参考資料

COSEL

TEST DATA OF FCA50F-24

(240V INPUT)

Regulated DC Power Supply

July 17, 2000

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コーセル株式会社

COSEL CO., LTD.

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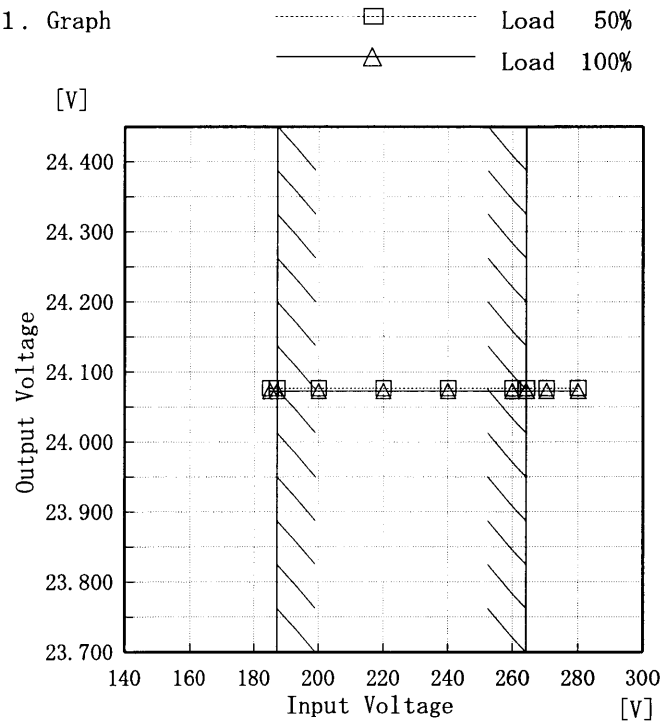
Model	FCA50F-24
Item	Line Regulation 静的入力変動
Object	+24.0V2.1A

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%
185	24.077	24.073
187	24.077	24.073
200	24.077	24.073
220	24.077	24.073
240	24.077	24.073
260	24.077	24.073
264	24.077	24.073
270	24.077	24.073
280	24.077	24.073

BC－3279

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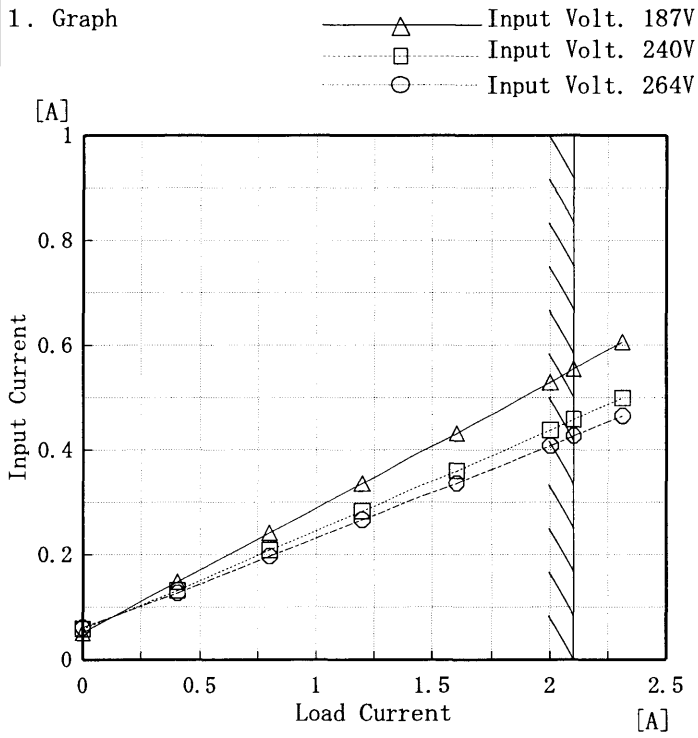
Model	FCA50F-24
Item	Input Current (by Load Current) 入力電流（負荷特性）
Object	――――

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

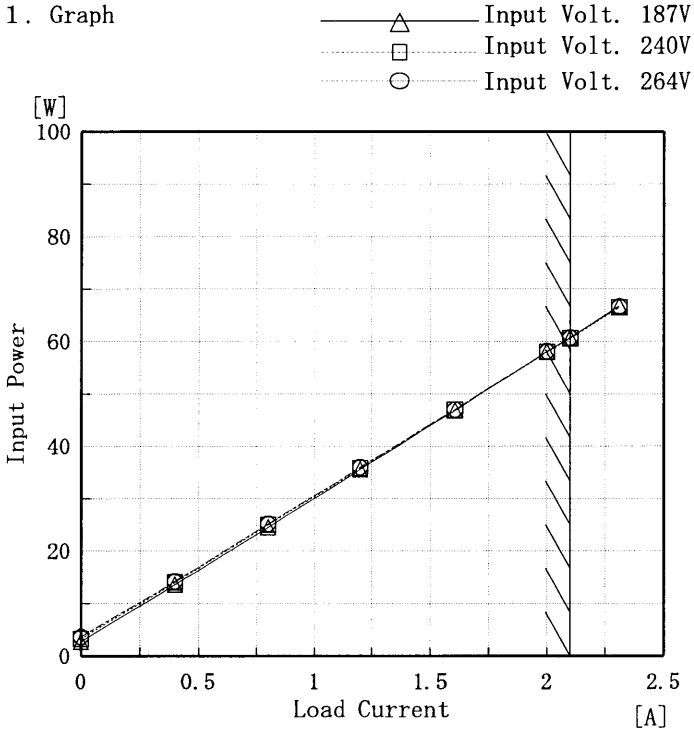
Load Current [A]	Input Current [A]		
	Input Volt. 187[V]	Input Volt. 240[V]	Input Volt. 264[V]
0.00	0.051	0.058	0.061
0.40	0.148	0.132	0.127
0.80	0.242	0.209	0.197
1.20	0.335	0.283	0.267
1.60	0.432	0.360	0.337
2.00	0.529	0.438	0.408
2.10	0.555	0.458	0.427
2.31	0.606	0.500	0.466
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—

COSEL

Model	FCA50F-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

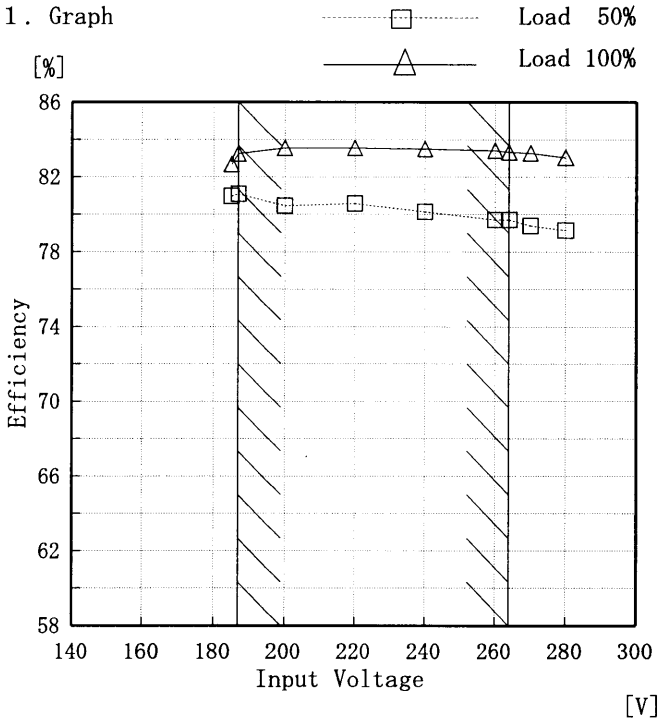
Load Current [A]	Input Power [W]		
	Input Volt. 187[V]	Input Volt. 240[V]	Input Volt. 264[V]
0.00	2.70	3.30	3.60
0.40	13.60	14.00	14.20
0.80	24.50	25.00	25.20
1.20	35.60	35.80	36.00
1.60	46.80	46.90	47.00
2.00	58.10	58.00	58.10
2.10	60.70	60.60	60.70
2.31	66.80	66.50	66.60
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—

