



TEST DATA OF PAA100F-3 (100V INPUT)

Regulated DC Power Supply

Date : July 3. 1997

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COSEL CO., LTD.

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Model		PAA100F-3		Temperature	25°C																																
Item		Line Regulation 静的入力変動		Testing Circuitry	Figure A																																
Object		+3V20.0A																																			
1. Graph			□----- Load 50% △----- Load 100%	2. Values																																	
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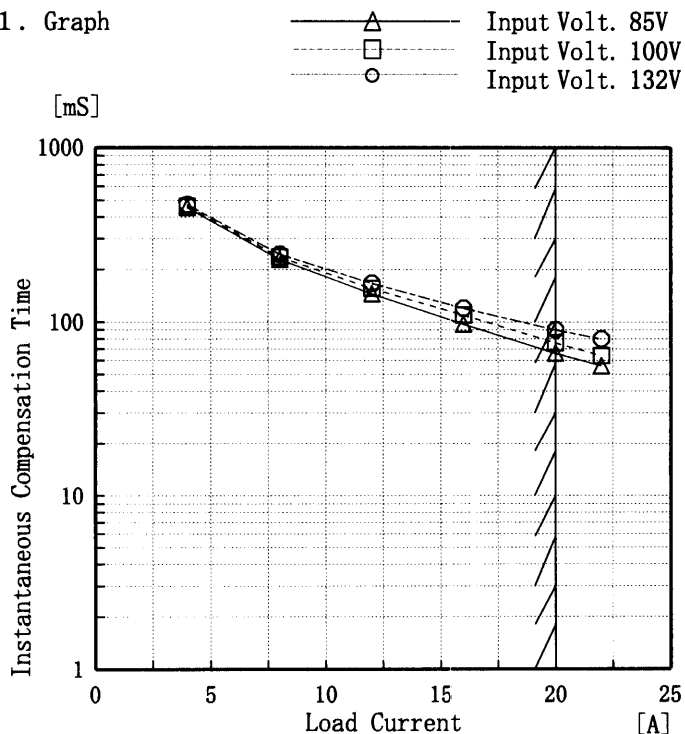
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<p>This duration covers from Shut-off of input voltage to the moment when output voltage descends to the rated range of voltage accuracy.</p> <p>Note: Slanted line shows the range of the rated input voltage.</p> <p>出力保持時間とは、入力電圧断から出力電圧が、定電圧精度の規格範囲を保持しているところまでの時間。 (注)斜線は定格入力電圧範囲を示す。</p>																																							



Model	PAA100F-3
Item	Instantaneous Interruption Compensation 瞬時停電保障
Object	+3V20.0A

Testing Circuitry Figure A

1. Graph



This duration covers from Shut-off of input voltage to the moment when output voltage descends to its 95% of the rated.

Note: Slanted line shows the range of the rated load current.

瞬時停電保障時間とは、出力電圧が定格値の95%になる時の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]		
0.0	—	—	—
4.0	453	462	472
8.0	229	237	246
12.0	145	155	167
16.0	97	110	120
20.0	66	76	90
22.0	56	64	80
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—



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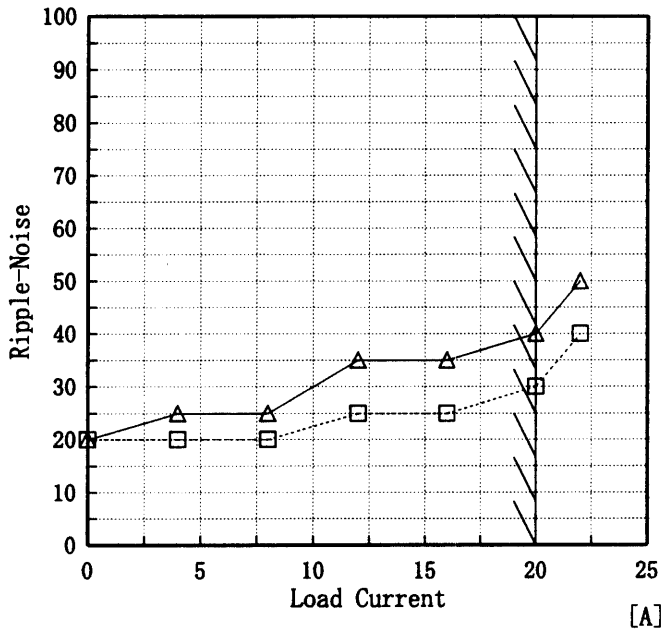


