参考資料

COSEL

TEST DATA OF PAA100F-15

(200V INPUT)

Regulated DC Power Supply

Date : Apr. 17. 1996

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Design Manager

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Design Engineer

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COSEL CO., LTD.

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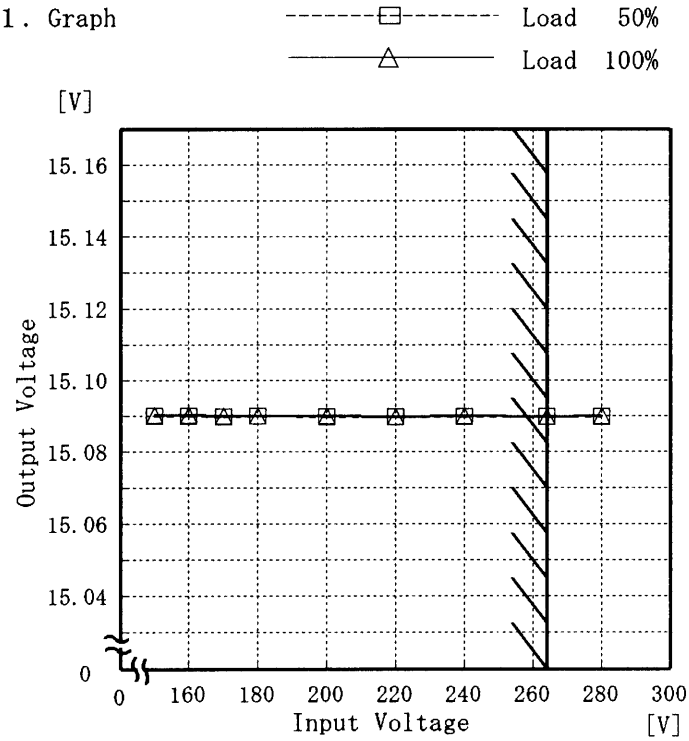
1. Graph



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	15.090	15.090
160	15.090	15.090
170	15.090	15.090
180	15.090	15.090
200	15.090	15.090
220	15.090	15.090
240	15.090	15.090
264	15.090	15.090
280	15.090	15.090

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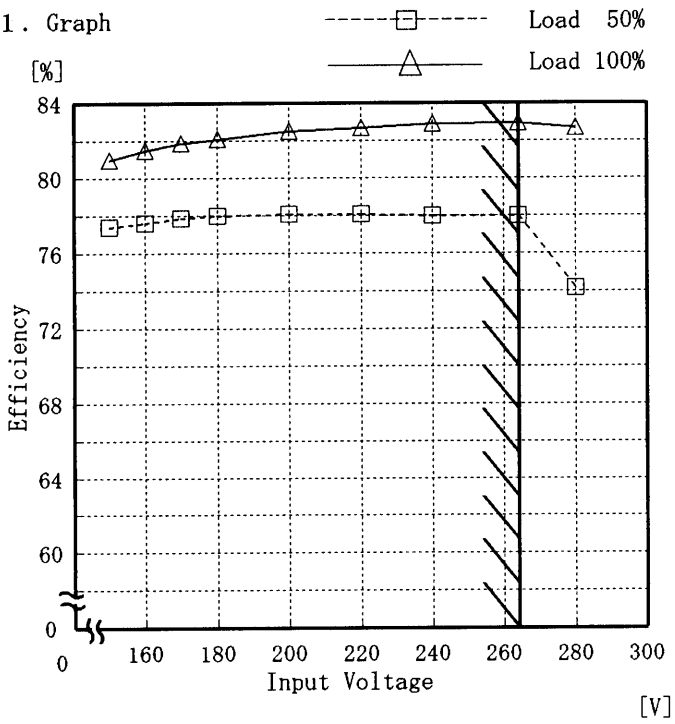
COSEL

Model	PAA100F-15
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

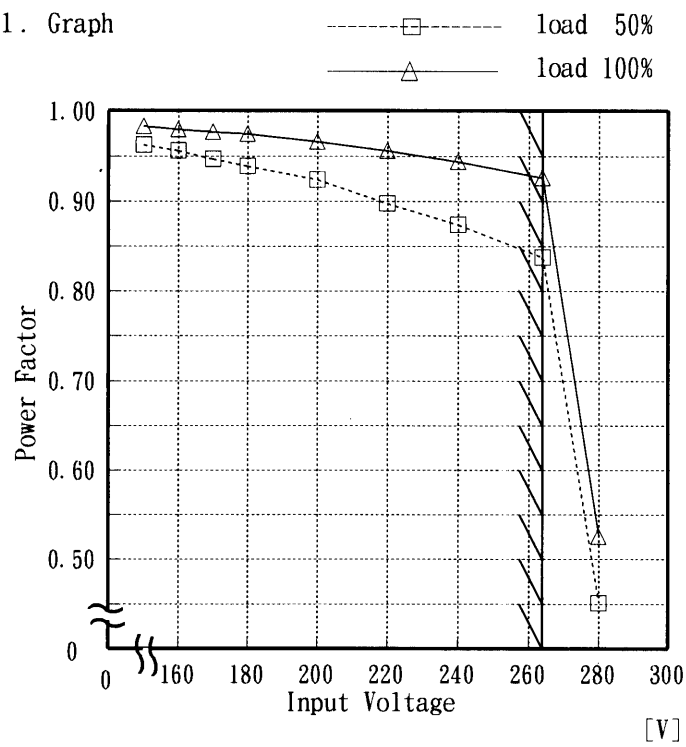
Input Voltage [V]	Load 50% Efficiency [%]	Load 100% Efficiency [%]
150	77.4	81.0
160	77.6	81.5
170	77.9	81.9
180	78.0	82.1
200	78.1	82.5
220	78.1	82.7
240	78.0	82.9
264	78.0	83.0
280	74.2	82.7

COSEL

Model	PAA100F-15
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	0.96	0.98
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	0.87	0.94
264	0.84	0.93
280	0.45	0.53

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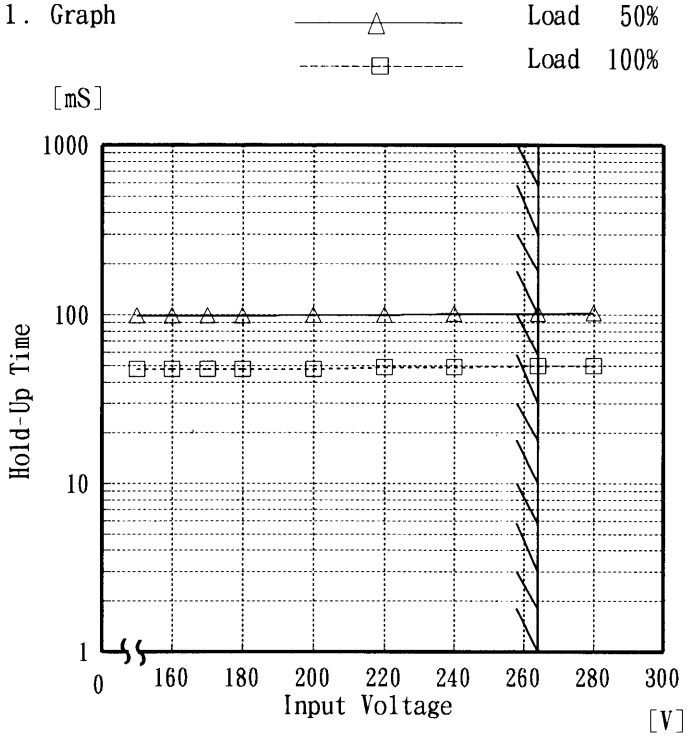
Model	PAA100F-15
Item	Hold-Up Time　出力保持時間
Object	+15V 7.00A

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	99	48
160	99	48
170	99	48
180	99	48
200	100	48
220	100	49
240	102	49
264	102	50
280	103	50

