参考資料

COSEL

TEST DATA OF LDA15F-12
(200V INPUT)

Regulated DC Power Supply

Date : June 23. 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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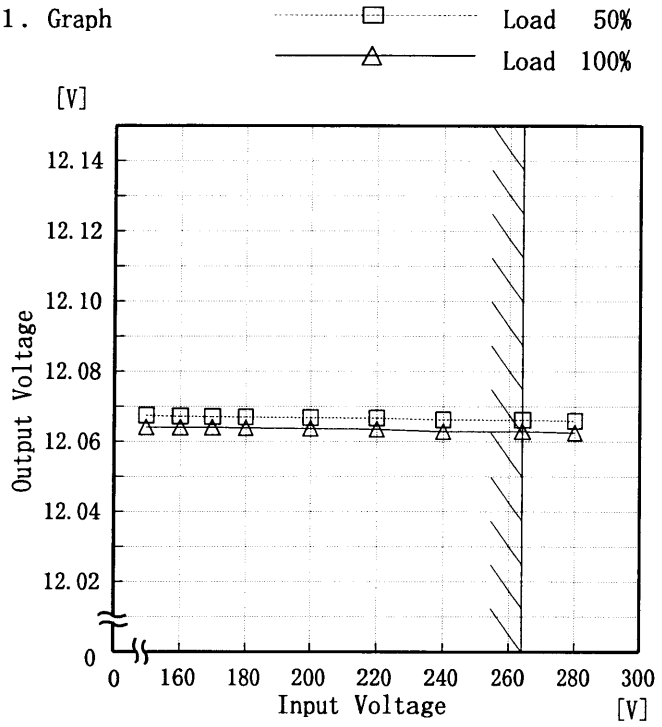
Model	LDA15F-12
Item	Line Regulation 静的入力変動
Object	+12.0V1.3A

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]	Output Voltage [V]	
	Load 50%	Load 100%
150	12.067	12.064
160	12.067	12.064
170	12.067	12.064
180	12.067	12.064
200	12.067	12.064
220	12.067	12.064
240	12.066	12.063
264	12.066	12.063
280	12.066	12.063

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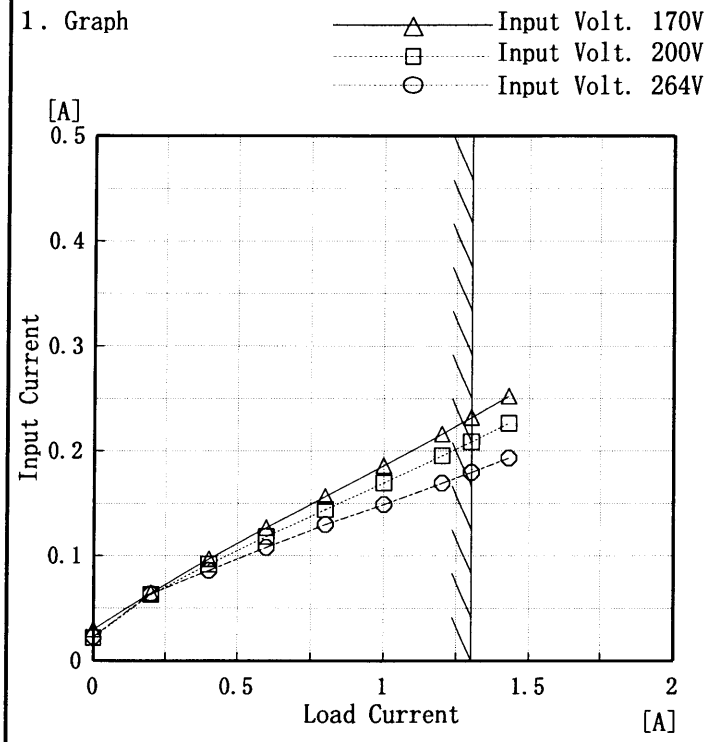
Model	LDA15F-12
Item	Input Current (by Load Current) 入力電流（負荷特性）
Output	――――

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

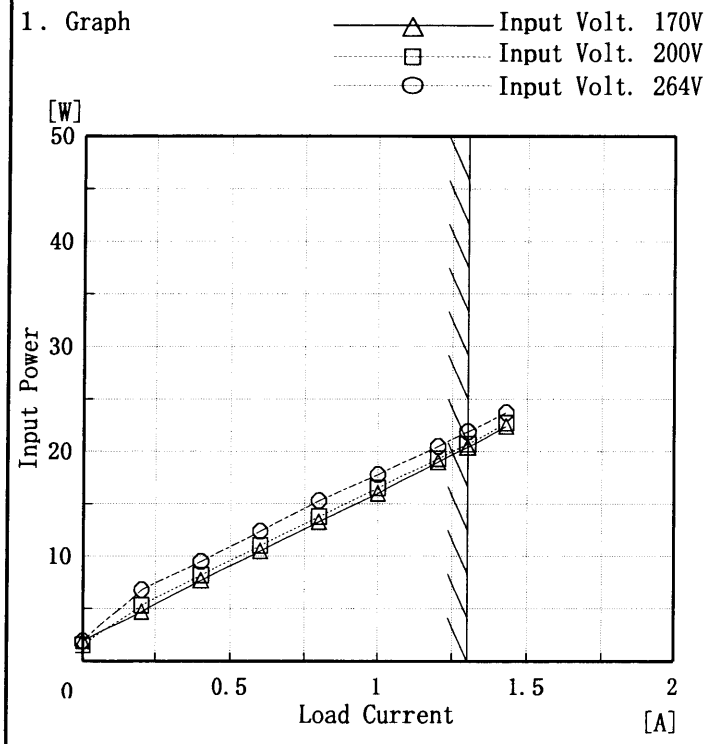
Load Current [A]	Input Current [A] Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
0.00	0.030	0.022	0.023
0.20	0.065	0.063	0.064
0.40	0.097	0.092	0.086
0.60	0.127	0.118	0.108
0.80	0.157	0.144	0.130
1.00	0.186	0.170	0.149
1.20	0.216	0.196	0.170
1.30	0.232	0.209	0.180
1.43	0.252	0.227	0.193
—	—	—	—
—	—	—	—
—	—	—	—

COSEL

Model	LDA15F-12
Item	Input Power (by Load Current) 入力電力 (負荷特性)
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

