参考資料

COSEL

TEST DATA OF LEP150F-24
(200V INPUT)

Regulated DC Power Supply
Oct. 17. 2002

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COSEL CO.,LTD.

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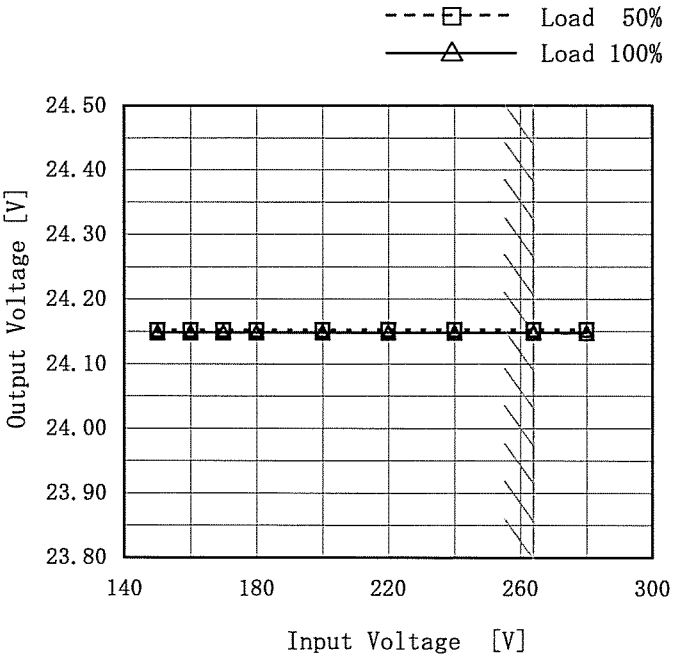


Note: Slanted line shows the range of the rated input voltage.

（注）斜線は定格入力電圧範囲を示す。

2. Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
150	24.152	24.148
160	24.152	24.148
170	24.152	24.148
180	24.152	24.148
200	24.152	24.148
220	24.153	24.148
240	24.153	24.148
264	24.153	24.148
280	24.153	24.148

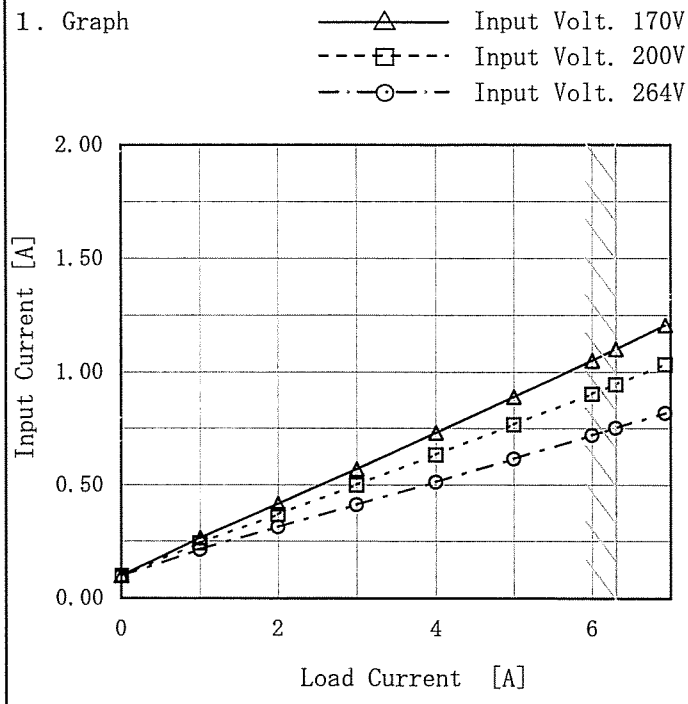
BC－3455

COSEL

Model	LEP150F-24
Item	Input Current (by Load Current) 入力電流 (負荷特性)
Object	————————

Temperature 25℃
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

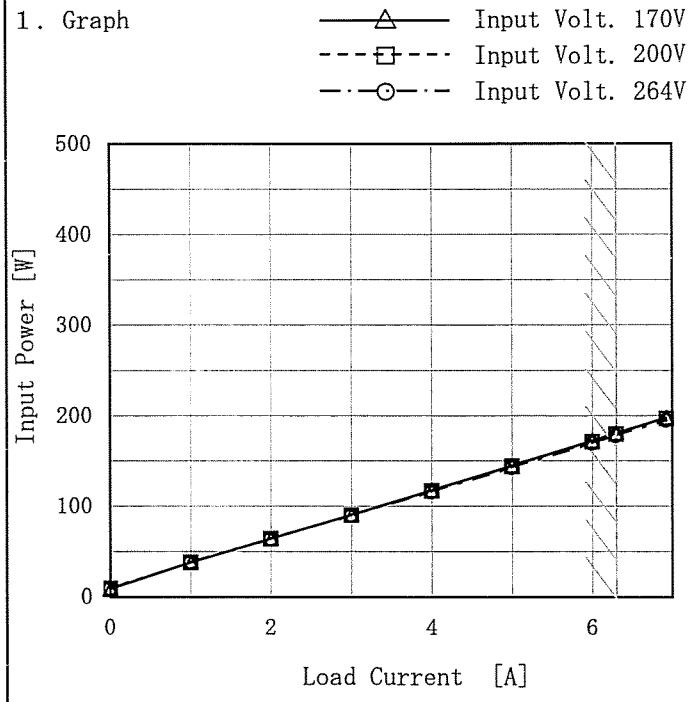
Load Current [A]	Input Current [A]		
	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
0.00	0.100	0.098	0.097
1.00	0.265	0.243	0.214
2.00	0.416	0.369	0.313
3.00	0.570	0.499	0.412
4.00	0.730	0.633	0.513
5.00	0.890	0.767	0.615
6.00	1.050	0.902	0.719
6.30	1.100	0.944	0.751
6.93	1.206	1.033	0.818
—	—	—	—
—	—	—	—

COSEL

Model	LEP150F-24
Item	Input Power (by Load Current) 入力電力 (負荷特性)
Object	————————

Temperature 25℃
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

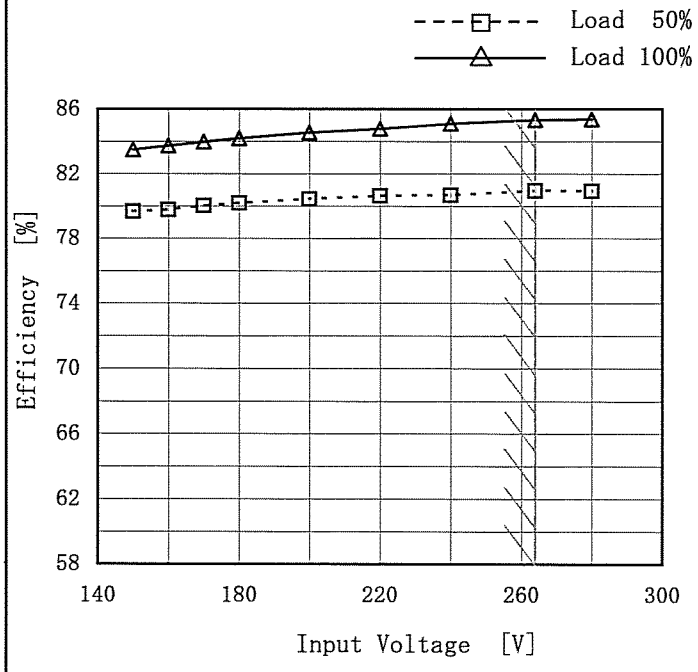
Load Current [A]	Input Power [W]		
	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
0.00	8.7	9.0	8.9
1.00	37.9	38.0	38.0
2.00	64.2	64.0	63.5
3.00	90.6	90.2	89.6
4.00	117.6	116.8	115.8
5.00	144.7	144.0	142.4
6.00	172.1	171.1	169.4
6.30	180.5	179.3	177.6
6.93	197.9	196.6	194.6
—	—	—	—
—	—	—	—

COSEL

Model	LEP150F-24
Item	Efficiency (by Input Voltage) 効率（入力電圧特性）
Object	――――――――――

Temperature 25℃
Testing Circuitry Figure A

1. Graph



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%
150	79.7	83.5
160	79.8	83.7
170	80.0	84.0
180	80.2	84.2
200	80.4	84.6
220	80.6	84.8
240	80.7	85.1
264	81.0	85.3
280	80.9	85.4

