参考資料

COSEL

TEST DATA OF PAA100F-24

(100V INPUT)

Regulated DC Power Supply

Date : Apr. 17. 1996

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COSEL CO., LTD.

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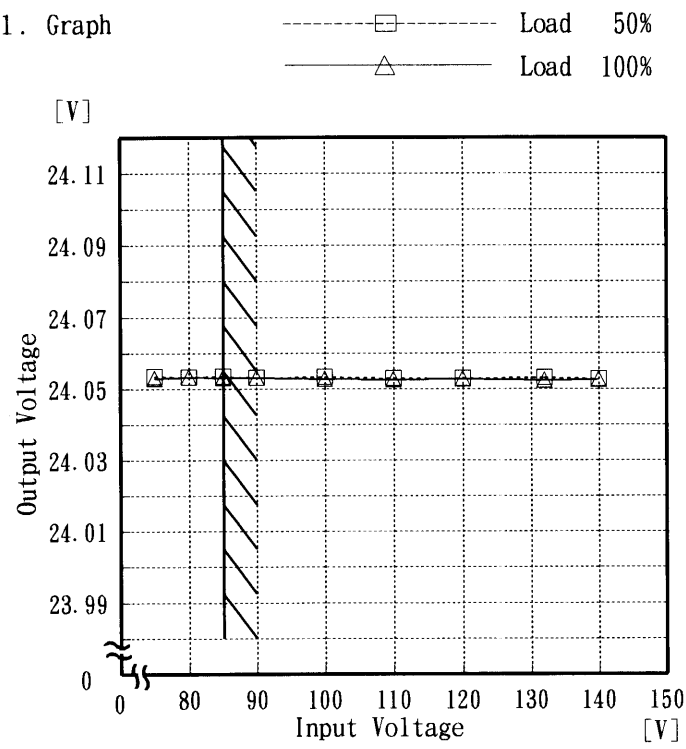
Testing Circuitry　Figure A

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]
75	24.053	24.053
80	24.053	24.053
85	24.054	24.053
90	24.053	24.053
100	24.053	24.053
110	24.053	24.053
120	24.053	24.053
120	24.053	24.053
132	24.053	24.053

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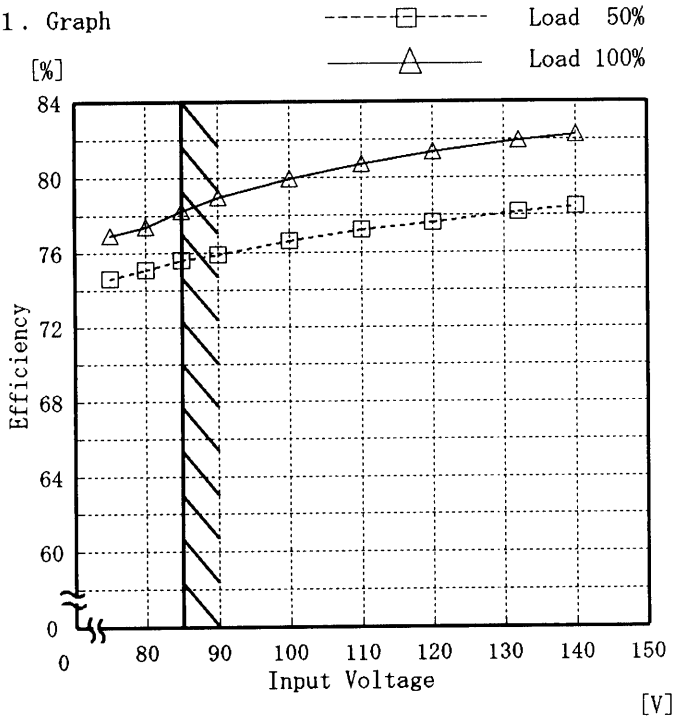
Model	PAA100F-24
Item	Efficiency 効率
Object	———————————

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

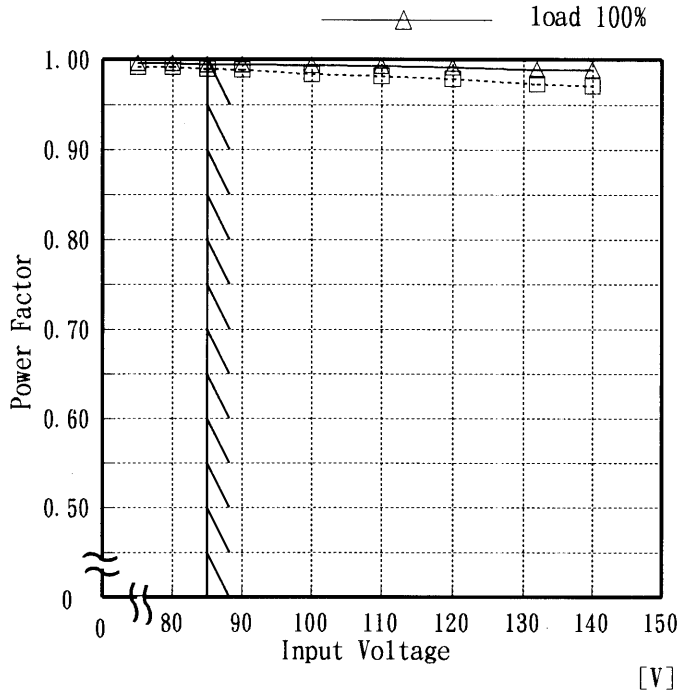
Input Voltage [V]	Load 50% Efficiency [%]	Load 100% Efficiency [%]
75	74.6	76.9
80	75.1	77.4
85	75.6	78.3
90	75.9	79.0
100	76.6	80.0
110	77.2	80.7
120	77.6	81.4
132	78.2	82.0
140	78.5	82.3

COSEL

Model	PAA100F-24
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
75	0.99	1.00
80	0.99	1.00
85	0.99	1.00
90	0.99	1.00
100	0.98	0.99
110	0.98	0.99
120	0.98	0.99
132	0.97	0.99
140	0.97	0.99

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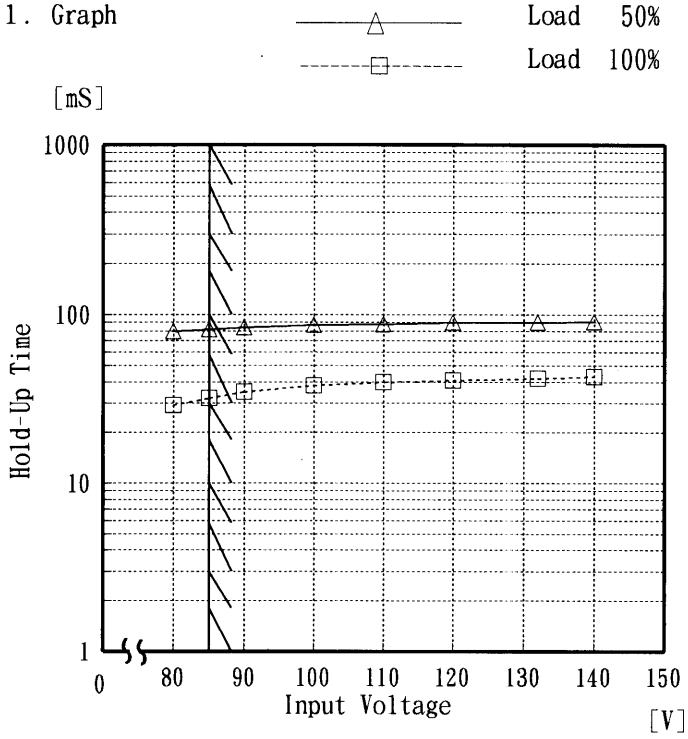
Model	PAA100F-24
Item	Hold-Up Time　出力保持時間
Object	+24V4.5A

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]
80	80	29
85	82	32
90	84	35
100	87	38
110	88	40
120	90	41
132	90	42
140	91	43

