参考資料

COSEL

TEST DATA OF PAA300F-15

(200V INPUT)

Regulated DC Power Supply

Date : Feb. 13. 1997

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コーセル株式会社

COSEL CO.,LTD.

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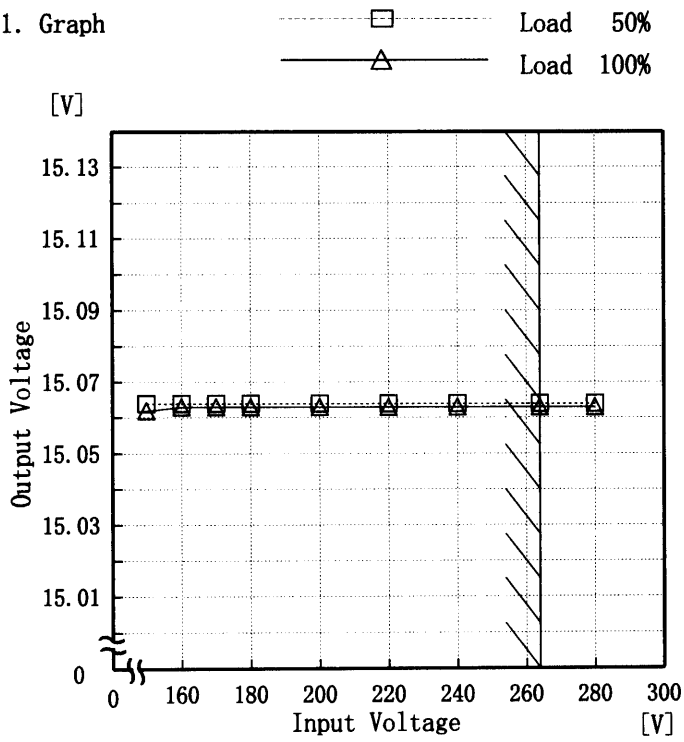
Item	Line Regulation 静的入力変動
Object	+15V22A

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

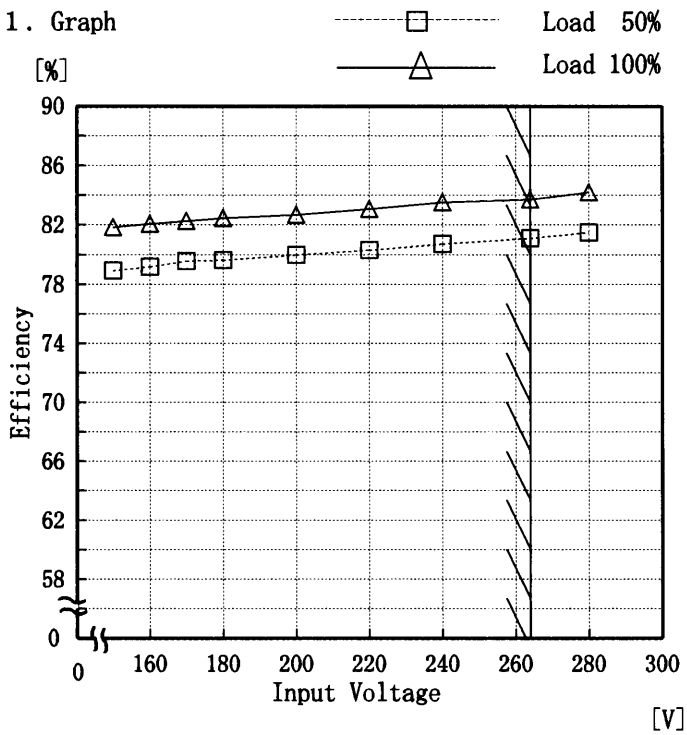
Input Voltage [V]	Load 50% Output Volt. [V]	Load 100% Output Volt. [V]
150	15.064	15.062
160	15.064	15.063
170	15.064	15.063
180	15.064	15.063
200	15.064	15.063
220	15.064	15.063
240	15.064	15.063
264	15.064	15.063
280	15.064	15.063

COSEL

Model	PAA300F-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

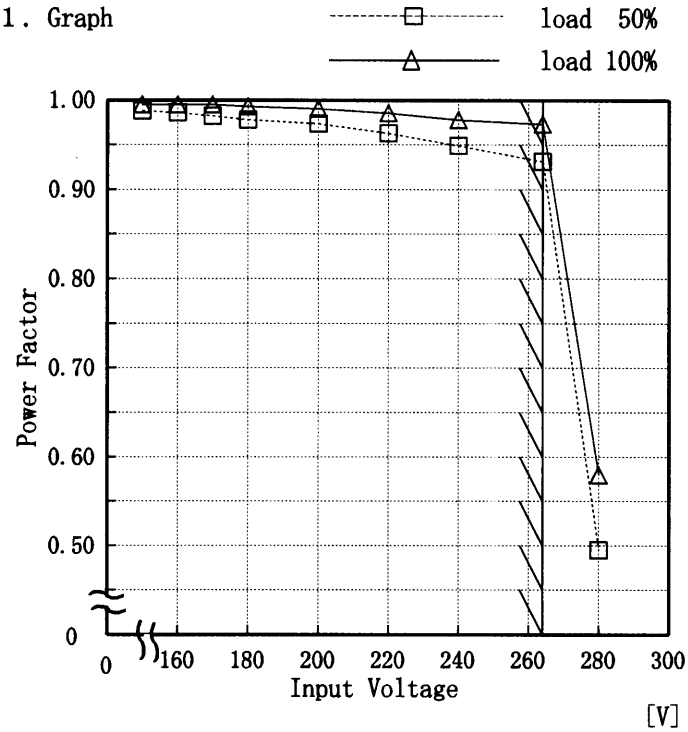
Input Voltage [V]	Load 50% Efficiency [%]	Load 100% Efficiency [%]
150	78.94	81.87
160	79.20	82.07
170	79.58	82.27
180	79.63	82.47
200	80.00	82.68
220	80.31	83.09
240	80.71	83.52
264	81.10	83.73
280	81.50	84.22

COSEL

Model	PAA300F-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	0.99	1.00
160	0.99	1.00
170	0.98	1.00
180	0.98	0.99
200	0.97	0.99
220	0.96	0.99
240	0.95	0.98
264	0.93	0.97
280	0.50	0.58

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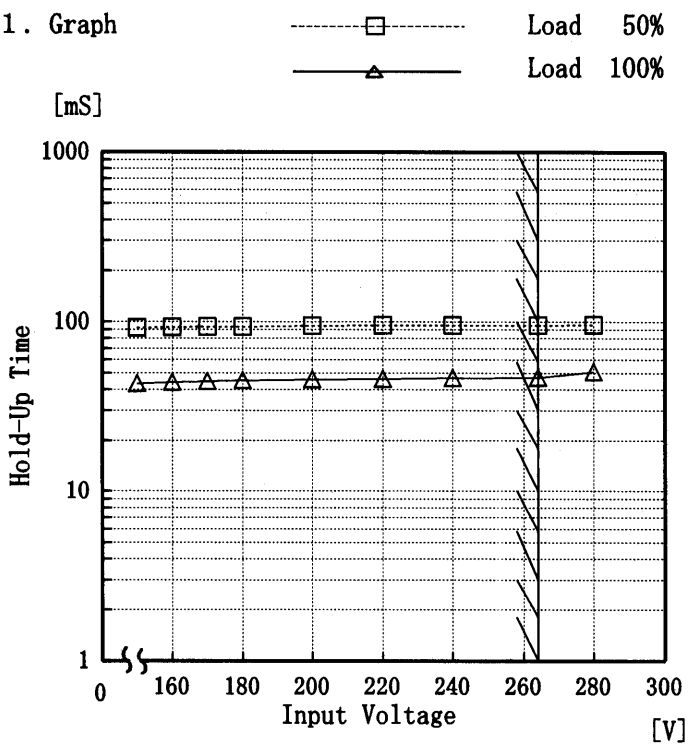
Model	PAA300F-15
Item	Hold-Up Time　出力保持時間
Object	+15V22A

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	92	43
160	93	44
170	94	45
180	94	45
200	95	46
220	95	47
240	95	47
264	96	47
280	96	51

