



TEST DATA OF RMB30A-1 (100V INPUT)

Regulated DC Power Supply

Date : July 2, 1999

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Design Manager

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コーセル株式会社

COSEL CO., LTD.

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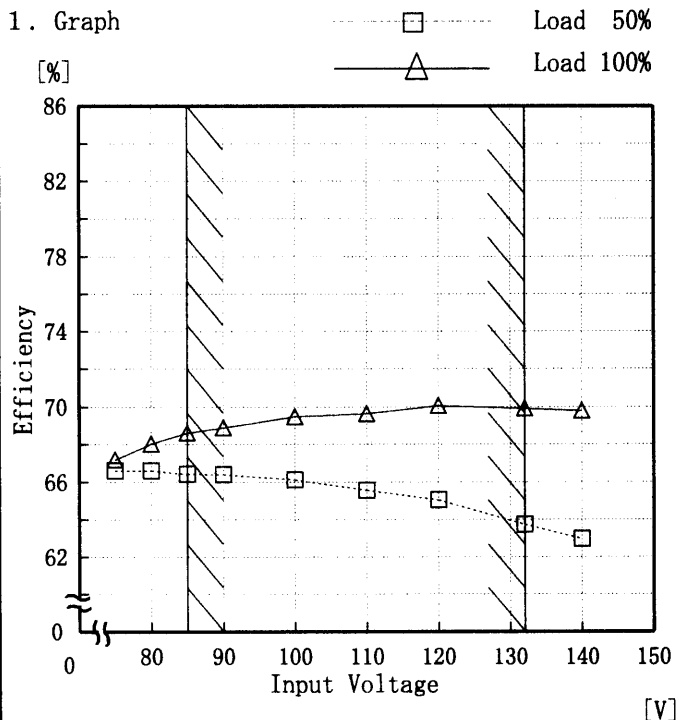


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Model	RMB30A-1
Item	Efficiency 効率
Object	_____

Temperature 25°C
Testing Circuitry Figure A



2. Values

Input Voltage [V]	Load 50%	Load 100%
	Efficiency [%]	Efficiency [%]
75	66.6	67.2
80	66.6	68.0
85	66.4	68.6
90	66.4	68.9
100	66.1	69.5
110	65.6	69.6
120	65.0	70.1
132	63.7	69.9
140	63.0	69.8

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

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Model		RMB30A-1	Temperature		25°C																																
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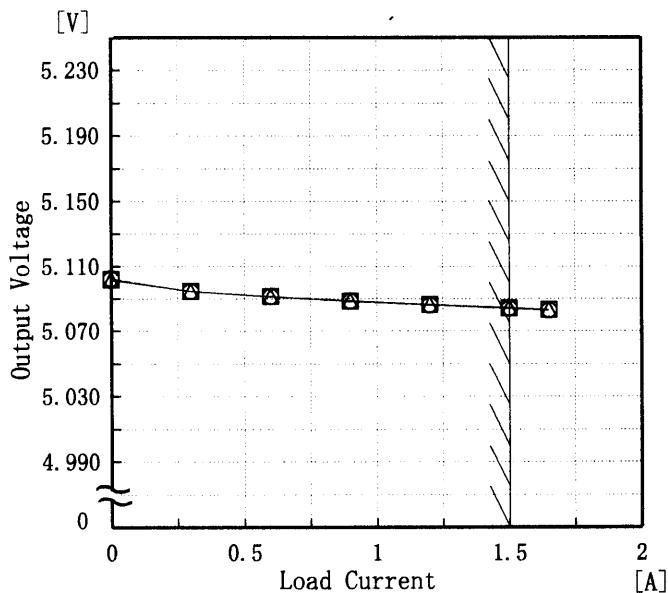


Model	RMB30A-1	Temperature	25°C
Item	Load Regulation 静的負荷変動	Testing Circuitry	Figure A

Object +5.0V1.5A

1. Graph

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



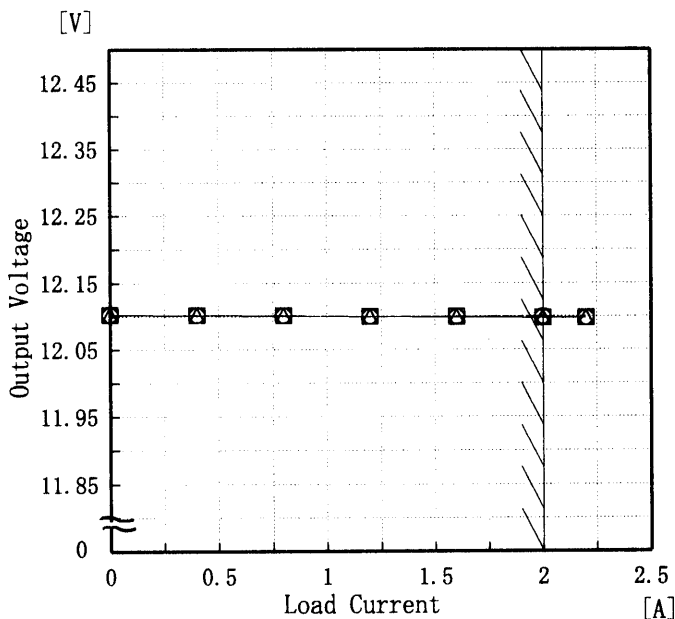
2. Values

Load Current [A]	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
	Output Volt. [V]	Output Volt. [V]	Output Volt. [V]
0.00	5.102	5.102	5.102
0.30	5.095	5.095	5.095
0.60	5.092	5.092	5.091
0.90	5.089	5.089	5.089
1.20	5.086	5.086	5.086
1.50	5.085	5.084	5.084
1.65	5.083	5.083	5.083
—	—	—	—
—	—	—	—
—	—	—	—

Object +12V2A

1. Graph

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



2. Values

Load Current [A]	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
	Output Volt. [V]	Output Volt. [V]	Output Volt. [V]
0.0	12.103	12.103	12.103
0.4	12.102	12.102	12.102
0.8	12.101	12.101	12.101
1.2	12.100	12.100	12.100
1.6	12.099	12.100	12.099
2.0	12.098	12.098	12.099
2.2	12.098	12.098	12.098
—	—	—	—
—	—	—	—
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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。



Model		RMB30A-1	Temperature		25°C																																						
Item		Ripple Voltage (by Load Current) リップル電圧(負荷電流特性)	Testing Circuitry		Figure A																																						
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1. Graph		<p>□ ----- Input Volt. 85V</p> <p>△ ----- Input Volt. 132V</p>	<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th>Input Volt. 85 [V]</th> <th>Input Volt. 132 [V]</th> </tr> <tr> <th>Ripple Output Volt. [mV]</th> <th>Ripple Output Volt. [mV]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>5</td><td>5</td></tr> <tr><td>0.3</td><td>10</td><td>5</td></tr> <tr><td>0.6</td><td>15</td><td>5</td></tr> <tr><td>0.9</td><td>15</td><td>10</td></tr> <tr><td>1.2</td><td>20</td><td>10</td></tr> <tr><td>1.5</td><td>20</td><td>10</td></tr> <tr><td>1.7</td><td>25</td><td>15</td></tr> <tr><td>—</td><td>—</td><td>—</td></tr> <tr><td>—</td><td>—</td><td>—</td></tr> <tr><td>—</td><td>—</td><td>—</td></tr> <tr><td>—</td><td>—</td><td>—</td></tr> </tbody> </table>			Load Current [A]	Input Volt. 85 [V]	Input Volt. 132 [V]	Ripple Output Volt. [mV]	Ripple Output Volt. [mV]	0.0	5	5	0.3	10	5	0.6	15	5	0.9	15	10	1.2	20	10	1.5	20	10	1.7	25	15	—	—	—	—	—	—	—	—	—	—	—	—
Load Current [A]	Input Volt. 85 [V]	Input Volt. 132 [V]																																									
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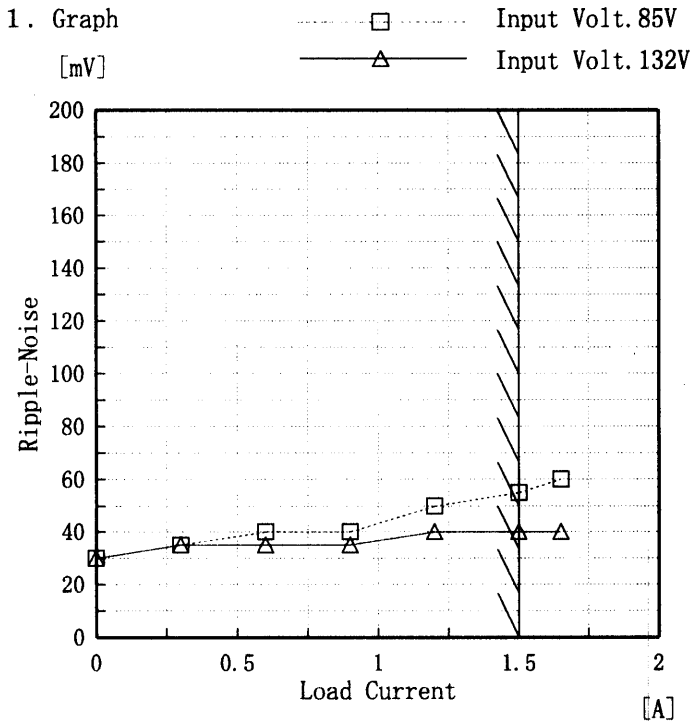


