DLP75-24-1

EVALUATION DATA

INDEX

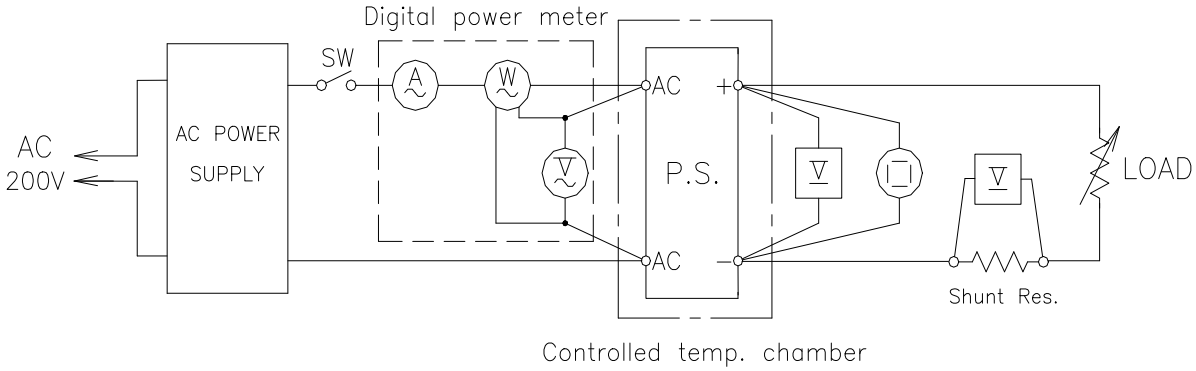
Terminology used

	Definition
Vin	. . . . . Input voltage
Vout	. . . . . Output voltage
Iin	. . . . . Input current
Iout	. . . . . Output current
f	. . . . . Frequency
Ta	. . . . . Ambient temperature

1.1 Circuit used for determination

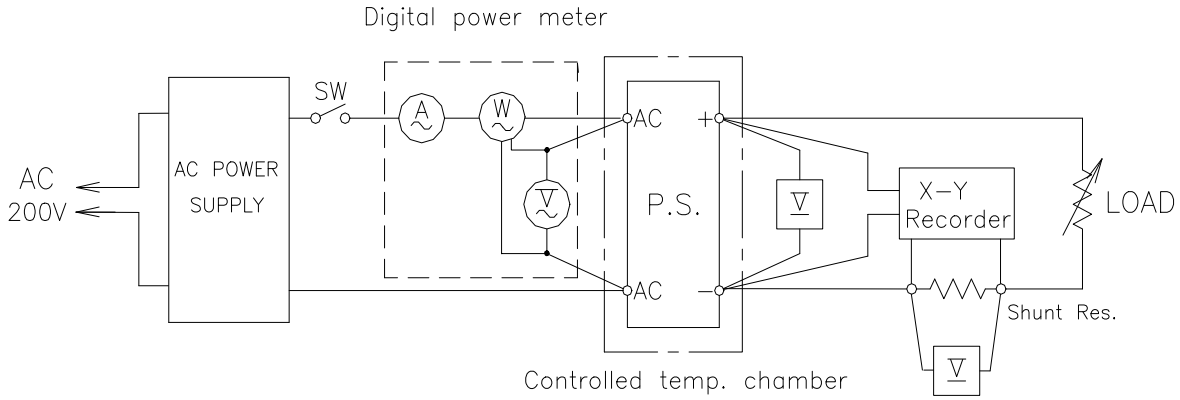
(1) Measurement Circuit. 1

- Steady state data
- Warm up voltage drift characteristics
- Over voltage protection (OVP) characteristics
- Output rise characteristics
- Output fall characteristics
- Dynamic line response characteristics
- Stand-by current characteristics



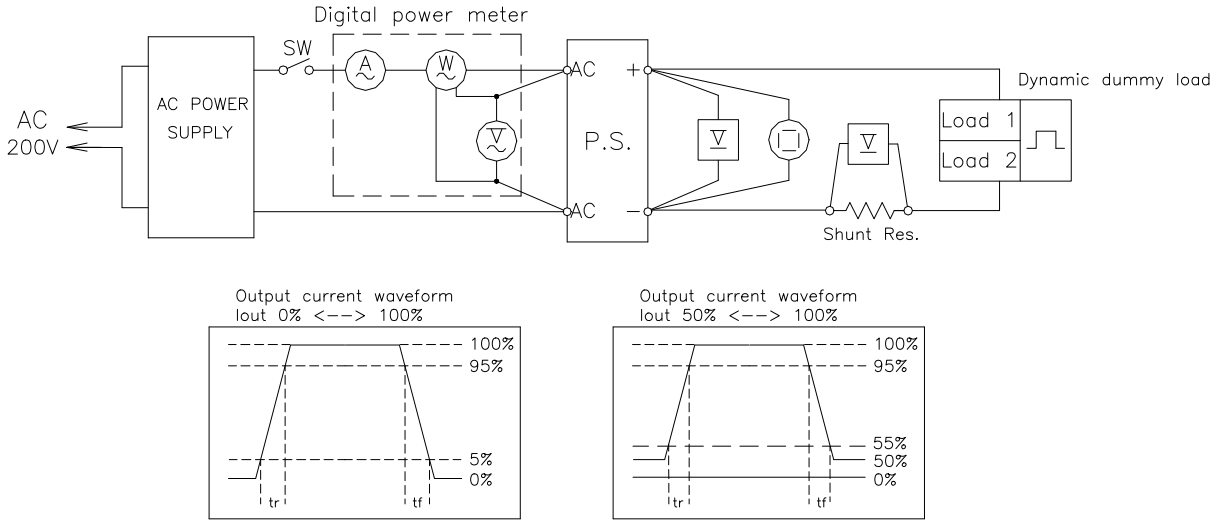
(2) Measurement Circuit. 2

- Over current protection (OCP) characteristics



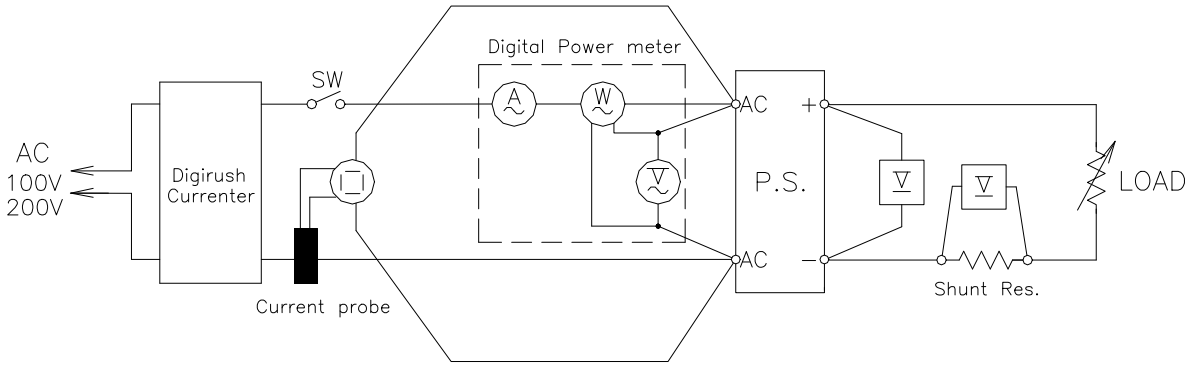
Measurement circuit. 3

・Dynamic load response characteristics



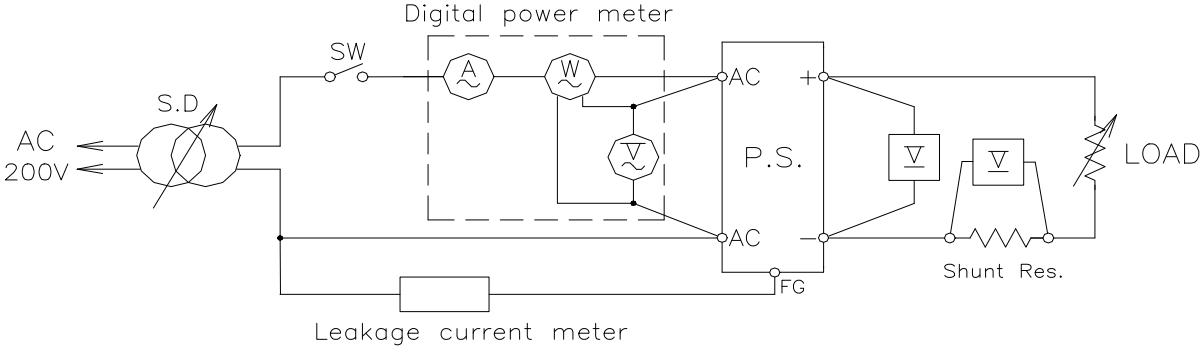
Measurement circuit. 4

・Inrush current characteristics



Measurement circuit. 5

・Leakage current characteristics



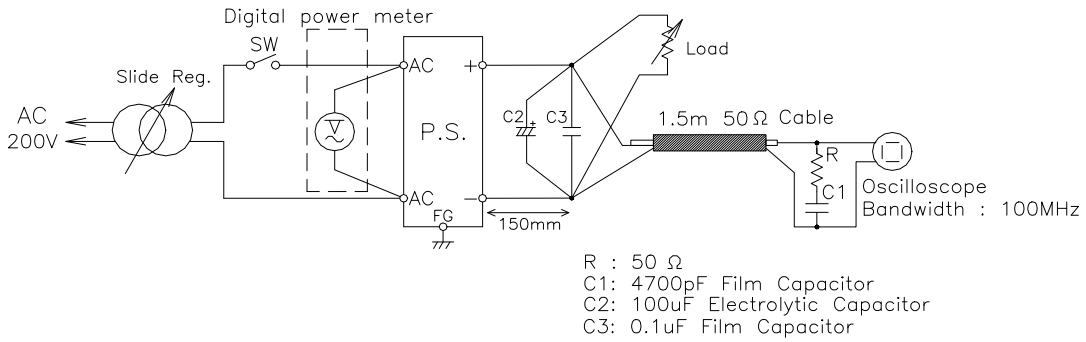
NOTE : Leakage current measured through a 1k ohm resistor.

Range used---AC+DC (For YOKOGAWA : TYPE3226)
AC (For SIMPSON : MODEL 229-2)

Measurement circuit. 6

・Output ripple and noise

(a) Normal Mode (JEITA Standard RC-9131)

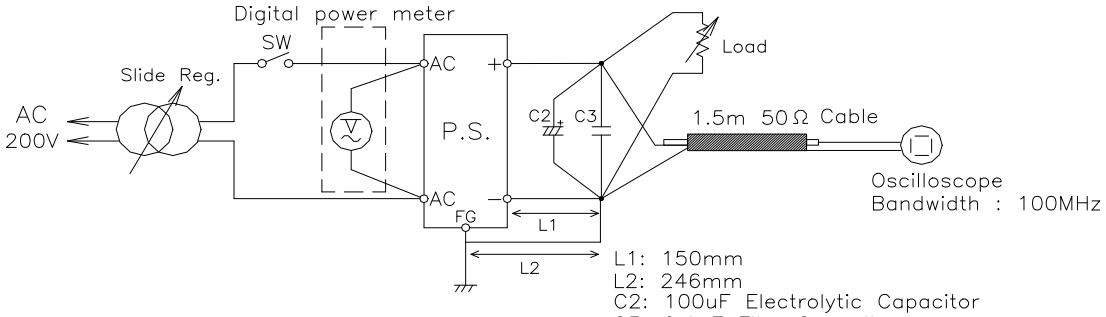


R : 50 Ω
C1: 4700pF Film Capacitor
C2: 100uF Electrolytic Capacitor
C3: 0.1uF Film Capacitor

