



TEST DATA OF RMB15A-2 (100V INPUT)

Regulated DC Power Supply

Sep. 15, 1999

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Design Manager

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Design Engineer

コーワセル株式会社

COSEL CO., LTD.



C O N T E N T S

1. Line Regulation	1
静的入力変動	
2. Efficiency (by Input Voltage)	2
効率 (入力電圧特性)	
3. Power Factor (by Input Voltage)	3
力率 (入力電圧特性)	
4. Hold-Up Time	4
出力保持時間	
5. Instantaneous Interruption Compensation	6
瞬時停電保障	
6. Load Regulation	8
静的負荷変動	
7. Ripple Voltage (by Load Current)	9
リップル電圧 (負荷特性)	
8. Ripple-Noise	11
リップルノイズ	
9. Overcurrent Protection	13
過電流保護	
10. Inrush Current	14
突入電流	
11. Dynamic Load Response	15
動的負荷変動	
12. Rise and Fall Time	17
立ち上り、立ち下り時間	
13. Ambient Temperature Drift	19
周囲温度変動	
14. Minimum Input Voltage for Regulated Output Voltage	20
最低レギュレーション電圧	
15. Ripple Voltage (by Ambient Temperature)	21
リップル電圧 (周囲温度特性)	
16. Time Lapse Drift	22
経時ドリフト	
17. Output Voltage Accuracy	23
定電圧精度	
18. Condensation	24
結露特性	
19. Leakage Current	25
漏洩電流	
20. Conducted Emission	26
雜音端子電圧	
21. Figure of Testing Circuitry	27
測定回路図	

(Final Page 28)

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Model RMB15A-2

Item Line Regulation 静的入力変動

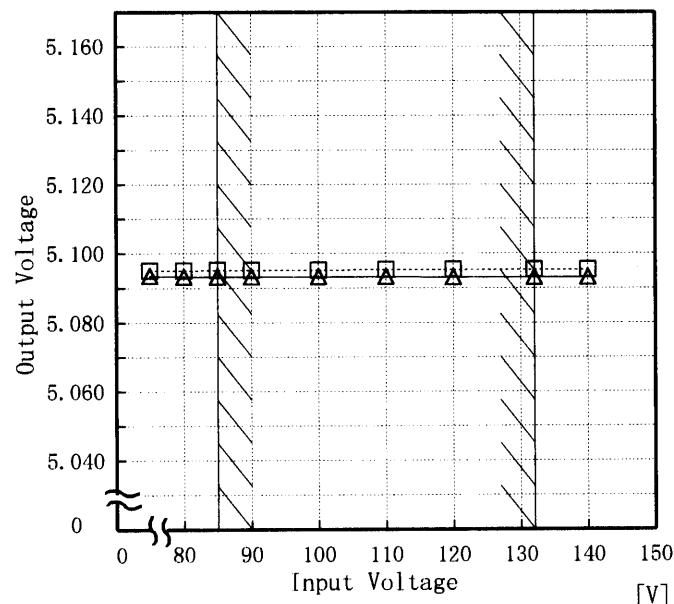
Object +5.0V 0.8A

1. Graph

□ Load 50%

△ Load 100%

[V]

Temperature
Testing Circuitry25°C
Figure A

2. Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
75	5.095	5.094
80	5.095	5.093
85	5.095	5.093
90	5.095	5.093
100	5.095	5.093
110	5.095	5.093
120	5.095	5.093
132	5.095	5.093
140	5.095	5.093

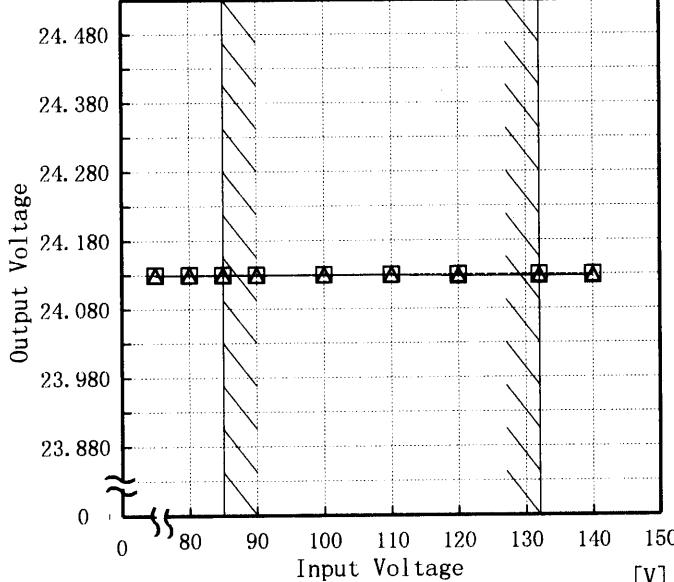
Object +24.0V 0.5A

1. Graph

□ Load 50%

△ Load 100%

[V]

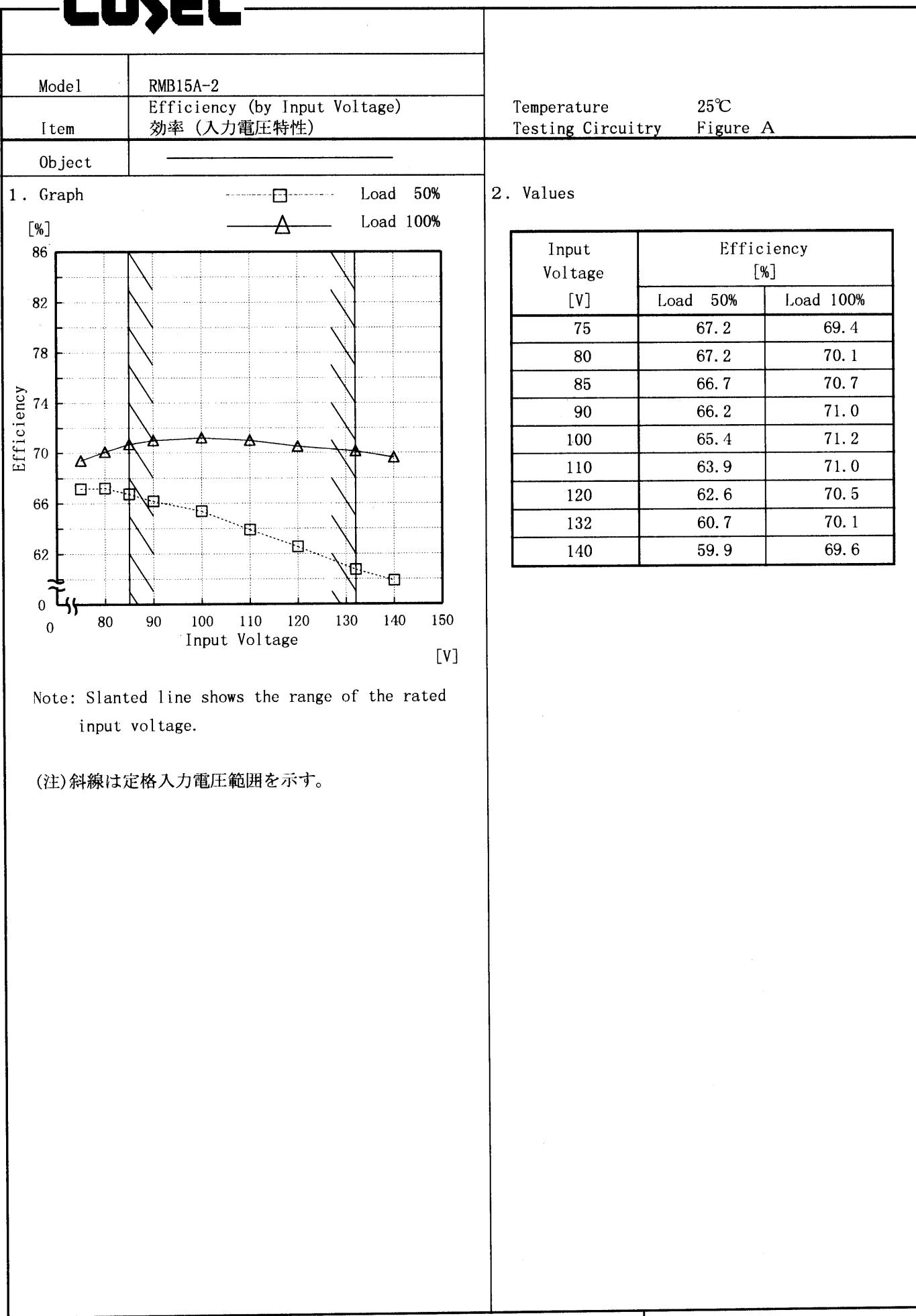


2. Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
75	24.130	24.129
80	24.130	24.129
85	24.130	24.129
90	24.130	24.129
100	24.130	24.129
110	24.130	24.129
120	24.130	24.128
132	24.130	24.128
140	24.130	24.128

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。

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Model	RMB15A-2	Temperature	25°C																																
Item	Power Factor (by Input Voltage) 力率(入力電圧特性)	Testing Circuitry	Figure A																																
Object																																			
1. Graph	<p style="text-align: center;">□ Load 50% △ Load 100%</p>																																		
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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。