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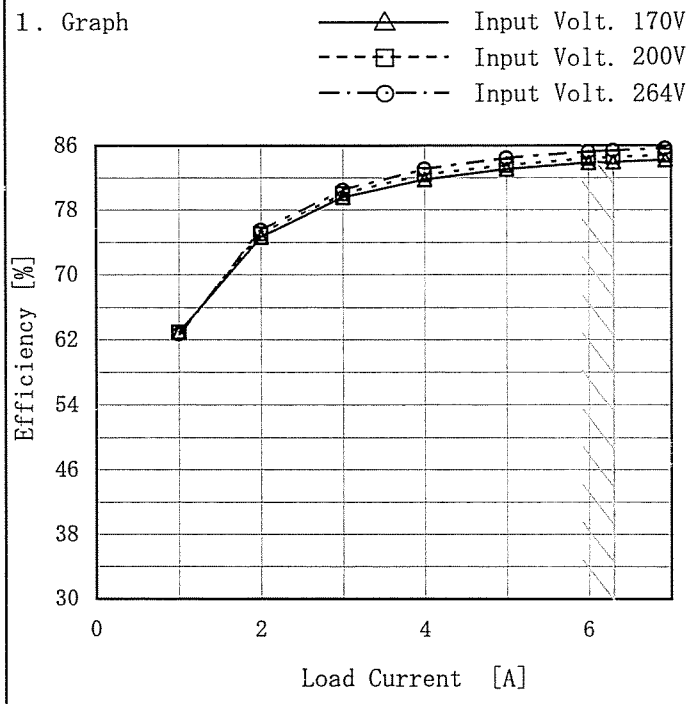
Model	LEP150F-24
Item	Efficiency (by Load Current) 効率（負荷特性）
Object	――――――

Temperature 25℃
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]	Efficiency [%]		
	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
0.00	—	—	—
1.00	62.9	62.9	62.7
2.00	74.7	75.0	75.5
3.00	79.6	80.0	80.4
4.00	81.8	82.4	83.0
5.00	83.1	83.5	84.4
6.00	83.9	84.4	85.2
6.30	84.0	84.5	85.4
6.93	84.2	84.8	85.6
—	—	—	—
—	—	—	—

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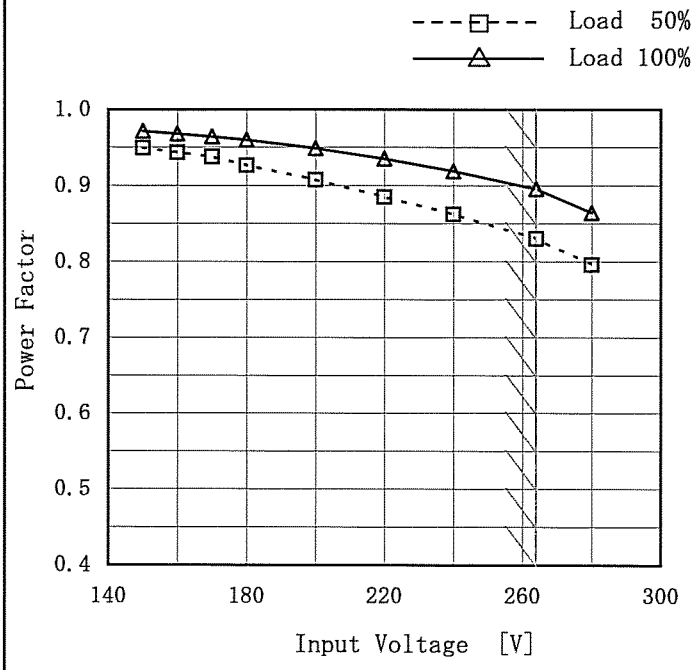
Model	LEP150F-24
Item	Power Factor (by Input Voltage) 力率（入力電圧特性）
Object	――――――――――

Temperature 25℃
Testing Circuitry Figure A

1. Graph



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]	Power Factor	
	Load 50%	Load 100%
150	0.949	0.971
160	0.944	0.968
170	0.938	0.964
180	0.927	0.960
200	0.908	0.949
220	0.885	0.935
240	0.863	0.919
264	0.830	0.896
280	0.796	0.864

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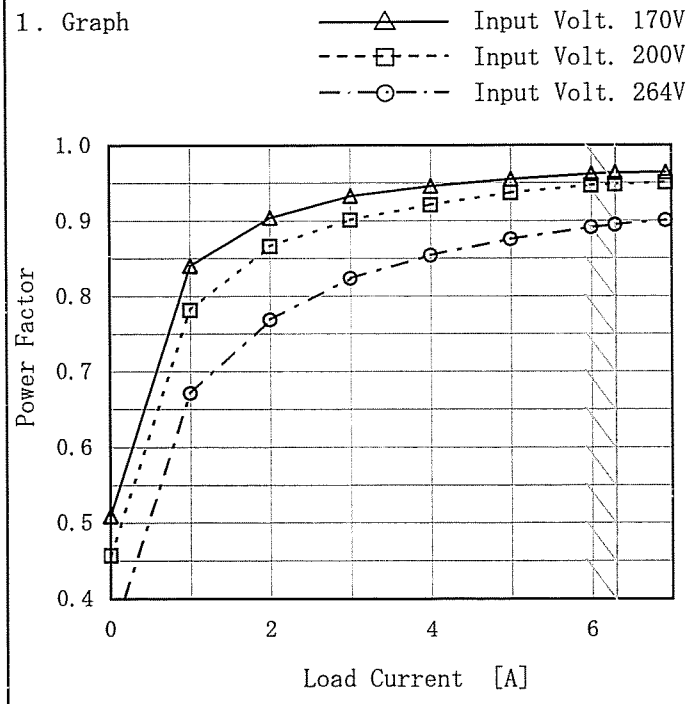
Model	LEP150F-24
Item	Power Factor (by Load Current) 力率（負荷特性）
Object	――――――

Temperature 25℃
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]	Power Factor		
	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
0.00	0.509	0.457	0.346
1.00	0.840	0.782	0.671
2.00	0.904	0.866	0.769
3.00	0.933	0.901	0.824
4.00	0.946	0.921	0.854
5.00	0.955	0.937	0.875
6.00	0.962	0.947	0.891
6.30	0.964	0.948	0.894
6.93	0.964	0.951	0.901
―	―	―	―
―	―	―	―

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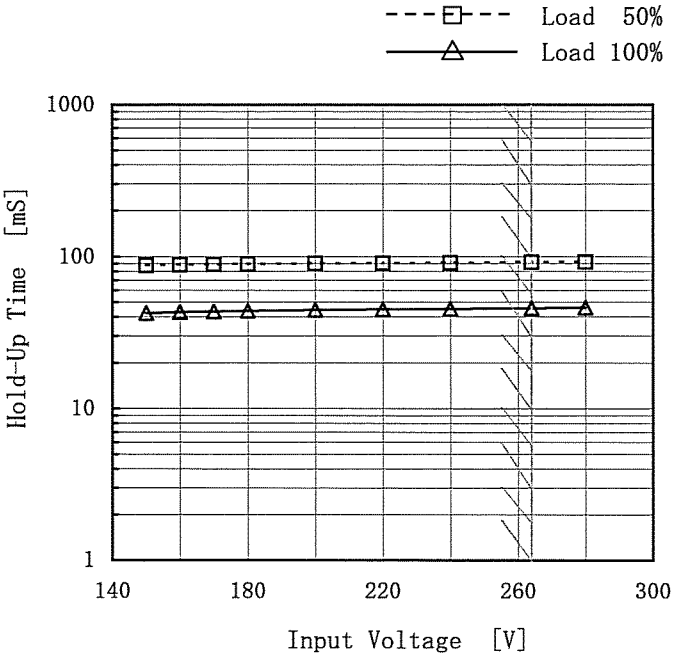
Model	LEP150F-24
Item	Hold-Up Time 出力保持時間
Object	+24V6.3A

Temperature 25℃
Testing Circuitry Figure A

1. Graph



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

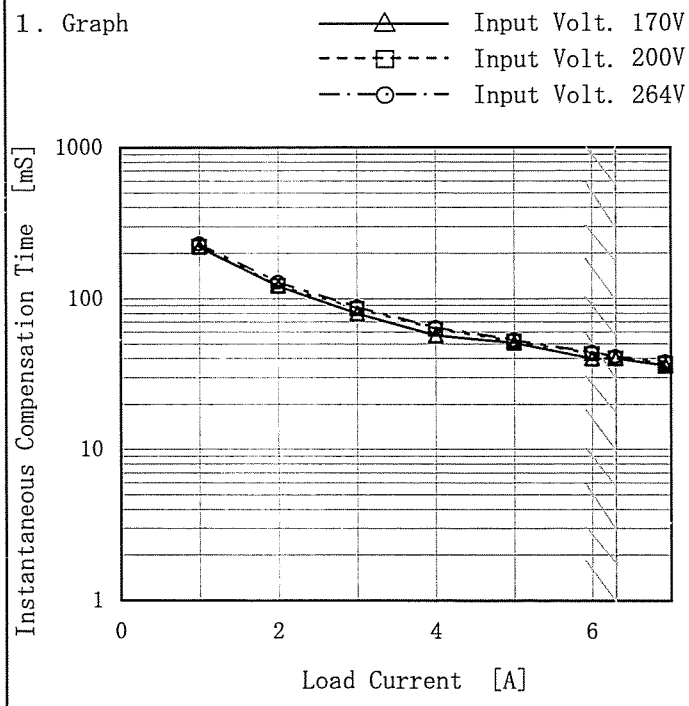
Input Voltage [V]	Hold-Up Time [mS]	
	Load 50%	Load 100%
150	88	43
160	88	43
170	89	44
180	89	44
200	90	44
220	91	45
240	91	45
264	92	46
280	92	46

