参考資料

COSEL

TEST DATA OF LEA150F-24

(100V　INPUT)

Regulated DC Power Supply

Date : Feb.5. 1999

Approved by : M. Maesaka

Design Manager

Prepared by : T. Ohhara

Design Engineer

コーセル株式会社

COSEL CO.,LTD.

COSEL

CONTENTS

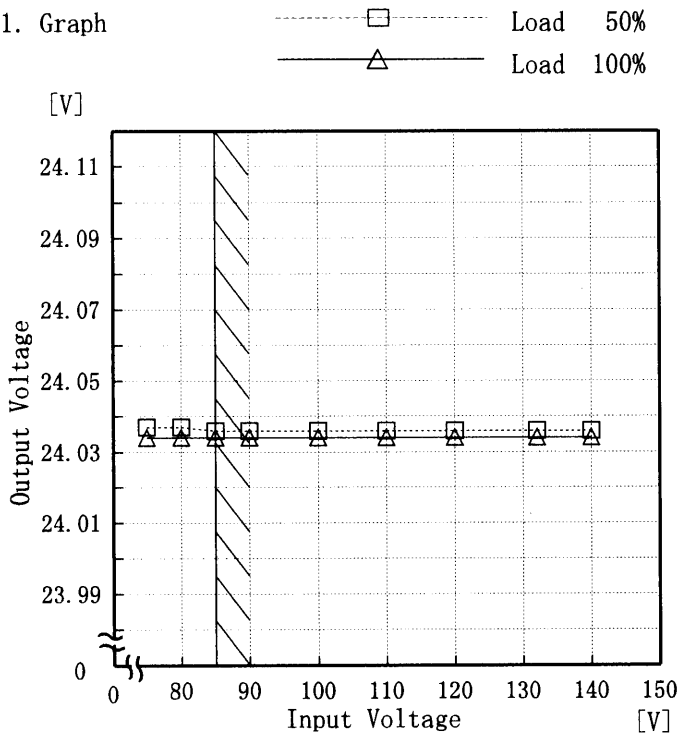
(Final Page 30)

COSEL

Model	LEA150F-24
Item	Line Regulation 静的入力変動
Object	+24.0V6.30A

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

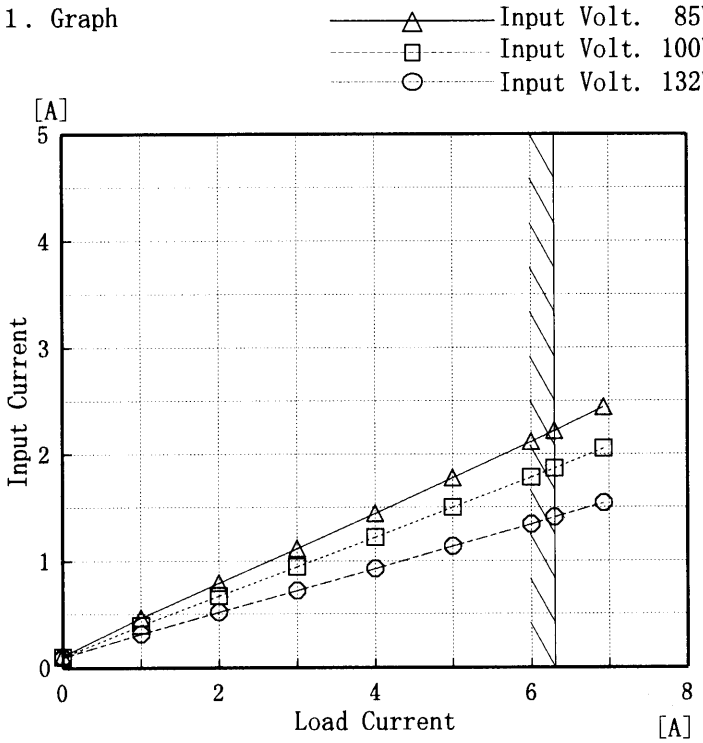
Input Voltage [V]	Load 50% Output Volt. [V]	Load 100% Output Volt. [V]
75	24.037	24.034
80	24.037	24.034
85	24.036	24.034
90	24.036	24.034
100	24.036	24.034
110	24.036	24.034
120	24.036	24.034
132	24.036	24.034
140	24.036	24.034

COSEL

Model	LEA150F-24
Item	Input Current (by Load Current) 入力電流（負荷特性）
Output	————

Temperature 25℃
Humidity 40%RH
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	0.11	0.10	0.10
1.00	0.46	0.40	0.32
2.00	0.79	0.67	0.52
3.00	1.12	0.95	0.72
4.00	1.44	1.22	0.93
5.00	1.78	1.50	1.14
6.00	2.12	1.78	1.34
6.30	2.22	1.87	1.41
6.93	2.45	2.05	1.54
—	—	—	—
—	—	—	—
—	—	—	—

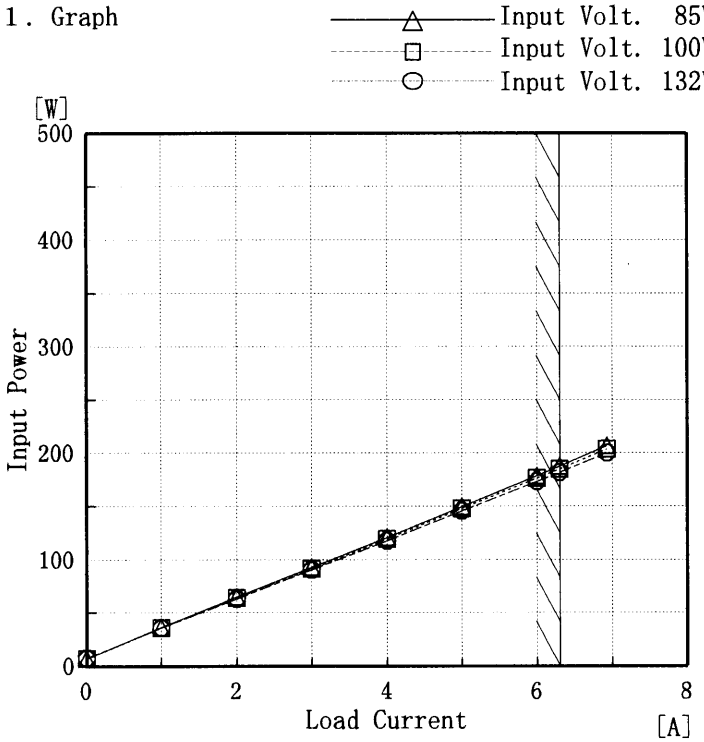
BC－3174

COSEL

Model	LEA150F-24
Item	Input Power (by Load Current) 入力電力（負荷特性）
Output	————

Temperature 25℃
Humidity 40%RH
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

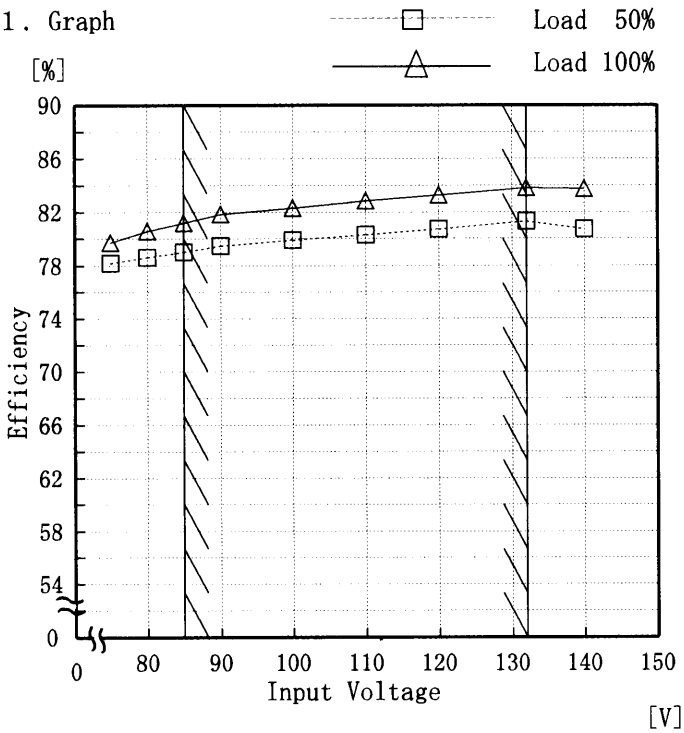
Load Current [A]	Input Power [W] Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
0.00	7	7	7
1.00	37	36	36
2.00	65	64	63
3.00	93	92	90
4.00	121	119	118
5.00	150	148	146
6.00	179	177	174
6.30	188	185	182
6.93	207	204	200
—	—	—	—
—	—	—	—
—	—	—	—

COSEL

Model	LEA150F-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

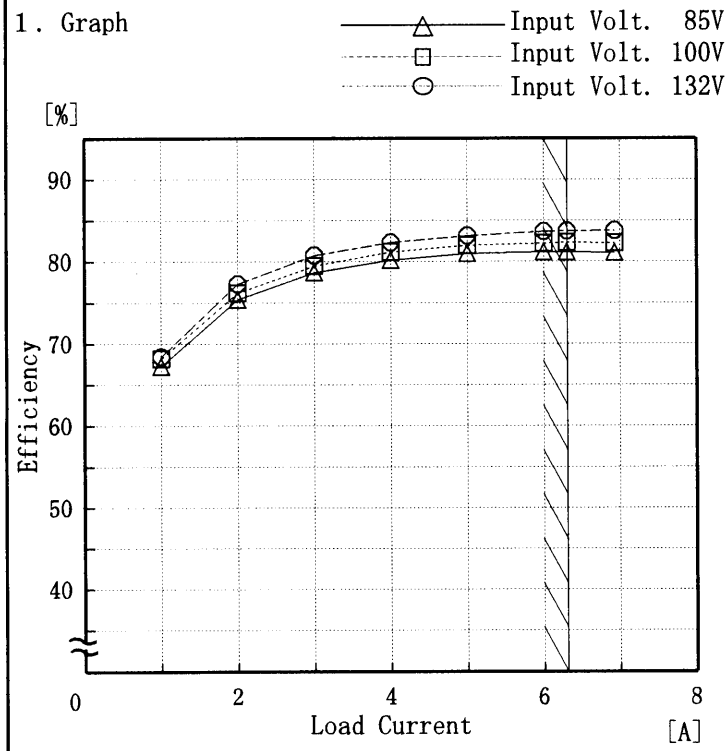
Input Voltage [V]	Load 50% Efficiency [%]	Load 100% Efficiency [%]
75	78.19	79.71
80	78.62	80.58
85	79.02	81.21
90	79.46	81.83
100	79.89	82.31
110	80.31	82.86
120	80.74	83.26
132	81.32	83.81
140	80.73	83.74

