DLP180-24-1

EVALUATION DATA

CA735-53-01			
QA APPD	APPD	CHK	DWG
4/Jun/03	30 May 2003	26/May/03	26/may/03

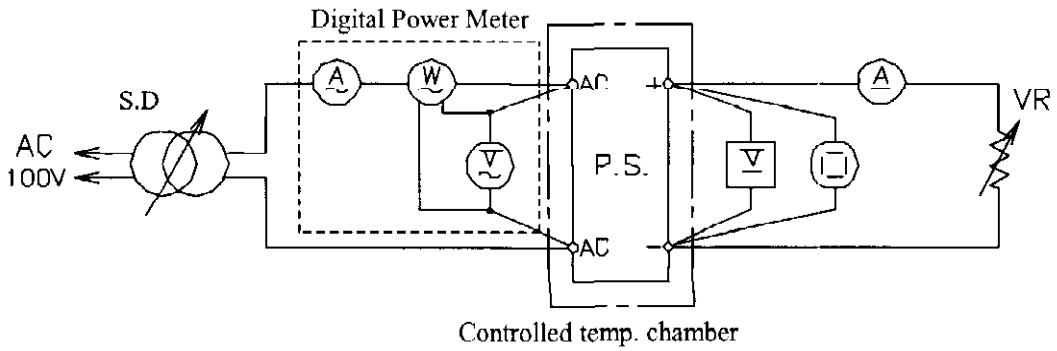
INDEX

Terminology used

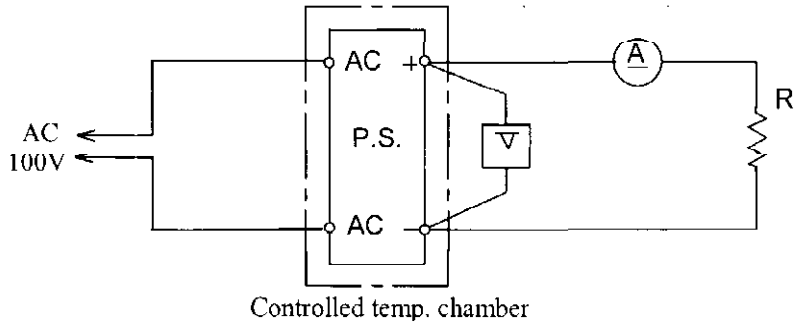
	Definition
Vin	. . . . . Input voltage
Vout	. . . . . Output voltage
Iin	. . . . . Input current
Iout	. . . . . Output current
Ta	. . . . . Ambient temperature

1. 1 Circuit used for determination

(1) Steady state data



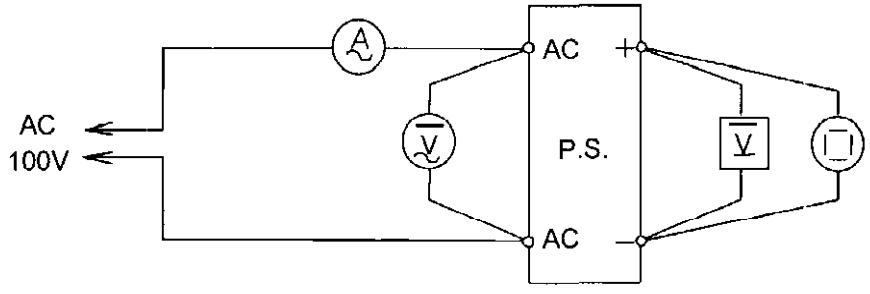
(2)Warm up voltage drift characteristics



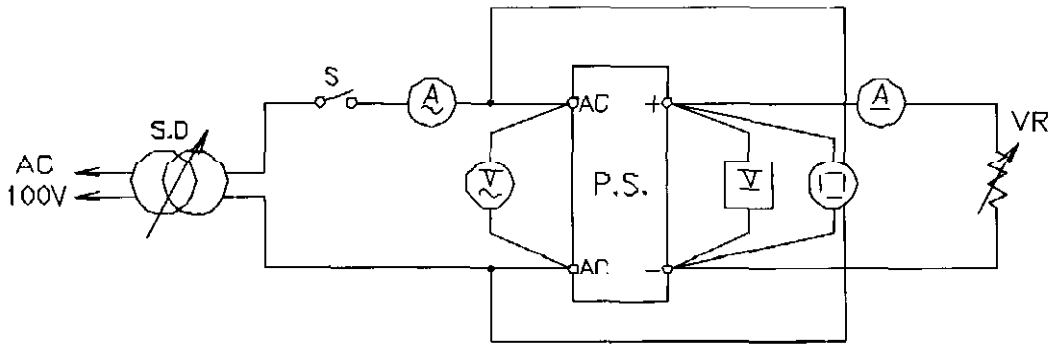
(3) Over current protection (O.C.P) characteristics

Same as steady state data.

(4) Over voltage protection (O.V.P) characteristics



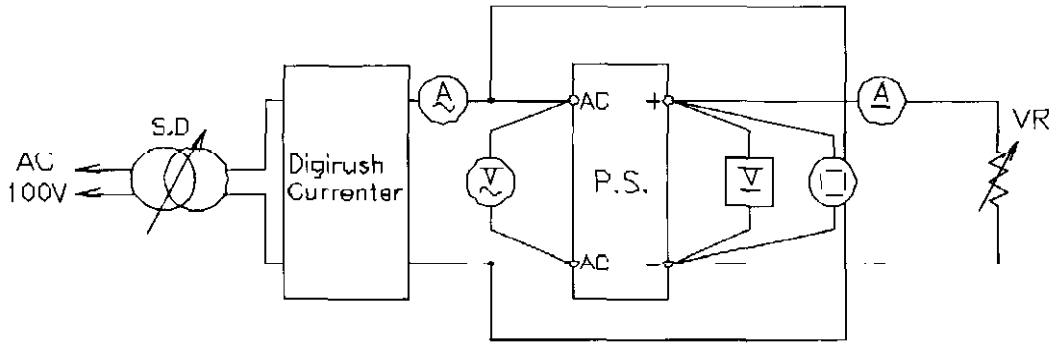
(5) Output rise characteristics



(6) Output fall characteristics

Same as output rise characteristics.

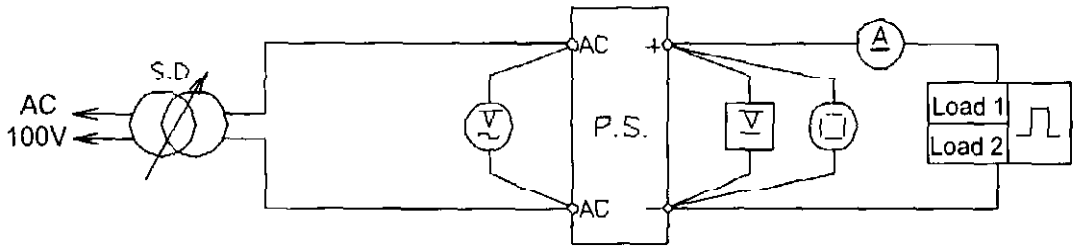
(7) Dynamic line response characteristics



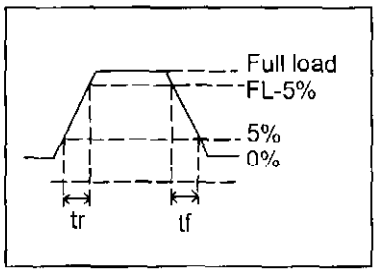
(8) Input voltage dip test

Same as Dynamic line response characteristics.

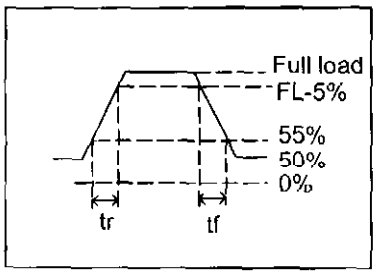
(9) Dynamic load response characteristics



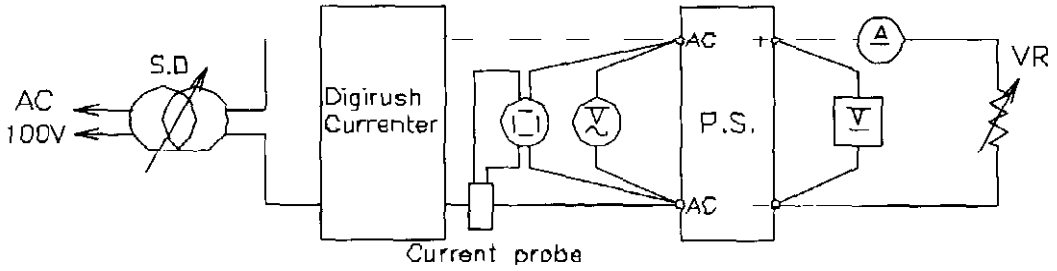
Output current waveform :
Iout 0% ⟷ Full load



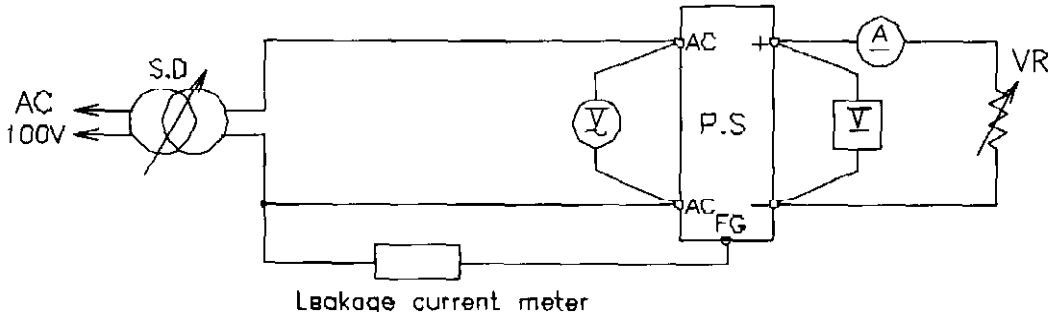
Output current waveform :
Iout 50% ⟷ Full load



(10) Inrush current characteristics



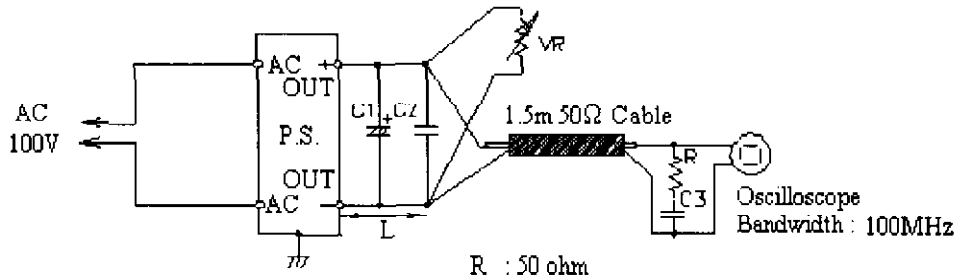
(11) Leakage current characteristics



Note : Leakage current measured through a 1k ohm resistor.
Range used : AC + DC
For SIMPSON MODEL 228 and YOKOGAWA TYPE 3226