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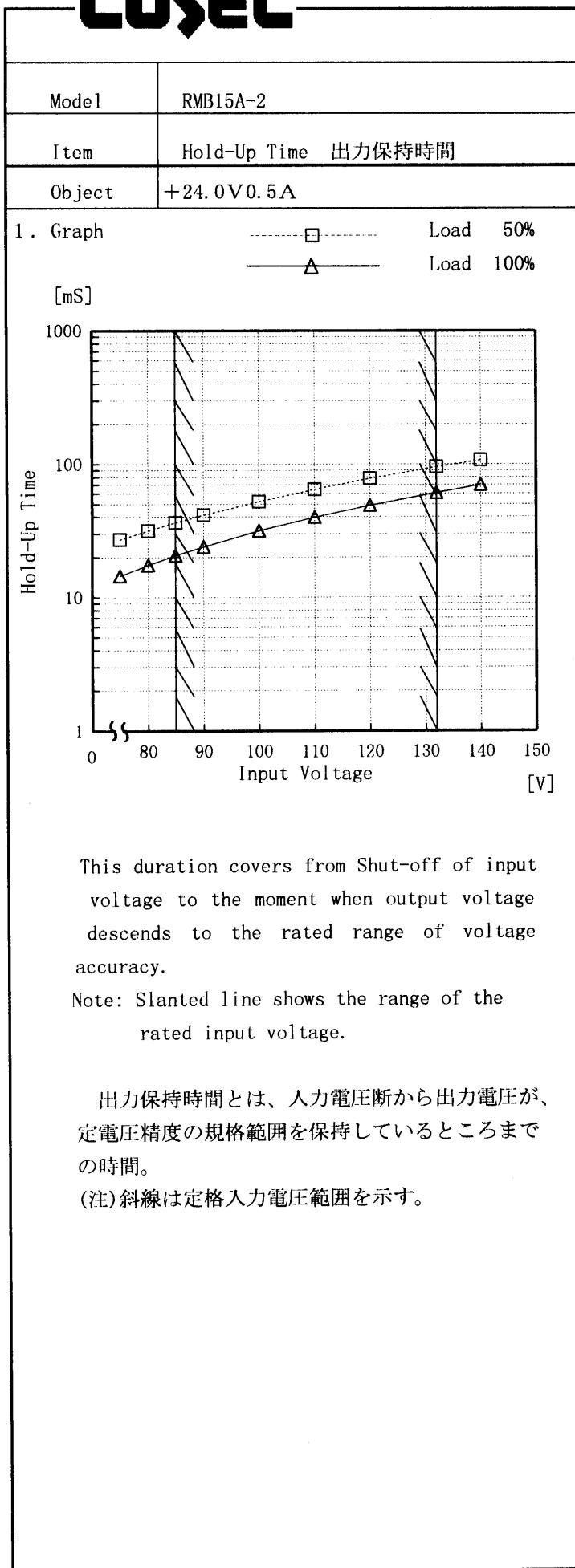
Model	RMB15A-2	Temperature Testing Circuitry	25°C Figure A																																
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Object	+5.0V 0.8A																																		
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This duration covers from Shut-off of input voltage 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。

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Temperature 25°C
Testing Circuitry Figure A

2. Values

Input Voltage [V]	Hold-Up Time [mS]	
	Load 50%	Load 100%
75	27	14
80	31	17
85	36	21
90	41	24
100	52	32
110	65	40
120	78	49
132	96	61
140	108	70

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Model	RMB15A-2
Item	Instantaneous Interruption Compensation 瞬時停電保障
Object	+5.0V 0.8A
1. Graph	
<p>Legend:</p> <ul style="list-style-type: none"> Input Volt. 85 V (Triangle) Input Volt. 100 V (Square) Input Volt. 132 V (Circle) 	
<p>This duration covers from Shut-off of input voltage to the moment when output voltage descends to the rated range of voltage accuracy.</p> <p>Note: Slanted line shows the range of the rated load current.</p>	
<p>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。</p> <p>(注) 斜線は定格負荷電流範囲を示す。</p>	

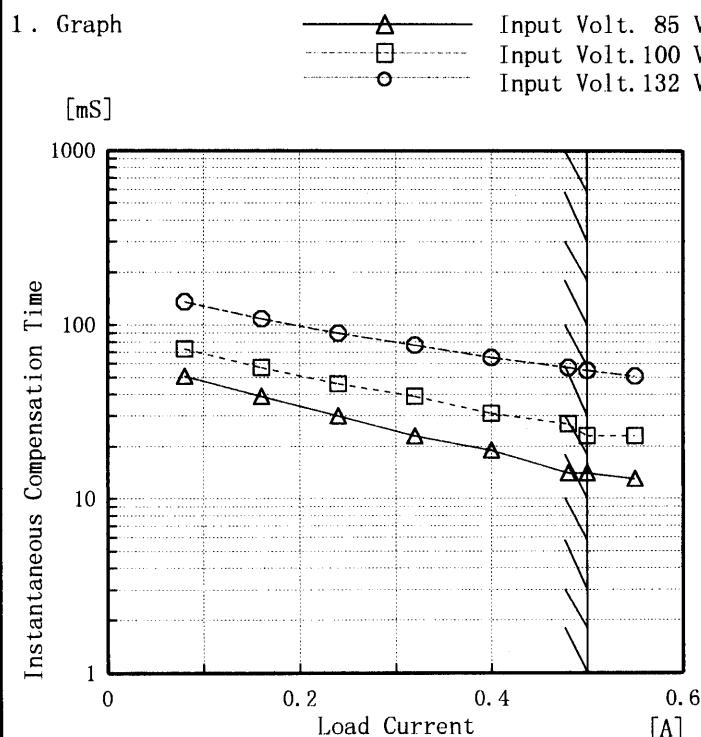
Temperature 25°C
Testing Circuitry Figure A

2. Values

Load Current [A]	Time [mS]		
	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
0.00	—	—	—
0.15	36	51	89
0.30	31	46	82
0.45	29	40	76
0.60	26	38	70
0.75	23	35	65
0.80	23	32	63
0.88	21	31	61
—	—	—	—
—	—	—	—
—	—	—	—

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Model	RMB15A-2
Item	Instantaneous Interruption Compensation 瞬時停電保障
Object	+24.0V 0.5A

Temperature 25°C
Testing Circuitry Figure A

2. Values

Load Current [A]	Time [mS]		
	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
0.00	—	—	—
0.08	51	73	136
0.16	39	57	109
0.24	30	46	90
0.32	23	39	77
0.40	19	31	65
0.48	14	27	57
0.50	14	23	55
0.55	13	23	51
—	—	—	—
—	—	—	—

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。

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Model	RMB15A-2
Item	Load Regulation 靜的負荷變動
Object	+5.0V 0.8A
1. Graph	<p style="text-align: center;"> △ Input Volt. 85 V □ Input Volt. 100 V ○ Input Volt. 132 V </p>

Temperature 25°C
Testing Circuitry Figure A

2. Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
0.00	5.099	5.099	5.099
0.15	5.096	5.097	5.097
0.30	5.095	5.096	5.096
0.45	5.095	5.095	5.095
0.60	5.094	5.094	5.094
0.75	5.094	5.094	5.094
0.80	5.094	5.094	5.094
0.88	5.093	5.093	5.094
—	—	—	—
—	—	—	—

Object	+24.0V 0.5A
1. Graph	<p style="text-align: center;"> △ Input Volt. 85 V □ Input Volt. 100 V ○ Input Volt. 132 V </p>
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。

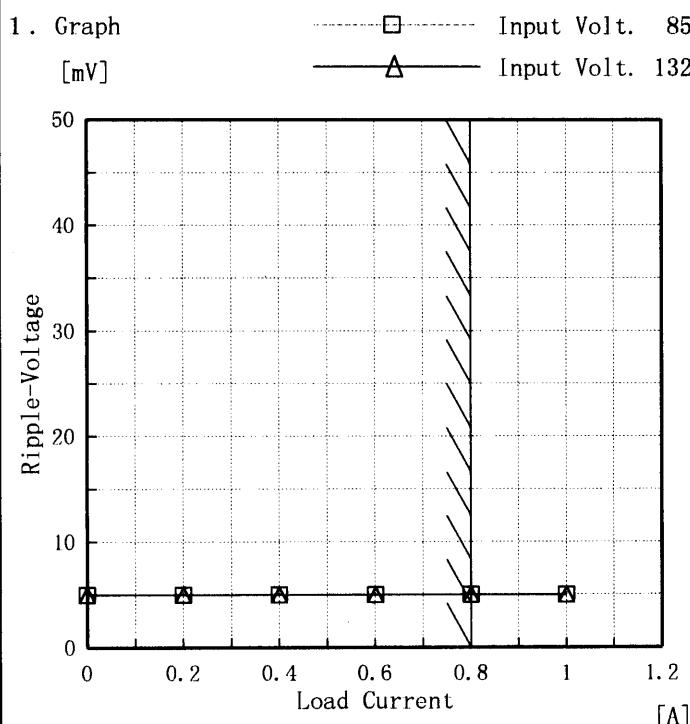
2. Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
0.00	24.132	24.132	24.131
0.08	24.132	24.131	24.131
0.16	24.131	24.131	24.130
0.24	24.130	24.130	24.130
0.32	24.130	24.129	24.129
0.40	24.129	24.129	24.129
0.48	24.129	24.129	24.128
0.50	24.129	24.128	24.128
0.55	24.128	24.128	24.128
—	—	—	—

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Model	RMB15A-2
Item	Ripple Voltage (by Load Current) リップル電圧(負荷特性)
Object	+5.0V 0.8A

Temperature 25°C
Testing Circuitry Figure A



2. Values

Load Current [A]	Ripple Output Voltage [mV]	
	Input Volt. 85 [V]	Input Volt. 132 [V]
0.0	5	5
0.2	5	5
0.4	5	5
0.6	5	5
0.8	5	5
1.0	5	5
—	—	—
—	—	—
—	—	—
—	—	—
—	—	—

