GENH SERIES EVALUATION DATA

DWG: IA598-53-01		
APPD	CHK	DWG
Dorow P. Sep-3-03	17.06.03	MICHAEL G. 17.06.2003

NEMIC-LAMBDA LTD.

INDEX PAGE

TERMINOLOGY USED

Definition

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

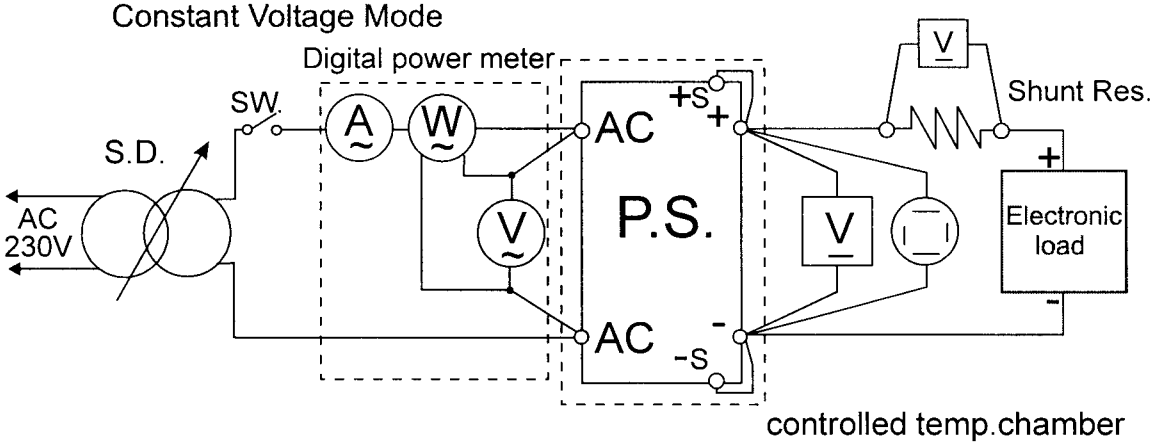
1.EVALUATION METHOD

GENH

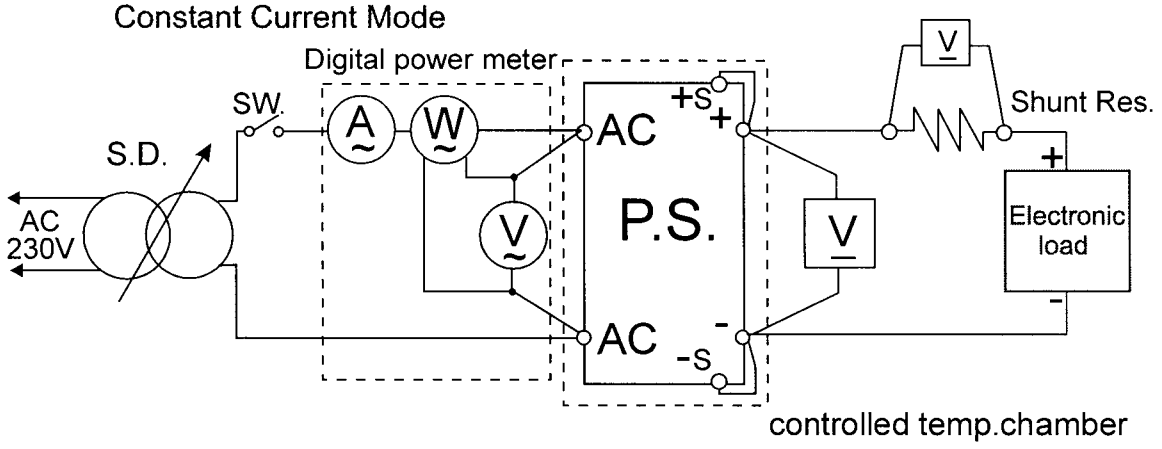
1-1.Circuits used for determination

(1) Steady state data

Constant Voltage Mode

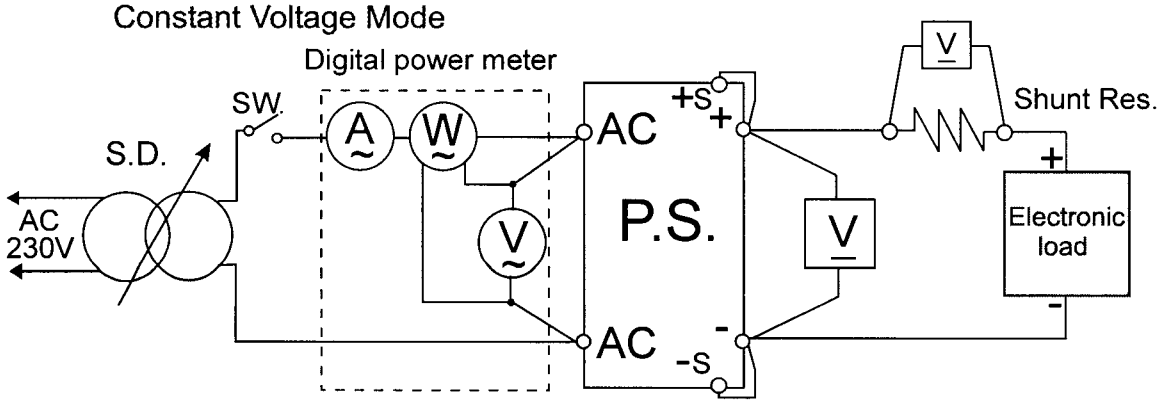


Constant Current Mode

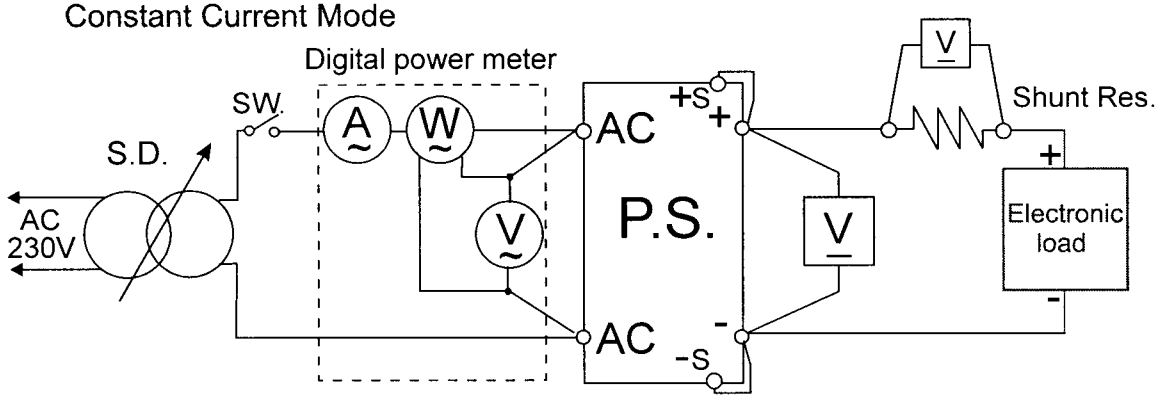


(2) Warm up voltage drift characteristics

Constant Voltage Mode

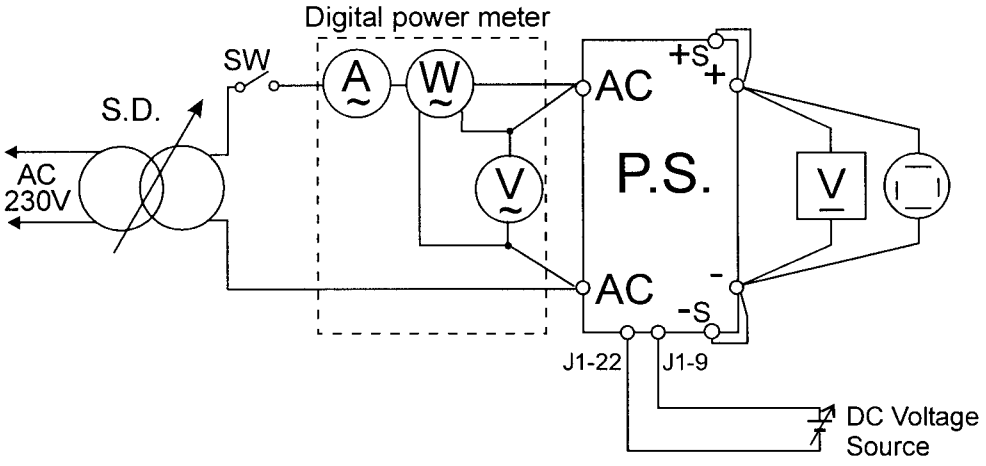


Constant Current Mode



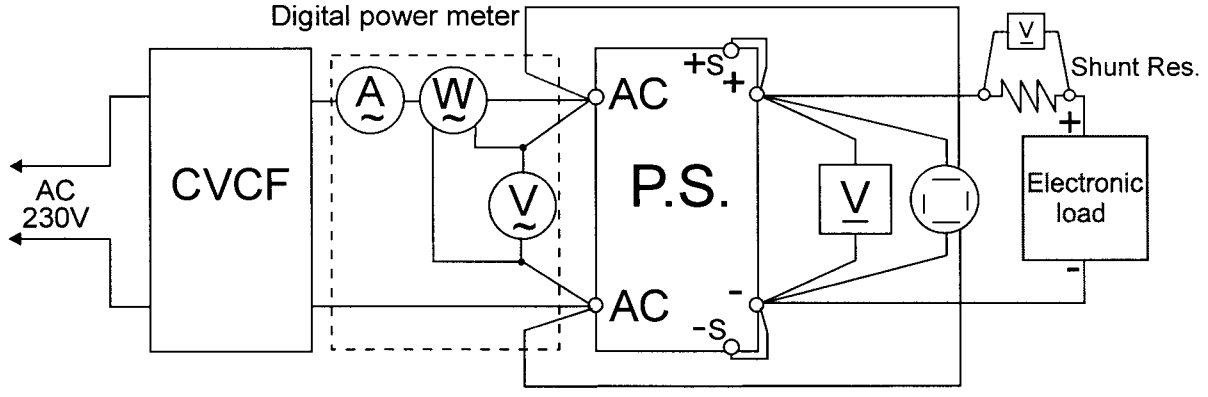
(3) Over voltage protection (OVP) characteristics

Constant Voltage Mode

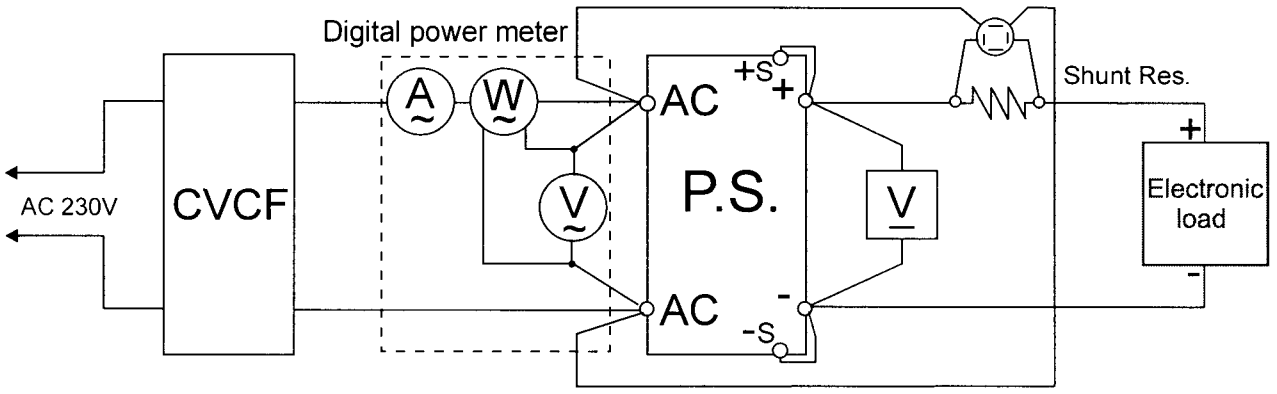


(4) Output rise characteristics

Constant Voltage Mode



Constant Current Mode

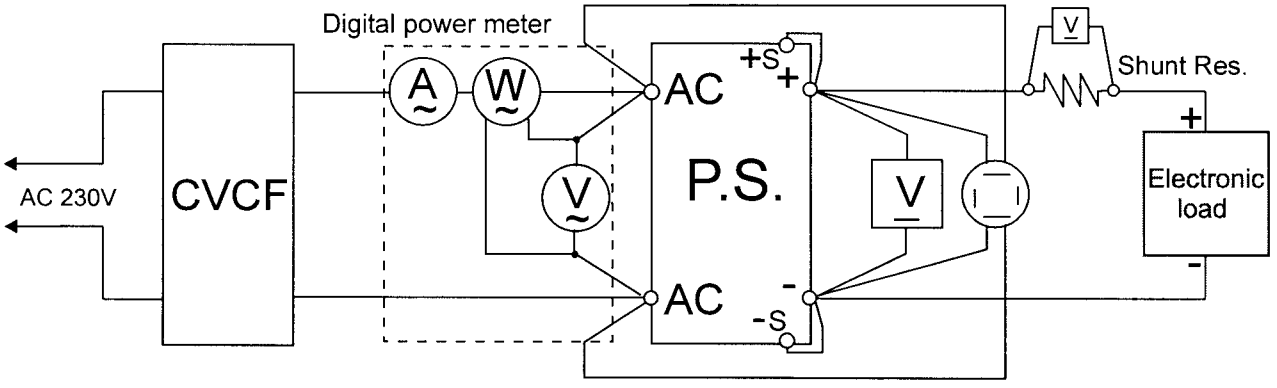


(5) Output fall characteristics

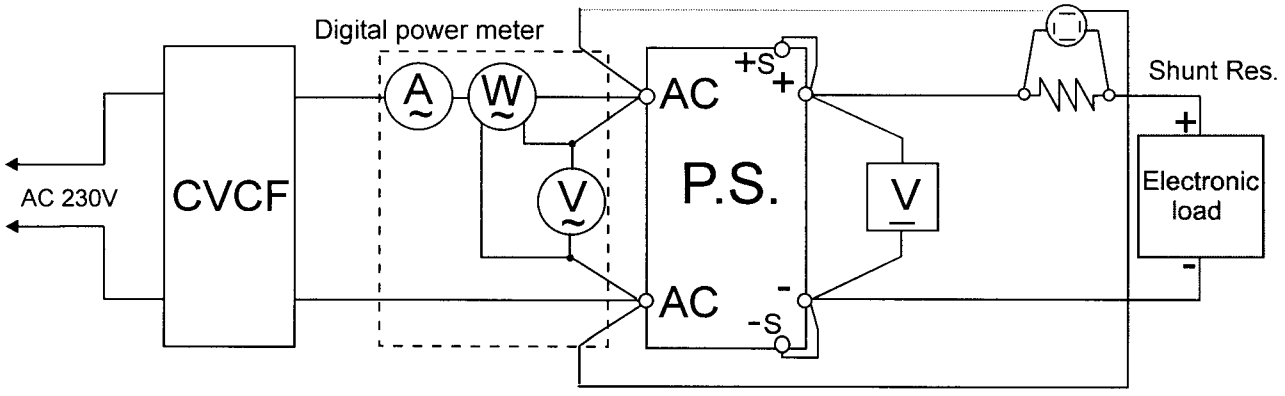
Same as output rise characteristics

(6) Dynamic line response characteristics

Constant Voltage Mode

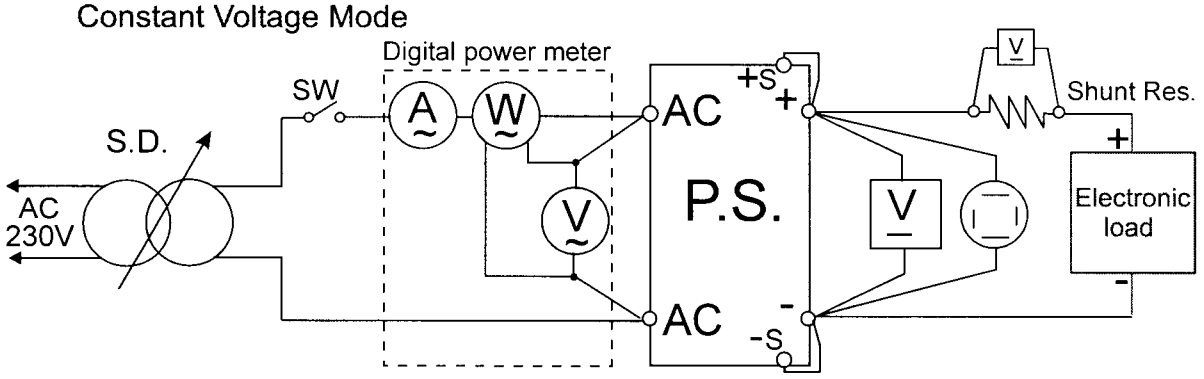


Constant Current Mode



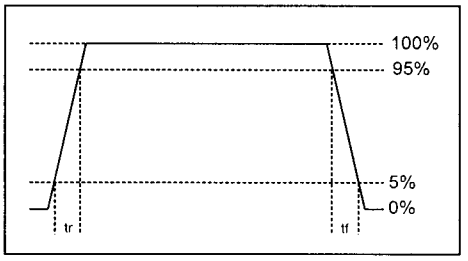
(7) Dynamic load response characteristics

Constant Voltage Mode



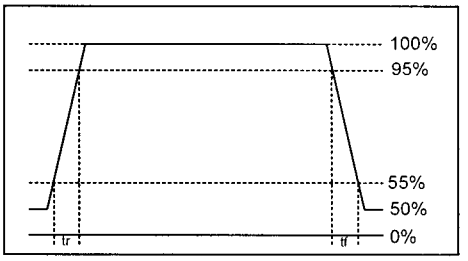
Output current waveform

Iout 0% <--> 100%



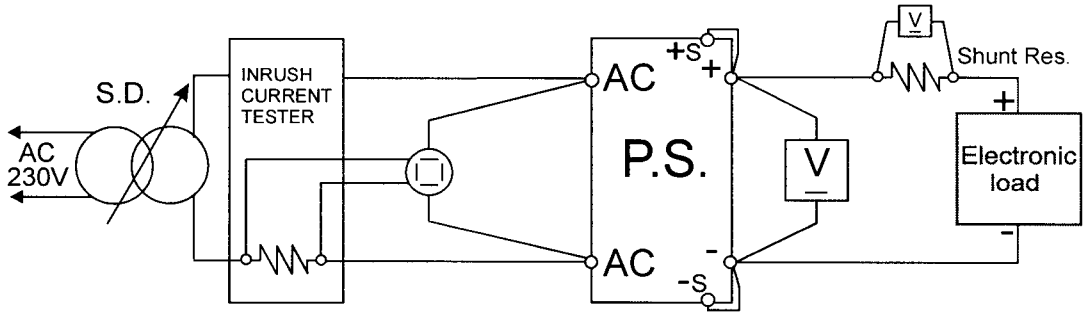
Output current waveform

Iout 50% <--> 100%

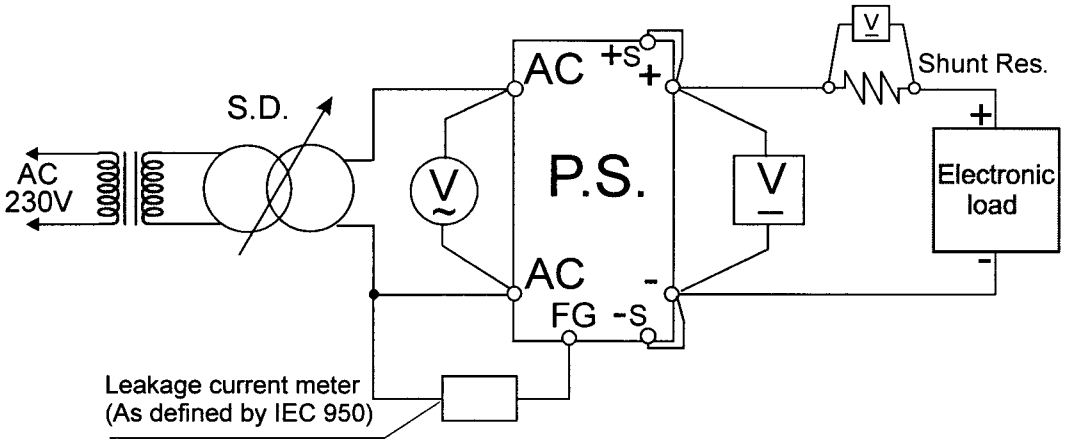


(8) Inrush current characteristics

Constant Voltage Mode



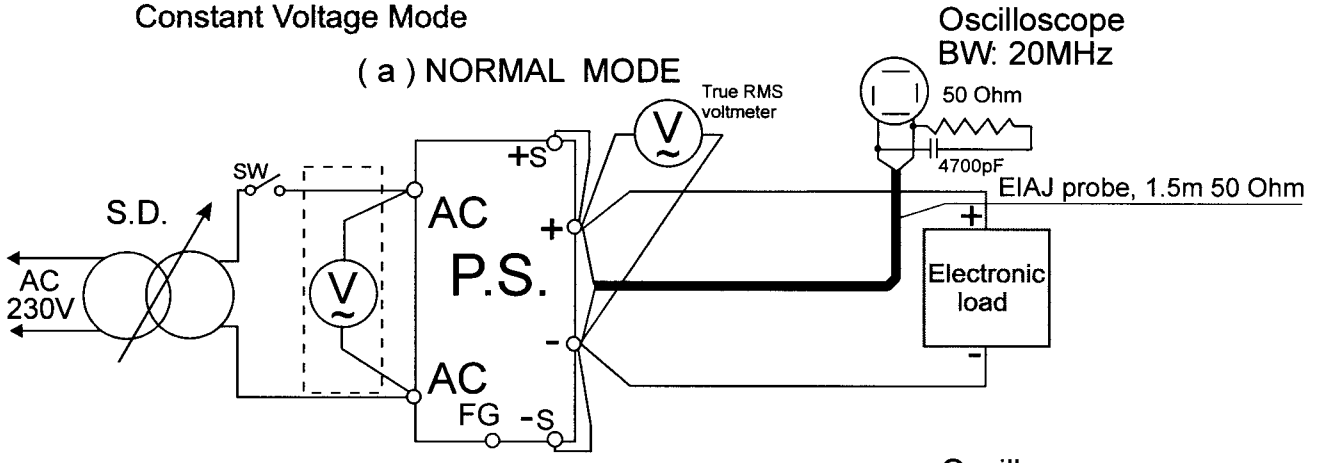
(9) Leakage current characteristics



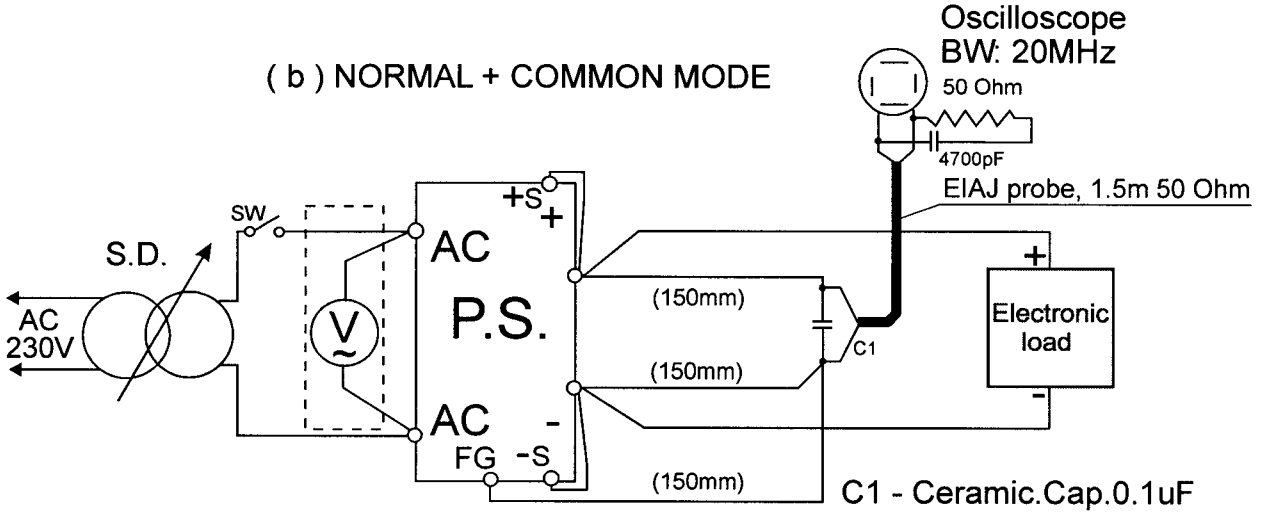
(10) Output ripple & noise waveform 6V to 150V models