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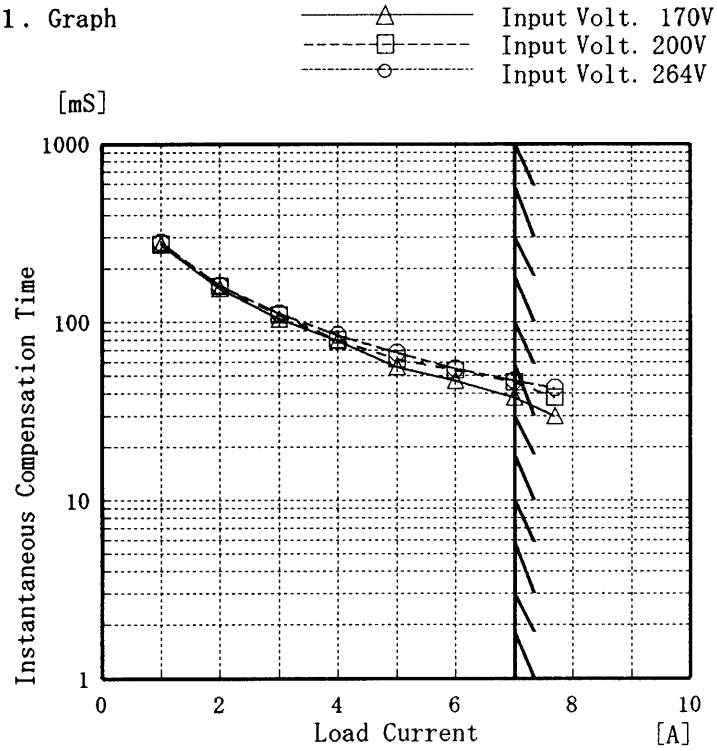
Model	PAA100F-15
Item	Instantaneous Interruption Compensation 瞬時停電保障
Object	+15V7.00A

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	—	—	—
1.0	272	277	281
2.0	155	160	162
3.0	105	110	112
4.0	79	80	85
5.0	56	62	68
6.0	47	54	55
7.0	38	46	47
7.7	30	38	43
—	—	—	—
—	—	—	—

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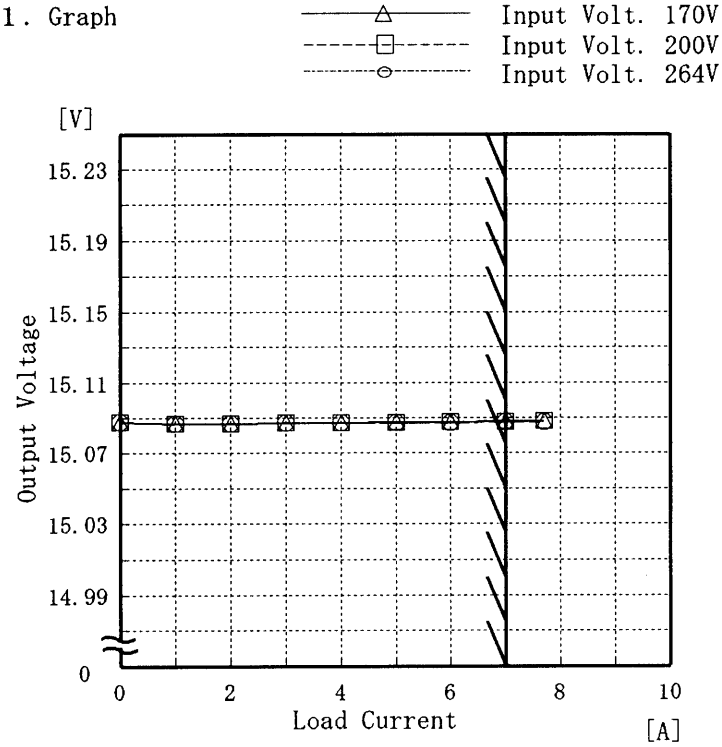
Model	PAA100F-15
Item	Load Regulation 静的負荷変動
Object	+15V7.00A

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	15.088	15.088	15.088
1.0	15.087	15.087	15.087
2.0	15.087	15.087	15.087
3.0	15.087	15.087	15.087
4.0	15.087	15.087	15.087
5.0	15.088	15.087	15.087
6.0	15.088	15.088	15.087
7.0	15.088	15.088	15.088
7.7	15.088	15.088	15.088
—	—	—	—

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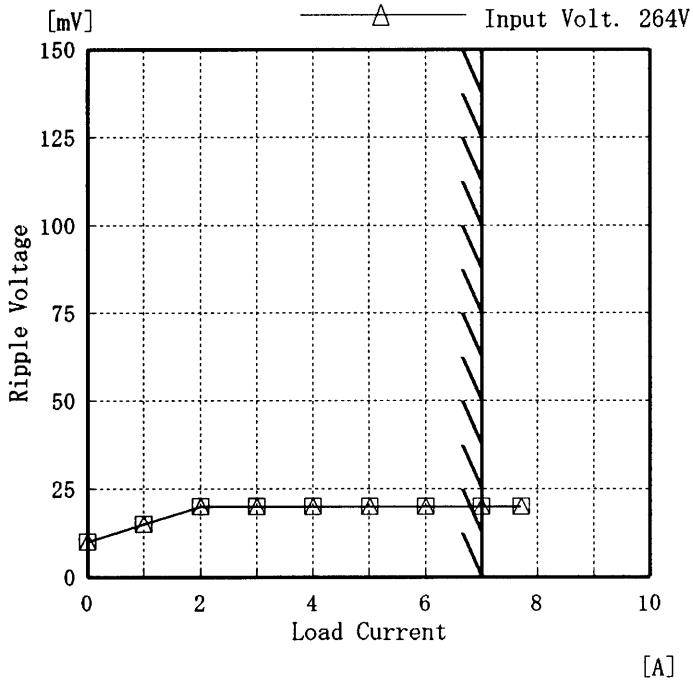
Model	PAA100F-15
Item	Ripple Voltage(by Load Current) リップル電圧(負荷電流特性)
Object	+15V7.00A

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

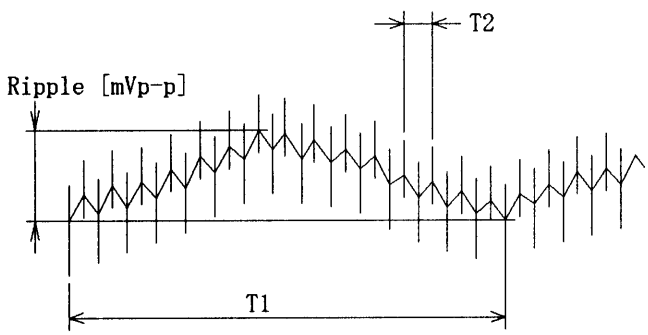


Fig. Complex Ripple Wave Form
図 リップル波形詳細図

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
1.0	15	15
2.0	20	20
3.0	20	20
4.0	20	20
5.0	20	20
6.0	20	20
7.0	20	20
7.7	20	20
—	—	—
—	—	—

