Z+400 Series

EVALUATION DATA

DWG No.: IA710-53-01		
APPD	CHK	DWG
Doron P. Nov-10-2011	10/11/11	10/11/11

TDK-Lambda

INDEX

TERMINOLOGY USED

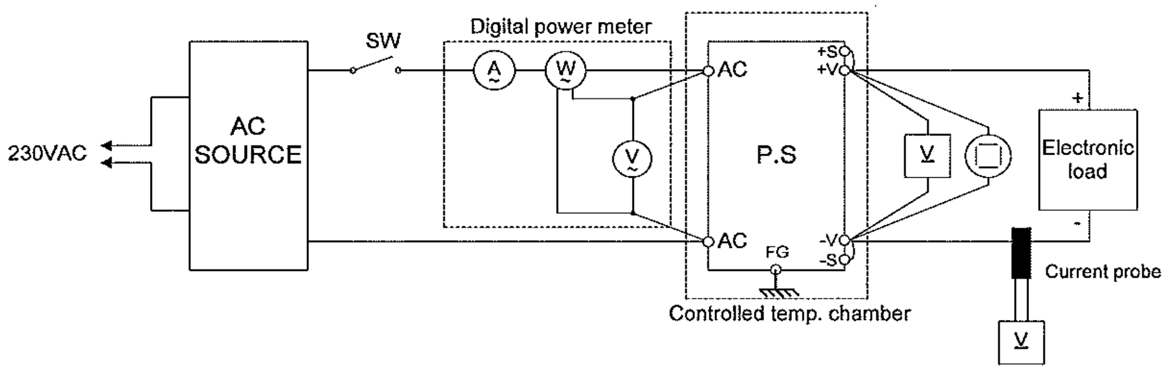
Definition

Vin	Input voltage
Vout	Output voltage
Iin	Input current
Iout	Output current
Ta	Ambient temperature
C.V	Constant voltage mode
C.C	Constant current mode

1. EVALUATION METHOD

1.1 Circuit used for determination

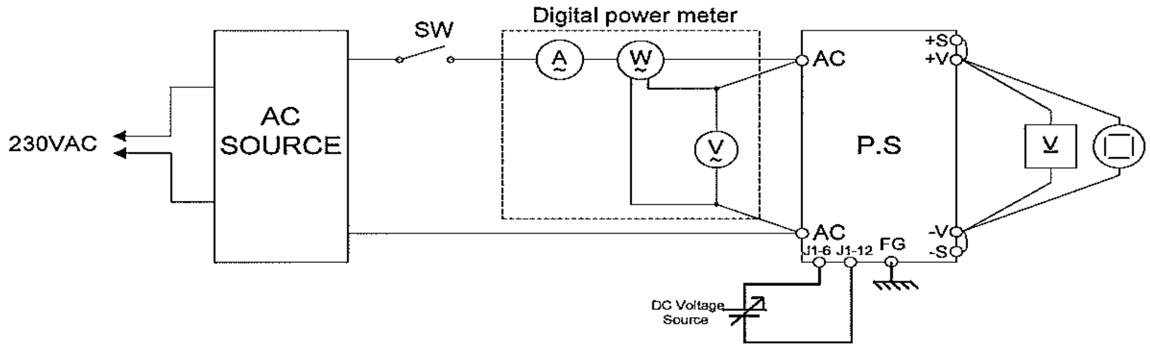
(1) Steady state data



(2) Warm up voltage drift characteristic same as Steady state data

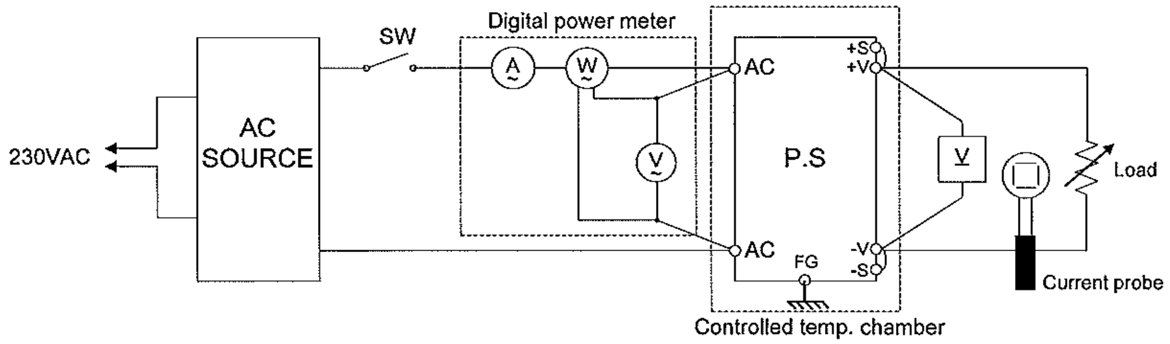
(3) Warm up current drift characteristic same as Steady state data

(4) Over voltage protection (OVP) characteristics



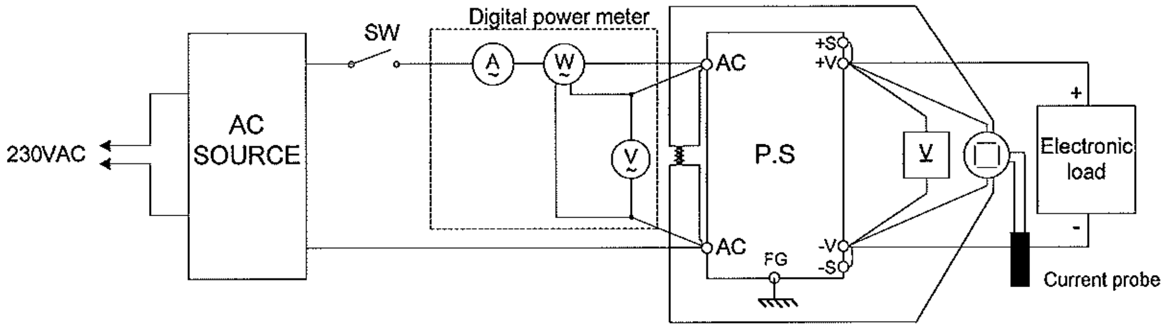
(5) Output voltage rise/fall characteristics same as Steady state data

(6) Output current rise/fall characteristics

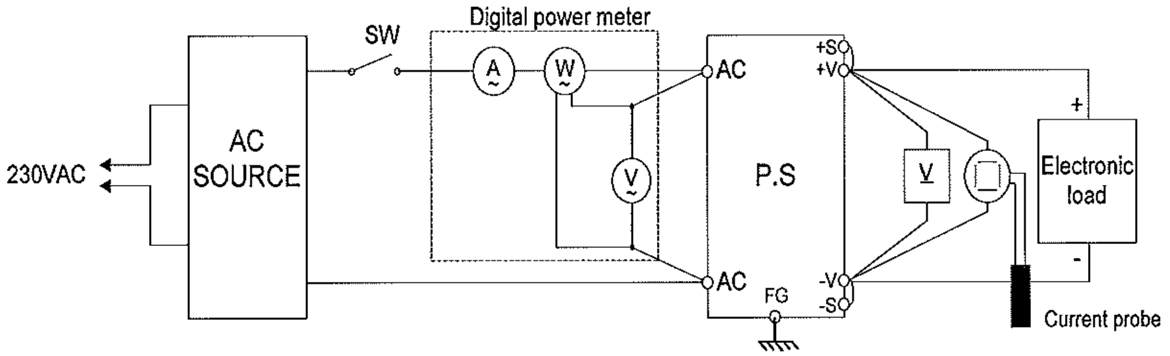


1.1 Circuit used for determination

(7) Dynamic line voltage and current response characteristics

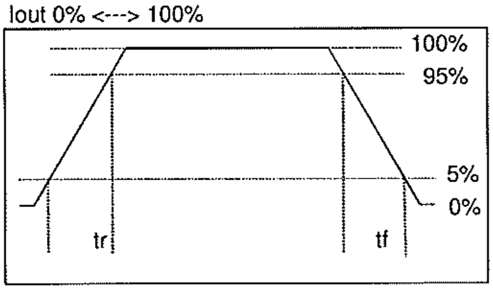


(8) Dynamic load voltage and current response characteristics

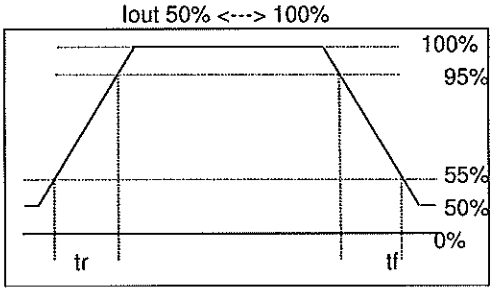


Constant Voltage mode

Output current waveform
Iout 0% <---> 100%

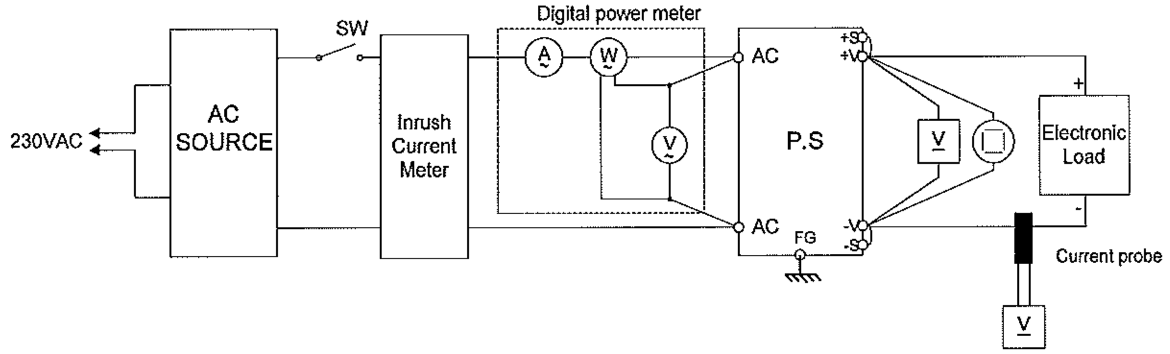


Output current waveform
Iout 50% <---> 100%



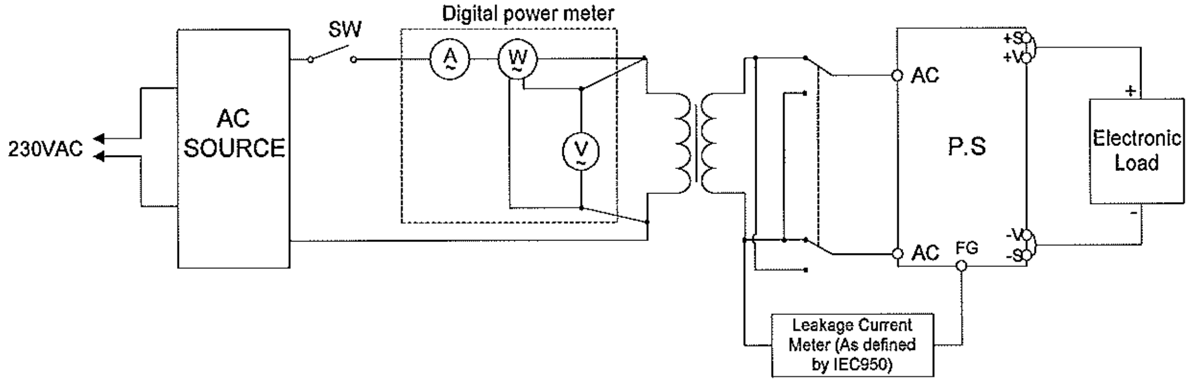
1.1 Circuit used for determination

(9) Response to brown-out characteristic



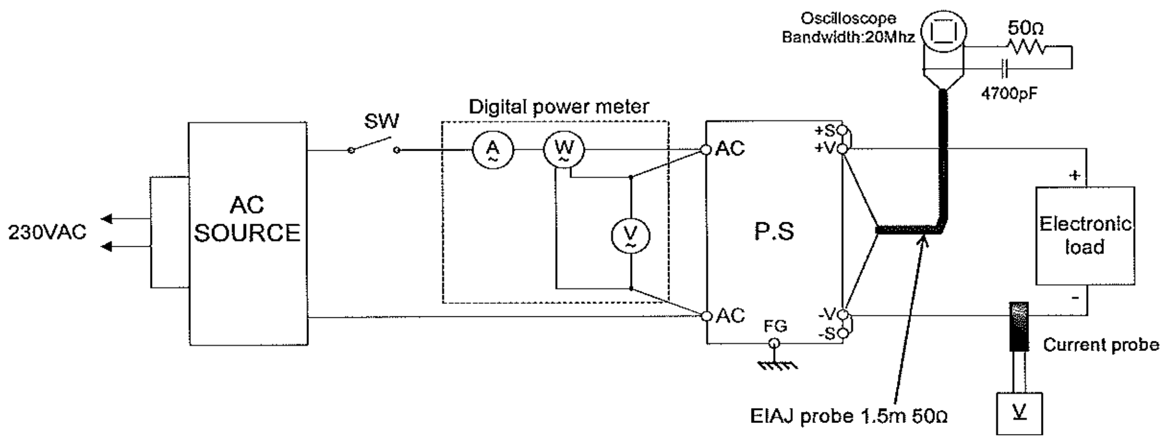
(10) Inrush current characteristics same as Response to brown-out

(11) Leakage current characteristics



(12) Output Voltage ripple & noise waveform 10V up to 100V models

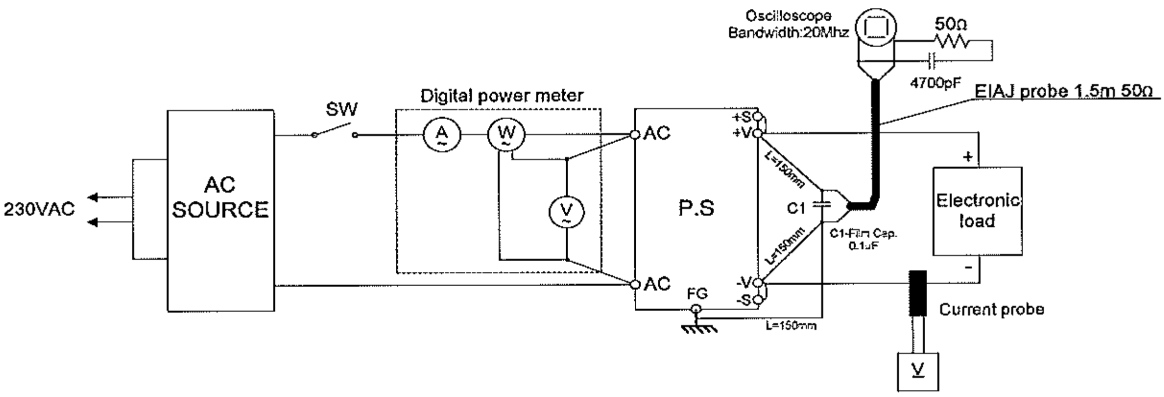
(a) Normal mode (JEITA Standard RC-9131A)



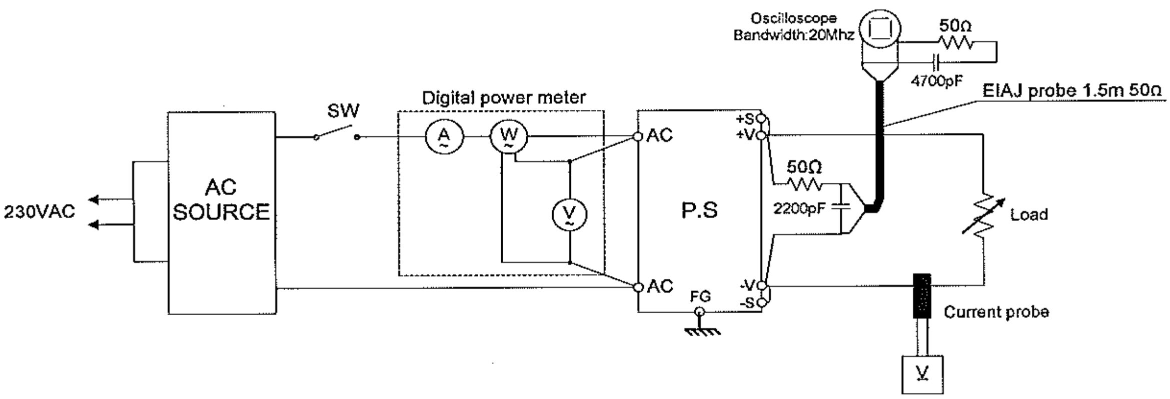
1.1 Circuit used for determination

(12) Output Voltage ripple & noise waveform 10V up to 100V models

(b) Normal + Common mode



(13) Output Current rms ripple 10V to 100V models



Notes:
(*) Ouput Current rms ripple =Output Voltage rms ripple divided by the Load resistance.

1.2 List of equipment used

	EQUIPMENT USED	MANUFACTURER	MODEL No.
1	Digital oscilloscope	YOKOGAWA	DL7100
2	Digital oscilloscope	YOKOGAWA	DL1740EL
3	Digital multimeter	AGILENT	34401A
4	Digital power meter	YOKOGAWA	WT230
5	AC Source	CHROMA	6590
6	AC Source	CHROMA	6530
7	Electronic load	H&H	ZS6060 SC150
8	Electronic load	H&H	ZS7006
9	Electronic load	H&H	ZS7060
10	Electronic load	CHROMA	63203
11	Electronic load	CHROMA	63204
12	Electronic load	CHROMA	63206
13	Controlled temp. chamber	THERMOTRON	SM-16-3800
14	Controlled temp. chamber	THERMOTRON	SE-600-5-5
15	Controlled temp. chamber	THERMOTRON	SE-600-6-6
16	Leakage Current Tester	KIKUSUI	TOS3200
17	Voltage probe	YOKOGAWA	700988
18	Current probe	YOKOGAWA	701933
19	Current probe	LEM Danfysik	IT 60-S Ultrastab
20	Inrush Current Meter	TAKAMISAWA	PSA-210
21	Data Acquisition/Switch Unit	AGILENT	34970A

2. CHARACTERISTIC

2.1 Steady state data

(1) Regulation - Line & Load, Temperature drift

Z10-40

Conditions: Ta = 25℃

1. Regulation - Line & Load, C.V mode (Readings in [V])

Io	Vin (AC) 85	100	200	265	Line Regulation	
0%	10.0001	10.0001	10.0001	10.0001	0.0	0.000
25%	9.9993	9.9993	9.9993	9.9994	0.1	0.001
50%	9.9993	9.9993	9.9994	9.9993	0.1	0.001
75%	9.9990	9.9990	9.9990	9.9990	0.0	0.000
100%	9.9986	9.9986	9.9986	9.9986	0.0	0.000
Load Regulation	1.5	1.5	1.5	1.5	ΔV(mV)	(%)
	0.015	0.015	0.015	0.015	(%)	

2. Temperature drift, C.V mode

Conditions: Vin:100Vac
Iout:100%

Ta	0℃	25℃	50℃	Temp. Coefficient (0°C~50°C)	
Vout	10.007	10.006	10.008	2 mV	4 ppm/°C

2.1 Steady state data

(1) Regulation - Line & Load, Temperature drift

Z36-12

Conditions: Ta = 25℃

1. Regulation - Line & Load, C.V mode (Readings in [V])

	Vin (AC)					
Io	**85**	**100**	**200**	**265**	**Line Regulation**	
0%	36.0011	36.0011	36.0011	36.0011	0.0	0.000
25%	36.0012	36.0012	36.0012	36.0012	0.0	0.000
50%	36.0012	36.0012	36.0012	36.0012	0.0	0.000
75%	36.0011	36.0011	36.0011	36.0011	0.0	0.000
100%	36.0011	36.0011	36.0011	36.0011	0.0	0.000
Load Regulation	0.1	0.1	0.1	0.1	**ΔV(mV)**	**(%)**
	0.000	0.000	0.000	0.000	**(%)**	

2. Temperature drift, C.V mode

Conditions: Vin:100Vac
Iout:100%

Ta	**0℃**	**25℃**	**50℃**	**Temp. Coefficient (0°C~50°C)**	
Vout	35.998	35.999	36.003	5 mV	3 ppm/°C

2.1 Steady state data

(1) Regulation - Line & Load, Temperature drift

Z100-4

Conditions: Ta = 25℃

1. Regulation - Line & Load, C.V mode (Readings in [V])

	Vin (AC)					
Io	85	100	200	265	Line Regulation	
0%	99.9982	99.9982	99.9985	99.9983	0.3	0.000
25%	99.9985	99.9985	99.9985	99.9986	0.1	0.000
50%	99.9984	99.9984	99.9984	99.9984	0.0	0.000
75%	99.9983	99.9984	99.9984	99.9984	0.1	0.000
100%	99.9983	99.9983	99.9983	99.9983	0.0	0.000
Load Regulation	0.3	0.3	0.2	0.3	ΔV(mV)	(%)
	0.000	0.000	0.000	0.000	(%)	

2. Temperature drift, C.V mode

Conditions: Vin:100Vac
Iout:100%

Ta	0℃	25℃	50℃	Temp. Coefficient (0°C~50°C)	
Vout	99.986	99.992	100.010	24 mV	5 ppm/°C

2.1 Steady state data

(1) Regulation - Line & Load, Temperature drift

Z10-40

Conditions: Ta = 25℃

1. Regulation - Line & Load, C.C mode (*) (Readings in [A])

	Vin (AC)					
Vo	**85**	**100**	**200**	**265**	**Line Regulation**	
0%	40.0130	40.0150	40.0160	40.0130	3.0	0.007
25%	40.0178	40.0166	40.0158	40.0152	2.6	0.006
50%	40.0142	40.0138	40.0135	40.0132	1.0	0.002
75%	40.0127	40.0122	40.0120	40.0117	1.0	0.002
100%	40.0112	40.0110	40.0109	40.0106	0.6	0.001
Load Regulation	6.6	5.6	5.1	4.6	**ΔI(mA)**	**(%)**
	0.016	0.014	0.013	0.011	**(%)**	

Notes:
(*) Not including load regulation thermal drift effect.

2. Temperature drift, C.C mode

Conditions: Vin:100Vac
Iout:100%

Ta	**0℃**	**25℃**	**50℃**	**Temp. Coefficient (0°C~50°C)**	
Iout	39.9790	39.9670	39.9580	21.0 mA	11 ppm/°C

2.1 Steady state data

(1) Regulation - Line & Load, Temperature drift

Z36-12

Conditions: Ta = 25℃

1. Regulation - Line & Load, C.C mode (*) (Readings in [A])

	Vin (AC)					
Vo	**85**	**100**	**200**	**265**	**Line Regulation**	
0%	12.0010	12.0009	12.0010	12.0011	0.2	0.002
25%	12.0008	12.0007	12.0008	12.0009	0.2	0.002
50%	12.0003	12.0002	12.0003	12.0002	0.1	0.001
75%	12.0001	12.0000	12.0001	12.0000	0.1	0.001
100%	12.0002	12.0004	12.0002	12.0001	0.3	0.002
Load Regulation	0.9	0.9	0.9	1.1	**ΔI(mA)**	**(%)**
	0.007	0.007	0.007	0.009	**(%)**	

Notes:
(*) Not including load regulation thermal drift effect.

