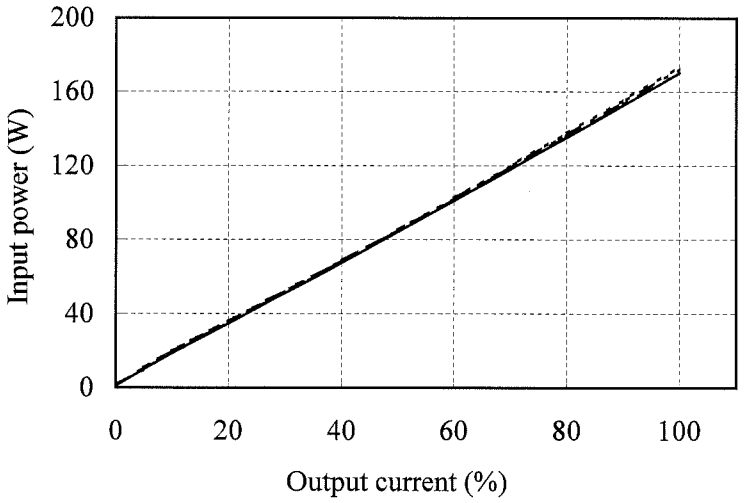
Vin	Input power
85VAC	8.1W
100VAC	8.0W
200VAC	7.7W
265VAC	7.0W



12V

Io: 0%

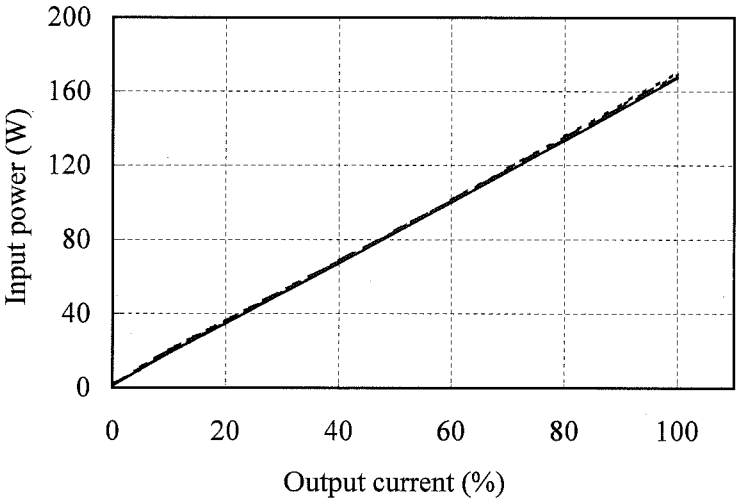
Vin	Input power
85VAC	1.1W
100VAC	1.2W
200VAC	1.0W
265VAC	1.5W



24V

Io: 0%

Vin	Input power
85VAC	1.2W
100VAC	1.5W
200VAC	1.2W
265VAC	1.6W



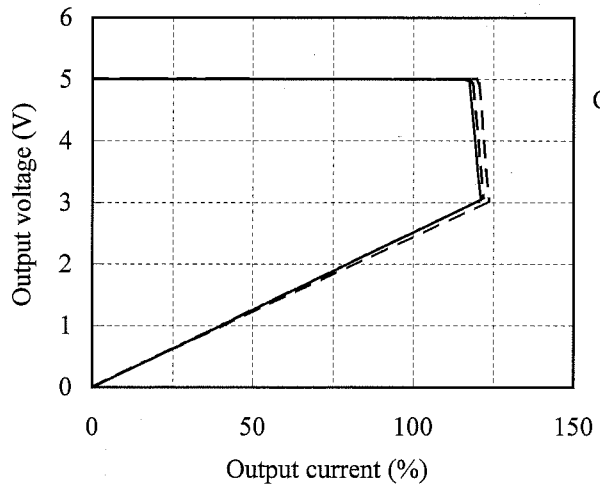
2. 2 過電流保護特性
Over current protection (OCP) characteristics

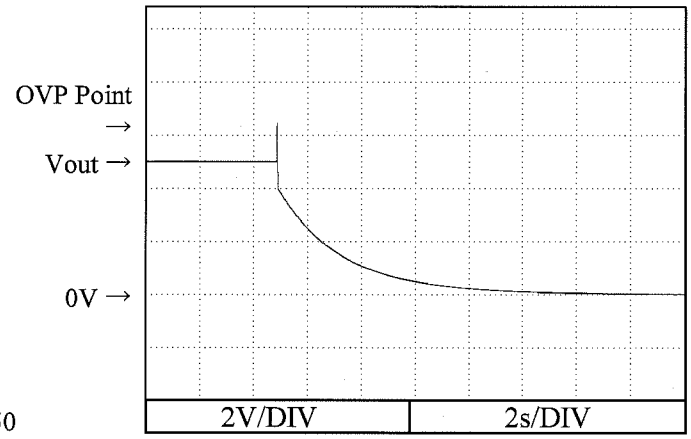
Conditions Vin : 100 VAC
Ta : -10 ℃ ----
25 ℃ -·-·-
50 ℃ ——

2. 3 過電圧保護特性
Over voltage protection (OVP) characteristics

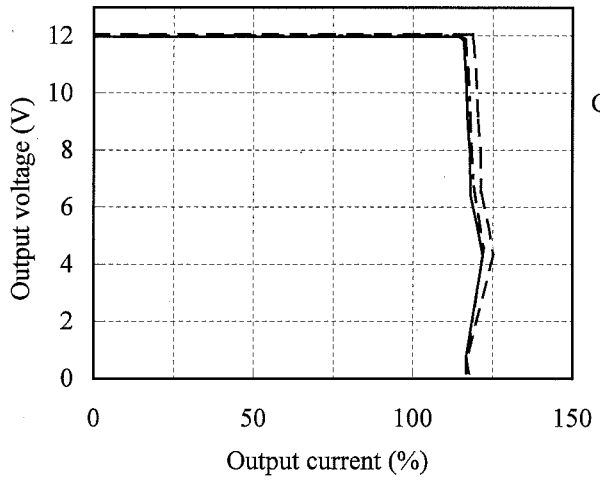
Conditions Vin : 100 VAC
Iout : 0 %
Ta : 25 ℃

