



TEST DATA OF LEA50F-48 (200V INPUT)

Regulated DC Power Supply

Nov. 15, 1999

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Design Manager

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コーワセル株式会社

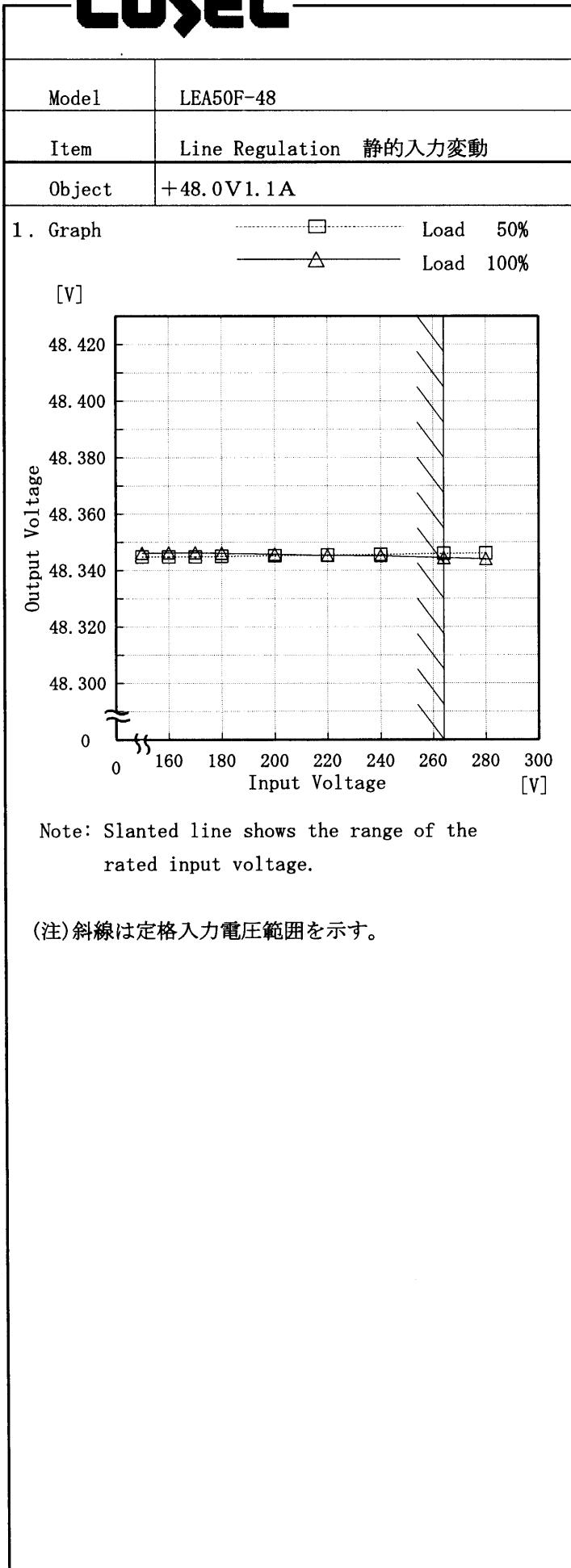
COSEL CO., LTD.



CONTENTS

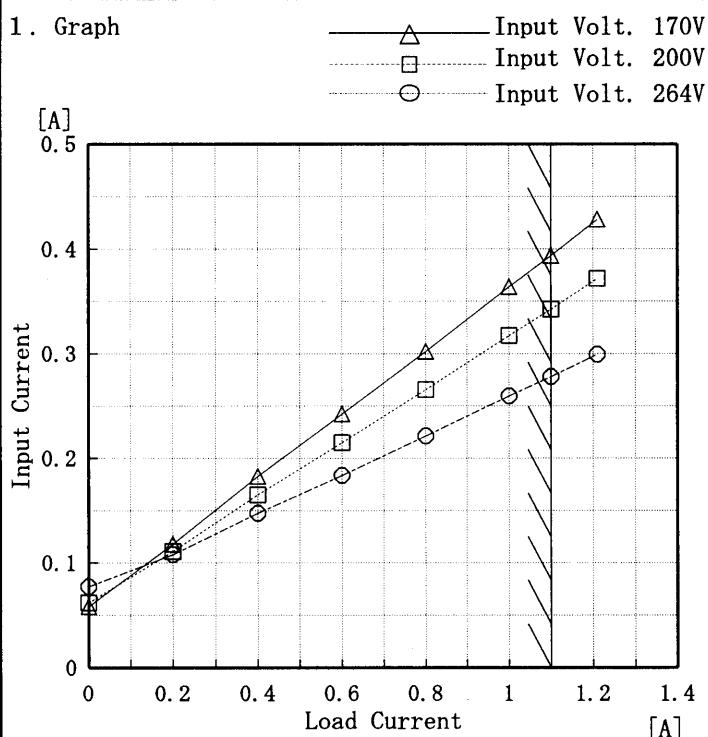
1. Line Regulation	1
静的入力変動	
2. Input Current (by Load Current)	2
入力電流(負荷特性)	
3. Input Power (by Load Current)	3
入力電力(負荷特性)	
4. Efficiency (by Input Voltage)	4
効率(入力電圧特性)	
5. Efficiency (by Load Current)	5
効率(負荷特性)	
6. Power Factor (by Input Voltage)	6
力率(入力電圧特性)	
7. Power Factor (by Load Current)	7
力率(負荷特性)	
8. Hold-Up Time	8
出力保持時間	
9. Instantaneous Interruption Compensation	9
瞬時停電保障	
10. Load Regulation	10
静的負荷変動	
11. Ripple Voltage (by Load Current)	11
リップル電圧(負荷特性)	
12. Ripple-Noise	12
リップルノイズ	
13. Overcurrent Protection	13
過電流保護	
14. Overvoltage Protection	14
過電圧保護	
15. Inrush Current	15
突入電流	
16. Dynamic Load Response	16
動的負荷変動	
17. Rise and Fall Time	17
立ち上り、立下り時間	
18. Ambient Temperature Drift	18
周囲温度変動	
19. Minimum Input Voltage for Regulated Output Voltage	19
最低レギュレーション電圧	
20. Ripple Voltage (by Ambient Temperature)	20
リップル電圧(周囲温度特性)	
21. Time Lapse Drift	21
経時ドリフト	
22. Output Voltage Accuracy	22
定電圧精度	
23. Harmonic Current	23
高調波電流	
24. Condensation	25
結露特性	
25. Leakage Current	26
漏洩電流	
26. Line Noise Tolerance	27
入力雜音耐量	
27. Conducted Emission	28
雜音端子電圧	
28. Figure of Testing Circuitry	29
測定回路図	

(Final Page 30)

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Model	LEA50F-48
Item	Input Current (by Load Current) 入力電流 (負荷特性)
Output	—


 Temperature 25°C
 Testing Circuitry Figure A

2. Values

Load Current [A]	Input Current [A]		
	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
0.00	0.058	0.062	0.078
0.20	0.118	0.111	0.108
0.40	0.183	0.165	0.148
0.60	0.242	0.215	0.184
0.80	0.302	0.266	0.221
1.00	0.364	0.317	0.260
1.10	0.394	0.343	0.278
1.21	0.428	0.372	0.300
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—