Measurement circuit. 7

・Output ripple and noise

(b) Normal + Common Mode

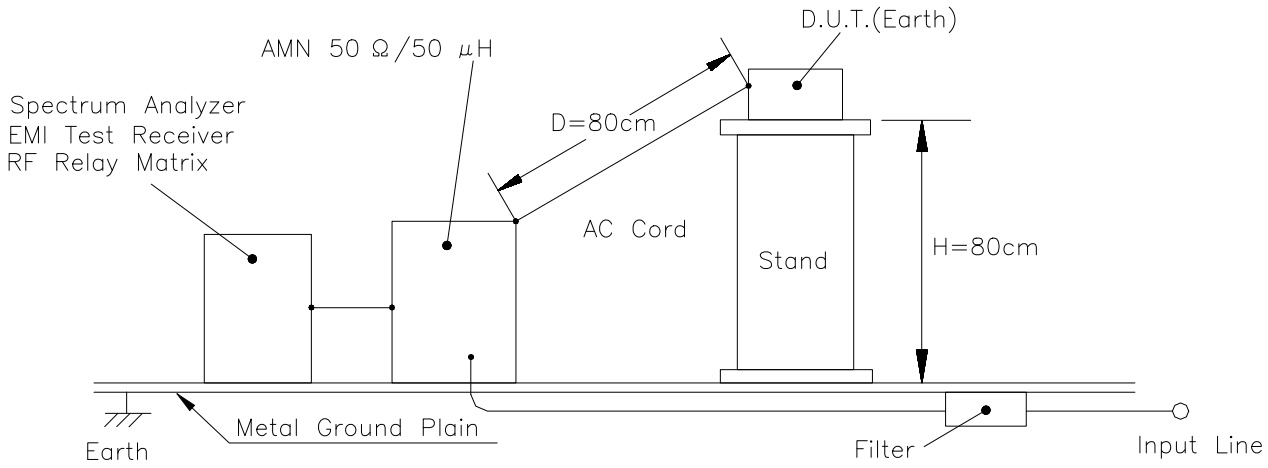


L1: 150mm
L2: 246mm
C2: 100uF Electrolytic Capacitor
C3: 0.1uF Film Capacitor

Measurement circuit. 8

・Electro-Magnetic Interference characteristics

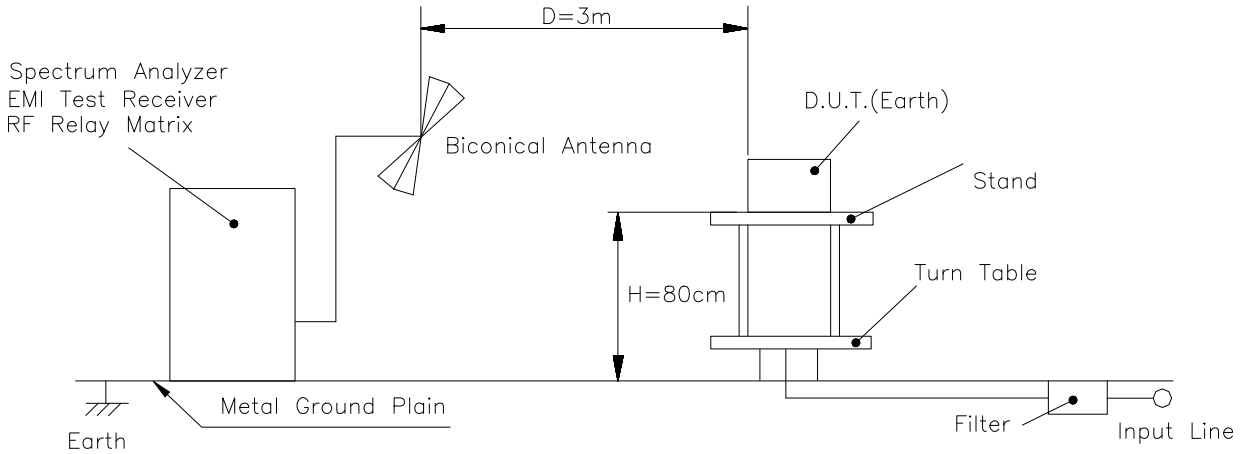
(a) Conducted Emission Noise



Measurement circuit. 9

・Electro-Magnetic Interference characteristics

(b) Radiated Emission Noise



1.2 LIST OF EQUIPMENT USED

	EQUIPMENT USED	MANUFACTURER	MODEL NO.
1	OSCILLOSCOPE	HITACHI	V-1100A
2	DIGITAL STORAGE OSCILLOSCOPE	TEKTRONIX	TDS754C
3	DIGITAL MULTIMETER	ADVANTEST	R6551
4	DIGITAL POWER METER	YOKOGAWA ELECT.	WT110E
5	SHUNT RESISTOR	YOKOGAWA ELECT.	2215
6	DYNAMIC DUMMY LOAD	TAKASAGO	FK-200L
7	CURRENT PROBE/AMPLIFIER	TEKTRONIX	A6303/AM503
8	CONTROLLED TEMP. CHAMBER	TABAI-ESPEC	SH-240SI
9	AC POWER SUPPLY	TAKASAGO	AA2000XG
10	LEAKAGE CURRENT METER	SIMPSON	MODEL229-2
11	LEAKAGE CURRENT METER	YOKOGAWA ELECT.	TYPE3226
12	X-Y RECORDER	GRAPHTEC	WX3000
13	SPECTRUM ANALYZER	ROHDE & SCHWARZ	FSA
14	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESHS10
15	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESVS10
16	RF RELAY MATRIX	ROHDE & SCHWARZ	PSU
17	AMN	KYORITU DENSHI	KNW-242
18	ANTENNA(BICONICAL ANTENA)	SCHWARZBECK	BBA9106

2. Characteristics

2.1 Steady state data

(1) Regulation - line and load, temperature drift

24V

1. Regulation-line and load

Iout \ Vin	85VAC	100VAC	230VAC	265VAC	line regulation	
0%	24.059V	24.074V	24.065V	24.071V	0.015V	0.063%
50%	24.050V	24.049V	24.057V	24.057V	0.008V	0.033%
100%	24.033V	24.033V	24.041V	24.040V	0.008V	0.033%
load	0.026V	0.041V	0.024V	0.031V		
regulation	0.108%	0.171%	0.100%	0.129%		

2. Temperature drift

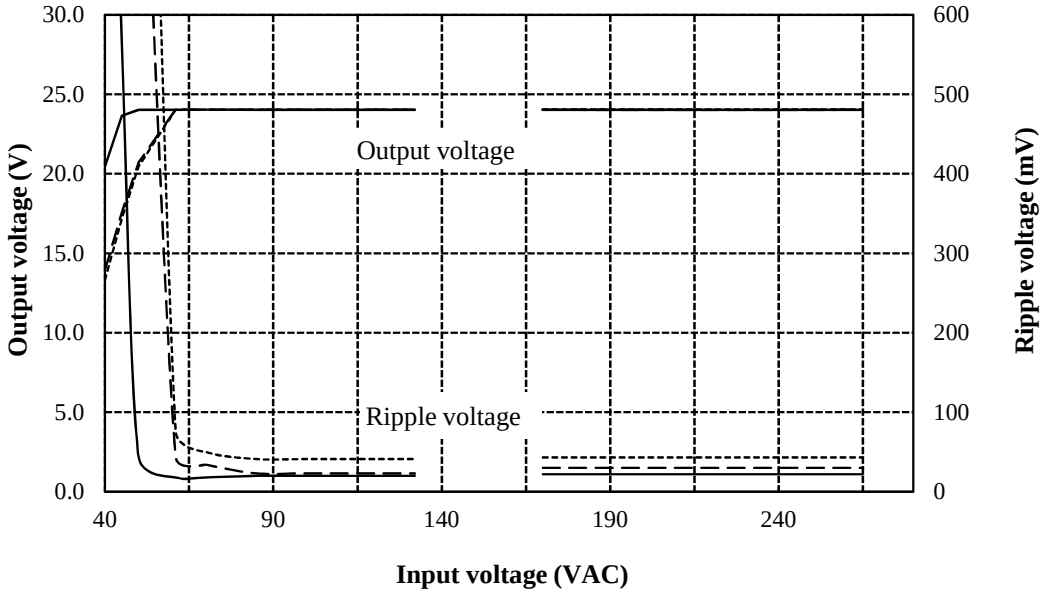
Conditions; Vin = 100VAC
Iout = 100%

Ta	-10°C	+25°C	+50°C	Temperature stability	
Vout	24.042V	24.033V	24.020V	0.022V	0.09%

(2) Output voltage and Ripple voltage v.s. Input voltage

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

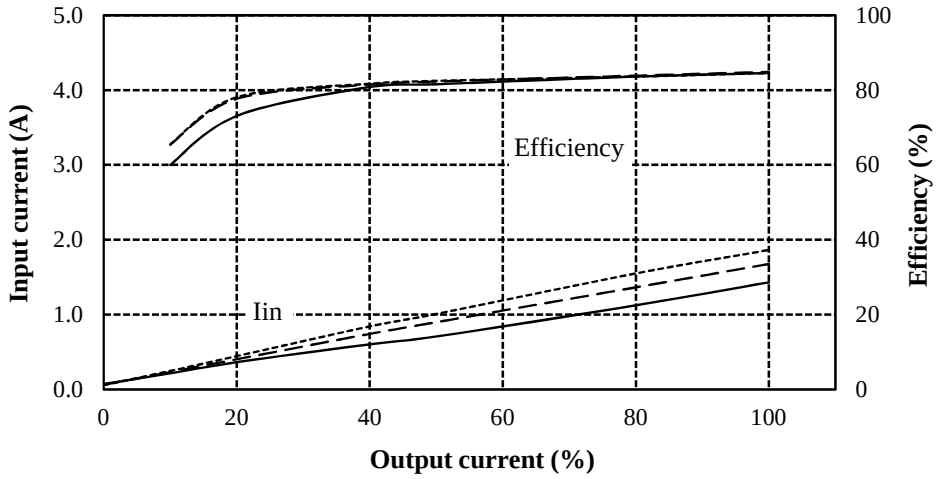
24V



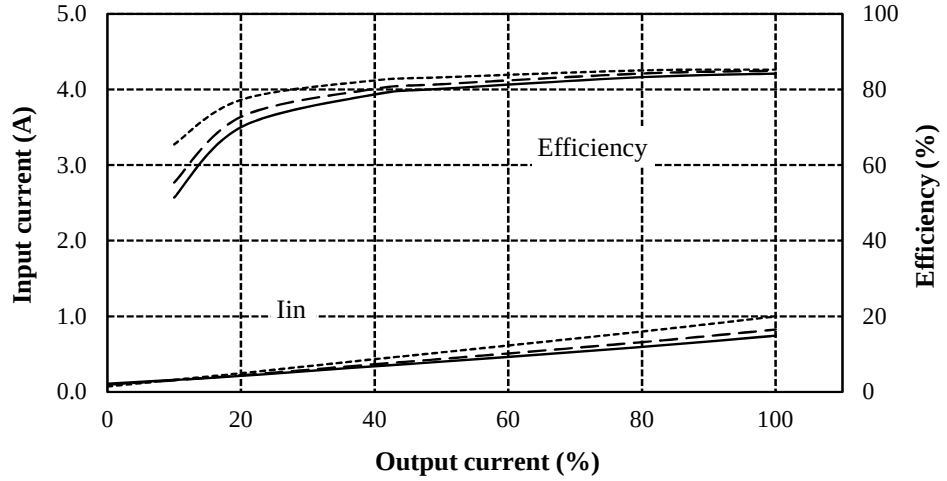
2.1 (3) Efficiency and input current v.s. Output current

Conditions; Vin : 85VAC ---------
: 100VAC – – – – –
: 132VAC ———
Ta : 25°C

24V



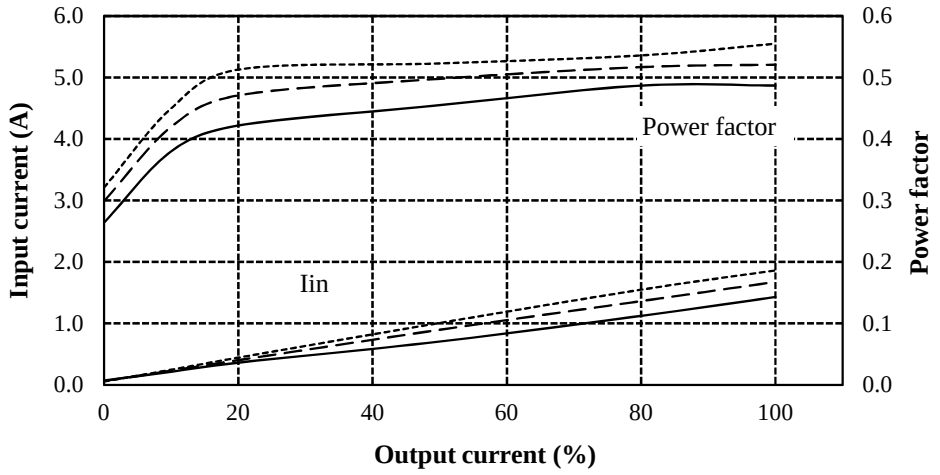
Conditions; Vin : 170VAC ---------
: 230VAC – – – – –
: 265VAC ———
Ta : 25°C



