

HWS80A

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・遮断電圧

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(*) 準標準品 HWS80A-*/R にて対応 For alternative standard model HWS80A-*/R

使用記号 Terminology used

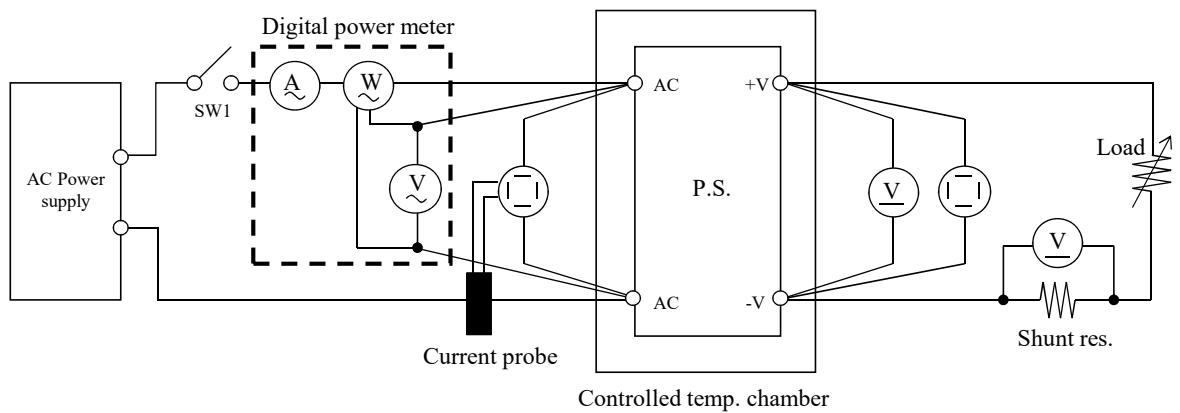
	定義	Definition
Vin	入力電圧 Input voltage
Vout	出力電圧 Output voltage
Iin	入力電流 Input current
Iout	出力電流 Output current
Ta	周囲温度 Ambient temperature
f	周波数 Frequency

1. 測定方法 Evaluation Method

1.1 測定回路 Circuit used for determination

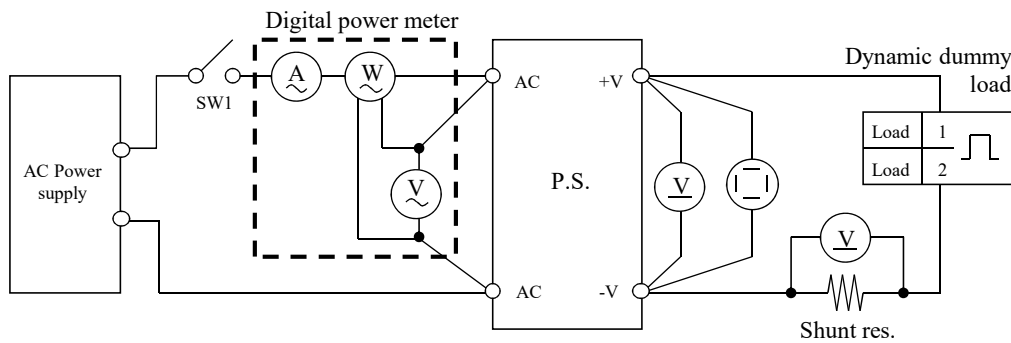
測定回路1 Circuit 1 used for determination

- 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
- 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
- 入力電流波形 Input current waveform

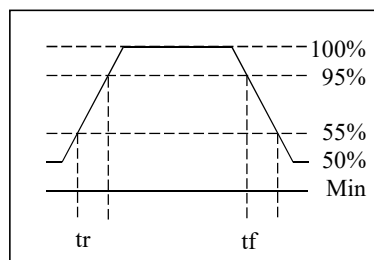


測定回路2 Circuit 2 used for determination

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

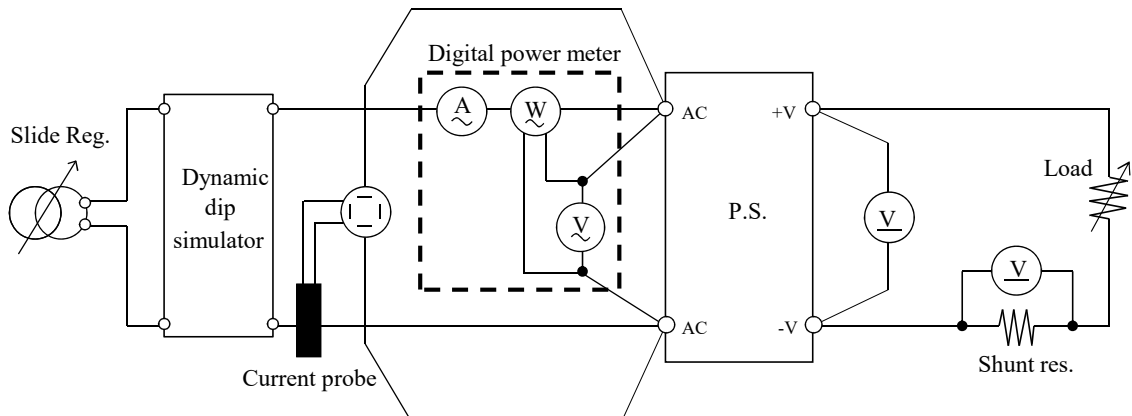


Output current waveform
I_{out} 50% <=> 100%



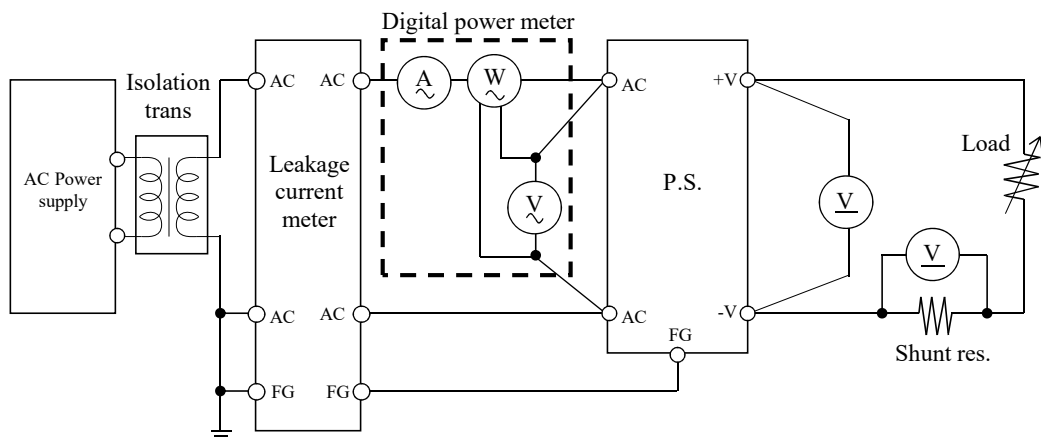
測定回路3 Circuit 3 used for determination

・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

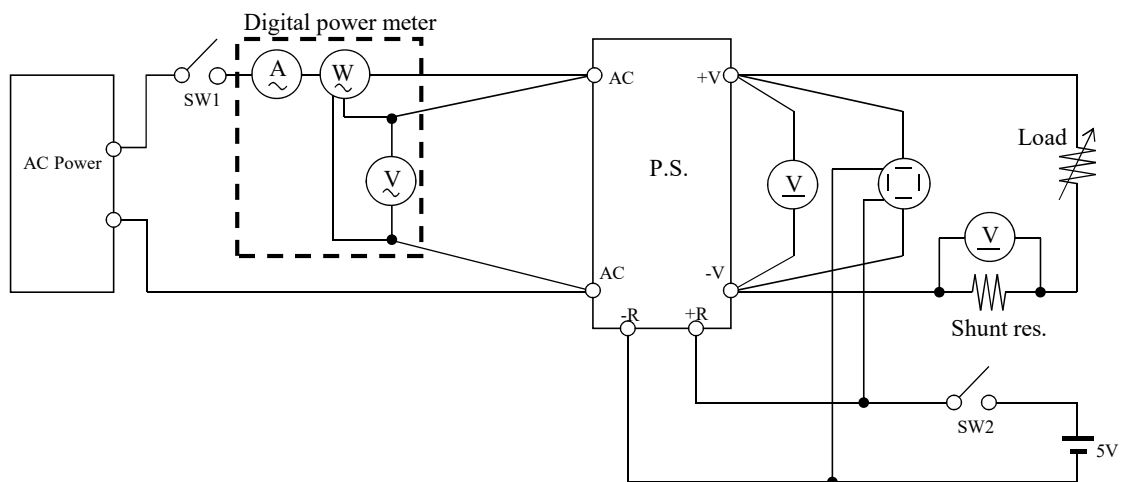


測定回路5 Circuit 5 used for determination

・ON/OFFコントロール時出力立ち上がり、立ち下がり特性
Output rise, fall characteristics with ON/OFF Control

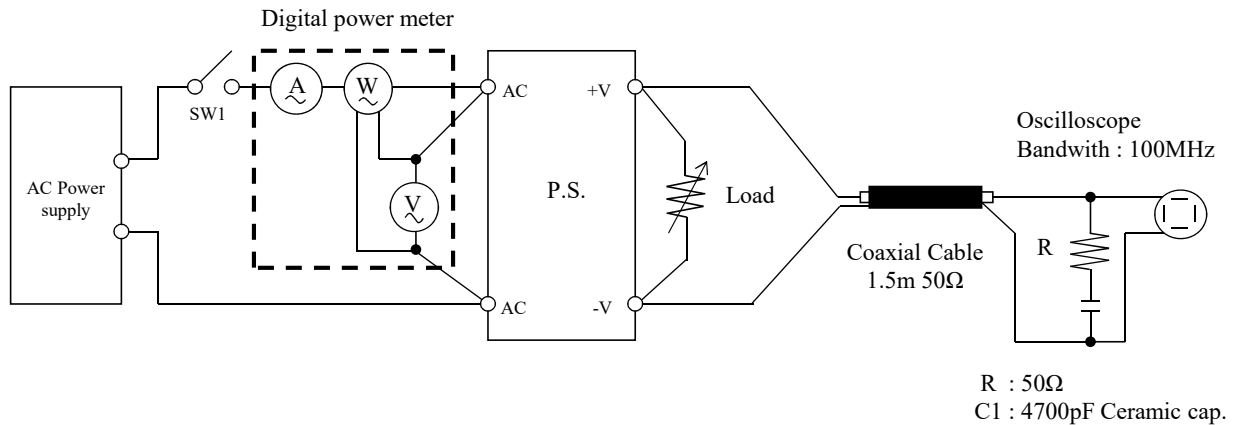
準標準品 HWS80A-*/R にて対応

For alternative standard model HWS80A-*/R



測定回路6 Circuit 5 used for determination

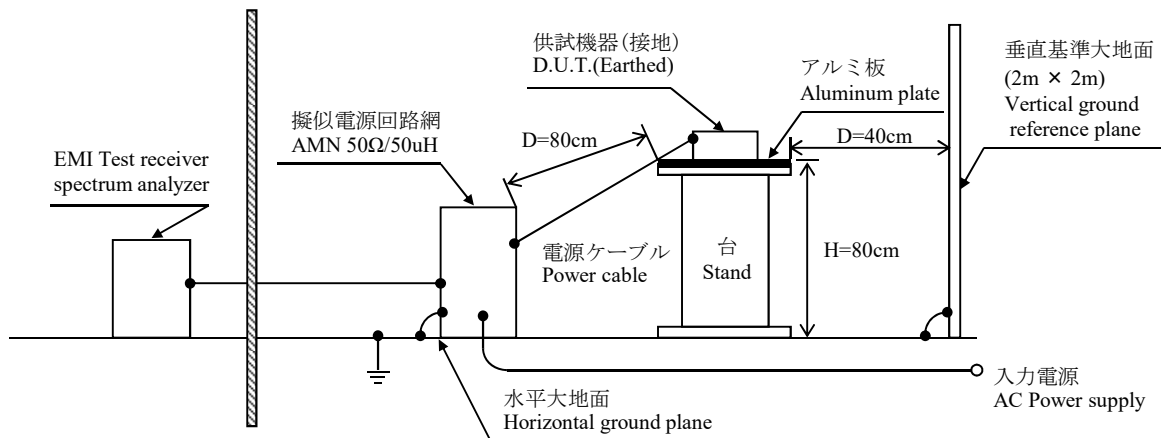
・出力リップル、ノイズ波形 Output ripple and noise waveform



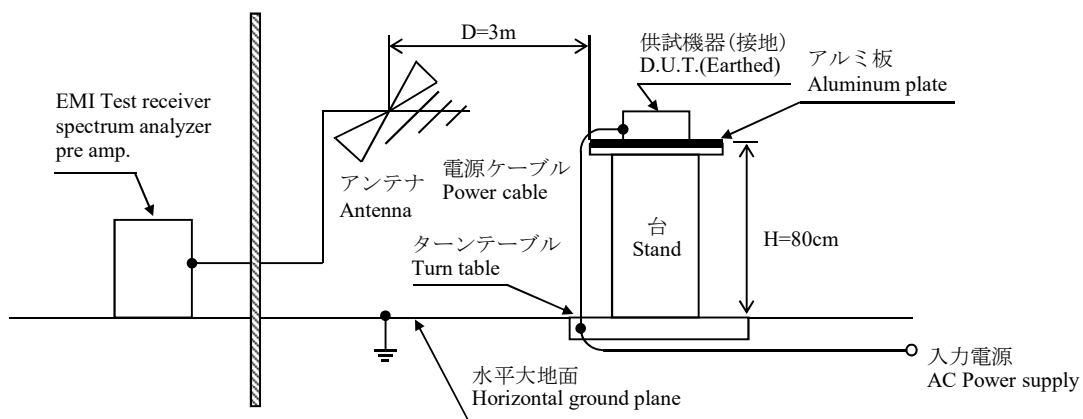
測定構成 Configuration used for determination

・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.	DL9040L / DLM2054
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-400L / FK-600L
7	DYNAMIC DUMMY LOAD	KIKUSUI	PLZ1004W / PLZ150U
8	DUMMY LOAD	PCN	PHF250 SERIES
9	ISOLATION TRANS	MATSUNAGA	3WTC-50K
10	CVCF	TAKASAGO	AA2000XG
11	CVCF	KIKUSUI	PCR4000L
12	CVCF	NF	ES10000S
13	LEAKAGE CURRENT METER	HIOKI	3156
14	DYNAMIC DIP SIMULATOR	TAKAMISAWA	PSA-210
15	CONTROLLED TEMP. CHAMBER	ESPEC	SU-261 / SH-240
16	EMI TEST RECEIVER / SPECTRUM ANALYZER	ROHDE & SCHWARZ	ESCI
17	PRE AMP.	SONOMA	310N
18	AMN	SCHWARZBECK	NNLK8121
19	ANTENNA	SCHWARZBECK	CBL6111D
20	HARMONIC / FLICKER ANALYZER	KIKUSUI	KHA1000
21	SINGLE-PHASE MASTER	NF	4420
22	REFERENCE IMPEDANCE NETWORK 20A	NF	4150
23	MULTI OUTLET UNIT	KIKUSUI	OT01-KHA

