

# DRJ50

# 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

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### 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

※ 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。

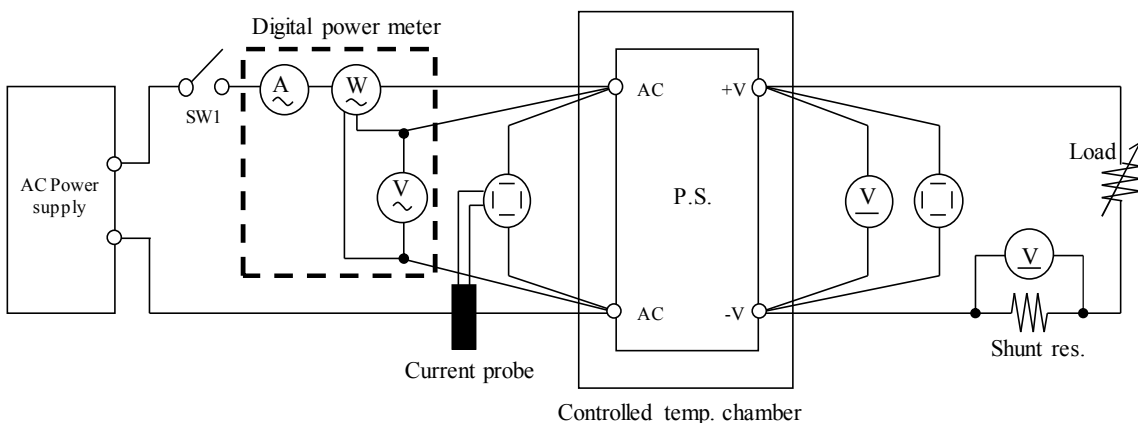
Test results are reference data based on our measurement condition.

1. 測定方法 Evaluation Method

1.1 測定回路 Circuit used for determination

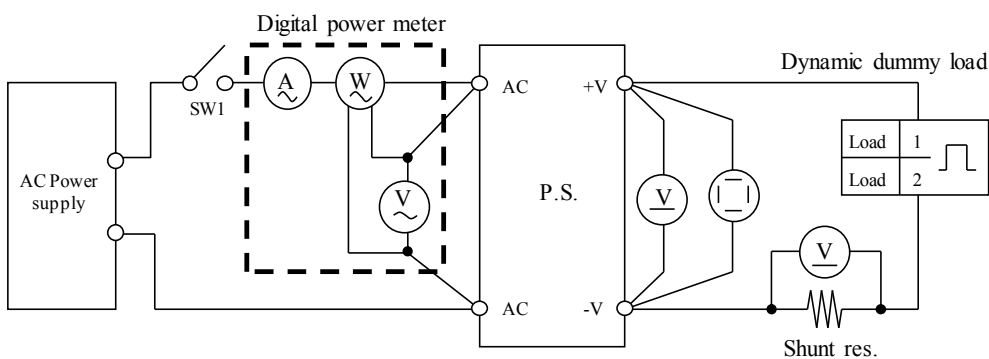
測定回路1 Circuit 1 used for determination

- 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 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
- 高調波成分 Input current harmonics

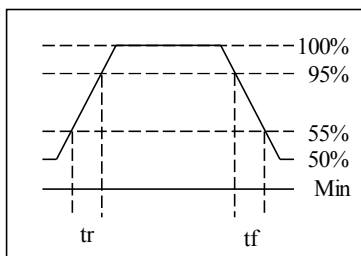


測定回路2 Circuit 2 used for determination

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

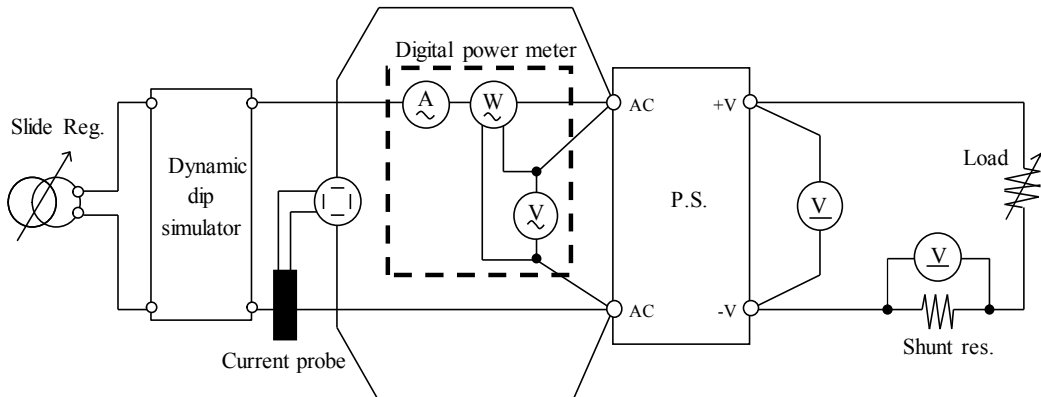


Output current waveform  
Iout 50%  $\longleftrightarrow$  100%



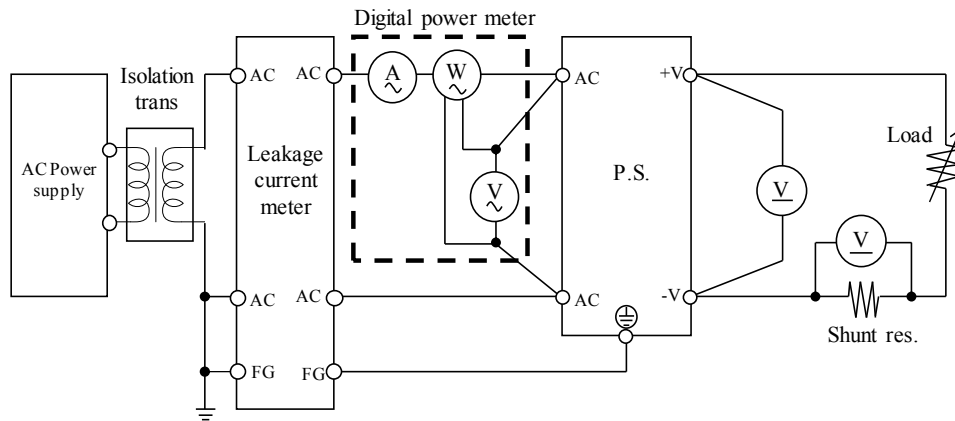
測定回路3 Circuit 3 used for determination

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



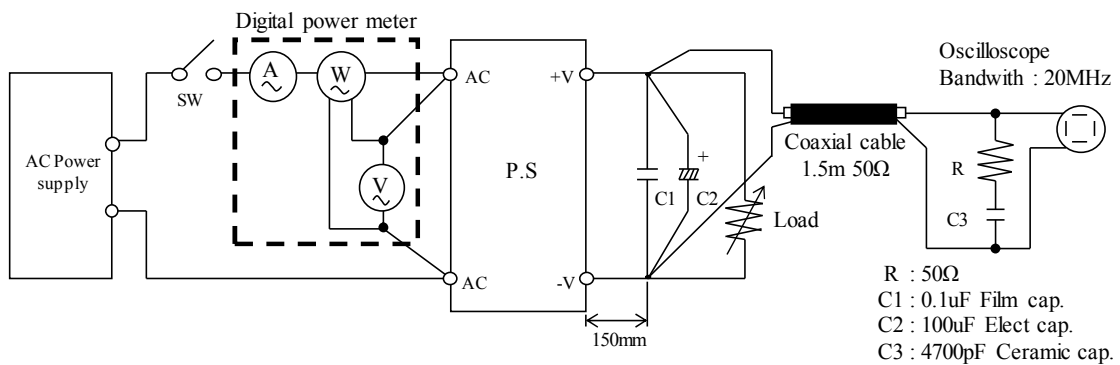
測定回路4 Circuit 4 used for determination

・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

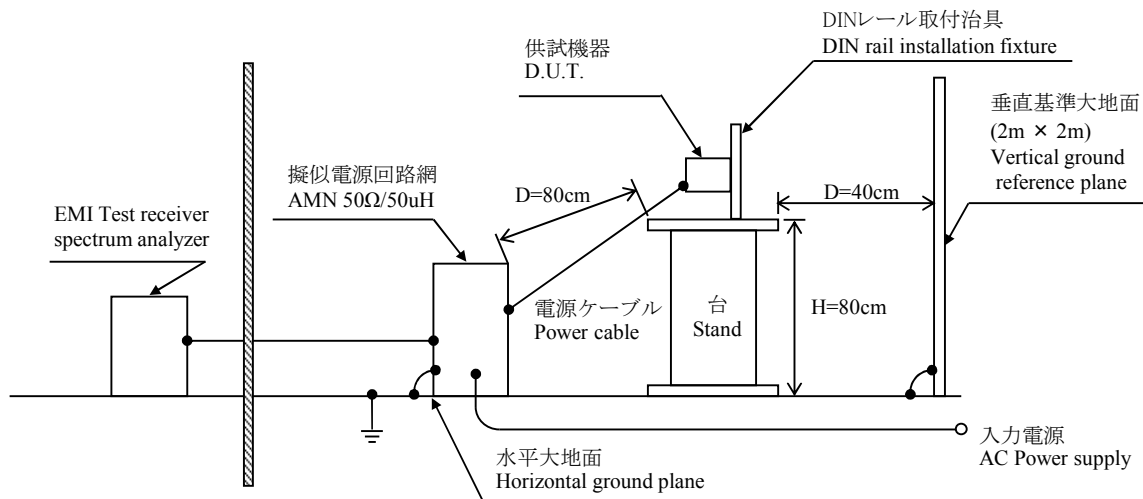


### 測定構成 Configuration used for determination

• EMI特性 Electro-Magnetic Interference characteristics

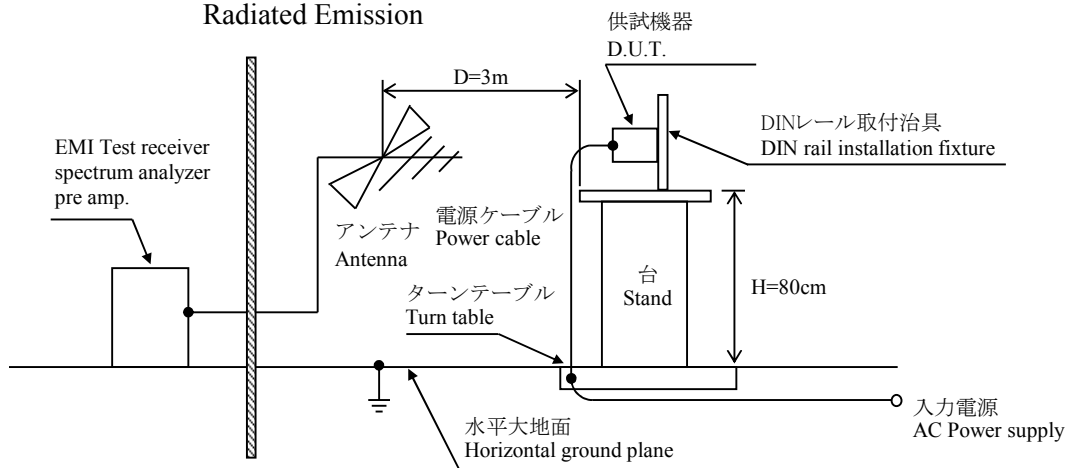
(a) 雑音端子電圧 (帰還ノイズ)