2. Temperature drift, C.C mode

Conditions: Vin:100Vac
Iout:100%

Ta	**0℃**	**25℃**	**50℃**	**Temp. Coefficient (0˚C~50˚C)**	
Iout	11.9887	11.9901	11.9953	6.6 mA	11 ppm/˚C

2.1 Steady state data

(1) Regulation - Line & Load, Temperature drift

Z100-4

Conditions: Ta = 25℃

1. Regulation - Line & Load, C.C mode (*) (Readings in [A])

	Vin (AC)					
Vo	**85**	**100**	**200**	**265**	**Line Regulation**	
0%	3.9993	3.9990	3.9996	3.9999	0.9	0.023
25%	3.9994	3.9994	3.9994	3.9994	0.0	0.000
50%	3.9992	3.9992	3.9992	3.9992	0.0	0.000
75%	3.9990	3.9990	3.9989	3.9990	0.1	0.003
100%	3.9987	3.9987	3.9987	3.9987	0.0	0.000
Load Regulation	0.7	0.7	0.9	1.2	**ΔI(mA)**	**(%)**
	0.018	0.018	0.023	0.030	**(%)**	

Notes:
(*) Not including load regulation thermal drift effect.

2. Temperature drift, C.C mode

Conditions: Vin:100Vac
Iout:100%

Ta	**0℃**	**25℃**	**50℃**	**Temp. Coefficient (0°C~50°C)**	
Iout	3.9992	3.9981	3.9993	1.2 mA	6 ppm/°C

2.1 Steady state data

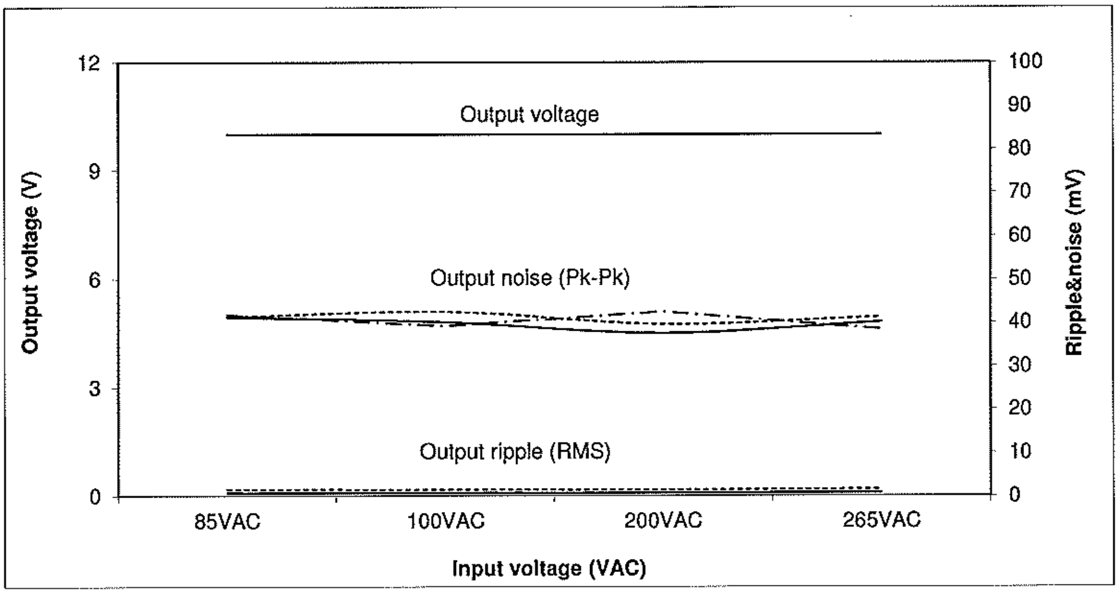
(2) Output voltage and ripple voltage v.s input voltage

C.V mode

Conditions: Vin:100Vac
Iout:100%

Z10-40

Ta: 0˚C ------------
25˚C -·-·-·-·-·-
50˚C ————



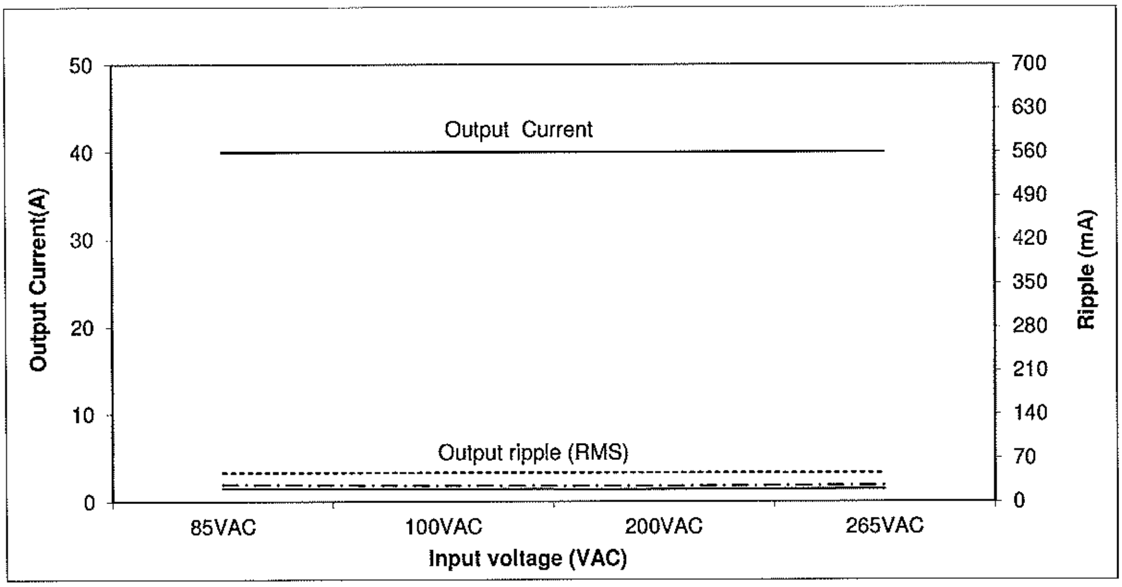
(3) Output current and ripple current v.s input voltage

C.C mode

Conditions: Vin:100Vac
Iout:100%

Z10-40

Ta: 0˚C ------------
25˚C -·-·-·-·-·-
50˚C ————



2.1 Steady state data

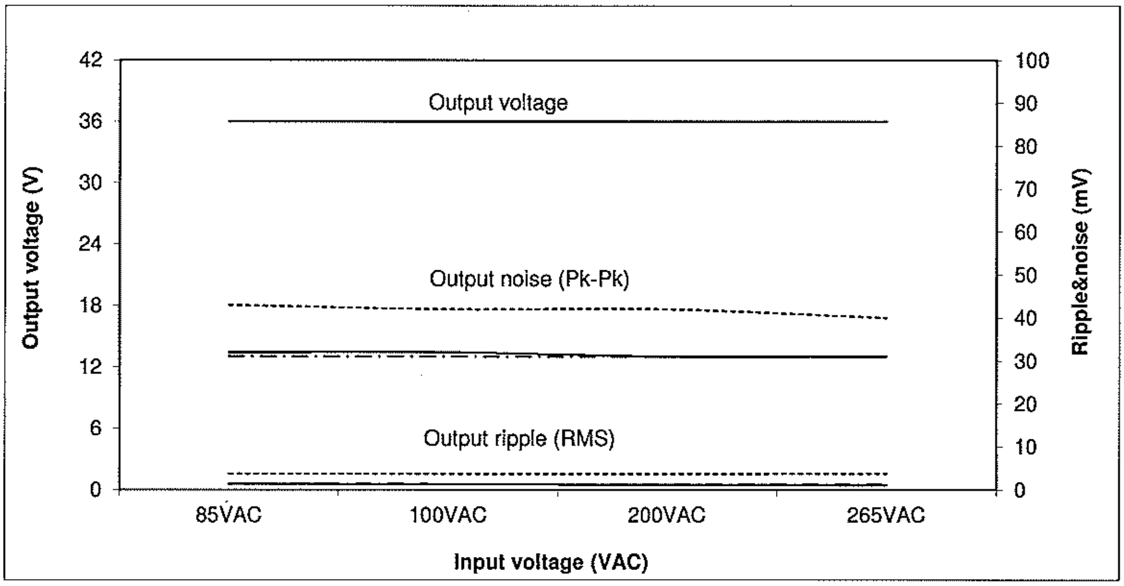
(2) Output voltage and ripple voltage v.s input voltage

C.V mode

Conditions: Vin:100Vac
Iout:100%

Ta: 0°C ------------
25°C -·-·-·-·-·-
50°C ————

Z36-12



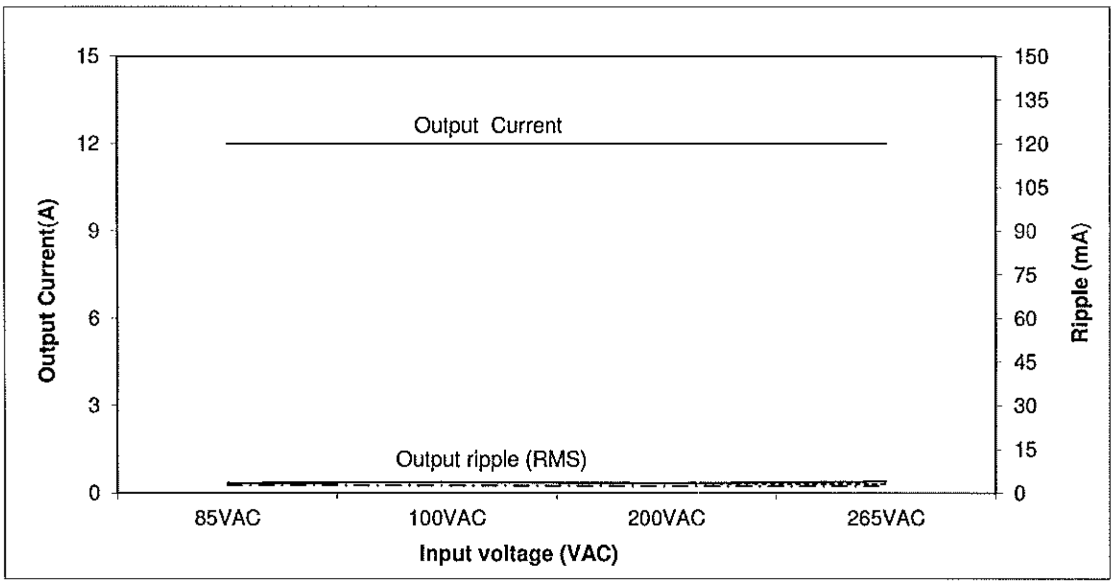
(3) Output current and ripple current v.s input voltage

C.C mode

Conditions: Vin:100Vac
Iout:100%

Ta: 0°C ------------
25°C -·-·-·-·-·-
50°C ————

Z36-12



2.1 Steady state data

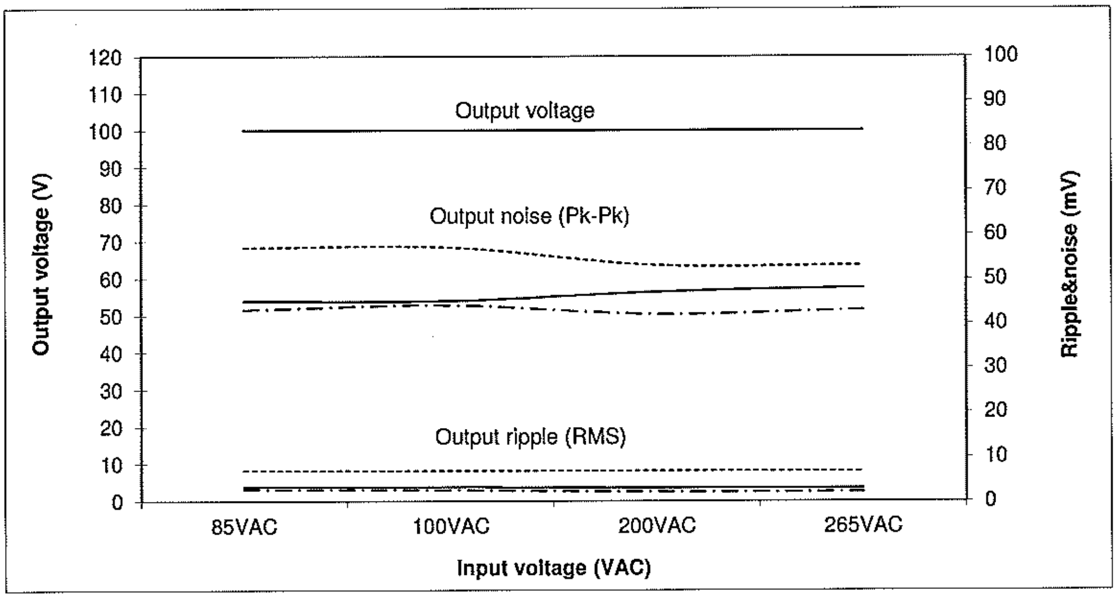
(2) Output voltage and ripple voltage v.s input voltage

C.V mode

Conditions: Vin:100Vac
Iout:100%

Z100-4

Ta: 0˚C ------------
25˚C -·-·-·-·-·-
50˚C ————



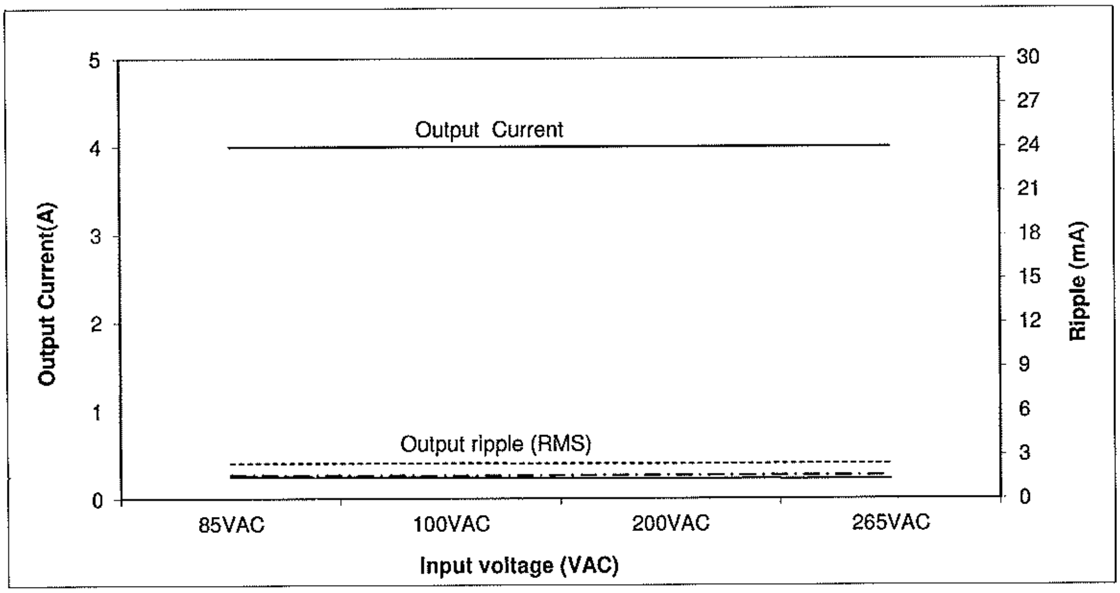
(3) Output current and ripple current v.s input voltage

C.C mode

Conditions: Vin:100Vac
Iout:100%

Z100-4

Ta: 0˚C ------------
25˚C -·-·-·-·-·-
50˚C ————



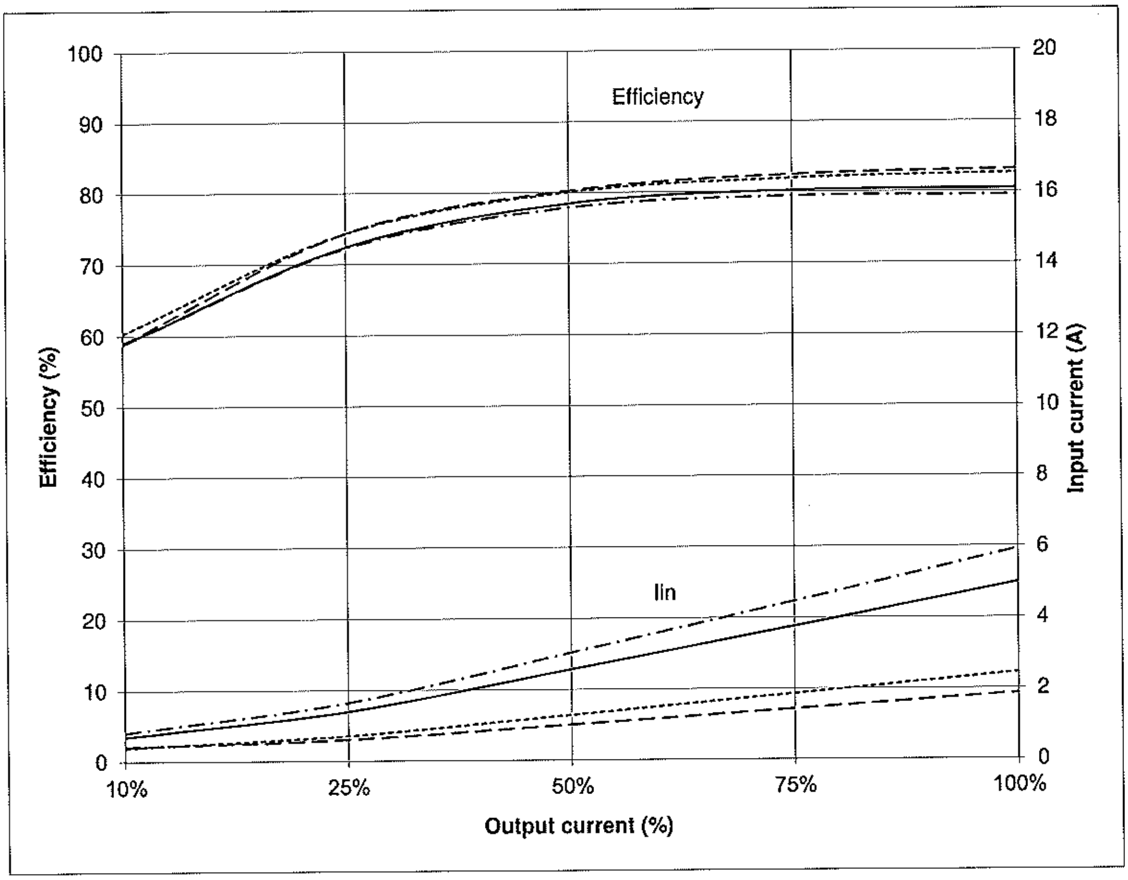
2.1 Steady state data

(4) Efficiency and Input current vs. Output current

Conditions:

Vin: 85 VAC -·-·-·-·-·-·-
100VAC ———————
200 VAC - - - - - - - - - -
265 VAC — — — — — —
Vout:100%
Ta: 25˚C

Z10-40

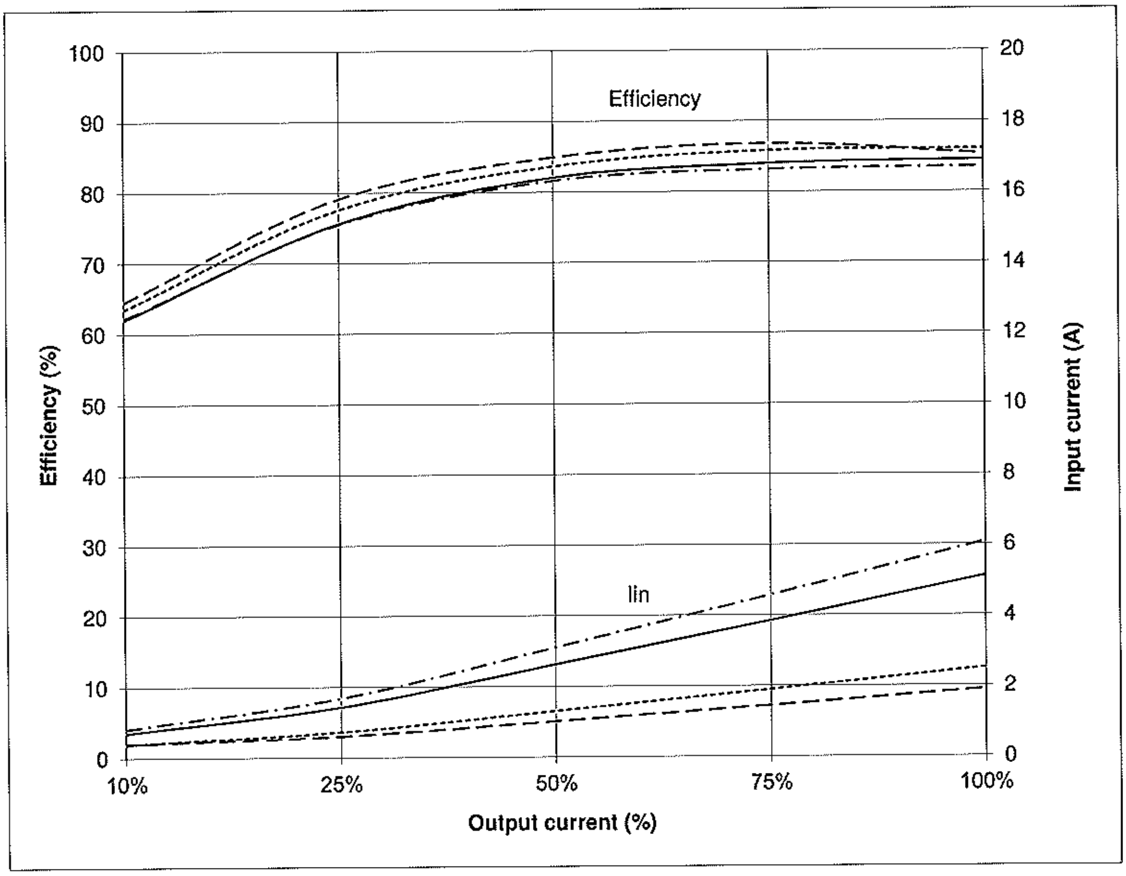


2.1 Steady state data

(4) Efficiency and Input current vs. Output current

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

Z36-12

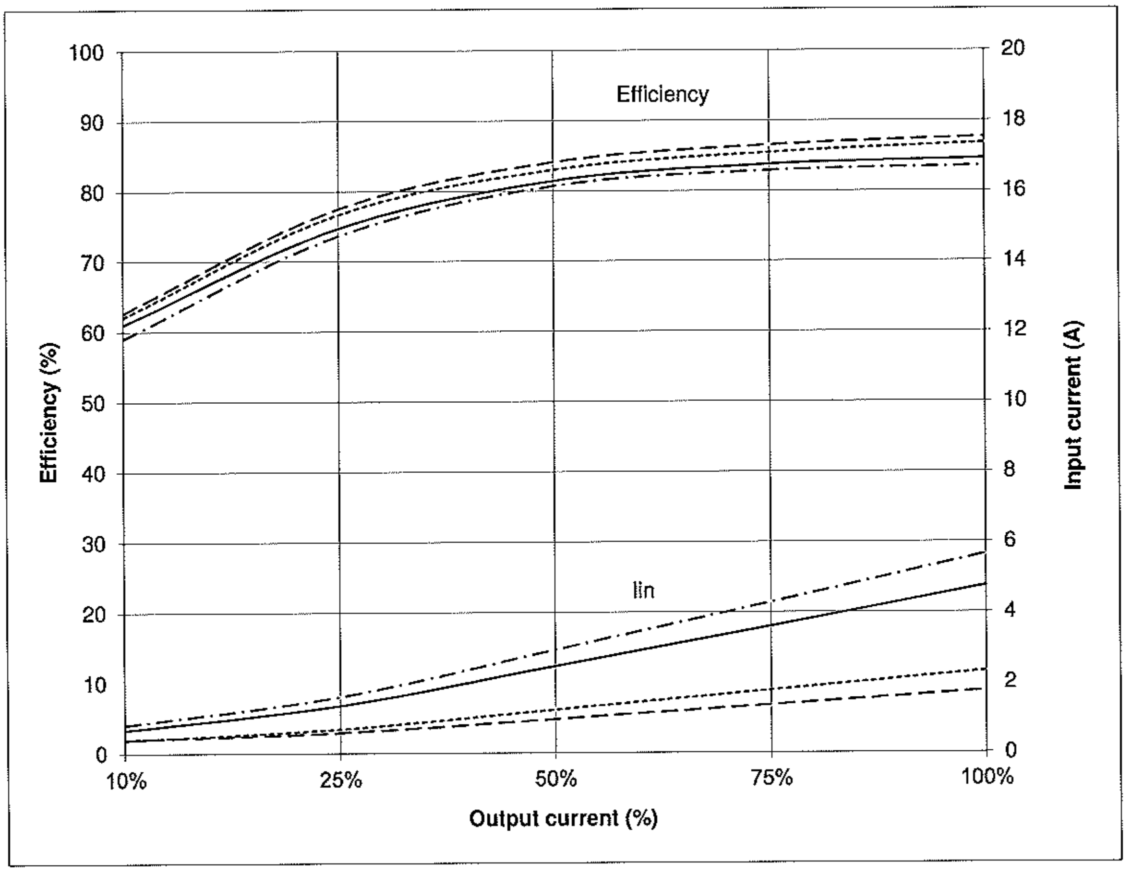


2.1 Steady state data

(4) Efficiency and Input current vs. Output current

Conditions:
Vin: 85 VAC -·-·-·-·-
100VAC ———
200 VAC - - - - - -
265 VAC — — — —
Vout:100%
Ta: 25˚C

