参考資料

COSEL

TEST DATA OF PAA100F-5

(200V INPUT)

Regulated DC Power Supply

Date : Apr. 17. 1996

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コーセル株式会社

COSEL CO., LTD.

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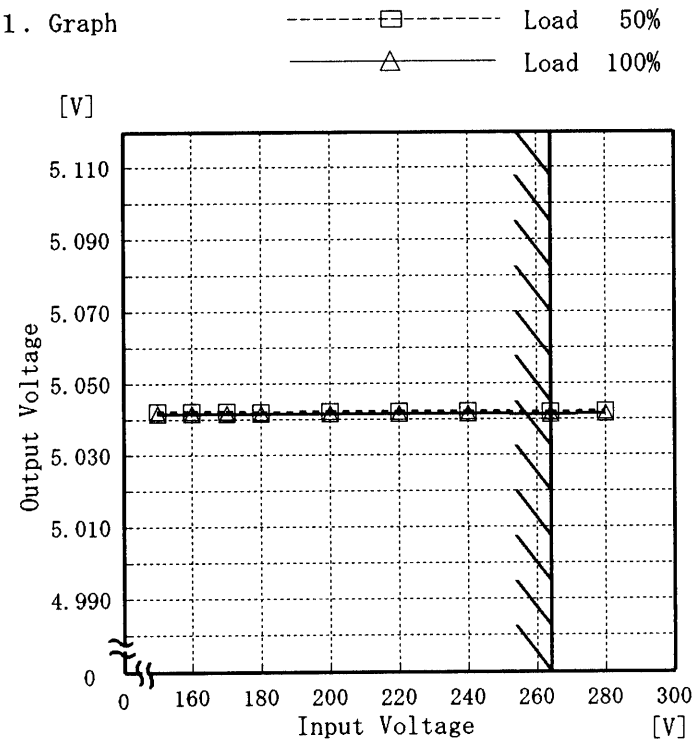
Model	PAA100F-5
Item	Line Regulation 静的入力変動
Object	+5V20.0A

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

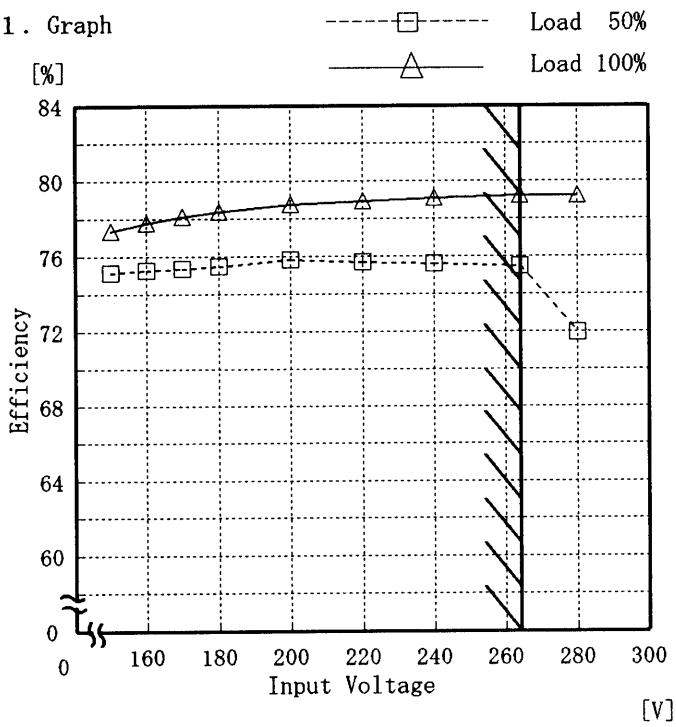
Input Voltage [V]	Load 50% Output Volt. [V]	Load 100% Output Volt. [V]
150	5.042	5.042
160	5.042	5.042
170	5.042	5.042
180	5.042	5.042
200	5.042	5.042
220	5.042	5.042
240	5.042	5.042
264	5.042	5.042
280	5.042	5.042

COSEL

Model	PAA100F-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

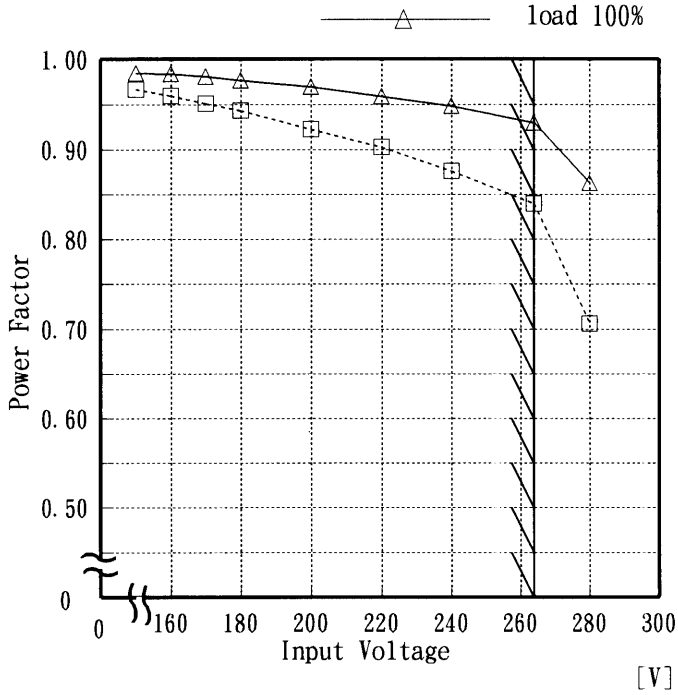
Input Voltage [V]	Load 50% Efficiency [%]	Load 100% Efficiency [%]
150	75.1	77.4
160	75.3	77.8
170	75.4	78.1
180	75.5	78.4
200	75.8	78.8
220	75.7	78.9
240	75.6	79.1
264	75.5	79.2
280	71.9	79.2

COSEL

Model	PAA100-5
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

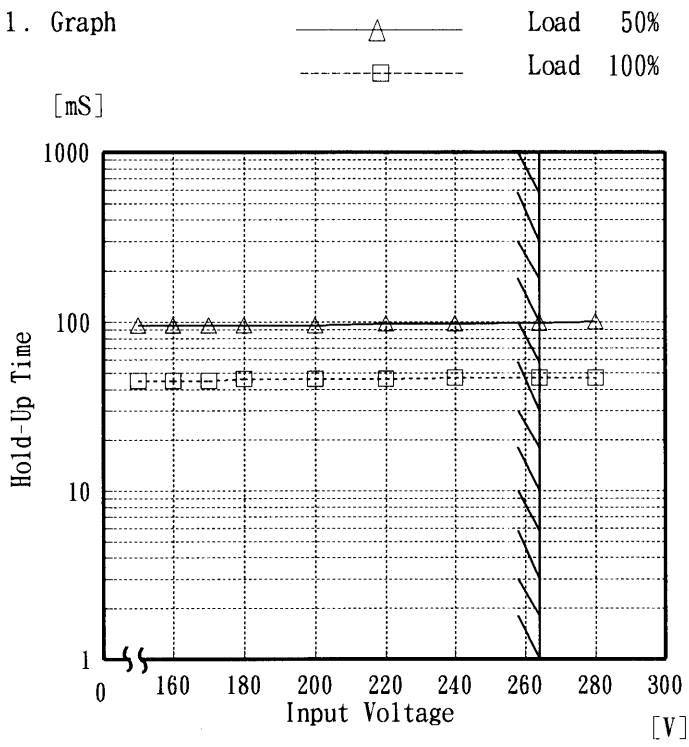
Input Voltage [V]	load 50% Power Factor	load 100% Power Factor
150	0.97	0.99
160	0.96	0.98
170	0.95	0.98
180	0.94	0.98
200	0.92	0.97
220	0.90	0.96
240	0.88	0.95
264	0.84	0.93
280	0.71	0.86

COSEL

Model	PAA100-5
Item	Hold-Up Time　出力保持時間
Object	+5V20.0A

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	45
160	96	45
170	96	45
180	96	46
200	96	46
220	98	46
240	98	47
264	99	47
280	101	47

