



# TEST DATA OF LCA150S-24

(100V INPUT)

Regulated DC Power Supply

Date : Aug. 13. 1999

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Design Manager

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Design Engineer

**コーセル株式会社**  
**COSEL CO., LTD.**

# COSEL

## CONTENTS

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

(Final Page 26 )

# COSEL

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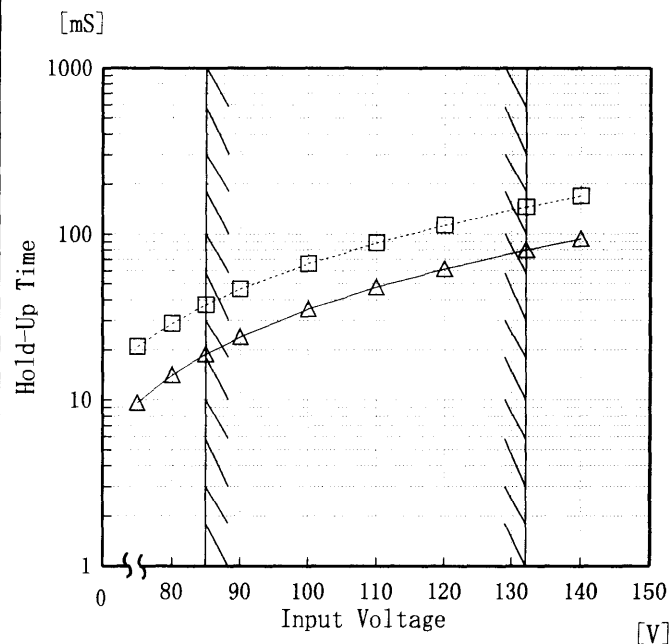
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Model	LCA150S-24
Item	Hold-Up Time 出力保持時間
Object	+24.0V6.3A

Temperature 25°C  
 Testing Circuitry Figure A

1. Graph □ Load 50%  
△ Load 100%



2. Values

Input Voltage [V]	Hold-Up Time [mS]	
	Load 50%	Load 100%
75	21	10
80	29	14
85	37	19
90	46	24
100	66	35
110	89	48
120	113	61
132	146	80
140	169	93

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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Item		Instantaneous Interruption Compensation 瞬時停電保障	Testing Circuitry		Figure A																																																			
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<p> <input type="checkbox"/> —△— Input Volt. 85 V  <input type="checkbox"/> - - - □ - - - Input Volt. 100 V  <input type="checkbox"/> - - - ○ - - - Input Volt. 132 V                 </p>			<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="3">Output Voltage [V]</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>24.237</td><td>24.237</td><td>24.237</td></tr> <tr><td>1.00</td><td>24.235</td><td>24.236</td><td>24.235</td></tr> <tr><td>2.00</td><td>24.236</td><td>24.235</td><td>24.235</td></tr> <tr><td>3.00</td><td>24.235</td><td>24.235</td><td>24.235</td></tr> <tr><td>4.00</td><td>24.235</td><td>24.235</td><td>24.235</td></tr> <tr><td>5.00</td><td>24.235</td><td>24.235</td><td>24.235</td></tr> <tr><td>6.00</td><td>24.235</td><td>24.235</td><td>24.234</td></tr> <tr><td>6.30</td><td>24.235</td><td>24.235</td><td>24.235</td></tr> <tr><td>6.93</td><td>24.235</td><td>24.235</td><td>24.234</td></tr> <tr><td>—</td><td>—</td><td>—</td><td>—</td></tr> </tbody> </table>			Load Current [A]	Output Voltage [V]			Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]	0.00	24.237	24.237	24.237	1.00	24.235	24.236	24.235	2.00	24.236	24.235	24.235	3.00	24.235	24.235	24.235	4.00	24.235	24.235	24.235	5.00	24.235	24.235	24.235	6.00	24.235	24.235	24.234	6.30	24.235	24.235	24.235	6.93	24.235	24.235	24.234	—	—	—	—
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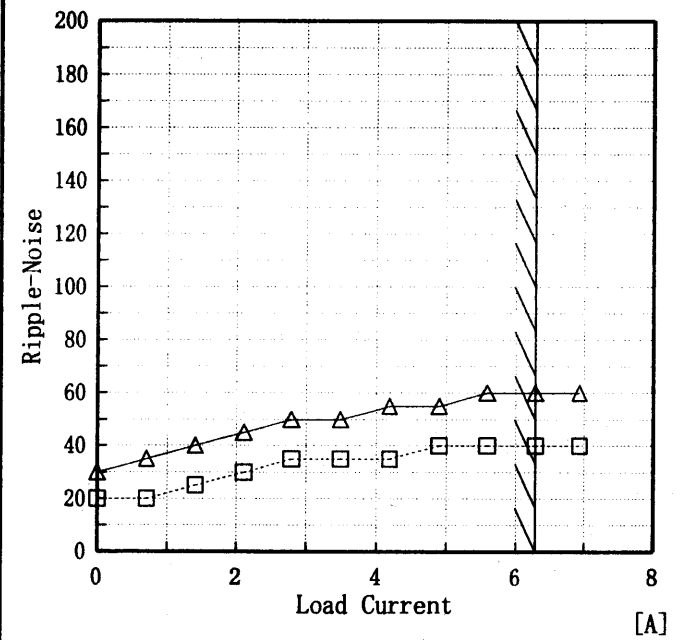
# COSEL

Model		LCA150S-24		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																																							
Object		+24.0V 6.3A																																											
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<p>Fig. Complex Ripple Wave Form</p> <p>図 リップル波形詳細図</p>																																													



Model	LCA150S-24	Temperature	25°C
Item	Ripple-Noise リップルノイズ	Testing Circuitry	Figure A
Object	+24.0V6.3A		