COSEL

Model	LEA150F-24
Item	Efficiency (by Load Current) 効率（負荷特性）
Output	————

Temperature 25℃
Humidity 40%RH
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. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
1.00	67.3	68.2	68.4
2.00	75.4	76.2	77.3
3.00	78.7	79.5	80.8
4.00	80.2	81.2	82.4
5.00	81.0	82.0	83.2
6.00	81.2	82.2	83.7
6.30	81.2	82.3	83.8
6.93	81.1	82.3	83.8
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—

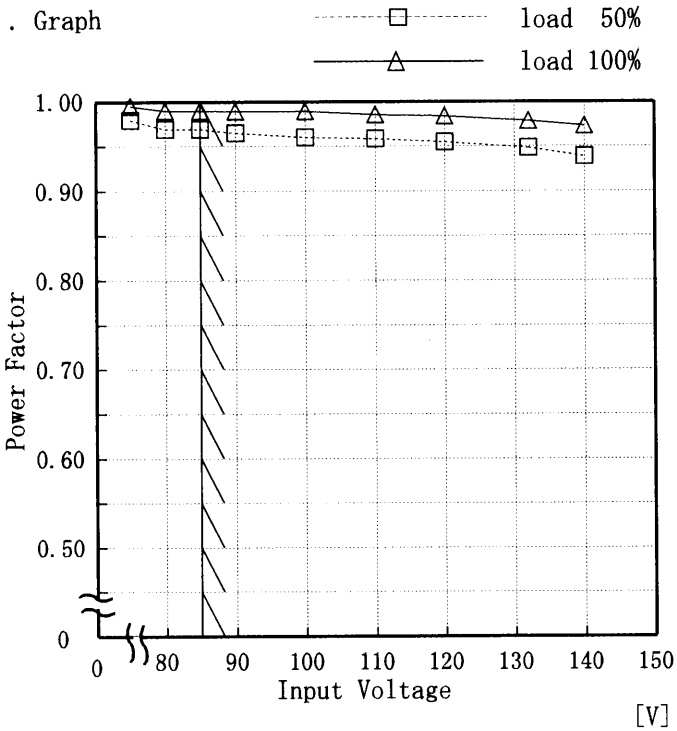
BC−3174

COSEL

Model	LEA150F-24
Item	Power Factor (by Input Voltage) 力率(入力電圧特性)
Object	———————————

Temperature 25℃
Humidity 40%RH
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

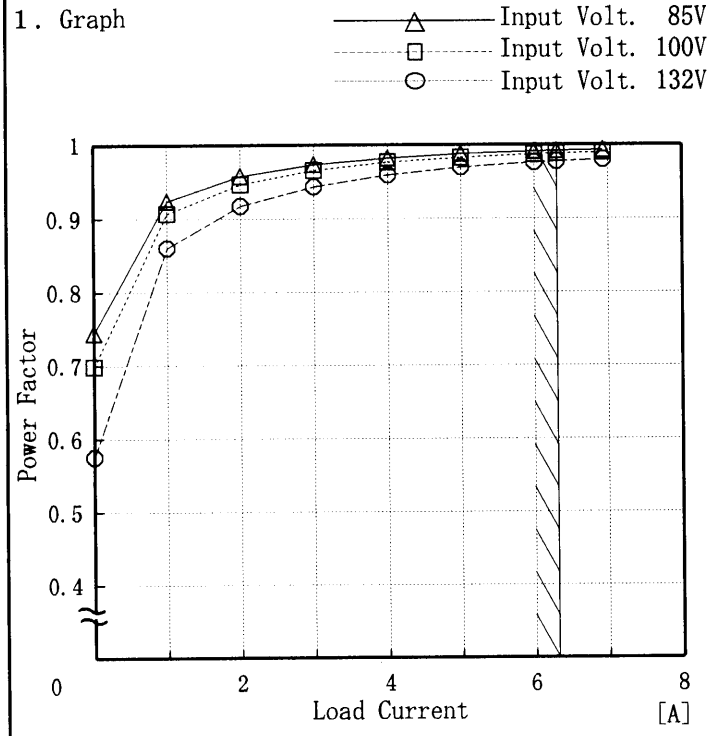
Input Voltage [V]	load 50% Power Factor	load 100% Power Factor
75	0.98	0.99
80	0.97	0.99
85	0.97	0.99
90	0.97	0.99
100	0.96	0.99
110	0.96	0.99
120	0.96	0.98
132	0.95	0.98
140	0.94	0.97

COSEL

Model	LEA150F-24
Item	Power Factor (by Load Current) 力率 (負荷電流特性)
Output	————

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

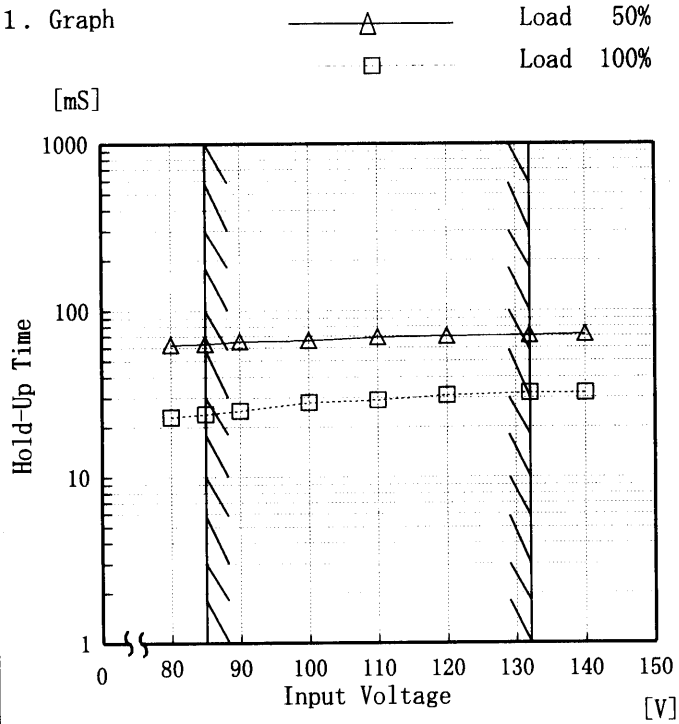
Load Current [A]	Power Factor		
	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
0.00	0.74	0.70	0.57
1.00	0.92	0.91	0.86
2.00	0.96	0.95	0.92
3.00	0.97	0.97	0.94
4.00	0.98	0.98	0.96
5.00	0.99	0.98	0.97
6.00	0.99	0.99	0.98
6.30	0.99	0.99	0.98
6.93	0.99	0.99	0.98
—	—	—	—
—	—	—	—
—	—	—	—

COSEL

Model	LEA150F-24
Item	Hold-Up Time　出力保持時間
Object	+24.0V6.3A

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

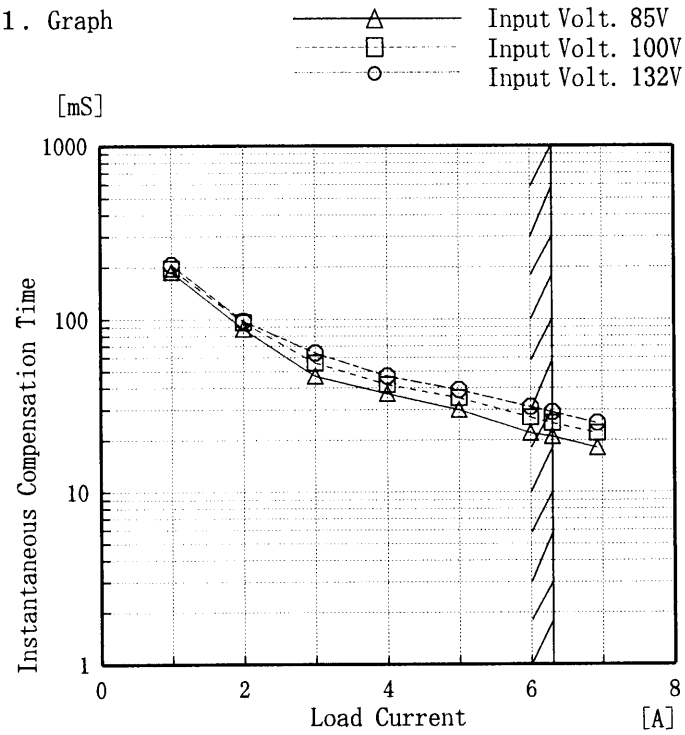
Input Voltage [V]	Load 50% Hold-Up Time [mS]	Load 100% Hold-Up Time [mS]
75	—	—
80	62	23
85	63	24
90	65	25
100	66	28
110	69	29
120	70	31
132	71	32
140	72	32

COSEL

Model	LEA150F-24
Item	Instantaneous Interruption Compensation 瞬時停電保障
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 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。