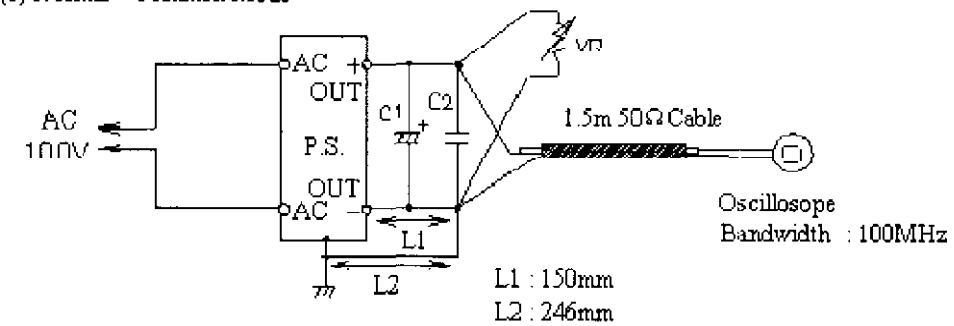
(12) Output - ripple, noise waveform

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



R : 50 ohm
C3 : 4700pF Film Capacitor
L : 150mm
C1 : 100uF Electrolytic Capacitor
C2 : 0.1uF Film Capacitor

(b) Normal + Common Mode



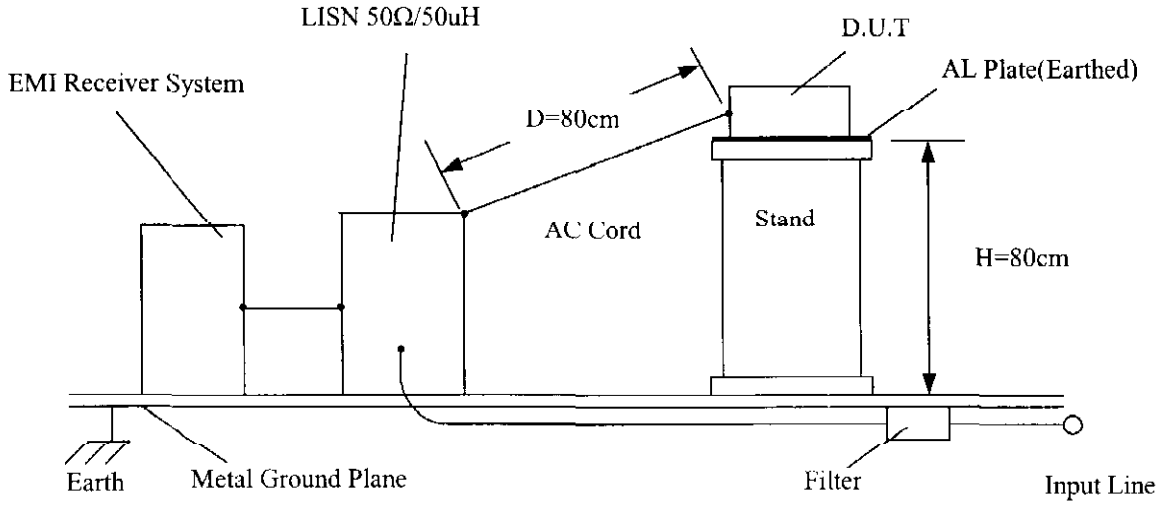
L1 : 150mm
L2 : 246mm
C1 : 100uF Electrolytic Capacitor
C2 : 0.1uF Film Capacitor

(13) Stand-by current

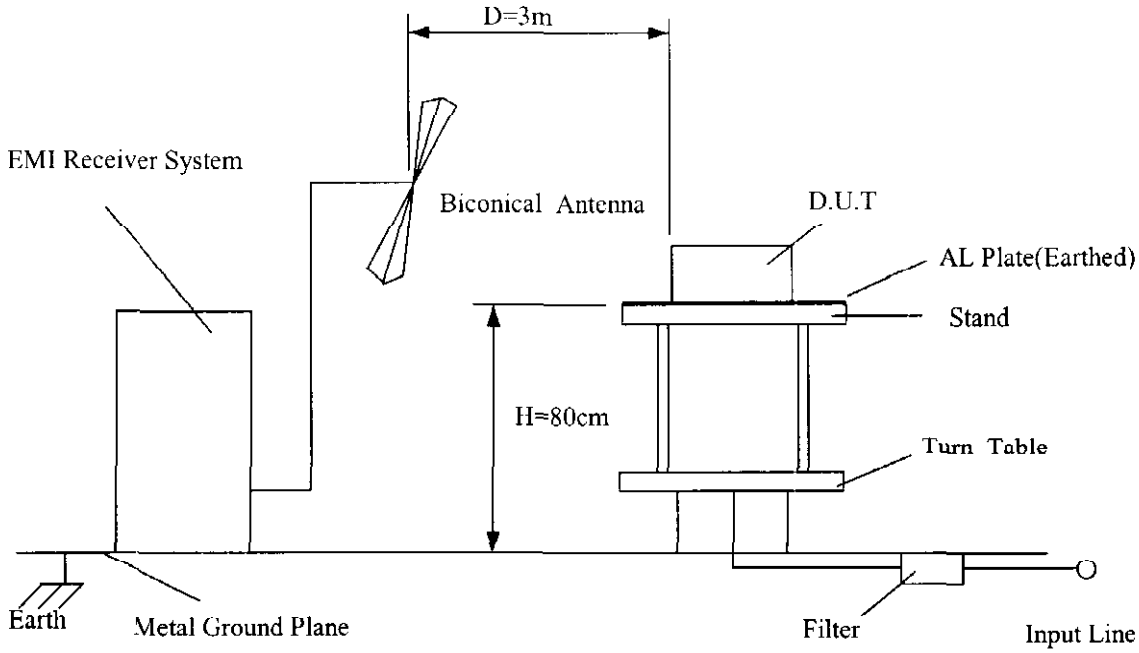
Same as steady state data

(14) Electro-Magnetic Interference characteristics

(a) Conducted Emission Noise



(b) Radiated Emission Noise



1.2 LIST OF EQUIPMENT USED

	EQUIPMENT USED	MANUFACTURER	MODEL NO.
1	Oscilloscope	HITACHI	V-1050F
2	Digital storage oscilloscope	TEKTRONIX	TDS 714L
3	Digital volt meter	LEADER	856
4	Digital power meter	YOKOGAWA	2533
5	DC ampere meter	YOKOGAWA	2051
6	Dynamic dummy load	KIKUSUI	PLZ152W
7	Current probe/amplifier	TEKTRONIX	A6303/AM503B
8	Controlled temperature chamber	TABAI-ESPEC	SU-240
9	Leakage current meter	SIMPSON	228
10	Digirush currenter	TAKAMIZAWA CYBERNETICS	PSA-200
11	EMI receiver	HEWLETT PACKARD	HP8546A
12	LISN	EMCO	3825/2
13	Biconical antenna	EMCO	3110B

2. Characteristics

2.1 Steady state data

(1) Regulation - line and load, temperature drift

24V

1. Regulation-line and load

condition Ta : 25°C

Iout \ Vin	85VAC	100VAC	230VAC	265VAC	line regulation	
0%	24.033V	24.033V	24.034V	24.033V	0.001V	0.004%
50%	24.030V	24.030V	24.030V	24.030V	0.000V	0.000%
100%	24.016V	24.016V	24.017V	24.017V	0.001V	0.004%
load	0.017V	0.017V	0.017V	0.016V		
regulation	0.071%	0.071%	0.071%	0.067%		

2. Temperature drift

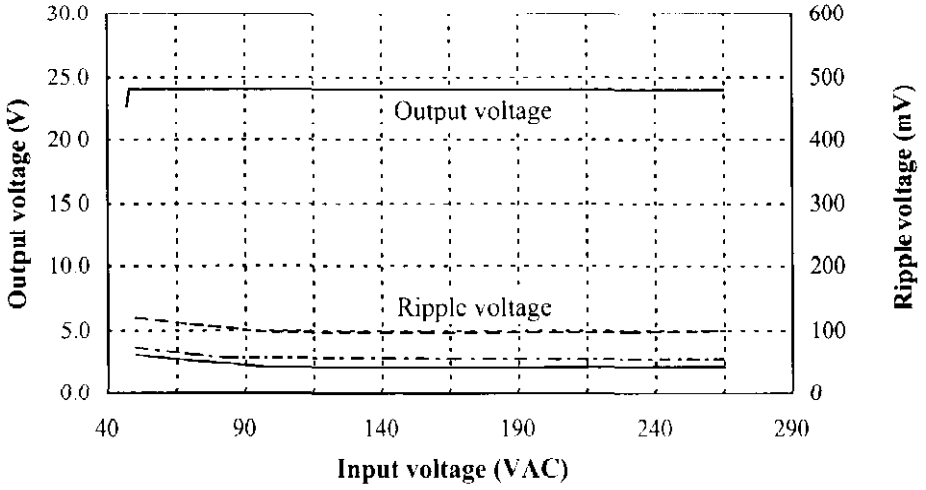
conditions Vin = 100VAC
Iout = 100%

Ta	-10°C	+25°C	+50°C	temperature stability	
Vout	24.039	24.016	23.986	0.053V	0.221%

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

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

24V

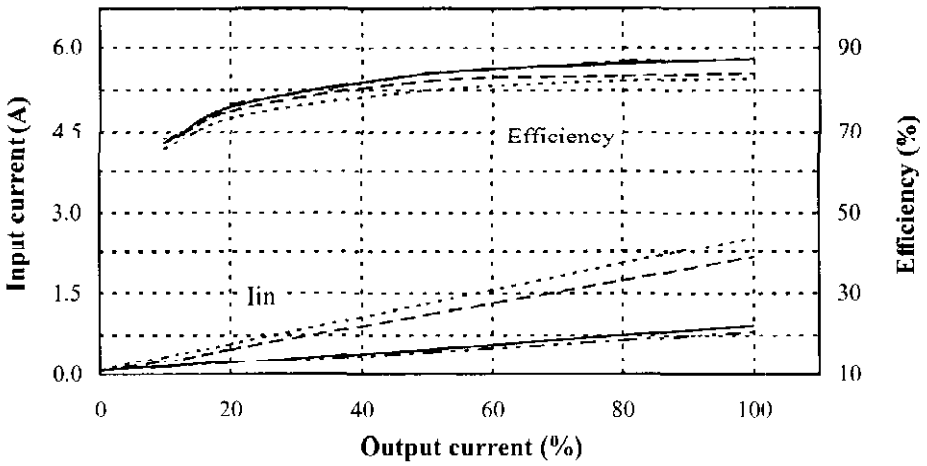


2.1 (3) Efficiency and input current v.s. Output current

Conditions Vin : 85VAC --------
: 100VAC – – – – –
: 230VAC ————
: 265VAC —·—·—·—