1. Graph  
 [mV]  
 □ Input Volt. 85V  
 △ Input Volt. 132V



2. Values

Load current [A]	Input Volt. 85 [V]	Input Volt. 132 [V]
	Ripple-Noise [mV]	Ripple-Noise [mV]
0.00	20	30
0.70	20	35
1.40	25	40
2.10	30	45
2.80	35	50
3.50	35	50
4.20	35	55
4.90	40	55
5.60	40	60
6.30	40	60
6.93	40	60

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

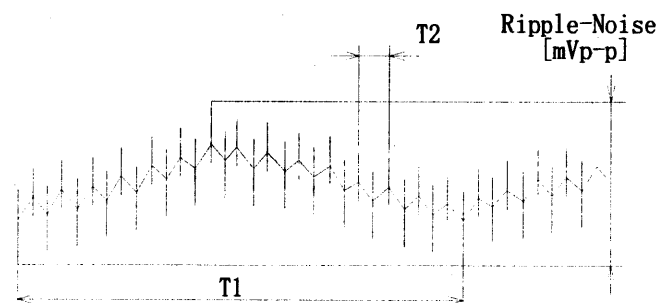


Fig. Complex Ripple Wave Form  
 図 リップル波形詳細図

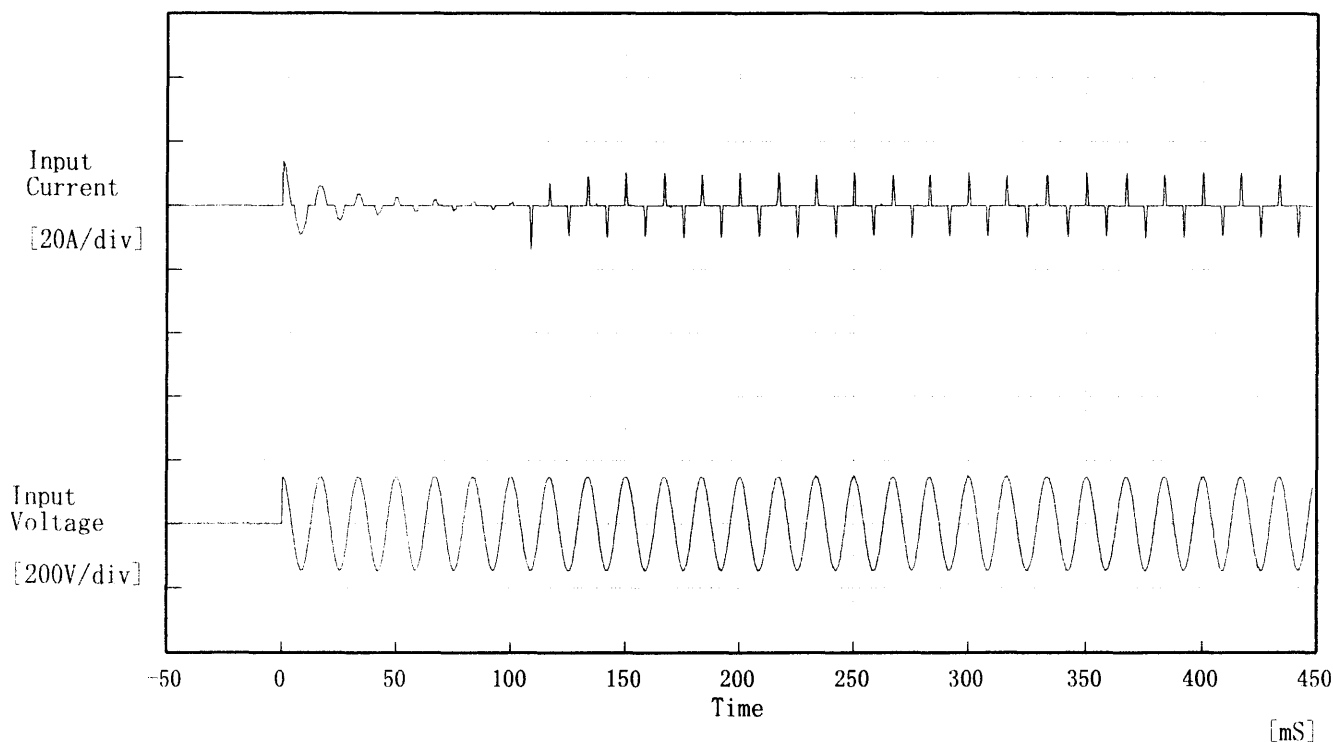
Model		LCA150S-24		Temperature		25°C																																																								
Item		Overcurrent Protection 過電流保護		Testing Circuitry		Figure A																																																								
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<p>Legend:              - - - - - Input Volt. 85 V              ———— Input Volt. 100 V              ———— Input Volt. 132 V</p>				<table border="1"> <thead> <tr> <th rowspan="3">Output Voltage [V]</th> <th colspan="3">Load Current [A]</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>24.00</td> <td>7.723</td> <td>7.673</td> <td>7.681</td> </tr> <tr> <td>22.80</td> <td>7.724</td> <td>7.680</td> <td>7.697</td> </tr> <tr> <td>21.60</td> <td>7.735</td> <td>7.697</td> <td>7.718</td> </tr> <tr> <td>19.20</td> <td>7.766</td> <td>7.742</td> <td>7.756</td> </tr> <tr> <td>16.80</td> <td>7.793</td> <td>7.767</td> <td>7.796</td> </tr> <tr> <td>14.40</td> <td>7.822</td> <td>7.785</td> <td>7.831</td> </tr> <tr> <td>12.00</td> <td>7.830</td> <td>7.813</td> <td>7.874</td> </tr> <tr> <td>9.60</td> <td>7.851</td> <td>7.839</td> <td>7.872</td> </tr> <tr> <td>7.20</td> <td>7.837</td> <td>7.816</td> <td>7.880</td> </tr> <tr> <td>4.80</td> <td>7.771</td> <td>7.854</td> <td>7.890</td> </tr> <tr> <td>2.40</td> <td>7.780</td> <td>7.750</td> <td>7.728</td> </tr> <tr> <td>0.00</td> <td>7.720</td> <td>7.757</td> <td>7.930</td> </tr> </tbody> </table>				Output Voltage [V]	Load Current [A]			Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]	24.00	7.723	7.673	7.681	22.80	7.724	7.680	7.697	21.60	7.735	7.697	7.718	19.20	7.766	7.742	7.756	16.80	7.793	7.767	7.796	14.40	7.822	7.785	7.831	12.00	7.830	7.813	7.874	9.60	7.851	7.839	7.872	7.20	7.837	7.816	7.880	4.80	7.771	7.854	7.890	2.40	7.780	7.750	7.728	0.00	7.720	7.757	7.930
