

COSEL

TEST DATA OF LEA100F-24
(200V INPUT)

Regulated DC Power Supply

Date : Feb. 9. 1999

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Design Manager

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Design Engineer

コーセル株式会社
COSEL CO., LTD.



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Model	LEA100F-24	Temperature Testing Circuitry	25°C Figure A																																
Item	Line Regulation 静的入力変動																																		
Object	+24V 4.3A	2. Values																																	
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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	LEA100F-24																																																									
Item	Input Current (by Load Current) 入力電流（負荷特性）	Temperature 25°C	Testing Circuitry Figure A																																																							
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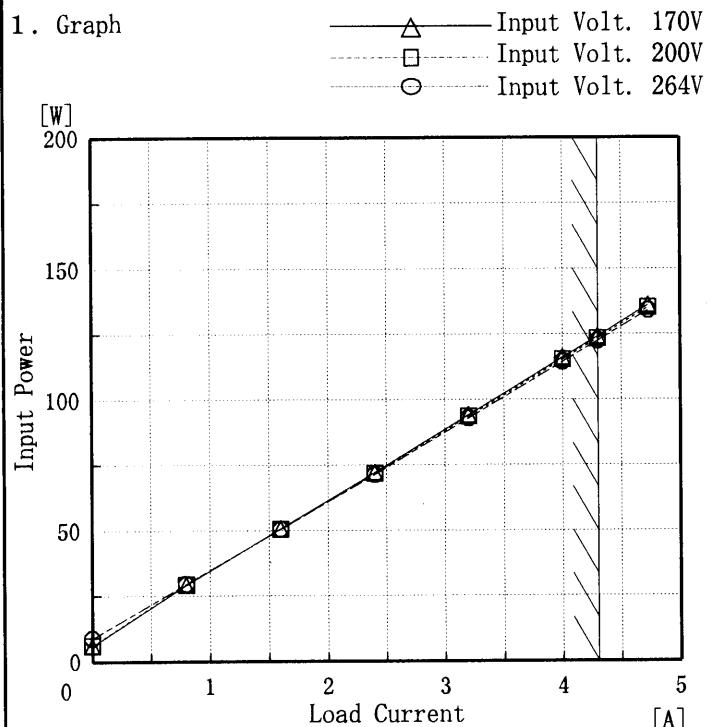
Model

LEA100F-24

Item

Input Power (by Load Current)
入力電力 (負荷特性)

Output



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 Power [W]		
	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
0.00	6.00	6.20	8.80
0.80	29.30	29.40	29.60
1.60	50.80	50.60	50.60
2.40	72.10	71.80	71.40
3.20	94.10	93.60	93.00
4.00	116.10	115.40	114.50
4.30	124.00	123.30	122.40
4.73	136.10	135.20	134.10
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—

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Model	LEA100F-24																																	
Item	Efficiency (by Input Voltage) 効率 (入力電圧特性)	Temperature 25°C Testing Circuitry Figure A																																
Object	<hr/>																																	
1. Graph																																		
<p>The graph plots Efficiency [%] on the y-axis (62 to 86) against Input Voltage [V] on the x-axis (0 to 300). Two data series are shown: Load 50% (squares) and Load 100% (triangles). The efficiency generally increases with input voltage, with a slight dip around 280V. A slanted line on the right side of the graph indicates the rated input voltage range.</p>		2. Values																																
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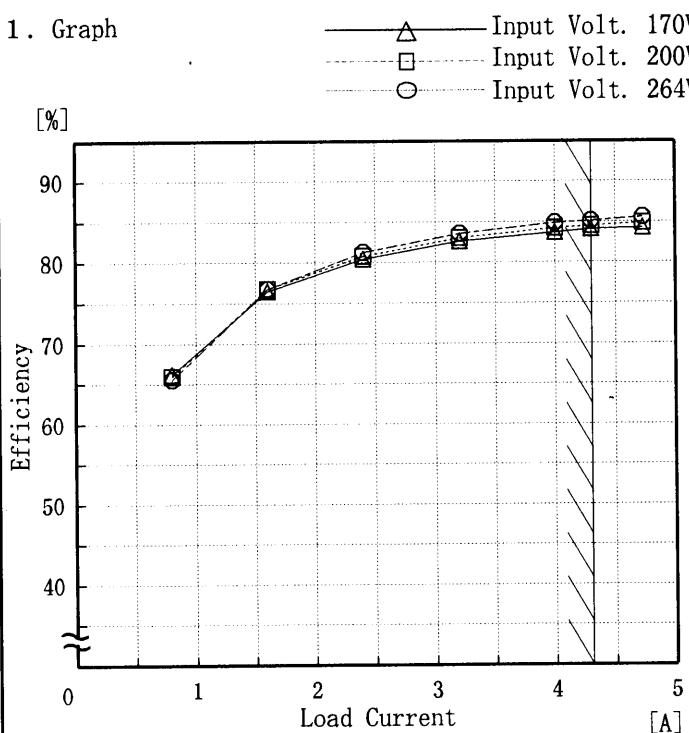
Note: Slanted line shows the range of the rated input voltage.

(注)斜線は定格入力電圧範囲を示す。

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Model	LEA100F-24
Item	Efficiency (by Load Current) 効率(負荷電流特性)
Output	—

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。

Temperature 25°C
Testing Circuitry Figure A

2. Values

Load Current [A]	Efficiency [%]		
	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
0.80	66.2	66.0	65.5
1.60	76.5	76.8	76.8
2.40	80.5	80.8	81.3
3.20	82.6	83.0	83.6
4.00	83.7	84.2	84.9
4.30	84.1	84.5	85.1
4.73	84.3	84.9	85.6
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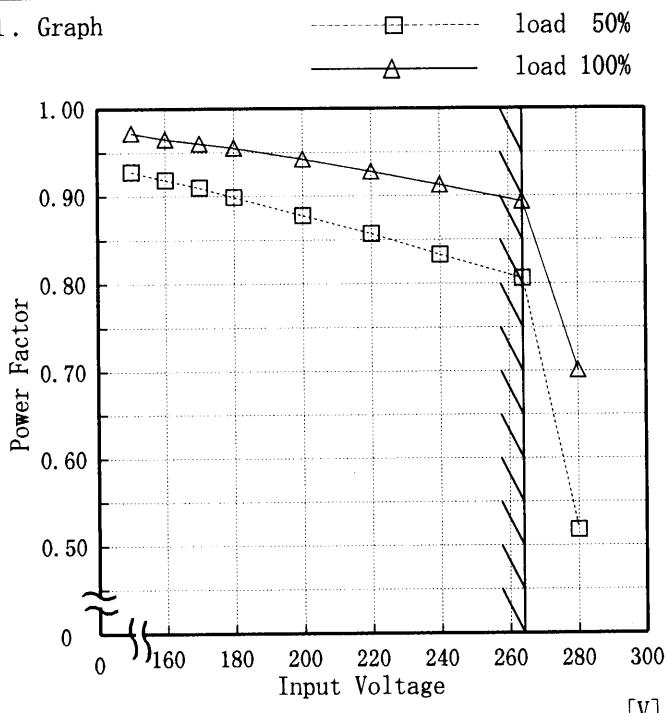
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Model LEA100F-24

Item Power Factor (by Input Voltage)
力率(入力電圧特性)

Object _____

1. Graph

Temperature 25°C
Testing Circuitry Figure A

2. Values

Input Voltage [V]	load 50%	load 100%
	Power Factor	Power Factor
150	0.93	0.97
160	0.92	0.97
170	0.91	0.96
180	0.90	0.96
200	0.88	0.94
220	0.86	0.93
240	0.83	0.91
264	0.81	0.89
280	0.52	0.70

