



TEST DATA OF LCA15S-12
(100V INPUT)

Regulated DC Power Supply

Date : June 17. 1999

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Design Manager

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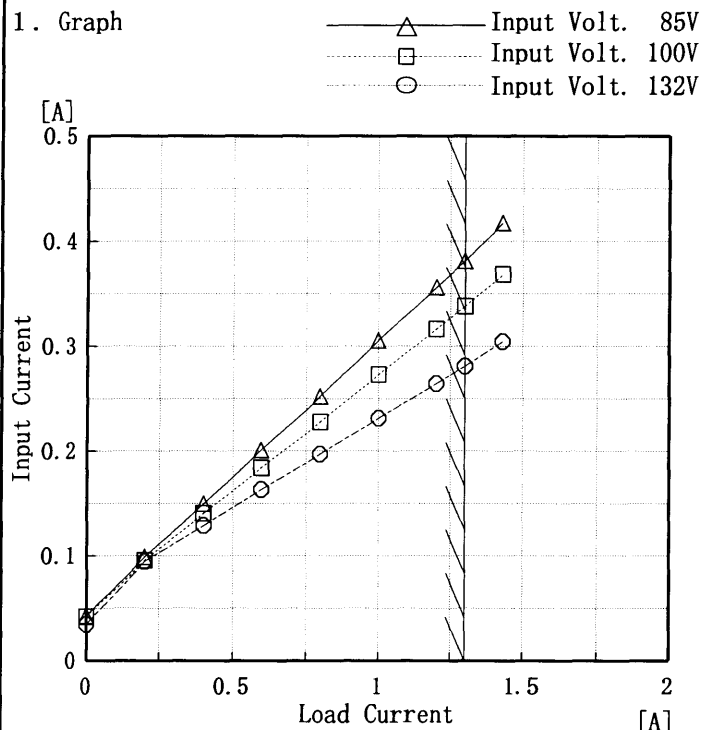
Model		LCA15S-12		Temperature	25°C																																
Item		Line Regulation 静的入力変動		Testing Circuitry	Figure A																																
Object		+12.0V1.3A																																			
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Model	LCA15S-12
Item	Input Current (by Load Current) 入力電流 (負荷特性)
Output	—————

Temperature 25°C
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	0.043	0.042	0.035
0.20	0.099	0.096	0.095
0.40	0.150	0.140	0.129
0.60	0.201	0.184	0.164
0.80	0.252	0.228	0.197
1.00	0.305	0.273	0.231
1.20	0.356	0.316	0.265
1.30	0.381	0.338	0.281
1.43	0.417	0.369	0.305
—	—	—	—
—	—	—	—
—	—	—	—



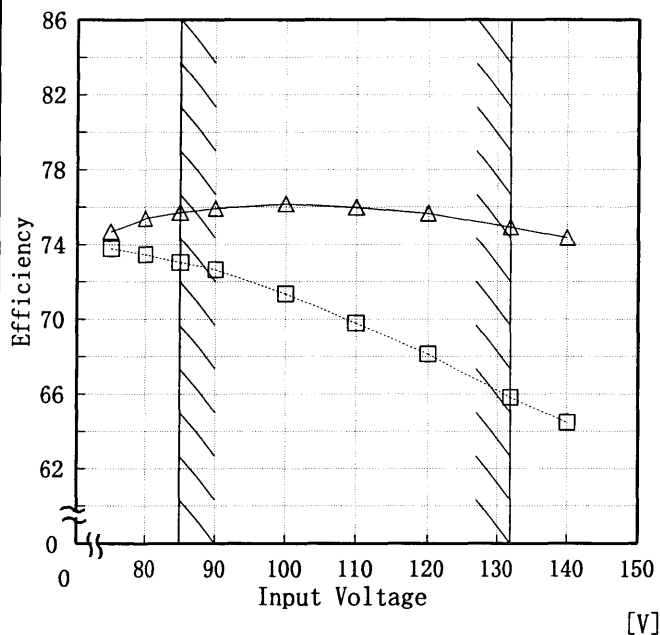
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<p> \triangle — Input Volt. 85V \square — Input Volt. 100V \circ — Input Volt. 132V </p> <p style="text-align: center;"> Note: Slanted line shows the range of the rated load current (注) 斜線は定格負荷電流範囲を示す。 </p>				<table border="1"> <thead> <tr> <th rowspan="2">Load 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>1.60</td><td>1.78</td><td>1.76</td></tr> <tr><td>0.20</td><td>4.43</td><td>4.86</td><td>5.99</td></tr> <tr><td>0.40</td><td>7.19</td><td>7.58</td><td>8.58</td></tr> <tr><td>0.60</td><td>10.04</td><td>10.34</td><td>11.28</td></tr> <tr><td>0.80</td><td>12.95</td><td>13.14</td><td>13.92</td></tr> <tr><td>1.00</td><td>16.04</td><td>16.11</td><td>16.73</td></tr> <tr><td>1.20</td><td>19.06</td><td>19.02</td><td>19.44</td></tr> <tr><td>1.30</td><td>20.56</td><td>20.45</td><td>20.78</td></tr> <tr><td>1.43</td><td>22.76</td><td>22.56</td><td>22.76</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	1.60	1.78	1.76	0.20	4.43	4.86	5.99	0.40	7.19	7.58	8.58	0.60	10.04	10.34	11.28	0.80	12.95	13.14	13.92	1.00	16.04	16.11	16.73	1.20	19.06	19.02	19.44	1.30	20.56	20.45	20.78	1.43	22.76	22.56	22.76	—	—	—	—	—	—	—	—	—	—	—	—
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Model	LCA15S-12
Item	Efficiency 効率
Object	_____

Temperature 25°C
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]	Efficiency [%]	
	Load 50%	Load 100%
75	73.8	74.7
80	73.5	75.4
85	73.1	75.7
90	72.7	75.9
100	71.4	76.2
110	69.8	76.0
120	68.1	75.7
132	65.8	74.9
140	64.5	74.4



