参考資料

COSEL

TEST DATA OF PAA600F-5

(200V INPUT)

Regulated DC Power Supply

Date : Aug. 28. 1997

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Design Manager

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Design Engineer

コーセル株式会社

COSEL CO., LTD.

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Object	+5V120A

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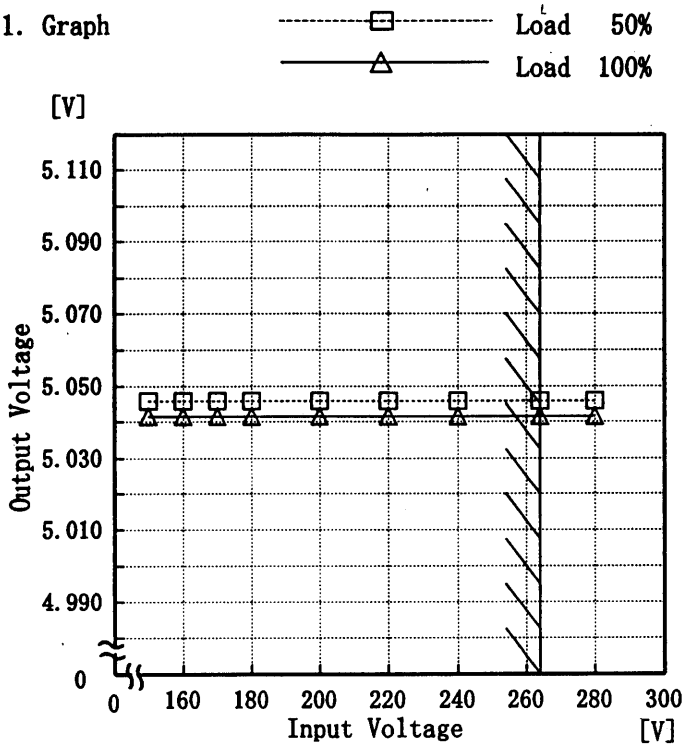
1. Graph



Note: Slanted line shows the range of the rated input voltage.

(注)斜線は定格入力電圧範囲を示す。

2. Values

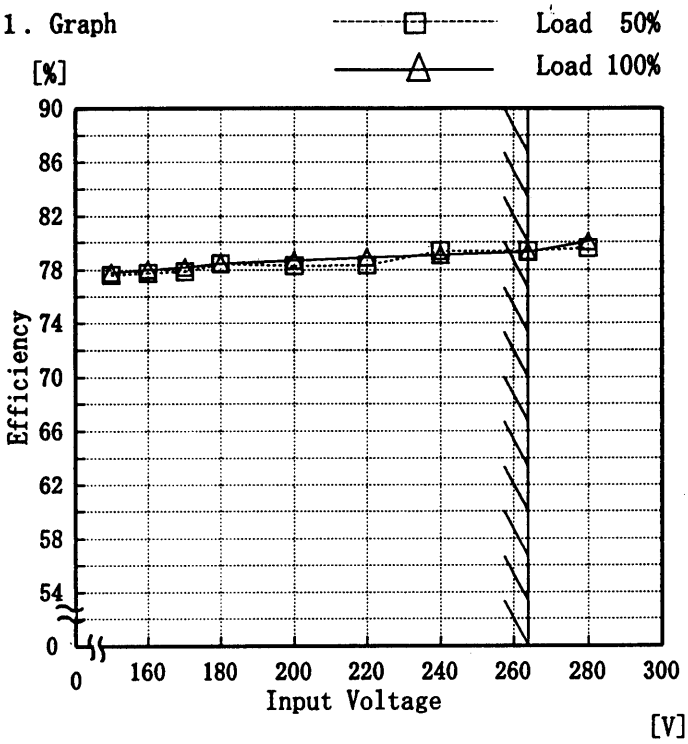
Input Voltage [V]	Load 50% Output Volt. [V]	Load 100% Output Volt. [V]
150	5.046	5.042
160	5.046	5.042
170	5.046	5.042
180	5.046	5.042
200	5.046	5.042
220	5.046	5.042
240	5.046	5.042
264	5.046	5.042
280	5.046	5.042

COSEL

Model	PAA600F-5
Item	Efficiency 効率
Object	――――――――――

Temperature 25℃
Testing Circuitry Figure A

1. Graph



Note: Slanted line shows the range of the rated input voltage.

(注)斜線は定格入力電圧範囲を示す。

2. Values

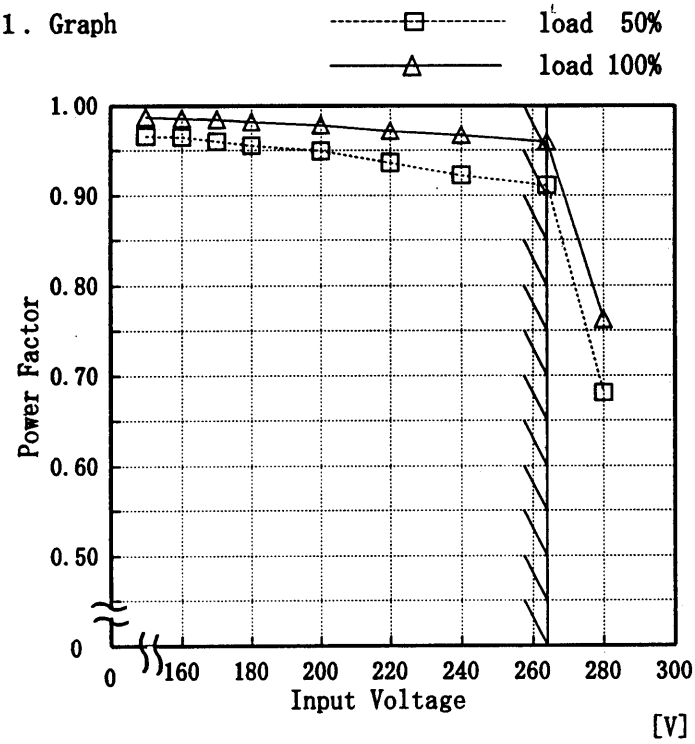
Input Voltage [V]	Load 50% Efficiency [%]	Load 100% Efficiency [%]
150	77.62	77.80
160	77.78	78.00
170	77.87	78.20
180	78.45	78.50
200	78.30	78.70
220	78.34	78.90
240	79.37	79.11
264	79.37	79.31
280	79.59	80.04

COSEL

Model	PAA600F-5
Item	Power Factor 力率
Object	———————————

Temperature 25℃
Testing Circuitry Figure A

1. Graph



Note: Slanted line shows the range of the rated input voltage.

(注)斜線は定格入力電圧範囲を示す。

2. Values

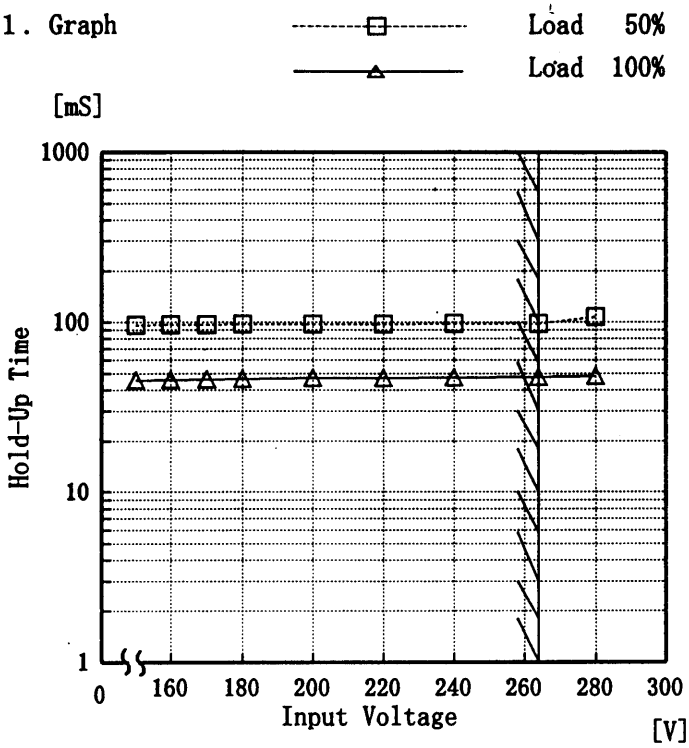
Input Voltage [V]	load 50% Power Factor	load 100% Power Factor
150	0.97	0.99
160	0.96	0.99
170	0.96	0.98
180	0.96	0.98
200	0.95	0.98
220	0.94	0.97
240	0.92	0.97
264	0.91	0.96
280	0.68	0.76

COSEL

Model	PAA600F-5
Item	Hold-Up Time 出力保持時間
Object	+5V120A

Temperature 25℃
Testing Circuitry Figure A

1. Graph



This duration covers from Shut-off of input voltage to the moment when output voltage descends to the rated range of voltage accuracy.

Note: Slanted line shows the range of the rated input voltage.