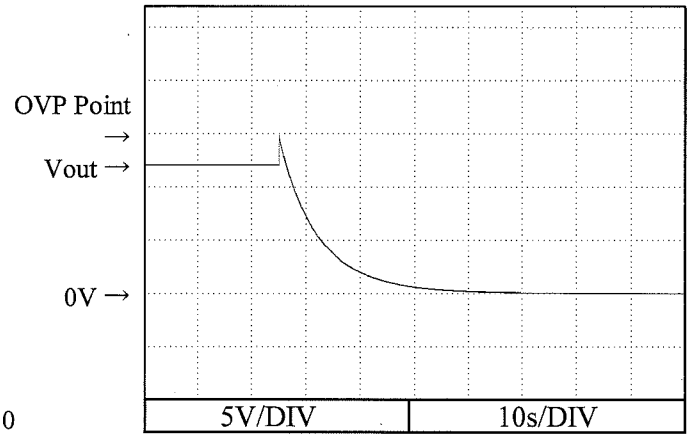
5V



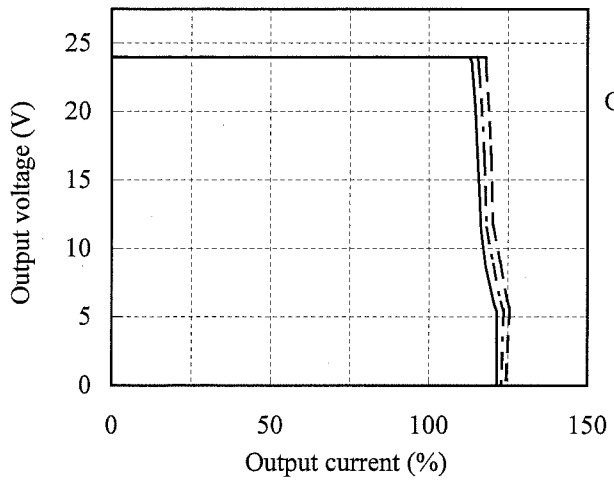


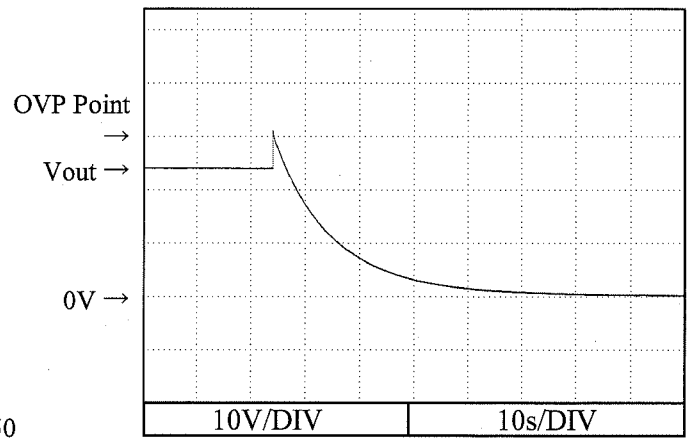
12V





24V



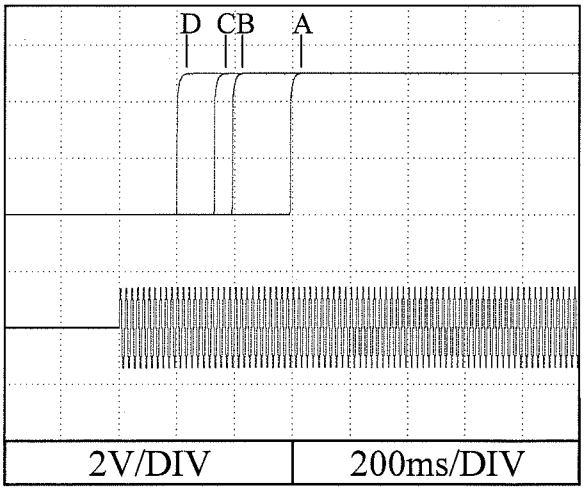


2.4 出力立ち上がり特性
Output rise characteristics

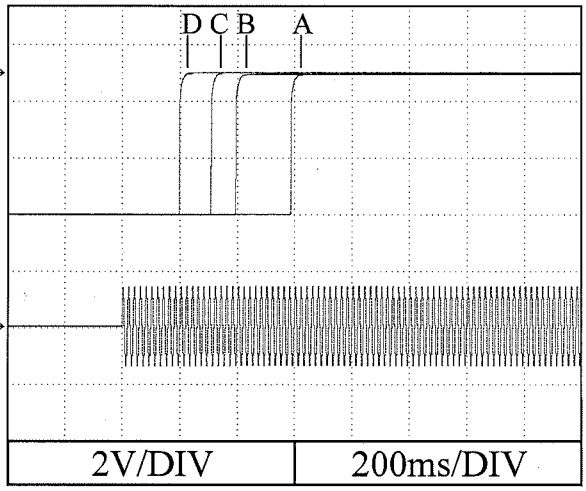
Conditions Vin : 85 VAC (A)
100 VAC (B)
200 VAC (C)
265 VAC (D)
Ta : 25 ℃

5V

Iout : 0%

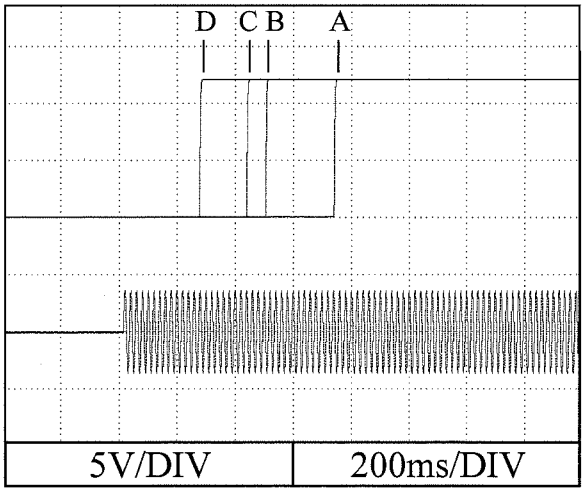


Iout : 100%

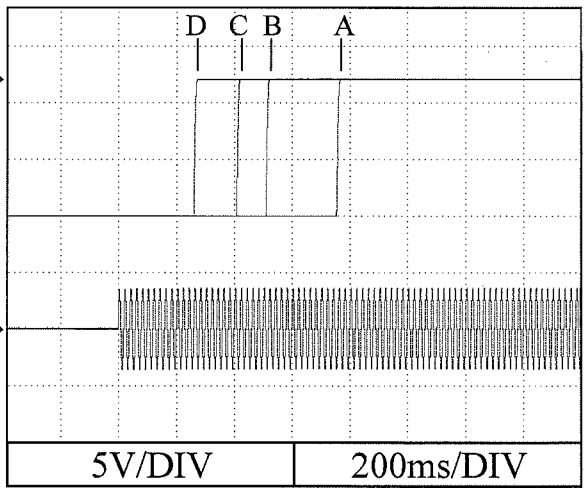


12V

Iout : 0%

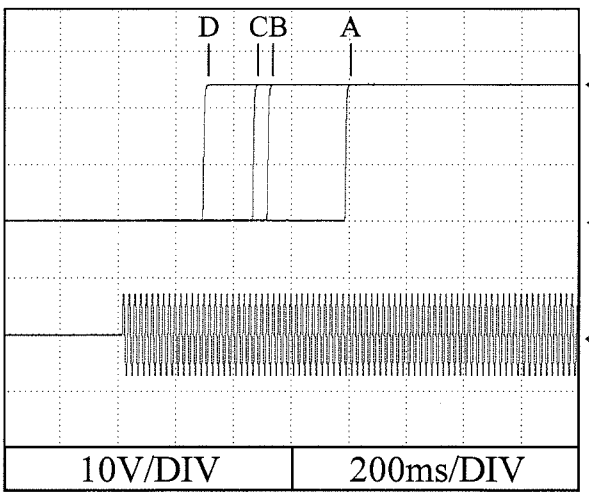


Iout : 100%

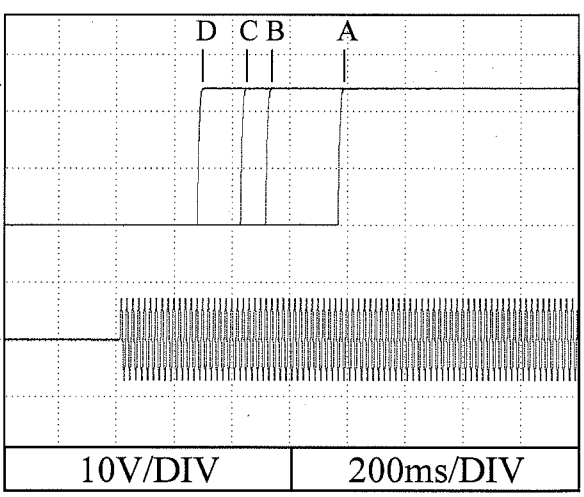


24V

Iout : 0%



Iout : 100%

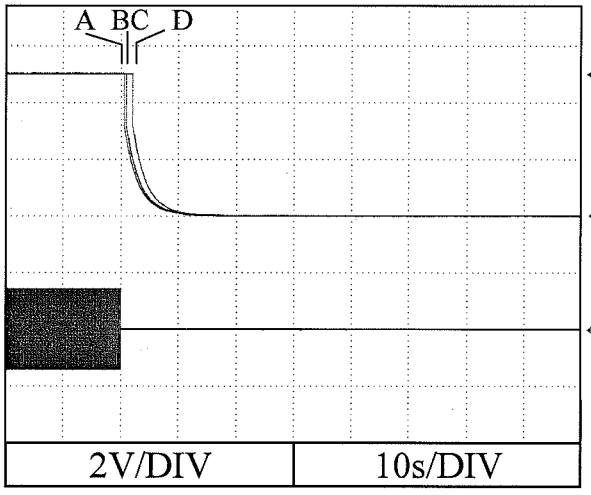


2.5 出力立ち下がり特性
Output fall characteristics

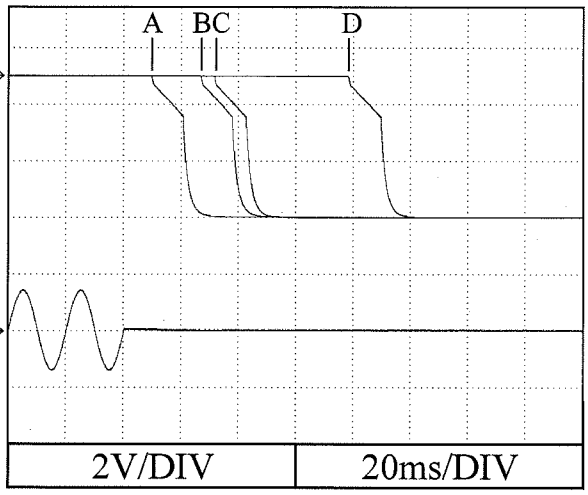
Conditions Vin : 85 VAC (A)
100 VAC (B)
200 VAC (C)
265 VAC (D)
Ta : 25 ℃