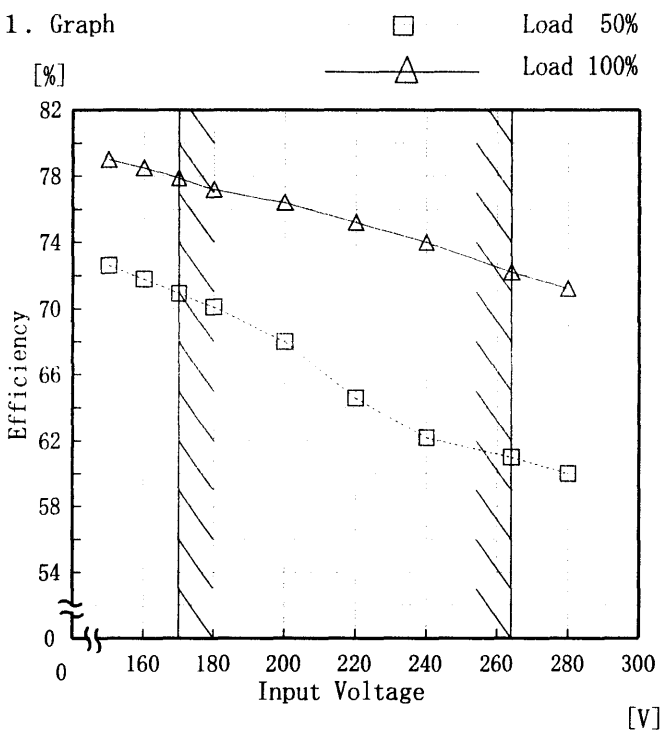
Load Current [A]	Input Power [W] Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
0.00	1.90	1.50	1.90
0.20	4.70	5.30	6.80
0.40	7.70	8.20	9.50
0.60	10.50	11.00	12.40
0.80	13.30	13.80	15.30
1.00	16.00	16.50	17.80
1.20	19.00	19.30	20.50
1.30	20.40	20.70	21.90
1.43	22.40	22.70	23.70
—	—	—	—
—	—	—	—
—	—	—	—

COSEL

Model	LDA15F-12
Item	Efficiency 効率
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	72.6	79.0
160	71.8	78.5
170	70.9	77.9
180	70.1	77.2
200	68.0	76.4
220	64.6	75.2
240	62.2	74.0
264	61.0	72.2
280	60.0	71.2

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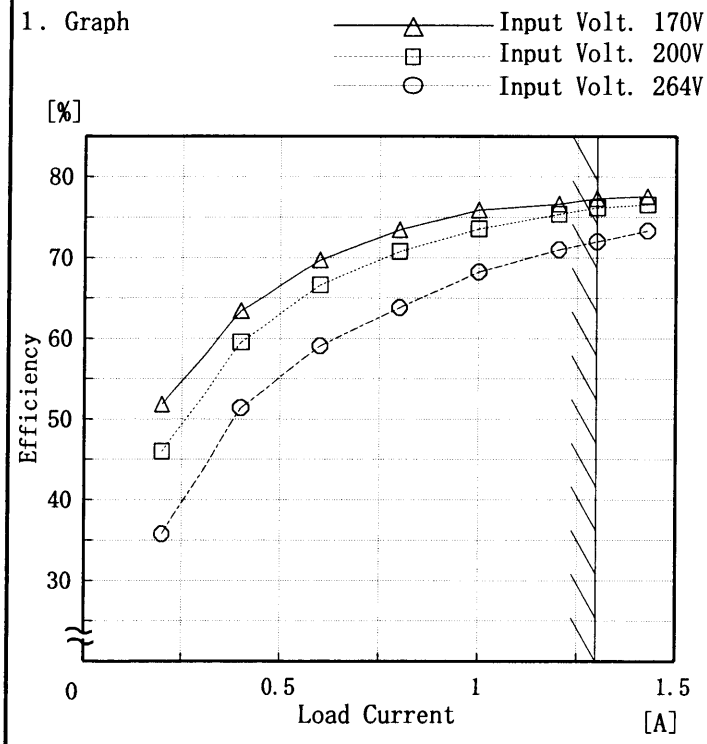
Model	LDA15F-12
Item	Efficiency (by Load Current) 効率（負荷電流特性）
Output	————

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

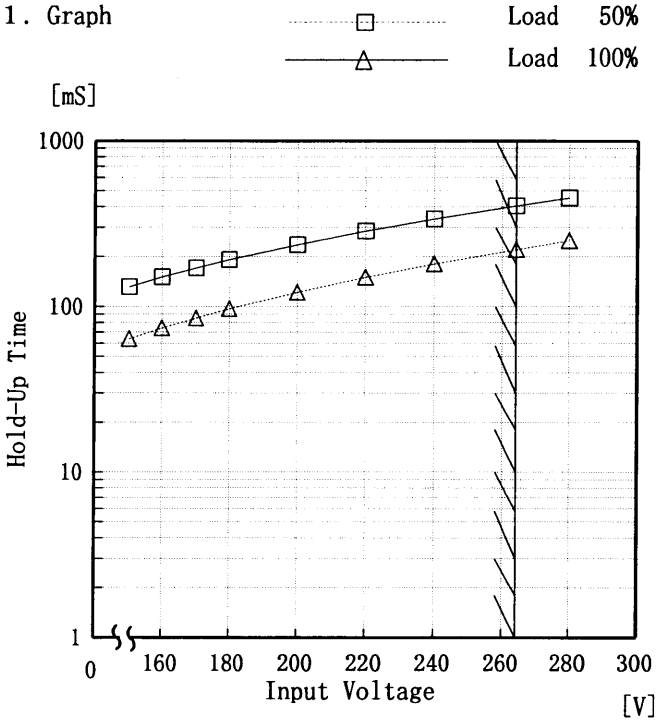
Load Current [A]	Efficiency [%] Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
0.20	51.9	46.0	35.8
0.40	63.4	59.5	51.4
0.60	69.7	66.6	59.1
0.80	73.5	70.8	63.8
1.00	75.9	73.6	68.2
1.20	76.6	75.4	71.0
1.30	77.3	76.2	72.0
1.43	77.6	76.6	73.3
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—

COSEL

Model	LDA15F-12
Item	Hold-Up Time 出力保持時間
Object	+12.0V1.3A

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]	Hold-Up Time [mS]	
	Load 50%	Load 100%
150	132	64
160	151	74
170	171	85
180	192	97
200	237	122
220	286	150
240	338	181
264	405	222
280	453	251

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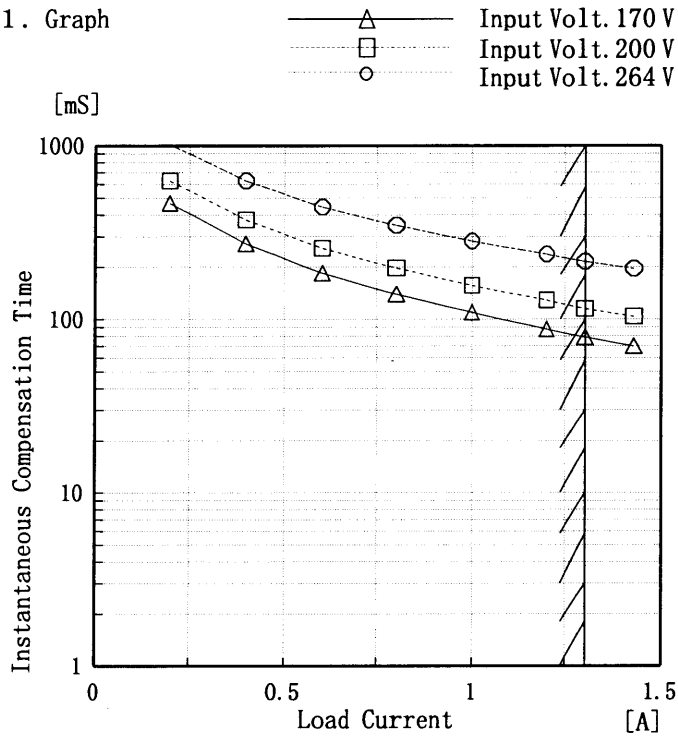
Model	LDA15F-12
Item	Instantaneous Interruption Compensation 瞬時停電保障
Object	+12.0V1.3A

