

ZWP300-650

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

※ 当社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。

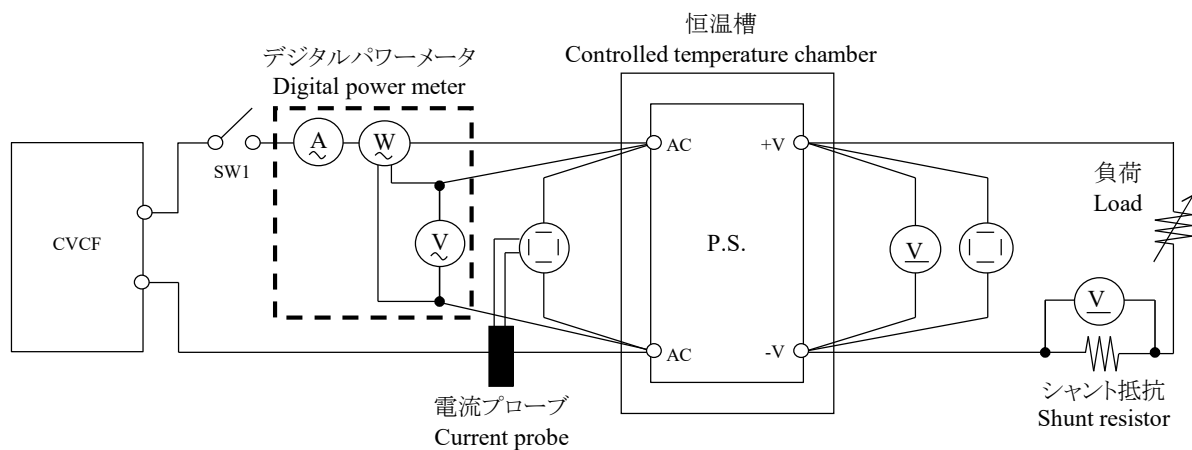
Test results are reference data based on our measurement condition.

1. 測定方法 Evaluation Method

1-1. 測定回路 Circuit used for determination

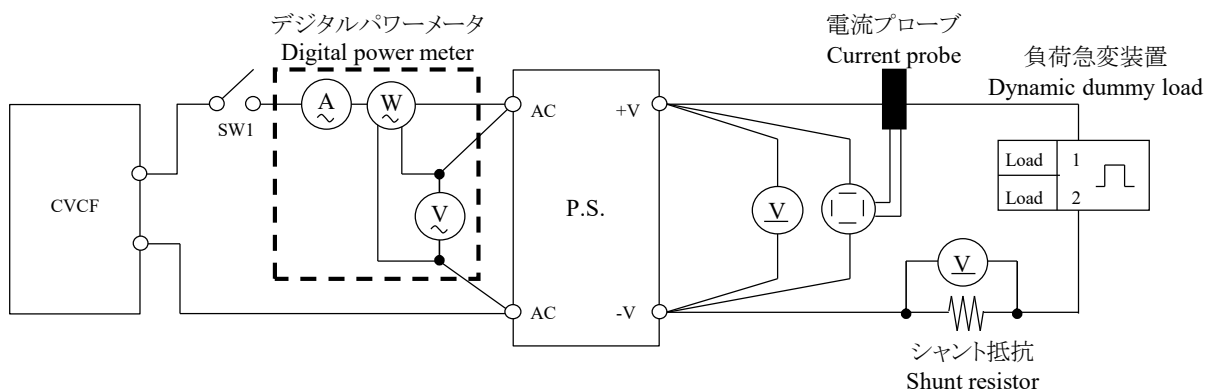
測定回路1 Circuit 1 used for determination

- | | |
|------------|---|
| ・静特性 | Steady state data |
| ・通電ドリフト特性 | Warm up voltage drift characteristics |
| ・出力保持時間特性 | Hold up time characteristics |
| ・出力立ち上がり特性 | Output voltage rise characteristics |
| ・出力立ち下がり特性 | Output voltage 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 |



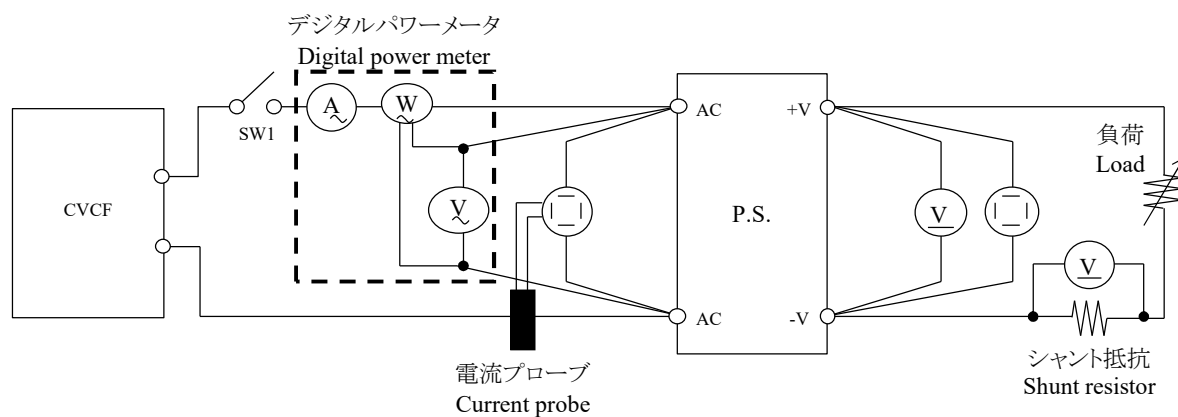
測定回路2 Circuit 2 used for determination

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



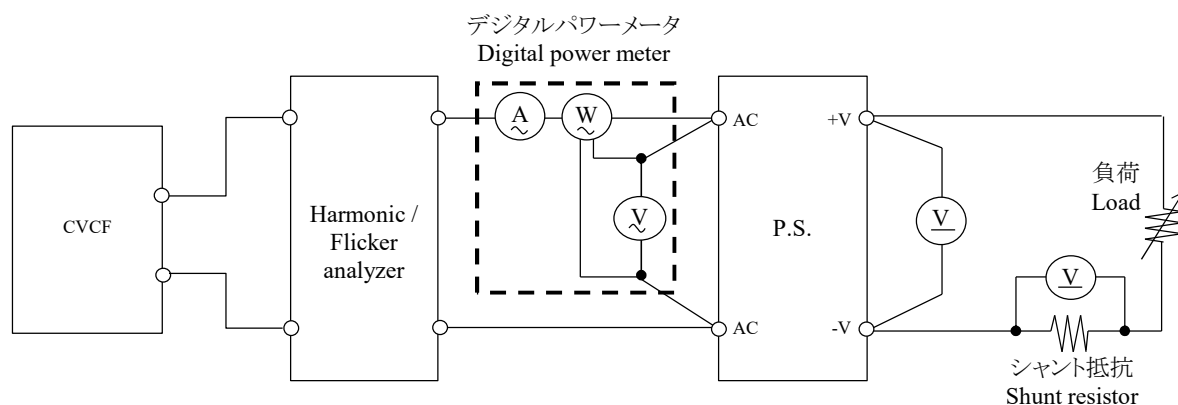
測定回路3 Circuit 3 used for determination

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



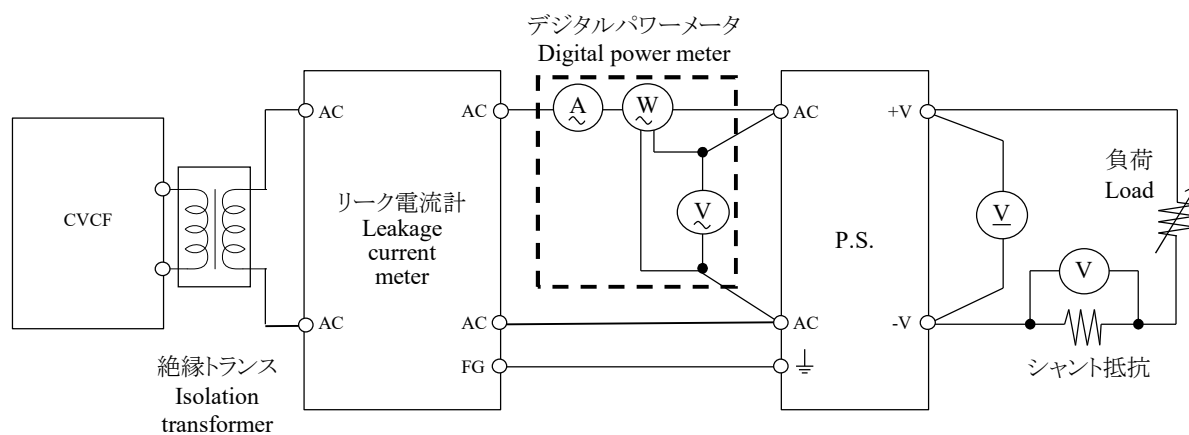
測定回路4 Circuit 4 used for determination

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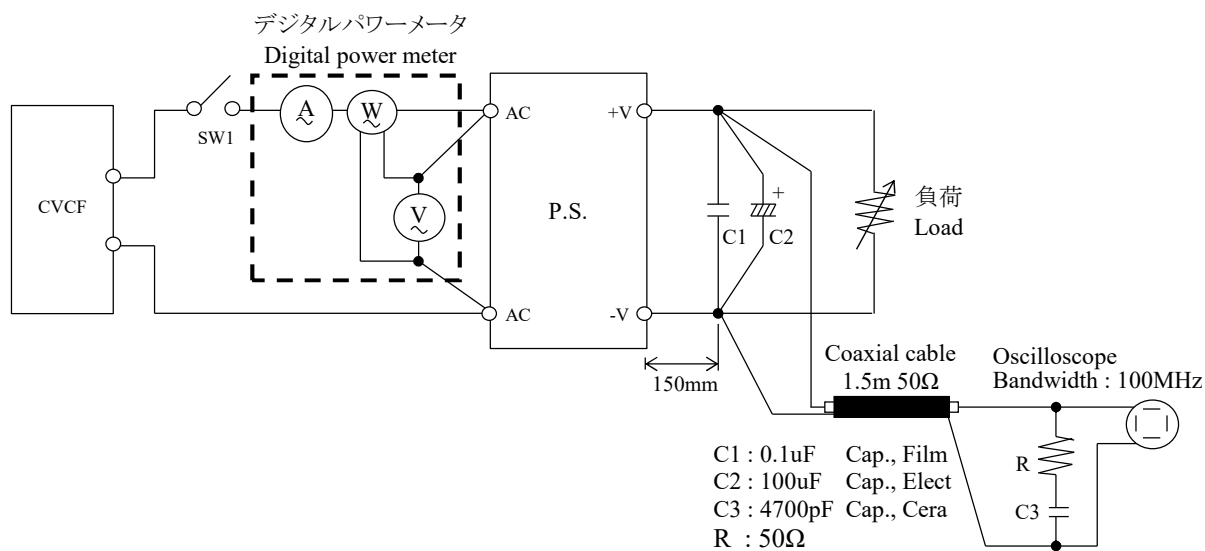
測定回路5 Circuit 5 used for determination

- ・リーク電流特性 Leakage current characteristics



測定回路6 Circuit 6 used for determination

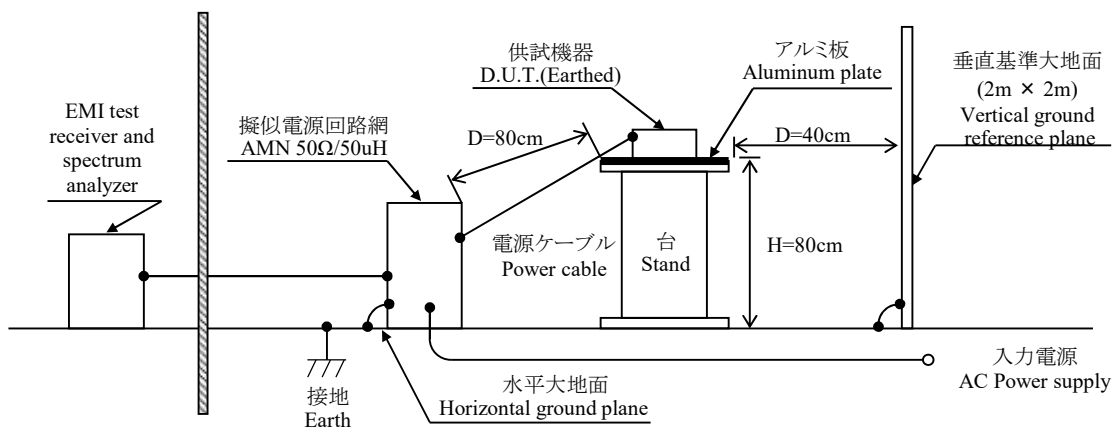
・出力リップル、ノイズ波形 Output ripple and noise waveform



測定構成 Configuration used for determination

•EMI特性 Electro-Magnetic Interference characteristics

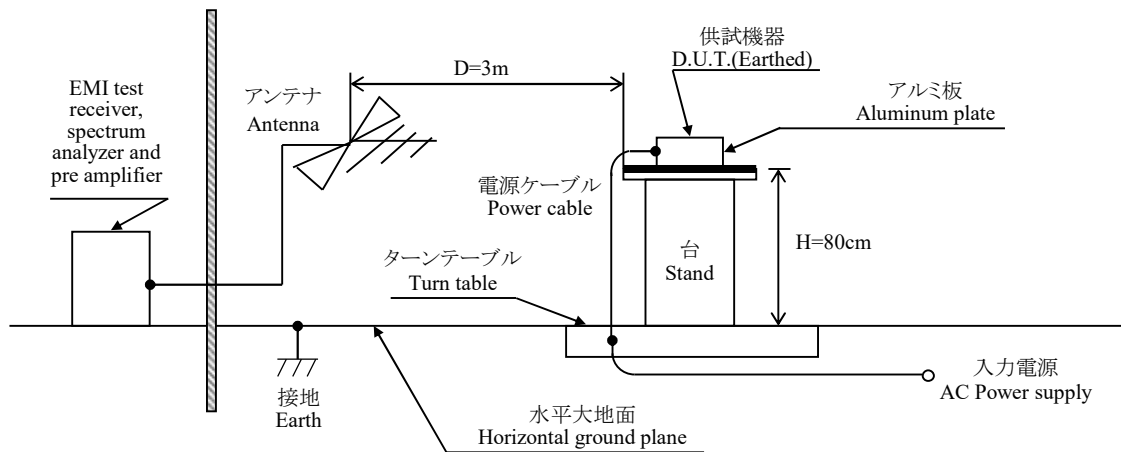
(a) 雑音端子電圧(帰還ノイズ) Conducted Emission



測定構成 Configuration used for determination

•EMI特性 Electro-Magnetic Interference characteristics

(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	KEYSIGHT	34461A
3	DATA ACQUISITION	KEYSIGHT	34970A
4	DIGITAL POWER METER	YOKOGAWA ELECT.	WT310E
5	DUMMY LOAD	CHROMA	63112A
6	SHUNT RESISTOR	YOKOGAWA ELECT.	2215
7	CVCF	KIKUSUI	PCR4000LE
8	CVCF	KIKUSUI	PCR6000LE
9	CVCF	KIKUSUI	PCR4000L
10	LEAKAGE CURRENT METER	SIMPSON	228
11	CONTROLLED TEMP. CHAMBER	ESPEC	SH-662
12	EMI TEST RECEIVER ANALYZER	ROHDE&SCHWARZ	ESR3
13	EMI TEST SPECTRUM ANALYZER	ROHDE&SCHWARZ	ESR3
14	PRE AMP.	SONOMA	310N
15	AMN	SCHWARZBECK	NNLK8121
16	ANTENNA	ROHDE&SCHWARZ	CBL6111D

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

Line and load regulation, Temperature drift, Start up voltage and Drop out voltage

24V

1. 入力・負荷変動 Line and load regulation

条件 Ta : 25°C
Condition

Iout \ Vin	85VAC	100VAC	200VAC	265VAC	Line regulation	
0%	24.010V	24.009V	24.009V	24.009V	1mV	0.004%
50%	24.006V	24.005V	24.005V	24.005V	1mV	0.004%
100%	24.002V	24.001V	24.001V	24.001V	1mV	0.004%
Load regulation	8mV	8mV	8mV	8mV		
	0.033%	0.033%	0.033%	0.033%		

2. 温度変動 Temperature drift

条件 Vin : 100VAC
Condition Iout : 100%

Ta	-20°C	+25°C	+50°C	Temperature stability	
Vout	24.000V	24.001V	23.972V	29mV	0.121%