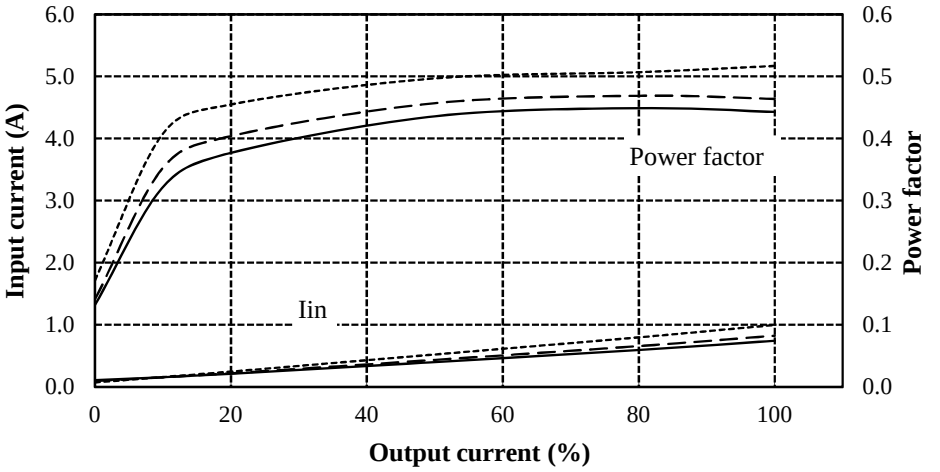
2.1 (4) Power factor and Input current v.s Output current

Conditions; Vin : 85VAC
: 100VAC
: 132VAC
Ta : 25°C

24V



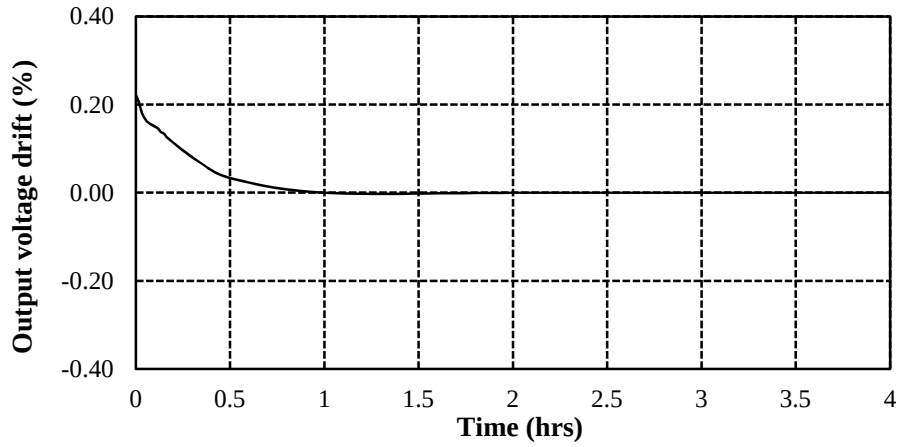
Conditions; Vin : 170VAC
: 230VAC
: 265VAC
Ta : 25°C



2.2 Warm up voltage drift characteristics

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

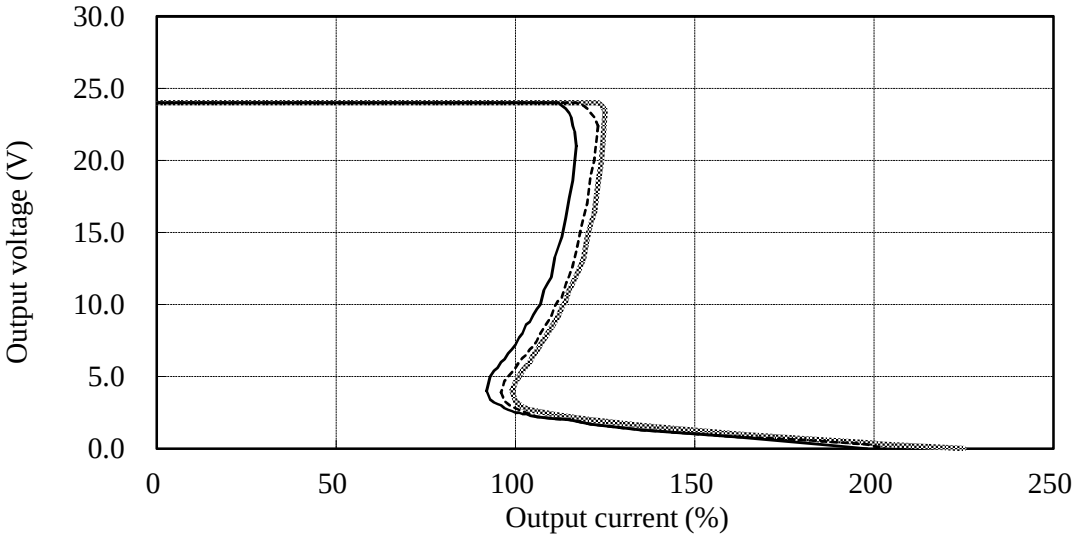
24V



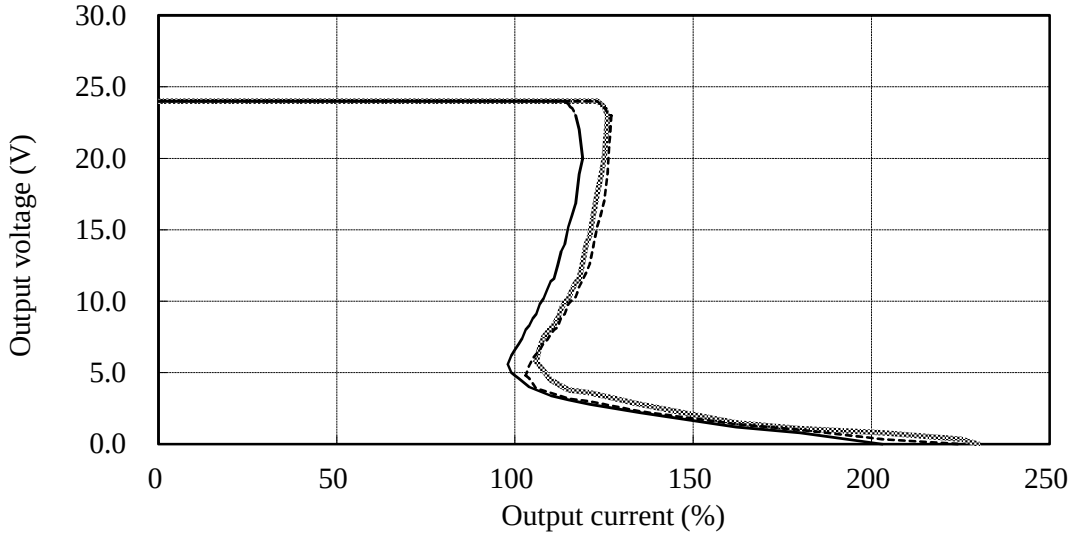
2.3 Over current protection (OCP) characteristics

Conditions; Ta : -10℃
: 25℃
: 50℃
Vin : 100VAC

24V



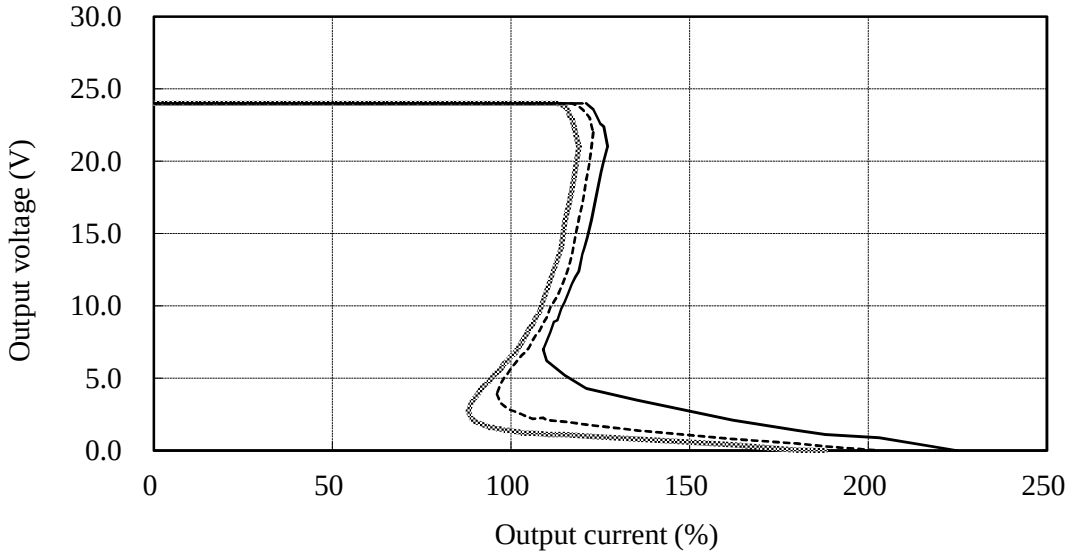
Conditions; Ta : -10℃
: 25℃
: 50℃
Vin : 230VAC



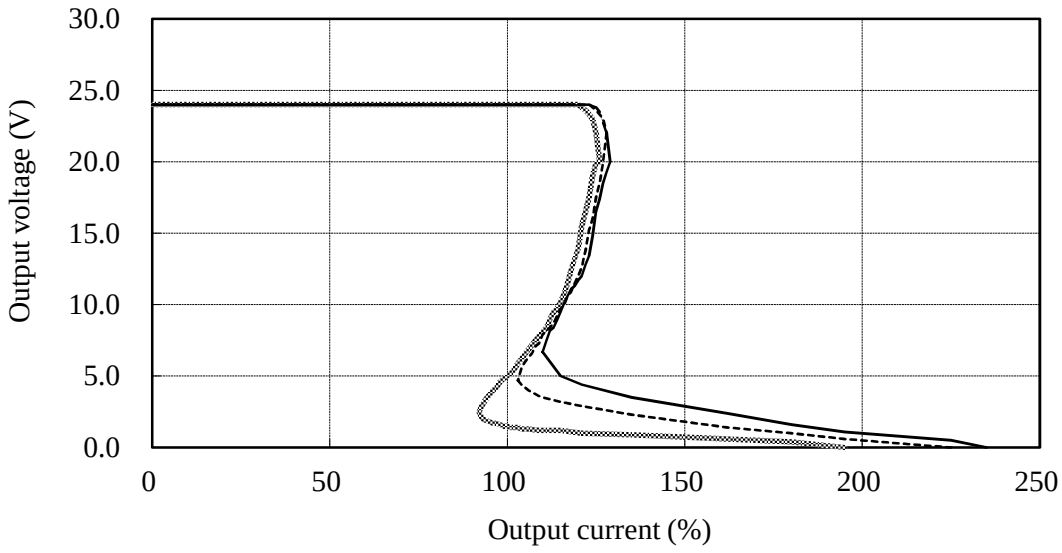
2.3 Over current protection (OCP) characteristics

24V

Conditions Vin : 85VAC
: 100VAC
: 132VAC
Ta : 25℃



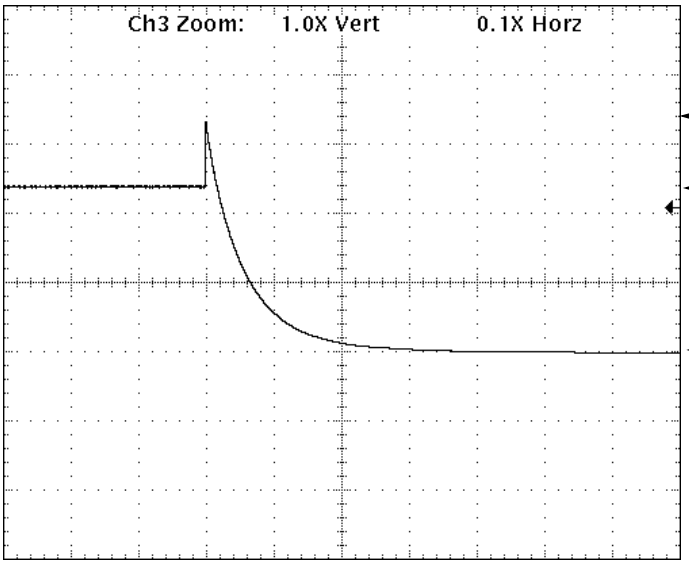
Conditions Vin : 170VAC
: 230VAC
: 265VAC
Ta : 25℃