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]	Time [mS]		
	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
0.00	—	—	—
0.20	467	626	1015
0.40	273	374	627
0.60	185	257	444
0.80	140	198	349
1.00	110	157	282
1.20	88	129	237
1.30	79	115	215
1.43	70	104	196
—	—	—	—
—	—	—	—

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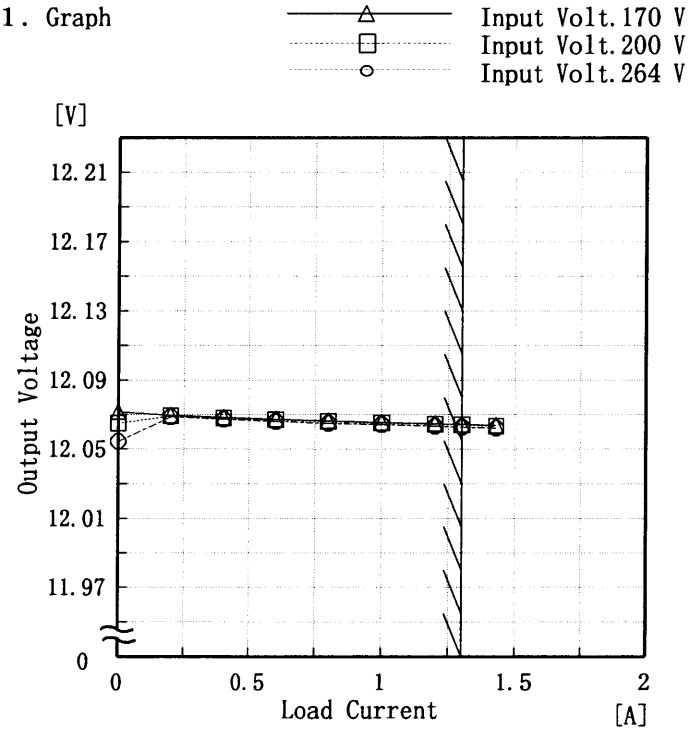
Model	LDA15F-12
Item	Load Regulation 静的負荷変動
Object	+12.0V1.3A

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

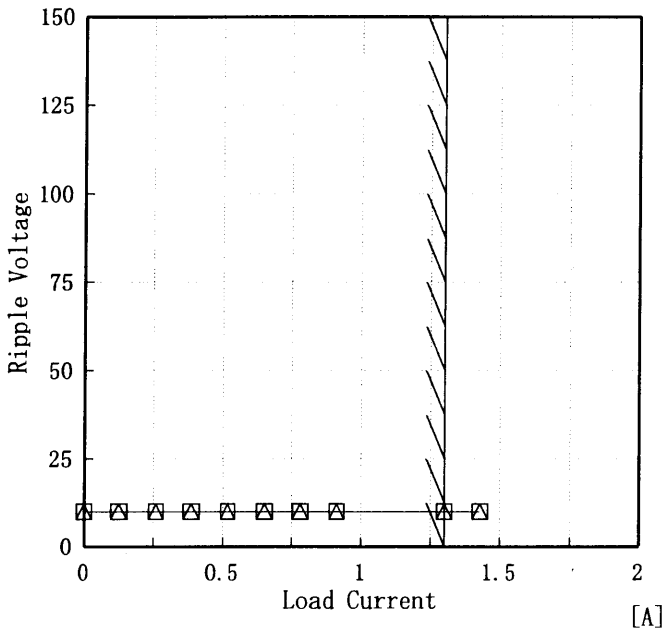
Load Current [A]	Output Voltage [V] Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
0.00	12.072	12.065	12.054
0.20	12.070	12.069	12.069
0.40	12.068	12.068	12.067
0.60	12.067	12.067	12.066
0.80	12.066	12.066	12.065
1.00	12.066	12.065	12.064
1.20	12.065	12.064	12.063
1.30	12.064	12.064	12.063
1.43	12.064	12.063	12.062
—	—	—	—

COSEL

Model	LDA15F-12
Item	Ripple Voltage(by Load Current) リップル電圧(負荷電流特性)
Object	+12.0V1.3A

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

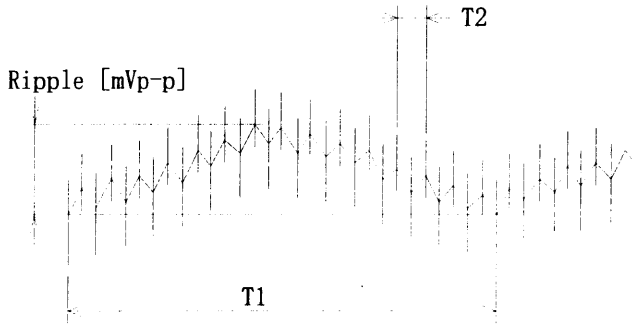


Fig. Complex Ripple Wave Form
図 リップル波形詳細図

2. Values

Load Current [A]	Input Volt. 170 [V] Ripple Output Volt. [mV]	Input Volt. 264 [V] Ripple Output Volt. [mV]
0.00	10	10
0.13	10	10
0.26	10	10
0.39	10	10
0.52	10	10
0.65	10	10
0.78	10	10
0.91	10	10
1.30	10	10
1.43	10	10
—	—	—

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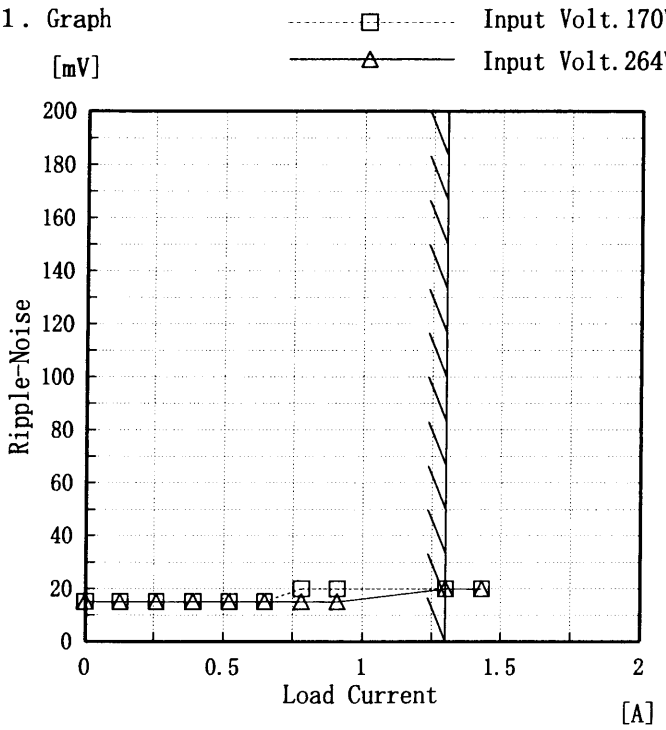
Model	LDA15F-12
Item	Ripple-Noise リップルノイズ
Object	+12.0V1.3A