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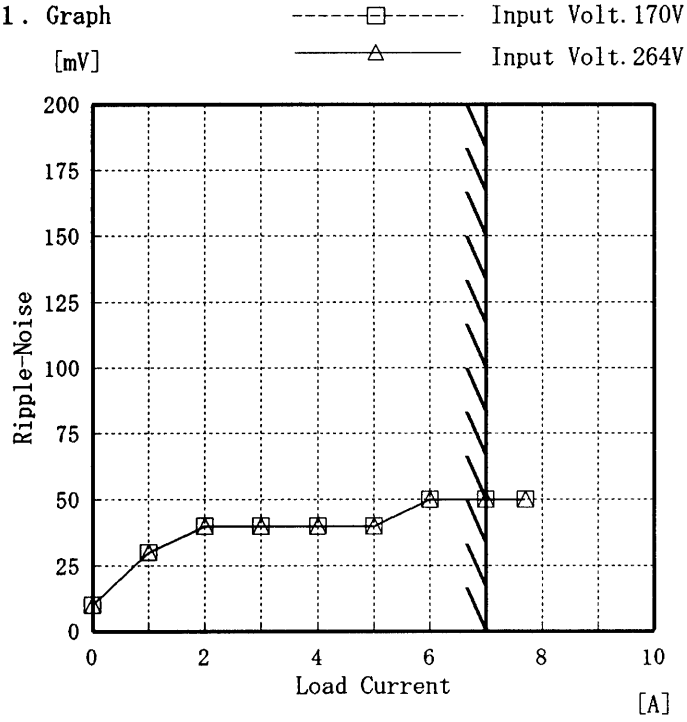
Model	PAA100F-15
Item	Ripple-Noise　リップルノイズ
Object	+15V7.00A

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

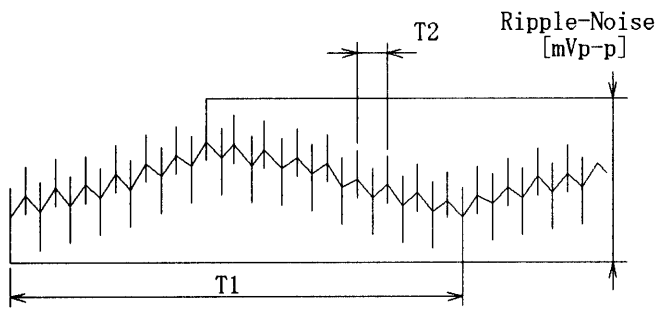


Fig. Complex Ripple Wave Form
図　リップル波形詳細図

2. Values

Load current [A]	Input Volt. 170 [V] Ripple-Noise [mV]	Input Volt. 264 [V] Ripple-Noise [mV]
0.0	10	10
1.0	30	30
2.0	40	40
3.0	40	40
4.0	40	40
5.0	40	40
6.0	50	50
7.0	50	50
7.7	50	50
—	—	—
—	—	—

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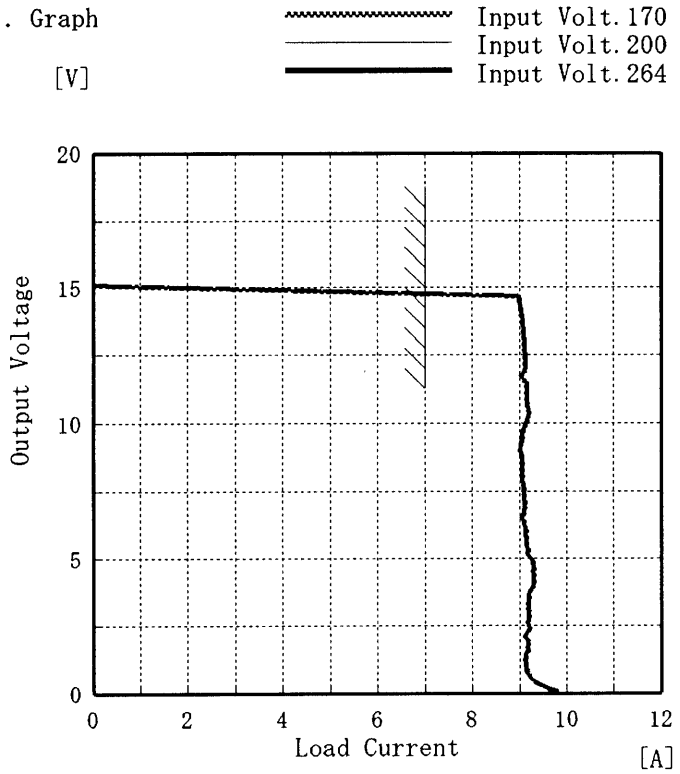
Model	PAA100F-15
Item	Overcurrent Protection 過電流保護
Object	+15V7.00A

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]
15.00	0.00	0.00	0.00
14.25	9.01	9.02	9.03
13.50	9.06	9.08	9.08
12.00	9.11	9.12	9.12
10.50	9.17	9.19	9.19
9.00	9.01	9.01	9.03
7.50	9.10	9.10	9.10
6.00	9.14	9.13	9.13
4.50	9.29	9.29	9.28
3.00	9.20	9.20	9.20
1.50	9.17	9.17	9.17
0.00	9.83	9.84	9.84

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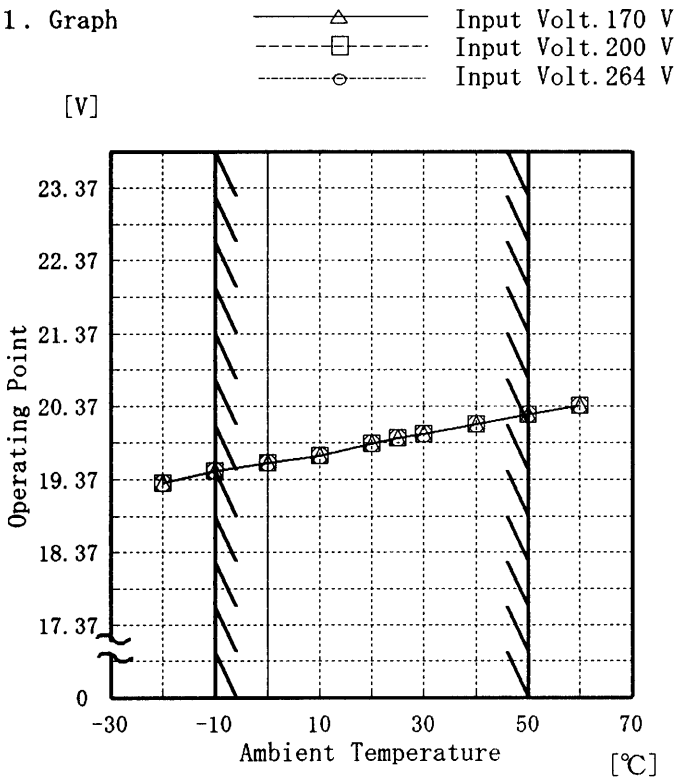
Model	PAA100F-15
Item	Overvoltage Protection 過電圧保護
Object	+15V7.00A

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	19.33	19.33	19.33
-10	19.49	19.49	19.49
0	19.60	19.60	19.60
10	19.70	19.70	19.70
20	19.86	19.86	19.86
25	19.94	19.94	19.94
30	20.00	20.00	20.00
40	20.13	20.13	20.13
50	20.26	20.26	20.26
60	20.38	20.38	20.38
—	—	—	—