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 / DL1740EL
2	DIGITAL MULTIMETER	AGILENT	34970A
3	DIGITAL POWER METER	YOKOGAWA ELECT.	WT210
4	CURRENT PROBE	YOKOGAWA ELECT.	701928 / 701930
5	DYNAMIC DUMMY LOAD	TAKASAGO	FK-200L / FK-400L
6	DYNAMIC DUMMY LOAD	KIKUSUI	PLZ150U
7	DUMMY LOAD	PCN	PHF250 SERIES
8	ISOLATION TRANS	MATSUNAGA	3WTC-50K
9	CVCF	TAKASAGO	AA2000XG
10	CVCF	KIKUSUI	PCR4000L
11	CVCF	NF	ES10000S
12	LEAKAGE CURRENT METER	HIOKI	3156
13	DYNAMIC DIP SIMULATOR	TAKAMISAWA	PSA-210
14	CONTROLLED TEMP. CHAMBER	ESPEC	PL-1KP / SH-240
15	EMI TEST RECEIVER / SPECTRUM ANALYZER	ROHDE & SCHWARZ	ESCI
16	PRE AMP.	SONOMA	310N
17	AMN	SCHWARZBECK	NNLK8121
18	ANTENNA	SCHWARZBECK	CBL6111D
19	HARMONIC / FLICKER ANALYZER	KIKUSUI	KHA1000
20	SINGLE-PHASE MASTER	NF	4420
21	REFERENCE IMPEDANCE NETWORK 20A	NF	4150
22	MULTI OUTLET UNIT	KIKUSUI	OT01-KHA

## 1.3 評価負荷条件 Load conditions

\*入力電圧が90VAC未満の場合、下記のとおり出力ディレーティングが必要です。  
Output derating is needed when input voltage is less than 90VAC.

Output voltage : 12V, 24V

Vin	Iout : Full load	12V	24V
90 - 265VAC	100%	3.4A	2.1A
85VAC	80%	2.72A	1.68A

## 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

12V

## 1. Regulation - line and load

Condition Ta : 25 °C

Iout \ Vin	90VAC	100VAC	230VAC	265VAC	line regulation	
0%	12.039V	12.039V	12.040V	12.040V	1mV	0.008%
50%	12.030V	12.030V	12.030V	12.030V	0mV	0.000%
100%	12.024V	12.024V	12.024V	12.024V	0mV	0.000%
load regulation	15mV	15mV	16mV	16mV		
	0.125%	0.125%	0.133%	0.133%		

## 2. Temperature drift

Conditions Vin : 100 VAC

Iout : 100 %

Ta	-10°C	+25°C	+55°C	temperature stability	
Vout	12.006V	12.024V	12.017V	18mV	0.150%

## 3. Start up voltage and Drop out voltage

Conditions Ta : 25 °C

Iout : 100 %

Start up voltage (Vin)	71VAC
Drop out voltage (Vin)	54VAC

24V

## 1. Regulation - line and load

Condition Ta : 25 °C

Iout \ Vin	90VAC	100VAC	230VAC	265VAC	line regulation	
0%	24.029V	24.029V	24.030V	24.030V	1mV	0.004%
50%	24.020V	24.021V	24.021V	24.020V	1mV	0.004%
100%	24.014V	24.014V	24.014V	24.014V	0mV	0.000%
load regulation	15mV	15mV	16mV	16mV		
	0.063%	0.063%	0.067%	0.067%		

## 2. Temperature drift

Conditions Vin : 100 VAC

Iout : 100 %

Ta	-10°C	+25°C	+55°C	temperature stability	
Vout	24.038V	24.014V	23.989V	49mV	0.204%

## 3. Start up voltage and Drop out voltage

Conditions Ta : 25 °C

Iout : 100 %

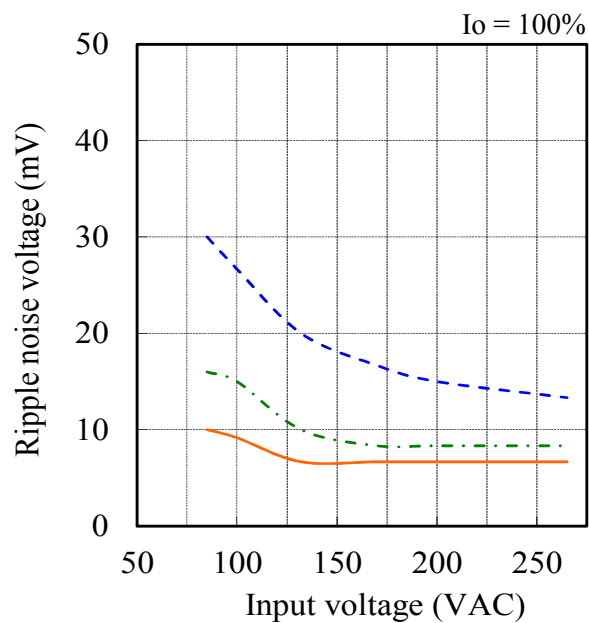
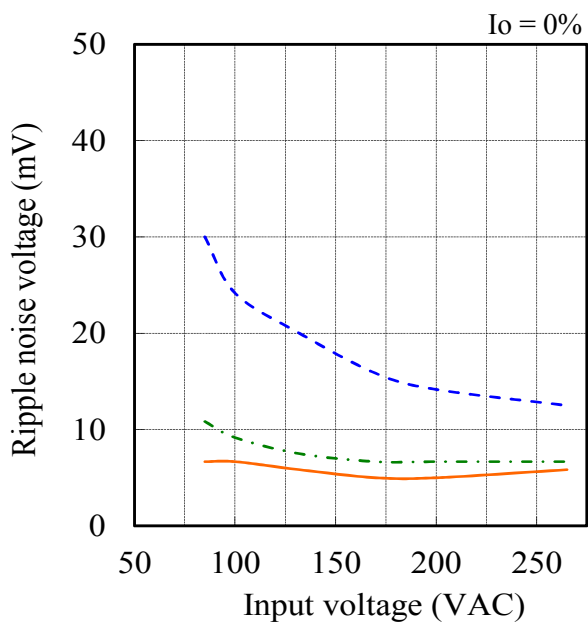
Start up voltage (Vin)	66VAC
Drop out voltage (Vin)	62VAC



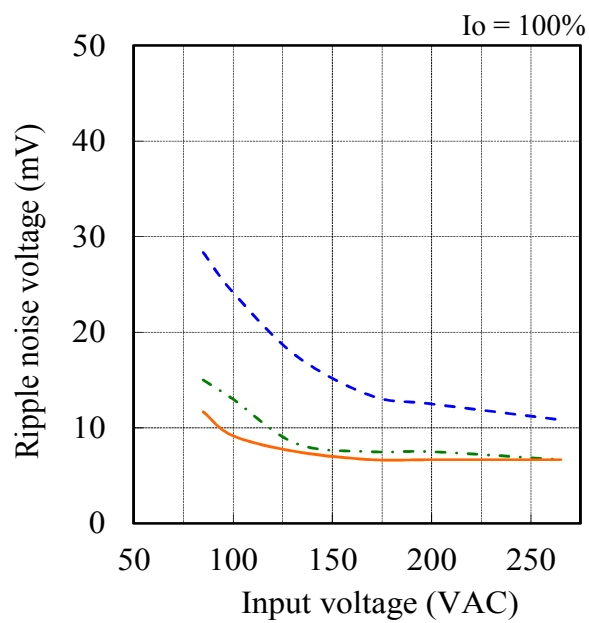
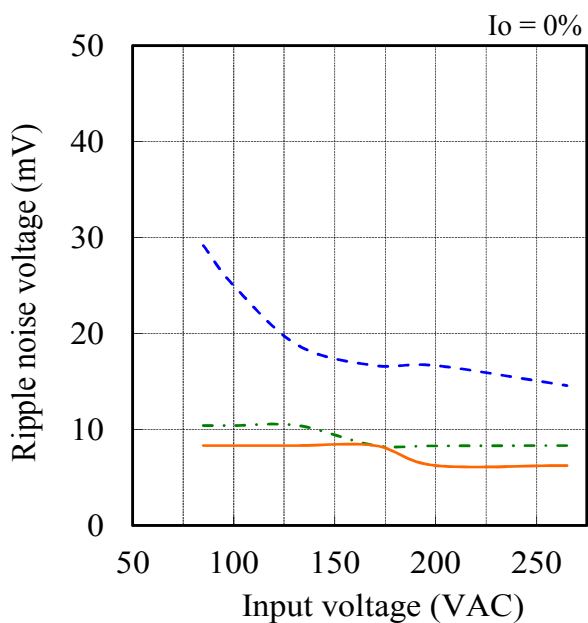
(2) リップルノイズ電圧対入力電圧  
Ripple noise voltage vs. Input voltage

