ELV12

EVALUATION DATA

型式データ

DWG No. V002-53-01A		
APPD	CHK	DWG
27 Aug.'13	27/Aug/'13	27/Aug/'13

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2. 特性データ　Characteristics

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。

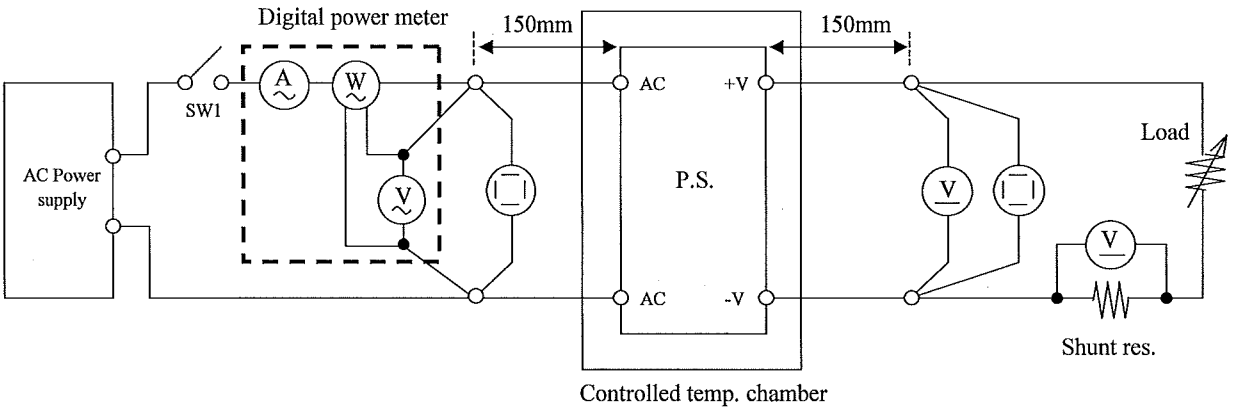
Test results are reference data based on our standard measurement condition.

1. 測定方法 Evaluation Method

1.1 測定回路 Circuit used for determination

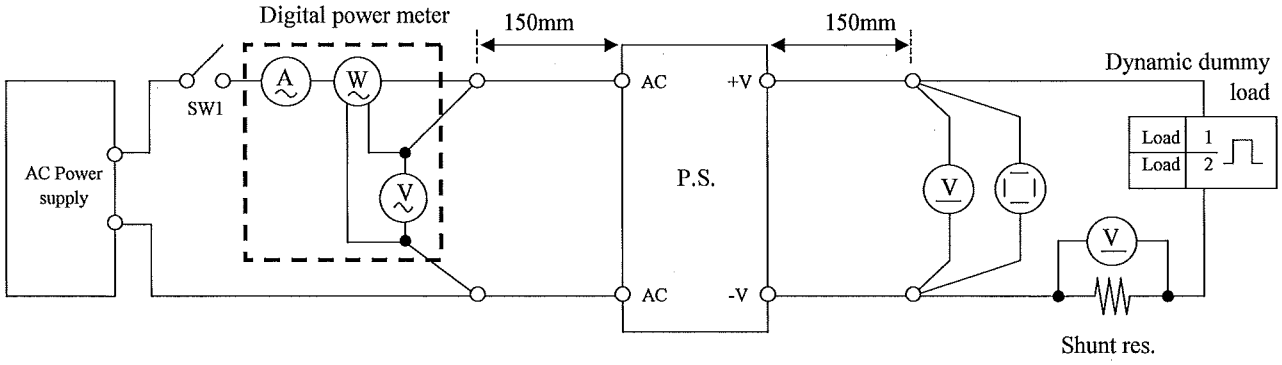
測定回路1 Circuit 1 used for determination

- ・静特性 Steady state data
- ・通電ドリフト特性 Warm up voltage drift characteristics
- ・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
- ・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

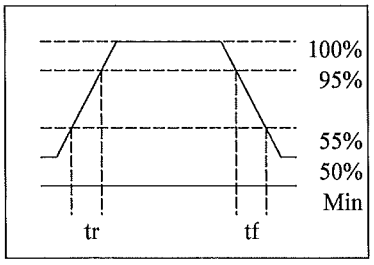


測定回路2 Circuit 2 used for determination

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



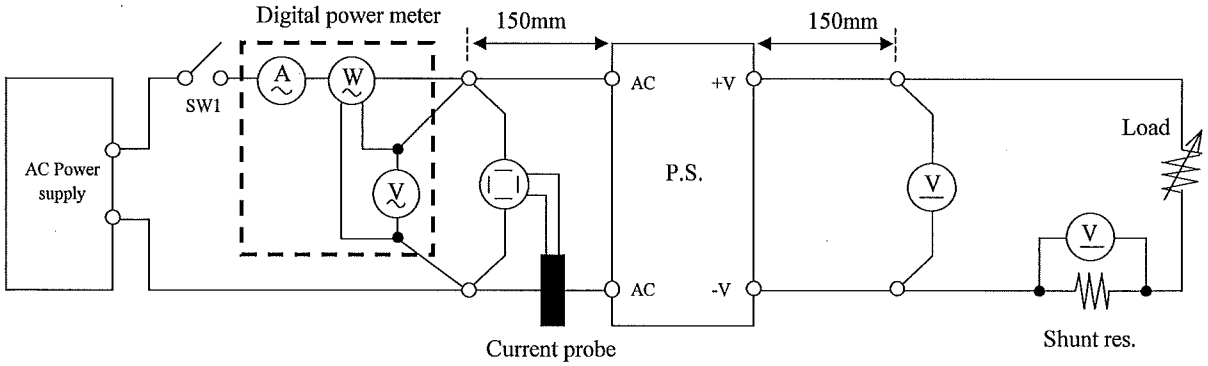
Output current waveform
Iout 50% <==> 100%



測定回路3 Circuit 3 used for determination

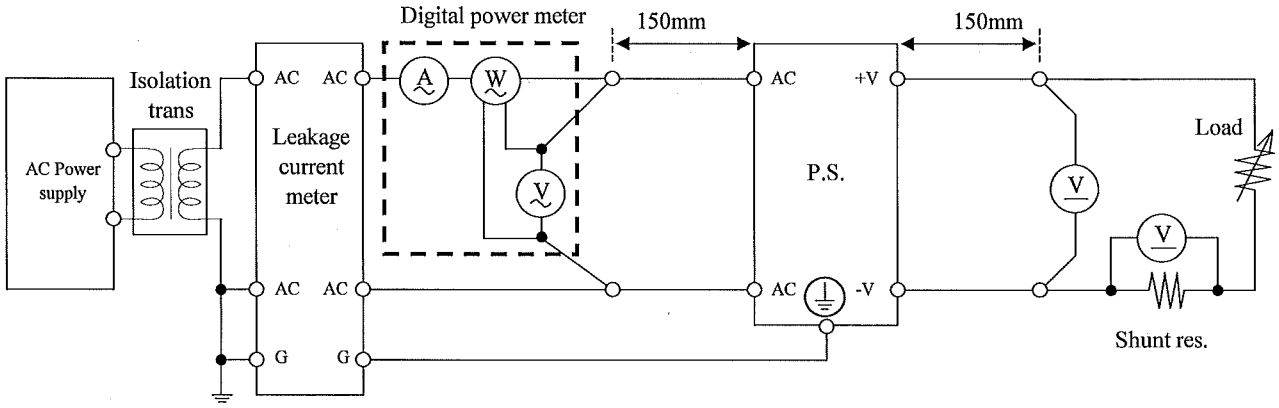
・入力サージ電流（突入電流）波形　Inrush current waveform

・入力電流波形　Input current waveform



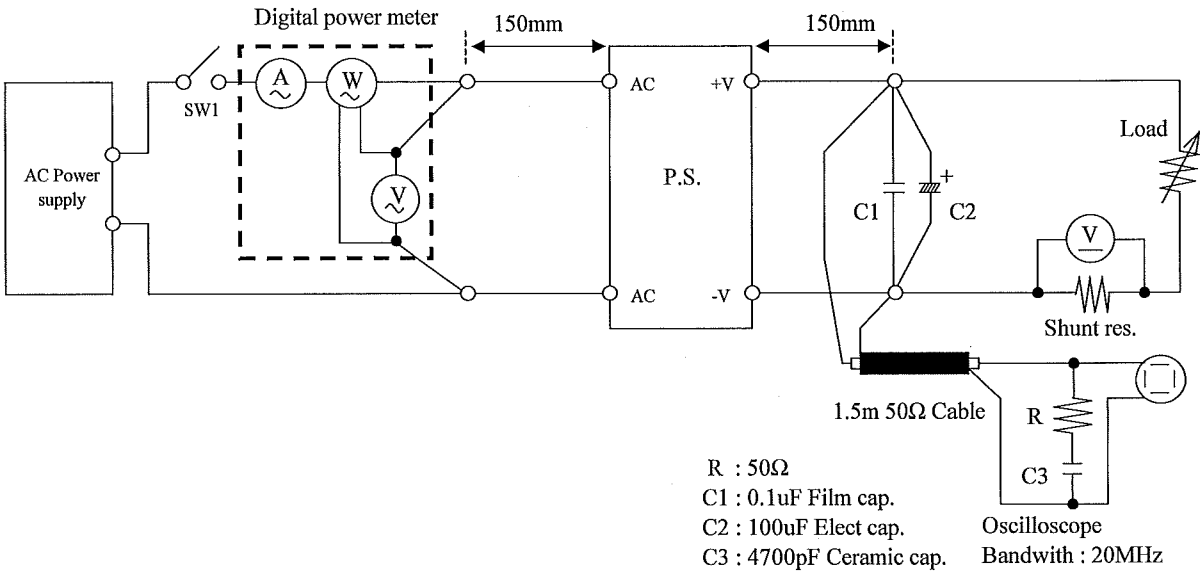
測定回路4 Circuit 4 used for determination

・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

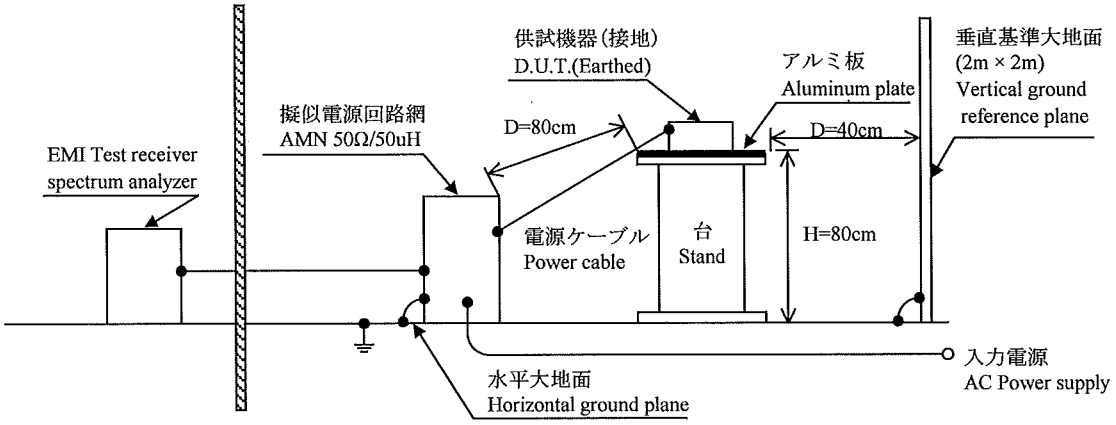


測定構成 Configuration used for determination

・EMI特性　Electro-Magnetic Interference characteristics

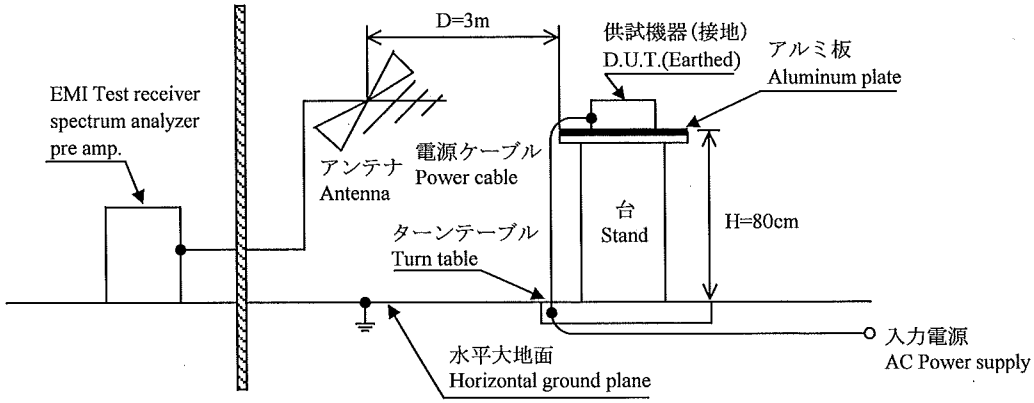
(a) 雑音端子電圧 (帰還ノイズ)