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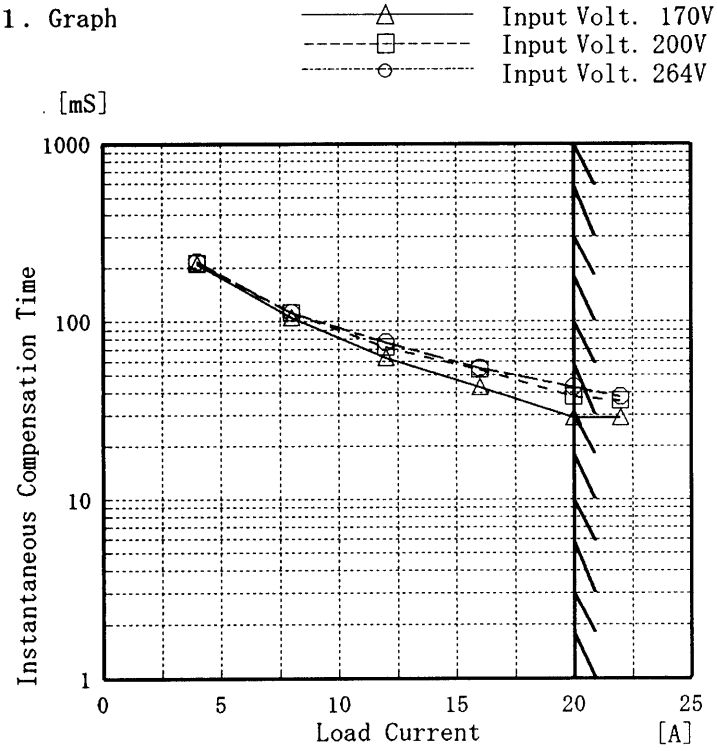
Model	PAA100F-5
Item	Instantaneous Interruption Compensation 瞬時停電保障
Object	+5V20.0A

Testing Circuitry Figure A

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

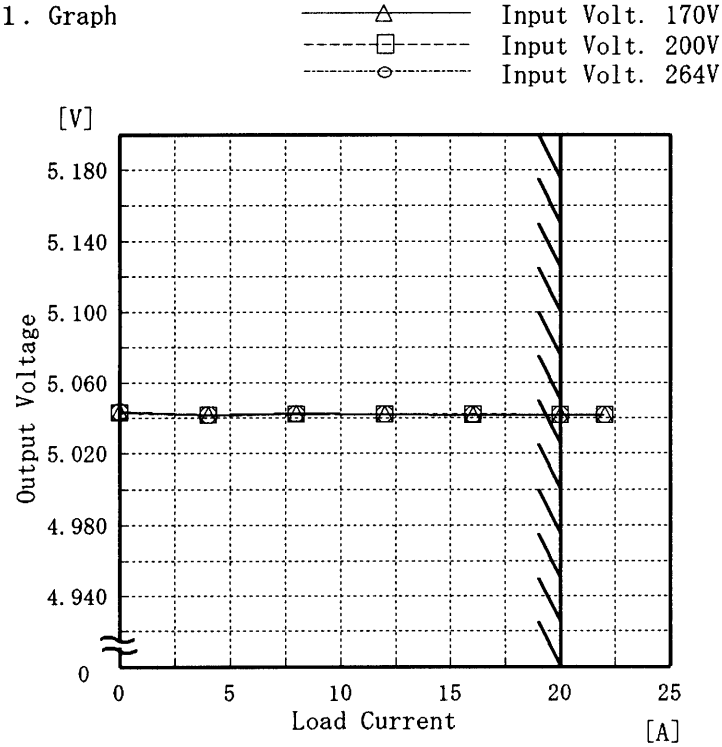
Load Current [A]	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
	Time [mS]		
0.0	—	—	—
4.0	212	213	217
8.0	106	113	113
12.0	63	72	77
16.0	43	54	55
20.0	29	38	43
22.0	29	36	38
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—

COSEL

Model	PAA100F-5
Item	Load Regulation 静的負荷変動
Object	+5V20.0A

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

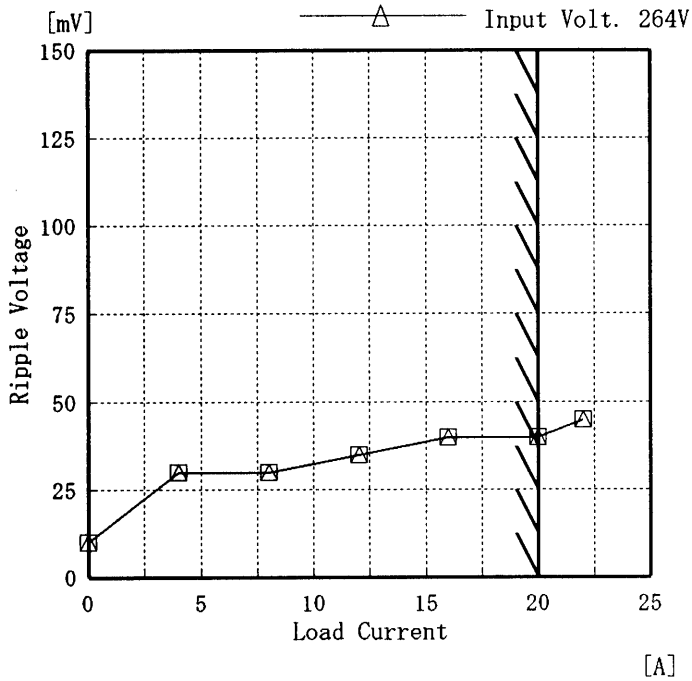
Load Current [A]	Input Volt. 170[V] Output Volt. [V]	Input Volt. 200[V] Output Volt. [V]	Input Volt. 264[V] Output Volt. [V]
0.0	5.043	5.043	5.044
4.0	5.042	5.042	5.042
8.0	5.043	5.042	5.042
12.0	5.042	5.042	5.042
16.0	5.042	5.042	5.042
20.0	5.042	5.042	5.042
22.0	5.042	5.042	5.042
—	—	—	—
—	—	—	—
—	—	—	—

COSEL

Model	PAA100F-5
Item	Ripple Voltage(by Load Current) リップル電圧(負荷電流特性)
Object	+5V20.0A

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

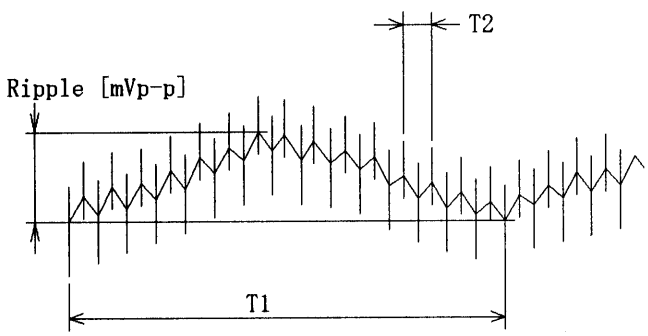


Fig. Complex Ripple Wave Form
図 リップル波形詳細図

2. Values

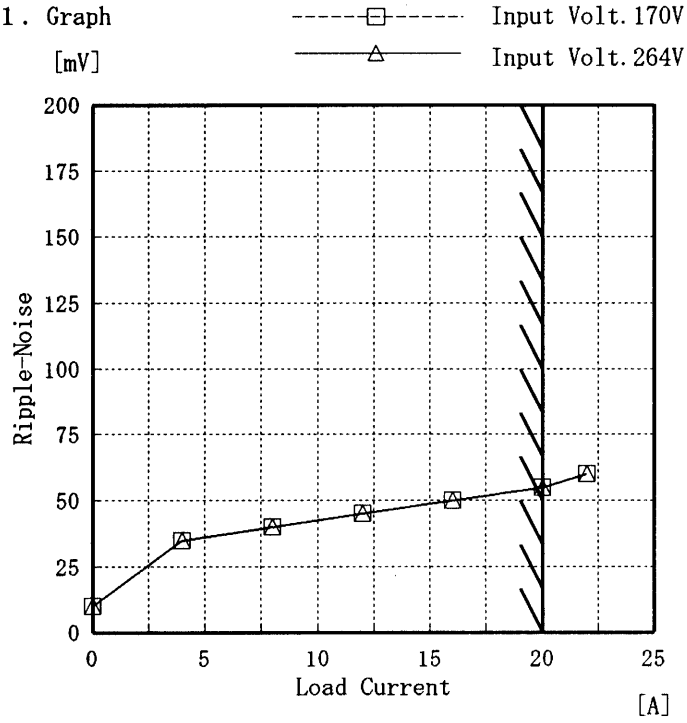
Load Current [A]	Input Volt. 170 [V] Ripple Output Volt. [mV]	Input Volt. 264 [V] Ripple Output Volt. [mV]
0.0	10	10
4.0	30	30
8.0	30	30
12.0	35	35
16.0	40	40
20.0	40	40
22.0	45	45
—	—	—
—	—	—
—	—	—
—	—	—