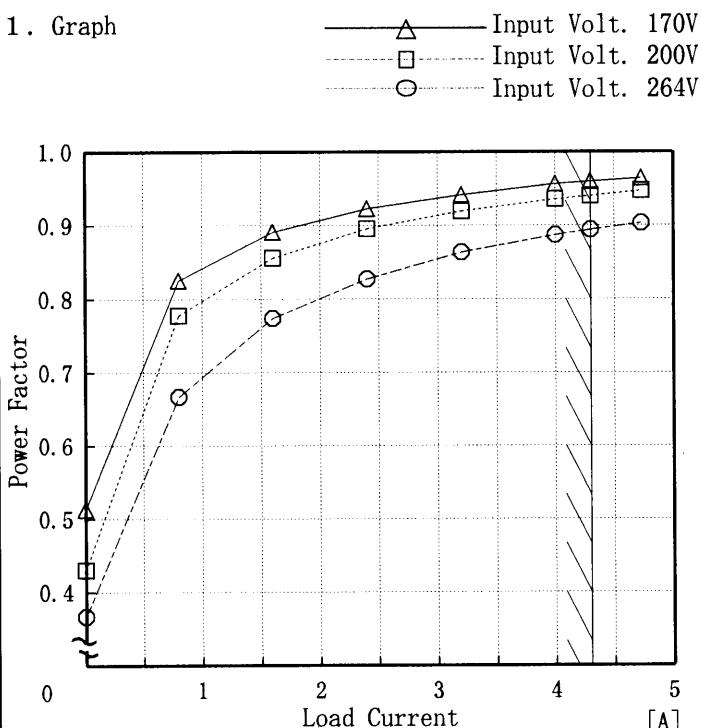
Note: Slanted line shows the range of the rated input voltage.

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Model	LEA100F-24
Item	Power Factor (by Load Current) 力率 (負荷電流特性)
Output	—

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。

Temperature 25°C
Testing Circuitry Figure A

2. Values

Load Current [A]	Power Factor		
	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
0.00	0.51	0.43	0.37
0.80	0.83	0.78	0.67
1.60	0.89	0.86	0.77
2.40	0.92	0.90	0.83
3.20	0.94	0.92	0.86
4.00	0.96	0.94	0.89
4.30	0.96	0.94	0.89
4.73	0.96	0.95	0.90
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—

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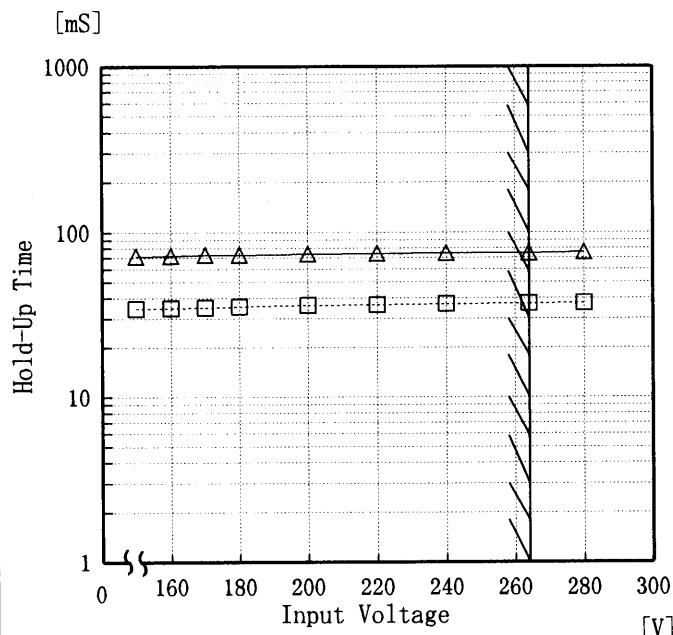
Model LEA100F-24

Item Hold-Up Time 出力保持時間

Object +24V 4.3A

1. Graph

—△— Load 50%
 -□- Load 100%


 Temperature 25°C
 Testing Circuitry Figure A

2. Values

Input Voltage [V]	Load 50%	Load 100%
	Hold-Up Time [mS]	Hold-Up Time [mS]
150	72	34
160	72	35
170	73	35
180	73	35
200	74	36
220	74	36
240	75	37
264	75	37
280	76	37

This duration covers from Shut-off of input voltage to the moment when output voltage descends to the rated range of voltage accuracy.

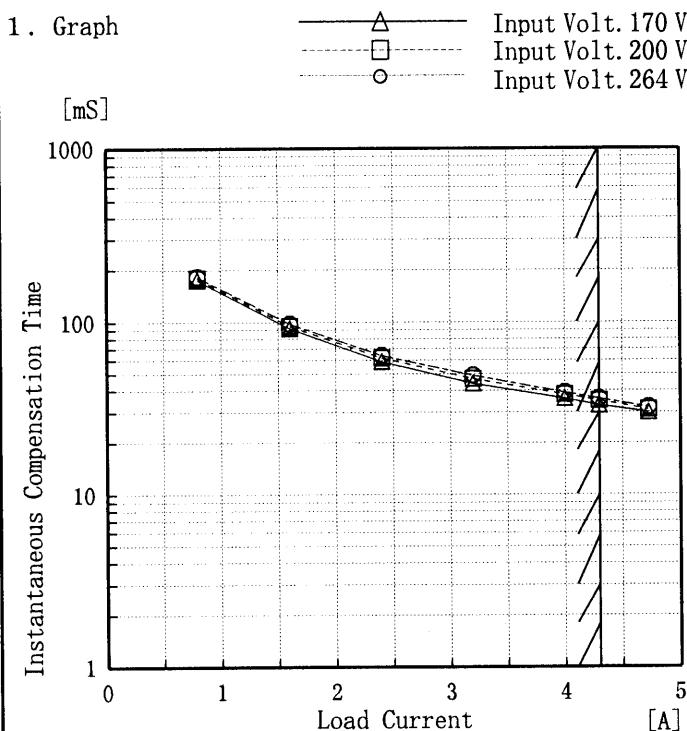
Note: Slanted line shows the range of the rated input voltage.

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。

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Model	LEA100F-24
Item	Instantaneous Interruption Compensation 瞬時停電保障
Object	+24V 4.3A



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。

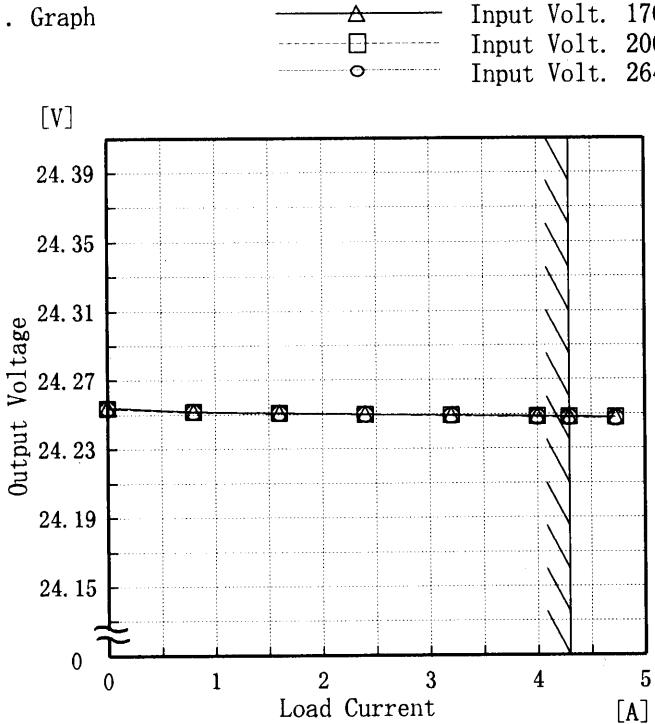
(注) 斜線は定格負荷電流範囲を示す。

Temperature 25°C
Testing Circuitry Figure A

2. Values

Load Current [A]	Input Volt. 170 [V]	Input Volt. 200 [V]	Input Volt. 264 [V]
	Time [mS]		
0.00	—	—	—
0.80	176	180	183
1.60	92	95	98
2.40	59	62	64
3.20	44	47	49
4.00	36	38	39
4.30	33	35	36
4.73	30	31	32
—	—	—	—
—	—	—	—
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Model	LEA100F-24	Temperature Testing Circuitry	25°C Figure A																																												
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Object	+24V 4.3A																																														
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COSEL