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	LEA50F-48	Temperature	25°C																																																							
Item	Input Power (by Load Current) 入力電力 (負荷特性)	Testing Circuitry	Figure A																																																							
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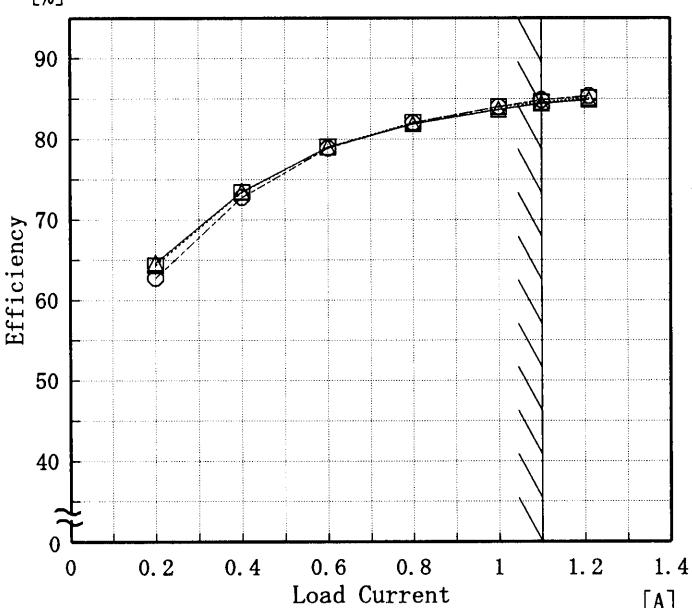
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Model	LEA50F-48	Temperature Testing Circuitry	25°C Figure A																															
Item	Efficiency (by Input Voltage) 効率(入力電圧特性)																																	
Object	_____																																	
1. Graph	<p>Efficiency [%]</p> <p>Input Voltage [V]</p> <p>Legend: Load 50% (Squares), Load 100% (Triangles)</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	LEA50F-48	Temperature	25°C																																																							
Item	Efficiency (by Load Current) 効率(負荷特性)	Testing Circuitry	Figure A																																																							
Output	——																																																									
1. Graph	——△— Input Volt. 170V - - -□- Input Volt. 200V - - ○- Input Volt. 264V																																																									
 <p>The graph plots Efficiency [%] on the y-axis (0 to 90) against Load Current [A] on the x-axis (0 to 1.4). Three data series are shown for different input voltages: 170V (triangles), 200V (squares), and 264V (circles). All series show efficiency increasing with load current. A slanted line on the graph indicates the range of the rated load current.</p>			2. Values																																																							
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Note: Slanted line shows the range of the rated load current

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

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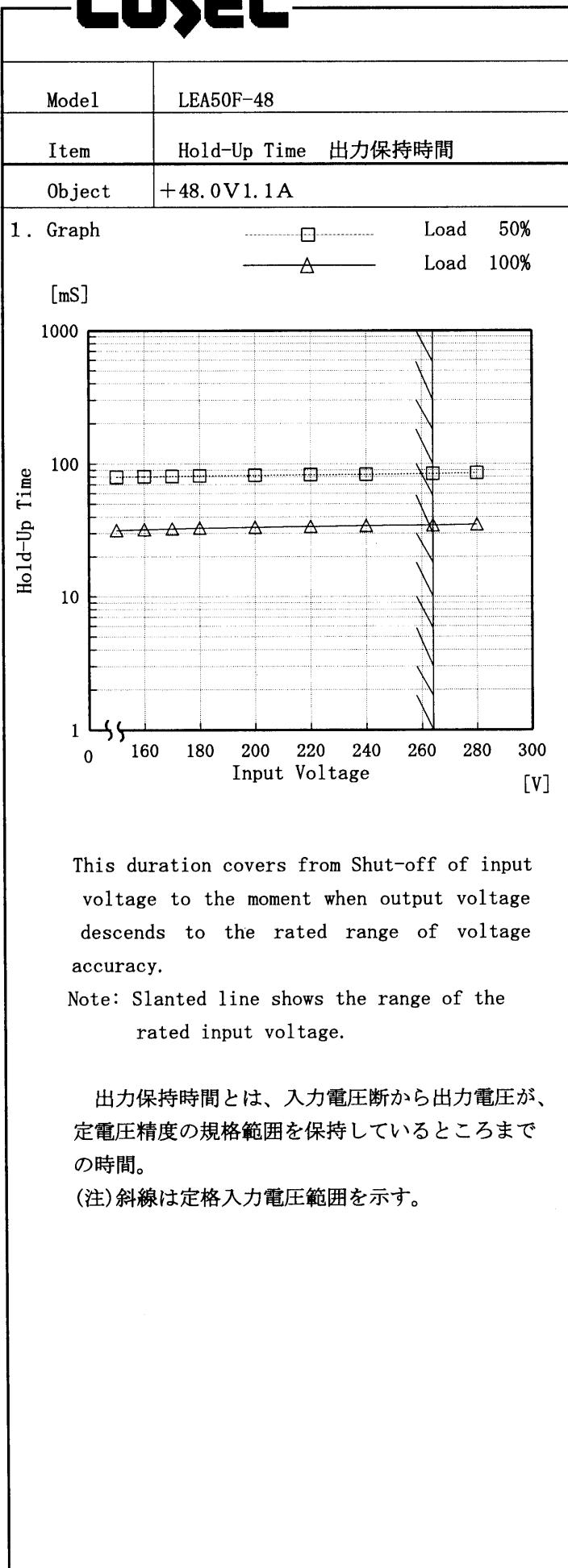
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Temperature 25°C
Testing Circuitry Figure A

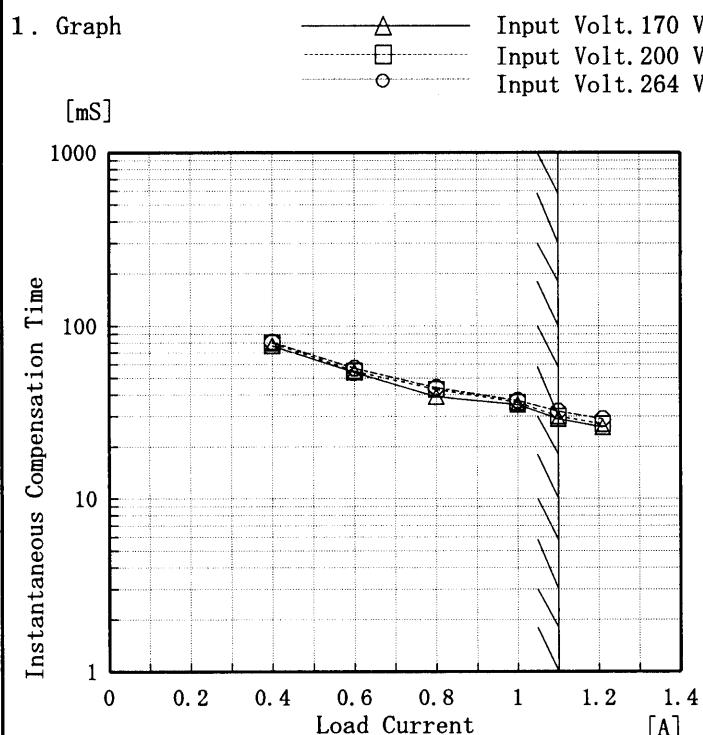
2. Values

Input Voltage [V]	Hold-Up Time [mS]	
	Load 50%	Load 100%
150	80	32
160	80	32
170	81	33
180	81	33
200	82	33
220	83	34
240	84	34
264	84	35
280	85	35

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Model	LEA50F-48
Item	Instantaneous Interruption Compensation 瞬時停電保障
Object	+48.0V 1.1A

Temperature 25°C
Testing Circuitry Figure A



2. Values

Load Current [A]	Time [mS]		
	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
0.00	—	—	—
0.20	—	—	—
0.40	77	80	81
0.60	54	55	57
0.80	39	43	44
1.00	35	36	37
1.10	29	30	32
1.21	26	27	29
—	—	—	—
—	—	—	—
—	—	—	—

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。

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Model	LEA50F-48	Temperature Testing Circuitry	25°C Figure A																																															
Item	Load Regulation 靜的負荷変動																																																	
Object	+48.0V 1.1A																																																	
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Load Current [A]	Output Voltage [V]																																																	
	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]																																															
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0.20	48.348	48.348	48.348																																															
0.40	48.346	48.346	48.346																																															
0.60	48.346	48.346	48.347																																															
0.80	48.346	48.346	48.347																																															
1.00	48.346	48.347	48.347																																															
1.10	48.347	48.347	48.347																																															
1.21	48.347	48.347	48.347																																															
—	—	—	—																																															
—	—	—	—																																															

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	LEA50F-48	Temperature Testing Circuitry 25°C Figure A																																						
Item	Ripple Voltage(by Load Current) リップル電圧(負荷特性)																																							
Object	+48.0V 1.1A																																							
1. Graph	<p style="text-align: center;">—△— Input Volt. 170V [mV] —○— Input Volt. 264V</p>	2. Values																																						
		<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="2">Ripple Output Voltage [mV]</th> </tr> <tr> <th>Input Volt. 170 [V]</th> <th>Input Volt. 264 [V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>20</td><td>20</td></tr> <tr><td>0.3</td><td>50</td><td>50</td></tr> <tr><td>0.6</td><td>50</td><td>50</td></tr> <tr><td>0.9</td><td>50</td><td>50</td></tr> <tr><td>1.1</td><td>50</td><td>50</td></tr> <tr><td>1.2</td><td>50</td><td>50</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> <tr><td>—</td><td>—</td><td>—</td></tr> </tbody> </table>	Load Current [A]	Ripple Output Voltage [mV]		Input Volt. 170 [V]	Input Volt. 264 [V]	0.0	20	20	0.3	50	50	0.6	50	50	0.9	50	50	1.1	50	50	1.2	50	50	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Load Current [A]	Ripple Output Voltage [mV]																																							
	Input Volt. 170 [V]	Input Volt. 264 [V]																																						
0.0	20	20																																						
0.3	50	50																																						
0.6	50	50																																						
0.9	50	50																																						
1.1	50	50																																						
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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

