PFE1000F

EVALUATION DATA

型式データ

DWG.NO. C251-53-01		
承認	査閲	担当
21.Oct.'08	H. Kawagoe 21, Oct, '08	K. Iwaya 20, Oct. '08

DENSEI-LAMBDA

INDEX

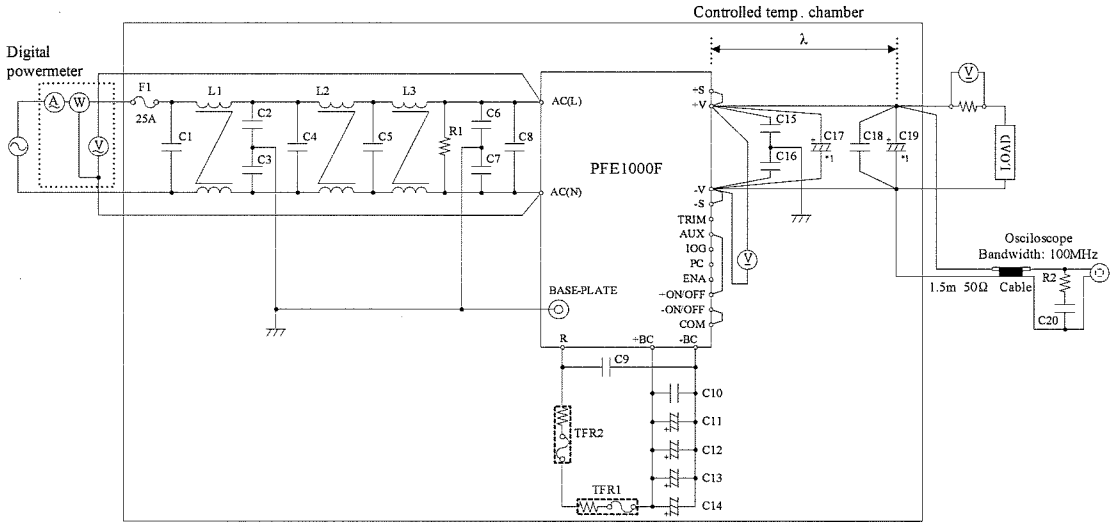
使用記号

Terminology used		Definition	
Vin	.....	入力電圧	Input Voltage
Vo	.....	出力電圧	Output Voltage
Vcnt	.....	CNT電圧	CNT Voltage
Iin	.....	入力電流	Input Current
Io	.....	出力電流	Output Current
Tbp	.....	ベースプレート温度	Base plate Temperature
Ta	.....	周囲温度	Ambient Temperature
f	.....	周波数	Frequency

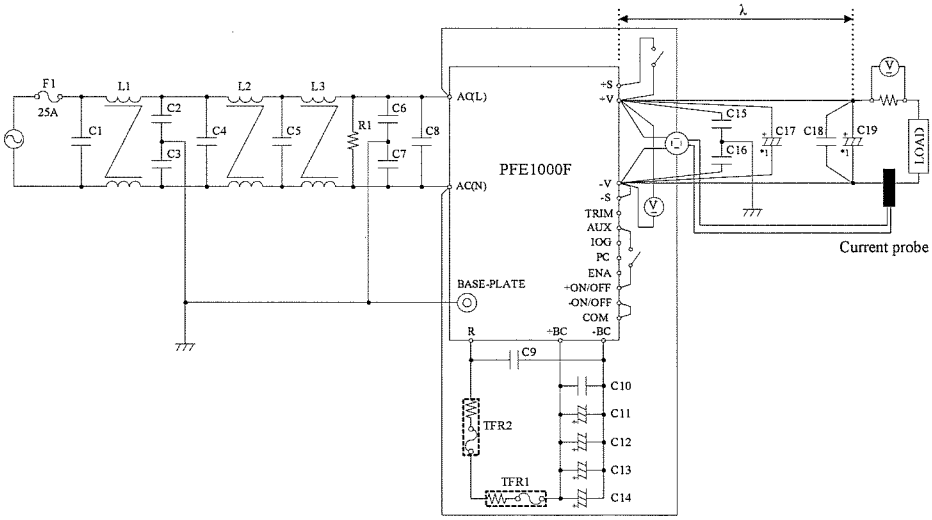
1. 測定方法　　Evaluation Method

1.1 測定回路　　Measurement Circuits

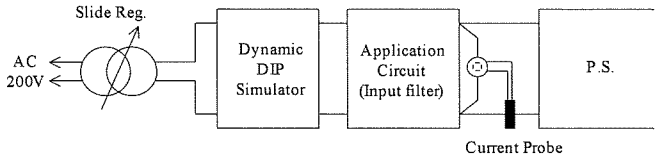
(1) 静特性、出力リップル、ノイズ波形、過電流保護機能
Steady state characteristics, output ripple noise waveform and over current protection



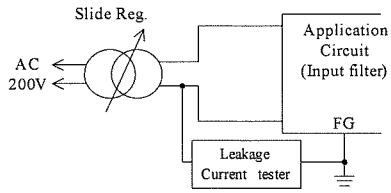
(2) 過渡応答、過電圧保護機能、その他
Dynamic characteristics, over voltage protection and other characteristics



Inrush current characteristics



Leakage current characteristics



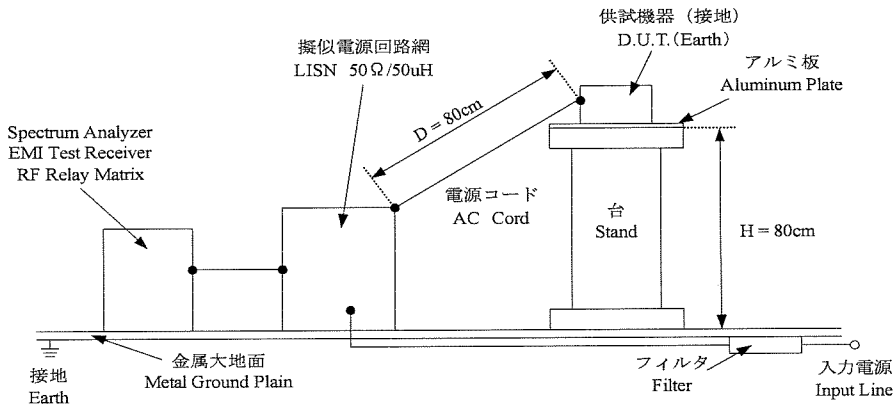
C1, C4, C5, C8:	1uF Film Capacitor	C17, C19:	12V-1000uF Electrolytic Capacitor
C2, C3:	470pF Ceramic Capacitor		28V- 470uF Electrolytic Capacitor
C6, C7:	4700pF Ceramic Capacitor		48V- 220uF Electrolytic Capacitor
C9, C10:	1uF Film Capacitor	R1:	0.5W 470kΩ
C11, C12, C13, C14:	390uF Electrolytic Capacitor	R2:	50Ω
C15, C16:	0.033uF Film Capacitor	L1, L2, L3:	2mH
C18:	2.2uF Ceramic Capacitor	λ:	50mm
C20:	4700pF Ceramic Capacitor	TFR1, TFR2:	5.1Ω 139°C

==== Note ====

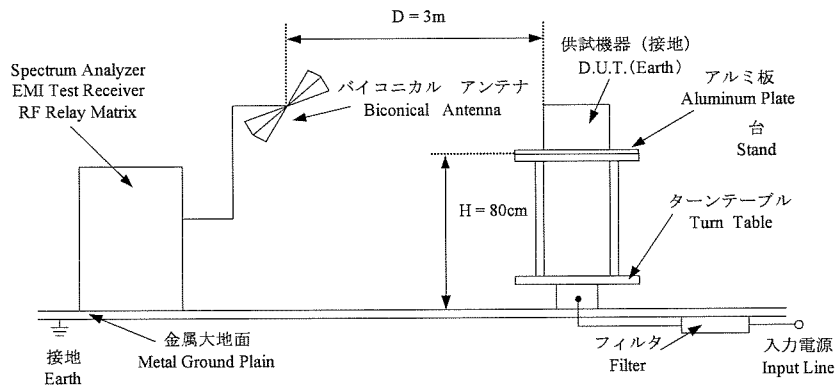
*1: If the ambient temperature is less than -20°C, use twice of the recommended capacitor above.

(3) EMI特性 Electro-Magnetic Interference characteristics

(a) 雑音端子電圧 (帰還ノイズ) Conducted Emission Noise

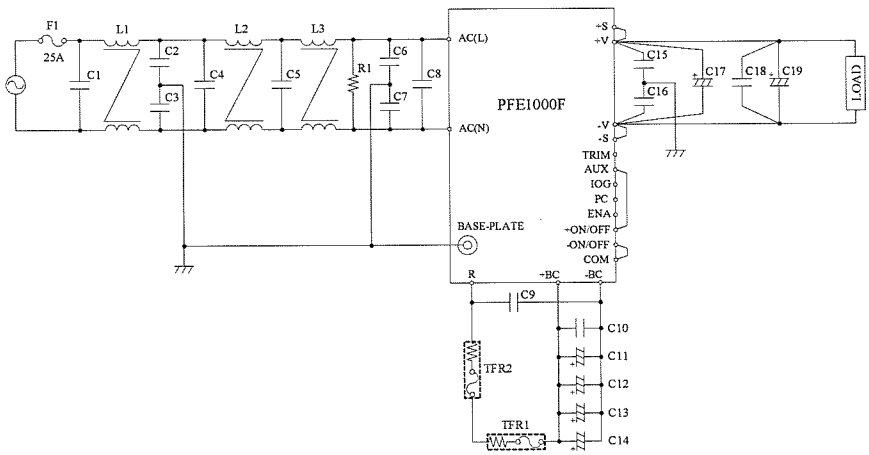


(b) 雑音電界強度(輻射ノイズ) Radiated Emission Noise



* Shielded cable used to input and output cable.

VCCI class A対応アプリケーションシステム
VCCI class A application system



C1, C4, C5, C8:	1uF Film Capacitor	C17, C19:	12V-1000uF Electrolytic Capacitor
C2, C3:	470pF Ceramic Capacitor		28V- 470uF Electrolytic Capacitor
C6, C7:	4700pF Ceramic Capacitor		48V- 220uF Electrolytic Capacitor
C9, C10:	1uF Film Capacitor	R1:	0.5W 470kΩ
C11, C12, C13, C14:	390uF Electrolytic Capacitor	L1, L2, L3:	2mH
C15, C16:	0.033uF Film Capacitor	TFR1, TFR2:	5.1Ω 139°C
C18:	2.2uF Ceramic Capacitor		

1.2 使用測定機器　　List of equipment used

	EQUIPMENT USED	MANUFACTURER	MODEL NO.
1	DIGITAL PHOSPHOR OSCILLOSCOPE	TEKTRONIX	TDS3012
2	DIGITAL STORAGE OSCILLOSCOPE	IWATSU-LECROY	DS-4354M
3	DIGITAL POWER METER	YOKOGAWA ELECT.	WT210
4	DATA ACQUISITION / SWITCH UNIT	AGILENT	34970A
5	CURRENT PROBE AMPLIFIER	TEKTRONIX	TM502A
6	CURRENT PROBE	TEKTRONIX	A6303
7	SHUNT RESISTER	YOKOGAWA ELECT.	2215
8	CONTROLLED TEMP. CHAMBER	ESPEC CORP.	SU-641
9	SPECTRUM ANALYZER	ROHDE & SCHWARZ	FSA
10	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESHS10
11	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESVS10
12	RF RELAY MATRIX	ROHDE & SCHWARZ	PSU
13	AMN	KYORITU DENSHI	KNW-242
14	ANTENNA(BICONICAL ANTENNA)	SCHWARZBECK	BBA9106
15	DYNAMIC DUMMY LOAD	TAKASAGO	FK-1000L
16	AC POWER SUPPLY	KIKUSUI	PCR4000L
17	LINE SUG SIMULATOR	TAKAMISAWA	PSA-210
18	TRANSFOMER	MATSUNAGA	3WTC-50K
19	SLIDE REGULATOR	MATSUNAGA	S3-24100
20	A.C. LEAKAGE CURRENT TESTER	SIMPSON	229-2

2. 特性データ Characteristics

2.1 静特性 Steady state data

(1) 入力・負荷・温度変動 Regulation - line and load, Temperature drift

12V

1. Regulation - line and load

Condition Tbp : 25℃

Iout \ Vin	85VAC	100VAC	200VAC	265VAC	line regulation	
0%	12.020V	12.020V	12.021V	12.021V	1mV	0.008%
50%	12.022V	12.022V	12.023V	12.023V	1mV	0.008%
100%	12.025V	12.025V	12.026V	12.026V	1mV	0.008%
load	5mV	5mV	5mV	5mV		
regulation	0.042%	0.042%	0.042%	0.042%		

2. Temperature drift

Conditions Vin=100VAC
Iout=100%

Tbp	-40℃	+25℃	+100℃	temperature stability	
Vout	11.901V	12.025V	12.092V	191mV	1.592%

28V

1. Regulation - line and load

Condition Tbp : 25℃

Iout \ Vin	85VAC	100VAC	200VAC	265VAC	line regulation	
0%	28.091V	28.091V	28.094V	28.092V	3mV	0.011%
50%	28.092V	28.092V	28.095V	28.093V	3mV	0.011%
100%	28.095V	28.095V	28.097V	28.096V	3mV	0.011%
load	4mV	4mV	3mV	4mV		
regulation	0.014%	0.014%	0.011%	0.014%		

2. Temperature drift

Conditions Vin=100VAC
Iout=100%

Tbp	-40℃	+25℃	+85℃	temperature stability	
Vout	27.900V	28.095V	28.253V	353mV	1.261%

48V

1. Regulation - line and load

Condition Tbp : 25℃

Iout \ Vin	85VAC	100VAC	200VAC	265VAC	line regulation	
0%	48.130V	48.130V	48.133V	48.131V	3mV	0.006%
50%	48.131V	48.132V	48.134V	48.132V	3mV	0.006%
100%	48.132V	48.134V	48.136V	48.134V	4mV	0.008%
load	2mV	4mV	3mV	3mV		
regulation	0.004%	0.008%	0.006%	0.006%		

2. Temperature drift

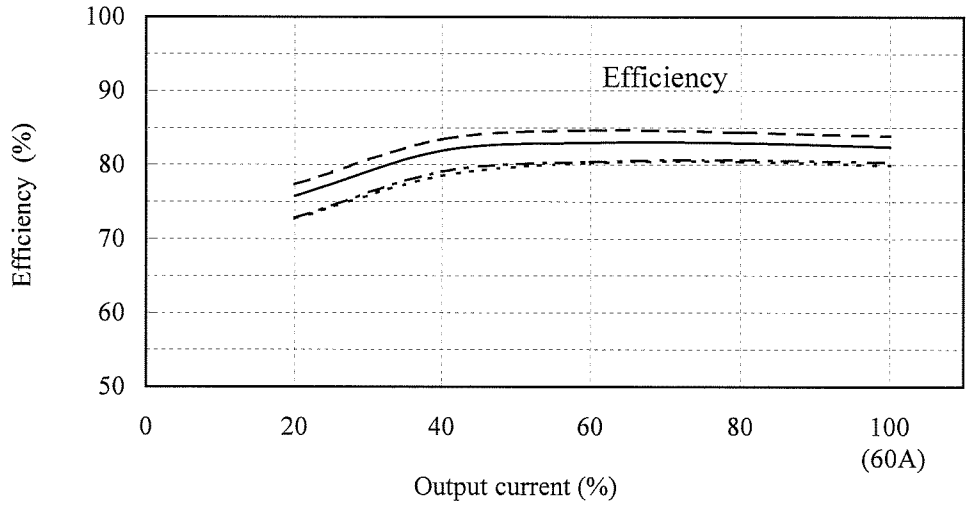
Conditions Vin=100VAC
Iout=100%

Tbp	-40℃	+25℃	+85℃	temperature stability	
Vout	47.695V	48.134V	48.354V	659mV	1.373%

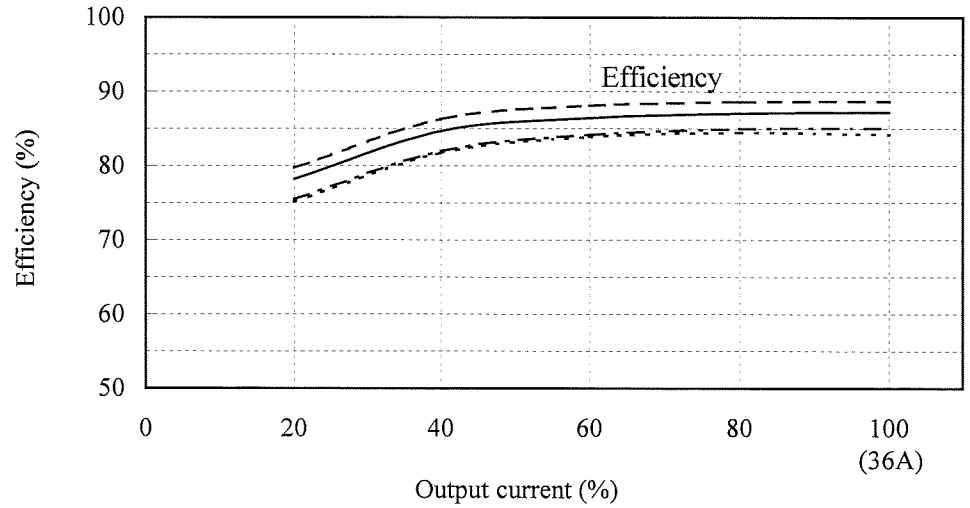
(2) 効率 対 出力電流
Efficiency vs. Output current