Constant Voltage Mode

(a) NORMAL MODE



(b) NORMAL + COMMON MODE

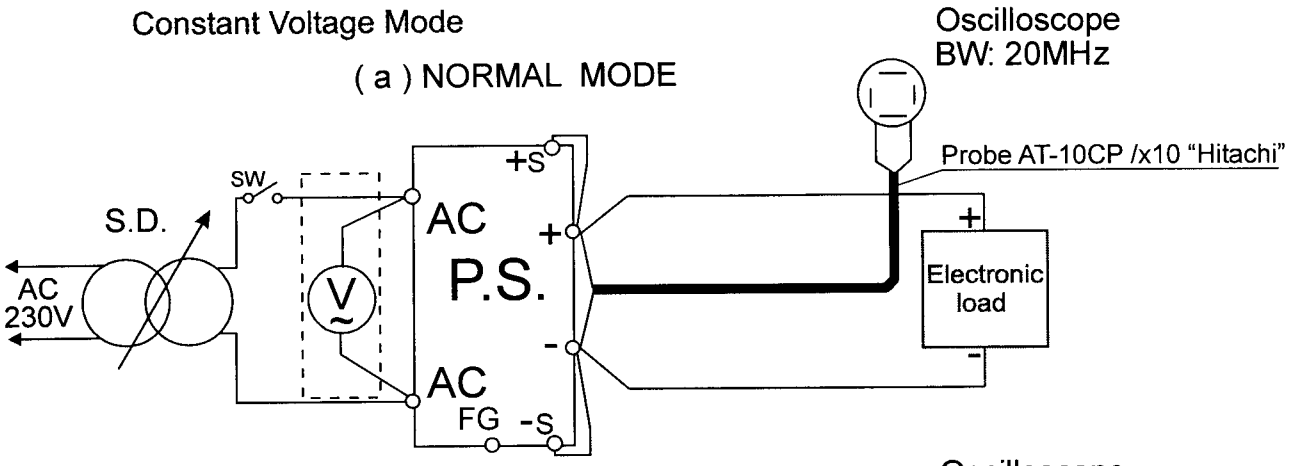


C1 - Ceramic.Cap.0.1uF

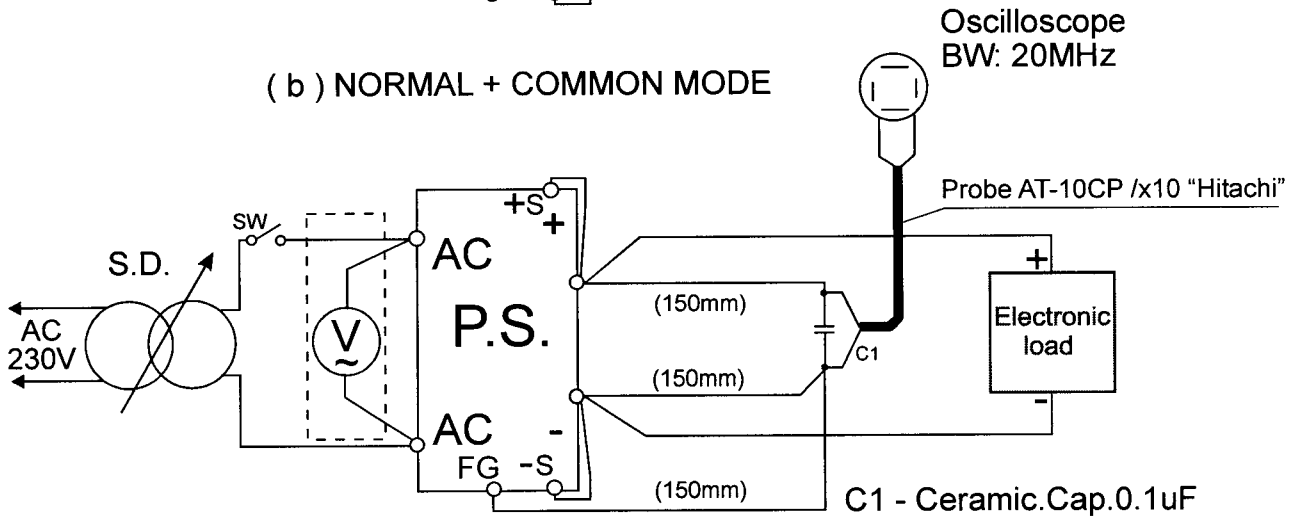
(11) Output ripple & noise waveform for models higher than 150V

Constant Voltage Mode

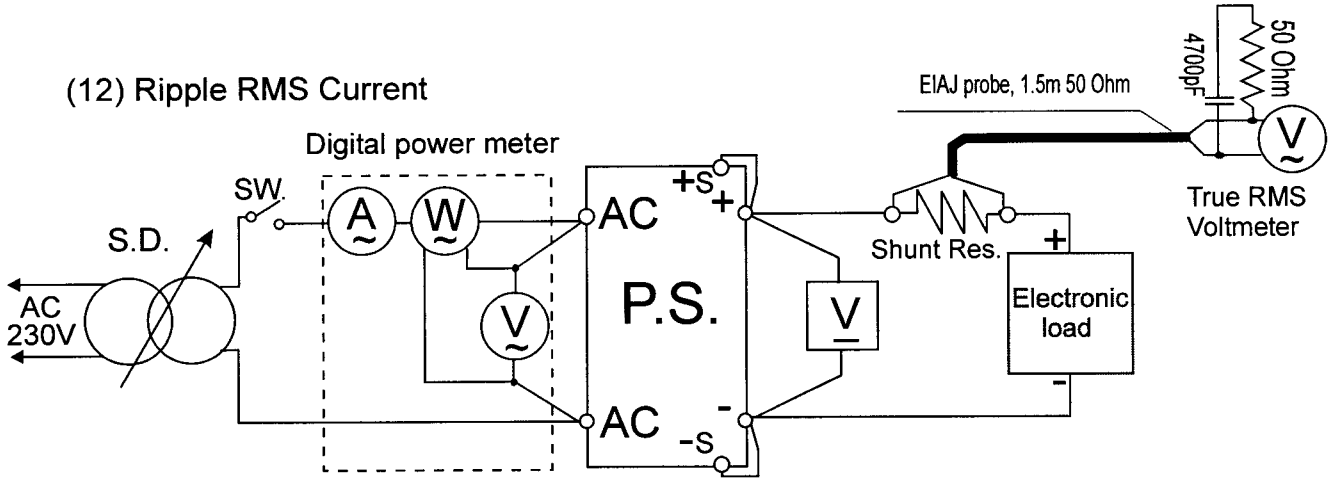
(a) NORMAL MODE



(b) NORMAL + COMMON MODE



(12) Ripple RMS Current



1-2 List of equipment used

	EQUIPMENT USED	MANUFACTURER	MODEL NO.
1	Storage oscilloscope	YOKOGAWA	DL7100
2	Storage oscilloscope	YOKOGAWA	DL1540
3	Analog Oscilloscope	HITACHI	V-1565
4	Digital multimeter	HP	34401A
5	Digital power meter	YOKOGAWA	WT110
6	Autotransformer	VOLTAC	B15
7	Dynamic electronic load	KIKUSUI	PLZ1003W
8	Electronic DC load	TAKASAGO	FK-1000H
9	Controlled temp. Chamber	THERMOTRON	SE-600-5-5
10	AC power supply (CVCF)	KIKUSUI	PCR4000L
11	Analyzing AC power supply	TAKASAGO	AA2000XG
12	Inrush current tester	TAKAMISAWA	PSA-210
13	Leakage current tester	HIOKI	3155
14	Current probe	TEKTRONIX	P6021
15	RMS voltmeter	HP	3400A

2.CHARACTERISTICS

2-1.Steady state data

(1).REGULATION - Line & Load,temperature drift

Constant Voltage Mode

1.Regulation - Line & Load　　Condition Ta: 25°C

GENH8-90

Vin / Iout	AC 85V	AC 100V	AC 200V	AC 265V	Line Regulation	
0%	8.0024 v	8.0024 v	8.0024 v	8.0024 v	0 mv	0 %
50%	8.0016 v	8.0016 v	8.0016 v	8.0016 v	0 mv	0 %
100%	8.0009 v	8.0009 v	8.0009 v	8.0009 v	0 mv	0 %
Load	1.5 mv	1.5 mv	1.5 mv	1.5 mv		
Regulation	0.019%	0.019%	0.019%	0.019%		

2.Temperature drift

Ta	0 °C	25°C	50 °C	Temp. Stability	
Vout	8.0054 v	8.0061 v	8.0073 v	1.9 mv	0.024 %

Conditions:
Vin : 100VAC
Iout : 100%

1.Regulation - Line & Load　　Condition Ta: 25°C

GENH60-12.5

Vin / Iout	AC 85V	AC 100V	AC 200V	AC 265V	Line Regulation	
0%	60.008 v	60.008 v	60.008 v	60.008 v	0 mv	0 %
50%	60.007 v	60.007 v	60.007 v	60.007 v	0 mv	0 %
100%	60.008 v	60.008 v	60.008 v	60.008 v	0 mv	0 %
Load	1 mv	1 mv	1 mv	1 mv		
Regulation	0.0017 %	0.0017 %	0.0017 %	0.0017 %		

2.Temperature drift

Ta	0 °C	25°C	50 °C	Temp. Stability	
Vout	60.008 v	60.014 v	60.024 v	16 mv	0.027 %

Conditions:
Vin : 100VAC
Iout : 100%

1.Regulation - Line & Load　　Condition Ta: 25°C

GENH300-2.5

Vin / Iout	AC 85V	AC 100V	AC 200V	AC 265V	Line Regulation	
0%	300.022v	300.022v	300.022v	300.022v	0 mv	0 %
50%	300.018v	300.018v	300.018v	300.018v	0 mv	0 %
100%	300.014v	300.014v	300.014v	300.014v	0 mv	0 %
Load	8 mv	8 mV	8 mv	8 mv		
Regulation	0.0027 %	0.0027 %	0.0027 %	0.0027 %		

2.Temperature drift

Ta	0 °C	25°C	50 °C	Temp. Stability	
Vout	300.012v	300.116 v	300.180v	168 mv	0.056 %

Conditions:
Vin : 100VAC
Iout : 100%

(1).REGULATION - Line & Load,temperature drift

Constant Current Mode

GENH8-90

1.Regulation - Line & Load

Condition Ta: 25°C

Vout \ Vin	AC 85V	AC 100V	AC 200V	AC 265V	Line Regulation	
SHORT	90.008 A	90.008 A	90.008 A	90.008 A	0 mA	0 %
50%	90.004 A	90.004 A	90.002 A	90.002 A	2 mA	0.002 %
100%	90.008 A	90.008 A	90.006 A	90.006 A	2 mA	0.002 %
Load	4 mA	4 mA	6 mA	6 mA		
Regulation	0.004 %	0.004 %	0.007 %	0.007 %		

2.Temperature drift

Ta	0 °C	25°C	50 °C	Temp. Stability	
Iout	90.049 A	90.066 A	90.054 A	17 mA	0.019%

Conditions:
Vin : 100VAC
Vout : 100%

GENH60-12.5

1.Regulation - Line & Load

Condition Ta: 25°C

Vout \ Vin	AC 85V	AC 100V	AC 200V	AC 265V	Line Regulation	
SHORT	12.538A	12.538A	12.538A	12.538 A	0 mA	0 %
50%	12.539A	12.539A	12.538A	12.538 A	1 mA	0.008 %
100%	12.539A	12.539A	12.539A	12.539 A	0 mA	0 %
Load	1 mA	1 mA	1 mA	1 mA		
Regulation	0.008 %	0.008 %	0.008 %	0.008 %		

2.Temperature drift

Ta	0 °C	25°C	50 °C	Temp. Stability	
Iout	12.504 A	12.502A	12.507A	5 mA	0.04 %

Conditions:
Vin : 100VAC
Vout : 100%

GENH300-2.5

1.Regulation - Line & Load

Condition Ta: 25°C

Vout \ Vin	AC 85V	AC 100V	AC 200V	AC 265V	Line Regulation	
SHORT	2.5021A	2.5021A	2.5021A	2.5021A	0 mA	0 %
50%	2.5011A	2.5011A	2.5011A	2.5011 A	0 mA	0 %
100%	2.5007A	2.5007A	2.5007A	2.5007A	0 mA	0 %
Load	1.4 mA	1.4 mA	1.4 mA	1.4 mA		
Regulation	0.056 %	0.056 %	0.056 %	0.056 %		

2.Temperature drift

Ta	0 °C	25°C	50 °C	Temp. Stability	
Iout	2.5123 A	2.5115 A	2.5112 A	1.1 mA	0.044%

Conditions:
Vin : 100VAC
Vout : 100%

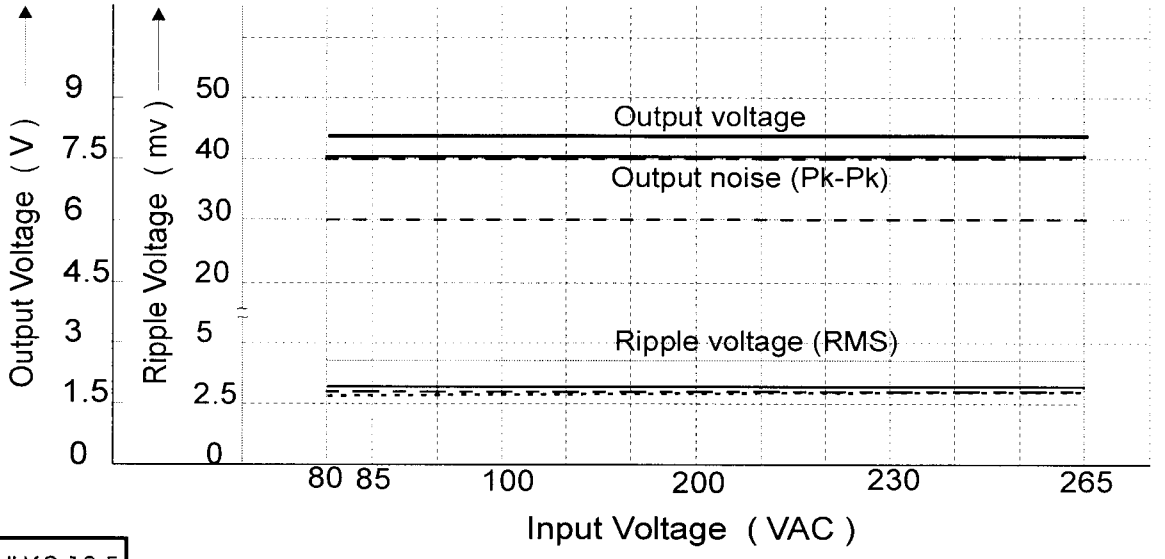
(2). Output voltage and ripple voltage v.s.input voltage

GENH

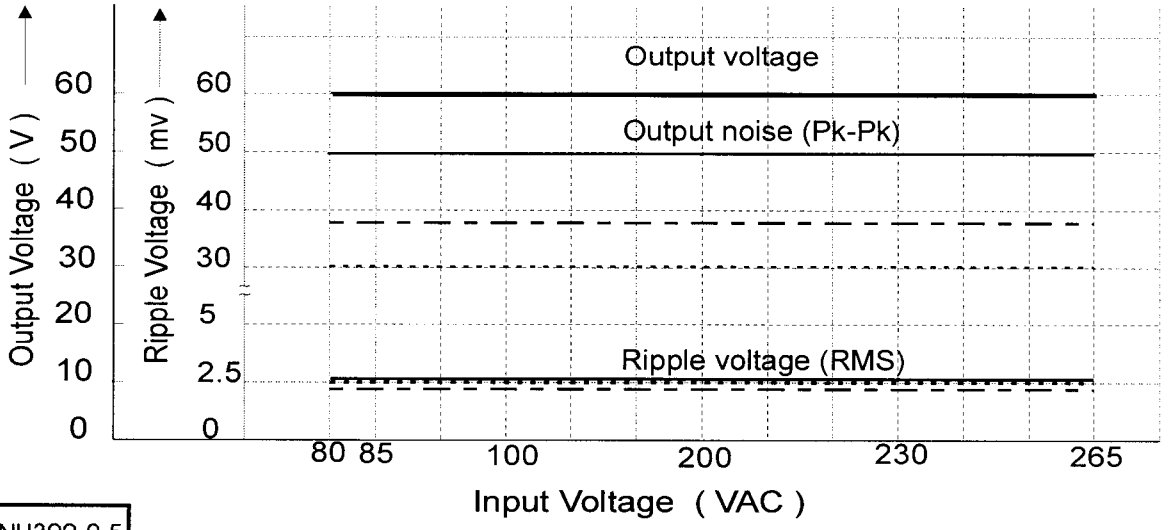
Constant Voltage Mode

Conditions Iout :100%
Ta : 0°C
25°C
50°C

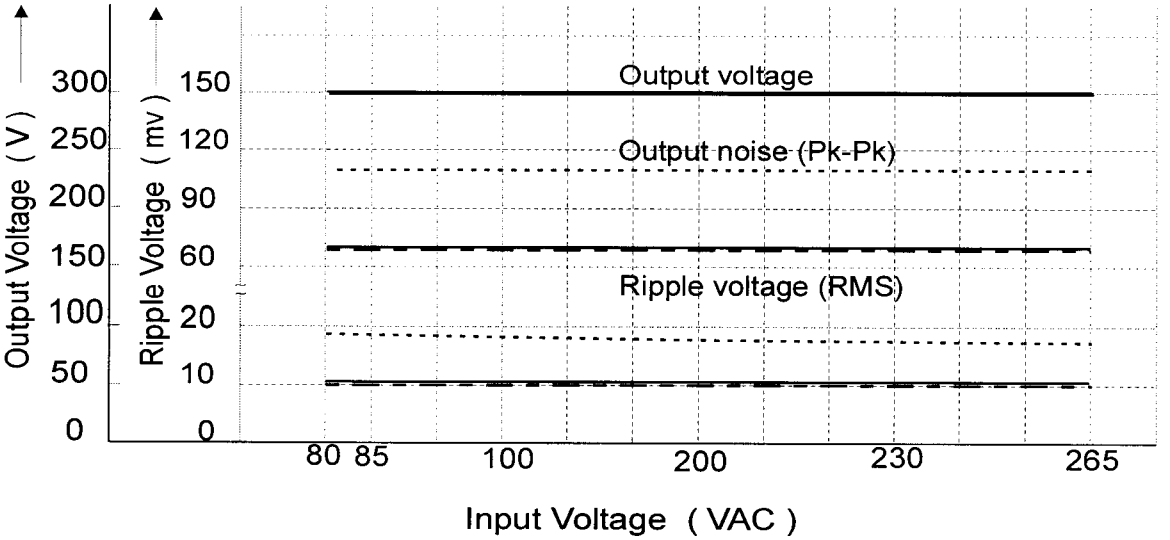
GENH8-90



GENH60-12.5



GENH300-2.5



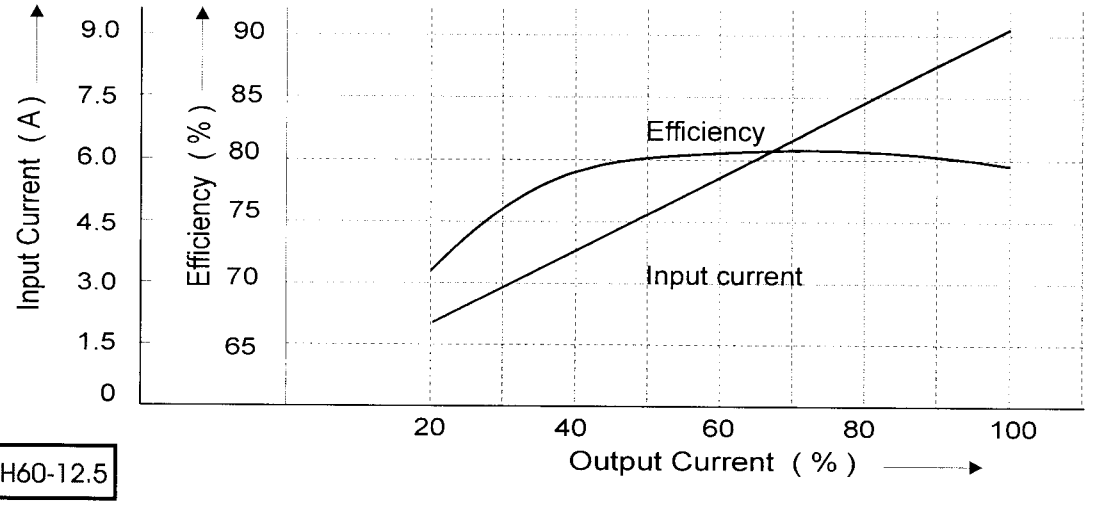
(3).Efficiency and Input current v.s. Output current

