参考資料

COSEL

TEST DATA OF R50A-12
(100V INPUT)

Regulated DC Power Supply

Date : Sep. 28. 1998

Approved by : Masanori Oshi
Design Manager

Prepared by : Jun Uchida
Design Engineer

コーセル株式会社

COSEL CO.,LTD.

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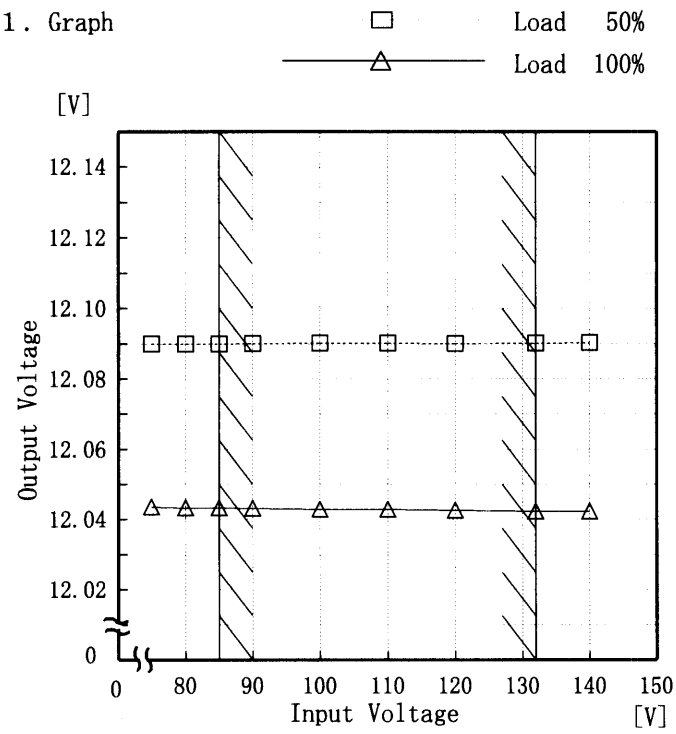


Note: Slanted line shows the range of the rated input voltage.

(注)斜線は定格入力電圧範囲を示す。

2. Values

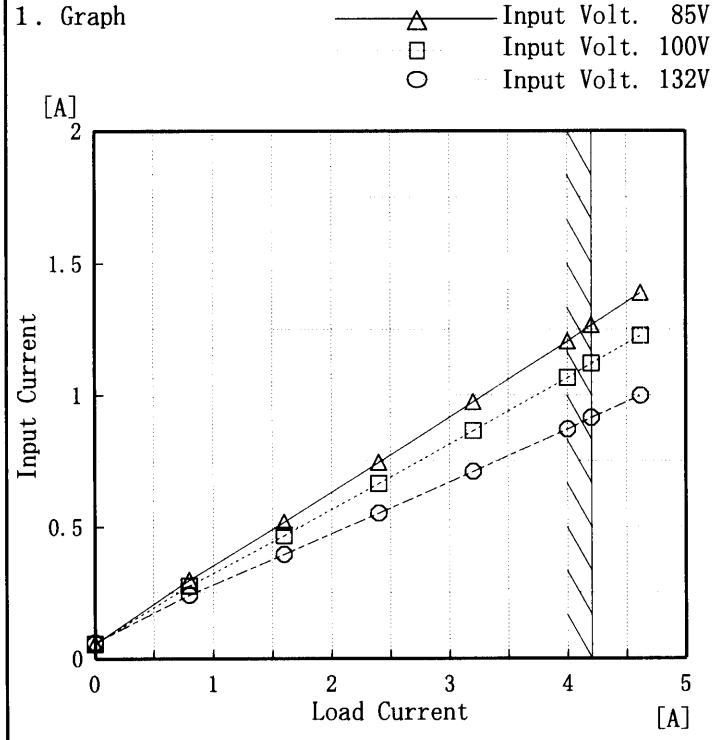
Input Voltage [V]	Load 50% Output Volt. [V]	Load 100% Output Volt. [V]
75	12.090	12.044
80	12.090	12.043
85	12.090	12.043
90	12.090	12.043
100	12.090	12.043
110	12.090	12.043
120	12.090	12.043
132	12.090	12.042
140	12.090	12.042

COSEL

Model	R50A-12
Item	Input Current (by Load Current) 入力電流（負荷特性）
Output	————

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 Current [A]		
	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
0.00	0.053	0.055	0.060
0.80	0.298	0.275	0.242
1.60	0.517	0.467	0.395
2.40	0.745	0.665	0.553
3.20	0.975	0.865	0.711
4.00	1.204	1.065	0.872
4.20	1.266	1.120	0.915
4.62	1.388	1.226	0.999
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—

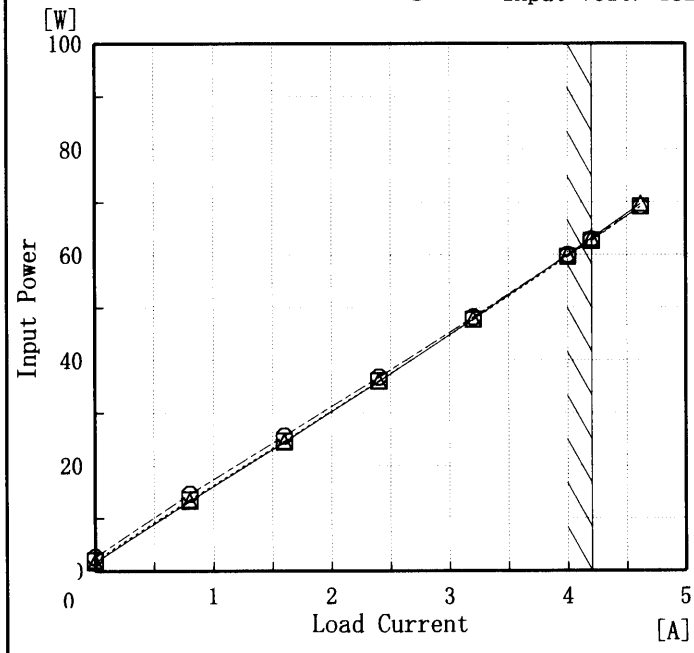
COSEL

Model	R50A-12
Item	Input Power (by Load Current) 入力電力（負荷特性）
Output	————

Temperature 25℃
Testing Circuitry Figure A

1. Graph

△ Input Volt. 85V
□ Input Volt. 100V
○ Input Volt. 132V



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 Power [W] Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
0.00	1.63	1.93	2.63
0.80	13.20	13.55	14.59
1.60	24.46	24.66	25.61
2.40	36.01	36.07	36.83
3.20	47.86	47.73	48.20
4.00	60.01	59.64	59.90
4.20	63.11	62.69	62.80
4.62	69.71	69.14	69.10
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—

