



# TEST DATA OF LCA10S-24

(100V INPUT)

Regulated DC Power Supply

Date : June 16. 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.**



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Model	LCA10S-24		Temperature Testing Circuitry 25°C Figure A																																
Item	Line Regulation 静的入力変動																																		
Object	+24.0V 0.5A																																		
1. Graph		Load 50% Load 100%	2. Values																																
<p>The graph plots Output Voltage [V] on the Y-axis (23.98 to 24.10) against Input Voltage [V] on the X-axis (0 to 150). Two sets of data points are shown: Load 50% (squares) and Load 100% (triangles). Both sets show a slight downward trend. Two slanted lines indicate the rated input voltage range from approximately 85V to 132V.</p>			<table border="1"> <thead> <tr> <th rowspan="2">Input Voltage [V]</th> <th colspan="2">Output Voltage [V]</th> </tr> <tr> <th>Load 50%</th> <th>Load 100%</th> </tr> </thead> <tbody> <tr><td>75</td><td>24.029</td><td>24.025</td></tr> <tr><td>80</td><td>24.028</td><td>24.026</td></tr> <tr><td>85</td><td>24.028</td><td>24.026</td></tr> <tr><td>90</td><td>24.027</td><td>24.026</td></tr> <tr><td>100</td><td>24.026</td><td>24.026</td></tr> <tr><td>110</td><td>24.025</td><td>24.025</td></tr> <tr><td>120</td><td>24.024</td><td>24.024</td></tr> <tr><td>132</td><td>24.023</td><td>24.024</td></tr> <tr><td>140</td><td>24.022</td><td>24.023</td></tr> </tbody> </table>	Input Voltage [V]	Output Voltage [V]		Load 50%	Load 100%	75	24.029	24.025	80	24.028	24.026	85	24.028	24.026	90	24.027	24.026	100	24.026	24.026	110	24.025	24.025	120	24.024	24.024	132	24.023	24.024	140	24.022	24.023
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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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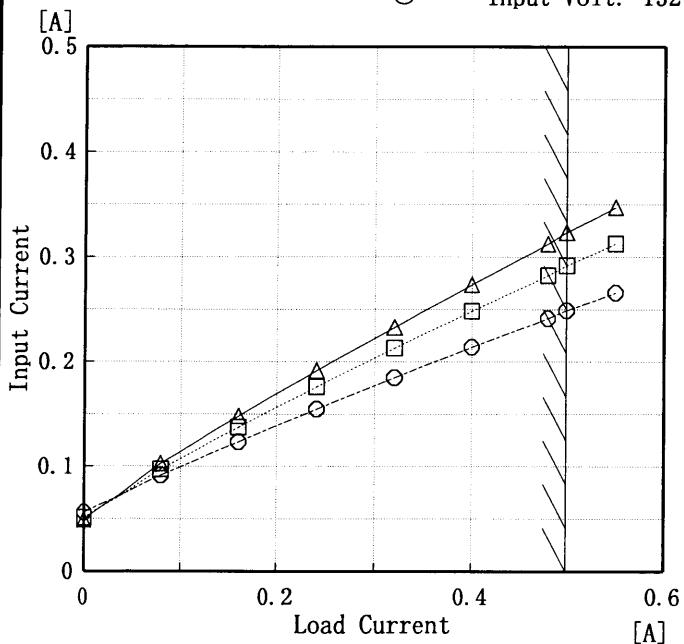
Model LCA10S-24

Item Input Current (by Load Current)  
入力電流 (負荷特性)

Output \_\_\_\_\_

## 1. Graph

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



Note: Slanted line shows the range of the rated load current

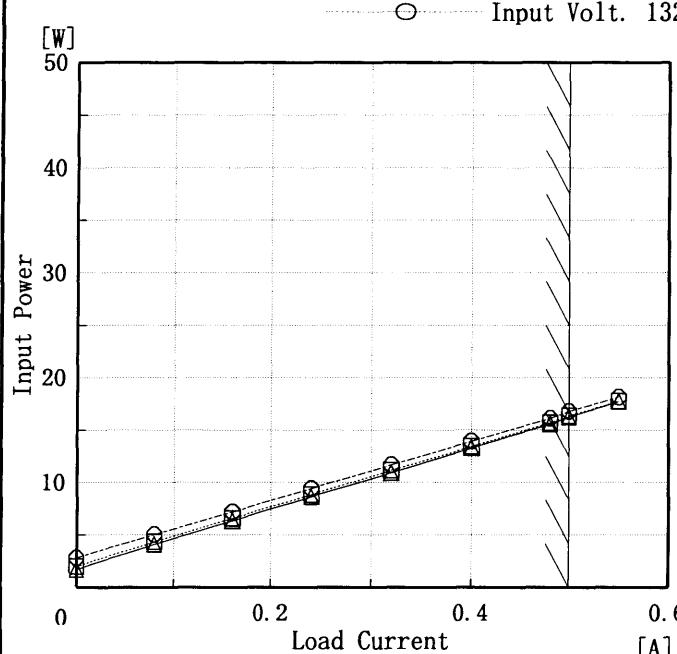
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Temperature 25°C  
Testing Circuitry Figure A

## 2. Values

Load Current [A]	Input Current [A]		
	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
0.00	0.049	0.051	0.056
0.08	0.103	0.097	0.092
0.16	0.148	0.138	0.124
0.24	0.192	0.176	0.155
0.32	0.233	0.213	0.185
0.40	0.274	0.248	0.214
0.48	0.312	0.282	0.241
0.50	0.323	0.292	0.249
0.55	0.348	0.313	0.266
—	—	—	—
—	—	—	—
—	—	—	—