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

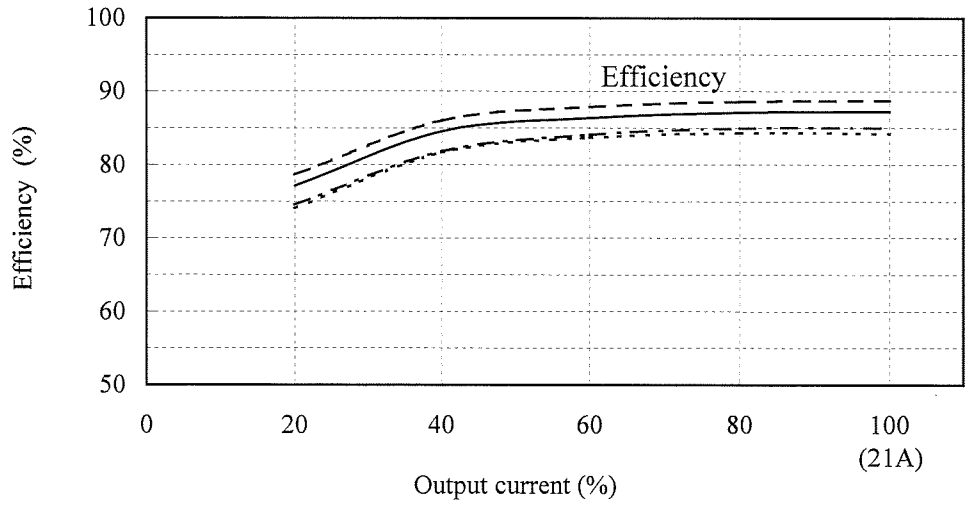
12V



28V



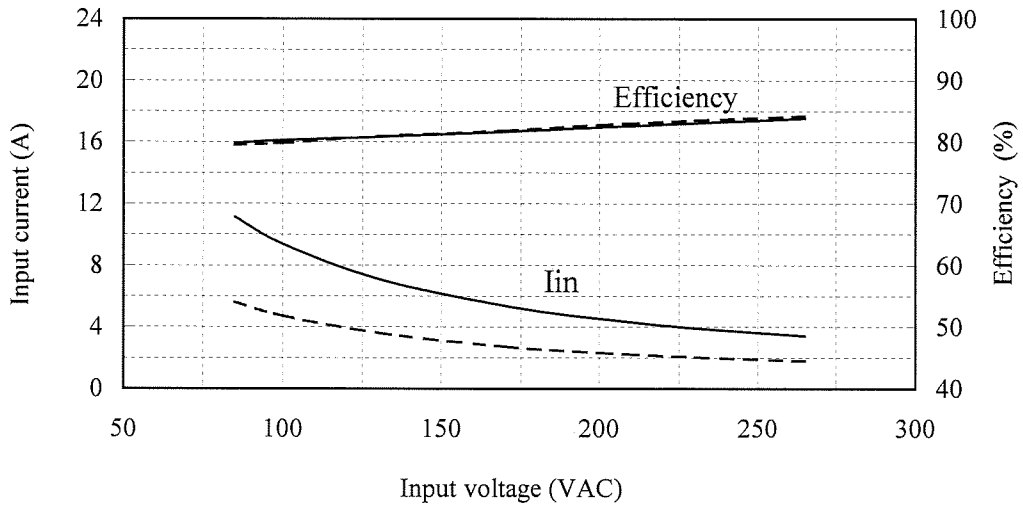
48V



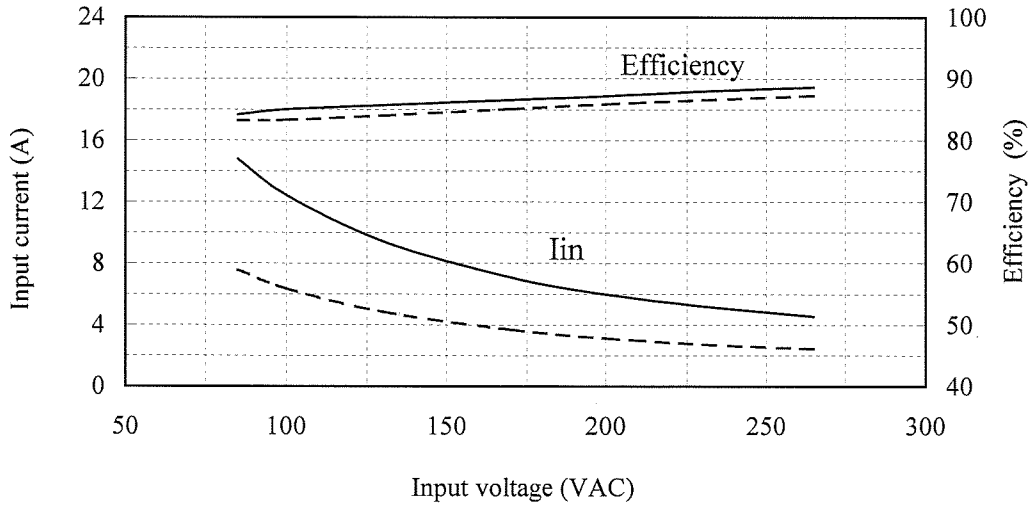
(3) 入力電流・効率 対 入力電圧
Input current and Efficiency vs. Input voltage

Conditions Io : 50 % ----
: 100 % ——
Tbp : 25 ℃

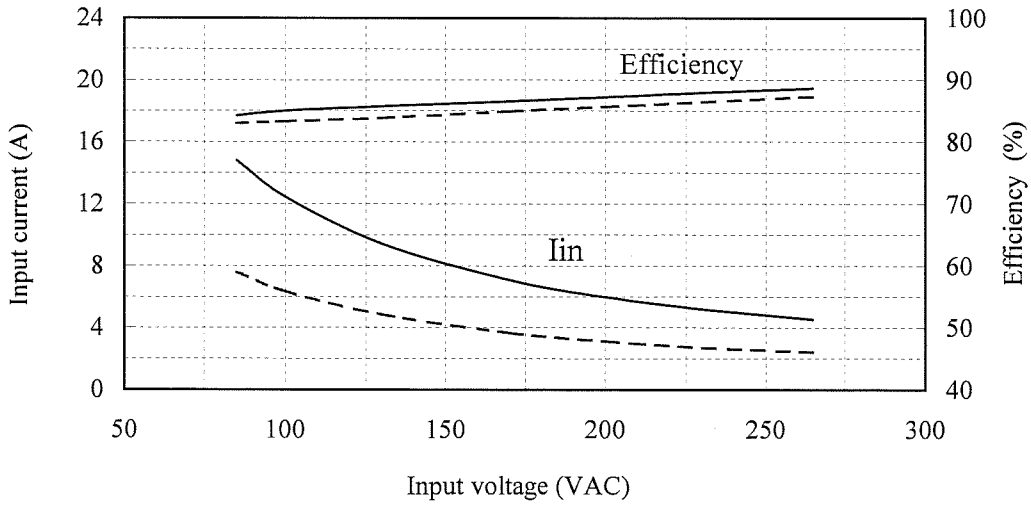
12V



28V



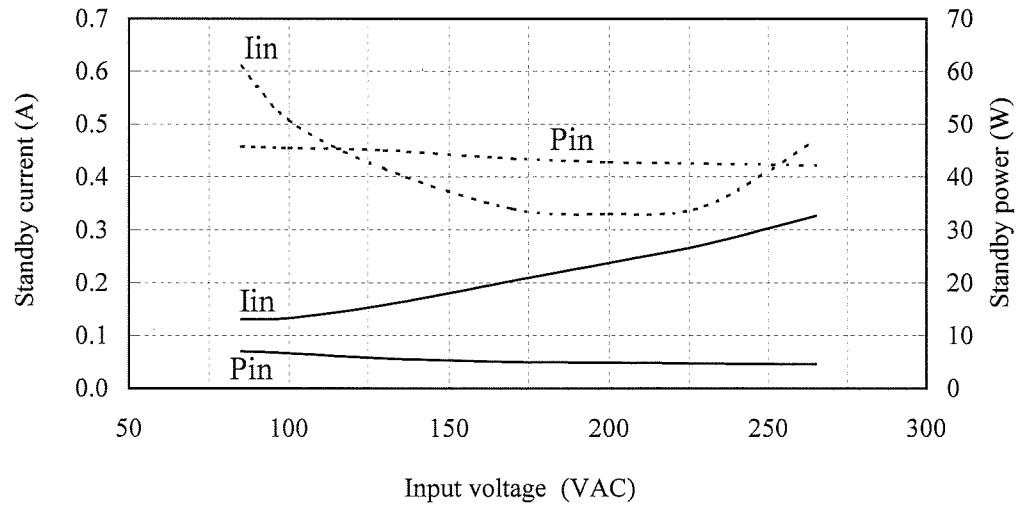
48V



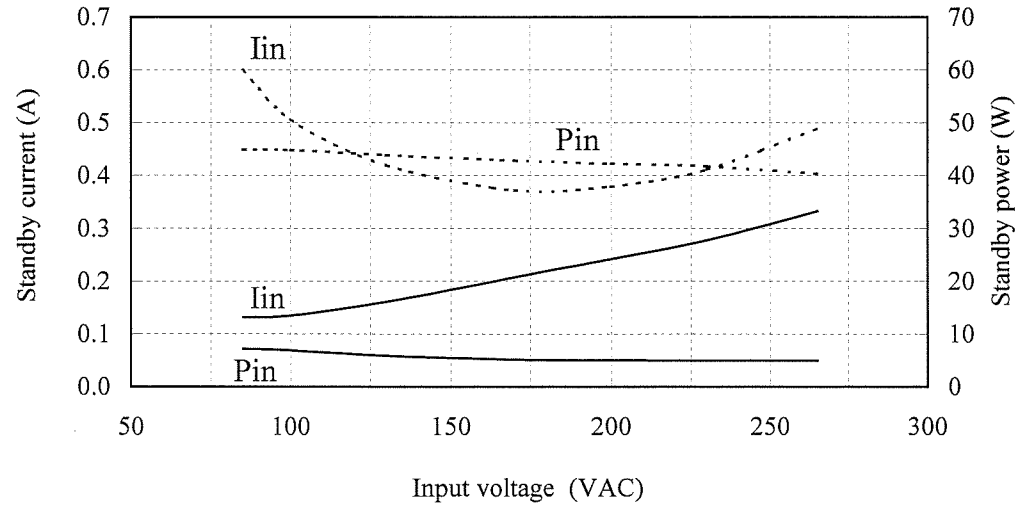
(4) 待機電流・電力特性
Standby current and power characteristics

Conditions No load ------
Control OFF ——
Tbp : 25 ℃

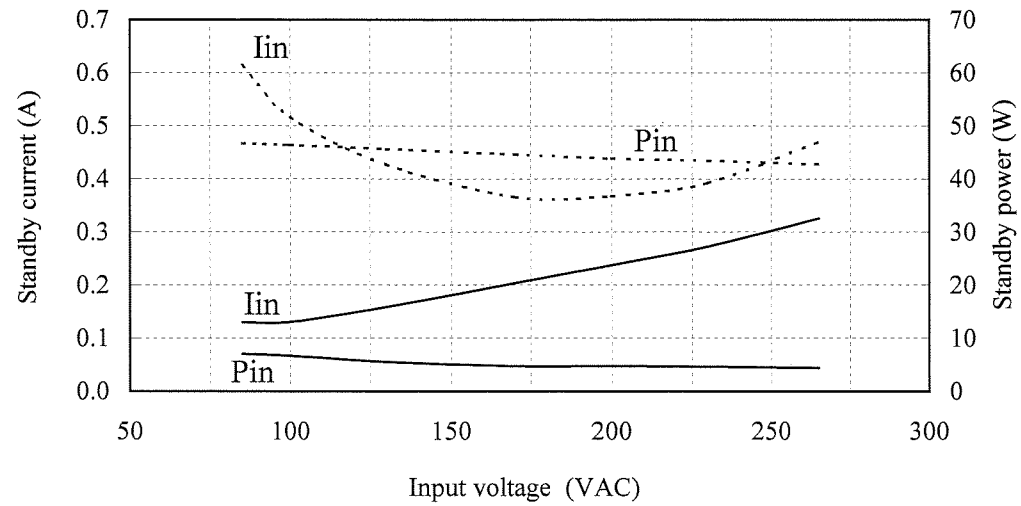
12V



28V



48V

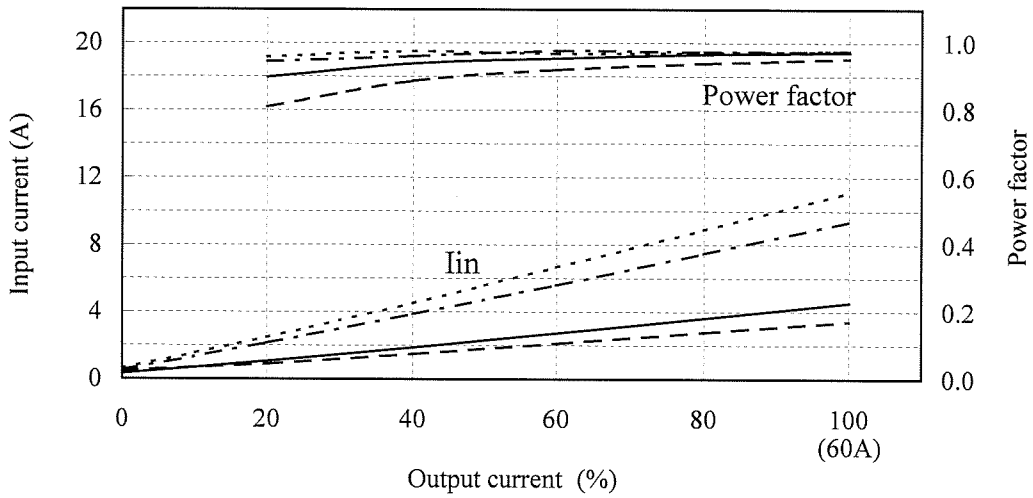


(5) 入力電流・力率 対 出力電流

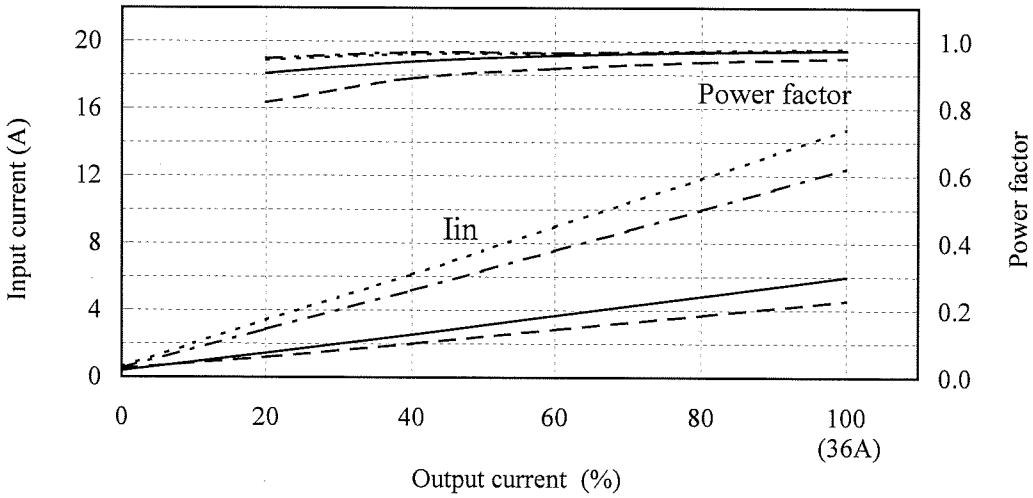
Input current and Power factor vs. Output current

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

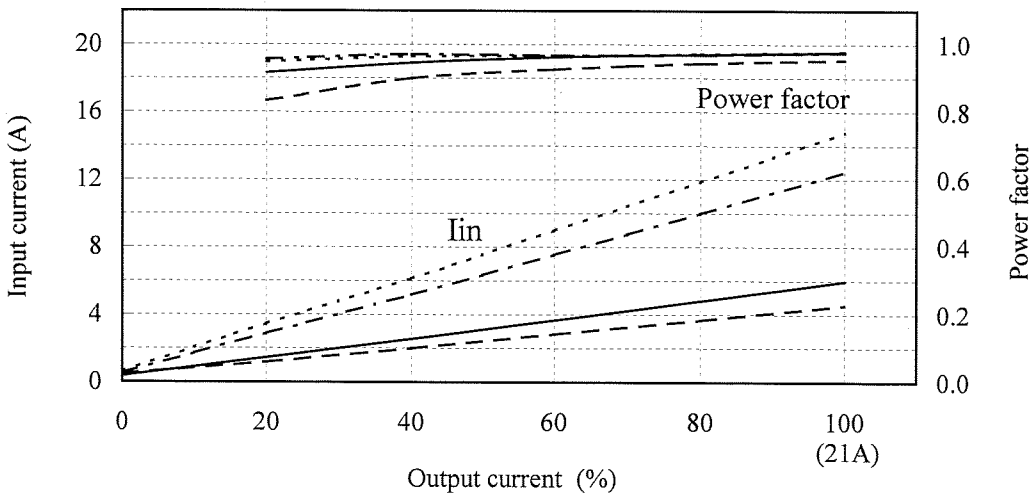
12V



28V



48V

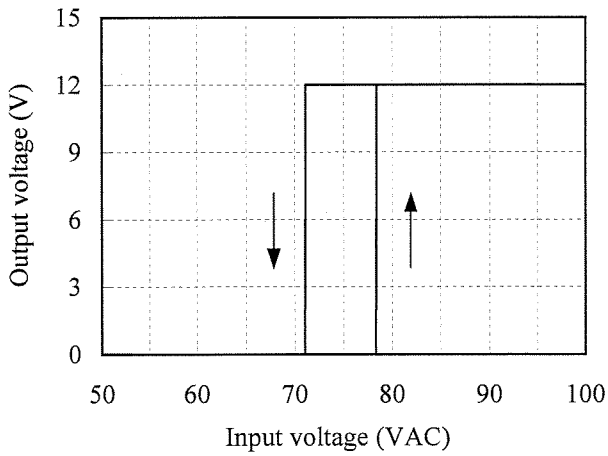


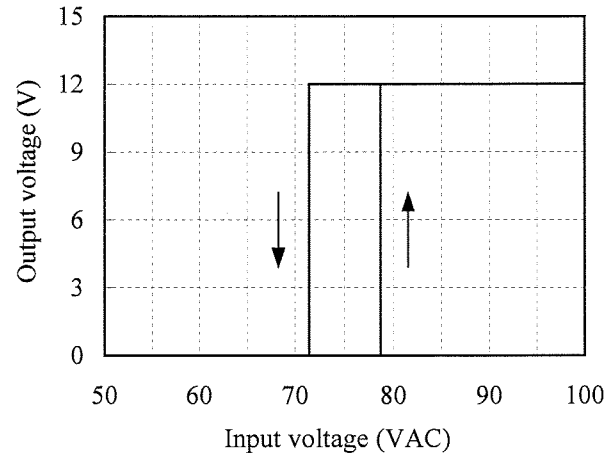
(6) 起動・停止電圧特性
Start and Stop voltage characteristics