Ta : 25°C

24V

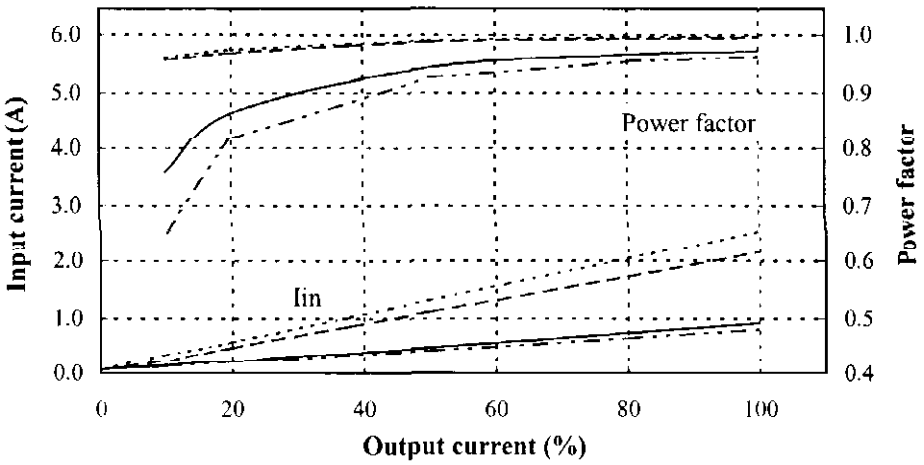


2.1 (1) Power factor and Input current v.s Output current

Conditions Vin : 85VAC
: 100VAC
: 230VAC
: 265VAC

Ta : 25°C

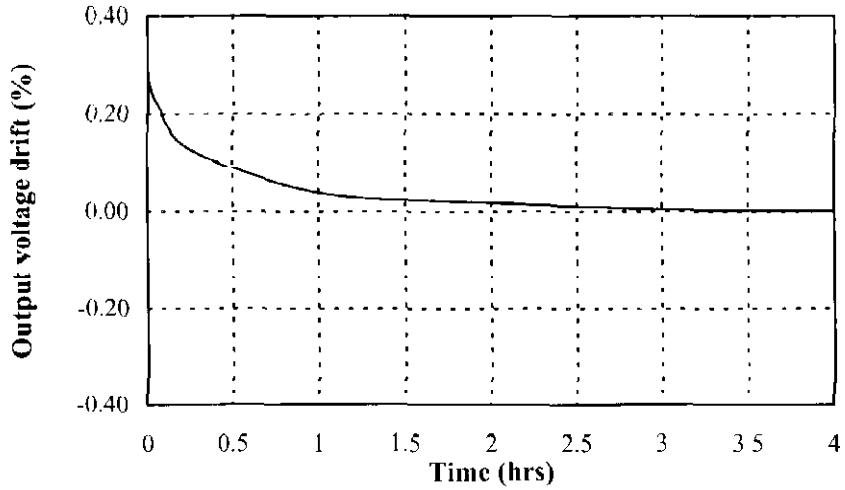
24V



2.2 Warm up voltage drift characteristics

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

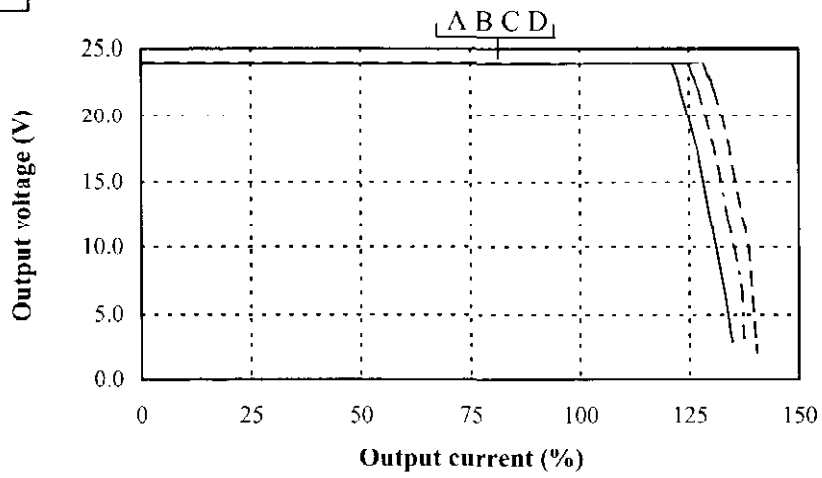
24V



2.3 Over current protection (OCP) characteristics

Conditions Vin : 85VAC (A) Ta : -10°C
: 100VAC (B) : 25°C
: 200VAC (C) : 50°C
: 265VAC (D)

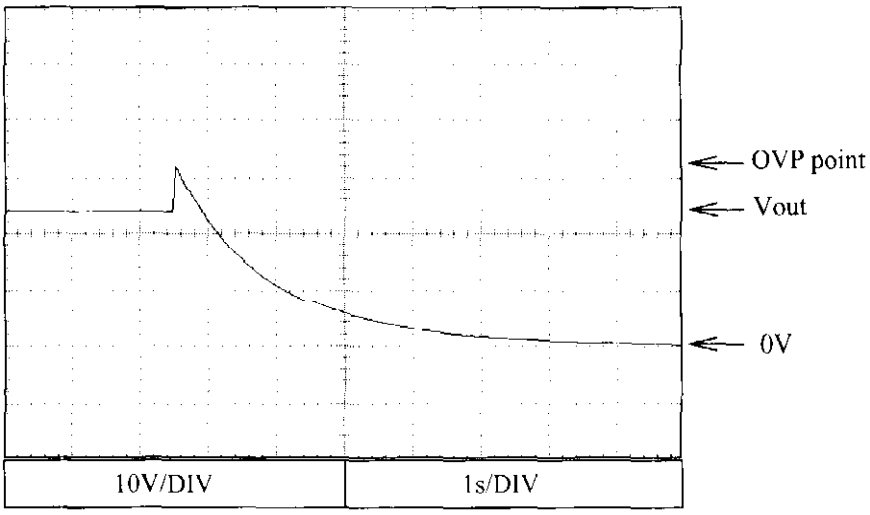
24V



2.4 Over voltage protection (OVP) characteristics

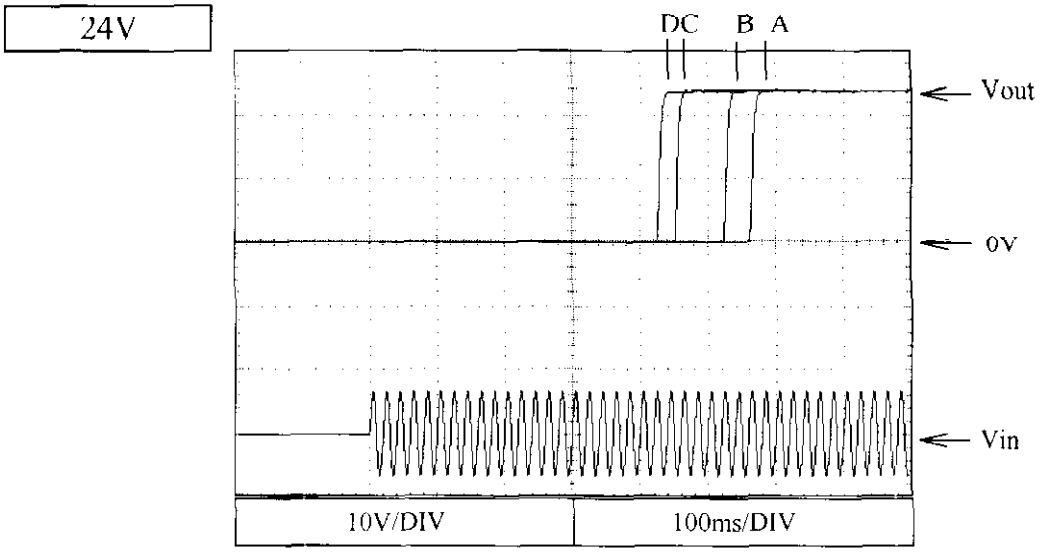
Conditions Vin : 100VAC
Iout : 0%
Ta : 25°C

24V



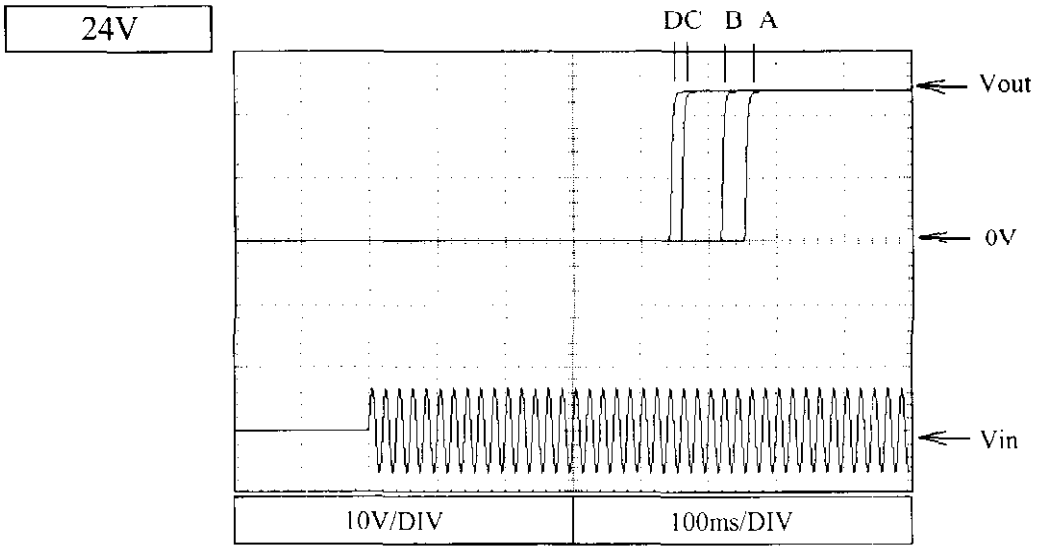
2.5 Output rise characteristics

Conditions Vin : 85VAC (A)
: 100VAC (B)
: 230VAC (C)
: 265VAC (D)
Iout : 0%
Ta : 25°C



