

ELV90

EVALUATION DATA

型式データ

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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・低下電圧

Regulation - line and load, Temperature drift

/ Start up voltage and Drop out voltage T-6

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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

※ 当社標準測定条件における結果であり、参考値としてお考え願います。

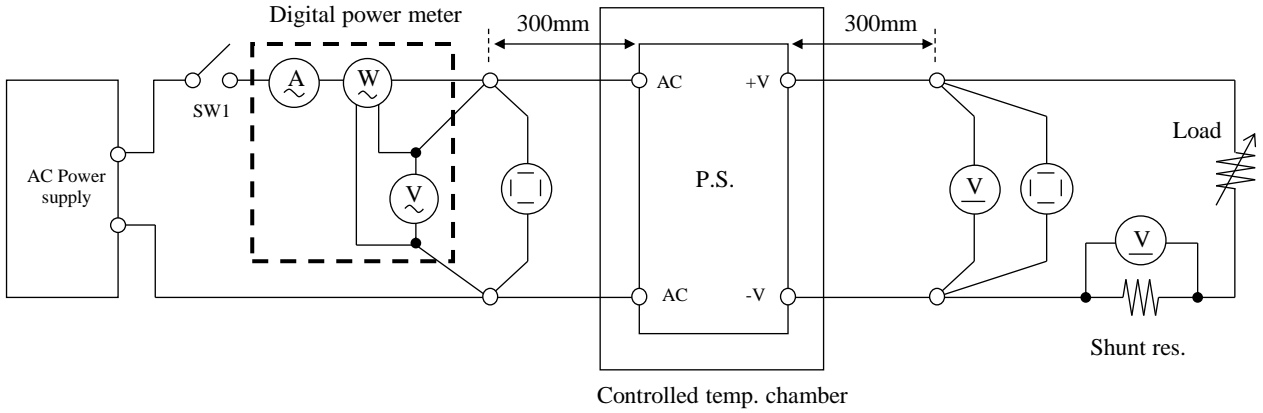
Test results are reference data based on our standard measurement condition.

1. 測定方法 Evaluation Method

1.1 測定回路 Circuit used for determination

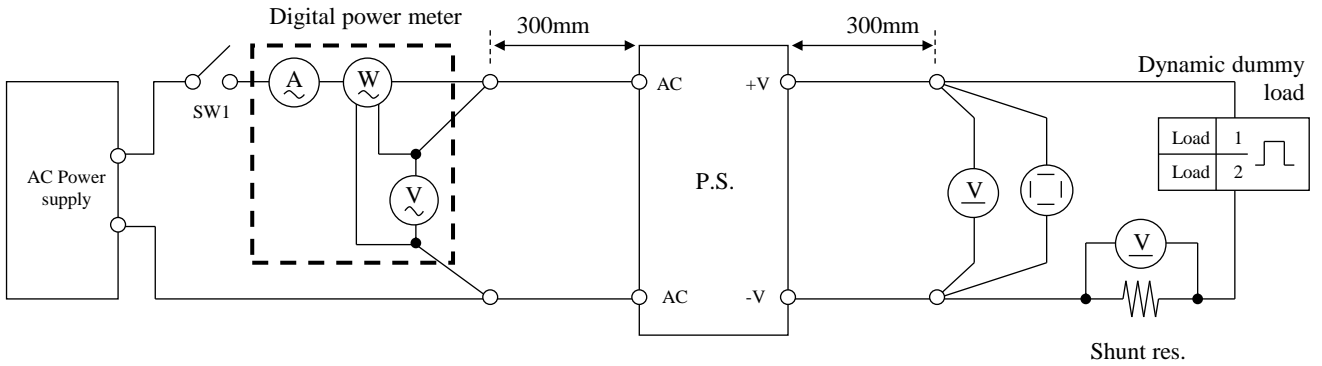
測定回路1 Circuit 1 used for determination

- 静特性 Steady state data
- 通電ドリフト特性 Warm up voltage drift characteristics
- 過電流保護特性 Over current protection (OCP) characteristics
- 過電圧保護特性 Over voltage protection (OVP) characteristics
- 出力立ち上がり特性 Output rise characteristics
- 出力立ち下がり特性 Output fall characteristics
- 過渡応答(入力急変)特性 Dynamic line response characteristics
- 入力電圧瞬停特性 Response to brown out characteristics

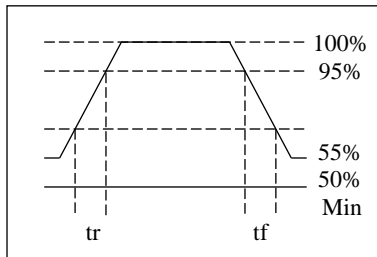


測定回路2 Circuit 2 used for determination

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

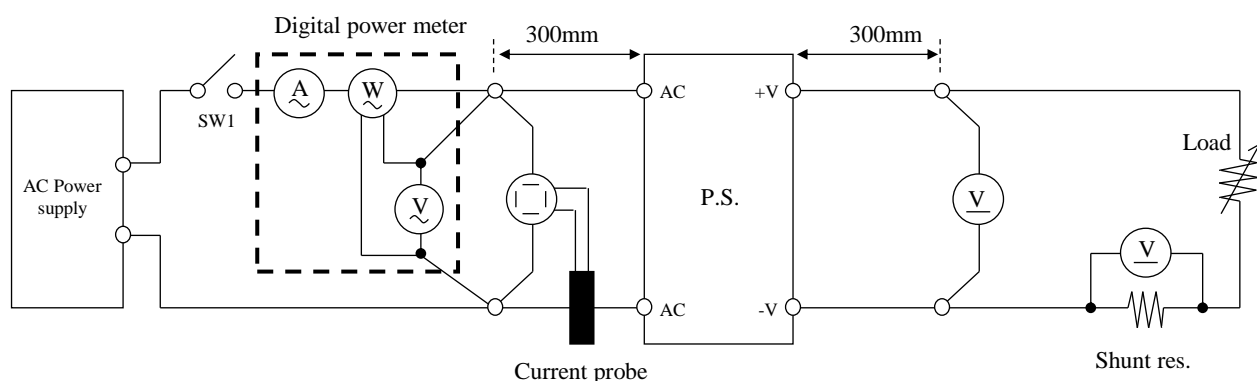


Output current waveform
Iout 50% <=> 100%



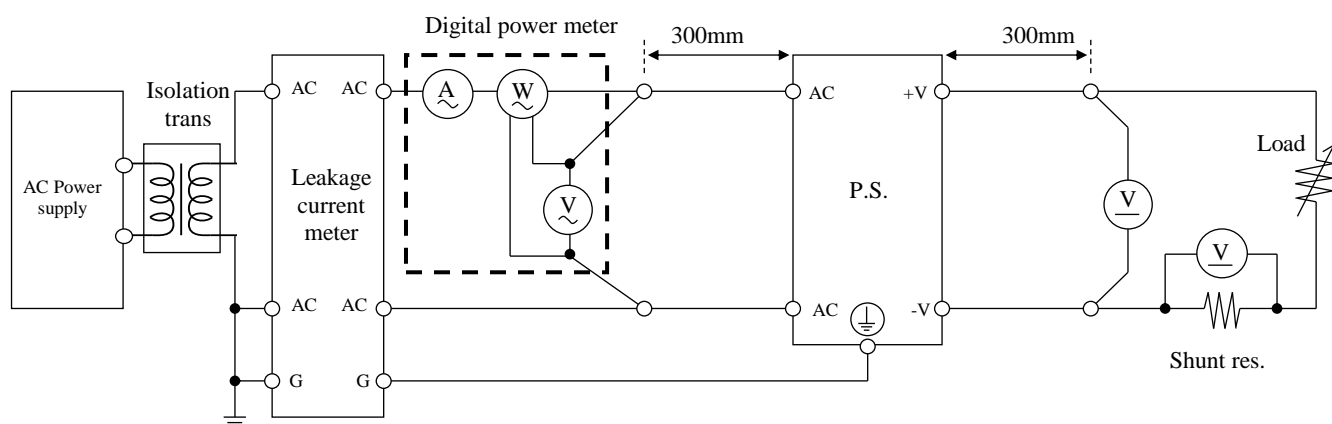
測定回路3 Circuit 3 used for determination

- 入力サージ電流 (突入電流) 波形 Inrush current waveform
- 入力電流波形 Input current waveform



測定回路4 Circuit 4 used for determination

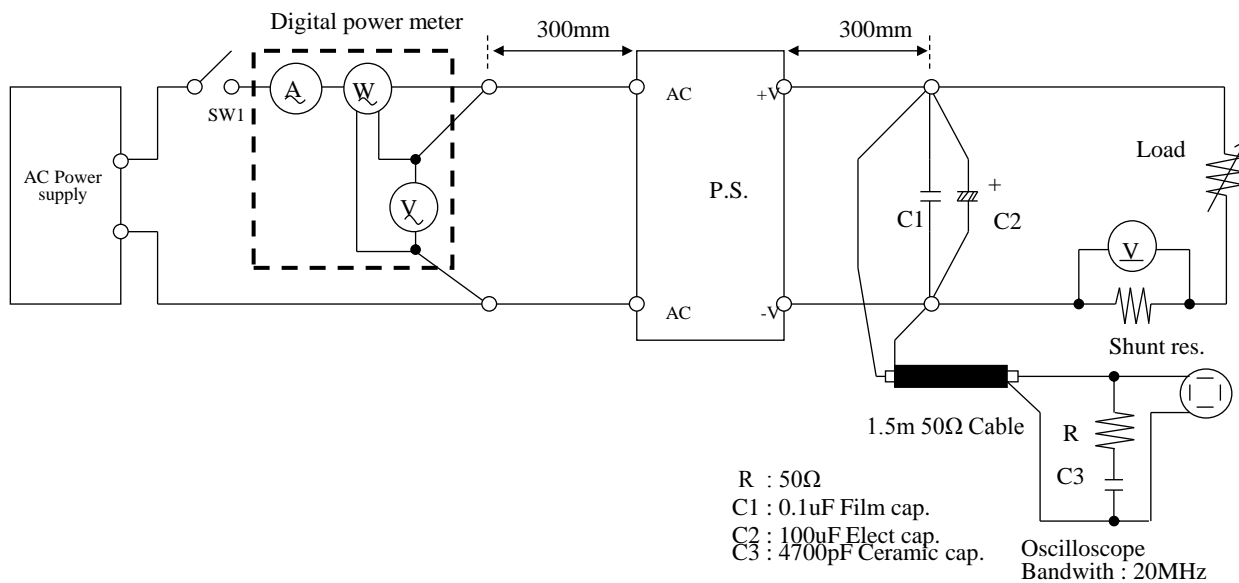
- リーク電流特性 Leakage current characteristics



測定回路5 Circuit 6 used for determination

・出力リップル、ノイズ波形

Output ripple and noise waveform

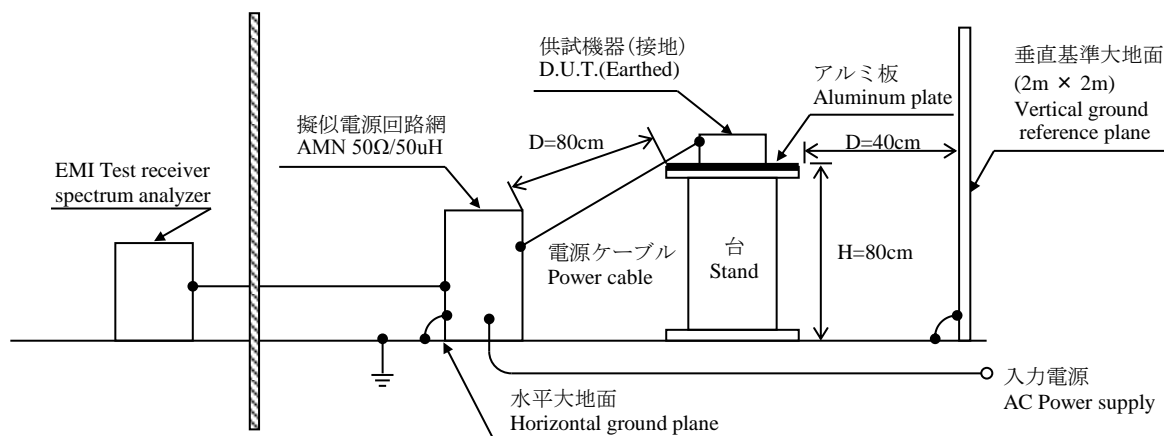


測定構成 Configuration used for determination

・EMI特性 Electro-Magnetic Interference characteristics

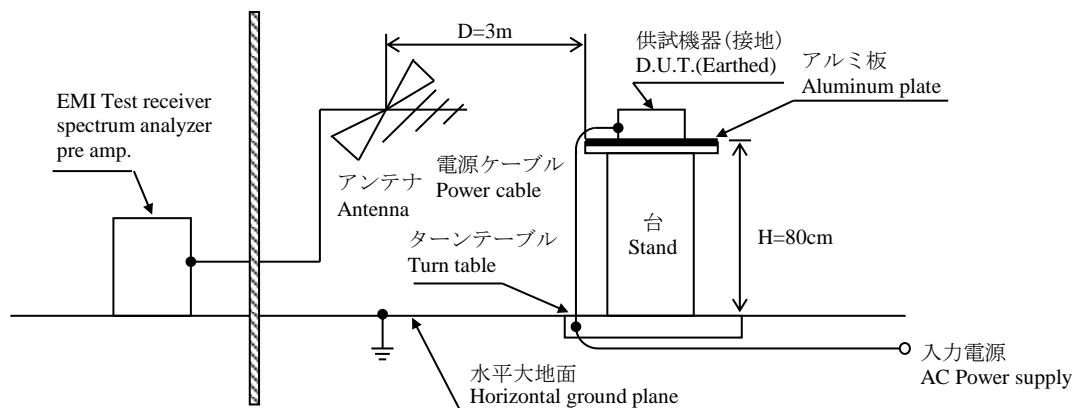
(a) 雑音端子電圧 (帰還ノイズ)