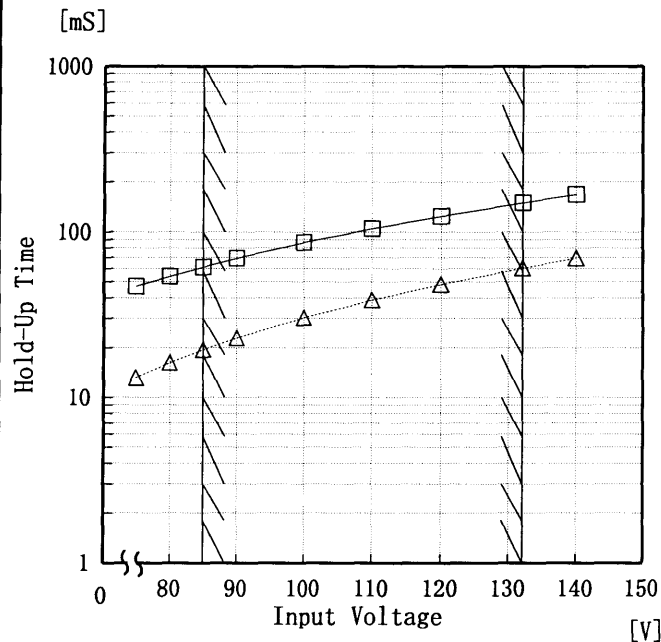
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<p> <input type="checkbox"/> —△— Input Volt. 85V <input type="checkbox"/> - - -□- - - Input Volt. 100V <input type="checkbox"/> - - -○- - - Input Volt. 132V </p> <p> Note: Slanted line shows the range of the rated load current (注) 斜線は定格負荷電流範囲を示す。 </p>			<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="3">Efficiency [%]</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>0.20</td><td>55.1</td><td>50.6</td><td>41.1</td></tr> <tr><td>0.40</td><td>67.1</td><td>64.2</td><td>56.2</td></tr> <tr><td>0.60</td><td>72.3</td><td>70.4</td><td>64.5</td></tr> <tr><td>0.80</td><td>74.8</td><td>73.8</td><td>69.7</td></tr> <tr><td>1.00</td><td>75.5</td><td>75.2</td><td>72.6</td></tr> <tr><td>1.20</td><td>75.6</td><td>75.9</td><td>74.4</td></tr> <tr><td>1.30</td><td>75.7</td><td>76.2</td><td>74.9</td></tr> <tr><td>1.43</td><td>75.5</td><td>76.3</td><td>75.6</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> <tr><td>—</td><td>—</td><td>—</td><td>—</td></tr> </tbody> </table>			Load Current [A]	Efficiency [%]			Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]	0.20	55.1	50.6	41.1	0.40	67.1	64.2	56.2	0.60	72.3	70.4	64.5	0.80	74.8	73.8	69.7	1.00	75.5	75.2	72.6	1.20	75.6	75.9	74.4	1.30	75.7	76.2	74.9	1.43	75.5	76.3	75.6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
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Model	LCA15S-12
Item	Hold-Up Time 出力保持時間
Object	+12.0V1.3A

Temperature 25°C
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]	Hold-Up Time [mS]	
	Load 50%	Load 100%
75	47	13
80	54	16
85	61	19
90	69	23
100	86	30
110	105	39
120	125	48
132	150	60
140	168	69



Model		LCA15S-12		Temperature		25°C																																																				
Item		Instantaneous Interruption Compensation 瞬時停電保障		Testing Circuitry		Figure A																																																				
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<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>																																																										

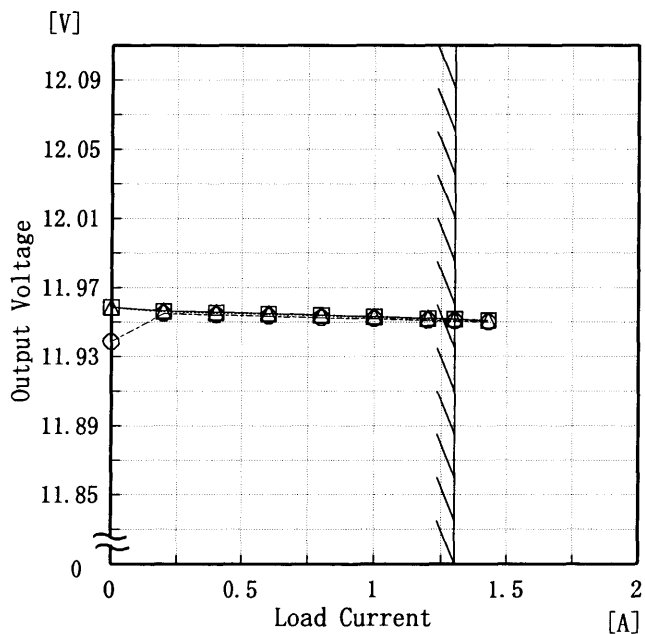


Model	LCA15S-12
Item	Load Regulation 静的負荷変動
Object	+12.0V 1.3A

Temperature 25°C
Testing Circuitry Figure A

1. Graph

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



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	11.959	11.958	11.939
0.20	11.957	11.956	11.955
0.40	11.956	11.955	11.954
0.60	11.955	11.955	11.953
0.80	11.954	11.954	11.953
1.00	11.953	11.953	11.952
1.20	11.952	11.952	11.951
1.30	11.952	11.952	11.951
1.43	11.951	11.951	11.950
—	—	—	—



Model		LCA15S-12																																							
Item		Ripple Voltage (by Load Current) リップル電圧(負荷電流特性)																																							
Object		+12.0V 1.3A																																							
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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 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>																																									