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	85VAC	100VAC	200VAC	265VAC	line regulation		
0%	5.045V	5.045V	5.045V	5.045V	0mV	0.000%	
50%	5.043V	5.043V	5.043V	5.043V	0mV	0.000%	
100%	5.042V	5.042V	5.042V	5.042V	0mV	0.000%	
load	3mV	3mV	3mV	3mV			
regulation	0.060%	0.060%	0.060%	0.060%			
		2. Temperature drift				Conditions Vin : 100 VAC Iout : 100 %	
Ta	-10°C	+25°C	+50°C	temperature stability			
Vout	5.037V	5.042V	5.044V	7mV	0.140%		
		3. Start up voltage and Drop out voltage				Conditions Ta : 25 °C Iout : 100 %	
Start up voltage (Vin)		77VAC					
Drop out voltage (Vin)		52VAC					

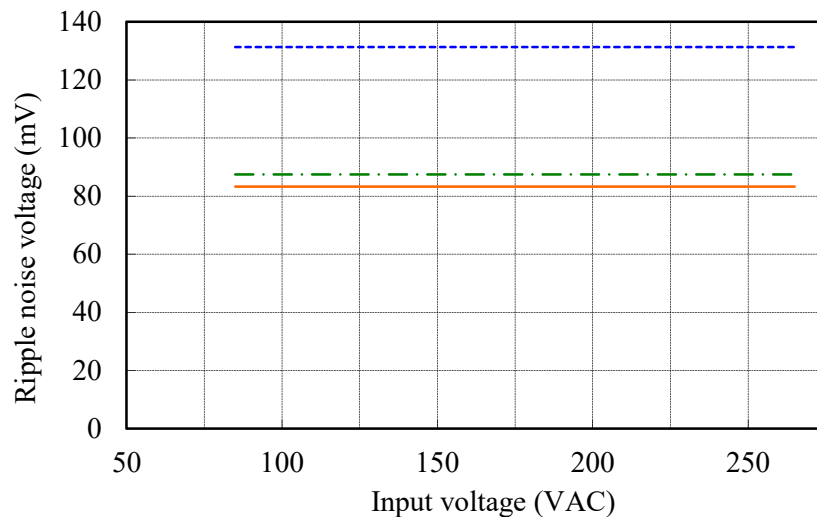
12V		1. Regulation - line and load				Condition Ta : 25 °C	
Iout \ Vin	85VAC	100VAC	200VAC	265VAC	line regulation		
0%	12.005V	12.005V	12.005V	12.005V	0mV	0.000%	
50%	12.003V	12.003V	12.003V	12.003V	0mV	0.000%	
100%	12.002V	12.002V	12.002V	12.002V	0mV	0.000%	
load	3mV	3mV	3mV	3mV			
regulation	0.025%	0.025%	0.025%	0.025%			
		2. Temperature drift				Conditions Vin : 100 VAC Iout : 100 %	
Ta	-10°C	+25°C	+50°C	temperature stability			
Vout	11.995V	12.002V	11.984V	18mV	0.150%		
		3. Start up voltage and Drop out voltage				Conditions Ta : 25 °C Iout : 100 %	
Start up voltage (Vin)		77VAC					
Drop out voltage (Vin)		53VAC					

24V		1. Regulation - line and load				Condition Ta : 25 °C	
Iout \ Vin	85VAC	100VAC	200VAC	265VAC	line regulation		
0%	24.084V	24.084V	24.084V	24.084V	0mV	0.000%	
50%	24.080V	24.080V	24.081V	24.081V	1mV	0.004%	
100%	24.080V	24.081V	24.080V	24.080V	1mV	0.004%	
load	4mV	4mV	4mV	4mV			
regulation	0.017%	0.017%	0.017%	0.017%			
		2. Temperature drift				Conditions Vin : 100 VAC Iout : 100 %	
Ta	-10°C	+25°C	+50°C	temperature stability			
Vout	24.046V	24.081V	24.057V	35mV	0.146%		
		3. Start up voltage and Drop out voltage				Conditions Ta : 25 °C Iout : 100 %	
Start up voltage (Vin)		75VAC					
Drop out voltage (Vin)		52VAC					

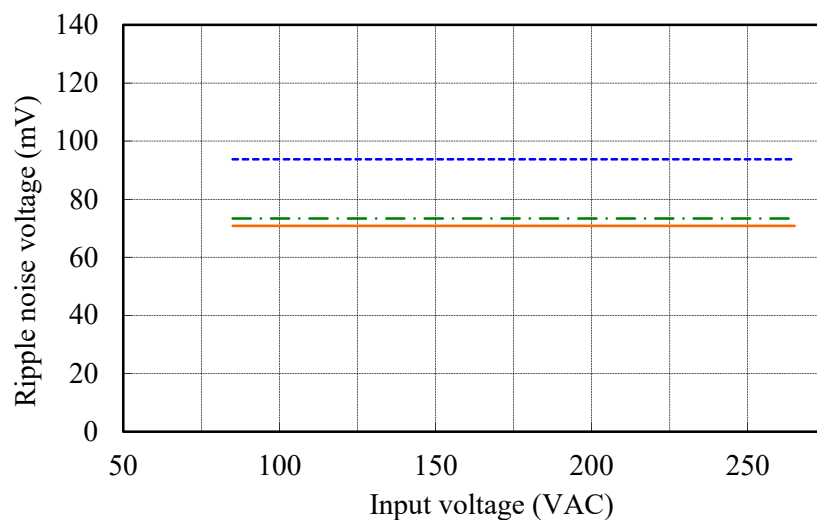
(2) リプルノイズ電圧対入力電圧 Ripple noise voltage vs. Input voltage

Conditions Iout: 100 %
Ta: -10 °C ---
25 °C -.-
50 °C —

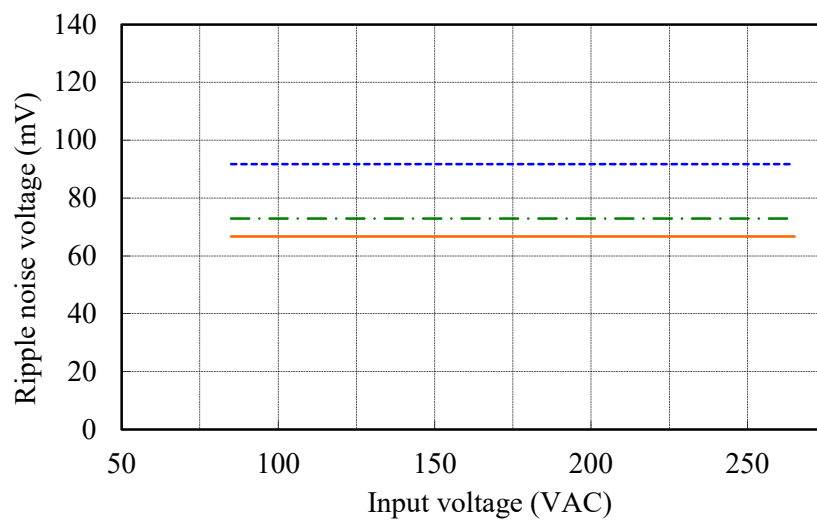
5V



12V



24V

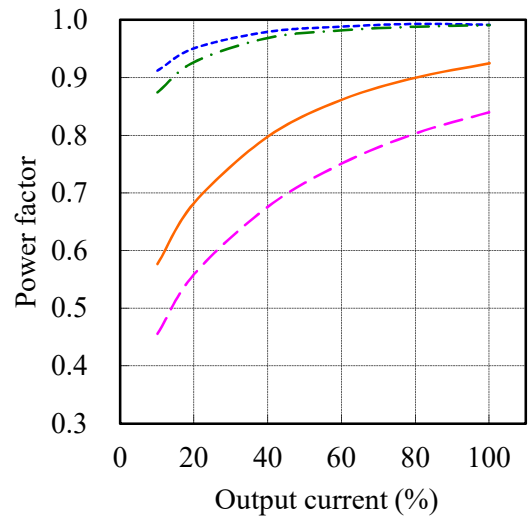
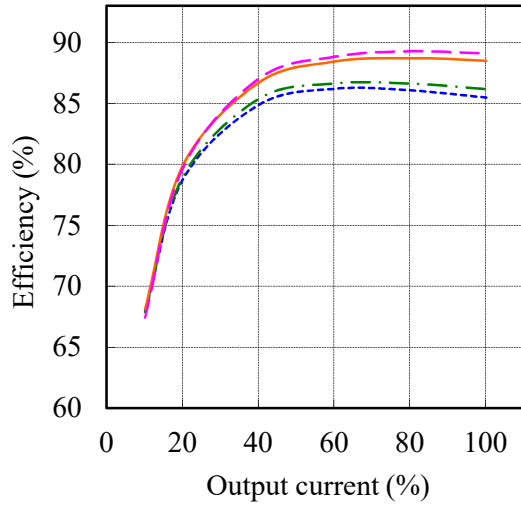


(3) 効率・力率対出力電流

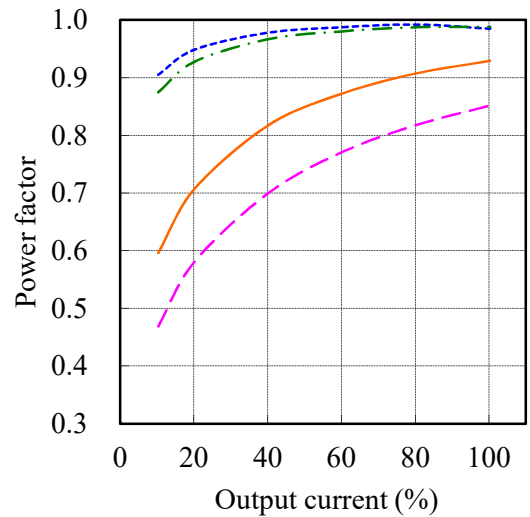
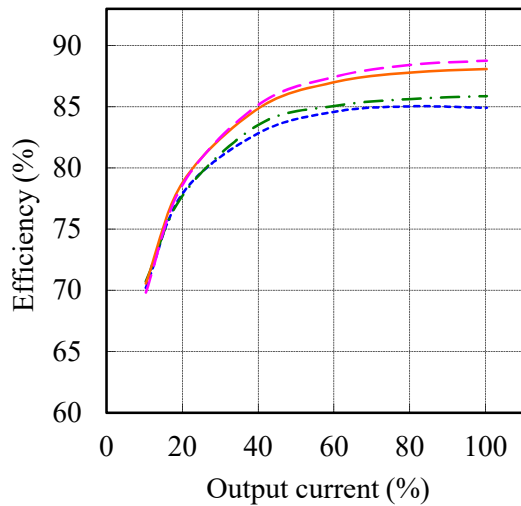
Efficiency and Power factor vs. Output current

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

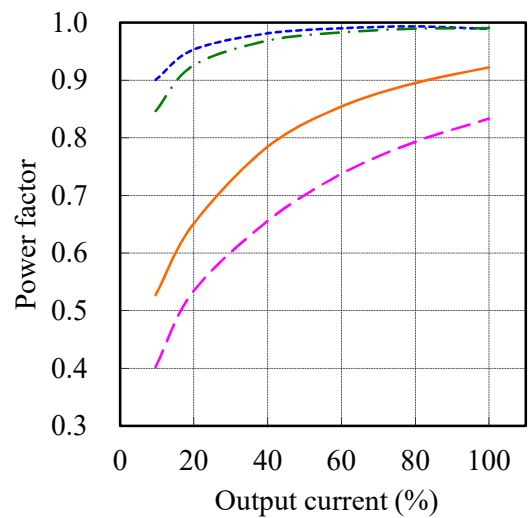
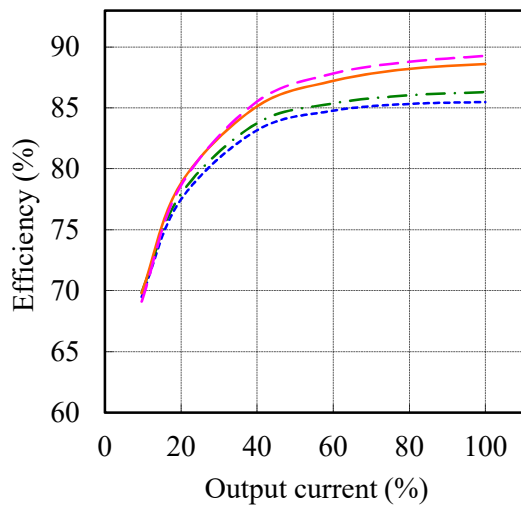
5V