Conducted Emission



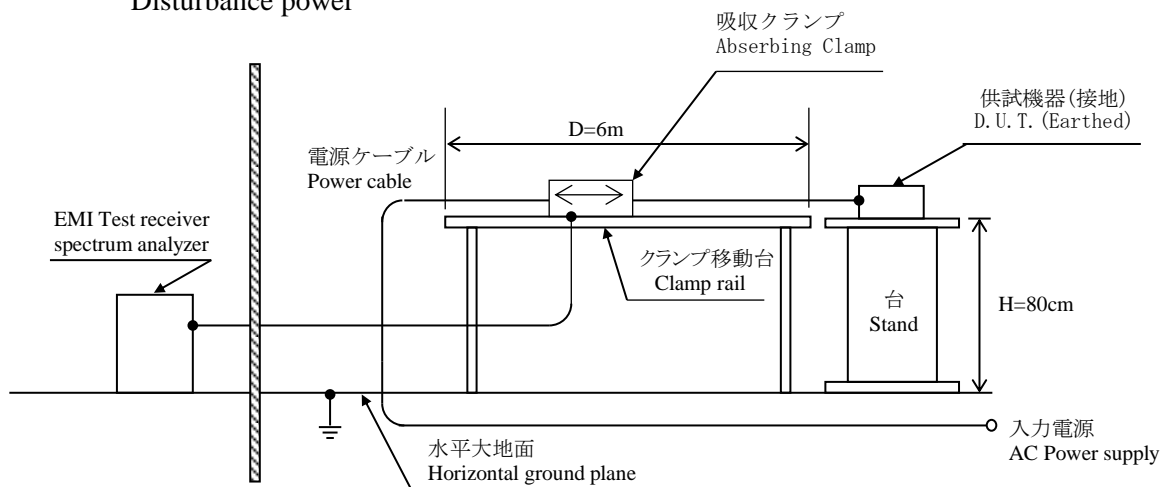
(b) 雑音電界強度 (放射ノイズ)

Radiated Emission



測定構成 Configuration used for determination

- EMI特性 Electro-Magnetic Interference characteristics
- (c) 妨害波電力 Disturbance power



1.2 使用測定機器 List of equipment used

	EQUIPMENT USED	MANUFACTURER	MODEL NO.
1	DIGITAL STORAGE OSCILLOSCOPE	YOKOGAWA ELECT.	DL9040L
2	DIGITAL MULTIMETER	AGILENT	34970A
3	DIGITAL POWER METER	HIOKI	3334
4	DIGITAL POWER METER	YOKOGAWA ELECT.	WT110/WT210
5	CURRENT PROBE	YOKOGAWA ELECT.	701928 / 701930
6	DYNAMIC DUMMY LOAD	TAKASAGO	FK-200L
7	DYNAMIC DUMMY LOAD	KIKUSUI	PLZ150U
8	ISOLATION TRANS	MATSUNAGA	3WTC-50K
9	CVCF	KIKUSUI	PCR4000L
10	CVCF	NF	ES10000S
11	LEAKAGE CURRENT METER	HIOKI	3156
12	CONTROLLED TEMP. CHAMBER	ESPEC	SU-261 / PL-4KP
13	EMI TEST RECEIVER / SPECTRUM ANALYZER	ROHDE & SCHWARZ	ESCI
14	PRE AMP.	SONOMA	310N
15	AMN	SCHWARZBECK	NNLK8121
16	ANTENNA	SCHWARZBECK	CBL6111D
17	ABSORBING CLAMP	LUTHI	MDS-21
18	HARMONIC / FLICKER ANALYZER	KIKUSUI	KHA1000
19	SINGLE-PHASE MASTER	NF	4420
20	REFERENCE IMPEDANCE NETWORK 20A	NF	4150
21	MULTI OUTLET UNIT	KIKUSUI	OT01-KHA

1.3 評価負荷条件 Load conditions

Vout	12V	24V
Iout : 100%	7.5A	3.8A
Iout : min	0.2A	0.2A

2.1 静特性 Steady state data

(1) 入力・負荷・温度変動／出力起動・低下電圧

Regulation - line and load, Temperature drift / Start up voltage and Drop out voltage

12V

1. Regulation - line and load

Condition Ta : 25 °C

Iout \ Vin	90VAC	100VAC	200VAC	305VAC	line regulation	
min	12.333V	12.333V	12.333V	12.333V	0mV	0.000%
50%	12.225V	12.225V	12.225V	12.226V	1mV	0.008%
100%	12.106V	12.106V	12.106V	12.106V	0mV	0.000%
load	227mV	227mV	227mV	227mV		
regulation	1.892%	1.892%	1.892%	1.892%		

2. Temperature drift

Conditions Vin : 100 VAC

Iout : 100 %

Ta	-25°C	+25°C	+50°C	temperature stability	
Vout	12.105V	12.106V	12.093V	13mV	0.108%

3. Total regulation

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

total regulation	
241mV	2.0%

4. Start up voltage and Drop out voltage

Conditions Ta : 25 °C

Iout : 100 %

Start up voltage (Vin)	68VAC
Drop out voltage (Vin)	66VAC

24V

1. Regulation - line and load

Condition Ta : 25 °C

Iout \ Vin	90VAC	100VAC	200VAC	265VAC	line regulation	
min	24.531V	24.531V	24.531V	24.531V	0mV	0.000%
50%	24.480V	24.480V	24.480V	24.480V	0mV	0.000%
100%	24.427V	24.427V	24.427V	24.427V	0mV	0.000%
load	104mV	104mV	104mV	104mV		
regulation	0.433%	0.433%	0.433%	0.433%		

2. Temperature drift

Conditions Vin : 100 VAC

Iout : 100 %

Ta	-25°C	+25°C	+50°C	temperature stability	
Vout	24.416V	24.427V	24.399V	28mV	0.117%

3. Total regulation

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

total regulation	
132mV	0.5%

4. Start up voltage and Drop out voltage

Conditions Ta : 25 °C

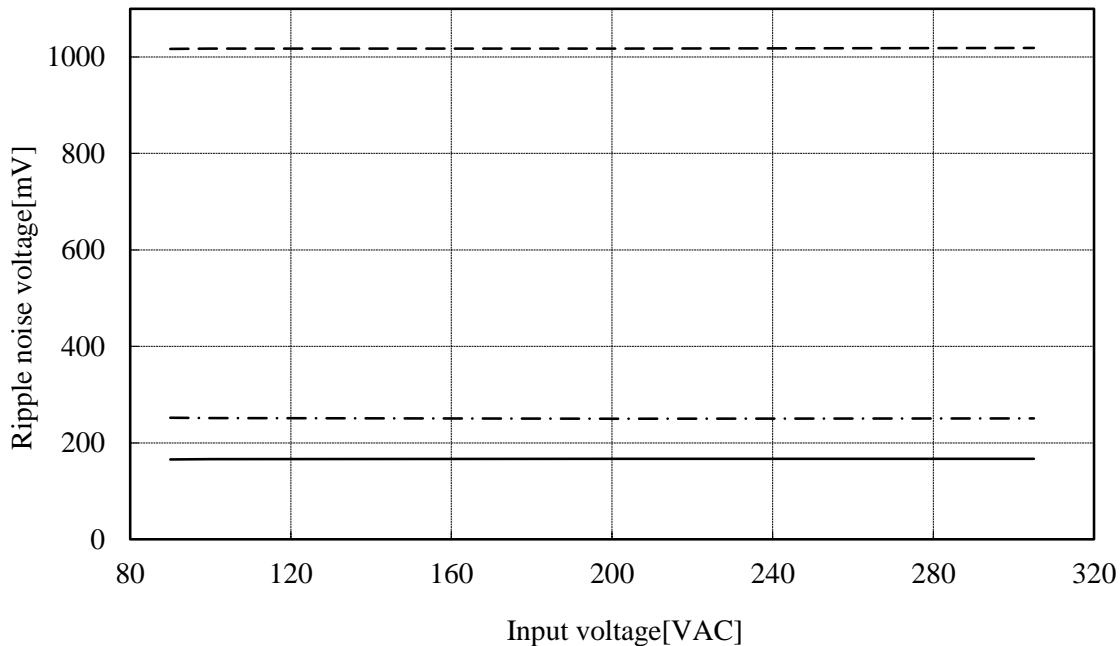
Iout : 100 %

Start up voltage (Vin)	68VAC
Drop out voltage (Vin)	67VAC

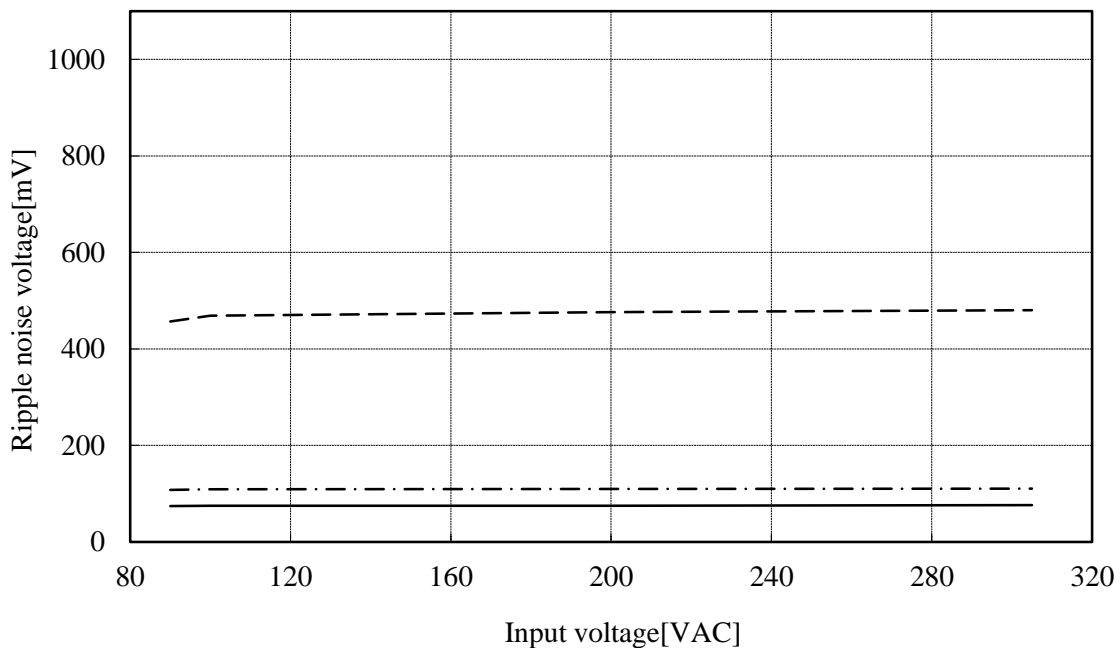
(2) リップル電圧対入力電圧
Ripple noise voltage vs. Input voltage

Conditions Iout : 100 %
Ta : -25 °C -----
25 °C -.-.-.
50 °C _____

12V



24V

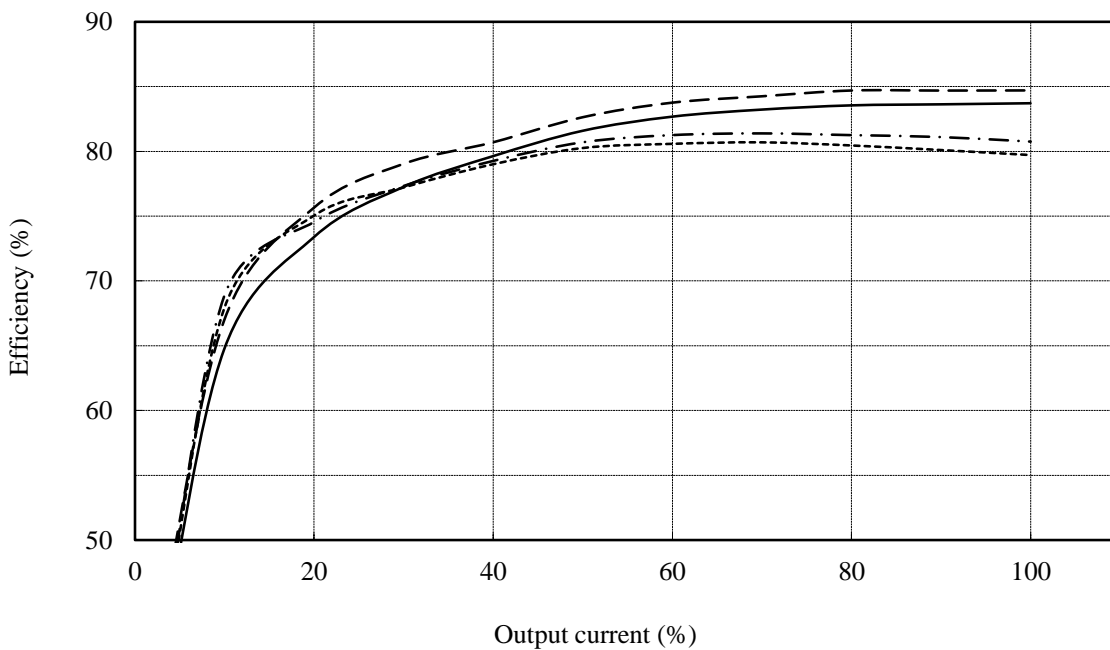


(3) 効率対出力電流

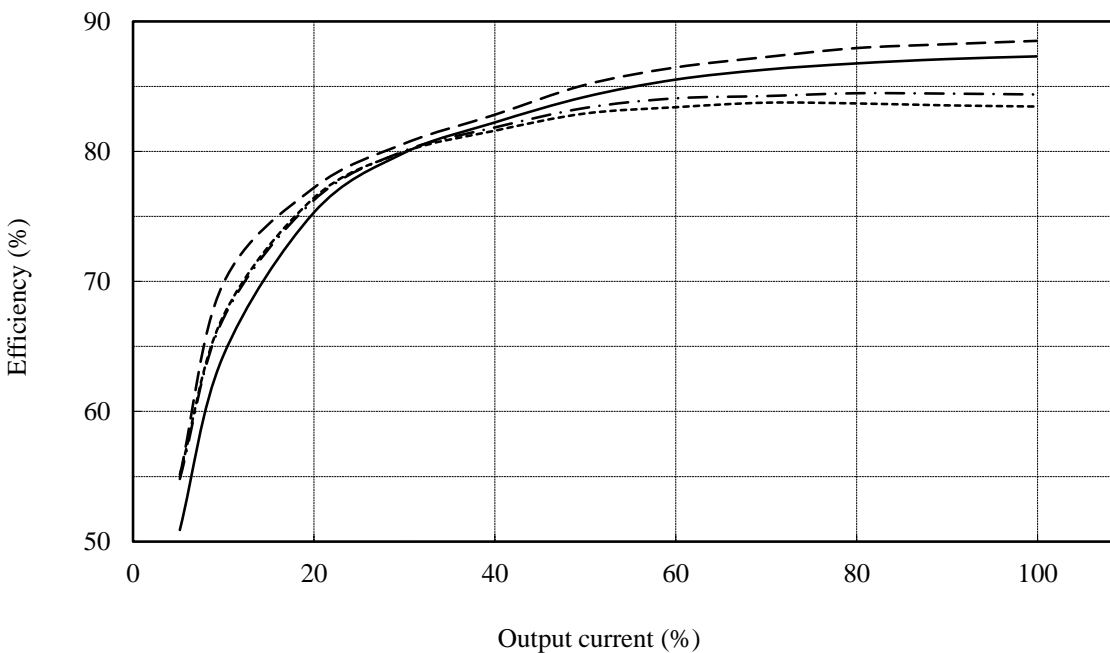
Efficiency vs. Output current

Conditions Vin : 90 VAC -----
 100 VAC -.-.-.-
 200 VAC ————
 305 VAC - - - -
 Ta : 25 °C

