



TEST DATA OF FCA50F-24 (480V INPUT)

Regulated DC Power Supply

July 17, 2000

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Yoshiaki Shimizu Design Manager

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コーセル株式会社
COSEL CO., LTD.



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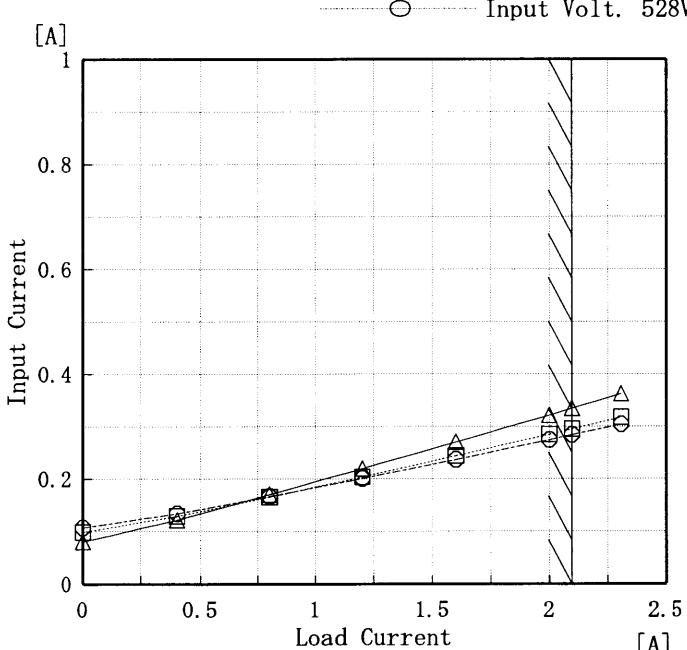
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Note: Slanted line shows the range of the rated input voltage.

(注)斜線は定格入力電圧範囲を示す。

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1. Graph	<p style="text-align: center;"> Input Volt. 380V Input Volt. 480V Input Volt. 528V </p>  <p>The graph shows the relationship between Input Current [A] on the Y-axis (0 to 1) and Load Current [A] on the X-axis (0 to 2.5). Three data series are plotted for different input voltages: 380V (triangles), 480V (squares), and 528V (circles). All three series show a similar trend, increasing from approximately 0.1 A at 0.2 A load current to about 0.35 A at 2.3 A load current. A slanted line is drawn through the data points, representing the rated load current range.</p>																																																									
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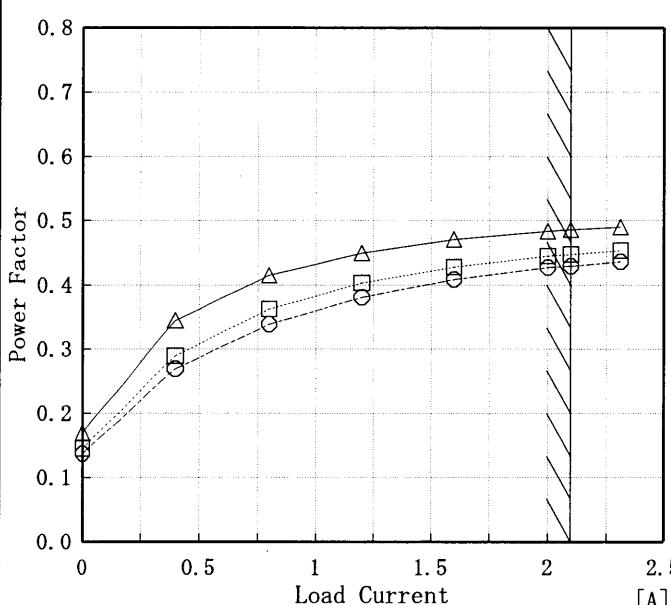


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Note: Slanted line shows the range of the rated input voltage.

(注)斜線は定格入力電圧範囲を示す。

COSEL

Model	FCA50F-24	Temperature	25°C																																																							
Item	Power Factor (by Load Current) 力率(負荷特性)	Testing Circuitry	Figure A																																																							
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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。

COSEL

Model	FCA50F-24	Temperature Testing Circuitry	25°C Figure A																																
Item	Hold-Up Time 出力保持時間																																		
Object	+24.0V 2.1A																																		
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<p>This duration covers from Shut-off of input voltage to the moment when output voltage descends to the rated range of voltage accuracy.</p> <p>Note: Slanted line shows the range of the rated input voltage.</p> <p>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。</p> <p>(注)斜線は定格入力電圧範囲を示す。</p>																																			

COSSEL

Model	FCA50F-24	Temperature	25°C																																																			
Item	Instantaneous Interruption Compensation 瞬時停電保障	Testing Circuitry	Figure A																																																			
Object	+24.0V 2.1A																																																					
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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。

