GEN-2U 3300W

EVALUATION DATA

DWG: IA626-53-01		
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TERMINOLOGY USED

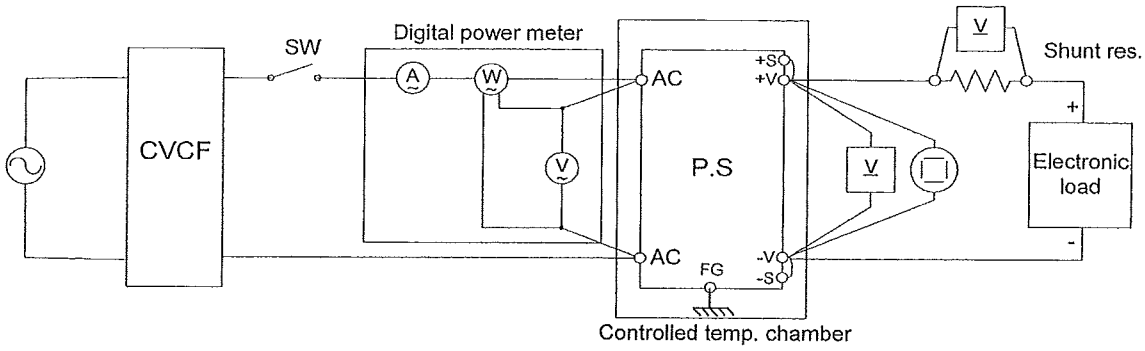
Definition

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

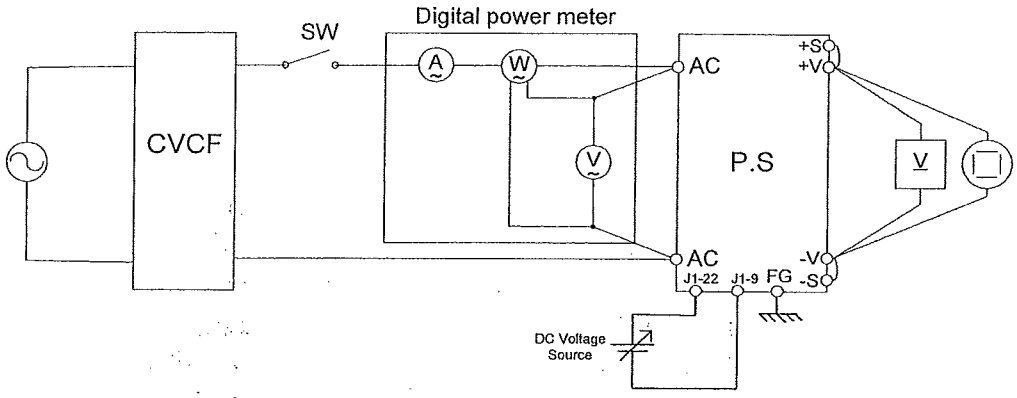
1. EVALUATION METHOD

1.1 Circuit used for determination

(1) Steady state data

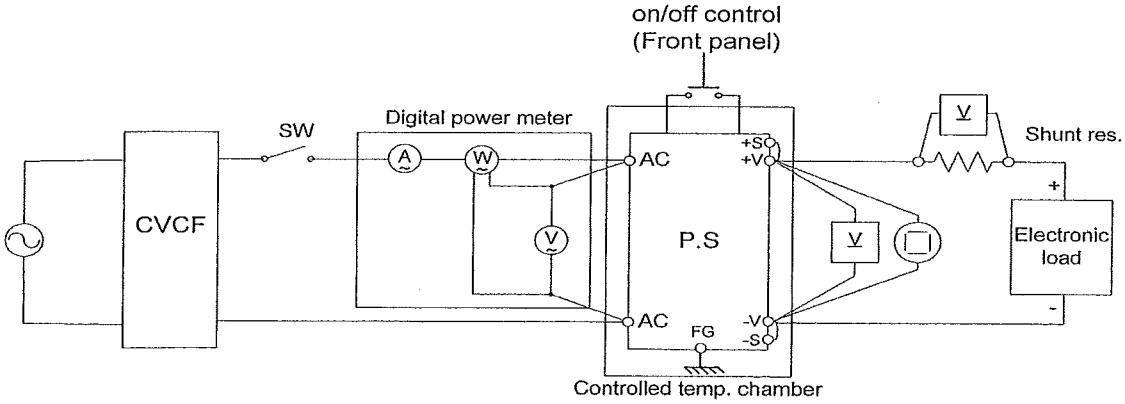


(2) Over voltage protection (OVP) characteristics

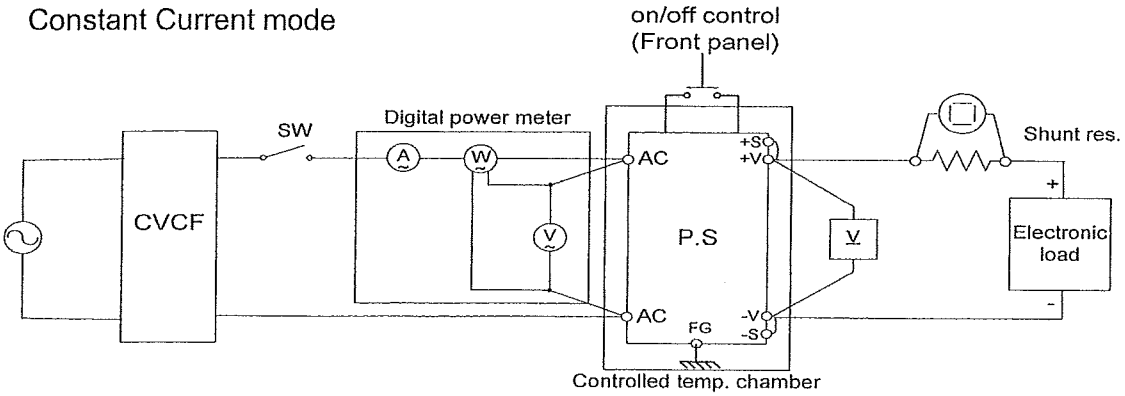


(3) Output rise/fall characteristics

Constant Voltage mode

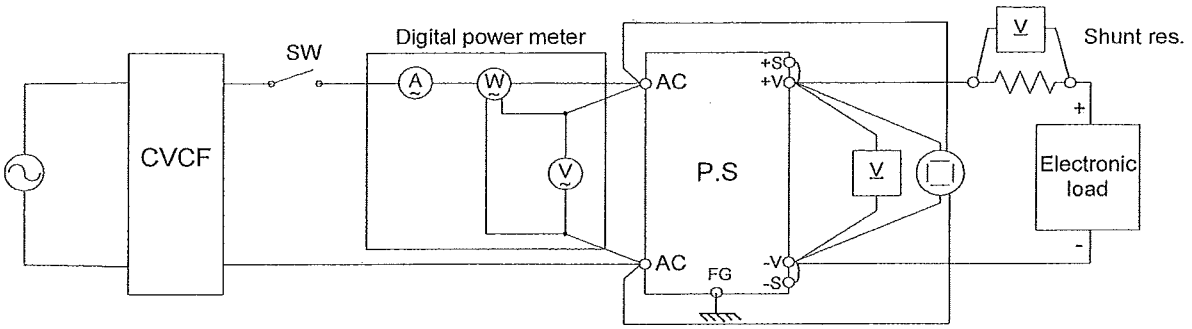


Constant Current mode

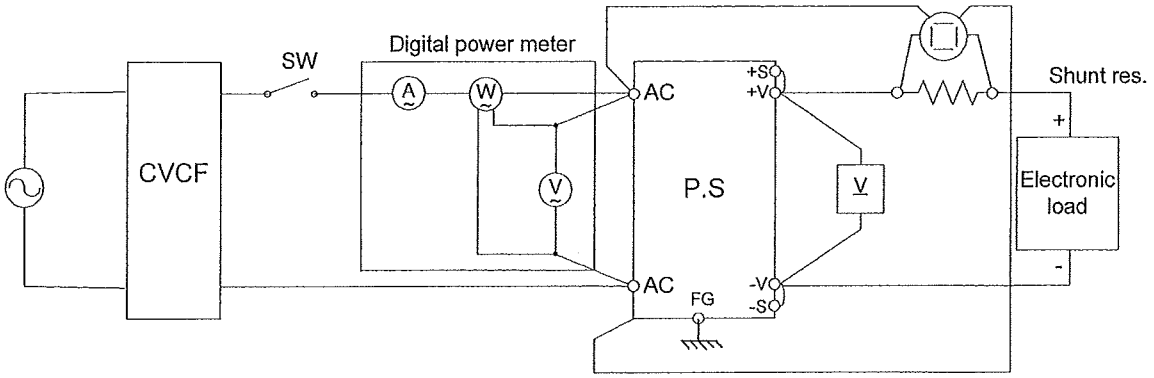


(4) Dynamic line response characteristics

Constant Voltage mode

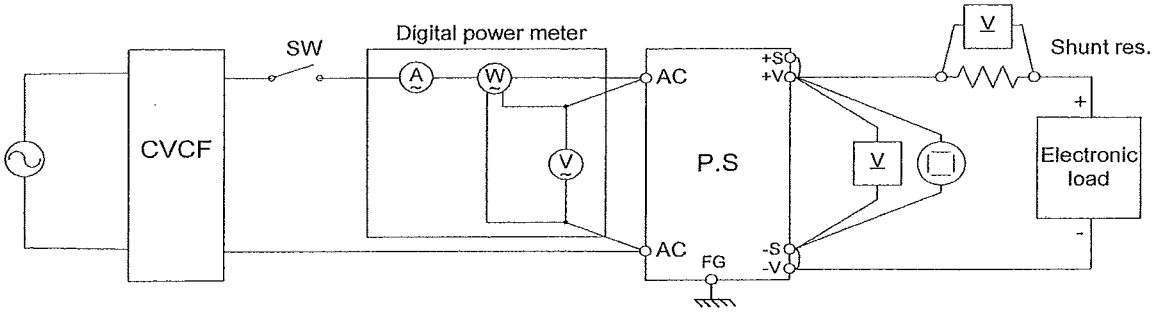


Constant Current mode



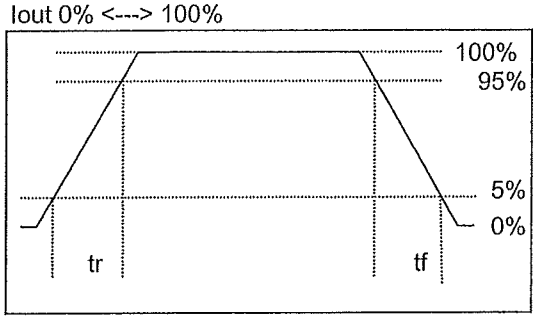
(5) Dynamic load response characteristics

Constant Voltage mode



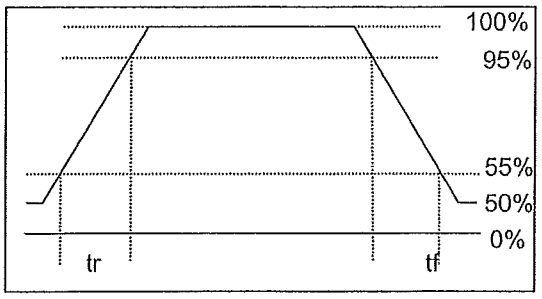
Output current waveform

Iout 0% <---> 100%



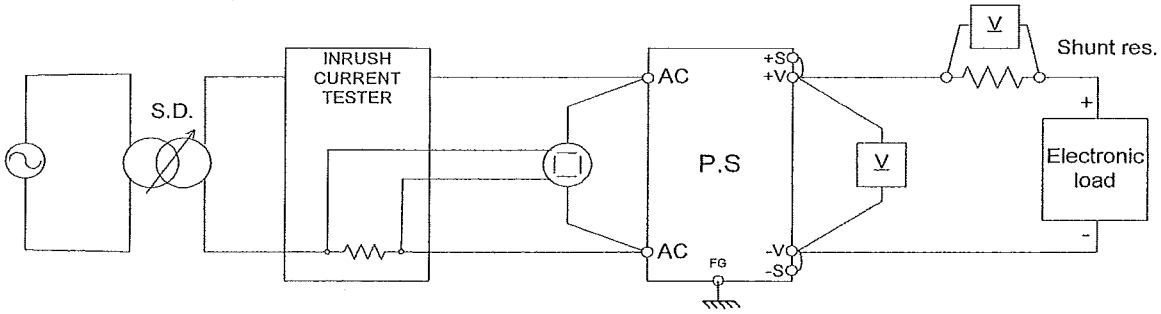
Output current waveform

Iout 50% <---> 100%

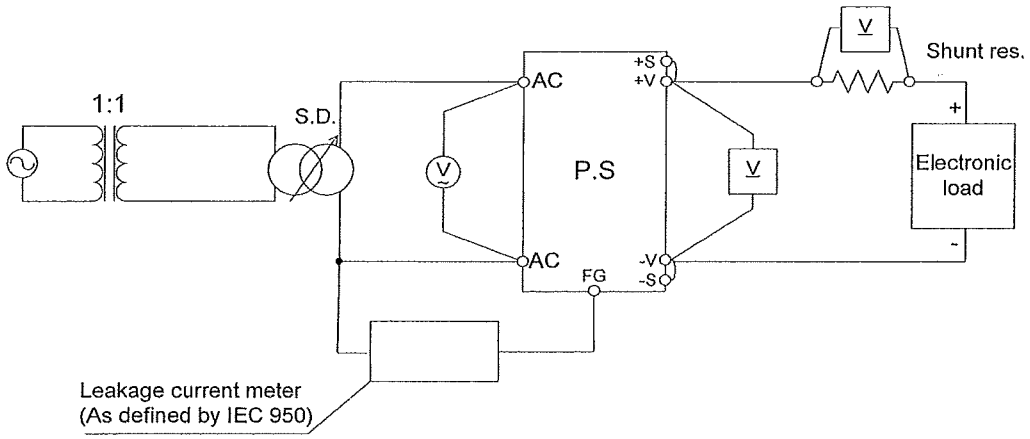


(6) Inrush current characteristics

Constant Voltage mode

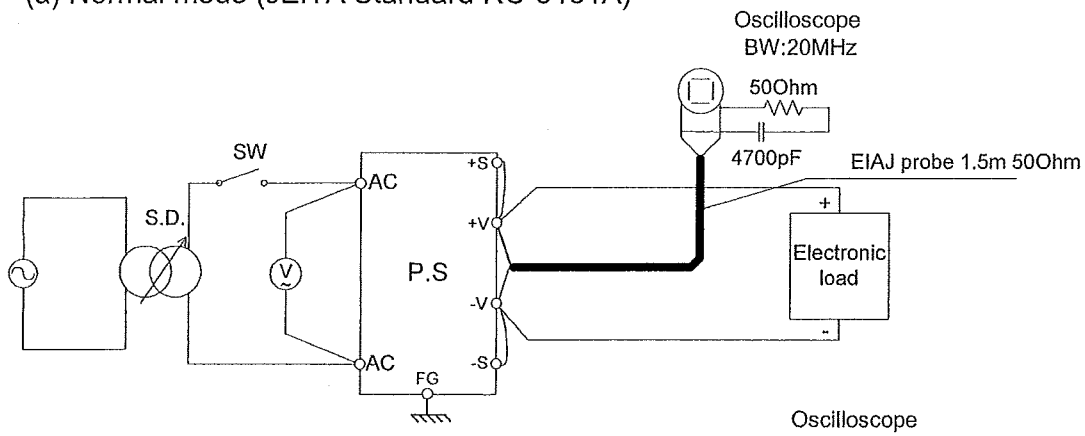


(7) Leakage current characteristics

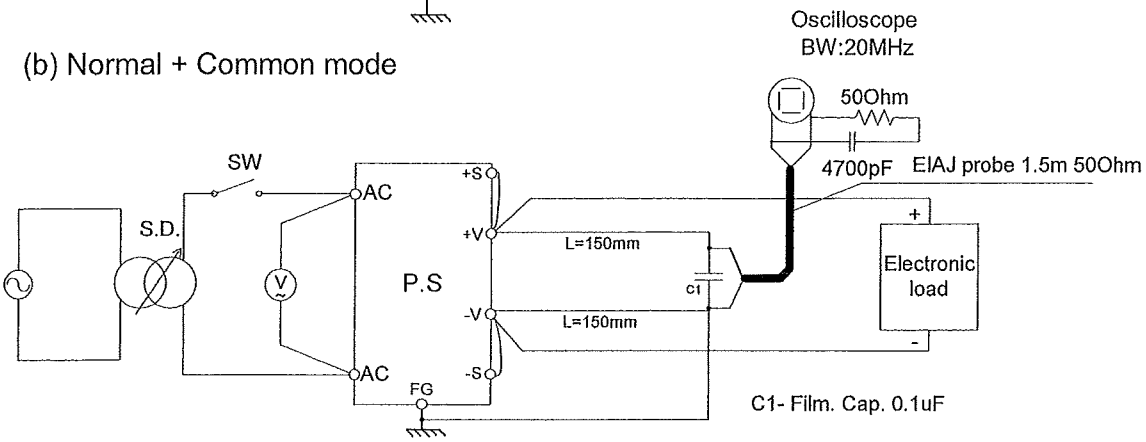


(8) Output ripple & noise waveform (8V to 300V models)

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

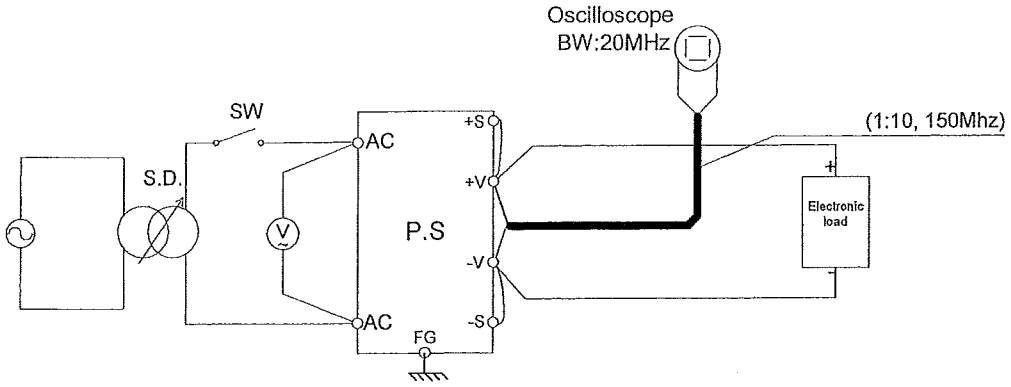


(b) Normal + Common mode

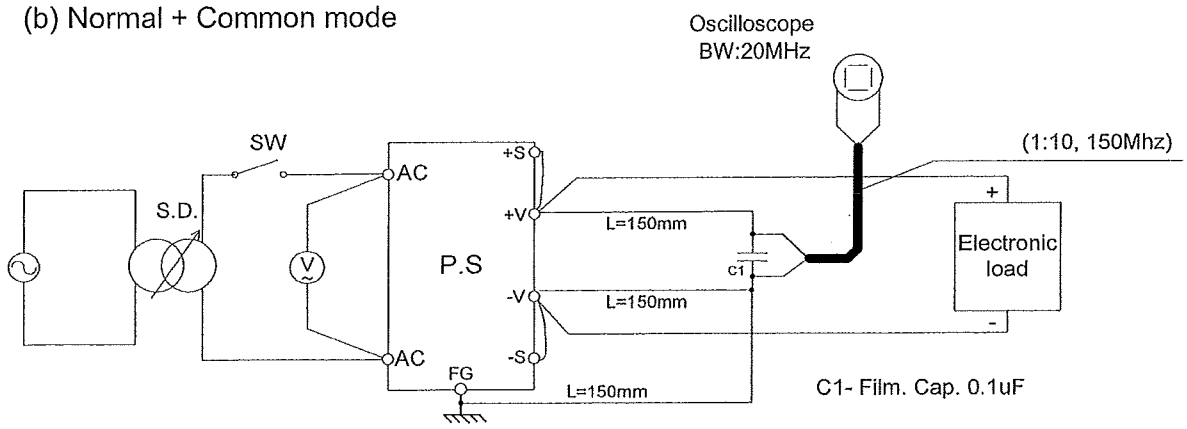


(9) Output ripple & noise waveform for 600V

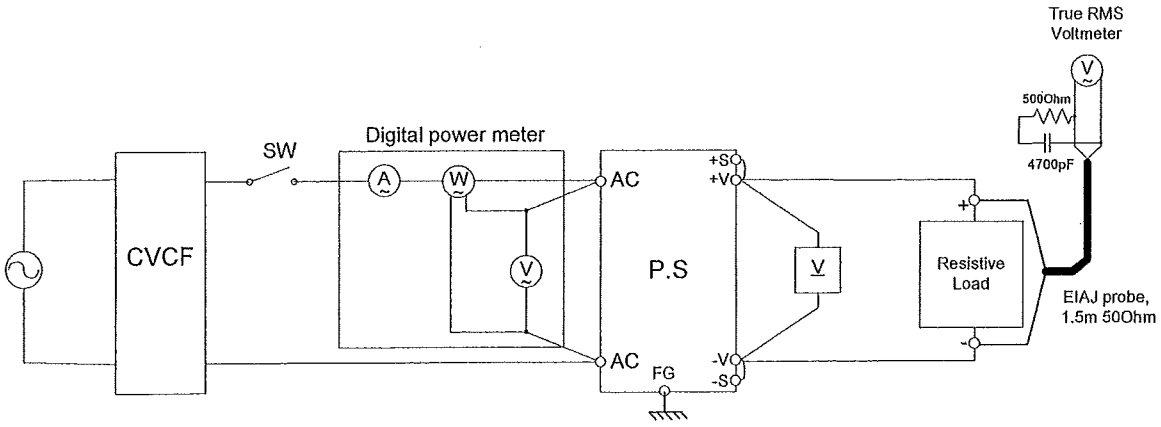
(a) Normal mode



(b) Normal + Common mode



(10) 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	AGILENT	34401A
5	Digital power meter - 3 Phase	YOKOGAWA	WT230
6	Digital power meter - 1 Phase	YOKOGAWA	WT110
7	Autotransformer - 3 Phase	METREL	HTN 450/20
8	Autotransformer - 1 Phase	METREL	HSN 260/30
9	AC Source (CVCF)	CHROMA	6590
10	Electronic load	CHROMA	63203
11	Electronic load	CHROMA	63204
12	Electronic load	H&H	ZS6060SC150
13	Electronic load	H&H	ZS7006
14	Controlled temp. chamber	THERMOTRON	SE-600-5-5
15	Inrush current tester	TAKAMISAWA	PSA-210
16	Leakage current tester	HIOKI	3155
17	Current probe	TEKTRONIX	P6021
18	RMS voltmeter	HP	3400A

(1). Regulation - Line & Load, Temperature drift

GEN8-400

Conditions: Ta = 25°C

1. Regulation - Line & Load, C.V mode 1Φ

	Vin					
Io	170VAC	200VAC	230VAC	265VAC	Line Regulation	
0%	8.0032	8.0032	8.0032	8.0032	0	0%
25%	8.0025	8.0025	8.0025	8.0025	0	0%
50%	8.0018	8.0018	8.0018	8.0018	0	0%
75%	8.0011	8.0011	8.0011	8.0011	0	0%
100%	8.0004	8.0004	8.0004	8.0004	0	0%
Load	2.8	2.8	2.8	2.8	mV	
Regulation	0.035%	0.035%	0.035%	0.035%		

2. Regulation - Line & Load, C.V mode 3Φ200

	Vin					
Io	170VAC	200VAC	230VAC	265VAC	Line Regulation	
0%	8.0007	8.0007	8.0007	8.0007	0	0%
25%	8.0000	8.0000	8.0000	8.0000	0	0%
50%	7.9994	7.9994	7.9994	7.9994	0	0%
75%	7.9987	7.9987	7.9987	7.9987	0	0%
100%	7.9981	7.9981	7.9981	7.9981	0	0%
Load	2.6	2.6	2.6	2.6	mV	
Regulation	0.032%	0.032%	0.032%	0.032%		

3. Regulation - Line & Load, C.V mode 3Φ400

	Vin					
Io	342VAC	380VAC	400VAC	460VAC	Line Regulation	
0%	8.0033	8.0033	8.0033	8.0033	0	0%
25%	8.0025	8.0025	8.0025	8.0025	0	0%
50%	8.0017	8.0017	8.0017	8.0017	0	0%
75%	8.0009	8.0009	8.0009	8.0009	0	0%
100%	8.0002	8.0002	8.0002	8.0002	0	0%
Load	3.1	3.1	3.1	3.1	mV	
Regulation	0.039%	0.039%	0.039%	0.039%		

4. Temperature drift, C.V mode

Conditions: Vin:230V 1Φ
Iout:100%

Ta	0°C	25°C	50°C	Temp. Coefficient (0°C~50°C)	
Vout	7.9979	7.9979	7.9962	1.7 mV	4 ppm/°C

(1). Regulation - Line & Load, Temperature drift

GEN60-55

Conditions: Ta = 25°C

1. Regulation - Line & Load, C.V mode 1Φ

	Vin					
Io	170VAC	200VAC	230VAC	265VAC	Line Regulation	
0%	60.002	60.002	60.002	60.002	0	0%
25%	60.002	60.002	60.002	60.002	0	0%
50%	60.002	60.002	60.002	60.002	0	0%
75%	60.001	60.001	60.001	60.001	0	0%
100%	60.001	60.001	60.001	60.001	0	0%
Load	1	1	1	1	mV	
Regulation	0.002%	0.002%	0.002%	0.002%		

2. Regulation - Line & Load, C.V mode 3Φ200

	Vin					
Io	170VAC	200VAC	230VAC	265VAC	Line Regulation	
0%	60.003	60.003	60.003	60.003	0	0%
25%	60.003	60.003	60.003	60.003	0	0%
50%	60.002	60.002	60.002	60.002	0	0%
75%	60.002	60.002	60.002	60.002	0	0%
100%	60.002	60.002	60.002	60.002	0	0%
Load	1	1	1	1	mV	
Regulation	0.002%	0.002%	0.002%	0.002%		

3. Regulation - Line & Load, C.V mode 3Φ400

	Vin					
Io	342VAC	380VAC	400VAC	460VAC	Line Regulation	
0%	60.008	60.008	60.008	60.008	0	0%
25%	60.008	60.008	60.008	60.008	0	0%
50%	60.007	60.007	60.007	60.007	0	0%
75%	60.007	60.007	60.007	60.007	0	0%
100%	60.006	60.006	60.006	60.006	0	0%
Load	2	2	2	2	mV	
Regulation	0.003%	0.003%	0.003%	0.003%		

4. Temperature drift, C.V mode

Conditions: Vin:230V 1Φ
Iout:100%

Ta	0°C	25°C	50°C	Temp. Coefficient (0°C~50°C)	
Vout	60.0073	60.0022	60.0019	5.4 mV	2 ppm/°C

(1). Regulation - Line & Load, Temperature drift

GEN150-22

Conditions: Ta = 25°C

1. Regulation - Line & Load, C.V mode 1Φ

	Vin					
Io	170VAC	200VAC	230VAC	265VAC	Line Regulation	
0%	149.997	149.997	149.997	149.997	0	0%
25%	149.996	149.996	149.996	149.996	0	0%
50%	149.995	149.995	149.995	149.995	0	0%
75%	149.995	149.995	149.995	149.995	0	0%
100%	149.994	149.994	149.994	149.994	0	0%
Load	3	3	3	3	mV	
Regulation	0.002%	0.002%	0.002%	0.002%		

2. Regulation - Line & Load, C.V mode 3Φ200

	Vin					
Io	170VAC	200VAC	230VAC	265VAC	Line Regulation	
0%	150.001	150.001	150.001	150.001	0	0%
25%	150.001	150.001	150.001	150.001	0	0%
50%	150.001	150.001	150.001	150.001	0	0%
75%	150.002	150.002	150.002	150.002	0	0%
100%	150.001	150.001	150.001	150.001	0	0%
Load	1	1	1	1	mV	
Regulation	0.001%	0.001%	0.001%	0.001%		

3. Regulation - Line & Load, C.V mode 3Φ400

	Vin					
Io	342VAC	380VAC	400VAC	460VAC	Line Regulation	
0%	150.251	150.251	150.251	150.251	0	0%
25%	150.252	150.252	150.252	150.252	0	0%
50%	150.252	150.252	150.252	150.252	0	0%
75%	150.253	150.253	150.253	150.253	0	0%
100%	150.254	150.254	150.254	150.254	0	0%
Load	3	3	3	3	mV	
Regulation	0.002%	0.002%	0.002%	0.002%		

4. Temperature drift, C.V mode

Conditions: Vin:230V 1Φ
Iout:100%

Ta	0°C	25°C	50°C	Temp. Coefficient (0°C~50°C)	
Vout	150.038	150.015	150.009	29 mV	4 ppm/°C

2. CHARACTERISTICS

2.1 Steady state data

(1). Regulation - Line & Load, Temperature drift

GEN600-5.5

Conditions: Ta = 25°C

0

1. Regulation - Line & Load, C.V mode 1Φ

	Vin					
Io	170VAC	200VAC	230VAC	265VAC	Line Regulation	
0%	600.241	600.241	600.241	600.241	0	0%
25%	600.236	600.236	600.236	600.236	0	0%
50%	600.235	600.235	600.235	600.235	0	0%
75%	600.234	600.234	600.234	600.234	0	0%
100%	600.235	600.235	600.235	600.235	0	0%
Load	7	7	7	7	mV	
Regulation	0.001%	0.001%	0.001%	0.001%		

2. Regulation - Line & Load, C.V mode 3Φ200

	Vin					
Io	170VAC	200VAC	230VAC	265VAC	Line Regulation	
0%	600.679	600.679	600.679	600.679	0	0%
25%	600.675	600.675	600.675	600.675	0	0%
50%	600.672	600.672	600.672	600.672	0	0%
75%	600.669	600.669	600.669	600.669	0	0%
100%	600.665	600.665	600.665	600.665	0	0%
Load	14	14	14	14	mV	
Regulation	0.002%	0.002%	0.002%	0.002%		

3. Regulation - Line & Load, C.V mode 3Φ400

	Vin					
Io	342VAC	380VAC	400VAC	460VAC	Line Regulation	
0%	600.040	600.040	600.040	600.040	0	0%
25%	600.040	600.040	600.040	600.040	0	0%
50%	600.030	600.030	600.030	600.030	0	0%
75%	600.030	600.030	600.030	600.030	0	0%
100%	600.030	600.030	600.030	600.030	0	0%
Load	10	10	10	10	mV	
Regulation	0.002%	0.002%	0.002%	0.002%		

4. Temperature drift, C.V mode

Conditions: Vin:230V 1Φ
Iout:100%

Ta	0°C	25°C	50°C	Temp. Coefficient (0°C~50°C)	
Vout	600.054	600.108	600.300	246 mV	8 ppm/°C

(1). Regulation - Line & Load, Temperature drift

GEN8-400

Conditions: Ta = 25°C

1. Regulation - Line & Load, C.C mode 1Φ (*)

	Vin					
Io	170VAC	200VAC	230VAC	265VAC	Line Regulation	
0%	398.958	398.958	398.958	398.958	0	0%
25%	398.958	398.958	398.958	398.958	0	0%
50%	398.958	398.958	398.958	398.958	0	0%
75%	398.958	398.958	398.958	398.958	0	0%
100%	398.958	398.958	398.958	398.958	0	0%
Load	0	0	0	0	mA	
Regulation	0.000%	0.000%	0.000%	0.000%		

2. Regulation - Line & Load, C.C mode 3Φ200 (*)

	Vin					
Io	170VAC	200VAC	230VAC	265VAC	Line Regulation	
0%	395.626	395.626	395.626	395.626	0	0%
25%	395.633	395.633	395.633	395.633	0	0%
50%	395.633	395.633	395.633	395.633	0	0%
75%	395.633	395.633	395.633	395.633	0	0%
100%	395.633	395.633	395.633	395.633	0	0%
Load	7	7	7	7	mA	
Regulation	0.002%	0.002%	0.002%	0.002%		

3. Regulation - Line & Load, C.C mode 3Φ400 (*)

	Vin					
Io	342VAC	380VAC	400VAC	460VAC	Line Regulation	
0%	399.114	399.114	399.114	399.114	0	0%
25%	399.105	399.105	399.105	399.105	0	0%
50%	399.105	399.105	399.105	399.105	0	0%
75%	399.105	399.105	399.105	399.105	0	0%
100%	399.105	399.105	399.105	399.105	0	0%
Load	9	9	9	9	mA	
Regulation	0.002%	0.002%	0.002%	0.002%		

4. Temperature drift, C.C mode

Conditions: Vin:230V 1Φ
Iout:100%

Ta	0°C	25°C	50°C	Temp. Coefficient (0°C~50°C)	
Vout	400.582	398.951	397.579	3003 mA	150 ppm/°C

Notes:
Not including load regulation thermal drift effect.

(1). Regulation - Line & Load, Temperature drift

GEN60-55

Conditions: Ta = 25°C

1. Regulation - Line & Load, C.C mode 1Φ (*)

	Vin					
Io	170VAC	200VAC	230VAC	265VAC	Line Regulation	
0%	54.993	54.993	54.993	54.993	0	0%
25%	54.992	54.992	54.992	54.992	0	0%
50%	54.992	54.992	54.992	54.992	0	0%
75%	54.992	54.992	54.992	54.992	0	0%
100%	54.992	54.992	54.992	54.992	0	0%
Load	1	1	1	1	mA	
Regulation	0.002%	0.002%	0.002%	0.002%		

2. Regulation - Line & Load, C.C mode 3Φ200 (*)

	Vin					
Io	170VAC	200VAC	230VAC	265VAC	Line Regulation	
0%	55.013	55.013	55.013	55.013	0	0%
25%	55.011	55.011	55.011	55.011	0	0%
50%	55.010	55.010	55.010	55.010	0	0%
75%	55.009	55.009	55.009	55.009	0	0%
100%	55.009	55.009	55.009	55.009	0	0%
Load	4	4	4	4	mA	
Regulation	0.007%	0.007%	0.007%	0.007%		

3. Regulation - Line & Load, C.C mode 3Φ400 (*)

	Vin					
Io	342VAC	380VAC	400VAC	460VAC	Line Regulation	
0%	54.973	54.973	54.973	54.973	0	0%
25%	54.973	54.973	54.973	54.973	0	0%
50%	54.972	54.972	54.972	54.972	0	0%
75%	54.972	54.972	54.972	54.972	0	0%
100%	54.971	54.971	54.971	54.971	0	0%
Load	2	2	2	2	mA	
Regulation	0.004%	0.004%	0.004%	0.004%		

4. Temperature drift, C.C mode

Conditions: Vin:230V 1Φ
Iout:100%

Ta	0°C	25°C	50°C	Temp. Coefficient (0°C~50°C)	
Vout	55.205	54.996	54.806	399 mA	145 ppm/°C

Notes:
Not including load regulation thermal drift effect.

(1). Regulation - Line & Load, Temperature drift

GEN150-22

Conditions: Ta = 25°C

1. Regulation - Line & Load, C.C mode 1Φ (*)

	Vin					
Io	170VAC	200VAC	230VAC	265VAC	Line Regulation	
0%	22.064	22.064	22.064	22.064	0	0%
25%	22.063	22.063	22.063	22.063	0	0%
50%	22.062	22.062	22.062	22.062	0	0%
75%	22.062	22.062	22.062	22.062	0	0%
100%	22.062	22.062	22.062	22.062	0	0%
Load	2	2	2	2	mA	
Regulation	0.009%	0.009%	0.009%	0.009%		

2. Regulation - Line & Load, C.C mode 3Φ200 (*)

	Vin					
Io	170VAC	200VAC	230VAC	265VAC	Line Regulation	
0%	21.960	21.960	21.960	21.960	0	0%
25%	21.959	21.959	21.959	21.959	0	0%
50%	21.959	21.959	21.959	21.959	0	0%
75%	21.958	21.958	21.958	21.958	0	0%
100%	21.958	21.958	21.958	21.958	0	0%
Load	2	2	2	2	mA	
Regulation	0.009%	0.009%	0.009%	0.009%		

3. Regulation - Line & Load, C.C mode 3Φ400 (*)

	Vin					
Io	342VAC	380VAC	400VAC	460VAC	Line Regulation	
0%	22.020	22.020	22.020	22.020	0	0%
25%	22.020	22.020	22.020	22.020	0	0%
50%	22.020	22.020	22.020	22.020	0	0%
75%	22.019	22.019	22.019	22.019	0	0%
100%	22.019	22.019	22.019	22.019	0	0%
Load	1	1	1	1	mA	
Regulation	0.005%	0.005%	0.005%	0.005%		

4. Temperature drift, C.C mode

Conditions: Vin:230V 1Φ
Iout:100%

Ta	0°C	25°C	50°C	Temp. Coefficient (0°C~50°C)	
Vout	21.960	21.953	21.945	15 mA	14 ppm/°C

Notes:
Not including load regulation thermal drift effect.

(1). Regulation - Line & Load, Temperature drift

GEN600-5.5

Conditions: Ta = 25°C

1. Regulation - Line & Load, C.C mode 1Φ (*)

	Vin					
Io	170VAC	200VAC	230VAC	265VAC	Line Regulation	
0%	5.5064	5.5064	5.5064	5.5064	0	0%
25%	5.5059	5.5059	5.5059	5.5059	0	0%
50%	5.5054	5.5054	5.5054	5.5054	0	0%
75%	5.5054	5.5054	5.5054	5.5054	0	0%
100%	5.5043	5.5043	5.5043	5.5043	0	0%
Load	2.1	2.1	2.1	2.1	mA	
Regulation	0.038%	0.038%	0.038%	0.038%		

2. Regulation - Line & Load, C.C mode 3Φ200 (*)

	Vin					
Io	170VAC	200VAC	230VAC	265VAC	Line Regulation	
0%	5.5526	5.5526	5.5526	5.5526	0	0%
25%	5.5524	5.5524	5.5524	5.5524	0	0%
50%	5.5517	5.5517	5.5517	5.5517	0	0%
75%	5.5513	5.5513	5.5513	5.5513	0	0%
100%	5.5510	5.5510	5.5510	5.5510	0	0%
Load	1.6	1.6	1.6	1.6	mA	
Regulation	0.028%	0.028%	0.028%	0.028%		

3. Regulation - Line & Load, C.C mode 3Φ400 (*)

	Vin					
Io	342VAC	380VAC	400VAC	460VAC	Line Regulation	
0%	5.5026	5.5026	5.5026	5.5026	0	0%
25%	5.5017	5.5017	5.5017	5.5017	0	0%
50%	5.5013	5.5013	5.5013	5.5013	0	0%
75%	5.5007	5.5007	5.5007	5.5007	0	0%
100%	5.5003	5.5003	5.5003	5.5003	0	0%
Load	2.3	2.3	2.3	2.3	mA	
Regulation	0.042%	0.042%	0.042%	0.042%		

4. Temperature drift, C.C mode

Conditions: Vin:230V 1Φ
Iout:100%

Ta	0°C	25°C	50°C	Temp. Coefficient (0°C~50°C)	
Vout	5.5016	5.4990	5.4984	3.2 mA	12 ppm/°C

Notes:
Not including load regulation thermal drift effect.