COSEL

Model	PAA100F-5
Item	Ripple-Noise　リップルノイズ
Object	+5V20.0A

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

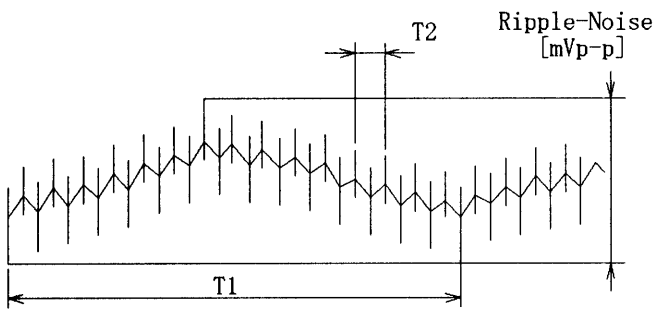


Fig. Complex Ripple Wave Form
図　リップル波形詳細図

2. Values

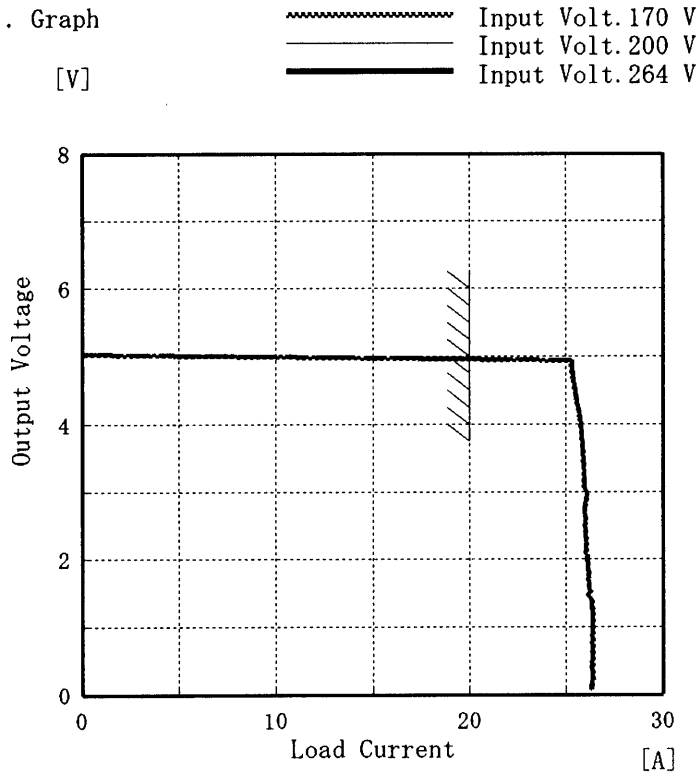
Load current [A]	Input Volt. 170 [V] Ripple-Noise [mV]	Input Volt. 264 [V] Ripple-Noise [mV]
0.0	10	10
4.0	35	35
8.0	40	40
12.0	45	45
16.0	50	50
20.0	55	55
22.0	60	60
—	—	—
—	—	—
—	—	—
—	—	—

COSEL

Model	PAA100F-5
Item	Overcurrent Protection 過電流保護
Object	+5V20.0A

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

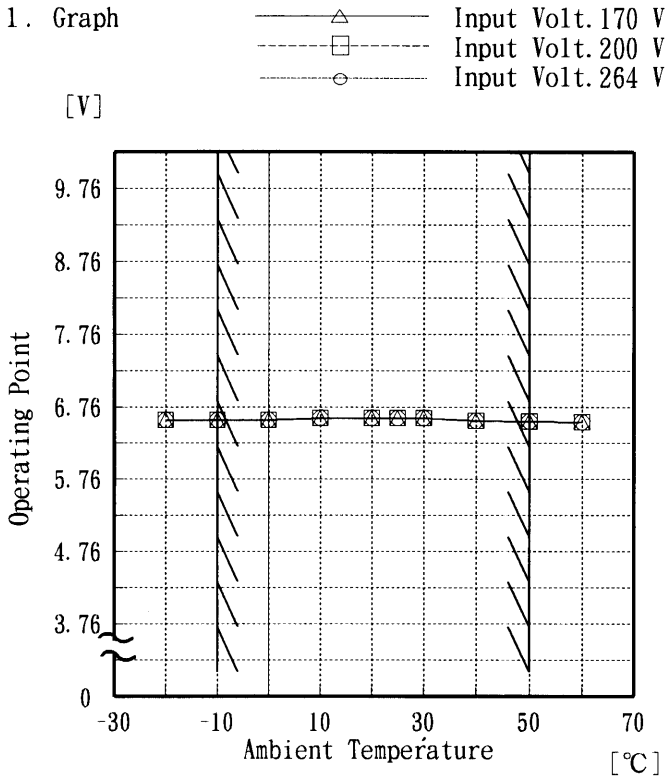
Output Voltage [V]	Input Volt. 170[V] Load Current [A]	Input Volt. 200[V] Load Current [A]	Input Volt. 264[V] Load Current [A]
5.00	0.00	0.00	0.00
4.75	25.29	25.34	25.34
4.50	25.41	25.46	25.46
4.00	25.72	25.75	25.75
3.50	25.86	25.89	25.89
3.00	25.98	26.01	26.03
2.50	25.96	25.97	25.97
2.00	26.08	26.08	26.08
1.50	26.22	26.22	26.22
1.00	26.36	26.35	26.35
0.50	26.35	26.35	26.35
0.00	26.30	26.30	26.29

