ZWS75B

EVALUATION DATA

型式データ

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使用記号　Terminology used

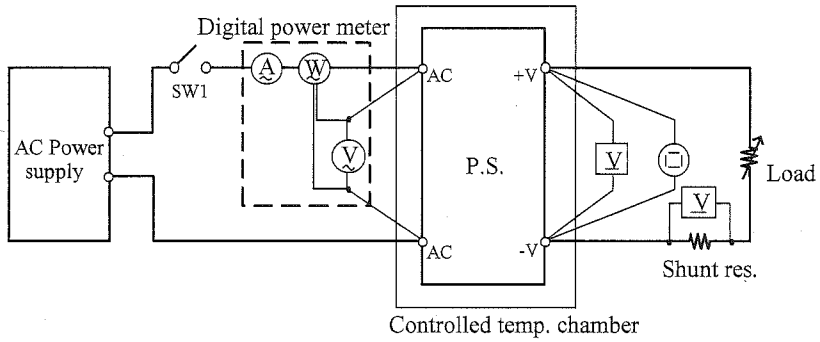
		定義	Definition
Vin	.....	入力電圧	Input voltage
Vout	.....	出力電圧	Output voltage
Iin	.....	入力電流	Input current
Iout	.....	出力電流	Output current
Ta	.....	周囲温度	Ambient temperature
f	.....	周波数	Frequency

1. 測定方法　Evaluation Method

1.1　測定回路　Circuit used for determination

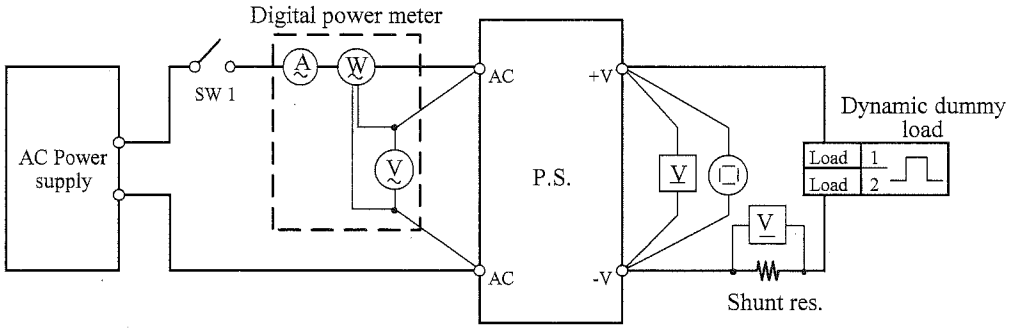
測定回路1　Circuit 1 used for determination

- 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

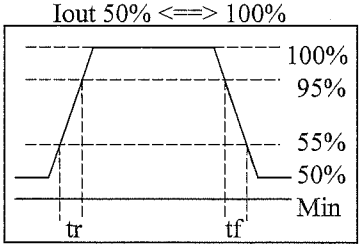


測定回路2　Circuit 2 used for determination

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

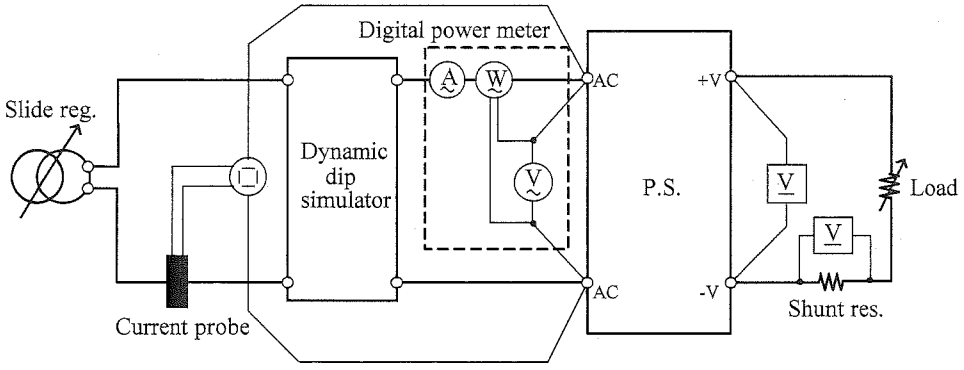


Output current waveform
Iout 50% <==> 100%



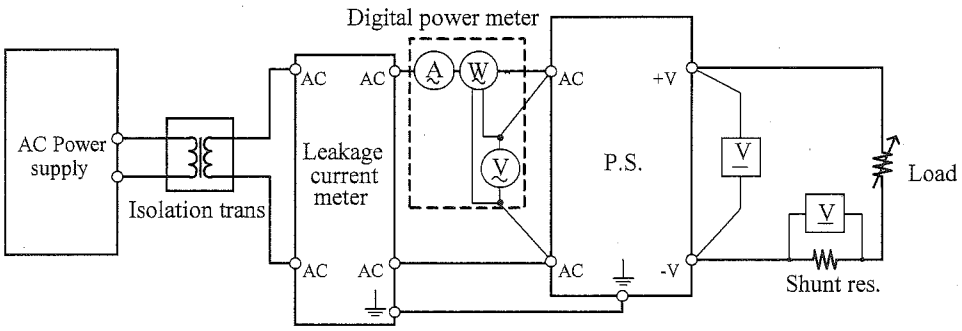
測定回路3　Circuit 3 used for determination

- 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



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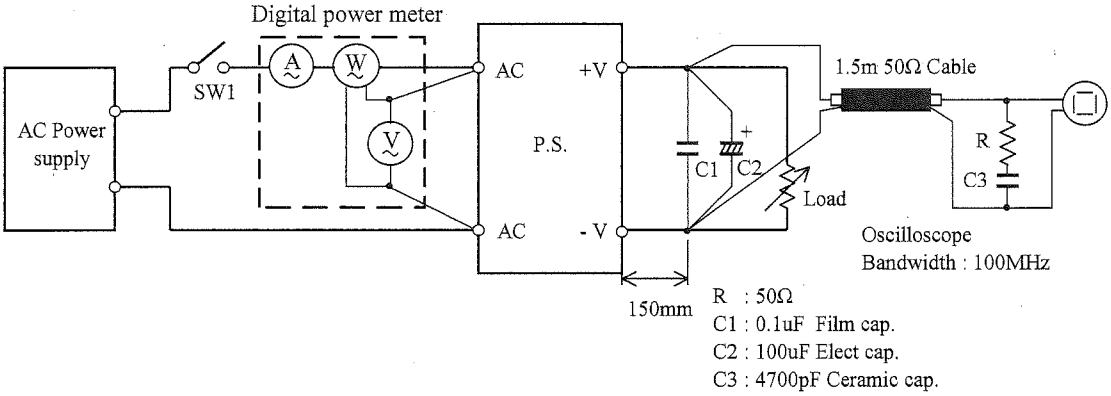
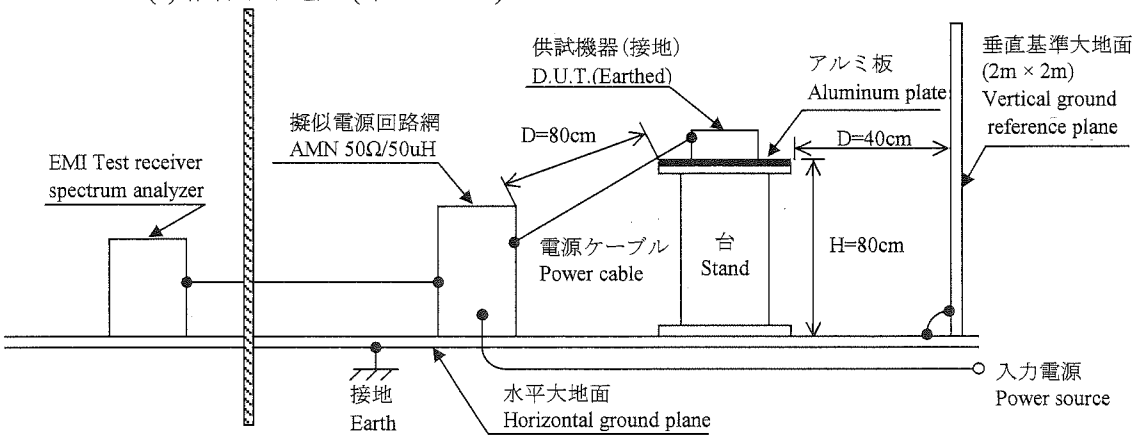
・出力リップル、ノイズ波形　Output ripple and noise waveform



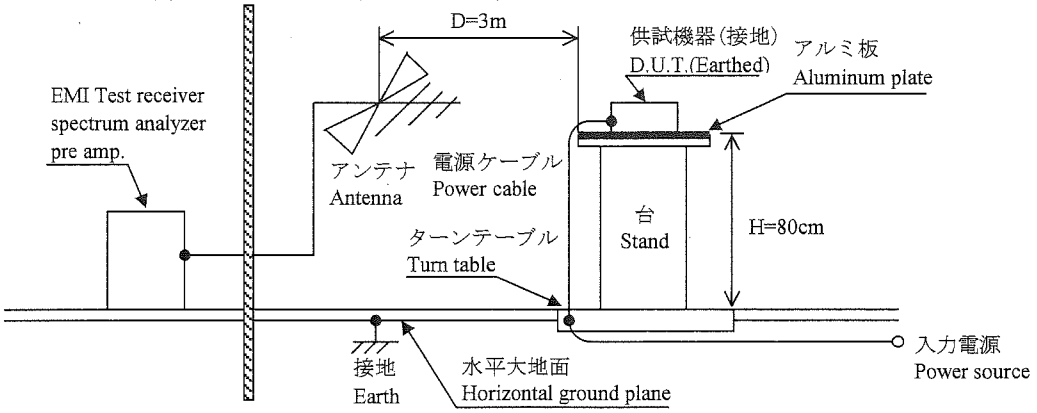
測定構成　Configuration used for determination

・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	TDS220
2	DIGITAL STORAGE OSCILLOSCOPE	YOKOGAWA ELECT.	DL9040L
3	DIGITAL MULTIMETER	AGILENT	34970A
4	DIGITAL POWER METER	YOKOGAWA ELECT.	WT210
5	CURRENT PROBE	YOKOGAWA ELECT.	701930 / 701932
7	DYNAMIC DUMMY LOAD	TAKASAGO	FK-200L
8	DUMMY LOAD	PCN	RHF250 SERIES
9	SLIDE REGULATOR	MATSUNAGA	S3-24100
10	ISOLATION TRANS	MATSUNAGA	3WTC-50K
11	CVCF	TAKASAGO	AA2000XG
12	CVCF	NF	ES10000S
13	LEAKAGE CURRENT METER	HIOKI	3156
14	DYNAMIC DIP SIMULATOR	TAKAMISAWA	PSA-210
15	CONTROLLED TEMP. CHAMBER	ESPEC	SU-240
16	EMI TEST RECEIVER / SPECTRUM ANALYZER	ROHDE & SCHWARZ	ESCI
17	PRE AMP.	SONOMA	310N
18	AMN	SCHWARZBECK	NNLK8121
19	ANTENNA	SCHWARZBECK	CBL6111D

2.1 静特性　Steady state data

(1) 入力・負荷・温度変動／起動電圧・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%	4.992V	4.992V	4.993V	4.993V	1mV	0.020%
50%	4.989V	4.990V	4.990V	4.990V	1mV	0.020%
100%	4.988V	4.988V	4.988V	4.988V	0mV	0.000%
load	4mV	4mV	5mV	5mV		
regulation	0.080%	0.080%	0.100%	0.100%		

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

Ta	-10℃	+25℃	+50℃	temperature stability	
Vout	5.004V	4.988V	4.981V	23mV	0.460%

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

Start up voltage (Vin)	75VAC
Drop out voltage (Vin)	62VAC

12V

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

Iout \ Vin	85VAC	100VAC	200VAC	265VAC	line regulation	
0%	12.007V	12.007V	12.007V	12.008V	1mV	0.008%
50%	12.004V	12.003V	12.003V	12.003V	1mV	0.008%
100%	12.002V	12.002V	12.002V	12.002V	0mV	0.000%
load	5mV	5mV	5mV	6mV		
regulation	0.042%	0.042%	0.042%	0.050%		