Model		RMB30A-1	Temperature		25°C																																						
Item		Ripple Voltage (by Load Current) リップル電圧(負荷電流特性)	Testing Circuitry		Figure A																																						
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Load Current [A]	Input Volt. 85 [V]	Input Volt. 132 [V]																																									
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Model	RMB30A-1	Temperature	25°C
Item	Ripple-Noise リップルノイズ	Testing Circuitry	Figure A

Object +5.0V 1.50A



2. Values

Load current [A]	Input Volt. 85 [V]	Input Volt. 132 [V]
	Ripple-Noise [mV]	Ripple-Noise [mV]
0.0	30	30
0.3	35	35
0.6	40	35
0.9	40	35
1.2	50	40
1.5	55	40
1.7	60	40
—	—	—
—	—	—
—	—	—
—	—	—

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
 スイッチング周期

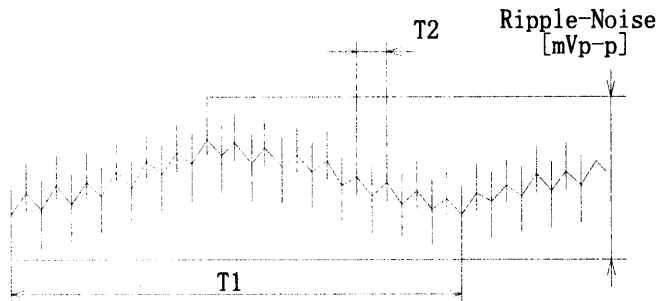


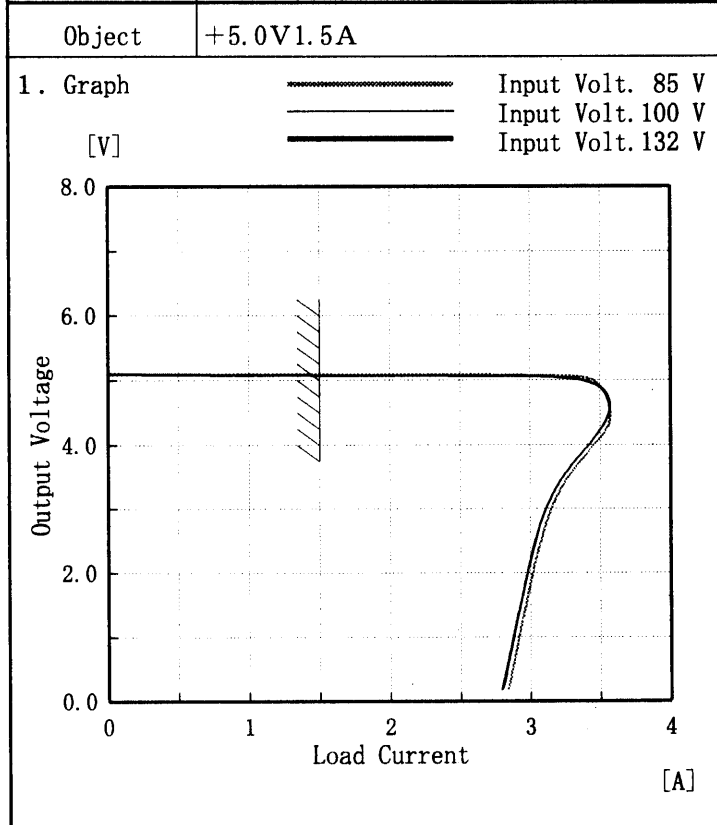
Fig. Complex Ripple Wave Form
 図 リップル波形詳細図



Model		RMB30A-1	Temperature	25°C																																						
Item		Ripple-Noise リップルノイズ	Testing Circuitry	Figure A																																						
Object		+12.0V2.00A																																								
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Load current [A]	Ripple-Noise [mV]																																									
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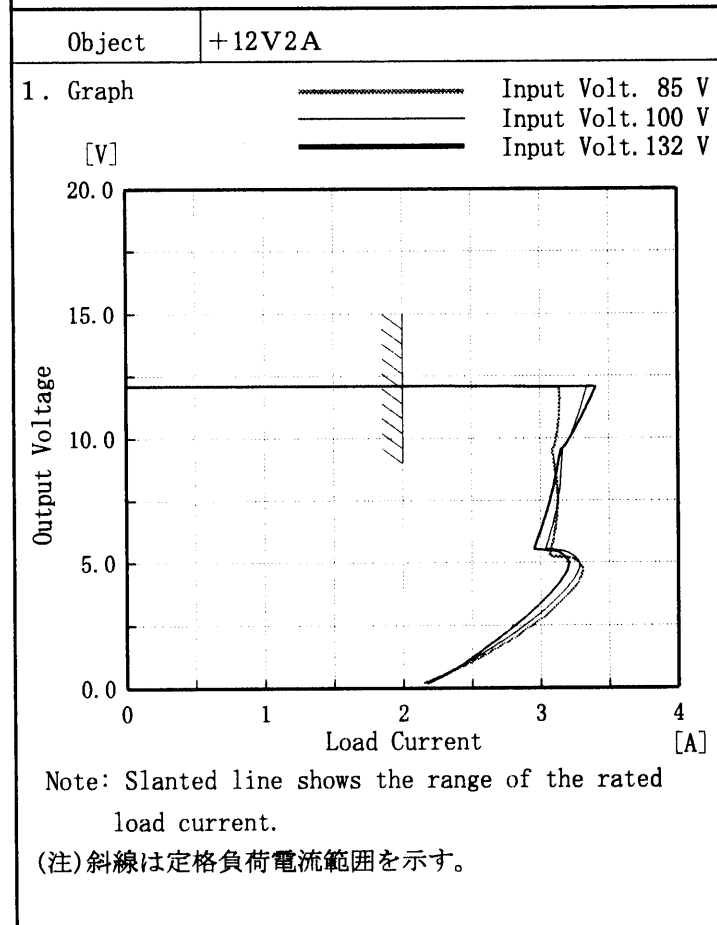


Model	RMB30A-1	Temperature	25°C
Item	Overcurrent Protection 過電流保護	Testing Circuitry	Figure A



2. Values

Output Voltage [V]	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
	Load Current [A]	Load Current [A]	Load Current [A]
5.00	3.463	3.445	3.406
4.75	3.547	3.545	3.553
4.50	3.571	3.554	3.558
4.00	3.453	3.400	3.400
3.50	3.260	3.229	3.229
3.00	3.142	3.101	3.099
2.50	3.074	3.037	3.031
2.00	3.015	2.980	2.975
1.50	2.964	2.926	2.923
1.00	2.913	2.877	2.870
0.50	2.866	2.831	2.821
0.00	2.833	2.795	2.788