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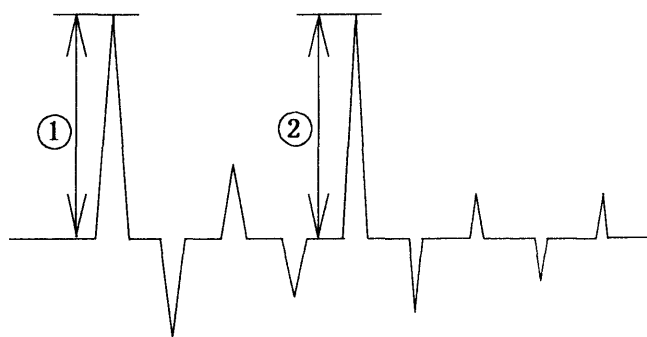
Model		LCA150S-24		Testing Circuitry Figure A																																																				
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<p>                     [V]                      Operating Point  </p> <p style="text-align: center;">Load 0%</p> <p>Note: Slanted line shows the range of the rated ambient temperature.</p> <p>(注)斜線は定格周囲温度範囲を示す。</p>		<table border="1"> <thead> <tr> <th rowspan="2">Ambient Temp. [°C]</th> <th colspan="3">Operating Point [V]</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>-20</td><td>30.51</td><td>30.51</td><td>30.51</td></tr> <tr><td>-10</td><td>30.79</td><td>30.79</td><td>30.79</td></tr> <tr><td>0</td><td>31.07</td><td>31.07</td><td>31.07</td></tr> <tr><td>10</td><td>31.35</td><td>31.35</td><td>31.35</td></tr> <tr><td>20</td><td>31.56</td><td>31.56</td><td>31.56</td></tr> <tr><td>25</td><td>31.70</td><td>31.70</td><td>31.70</td></tr> <tr><td>30</td><td>31.83</td><td>31.83</td><td>31.83</td></tr> <tr><td>40</td><td>32.11</td><td>32.11</td><td>32.11</td></tr> <tr><td>50</td><td>32.39</td><td>32.39</td><td>32.39</td></tr> <tr><td>60</td><td>32.60</td><td>32.60</td><td>32.60</td></tr> <tr><td>—</td><td>—</td><td>—</td><td>—</td></tr> </tbody> </table>		Ambient Temp. [°C]	Operating Point [V]			Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]	-20	30.51	30.51	30.51	-10	30.79	30.79	30.79	0	31.07	31.07	31.07	10	31.35	31.35	31.35	20	31.56	31.56	31.56	25	31.70	31.70	31.70	30	31.83	31.83	31.83	40	32.11	32.11	32.11	50	32.39	32.39	32.39	60	32.60	32.60	32.60	—	—	—	—		
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60	32.60	32.60	32.60																																																					
—	—	—	—																																																					