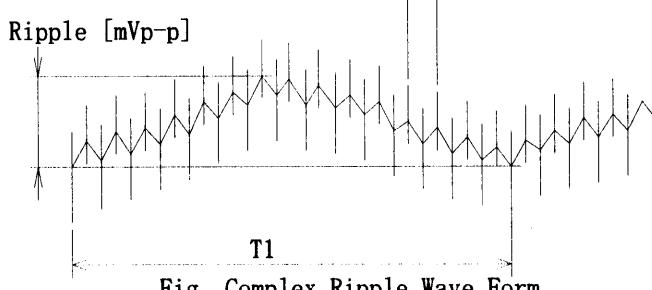


Fig. Complex Ripple Wave Form

図 リップル波形詳細図

COSEL

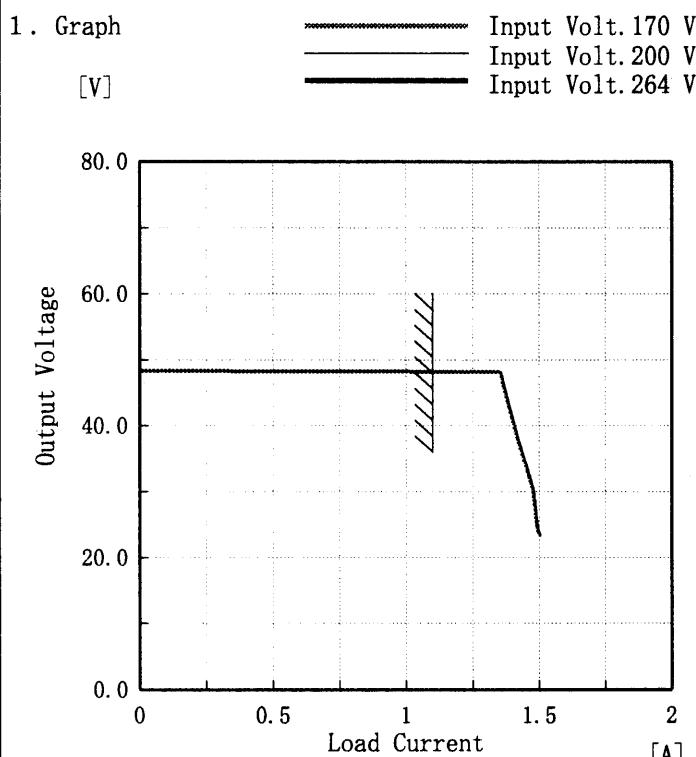
Model	LEA50F-48																																							
Item	Ripple-Noise リップルノイズ	Temperature 25°C Testing Circuitry Figure A																																						
Object	+48.0V 1.1A																																							
1. Graph	—△— Input Volt. 170V [mV]	—○— Input Volt. 264V																																						
		2. Values																																						
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Load Current [A]	Ripple-Noise [mV]																																							
	Input Volt. 170 [V]	Input Volt. 264 [V]																																						
0.0	30	30																																						
0.3	60	60																																						
0.6	65	65																																						
0.9	65	65																																						
1.1	65	65																																						
1.2	70	70																																						
—	—	—																																						
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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 T2: Due to Switching</p> <p>Fig. Complex Ripple Wave Form 図 リップル波形詳細図</p>																																								

COSEL

Model LEA50F-48

Item Overcurrent Protection
過電流保護

Object +48.0V 1.1A

Temperature 25°C
Testing Circuitry Figure A

2. Values

Output Voltage [V]	Load Current [A]		
	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
48.00	1.356	1.358	1.359
45.60	1.369	1.371	1.372
43.20	1.382	1.385	1.385
38.40	1.413	1.416	1.417
33.60	1.451	1.453	1.454
28.80	1.480	1.482	1.483
24.00	1.493	1.494	1.495
19.20	—	—	—
14.40	—	—	—
9.60	—	—	—
4.80	—	—	—
0.00	—	—	—

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

Intermittent operation occurs when the output voltage is from 23V to 0V.

(注)斜線は定格負荷電流範囲を示す。

23V～0V間は、間欠モードとなる。

COSEL

Model	LEA50F-48
Item	Overvoltage Protection 過電圧保護
Object	+48.0V 1.1A

1. Graph

Operating Point [V]

Ambient Temperature [°C]

Load 0%

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。

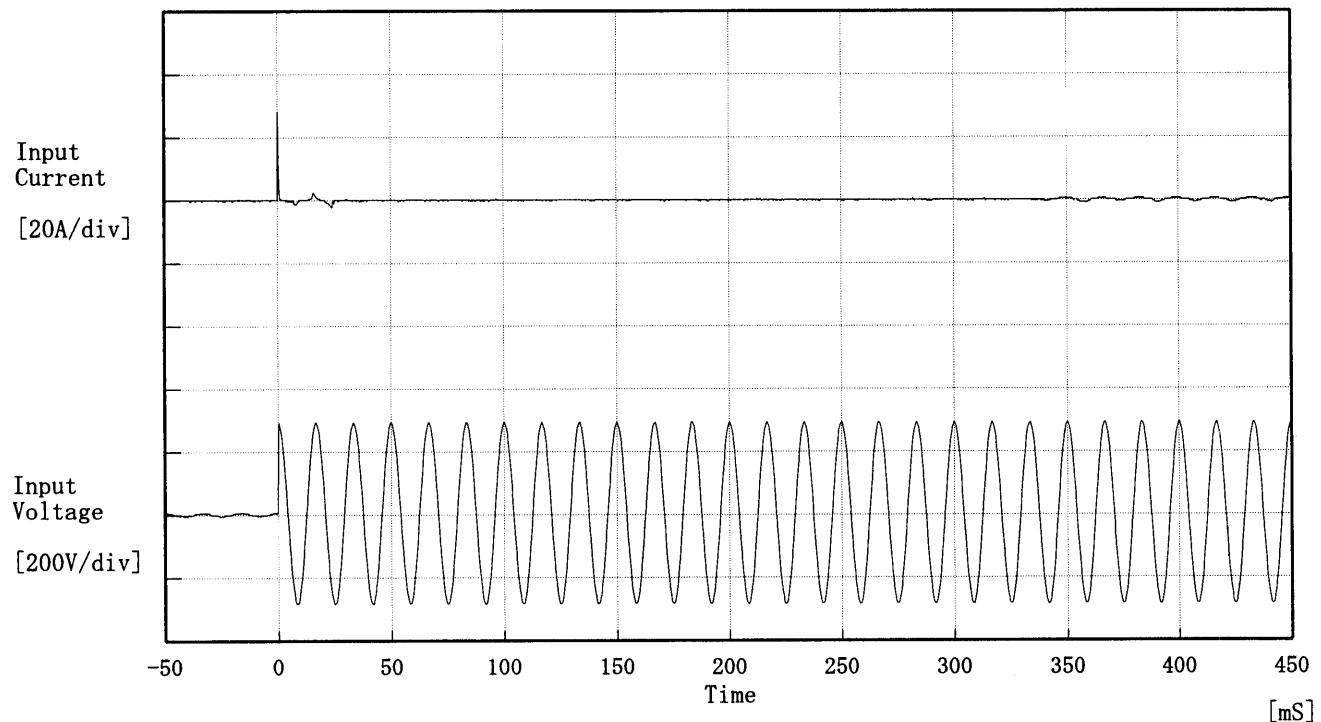
Testing Circuitry Figure A

2. Values

Ambient Temperature [°C]	Operating Point [V]		
	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
-20	59.48	59.49	59.55
-10	59.55	59.55	59.55
0	59.55	59.55	59.55
10	59.55	59.55	59.55
20	59.54	59.54	59.54
25	59.55	59.55	59.55
30	59.56	59.55	59.55
40	59.55	59.56	59.56
50	59.55	59.55	59.55
60	59.55	59.55	59.55
—	—	—	—