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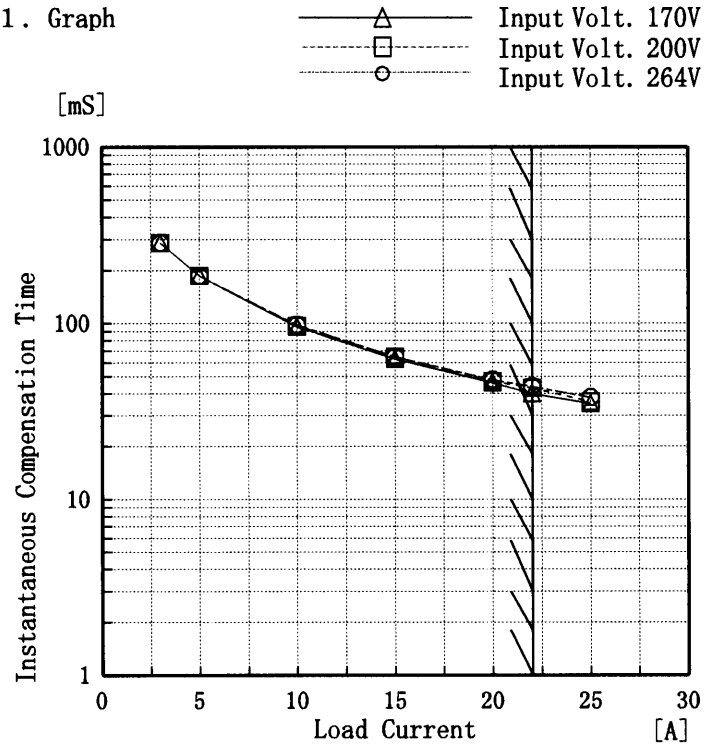
Model	PAA300F-15
Item	Instantaneous Interruption Compensation 瞬時停電保障
Object	+15V22A

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]		
0.0	—	—	—
3.0	286	287	287
5.0	187	187	187
10.0	96	97	98
15.0	63	65	65
20.0	46	47	48
22.0	40	43	44
25.0	35	36	38
—	—	—	—
—	—	—	—
—	—	—	—

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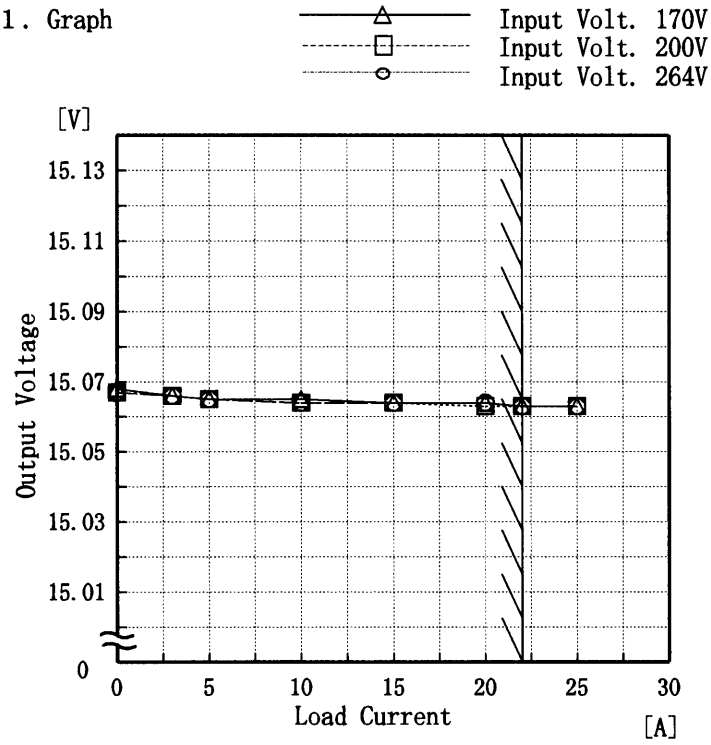
Model	PAA300F-15
Item	Load Regulation 静的負荷変動
Object	+15V22A

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

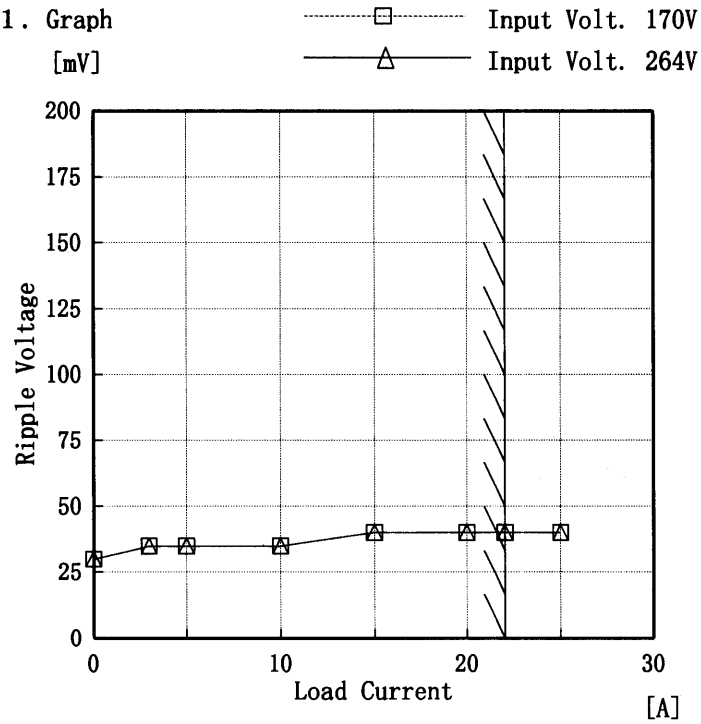
Load Current [A]	Input Volt. 170[V] Output Volt. [V]	Input Volt. 200[V] Output Volt. [V]	Input Volt. 264[V] Output Volt. [V]
0.0	15.068	15.067	15.067
3.0	15.066	15.066	15.066
5.0	15.065	15.065	15.065
10.0	15.065	15.064	15.064
15.0	15.064	15.064	15.064
20.0	15.064	15.063	15.064
22.0	15.063	15.063	15.063
25.0	15.063	15.063	15.063
—	—	—	—
—	—	—	—

COSEL

Model	PAA300F-15
Item	Ripple Voltage(by Load Current) リップル電圧(負荷電流特性)
Object	+15V22A

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

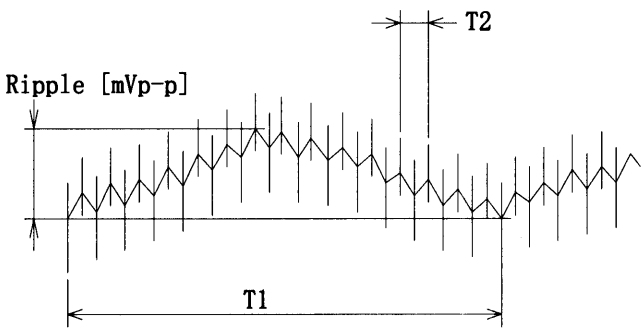


Fig. Complex Ripple Wave Form
図 リップル波形詳細図

2.Values

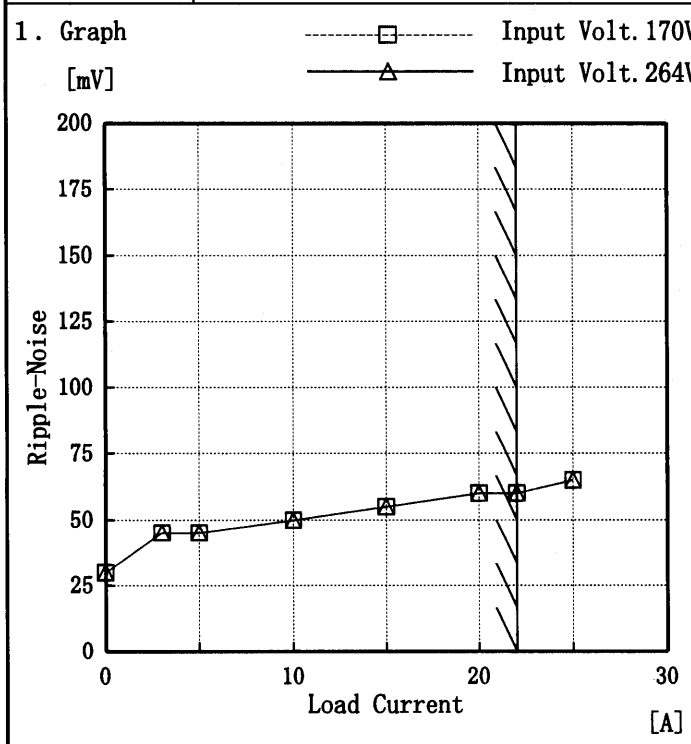
Load Current [A]	Input Volt. 170 [V] Ripple Output Volt. [mV]	Input Volt. 264 [V] Ripple Output Volt. [mV]
0.0	30	30
3.0	35	35
5.0	35	35
10.0	35	35
15.0	40	40
20.0	40	40
22.0	40	40
25.0	40	40
—	—	—
—	—	—
—	—	—