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Model	LCA10S-24																																																									
Item	Input Power (by Load Current) 入力電力 (負荷特性)	Temperature 25°C	Testing Circuitry Figure A																																																							
Output	_____																																																									
1. Graph	<p>—△— Input Volt. 85V        -□- Input Volt. 100V        -○- Input Volt. 132V</p>  <p>The graph plots Input Power [W] on the Y-axis (0 to 50) against Load Current [A] on the X-axis (0 to 0.6). Three data series are shown for input voltages of 85V, 100V, and 132V. Each series consists of four data points connected by straight lines. A slanted line is drawn through the data points at approximately 0.45A, indicating the rated load current range.</p>																																																									
2. Values	<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="3">Input Power [W]</th> </tr> <tr> <th>Input Volt. 85[V]</th> <th>Input Volt. 100[V]</th> <th>Input Volt. 132[V]</th> </tr> </thead> <tbody> <tr><td>0.00</td><td>1.69</td><td>2.01</td><td>2.81</td></tr> <tr><td>0.08</td><td>4.08</td><td>4.34</td><td>5.03</td></tr> <tr><td>0.16</td><td>6.34</td><td>6.58</td><td>7.19</td></tr> <tr><td>0.24</td><td>8.64</td><td>8.87</td><td>9.43</td></tr> <tr><td>0.32</td><td>10.94</td><td>11.17</td><td>11.68</td></tr> <tr><td>0.40</td><td>13.28</td><td>13.44</td><td>13.94</td></tr> <tr><td>0.48</td><td>15.58</td><td>15.70</td><td>16.13</td></tr> <tr><td>0.50</td><td>16.25</td><td>16.36</td><td>16.77</td></tr> <tr><td>0.55</td><td>17.72</td><td>17.77</td><td>18.16</td></tr> <tr><td>—</td><td>—</td><td>—</td><td>—</td></tr> <tr><td>—</td><td>—</td><td>—</td><td>—</td></tr> <tr><td>—</td><td>—</td><td>—</td><td>—</td></tr> </tbody> </table>			Load Current [A]	Input Power [W]			Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]	0.00	1.69	2.01	2.81	0.08	4.08	4.34	5.03	0.16	6.34	6.58	7.19	0.24	8.64	8.87	9.43	0.32	10.94	11.17	11.68	0.40	13.28	13.44	13.94	0.48	15.58	15.70	16.13	0.50	16.25	16.36	16.77	0.55	17.72	17.77	18.16	—	—	—	—	—	—	—	—	—	—	—	—
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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。

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Model	LCA10S-24																																	
Item	Efficiency 効率	Temperature Testing Circuitry 25°C Figure A																																
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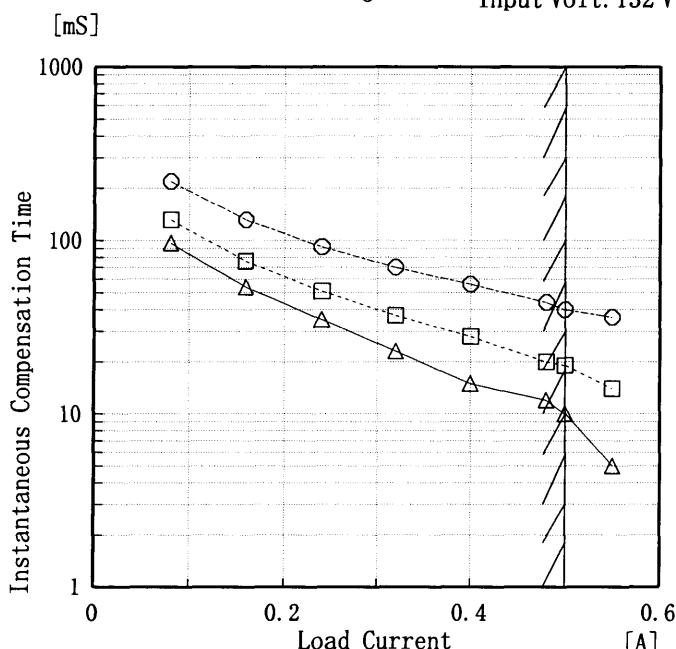
Model	LCA10S-24		Temperature Testing Circuitry	25°C Figure A																																
Item	Hold-Up Time 出力保持時間																																			
Object	+24.0V 0.5A																																			
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2. Values	<table border="1"> <thead> <tr> <th rowspan="2">Input Voltage [V]</th> <th colspan="2">Hold-Up Time [ms]</th> </tr> <tr> <th>Load 50%</th> <th>Load 100%</th> </tr> </thead> <tbody> <tr><td>75</td><td>30</td><td>12</td></tr> <tr><td>80</td><td>34</td><td>15</td></tr> <tr><td>85</td><td>39</td><td>17</td></tr> <tr><td>90</td><td>43</td><td>20</td></tr> <tr><td>100</td><td>54</td><td>26</td></tr> <tr><td>110</td><td>65</td><td>33</td></tr> <tr><td>120</td><td>78</td><td>40</td></tr> <tr><td>132</td><td>94</td><td>50</td></tr> <tr><td>140</td><td>106</td><td>56</td></tr> </tbody> </table>				Input Voltage [V]	Hold-Up Time [ms]		Load 50%	Load 100%	75	30	12	80	34	15	85	39	17	90	43	20	100	54	26	110	65	33	120	78	40	132	94	50	140	106	56
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<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 input voltage.</p> <p>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。</p> <p>(注) 斜線は定格入力電圧範囲を示す。</p>																																				

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Model	LCA10S-24
Item	Instantaneous Interruption Compensation 瞬時停電保障
Object	+24.0V 0.5A

## 1. Graph

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



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。

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	97	132	219
0.16	54	76	132
0.24	35	51	92
0.32	23	37	70
0.40	15	28	56
0.48	12	20	44
0.50	10	19	40
0.55	5	14	36
—	—	—	—
—	—	—	—

**COSEL**

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Item	Load Regulation 靜的負荷変動	Temperature 25°C	Testing Circuitry Figure A																																															
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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。