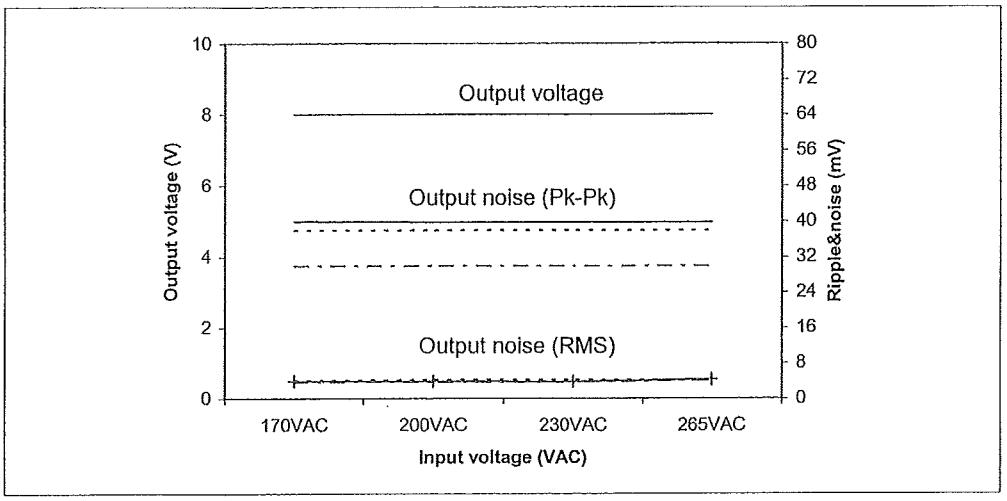
(2). Output voltage and ripple voltage v.s input voltage

C.V mode

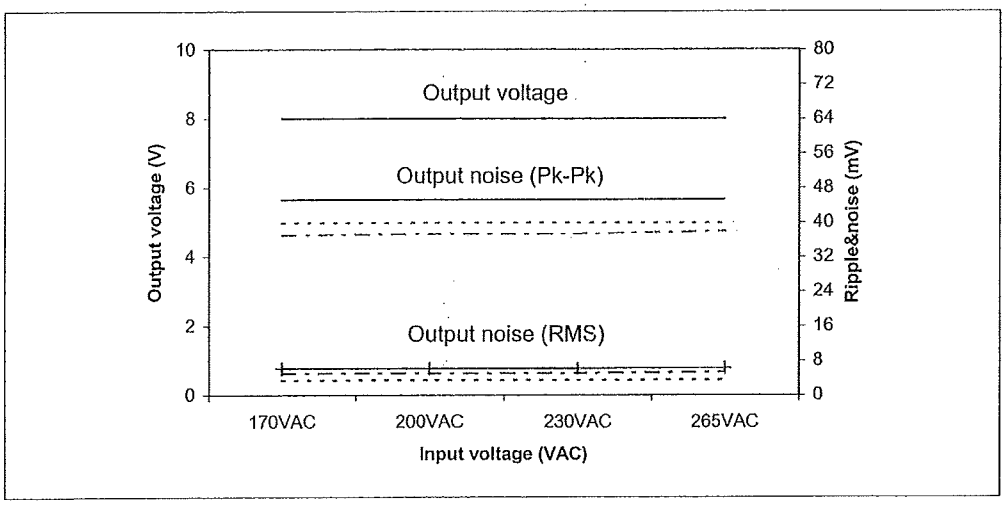
Conditions: Iout:100%

Ta: 0°C
25°C
50°C

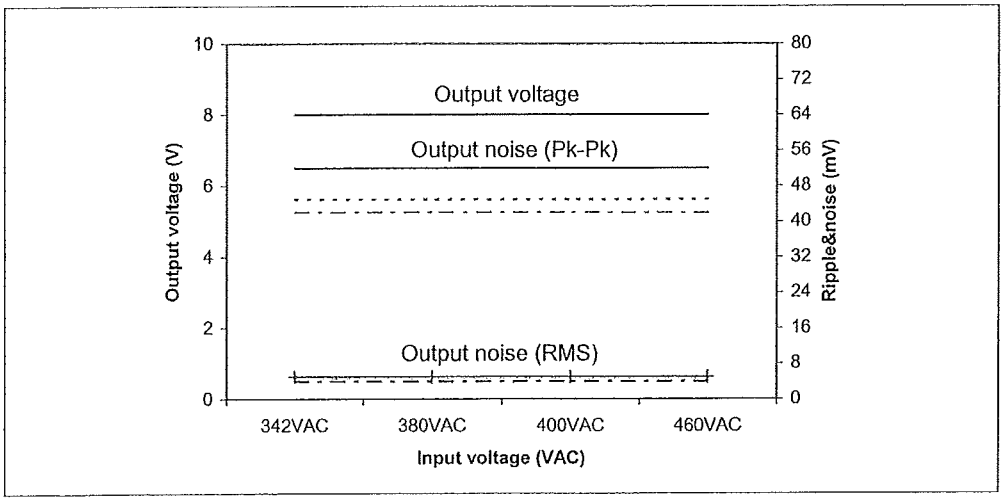
GEN8-400 1Φ



GEN8-400 3Φ 200



GEN8-400 3Φ 400



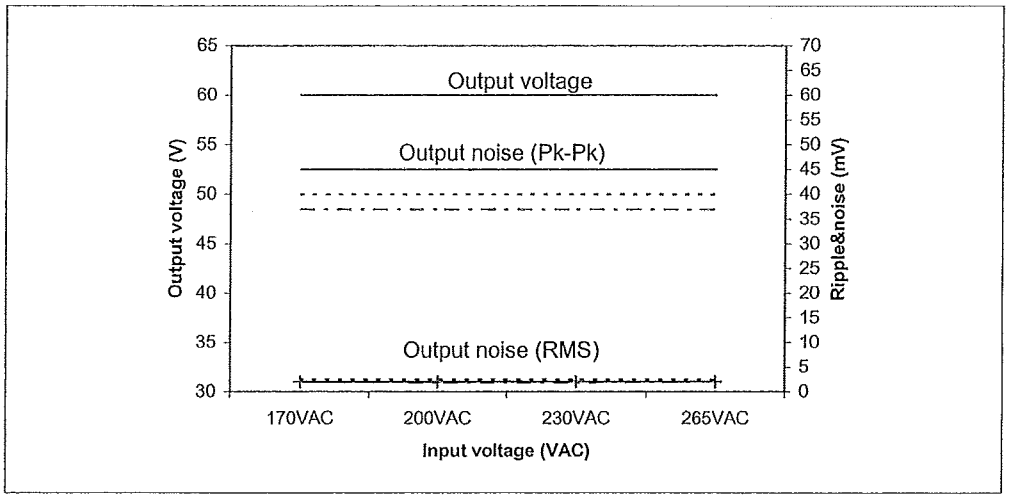
(2). Output voltage and ripple voltage v.s input voltage

C.V mode

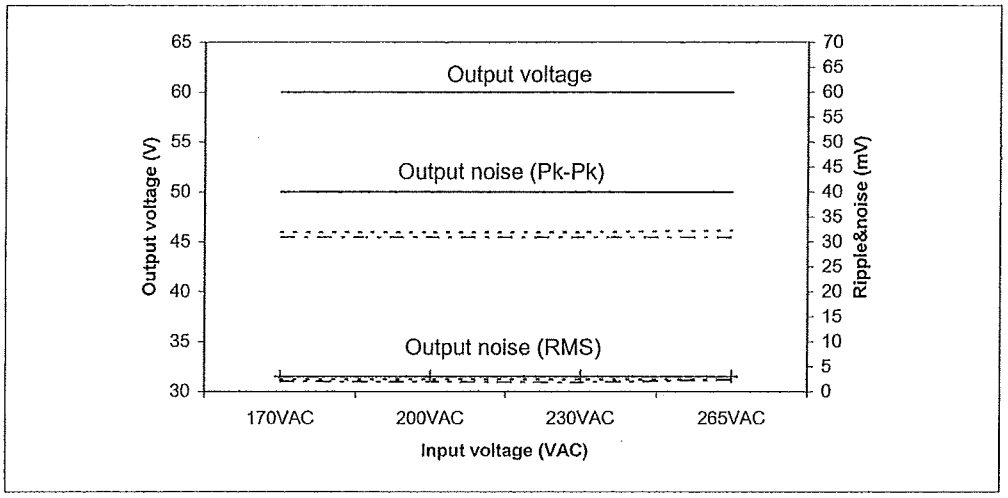
Conditions: Iout:100%

Ta: 0°C
25°C
50°C

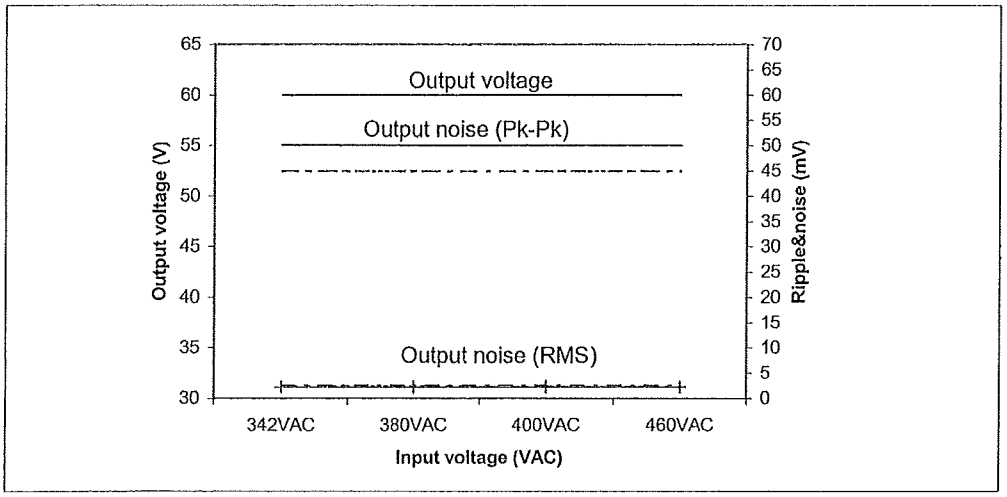
GEN60-55 1Φ



GEN60-55 3Φ 200



GEN60-55 3Φ 400



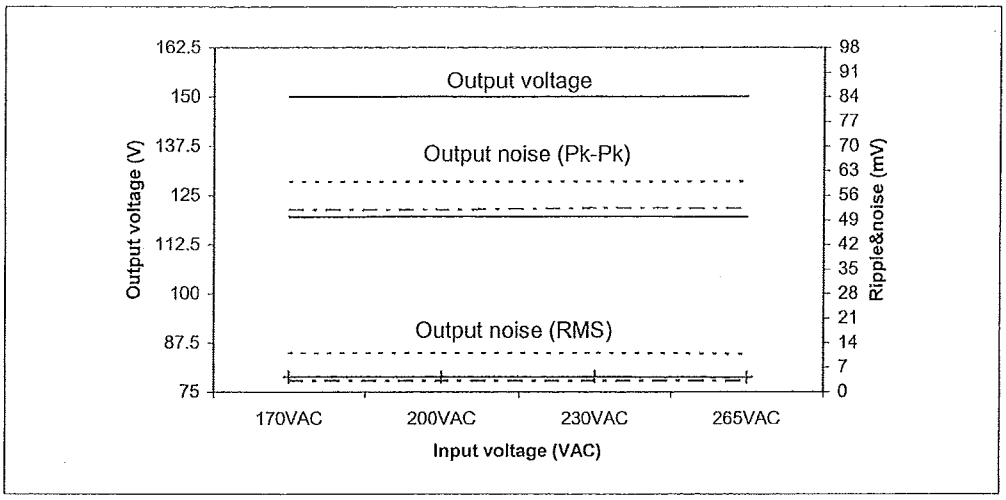
(2). Output voltage and ripple voltage v.s input voltage

C.V mode

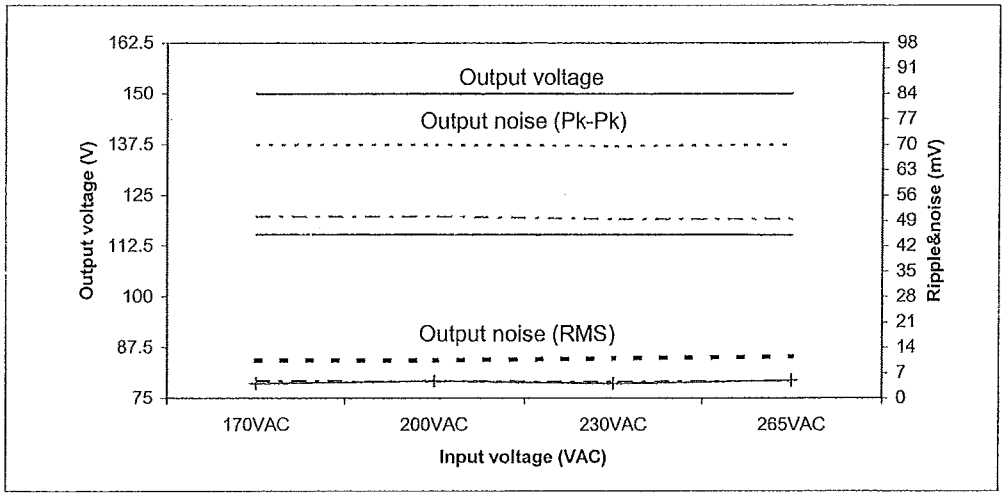
Conditions: Iout:100%

Ta: 0°C
25°C
50°C

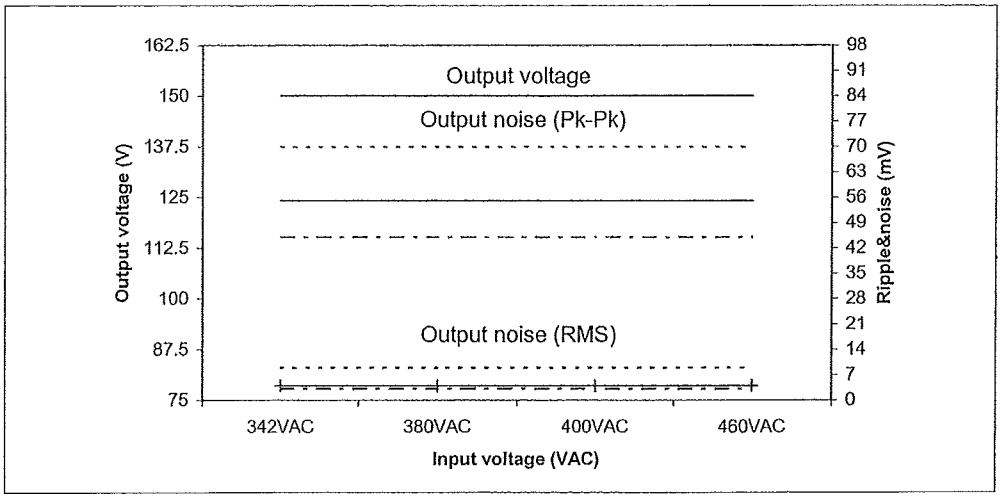
GEN150-22 1Φ



GEN150-22 3Φ 200



GEN150-22 3Φ 400



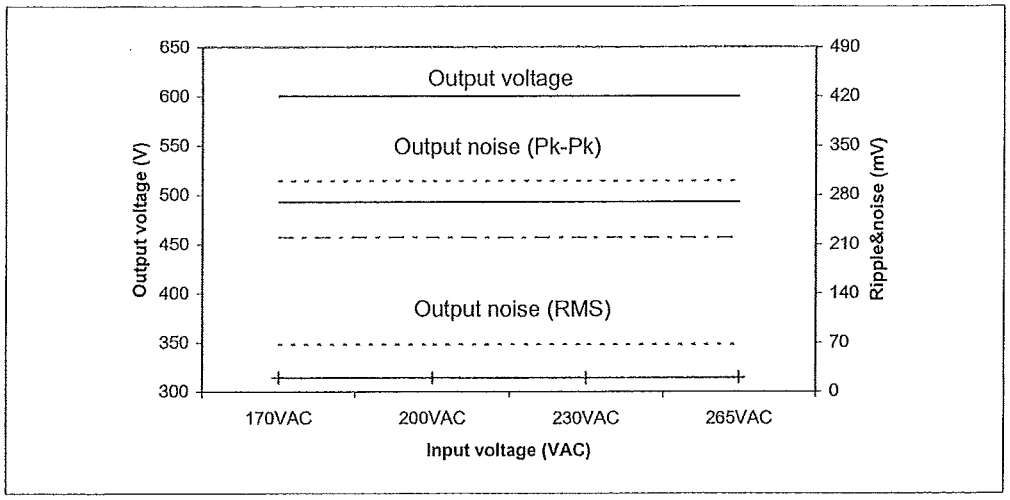
(2). Output voltage and ripple voltage v.s input voltage