出力保持時間とは、ＡＣ入力断から出力電圧が、定電圧精度の規格範囲を保持しているところまでの時間。

(注)斜線は定格入力電圧範囲を示す。

2. Values

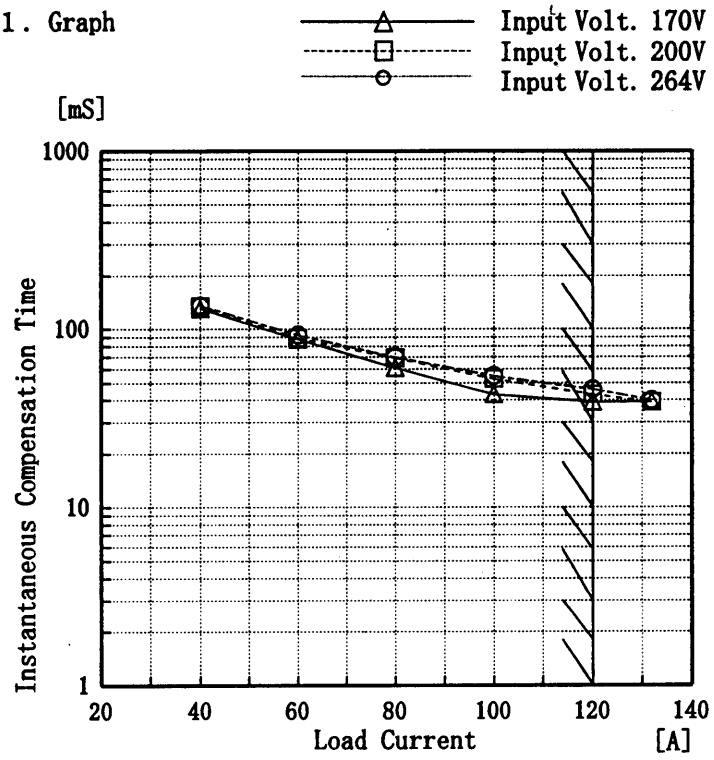
Input Voltage [V]	Load 50% Hold-Up Time [mS]	Load 100% Hold-Up Time [mS]
150	96	46
160	97	46
170	97	46
180	97	47
200	97	47
220	98	47
240	98	48
264	98	48
280	107	48

COSEL

Model	PAA600F-5
Item	Instantaneous Interruption Compensation 瞬時停電保障
Object	+5V120A

Testing Circuitry Figure A 25℃

1. Graph



This duration covers from Shut-off of AC-IN to the moment when output voltage descends to its 95% of the rated.

Note: Slanted line shows the range of the rated load current.

瞬時停電保障時間とは、出力電圧が定格値の９５％になる時の瞬時停電時間をいう。

(注)斜線は定格負荷電流範囲を示す。

2. Values

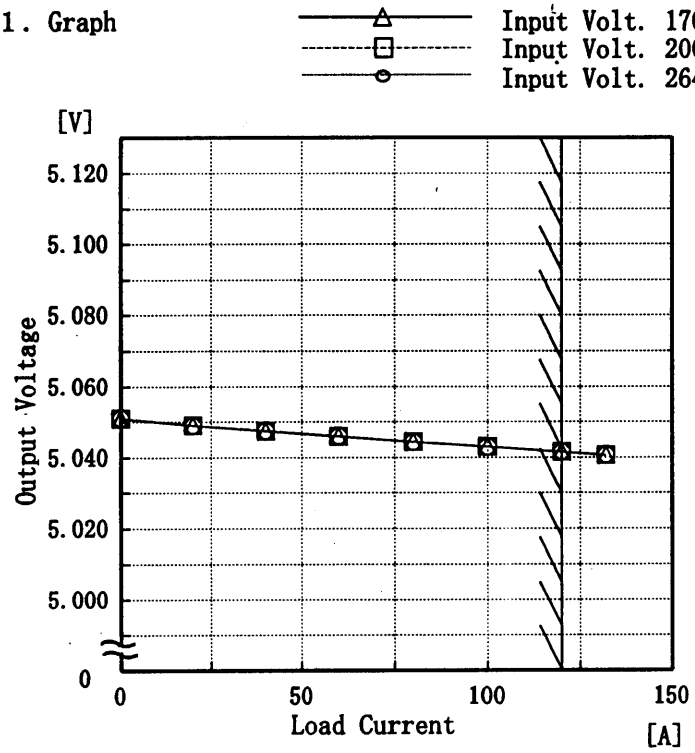
Load Current [A]	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
	Time [mS]		
20.0	238	238	239
40.0	130	135	136
60.0	88	89	93
80.0	61	69	70
100.0	43	53	55
120.0	39	43	46
132.0	39	39	40

COSEL

Model	PAA600F-5
Item	Load Regulation 静的負荷変動
Object	+5V120A

Temperature 25℃
Testing Circuitry Figure A

1. Graph



Note: Slanted line shows the range of the rated load current.

(注)斜線は定格負荷電流範囲を示す。

2. Values

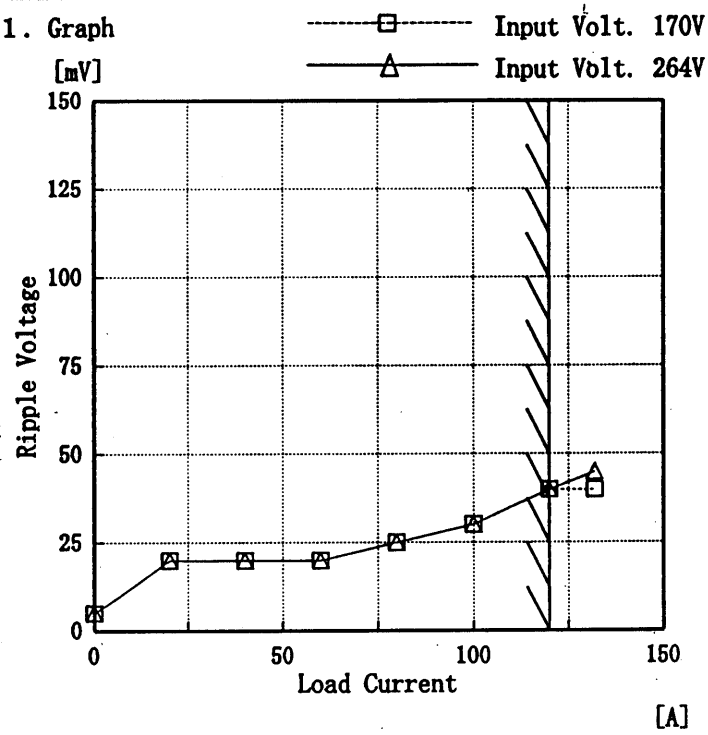
Load Current [A]	Input Volt. 170[V] Output Volt. [V]	Input Volt. 200[V] Output Volt. [V]	Input Volt. 264[V] Output Volt. [V]
0.0	5.051	5.051	5.051
20.0	5.049	5.049	5.049
40.0	5.048	5.048	5.048
60.0	5.046	5.046	5.046
80.0	5.045	5.045	5.045
100.0	5.043	5.043	5.043
120.0	5.042	5.042	5.042
120.0	5.042	5.042	5.042
132.0	5.041	5.041	5.041
—	—	—	—

COSEL

Model	PAA600F-5
Item	Ripple Voltage(by Load Current) リップル電圧(負荷電流特性)
Object	+5V120A

Temperature 25℃
Testing Circuitry Figure A

1. Graph



Ripple Voltage is shown as p-p in the figure below.

Note: Slanted line shows the range of the rated load current.

リップル電圧は、下図ｐ－ｐ値で示される。

(注)斜線は定格負荷電流範囲を示す。

T1: Due to AC Input Line
入力商用周期
T2: Due to Switching
ｽｲｯﾁﾝｸﾞ周期

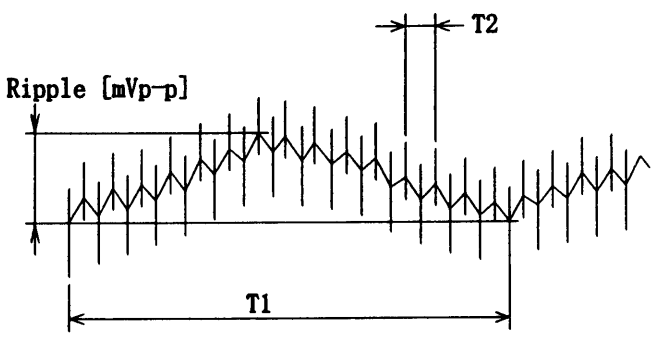


Fig. Complex Ripple Wave Form
図 リップル波形詳細図

2. Values

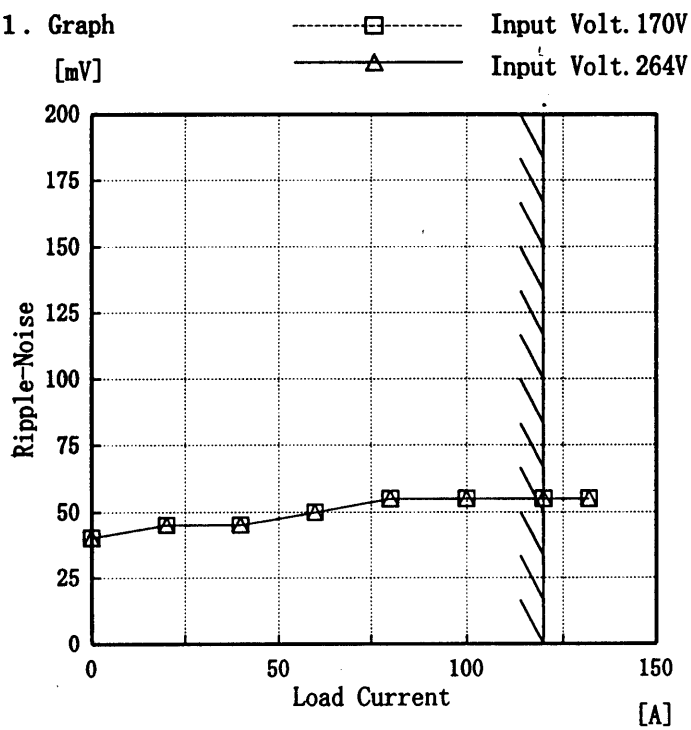
Load Current [A]	Input Volt. 170 [V] Ripple Output Volt. [mV]	Input Volt. 264 [V] Ripple Output Volt. [mV]
0.0	5	5
20.0	20	20
40.0	20	20
60.0	20	20
80.0	25	25
100.0	30	30
120.0	40	40
132.0	40	45