Constant Voltage Mode

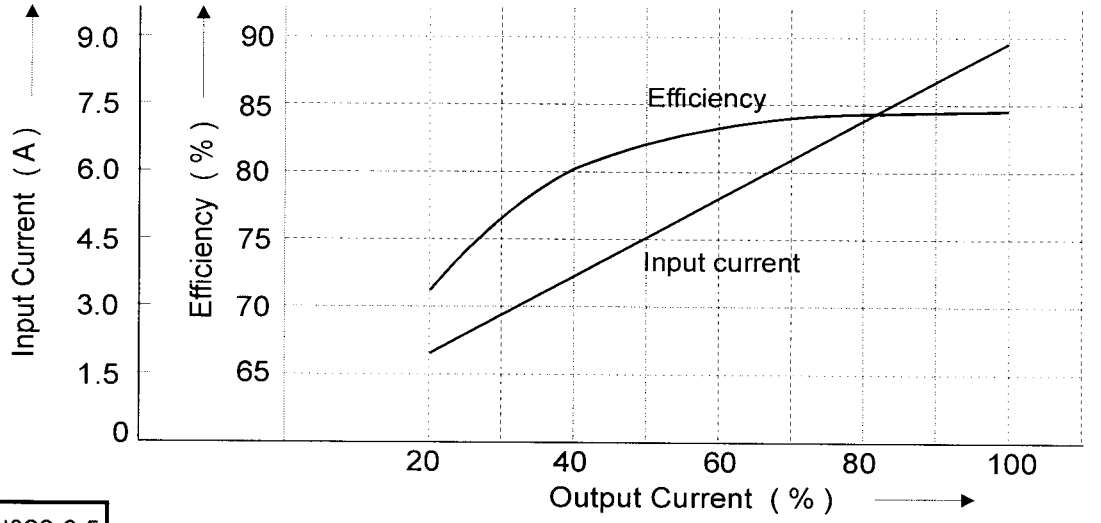
GENH

Condition Vin : AC 100 V
Vout:100%
Ta: 25°C

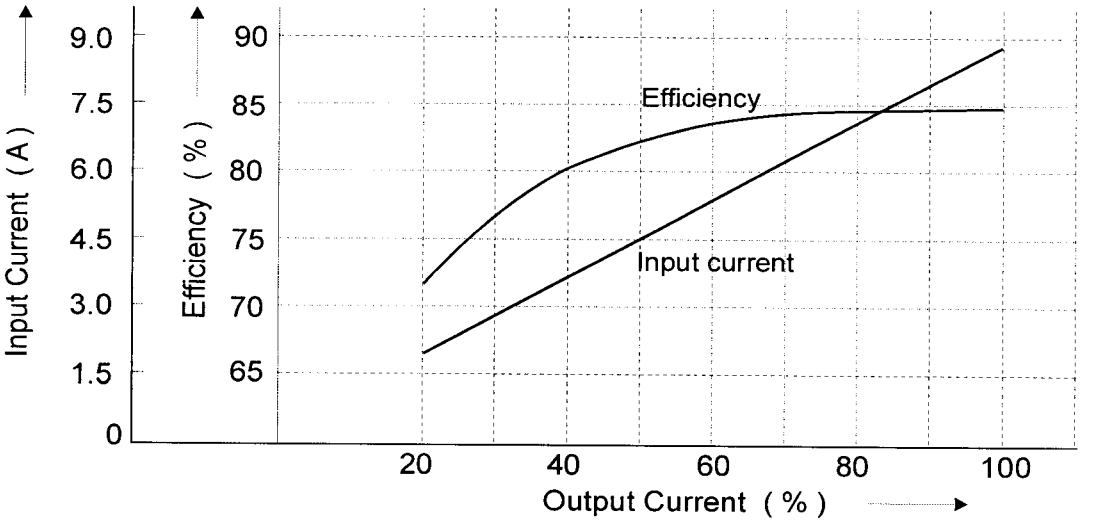
GENH8-90



GENH60-12.5



GENH300-2.5



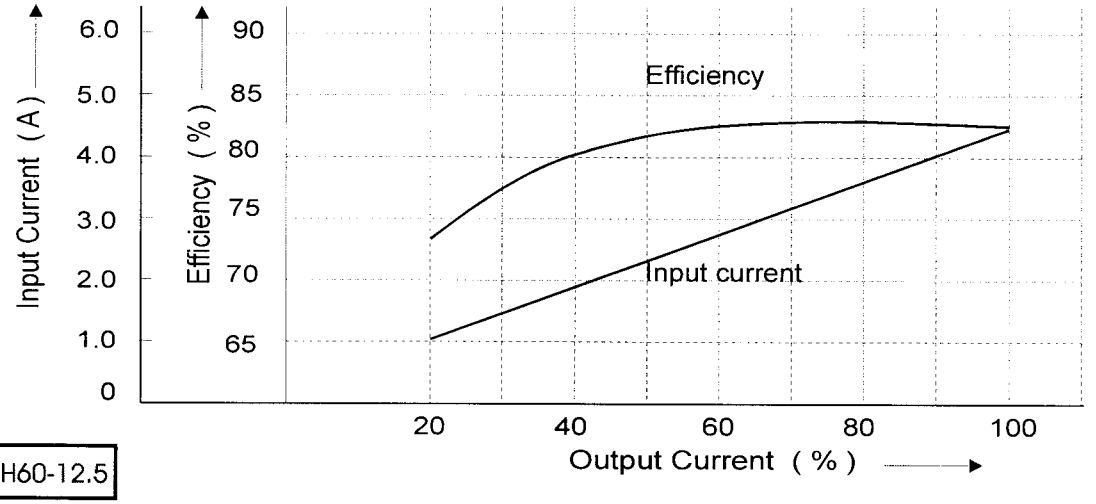
Efficiency and Input current v.s. Output current

Constant Voltage Mode

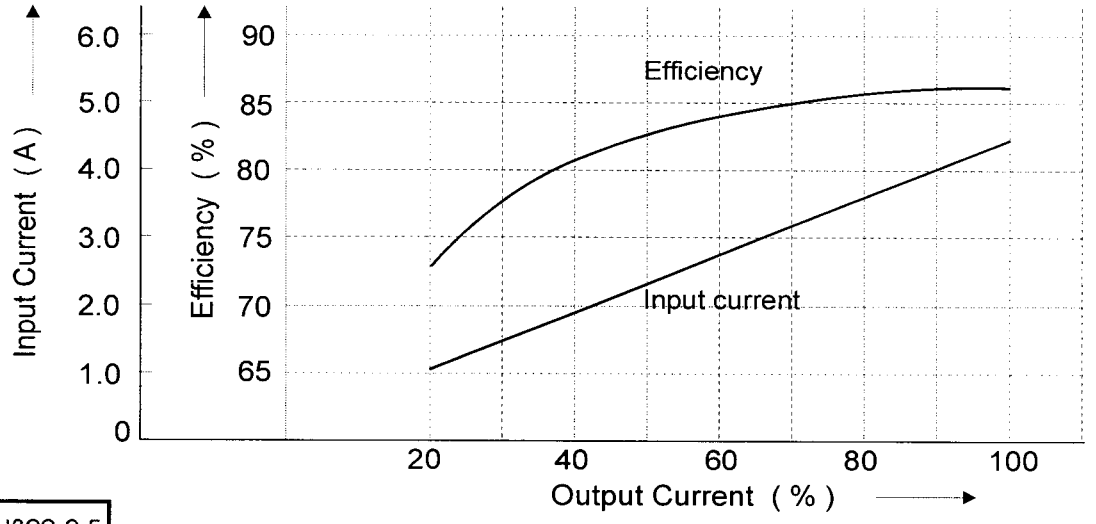
GENH

Condition Vin : AC 200 V
Vout:100%
Ta: 25°C

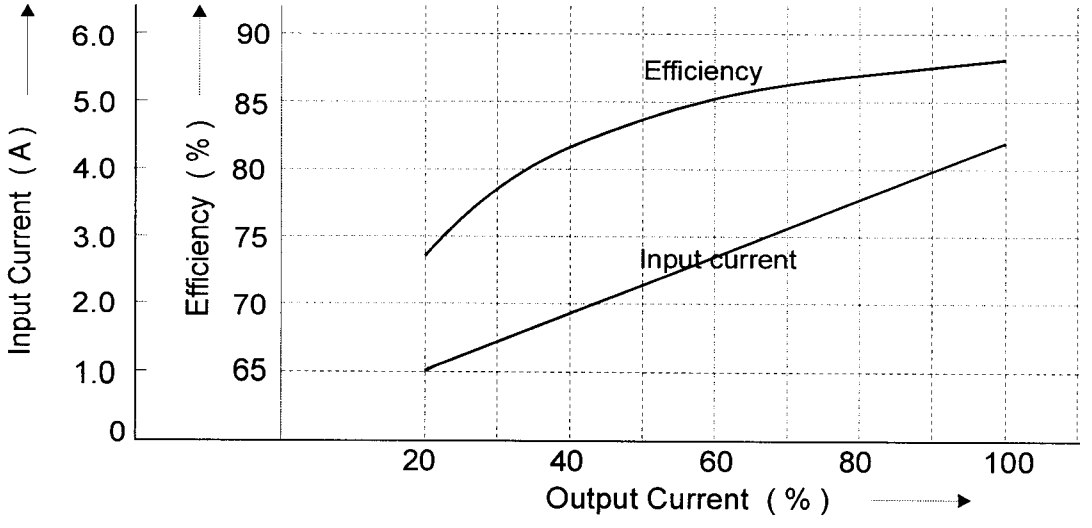
GENH8-90



GENH60-12.5



GENH300-2.5



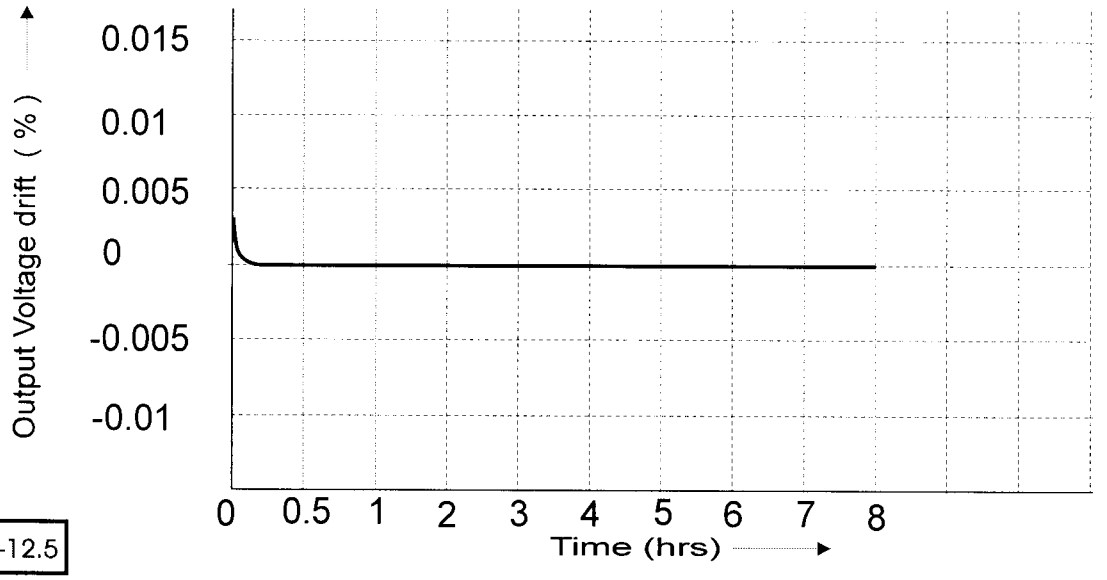
2-2.Warm up voltage drift characteristics

GENH

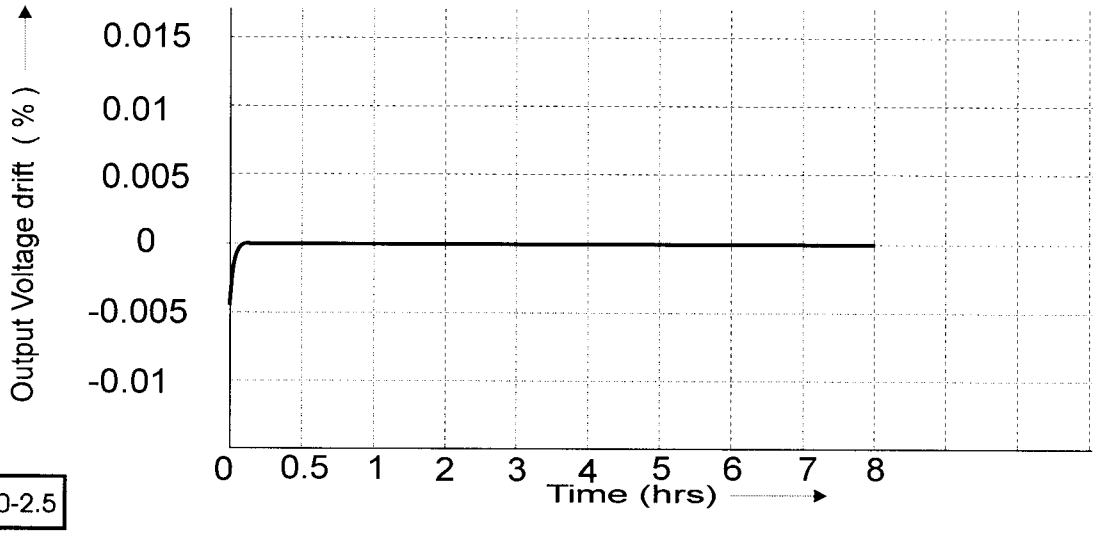
Constant Voltage Mode

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

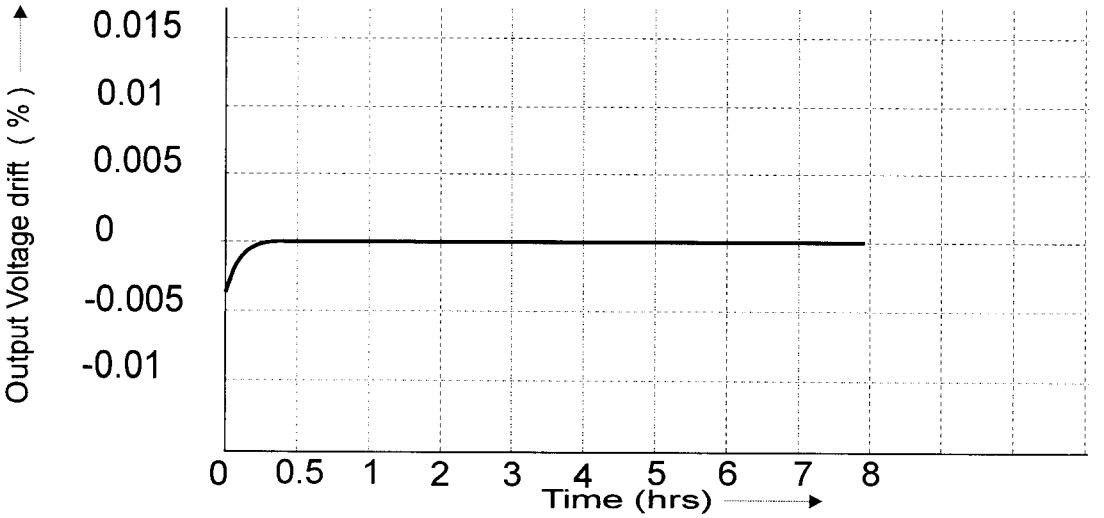
GENH8-90



GENH60-12.5



GENH300-2.5



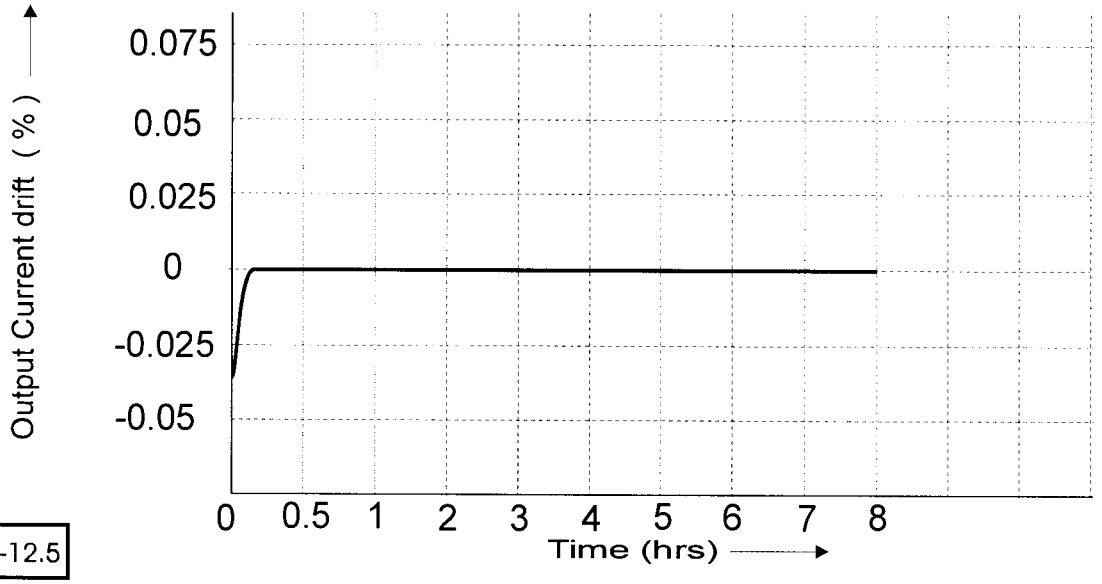
Warm up current drift characteristics

Constant Current Mode

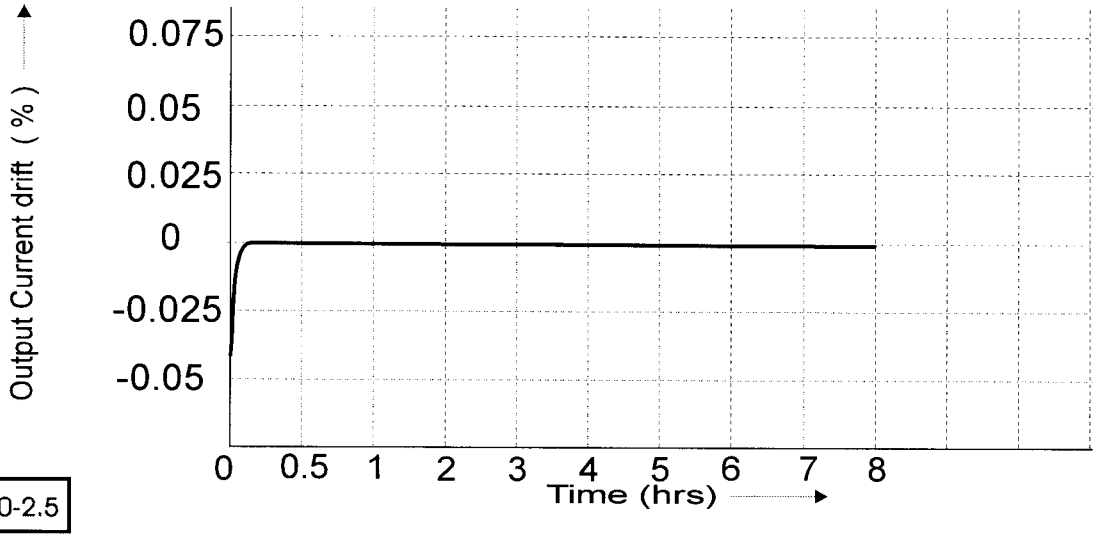
GENH

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

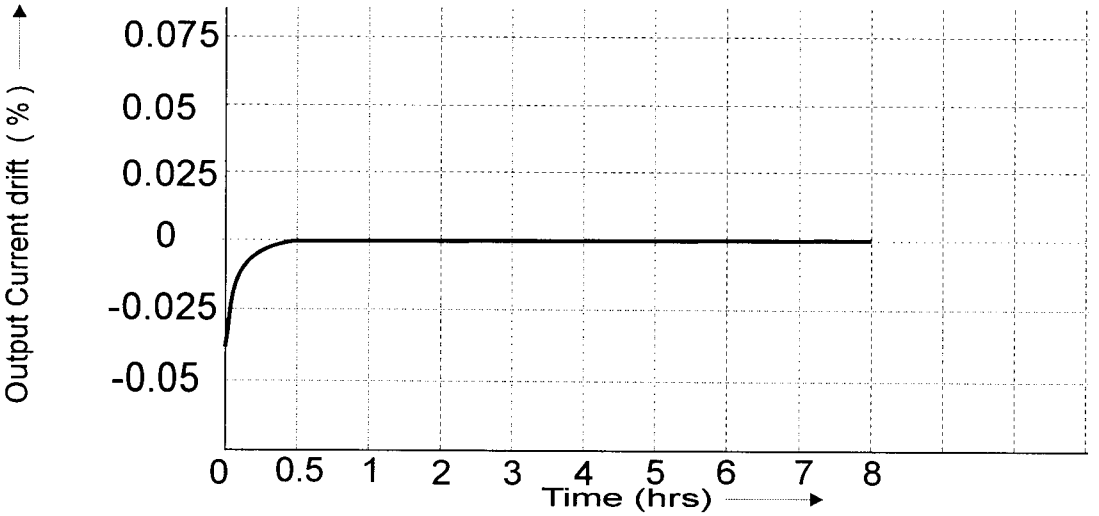
GENH8-90



GENH60-12.5



GENH300-2.5



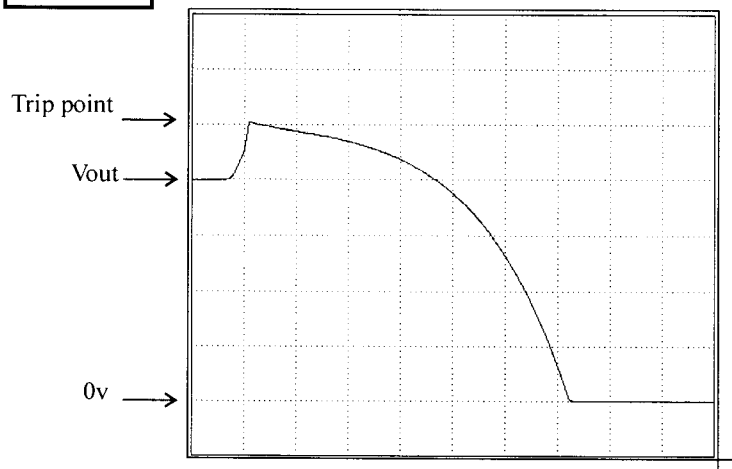
2-3. Over voltage protection (OVP) Characteristics