2. Values

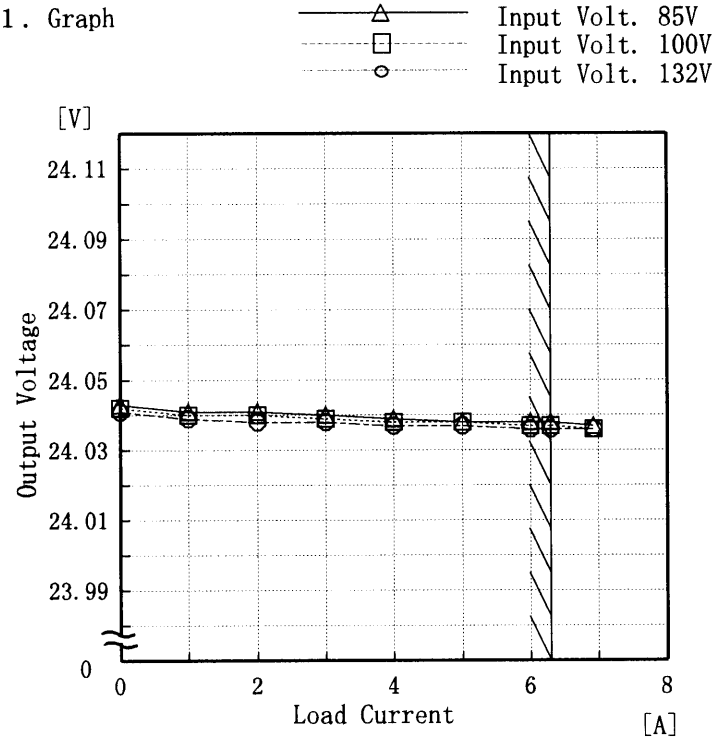
Load Current [A]	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
	Time [mS]		
0.00	—	—	—
1.00	188	197	206
2.00	88	96	98
3.00	47	56	64
4.00	37	42	47
5.00	30	35	39
6.00	22	27	31
6.30	21	25	29
6.93	18	22	25
—	—	—	—
—	—	—	—

COSEL

Model	LEA150F-24
Item	Load Regulation　静的負荷変動
Object	+24.0V6.30A

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

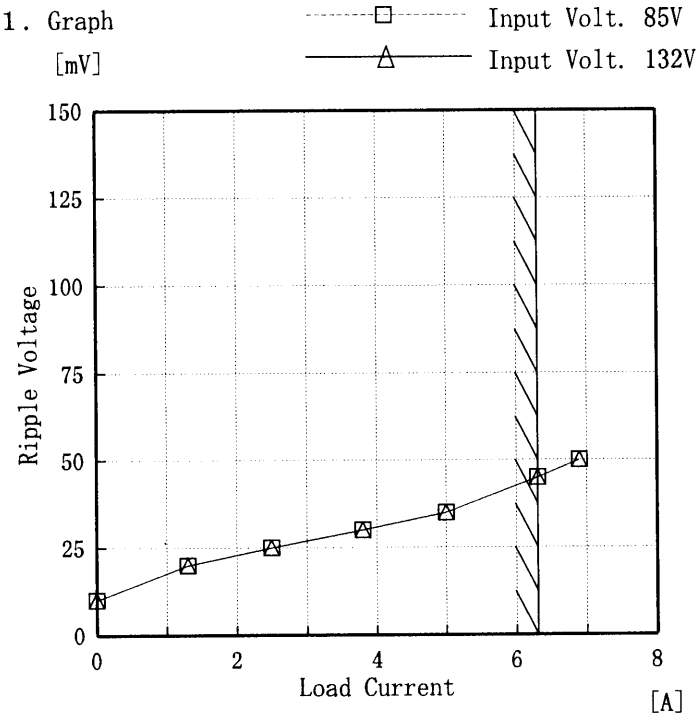
Load Current [A]	Input Volt. 85[V] Output Volt. [V]	Input Volt. 100[V] Output Volt. [V]	Input Volt. 132[V] Output Volt. [V]
0.0	24.043	24.042	24.041
1.0	24.041	24.040	24.039
2.0	24.041	24.040	24.038
3.0	24.040	24.039	24.038
4.0	24.039	24.038	24.037
5.0	24.038	24.038	24.037
6.0	24.038	24.037	24.036
6.3	24.038	24.037	24.036
6.9	24.037	24.036	24.036
—	—	—	—

COSEL

Model	LEA150F-24
Item	Ripple Voltage(by Load Current) リップル電圧(負荷電流特性)
Object	+24.0V6.30A

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

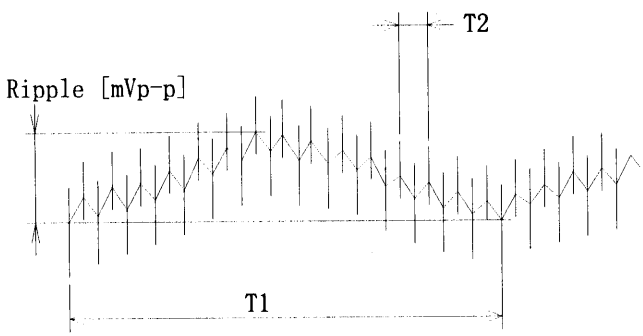


Fig. Complex Ripple Wave Form
図 リップル波形詳細図

2. Values

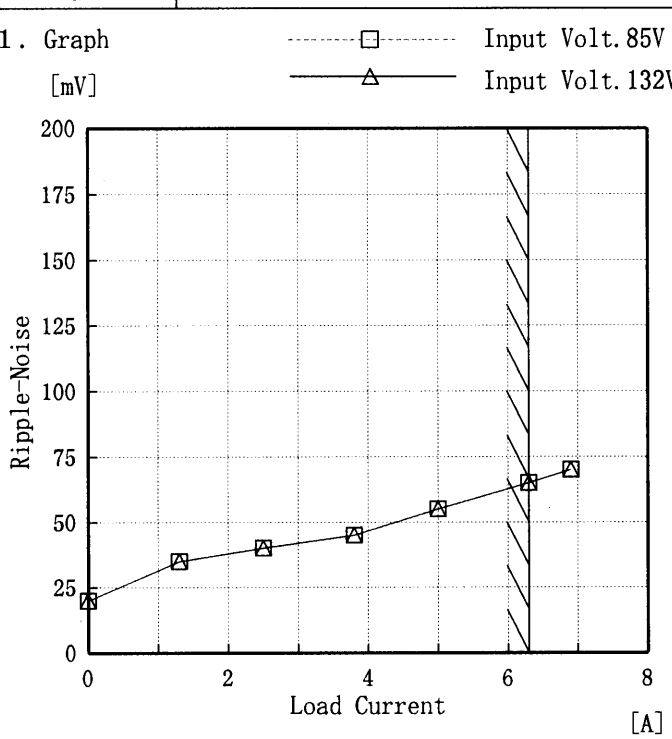
Load Current [A]	Input Volt. 85 [V] Ripple Output Volt. [mV]	Input Volt. 132 [V] Ripple Output Volt. [mV]
0.0	10	10
1.3	20	20
2.5	25	25
3.8	30	30
5.0	35	35
6.3	45	45
6.9	50	50
—	—	—
—	—	—
—	—	—
—	—	—

COSEL

Model	LEA150F-24
Item	Ripple-Noise　リップルノイズ
Object	+24.0V6.30A

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

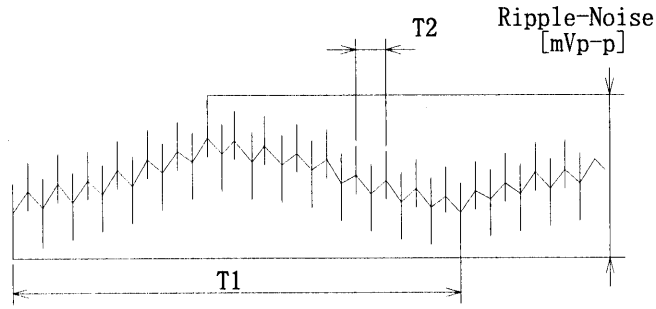


Fig. Complex Ripple Wave Form
図　リップル波形詳細図

2. Values

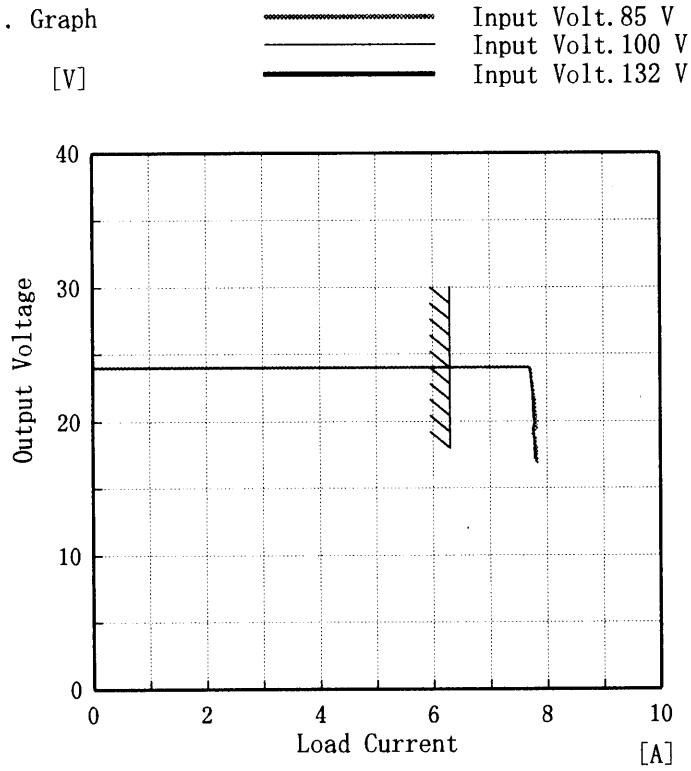
Load current [A]	Input Volt. 85 [V] Ripple-Noise [mV]	Input Volt. 132 [V] Ripple-Noise [mV]
0.0	20	20
1.3	35	35
2.5	40	40
3.8	45	45
5.0	55	55
6.3	65	65
6.9	70	70
—	—	—
—	—	—
—	—	—
—	—	—