COSEL

Model	PAA600F-5
Item	Ripple-Noise リップルノイズ
Object	+5V 120A

Temperature 25℃
Testing Circuitry Figure A

1. Graph



Ripple-Noise is shown as p-p in the figure below.
Note: Slanted line shows the range of the rated load current.

リップルノイズは、下図ｐ－ｐ値で示される。
(注)斜線は定格負荷電流範囲を示す。

T1: Due to AC Input Line
入力商用周期
T2: Due to Switching
ｽｲｯﾁﾝｸﾞ周期

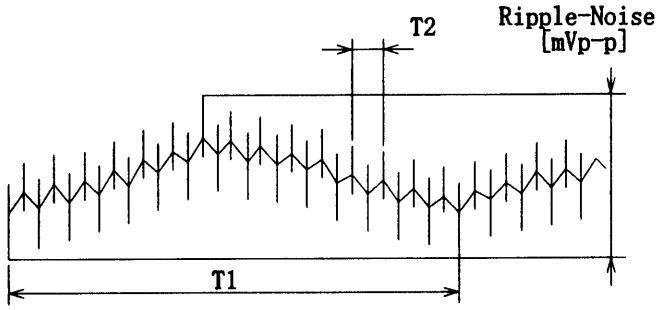


Fig. Complex Ripple Wave Form
図 リップル波形詳細図

2. Values

Load current [A]	Input Volt. 170 [V] Ripple-Noise [mV]	Input Volt. 264 [V] Ripple-Noise [mV]
0.0	40	40
20.0	45	45
40.0	45	45
60.0	50	50
80.0	55	55
100.0	55	55
120.0	55	55
132.0	55	55

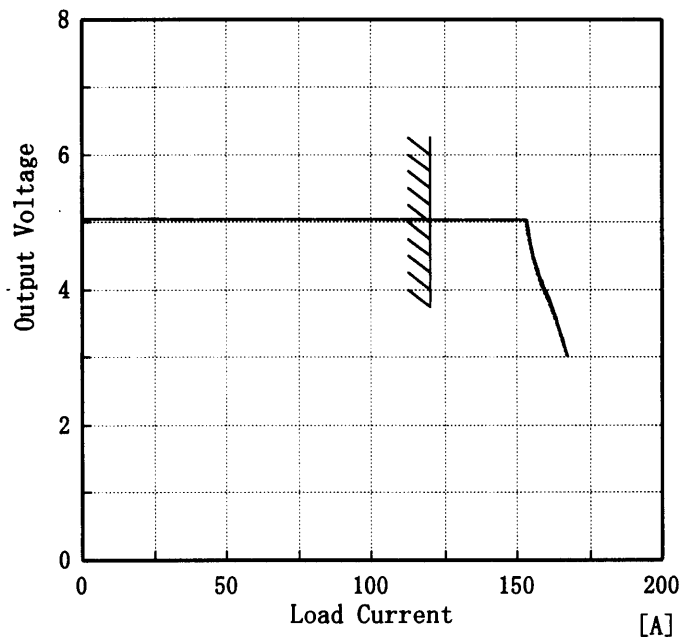
COSEL

Model	PAA600F-5
Item	Overcurrent Protection 過電流保護
Object	+5V120A

Temperature 25℃
Testing Circuitry Figure A

1. Graph

Input Volt. 170 V
Input Volt. 200 V
Input Volt. 264 V



Note: Slanted line shows the range of the rated load current.

(注)斜線は定格負荷電流範囲を示す。

3V以下は間欠モードにはいる。

2. Values

Output Voltage [V]	Input Volt. 170[V] Load Current [A]	Input Volt. 200[V] Load Current [A]	Input Volt. 264[V] Load Current [A]
5.00	152.94	153.28	153.42
4.75	153.85	154.38	154.28
4.50	154.95	155.52	155.37
4.00	158.76	159.61	159.48
3.50	163.38	164.01	163.88
3.00	166.79	167.38	167.17

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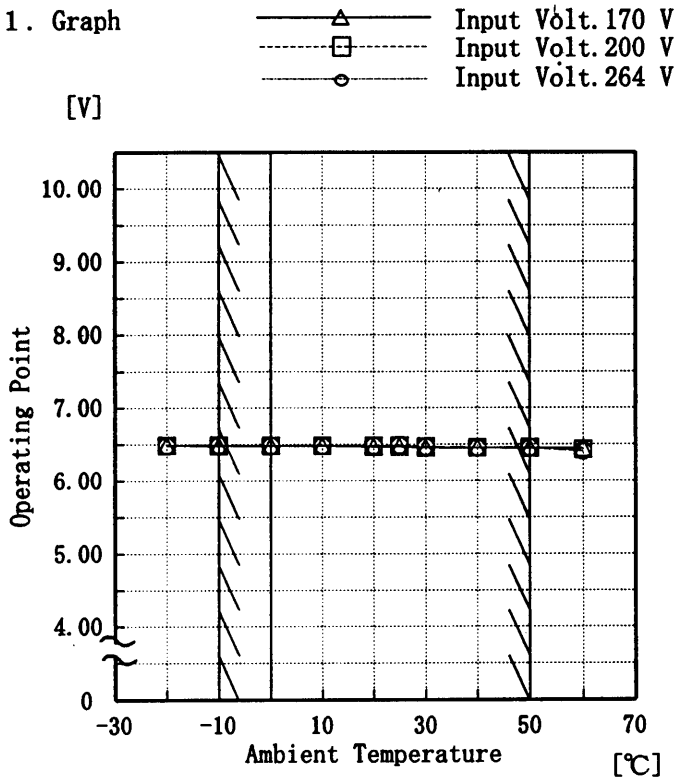
Model	PAA600F-5
Item	Overvoltage Protection 過電圧保護
Object	+5V120A

Testing Circuitry Figure A

1. Graph



Note: Slanted line shows the range of the rated ambient temperature.