COSEL

Model	PAA100F-5
Item	Overvoltage Protection 過電圧保護
Object	+5V 20.0A

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。

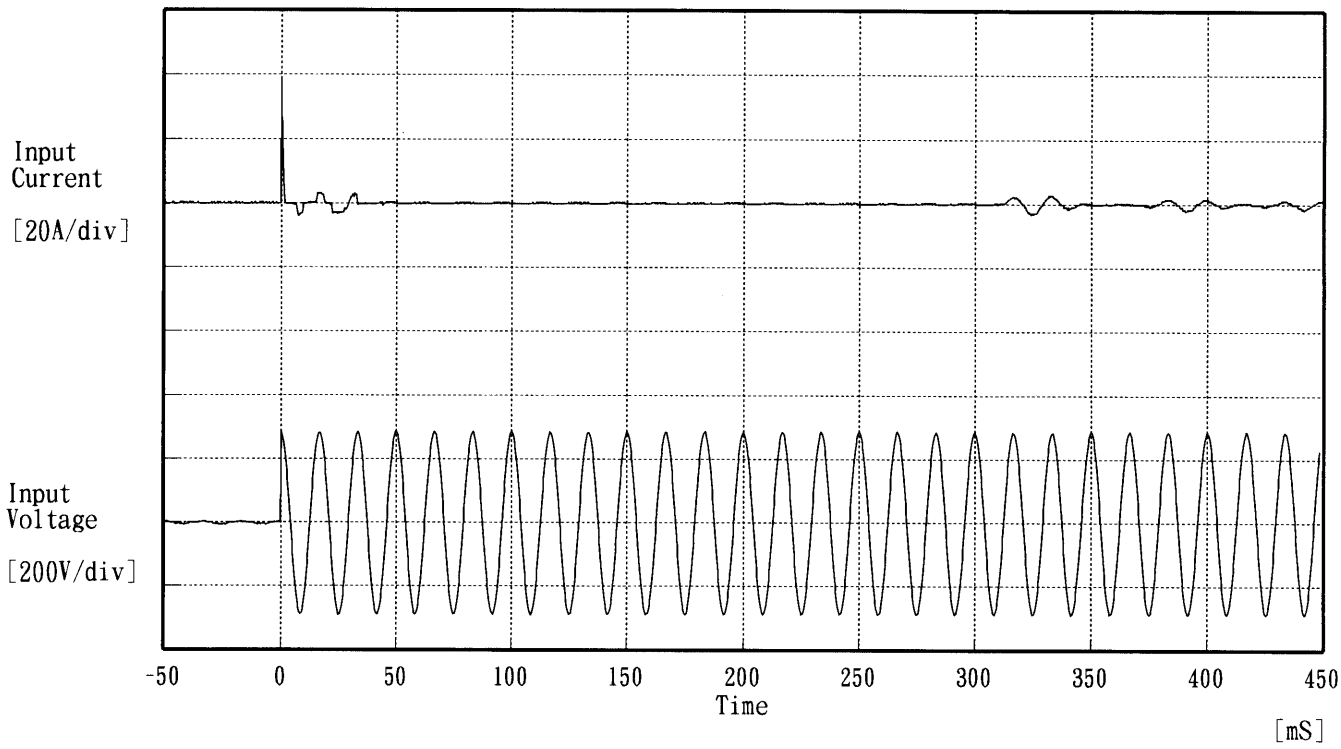
2. Values

Ambient Temp. [℃]	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
	Operating Point [V]		
-20	6.58	6.58	6.58
-10	6.58	6.58	6.58
0	6.58	6.58	6.58
10	6.61	6.61	6.61
20	6.61	6.61	6.61
25	6.61	6.61	6.61
30	6.61	6.61	6.61
40	6.57	6.57	6.57
50	6.56	6.56	6.56
60	6.55	6.55	6.55
—	—	—	—

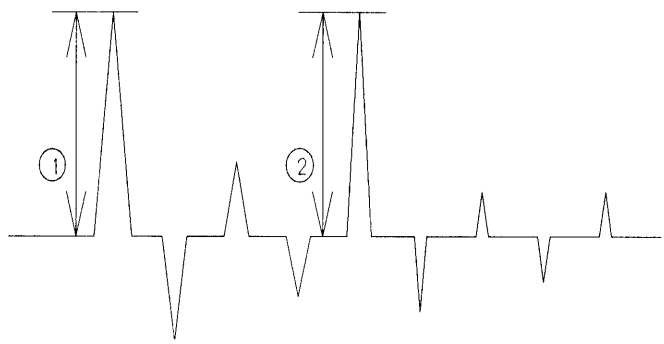
COSEL

Model	PAA100-5
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 39.13 [A]
② 3.00 [A]



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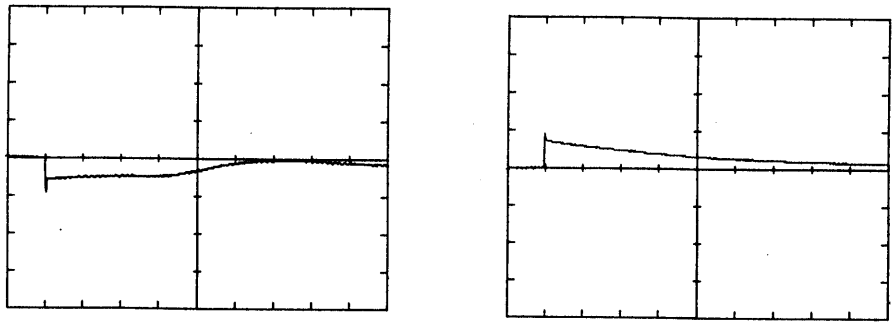
Model	PAA100-5
Item	Dynamic Load Responce 動的負荷変動
Object	+5V20.0A

Temperature 25 ℃
Testing Circuitry Figure A

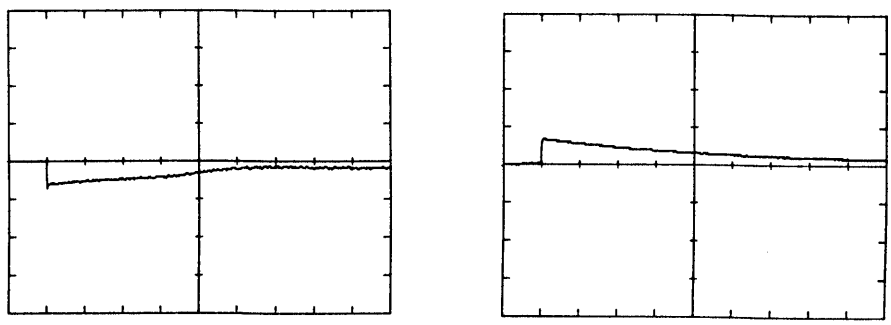
Input Volt. 200 V
Cycle 1000 mS

Load Current

Min. Load ←→
Load 100 %



Min. Load ←→
Load 50 %



100 mV/div

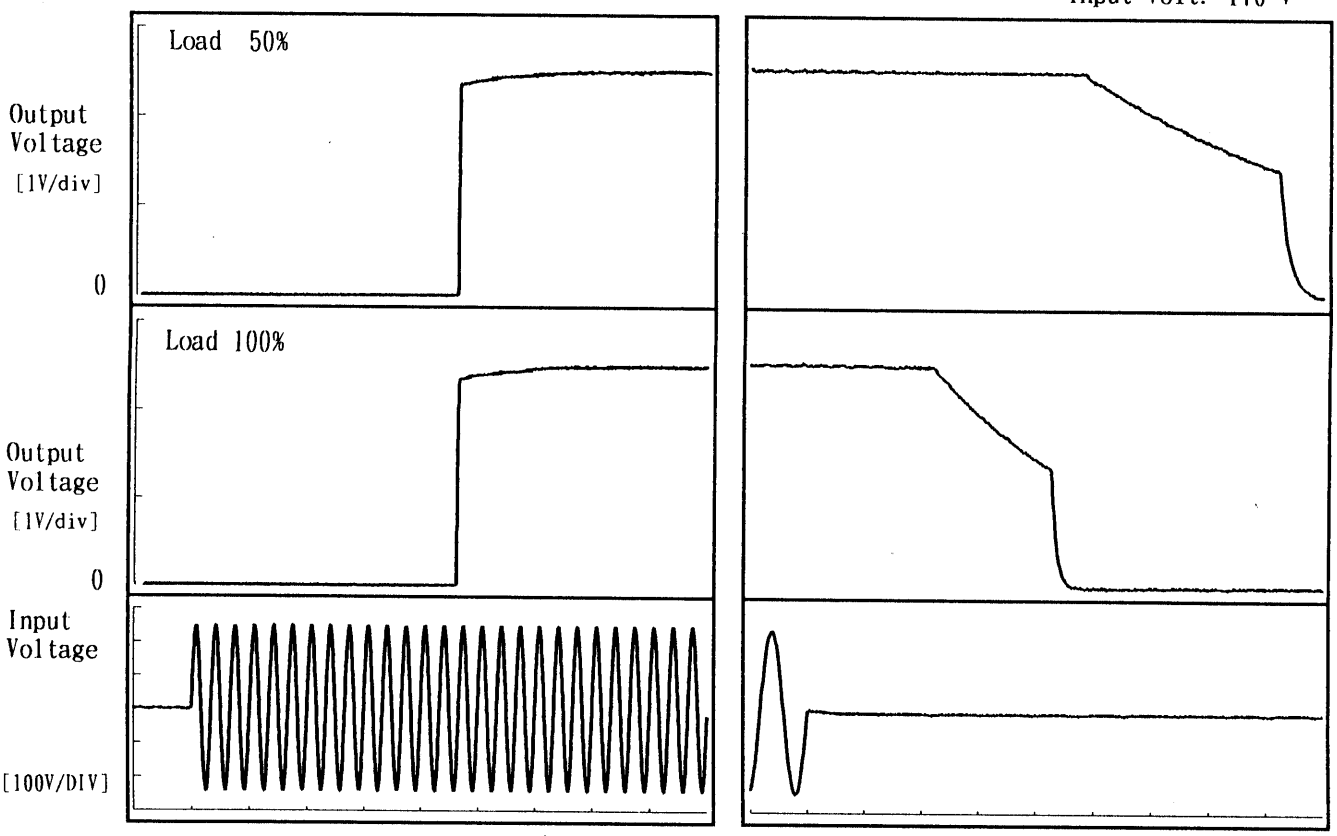
10 mS/div

COSEL

Model	PAA100-5		
Item	Rise and Fall Time　立上り、立下り時間	Temperature	25 ℃
		Testing Circuitry	Figure A
Object	+5V20.0A		