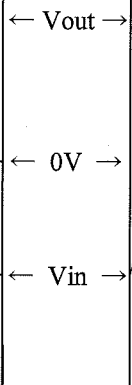
5V

Iout : 0%



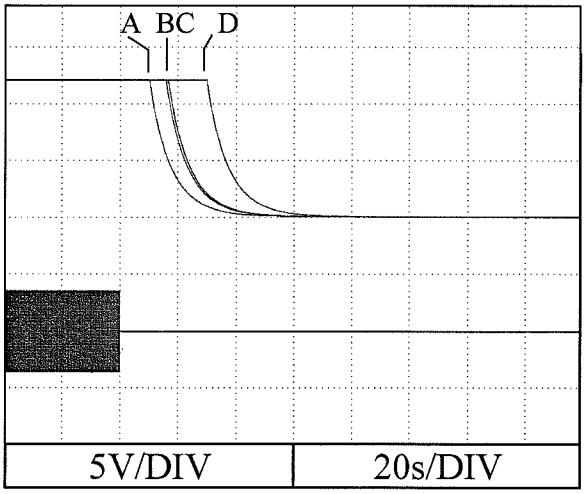
Iout : 100%



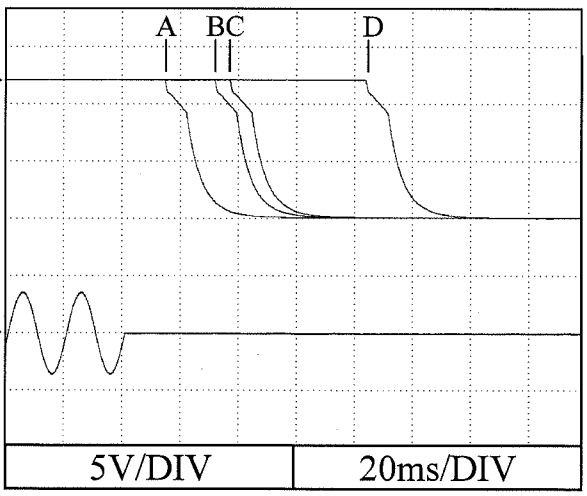


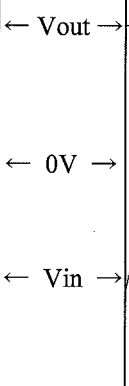
12V

Iout : 0%



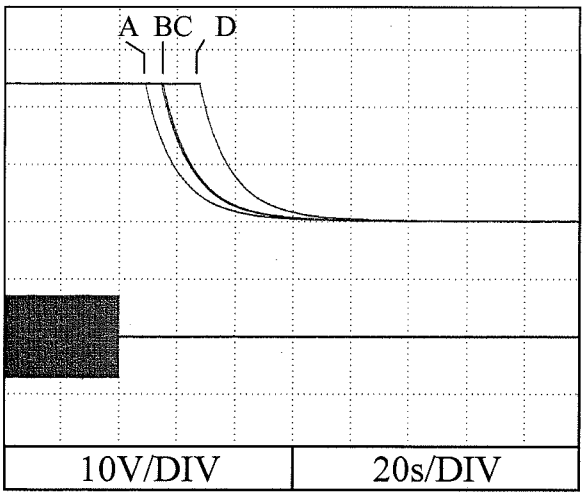
Iout : 100%



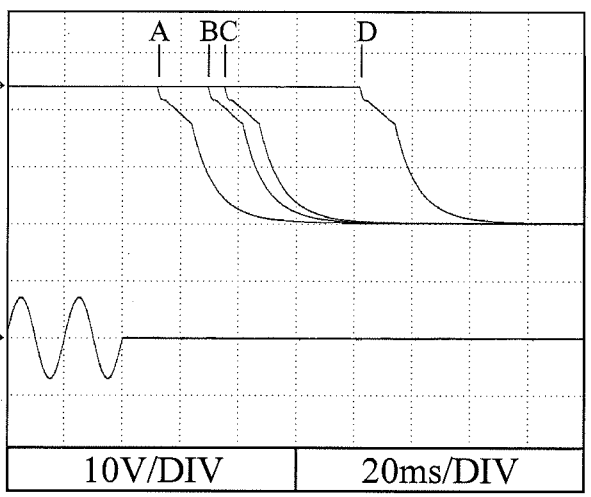


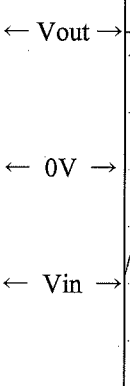
24V

Iout : 0%



Iout : 100%

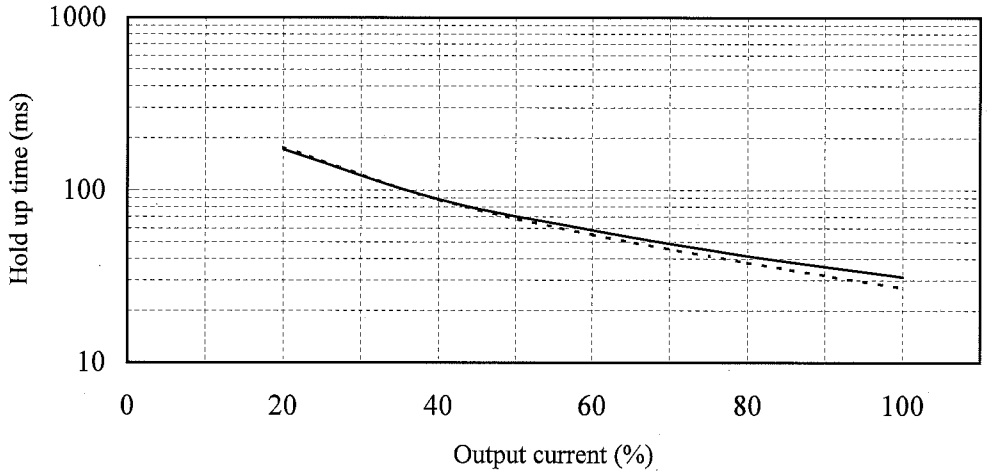




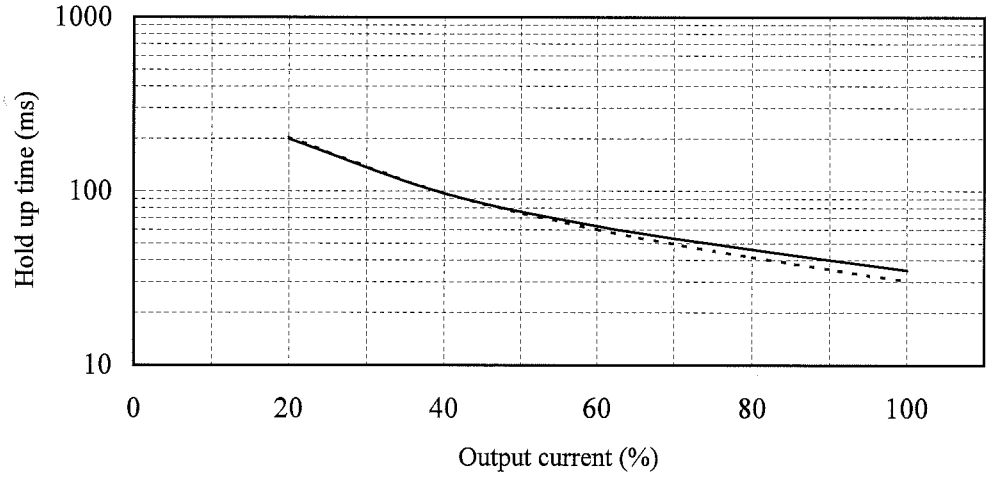
2.6 出力保持時間特性
Hold up time characteristics