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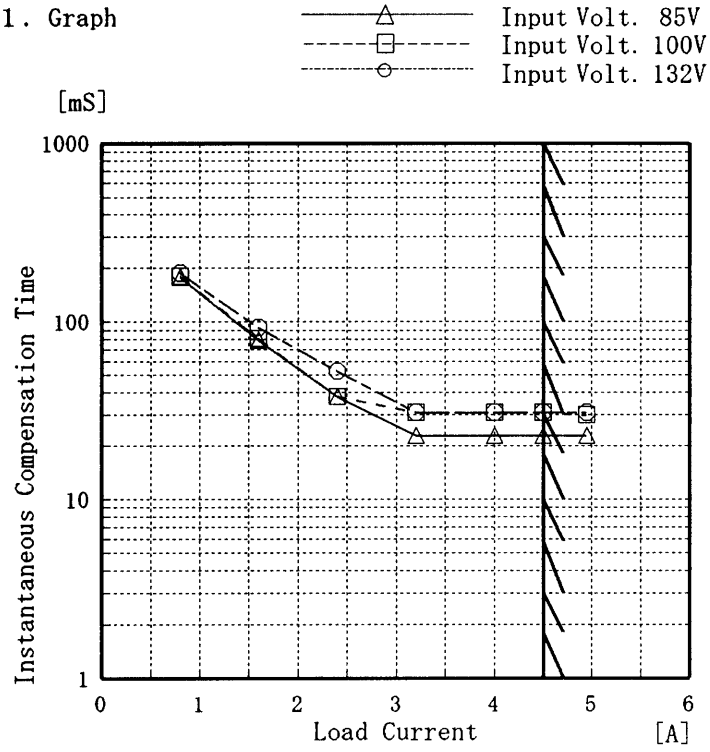
Model	PAA100F-24
Item	Instantaneous Interruption Compensation 瞬時停電保障
Object	+24V4.5A

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. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
	Time [mS]		
0.0	—	—	—
0.8	179	180	189
1.6	79	81	93
2.4	38	38	53
3.2	23	31	31
4.0	23	31	31
4.5	23	31	31
5.0	23	30	31
—	—	—	—
—	—	—	—
—	—	—	—

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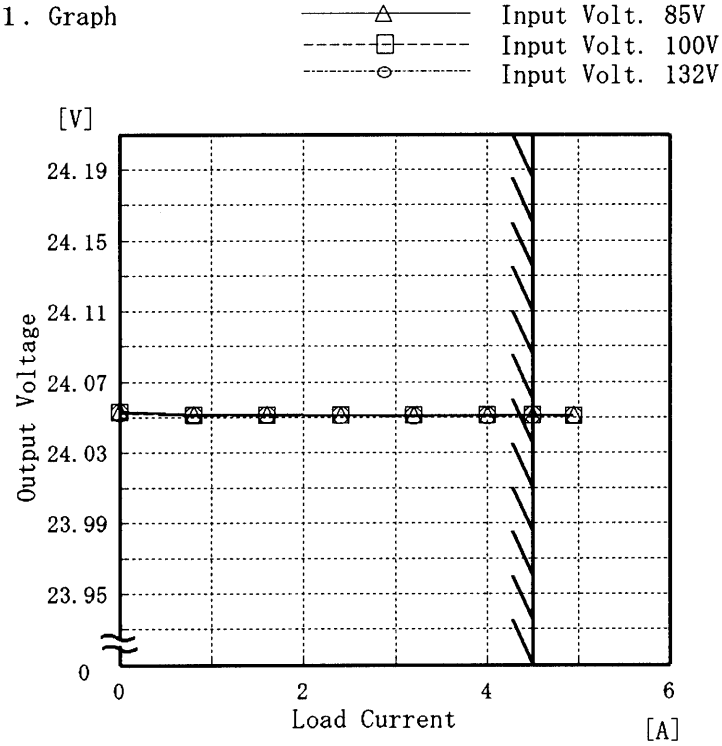
Model	PAA100F-24
Item	Load Regulation　静的負荷変動
Object	+24V4.5A

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. 85[V] Output Volt. [V]	Input Volt. 100[V] Output Volt. [V]	Input Volt. 132[V] Output Volt. [V]
0.0	24.053	24.053	24.053
0.8	24.052	24.051	24.051
1.6	24.052	24.051	24.051
2.4	24.051	24.051	24.051
3.2	24.051	24.051	24.051
4.0	24.051	24.051	24.051
4.5	24.051	24.051	24.051
5.0	24.051	24.051	24.051
—	—	—	—
—	—	—	—

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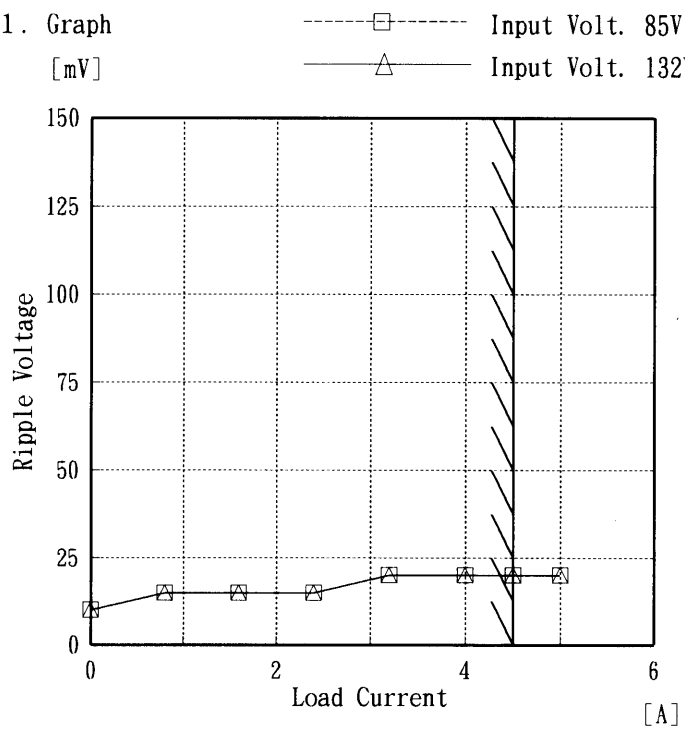
Model	PAA100F-24
Item	Ripple Voltage(by Load Current) リップル電圧(負荷電流特性)
Object	+24V4.5A

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

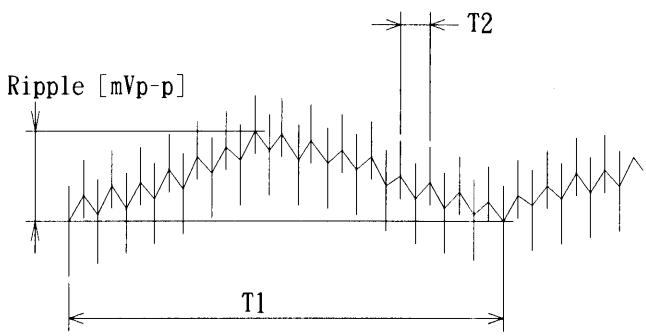


Fig. Complex Ripple Wave Form
図 リップル波形詳細図

2. Values

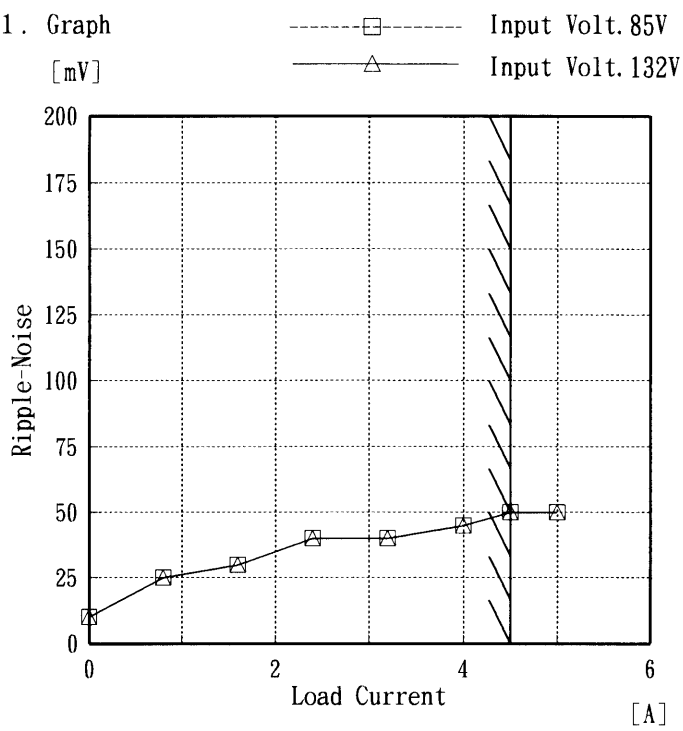
Load Current [A]	Input Volt. 85 [V] Ripple Output Volt. [mV]	Input Volt. 132 [V] Ripple Output Volt. [mV]
0.0	10	10
0.8	15	15
1.6	15	15
2.4	15	15
3.2	20	20
4.0	20	20
4.5	20	20
5.0	20	20
—	—	—
—	—	—
—	—	—