Model	LCA150S-24	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 13.80 [A]  
 ② 13.80 [A]



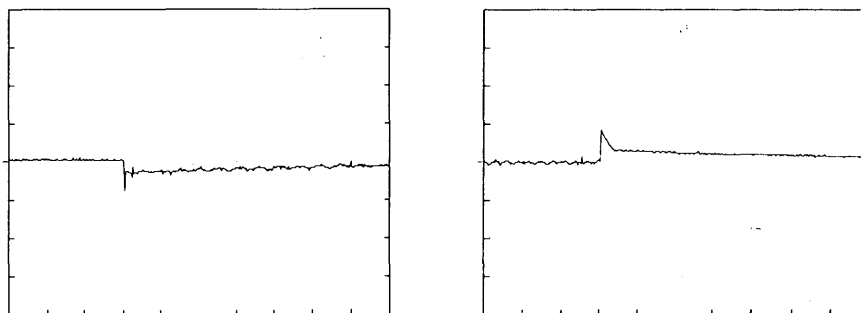
# COSEL

Model	LCA150S-24	Temperature 25°C Testing Circuitry Figure A
Item	Dynamic Load Responce 動的負荷変動	
Object	+24.0V6.3A	

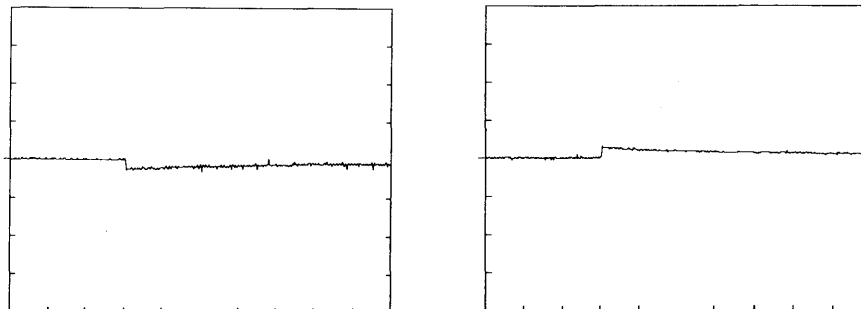
Input Volt. 100 V  
Cycle 1000 mS



Load 0% ↔  
Load 100 %



Load 0% ↔  
Load 50 %



100 mV/div

10 mS/div

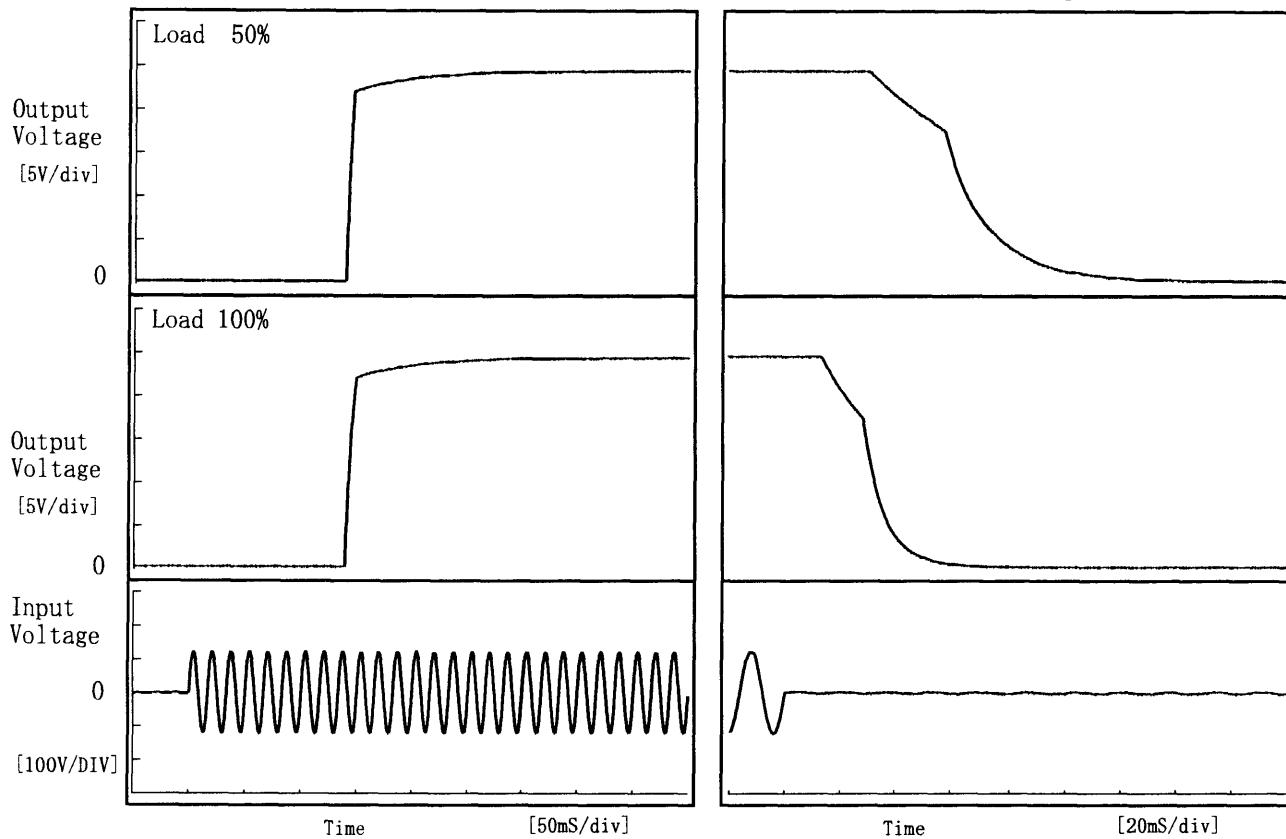


# COSEL

Model	LCA150S-24	Temperature	25°C
Item	Rise and Fall Time 立上り、立下り時間	Testing Circuitry	Figure A
Object	+24.0V6.3A		

1. Graph

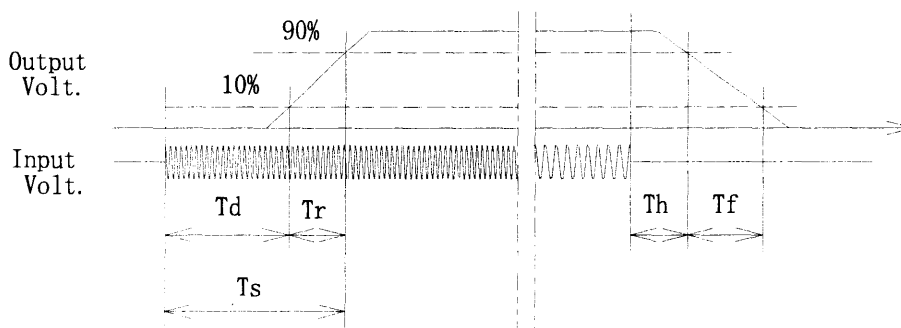
Input Volt. 85 V



2. Values

[mS]

Load \ Time	T <sub>d</sub>	T <sub>r</sub>	T <sub>s</sub>	T <sub>h</sub>	T <sub>f</sub>
50 %	139.3	6.5	145.8	39.5	49.1
100 %	139.0	10.0	149.0	18.0	25.9