COSEL

Model	FCA50F-24	Temperature 25°C Testing Circuitry Figure A																																																	
Item	Load Regulation 静的負荷変動																																																		
Object	+24.0V 2.1A																																																		
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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。

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Model	FCA50F-24	Temperature Testing Circuitry	25°C Figure A
Item	Ripple Voltage (by Load Current) リップル電圧(負荷特性)		
Object	+24.0 V 2.1 A		
1. Graph	<p>Graph showing Ripple Voltage [mV] vs Load Current [A]. The Y-axis ranges from 0 to 100 mV, and the X-axis ranges from 0 to 2.5 A. Two sets of data points are shown: Input Volt. 380V (triangles) and Input Volt. 528V (circles). Dashed lines connect the points. A slanted line indicates the rated load current range.</p>	2. Values	
Ripple Output Voltage [mV]			
Load Current [A]	Input Volt. 380 [V]	Input Volt. 528 [V]	
0.00	25	25	
0.40	40	50	
0.80	45	55	
1.20	50	55	
1.60	55	60	
2.00	55	60	
2.10	55	60	
2.31	55	60	
—	—	—	
—	—	—	
—	—	—	



Model	FCA50F-24	Temperature Testing Circuitry	25°C Figure A																																				
Item	Ripple-Noise リップルノイズ																																						
Object	+24.0V 2.1A																																						
1. Graph	<p>Graph showing Ripple-Noise [mV] vs Load Current [A]. The graph shows two sets of data points for Input Volt. 380V (triangles) and Input Volt. 528V (circles). The x-axis represents Load Current [A] from 0 to 2.5. The y-axis represents Ripple-Noise [mV] from 0 to 300. A slanted line indicates the rated load current range.</p> <table border="1"> <thead> <tr> <th>Load Current [A]</th> <th>Ripple-Noise [mV] (Input Volt. 380V)</th> <th>Ripple-Noise [mV] (Input Volt. 528V)</th> </tr> </thead> <tbody> <tr><td>0.00</td><td>60</td><td>95</td></tr> <tr><td>0.40</td><td>95</td><td>100</td></tr> <tr><td>0.80</td><td>135</td><td>145</td></tr> <tr><td>1.20</td><td>160</td><td>180</td></tr> <tr><td>1.60</td><td>190</td><td>220</td></tr> <tr><td>2.00</td><td>220</td><td>260</td></tr> <tr><td>2.10</td><td>230</td><td>270</td></tr> <tr><td>2.31</td><td>240</td><td>285</td></tr> <tr><td>—</td><td>—</td><td>—</td></tr> <tr><td>—</td><td>—</td><td>—</td></tr> <tr><td>—</td><td>—</td><td>—</td></tr> </tbody> </table>	Load Current [A]	Ripple-Noise [mV] (Input Volt. 380V)	Ripple-Noise [mV] (Input Volt. 528V)	0.00	60	95	0.40	95	100	0.80	135	145	1.20	160	180	1.60	190	220	2.00	220	260	2.10	230	270	2.31	240	285	—	—	—	—	—	—	—	—	—	2. Values	
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COSSEL

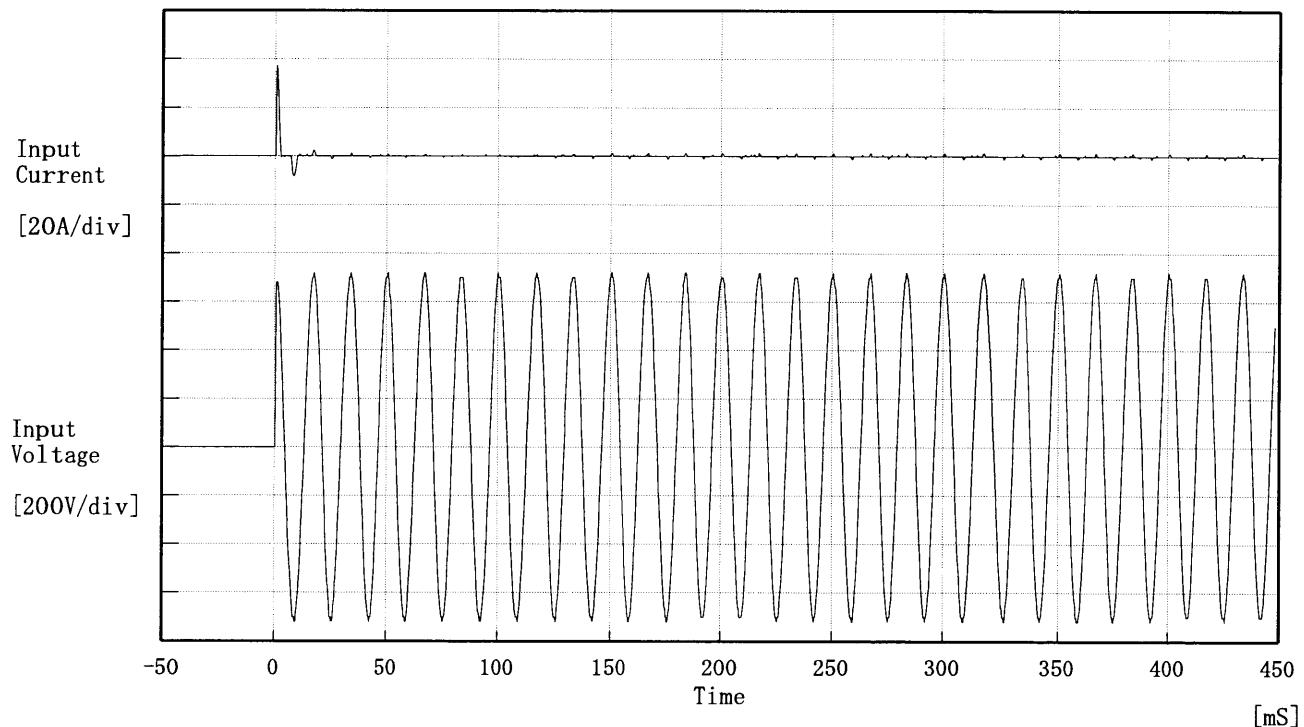
Model	FCA50F-24	Temperature	25°C																																																								
Item	Overcurrent Protection 過電流保護	Testing Circuitry	Figure A																																																								
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COSSEL