Model	LEA100F-24	Temperature Testing Circuitry 25°C Figure A																																						
Item	Ripple Voltage(by Load Current) リップル電圧(負荷電流特性)																																							
Object	+24V 4.3A																																							
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Load Current [A]	Input Volt. 170 [V]	Input Volt. 264 [V]																																						
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COSEL

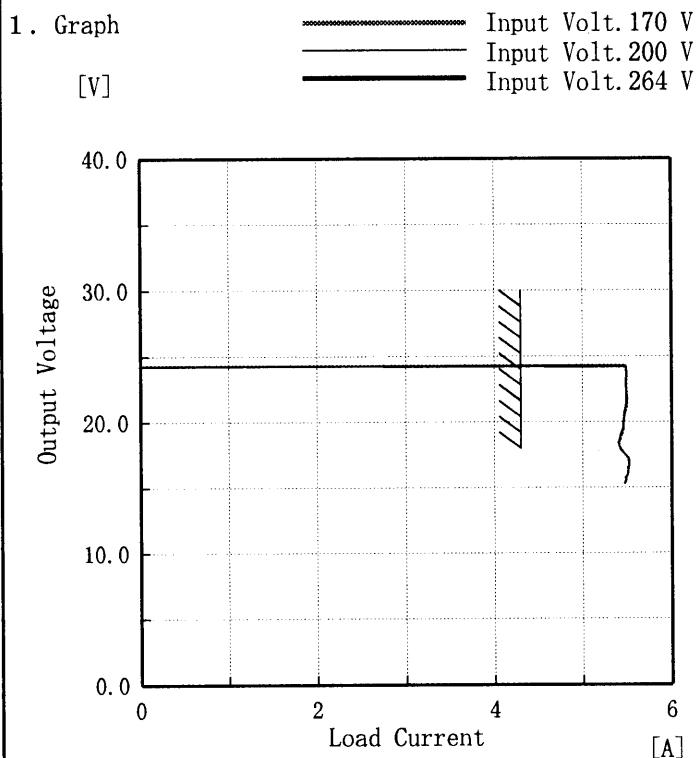
Model	LEA100F-24	Temperature Testing Circuitry	25°C Figure A																																						
Item	Ripple-Noise リップルノイズ																																								
Object	+24V 4.3A	2. Values																																							
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Load Current [A]	Ripple-Noise 170V [mV] (□)	Ripple-Noise 264V [mV] (△)																																							
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Load current [A]	Input Volt. 170 [V]	Input Volt. 264 [V]																																							
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COSEL

Model LEA100F-24

Item Overcurrent Protection
過電流保護

Object +24V 4.3A



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。

16.8V以下は間欠状態。

Temperature 25°C
Testing Circuitry Figure A

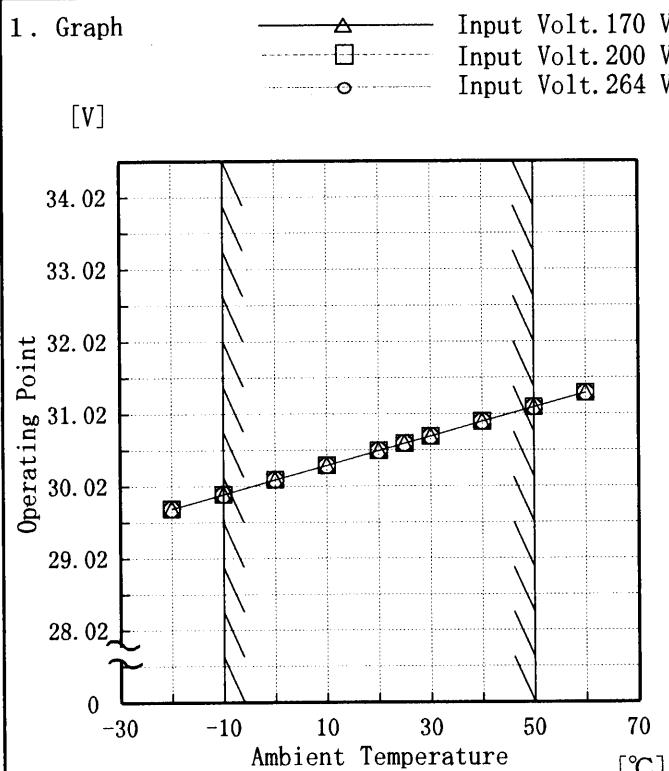
2. Values

Output Voltage [V]	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
	Load Current [A]	Load Current [A]	Load Current [A]
24.00	5.48	5.48	5.49
22.80	5.49	5.48	5.49
21.60	5.50	5.49	5.49
19.20	5.45	5.44	5.44
16.80	5.52	5.52	5.52
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—

COSEL

Model	LEA100F-24
Item	Overvoltage Protection 過電圧保護
Object	+24V 4.3A

Testing Circuitry Figure A



Load 0%

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

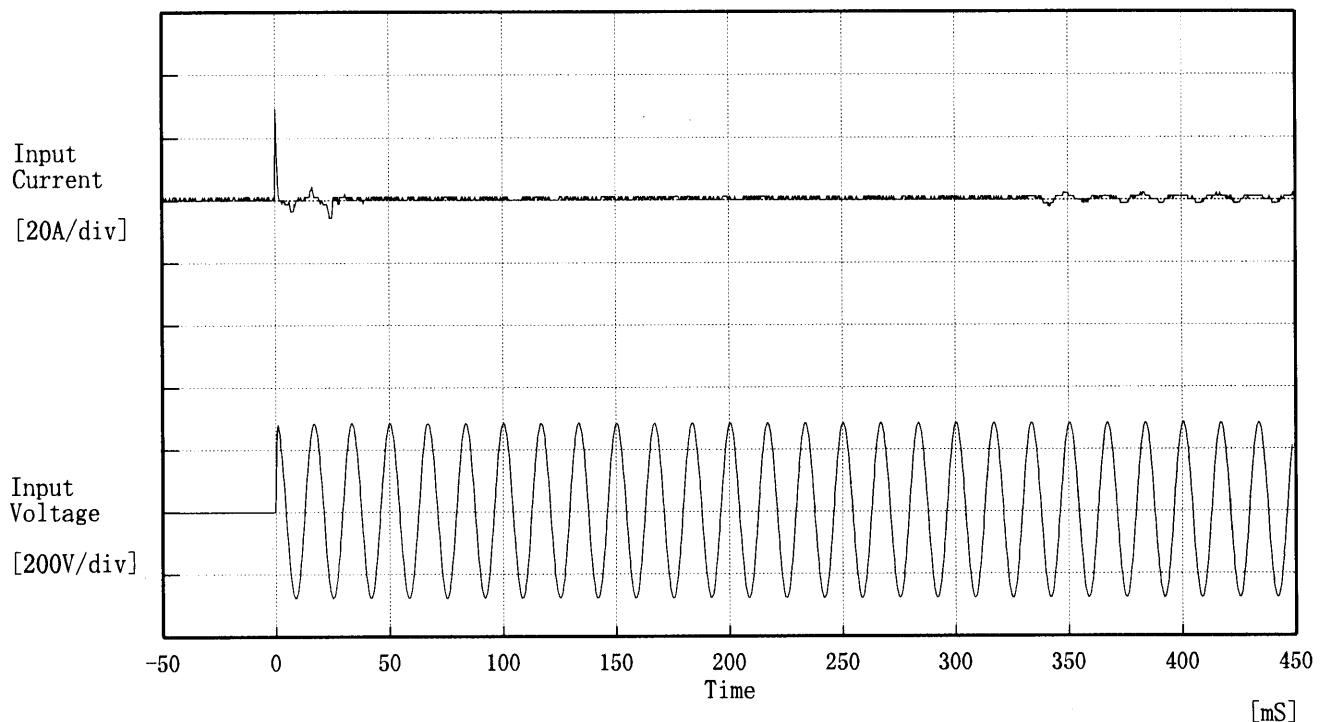
(注)斜線は定格周囲温度範囲を示す。

2. Values

Ambient Temp. [°C]	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
	Operating Point [V]		
-20	29.7	29.7	29.7
-10	29.9	29.9	29.9
0	30.1	30.1	30.1
10	30.3	30.3	30.3
20	30.5	30.5	30.5
25	30.6	30.6	30.6
30	30.7	30.7	30.7
40	30.9	30.9	30.9
50	31.1	31.1	31.1
60	31.3	31.3	31.3
—	—	—	—