Conditions Ta : -10 °C ---  
25 °C - · - · -  
55 °C —

12V

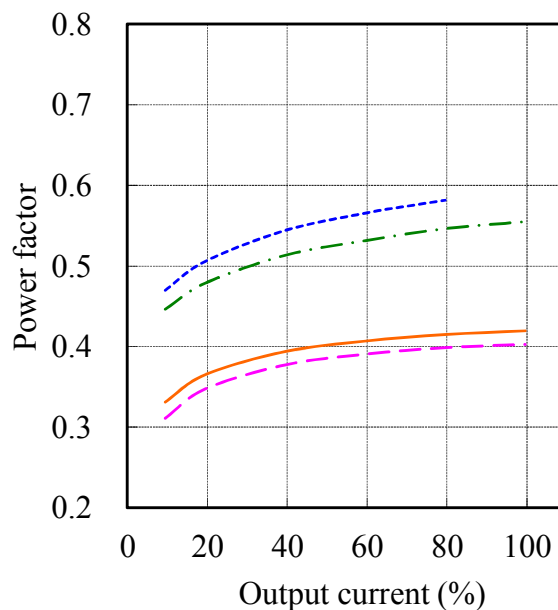
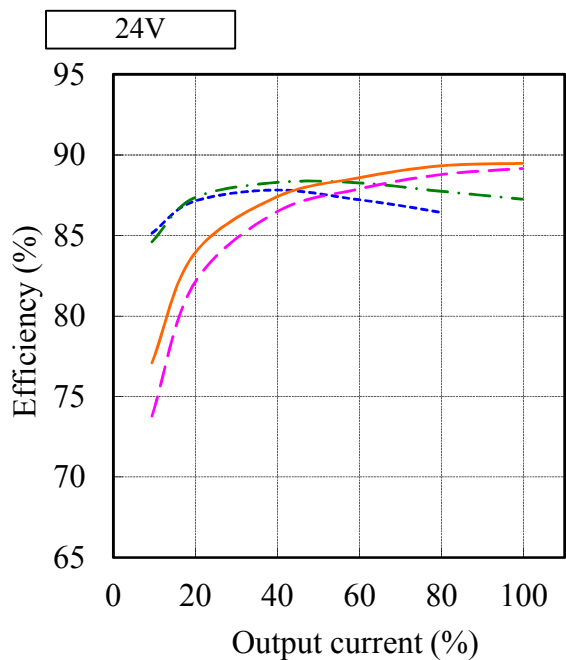
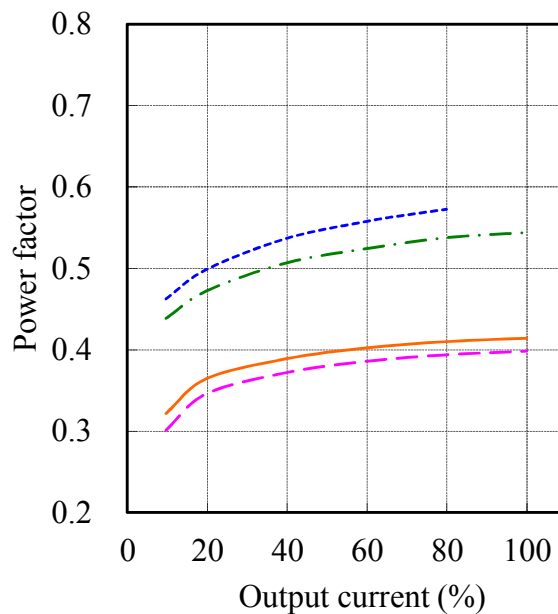
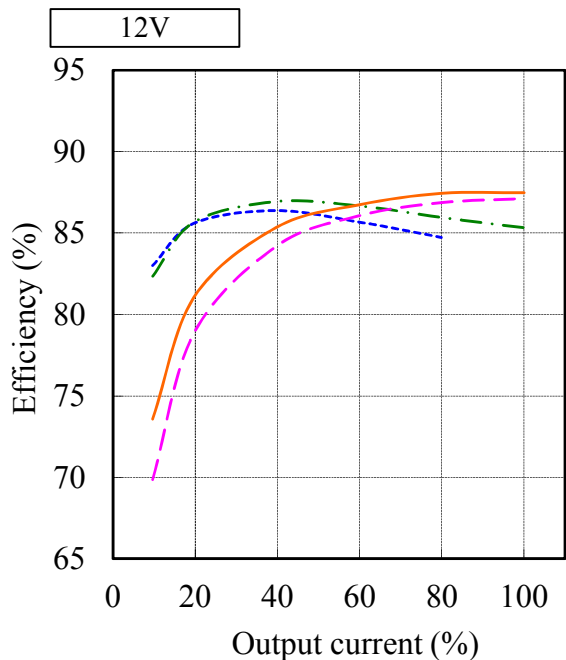


24V



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

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

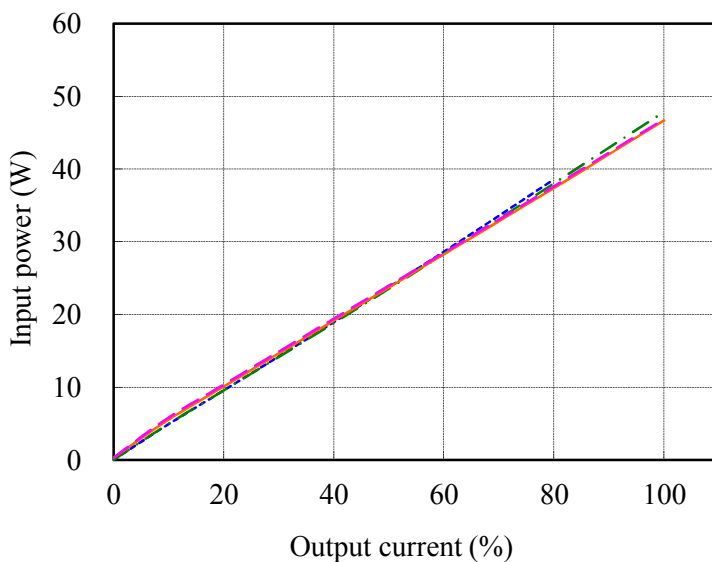


(4) 入力電力対出力電流  
Input power vs. Output current

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

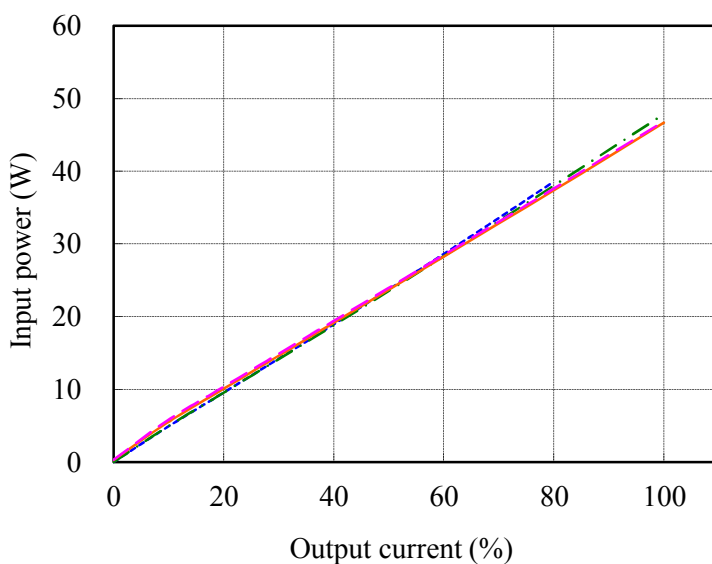
12V

Vin	Input power
	Iout : 0%
85VAC	0.31W
100VAC	0.27W
230VAC	0.29W
265VAC	0.34W



24V

Vin	Input power
	Iout : 0%
85VAC	0.35W
100VAC	0.31W
230VAC	0.36W
265VAC	0.41W

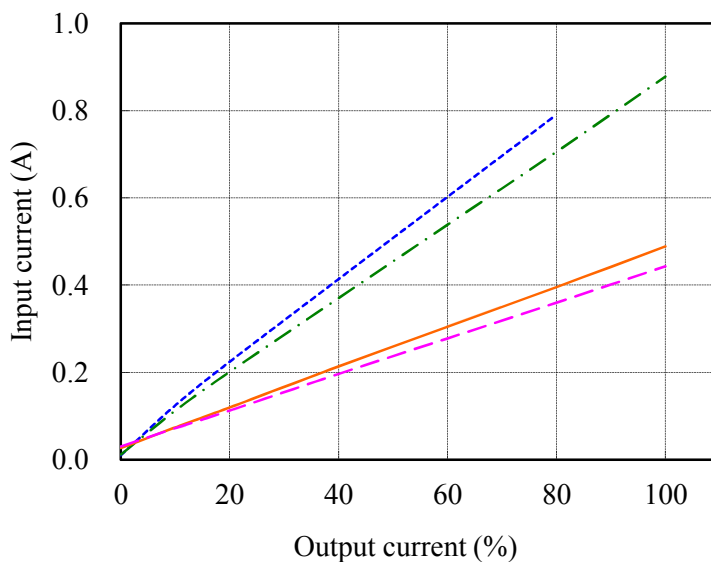


(5) 入力電流対出力電流  
Input current vs. Output current

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

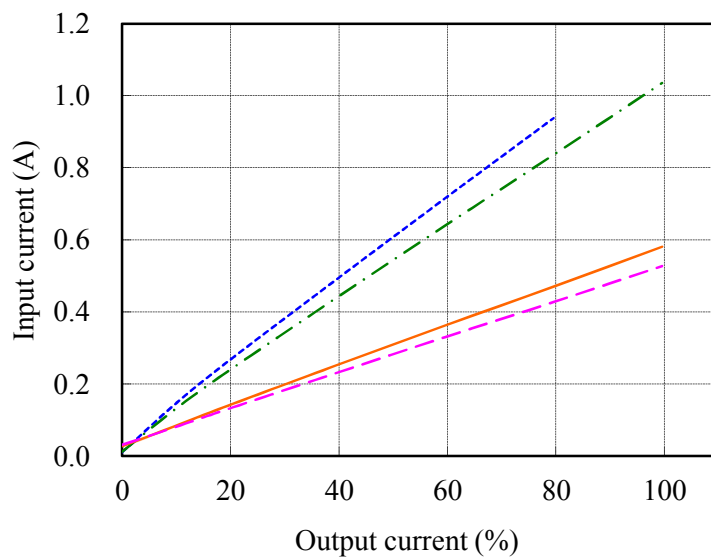
12V

Vin	Input current
	Iout : 0%
85VAC	0.014A
100VAC	0.013A
230VAC	0.024A
265VAC	0.027A