Z100-4

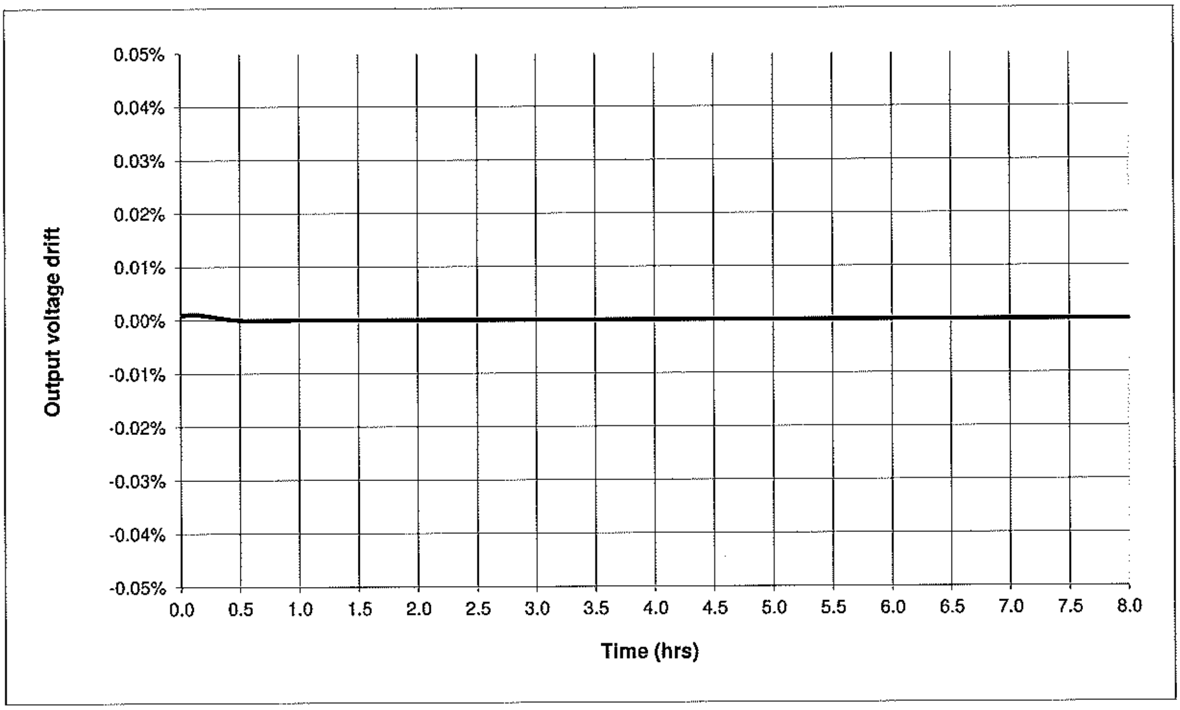


2.2 Warm up drift & stability

Conditions: Vin:100Vac
Vout: 100%
Iout: 100%
Ta = 25°C

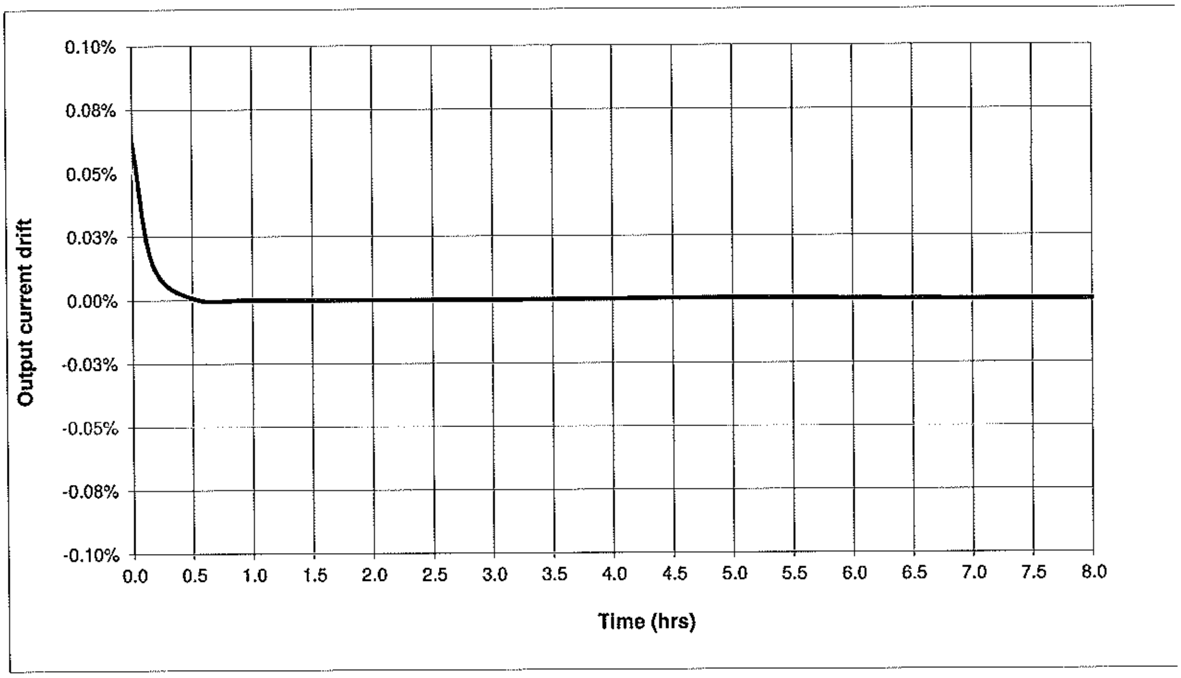
C.V mode

Z10-40



C.C mode

Z10-40

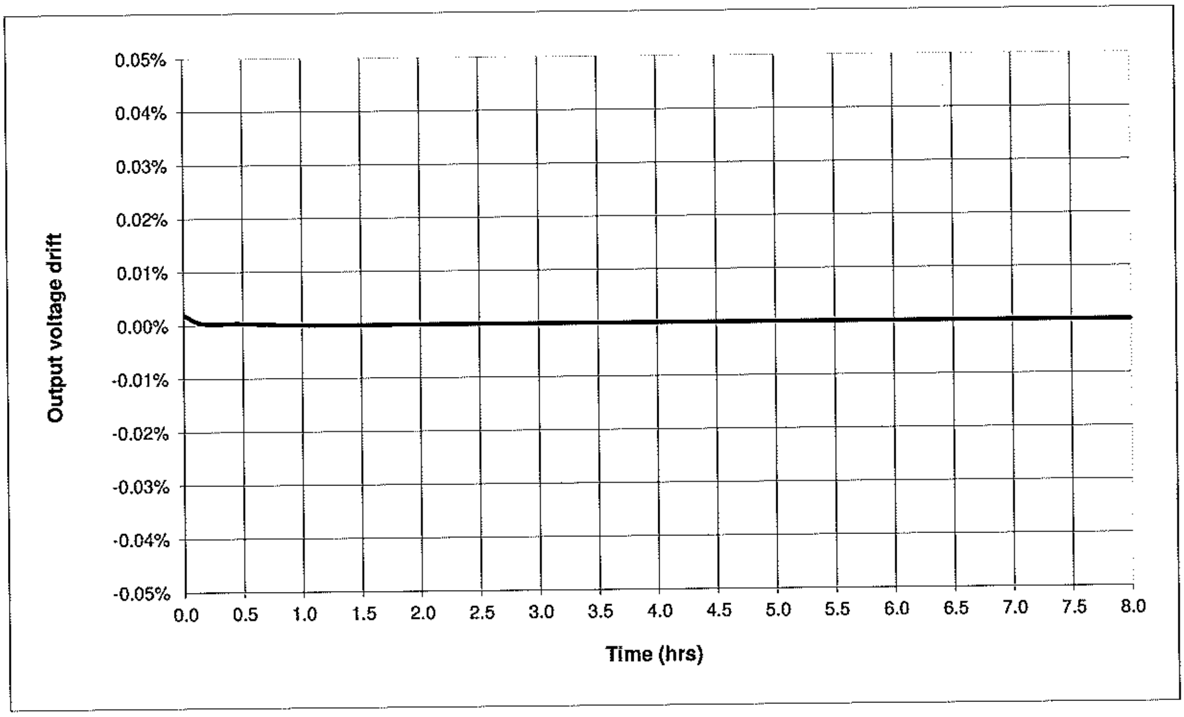


2.2 Warm up drift & stability

Conditions: Vin:100Vac
Vout: 100%
Iout: 100%
Ta = 25℃

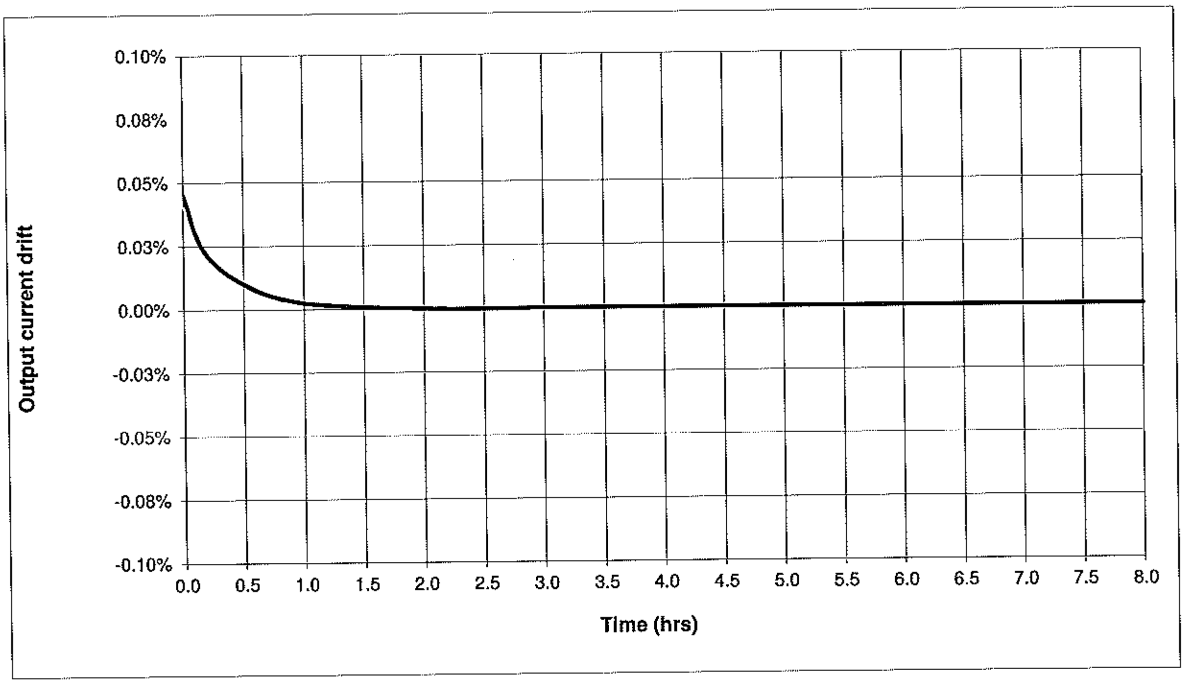
C.V mode

Z36-12



C.C mode

Z36-12

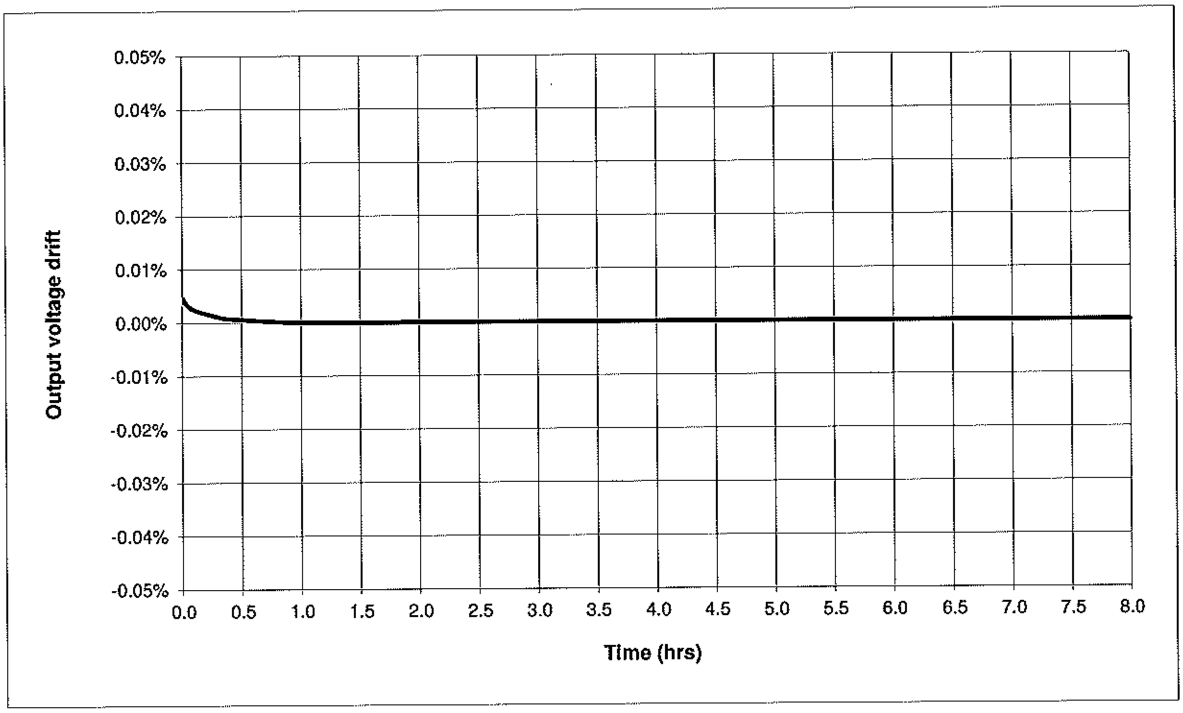


2.2 Warm up drift & stability

Conditions: Vin:100Vac
Vout: 100%
Iout: 100%
Ta = 25℃

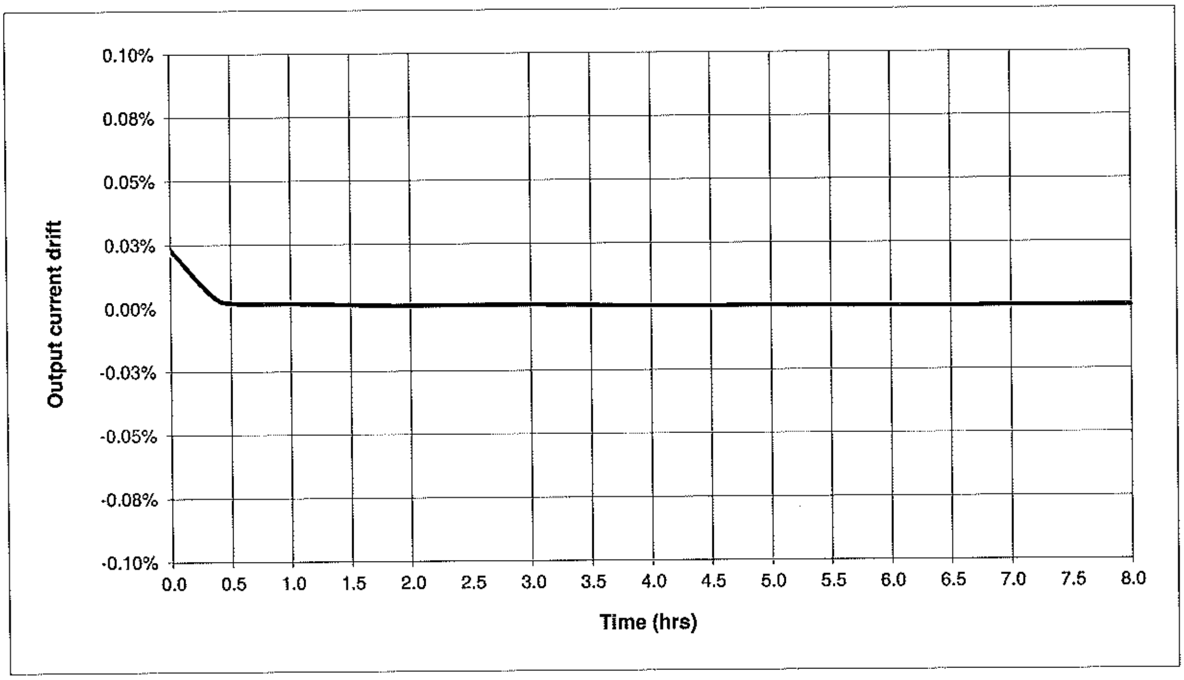
C.V mode

Z100-4



C.C mode

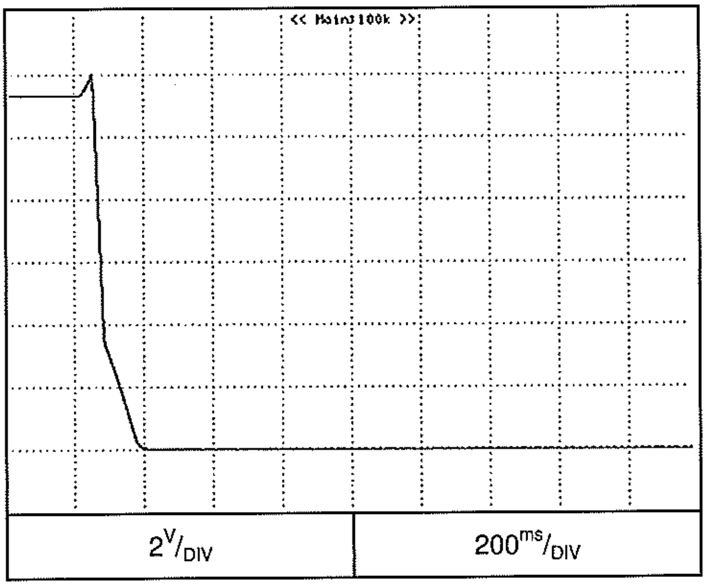
Z100-4



2.3 Over voltage protection (OVP) characteristic

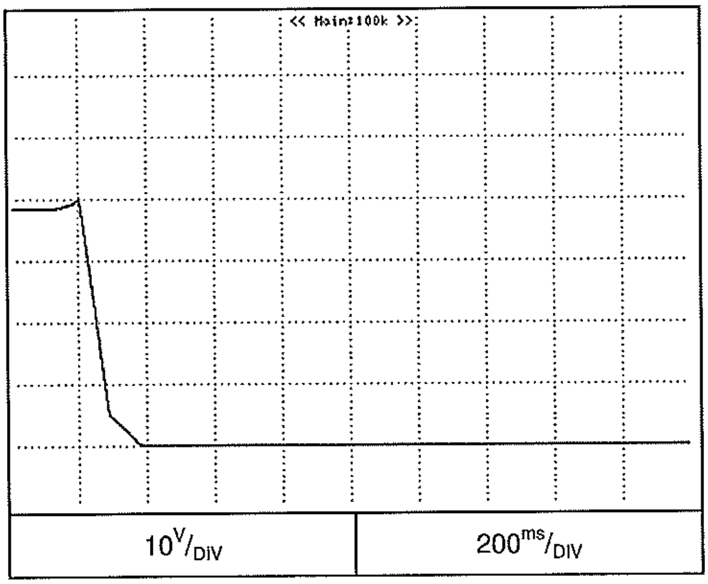
Conditions: Vin:100Vac
Iout: 0%
Ta = 25℃