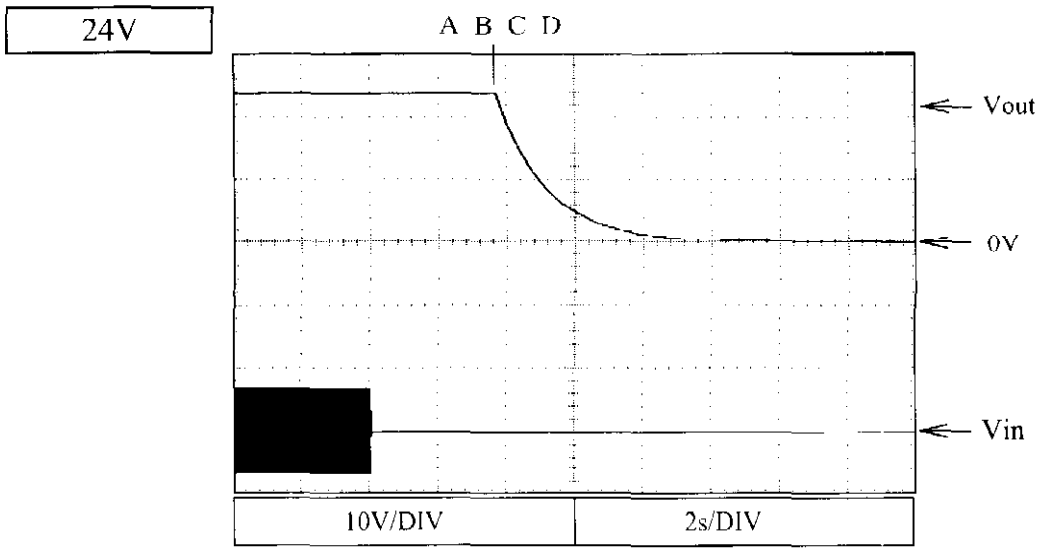
2.5 Output rise characteristics

Conditions
Vin : 85VAC (A)
: 100VAC (B)
: 230VAC (C)
: 265VAC (D)
Iout : 100%
Ta : 25°C



2.6 Output fall characteristics

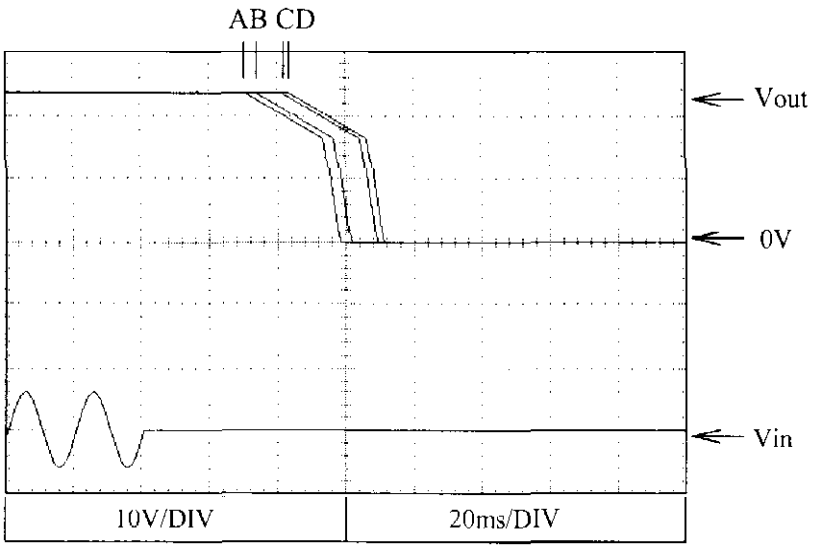
Conditions
Vin : 85VAC (A)
: 100VAC (B)
: 230VAC (C)
: 265VAC (D)
Iout : 0%
Ta : 25°C



2.6 Output fall characteristics

Conditions Vin : 85VAC (A)
: 100VAC (B)
: 230VAC (C)
: 265VAC (D)
Iout : 100%
Ta : 25°C

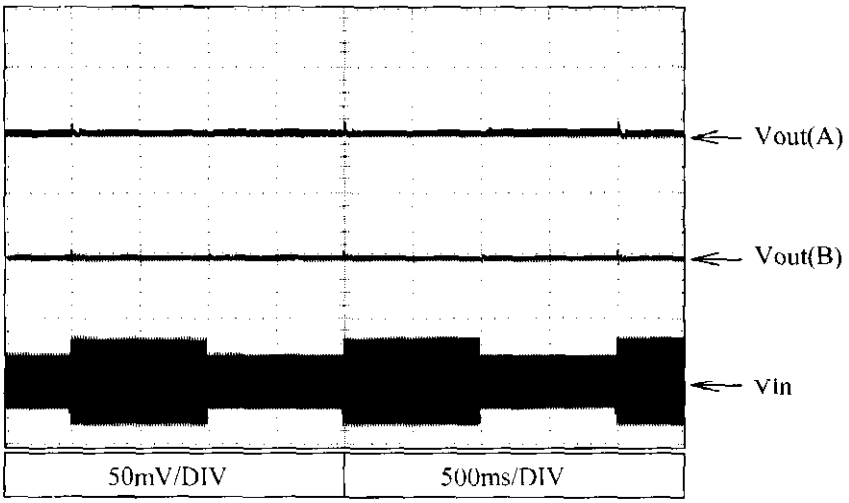
24V



2.7 Dynamic line response characteristics

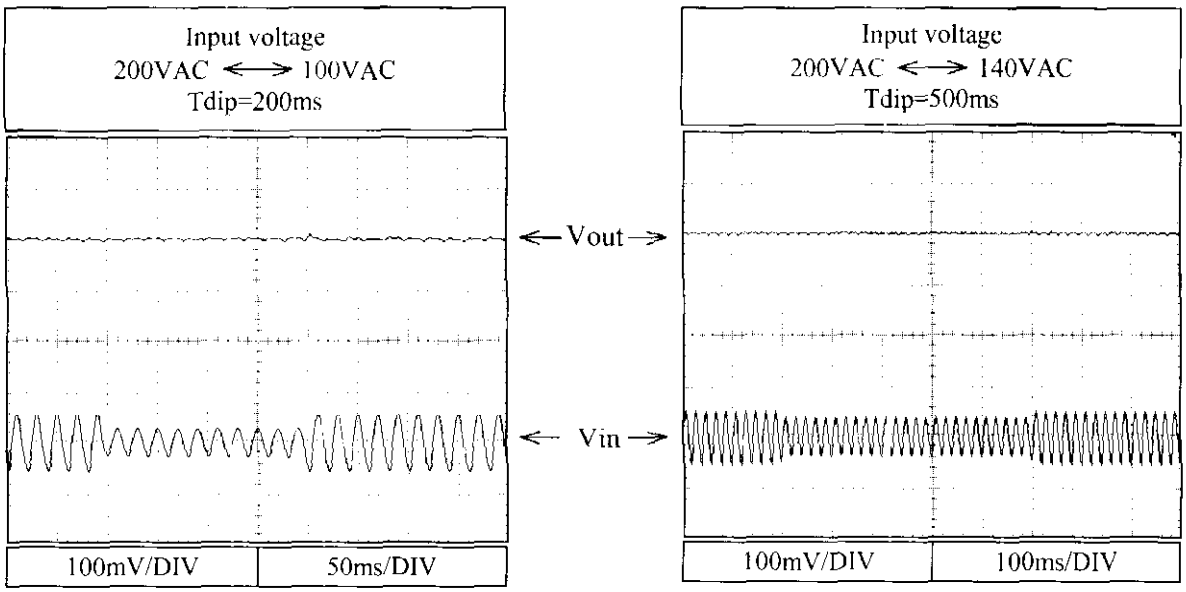
Conditions Vin : 85VAC ⟷ 132VAC(A)
170VAC ⟷ 265VAC(B)
Iout : 100%
Ta : 25°C