3. 出力起動・遮断電圧 Start up voltage and Shut down voltage

条件 Ta : 25°C
Condition Iout : 100%

Start up voltage (Vin)	78VAC
Drop out voltage (Vin)	69VAC

30V

1. 入力・負荷変動 Line and load regulation

条件 Ta : 25°C
Condition

Iout \ Vin	85VAC	100VAC	200VAC	265VAC	Line regulation	
0%	29.948V	29.946V	29.944V	29.943V	5mV	0.017%
50%	29.944V	29.942V	29.941V	29.940V	4mV	0.013%
100%	29.939V	29.938V	29.937V	29.936V	3mV	0.010%
Load regulation	9mV	8mV	7mV	7mV		
	0.030%	0.027%	0.023%	0.023%		

2. 温度変動 Temperature drift

条件 Vin : 100VAC
Condition Iout : 100%

Ta	-20°C	+25°C	+50°C	Temperature stability	
Vout	29.942V	29.938V	29.921V	21mV	0.070%

3. 出力起動・遮断電圧 Start up voltage and Shut down voltage

条件 Ta : 25°C
Condition Iout : 100%

Start up voltage (Vin)	77VAC
Drop out voltage (Vin)	68VAC

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

Line and load regulation, Temperature drift, Start up voltage and Drop out voltage

36V

1. 入力・負荷変動 Line and load regulation

条件 Ta : 25°C
Condition

Iout \ Vin	85VAC	100VAC	200VAC	265VAC	Line regulation	
0%	35.999V	35.997V	35.993V	35.991V	8mV	0.022%
50%	35.995V	35.993V	35.989V	35.987V	8mV	0.022%
100%	35.992V	35.989V	35.985V	35.985V	7mV	0.019%
Load regulation	7mV	8mV	8mV	6mV		
	0.019%	0.022%	0.022%	0.017%		

2. 温度変動 Temperature drift

条件 Vin : 100VAC
Condition Iout : 100%

Ta	-20°C	+25°C	+50°C	Temperature stability	
Vout	35.950V	35.989V	35.973V	39mV	0.108%

3. 出力起動・遮断電圧 Start up voltage and Shut down voltage

条件 Ta : 25°C
Condition Iout : 100%

Start up voltage (Vin)	78VAC
Drop out voltage (Vin)	66VAC

48V

1. 入力・負荷変動 Line and load regulation

条件 Ta : 25°C
Condition

Iout \ Vin	85VAC	100VAC	200VAC	265VAC	Line regulation	
0%	47.988V	47.990V	47.991V	47.992V	4mV	0.008%
50%	47.984V	47.986V	47.987V	47.987V	3mV	0.006%
100%	47.983V	47.983V	47.985V	47.985V	2mV	0.004%
Load regulation	5mV	7mV	6mV	7mV		
	0.010%	0.015%	0.013%	0.015%		

2. 温度変動 Temperature drift

条件 Vin : 100VAC
Condition Iout : 100%

Ta	-20°C	+25°C	+50°C	Temperature stability	
Vout	47.926V	47.983V	47.998V	72mV	0.150%

3. 出力起動・遮断電圧 Start up voltage and Shut down voltage

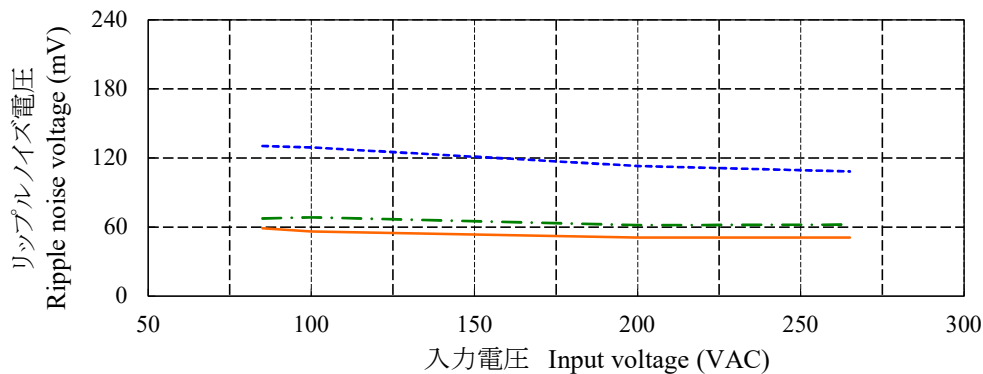
条件 Ta : 25°C
Condition Iout : 100%

Start up voltage (Vin)	76VAC
Drop out voltage (Vin)	67VAC

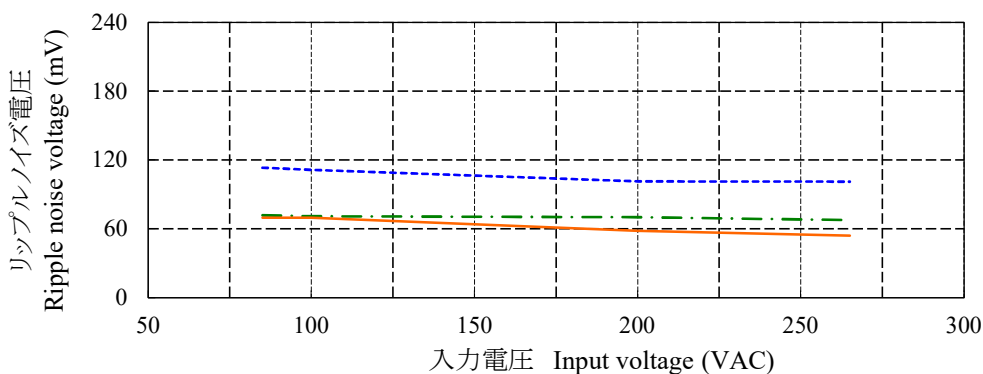
(2) リップルノイズ電圧対入力電圧 Ripple noise voltage vs. Input voltage

条件 Conditions Iout : 100%
 Ta : 20°C ---
 25°C - - -
 50°C _ _ _

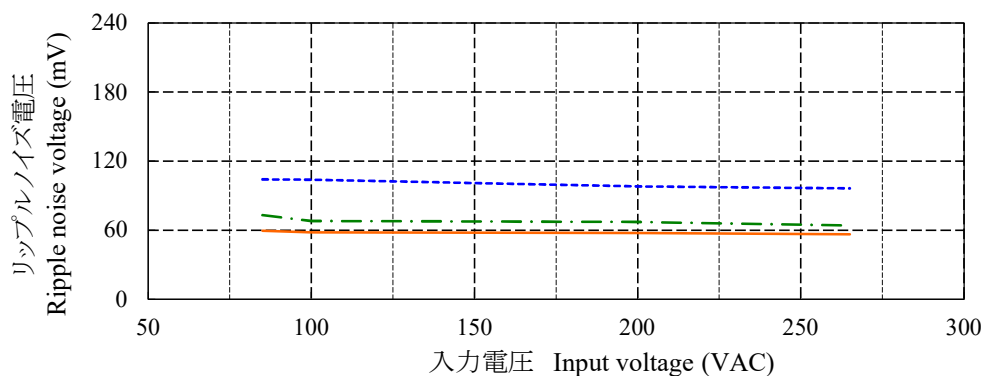
24V



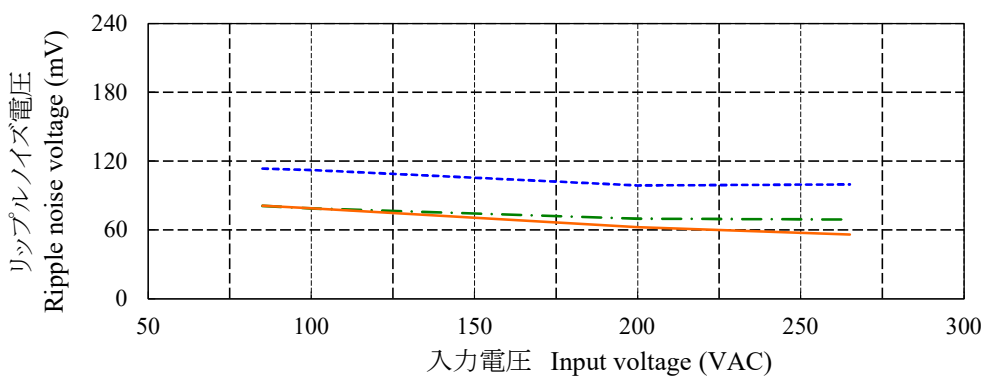
30V



36V



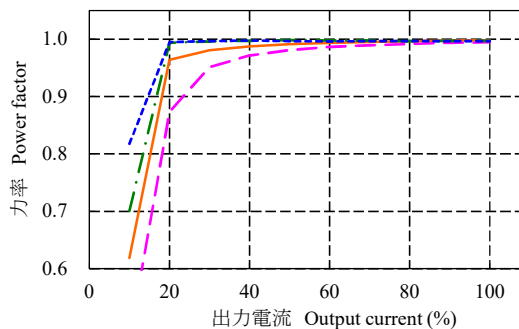
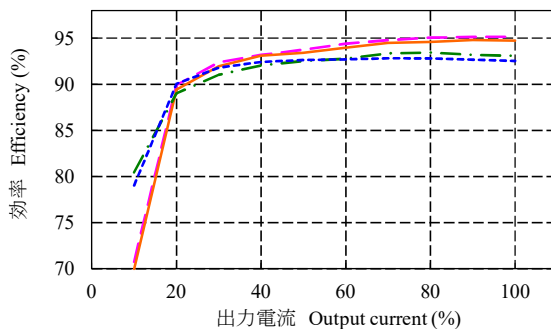
48V



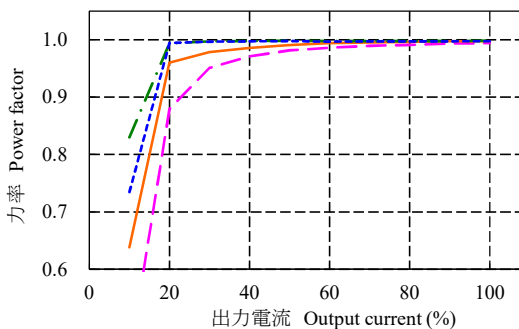
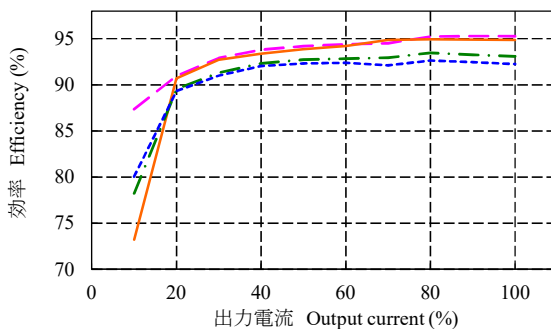
(3) 効率・力率対出力電流 Efficiency and Power factor vs. Output current

条件 Vin : 85VAC
 Conditions 100VAC
 200VAC
 265VAC
 Ta : 25°C

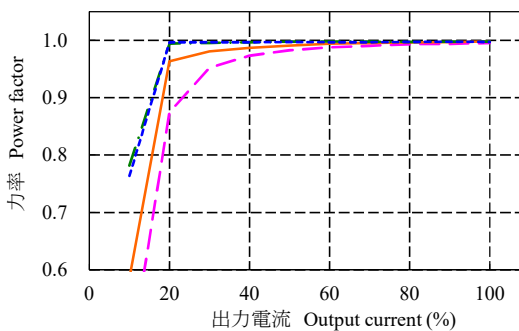
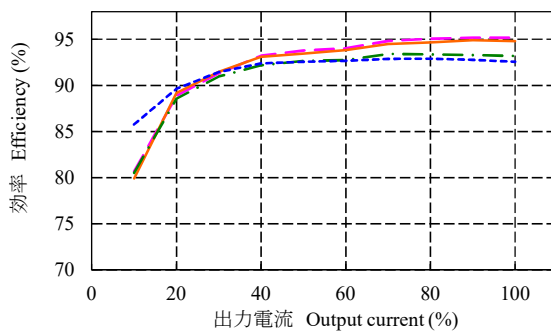
24V



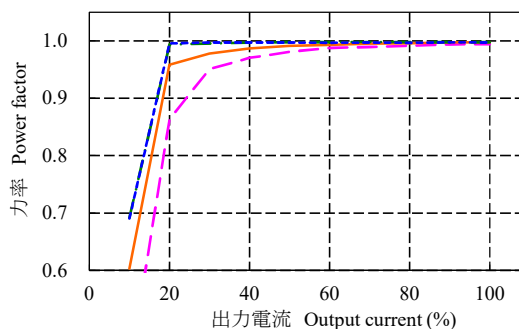
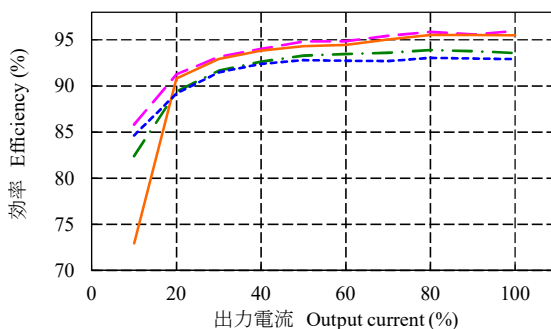
30V



36V



48V

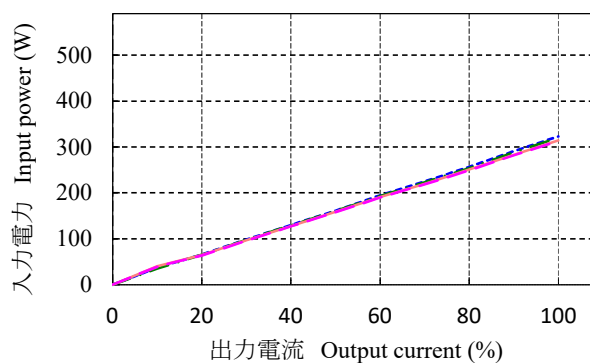


(4) 入力電力対出力電流 Input power vs. Output current

条件 Vin : 85VAC ---
 Conditions 100VAC -.-
 200VAC ---
 265VAC -.-
 Ta : 25°C

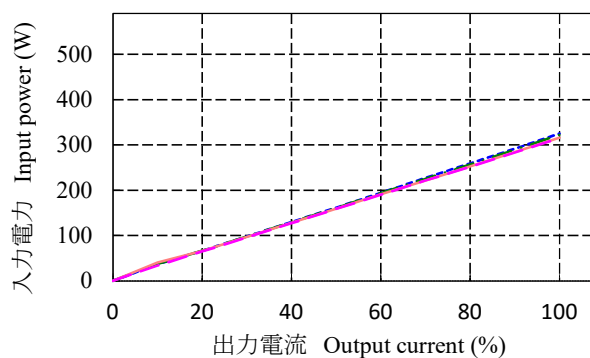
24V

入力電圧 Input Voltage	入力電力 Input power
	Iout : 0%
85VAC	0.2W
100VAC	0.2W
200VAC	0.2W
265VAC	0.3W



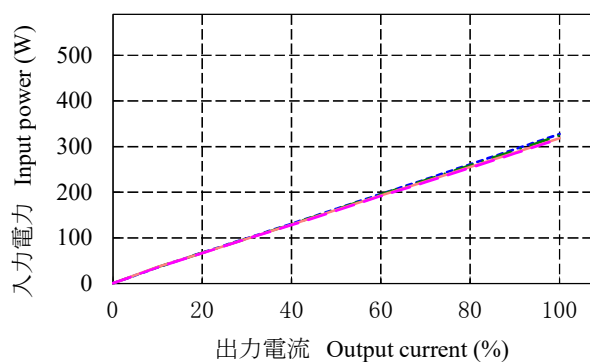
30V

入力電圧 Input Voltage	入力電力 Input power
	Iout : 0%
85VAC	0.2W
100VAC	0.3W
200VAC	0.4W
265VAC	0.3W



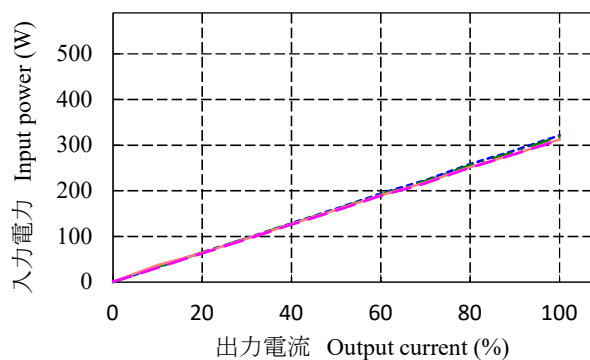
36V

入力電圧 Input Voltage	入力電力 Input power
	Iout : 0%
85VAC	0.2W
100VAC	0.1W
200VAC	0.2W
265VAC	0.3W