COSEL

Model	PAA100F-24
Item	Ripple-Noise リップルノイズ
Object	+24V4.5A

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

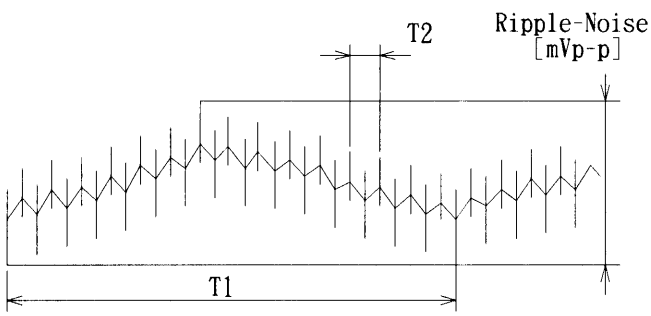


Fig. Complex Ripple Wave Form
図 リップル波形詳細図

2. Values

Load current [A]	Input Volt. 85 [V] Ripple-Noise [mV]	Input Volt. 132 [V] Ripple-Noise [mV]
0.0	10	10
0.8	25	25
1.6	30	30
2.4	40	40
3.2	40	40
4.0	45	45
4.5	50	50
5.0	50	50
—	—	—
—	—	—
—	—	—

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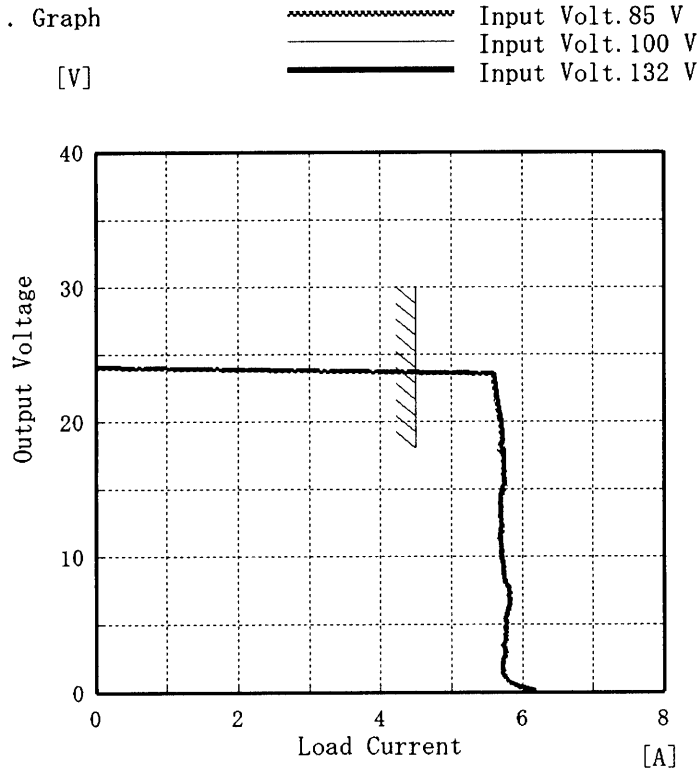
Model	PAA100F-24
Item	Overcurrent Protection 過電流保護
Object	+24V4.5A

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. 85[V] Load Current [A]	Input Volt. 100[V] Load Current [A]	Input Volt. 132[V] Load Current [A]
24.00	0.00	0.00	0.00
22.80	5.60	5.61	5.63
21.60	5.63	5.64	5.65
19.20	5.70	5.71	5.72
16.80	5.73	5.74	5.74
14.40	5.70	5.70	5.70
12.00	5.71	5.71	5.70
9.60	5.72	5.72	5.72
7.20	5.82	5.82	5.82
4.80	5.78	5.77	5.77
2.40	5.75	5.74	5.74
0.00	6.20	6.20	6.20

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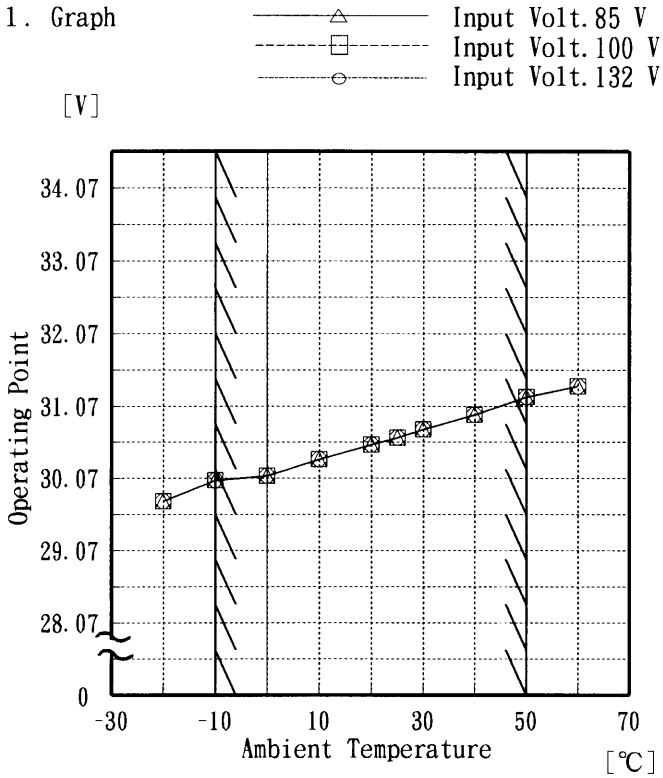
Model	PAA100F-24
Item	Overvoltage Protection 過電圧保護
Object	+24V4.5A

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. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
	Operating Point [V]		
-20	29.76	29.76	29.76
-10	30.05	30.05	30.05
0	30.11	30.11	30.11
10	30.34	30.34	30.34
20	30.54	30.54	30.54
25	30.64	30.64	30.64
30	30.75	30.75	30.75
40	30.95	30.95	30.95
50	31.20	31.20	31.20
60	31.35	31.35	31.35
—	—	—	—