GENH

Constant Voltage Mode

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

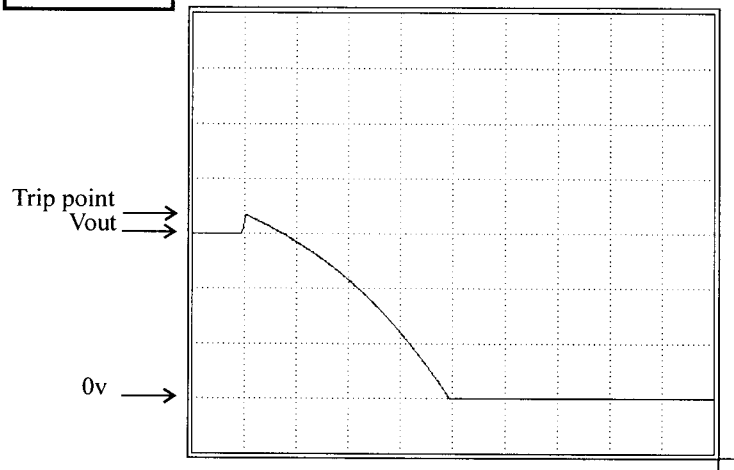
GENH8-90



OVP setting:10V

2V/DIV | 100ms/DIV

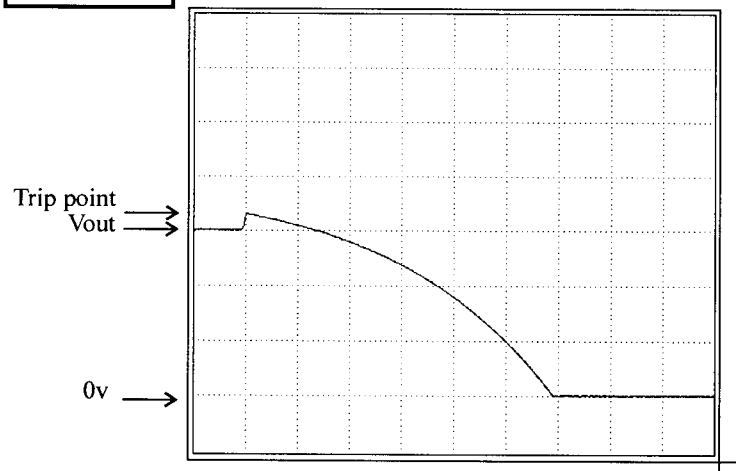
GENH60-12.5



OVP setting:66V

20V/DIV | 200ms/DIV

GENH300-2.5



OVP setting:330V

100V/DIV | 500ms/DIV

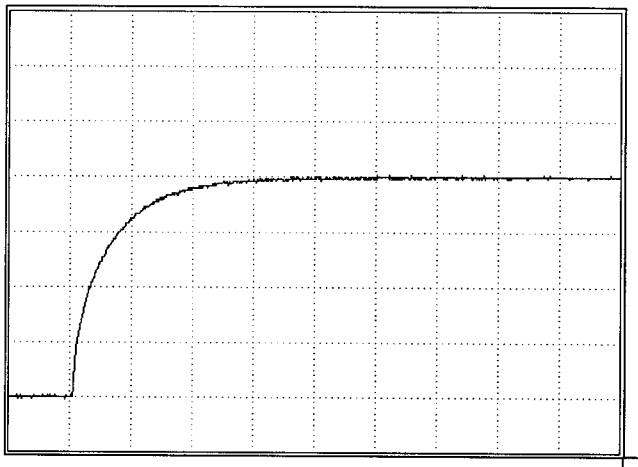
2-4.Output Rise Characteristics

Constant Voltage Mode

GENH

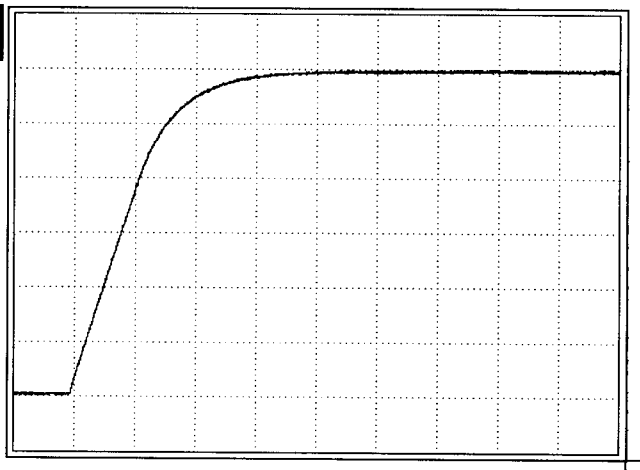
Conditions Vin: 100VAC
Vout:100%
Iout:0%
Ta:25°C

GENH8-90



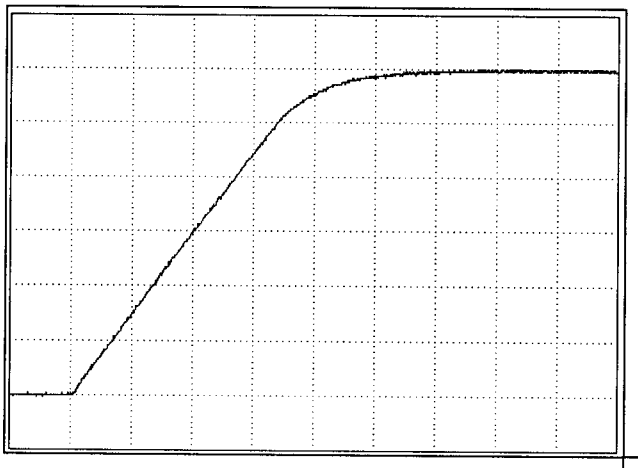
2V/DIV	10ms/DIV

GENH60-12.5



10V/DIV	10ms/DIV

GENH300-2.5



50V/DIV	10ms/DIV

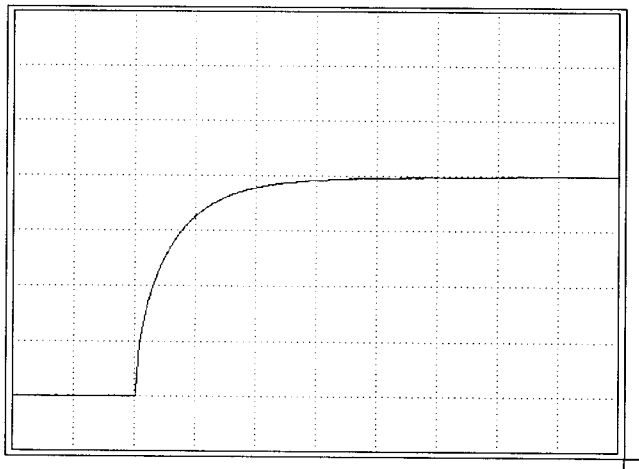
Output Rise Characteristics

Constant Voltage Mode

GENH

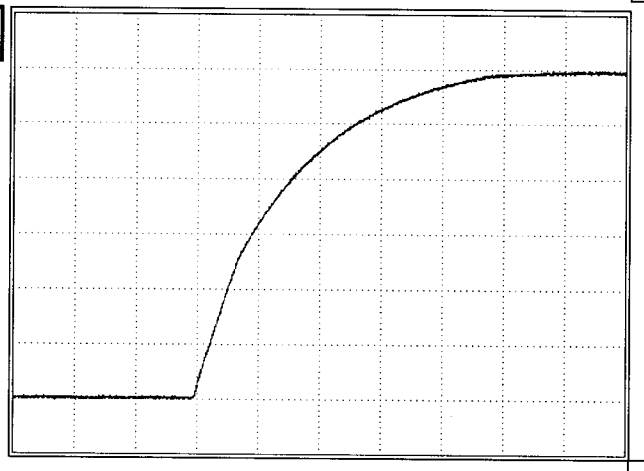
Conditions Vin: 100VAC
Vout:100%
Iout:100%
Ta:25°C

GENH8-90



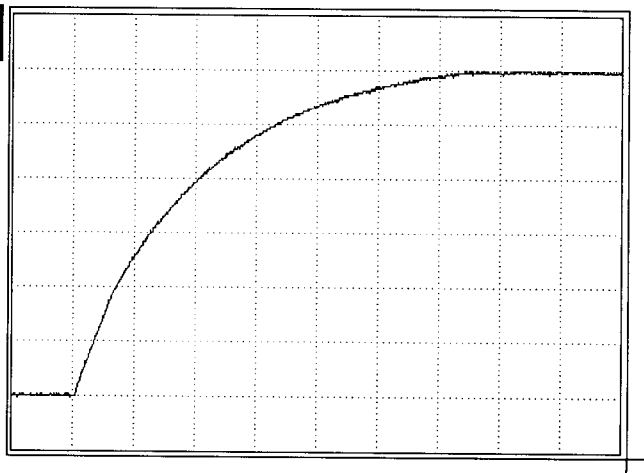
2V/DIV	10ms/DIV

GENH60-12.5



10V/DIV	10ms/DIV

GENH300-2.5



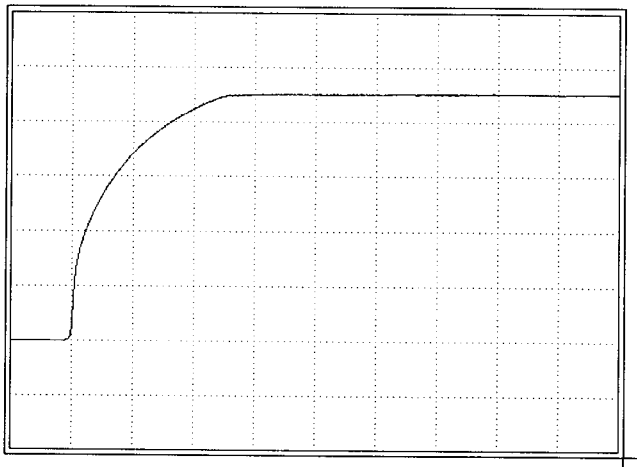
50V/DIV	20ms/DIV

Output Rise Characteristics
Constant Current Mode

GENH

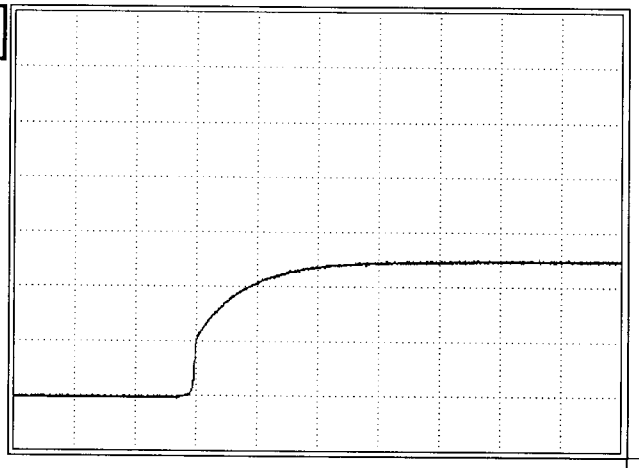
Conditions Vin: 100VAC
Vout:100%
Iout:100%
Load:Constant Resistance
Ta:25°C

GENH8-90



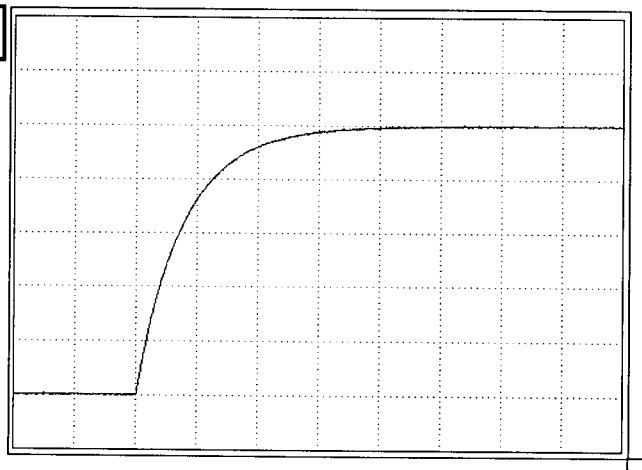
20A/DIV | 5ms/DIV

GENH60-12.5



5A/DIV | 20ms/DIV

GENH300-2.5



0.5A/DIV | 50ms/DIV

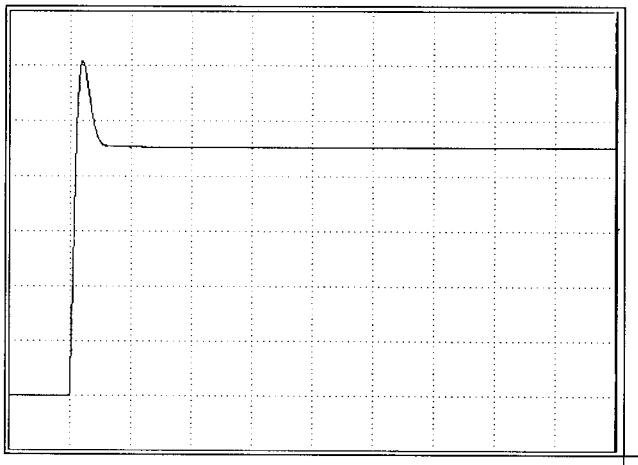
Output Rise Characteristics

Constant Current Mode

GENH

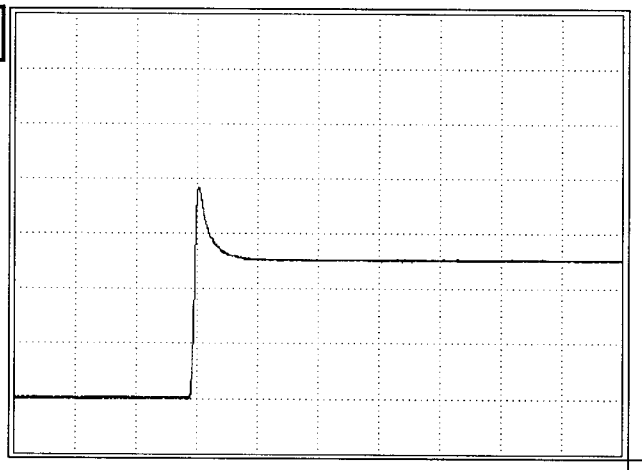
Conditions Vin: 100VAC
Start to short circuit
Iout:100%
Ta:25°C

GENH8-90



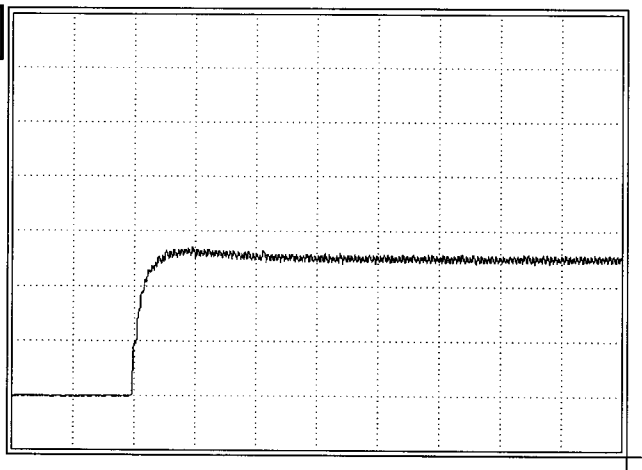
20A/DIV	5ms/DIV

GENH60-12.5



5A/DIV	2ms/DIV

GENH300-2.5



1A/DIV	1ms/DIV

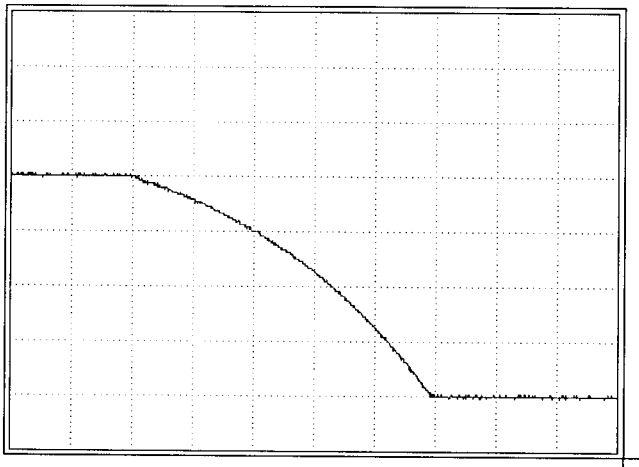
2-5.Output Fall Characteristics

Constant Voltage Mode

GENH

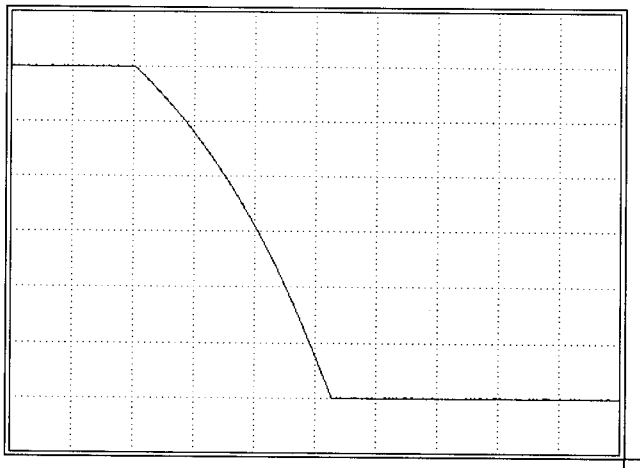
Conditions Vin: 100VAC
Vout:100%
Iout:0%
Ta:25°C

GENH8-90



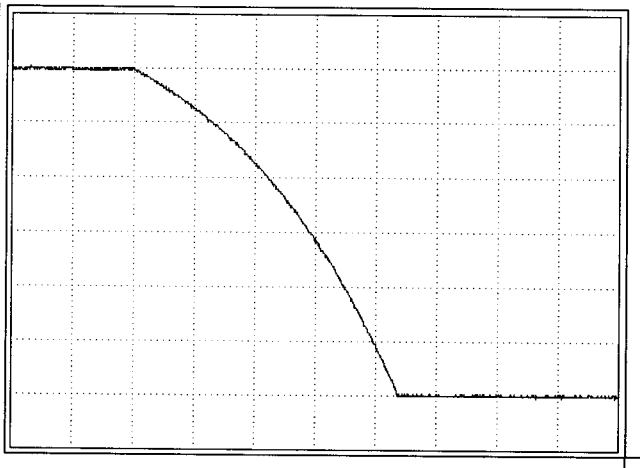
2V/DIV	50ms/DIV

GENH60-12.5



10V/DIV	200ms/DIV

GENH300-2.5



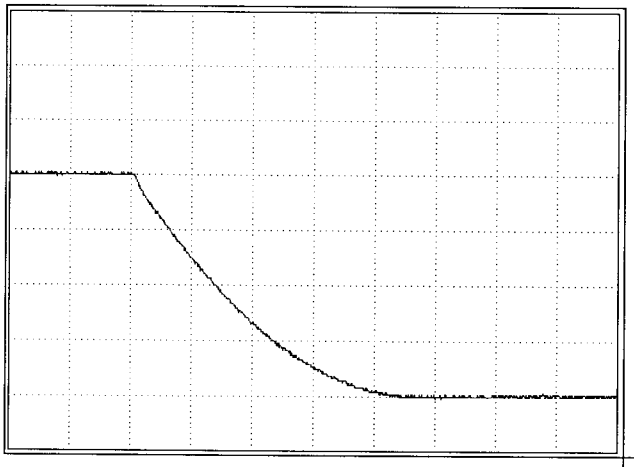
50V/DIV	500ms/DIV

Output Fall Characteristics
Constant Voltage Mode

GENH

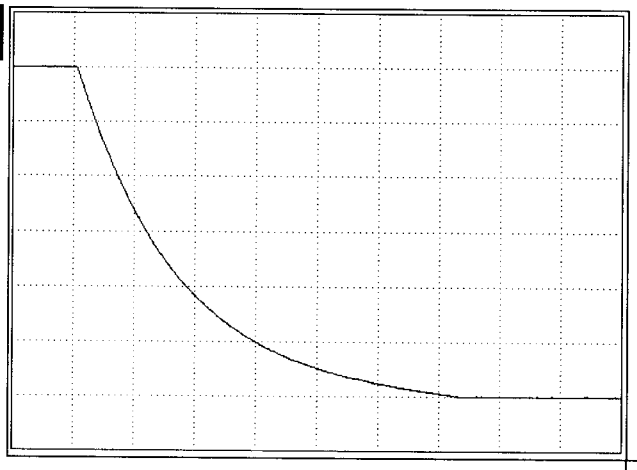
Conditions Vin: 100VAC
Vout:100%
Iout:100%
Ta:25°C

GENH8-90



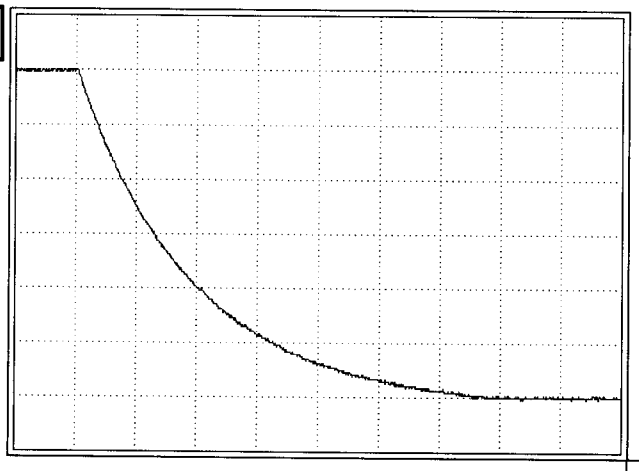
2V/DIV	0.5ms/DIV

GENH60-12.5



10V/DIV	5ms/DIV

GENH300-2.5



50V/DIV	20ms/DIV

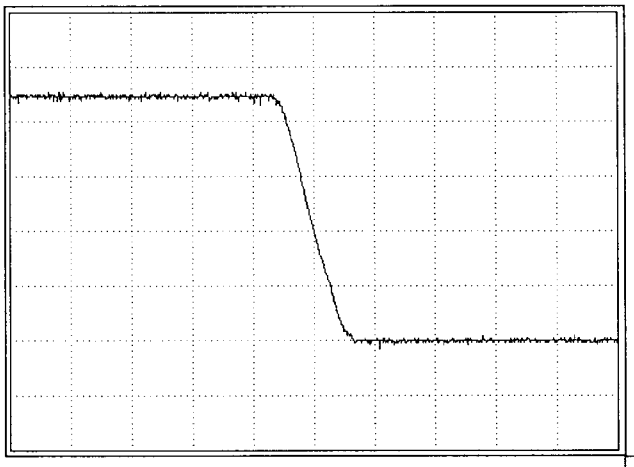
Output Fall Characteristics

Constant Current Mode

GENH

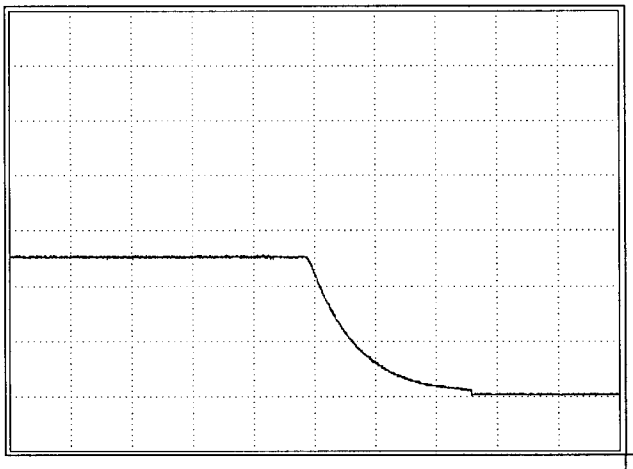
Conditions Vin: 100VAC
Vout:100%
Iout:100%
Load:Constant Resistance
Ta:25°C