C.V mode

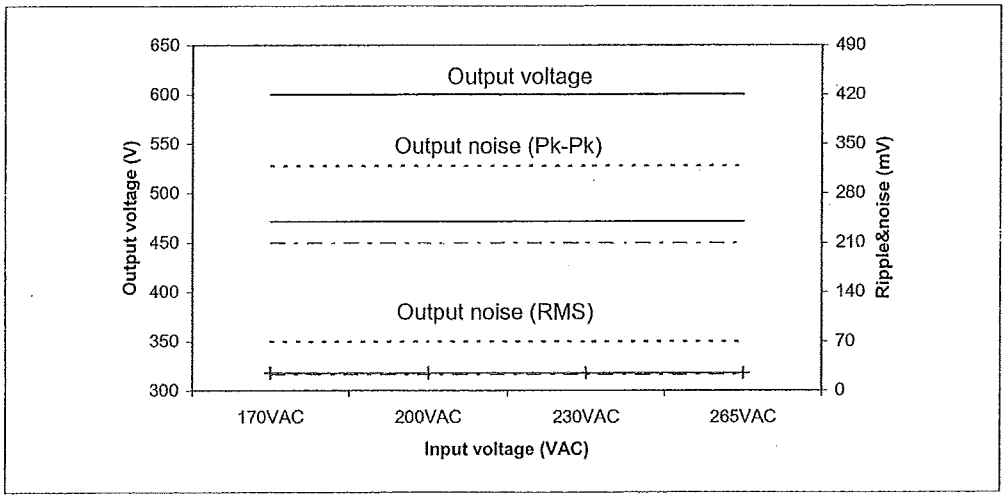
Conditions: Iout:100%

Ta: 0˚C
25˚C
50˚C

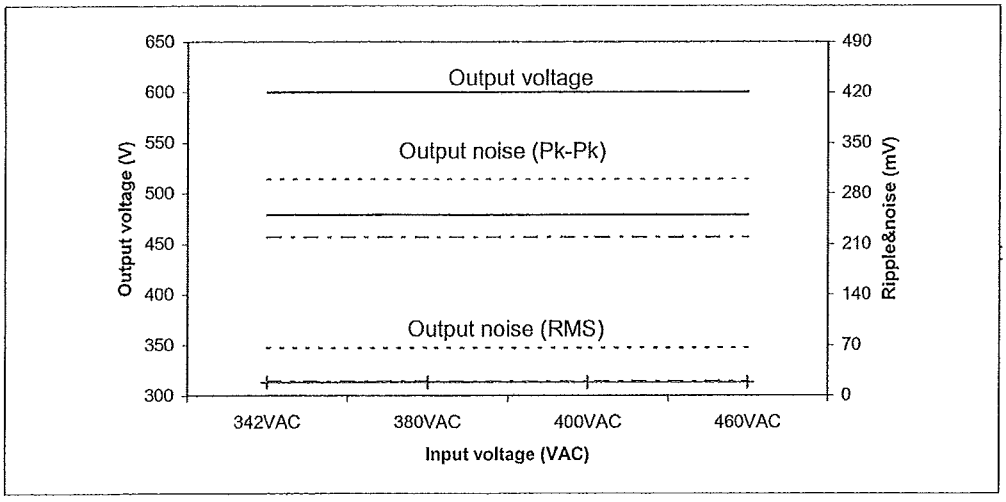
GEN600-5.5 1Φ



GEN600-5.5 3Φ 200



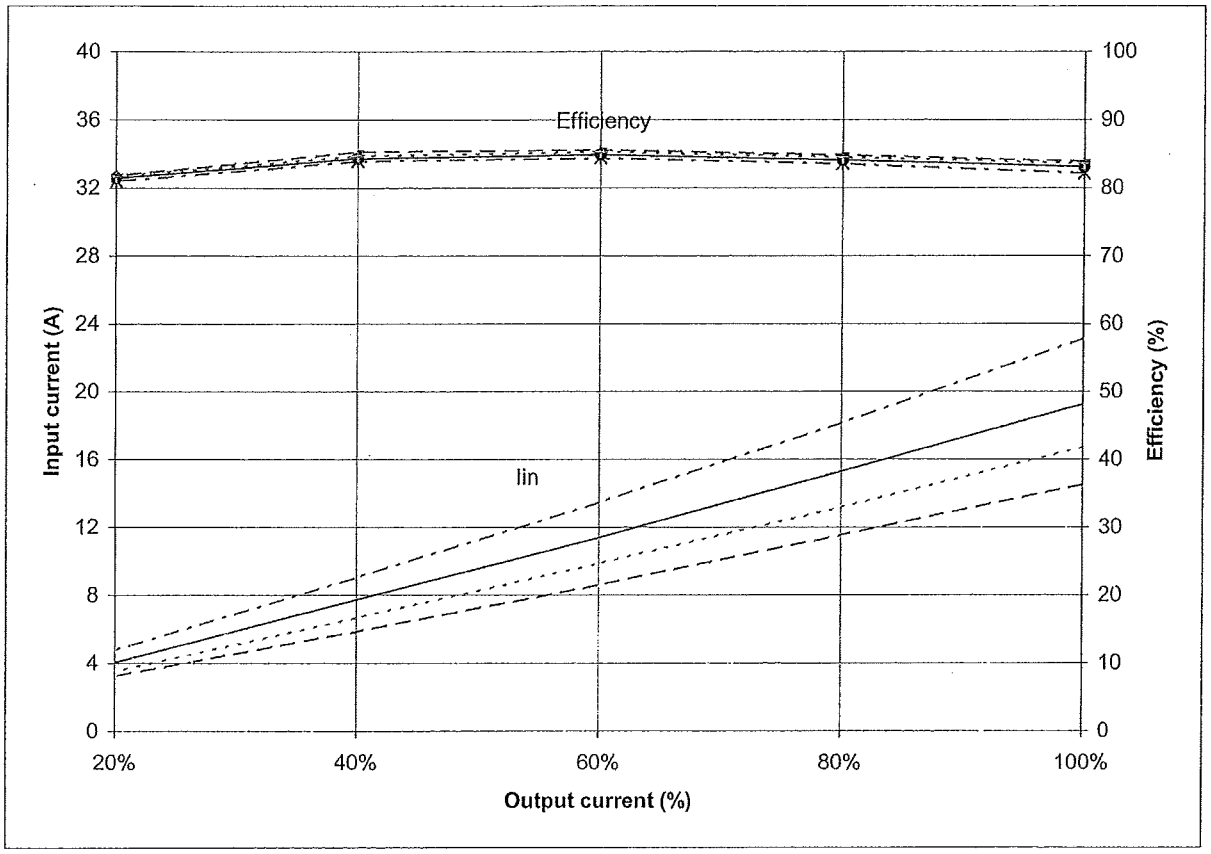
GEN600-5.5 3Φ 400



(3). Efficiency and Input current vs. Output current

Conditions:
Vin: 170 VAC
200 VAC
230 VAC
265 VAC
Vout:100%
Ta: 25˚C

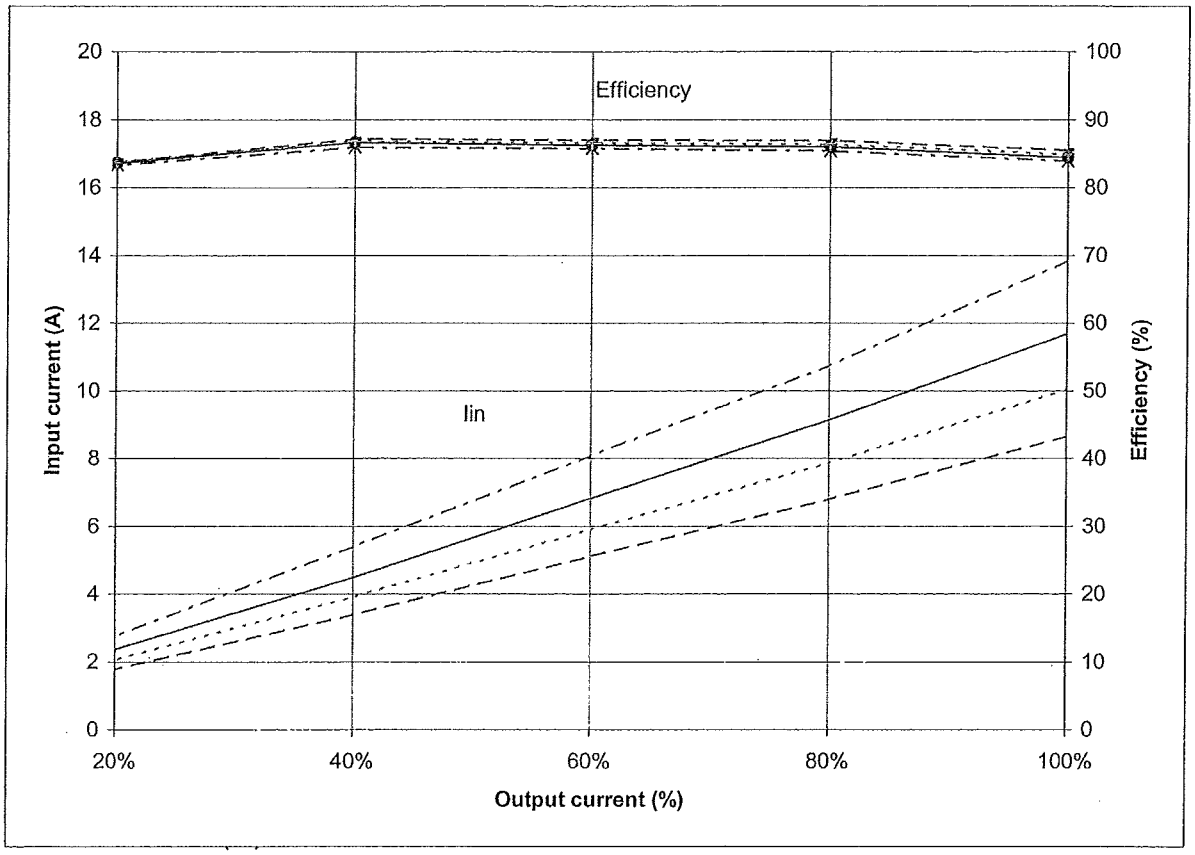
GEN8-400 1Φ



(3). Efficiency and Input current vs. Output current

Conditions:
Vin: 170 VAC
200 VAC
230 VAC
265 VAC
Vout:100%
Ta: 25˚C

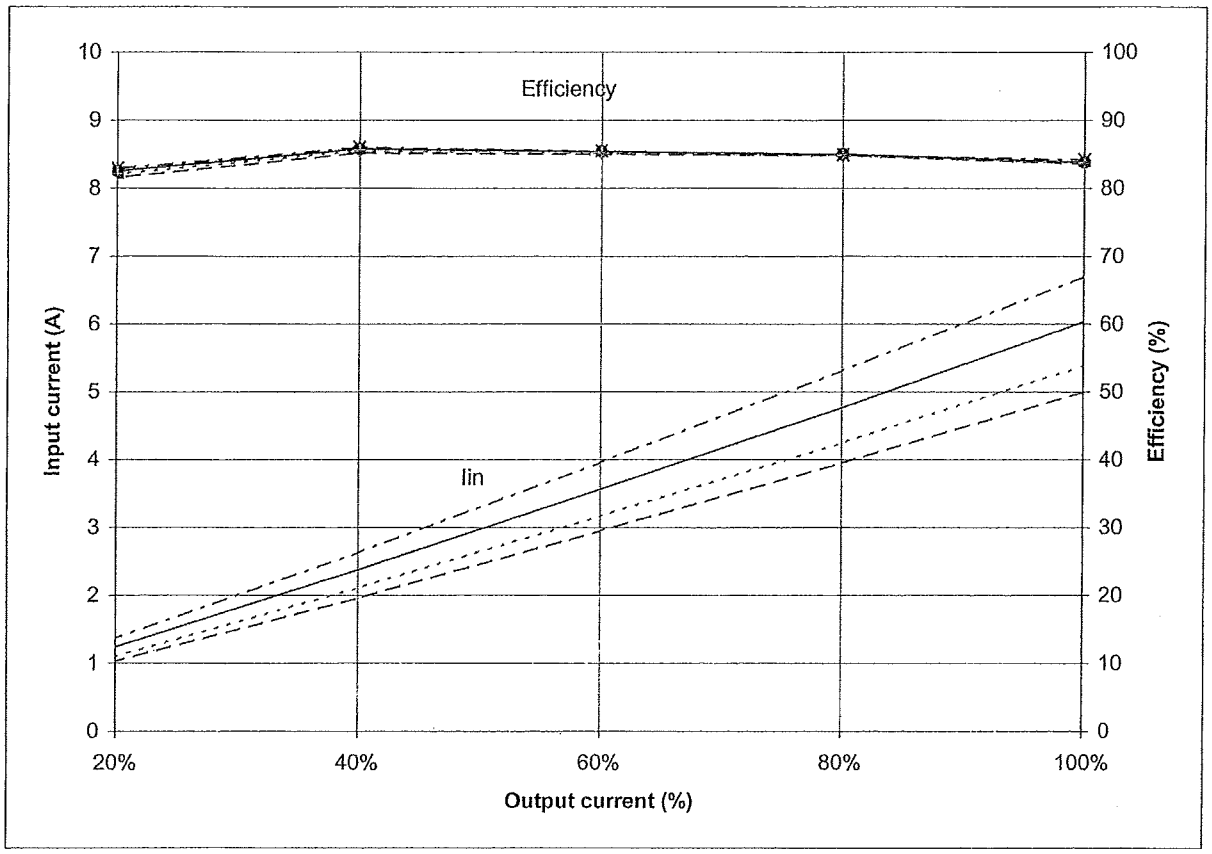
GEN8-400 3Φ 200



(3). Efficiency and Input current vs. Output current

Conditions:
Vin: 342 VAC
380 VAC
400 VAC
460 VAC
Vout:100%
Ta: 25˚C

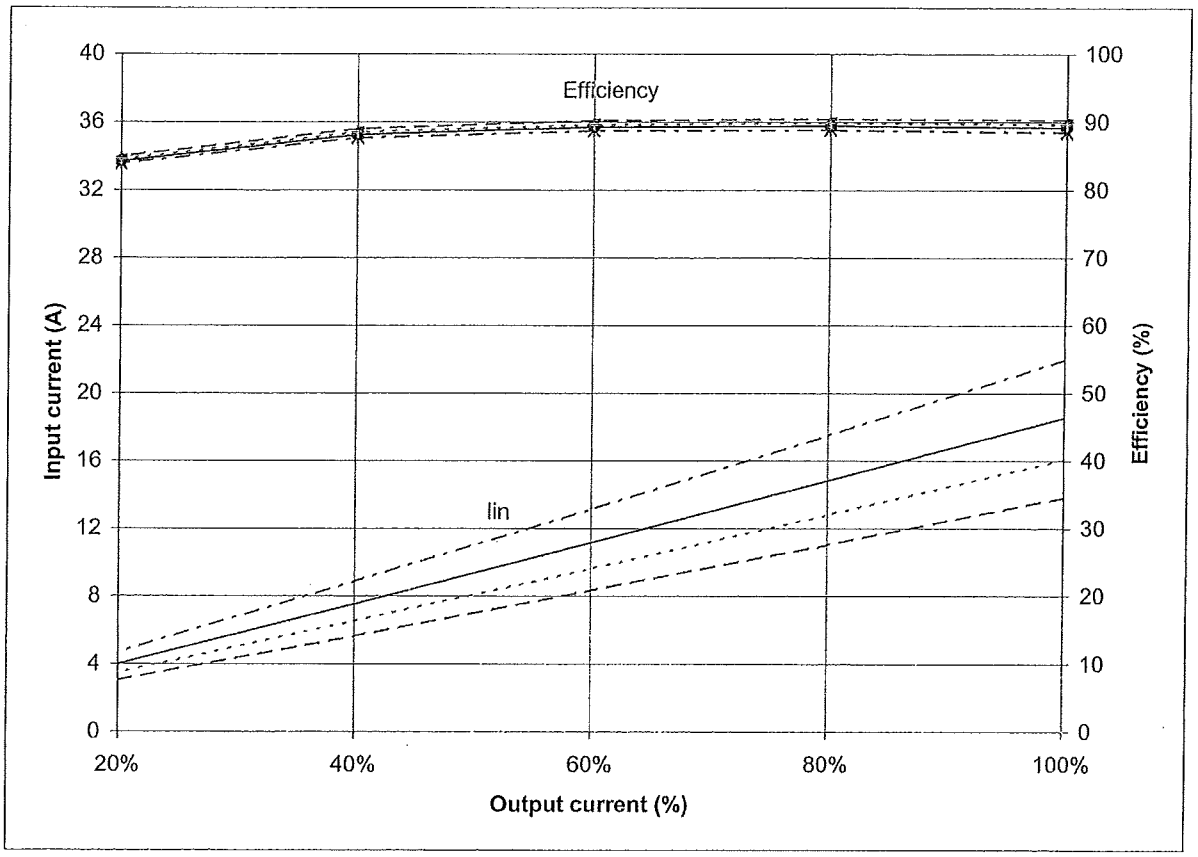
GEN8-400 3Φ 400



(3). Efficiency and Input current vs. Output current

Conditions:
Vin: 170 VAC
200 VAC
230 VAC
265 VAC
Vout:100%
Ta: 25˚C

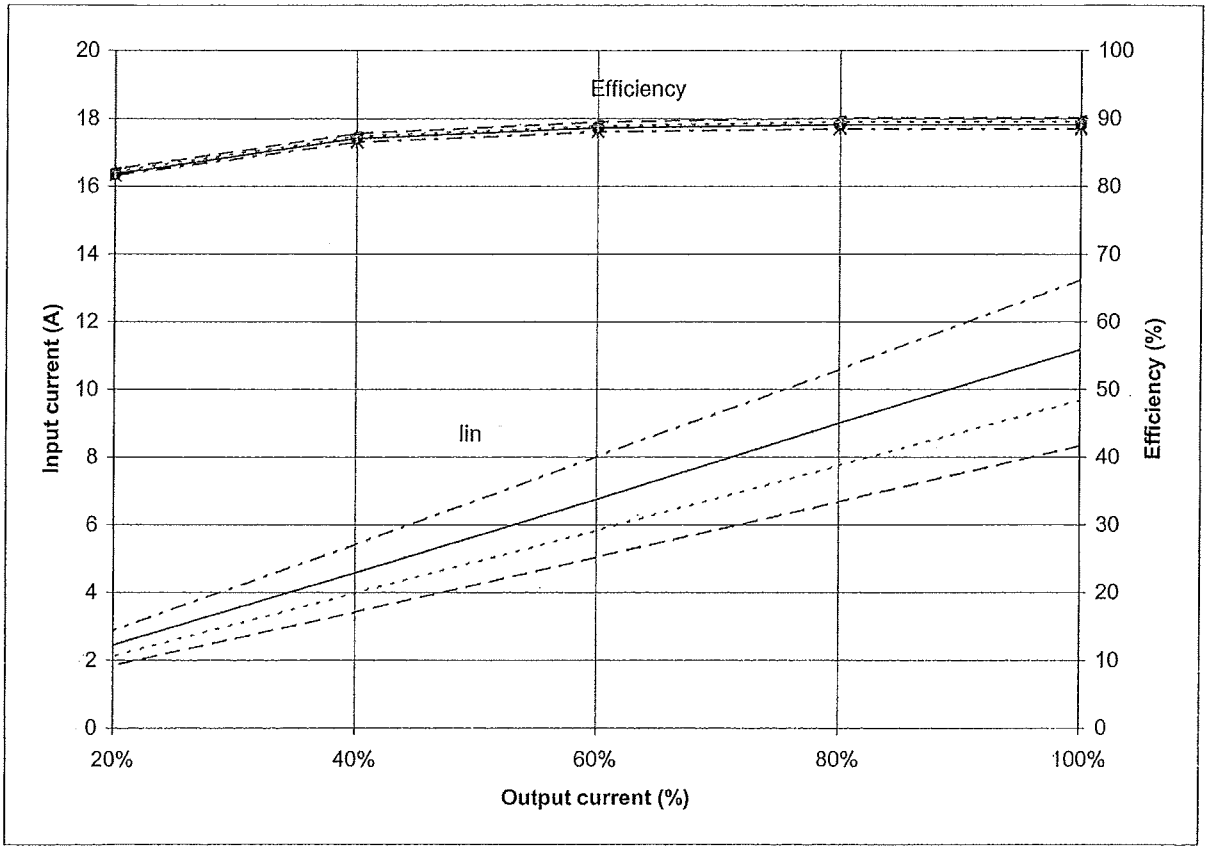
GEN60-55 1Φ



(3). Efficiency and Input current vs. Output current

Conditions:
Vin: 170 VAC
200 VAC
230 VAC
265 VAC
Vout:100%
Ta: 25˚C

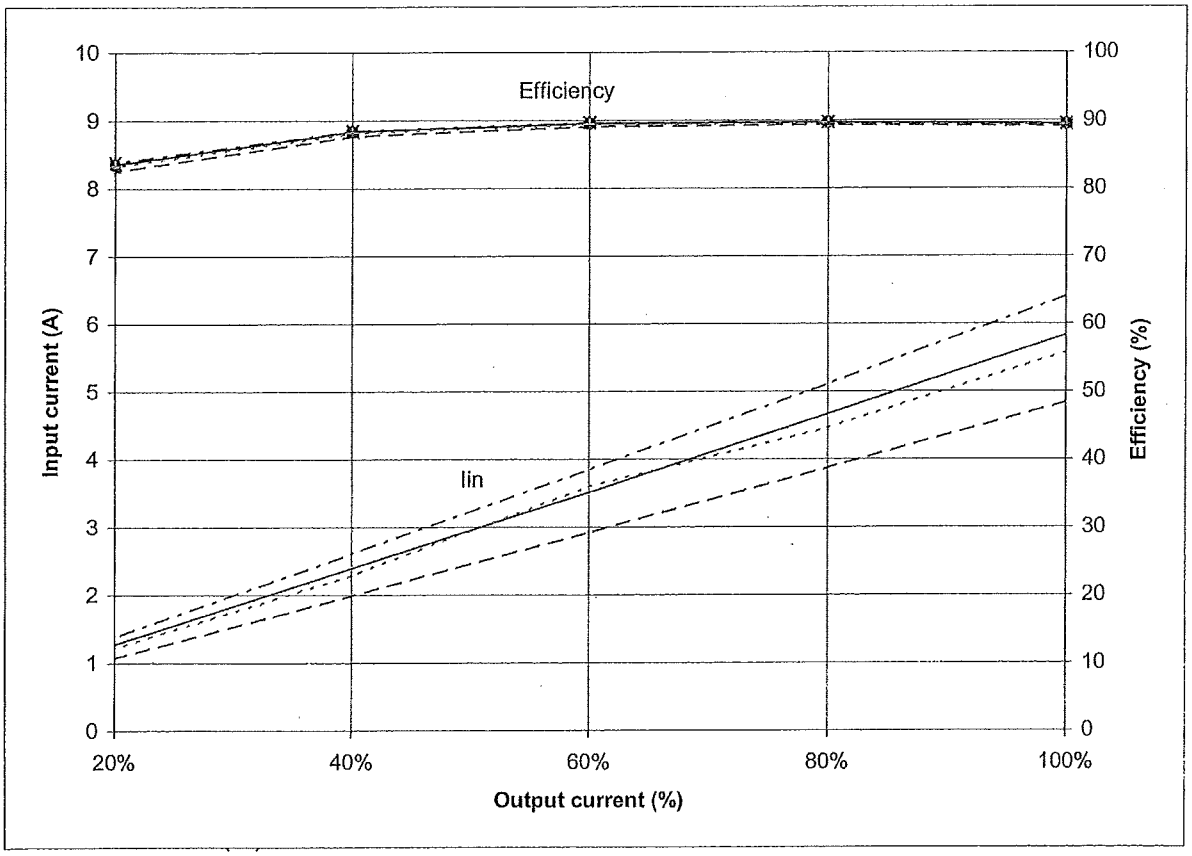
GEN60-55 3Φ 200



(3). Efficiency and Input current vs. Output current

Conditions:
Vin: 342 VAC
380 VAC
400 VAC
460 VAC
Vout:100%
Ta: 25˚C

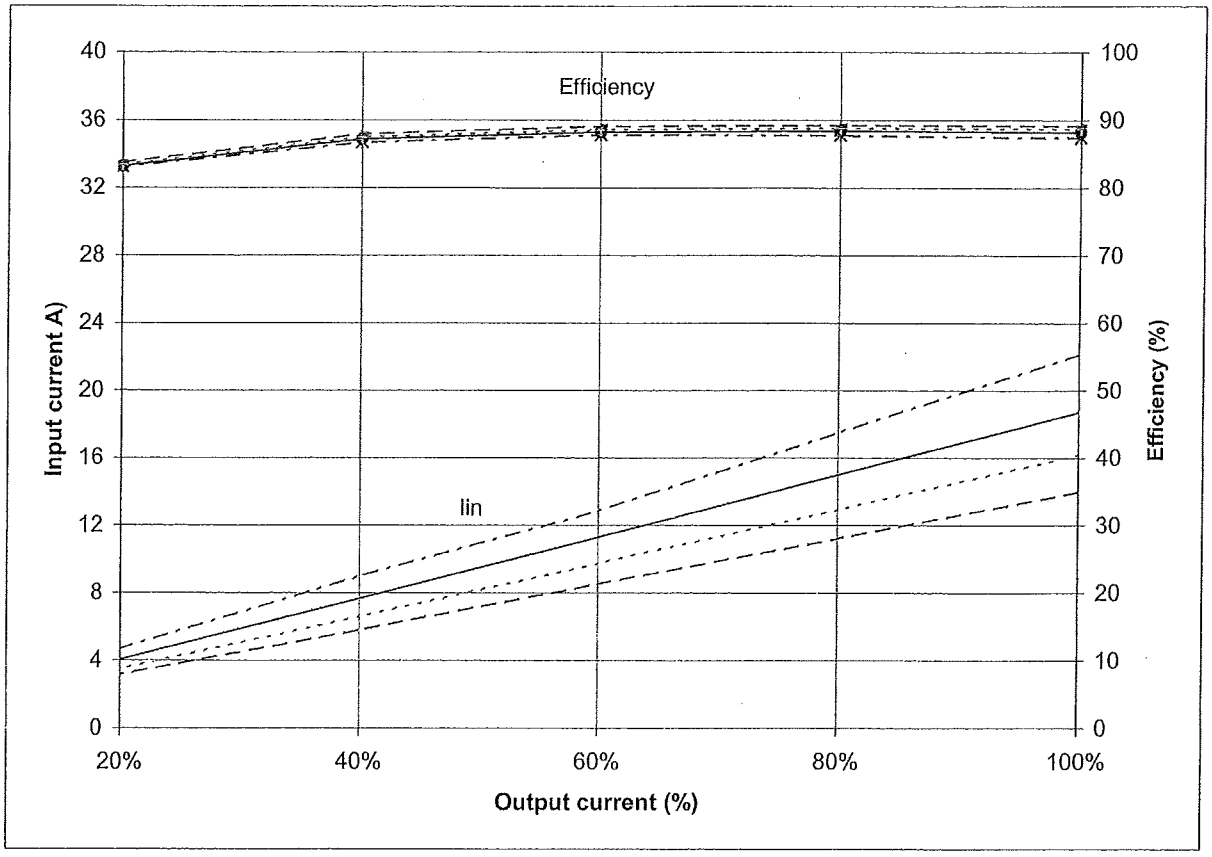
GEN60-55 3Φ 400



(3). Efficiency and Input current vs. Output current

Conditions:
Vin: 170 VAC
200 VAC
230 VAC
265 VAC
Vout:100%
Ta: 25˚C

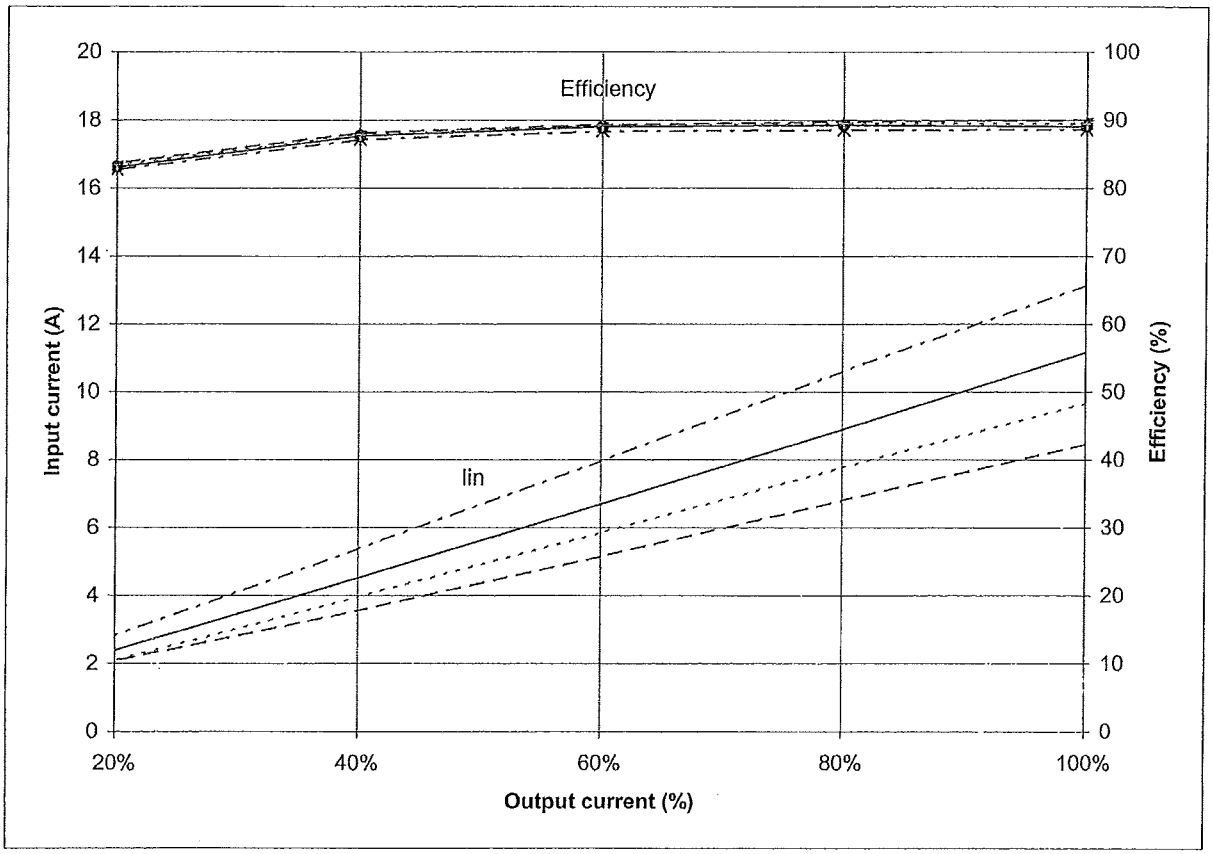
GEN150-22 1Φ



(3). Efficiency and Input current vs. Output current

Conditions:
Vin: 170 VAC
200 VAC
230 VAC
265 VAC
Vout:100%
Ta: 25˚C

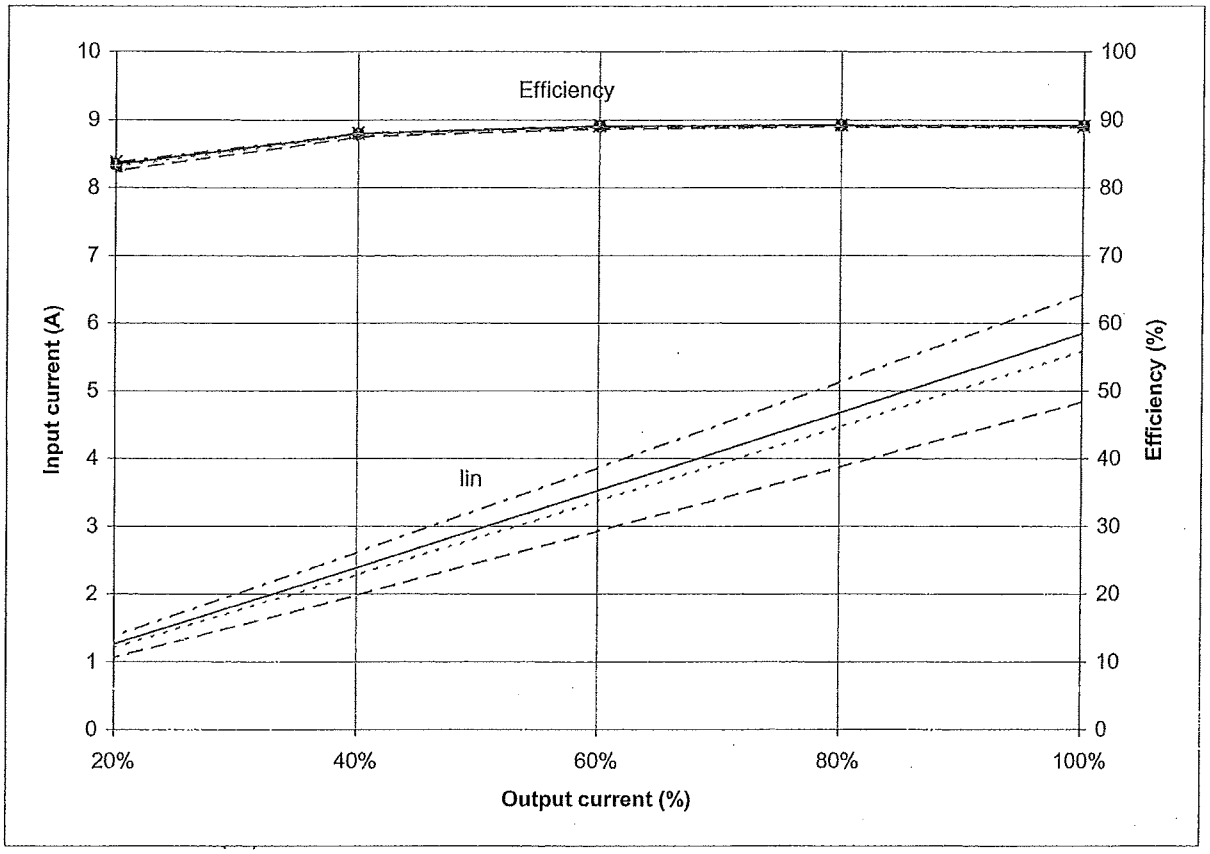
GEN150-22 3Φ 200



(3). Efficiency and Input current vs. Output current

Conditions:
Vin: 342 VAC
380 VAC
400 VAC
460 VAC
Vout:100%
Ta: 25˚C

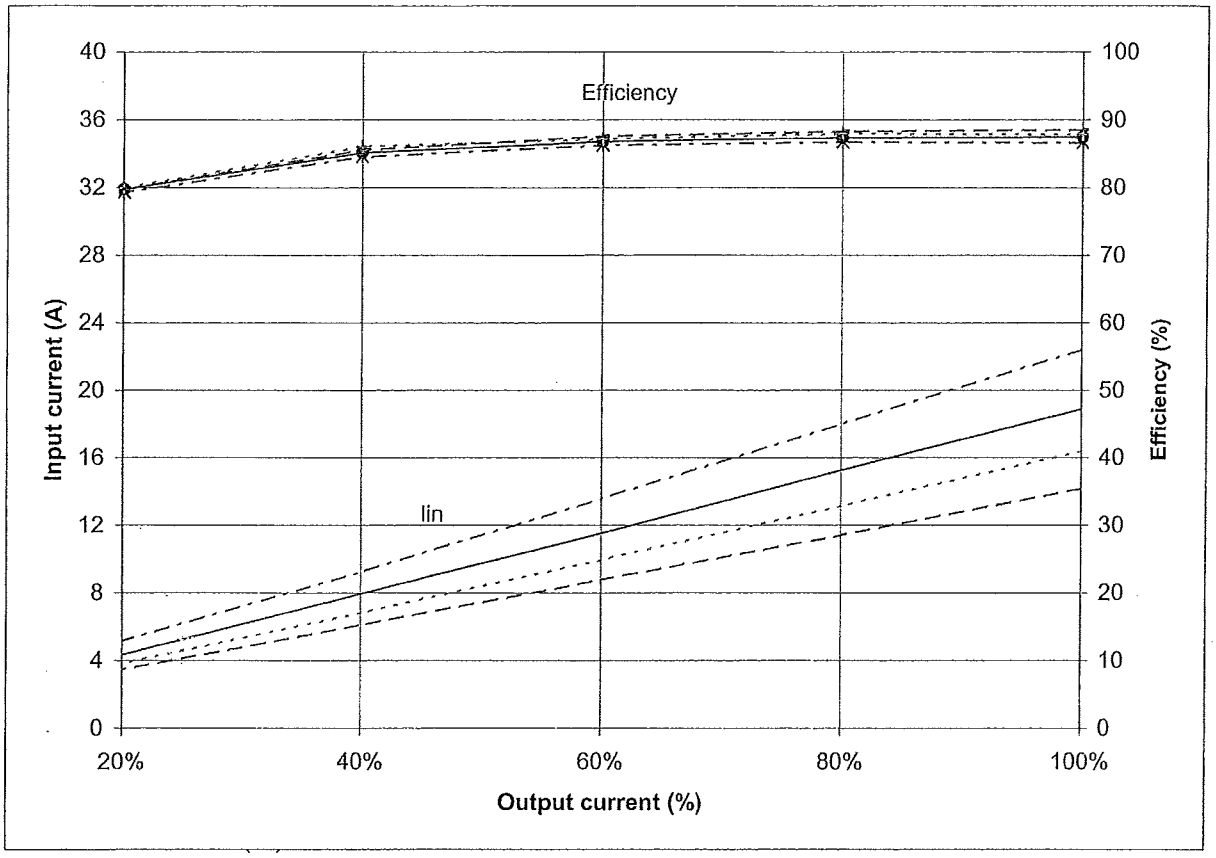
GEN150-22 3Φ 400



(3). Efficiency and Input current vs. Output current

Conditions:
Vin: 170 VAC
200 VAC
230 VAC
265 VAC
Vout:100%
Ta: 25˚C

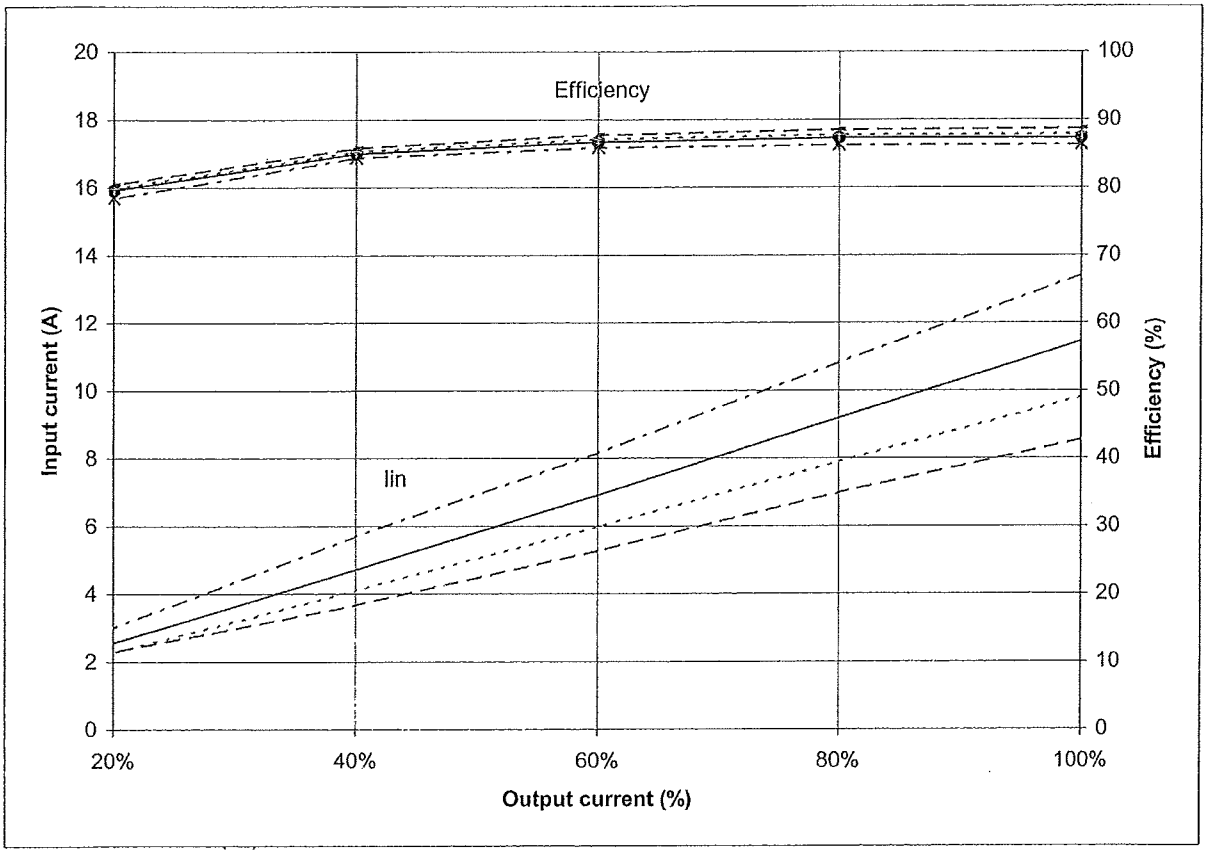
GEN600-5.5 1Φ



(3). Efficiency and Input current vs. Output current

Conditions:
Vin: 170 VAC
200 VAC
230 VAC
265 VAC
Vout:100%
Ta: 25˚C

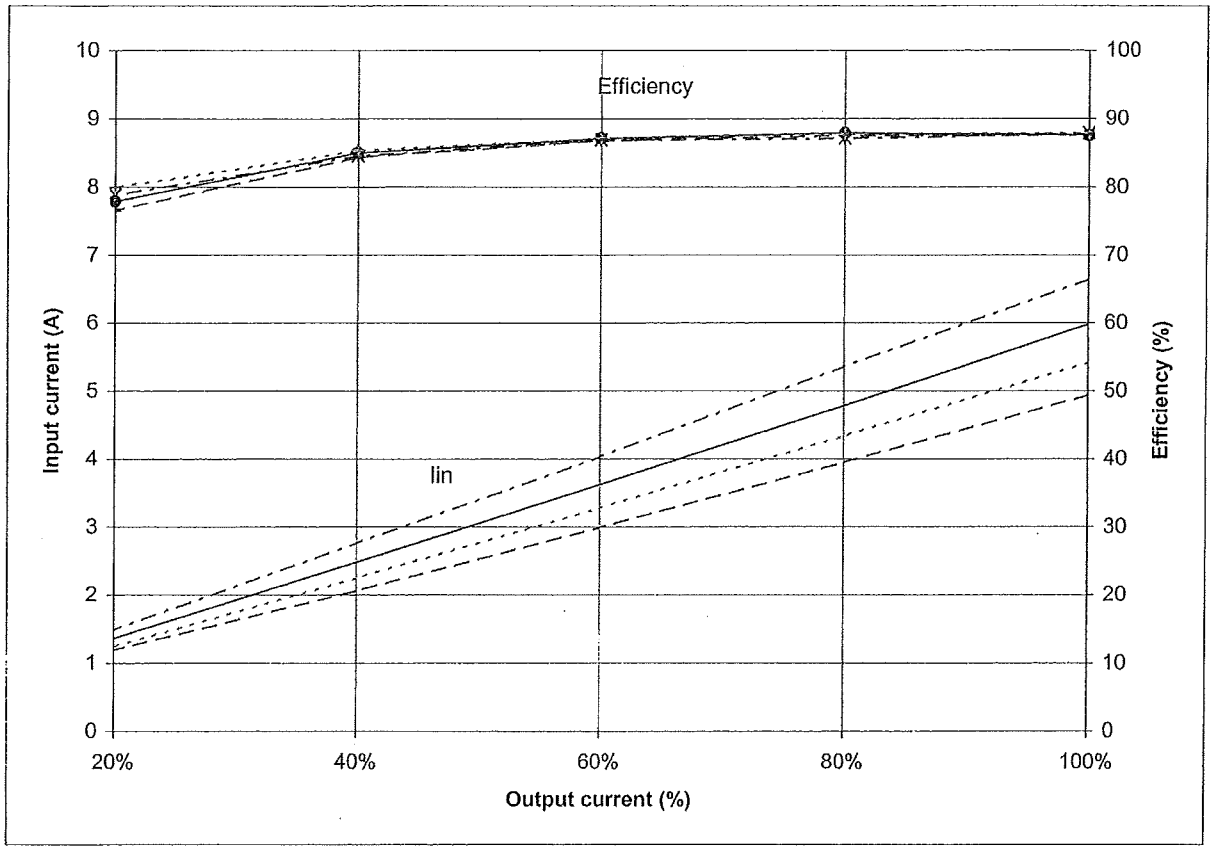
GEN600-5.5 3Φ 200



(3). Efficiency and Input current vs. Output current

Conditions:
Vin: 342 VAC
380 VAC
400 VAC
460 VAC
Vout:100%
Ta: 25˚C

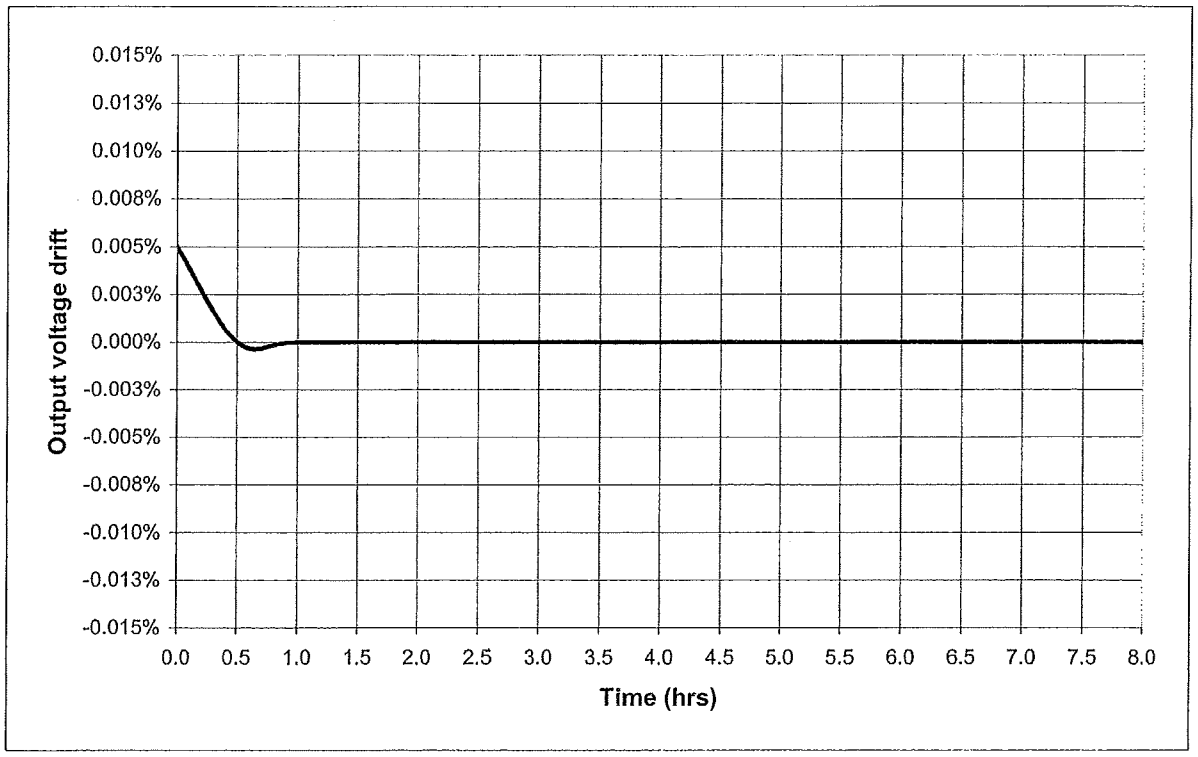
GEN600-5.5 3Φ 400



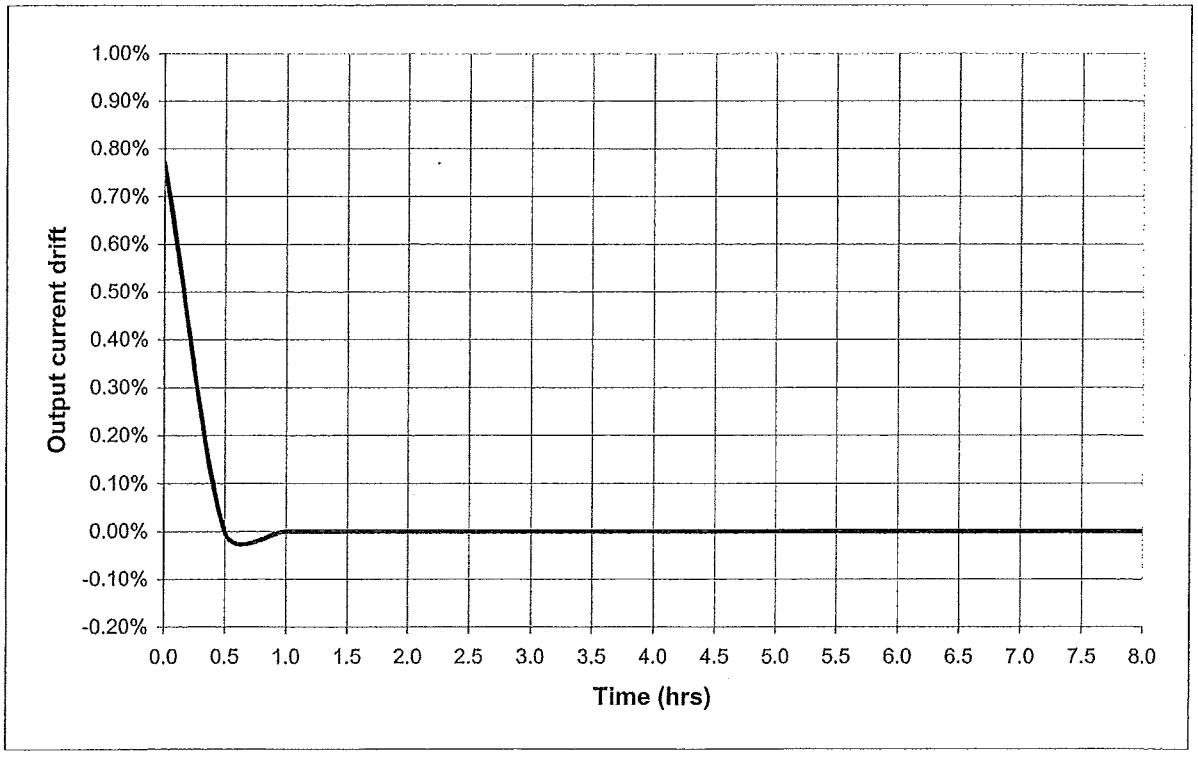
2.2 Warm up drift & stability

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

GEN8-400 C.V mode



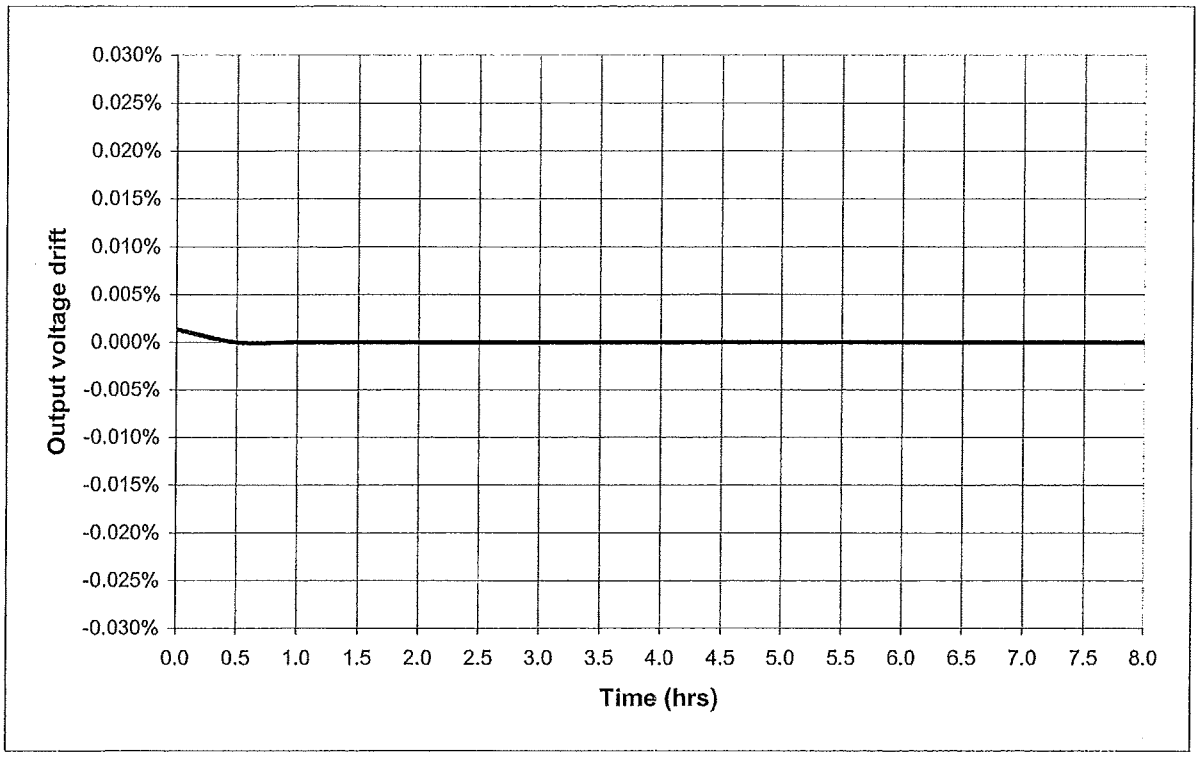
GEN8-400 C.C mode



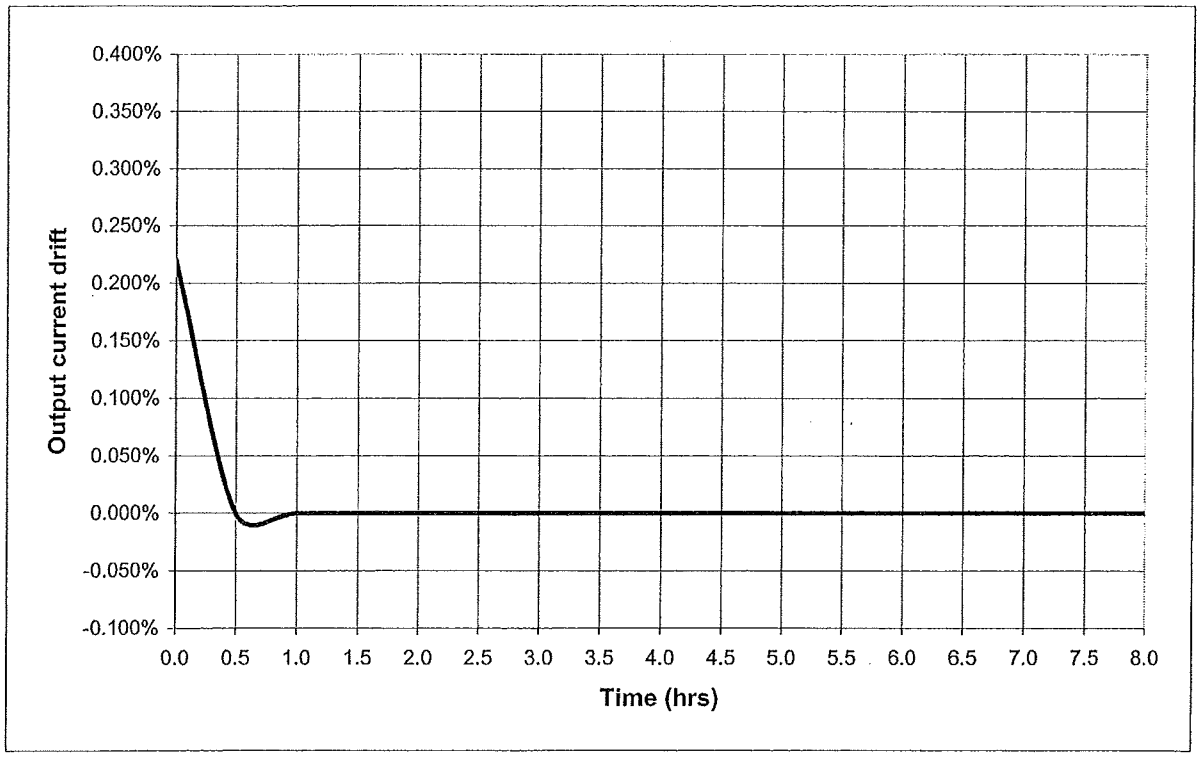
2.2 Warm up drift & stability