Conducted Emission



(b) 雑音電界強度 (放射ノイズ)

Radiated Emission

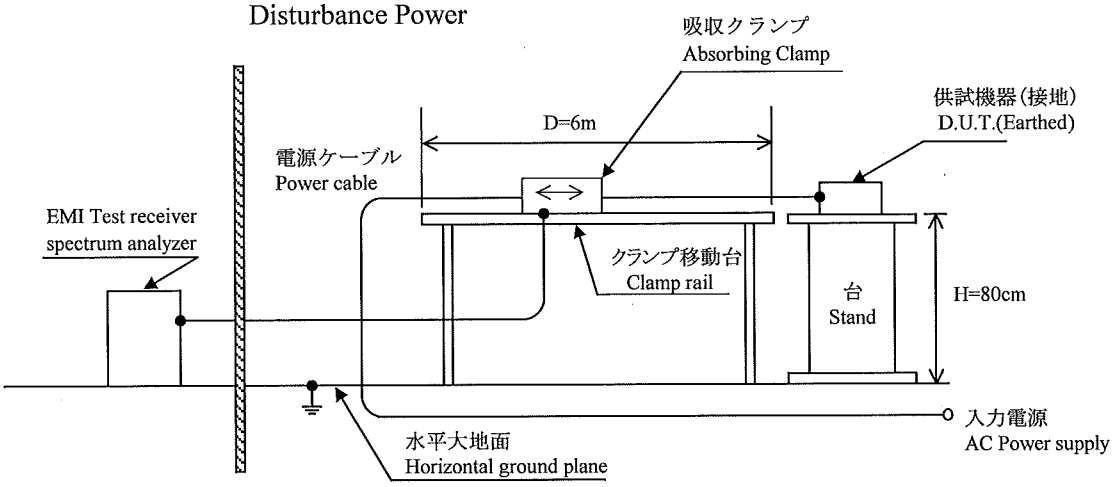


測定構成　Configuration used for determination

・EMI特性　Electro-Magnetic Interference characteristics

(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

Vout	12V	24V
Iout : 100%	1A	0.5A
Iout : min	0.1A	0.05A

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

12V

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

Iout \ Vin	90VAC	100VAC	200VAC	265VAC	line regulation	
min	12.132V	12.132V	12.132V	12.132V	0mV	0.000%
50%	12.126V	12.126V	12.126V	12.126V	0mV	0.000%
100%	12.117V	12.117V	12.117V	12.117V	0mV	0.000%
load	15mV	15mV	15mV	15mV		
regulation	0.125%	0.125%	0.125%	0.125%		

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

Ta	-10℃	+25℃	+60℃	temperature stability	
Vout	12.095V	12.117V	12.114V	22mV	0.183%

3. Total regulation

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

total regulation	
37mV	0.3%

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

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

24V

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

Iout \ Vin	90VAC	100VAC	200VAC	265VAC	line regulation	
min	23.868V	23.868V	23.866V	23.865V	3mV	0.013%
50%	23.865V	23.865V	23.859V	23.854V	11mV	0.046%
100%	23.859V	23.859V	23.854V	23.844V	15mV	0.063%
load	9mV	9mV	12mV	21mV		
regulation	0.037%	0.037%	0.050%	0.087%		

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

Ta	-10℃	+25℃	+60℃	temperature stability	
Vout	23.819V	23.859V	23.843V	40mV	0.167%

3. Total regulation

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

total regulation	
76mV	0.3%

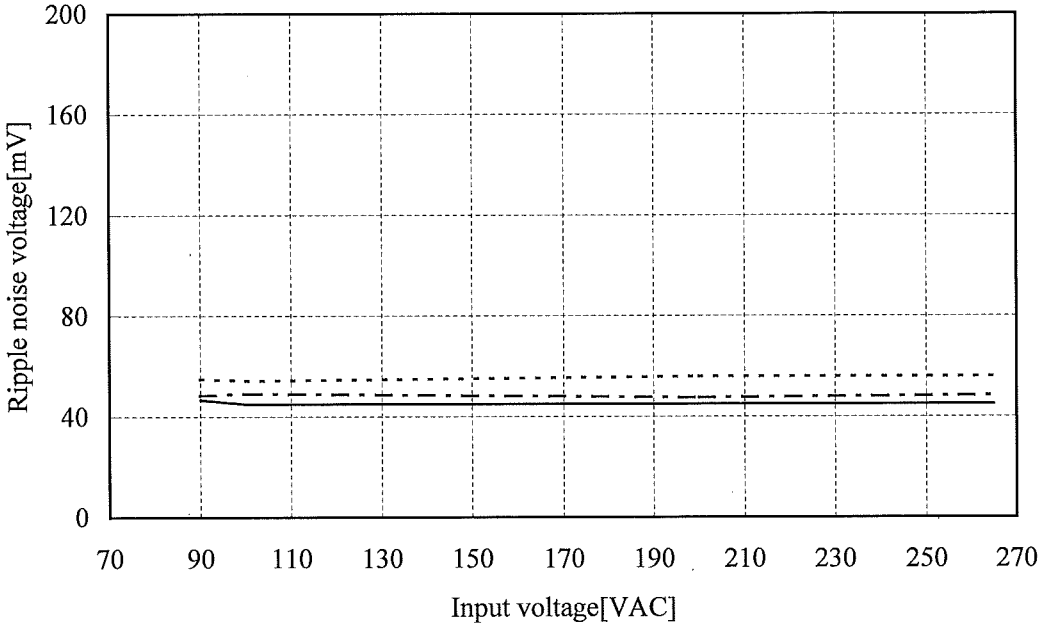
3. Start up voltage and Drop out voltage　Conditions　Ta :　25 ℃
Iout : 100 %

Start up voltage (Vin)	84VAC
Drop out voltage (Vin)	71VAC

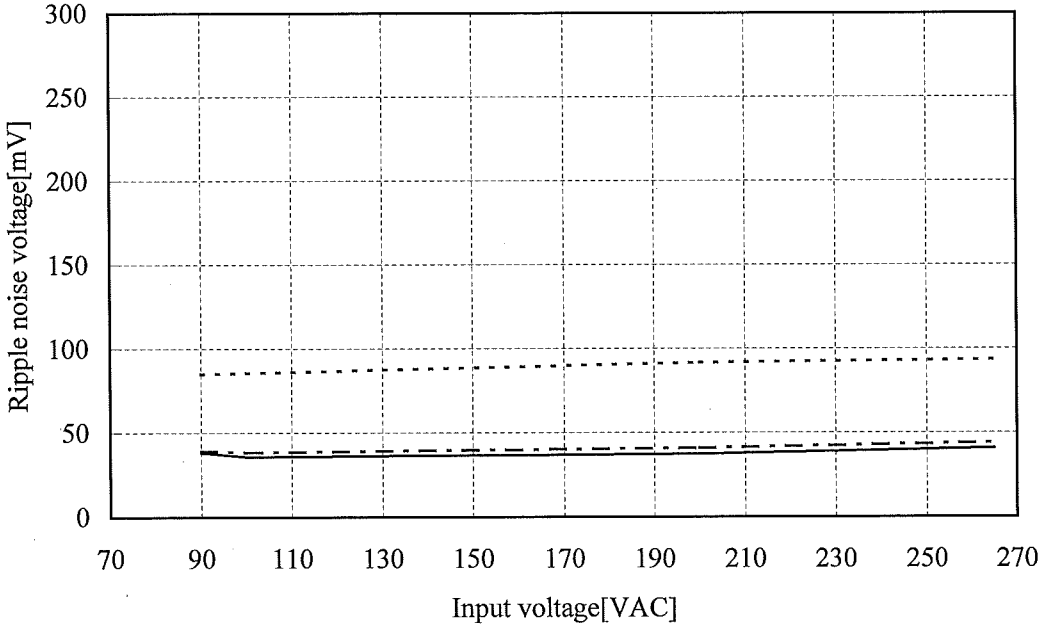
(2) リップル電圧対入力電圧
Ripple noise voltage vs. Input voltage

Conditions Iout : 100 %
Ta : -10 ℃
25 ℃
60 ℃

12V



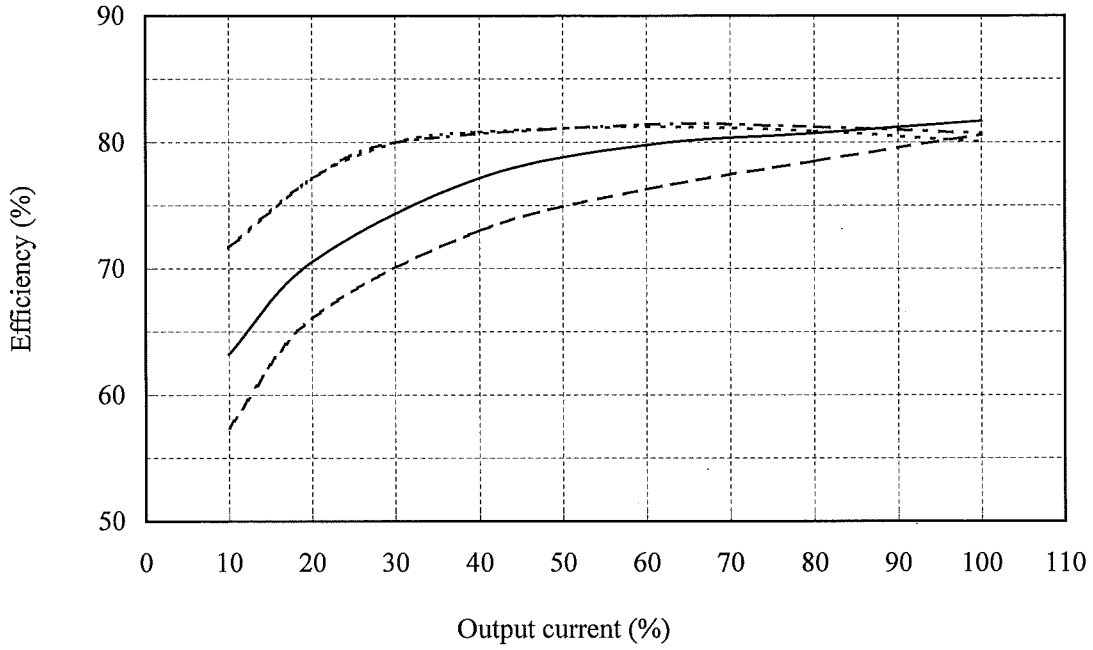
24V



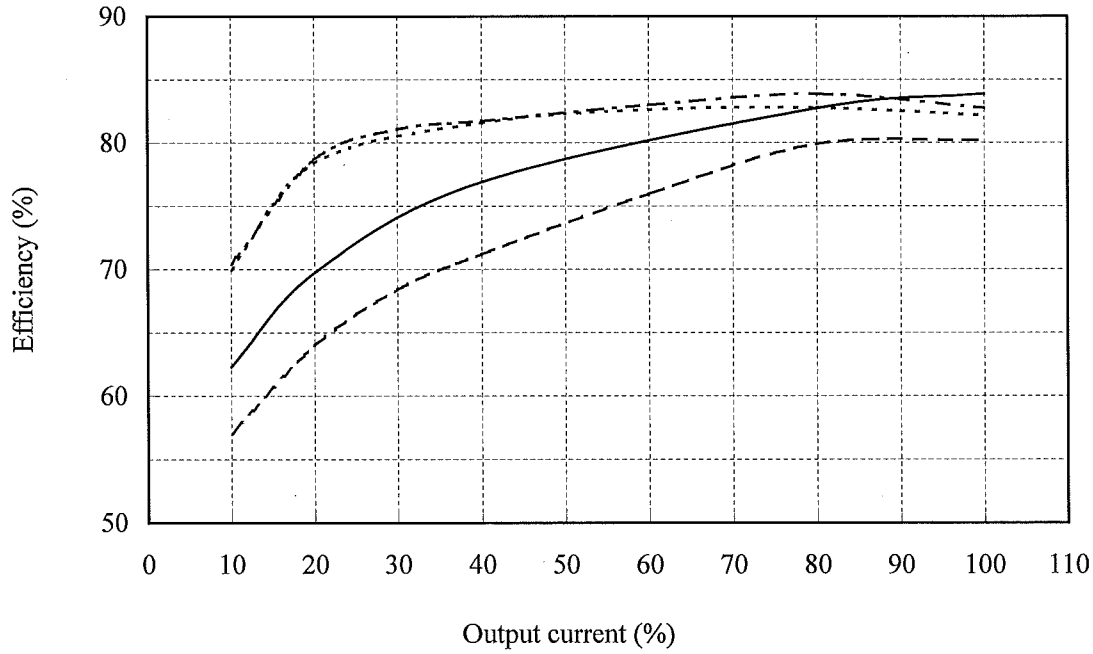
(3) 効率対出力電流
Efficiency vs. Output current