(注)斜線は定格周囲温度範囲を示す。

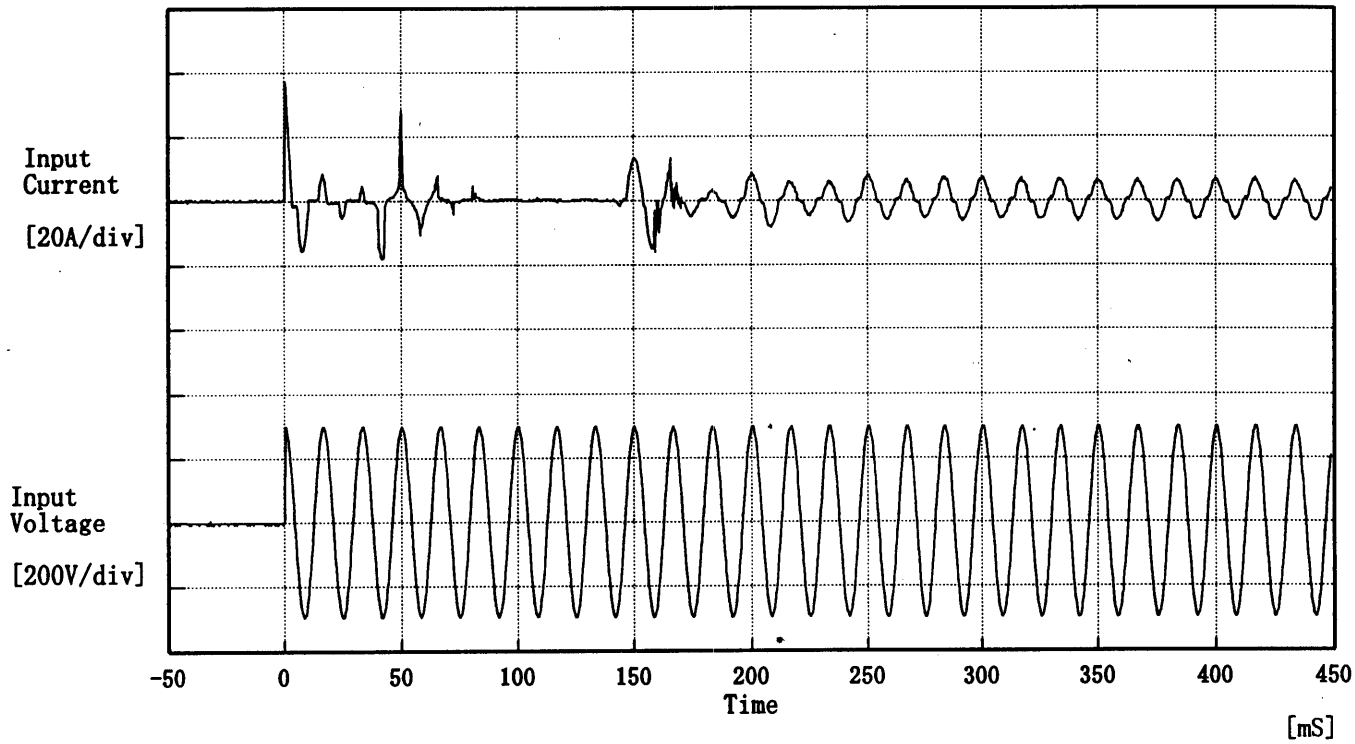
2. Values

Ambient Temp. [℃]	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
	Operating Point [V]		
-20	6.49	6.49	6.49
-10	6.48	6.49	6.49
0	6.48	6.48	6.48
10	6.48	6.48	6.48
20	6.47	6.48	6.48
25	6.47	6.48	6.49
30	6.46	6.47	6.47
40	6.46	6.46	6.46
50	6.45	6.46	6.46
60	6.45	6.43	6.41
—	—	—	—

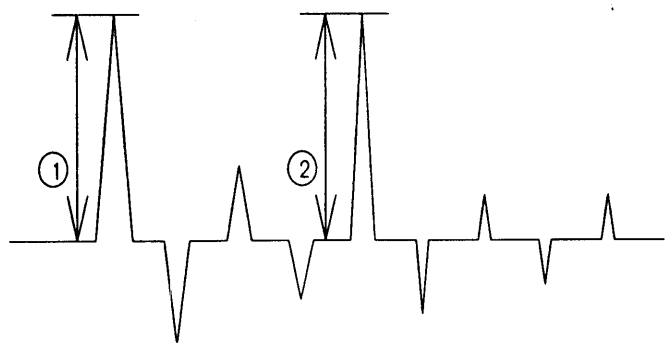
COSEL

Model	PAA600F-5
Item	Inrush Current 突入電流
Object	――――――

Temperature 25℃
Testing Circuitry Figure A



Input Voltage 200 V
Frequency 60 Hz
Load 100 %
Inrush Current
① 37.20 [A]
② 28.20 [A]



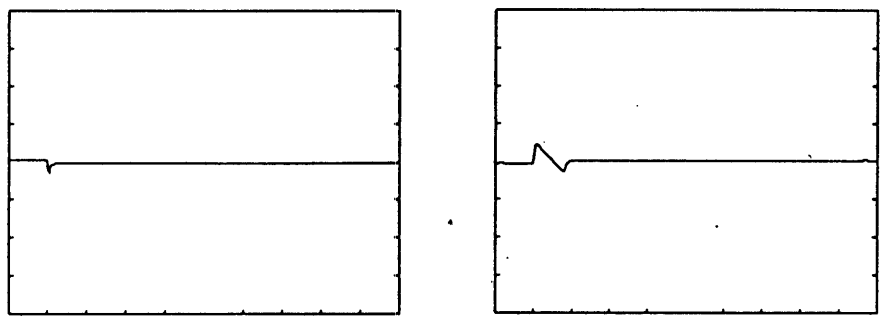
COSEL

Model	PAA600F-5		
Item	Dynamic Load Responce 動的負荷変動	Temperature Testing Circuitry	25℃ Figure A
Object	+5V 120A		

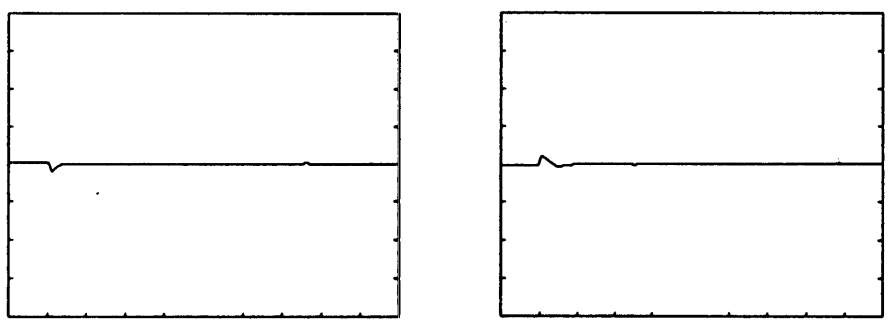
Input Volt. 200 V

Cycle 200 mS

Load 0% ⟷
Load 100 %



Load 0% ⟷
Load 50 %



100 mV/div

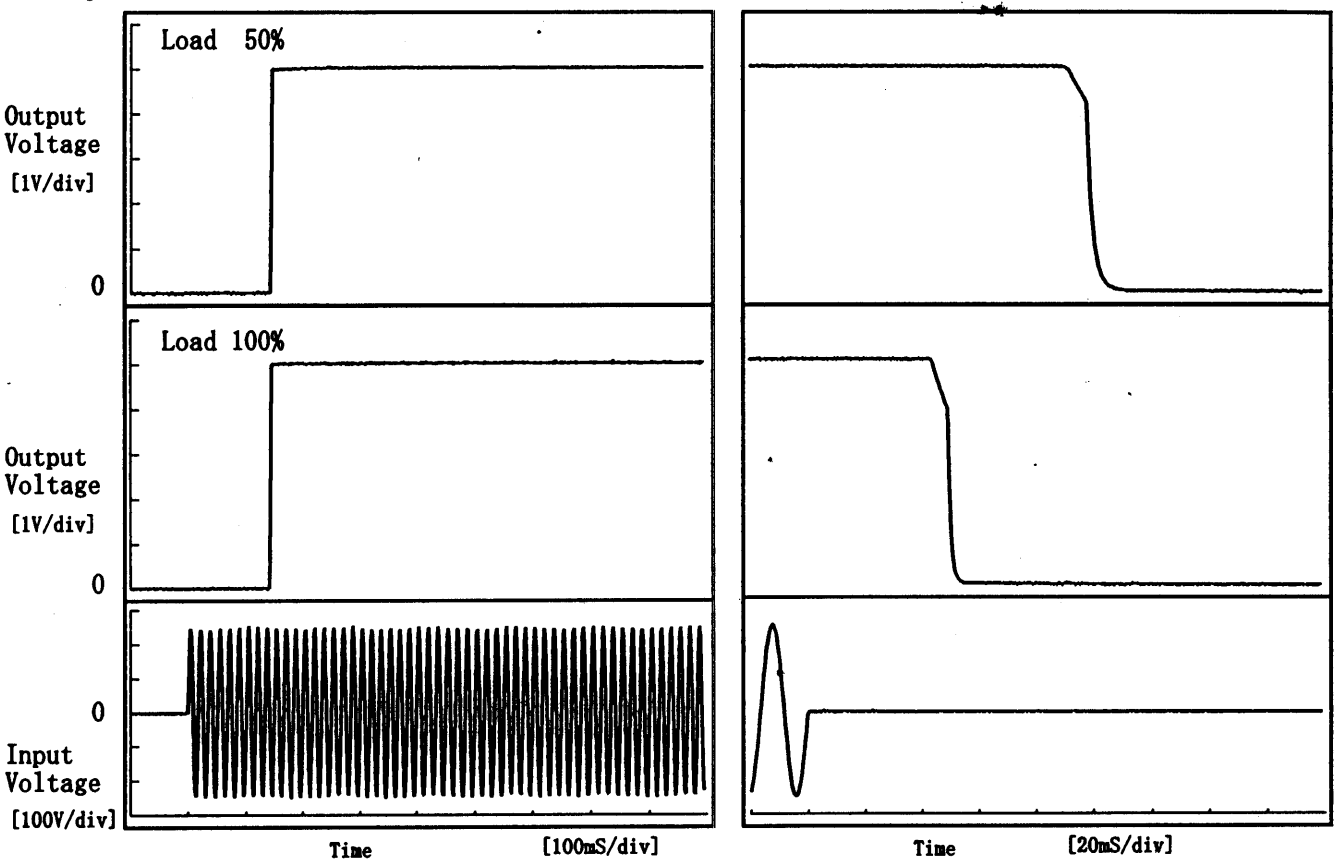
10 mS/div

COSEL

Model	PAA600F-5		
Item	Rise and Fall Time 立上り、立下り時間	Temperature	25℃
		Testing Circuitry	Figure A
Object	+5V120A		