Conditions Vin : 100 VAC ------
200 VAC ——
Ta : 25 ℃

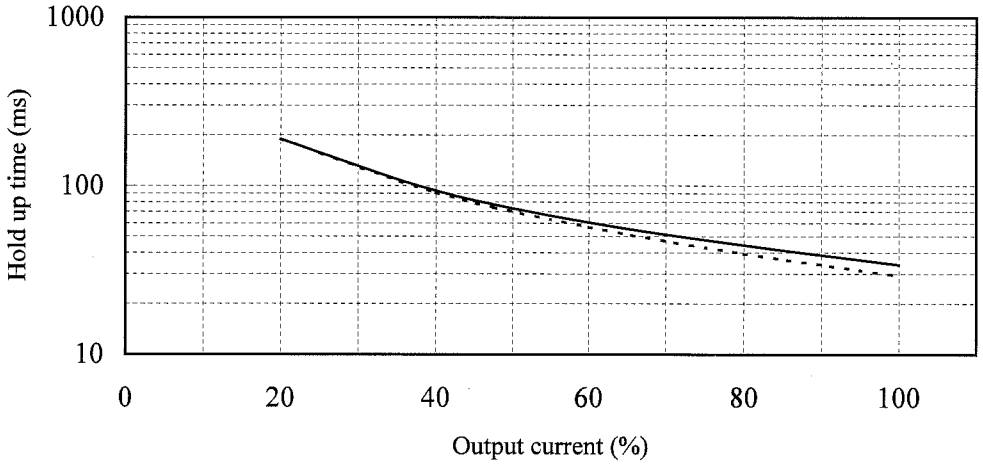
5V



12V



24V



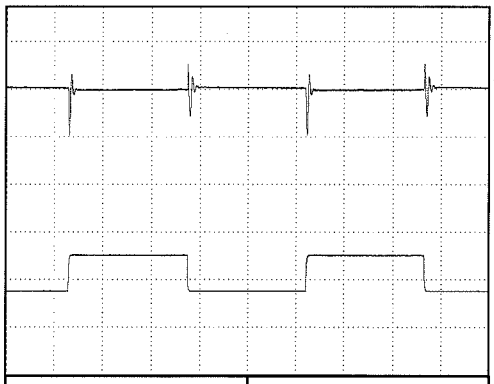
2.7 過渡応答（負荷急変）特性

Dynamic load response characteristics

Conditions Vin : 100 VAC
Iout : 50 % ⟷ 100 %
(tr = tf = 50us)
Ta : 25 ℃

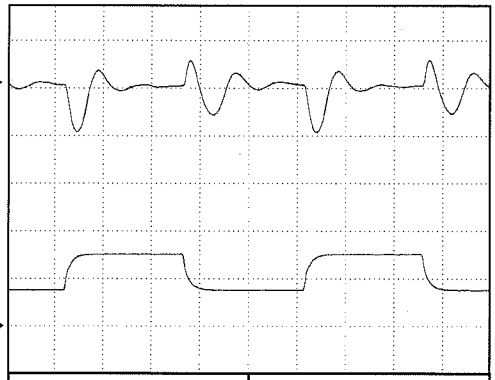
5V

f = 100Hz



100mV/DIV	2ms/DIV
+1.06%	-1.93%

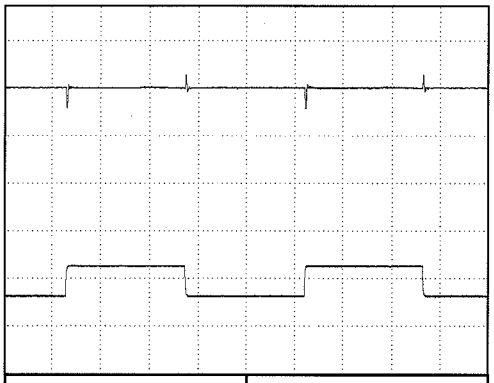
f = 1kHz



100mV/DIV	200 μ s/DIV
+1.19%	-1.86%

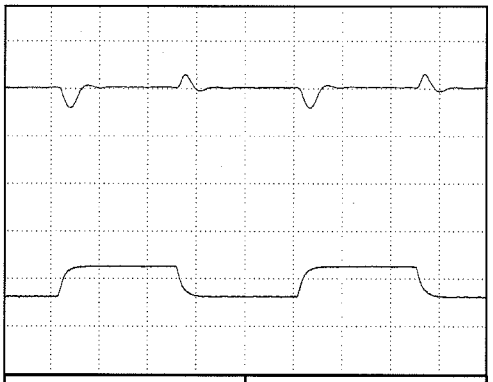
12V

f = 100Hz



100mV/DIV	2ms/DIV
+0.24%	-0.35%

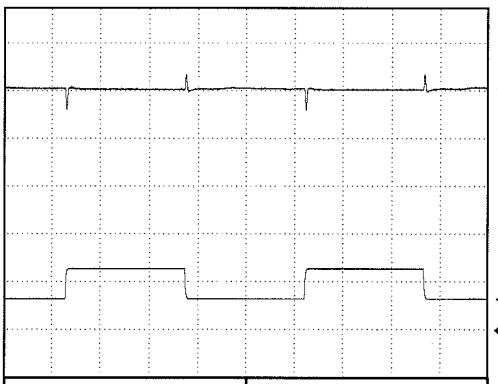
f = 1kHz



100mV/DIV	200 μ s/DIV
+0.25%	-0.34%

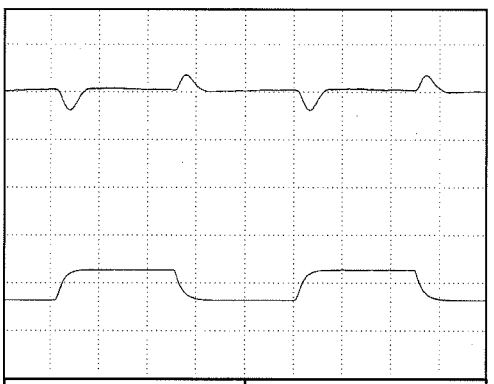
24V

f = 100Hz



100mV/DIV	2ms/DIV
+0.14%	-0.17%

f = 1kHz



100mV/DIV	200 μ s/DIV
+0.15%	-0.16%

2.8 入力電圧瞬停特性

Response to brown out characteristics

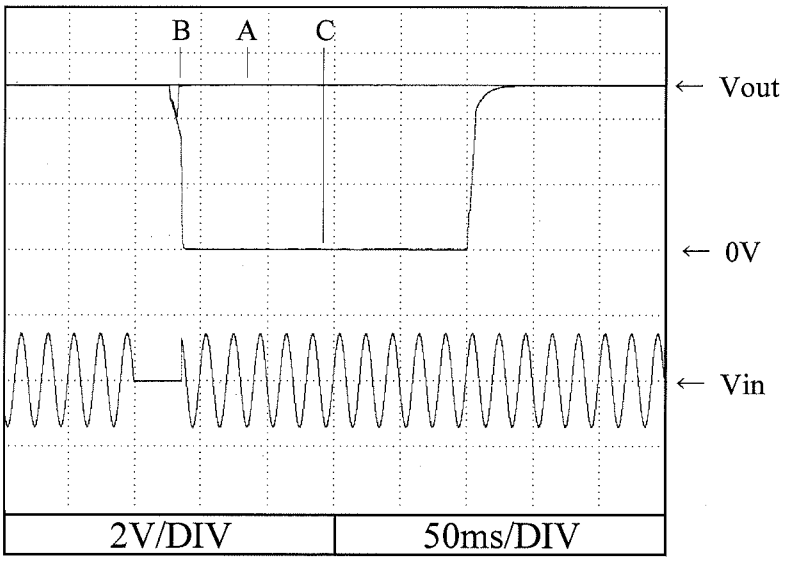
Conditions Vin : 100 VAC
Iout : 100 %
Ta : 25 ℃