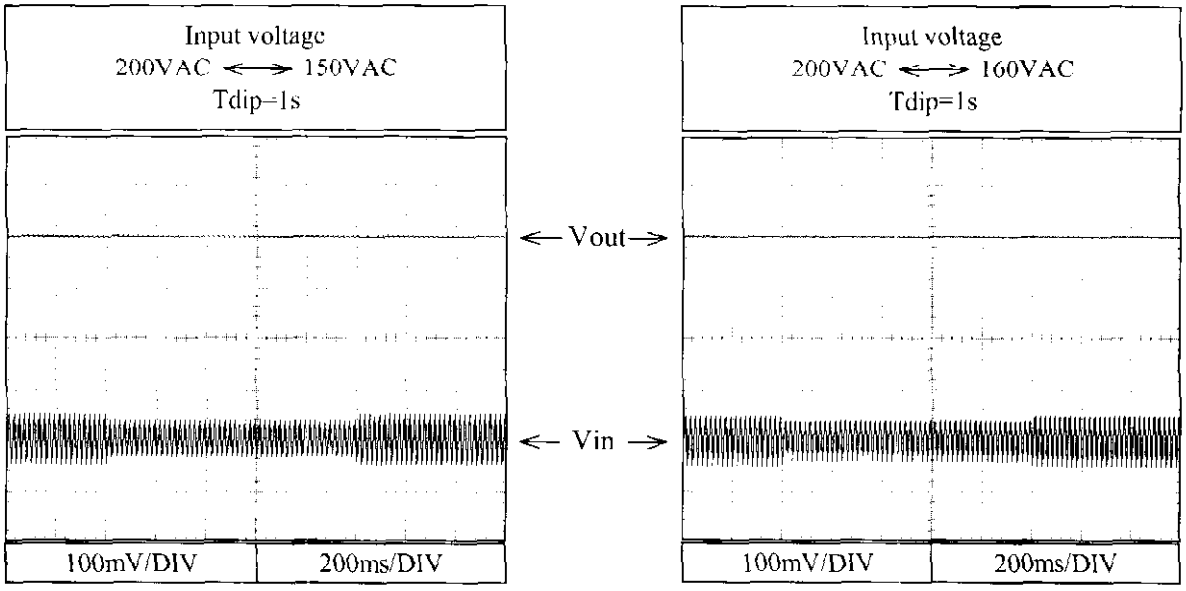
24V



2.8 Input voltage dip test

Conditions Ta : 25°C
Iout : 100%



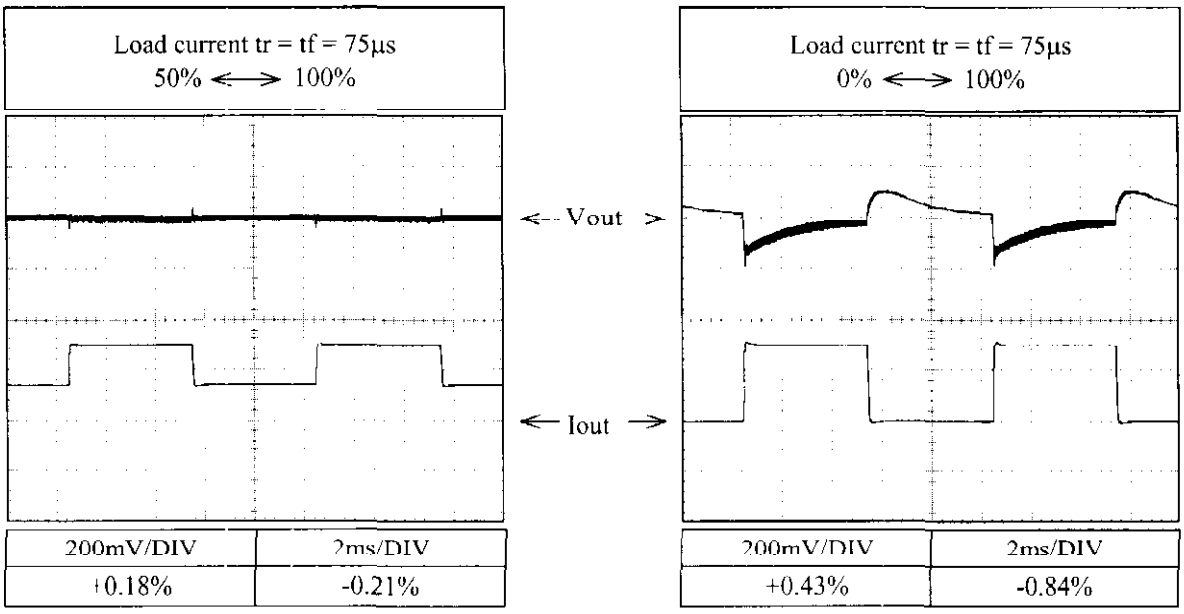


2.9 Dynamic load response characteristics

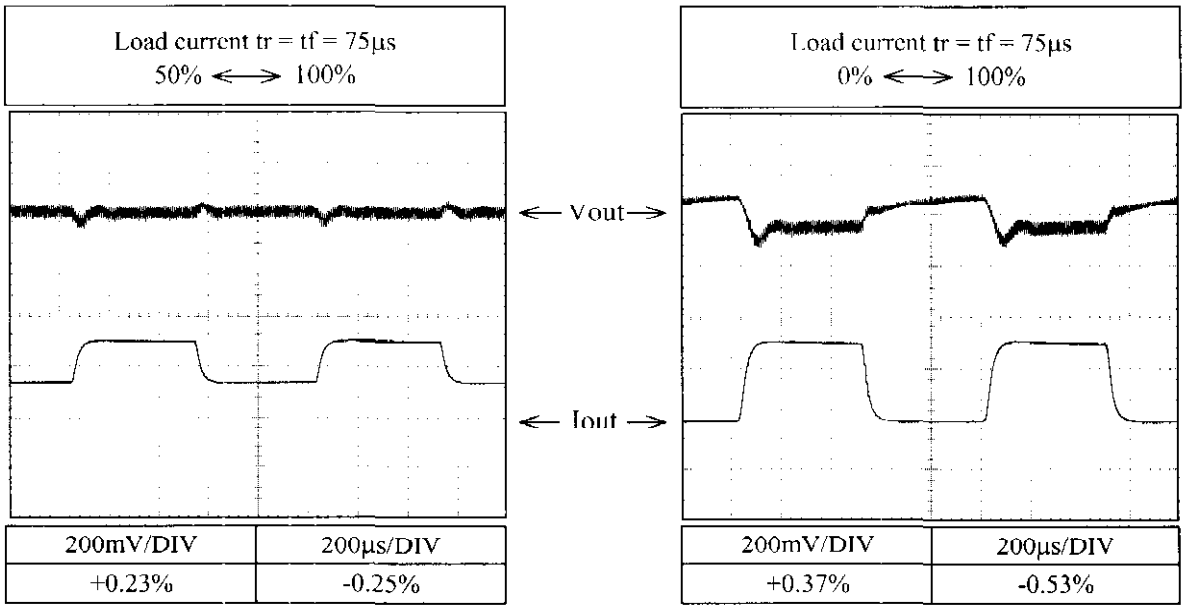
Conditions Vin : 100VAC
Ta : 25°C

24V

f=100Hz



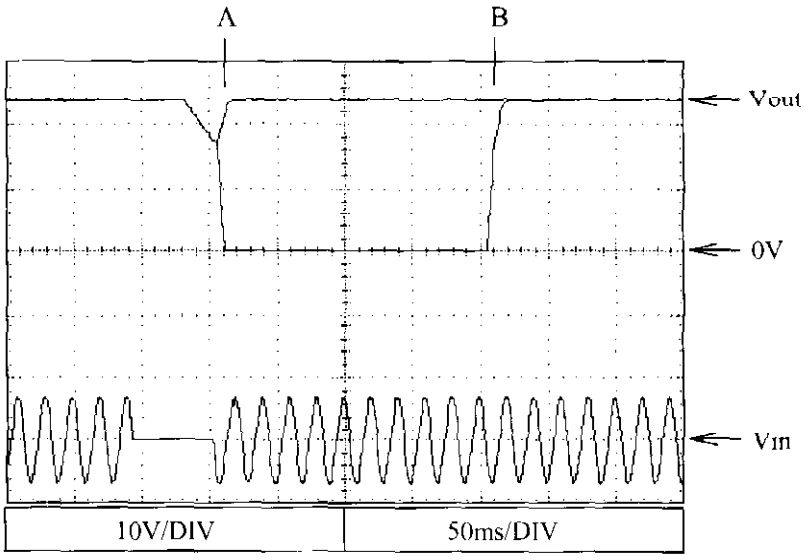
f=1kHz



2.10 Response to brown out characteristics

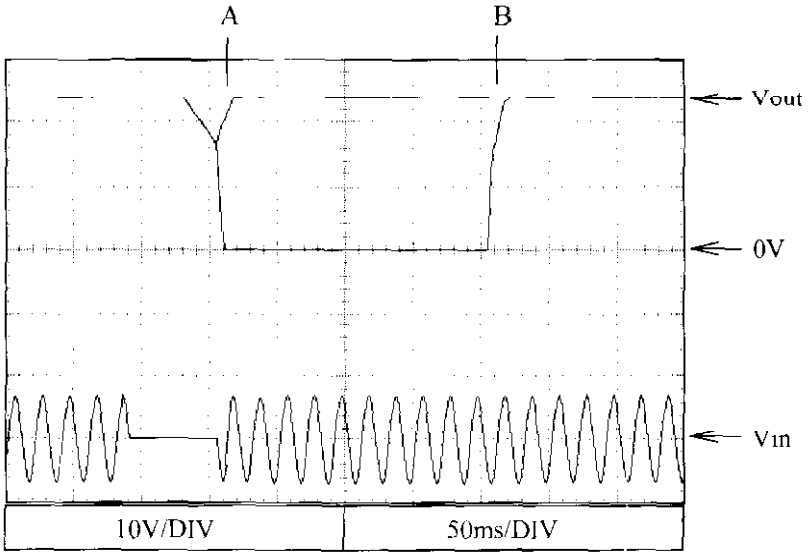
Conditions Vin : 100VAC
Iout : 100%
Ta : 25°C

24V



A=57ms
B=58ms

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



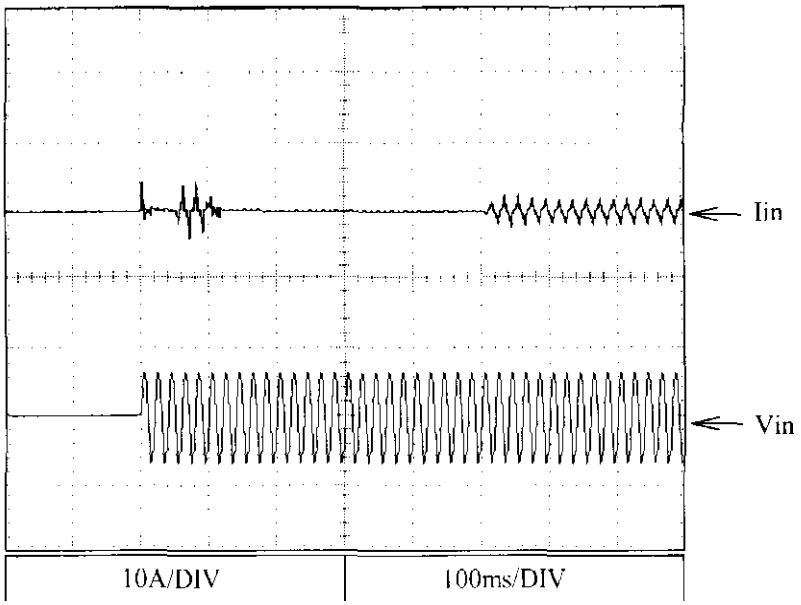
A=67ms
B=68ms

2.11 Inrush current waveform

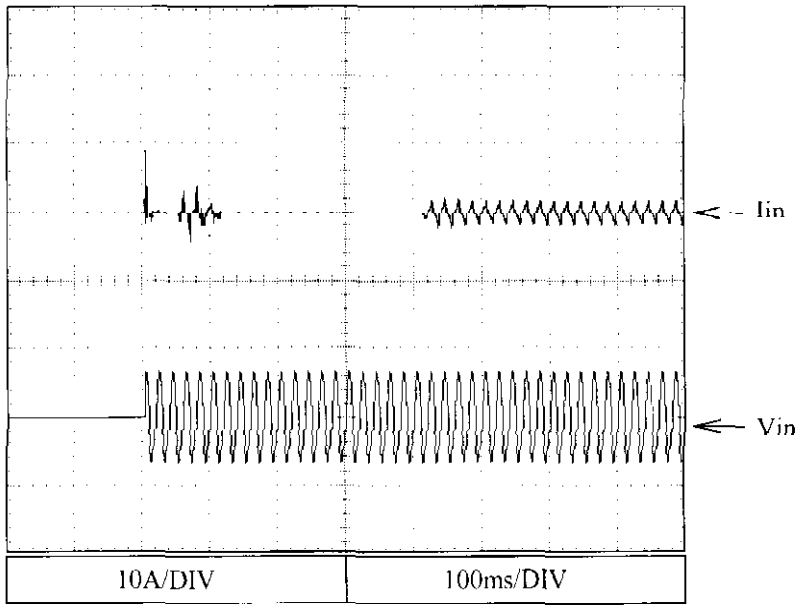
Conditions Vin : 100VAC
Iout : 100%
Ta : 25°C