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

Ta	-10℃	+25℃	+50℃	temperature stability	
Vout	12.014V	12.002V	11.981V	33mV	0.275%

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

Start up voltage (Vin)	77VAC
Drop out voltage (Vin)	62VAC

24V

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

Iout \ Vin	85VAC	100VAC	200VAC	265VAC	line regulation	
0%	23.988V	23.987V	23.988V	23.989V	2mV	0.008%
50%	23.988V	23.988V	23.989V	23.988V	1mV	0.004%
100%	23.988V	23.990V	23.994V	23.991V	6mV	0.025%
load	0mV	3mV	6mV	3mV		
regulation	0.000%	0.013%	0.025%	0.013%		

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

Ta	-10℃	+25℃	+50℃	temperature stability	
Vout	24.038V	23.990V	23.946V	92mV	0.383%

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

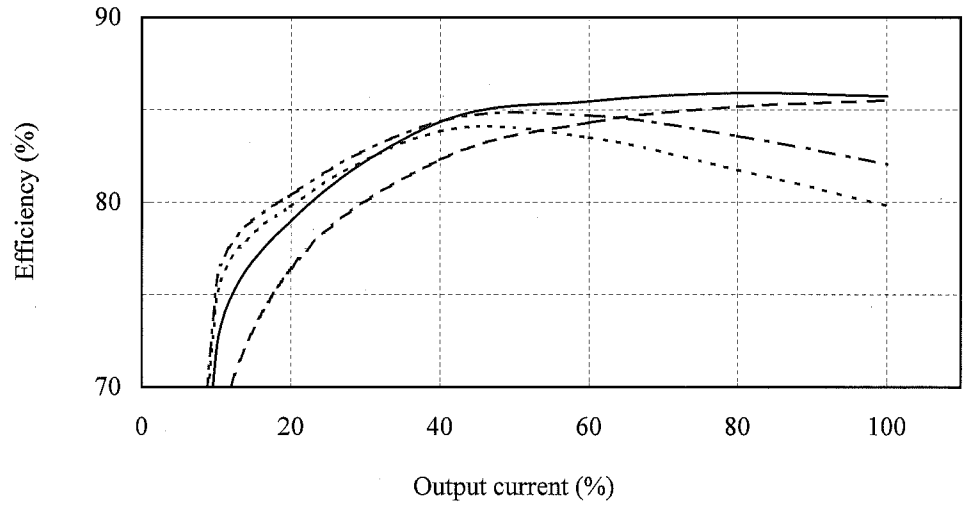
Start up voltage (Vin)	79VAC
Drop out voltage (Vin)	60VAC

(2) 効率対出力電流

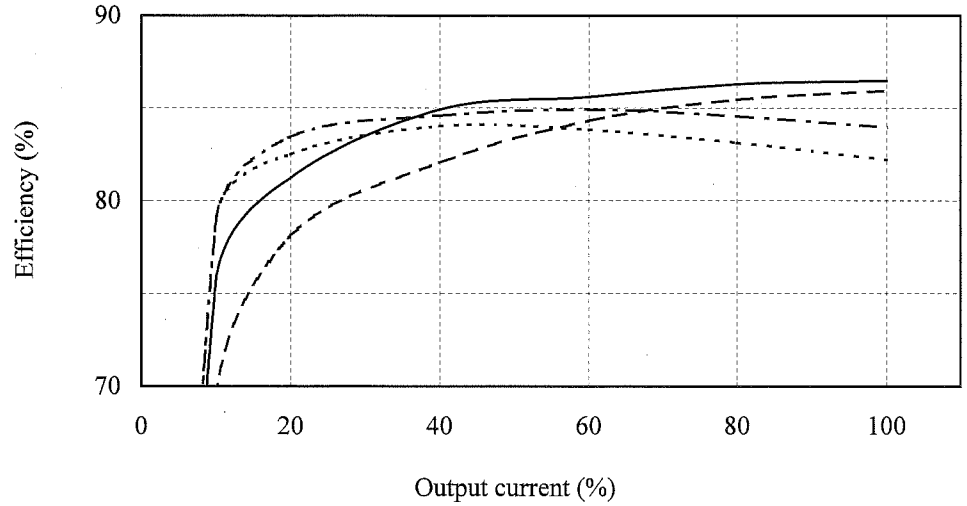
Efficiency vs. Output current

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

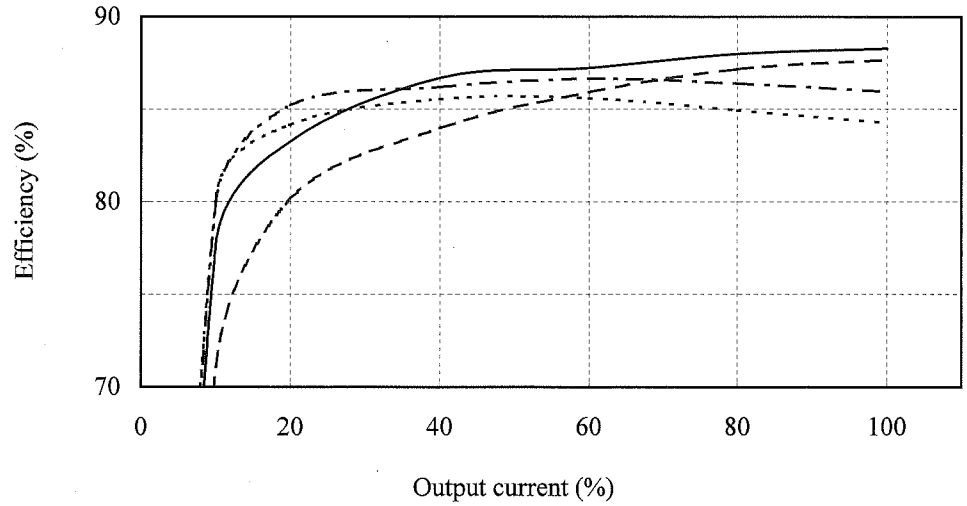
5V



12V



24V



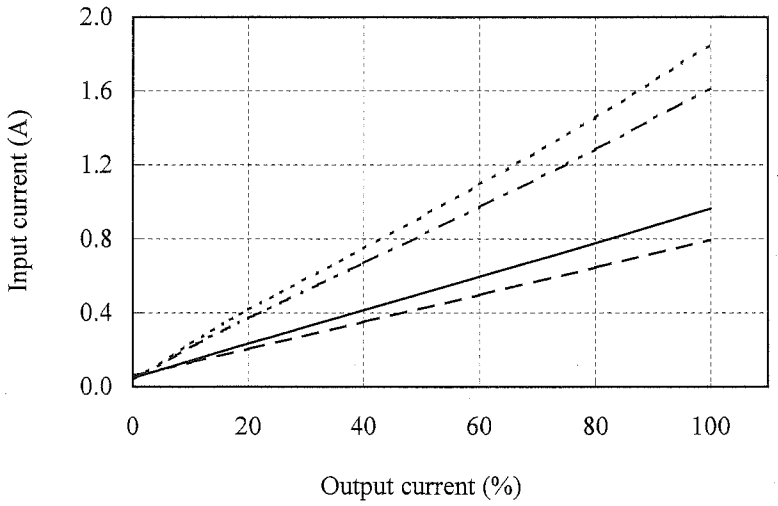
(3) 入力電流対出力電流
Input current vs. Output current

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

5V

Iout : 0%

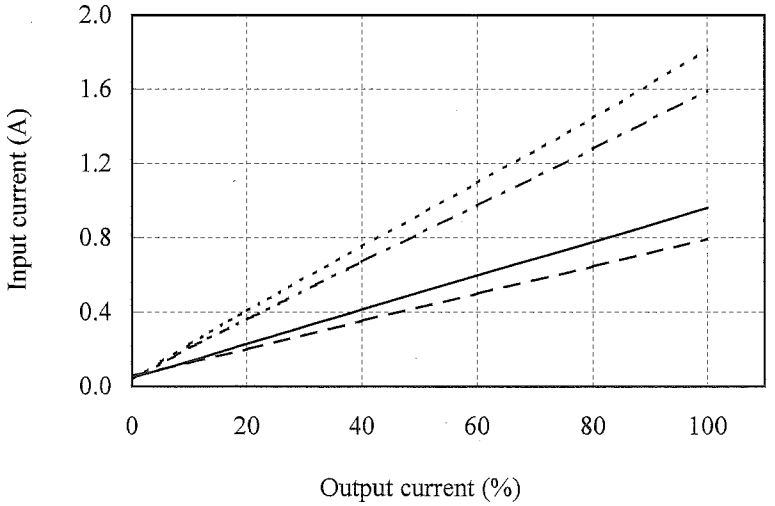
Vin	Input current
85VAC	0.038A
100VAC	0.038A
200VAC	0.049A
265VAC	0.059A



12V

Iout : 0%

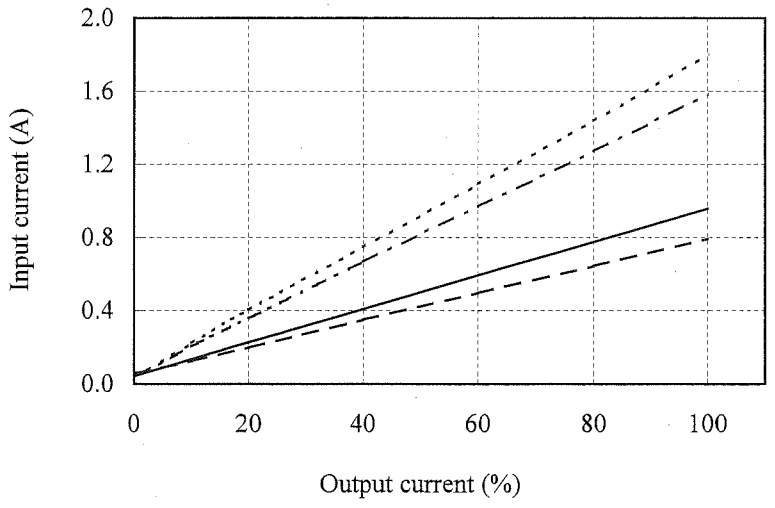
Vin	Input current
85VAC	0.037A
100VAC	0.038A
200VAC	0.048A
265VAC	0.057A



24V

Iout : 0%

Vin	Input current
85VAC	0.034A
100VAC	0.036A
200VAC	0.044A
265VAC	0.055A



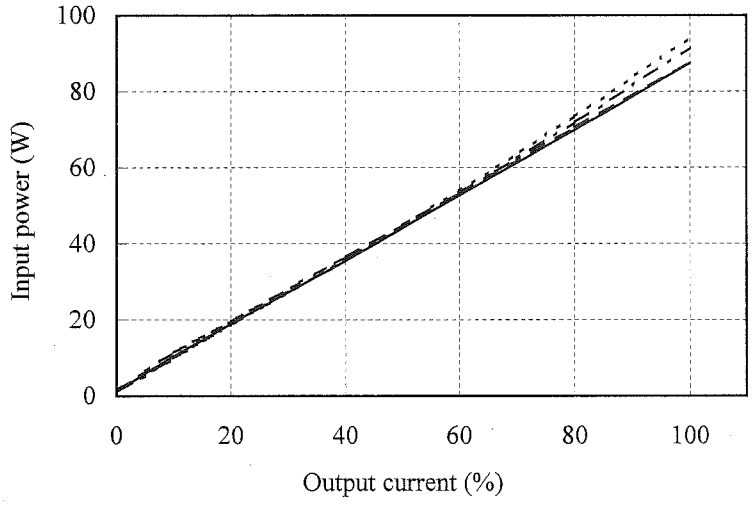
(4) 入力電力対出力電流
Input power vs. Output current