1. Graph

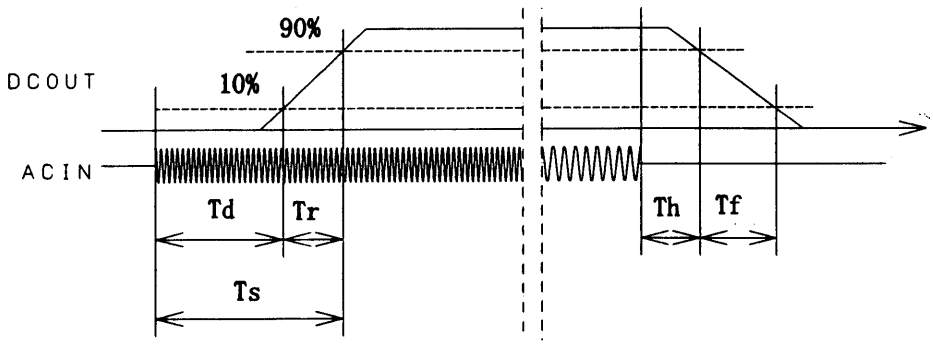
Input Volt. 170 V



2. Values

[mS]

Load \ Time	T d	T r	T s	T h	T f
50 %	143.0	1.5	144.5	95.8	6.7
100 %	143.0	1.5	144.5	46.6	5.2

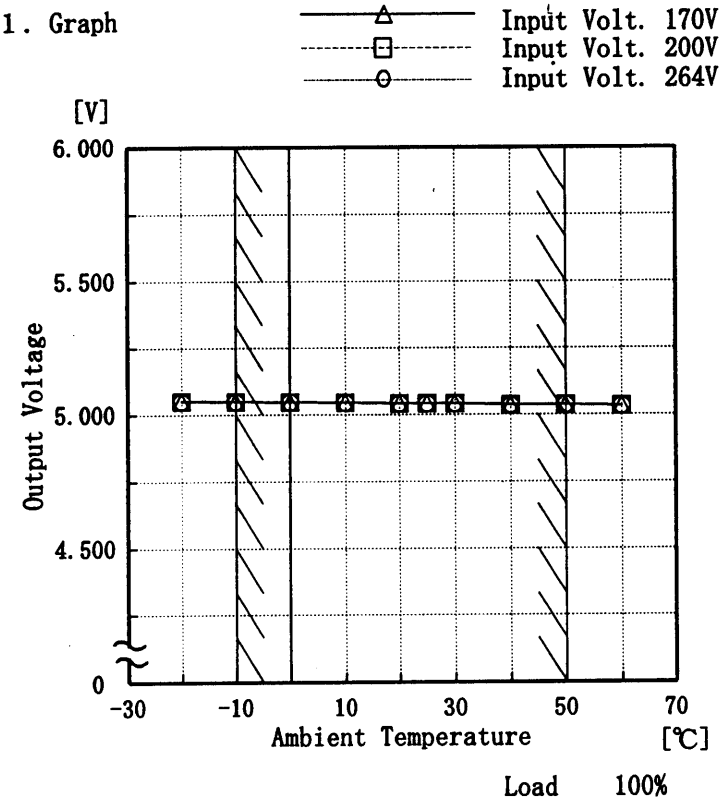


COSEL

Model	PAA600F-5
Item	Ambient Temperature Drift 周囲温度変動
Object	+5V120A

Testing Circuitry Figure A

1. Graph



Note: Slanted line shows the range of the rated ambient temperature.

(注)斜線は定格周囲温度範囲を示す。

2. Values

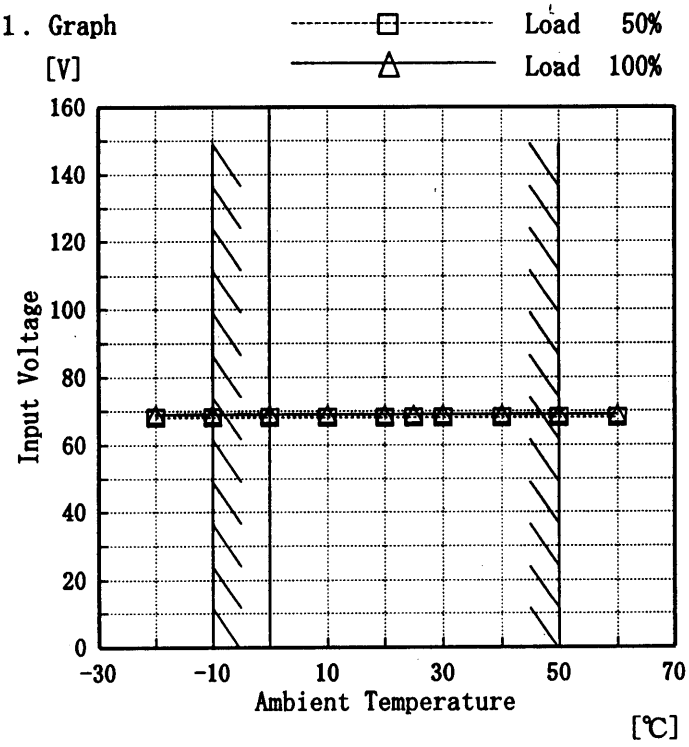
Temperature [℃]	Input Volt. 170[V] Output Volt. [V]	Input Volt. 200[V] Output Volt. [V]	Input Volt. 264[V] Output Volt. [V]
-20	5.050	5.050	5.050
-10	5.049	5.049	5.049
0	5.047	5.047	5.047
10	5.045	5.045	5.045
20	5.042	5.042	5.042
25	5.041	5.041	5.041
30	5.042	5.042	5.041
40	5.037	5.037	5.037
50	5.036	5.036	5.036
60	5.033	5.033	5.032

COSEL

Model	PAA600F-5
Item	Minimum Input Voltage for Regulated Output Voltage 最低レギュレーション電圧
Object	+5V120A

Testing Circuitry Figure A

1. Graph



Note: Slanted line shows the range of the rated ambient temperature.

(注)斜線は定格周囲温度範囲を示す。

2. Values

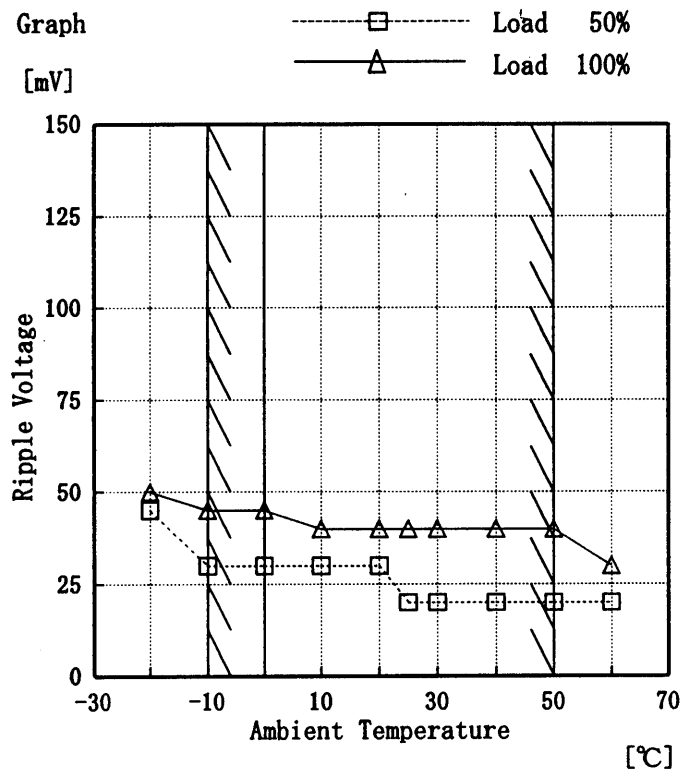
Ambient Temp. [℃]	Load 50% Input Volt. [V]	Load 100% Input Volt. [V]
-20	68	69
-10	68	69
0	68	69
10	68	69
20	68	69
25	68	69
30	68	69
40	68	69
50	68	69
60	68	69
—	—	—

COSEL

Model	PAA600F-5
Item	Ripple Voltage (by Ambient Temp.) リップル電圧 (周囲温度特性)
Object	+5V120A

Testing Circuitry Figure A

1. Graph



Input Volt. 200 V

Note: Slanted line shows the range of the rated ambient temperature.