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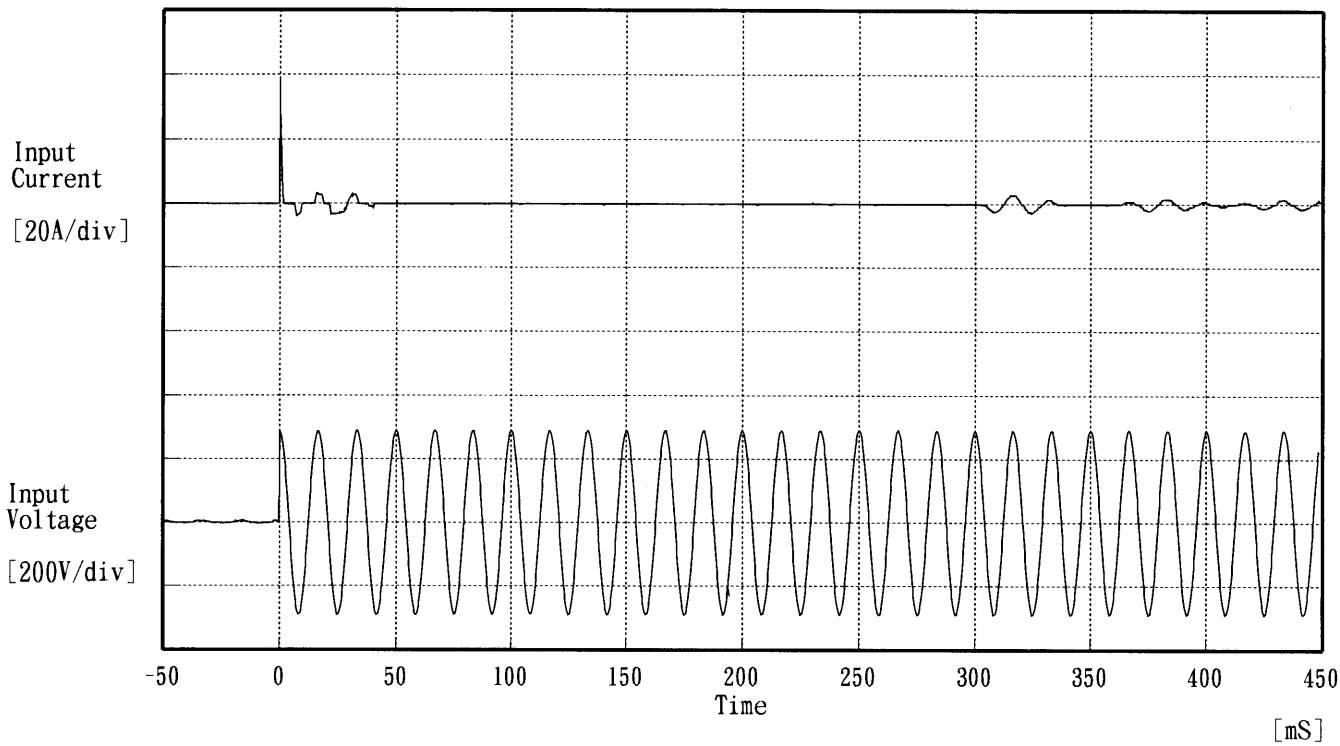
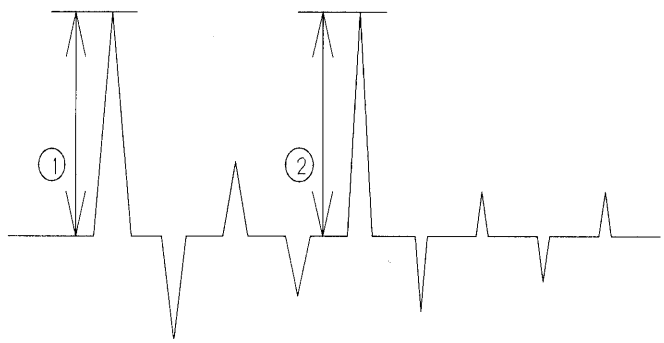
Model	PAA100F-15
Item	Inrush Current　突入電流
Object	――――――

Temperature　25 ℃
Testing Circuitry　Figure　A



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



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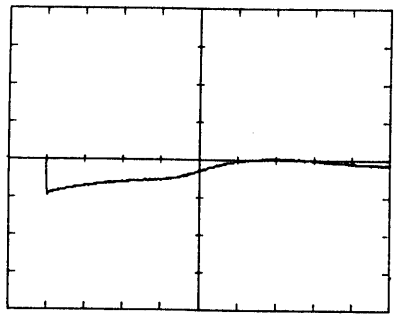
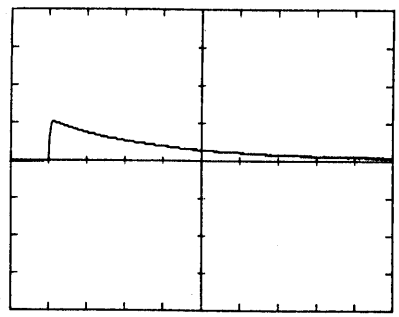
Model	PAA100F-15		
Item	Dynamic Load Responce 動的負荷変動	Temperature Testing Circuitry	25 ℃ Figure A
Object	+15V 7.00A		

