

RWS100B

EVALUATION DATA

型式データ

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2. 特性データ Characteristics

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使用記号 Terminology used

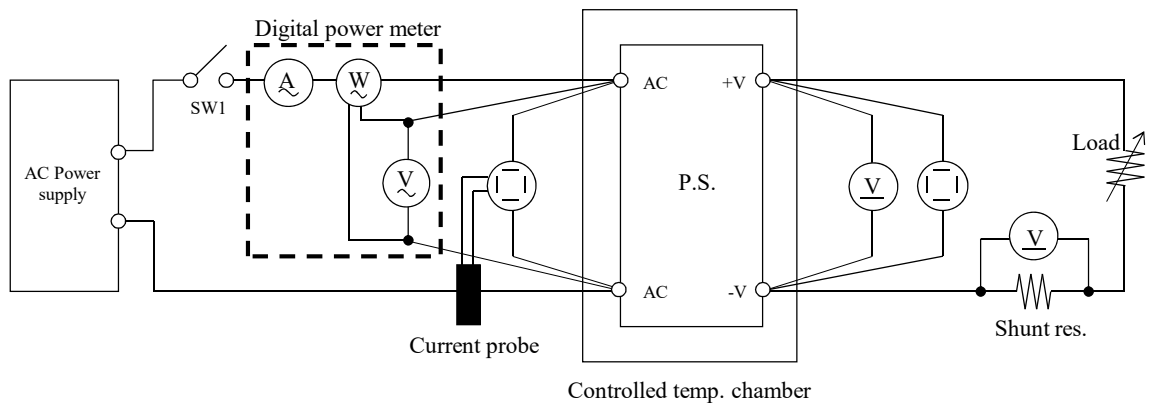
	定義	Definition
V_{in}	入力電圧 Input voltage
V_{out}	出力電圧 Output voltage
I_{in}	入力電流 Input current
I_{out}	出力電流 Output current
T_a	周囲温度 Ambient temperature
f	周波数 Frequency

1. 測定方法 Evaluation Method

1.1 測定回路 Circuit used for determination

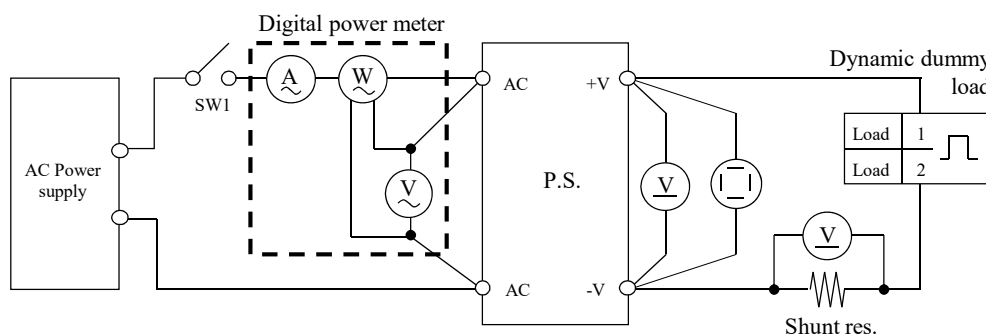
測定回路1 Circuit 1 used for determination

- 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

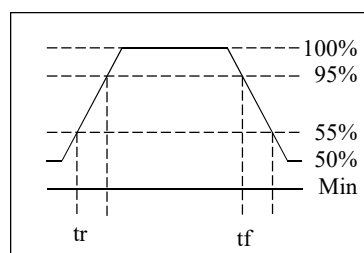


測定回路2 Circuit 2 used for determination

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

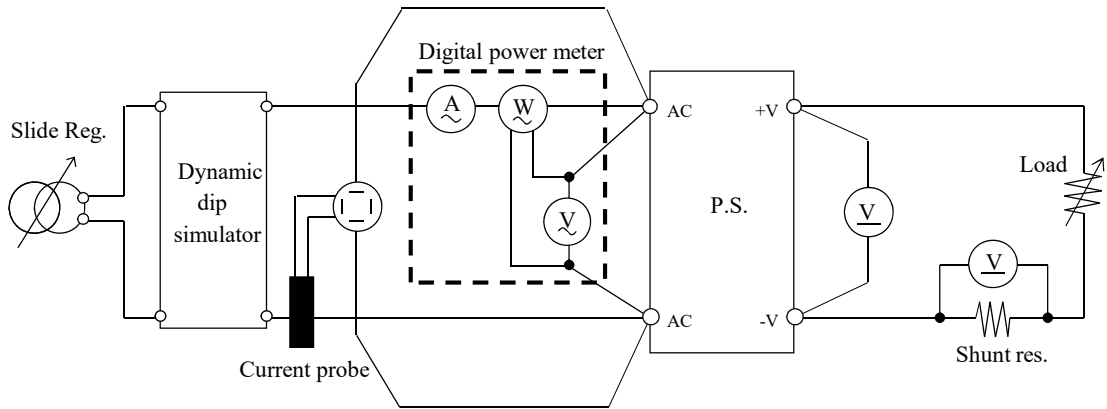


Output current waveform
Iout 50% <=> 100%



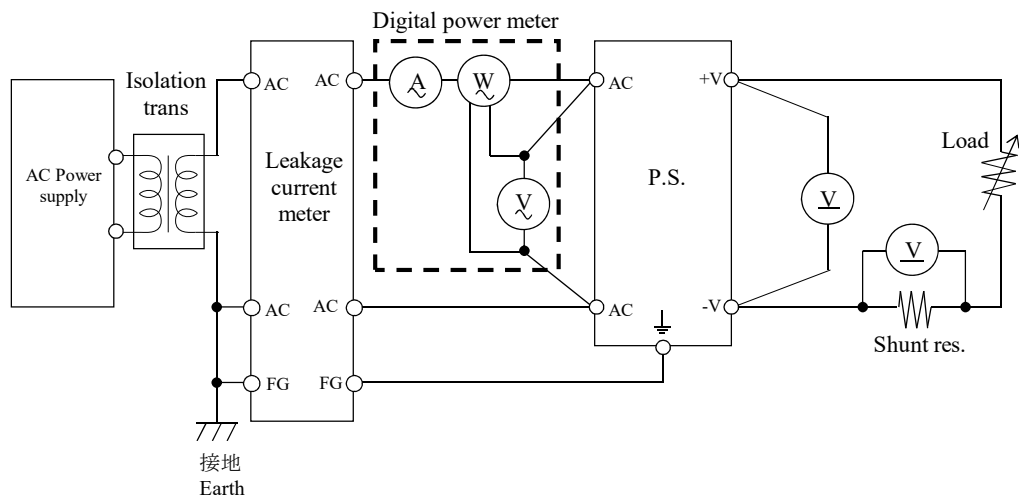
測定回路3 Circuit 3 used for determination

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



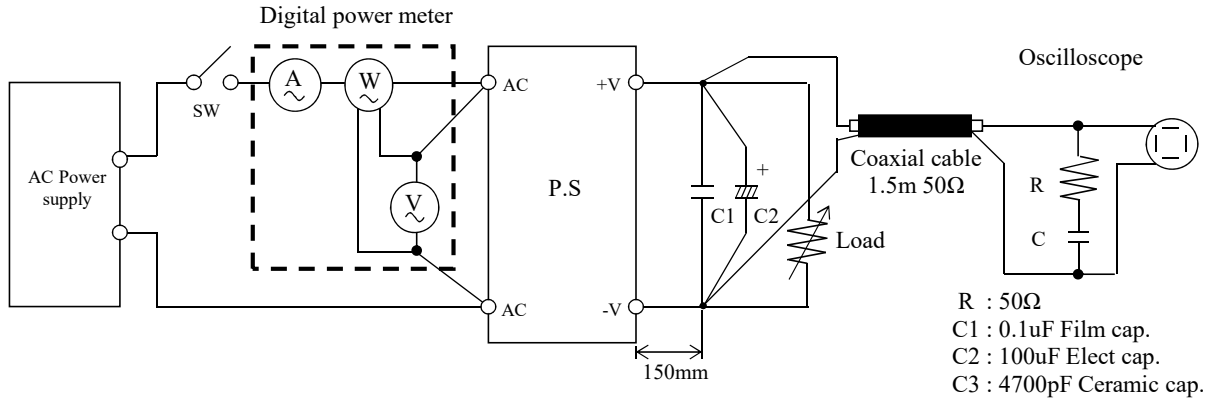
測定回路4 Circuit 4 used for determination

・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

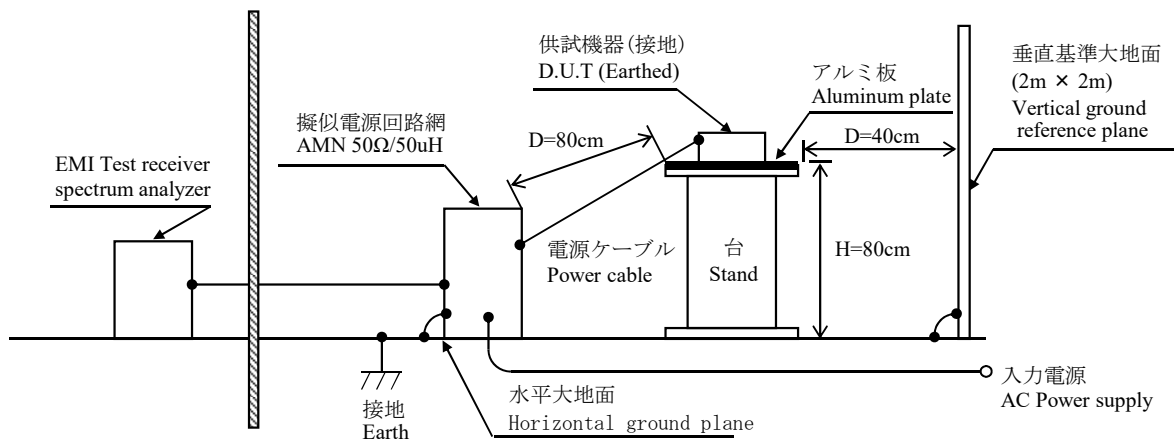


測定構成 Configuration used for determination

・EMI特性 Electro-Magnetic Interference characteristics

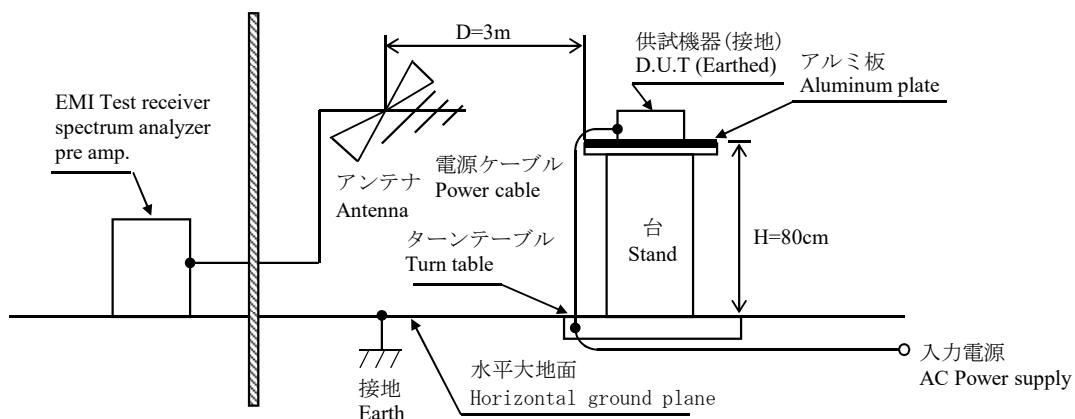
(a) 雑音端子電圧 (帰還ノイズ)

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	KIKUSUI	PCR3000LE
10	CVCF	CHROMA	61605
11	LEAKAGE CURRENT METER	SIMPSON	228
12	CONTROLLED TEMP. CHAMBER	ESPEC	SU-661 / SH-661
13	EMI TEST RECEIVER / SPECTRUM ANALYZER	ROHDE & SCHWARZ	ESCI-03
14	PRE AMP.	AGILENT	8447D
15	AMN	SCHWARZBECK	NNLK8121
16	ANTENNA	SCHWARZBECK	VULB9168
17	HARMONIC / FLICKER ANALYZER	SCHAFFNER	CCN100-1

1.3 評価負荷条件 Load conditions

*入力電圧が110VAC以下の場合、下記のとおり出力デレーティングが必要です。
Output derating is needed when input voltage is less than 110VAC.

