CUS200LJ

EVALUATION DATA

型式データ

INDEX

2. 特性データ　Characteristics

使用記号　Terminology used

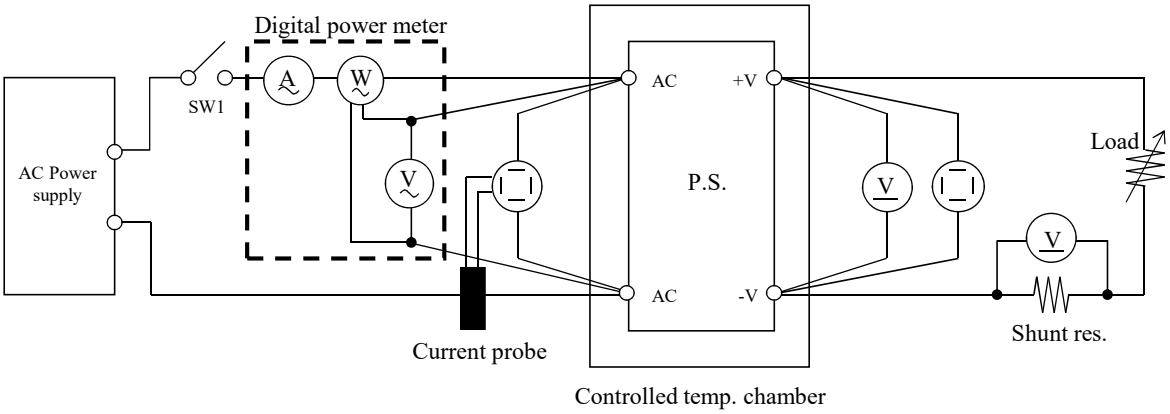
	定義　Definition
Vin	..... 入力電圧　Input voltage
Vout	..... 出力電圧　Output voltage
Iin	..... 入力電流　Input current
Iout	..... 出力電流　Output current
Ta	..... 周囲温度　Ambient temperature
f	..... 周波数　Frequency

1. 測定方法　Evaluation Method

1.1　測定回路　Circuit used for determination

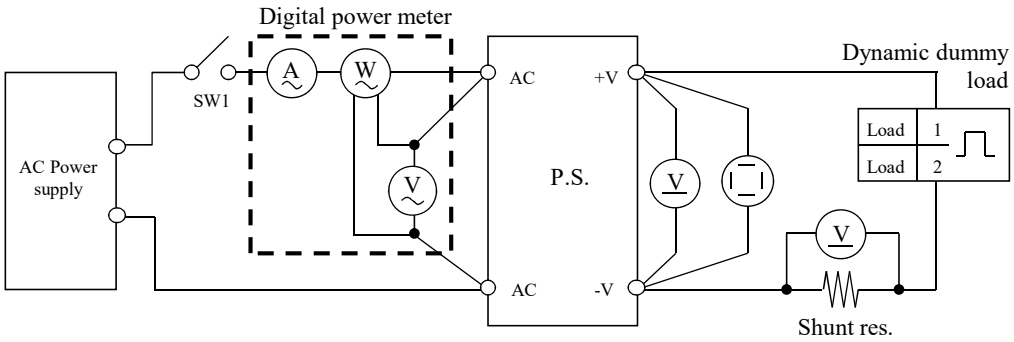
測定回路1 Circuit 1 used for determination

- ・静特性　Steady state data
- ・通電ドリフト特性　Warm up voltage drift characteristics
- ・出力保持時間特性　Hold up time 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
- ・過電流保護特性　Over current protection (OCP) characteristics
- ・過電圧保護特性　Over voltage protection (OVP) characteristics
- ・入力電圧瞬停特性　Response to brown out characteristics
- ・入力電流波形　Input current waveform

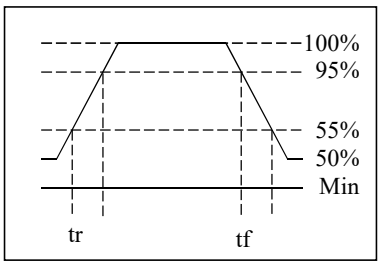


測定回路2 Circuit 2 used for determination

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

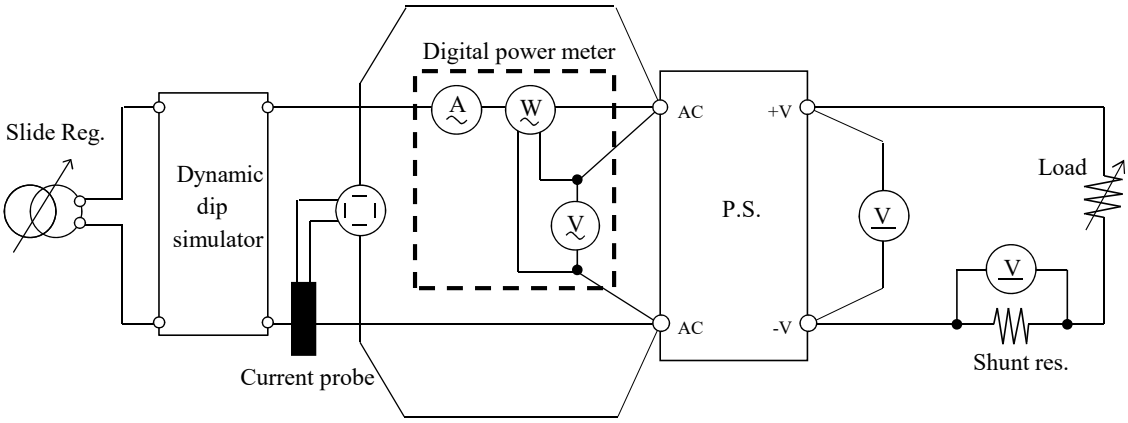


Output current waveform
Iout 50% <==> 100%



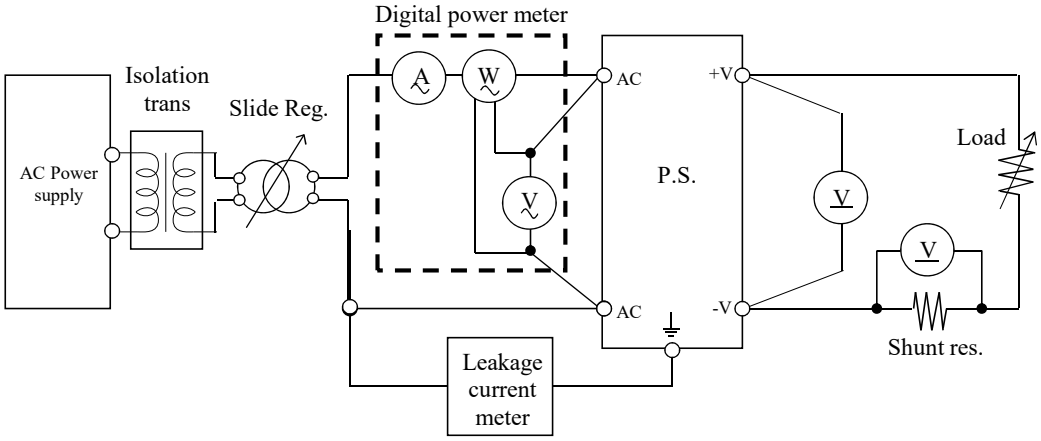
測定回路3 Circuit 3 used for determination

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



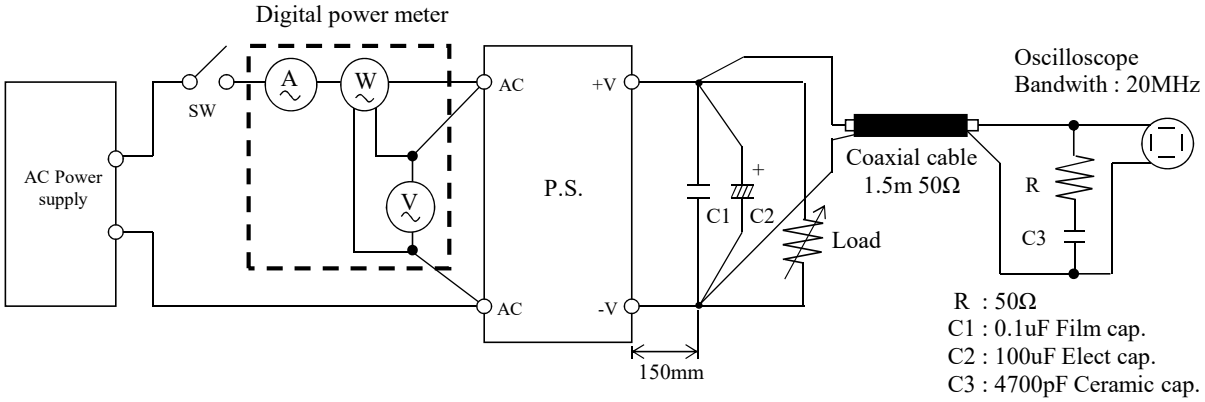
測定回路4 Circuit 4 used for determination

・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

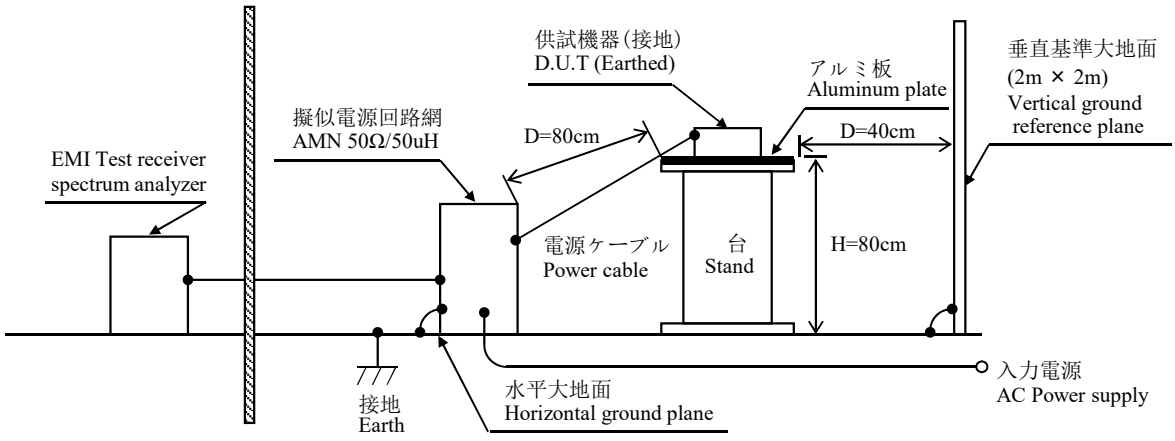


測定構成 Configuration used for determination

・EMI特性　Electro-Magnetic Interference characteristics

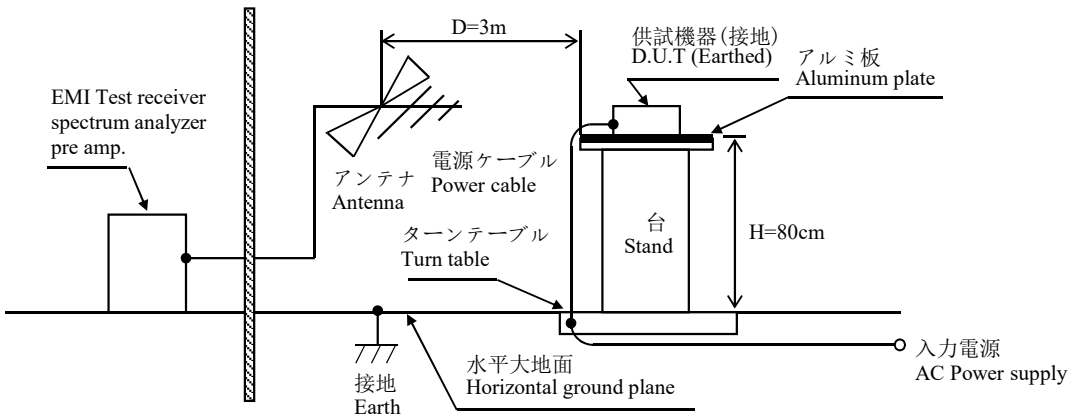
(a) 雑音端子電圧 (帰還ノイズ）

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	YOKOGAWA ELECT.	DLM2054
2	DIGITAL MULTIMETER	AGILENT	34405A/34410A
3	DIGITAL POWER METER	YOKOGAWA ELECT.	WT110 / WT210
4	CURRENT PROBE	YOKOGAWA ELECT.	701930 / 701933
5	DYNAMIC DUMMY LOAD	CHROMA	63640
6	DUMMY LOAD	CHROMA	63640
7	ISOLATION TRANS	TOUZHONG	BJZ-3KVA
8	CVCF	KIKUSUI	PCR2000LE
9	CVCF	CHROMA	61605
10	LEAKAGE CURRENT METER	SIMPSON	228
11	CONTROLLED TEMP. CHAMBER	ESPEC	SU-661 / SH-661
12	EMI TEST RECEIVER / SPECTRUM ANALYZER	ROHDE & SCHWARZ	ESCI-03
13	PRE AMP.	AGILENT	8447D
14	AMN	SCHWARZBECK	NNLK8121
15	ANTENNA	SCHWARZBECK	VULB9168
16	HARMONIC / FLICKER ANALYZER	SCHAFFNER	CCN100-1

1.3 評価負荷条件　　Load conditions

*入力電圧が115VAC以下の場合、下記のとおり出力ディレーティングが必要です。
Output derating is needed when input voltage is less than 115VAC.