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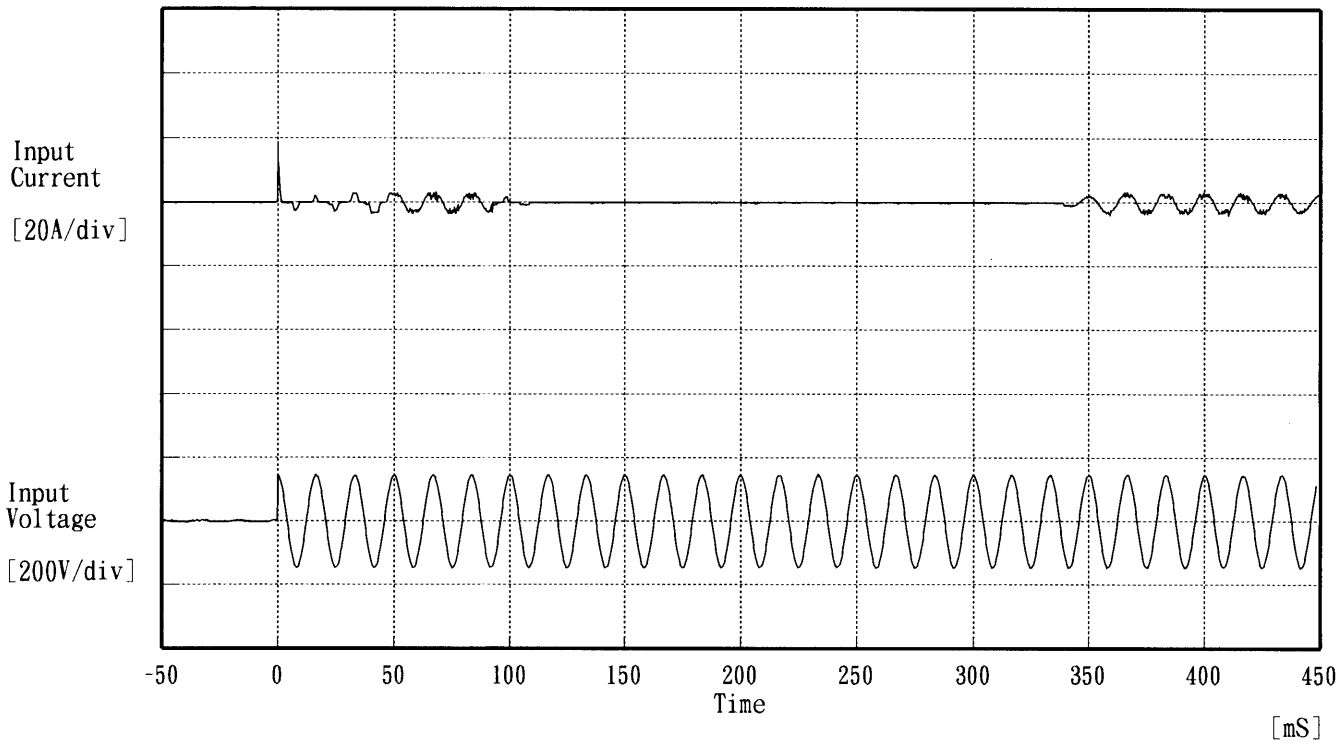
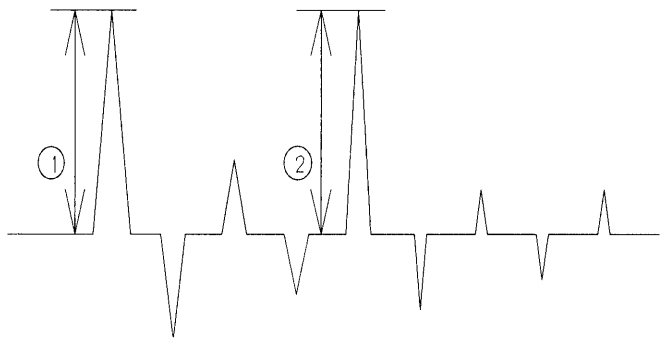
Model	PAA100F-24
Item	Inrush Current　突入電流
Object	————————

Temperature　25 ℃
Testing Circuitry　Figure A



Input Voltage　100 V
Frequency　60 Hz
Load　100 %
Inrush Current
① 18.81 [A]
② 4.00 [A]

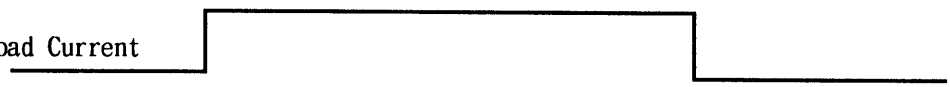


COSEL

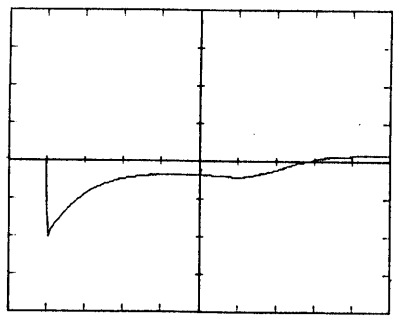
Model	PAA100F-24		
Item	Dynamic Load Responce 動的負荷変動	Temperature Testing Circuitry	25 ℃ Figure A
Object	+24V4.5A		