**COSSEL**

Model	LCA10S-24																																								
Item	Ripple Voltage (by Load Current) リップル電圧(負荷電流特性)	Temperature Testing Circuitry	25°C Figure A																																						
Object	+24.0V 0.5A																																								
1. Graph	<p>---□--- Input Volt. 85V [mV]</p> <p>—△— Input Volt. 132V [mV]</p>																																								
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**COSSEL**

Model	LCA10S-24	Temperature Testing Circuitry	25°C Figure A																																						
Item	Ripple-Noise リップルノイズ																																								
Object	+24.0V 0.5A																																								
1. Graph	-----□----- Input Volt. 85V [mV] -----△----- Input Volt. 132V	2. Values																																							
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**COSEL**

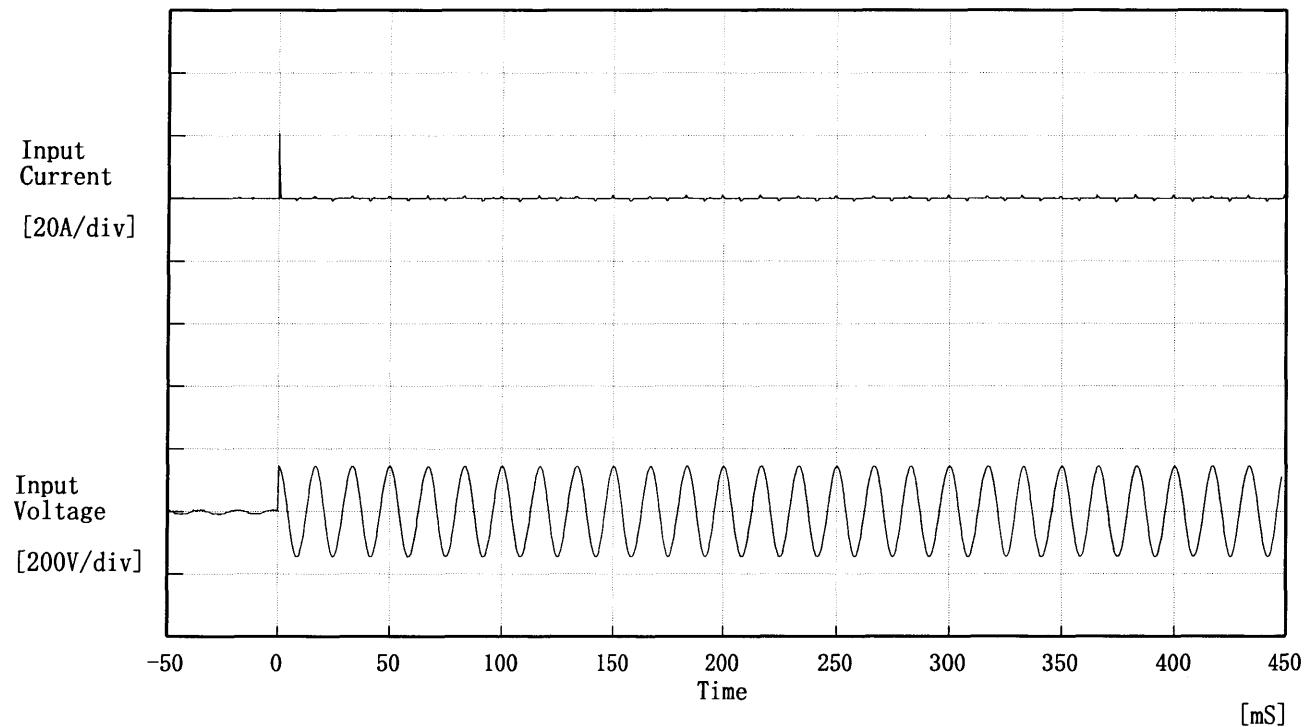
Model	LCA10S-24																																																									
Item	Overcurrent Protection 過電流保護	Temperature 25°C	Testing Circuitry Figure A																																																							
Object	+24.0V 0.5A																																																									
1. Graph	<p>The graph plots Output Voltage [V] on the Y-axis (0.0 to 40.0) against Load Current [A] on the X-axis (0 to 0.8). Three curves are shown for different input voltages: 85V (top), 100V (middle), and 132V (bottom). All curves show a linear increase in output voltage with load current until they reach their respective saturation points. A slanted line is drawn across the graph, intersecting the curves at approximately 0.5A, which represents the rated load current range.</p>																																																									
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Note: Slanted line shows the range of the rated load current.

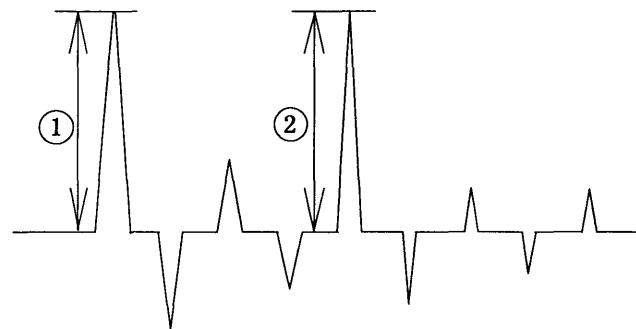
(注)斜線は定格負荷電流範囲を示す。

COSEL

Model	LCA10S-24	Temperature	25°C
Item	Inrush Current 突入電流	Testing Circuitry	Figure A
Object	<hr/>		



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



**COSEL**

Model	LCA10S-24	Temperature Testing Circuitry 25°C Figure A
Item	Dynamic Load Response 動的負荷變動	
Object	+24.0V 0.5A	

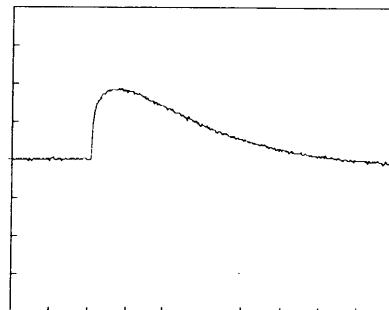
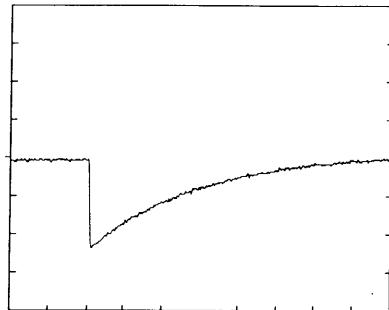
Input Volt. 100 V