Model	FCA50F-24	Testing Circuitry Figure A																																																								
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Object	+24.0V 2.1A																																																									
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COSEL

Model	FCA50F-24	Temperature Testing Circuitry 25°C Figure A
Item	Inrush Current 突入電流	
Object	_____	



Input Voltage 480 V

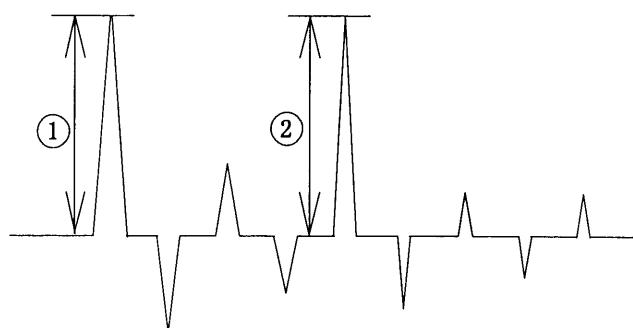
Frequency 60 Hz

Load 100 %

Inrush Current

① 37.20 [A]

② 1.20 [A]



COSEL

Model	FCA50F-24	Temperature	25°C
Item	Dynamic Load Response 動的負荷變動	Testing Circuitry	Figure A
Object	+24.0V 2.1A		

Input Volt. 480 V

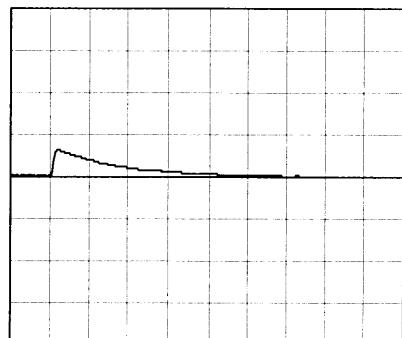
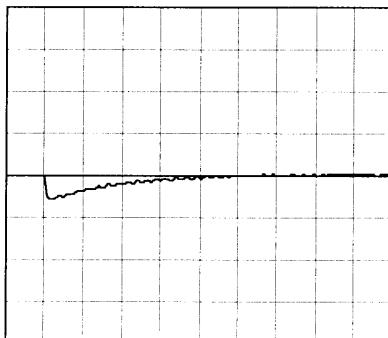
Cycle 1000 mS

Load Current

Load 0% (0.0A) ↔

Load 100% (2.1A)

50 mV/div

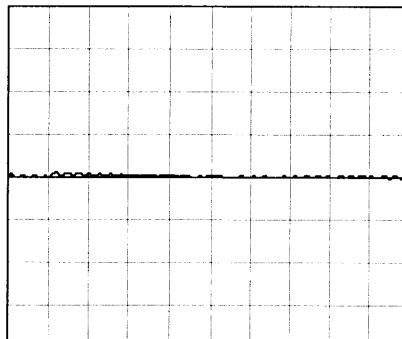
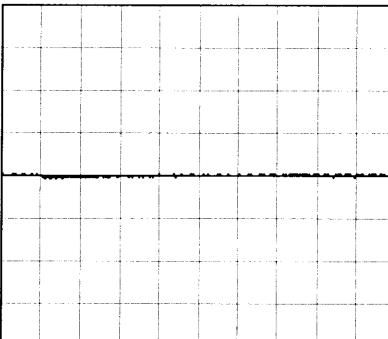