COSEL

Model	LEA100F-24	Temperature Testing Circuitry 25°C Figure A
Item	Inrush Current 突入電流	
Object	_____	



Input Voltage 200 V

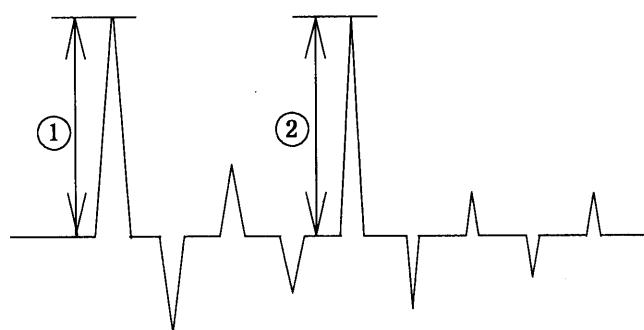
Frequency 60 Hz

Load 100 %

Inrush Current

① 29.15 [A]

② 2.25 [A]



COSEL

Model	LEA100F-24	Temperature Testing Circuitry Figure A	25°C
Item	Dynamic Load Response 動的負荷變動		
Object	+24V 4.3A		

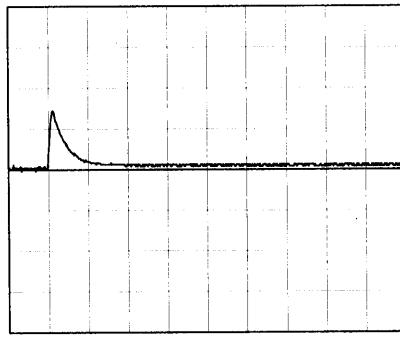
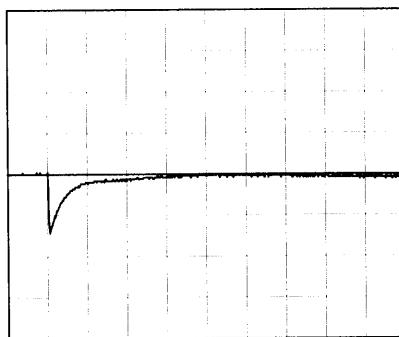
Input Volt. 200 V

Cycle 1000 mS

Load Current

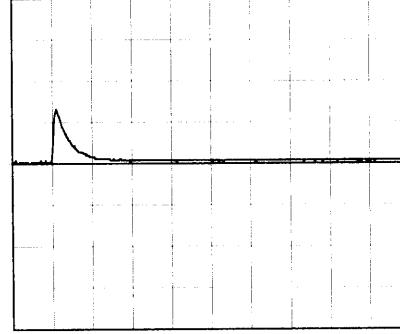
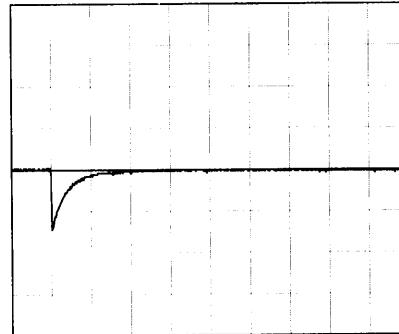
Min. Load ↔

Load 100 %



Min. Load ↔

Load 50 %



100 mV/div

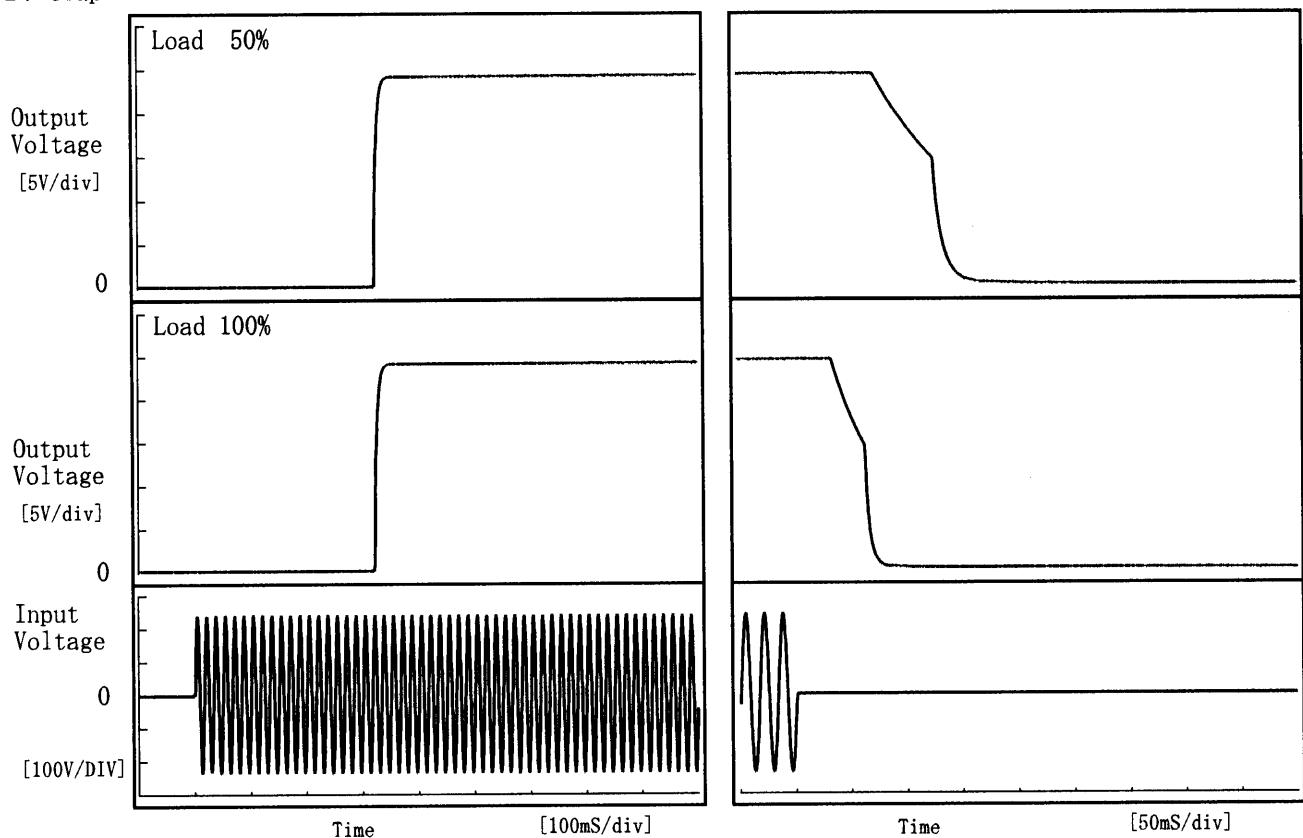
10 ms/div

COSEL

Model	LEA100F-24
Item	Rise and Fall Time 立上り、立下り時間
Object	+24V 4.3A

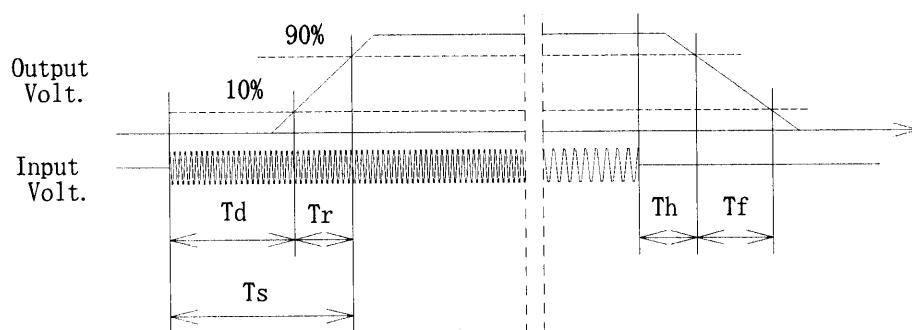
Temperature 25°C
Testing Circuitry Figure A