5V

A = 26ms

B = 28ms

C = 36ms

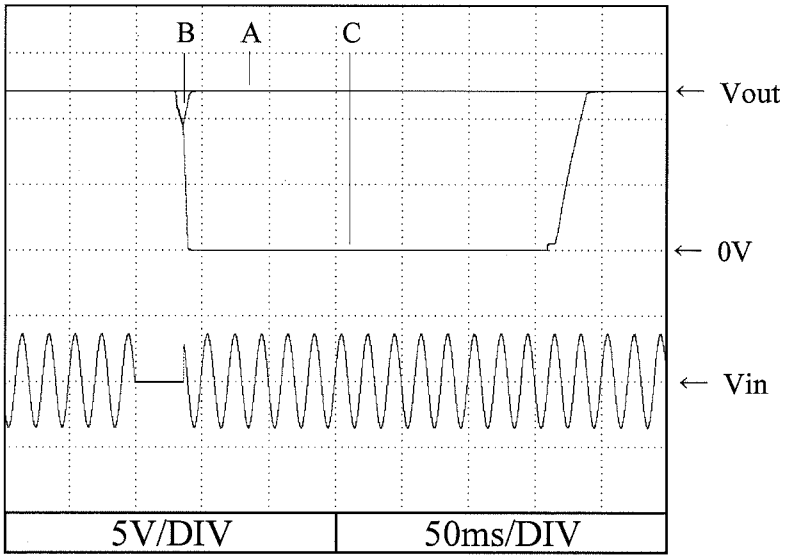


12V

A = 27ms

B = 36ms

C = 37ms

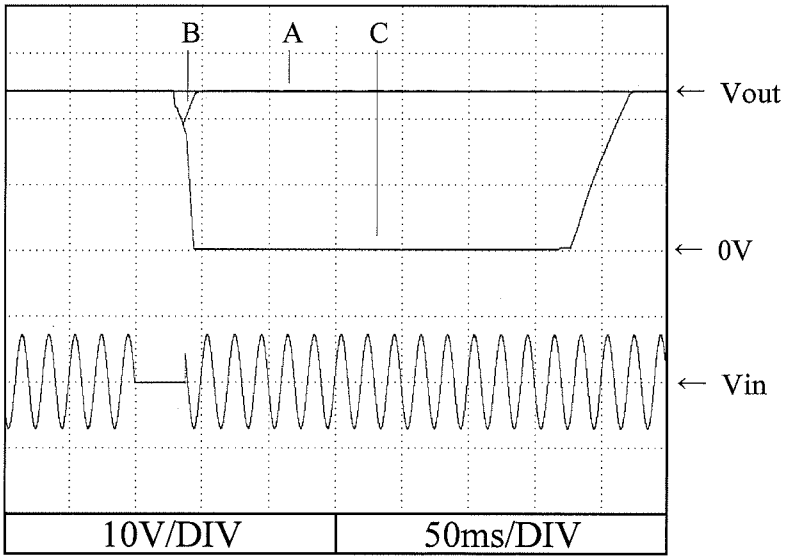


24V

A = 27ms

B = 36ms

C = 38ms



2.8 入力電圧瞬停特性

Response to brown out characteristics

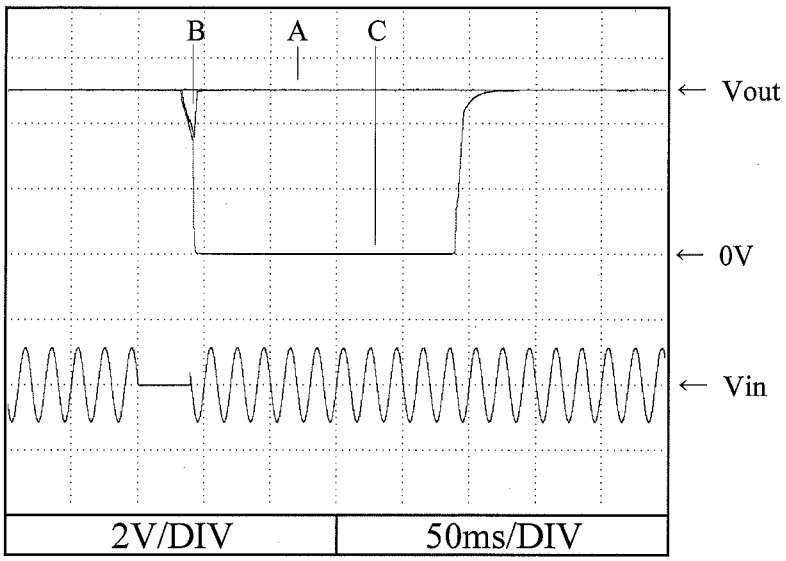
Conditions Vin : 200 VAC
Iout : 100 %
Ta : 25 ℃