24V

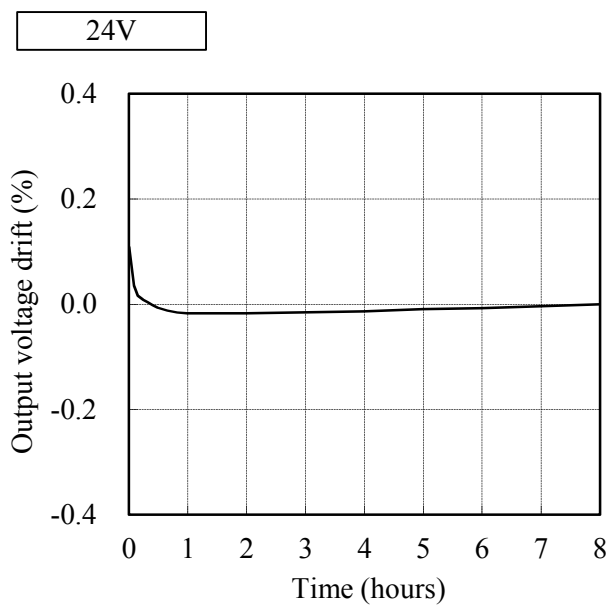
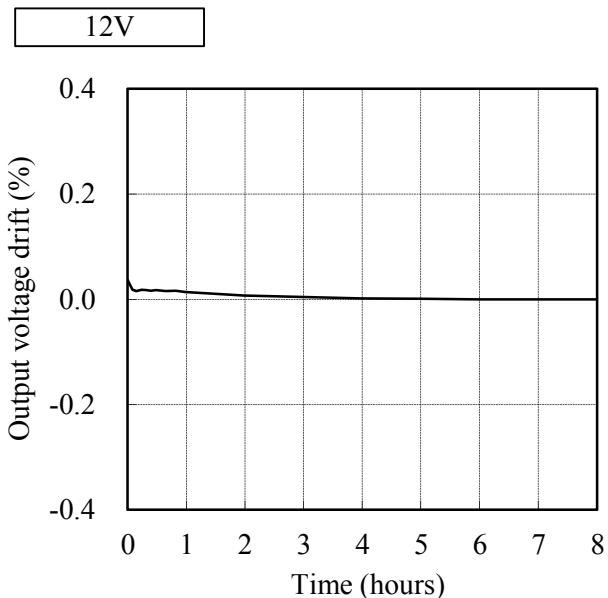
Vin	Input current
	Iout : 0%
85VAC	0.015A
100VAC	0.014A
230VAC	0.024A
265VAC	0.028A



2.2 通電ドリフト特性

Warm up voltage drift characteristics

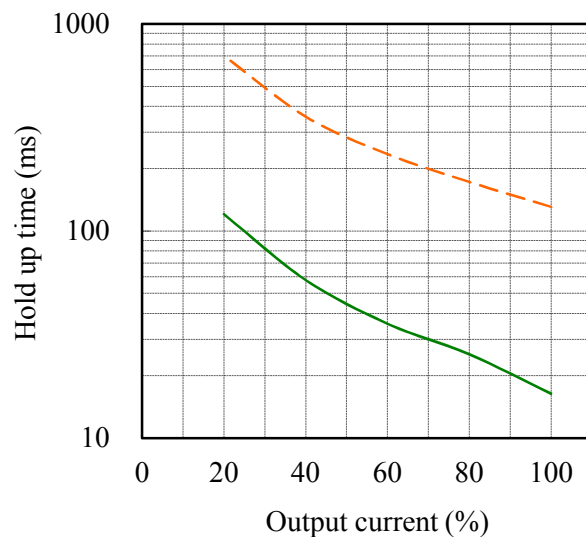
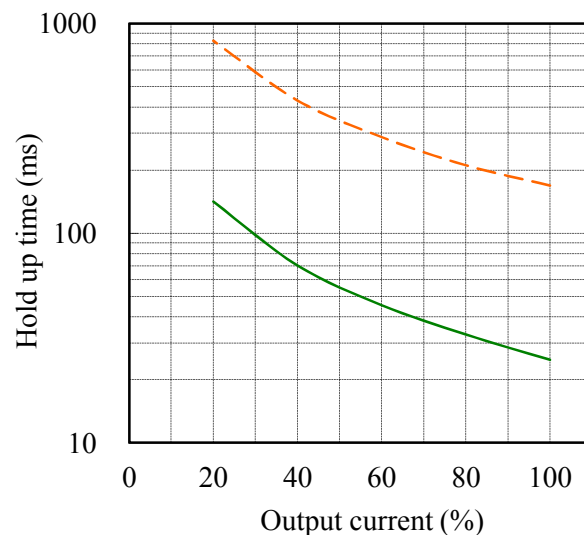
Conditions Vin : 100 VAC  
Iout : 100 %  
Ta : 25 °C



2.3 出力保持時間特性

Hold up time characteristics

Conditions Vin : 100 VAC ———  
230 VAC - - - -  
Ta : 25 °C



2.4 出力立ち上がり特性

Output rise characteristics

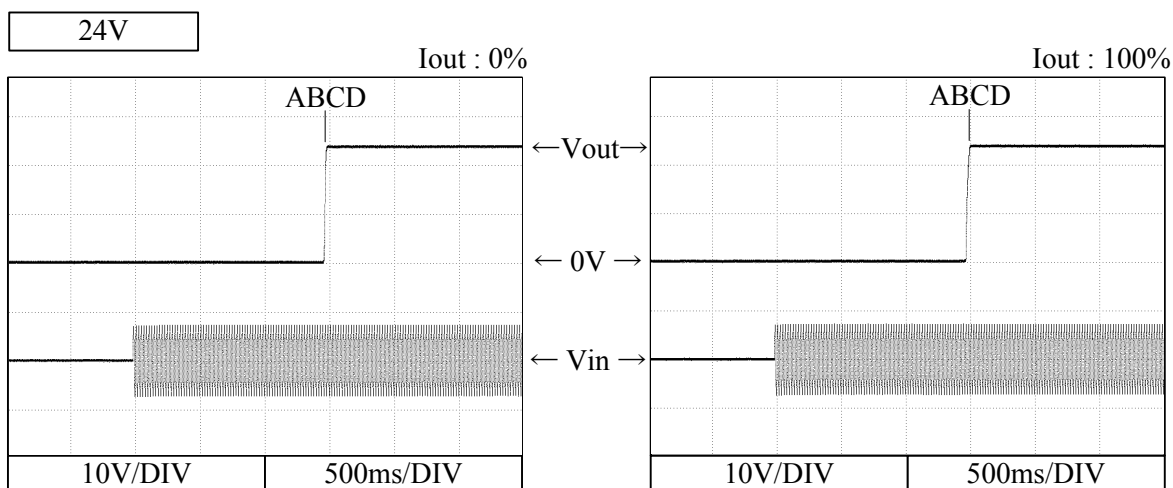
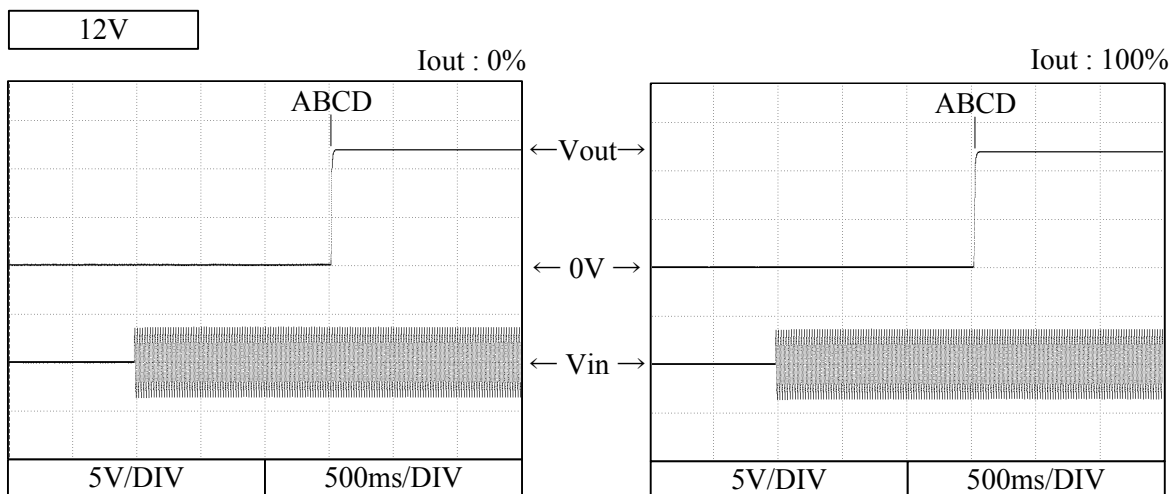
Conditions Vin : 90 VAC (A)