48V

入力電圧 Input Voltage	入力電力 Input power
	Iout : 0%
85VAC	0.2W
100VAC	0.1W
200VAC	0.2W
265VAC	0.4W

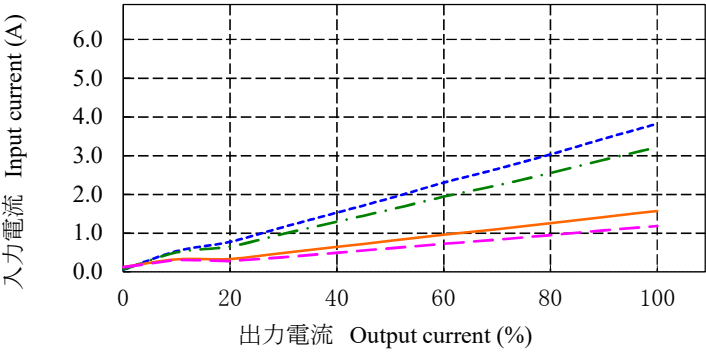


(5) 入力電流対出力電流 Input current vs. Output current

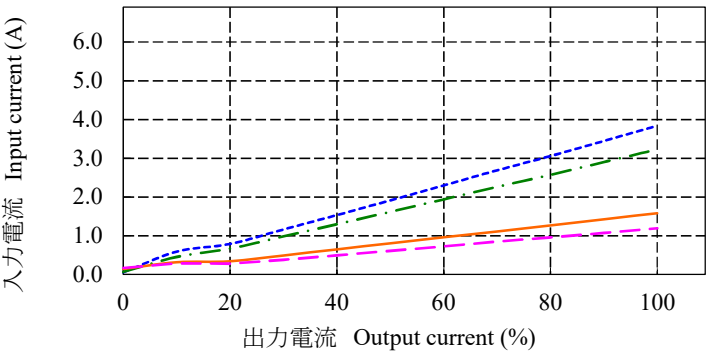
条件
Conditions

Vin : 85VAC - - - -
 100VAC - · - · -
 200VAC - - - -
 265VAC - - - -
Ta : 25°C

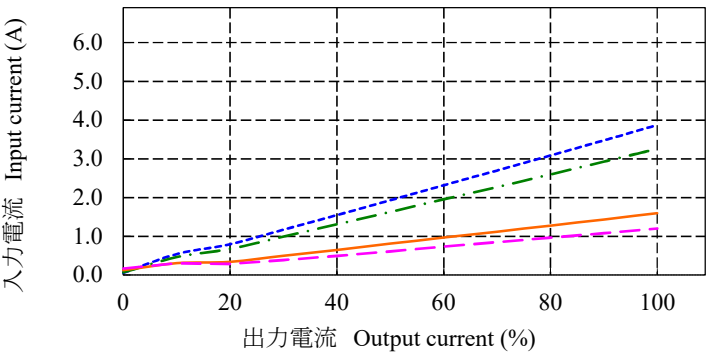
24V



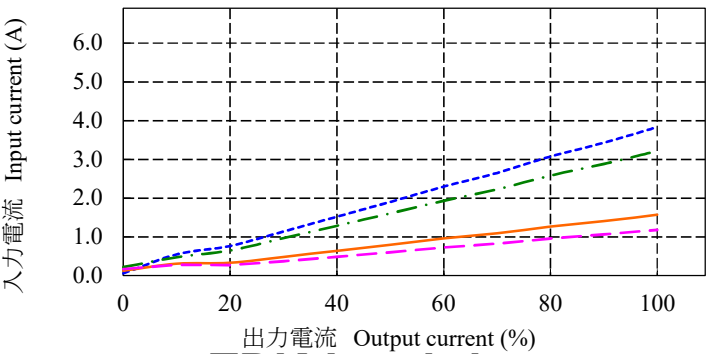
30V



36V



48V

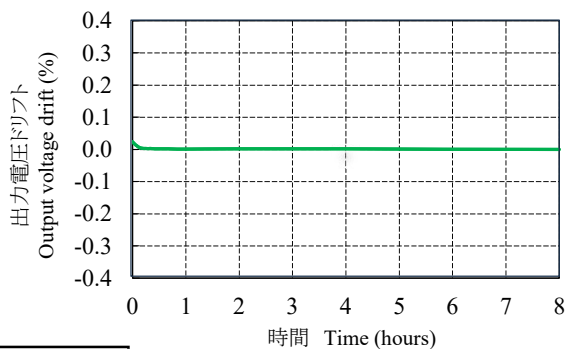


2-2. 通電ドリフト特性

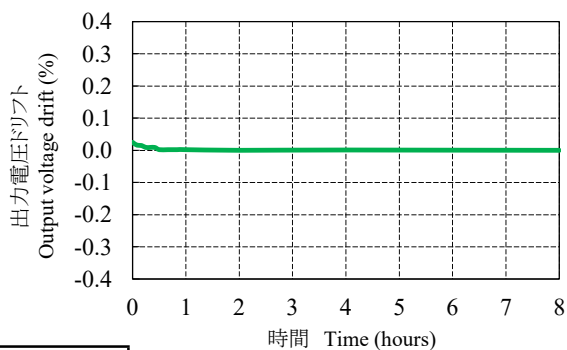
Warm up voltage drift characteristics

条件 Vin : 100VAC
Conditions Iout : 100%
Ta : 25°C

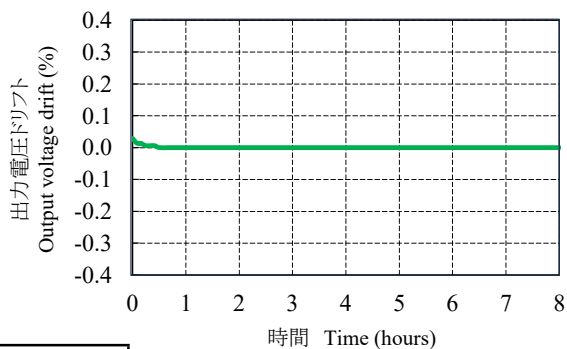
24V



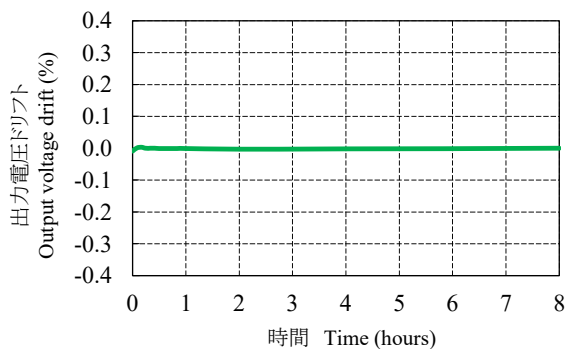
30V



36V



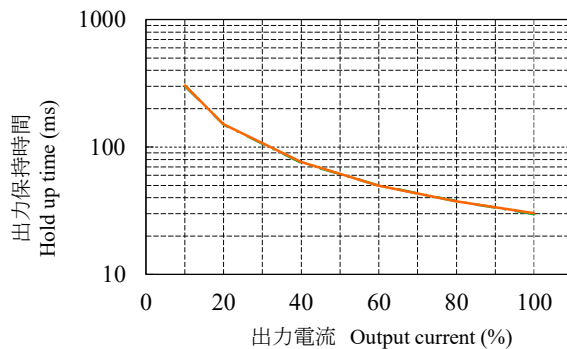
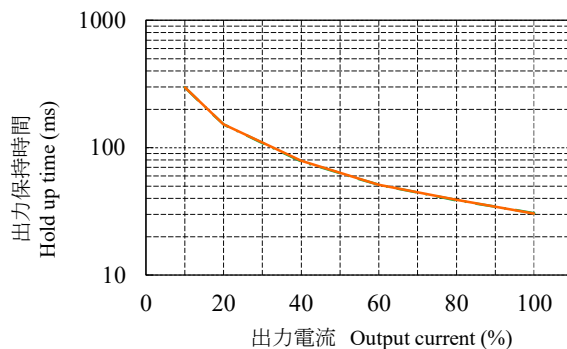
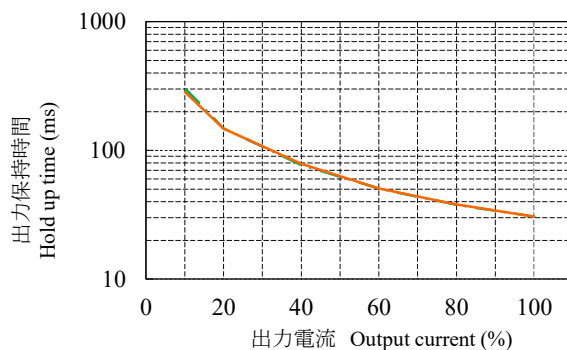
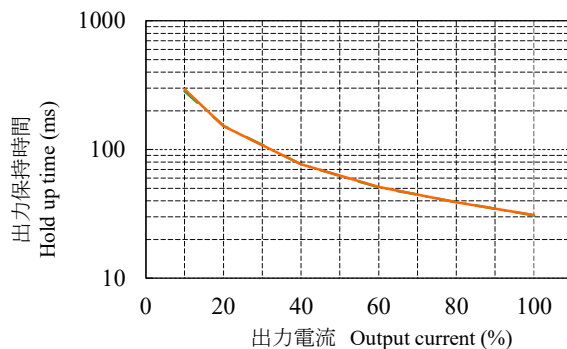
48V



2-3. 出力保持時間特性

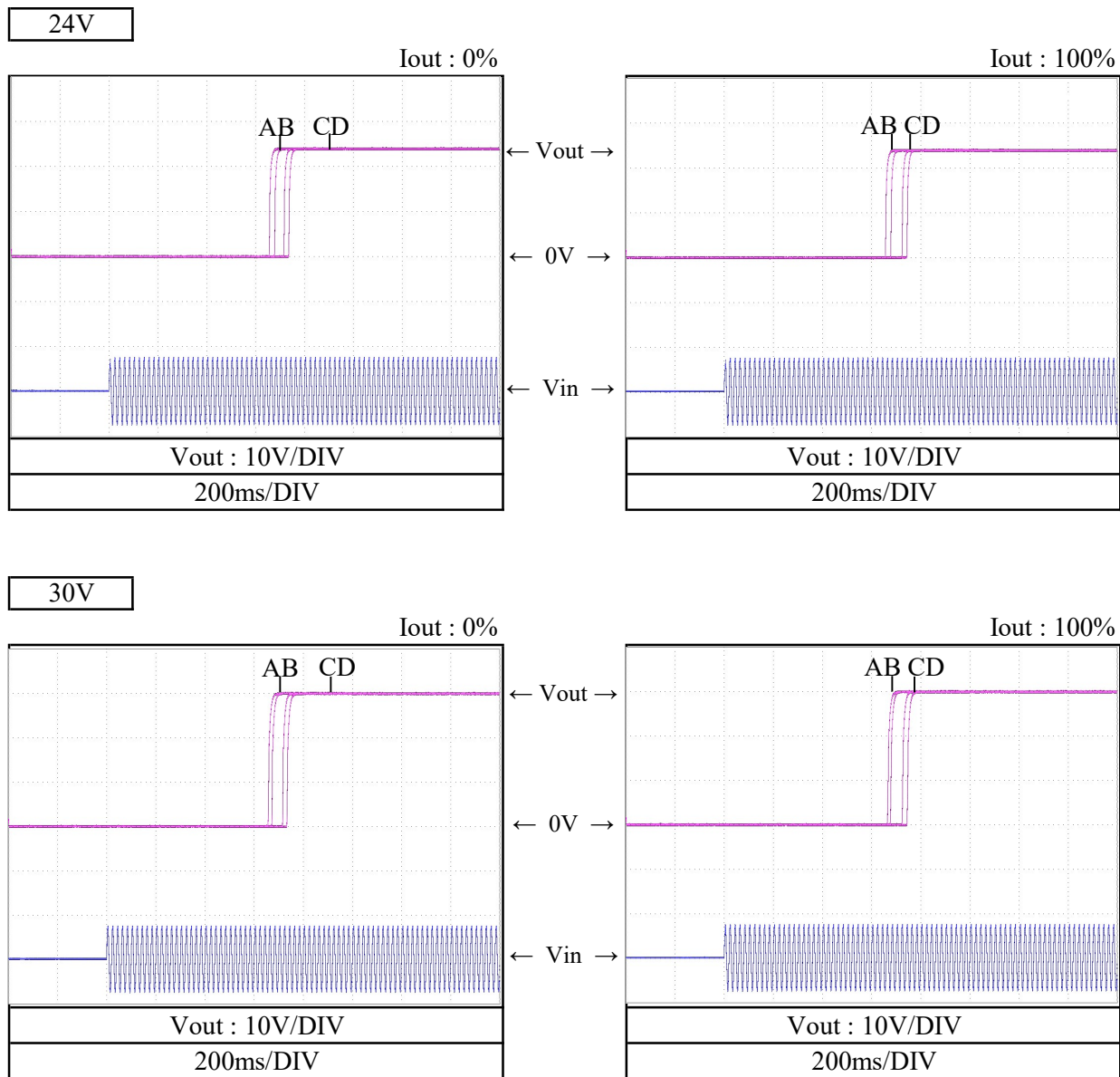
Hold up time characteristics

条件 Vin : 100VAC
Conditions 200VAC
Ta : 25°C



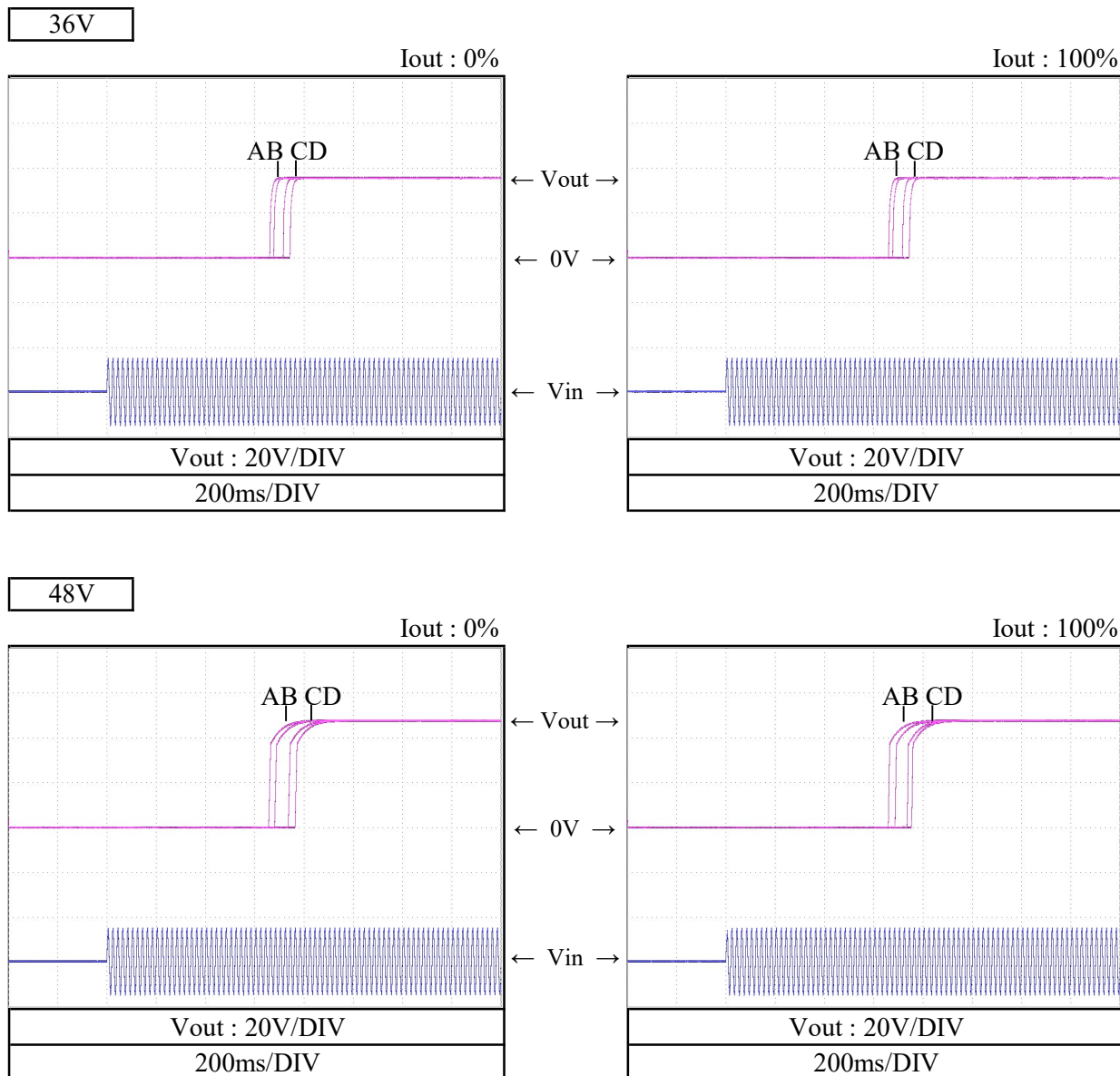
2-4. 出力電圧立ち上がり特性 Output voltage rise characteristics