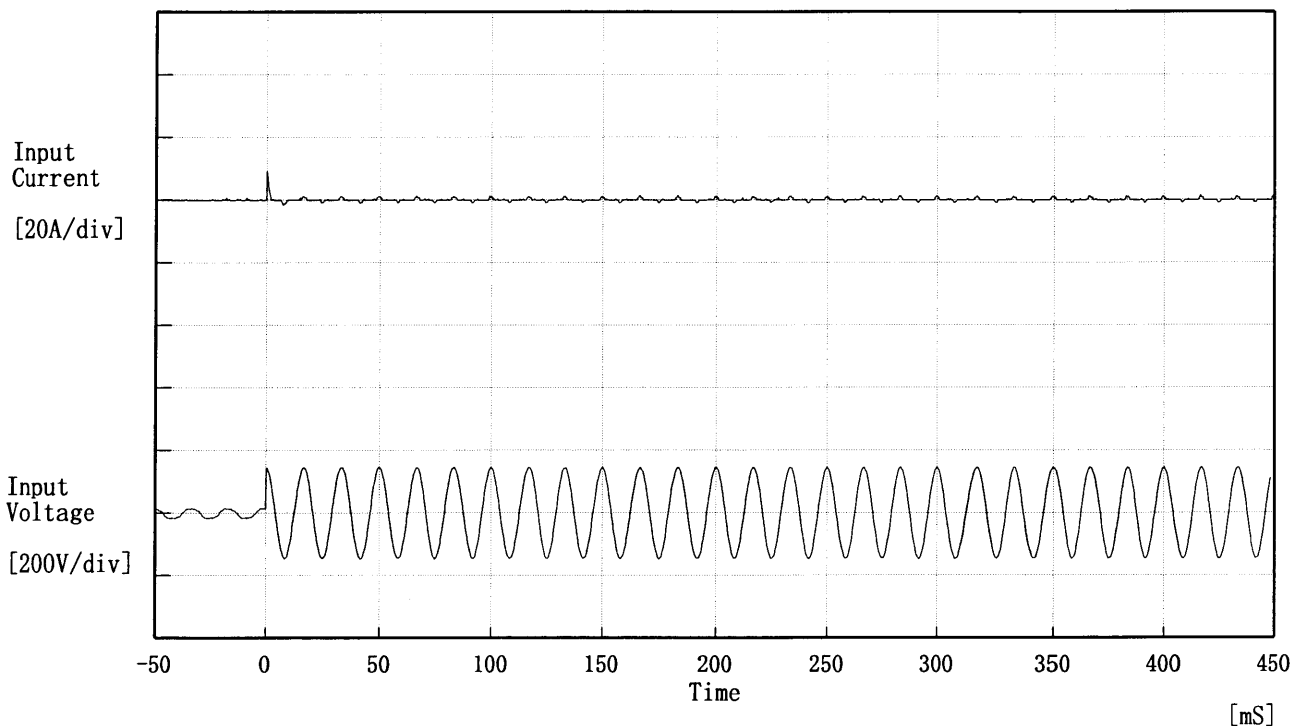
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<p>1. Graph</p> <p>-----□----- Input Volt. 85V -----△----- Input Volt. 132V</p> <p>[mV]</p> <p>Ripple-Noise</p> <p>Load Current [A]</p>		<p>2. Values</p> <table border="1"> <thead> <tr> <th rowspan="2">Load current [A]</th> <th>Input Volt. 85 [V]</th> <th>Input Volt. 132 [V]</th> </tr> <tr> <th>Ripple-Noise [mV]</th> <th>Ripple-Noise [mV]</th> </tr> </thead> <tbody> <tr><td>0.00</td><td>15</td><td>15</td></tr> <tr><td>0.13</td><td>15</td><td>15</td></tr> <tr><td>0.26</td><td>15</td><td>15</td></tr> <tr><td>0.39</td><td>15</td><td>15</td></tr> <tr><td>0.52</td><td>20</td><td>15</td></tr> <tr><td>0.65</td><td>20</td><td>15</td></tr> <tr><td>0.78</td><td>20</td><td>15</td></tr> <tr><td>0.91</td><td>20</td><td>15</td></tr> <tr><td>1.30</td><td>30</td><td>25</td></tr> <tr><td>1.43</td><td>50</td><td>30</td></tr> <tr><td>—</td><td>—</td><td>—</td></tr> </tbody> </table>		Load current [A]	Input Volt. 85 [V]	Input Volt. 132 [V]	Ripple-Noise [mV]	Ripple-Noise [mV]	0.00	15	15	0.13	15	15	0.26	15	15	0.39	15	15	0.52	20	15	0.65	20	15	0.78	20	15	0.91	20	15	1.30	30	25	1.43	50	30	—	—	—
Load current [A]	Input Volt. 85 [V]	Input Volt. 132 [V]																																							
	Ripple-Noise [mV]	Ripple-Noise [mV]																																							
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—	—	—																																							
<p>Ripple-Noise is shown as p-p in the figure below. Note: Slanted line shows the range of the rated load current.</p> <p>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。</p> <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>Ripple-Noise [mVp-p]</p>																																									
<p>Fig. Complex Ripple Wave Form 図 リップル波形詳細図</p>																																									



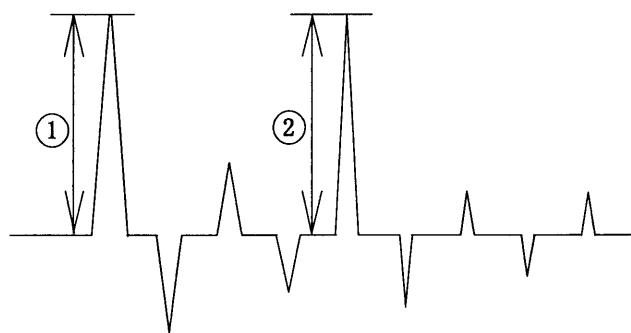
<p>Model LCA15S-12</p> <p>Item Overcurrent Protection 過電流保護</p> <p>Object +12.0V1.3A</p>		<p>Temperature 25°C</p> <p>Testing Circuitry Figure A</p>																																																						
<p>1. Graph</p> <p>[V]</p> <p>Output Voltage</p> <p>20.0</p> <p>15.0</p> <p>10.0</p> <p>5.0</p> <p>0.0</p> <p>0 0.5 1 1.5 2</p> <p>Load Current [A]</p> <p> _____ Input Volt. 85 V _____ Input Volt. 100 V _____ Input Volt. 132 V </p> <p>Note: Slanted line shows the range of the rated load current.</p> <p>(注)斜線は定格負荷電流範囲を示す。</p>	<p>2. Values</p> <table border="1"> <thead> <tr> <th rowspan="2">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>12.00</td><td>1.66</td><td>1.67</td><td>1.62</td></tr> <tr><td>11.40</td><td>1.67</td><td>1.67</td><td>1.62</td></tr> <tr><td>10.80</td><td>1.67</td><td>1.66</td><td>1.61</td></tr> <tr><td>9.60</td><td>1.66</td><td>1.64</td><td>1.59</td></tr> <tr><td>8.40</td><td>1.64</td><td>1.61</td><td>1.56</td></tr> <tr><td>7.20</td><td>1.60</td><td>1.56</td><td>1.52</td></tr> <tr><td>6.00</td><td>1.55</td><td>1.51</td><td>1.47</td></tr> <tr><td>4.80</td><td>1.48</td><td>1.44</td><td>1.41</td></tr> <tr><td>3.60</td><td>1.38</td><td>1.35</td><td>1.33</td></tr> <tr><td>2.40</td><td>1.25</td><td>1.22</td><td>1.22</td></tr> <tr><td>1.20</td><td>1.08</td><td>1.07</td><td>1.09</td></tr> <tr><td>0.00</td><td>0.97</td><td>0.97</td><td>1.01</td></tr> </tbody> </table>	Output Voltage [V]	Load Current [A]			Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]	12.00	1.66	1.67	1.62	11.40	1.67	1.67	1.62	10.80	1.67	1.66	1.61	9.60	1.66	1.64	1.59	8.40	1.64	1.61	1.56	7.20	1.60	1.56	1.52	6.00	1.55	1.51	1.47	4.80	1.48	1.44	1.41	3.60	1.38	1.35	1.33	2.40	1.25	1.22	1.22	1.20	1.08	1.07	1.09	0.00	0.97	0.97	1.01
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Model	LCA15S-12	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 9.10 [A]
 ② 1.50 [A]