Input Volt. 200 V
Cycle 1000 mS

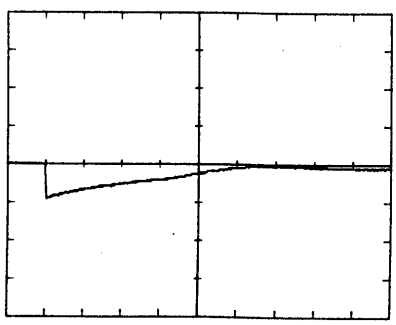
Load Current

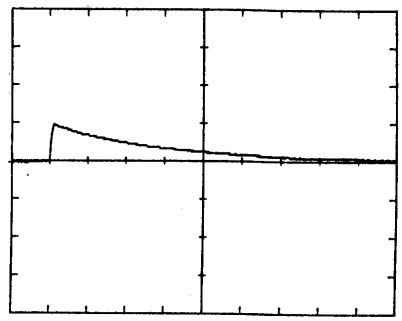
Min. Load ←→
Load 100 %





Min. Load ←→
Load 50 %





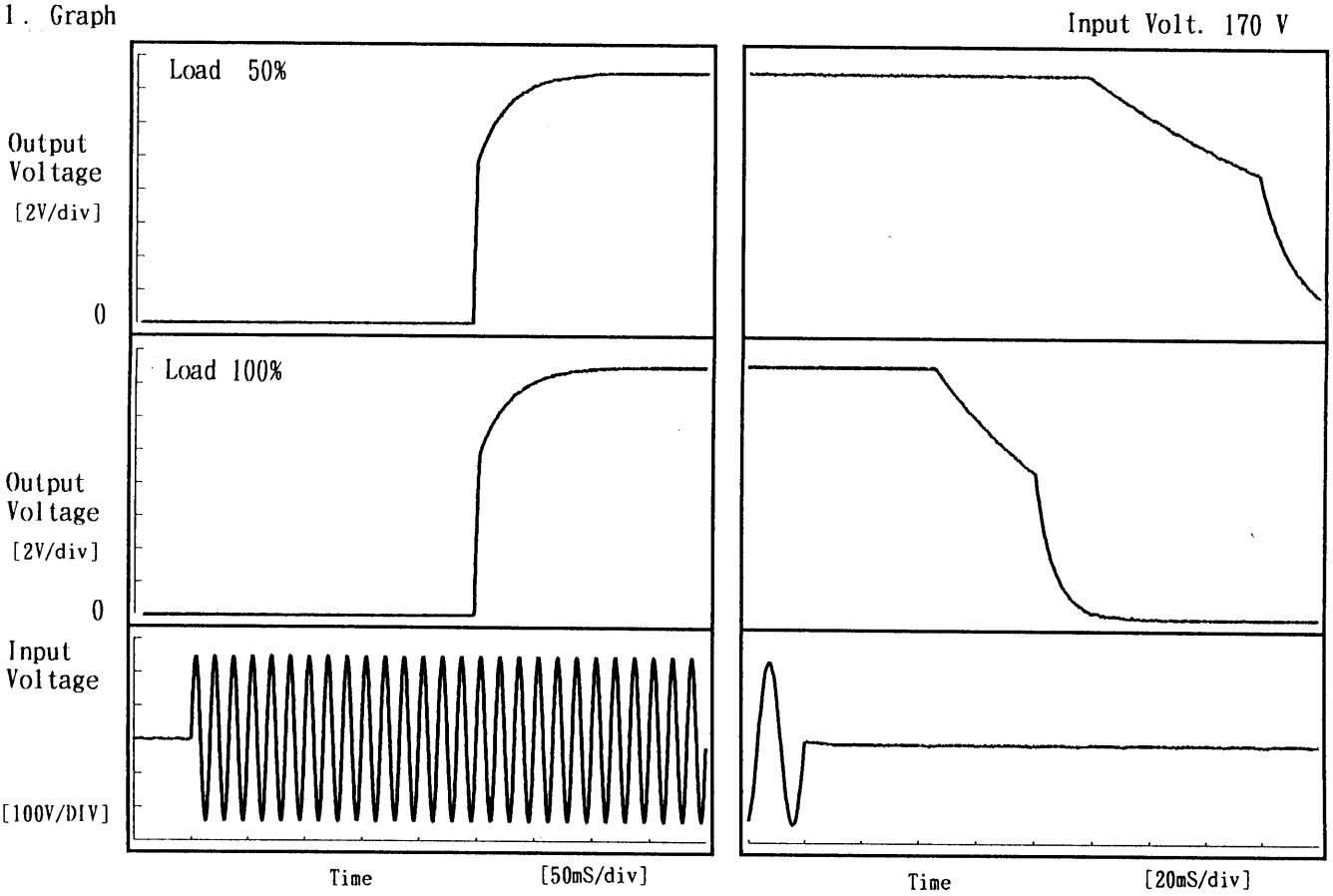
100 mV/div

10 mS/div

COSEL

Model	PAA100F-15		
Item	Rise and Fall Time　立上り、立下り時間	Temperature	25 ℃
		Testing Circuitry	Figure A
Object	+15V 7.00A		

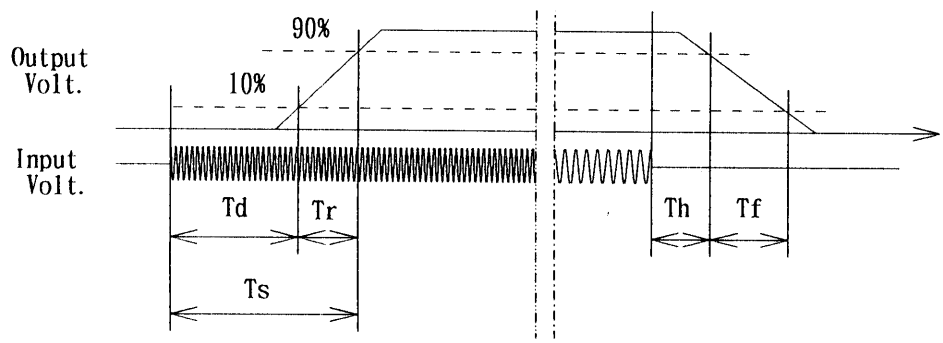
1. Graph



2. Values

[mS]

Load \ Time	T d	T r	T s	T h	T f
50 %	245.5	37.0	282.5	111.3	71.8
100 %	248.3	37.3	285.5	53.0	39.5



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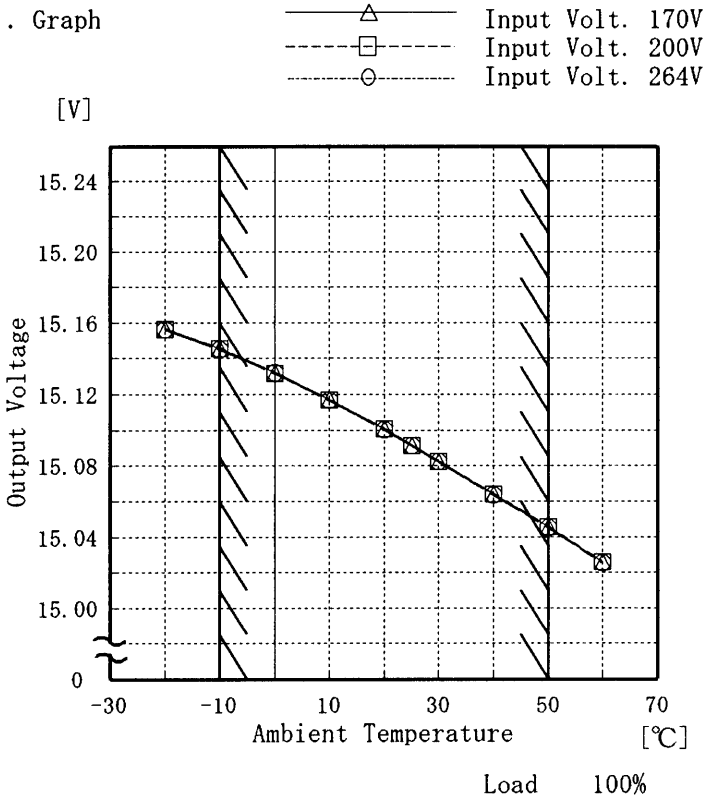
Model	PAA100F-15
Item	Ambient Temperature Drift 周囲温度変動
Object	+15V7.00A

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

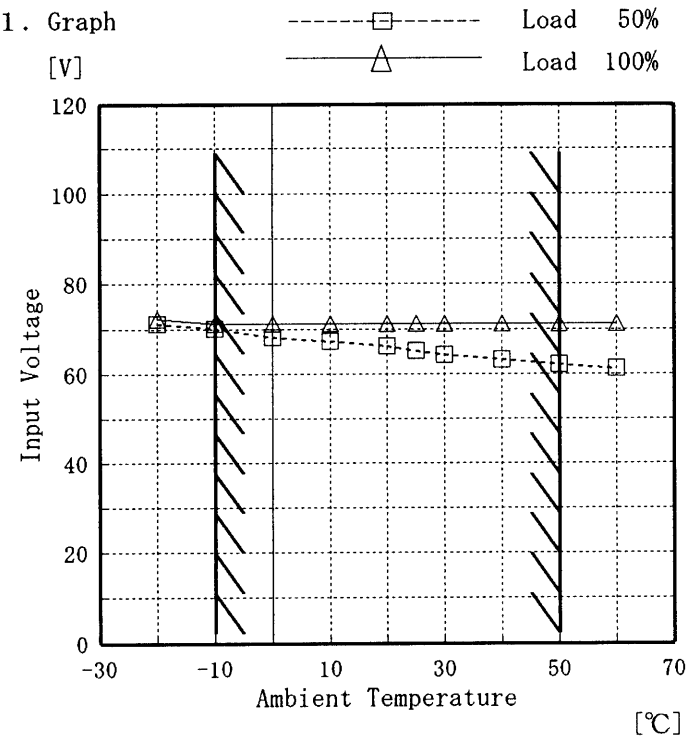
Temperature [℃]	Input Volt. 170[V] Output Volt. [V]	Input Volt. 200[V] Output Volt. [V]	Input Volt. 264[V] Output Volt. [V]
-20	15.156	15.156	15.156
-10	15.145	15.145	15.145
0	15.132	15.132	15.132
10	15.117	15.117	15.117
20	15.101	15.101	15.100
25	15.091	15.091	15.091
30	15.083	15.083	15.082
40	15.064	15.064	15.064
50	15.045	15.045	15.045
60	15.026	15.026	15.025
—	—	—	—

COSEL

Model	PAA100F-15
Item	Minimum Input Voltage for Regulated Output Voltage 最低レギュレーション電圧
Object	+15V7.00A