Output voltage : 5V

Vin	Iout: Full load	5V
85VAC	90%	12.6A
90 - 265VAC	100%	14A

Output voltage : 12V, 24V

Vin	Iout: Full load	12V	24V
85VAC	80%	6.8A	3.6A
100VAC	92%	7.82A	4.14A
110 - 265VAC	100%	8.5A	4.5A

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 °C	
Iout \ Vin	90VAC	100VAC	200VAC	265VAC	line regulation		
0%	5.048V	5.048V	5.048V	5.048V	0mV	0.000%	
50%	5.043V	5.043V	5.043V	5.043V	0mV	0.000%	
Full load	5.032V	5.032V	5.032V	5.032V	0mV	0.000%	
Load regulation	16mV	16mV	16mV	16mV			
	0.320%	0.320%	0.320%	0.320%			

2. Temperature drift		Conditions Vin : 100 VAC Iout : Full load			
Ta	-10°C	+25°C	+40°C	temperature stability	
Vout	5.039V	5.032V	5.025V	14mV	0.280%

3. Start up voltage and Drop out voltage		Conditions Ta : 25 °C Iout : 100%	
Start up voltage (Vin)	78VAC		
Drop out voltage (Vin)	74VAC		

12V		1. Regulation - line and load				Condition Ta : 25 °C	
Iout \ Vin	100VAC	110VAC	200VAC	265VAC	line regulation		
0%	12.019V	12.019V	12.019V	12.019V	0mV	0.000%	
50%	12.015V	12.016V	12.015V	12.016V	1mV	0.008%	
Full load	12.010V	12.009V	12.009V	12.009V	0mV _{※1}	0.000%	
Load regulation	9mV	10mV	10mV	10mV			
	0.075%	0.083%	0.083%	0.083%			

2. Temperature drift		Conditions Vin : 110 VAC Iout : Full load			
Ta	-10°C	+25°C	+40°C	temperature stability	
Vout	12.024V	12.009V	12.000V	24mV	0.200%

3. Start up voltage and Drop out voltage		Conditions Ta : 25 °C Iout : 100%	
Start up voltage (Vin)	78VAC		
Drop out voltage (Vin)	74VAC		

24V		1. Regulation - line and load				Condition Ta : 25 °C	
Iout \ Vin	100VAC	110VAC	200VAC	265VAC	line regulation		
0%	24.052V	24.052V	24.052V	24.052V	0mV	0.000%	
50%	24.049V	24.049V	24.048V	24.048V	1mV	0.004%	
Full load	24.047V	24.046V	24.046V	24.046V	0mV _{※1}	0.000%	
Load regulation	5mV	6mV	6mV	6mV			
	0.021%	0.025%	0.025%	0.025%			

2. Temperature drift		Conditions Vin : 110 VAC Iout : Full load			
Ta	-10°C	+25°C	+40°C	temperature stability	
Vout	24.064V	24.046V	24.030V	34mV	0.142%

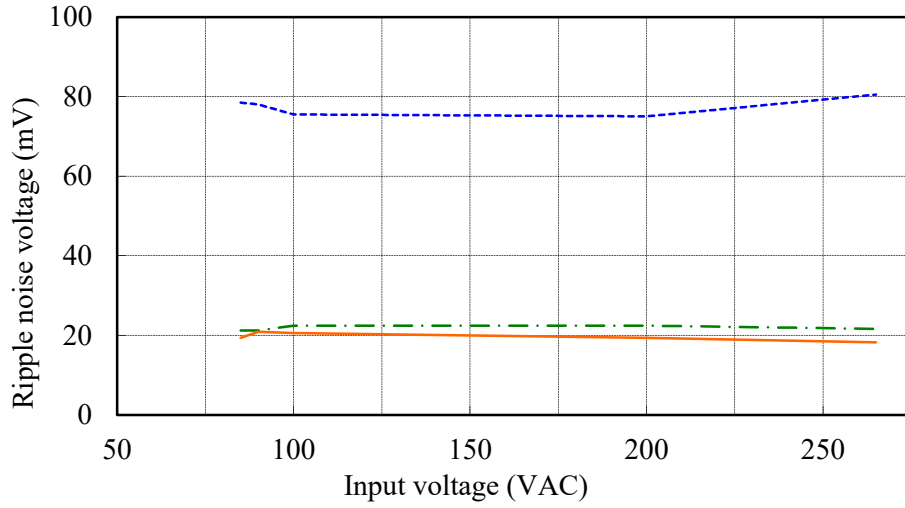
3. Start up voltage and Drop out voltage		Conditions Ta : 25 °C Iout : 100%	
Start up voltage (Vin)	78VAC		
Drop out voltage (Vin)	74VAC		

※1 Line regulation (12V,24V) : 110VAC - 265VAC

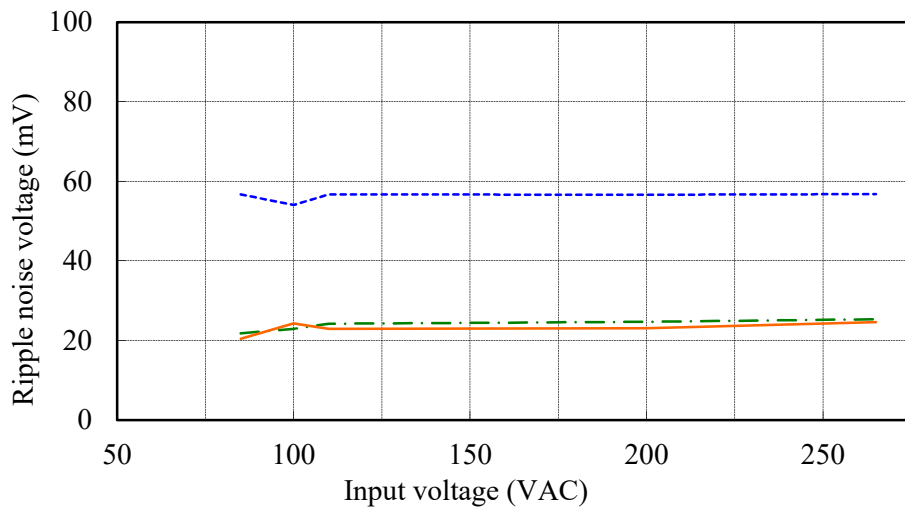
(2) リップルノイズ電圧対入力電圧
Ripple noise voltage vs. Input voltage

Conditions Iout : Full load
 Ta : -10 °C ---
 25 °C -.-
 40 °C —

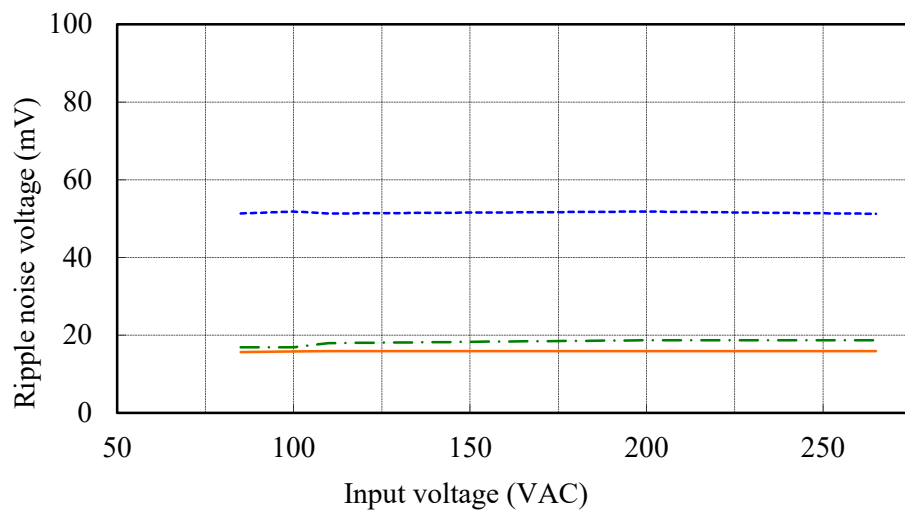
5V



12V



24V

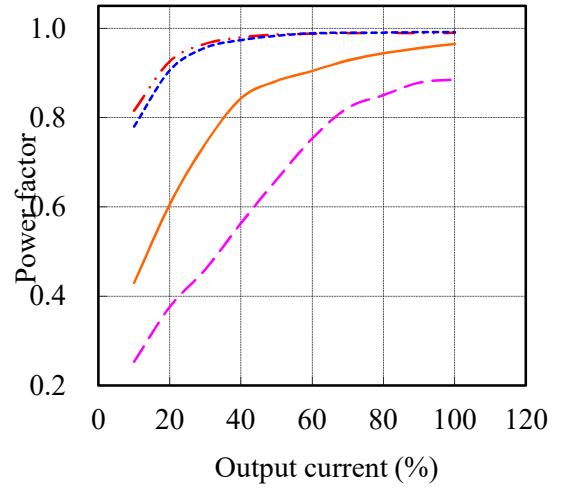
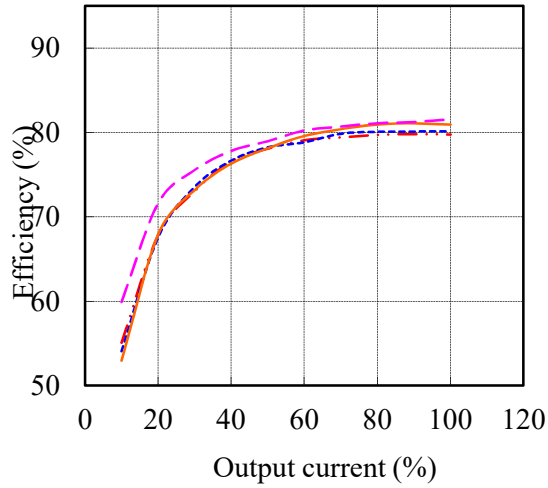


(3) 効率・力率対出力電流

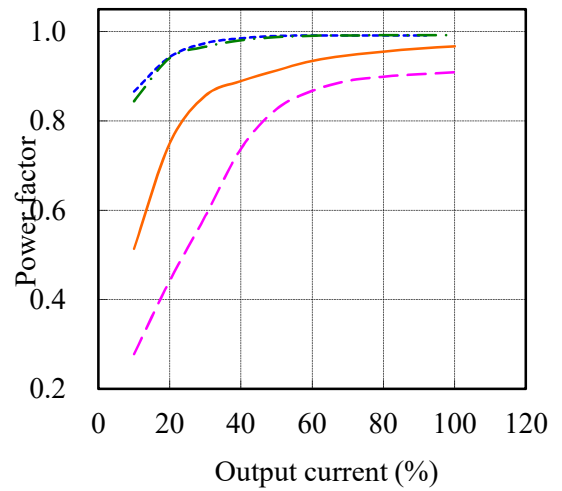
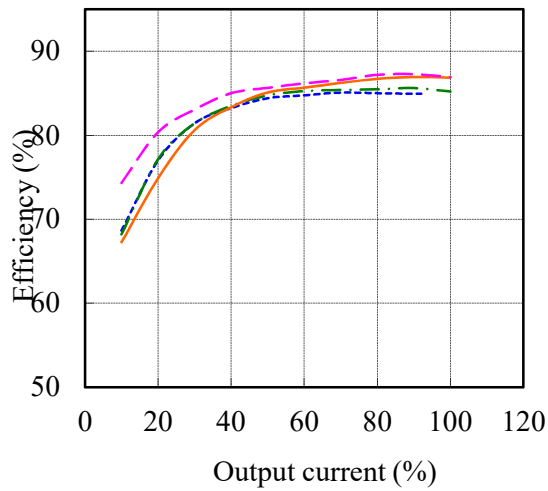
Efficiency and Power factor vs. Output current

Conditions Vin : 90 VAC ---
 100 VAC ---
 110 VAC ---
 200 VAC ---
 265 VAC ---
 Ta : 25 °C