1. Graph

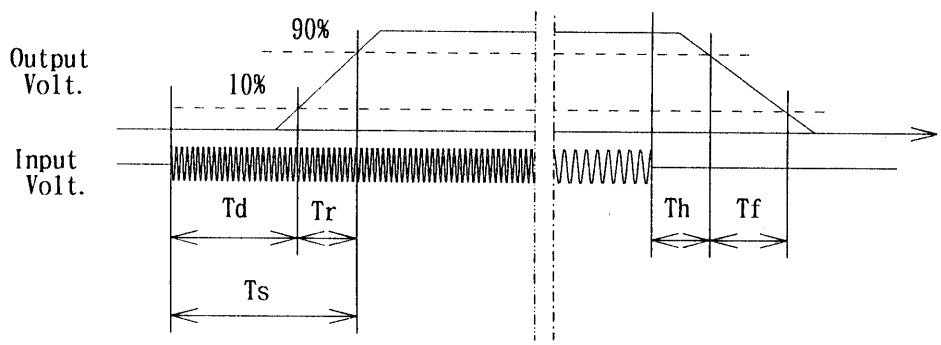
Input Volt. 170 V



2. Values

[mS]

Load \ Time	T d	T r	T s	T h	T f
50 %	230.8	1.5	232.3	109.8	61.0
100 %	230.5	2.0	232.5	51.8	37.5



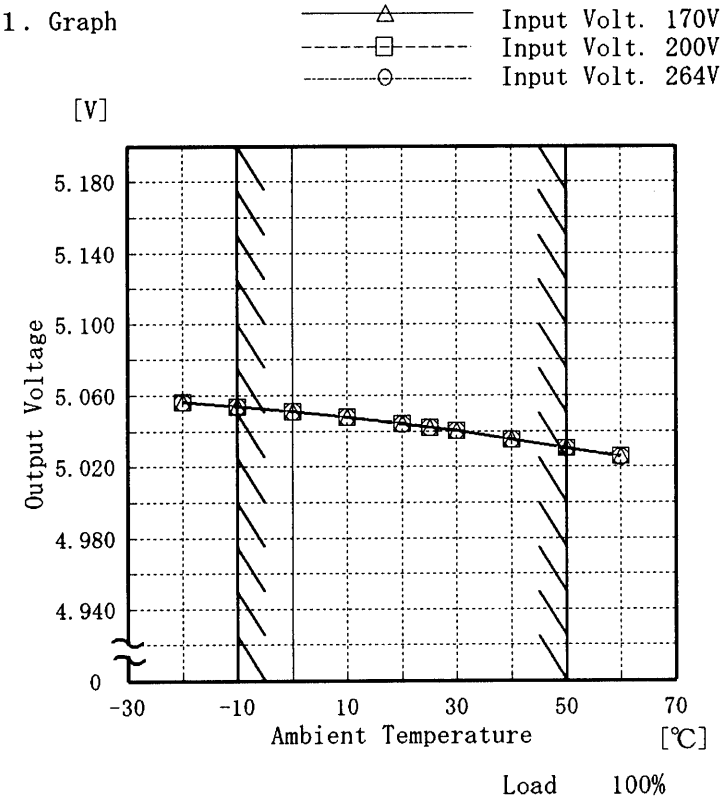
BC－0679

COSEL

Model	PAA100F-5
Item	Ambient Temperature Drift 周囲温度変動
Object	+5V20.0A

Testing Circuitry Figure A

1. Graph



Load 100%

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

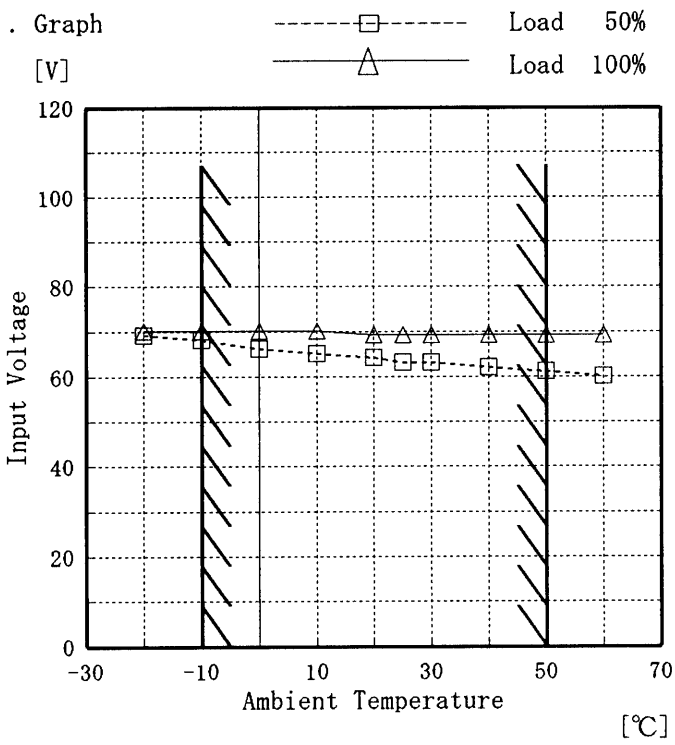
Temperature [℃]	Input Volt. 170[V] Output Volt. [V]	Input Volt. 200[V] Output Volt. [V]	Input Volt. 264[V] Output Volt. [V]
-20	5.056	5.056	5.056
-10	5.054	5.054	5.054
0	5.051	5.051	5.051
10	5.048	5.048	5.048
20	5.044	5.044	5.044
25	5.042	5.042	5.042
30	5.040	5.040	5.040
40	5.036	5.036	5.035
50	5.031	5.031	5.031
60	5.026	5.026	5.026
—	—	—	—

COSEL

Model	PAA100F-5
Item	Minimum Input Voltage for Regulated Output Voltage 最低レギュレーション電圧
Object	+5V20.0A

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

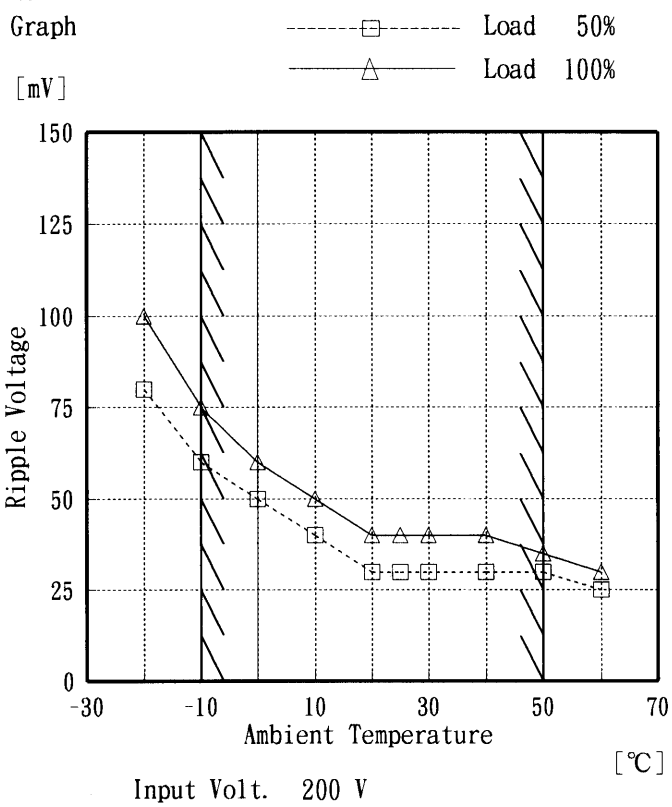
Ambient Temp. [℃]	Load 50% Input Volt. [V]	Load 100% Input Volt. [V]
-20	69	70
-10	68	70
0	66	70
10	65	70
20	64	69
25	63	69
30	63	69
40	62	69
50	61	69
60	60	69
—	—	—