Conditions Vin : 90 VAC
: 100 VAC
: 200 VAC
: 265 VAC
Ta : 25 ℃

12V



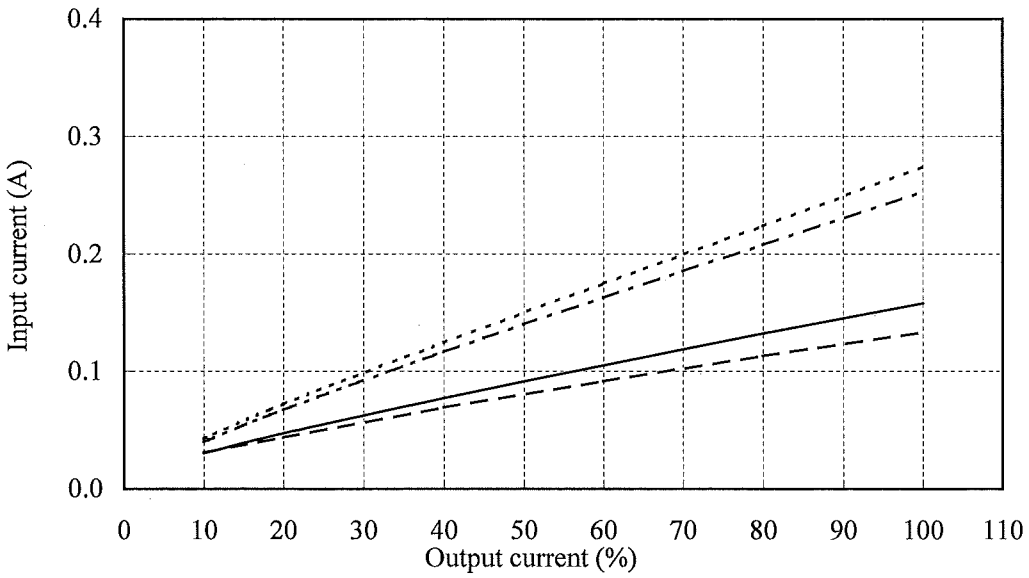
24V



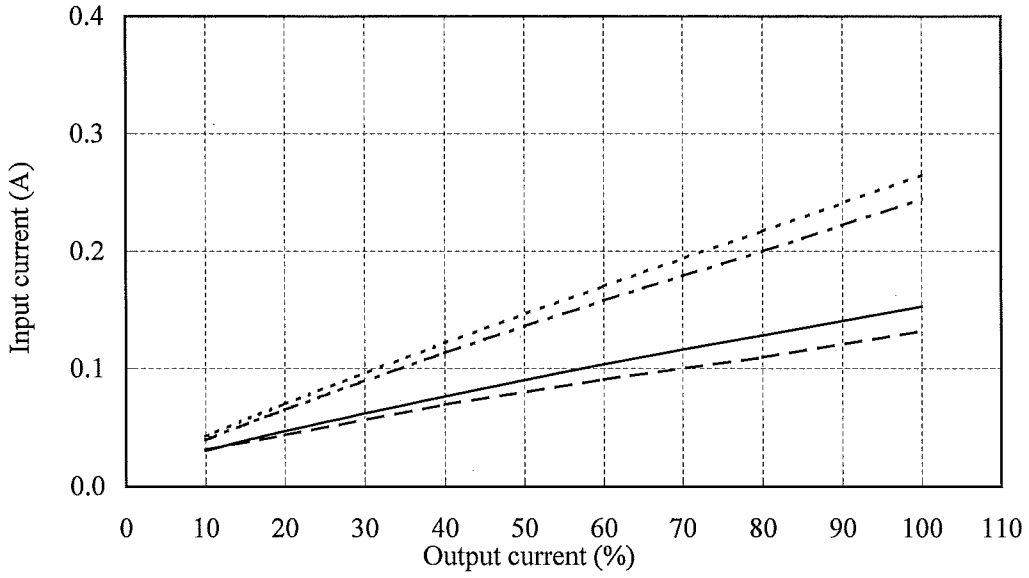
(4) 入力電流対出力電流
Input current vs. Output current

Conditions Vin : 90 VAC
: 100 VAC
: 200 VAC
: 265 VAC
Ta : 25 ℃

12V



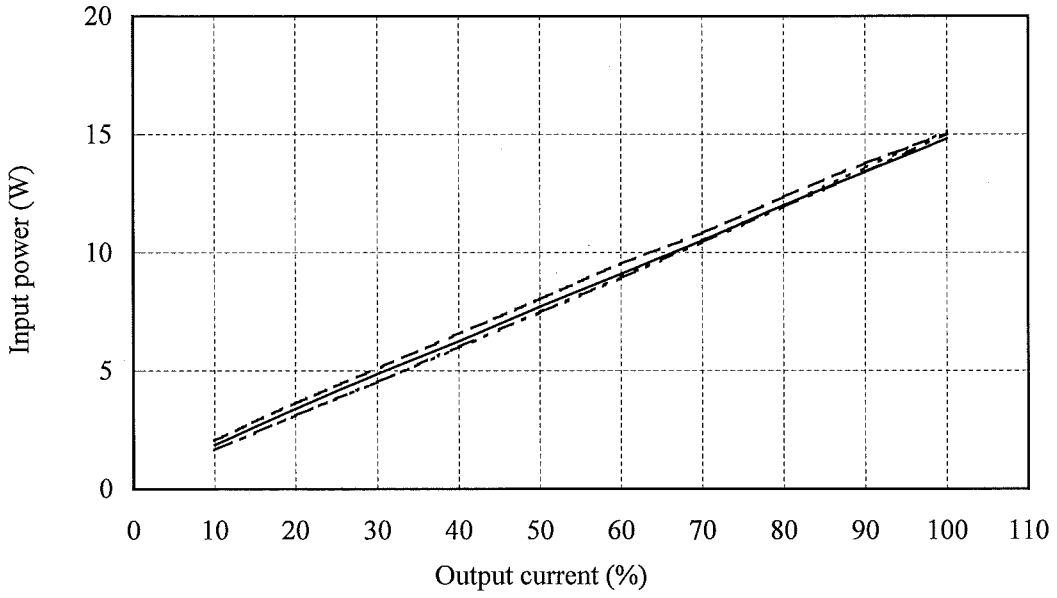
24V



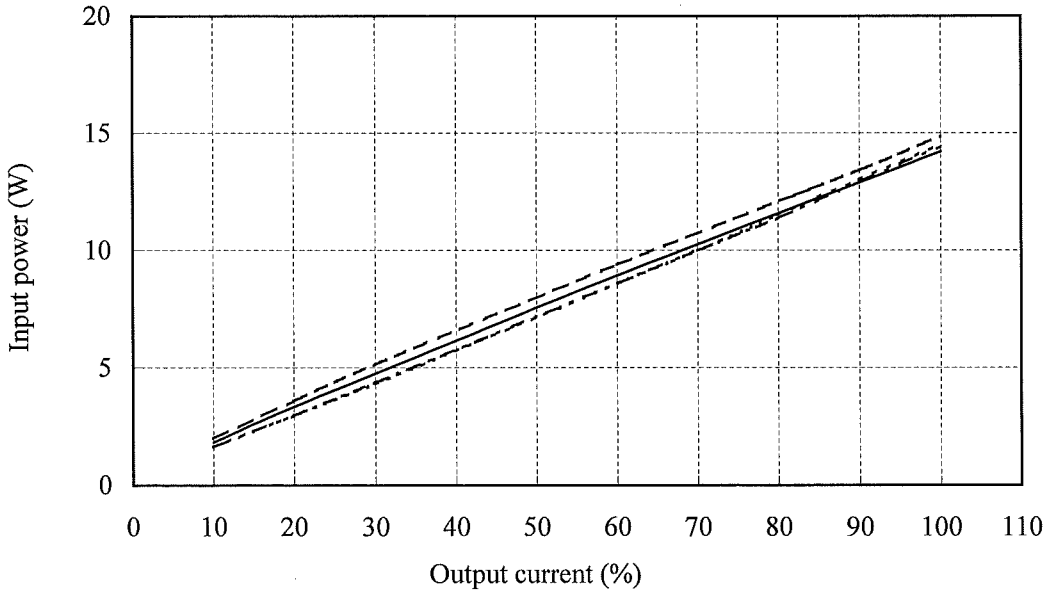
(5) 入力電力対出力電流
Input power vs. Output current

Conditions Vin : 90 VAC
: 100 VAC
: 200 VAC
: 265 VAC
Ta : 25 ℃

12V



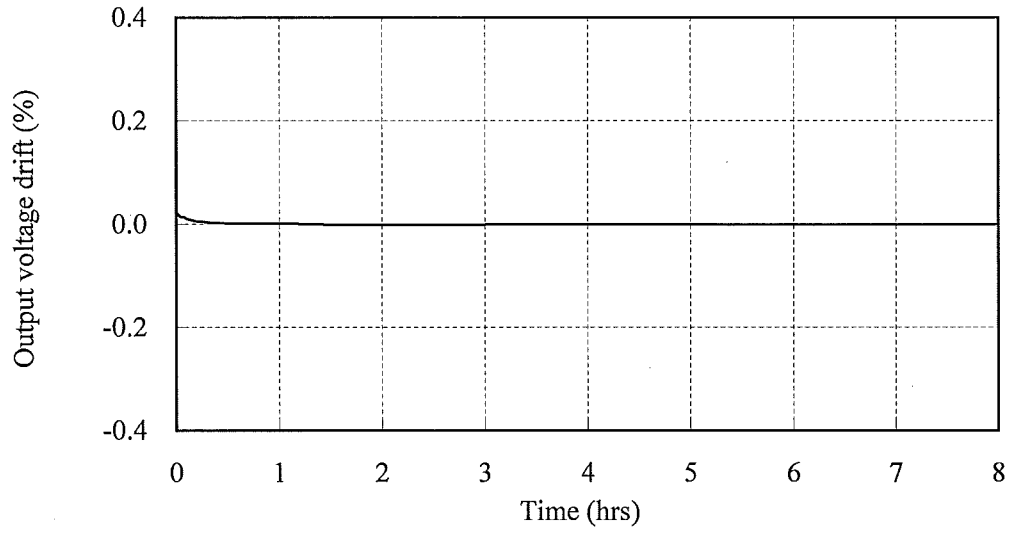
24V



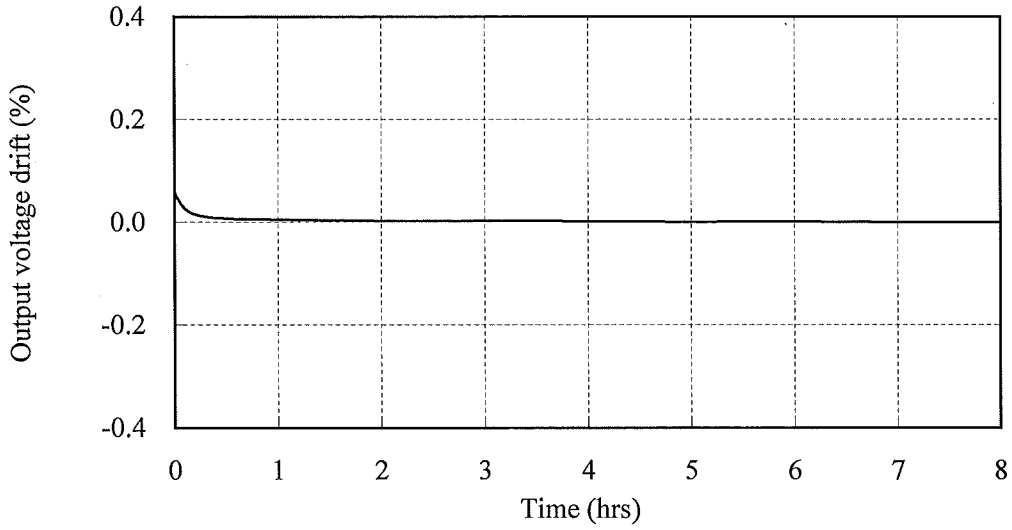
2.2 通電ドリフト特性
Warm up voltage drift characteristics