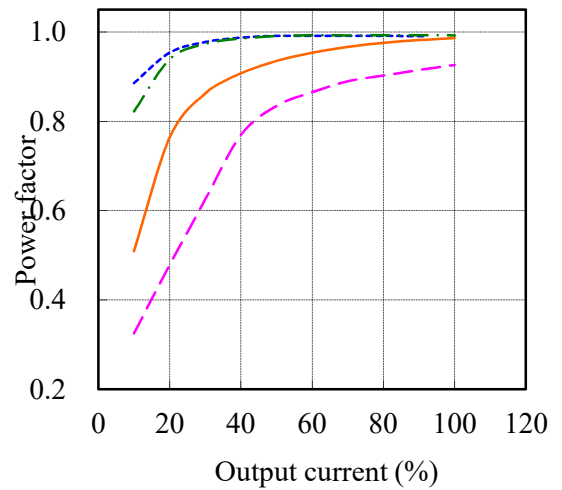
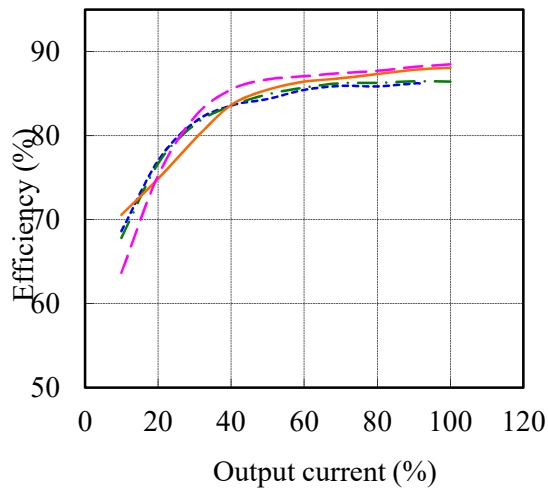
5V



12V



24V



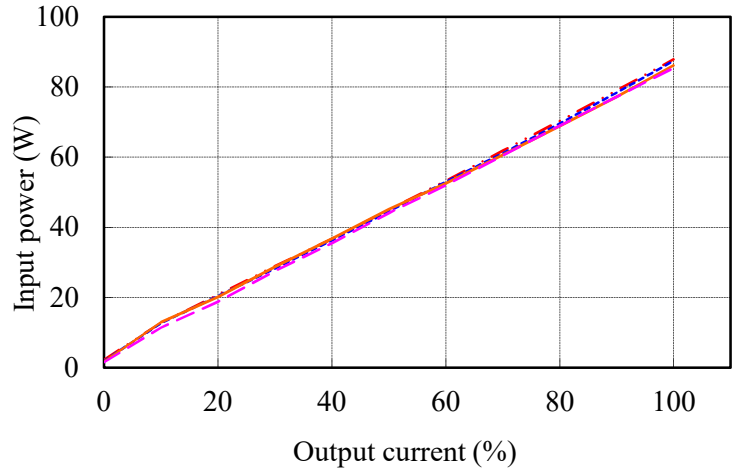
(4) 入力電力対出力電流

Input power vs. Output current

Conditions Vin : 90 VAC — · · ·
 100 VAC - - -
 110 VAC - · · ·
 200 VAC —
 265 VAC —
 Ta : 25 °C

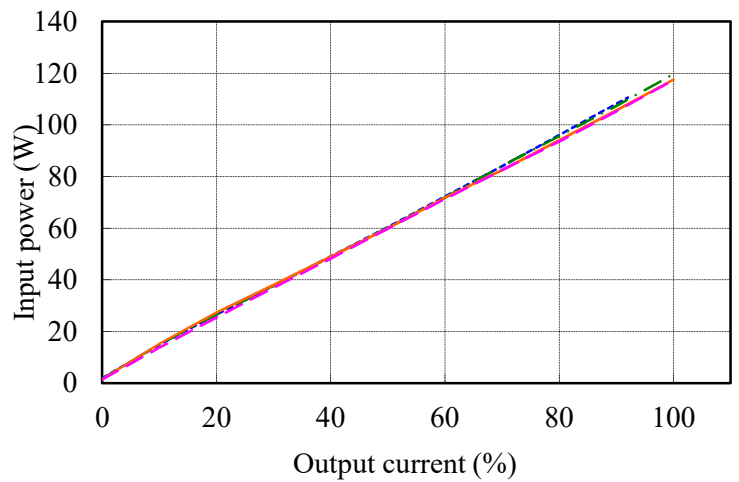
5V

Vin	Input power
	Iout : 0%
90VAC	2.2W
100VAC	1.9W
200VAC	1.7W
265VAC	1.5W



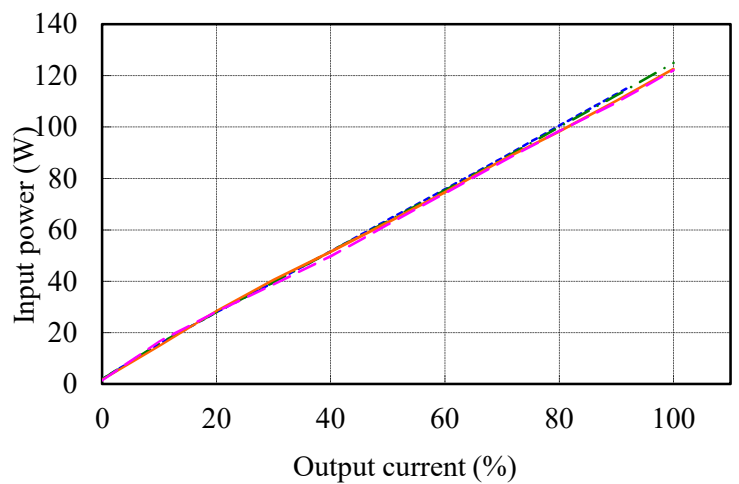
12V

Vin	Input power
	Iout : 0%
100VAC	1.8W
110VAC	1.8W
200VAC	1.5W
265VAC	1.3W



24V

Vin	Input power
	Iout : 0%
100VAC	1.9W
110VAC	1.9W
200VAC	1.7W
265VAC	1.4W



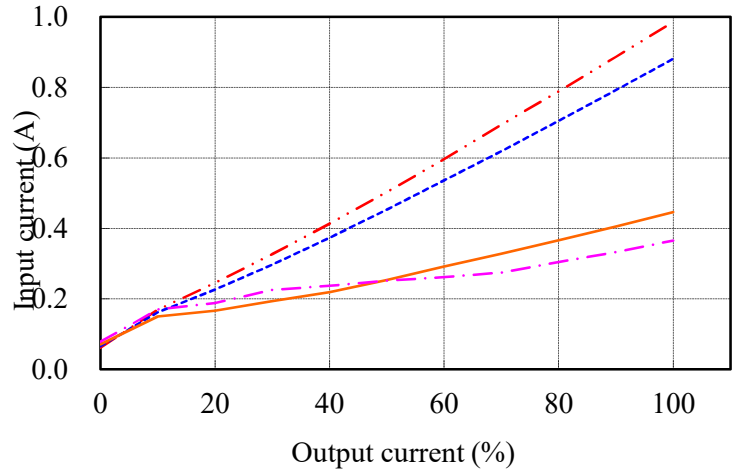
(5) 入力電流対出力電流

Input current vs. Output current

Conditions Vin : 90 VAC — · —
 100 VAC - - -
 110 VAC · · ·
 200 VAC — — —
 265 VAC - · -
 Ta : 25 °C

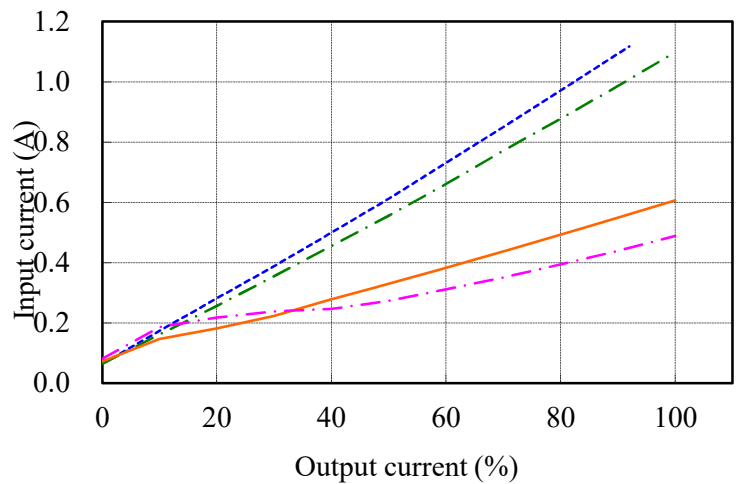
5V

Vin	Input current
	Iout : 0%
90VAC	0.06A
100VAC	0.07A
200VAC	0.07A
265VAC	0.08A



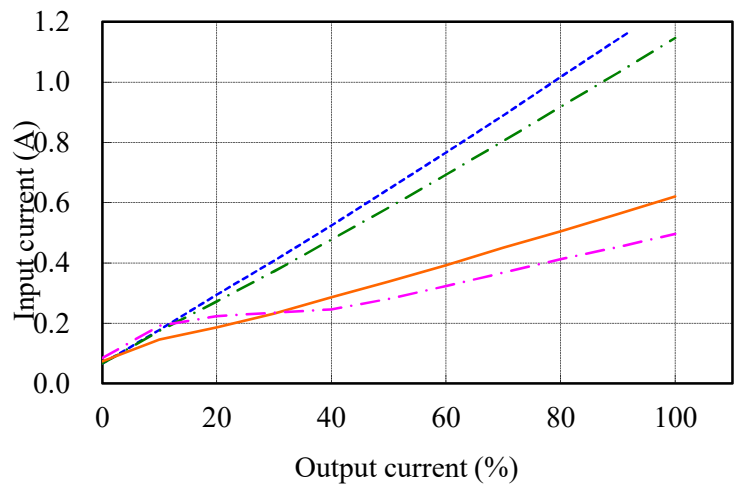
12V

Vin	Input current
	Iout : 0%
100VAC	0.06A
110VAC	0.07A
200VAC	0.07A
265VAC	0.08A



24V

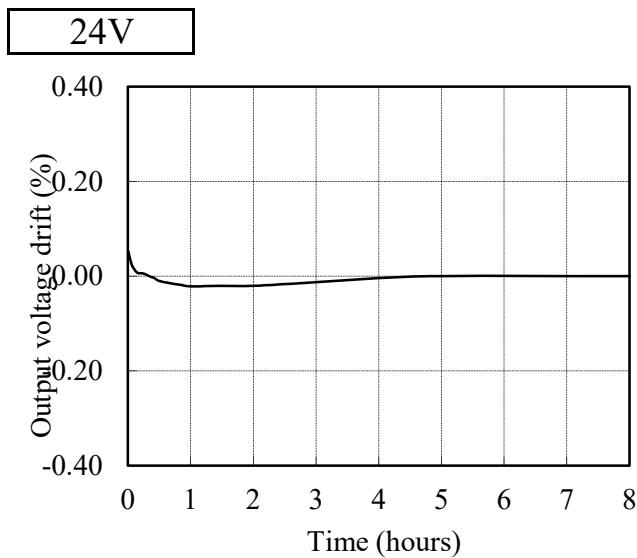
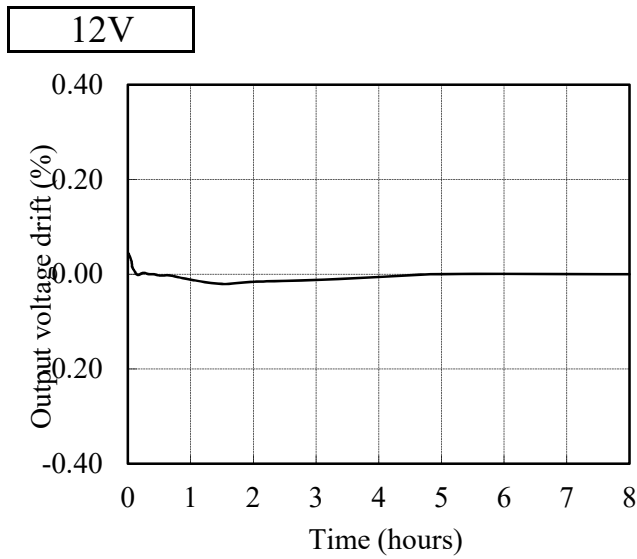
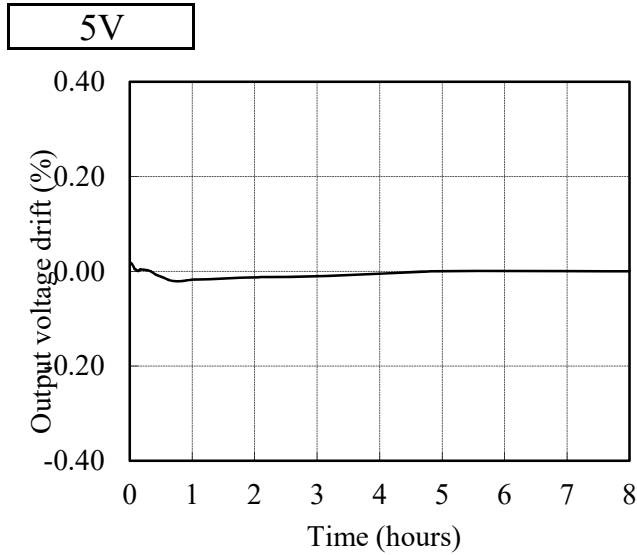
Vin	Input current
	Iout : 0%
100VAC	0.07A
110VAC	0.07A
200VAC	0.07A
265VAC	0.08A