2. Values

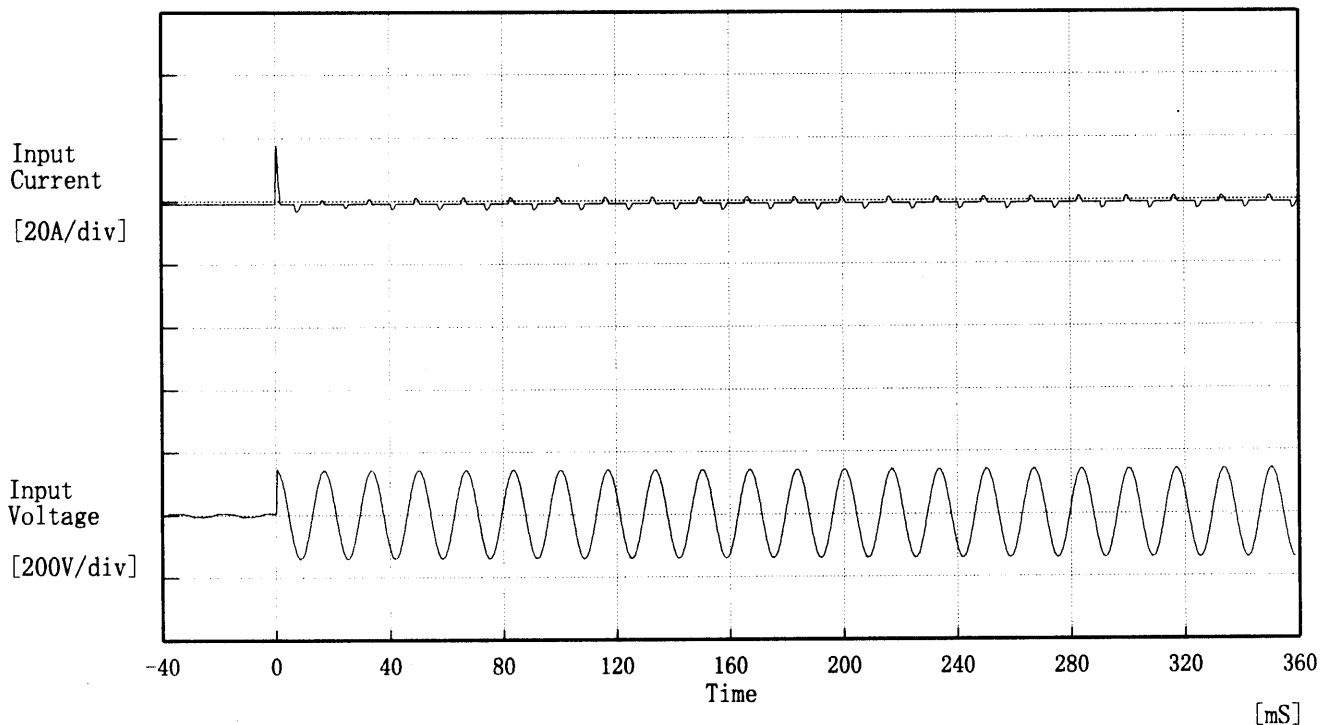
Output Voltage [V]	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
	Load Current [A]	Load Current [A]	Load Current [A]
12.00	3.14	3.33	3.40
11.40	3.14	3.30	3.35
10.80	3.14	3.26	3.29
9.60	3.09	3.16	3.15
8.40	3.12	3.15	3.11
7.20	3.12	3.11	3.05
6.00	3.09	3.05	2.97
4.80	3.31	3.28	3.20
3.60	3.17	3.11	3.02
2.40	2.90	2.84	2.77
1.20	2.54	2.51	2.49
0.00	2.13	2.13	2.16



Model		RMB30A-1		Testing Circuitry Figure A																																																		
Item		Overvoltage Protection 過電圧保護																																																				
Object		+5.0V1.5A		2. Values																																																		
1. Graph		<div style="display: flex; justify-content: space-around;"> —△— Input Volt. 85 V —□— Input Volt. 100 V —○— Input Volt. 132 V </div>																																																				
<div style="display: flex;"> <div style="flex: 1;"> <p>[V]</p> <p style="text-align: center;">Ambient Temperature [°C]</p> </div> <div style="flex: 1; padding-left: 20px;"> <p style="text-align: center;">Load 0%</p> <p>Note: Slanted line shows the range of the rated ambient temperature.</p> <p>(注) 斜線は定格周囲温度範囲を示す。</p> </div> </div>		<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">Ambient Temp. [°C]</th> <th>Input Volt. 85[V]</th> <th>Input Volt. 100[V]</th> <th>Input Volt. 132[V]</th> </tr> <tr> <th colspan="3">Operating Point [V]</th> </tr> </thead> <tbody> <tr><td>-20</td><td>6.40</td><td>6.40</td><td>6.40</td></tr> <tr><td>-10</td><td>6.40</td><td>6.40</td><td>6.40</td></tr> <tr><td>0</td><td>6.40</td><td>6.40</td><td>6.40</td></tr> <tr><td>10</td><td>6.40</td><td>6.40</td><td>6.40</td></tr> <tr><td>20</td><td>6.33</td><td>6.33</td><td>6.33</td></tr> <tr><td>25</td><td>6.33</td><td>6.33</td><td>6.33</td></tr> <tr><td>30</td><td>6.33</td><td>6.33</td><td>6.33</td></tr> <tr><td>40</td><td>6.33</td><td>6.33</td><td>6.33</td></tr> <tr><td>50</td><td>6.33</td><td>6.33</td><td>6.33</td></tr> <tr><td>60</td><td>6.33</td><td>6.33</td><td>6.33</td></tr> <tr><td>—</td><td>—</td><td>—</td><td>—</td></tr> </tbody> </table>		Ambient Temp. [°C]	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]	Operating Point [V]			-20	6.40	6.40	6.40	-10	6.40	6.40	6.40	0	6.40	6.40	6.40	10	6.40	6.40	6.40	20	6.33	6.33	6.33	25	6.33	6.33	6.33	30	6.33	6.33	6.33	40	6.33	6.33	6.33	50	6.33	6.33	6.33	60	6.33	6.33	6.33	—	—	—	—
Ambient Temp. [°C]	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]																																																			
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Model		RMB30A-1	Temperature 25°C Testing Circuitry Figure A
Item		Inrush Current 突入電流	
Object		_____	



Input Voltage 100 V

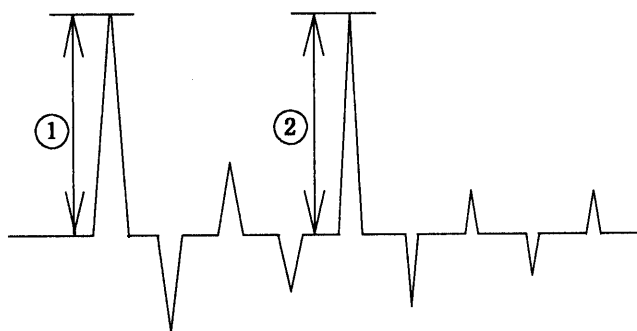
Frequency 60 Hz

Load 100 %

Inrush Current

① 17.68 [A]

② 2.83 [A]



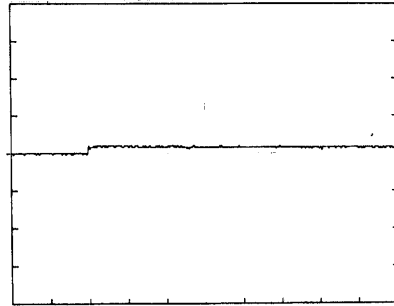
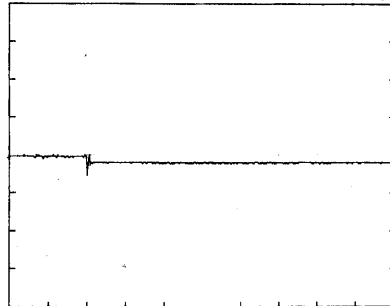


Model		RMB30A-1	Temperature 25°C Testing Circuitry Figure A
Item		Dynamic Load Responce 動的負荷変動	
Object		+5.0V 1.50A	

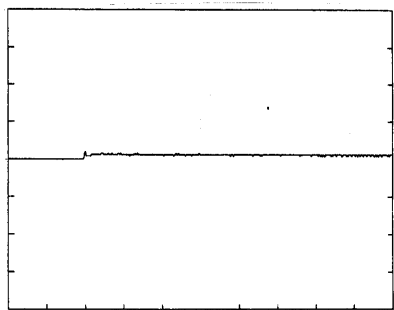
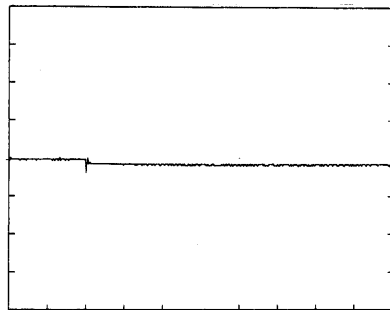
Input Volt. 100 V
Cycle 200 mS



Load 0% ←→
Load 100 %



Load 0% ←→
Load 50 %



100 mV/div

10 mS/div

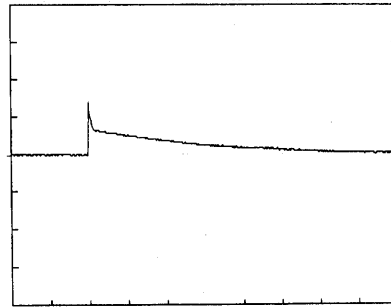
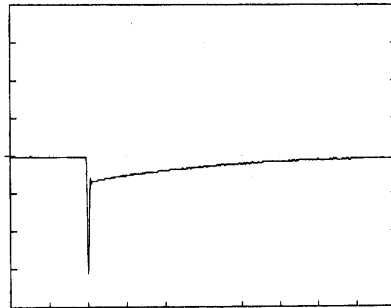


Model		RMB30A-1	Temperature 25°C Testing Circuitry Figure A
Item		Dynamic Load Responce 動的負荷変動	
Object		+12.0V2.00A	