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

12V



24V

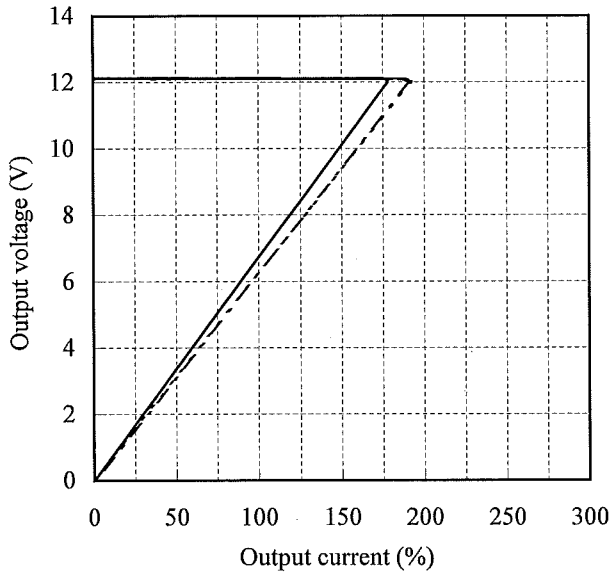


2.3 過電流保護特性
Over current protection (OCP) characteristics

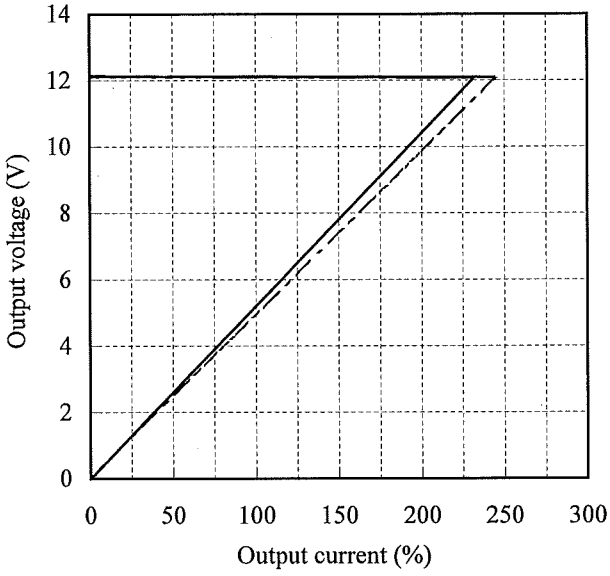
Conditions
Ta : -10 ℃ -----
25 ℃ -·-·-
60 ℃ ——

12V

Vin : 100 VAC

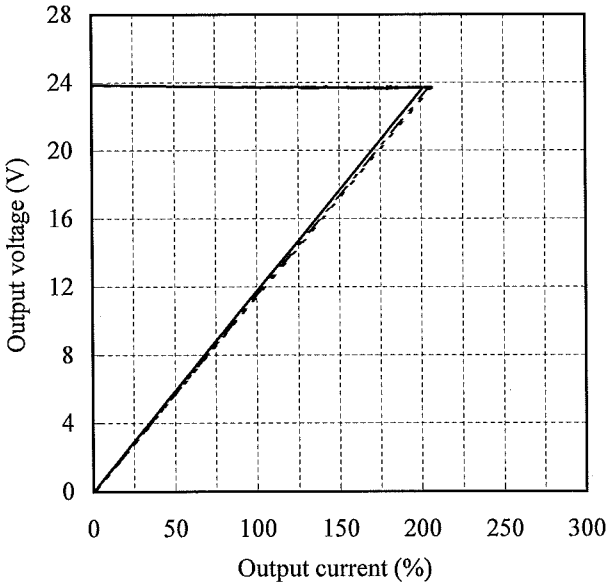


Vin : 200 VAC

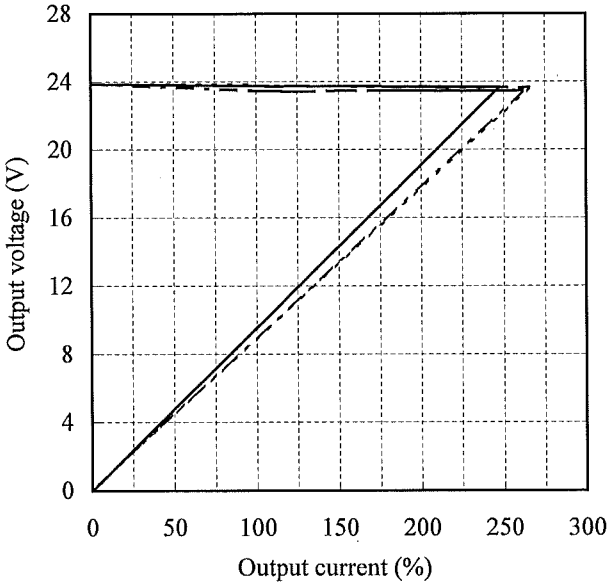


24V

Vin : 100 VAC



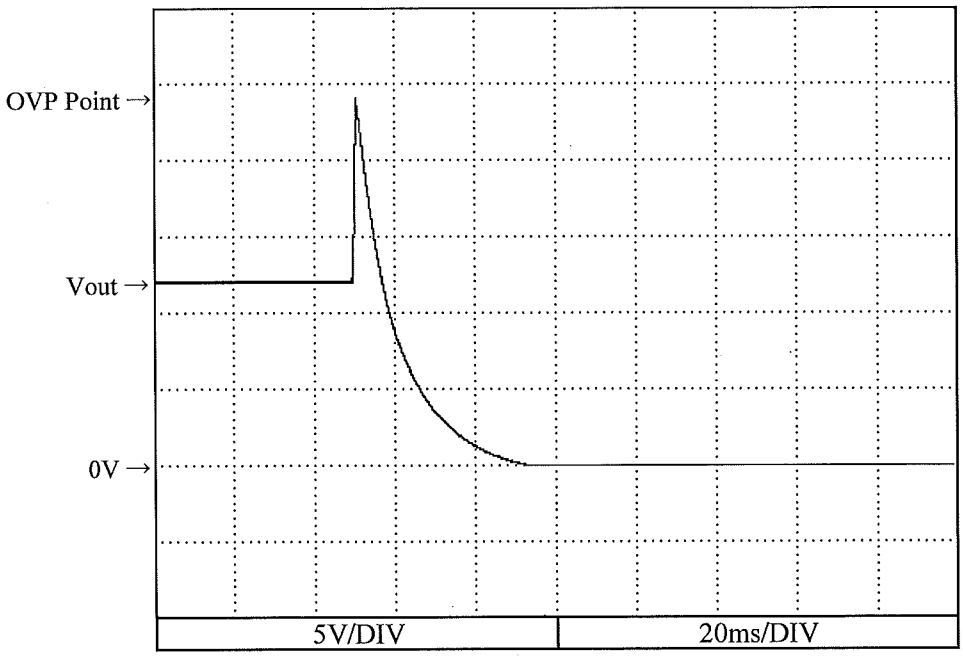
Vin : 200 VAC



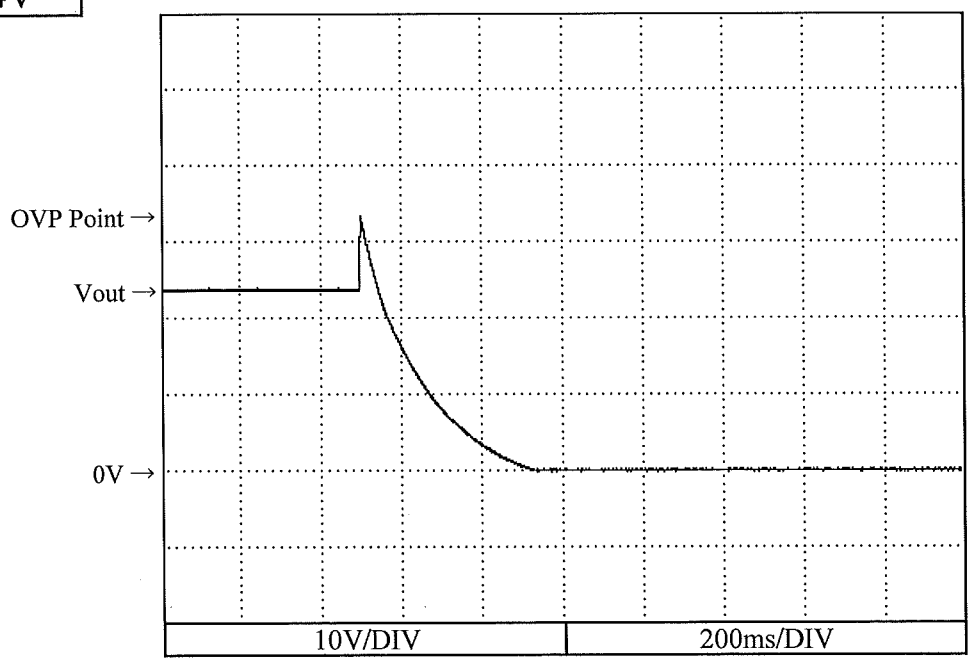
2.4 過電圧保護特性
Over voltage protection (OVP) characteristics

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

12V



24V

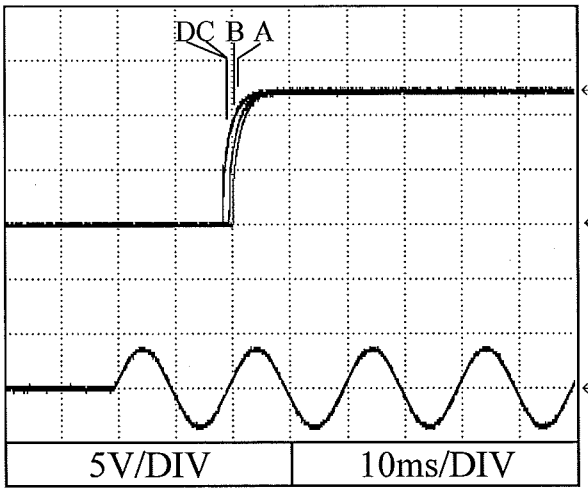


2.5 出力立ち上がり特性
Output rise characteristics

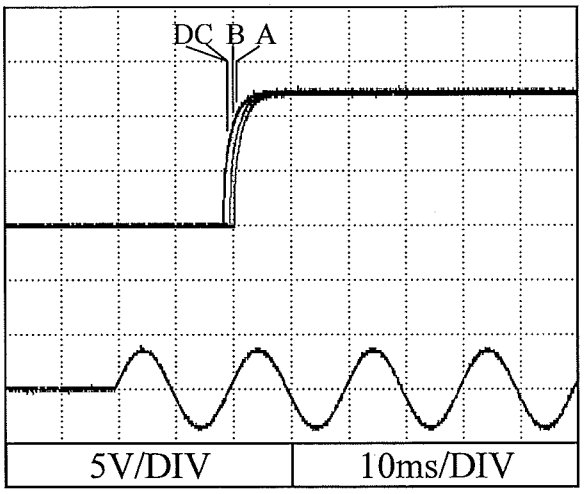
Conditions Vin : 90 VAC (A)
100 VAC (B)
200 VAC (C)
265 VAC (D)
Ta : 25 ℃