100 VAC (B)

230 VAC (C)

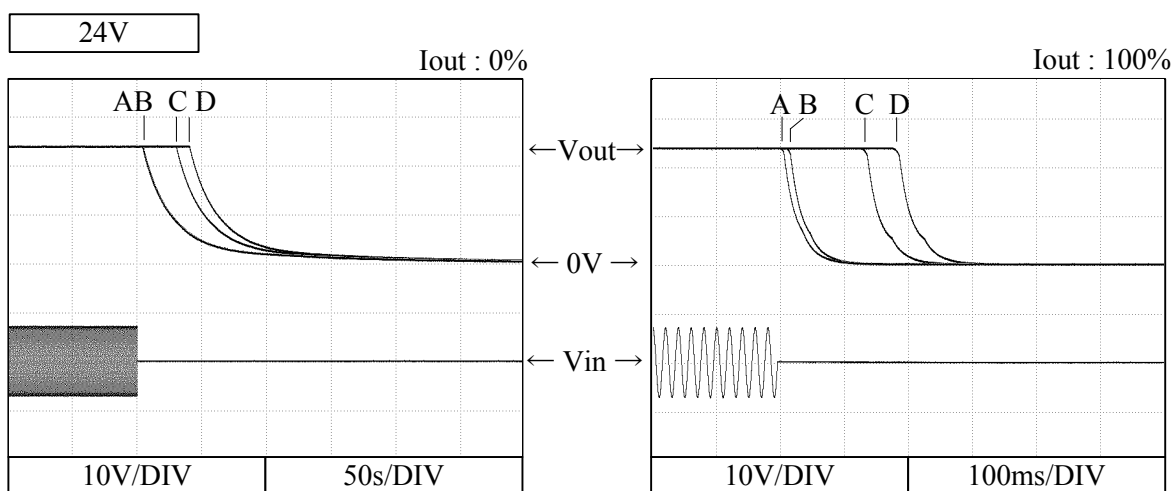
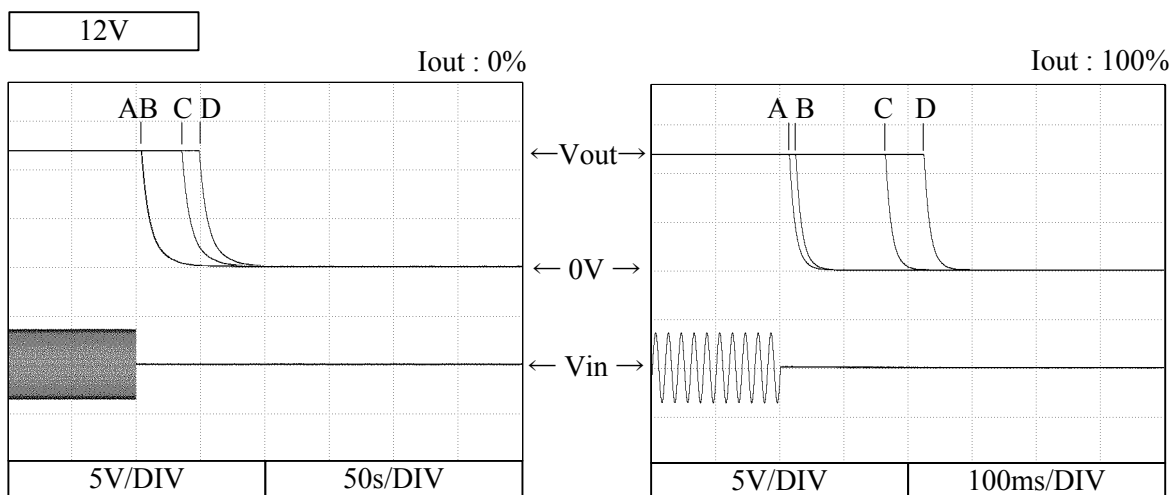
265 VAC (D)

Ta : 25 °C



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

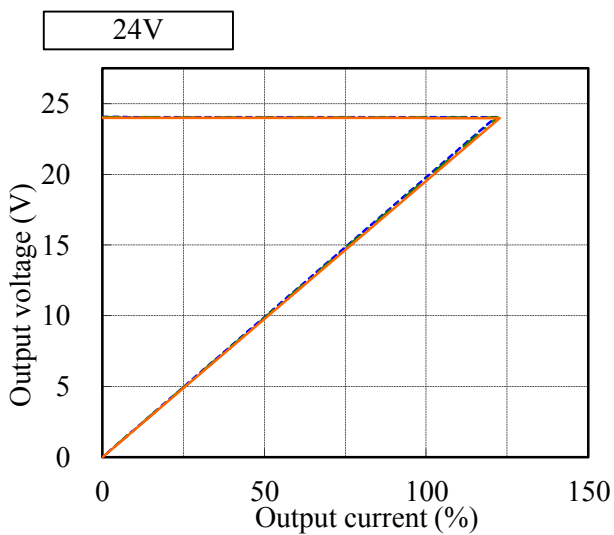
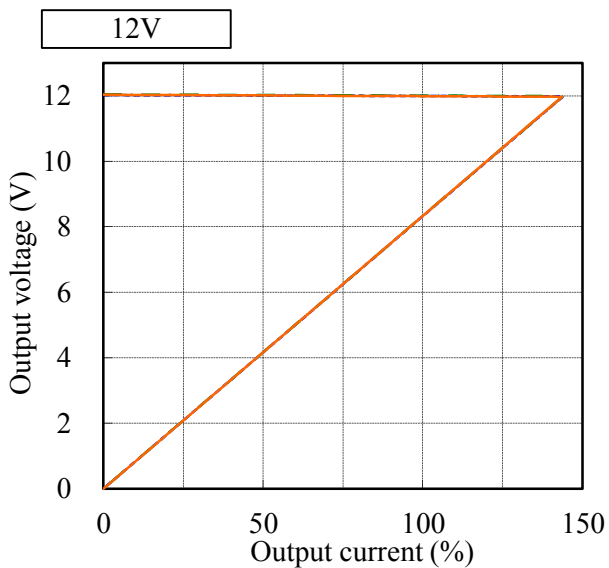
Conditions Vin : 90 VAC (A)  
100 VAC (B)  
230 VAC (C)  
265 VAC (D)  
Ta : 25 °C



2.6 過電流保護特性

Over current protection (OCP) characteristics

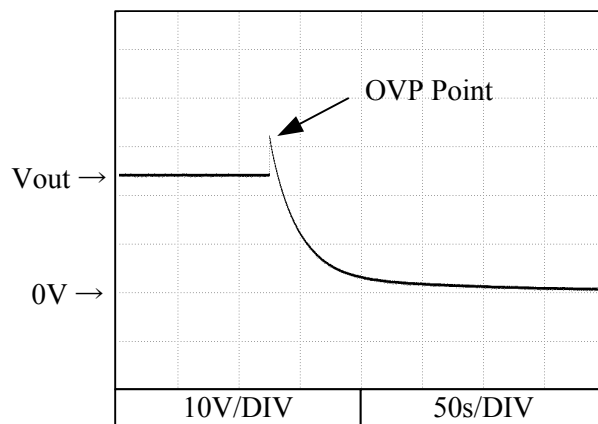
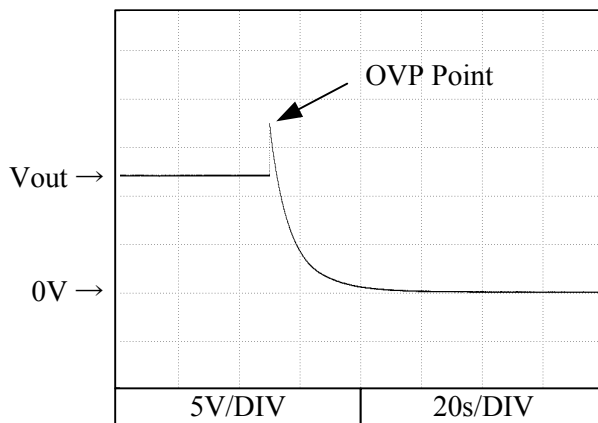
Conditions Iout : 100 VAC  
 Ta : -10 °C ---  
 25 °C - - -  
 55 °C ———



2.7 過電壓保護特性

Over voltage protection (OVP) characteristics

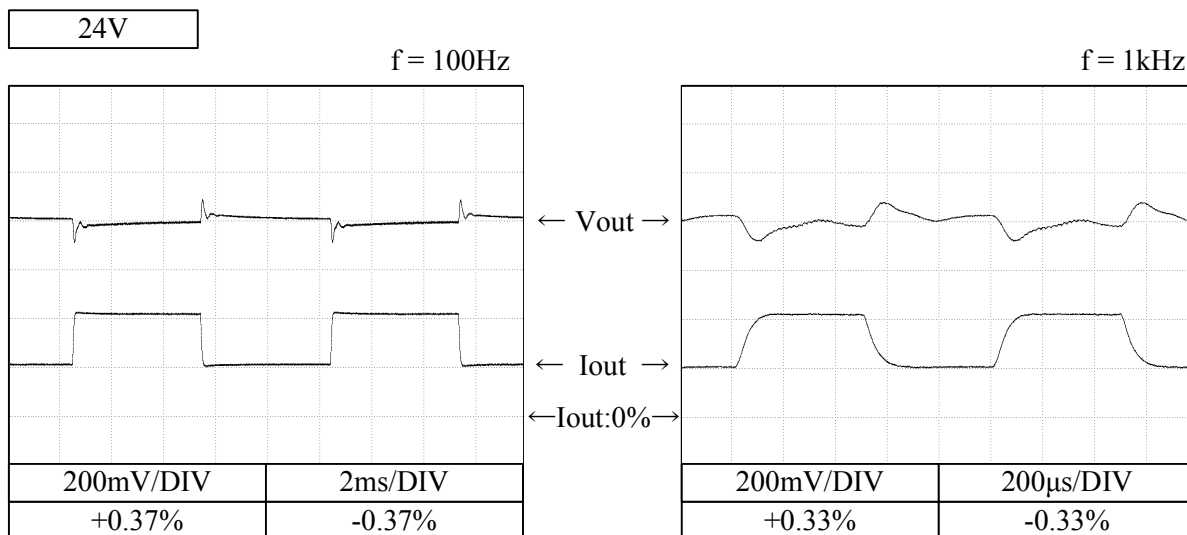
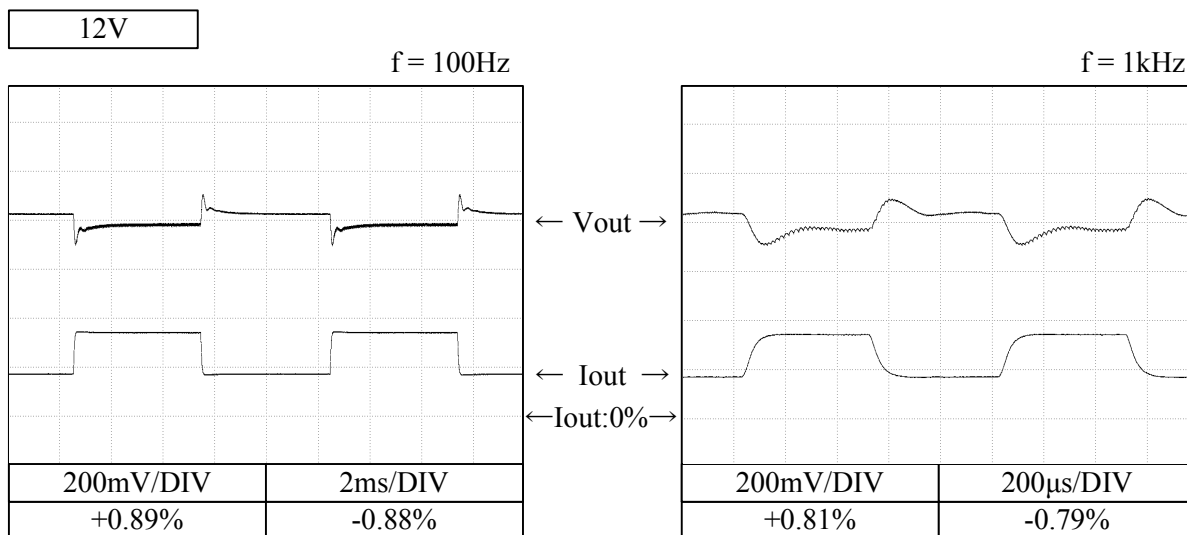
Conditions Vin : 100 VAC  
 Iout : 0 %  
 Ta : 25 °C