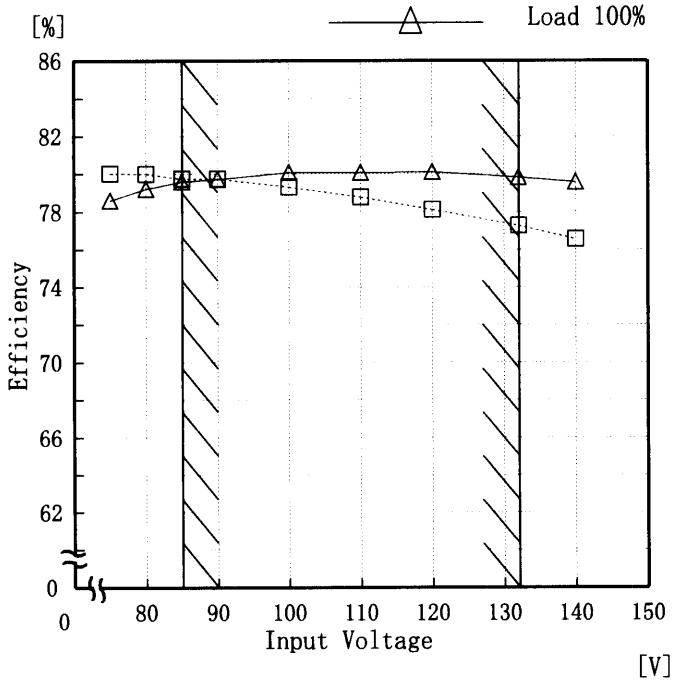
COSEL

Model	R50A-12
Item	Efficiency 効率
Object	———————

Temperature 25℃
Testing Circuitry Figure A

1. Graph

□ Load 50%
△ Load 100%



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

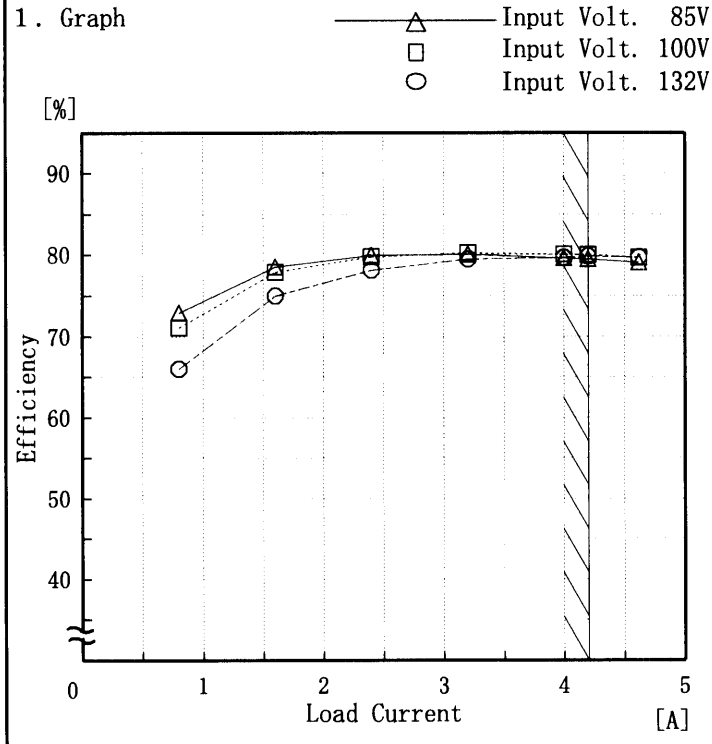
Input Voltage [V]	Load 50% Efficiency [%]	Load 100% Efficiency [%]
75	80.0	78.6
80	80.0	79.2
85	79.8	79.6
90	79.8	79.7
100	79.3	80.1
110	78.8	80.1
120	78.1	80.1
132	77.3	79.8
140	76.6	79.6

COSEL

Model	R50A-12
Item	Efficiency (by Load Current) 効率 (負荷電流特性)
Output	————

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

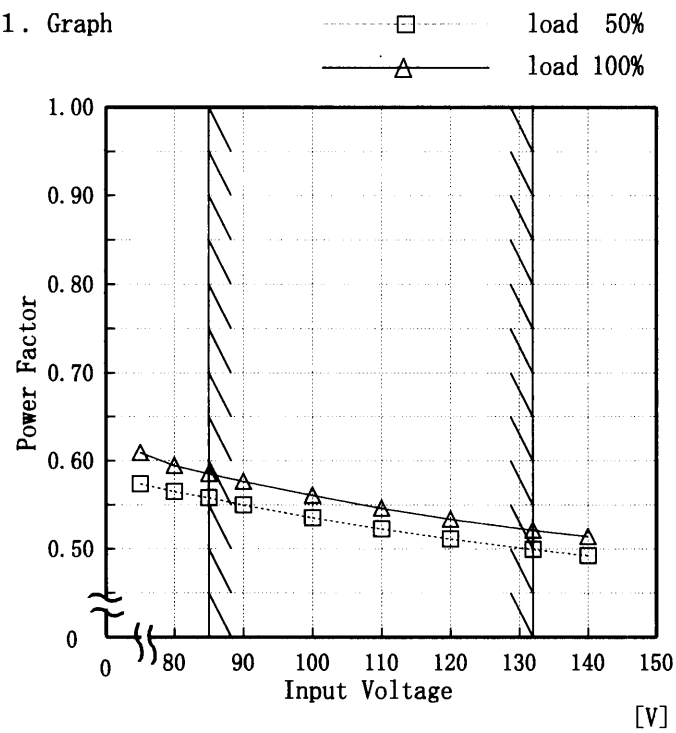
Load Current [A]	Efficiency [%] Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
0.80	72.9	71.1	66.0
1.60	78.5	77.9	75.0
2.40	79.9	79.8	78.1
3.20	80.1	80.3	79.5
4.00	79.6	80.1	79.7
4.20	79.5	80.0	79.9
4.62	79.1	79.7	79.7
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—

COSEL

Model	R50A-12
Item	Power Factor (by Input Voltage) 力率（入力電圧特性）
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

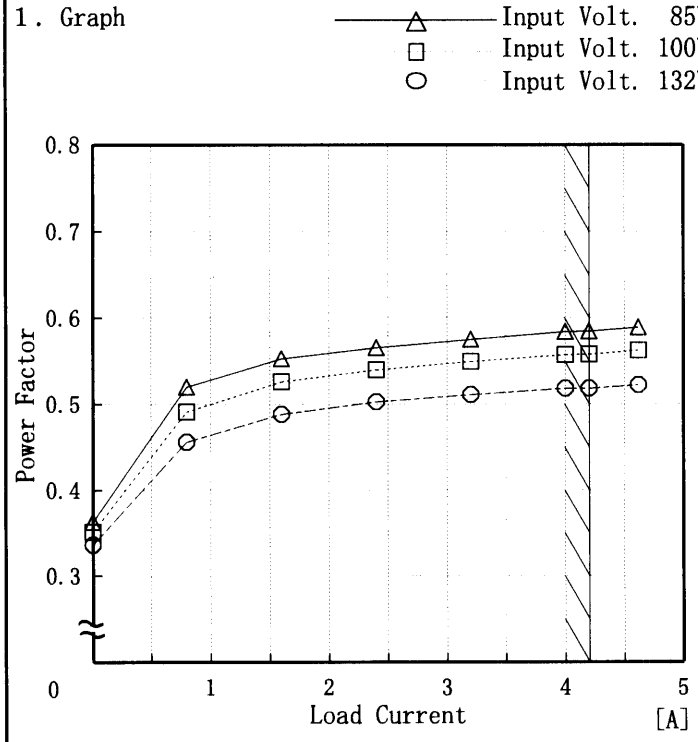
Input Voltage [V]	load 50% Power Factor	load 100% Power Factor
75	0.57	0.61
80	0.57	0.59
85	0.56	0.59
90	0.55	0.58
100	0.54	0.56
110	0.52	0.55
120	0.51	0.53
132	0.50	0.52
140	0.49	0.51

COSEL

Model	R50A-12
Item	Power Factor (by Load Current) 力率（負荷電流特性）
Output	————

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]	Power Factor		
	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
—	0.36	0.35	0.34
0.80	0.52	0.49	0.46
1.60	0.55	0.53	0.49
2.40	0.57	0.54	0.50
3.20	0.58	0.55	0.51
4.00	0.58	0.56	0.52
4.20	0.58	0.56	0.52
4.62	0.59	0.56	0.52
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—

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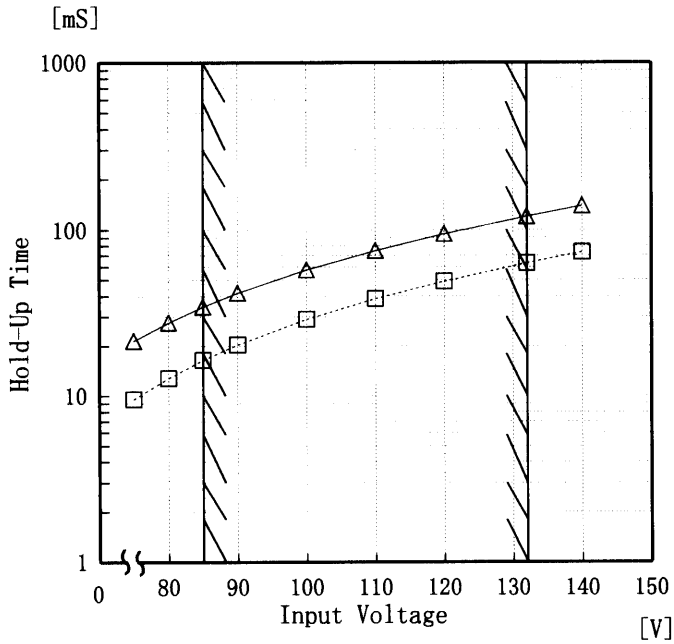
Model	R50A-12
Item	Hold-Up Time　出力保持時間
Object	+12.0V4.2A