COSEL

Model	LEP150F-24
Item	Instantaneous Interruption Compensation 瞬時停電保障
Object	+24V6.3A

Temperature 25℃
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

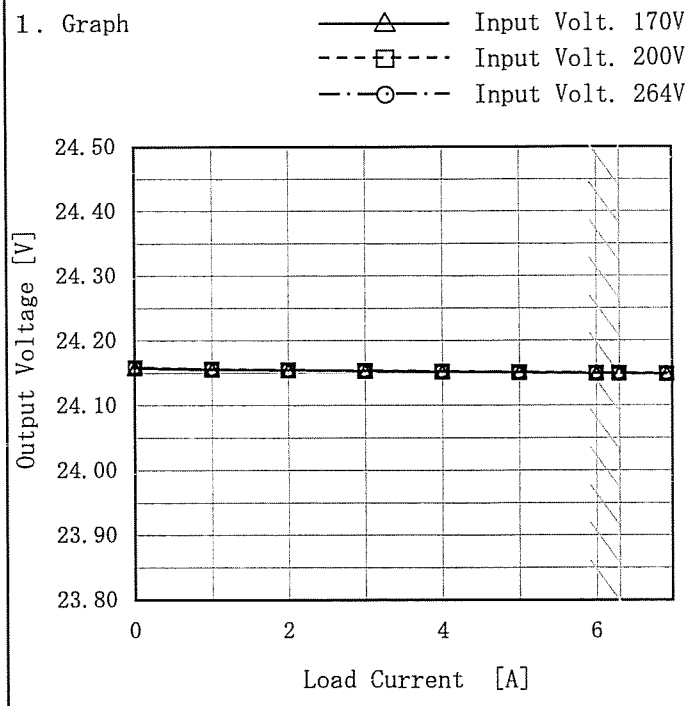
Load Current [A]	Time [mS]		
	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
0.00	—	—	—
1.00	221	222	230
2.00	121	122	128
3.00	80	86	88
4.00	57	63	64
5.00	51	52	53
6.00	40	43	44
6.30	40	40	41
6.93	36	37	38
—	—	—	—
—	—	—	—

COSEL

Model	LEP150F-24
Item	Load Regulation 静的負荷変動
Object	+24V6.3A

Temperature 25℃
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

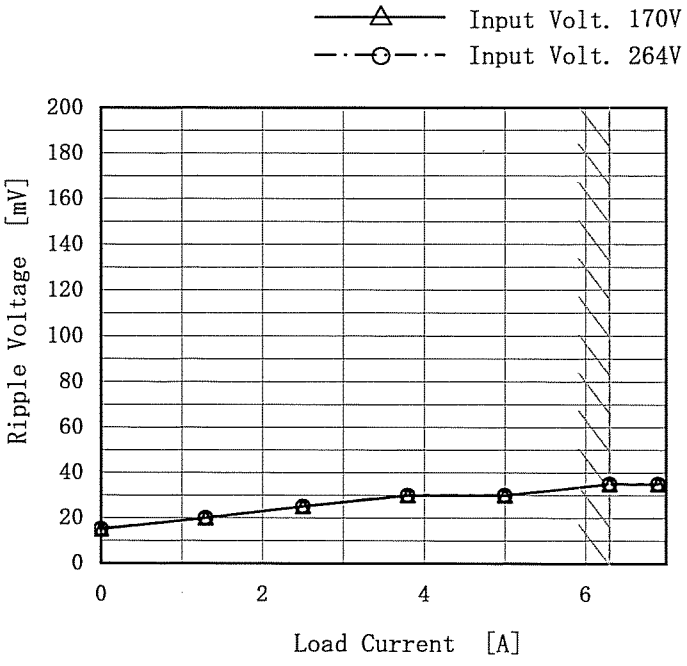
Load Current [A]	Output Voltage [V]		
	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
0.00	24.158	24.158	24.158
1.00	24.155	24.156	24.156
2.00	24.154	24.154	24.154
3.00	24.153	24.153	24.153
4.00	24.152	24.152	24.152
5.00	24.151	24.151	24.151
6.00	24.150	24.149	24.150
6.30	24.149	24.149	24.149
6.93	24.148	24.148	24.149
—	—	—	—

COSEL

Model	LEP150F-24
Item	Ripple Voltage (by Load Current) リップル電圧（負荷特性）
Object	+24V6.3A

Temperature 25℃
Testing Circuitry Figure A

1. Graph



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
ｽｲｯﾁﾝｸﾞ周期

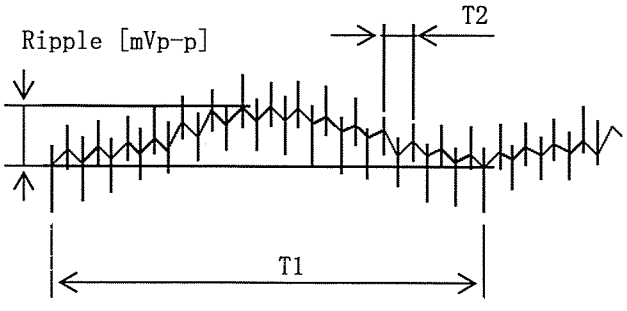


Fig. Complex Ripple Wave Form
図　リップル波形詳細図

2. Values

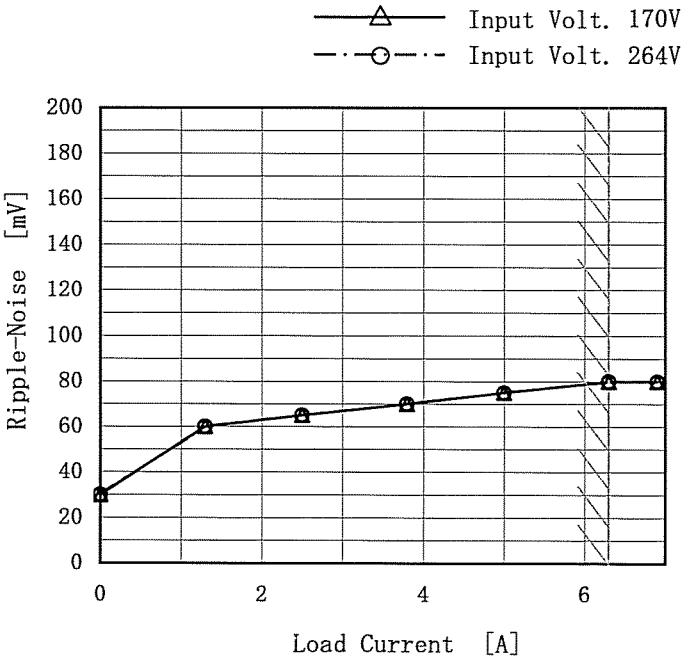
Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 170 [V]	Input Volt. 264 [V]
0.0	15	15
1.3	20	20
2.5	25	25
3.8	30	30
5.0	30	30
6.3	35	35
6.9	35	35
—	—	—
—	—	—
—	—	—
—	—	—

COSEL

Model	LEP150F-24
Item	Ripple-Noise リップルノイズ
Object	+24V6.3A

Temperature 25℃
Testing Circuitry Figure A

1. Graph



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
ｽｲｯﾁﾝｸﾞ周期

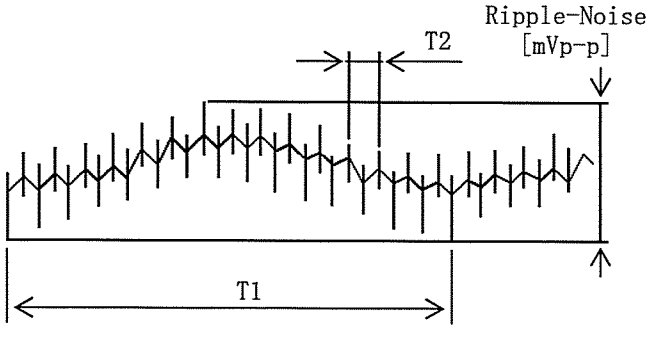


Fig. Complex Ripple Wave Form
図　リップル波形詳細図

2. Values

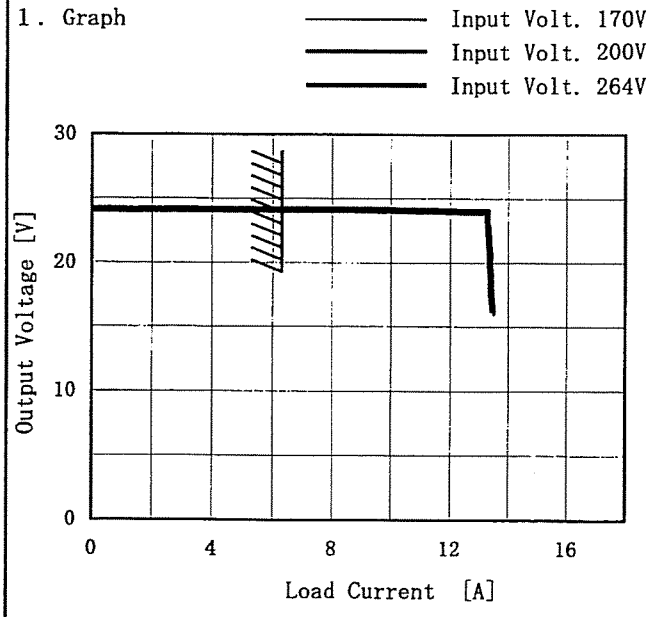
Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 170 [V]	Input Volt. 264 [V]
0.0	30	30
1.3	60	60
2.5	65	65
3.8	70	70
5.0	75	75
6.3	80	80
6.9	80	80
—	—	—
—	—	—
—	—	—
—	—	—