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

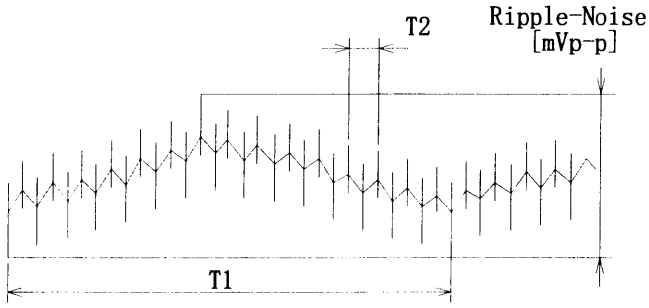


Fig. Complex Ripple Wave Form
図 リップル波形詳細図

2. Values

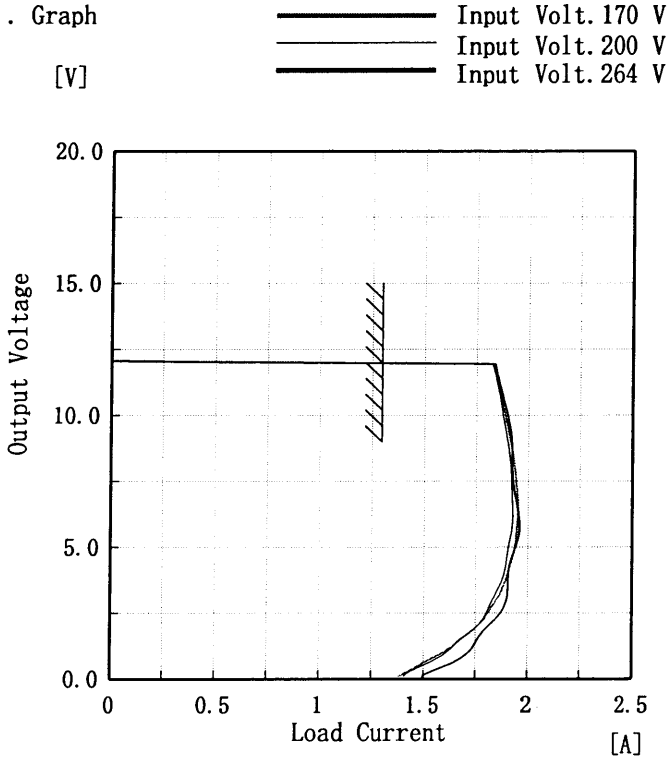
Load current [A]	Input Volt. 170 [V] Ripple-Noise [mV]	Input Volt. 264 [V] Ripple-Noise [mV]
0.00	15	15
0.13	15	15
0.26	15	15
0.39	15	15
0.52	15	15
0.65	15	15
0.78	20	15
0.91	20	15
1.30	20	20
1.43	20	20
—	—	—

COSEL

Model	LDA15F-12
Item	Overcurrent Protection 過電流保護
Object	+12.0V1.3A

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

Output Voltage [V]	Load Current [A]		
	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
12.00	1.83	1.83	1.83
11.40	1.84	1.84	1.85
10.80	1.86	1.86	1.87
9.60	1.90	1.89	1.91
8.40	1.93	1.91	1.93
7.20	1.95	1.92	1.94
6.00	1.95	1.93	1.96
4.80	1.94	1.91	1.94
3.60	1.89	1.87	1.91
2.40	1.80	1.80	1.87
1.20	1.65	1.65	1.74
0.00	1.38	1.40	1.49

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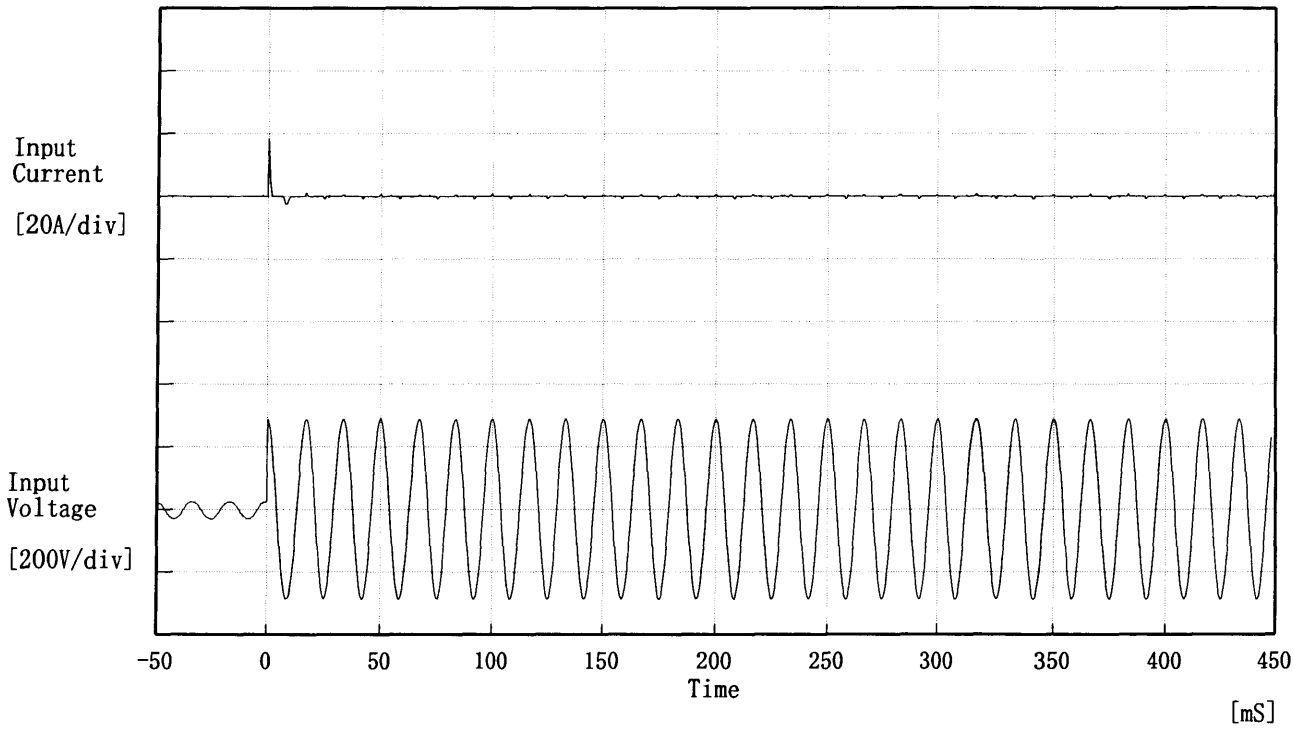
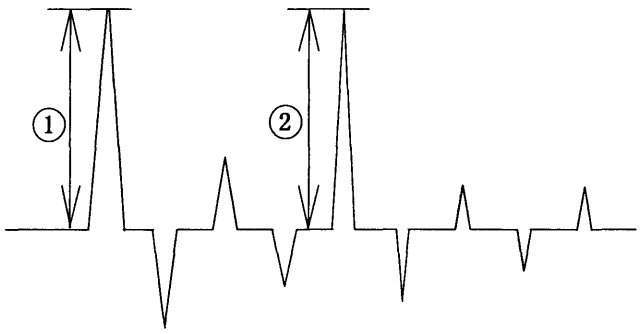
Model	LDA15F-12	Temperature 25℃
Item	Inrush Current 突入電流	Testing Circuitry Figure A
Object	――――――	