COSEL

Model	FCA50F-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

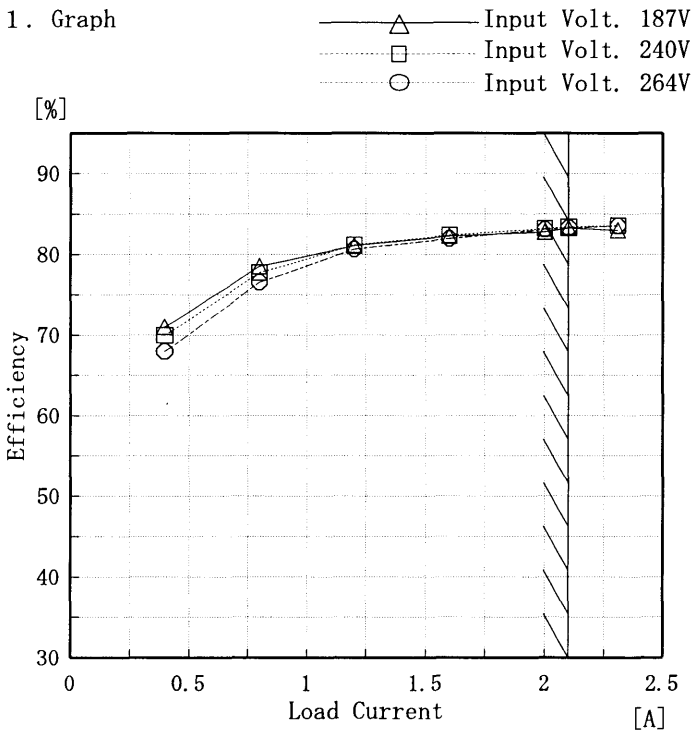
Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
185	81.0	82.7
187	81.1	83.2
200	80.5	83.6
220	80.6	83.6
240	80.2	83.5
260	79.7	83.4
264	79.7	83.3
270	79.4	83.3
280	79.1	83.0

COSEL

Model	FCA50F-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

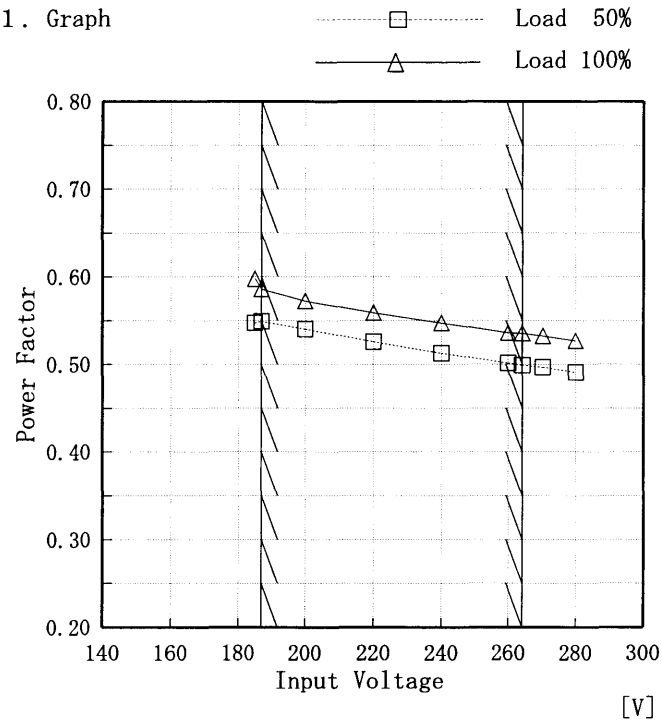
Load Current [A]	Efficiency [%] Input Volt. 187[V]	Input Volt. 240[V]	Input Volt. 264[V]
0.40	71.0	70.0	68.0
0.80	78.5	77.7	76.5
1.20	81.1	81.2	80.7
1.60	82.3	82.4	82.0
2.00	82.8	83.2	83.1
2.10	83.2	83.4	83.3
2.31	83.0	83.6	83.5
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—

COSEL

Model	FCA50F-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

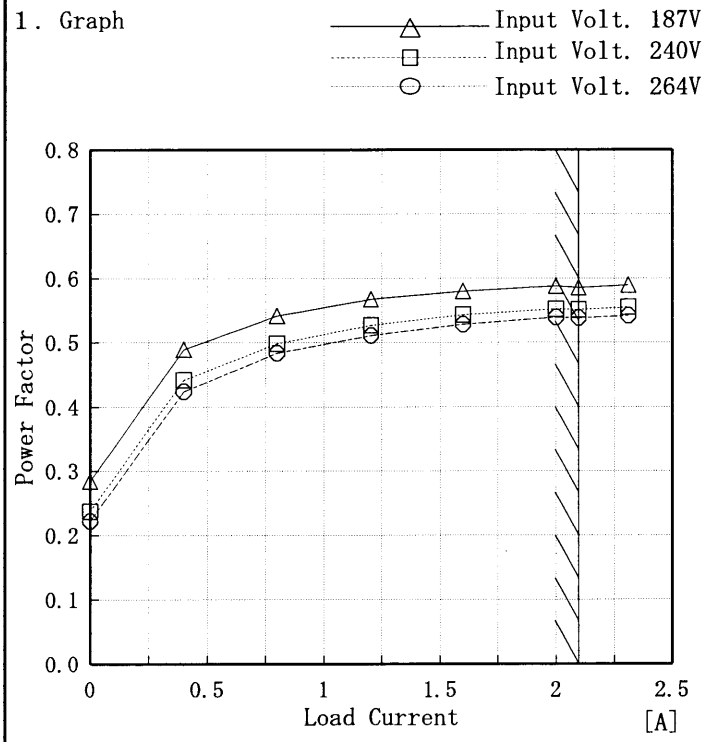
Input Voltage [V]	Power Factor	
	Load 50%	Load 100%
185	0.55	0.60
187	0.55	0.59
200	0.54	0.57
220	0.53	0.56
240	0.51	0.55
260	0.50	0.54
264	0.50	0.54
270	0.50	0.53
280	0.49	0.53

COSEL

Model	FCA50F-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

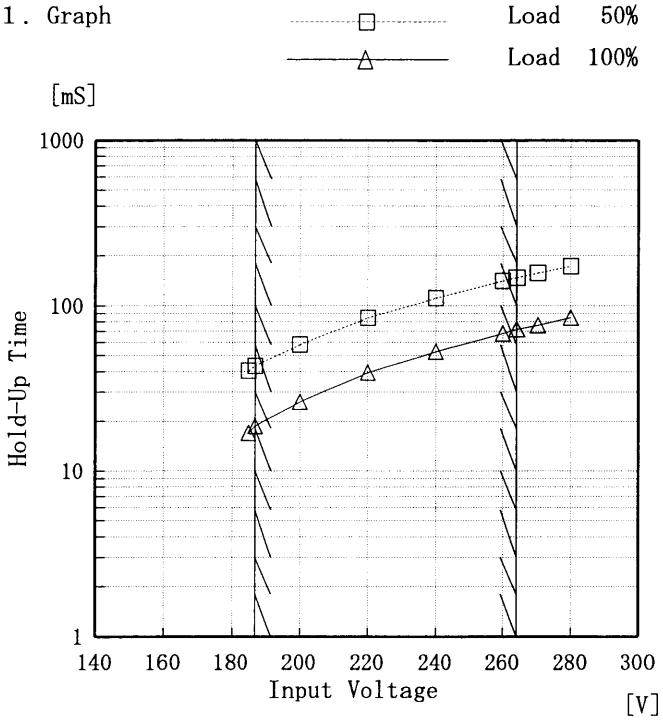
Load Current [A]	Power Factor		
	Input Volt. 187[V]	Input Volt. 240[V]	Input Volt. 264[V]
0.00	0.28	0.24	0.22
0.40	0.49	0.44	0.42
0.80	0.54	0.50	0.48
1.20	0.57	0.53	0.51
1.60	0.58	0.54	0.53
2.00	0.59	0.55	0.54
2.10	0.59	0.55	0.54
2.31	0.59	0.56	0.54
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—