COSEL

Model	LEP150F-24
Item	Overcurrent Protection 過電流保護
Object	+24V6.3A

Temperature 25℃
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。

Intermittent operation occurs when the output voltage is from 14.4V to 0V.
14.4V～0V間は、間欠モードとなる。

2. Values

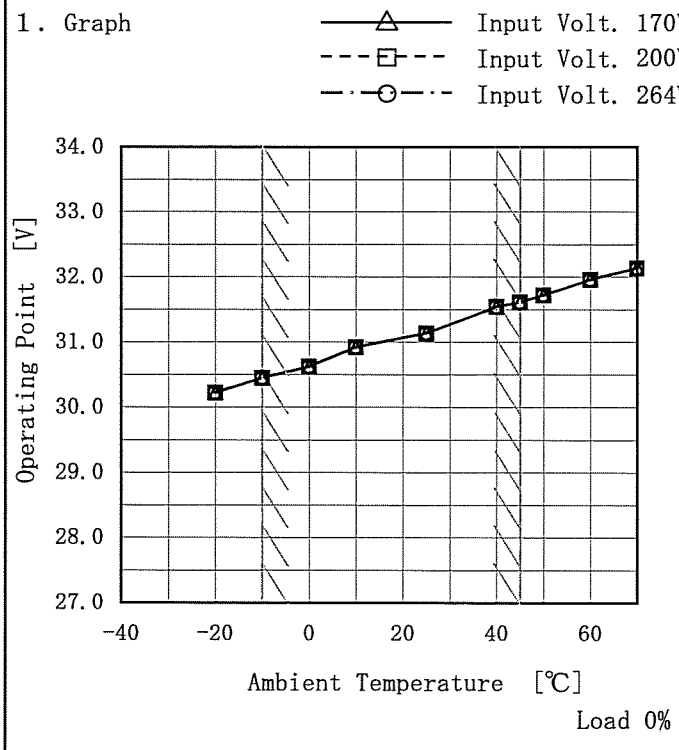
Output Voltage [V]	Load Current [A]		
	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
24.0	13.28	13.30	13.30
22.8	13.30	13.31	13.32
21.6	13.34	13.36	13.36
19.2	13.39	13.41	13.41
16.8	13.45	13.46	13.47
14.4	13.47	13.48	13.47
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—

COSEL

Model	LEP150F-24
Item	Overvoltage Protection 過電圧保護
Object	+24V6.3A

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。

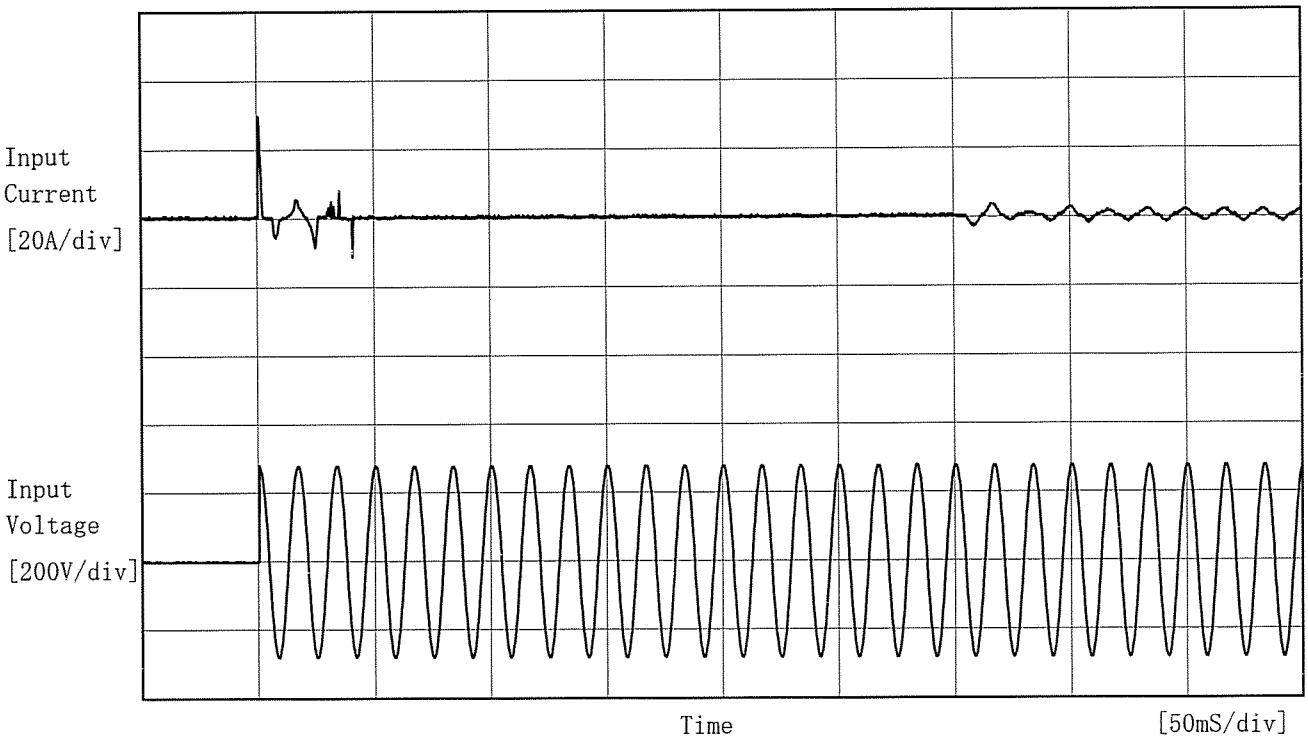
2. Values

Ambient Temperature [℃]	Operating Point [V]		
	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
-20	30.22	30.22	30.22
-10	30.45	30.45	30.45
0	30.62	30.62	30.62
10	30.92	30.92	30.92
25	31.14	31.14	31.14
40	31.54	31.54	31.54
45	31.61	31.61	31.61
50	31.72	31.72	31.72
60	31.96	31.96	31.96
70	32.14	32.14	32.14
—	—	—	—

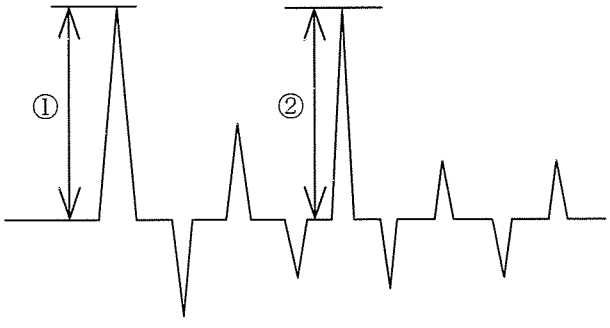
COSEL

Model	LEP150F-24
Item	Inrush Current 突入電流
Object	――――――――

Temperature 25℃
Testing Circuitry Figure A



Input Voltage 200 V
Frequency 60 Hz
Load 100 %
Inrush Current
① 29.8 [A]
② 11.2 [A]



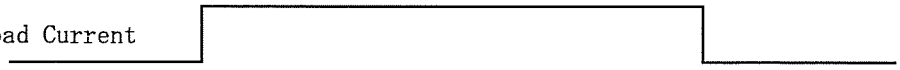
COSEL

Model	LEP150F-24		
Item	Dynamic Load Response 動的負荷変動	Temperature Testing Circuitry	25℃ Figure A
Object	+24V6.3A		

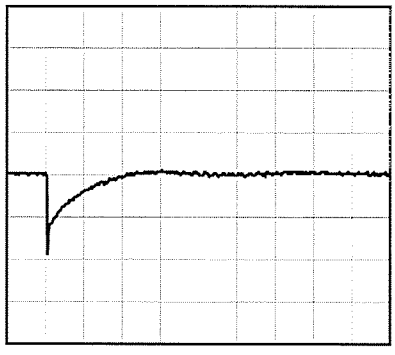
Input Volt. 200 V

Cycle 1000 ms

Load Current

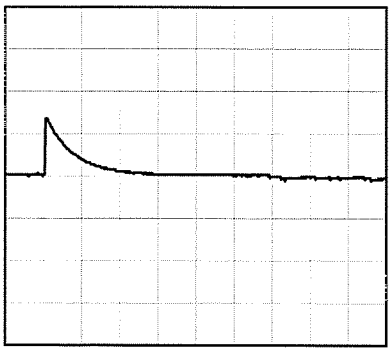


Min. Load (0A) ⟷
Load 100% (6.3A)