Conditions Io : 0 % ——
Tbp : 25 ℃

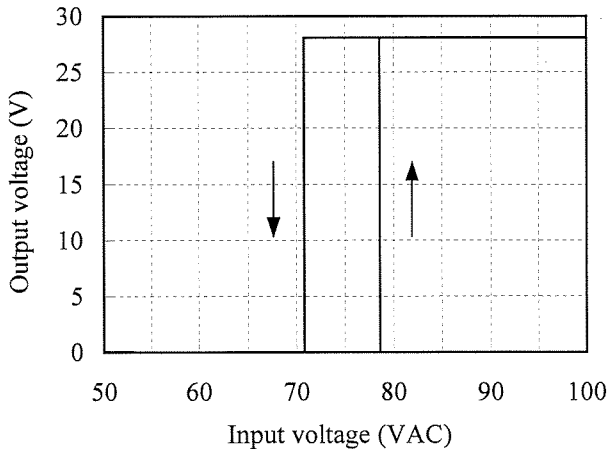
Conditions Io : 100 % ——
Tbp : 25 ℃

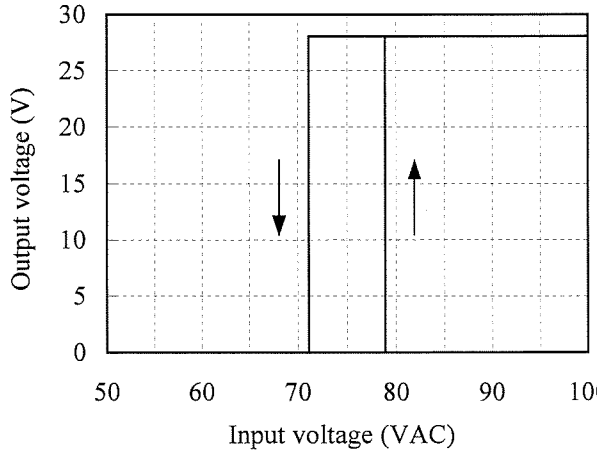
12V



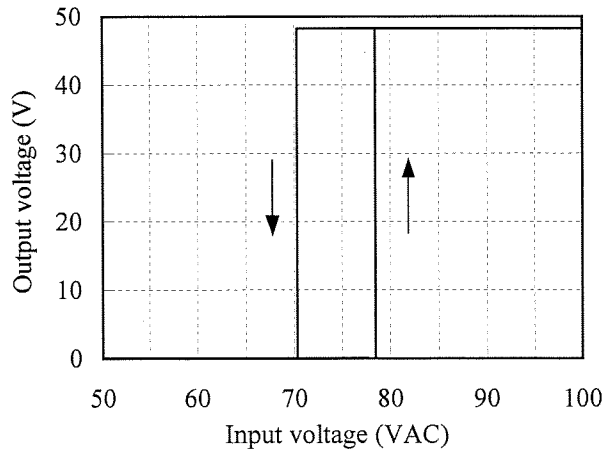


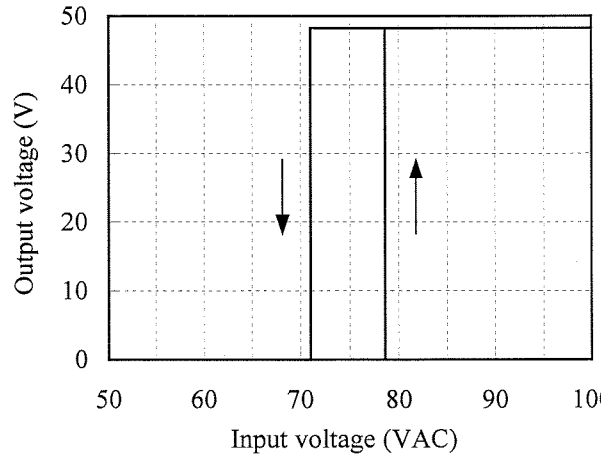
28V





48V



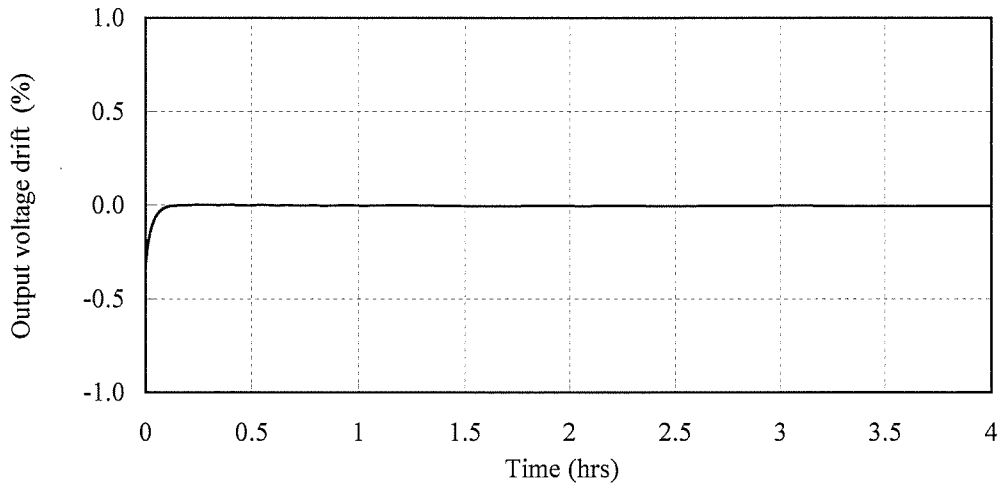


2.2 通電ドリフト特性

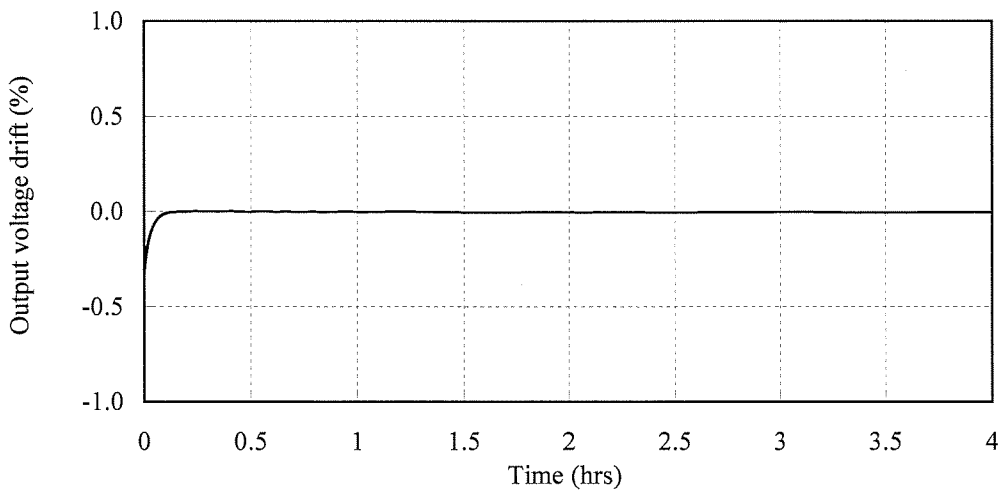
Warm up voltage drift characteristics

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

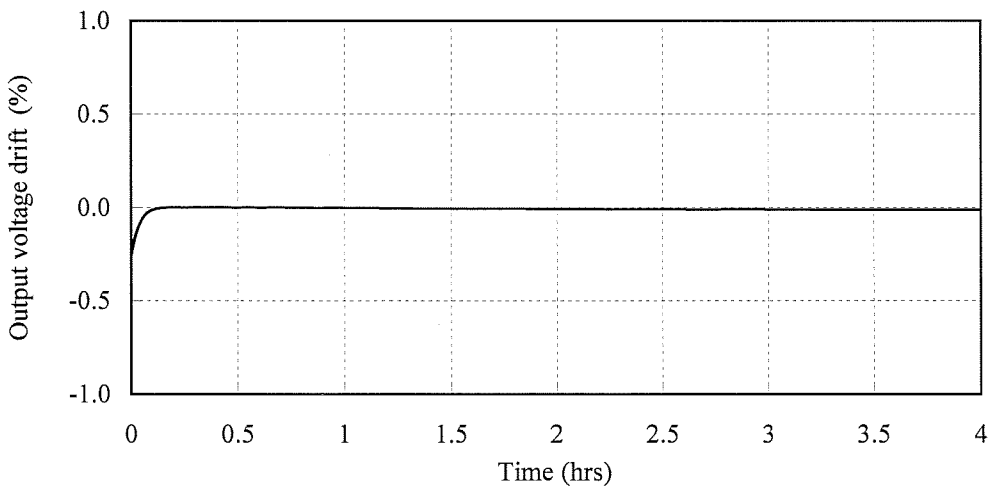
12V



28V



48V

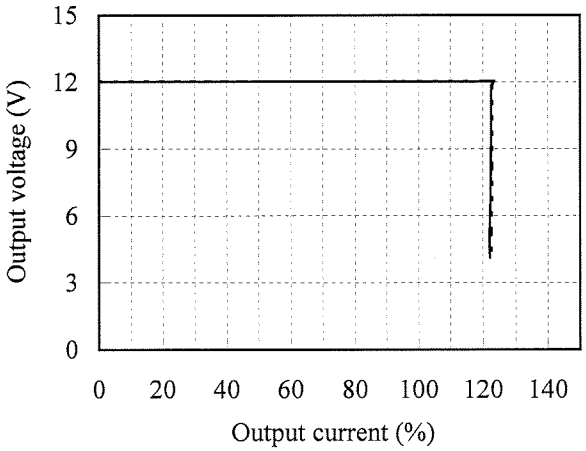


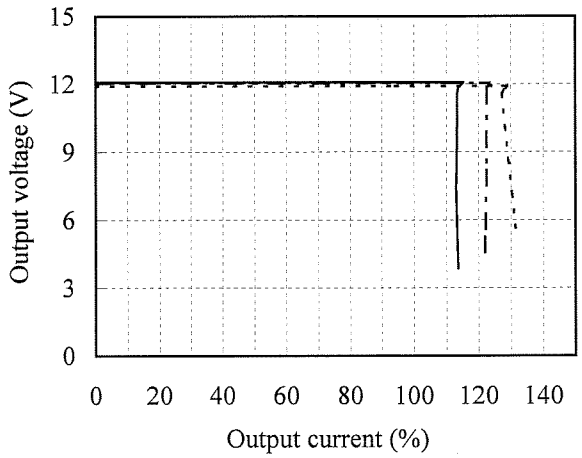
2.3 過電流保護特性
Over current protection (OCP) characteristics

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

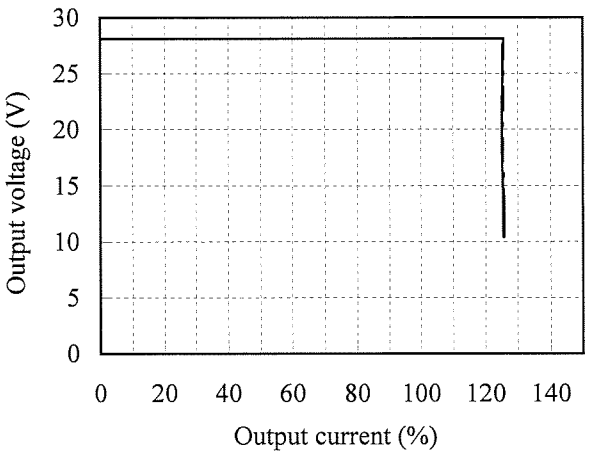
Conditions Vin : 200 VAC
Tbp : -40 ℃ ------
25 ℃ —·—·—
100 ℃ ———

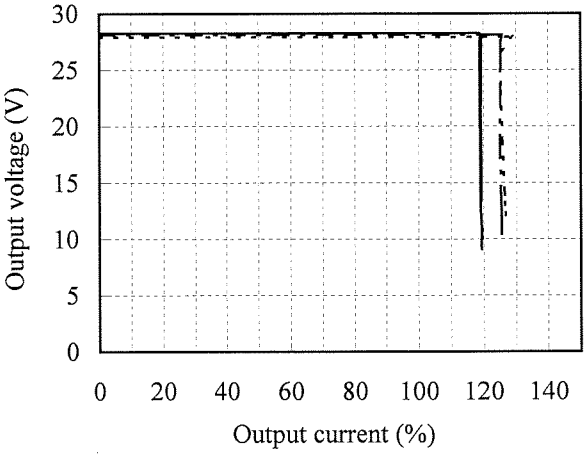
12V



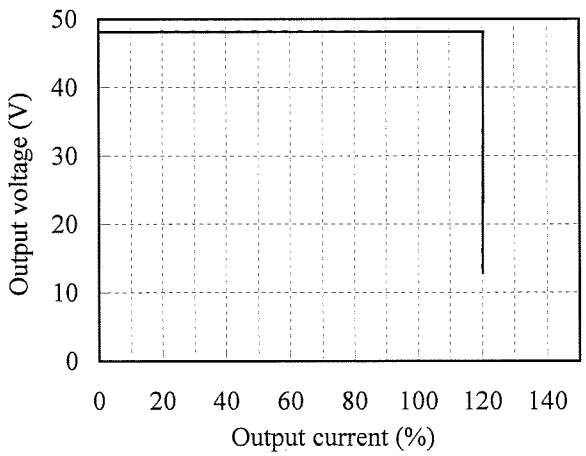


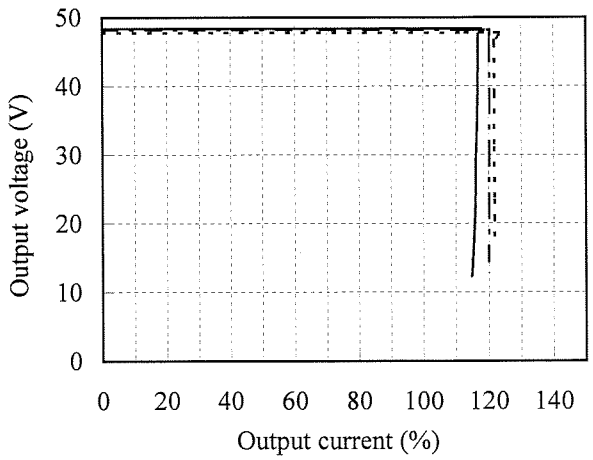
28V





48V



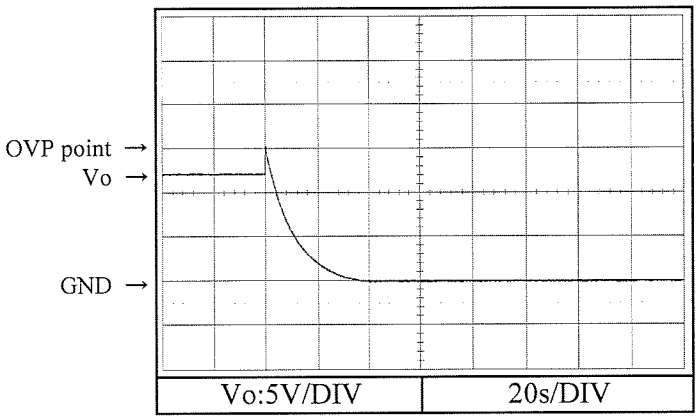


2.4 過電圧保護特性

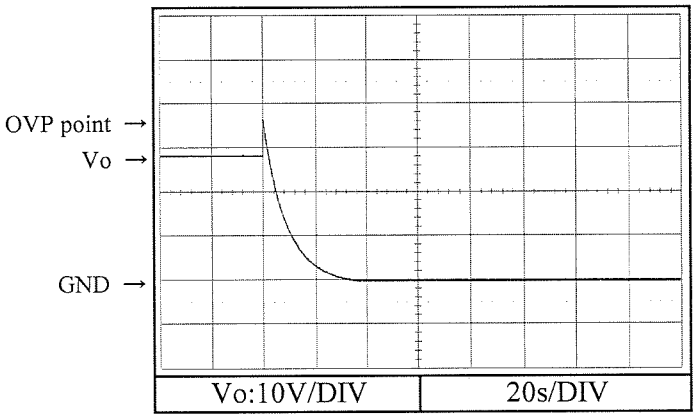
Over voltage protection (OVP) characteristics

Conditions Vin : 100VAC
Io : 0%
Tbp : 25℃

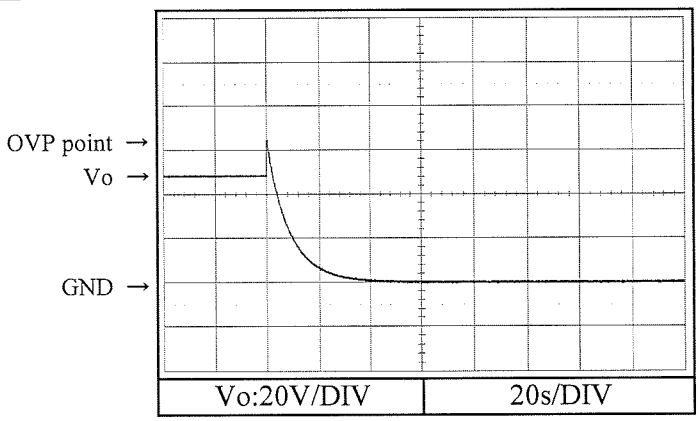
12V



28V



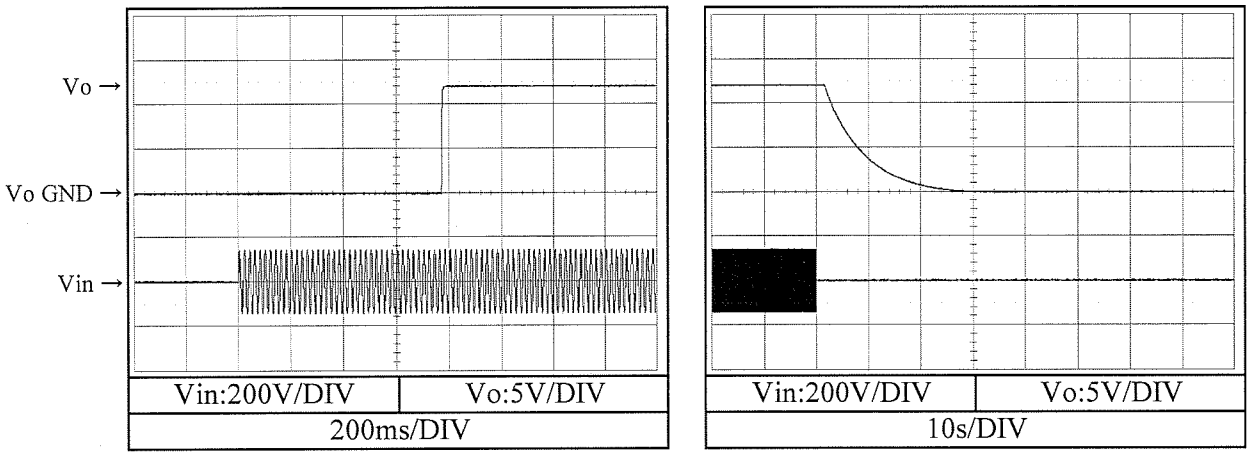
48V



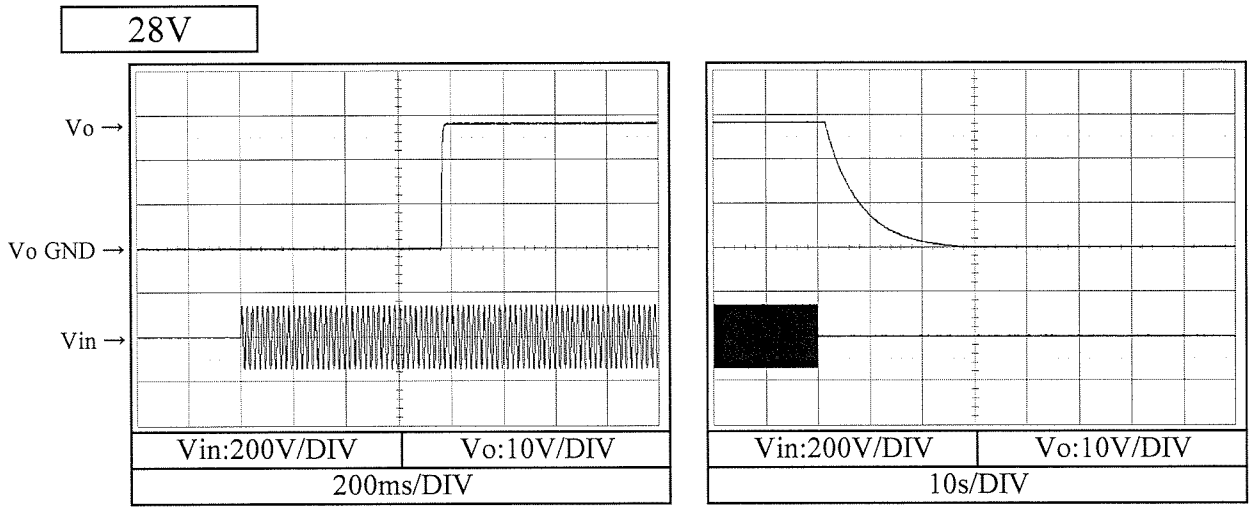
2.5 出力立ち上がり、立ち下り特性
Output rise and fall characteristics