GENH8-90



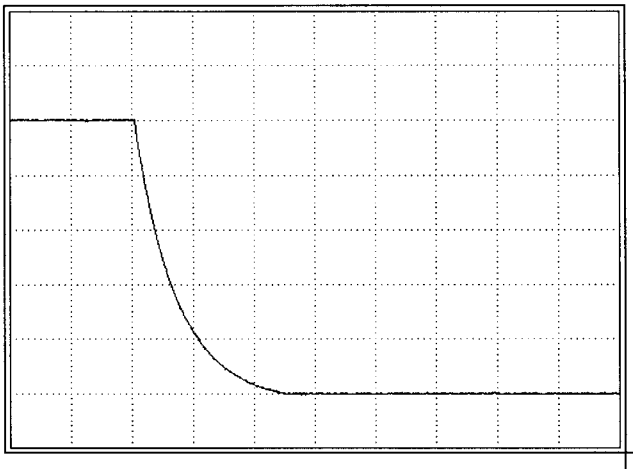
20A/DIV	2ms/DIV

GENH60-12.5



5A/DIV	10ms/DIV

GENH300-2.5



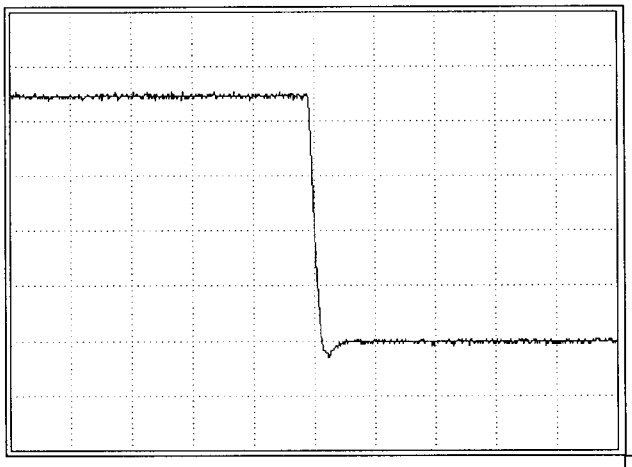
0.5A/DIV	50ms/DIV

Output Fall Characteristics
Constant Current Mode

GENH

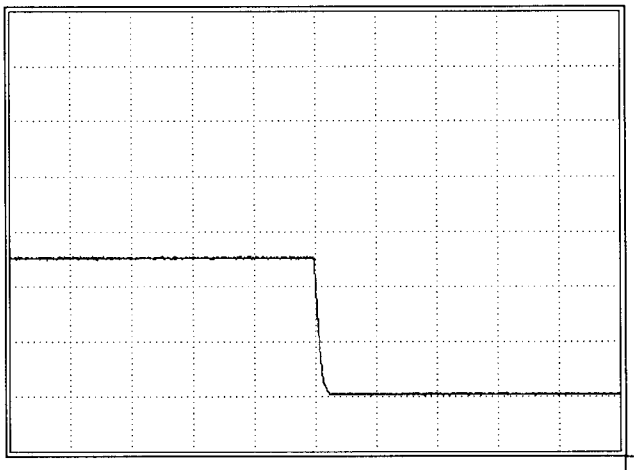
Conditions Vin: 100VAC
Fall to short circuit
Iout:100%
Ta:25°C

GENH8-90



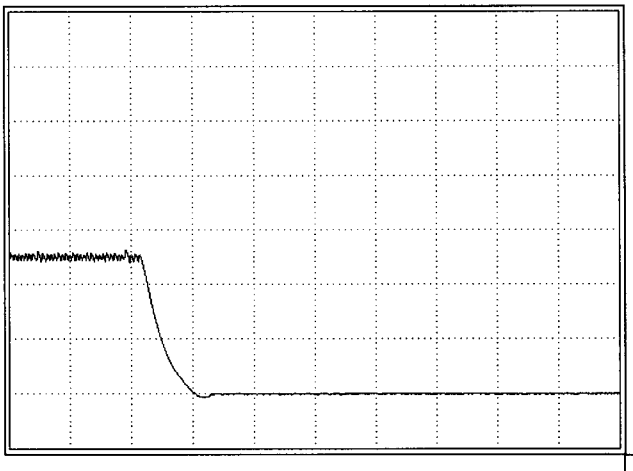
20A/DIV	2ms/DIV

GENH60-12.5



5A/DIV	5ms/DIV

GENH300-2.5

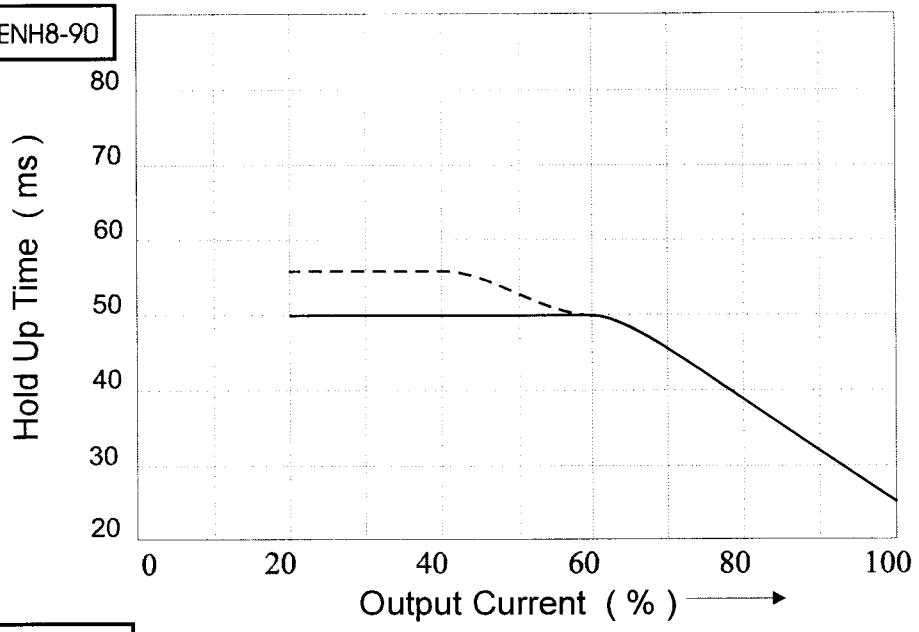


1A/DIV	1ms/DIV

2-6. Hold Up Time Characteristics

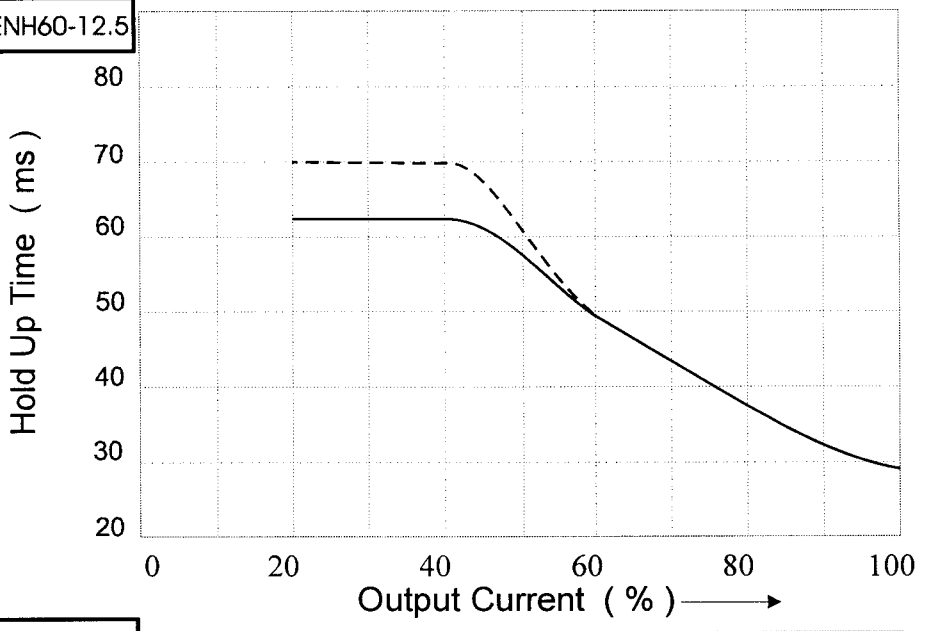
Constant Voltage Mode

GENH8-90

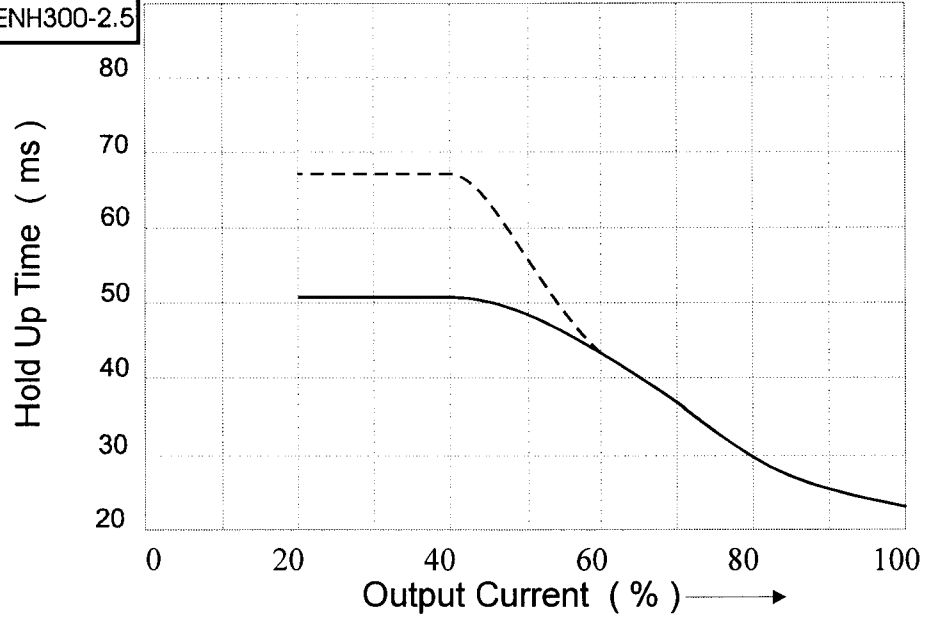


Conditions:Vout:100%
AC 100 V ——
AC 200V - - - - - -
Ta : 25°C

GENH60-12.5



GENH300-2.5



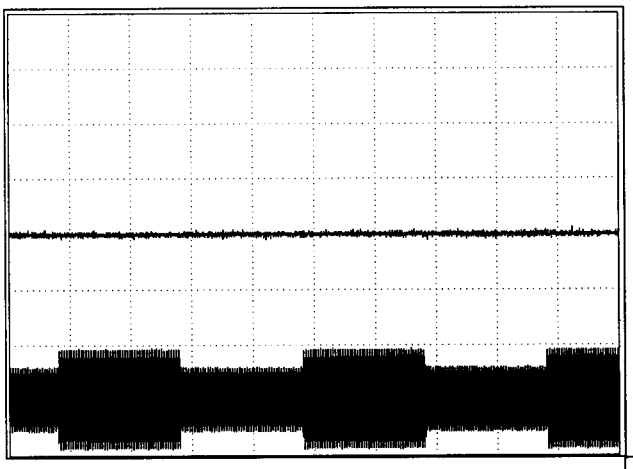
2-7.Dynamic Line Response

Constant Voltage Mode

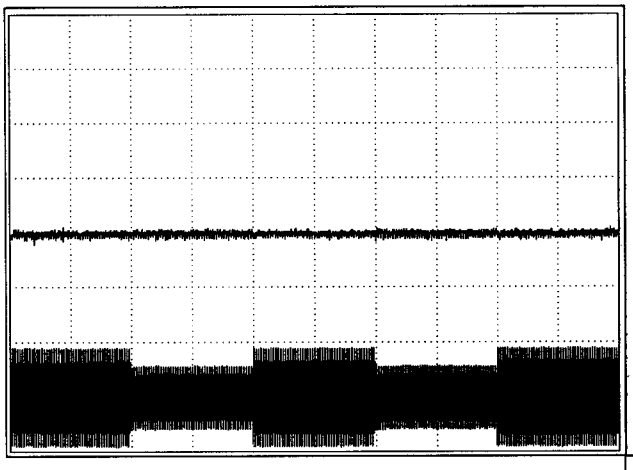
GENH

Conditions : Vout:100%
Iout:100%
Vin: 85 ⟷ 132 VAC
Ta : 25°C

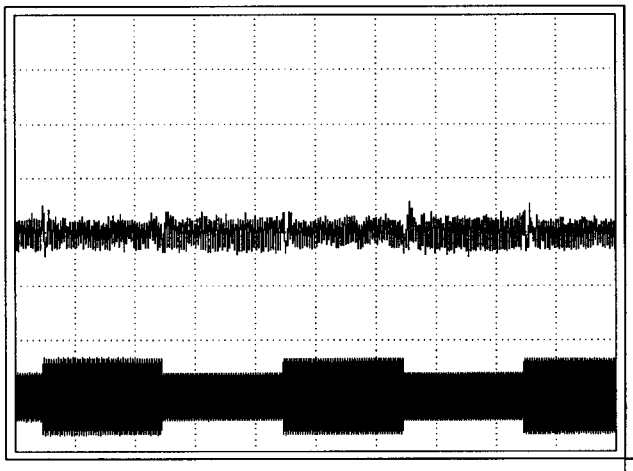
GENH8-90



GENH60-12.5



GENH300-2.5

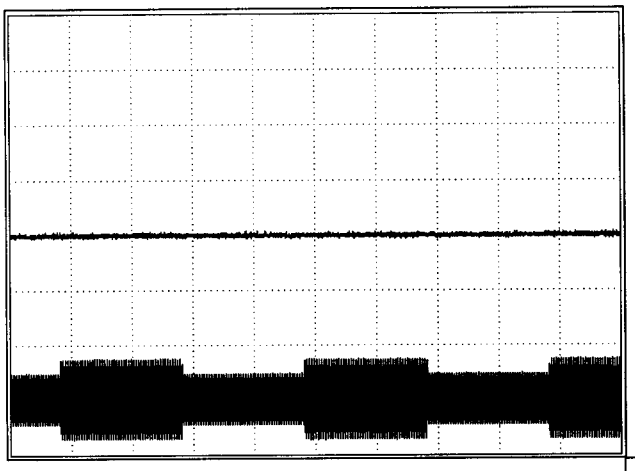


Dynamic Line Response
Constant Voltage Mode

GENH

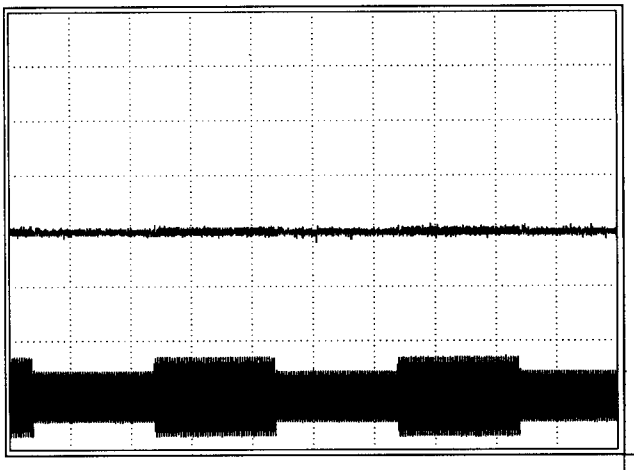
Conditions : Vout:100%
Iout:100%
Vin: 170 ⟷ 265 VAC
Ta : 25°C

GENH8-90



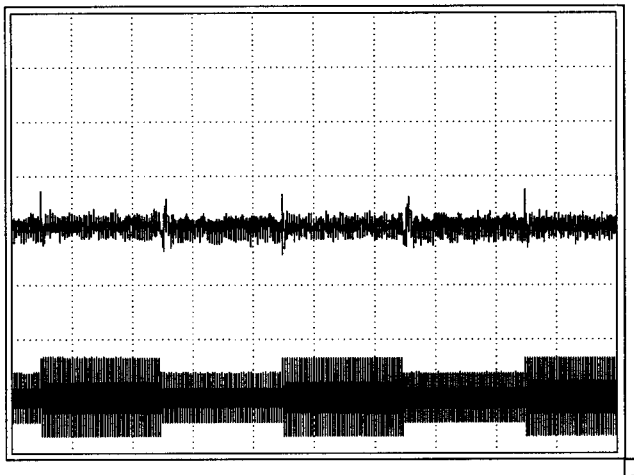
50mV/DIV | 500mS / DIV

GENH60-12.5



50mV/DIV | 500mS / DIV

GENH300-2.5



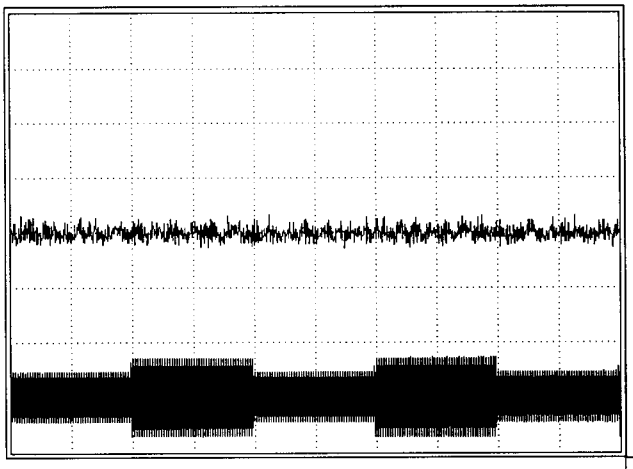
50mV/DIV | 500mS / DIV

Dynamic Line Response
Constant Current Mode

GENH

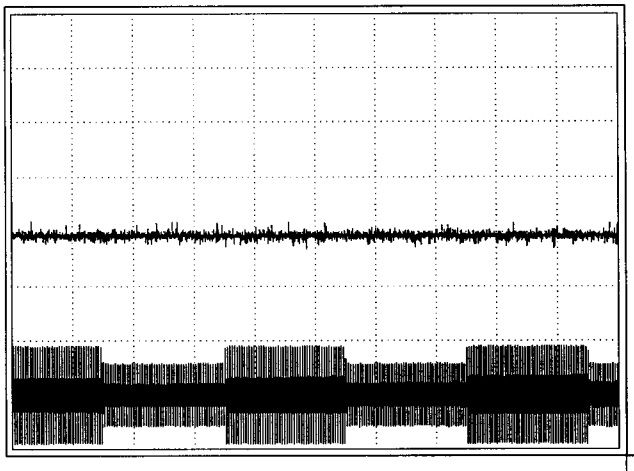
Conditions : Vout:100%
Iout:100%
Vin: 85 ⟷ 132 VAC
Ta : 25°C

GENH8-90



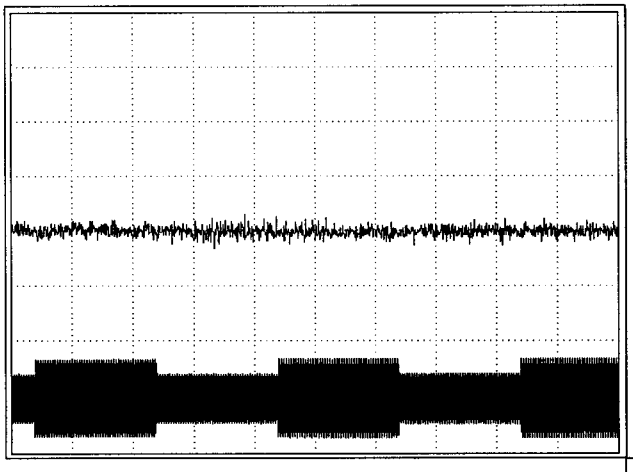
2A/DIV | 500mS / DIV

GENH60-12.5



1A/DIV | 500mS / DIV

GENH300-2.5



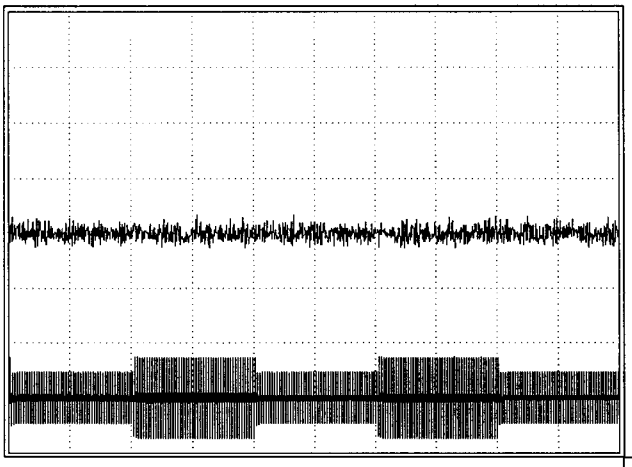
20mA/DIV | 500mS / DIV

Dynamic Line Response
Constant Current Mode

GENH

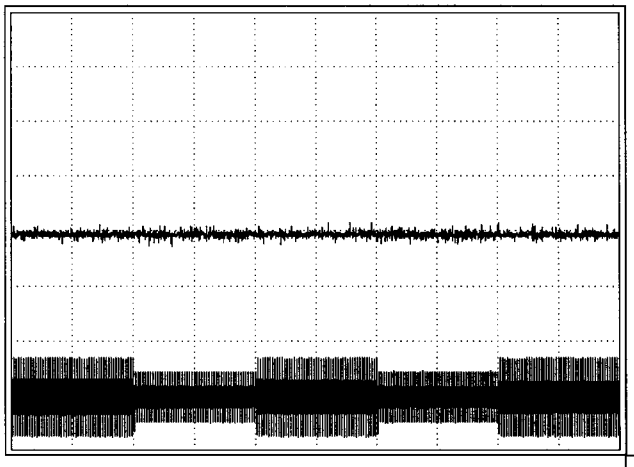
Conditions : Vout:100%
Iout:100%
Vin: 170 ⟷ 265 VAC
Ta : 25°C

GENH8-90



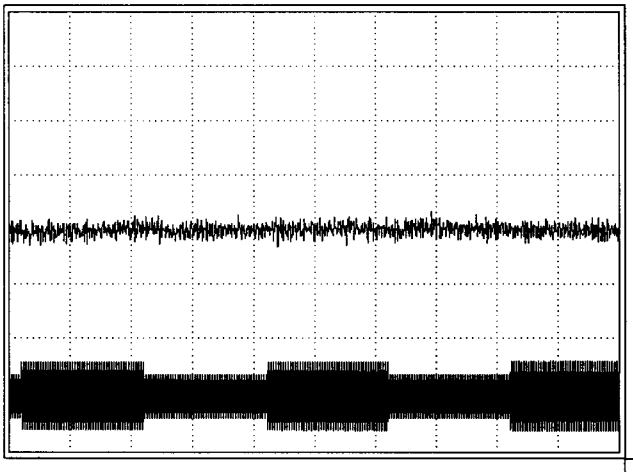
2A/DIV | 500mS / DIV

GENH60-12.5



1A/DIV | 500mS / DIV

GENH300-2.5



20mA/DIV | 500mS / DIV

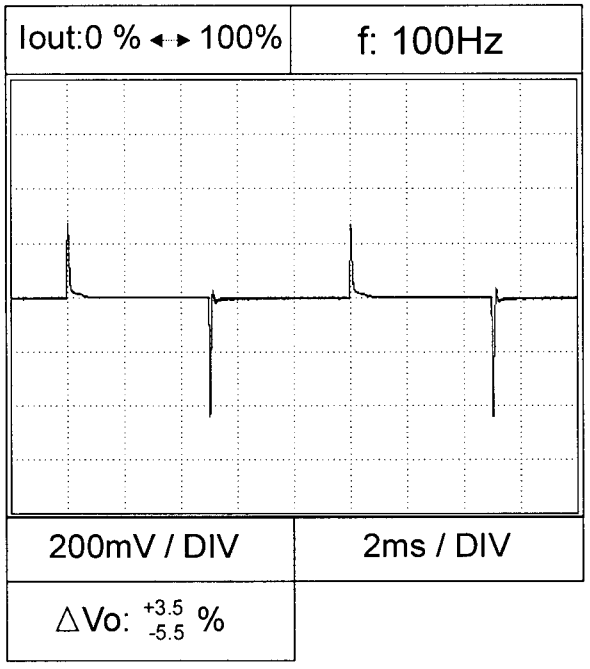
2-8.Dynamic Load Response Characteristics