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



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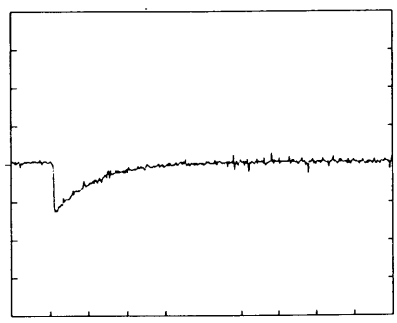
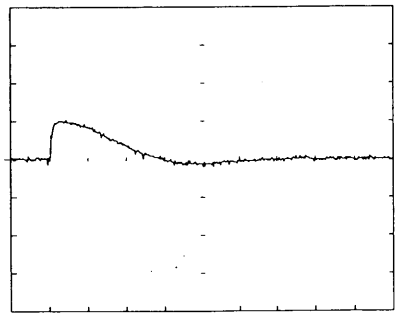
Model	LDA15F-12		
Item	Dynamic Load Responce 動的負荷変動	Temperature Testing Circuitry	25℃ Figure A
Object	+12.0V1.3A		

Input Volt. 200 V
Cycle 1000 mS

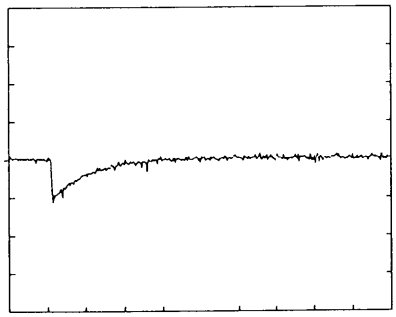
Load Current

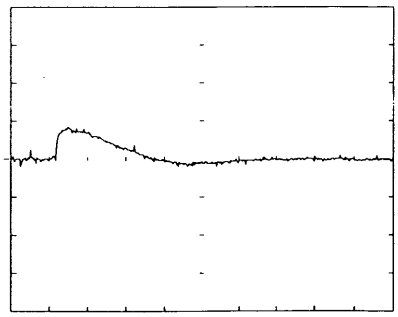
Load 0% ←→
Load 100 %





Load 0% ←→
Load 50 %





200 mV/div

10 mS/div

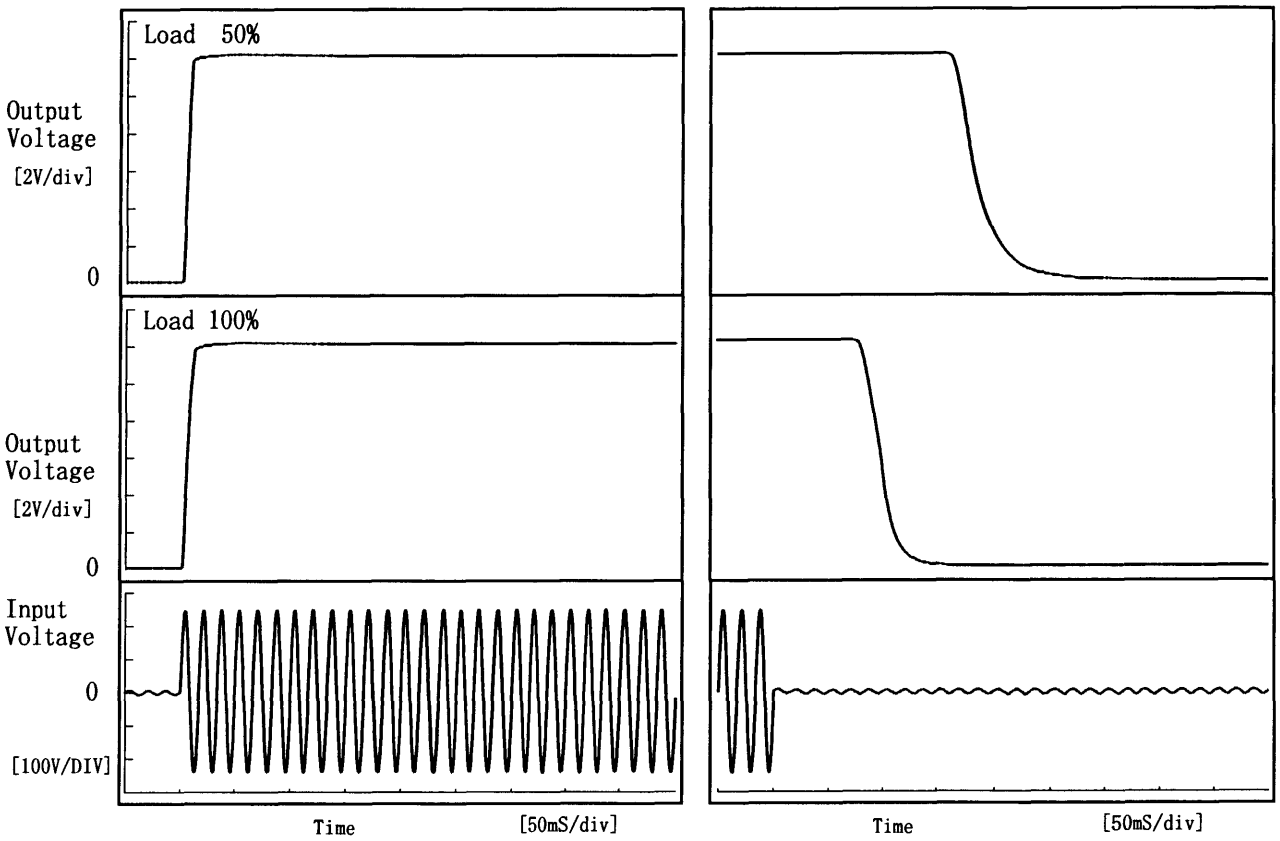
BC-4045

COSEL

Model	LDA15F-12		
Item	Rise and Fall Time 立上り、立下り時間	Temperature Testing Circuitry	25℃ Figure A
Object	+12.0V1.3A		

1. Graph

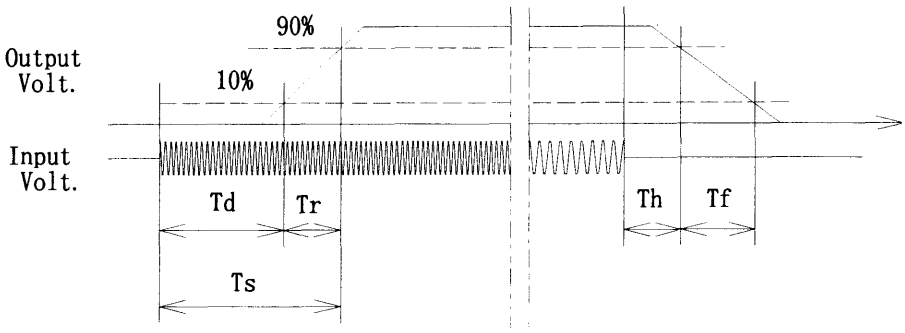
Input Volt. 170 V



2. Values

[mS]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	2.3	6.8	9.0	171.0	46.5
100 %	2.3	9.0	11.3	85.0	32.0