COSEL

Model	LEA150F-24
Item	Overcurrent Protection 過電流保護
Object	+24.0V6.30A

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。
16.8V以下は間欠状態。

2. Values

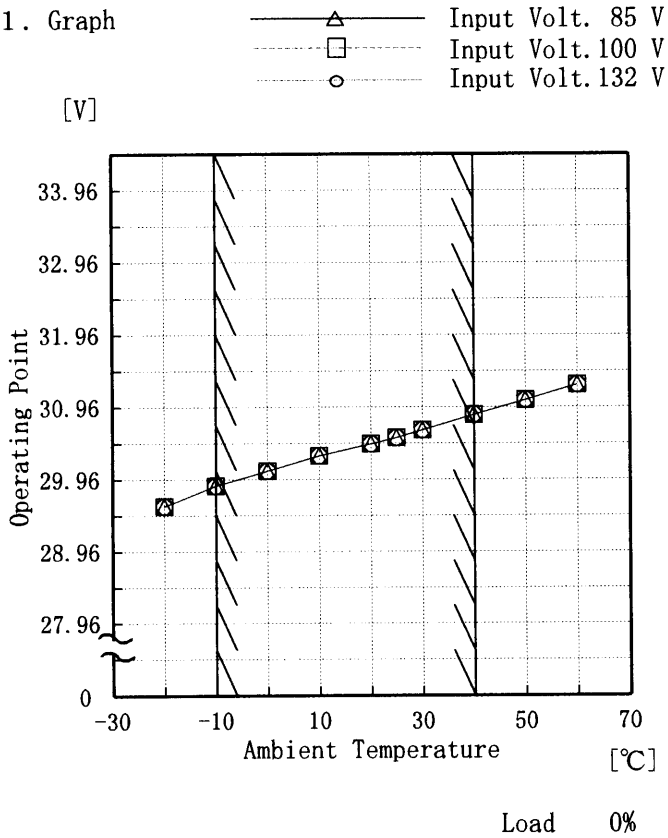
Output Voltage [V]	Input Volt. 85[V] Load Current [A]	Input Volt. 100[V] Load Current [A]	Input Volt. 132[V] Load Current [A]
24.00	7.70	7.70	7.69
22.80	7.74	7.73	7.73
21.60	7.78	7.76	7.75
19.20	7.77	7.74	7.77
16.80	7.82	7.79	7.78
–	–	–	–
–	–	–	–
–	–	–	–
–	–	–	–
–	–	–	–
–	–	–	–
–	–	–	–

COSEL

Model	LEA150F-24
Item	Overvoltage Protection 過電圧保護
Object	+24.0V6.3A

Testing Circuitry Figure A

1. Graph



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

(注)斜線は定格周囲温度範囲を示す。

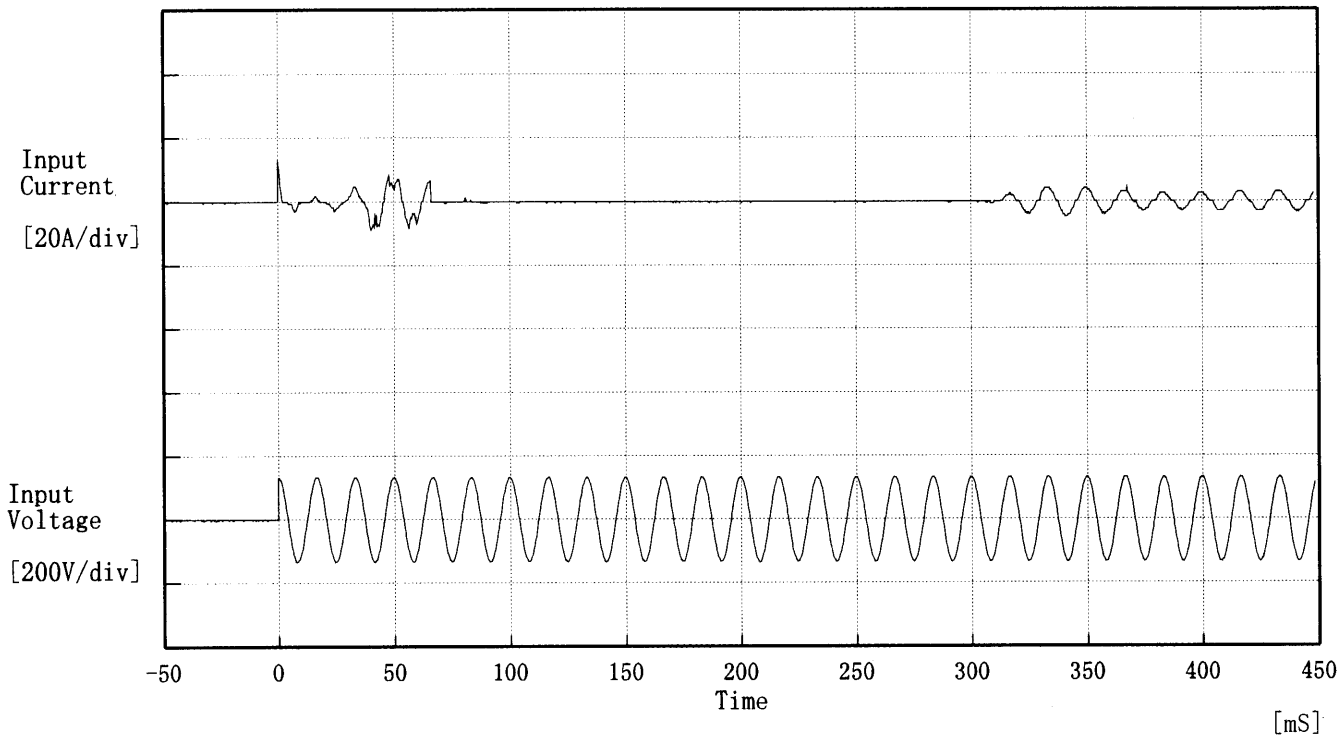
2. Values

Ambient Temp. [℃]	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
	Operating Point [V]		
-20	29.59	29.59	29.59
-10	29.87	29.87	29.87
0	30.08	30.08	30.08
10	30.29	30.29	30.29
20	30.45	30.45	30.45
25	30.54	30.54	30.54
30	30.64	30.64	30.64
40	30.85	30.85	30.85
50	31.06	31.06	31.06
60	31.27	31.27	31.27
—	—	—	—

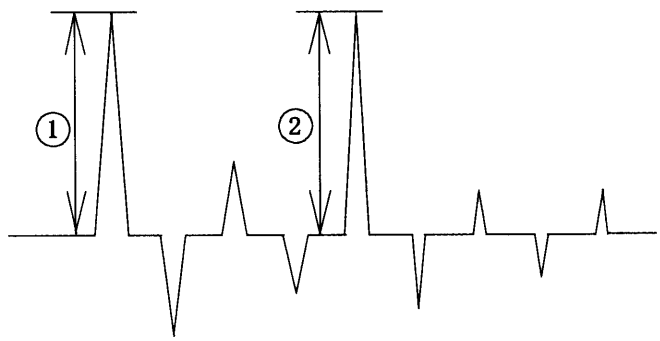
COSEL

Model	LEA150F-24
Item	Inrush Current　突入電流
Object	――――――――

Temperature　25℃
Testing Circuitry　Figure A



Input Voltage　100 V
Frequency　60 Hz
Load　100 %
Inrush Current
① 13.20 [A]
② 8.40 [A]



COSEL

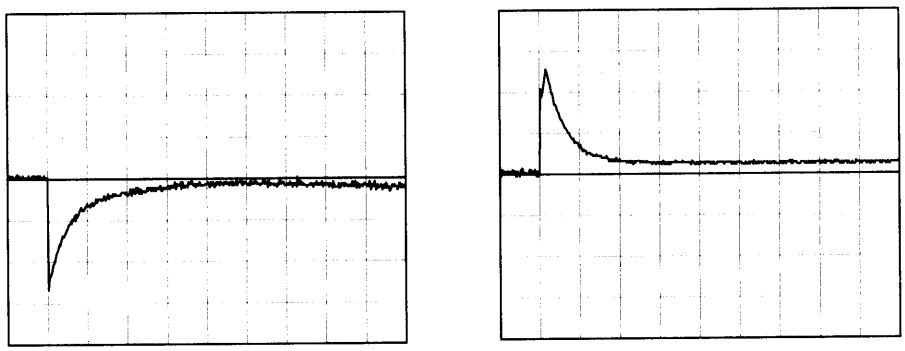
Model	LEA150F-24		
Item	Dynamic Load Responce 動的負荷変動	Temperature Testing Circuitry	25℃ Figure A
Object	+24V6.3A		