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

GEN60-55 C.V mode



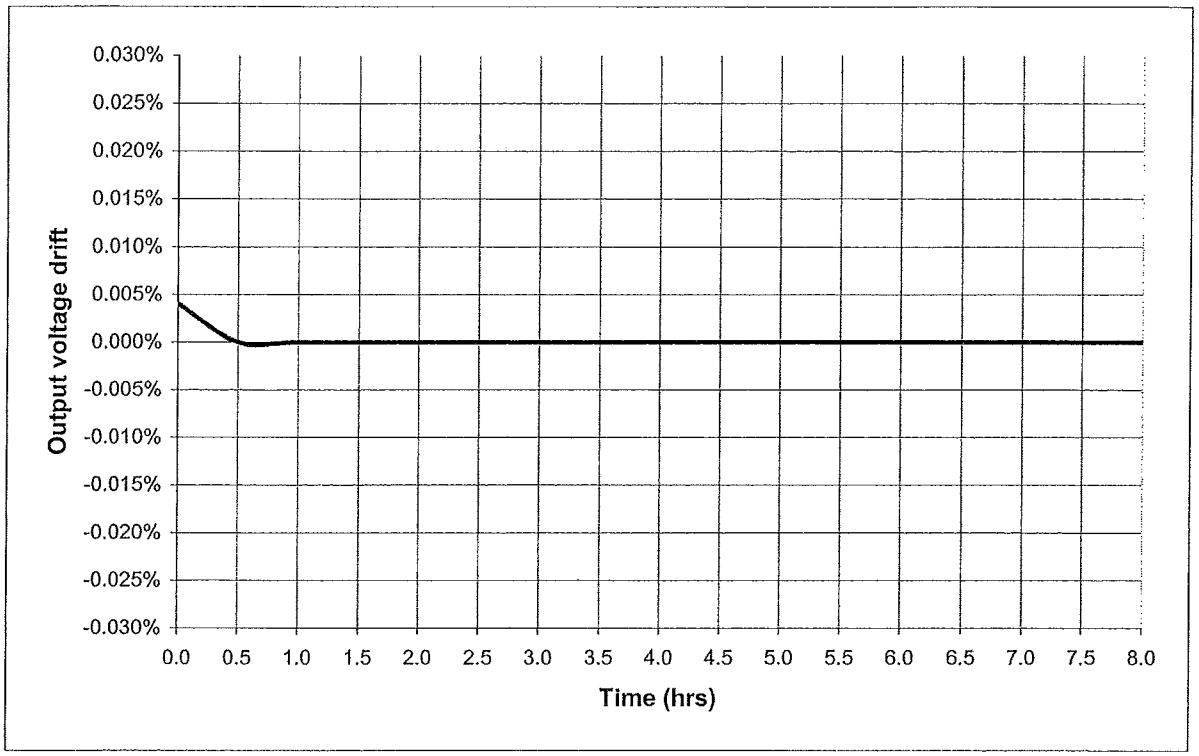
GEN60-55 C.C mode



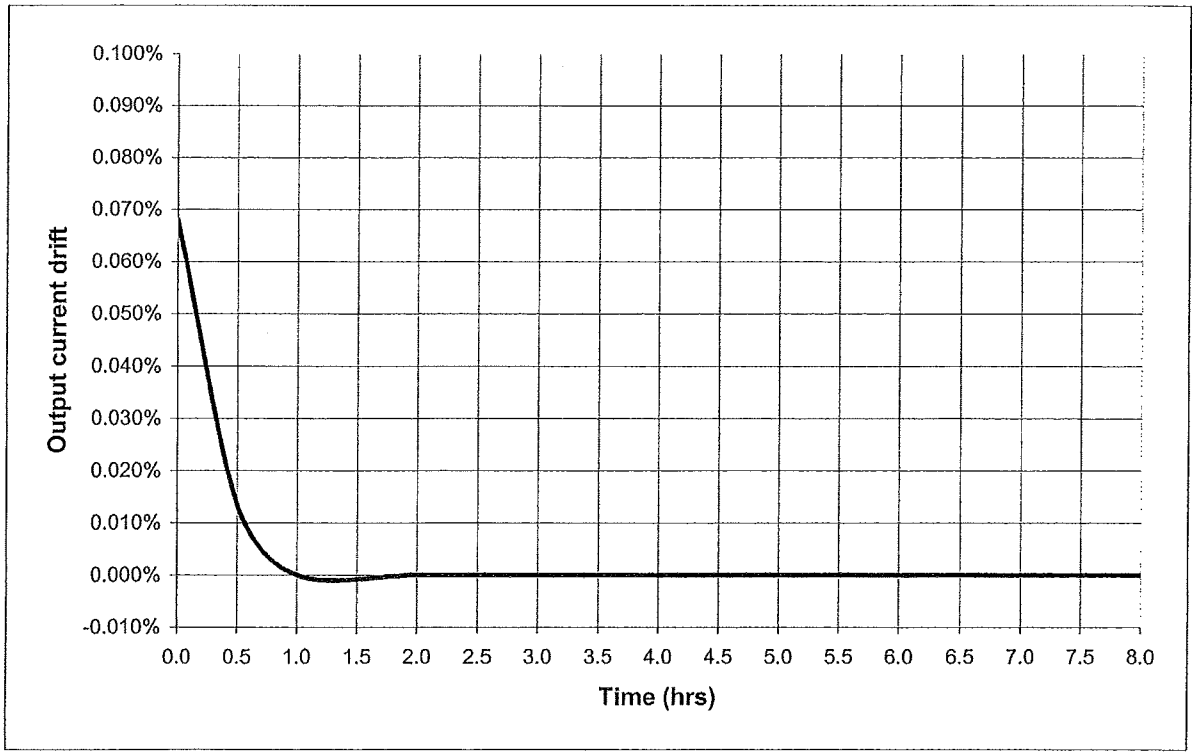
2.2 Warm up drift & stability

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

GEN150-22 C.V mode



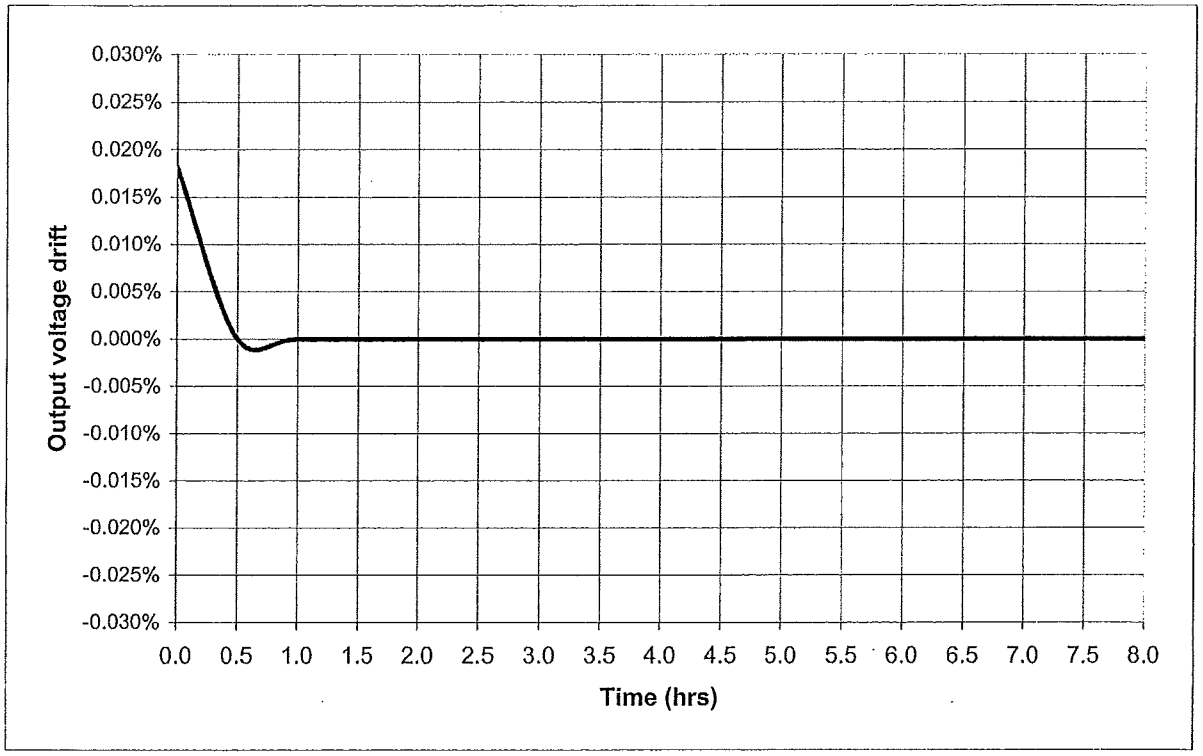
GEN150-22 C.C mode



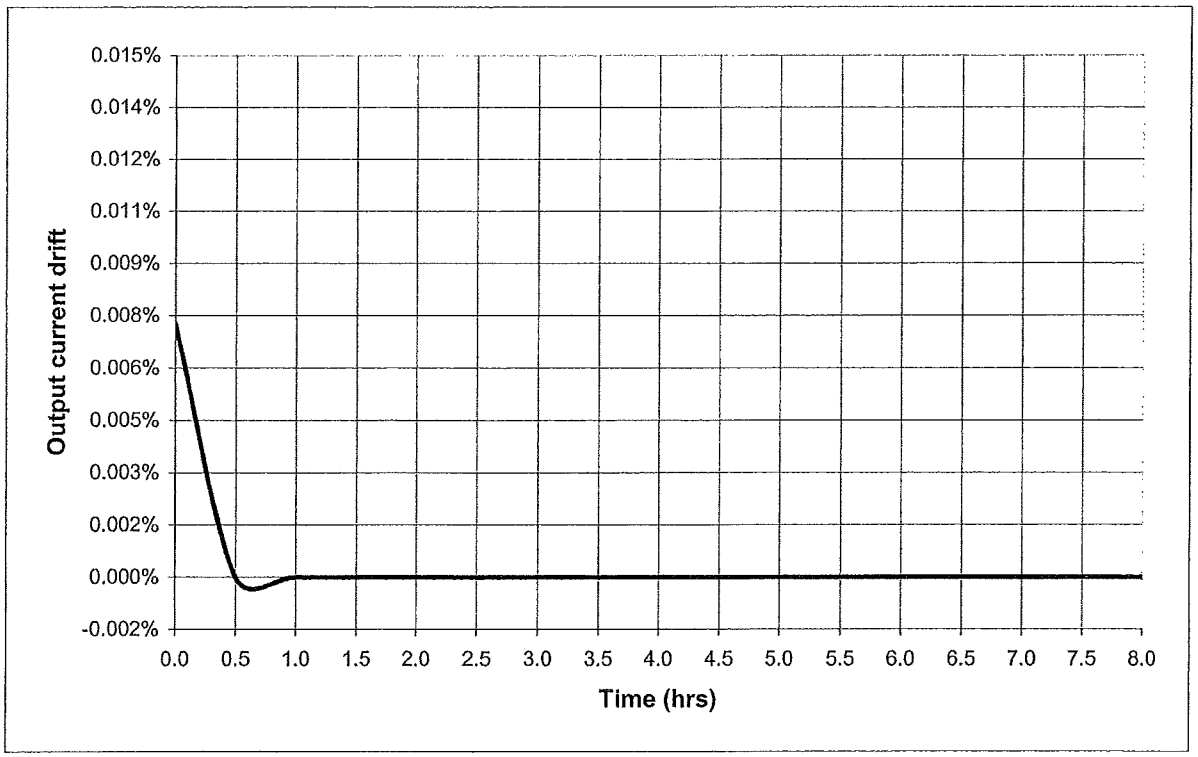
2.2 Warm up drift & stability

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

GEN600-5.5 C.V mode



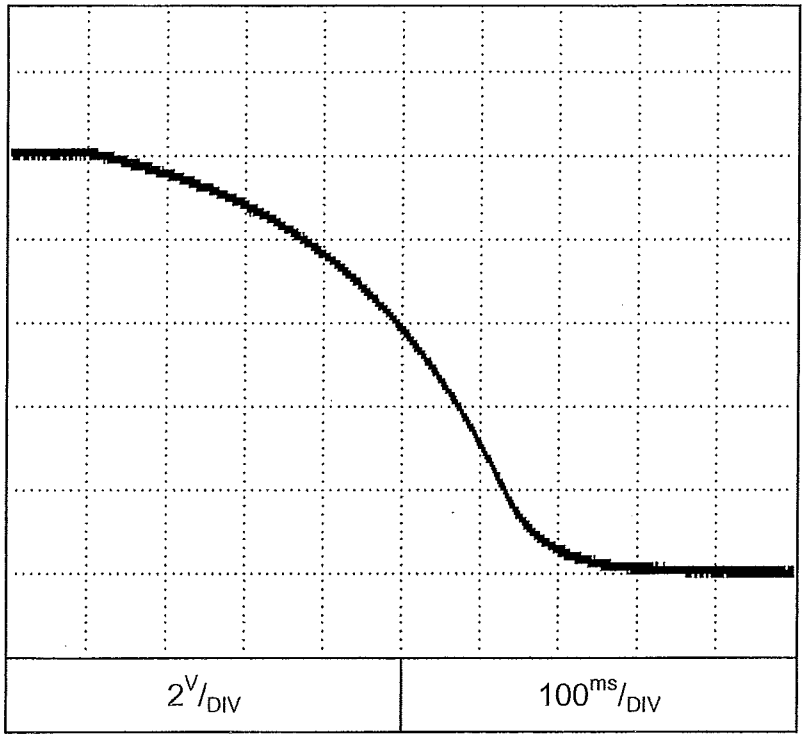
GEN600-5.5 C.C mode



2.3 Over voltage protection (OVP) characteristic

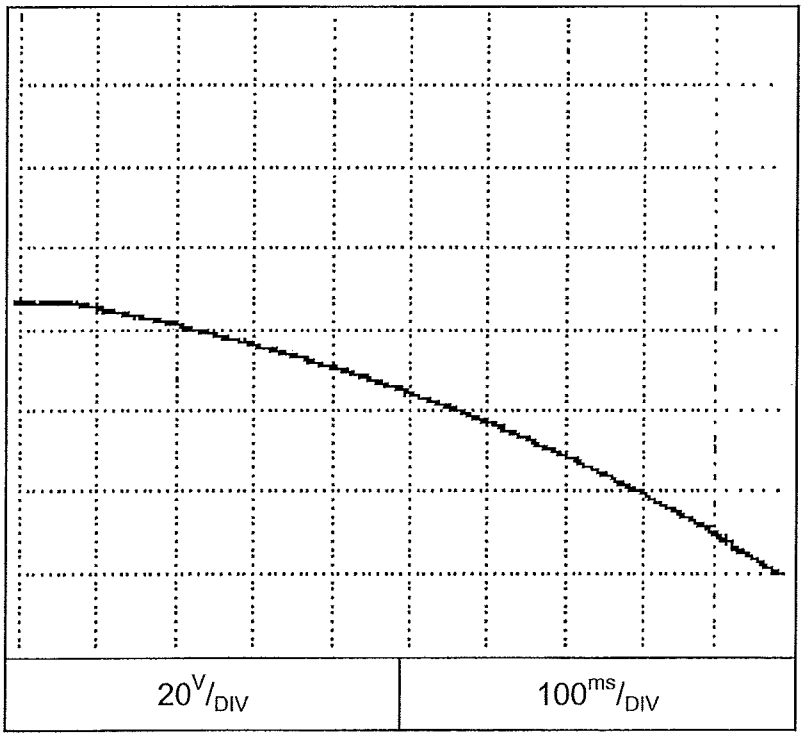
Conditions: Vset: 100%
Iout: 0%
Ta = 25°C

GEN8-400



OVP setting:10V

GEN60-55

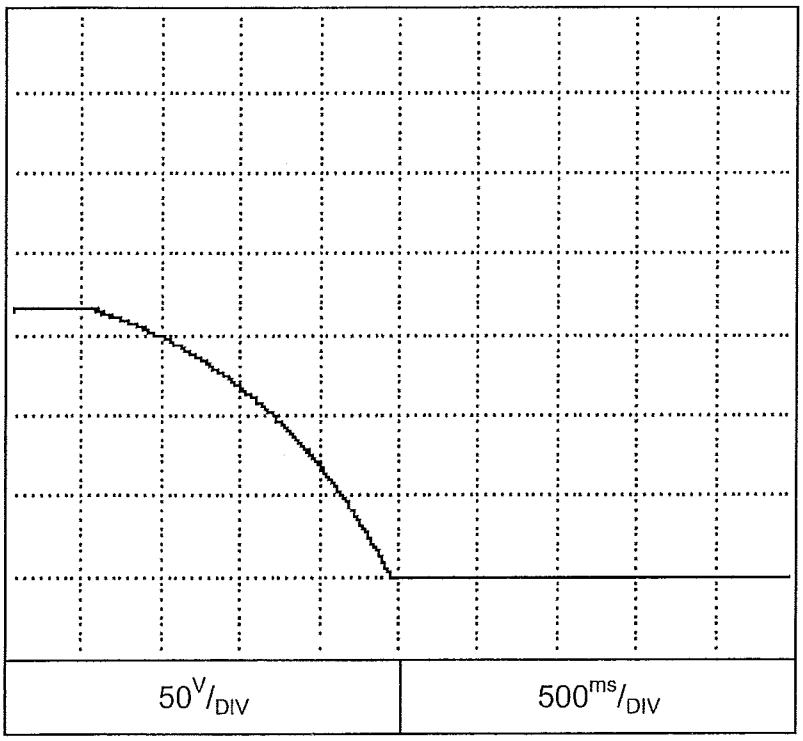


OVP setting:66V

2.3 Over voltage protection (OVP) characteristic

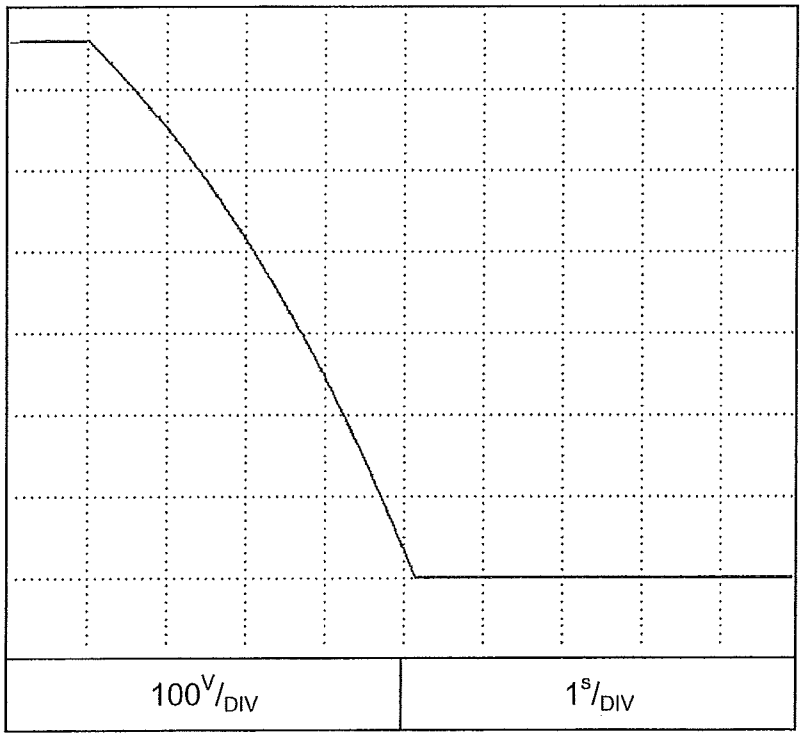
Conditions: Vset: 100%
Iout: 0%
Ta = 25°C

GEN150-22



OVP setting:165V

GEN600-5.5

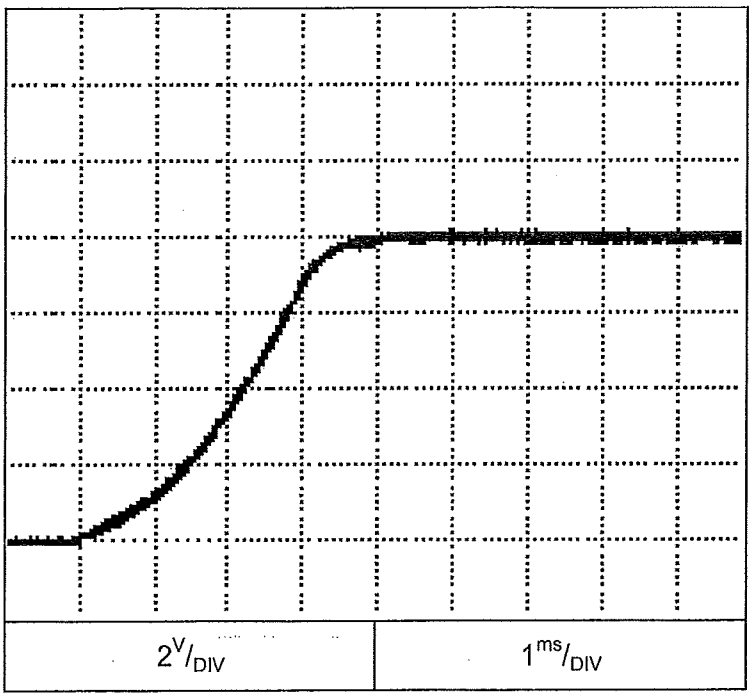


OVP setting:660V

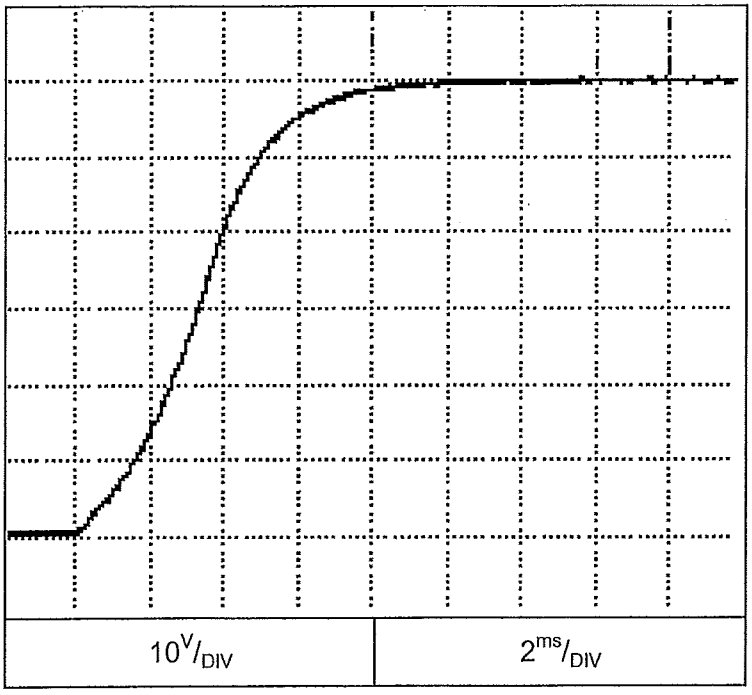
2.4 ON/OFF Output rise characteristics
C.V mode

Conditions: Vin:230V
Vout: 100%
Iout: 0%
Iset=105%
Ta = 25°C

GEN8-400



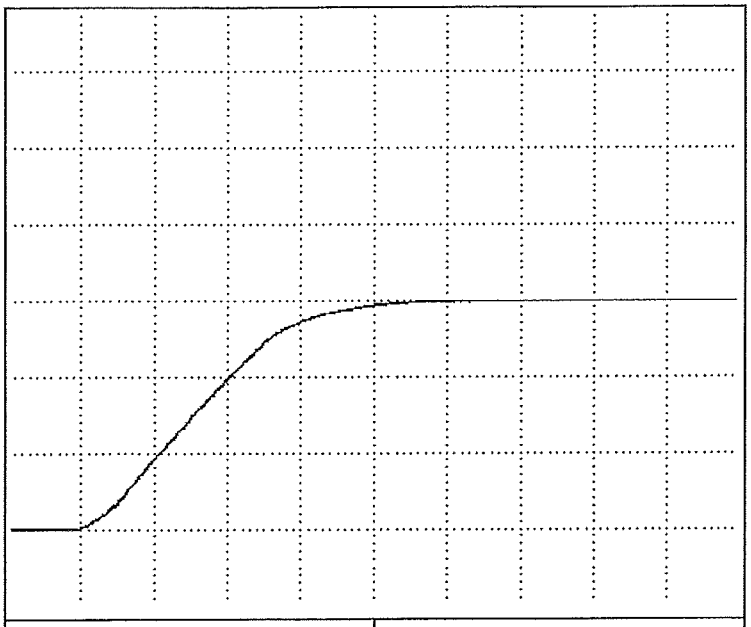
GEN60-55



2.4 ON/OFF Output rise characteristics
C.V mode

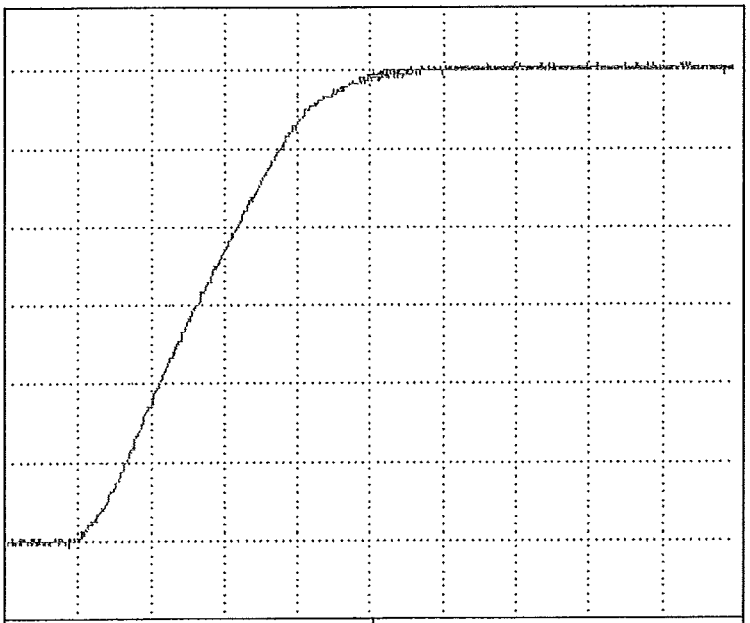
Conditions: Vin:230V
Vout: 100%
Iout: 0%
Iset=105%
Ta = 25°C

GEN150-22



50V/DIV	5ms/DIV

GEN600-5.5

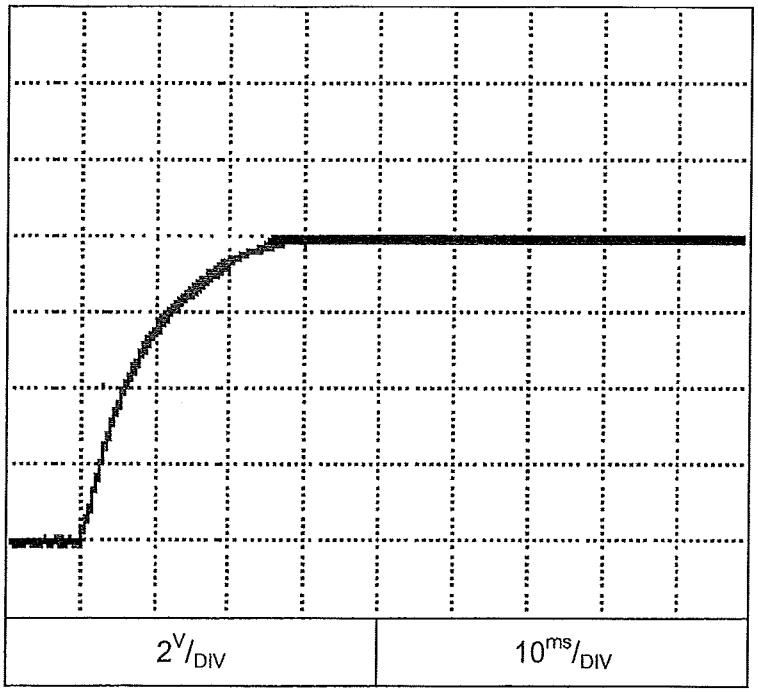


100V/DIV	10ms/DIV

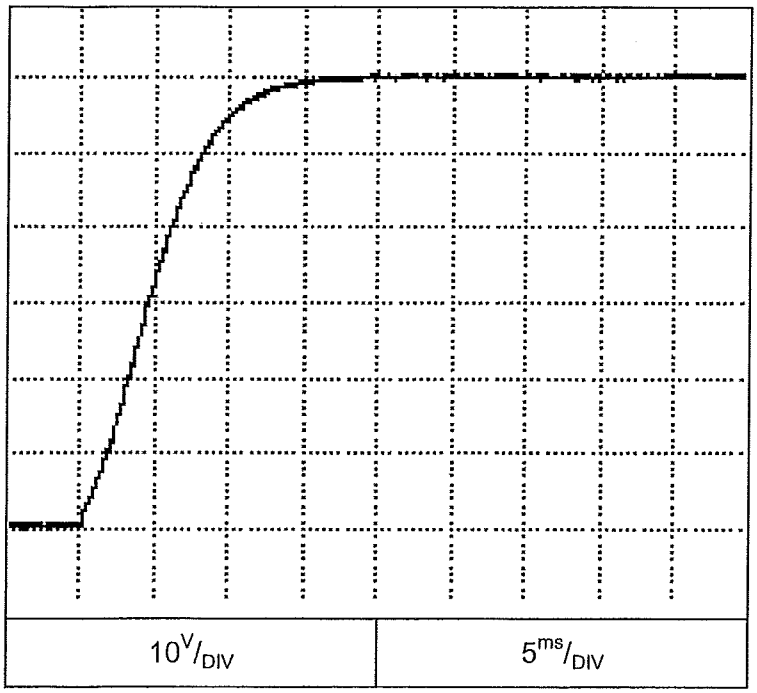
2.4 ON/OFF Output rise characteristics
C.V mode

Conditions: Vin:230V
Vout: 100%
Iout: 100%
Iset=105%
Load: CR
Ta = 25°C

GEN8-400



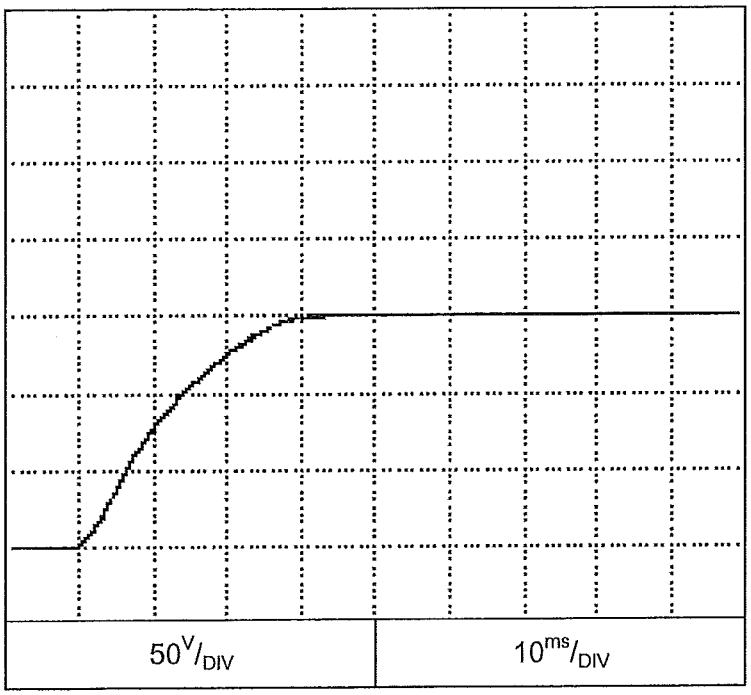
GEN60-55



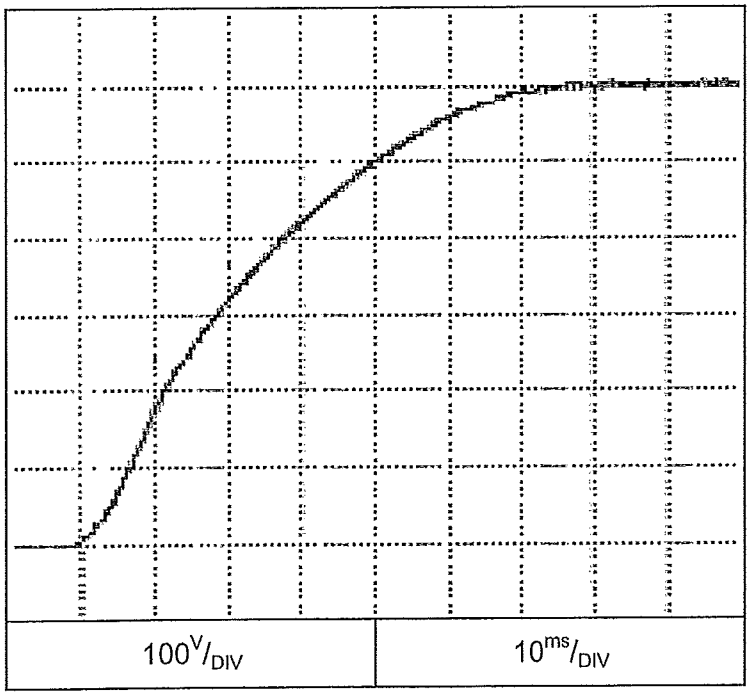
2.4 ON/OFF Output rise characteristics
C.V mode

Conditions: Vin:230V
Vout: 100%
Iout: 100%
Iset=105%
Load: CR
Ta = 25°C

GEN150-22



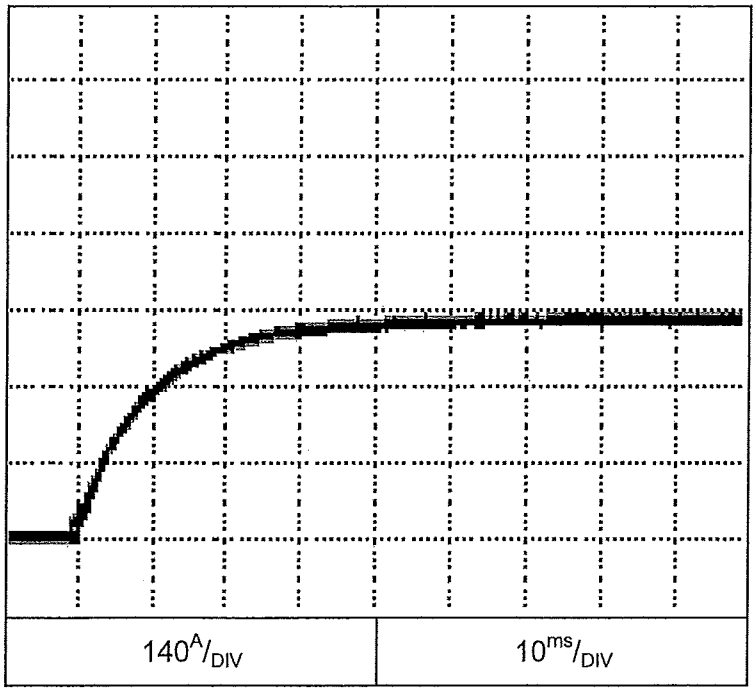
GEN600-5.5



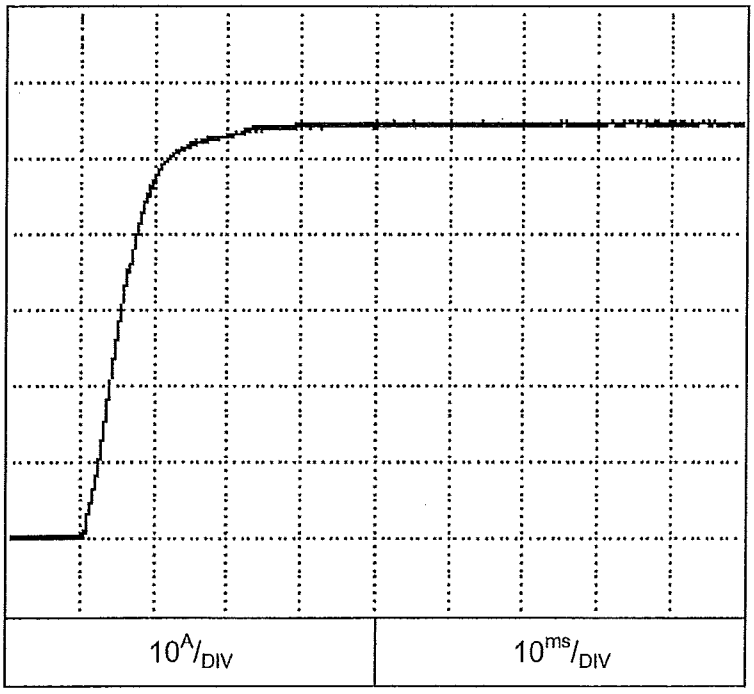
2.4 ON/OFF Output rise characteristics
C.C mode

Conditions: Vin:230V
Vout: 100%
Iout: 100%
Vset=105%
Load: CR
Ta = 25°C

GEN8-400



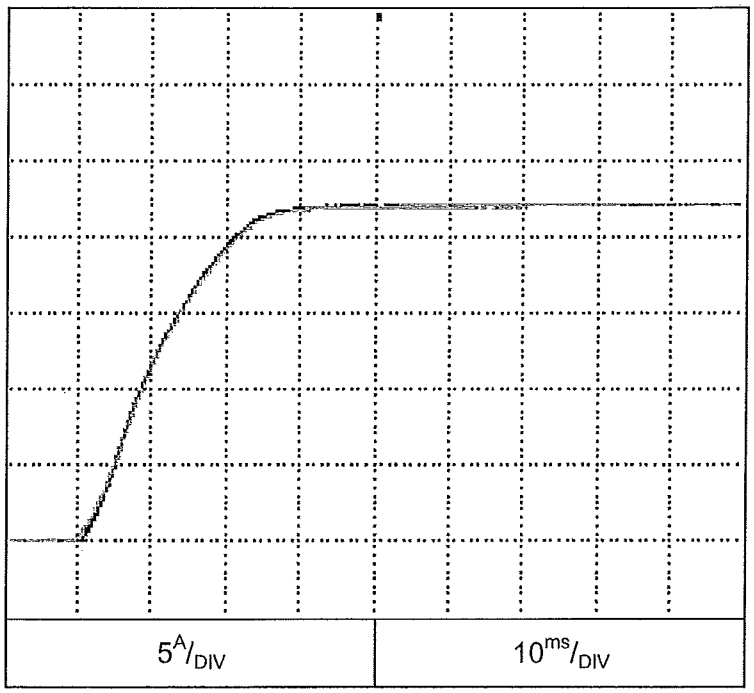
GEN60-55



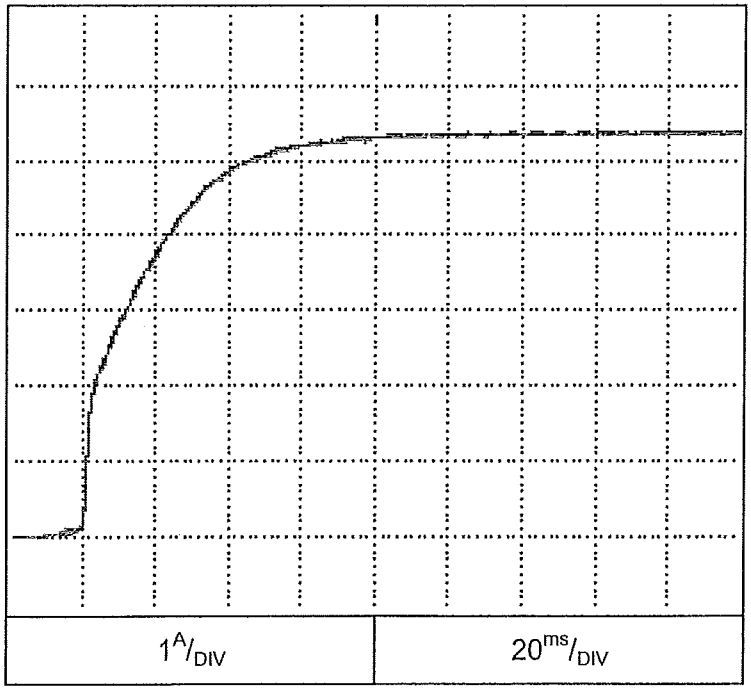
2.4 ON/OFF Output rise characteristics
C.C mode

Conditions: Vin:230V
Vout: 100%
Iout: 100%
Vset=105%
Load: CR
Ta = 25°C

GEN150-22



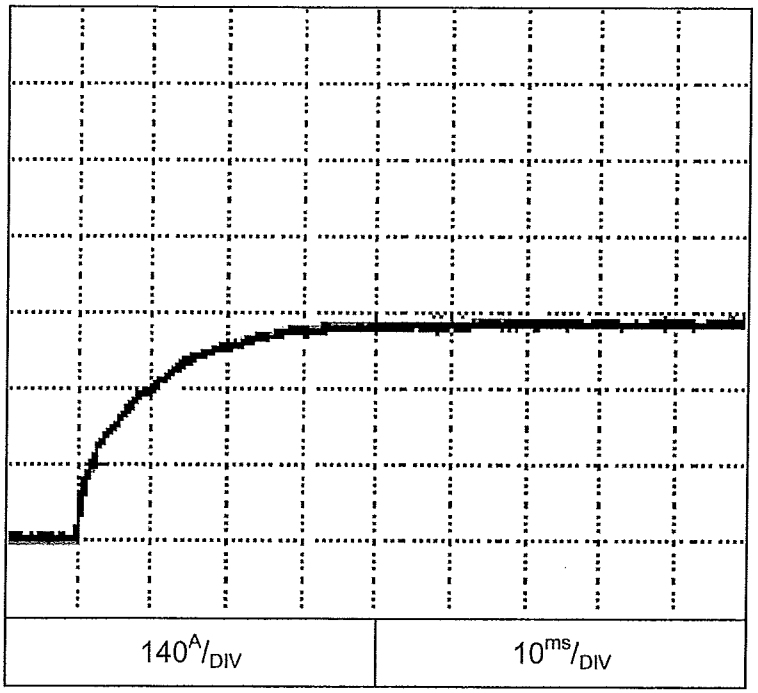
GEN600-5.5



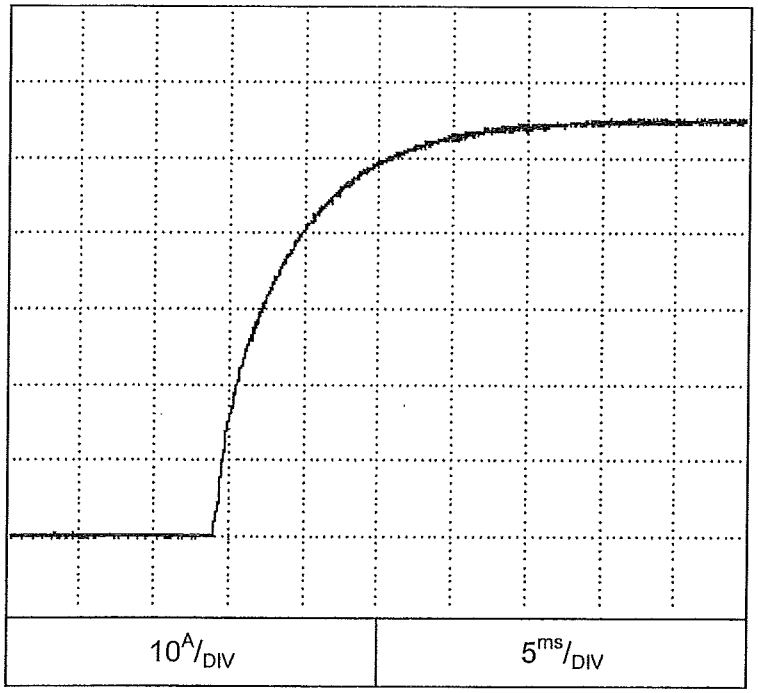
2.4 ON/OFF Output rise characteristics
C.C mode

Conditions: Vin:230V
Iout: 100%
Vset=105%
shorted output
Ta = 25°C

GEN8-400



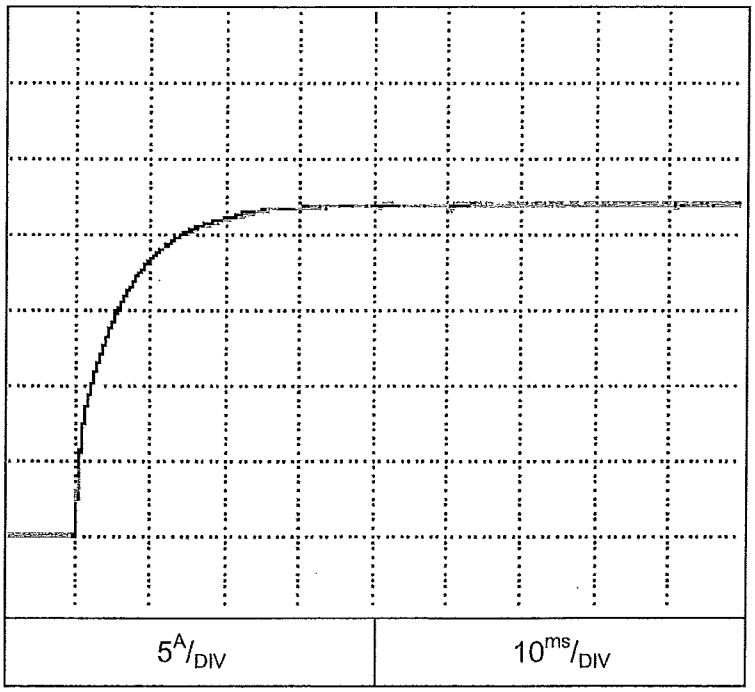
GEN60-55



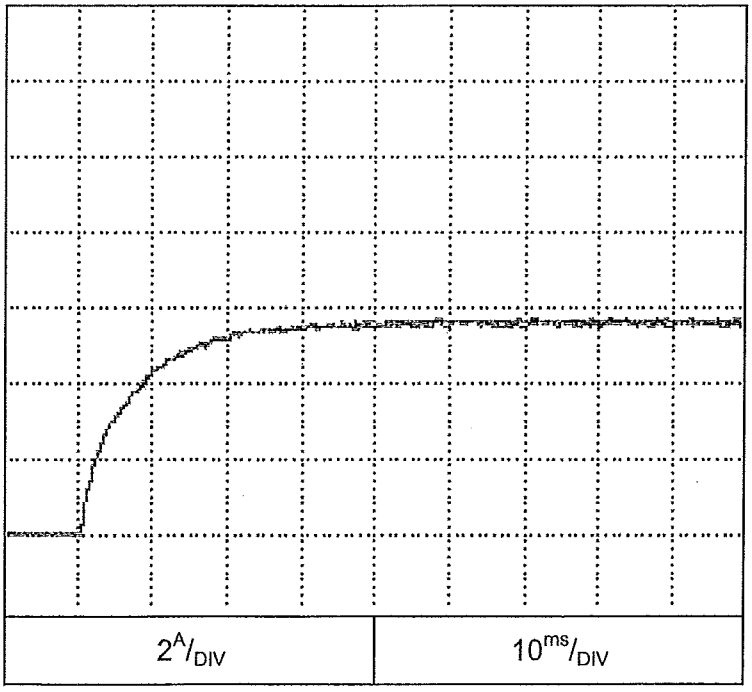
2.4 ON/OFF Output rise characteristics
C.C mode