(注)斜線は定格周囲温度範囲を示す。

2. Values

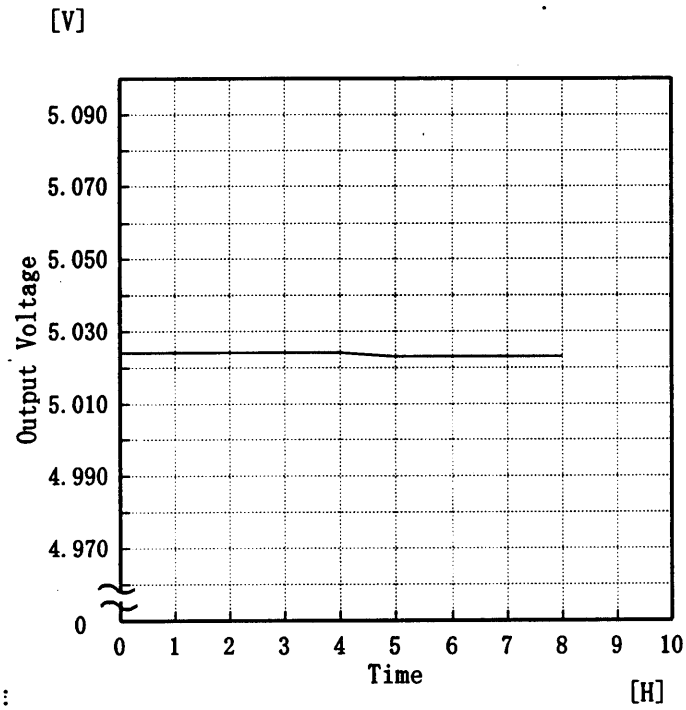
Ambient Temp. [℃]	Load 50% Ripple Output Volt. [mV]	Load 100% Ripple Output Volt. [mV]
-20	45	50
-10	30	45
0	30	45
10	30	40
20	30	40
25	20	40
30	20	40
40	20	40
50	20	40
60	20	30
—	—	—

COSEL

Model	PAA600F-5
Item	Time Lapse Drift 経時ドリフト
Object	+5V120A

Temperature 25 ℃
Testing Circuitry Figure A

1. Graph



Input Volt. 200V
Load 100%

2. Values

Time since start [H]	Output Voltage [V]
0.0	5.022
0.5	5.024
1.0	5.024
2.0	5.024
3.0	5.024
4.0	5.024
5.0	5.023
6.0	5.023
7.0	5.023
8.0	5.023

COSEL

Model	PAA600F-5	
Item	Output Voltage Accuracy 定電圧精度	Testing Circuitry Figure A
Object	+5V120A	

Output Voltage Accuracy

This is defined as the maximum value of the output voltage regulation load, temperature and input voltage vary at random in the range as specified below.

Temperature : -10～50 ℃
Input Voltage : 170～264 V
Load Current : 0～120 A

* Output Voltage Accuracy = ±(Maximum of Output Voltage − Minimum of Output Voltage)/2

$$\text{* Output Voltage Accuracy (Ration)} = \frac{\text{Voltage Accuracy}}{\text{Rated Output Voltage}} \times 100$$

定電圧精度

温度、入力電圧、負荷を下記仕様内で、任意に変動させたときの出力電圧の変動をいう。

周囲温度 -10～50 ℃
入力電圧 170～264 V
負過電流 0～120 A

* 定電圧精度(変動値) ＝ ±(出力電圧の最高値－出力電圧の最低値)／2

$$\text{* 定電圧精度(変動率)} = \frac{\text{変動値}}{\text{定格出力電圧}} \times 100$$

Item	Temperature [℃]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy (Ration) [%]
Maximum Voltage	-10	264	0	5.057	±11	±0.218
Minimum Voltage	50	170	120	5.035		

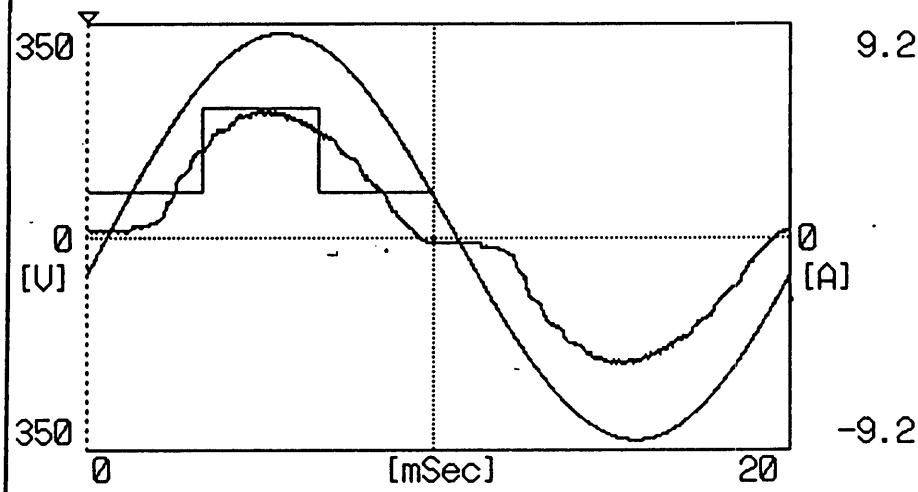
COSEL

Model	PAA600F-5		
Item	Harmonic Current 高調波電流	Temperature Testing Circuitry	25℃ Figure E
Object	————		

1. Input Current Waveform

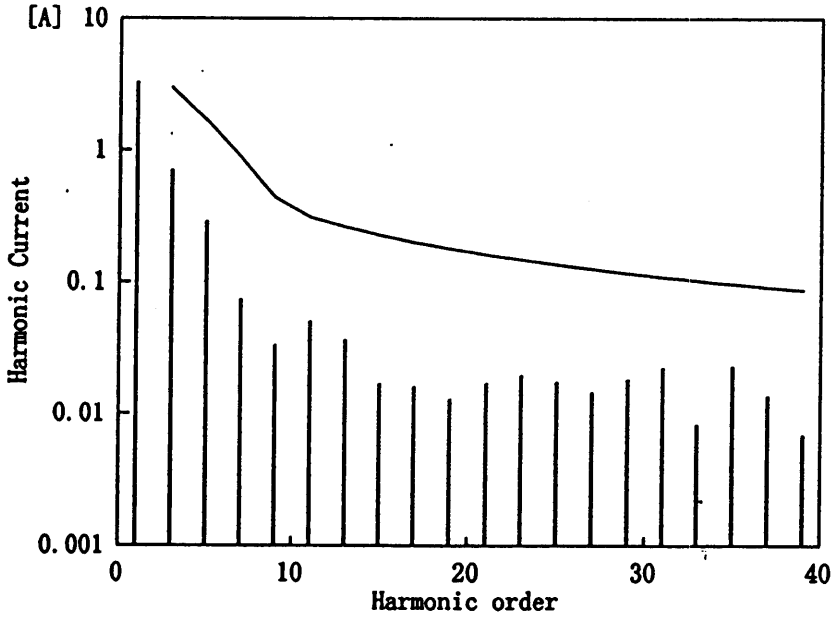
——— Input Current

——— Envelope of the input current to classify equipment as Class D
クラスDの機器を決定するための入力電流包絡線



Conditions	Values
Input Voltage [V]	230
Input Current [A]	3.38
Active Power [W]	766.2
Apparent Power[VA]	783.9
Frequency [Hz]	50
Power Factor	0.977
Output Power [W]	600

2. Harmonic Current



——— Harmonic Current
高調波電流

——— Limits for Class D equipment
クラスDの機器に対する限度値

Harmonics order 高調波次数	Limits 限度値 [A]	Values 測定値 [A]
1	—	3.32900
2	—	0.00068
3	2.99584	0.71229
4	—	0.00007
5	1.67415	0.28827
6	—	0.00020
7	0.88113	0.07428
8	—	0.00010
9	0.44057	0.03353
10	—	0.00011
11	0.30840	0.05039
12	—	0.00009
13	0.26095	0.03642
14	—	0.00012
15	0.22616	0.01696
16	—	0.00007
17	0.19955	0.01614
18	—	0.00007
19	0.17854	0.01312
20	—	0.00009
21	0.16154	0.01710
22	—	0.00009
23	0.14749	0.01952
24	—	0.00006
25	0.13569	0.01738
26	—	0.00011
27	0.12564	0.01453
28	—	0.00014
29	0.11698	0.01836
30	—	0.00015
31	0.10943	0.02247
32	—	0.00019
33	0.10280	0.00827
34	—	0.00025
35	0.09692	0.02287
36	—	0.00027
37	0.09169	0.01380
38	—	0.00025
39	0.08698	0.00692
40	—	0.00032

COSEL

Model	PAA600F-5
Item	Harmonic Current 高調波電流
Object	———

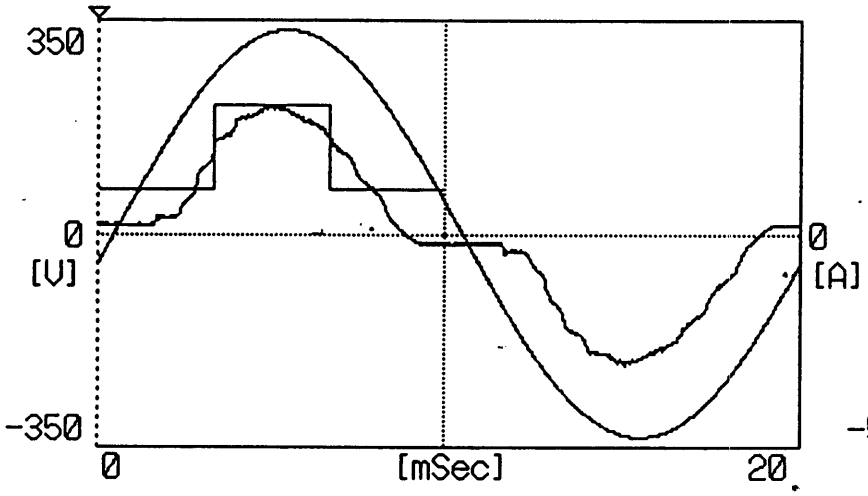
Temperature 25℃
Testing Circuitry Figure E