12V



24V



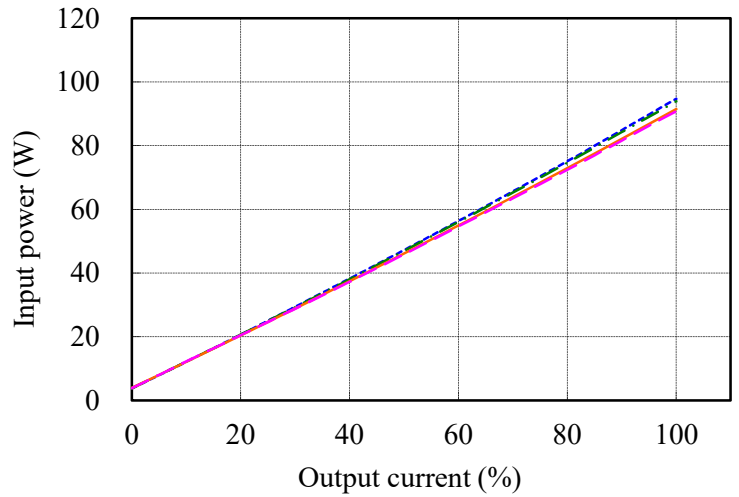
HWS80A

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

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

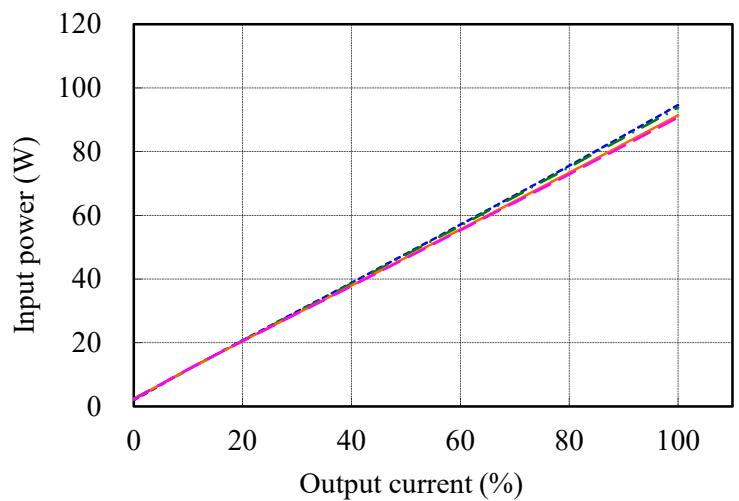
5V

Vin	Input power
	Iout : 0%
85VAC	3.8W
100VAC	3.8W
200VAC	3.9W
265VAC	3.8W



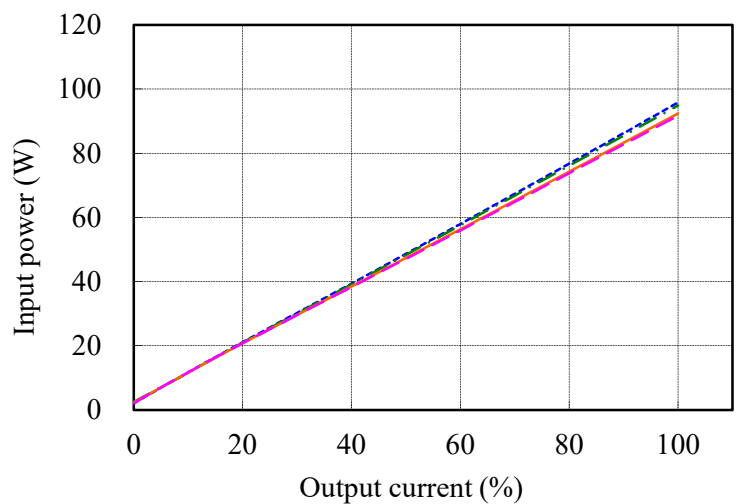
12V

Vin	Input power
	Iout : 0%
85VAC	1.9W
100VAC	2.4W
200VAC	2.3W
265VAC	2.2W



24V

Vin	Input power
	Iout : 0%
85VAC	2.1W
100VAC	2.5W
200VAC	2.3W
265VAC	2.2W



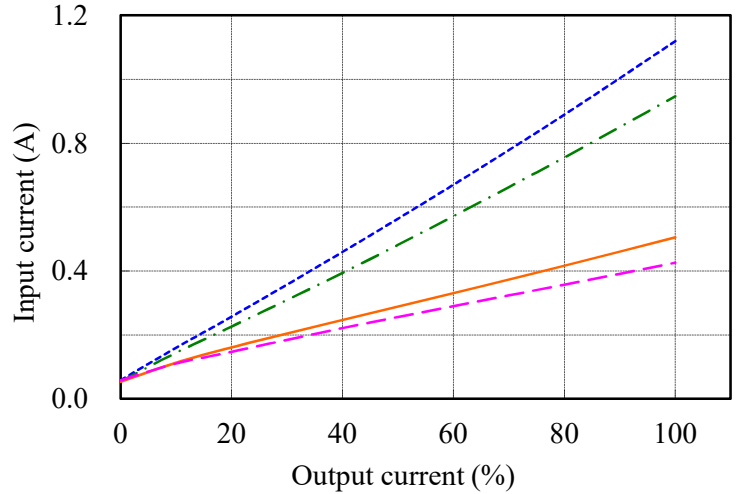
HWS80A

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

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

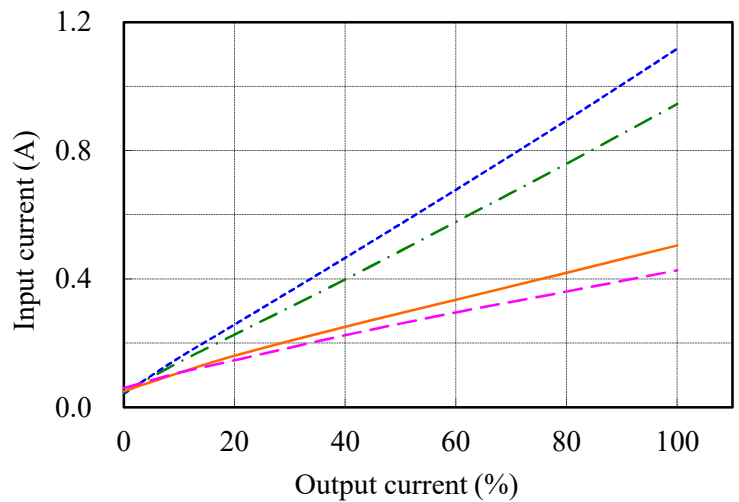
5V

Vin	Input current
	Iout : 0%
85VAC	0.06A
100VAC	0.05A
200VAC	0.05A
265VAC	0.06A



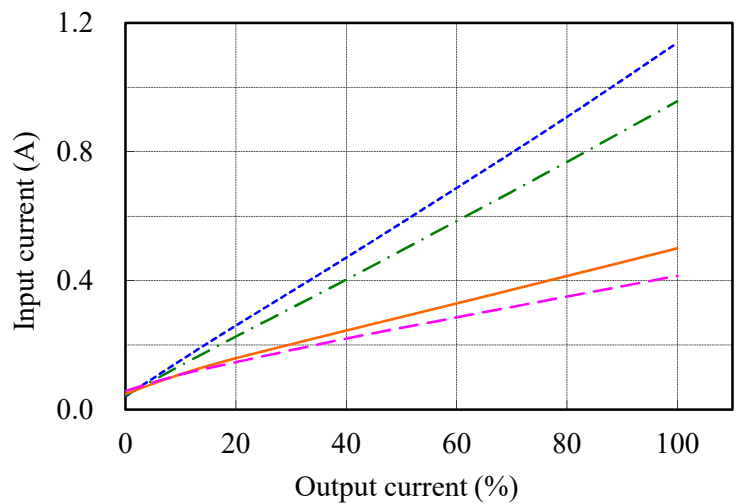
12V

Vin	Input current
	Iout : 0%
85VAC	0.04A
100VAC	0.05A
200VAC	0.05A
265VAC	0.06A



24V

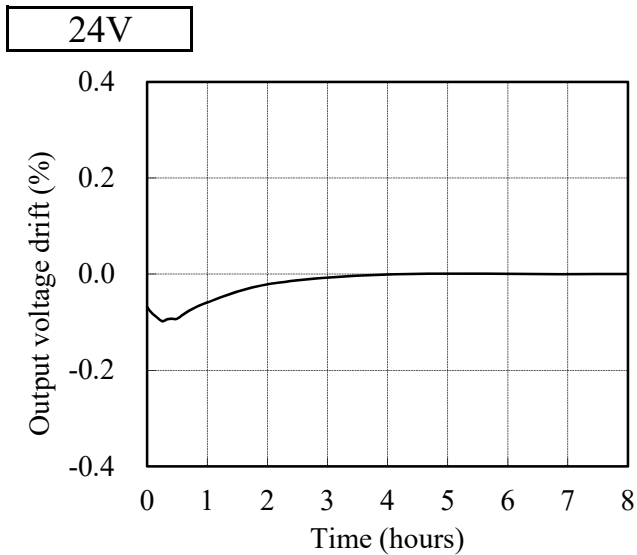
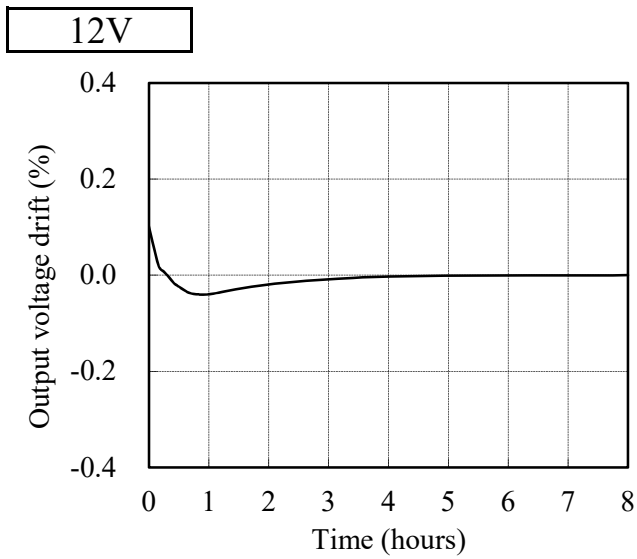
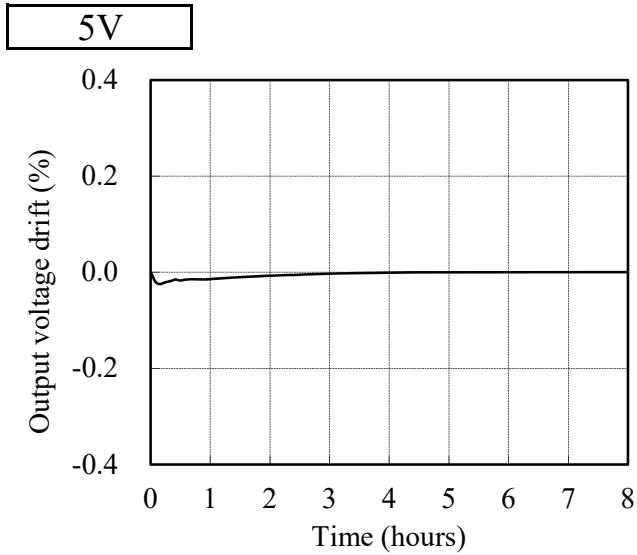
Vin	Input current
	Iout : 0%
85VAC	0.04A
100VAC	0.04A
200VAC	0.05A
265VAC	0.06A



2.2 通電ドリフト特性

Warm up voltage drift characteristics

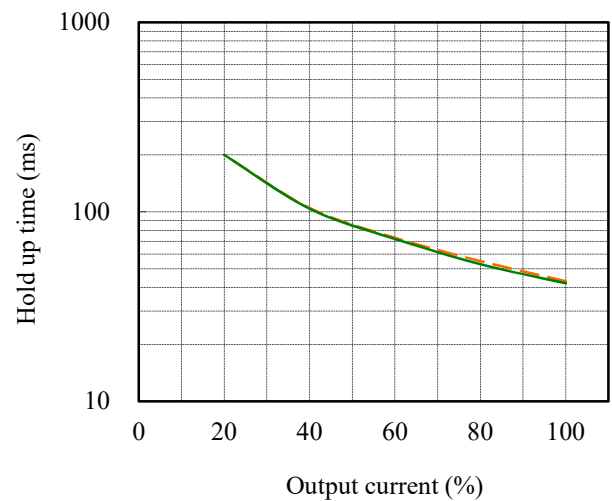
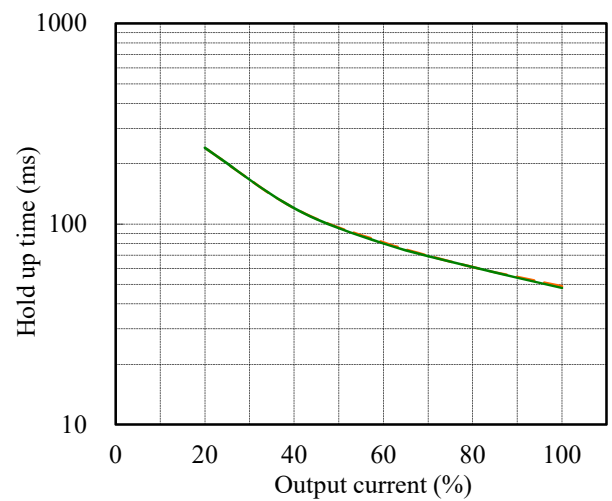
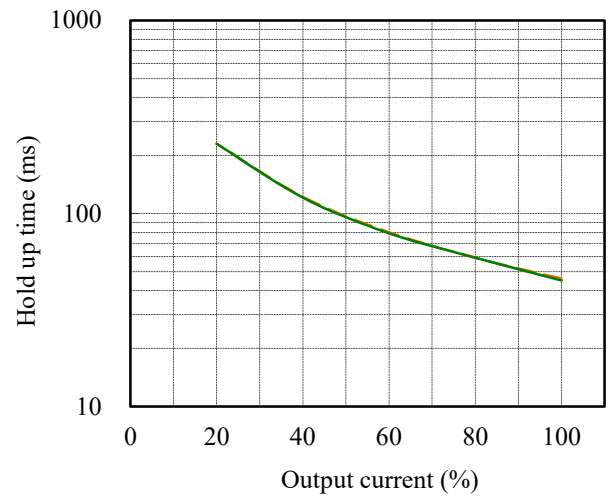
Conditions Vin : 100 VAC
Iout : 100 %
Ta : 25 °C



2.3 出力保持時間特性

Hold up time characteristics

Conditions Vin : 100 VAC (solid green line)
200 VAC (dashed orange line)
Ta : 25 °C