2.4 Over voltage protection (OVP) characteristics

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

24V

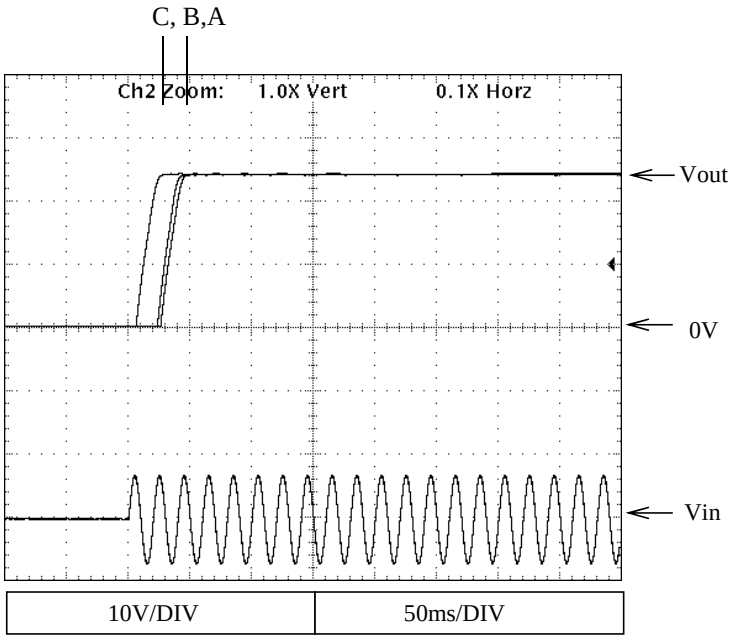


10V/DIV	5s/DIV

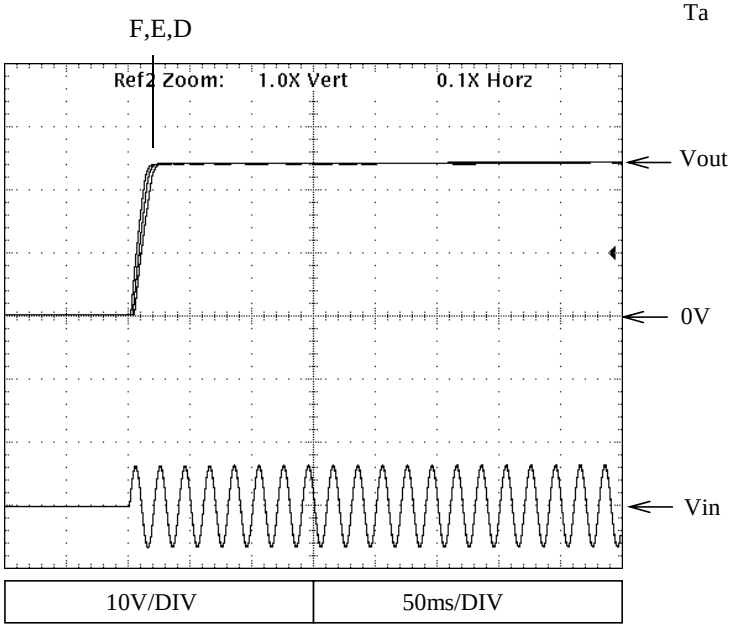
2.5 Output rise characteristics

Conditions Vin : 85VAC (A)
: 100VAC (B)
: 132VAC (C)
Iout : 0%
Ta : 25°C

24V



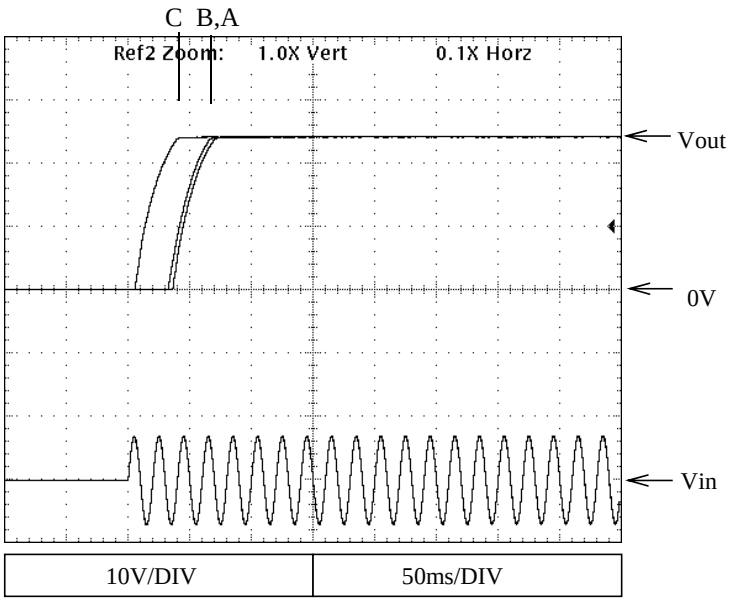
Conditions Vin : 170VAC (D)
: 230VAC (E)
: 265VAC (F)
Iout : 0%
Ta : 25°C



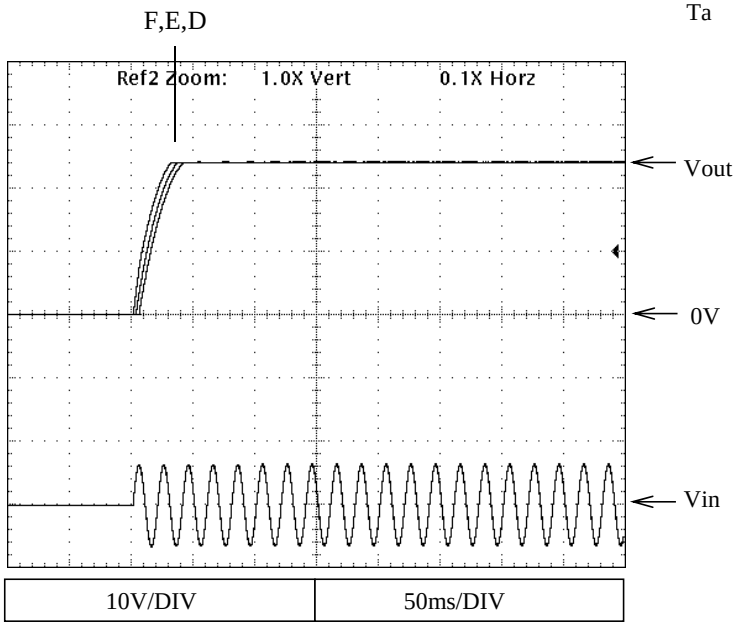
2.5 Output rise characteristics

Conditions; Vin : 85VAC (A)
: 100VAC (B)
: 132VAC (C)
Iout : 100%
Ta : 25°C

24V



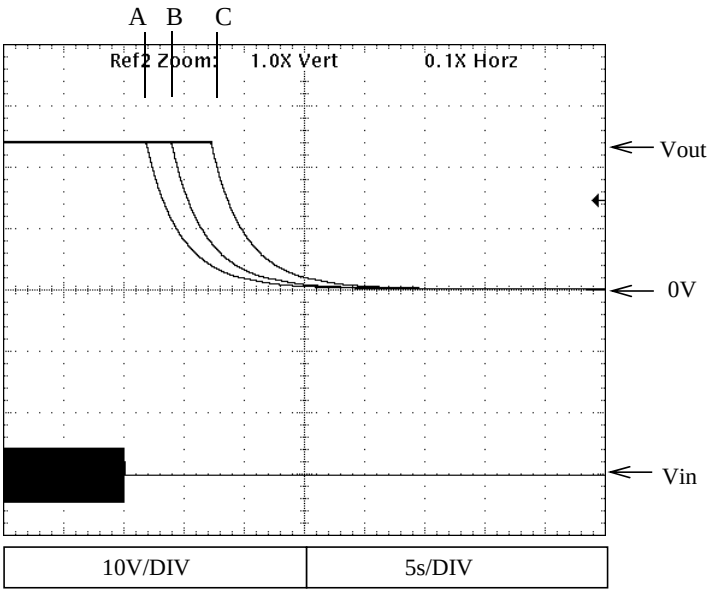
Conditions; Vin : 170VAC (D)
: 230VAC (E)
: 265VAC (F)
Iout : 100%
Ta : 25°C



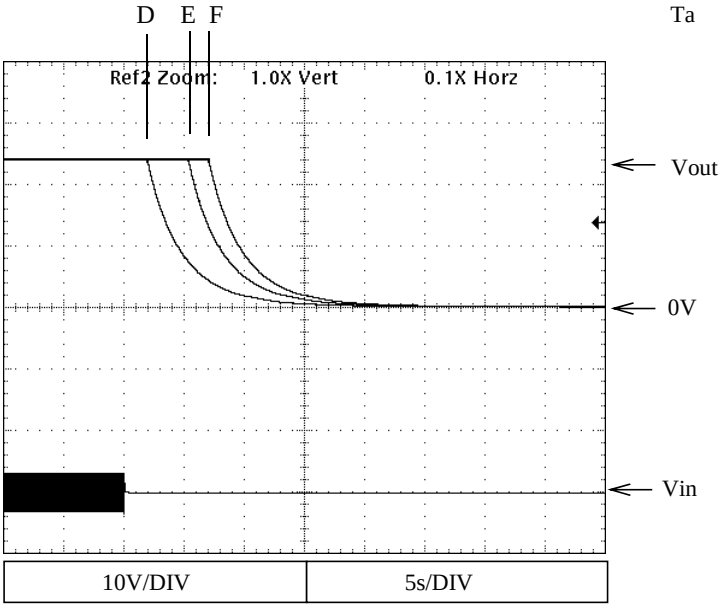
2.6 Output fall characteristics

Conditions Vin : 85VAC (A)
: 100VAC (B)
: 132VAC (C)
Iout : 0%
Ta : 25°C

24V



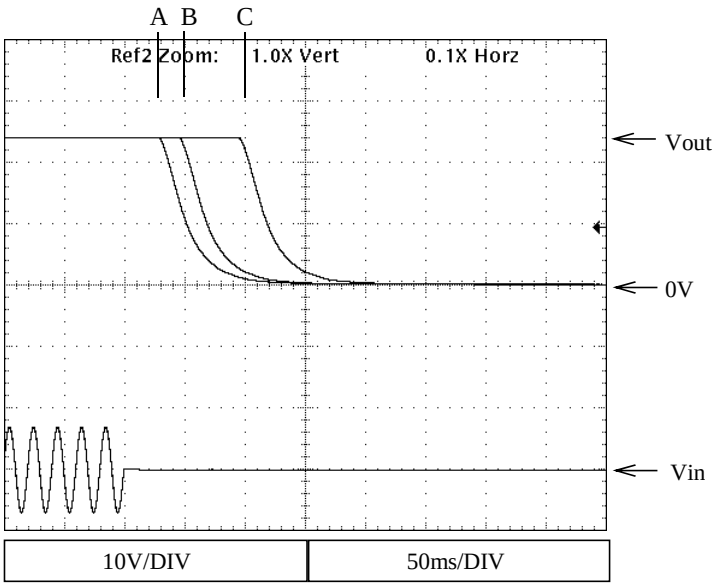
Conditions Vin : 170VAC (D)
: 230VAC (E)
: 265VAC (F)
Iout : 0%
Ta : 25°C



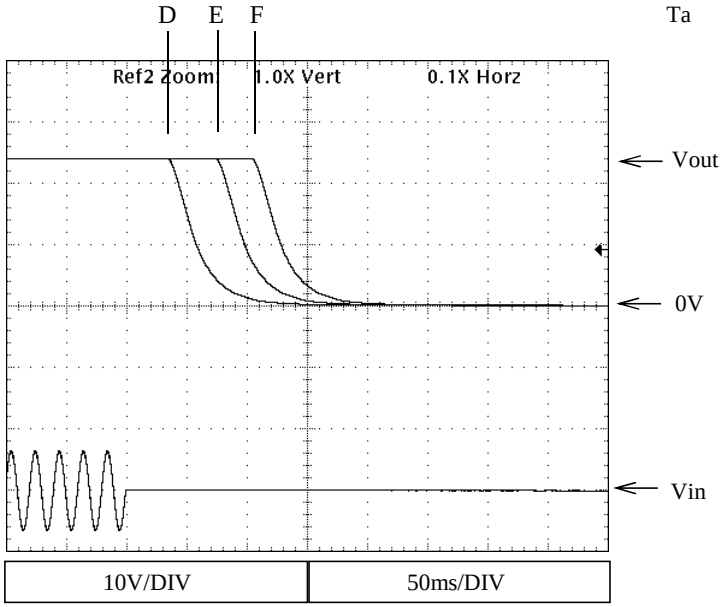
2.6 Output fall characteristics

Conditions; Vin : 85VAC (A)
: 100VAC (B)
: 132VAC (C)
Iout : 100%
Ta : 25°C

24V



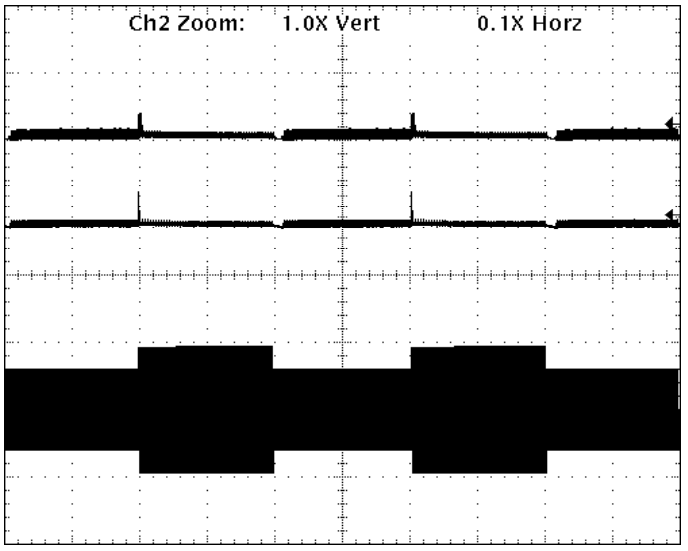
Conditions; Vin : 170VAC (D)
: 230VAC (E)
: 265VAC (F)
Iout : 100%
Ta : 25°C