5V

A = 27ms

B = 38ms

C = 39ms

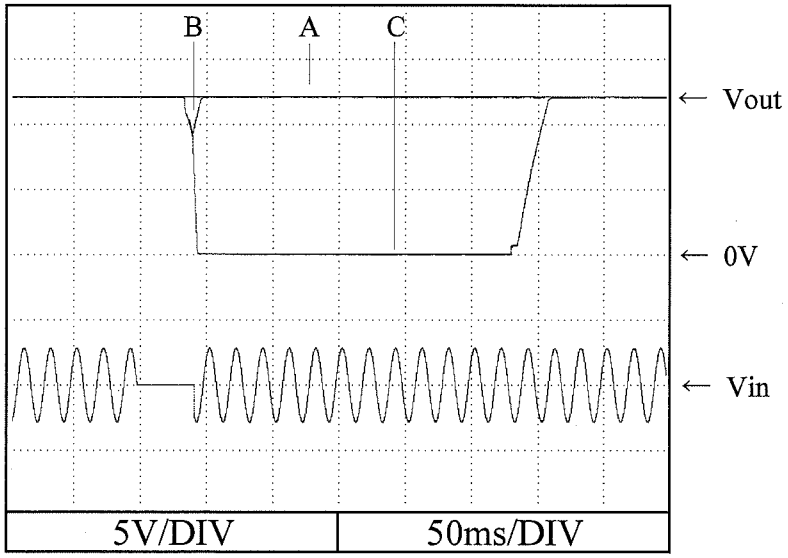


12V

A = 35ms

B = 38ms

C = 43ms

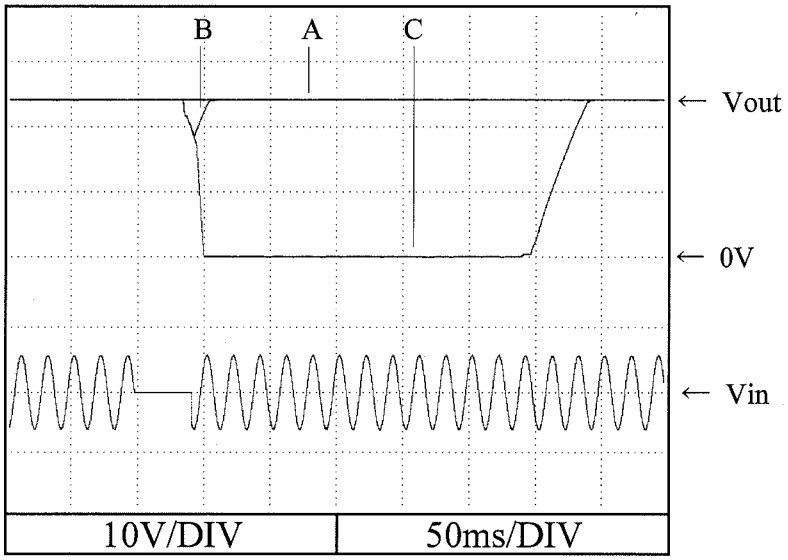


24V

A = 33ms

B = 38ms

C = 44ms

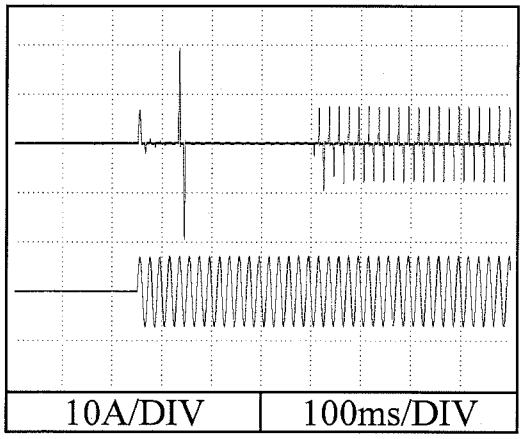


2.9 入力サージ電流（突入電流）波形
Inrush current waveform

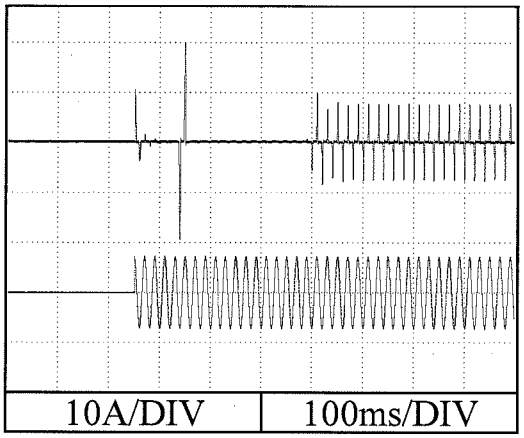
5V

Conditions Vin : 100 VAC
Iout : 100 %
Ta : 25 ℃

Switch on phase angle of input AC voltage
ϕ = 0°

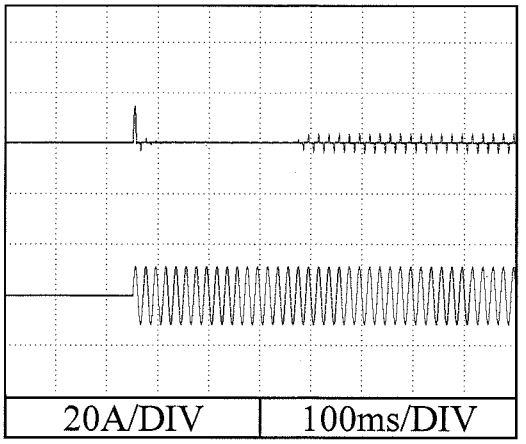


Switch on phase angle of input AC voltage
ϕ = 90°

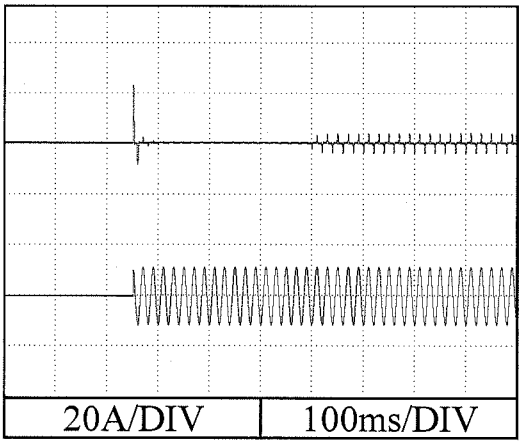


Conditions Vin : 200 VAC
Iout : 100 %
Ta : 25 ℃

Switch on phase angle of input AC voltage
ϕ = 0°



Switch on phase angle of input AC voltage
ϕ = 90°

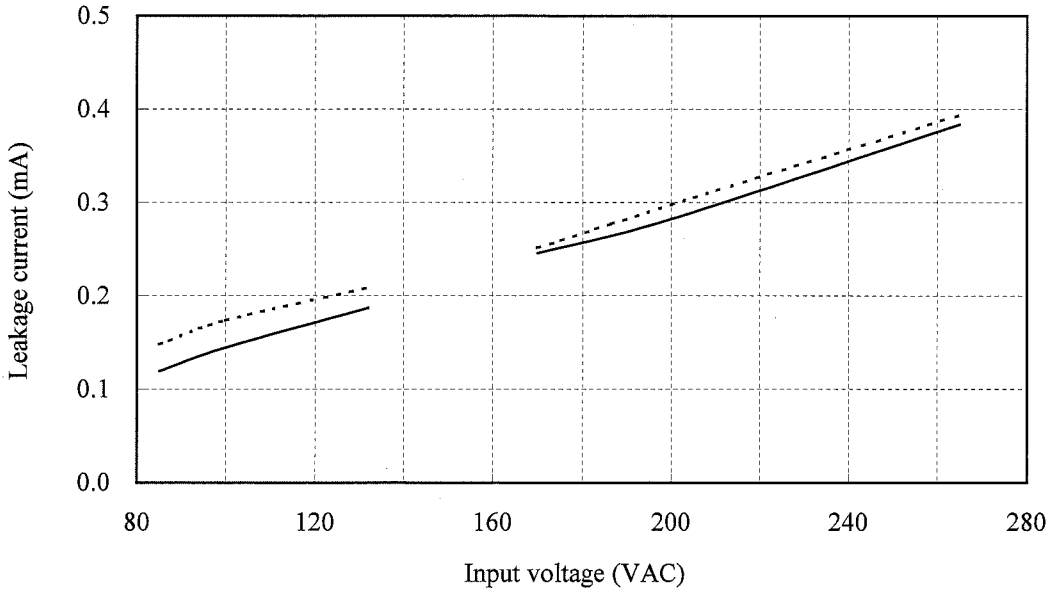


2. 10 リーク電流特性
Leakage current characteristics

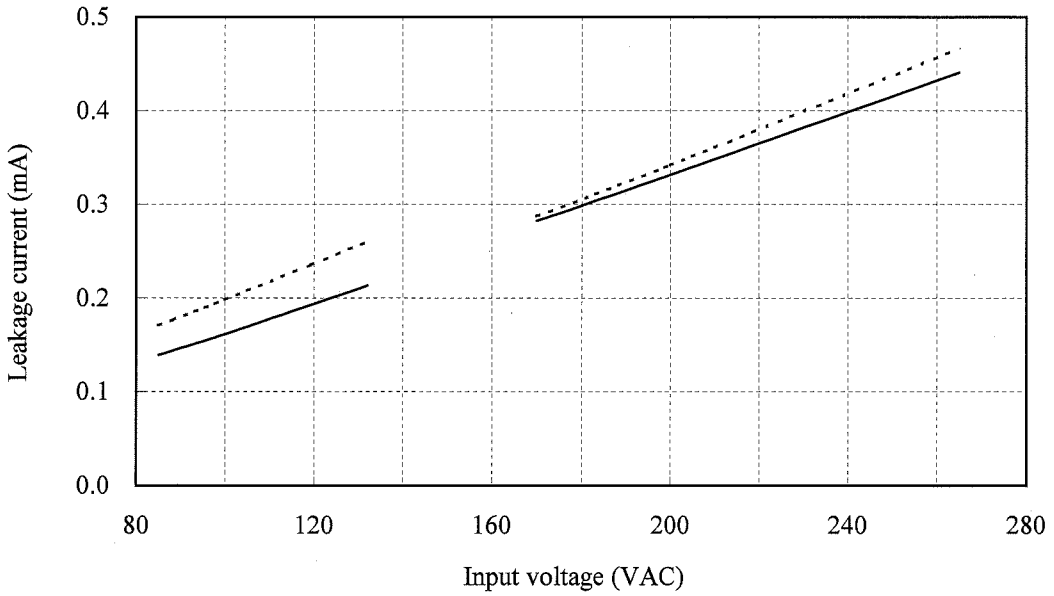
Conditions Iout : 0 % ------
100 % ——
Ta : 25 ℃
Equipment used : 3156 (HIOKI)

5V

f : 50 Hz



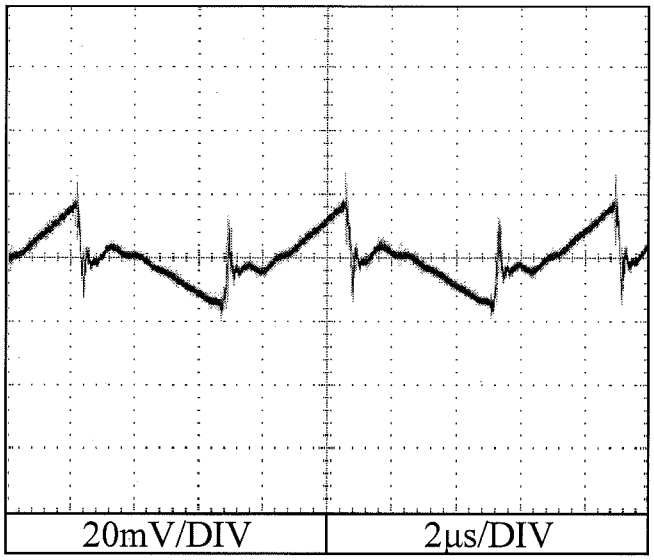
f : 60 Hz



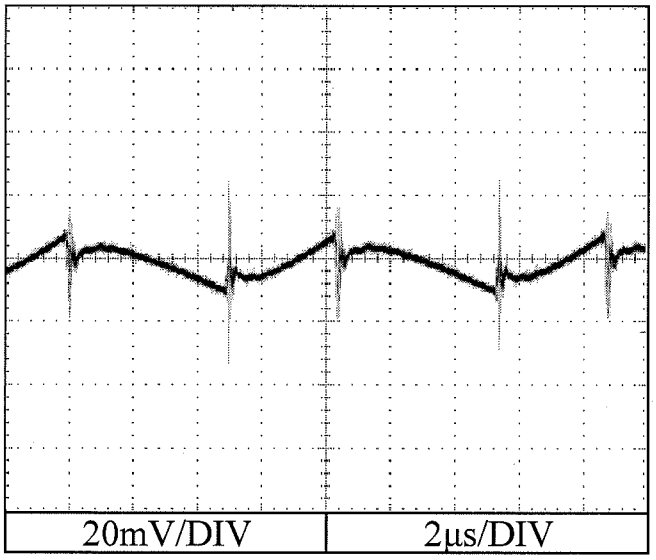
2.11 出力リップル、ノイズ波形
Output ripple and noise waveform

Conditions Vin : 100 VAC
Iout : 100 %
Ta : 25 ℃

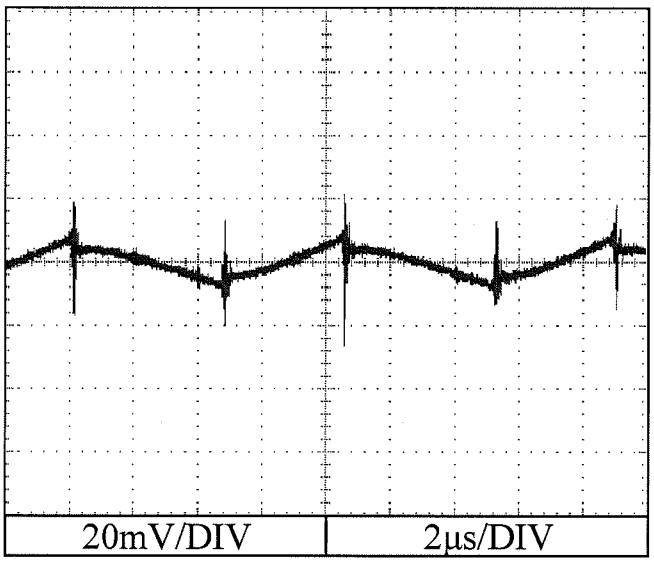
5V



12V



24V



2. 12 ＥＭＩ特性

Electro-Magnetic Interference characteristics

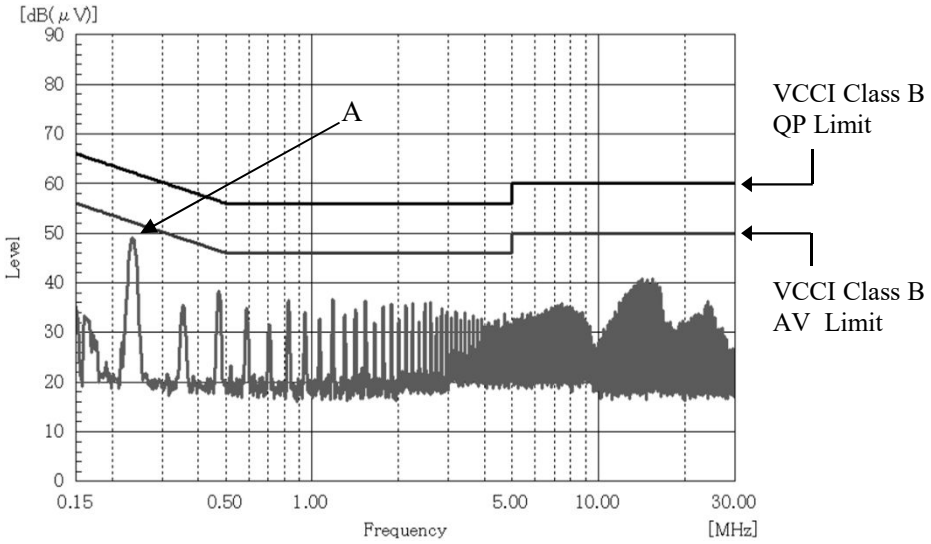
Conditions Vin : 230 VAC
Iout : 100 %
Ta : 25 ℃