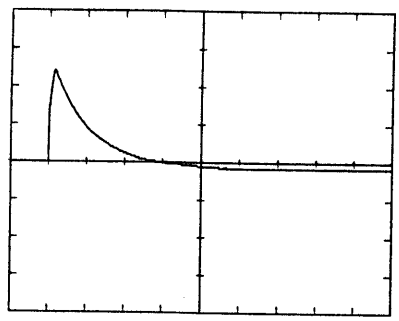
Input Volt. 100 V
Cycle 1000 mS

Load Current

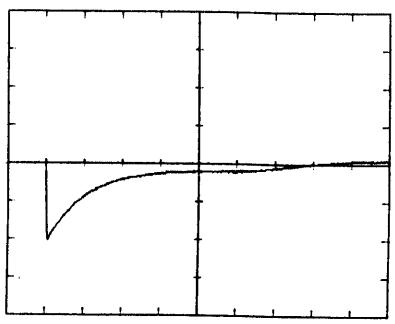


Min. Load ←→
Load 100 %

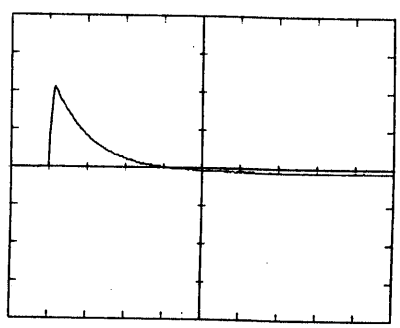




Min. Load ←→
Load 50 %



100 mV/div

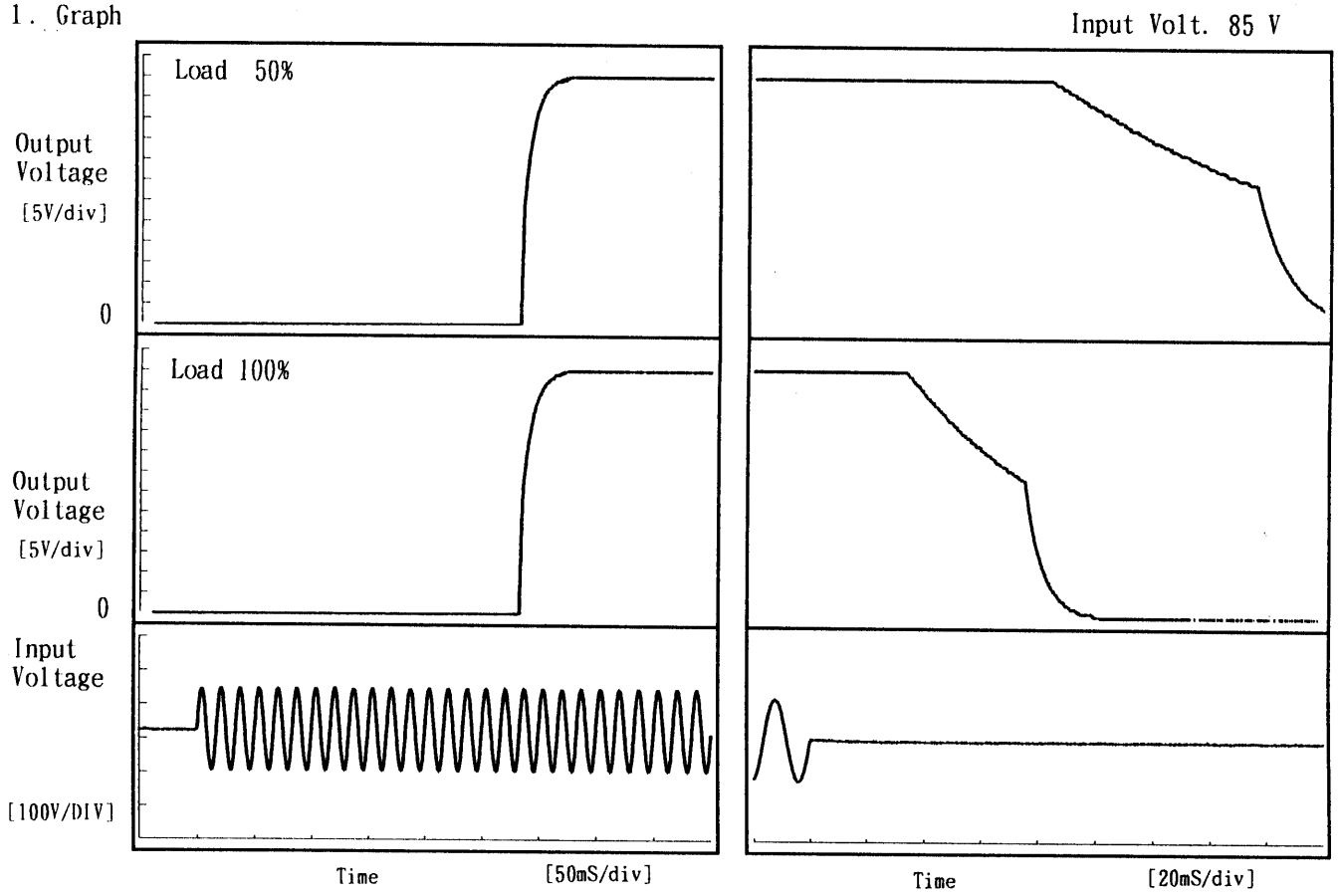


10 mS/div

COSEL

Model	PAA100F-24		
Item	Rise and Fall Time　立上り、立下り時間	Temperature	25 ℃
		Testing Circuitry	Figure A
Object	+24V4.5A		

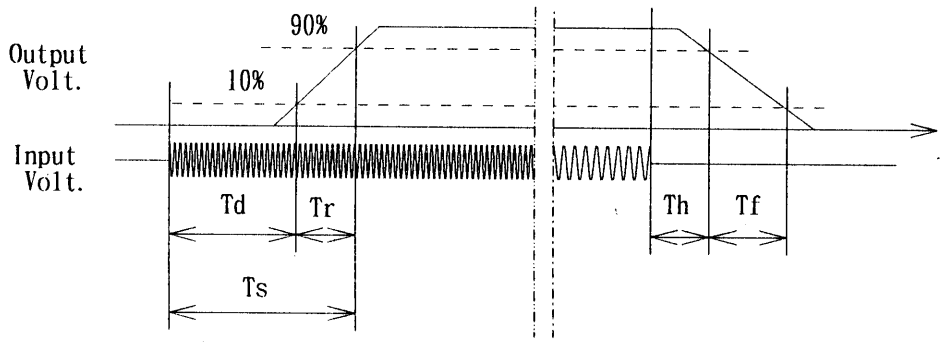
1. Graph



2. Values

[mS]

Load \ Time	T d	T r	T s	T h	T f
50 %	282.8	16.8	299.5	99.5	78.8
100 %	282.8	16.5	299.3	42.3	44.6



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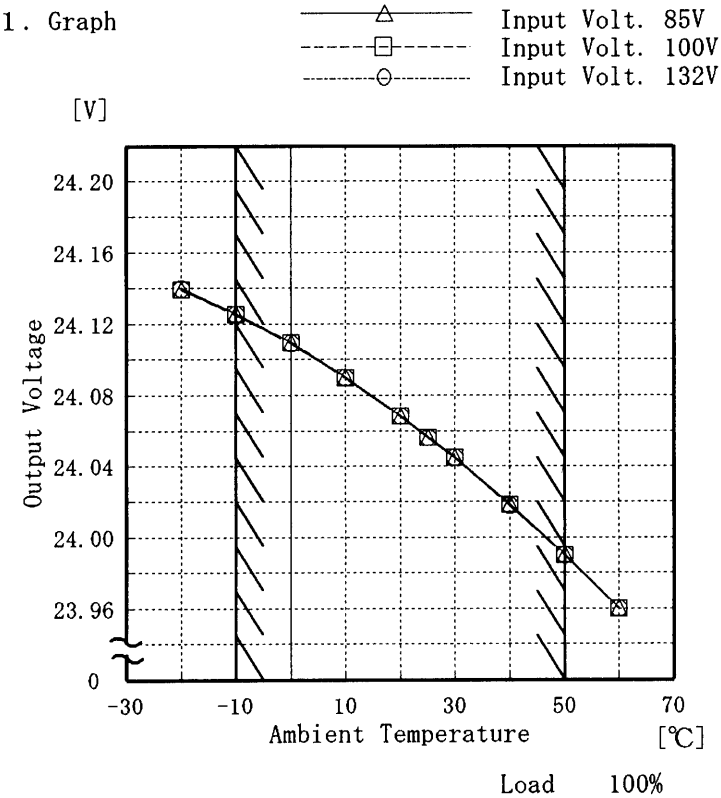
COSEL

Model	PAA100F-24
Item	Ambient Temperature Drift 周囲温度変動
Object	+24V4.5A

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

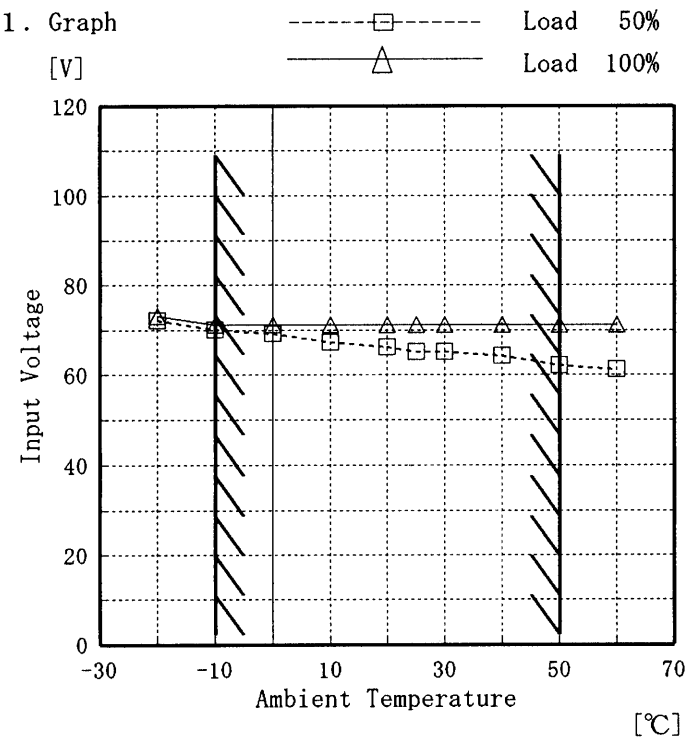
Temperature [℃]	Input Volt. 85[V] Output Volt. [V]	Input Volt. 100[V] Output Volt. [V]	Input Volt. 132[V] Output Volt. [V]
-20	24.139	24.139	24.139
-10	24.126	24.126	24.125
0	24.110	24.109	24.109
10	24.090	24.090	24.090
20	24.069	24.068	24.068
25	24.056	24.056	24.056
30	24.045	24.045	24.045
40	24.018	24.018	24.018
50	23.990	23.990	23.990
60	23.960	23.960	23.960
—	—	—	—

COSEL

Model	PAA100F-24
Item	Minimum Input Voltage for Regulated Output Voltage 最低レギュレーション電圧
Object	+24V4.5A