Conditions Vin : 100VAC
Io : 0%
Tbp : 25℃

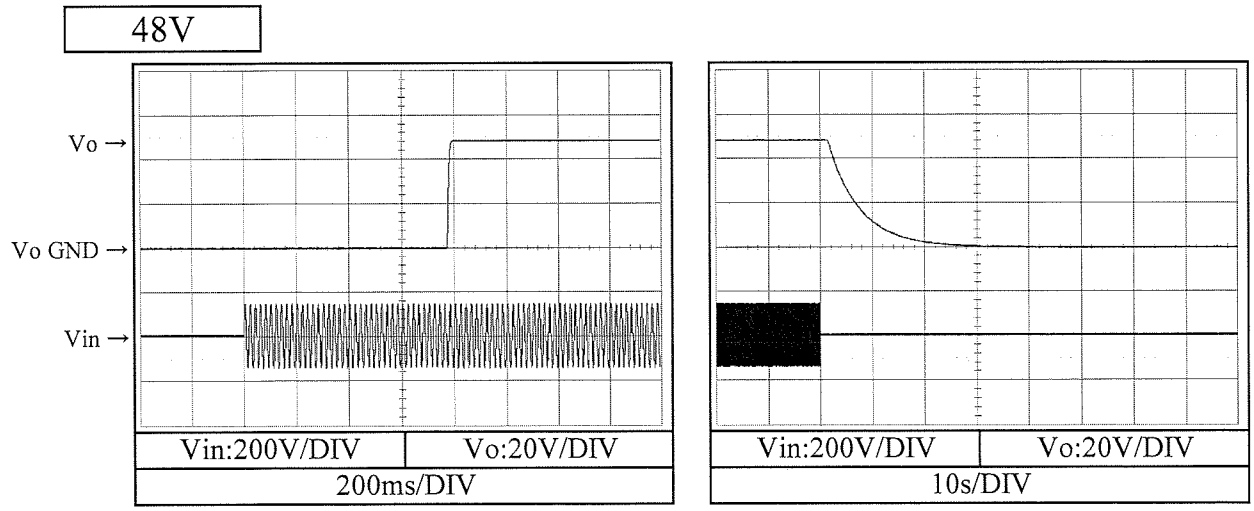
12V



28V



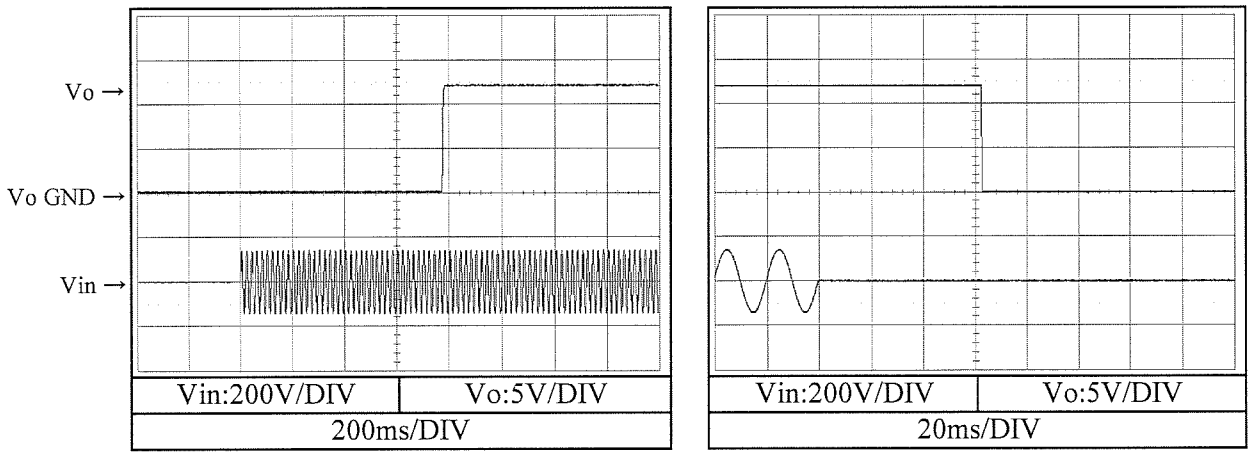
48V



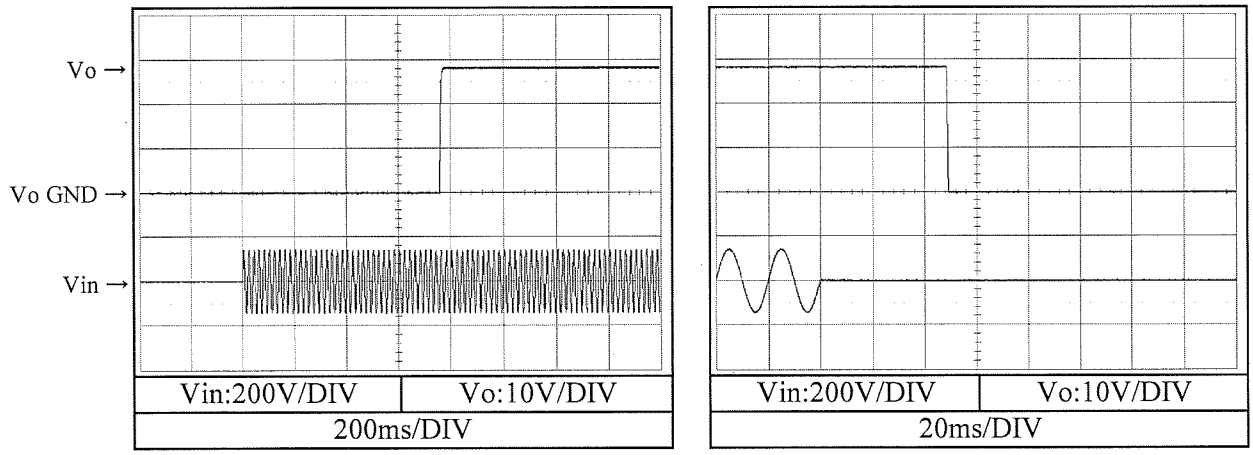
2.5 出力立ち上がり、立ち下り特性
Output rise and fall characteristics

Conditions Vin : 100VAC
Io : 100%
Tbp : 25℃

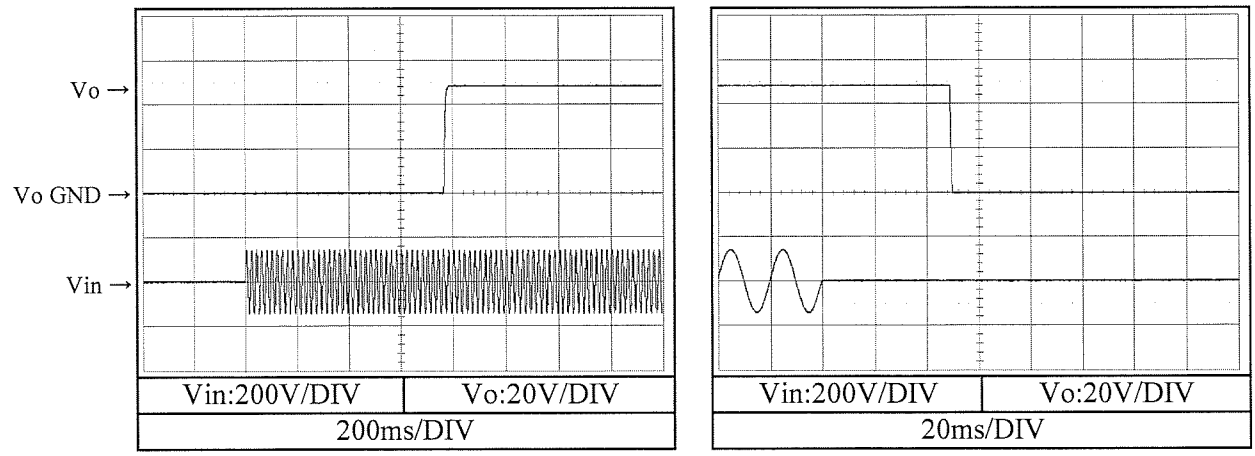
12V



28V



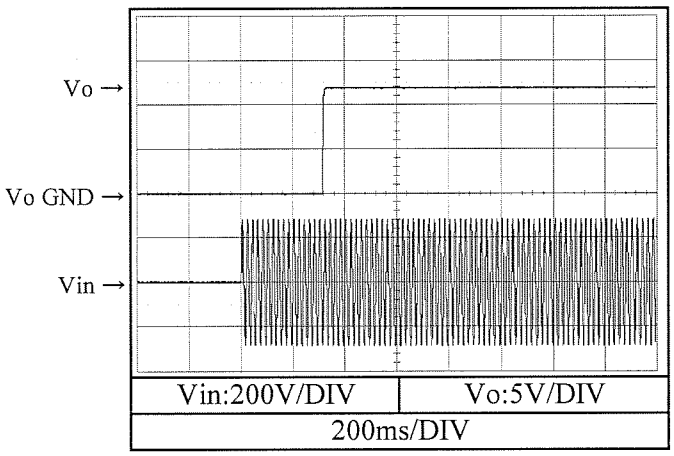
48V

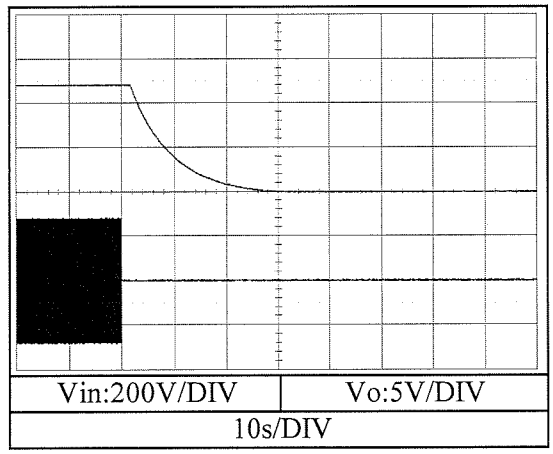


2.5 出力立ち上がり、立ち下り特性
Output rise and fall characteristics

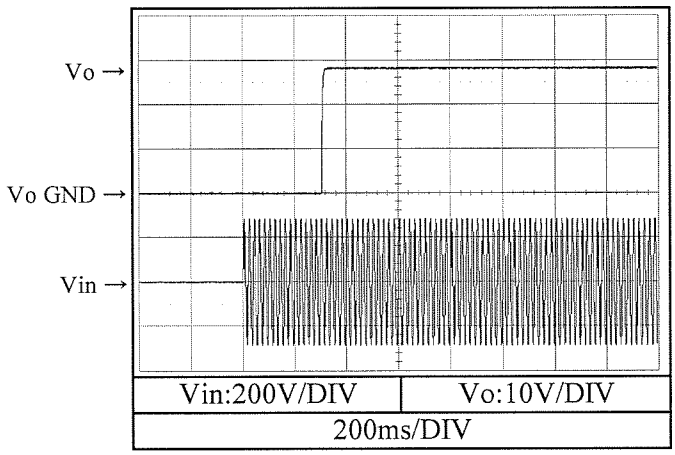
Conditions Vin : 200VAC
Io : 0%
Tbp : 25℃

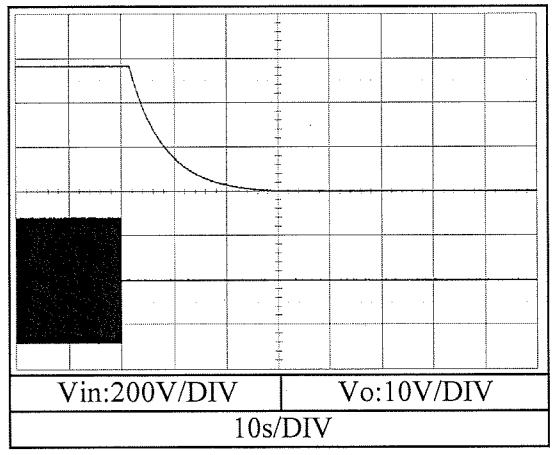
12V



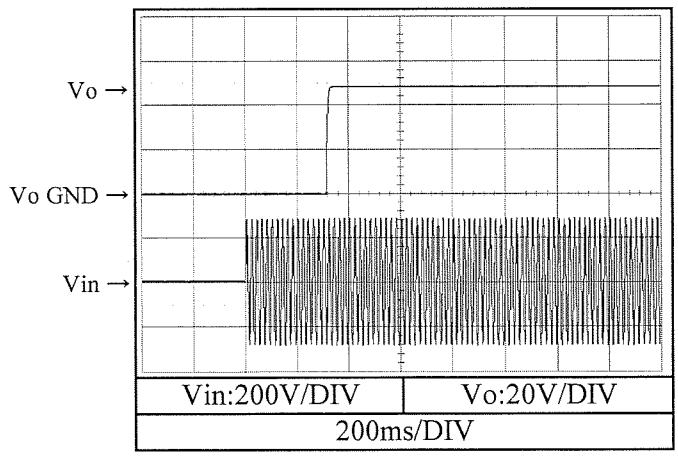


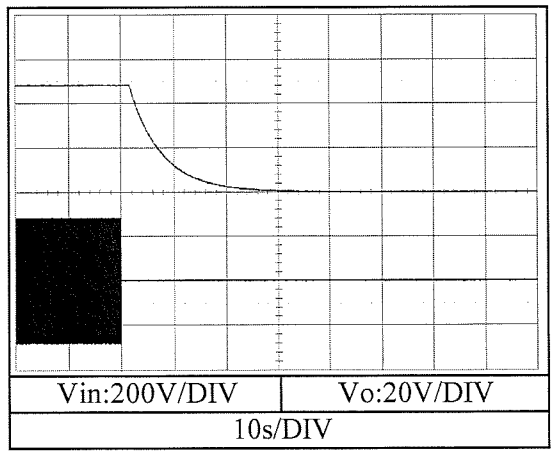
28V





48V

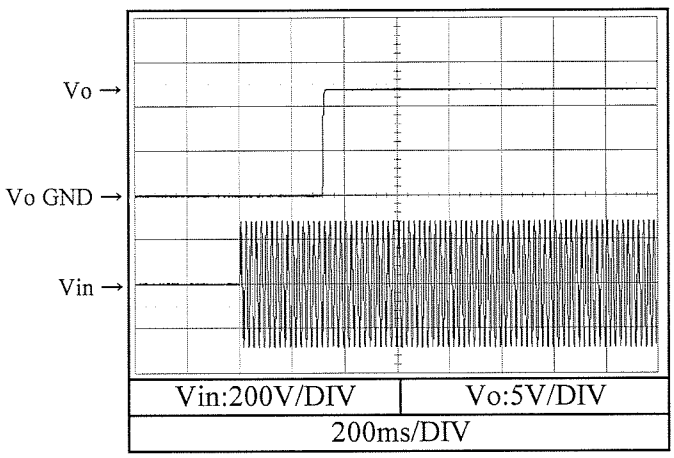


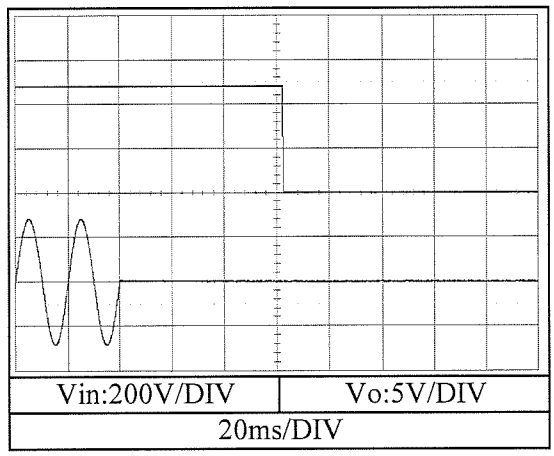


2.5 出力立ち上がり、立ち下り特性
Output rise and fall characteristics

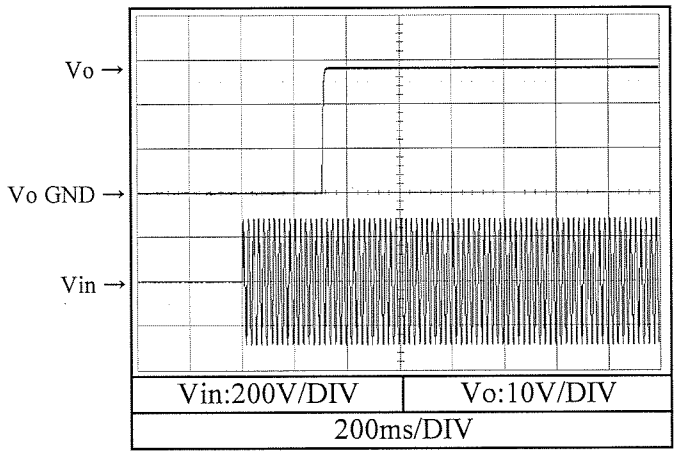
Conditions Vin : 200VAC
Io : 100%
Tbp : 25℃