COSEL

Model	LEA50F-48	Temperature Testing Circuitry	25°C
Item	Inrush Current 突入電流		Figure A
Object	_____		



Input Voltage 200 V

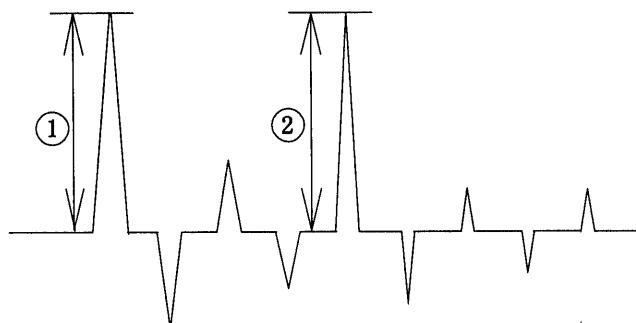
Frequency 60 Hz

Load 100 %

Inrush Current

① 28.06 [A]

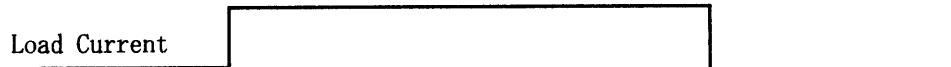
② 0.74 [A]



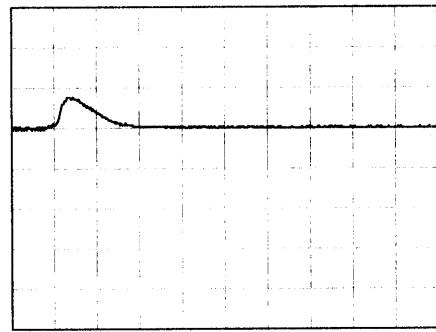
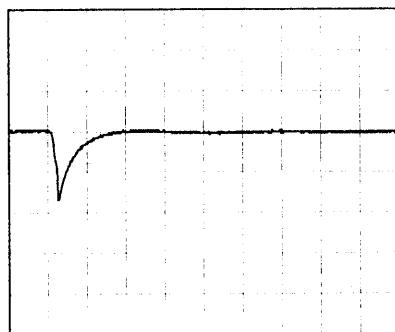
COSEL

Model	LEA50F-48	Temperature	25°C
Item	Dynamic Load Response 動的負荷變動	Testing Circuitry	Figure A
Object	+48.0V 1.1A		

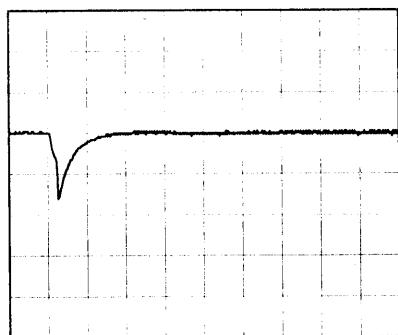
Input Volt. 200 V
 Cycle 1000 mS



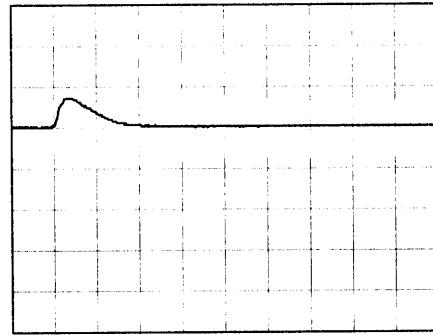
Min. Load ↔
 Load 100 %



Min. Load ↔
 Load 50 %



100 mV/div



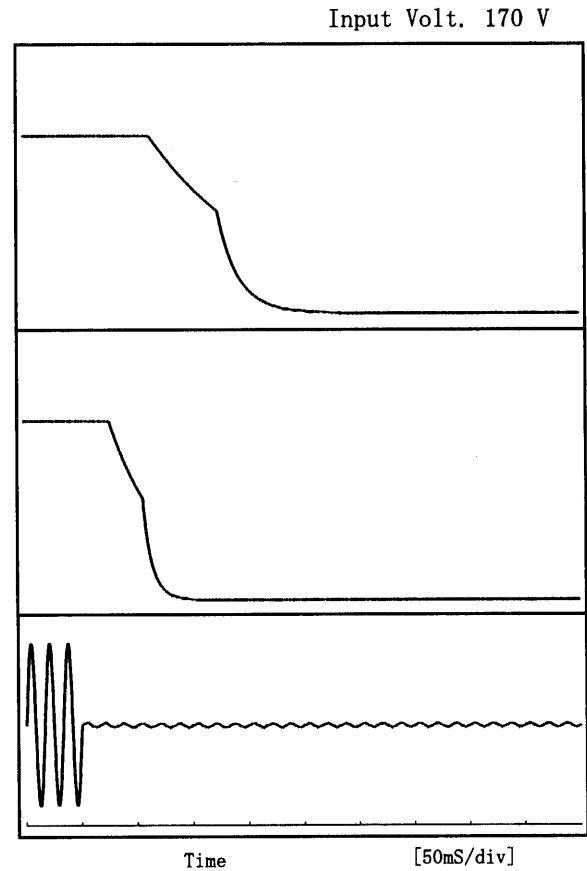
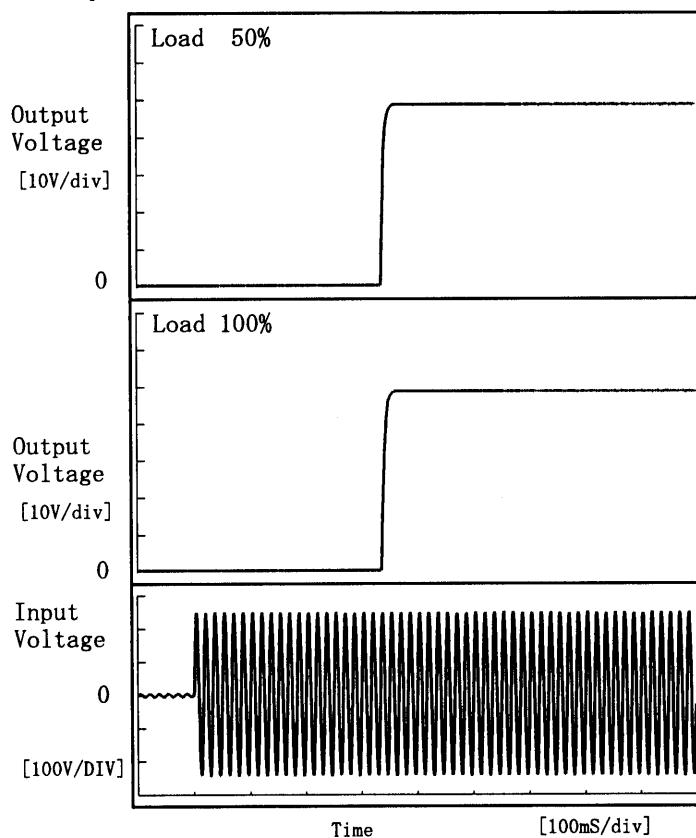
10 mS/div

COSEL

Model	LEA50F-48
Item	Rise and Fall Time 立上り、立下り時間
Object	+48.0V 1.1A

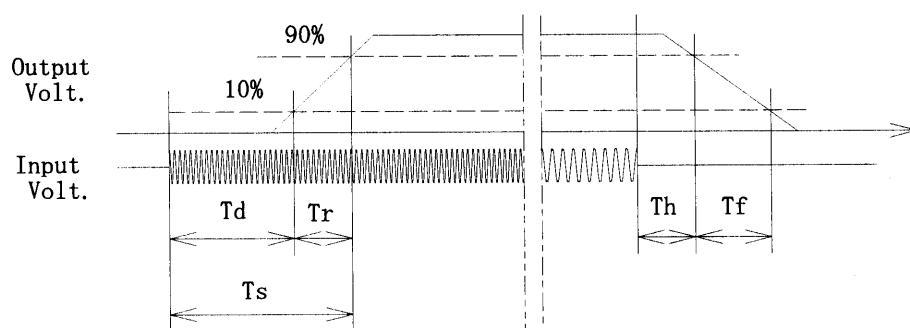
Temperature 25°C
Testing Circuitry Figure A