COSEL

Model	PAA300F-15
Item	Ripple-Noise　リップルノイズ
Object	+15V22A

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

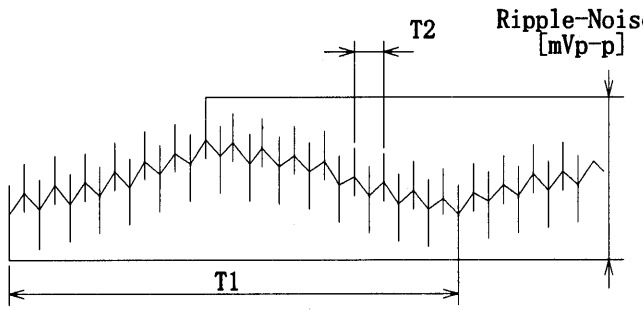


Fig. Complex Ripple Wave Form
図　リップル波形詳細図

2. Values

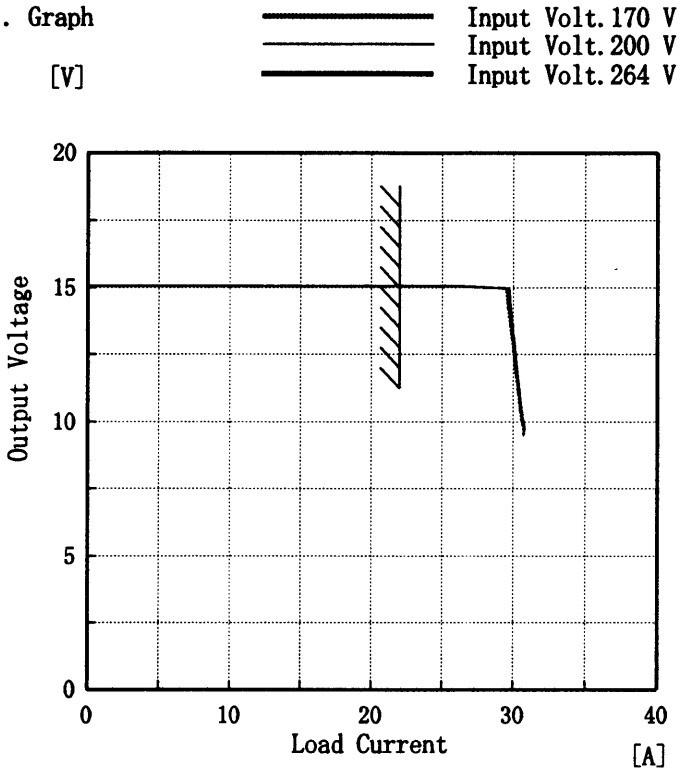
Load current [A]	Input Volt. 170 [V] Ripple-Noise [mV]	Input Volt. 264 [V] Ripple-Noise [mV]
0.0	30	30
3.0	45	45
5.0	45	45
10.0	50	50
15.0	55	55
20.0	60	60
22.0	60	60
25.0	65	65
—	—	—
—	—	—
—	—	—

COSEL

Model	PAA300F-15
Item	Overcurrent Protection 過電流保護
Object	+15V22A

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。
10V以下は間欠モードにはいる。

2. Values

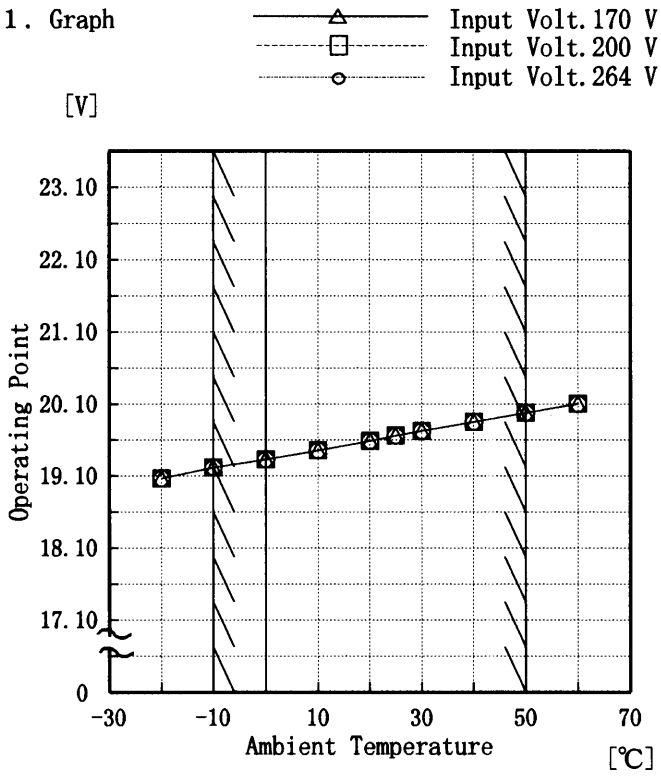
Output Voltage [V]	Input Volt. 170[V] Load Current [A]	Input Volt. 200[V] Load Current [A]	Input Volt. 264[V] Load Current [A]
15.00	29.49	29.64	29.68
14.25	29.60	29.72	29.76
13.50	29.78	29.88	29.93
12.00	30.09	30.17	30.20
10.50	30.42	30.47	30.50
9.00	——	——	——
7.50	——	——	——
6.00	——	——	——
4.50	——	——	——
3.00	——	——	——
1.50	——	——	——
0.00	——	——	——