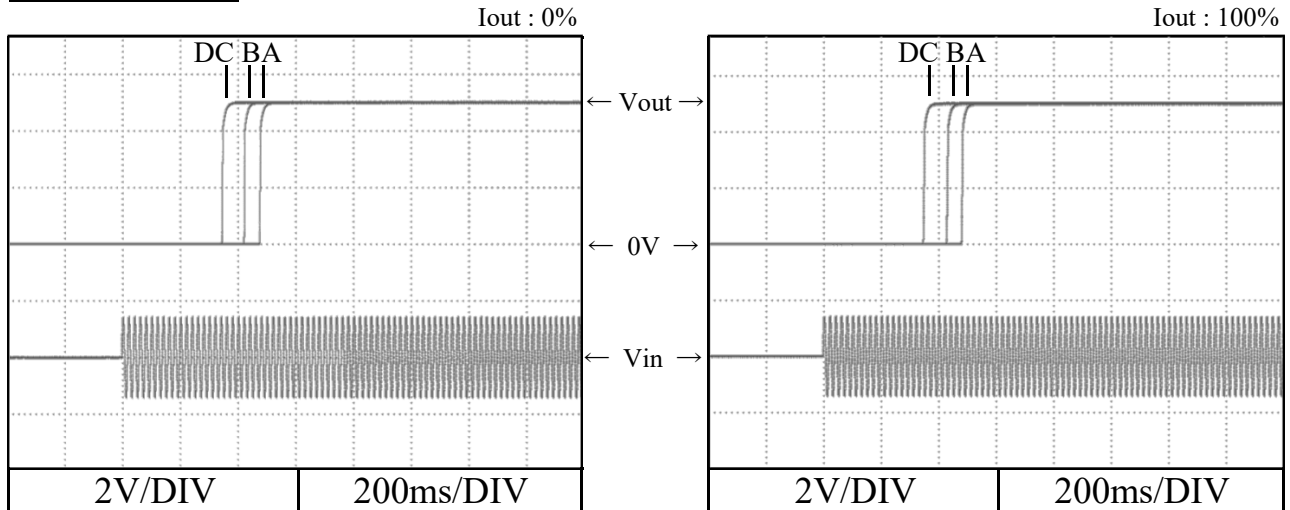


2.4 出力立ち上がり特性

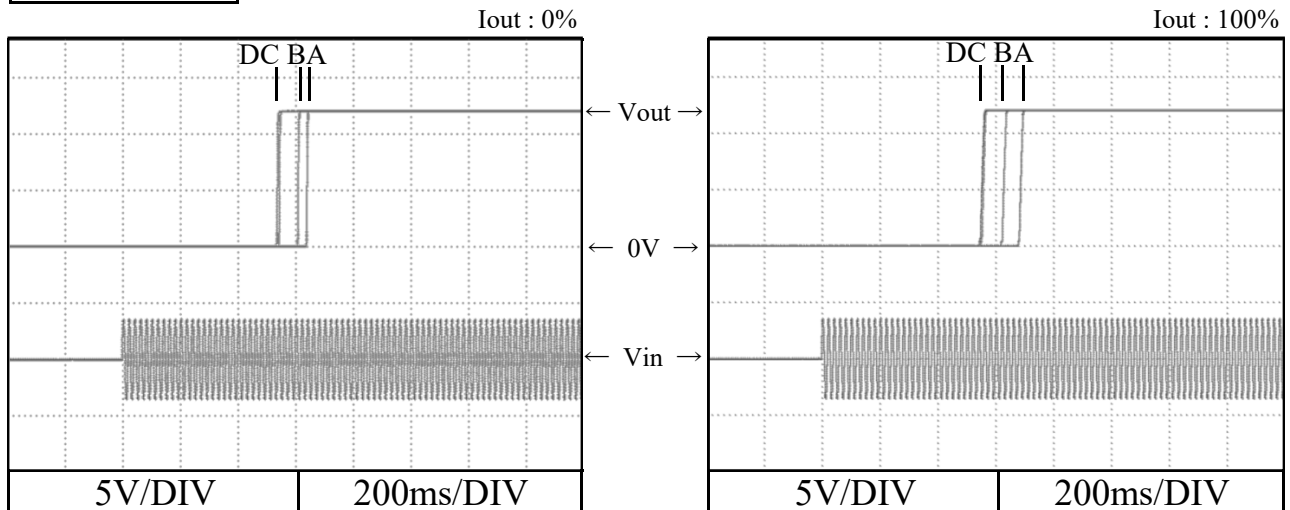
Output rise characteristics

Conditions V_{in} : 85 VAC (A)
 100 VAC (B)
 200 VAC (C)
 265 VAC (D)
 T_a : 25 °C

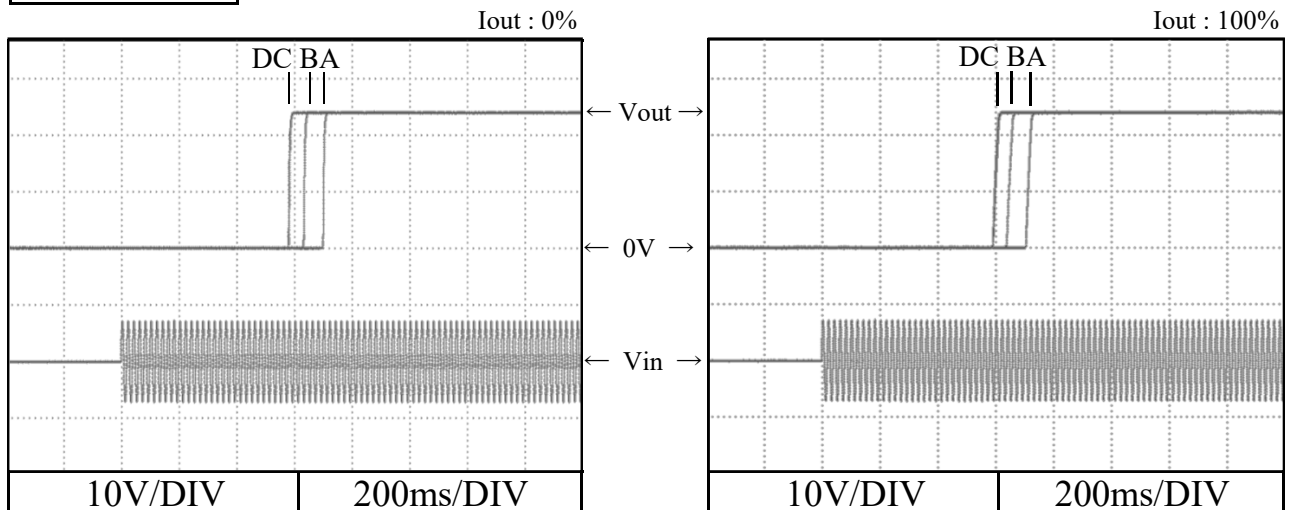
5V



12V



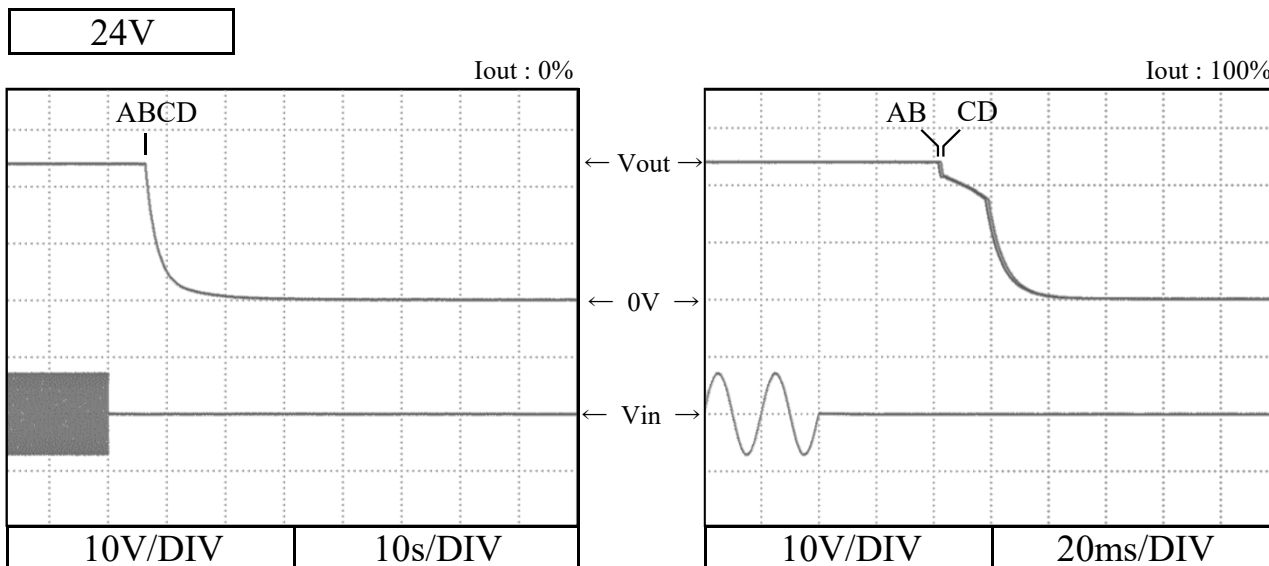
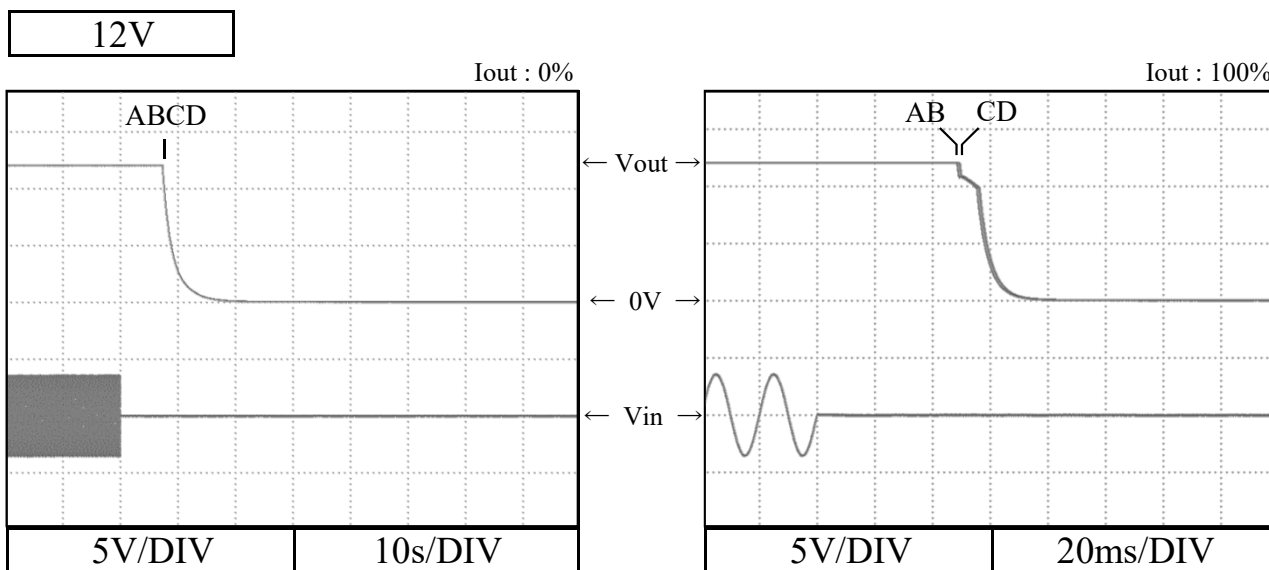
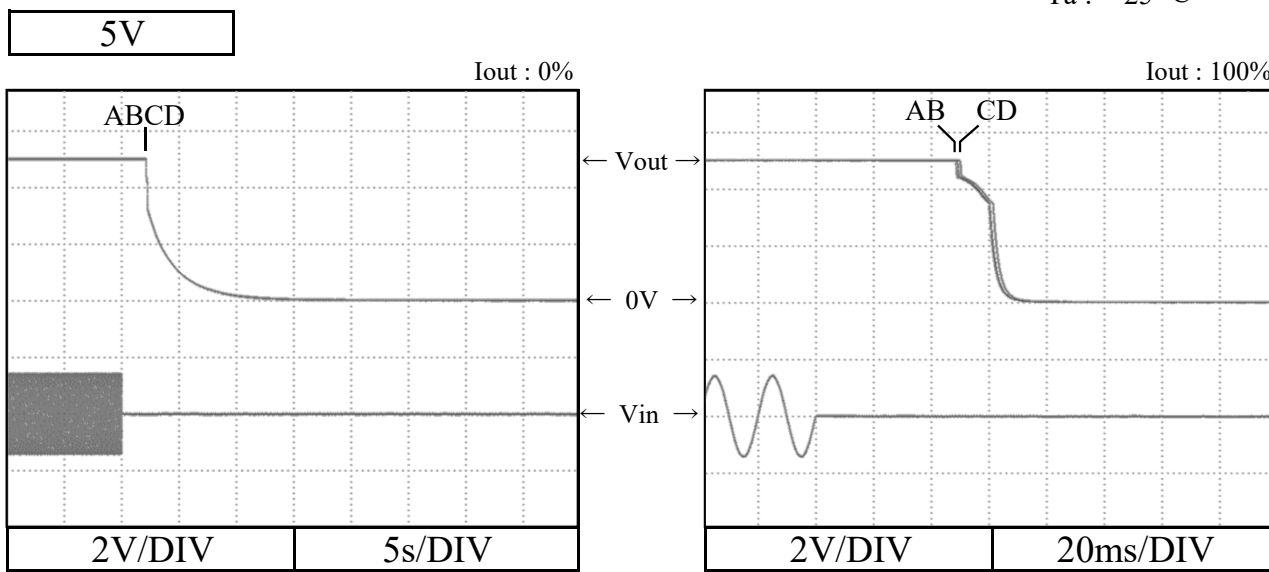
24V