1. Graph

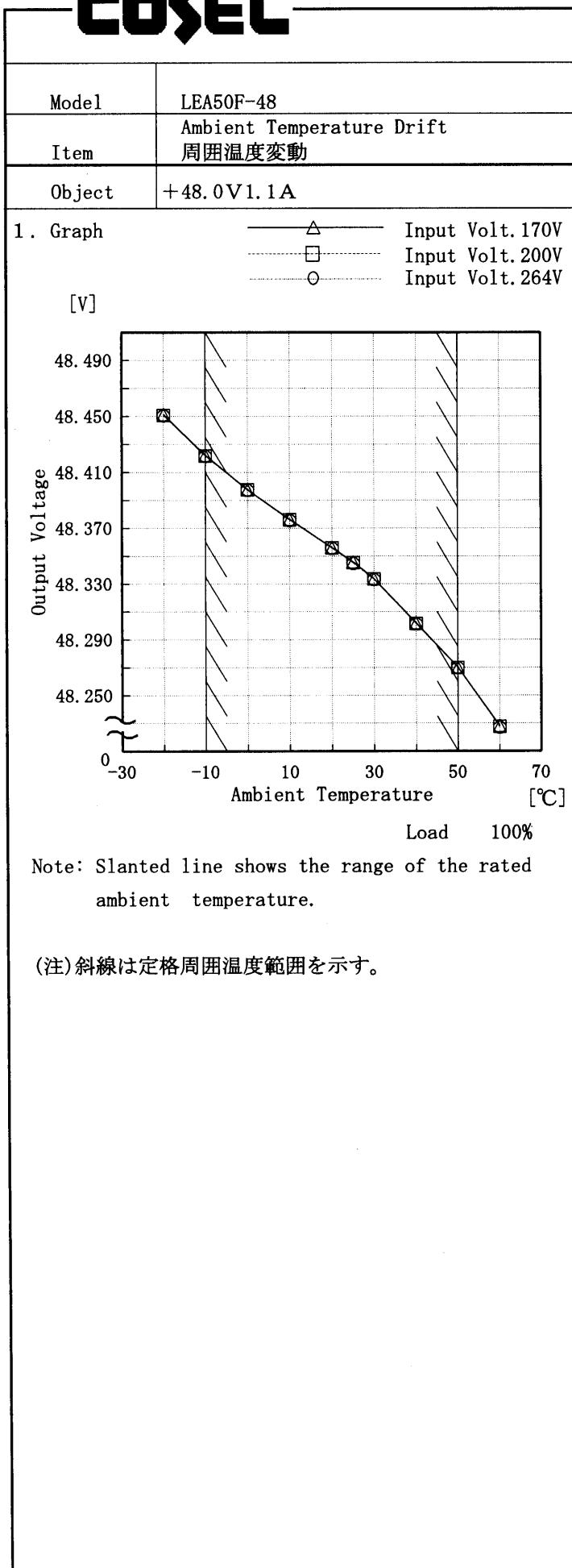


2. Values

Load	Time	T d	T r	T s	T h	T f
50 %		337.0	9.0	346.0	75.0	85.3
100 %		336.5	11.0	347.5	32.8	39.8



COSEL



Testing Circuitry Figure A

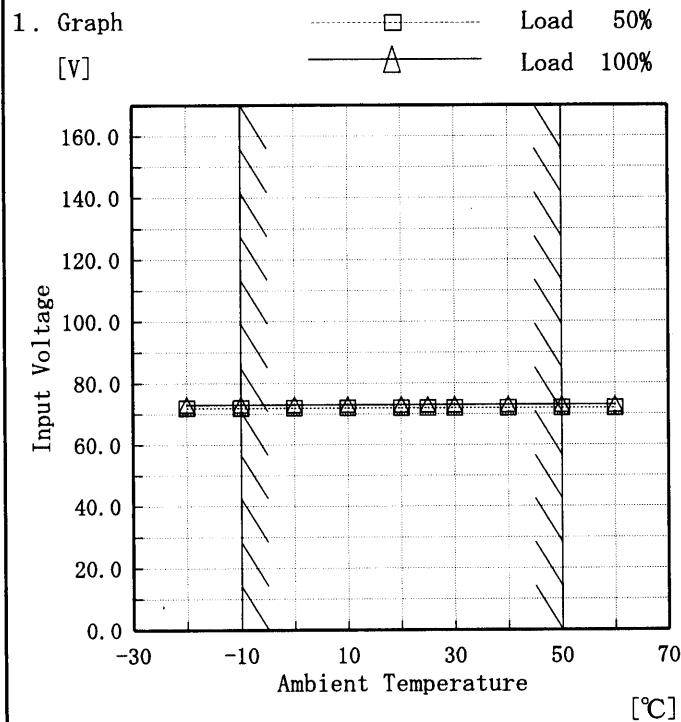
2. Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
-20	48.451	48.451	48.451
-10	48.422	48.422	48.422
0	48.398	48.397	48.397
10	48.376	48.376	48.376
20	48.356	48.356	48.356
25	48.346	48.345	48.345
30	48.334	48.333	48.333
40	48.302	48.301	48.301
50	48.270	48.270	48.270
60	48.228	48.228	48.227
—	—	—	—

COSEL

Model	LEA50F-48
Item	Minimum Input Voltage for Regulated Output Voltage 最低レギュレーション電圧
Object	+48.0V 1.1A

Testing Circuitry Figure A



2. Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	72	73
-10	72	73
0	72	73
10	72	73
20	72	73
25	72	73
30	72	73
40	72	73
50	72	73
60	72	73
—	—	—

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。

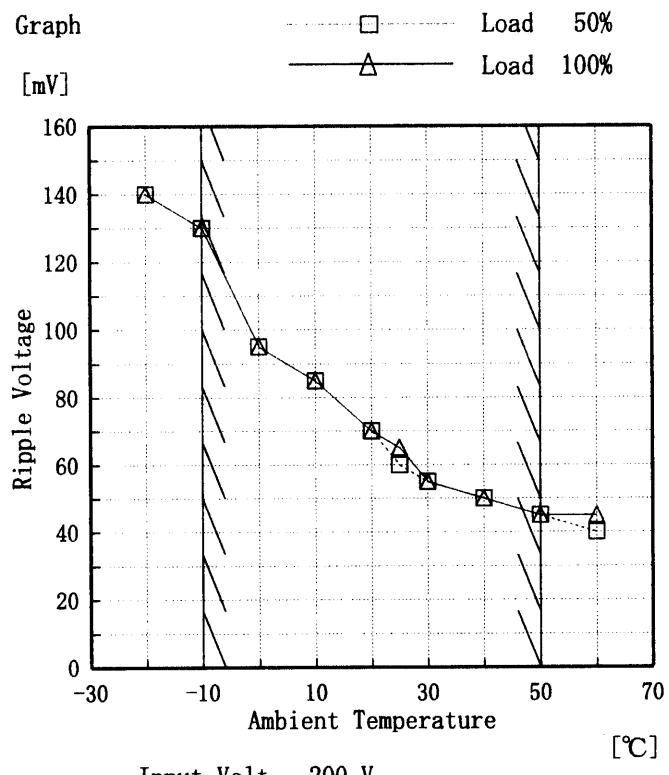
COSEL

Model LEA50F-48

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

Object +48.0V 1.1A

1. Graph



Input Volt. 200 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

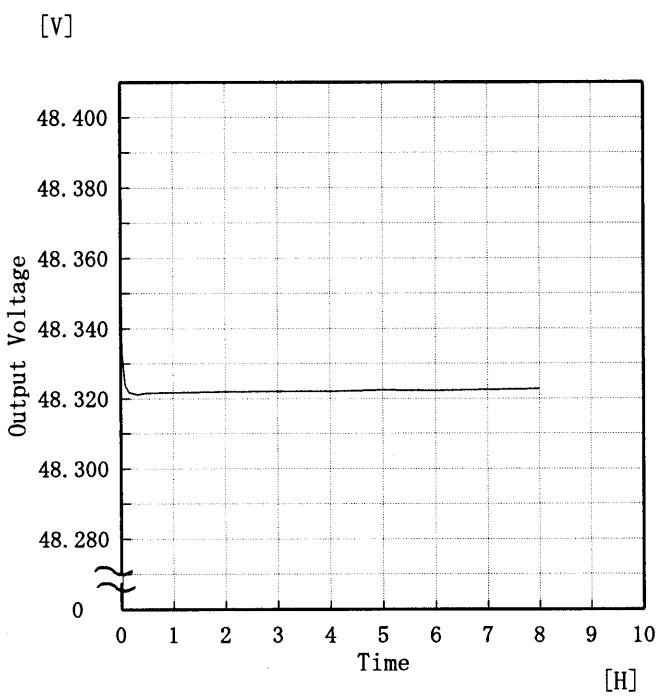
Ambient Temperature [°C]	Ripple Output Voltage [mV]	
	Load 50%	Load 100%
-20	140	140
-10	130	130
0	95	95
10	85	85
20	70	70
25	60	65
30	55	55
40	50	50
50	45	45
60	40	45
—	—	—