2.2 通電ドリフト特性

Warm up voltage drift characteristics

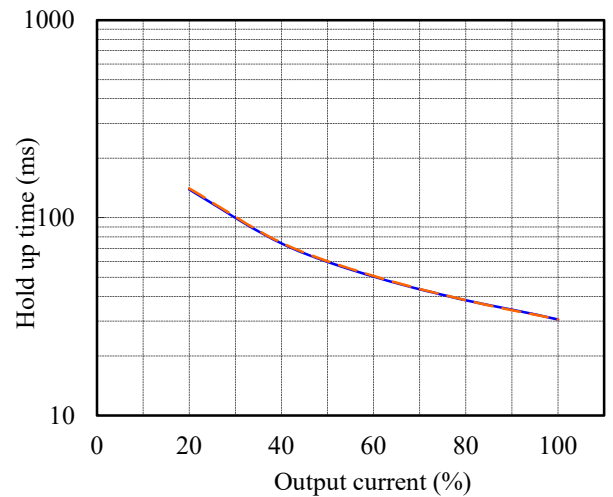
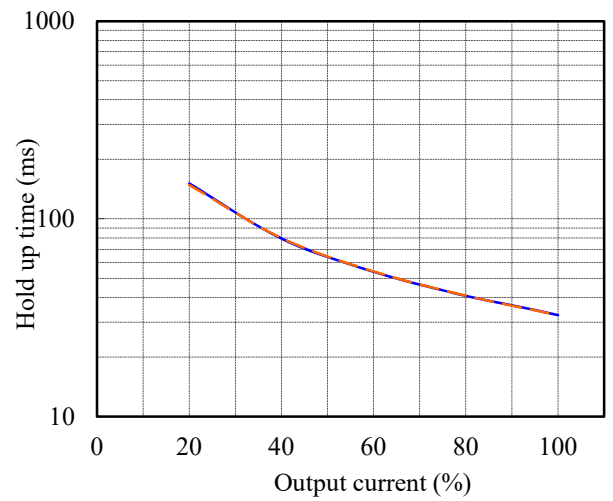
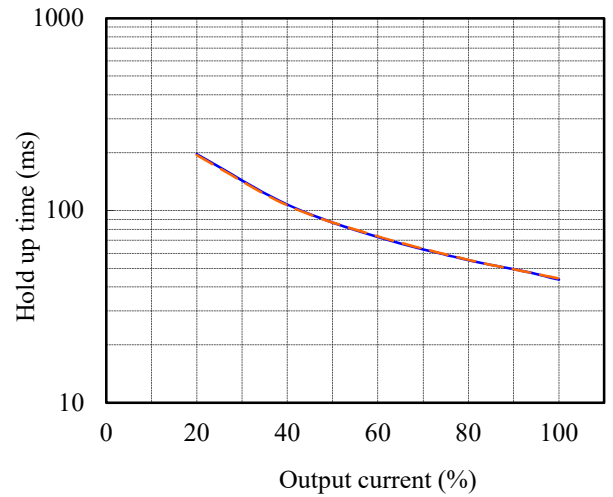
Conditions Vin : 110 VAC
Iout : Full load
Ta : 25 °C



2.3 出力保持時間特性

Hold up time characteristics

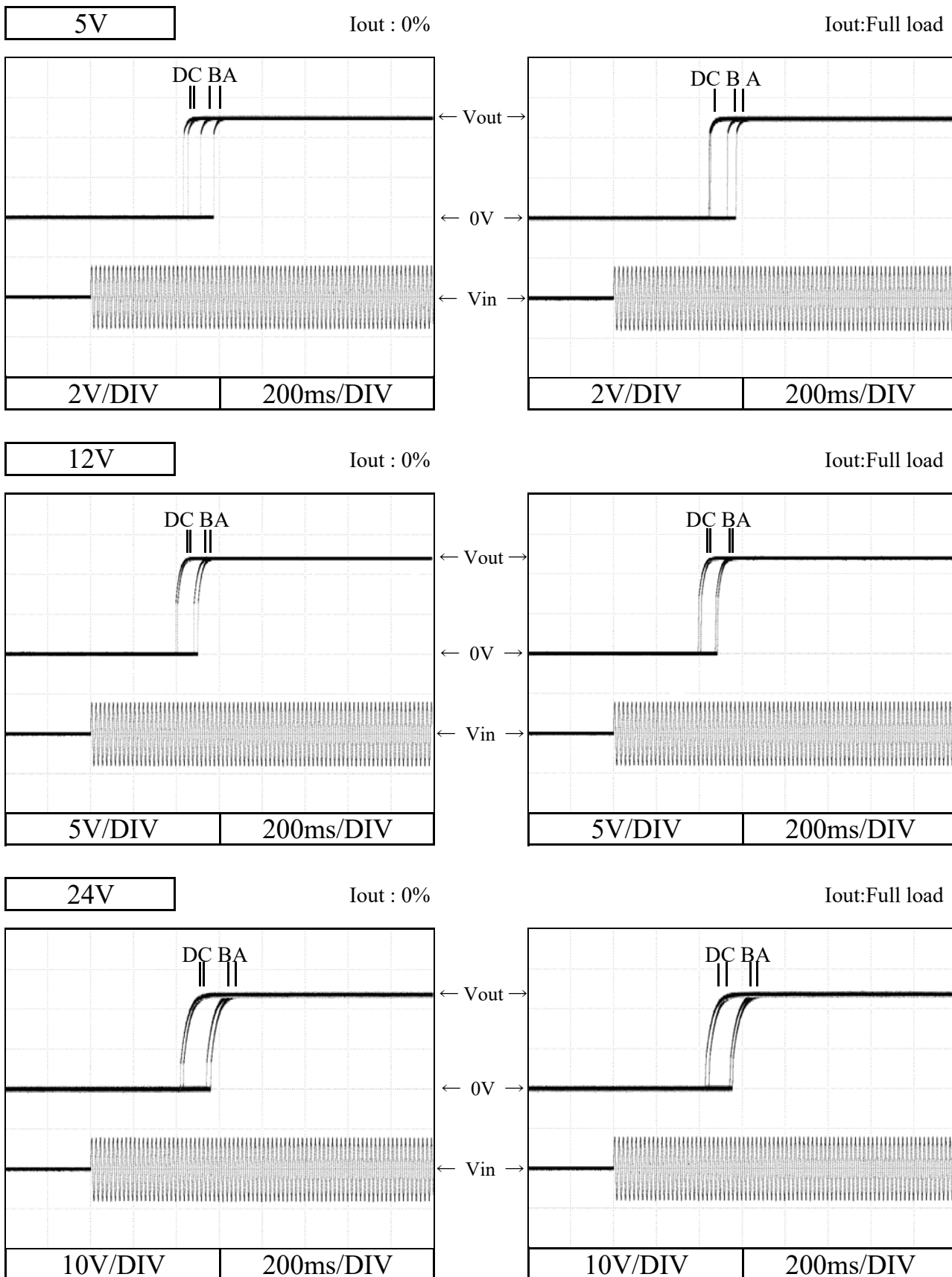
Conditions Vin : 110 VAC ———
200 VAC - - - -
Ta : 25 °C



2.4 出力立ち上がり特性

Output rise characteristics

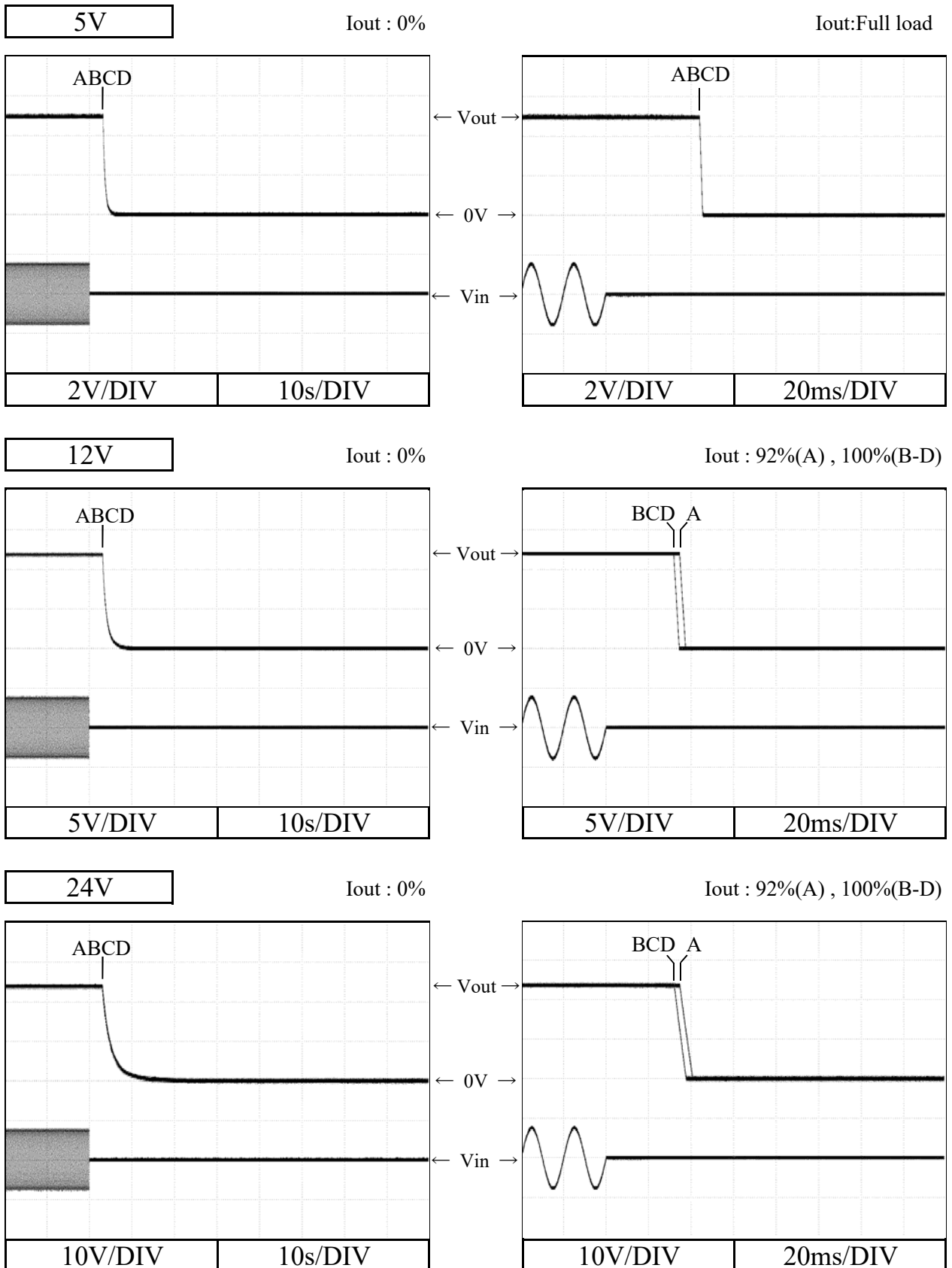
Conditions V_{in} : 100 VAC (A)
 110 VAC (B)
 200 VAC (C)
 265 VAC (D)
 T_a : 25 °C