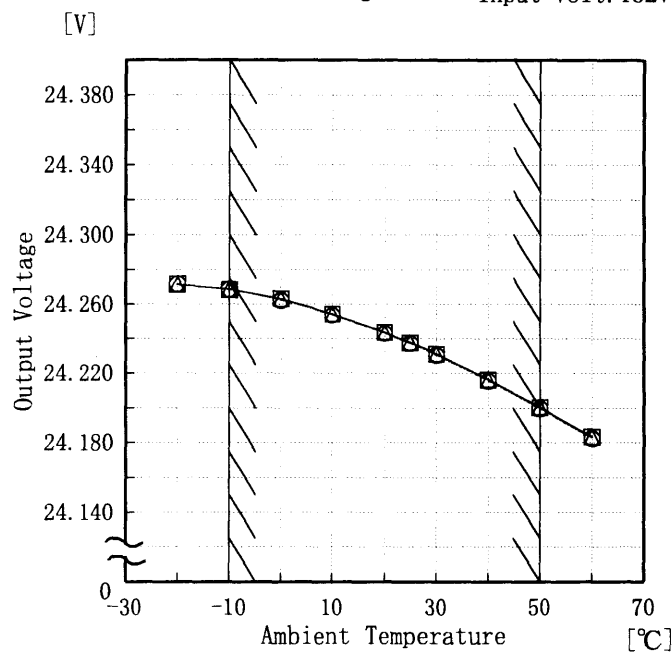


Model	LCA150S-24
Item	Ambient Temperature Drift 周囲温度変動
Object	+24.0V6.3A

Testing Circuitry Figure A

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。

2. Values

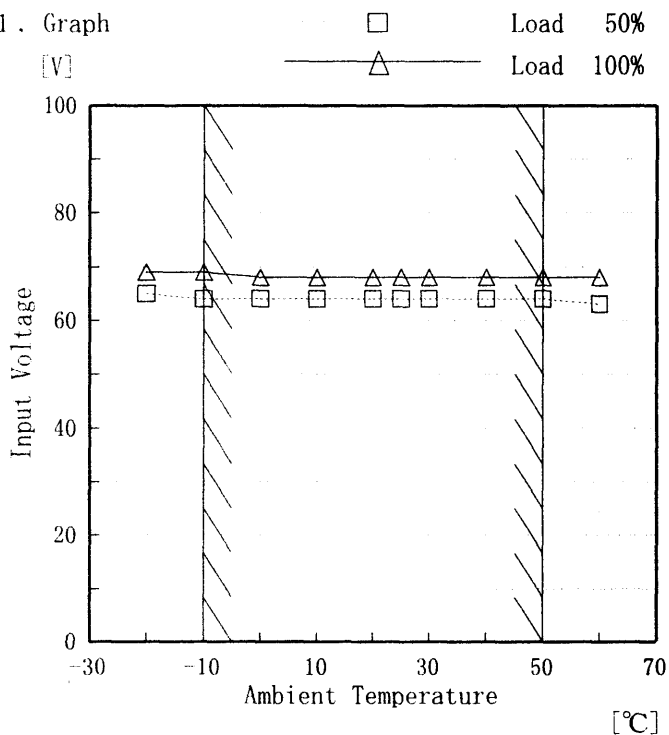
Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
-20	24.271	24.272	24.272
-10	24.269	24.268	24.269
0	24.263	24.263	24.262
10	24.254	24.254	24.254
20	24.244	24.244	24.243
25	24.238	24.238	24.237
30	24.231	24.231	24.230
40	24.216	24.216	24.216
50	24.200	24.200	24.200
60	24.183	24.183	24.182
—	—	—	—



Model	LCA150S-24
Item	Minimum Input Voltage for Regulated Output Voltage 最低レギュレーション電圧
Object	+24.0V6.3A

Testing Circuitry Figure A

1. Graph



2. Values

Ambient Temp. [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	65	69
-10	64	69
0	64	68
10	64	68
20	64	68
25	64	68
30	64	68
40	64	68
50	64	68
60	63	68
—	—	—

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

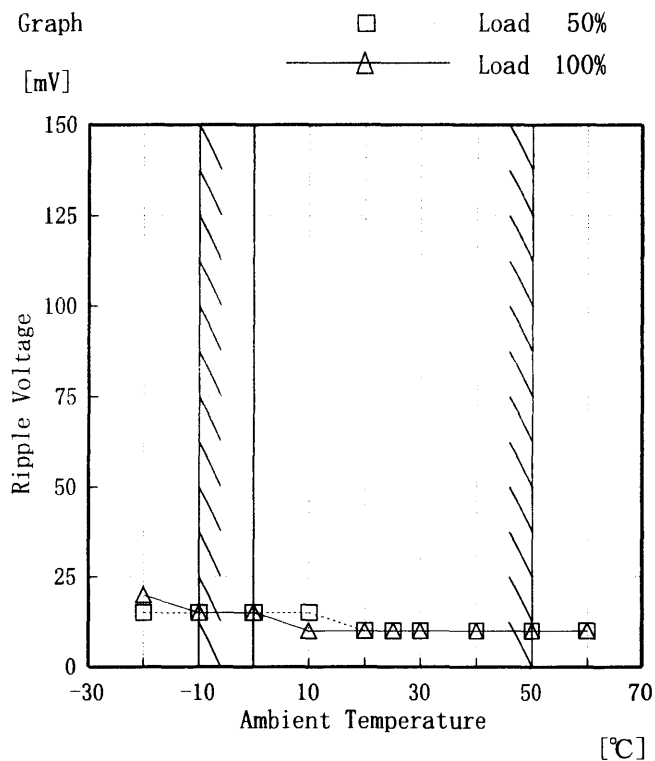
(注)斜線は定格周囲温度範囲を示す。



Model	LCA150S-24
Item	Ripple Voltage (by Ambient Temp.) リップル電圧 (周囲温度特性)
Object	+24.0V 6.3A