24V

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



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

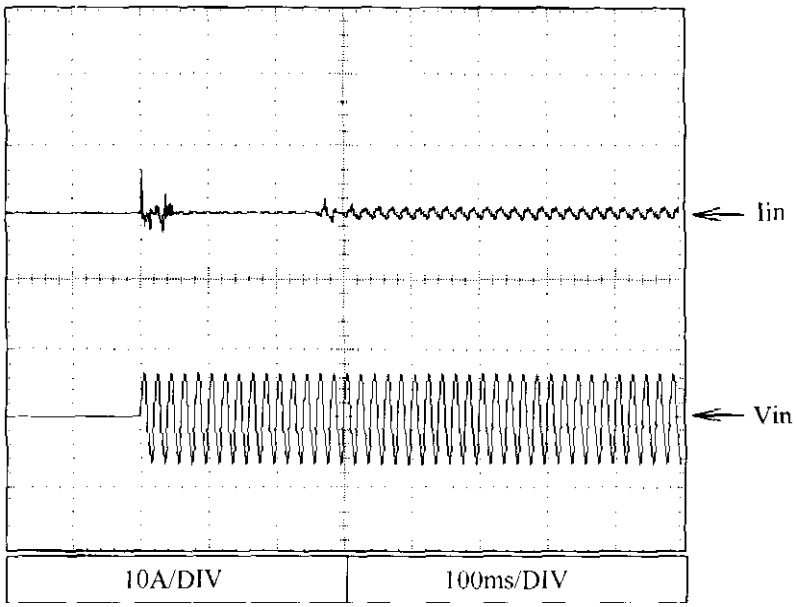


2.11 Inrush current waveform

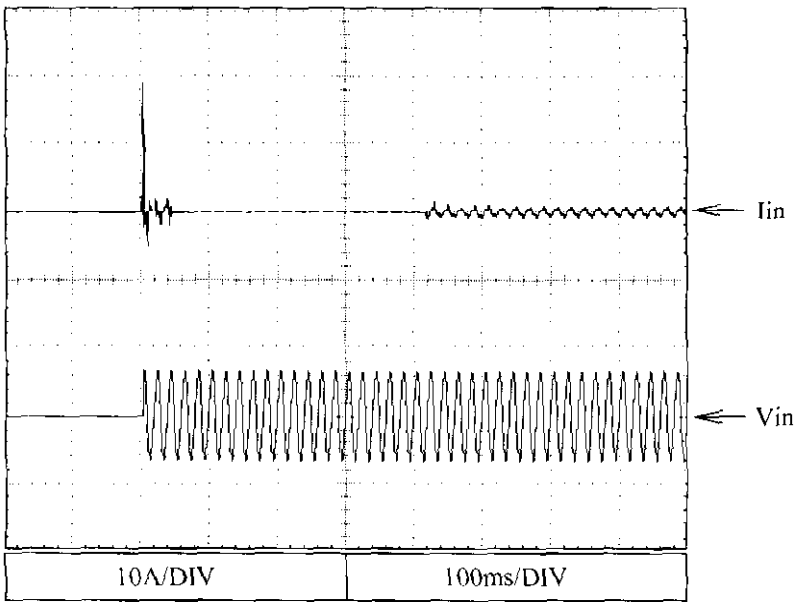
Conditions Vin : 230VAC
Iout : 100%
Ta : 25°C

24V

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



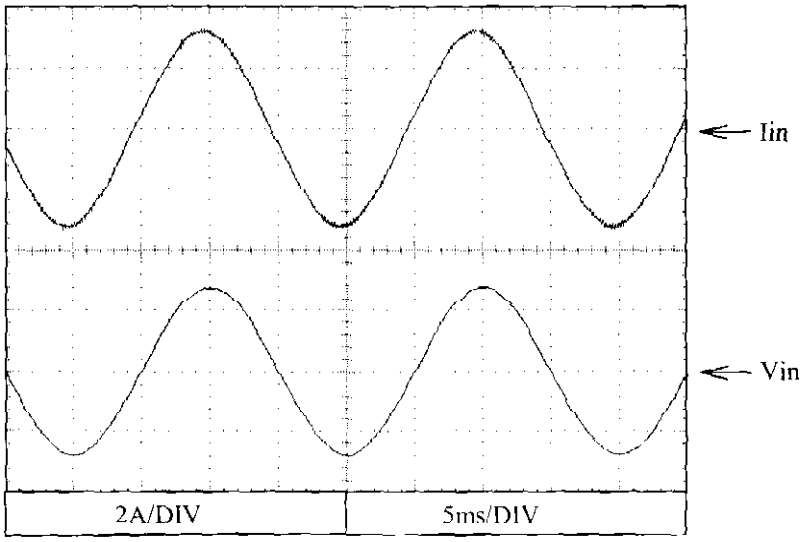
Switch on phase angle of input AC voltage
$\phi = 90^{o}$



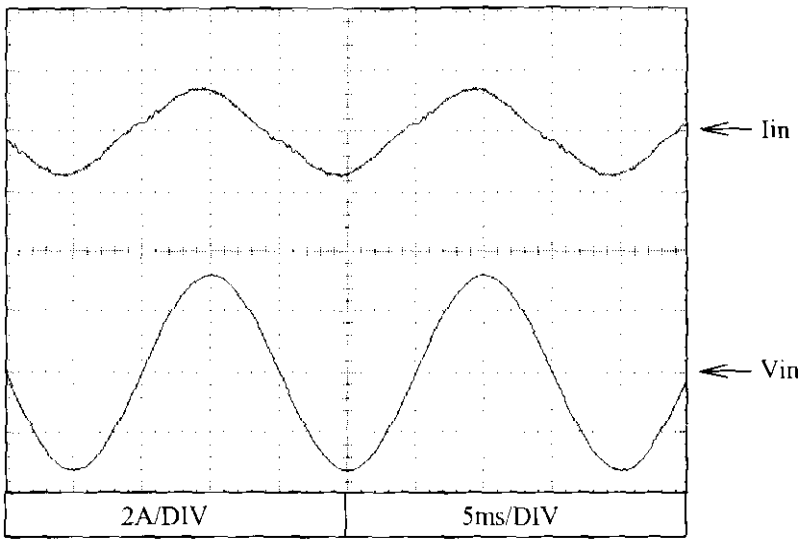
2.12 Input current waveform

24V

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



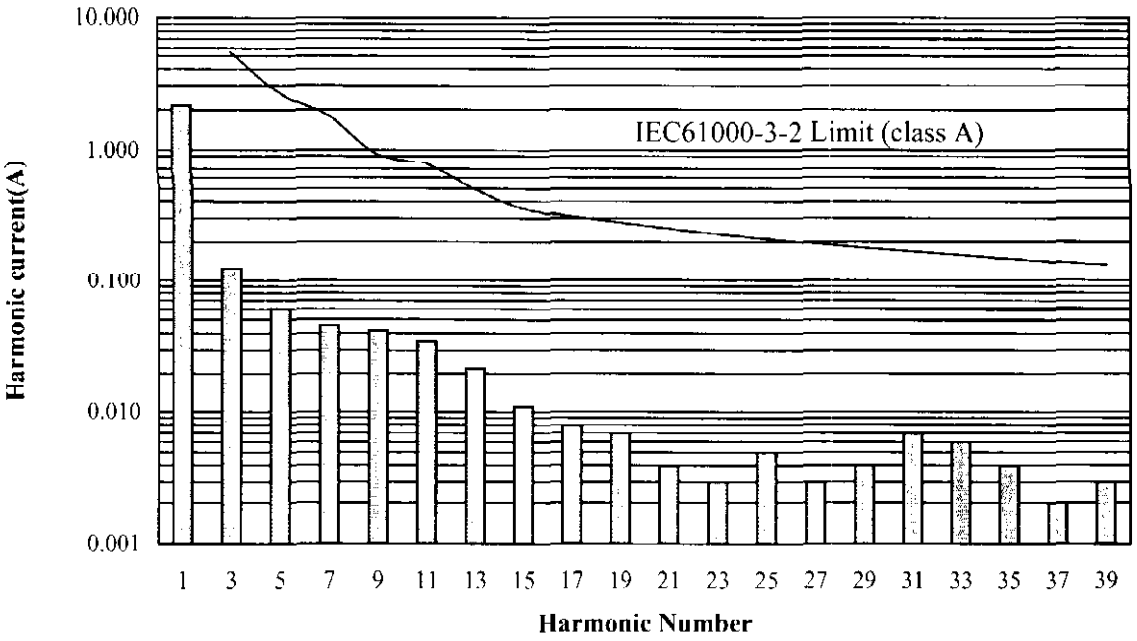
Conditions Vin : 230VAC
Iout : 100%
Ta : 25°C



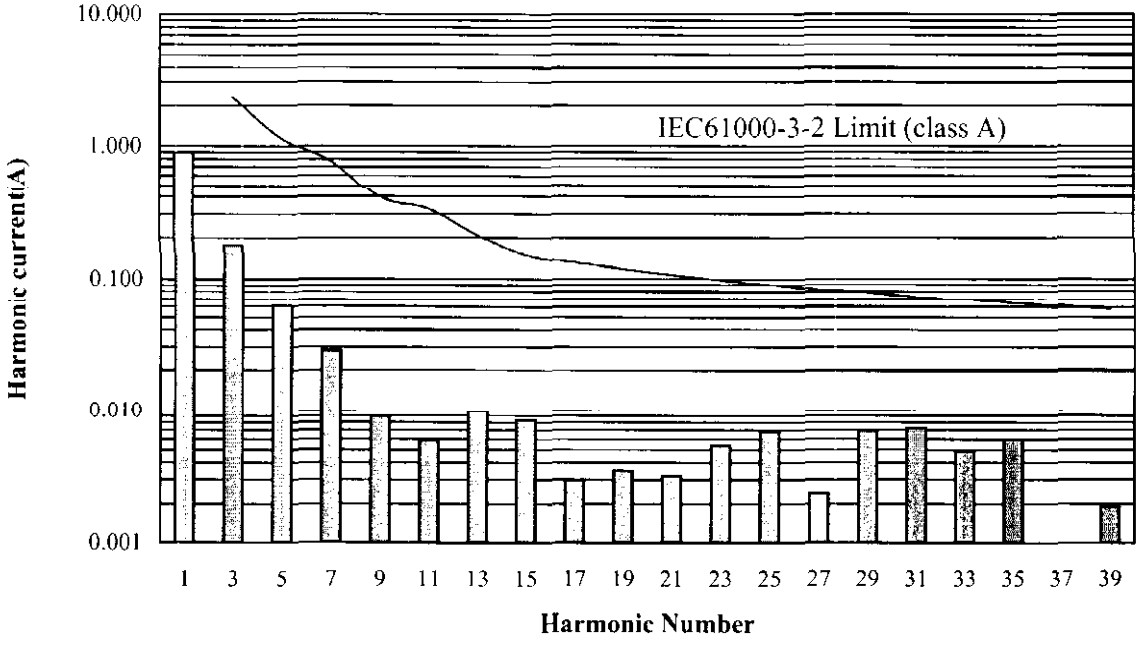
2.13 Input current harmonics

24V

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



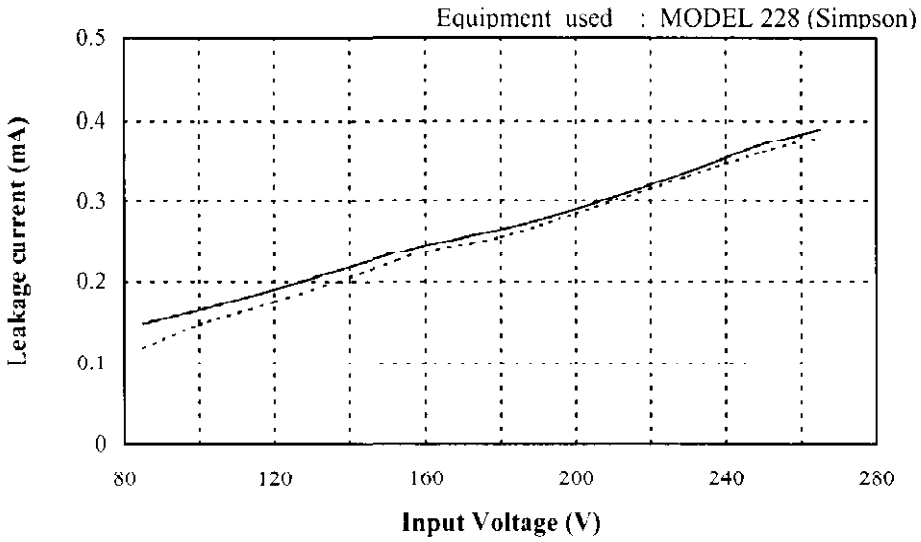
Conditions Vin : 230VAC
Iout : 100%
Ta : 25°C