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

RWS100B

Conditions Vin : 100 VAC (A)
110 VAC (B)
200 VAC (C)
265 VAC (D)
Ta : 25 °C



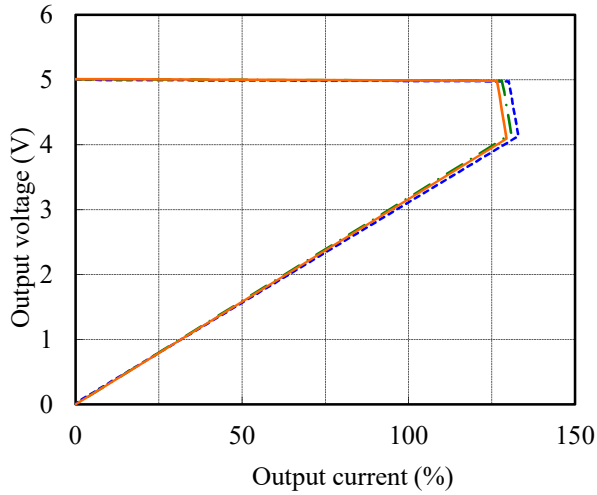
2.6 過電流保護特性

Over current protection (OCP) characteristics

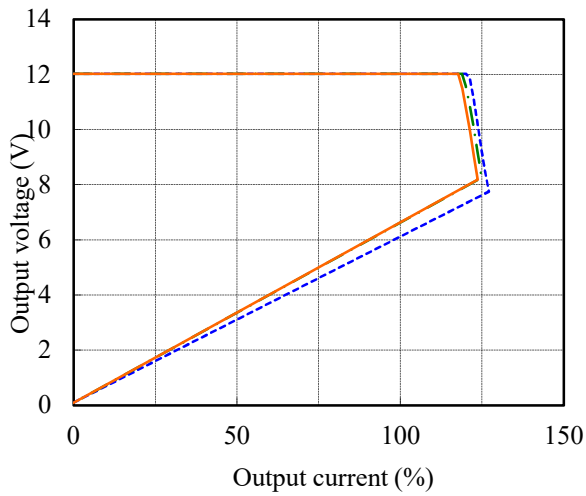
Conditions Vin : 110 VAC

Ta : -10 °C ————
 25 °C - · - · -
 40 °C ————

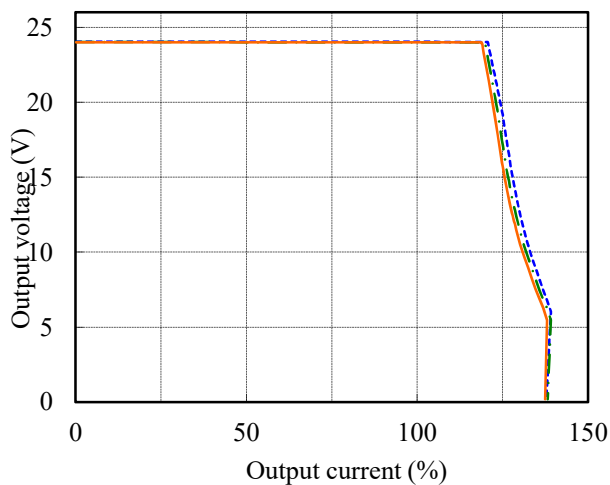
5V



12V



24V

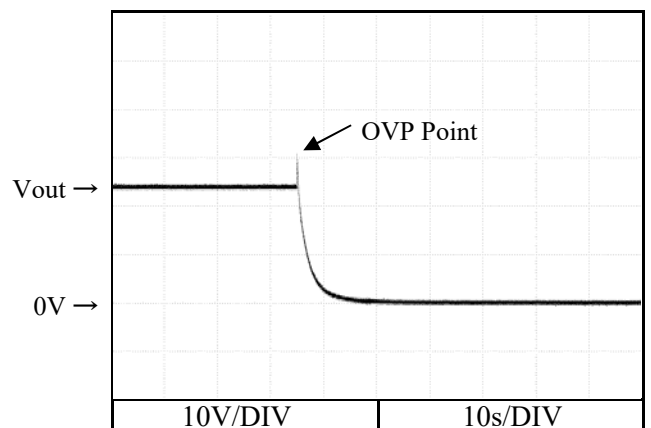
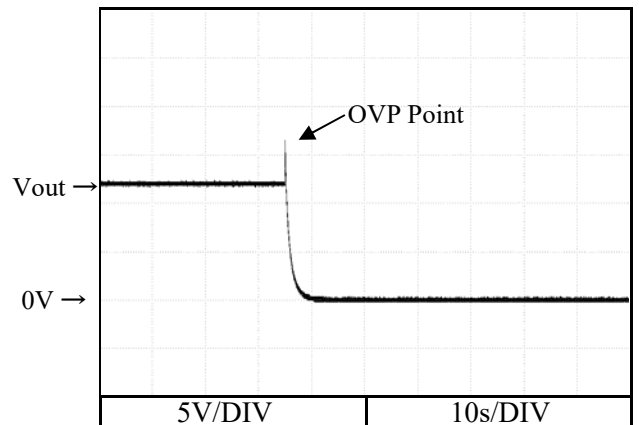
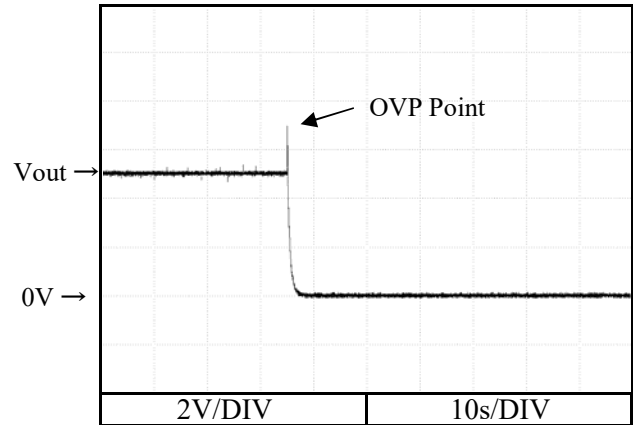


2.7 過電圧保護特性

Over voltage protection (OVP) characteristics

Conditions Vin : 100 VAC

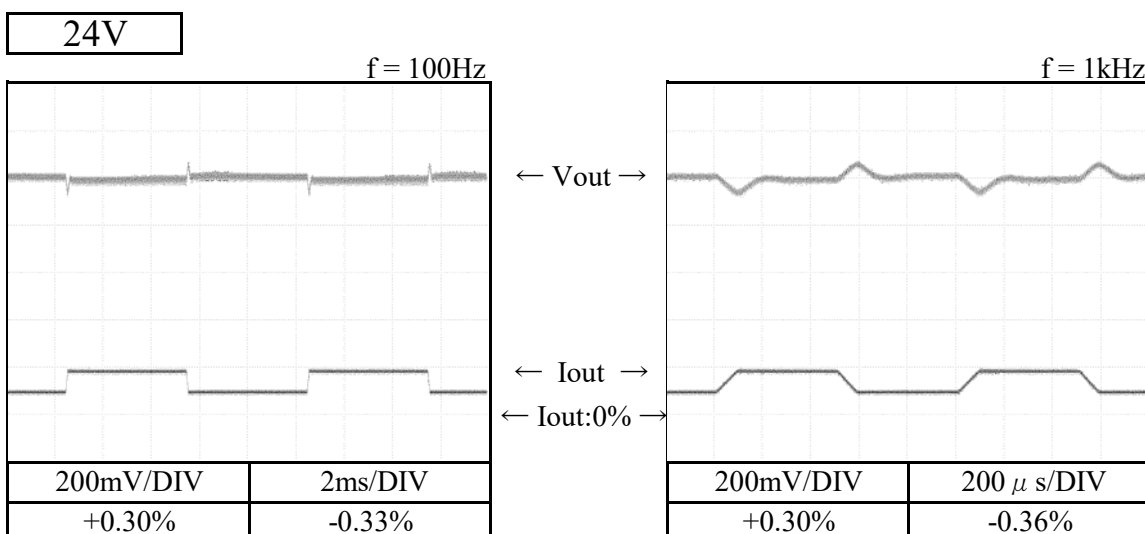
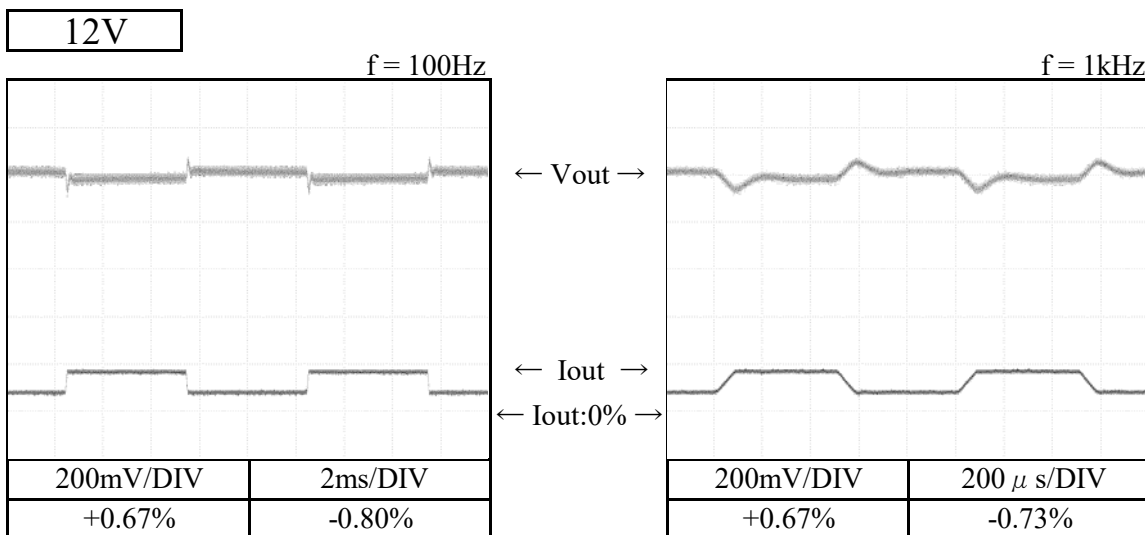
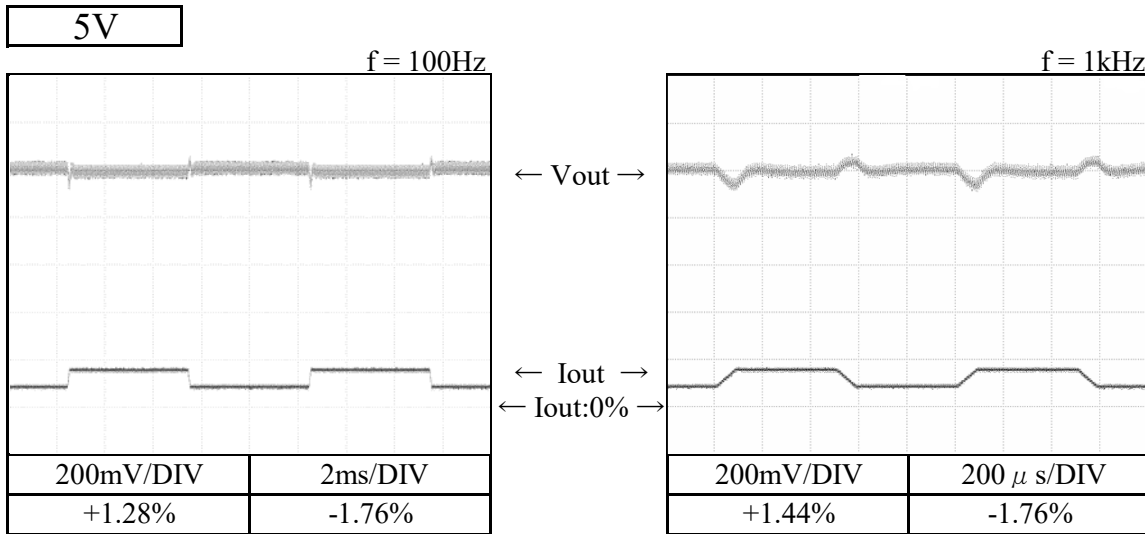
Iout : 0 %
 Ta : 25 °C



2.8 過渡応答（負荷急変）特性

Dynamic load response characteristics

Conditions Vin : 110 VAC
 Iout : 50 % ↔ 100 %
 (tr = tf = 50us)
 Ta : 25 °C



2.9 入力電圧瞬停特性

Response to brown out characteristics

Conditions T_a : 25 °C
 I_{out} : Full load

瞬停時間 Interruption time

A : 出力電圧が低下なし Output voltage does not drop.