COSEL

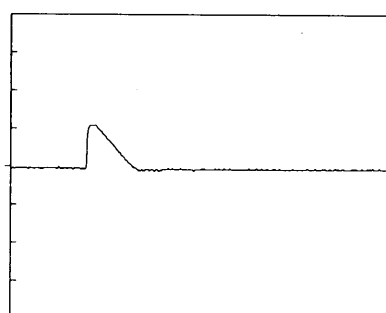
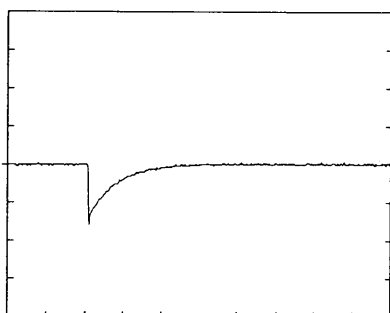
Model	LCA15S-12	Temperature	25°C
Item	Dynamic Load Responce 動的負荷変動	Testing Circuitry	Figure A
Object	+12.0V 1.3A		

Input Volt. 100 V
Cycle 1000 mS



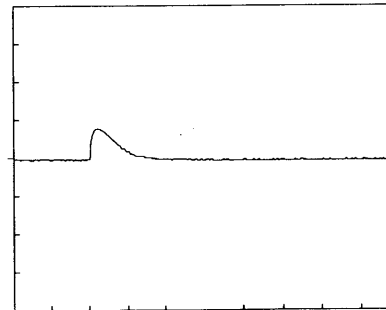
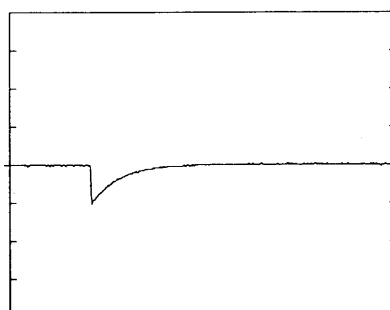
Load 0% ↔