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



2-4. 出力電圧立ち上がり特性 Output voltage rise characteristics

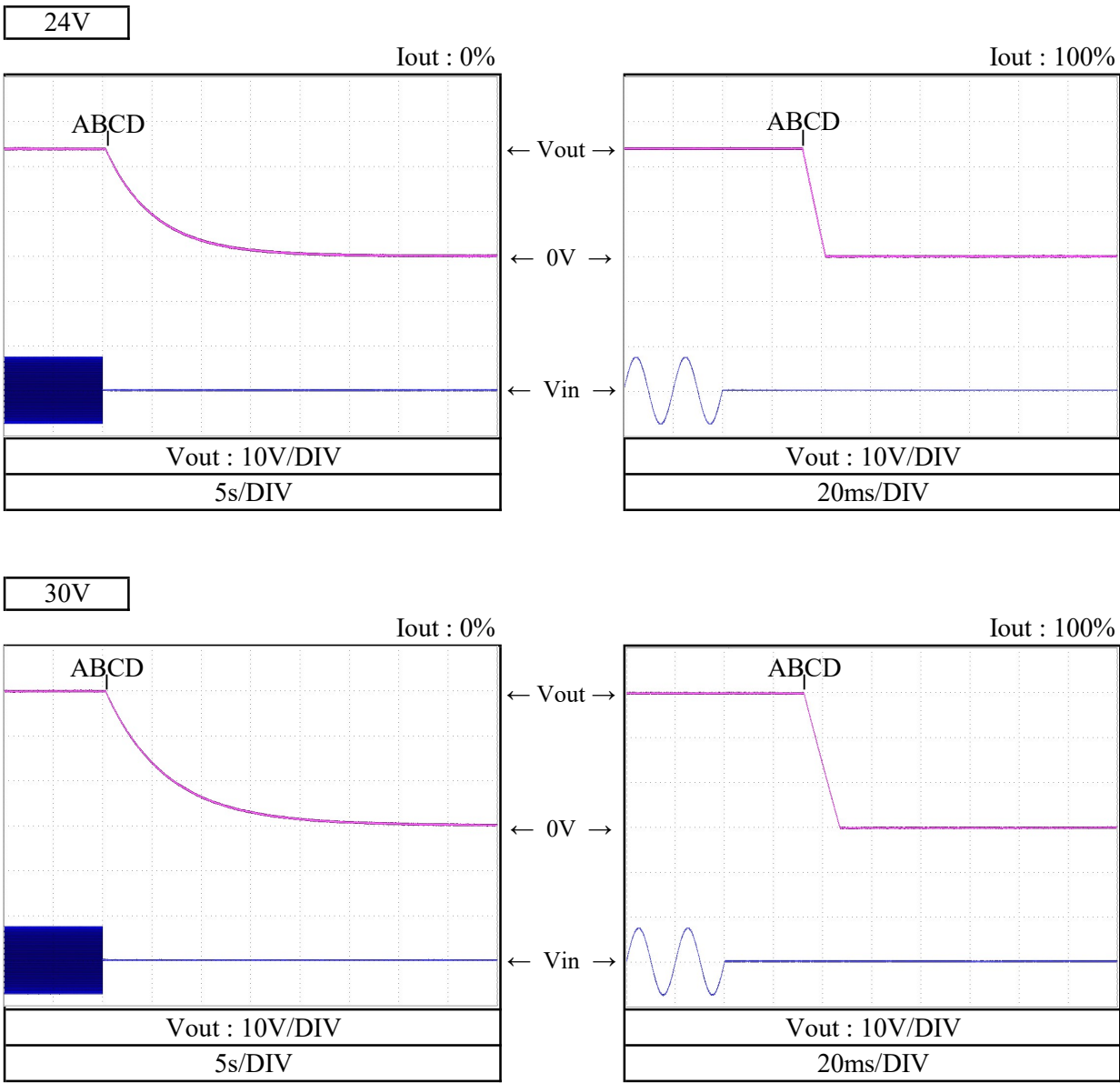
条件 Vin : 85VAC (A)
 Conditions 100VAC (B)
 200VAC (C)
 265VAC (D)
 Ta : 25°C



2-5. 出力電圧立ち下がり特性 Output voltage fall characteristics

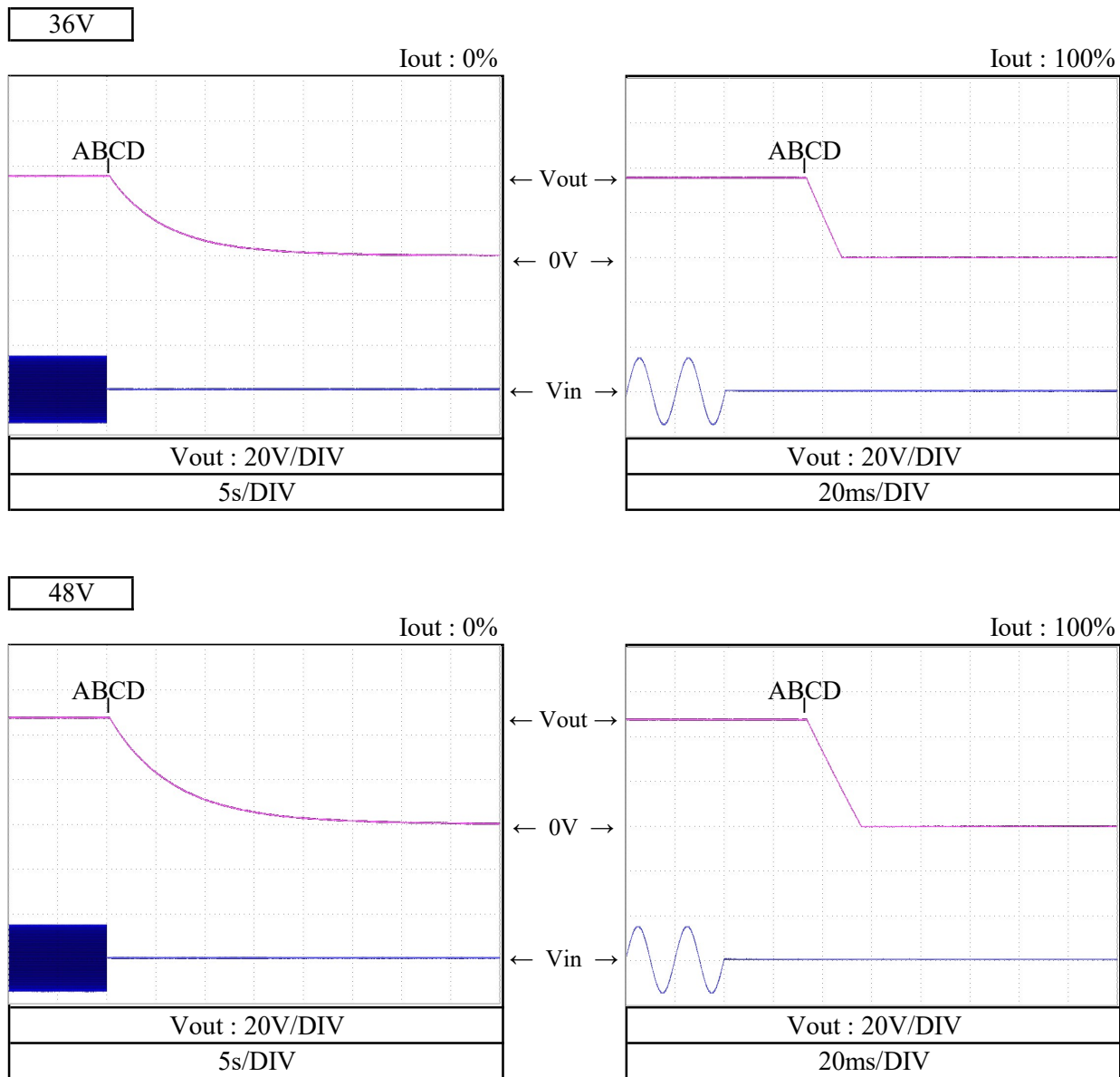
条件
Conditions

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



2-5. 出力電圧立ち下がり特性 Output voltage fall characteristics

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

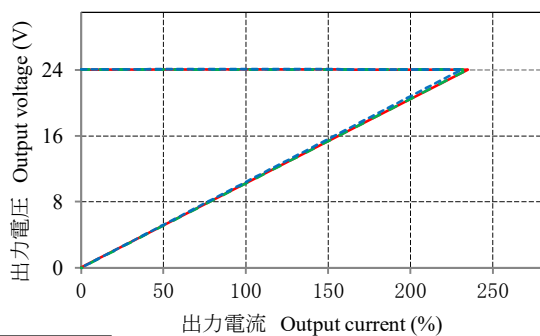


2-6. 過電流保護特性

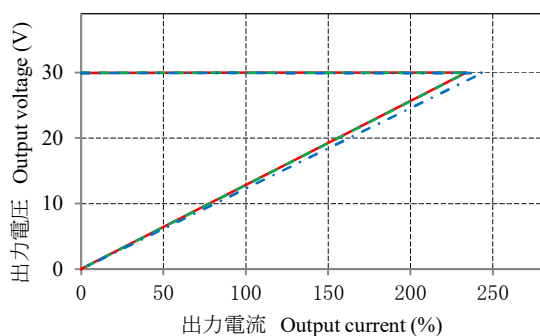
Over current protection (OCP) characteristics

条件 Vin : 100VAC
 Conditions Ta : -20°C ---
 25°C —
 50°C - - -

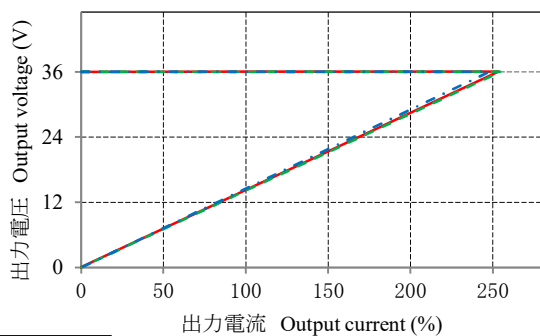
24V



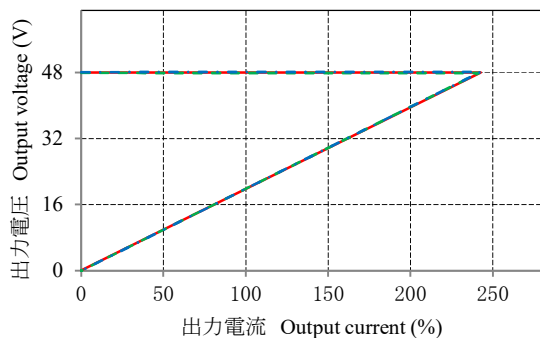
30V



36V



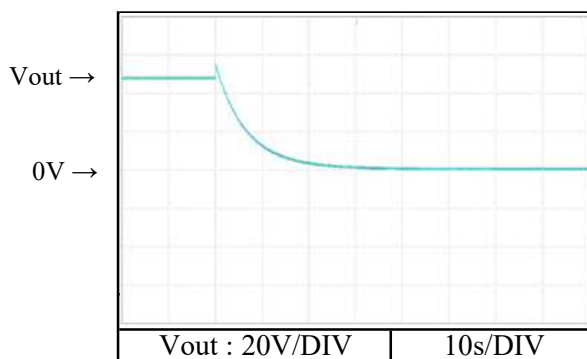
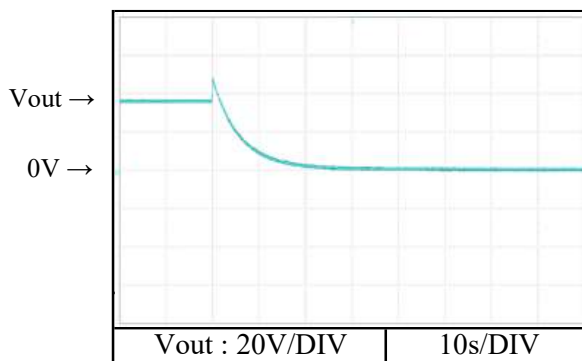
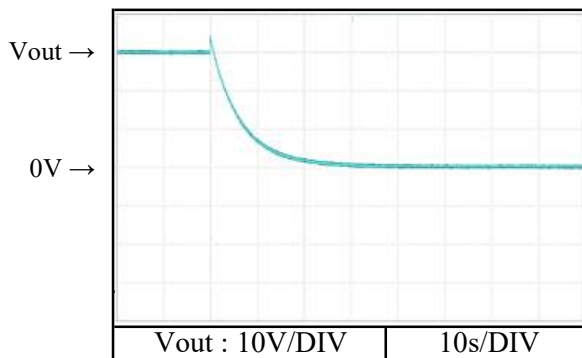
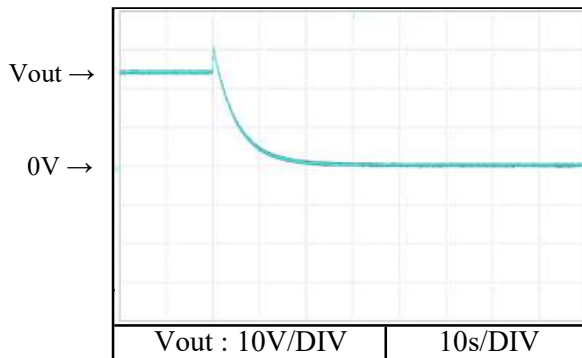
48V



2-7. 過電圧保護特性

Over voltage protection (OVP) characteristics

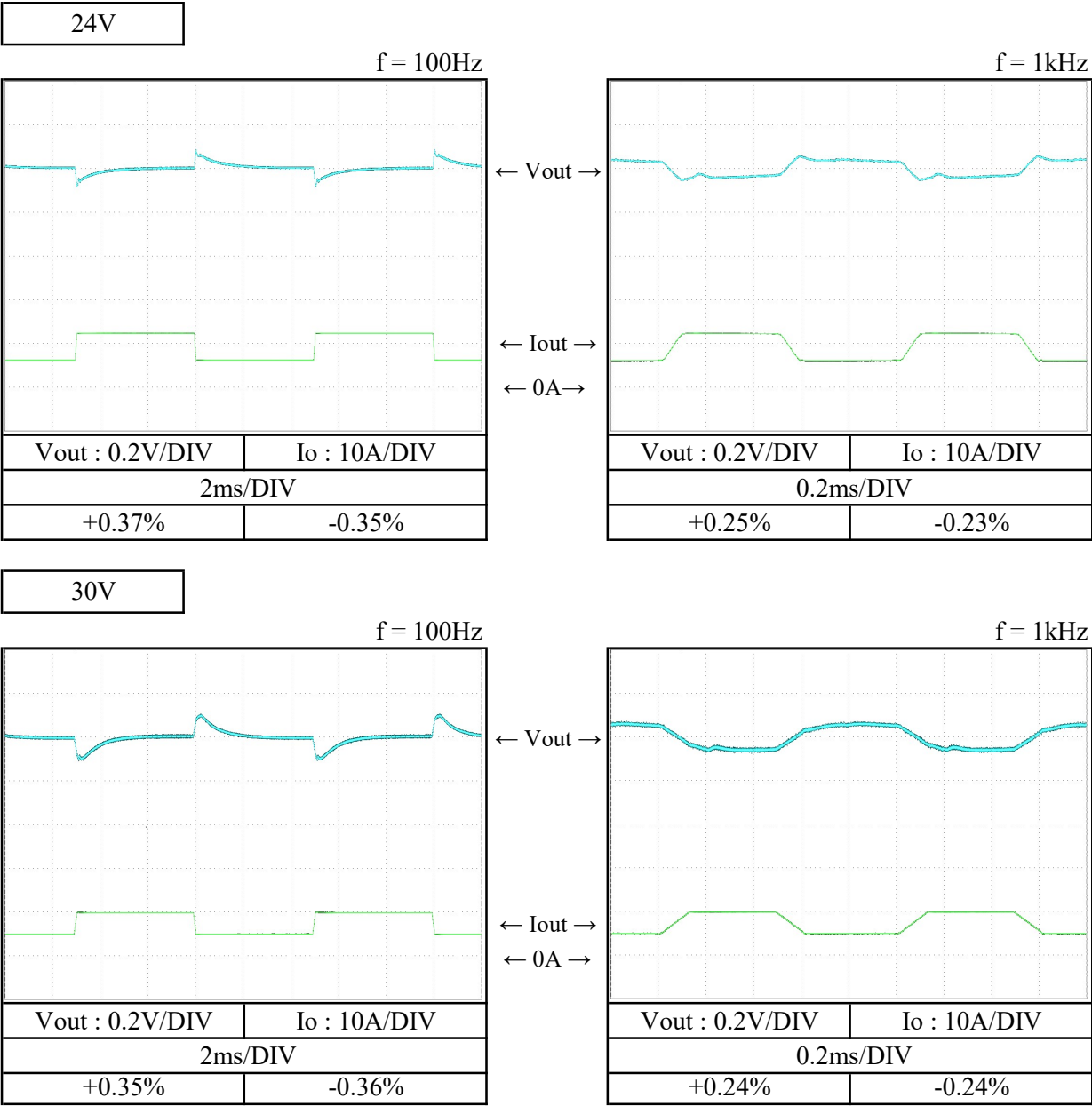
条件 Vin : 100VAC
 Conditions Io : 0%
 Ta : 25°C