12V

Iout : min

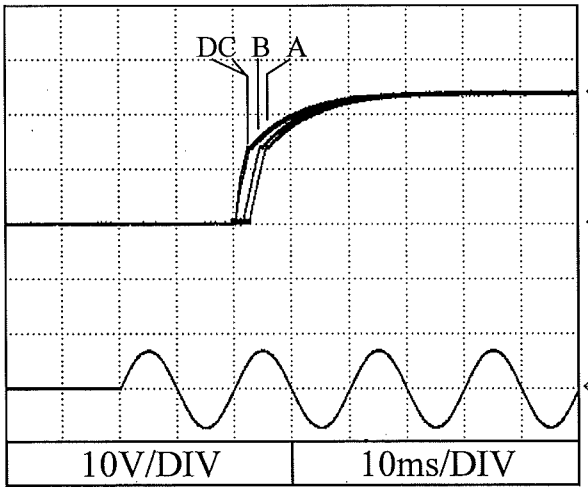


Iout : 100%

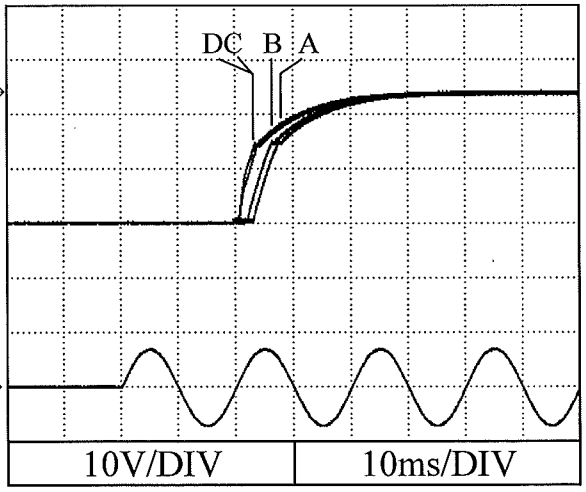


24V

Iout : min



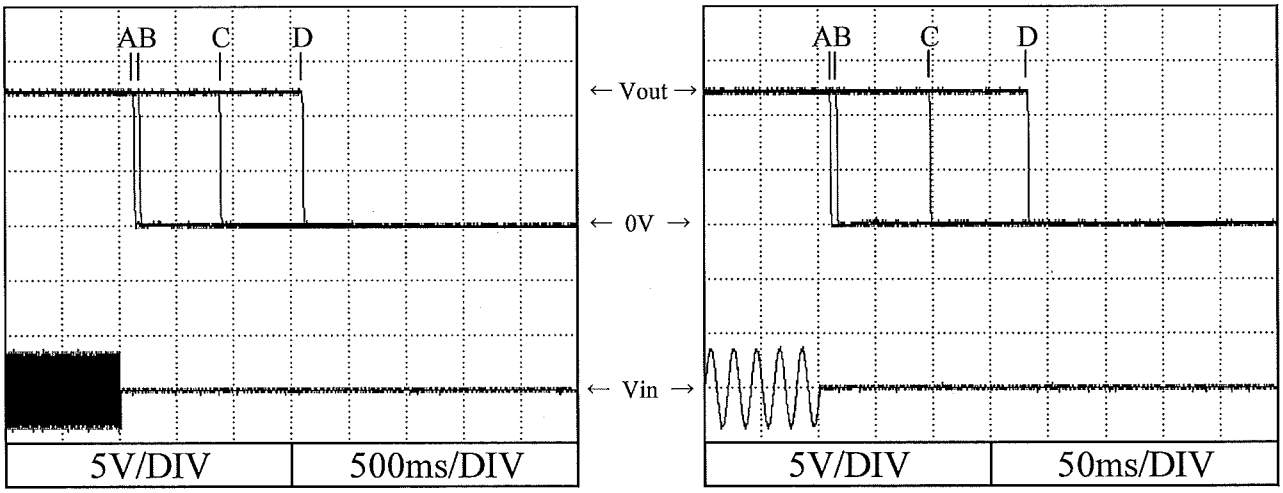
Iout : 100%



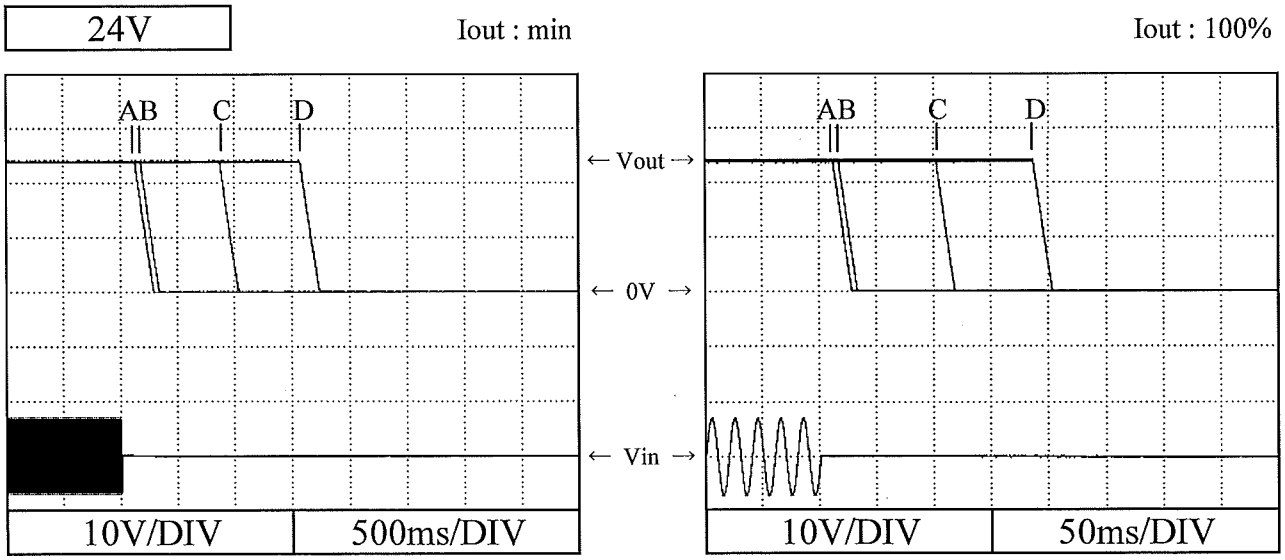
2.6 出力立ち下がり特性
Output fall characteristics

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

12V



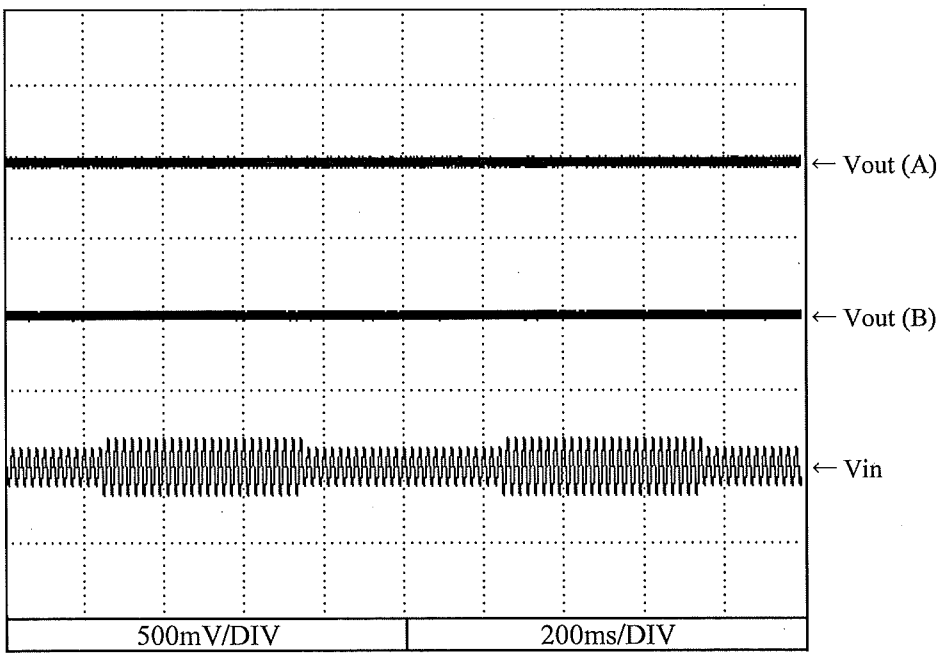
24V



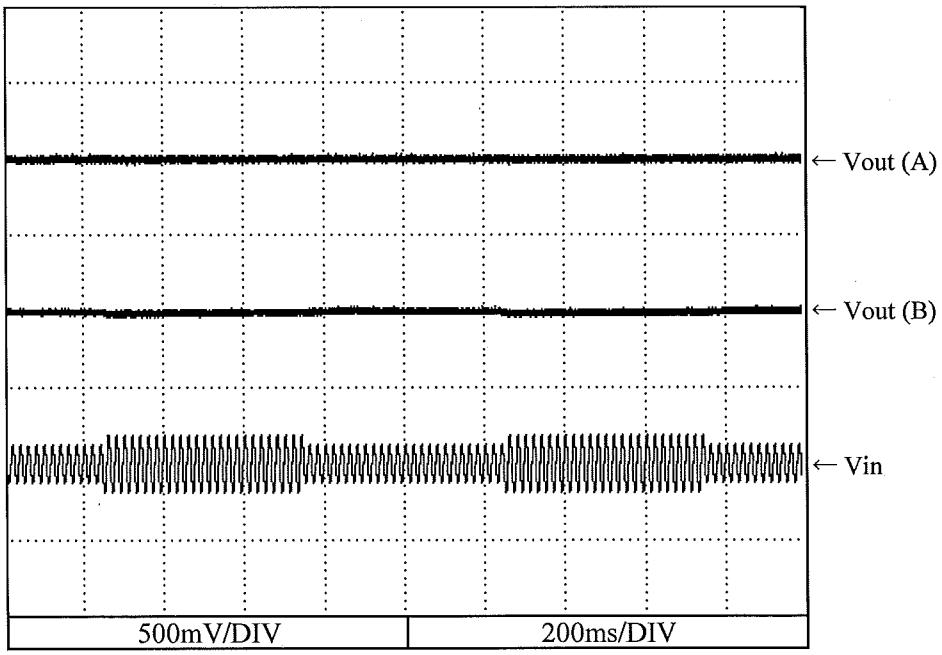
2.7 過渡応答(入力急変)特性
Dynamic line response characteristics