Temperature　25℃
Testing Circuitry　Figure A

1. Graph

△——— Load 50%
□ ··· Load 100%



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、入力電圧断から出力電圧が、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]
75	21	10
80	28	13
85	35	17
90	42	20
100	57	29
110	75	39
120	94	49
132	120	63
140	139	74

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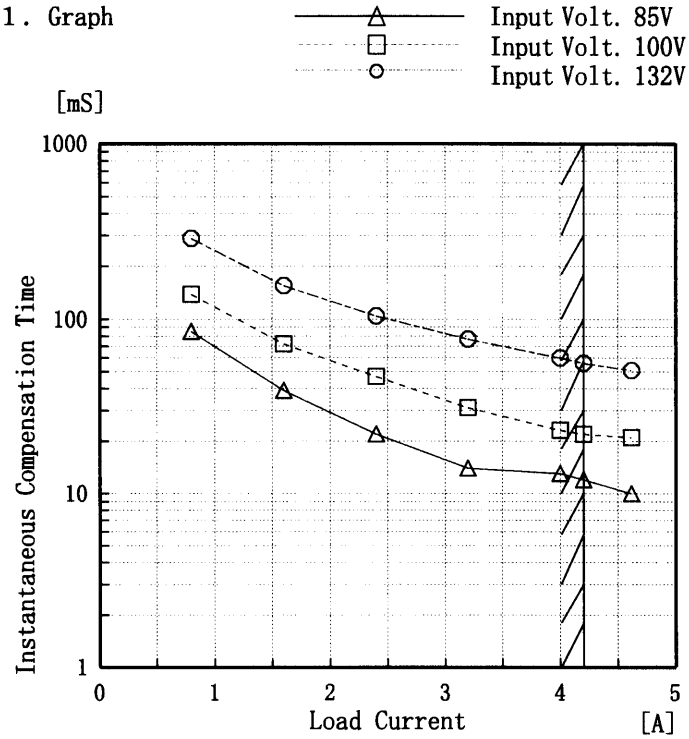
Model	R50A-12
Item	Instantaneous Interruption Compensation 瞬時停電保障
Object	+12.0V4.20A

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 load current.

瞬時停電保障時間とは、出力電圧が定電圧精度の規格範囲を保持している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

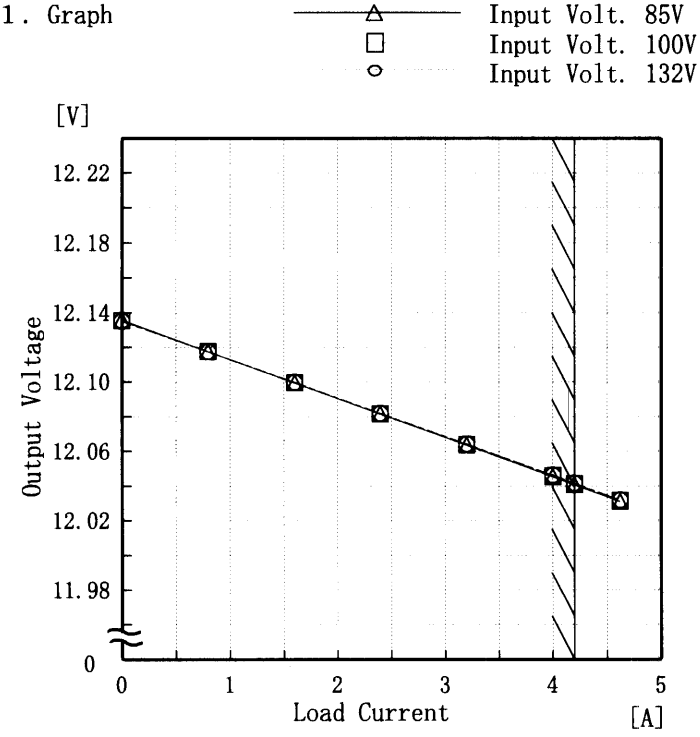
Load Current [A]	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
	Time [mS]		
0.00	—	—	—
0.80	85	139	290
1.60	39	72	155
2.40	22	47	104
3.20	14	31	77
4.00	13	23	60
4.20	12	22	56
4.62	10	21	51
—	—	—	—
—	—	—	—
—	—	—	—

COSEL

Model	R50A-12
Item	Load Regulation 静的負荷変動
Object	+12.0V4.20A

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

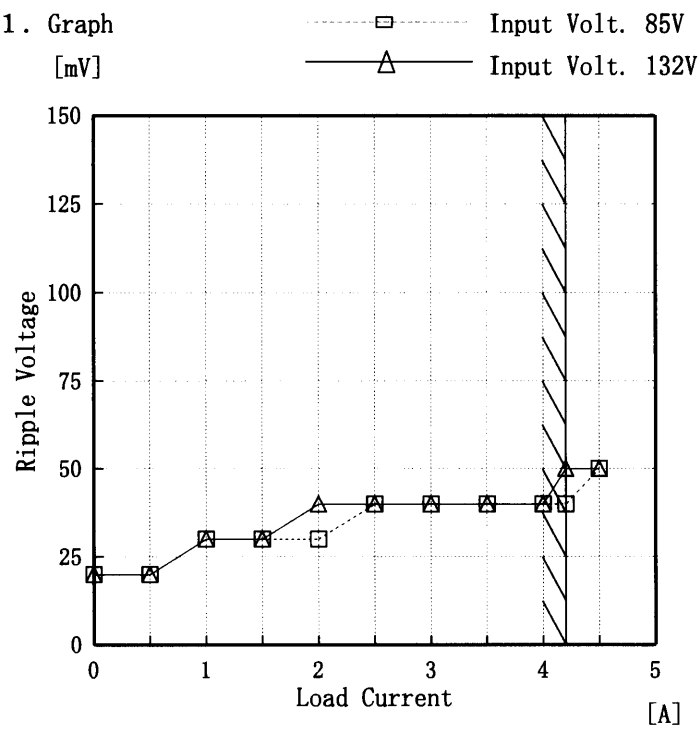
Load Current [A]	Input Volt. 85[V] Output Volt. [V]	Input Volt. 100[V] Output Volt. [V]	Input Volt. 132[V] Output Volt. [V]
0.00	12.136	12.136	12.135
0.80	12.117	12.117	12.117
1.60	12.100	12.100	12.100
2.40	12.081	12.082	12.082
3.20	12.064	12.064	12.064
4.00	12.046	12.046	12.046
4.20	12.041	12.041	12.042
4.62	12.031	12.032	12.032
—	—	—	—
—	—	—	—

COSEL

Model	R50A-12
Item	Ripple Voltage(by Load Current) リップル電圧(負荷電流特性)
Object	+12.0V4.20A