Cycle 1000 mS

Load Current

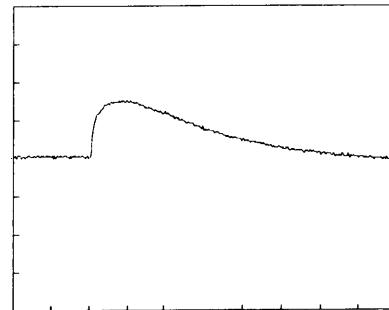
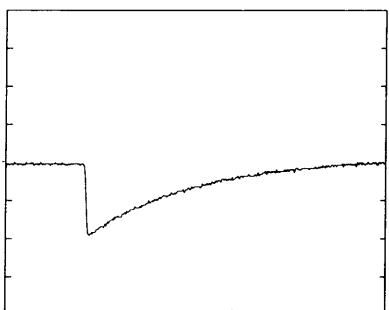
Load 0% ↔

Load 100 %



Load 0% ↔

Load 50 %



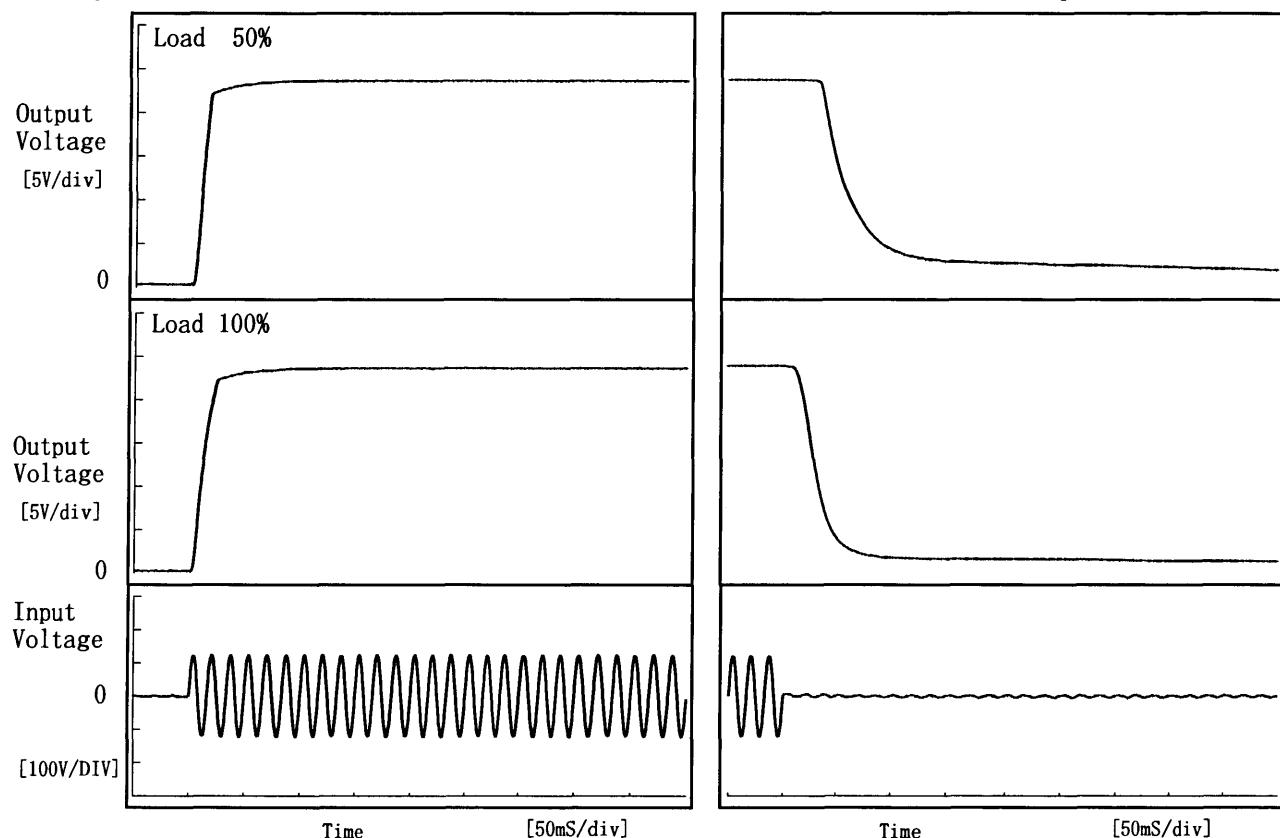
200 mV/div

10 mS/div

**COSSEL**

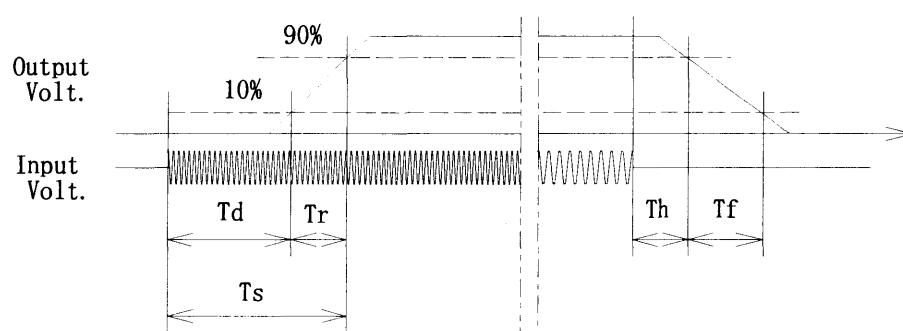
Model	LCA10S-24	Temperature Testing Circuitry Figure A	25°C Figure A
Item	Rise and Fall Time 立上り、立下り時間		
Object	+24.0V 0.5A		