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



<b>COSEL</b>																								
Model	LCA150S-24																							
Item	Time Lapse Drift 経時ドリフト	Temperature 25°C Testing Circuitry Figure A																						
Object	+24.0V6.3A																							
<p>1. Graph</p> <p style="text-align: center;">Time [H]</p> <p>Input Volt. 100V Load 100%</p>		<p>2. Values</p> <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>24.255</td></tr> <tr><td>0.5</td><td>24.245</td></tr> <tr><td>1.0</td><td>24.244</td></tr> <tr><td>2.0</td><td>24.244</td></tr> <tr><td>3.0</td><td>24.245</td></tr> <tr><td>4.0</td><td>24.244</td></tr> <tr><td>5.0</td><td>24.244</td></tr> <tr><td>6.0</td><td>24.244</td></tr> <tr><td>7.0</td><td>24.244</td></tr> <tr><td>8.0</td><td>24.244</td></tr> </tbody> </table>	Time since start [H]	Output Voltage [V]	0.0	24.255	0.5	24.245	1.0	24.244	2.0	24.244	3.0	24.245	4.0	24.244	5.0	24.244	6.0	24.244	7.0	24.244	8.0	24.244
Time since start [H]	Output Voltage [V]																							
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3.0	24.245																							
4.0	24.244																							
5.0	24.244																							
6.0	24.244																							
7.0	24.244																							
8.0	24.244																							



Model		LCA150S-24	Testing Circuitry Figure A
Item	Output Voltage Accuracy 定電圧精度		
Object	+24.0V6.3A		

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 : 0.00~6.30 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 0.00~6.30 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	0.00	24.265	±36	±0.2
Minimum Voltage	50	132	6.30	24.194		



<b>COSEL</b>		
Model	LCA150S-24	
Item	Condensation 結露特性	Testing Circuitry Figure A
Object	+24.0V6.3A	

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]	24.242	Input Volt.: 100V, Load Current:6.3A
Line Regulation [mV]	5	Input Volt.: 85~132V, Load Current:6.3A
Load Regulation [mV]	8	Input Volt.: 100V, Load Current:0~6.3A



Model		LCA150S-24	Temperature 25°C Testing Circuitry 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	0.18	0.21	0.27
(B) IEC60950	0.18	0.21	0.28

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

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。





Model	LCA150S-24	Temperature 25°C Testing Circuitry Figure C
Item	Line Noise Tolerance 入力雑音耐量	
Object	+24.0V6.3A	

## 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 %



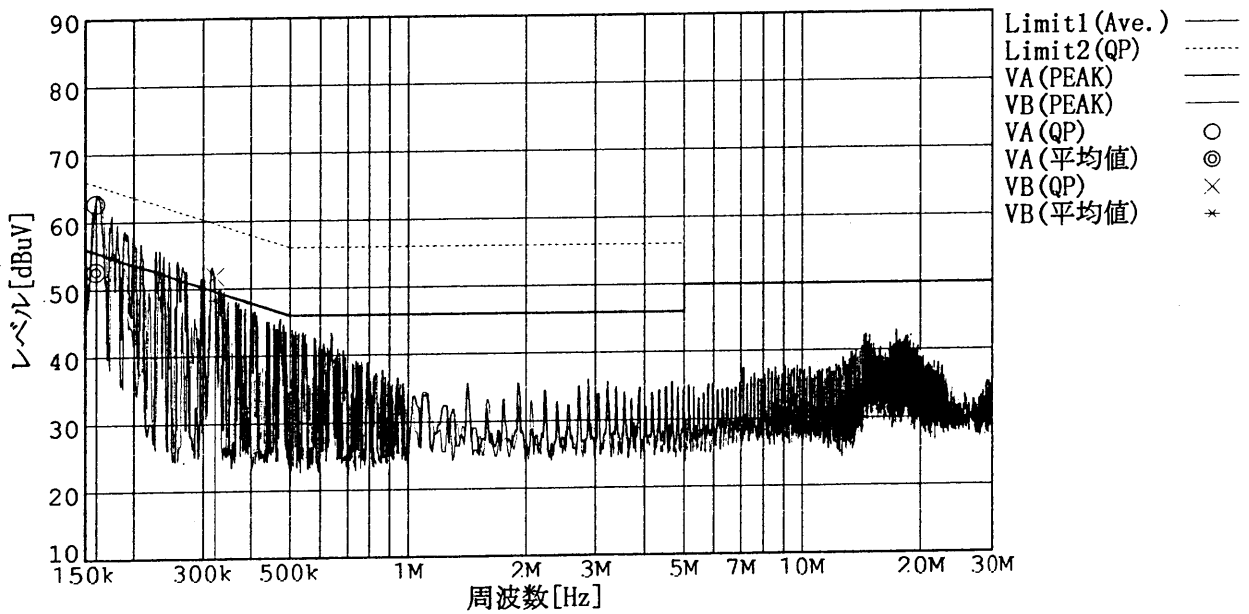
Model	LCA150S-24	Temperature	25°C
Item	Conducted Emission 雑音端子電圧	Testing Circuitry	Figure D
Object	_____		