1. Input Current Waveform

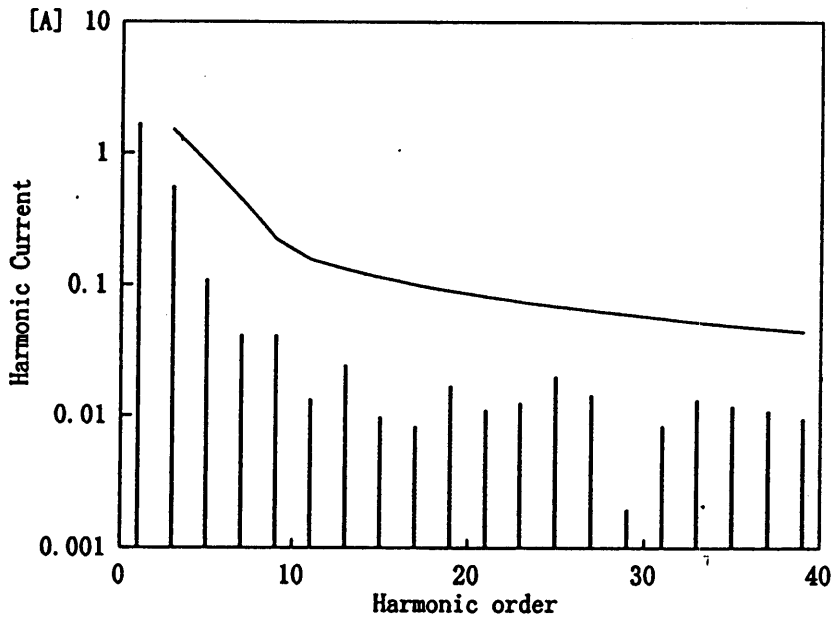
——— Input Current

——— Envelope of the input current to classify equipment as Class D
クラスDの機器を決定するための入力電流包絡線

2 A/div



Conditions	Values
Input Voltage [V]	230
Input Current [A]	1.76
Active Power [W]	385.4
Apparent Power[VA]	408
Frequency [Hz]	60
Power Factor	0.945
Output Power [W]	300



——— Harmonic Current
高調波電流

——— Limits for Class D equipment
クラスDの機器に対する限度値

Harmonics order 高調波次数	Limits 限度値 [A]	Values 測定値 [A]
1	—	1.68100
2	—	0.00035
3	1.50691	0.56047
4	—	0.00006
5	0.84210	0.10993
6	—	0.00009
7	0.44321	0.04179
8	—	0.00007
9	0.22161	0.04150
10	—	0.00006
11	0.15512	0.01351
12	—	0.00005
13	0.13126	0.02447
14	—	0.00003
15	0.11376	0.00977
16	—	0.00005
17	0.10037	0.00825
18	—	0.00005
19	0.08981	0.01693
20	—	0.00004
21	0.08126	0.01109
22	—	0.00010
23	0.07419	0.01265
24	—	0.00006
25	0.06825	0.01990
26	—	0.00006
27	0.06320	0.01441
28	—	0.00004
29	0.05884	0.00196
30	—	0.00007
31	0.05504	0.00835
32	—	0.00007
33	0.05171	0.01333
34	—	0.00006
35	0.04875	0.01185
36	—	0.00006
37	0.04612	0.01096
38	—	0.00007
39	0.04375	0.00945
40	—	0.00007

BC-3096

COSEL

Model	PAA600F-5
Item	Condensation 結露特性
Object	+5V120A

Testing Circuitry Figure A

1. Condensation test

Testing procedure is as follows.

① Keeping and cooling the unit in a tank at -10℃ for an hour with the input off.

② Taking it out of the tank and dewing itself in a room where the temperature is 25℃ and the humidity is 40%RH.

③ Testing electrical characteristics of the unit to confirm there be no fault.

④ Repeating ①, ② and ③ three times.

1．結露特性試験

入力を切った状態で、恒温槽で－１０℃に冷却しておき、約１時間後に恒温槽から取り出し、室温２５℃、湿度４０%RHの状態におき結露させ、その電気的特性の測定を３度行い、異常のないことを確認する。

2．Values

	Times	Output Voltage [V]	Ripple Voltage [mV]	Ripple Noise [mV]
Load 50 %	1	5.047	50	60
	2	5.044	50	60
	3	5.043	50	60
Load 100 %	1	5.013	50	70
	2	5.008	50	70
	3	5.006	50	70

Input Volt. 200 V

COSEL

Model	PAA600F-5
Item	Leakage Current 漏洩電流
Object	――――――

Testing Circuitry Figure A

1. Results

Standards	Leakage Current [mA]		
	Input Volt. 170 [V]	Input Volt. 200 [V]	Input Volt. 264 [V]
(A) DENTORI	―	―	―
(B) UL	―	―	―
(C) CSA	―	―	―

Standards	Leakage Current [mA]		
	Input Volt. 170 [V]	Input Volt. 220 [V]	Input Volt. 264 [V]
(D) VDE	0.38	0.36	0.44

2. Condition

Leakage current value is concluded after measuring both phases of AC input and by choosing the larger one.

交流入力の両相について測定し、その大きい方を漏洩電流測定値とする。

Load 100 %

COSEL

Model	PAA600F-5
Item	Line Noise Tolerance 入力雑音耐量
Object	+5V120A

Testing Circuitry Figure C

1. Results

Pulse Width [nS]	MODE	Operating Point of Overvoltage Protection [V] 過電圧保護動作値	DC-like Regulation of Output Voltage 出力電圧の直流的変動
50	COMMON	6.52	no regulation
	NORMAL	6.52	no regulation
1000	COMMON	6.52	no regulation
	NORMAL	6.52	no regulation

Conditions

Input Voltage :200 V
Pulse Voltage :2000 V
Pulse Cycle :10 mS
Pulse Input Duration :1 min. or more
Load :100 %

COSEL

Model	PAA600F-5	
Item	Conducted Emission 雑音端子電圧	Testing Circuitry Figure D
Object	———————	

1. Graph

Remarks

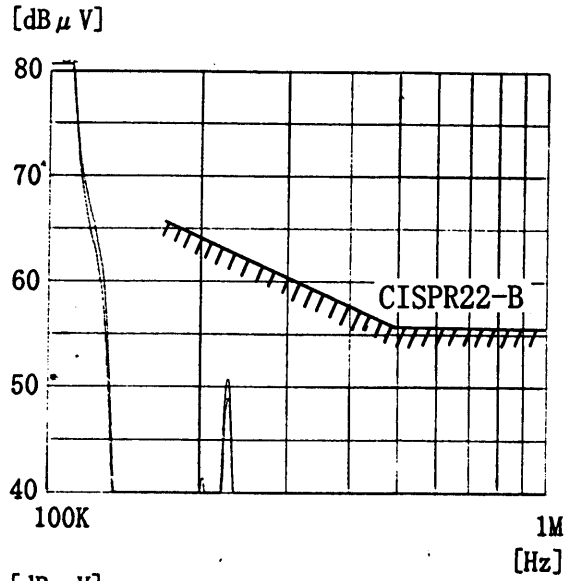
Input Volt. 230 V

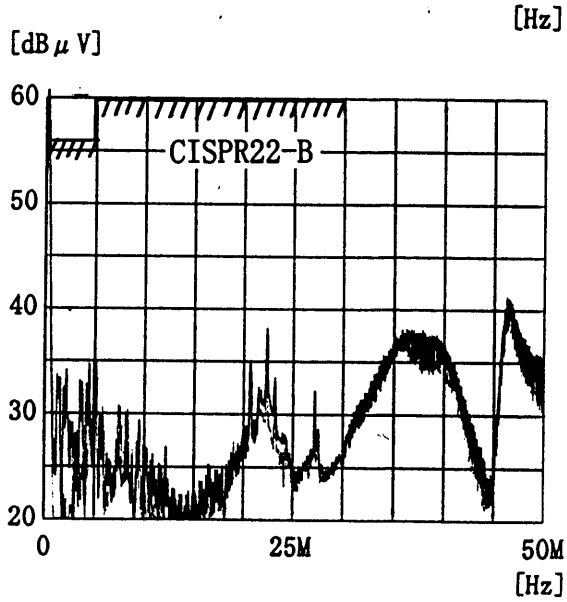
Load 100 %

Note: Slanted line shows the range of Tolerance.