10 ms/div

Load 50% (1.05A) ↔

Load 100% (2.1A)

50 mV/div

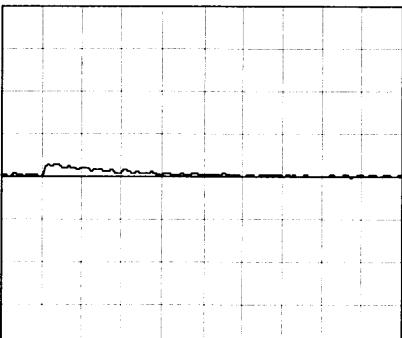
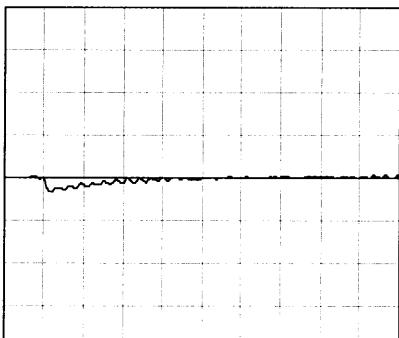


10 ms/div

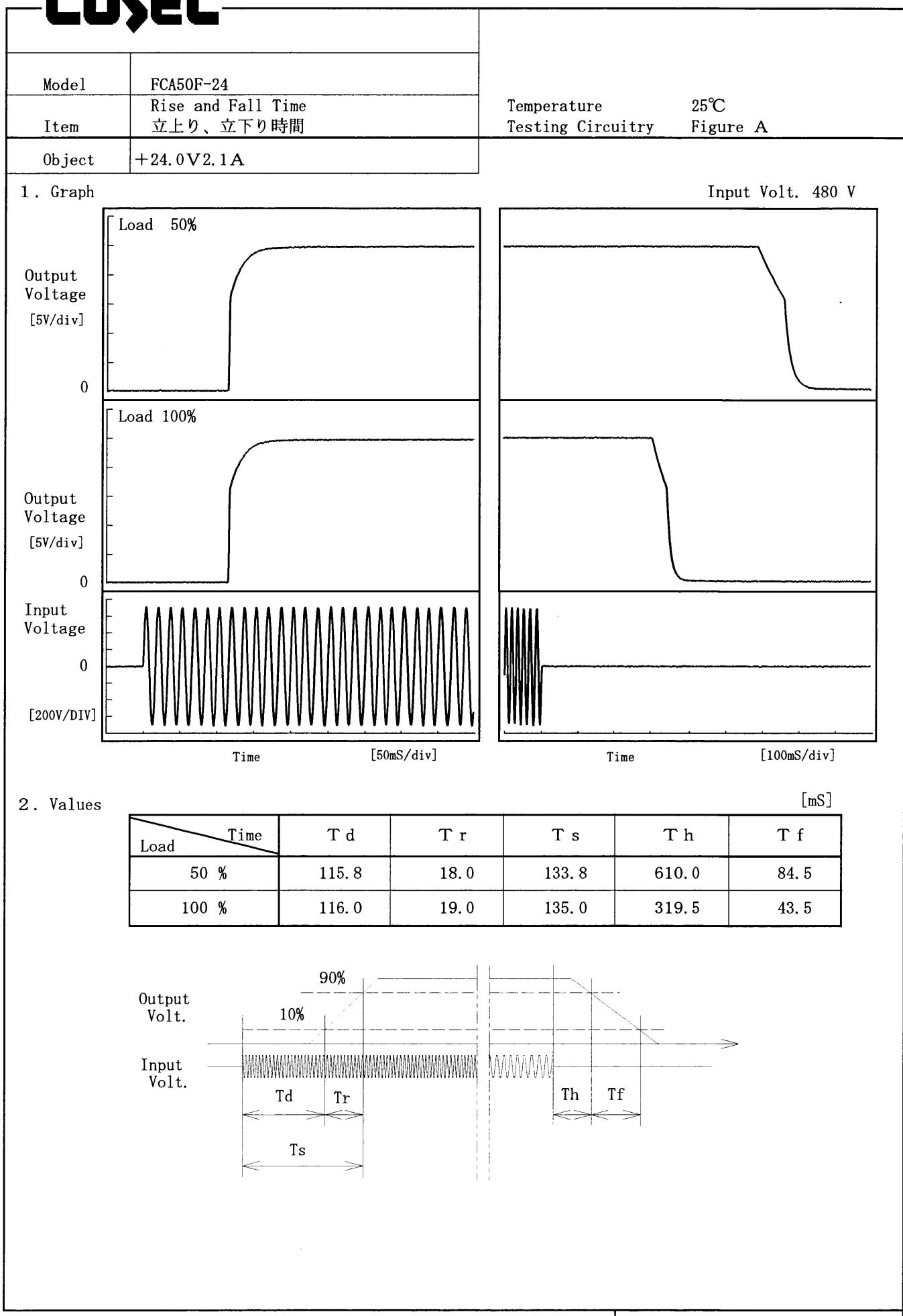
Load 100% (2.1A) ↔

Peak Load (6.7A)