COSEL

Model	FCA50F-24
Item	Hold-Up Time 出力保持時間
Object	+24.0V2.1A

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

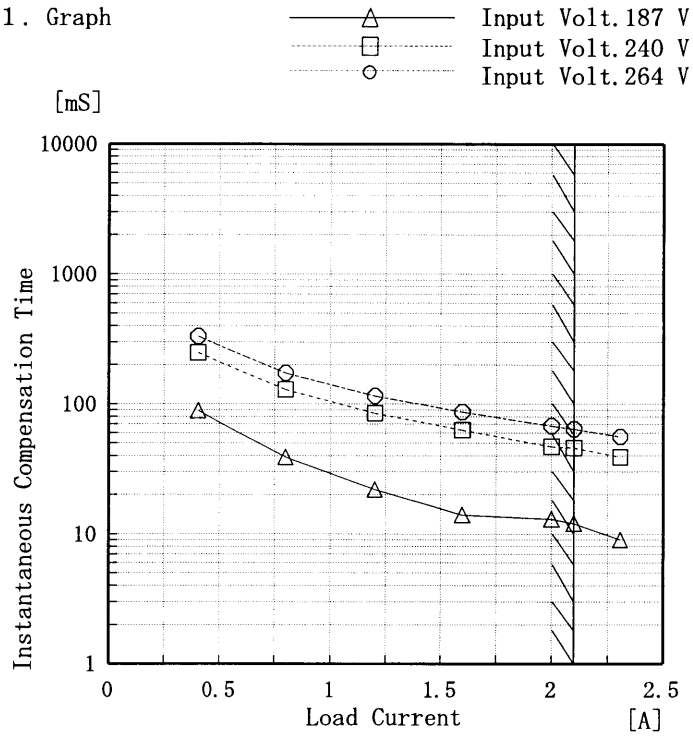
Input Voltage [V]	Hold-Up Time [mS]	
	Load 50%	Load 100%
185	41	17
187	43	19
200	58	26
220	84	39
240	111	53
260	141	68
264	148	72
270	157	76
280	173	85

COSEL

Model	FCA50F-24
Item	Instantaneous Interruption Compensation 瞬時停電保障
Object	+24.0V2.1A

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

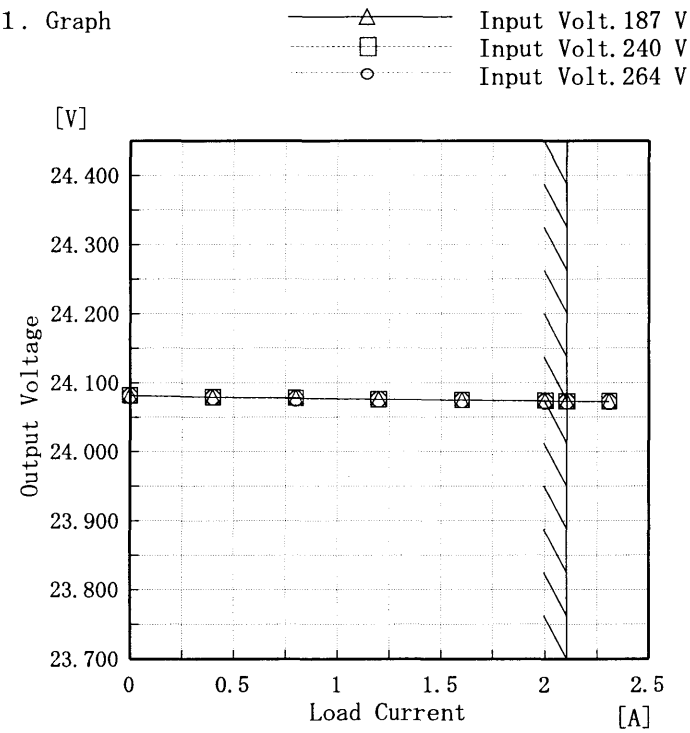
Load Current [A]	Time [mS] Input Volt. 187[V]	Input Volt. 240[V]	Input Volt. 264[V]
0.00	—	—	—
0.40	89	248	331
0.80	39	129	173
1.20	22	85	115
1.60	14	63	87
2.00	13	47	68
2.10	12	46	64
2.31	9	39	56
—	—	—	—
—	—	—	—
—	—	—	—

COSEL

Model	FCA50F-24
Item	Load Regulation 静的負荷変動
Object	+24.0V2.1A

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

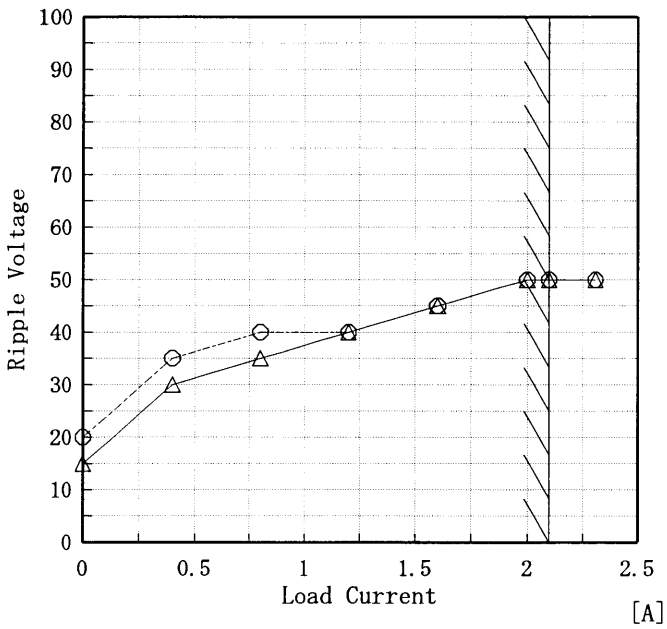
Load Current [A]	Output Voltage [V]		
	Input Volt. 187[V]	Input Volt. 240[V]	Input Volt. 264[V]
0.00	24.082	24.082	24.081
0.40	24.079	24.079	24.079
0.80	24.078	24.078	24.077
1.20	24.076	24.076	24.076
1.60	24.075	24.075	24.075
2.00	24.074	24.074	24.073
2.10	24.073	24.073	24.073
2.31	24.073	24.073	24.072
—	—	—	—
—	—	—	—

COSEL

Model	FCA50F-24
Item	Ripple Voltage(by Load Current) リップル電圧(負荷特性)
Object	+24.0V2.1A

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

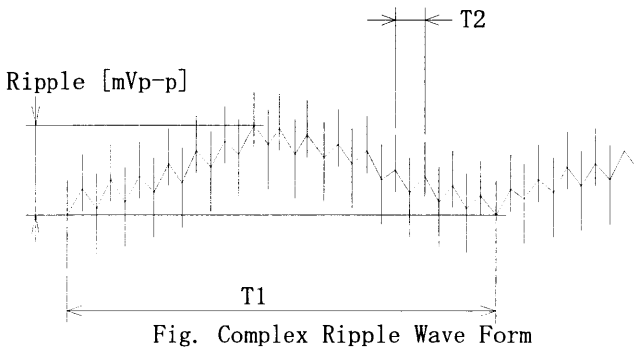


Fig. Complex Ripple Wave Form
図 リップル波形詳細図

2. Values

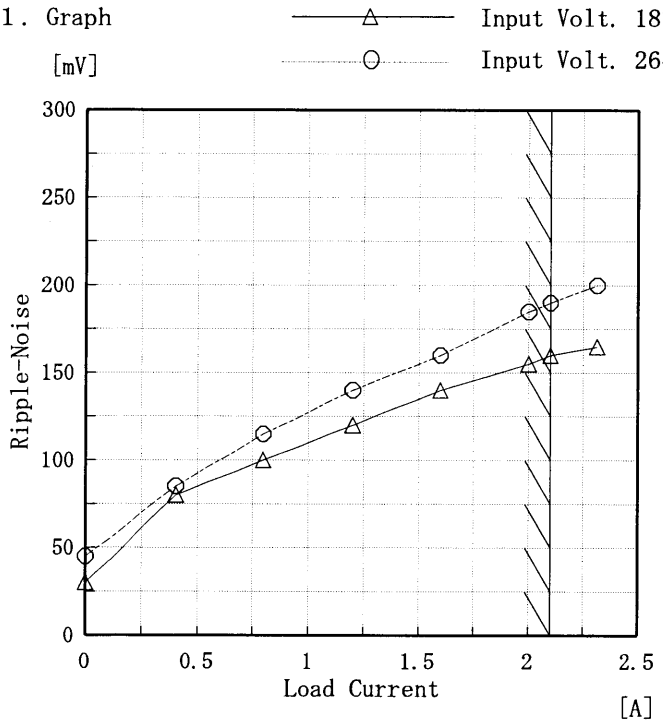
Load Current [A]	Ripple Output Voltage [mV]	
	Input Volt. 187 [V]	Input Volt. 264 [V]
0.00	15	20
0.40	30	35
0.80	35	40
1.20	40	40
1.60	45	45
2.00	50	50
2.10	50	50
2.31	50	50
—	—	—
—	—	—
—	—	—