12V



24V

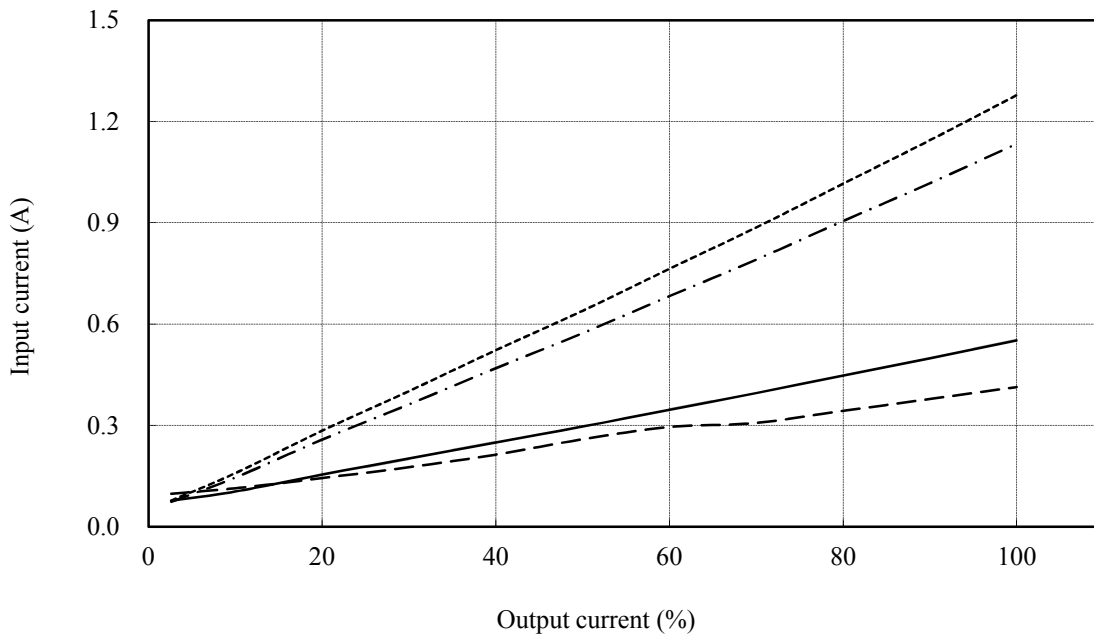


(4) 入力電流対出力電流

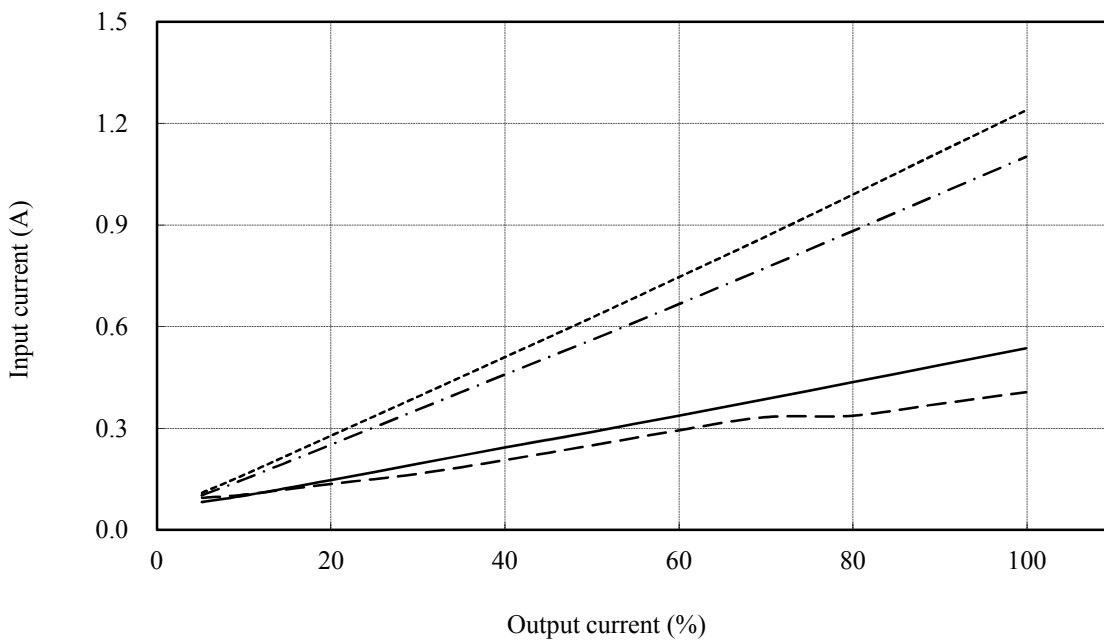
Input current vs. Output current

Conditions Vin : 90 VAC -----
 100 VAC -.-.-.-
 200 VAC ————
 305 VAC - - - -
 Ta : 25 °C

12V



24V

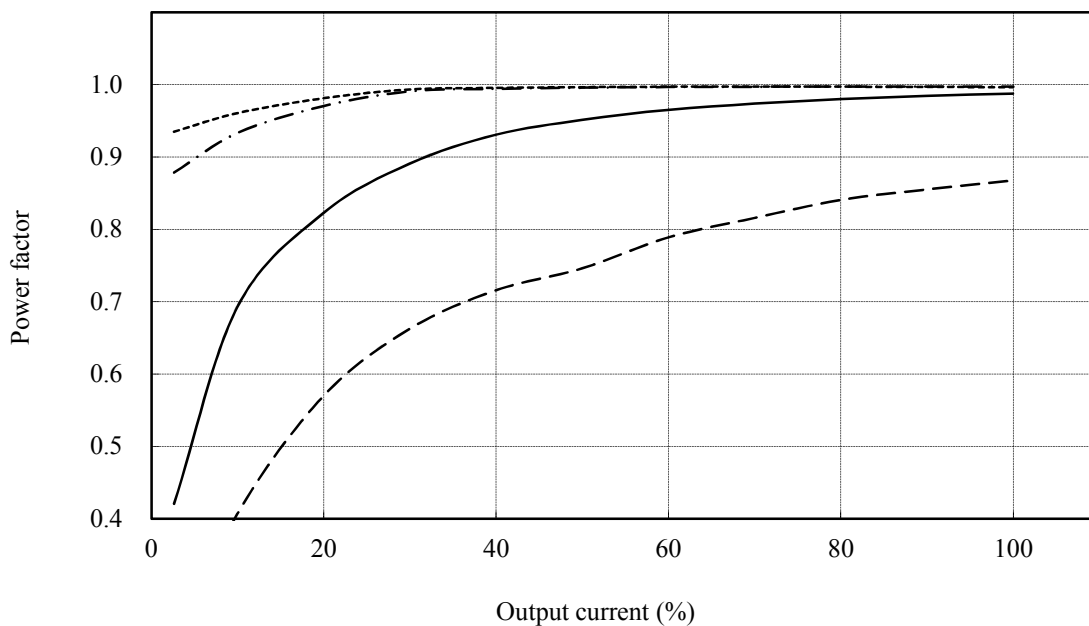


(5) 力率対出力電流

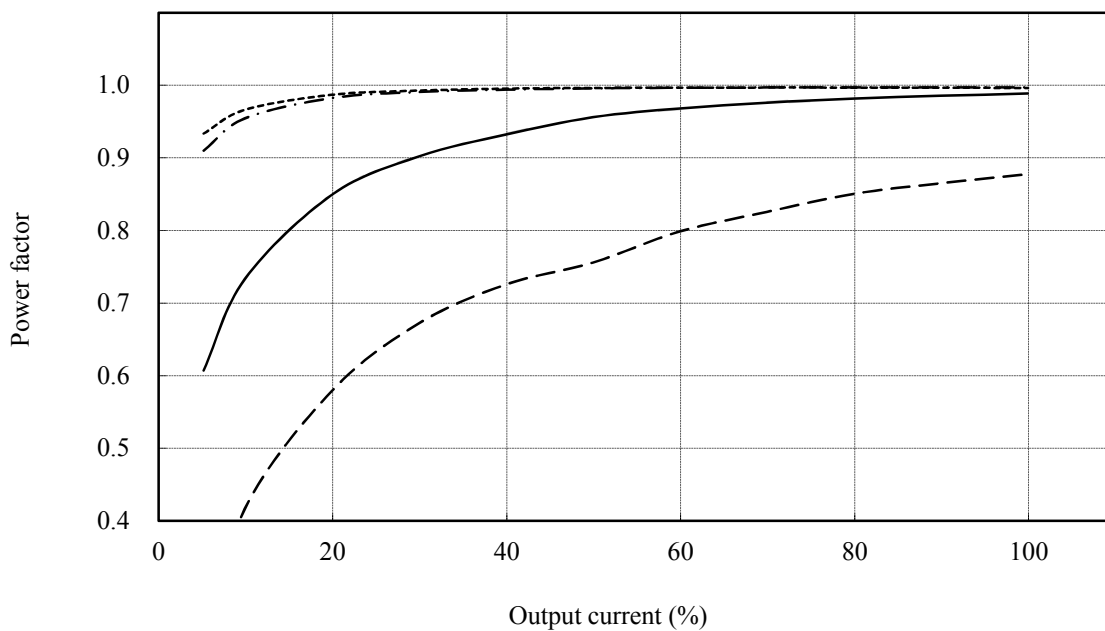
Power factor vs. Output current

Conditions Vin : 90 VAC -----
 100 VAC -.-.-.-
 200 VAC ————
 305 VAC - - - -
 Ta : 25 °C