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

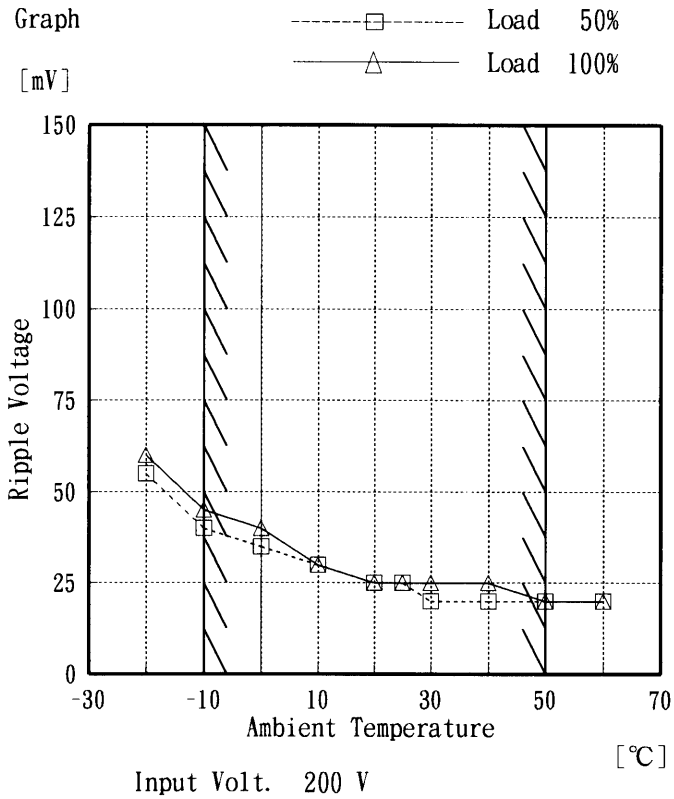
Ambient Temp. [℃]	Load 50% Input Volt. [V]	Load 100% Input Volt. [V]
-20	71	72
-10	70	71
0	68	71
10	67	71
20	66	71
25	65	71
30	64	71
40	63	71
50	62	71
60	61	71
—	—	—

COSEL

Model	PAA100F-15
Item	Ripple Voltage (by Ambient Temp.) リップル電圧（周囲温度特性）
Object	+15V7.00A

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

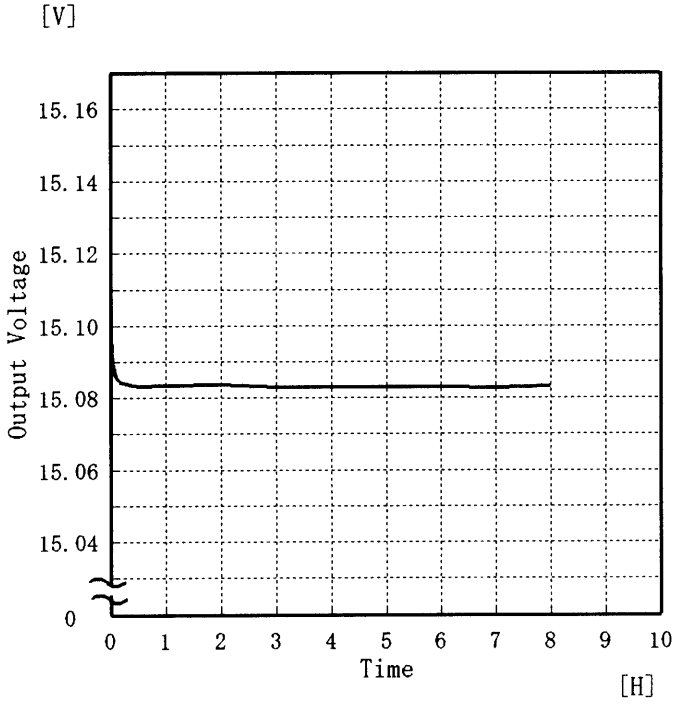
Ambient Temp. [℃]	Load 50% Ripple Output Volt. [mV]	Load 100% Ripple Output Volt. [mV]
-20	55	60
-10	40	45
0	35	40
10	30	30
20	25	25
25	25	25
30	20	25
40	20	25
50	20	20
60	20	20
—	—	—

COSEL

Model	PAA100F-15
Item	Time Lapse Drift 経時ドリフト
Object	+15V7.00A

Temperature 25 ℃
Testing Circuitry Figure A

1. Graph



Input Volt. 200V
Load 100%

2. Values

Time since start [H]	Output Voltage [V]
0.0	15.097
0.5	15.083
1.0	15.084
2.0	15.084
3.0	15.083
4.0	15.083
5.0	15.083
6.0	15.083
7.0	15.083
8.0	15.083

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Model	PAA100F-15
Item	Output Voltage Accuracy　定電圧精度
Object	+15V7.00A

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　: 0.0～7.00 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　　0.0～7.00 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

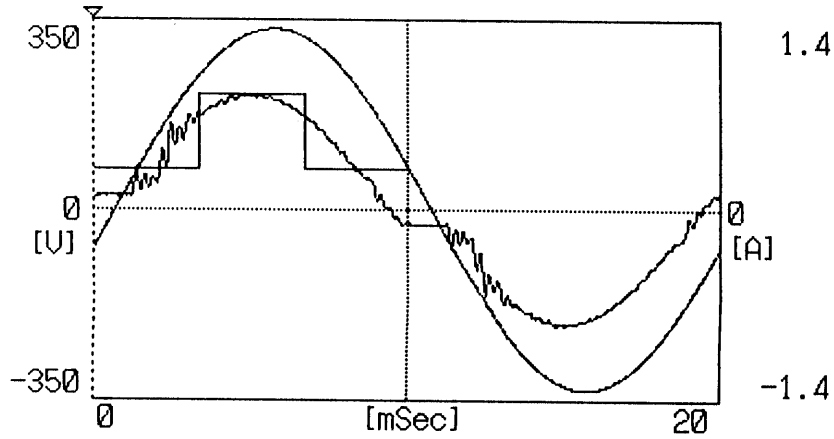
$$* \text{定電圧精度(変動率)} = \left(\frac{\text{変動値}}{\text{定格出力電圧}} \right) \times 100$$

Item	Temperature [℃]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy(Ration) [%]
Maximum Voltage	-10	170	7.00	15.145	±51	±0.4
Minimum Voltage	50	264	7.00	15.044		

COSEL

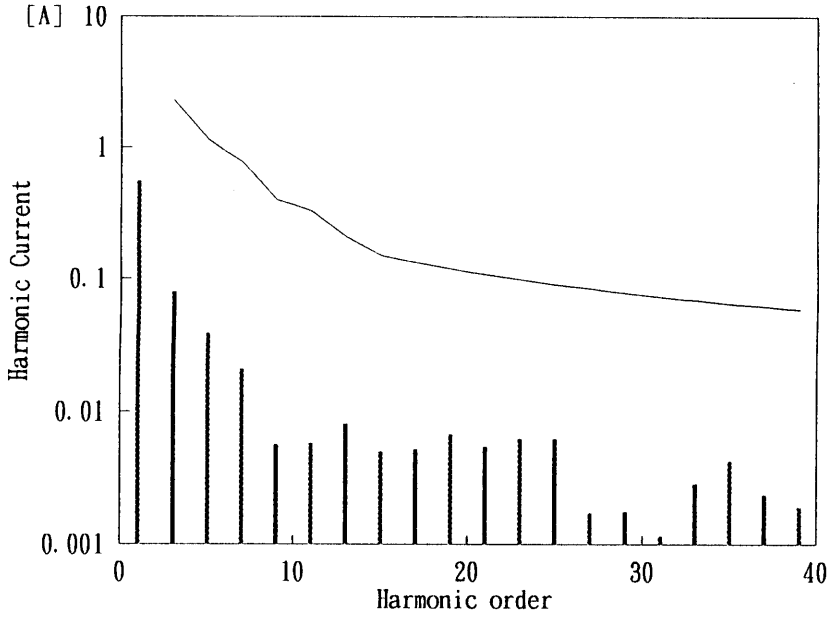
Model	PAA100F-15		
Item	Harmonic Current 高調波電流	Temperature Testing Circuitry	25℃ Figure E
Object	————		

1. Input Current Waveform



Conditions	Values
Input Voltage [V]	231
Input Current [A]	0.56
Active Power [W]	124.1
Apparent Power[VA]	128.6
Frequency [Hz]	50
Power Factor	0.965
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