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

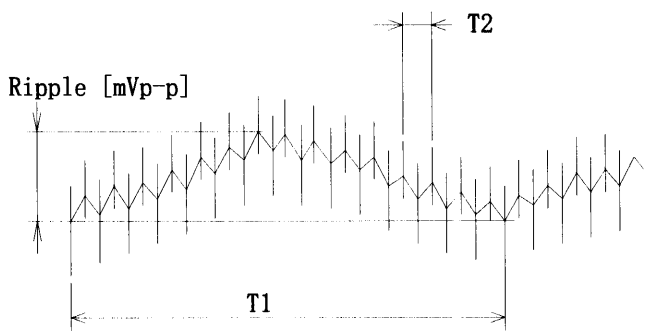


Fig. Complex Ripple Wave Form
図 リップル波形詳細図

2. Values

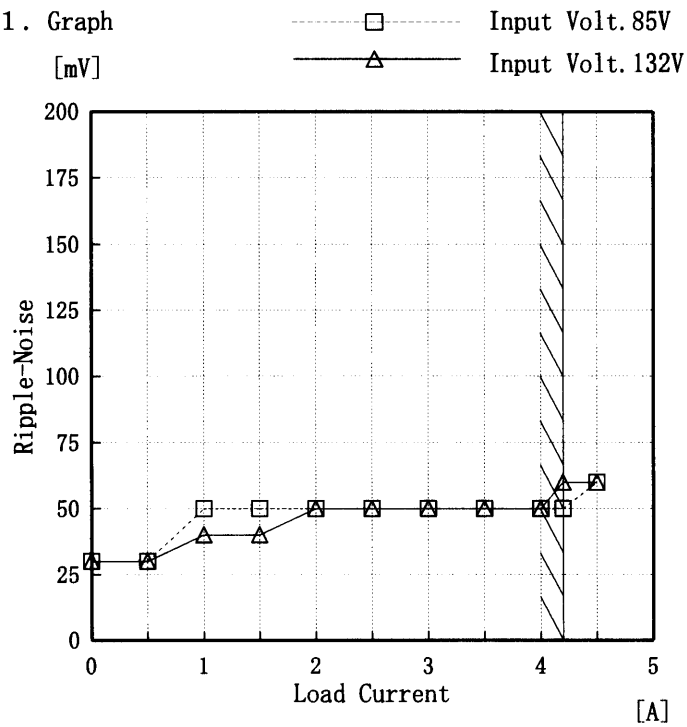
Load Current [A]	Input Volt. 85 [V] Ripple Output Volt. [mV]	Input Volt. 132 [V] Ripple Output Volt. [mV]
0.0	20	20
0.5	20	20
1.0	30	30
1.5	30	30
2.0	30	40
2.5	40	40
3.0	40	40
3.5	40	40
4.0	40	40
4.2	40	50
4.5	50	50

COSEL

Model	R50A-12
Item	Ripple-Noise　リップルノイズ
Object	+12.0V4.20A

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

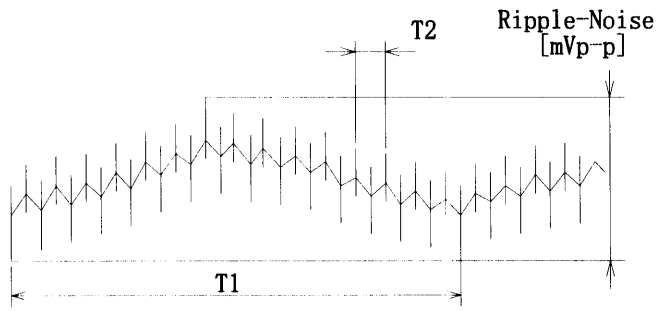


Fig. Complex Ripple Wave Form
図　リップル波形詳細図

2. Values

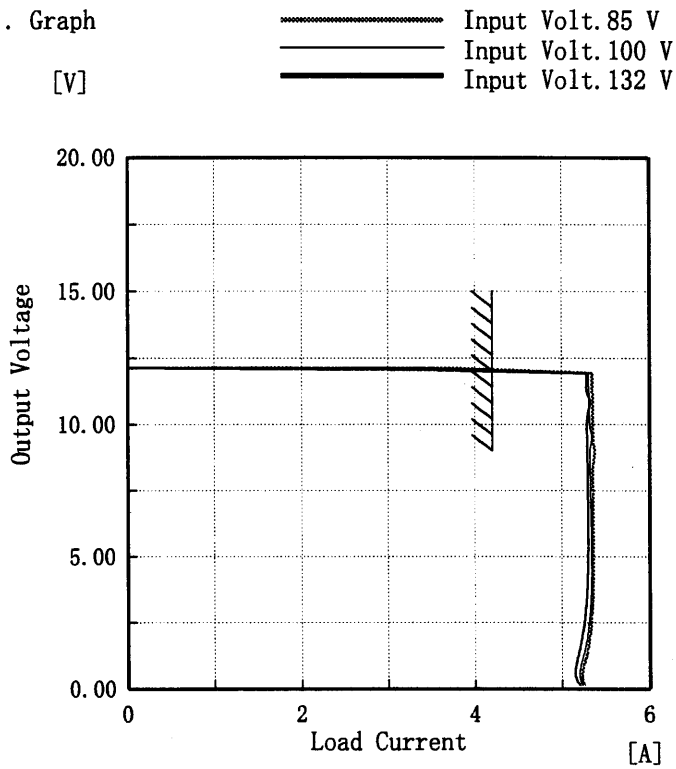
Load current [A]	Input Volt. 85 [V] Ripple-Noise [mV]	Input Volt. 132 [V] Ripple-Noise [mV]
0.0	30	30
0.5	30	30
1.0	50	40
1.5	50	40
2.0	50	50
2.5	50	50
3.0	50	50
3.5	50	50
4.0	50	50
4.2	50	60
4.5	60	60

COSEL

Model	R50A-12
Item	Overcurrent Protection 過電流保護
Object	+12.0V4.20A

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

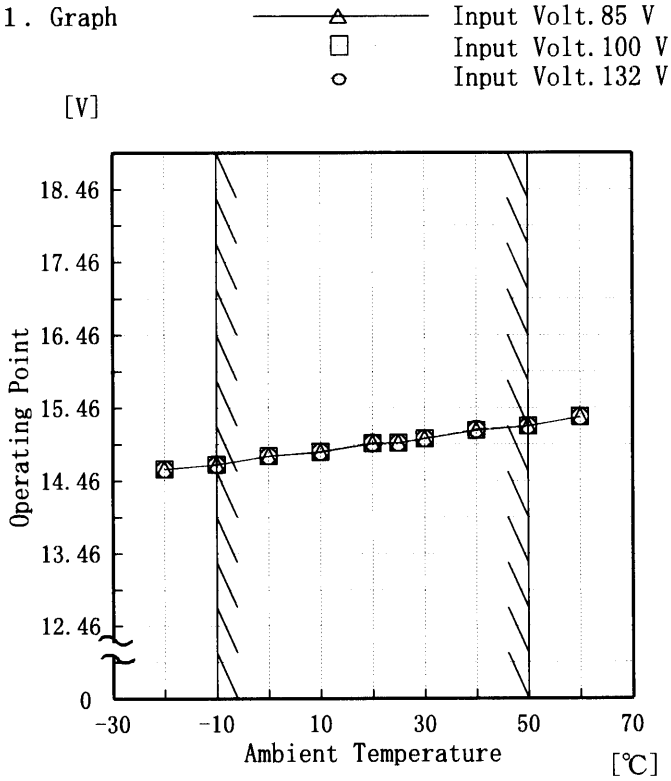
Output Voltage [V]	Input Volt. ERR Load Current [A]	Input Volt. ERR Load Current [A]	Input Volt. ERR Load Current [A]
12.00	5.36	5.33	5.29
11.40	5.36	5.33	5.29
10.80	5.36	5.33	5.29
9.60	5.36	5.33	5.29
8.40	5.36	5.33	5.29
7.20	5.36	5.33	5.29
6.00	5.36	5.33	5.29
4.80	5.36	5.31	5.28
3.60	5.35	5.30	5.28
2.40	5.33	5.30	5.25
1.20	5.28	5.25	5.21
0.00	5.25	5.24	5.18