Conditions: Vin:230V
Iout: 100%
Vset=105%
shorted output
Ta = 25°C

GEN150-22



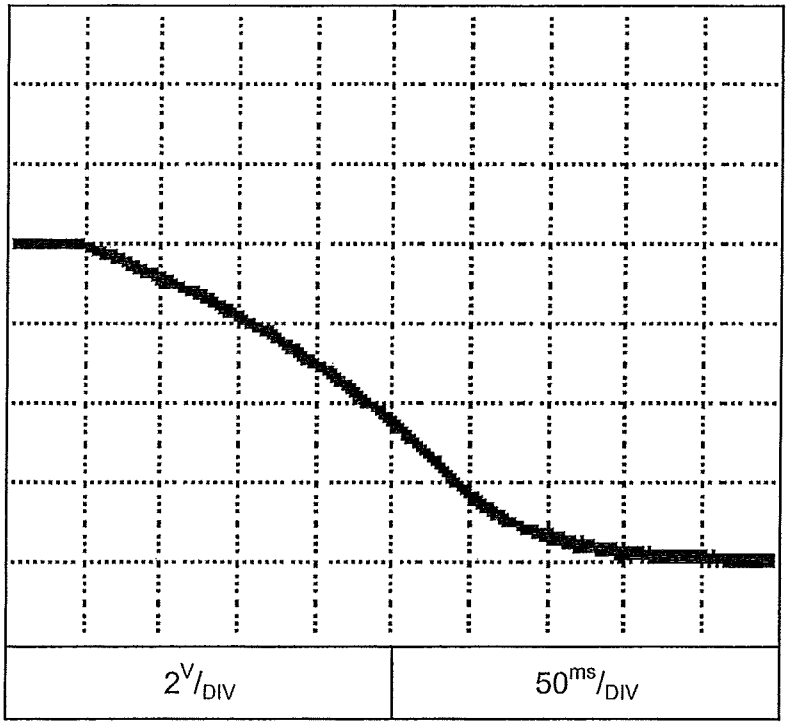
GEN600-5.5



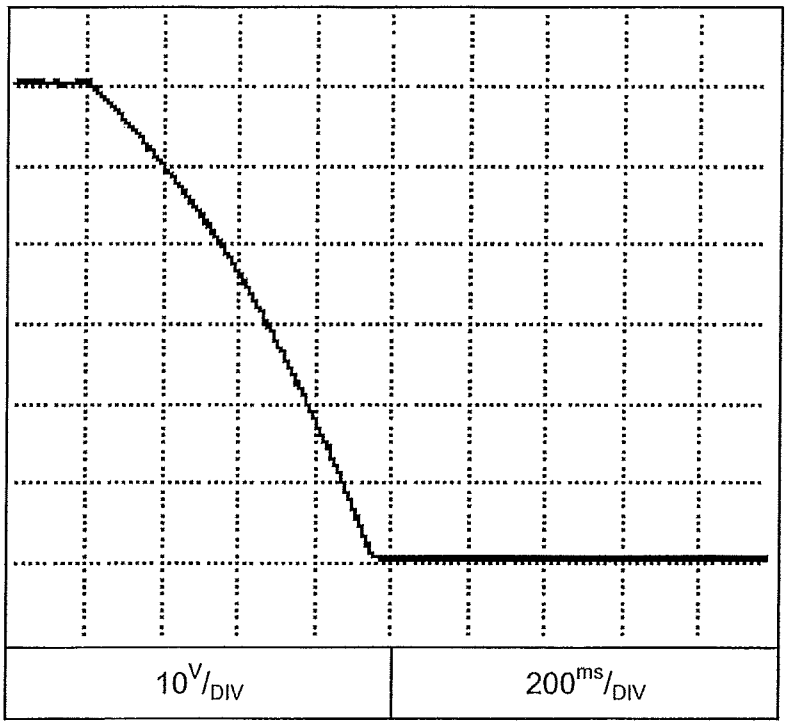
2.5 ON/OFF Output fall characteristics
C.V mode

Conditions: Vin:230V
Vout: 100%
Iout: 0%
Ta = 25°C

GEN8-400



GEN60-55

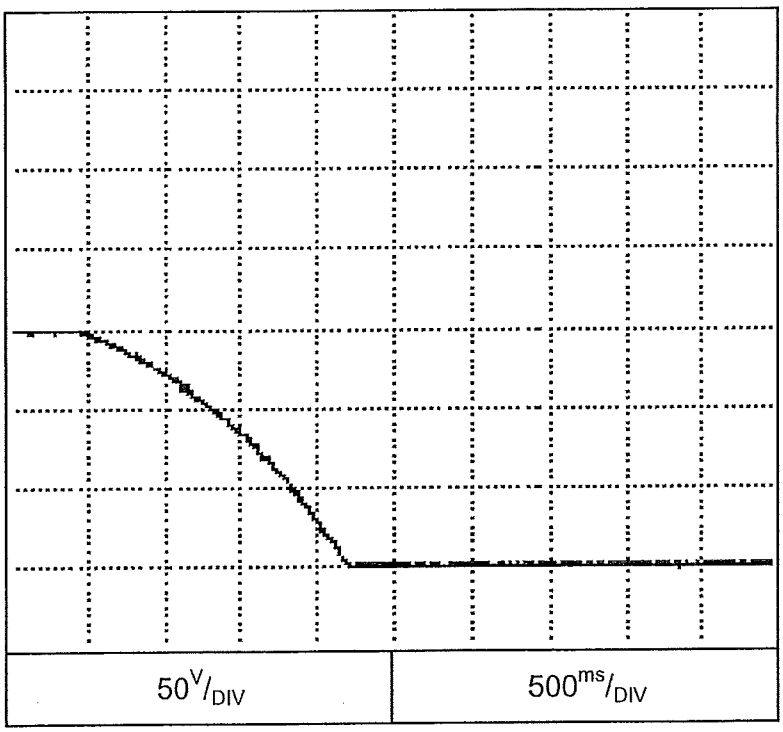


2.5 ON/OFF Output fall characteristics

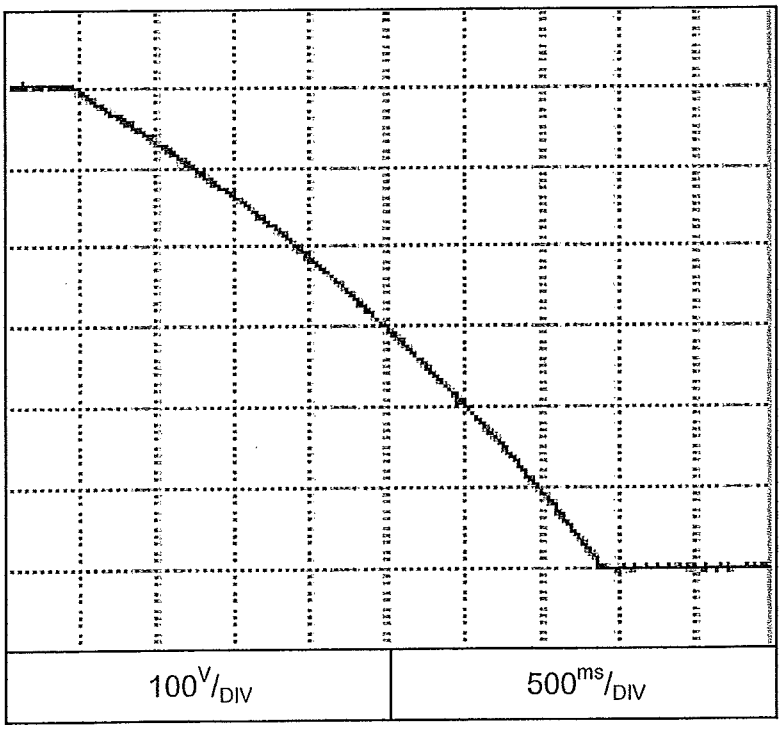
C.V mode

Conditions: Vin:230V
Vout: 100%
Iout: 0%
Ta = 25°C

GEN150-22



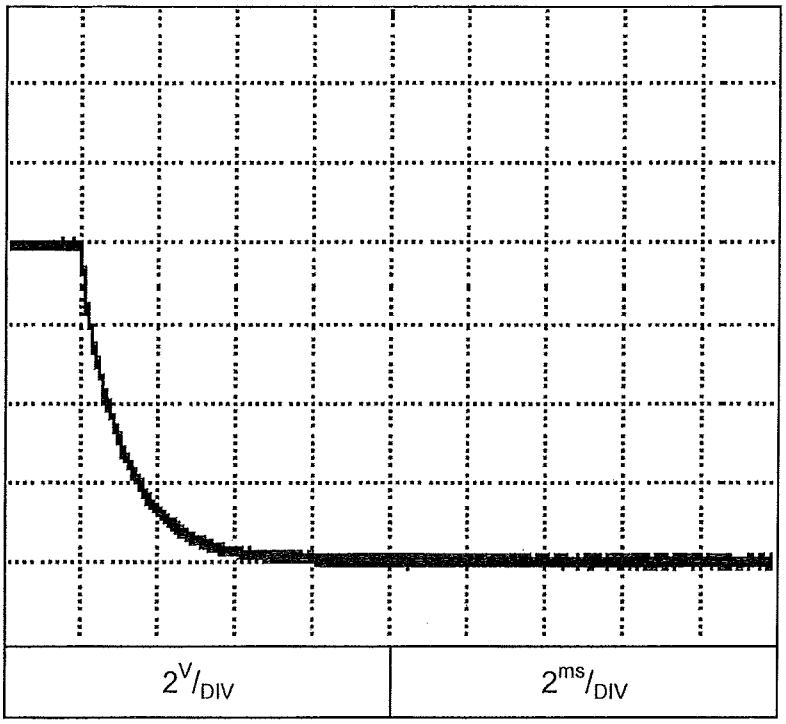
GEN600-5.5



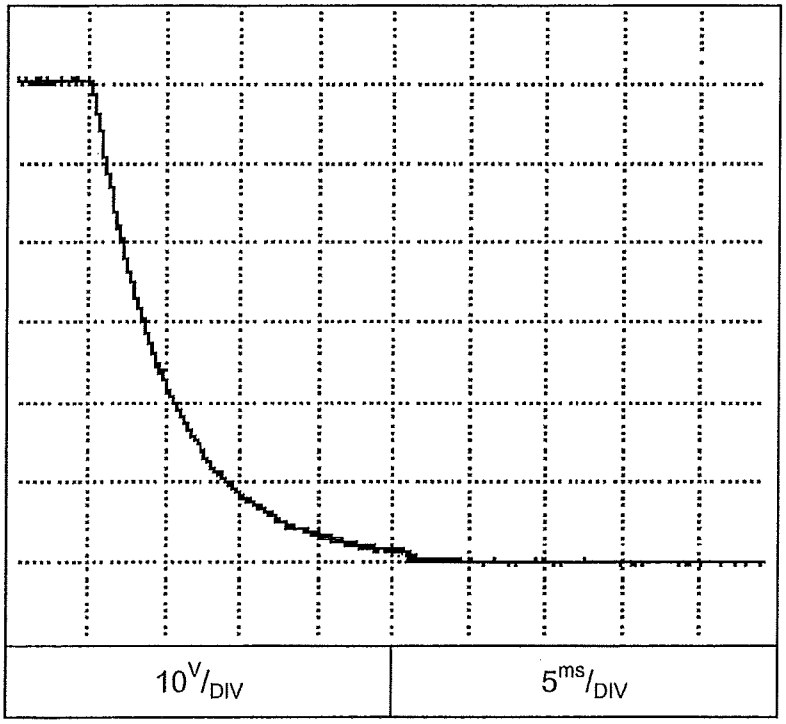
2.5 ON/OFF Output fall characteristics
C.V mode

Conditions: Vin:230V
Vout: 100%
Iout: 100%
Load: CR
Ta = 25°C

GEN8-400



GEN60-55

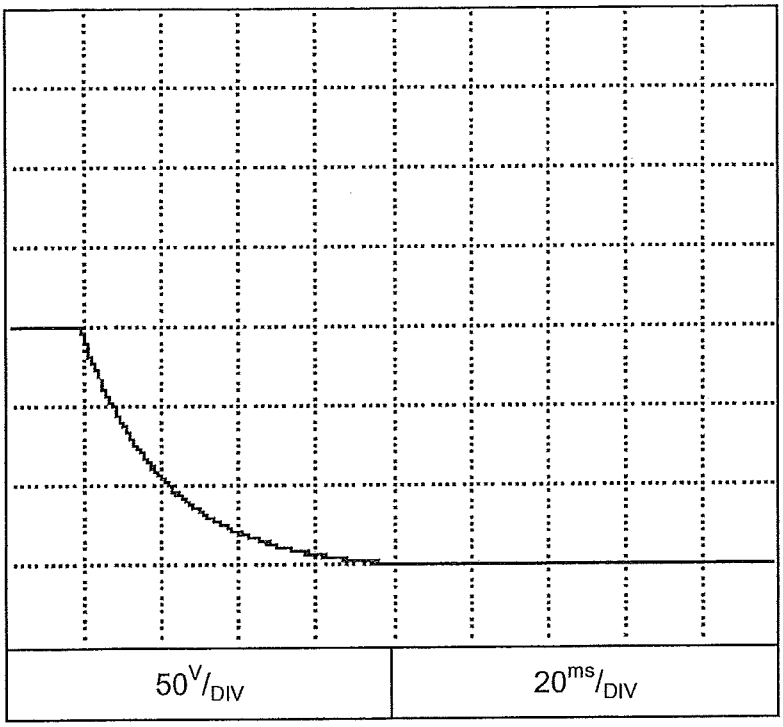


2.5 ON/OFF Output fall characteristics

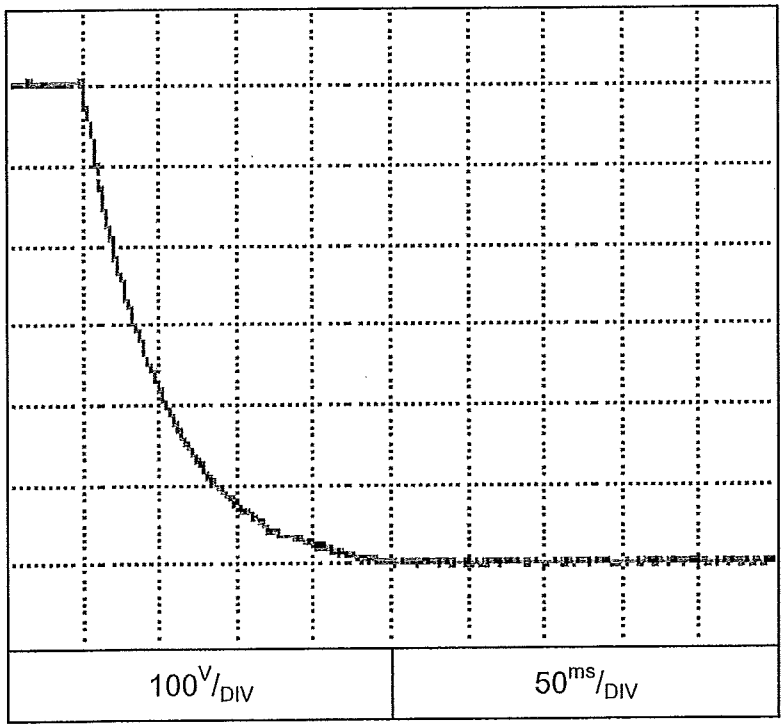
C.V mode

Conditions: Vin:230V
Vout: 100%
Iout: 100%
Load: CR
Ta = 25°C

GEN150-22



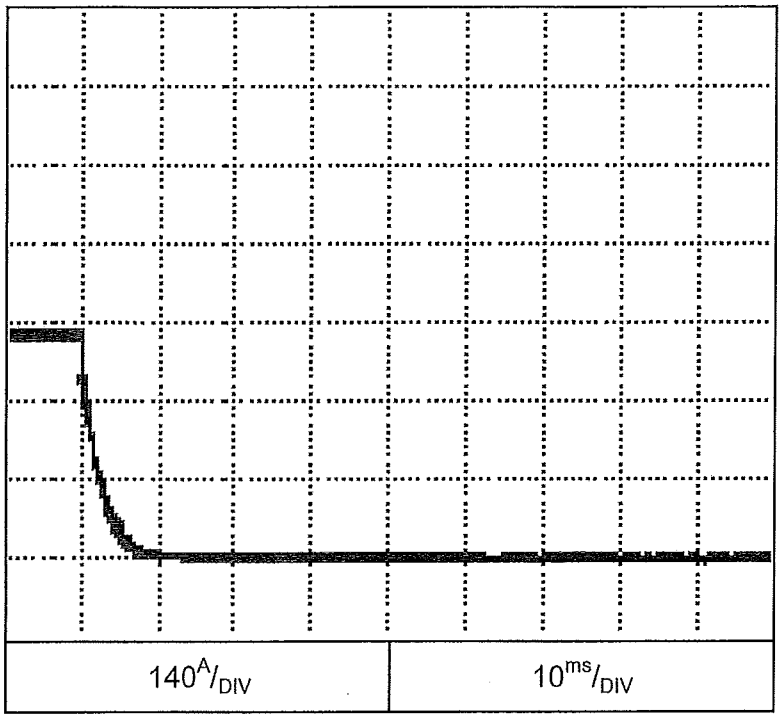
GEN600-5.5



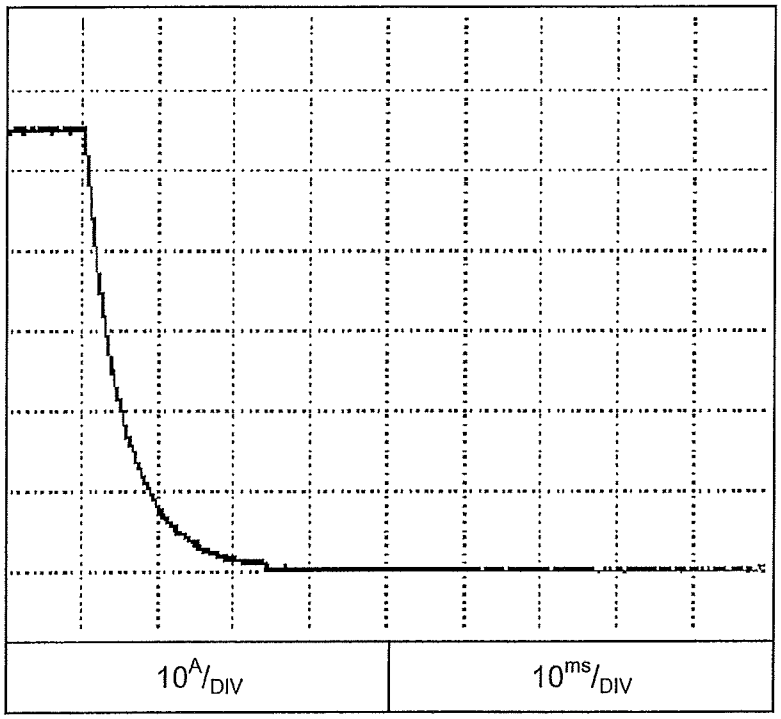
2.5 ON/OFF Output fall characteristics
C.C mode

Conditions: Vin:230V
Vout: 100%
Iout: 100%
Load: CR
Ta = 25°C

GEN8-400



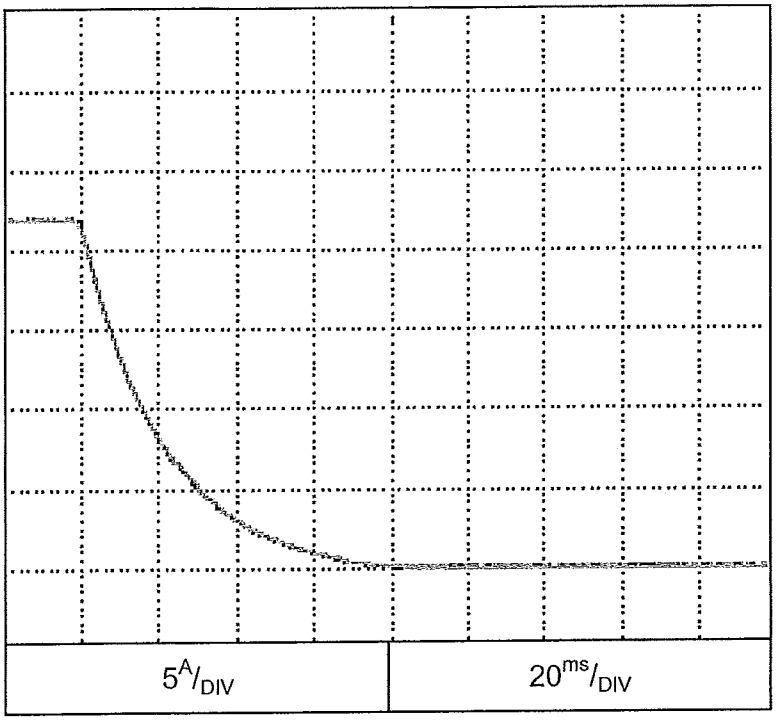
GEN60-55



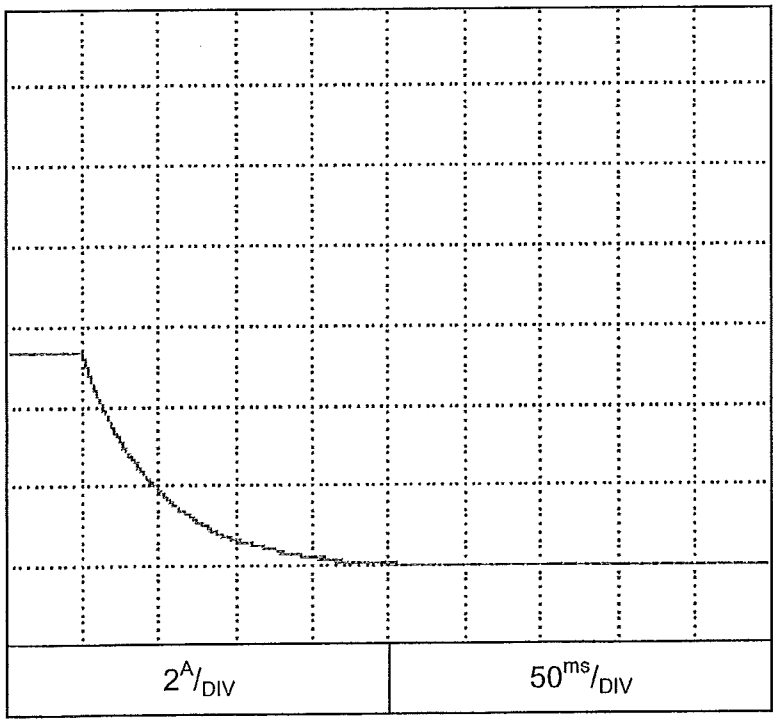
2.5 ON/OFF Output fall characteristics
C.C mode

Conditions: Vin:230V
Vout: 100%
Iout: 100%
Load: CR
Ta = 25°C

GEN150-22



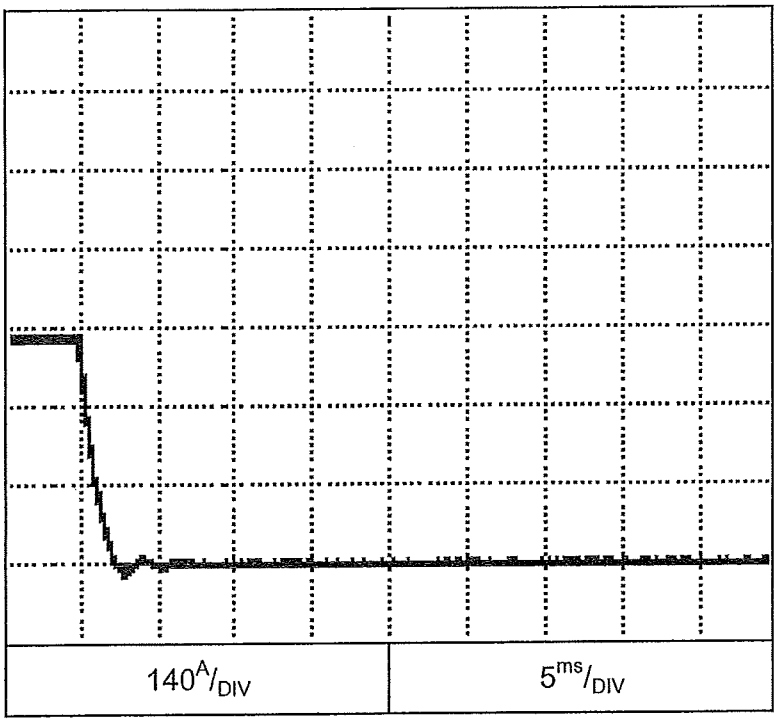
GEN600-5.5



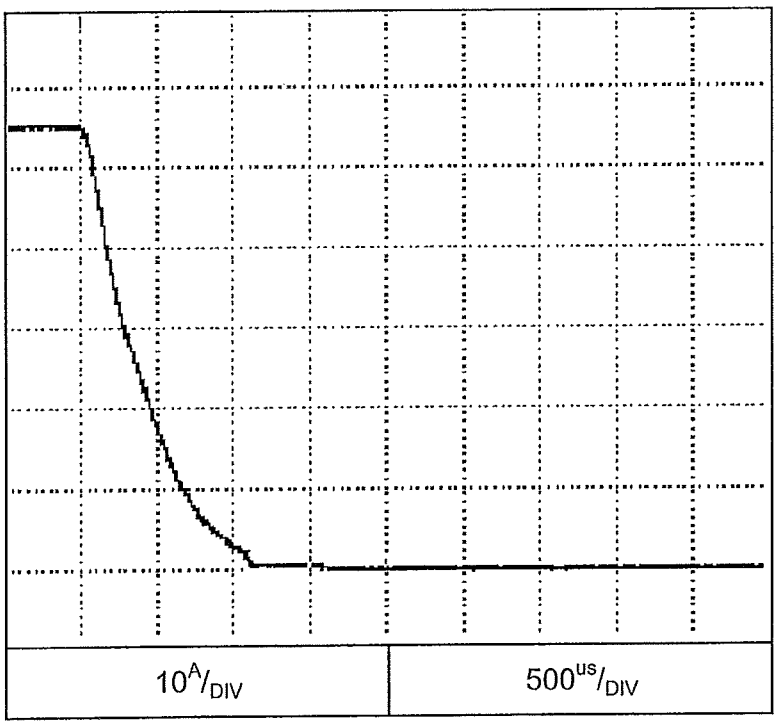
2.5 ON/OFF Output fall characteristics
C.C mode

Conditions: Vin:230V
Iout: 100%
shorted output
Ta = 25°C

GEN8-400



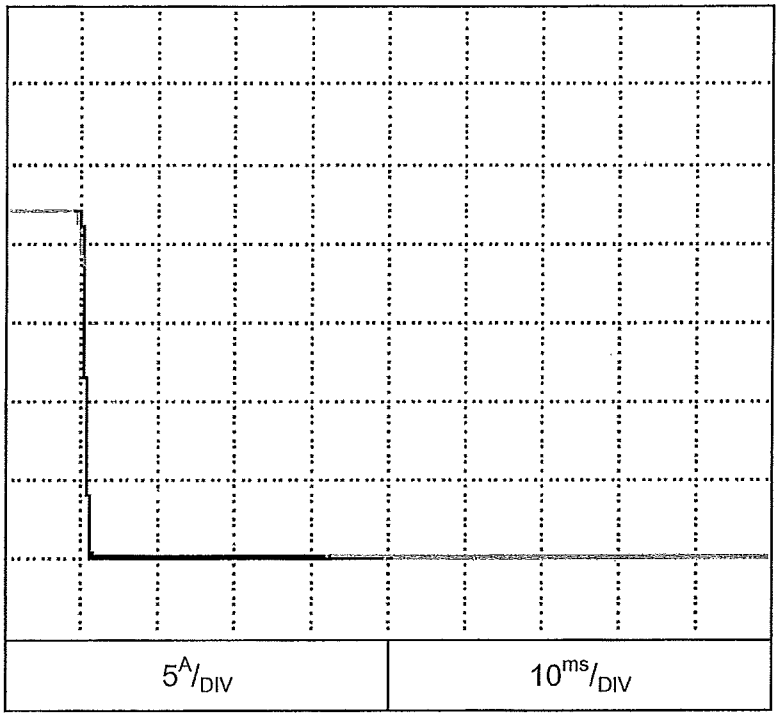
GEN60-55



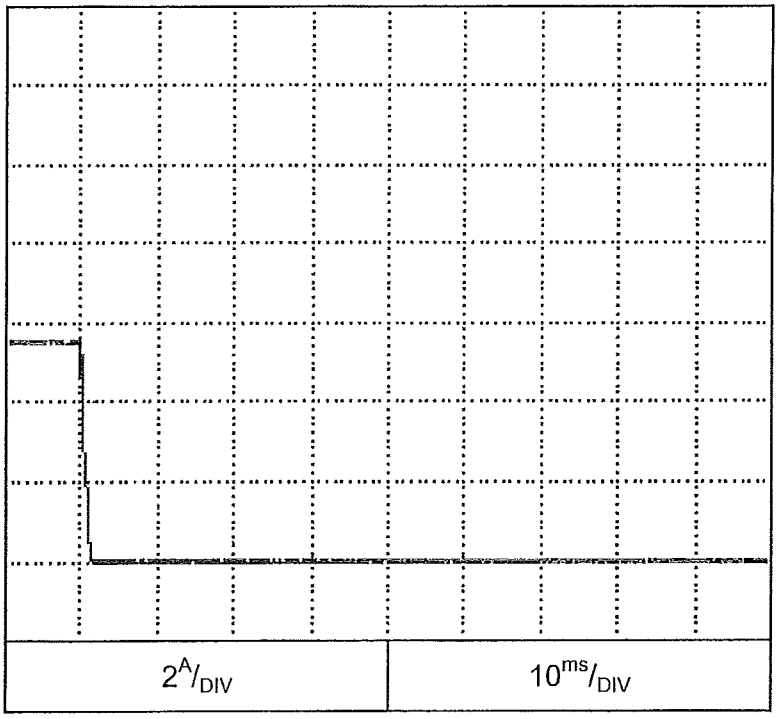
2.5 ON/OFF Output fall characteristics
C.C mode