COSEL

Model	PAA100-5
Item	Ripple Voltage (by Ambient Temp.) リップル電圧（周囲温度特性）
Object	+5V20.0A

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

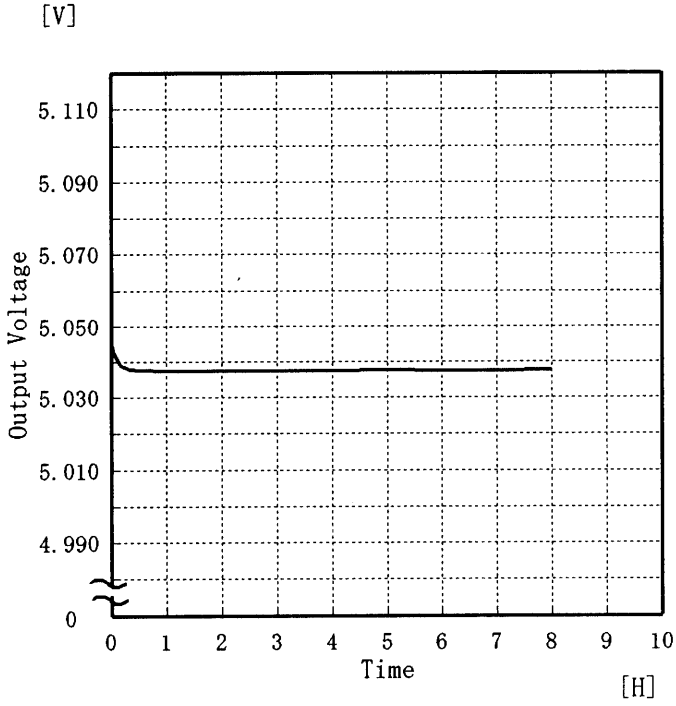
Ambient Temp. [℃]	Load 50% Ripple Output Volt. [mV]	Load 100% Ripple Output Volt. [mV]
-20	80	100
-10	60	75
0	50	60
10	40	50
20	30	40
25	30	40
30	30	40
40	30	40
50	30	35
60	25	30
—	—	—

COSEL

Model	PAA100F-5
Item	Time Lapse Drift 経時ドリフト
Object	+5V20.0A

Temperature 25 ℃
Testing Circuitry Figure A

1. Graph



Input Volt. 200V
Load 100%

2. Values

Time since start [H]	Output Voltage [V]
0.0	5.045
0.5	5.038
1.0	5.038
2.0	5.038
3.0	5.038
4.0	5.038
5.0	5.038
6.0	5.037
7.0	5.037
8.0	5.038

COSEL

Model	PAA100F-5
Item	Output Voltage Accuracy　定電圧精度
Object	+5V20.0A

Testing Circuitry　Figure A

Output Voltage Accuracy

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

Temperature　: -10～50 ℃
Input Voltage : 170～264 V
Load Current　: 0.0～20.0 A

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

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

定電圧精度

周囲温度、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
負荷電流　　0.0～20.0 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

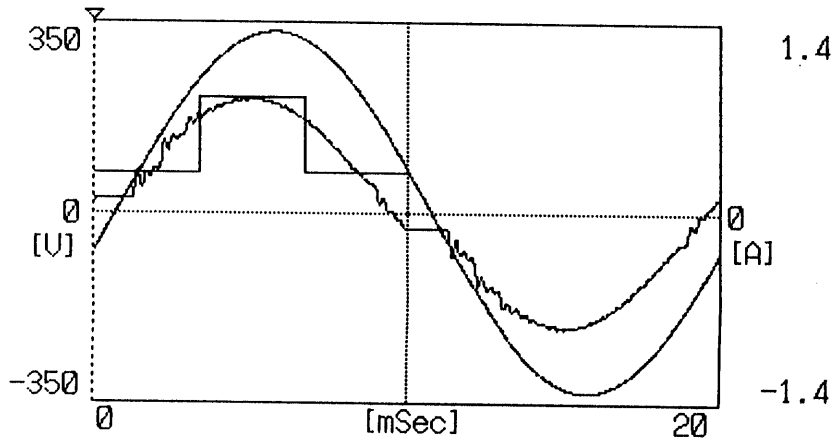
$$* \text{定電圧精度(変動率)} = \left(\frac{\text{変動値}}{\text{定格出力電圧}} \right) \times 100$$

Item	Temperature [℃]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy(Ration) [%]
Maximum Voltage	-10	170	0.0	5.055	±13	±0.3
Minimum Voltage	50	200	20.0	5.030		

COSEL

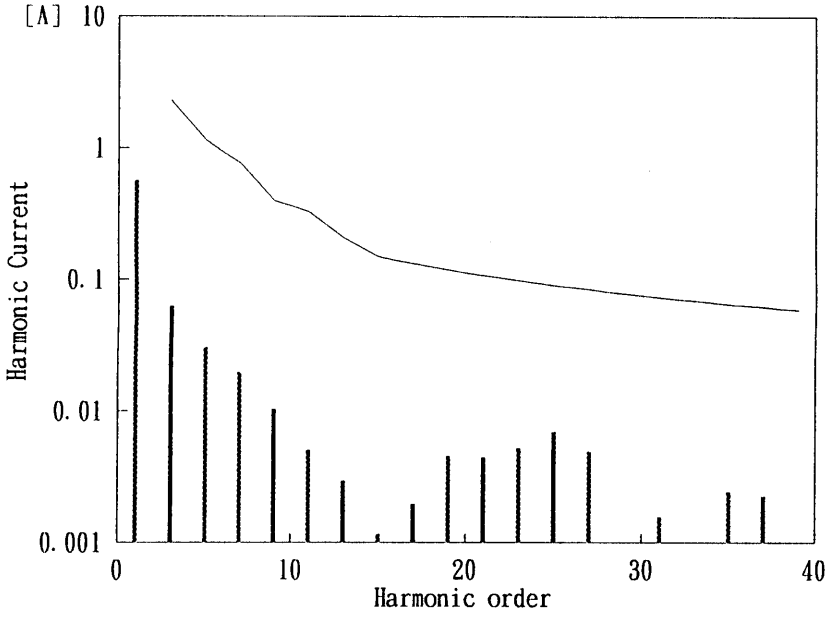
Model	PAA100F-5		
Item	Harmonic Current 高調波電流	Temperature Testing Circuitry	25℃ Figure E
Object	————		

1. Input Current Waveform



Conditions	Values
Input Voltage [V]	230.8
Input Current [A]	0.57
Active Power [W]	126.8
Apparent Power[VA]	131.1
Frequency [Hz]	50
Power Factor	0.967
Output Power [W]	100

2. Harmonic Current



——— Harmonic Current
高調波電流

_____ Limits for Class A equipment of odd harmonics
ｸﾗｽAの機器に対する高調波奇数次限度値

Harmonics order 高調波次数	Limits 限度値 [A]	Values 測定値 [A]
1	—	0.56837
2	—	0.00015
3	2.30000	0.06253
4	—	0.00001
5	1.14000	0.03072
6	—	0.00009
7	0.77000	0.01968
8	—	0.00004
9	0.40000	0.01028
10	—	0.00004
11	0.33000	0.00500
12	—	0.00005
13	0.21000	0.00294
14	—	0.00001
15	0.15000	0.00115
16	—	0.00002
17	0.13235	0.00196
18	—	0.00004
19	0.11842	0.00453
20	—	0.00002
21	0.10714	0.00443
22	—	0.00002
23	0.09783	0.00517
24	—	0.00003
25	0.09000	0.00692
26	—	0.00003
27	0.08333	0.00491
28	—	0.00003
29	0.07759	0.00086
30	—	0.00004
31	0.07258	0.00157
32	—	0.00002
33	0.06818	0.00057
34	—	0.00003
35	0.06429	0.00243
36	—	0.00002
37	0.06081	0.00226
38	—	0.00002
39	0.05769	0.00092
40	—	0.00002