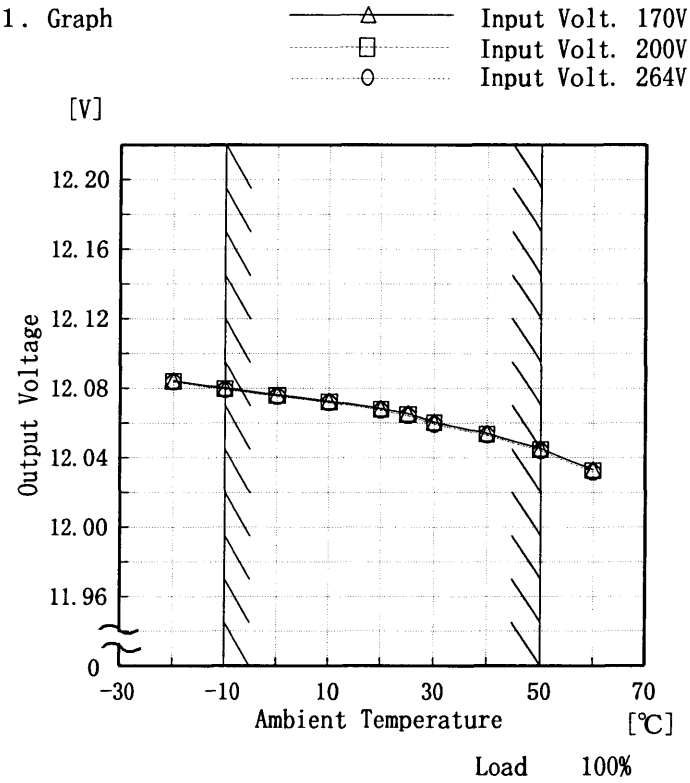


COSEL

Model	LDA15F-12
Item	Ambient Temperature Drift 周囲温度変動
Object	+12.0V1.3A

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

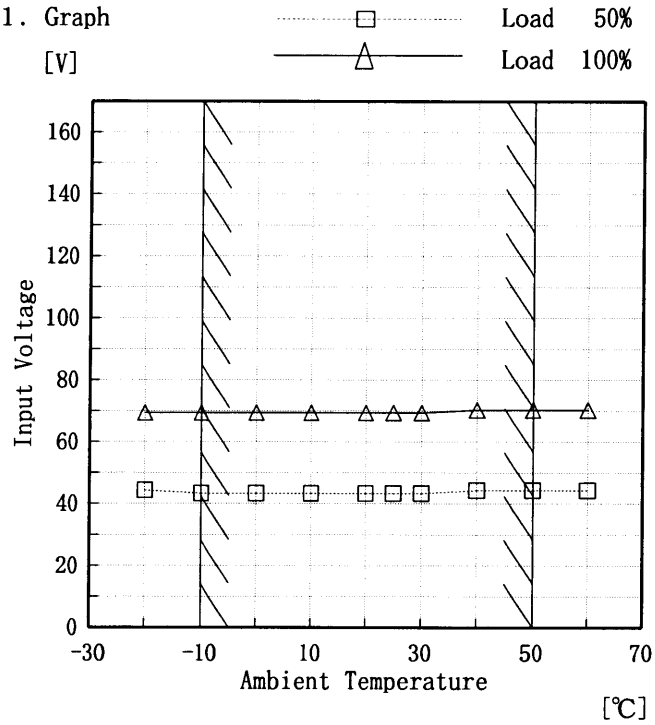
Temperature [℃]	Output Voltage [V] Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
-20	12.084	12.084	12.084
-10	12.080	12.080	12.079
0	12.076	12.076	12.075
10	12.072	12.072	12.072
20	12.068	12.068	12.067
25	12.065	12.065	12.064
30	12.061	12.060	12.059
40	12.054	12.053	12.053
50	12.045	12.045	12.044
60	12.033	12.033	12.032
—	—	—	—

COSEL

Model	LDA15F-12
Item	Minimum Input Voltage for Regulated Output Voltage 最低レギュレーション電圧
Object	+12.0V1.3A

Testing Circuitry Figure A

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

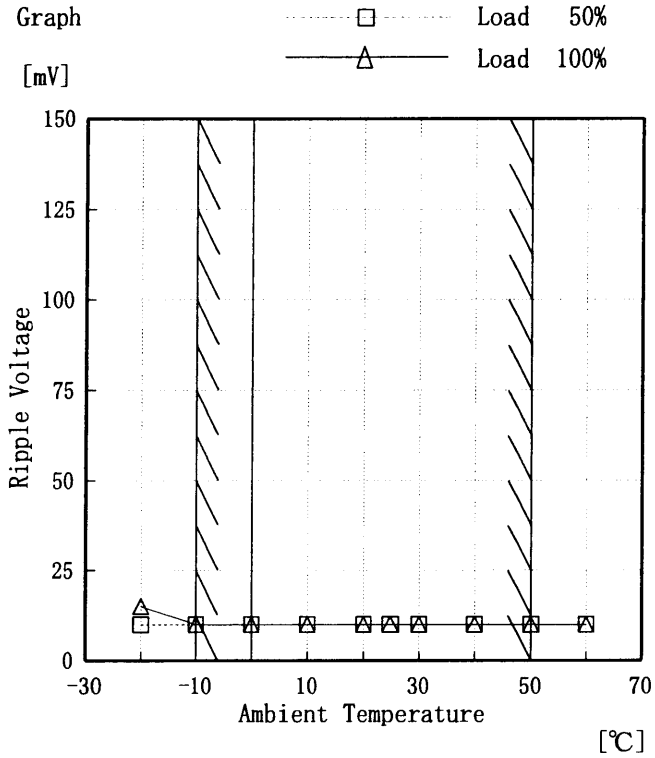
Ambient Temperature [℃]	Input Voltage [V]	
	Load 50%	Load 100%
-20	44	69
-10	43	69
0	43	69
10	43	69
20	43	69
25	43	69
30	43	69
40	44	70
50	44	70
60	44	70
—	—	—

COSEL

Model	LDA15F-12
Item	Ripple Voltage (by Ambient Temp.) リップル電圧（周囲温度特性）
Object	+12.0V1.3A

Testing Circuitry　Figure A

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。

2. Values

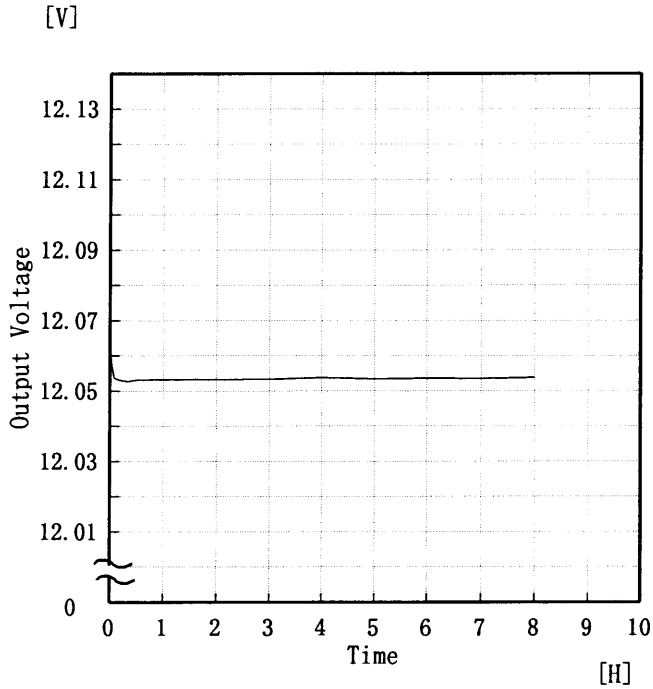
Ambient Temp. [℃]	Load 50% Ripple Output Volt. [mV]	Load 100% Ripple Output Volt. [mV]
-20	10	15
-10	10	10
0	10	10
10	10	10
20	10	10
25	10	10
30	10	10
40	10	10
50	10	10
60	10	10
—	—	—