Load 100 %



Load 0% ↔

Load 50 %



200 mV/div

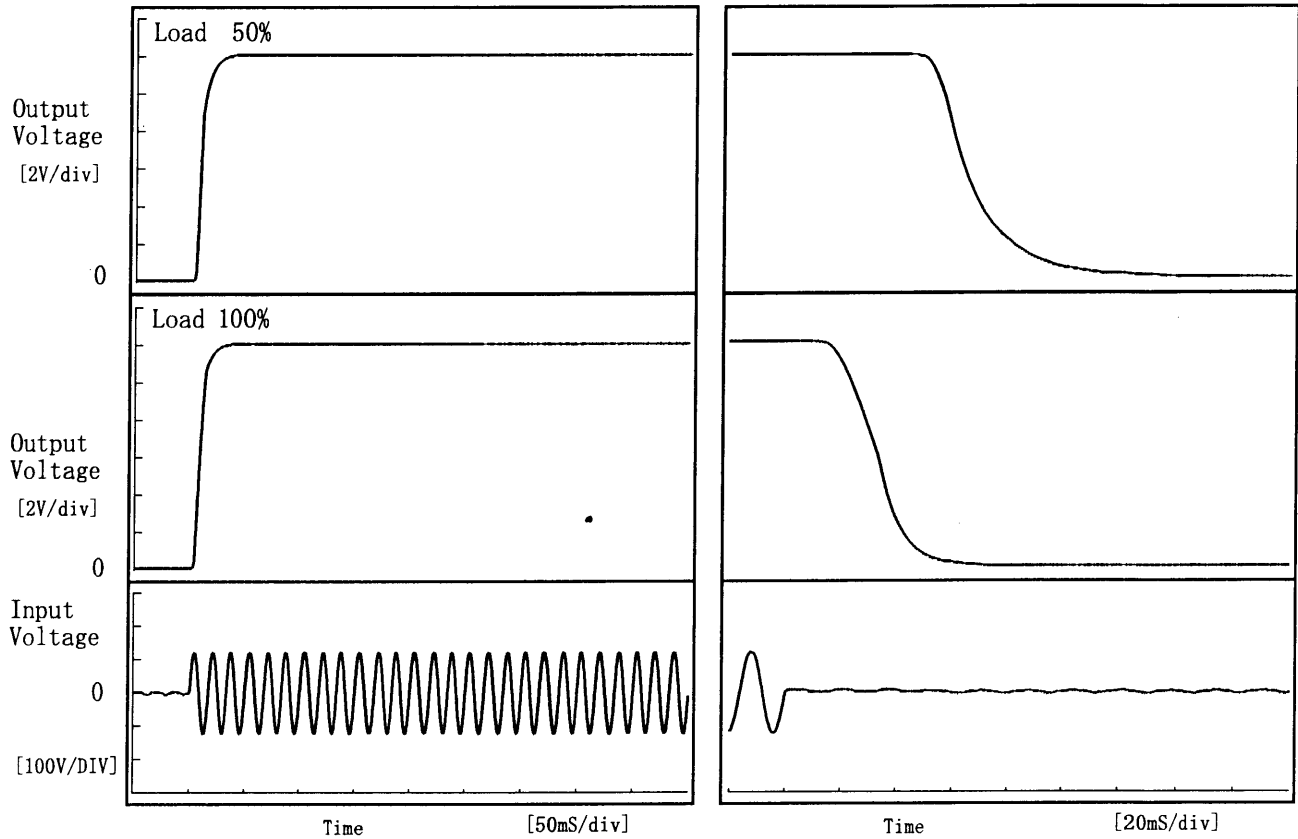
10 mS/div



Model	LCA15S-12	Temperature	25°C
Item	Rise and Fall Time 立上り、立下り時間	Testing Circuitry	Figure A
Object	+12.0V1.3A		

1. Graph

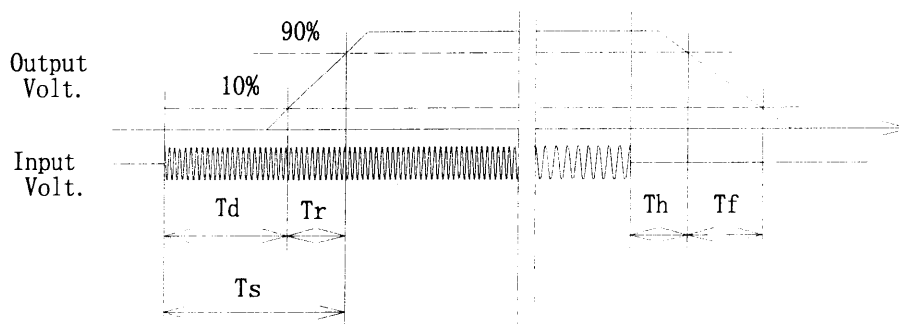
Input Volt. 85 V



2. Values

[mS]

Load \ Time	T d	T r	T s	T h	T f
50 %	3.8	12.5	16.3	54.7	34.7
100 %	3.8	11.3	15.0	21.0	25.4

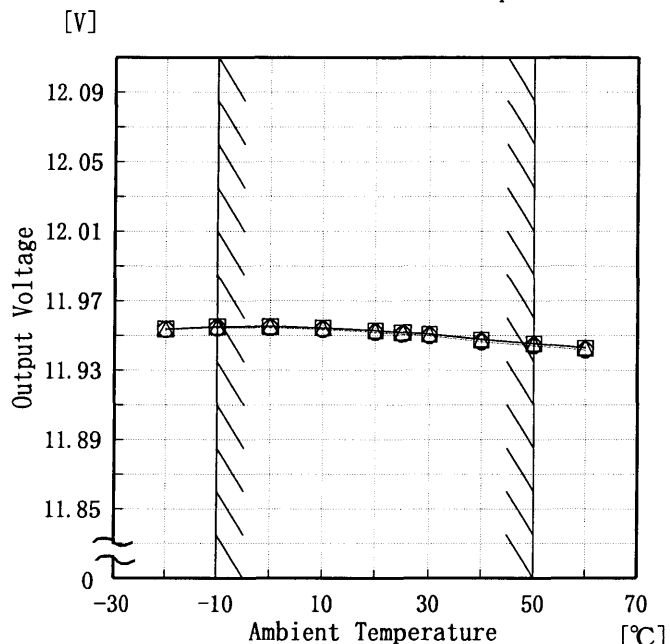




Model	LCA15S-12
Item	Ambient Temperature Drift 周囲温度変動
Object	+12.0V1.3A

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。

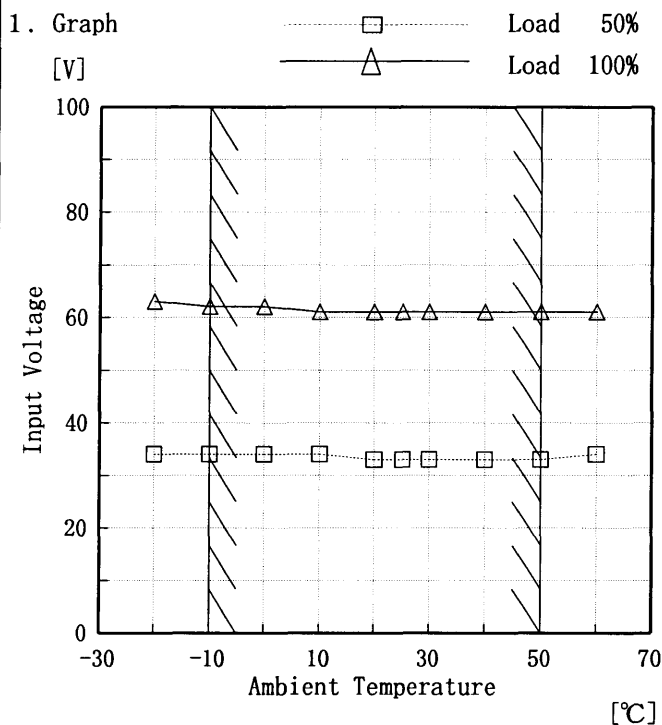
2. Values

Temperature [°C]	Output Voltage [V]		
	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
-20	11.954	11.954	11.953
-10	11.955	11.955	11.954
0	11.955	11.955	11.954
10	11.954	11.954	11.953
20	11.953	11.953	11.952
25	11.952	11.952	11.951
30	11.951	11.951	11.950
40	11.948	11.947	11.946
50	11.945	11.945	11.944
60	11.943	11.943	11.942
—	—	—	—



Model	LCA15S-12
Item	Minimum Input Voltage for Regulated Output Voltage 最低レギュレーション電圧
Object	+12.0V1.3A

Testing Circuitry Figure A



2. Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	34	63
-10	34	62
0	34	62
10	34	61
20	33	61
25	33	61
30	33	61
40	33	61
50	33	61
60	34	61
—	—	—