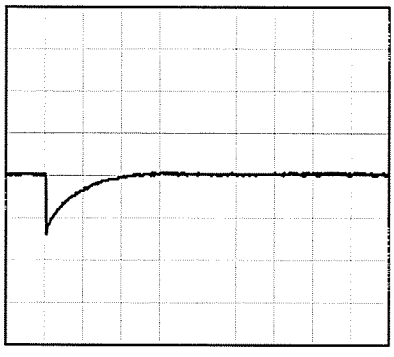
100 mV/div

10 ms/div



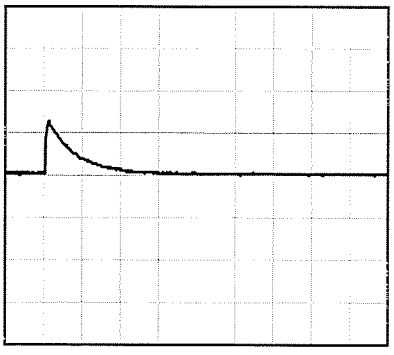
10 ms/div

Min. Load (0A) ⟷
Load 50% (3.15A)



100 mV/div

10 ms/div

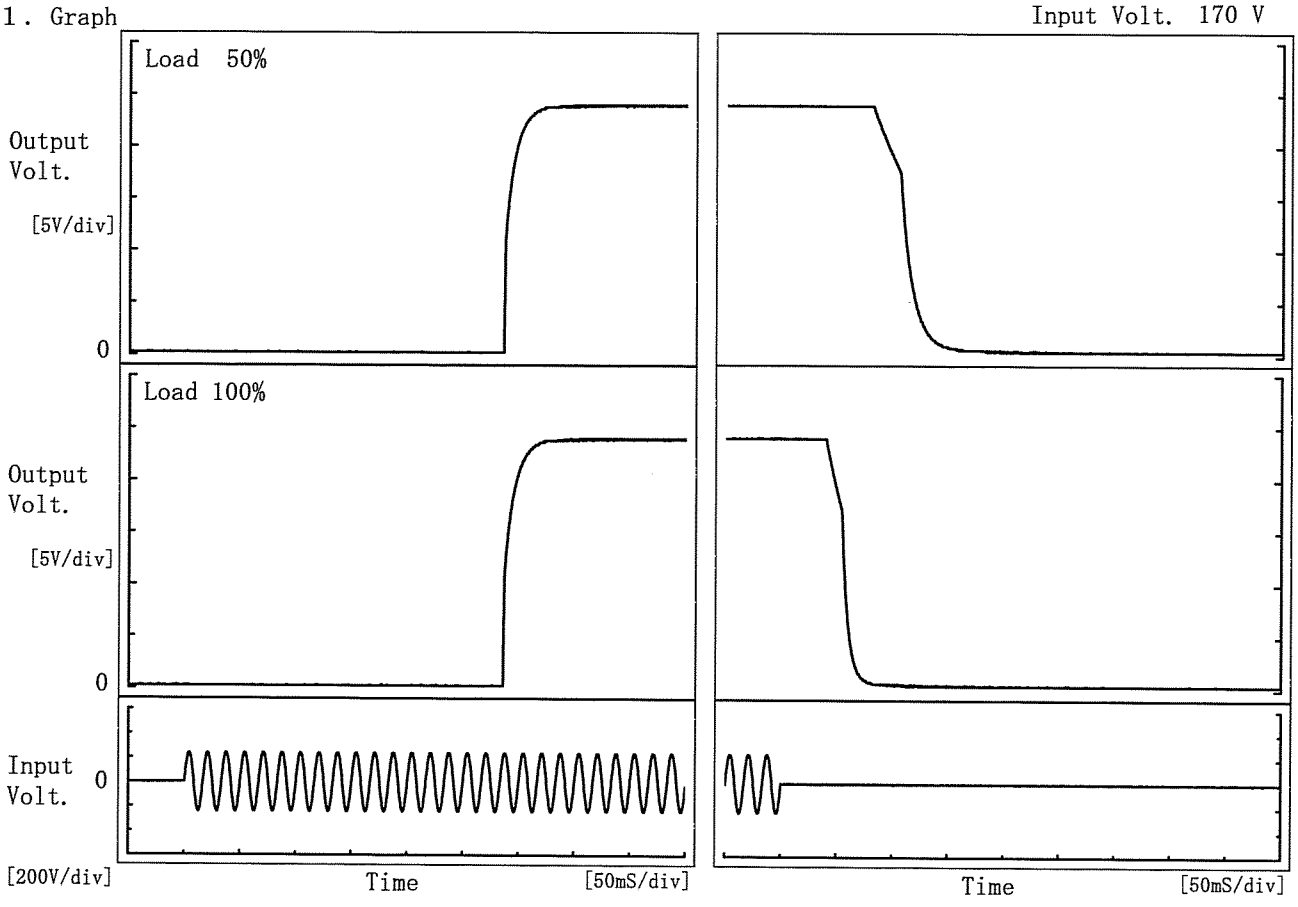


10 ms/div

COSEL

Model	LEP150F-24		
Item	Rise and Fall Time 立上り、立下り時間	Temperature	25℃
		Testing Circuitry	Figure A
Object	+24V6.3A		

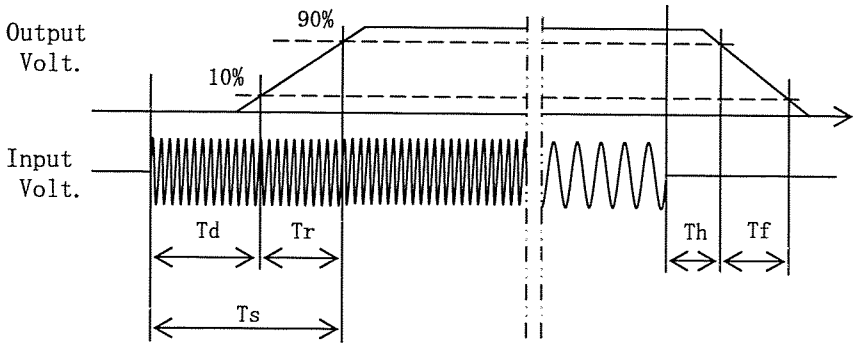
1. Graph



2. Values

[mS]

Load \ Time	T d	T r	T s	T h	T f
50 %	286.3	17.8	304.0	88.5	39.8
100 %	286.0	18.0	304.0	44.3	21.8