Output voltage : 5V, 12V, 24V,

Vin	Iout: Full load	5V	12V	24V
85VAC	80%	24.00A	10.00A	5.04A
115 - 265VAC	100%	30.00A	12.50A	6.30A

2. 特性データ　　Characteristics

2.1 静特性　　Steady state data

(1) 入力・負荷・温度変動 / 出力起動・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	115VAC	230VAC	265VAC	line regulation	
0%	5.007V	5.008V	5.007V	5.006V	2mV	0.040%
50%	5.008V	5.009V	5.010V	5.009V	2mV	0.040%
Full load	5.008V	5.010V	5.011V	5.010V	1mV※1	0.020%
Load regulation	1mV	2mV	4mV	4mV		
	0.020%	0.040%	0.080%	0.080%		

2. Temperature drift　　Conditions　Vin：115 VAC
Iout：Full load

Ta	-25℃	+25℃	+45℃	temperature stability	
Vout	4.974V	5.010V	5.009V	36mV	0.720%

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

Start up voltage (Vin)	73VAC
Drop out voltage (Vin)	63VAC

12V

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

Iout \ Vin	85VAC	115VAC	230VAC	265VAC	line regulation	
0%	12.023V	12.024V	12.025V	12.025V	2mV	0.017%
50%	12.022V	12.024V	12.024V	12.024V	2mV	0.017%
Full load	12.022V	12.024V	12.023V	12.024V	1mV※1	0.008%
Load regulation	1mV	0mV	2mV	1mV		
	0.008%	0.000%	0.017%	0.008%		

2. Temperature drift　　Conditions　Vin：115 VAC
Iout：Full load

Ta	-25℃	+25℃	+45℃	temperature stability	
Vout	11.968V	12.024V	12.029V	61mV	0.508%

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

Start up voltage (Vin)	74VAC
Drop out voltage (Vin)	64VAC

24V

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

Iout \ Vin	85VAC	115VAC	230VAC	265VAC	line regulation	
0%	24.030V	24.029V	24.029V	24.029V	1mV	0.004%
50%	24.026V	24.027V	24.028V	24.028V	2mV	0.008%
Full load	24.024V	24.025V	24.026V	24.026V	1mV※1	0.004%
Load regulation	6mV	4mV	3mV	3mV		
	0.025%	0.017%	0.013%	0.013%		

2. Temperature drift　　Conditions　Vin：115 VAC
Iout：Full load

Ta	-25℃	+25℃	+45℃	temperature stability	
Vout	23.938V	24.025V	24.026V	88mV	0.367%

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

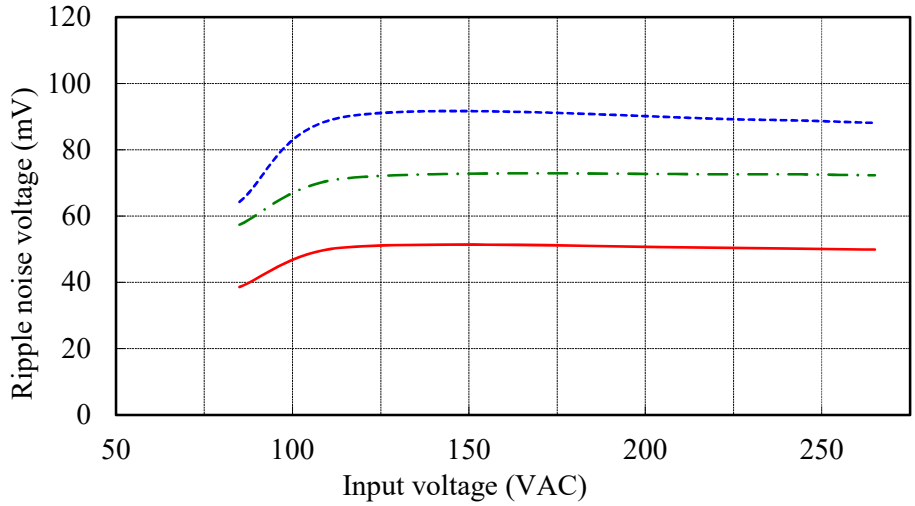
Start up voltage (Vin)	73VAC
Drop out voltage (Vin)	63VAC

※1　Line regulation : 115VAC - 265VAC

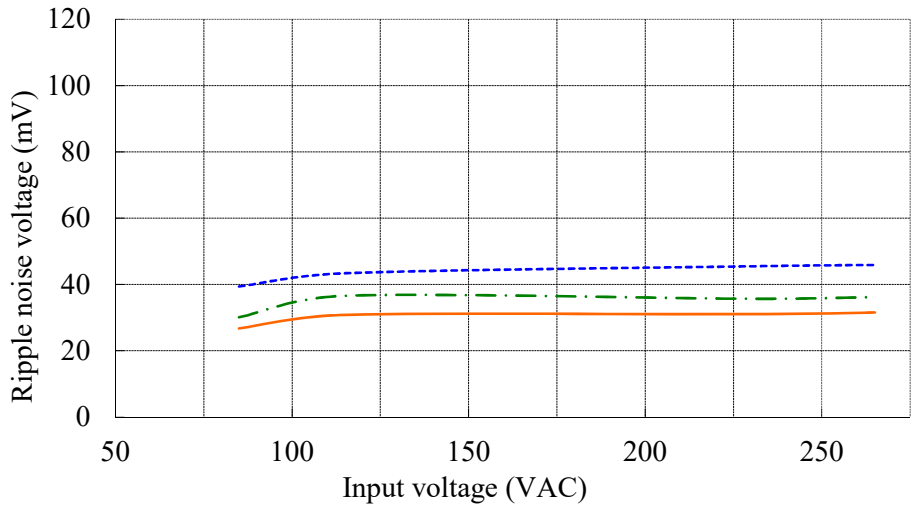
(2) リップルノイズ電圧対入力電圧
Ripple noise voltage vs. Input voltage

Conditions Iout : Full load
Ta : -25 ℃
25 ℃
45 ℃

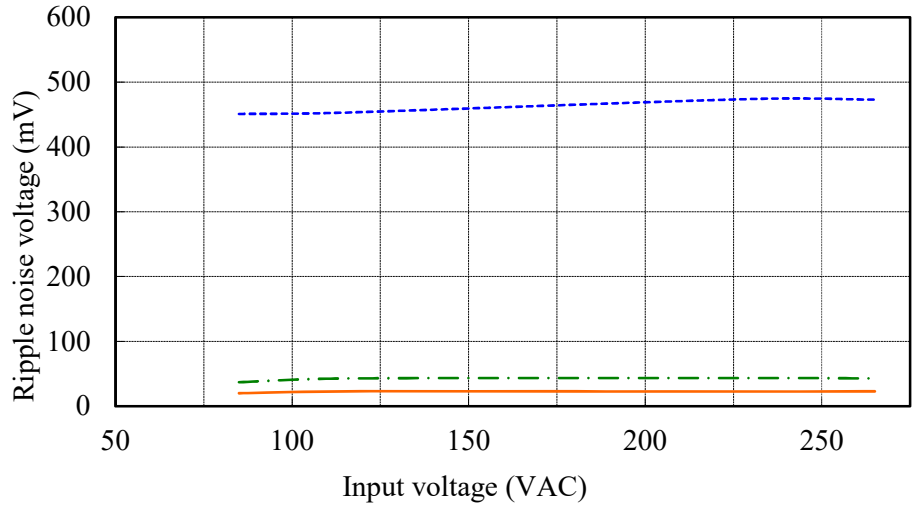
5V



12V



24V

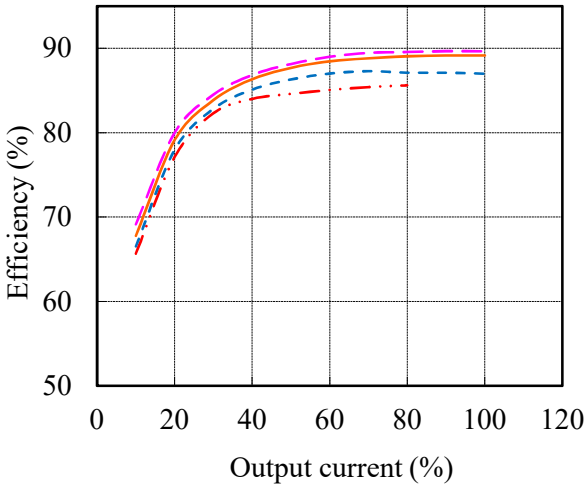


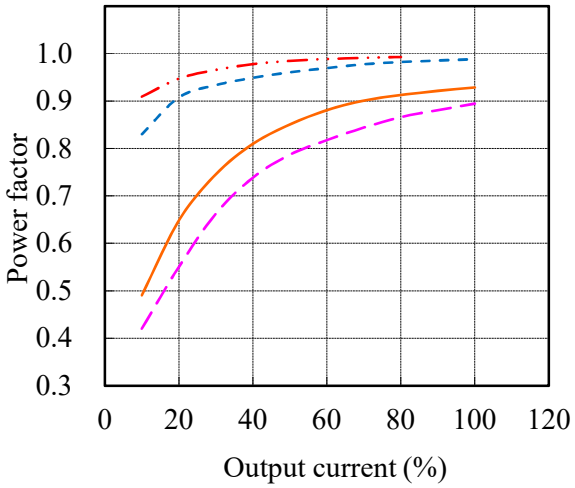
(3) 効率・力率対出力電流

Efficiency and Power factor vs. Output current

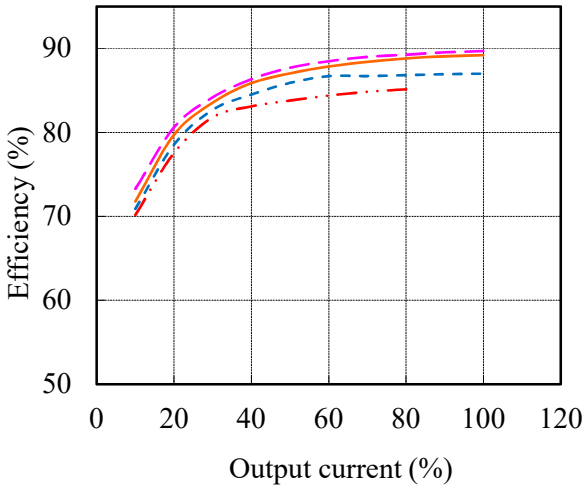
Conditions Vin : 85 VAC
115 VAC
230 VAC
265 VAC
Ta : 25 ℃