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

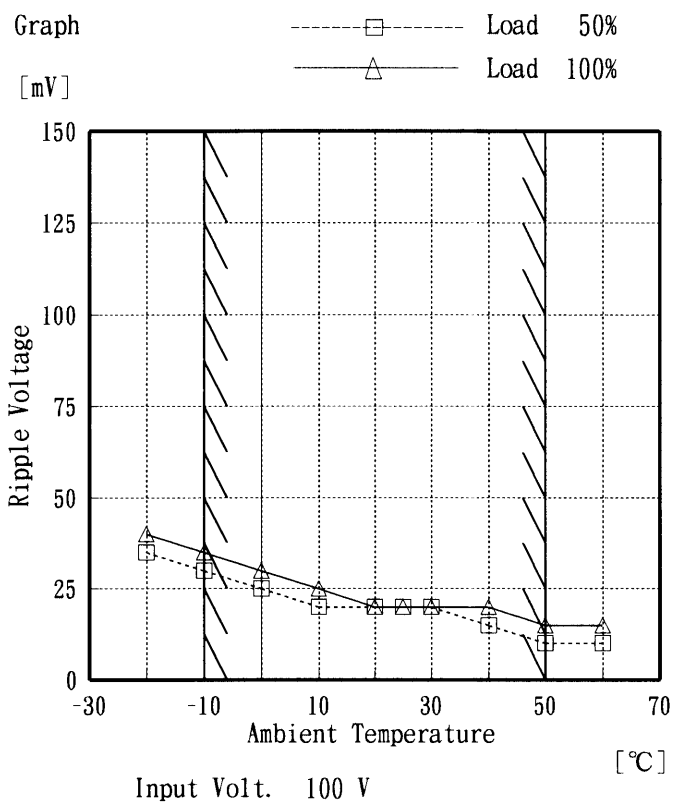
Ambient Temp. [℃]	Load 50% Input Volt. [V]	Load 100% Input Volt. [V]
-20	72	73
-10	70	71
0	69	71
10	67	71
20	66	71
25	65	71
30	65	71
40	64	71
50	62	71
60	61	71
—	—	—

COSEL

Model	PAA100F-24
Item	Ripple Voltage (by Ambient Temp.) リップル電圧（周囲温度特性）
Object	+24V4.5A

Testing Circuitry Figure A

1. Graph



Input Volt. 100 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

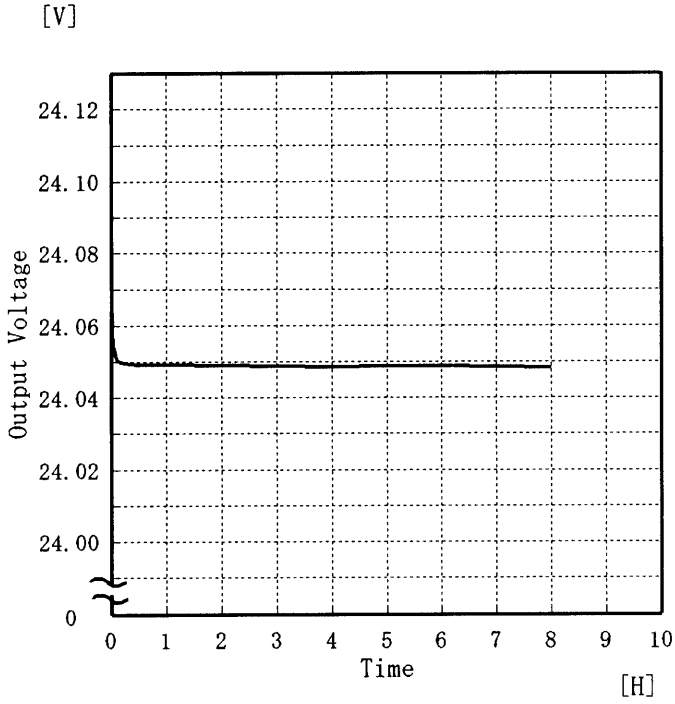
Ambient Temp. [℃]	Load 50% Ripple Output Volt. [mV]	Load 100% Ripple Output Volt. [mV]
-20	35	40
-10	30	35
0	25	30
10	20	25
20	20	20
25	20	20
30	20	20
40	15	20
50	10	15
60	10	15
—	—	—

COSEL

Model	PAA100F-24
Item	Time Lapse Drift　経時ドリフト
Object	+24V4.5A

Temperature　25 ℃
Testing Circuitry　Figure A

1. Graph



Input Volt.　100V
Load　100%

2. Values

Time since start [H]	Output Voltage [V]
0.0	24.069
0.5	24.049
1.0	24.049
2.0	24.049
3.0	24.049
4.0	24.049
5.0	24.049
6.0	24.049
7.0	24.049
8.0	24.048

COSEL

Model	PAA100F-24
Item	Output Voltage Accuracy　定電圧精度
Object	+24V4.5A

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 : 85～132 V
Load Current　: 0.0～4.5 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　　85～132 V
負荷電流　　0.0～4.5 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

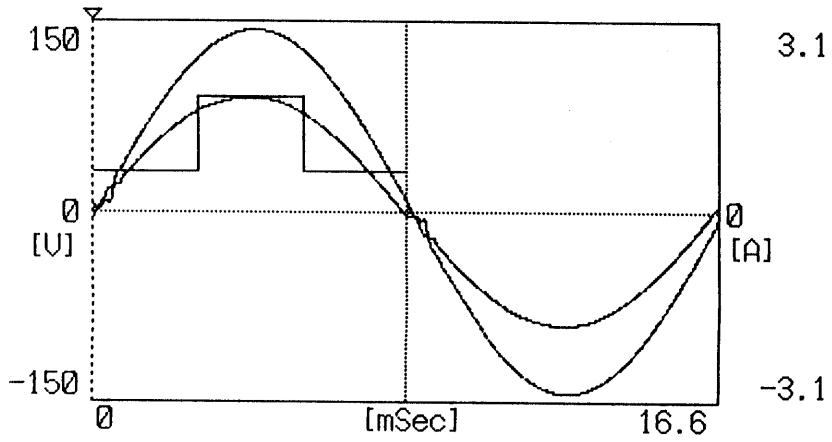
$$* \text{定電圧精度(変動率)} = \left(\frac{\text{変動値}}{\text{定格出力電圧}} \right) \times 100$$

Item	Temperature [℃]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy(Ration) [%]
Maximum Voltage	-10	85	0.0	24.127	±69	±0.3
Minimum Voltage	50	132	4.5	23.989		

COSEL

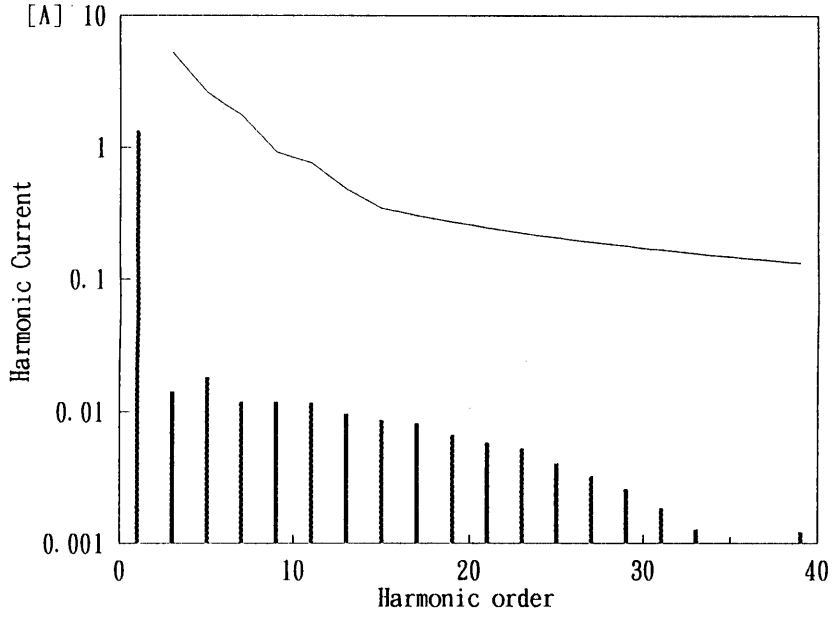
Model	PAA100F-24		
Item	Harmonic Current 高調波電流	Temperature Testing Circuitry	25℃ Figure E
Object	————		

1. Input Current Waveform



Conditions	Values
Input Voltage [V]	99.6
Input Current [A]	1.34
Active Power [W]	133.1
Apparent Power[VA]	133.6
Frequency [Hz]	60
Power Factor	0.996
Output Power [W]	100