50 mV/div



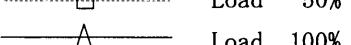
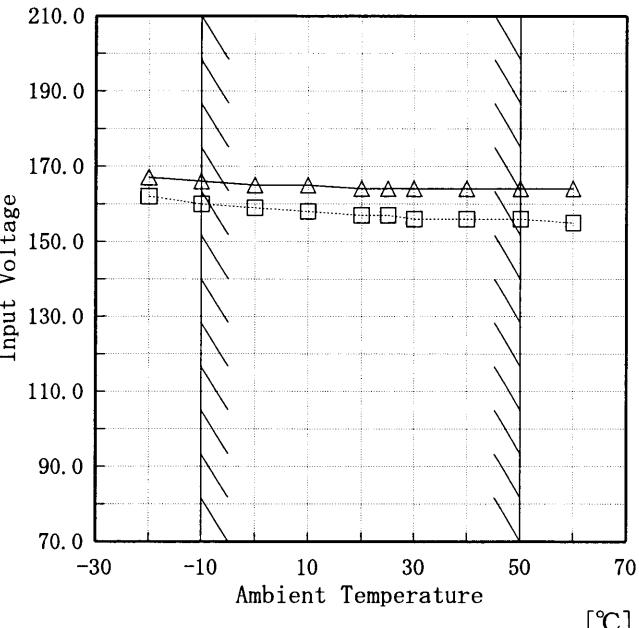
10 ms/div

COSEL

COSSEL

Model	FCA50F-24																																																					
Item	Ambient Temperature Drift 周囲温度変動	Testing Circuitry Figure A																																																				
Object	+24.0V 2.1A																																																					
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COSEL

Model	FCA50F-24		Testing Circuitry Figure A																																						
Item	Minimum Input Voltage for Regulated Output Voltage 最低レギュレーション電圧																																								
Object	+24.0V 2.1A																																								
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Ambient Temperature [°C]	Input Voltage [V]																																								
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<p>Note: Slanted line shows the range of the rated ambient temperature.</p> <p>(注) 斜線は定格周囲温度範囲を示す。</p>																																									

COSEL

Model	FCA50F-24																																								
Item	Ripple Voltage (by Ambient Temp.) リップル電圧 (周囲温度特性)	Testing Circuitry Figure A																																							
Object	+24.0V 2.1A																																								
1. Graph																																									
		Load 50% □	Load 100% △																																						
<p>Graph showing Ripple Voltage [mV] vs Ambient Temperature [°C]. The Y-axis ranges from 0 to 100 mV, and the X-axis ranges from -30 to 70 °C. The graph shows two data series: Load 50% (squares) and Load 100% (triangles). Both series show a decreasing trend as ambient temperature increases. Two slanted lines indicate the rated ambient temperature range from approximately -10°C to 50°C.</p> <p>Input Volt. 480 V</p>																																									
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60	50	50																																							
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COSEL

Model	FCA50F-24	Temperature	25°C																				
Item	Time Lapse Drift 経時ドリフト	Testing Circuitry	Figure A																				
Object	+24.0V 2.1A																						
1. Graph		2. Values																					
<p>[V]</p> <table border="1"> <caption>Data points from the graph</caption> <thead> <tr> <th>Time since start [H]</th> <th>Output Voltage [V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>24.063</td></tr> <tr><td>0.5</td><td>24.058</td></tr> <tr><td>1.0</td><td>24.058</td></tr> <tr><td>2.0</td><td>24.059</td></tr> <tr><td>3.0</td><td>24.059</td></tr> <tr><td>4.0</td><td>24.059</td></tr> <tr><td>5.0</td><td>24.059</td></tr> <tr><td>6.0</td><td>24.059</td></tr> <tr><td>7.0</td><td>24.059</td></tr> <tr><td>8.0</td><td>24.059</td></tr> </tbody> </table>		Time since start [H]	Output Voltage [V]	0.0	24.063	0.5	24.058	1.0	24.058	2.0	24.059	3.0	24.059	4.0	24.059	5.0	24.059	6.0	24.059	7.0	24.059	8.0	24.059
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<p>Output Voltage [V]</p> <p>Input Volt. 480V</p> <p>Load 100%</p>																							



Model	FCA50F-24	
Item	Output Voltage Accuracy 定電圧精度	Testing Circuitry Figure A
Object	+24.0V 2.1A	

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 °C

Input Voltage : 380~528 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 °C

入力電圧 380~528 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 [°C]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy(Ration) [%]
Maximum Voltage	25	380	0.0	24.079		
Minimum Voltage	50	380	2.1	24.055	±13	±0.1



Model	FCA50F-24	
Item	Condensation 結露特性	Testing Circuitry Figure A
Object	+24.0V 2.1A	

1. Condensation test

Testing procedure is as follows.