Z10-40



OVP setting:12V

Z36-12

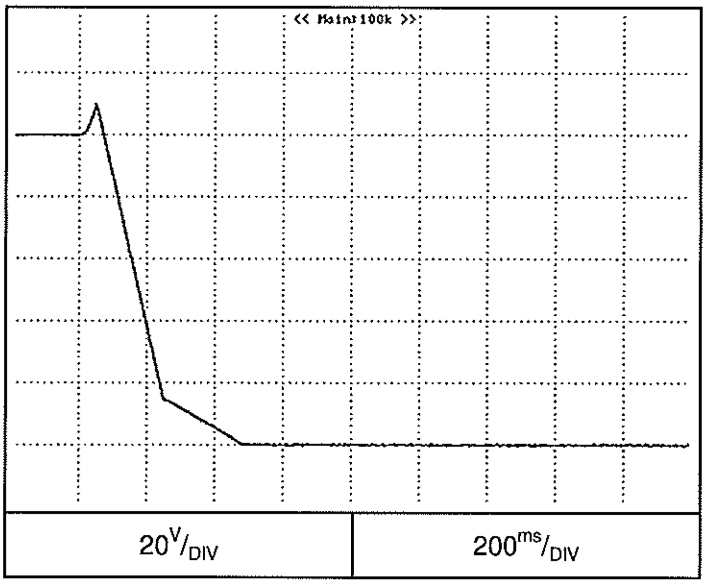


OVP setting: 40V

2.3 Over voltage protection (OVP) characteristic

Conditions: Vin:100Vac
Iout: 0%
Ta = 25℃

Z100-4



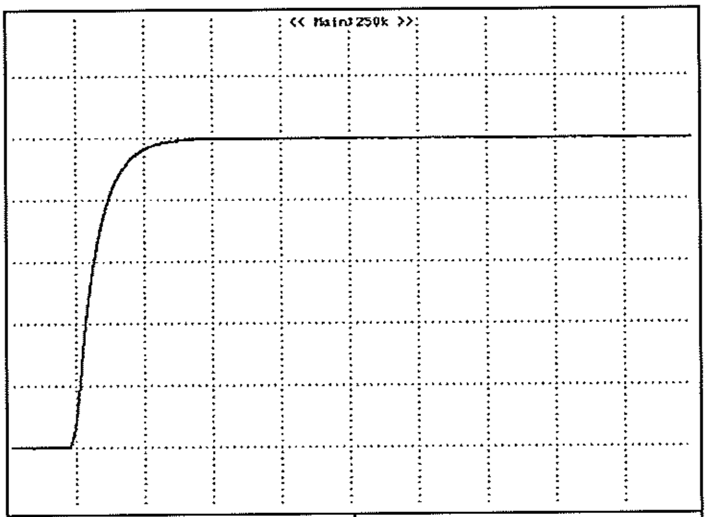
OVP setting: 110V

2.4 ON/OFF Output rise characteristics

Conditions: Vin:100Vac
Vout: 100%
Iout: 0%
Iset=105%
Ta = 25℃

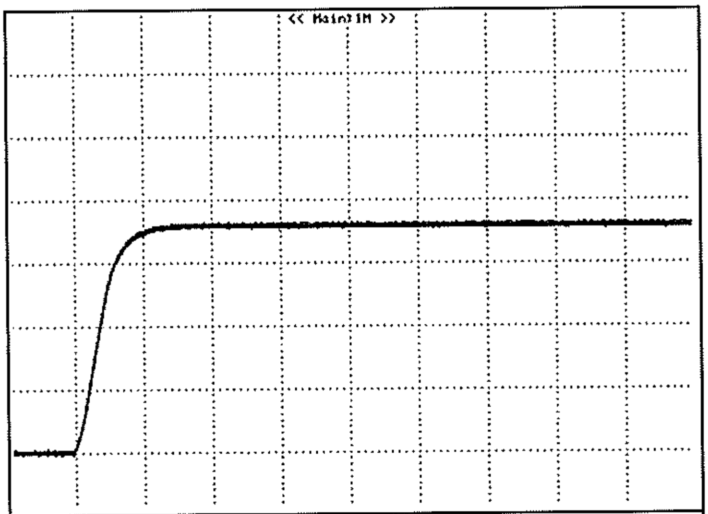
C.V mode

Z10-40



2 V/DIV	5 ms/DIV

Z36-12



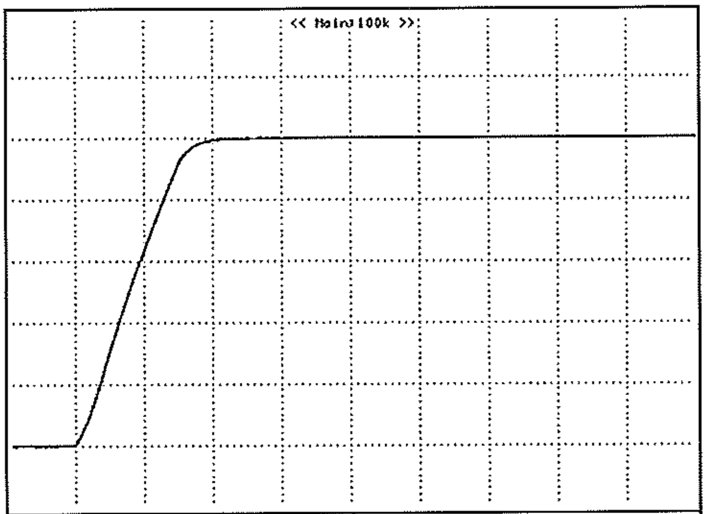
10 V/DIV	5 ms/DIV

2.4 ON/OFF Output rise characteristics

Conditions: Vin:100Vac
Vout: 100%
Iout: 0%
Iset=105%
Ta = 25℃

C.V mode

Z100-4



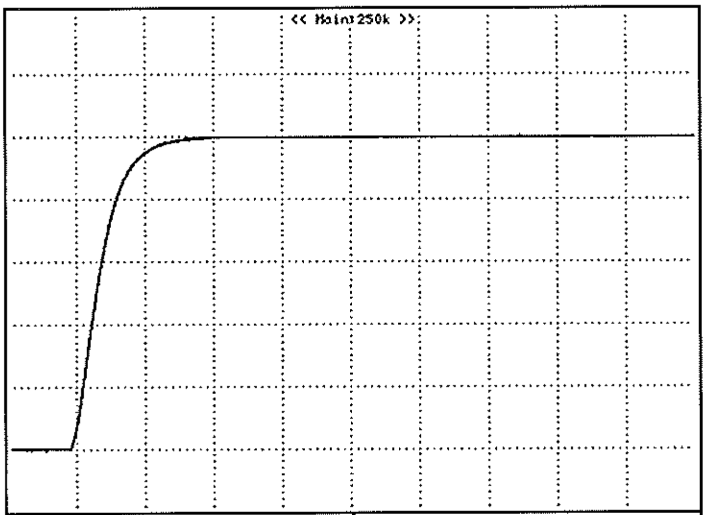
20 V/DIV	5 ms/DIV

2.4 ON/OFF Output rise characteristics

Conditions: Vin:100Vac
Vout: 100%
Iout: 100%
Iset=105%
Load: CR
Ta = 25℃

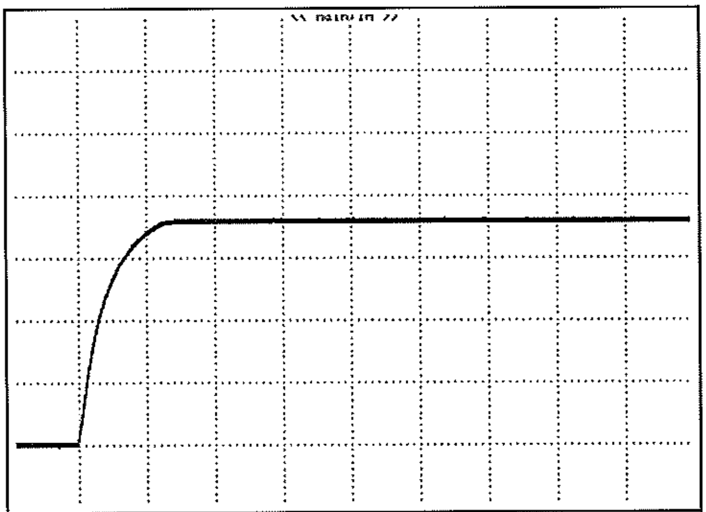
C.V mode

Z10-40



$2^{V}/_{DIV}$	$5^{ms}/_{DIV}$

Z36-12



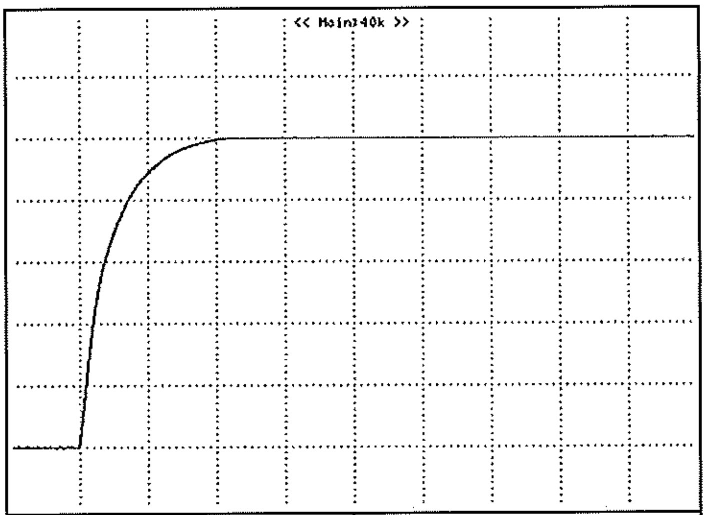
$10^{V}/_{DIV}$	$10^{ms}/_{DIV}$

2.4 ON/OFF Output rise characteristics

Conditions: Vin:100Vac
Vout: 100%
Iout: 100%
Iset=105%
Load: CR
Ta = 25℃

C.V mode

Z100-4



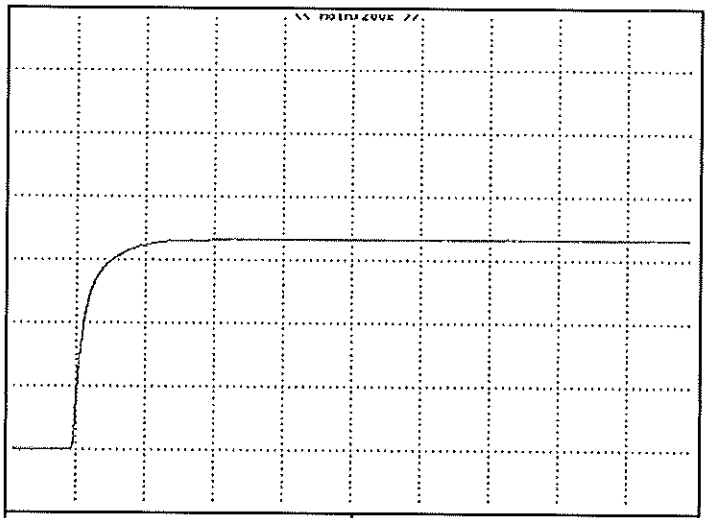
20V/DIV	20ms/DIV

2.4 ON/OFF Output rise characteristics

Conditions: Vin:100Vac
Vout: 100%
Iout: 100%
Vset=105%
Load: CR
Ta = 25℃

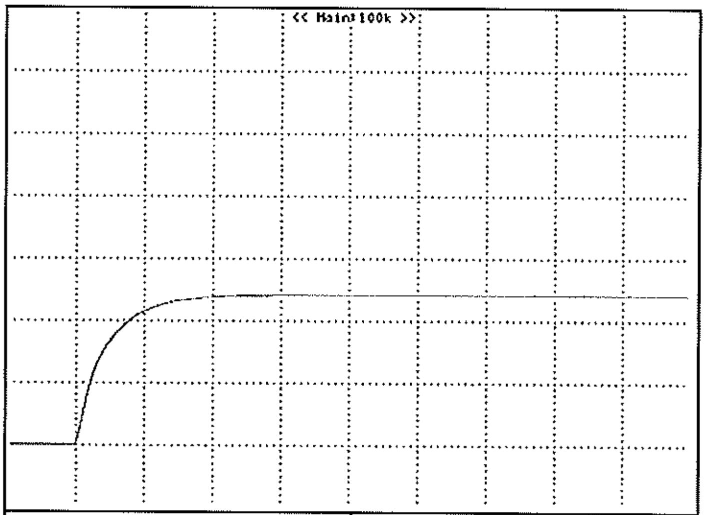
C.C mode

Z10-40



12A/DIV	10ms/DIV

Z36-12



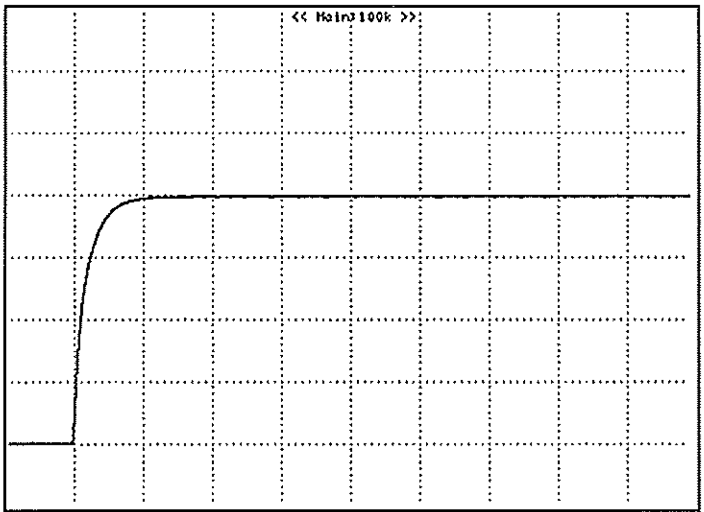
5A/DIV	10ms/DIV

2.4 ON/OFF Output rise characteristics

Conditions: Vin:100Vac
Vout: 100%
Iout: 100%
Vset=105%
Load: CR
Ta = 25℃

C.C mode

Z100-4



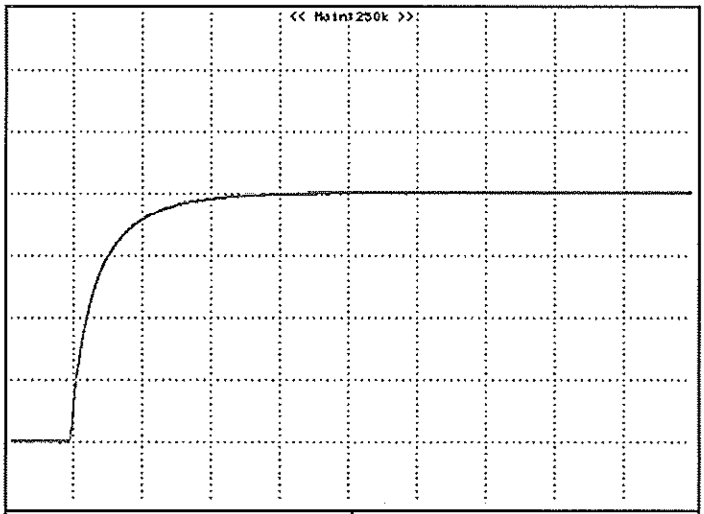
1A/DIV	50ms/DIV

2.4 ON/OFF Output rise characteristics

Conditions: Vin:100Vac
Iout: 100%
Vset=105%
shorted output
Ta = 25℃

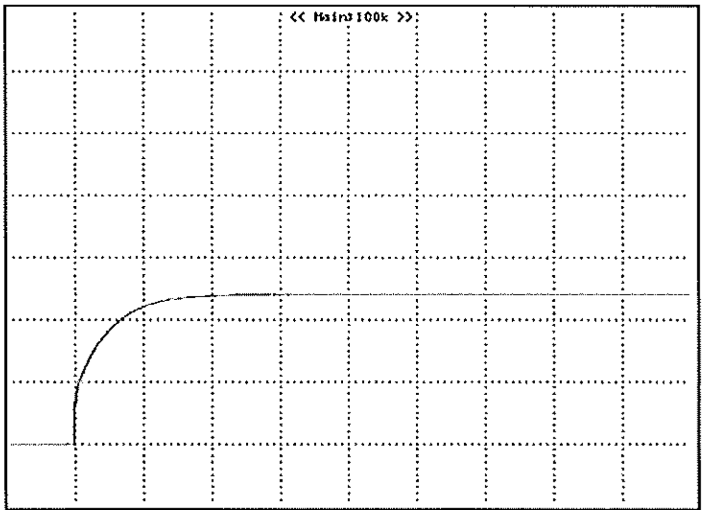
C.C mode

Z10-40



10 A/DIV	10 ms/DIV

Z36-12



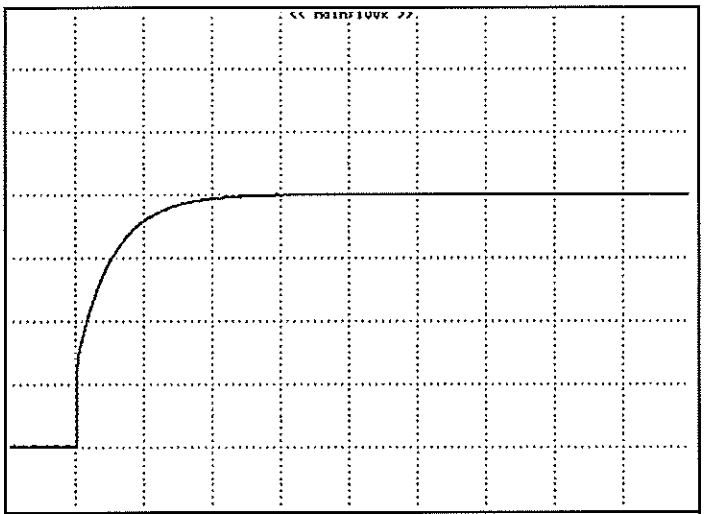
5 A/DIV	10 ms/DIV

2.4 ON/OFF Output rise characteristics

Conditions: Vin:100Vac
Iout: 100%
Vset=105%
shorted output
Ta = 25℃

C.C mode

Z100-4



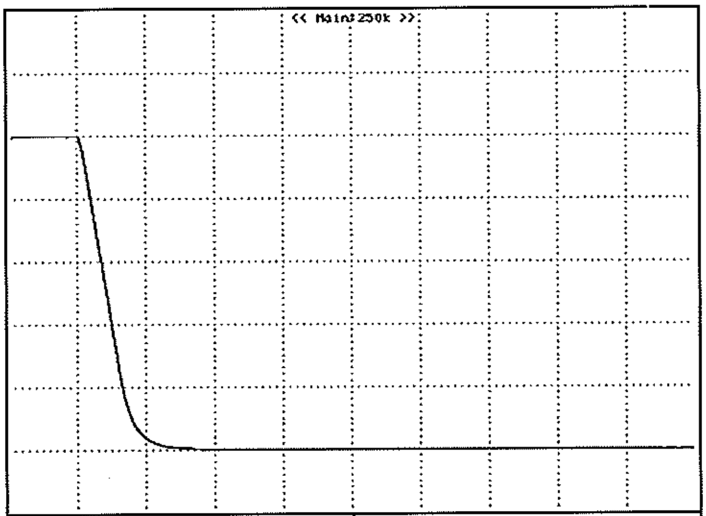
$1^{A}/_{DIV}$	$20^{ms}/_{DIV}$

2.5 ON/OFF Output fall characteristics

Conditions: Vin:100Vac
Vout: 100%
Iout: 0%
Iset=105%
Ta = 25℃

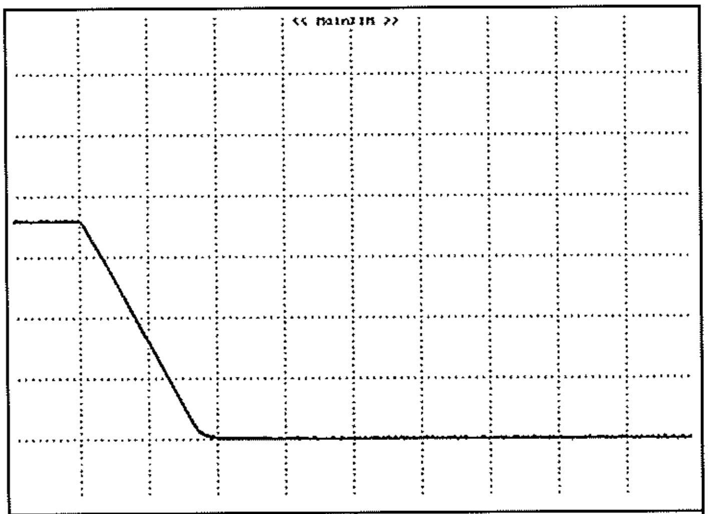
C.V mode

Z10-40



$2^{V}/_{DIV}$	$50^{ms}/_{DIV}$

Z36-12



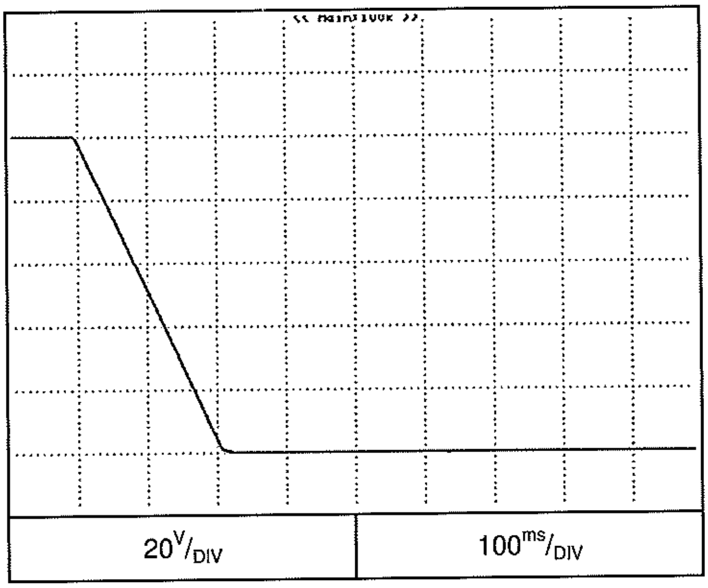
$10^{V}/_{DIV}$	$50^{ms}/_{DIV}$

2.5 ON/OFF Output fall characteristics