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

スイッチング周期

— T2

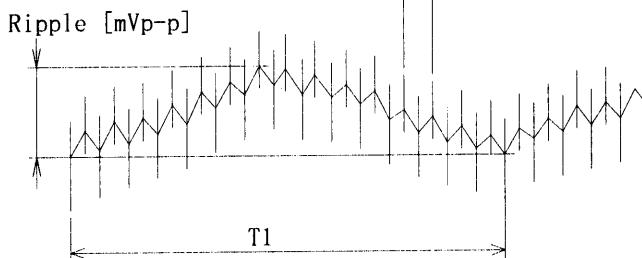


Fig. Complex Ripple Wave Form

図 リップル波形詳細図

COSEL

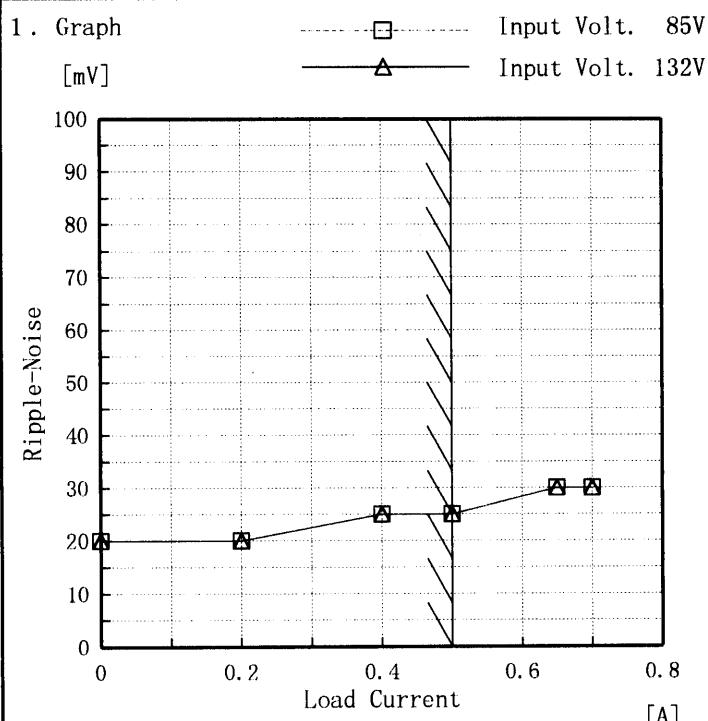
Model	RMB15A-2	Temperature	25°C																																						
Item	Ripple Voltage (by Load Current) リップル電圧(負荷特性)	Testing Circuitry	Figure A																																						
Object	$+24.0 \text{V} 0.5 \text{A}$																																								
1. Graph	<p>[mV]</p> <table border="1"> <caption>Data points estimated from Figure 1</caption> <thead> <tr> <th>Load Current [A]</th> <th>Ripple Voltage 85V [mV]</th> <th>Ripple Voltage 132V [mV]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>5</td><td>5</td></tr> <tr><td>0.2</td><td>5</td><td>5</td></tr> <tr><td>0.4</td><td>10</td><td>5</td></tr> <tr><td>0.5</td><td>15</td><td>10</td></tr> <tr><td>0.65</td><td>15</td><td>10</td></tr> <tr><td>0.7</td><td>20</td><td>10</td></tr> </tbody> </table>			Load Current [A]	Ripple Voltage 85V [mV]	Ripple Voltage 132V [mV]	0.0	5	5	0.2	5	5	0.4	10	5	0.5	15	10	0.65	15	10	0.7	20	10																	
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Load Current [A]	Ripple Output Voltage [mV]																																								
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<p>Ripple Voltage is shown as p-p in the figure below.</p> <p>Note: Slanted line shows the range of the rated load current.</p> <p>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。</p> <p>T1: Due to AC Input Line T2: Due to Switching</p> <p>Fig. Complex Ripple Wave Form 図 リップル波形詳細図</p>																																									

COSEL

Model	RMB15A-2	Temperature Testing Circuitry	25°C Figure A																																						
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Load Current [A]	Ripple-Noise [mV]																																								
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<p>T1: Due to AC Input Line 入力商用周期 T2: Due to Switching スイッチング周期</p>																																									
<p>Fig. Complex Ripple Wave Form 図 リップル波形詳細図</p>																																									

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Model	RMB15A-2
Item	Ripple-Noise リップルノイズ
Object	+24.0V 0.5A



Temperature 25°C
Testing Circuitry Figure A

2. Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 85 [V]	Input Volt. 132 [V]
0.0	20	20
0.2	20	20
0.4	25	25
0.5	25	25
0.65	30	30
0.7	30	30
—	—	—
—	—	—
—	—	—
—	—	—
—	—	—

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

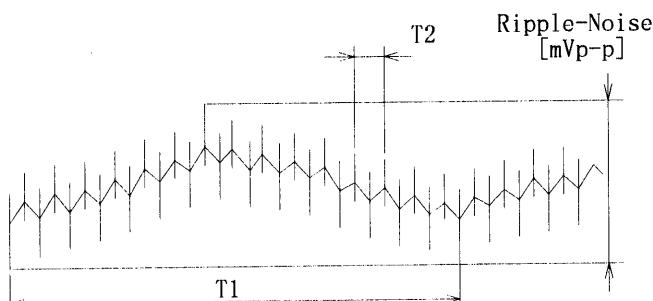
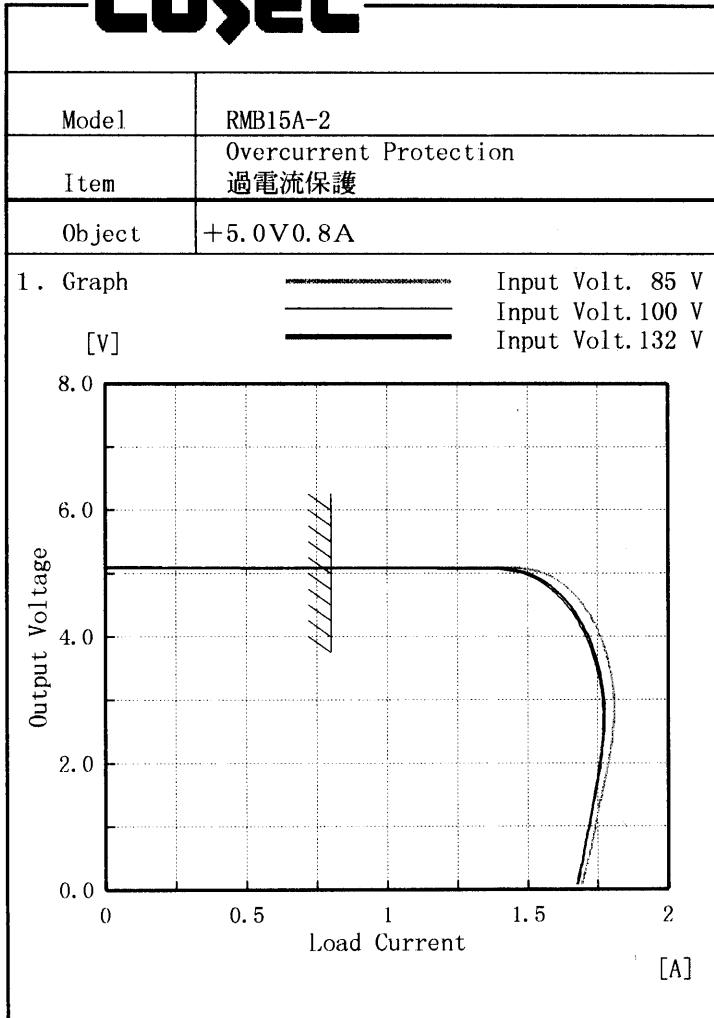


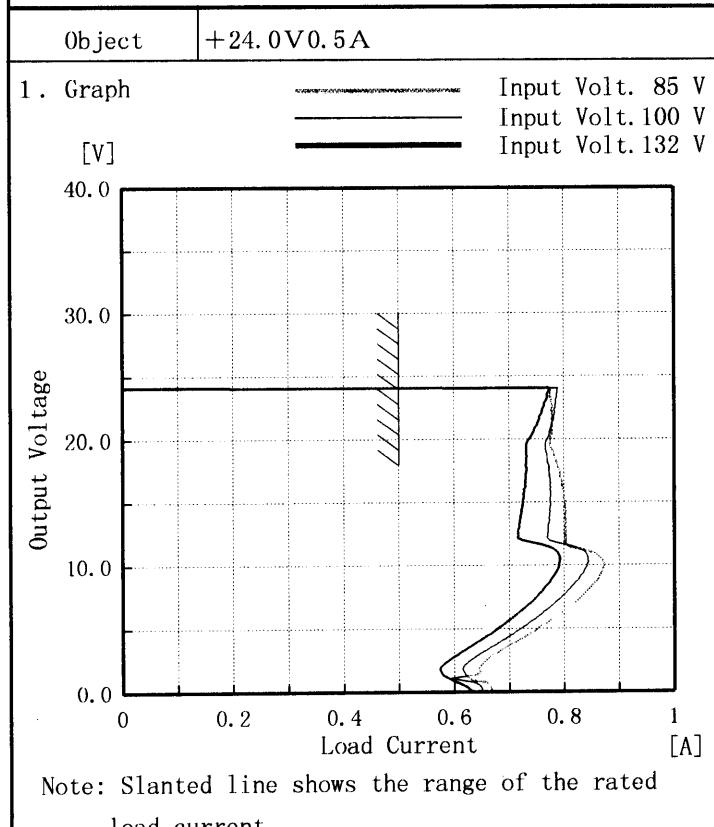
Fig. Complex Ripple Wave Form

図 リップル波形詳細図

COSEL
 Temperature 25°C
 Testing Circuitry Figure A

2. Values

Output Voltage [V]	Load Current [A]		
	Input Volt. 85 [V]	Input Volt. 100 [V]	Input Volt. 132 [V]
5.00	1.585	1.515	1.529
4.75	1.652	1.589	1.601
4.50	1.701	1.646	1.658
4.00	1.760	1.706	1.716
3.50	1.793	1.746	1.754
3.00	1.808	1.767	1.771
2.50	1.805	1.768	1.772
2.00	1.786	1.753	1.757
1.50	1.764	1.736	1.738
1.00	1.738	1.714	1.716
0.50	1.714	1.693	1.696
0.00	1.693	1.672	1.675