2.5 出力立ち下がり特性

Output fall characteristics

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



2.6 ON/OFFコントロール時出力立ち上がり、立ち下がり特性

Output rise, fall characteristics with ON/OFF Control

Conditions

V_{in} : 100 VAC

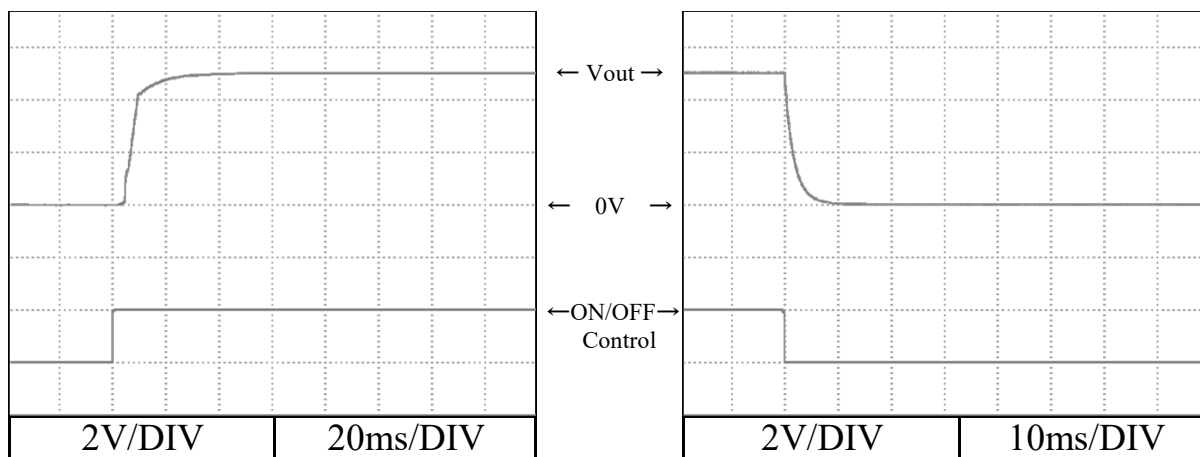
I_{out} : 100 %

T_a : 25 °C

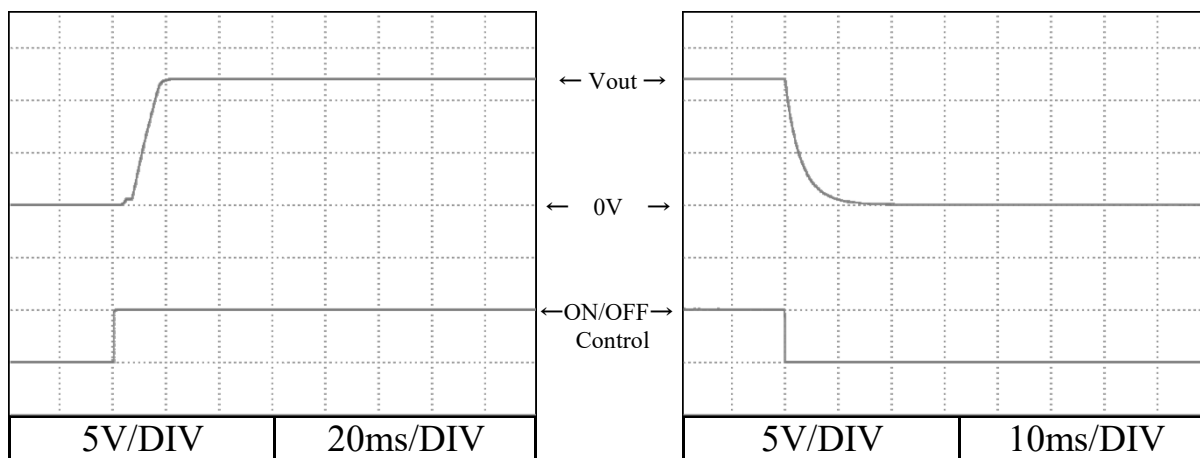
標準品 HWS80A-*/R にて対応

For alternative standard model HWS80A-*/R

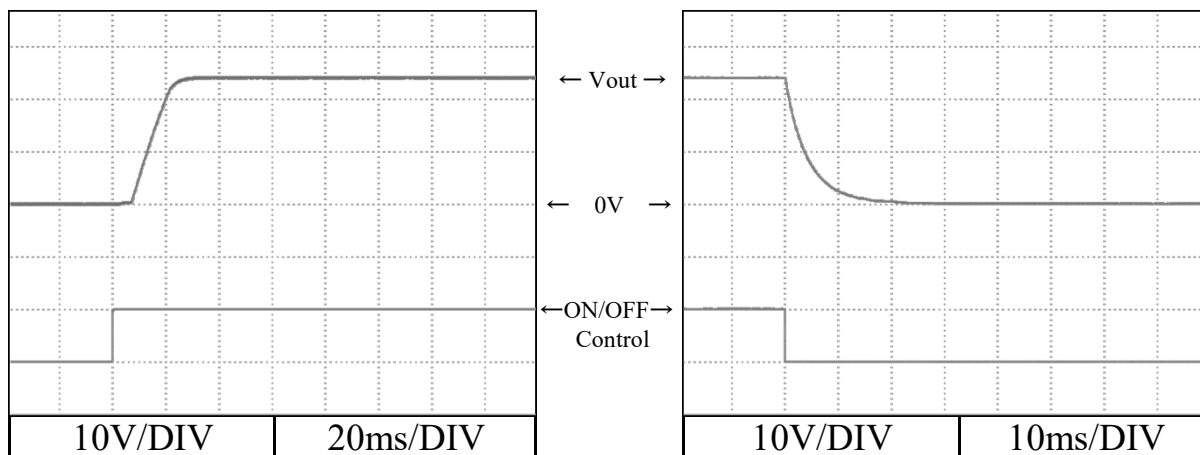
5V



12V



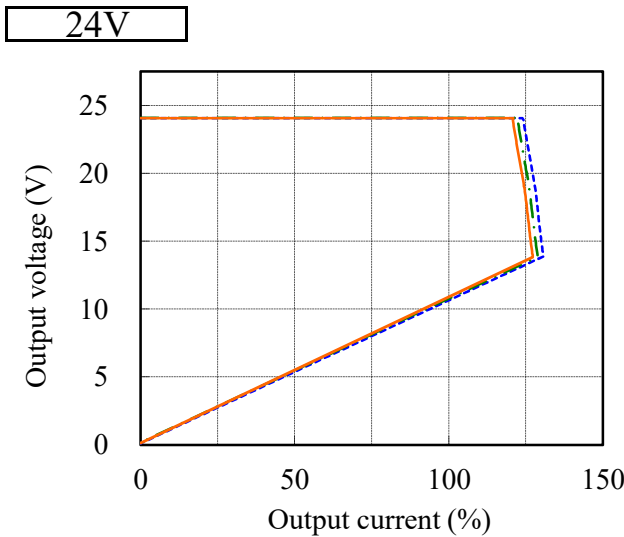
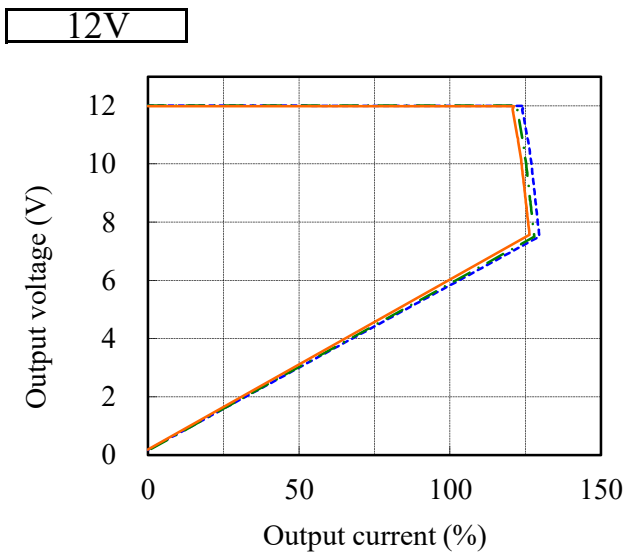
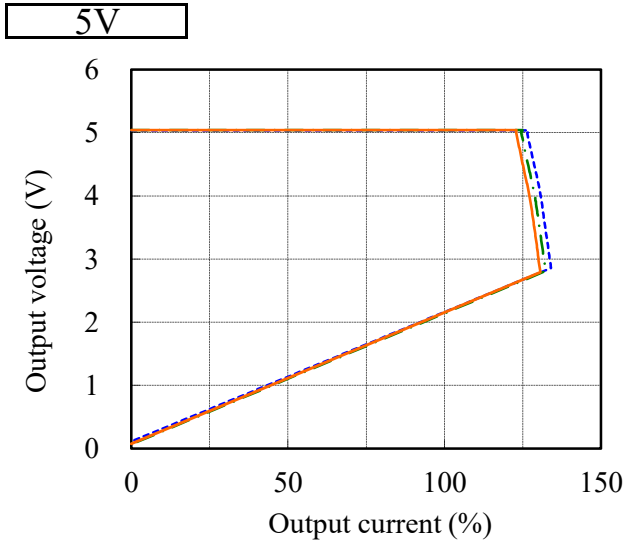
24V



2.7 過電流保護特性

Over current protection (OCP) characteristics

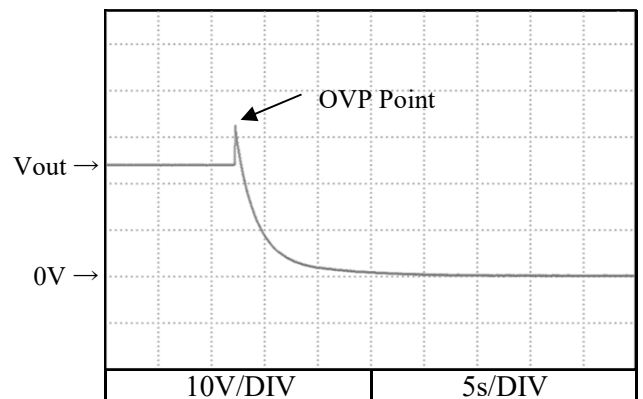
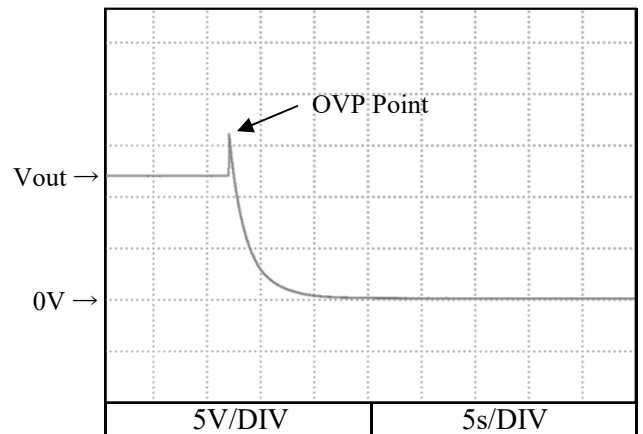
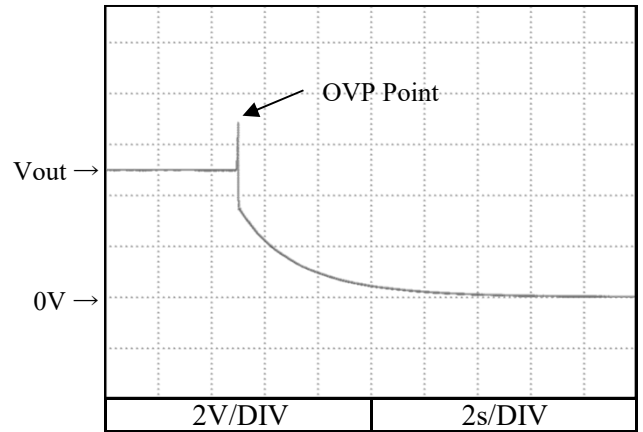
Conditions V_{in} : 100 VAC
 T_a : -10 °C ---
 25 °C - - -
 50 °C ———



2.8 過電圧保護特性

Over voltage protection (OVP) characteristics

Conditions V_{in} : 100 VAC
 I_{out} : 0 %
 T_a : 25 °C

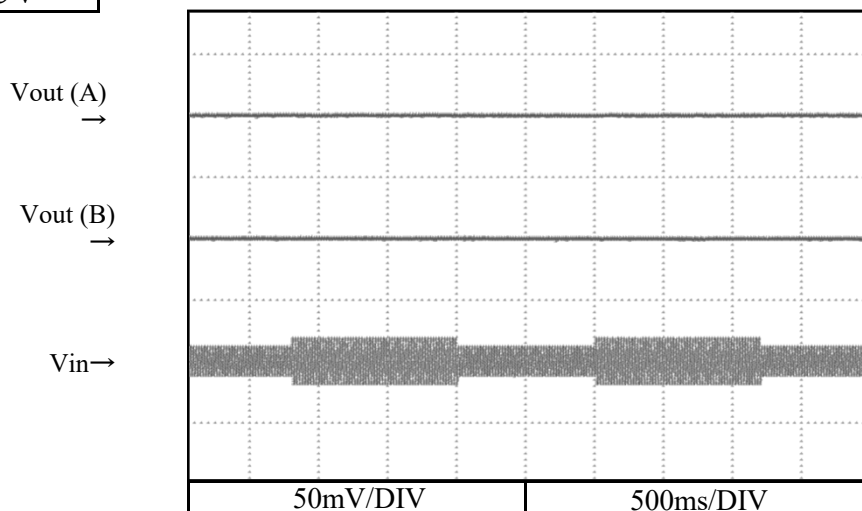


2.9 過渡応答 (入力急変) 特性

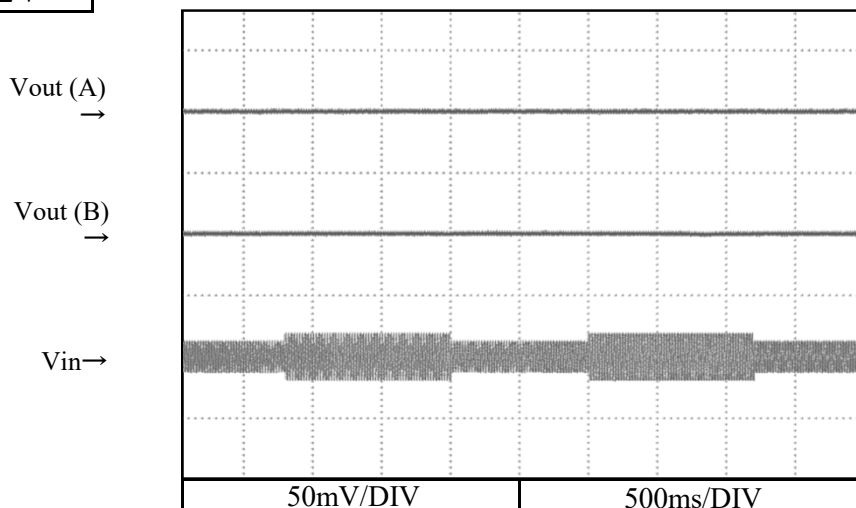
Dynamic line response characteristics

Conditions Vin : 85 VAC \longleftrightarrow 132VAC (A)
 170 VAC \longleftrightarrow 265VAC (B)
 Iout : 100 %
 Ta : 25 °C

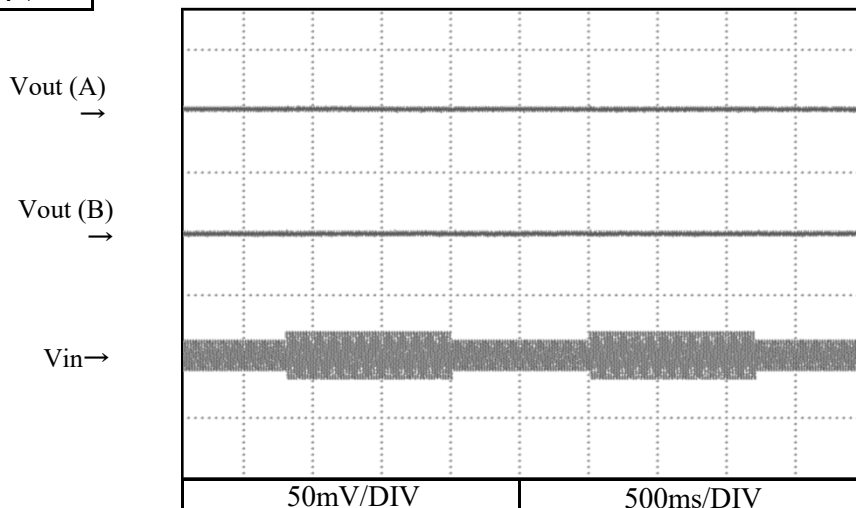
5V



12V



24V

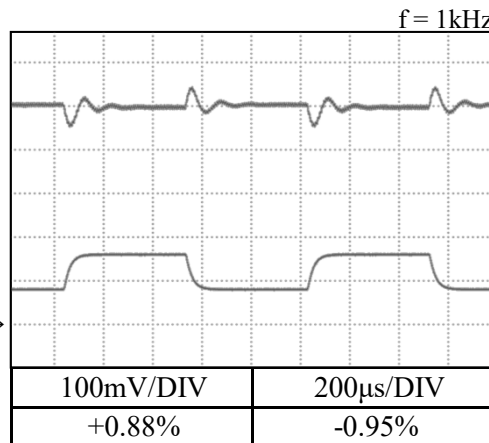
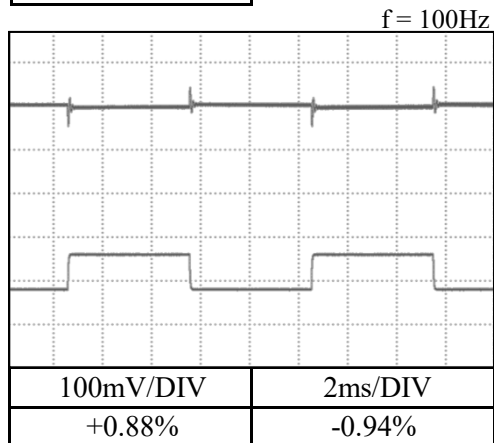