- ① Keeping and cooling the unit in a tank at -10°C for an hour with the input off.
- ② Taking it out of the tank and dewing itself in a room where the temperature is 25°C and the humidity is 40%RH.
- ③ Testing electrical characteristics of the unit to confirm there be no fault.

1. 結露特性試験

入力を切った状態で、恒温槽で-10°Cに冷却しておき、約1時間後に恒温槽から取り出し、室温25°C、湿度40%RHの状態におき結露させ、その電気的特性の測定を行い、異常のないことを確認する。

2. Values

Item	Data	Testing Conditions
Output Voltage [V]	24.065	Input Volt.: 480.0V, Load Current:2.1A
Line Regulation [mV]	3	Input Volt.: 380.0~528.0V, Load Current:2.1A
Load Regulation [mV]	9	Input Volt.: 480.0V, Load Current:0.0~2.1A



Model	FCA50F-24	Temperature	25°C
Item	Leakage Current 漏洩電流	Testing Circuitry	Figure B
Object	_____		

1. Results

Standards	Leakage Current [mA]		
	Input Volt.	Input Volt.	Input Volt.
380 [V]	480 [V]	528 [V]	
(B) IEC60950	0.21	0.27	0.29

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。



Model	FCA50F-24	Temperature Testing Circuitry Figure C	25°C
Item	Line Noise Tolerance 入力雑音耐量		
Object	+24.0V 2.1A		

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

COSEL

Model	FCA50F-24	Temperature Testing Circuitry	25°C Figure D
Item	Conducted Emission 雜音端子電壓		
Object	—		

1. Graph

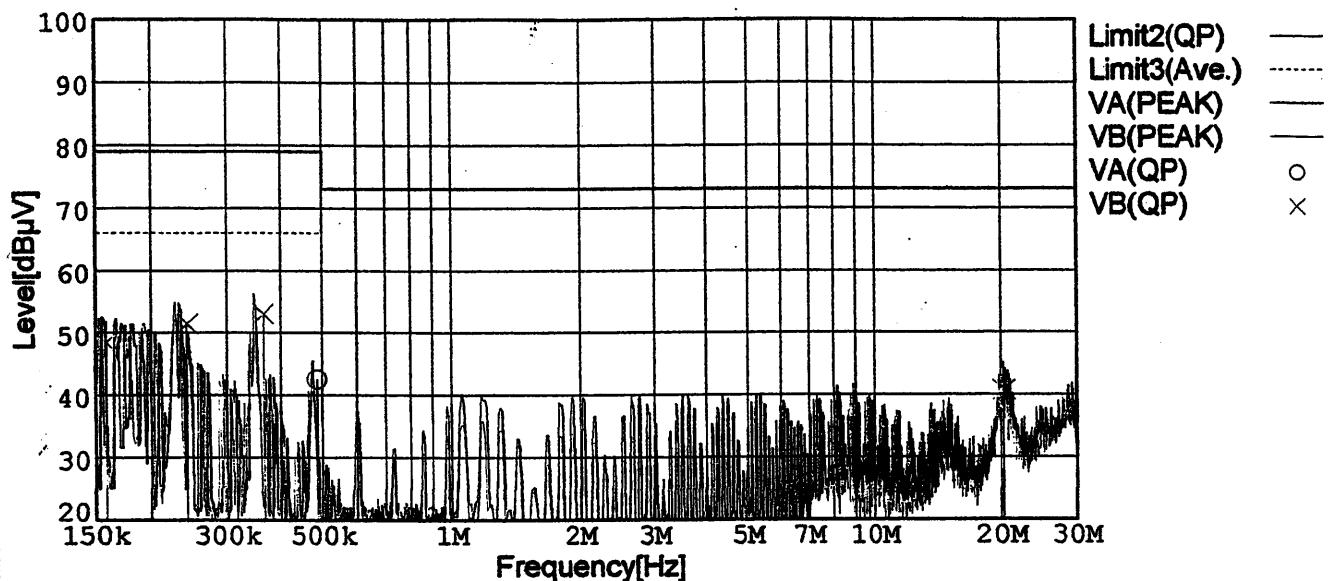
Remarks

Input Volt. 480 V (CISPR Pub11 Class A)
480 V (FCC Part15 Class A)