1. Graph



2. Values

Load	Time	T _d	T _r	T _s	T _h	T _f
50 %		322.0	9.5	331.5	83.5	57.8
100 %		322.0	10.0	332.0	40.3	31.5



COSEL

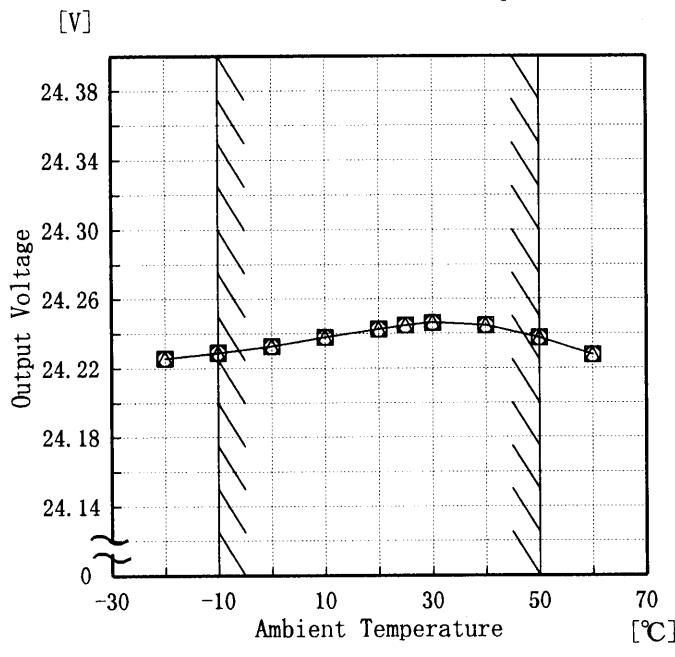
Model LEA100F-24

Item Ambient Temperature Drift
周囲温度変動

Object +24V 4.3A

1. Graph

△ Input Volt. 170V
 □ Input Volt. 200V
 ○ Input Volt. 264V



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。

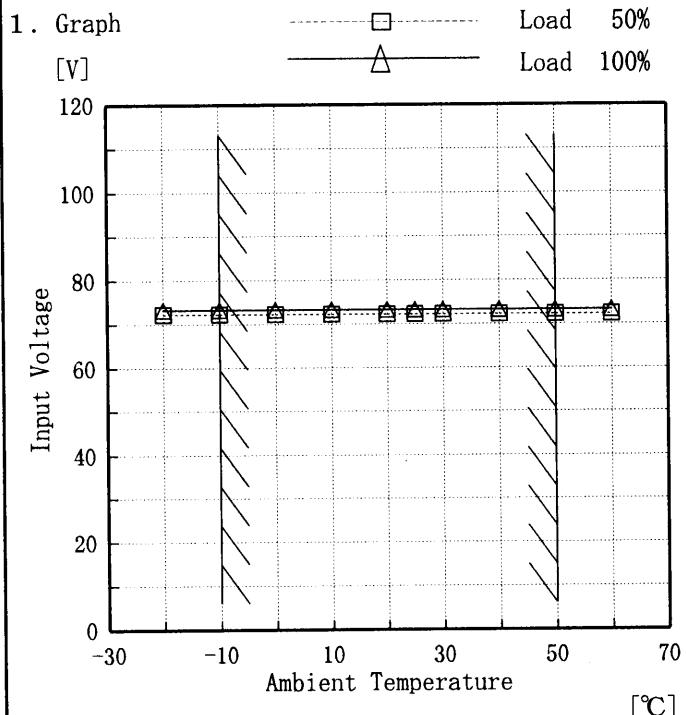
Testing Circuitry Figure A

2. Values

Temperature [°C]	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
	Output Volt. [V]	Output Volt. [V]	Output Volt. [V]
-20	24.226	24.226	24.226
-10	24.229	24.229	24.229
0	24.233	24.233	24.233
10	24.238	24.238	24.238
20	24.243	24.243	24.242
25	24.245	24.245	24.245
30	24.246	24.246	24.246
40	24.245	24.245	24.245
50	24.238	24.237	24.237
60	24.228	24.228	24.228
—	—	—	—

COSEL

Model	LEA100F-24
Item	Minimum Input Voltage for Regulated Output Voltage 最低レギュレーション電圧
Object	+24V 4.3A



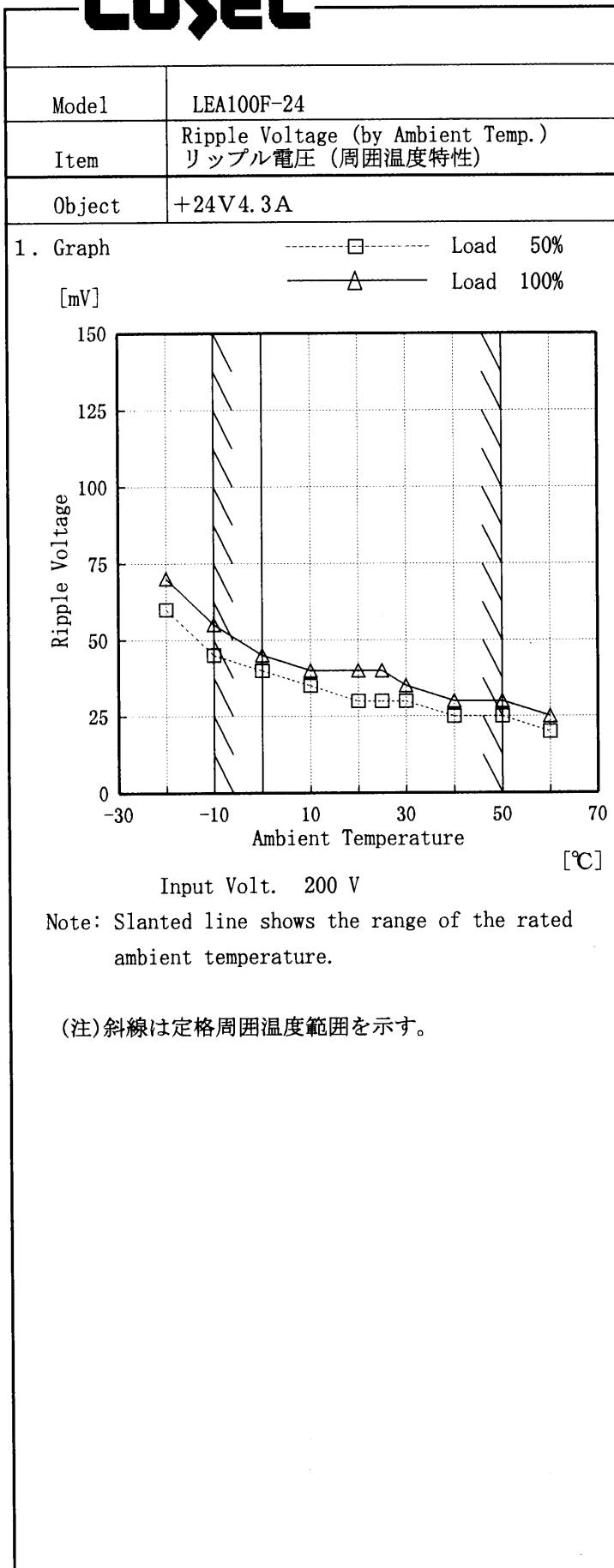
Note: Slanted line shows the range of the rated ambient temperature.