Input Volt. 100 V

Cycle 1000 mS

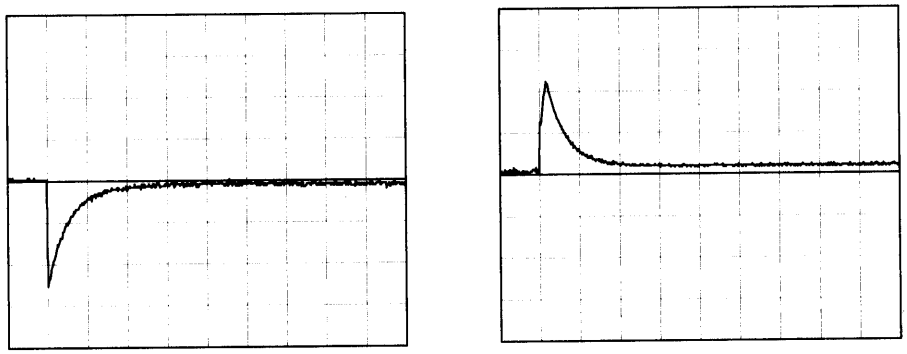
Min. Load ⟷

Load 100 %



Min. Load ⟷

Load 50 %

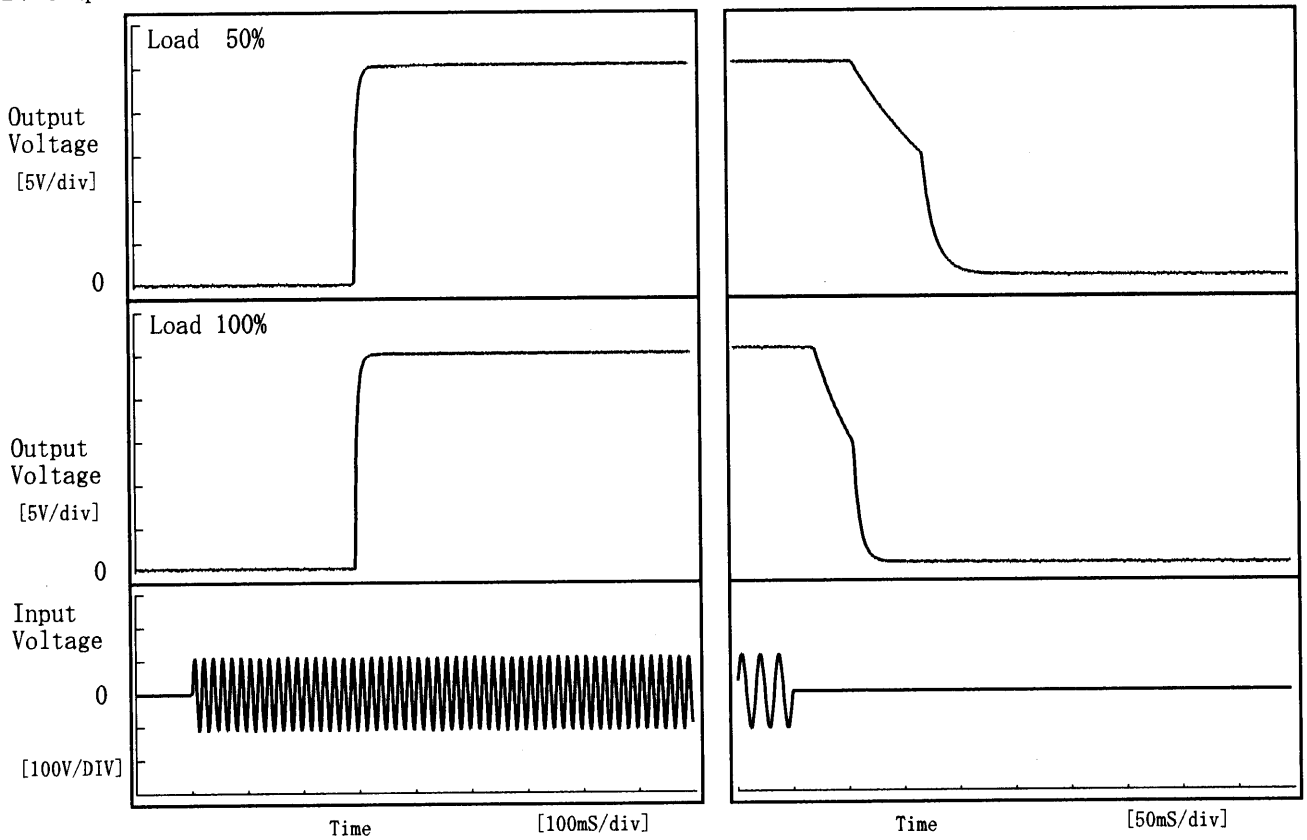


COSEL

Model	LEA150F-24		
Item	Rise and Fall Time 立上り、立下り時間	Temperature	25℃
		Testing Circuitry	Figure A
Object	+24.0V6.30A		

1. Graph

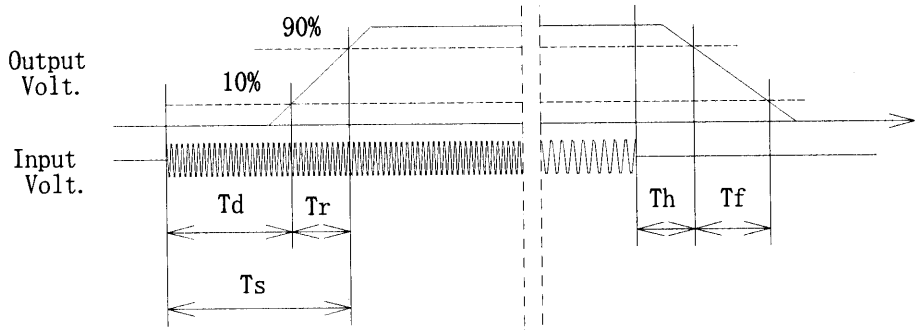
Input Volt. 85 V



2. Values

[mS]

Load \ Time	T d	T r	T s	T h	T f
50 %	296.0	9.0	305.0	75.3	70.0
100 %	295.0	9.0	304.0	31.8	36.3

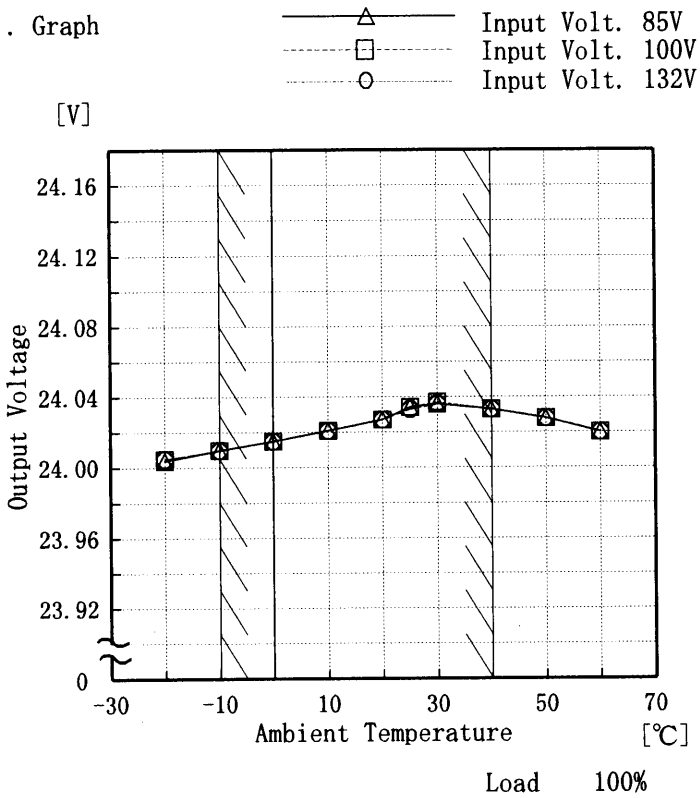


COSEL

Model	LEA150F-24
Item	Ambient Temperature Drift 周囲温度変動
Object	+24.0V6.30A

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

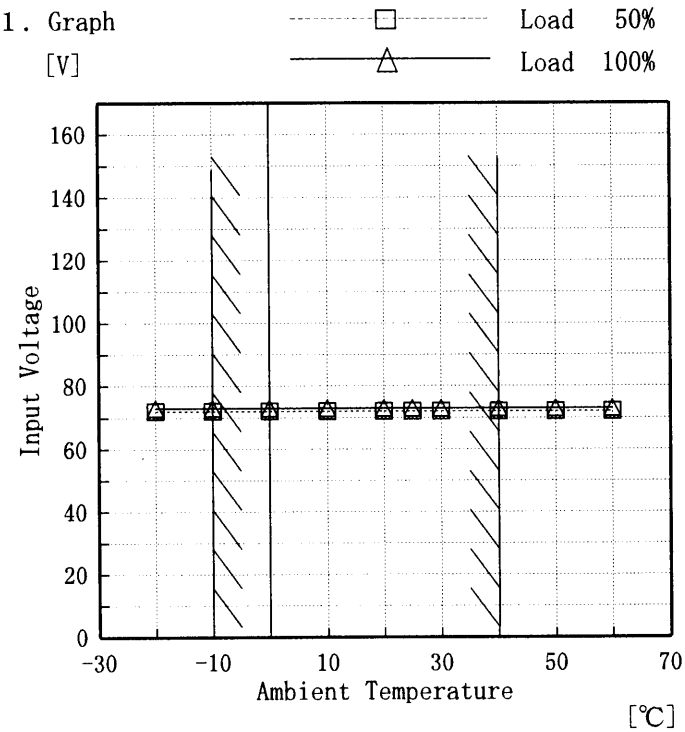
Temperature [℃]	Input Volt. 85[V] Output Volt. [V]	Input Volt. 100[V] Output Volt. [V]	Input Volt. 132[V] Output Volt. [V]
-20	24.004	24.005	24.005
-10	24.010	24.010	24.010
0	24.015	24.015	24.015
10	24.021	24.021	24.021
20	24.027	24.027	24.027
25	24.034	24.034	24.033
30	24.036	24.037	24.036
40	24.033	24.033	24.033
50	24.028	24.028	24.028
60	24.020	24.020	24.020
—	—	—	—