1. Graph

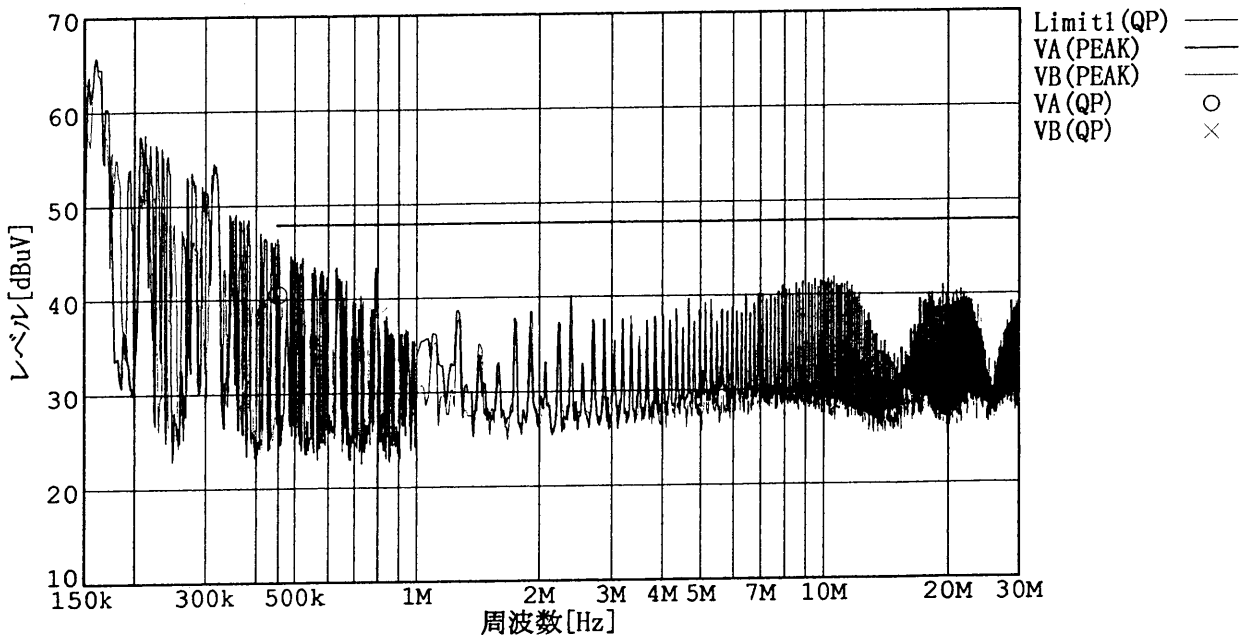
Remarks

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 1 : [FCC Part15] Class B



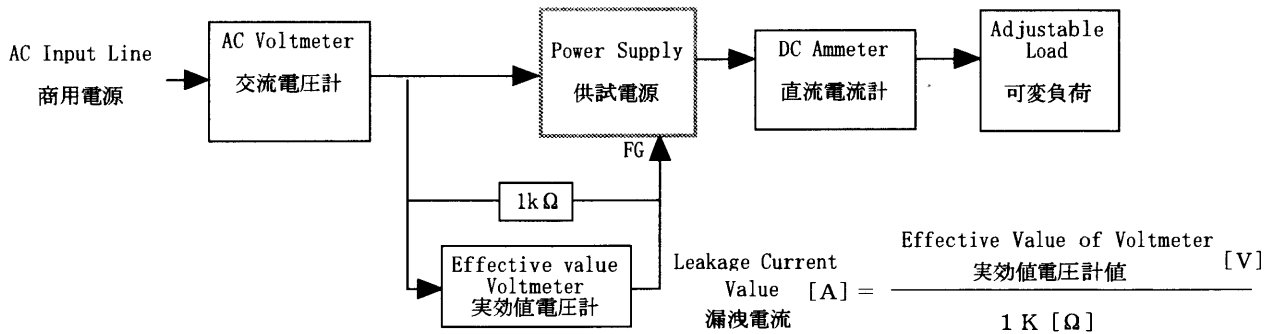
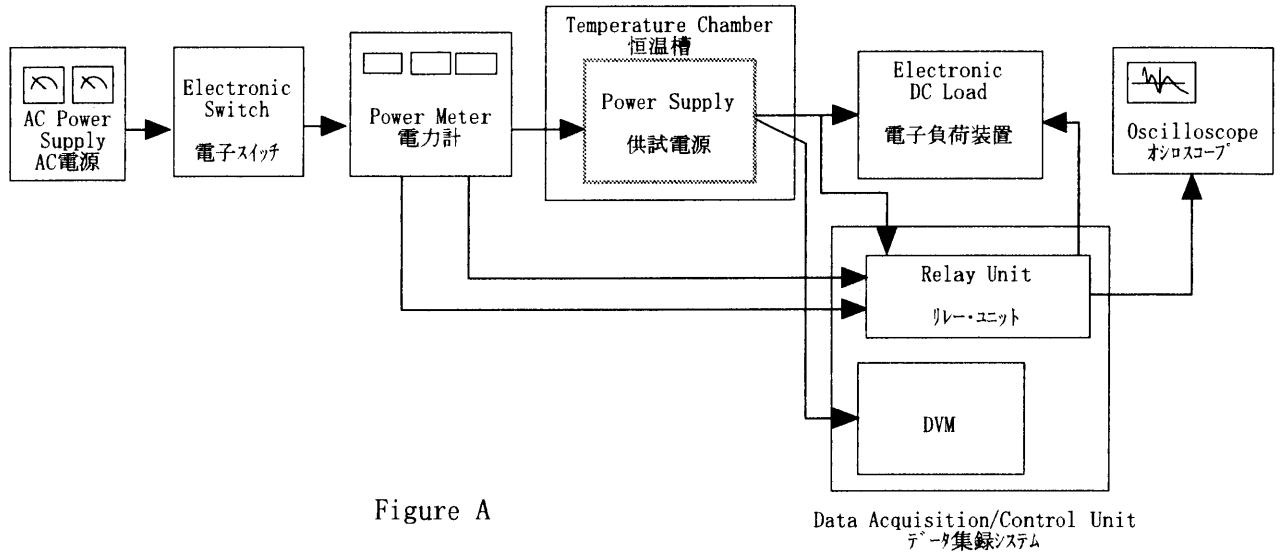