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

5V

Iout : 0%

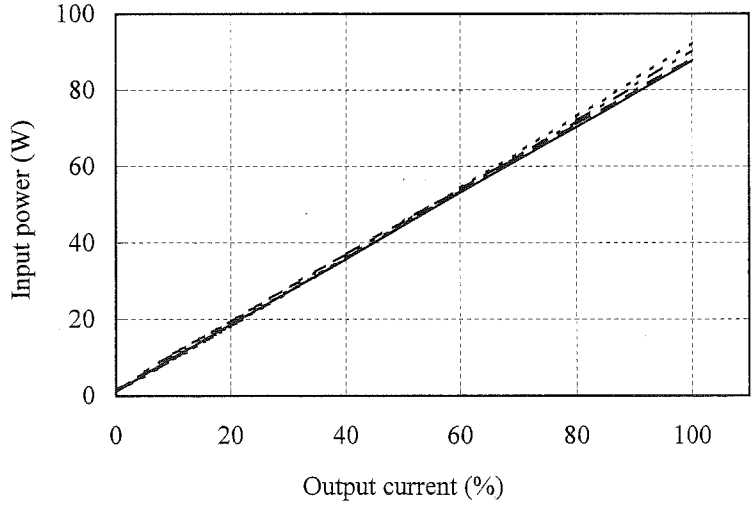
Vin	Input power
85VAC	1.0W
100VAC	1.0W
200VAC	1.3W
265VAC	1.5W



12V

Iout : 0%

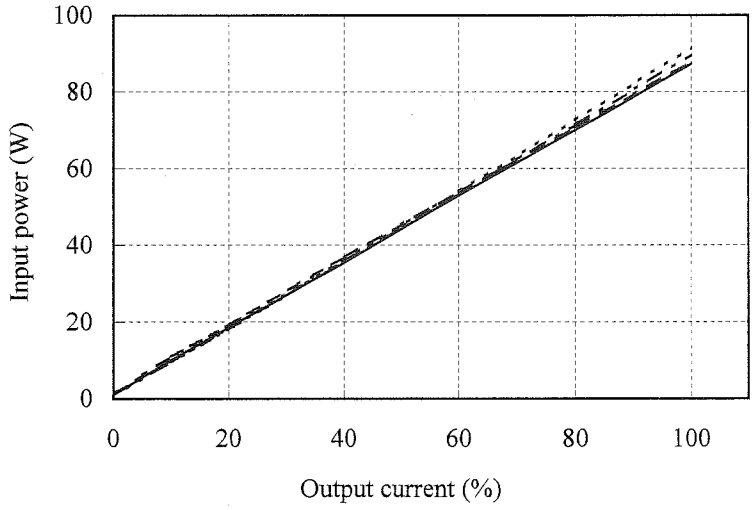
Vin	Input power
85VAC	1.0W
100VAC	1.1W
200VAC	1.2W
265VAC	1.4W



24V

Iout : 0%

Vin	Input power
85VAC	0.9W
100VAC	1.1W
200VAC	1.1W
265VAC	1.2W



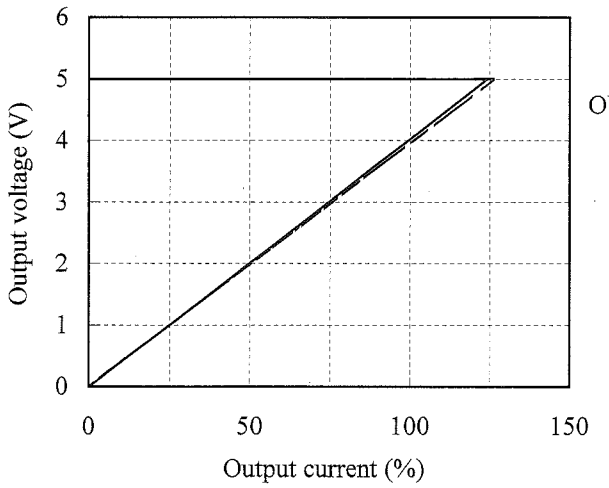
2.2 過電流保護特性
Over current protection (OCP) characteristics

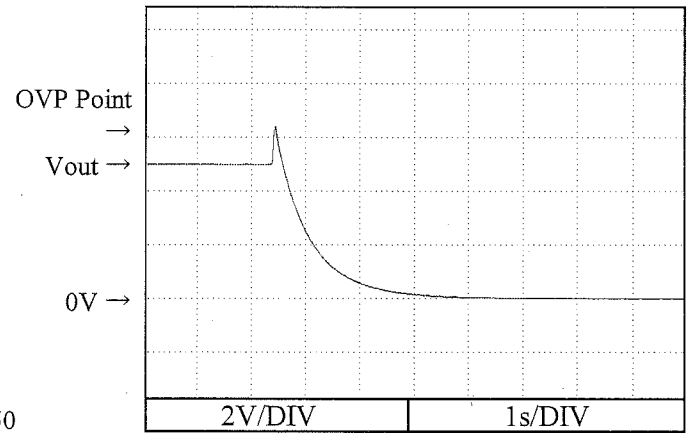
Conditions Vin : 100 VAC
Ta : -10 ℃ ----
25 ℃ -·-·-
50 ℃ ——

2.3 過電圧保護特性
Over voltage protection (OVP) characteristics

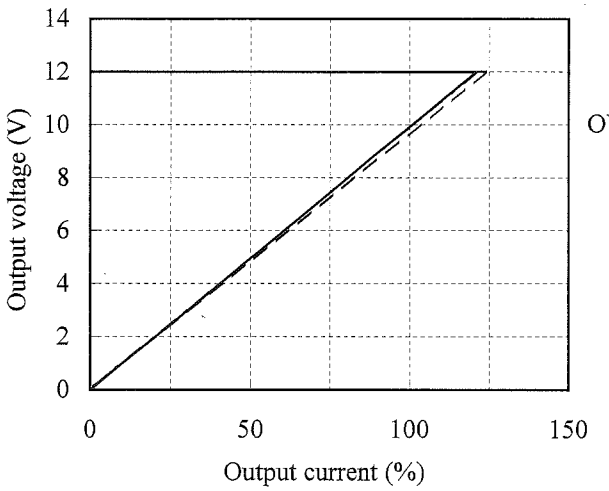
Conditions Vin : 100 VAC
Iout : 0 %
Ta : 25 ℃