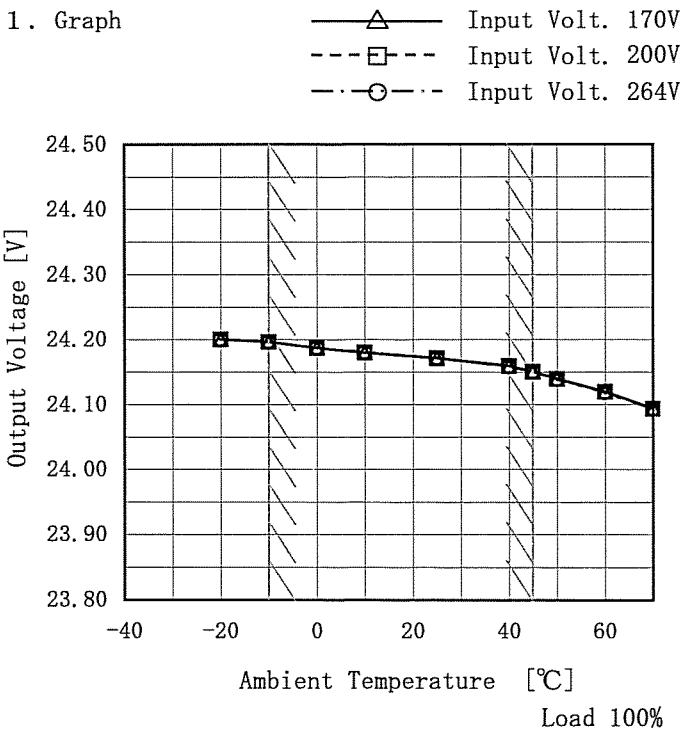


COSEL

Model	LEP150F-24
Item	Ambient Temperature Drift 周囲温度変動
Object	+24V6.3A

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

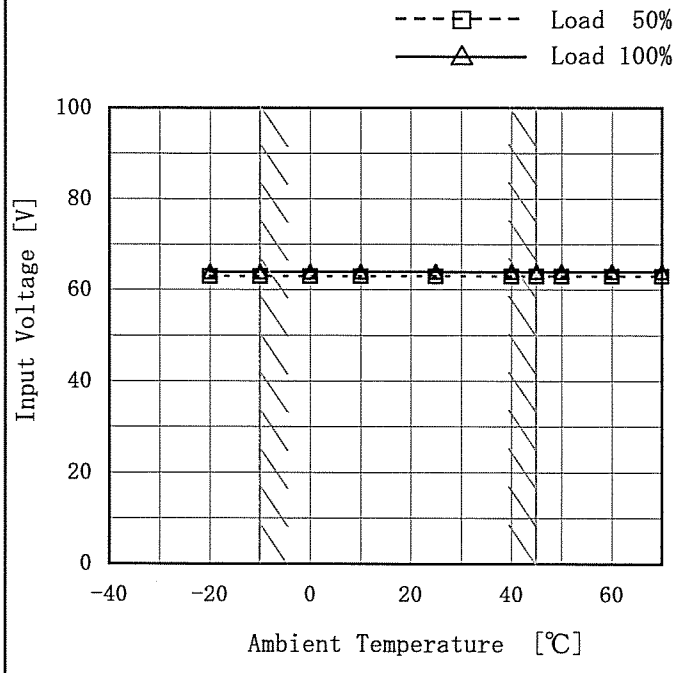
Ambient Temperature [℃]	Output Voltage [V]		
	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
-20	24.201	24.201	24.201
-10	24.196	24.197	24.196
0	24.187	24.187	24.187
10	24.180	24.180	24.180
25	24.172	24.172	24.171
40	24.160	24.159	24.159
45	24.151	24.150	24.150
50	24.140	24.140	24.139
60	24.120	24.120	24.119
70	24.094	24.094	24.093
--	—	—	—

COSEL

Model	LEP150F-24
Item	Minimum Input Voltage for Regulated Output Voltage 最低レギュレーション電圧
Object	+24V6.3A

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

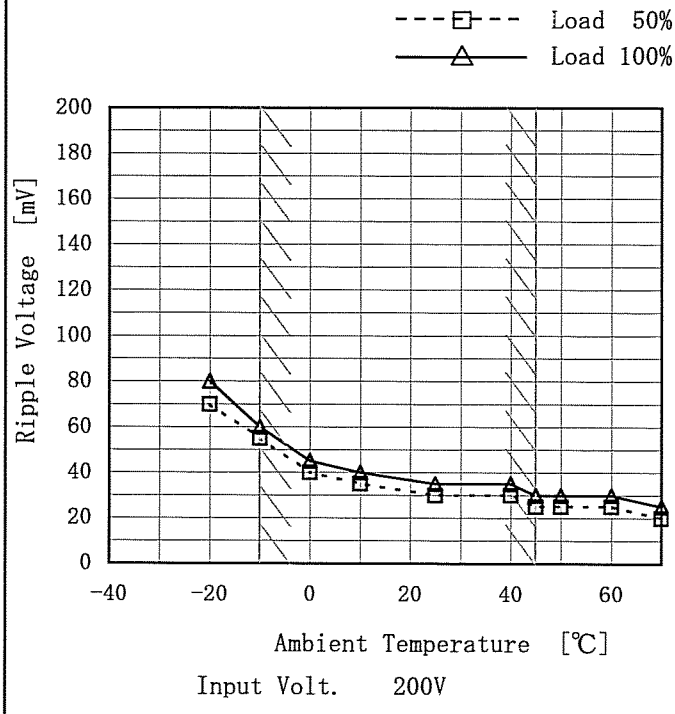
Ambient Temperature [℃]	Input Voltage [V]	
	Load 50%	Load 100%
-20	63	64
-10	63	64
0	63	64
10	63	64
25	63	64
40	63	64
45	63	64
50	63	64
60	63	64
70	63	64
—	—	—

COSEL

Model	LEP150F-24
Item	Ripple Voltage (by Ambient Temp.) リップル電圧（周囲温度特性）
Object	+24V6.3A

Testing Circuitry Figure A

1. Graph



Input Volt. 200V

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

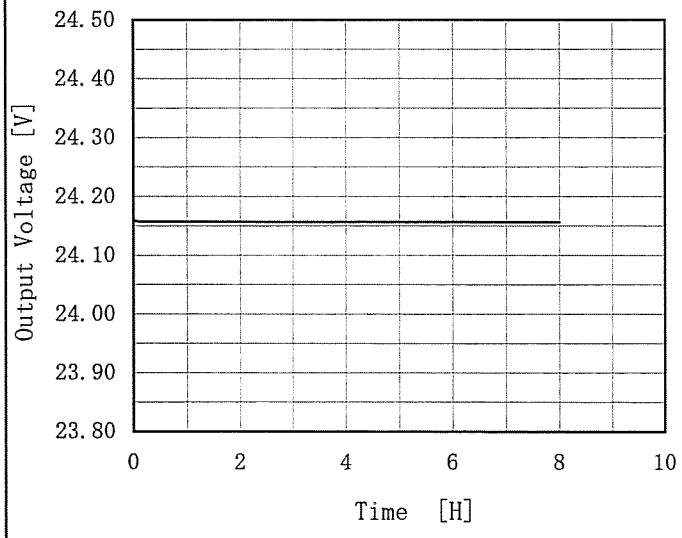
Ambient Temperature [℃]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-20	70	80
-10	55	60
0	40	45
10	35	40
25	30	35
40	30	35
45	25	30
50	25	30
60	25	30
70	20	25
—	—	—

COSEL

Model	LEP150F-24
Item	Time Lapse Drift 経時ドリフト
Object	+24V6.3A

Temperature 25℃
Testing Circuitry Figure A

1. Graph



Input Volt. 200V
Load 100%

2. Values

Time since start [H]	Output Voltage [V]
0.0	24.162
0.5	24.157
1.0	24.157
2.0	24.157
3.0	24.157
4.0	24.157
5.0	24.157
6.0	24.157
7.0	24.157
8.0	24.156

COSEL

Model	LEP150F-24
Item	Output Voltage Accuracy 定電圧精度
Object	+24V6.3A

Testing Circuitry Figure A

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 ～ 45℃
Input Voltage : 170 ～ 264V
Load Current : 0 ～ 6.3A

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

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

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 ～ 45℃
入力電圧 : 170 ～ 264V
負荷電流 : 0 ～ 6.3A

* 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 [℃]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	-10	264	0	24.203	±32	±0.1
Minimum Voltage	45	264	6.3	24.139		

COSEL

Model	LEP150F-24		
Item	Harmonic Current 高調波電流	Temperature Testing Circuitry	25℃ Figure E
Object	―――――		

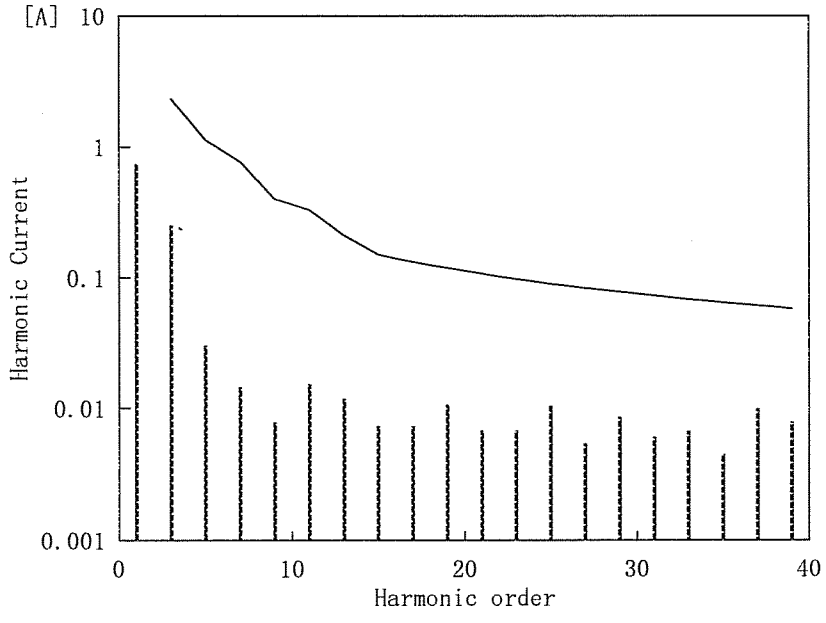
1. Input Current Waveform

――― Input Current

――― Envelope of the input current to classify equipment as Class D
ｸﾗｽDの機器を決定するための入力電流包絡線

Conditions	Values
Input Voltage [V]	230.9
Input Current [A]	0.788
Active Power [W]	168.1
Apparent Power[VA]	181.9
Frequency [Hz]	50
Power Factor	0.924
Output Power [W]	151.2