2. Values

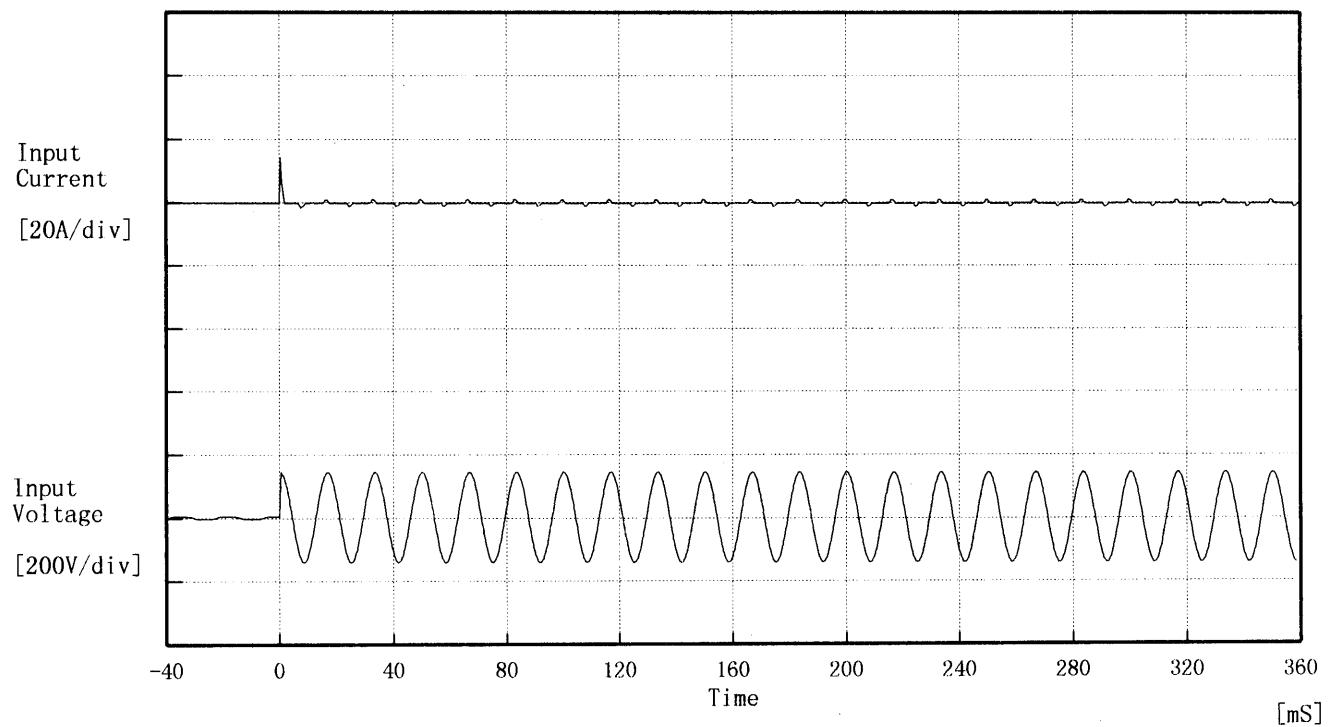
Output Voltage [V]	Load Current [A]		
	Input Volt. 85 [V]	Input Volt. 100 [V]	Input Volt. 132 [V]
24.00	0.774	0.787	0.773
22.80	0.777	0.785	0.764
21.60	0.779	0.779	0.753
19.20	0.778	0.766	0.731
16.80	0.795	0.774	0.729
14.40	0.803	0.774	0.722
12.00	0.802	0.773	0.726
9.60	0.869	0.836	0.786
7.20	0.820	0.784	0.739
4.80	0.745	0.712	0.671
2.40	0.652	0.624	0.584
0.00	0.654	0.640	0.621

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。

COSSEL

Model	RMB15A-2	Temperature	25°C
Item	Inrush Current 突入電流	Testing Circuitry	Figure A
Object	—		



Input Voltage 100 V

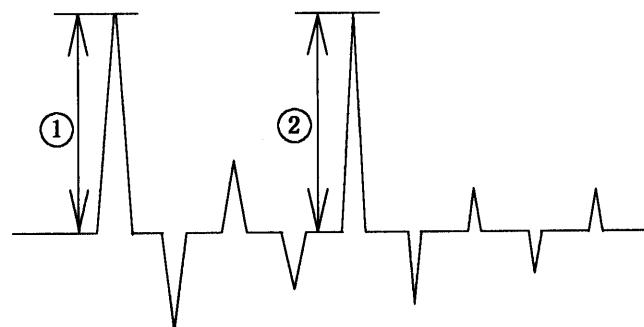
Frequency 60 Hz

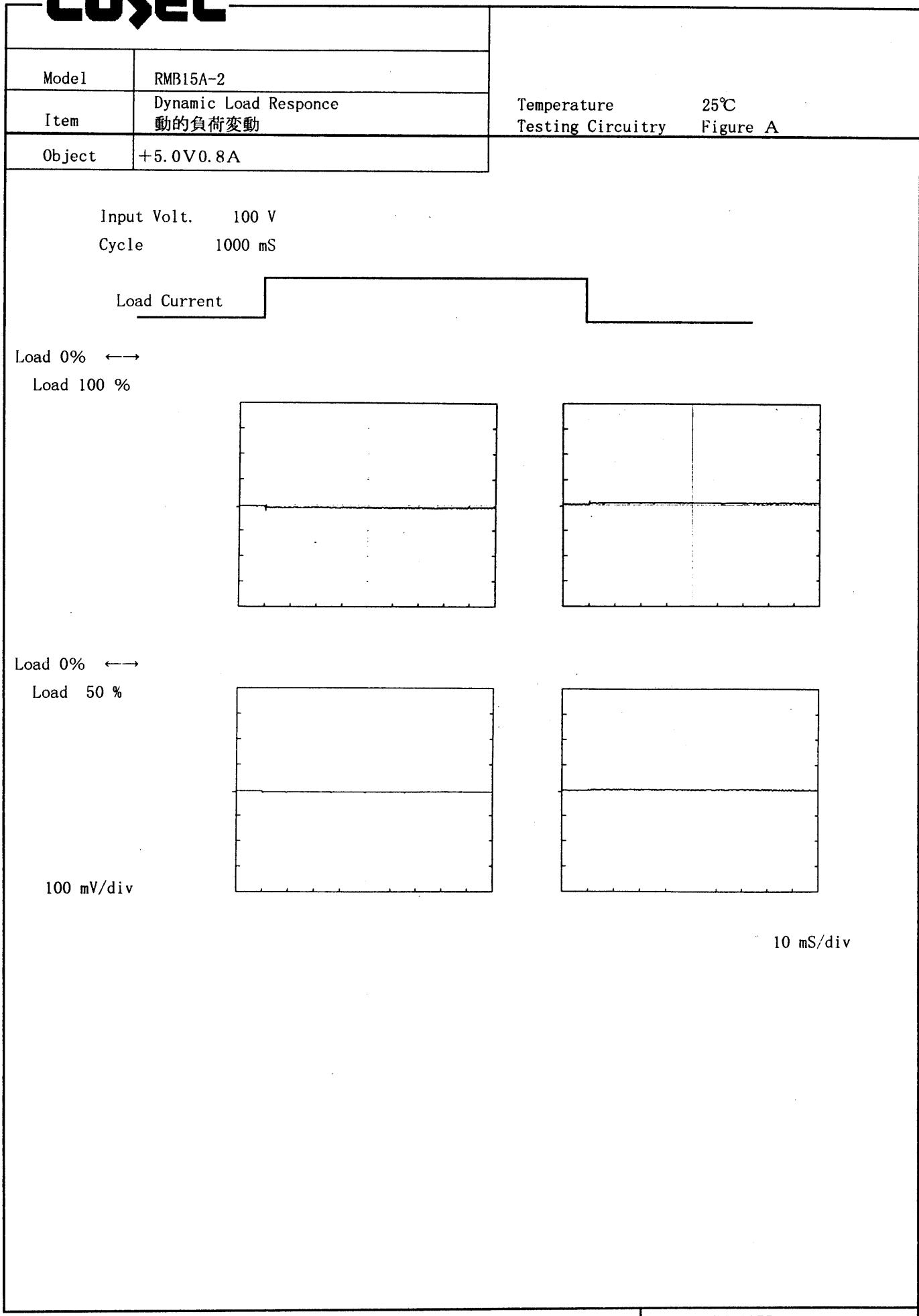
Load 100 %

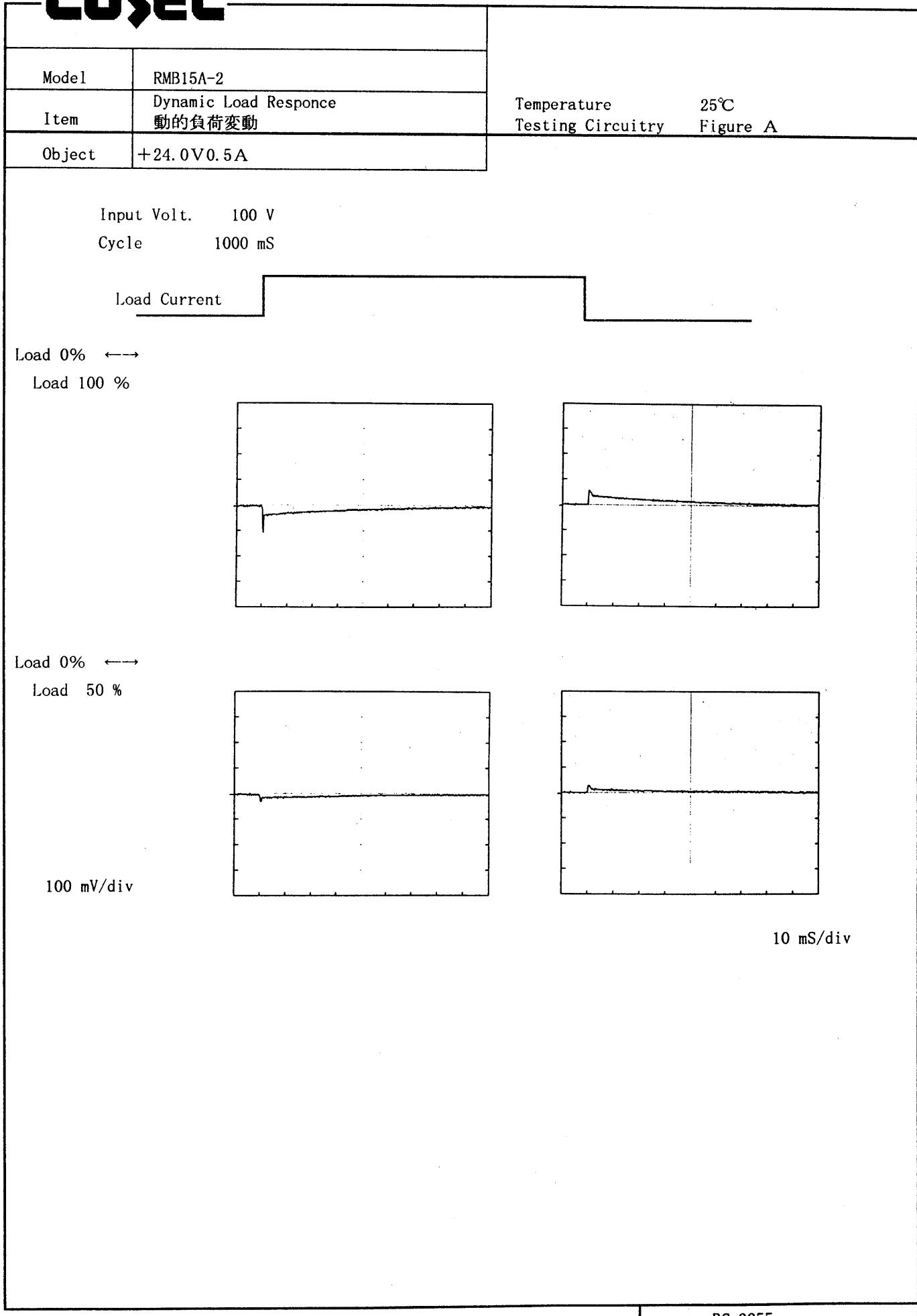
Inrush Current

① 14.16 [A]