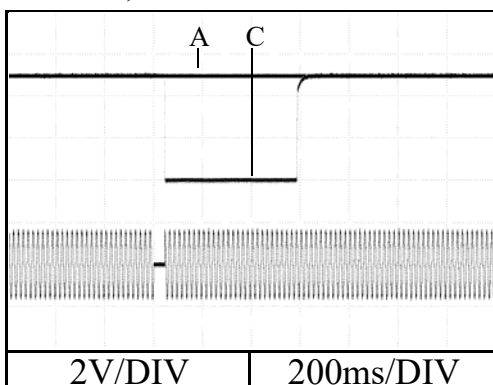
B : 出力電圧の低下が0Vまでいかない Output voltage drop down not reaching 0V.

C : 出力電圧が0Vまで低下 Output voltage drops until 0V.

5V

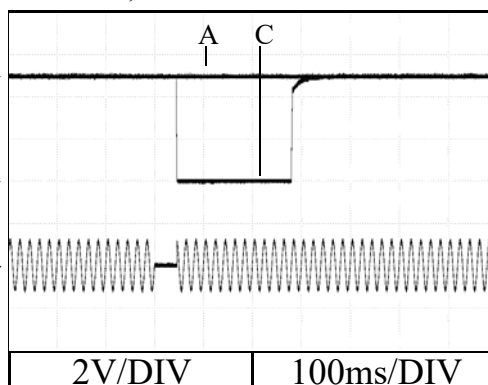
V_{in} : 110VAC

A = 44ms, C = 45ms



V_{in} : 200VAC

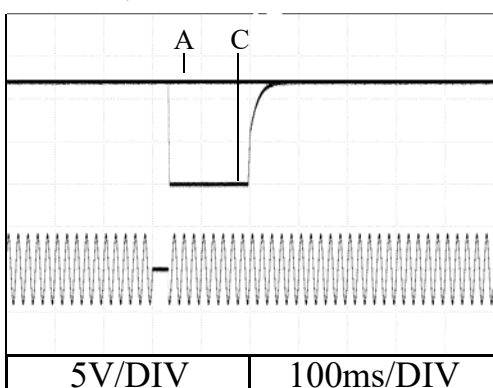
A = 45ms, C = 46ms



12V

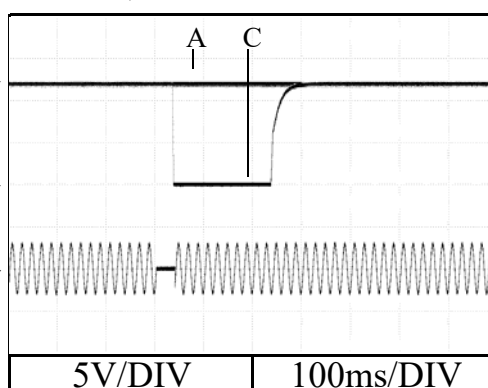
V_{in} : 110VAC

A = 33ms, C = 34ms



V_{in} : 200VAC

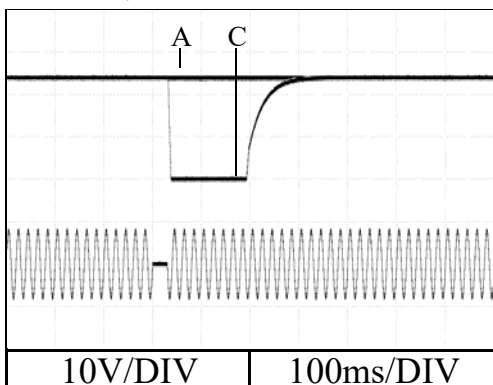
A = 33ms, C = 34ms



24V

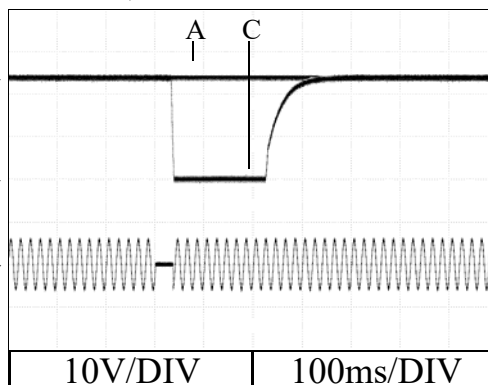
V_{in} : 110VAC

A = 30ms, C = 31ms



V_{in} : 200VAC

A = 31ms, C = 32ms

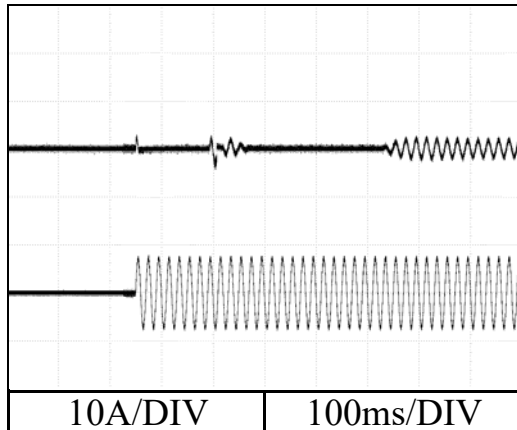


2.10 入力サージ電流 (突入電流) 波形
Inrush current waveform

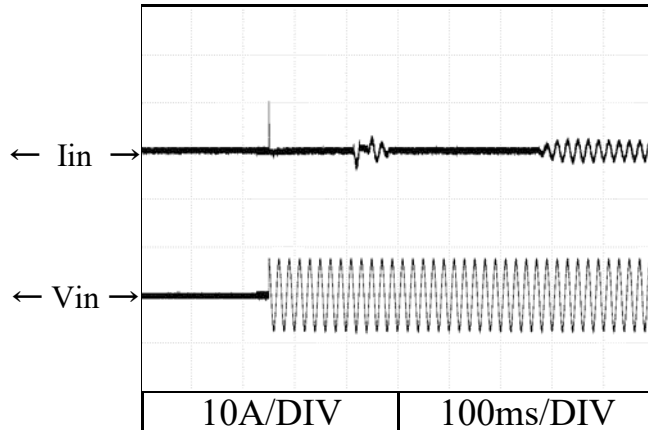
24V

Conditions Vin : 100 VAC
Iout : Full load
Ta : 25 °C

Switch on phase angle of input AC voltage
 $\phi = 0^\circ$

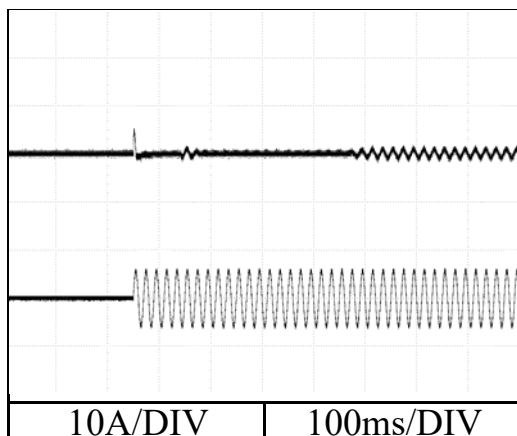


Switch on phase angle of input AC voltage
 $\phi = 90^\circ$

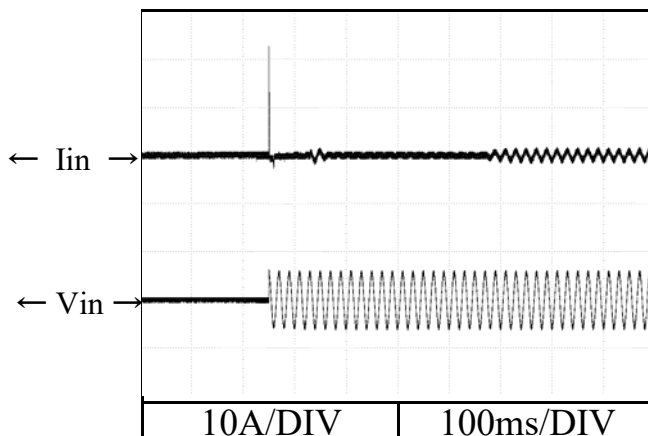


Conditions Vin : 200 VAC
Iout : Full load
Ta : 25 °C

Switch on phase angle of input AC voltage
 $\phi = 0^\circ$



Switch on phase angle of input AC voltage
 $\phi = 90^\circ$



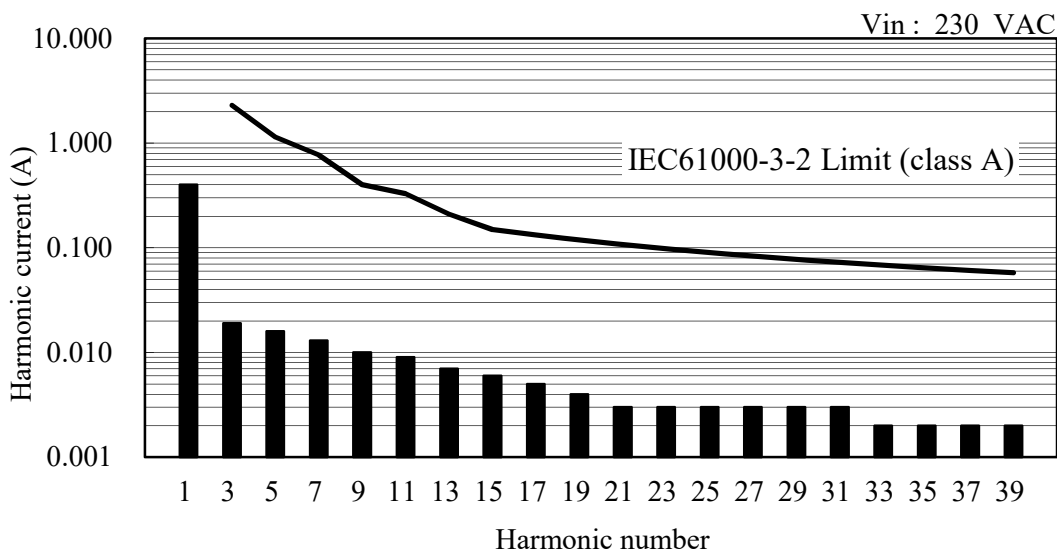
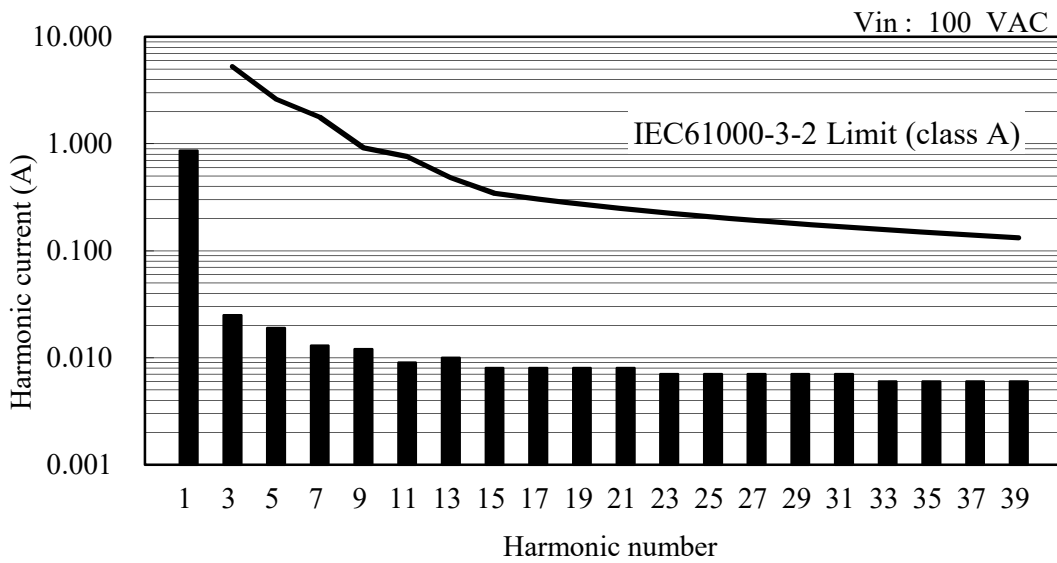
2.11 高調波成分