2. Harmonic Current



――― Harmonic Current
高調波電流

――― Limits for Class A equipment
ｸﾗｽAの機器に対する限度値

Harmonics order 高調波次数	Limits 限度値 [A]	Values 測定値 [A]
1	—	0.74350
2	—	0.00040
3	2.29104	0.25200
4	—	0.00010
5	1.13556	0.03020
6	—	0.00000
7	0.76700	0.01450
8	—	0.00000
9	0.39844	0.00780
10	—	0.00010
11	0.32871	0.01520
12	—	0.00010
13	0.20918	0.01180
14	—	0.00030
15	0.14942	0.00730
16	—	0.00000
17	0.13184	0.00730
18	—	0.00000
19	0.11796	0.01070
20	—	0.00010
21	0.10673	0.00680
22	—	0.00000
23	0.09744	0.00680
24	—	0.00010
25	0.08965	0.01040
26	—	0.00000
27	0.08301	0.00540
28	—	0.00010
29	0.07728	0.00860
30	—	0.00030
31	0.07230	0.00600
32	—	0.00010
33	0.06792	0.00670
34	—	0.00000
35	0.06404	0.00450
36	—	0.00000
37	0.06057	0.00990
38	—	0.00010
39	0.05747	0.00780
40	—	0.00040

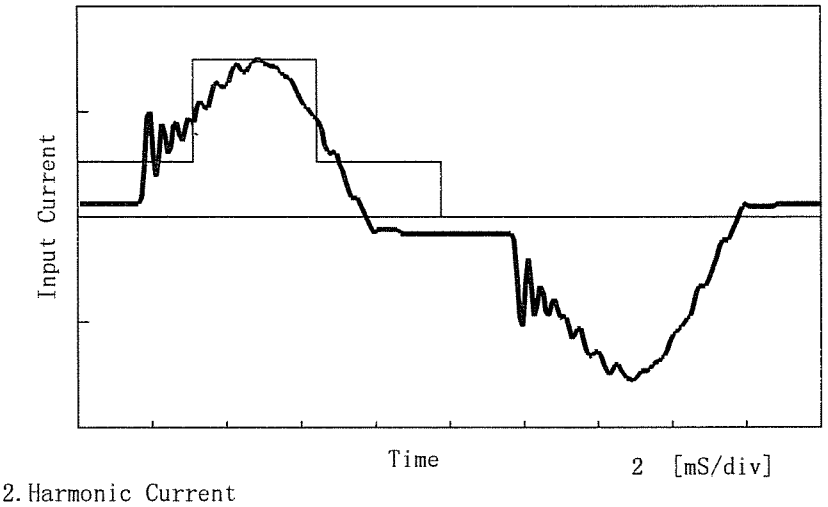
COSEL

Model	LEP150F-24		
Item	Harmonic Current 高調波電流	Temperature Testing Circuitry	25℃ Figure E
Object	————		

1. Input Current Waveform

——— Input Current

——— Envelope of the input current to classify equipment as Class D
ｸﾗｽDの機器を決定するための入力電流包絡線



2. Harmonic Current

——— Harmonic Current
高調波電流

——— Limits for Class A equipment
ｸﾗｽAの機器に対する限度値

Conditions	Values
Input Voltage [V]	231
Input Current [A]	0.437
Active Power [W]	88.8
Apparent Power[VA]	101.1
Frequency [Hz]	50
Power Factor	0.878
Output Power [W]	75.6

Harmonics order 高調波次数	Limits 限度値 [A]	Values 測定値 [A]
1	—	0.40510
2	—	0.00050
3	2.29004	0.15550
4	—	0.00010
5	1.13506	0.02490
6	—	0.00000
7	0.76667	0.01050
8	—	0.00010
9	0.39827	0.01880
10	—	0.00010
11	0.32857	0.00980
12	—	0.00010
13	0.20909	0.01080
14	—	0.00010
15	0.14935	0.00980
16	—	0.00000
17	0.13178	0.00670
18	—	0.00000
19	0.11791	0.00780
20	—	0.00010
21	0.10668	0.00750
22	—	0.00010
23	0.09740	0.00490
24	—	0.00010
25	0.08961	0.00630
26	—	0.00000
27	0.08297	0.00890
28	—	0.00010
29	0.07725	0.00450
30	—	0.00000
31	0.07227	0.01110
32	—	0.00000
33	0.06789	0.00660
34	—	0.00010
35	0.06401	0.01040
36	—	0.00010
37	0.06055	0.00300
38	—	0.00010
39	0.05744	0.00580
40	—	0.00010

COSEL

Model	LEP150F-24	
Item	Condense 結露特性	Testing Circuitry Figure A
Object	+24V6.3A	

1. Condensation test

Testing procedure is as follows.

① Keeping and cooling the unit in a tank at -10℃ 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℃ 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℃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℃、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]	24.193	Input Volt.:200V, Load Current.:6.3A
Line Regulation [mV]	1	Input Volt.:170～264V, Load Current.:6.3A
Load Regulation [mV]	8	Input Volt.:200V, Load Current.:0～6.3A

COSEL

Model	LEP150F-24		
Item	Leakage Current 漏洩電流	Temperature Testing Circuitry	25℃ Figure B
Object	――――――――――		

1. Results

Standards	Leakage Current [mA]		
	Input Volt. 85 [V]	Input Volt. 100 [V]	Input Volt. 132 [V]
(A)DEN-AN	—	—	—
(B)IEC60950	—	—	—

Standards	Leakage Current [mA]		
	Input Volt. 170 [V]	Input Volt. 230 [V]	Input Volt. 264 [V]
(B)IEC60950	0.32	0.44	0.51

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。

COSEL

Model	LEP150F-24		
Item	Line Noise Tolerance 入力雑音耐量	Temperature Testing Circuitry	25℃ Figure C
Object	+24V6.3A		

1. Conditions

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

2. Results

Pulse Width [nS]	MODE	POLARITY	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
		−	OK	no fluctuation
	NORMAL	+	OK	no fluctuation
		−	OK	no fluctuation
1000	COMMON	+	OK	no fluctuation
		−	OK	no fluctuation
	NORMAL	+	OK	no fluctuation
		−	OK	no fluctuation

COSEL

Model	LEP150F-24		
Item	Conducted Emission 雑音端子電圧	Temperature Testing Circuitry	25℃ Figure D
Object	————————		

1. Graph

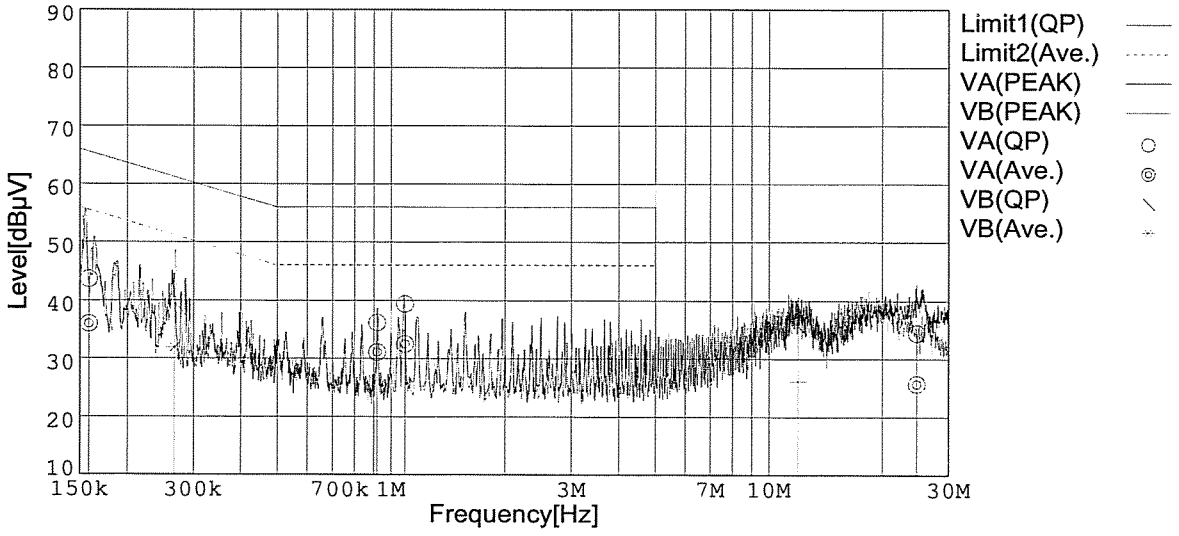
Remarks

Input Volt. 230V(CISPR Pub22 Class B)

Load 100%

Limit1:[CISPR Pub22] Class B(QP)