COSEL

Model	LEA50F-48
Item	Time Lapse Drift 経時ドリフト
Object	+48.0V 1.1A

Temperature 25°C
 Testing Circuitry Figure A

1. Graph



2. Values

Time since start [H]	Output Voltage [V]
0.0	48.361
0.5	48.322
1.0	48.322
2.0	48.322
3.0	48.322
4.0	48.322
5.0	48.322
6.0	48.322
7.0	48.323
8.0	48.323



Model	LEA50F-48	Testing Circuitry Figure A
Item	Output Voltage Accuracy 定電圧精度	
Object	+48.0V 1.1A	

1. 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 : 170~264 V

Load Current : 0~1.1 A

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

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

1. 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 170~264 V

負荷電流 0~1.1 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

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

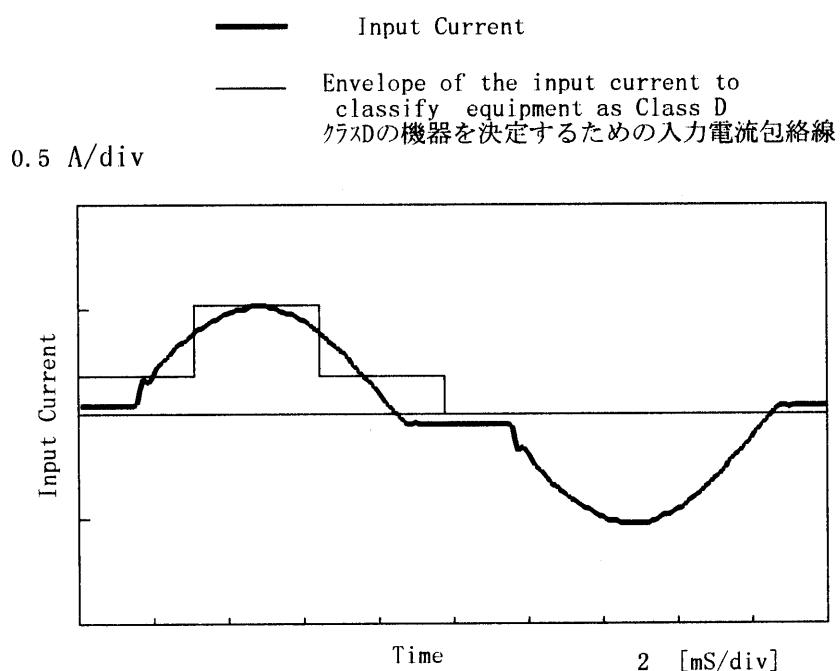
2. Values

Item	Temperature [°C]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy(Ration) [%]
Maximum Voltage	-10	264	0.0	48.433	±86	±0.2
Minimum Voltage	50	264	1.1	48.262		

COSEL

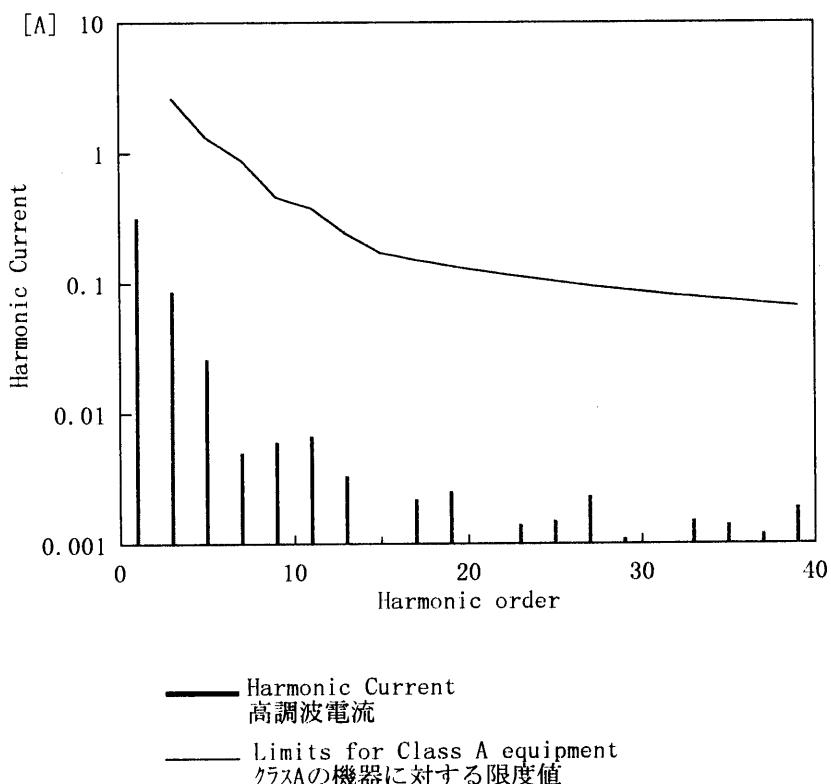
Model	LEA50F-48	Temperature	25°C
Item	Harmonic Current 高調波電流	Testing Circuitry	Figure E
Object	—		

1. Input Current Waveform



Conditions	Values
Input Voltage [V]	200.9
Input Current [A]	0.331
Active Power [W]	62.6
Apparent Power [VA]	66.7
Frequency [Hz]	50
Power Factor	0.939
Output Power [W]	52.8

2. Harmonic Current

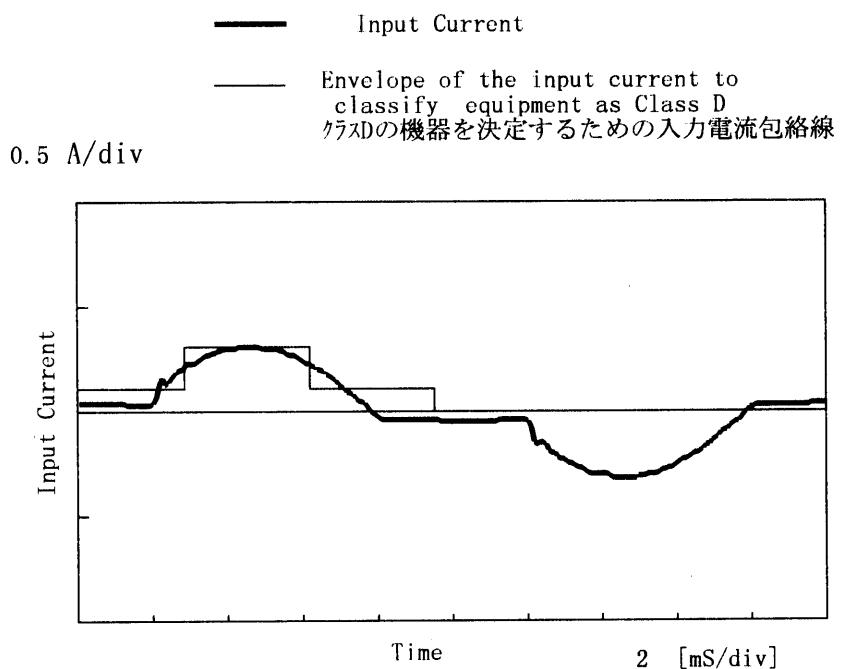


Harmonics order 高調波次数	Limits 限度値 [A] 測定値 [A]
1	—
2	—
3	2.63315
4	—
5	1.30513
6	—
7	0.88153
8	—
9	0.45794
10	—
11	0.37780
12	—
13	0.24042
14	—
15	0.17173
16	—
17	0.15152
18	—
19	0.13557
20	—
21	0.12266
22	—
23	0.11200
24	—
25	0.10304
26	—
27	0.09540
28	—
29	0.08882
30	—
31	0.08309
32	—
33	0.07806
34	—
35	0.07360
36	—
37	0.06962
38	—
39	0.06605
40	—