COSEL

Model	R50A-12
Item	Overvoltage Protection 過電圧保護
Object	+12.0V4.20A

Testing Circuitry Figure A

1. Graph



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

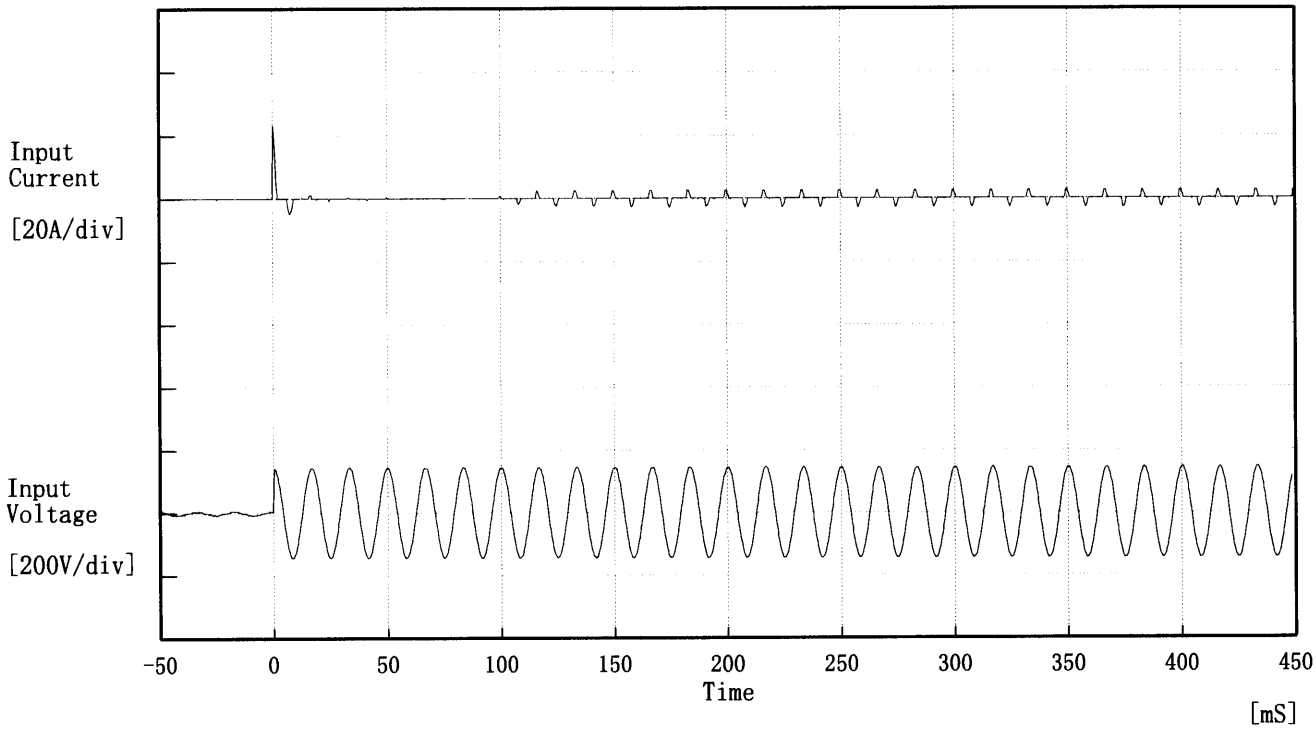
(注)斜線は定格周囲温度範囲を示す。

2. Values

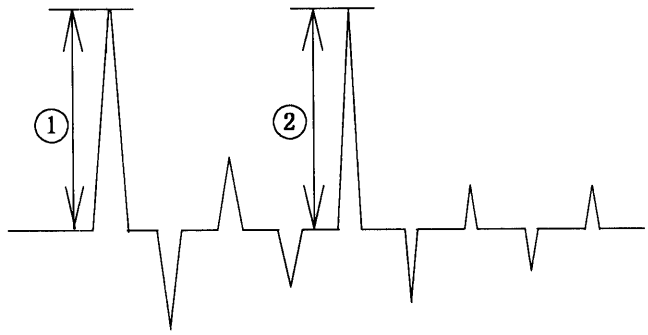
Ambient Temp. [℃]	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
	Operating Point [V]		
-20	14.6	14.6	14.6
-10	14.7	14.7	14.7
0	14.8	14.8	14.8
10	14.9	14.9	14.9
20	15.0	15.0	15.0
25	15.0	15.0	15.0
30	15.0	15.0	15.0
40	15.2	15.2	15.2
50	15.2	15.2	15.2
60	15.3	15.3	15.3
—	—	—	—

COSEL

Model	R50A-12		
Item	Inrush Current 突入電流	Temperature	25℃
		Testing Circuitry	Figure A
Object	――――――――		



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



BC－4018

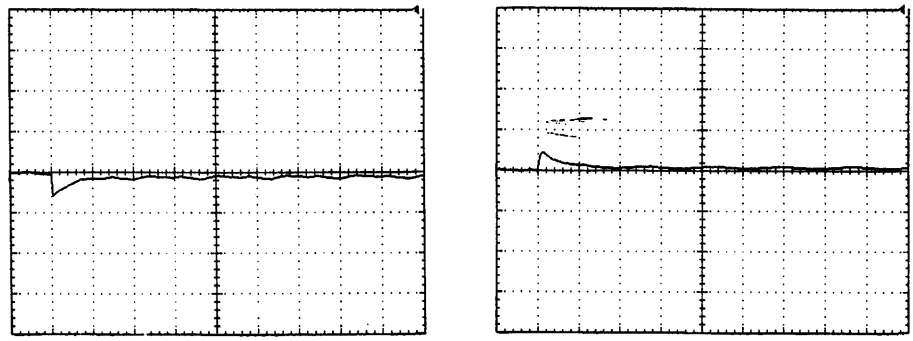
COSEL

Model	R50A-12		
Item	Dynamic Load Responce 動的負荷変動	Temperature Testing Circuitry	25℃ Figure A
Object	+12.0V4.20A		