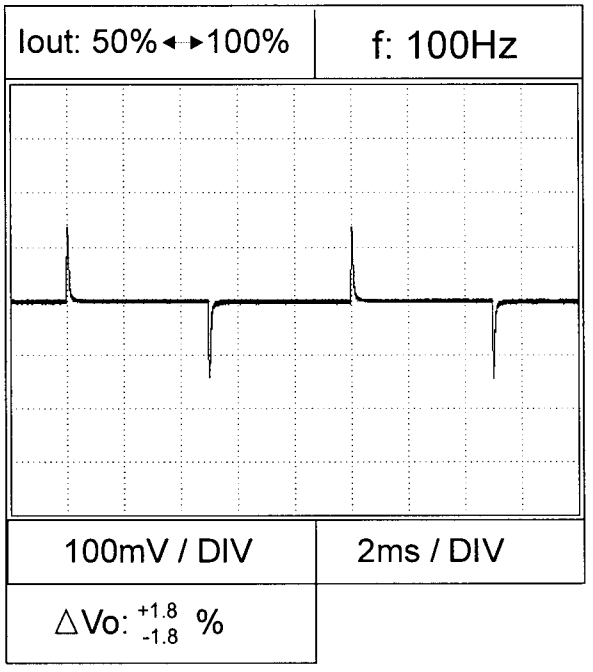
Constant Voltage Mode

GENH

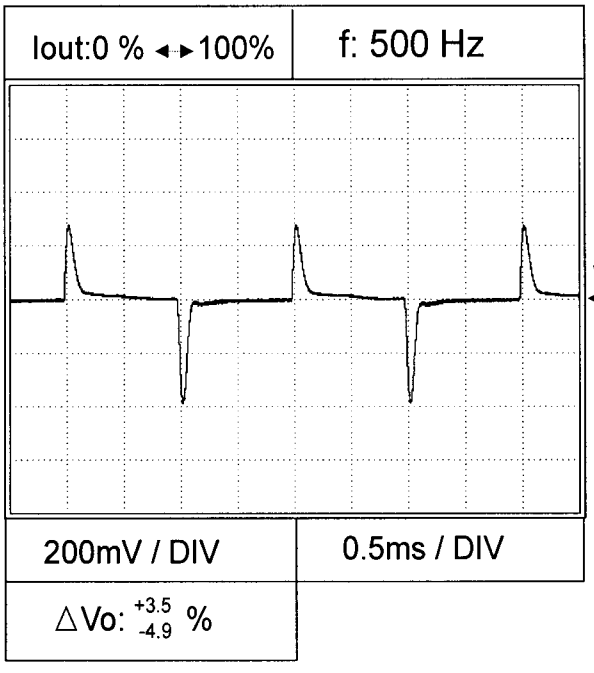
Conditions : Vin :100VAC
Vout:100%
Load current tr = tf = 100us
Ta :25°C

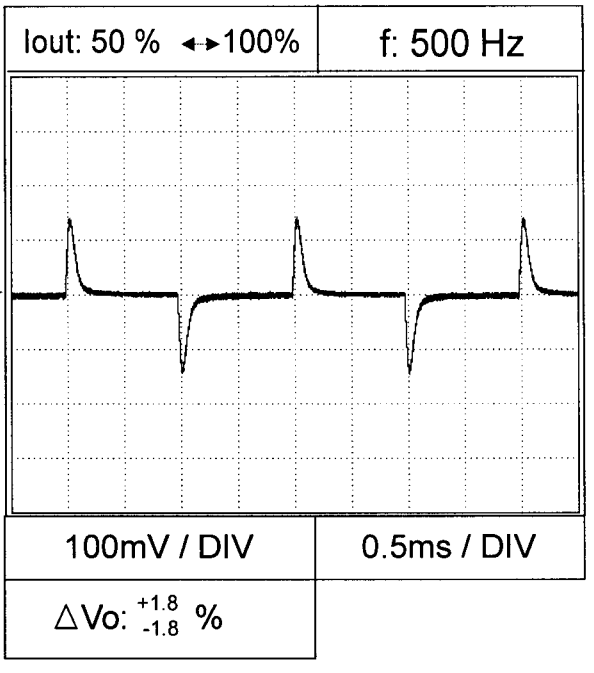
GENH8-90





Vout





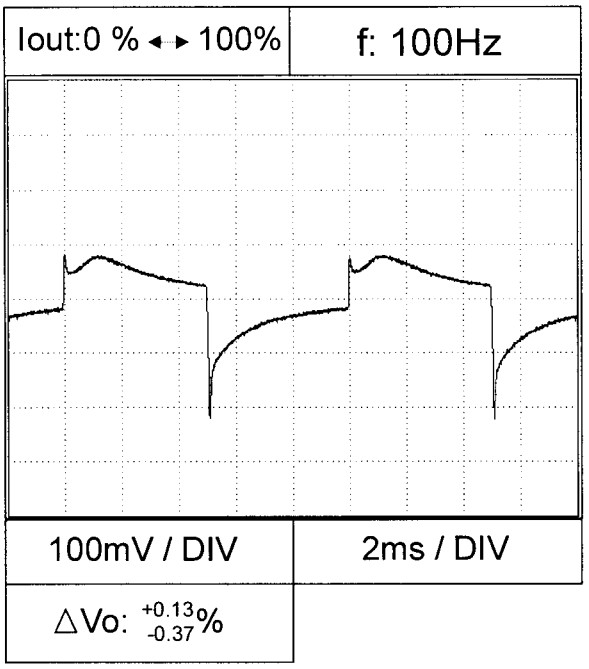
Vout

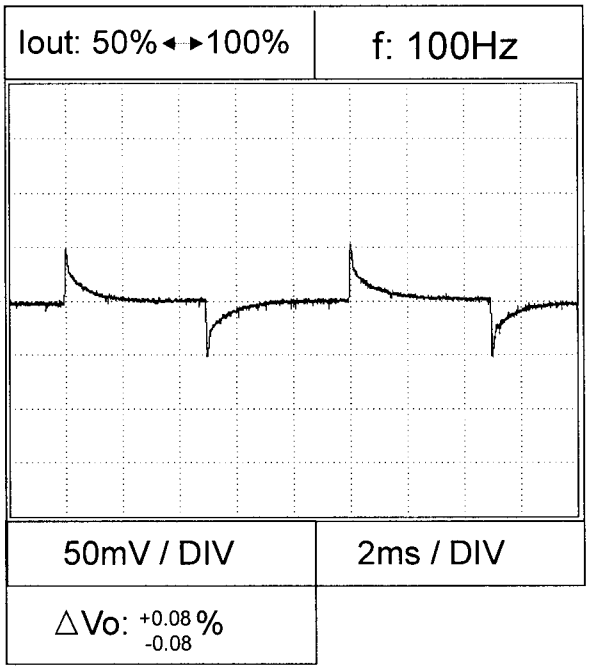
Dynamic Load Response Characteristics
Constant Voltage Mode

GENH

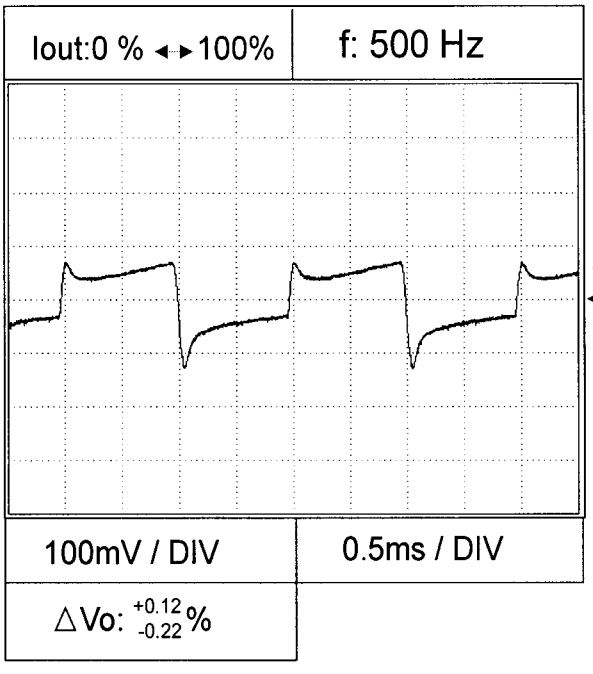
Conditions : Vin :100VAC
Vout:100%
Load current tr = tf = 100us
Ta :25°C

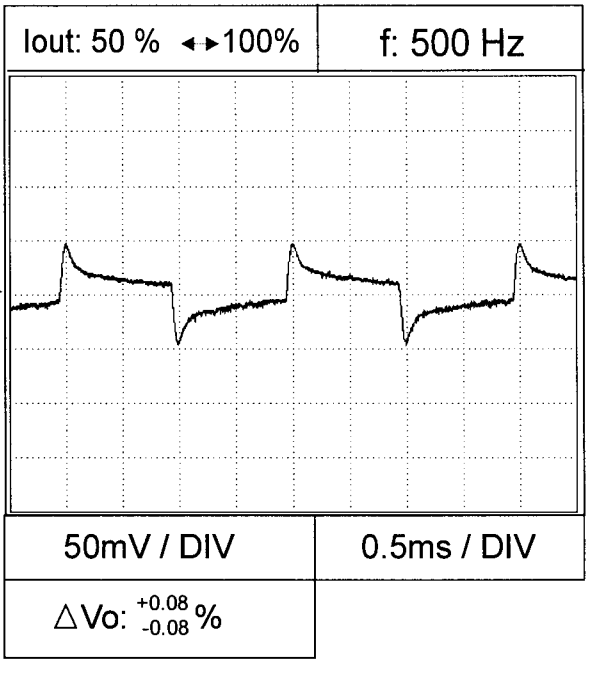
GENH60-12.5





Vout





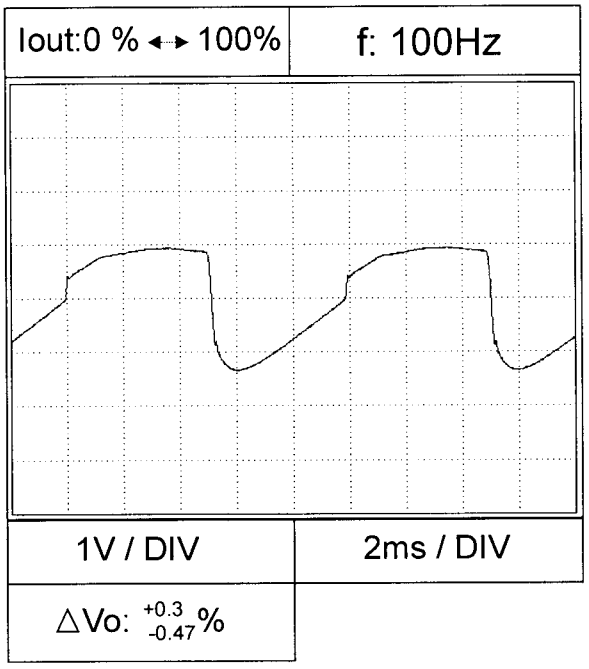
Vout

Dynamic Load Response Characteristics
Constant Voltage Mode

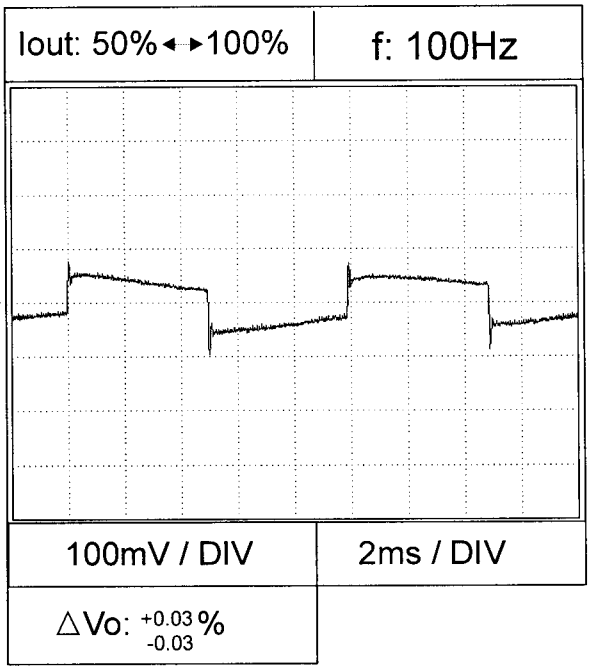
GENH

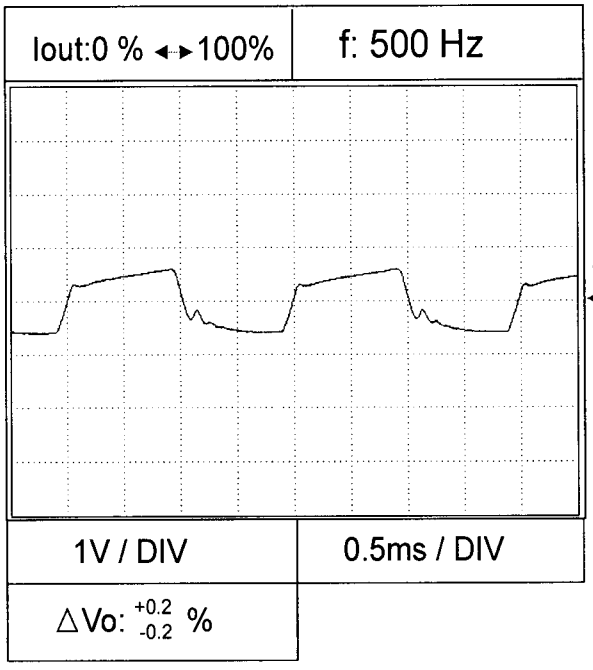
Conditions : Vin :100VAC
Vout:100%
Load current tr = tf = 100us
Ta :25°C