(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%
	Input Volt. [V]	Input Volt. [V]
-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
—	—	—

COSEL

Testing Circuitry Figure A

COSEL

Model	LEA100F-24	Temperature	25 °C																					
Item	Time Lapse Drift 経時ドリフト	Testing Circuitry	Figure A																					
Object	+24V 4.3A																							
1. Graph			2. Values																					
<p>[V]</p> <table border="1"> <caption>Data points estimated from Figure A graph</caption> <thead> <tr> <th>Time [H]</th> <th>Output Voltage [V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>24.256</td></tr> <tr><td>0.5</td><td>24.235</td></tr> <tr><td>1.0</td><td>24.235</td></tr> <tr><td>2.0</td><td>24.235</td></tr> <tr><td>3.0</td><td>24.235</td></tr> <tr><td>4.0</td><td>24.235</td></tr> <tr><td>5.0</td><td>24.235</td></tr> <tr><td>6.0</td><td>24.235</td></tr> <tr><td>7.0</td><td>24.235</td></tr> <tr><td>8.0</td><td>24.235</td></tr> </tbody> </table>			Time [H]	Output Voltage [V]	0.0	24.256	0.5	24.235	1.0	24.235	2.0	24.235	3.0	24.235	4.0	24.235	5.0	24.235	6.0	24.235	7.0	24.235	8.0	24.235
Time [H]	Output Voltage [V]																							
0.0	24.256																							
0.5	24.235																							
1.0	24.235																							
2.0	24.235																							
3.0	24.235																							
4.0	24.235																							
5.0	24.235																							
6.0	24.235																							
7.0	24.235																							
8.0	24.235																							
<p>Output Voltage</p> <p>Input Volt. 200V Load 100%</p>																								



Model	LEA100F-24	Testing Circuitry Figure A
Item	Output Voltage Accuracy 定電圧精度	
Object	+24V 4.3A	

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 : 170~264 V

Load Current : 0.00~4.30 A

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

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

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 170~264 V

負荷電流 0.00~4.30 A

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

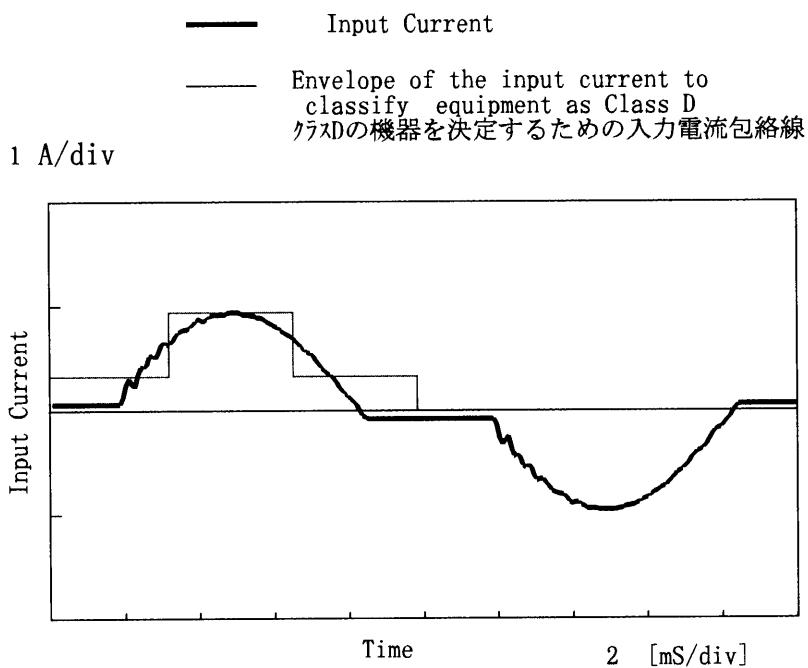
$$* \text{ 定電圧精度(変動率)} = \frac{\text{変動値}}{\text{定格出力電圧}} \times 100$$

Item	Temperature [°C]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy(Ration) [%]
Maximum Voltage	25	264	0.00	24.254		
Minimum Voltage	-10	264	4.30	24.229	±13	±0.1

COSEL

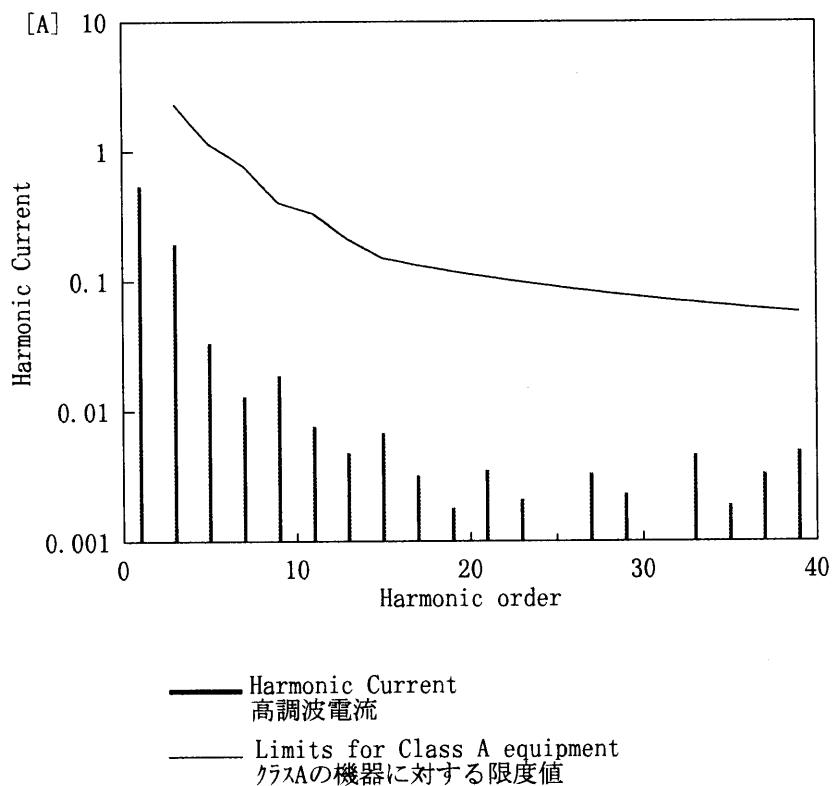
Model	LEA100F-24	Temperature Testing Circuitry	25°C Figure E
Item	Harmonic Current 高調波電流		
Object	——		

1. Input Current Waveform



Conditions	Values
Input Voltage [V]	230
Input Current [A]	0.58
Active Power [W]	123.3
Apparent Power [VA]	133.6
Frequency [Hz]	50
Power Factor	0.923
Output Power [W]	103.2