(注)斜線は許容値を示す。

NO	Standards	Standards Complied	Frequency [MHz]	Tolerance [dB/μV]
1	FCC Class A		0.45～1.6	60
			1.6～30	69.5
2	FCC Class B		0.45～30	48
3	VCCI -1		0.15～0.5	79
			0.5～30	73
4	VCCI -2		0.15～0.5	66-56
			0.5～5	56
			5～30	60
5	VDE Class A		0.01～0.15	91-69.5
			0.15～0.5	66
			0.5～30	60
6	CISPR22 Class B	○	0.15～0.5	66-56
			0.5～5	56
			5～30	60





COSEL

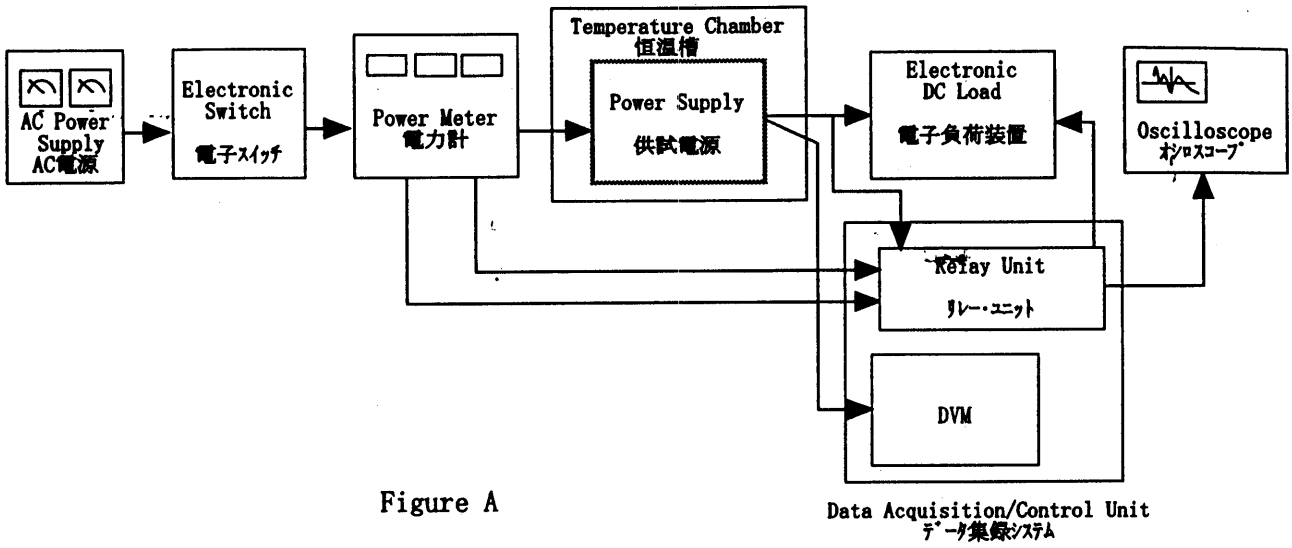


Figure A

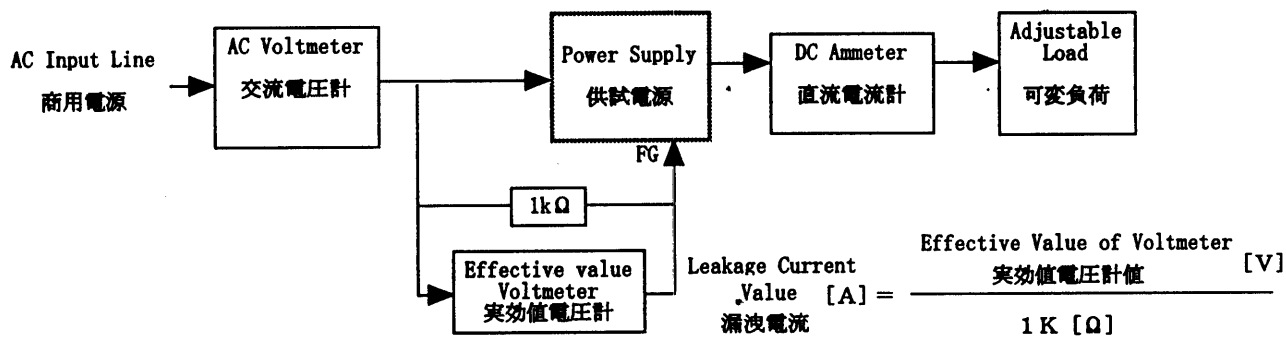


Figure B(DENTORI)

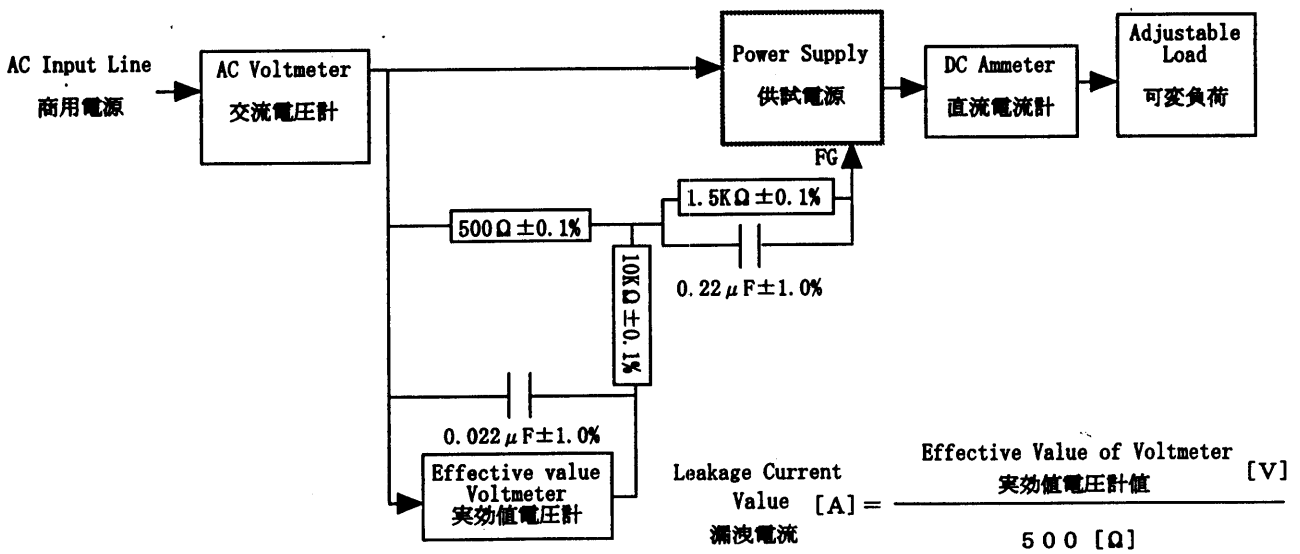


Figure B (UL, CSA, VDE)

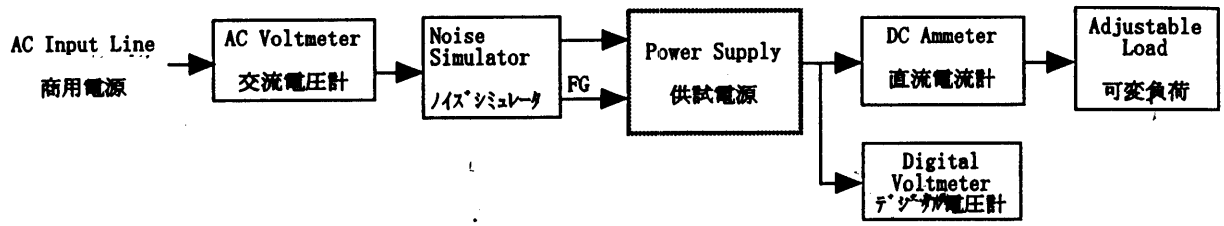


Figure C

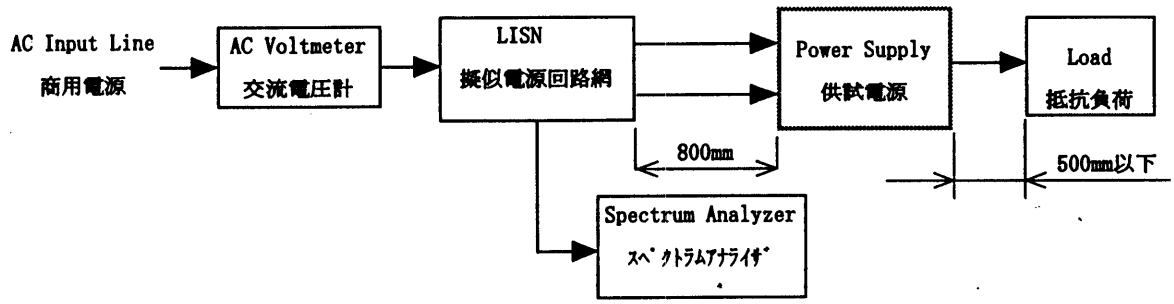


Figure D

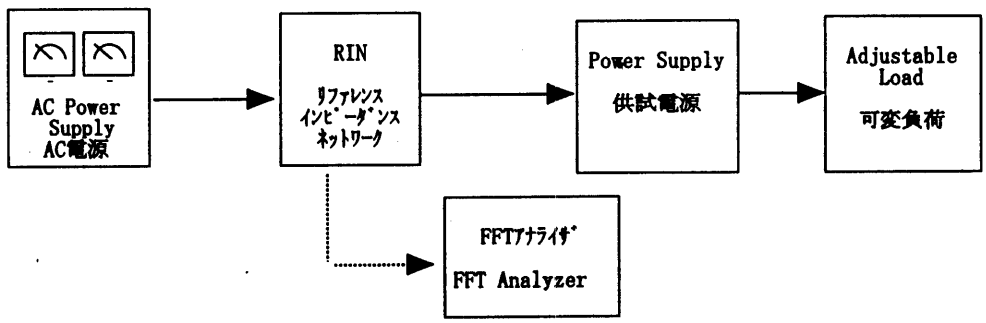


Figure E