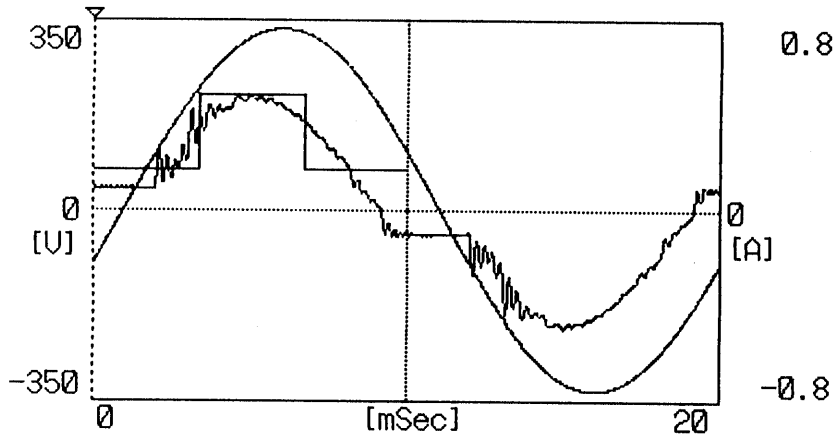
Harmonics order 高調波次数	Limits 限度値 [A]	Values 測定値 [A]
1	—	0.55383
2	—	0.00006
3	2.30000	0.07960
4	—	0.00002
5	1.14000	0.03859
6	—	0.00008
7	0.77000	0.02084
8	—	0.00003
9	0.40000	0.00561
10	—	0.00004
11	0.33000	0.00573
12	—	0.00005
13	0.21000	0.00804
14	—	0.00002
15	0.15000	0.00499
16	—	0.00001
17	0.13235	0.00517
18	—	0.00004
19	0.11842	0.00671
20	—	0.00001
21	0.10714	0.00544
22	—	0.00002
23	0.09783	0.00617
24	—	0.00003
25	0.09000	0.00622
26	—	0.00002
27	0.08333	0.00173
28	—	0.00002
29	0.07759	0.00177
30	—	0.00003
31	0.07258	0.00115
32	—	0.00003
33	0.06818	0.00287
34	—	0.00002
35	0.06429	0.00423
36	—	0.00003
37	0.06081	0.00237
38	—	0.00002
39	0.05769	0.00191
40	—	0.00002

BC－0683

COSEL

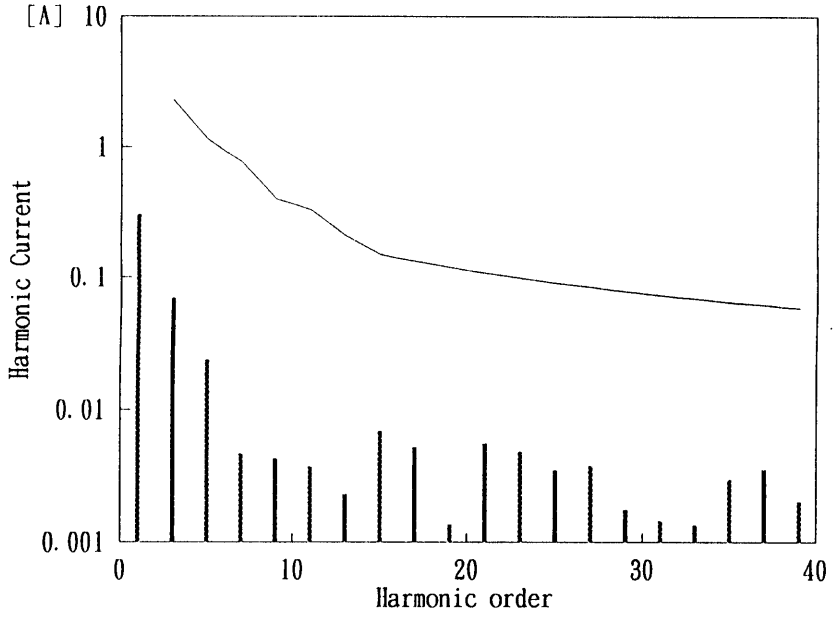
Model	PAA100F-15		
Item	Harmonic Current 高調波電流	Temperature	25℃
		Testing Circuitry	Figure E
Object	————		

1. Input Current Waveform



Conditions	Values
Input Voltage [V]	231.1
Input Current [A]	0.31
Active Power [W]	65.1
Apparent Power[VA]	71.5
Frequency [Hz]	50
Power Factor	0.910
Output Power [W]	50

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	—	0.30312
2	—	0.00006
3	2.30000	0.06911
4	—	0.00001
5	1.14000	0.02392
6	—	0.00007
7	0.77000	0.00463
8	—	0.00001
9	0.40000	0.00424
10	—	0.00004
11	0.33000	0.00369
12	—	0.00004
13	0.21000	0.00230
14	—	0.00001
15	0.15000	0.00687
16	—	0.00002
17	0.13235	0.00522
18	—	0.00004
19	0.11842	0.00136
20	—	0.00002
21	0.10714	0.00558
22	—	0.00001
23	0.09783	0.00482
24	—	0.00003
25	0.09000	0.00347
26	—	0.00002
27	0.08333	0.00375
28	—	0.00002
29	0.07759	0.00175
30	—	0.00003
31	0.07258	0.00145
32	—	0.00003
33	0.06818	0.00133
34	—	0.00002
35	0.06429	0.00297
36	—	0.00002
37	0.06081	0.00353
38	—	0.00002
39	0.05769	0.00203
40	—	0.00002

BC－0683

COSEL

Model	PAA100F-15
Item	Condensation 結露特性
Object	+15V7.00A

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	15.150	20	40
	2	15.159	20	40
	3	15.164	20	40
Load 100 %	1	15.149	20	50
	2	15.158	20	50
	3	15.163	20	50

Input Volt. 200 V

COSEL

Model	PAA100F-15	
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	－	－	－
(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-15	
Item	Line Noise Tolerance 入力雑音耐量	Testing Circuitry Figure C
Object	+15V7.00A	

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	19.60	no regulation
	NORMAL	19.60	no regulation
1000	COMMON	19.70	no regulation
	NORMAL	19.70	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	PAA100F-15	
Item	Conducted Emission 雑音端子電圧	Testing Circuitry Figure D
Object	————————	