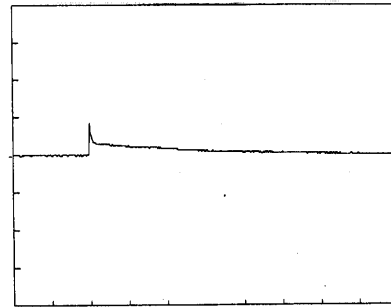
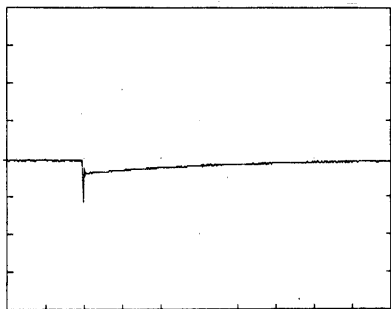
Input Volt. 100 V
Cycle 200 mS



Load 0% ←→
Load 100 %



Load 0% ←→
Load 50 %



100 mV/div

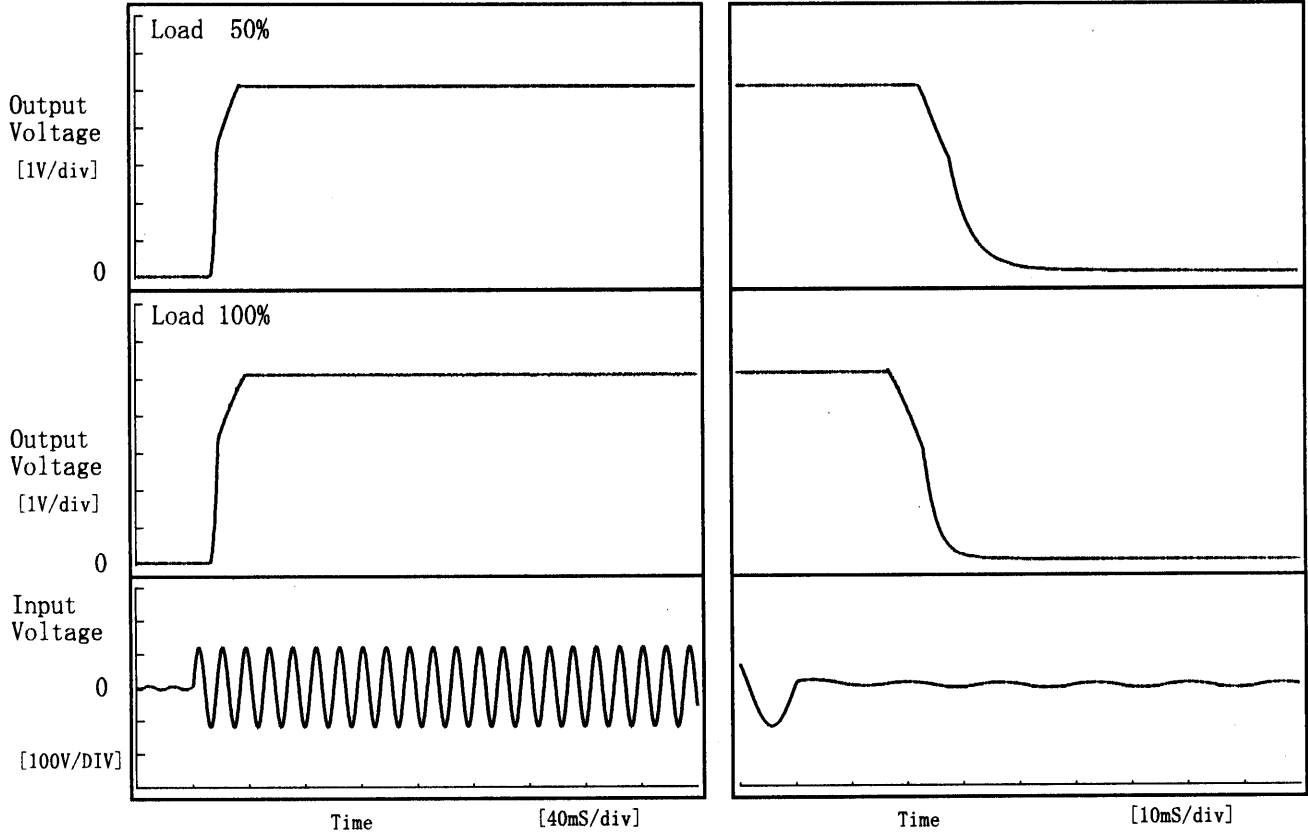
10 mS/div



Model	RMB30A-1	Temperature	25°C
Item	Rise and Fall Time 立上り、立下り時間	Testing Circuitry	Figure A
Object	+5.0V1.50A		

1. Graph

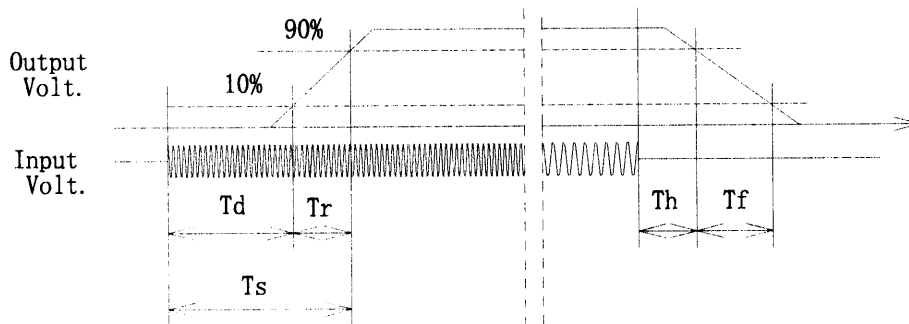
Input Volt. 85 V



2. Values

[mS]

Load \ Time	T d	T r	T s	T h	T f
50 %	14.4	12.4	26.8	24.1	11.8
100 %	14.4	15.6	30.0	19.1	8.4

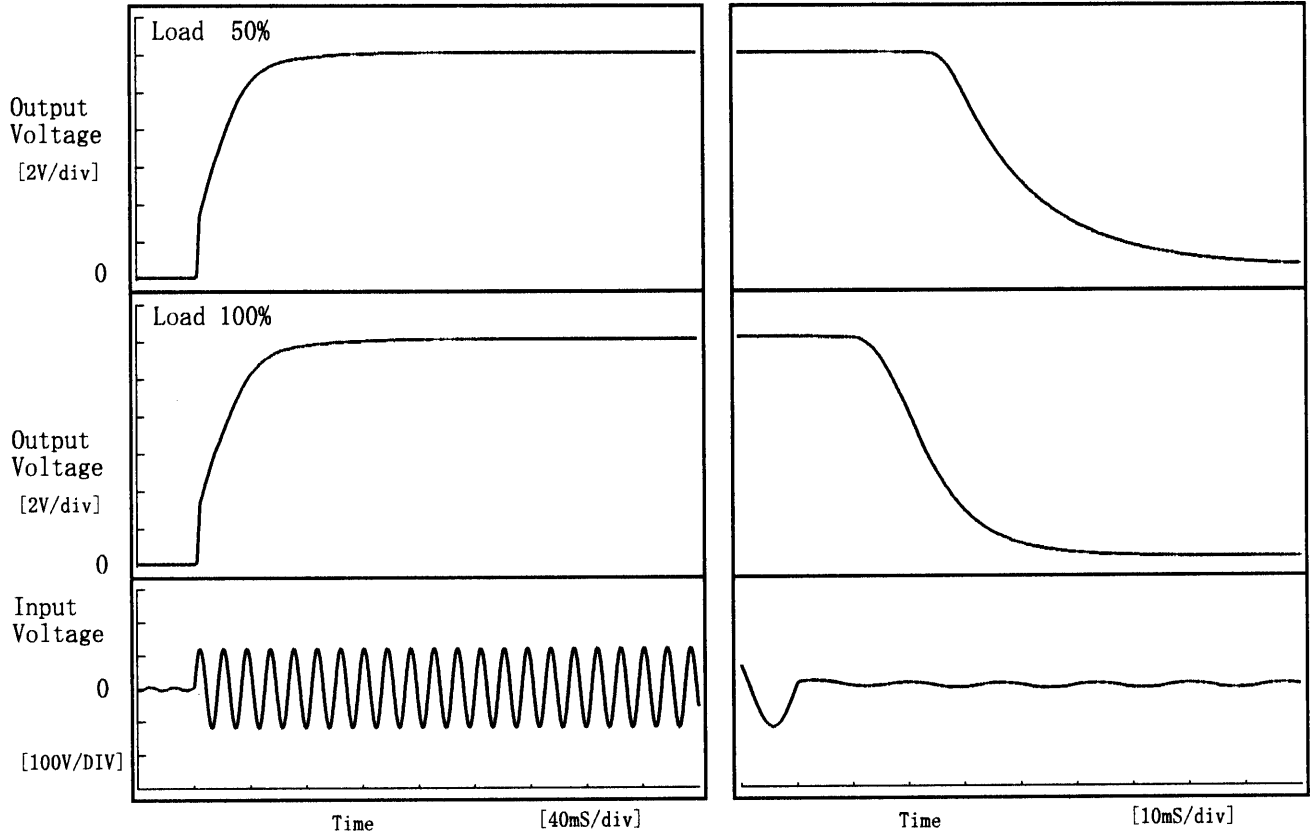


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Model	RMB30A-1	Temperature	25°C
Item	Rise and Fall Time 立上り、立下り時間	Testing Circuitry	Figure A
Object	+12.0V2.00A		