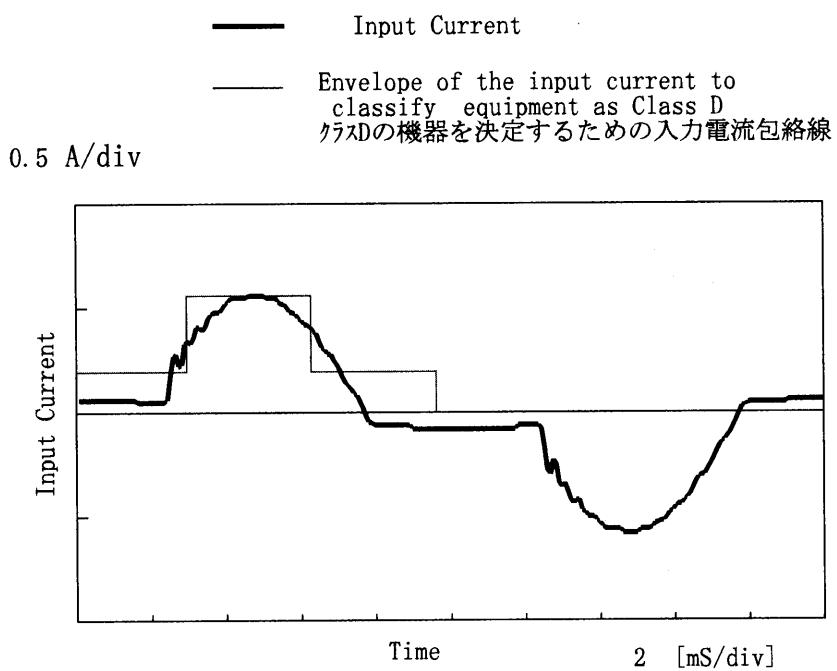
2. Harmonic Current



COSSEL

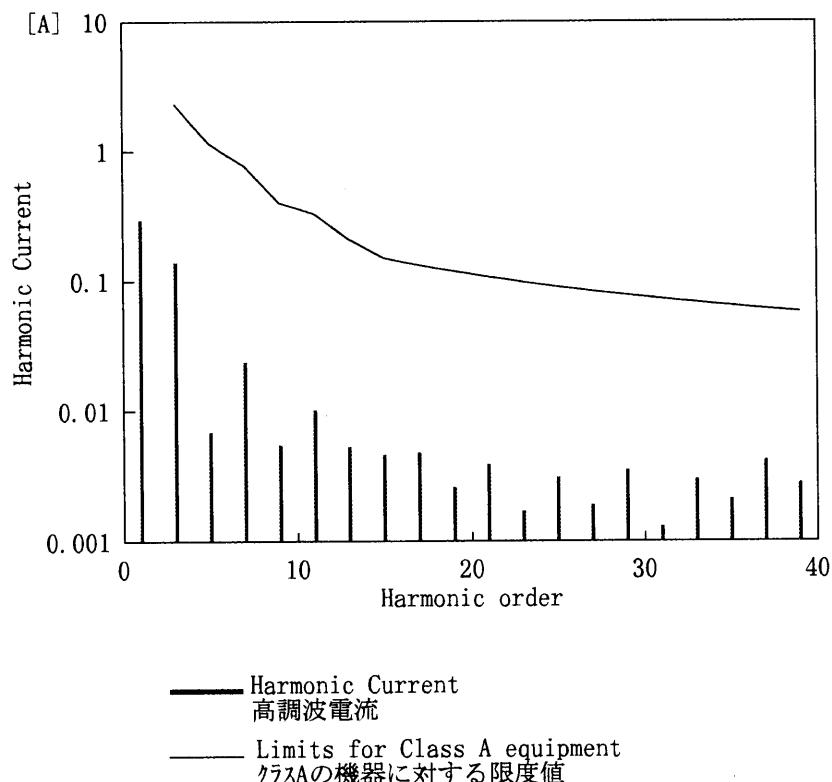
Model	LEA100F-24	Temperature Testing Circuitry	25°C Figure E
Item	Harmonic Current 高調波電流		
Object	—		

1. Input Current Waveform



Conditions	Values
Input Voltage [V]	230.6
Input Current [A]	0.328
Active Power [W]	65.5
Apparent Power [VA]	75.9
Frequency [Hz]	50
Power Factor	0.863
Output Power [W]	51.6

2. Harmonic Current



Harmonics order 高調波次数	Limits 限度値 [A]	Values 測定値 [A]
1	—	0.29540
2	—	0.00040
3	2.29402	0.14060
4	—	0.00000
5	1.13703	0.00690
6	—	0.00010
7	0.76800	0.02390
8	—	0.00010
9	0.39896	0.00550
10	—	0.00010
11	0.32914	0.01020
12	—	0.00000
13	0.20945	0.00530
14	—	0.00010
15	0.14961	0.00460
16	—	0.00000
17	0.13201	0.00480
18	—	0.00010
19	0.11811	0.00260
20	—	0.00010
21	0.10686	0.00390
22	—	0.00000
23	0.09757	0.00170
24	—	0.00010
25	0.08977	0.00310
26	—	0.00010
27	0.08312	0.00190
28	—	0.00010
29	0.07738	0.00350
30	—	0.00010
31	0.07239	0.00130
32	—	0.00000
33	0.06800	0.00300
34	—	0.00010
35	0.06412	0.00210
36	—	0.00010
37	0.06065	0.00420
38	—	0.00000
39	0.05754	0.00280
40	—	0.00010



Model	LEA100F-24	
Item	Condensation 結露特性	Testing Circuitry Figure A
Object	+24V 4.3A	

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]	24.249	Input Volt.: 200V, Load Current:4.3A
Line Regulation [mV]	1	Input Volt.: 170~264V, Load Current:4.3A
Load Regulation [mV]	6	Input Volt.: 200V, Load Current:0.0~4.3A



Model	LEA100F-24	Temperature	25°C
Item	Leakage Current 漏洩電流	Testing Circuitry	Figure B
Object	<hr/>		

1. Results

Standards	Leakage Current [mA]		
	Input Volt.	Input Volt.	Input Volt.
85 [V]	100 [V]	132 [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.	Input Volt.	Input Volt.
170 [V]	230 [V]	264 [V]	—
(B) IEC60950	0.31	0.43	0.49



Model	LEA100F-24	Temperature Testing Circuitry	25°C Figure C
Item	Line Noise Tolerance 入力雑音耐量		
Object	+24V 4.3A		

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

Conditions

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

COSEL

Model	LEA100F-24	Temperature Testing Circuitry	25°C Figure D
Item	Conducted Emission 雜音端子電壓		
Object	<hr/>		

1. Graph

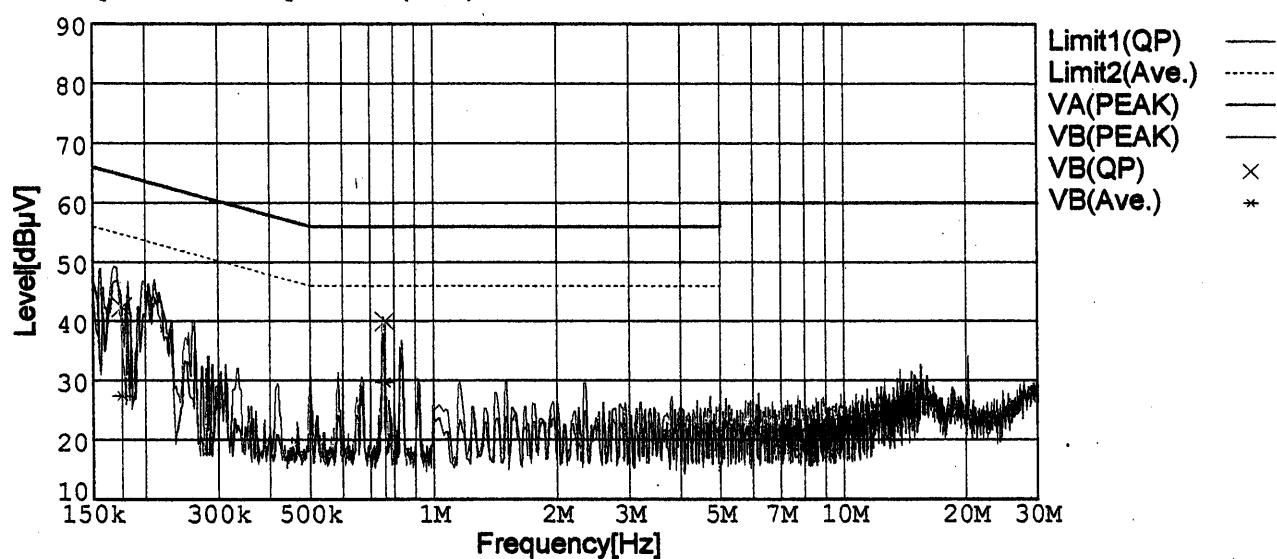
Remarks

Input Volt. 230V (CISPR Pub22 Class B)

Load 100 %

Limit1: [CISPR Pub22] Class B(QP)