1. Graph

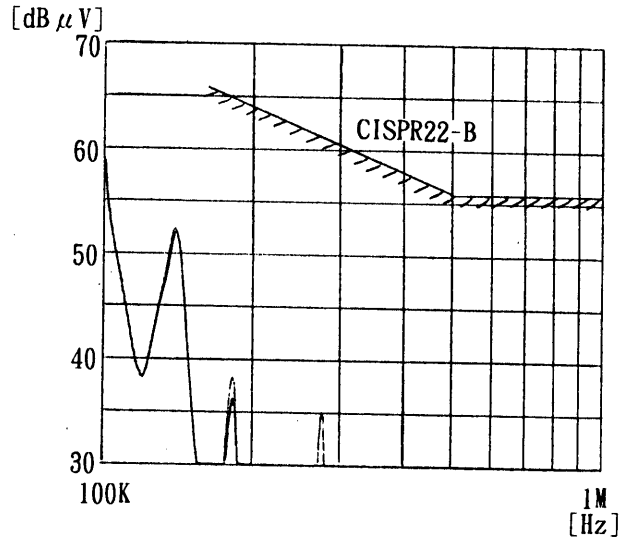
Remarks

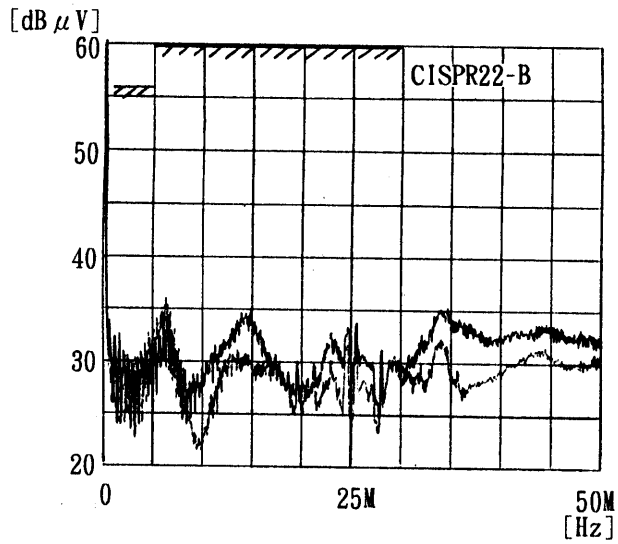
Input Volt. 230 V

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





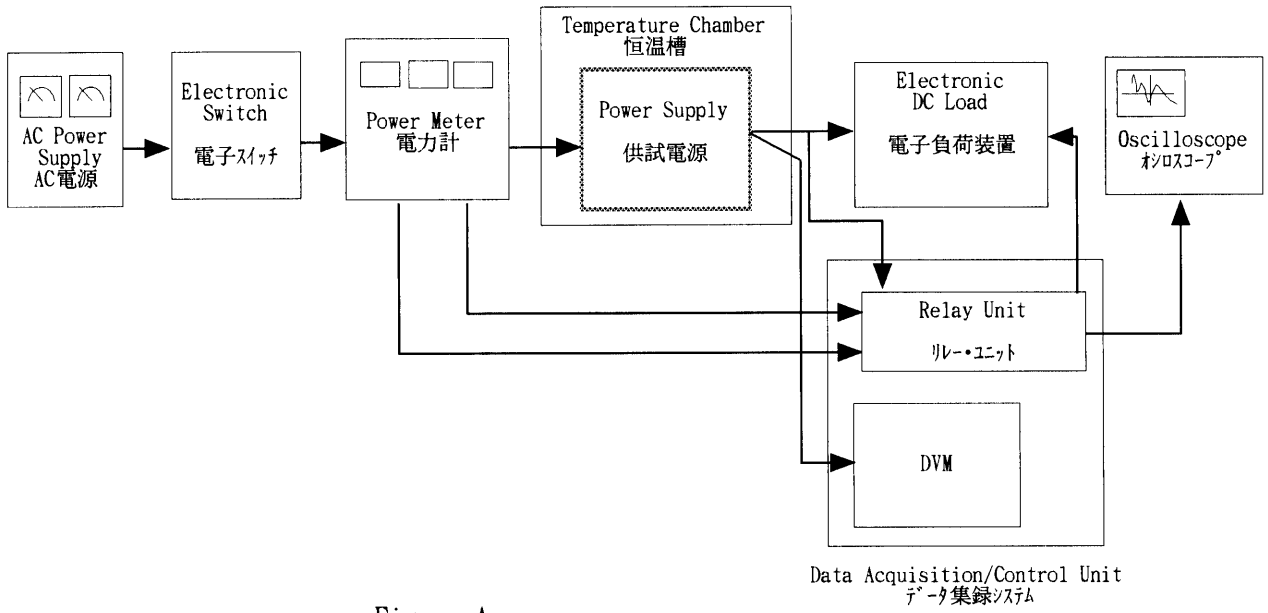


Figure A

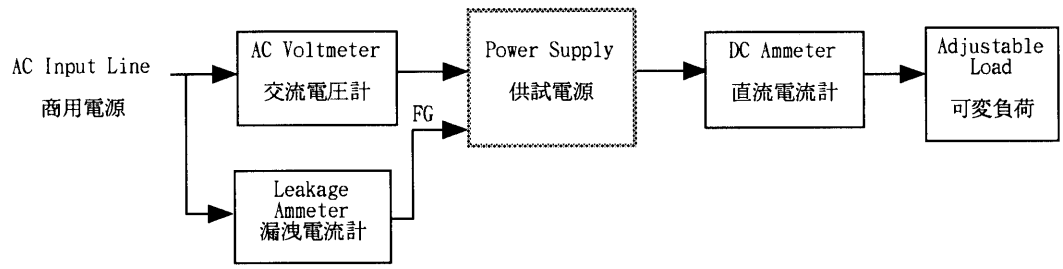


Figure B

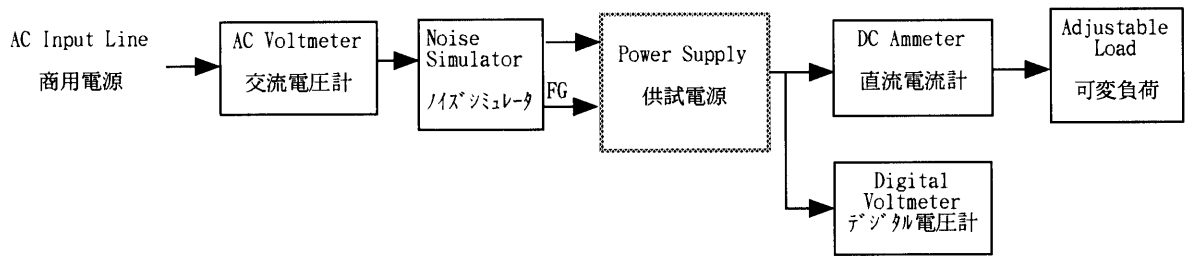


Figure C

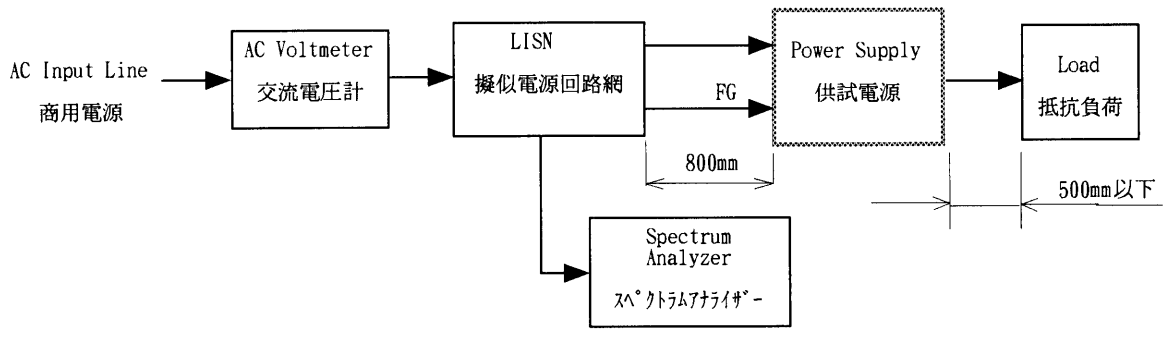
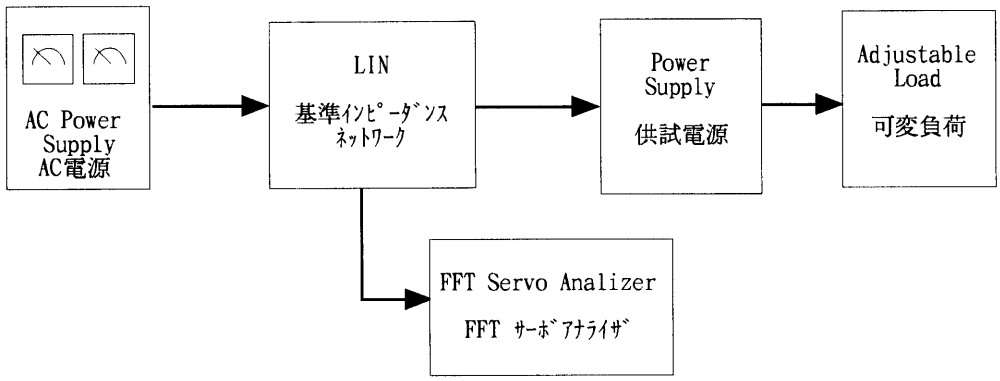


Figure D



Testing Circuitry Figure E