COSEL

Model	PAA300F-15
Item	Overvoltage Protection 過電圧保護
Object	+15V22A

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。

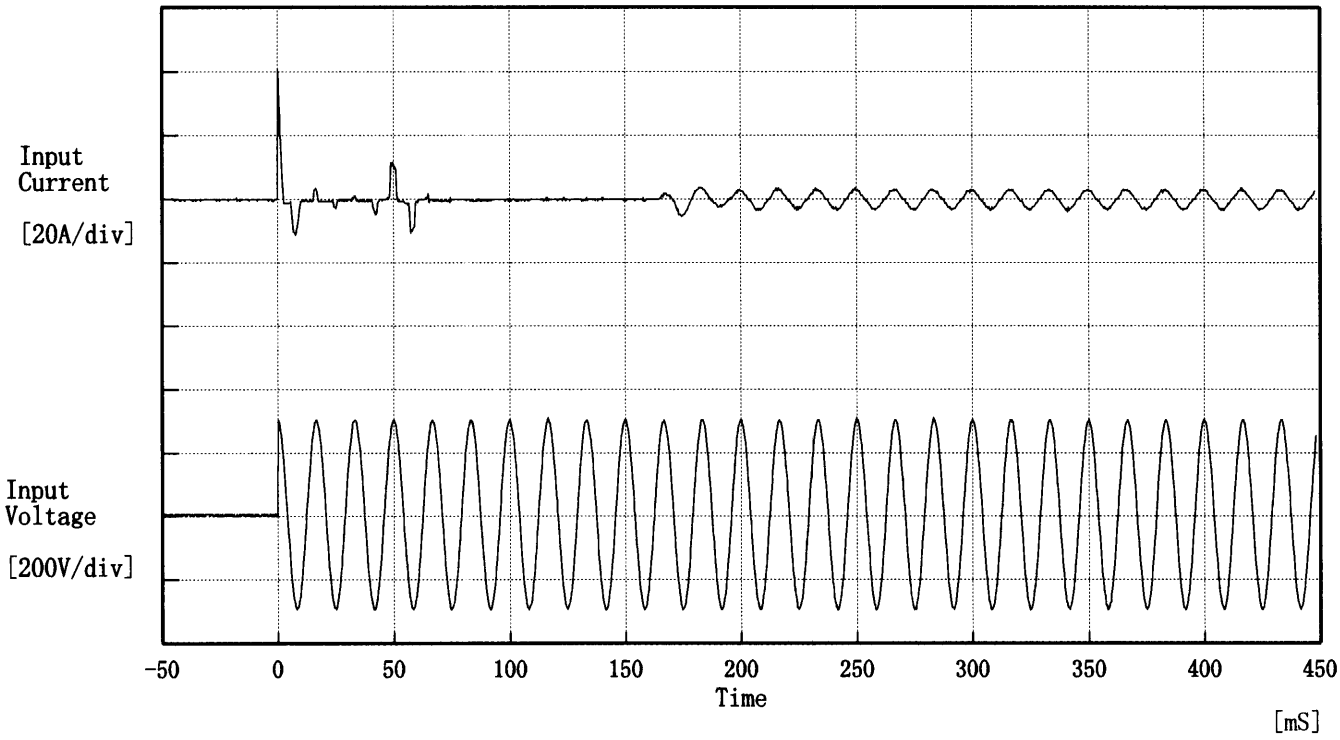
2. Values

Ambient Temp. [℃]	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
	Operating Point [V]		
-20	19.07	19.07	19.07
-10	19.22	19.22	19.22
0	19.33	19.33	19.33
10	19.46	19.46	19.46
20	19.59	19.59	19.59
25	19.66	19.66	19.66
30	19.73	19.73	19.73
40	19.85	19.85	19.85
50	19.98	19.98	19.98
60	20.10	20.10	20.10
—	—	—	—

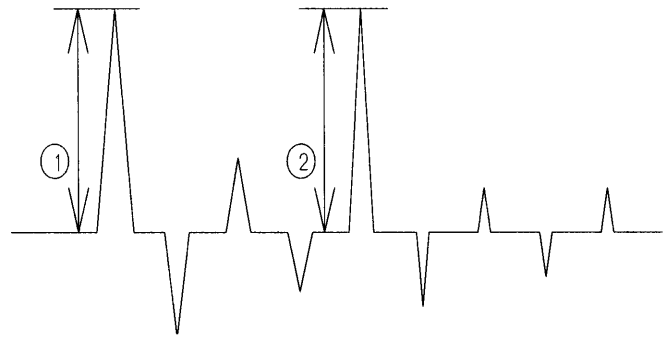
COSEL

Model	PAA300F-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 40.80 [A]
② 10.80 [A]



COSEL

Model	PAA300F-15		
Item	Dynamic Load Responce 動的負荷変動	Temperature Testing Circuitry	25℃ Figure A
Object	+15V22A		

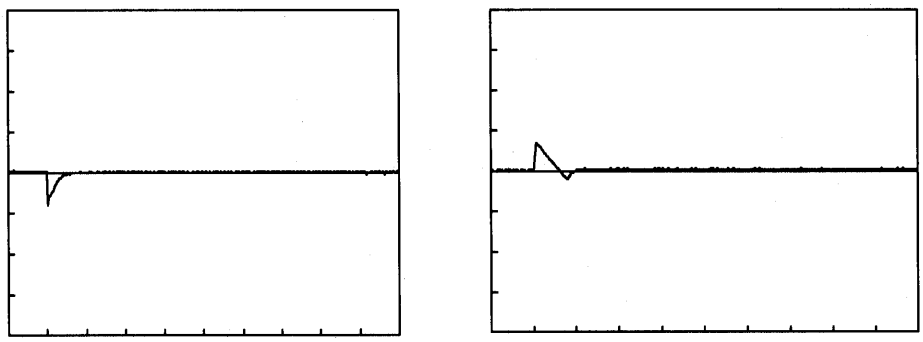
Input Volt. 200 V

Cycle 200 mS

Load Current

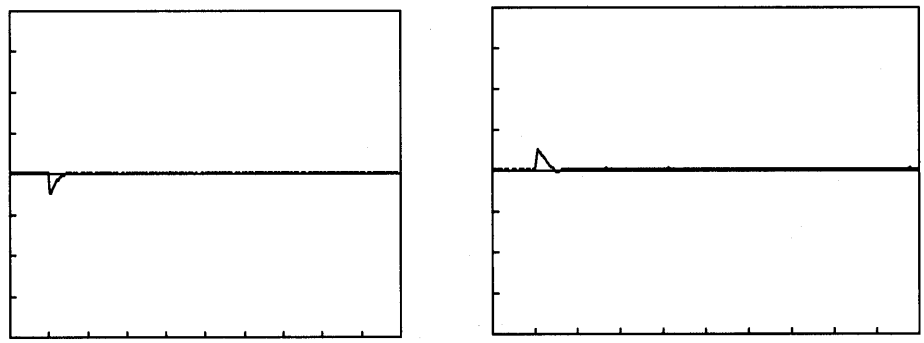
Min. Load ←→

Load 100 %



Min. Load ←→

Load 50 %



100 mV/div

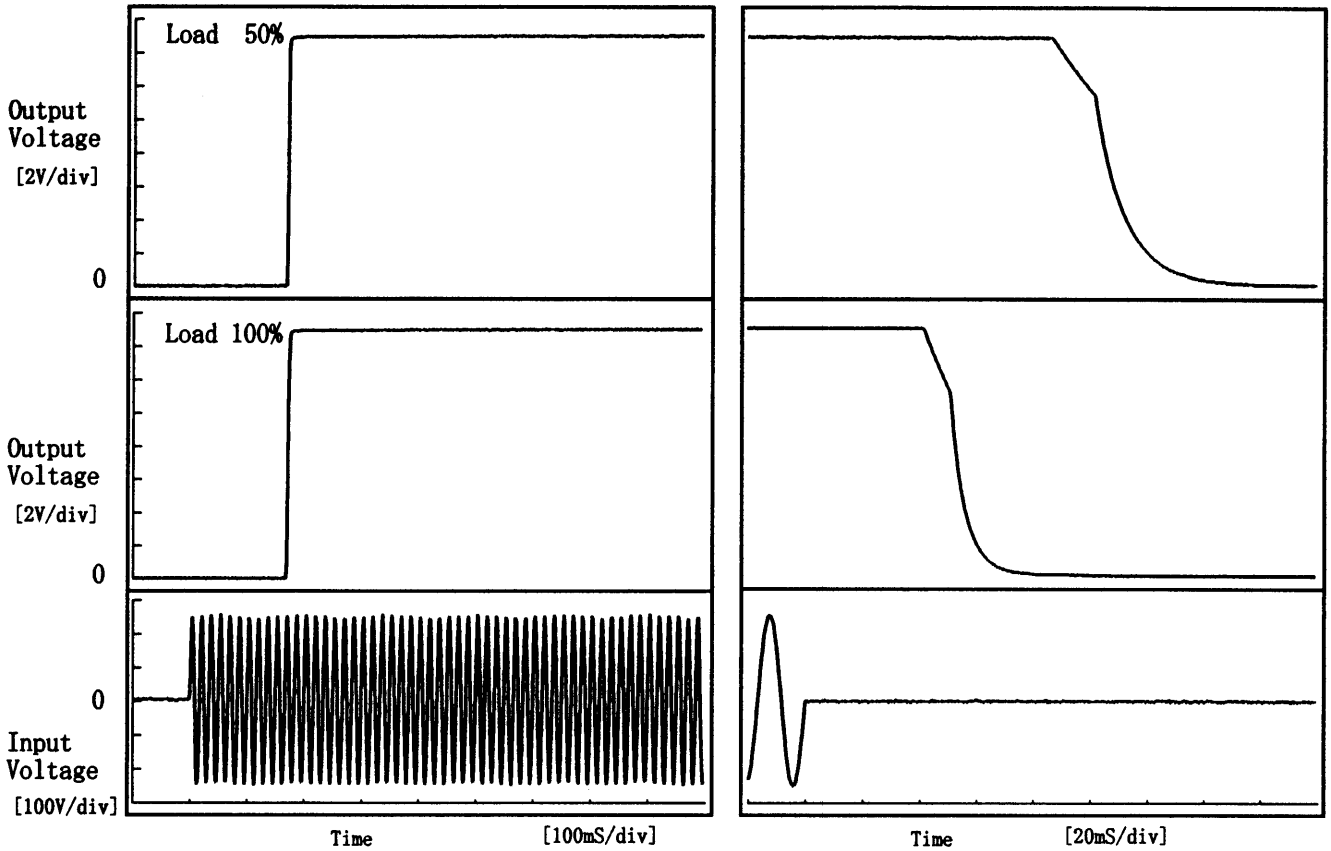
10 mS/div

COSEL

Model	PAA300F-15		
Item	Rise and Fall Time 立上り、立下り時間	Temperature	25℃
		Testing Circuitry	Figure A
Object	+15V22A		