1. Graph

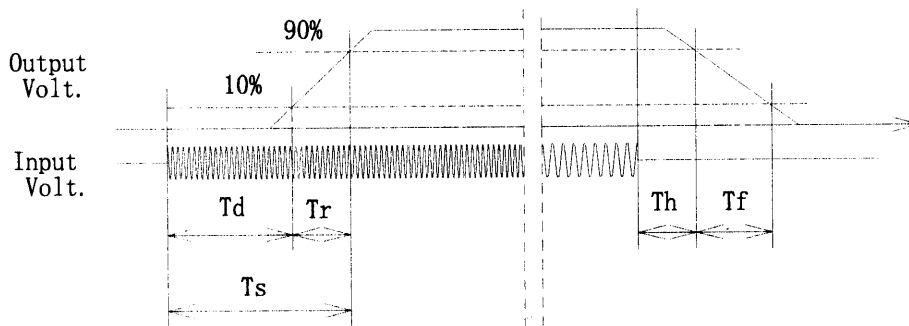
Input Volt. 85 V

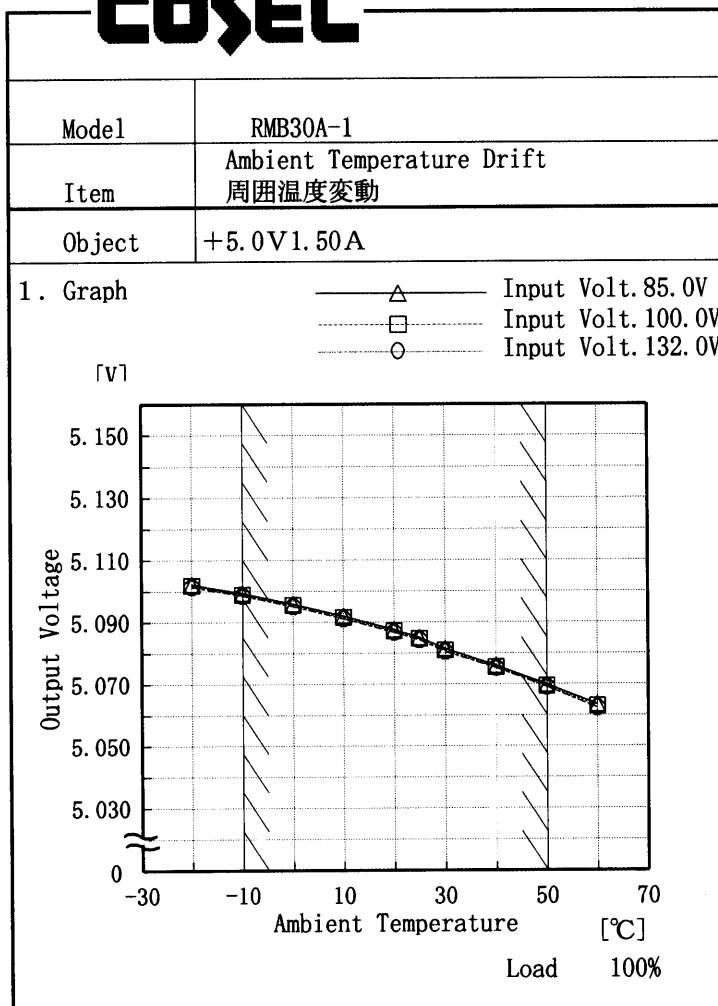


2. Values

[mS]

Load \ Time	T d	T r	T s	T h	T f
50 %	3.0	41.8	44.8	28.6	40.3
100 %	3.0	45.4	48.4	15.6	23.0

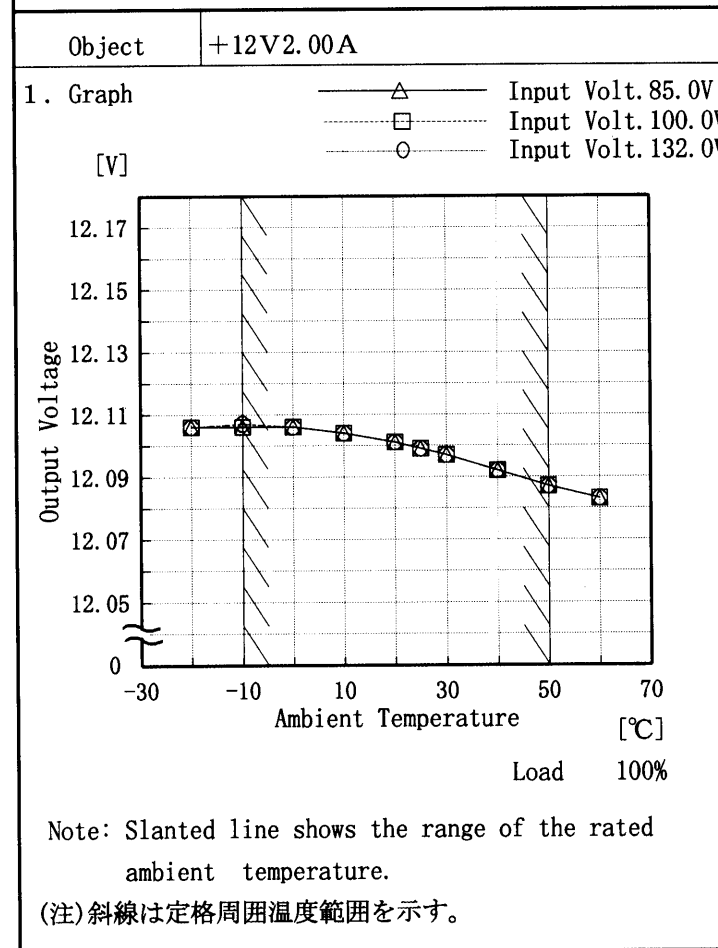




Testing Circuitry Figure A

2. Values

Temperature [°C]	Input Volt. 85.0[V]	Input Volt. 100.0[V]	Input Volt. 132.0[V]
	Output Volt. [V]	Output Volt. [V]	Output Volt. [V]
-20	5.102	5.102	5.101
-10	5.099	5.099	5.099
0	5.096	5.096	5.095
10	5.092	5.092	5.091
20	5.088	5.087	5.087
25	5.085	5.085	5.084
30	5.081	5.081	5.081
40	5.076	5.076	5.075
50	5.070	5.069	5.069
60	5.063	5.063	5.062
-	-	-	-



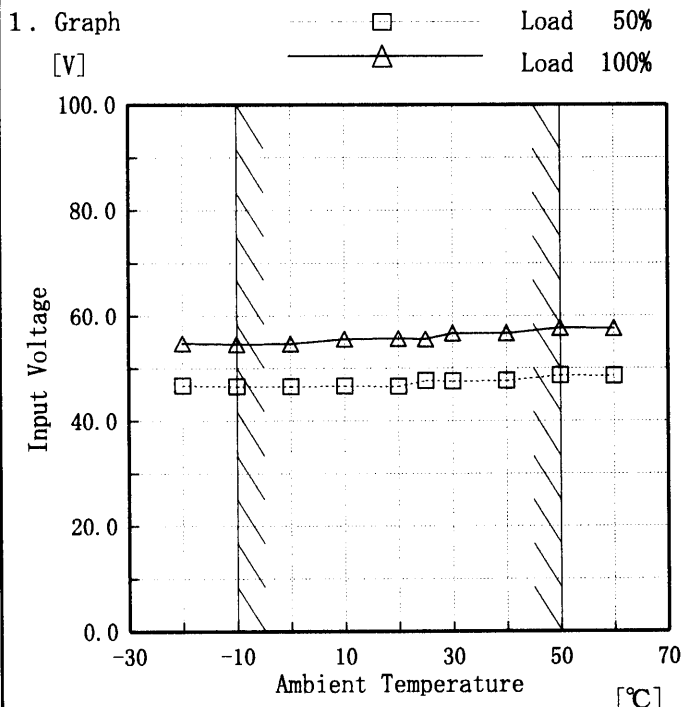
2. Values

Temperature [°C]	Input Volt. 85.0[V]	Input Volt. 100.0[V]	Input Volt. 132.0[V]
	Output Volt. [V]	Output Volt. [V]	Output Volt. [V]
-20	12.106	12.106	12.106
-10	12.106	12.106	12.107
0	12.106	12.106	12.106
10	12.104	12.104	12.104
20	12.101	12.101	12.101
25	12.099	12.099	12.099
30	12.097	12.097	12.097
40	12.092	12.092	12.092
50	12.087	12.087	12.087
60	12.083	12.083	12.083
-	-	-	-