COSEL

Model	LEA150F-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

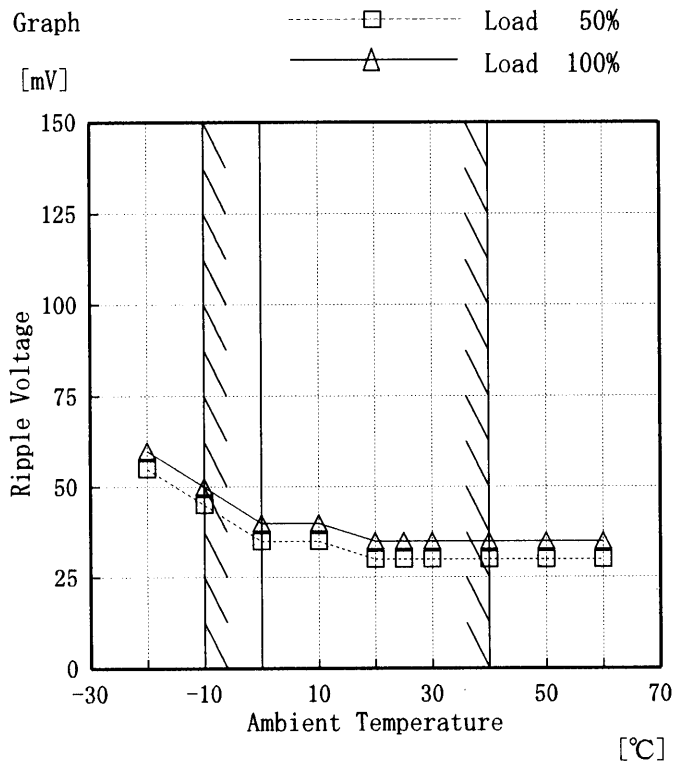
Ambient Temp. [℃]	Load 50% Input Volt. [V]	Load 100% Input Volt. [V]
-20	72	73
-10	72	73
0	72	73
10	72	73
20	72	73
25	72	73
30	72	73
40	72	73
50	72	73
60	72	73
—	—	—

COSEL

Model	LEA150F-24
Item	Ripple Voltage (by Ambient Temp.) リップル電圧（周囲温度特性）
Object	+5.0V30.00A

Testing Circuitry Figure A

1. Graph



Input Volt. 100 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。

2. Values

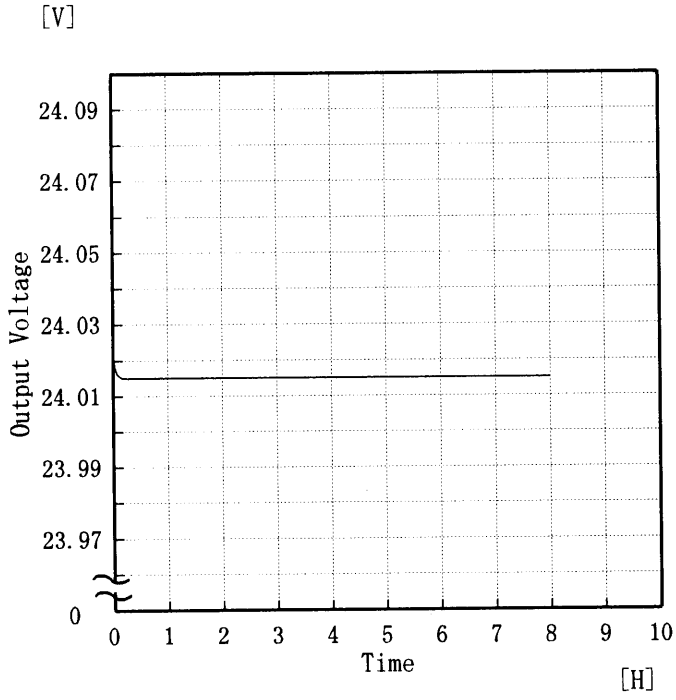
Ambient Temp. [℃]	Load 50% Ripple Output Volt. [mV]	Load 100% Ripple Output Volt. [mV]
-20	55	60
-10	45	50
0	35	40
10	35	40
20	30	35
25	30	35
30	30	35
40	30	35
50	30	35
60	30	35
—	—	—

COSEL

Model	LEA150F-24
Item	Time Lapse Drift 経時ドリフト
Object	+24.0V6.30A

Temperature 25 ℃
Testing Circuitry Figure A

1. Graph



Input Volt. 100V
Load 100%

2. Values

Time since start [H]	Output Voltage [V]
0.0	24.025
0.5	24.015
1.0	24.015
2.0	24.015
3.0	24.015
4.0	24.015
5.0	24.015
6.0	24.015
7.0	24.015
8.0	24.015

COSEL

Model	LEA150F-24	
Item	Output Voltage Accuracy 定電圧精度	Testing Circuitry Figure A
Object	+24.0V6.30A	

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 : -10～40 ℃
Input Voltage : 85～132 V
Load Current : 0.00～6.30 A

* Output Voltage Accuracy = ±(Maximum of Output Voltage − 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 -10～40 ℃
入力電圧 85～132 V
負荷電流 0.00～6.30 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

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

Item	Temperature [℃]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy (Ration) [%]
Maximum Voltage	25	85	0.00	24.041	±15	±0.1
Minimum Voltage	-10	85	6.30	24.013		

COSEL

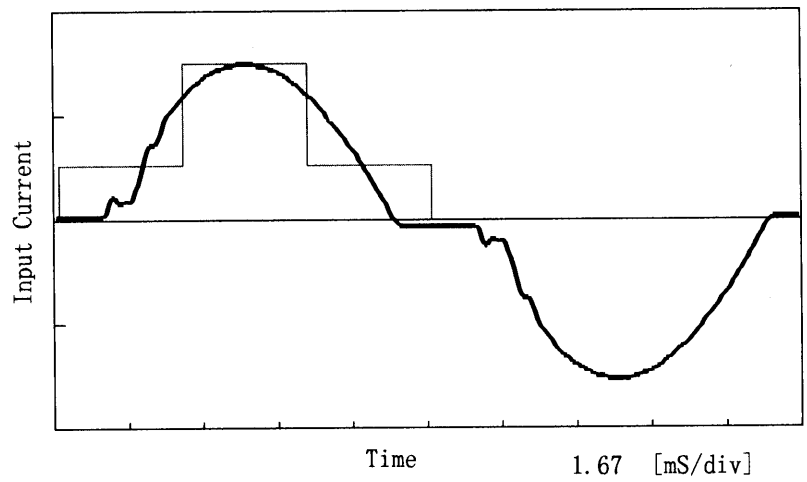
Model	LEA150F-24
Item	Harmonic Current 高調波電流
Object	————

Temperature 25℃
Testing Circuitry Figure E

1. Input Current Waveform

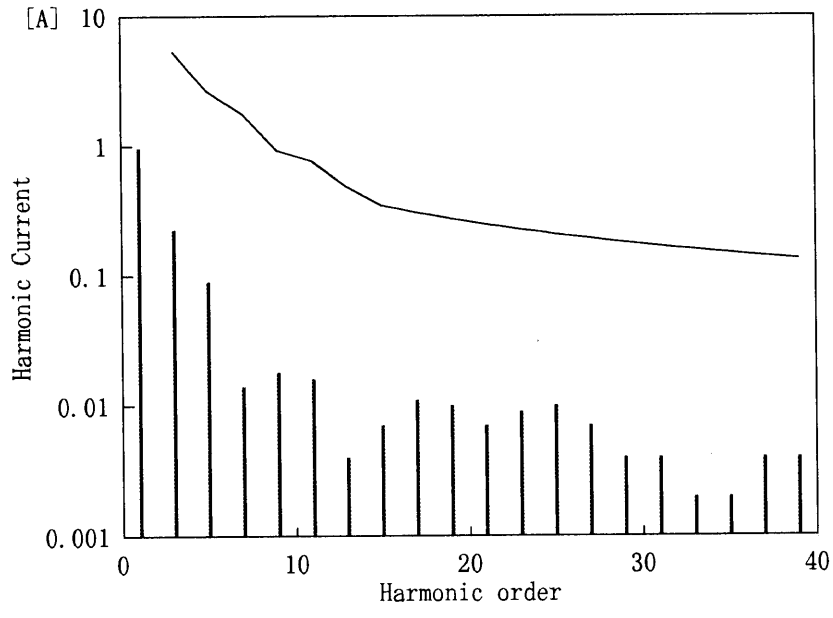
——— Input Current

——— 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]	100
Input Current [A]	0.998
Active Power [W]	96.6
Apparent Power[VA]	99.8
Frequency [Hz]	60
Power Factor	0.968
Output Power [W]	75

2. Harmonic Current



——— Harmonic Current
高調波電流

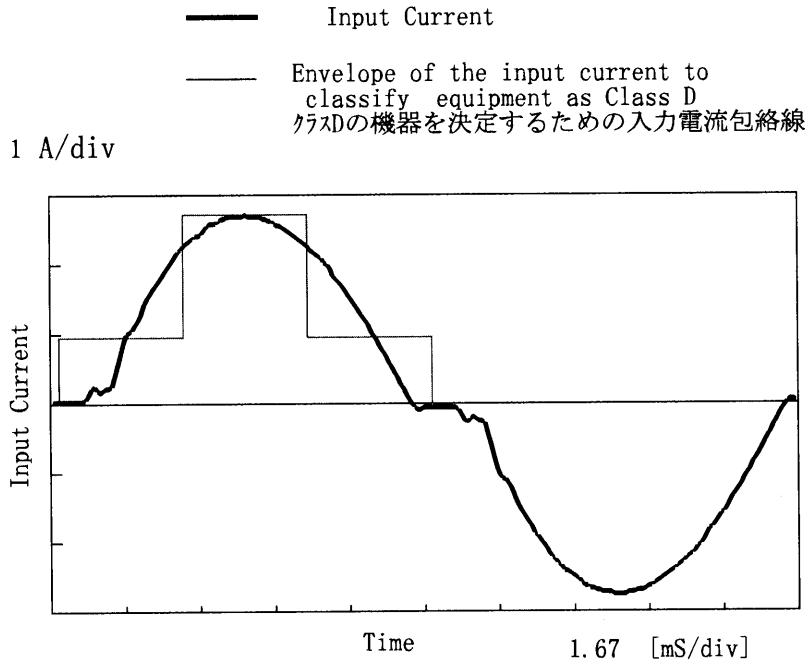
——— Limits for Class A equipment
ｸﾗｽAの機器に対する限度値