Input current harmonics

Conditions Iout : Full load

Ta : 25 °C

5V



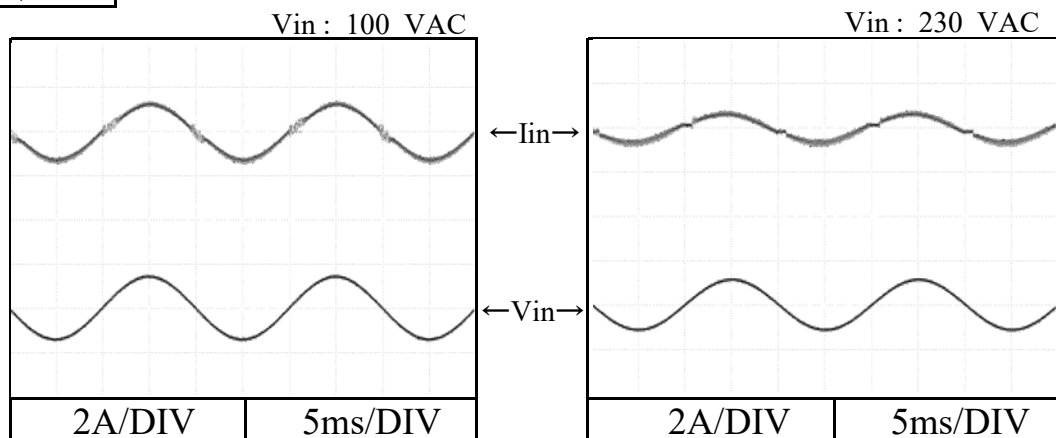
2.12 入力電流波形

Input current waveform

Conditions Iout : Full load

Ta : 25 °C

5V

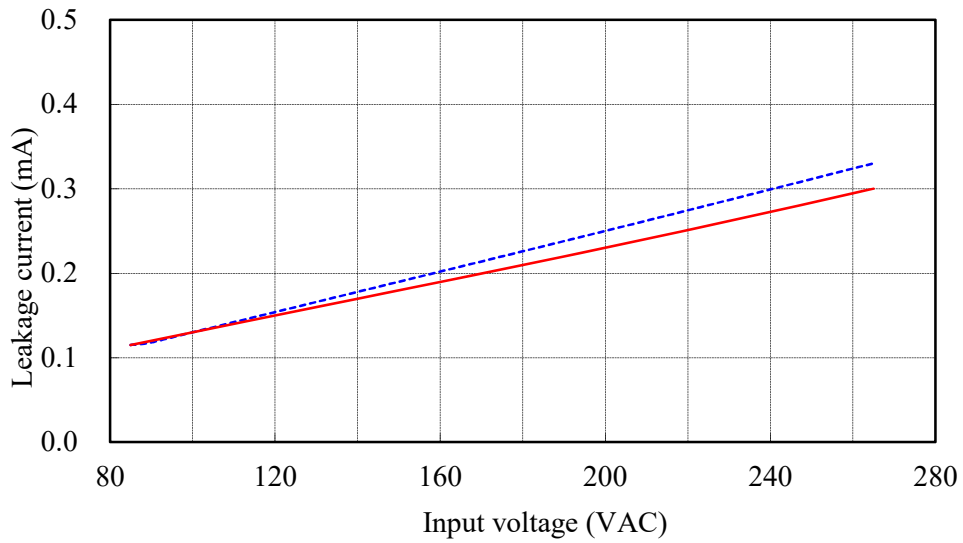


2.13 リーク電流特性
Leakage current characteristics

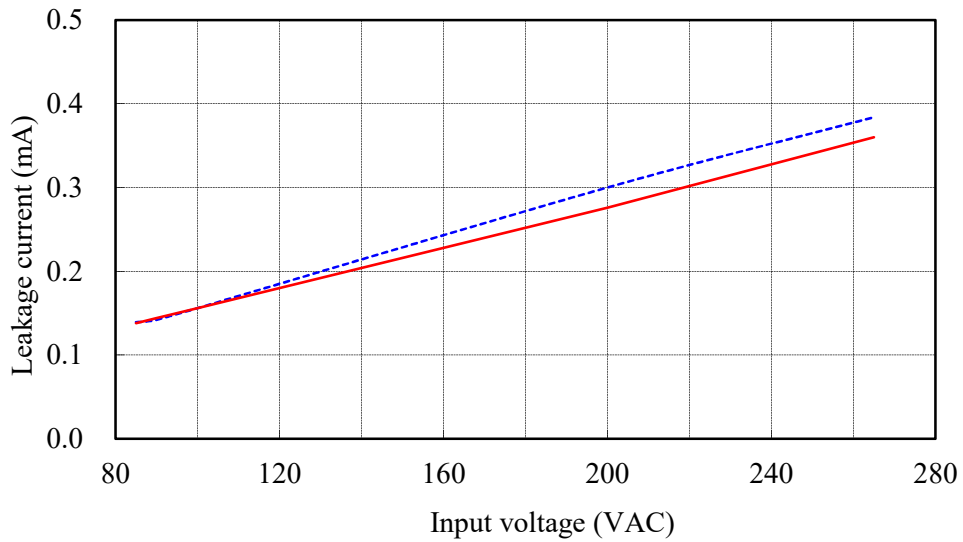
Conditions Iout : 0 % - - - -
 Full Load - - - -
 Ta : 25 °C
Equipment used : MODEL 228
 (Simpson)

5V

f: 50 Hz



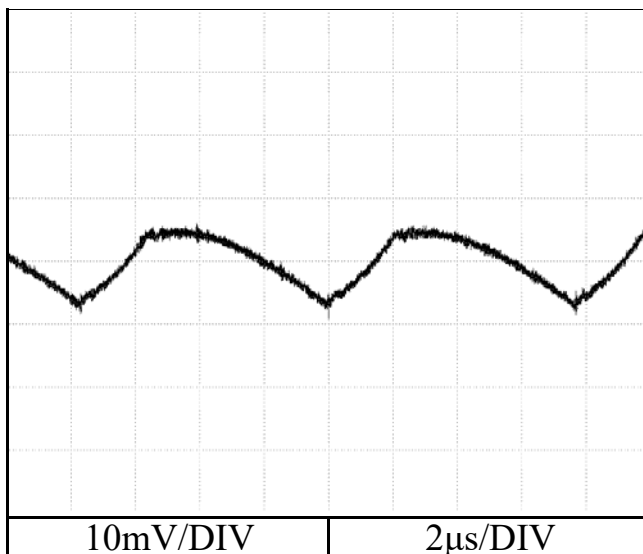
f: 60 Hz



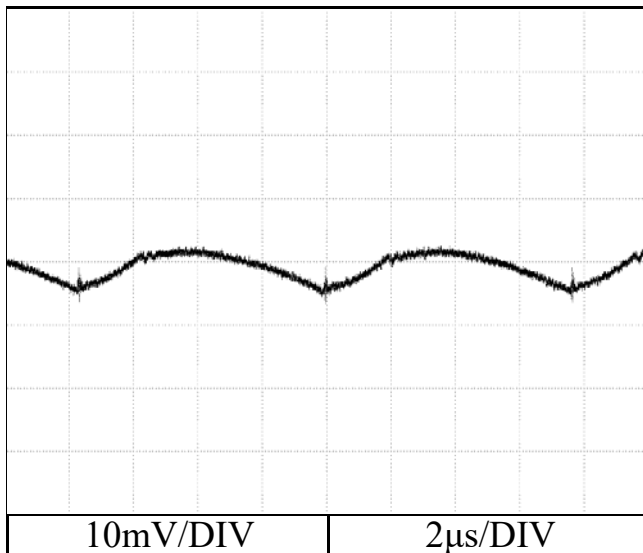
2.14 出力リップル、ノイズ波形
Output ripple and noise waveform

Conditions Vin : 110 VAC
Iout : Full load
Ta : 25 °C

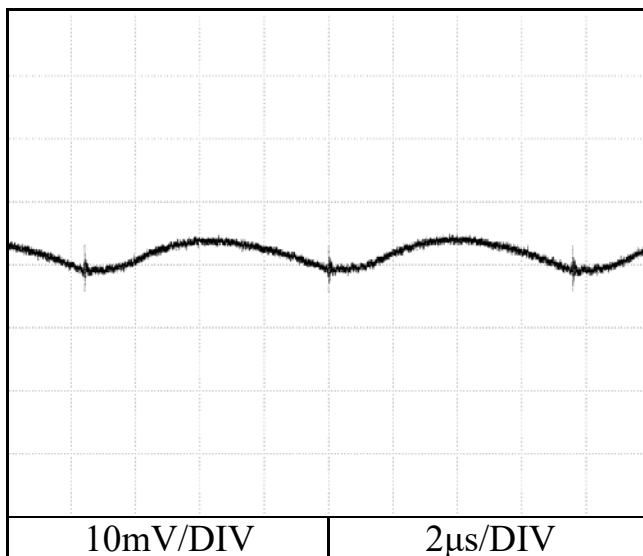
5V



12V



24V



2.15 EMI 特性

Electro-Magnetic Interference characteristics

Conditions Vin : 230 VAC

Iout : Full load

Ta : 25 °C

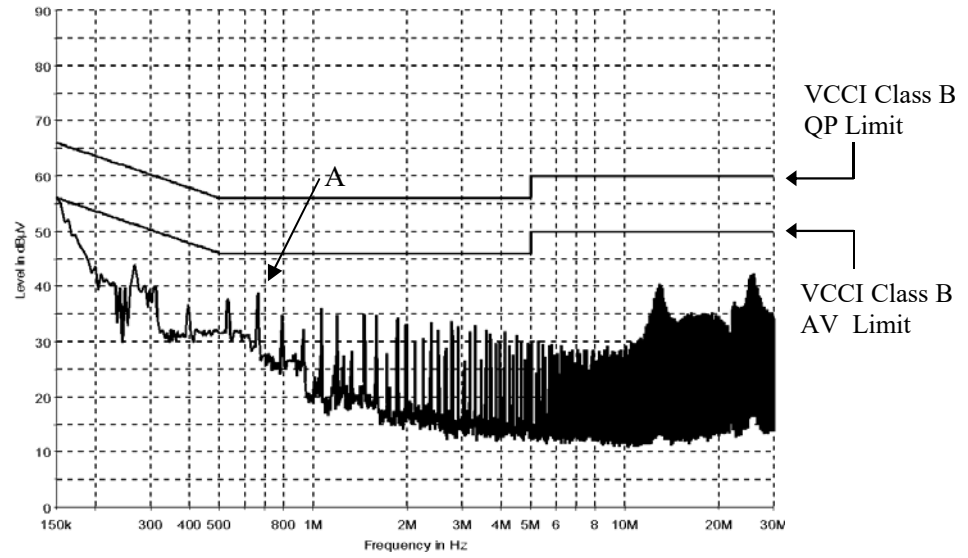
雑音端子電圧

Conducted Emission

5V

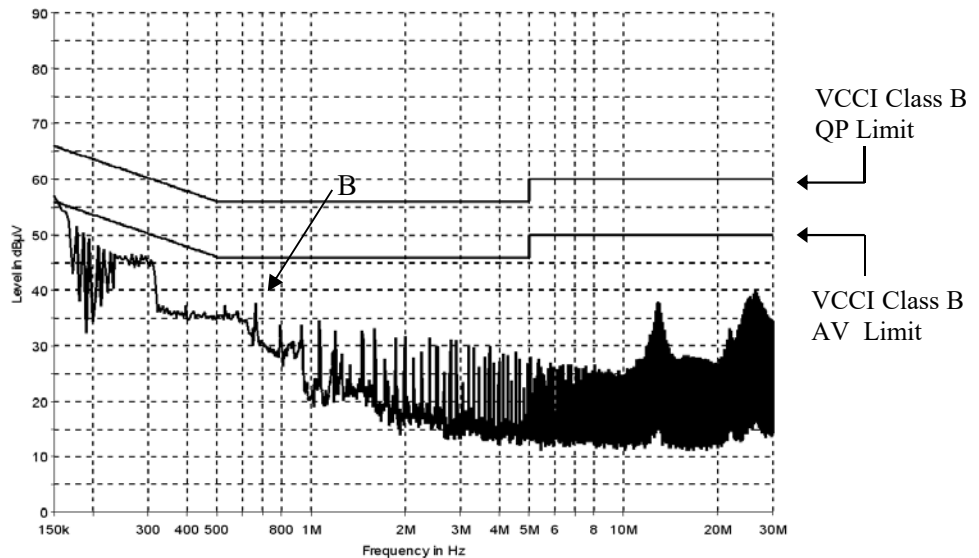
Phase : N

Point A (664kHz)		
Ref. Data	Limit (dBuV)	Measure (dBuV)
QP	56.0	39.5
AV	46.0	39.5



Phase : L

Point B (664kHz)		
Ref. Data	Limit (dBuV)	Measure (dBuV)
QP	56.0	40.1
AV	46.0	40.0



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.