12V



24V

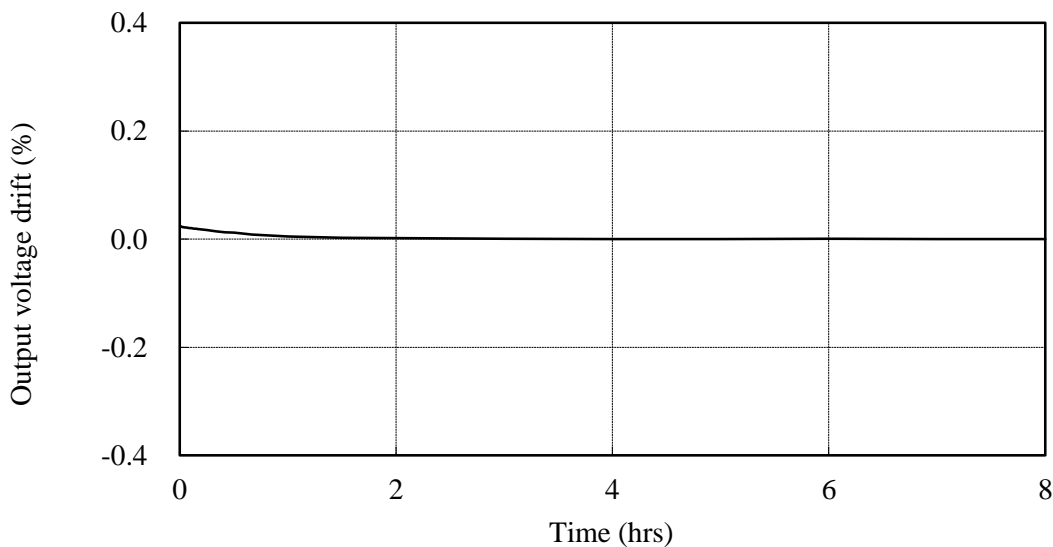


2.2 通電ドリフト特性

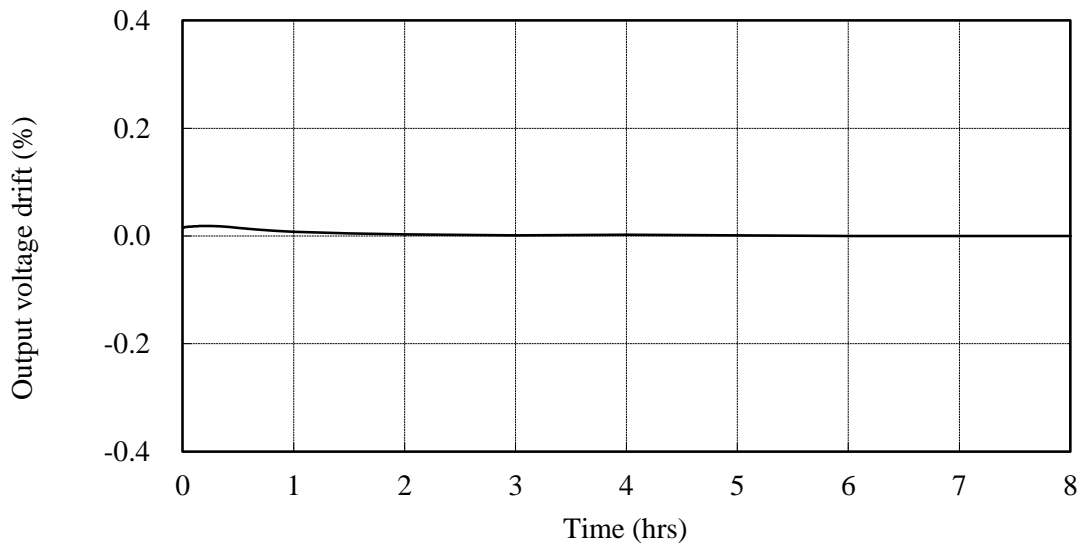
Warm up voltage drift characteristics

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

12V



24V

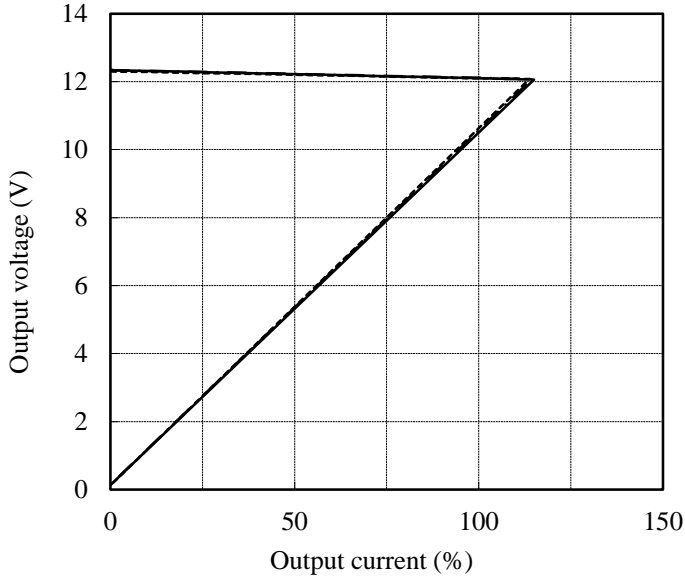


2.3 過電流保護特性

Over current protection (OCP) characteristics

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

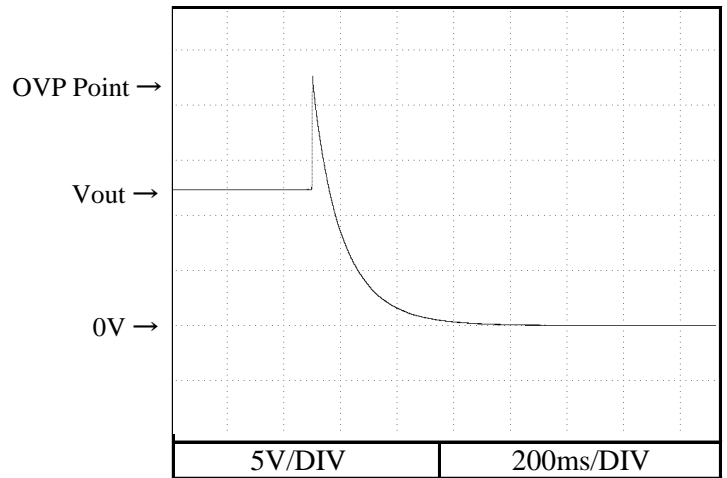
12V



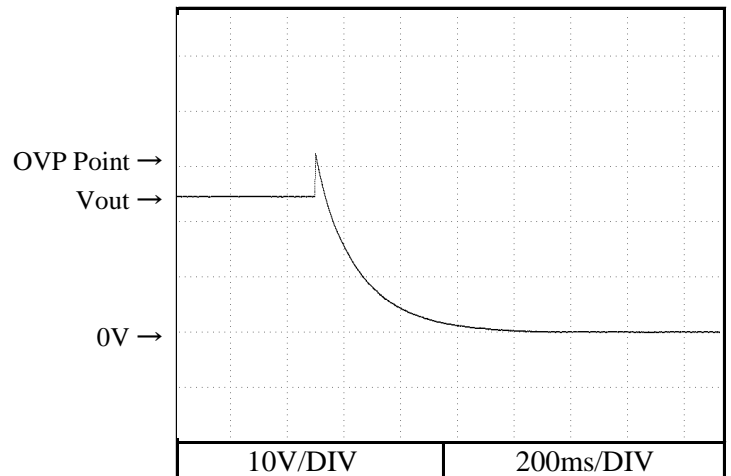
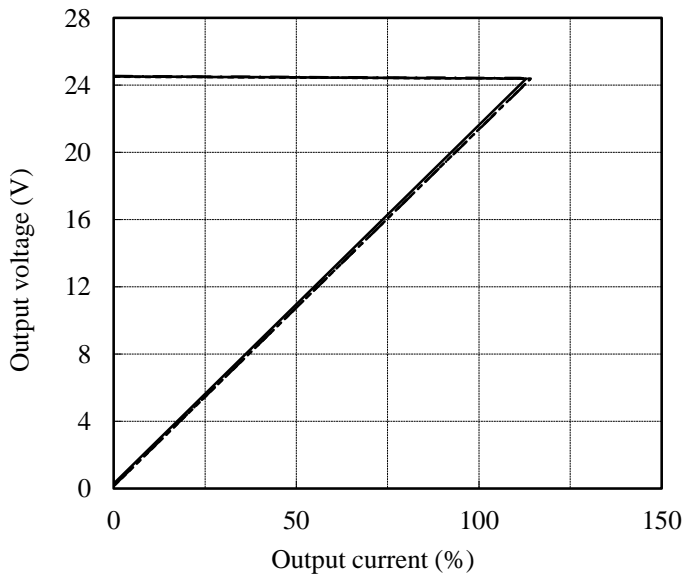
2.4 過電圧保護特性

Over voltage protection (OVP) characteristics

Conditions Vin : 100 VAC
 Iout : min
 Ta : 25 °C



24V



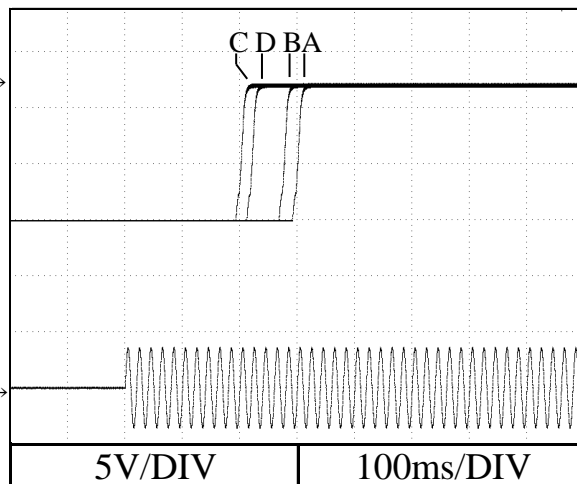
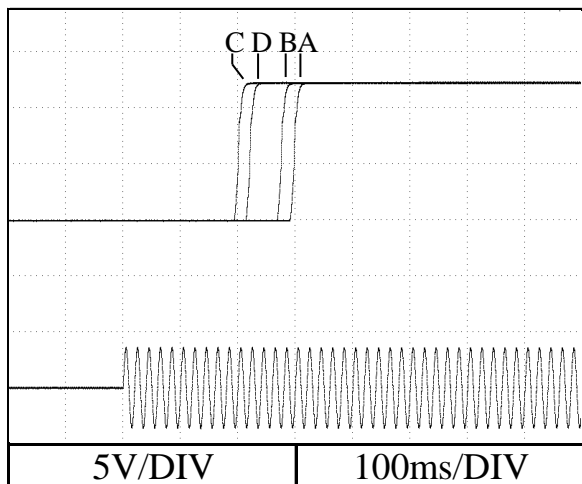
2.5 出力立ち上がり特性
Output rise characteristics

Conditions Vin : 90 VAC (A)
100 VAC (B)
200 VAC (C)
305 VAC (D)
Ta : 25 °C

12V

Iout : min

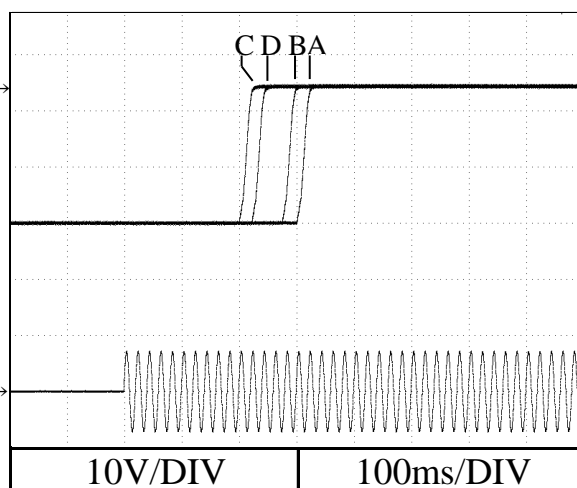
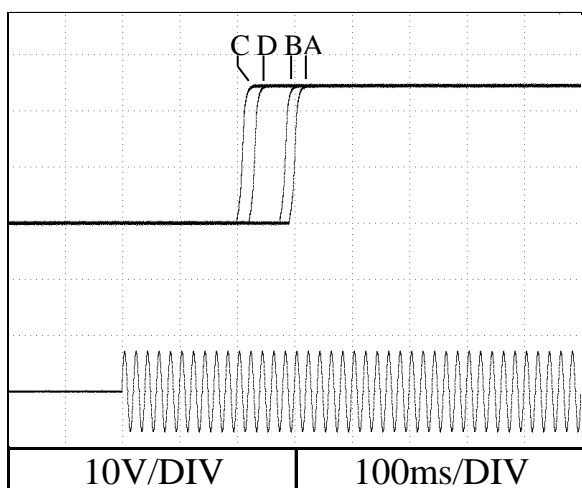
Iout : 100%



24V

Iout : min

Iout : 100%



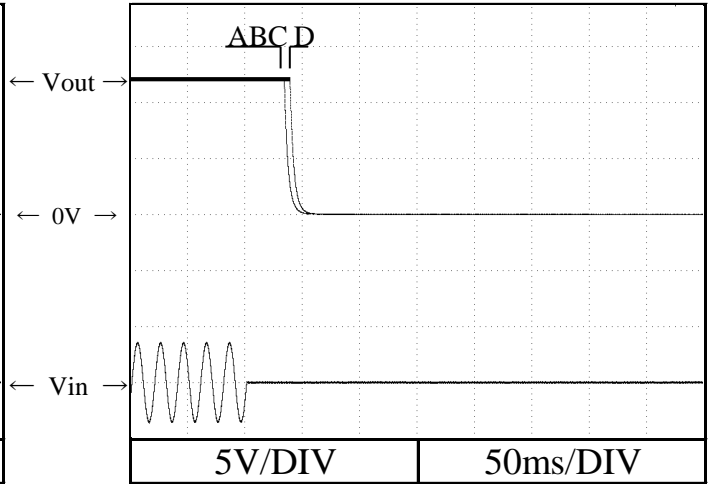
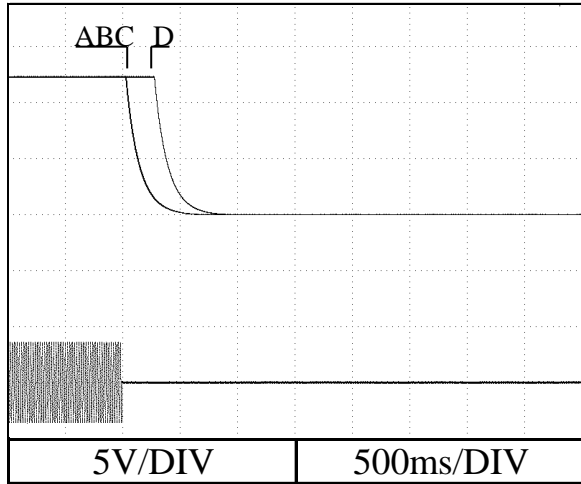
2.6 出力立ち下がり特性
Output fall characteristics

Conditions Vin : 90 VAC (A)
100 VAC (B)
200 VAC (C)
305 VAC (D)
Ta : 25 °C

12V

Iout : min

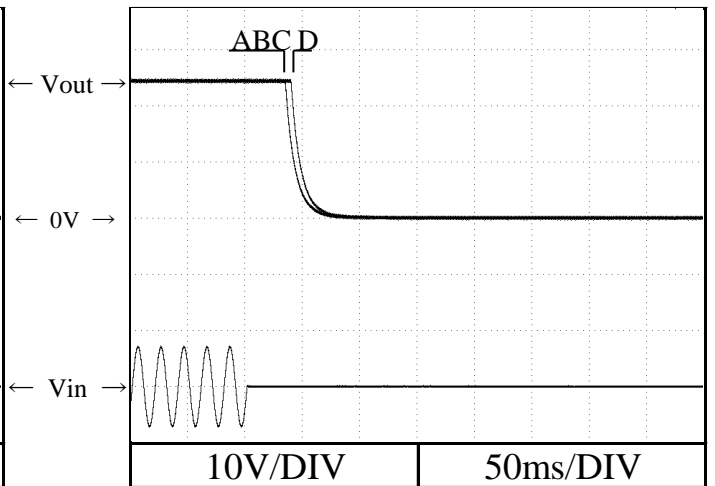
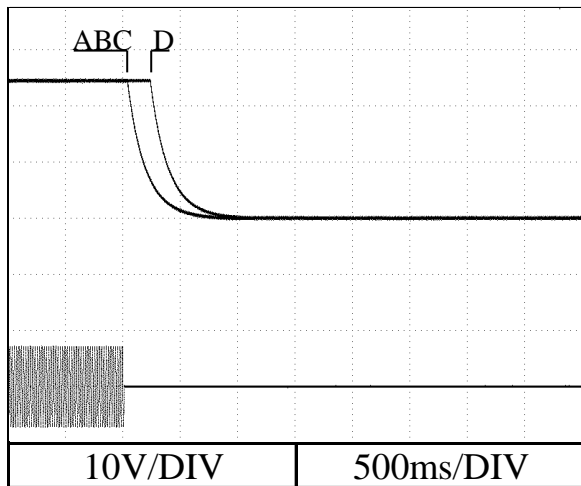
Iout : 100%