② 1.27 [A]



COSEL

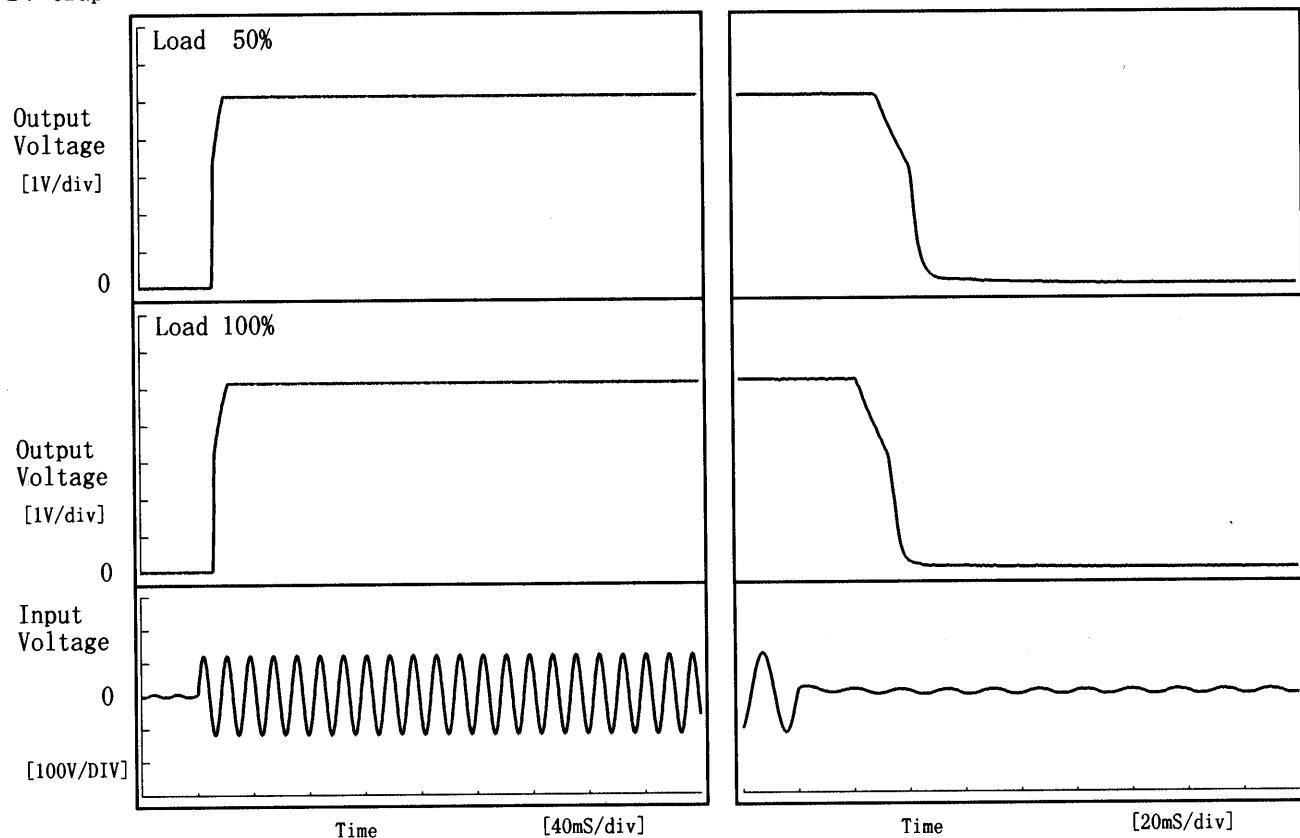
COSEL

COSEL

Model	RMB15A-2
Item	Rise and Fall Time 立上り、立下り時間
Object	+5.0V 0.8A

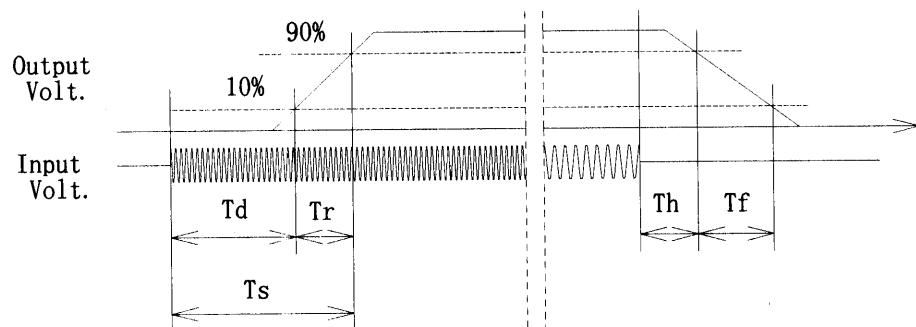
Temperature 25°C
Testing Circuitry Figure A

1. Graph



2. Values

Load	Time	T d	T r	T s	T h	T f	[mS]
50 %		11.6	5.6	17.2	32.5	14.5	
100 %		11.4	7.0	18.4	24.5	14.0	

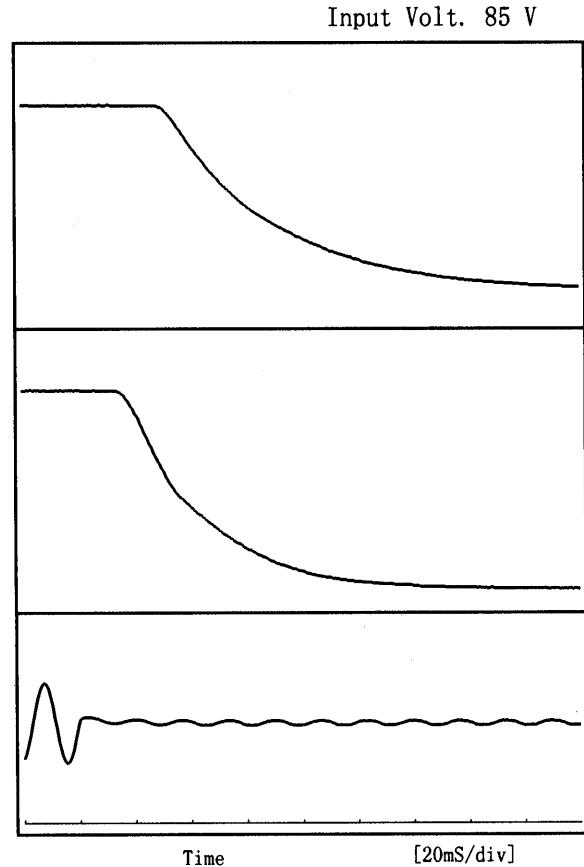
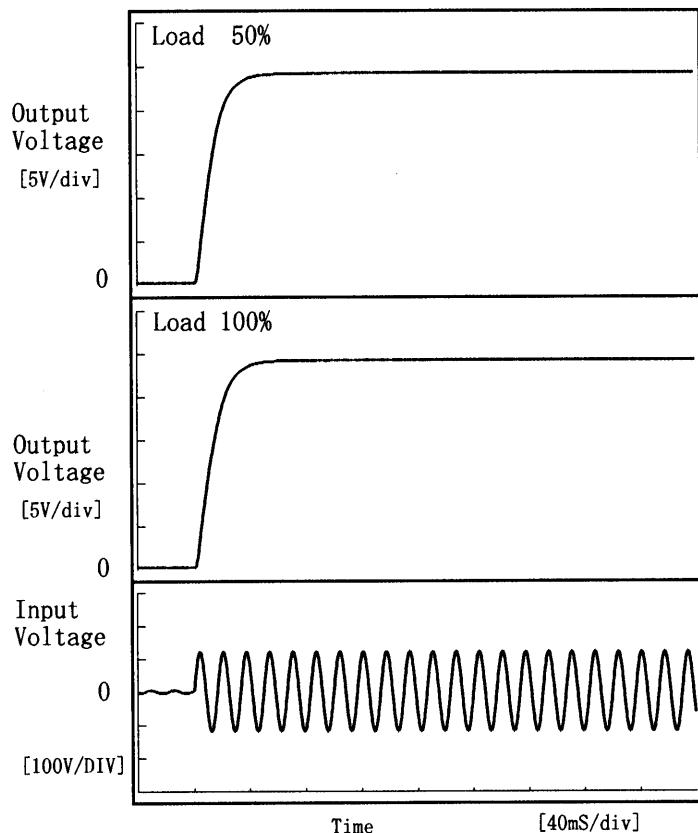


COSEL

Model	RMB15A-2
Item	Rise and Fall Time 立上り、立下り時間
Object	+24.0V 0.5A

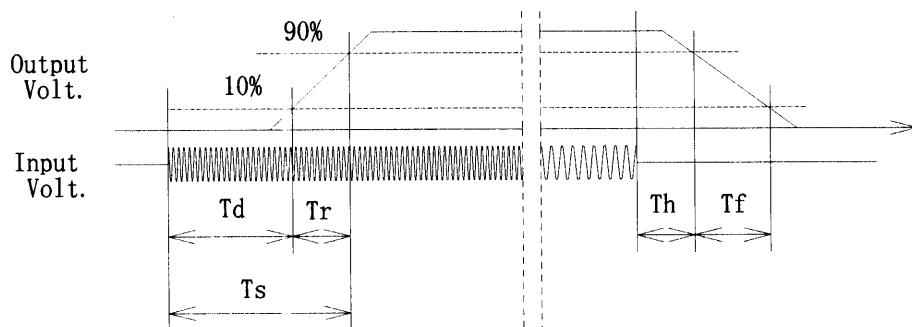
Temperature 25°C
Testing Circuitry Figure A