COSEL

Model	FCA50F-24
Item	Ripple-Noise リップルノイズ
Object	+24.0V2.1A

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

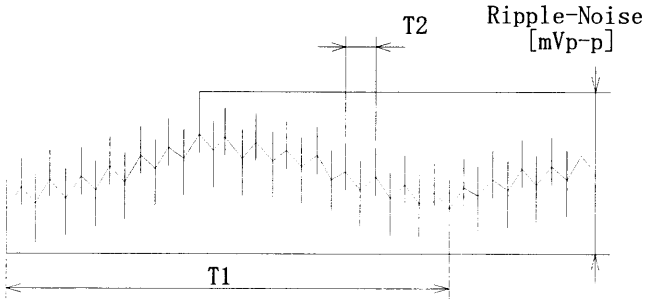


Fig. Complex Ripple Wave Form
図　リップル波形詳細図

2. Values

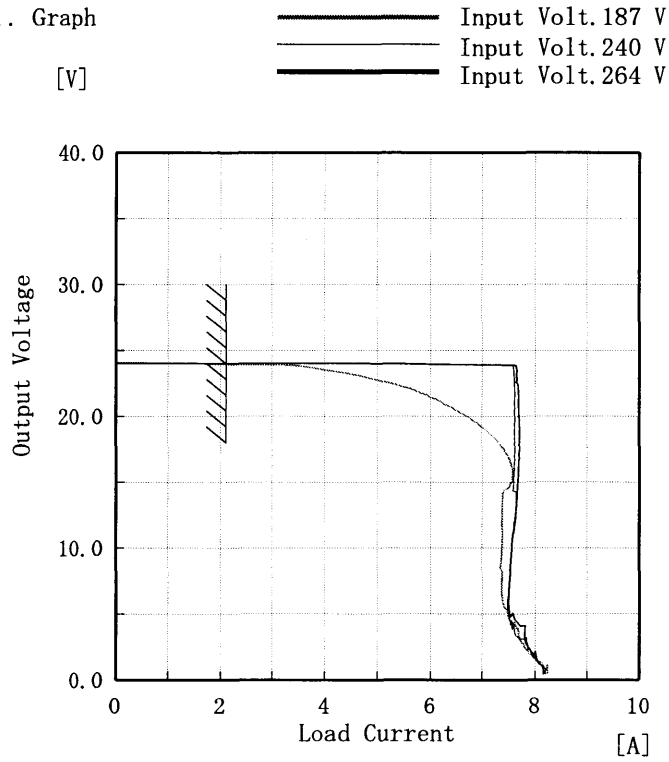
Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 187 [V]	Input Volt. 264 [V]
0.00	30	45
0.40	80	85
0.80	100	115
1.20	120	140
1.60	140	160
2.00	155	185
2.10	160	190
2.31	165	200
—	—	—
—	—	—
—	—	—

COSEL

Model	FCA50F-24
Item	Overcurrent Protection 過電流保護
Object	+24.0V2.1A

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

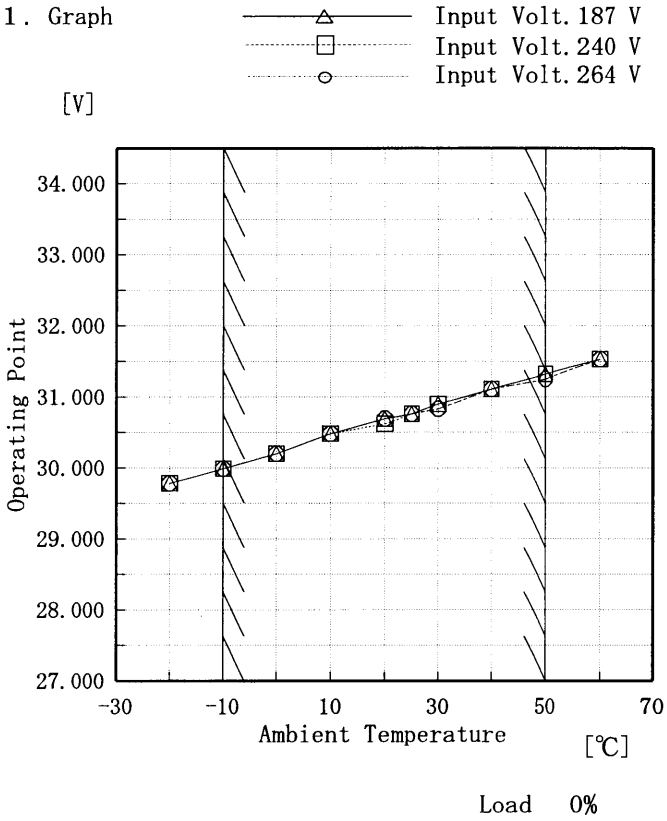
Output Voltage [V]	Load Current [A]		
	Input Volt. 187[V]	Input Volt. 240[V]	Input Volt. 264[V]
24.00	3.387	7.568	7.631
22.80	4.859	7.595	7.649
21.60	5.931	7.607	7.681
19.20	6.957	7.610	7.700
16.80	7.504	7.603	7.687
14.40	7.422	7.575	7.655
12.00	7.386	7.619	7.608
9.60	7.381	7.545	7.548
7.20	7.370	7.512	7.509
4.80	7.492	7.510	7.530
2.40	7.800	7.855	7.872
0.00	8.243	8.197	8.157