2.7 Dynamic line response characteristics

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

24V

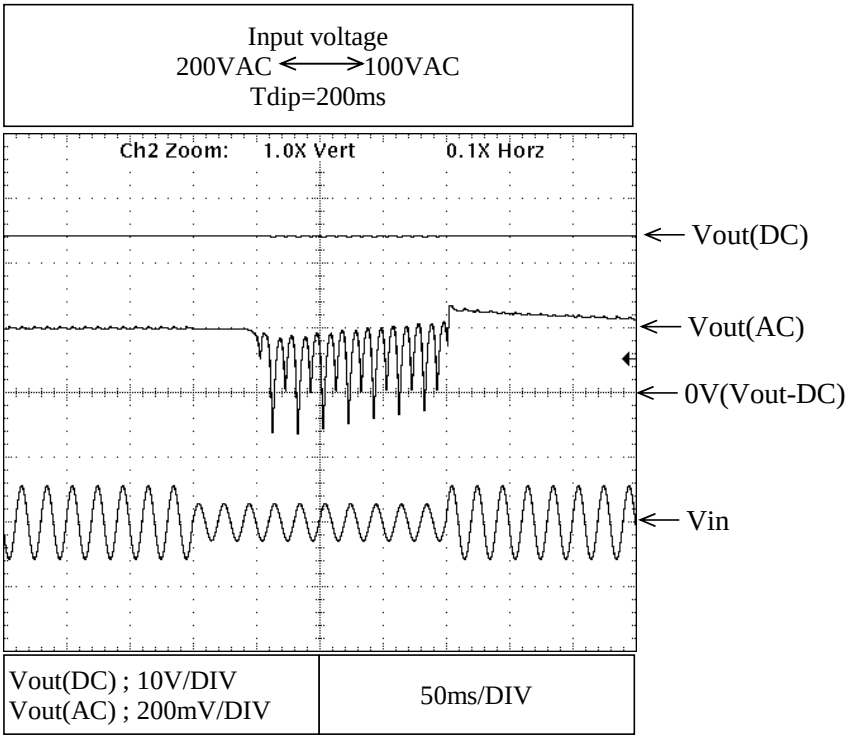


50mV/DIV	500ms/DIV

2.8 Input voltage DIP test

Conditions Ta : 25°C
Iout : 100%

24V

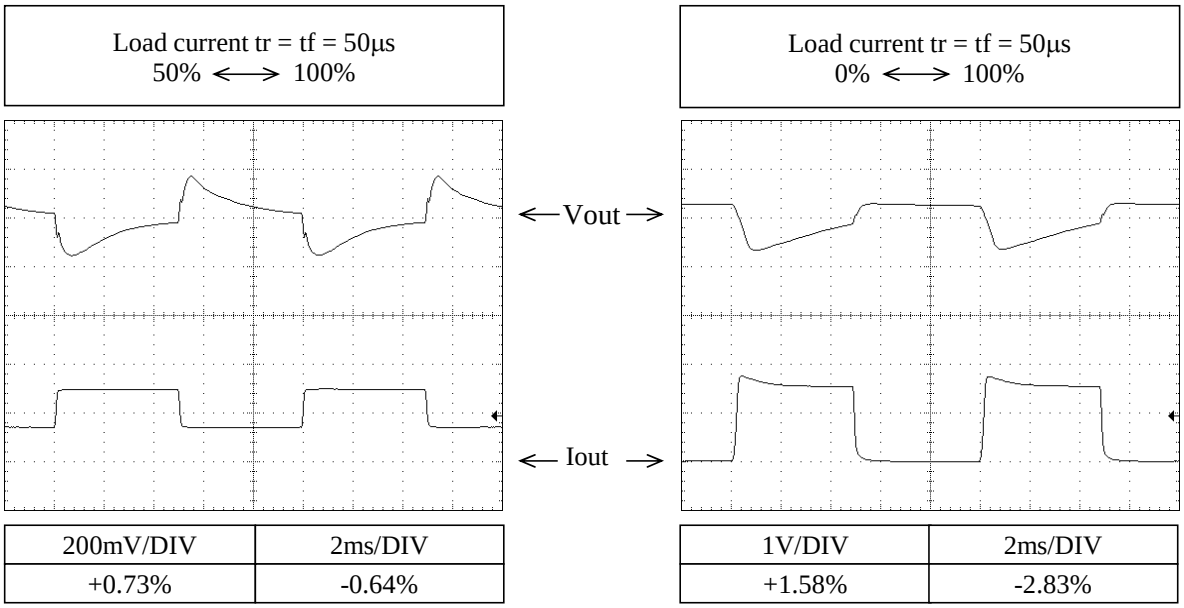


2.9 Dynamic load response characteristics

Conditions; Vin : 100VAC
Ta : 25°C

24V

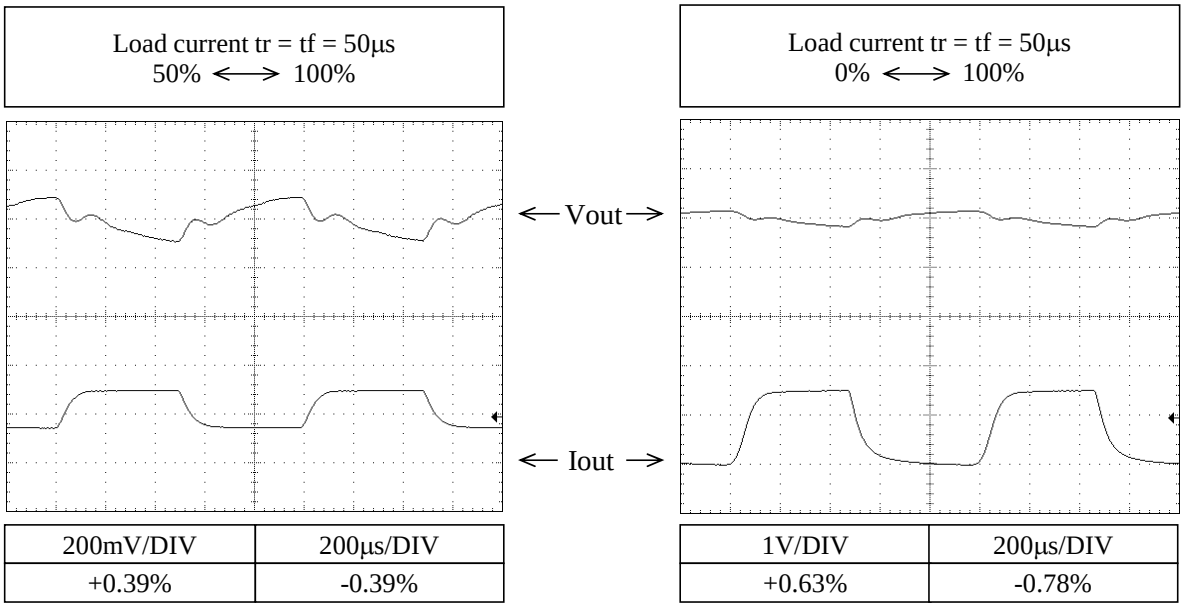
f=100Hz



200mV/DIV	2ms/DIV
+0.73%	-0.64%

1V/DIV	2ms/DIV
+1.58%	-2.83%

f=1kHz



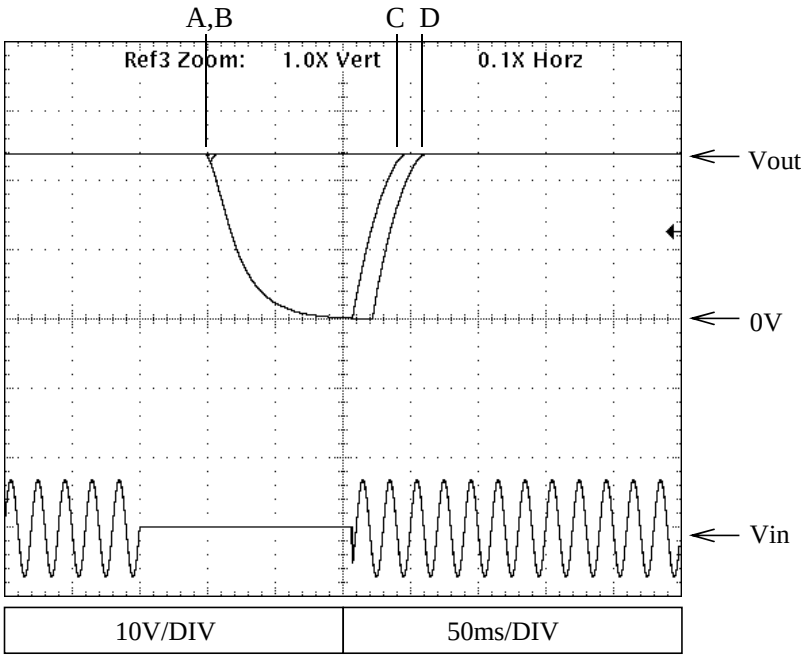
200mV/DIV	200μs/DIV
+0.39%	-0.39%

1V/DIV	200μs/DIV
+0.63%	-0.78%

2.10 Response to brown out characteristics

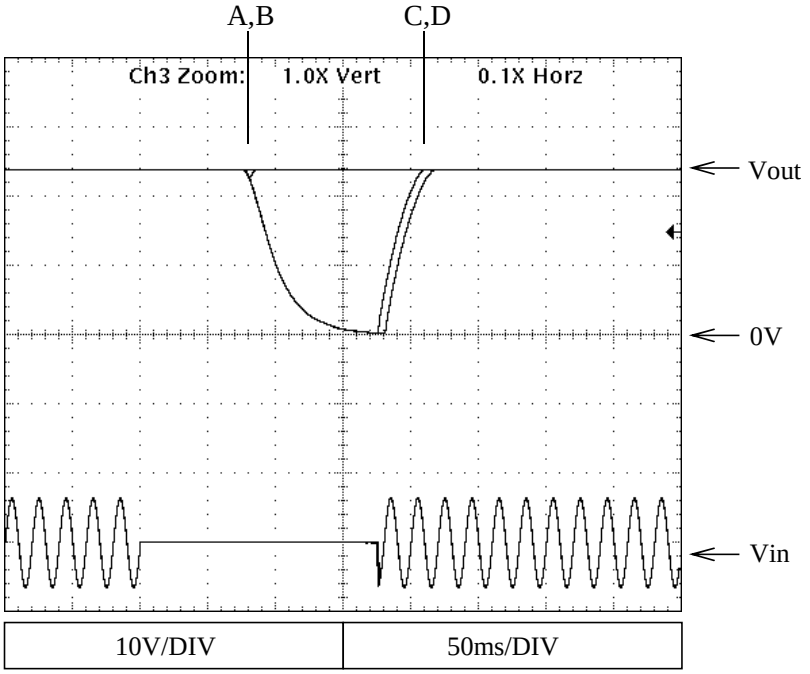
Conditions Vin : 100VAC
Iout : 100%
Ta : 25°C