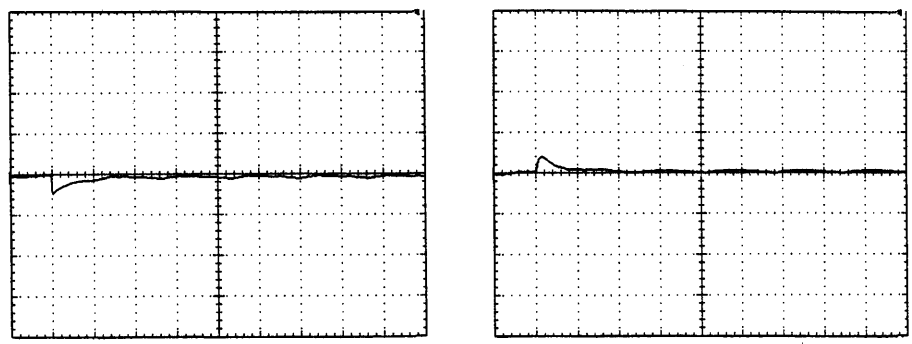
Input Volt. 100 V
Cycle 200 mS

Load Current

Min. Load ⟷
Load 100 %



Min. Load ⟷
Load 50 %



100 mV/div

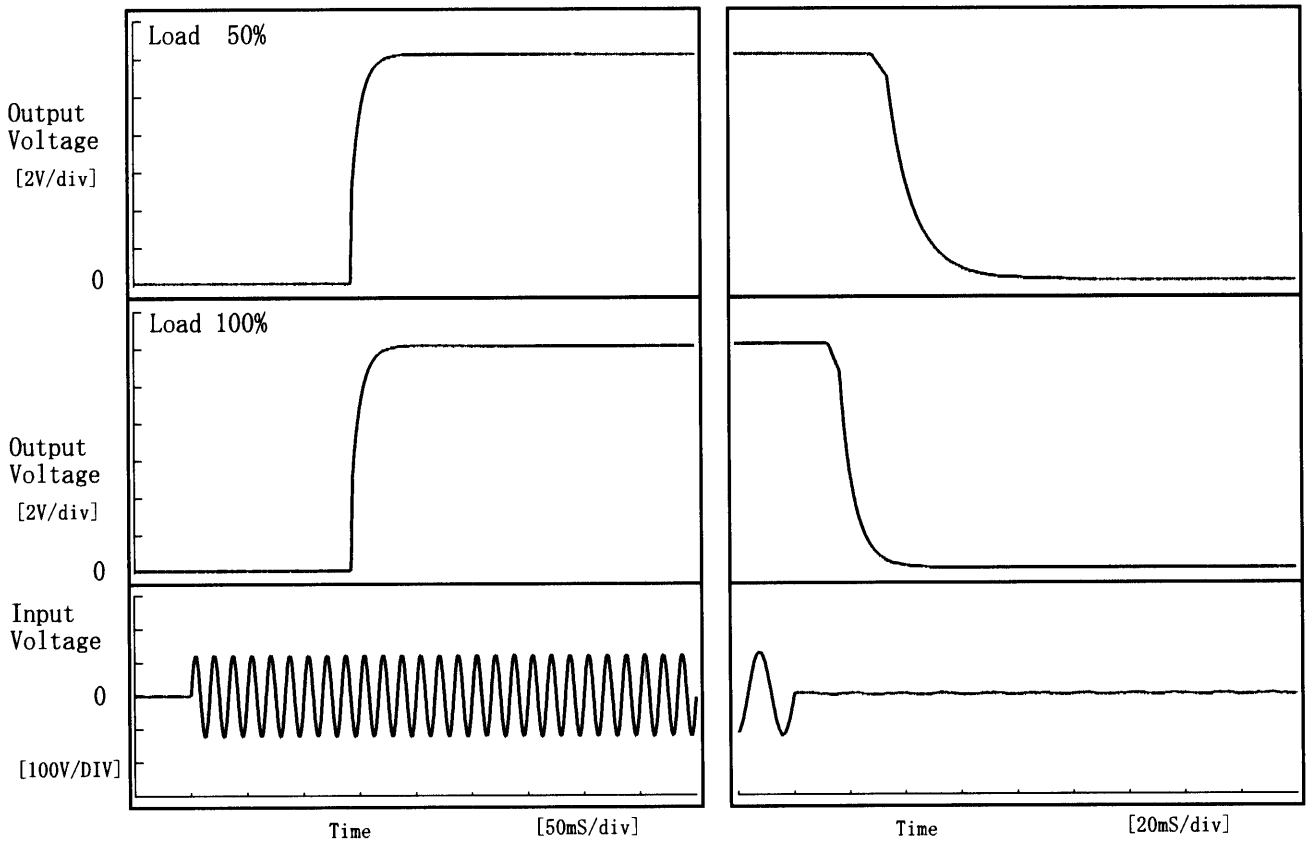
10 mS/div

COSEL

Model	R50A-12		
Item	Rise and Fall Time 立上り、立下り時間	Temperature	25℃
		Testing Circuitry	Figure A
Object	+12.0V4.20A		

1. Graph

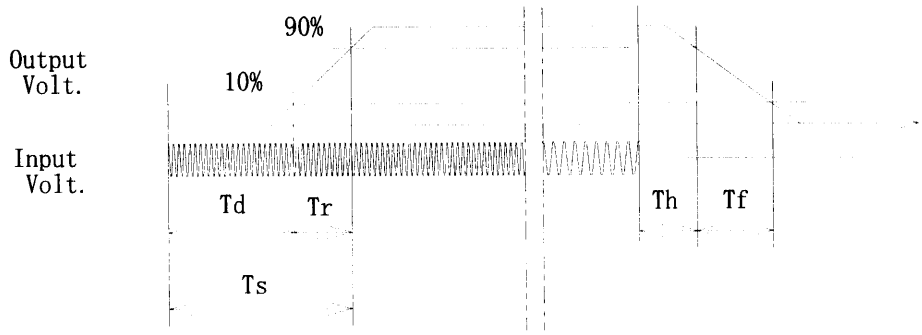
Input Volt. 85 V



2. Values

[mS]

Load \ Time	T d	T r	T s	T h	T f
50 %	143.0	15.8	158.8	34.7	21.6
100 %	142.8	16.0	158.8	16.5	12.2



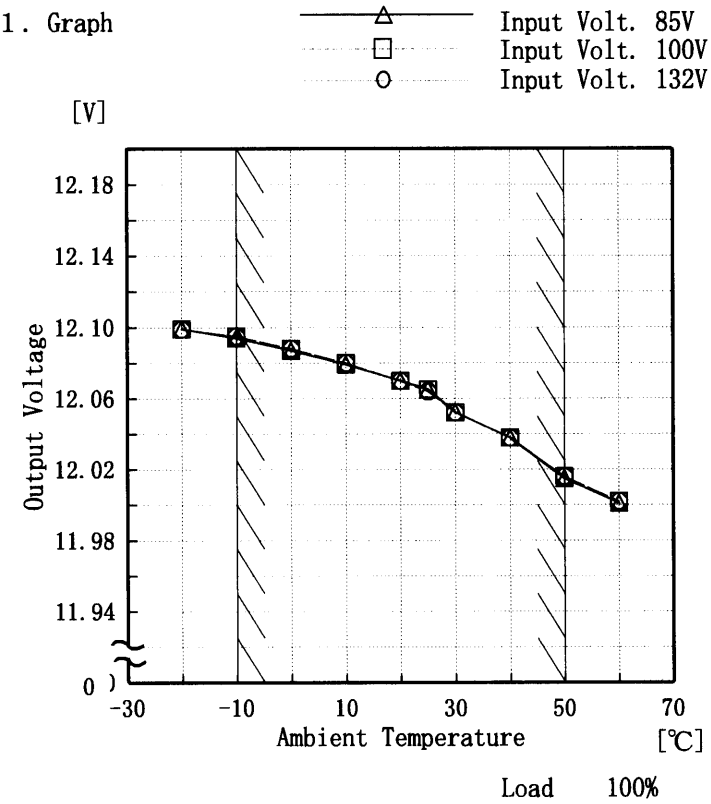
BC−4018

COSEL

Model	R50A-12
Item	Ambient Temperature Drift 周囲温度変動
Object	+12.0V4.20A

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. 85[V] Output Volt. [V]	Input Volt. 100[V] Output Volt. [V]	Input Volt. 132[V] Output Volt. [V]
-20	12.099	12.099	12.099
-10	12.094	12.095	12.095
0	12.087	12.088	12.088
10	12.079	12.080	12.080
20	12.070	12.070	12.070
25	12.065	12.065	12.064
30	12.052	12.052	12.052
40	12.038	12.038	12.038
50	12.015	12.016	12.016
60	12.001	12.002	12.002
—	—	—	—

COSEL

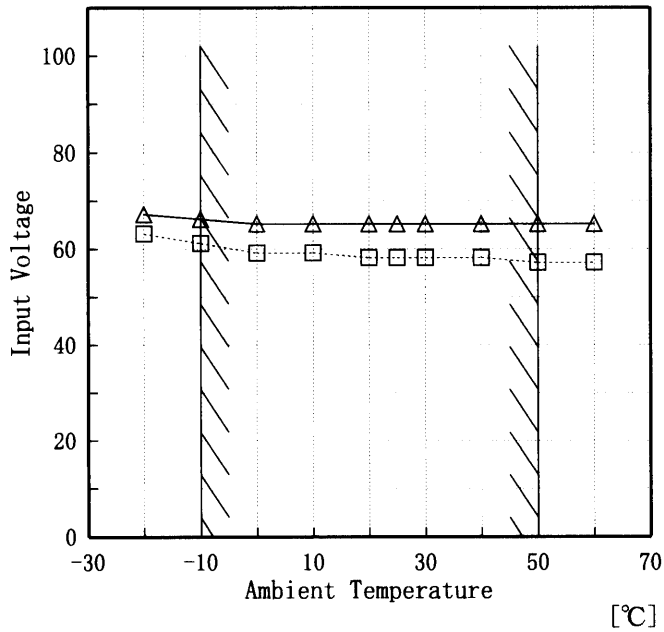
Model	R50A-12
Item	Minimum Input Voltage for Regulated Output Voltage 最低レギュレーション電圧
Object	+12.0V4.20A

Testing Circuitry Figure A

1. Graph

□ Load 50%

△ 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

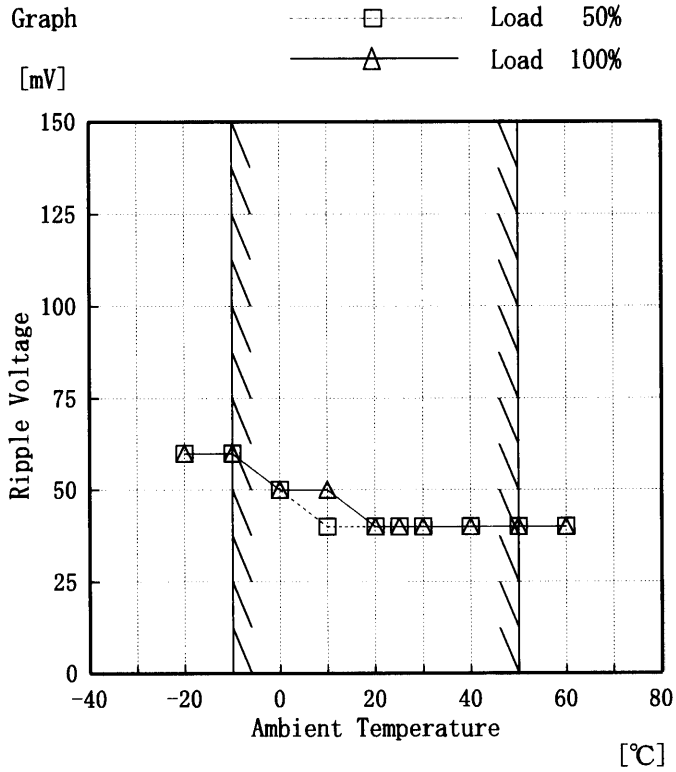
Ambient Temp. [℃]	Load 50% Input Volt. [V]	Load 100% Input Volt. [V]
-20	63	67
-10	61	66
0	59	65
10	59	65
20	58	65
25	58	65
30	58	65
40	58	65
50	57	65
60	57	65
—	—	—