COSEL

Model	LDA15F-12
Item	Time Lapse Drift 経時ドリフト
Object	+12.0V1.3A

Temperature 25℃
Testing Circuitry Figure A

1. Graph



Input Volt. 200V
Load 100%

2. Values

Time since start [H]	Output Voltage [V]
0.0	12.068
0.5	12.053
1.0	12.053
2.0	12.053
3.0	12.053
4.0	12.054
5.0	12.053
6.0	12.054
7.0	12.053
8.0	12.054

BC−4045

COSEL

Model	LDA15F-12	
Item	Output Voltage Accuracy 定電圧精度	Testing Circuitry Figure A
Object	+12.0V1.3A	

Output Voltage Accuracy

This is defined as the value of the output voltage, regulation load, ambient temperature and input voltage varied at random in the range as specified below.

Temperature -10～50 ℃
Input Voltage : 170～264 V
Load Current : 0～1.3 A

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

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

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 ℃
入力電圧 170～264 V
負荷電流 0～1.3 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	-10	170	0	12.084	±29	±0.3
Minimum Voltage	50	264	0	12.028		

COSEL

Model	LDA15F-12	
Item	Condensation 結露特性	Testing Circuitry Figure A
Object	+12.0V1.3A	

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]	12.065	Input Volt.: 200V, Load Current:1.3A
Line Regulation [mV]	6	Input Volt.: 170～264V, Load Current:1.3A
Load Regulation [mV]	14	Input Volt.: 200V, Load Current:0～1.3A

COSEL

Model	LDA15F-12		
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) DENTORI	—	—	—
(B) IEC60950	—	—	—

Standards	Leakage Current [mA]		
	Input Volt. 170 [V]	Input Volt. 230 [V]	Input Volt. 264 [V]
(B) IEC60950	0.25	0.36	0.43

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	LDA15F-12		
Item	Line Noise Tolerance 入力雑音耐量	Temperature Testing Circuitry	25℃ Figure C
Object	+12.0V1.3A		

1. Results

Pulse Width [nS]	MODE	No protection failure should occur 保護回路の誤動作がない	DC-like Regulation of Output Voltage 出力電圧の直流的変動
50	COMMON	OK	no fluctuation
	NORMAL	OK	no fluctuation
1000	COMMON	OK	no fluctuation
	NORMAL	OK	no fluctuation

2. Conditions

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

COSEL

Model	LDA15F-12		
Item	Conducted Emission 雑音端子電圧	Temperature Testing Circuitry	25℃ Figure D
Object	――――――――		

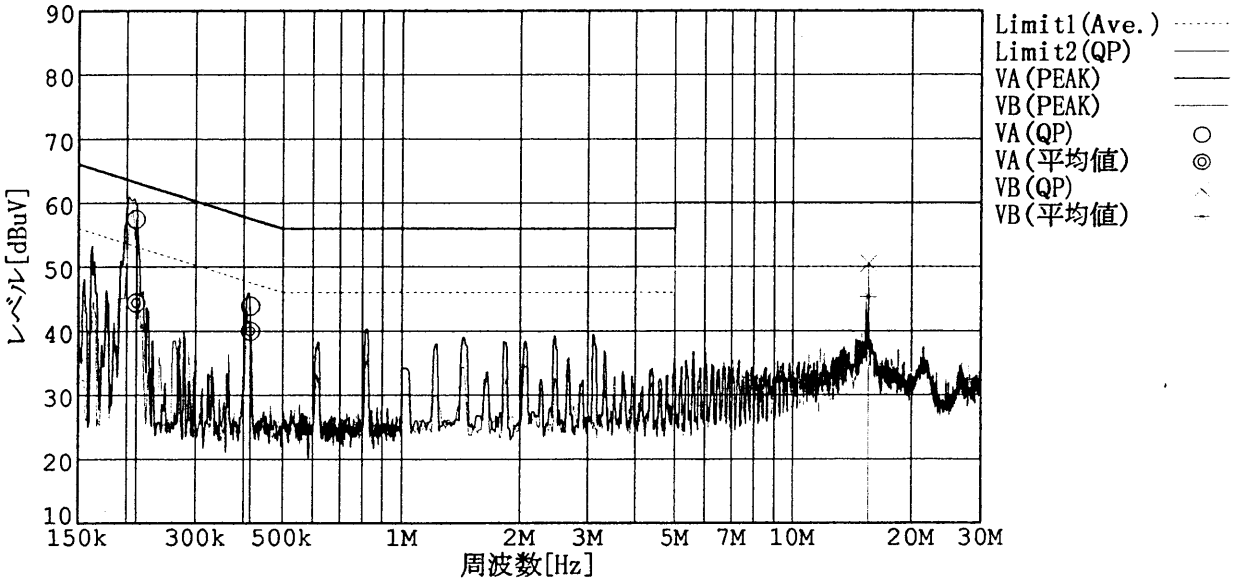
1. Graph

Remarks

Input Volt. 230 V

Load 100 %

規格1：[EN 55022] Class B(平均値)
規格2：[EN 55022] Class B(QP)