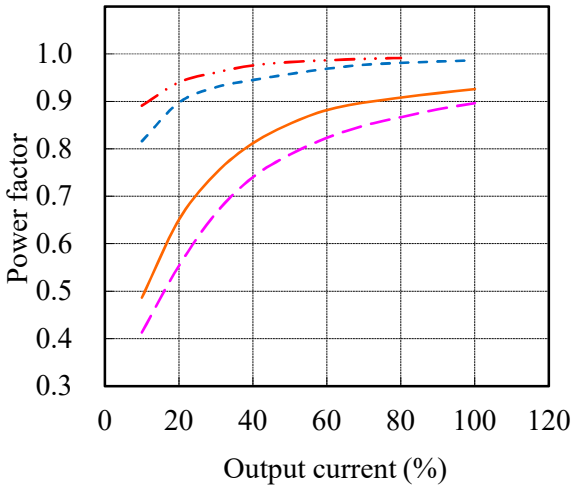
5V



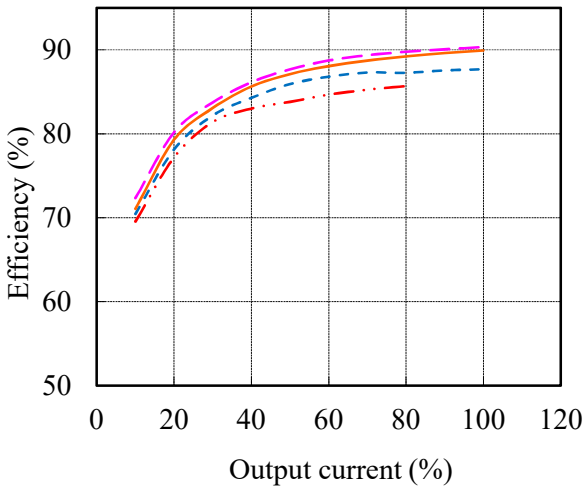


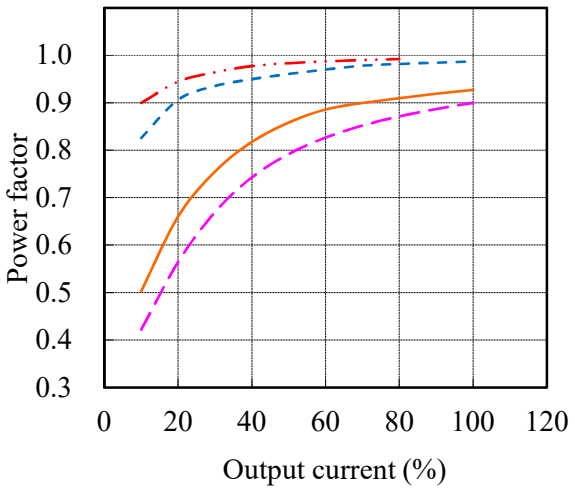
12V





24V



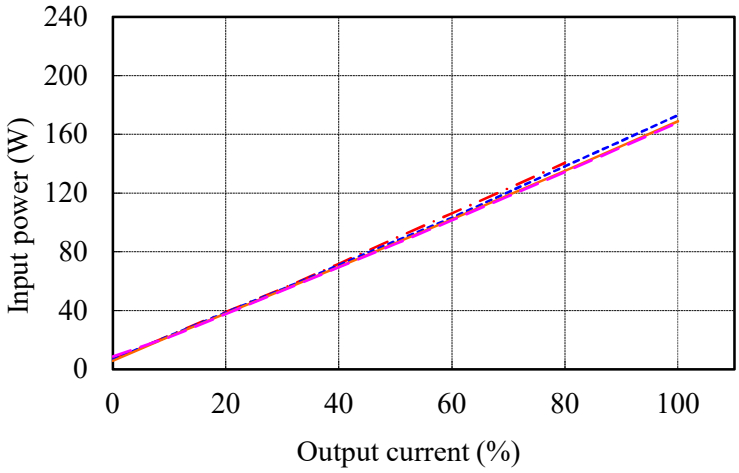


(4) 入力電力対出力電流
Input power vs. Output current

Conditions Vin : 85 VAC
115 VAC
230 VAC
265 VAC
Ta : 25 ℃

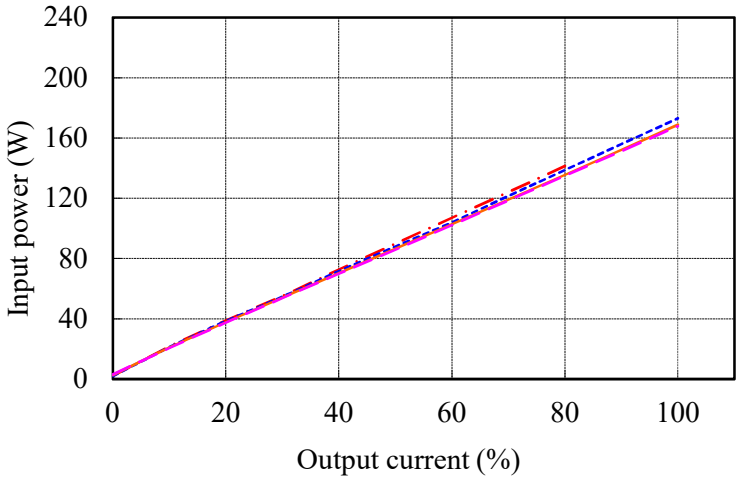
5V

Vin	Input power
	Iout : 0%
85VAC	6.68W
115VAC	6.62W
230VAC	5.76W
265VAC	8.71W



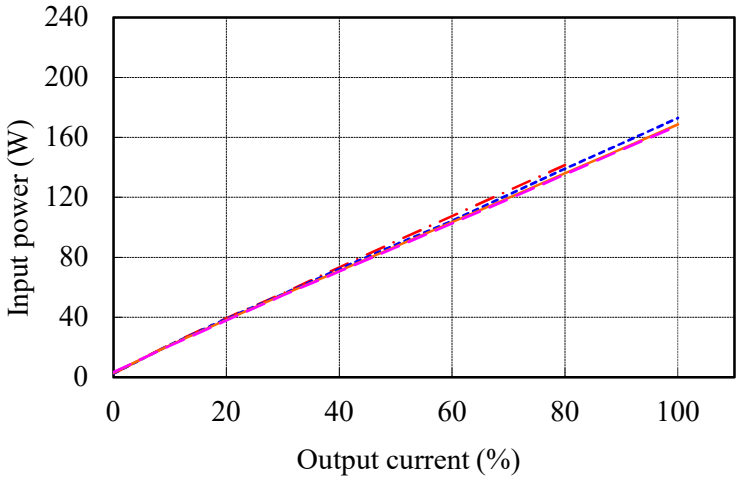
12V

Vin	Input power
	Iout : 0%
85VAC	2.21W
115VAC	1.98W
230VAC	2.68W
265VAC	3.10W



24V

Vin	Input power
	Iout : 0%
85VAC	2.52W
115VAC	2.36W
230VAC	2.88W
265VAC	3.35W

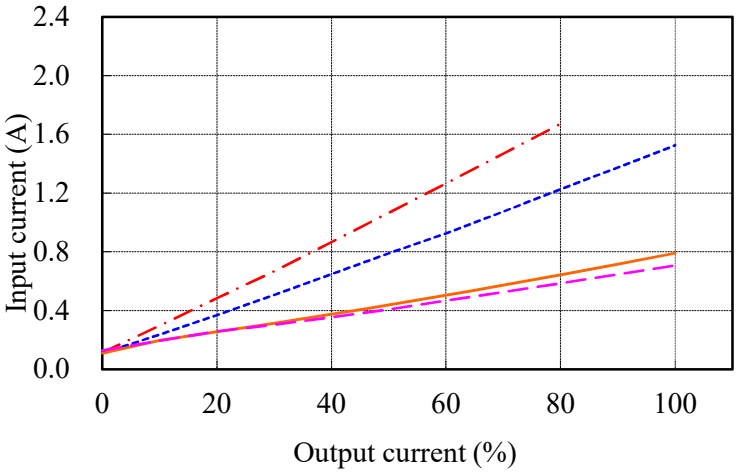


(5) 入力電流対出力電流
Input current vs. Output current

Conditions Vin : 85 VAC
115 VAC
230 VAC
265 VAC
Ta : 25 ℃

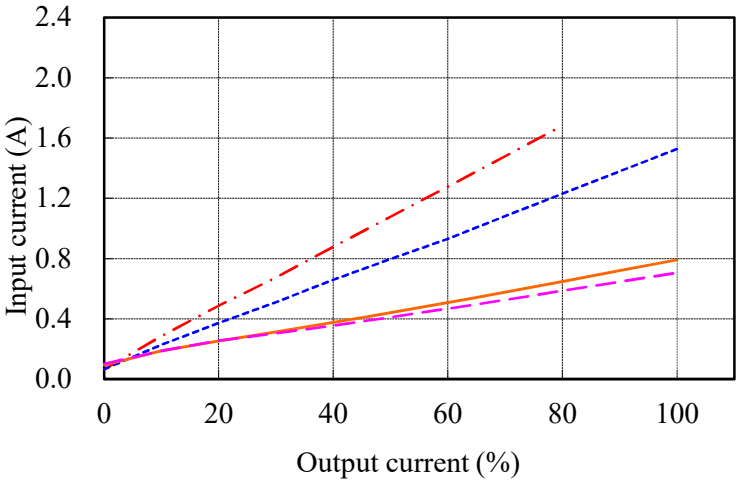
5V

Vin	Input current
	Iout : 0%
85VAC	0.11A
115VAC	0.11A
230VAC	0.11A
265VAC	0.13A



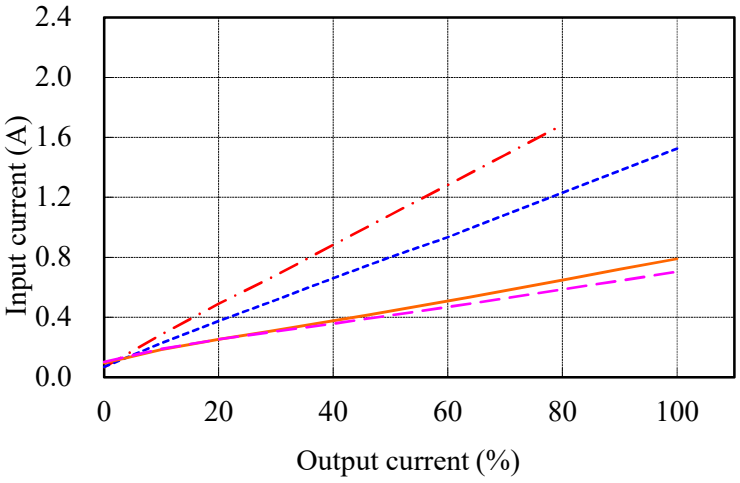
12V

Vin	Input current
	Iout : 0%
85VAC	0.06A
115VAC	0.07A
230VAC	0.09A
265VAC	0.10A



24V

Vin	Input current
	Iout : 0%
85VAC	0.07A
115VAC	0.07A
230VAC	0.09A
265VAC	0.10A