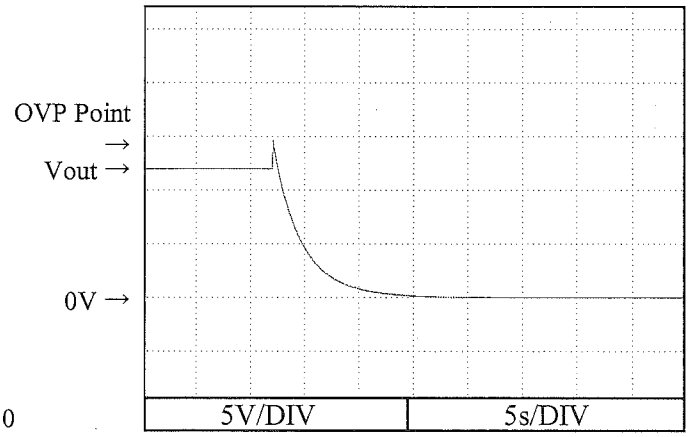
5V



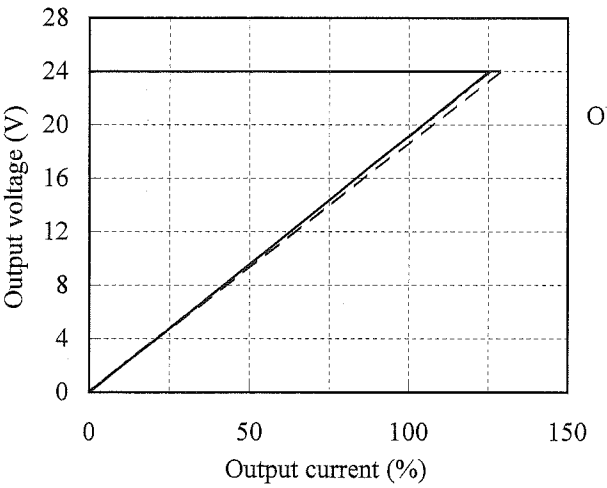


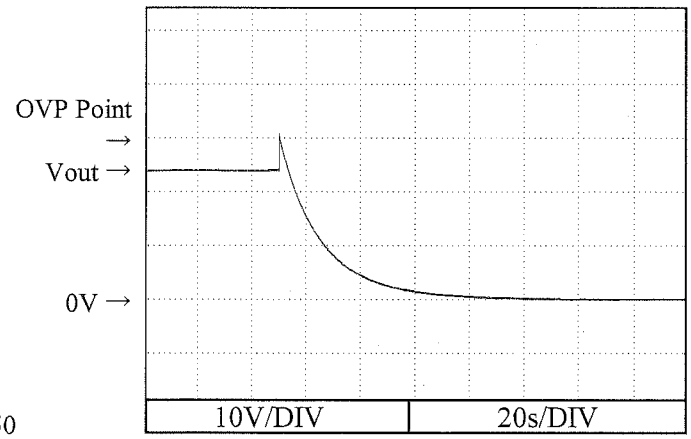
12V





24V



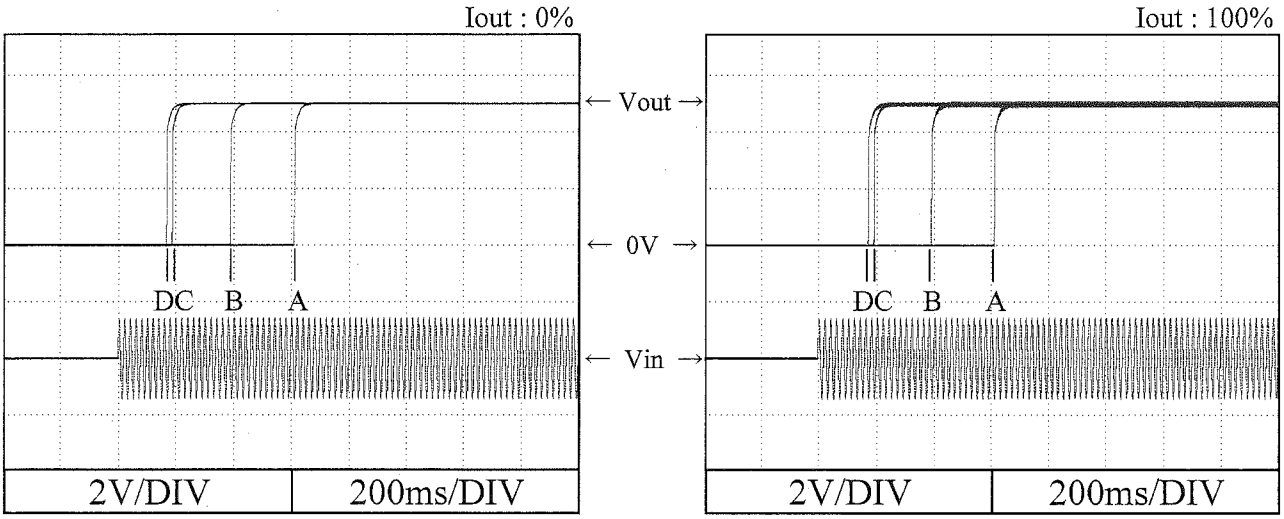


2.4 出力立ち上がり特性

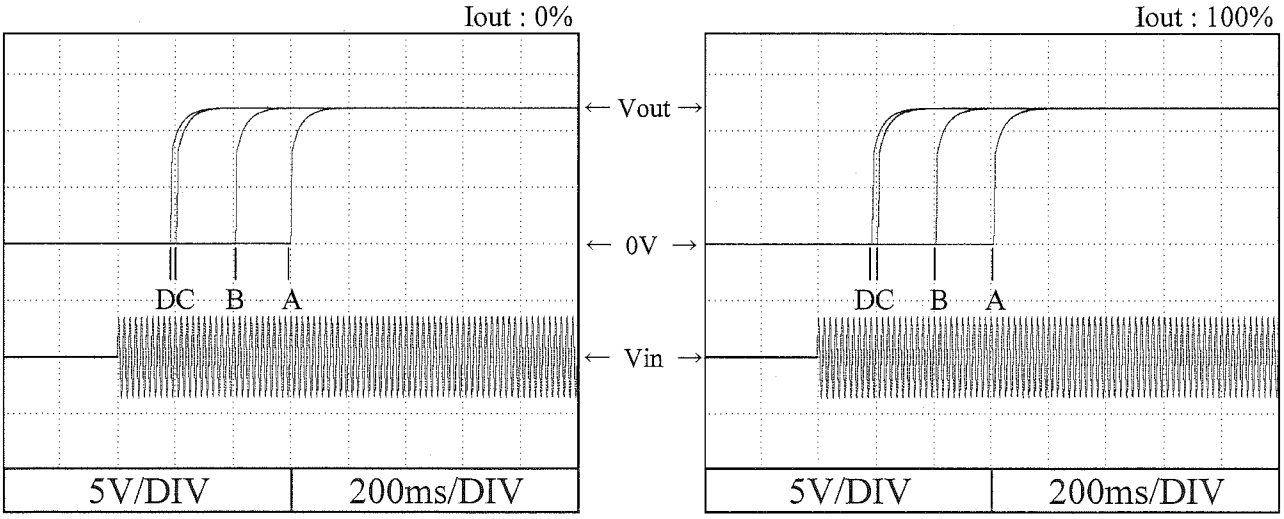
Output rise characteristics

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

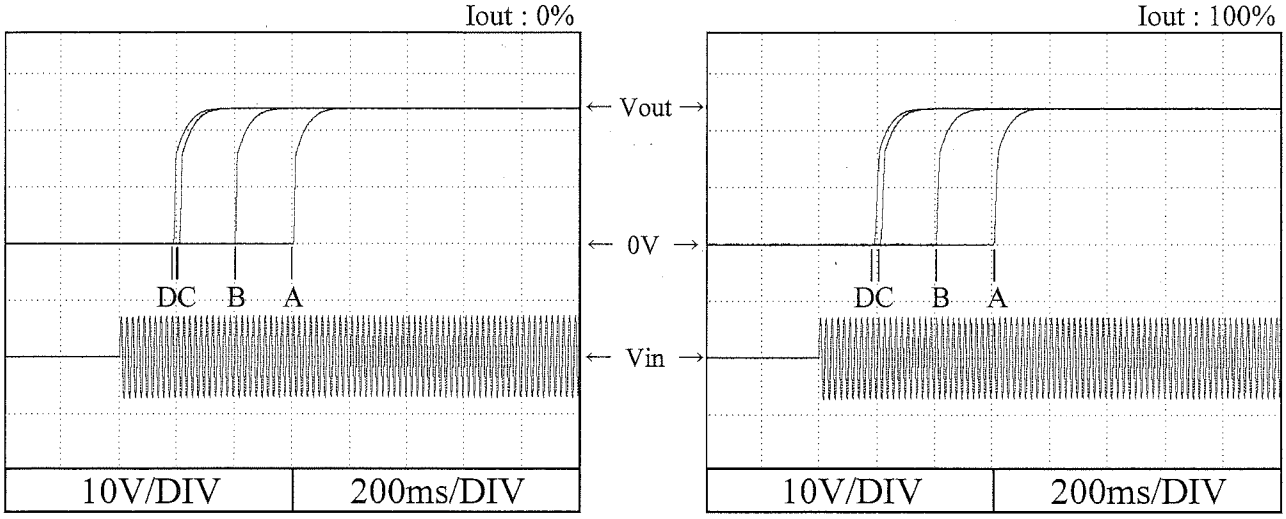
5V



12V



24V

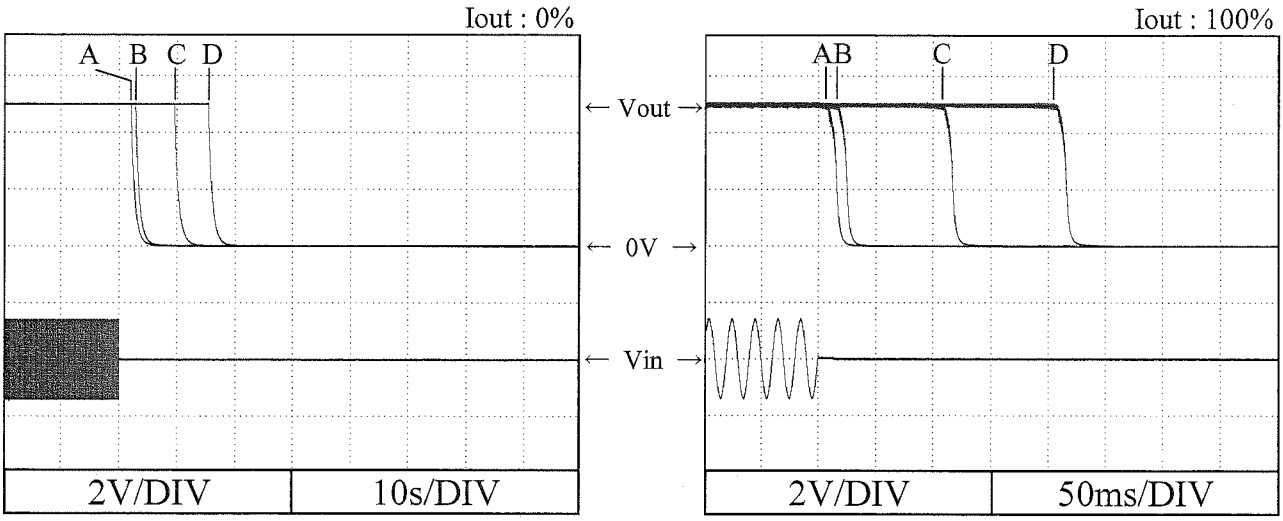


2.5 出力立ち下がり特性

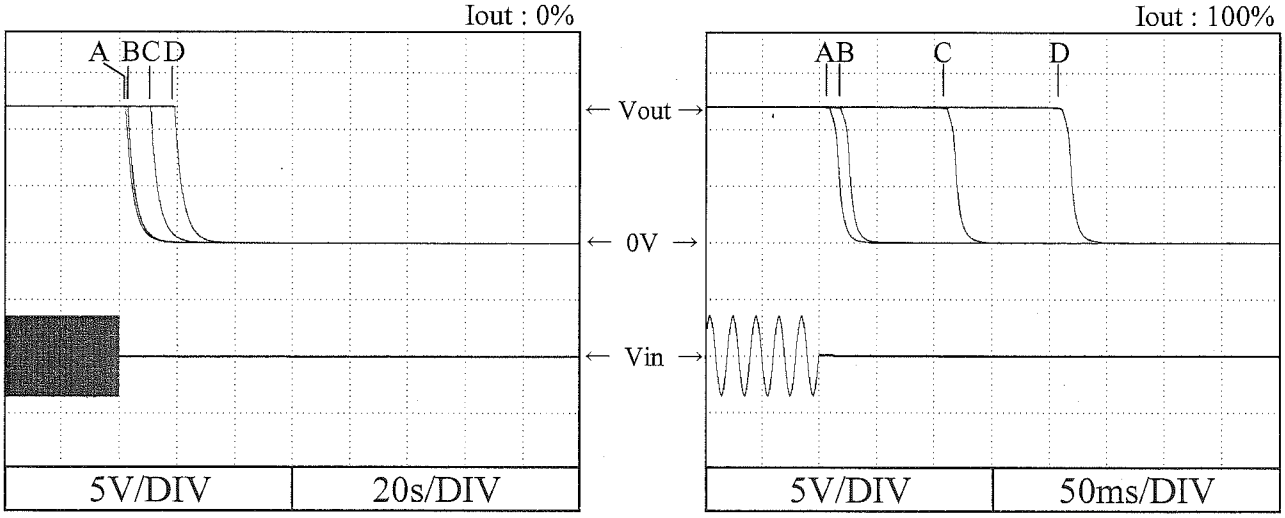
Output fall characteristics

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

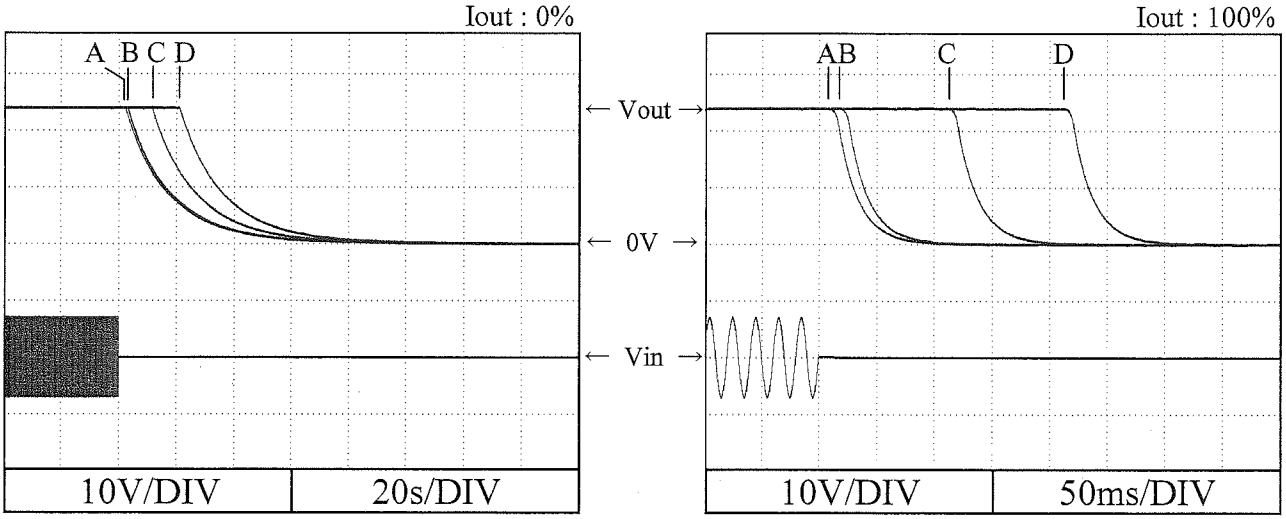
5V



12V



24V

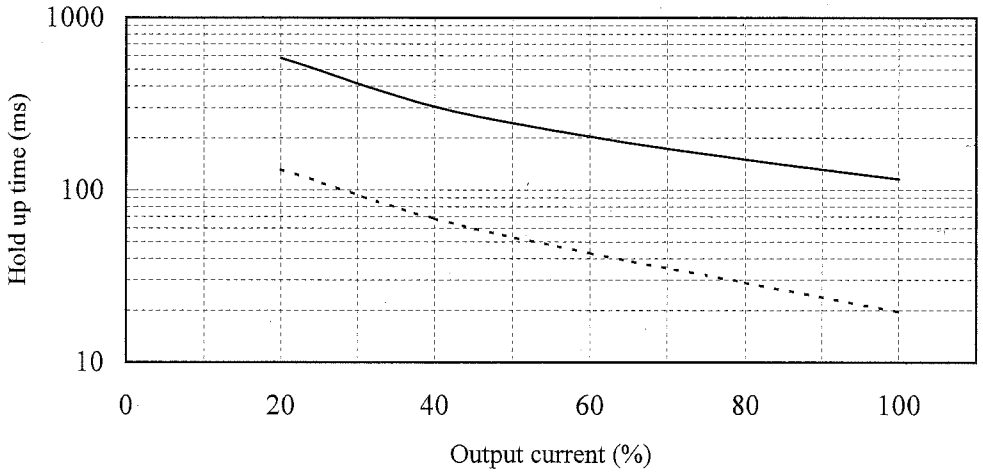


2.6 出力保持時間特性

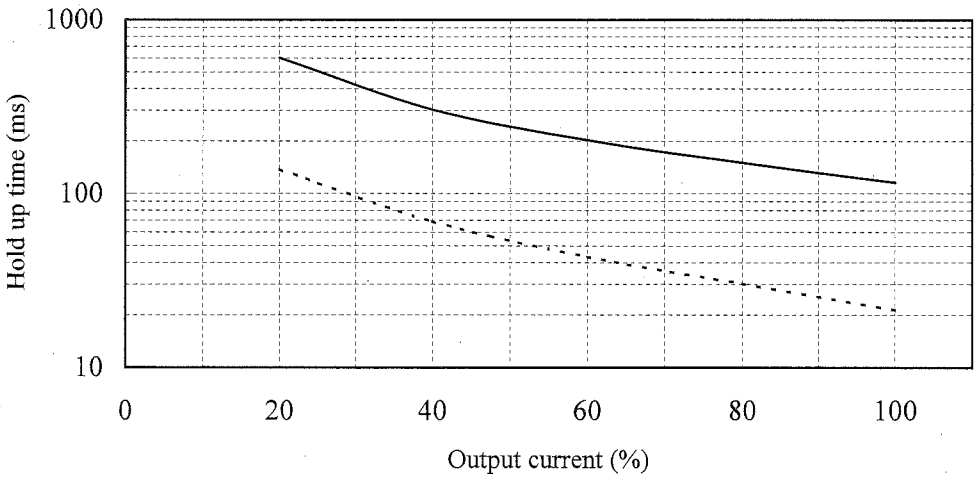
Hold up time characteristics