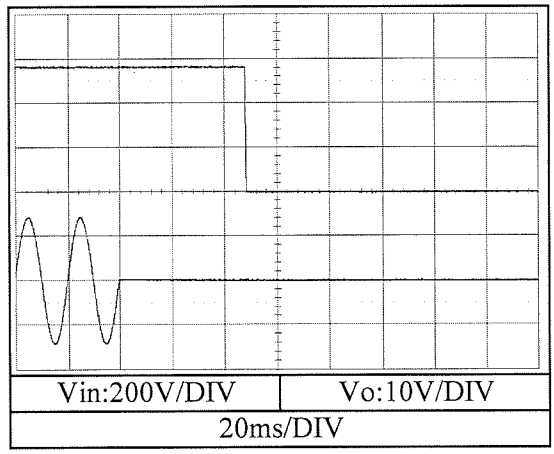
12V



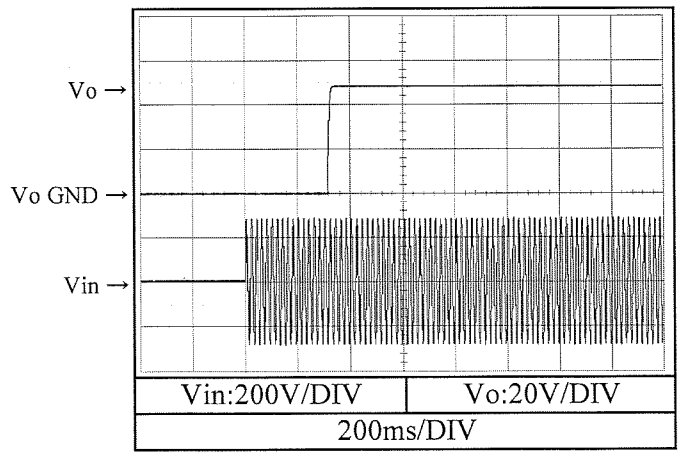


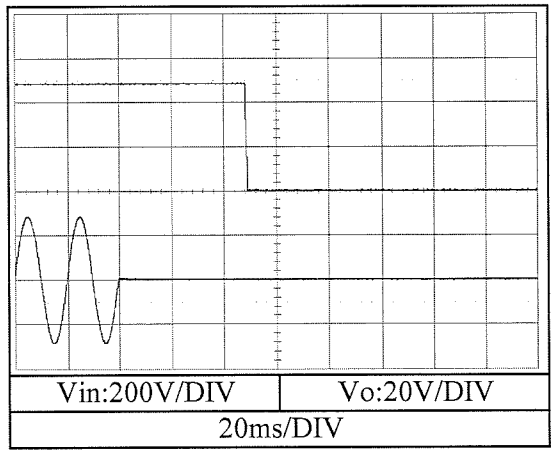
28V





48V

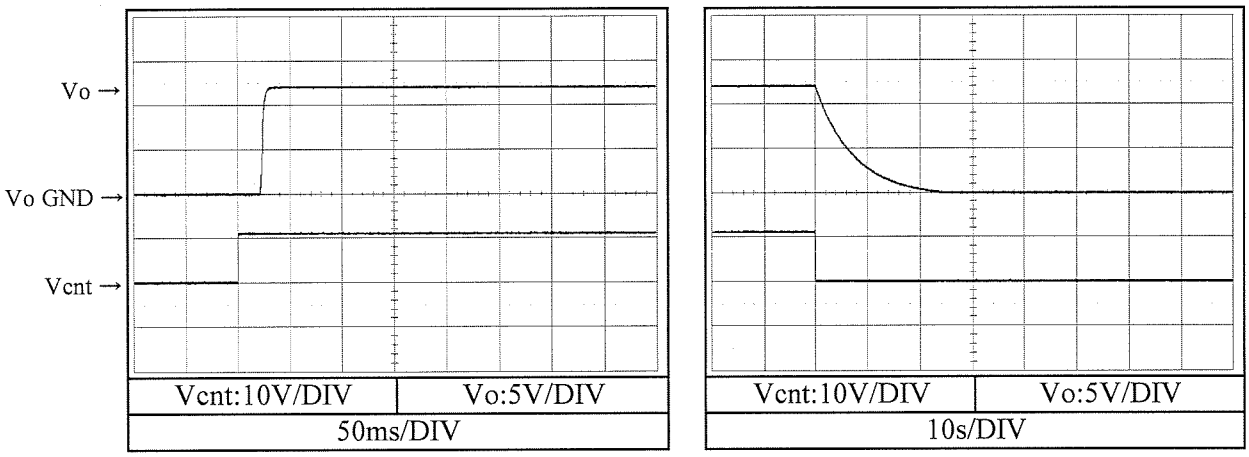




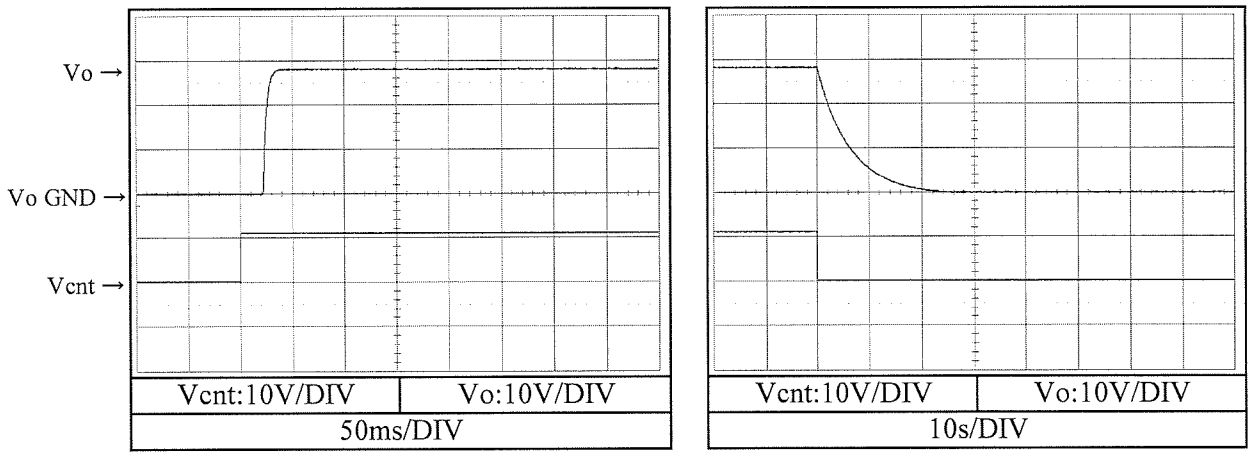
2.6 出力立ち上がり、立ち下り特性（ON/OFFコントロール時）
Output rise and fall characteristics with ON/OFF CONTROL

Conditions Vin : 100VAC
Io : 0%
Tbp : 25℃

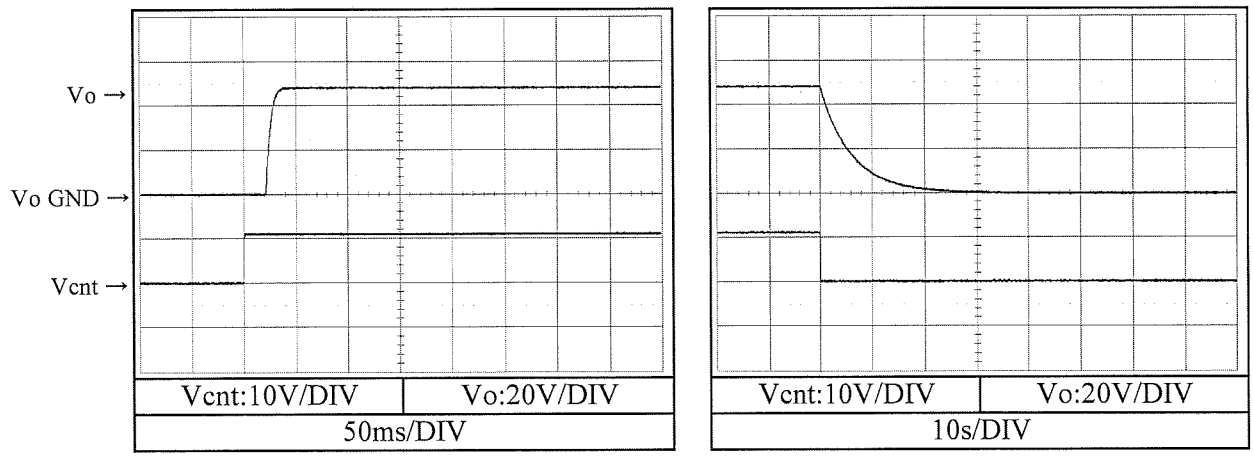
12V



28V



48V

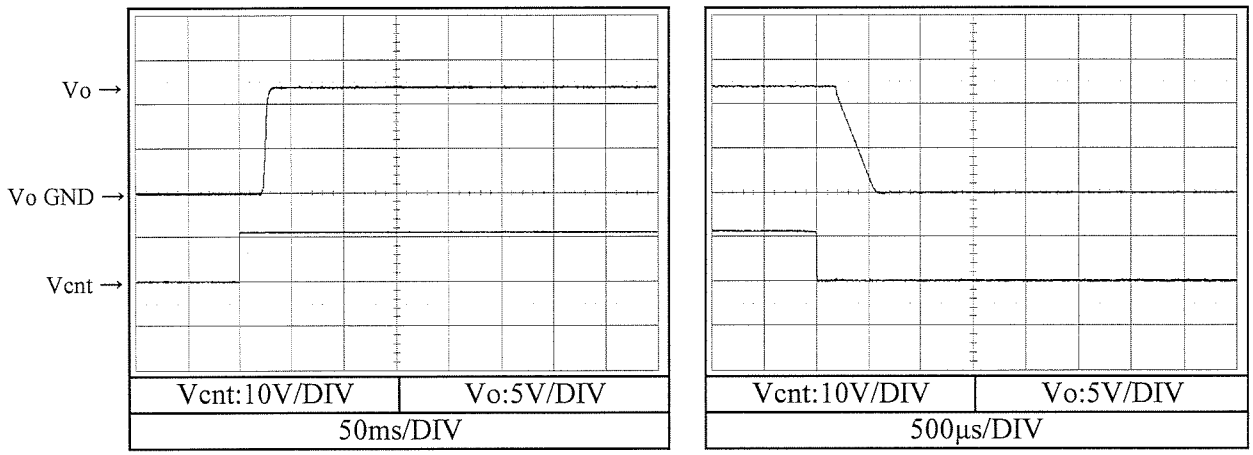


Note : 200VAC is same as characteristics of 100VAC.

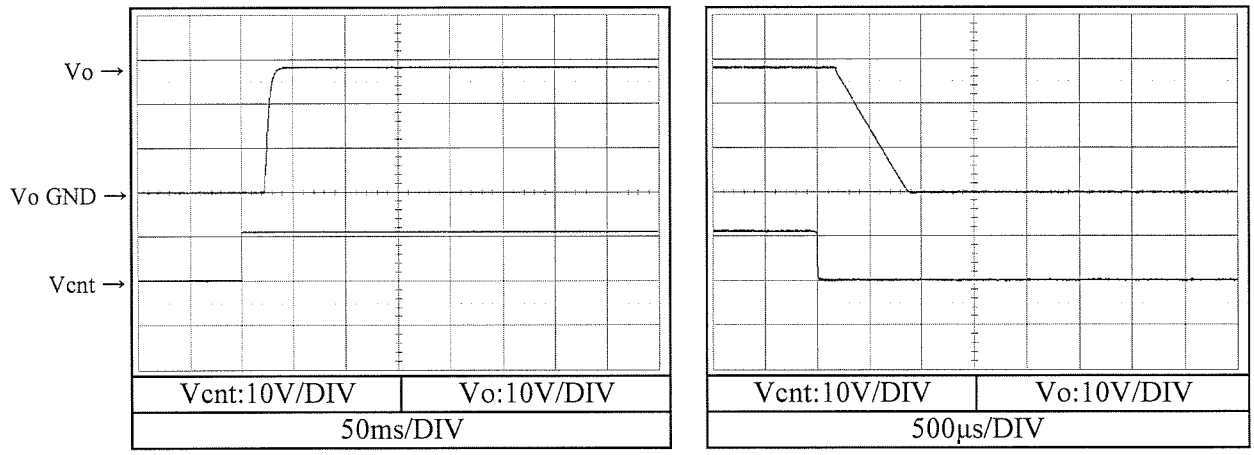
2.6 出力立ち上がり、立ち下り特性（ON/OFFコントロール時）
Output rise and fall characteristics with ON/OFF CONTROL

Conditions Vin : 100VAC
Io : 100%
Tbp : 25℃

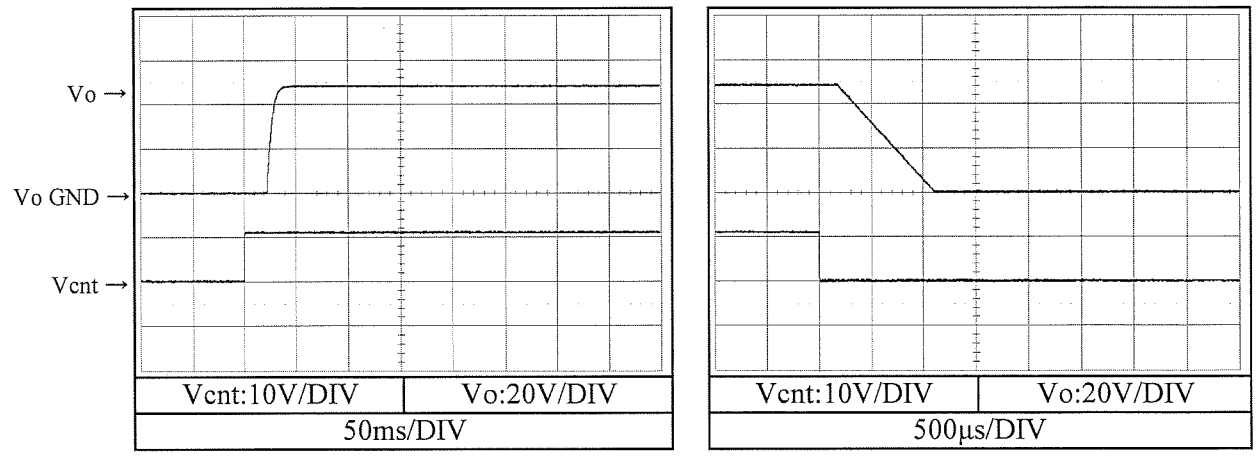
12V



28V



48V

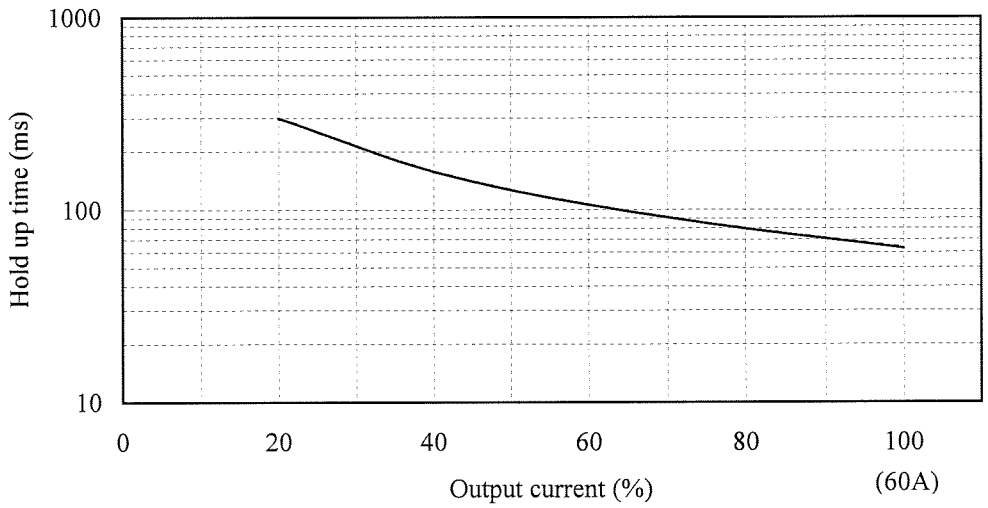


Note : 200VAC is same as characteristics of 100VAC.