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		LCA15S-12		Testing Circuitry Figure A																																							
Item		Ripple Voltage (by Ambient Temp.) リップル電圧 (周囲温度特性)																																									
Object		+12.0V 1.3A																																									
1. Graph		<p>-----□----- Load 50%</p> <p>-----△----- Load 100%</p>		2. Values																																							
<p>[mV]</p> <p>Ripple Voltage</p> <p>Ambient Temperature [°C]</p> <p>Input Volt. 100 V</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>Load 50%</th> <th>Load 100%</th> </tr> <tr> <th>Ripple Output Volt. [mV]</th> <th>Ripple Output Volt. [mV]</th> </tr> </thead> <tbody> <tr><td>-20</td><td>40</td><td>90</td></tr> <tr><td>-10</td><td>25</td><td>70</td></tr> <tr><td>0</td><td>20</td><td>40</td></tr> <tr><td>10</td><td>15</td><td>30</td></tr> <tr><td>20</td><td>15</td><td>20</td></tr> <tr><td>25</td><td>10</td><td>20</td></tr> <tr><td>30</td><td>10</td><td>20</td></tr> <tr><td>40</td><td>10</td><td>20</td></tr> <tr><td>50</td><td>10</td><td>20</td></tr> <tr><td>60</td><td>10</td><td>20</td></tr> <tr><td>—</td><td>—</td><td>—</td></tr> </tbody> </table>		Ambient Temp. [°C]	Load 50%	Load 100%	Ripple Output Volt. [mV]	Ripple Output Volt. [mV]	-20	40	90	-10	25	70	0	20	40	10	15	30	20	15	20	25	10	20	30	10	20	40	10	20	50	10	20	60	10	20	—	—	—
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—	—	—																																									



COSEL																								
Model	LCA15S-12	Temperature 25°C Testing Circuitry Figure A																						
Item	Time Lapse Drift 経時ドリフト																							
Object	+12.0V1.3A																							
<p>1. Graph</p> <p>[V]</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>11.961</td></tr> <tr><td>0.5</td><td>11.958</td></tr> <tr><td>1.0</td><td>11.958</td></tr> <tr><td>2.0</td><td>11.958</td></tr> <tr><td>3.0</td><td>11.958</td></tr> <tr><td>4.0</td><td>11.958</td></tr> <tr><td>5.0</td><td>11.958</td></tr> <tr><td>6.0</td><td>11.958</td></tr> <tr><td>7.0</td><td>11.958</td></tr> <tr><td>8.0</td><td>11.958</td></tr> </tbody> </table>	Time since start [H]	Output Voltage [V]	0.0	11.961	0.5	11.958	1.0	11.958	2.0	11.958	3.0	11.958	4.0	11.958	5.0	11.958	6.0	11.958	7.0	11.958	8.0	11.958
Time since start [H]	Output Voltage [V]																							
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7.0	11.958																							
8.0	11.958																							



COSEL		
Model	LCA15S-12	
Item	Output Voltage Accuracy 定電圧精度	Testing Circuitry Figure A
Object	+12.0V1.3A	

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 : 0~1.3 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 0~1.3 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	11.962	±12	±0.1
Minimum Voltage	50	132	0	11.939		

COSEL

Model		LCA15S-12	Testing Circuitry Figure A
Item		Condensation 結露特性	
Object		+12.0V1.3A	

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]	11.95	Input Volt.:100V, Load Current:1.3A
Line Regulation [mV]	5	Input Volt.:85~132V, Load Current:1.3A
Load Regulation [mV]	20	Input Volt.:100V, Load Current:0~1.3A



Model		LCA15S-12	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	0.08	0.08	0.11
(B) IEC60950	0.08	0.09	0.12

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 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。



Model		LCA15S-12	Temperature		25°C
Item		Line Noise Tolerance 入力雑音耐量	Testing Circuitry		Figure C
Object		+12.0V1.3A			

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 %



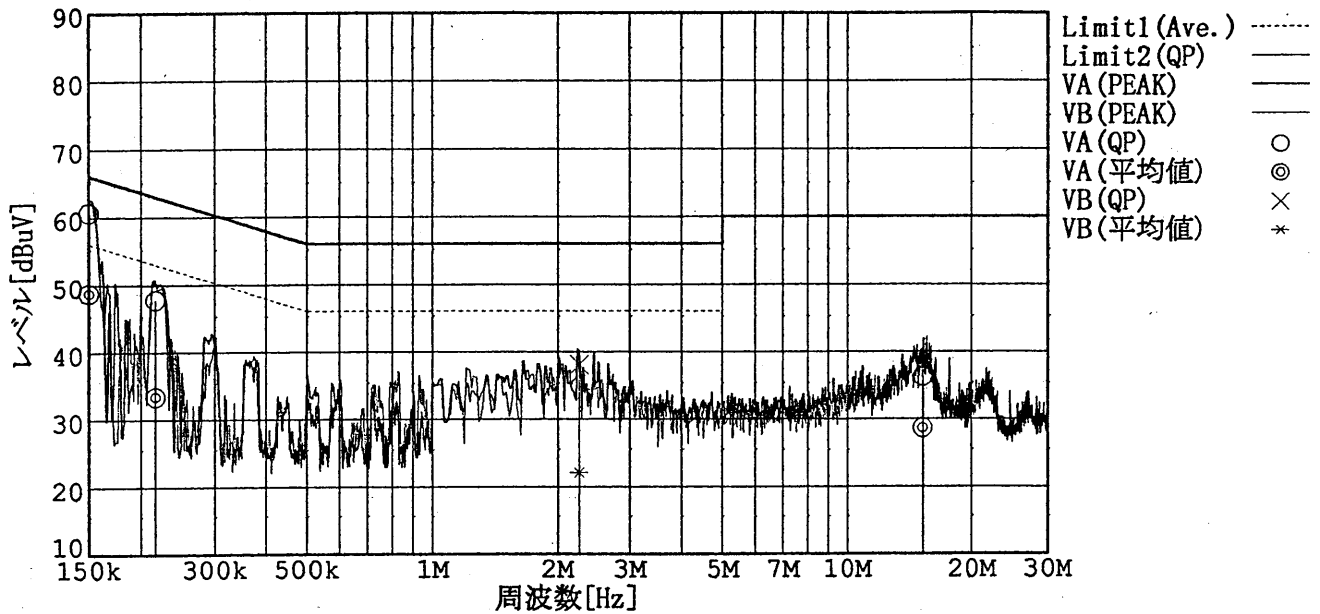
Model	LCA15S-12	Temperature	25°C
Item	Conducted Emission 雑音端子電圧	Testing Circuitry	Figure D
Object			