2.10 過渡応答（負荷急変）特性

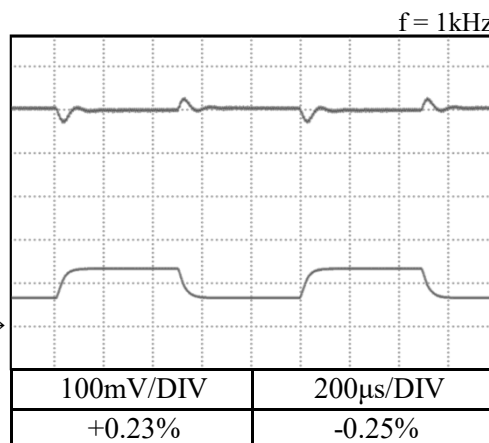
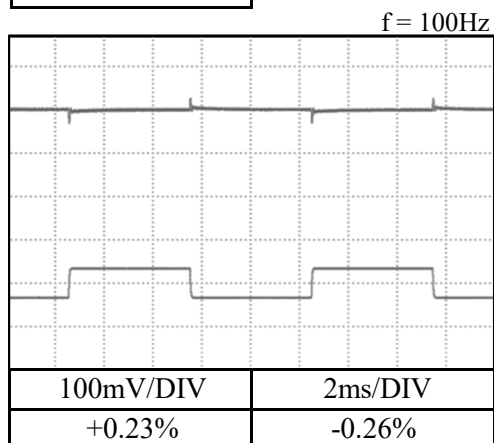
Dynamic load response characteristics

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

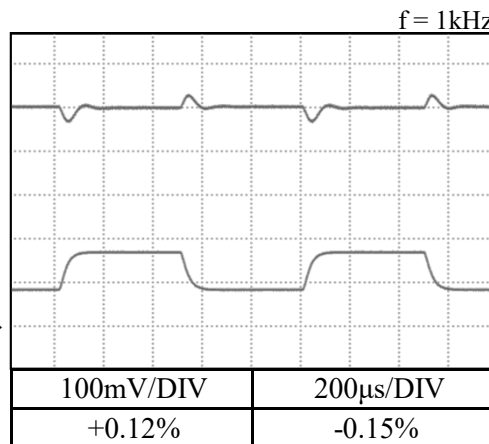
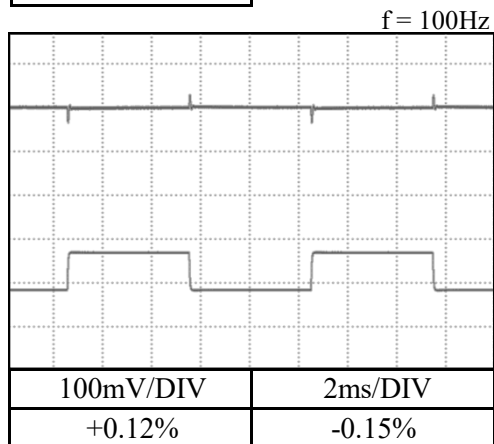
5V



12V



24V



2.11 入力電圧瞬停特性

Response to brown out characteristics

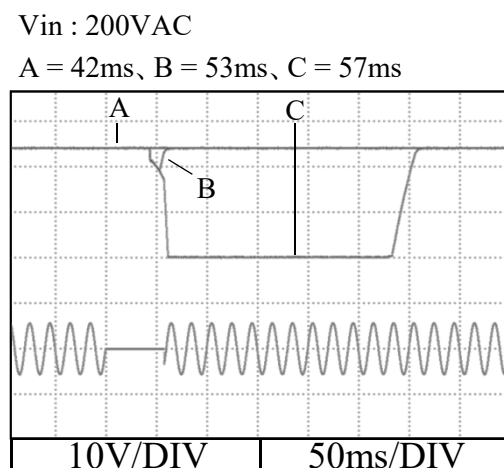
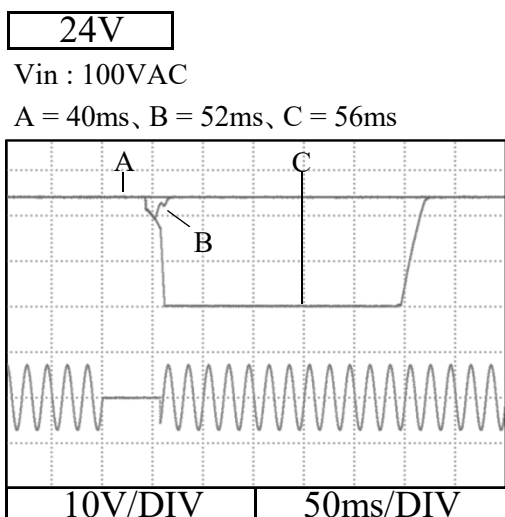
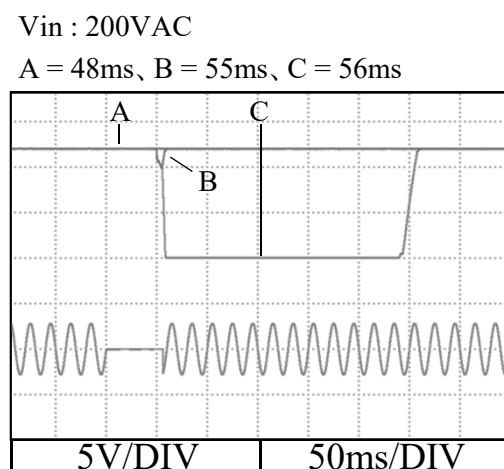
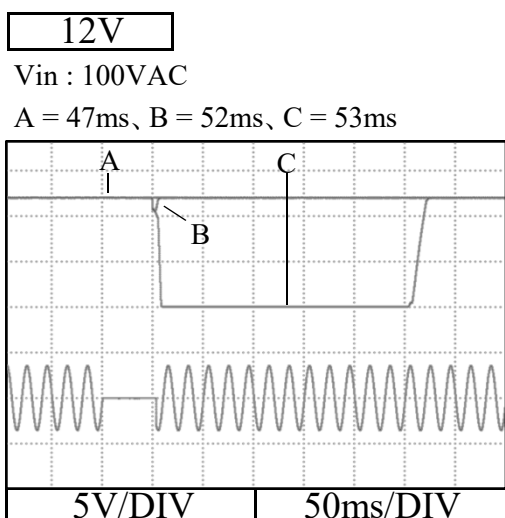
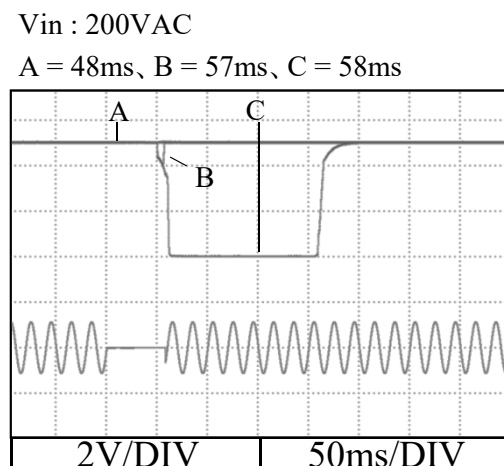
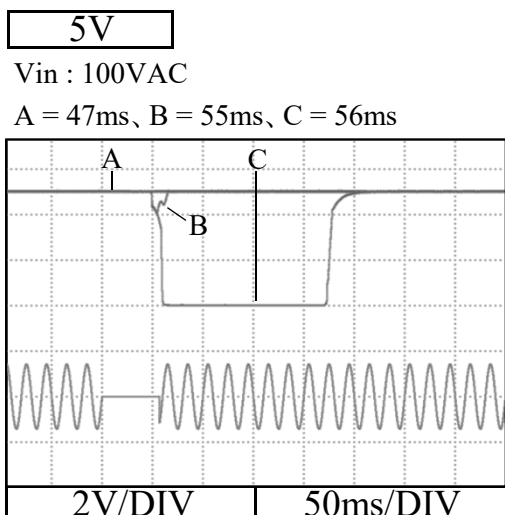
Conditions Iout : 100 %
Ta : 25 °C

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.