Conditions Vin : 90 VAC ⟷ 132 VAC(A)
170 VAC ⟷ 265 VAC(B)
Iout : 100 %
Ta : 25 ℃

12V



24V



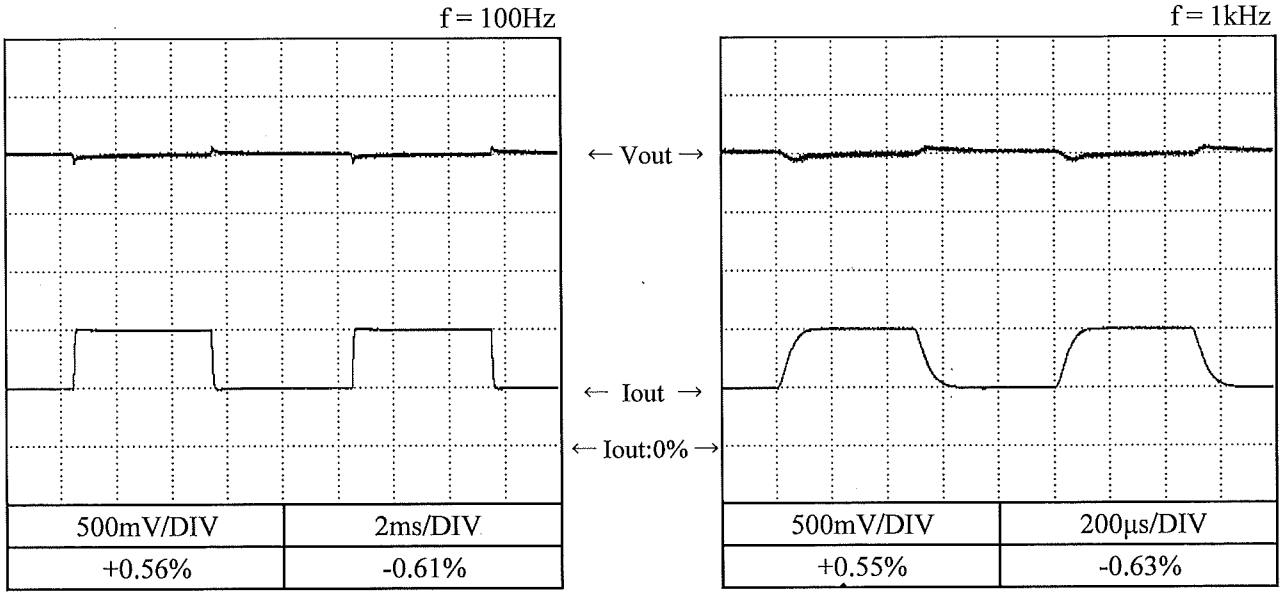
2.8 過渡応答（負荷急変）特性

Dynamic load response characteristics

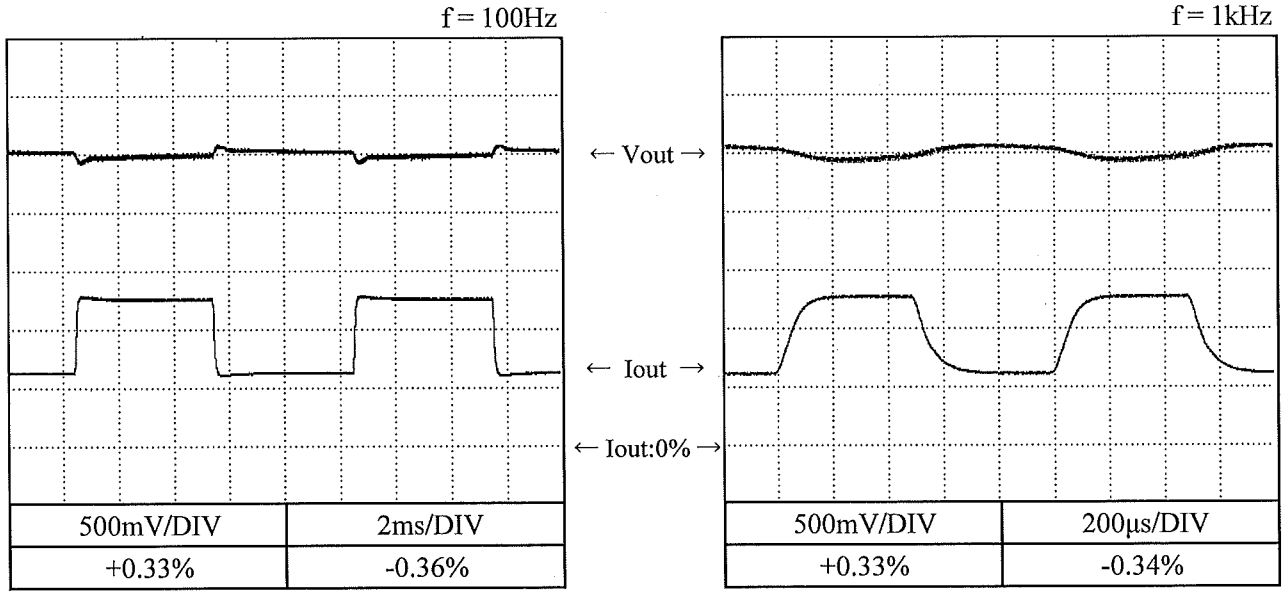
Conditions

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

12V



24V



2.9 入力電圧瞬停特性

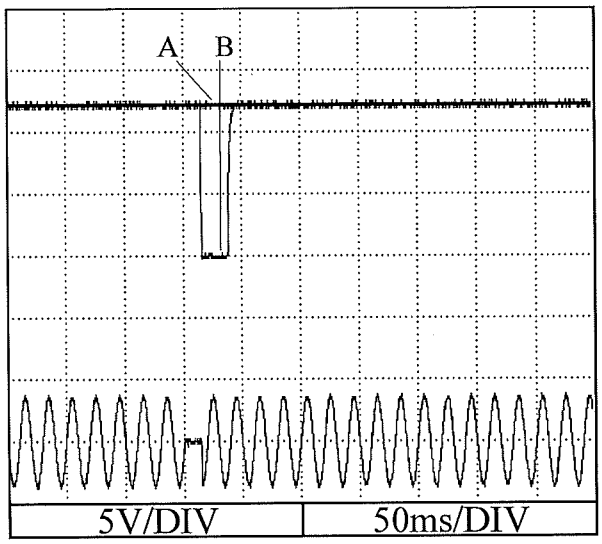
Response to brown out characteristics

Conditions Iout : 100 %
Ta : 25 ℃

12V

Vin : 100VAC

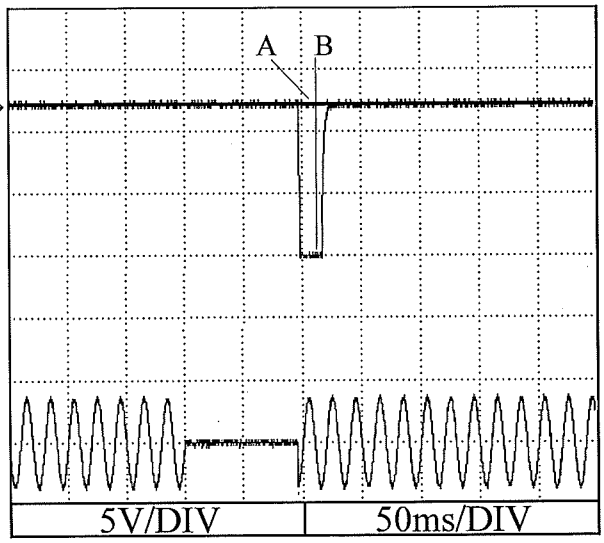
A = 15ms
B = 16ms



← Vout →
← 0V →
← Vin →

Vin : 200VAC

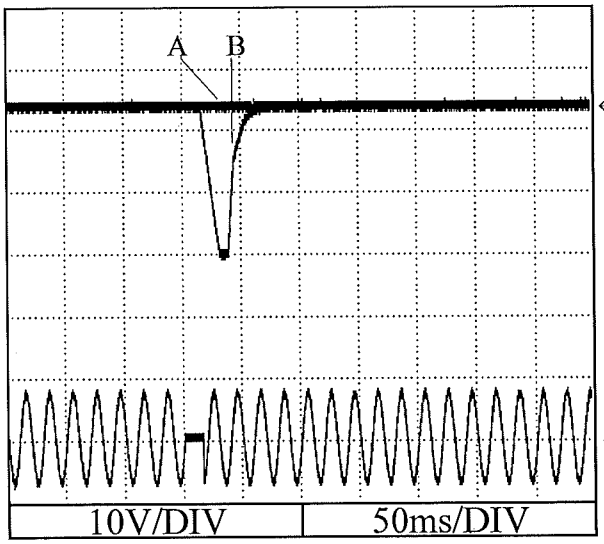
A = 98ms
B = 99ms



24V

Vin : 100VAC

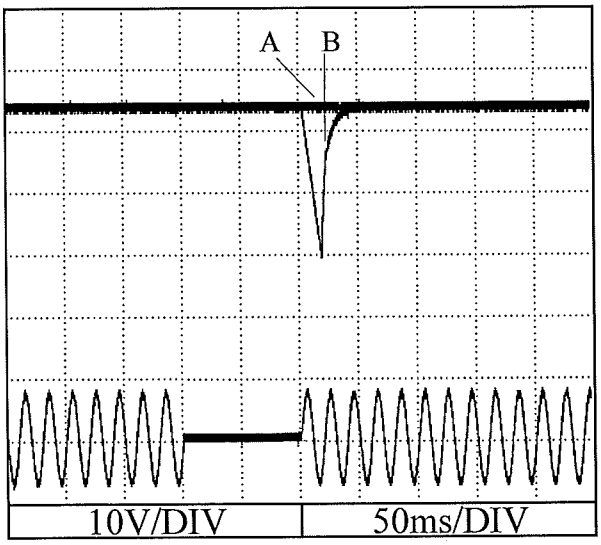
A = 16ms
B = 17ms



← Vout →
← 0V →
← Vin →

Vin : 200VAC

A = 102ms
B = 103ms

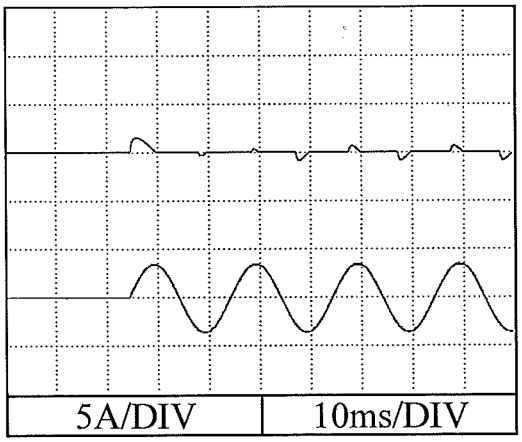


2.10 入力サージ電流（突入電流）波形
Inrush current waveform

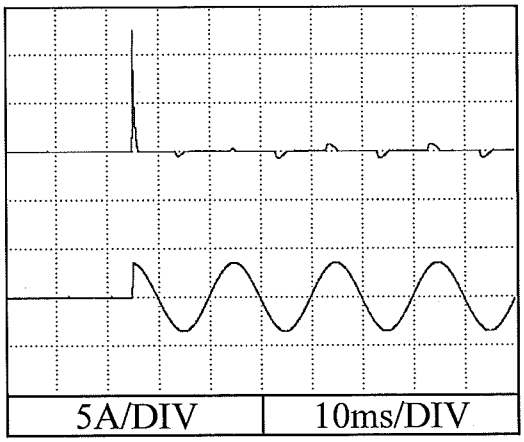
12V

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

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

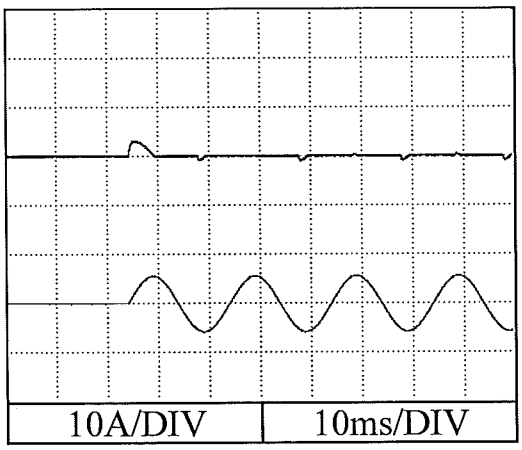


Switch on phase angle of input AC voltage
ϕ = 90°

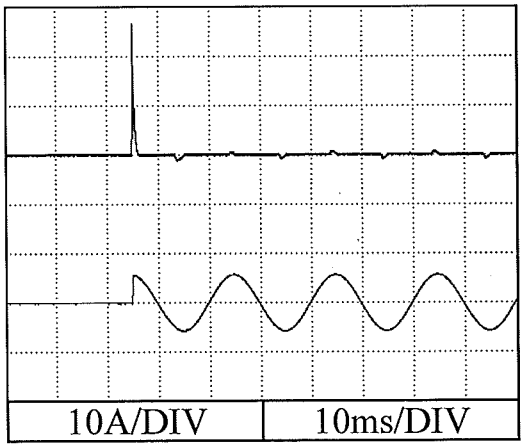


Conditions Vin : 200 VAC
Iout : 100 %
Ta : 25 ℃

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



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



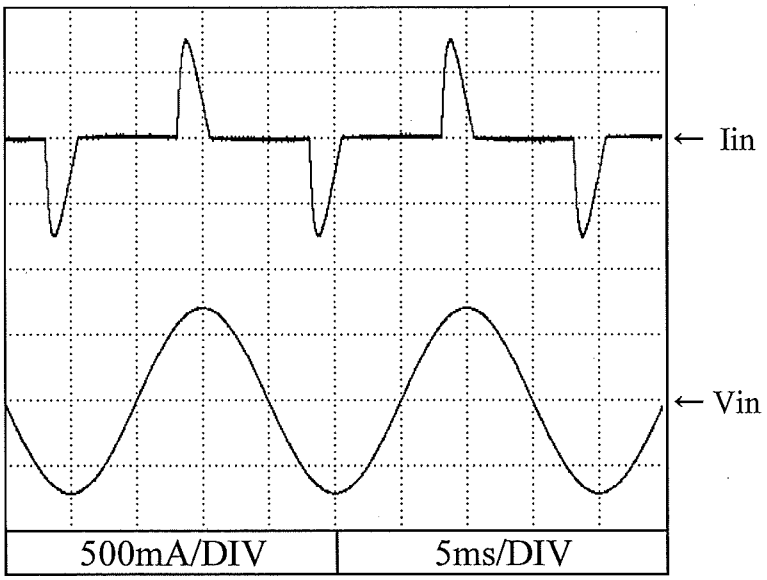