雑音端子電圧

Conducted Emission

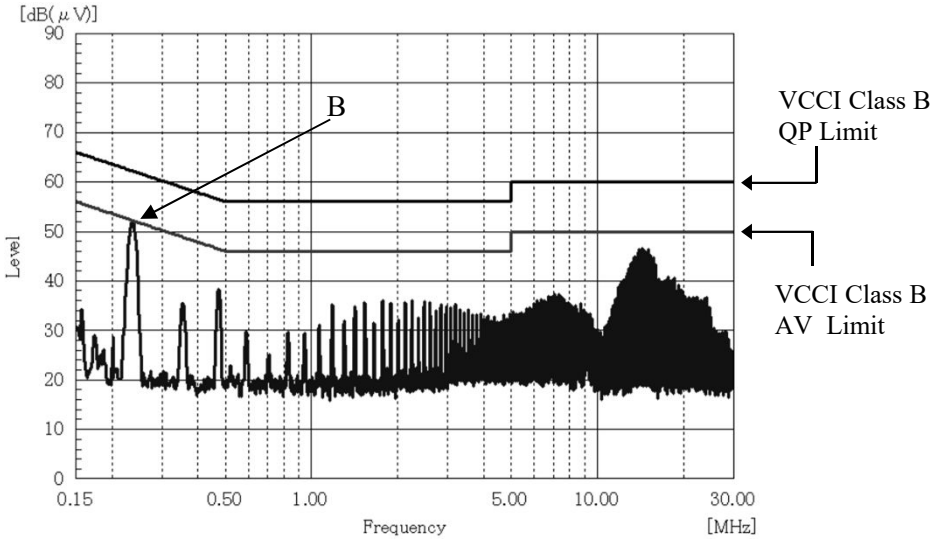
5V

Phase : N



Ref. Data	Point A (237kHz) Limit (dBuV)	Measure (dBuV)
QP	62.2	47.6
AV	52.2	44.0

Phase : L



Ref. Data	Point B (237kHz) Limit (dBuV)	Measure (dBuV)
QP	62.2	50.6
AV	52.2	48.6

EN55011-B,EN55032-B,FCC-Bの限界値はVCCI class Bの限界値と同じ
Limit of EN55011-B,EN55032-B,FCC-B are same as its VCCI class B.

2. 12 ＥＭＩ特性

Electro-Magnetic Interference characteristics

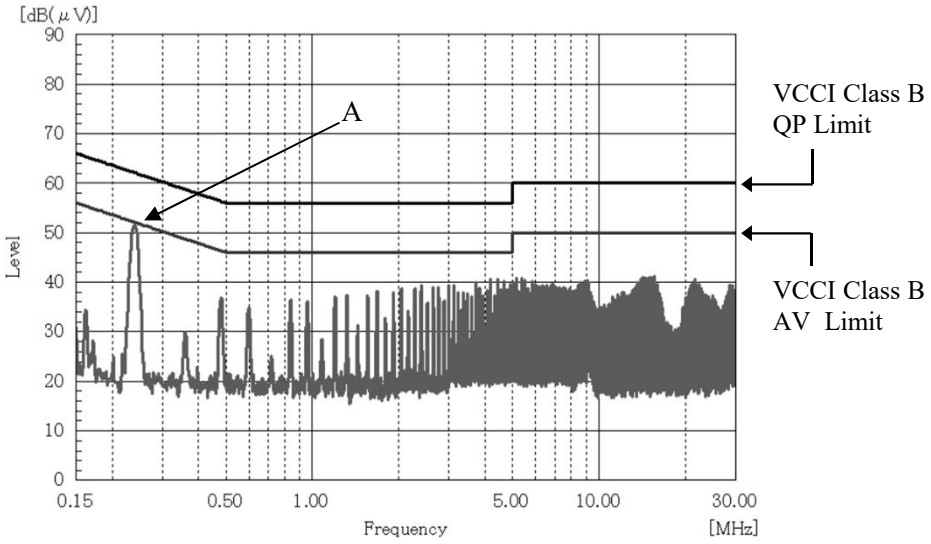
Conditions Vin : 230 VAC
Iout : 100 %
Ta : 25 ℃

雑音端子電圧

Conducted Emission

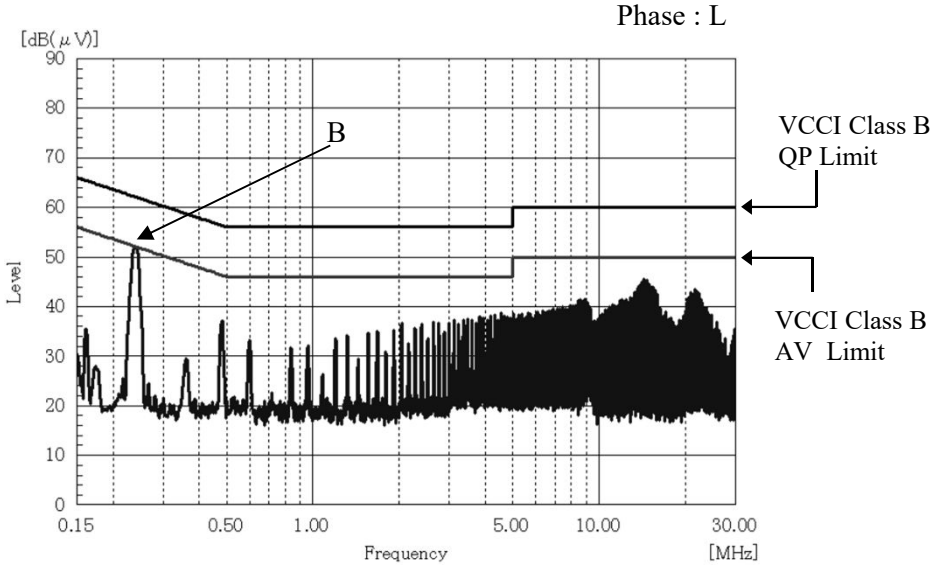
12V

Phase : N



Ref. Data	Point A (238kHz) Limit (dBuV)	Measure (dBuV)
QP	62.2	50.2
AV	52.2	47.4

Phase : L



Ref. Data	Point B (238kHz) Limit (dBuV)	Measure (dBuV)
QP	62.2	50.3
AV	52.2	48.2

EN55011-B,EN55032-B,FCC-Bの限界値はVCCI class Bの限界値と同じ
Limit of EN55011-B,EN55032-B,FCC-B are same as its VCCI class B.