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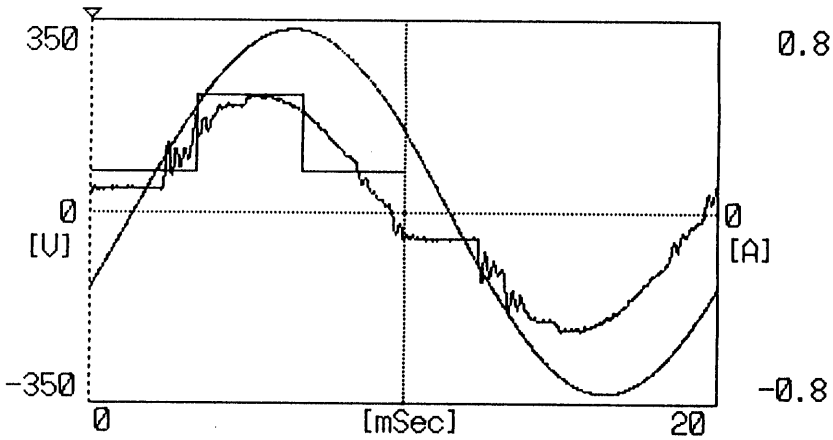
COSEL

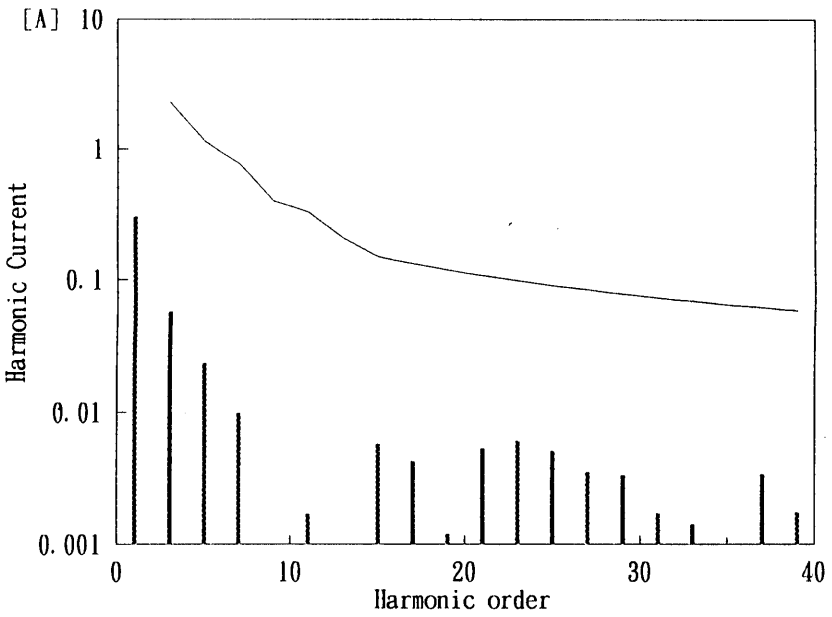
Model	PAA100F-5		
Item	Harmonic Current 高調波電流	Temperature Testing Circuitry	25℃ Figure E
Object	————		

1. Input Current Waveform



Conditions	Values
Input Voltage [V]	231.2
Input Current [A]	0.31
Active Power [W]	64.8
Apparent Power[VA]	71.3
Frequency [Hz]	50
Power Factor	0.909
Output Power [W]	50

2. Harmonic Current



Harmonics order 高調波次数	Limits 限度値 [A]	Values 測定値 [A]
1	—	0.30425
2	—	0.00005
3	2.30000	0.05726
4	—	0.00002
5	1.14000	0.02366
6	—	0.00008
7	0.77000	0.00983
8	—	0.00003
9	0.40000	0.00047
10	—	0.00003
11	0.33000	0.00170
12	—	0.00005
13	0.21000	0.00076
14	—	0.00001
15	0.15000	0.00572
16	—	0.00002
17	0.13235	0.00422
18	—	0.00005
19	0.11842	0.00119
20	—	0.00001
21	0.10714	0.00530
22	—	0.00002
23	0.09783	0.00610
24	—	0.00002
25	0.09000	0.00508
26	—	0.00002
27	0.08333	0.00352
28	—	0.00002
29	0.07759	0.00332
30	—	0.00003
31	0.07258	0.00171
32	—	0.00002
33	0.06818	0.00141
34	—	0.00003
35	0.06429	0.00047
36	—	0.00002
37	0.06081	0.00338
38	—	0.00002
39	0.05769	0.00175
40	—	0.00003

——— Harmonic Current
高調波電流

——— Limits for Class A equipment of odd harmonics
ｸﾗｽAの機器に対する高調波奇数次限度値

COSEL

Model	PAA100F-5
Item	Condensation 結露特性
Object	+5V20.0A

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	5.057	30	45
	2	5.055	30	45
	3	5.055	30	45
Load 100 %	1	5.056	40	60
	2	5.054	40	60
	3	5.054	40	60

Input Volt. 200 V

COSEL

Model	PAA100F-5
Item	Leakage Current　漏洩電流
Object	――――――

Testing Circuitry　Figure A

1. Results

Standards	Leakage Current [mA]		
	Input Volt. 85 [V]	Input Volt. 100 [V]	Input Volt. 132 [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	0.35	0.46	0.57

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 %

(A) Input Resistance :1K Ω

(B) Input Resistance :1.5K Ω
Input Capacitance :0.15 μF

(C) Input Resistance :1.5K Ω
Input Capacitance :0.15 μF

(D) Input Resistance :2K Ω
Input Capacitance :0.1 μF

COSEL

Model	PAA100F-5	
Item	Line Noise Tolerance 入力雑音耐量	Testing Circuitry Figure C
Object	+5V20.0A	

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	6.56	no regulation
	NORMAL	6.56	no regulation
1000	COMMON	6.57	no regulation
	NORMAL	6.55	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	PAA100-5	
Item	Conducted Emission 雑音端子電圧	Testing Circuitry Figure D
Object	————————	

1. Graph

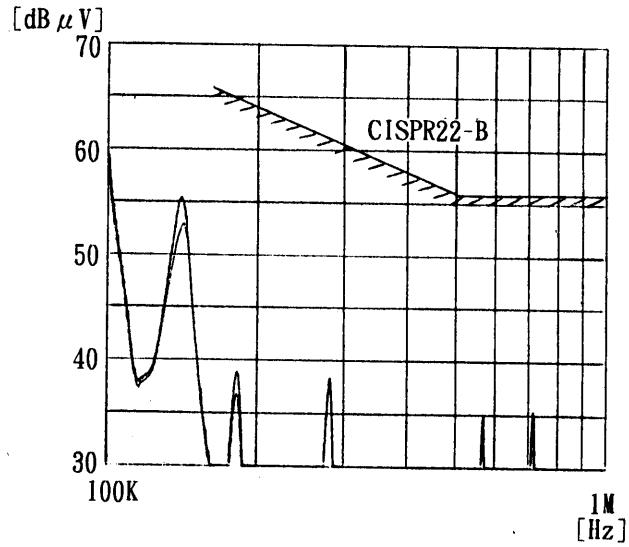
Remarks

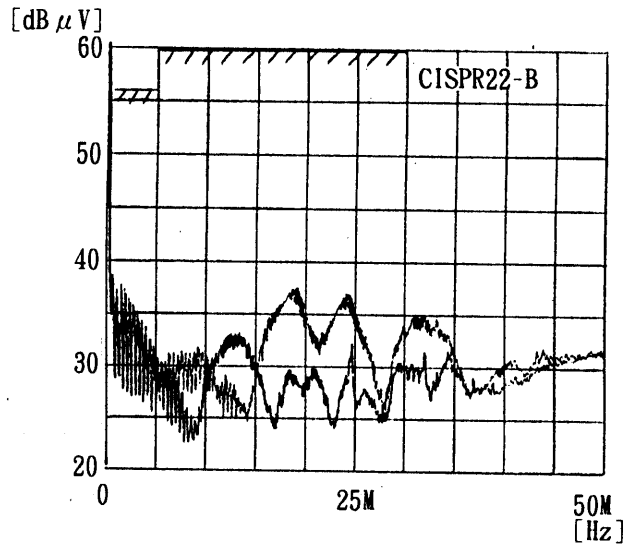
Input Volt. 230 V

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	CISPR 22 class B	○	0.15～0.5	66-56
			0.5～5	56
			5～30	60