Harmonics order 高調波次数	Limits 限度値 [A]	Values 測定値 [A]
1	—	0.96600
2	—	0.00100
3	5.29000	0.22600
4	—	0.00000
5	2.62200	0.09000
6	—	0.00000
7	1.77100	0.01400
8	—	0.00000
9	0.92000	0.01800
10	—	0.00000
11	0.75900	0.01600
12	—	0.00000
13	0.48300	0.00400
14	—	0.00000
15	0.34500	0.00700
16	—	0.00000
17	0.30441	0.01100
18	—	0.00000
19	0.27237	0.01000
20	—	0.00000
21	0.24643	0.00700
22	—	0.00000
23	0.22500	0.00900
24	—	0.00000
25	0.20700	0.01000
26	—	0.00000
27	0.19167	0.00700
28	—	0.00000
29	0.17845	0.00400
30	—	0.00000
31	0.16694	0.00400
32	—	0.00000
33	0.15682	0.00200
34	—	0.00000
35	0.14786	0.00200
36	—	0.00000
37	0.13986	0.00400
38	—	0.00000
39	0.13269	0.00400
40	—	0.00000

COSEL

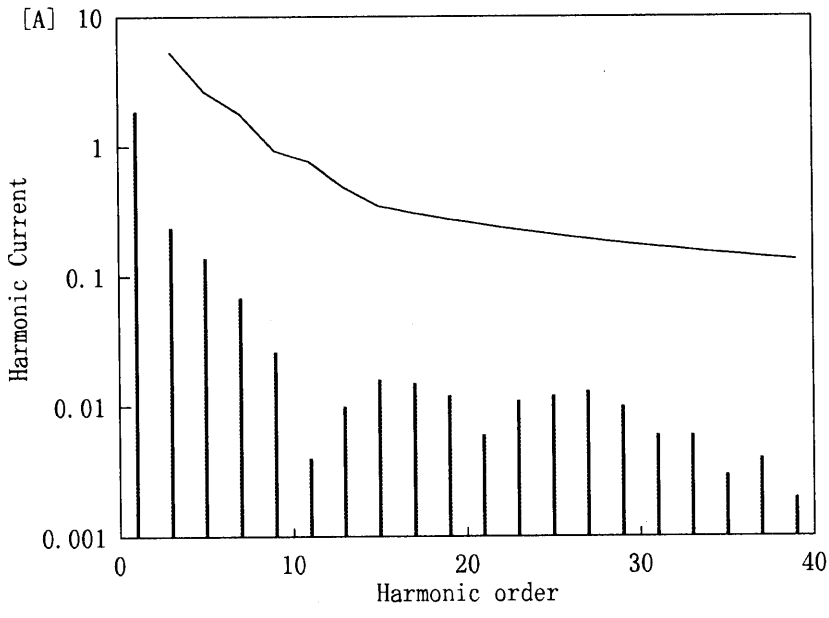
Model	LEA150F-24		
Item	Harmonic Current 高調波電流	Temperature Testing Circuitry	25℃ Figure E
Object	————		

1. Input Current Waveform



Conditions	Values
Input Voltage [V]	99.7
Input Current [A]	1.897
Active Power [W]	186.8
Apparent Power[VA]	189.1
Frequency [Hz]	60
Power Factor	0.988
Output Power [W]	150

2. Harmonic Current



Harmonics order 高調波次数	Limits 限度値 [A]	Values 測定値 [A]
1	—	1.87400
2	—	0.00100
3	5.30592	0.23900
4	—	0.00100
5	2.62989	0.13900
6	—	0.00000
7	1.77633	0.06900
8	—	0.00000
9	0.92277	0.02600
10	—	0.00000
11	0.76128	0.00400
12	—	0.00000
13	0.48445	0.01000
14	—	0.00000
15	0.34604	0.01600
16	—	0.00000
17	0.30533	0.01500
18	—	0.00000
19	0.27319	0.01200
20	—	0.00000
21	0.24717	0.00600
22	—	0.00000
23	0.22568	0.01100
24	—	0.00000
25	0.20762	0.01200
26	—	0.00000
27	0.19224	0.01300
28	—	0.00000
29	0.17899	0.01000
30	—	0.00000
31	0.16744	0.00600
32	—	0.00000
33	0.15729	0.00600
34	—	0.00000
35	0.14830	0.00300
36	—	0.00000
37	0.14029	0.00400
38	—	0.00000
39	0.13309	0.00200
40	—	0.00000

COSEL

Model	LEA150F-24
Item	Condensation 結露特性
Object	+24V6.3A

Testing Circuitry Figure A

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]	24.034	Input Volt.: 100V, Load Current:6.3A
Line Regulation [mV]	1	Input Volt.: 85～132V, Load Current:6.3A
Load Regulation [mV]	5	Input Volt.: 100V, Load Current:0～6.3A

COSEL

Model	LEA150F-24
Item	Leakage Current 漏洩電流
Object	――――――

Temperature 25℃
Testing Circuitry Figure B

1. Results

Standards	Leakage Current [mA]		
	Input Volt. 85 [V]	Input Volt. 100 [V]	Input Volt. 132 [V]
(A) DENTORI	0.15	0.18	0.24
(B) IEC60950	0.15	0.18	0.24

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

2. Condition

Leakage current value is concluded after measuring both phases of AC input and by choosing the larger one.

交流入力の両相について測定し、その大きい方を漏洩電流測定値とする。

COSEL

Model	LEA150F-24		
Item	Line Noise Tolerance 入力雑音耐量	Temperature Testing Circuitry	25℃ Figure C
Object	+24V6.3A		

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

COSEL

Model	LEA150F-24		
Item	Conducted Emission 雑音端子電圧	Temperature Testing Circuitry	25℃ Figure D
Object	————————		

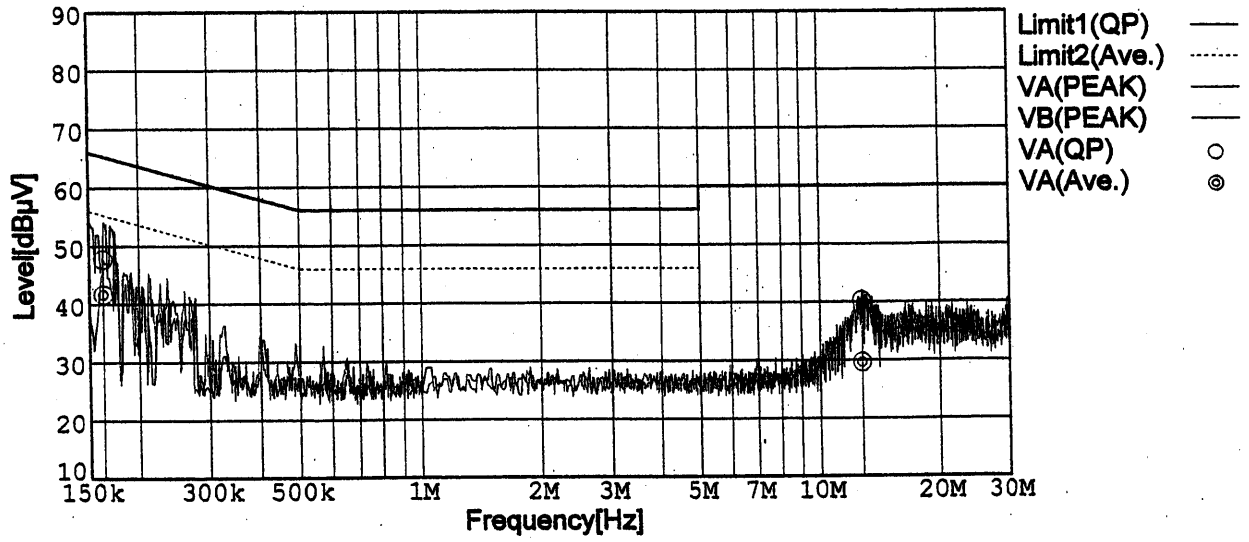
1. Graph

Remarks

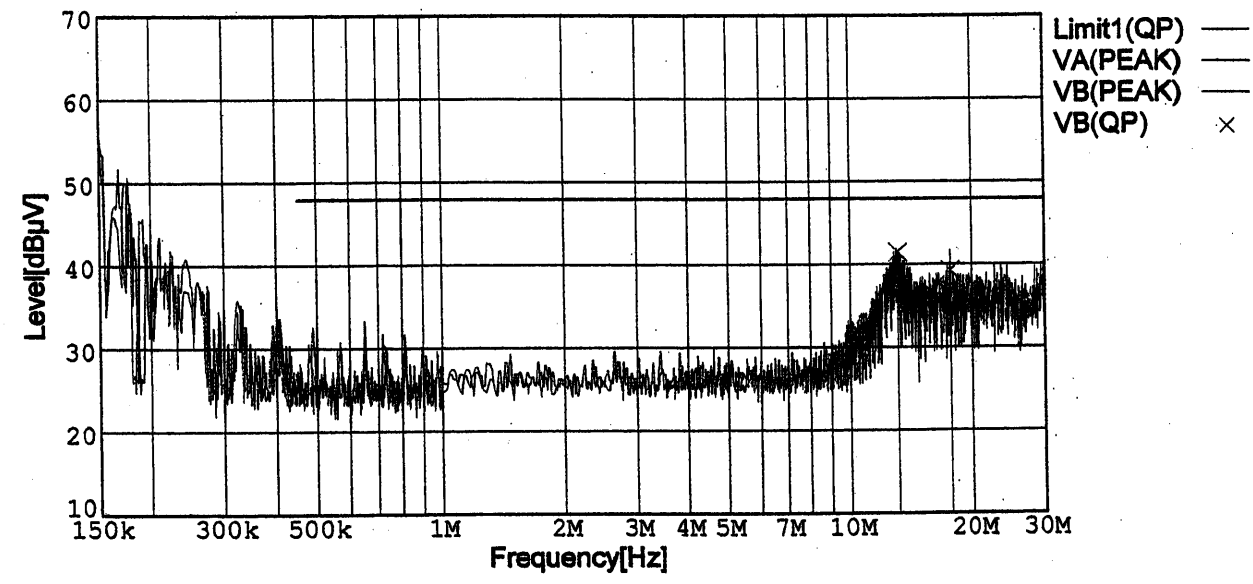
Input Volt. 100V (VCCI Class B)
120V (FCC Class B)

Load 100 %

Limit1: [VCCI] Class B(QP)
Limit2: [VCCI] Class B(Ave.)