Conditions: Vin:100Vac
Vout: 100%
Iout: 0%
Iset=105%
Ta = 25℃

C.V mode

Z100-4

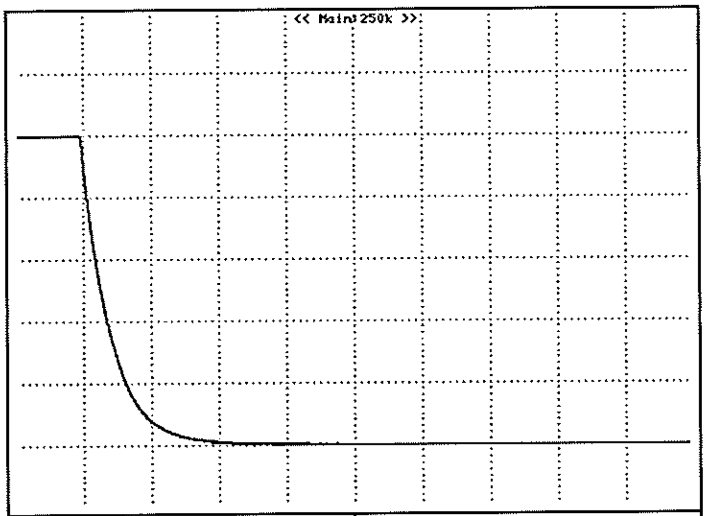


2.5 ON/OFF Output fall characteristics

Conditions: Vin:100Vac
Vout: 100%
Iout: 100%
Iset=105%
Load: CR
Ta = 25℃

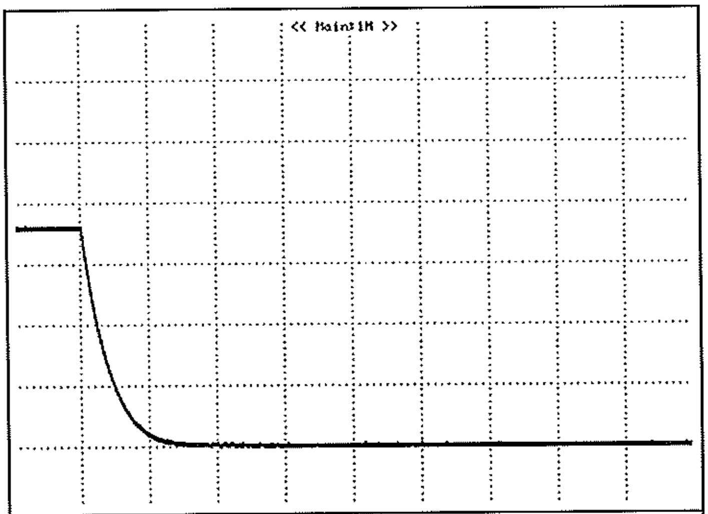
C.V mode

Z10-40



$2^{V}/_{DIV}$	$5^{ms}/_{DIV}$

Z36-12



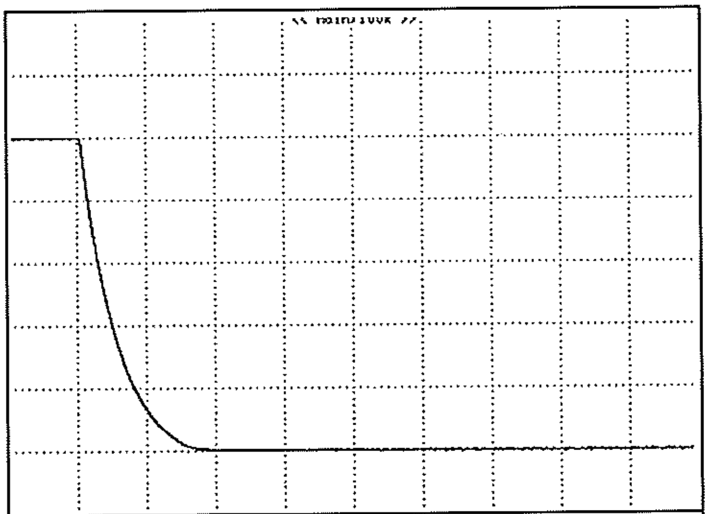
$10^{V}/_{DIV}$	$10^{ms}/_{DIV}$

2.5 ON/OFF Output fall characteristics

Conditions: Vin:100Vac
Vout: 100%
Iout: 100%
Iset=105%
Load: CR
Ta = 25℃

C.V mode

Z100-4



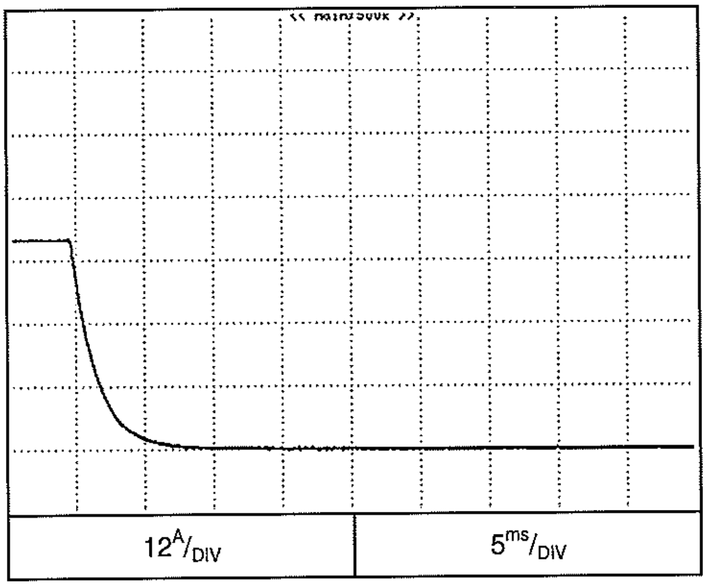
$20^{V}/_{DIV}$	$20^{ms}/_{DIV}$

2.5 ON/OFF Output fall characteristics

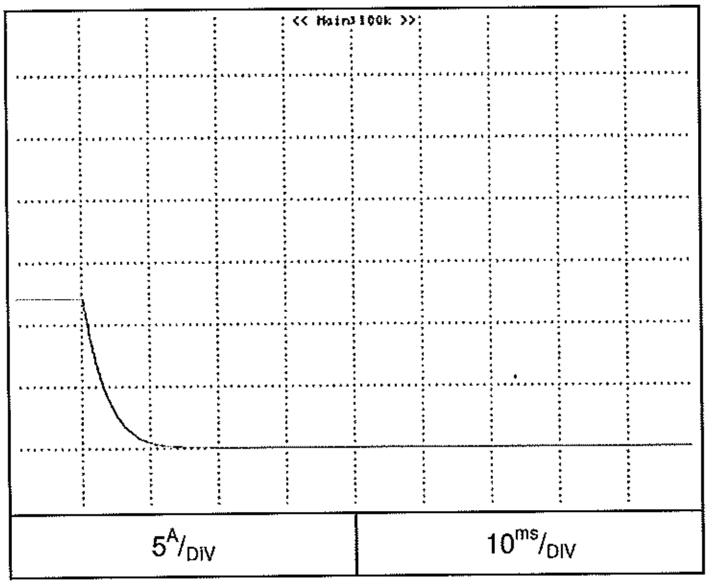
Conditions: Vin:100Vac
Vout: 100%
Iout: 100%
Vset=105%
Load: CR
Ta = 25℃

C.C mode

Z10-40



Z36-12

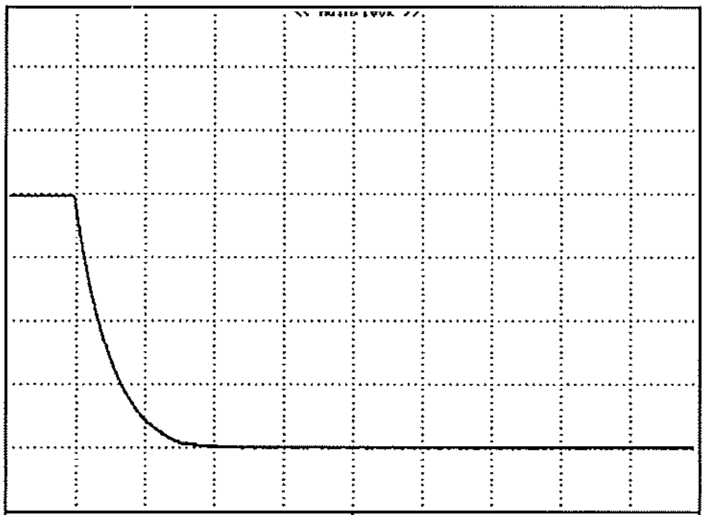


2.5 ON/OFF Output fall characteristics

Conditions: Vin:100Vac
Vout: 100%
Iout: 100%
Vset=105%
Load: CR
Ta = 25℃

C.C mode

Z100-4



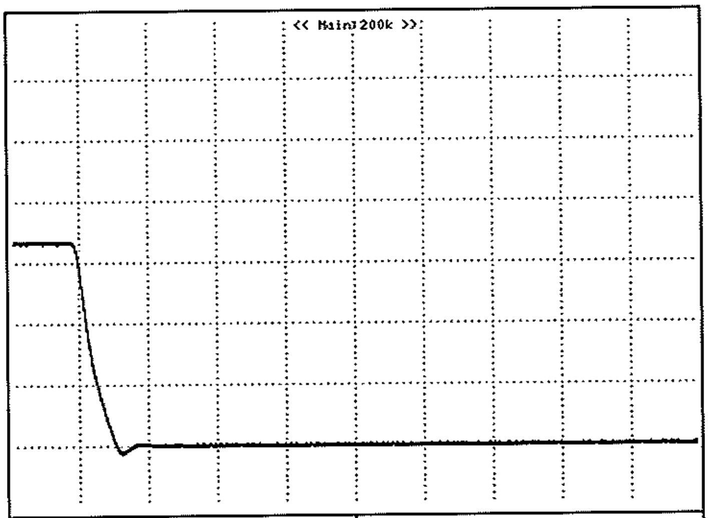
$1^{A}/_{DIV}$	$20^{ms}/_{DIV}$

2.5 ON/OFF Output fall characteristics

Conditions: Vin:100Vac
Iout: 100%
Vset=105%
shorted output
Ta = 25℃

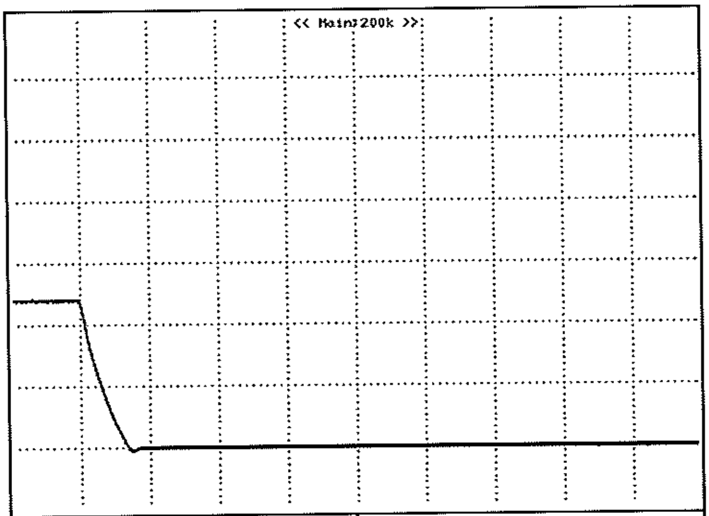
C.C mode

Z10-40



$12^{A}/_{DIV}$	$1^{ms}/_{DIV}$

Z36-12



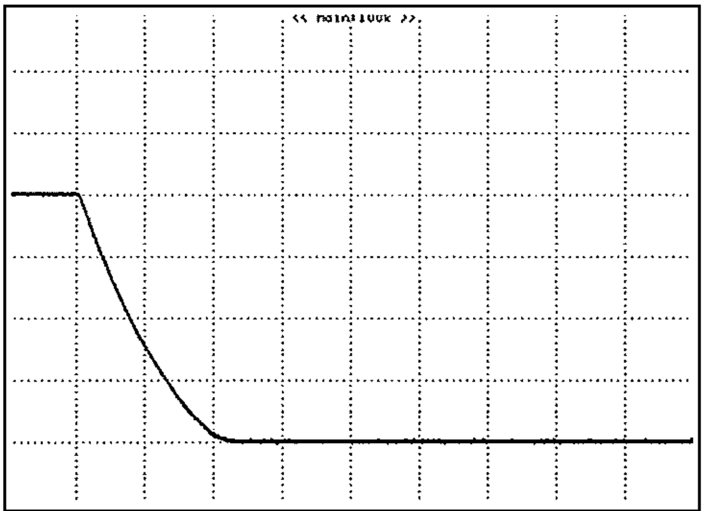
$5^{A}/_{DIV}$	$1^{ms}/_{DIV}$

2.5 ON/OFF Output fall characteristics

Conditions: Vin:100Vac
Iout: 100%
Vset=105%
shorted output
Ta = 25℃

C.C mode

Z100-4

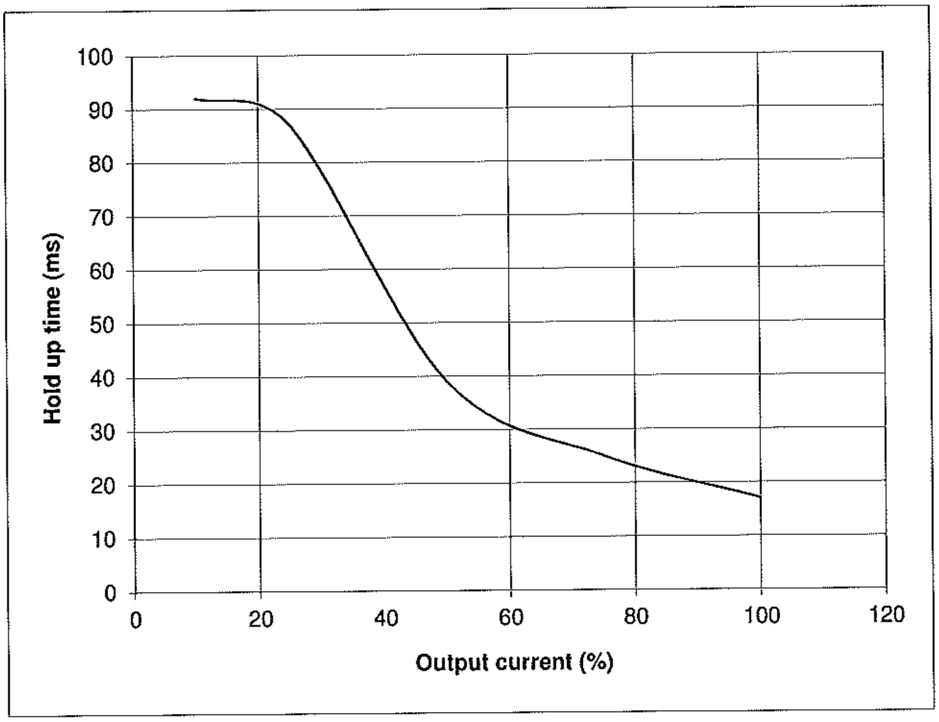


1 A/DIV	1 ms/DIV

2.6 Hold up time characteristics

Conditions: Vin:100Vac
Vout: 100%
Ta = 25℃

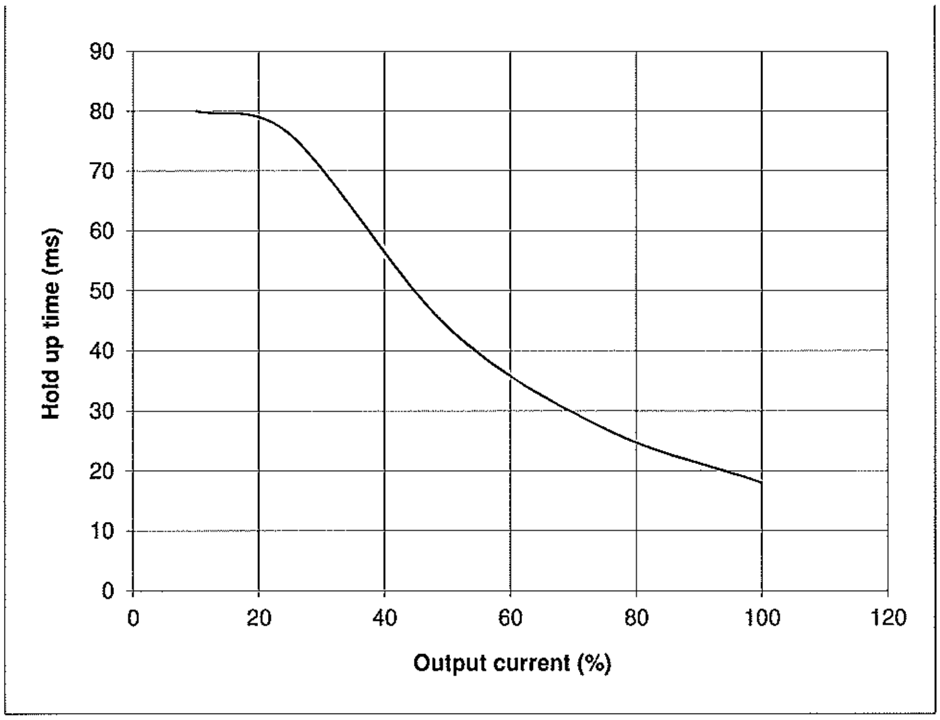
Z10-40



2.6 Hold up time characteristics

Conditions: Vin:100Vac
Vout: 100%
Ta = 25℃

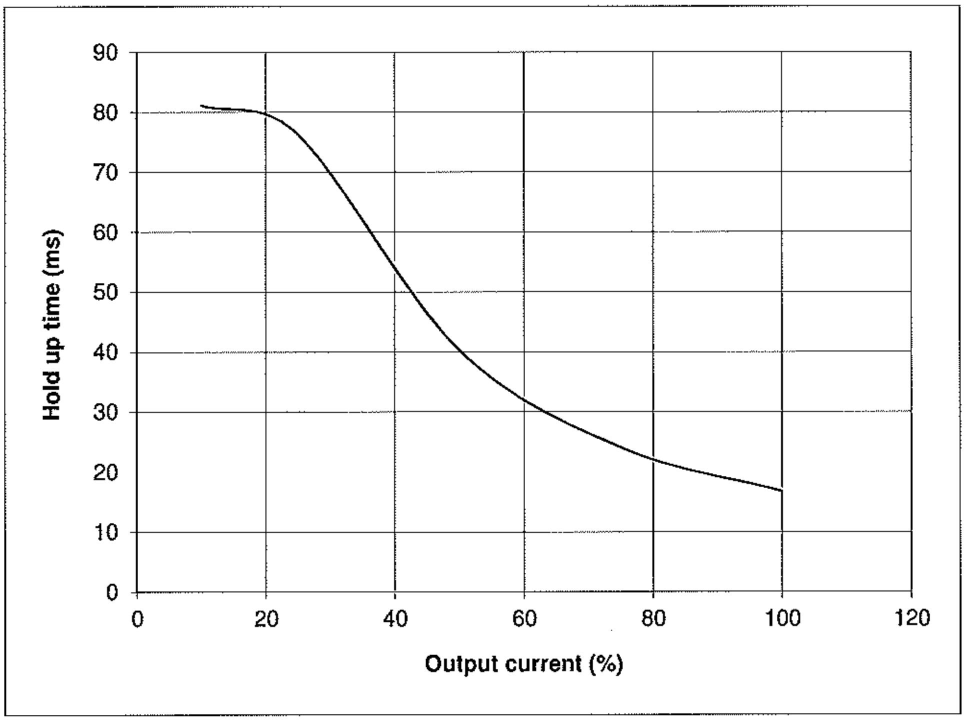
Z36-12



2.6 Hold up time characteristics

Conditions: Vin:100Vac
Vout: 100%
Ta = 25℃

Z100-4

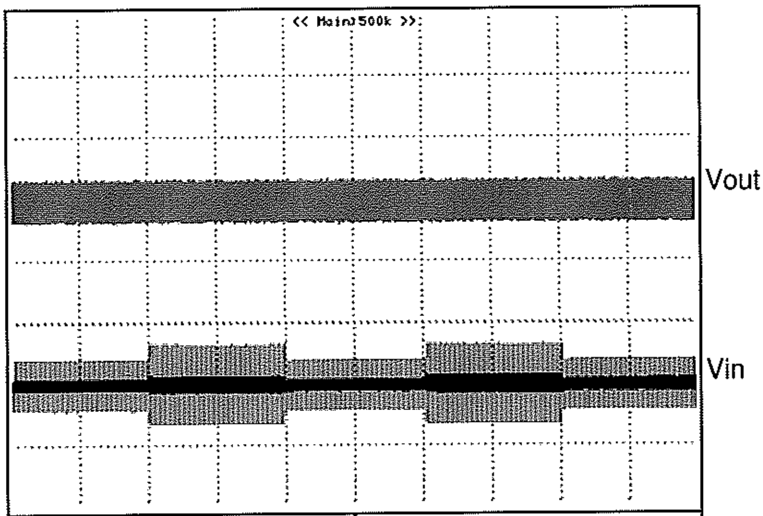


2.7 Dynamic line response characteristics

Conditions: Vin:85↔132V
Vout: 100%
Iout: 100%
Ta = 25℃

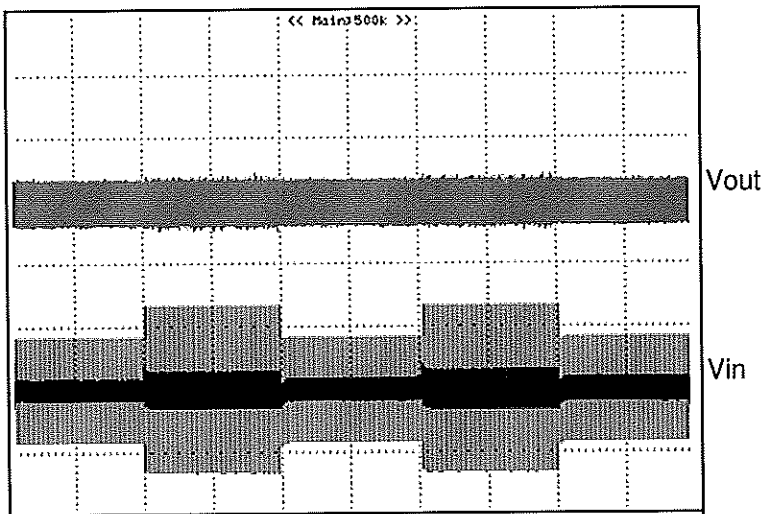
C.V mode

Z10-40



Vout: 20^{mv}/$_{DIV}$	500^{ms}/$_{DIV}$

Conditions: Vin:170↔265V
Vout: 100%
Iout: 100%
Ta = 25℃



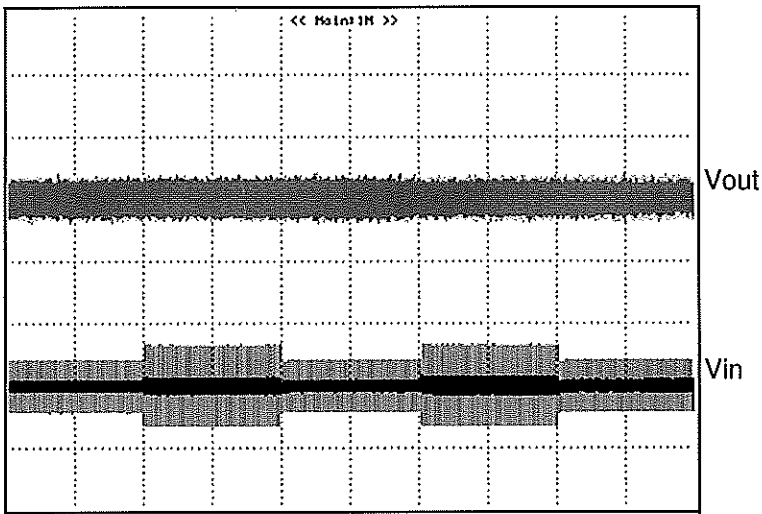
Vout: 20^{mv}/$_{DIV}$	500^{ms}/$_{DIV}$

2.7 Dynamic line response characteristics

C.V mode

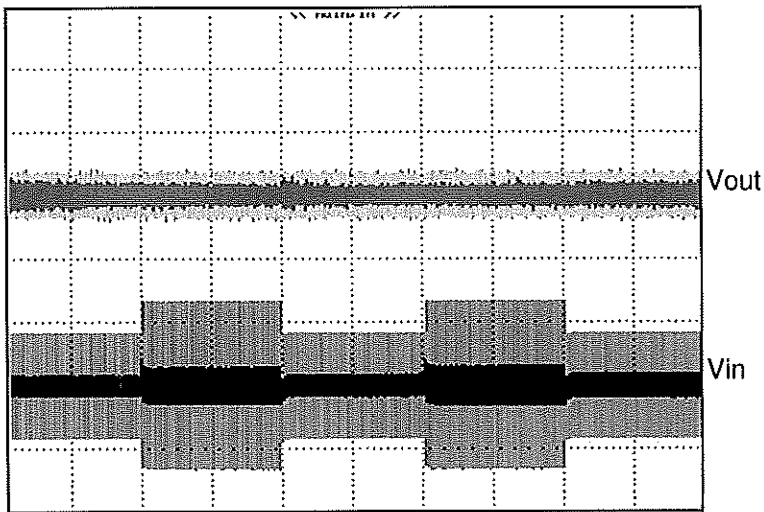
Conditions: Vin:85↔132V
Vout: 100%
Iout: 100%
Ta = 25℃