Figure B (DENTORI)

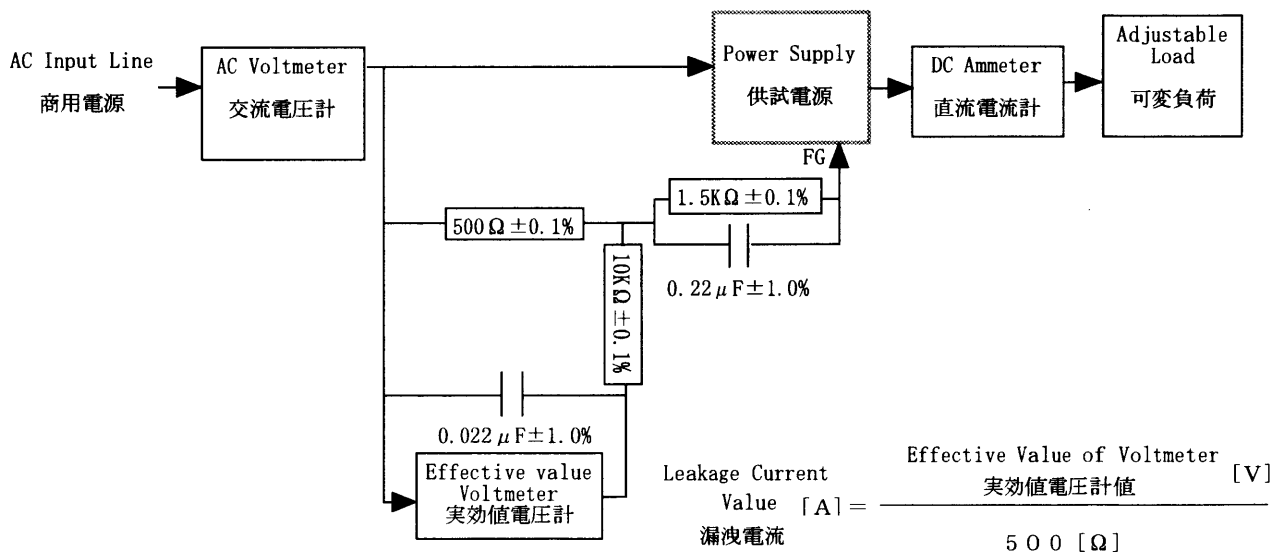


Figure B (IEC 60950)

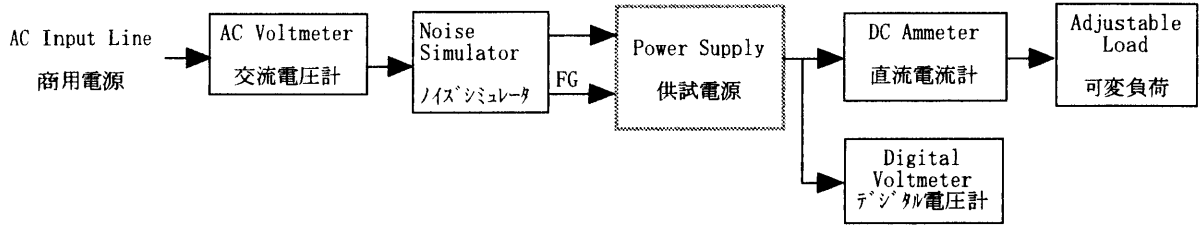


Figure C

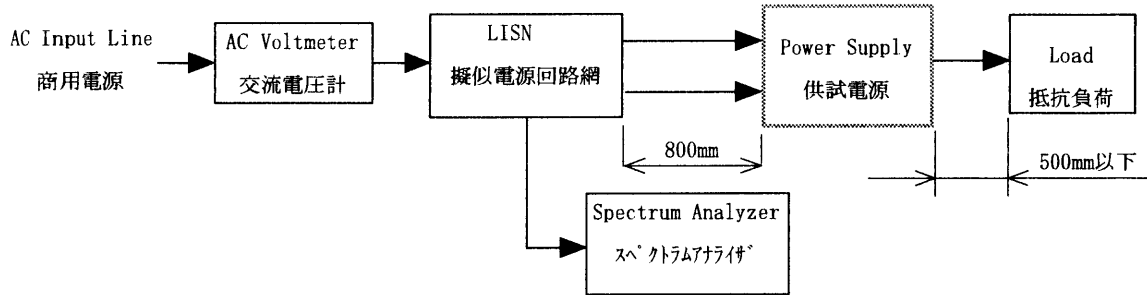


Figure D

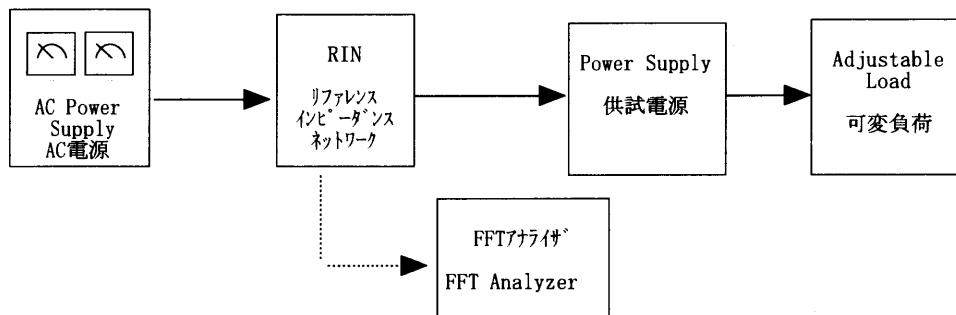


Figure E