1. Graph

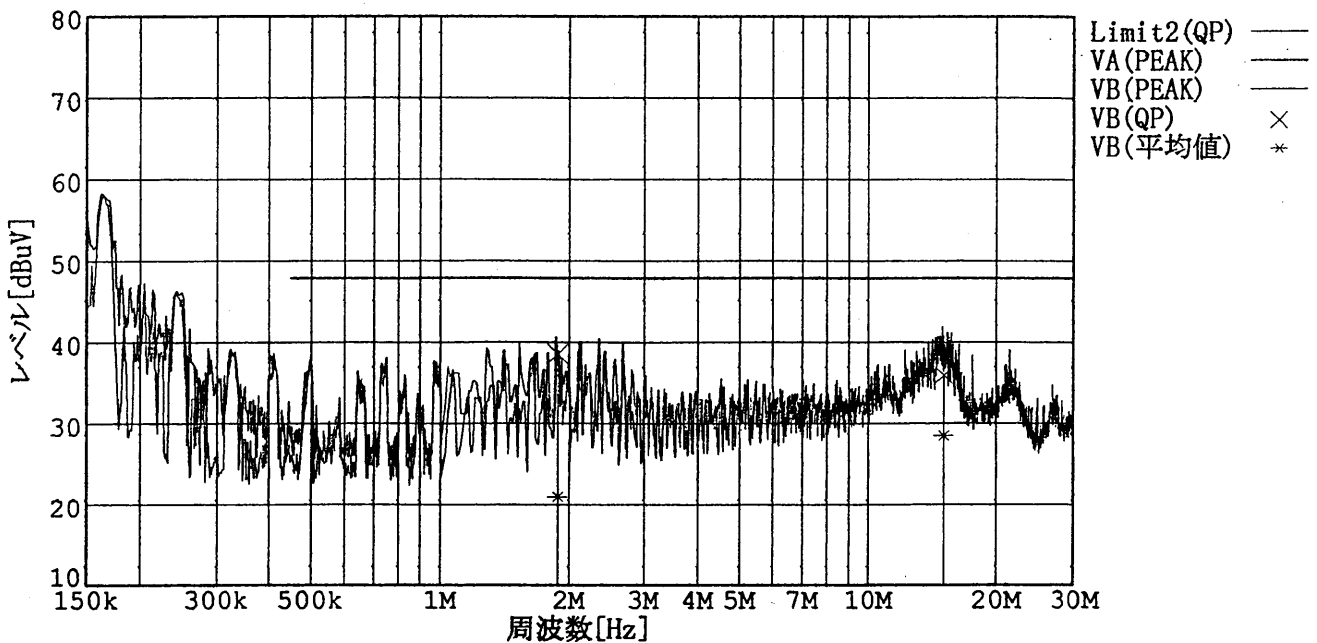
Remarks

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 2: [FCC Part15] Class B



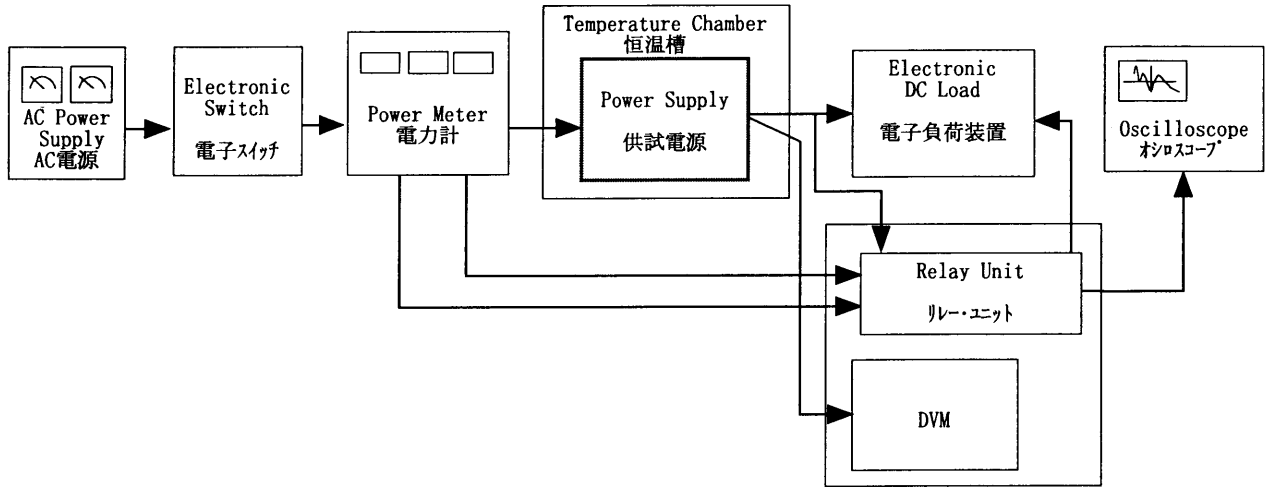


Figure A

Data Acquisition/Control Unit
データ収集システム

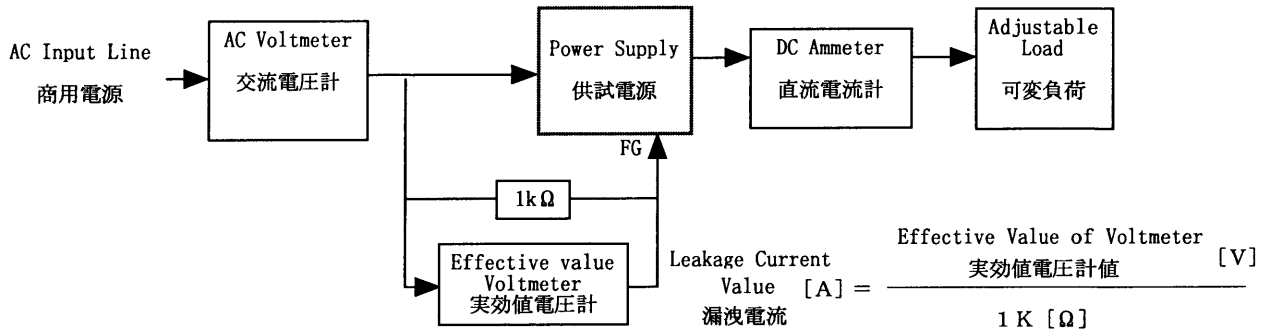


Figure B (DENTORI)