1. Graph

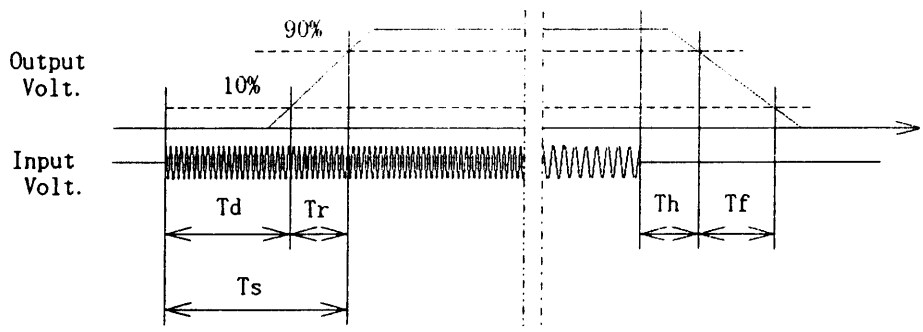
Input Volt. 170 V



2. Values

[mS]

Load \ Time	T d	T r	T s	T h	T f
50 %	168.0	4.0	172.0	92.3	31.5
100 %	169.0	5.5	174.5	44.8	17.3

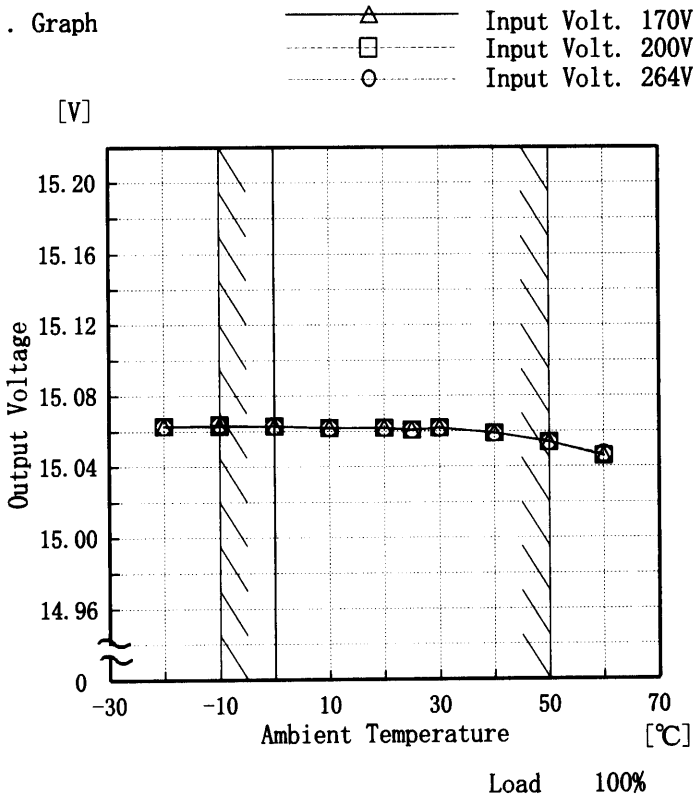


COSEL

Model	PAA300F-15
Item	Ambient Temperature Drift 周囲温度変動
Object	+15V22A

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

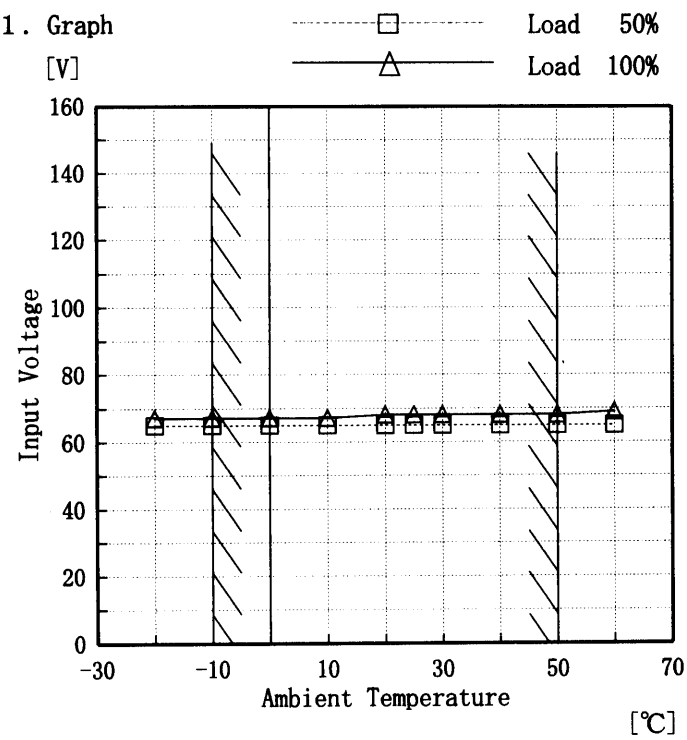
Temperature [℃]	Input Volt. 170[V] Output Volt. [V]	Input Volt. 200[V] Output Volt. [V]	Input Volt. 264[V] Output Volt. [V]
-20	15.063	15.063	15.063
-10	15.063	15.064	15.064
0	15.063	15.063	15.063
10	15.062	15.062	15.062
20	15.062	15.062	15.062
25	15.061	15.061	15.061
30	15.062	15.062	15.062
40	15.059	15.059	15.059
50	15.054	15.054	15.054
60	15.046	15.046	15.047
—	—	—	—

COSEL

Model	PAA300F-15
Item	Minimum Input Voltage for Regulated Output Voltage 最低レギュレーション電圧
Object	+15V22A

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

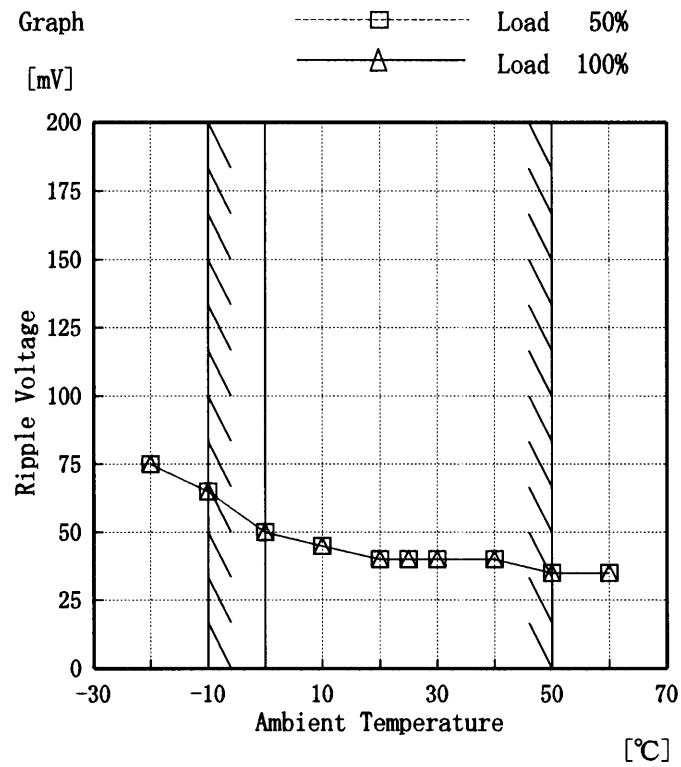
Ambient Temp. [℃]	Load 50% Input Volt. [V]	Load 100% Input Volt. [V]
-20	65	67
-10	65	67
0	65	67
10	65	67
20	65	68
25	65	68
30	65	68
40	65	68
50	65	68
60	65	69
—	—	—