24V



A= 48ms
B= 49ms
C= 156ms
D= 157ms

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



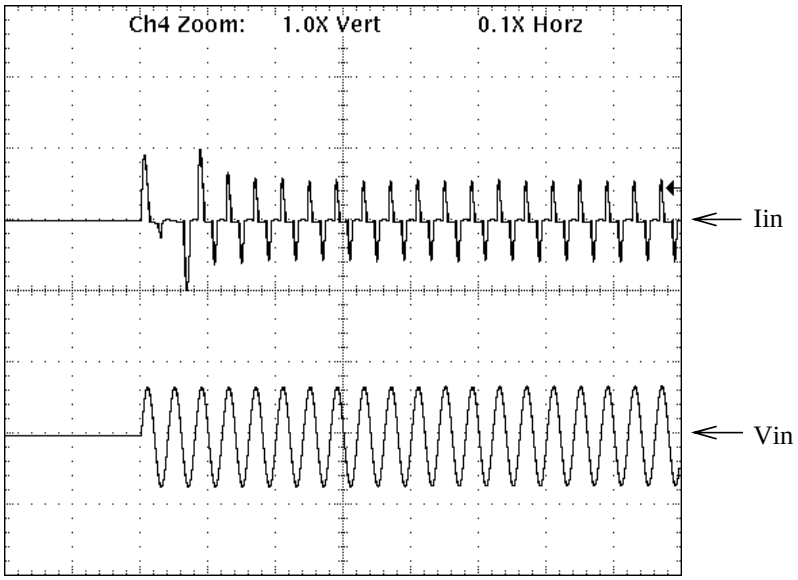
A= 78ms
B= 79ms
C= 175ms
A= 176ms

2.11 Inrush current waveform

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

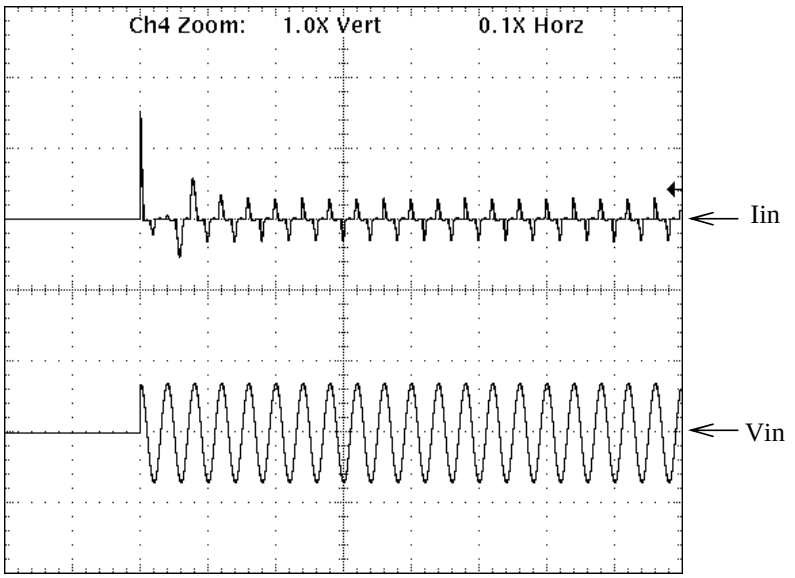
24V

Switch on phase angle of input AC voltage
$\phi = 0^{o}$



5A/DIV	50ms/DIV

Switch on phase angle of input AC voltage
$\phi = 90^{o}$



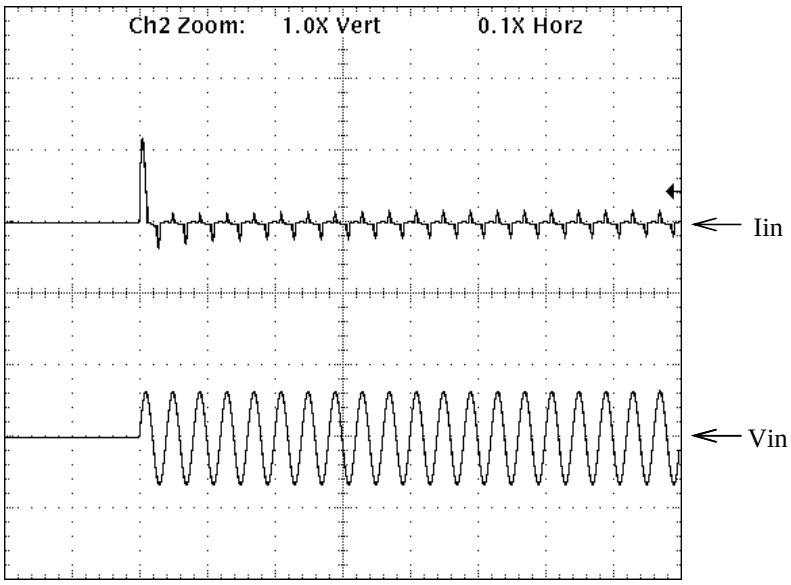
10A/DIV	50ms/DIV

2.11 Inrush current waveform

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

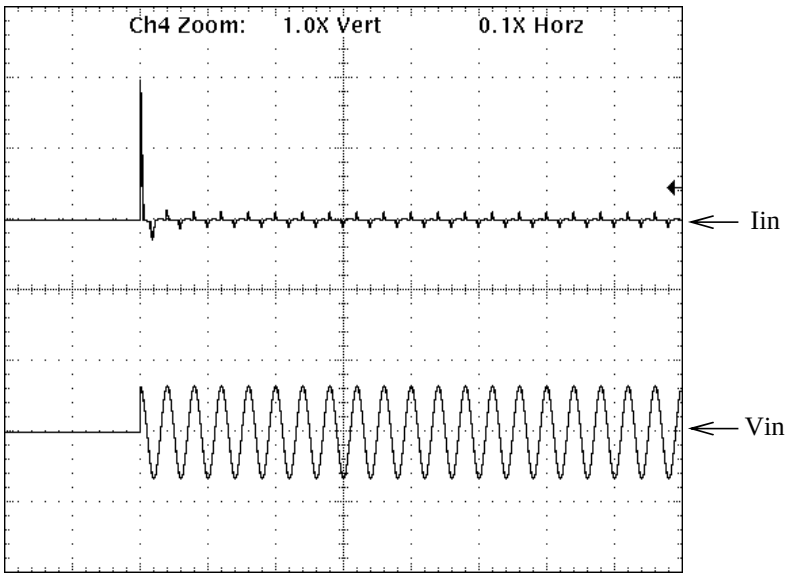
24V

Switch on phase angle of input AC voltage
$\phi = 0^{o}$



10A/DIV	25ms/DIV

Switch on phase angle of input AC voltage
$\phi = 90^{o}$

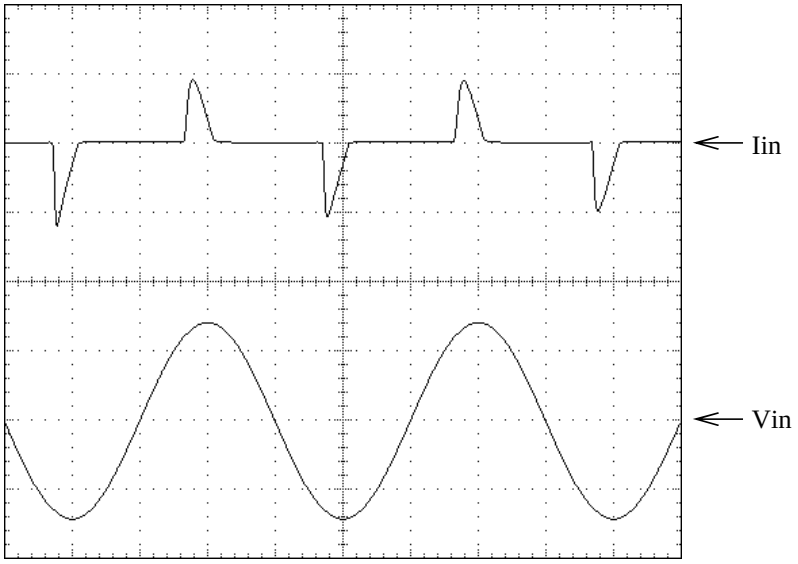


20A/DIV	25ms/DIV

2.12 Input current waveform

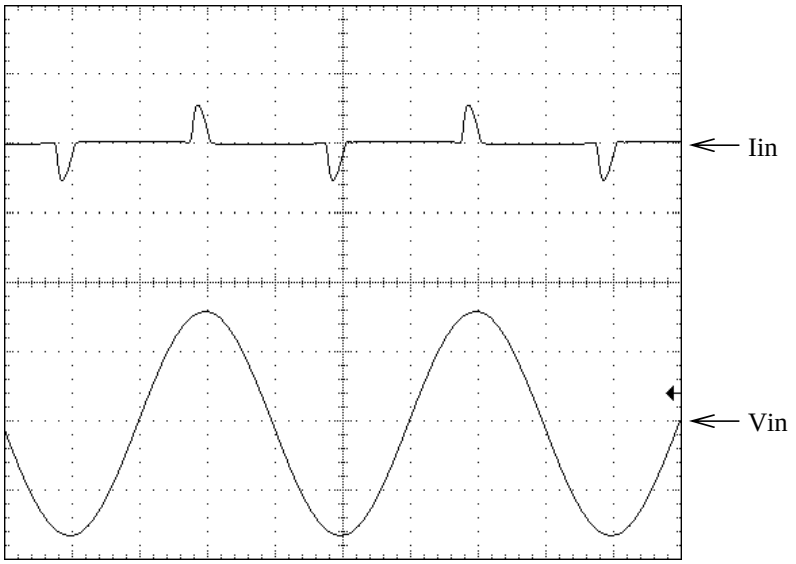
Conditions; Vin : 100VAC
Iout : 100%
Ta : 25°C