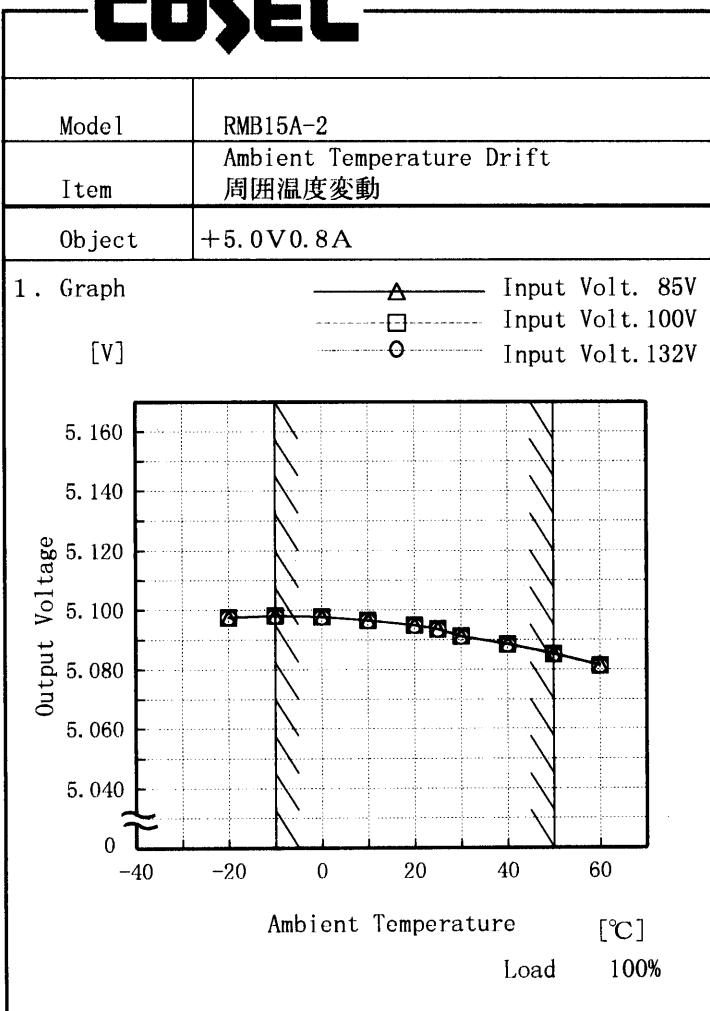
1. Graph



2. Values

Load	Time	T d	T r	T s	T h	T f	[mS]
50 %		3.6	22.4	26.0	35.5	130.0	
100 %		3.6	23.8	27.4	20.0	61.0	

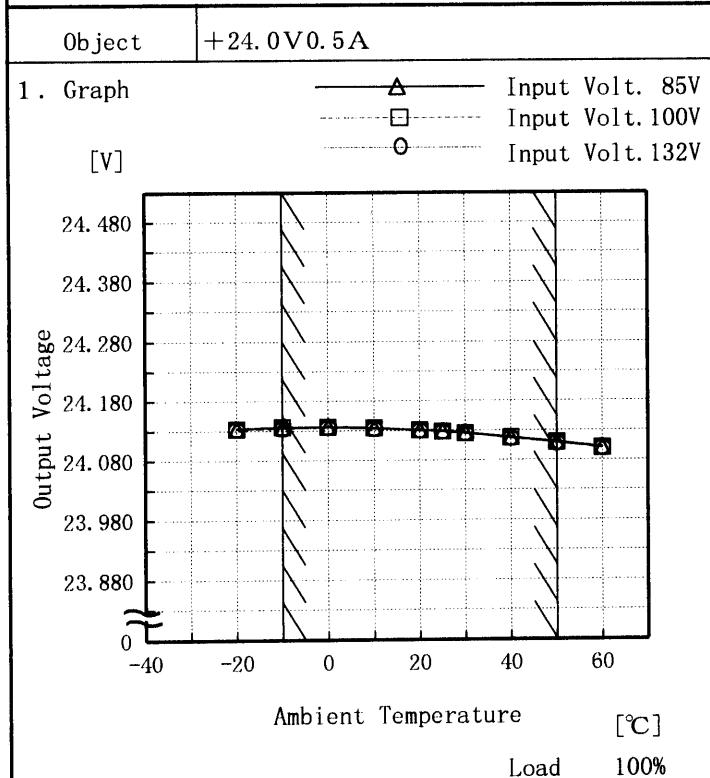


COSEL

Testing Circuitry Figure A

2. Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
-20	5.097	5.098	5.098
-10	5.098	5.098	5.098
0	5.098	5.098	5.098
10	5.097	5.097	5.097
20	5.095	5.095	5.095
25	5.094	5.094	5.094
30	5.091	5.091	5.091
40	5.089	5.088	5.088
50	5.085	5.085	5.085
60	5.082	5.081	5.081
—	—	—	—



2. Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
-20	24.134	24.133	24.133
-10	24.136	24.136	24.135
0	24.137	24.136	24.136
10	24.135	24.135	24.134
20	24.131	24.131	24.131
25	24.129	24.128	24.128
30	24.126	24.125	24.125
40	24.118	24.118	24.117
50	24.110	24.110	24.109
60	24.101	24.100	24.100
—	—	—	—

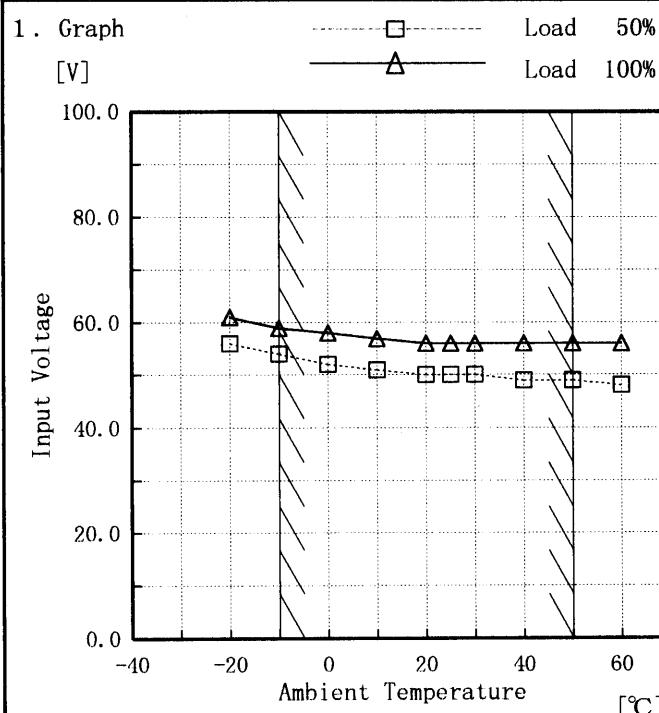
Note: Slanted line shows the range of the rated ambient temperature.

(注)斜線は定格周囲温度範囲を示す。

COSEL

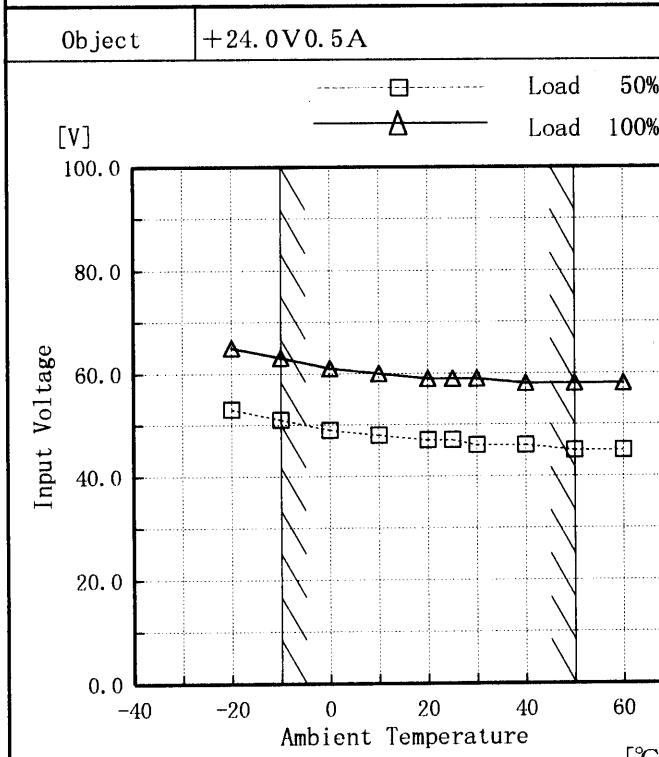
Model	RMB15A-2
Item	Minimum Input Voltage for Regulated Output Voltage 最低レギュレーション電圧
Object	+5.0V 0.8A

Testing Circuitry Figure A



2. Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	56	61
-10	54	59
0	52	58
10	51	57
20	50	56
25	50	56
30	50	56
40	49	56
50	49	56
60	48	56
—	—	—



2. Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	53	65
-10	51	63
0	49	61
10	48	60
20	47	59
25	47	59
30	46	59
40	46	58
50	45	58
60	45	58
—	—	—

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。

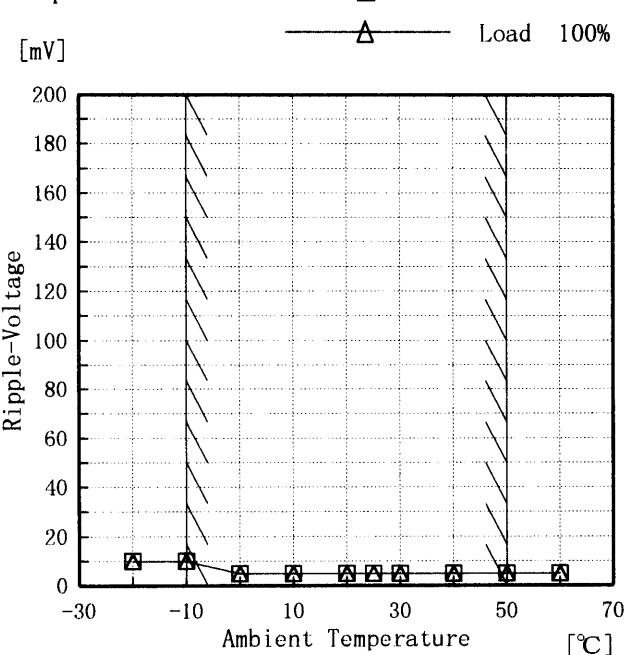
COSEL

Model RMB15A-2

Item Ripple Voltage (by Ambient Temp.)
リップル電圧 (周囲温度特性)