COSEL

Model	PAA300F-15
Item	Ripple Voltage (by Ambient Temp.) リップル電圧 (周囲温度特性)
Object	+15V22A

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

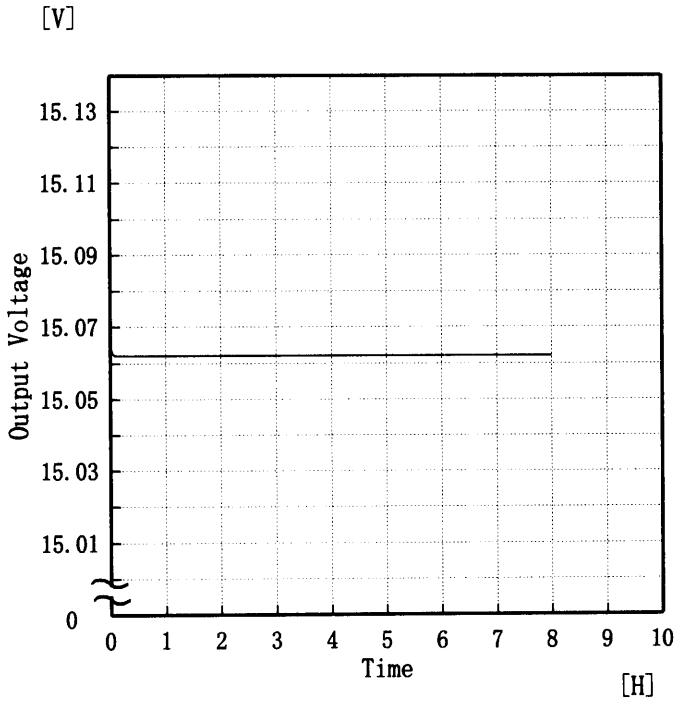
Ambient Temp. [℃]	Load 50% Ripple Output Volt. [mV]	Load 100% Ripple Output Volt. [mV]
-20	75	75
-10	65	65
0	50	50
10	45	45
20	40	40
25	40	40
30	40	40
40	40	40
50	35	35
60	35	35
—	—	—

COSEL

Model	PAA300F-15
Item	Time Lapse Drift 経時ドリフト
Object	+15V22A

Temperature 25 ℃
Testing Circuitry Figure A

1. Graph



Input Volt. 200V
Load 100%

2. Values

Time since start [H]	Output Voltage [V]
0.0	15.065
0.5	15.062
1.0	15.062
2.0	15.062
3.0	15.062
4.0	15.062
5.0	15.062
6.0	15.062
7.0	15.062
8.0	15.062

COSEL

Model	PAA300F-15	
Item	Output Voltage Accuracy 定電圧精度	Testing Circuitry Figure A
Object	+15V22A	

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 : 0～22 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 0～22 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

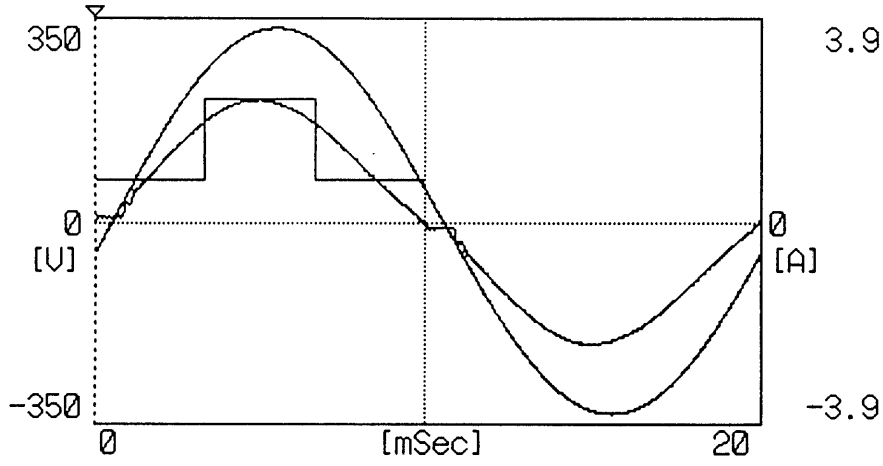
$$\text{* 定電圧精度(変動率)} = \frac{\text{変動値}}{\text{定格出力電圧}} \times 100$$

Item	Temperature [℃]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy (Ration) [%]
Maximum Voltage	-10	264	0	15.068	±8	±0.053
Minimum Voltage	50	170	22	15.053		

COSEL

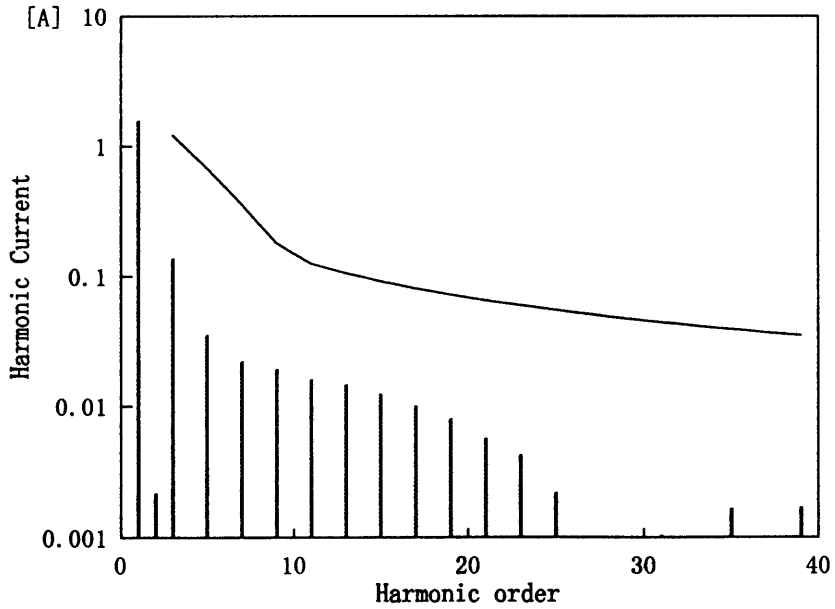
Model	PAA300F-15		
Item	Harmonic Current 高調波電流	Temperature Testing Circuitry	25℃ Figure E
Object	———		

1. Input Current Waveform



Conditions	Values
Input Voltage [V]	231.2
Input Current [A]	1.57
Active Power [W]	359.4
Apparent Power[VA]	362.8
Frequency [Hz]	60
Power Factor	0.991
Output Power [W]	330

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	—	1.57900
2	—	0.00218
3	1.21562	0.13836
4	—	0.00029
5	0.67932	0.03598
6	—	0.00017
7	0.35753	0.02232
8	—	0.00012
9	0.17877	0.01962
10	—	0.00020
11	0.12514	0.01630
12	—	0.00023
13	0.10589	0.01476
14	—	0.00024
15	0.09177	0.01261
16	—	0.00018
17	0.08097	0.01019
18	—	0.00017
19	0.07245	0.00816
20	—	0.00018
21	0.06555	0.00572
22	—	0.00015
23	0.05985	0.00429
24	—	0.00020
25	0.05506	0.00221
26	—	0.00017
27	0.05098	0.00086
28	—	0.00013
29	0.04747	0.00044
30	—	0.00016
31	0.04440	0.00104
32	—	0.00017
33	0.04171	0.00028
34	—	0.00013
35	0.03933	0.00166
36	—	0.00018
37	0.03720	0.00084
38	—	0.00015
39	0.03530	0.00169
40	—	0.00013