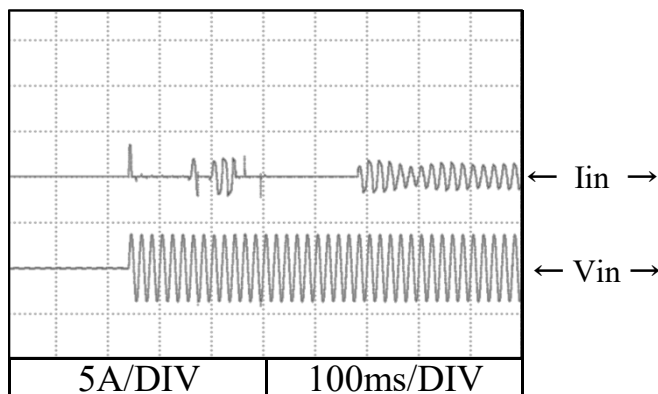


2.12 入力サージ電流（突入電流）波形
Inrush current waveform

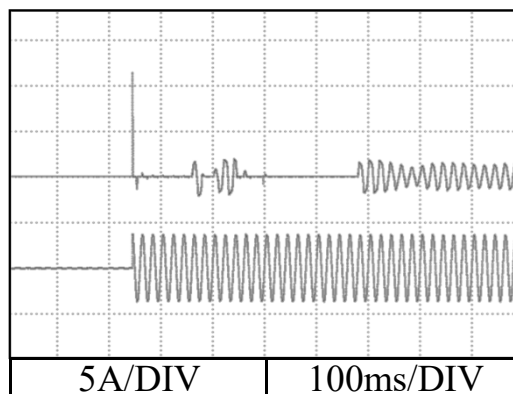
5V

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

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

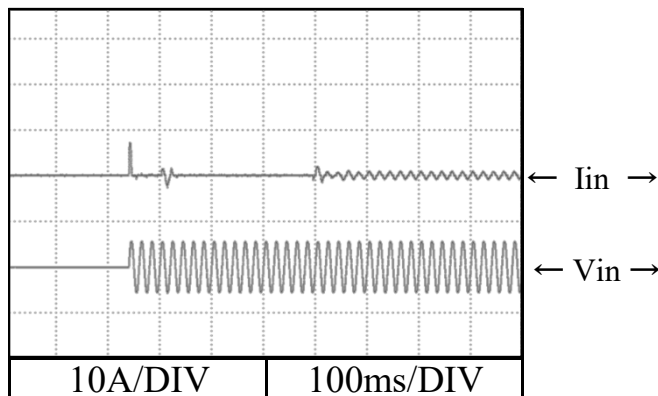


Switch on phase angle of input AC voltage
 $\phi = 90^\circ$

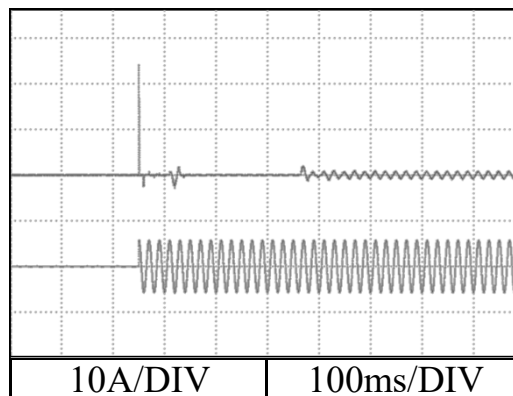


Conditions Vin : 200 VAC
Iout : 100 %
Ta : 25 °C

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



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



2.13 高調波成分

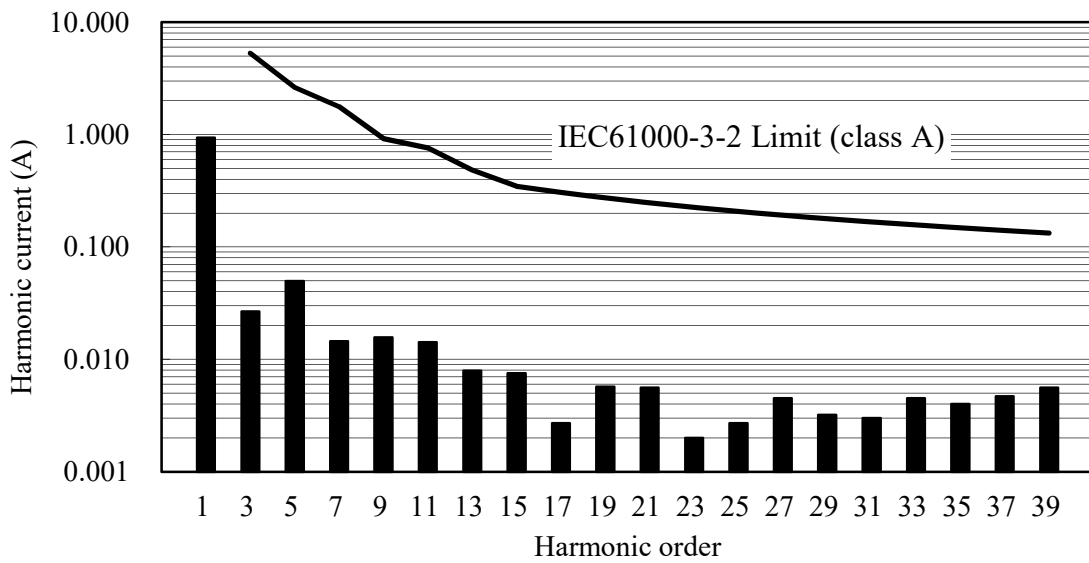
Input current harmonics

Conditions Iout : 100 %

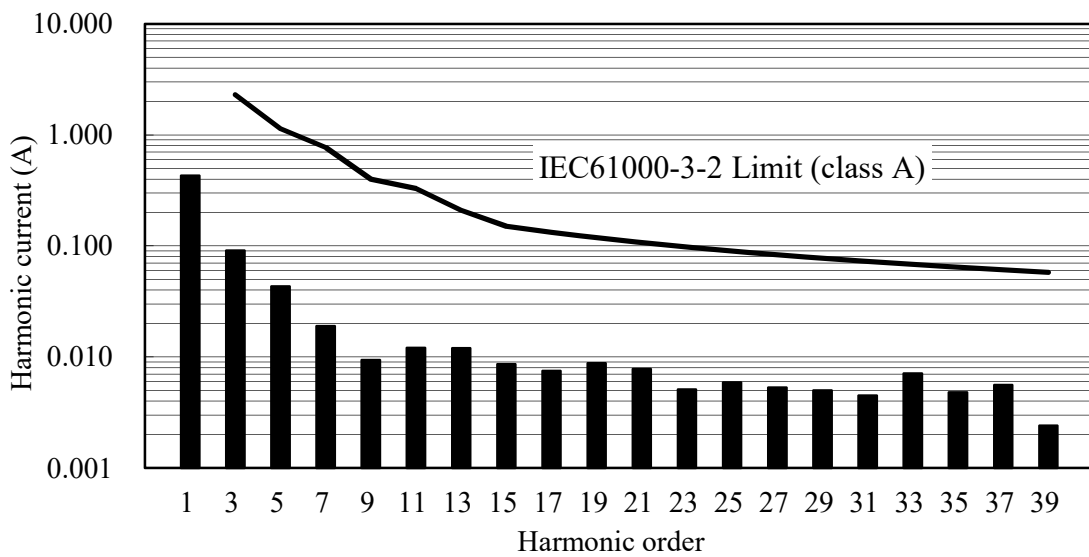
Ta : 25 °C

5V

Vin : 100 VAC



Vin : 230 VAC

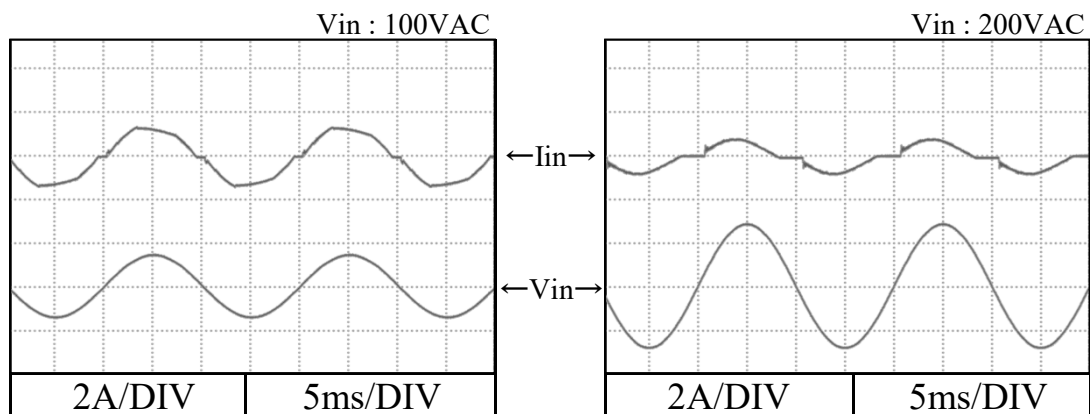


2.14 入力電流波形

Input current waveform

Conditions Iout : 100 %

Ta : 25 °C



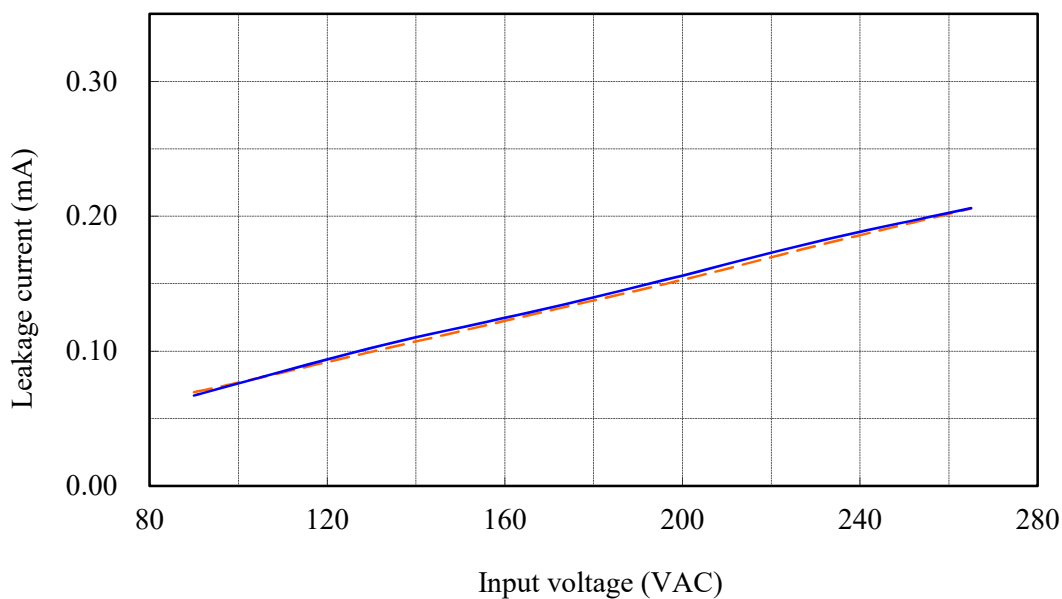
2.15 リーク電流特性

Leakage current characteristics

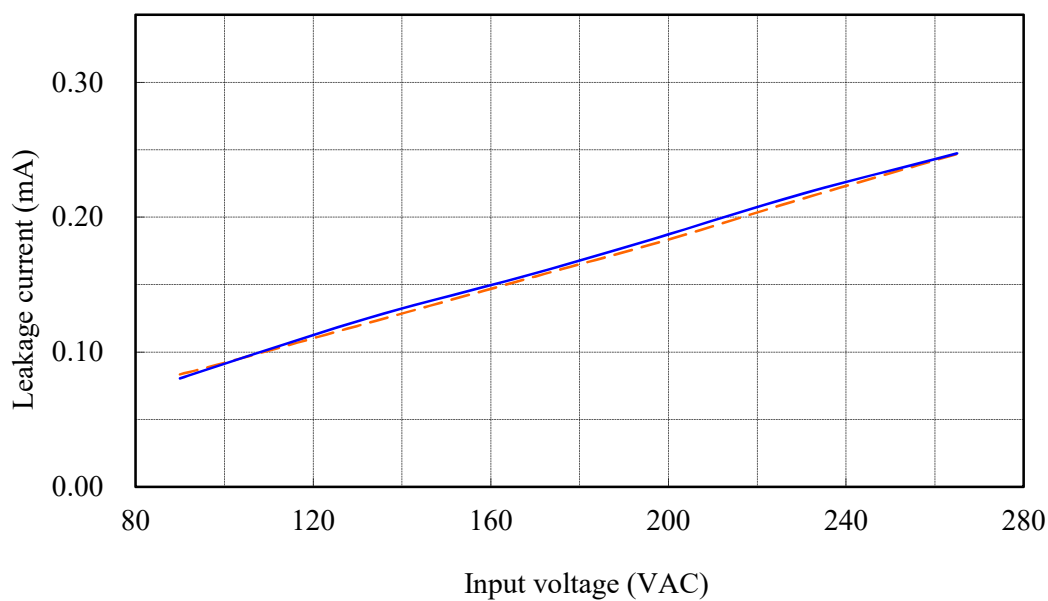
Conditions Iout : 0 % —
 100 % - - -
 Ta : 25 °C
Equipment used : 3156 (HIOKI)

5V

f: 50 Hz



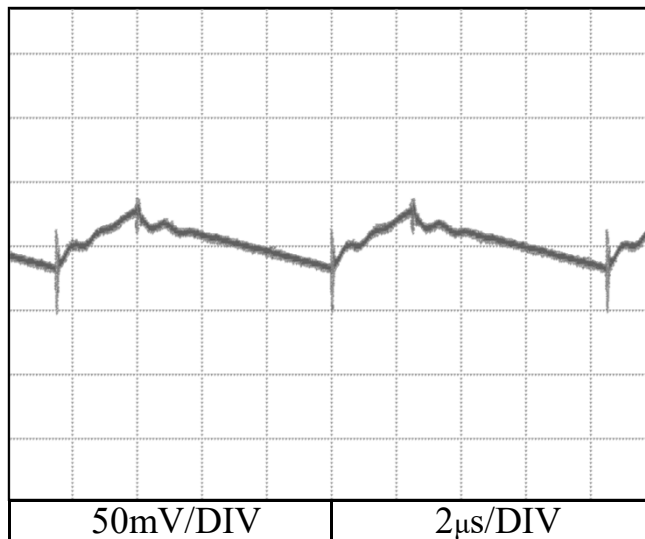
f: 60 Hz



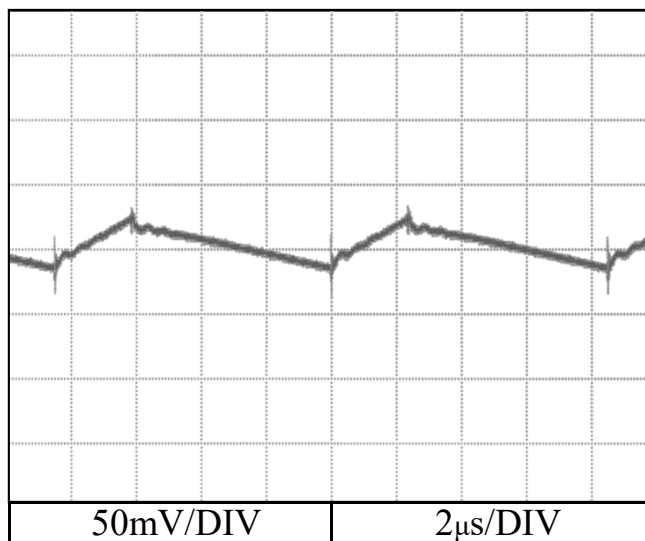
2.16 出力リップル、ノイズ波形 Output ripple and noise waveform

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

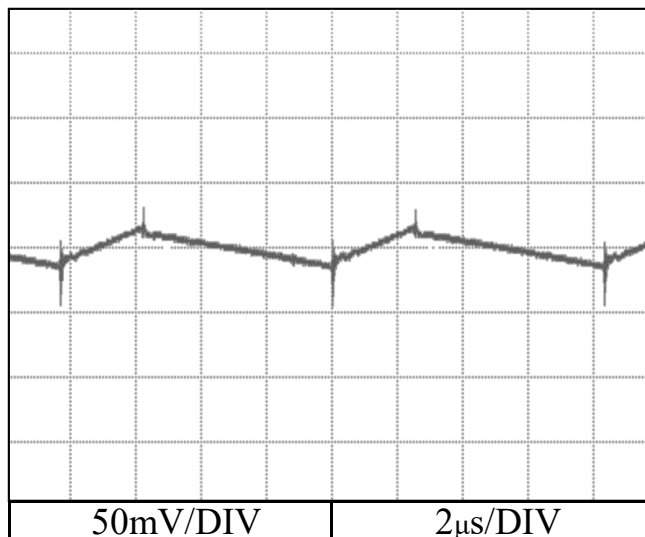
5V



12V



24V



2.17 リモートコントロールOFF時入力電力・入力電流対入力電圧

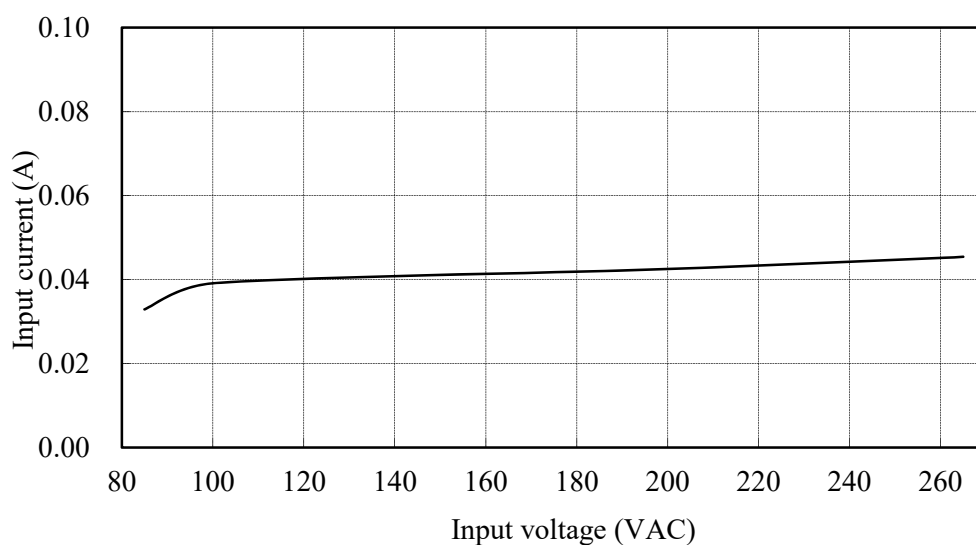
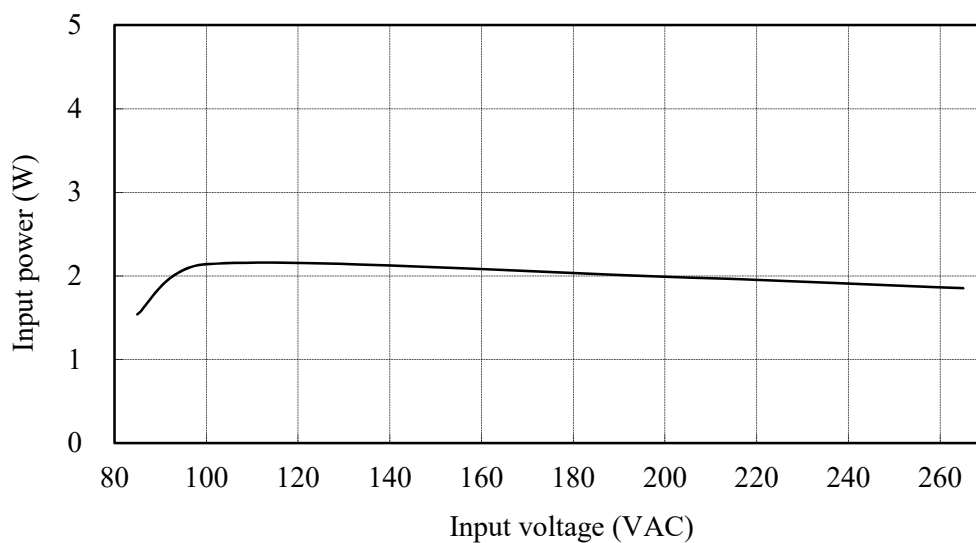
Input power and Input current vs. Input voltage with Remote control OFF