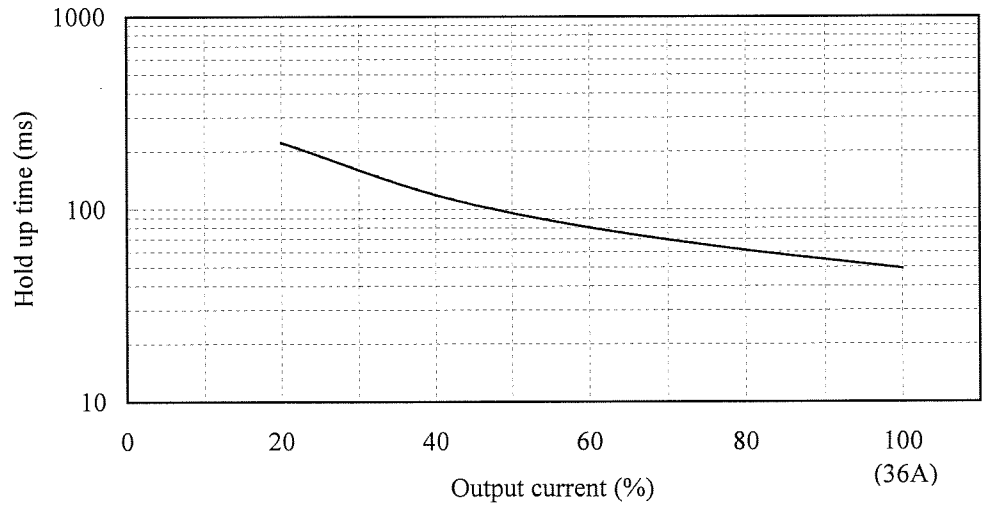
2.7 出力電圧保持時間特性
Hold up time characteristics

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

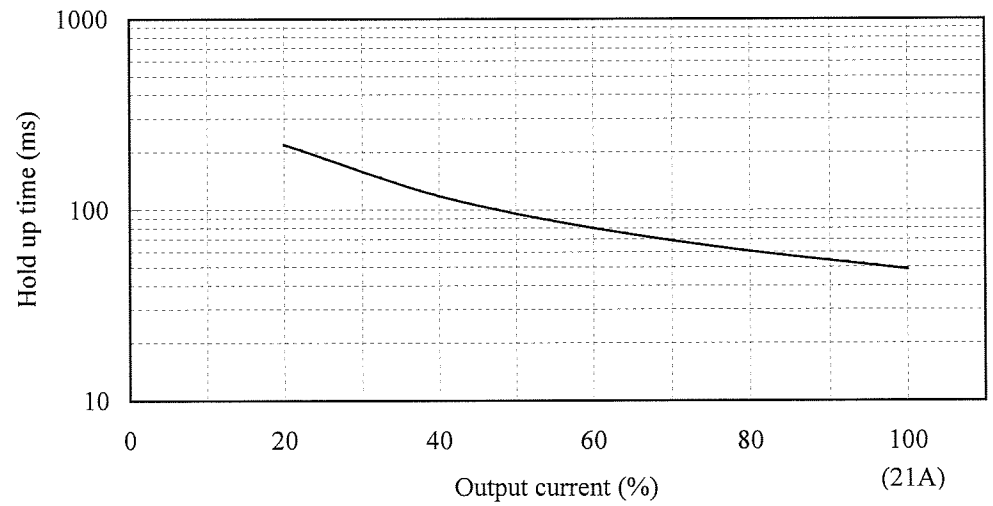
12V



28V



48V



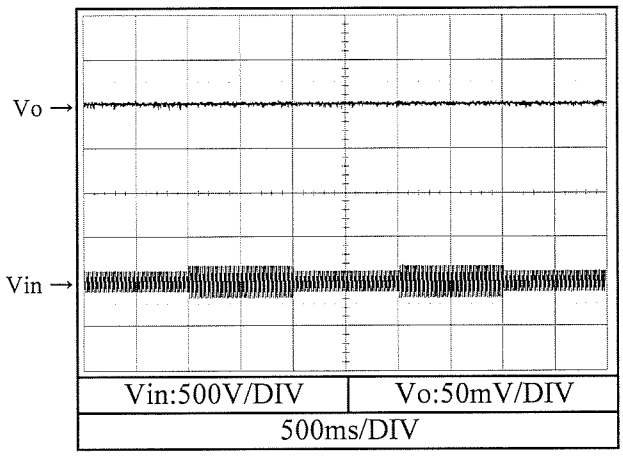
2.8 過渡応答（入力急変）特性
Dynamic line response characteristics

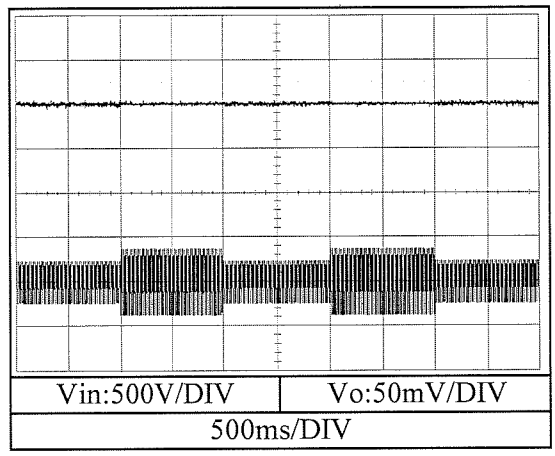
Conditions Io : 100%
Tbp : 25℃

Vin:85VAC <=> 130VAC

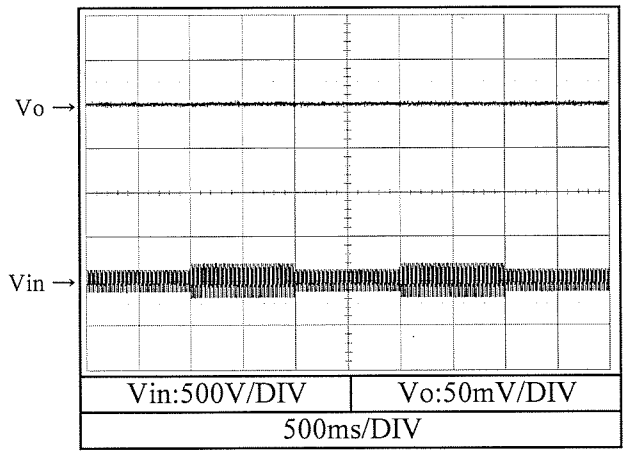
Vin:170VAC <=> 265VAC

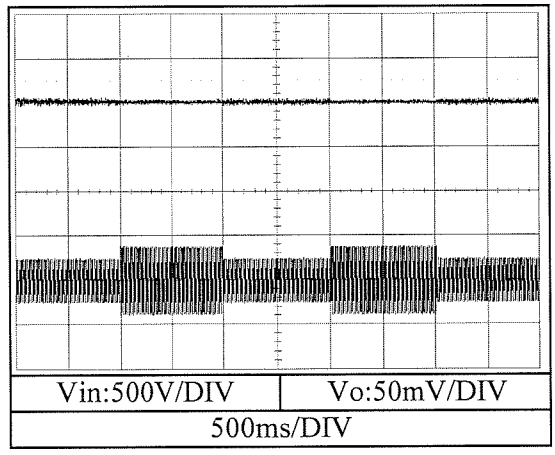
12V



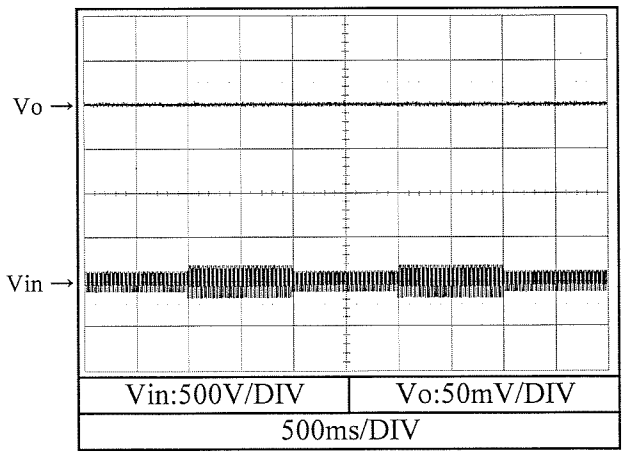


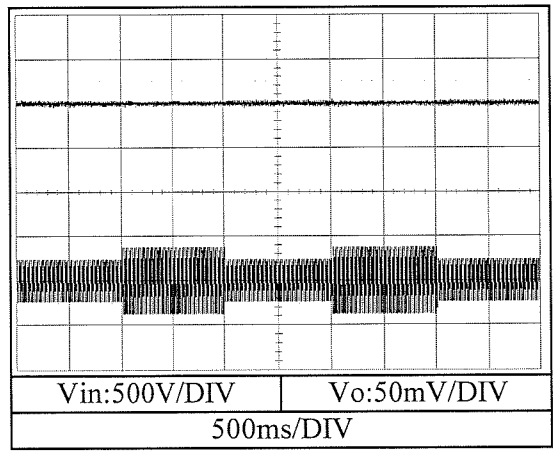
28V





48V



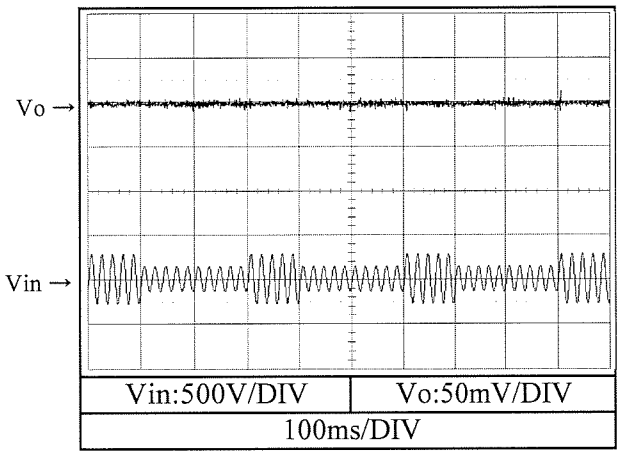


2.8 過渡応答（入力急変）特性
Dynamic line response characteristics

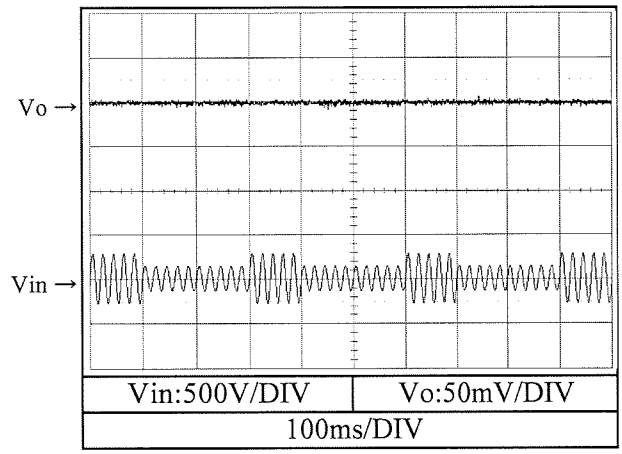
Conditions Io :100%
Tbp :25℃

Vin:100VAC <=> 200VAC

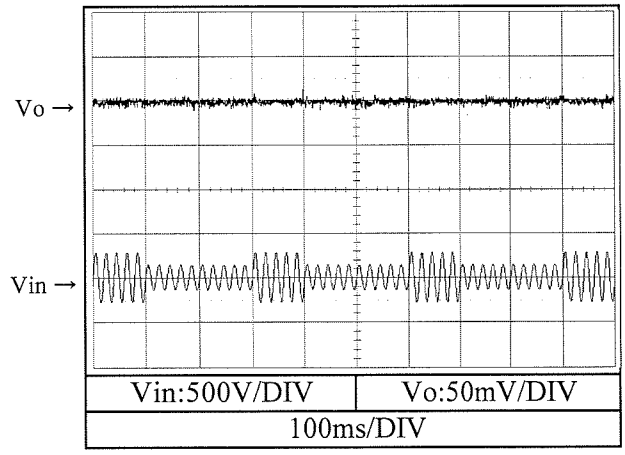
12V



28V



48V

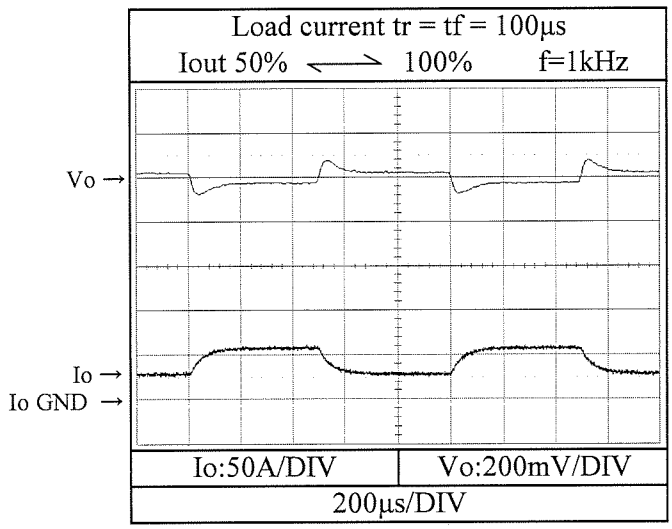


Note : This test follows SEMI F47-0200.

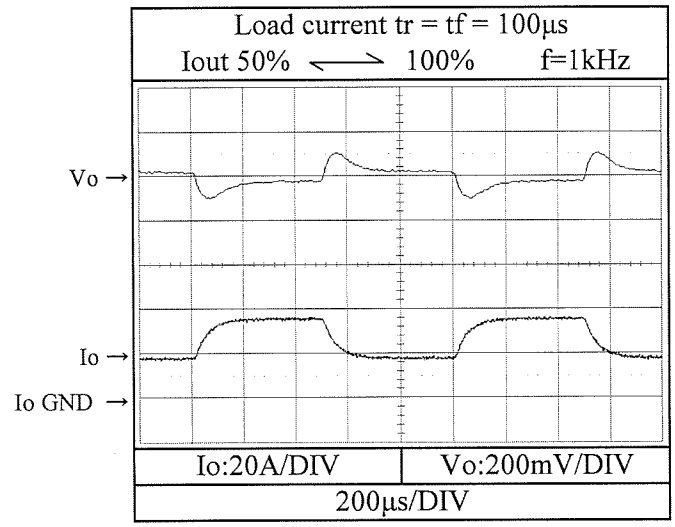
2.9 過渡応答（負荷急変）特性
Dynamic load response characteristics

Conditions Vin : 100VAC
Tbp : 25℃

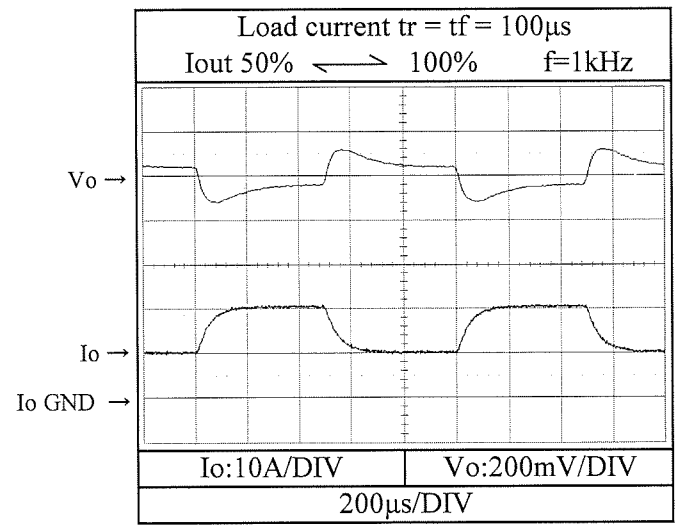
12V



28V



48V



2.10 入力電圧瞬停特性

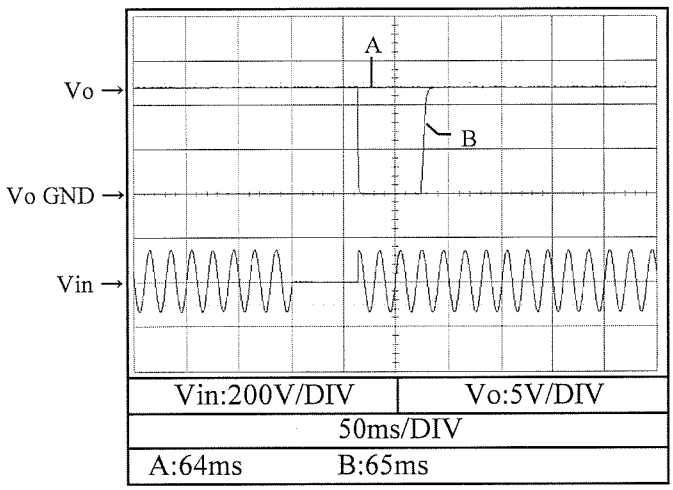
Response to brownout characteristics

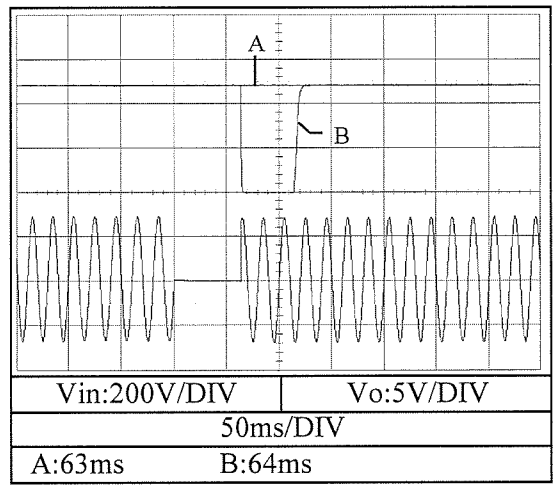
Conditions Io : 100%
Tbp : 25℃

Vin : 100VAC

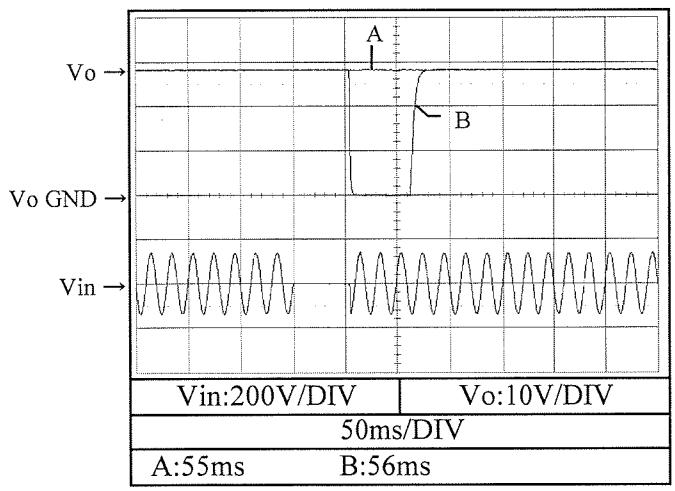
Vin : 200VAC

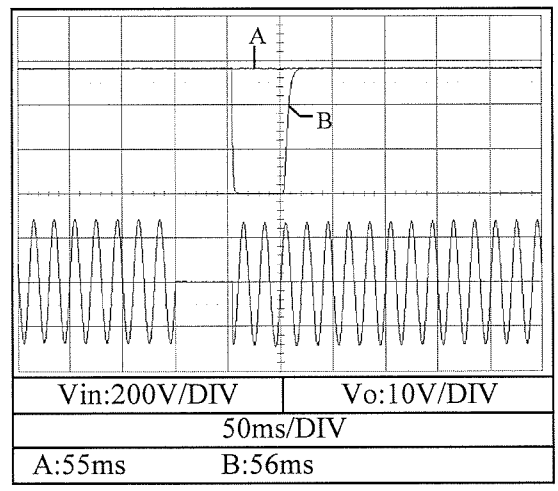
12V



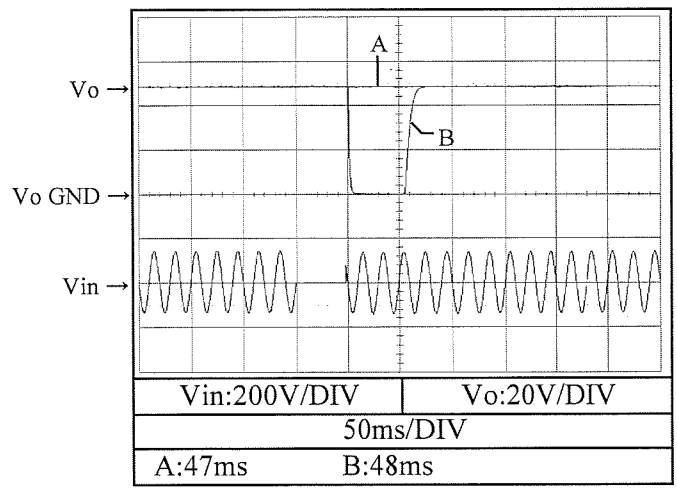


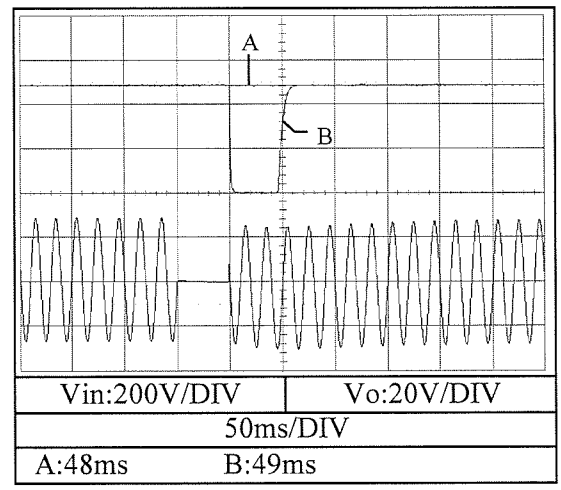
28V





48V





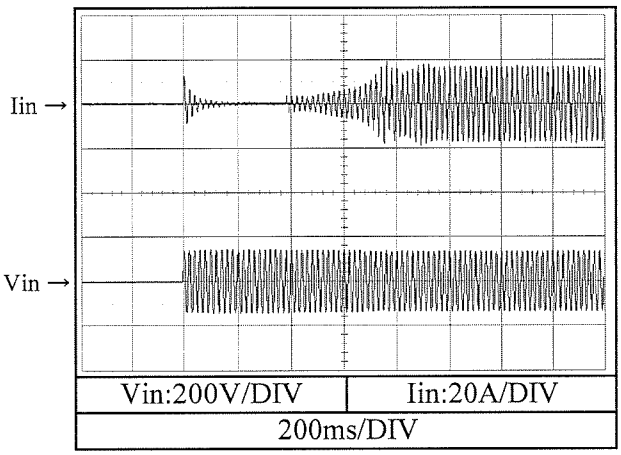
2.11 入力サージ電流（突入電流）特性
Inrush current characteristics