COSEL

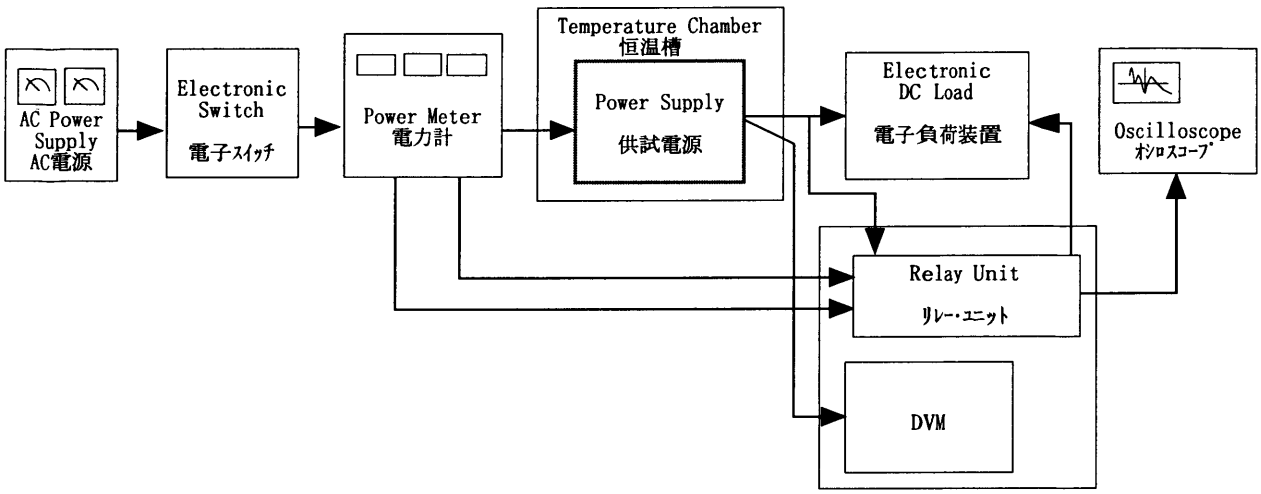


Figure A

Data Acquisition/Control Unit
データ集録システム

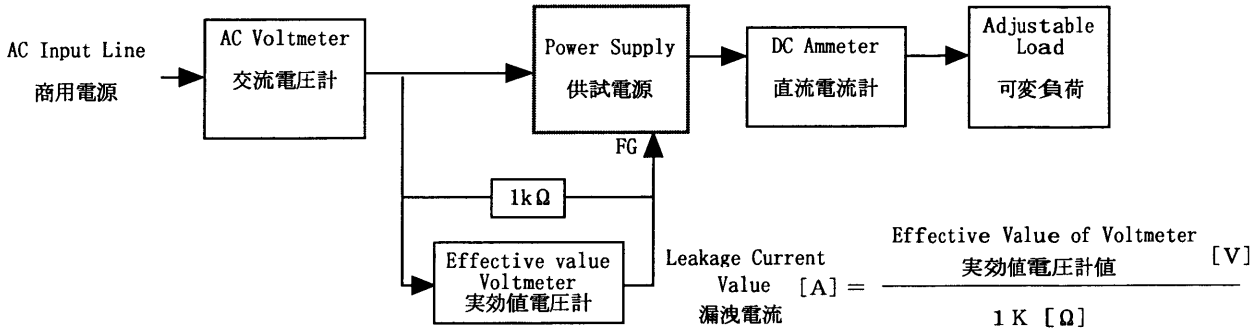


Figure B(DENTORI)

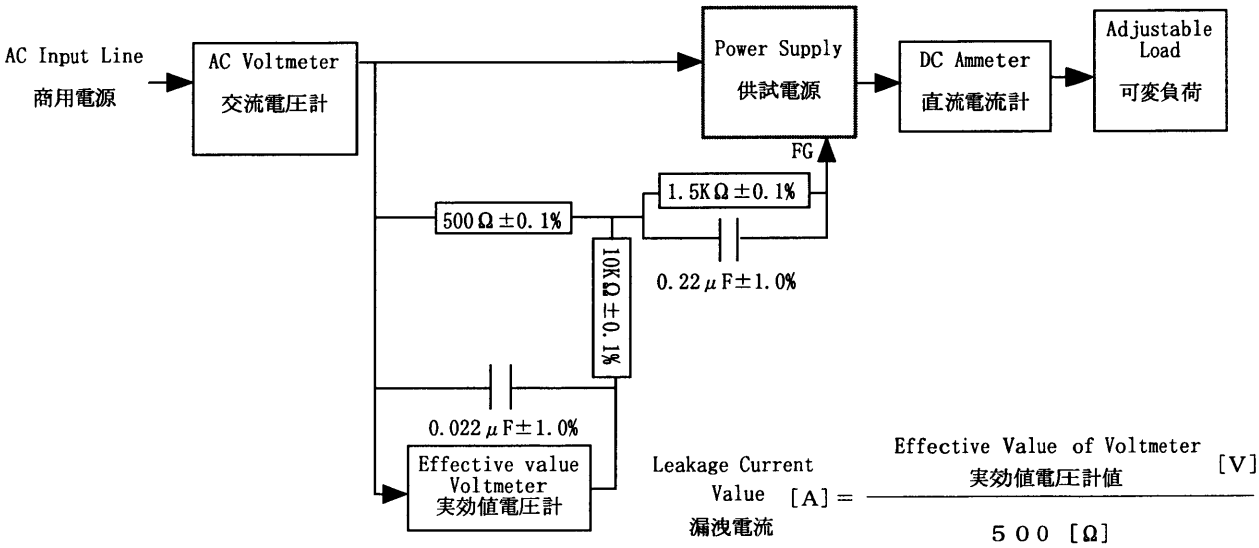


Figure B（ＩＥＣ６０９５０）

COSEL

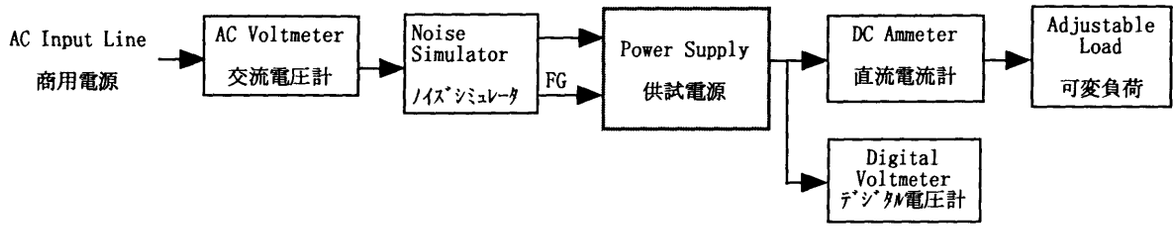


Figure C

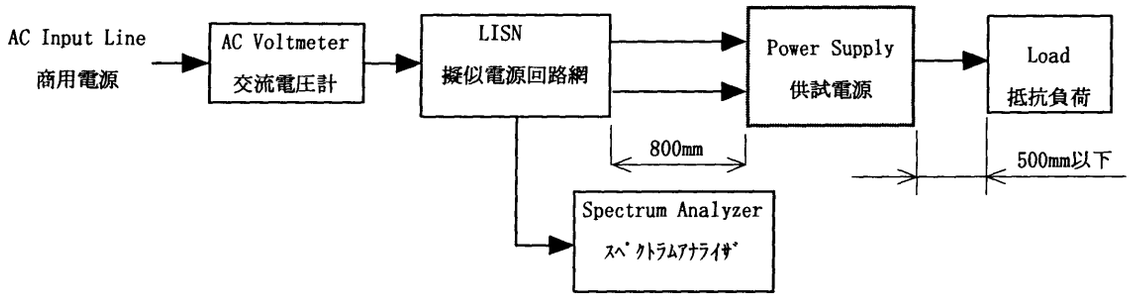


Figure D

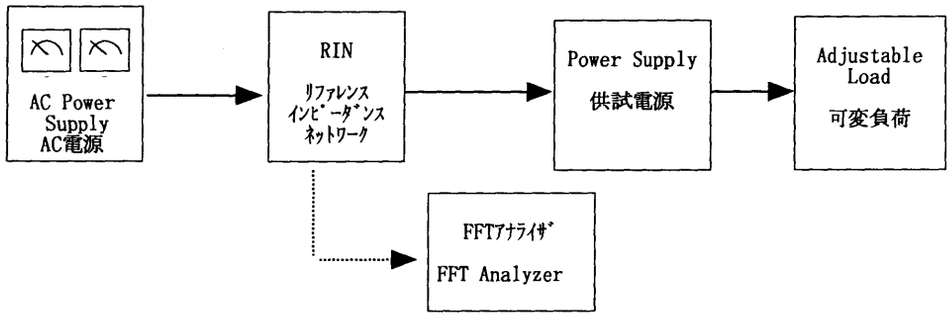


Figure E