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

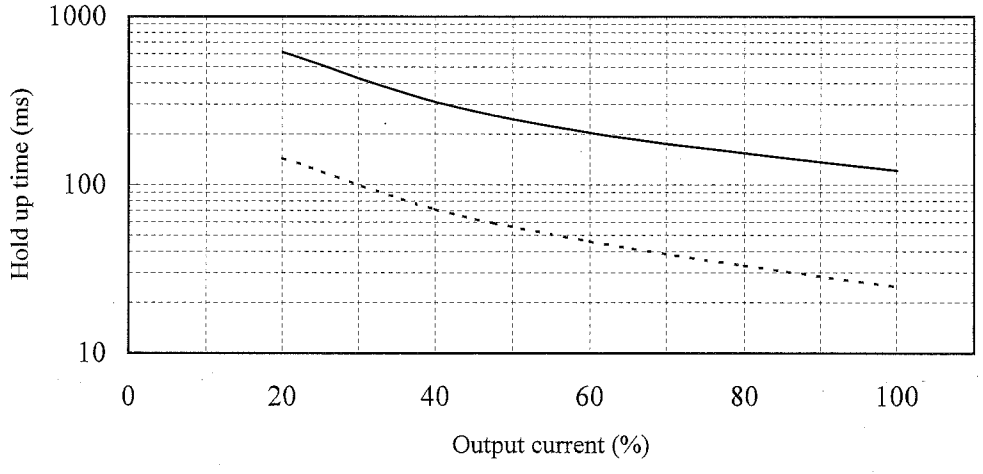
5V



12V



24V

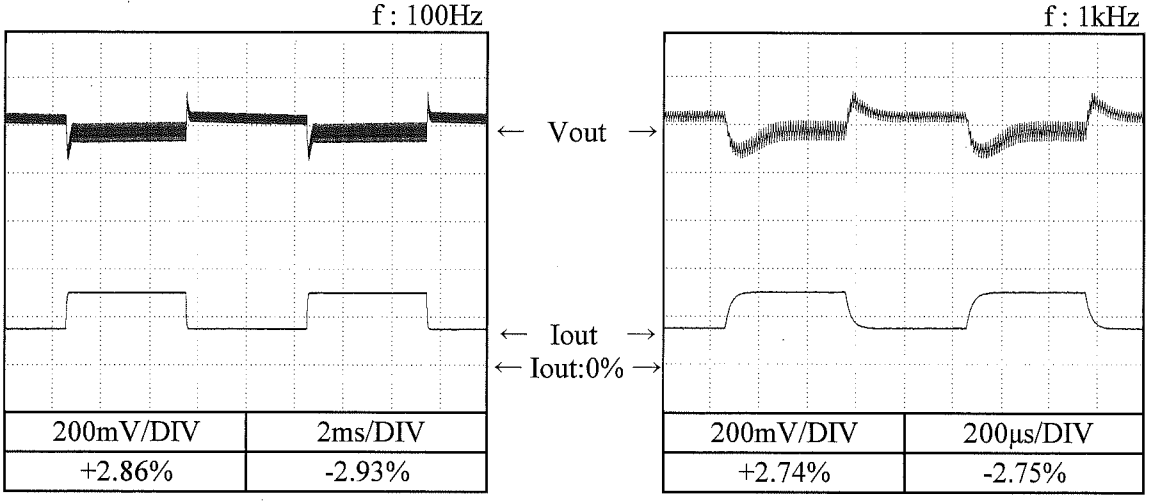


2.7 過渡応答 (負荷急変) 特性

Dynamic load response characteristics

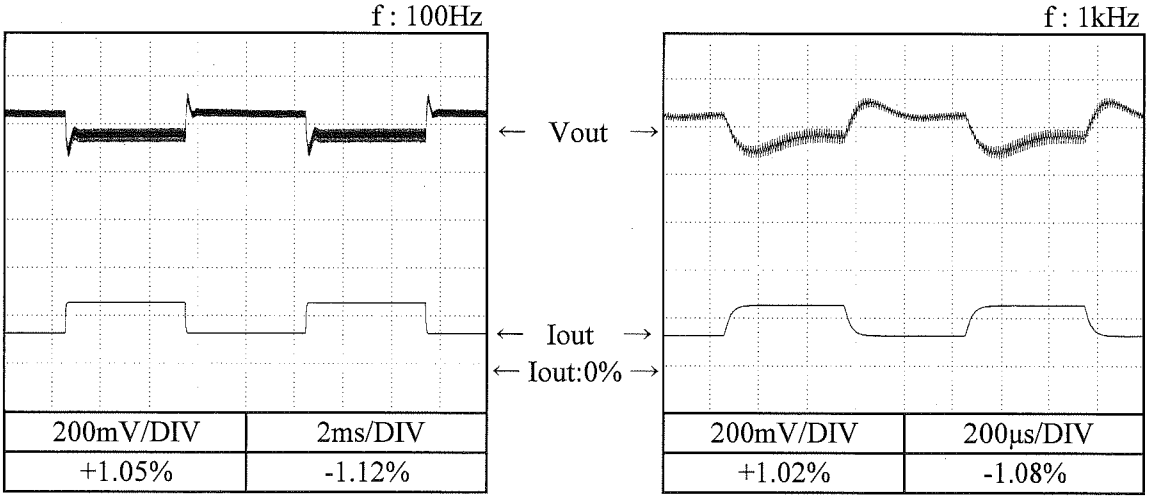
Conditions Vin : 100 VAC
Iout : 50 % ⇔ 100 %
(tr = tf = 50us)
Ta : 25 ℃

5V



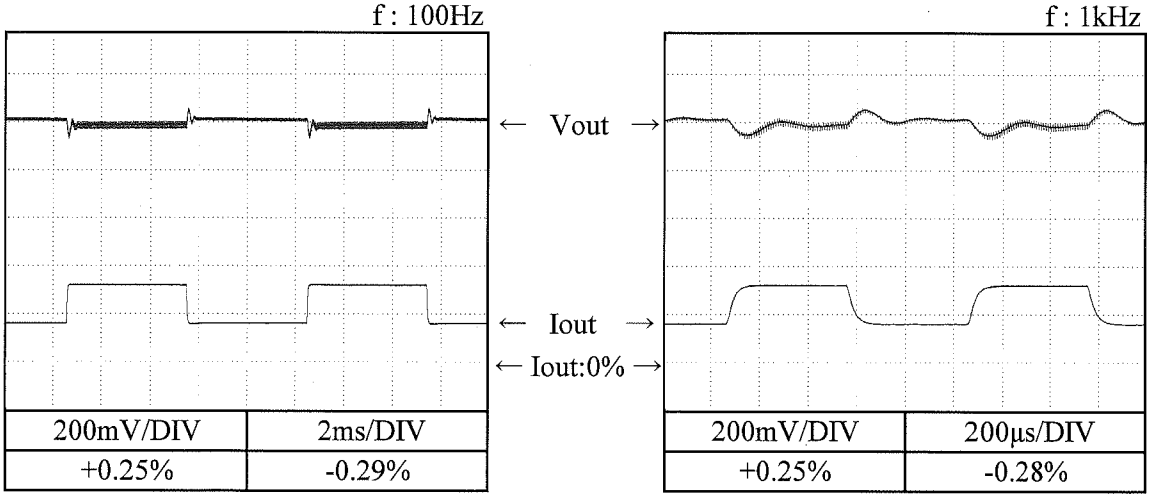
200mV/DIV	2ms/DIV	200mV/DIV	200μs/DIV
+2.86%	-2.93%	+2.74%	-2.75%

12V



200mV/DIV	2ms/DIV	200mV/DIV	200μs/DIV
+1.05%	-1.12%	+1.02%	-1.08%

24V



200mV/DIV	2ms/DIV	200mV/DIV	200μs/DIV
+0.25%	-0.29%	+0.25%	-0.28%

2.8 入力電圧瞬停特性

Response to brown out characteristics

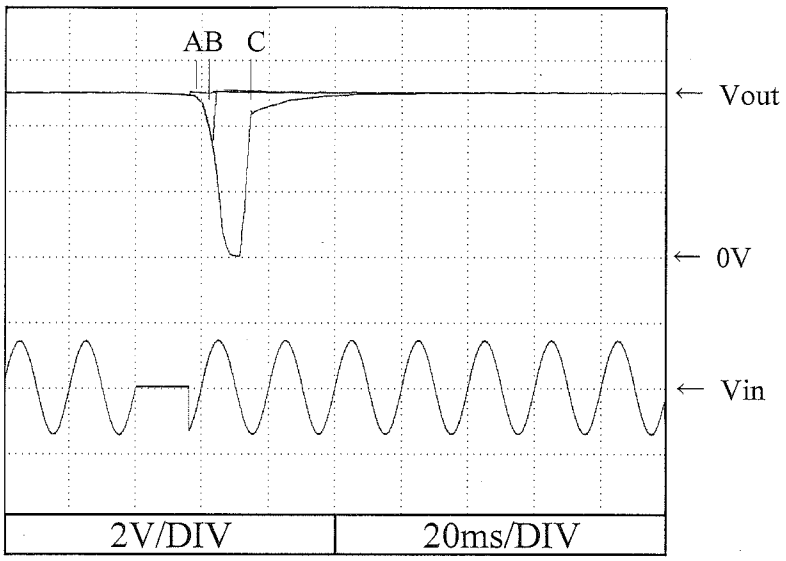
Conditions Vin : 100 VAC
Iout : 100 %
Ta : 25 ℃