Z36-12



Vout: 20mv/DIV	500ms/DIV

Conditions: Vin:170↔265V
Vout: 100%
Iout: 100%
Ta = 25℃



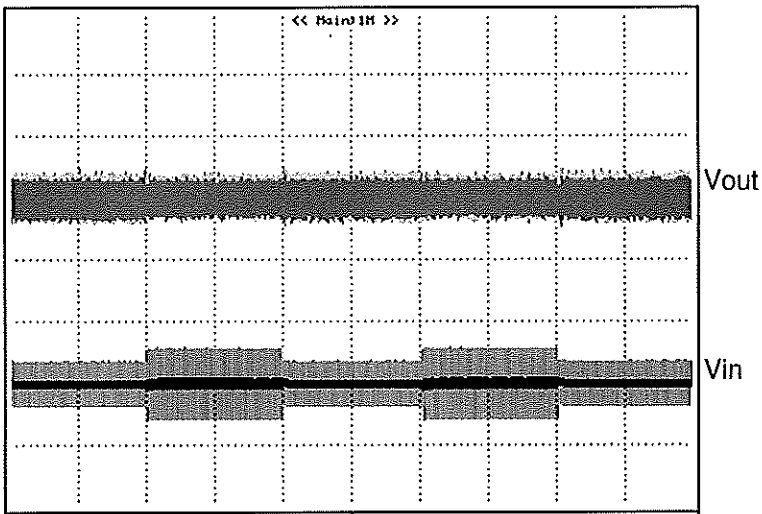
Vout: 20mv/DIV	500ms/DIV

2.7 Dynamic line response characteristics

C.V mode

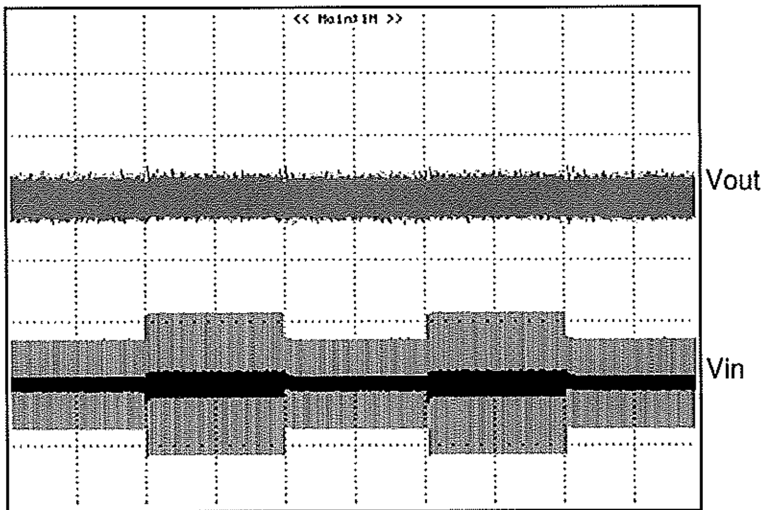
Z100-4

Conditions: Vin:85↔132V
Vout: 100%
Iout: 100%
Ta = 25℃



Vout: 20mv/DIV	500ms/DIV

Conditions: Vin:170↔265V
Vout: 100%
Iout: 100%
Ta = 25℃



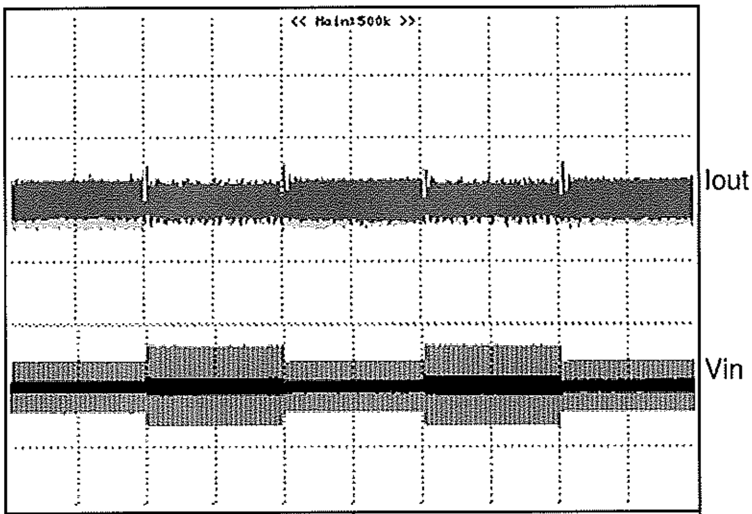
Vout: 20mv/DIV	500ms/DIV

2.7 Dynamic line response characteristics

Conditions: Vin:85↔132V
Vout: 100%
Iout: 100%
Ta = 25℃

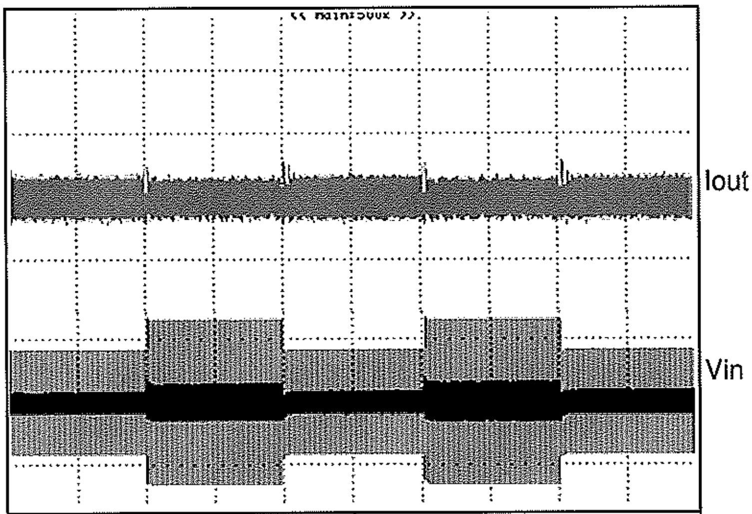
C.C mode

Z10-40



Iout: 0.12^{A}/$_{DIV}$	500^{ms}/$_{DIV}$

Conditions: Vin:170↔265V
Vout: 100%
Iout: 100%
Ta = 25℃



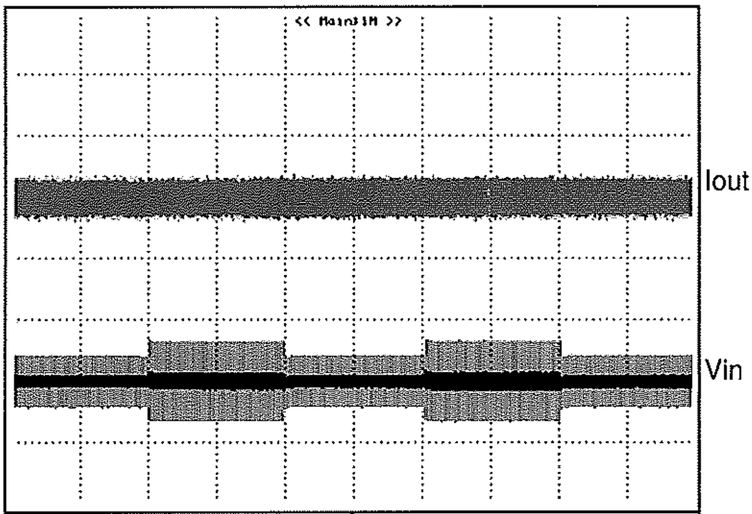
Iout: 0.12^{A}/$_{DIV}$	500^{ms}/$_{DIV}$

2.7 Dynamic line response characteristics

C.C mode

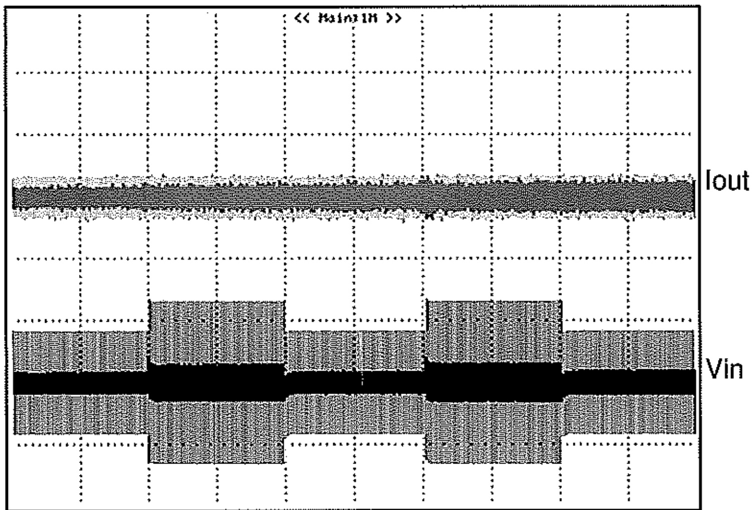
Conditions: Vin:85↔132V
Vout: 100%
Iout: 100%
Ta = 25℃

Z36-12



Iout: $20^{mA}/_{DIV}$	$500^{ms}/_{DIV}$

Conditions: Vin:170↔265V
Vout: 100%
Iout: 100%
Ta = 25℃



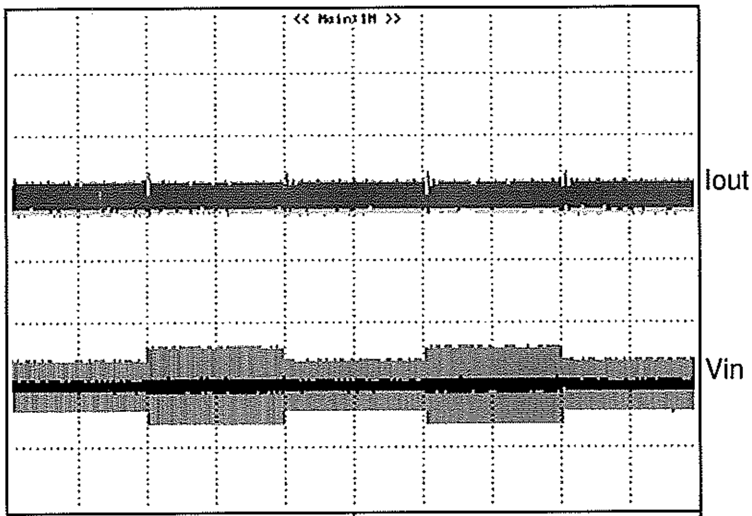
Iout: $20^{mA}/_{DIV}$	$500^{ms}/_{DIV}$

2.7 Dynamic line response characteristics

Conditions: Vin:85↔132V
Vout: 100%
Iout: 100%
Ta = 25℃

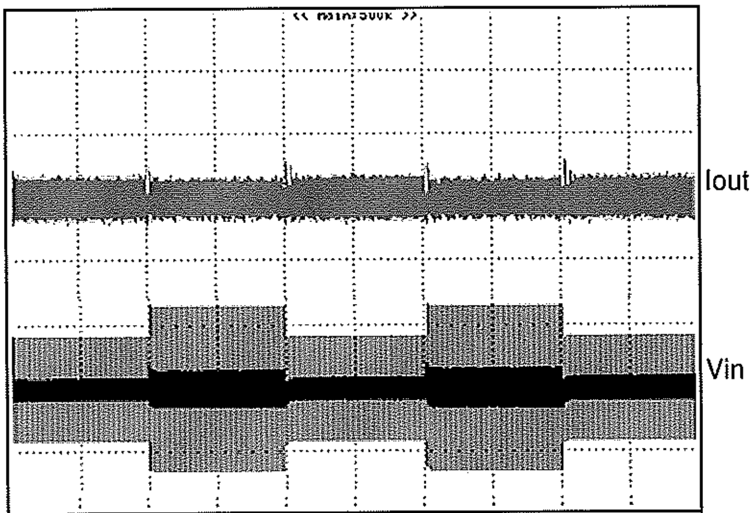
C.C mode

Z100-4



Iout: 20mA/DIV	500ms/DIV

Conditions: Vin:170↔265V
Vout: 100%
Iout: 100%
Ta = 25℃



Iout: 20mA/DIV	500ms/DIV

2.8 Dynamic load response characteristics

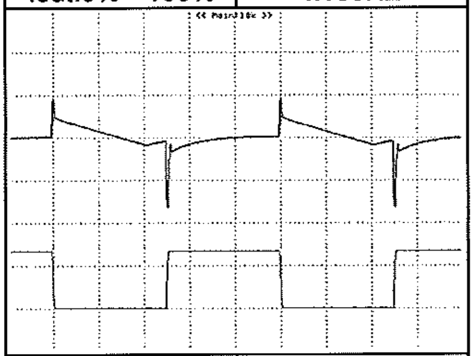
Conditions: Vin:100Vac
Vout: 100%
Ta = 25℃

C.V mode

Load current: tr=tf=100us

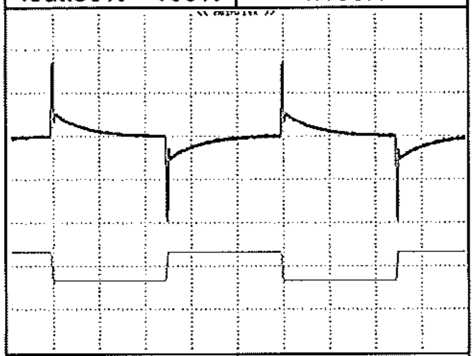
Z10-40

Iout:0%↔100%	f:100HZ



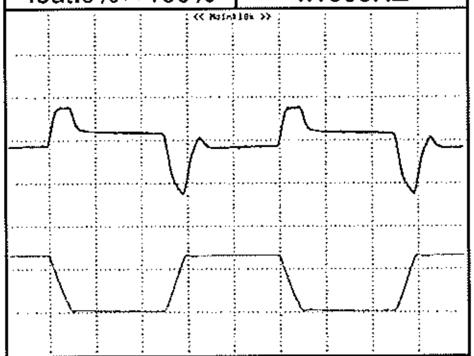
0.2$^{V}/_{DIV}$	2$^{ms}/_{DIV}$
1.76%	-3.27%

Iout:50%↔100%	f:100HZ



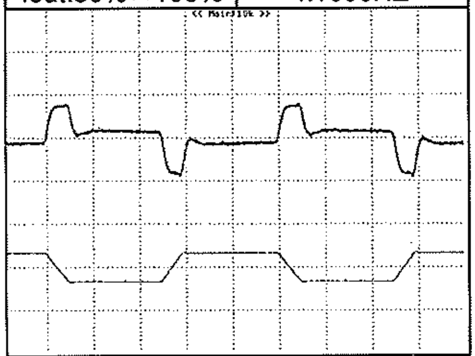
0.05$^{V}/_{DIV}$	2$^{ms}/_{DIV}$
0.85%	-1.00%

Iout:0%↔100%	f:1000HZ



0.2$^{V}/_{DIV}$	500$^{us}/_{DIV}$
1.54%	-2.49%

Iout:50%↔100%	f:1000HZ



0.1$^{V}/_{DIV}$	500$^{us}/_{DIV}$
0.78%	-0.89%

2.8 Dynamic load response characteristics

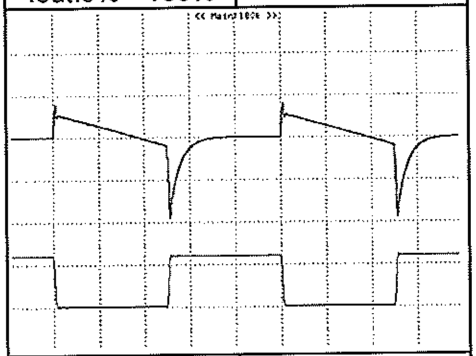
Conditions: Vin:100Vac
Vout: 100%
Ta = 25℃

C.V mode

Load current: tr=tf=100us

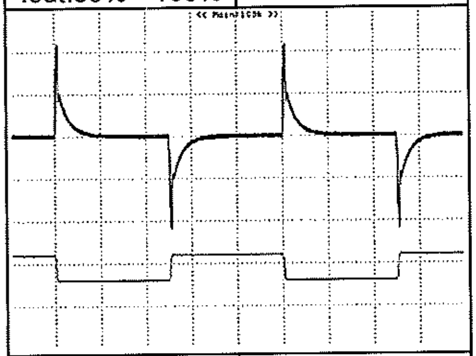
Z36-12

Iout:0%↔100%	f:100HZ



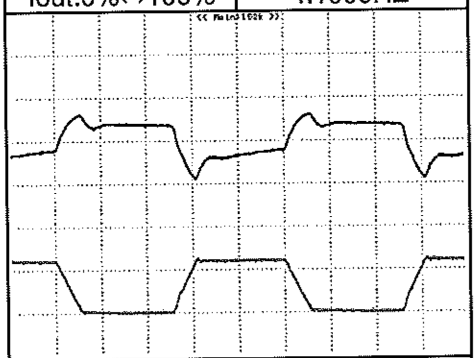
$0.5\,{}^{V}/_{DIV}$	$2\,{}^{ms}/_{DIV}$
1.10%	-2.77%

Iout:50%↔100%	f:100HZ



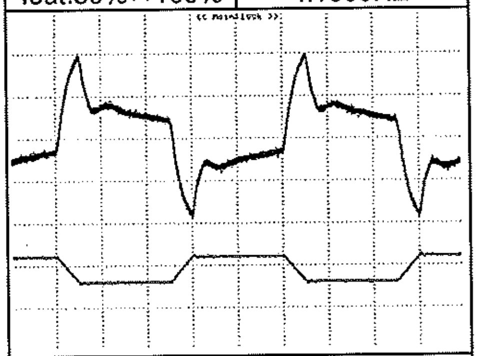
$0.1\,{}^{V}/_{DIV}$	$2\,{}^{ms}/_{DIV}$
0.60%	-0.60%

Iout:0%↔100%	f:1000HZ



$0.5\,{}^{V}/_{DIV}$	$200\,{}^{us}/_{DIV}$
0.86%	-1.24%

Iout:50%↔100%	f:1000HZ



$0.1\,{}^{V}/_{DIV}$	$200\,{}^{us}/_{DIV}$
0.55%	-0.52%

2.8 Dynamic load response characteristics

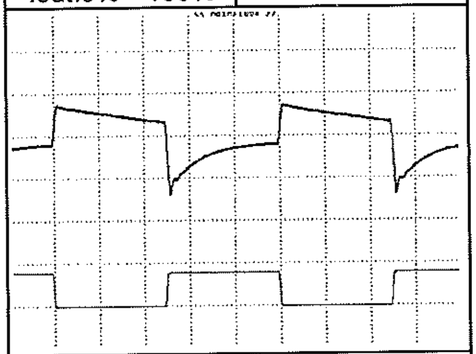
Conditions: Vin:100Vac
Vout: 100%
Ta = 25℃

C.V mode

Load current: tr=tf=100us

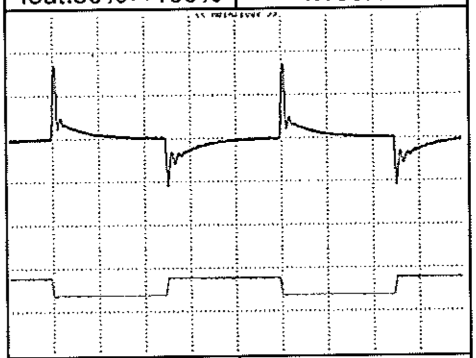
Z100-4

Iout:0%↔100%	f:100HZ



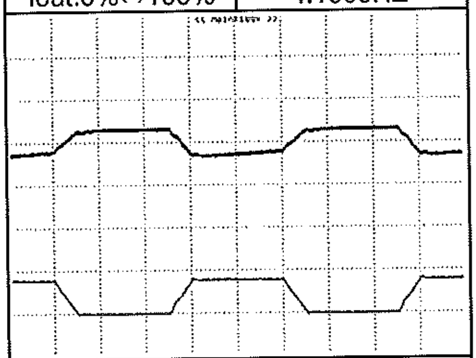
$1^{V}/_{DIV}$	$2^{ms}/_{DIV}$
0.70%	-1.30%

Iout:50%↔100%	f:100HZ



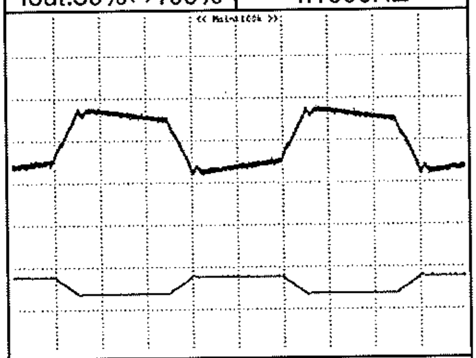
$0.2^{V}/_{DIV}$	$2^{ms}/_{DIV}$
0.34%	-0.23%