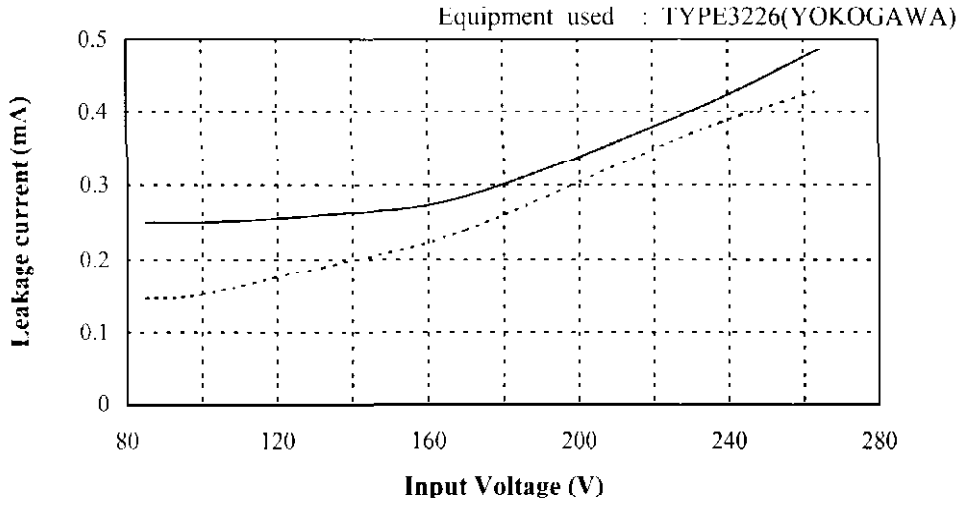


2.14 Leakage current characteristics

Conditions Iout : 0% --------
: 100% ————
Ta : 25°C
f : 50Hz

24V



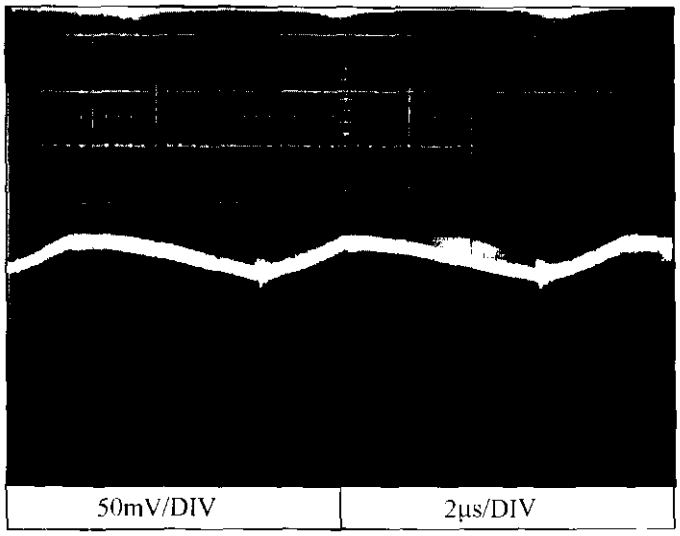


2.14 Output ripple and noise waveform

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

NORMAL MODE

24V

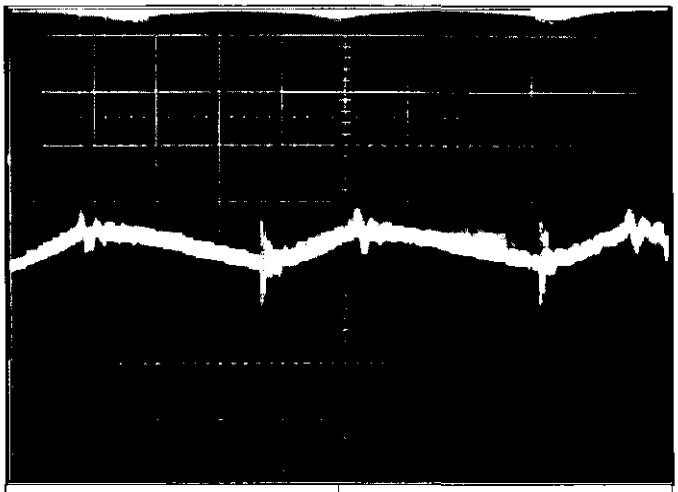


2.14 Output ripple and noise waveform

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

NORMAL + COMMON MODE

24V



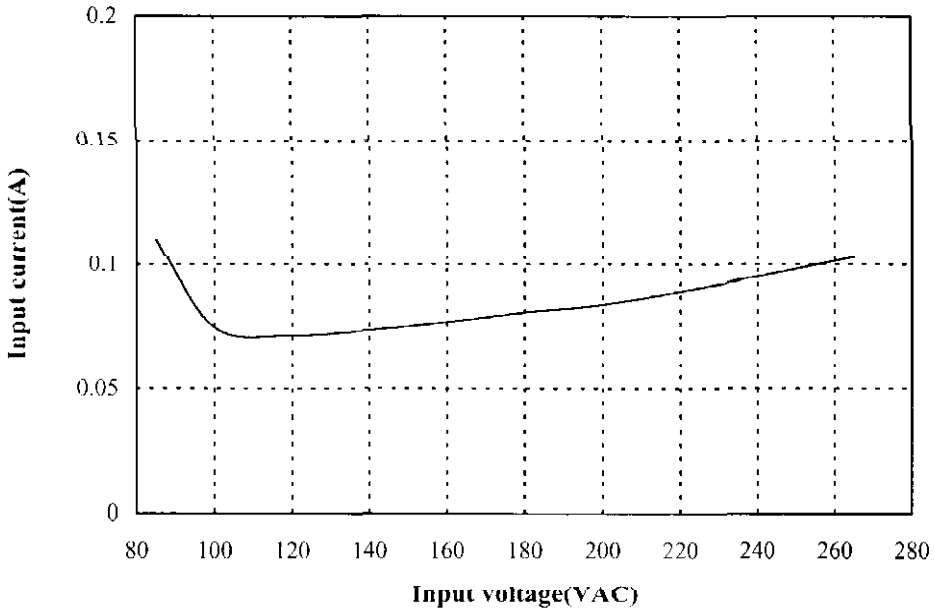
50mV/DIV	2μs/DIV

2.16 Stand-by current

Conditions Ta : 25°C

24V

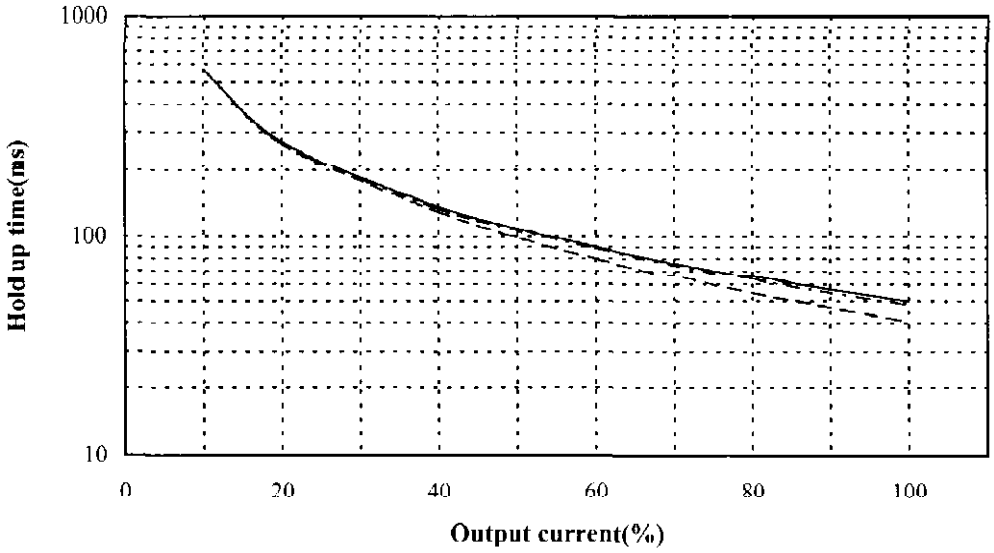
Iout = 0%



2.17 Hold up time characteristics

Conditions Vin : 100VAC – – – – –
: 200VAC –·–·–·–
: 230VAC ——
Ta : 25°C

24V



2.18 Electro-Magnetic Interference characteristics

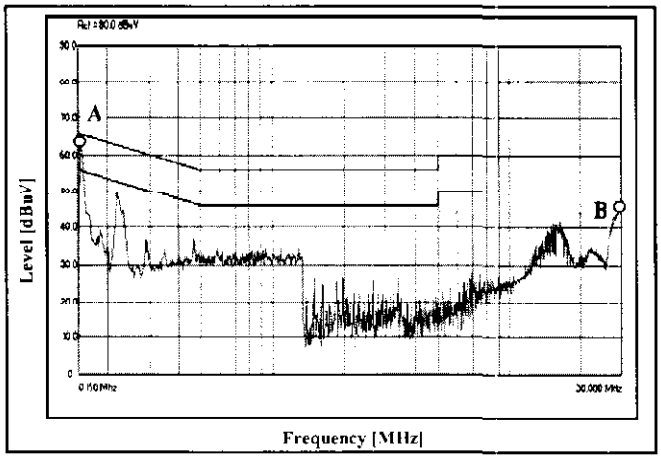
Conducted Emission

Conditions
Vin : 100VAC
Iout : 100%

24V

Ref. / Data	Point A (0.158MHz) Limit (dBuV)	Measure (dBuV)
QP	65.5	52.3
AV	55.3	35.2

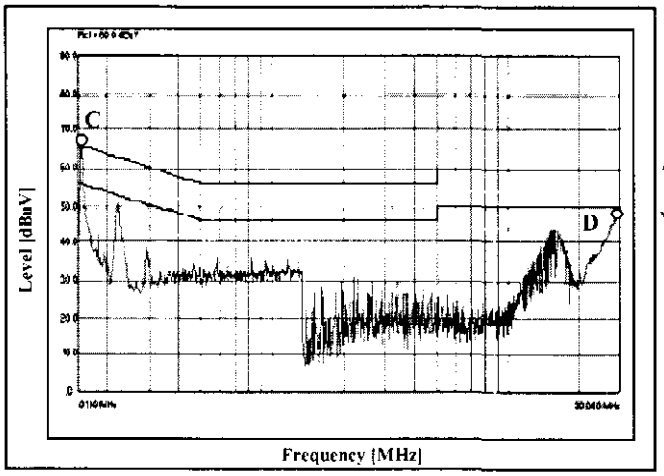
Ref. / Data	Point B (29.7MHz) Limit (dBuV)	Measure (dBuV)
QP	60.0	44.3
AV	50.0	42.2



Phase : L

Ref. / Data	Point C (0.156MHz) Limit (dBuV)	Measure (dBuV)
QP	65.7	54.5
AV	55.5	35.8

Ref. / Data	Point D (29.6MHz) Limit (dBuV)	Measure (dBuV)
QP	60.0	46.7
AV	50.0	43.3



Phase : N

Limits of EN55022-B, FCC Class B are same as VCCI class B.