COSEL

Model	FCA50F-24
Item	Overvoltage Protection 過電圧保護
Object	+24.0V2.1A

Testing Circuitry Figure A

1. Graph



Load 0%

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

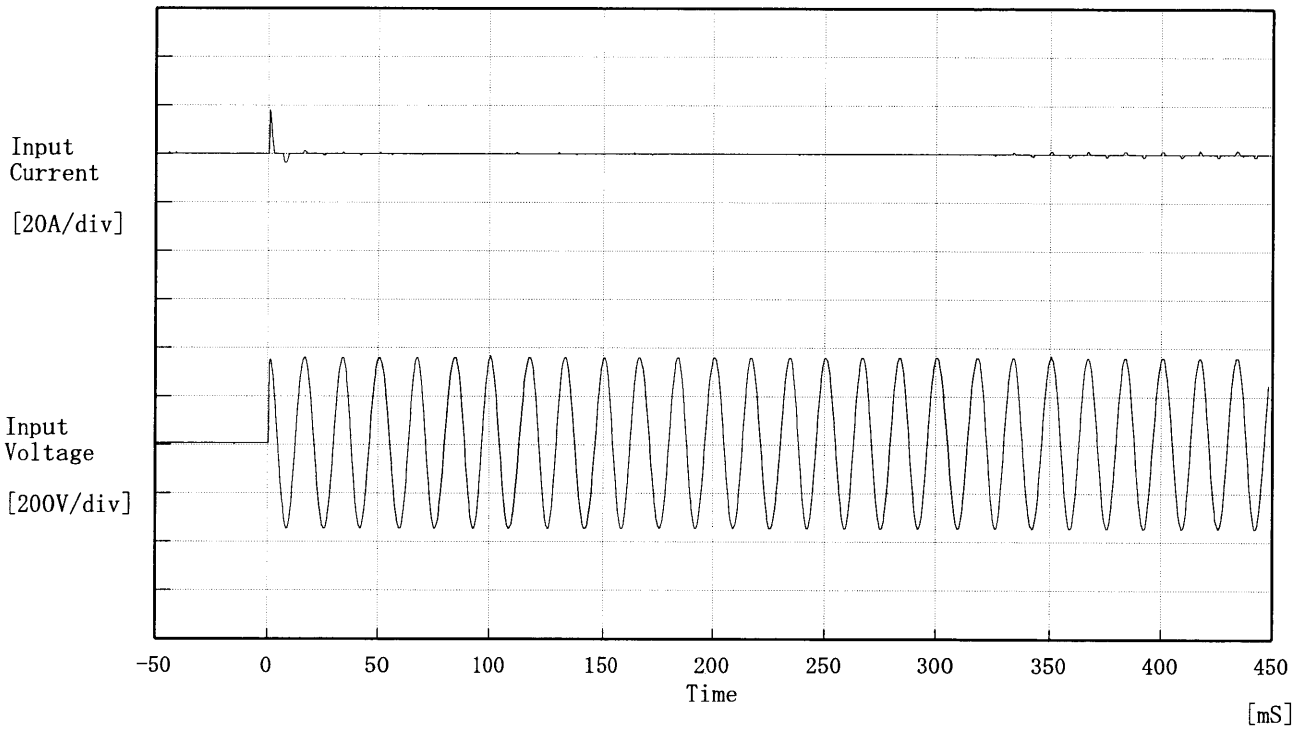
(注)斜線は定格周囲温度範囲を示す。

2. Values

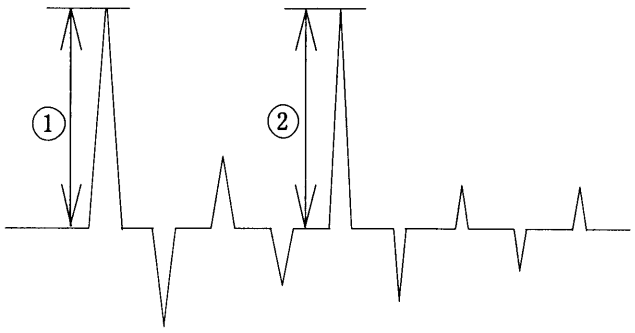
Ambient Temperature [℃]	Operating Point [V]		
	Input Volt. 187[V]	Input Volt. 240[V]	Input Volt. 264[V]
-20	29.78	29.78	29.78
-10	29.99	29.99	29.99
0	30.20	30.20	30.20
10	30.48	30.48	30.48
20	30.69	30.62	30.69
25	30.76	30.76	30.76
30	30.90	30.90	30.83
40	31.11	31.11	31.11
50	31.32	31.32	31.25
60	31.53	31.53	31.53
—	—	—	—

COSEL

Model	FCA50F-24		
Item	Inrush Current 突入電流	Temperature Testing Circuitry	25℃ Figure A
Object	――――――――		



Input Voltage 240 V
Frequency 60 Hz
Load 100 %
Inrush Current
① 18.00 [A]
② 1.80 [A]



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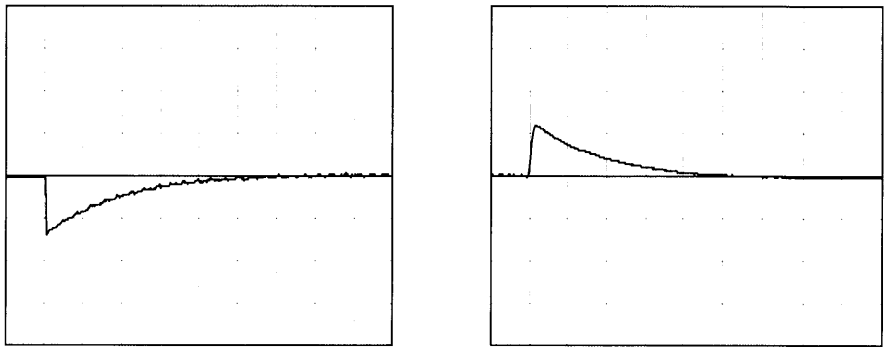
COSEL

Model	FCA50F-24		
Item	Dynamic Load Responce 動的負荷変動	Temperature Testing Circuitry	25℃ Figure A
Object	+24.0V2.1A		

Input Volt. 240 V
Cycle 1000 mS

Load Current

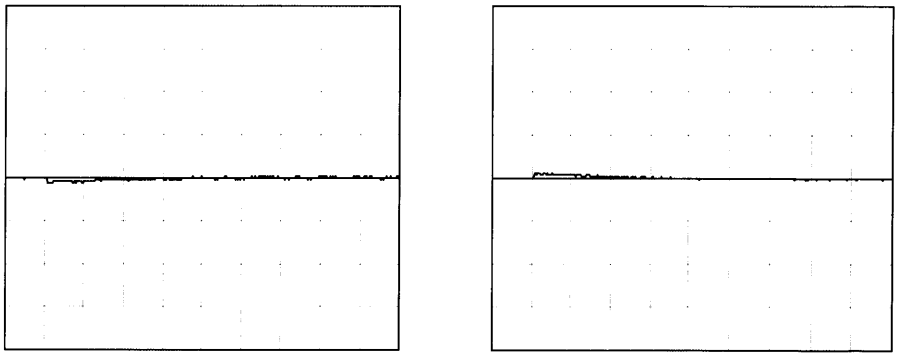
Load 0%(0.0A) ←→
Load 100% (2.1A)



50 mV/div

10 ms/div

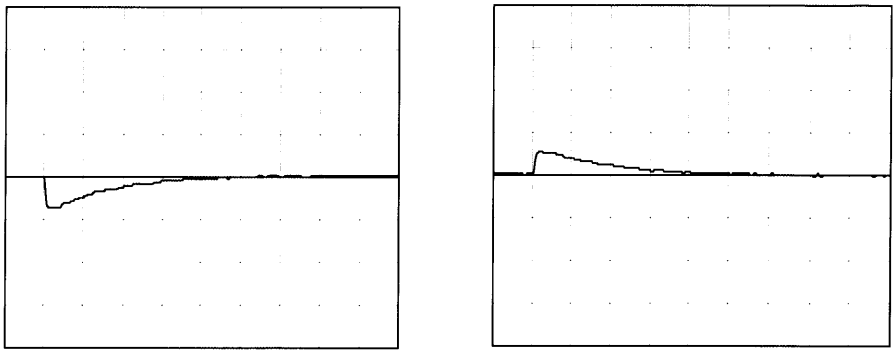
Load 50% (1.05A) ←→
Load 100% (2.1A)



50 mV/div

10 ms/div

Load 100% (2.1A) ←→
Peak Load (6.7A)



50 mV/div

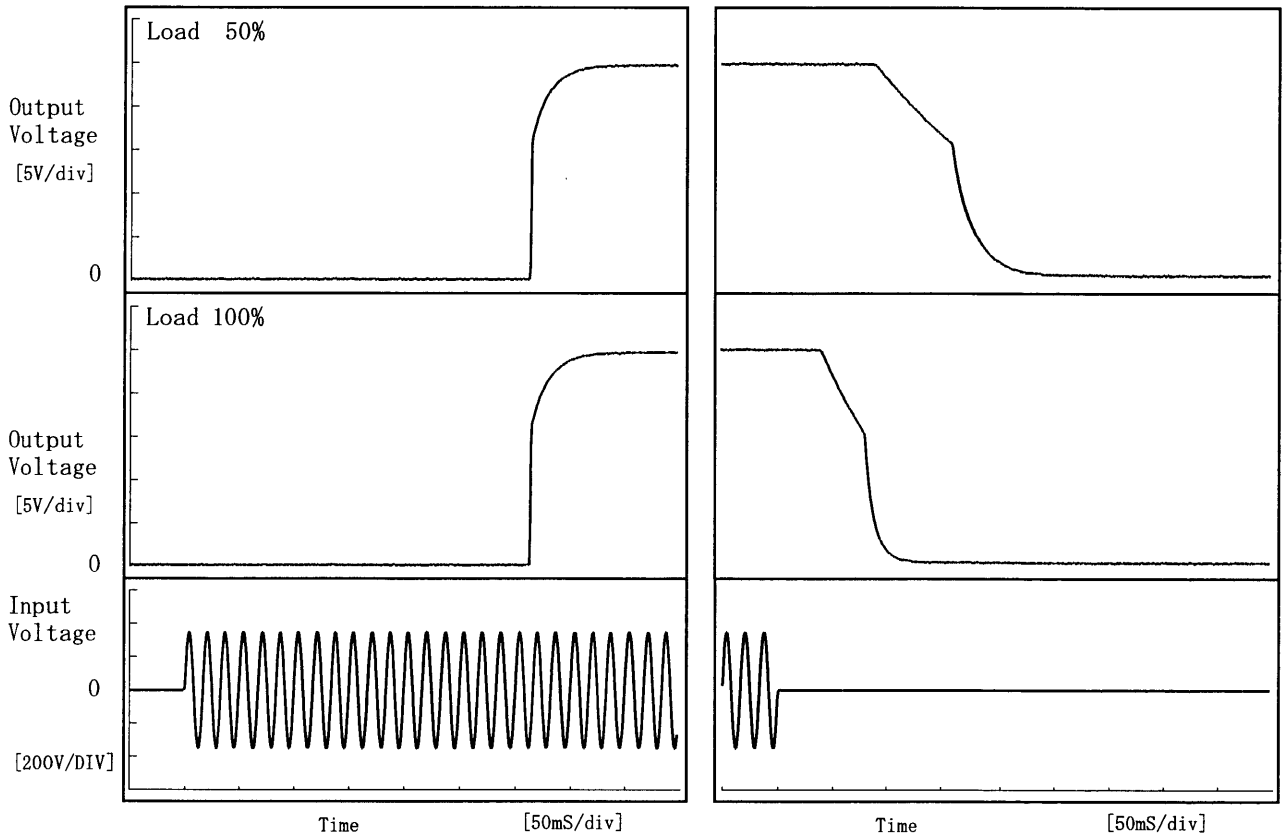
10 ms/div

COSEL

Model	FCA50F-24		
Item	Rise and Fall Time 立上り、立下り時間	Temperature Testing Circuitry	25℃ Figure A
Object	+24.0V2.1A		