COSEL

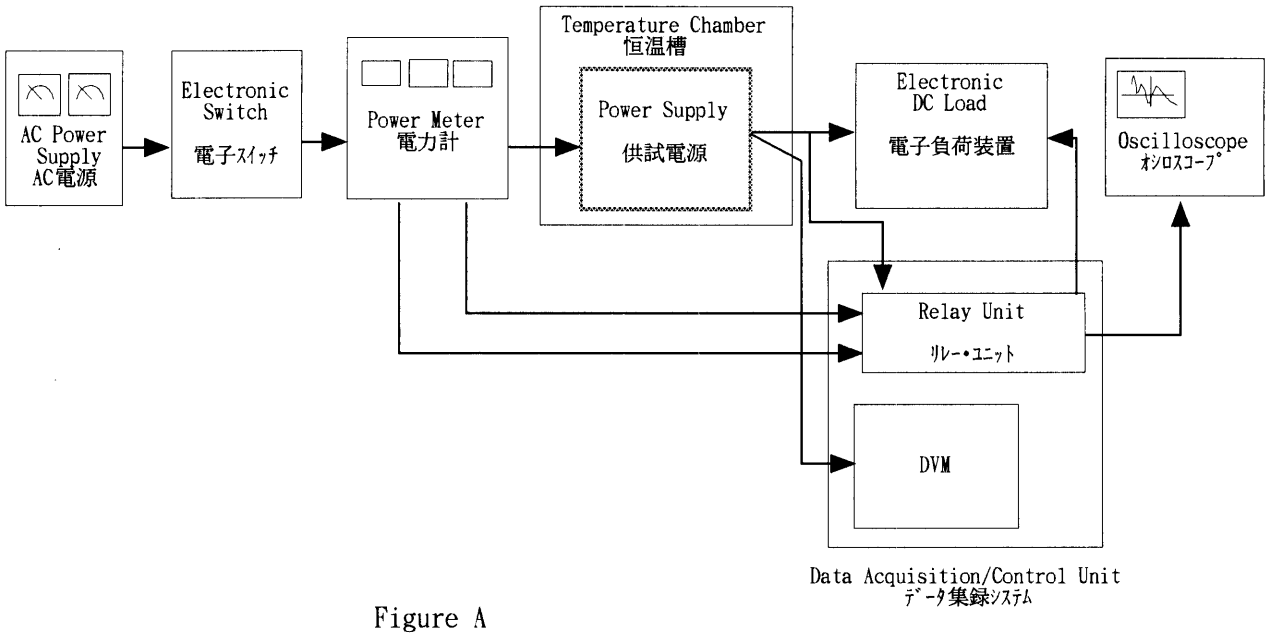


Figure A

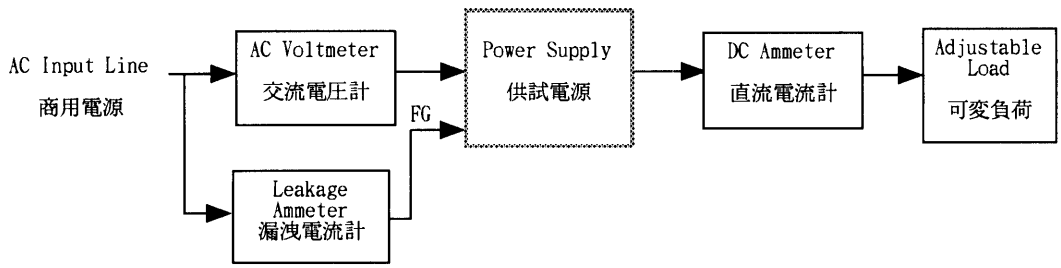


Figure B

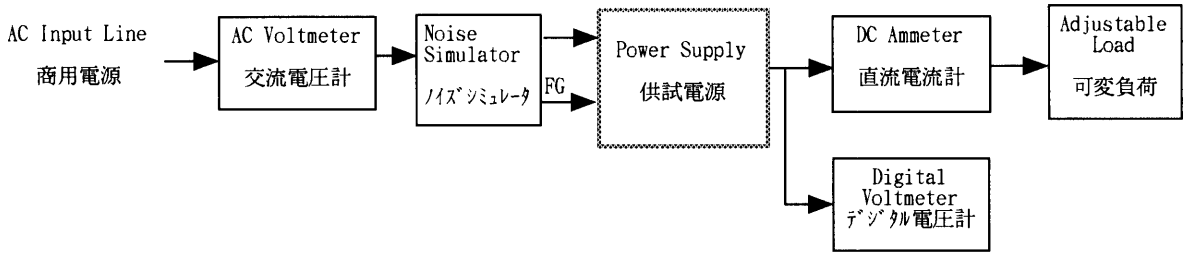


Figure C

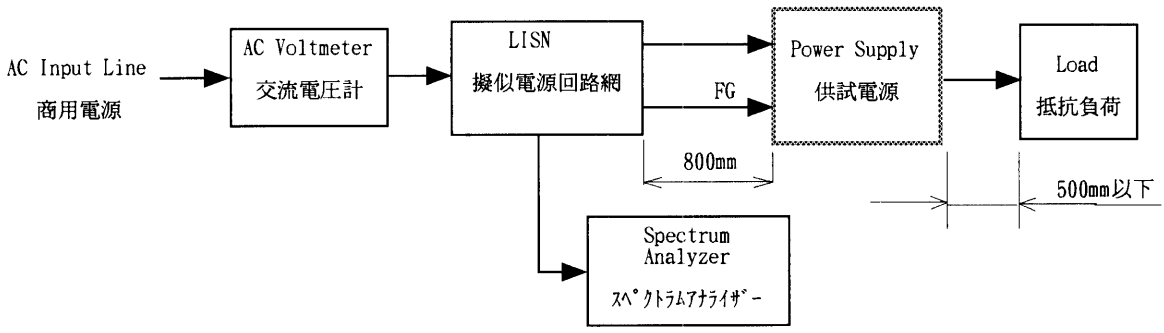
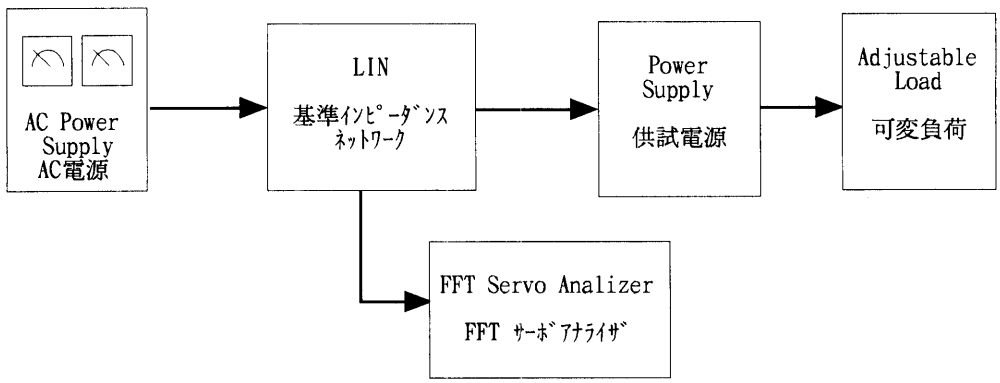


Figure D



Testing Circuitry Figure E