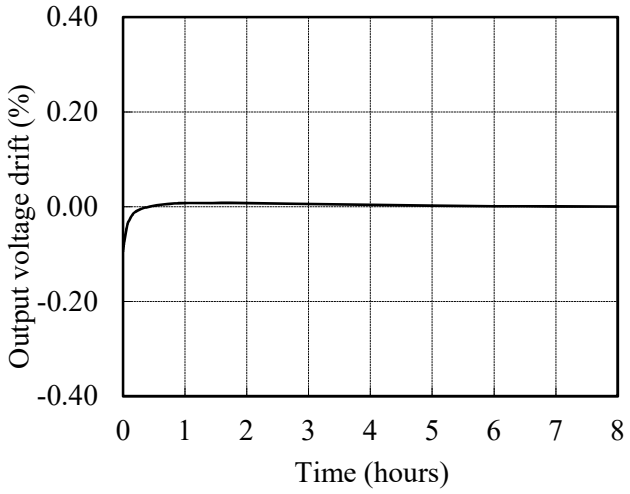


2.2 通電ドリフト特性

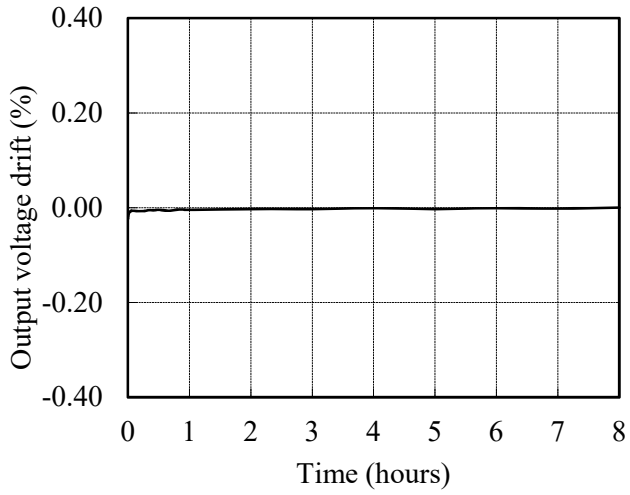
Warm up voltage drift characteristics

Conditions Vin : 115 VAC
Iout : Full load
Ta : 25 ℃

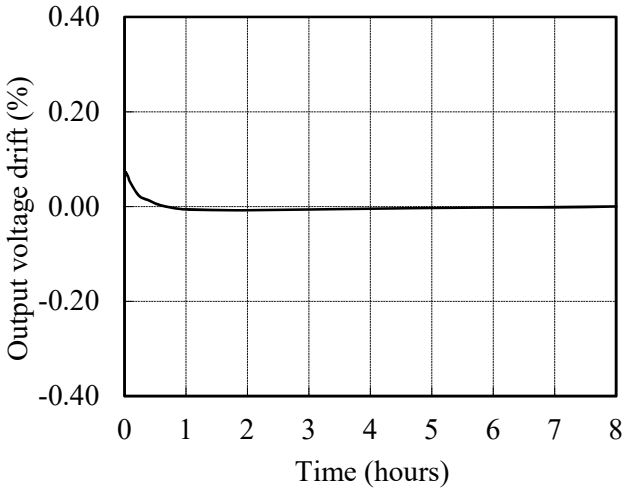
5V



12V



24V

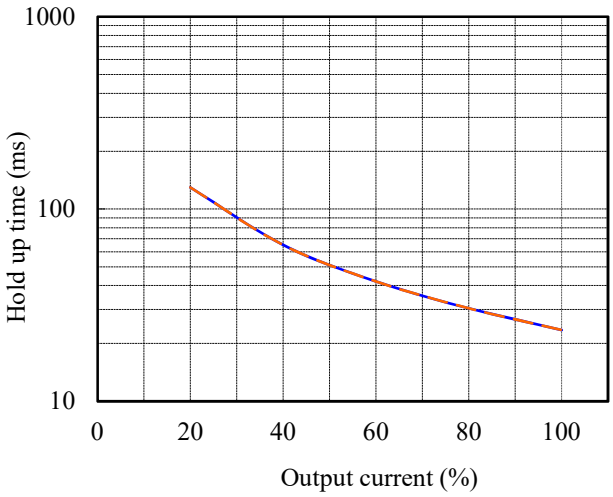


2.3 出力保持時間特性

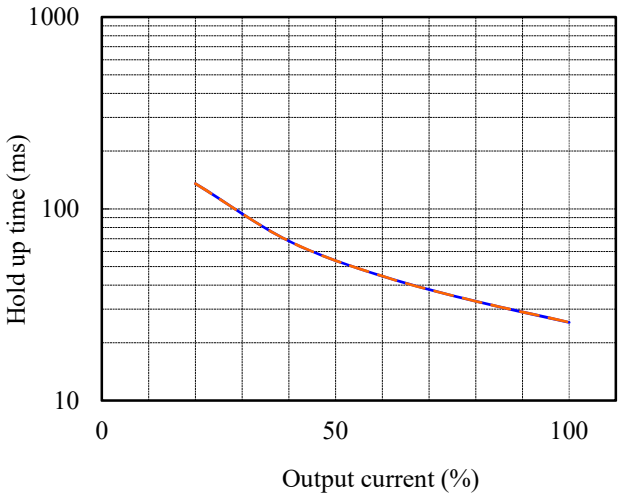
Hold up time characteristics

Conditions Vin : 115 VAC
230 VAC
Ta : 25 ℃

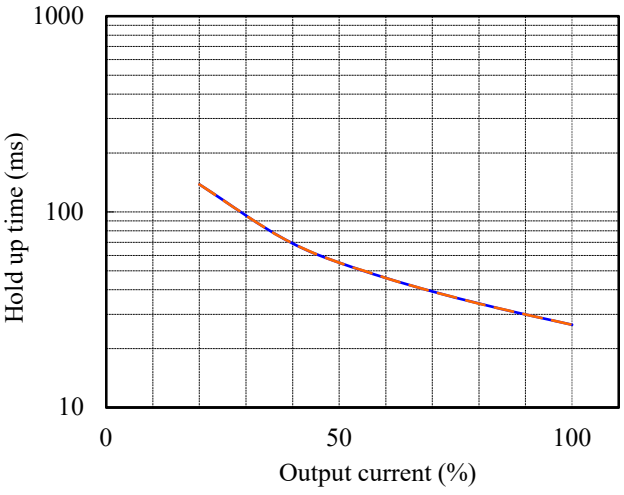
5V



12V



24V

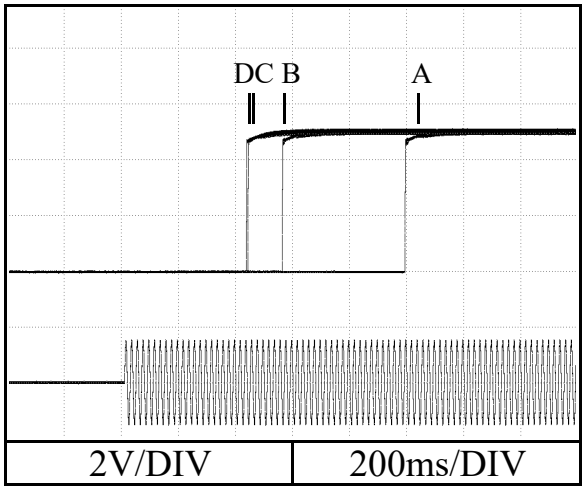


2.4 出力立ち上がり特性
Output rise characteristics

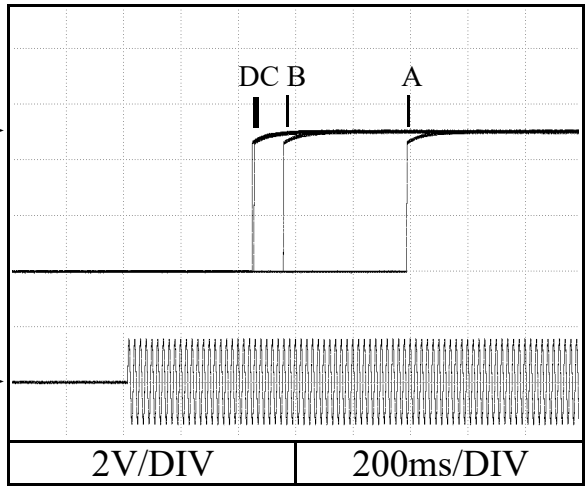
Conditions Vin : 85 VAC (A)
115 VAC (B)
230 VAC (C)
265 VAC (D)
Ta : 25 ℃

5V

Iout : 0%

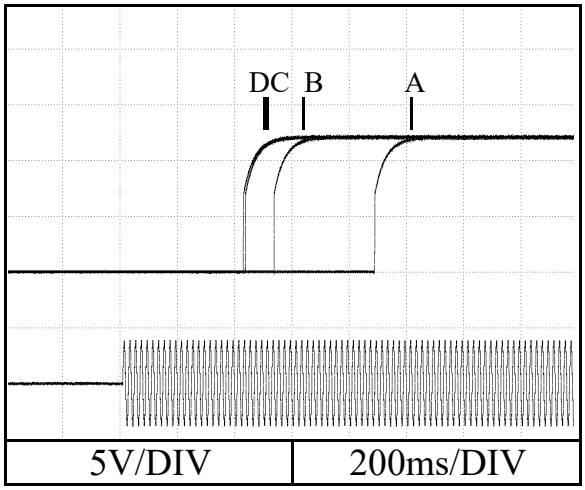


Iout:Full load

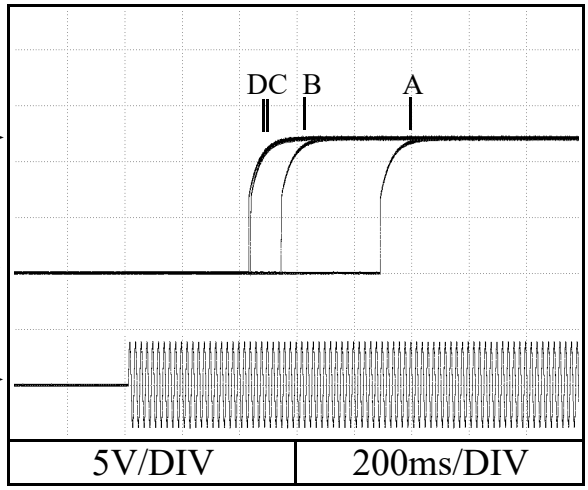


12V

Iout : 0%

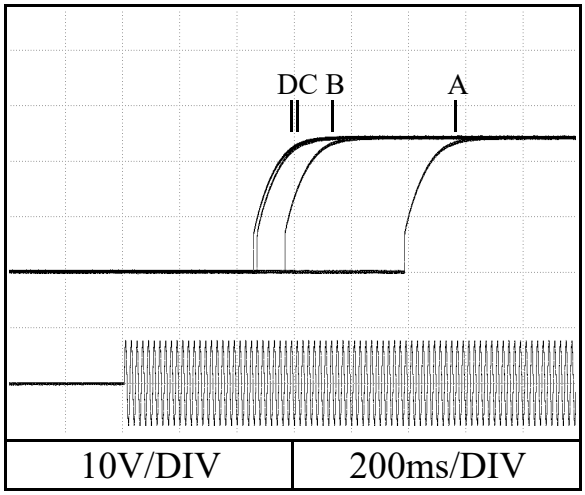


Iout:Full load

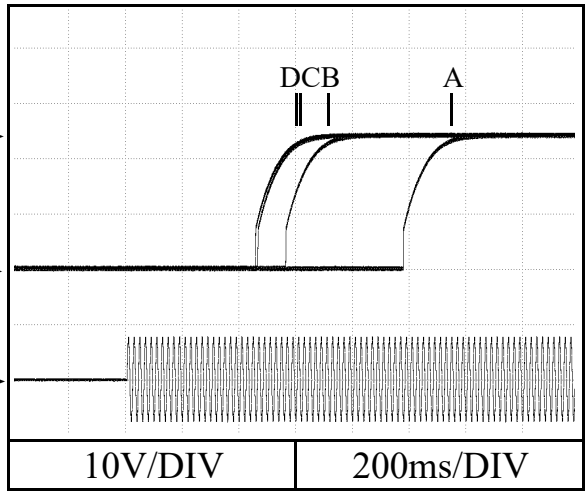


24V

Iout : 0%



Iout:Full load

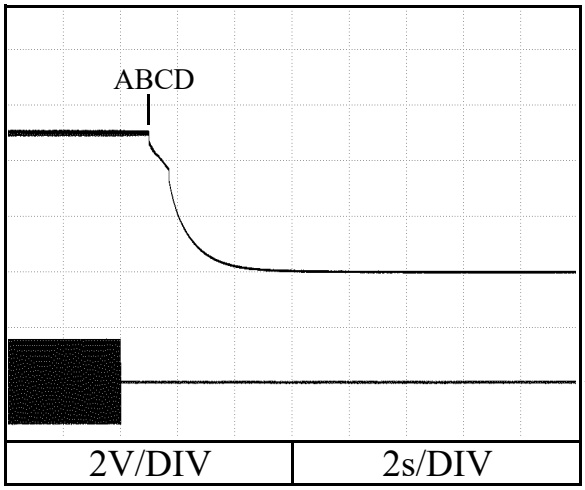


2.5 出力立ち下がり特性
Output fall characteristics

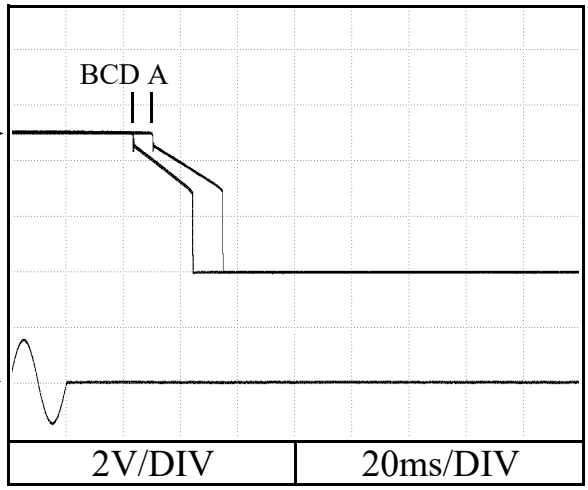
Conditions Vin : 85 VAC (A)
115 VAC (B)
230 VAC (C)
265 VAC (D)
Ta : 25 ℃