24V

Iout : min

Iout : 100%

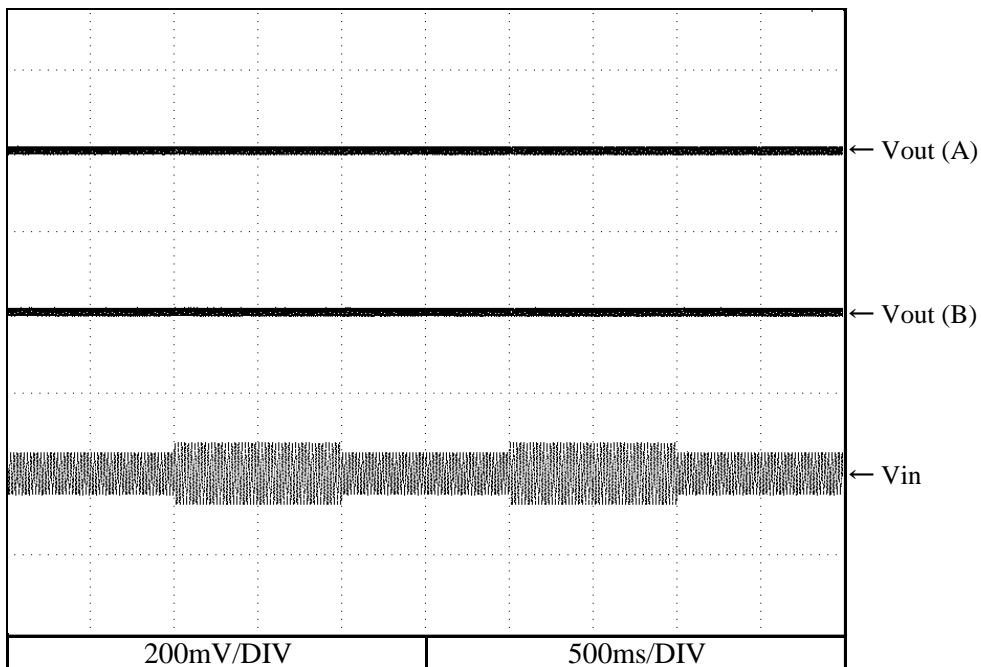


2.7 過渡応答(入力急変)特性

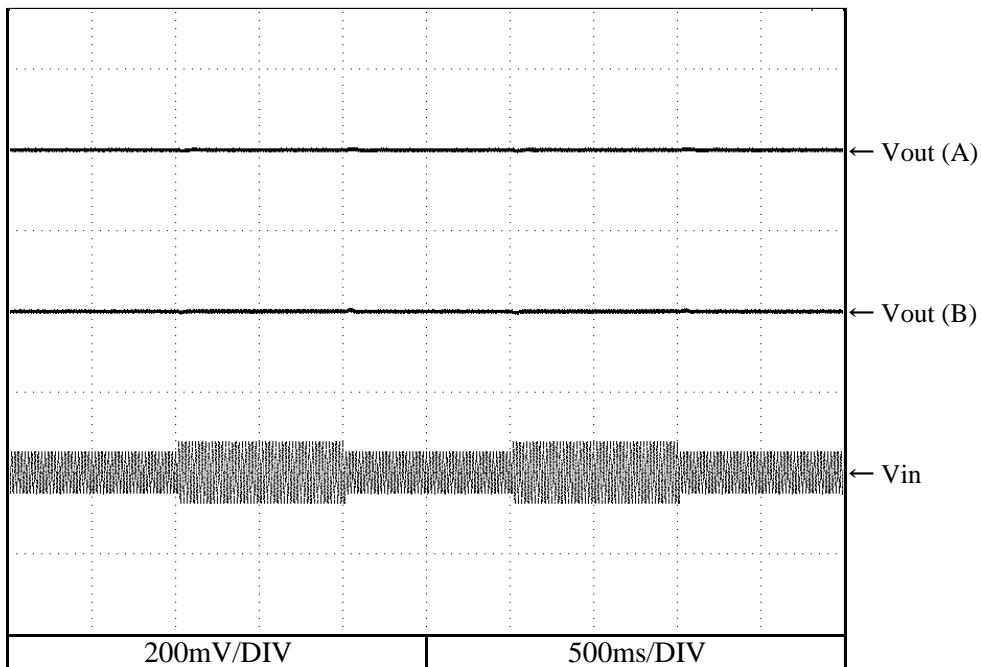
Dynamic line response characteristics

Conditions Vin : 90 VAC ↔ 132 VAC(A)
170 VAC ↔ 305 VAC(B)
Iout : 100 %
Ta : 25 °C

12V



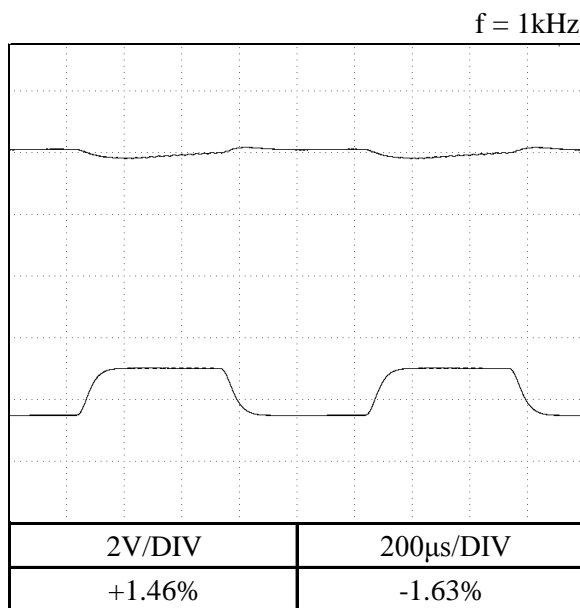
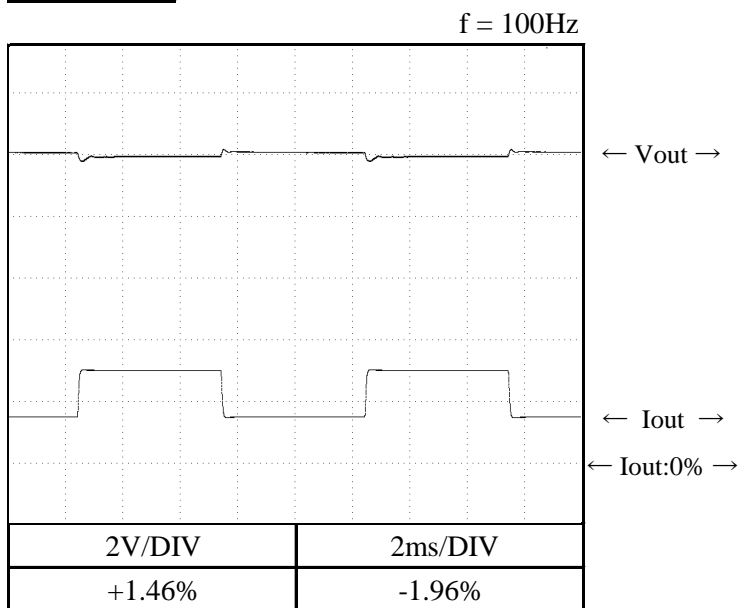
24V



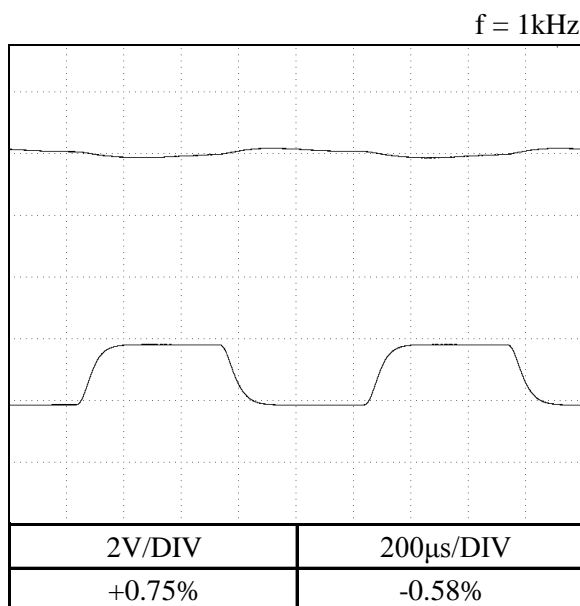
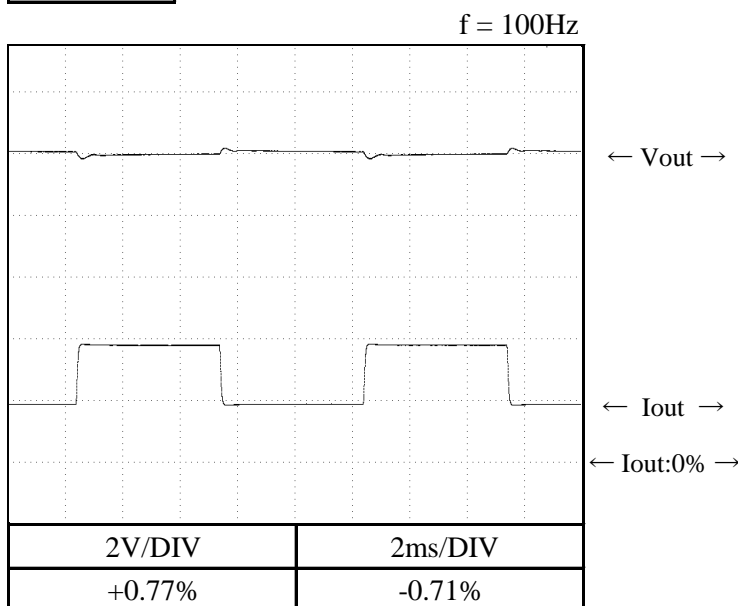
2.8 過渡応答（負荷急変）特性 Dynamic load response characteristics