COSEL

Model	R50A-12
Item	Ripple Voltage (by Ambient Temp.) リップル電圧 (周囲温度特性)
Object	+12.0V4.20A

Testing Circuitry Figure A

1. Graph



Input Volt. 85 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

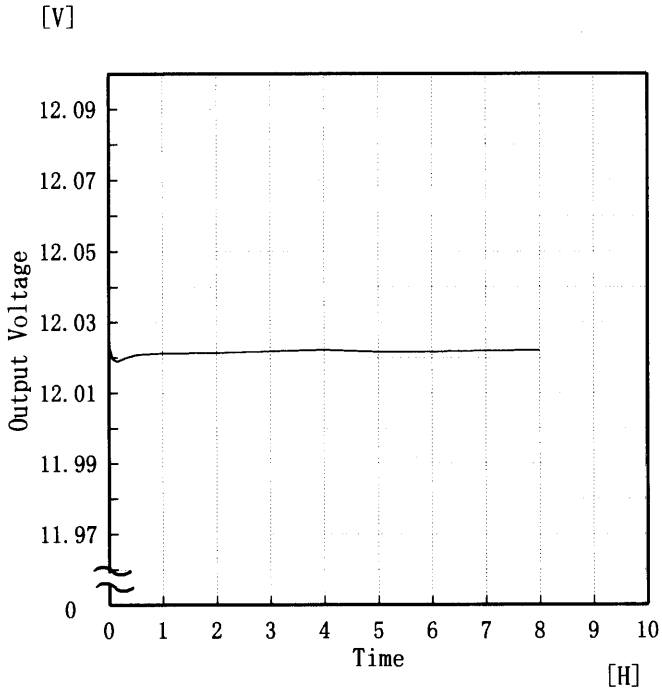
Ambient Temp. [℃]	Load 50% Ripple Output Volt. [mV]	Load 100% Ripple Output Volt. [mV]
-20	60	60
-10	60	60
0	50	50
10	40	50
20	40	40
25	40	40
30	40	40
40	40	40
50	40	40
60	40	40
—	—	—

COSEL

Model	R50A-12
Item	Time Lapse Drift 経時ドリフト
Object	+12.0V4.20A

Temperature 25 ℃
Testing Circuitry Figure A

1. Graph



Input Volt. 100V
Load 100%

2. Values

Time since start [H]	Output Voltage [V]
0.0	12.019
0.5	12.021
1.0	12.021
2.0	12.021
3.0	12.022
4.0	12.022
5.0	12.022
6.0	12.022
7.0	12.022
8.0	12.022

COSEL

Model	R50A-12	
Item	Output Voltage Accuracy　定電圧精度	Testing Circuitry　Figure A
Object	+12.0V4.20A	

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　: 0.00～4.20 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

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　0.00～4.20 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	132	0.00	12.172	±93	±0.8
Minimum Voltage	50	132	4.20	11.988		

COSEL

Model	R50A-12
Item	Condensation 結露特性
Object	+12.0V4.20A

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(Output Voltage,Ripple Voltage,Ripple noise) 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（出力電圧、ﾘｯﾌﾟﾙ、ﾘｯﾌﾟﾙﾉｲｽﾞ）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	12.085	40	50
	2	12.085	40	50
	3	12.083	40	50
Load 100 %	1	12.079	40	50
	2	12.078	40	50
	3	12.079	40	50

Input Volt. 100 V

COSEL

Model	R50A-12
Item	Leakage Current 漏洩電流
Object	+12.0V4.20A

Testing Circuitry Figure A

1. Results

Standards	Leakage Current [mA]		
	Input Volt. 85 [V]	Input Volt. 100 [V]	Input Volt. 132[V]
(A) DENTORI	0.20	0.24	0.31
(B) UL	0.20	0.24	0.30
(C) CSA	0.20	0.24	0.30

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	R50A-12
Item	Line Noise Tolerance 入力雑音耐量
Object	+12.0V4.20A

Testing Circuitry Figure A

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	15.4	no regulation
	NORMAL	15.5	no regulation
1000	COMMON	15.5	no regulation
	NORMAL	15.5	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	R50A-12	
Item	Conducted Emission 雑音端子電圧	Testing Circuitry Figure D
Object	+12V4.2A	

1. Graph

Remarks

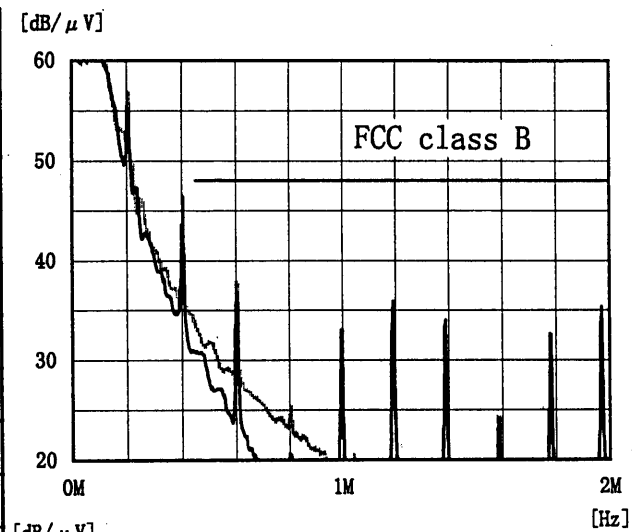
Input Volt. 120 V

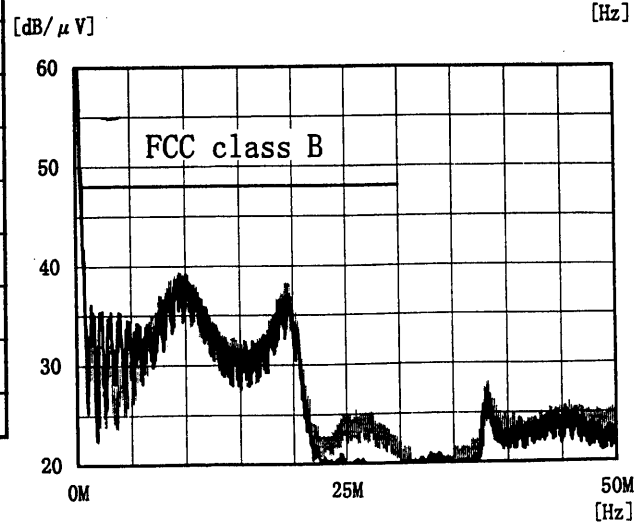
Load 100 %

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	CISPR22-A		0.01～0.15	91-69.5
			0.15～0.5	66
			0.5～30	60
6	CISPR22-B		0.01～0.05	110
			0.05～0.15	90-80
			0.15～0.5	66-56
			0.5～5	56
			5～30	60