2.11 入力電流波形

Input current waveform

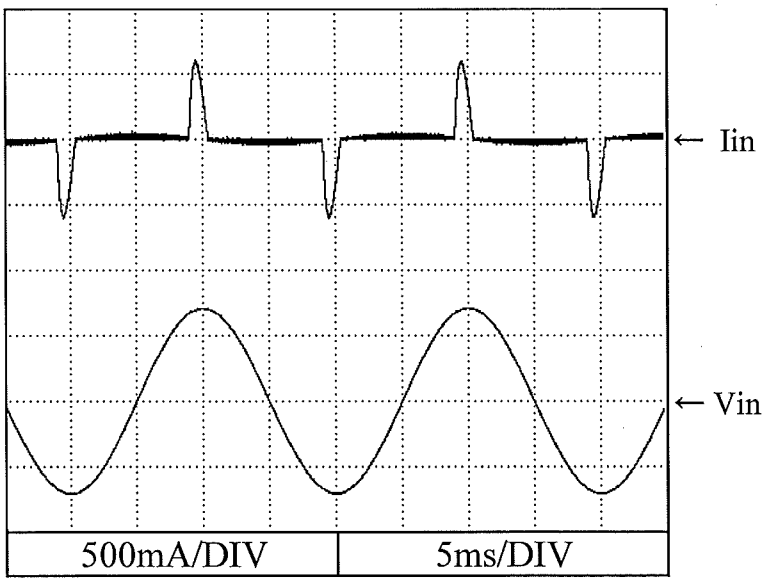
Conditions Iout : 100 %
Ta : 25 ℃

12V

Vin : 100 VAC



Vin : 200 VAC

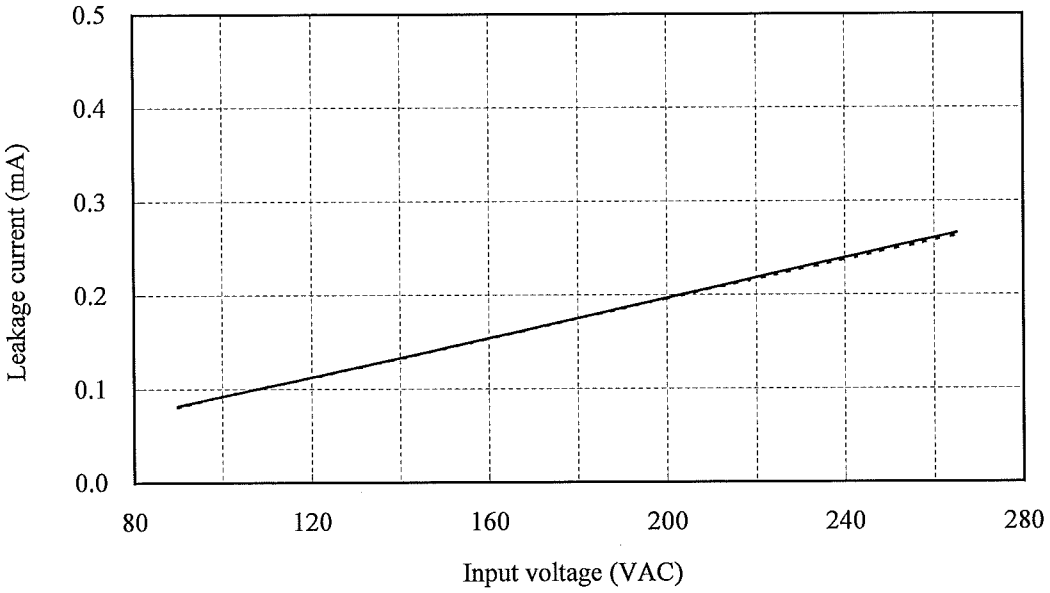


2.12 リーク電流特性
Leakage current characteristics

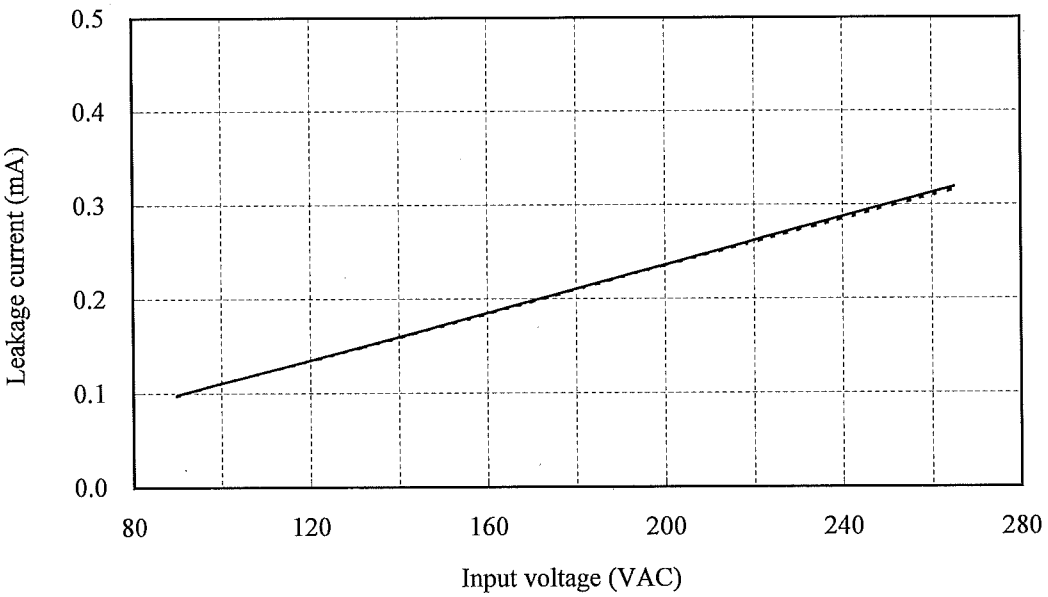
Conditions Iout : min ------
100 % ——
Ta : 25 ℃
Equipment used : 3156 (HIOKI)

12V

f : 50 Hz



f : 60 Hz

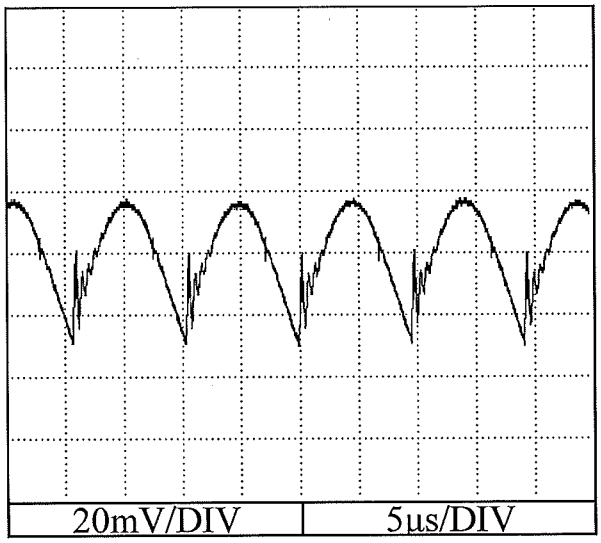


2.13 出力リップル、ノイズ波形
Output ripple and noise waveform

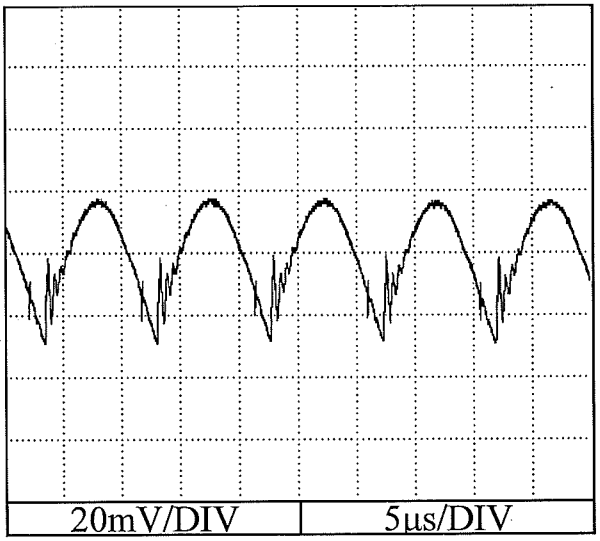
Conditions Iout : 100 %
Ta : 25 ℃

12V

Vin : 100VAC

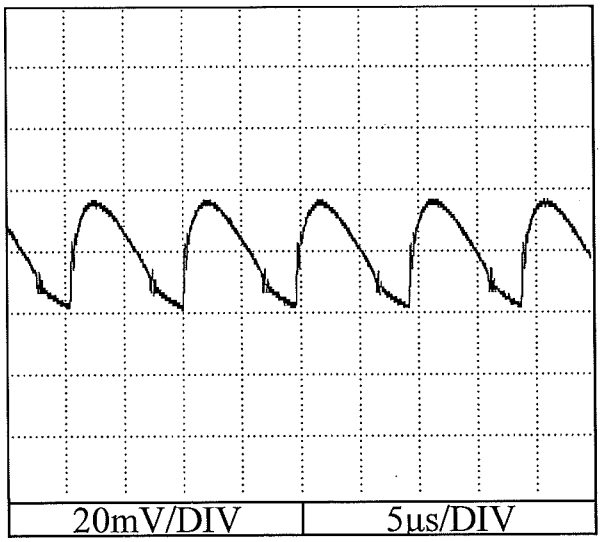


Vin : 200VAC

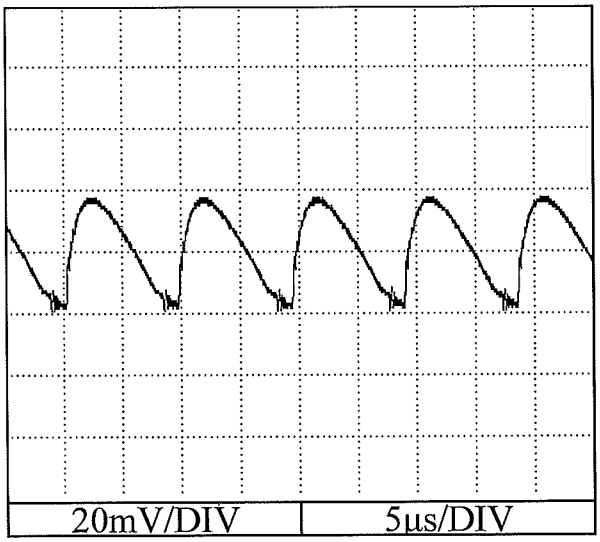


24V

Vin : 100VAC



Vin : 200VAC



2.14 EMI特性

Electro-Magnetic Interference characteristics

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

雑音端子電圧

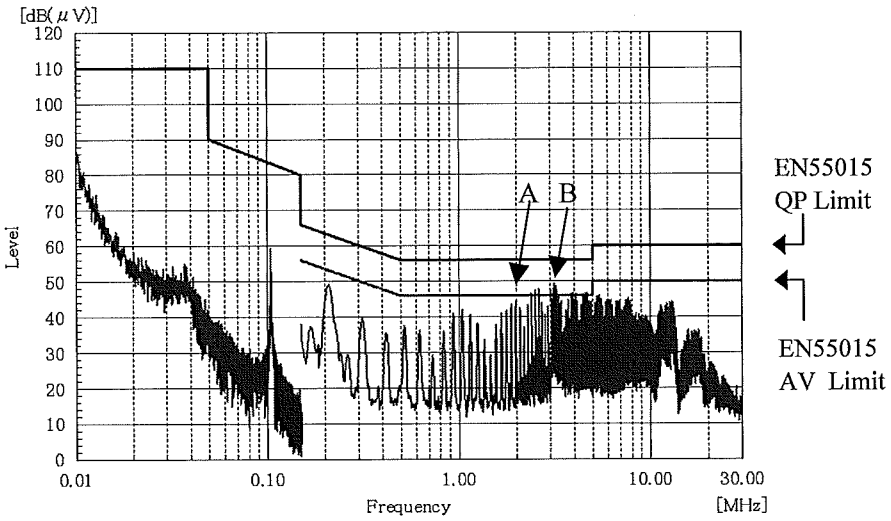
Conducted Emission

12V

Phase : N

Ref. Data	Point A (1.98MHz) Limit (dBuV)	Measure (dBuV)
QP	56.0	44.3
AV	46.0	40.4

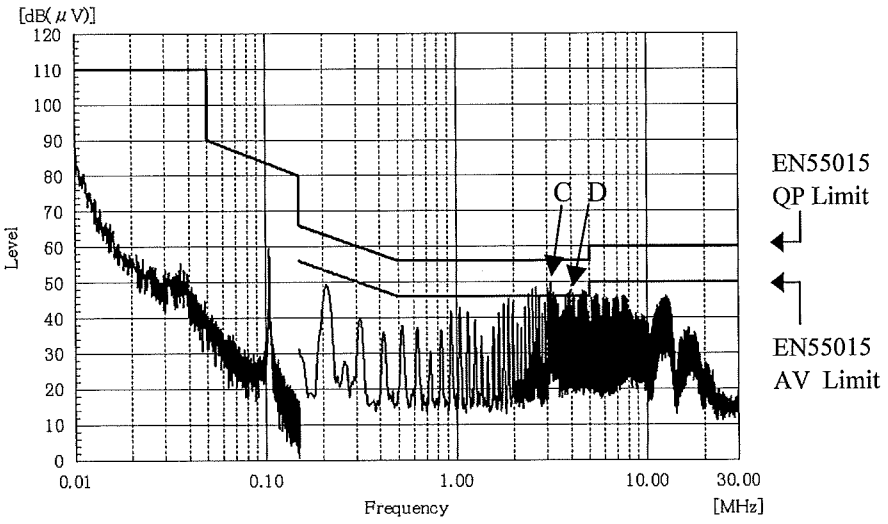
Ref. Data	Point B (3.13MHz) Limit (dBuV)	Measure (dBuV)
QP	56.0	45.5
AV	46.0	39.3



Phase : L

Ref. Data	Point C (3.13MHz) Limit (dBuV)	Measure (dBuV)
QP	56.0	46.2
AV	46.0	40.0

Ref. Data	Point D (3.97MHz) Limit (dBuV)	Measure (dBuV)
QP	56.0	46.3
AV	46.0	40.9



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.