5V

Iout : 0%

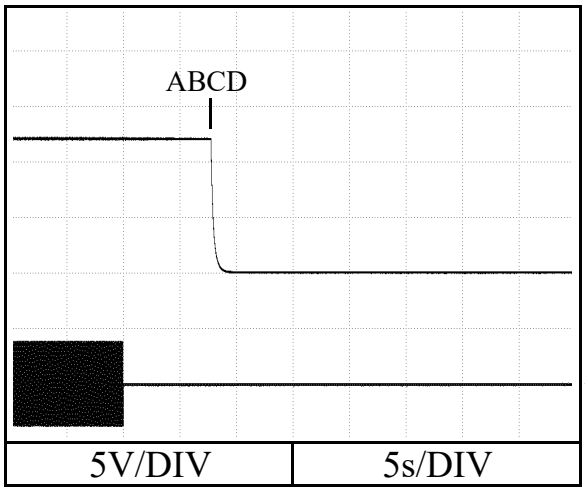


Iout:Full load

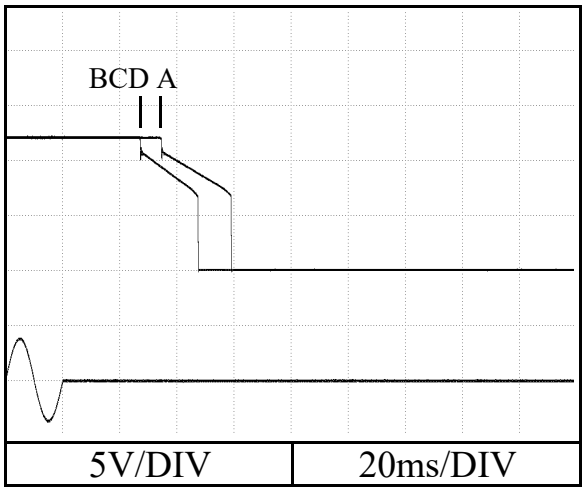


12V

Iout : 0%

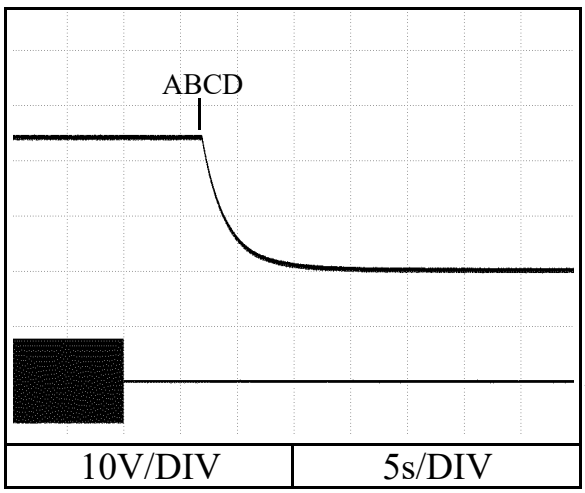


Iout:Full load

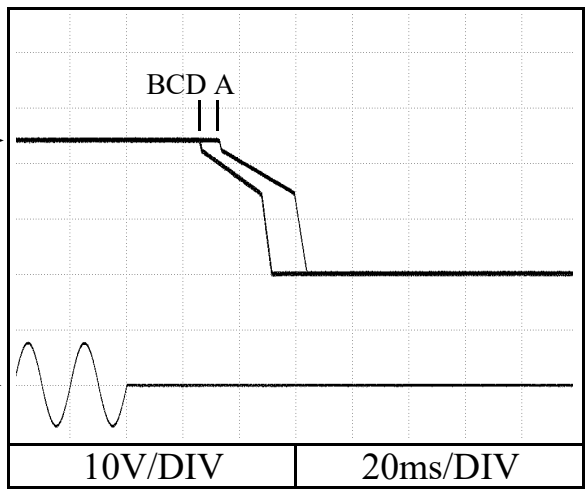


24V

Iout : 0%



Iout:Full load

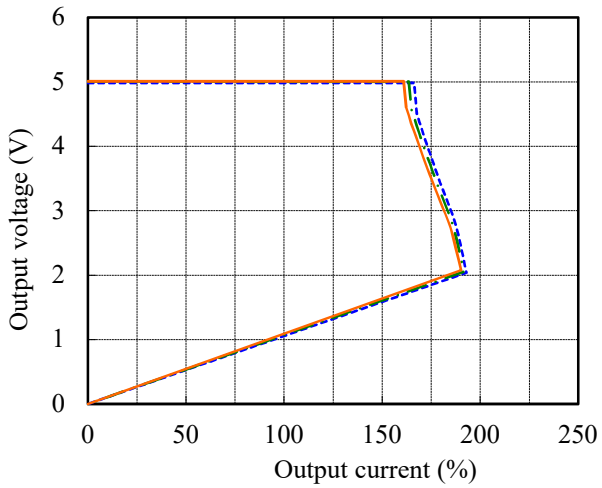


2.6 過電流保護特性

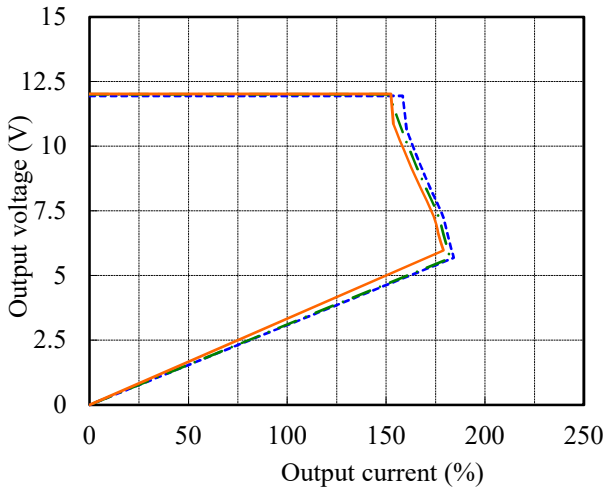
Over current protection (OCP) characteristics

Conditions Vin : 115 VAC
Ta : -25 ℃
25 ℃
45 ℃

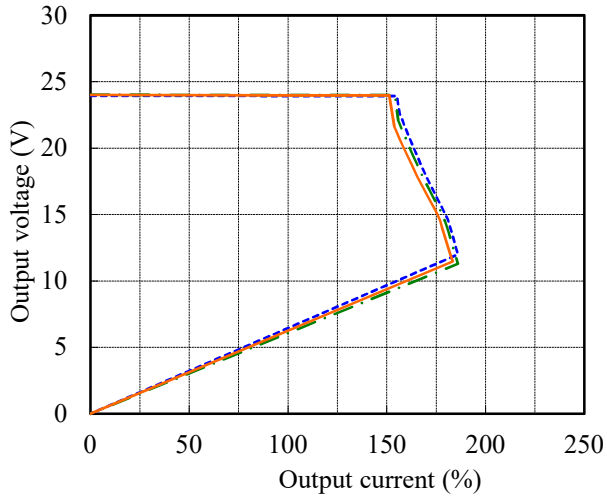
5V



12V



24V

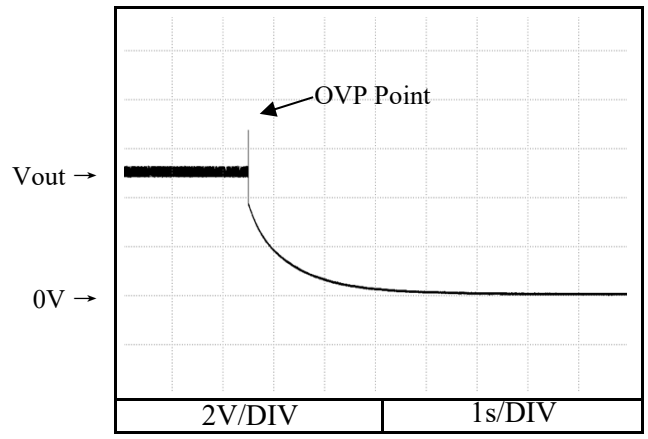


2.7 過電圧保護特性

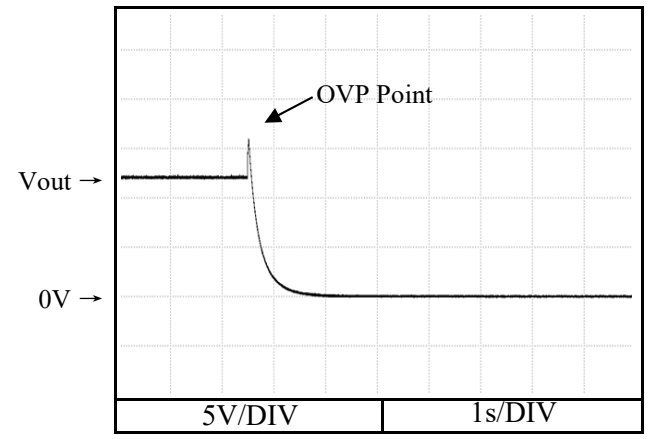
Over voltage protection (OVP) characteristics

Conditions Vin : 115 VAC
Iout : 0 %
Ta : 25 ℃

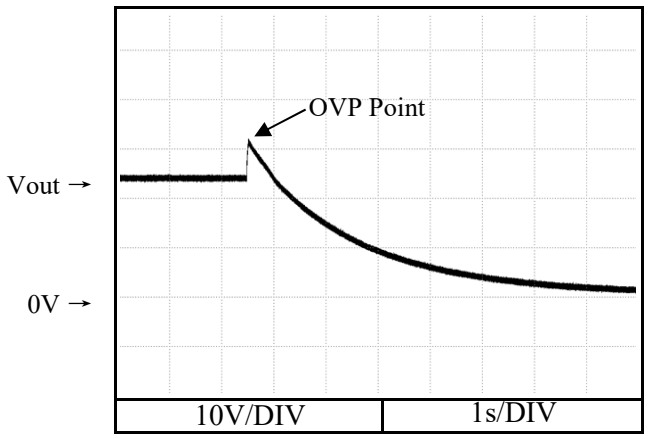
5V



12V



24V

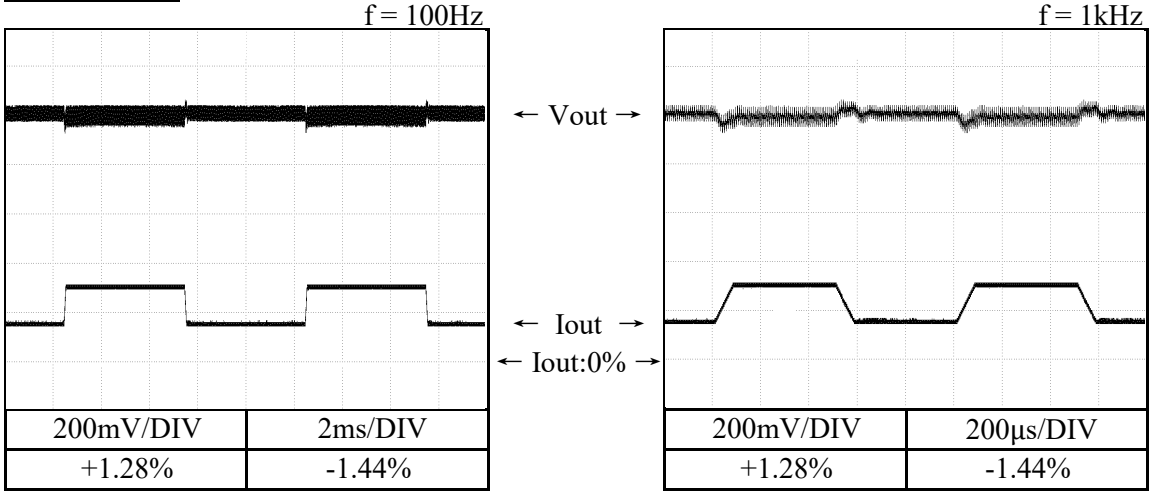


2.8 過渡応答（負荷急変）特性

Dynamic load response characteristics

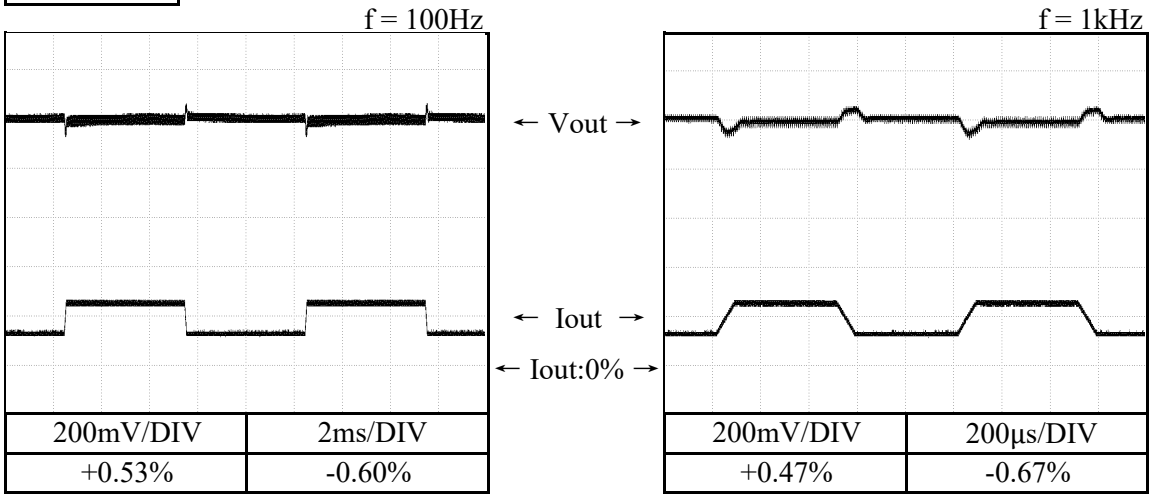
Conditions Vin : 115 VAC
Iout : 50 %⟷ 100 %
(tr = tf = 75us)
Ta : 25 ℃

5V



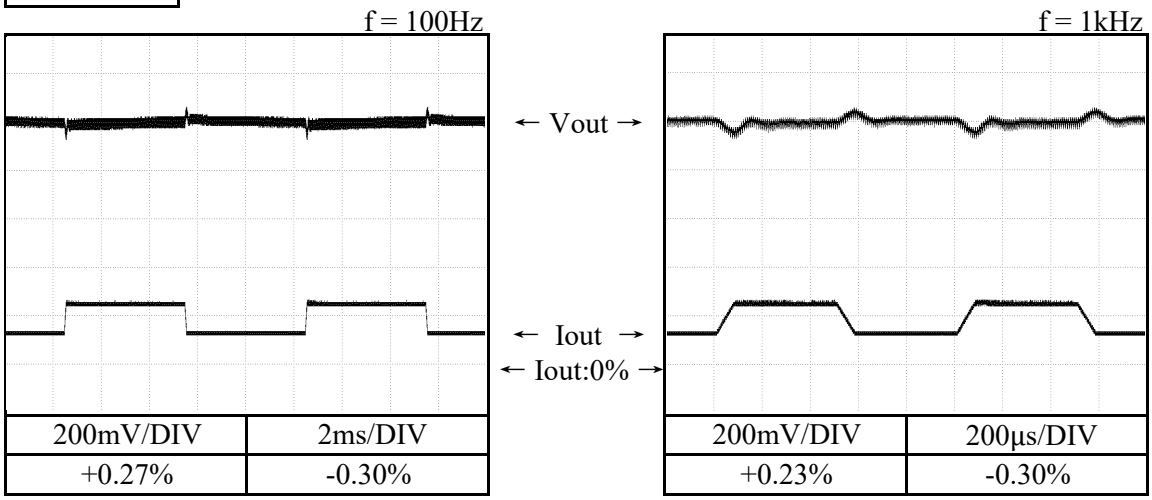
200mV/DIV	2ms/DIV	200mV/DIV	200µs/DIV
+1.28%	-1.44%	+1.28%	-1.44%

12V



200mV/DIV	2ms/DIV	200mV/DIV	200µs/DIV
+0.53%	-0.60%	+0.47%	-0.67%

24V



200mV/DIV	2ms/DIV	200mV/DIV	200µs/DIV
+0.27%	-0.30%	+0.23%	-0.30%

2.9 入力電圧瞬停特性

Response to brown out characteristics

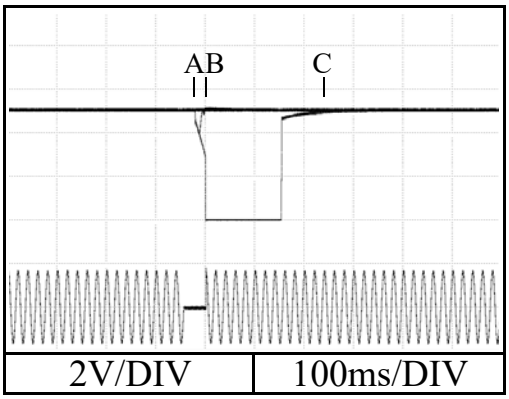
Conditions Ta : 25 ℃
Iout : Full load

瞬停時間 Interruption time

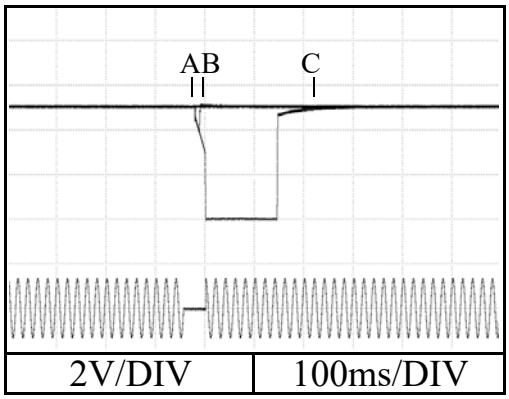
A : 出力電圧が低下なし Output voltage does not drop.
B : 出力電圧の低下が0Vまでいかない Output voltage drop down not reaching 0V.
C : 出力電圧が0Vまで低下 Output voltage drops until 0V.