Object +5.0V 0.8A

1. Graph

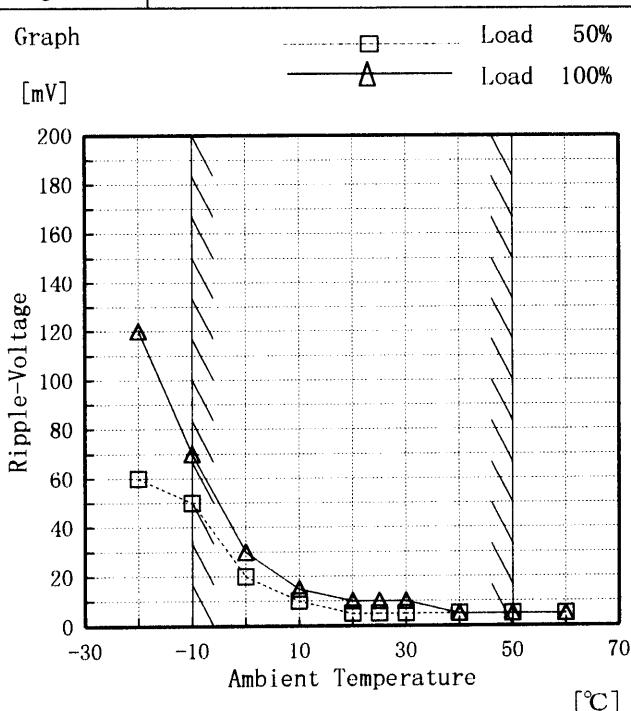


Testing Circuitry Figure A

2. Values

Ambient Temperature [°C]	Ripple Output Voltage [mV]	
	Load 50%	Load 100%
-20	10	10
-10	10	10
0	5	5
10	5	5
20	5	5
25	5	5
30	5	5
40	5	5
50	5	5
60	5	5
—	—	—

1. Graph



2. Values

Ambient Temperature [°C]	Ripple Output Voltage [mV]	
	Load 50%	Load 100%
-20	60	120
-10	50	70
0	20	30
10	10	15
20	5	10
25	5	10
30	5	10
40	5	5
50	5	5
60	5	5
—	—	—

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

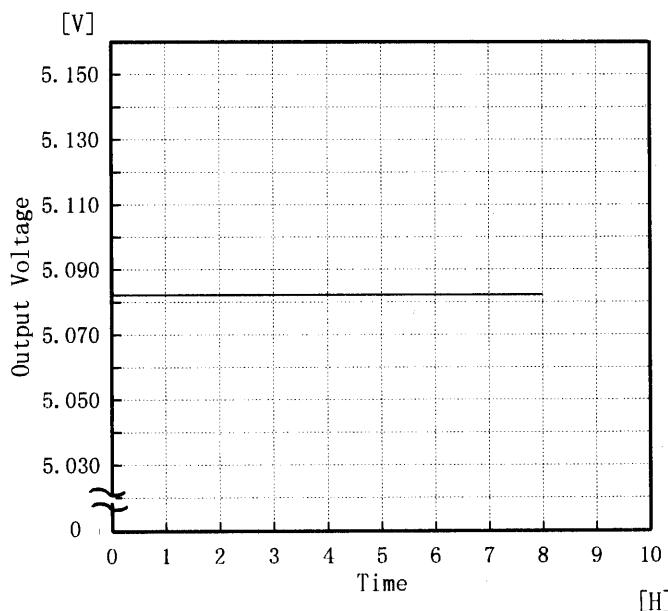
(注)斜線は定格周囲温度範囲を示す。

COSEL

Model	RMB15A-2
Item	Time Lapse Drift 経時ドリフト
Object	+5.0V 0.8A

Temperature 25°C
Testing Circuitry Figure A

1. Graph



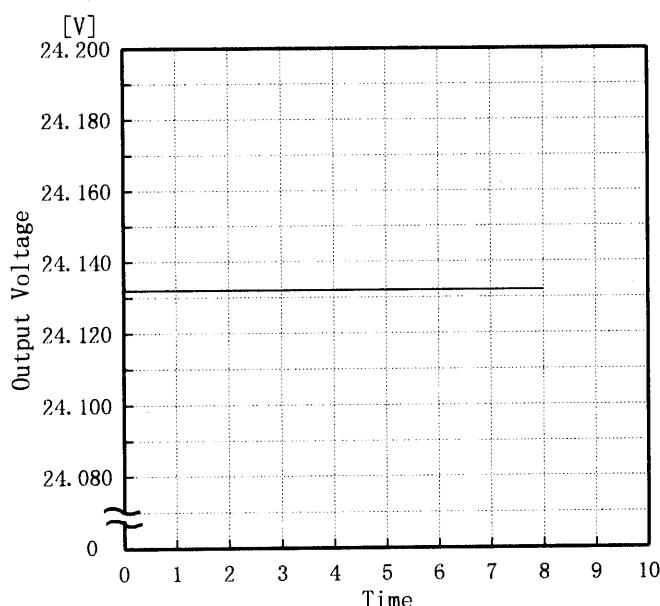
Input Volt. 100V
Load 100%

2. Values

Time since start [H]	Output Voltage [V]
0.0	5.084
0.5	5.082
1.0	5.082
2.0	5.082
3.0	5.082
4.0	5.082
5.0	5.082
6.0	5.082
7.0	5.082
8.0	5.082

Object +24.0V 0.5A

1. Graph



Input Volt. 100V
Load 100%

2. Values

Time since start [H]	Output Voltage [V]
0.0	24.136
0.5	24.132
1.0	24.132
2.0	24.132
3.0	24.132
4.0	24.132
5.0	24.132
6.0	24.132
7.0	24.132
8.0	24.132



Model RMB15A-2

Item Output Voltage Accuracy 定電圧精度

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 °C

Input Voltage : 85~132 V

Load Current (AVR 1) : 0~0.8 A

(AVR 2) : 0~0.5 A

* Output Voltage Accuracy = ±(Maximum of Output Voltage - Minimum of Output Voltage) / 2

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

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) 0~0.8 A

(AVR 2) 0~0.5 A

* 定電圧精度(変動値) = ±(出力電圧の最高値 - 出力電圧の最低値) / 2

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

Object +5.0V 0.8A

Item	Temperature [°C]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy(Ratio) [%]
Maximum Voltage	-10	85	0.0	5.101		
Minimum Voltage	50	132	0.8	5.085	±8	±0.2

Object +24.0V 0.5A

Item	Temperature [°C]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy(Ratio) [%]
Maximum Voltage	-10	85	0.0	24.140		
Minimum Voltage	50	85	0.5	24.111	±15	±0.1



Model	RMB15A-2	Testing Circuitry Figure A
Item	Condensation 結露特性	

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

Object	+5.0V 0.8A
--------	------------

Item	Data	Testing Conditions
Output Voltage [V]	5.095	Input Volt.: 100V, Load Current:0.8A
Line Regulation [mV]	1	Input Volt.: 85~132V, Load Current:0.8A
Load Regulation [mV]	7	Input Volt.: 100V, Load Current:0~0.8A

Object	+24.0V 0.5A
--------	-------------

Item	Data	Testing Conditions
Output Voltage [V]	24.128	Input Volt.: 100V, Load Current:0.5A
Line Regulation [mV]	1	Input Volt.: 85~132V, Load Current:0.5A
Load Regulation [mV]	2	Input Volt.: 100V, Load Current:0~0.5A



Model	RMB15A-2	Temperature	25°C
Item	Leakage Current 漏洩電流	Testing Circuitry	Figure B
Object	—	—	—

1. Results

Standards	Leakage Current [mA]		
	Input Volt. 85 [V]	Input Volt. 100 [V]	Input Volt. 132 [V]
(A) DENTORI	0.09	0.11	0.14
(B) IEC60950	0.09	0.11	0.14

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。

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

COSEL

Model RMB15A-2

Item Conducted Emission
雜音端子電圧

Object

Testing Circuitry

Figure D

1. Graph

Remarks

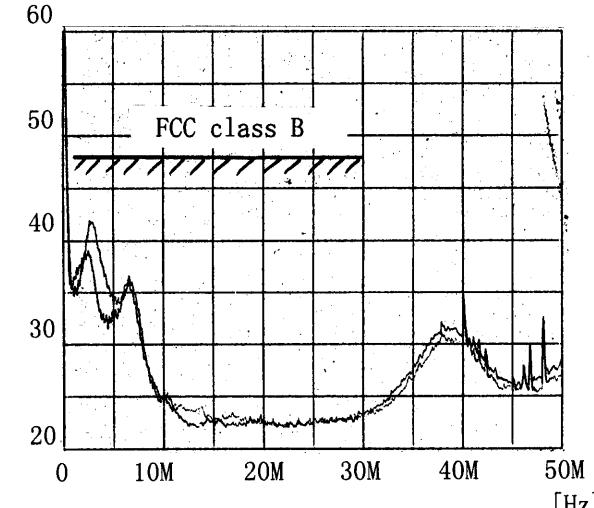
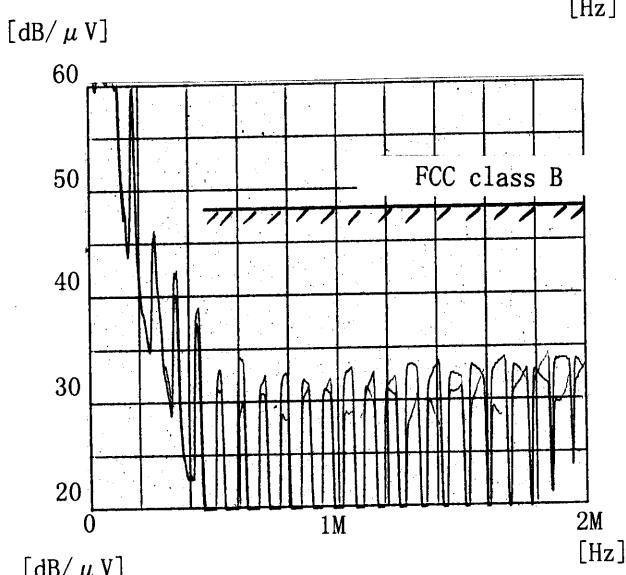
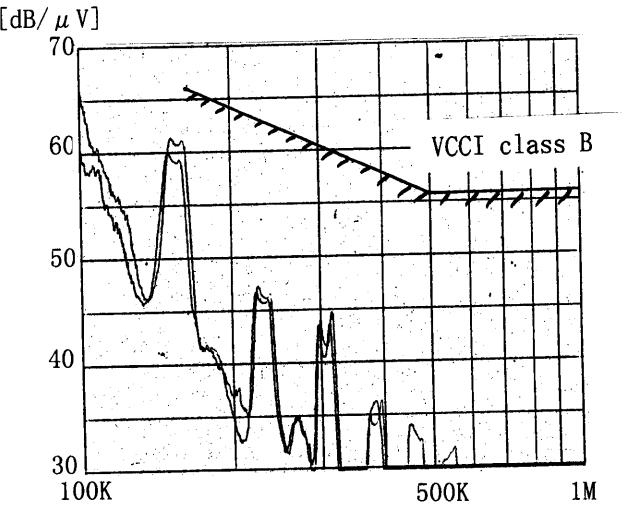
Input Volt. 120 V (VCCI: 100V)