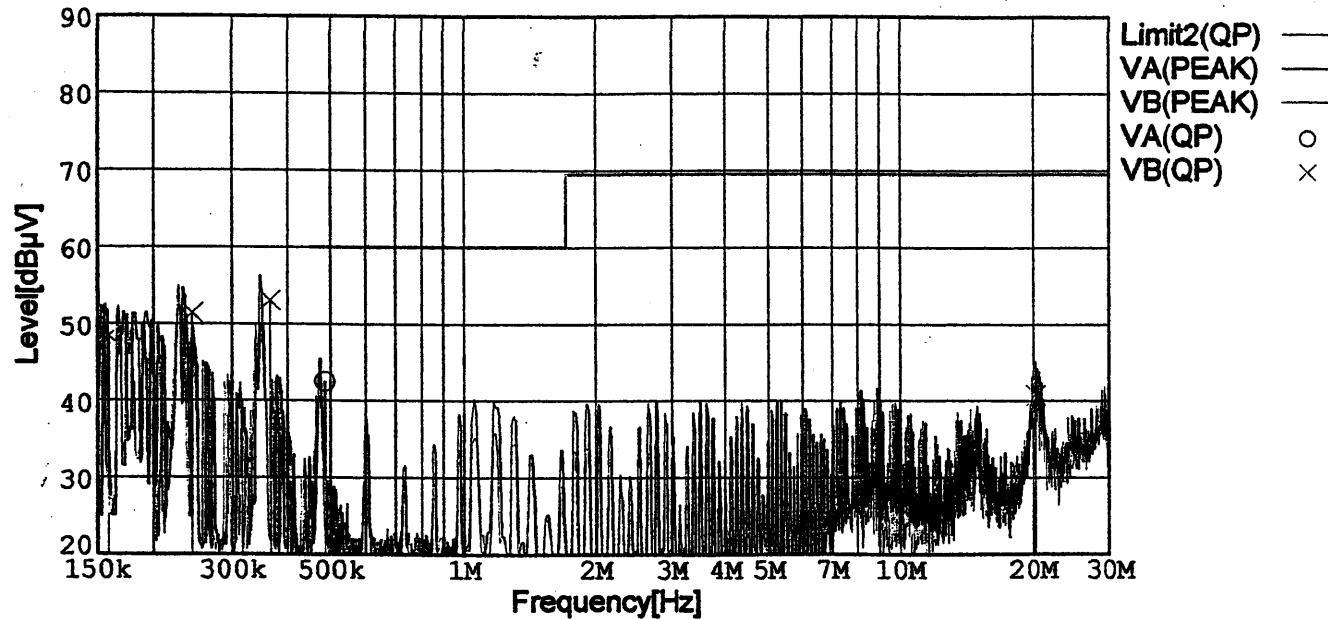
Load 100 %

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

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



Limit2: [FCC Part15] Class A



COSEL