5V

Vin : 115VAC
A = 22ms, B = 32ms, C = 45ms

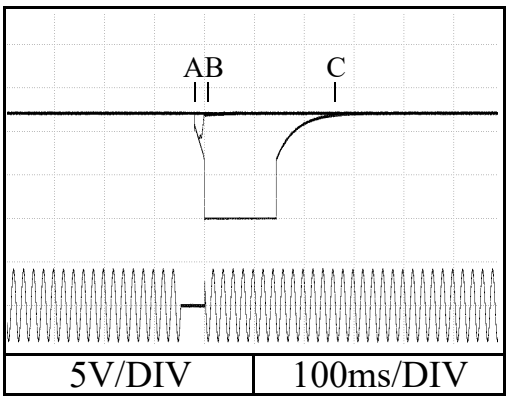


Vin : 230VAC
A = 22ms, B = 30ms, C = 45ms

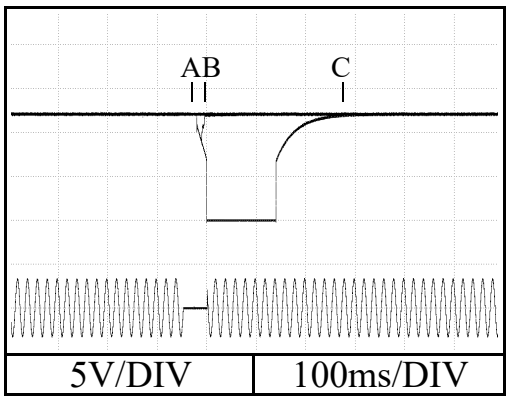


12V

Vin : 115VAC
A = 25ms, B = 36ms, C = 48ms

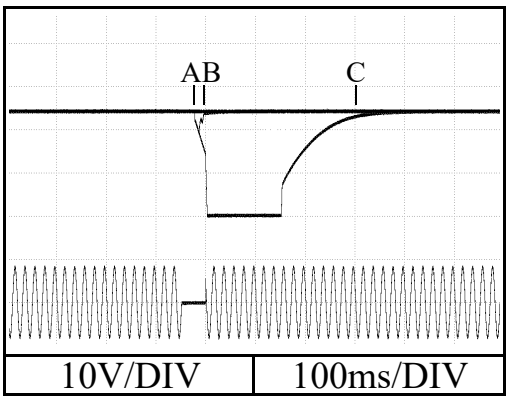


Vin : 230VAC
A = 24ms, B = 35ms, C = 48ms

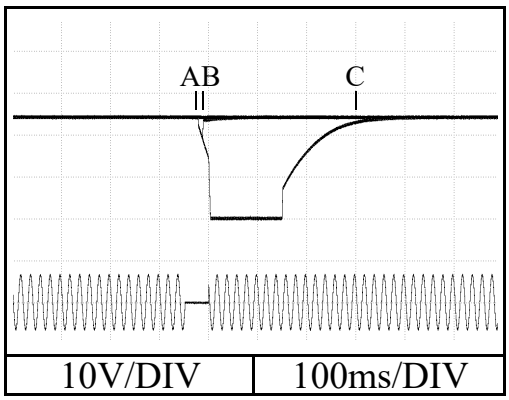


24V

Vin : 115VAC
A = 24ms, B = 35ms, C = 48ms



Vin : 230VAC
A = 25ms, B = 35ms, C = 47ms

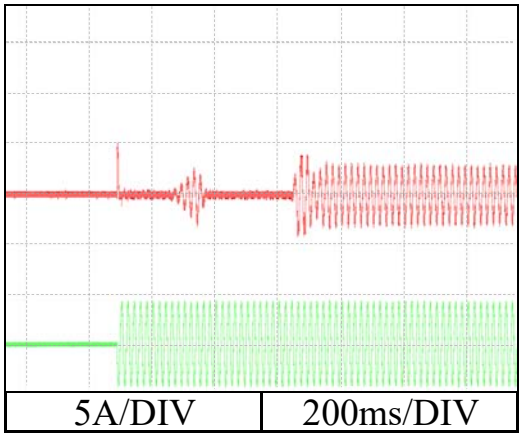


2.10 入力サージ電流（突入電流）波形
Inrush current waveform

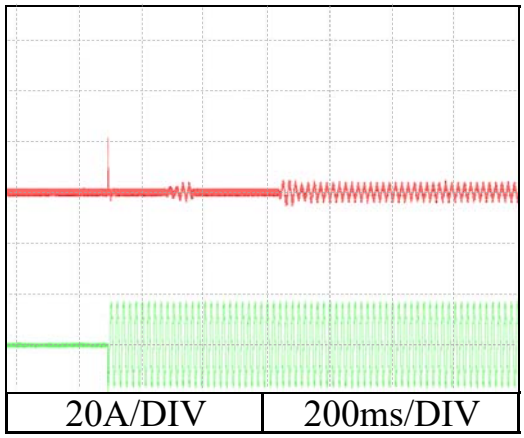
5V

Conditions Vin : 115 VAC
Iout : Full load
Ta : 25 ℃

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

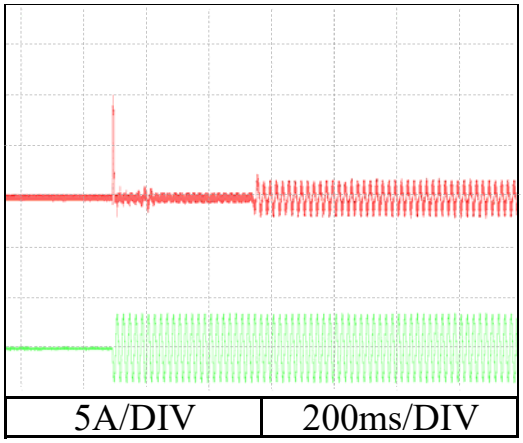


Switch on phase angle of input AC voltage
ϕ = 90°

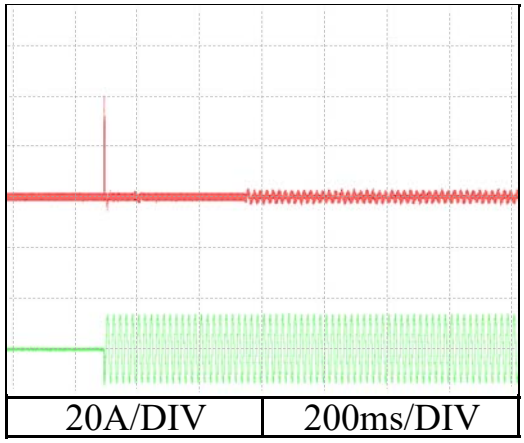


Conditions Vin : 230 VAC
Iout : Full load
Ta : 25 ℃

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



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

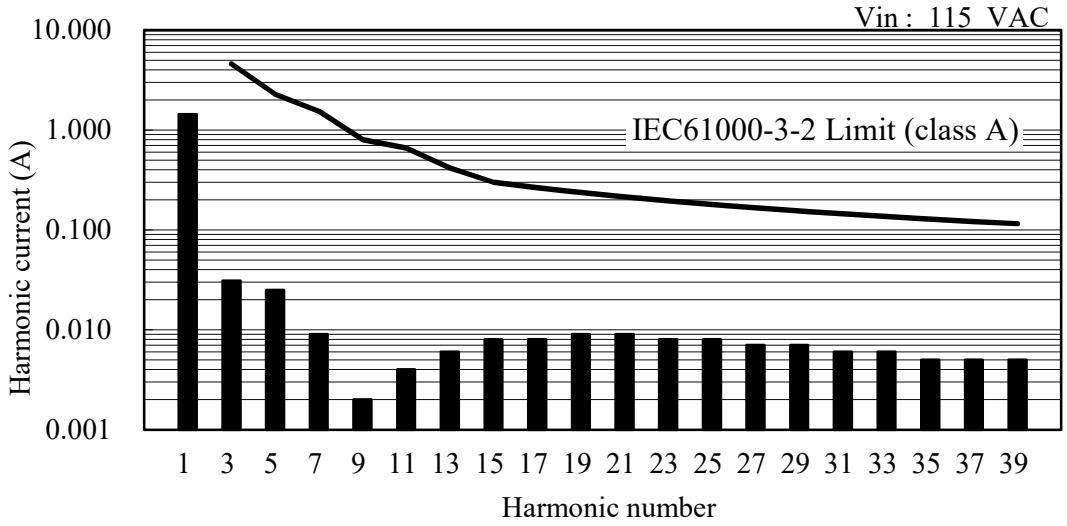


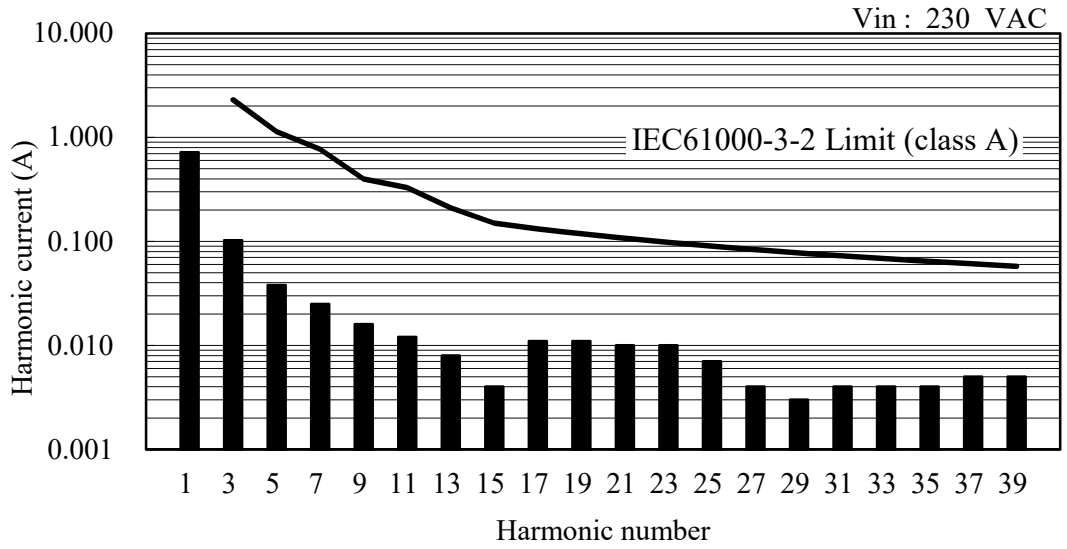
2.11 高調波成分

Input current harmonics

Conditions Iout : Full load
Ta : 25 ℃

5V



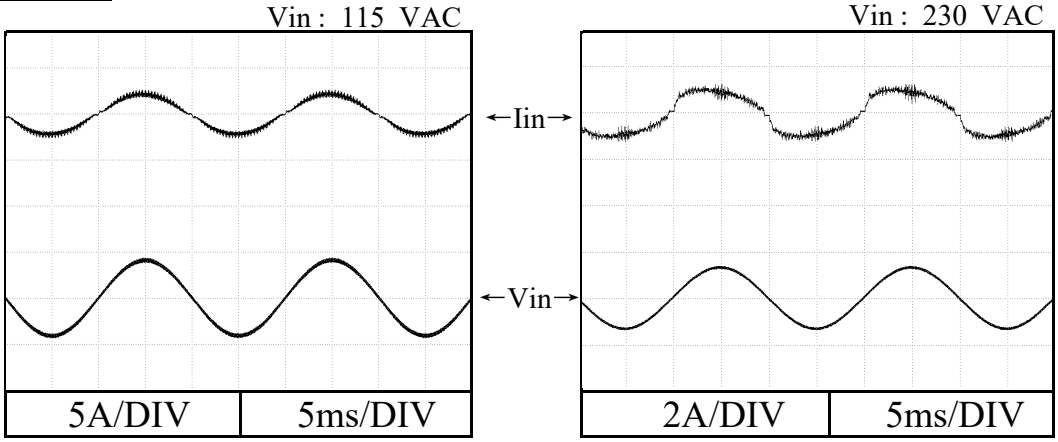