Conditions: Vin:230V
Iout: 100%
shorted output
Ta = 25°C

GEN150-22



GEN600-5.5

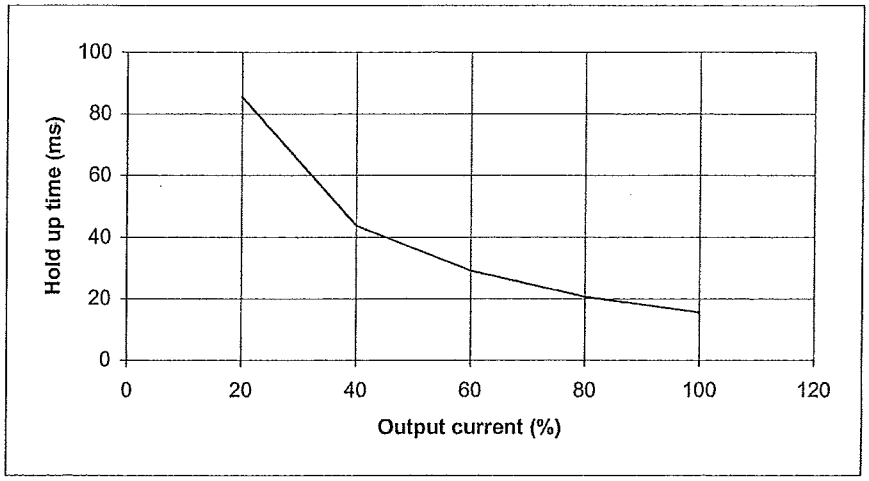


2.6 Hold up time characteristics

Conditions: Ta = 25°C
Vout:100%

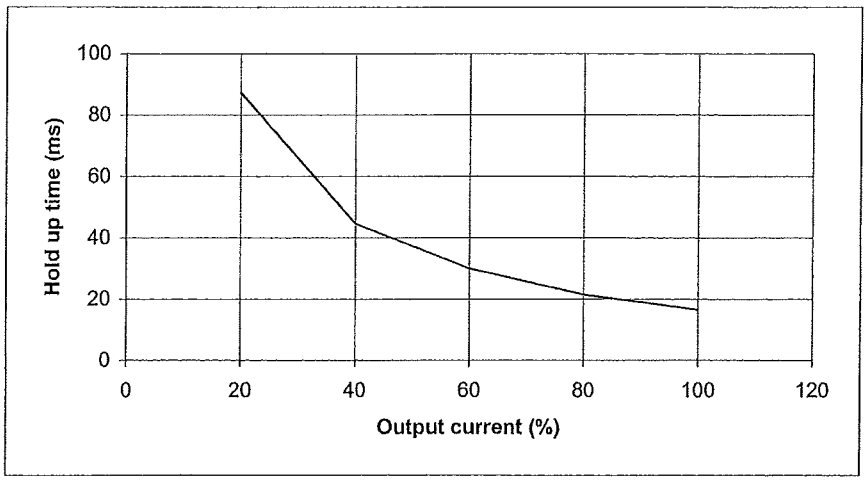
GEN8-400 1Φ

Vin:230VAC



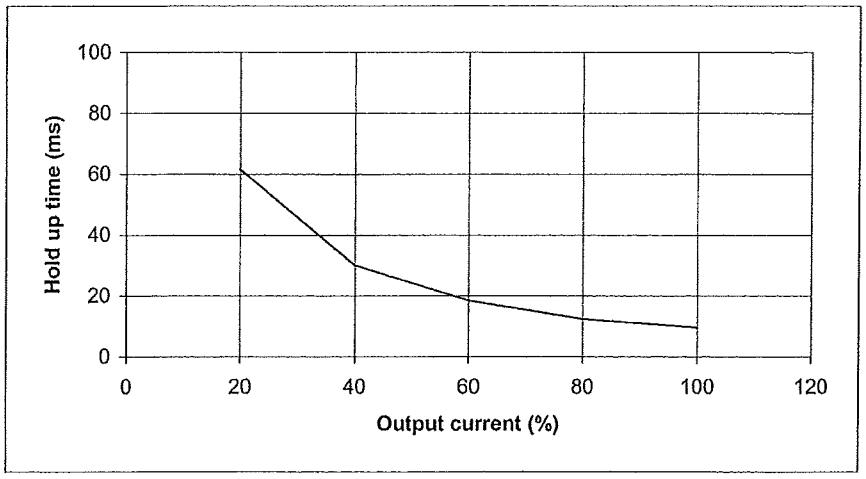
GEN8-400 3Φ 200

Vin:208VAC



GEN8-400 3Φ 400

Vin:400VAC

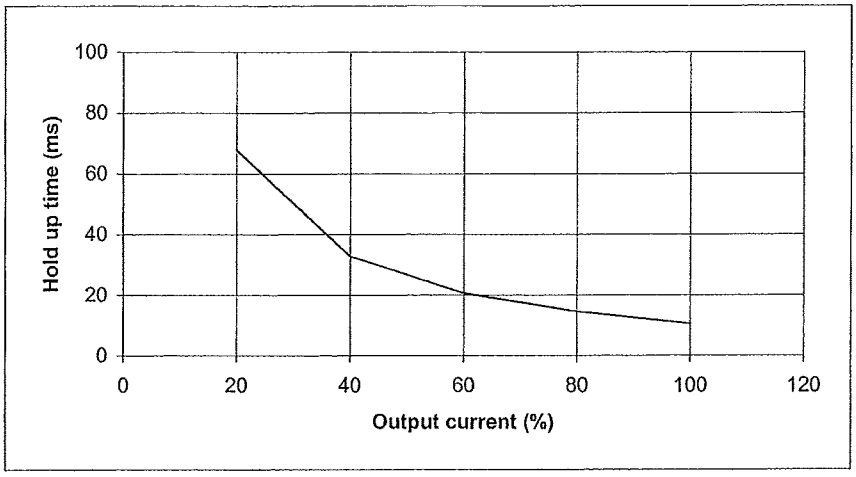


2.6 Hold up time characteristics

Conditions: Ta = 25°C
Vout:100%

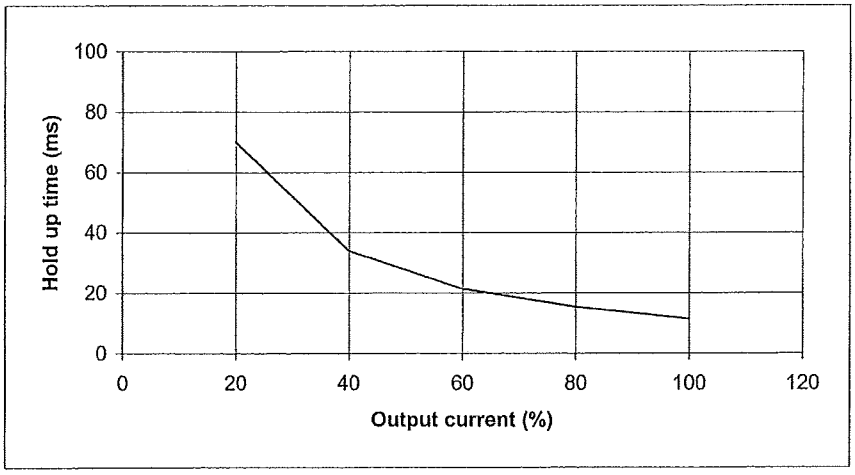
GEN60-55 1Φ

Vin:230VAC



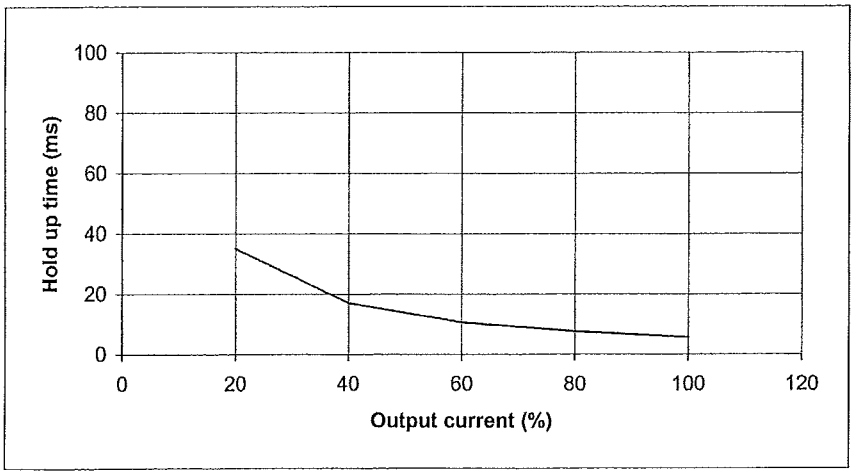
GEN60-55 3Φ 200

Vin:208VAC



GEN60-55 3Φ 400

Vin:400VAC

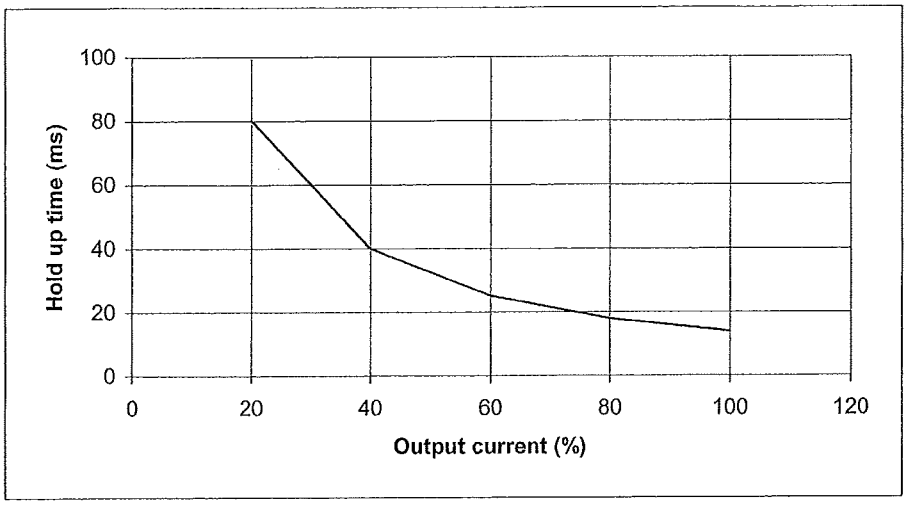


2.6 Hold up time characteristics

Conditions: Ta = 25°C
Vout:100%

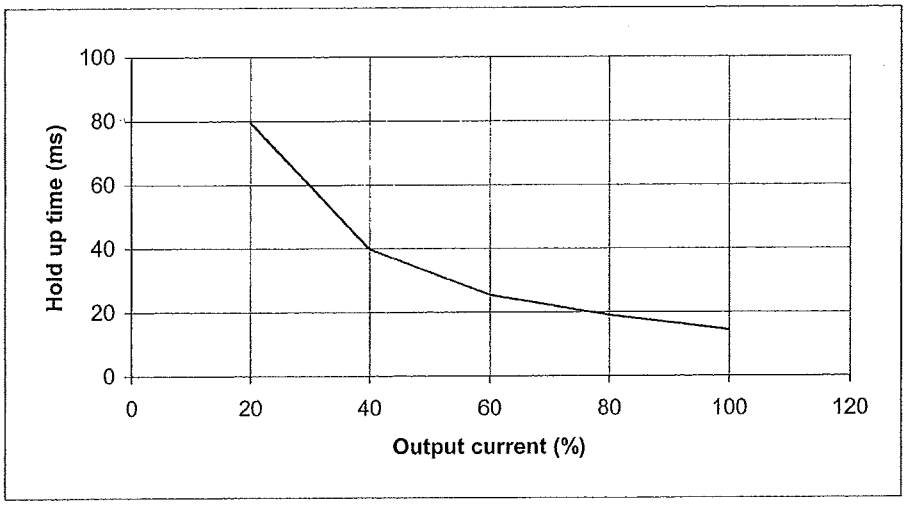
GEN150-22 1Φ

Vin:230VAC



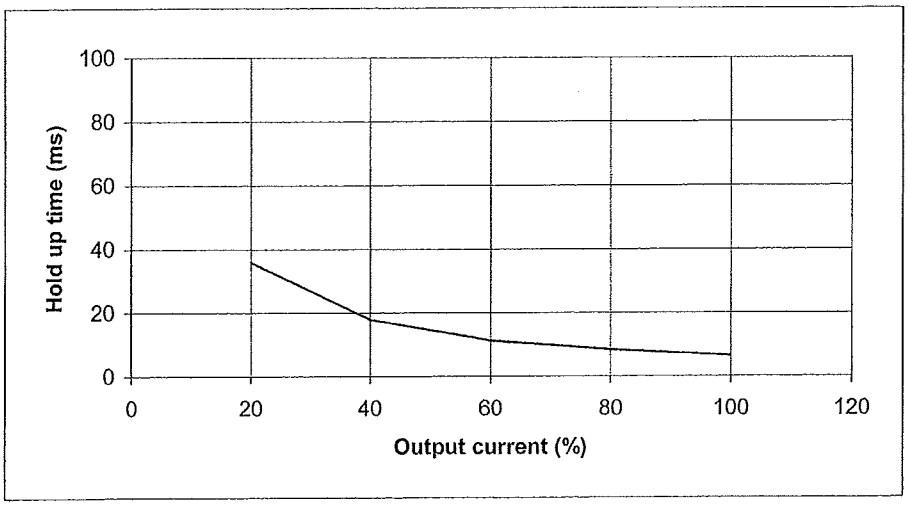
GEN150-22 3Φ 200

Vin:208VAC



GEN150-22 3Φ 400

Vin:400VAC

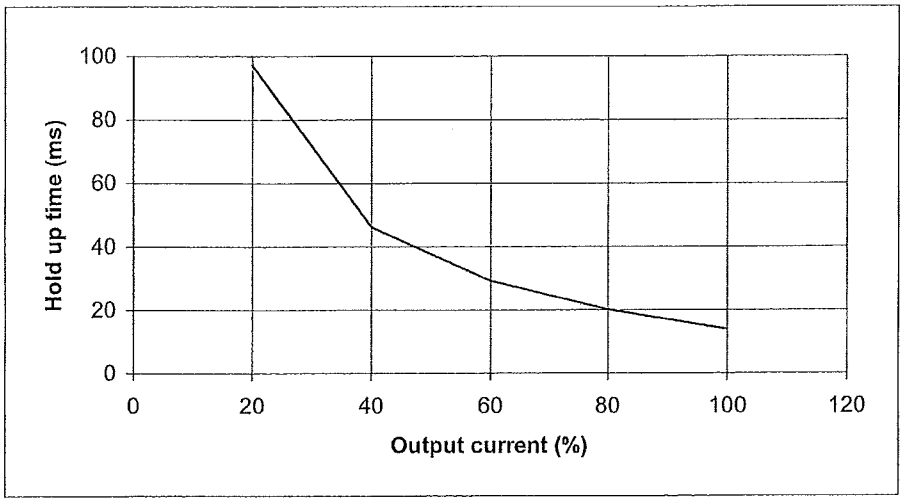


2.6 Hold up time characteristics

Conditions: Ta = 25°C
Vout:100%

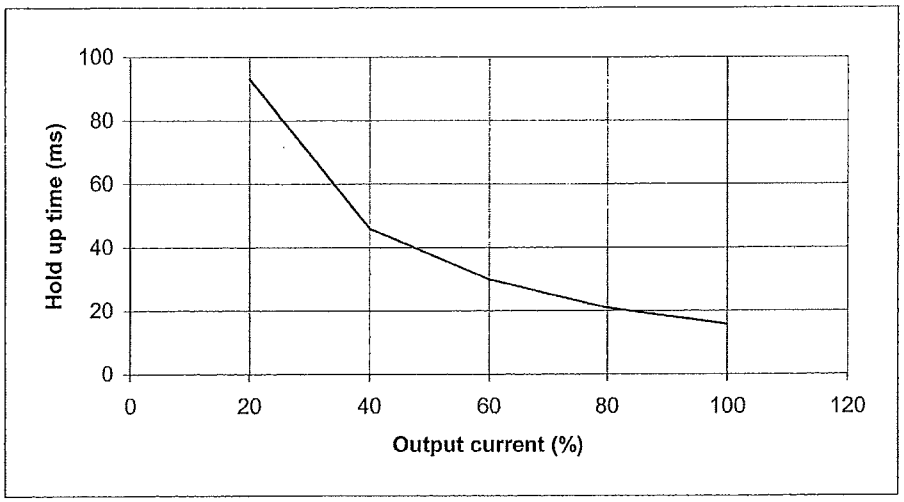
GEN600-5.5 1Φ

Vin:230VAC



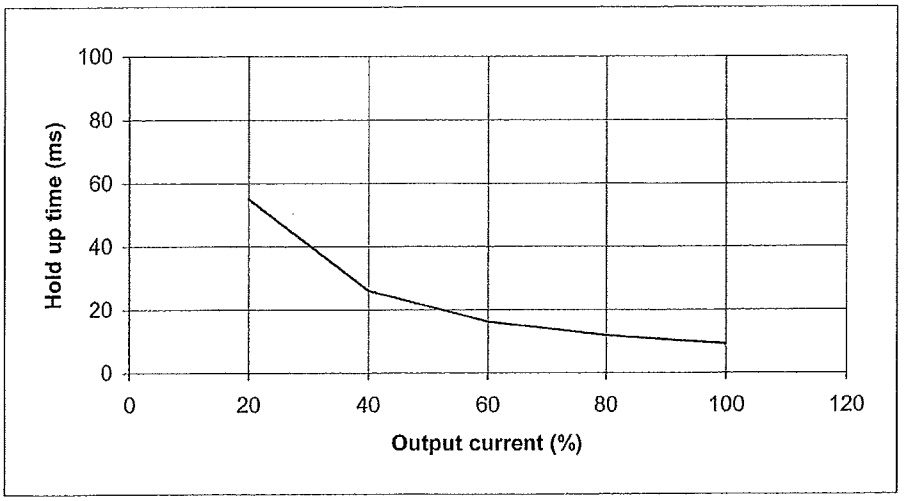
GEN600-5.5 3Φ 200

Vin:208VAC



GEN600-5.5 3Φ 400

Vin:400VAC



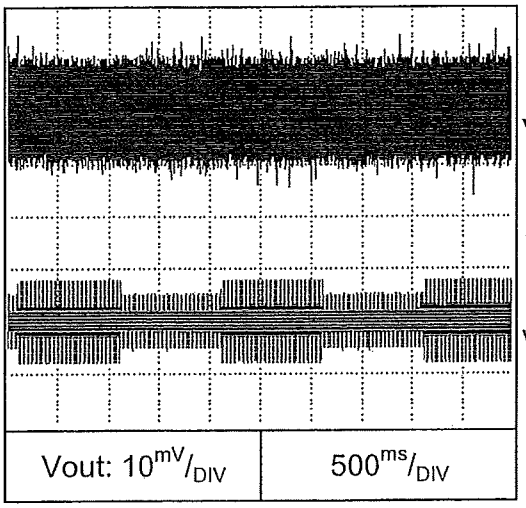
2.7 Dynamic line response characteristics

Ta = 25°C

C.V mode

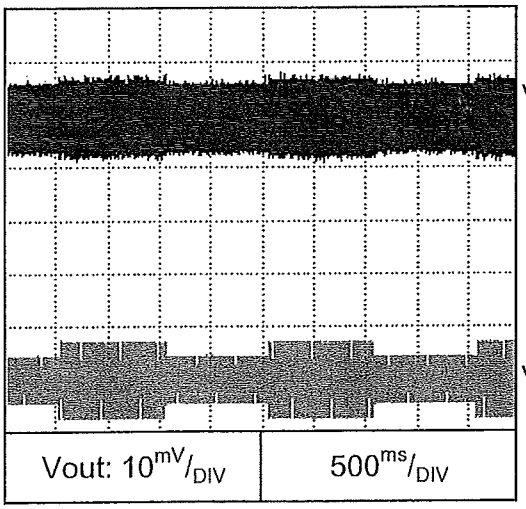
GEN8-400 1Φ

Conditions: Vout: 100%
Iout: 100%
Vin:170↔265V



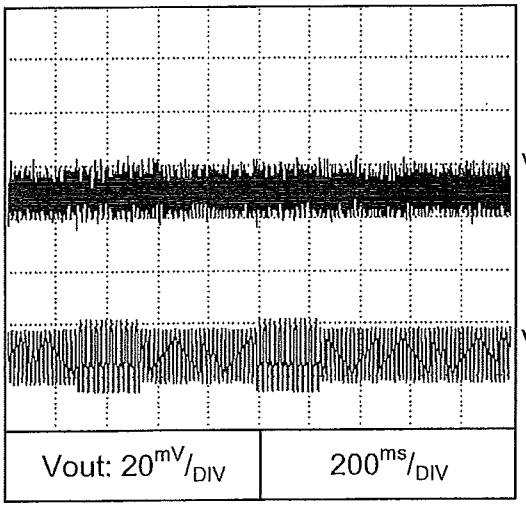
GEN8-400 3Φ 200

Conditions: Vout: 100%
Iout: 100%
Vin:170↔265V



GEN8-400 3Φ 400

Conditions: Vout: 100%
Iout: 100%
Vin:342↔460V



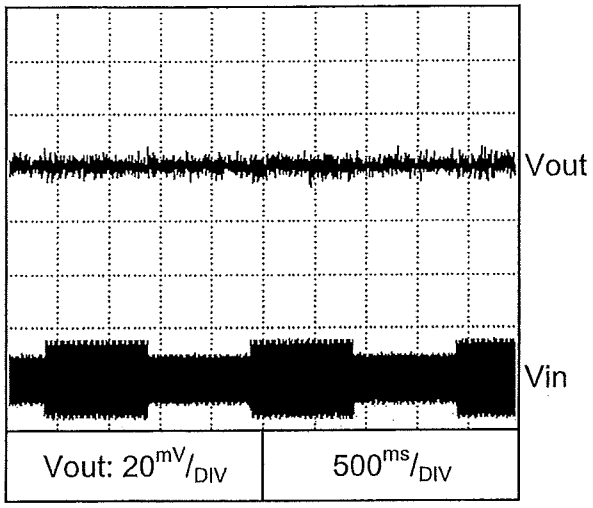
2.7 Dynamic line response characteristics

Ta = 25°C

C.V mode

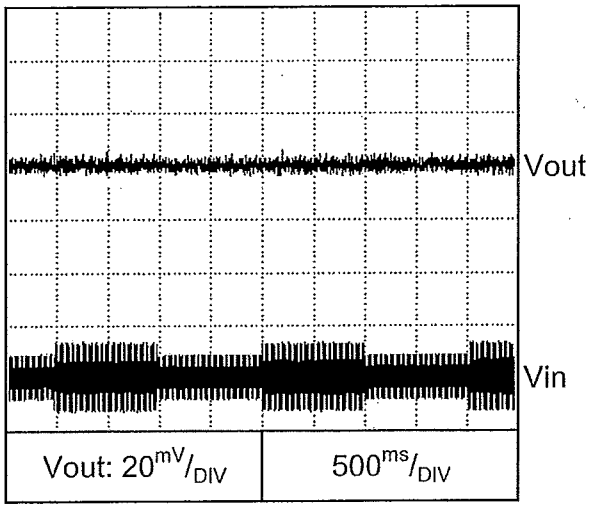
GEN60-55 1Φ

Conditions: Vout: 100%
Iout: 100%
Vin:170↔265V



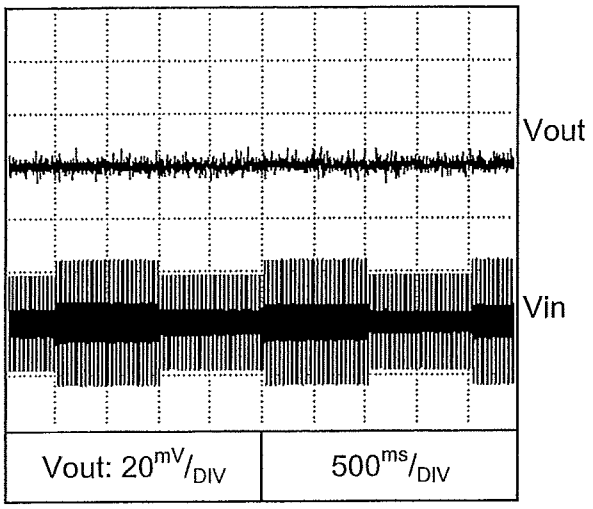
GEN60-55 3Φ 200

Conditions: Vout: 100%
Iout: 100%
Vin:170↔265V



GEN60-55 3Φ 400

Conditions: Vout: 100%
Iout: 100%
Vin:342↔460V



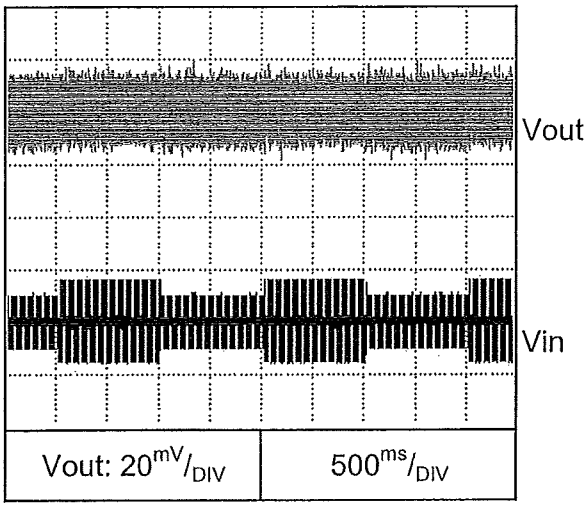
2.7 Dynamic line response characteristics

Ta = 25°C

C.V mode

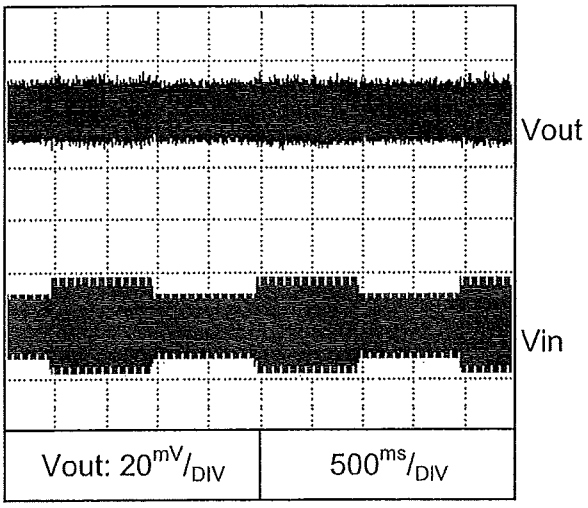
GEN150-22 1Φ

Conditions: Vout: 100%
Iout: 100%
Vin:170↔265V



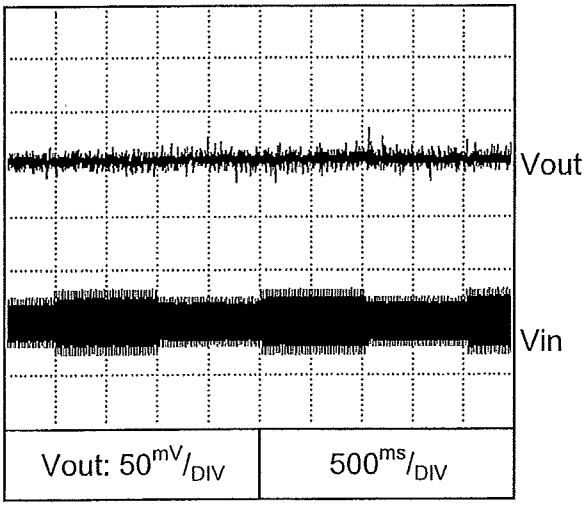
GEN150-22 3Φ 200

Conditions: Vout: 100%
Iout: 100%
Vin:170↔265V



GEN150-22 3Φ 400

Conditions: Vout: 100%
Iout: 100%
Vin:342↔460V



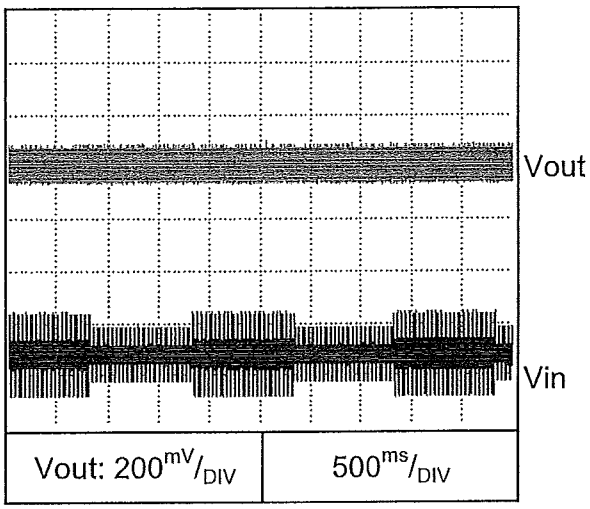
2.7 Dynamic line response characteristics

Ta = 25°C

C.V mode

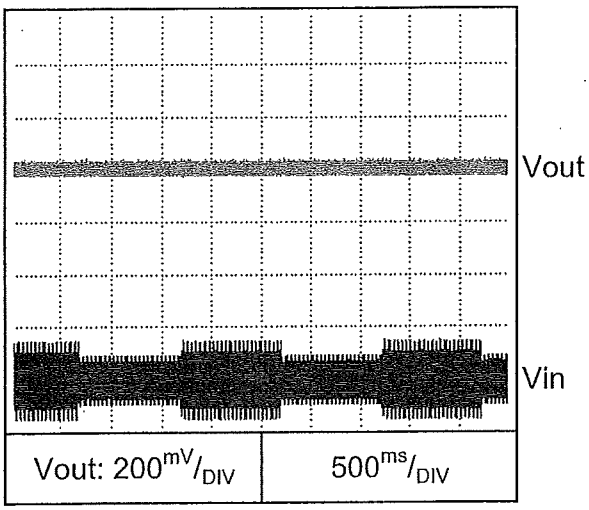
GEN600-5.5 1Φ

Conditions: Vout: 100%
Iout: 100%
Vin:170↔265V



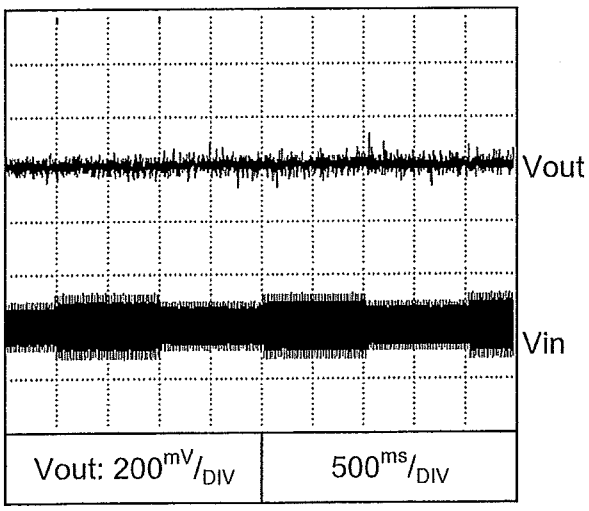
GEN600-5.5 3Φ 200

Conditions: Vout: 100%
Iout: 100%
Vin:170↔265V



GEN600-5.5 3Φ 400

Conditions: Vout: 100%
Iout: 100%
Vin:342↔460V



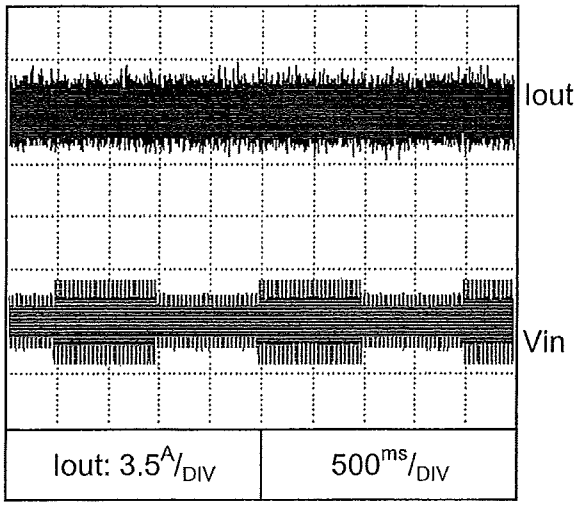
2.7 Dynamic line response characteristics

Ta = 25°C

C.C mode

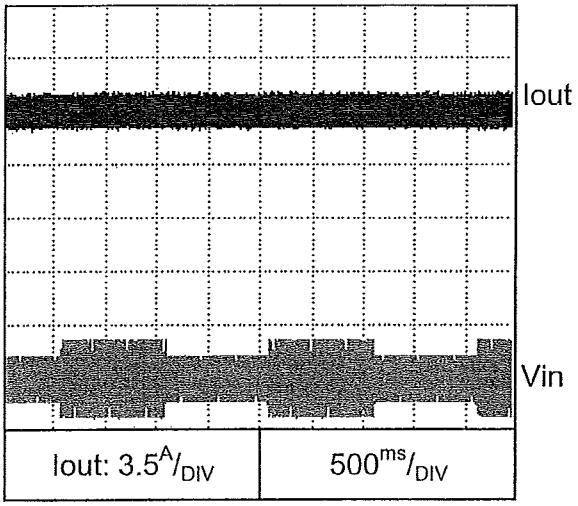
GEN8-400 1Φ

Conditions: Vout: 100%
Iout: 100%
Vin:170↔265V



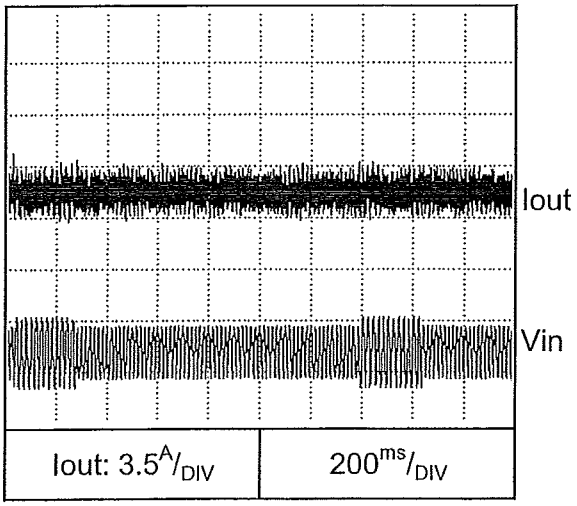
GEN8-400 3Φ 200

Conditions: Vout: 100%
Iout: 100%
Vin:170↔265V



GEN8-400 3Φ 400

Conditions: Vout: 100%
Iout: 100%
Vin:342↔460V



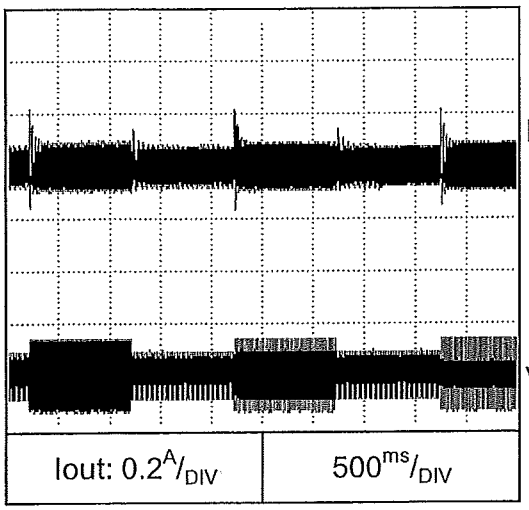
2.7 Dynamic line response characteristics

Ta = 25°C

C.C mode

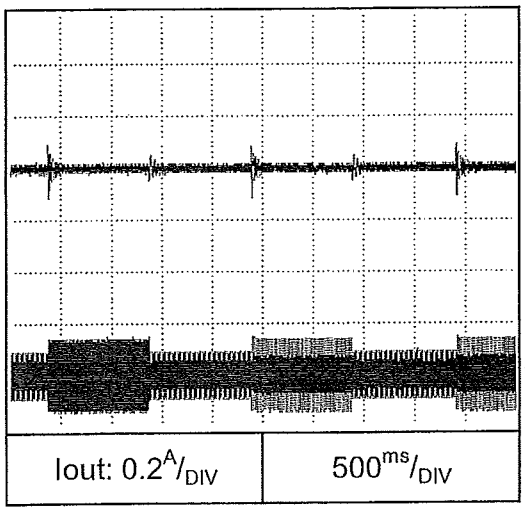
GEN60-55 1Φ

Conditions: Vout: 100%
Iout: 100%
Vin:170↔265V



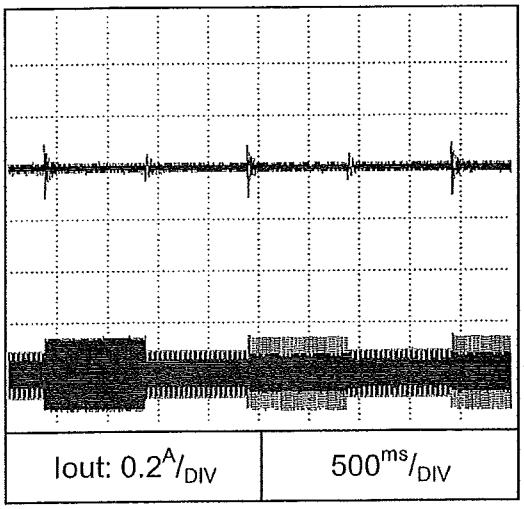
GEN60-55 3Φ 200

Conditions: Vout: 100%
Iout: 100%
Vin:170↔265V



GEN60-55 3Φ 400

Conditions: Vout: 100%
Iout: 100%
Vin:342↔460V



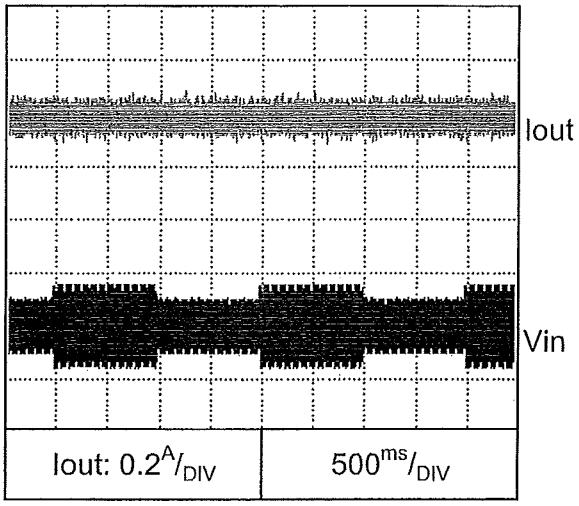
2.7 Dynamic line response characteristics

Ta = 25°C

C.C mode

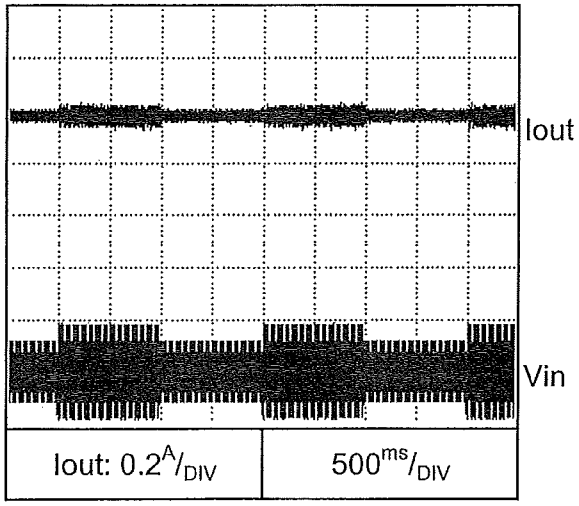
GEN150-22 1Φ

Conditions: Vout: 100%
Iout: 100%
Vin:170↔265V



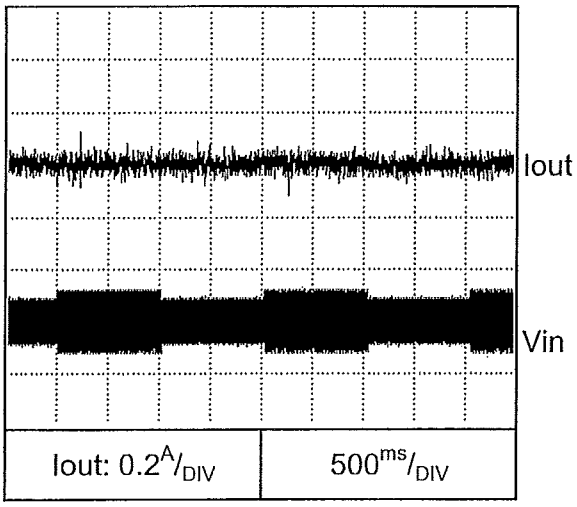
GEN150-22 3Φ 200

Conditions: Vout: 100%
Iout: 100%
Vin:170↔265V



GEN150-22 3Φ 400

Conditions: Vout: 100%
Iout: 100%
Vin:342↔460V



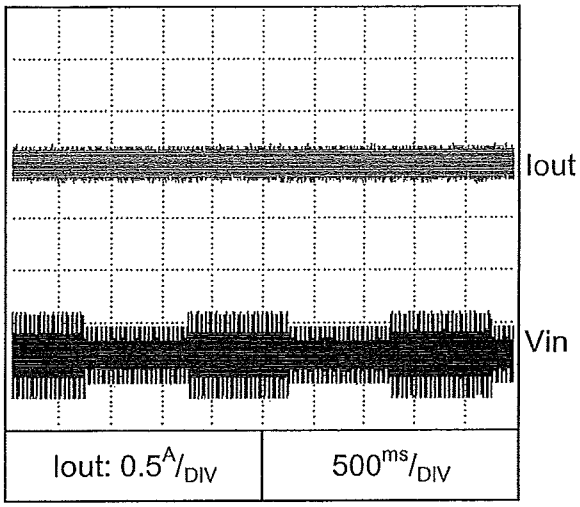
2.7 Dynamic line response characteristics

Ta = 25°C

C.C mode

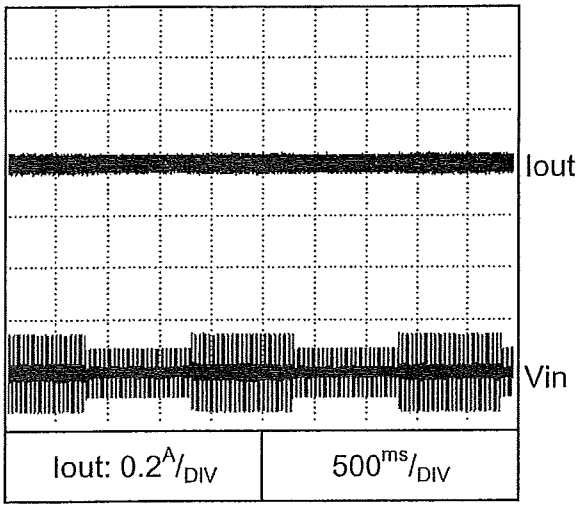
GEN600-5.5 1Φ

Conditions: Vout: 100%
Iout: 100%
Vin:170↔265V



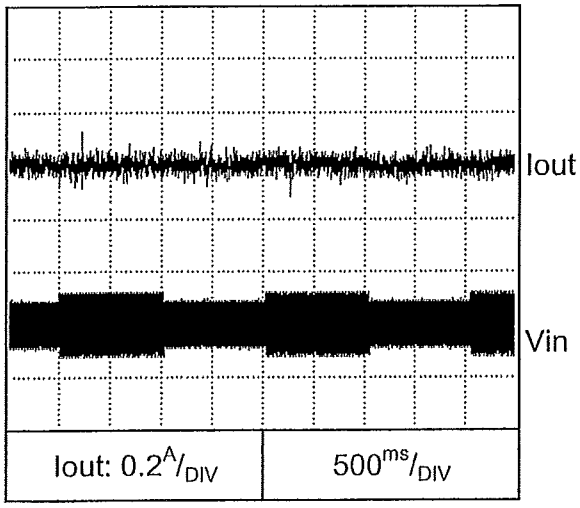
GEN600-5.5 3Φ 200

Conditions: Vout: 100%
Iout: 100%
Vin:170↔265V



GEN600-5.5 3Φ 400

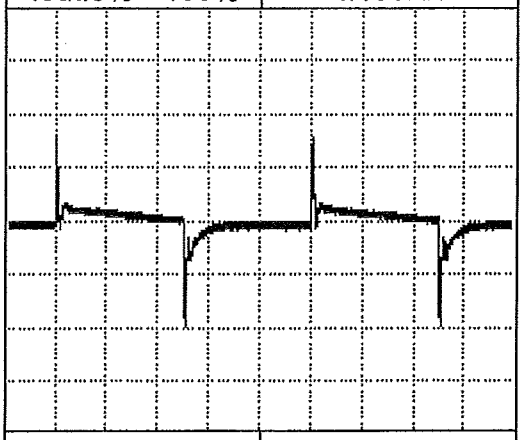
Conditions: Vout: 100%
Iout: 100%
Vin:342↔460V

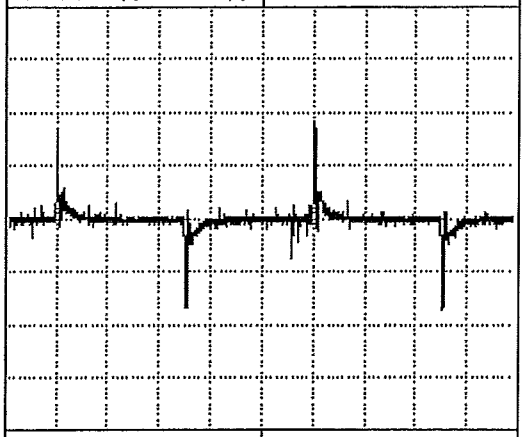


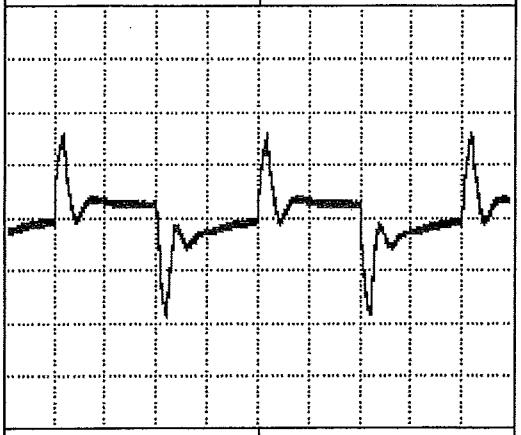
2.8 Dynamic load response characteristics
C.V mode

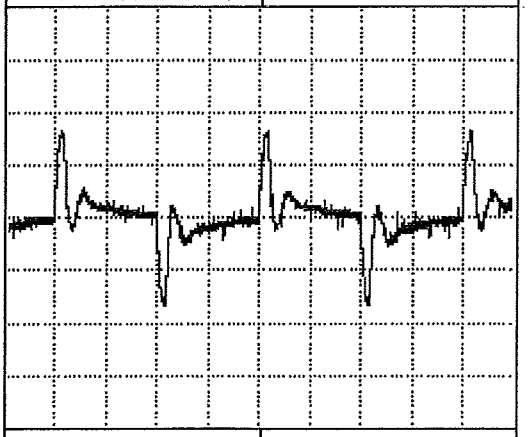
Conditions: Vin:230VAC
Vout: 100%
Load current: tr=tf=100us
Ta = 25°C

GEN8-400

Iout:0%↔100%	f:100Hz
	
0.5V/DIV	2ms/DIV
7.50%	-12.50%

Iout:50%↔100%	f:100Hz
	
0.2V/DIV	2ms/DIV
3.75%	-3.75%

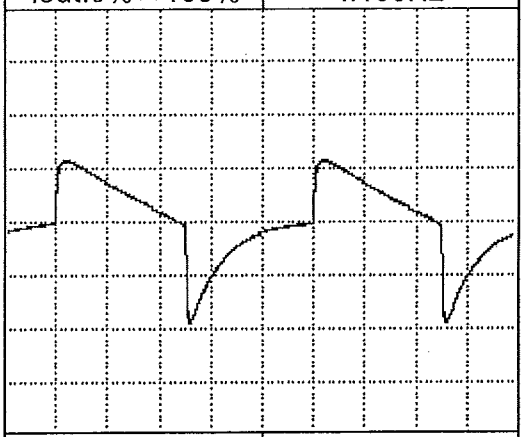
Iout:0%↔100%	f:500Hz
	
0.5V/DIV	500us/DIV
7.50%	-12.50%

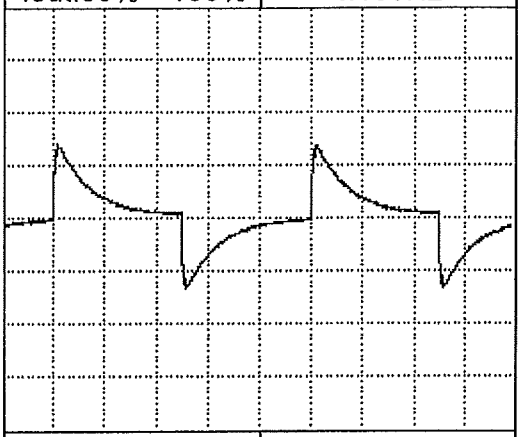
Iout:50%↔100%	f:500Hz
	
0.2V/DIV	500us/DIV
3.75%	-3.75%

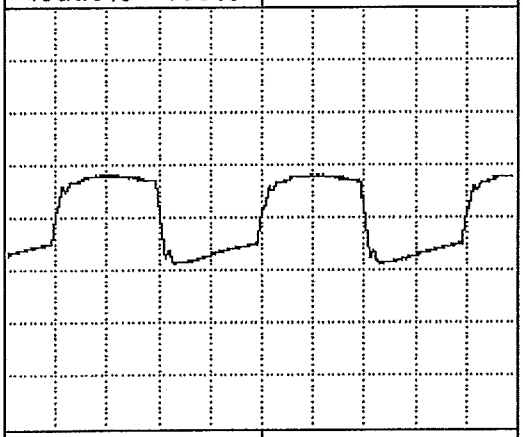
2.8 Dynamic load response characteristics
C.V mode