2. 12 ＥＭＩ特性

Electro-Magnetic Interference characteristics

Conditions Vin : 230 VAC
Iout : 100 %
Ta : 25 ℃

雑音端子電圧

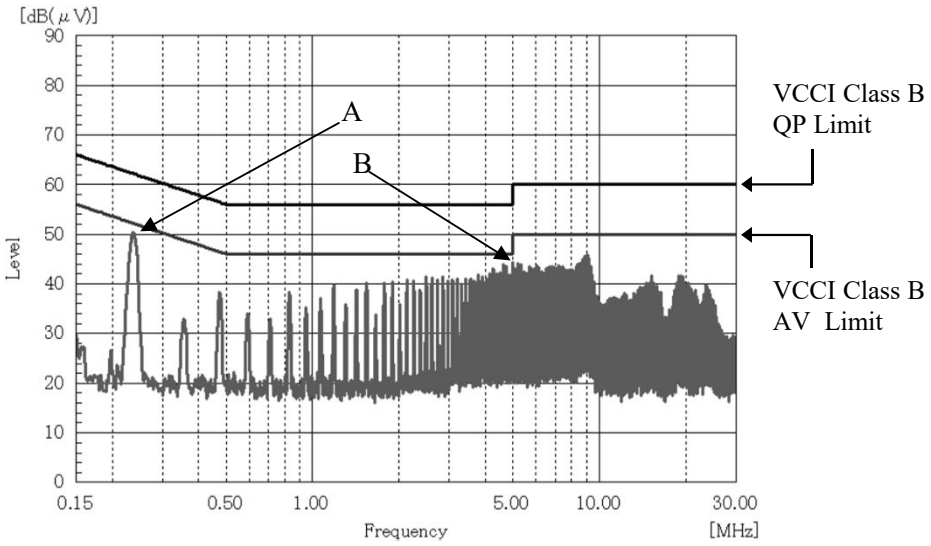
Conducted Emission

24V

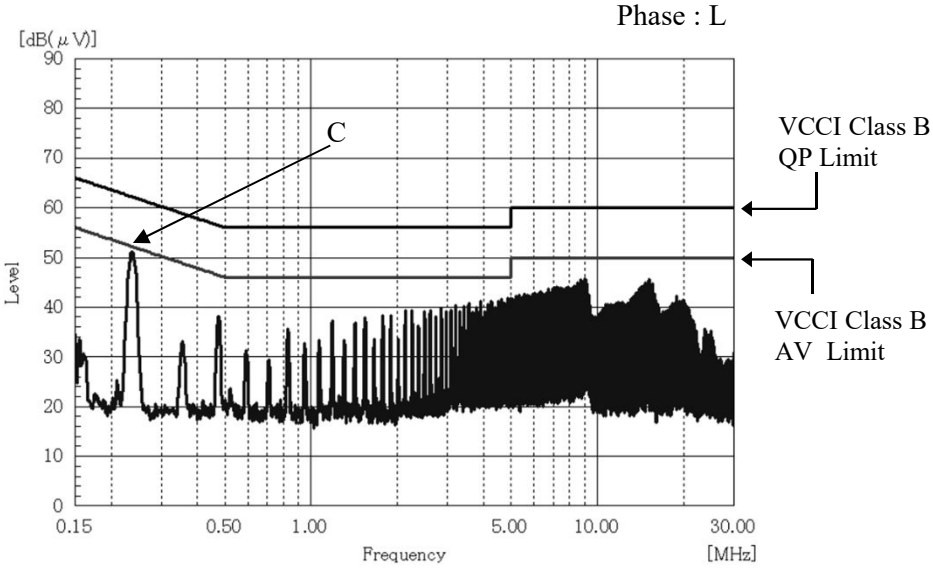
Ref. Data	Point A (238kHz) Limit (dBuV)	Measure (dBuV)
QP	62.2	48.9
AV	52.2	45.6

Ref. Data	Point B (4.86MHz) Limit (dBuV)	Measure (dBuV)
QP	56.0	42.0
AV	46.0	39.9

Phase : N



Phase : L



Ref. Data	Point C (237kHz) Limit (dBuV)	Measure (dBuV)
QP	62.2	49.7
AV	52.2	46.7

EN55011-B,EN55032-B,FCC-Bの限界値はVCCI class Bの限界値と同じ
Limit of EN55011-B,EN55032-B,FCC-B are same as its VCCI class B.

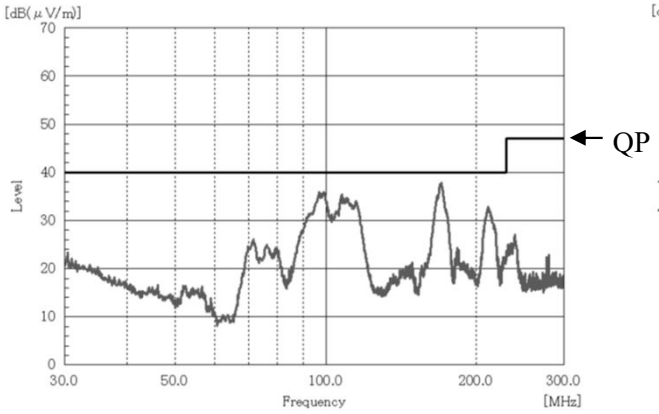
2. 12 ＥＭＩ特性
Electro-Magnetic Interference characteristics

Conditions Vin : 230 VAC
Io : 100 %
Ta : 25 ℃

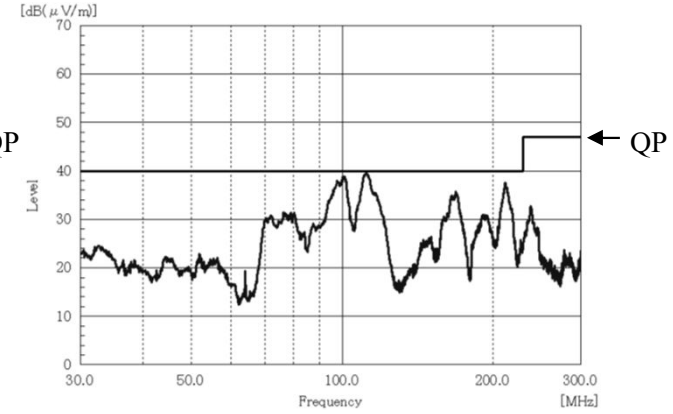
雑音電界強度
Radiated Emission

5V

HORIZONTAL

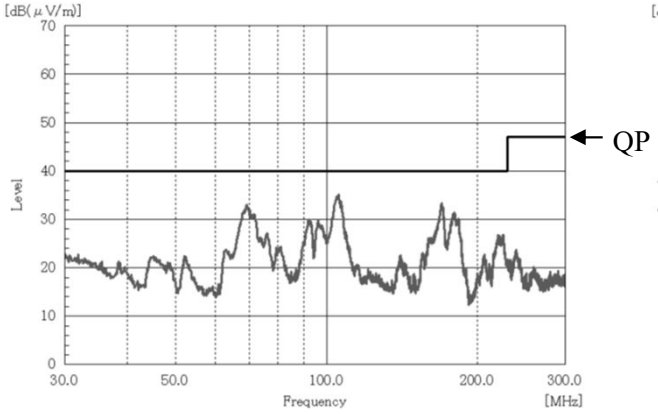


VERTICAL

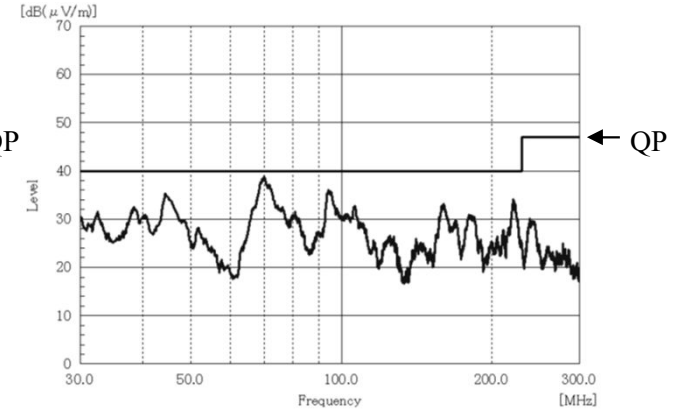


12V

HORIZONTAL

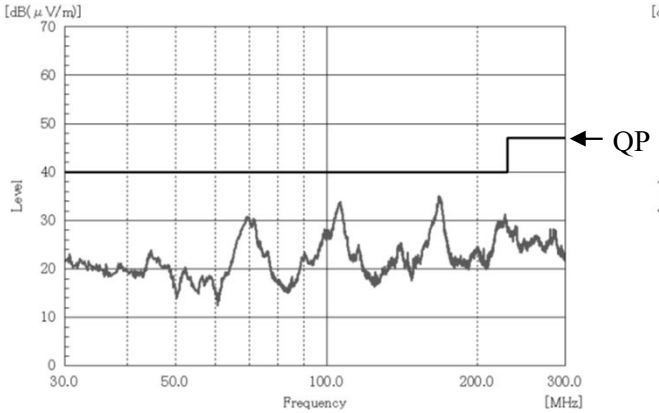


VERTICAL

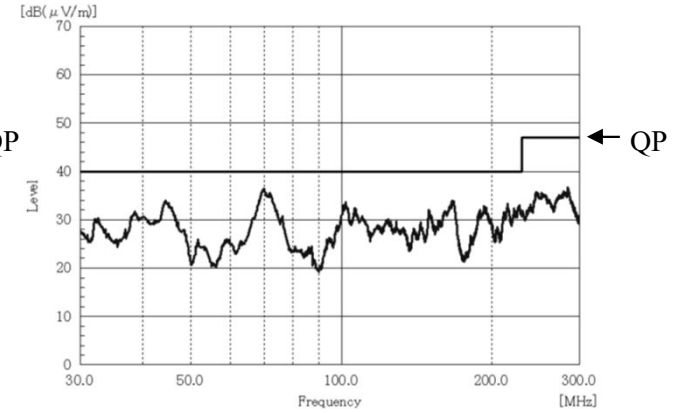


24V

HORIZONTAL



VERTICAL



EN55011-B,EN55032-Bの限界値はVCCI class Bの限界値と同じ
Limit of EN55011-B,EN55032-B are same as its VCCI class B.

表示はピーク値
Indication is peak values.