## 1. Graph



## 2. Values

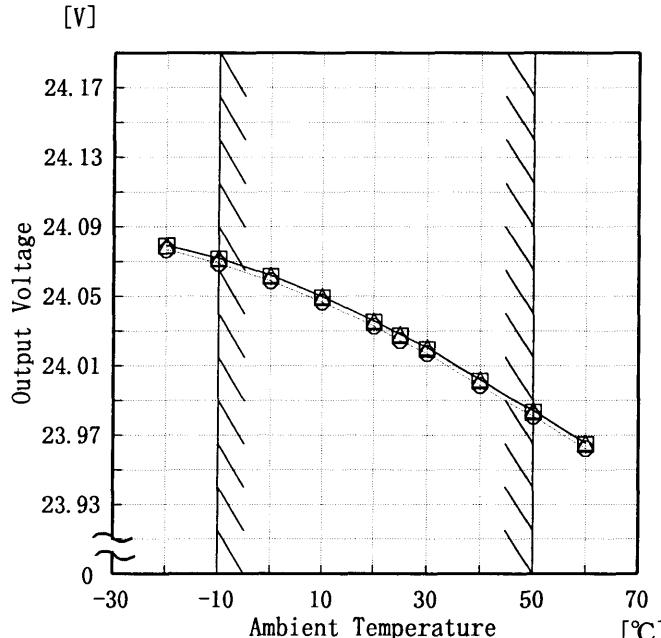
Load	Time	T <sub>d</sub>	T <sub>r</sub>	T <sub>s</sub>	T <sub>h</sub>	T <sub>f</sub>	[mS]
50 %		4.5	13.0	17.5	38.5	231.8	
100 %		4.5	19.0	23.5	16.5	50.5	



**COSEL**

Model	LCA10S-24
Item	Ambient Temperature Drift 周囲温度変動
Object	+24.0V 0.5A

1. Graph
- 
- Input Volt. 85V      Input Volt. 100V      Input Volt. 132V



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。

Testing Circuitry Figure A

## 2. Values

Temperature [°C]	Output Voltage [V]		
	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
-20	24.079	24.079	24.077
-10	24.072	24.071	24.069
0	24.062	24.061	24.059
10	24.050	24.049	24.047
20	24.036	24.035	24.033
25	24.028	24.027	24.025
30	24.020	24.020	24.017
40	24.002	24.001	23.999
50	23.984	23.983	23.981
60	23.966	23.965	23.962
—	—	—	—

**COSSEL**

Model	LCA10S-24	
Item	Minimum Input Voltage for Regulated Output Voltage 最低レギュレーション電圧	
Object	+24.0V 0.5A	
1. Graph	[V]	Load 50%      Load 100%
Note: Slanted line shows the range of the rated ambient temperature.		2. Values
Ambient Temperature [°C]	Input Voltage [V]	
[°C]	Load 50%	Load 100%
-20	39	69
-10	38	69
0	37	68
10	37	67
20	37	67
25	37	67
30	37	67
40	37	66
50	37	66
60	37	66
—	—	—

(注)斜線は定格周囲温度範囲を示す。

**COSEL**

Model LCA10S-24

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

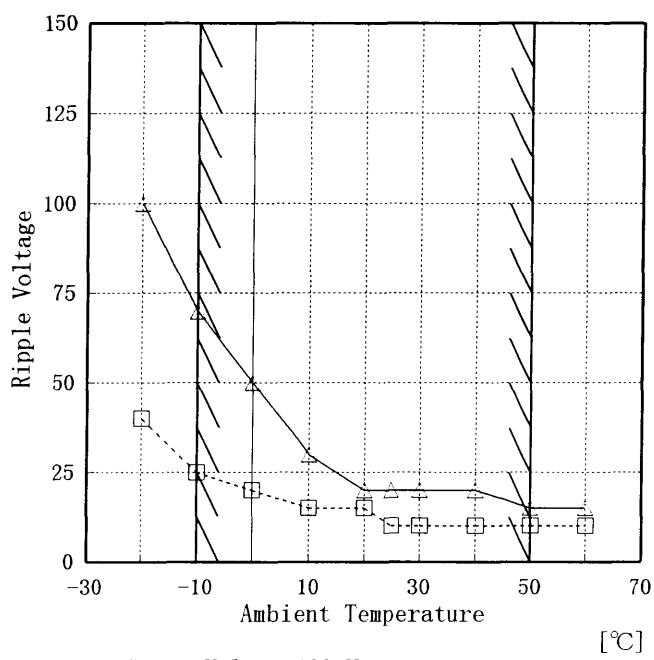
Object +24.0V 0.5A

## 1. Graph

Load 50%

Load 100%

[mV]



Input Volt. 100 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。

Testing Circuitry Figure A

## 2. Values

Ambient Temp. [°C]	Load 50%	Load 100%
	Ripple Output Volt. [mV]	Ripple Output Volt. [mV]
-20	40	100
-10	25	70
0	20	50
10	15	30
20	15	20
25	10	20
30	10	20
40	10	20
50	10	15
60	10	15
—	—	—