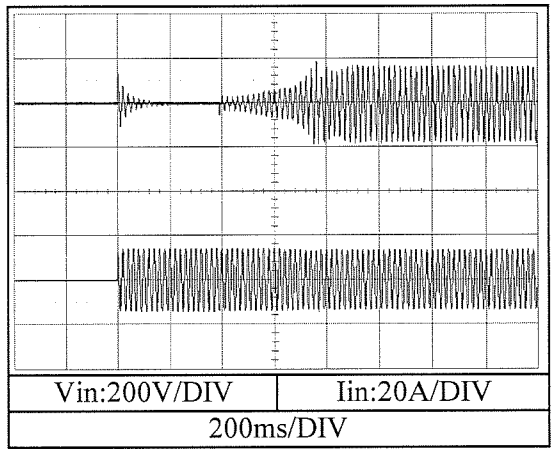
Conditions Vin : 100VAC
Io : 100%
Tbp : 25℃

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

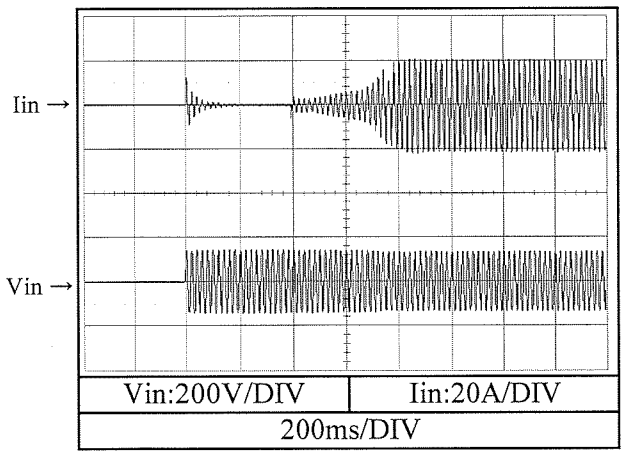
Switch on phase angle of input AC voltage ϕ =90°

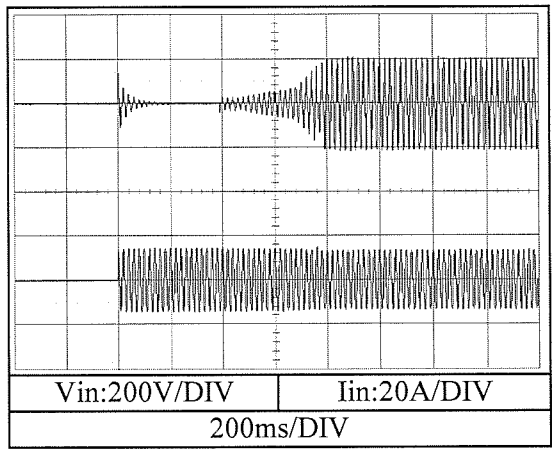
12V





48V





Note : 28V is same as characteristics of 48V

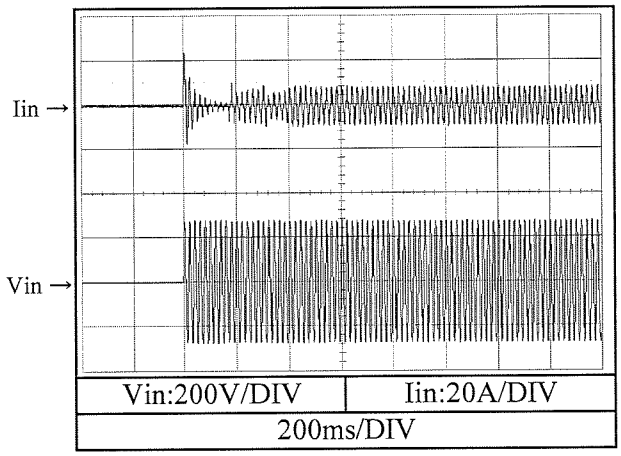
2.11 入力サージ電流（突入電流）特性
Inrush current characteristics

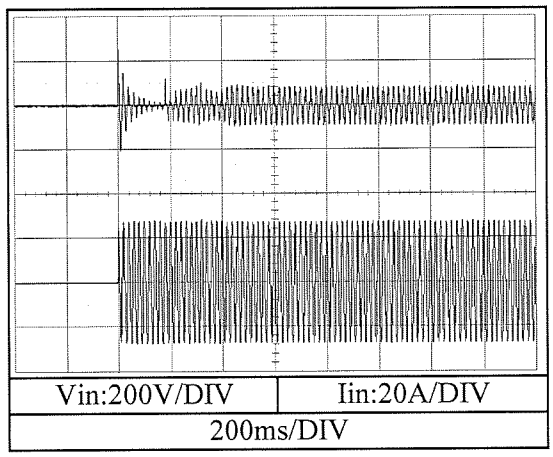
Conditions Vin : 200VAC
Io : 100%
Tbp : 25℃

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

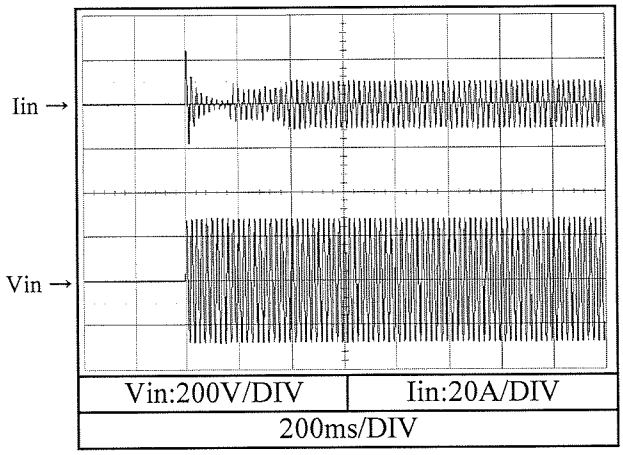
Switch on phase angle of input AC voltage ϕ =90°

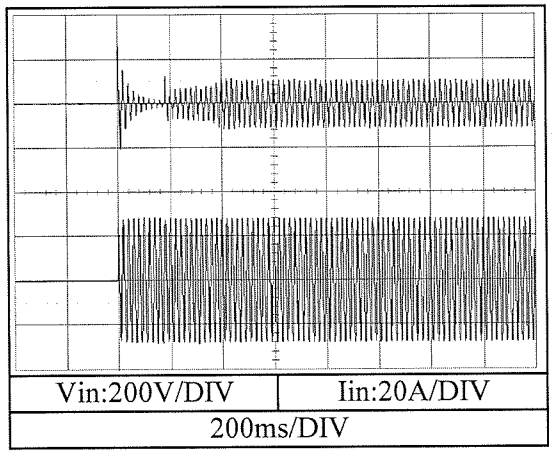
12V





48V





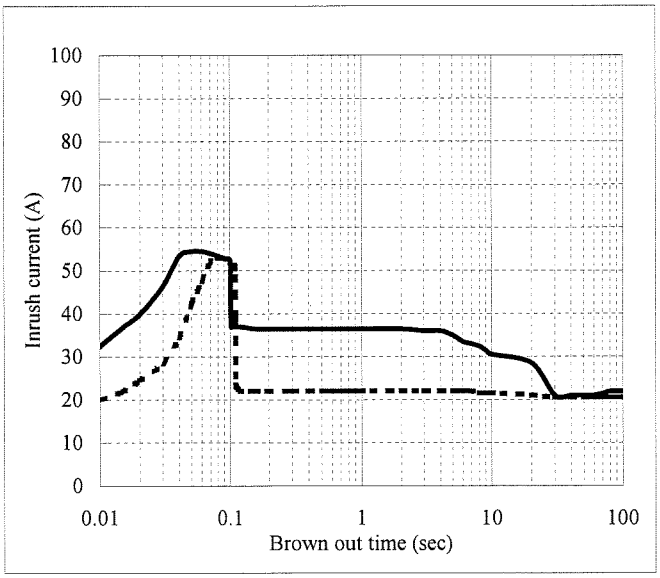
Note : 28V is same as characteristics of 48V

2.12 瞬停突入電流特性
Inrush current characteristics

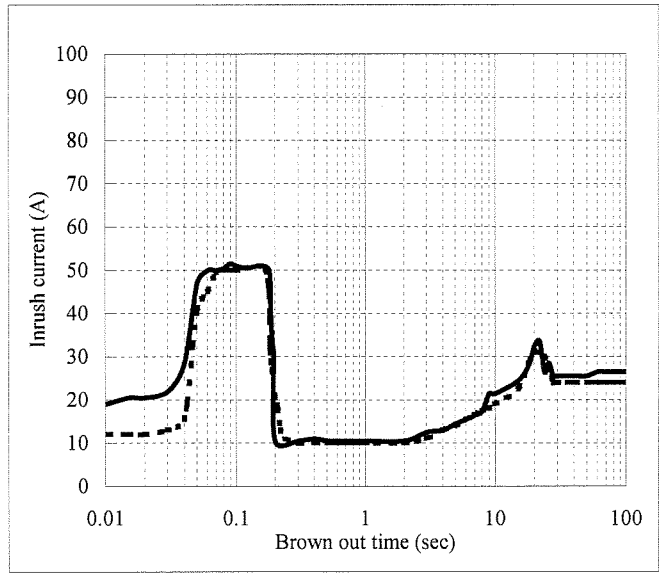
Conditions Io : 50 % ------
100 % ——
Tbp : 25 ℃

Vin:100VAC

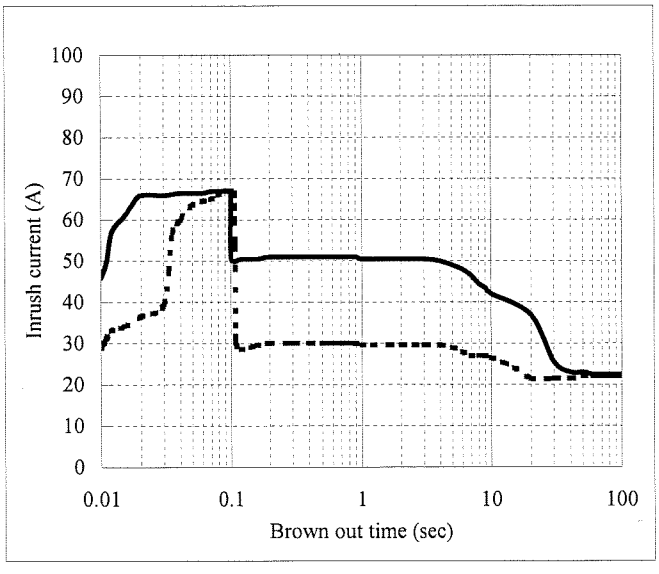
12V

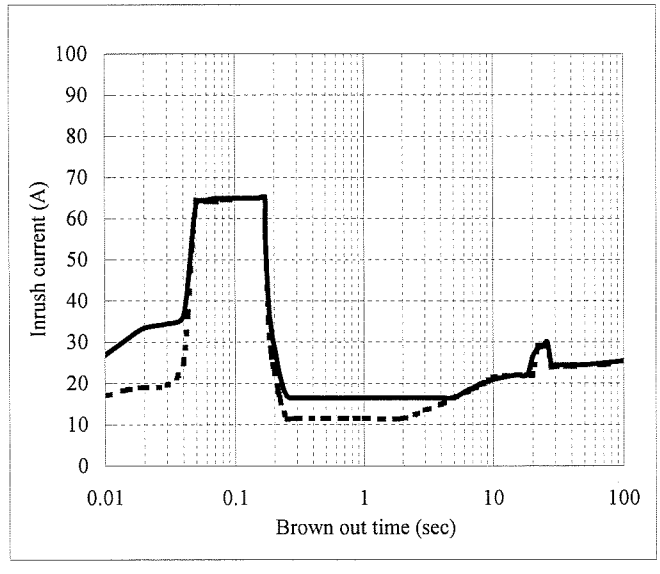


Vin:200VAC



48V





Note : Above data includes secondary inrush current.
: 28V is same as characteristics of 48V