Limit1: [FCC Part15] Class B



COSEL

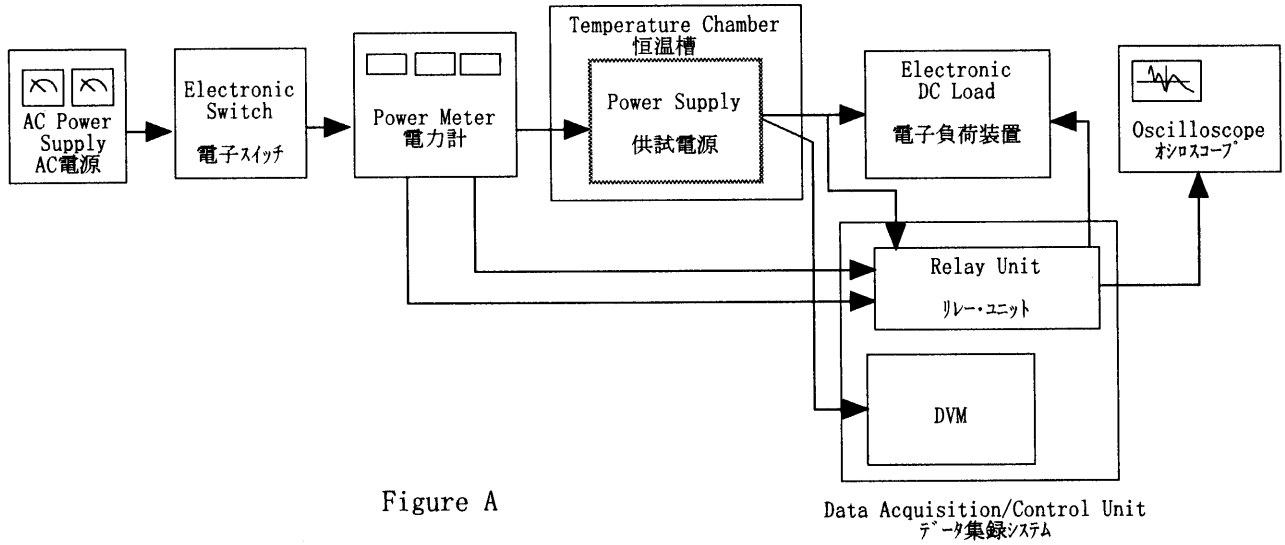


Figure A

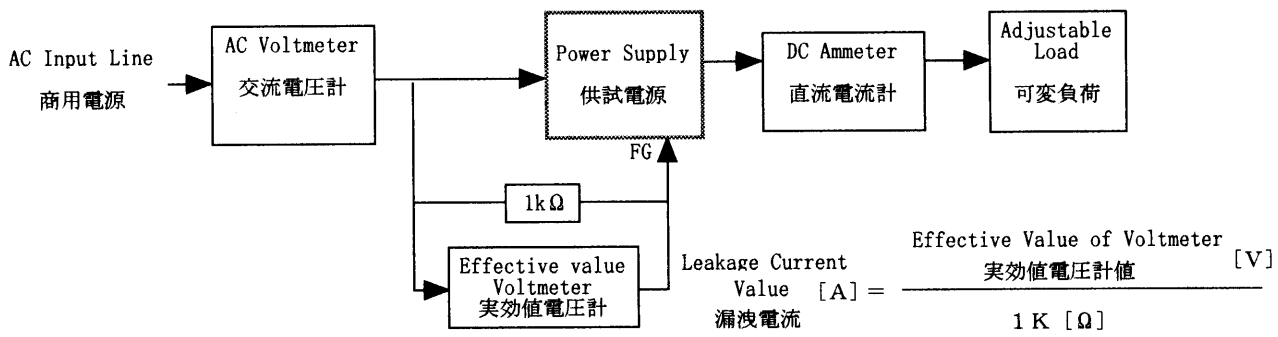


Figure B(DENTORI)

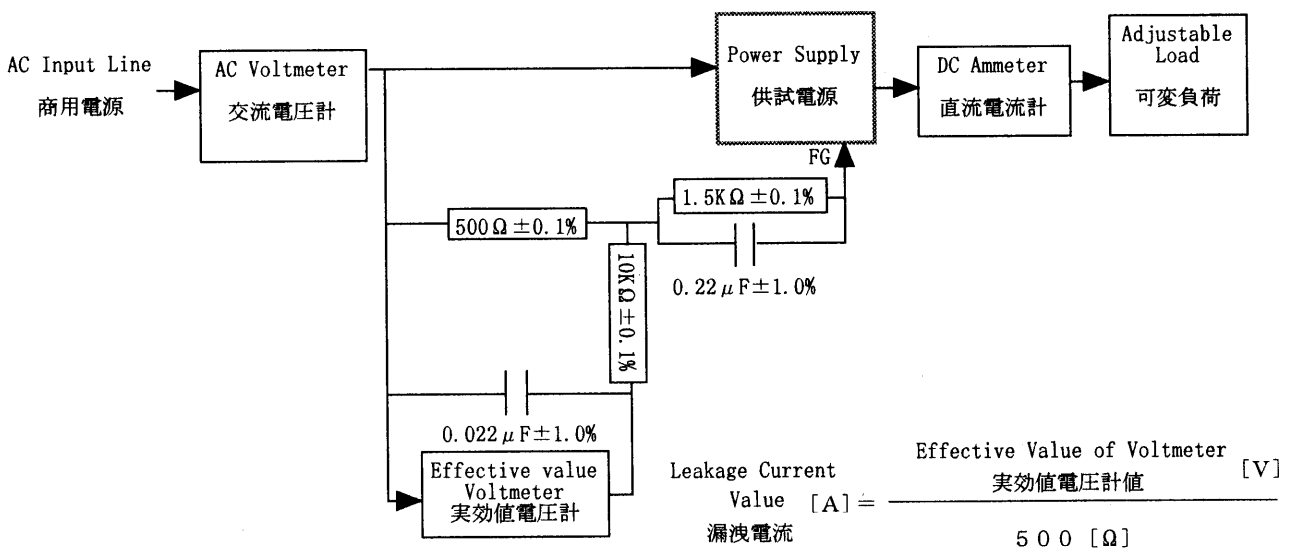


Figure B (IEC60950)

COSEL

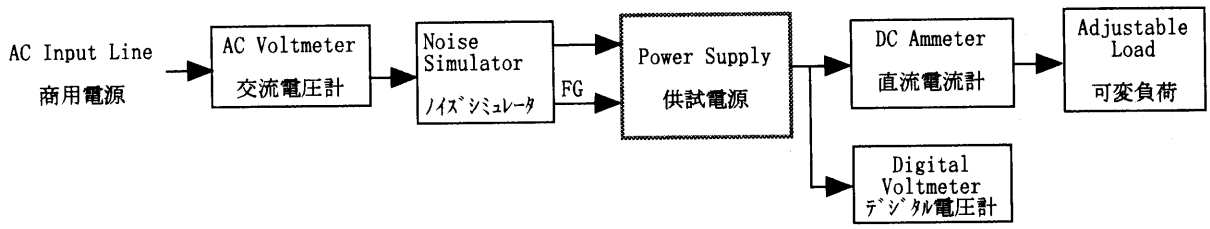


Figure C

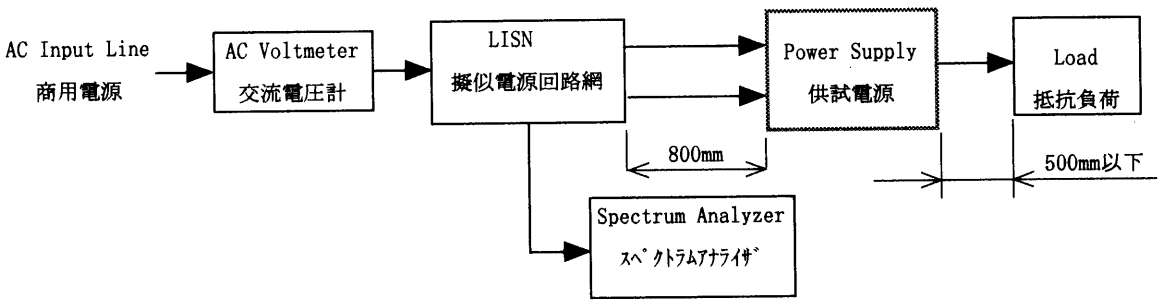


Figure D

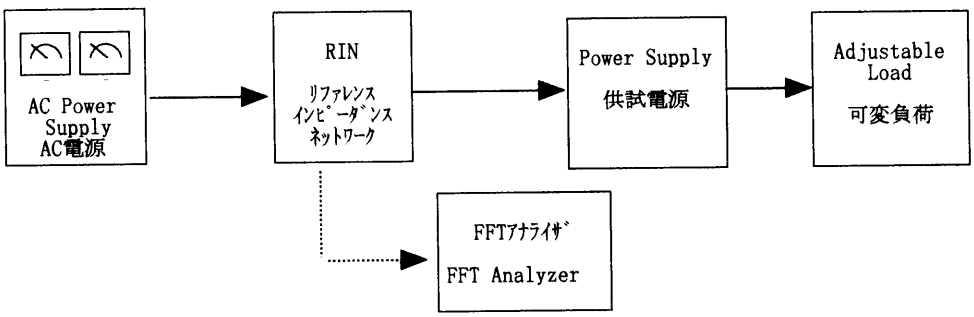


Figure E