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

12V



24V



2.9 入力電圧瞬停特性

Response to brown out characteristics

Conditions Iout : 100 %

Ta : 25 °C

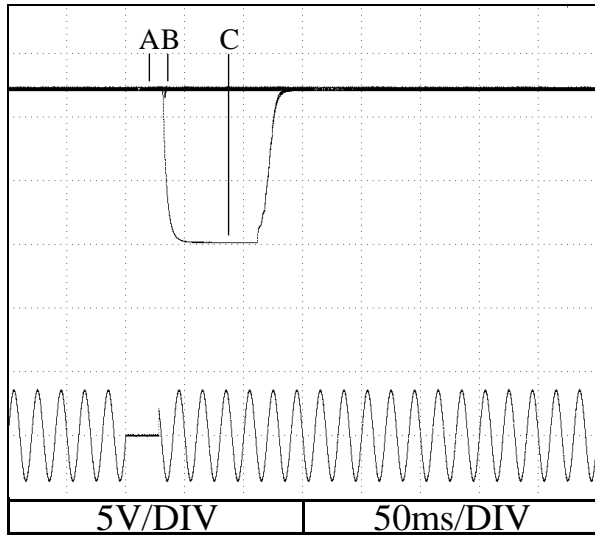
12V

Vin : 100VAC

A = 27ms

B = 28ms

C = 29ms

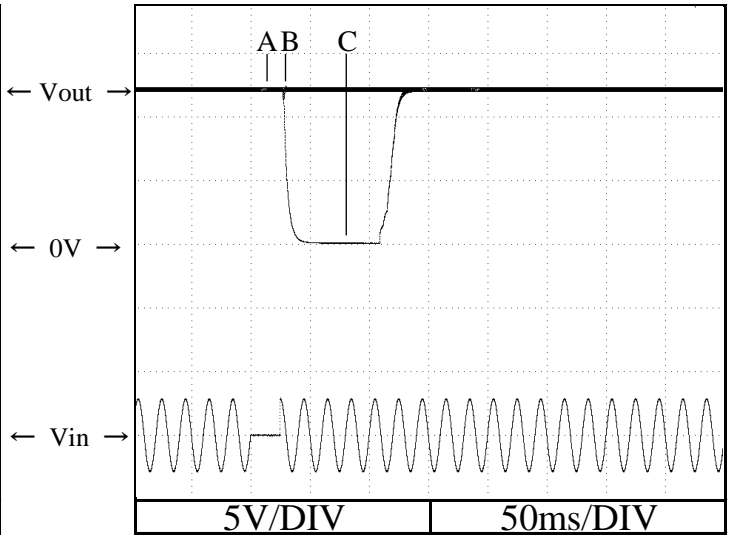


Vin : 200VAC

A = 23ms

B = 24ms

C = 25ms



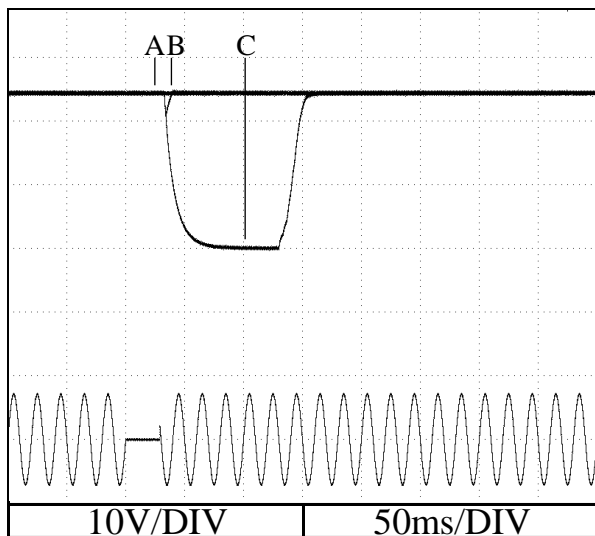
24V

Vin : 100VAC

A = 27ms

B = 28ms

C = 29ms

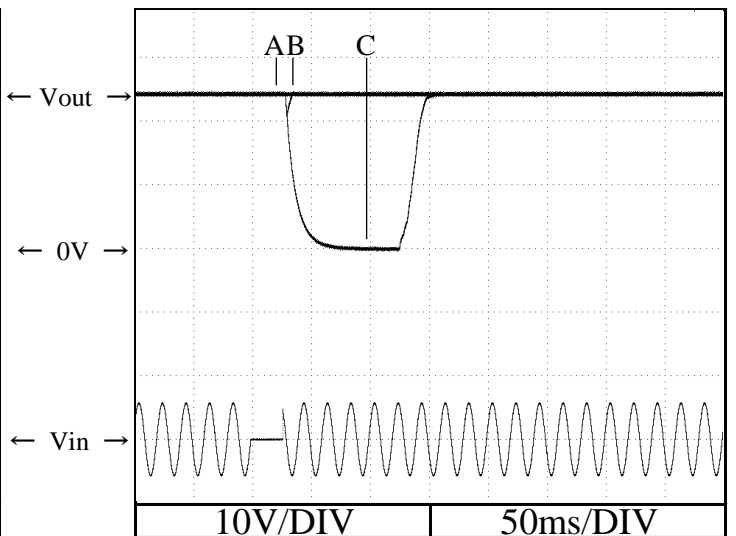


Vin : 200VAC

A = 25ms

B = 26ms

C = 27ms

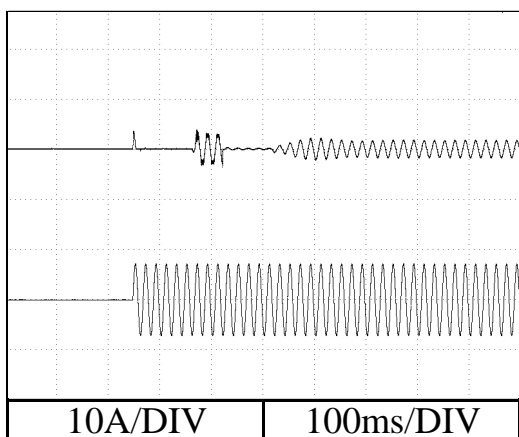


2.10 入力サージ電流（突入電流）波形
Inrush current waveform

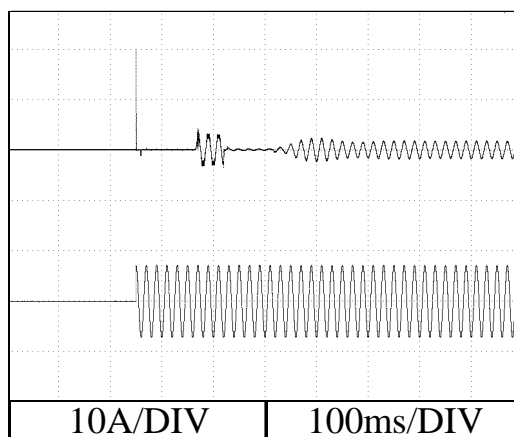
12V

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

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

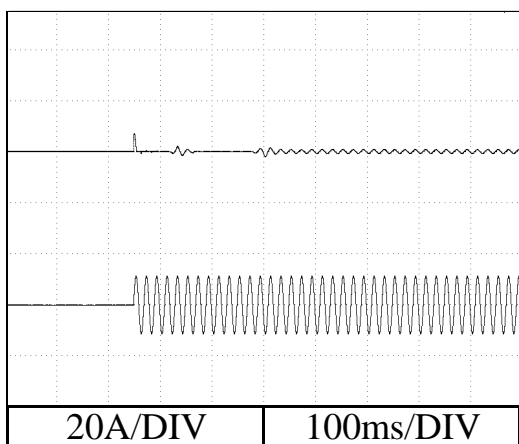


Switch on phase angl of input AC voltage
 $\phi = 90^\circ$

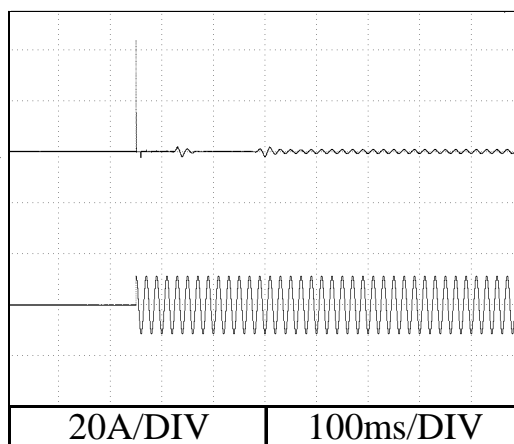


Conditions Vin : 200 VAC
Iout : 100 %
Ta : 25 °C

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



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



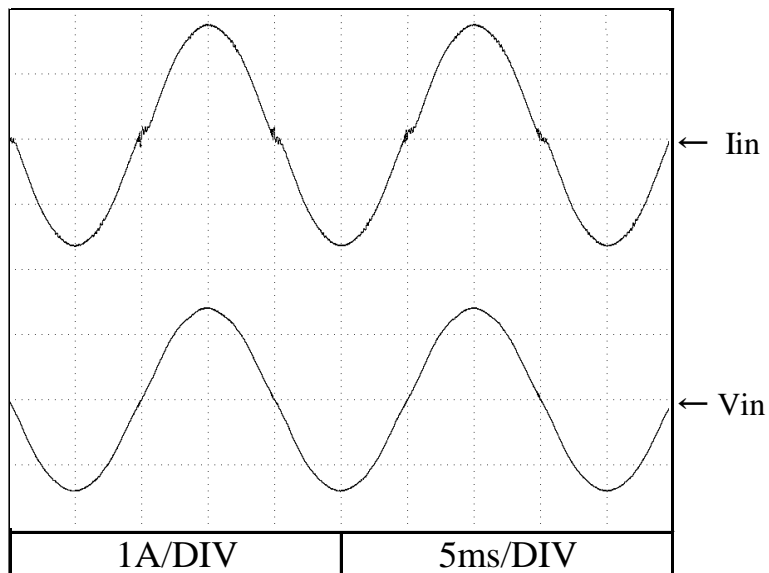
2.11 入力電流波形

Input current waveform

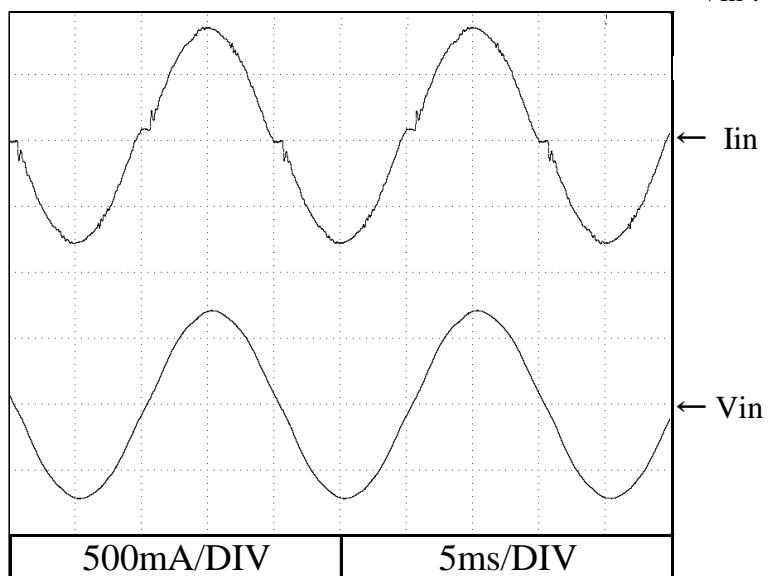
Conditions Iout : 100 %
Ta : 25 °C

12V

Vin : 100 VAC



Vin : 200 VAC



2.12 高調波成分

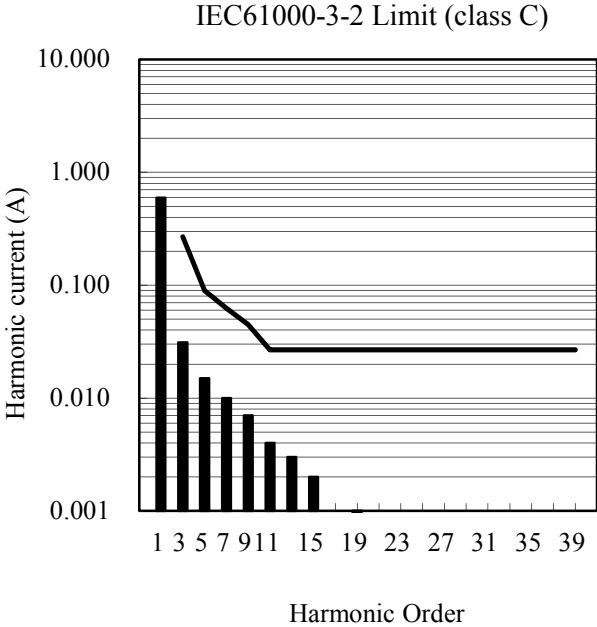
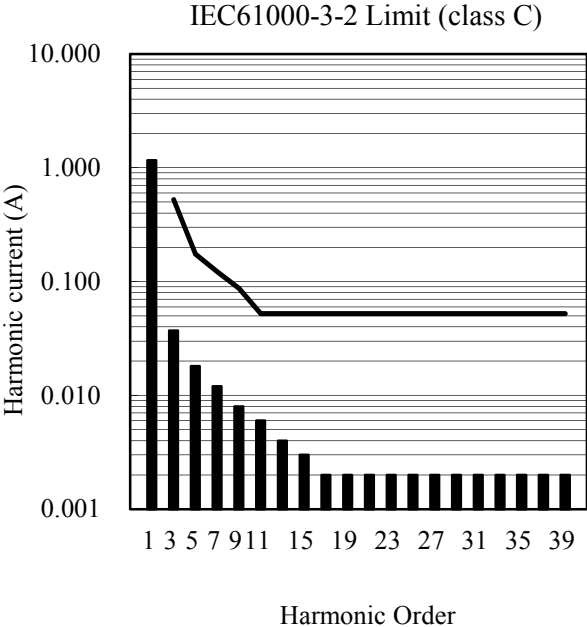
Input current harmonics

Conditions Vin : 100 VAC
Ta : 25 °C

12V

Iout : 100%

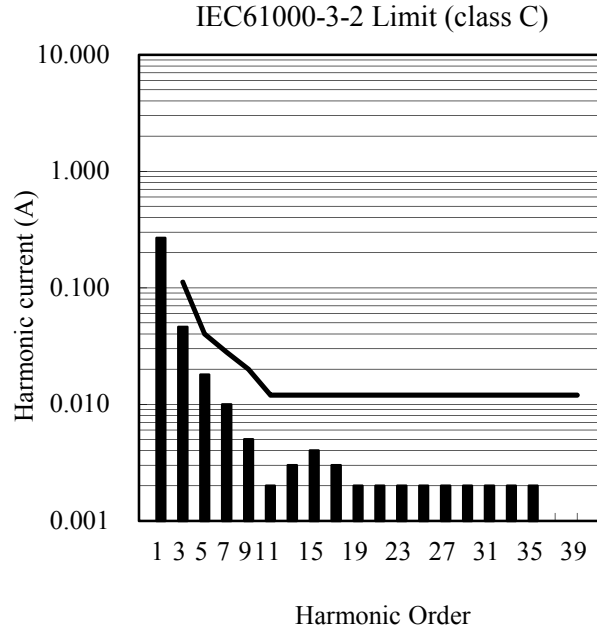
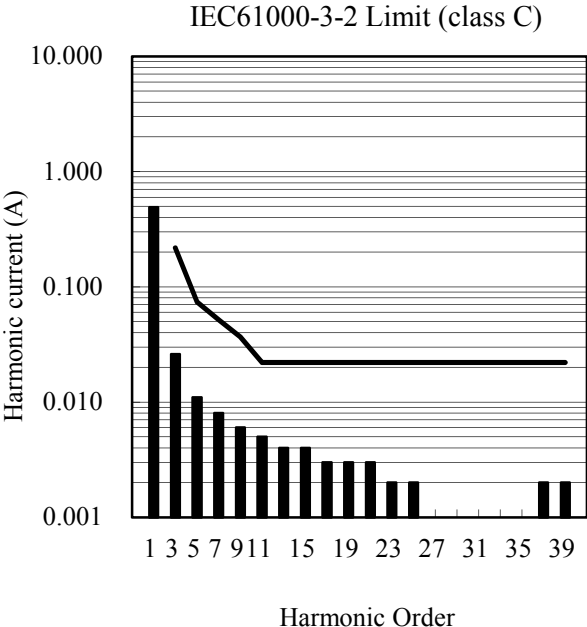
Iout : 50%