2.12 入力電流波形

Input current waveform

Conditions Iout : Full load
Ta : 25 ℃

5V

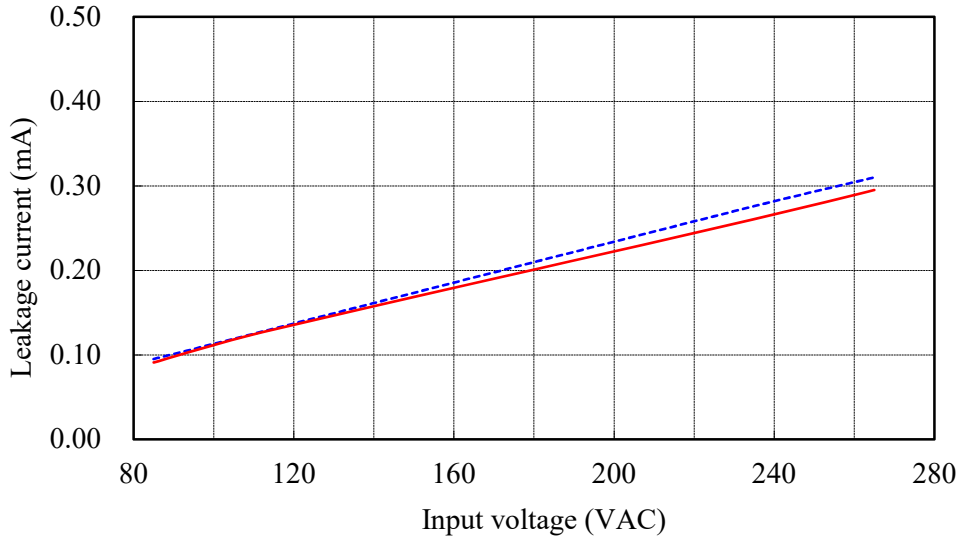


2.13 リーク電流特性
Leakage current characteristics

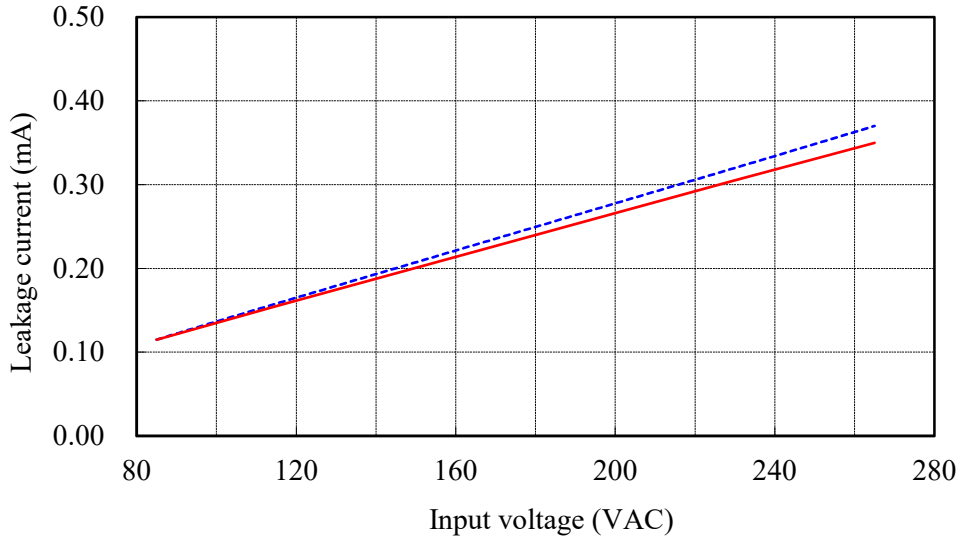
Conditions Iout : 0 %
Full Load
Ta : 25 ℃
Equipment used : MODEL 228
(Simpson)

5V

f : 50 Hz



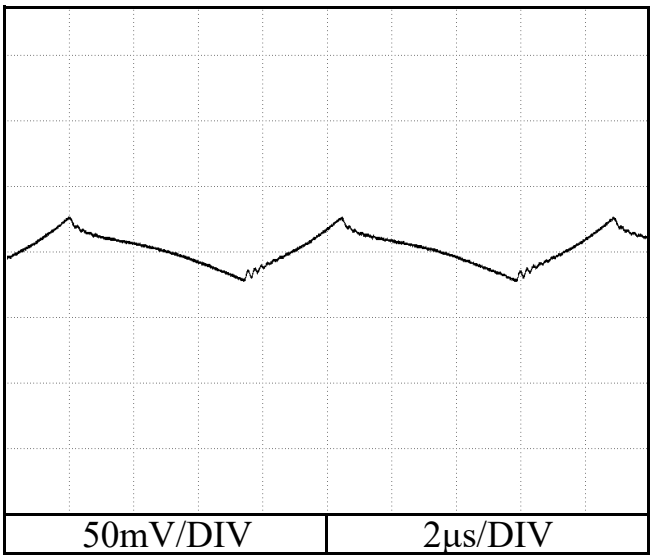
f : 60 Hz



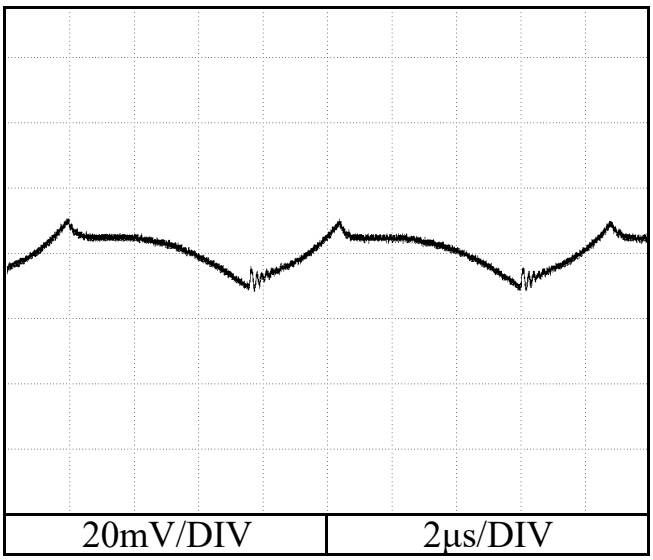
2.14 出力リップル、ノイズ波形
Output ripple and noise waveform

Conditions Vin : 115 VAC
Iout : Full load
Ta : 25 ℃

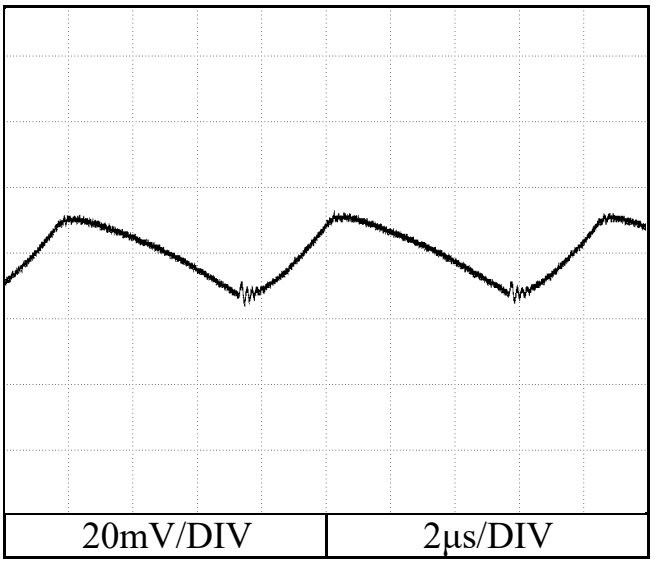
5V



12V



24V



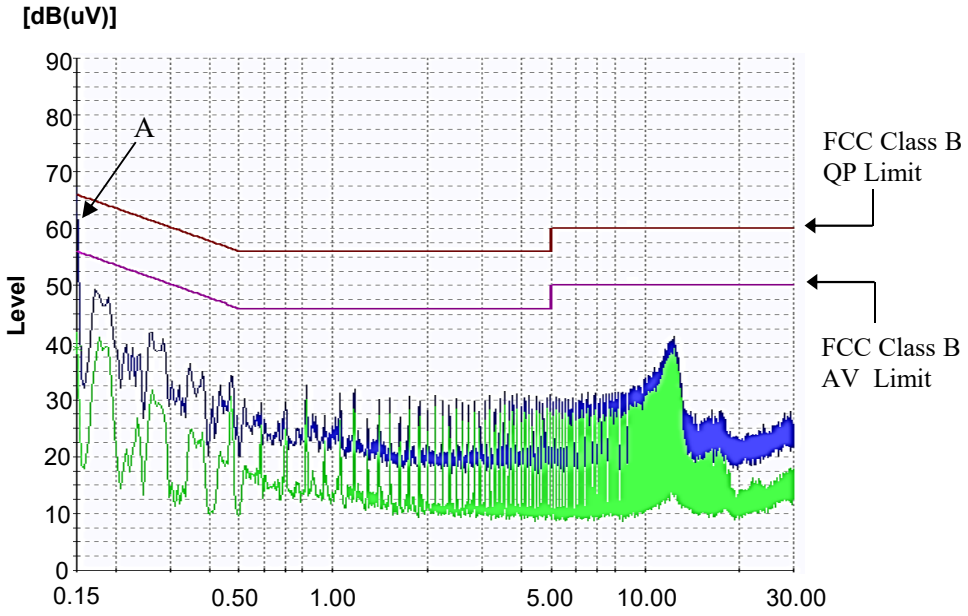
2.15 ＥＭＩ特性
Electro-Magnetic Interference characteristics

Conditions Vin : 230 VAC
Iout : Full load
Ta : 25 ℃

雑音端子電圧
Conducted Emission

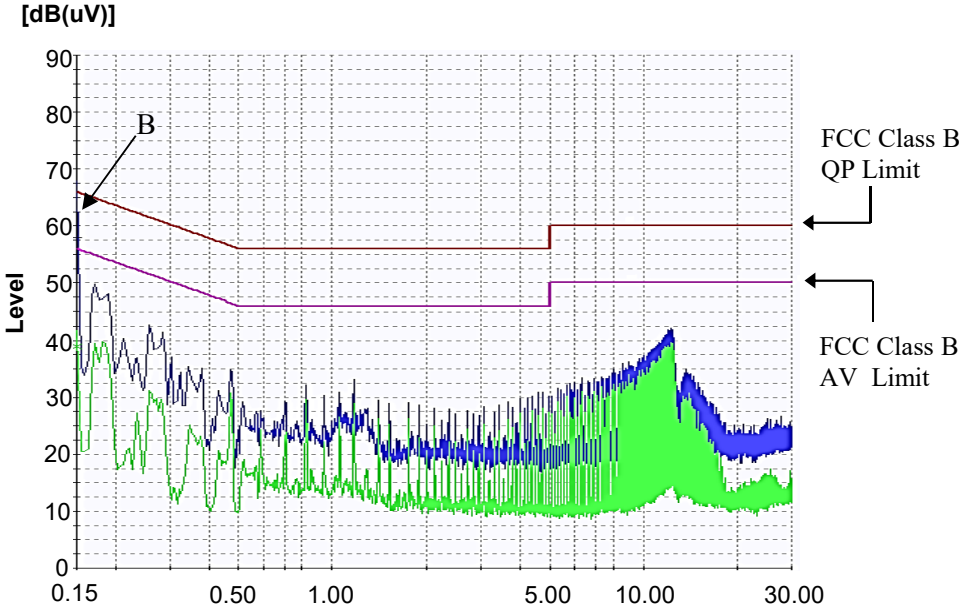
5V

Phase : N



Ref. Data	Point A (150kHz) Limit (dBuV)	Measure (dBuV)
QP	66.0	57.6
AV	56.0	39.1

Phase : L



Ref. Data	Point B (150kHz) Limit (dBuV)	Measure (dBuV)
QP	66.0	57.9
AV	56.0	39.0

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

2.15 ＥＭＩ特性
Electro-Magnetic Interference characteristics

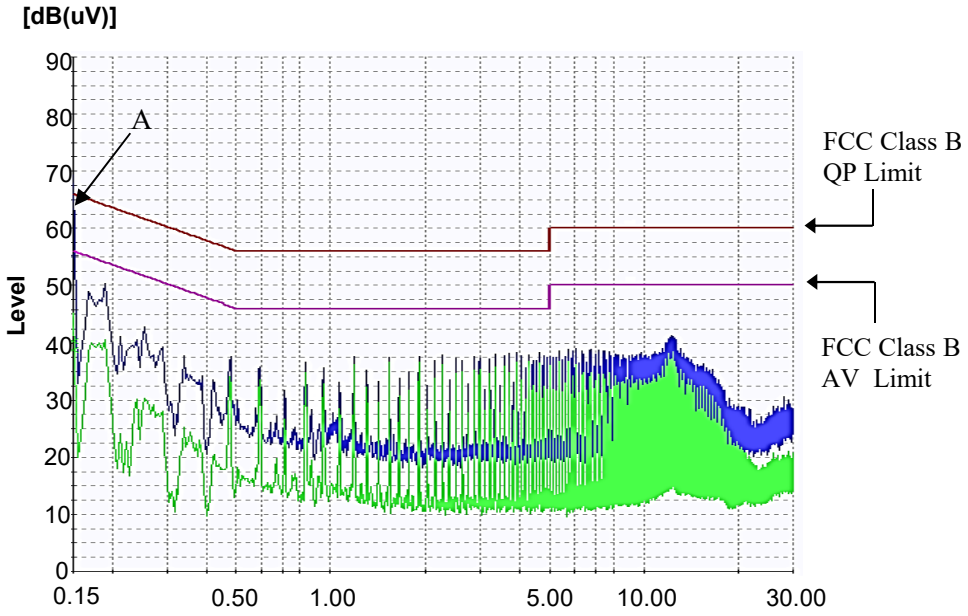
Conditions Vin : 230 VAC
Iout : Full load
Ta : 25 ℃