GENH300-2.5

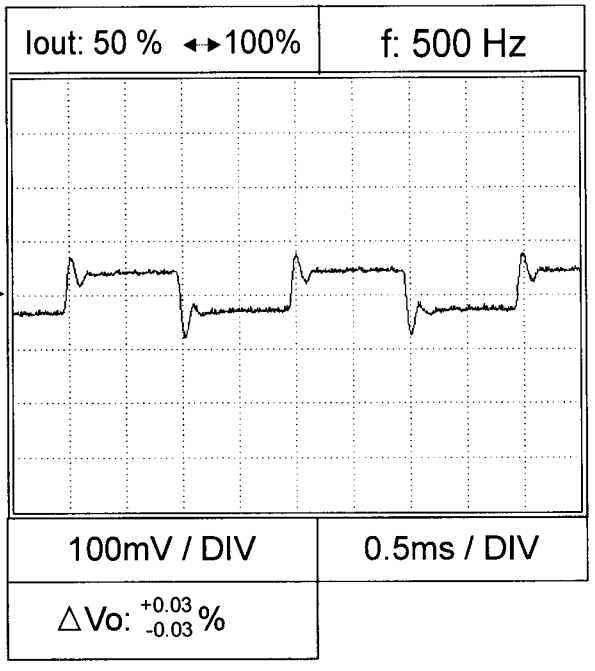


Vout





Vout



Dynamic Load Response Characteristics

Constant Current Mode

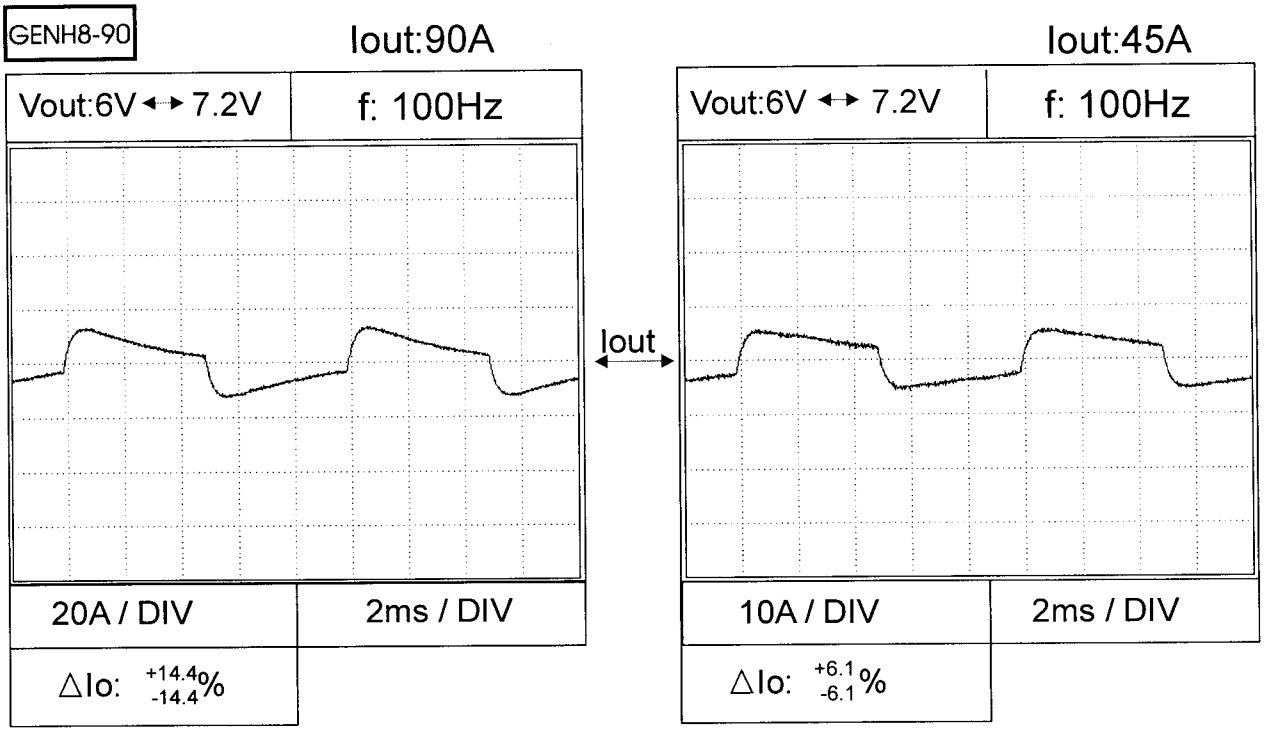
GENH

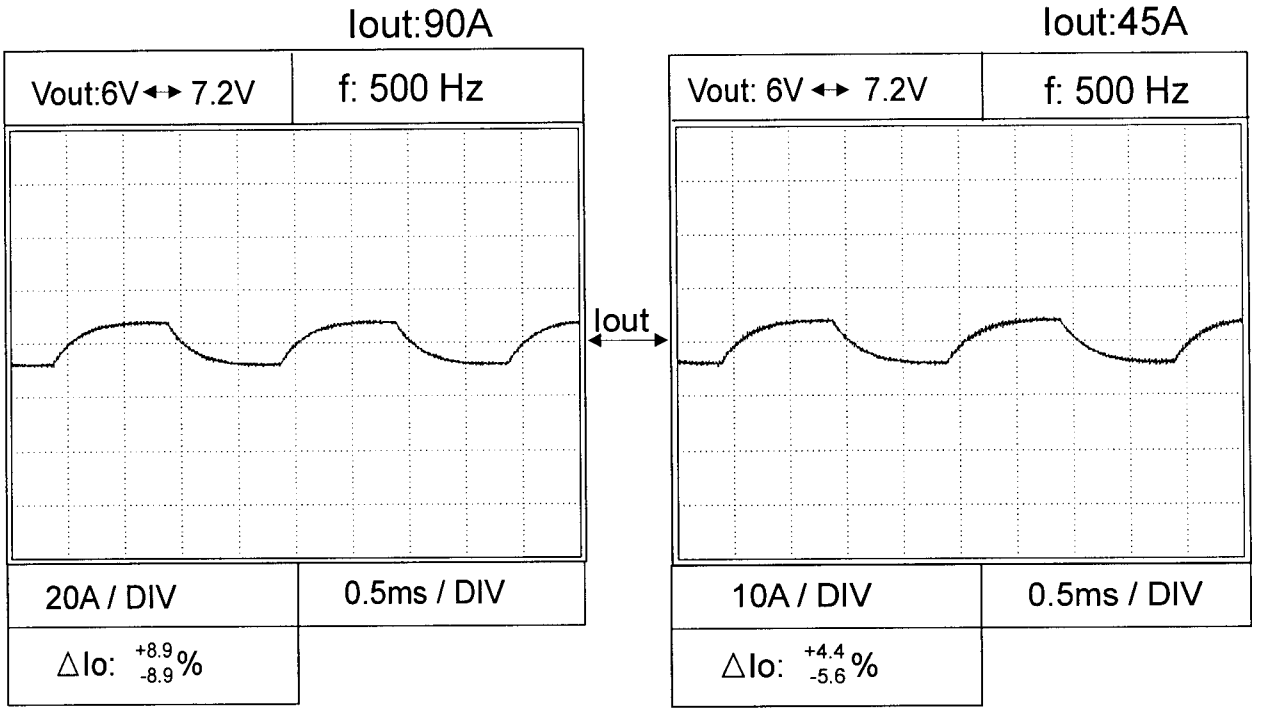
Conditions : Vin :100VAC

Load current tr = tf = 100us

Ta :25°C

GENH8-90





Dynamic Load Response Characteristics
Constant Current Mode

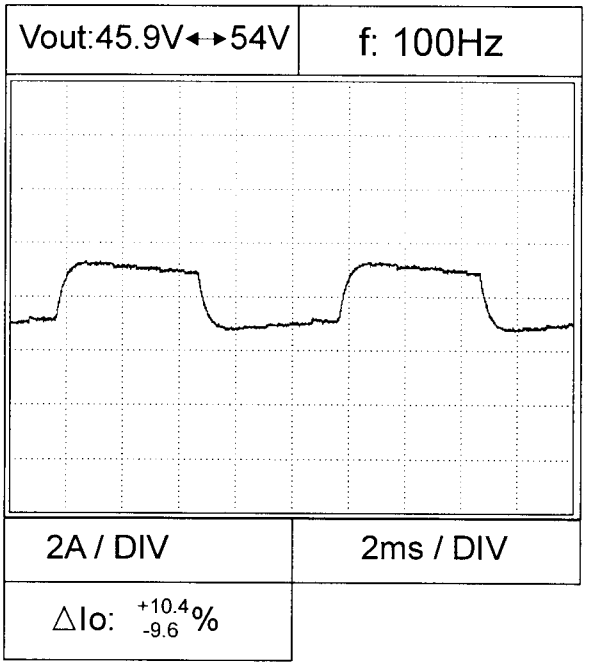
GENH

Conditions : Vin :100VAC

Load current tr = tf = 100us
Ta :25°C

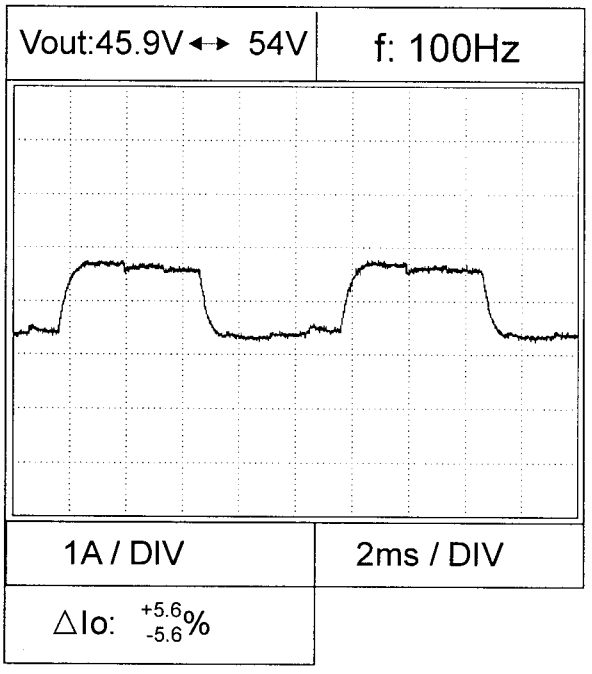
GENH60-12.5

Iout:12.5A

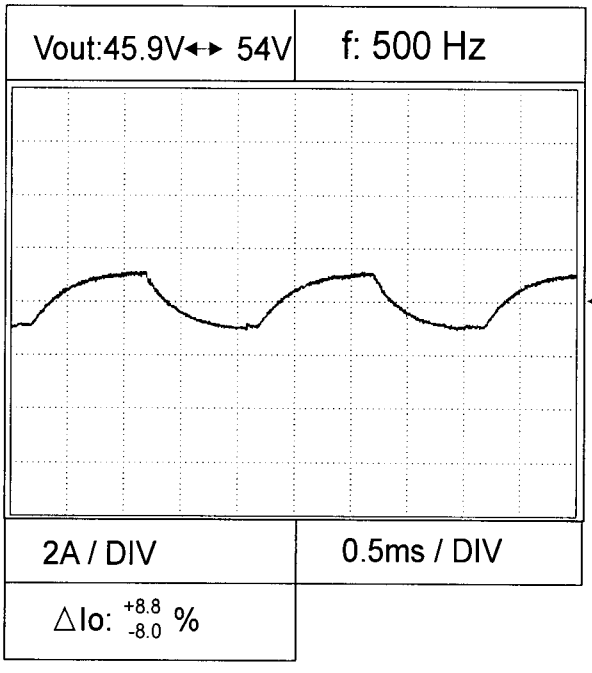


Iout

Iout:6.25A

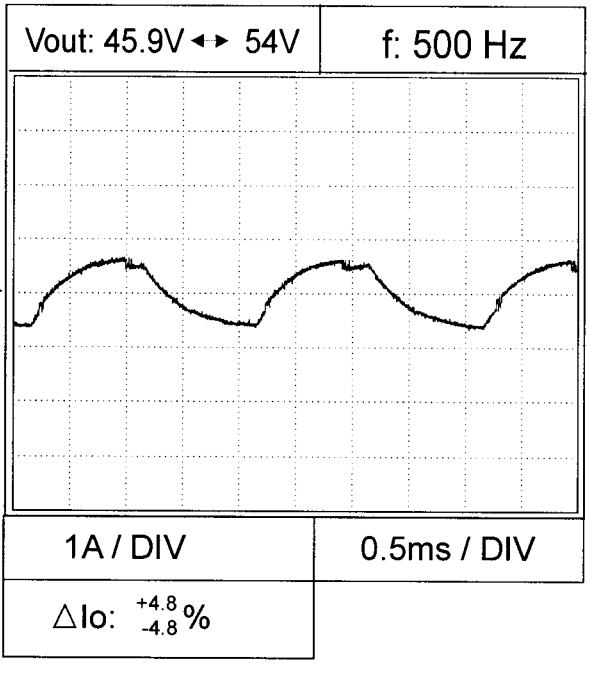


Iout:12.5A



Iout

Iout:6.25A



Dynamic Load Response Characteristics

Constant Current Mode

GENH

Conditions : Vin :100VAC

Load current tr = tf = 100us

Ta :25°C

GENH300-2.5

Iout:2.5A

Vout:229V ◄► 270V | f: 100Hz

500mA / DIV | 2ms / DIV

△Vo: $^{+12.0}_{-12.0}$%

Iout

Iout:1.25A

Vout:229V ◄► 270V | f: 100Hz

200mA / DIV | 2ms / DIV

△Vo: $^{+5.6}_{-5.6}$ %

Iout:2.5A

Vout:229V ◄► 270V | f: 500 Hz

500mA / DIV | 0.5ms / DIV

△Vo: $^{+10.0}_{-10.0}$%

Iout

Iout:1.25A

Vout: 229V ◄► 270V | f: 500 Hz

200mA / DIV | 0.5ms / DIV

△Vo: $^{+4.8}_{-5.6}$ %

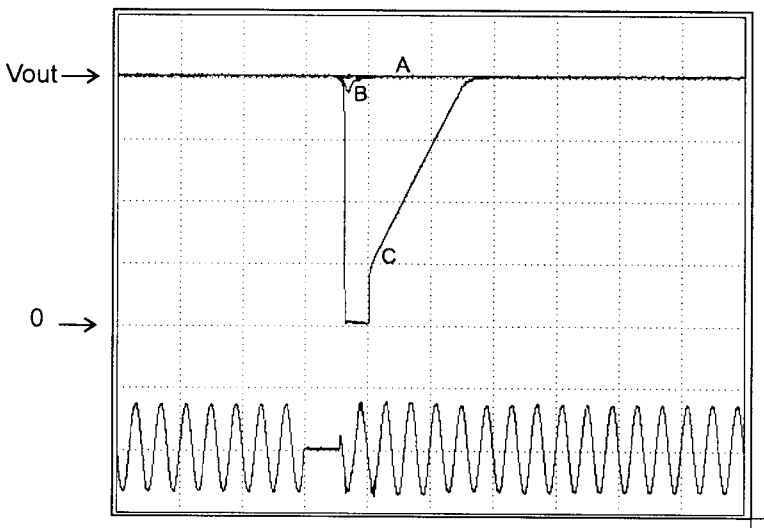
2-9.Response to Brown-out Characteristics

Constant Voltage Mode

GENH

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

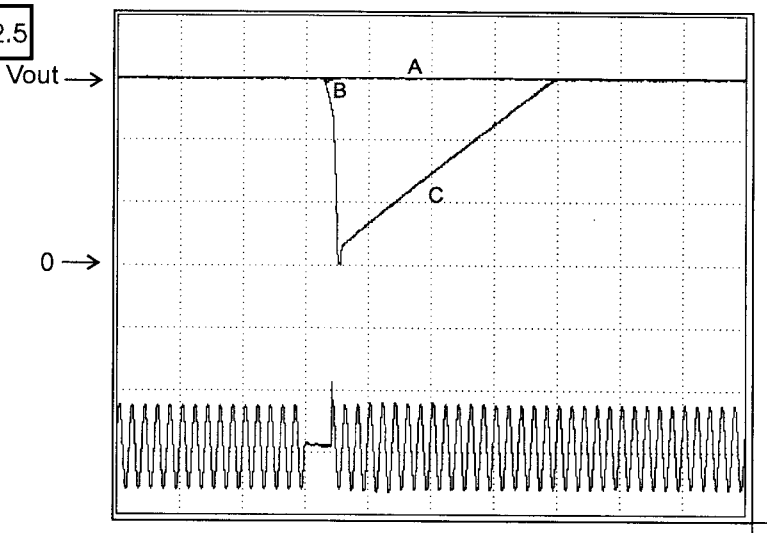
GENH8-90



Brown-out Time
A-25mS
B-27mS
C-28mS

2V/DIV	50ms/DIV

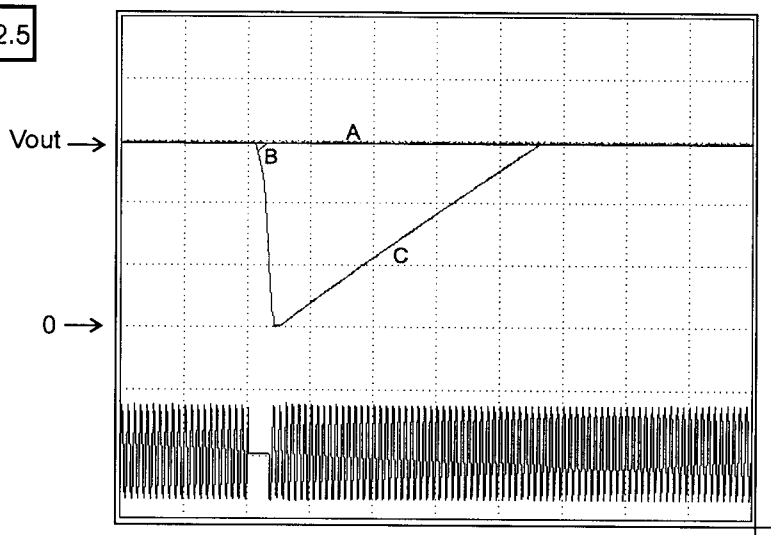
GENH60-12.5



Brown-out Time
A-27mS
B-29mS
C-43mS

20V/DIV	100ms/DIV

GENH300-2.5



Brown-out Time
A-22mS
B-23mS
C-65mS

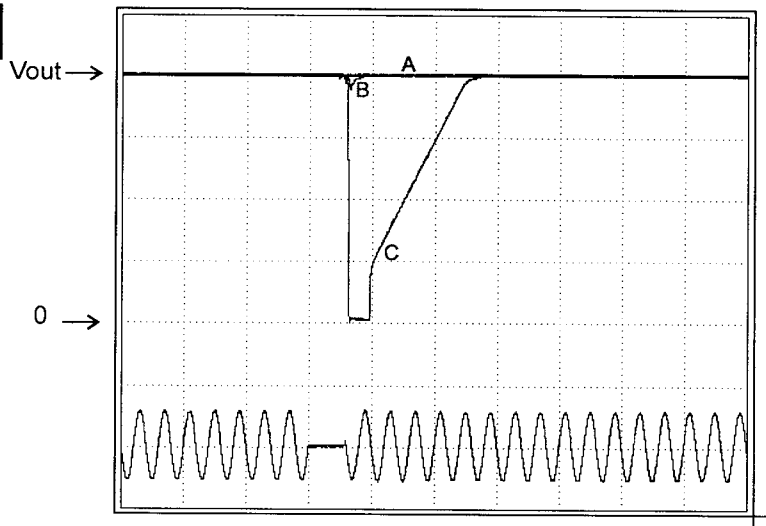
100V/DIV	200ms/DIV

Response to Brown-out Characteristics
Constant Voltage Mode

GENH

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

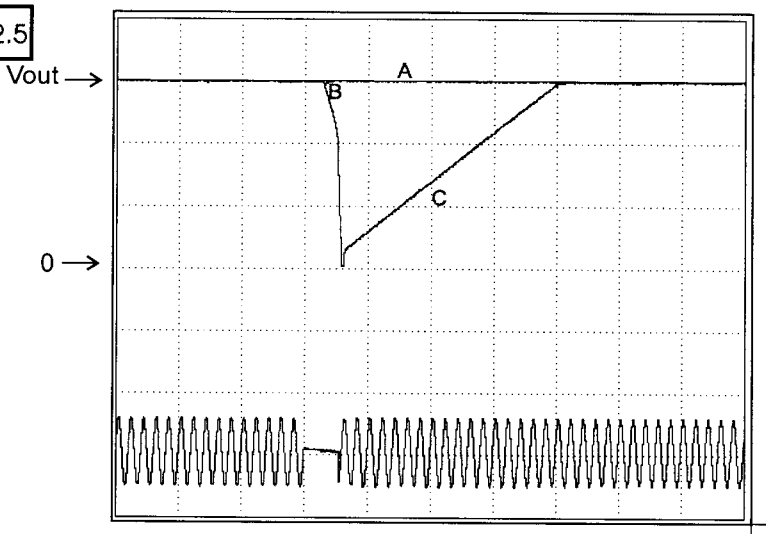
GENH8-90



Brown-out Time
A-23mS
B-28mS
C-29mS

2V/DIV | 50ms/DIV

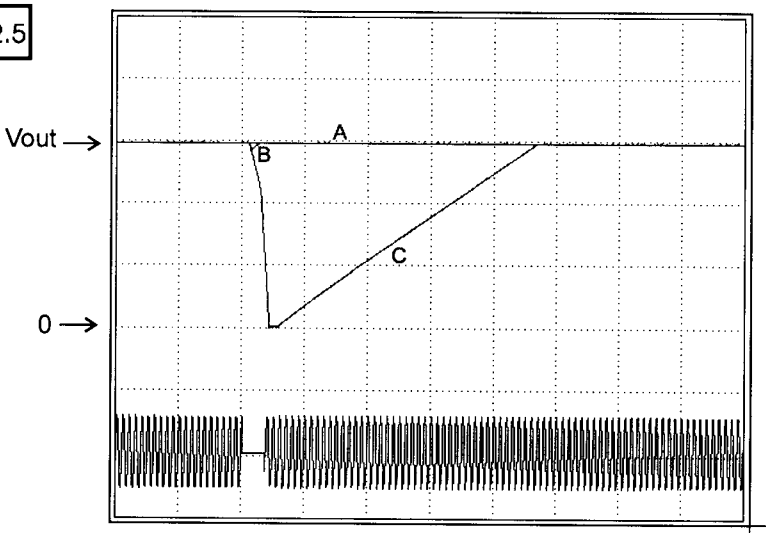
GENH60-12.5



Brown-out Time
A-28mS
B-30mS
C-55mS

20V/DIV | 100ms/DIV

GENH300-2.5



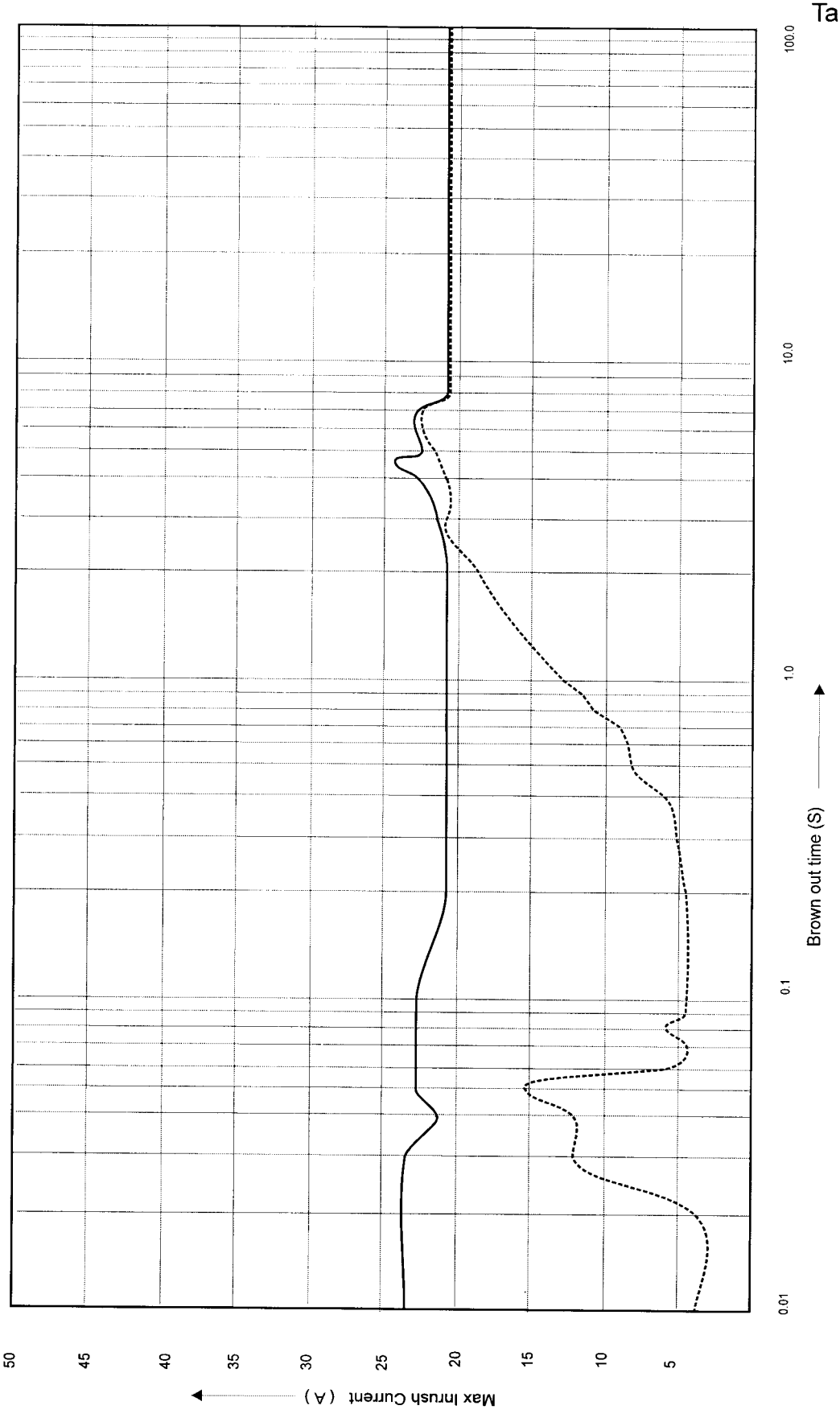
Brown-out Time
A-23mS
B-24mS
C-73mS

100V/DIV | 200ms/DIV

2 -10. Inrush Current Characteristic

GENH

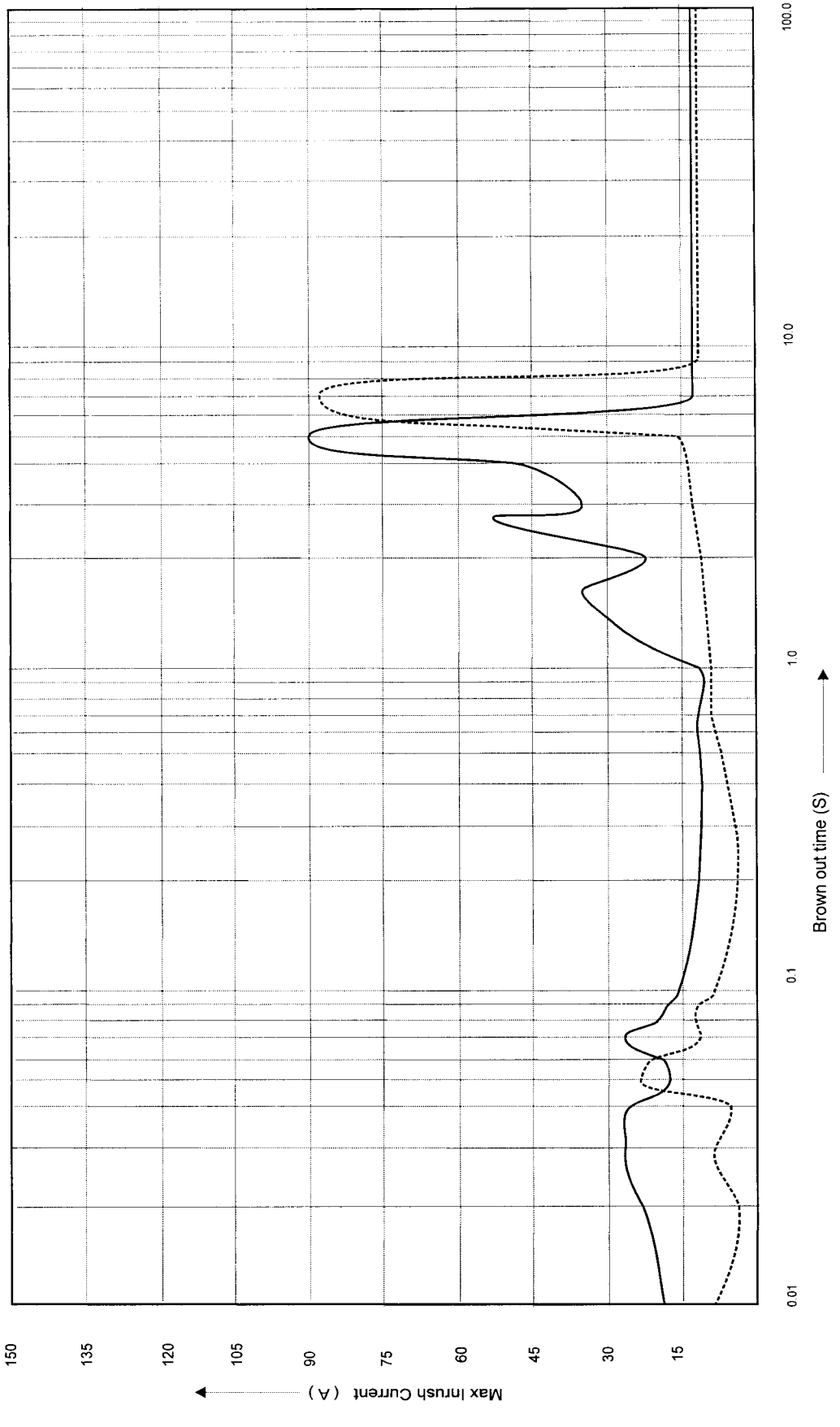
Conditions: Vout: 100%
Iout: 0% ---------
Iout: 100% ——————
Vin : 100VAC
Ta : 25°C



Inrush Current Characteristic

GENH

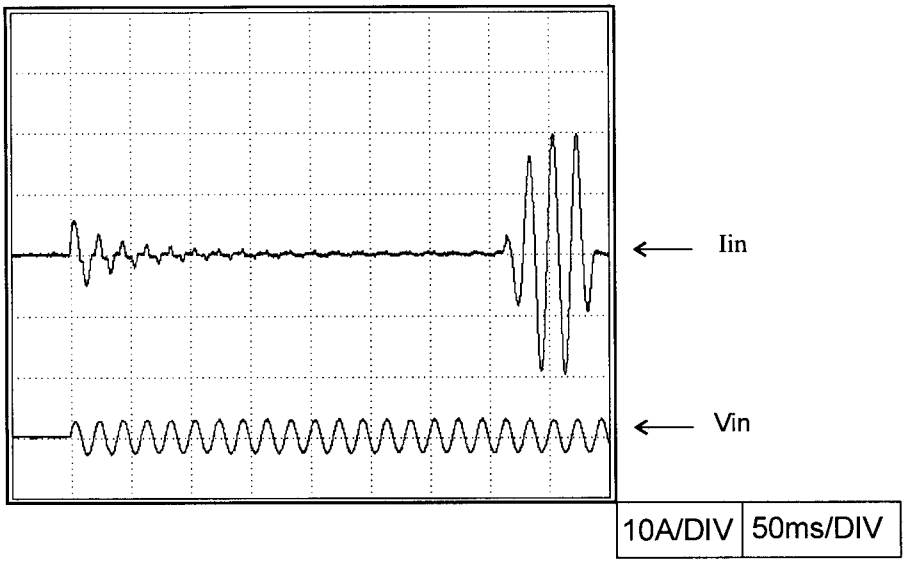
Conditions: Vout: 100%
Iout: 0% ---------
Iout: 100% ——————
Vin : 200VAC
Ta : 25°C