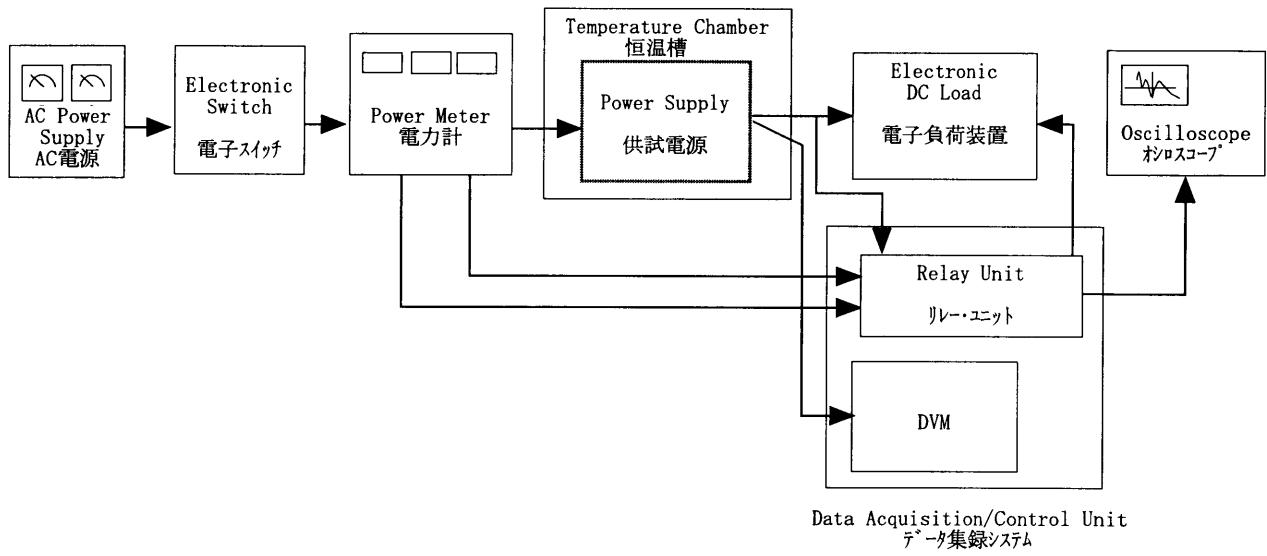


Figure A

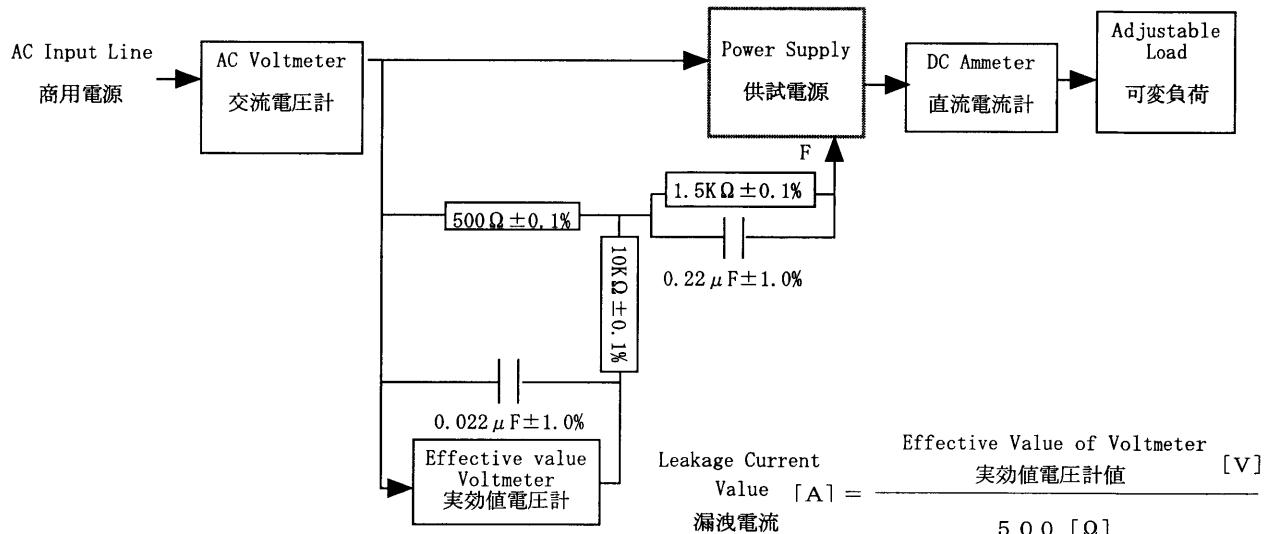


Figure B (IEC60950)

COSEL

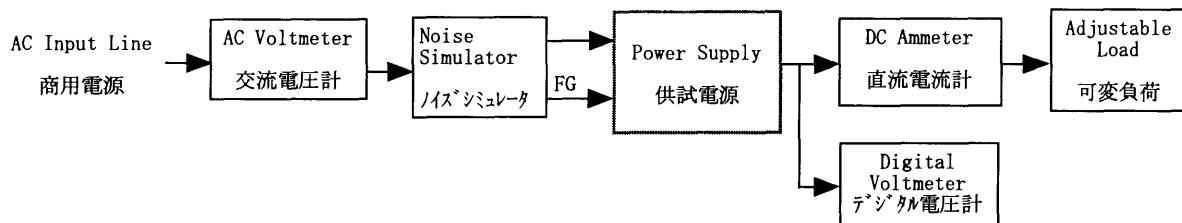


Figure C

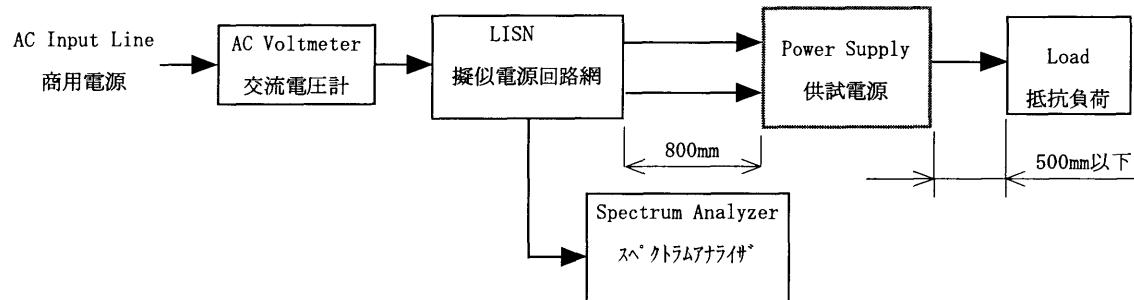


Figure D