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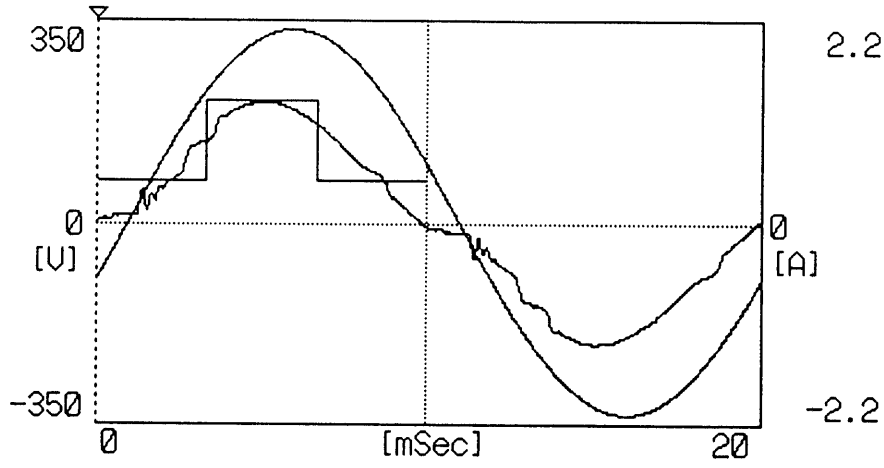
COSEL

Model	PAA300F-15
Item	Harmonic Current 高調波電流
Object	————

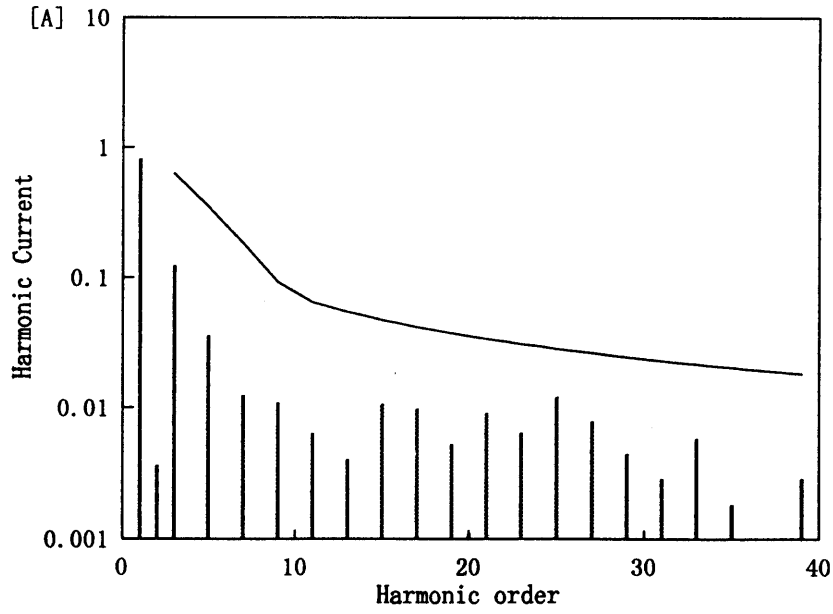
Temperature 25℃
Testing Circuitry Figure E

1. Input Current Waveform



Conditions	Values
Input Voltage [V]	232
Input Current [A]	0.83
Active Power [W]	186.5
Apparent Power[VA]	192.3
Frequency [Hz]	60
Power Factor	0.970
Output Power [W]	165

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	—	0.82646
2	—	0.00366
3	0.62863	0.12527
4	—	0.00041
5	0.35130	0.03611
6	—	0.00046
7	0.18489	0.01249
8	—	0.00027
9	0.09245	0.01105
10	—	0.00041
11	0.06471	0.00644
12	—	0.00042
13	0.05476	0.00403
14	—	0.00047
15	0.04746	0.01072
16	—	0.00083
17	0.04187	0.00985
18	—	0.00069
19	0.03747	0.00529
20	—	0.00110
21	0.03390	0.00917
22	—	0.00086
23	0.03095	0.00647
24	—	0.00087
25	0.02847	0.01219
26	—	0.00085
27	0.02636	0.00797
28	—	0.00063
29	0.02455	0.00448
30	—	0.00049
31	0.02296	0.00289
32	—	0.00012
33	0.02157	0.00588
34	—	0.00007
35	0.02034	0.00183
36	—	0.00043
37	0.01924	0.00056
38	—	0.00046
39	0.01825	0.00289
40	—	0.00073

BC−3086

COSEL

Model	PAA300F-15
Item	Condensation 結露特性
Object	+15V22A

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	15.064	40	50
	2	15.064	40	50
	3	15.063	40	50
Load 100 %	1	15.063	40	60
	2	15.063	40	60
	3	15.063	40	60

Input Volt. 200 V

COSEL

Model	PAA300F-15
Item	Leakage Current 漏洩電流
Object	————————

Testing Circuitry Figure B

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	0.29	0.38	0.46

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	PAA300F-15
Item	Line Noise Tolerance 入力雑音耐量
Object	+15V22A

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	19.66	no regulation
	NORMAL	19.66	no regulation
1000	COMMON	19.66	no regulation
	NORMAL	19.66	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	PAA300F-15
Item	Conducted Emission 雑音端子電圧
Object	————————