Iout:0%↔100%	f:1000HZ



$1^{V}/_{DIV}$	$200^{us}/_{DIV}$
0.34%	-0.36%

Iout:50%↔100%	f:1000HZ



$0.2^{V}/_{DIV}$	$200^{us}/_{DIV}$
0.15%	-0.16%

2.8 Dynamic load response characteristics

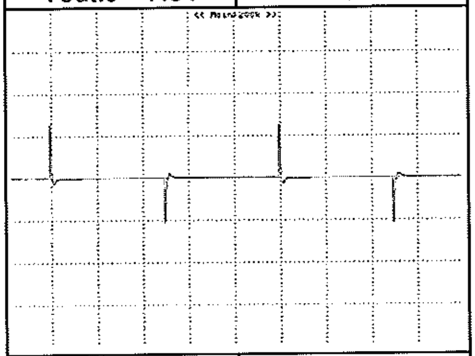
Conditions: Vin:100Vac
Ta = 25℃

C.C mode

Z10-40

Io=40A

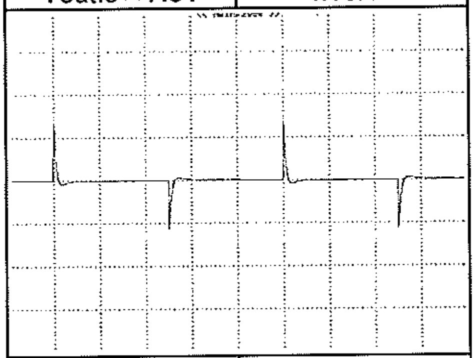
Vout:9↔7.5V	f:10HZ



$6^{A}/_{DIV}$	$20^{ms}/_{DIV}$
19.05%	-15.75%

Io=20A

Vout:9↔7.5V	f:10HZ

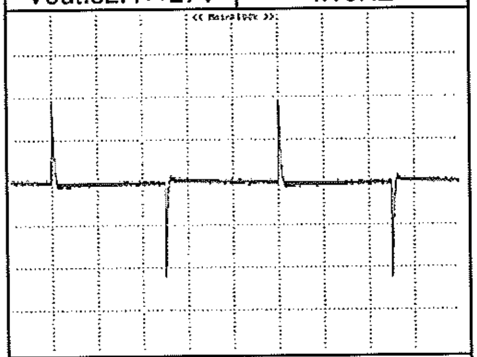


$3^{A}/_{DIV}$	$20^{ms}/_{DIV}$
10.05%	-8.45%

Z36-12

Io=12A

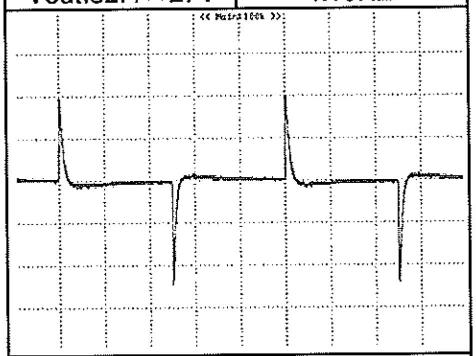
Vout:32.4↔27V	f:10HZ



$1^{A}/_{DIV}$	$20^{ms}/_{DIV}$
15.62%	-18.75%

Io=6A

Vout:32.4↔27V	f:10HZ



$0.5^{A}/_{DIV}$	$20^{ms}/_{DIV}$
8.33%	-10.24%

2.8 Dynamic load response characteristics

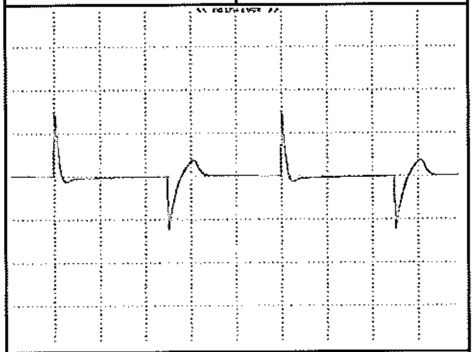
Conditions: Vin:100Vac
Ta = 25℃

C.C mode

Z100-4

Io=4A

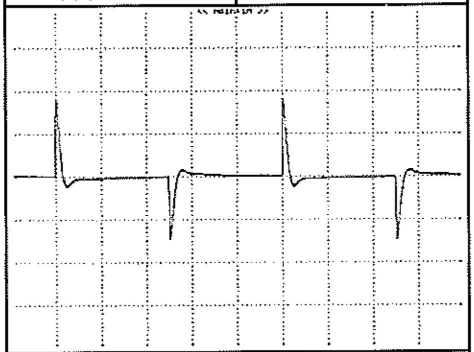
Vout:90↔75V	f:10HZ



0.5A/DIV	20ms/DIV
18.25%	-15.32%

Io=2A

Vout:90↔75V	f:10HZ



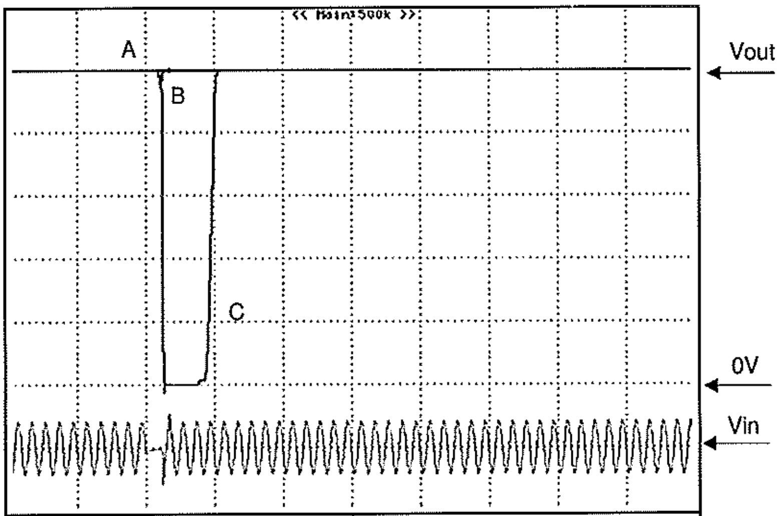
0.2A/DIV	20ms/DIV
8.91%	-7.35%

2.9 Response to brown-out characteristics

Conditions: Vin:100VAC
Vout: 100%
Iout: 100%
Ta = 25℃

C.V mode

Z10-40



Vout: 2^{V}/$_{DIV}$	50^{ms}/$_{DIV}$

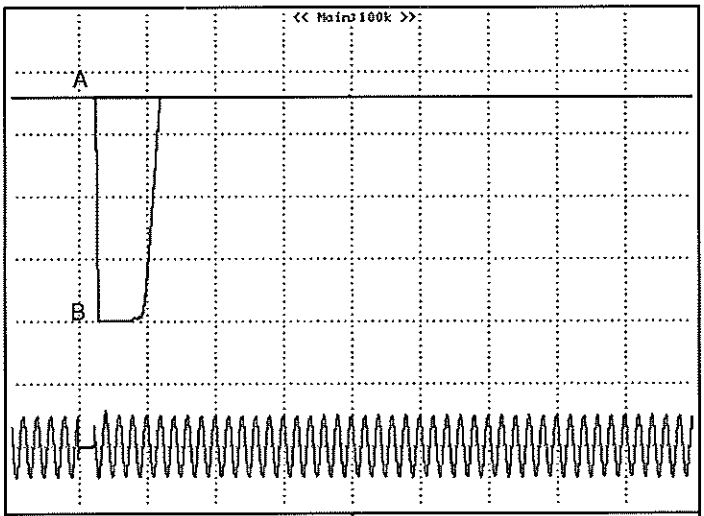
Brown-out time
A -16mS
B -17mS
C -24mS

2.9 Response to brown-out characteristics

Conditions: Vin:100VAC
Vout: 100%
Iout: 100%
Ta = 25℃

C.V mode

Z36-12



Vout: 10 V/DIV	100 ms/DIV

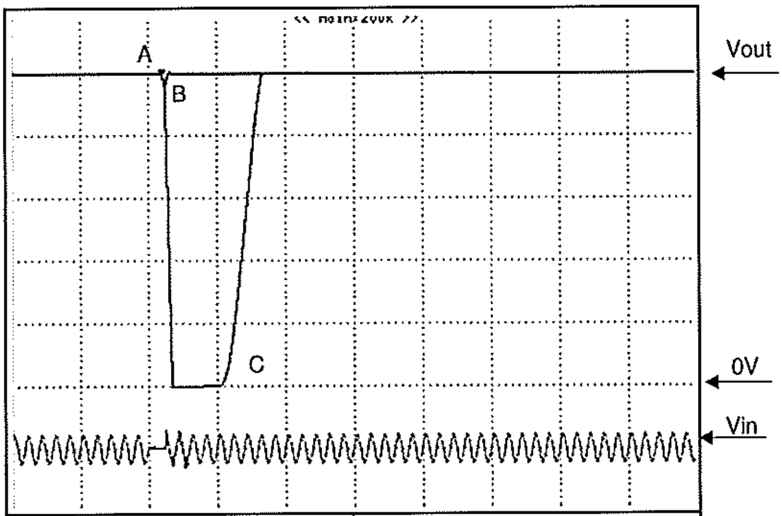
Brown-out time
A - 18ms
B - 19ms

2.9 Response to brown-out characteristics

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

C.V mode

Z100-4



Vout: 20 V/DIV	100 ms/DIV

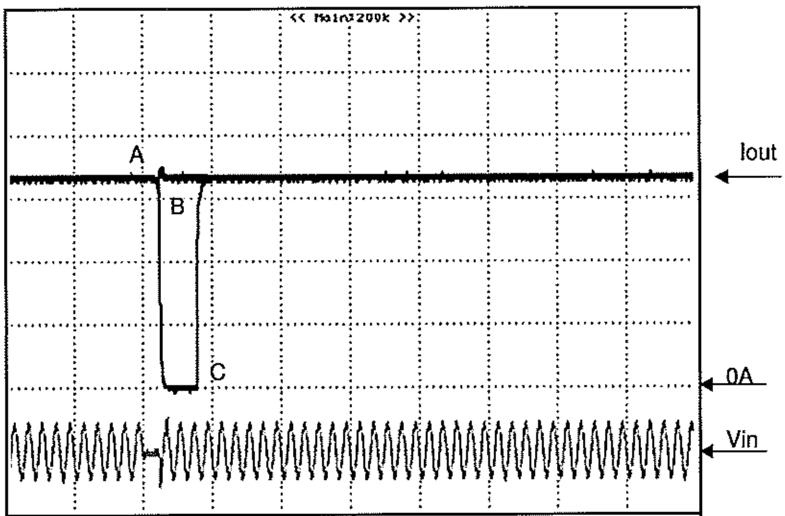
Brown-out time
A - 17ms
B - 18ms
C - 25ms

2.9 Response to brown-out characteristics

C.C mode

Conditions: Vin:100VAC
Vout: 100%
Iout: 100%
Ta = 25℃

Z10-40



Iout: 12A/DIV	100ms/DIV

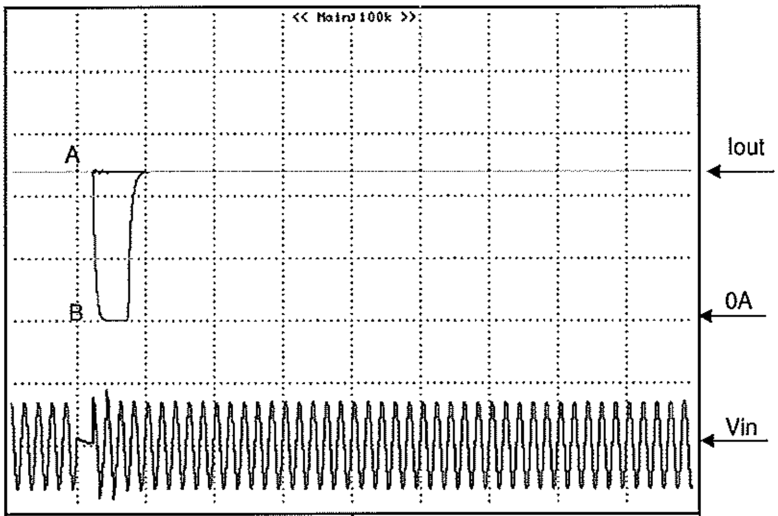
Brown-out time
A -16mS
B -17mS
C -24mS

2.9 Response to brown-out characteristics

C.C mode

Conditions: Vin:100VAC
Vout: 100%
Iout: 100%
Ta = 25℃

Z36-12



Iout: 5A/DIV	100ms/DIV

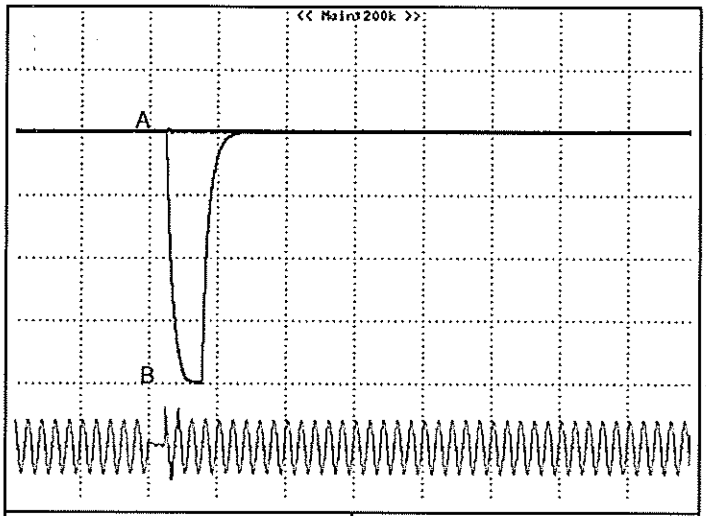
Brown-out time
A - 16ms
B - 17ms

2.9 Response to brown-out characteristics

C.C mode

Conditions: Vin:100VAC
Vout: 100%
Iout: 100%
Ta = 25℃

Z100-4



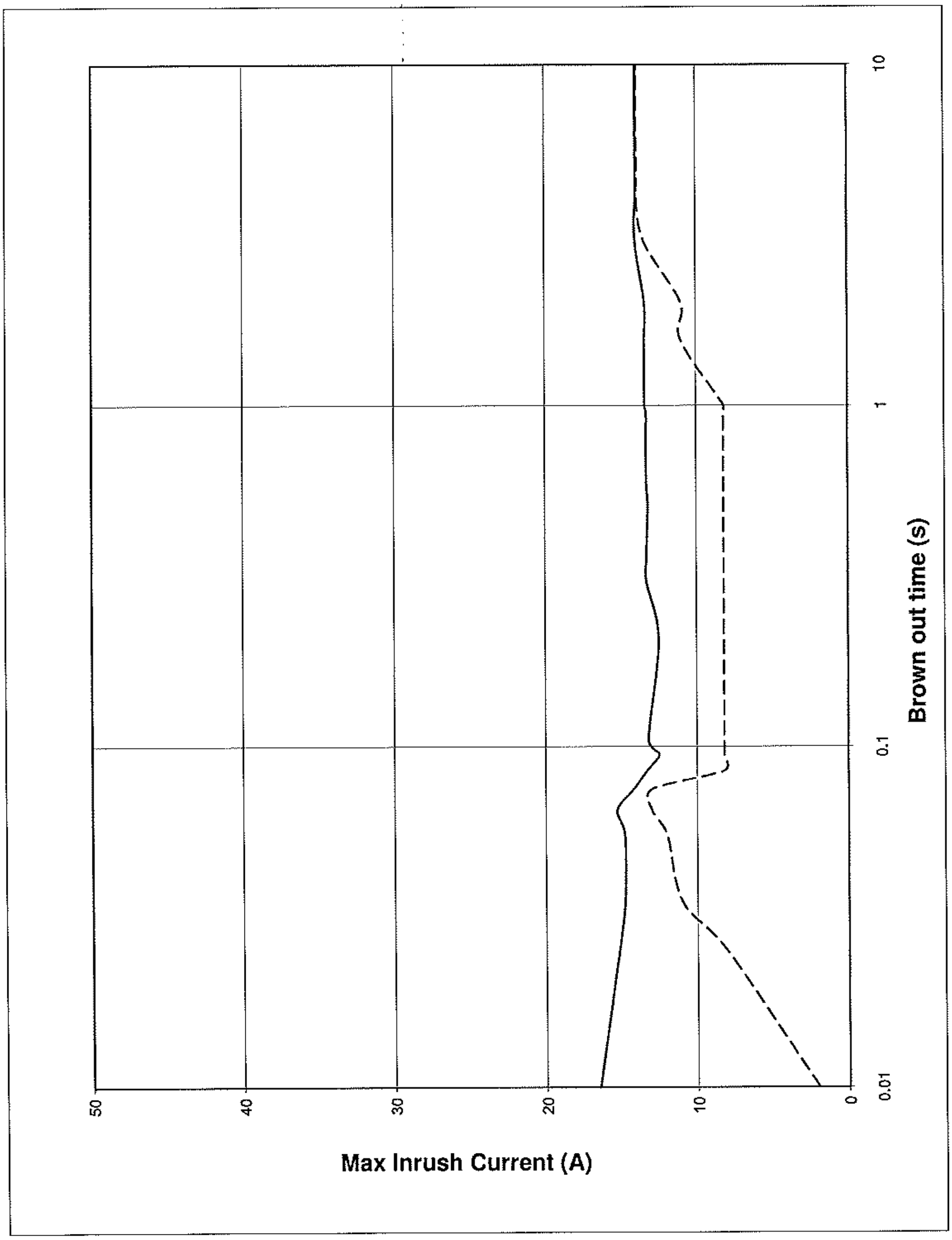
Iout: 1 A/DIV	100 ms/DIV

Brown-out time
A - 17ms
B - 18ms

2.10 Inrush Current Characteristics during line brown outs

Conditions: Vin: 100VAC
Vout: 100%
Iout: 0% - - - - - - - -
Iout: 100% ————
Ta = 25℃

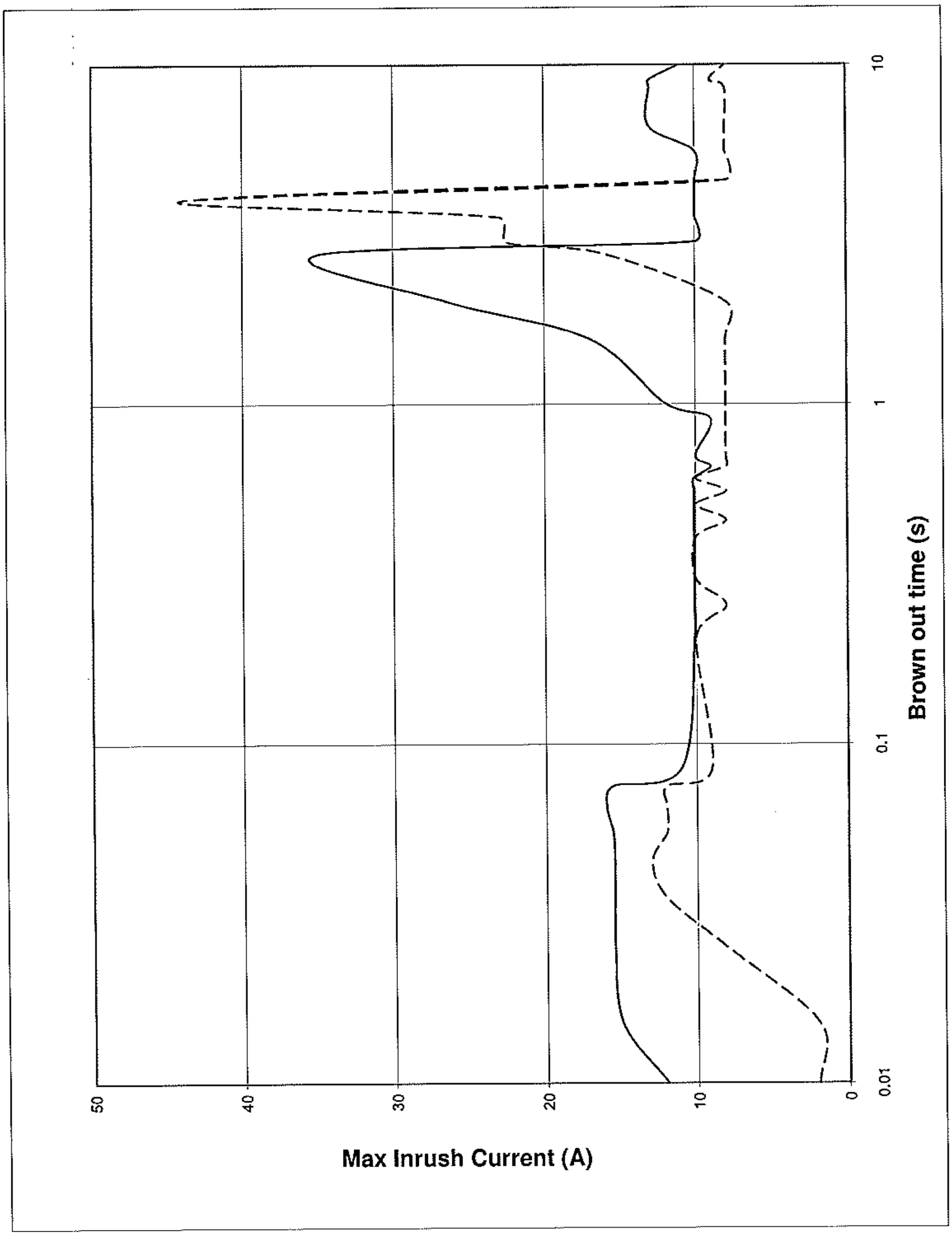
Z10-40



2.10 Inrush Current Characteristics during line brown outs

Conditions: Vin: 200VAC
Vout: 100%
Iout: 0% - - - - - - - - -
Iout: 100% ————
Ta = 25℃

Z10-40



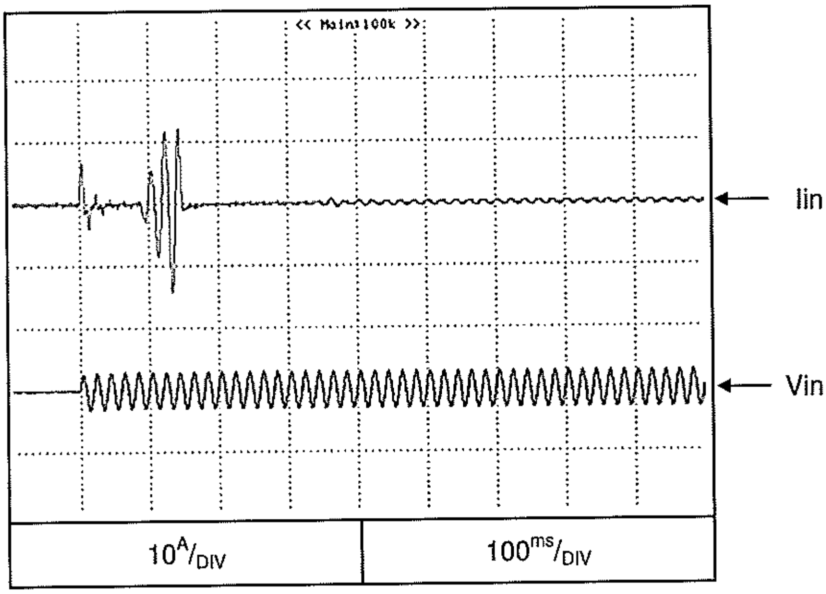
2.11 Inrush current waveform

Conditions: Vin: 100V
Vout: 100%
Iout: 100%
Ta = 25℃

Z10-40

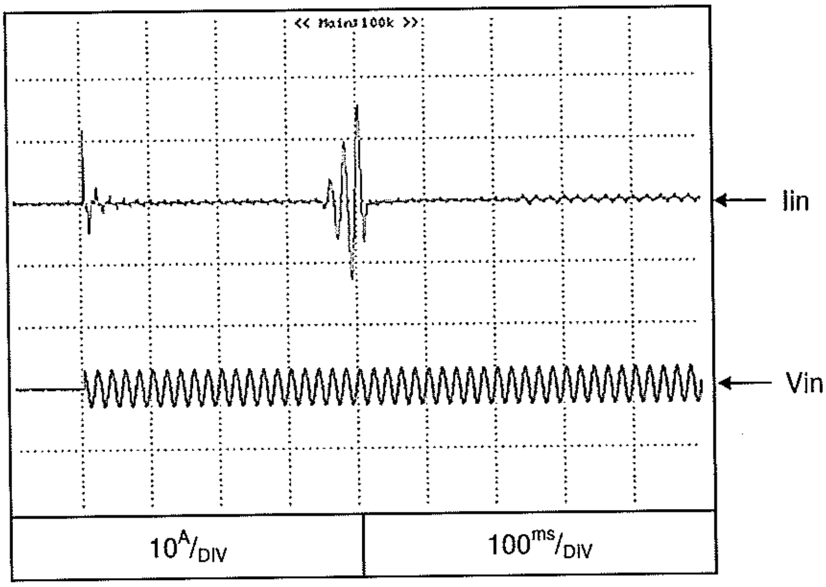
Switch on phase angle of input AC voltage