Conditions Vin : 230 VAC
Ta : 25 °C

Iout : 100%

Iout : 50%



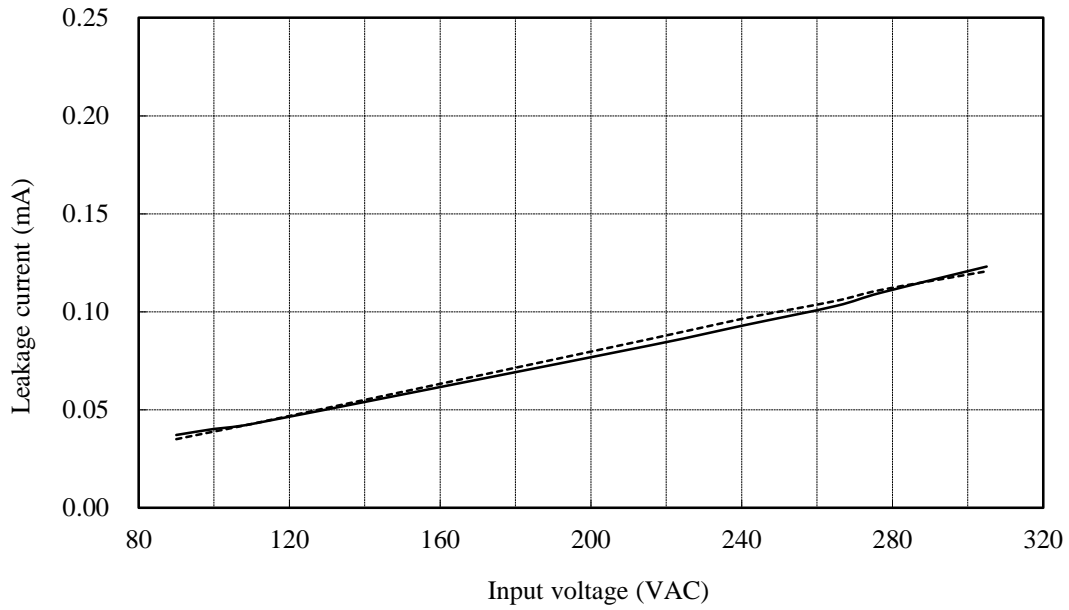
2.13 リーク電流特性
Leakage current characteristics

ELV90

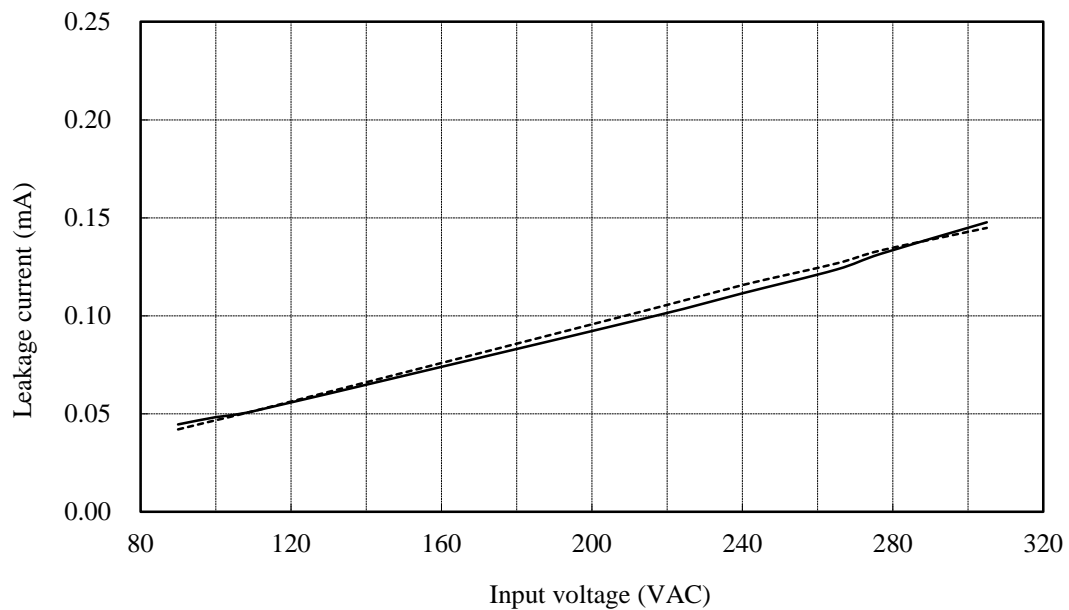
Conditions Iout : min -----
 100 % ———
 Ta : 25 °C
Equipment used : 3156 (HIOKI)

12V

f : 50 Hz



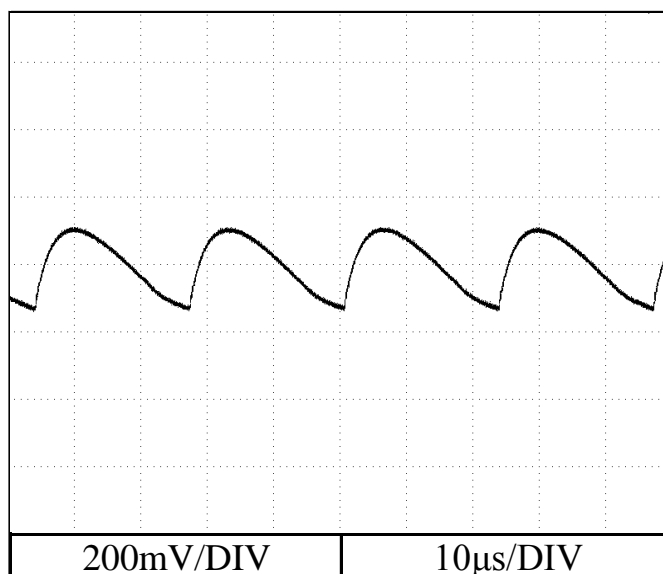
f : 60 Hz



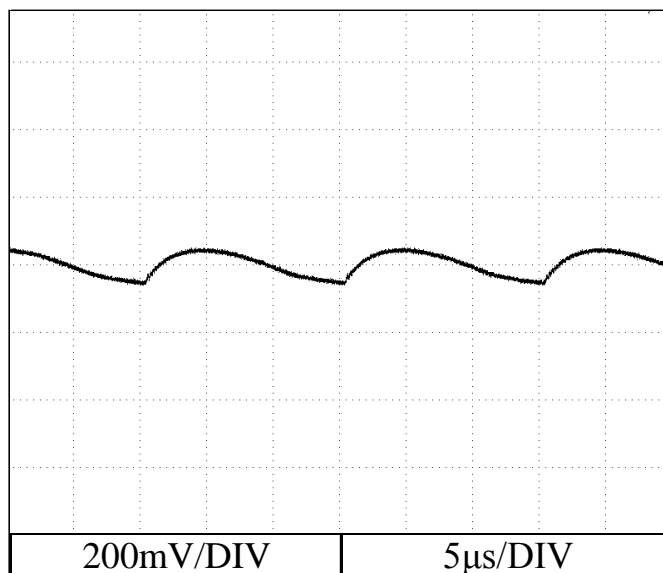
2.14 出力リップル、ノイズ波形
Output ripple and noise waveform

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

12V



24V



2.15 EMI特性

Electro-Magnetic Interference characteristics

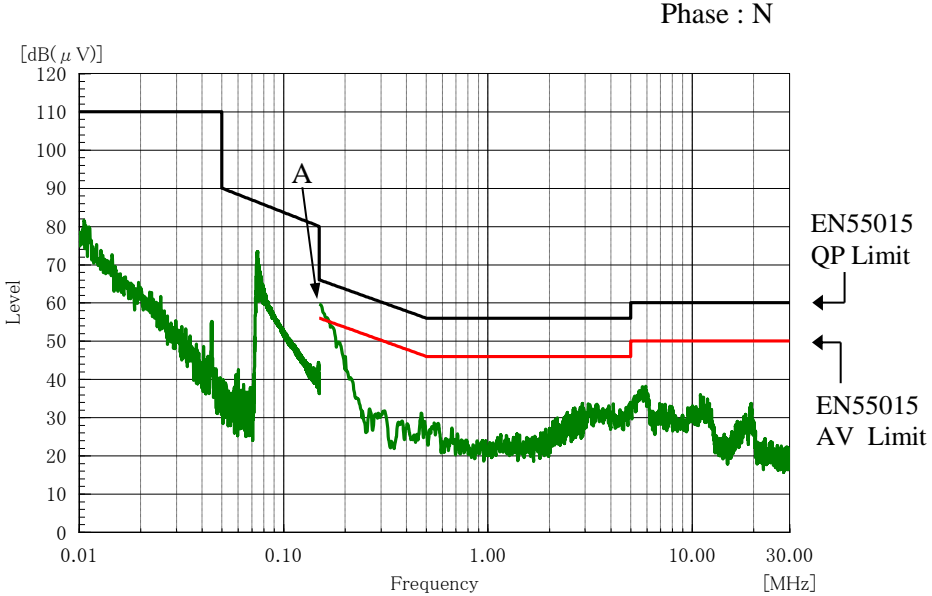
Conditions Vin : 230 VAC
Iout : 100 %
Ta : 25 °C

雑音端子電圧

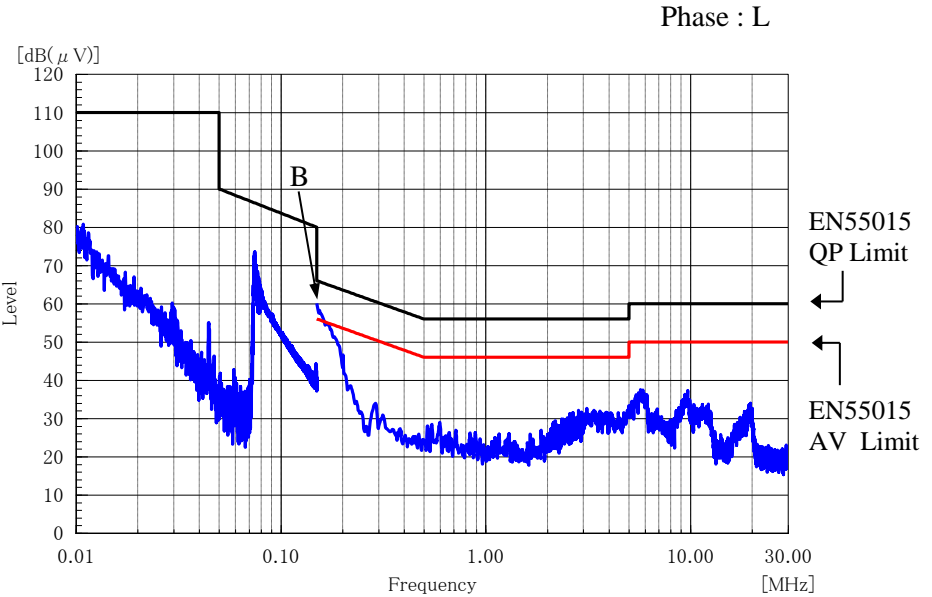
Conducted Emission

12V

Point A (150kHz)		
Ref. Data	Limit (dBuV)	Measure (dBuV)
QP	66.0	58.5
AV	56.0	43.8



Point B (150kHz)		
Ref. Data	Limit (dBuV)	Measure (dBuV)
QP	66.0	58.5
AV	56.0	43.8



EN55022-B,VCCI-B,CISPR22-B,FCC-Bの限界値はEN55015の限界値と同じ(150kHz以上)
Limit of EN55022-B,VCCI-B,CISPR22-B,FCC-B are same as its EN55015.(more than 150kHz)

表示はピーク値
Indication is peak values.

2.15 EMI特性

Electro-Magnetic Interference characteristics

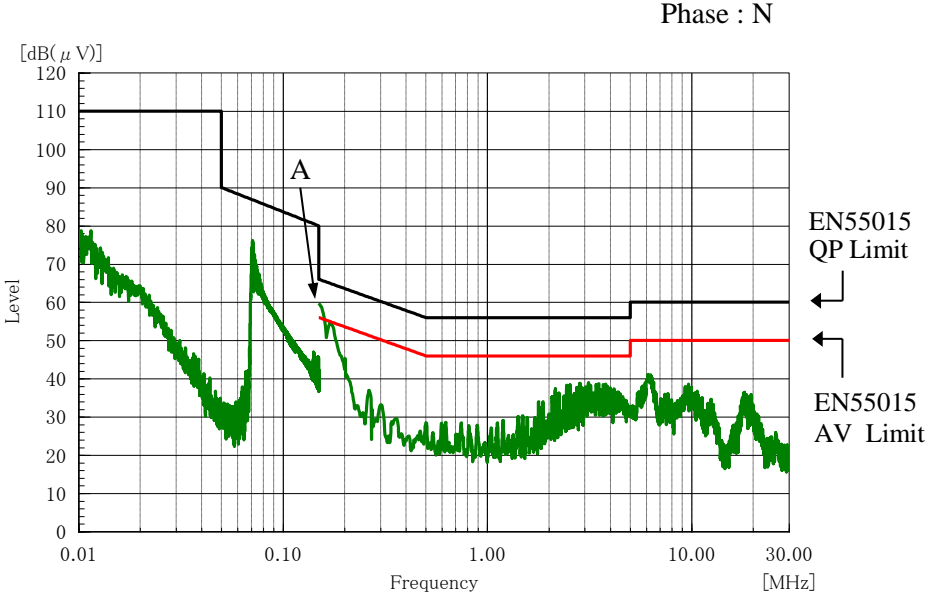
Conditions Vin : 230 VAC
Iout : 100 %
Ta : 25 °C

雑音端子電圧

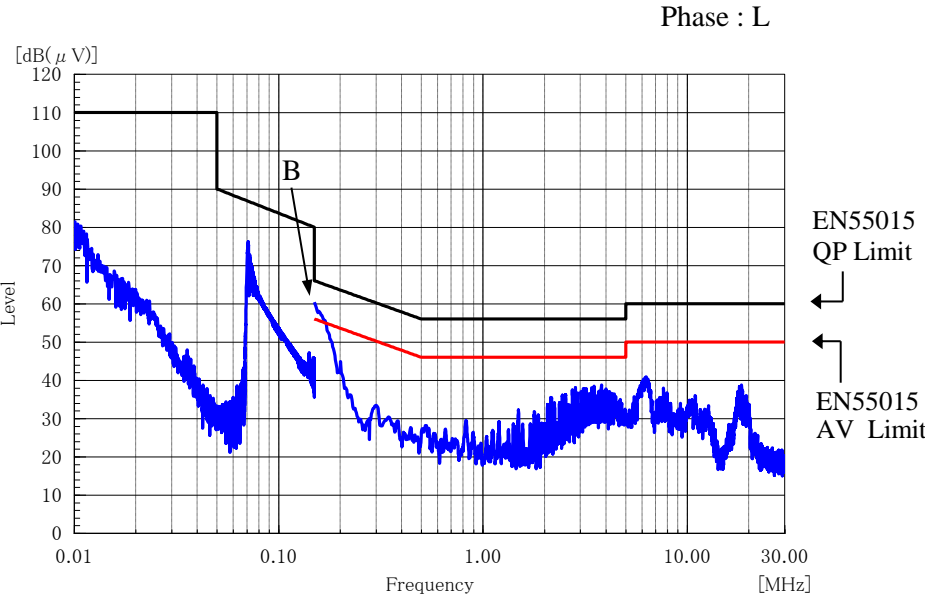
Conducted Emission

24V

Point A (150kHz)		
Ref. Data	Limit (dBuV)	Measure (dBuV)
QP	66.0	58.7
AV	56.0	44.3



Point B (150kHz)		
Ref. Data	Limit (dBuV)	Measure (dBuV)
QP	66.0	58.7
AV	56.0	44.3



EN55022-B,VCCI-B,CISPR22-B,FCC-Bの限界値はEN55015の限界値と同じ(150kHz以上)
Limit of EN55022-B,VCCI-B,CISPR22-B,FCC-B are same as its EN55015.(more than 150kHz)

表示はピーク値
Indication is peak values.