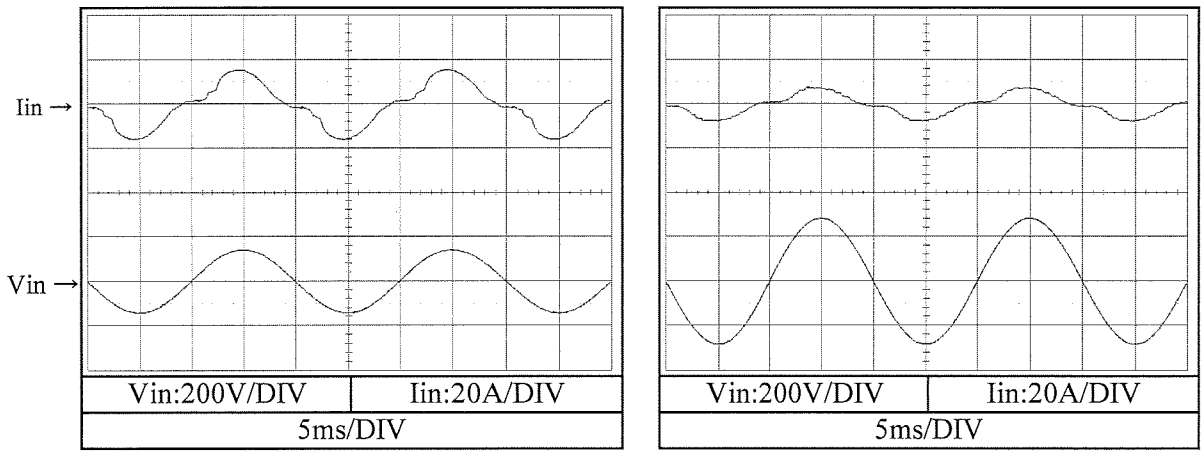
2.13 入力電流波形
Input current waveform

Conditions Io : 100%
Tbp : 25℃

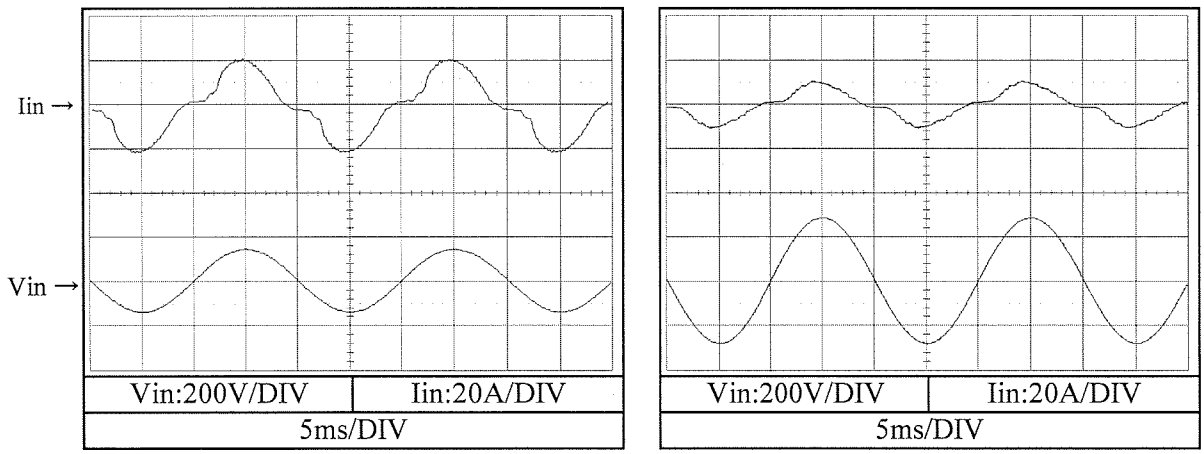
Vin:100AC

Vin:200AC

12V



48V



Note : 28V is same as characteristics of 48V

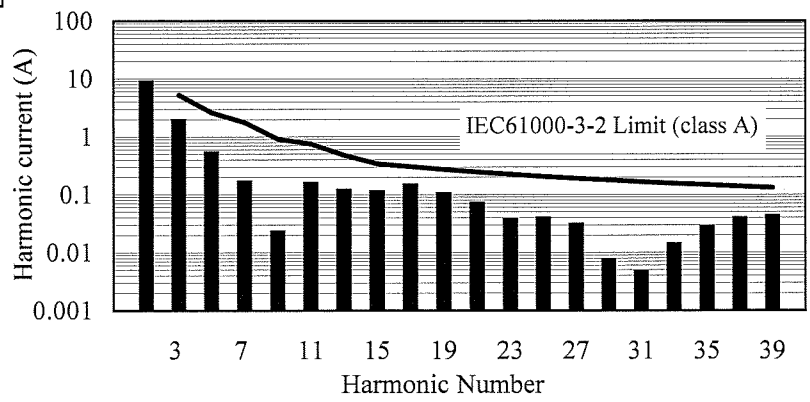
2.14 高調波成分

Input current harmonics

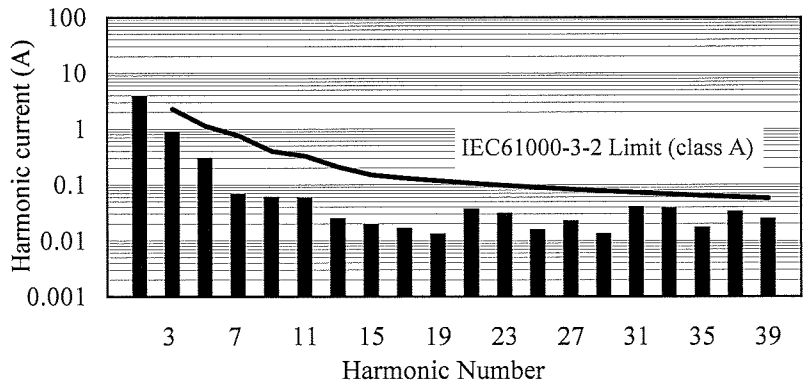
Conditions Io : 100%
Tbp : 25℃

12V

Vin:100VAC

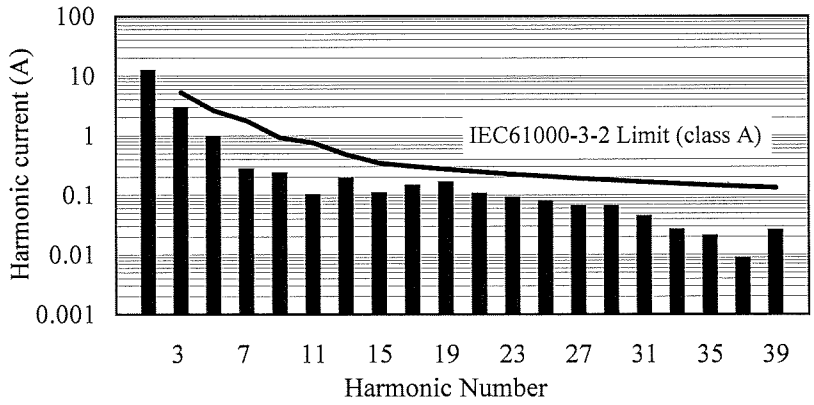


Vin:230VAC

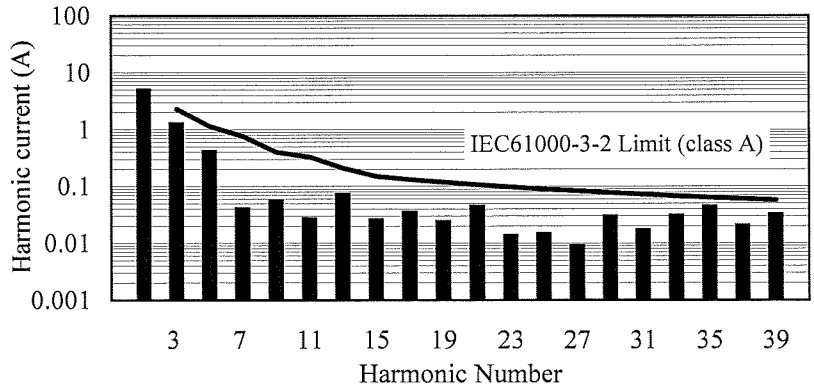


48V

Vin:100VAC



Vin:230VAC



Note : 28V is same as characteristics of 48V

2.15 リーク電流特性

Leakage current characteristics

Conditions Io : 0 % ------

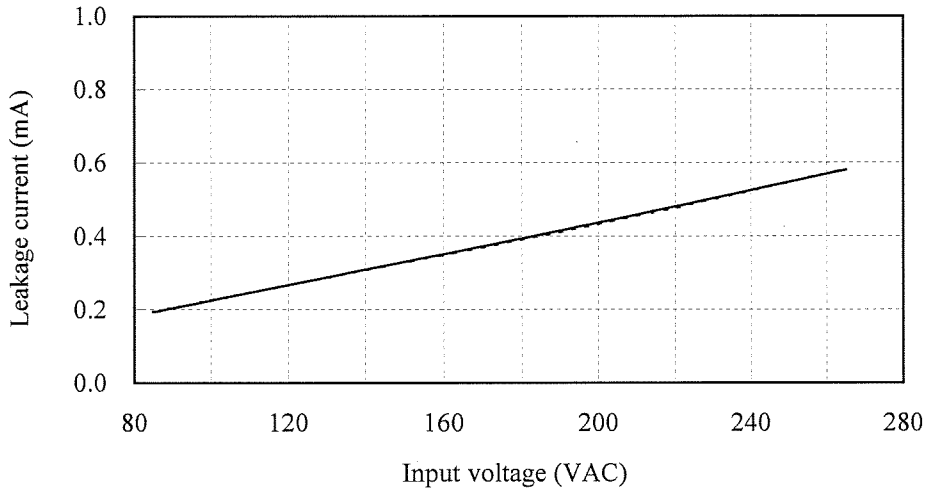
100 % ———

Tbp : 25 ℃

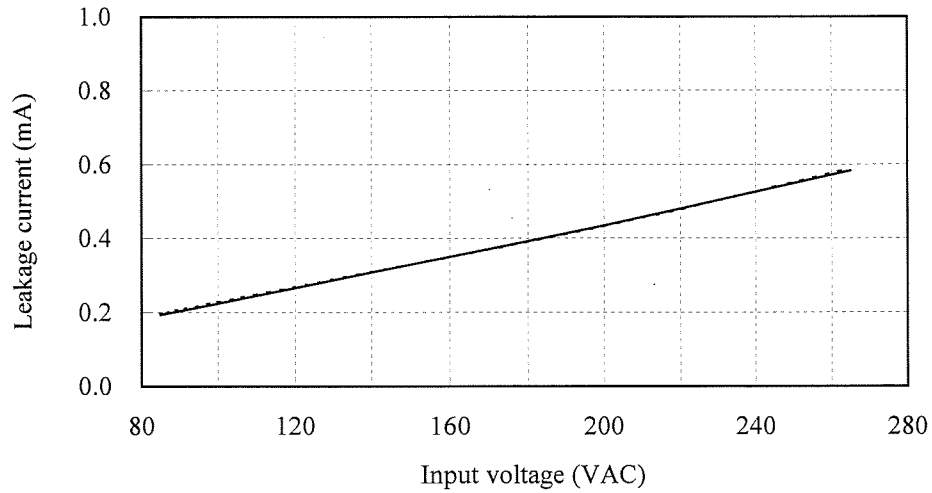
f : 50 Hz

Equipment used : MODEL 229-2 (Simpson)

12V



48V

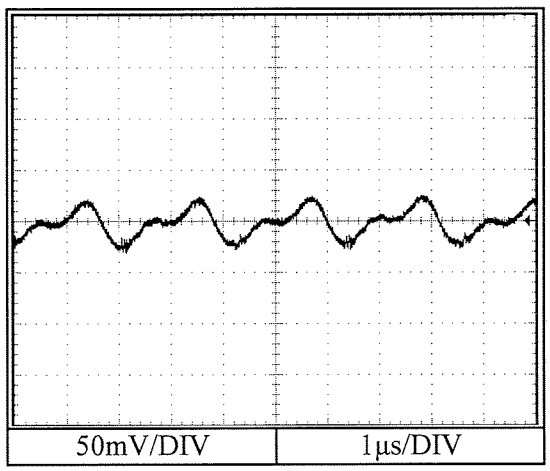


Note : 28V is same as characteristics of 48V

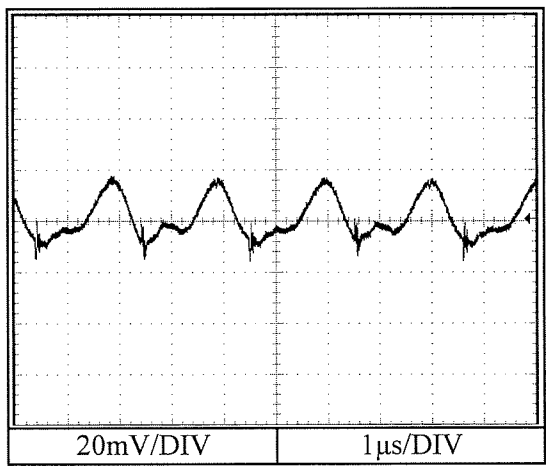
2.16 出力リップル、ノイズ波形
Output ripple and noise waveform

Conditions Vin : 100VAC
Io : 100%
Tbp : 25℃

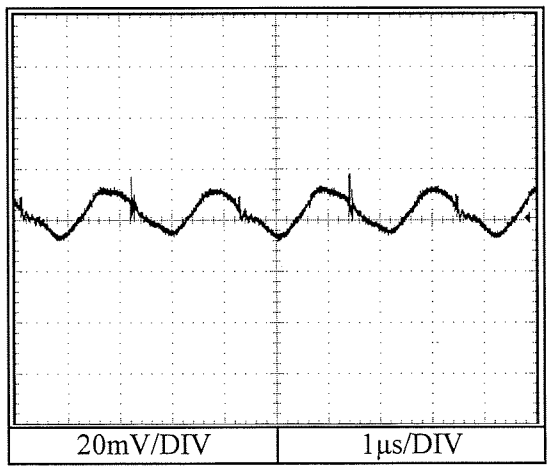
12V



28V



48V



2.17 EMI特性
Electro-Magnetic Interference characteristics

(a) 雑音端子電圧（帰還ノイズ）

Conducted Emission

Conditions Vin : 100VAC

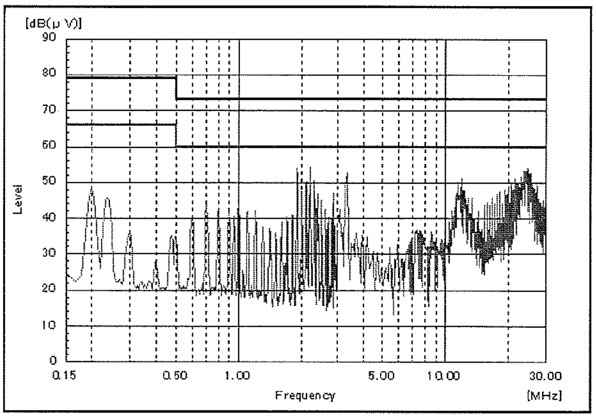
Io : 100%

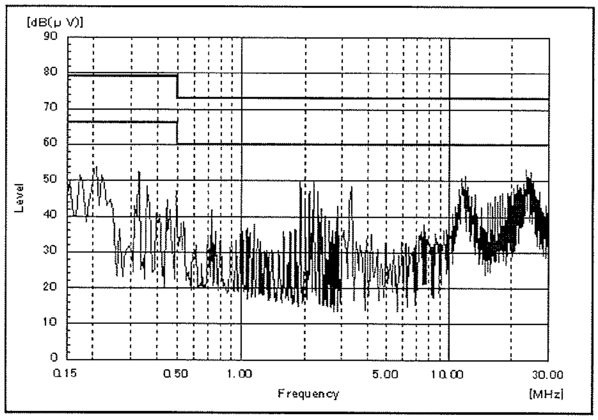
Tbp : 25℃

Phase:N

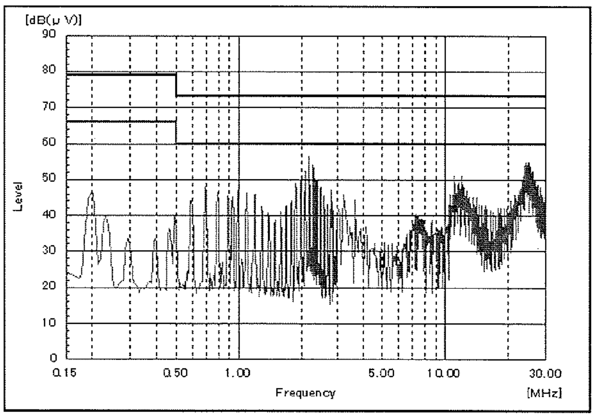
Phase:L

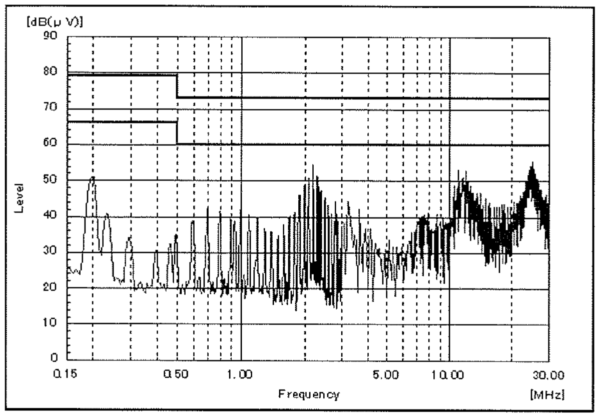
12V



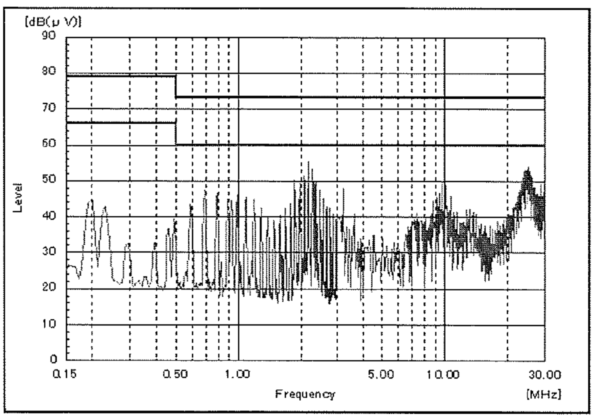


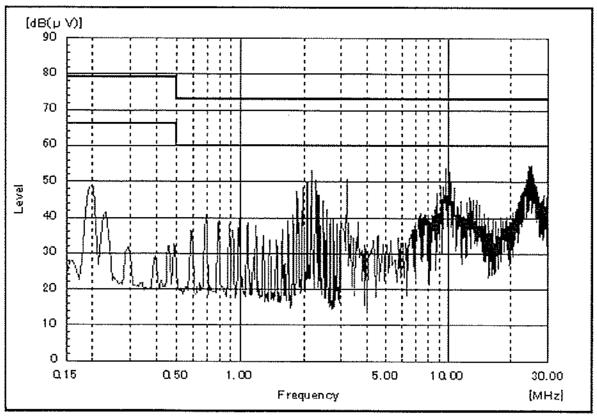
28V





48V





2.17 EMI特性

Electro-Magnetic Interference characteristics

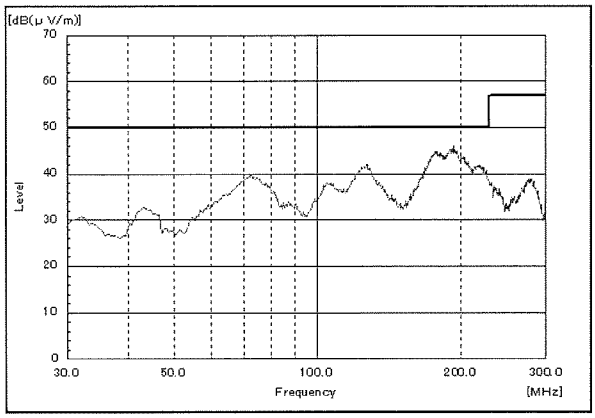
(b) 雑音電界強度（輻射ノイズ）

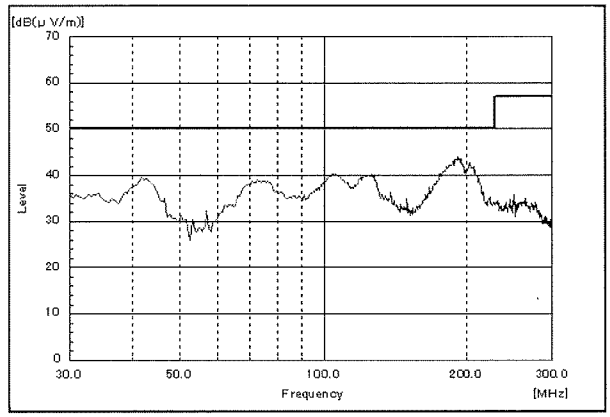
Radiated Emission

Conditions Vin : 100VAC
Io : 100%
Tbp : 25℃

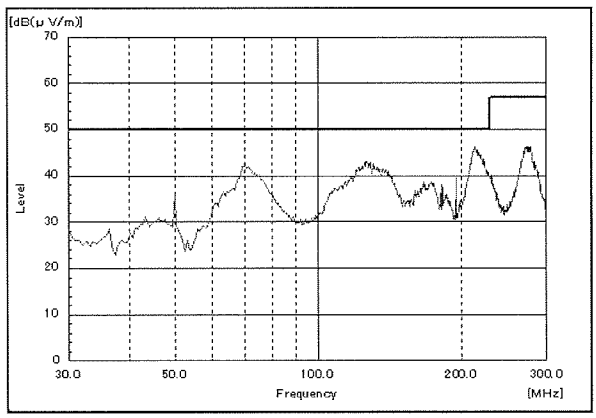
HORIZONTAL VERTICAL

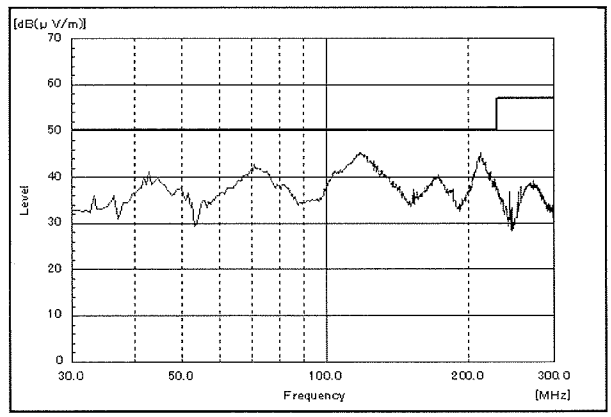
12V





28V





48V