2.15 EMI 特性

Electro-Magnetic Interference characteristics

Conditions Vin : 230 VAC

Iout : Full load

Ta : 25 °C

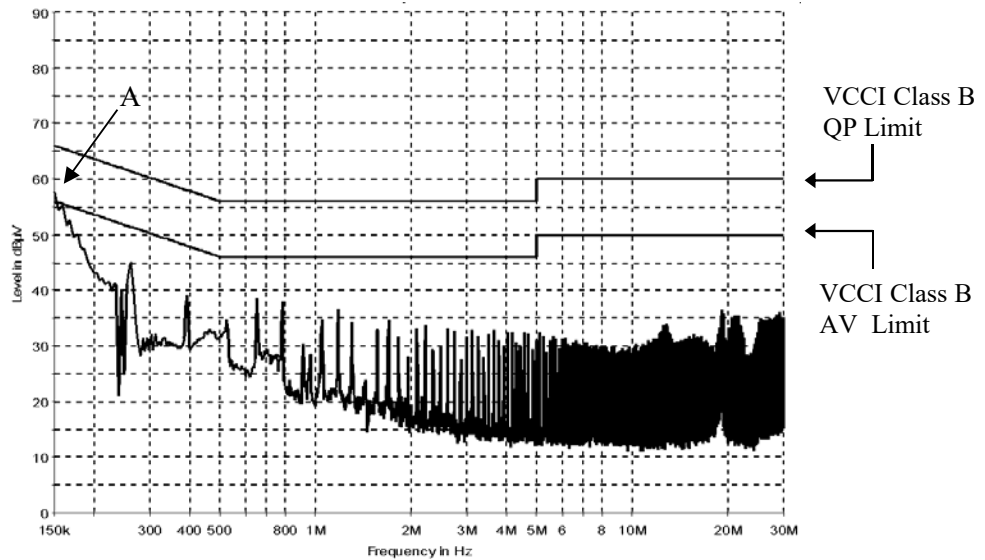
雑音端子電圧

Conducted Emission

12V

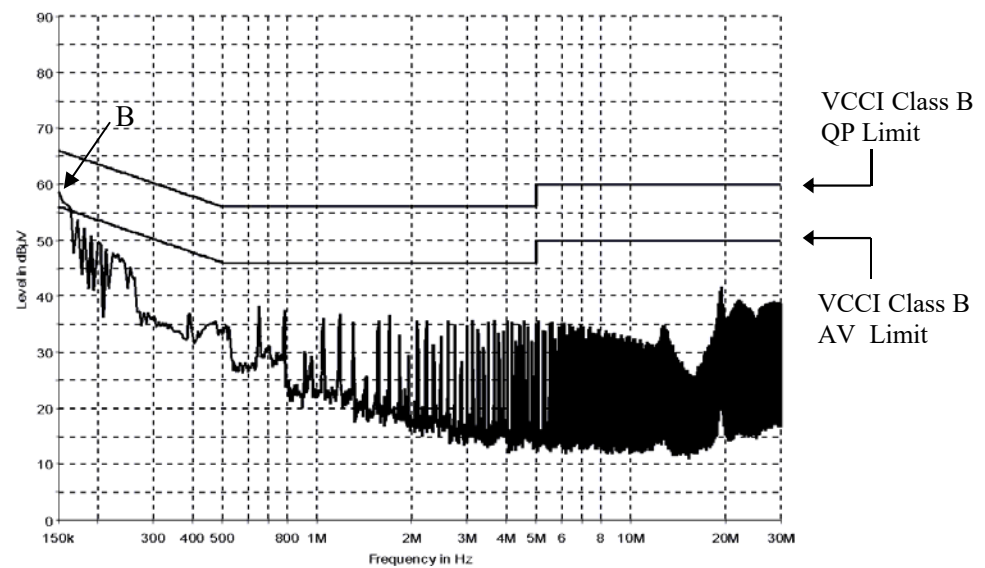
Phase : N

Point A (150kHz)		
Ref. Data	Limit (dBuV)	Measure (dBuV)
QP	66.0	54.5
AV	56.0	32.1



Phase : L

Point B (150kHz)		
Ref. Data	Limit (dBuV)	Measure (dBuV)
QP	66.0	54.8
AV	56.0	32.1



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.

2.15 EMI 特性

Electro-Magnetic Interference characteristics

Conditions Vin : 230 VAC

Iout : Full load

Ta : 25 °C

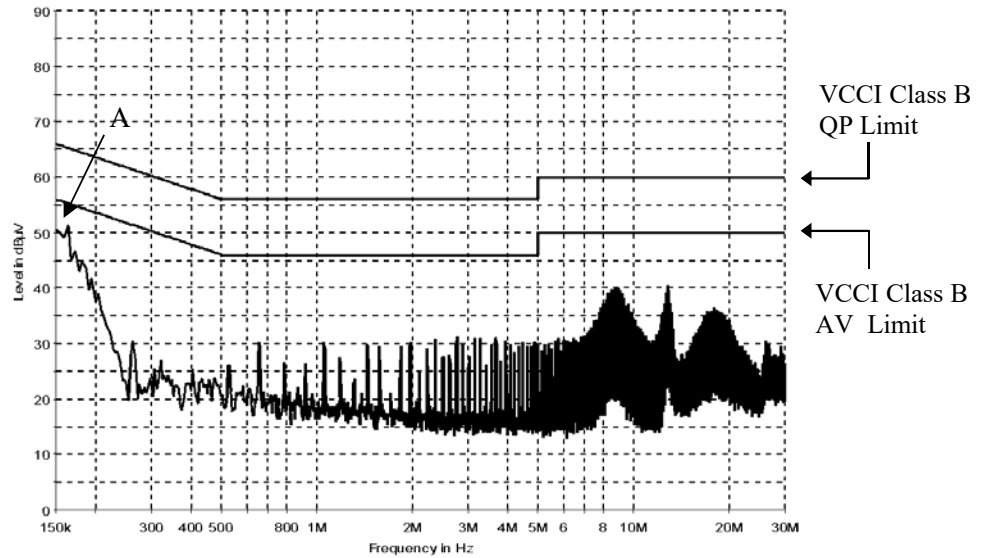
雑音端子電圧

Conducted Emission

24V

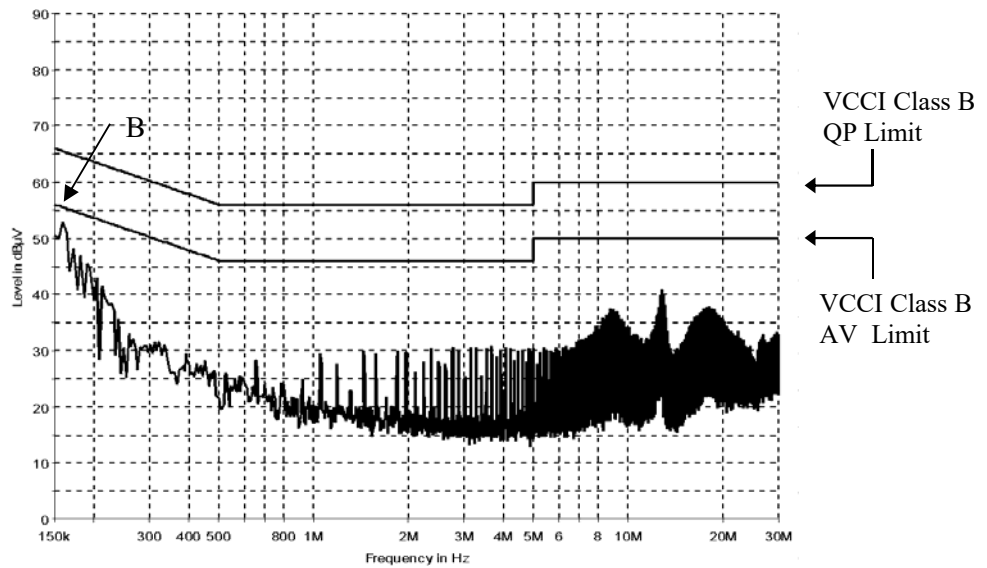
Phase : N

Point A (150kHz)		
Ref. Data	Limit (dBuV)	Measure (dBuV)
QP	66.0	54.1
AV	56.0	31.6



Phase : L

Point B (150kHz)		
Ref. Data	Limit (dBuV)	Measure (dBuV)
QP	66.0	54.7
AV	56.0	30.2



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

2.15 EMI 特性

Electro-Magnetic Interference characteristics

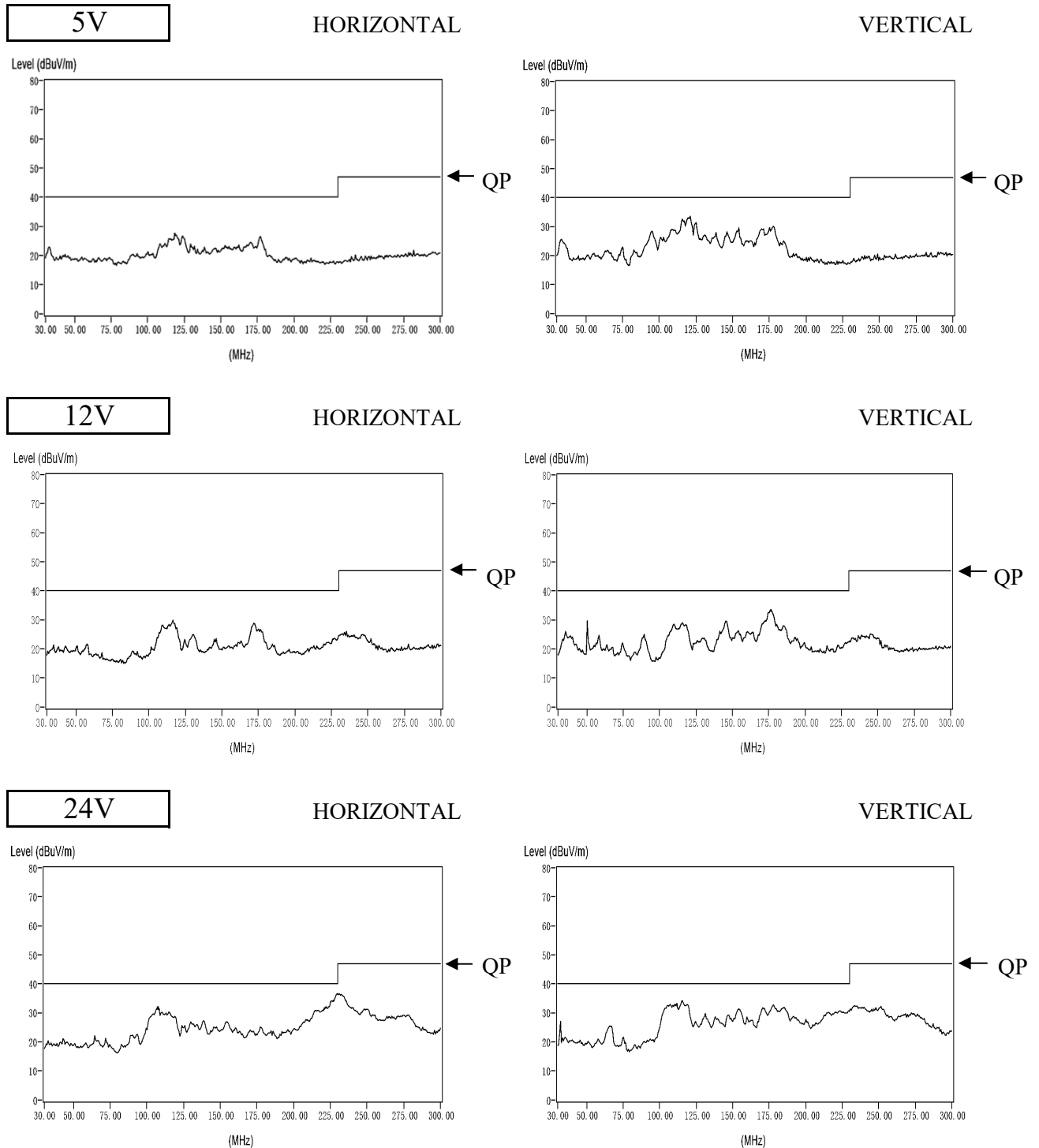
Conditions V_{in} : 230 VAC

I_o : Full load

T_a : 25 °C

雑音電界強度

Radiated Emission



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.