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

Conditions  $V_{in}$  : 100 VAC  
 $I_{out}$  : 50 %  $\leftrightarrow$  100%  
 ( $t_r = t_f = 50\mu s$ )  
 $T_a$  : 25°C



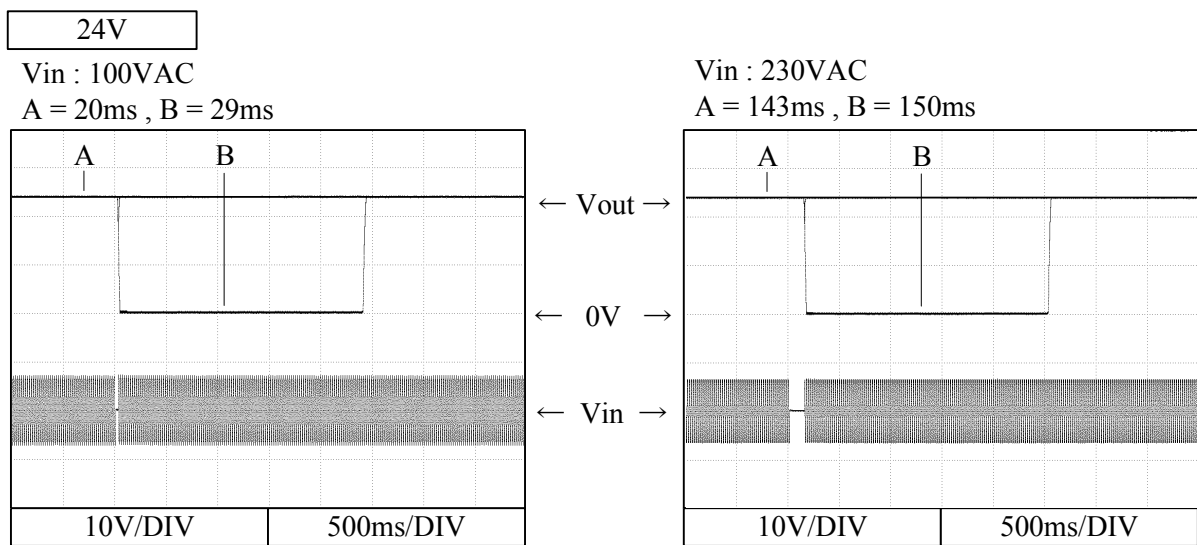
2.9 入力電圧瞬停特性

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



2.10 入力サージ電流(突入電流)波形

Inrush current waveform

24V

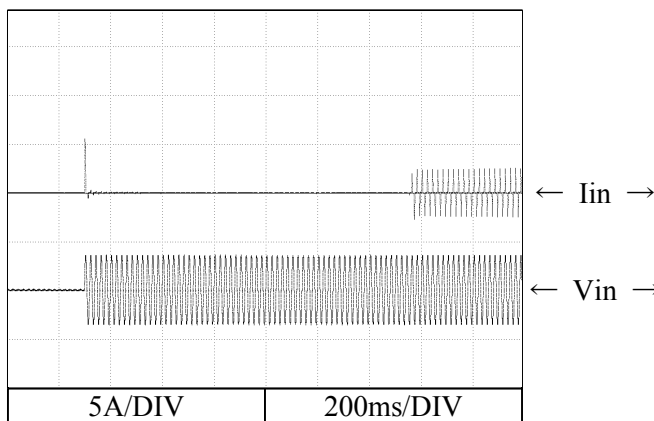
Conditions  $V_{in}$  : 100 VAC

$I_{out}$  : 100 %

$T_a$  : 25 °C

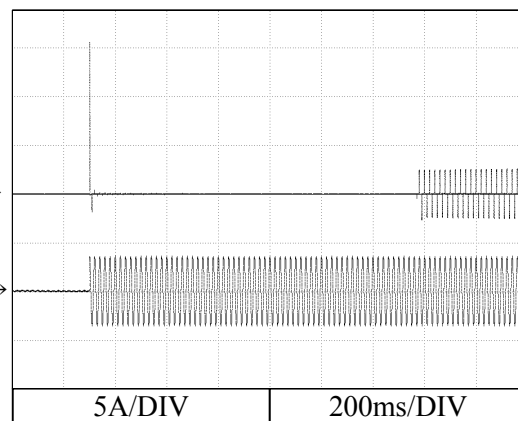
Switch on phase angle of input AC voltage

$\phi = 0^\circ$



Switch on phase angle of input AC voltage

$\phi = 90^\circ$



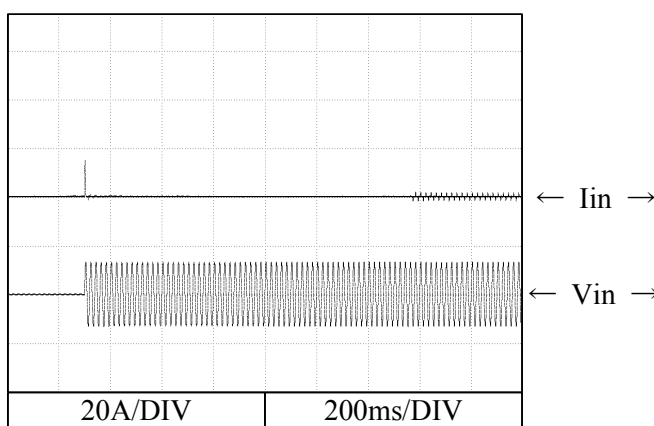
Conditions  $V_{in}$  : 230 VAC

$I_{out}$  : 100 %

$T_a$  : 25 °C

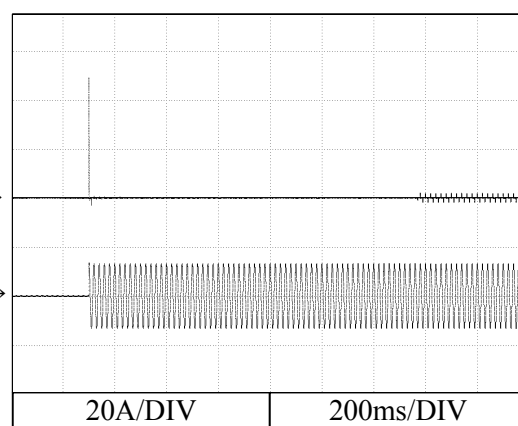
Switch on phase angle of input AC voltage