2-8. 過渡応答(負荷急変)特性 Dynamic load response characteristics

条件
Conditions

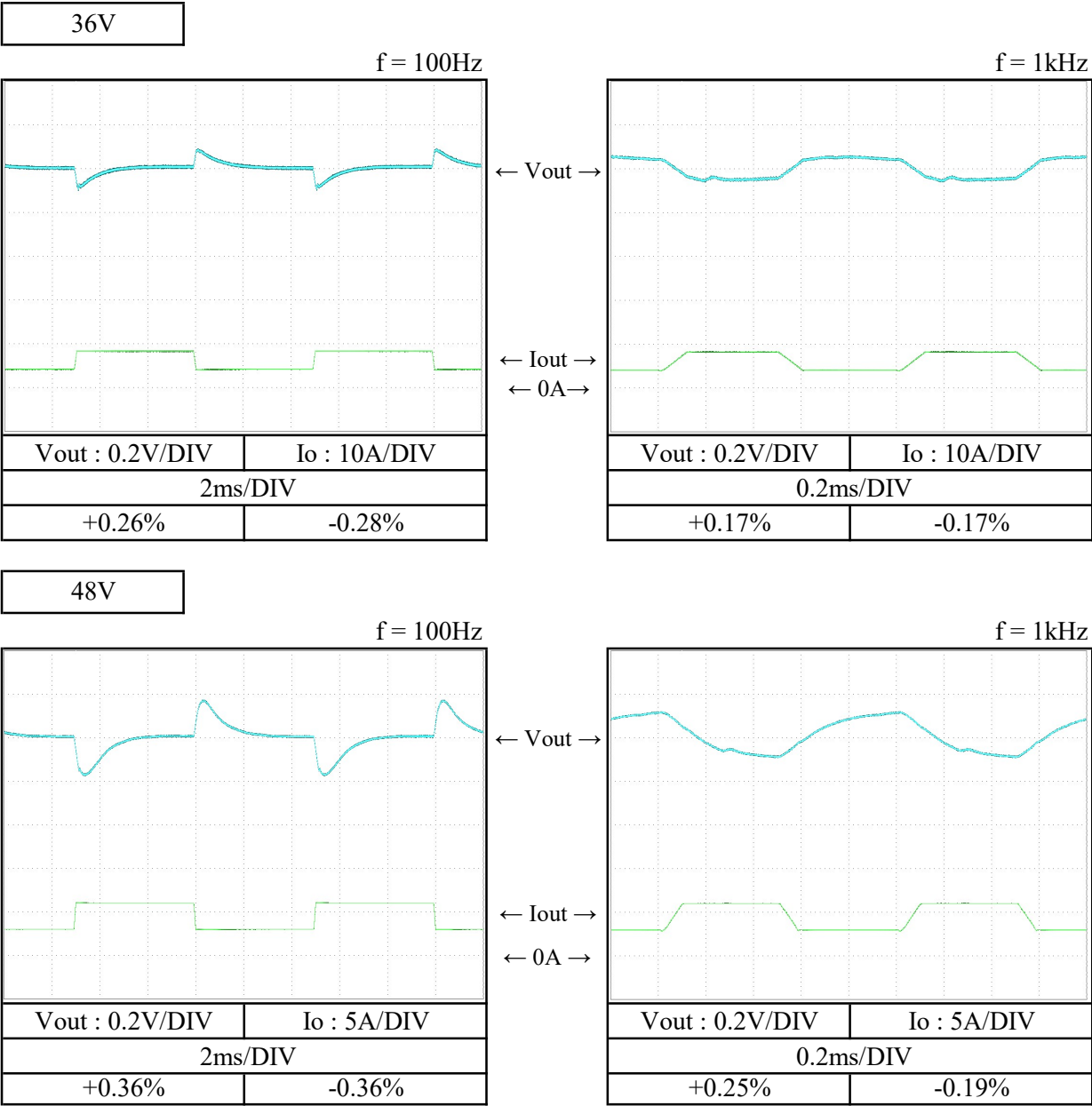
Vin : 100VAC
Iout : 50% ↔ 100%
(tr = tf = 75us)
Ta : 25°C



2-8. 過渡応答(負荷急変)特性 Dynamic load response characteristics

条件
Conditions

Vin : 100VAC
Iout : 50% ↔ 100%
(tr = tf = 75us)
Ta : 25°C

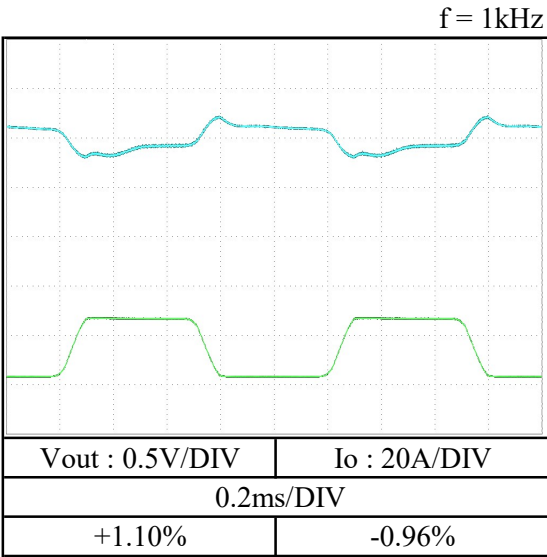
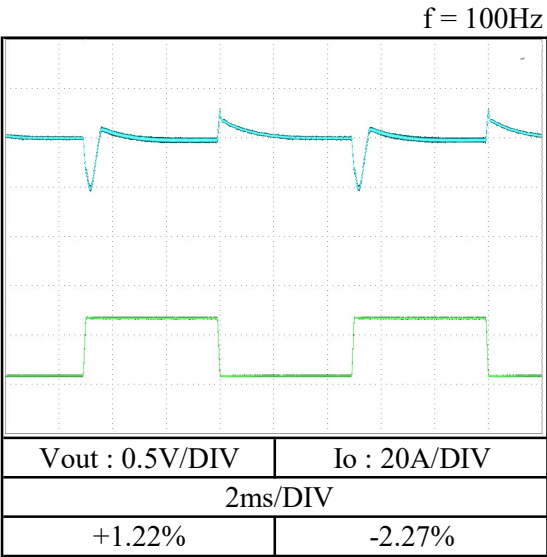


2-8. 過渡応答(負荷急変)特性 Dynamic load response characteristics

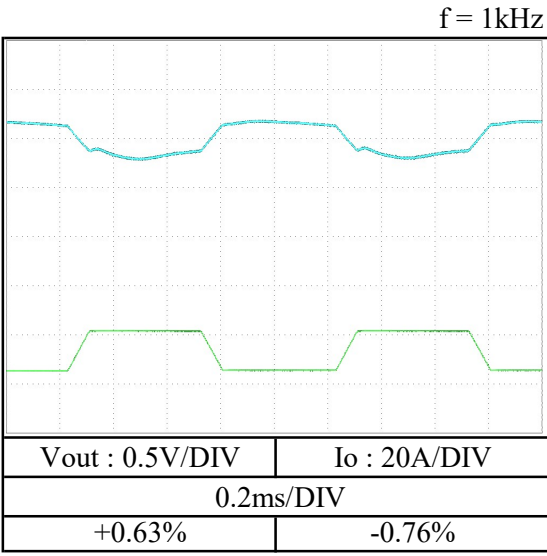
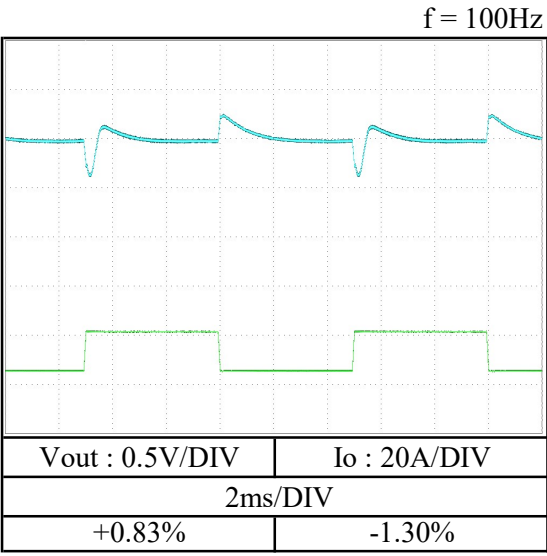
条件
Conditions

Vin : 100VAC
Iout : 25% ⇔ Peak load (650W)
(tr = tf = 75us)
Ta : 25°C

24V



30V

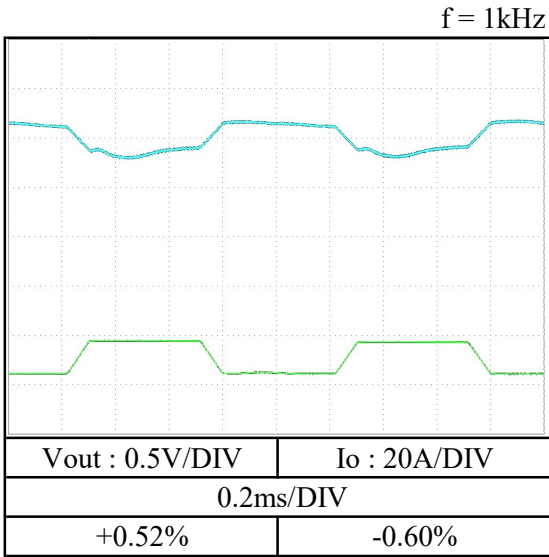
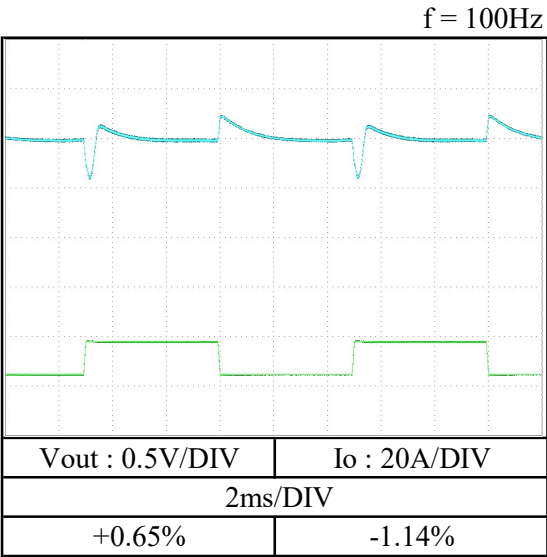


2-8. 過渡応答(負荷急変)特性 Dynamic load response characteristics

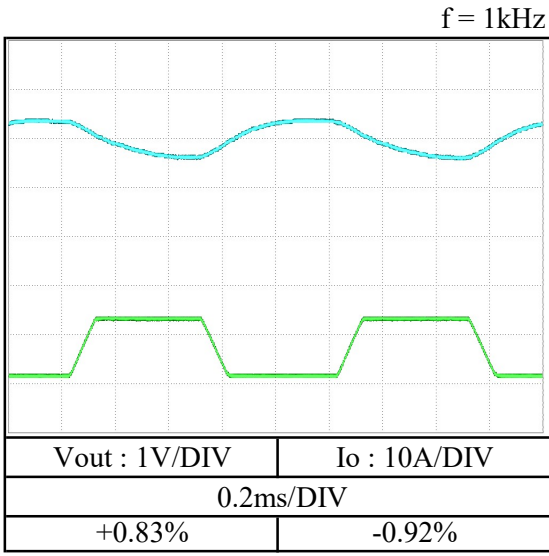
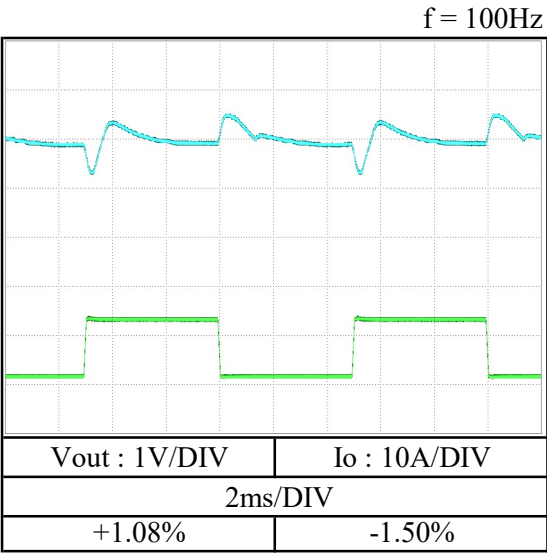
条件
Conditions

Vin : 100VAC
Iout : 25% ⇔ Peak load (650W)
(tr = tf = 75us)
Ta : 25°C

36V



48V



2-9. 入力電圧瞬停特性 Response to brown out characteristics

条件 Conditions
 $I_{out} : 100\%$
 $T_a : 25^{\circ}\text{C}$

瞬停時間 Interruption time

A : 出力電圧の低下なし No output voltage drop.

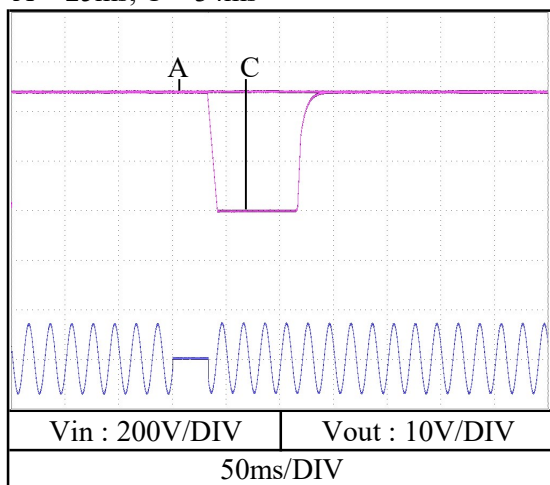
B : 出力電圧の低下が0Vまでいかない No output voltage drop to 0V.