2.14 EMI特性

Electro-Magnetic Interference characteristics

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

雑音端子電圧

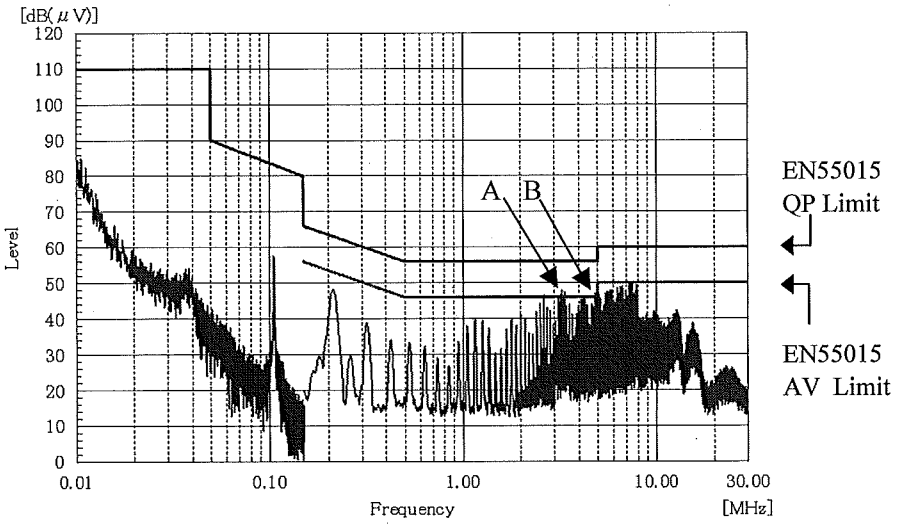
Conducted Emission

24V

Phase : N

Ref. Data	Point A (3.37MHz) Limit (dBuV)	Measure (dBuV)
QP	56.0	42.5
AV	46.0	37.5

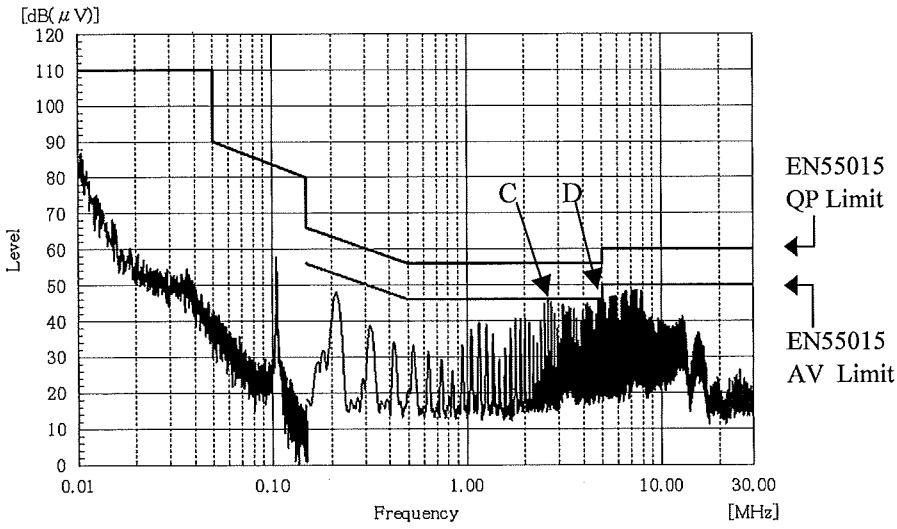
Ref. Data	Point B (4.85MHz) Limit (dBuV)	Measure (dBuV)
QP	56.0	45.2
AV	46.0	39.9



Phase : L

Ref. Data	Point C (2.64MHz) Limit (dBuV)	Measure (dBuV)
QP	56.0	42.2
AV	46.0	36.2

Ref. Data	Point D (4.96MHz) Limit (dBuV)	Measure (dBuV)
QP	56.0	44.8
AV	46.0	39.2



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.

2.14 EMI特性

Electro-Magnetic Interference characteristics

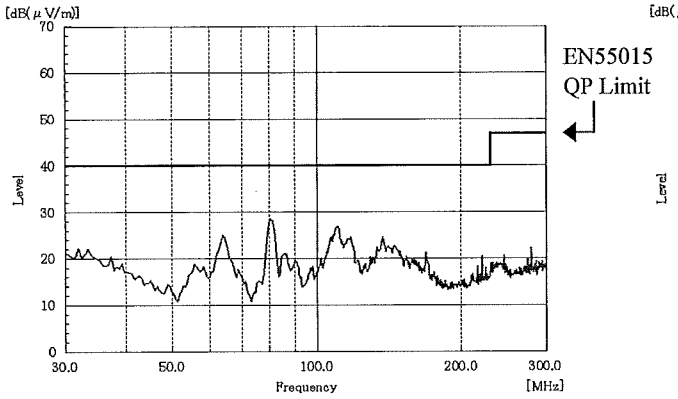
Conditions Vin : 100 VAC
Iout : 100 %
Ta : 25 ℃

雑音電界強度

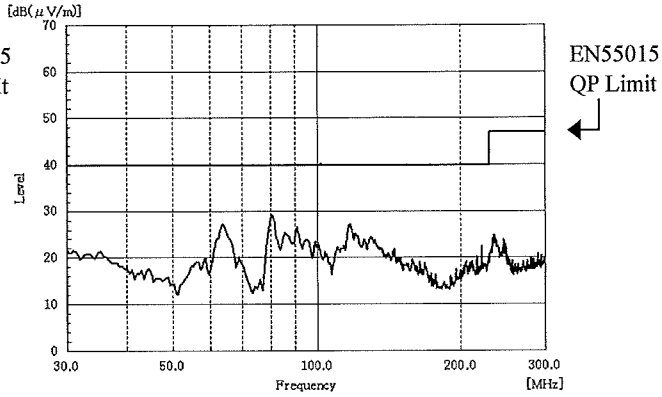
Radiated Emission

12V

HORIZONTAL

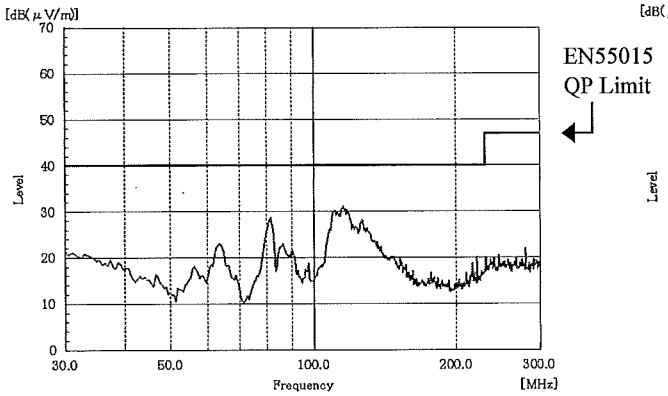


VERTICAL

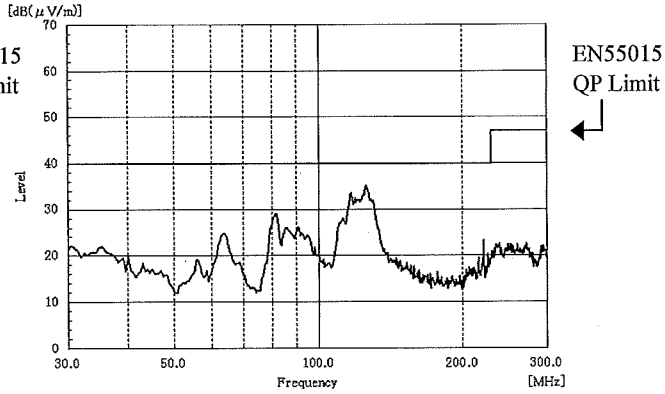


24V

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.

2.14 EMI特性

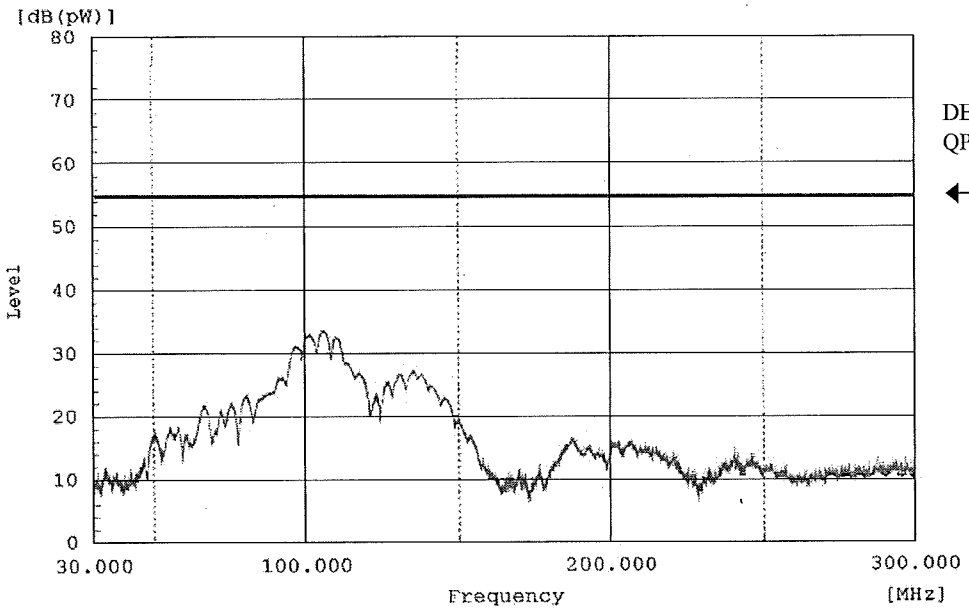
Electro-Magnetic Interference characteristics

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

妨害波電力

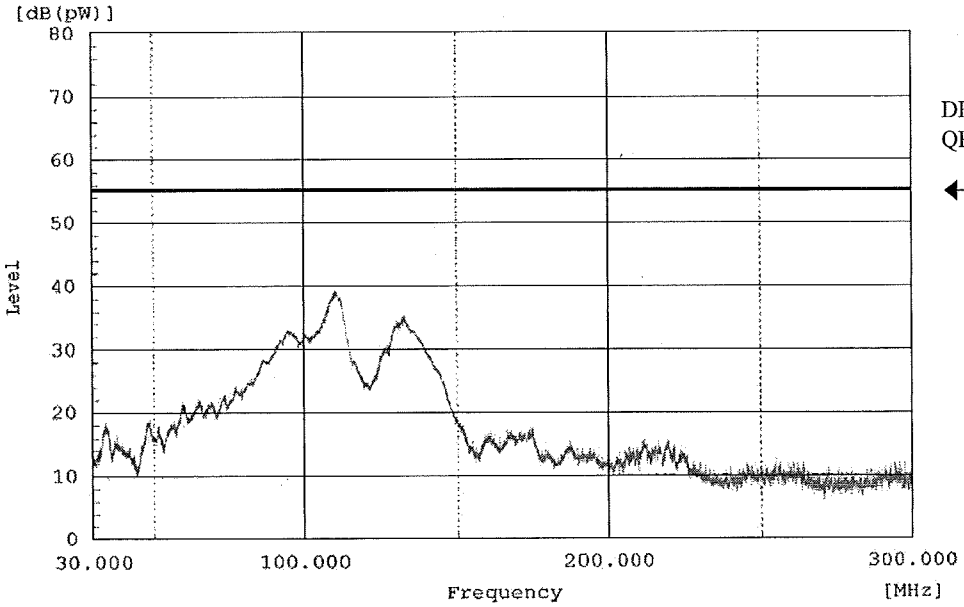
Disturbance Power

12V



DENAN Appendix 8
QP Limit

24V



DENAN Appendix 8
QP Limit

表示はピーク値

Indication is peak values.