$\phi = 0^\circ$



Switch on phase angle of input AC voltage

$\phi = 90^\circ$



2.11 高調波成分

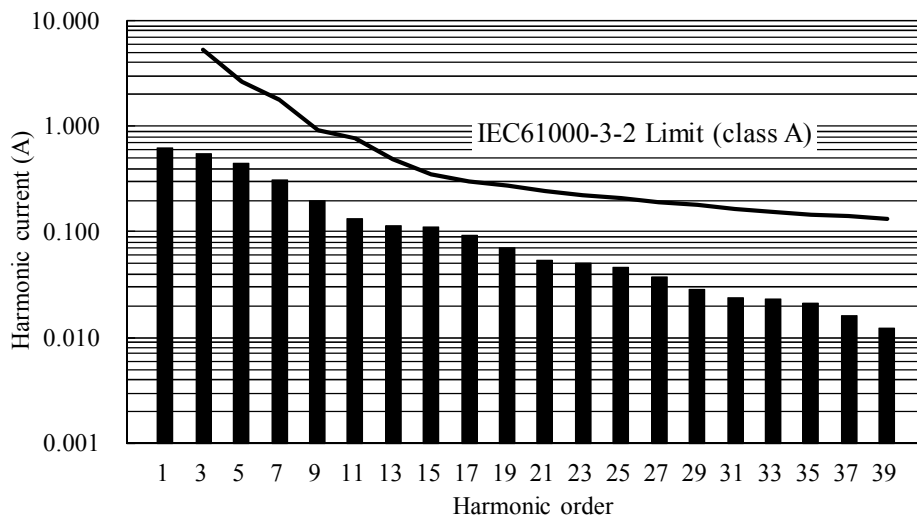
Input current harmonics

Conditions Iout : 100 %

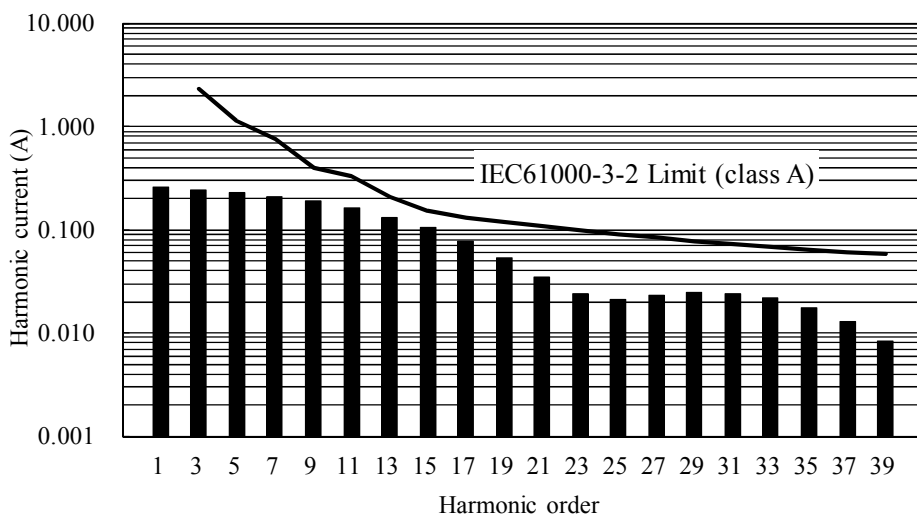
Ta : 25 °C

24V

Vin : 100 VAC



Vin : 230 VAC



2.12 入力電流波形

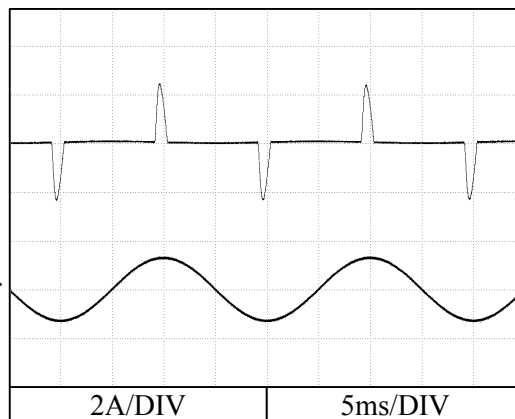
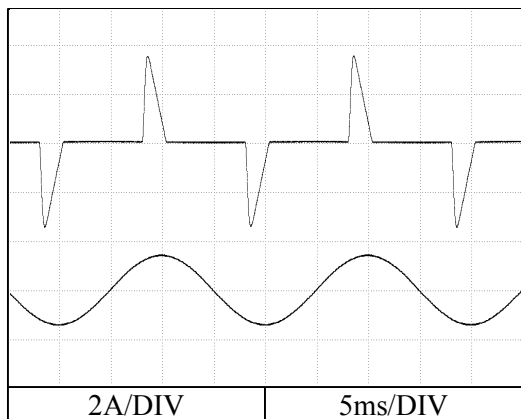
Input current waveform

Conditions Iout : 100 %

Ta : 25 °C

Vin : 100VAC

Vin : 230VAC



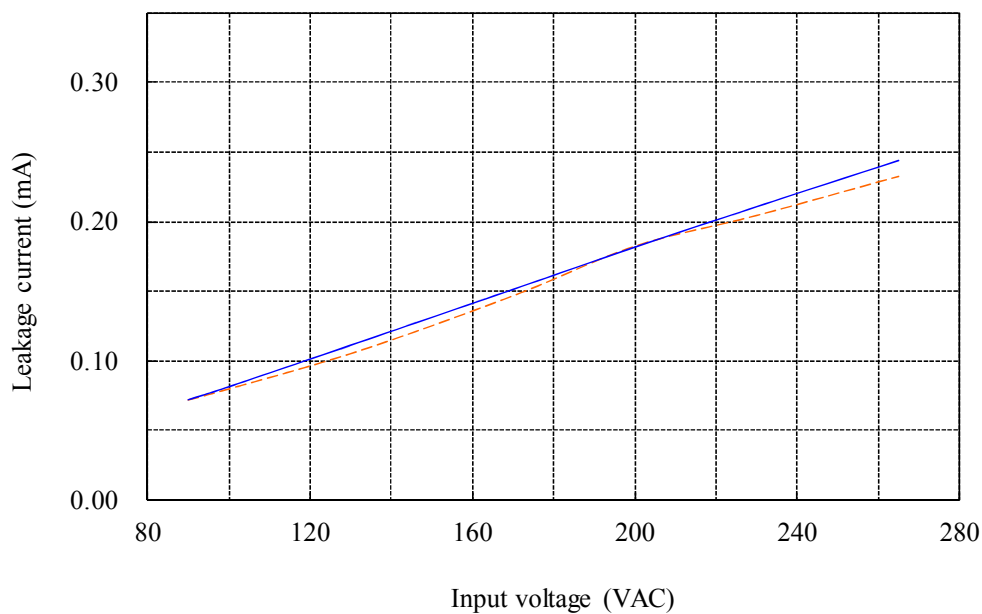
2.13 リーク電流特性

Leakage current characteristics

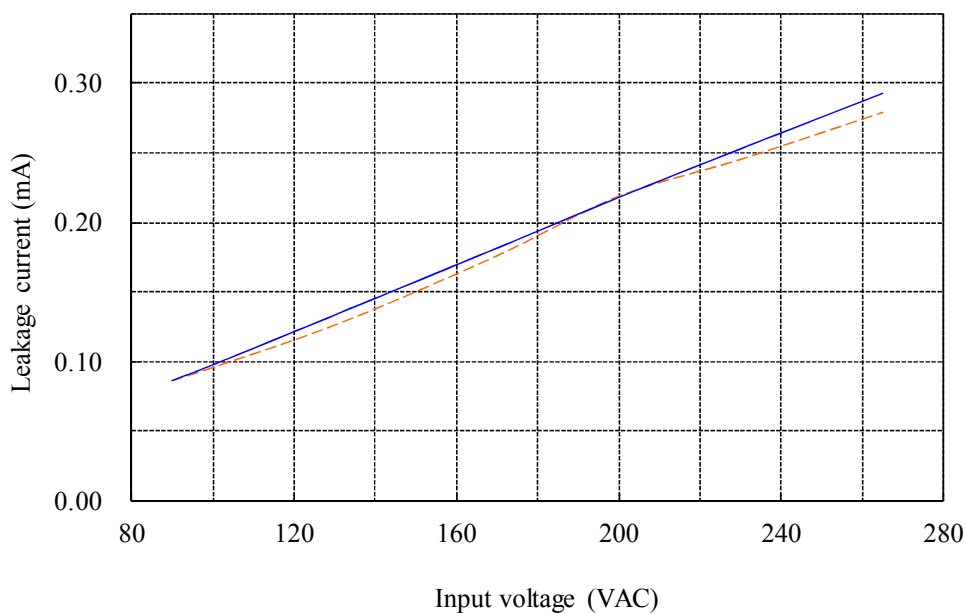
Conditions Iout : 0% ———  
                  100% - - - - -  
                  Ta : 25 °C  
Equipment used : 3156(HIOKI)

24V

f: 50 Hz

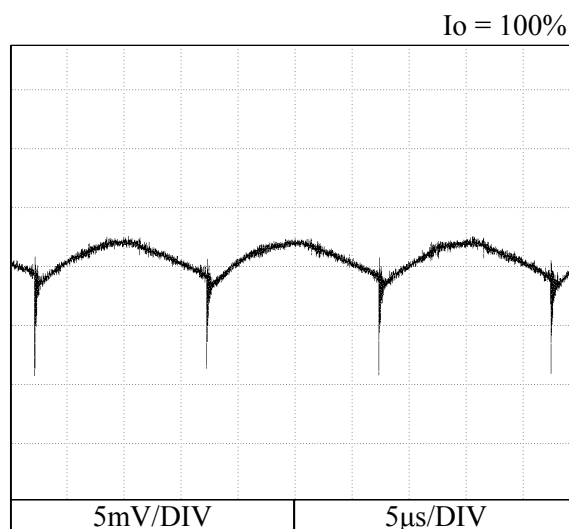
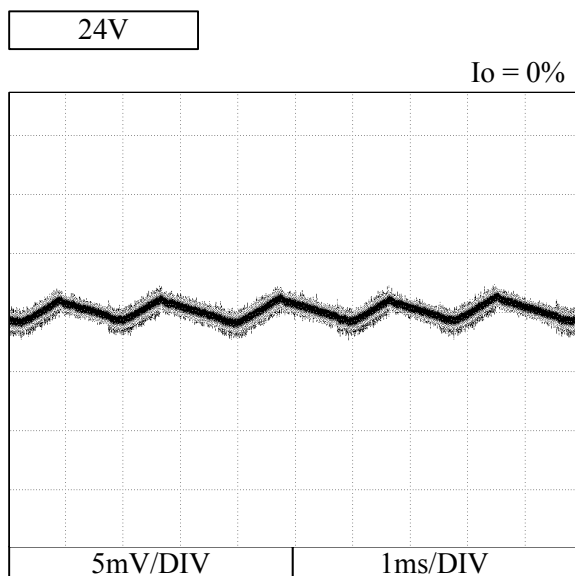
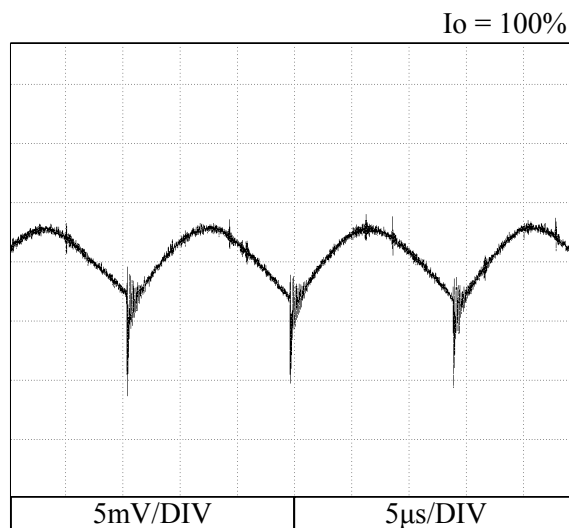
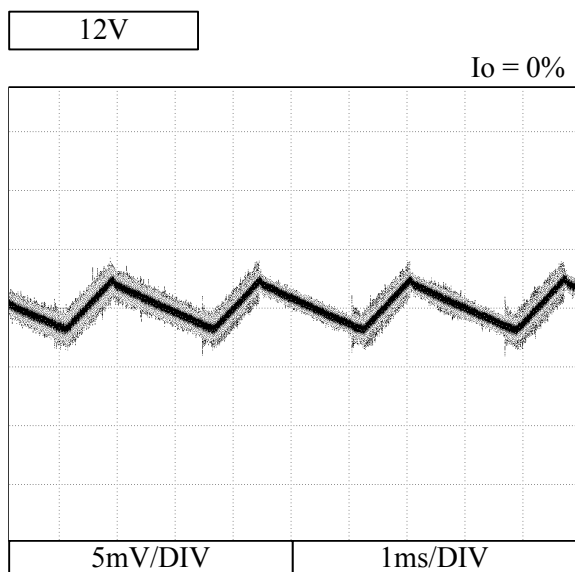