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

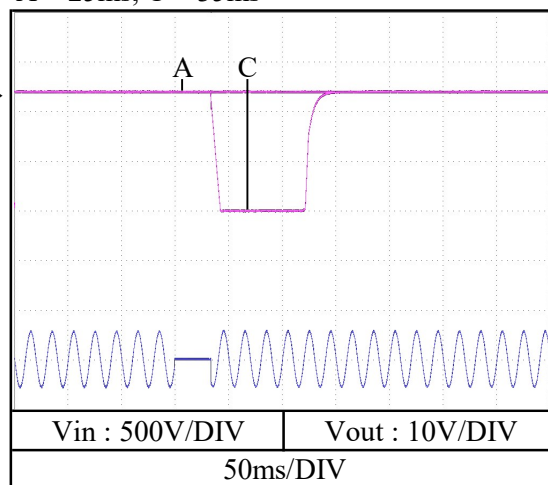
24V

 $V_{in} : 100\text{VAC}$

A = 25ms, C = 34ms

 $V_{in} : 200\text{VAC}$

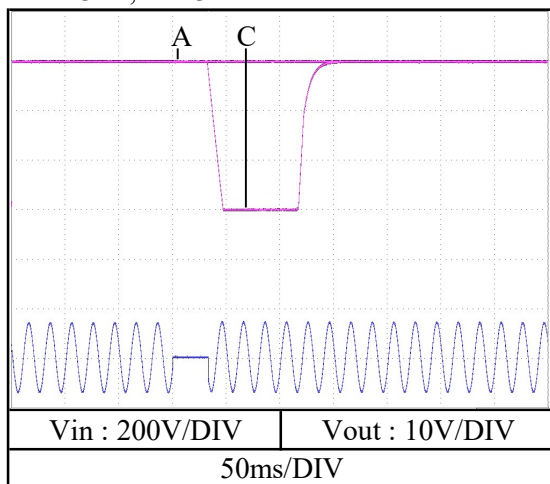
A = 25ms, C = 35ms



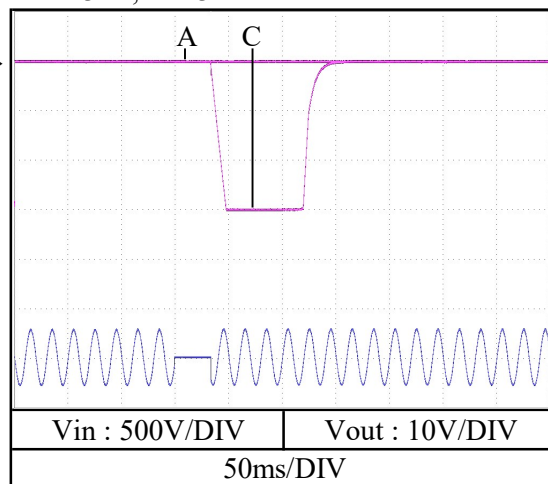
30V

 $V_{in} : 100\text{VAC}$

A = 23ms, C = 34ms

 $V_{in} : 200\text{VAC}$

A = 23ms, C = 34ms



2-9. 入力電圧瞬停特性 Response to brown out characteristics

条件
Conditions

I_{out} : 100%
Ta : 25°C

瞬停時間 Interruption time

A : 出力電圧の低下なし No output voltage drop.

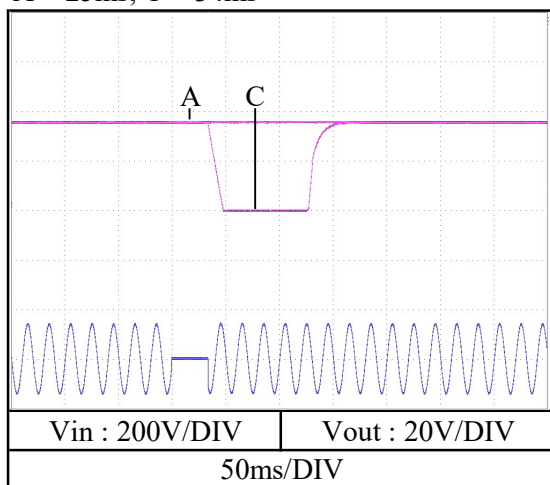
B : 出力電圧の低下が0Vまでいかない No output voltage drop to 0V.

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

36V

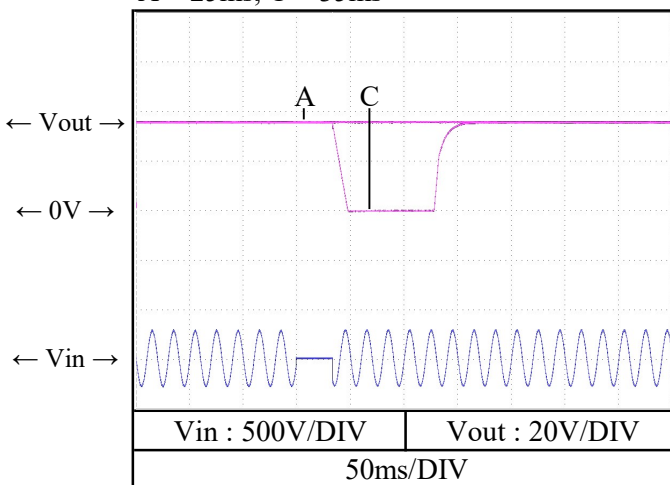
Vin : 100VAC

A = 25ms, C = 34ms



Vin : 200VAC

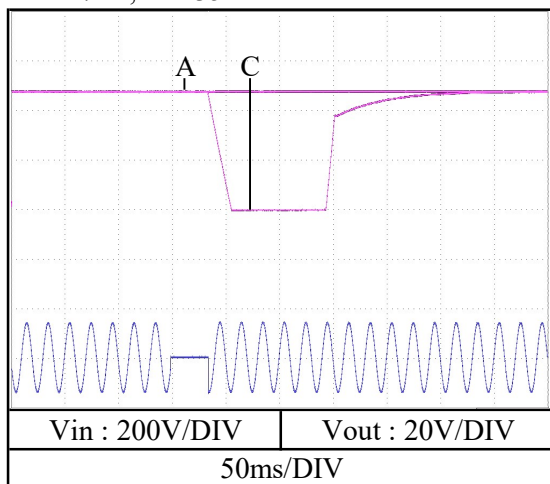
A = 25ms, C = 35ms



48V

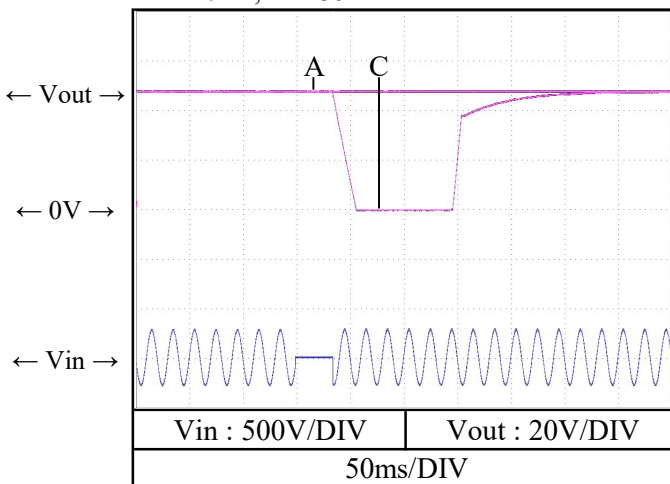
Vin : 100VAC

A = 27ms, C = 35ms



Vin : 200VAC

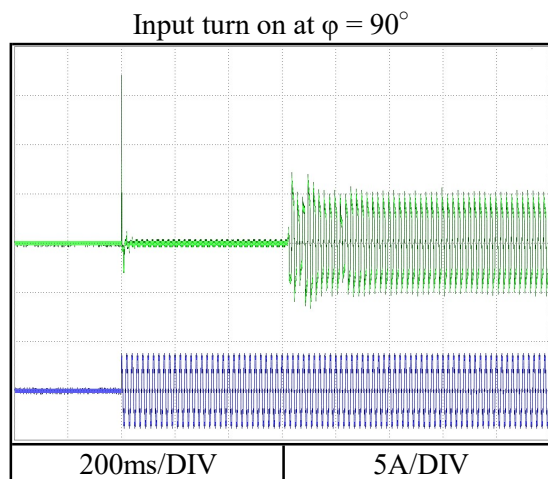
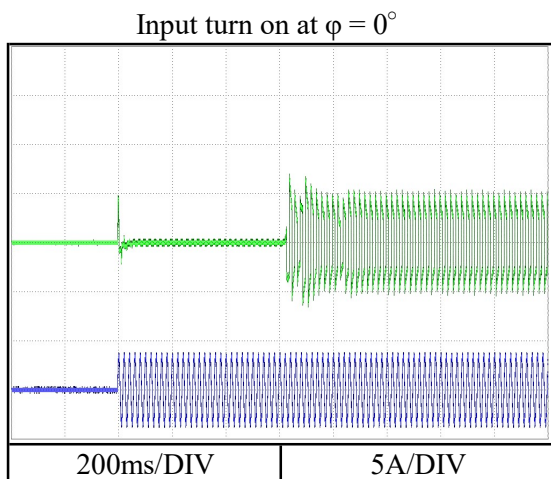
A = 27ms, C = 35ms



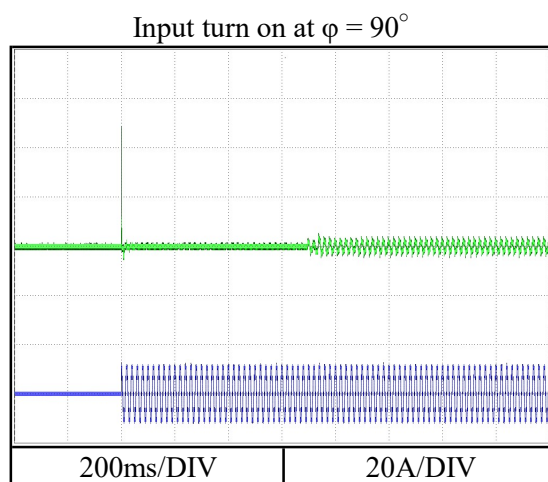
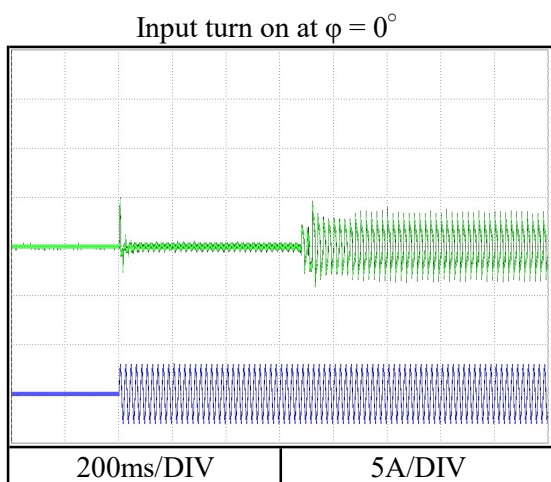
2-10. 入力サージ電流(突入電流)波形 Inrush current waveform

条件 Vin : 100VAC
Conditions Iout : 100%
Ta : 25°C

24V

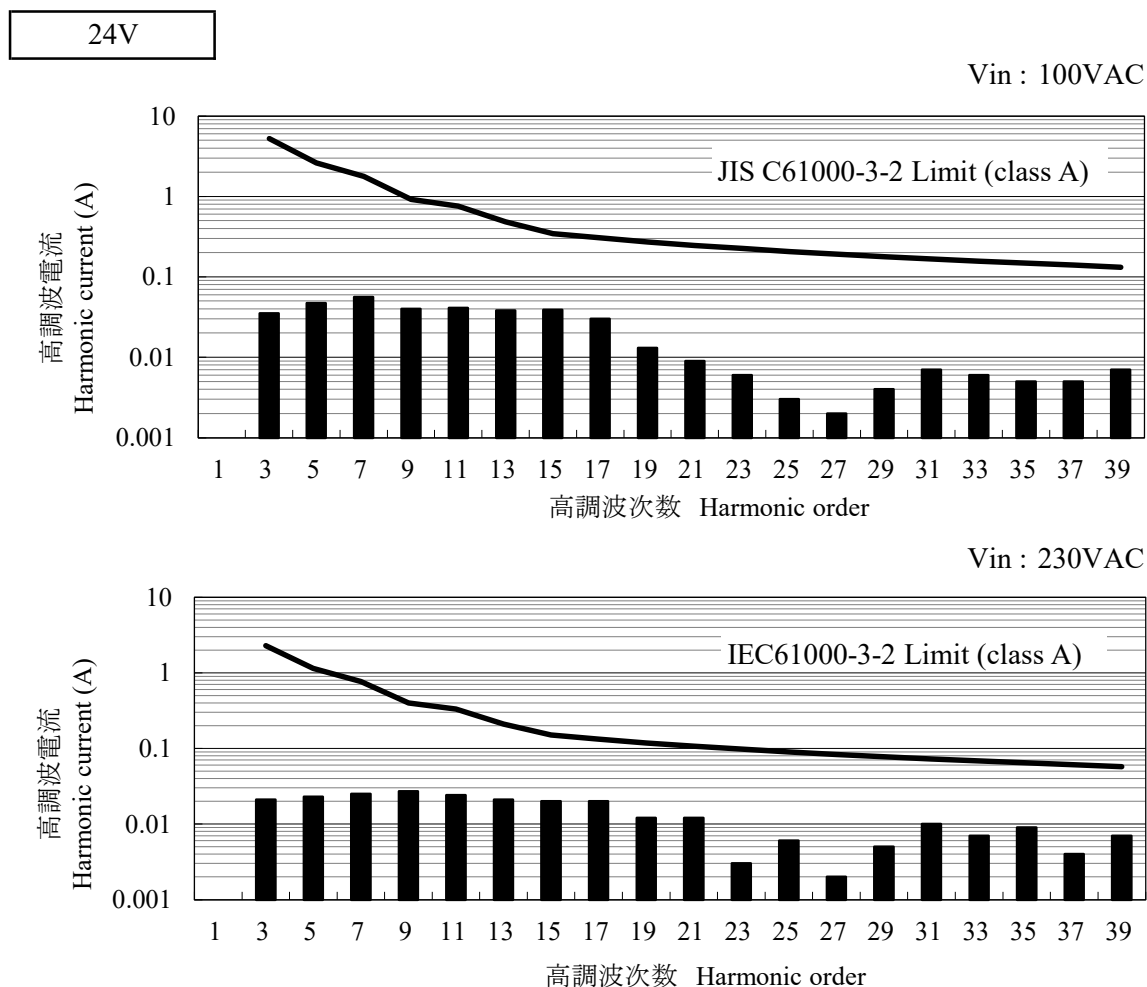


条件 Vin : 200VAC
Conditions Iout : 100%
Ta : 25°C



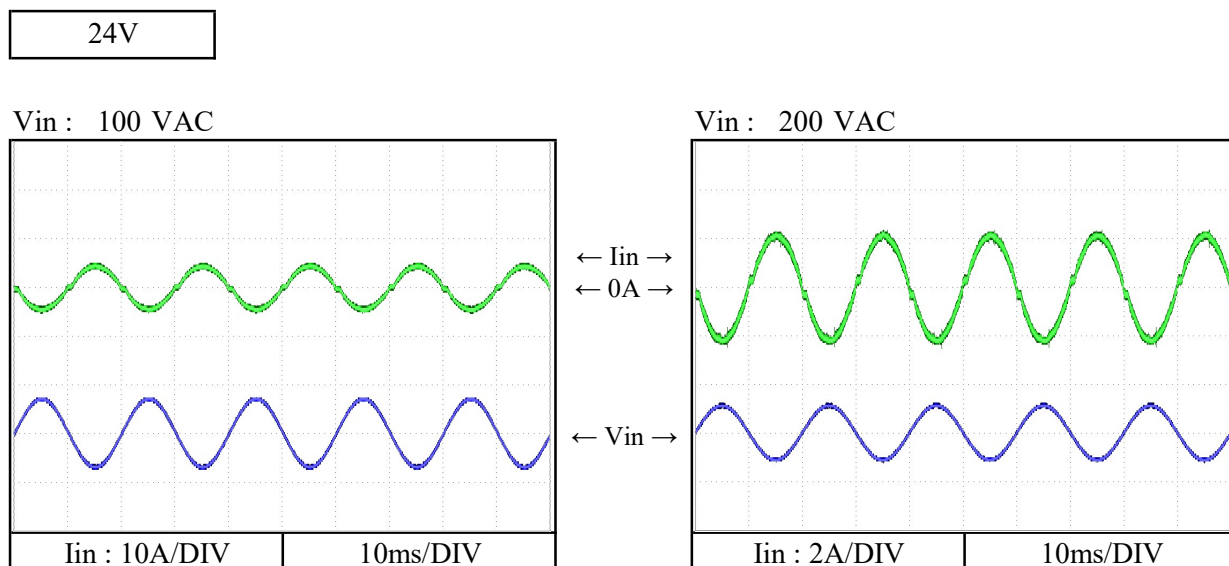
2-11. 高調波成分 Input current harmonics

条件 Conditions Iout : 100% Ta : 25°C



2-12. 入力電流波形 Input current waveform

条件 Conditions Iout : 100% Ta : 25°C



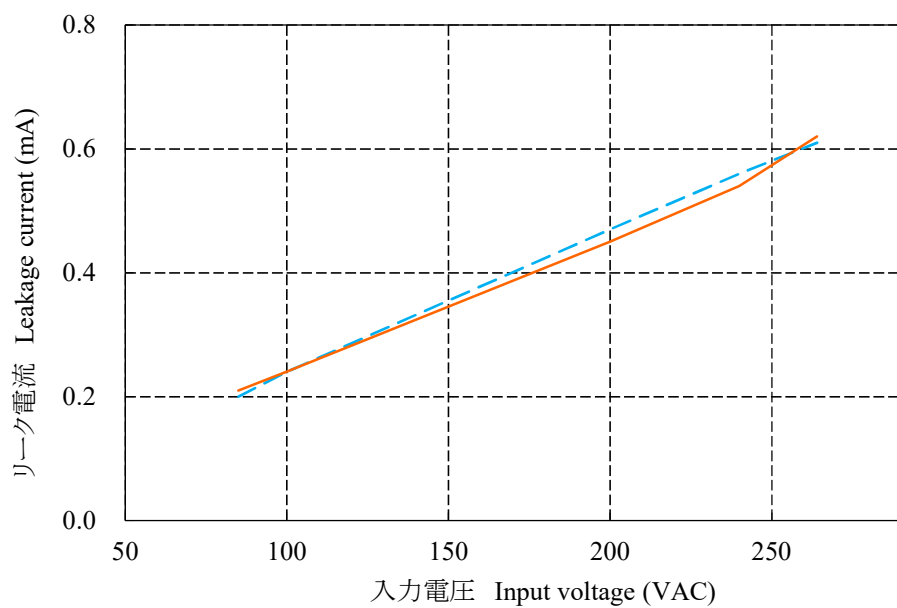
2-13. リーク電流特性 Leakage current characteristics