Model	RMB30A-1
Item	Minimum Input Voltage for Regulated Output Voltage 最低レギュレーション電圧
Object	+5.0V1.5A

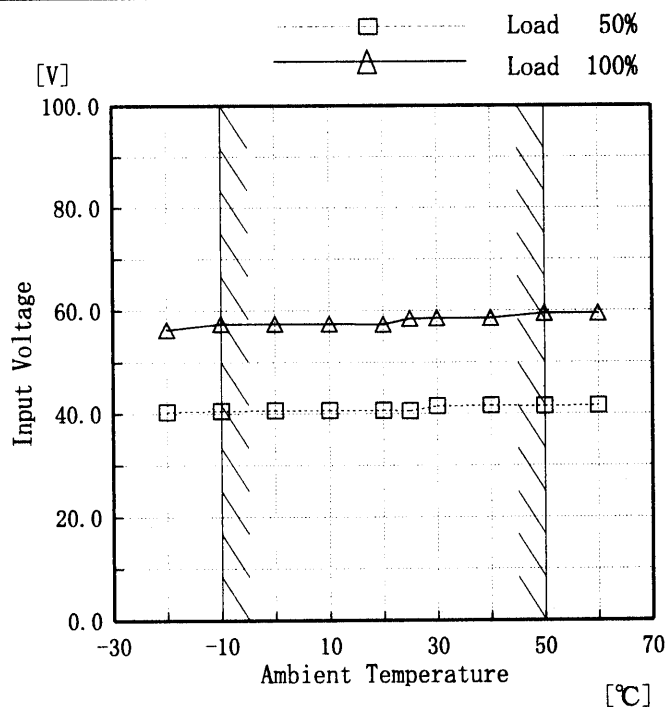
Testing Circuitry Figure A



2. Values

Ambient Temp. [°C]	Load 50%	Load 100%
	Input Volt. [V]	Input Volt. [V]
-20	46.7	54.7
-10	46.5	54.5
0	46.5	54.6
10	46.6	55.5
20	46.5	55.6
25	47.6	55.5
30	47.5	56.6
40	47.6	56.6
50	48.6	57.6
60	48.5	57.5
—	—	—

Object +12V2.00A

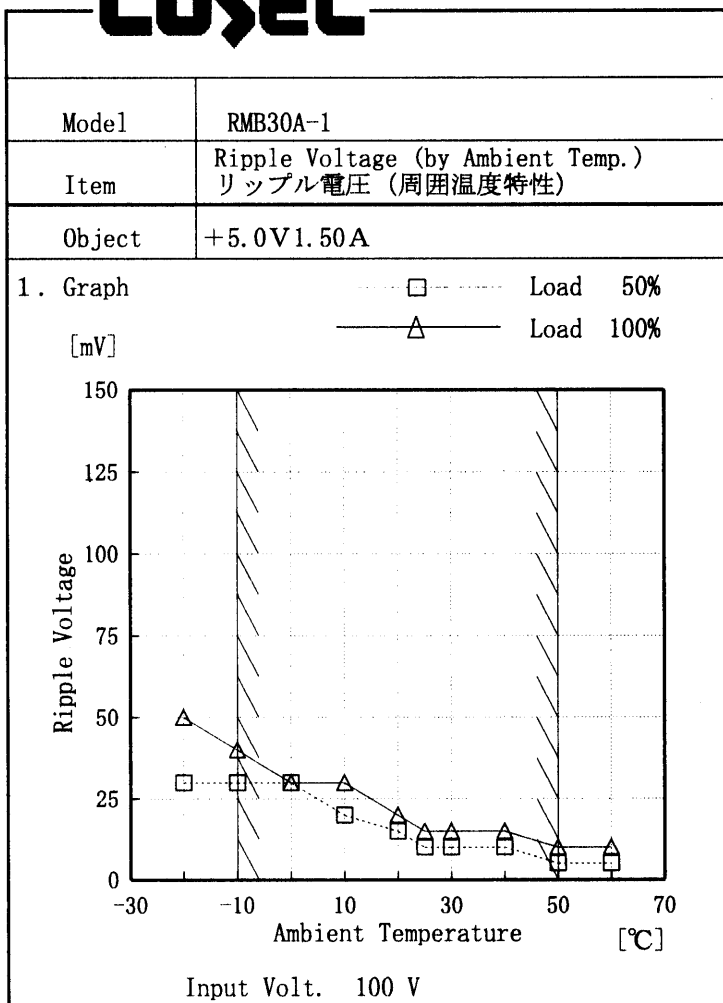


2. Values

Ambient Temp. [°C]	Load 50%	Load 100%
	Input Volt. [V]	Input Volt. [V]
-20	40.4	56.4
-10	40.5	57.5
0	40.6	57.5
10	40.6	57.5
20	40.6	57.4
25	40.5	58.5
30	41.5	58.6
40	41.6	58.6
50	41.5	59.5
60	41.6	59.5
—	—	—

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

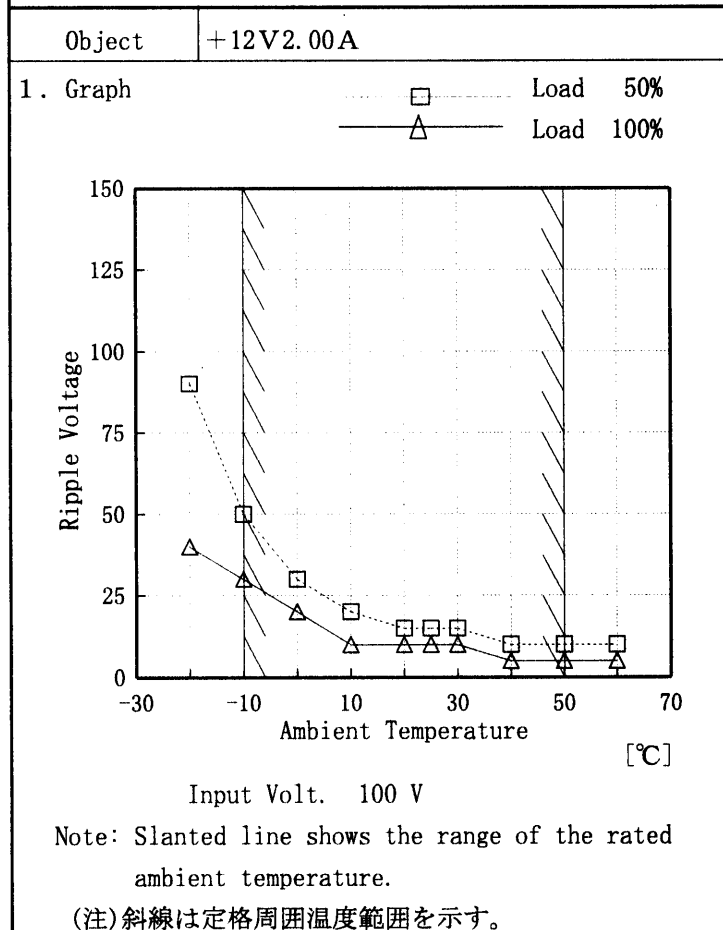
(注)斜線は定格周囲温度範囲を示す。



Testing Circuitry Figure A

2. Values

Ambient Temp. [°C]	Load 50%	Load 100%
	Ripple Output Volt. [mV]	Ripple Output Volt. [mV]
-20	30	50
-10	30	40
0	30	30
10	20	30
20	15	20
25	10	15
30	10	15
40	10	15
50	5	10
60	5	10
—	—	—



2. Values

Ambient Temp. [°C]	Load 50%	Load 100%
	Ripple Output Volt. [mV]	Ripple Output Volt. [mV]
-20	40	90
-10	30	50
0	20	30
10	10	20
20	10	15
25	10	15
30	10	15
40	5	10
50	5	10
60	5	10
—	—	—



Model	RMB30A-1	Temperature	25 °C
Item	Time Lapse Drift 経時ドリフト	Testing Circuitry	Figure A

Object +5.0V1.50A

1. Graph

Input Volt. 100V
Load 100%

2. Values

Time since start [H]	Output Voltage [V]
0.0	5.088
0.5	5.081
1.0	5.081
2.0	5.081
3.0	5.081
4.0	5.081
5.0	5.081
6.0	5.081
7.0	5.081
8.0	5.081

Object +12V2.00A

1. Graph

Input Volt. 100V
Load 100%

2. Values

Time since start [H]	Output Voltage [V]
0.0	12.106
0.5	12.104
1.0	12.104
2.0	12.104
3.0	12.104
4.0	12.104
5.0	12.104
6.0	12.104
7.0	12.104
8.0	12.104