1. Graph

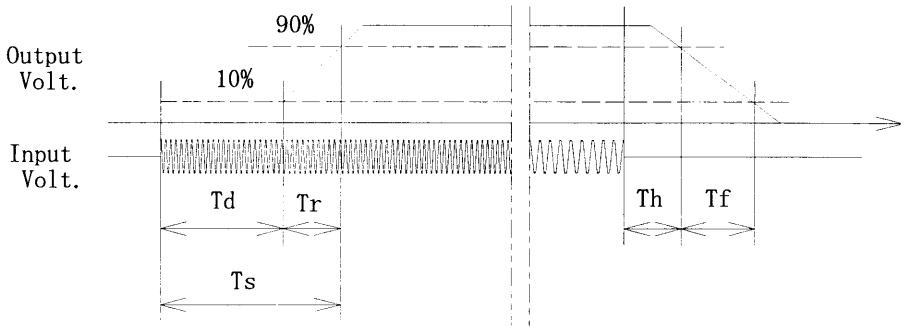
Input Volt. 240 V



2. Values

[mS]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	313.5	18.3	331.8	111.8	85.0
100 %	313.0	18.5	331.5	51.5	47.3



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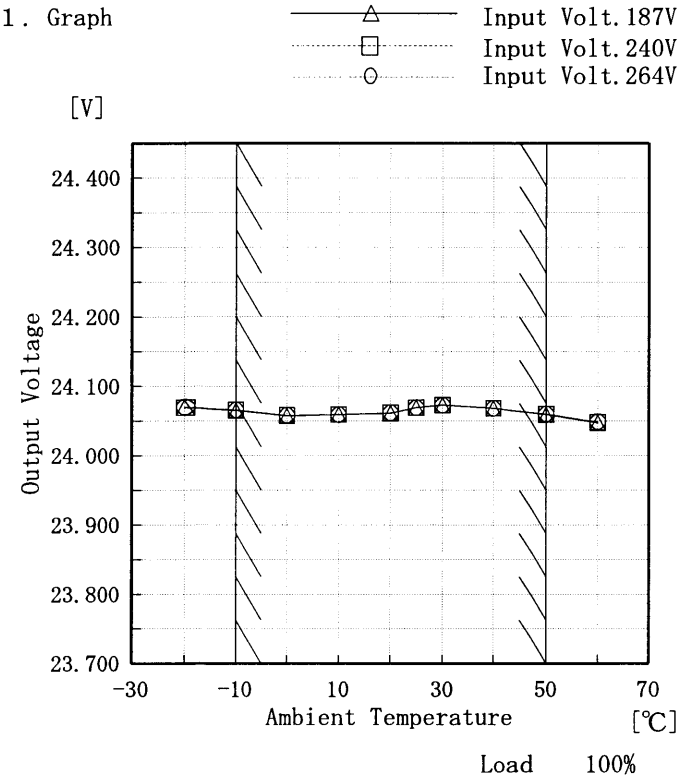
COSEL

Model	FCA50F-24
Item	Ambient Temperature Drift 周囲温度変動
Object	+24.0V2.1A

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

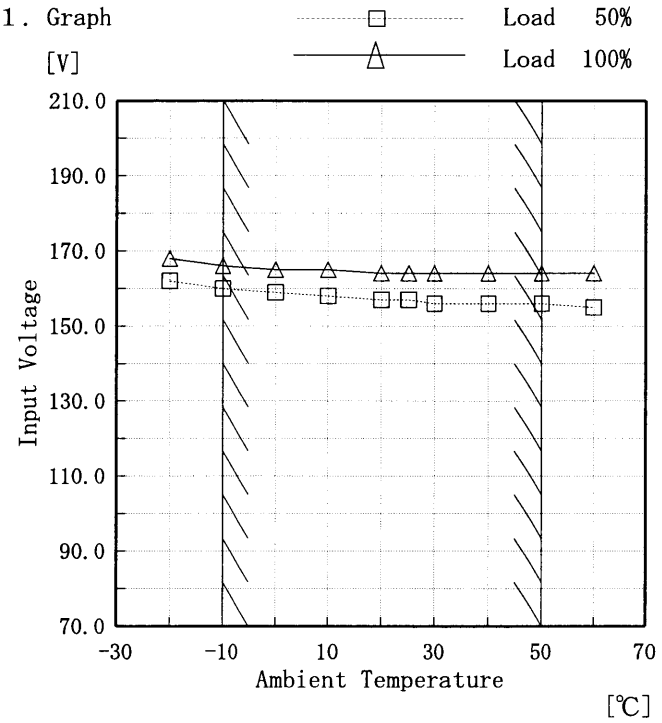
Ambient Temperature [℃]	Output Voltage [V]		
	Input Volt. 187[V]	Input Volt. 240[V]	Input Volt. 264[V]
-20	24.069	24.069	24.070
-10	24.065	24.066	24.066
0	24.057	24.058	24.058
10	24.059	24.059	24.059
20	24.061	24.062	24.062
25	24.069	24.069	24.069
30	24.073	24.073	24.073
40	24.068	24.068	24.068
50	24.059	24.060	24.060
60	24.047	24.048	24.049
—	—	—	—

COSEL

Model	FCA50F-24
Item	Minimum Input Voltage for Regulated Output Voltage 最低レギュレーション電圧
Object	+24.0V2.1A

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

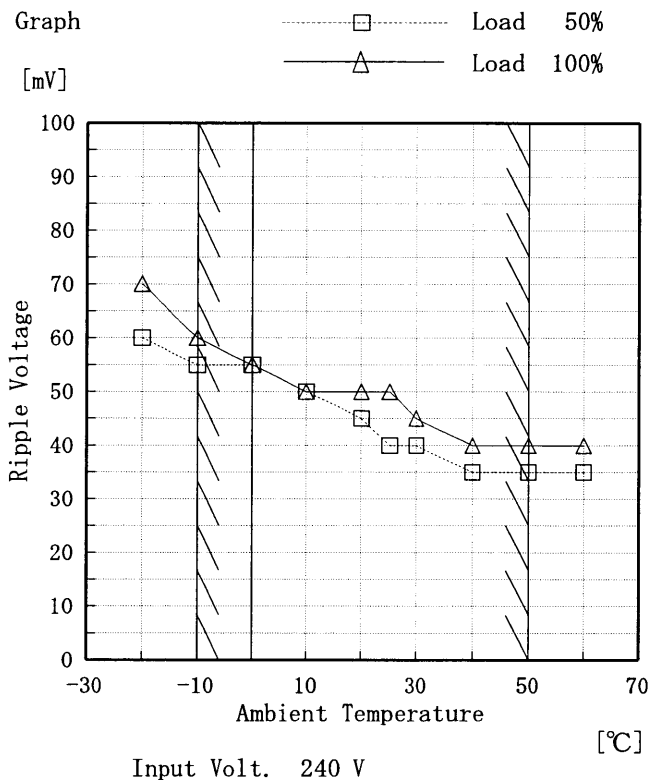
Ambient Temperature [℃]	Input Voltage [V]	
	Load 50%	Load 100%
-20	162	168
-10	160	166
0	159	165
10	158	165
20	157	164
25	157	164
30	156	164
40	156	164
50	156	164
60	155	164
—	—	—

COSEL

Model	FCA50F-24
Item	Ripple Voltage (by Ambient Temp.) リップル電圧（周囲温度特性）
Object	+24.0V2.1A