5V

A = 16ms

B = 23ms

C = 30ms

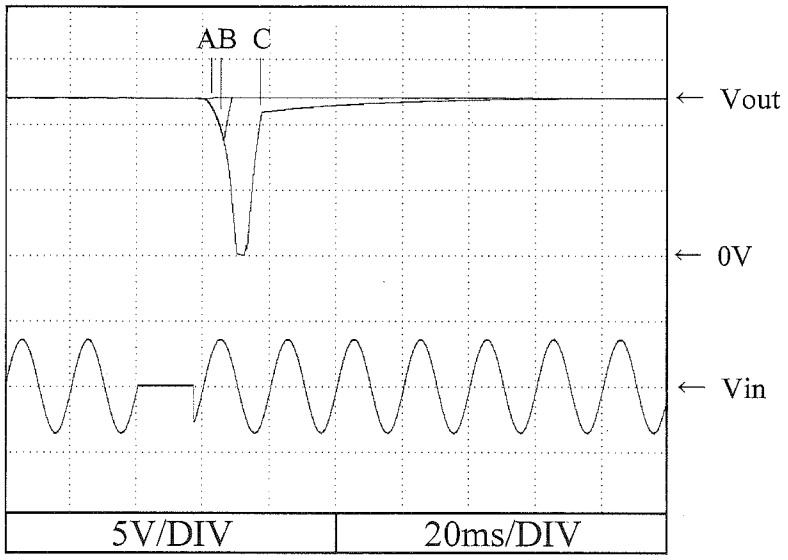


12V

A = 17ms

B = 25ms

C = 29ms

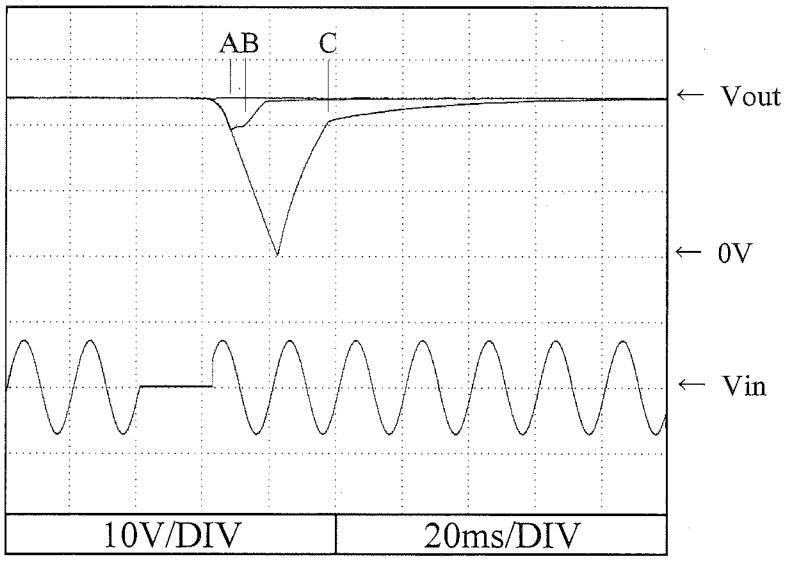


24V

A = 22ms

B = 28ms

C = 42ms



2.8 入力電圧瞬停特性

Response to brown out characteristics

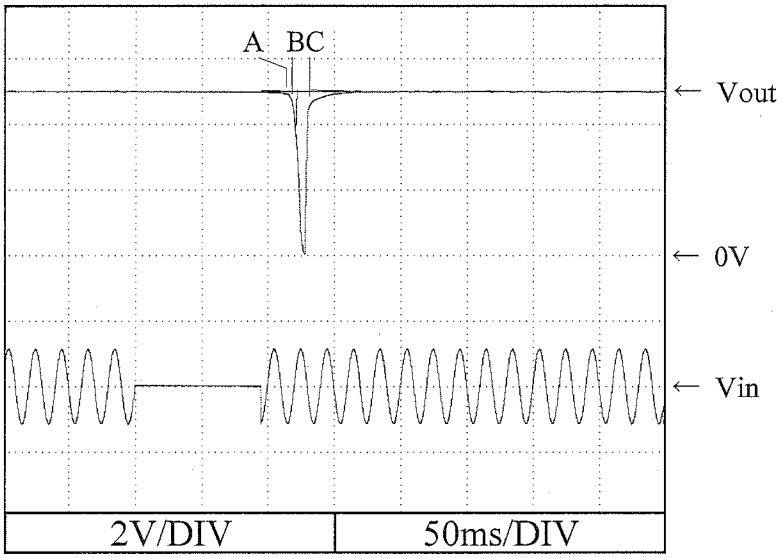
Conditions Vin : 200 VAC
Iout : 100 %
Ta : 25 ℃