標準品 HWS80A-*/R にて対応

For alternative standard model HWS80A-*/R

Condition Ta : 25 °C

5V



2.18 EMI 特性

Electro-Magnetic Interference characteristics

Conditions Vin : 230 VAC

Iout : 100 %

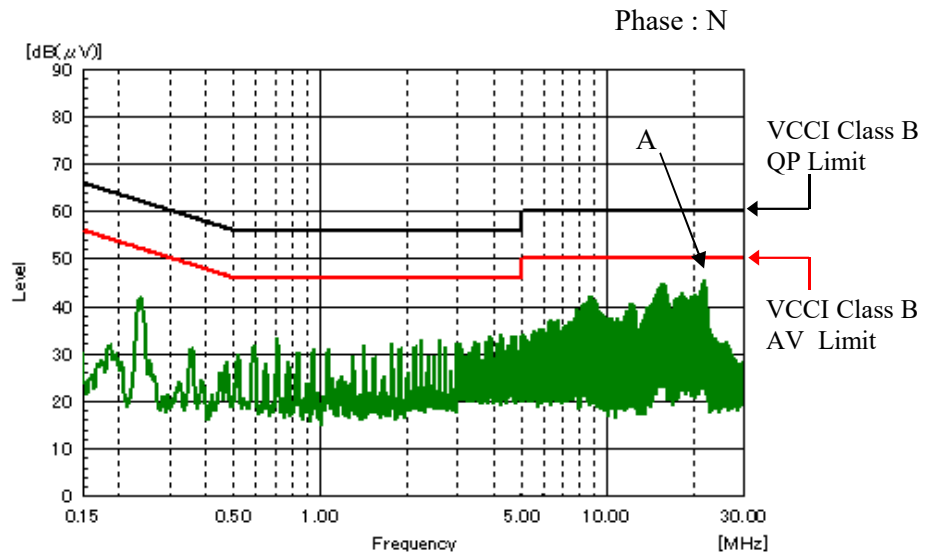
Ta : 25 °C

雑音端子電圧

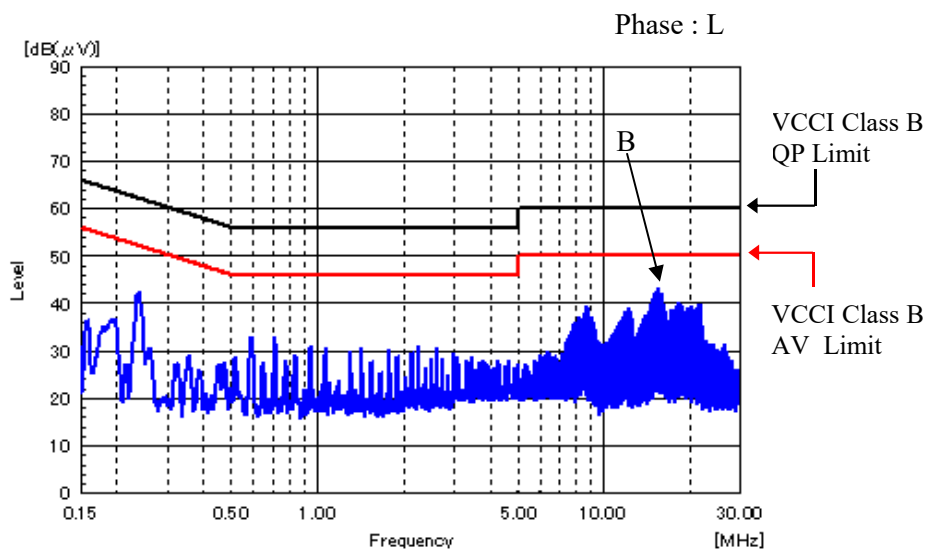
Conducted Emission

5V

Point A (22MHz)		
Ref. Data	Limit (dB)	Measure (dB)
QP	60.0	44.1
AV	50.0	42.4



Point B (15MHz)		
Ref. Data	Limit (dB)	Measure (dB)
QP	60.0	41.7
AV	50.0	38.2



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.

2.18 EMI 特性

Electro-Magnetic Interference characteristics

Conditions Vin : 230 VAC

Iout : 100 %

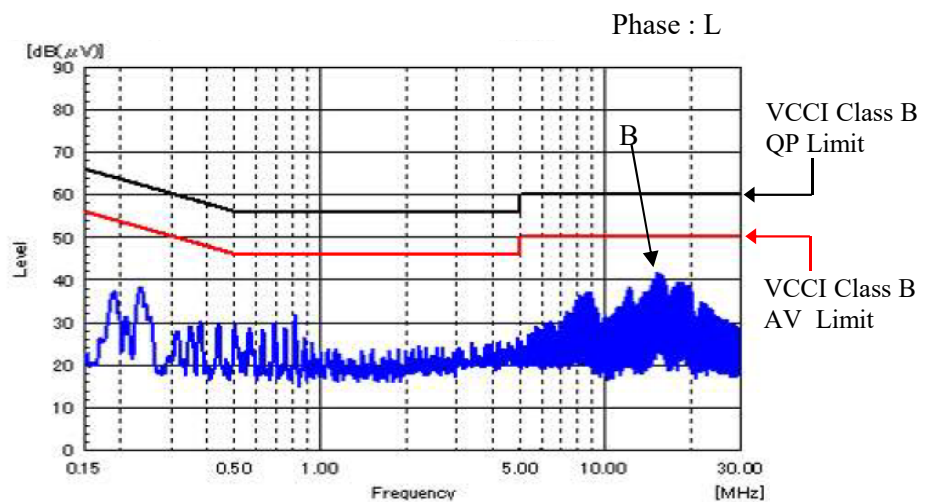
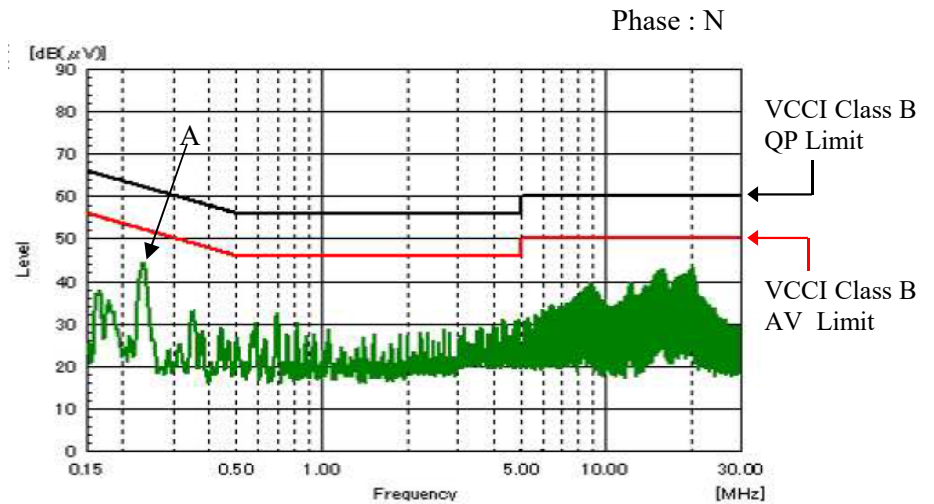
Ta : 25 °C

雑音端子電圧

Conducted Emission

12V

Point A (235kHz)		
Ref. Data	Limit (dB)	Measure (dB)
QP	62.3	42.9
AV	52.3	41.6



Point B (15MHz)		
Ref. Data	Limit (dB)	Measure (dB)
QP	60.0	39.5
AV	50.0	37.1

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.

2.18 EMI 特性

Electro-Magnetic Interference characteristics

Conditions Vin : 230 VAC

Iout : 100 %

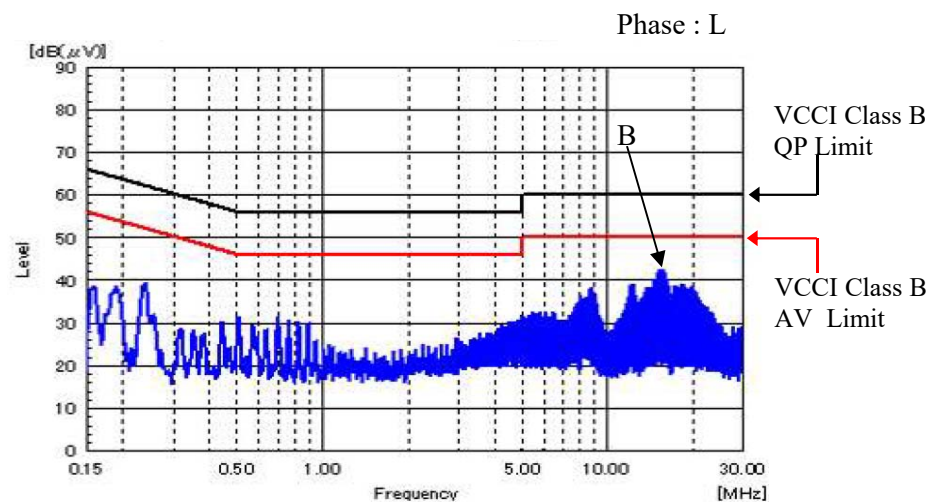
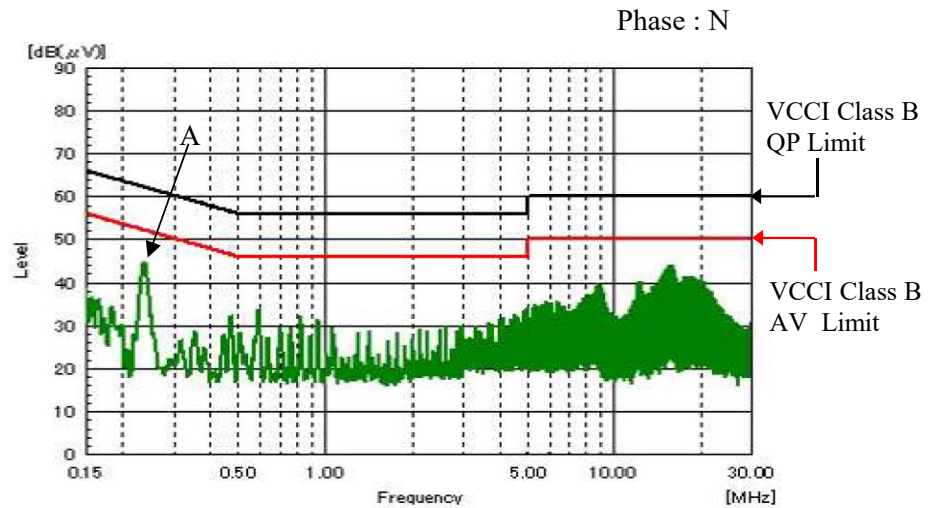
Ta : 25 °C

雑音端子電圧

Conducted Emission

24V

Point A (238kHz)		
Ref. Data	Limit (dB)	Measure (dB)
QP	62.2	43.0
AV	52.2	40.1



Point B (15MHz)		
Ref. Data	Limit (dB)	Measure (dB)
QP	60.0	41.5
AV	50.0	39.9

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.

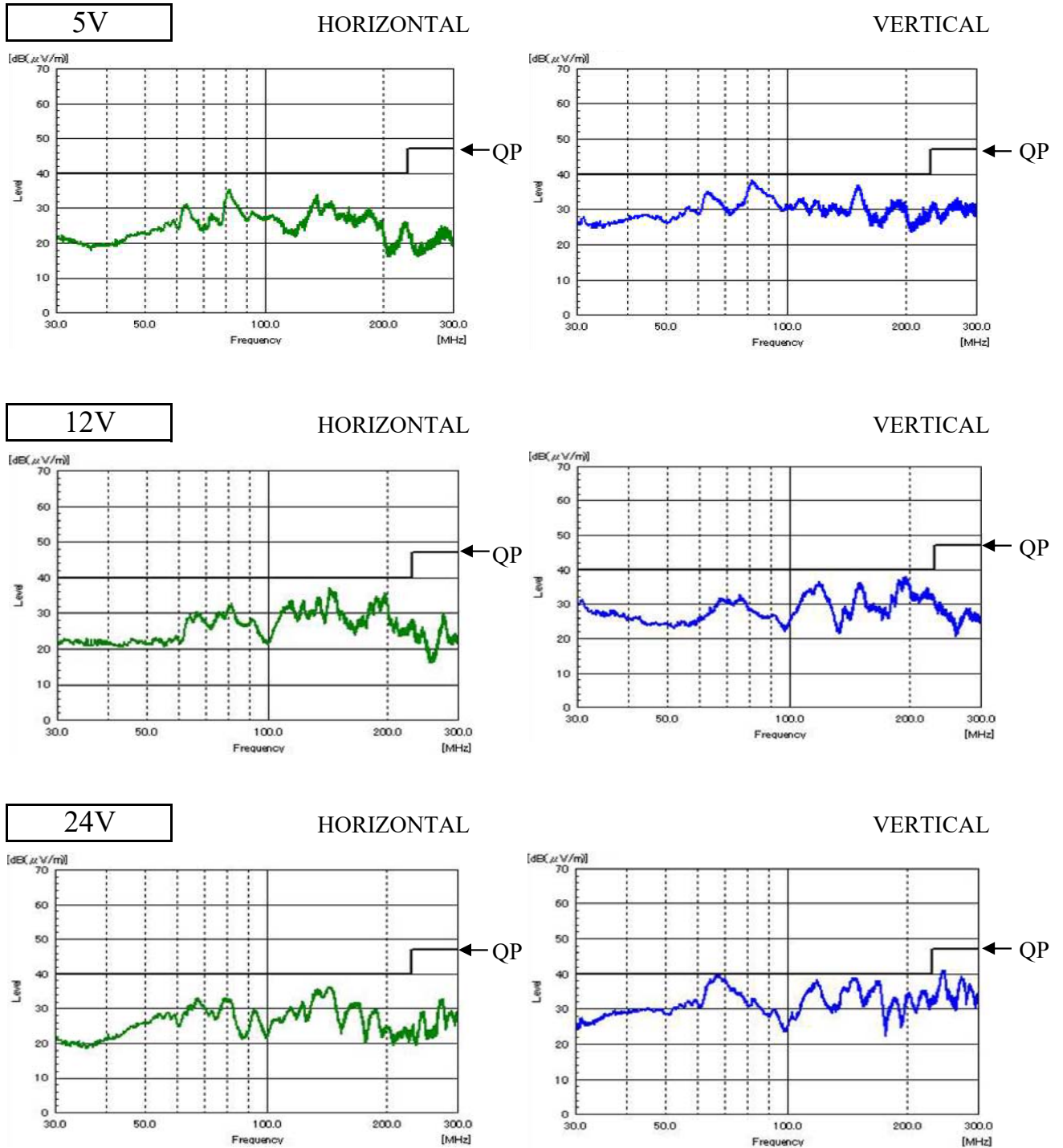
2.18 EMI 特性

Electro-Magnetic Interference characteristics

Conditions Vin : 230 VAC
Iout : 100 %
Ta : 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.