Testing Circuitry　Figure A

1. Graph



Input Volt.　240 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

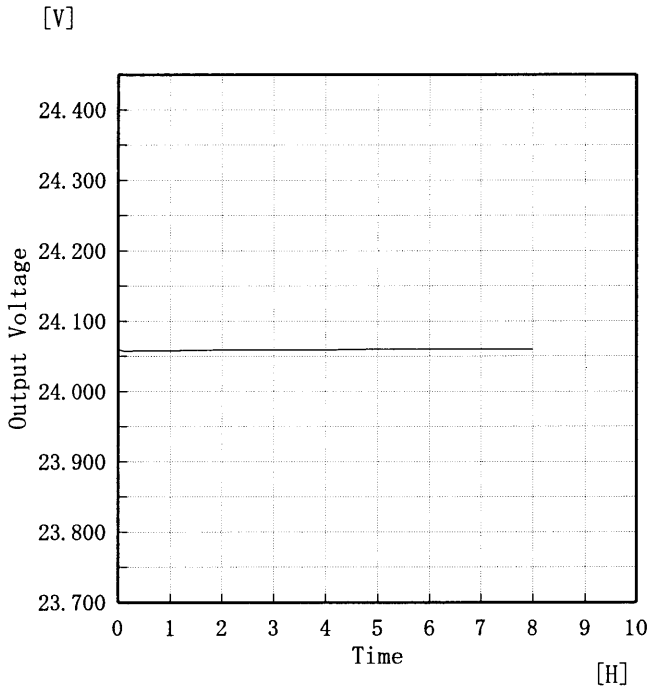
Ambient Temperature [℃]	Ripple Output Voltage [mV]	
	Load 50%	Load 100%
-20	60	70
-10	55	60
0	55	55
10	50	50
20	45	50
25	40	50
30	40	45
40	35	40
50	35	40
60	35	40
—	—	—

COSEL

Model	FCA50F-24
Item	Time Lapse Drift 経時ドリフト
Object	+24.0V2.1A

Temperature 25℃
Testing Circuitry Figure A

1. Graph



Input Volt. 240V
Load 100%

2. Values

Time since start [H]	Output Voltage [V]
0.0	24.061
0.5	24.058
1.0	24.058
2.0	24.059
3.0	24.059
4.0	24.059
5.0	24.060
6.0	24.060
7.0	24.060
8.0	24.060

COSEL

Model	FCA50F-24	
Item	Output Voltage Accuracy 定電圧精度	Testing Circuitry　Figure A
Object	+24.0V2.1A	

1. Output Voltage Accuracy

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

Temperature : -10～50 ℃
Input Voltage : 187～264 V
Load Current : 0～2.1 A

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

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

1. 定電圧精度

周囲温度、入力電圧、負荷電流を下記仕様内で、任意に変動させたときの出力電圧の変動をいう。

周囲温度　-10～50 ℃
入力電圧　187～264 V
負荷電流　0～2.1 A

* 定電圧精度(変動値) ＝ ±(出力電圧の最高値－出力電圧の最低値)／2

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

2. Values

Item	Temperature [℃]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy(Ration) [%]
Maximum Voltage	25	187	0.0	24.081	±13	±0.1
Minimum Voltage	50	187	2.1	24.056		

COSEL

Model	FCA50F-24
Item	Condensation 結露特性
Object	+24.0V2.1A

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]	24.065	Input Volt.: 240.0V, Load Current:2.1A
Line Regulation [mV]	2	Input Volt.: 187.0～264.0V, Load Current:2.1A
Load Regulation [mV]	8	Input Volt.: 240.0V, Load Current:0.0～2.1A

COSEL

Model	FCA50F-24		
Item	Leakage Current 漏洩電流	Temperature Testing Circuitry	25℃ Figure B
Object	――――――		

1. Results

Standards	Leakage Current [mA]		
	Input Volt. 187 [V]	Input Volt. 240 [V]	Input Volt. 264 [V]
(B) IEC60950	0.10	0.13	0.14

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	FCA50F-24		
Item	Line Noise Tolerance 入力雑音耐量	Temperature Testing Circuitry	25℃ Figure C
Object	+24.0V2.1A		

1. 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

2. Conditions

Input Voltage : 240 V
Pulse Voltage : 2000 V
Pulse Cycle : 10 mS
Pulse Input Duration : 1 min. or more
Load : 100 %

COSEL

Model	FCA50F-24		
Item	Conducted Emission 雑音端子電圧	Temperature Testing Circuitry	25℃ Figure D
Object	――――――		

1. Graph

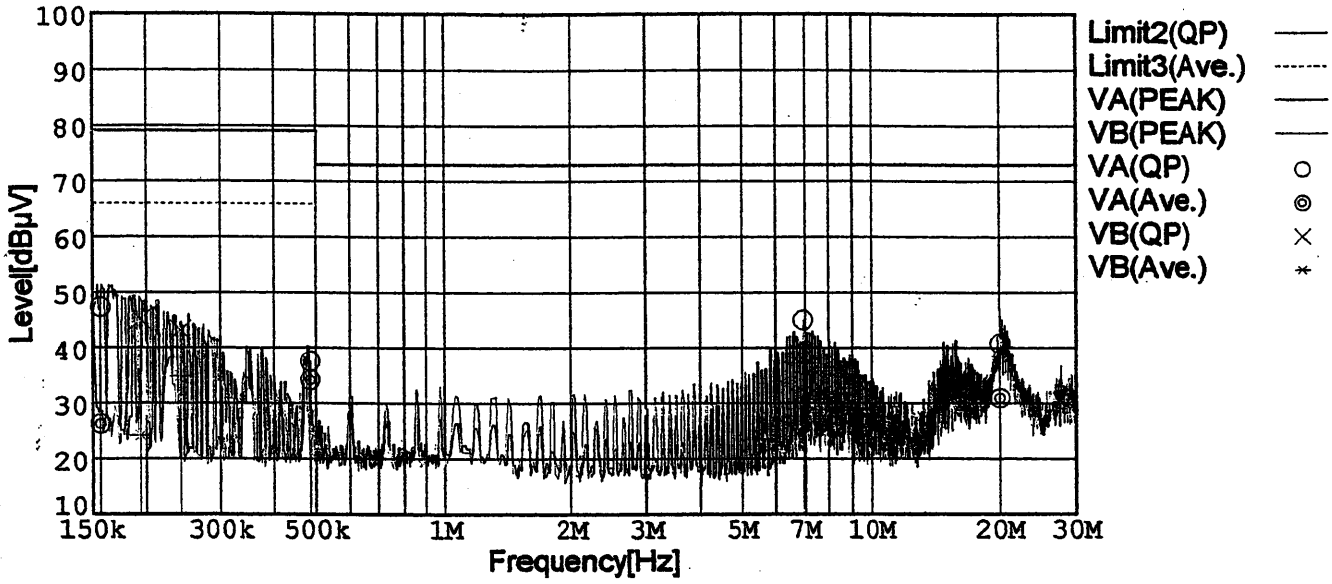
Remarks

Input Volt. 240 V (CISPR Pub11 Class A)