24V



5A/DIV	5ms/DIV

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

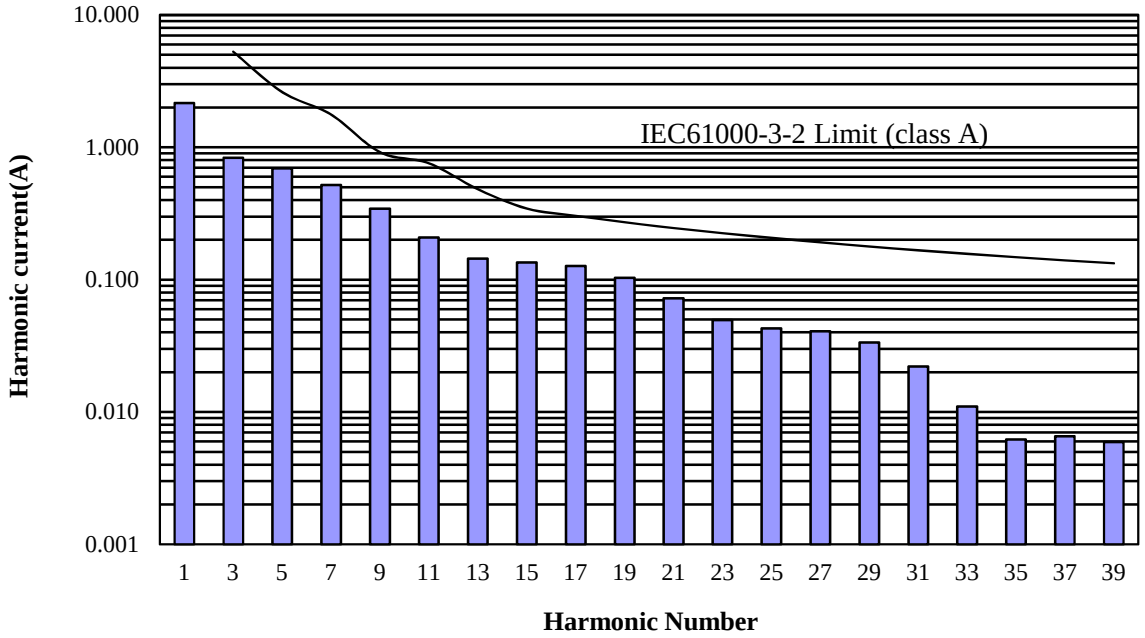


5A/DIV	5ms/DIV

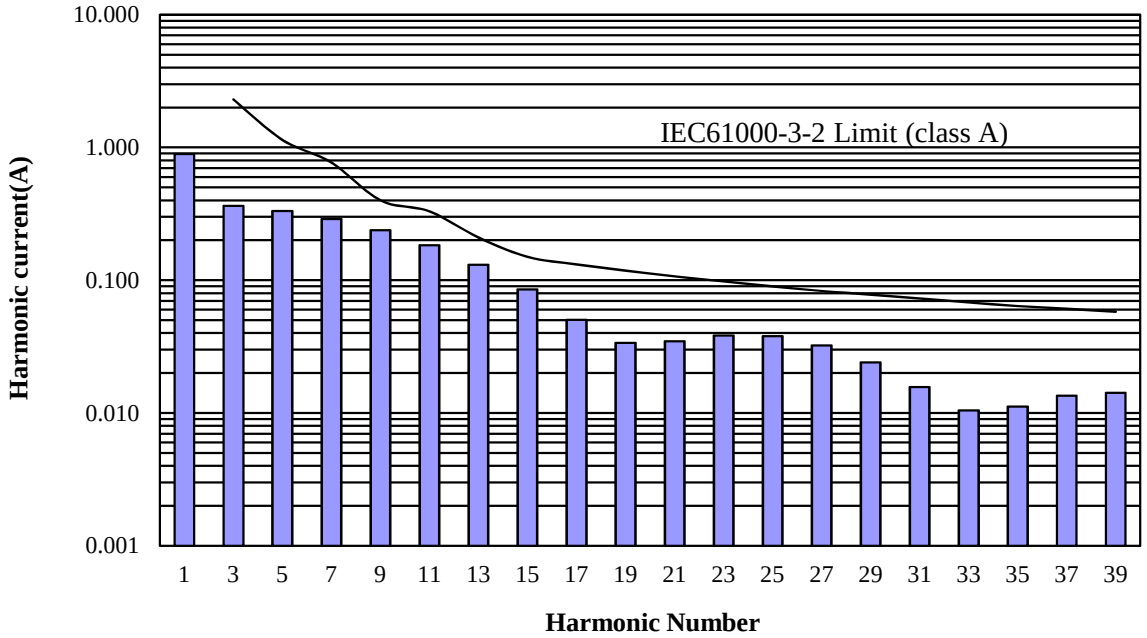
2.13 Input current harmonics

24V

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



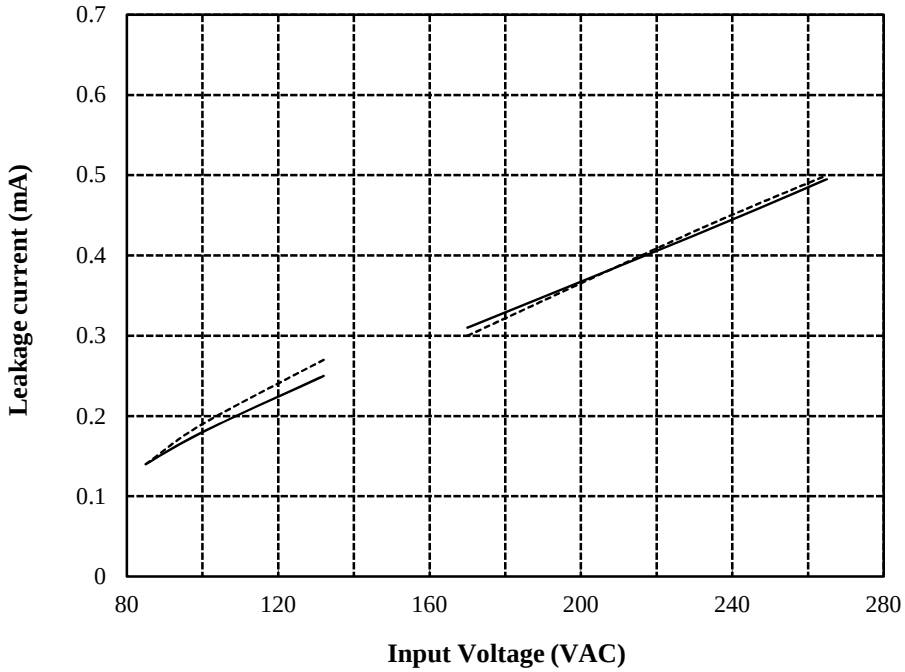
Conditions; Vin : 230VAC
Iout : 100%
Ta : 25°C



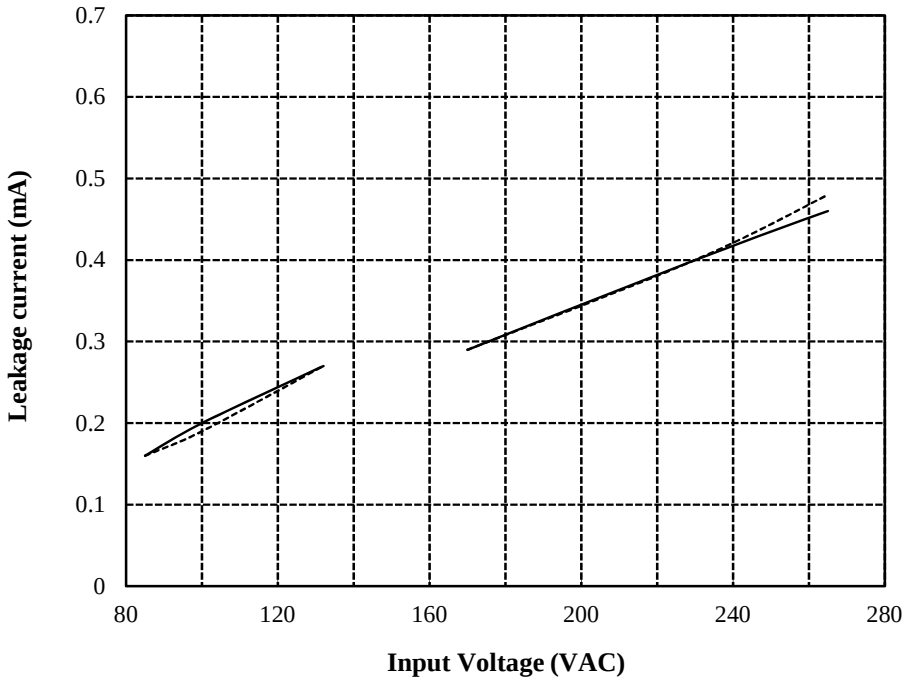
2.14 Leakage current characteristics

Conditions; Iout : 0% --------
: 100% ————
Ta : 25°C
f : 50Hz
Equipment used : MODEL 229-2 (Simpson)

24V



Conditions; Iout : 0% --------
: 100% ————
Ta : 25°C
f : 50Hz
Equipment used : TYPE 3226 (YOKOGAWA)

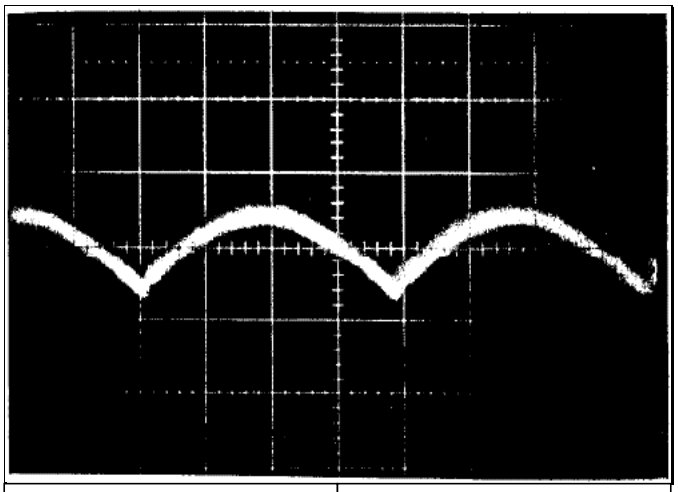


2.15 Output ripple and noise waveform

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

NORMAL MODE

24V

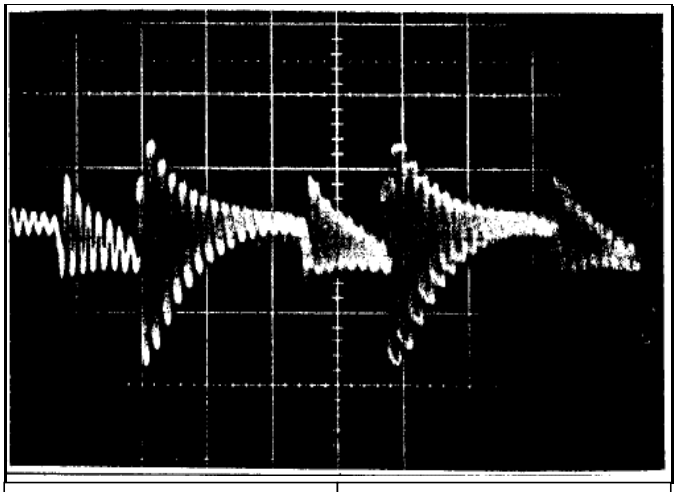


← Vout

5mV/DIV	5μs/DIV

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

NORMAL + COMMON MODE



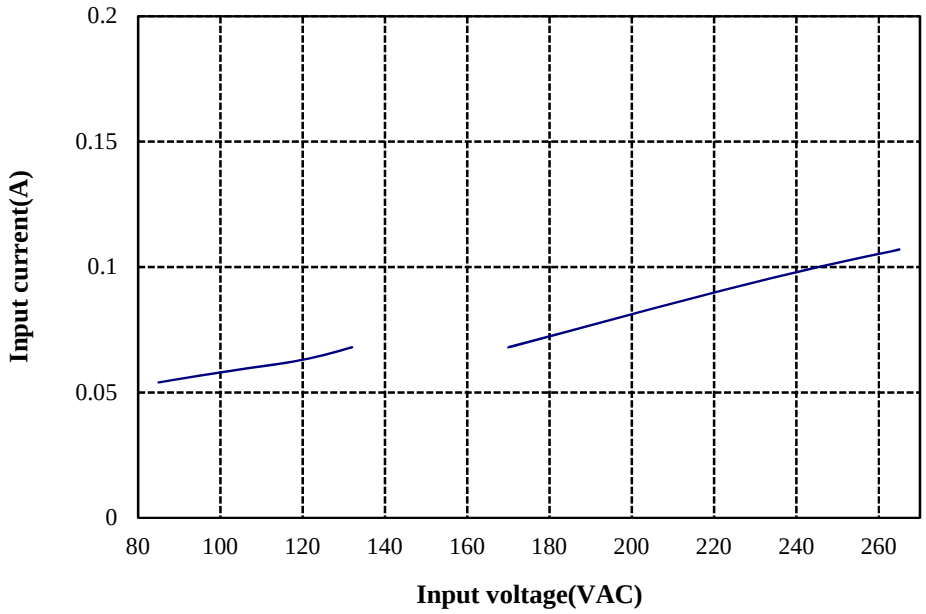
← Vout

10mV/DIV	5μs/DIV

2.16 Stand-by current

Conditions; Ta : 25°C
Iout : 0%

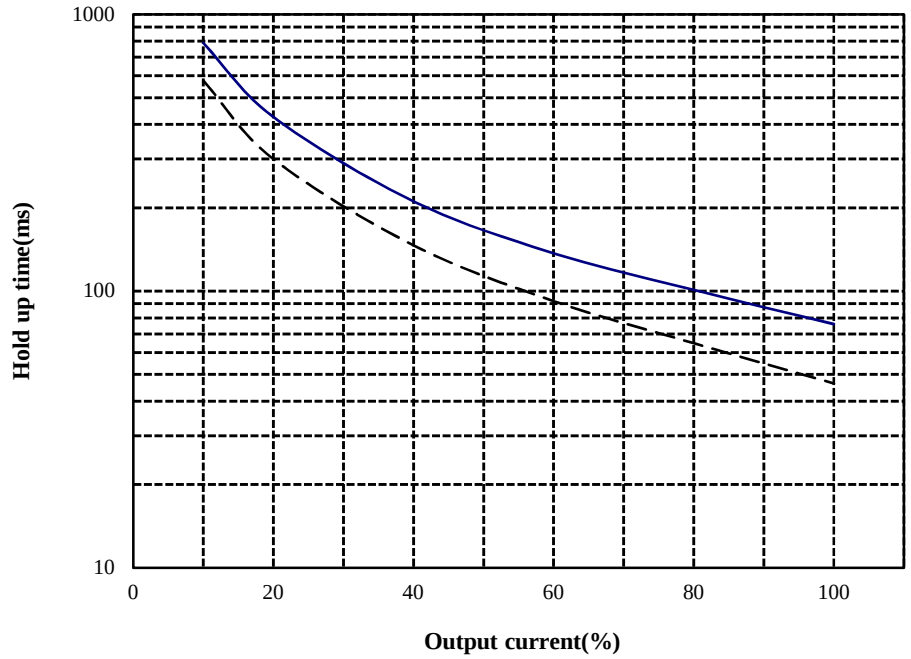
24V



2.17 Hold up time characteristics

Conditions; Vin : 100VAC – – – – –
: 230VAC ———
Ta : 25°C

24V



2.18 Electro-Magnetic Interference characteristics

Conducted Emission

Conditions

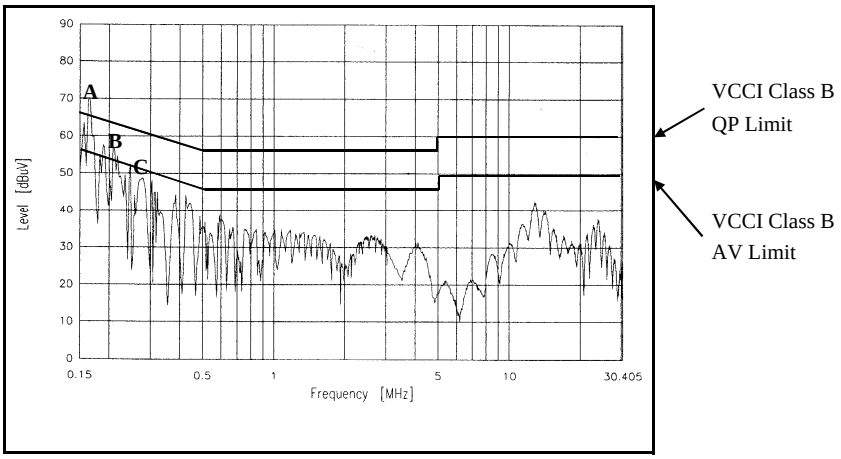
Iout : 100%

24V

Ref. / Data	Point A (0.164MHz) Limit (dBuV)	Measure (dBuV)
QP	65.3	51.6
AV	55.3	39.3