Testing Circuitry Figure D

1. Graph

Remarks

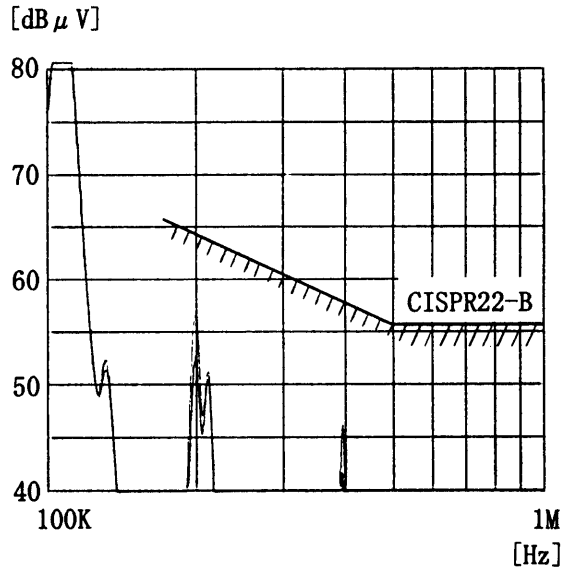
Input Volt. 230 V

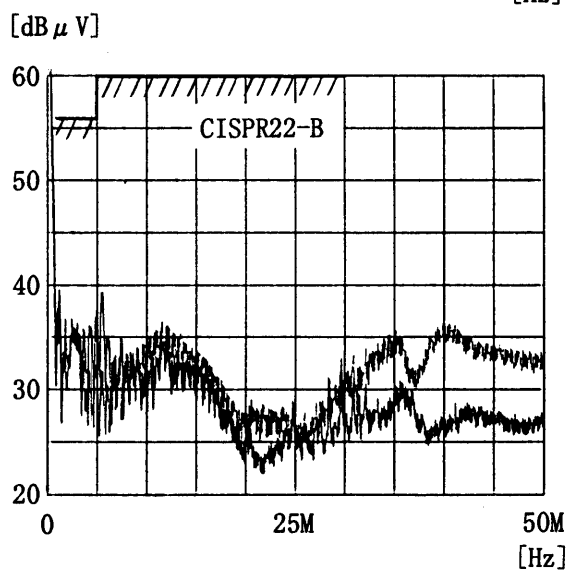
Load 100 %

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

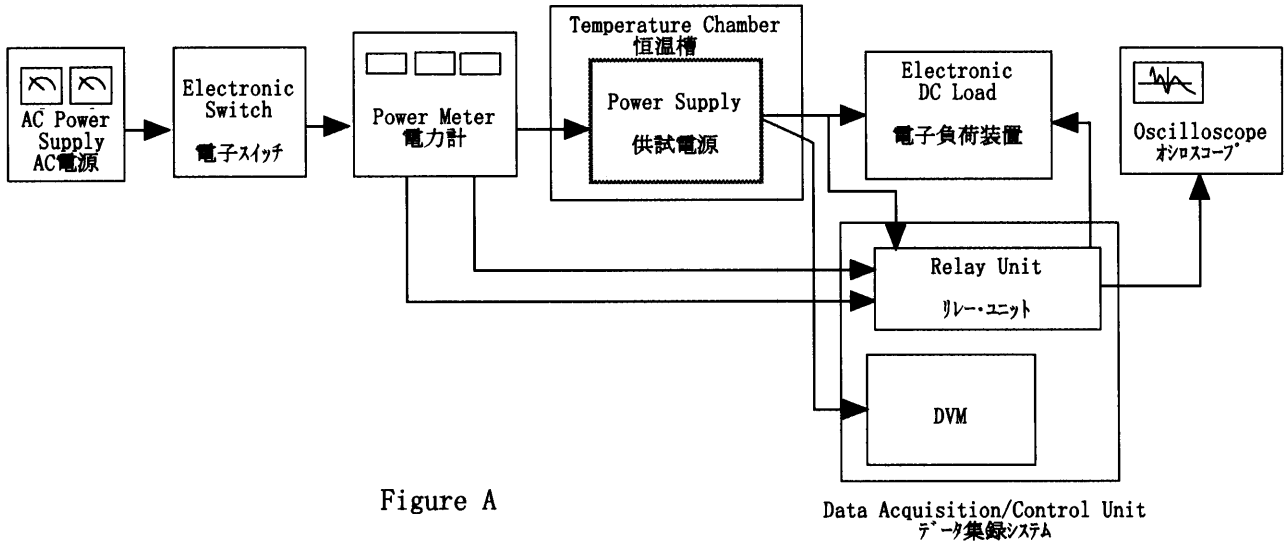


Figure A

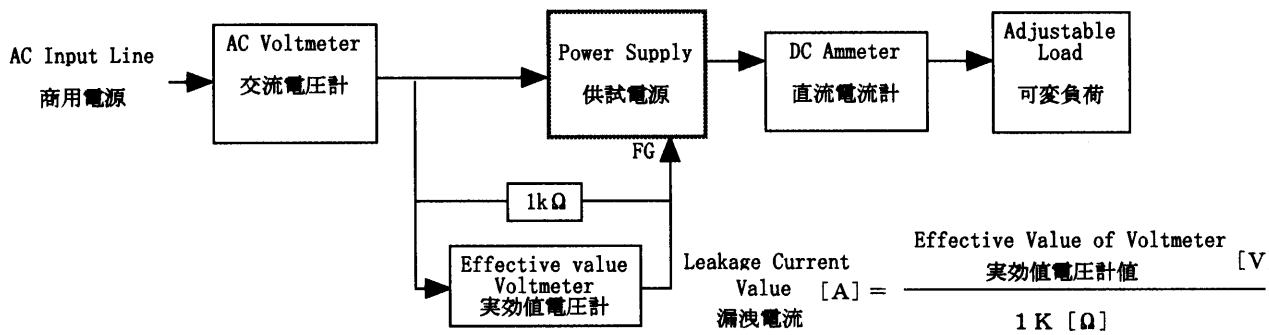


Figure B(DENTORI)

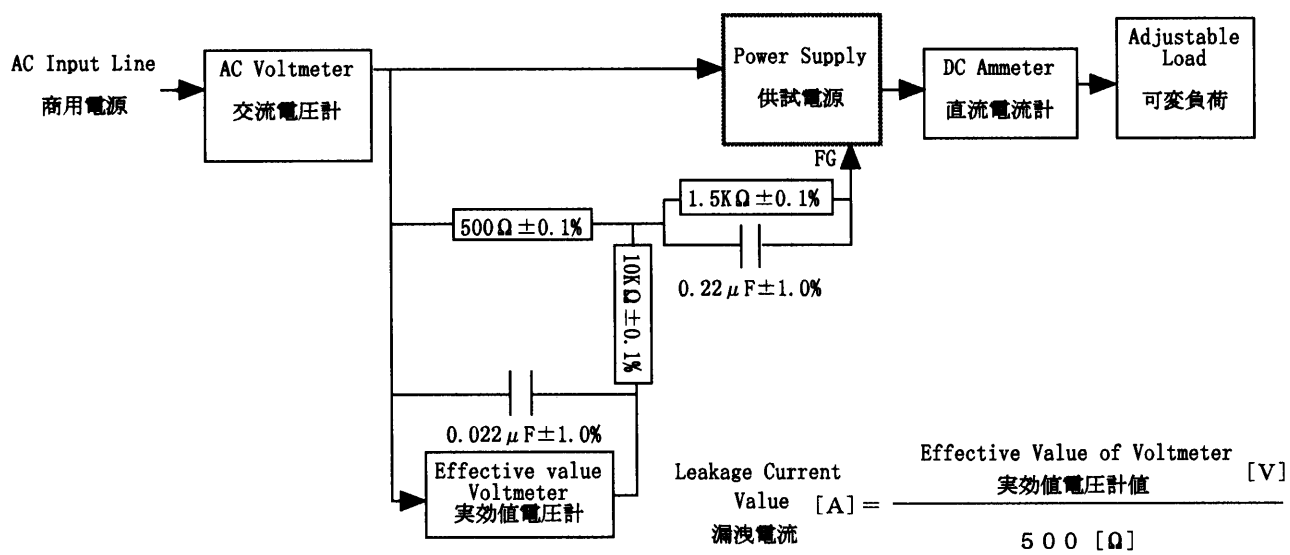


Figure B (UL, CSA, VDE)

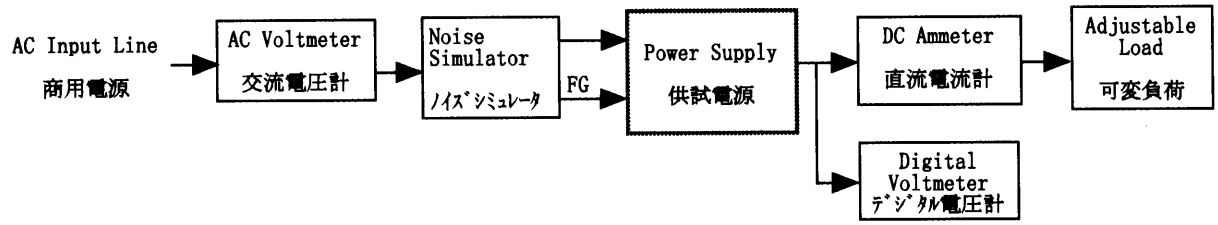


Figure C

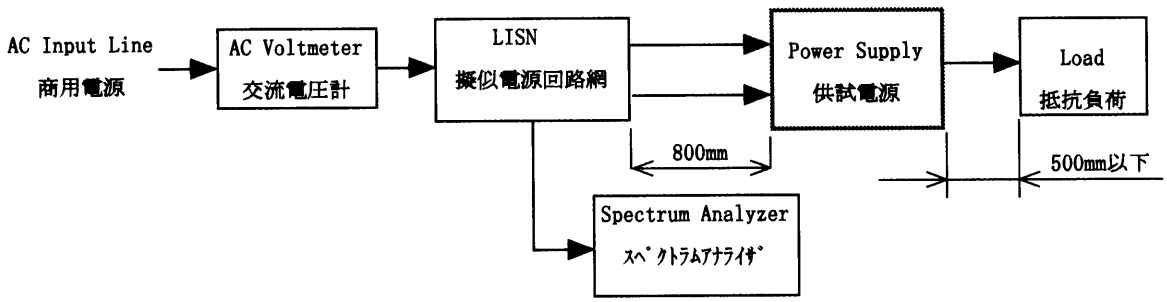


Figure D

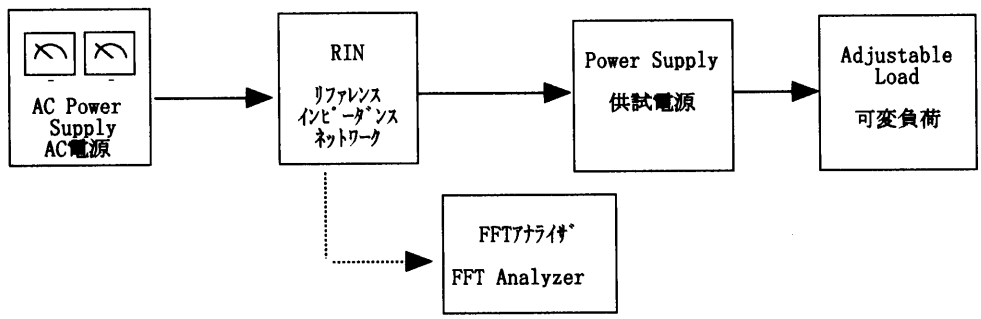


Figure E