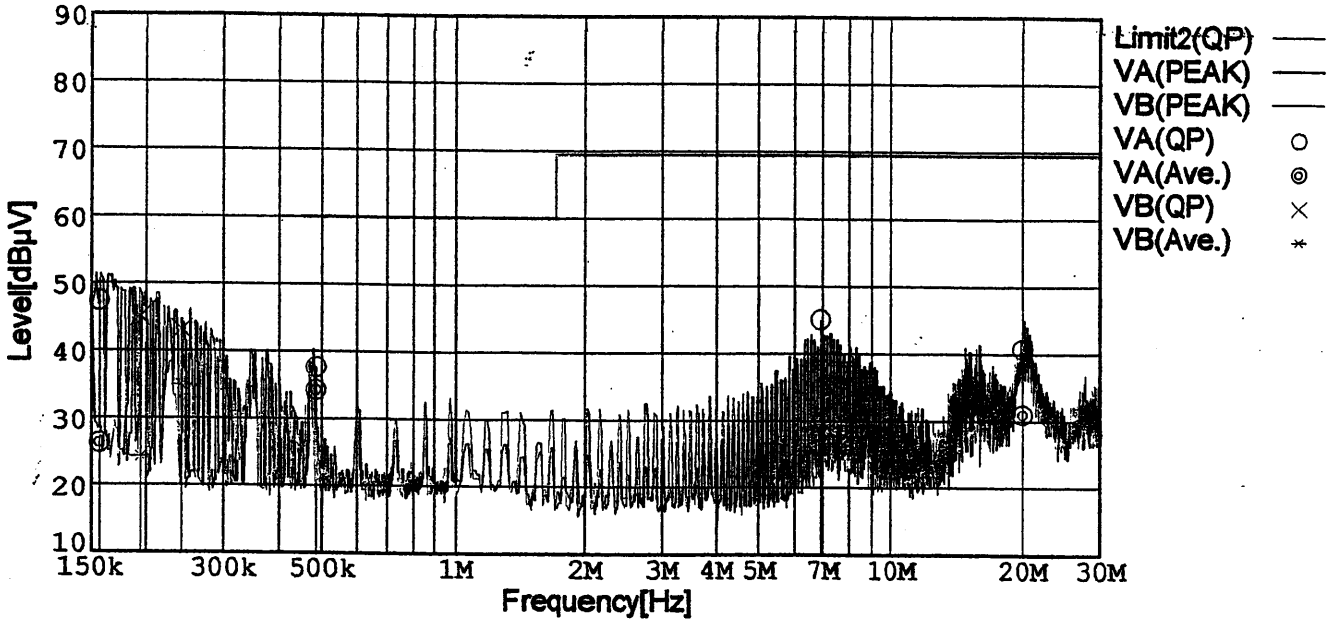
240 V (FCC Part15 Class A)

Load 100 %

Limit2: [CISPR Pub11] Class A Gr.1(QP)
Limit3: [CISPR Pub11] Class A Gr.1(Ave.)



Limit2: [FCC Part15] Class A



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COSEL

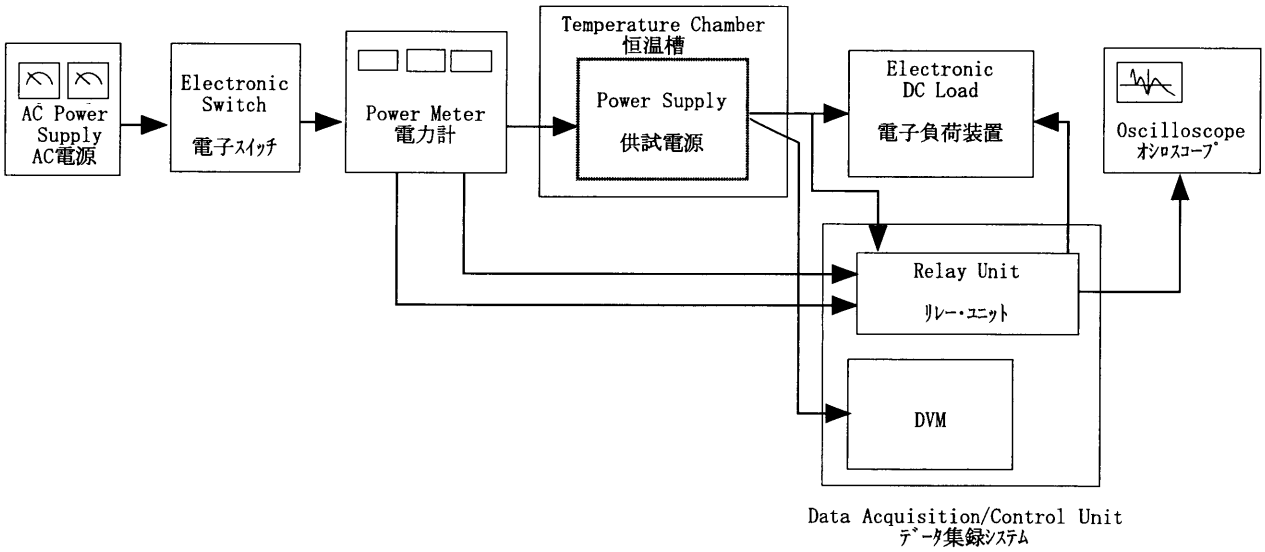

Figure A

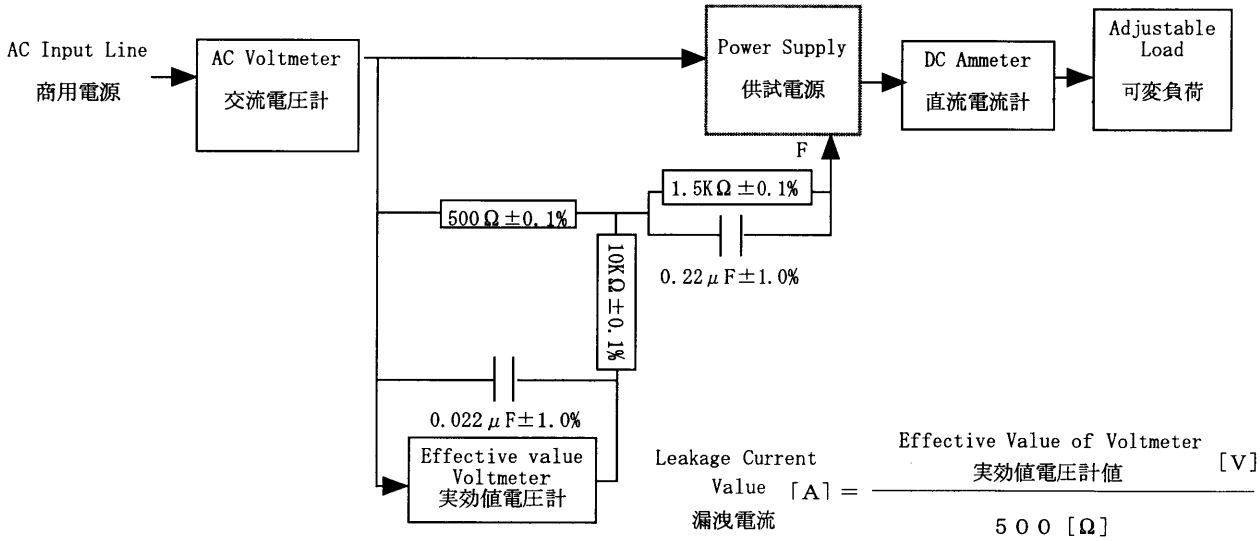

Figure B (IEC60950)

COSEL

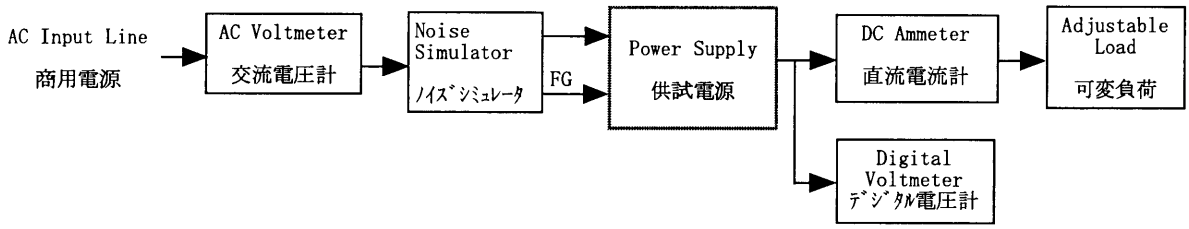

Figure C

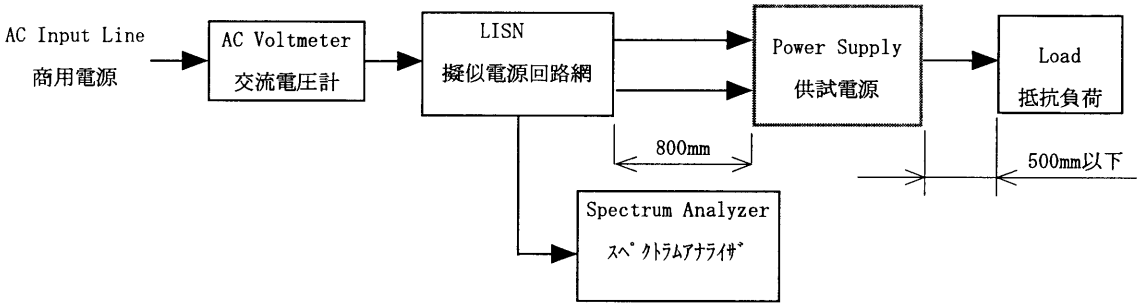

Figure D