2. Harmonic Current



——— Harmonic Current
高調波電流

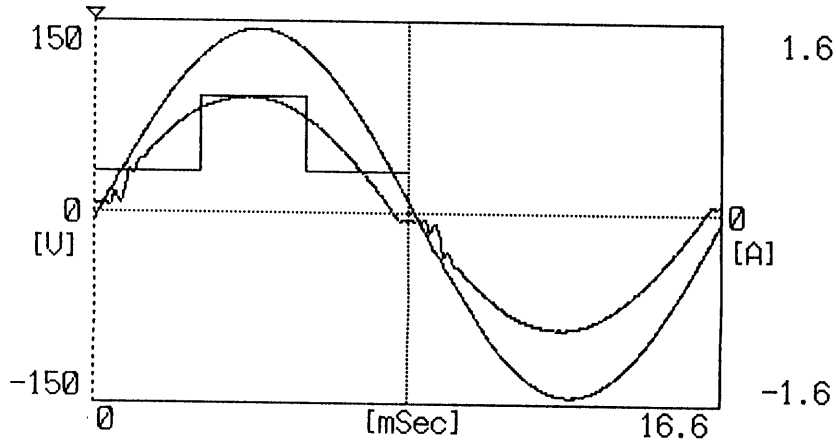
——— Limits for Class A equipment of odd harmonics
ｸﾗｽAの機器に対する高調波奇数次限度値

Harmonics order 高調波次数	Limits 限度値 [A]	Values 測定値 [A]
1	—	1.34000
2	—	0.00032
3	5.29000	0.01426
4	—	0.00003
5	2.62200	0.01816
6	—	0.00008
7	1.77100	0.01189
8	—	0.00005
9	0.92000	0.01194
10	—	0.00007
11	0.75900	0.01169
12	—	0.00009
13	0.48300	0.00962
14	—	0.00007
15	0.34500	0.00864
16	—	0.00007
17	0.30441	0.00812
18	—	0.00007
19	0.27237	0.00668
20	—	0.00008
21	0.24643	0.00583
22	—	0.00006
23	0.22500	0.00524
24	—	0.00008
25	0.20700	0.00405
26	—	0.00007
27	0.19167	0.00324
28	—	0.00006
29	0.17845	0.00258
30	—	0.00007
31	0.16694	0.00185
32	—	0.00007
33	0.15682	0.00128
34	—	0.00007
35	0.14786	0.00084
36	—	0.00008
37	0.13986	0.00099
38	—	0.00010
39	0.13269	0.00122
40	—	0.00006

COSEL

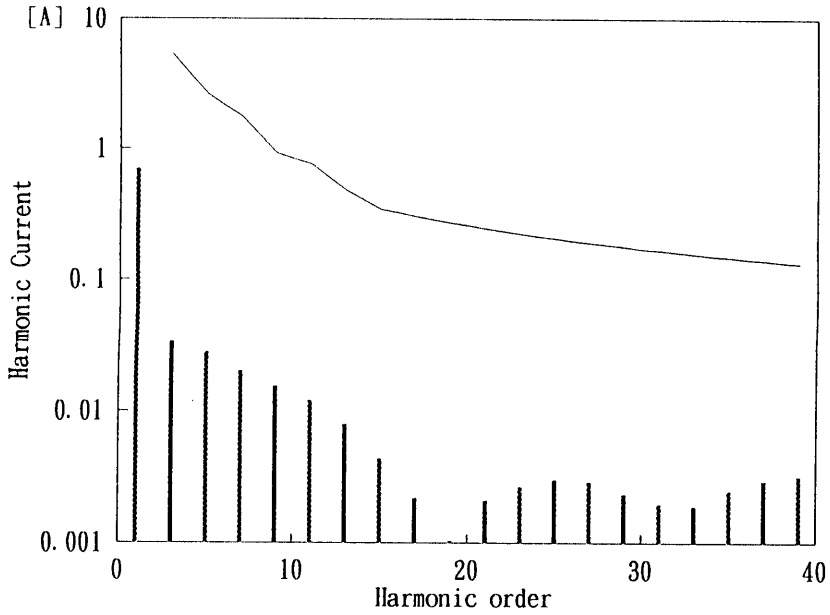
Model	PAA100F-24		
Item	Harmonic Current 高調波電流	Temperature Testing Circuitry	25℃ Figure E
Object	————		

1. Input Current Waveform



Conditions	Values
Input Voltage [V]	99.9
Input Current [A]	0.7
Active Power [W]	69.1
Apparent Power[VA]	69.8
Frequency [Hz]	60
Power Factor	0.990
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	—	0.69562
2	—	0.00019
3	5.29000	0.03361
4	—	0.00005
5	2.62200	0.02809
6	—	0.00007
7	1.77100	0.02012
8	—	0.00008
9	0.92000	0.01541
10	—	0.00006
11	0.75900	0.01210
12	—	0.00006
13	0.48300	0.00797
14	—	0.00005
15	0.34500	0.00435
16	—	0.00005
17	0.30441	0.00219
18	—	0.00005
19	0.27237	0.00103
20	—	0.00005
21	0.24643	0.00208
22	—	0.00006
23	0.22500	0.00265
24	—	0.00006
25	0.20700	0.00301
26	—	0.00006
27	0.19167	0.00290
28	—	0.00006
29	0.17845	0.00235
30	—	0.00006
31	0.16694	0.00198
32	—	0.00007
33	0.15682	0.00190
34	—	0.00009
35	0.14786	0.00247
36	—	0.00009
37	0.13986	0.00297
38	—	0.00010
39	0.13269	0.00319
40	—	0.00009

——— 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-24
Item	Condensation 結露特性
Object	+24V4.5A

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	24.140	15	35
	2	24.140	15	35
	3	24.138	15	35
Load 100 %	1	24.139	20	50
	2	24.139	20	50
	3	24.137	20	50

Input Volt. 100 V

COSEL

Model	PAA100F-24	
Item	Leakage Current 漏洩電流	Testing Circuitry Figure A
Object	――――――	

1. Results

Standards	Leakage Current [mA]		
	Input Volt. 85 [V]	Input Volt. 100 [V]	Input Volt. 132 [V]
(A) DENTORI	0.16	0.19	0.27
(B) UL	0.16	0.19	0.27
(C) CSA	0.16	0.19	0.27

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

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 :1KΩ

(B) Input Resistance :1.5KΩ
Input Capacitance :0.15μF

(C) Input Resistance :1.5KΩ
Input Capacitance :0.15μF

(D) Input Resistance :2KΩ
Input Capacitance :0.1μF

COSEL

Model	PAA100F-24
Item	Line Noise Tolerance 入力雑音耐量
Object	+24V4.5A

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	30.70	no regulation
	NORMAL	30.70	no regulation
1000	COMMON	30.80	no regulation
	NORMAL	30.80	no regulation