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



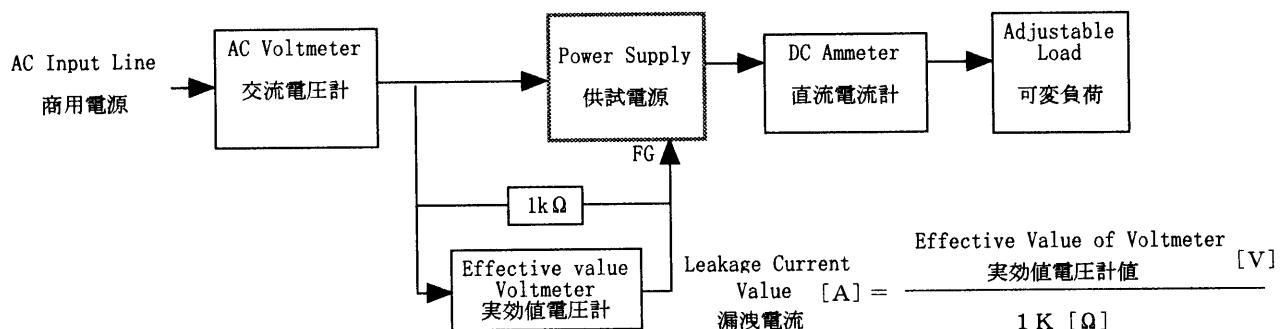
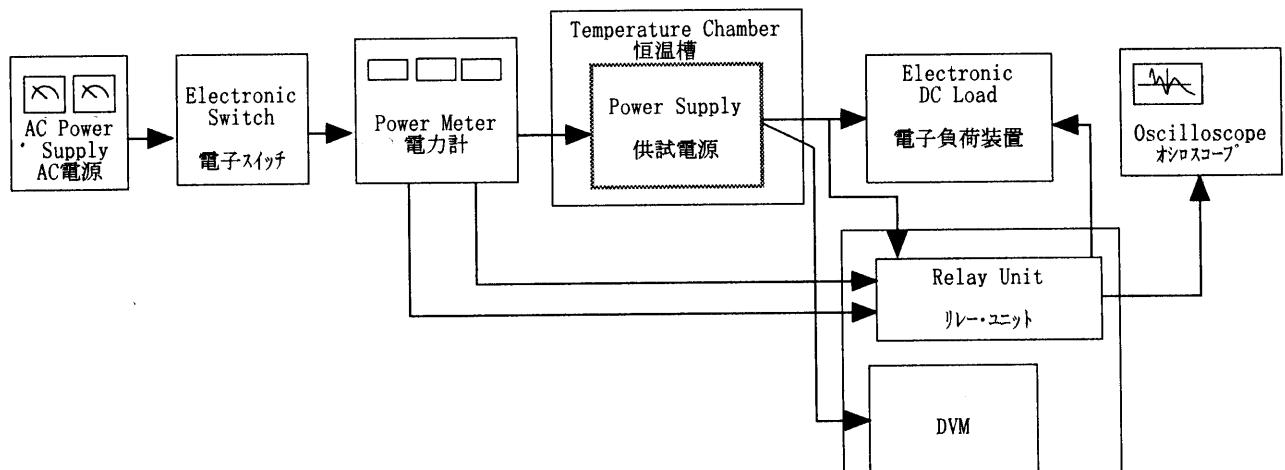


Figure B (DENTORI)

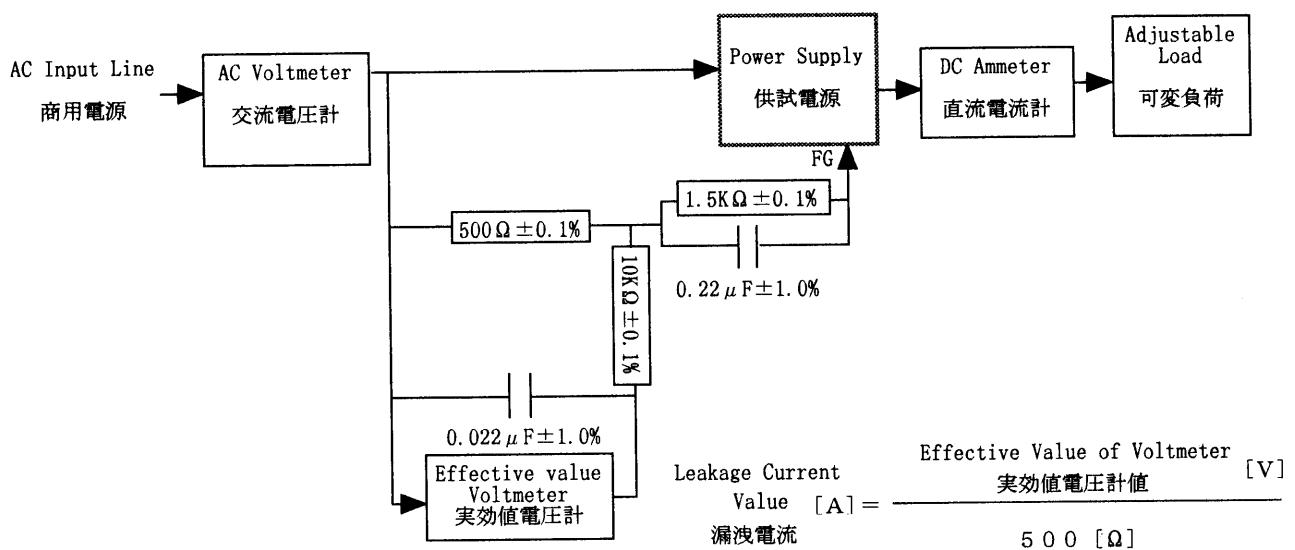


Figure B (IEC60950)

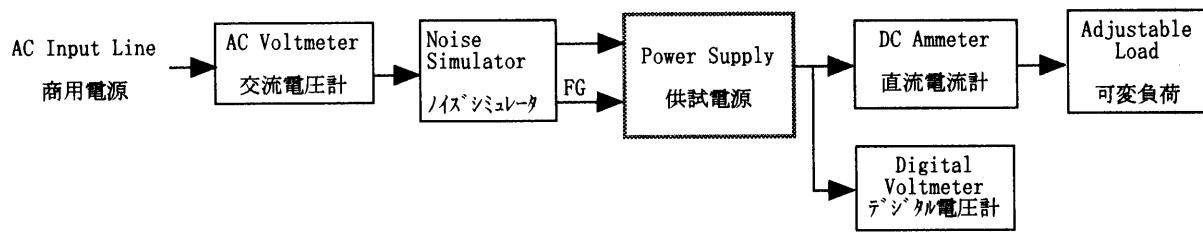


Figure C

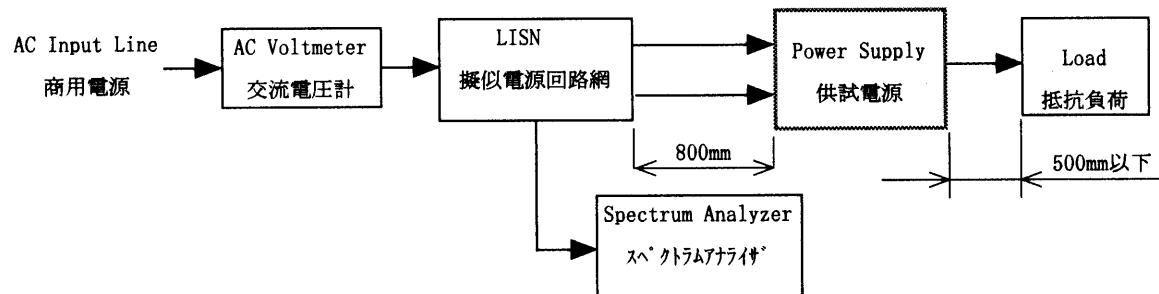


Figure D

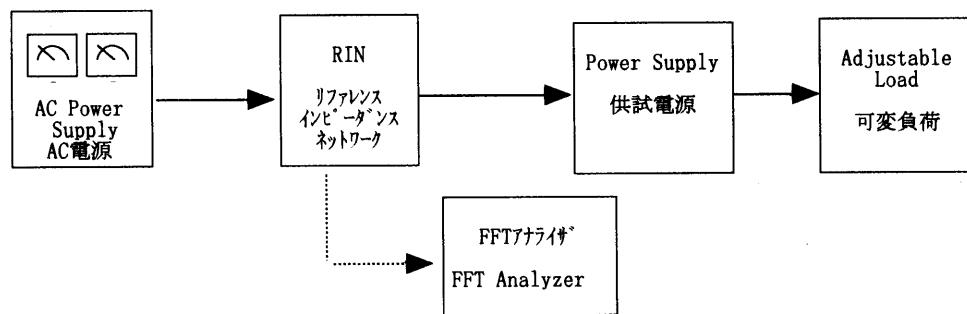


Figure E