COSSEL

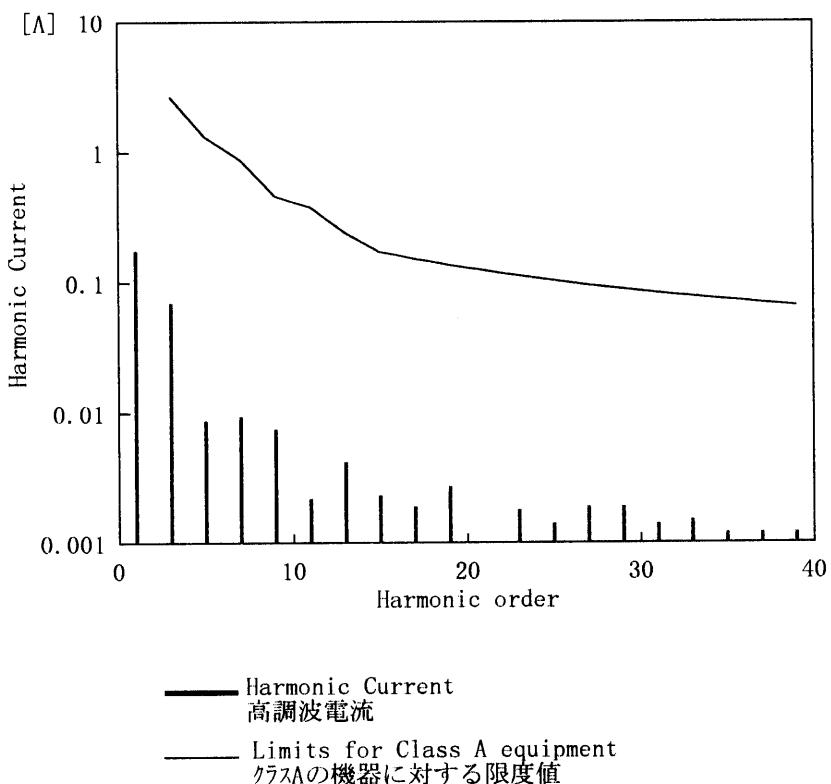
Model	LEA50F-48	Temperature Testing Circuitry	25°C Figure E
Item	Harmonic Current 高調波電流		
Object	——		

1. Input Current Waveform



Conditions	Values
Input Voltage [V]	200.9
Input Current [A]	0.191
Active Power [W]	34
Apparent Power [VA]	38.5
Frequency [Hz]	50
Power Factor	0.883
Output Power [W]	26.4

2. Harmonic Current



Harmonics order 高調波次数	Limits 限度値 [A]	Values 測定値 [A]
1	—	0.17760
2	—	0.00030
3	2.63315	0.06990
4	—	0.00000
5	1.30513	0.00870
6	—	0.00000
7	0.88153	0.00940
8	—	0.00010
9	0.45794	0.00750
10	—	0.00010
11	0.37780	0.00220
12	—	0.00010
13	0.24042	0.00420
14	—	0.00000
15	0.17173	0.00230
16	—	0.00000
17	0.15152	0.00190
18	—	0.00010
19	0.13557	0.00270
20	—	0.00010
21	0.12266	0.00030
22	—	0.00010
23	0.11200	0.00180
24	—	0.00000
25	0.10304	0.00140
26	—	0.00010
27	0.09540	0.00190
28	—	0.00010
29	0.08882	0.00190
30	—	0.00010
31	0.08309	0.00140
32	—	0.00000
33	0.07806	0.00150
34	—	0.00000
35	0.07360	0.00120
36	—	0.00010
37	0.06962	0.00120
38	—	0.00010
39	0.06605	0.00120
40	—	0.00000



Model	LEA50F-48	Testing Circuitry Figure A
Item	Condensation 結露特性	
Object	+48.0V 1.1A	

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]	48.345	Input Volt.: 200V, Load Current: 1.1A
Line Regulation [mV]	2	Input Volt.: 170~264V, Load Current: 1.1A
Load Regulation [mV]	8	Input Volt.: 200V, Load Current: 0.0~1.1A



Model	LEA50F-48	Temperature	25°C
Item	Leakage Current 漏洩電流	Testing Circuitry	Figure A
Object	<hr/>		

1. Results

Standards	Leakage Current [mA]		
	Input Volt. 170 [V]	Input Volt. 200 [V]	Input Volt. 264 [V]
(A) DENTORI	—	—	—
(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。

Standards	Leakage Current [mA]		
	Input Volt. 170 [V]	Input Volt. 230 [V]	Input Volt. 264 [V]
(B) IEC60950	0.32	0.44	0.52



Model	LEA50F-48	Temperature Testing Circuitry	25°C Figure A
Item	Line Noise Tolerance 入力雑音耐量		
Object	+48.0V 1.1A		

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

COSEL

Model	LEA50F-48	Temperature Testing Circuitry	25°C Figure D
Item	Conducted Emission 雜音端子電壓		
Object	<hr/>		

1. Graph

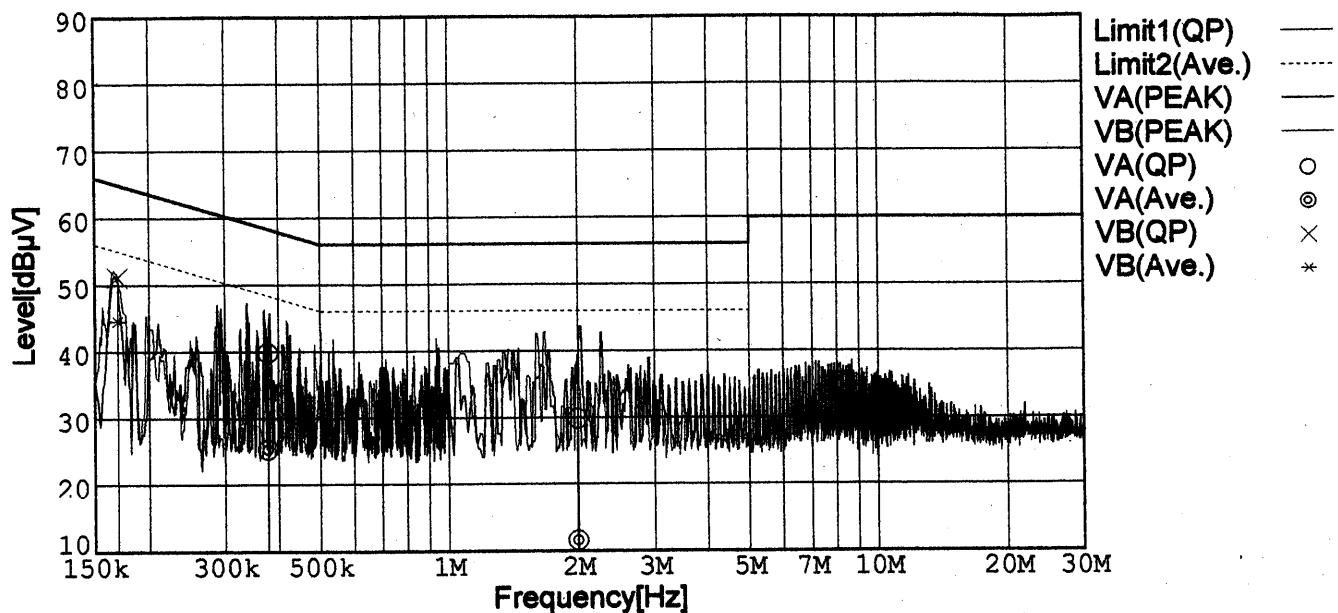
Remarks

Input Volt. 230 V (CISPR Pub22 Class B)

Load 100 %

Limit1: [CISPR Pub22] Class B(QP)

Limit2: [CISPR Pub22] Class B(Ave.)