条件
Conditions

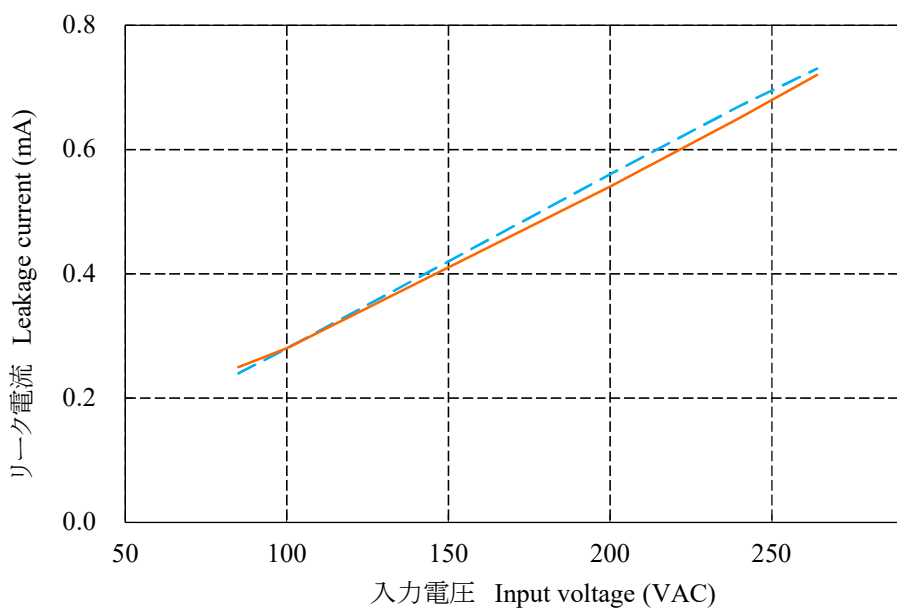
I_{out} : 0%
100%
T_a : 25°C

24V

f : 50Hz



f : 60Hz

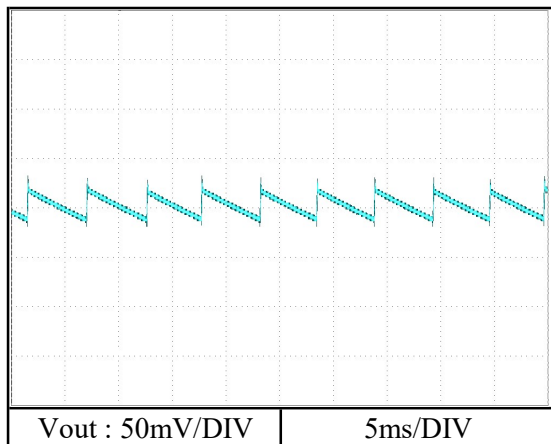


2-14. 出力リップル、ノイズ波形 Output ripple and noise waveform

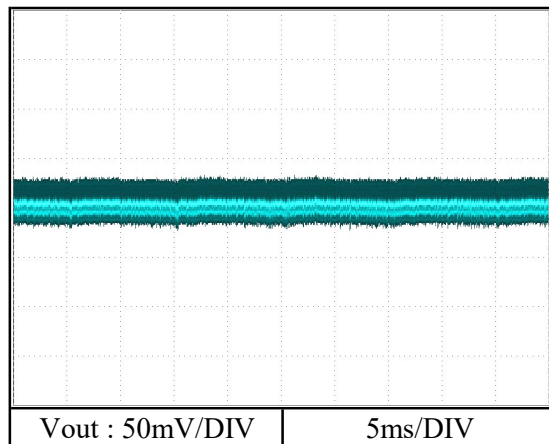
条件 Vin : 100VAC
Conditions Iout : 100%
Ta : 25°C

24V

Iout : 0%

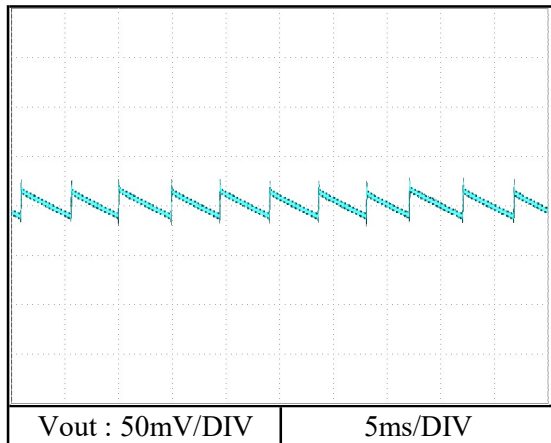


Iout : 100%

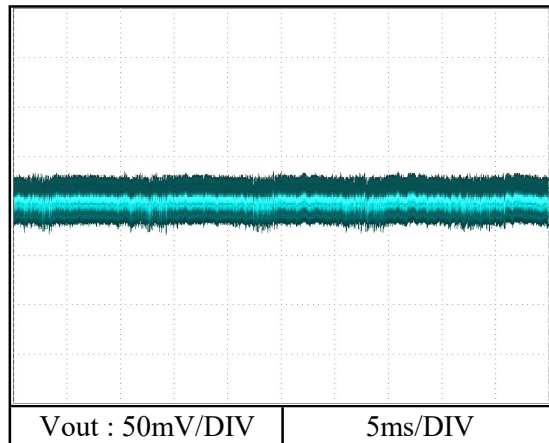


30V

Iout : 0%



Iout : 100%

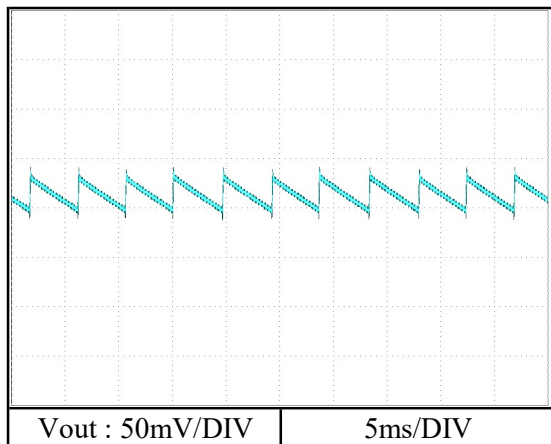


2-14. 出力リップル、ノイズ波形 Output ripple and noise waveform

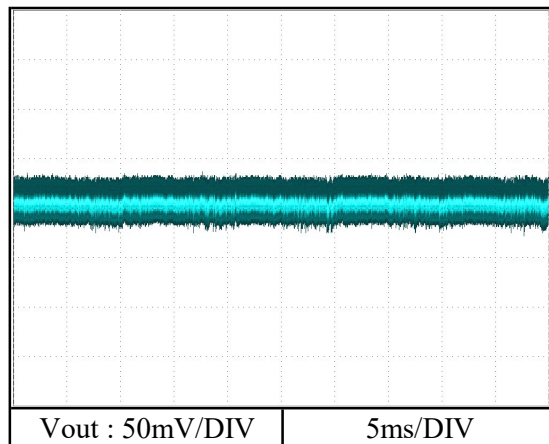
条件 Vin : 100VAC
Conditions Iout : 100%
Ta : 25°C

36V

Iout : 0%

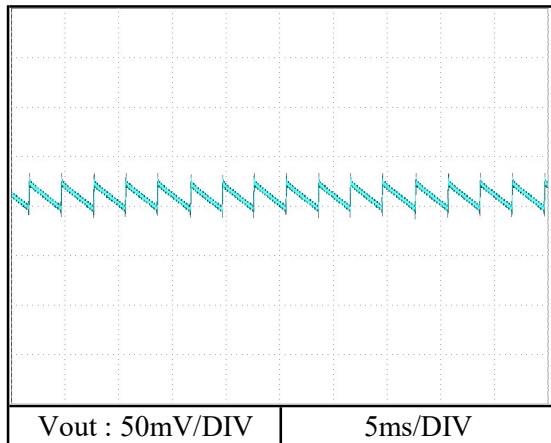


Iout : 100%

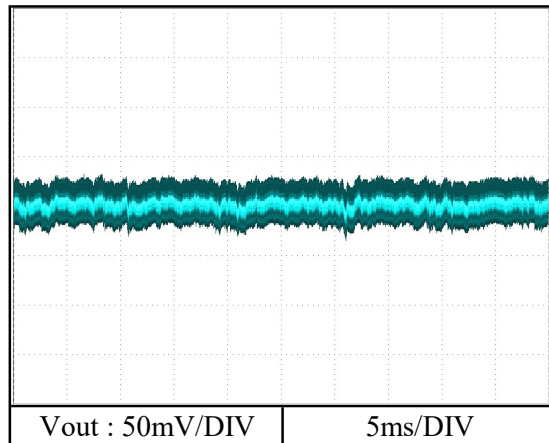


48V

Iout : 0%



Iout : 100%



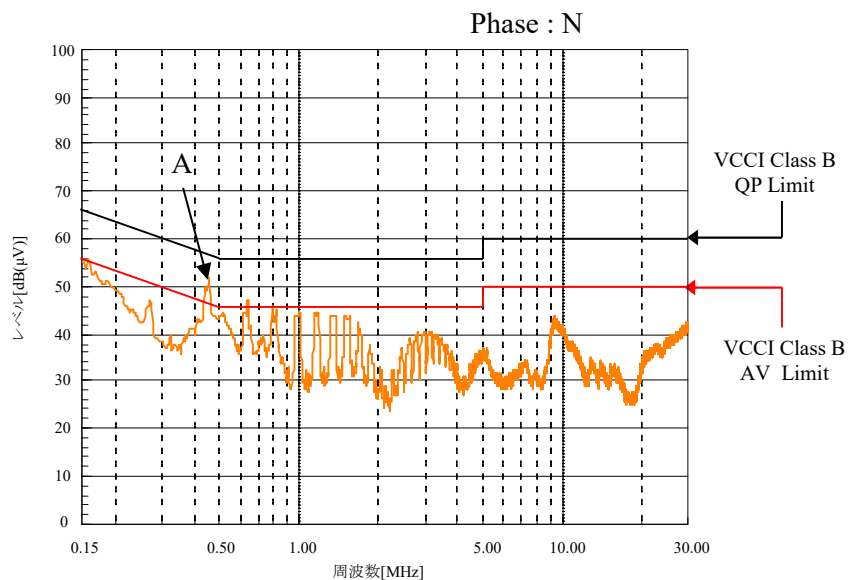
2-15. EMI特性 Electro-Magnetic Interference characteristics

雑音端子電圧 Conducted Emission

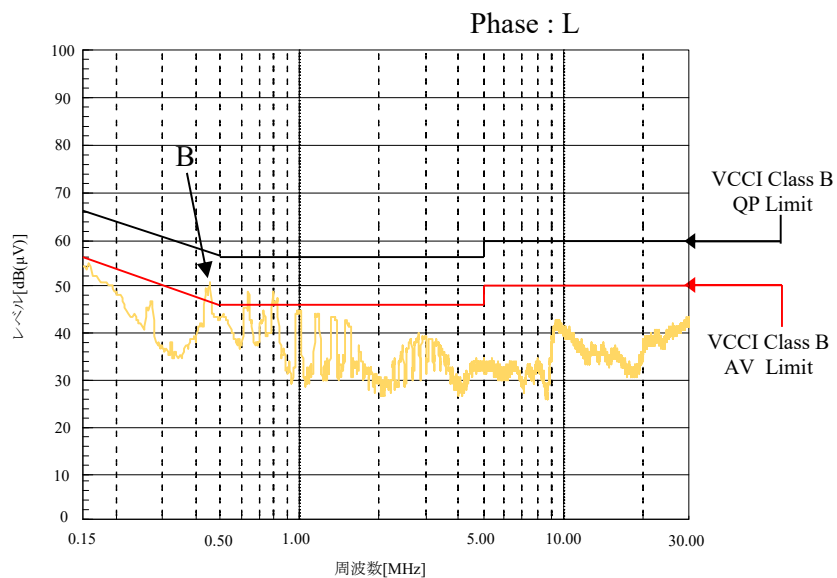
条件 Vin : 230VAC
Conditions Iout : 100%
Ta : 25°C

24V

Ref. Data	Point A (0.452MHz)	
	Limit (dB)	Measure (dB)
QP	56.8	47.5
AV	46.8	40.7



Ref. Data	Point B (0.448MHz)	
	Limit (dB)	Measure (dB)
QP	56.9	47.1
AV	46.9	39.6



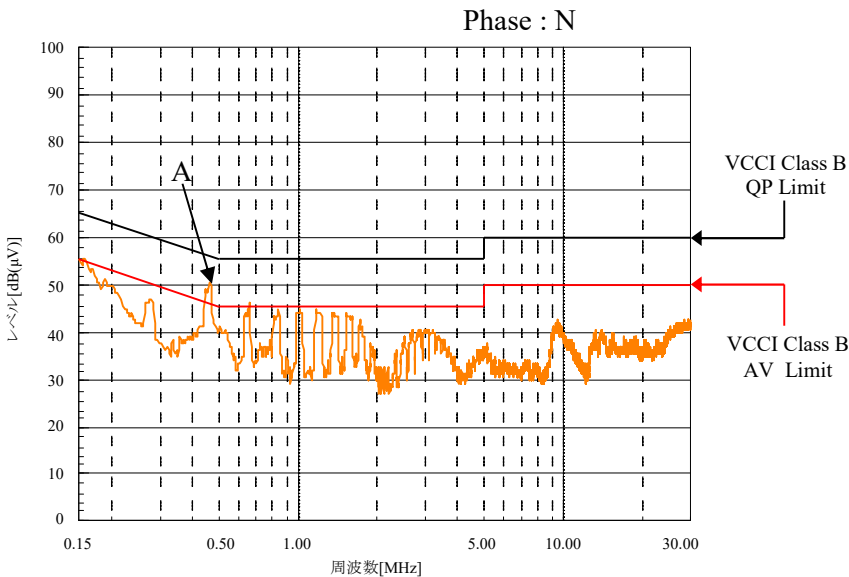
EN55011-B, EN55032-B, FCC-Bの限界値はVCCI class Bの限界値と同じ
Limit of EN55011-B, EN55032-B, FCC-B are same as its VCCI class B.