**COSEL**

Model	LCA10S-24	Temperature	25°C																										
Item	Time Lapse Drift 経時ドリフト	Testing Circuitry	Figure A																										
Object	+24.0V 0.5A																												
1. Graph			2. Values																										
<p>[V]</p> <table> <tr><td>Input Volt.</td><td>100V</td></tr> <tr><td>Load</td><td>100%</td></tr> </table>			Input Volt.	100V	Load	100%	<table border="1"> <thead> <tr> <th>Time since start [H]</th> <th>Output Voltage [V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>24.041</td></tr> <tr><td>0.5</td><td>24.032</td></tr> <tr><td>1.0</td><td>24.030</td></tr> <tr><td>2.0</td><td>24.030</td></tr> <tr><td>3.0</td><td>24.030</td></tr> <tr><td>4.0</td><td>24.030</td></tr> <tr><td>5.0</td><td>24.031</td></tr> <tr><td>6.0</td><td>24.030</td></tr> <tr><td>7.0</td><td>24.031</td></tr> <tr><td>8.0</td><td>24.031</td></tr> </tbody> </table>	Time since start [H]	Output Voltage [V]	0.0	24.041	0.5	24.032	1.0	24.030	2.0	24.030	3.0	24.030	4.0	24.030	5.0	24.031	6.0	24.030	7.0	24.031	8.0	24.031
Input Volt.	100V																												
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7.0	24.031																												
8.0	24.031																												



Model	LCA10S-24	Testing Circuitry Figure A
Item	Output Voltage Accuracy 定電圧精度	
Object	+24.0V 0.5A	

#### 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 : 0~0.5 A

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

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

#### 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 0~0.5 A

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

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

Item	Temperature [°C]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy(Ration) [%]
Maximum Voltage	-10	85	0.0	24.076		
Minimum Voltage	50	132	0.5	23.980	±49	±0.3



Model	LCA10S-24		
Item	Condensation 結露特性	Testing Circuitry	Figure A
Object	+24.0V 0.5A		

### 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]	24.025	Input Volt.:100V, Load Current:0.5A
Line Regulation [mV]	7	Input Volt.:85~132V, Load Current:0.5A
Load Regulation [mV]	11	Input Volt.:100V, Load Current:0~0.5A

**COSEL**

Model	LCA10S-24	Temperature Testing Circuitry	25°C Figure B
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	0.07	0.08	0.10
(B) IEC60950	0.07	0.09	0.11

## 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	LCA10S-24	Temperature Testing Circuitry	25°C Figure C
Item	Line Noise Tolerance 入力雑音耐量		
Object	+24.0V 0.5A		

## 1. Results

Pulse Width [ nS ]	MODE	No protection failure should occur 保護回路の誤動作がない	DC-like Regulation of Output Voltage 出力電圧の直流的変動
50	COMMON	OK	no fluctuation
	NORMAL	OK	no fluctuation
1000	COMMON	OK	no fluctuation
	NORMAL	OK	no fluctuation

## 2. Conditions

Input Voltage : 100 V  
 Pulse Voltage : 2000 V  
 Pulse Cycle : 10 mS  
 Pulse Input Duration : 1 min. or more  
 Load : 100 %

COSEL

Model	LCA10S-24	Temperature Testing Circuitry	25°C Figure D
Item	Conducted Emission 雜音端子電圧		
Object	_____		

## 1. Graph

## Remarks

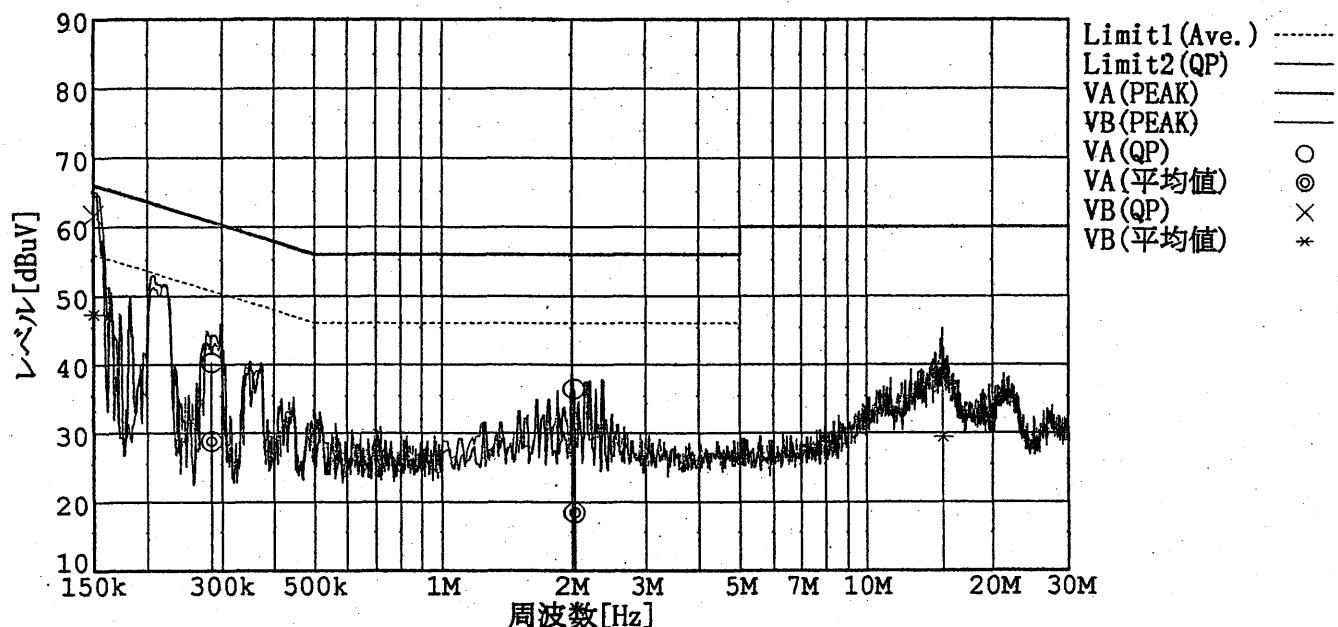
Input Volt. 100 V (VCCI Class B)