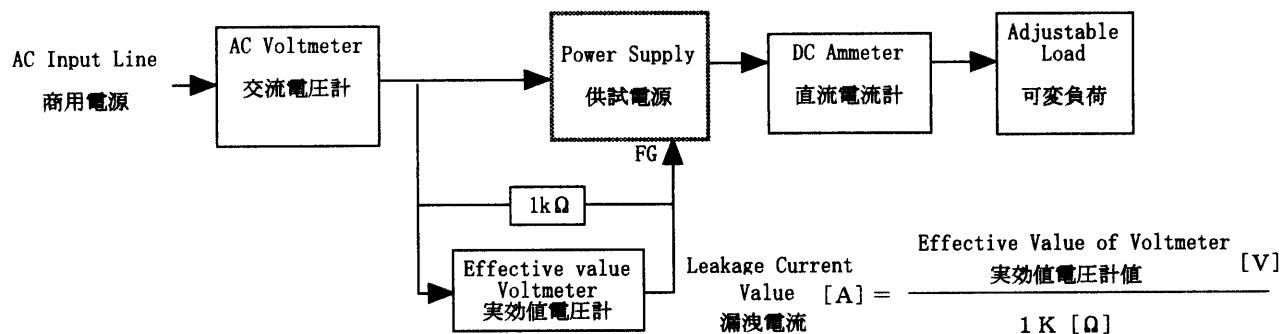
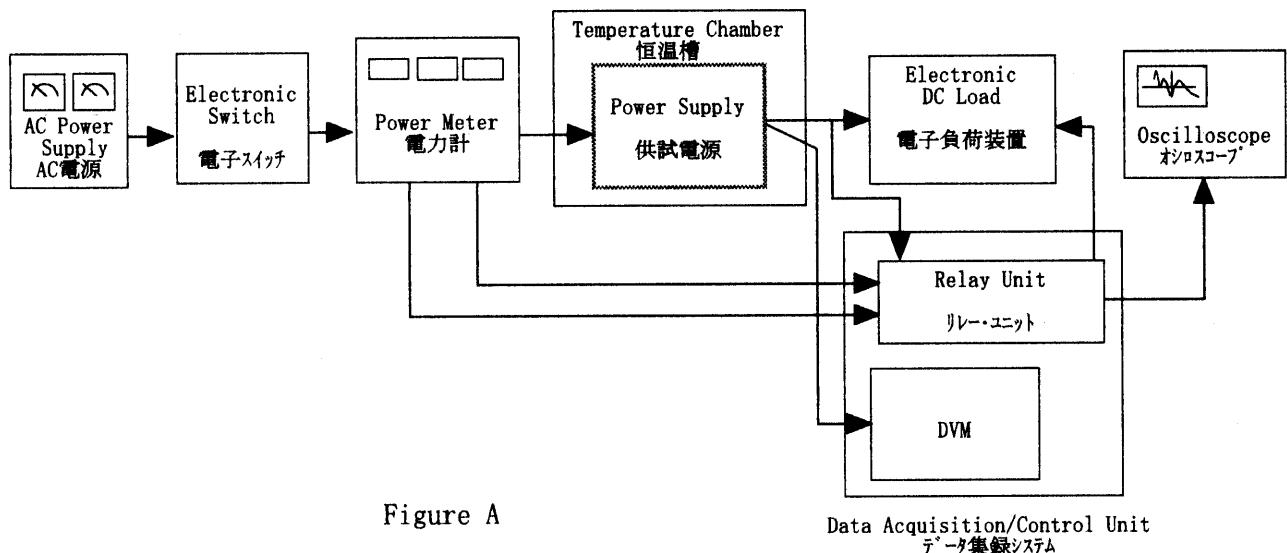


Figure B (DENTORI)

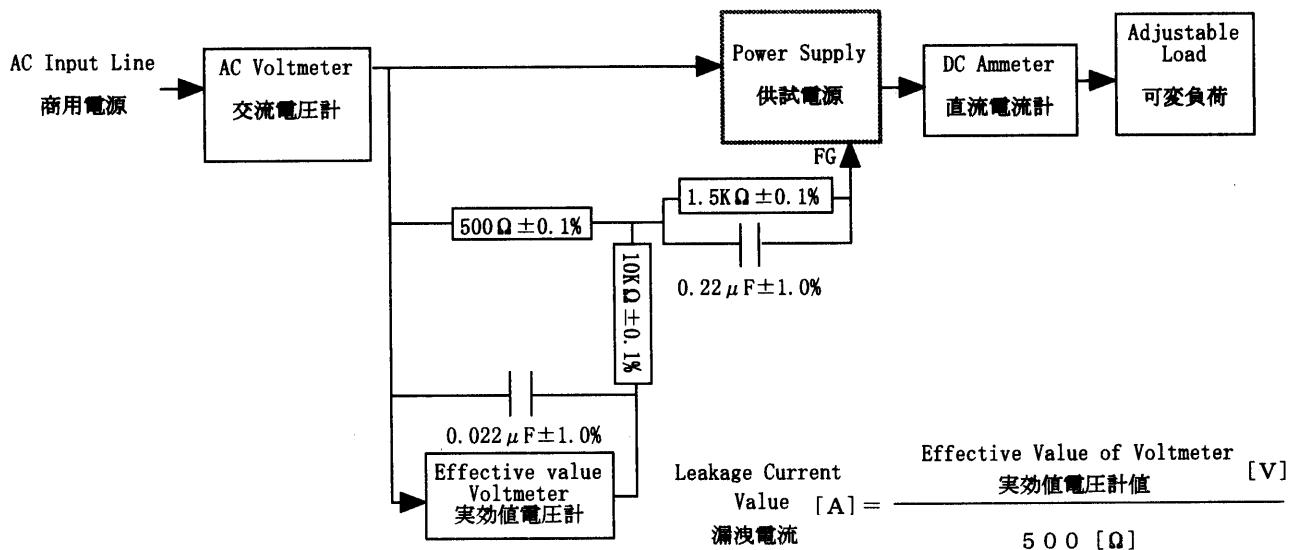


Figure B (IEC 60950)

COSEL

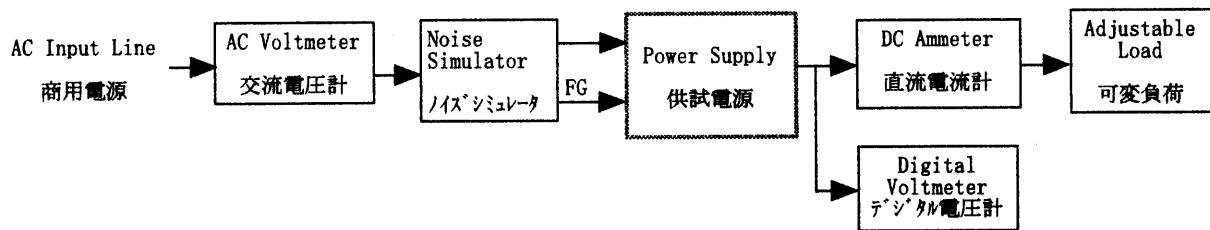


Figure C

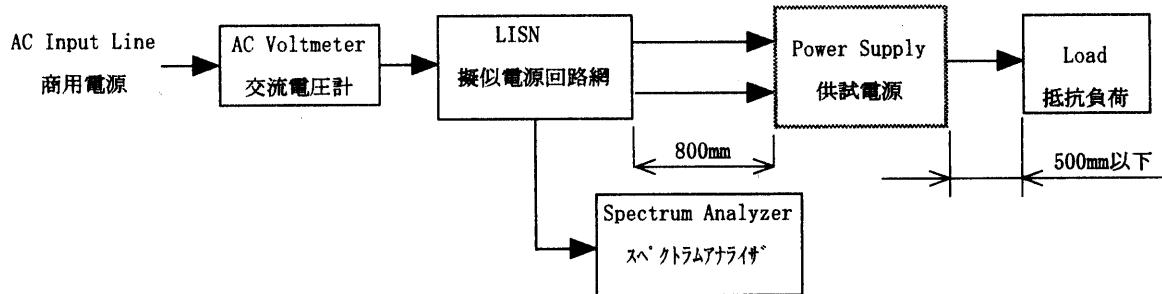


Figure D

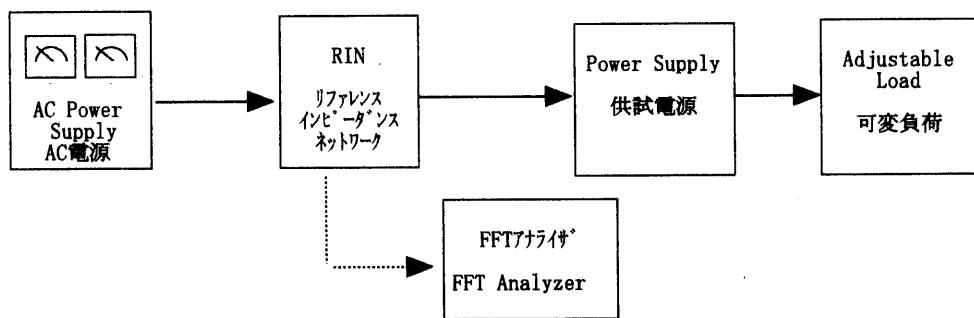


Figure E