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



COSEL

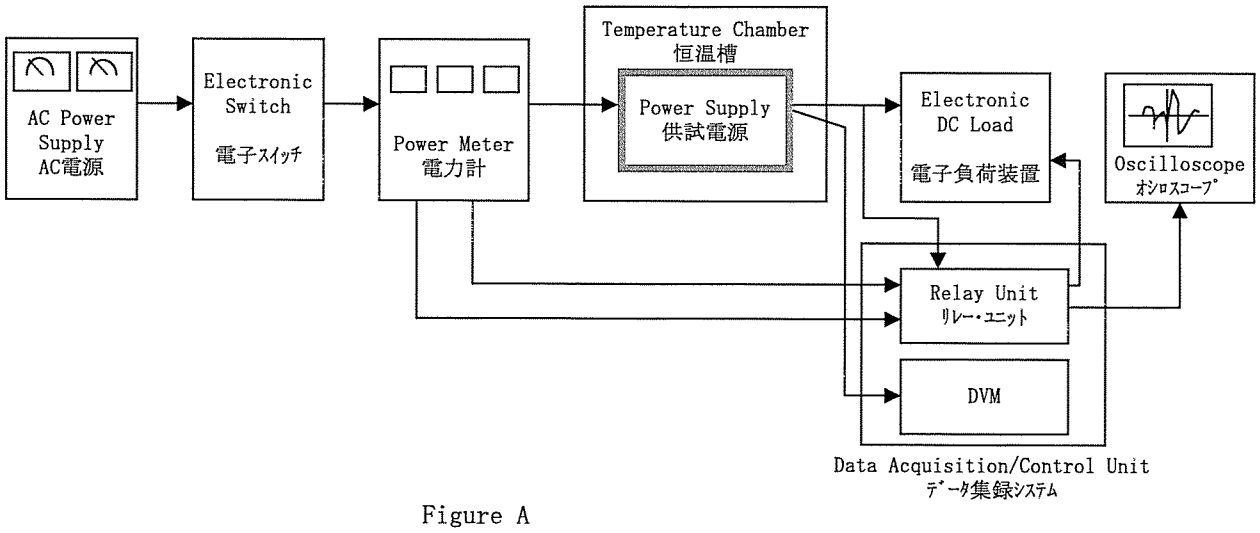


Figure A

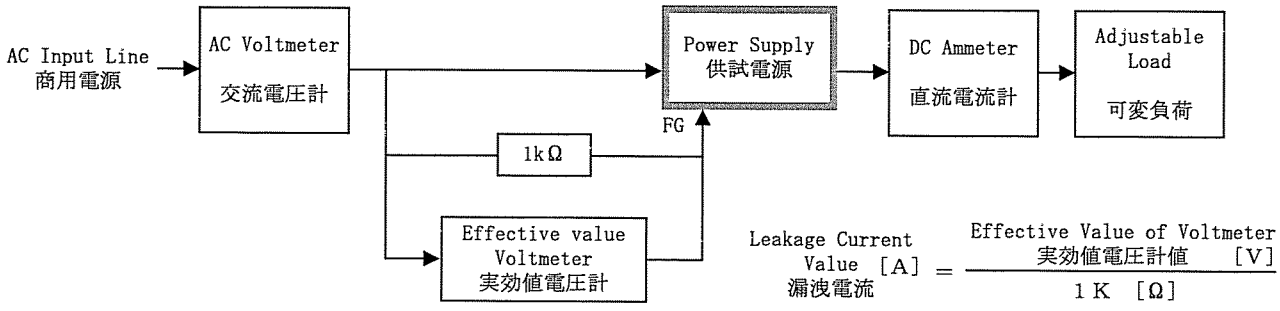


Figure B (DEN-AN)

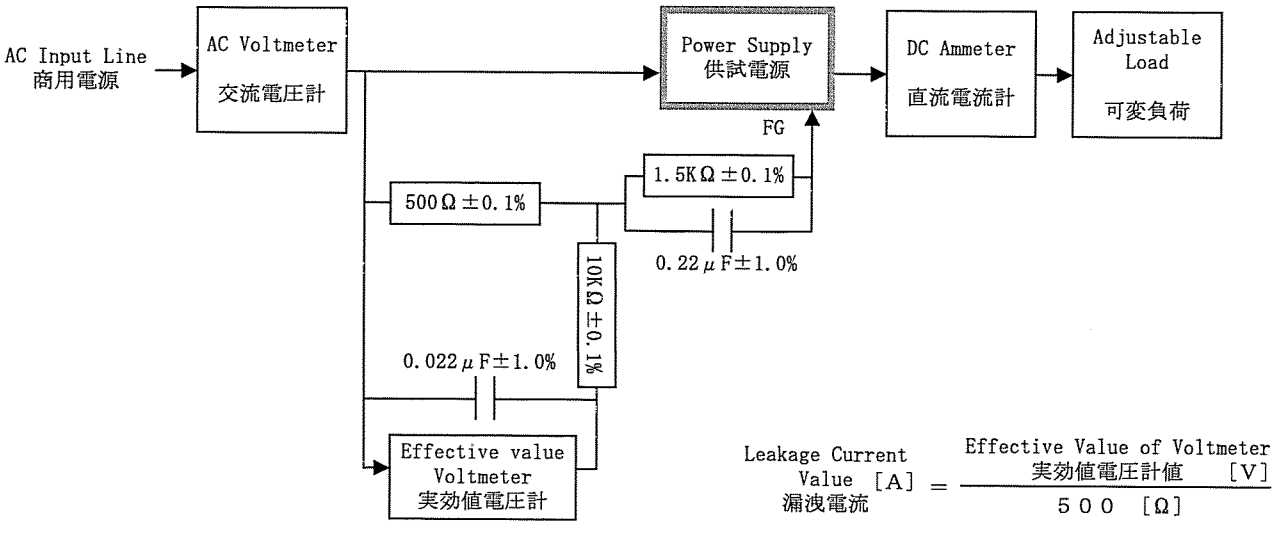


Figure B (IEC60950)

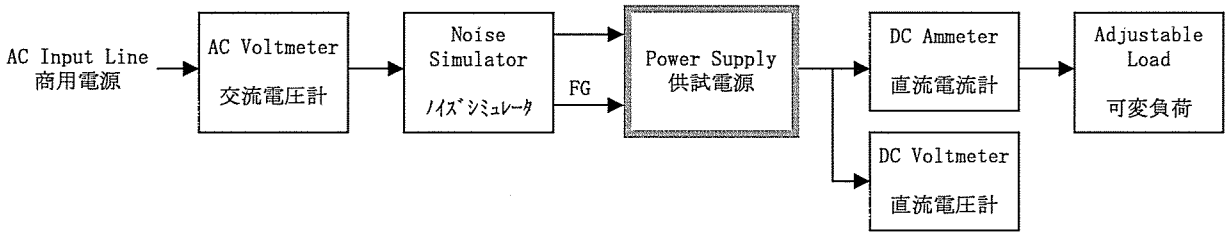


Figure C

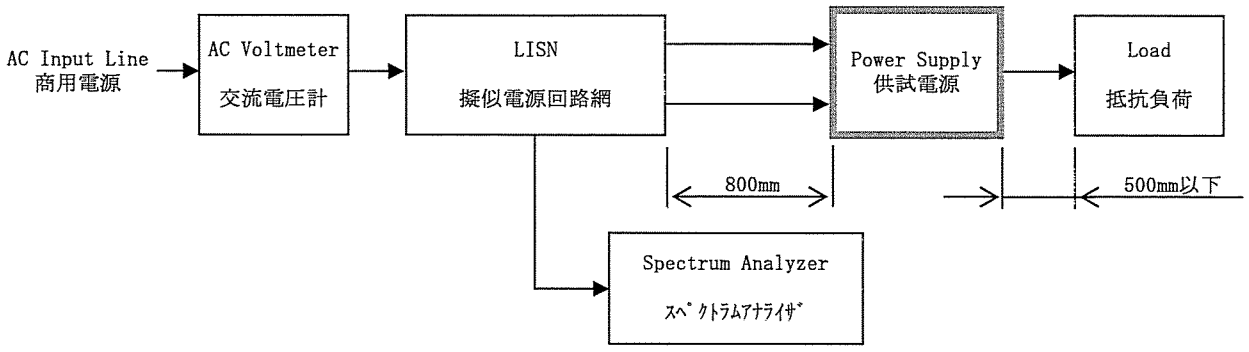


Figure D

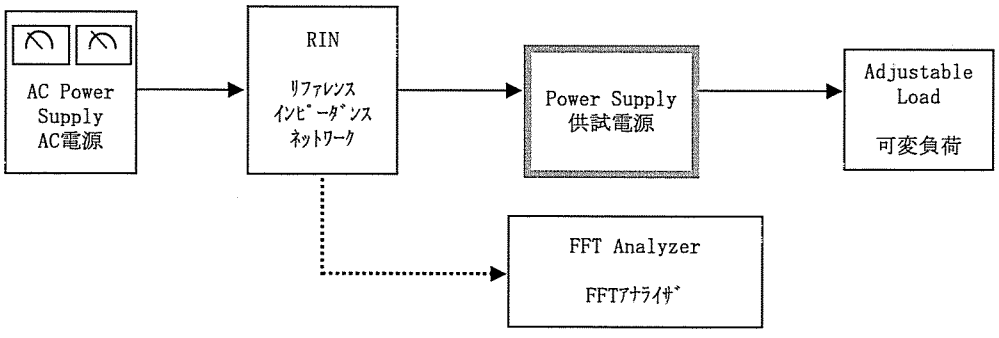


Figure E