Conditions

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

COSEL

Model	PAA100F-24
Item	Conducted Emission 雑音端子電圧
Object	————————

Testing Circuitry Figure D

1. Graph

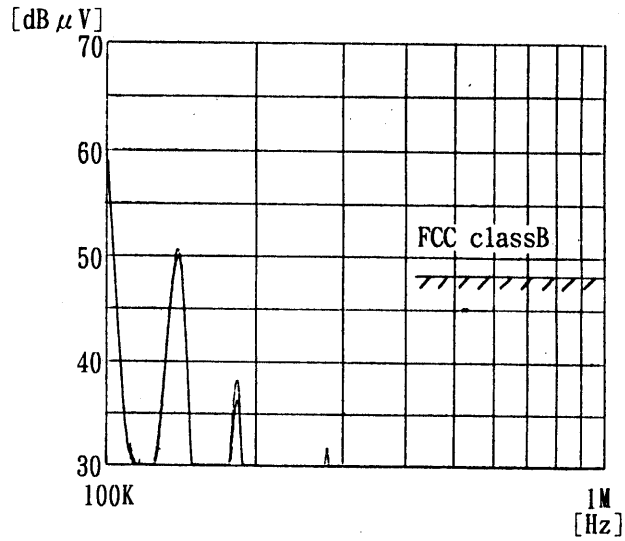
Remarks

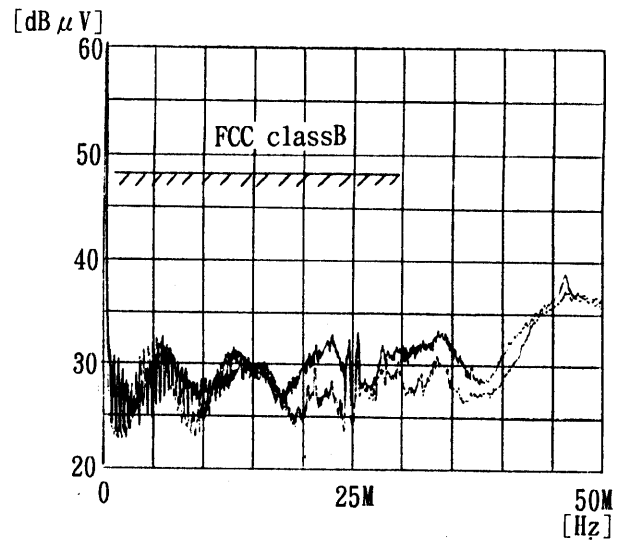
Input Volt. 100 V

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

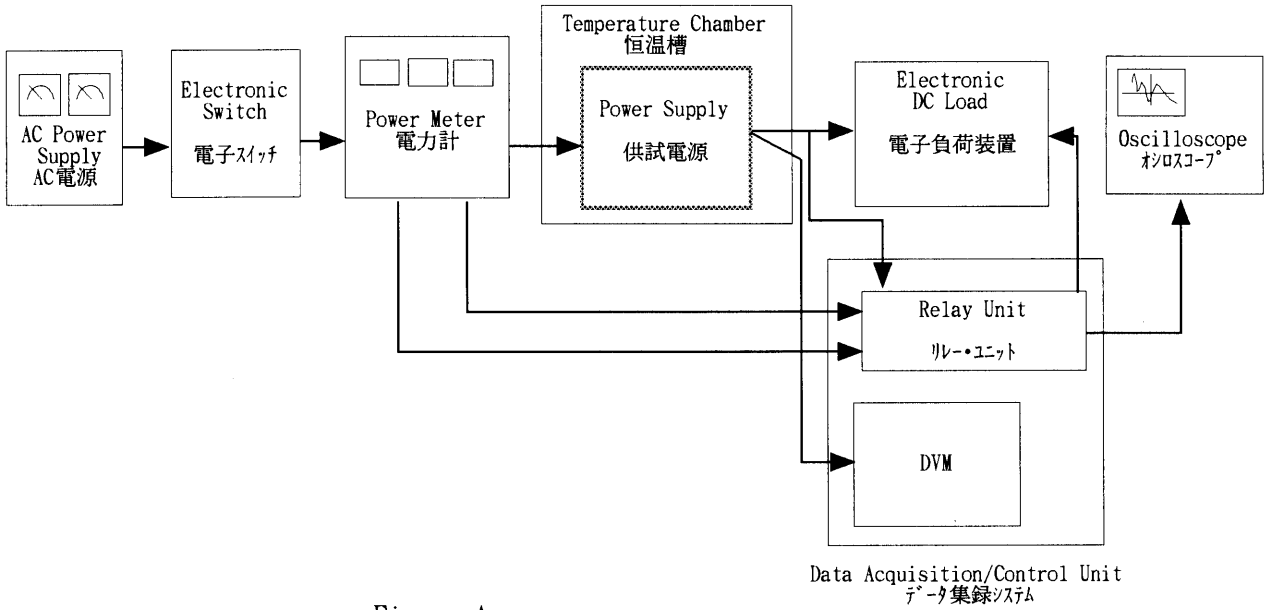


Figure A

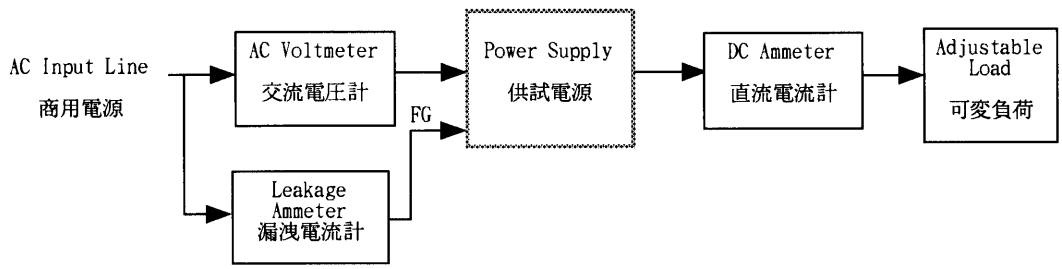


Figure B

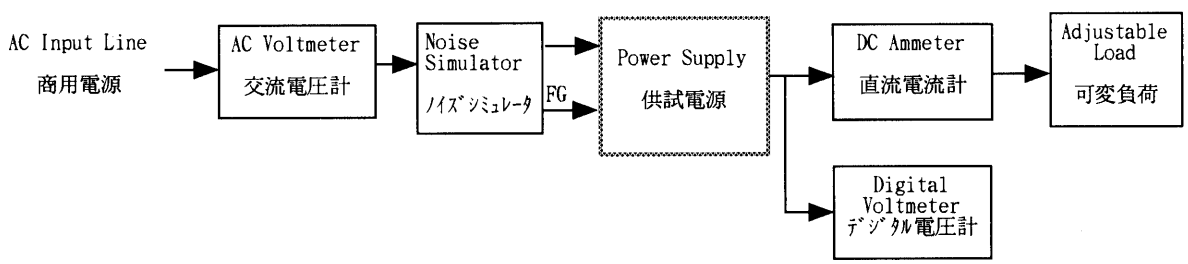


Figure C

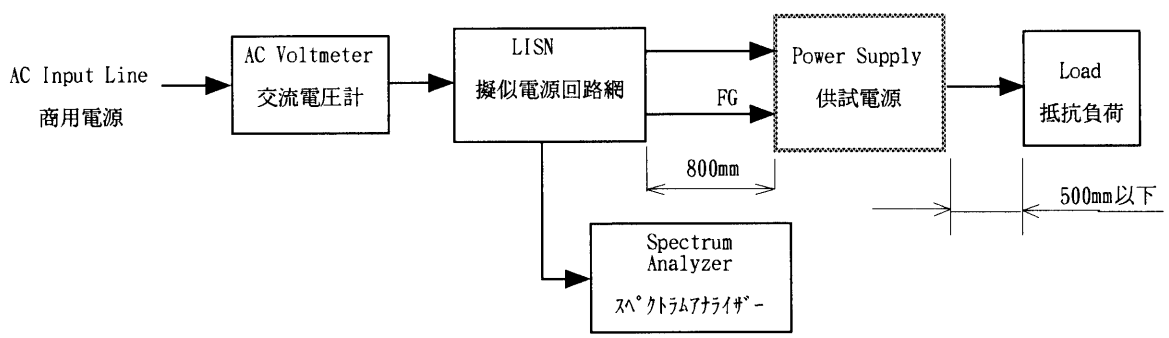
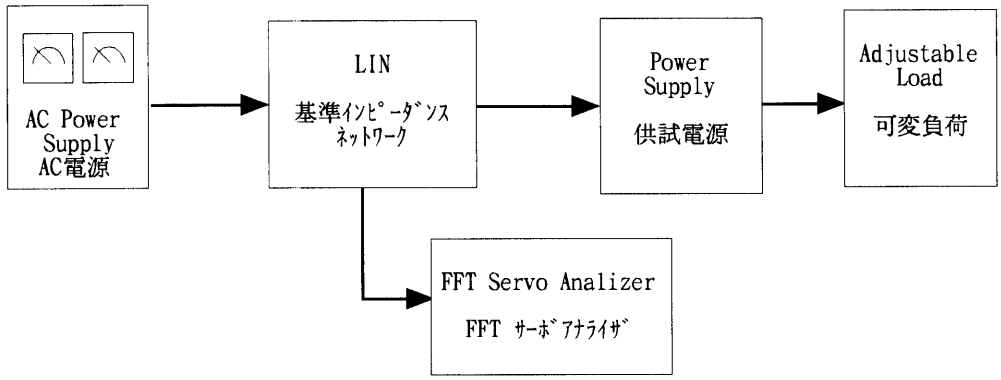


Figure D



Testing Circuitry Figure E