COSEL

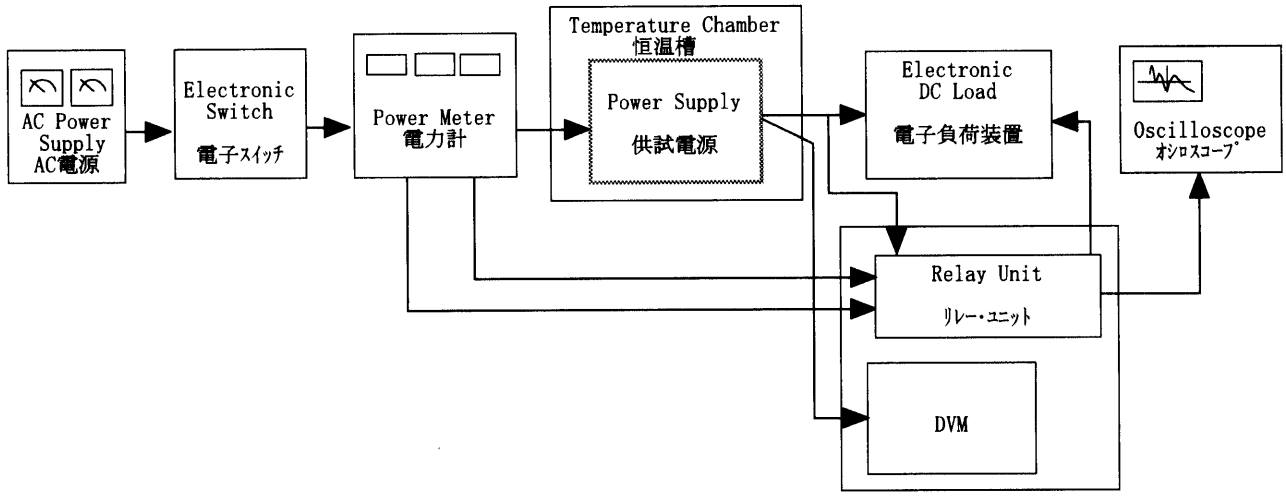


Figure A

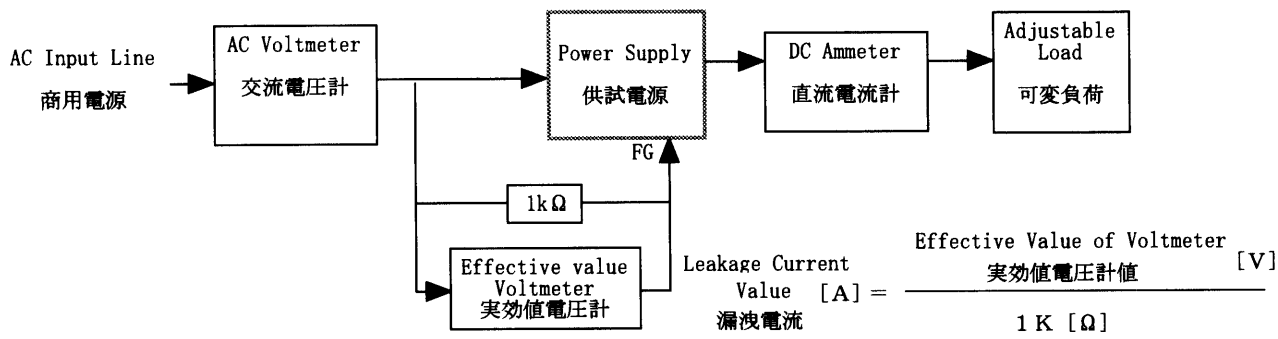


Figure B(DENTORI)

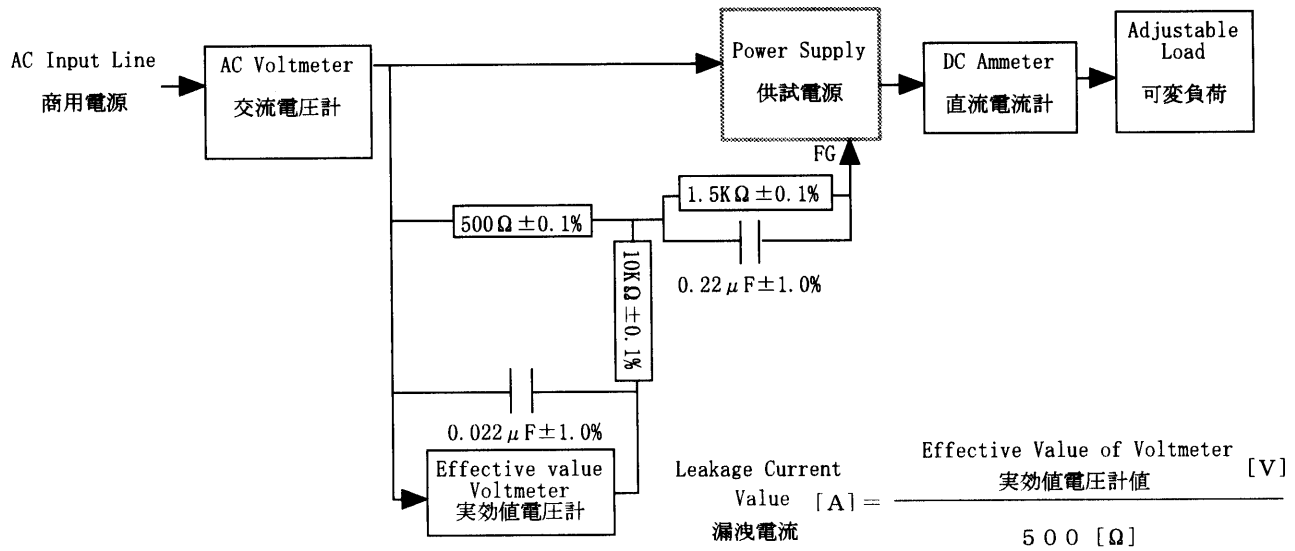


Figure B (UL, CSA, VDE)

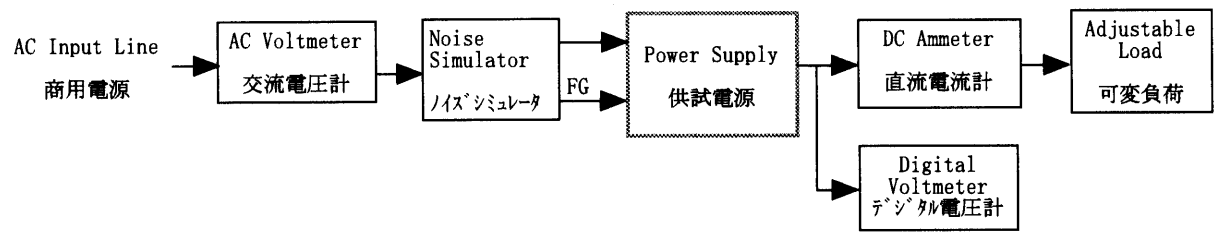


Figure C

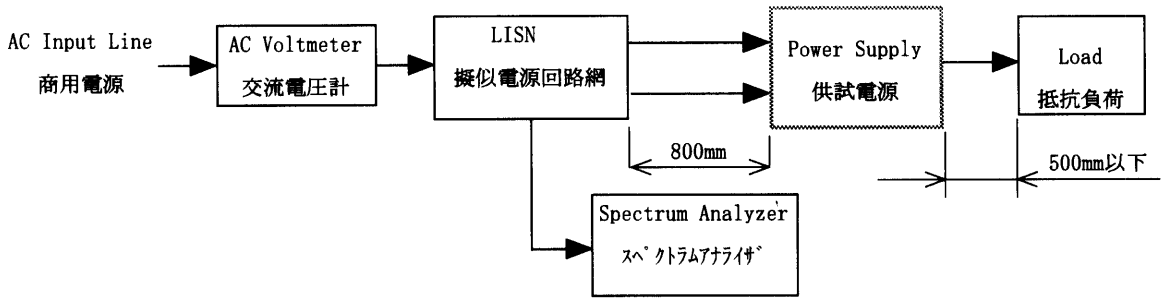


Figure D

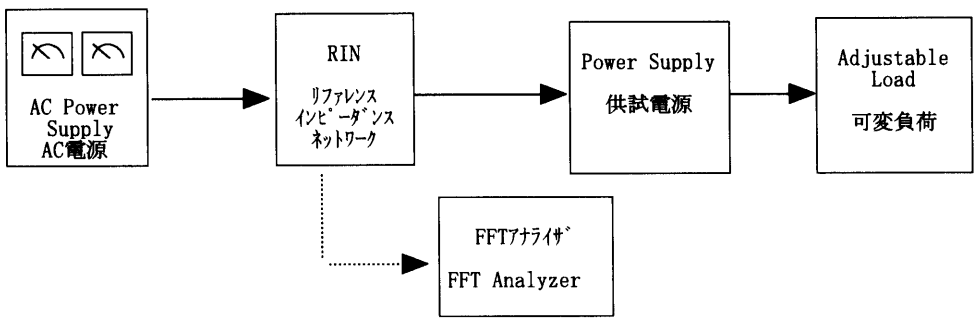


Figure E