Ref. / Data	Point B (0.219MHz) Limit (dBuV)	Measure (dBuV)
QP	62.9	47.7
AV	52.9	44.2

Ref. / Data	Point C (0.274MHz) Limit (dBuV)	Measure (dBuV)
QP	61.0	47.5
AV	51.0	43.1

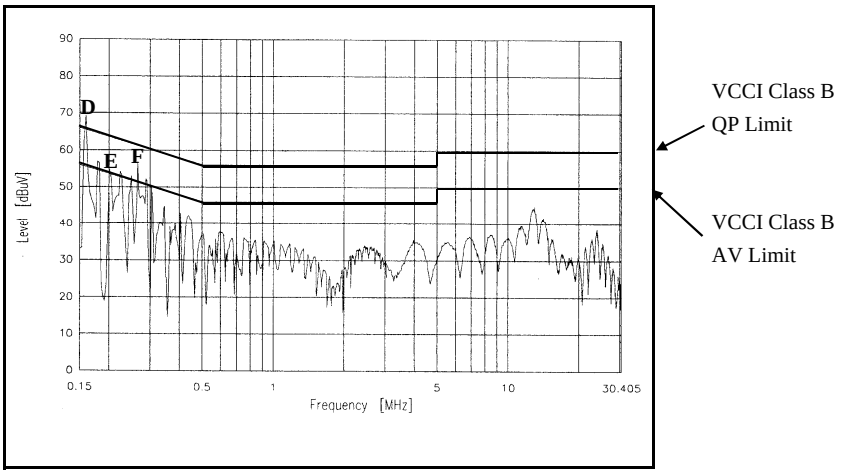


Phase : L

Ref. / Data	Point D (0.164MHz) Limit (dBuV)	Measure (dBuV)
QP	65.3	51.3
AV	55.3	39.9

Ref. / Data	Point E (0.219MHz) Limit (dBuV)	Measure (dBuV)
QP	62.9	47.1
AV	52.9	43.4

Ref. / Data	Point F (0.274MHz) Limit (dBuV)	Measure (dBuV)
QP	61.0	47.3
AV	51.0	42.9



Phase : N

Limits of EN55032-B,FCC Class B are same as VCCI class B.

2.18 Electro-Magnetic Interference characteristics

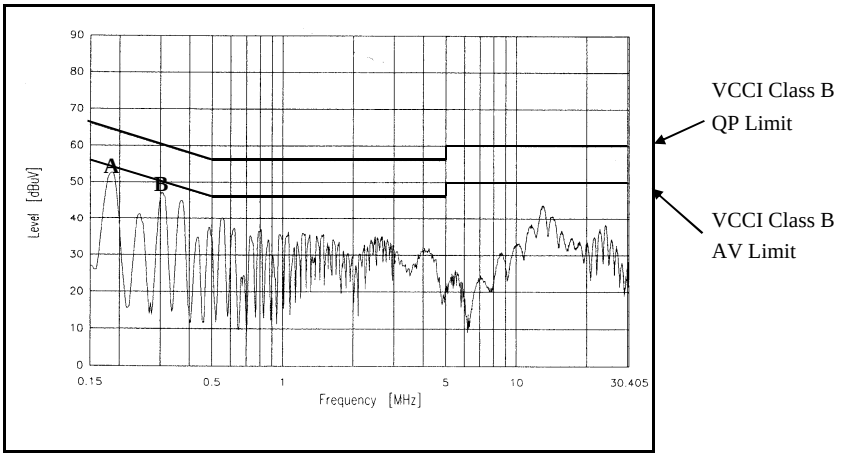
Conducted Emission

Conditions
Vin : 230VAC
Iout : 100%

24V

Ref. / Data	Point A (0.183MHz) Limit (dBuV)	Measure (dBuV)
QP	64.3	51.7
AV	54.3	47.3

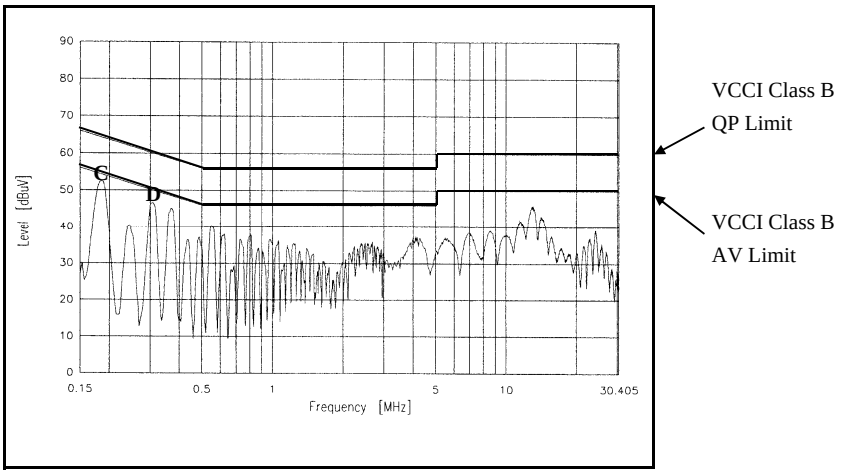
Ref. / Data	Point B (0.306MHz) Limit (dBuV)	Measure (dBuV)
QP	60.1	46.1
AV	50.1	44.0



Phase : L

Ref. / Data	Point C (0.184MHz) Limit (dBuV)	Measure (dBuV)
QP	64.3	51.7
AV	54.3	47.5

Ref. / Data	Point D (0.306MHz) Limit (dBuV)	Measure (dBuV)
QP	60.1	45.5
AV	50.1	43.6



Phase : N

Limits of EN55032-B,FCC Class B are same as VCCI class B.

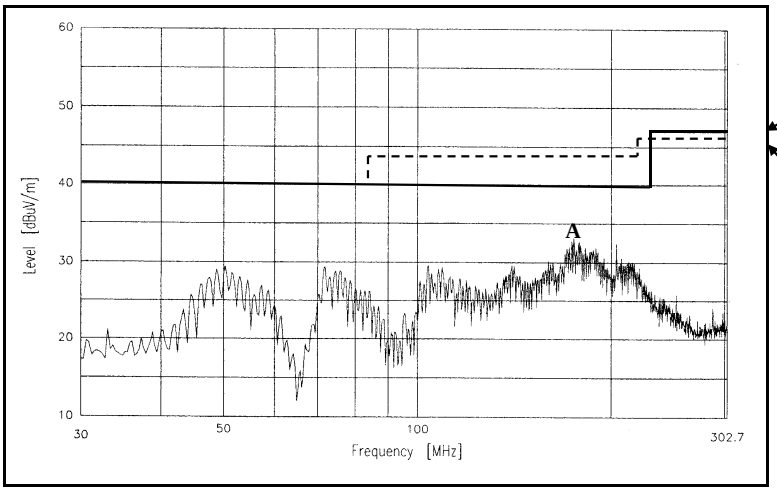
2.18 Electro-Magnetic Interference characteristics

Radiated Emission

Conditions
Vin : 100VAC
Iout : 100%

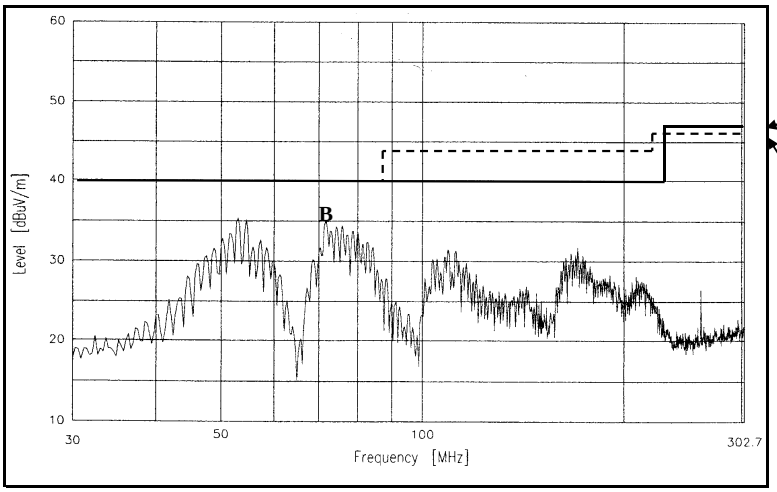
24V

HORIZONTAL:



Point A (173.7MHz)	
Limit (dBuV/m)	Measure (dBuV/m)
40.0	30.2

VERTICAL:



Point B (71.4MHz)	
Limit (dBuV/m)	Measure (dBuV/m)
40.0	34.6

Limits of EN55032-B are same as its VCCI class B.

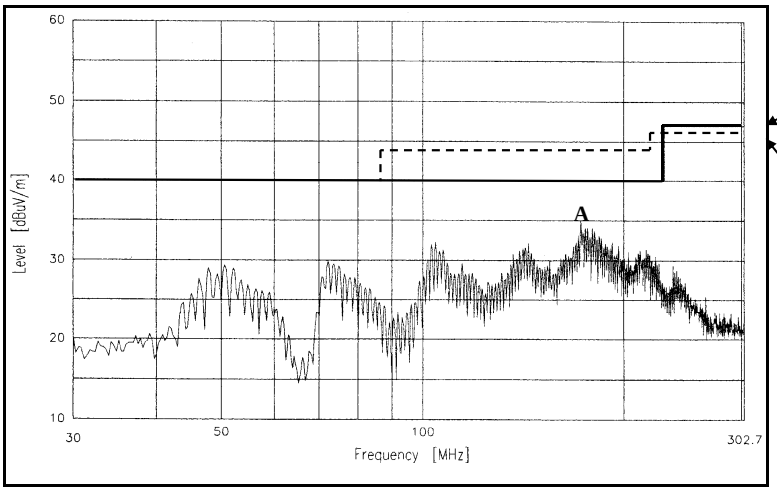
2.18 Electro-Magnetic Interference characteristics

Radiated Emission

Conditions
Vin : 230VAC
Iout : 100%

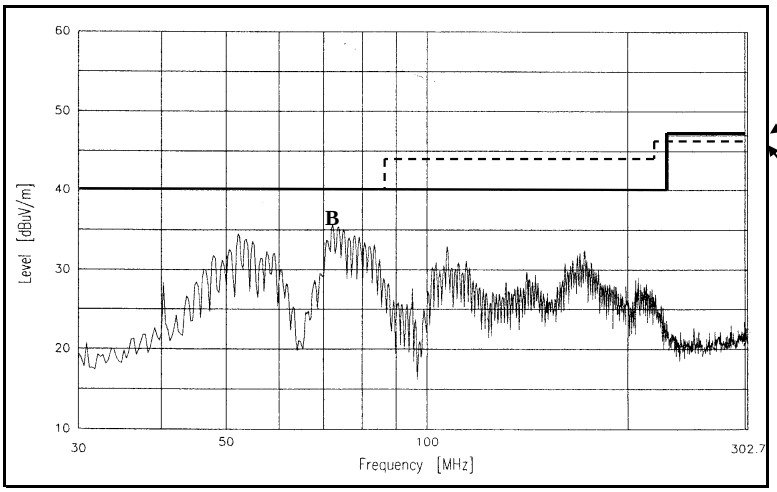
24V

HORIZONTAL:



Point A (173.4MHz)	
Limit (dBuV/m)	Measure (dBuV/m)
40.0	32.2

VERTICAL:



Point B (72.1MHz)	
Limit (dBuV/m)	Measure (dBuV/m)
40.0	35.1

Limits of EN55032-B are same as its VCCI class B.