Model		RMB30A-1	Testing Circuitry Figure A
Item		Output Voltage Accuracy 定電圧精度	

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 °C

Input Voltage : 85~132 V

Load Current (AVR 1) : 0~1.5 A

(AVR 2) : 0~2 A

* Output Voltage Accuracy = $\pm(\text{Maximum of Output Voltage} - \text{Minimum of Output Voltage}) / 2$

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

定電圧精度

周囲温度、入力電圧、負荷電流を下記仕様内で、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 °C

入力電圧 85~132 V

負荷電流 (AVR 1) 0~1.5 A

(AVR 2) 0~2 A

* 定電圧精度(変動値) = $\pm(\text{出力電圧の最高値} - \text{出力電圧の最低値}) / 2$

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

Object +5.0V1.5A

Item	Temperature [°C]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy (Ration) [%]
Maximum Voltage	-10	132	0.0	5.115	±24	±0.5
Minimum Voltage	50	132	1.5	5.068		

Object +12.0V2.0A

Item	Temperature [°C]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy (Ration) [%]
Maximum Voltage	-10	85	0	12.111	±12	±0.1
Minimum Voltage	50	100	2	12.087		



Model		RMB30A-1	Testing Circuitry Figure A
Item		Condensation 結露特性	
Object		+5.0V1.5A	

1. Condensation test

Testing procedure is as follows.

- ① Keeping and cooling the unit in a tank at -10°C 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°C and the humidity is 40%RH.
- ③ Testing electrical characteristics of the unit to confirm there be no fault.

1. 結露特性試験

入力を切った状態で、恒温槽で-10°C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°C、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行い、異常のないことを確認する。

2. Values

Item	Data	Testing Conditions
Output Voltage [V]	5.082	Input Volt. : 100V, Load Current:1.5A
Line Regulation [mV]	1	Input Volt. : 85~132V, Load Current:1.5A
Load Regulation [mV]	18	Input Volt. : 100V, Load Current:0.0~1.5A

COSEL

Model		RMB30A-1	Testing Circuitry Figure A												
Item		Condensation 結露特性													
Object		+12.0V2A													
<p>1. Condensation test</p> <p>Testing procedure is as follows.</p> <p>① Keeping and cooling the unit in a tank at -10°C for an hour with the input off.</p> <p>② Taking it out of the tank and dewing itself in a room where the temperature is 25°C and the humidity is 40%RH.</p> <p>③ Testing electrical characteristics of the unit to confirm there be no fault.</p> <p>1. 結露特性試験</p> <p>入力を切った状態で、恒温槽で-10°C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°C、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行い、異常のないことを確認する。</p>															
<p>2. Values</p> <table border="1"> <thead> <tr> <th>Item</th> <th>Data</th> <th>Testing Conditions</th> </tr> </thead> <tbody> <tr> <td>Output Voltage [V]</td> <td>12.98</td> <td>Input Volt.: 100V, Load Current:2A</td> </tr> <tr> <td>Line Regulation [mV]</td> <td>1</td> <td>Input Volt.: 85~132V, Load Current:2A</td> </tr> <tr> <td>Load Regulation [mV]</td> <td>5</td> <td>Input Volt.: 100V, Load Current:0~2A</td> </tr> </tbody> </table>				Item	Data	Testing Conditions	Output Voltage [V]	12.98	Input Volt.: 100V, Load Current:2A	Line Regulation [mV]	1	Input Volt.: 85~132V, Load Current:2A	Load Regulation [mV]	5	Input Volt.: 100V, Load Current:0~2A
Item	Data	Testing Conditions													
Output Voltage [V]	12.98	Input Volt.: 100V, Load Current:2A													
Line Regulation [mV]	1	Input Volt.: 85~132V, Load Current:2A													
Load Regulation [mV]	5	Input Volt.: 100V, Load Current:0~2A													



Model		RMB30A-1	Temperature 25°C Testing Circuitry Figure A
Item		Leakage Current 漏洩電流	
Object		_____	

1. Results

Standards	Leakage Current [mA]		
	Input Volt. 85 [V]	Input Volt. 100 [V]	Input Volt. 132 [V]
(A) DENTORI	0.18	0.22	0.29
(B) IEC60950	0.18	0.22	0.30

2. Condition

Leakage current value is concluded after measuring both phases of AC input and by choosing the larger one.

交流入力 of 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。

Standards	Leakage Current [mA]		
	Input Volt. 170 [V]	Input Volt. 230 [V]	Input Volt. 264 [V]
(B) IEC60950	—	—	—

Model	RMB30A-1
Item	Conducted Emission 雑音端子電圧
Object	_____

Testing Circuitry Figure D

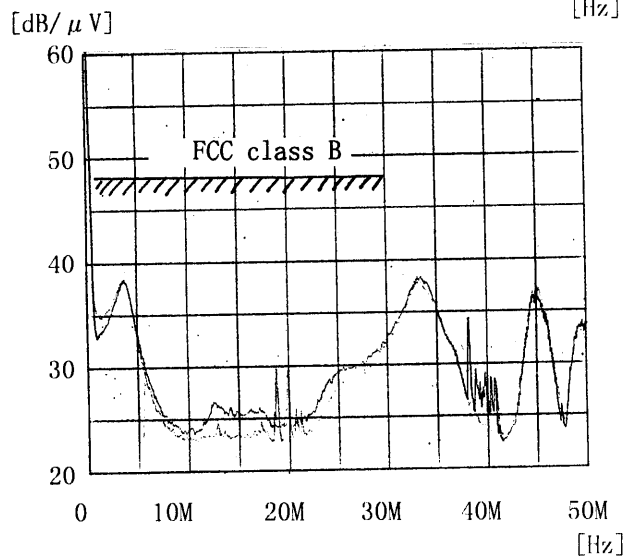
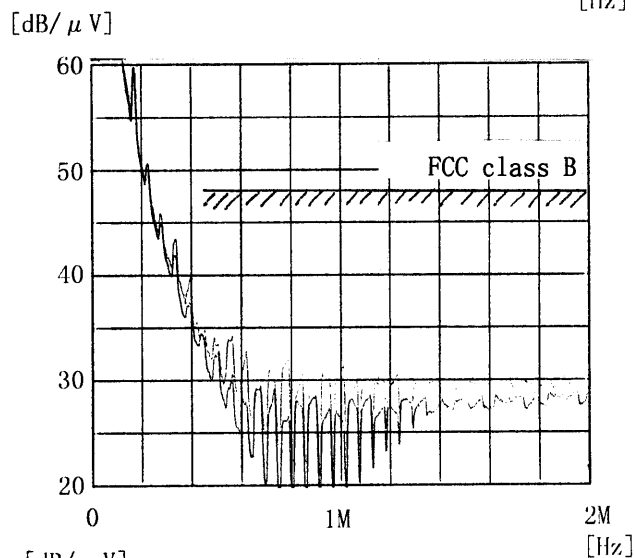
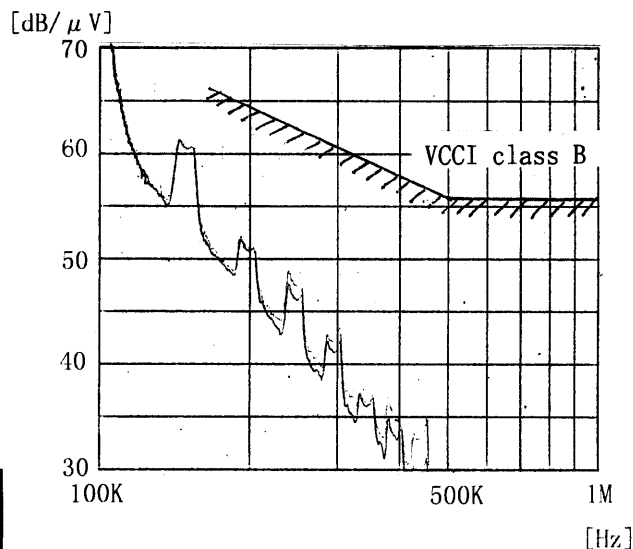
1. Graph

Remarks

Input Volt. 120 V (VCCI:100V)
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 class A		0.15~0.5	79
			0.5~30	73
4	VCCI class B	○	0.15~0.5	66-56
			0.5~5	56
			5~30	60
5	CISPR Pub. 22 class A (EN55022)		0.15~0.5	79
			0.5~30	73
6	CISPR Pub. 22 class B (EN55022)		0.15~0.5	66-56
			0.5~5	56
			5~30	60