5V

A = 95ms

B = 120ms

C = 128ms

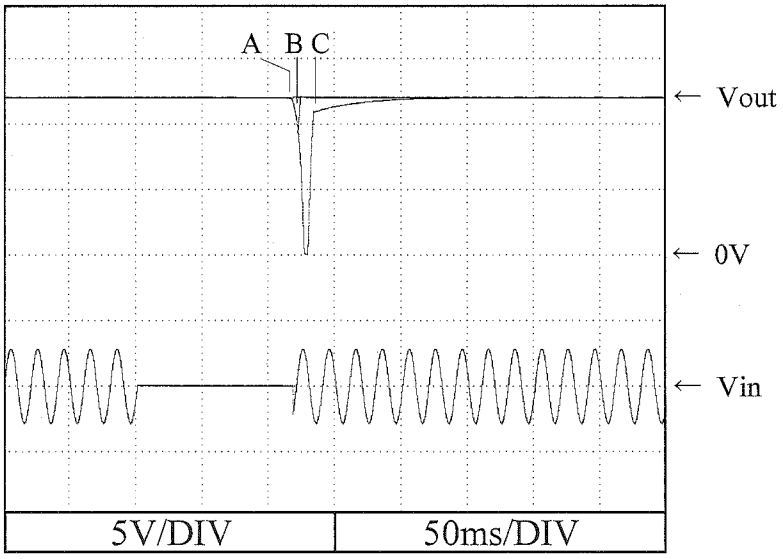


12V

A = 117ms

B = 123ms

C = 130ms

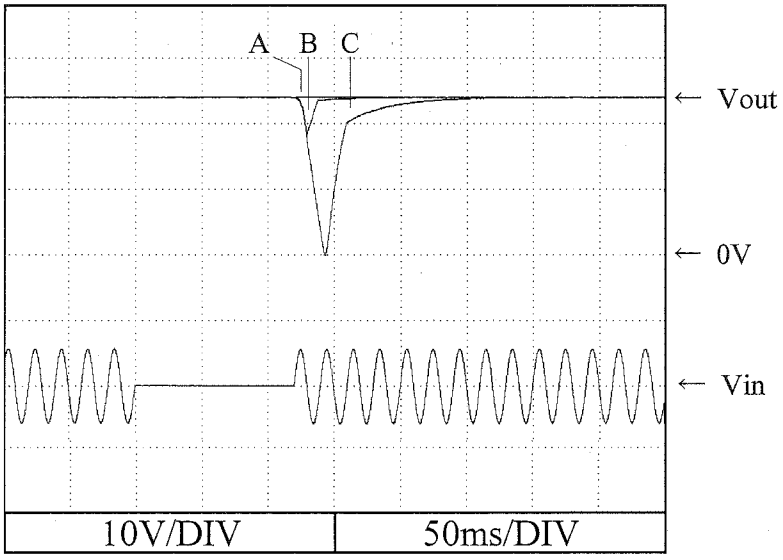


24V

A = 120ms

B = 127ms

C = 143ms

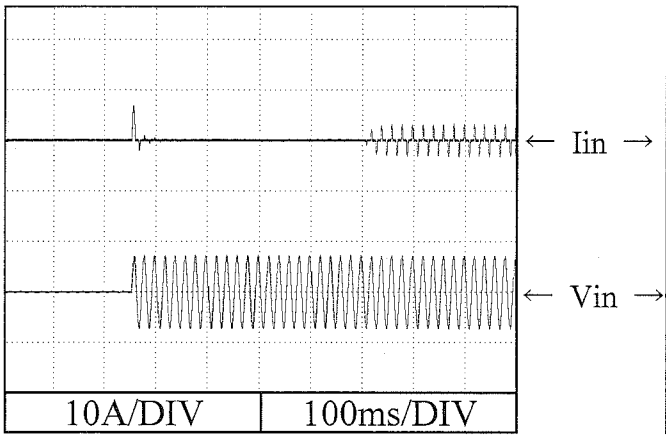


2.9 入力サージ電流 (突入電流) 波形
Inrush current waveform

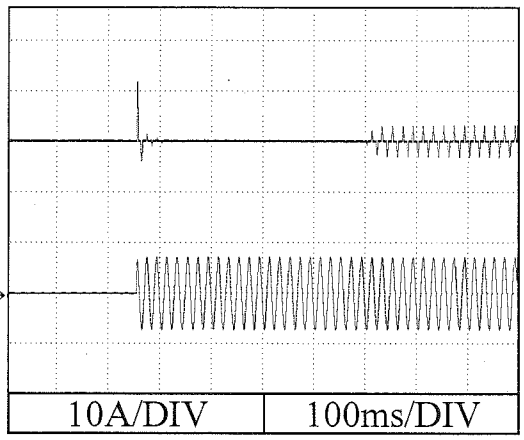
5V

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

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

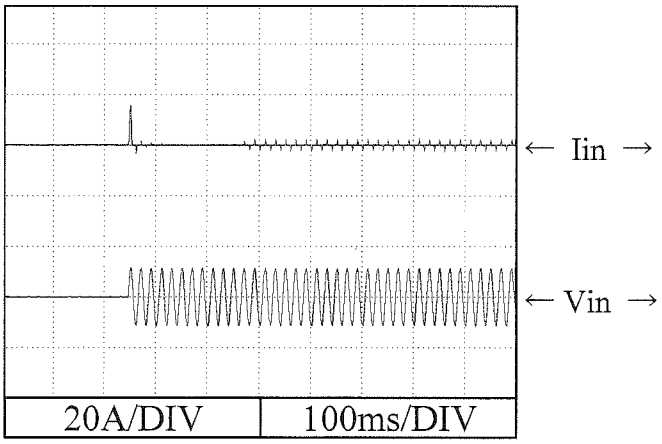


Switch on phase angle of input AC voltage
ϕ = 90°

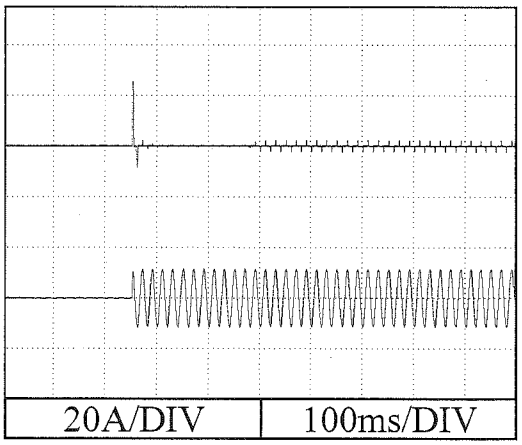


Conditions Vin : 200 VAC
Iout : 100 %
Ta : 25 ℃

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



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

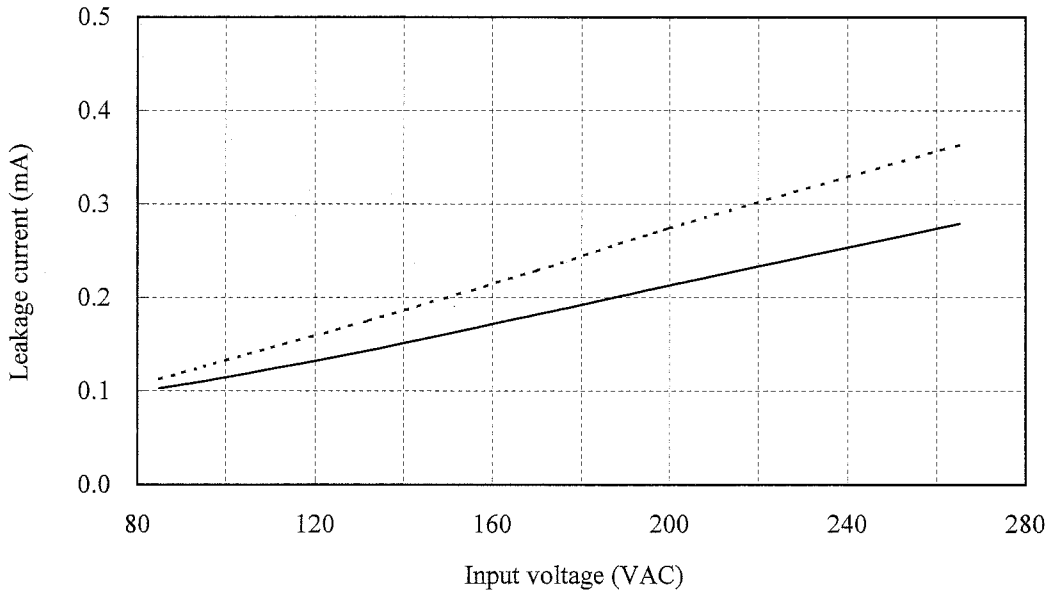


2.10 リーク電流特性
Leakage current characteristics

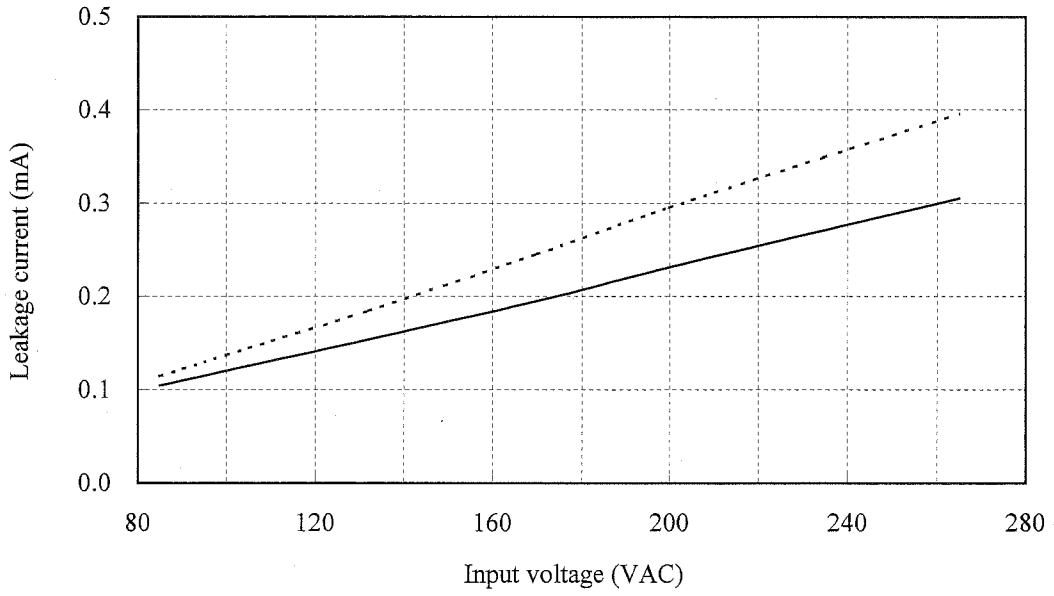
Conditions Iout : 0 % ------
100 % ——
Ta : 25 ℃
Equipment used : 3156 (HIOKI)

5V

f : 50 Hz



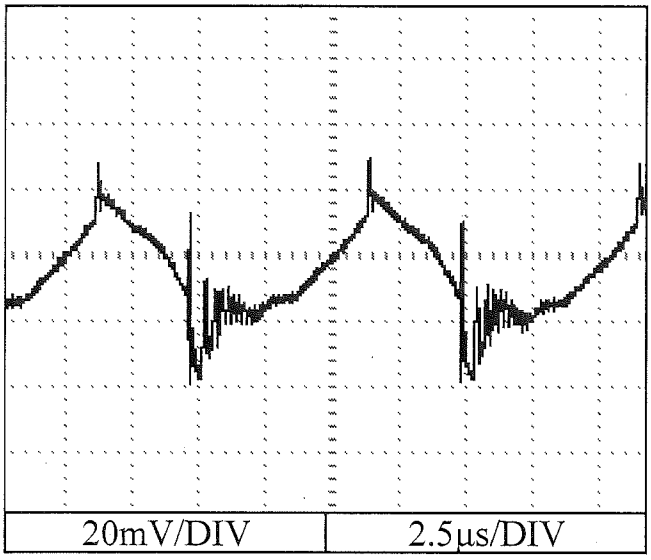
f : 60 Hz



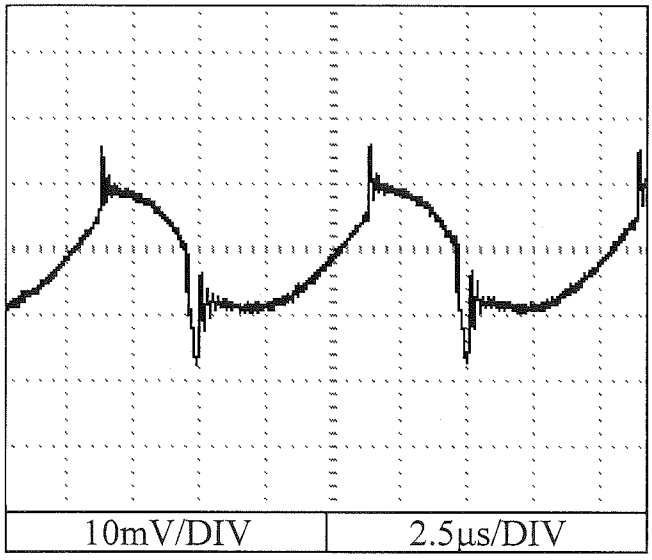
2.11 出力リップル、ノイズ波形
Output ripple and noise waveform