120 V (FCC Class B)

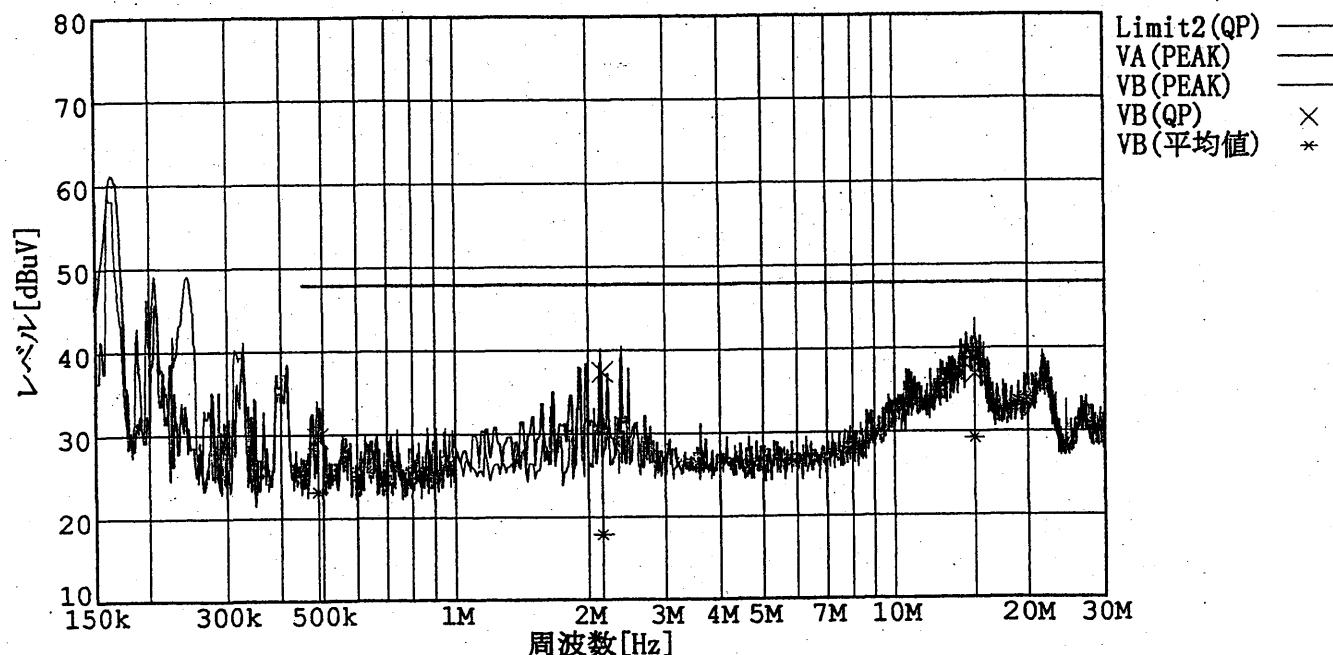
Load 100 %

規格1: [VCCI] Class B(平均値)

規格2: [VCCI] Class B(QP)



規格2: [FCC Part15] Class B



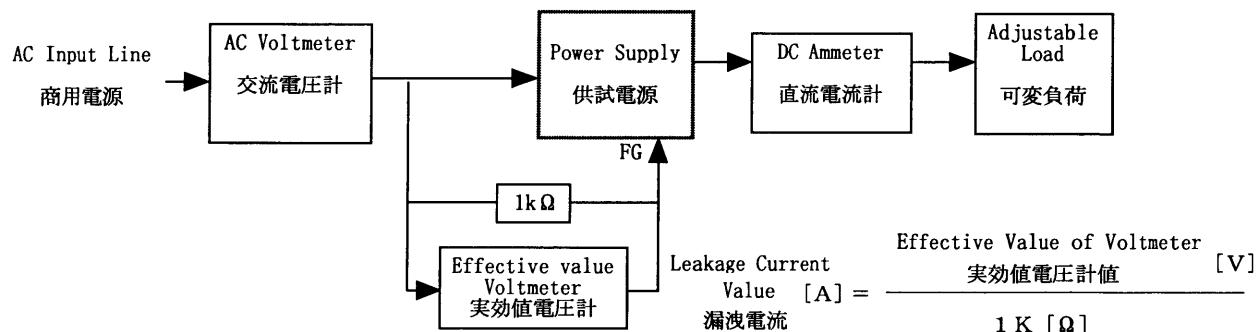
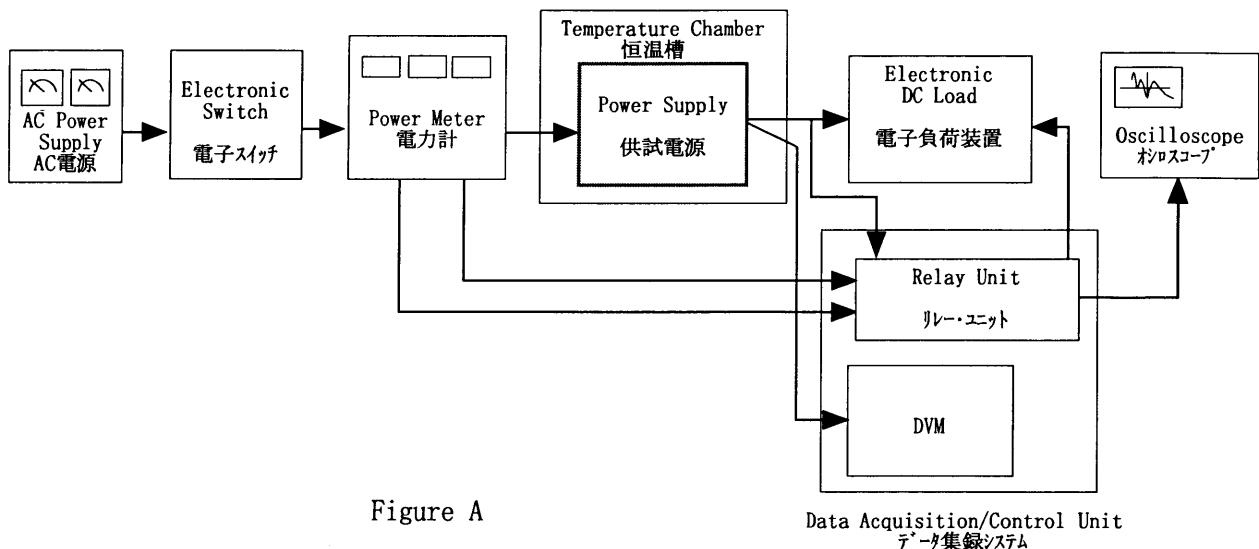