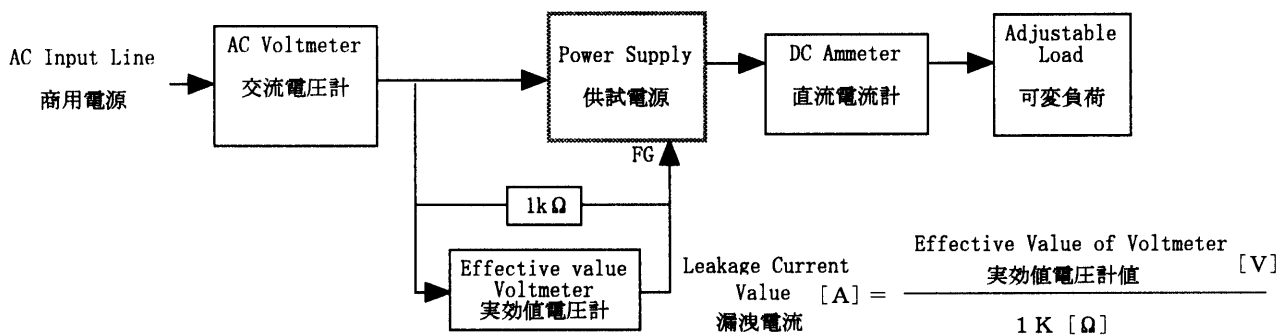
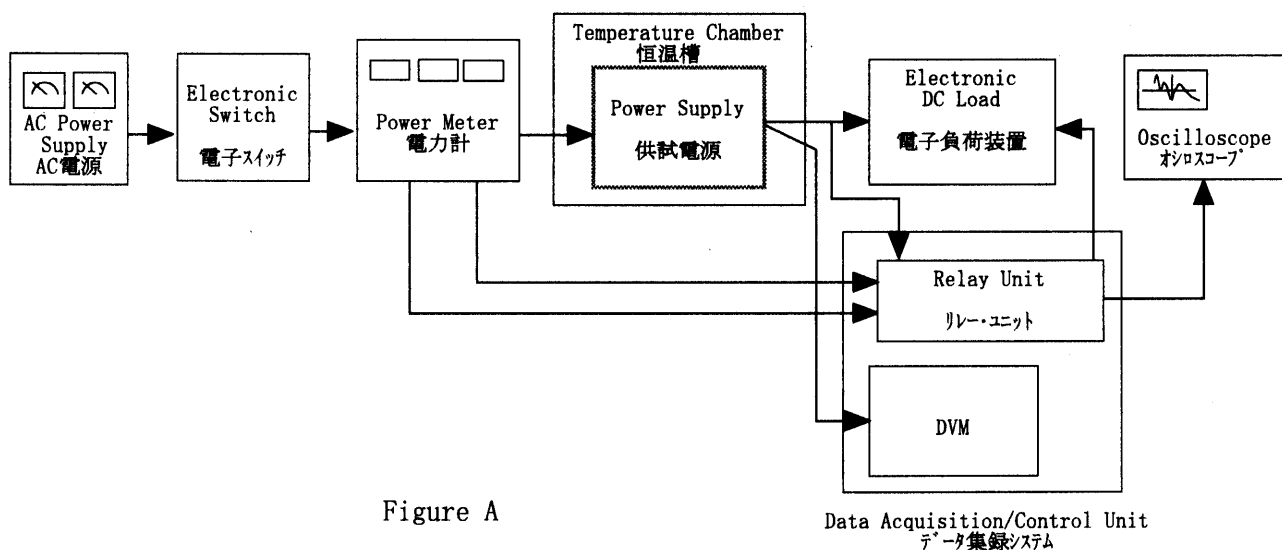


Figure B (DENTORI)

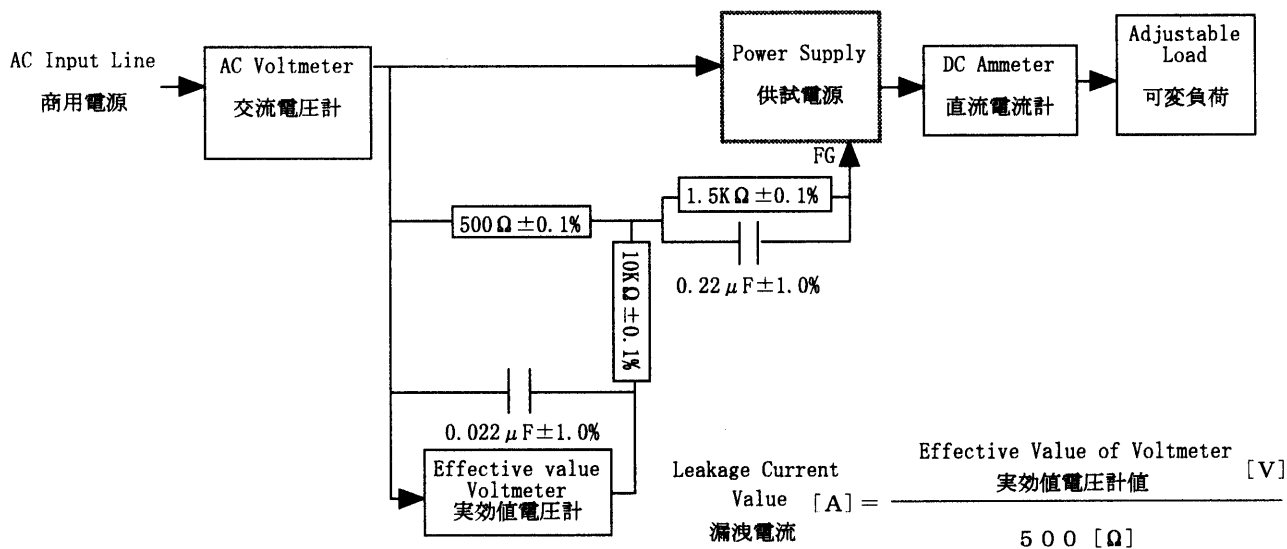


Figure B (IEC 60950)

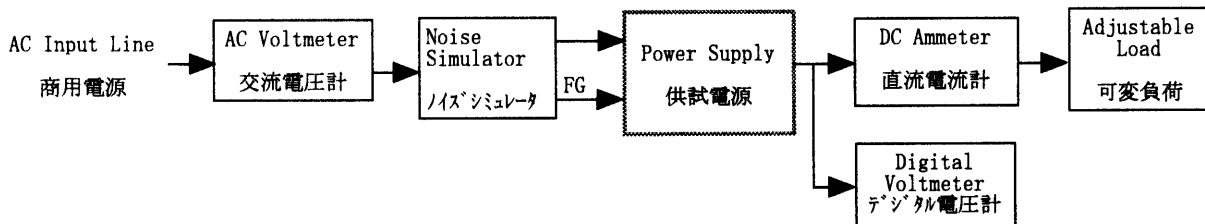


Figure C

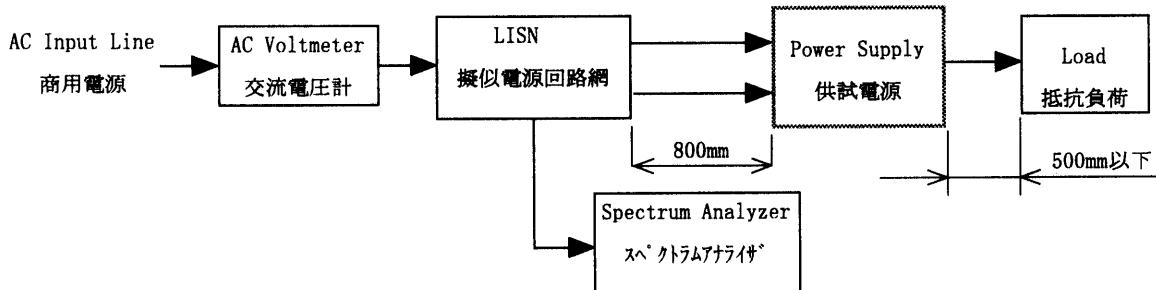


Figure D

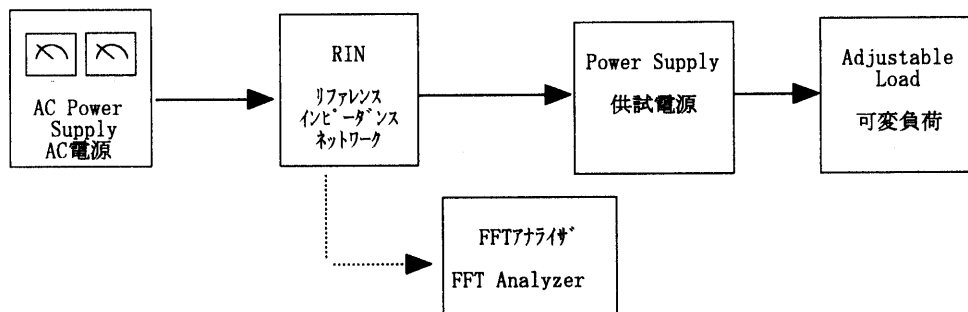


Figure E