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



COSEL

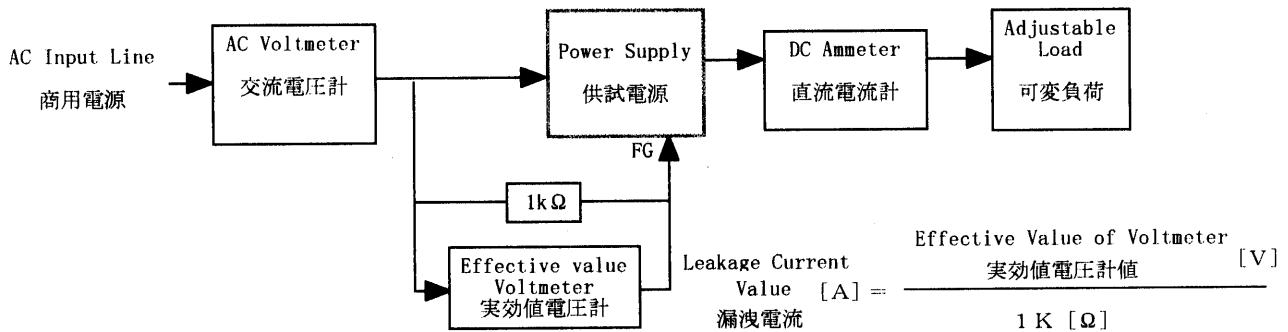
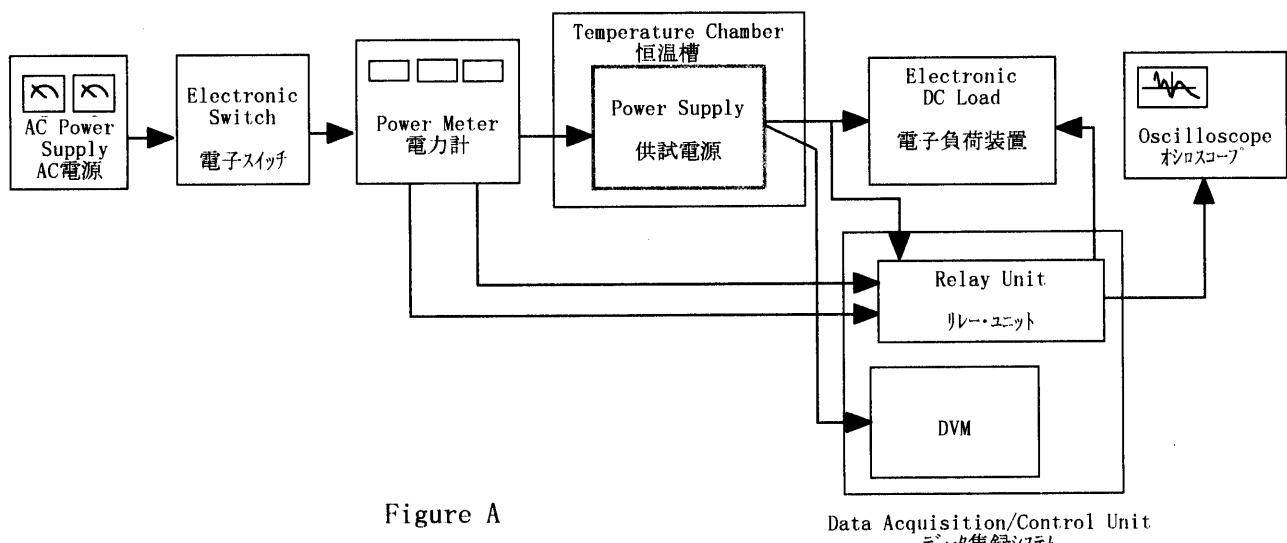


Figure B (DENTORI)

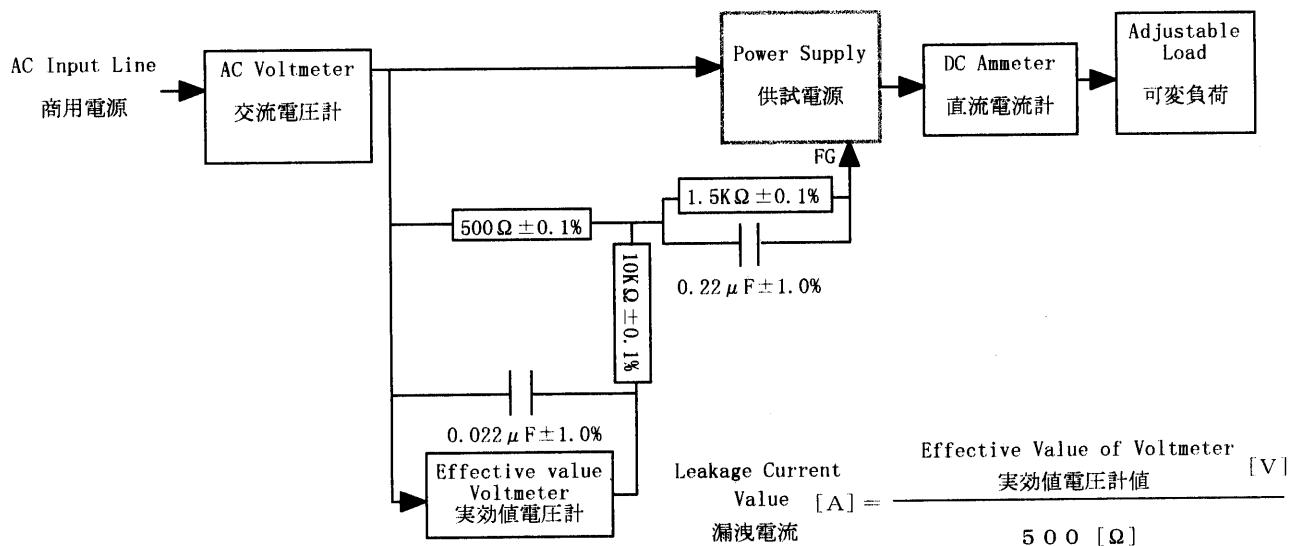


Figure B (IEC 60950)

COSEL

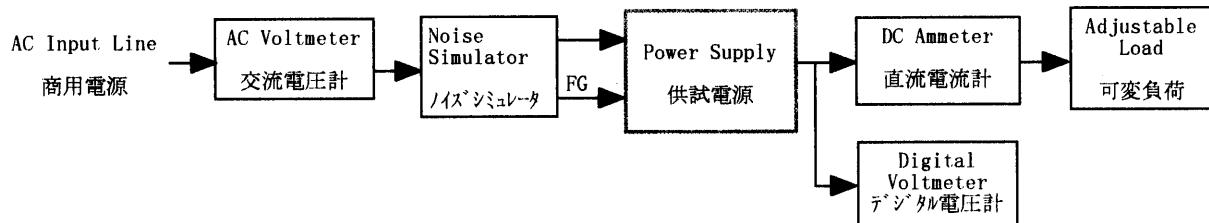


Figure C

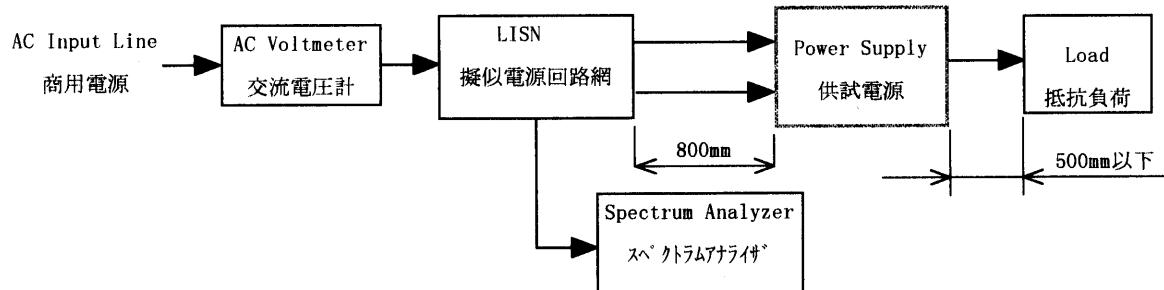


Figure D

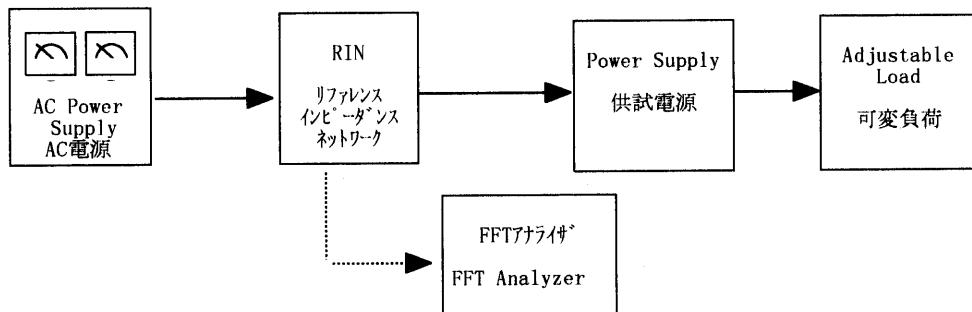


Figure E