Figure B (DENTORI)

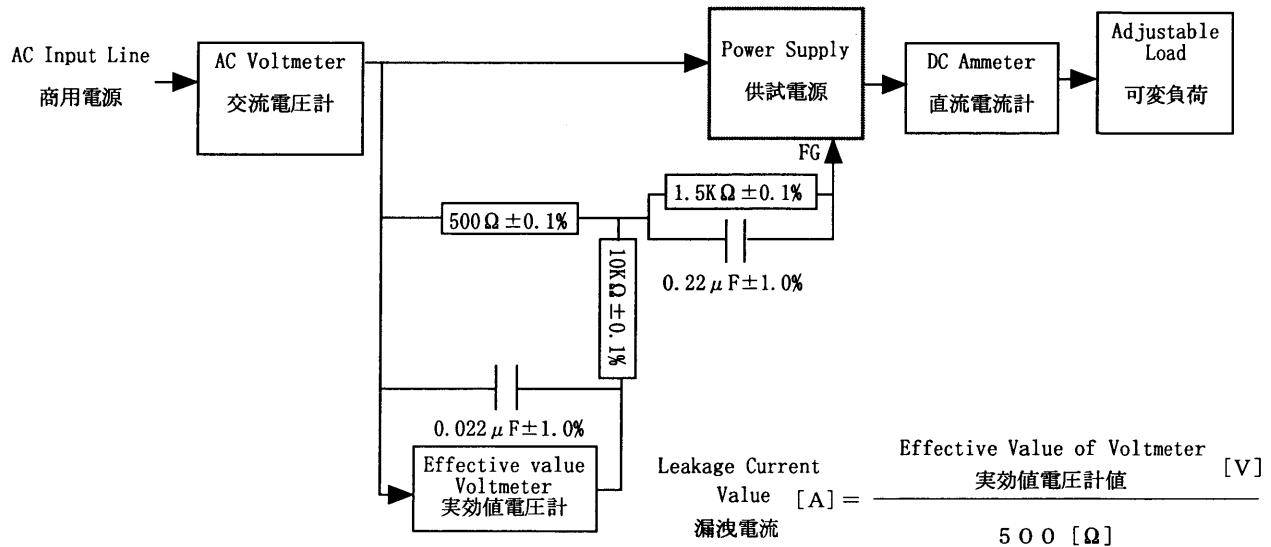


Figure B (IEC 60950)

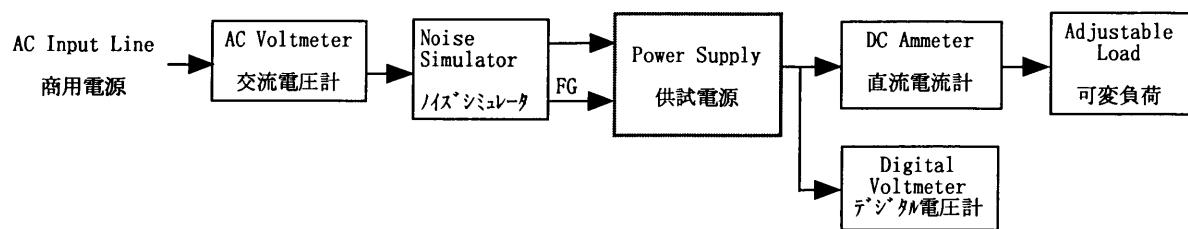


Figure C

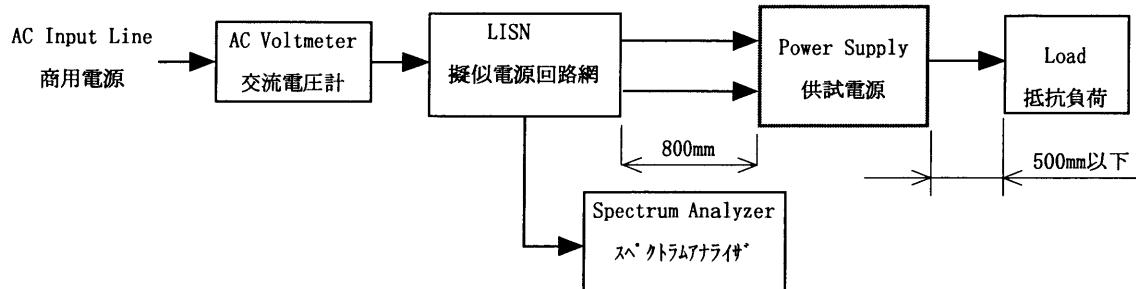


Figure D

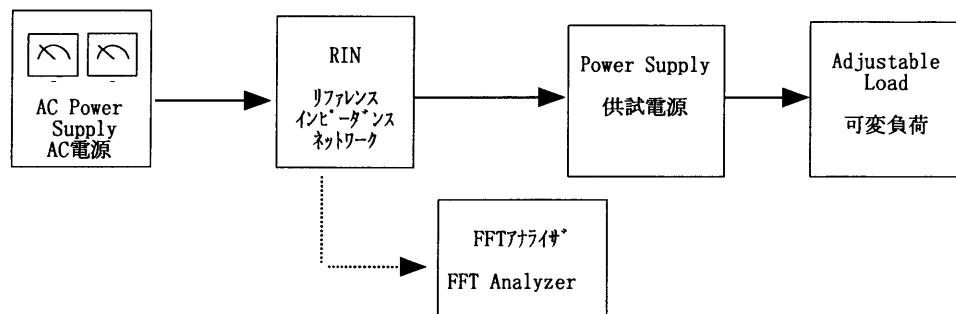


Figure E