Φ=0˚



Switch on phase angle of input AC voltage

Φ=90˚



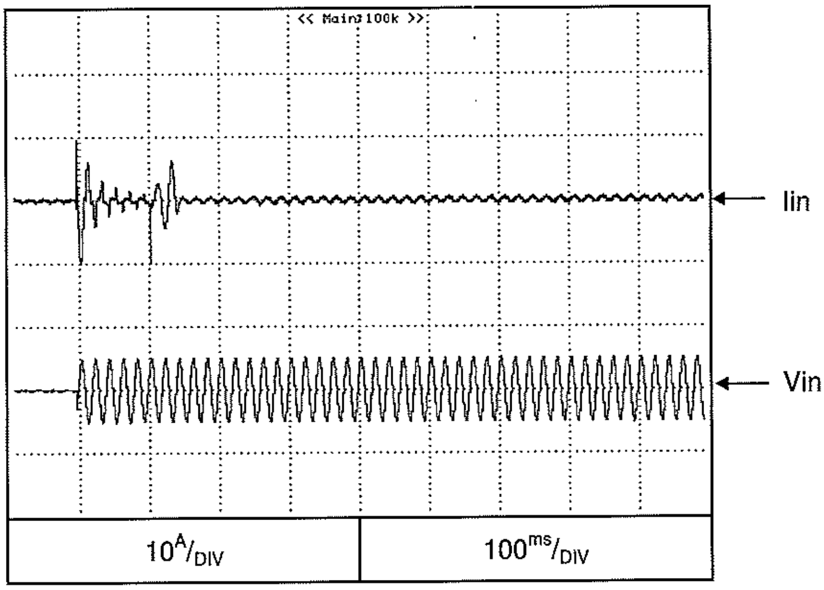
2.11 Inrush current waveform

Conditions: Vin: 200V
Vout: 100%
Iout: 100%
Ta = 25℃

Z10-40

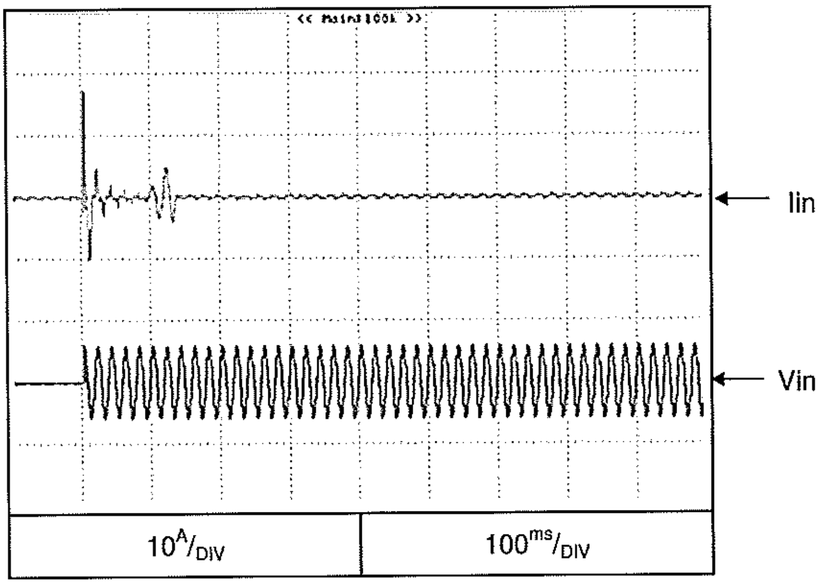
Switch on phase angle of input AC voltage

Φ=0°



Switch on phase angle of input AC voltage

Φ=90°



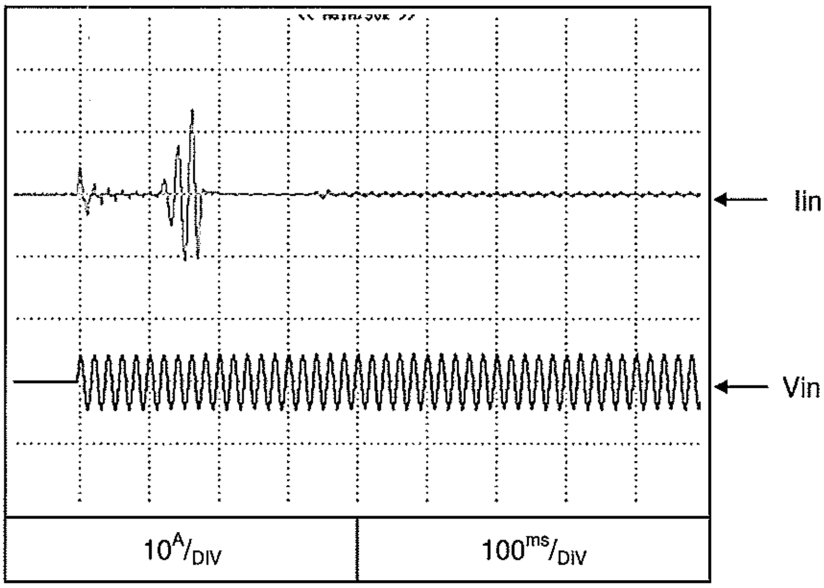
2.11 Inrush current waveform

Conditions: Vin: 100V
Vout: 100%
Iout: 100%
Ta = 25℃

Z100-4

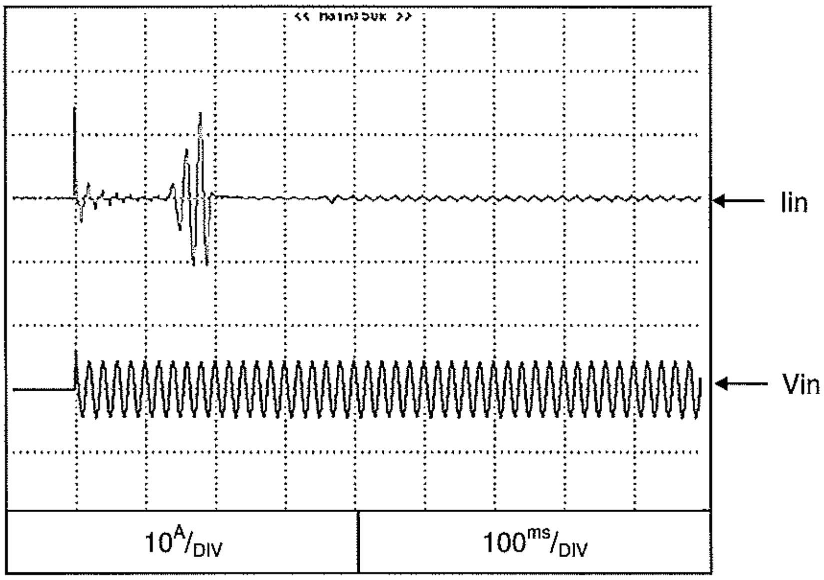
Switch on phase angle of input AC voltage

Φ=0°



Switch on phase angle of input AC voltage

Φ=90°



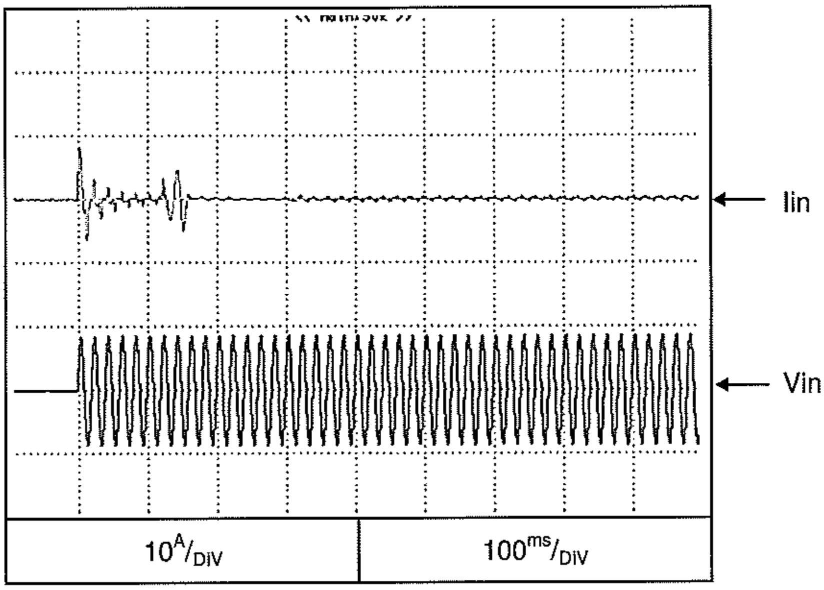
2.11 Inrush current waveform

Conditions: Vin: 200V
Vout: 100%
Iout: 100%
Ta = 25℃

Z100-4

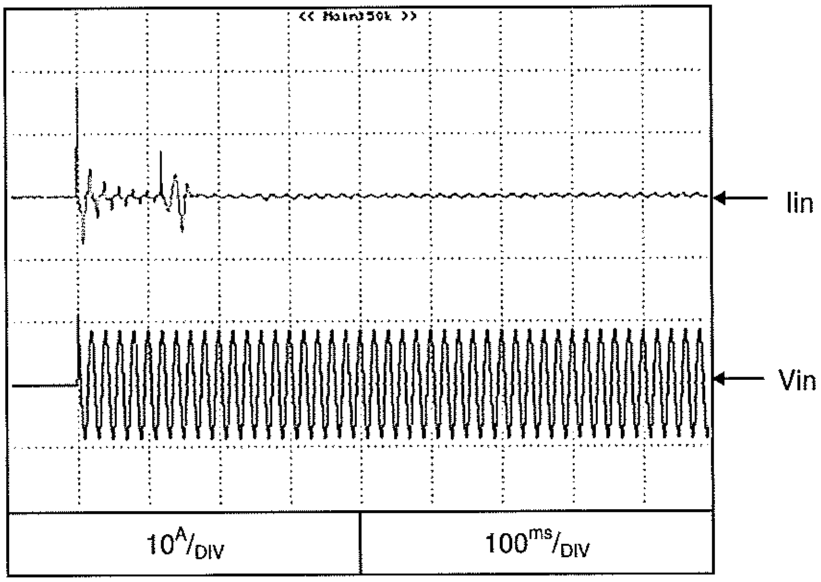
Switch on phase angle of input AC voltage

Φ=0°



Switch on phase angle of input AC voltage

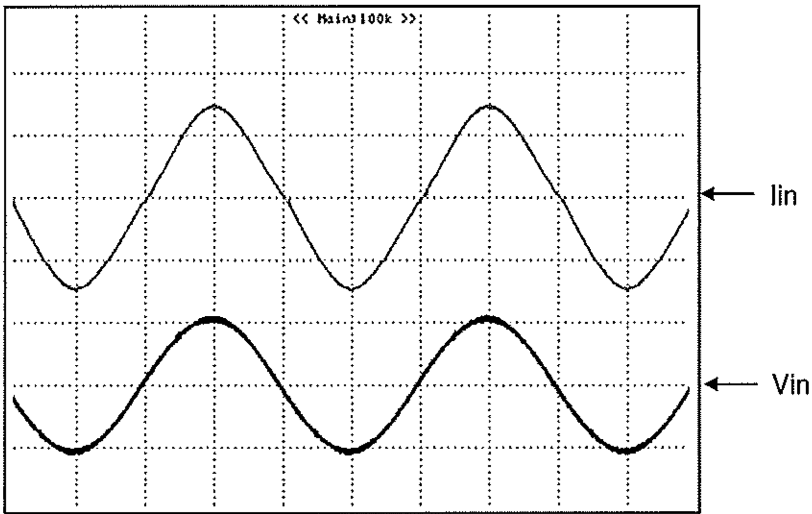
Φ=90°



2.12 Input current waveform

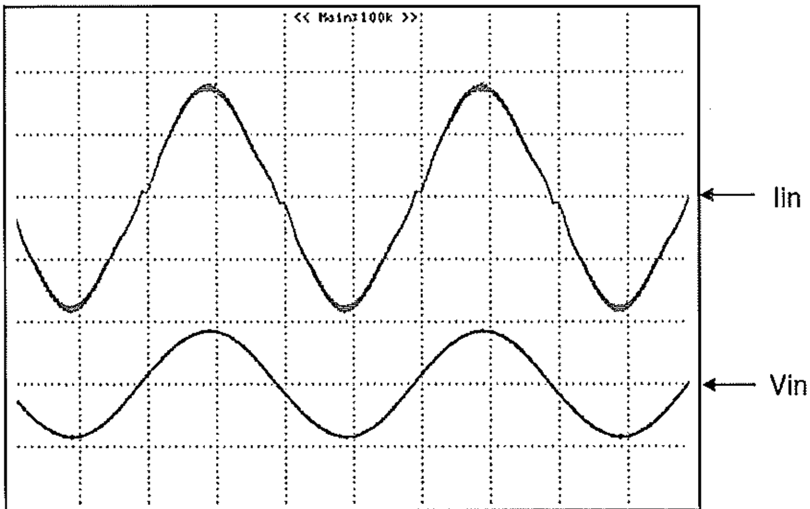
Conditions: Vin: 100VAC
Vout: 100%
Iout: 100%
Ta = 25℃

Z10-40



$5^{A}/_{DIV}$	$5^{ms}/_{DIV}$

Conditions: Vin: 200VAC
Vout: 100%
Iout: 100%
Ta = 25℃

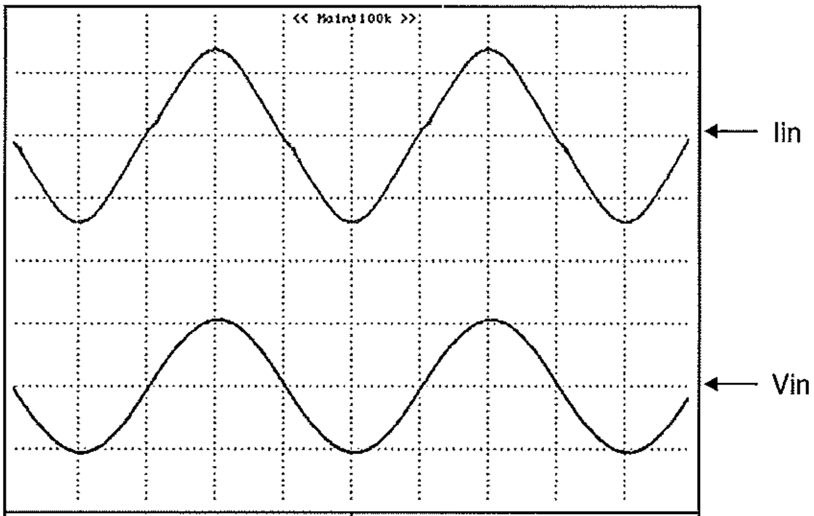


$2^{A}/_{DIV}$	$5^{ms}/_{DIV}$

2.12 Input current waveform

Conditions: Vin: 100VAC
Vout: 100%
Iout: 100%
Ta = 25℃

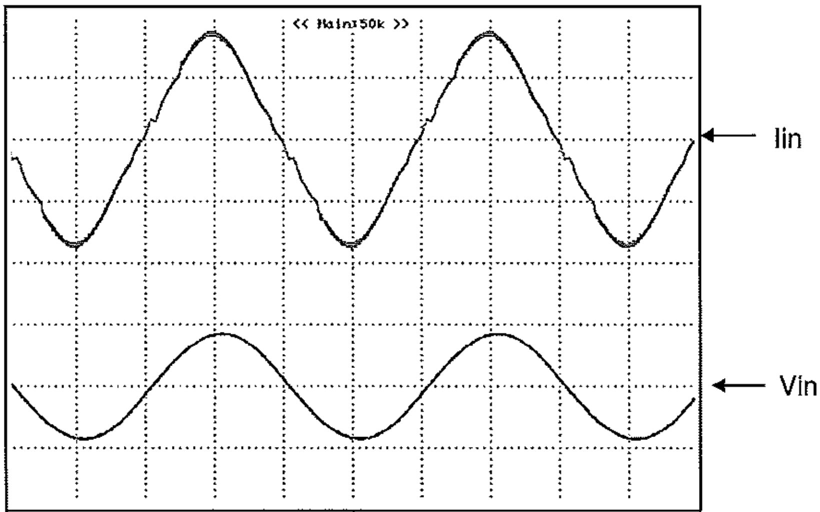
Z100-4



$5^{A}/_{DIV}$	$10^{ms}/_{DIV}$

Conditions: Vin: 200VAC
Vout: 100%
Iout: 100%
Ta = 25℃

Z100-4

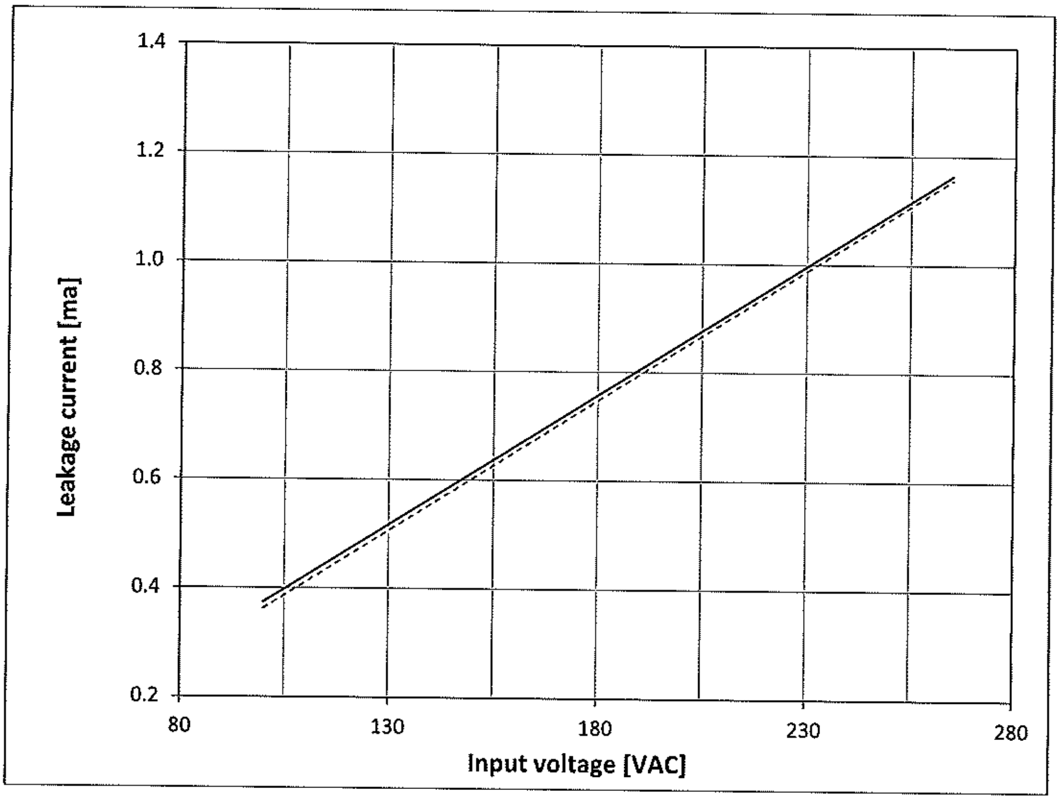


$2^{A}/_{DIV}$	$10^{ms}/_{DIV}$

2.13 Leakage current characteristics

Conditions: Vin: 100~265Vac
Iout: 0% - - - - - -
Iout:100% ————
Ta = 25℃
f=50HZ

Z36-12



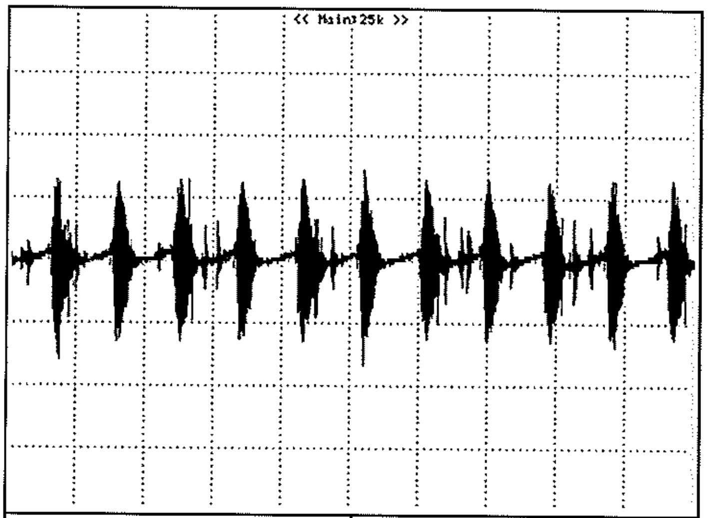
2.14 Output voltage ripple & noise waveform

C.V mode

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

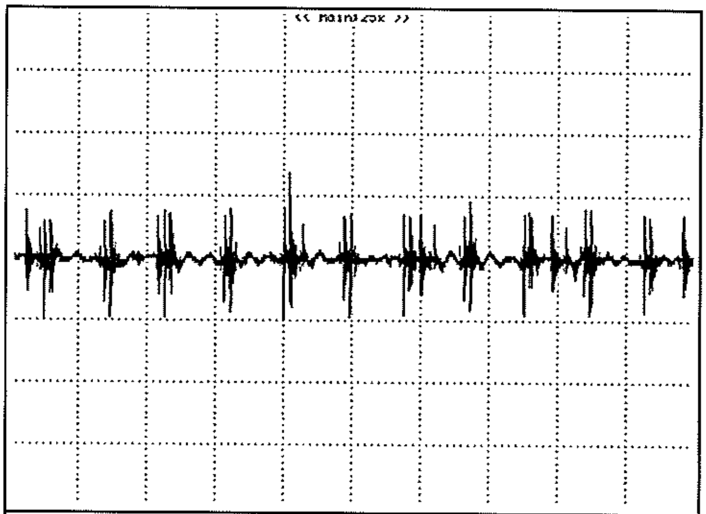
Normal Mode

Z10-40



$10^{mV}/_{DIV}$	$5^{us}/_{DIV}$

Z36-12



$10^{mV}/_{DIV}$	$5^{us}/_{DIV}$

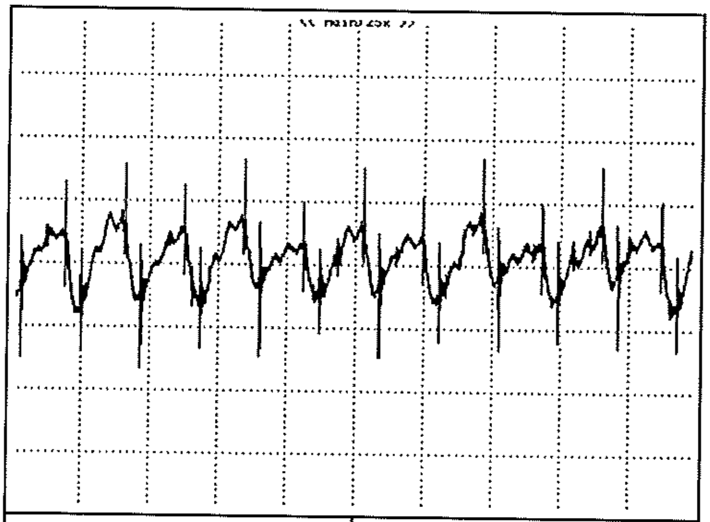
2.14 Output voltage ripple & noise waveform

C.V mode

Conditions: Vin: 100VAC
Vout: 100%
Iout: 100%
Ta = 25℃

Normal Mode

Z100-4



$10^{mV}/_{DIV}$	$5^{us}/_{DIV}$