雑音端子電圧
Conducted Emission

12V

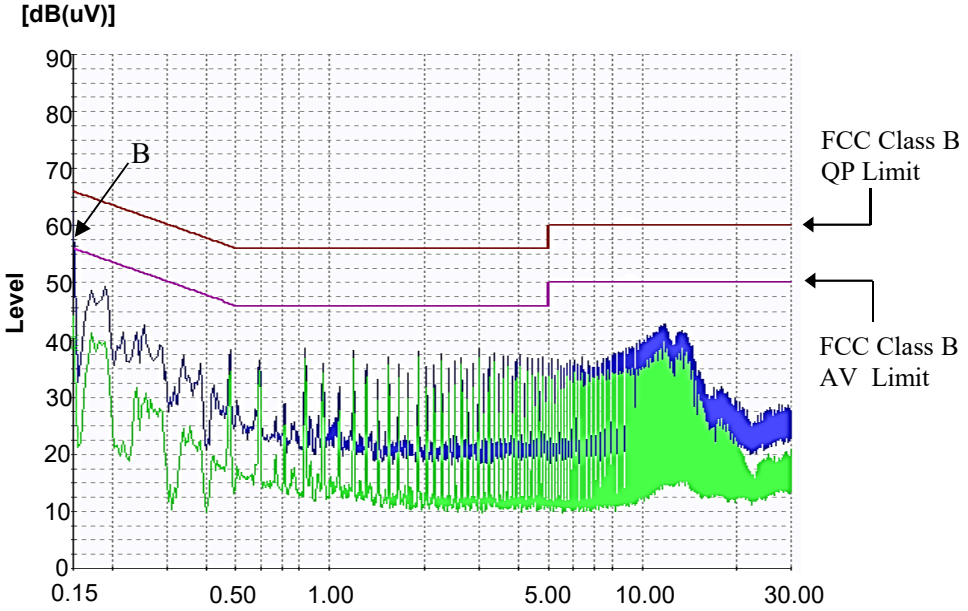
Phase : N

Ref. Data	Point A (150kHz) Limit (dBuV)	Measure (dBuV)
QP	66.0	55.3
AV	56.0	38.8



Phase : L

Ref. Data	Point B (150kHz) Limit (dBuV)	Measure (dBuV)
QP	66.0	56.4
AV	56.0	38.7



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

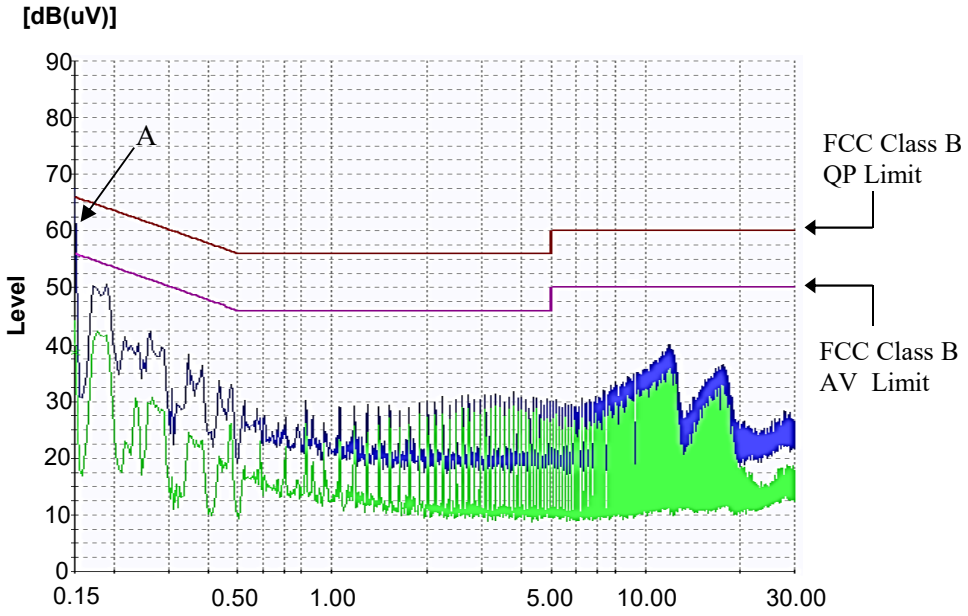
2.15 ＥＭＩ特性
Electro-Magnetic Interference characteristics

Conditions Vin : 230 VAC
Iout : Full load
Ta : 25 ℃

雑音端子電圧
Conducted Emission

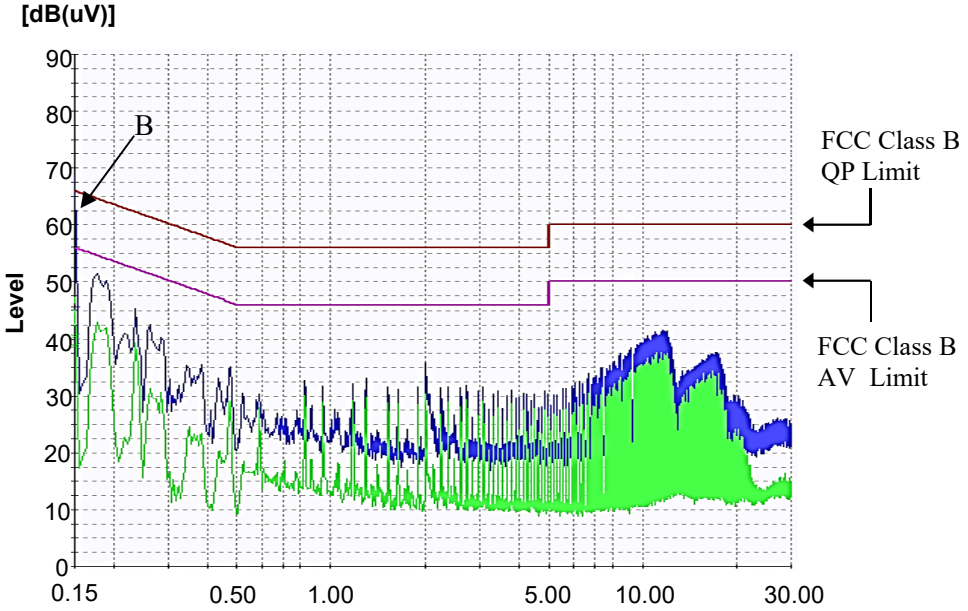
24V

Phase : N



Ref. Data	Point A (150kHz) Limit (dBuV)	Measure (dBuV)
QP	66.0	55.4
AV	56.0	38.7

Phase : L



Ref. Data	Point B (150kHz) Limit (dBuV)	Measure (dBuV)
QP	66.0	56.1
AV	56.0	38.9

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

2.15 ＥＭＩ特性

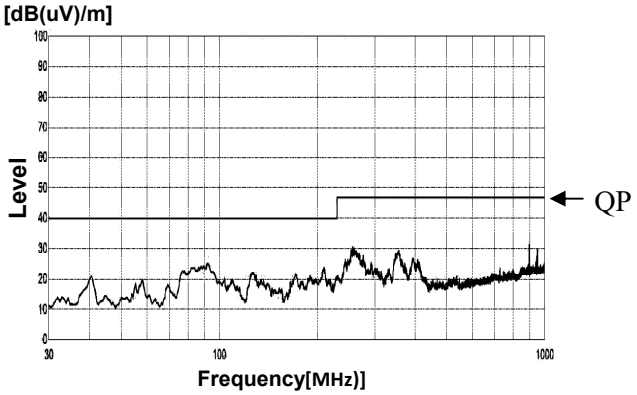
Electro-Magnetic Interference characteristics

Conditions Vin : 230 VAC
Io : Full load
Ta : 25 ℃

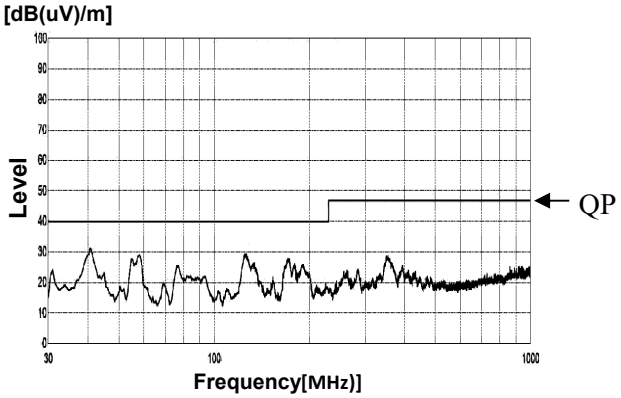
雑音電界強度
Radiated Emission

5V

HORIZONTAL

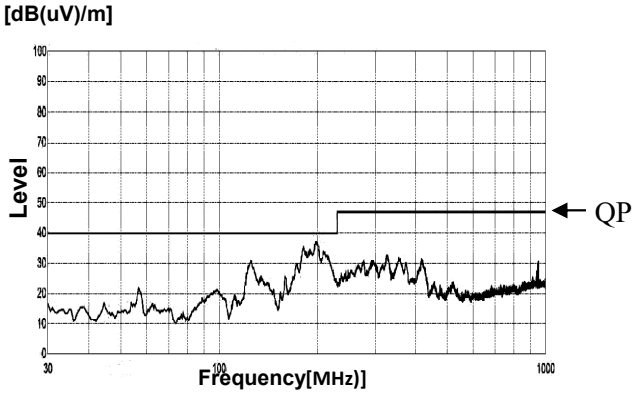


VERTICAL

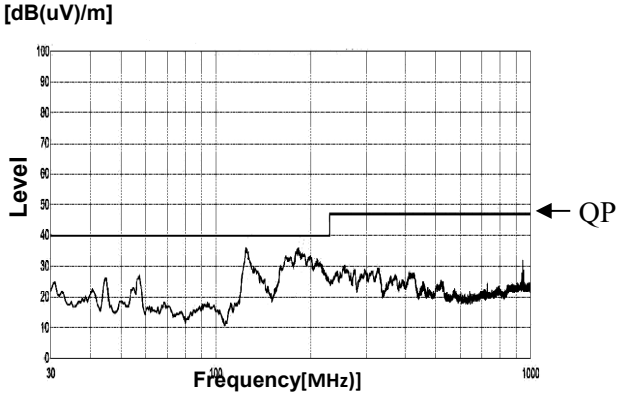


12V

HORIZONTAL

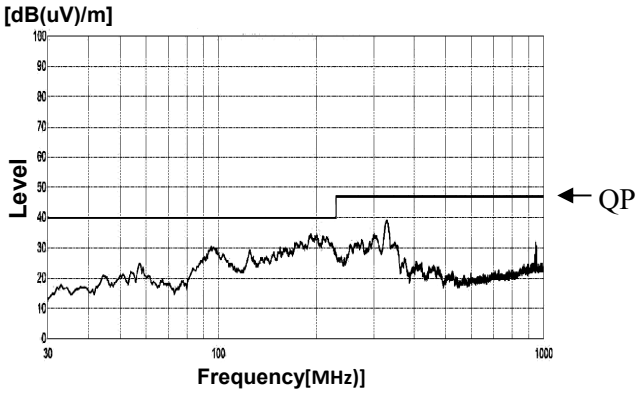


VERTICAL

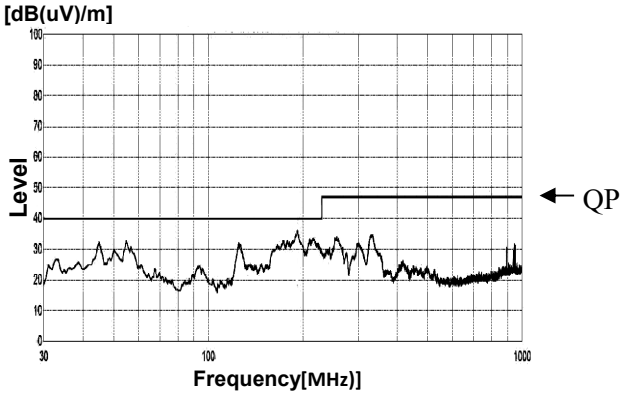


24V

HORIZONTAL



VERTICAL



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

表示は ピーク値
Indication is peak values.