f: 60 Hz



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

Conditions  $V_{in} : 100 \text{ VAC}$   
 $T_a : 25 \text{ }^\circ\text{C}$



2.15 EMI特性

Electro-Magnetic Interference characteristics

Conditions Vin : 230 VAC

Iout : 100 %

Ta : 25 °C

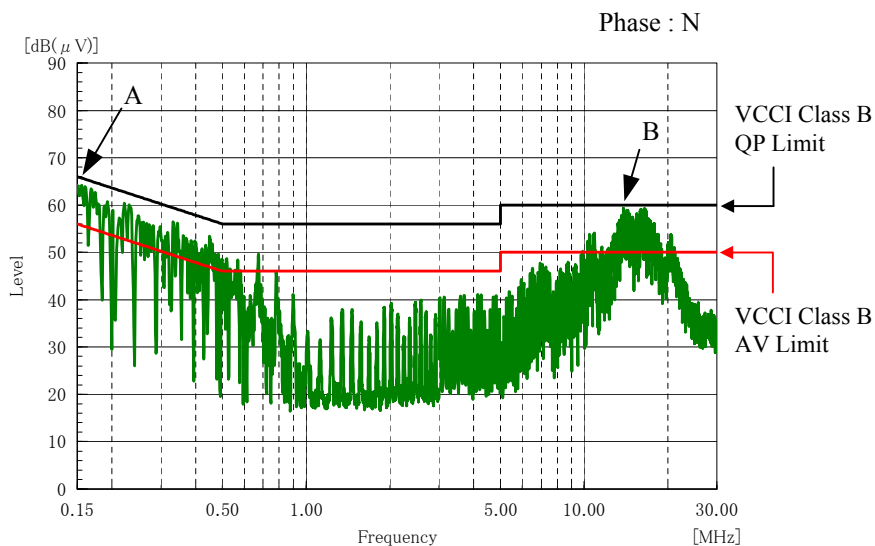
雑音端子電圧

Conducted Emission

12V

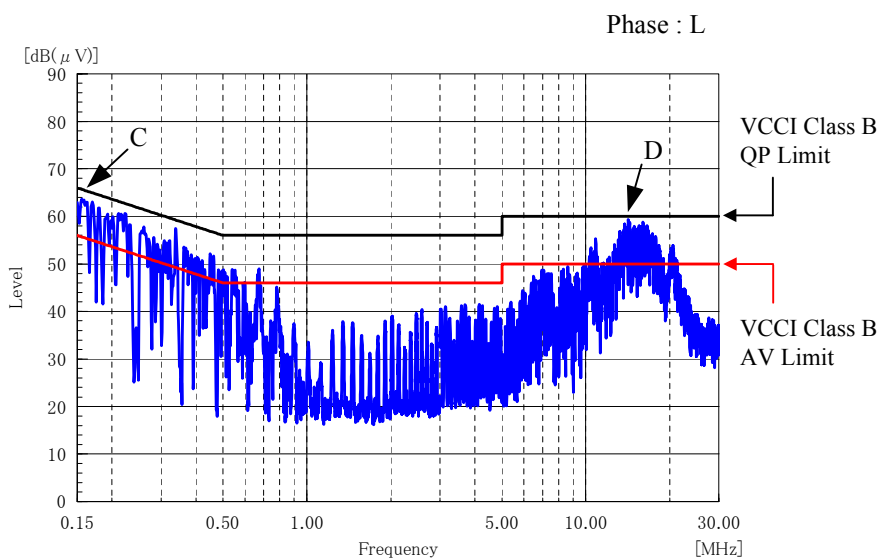
Point A (150kHz)		
Ref. Data	Limit (dB)	Measure (dB)
QP	66.0	56.8
AV	56.0	31.4

Point B (14MHz)		
Ref. Data	Limit (dB)	Measure (dB)
QP	60.0	54.5
AV	50.0	46.6



Point C (150kHz)		
Ref. Data	Limit (dB)	Measure (dB)
QP	66.0	56.7
AV	56.0	31.4

Point D (16MHz)		
Ref. Data	Limit (dB)	Measure (dB)
QP	60.0	54.6
AV	50.0	47.0



2.15 EMI特性

Electro-Magnetic Interference characteristics

Conditions Vin : 230 VAC

Iout : 100 %

Ta : 25 °C

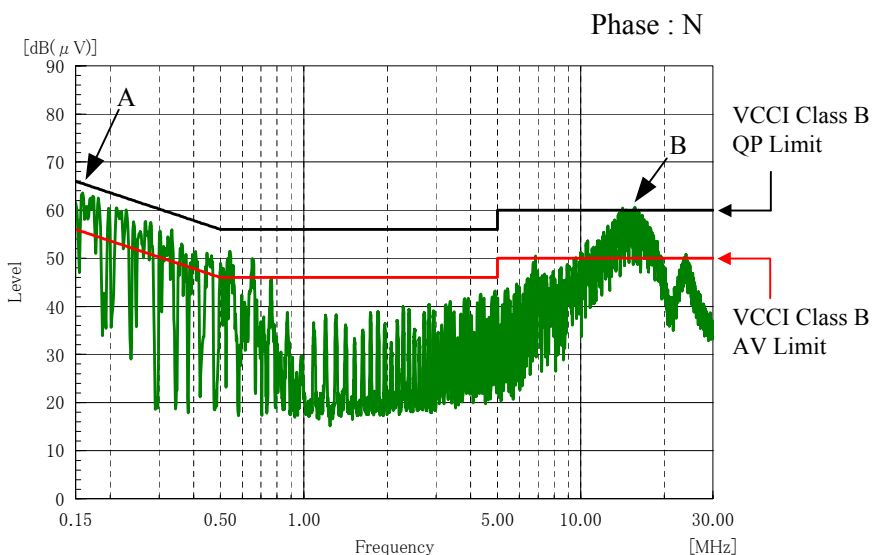
雑音端子電圧

Conducted Emission

24V

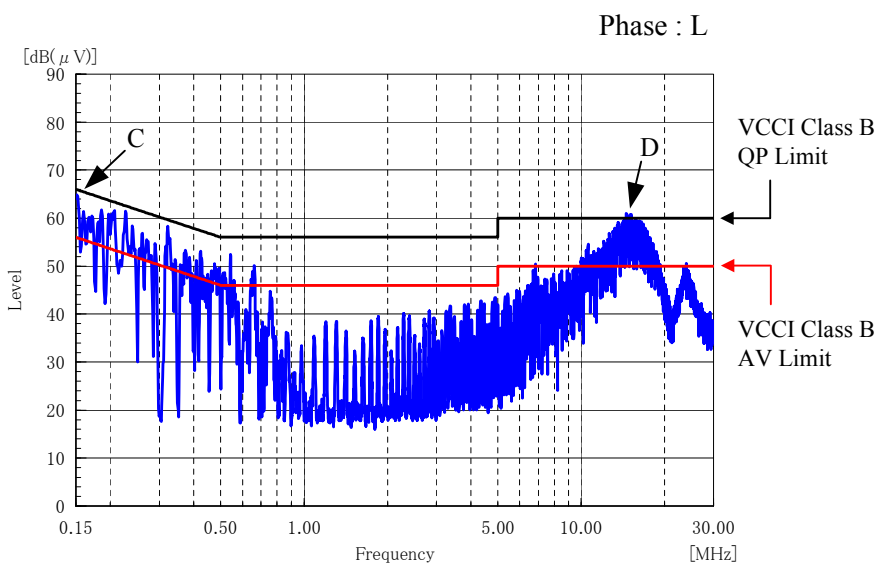
Point A (218kHz)		
Ref. Data	Limit (dB)	Measure (dB)
QP	62.9	54.0
AV	52.9	42.9

Point B (16MHz)		
Ref. Data	Limit (dB)	Measure (dB)
QP	60.0	55.4
AV	50.0	46.1



Point C (150kHz)		
Ref. Data	Limit (dB)	Measure (dB)
QP	66.0	56.6
AV	56.0	30.7

Point D (15MHz)		
Ref. Data	Limit (dB)	Measure (dB)
QP	60.0	55.8
AV	50.0	46.7





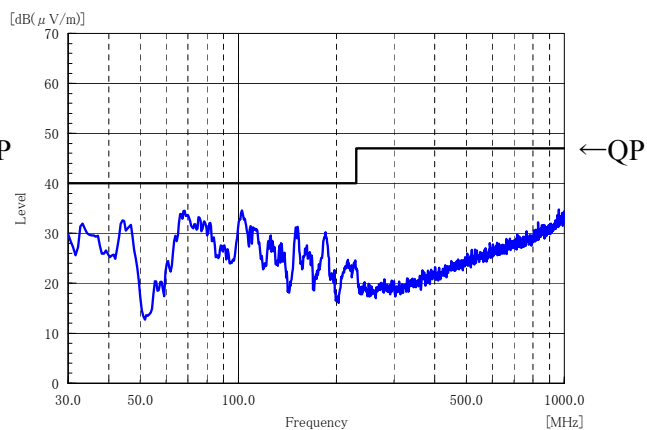
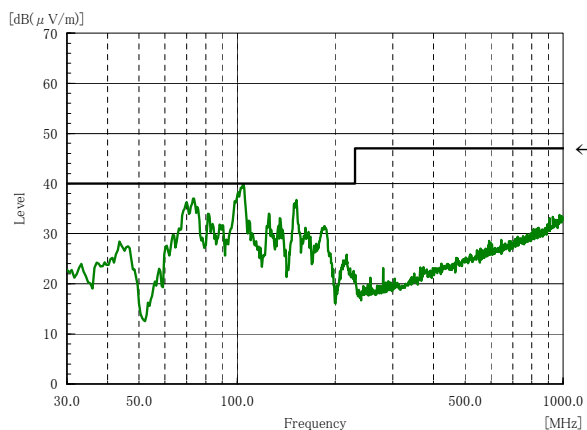
雑音電界強度  
Radiated Emission

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

12V

HORIZONTAL

VERTICAL



24V

HORIZONTAL

VERTICAL