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

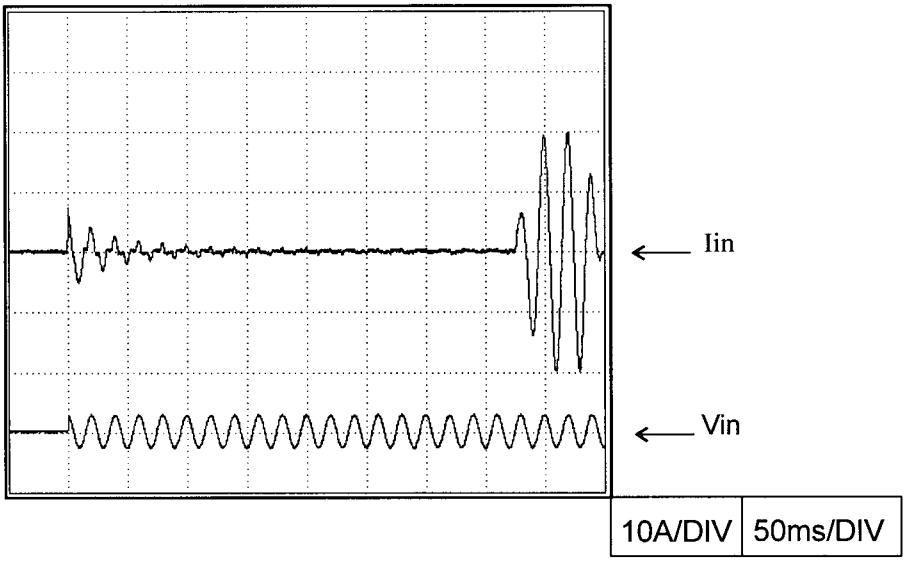
SWITCH ON PHASE ANGLE OF INPUT AC VOLTAGE

Ø = 0°



SWITCH ON PHASE ANGLE OF INPUT AC VOLTAGE

Ø = 90°



Inrush Current Waveform

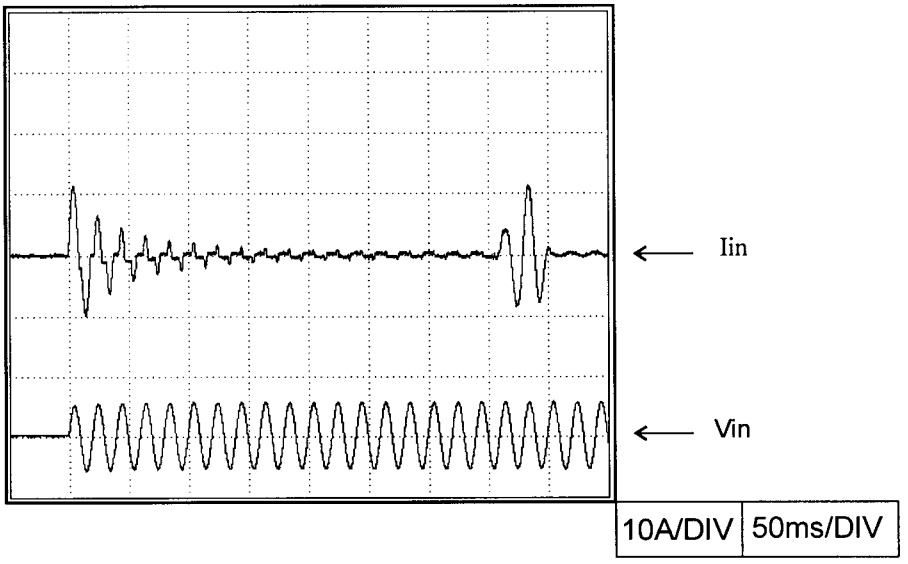
Constant Voltage Mode

GENH

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

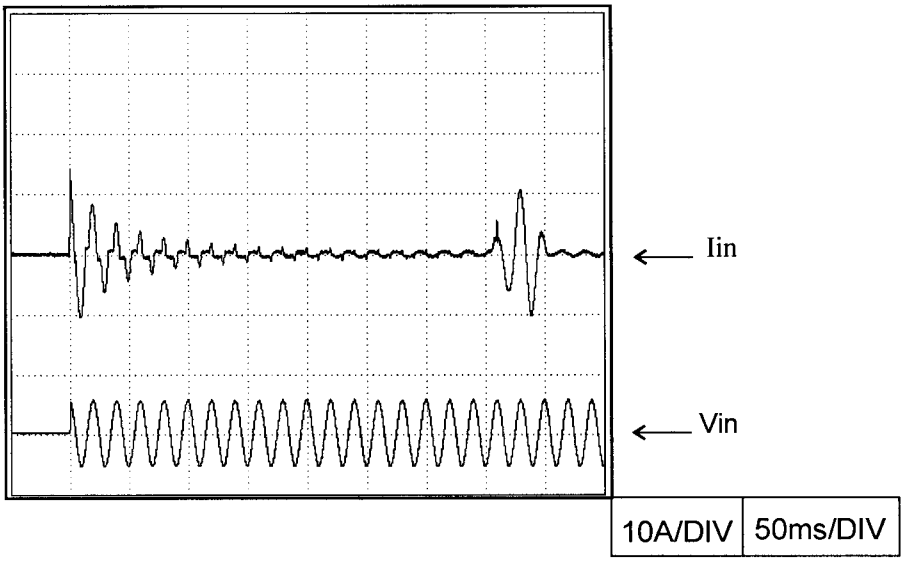
SWITCH ON PHASE ANGLE OF INPUT AC VOLTAGE

Ø = 0°

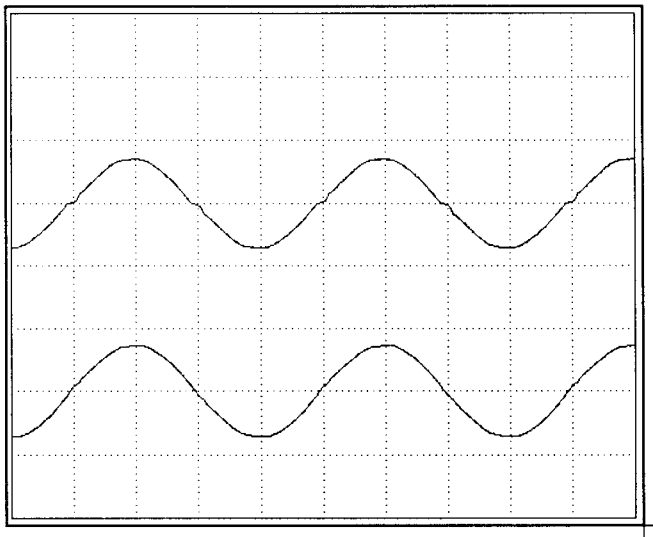


SWITCH ON PHASE ANGLE OF INPUT AC VOLTAGE

Ø = 90°

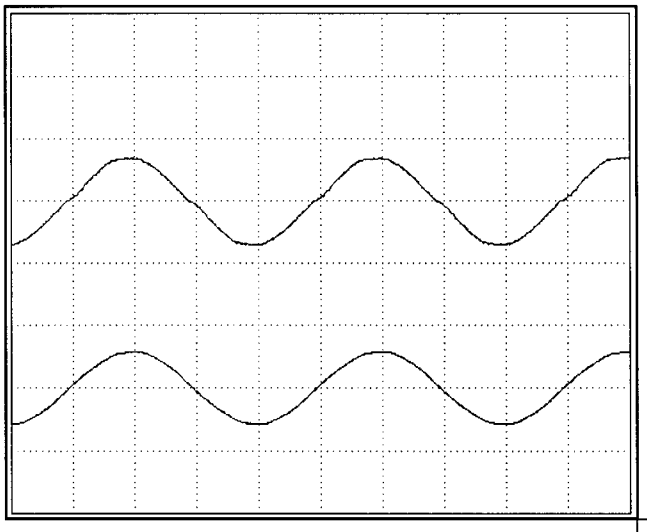


Conditions:Vin : 100VAC
Vout: 100%
Iout:100 %
Ta :25°C



20A/DIV	5ms/DIV

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



10A/DIV	5ms/DIV

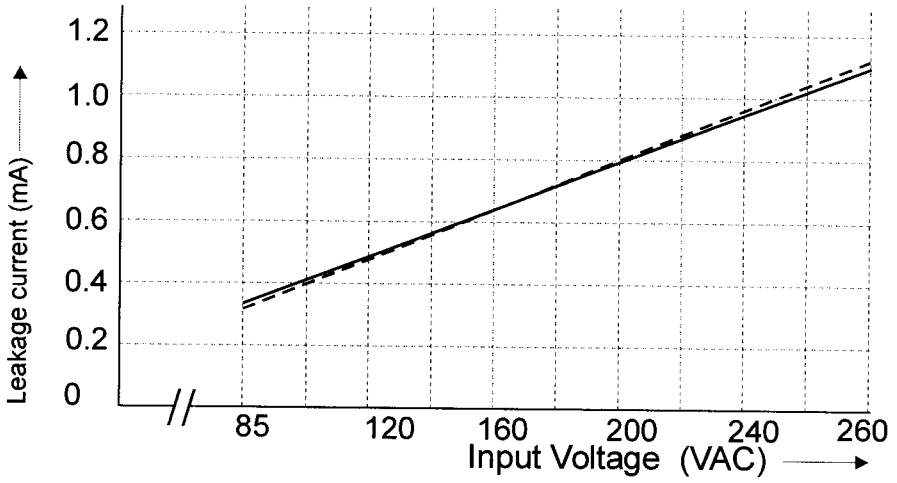
Leakage current characteristics

GENH

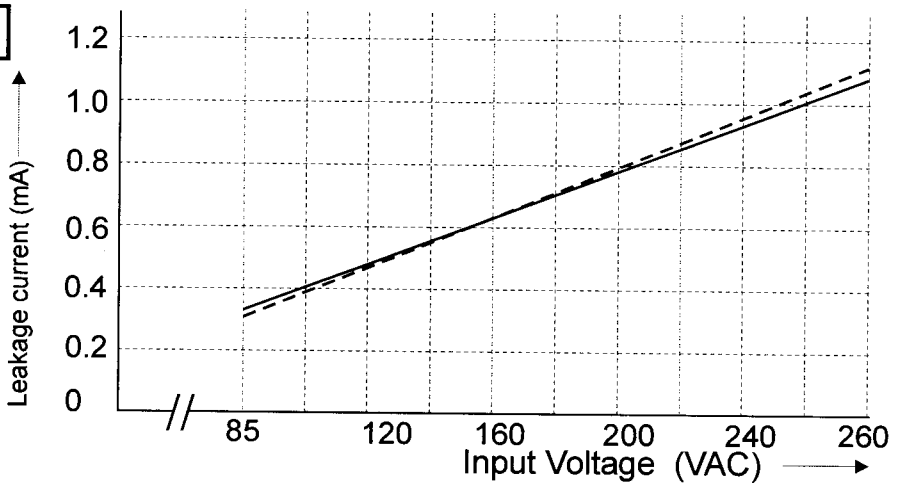
Conditions: Vout:100%
Iout: 100% ———
0% - - - - -
Ta:25°C

LINE-GND.

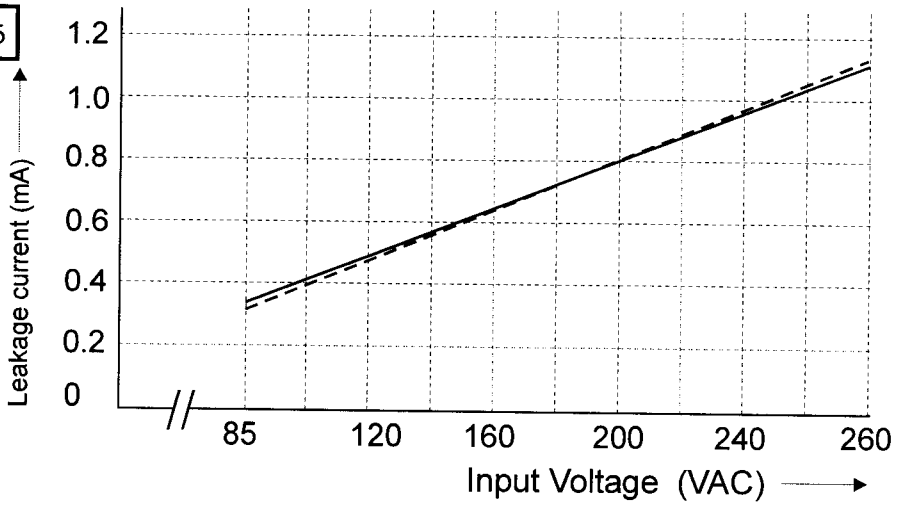
GENH8-90



GENH60-12.5



GENH300-2.5



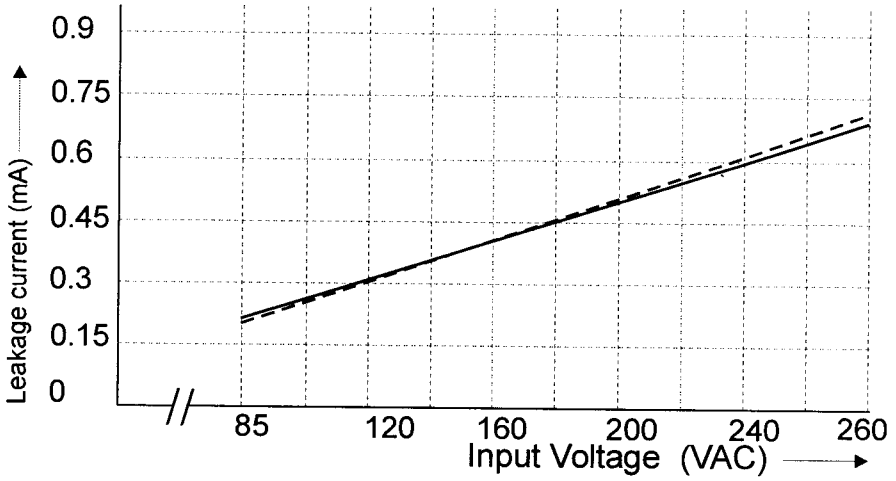
2-13.Leakage current characteristics

GENH

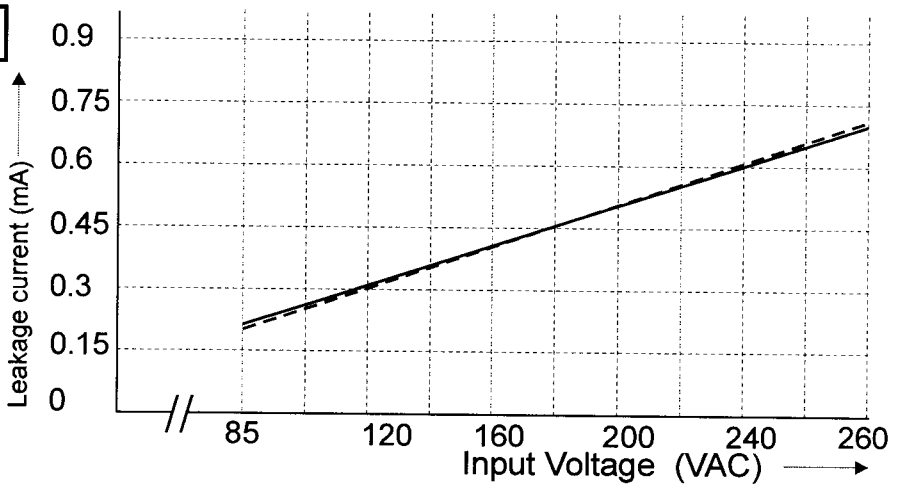
Conditions: Vout:100%
Iout: 100% ———
0% - - - - -
Ta:25°C

NEUTRAL-GND.

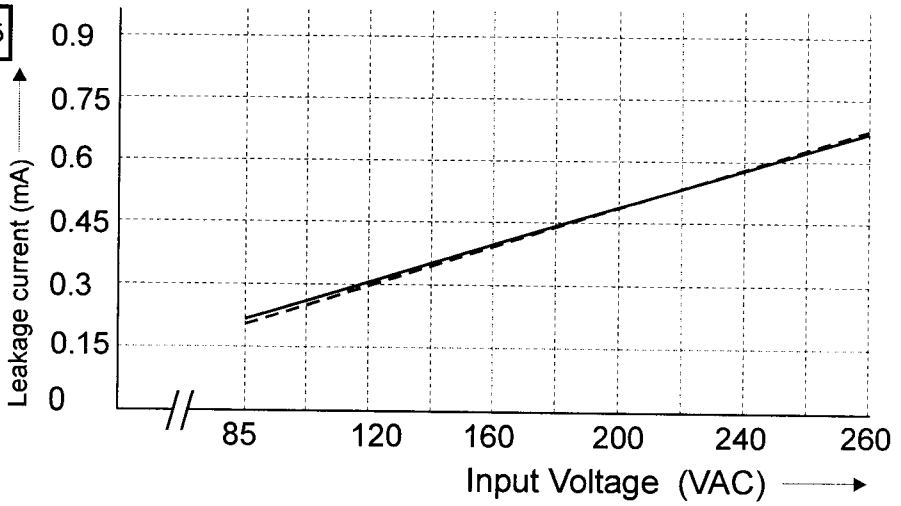
GENH8-90



GENH60-12.5



GENH300-2.5



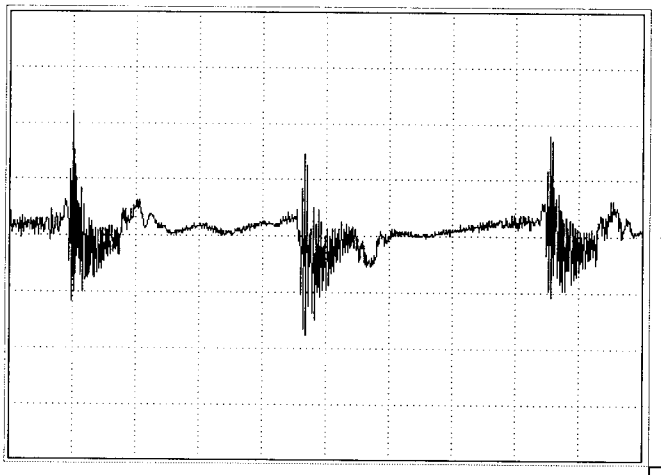
2-14.Output Ripple & Noise waveform
Constant Voltage Mode

GENH

Normal Mode

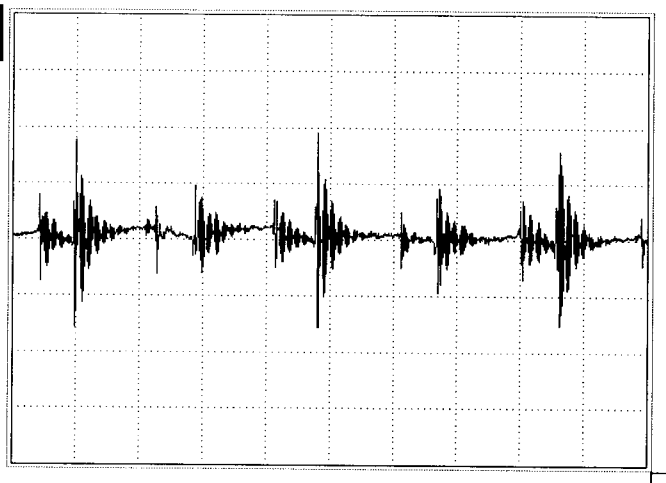
Conditions:Vin :85-265VAC
Vout: 100%
Iout:100 %
Ta :25°C

GENH8-90



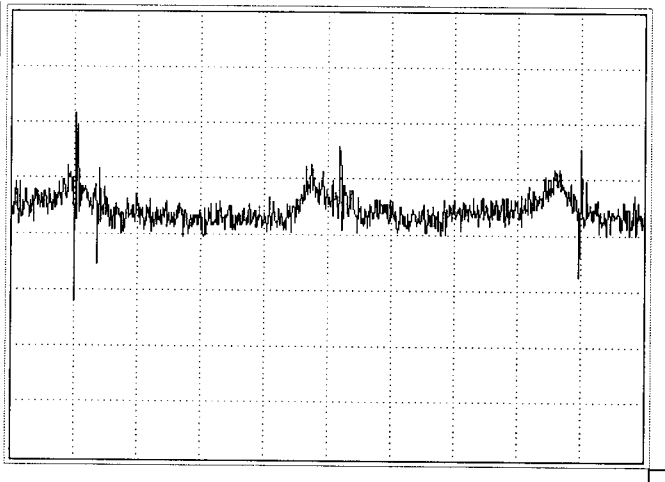
10mV/DIV | 1μs/DIV

GENH60-12.5



10mV/DIV | 2μs/DIV

GENH300-2.5



10mV/DIV | 1μs/DIV

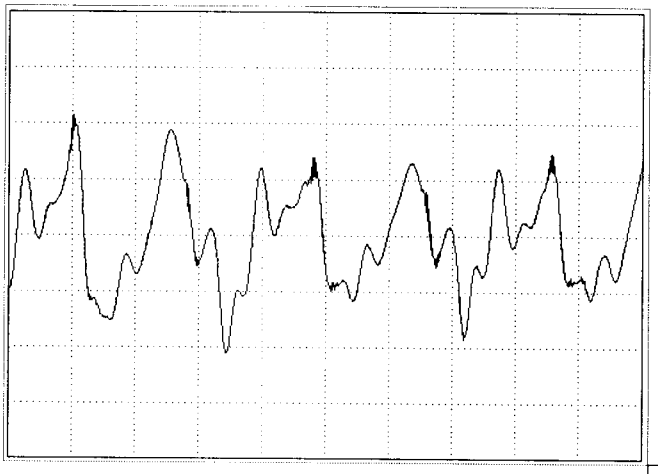
Output Ripple & Noise waveform
Constant Voltage Mode

GENH

Normal & Common Mode

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

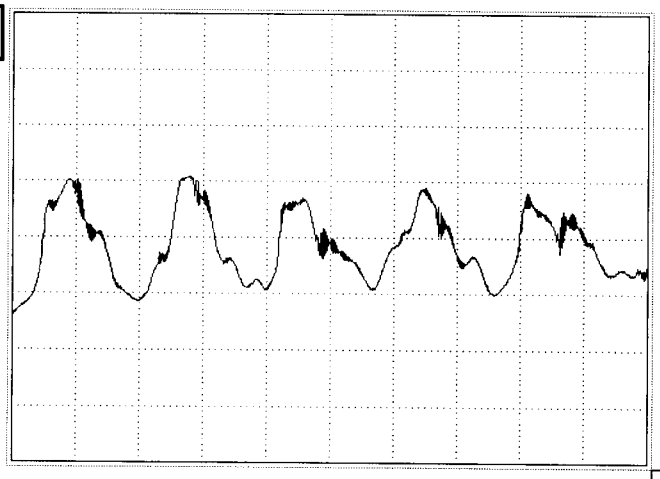
GENH8-90



← Vout

20mV/DIV | 2μs/DIV

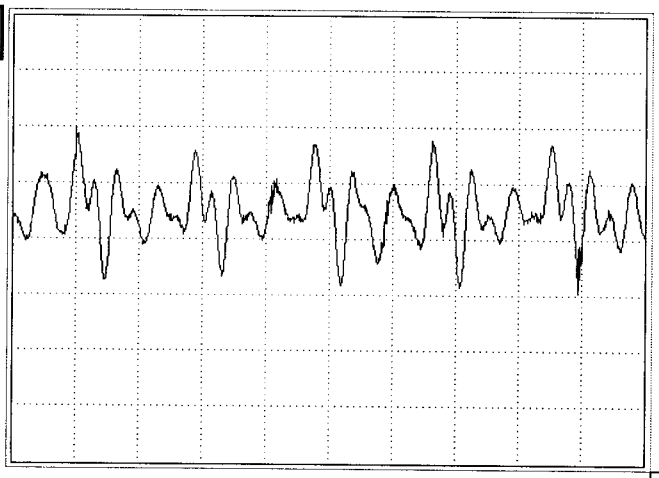
GENH60-12.5



← Vout

10mV/DIV | 2μs/DIV

GENH300-2.5



← Vout

20mV/DIV | 2μs/DIV