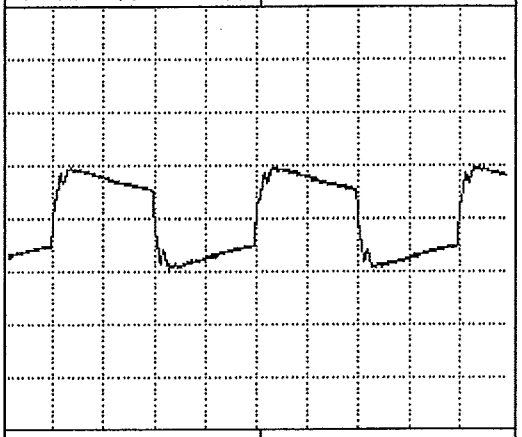
Conditions: Vin:230VAC
Vout: 100%
Load current: tr=tf=100us
Ta = 25°C

GEN60-55

Iout:0%↔100%	f:100Hz
	
0.5V/DIV	2ms/DIV
0.91%	-1.66%

Iout:50%↔100%	f:100Hz
	
0.2V/DIV	2ms/DIV
0.42%	-0.42%

Iout:0%↔100%	f:500Hz
	
0.5V/DIV	500us/DIV
0.83%	-0.83%

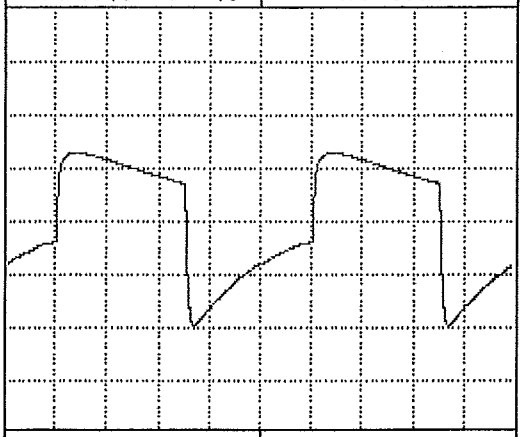
Iout:50%↔100%	f:500Hz
	
0.2V/DIV	500us/DIV
0.33%	-0.33%

2.8 Dynamic load response characteristic
C.V mode

Conditions: Vin:230VAC
Vout: 100%
Load current: tr=tf=100us
Ta = 25°C

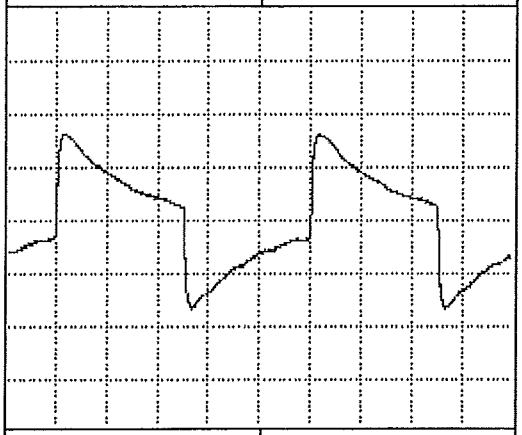
GEN150-22

Iout:0%↔100%	f:100Hz



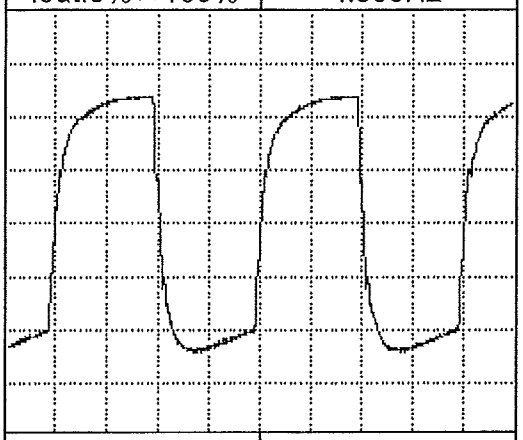
0.5V/DIV	2ms/DIV
0.46%	-0.66%

Iout:50%↔100%	f:100Hz



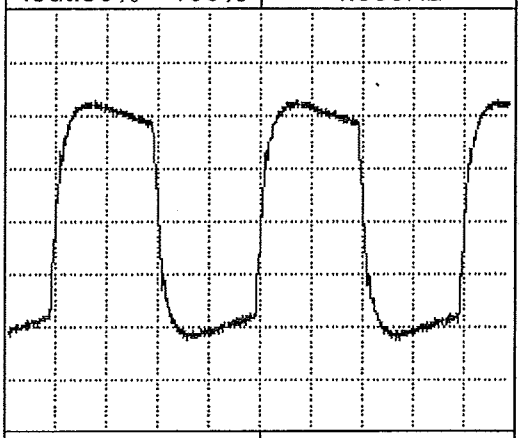
0.2V/DIV	2ms/DIV
0.20%	-0.20%

Iout:0%↔100%	f:500Hz



0.2V/DIV	500us/DIV
0.33%	-0.33%

Iout:50%↔100%	f:500Hz



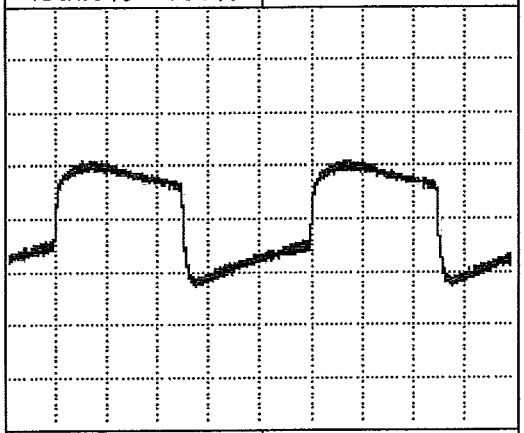
0.1V/DIV	500us/DIV
0.15%	-0.15%

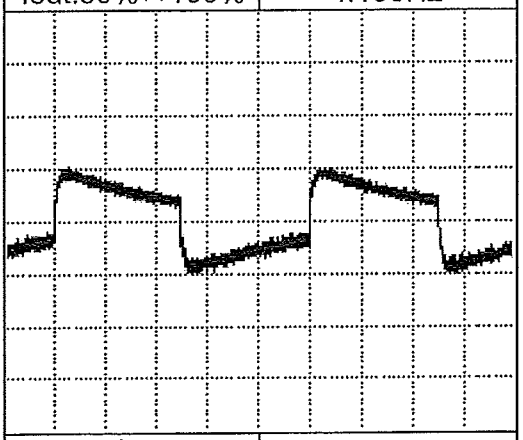
2.8 Dynamic load response characteristics

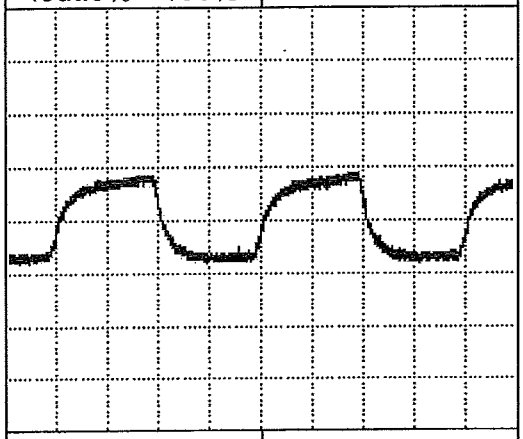
C.V mode

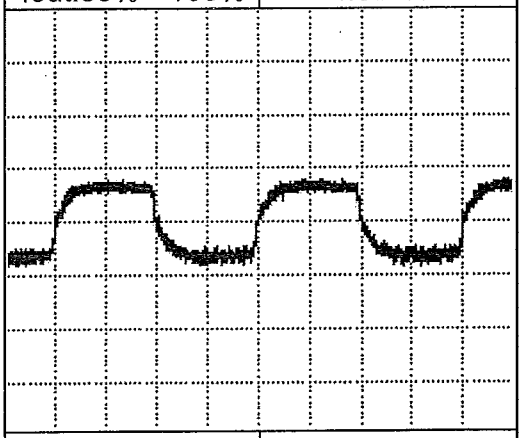
Conditions: Vin:230VAC
Vout: 100%
Load current: tr=tf=100us
Ta = 25°C

GEN600-5.5

Iout:0%↔100%	f:100Hz
	
$1^{V}/_{DIV}$	$2^{ms}/_{DIV}$
0.16%	-0.20%

Iout:50%↔100%	f:100Hz
	
$0.5^{V}/_{DIV}$	$2^{ms}/_{DIV}$
0.08%	-0.08%

Iout:0%↔100%	f:500Hz
	
$1^{V}/_{DIV}$	$500^{us}/_{DIV}$
0.16%	-0.20%

Iout:50%↔100%	f:500Hz
	
$0.5^{V}/_{DIV}$	$500^{us}/_{DIV}$
0.07%	-0.07%

2.8 Dynamic load response characteristics

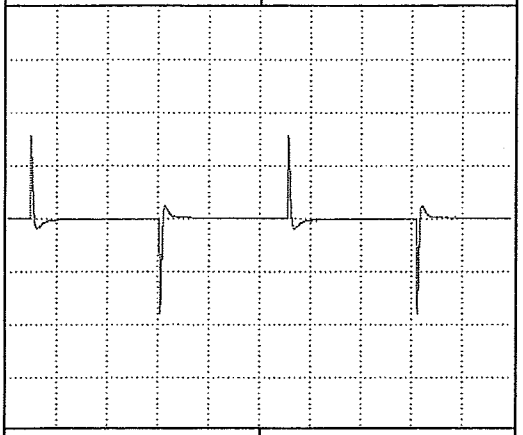
C.C mode

Conditions: Vin:230VAC
Ta = 25°C

GEN8-400

Io=400A

Vout:8↔6.8V	f:10Hz



35A/DIV	20ms/DIV
13.13%	-16.25%

Io=200A

Vout:8↔6.8V	f:10Hz

14A/DIV	20ms/DIV
6.30%	-7.00%

GEN60-55

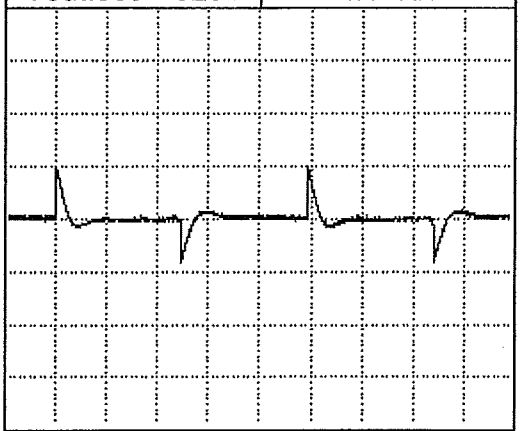
Io=55A

Vout:540↔460V	f:10Hz

5A/DIV	20ms/DIV
17.27%	-13.64%

Io=27.5A

Vout:380↔323V	f:10Hz



5A/DIV	20ms/DIV
9.00%	-7.27%

2.8 Dynamic load response characteristics

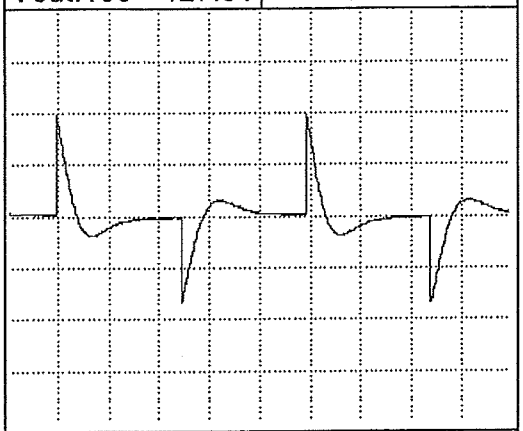
C.C mode

Conditions: Vin:230VAC
Ta = 25°C

GEN150-22

Io=22A

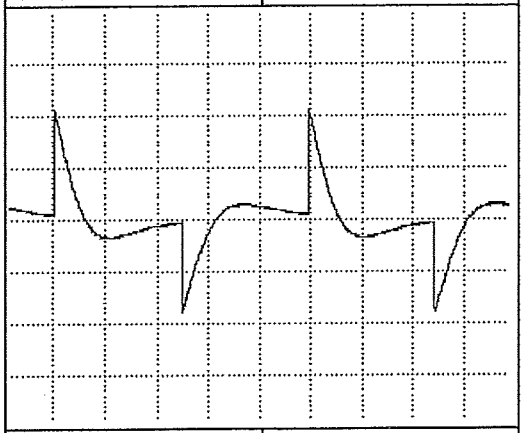
Vout:150↔127.5V	f:10Hz



2A/DIV	20ms/DIV
18.18%	-15.45%

Io=11A

Vout:150↔127.5V	f:10Hz

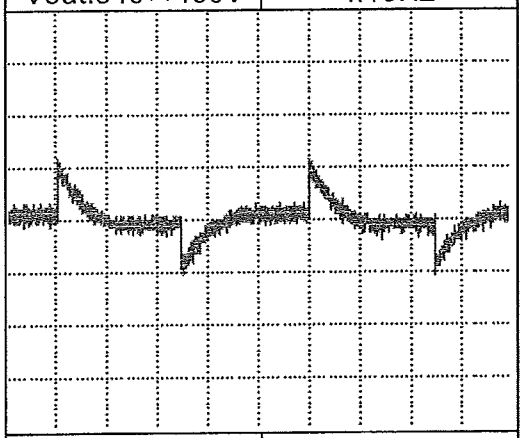


1A/DIV	20ms/DIV
9.09%	-8.18%

GEN600-5.5

Io=5.5A

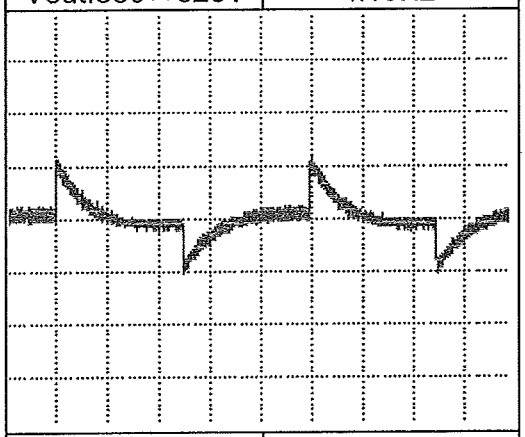
Vout:540↔460V	f:10Hz



1A/DIV	20ms/DIV
18.18%	-18.18%

Io=2.75A

Vout:380↔323V	f:10Hz



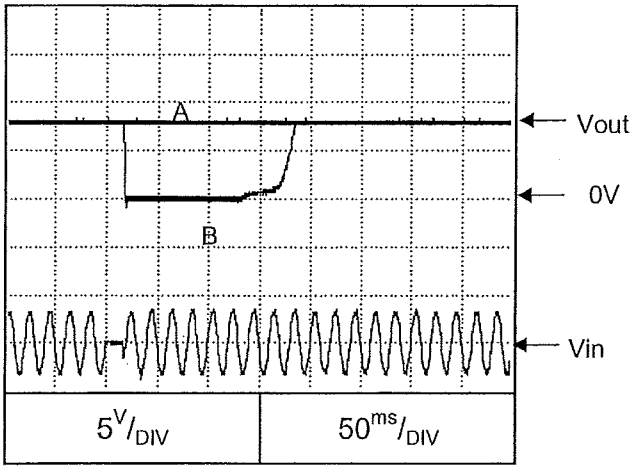
0.5A/DIV	20ms/DIV
9.00%	-9.00%

2.9 Response to brown-out characteristics
C.V mode

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

GEN8-400 1Φ

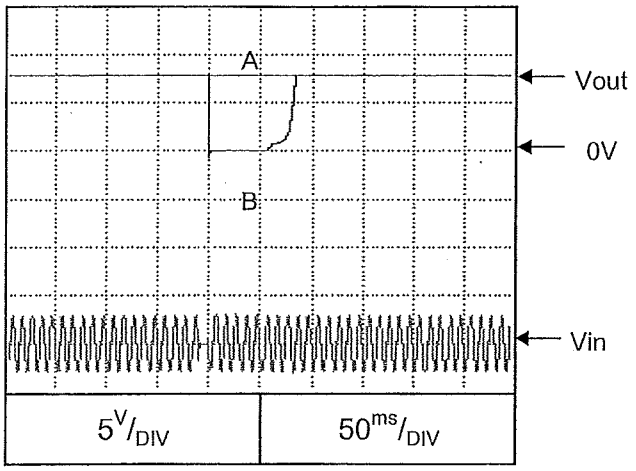
Vin:230VAC



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

GEN8-400 3Φ 200

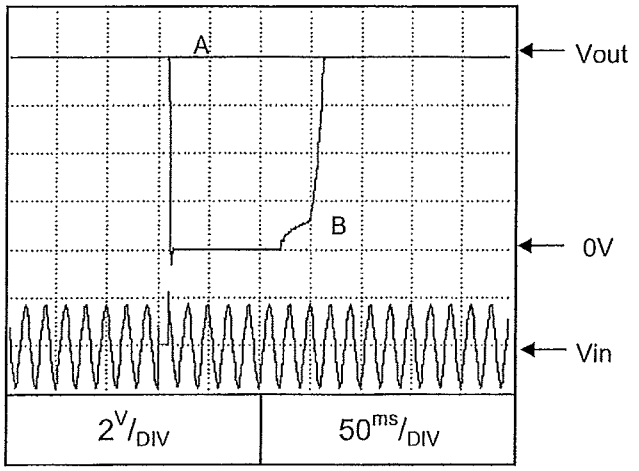
Vin:200VAC



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

GEN8-400 3Φ 400

Vin:380VAC



Brown-out time
A -9mS
B -10mS

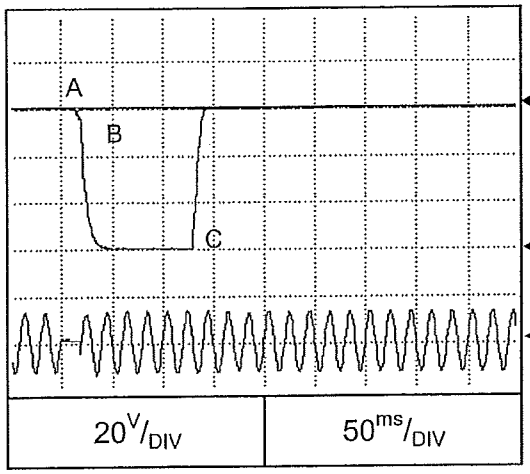
2.9 Response to brown-out characteristics

C.V mode

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

GEN60-55 1Φ

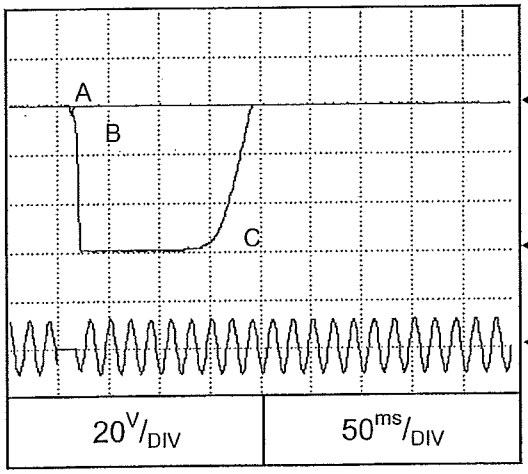
Vin:230VAC



Brown-out time
A -13mS
B -16mS
C -18mS

GEN60-55 3Φ 200

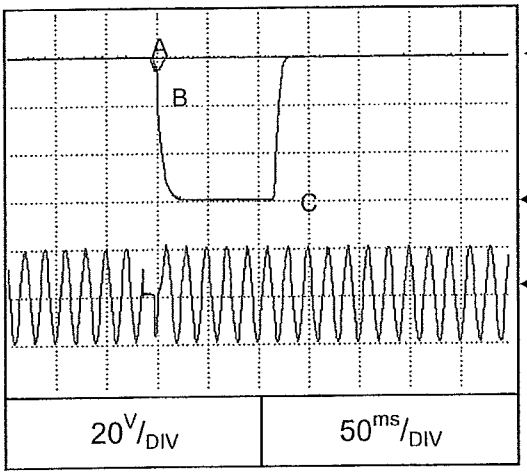
Vin:200VAC



Brown-out time
A -13mS
B -15mS
C -19mS

GEN60-55 3Φ 400

Vin:380VAC



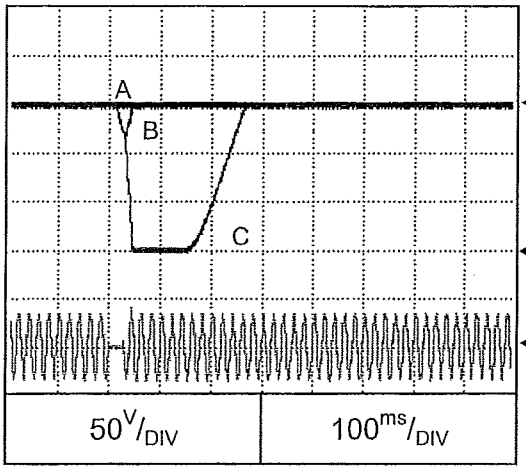
Brown-out time
A -6mS
B -10mS
C -11mS

2.9 Response to brown-out characteristics
C.V mode

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

GEN150-22 1Φ

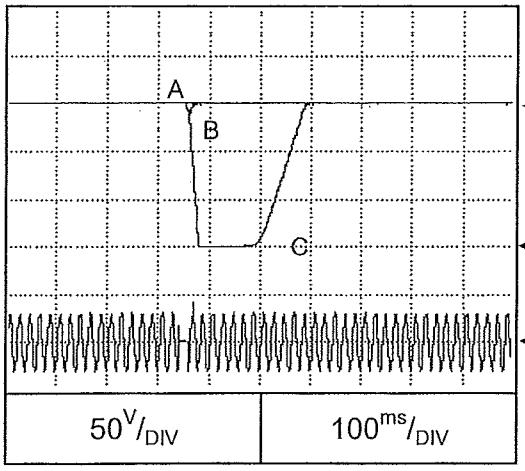
Vin:230VAC



Brown-out time
A -13mS
B -28mS
C -29mS

GEN150-22 3Φ 200

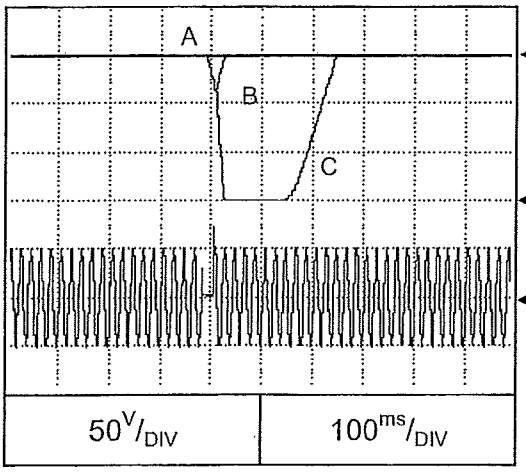
Vin:200VAC



Brown-out time
A -13mS
B -19mS
C -20mS

GEN150-22 3Φ 400

Vin:380VAC



Brown-out time
A -6mS
B -21mS
C -22mS

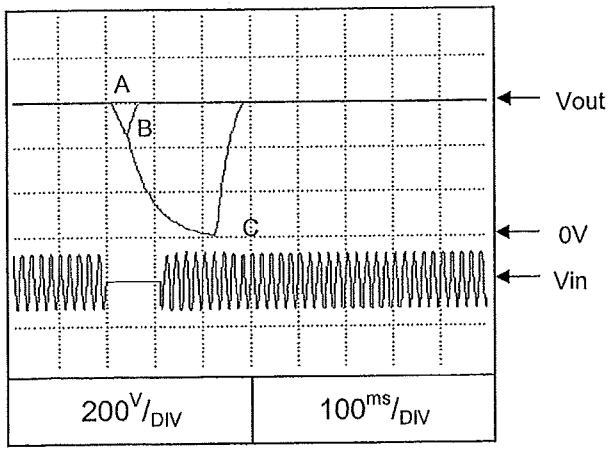
2.9 Response to brown-out characteristics

C.V mode

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

GEN600-5.5 1Φ

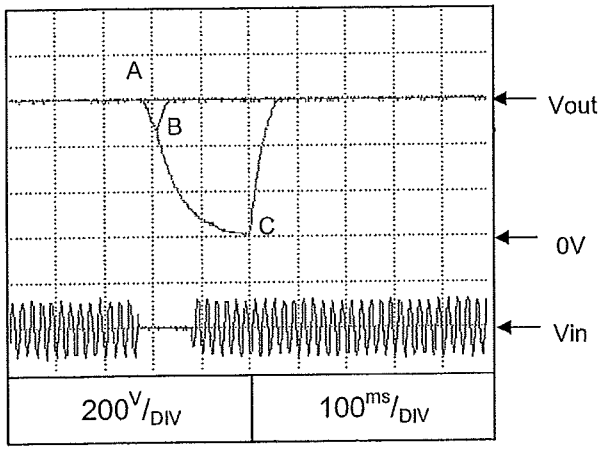
Vin:230VAC



Brown-out time
A -15mS
B -45mS
C -115mS

GEN600-5.5 3Φ 200

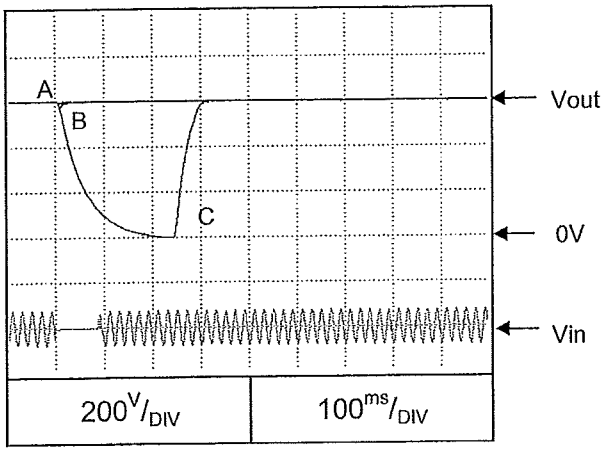
Vin:200VAC



Brown-out time
A -15mS
B -45mS
C -110mS

GEN600-5.5 3Φ 400

Vin:380VAC



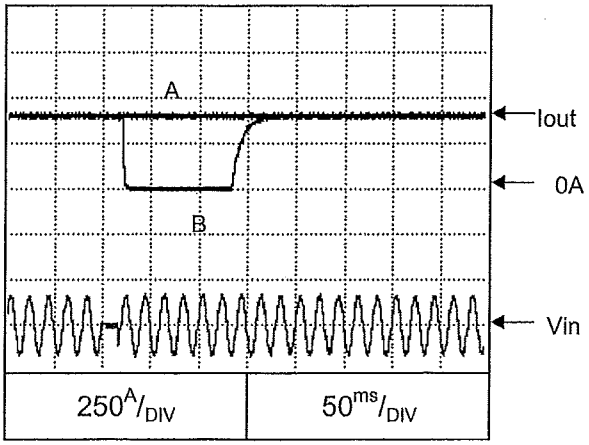
Brown-out time
A -7mS
B -8mS
C -88mS

2.9 Response to brown-out characteristics
C.C mode

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

GEN8-400 1Φ

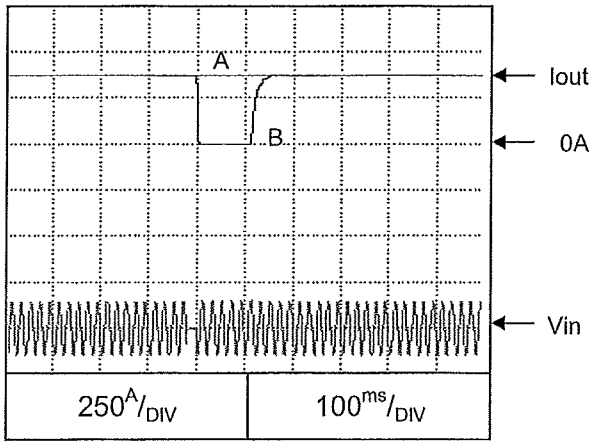
Vin:230VAC



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

GEN8-400 3Φ 200

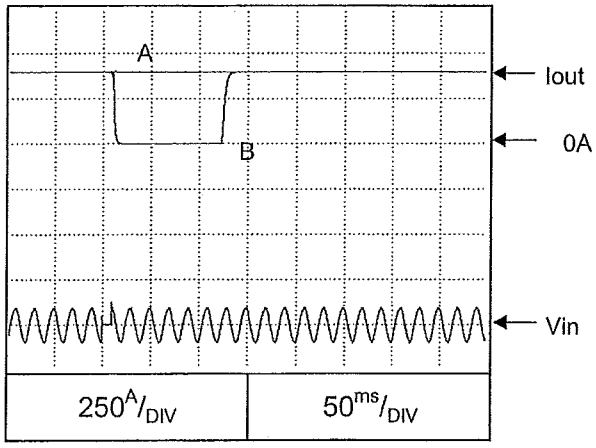
Vin:200VAC



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

GEN8-400 3Φ 400

Vin:380VAC



Brown-out time
A -9mS
B -10mS

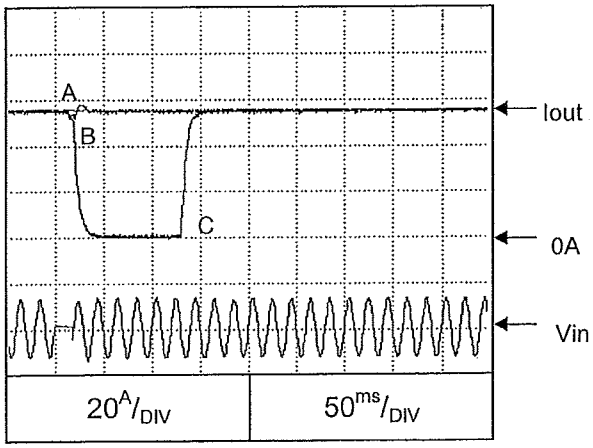
2.9 Response to brown-out characteristics

C.C mode

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

GEN60-55 1Φ

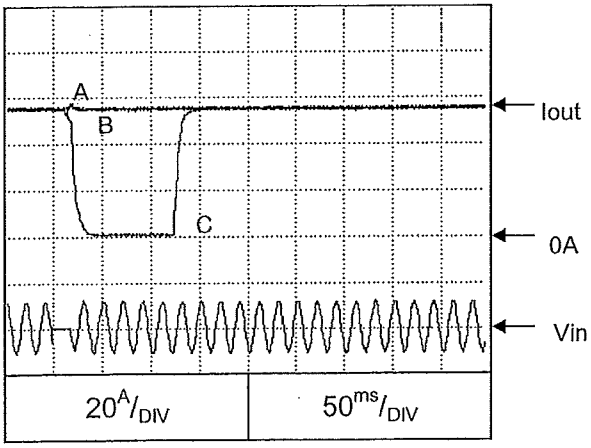
Vin:230VAC



Brown-out time
A -13mS
B -17mS
C -28mS

GEN60-55 3Φ 200

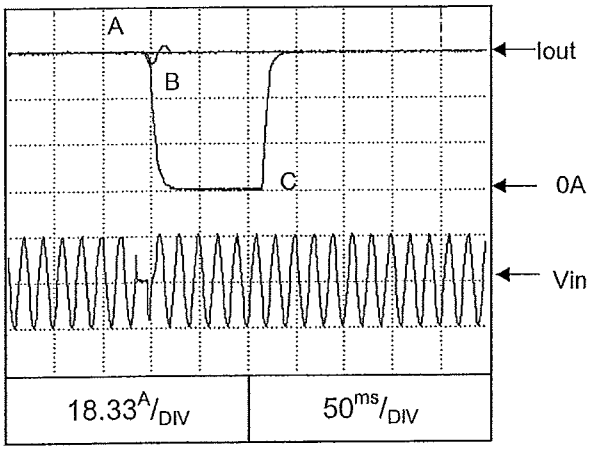
Vin:200VAC



Brown-out time
A -13mS
B -15mS
C -19mS

GEN60-55 3Φ 400

Vin:380VAC



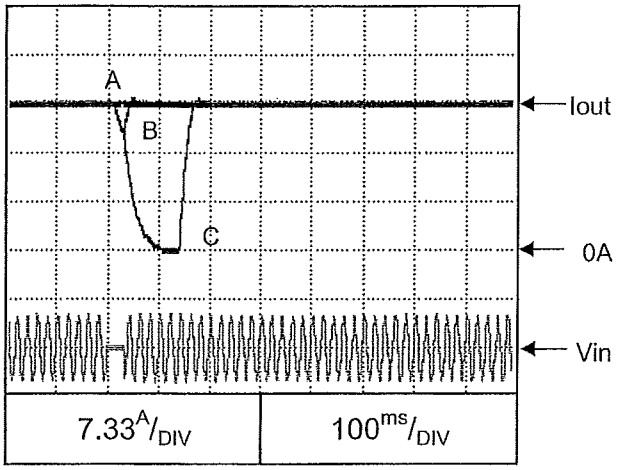
Brown-out time
A -6mS
B -10mS
C -11mS

2.9 Response to brown-out characteristics
C.C mode

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

GEN150-22 1Φ

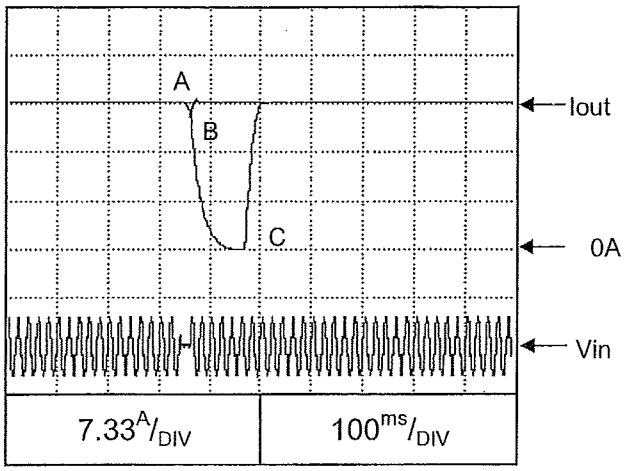
Vin:230VAC



Brown-out time
A -13mS
B -32mS
C -34mS

GEN150-22 3Φ 200

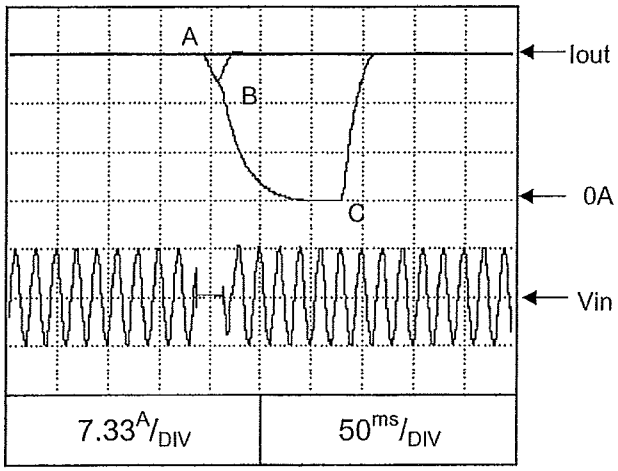
Vin:200VAC



Brown-out time
A -13mS
B -18mS
C -20mS

GEN150-22 3Φ 400

Vin:380VAC



Brown-out time
A -5mS
B -18mS
C -28mS

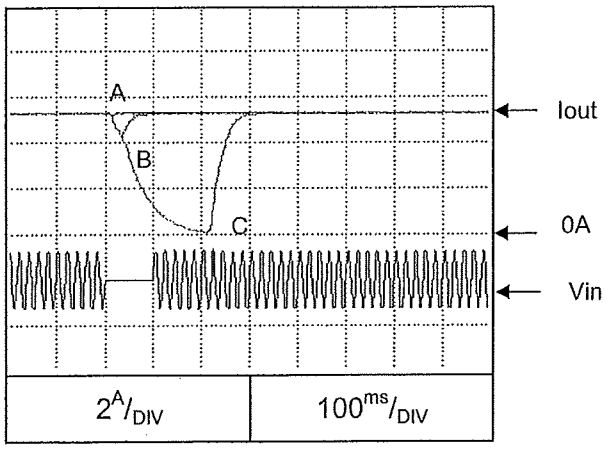
2.9 Response to brown-out characteristics