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

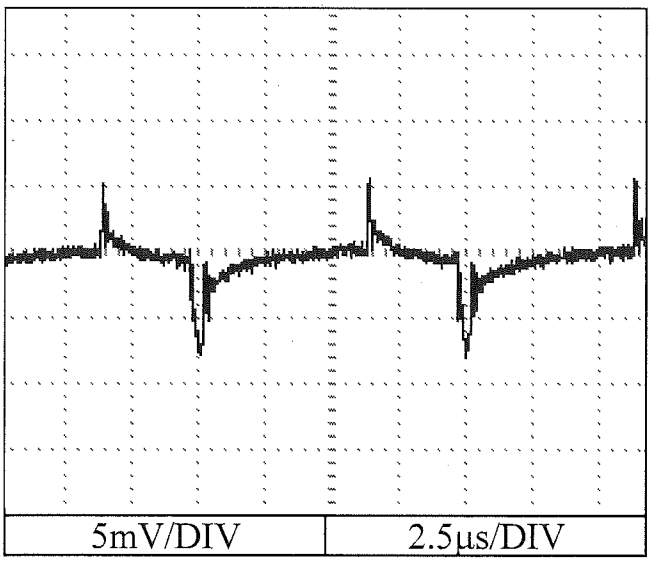
5V



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

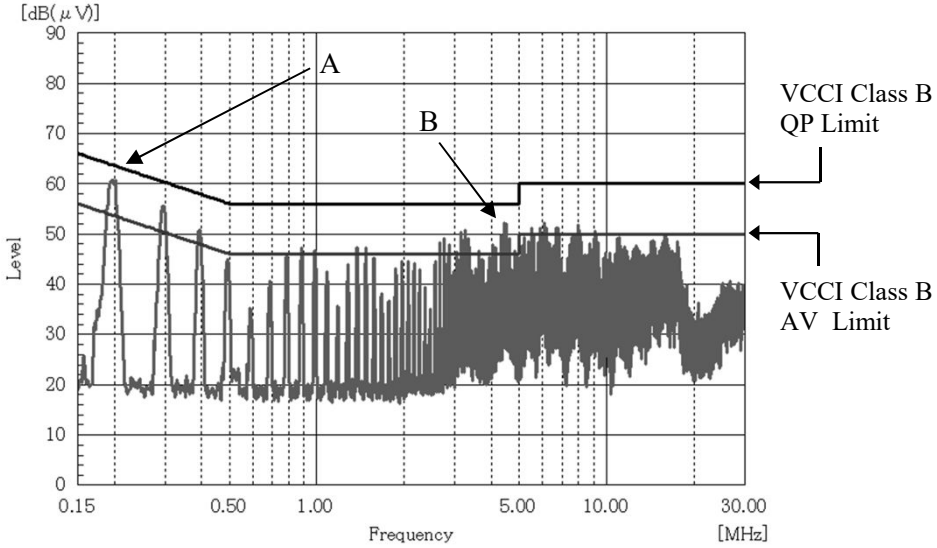
Conducted Emission

5V

Ref. Data	Point A (197kHz) Limit (dBuV)	Measure (dBuV)
QP	63.7	59.7
AV	53.7	47.6

Ref. Data	Point B (4.5MHz) Limit (dBuV)	Measure (dBuV)
QP	56.0	50.0
AV	46.0	40.7

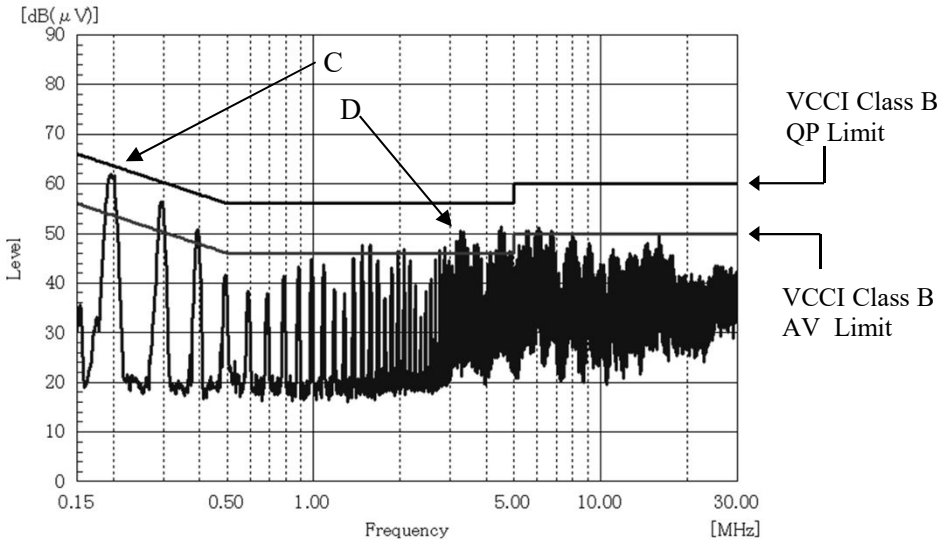
Phase : N



Ref. Data	Point C (197kHz) Limit (dBuV)	Measure (dBuV)
QP	63.7	60.0
AV	53.7	49.2

Ref. Data	Point D (3.4MHz) Limit (dBuV)	Measure (dBuV)
QP	56.0	48.9
AV	46.0	42.6

Phase : L



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

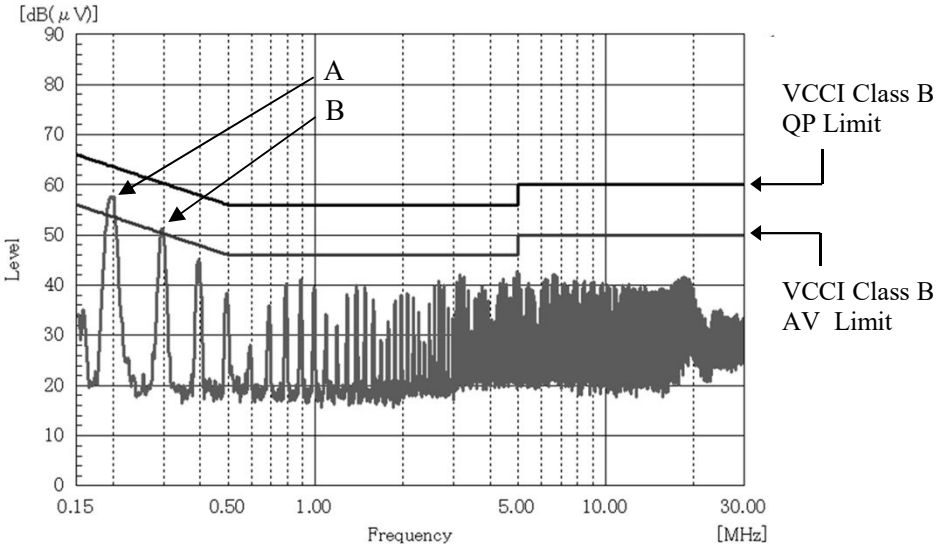
Conducted Emission

12V

Ref. Data	Point A (197kHz) Limit (dBuV)	Measure (dBuV)
QP	63.7	56.8
AV	53.7	44.5

Ref. Data	Point B (295kHz) Limit (dBuV)	Measure (dBuV)
QP	60.4	50.1
AV	50.4	38.8

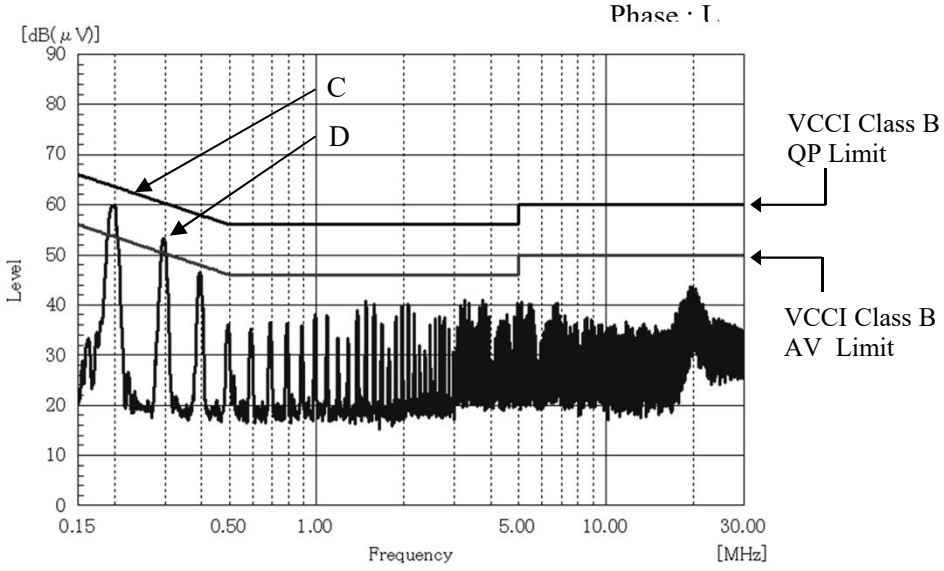
Phase : N



Ref. Data	Point C (197kHz) Limit (dBuV)	Measure (dBuV)
QP	63.7	58.3
AV	53.7	47.5

Ref. Data	Point D (295kHz) Limit (dBuV)	Measure (dBuV)
QP	60.4	52.2
AV	50.4	42.0

Phase : L



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

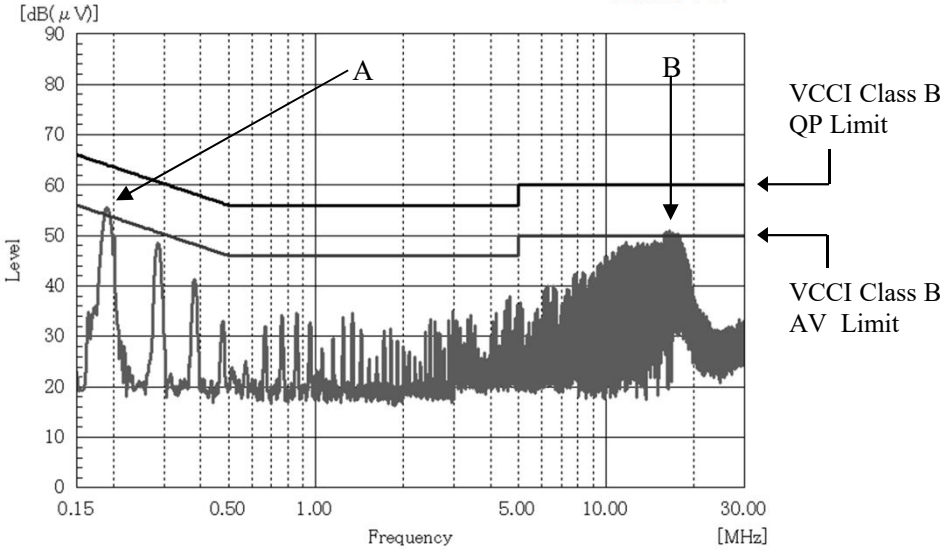
Conducted Emission

24V

Ref. Data	Point A (191kHz) Limit (dBuV)	Measure (dBuV)
QP	64.0	54.1
AV	54.0	41.1

Ref. Data	Point B (16.7MHz) Limit (dBuV)	Measure (dBuV)
QP	60.0	48.8
AV	50.0	36.8

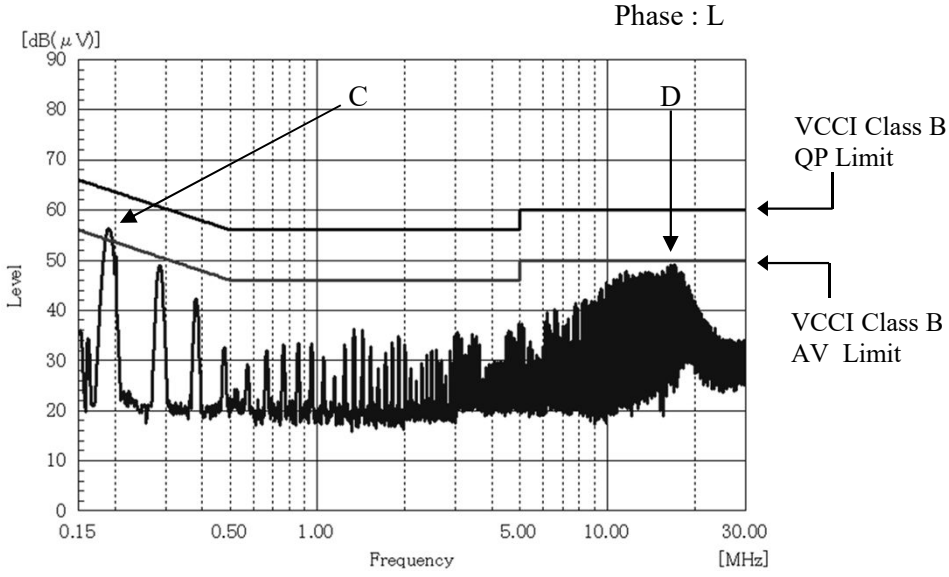
Phase : N



Ref. Data	Point C (191kHz) Limit (dBuV)	Measure (dBuV)
QP	64.0	55.0
AV	54.0	42.5

Ref. Data	Point D (17.1MHz) Limit (dBuV)	Measure (dBuV)
QP	60.0	46.4
AV	50.0	35.9

Phase : L



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

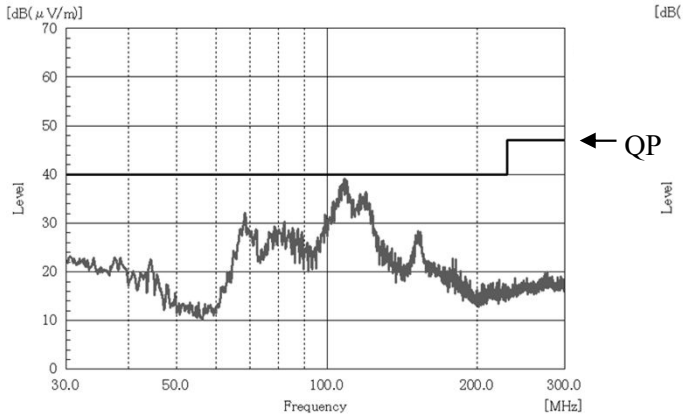
Conditions Vin : 230 VAC
Iout : 100 %
Ta : 25 ℃

雑音電界強度

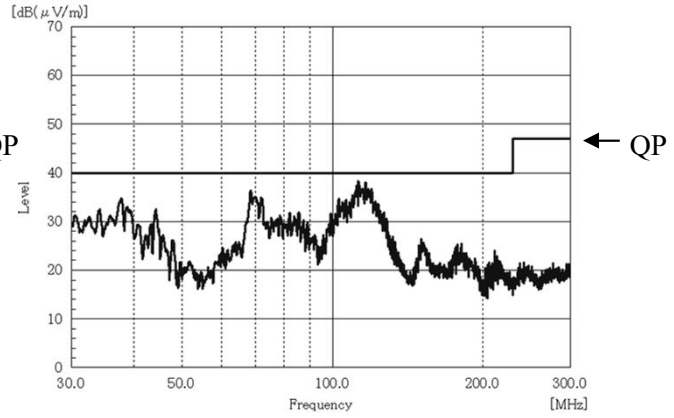
Radiated Emission

5V

HORIZONTAL

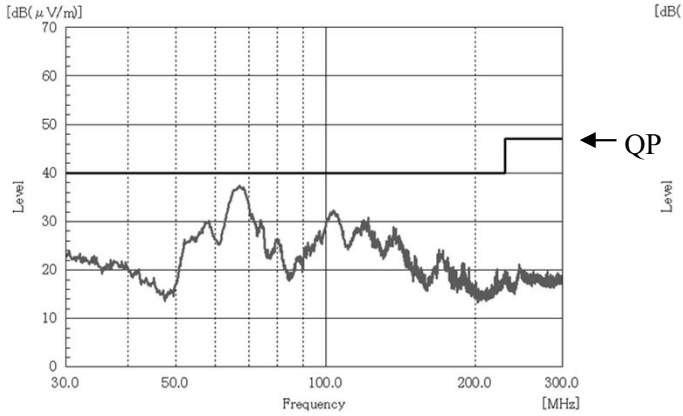


VERTICAL

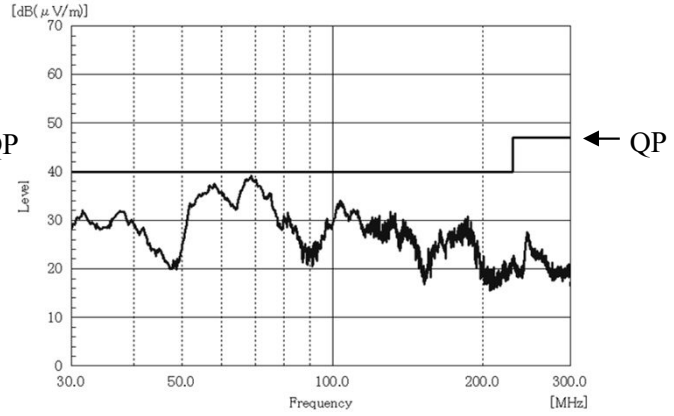


12V

HORIZONTAL

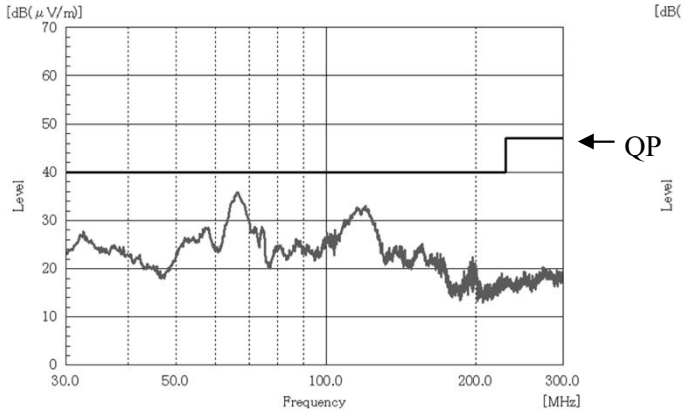


VERTICAL

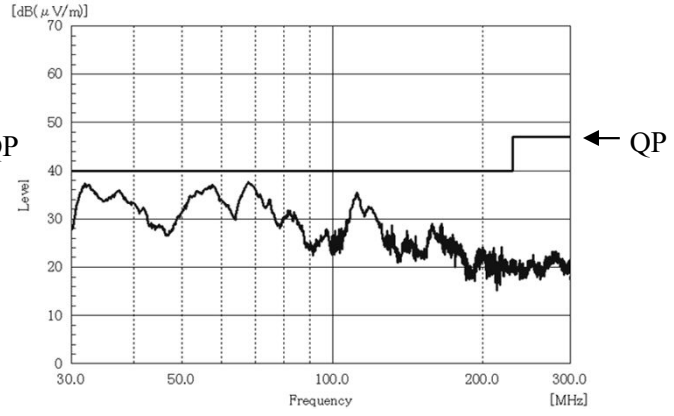


24V

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.