2.15 EMI特性

Electro-Magnetic Interference characteristics

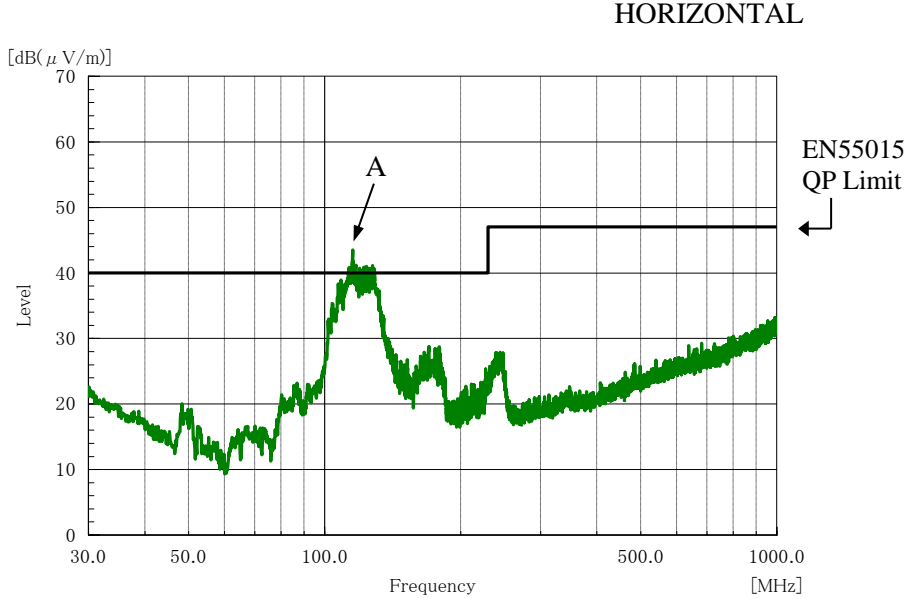
Conditions Vin : 230 VAC
Iout : 100 %
Ta : 25 °C

雑音電界強度

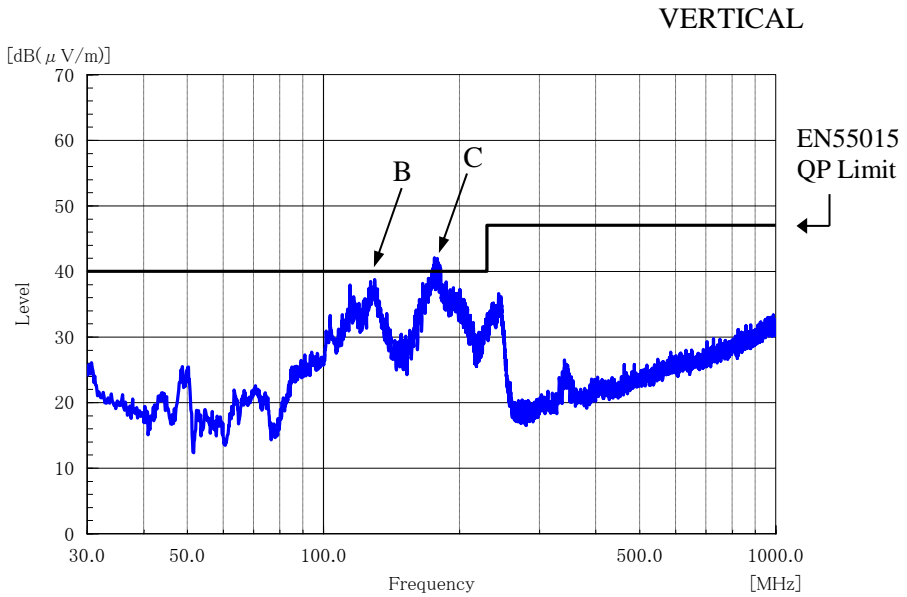
Radiated Emission

12V

Point A (113MHz)		
Ref. Data	Limit (dBuV)	Measure (dBuV)
QP	40.0	35.6



Point B (128MHz)		
Ref. Data	Limit (dBuV)	Measure (dBuV)
QP	40.0	35.6



Point C (175MHz)		
Ref. Data	Limit (dBuV)	Measure (dBuV)
QP	40.0	36.2

EN55022-B,VCCI-B,CISPR22-B,FCC-Bの限界値はEN55015の限界値と同じ
Limit of EN55022-B,VCCI-B,CISPR22-B,FCC-B are same as its EN55015.

表示はピーク値
Indication is peak values.

2.15 EMI特性

Electro-Magnetic Interference characteristics

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

雑音電界強度

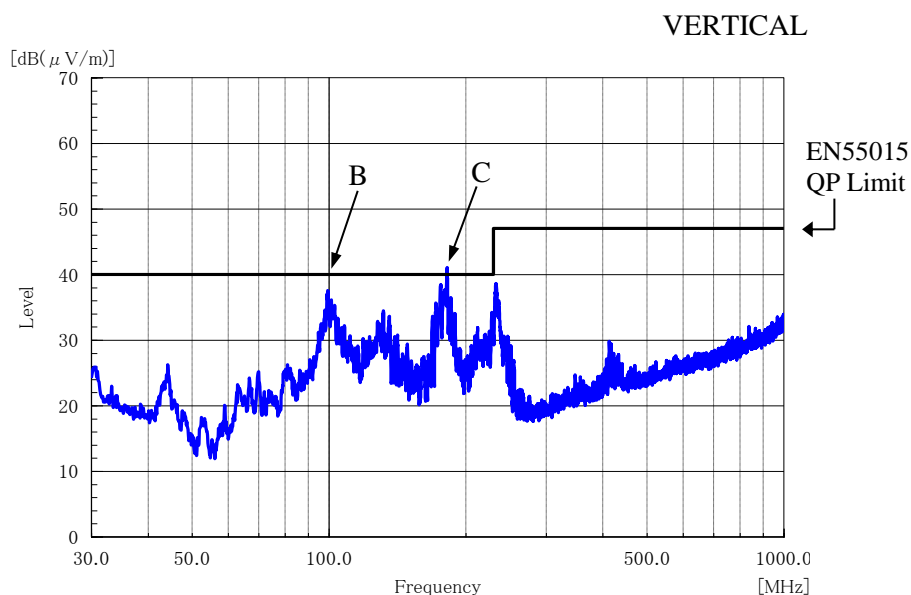
Radiated Emission

24V

Point A (123MHz)		
Ref.	Limit	Measure
Data	(dBuV)	(dBuV)
QP	40.0	34.6



Point B (99MHz)		
Ref.	Limit	Measure
Data	(dBuV)	(dBuV)
QP	40.0	33.0



Point C (181MHz)		
Ref.	Limit	Measure
Data	(dBuV)	(dBuV)
QP	40.0	35.4

EN55022-B,VCCI-B,CISPR22-B,FCC-Bの限界値はEN55015の限界値と同じ
Limit of EN55022-B,VCCI-B,CISPR22-B,FCC-B are same as its EN55015.

表示はピーク値

Indication is peak values.

2.15 EMI特性

Electro-Magnetic Interference characteristics

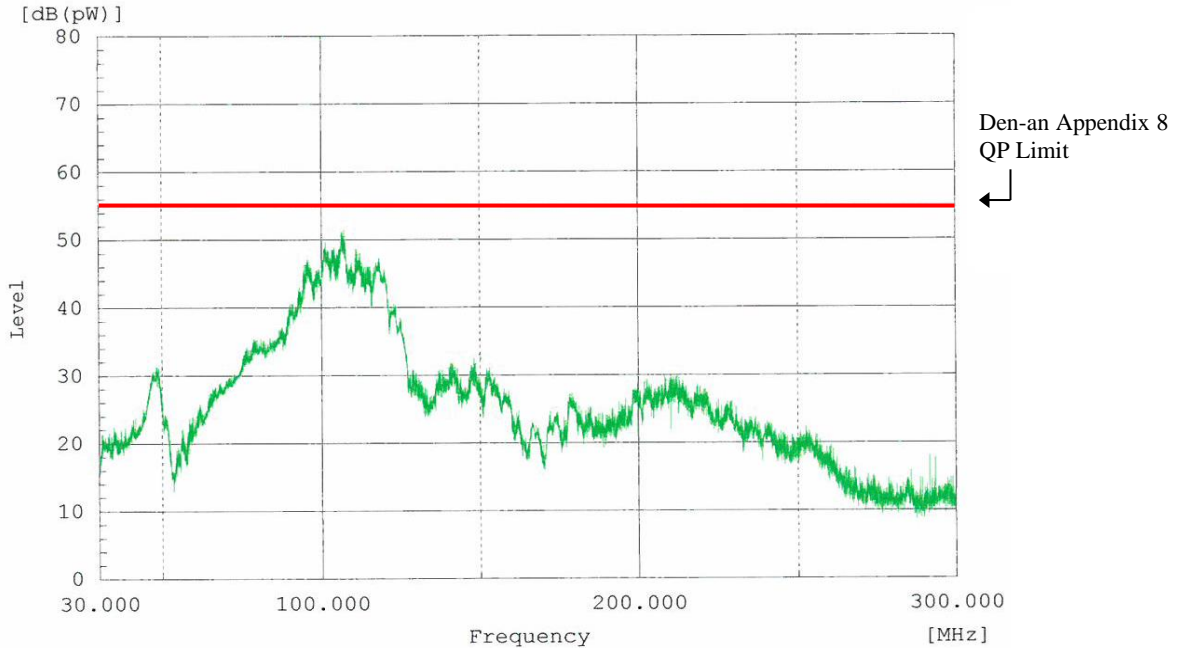
ELV90

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

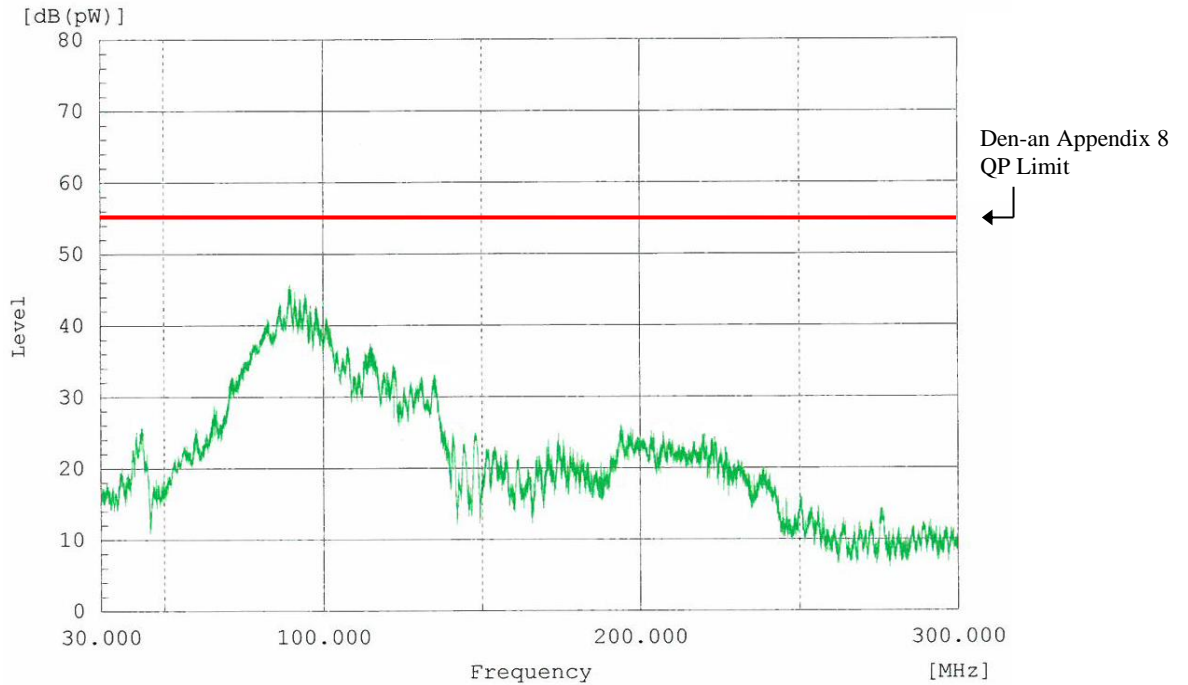
妨害波電力

Disturbance Power

12V



24V



表示はピーク値

Indication is peak values.