2.18 Electro-Magnetic Interference characteristics

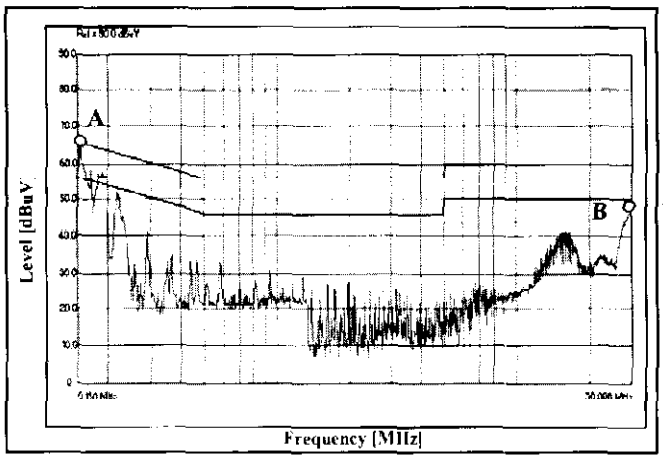
Conducted Emission

Conditions
Vin : 230VAC
Iout : 100%

24V

Ref. / Data	Point A (0.156MHz) Limit (dBuV)	Measure (dBuV)
QP	65.7	57.3
AV	55.5	41.9

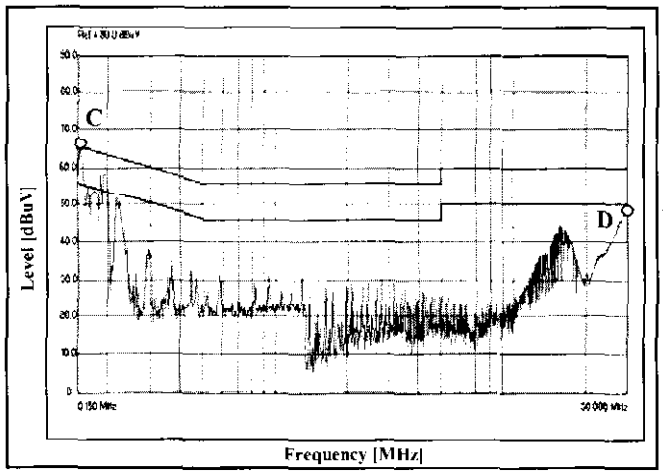
Ref. / Data	Point B (29.9MHz) Limit (dBuV)	Measure (dBuV)
QP	60.0	45.7
AV	50.0	44.0



Phase : L

Ref. / Data	Point C (0.159MHz) Limit (dBuV)	Measure (dBuV)
QP	64.3	58.6
AV	54.2	43.2

Ref. / Data	Point D (29.8MHz) Limit (dBuV)	Measure (dBuV)
QP	60.0	48.2
AV	50.0	44.6



Phase : N

Limits of EN55022-B, FCC Class B are same as VCCI class B.

2.18 Electro-Magnetic Interference characteristics

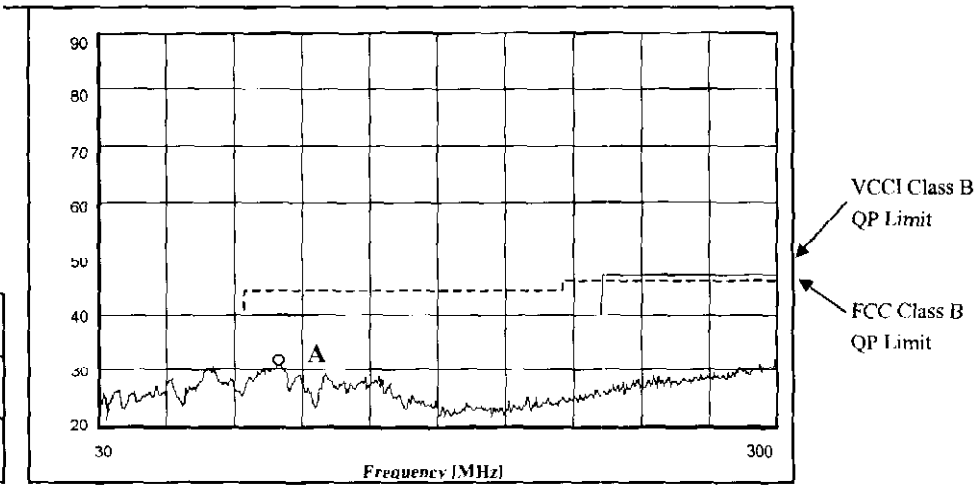
Radiated Emission

Conditions
Vin : 100VAC
Iout : 100%

24V

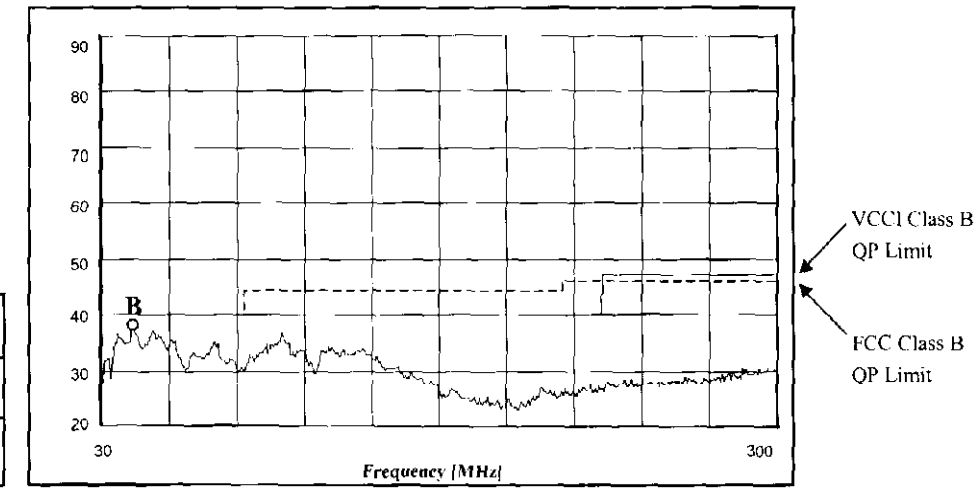
HORIZONTAL:

Point A (101.3MHz)	
Limit (dBuV/m)	Measure (dBuV/m)
40.0	29.8



VERTICAL:

Point B (47.6MHz)	
Limit (dBuV/m)	Measure (dBuV/m)
40.0	32.8



Limits of EN55022-B are same as its VCCI class B.

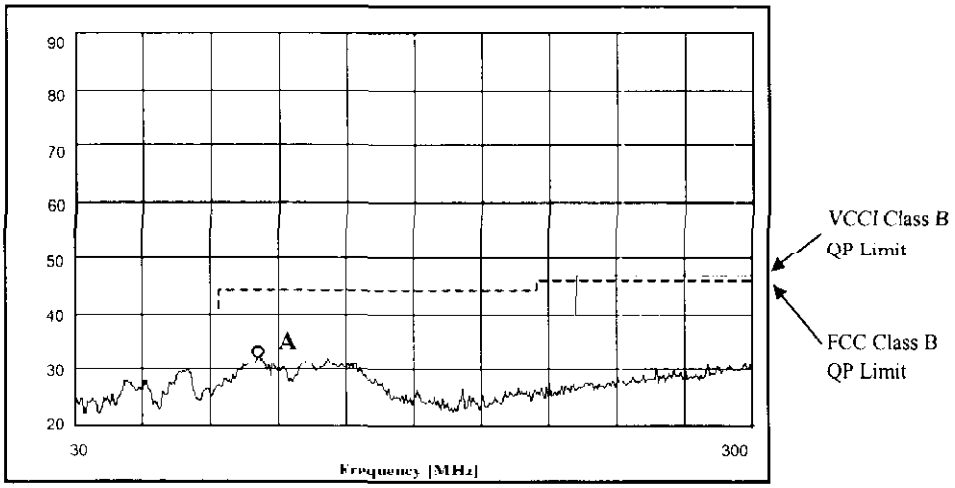
2.18 Electro-Magnetic Interference characteristics

Radiated Emission

Conditions
Vin : 230VAC
Iout : 100%

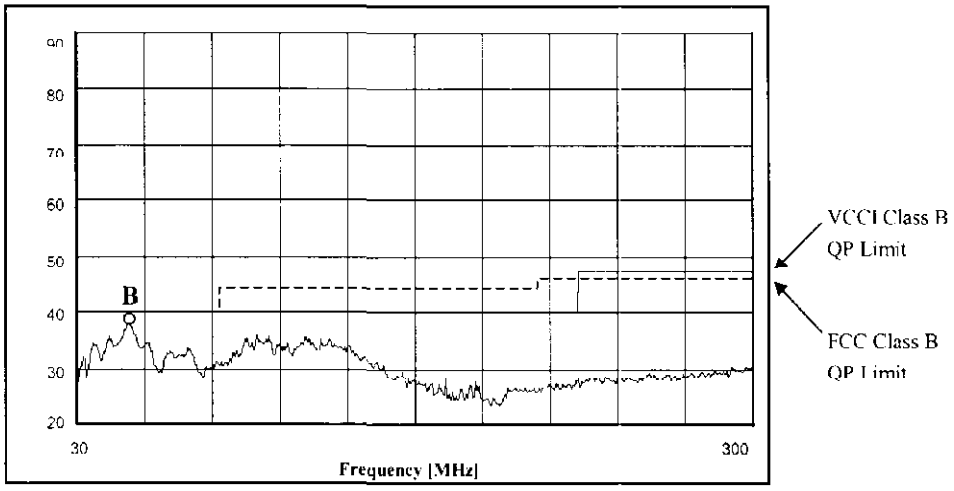
24V

HORIZONTAL:



Point A (100.5MHz)	
Limit (dBuV/m)	Measure (dBuV/m)
40.0	30.2

VERTICAL:



Point B (50MHz)	
Limit (dBuV/m)	Measure (dBuV/m)
40.0	33.5

Limits of EN55022-B are same as its VCCI class B.