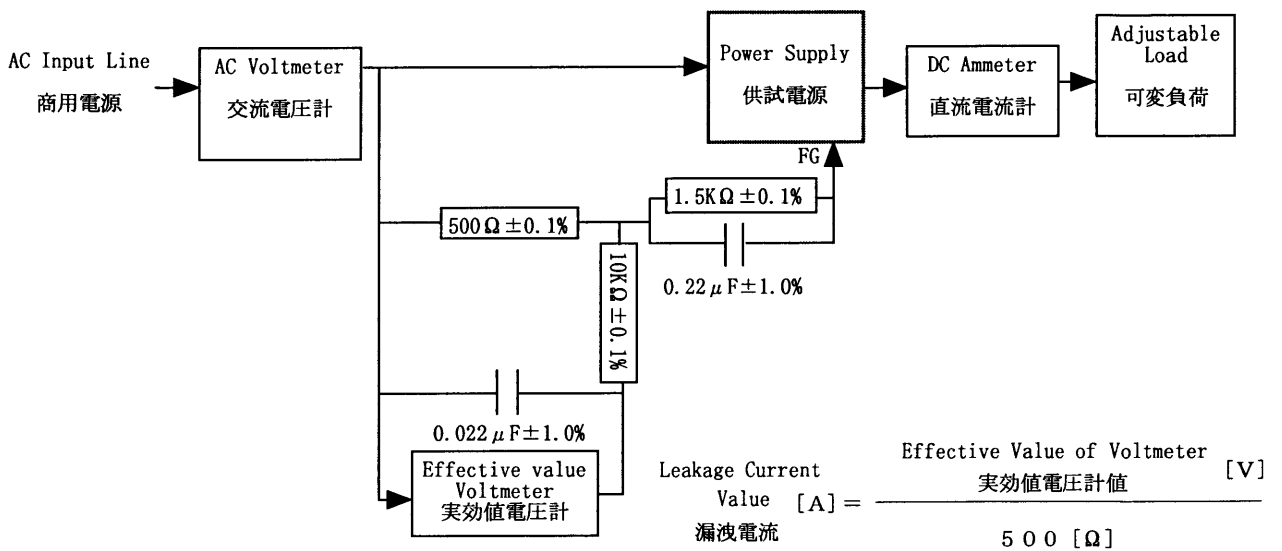


Figure B (IEC 60950)

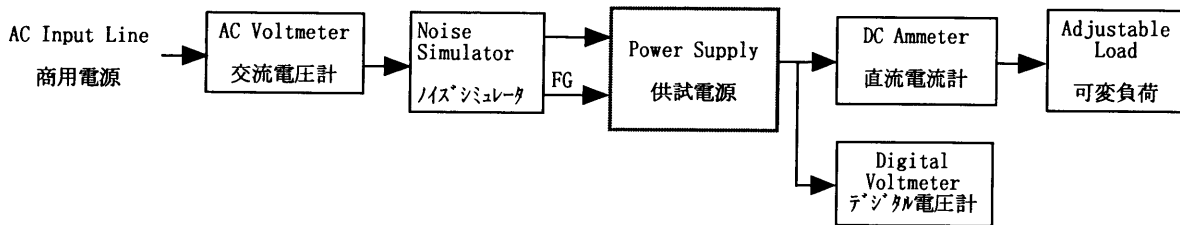


Figure C

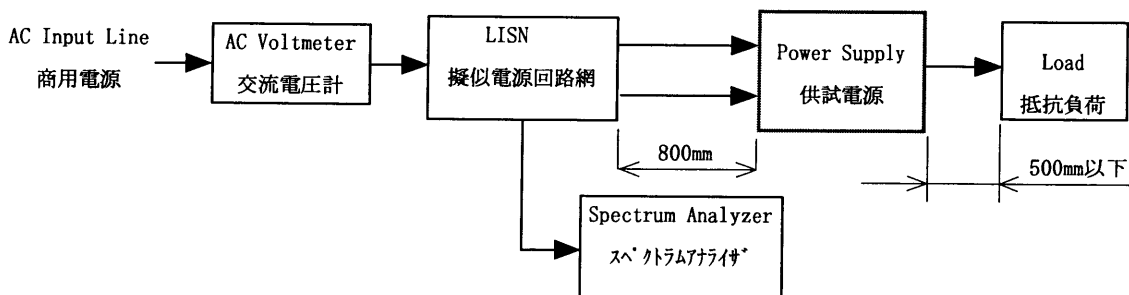


Figure D

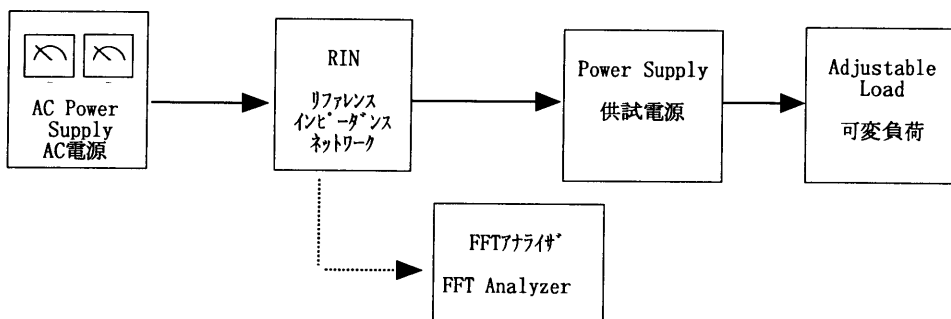


Figure E