C.C mode

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

GEN600-5.5 1Φ

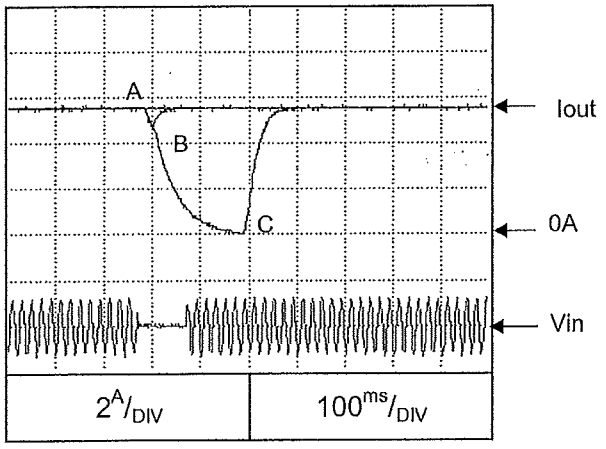
Vin:230VAC



Brown-out time
A -15mS
B -35mS
C -100mS

GEN600-5.5 3Φ 200

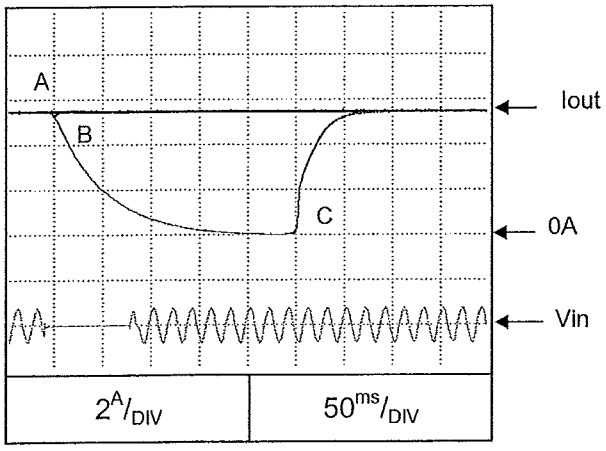
Vin:200VAC



Brown-out time
A -16mS
B -30mS
C -100mS

GEN600-5.5 3Φ 400

Vin:380VAC

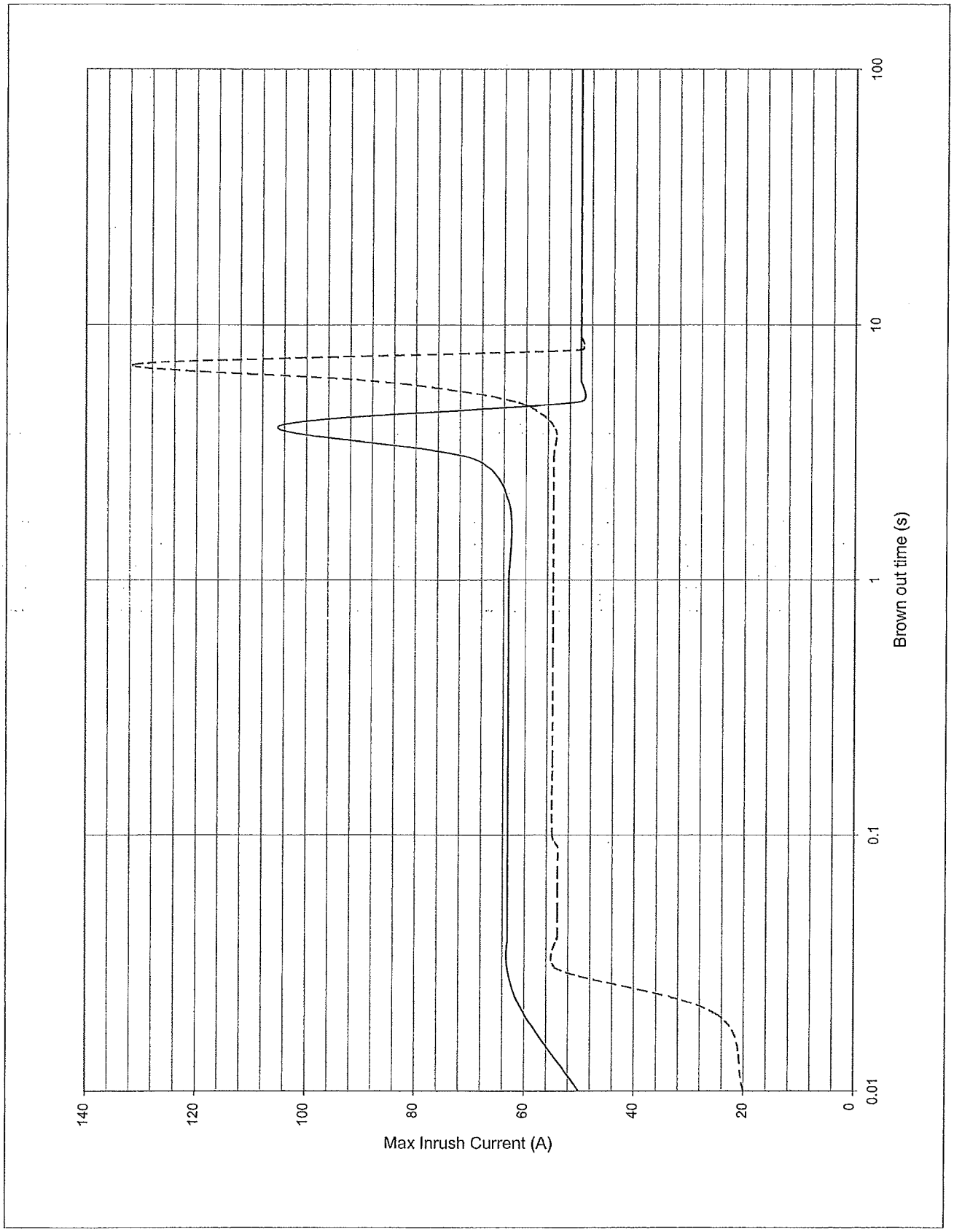


Brown-out time
A -7mS
B -8mS
C -88mS

2.10 Inrush Current Characteristics

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

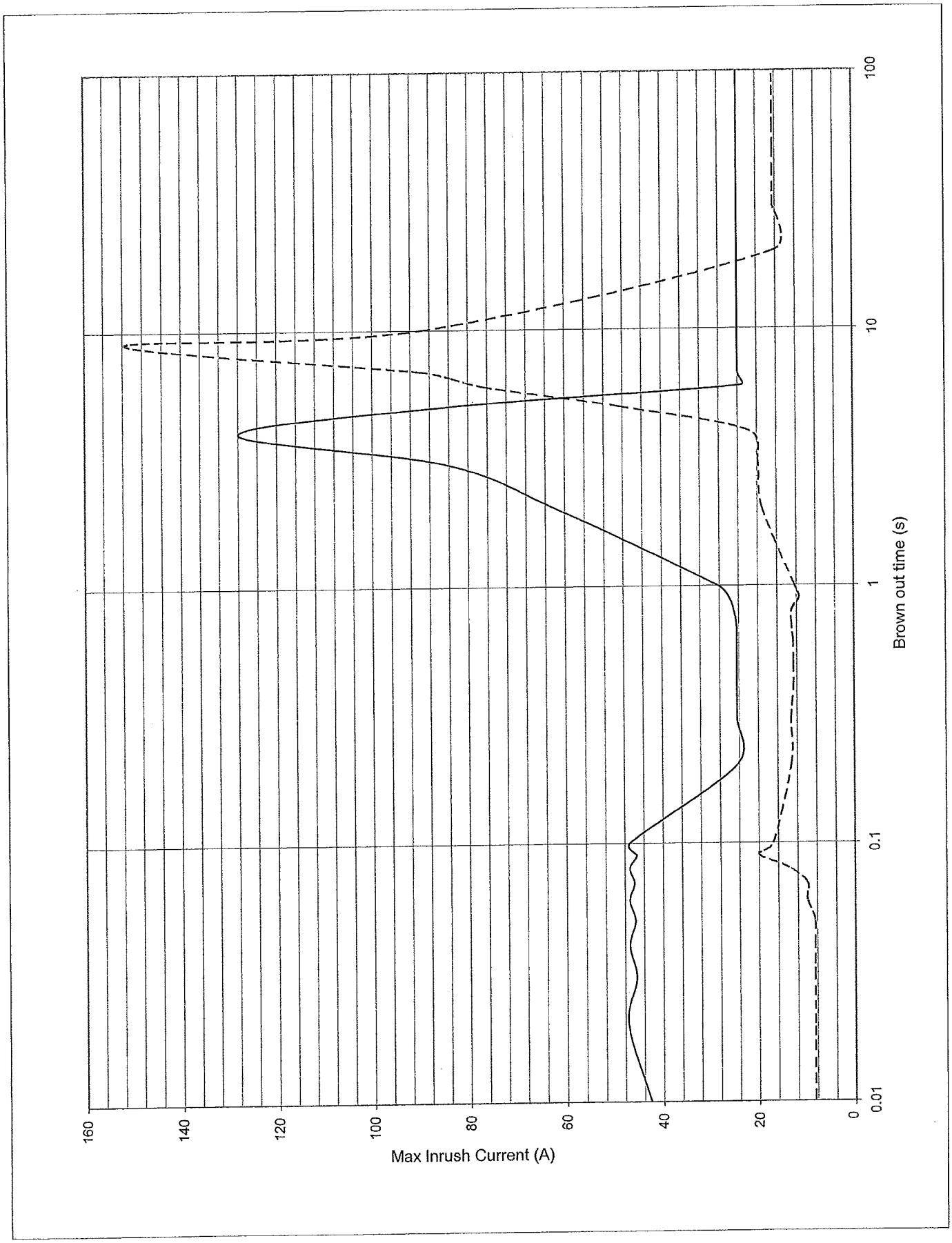
1Φ Input



2.10 Inrush Current Characteristics

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

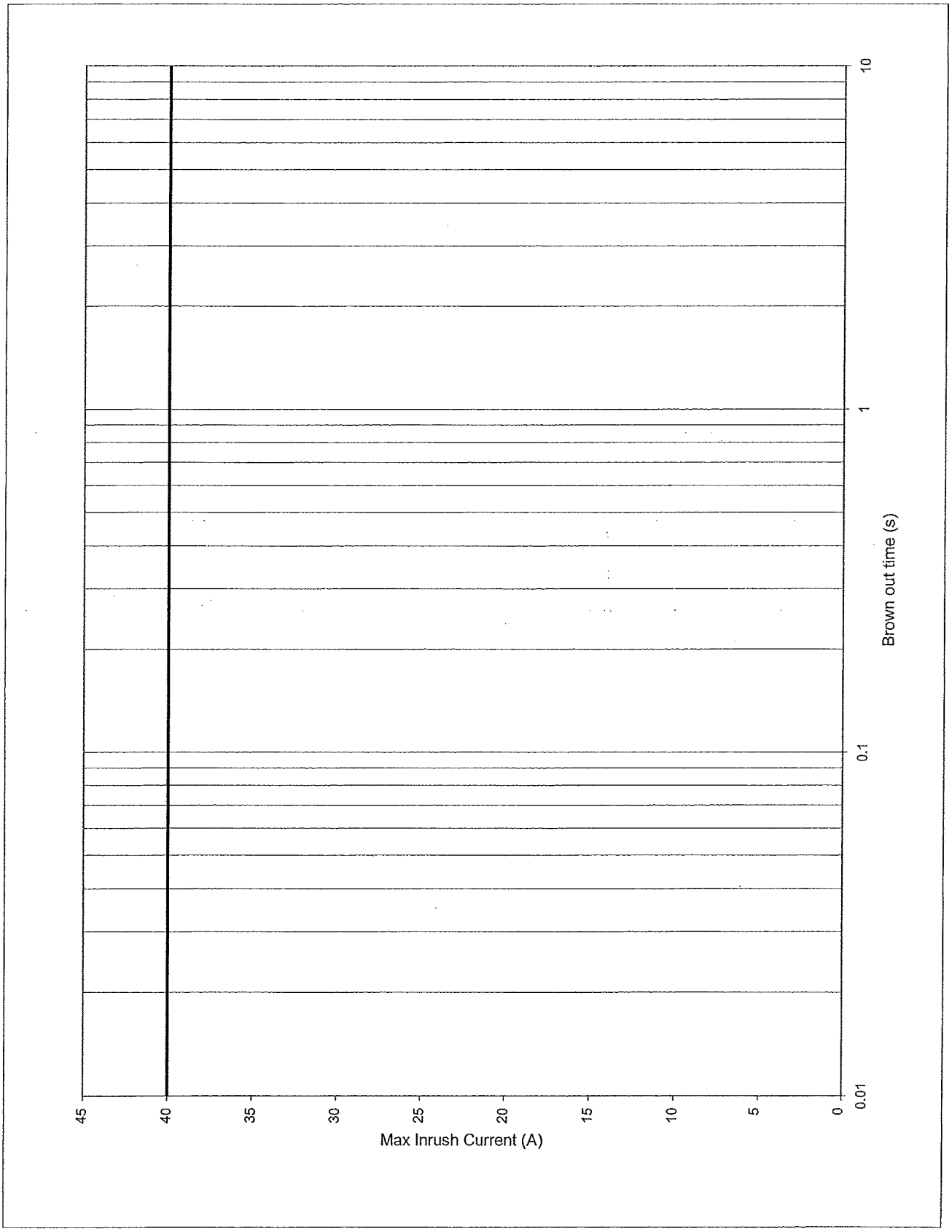
3Φ 200 Input



2.10 Inrush Current Characteristics

Conditions: Vout: 100%
Iout: 0%/100%
Vin: 380VAC
Ta = 25°C

3Φ 400 Input

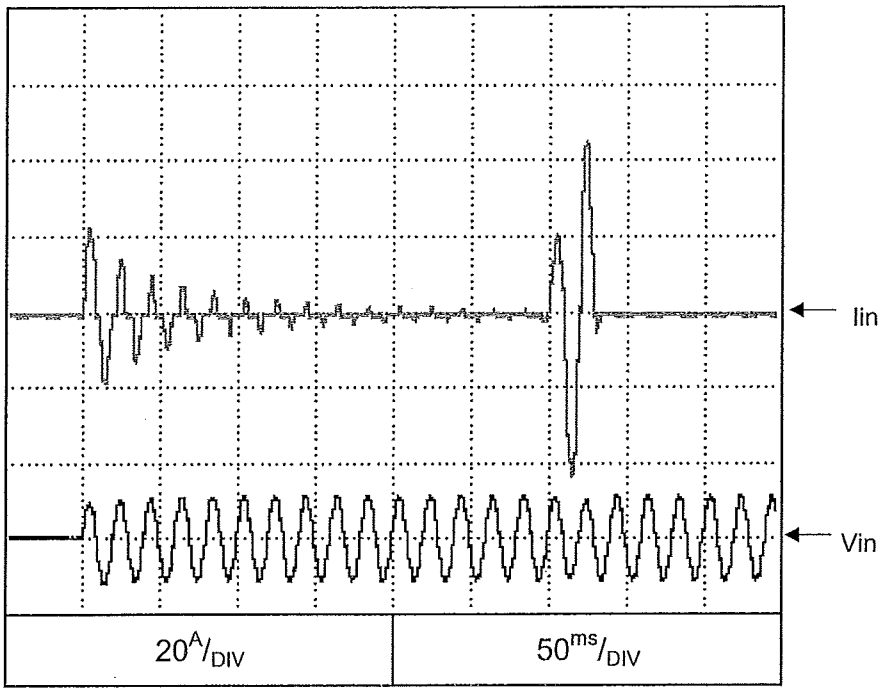


2.11 Inrush current waveform

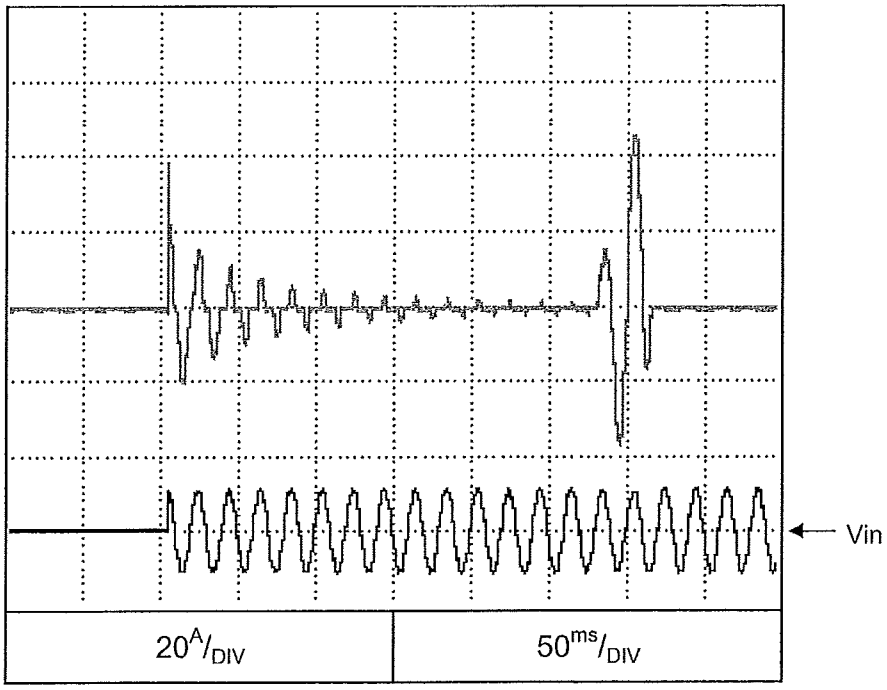
Conditions: Vin: 200VAC
Vout: 100%
Iout: 100%
Ta = 25°C

1Φ Input

Switch on phase angle of input AC voltage
Φ=0°



Switch on phase angle of input AC voltage
Φ=90°

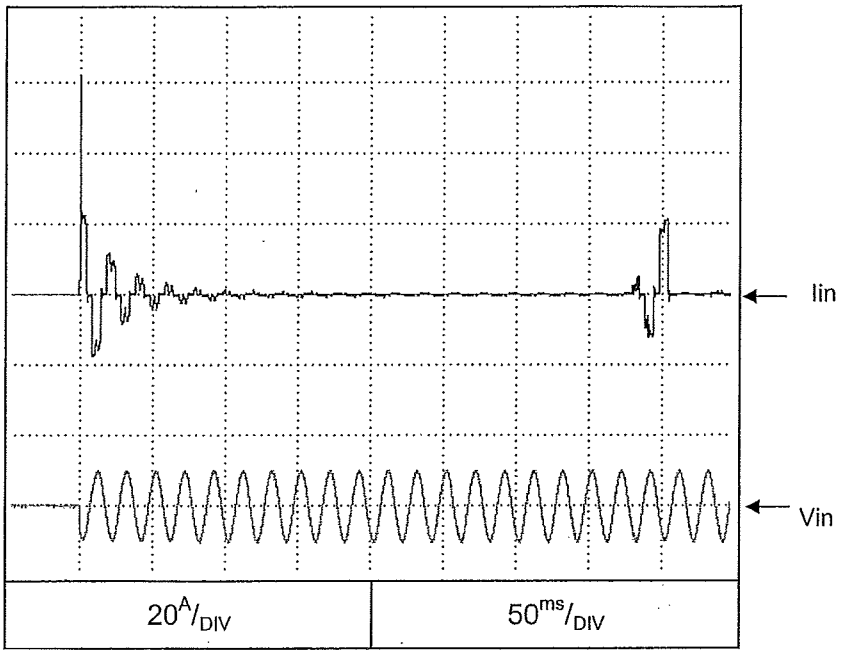


2.11 Inrush current waveform

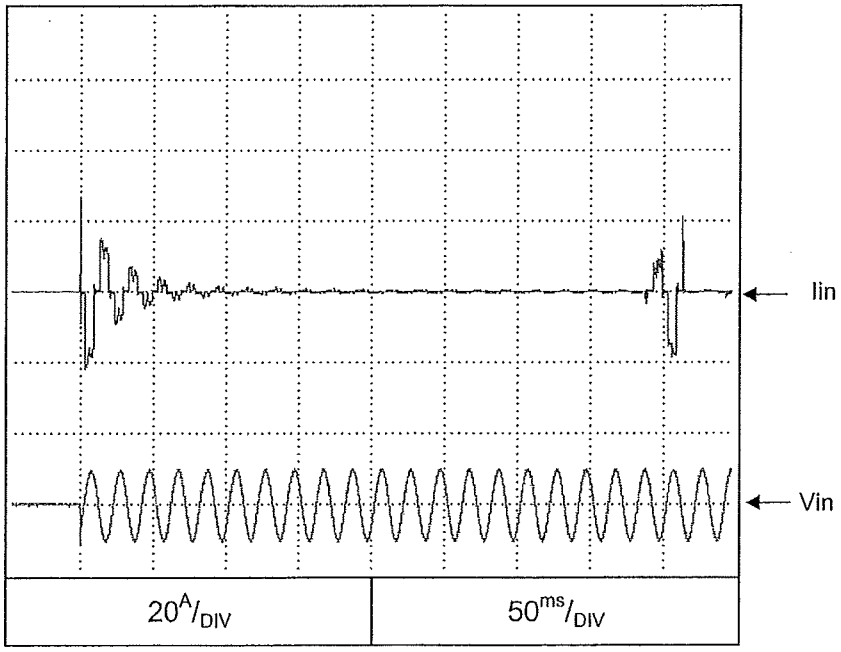
Conditions: Vin: 200VAC
Vout: 100%
Iout: 100%
Ta = 25°C

3Φ 200 Input

Switch on phase angle of input AC voltage
Φ=0°



Switch on phase angle of input AC voltage
Φ=90°

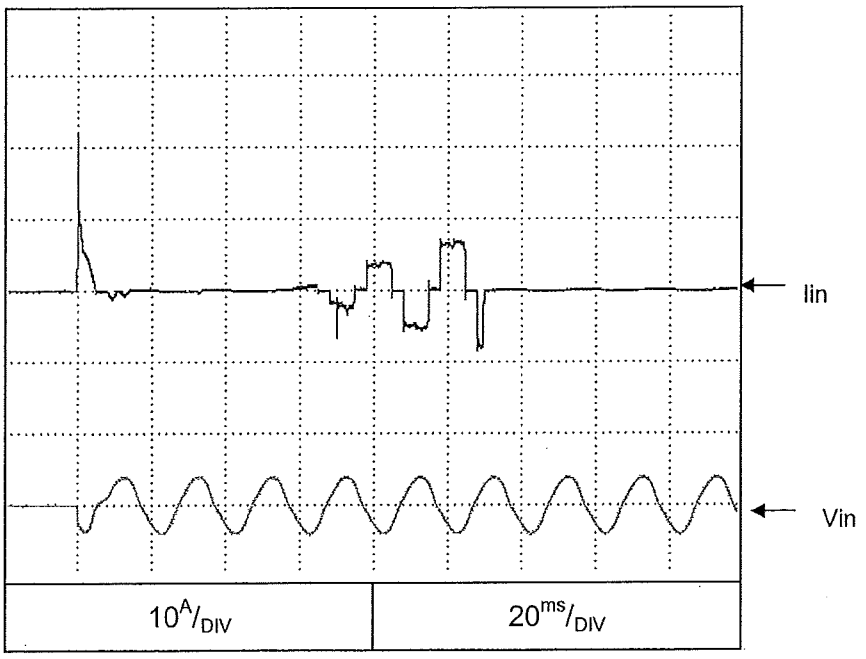


2.11 Inrush current waveform

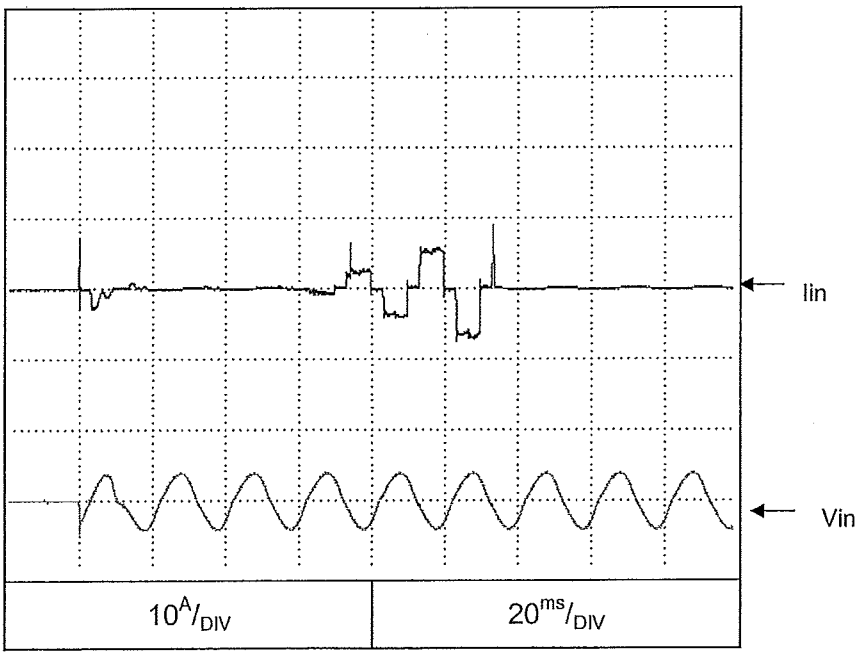
Conditions: Vin: 400VAC
Vout: 100%
Iout: 100%
Ta = 25°C

3Φ 400 Input

Switch on phase angle of input AC voltage
Φ=0°



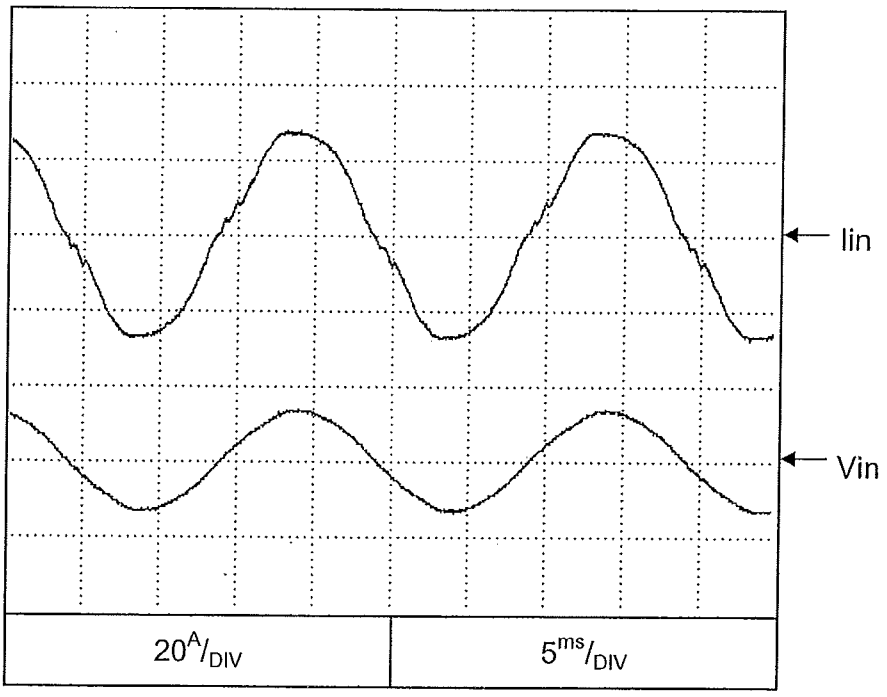
Switch on phase angle of input AC voltage
Φ=90°



2.12 Input current waveform

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

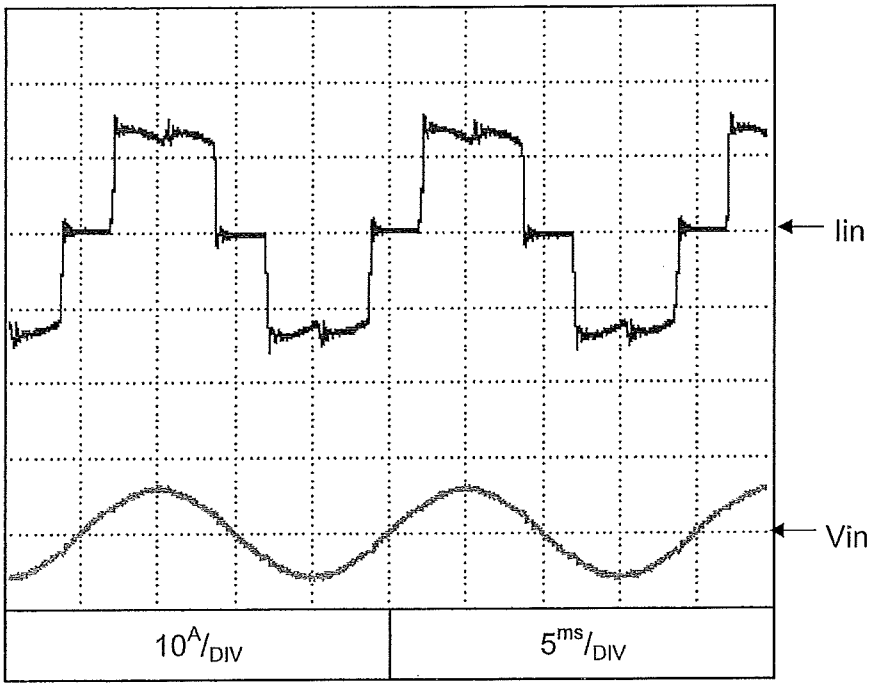
1Φ Input



2.12 Input current waveform

Conditions: Vin: 208VAC
Vout: 100%
Iout: 100%
Ta = 25°C

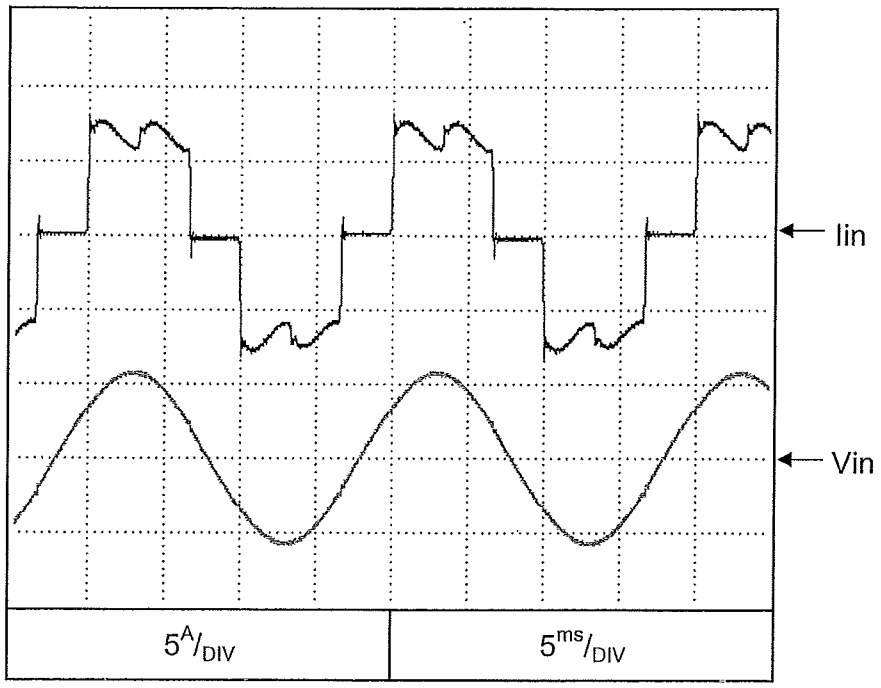
3Φ 200 Input



2.12 Input current waveform

Conditions: Vin: 400VAC
Vout: 100%
Iout: 100%
Ta = 25°C

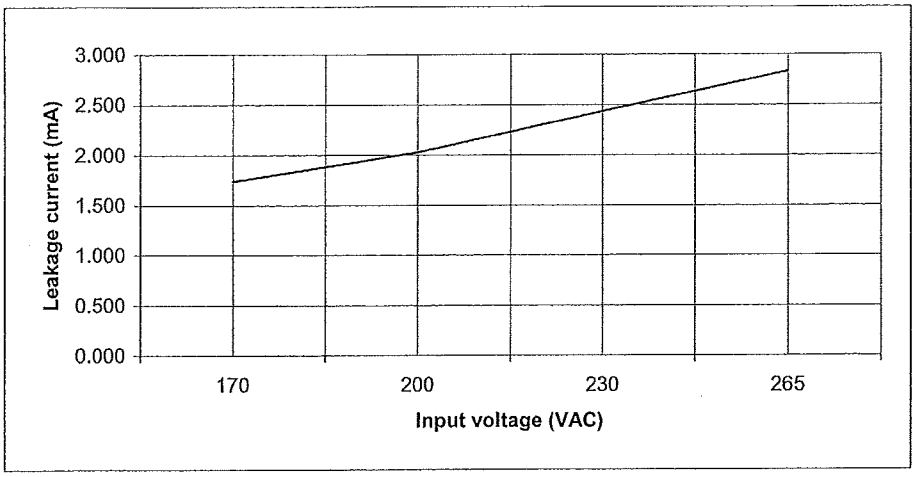
3Φ 400 Input



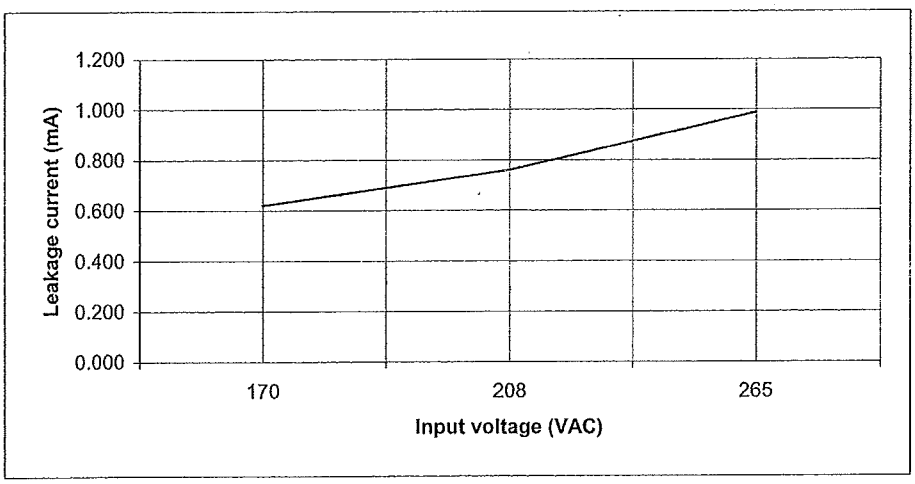
2.13 Leakage current characteristics

Conditions: Ta = 25°C
f=60Hz

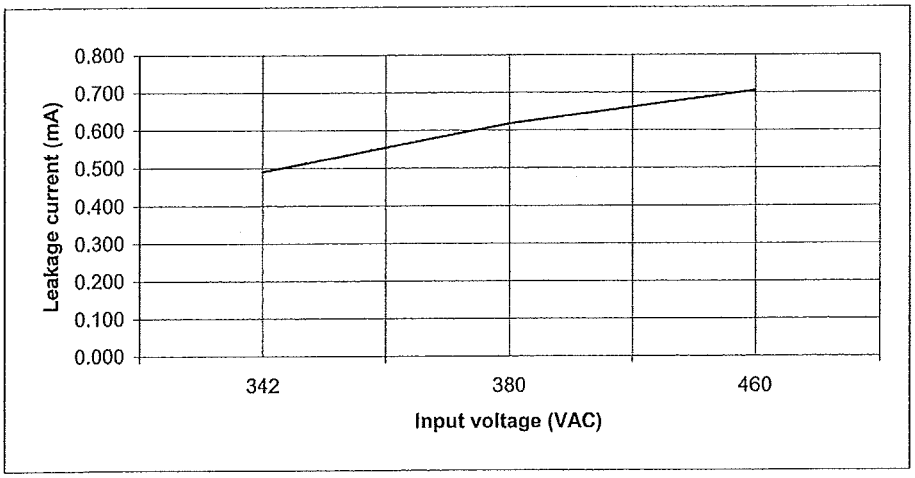
1Φ 170-265V



3Φ 170-265V (*)



3Φ 342-460V (*)



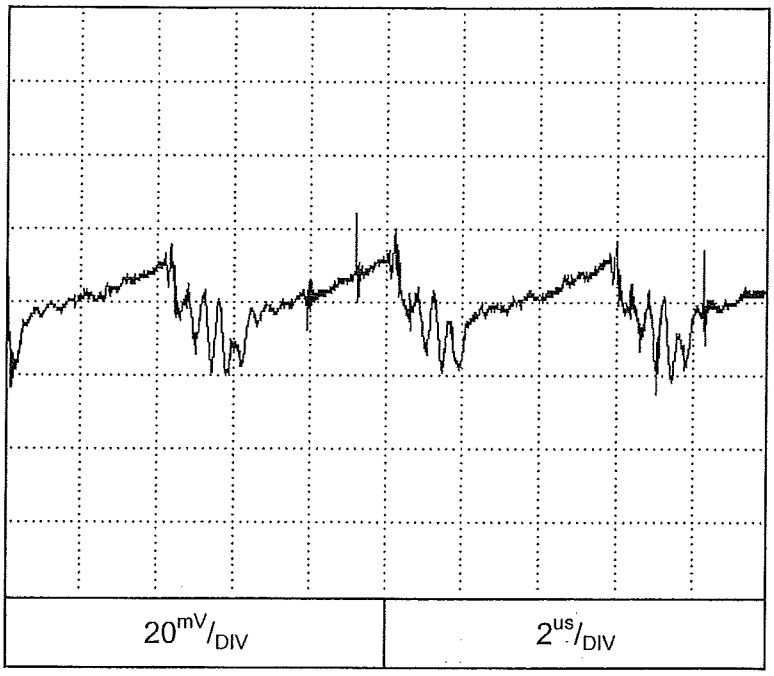
(*) TN & TT power system

2.14 Output ripple & noise waveform
C.V mode

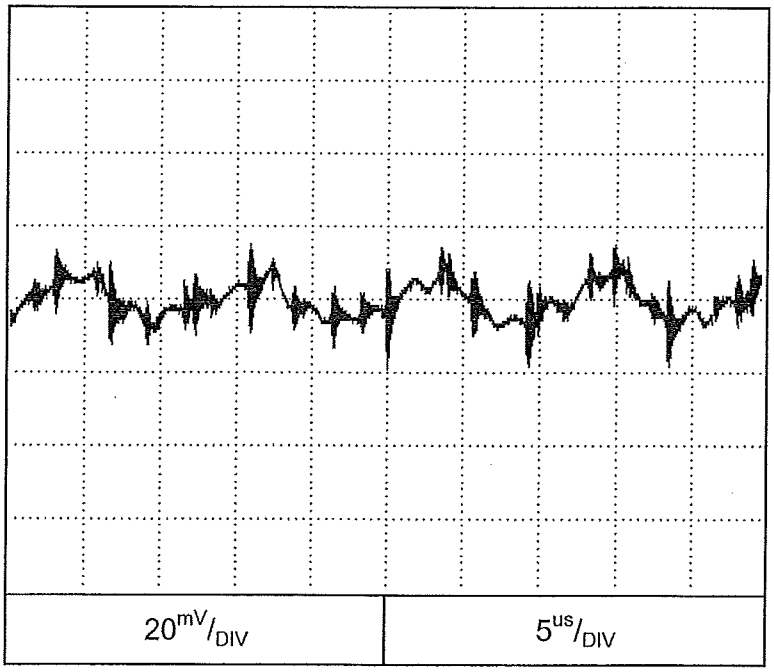
Conditions: Vout: 100%
Iout: 100%
Ta = 25°C

Normal Mode

GEN8-400



GEN60-55

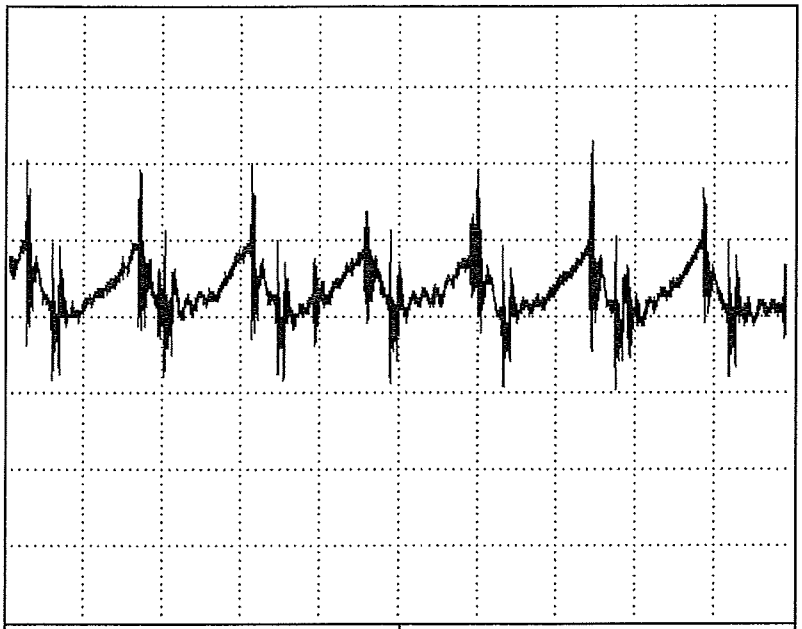


2.14 Output ripple & noise waveform
C.V mode

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

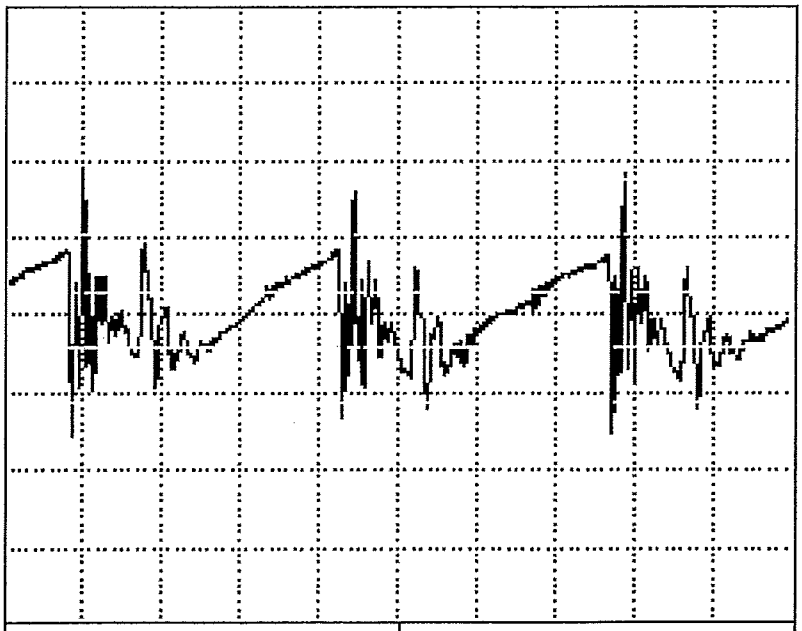
Normal Mode

GEN150-22



10mV/DIV	5us/DIV

GEN600-5.5



50mV/DIV	2us/DIV