2-15. EMI特性 Electro-Magnetic Interference characteristics
雑音端子電圧 Conducted Emission

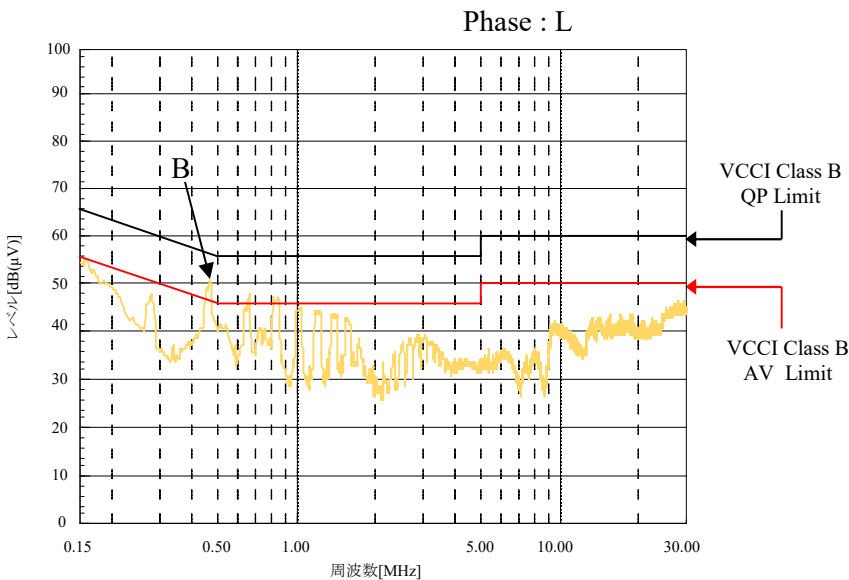
条件 Vin : 230VAC
Conditions Iout : 100%
Ta : 25℃

30V

Ref. Data	Point A (0.462MHz)	
	Limit (dB)	Measure (dB)
QP	56.7	47.0
AV	46.7	38.5



Ref. Data	Point B (0.469MHz)	
	Limit (dB)	Measure (dB)
QP	56.5	47.4
AV	46.5	39.4



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.

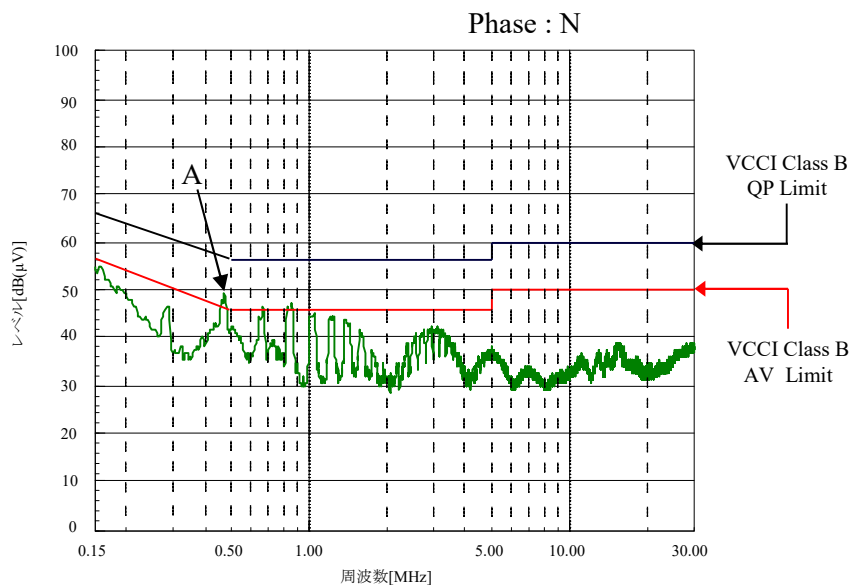
2-15. EMI特性 Electro-Magnetic Interference characteristics

雑音端子電圧 Conducted Emission

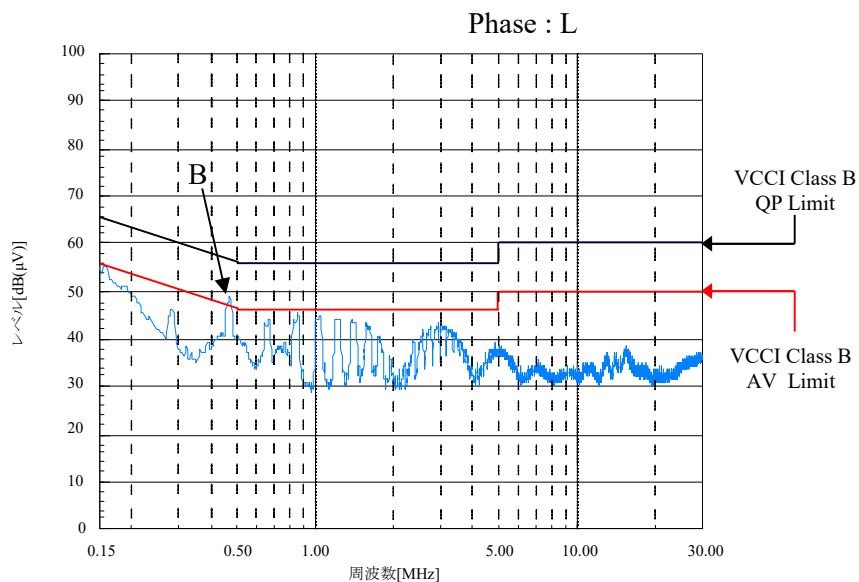
条件 Vin : 230VAC
Conditions Iout : 100%
Ta : 25°C

36V

Ref. Data	Point A (0.473MHz)	
	Limit (dB)	Measure (dB)
QP	56.5	45.8
AV	46.5	37.3



Ref. Data	Point B (0.464MHz)	
	Limit (dB)	Measure (dB)
QP	56.6	43.2
AV	46.6	35.0



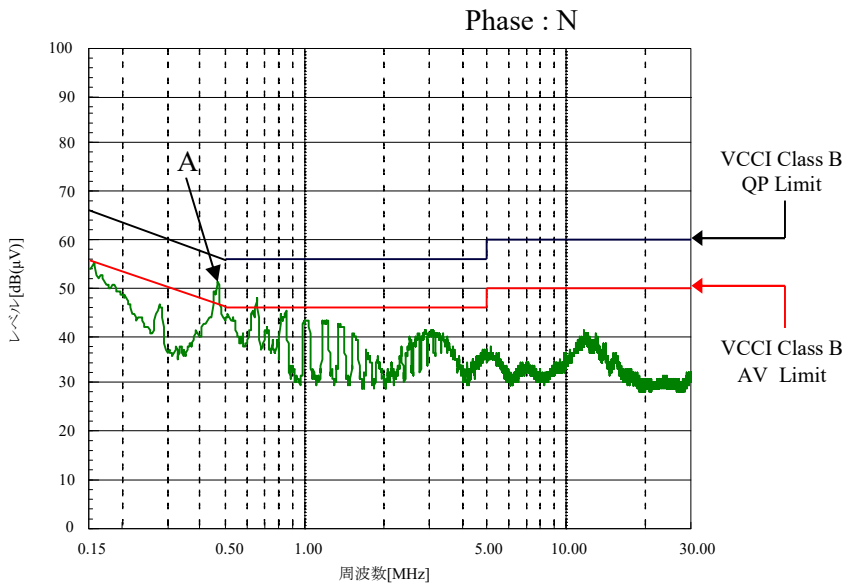
EN55011-B,EN55032-B,FCC-Bの限界値はVCCI class Bの限界値と同じ
Limit of EN55011-B,EN55032-B,FCC-B are same as its VCCI class B.

2-15. EMI特性 Electro-Magnetic Interference characteristics
雑音端子電圧 Conducted Emission

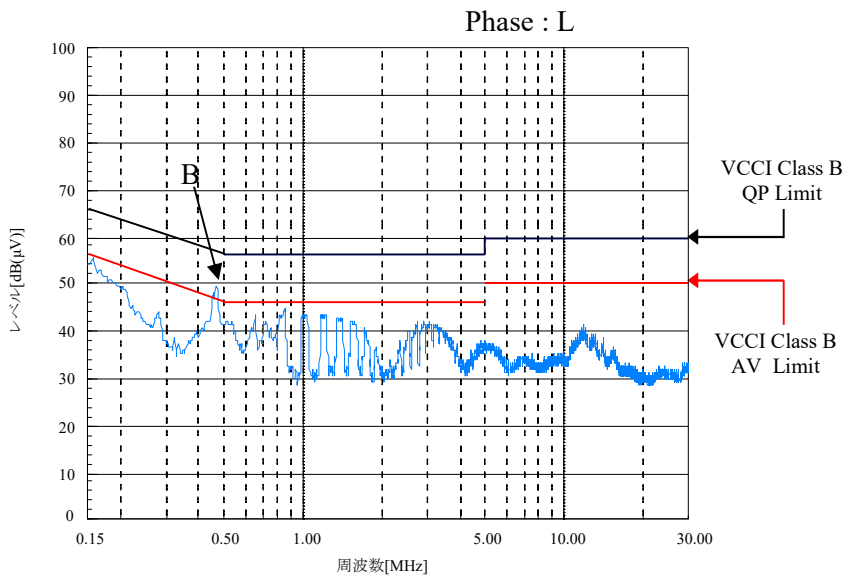
条件 Vin : 230VAC
Conditions Iout : 100%
Ta : 25°C

48V

Ref. Data	Point A (0.469MHz)	
	Limit (dB)	Measure (dB)
QP	56.5	46.6
AV	46.5	38.2



Ref. Data	Point B (0.468MHz)	
	Limit (dB)	Measure (dB)
QP	56.6	44.9
AV	46.6	36.6

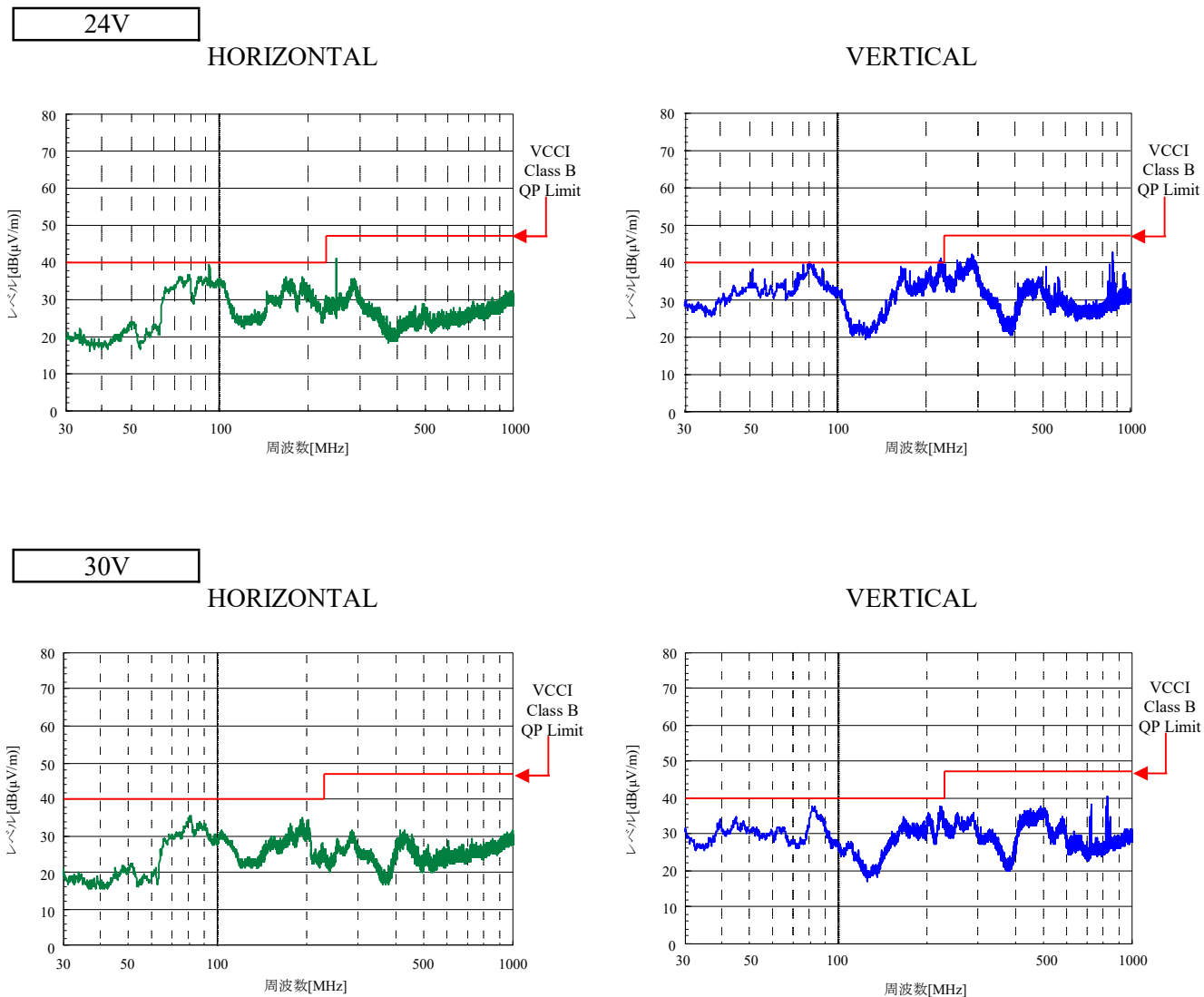


EN55011-B,EN55032-B,FCC-Bの限界値はVCCI class Bの限界値と同じ
Limit of EN55011-B,EN55032-B,FCC-B are same as its VCCI class B.

2-15. EMI特性 Electro-Magnetic Interference characteristics

雑音電界強度 Radiated Emission

条件 Vin : 230VAC
Conditions Iout : 100%
Ta : 25°C



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.

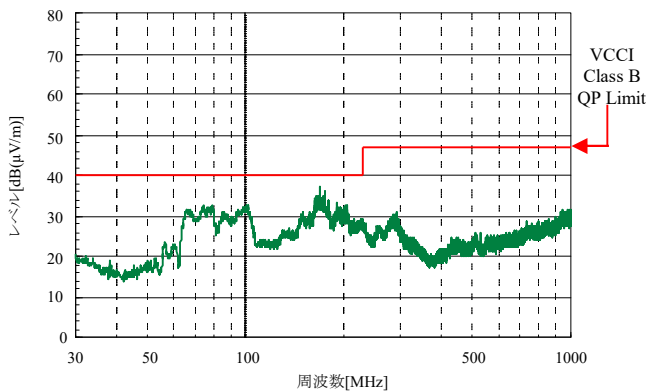
表示はピーク値
Indication is peak values.

2-15. EMI特性 Electro-Magnetic Interference characteristics 雑音電界強度 Radiated Emission

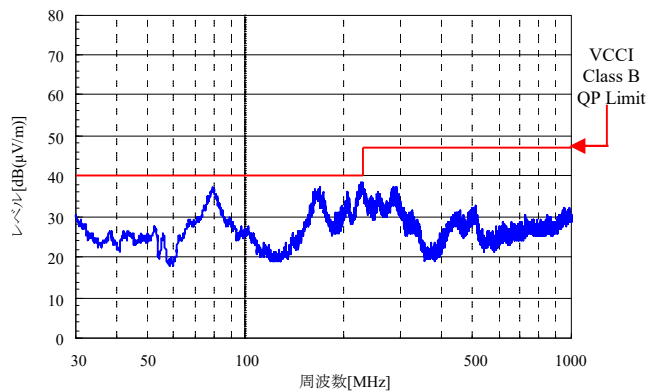
条件 Vin : 230VAC
Conditions Iout : 100%
Ta : 25°C

36V

HORIZONTAL

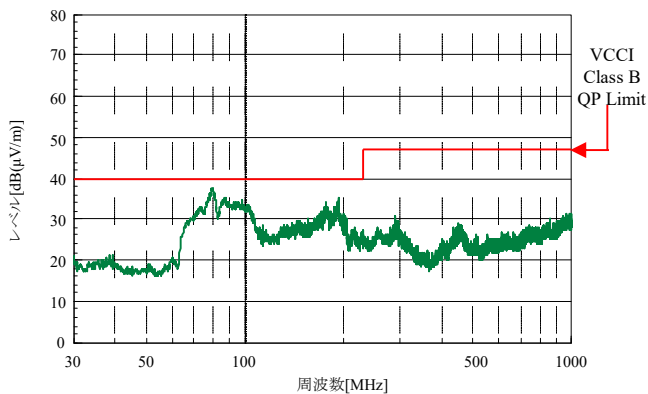


VERTICAL

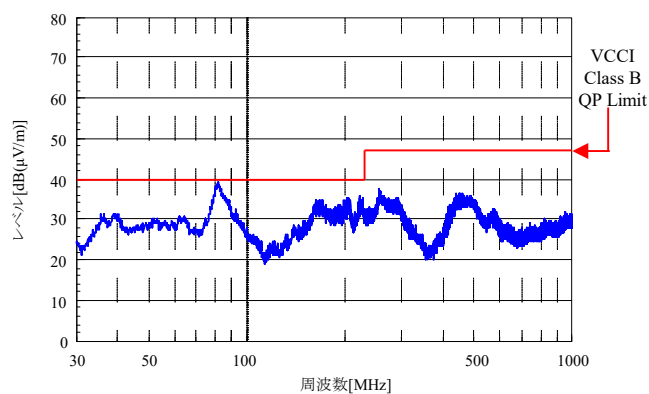


48V

HORIZONTAL



VERTICAL



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

表示はピーク値
Indication is peak values.