Model		PAA100F-3		Temperature		25°C																																							
Item		Ripple Voltage (by Load Current) リップル電圧 (負荷電流特性)		Testing Circuitry		Figure A																																							
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<p>1. Graph</p> <p>[mV]</p> <p>-----□----- Input Volt. 85V</p> <p>-----△----- Input Volt. 132V</p> <p>Ripple Voltage</p> <p>Load Current [A]</p>				<p>2. Values</p> <table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th>Input Volt. 85 [V]</th> <th>Input Volt. 132 [V]</th> </tr> <tr> <th>Ripple Output Volt. [mV]</th> <th>Ripple Output Volt. [mV]</th> </tr> </thead> <tbody> <tr><td>0.00</td><td>20</td><td>20</td></tr> <tr><td>4.00</td><td>20</td><td>20</td></tr> <tr><td>8.00</td><td>20</td><td>20</td></tr> <tr><td>12.00</td><td>25</td><td>25</td></tr> <tr><td>16.00</td><td>25</td><td>25</td></tr> <tr><td>20.00</td><td>30</td><td>30</td></tr> <tr><td>22.00</td><td>40</td><td>40</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> <tr><td>—</td><td>—</td><td>—</td></tr> </tbody> </table>				Load Current [A]	Input Volt. 85 [V]	Input Volt. 132 [V]	Ripple Output Volt. [mV]	Ripple Output Volt. [mV]	0.00	20	20	4.00	20	20	8.00	20	20	12.00	25	25	16.00	25	25	20.00	30	30	22.00	40	40	—	—	—	—	—	—	—	—	—	—	—	—
Load Current [A]	Input Volt. 85 [V]	Input Volt. 132 [V]																																											
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<p>Ripple Voltage is shown as p-p in the figure below.</p> <p>Note: Slanted line shows the range of the rated load current.</p> <p>リップル電圧は、下図 p-p 値で示される。</p> <p>(注) 斜線は定格負荷電流範囲を示す。</p> <p>T1: Due to AC Input Line 入力商用周期</p> <p>T2: Due to Switching スイッチング周期</p> <p>Ripple [mVp-p]</p> <p>T1</p> <p>T2</p>																																													
<p>Fig. Complex Ripple Wave Form</p> <p>図 リップル波形詳細図</p>																																													



Model	PAA100F-3	Temperature	25°C
Item	Ripple-Noise リップルノイズ	Testing Circuitry	Figure A
Object	+3V20.0A		

1. Graph
 [mV]
 -----□----- Input Volt. 85V
 -----△----- Input Volt. 132V



2. Values

Load current [A]	Input Volt. 85 [V]	Input Volt. 132 [V]
	Ripple-Noise [mV]	Ripple-Noise [mV]
0.0	20	20
4.0	20	25
8.0	20	25
12.0	25	35
16.0	25	35
20.0	30	40
22.0	40	50
—	—	—
—	—	—
—	—	—
—	—	—

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
 スイッチング周期

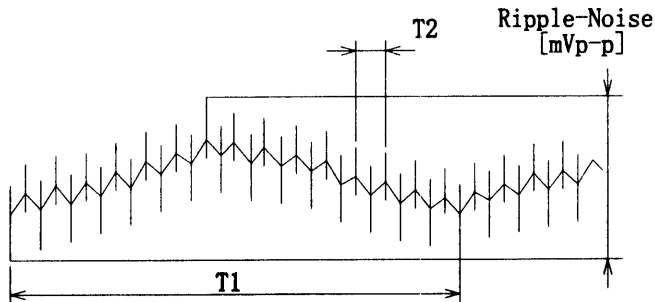


Fig. Complex Ripple Wave Form
 図 リップル波形詳細図



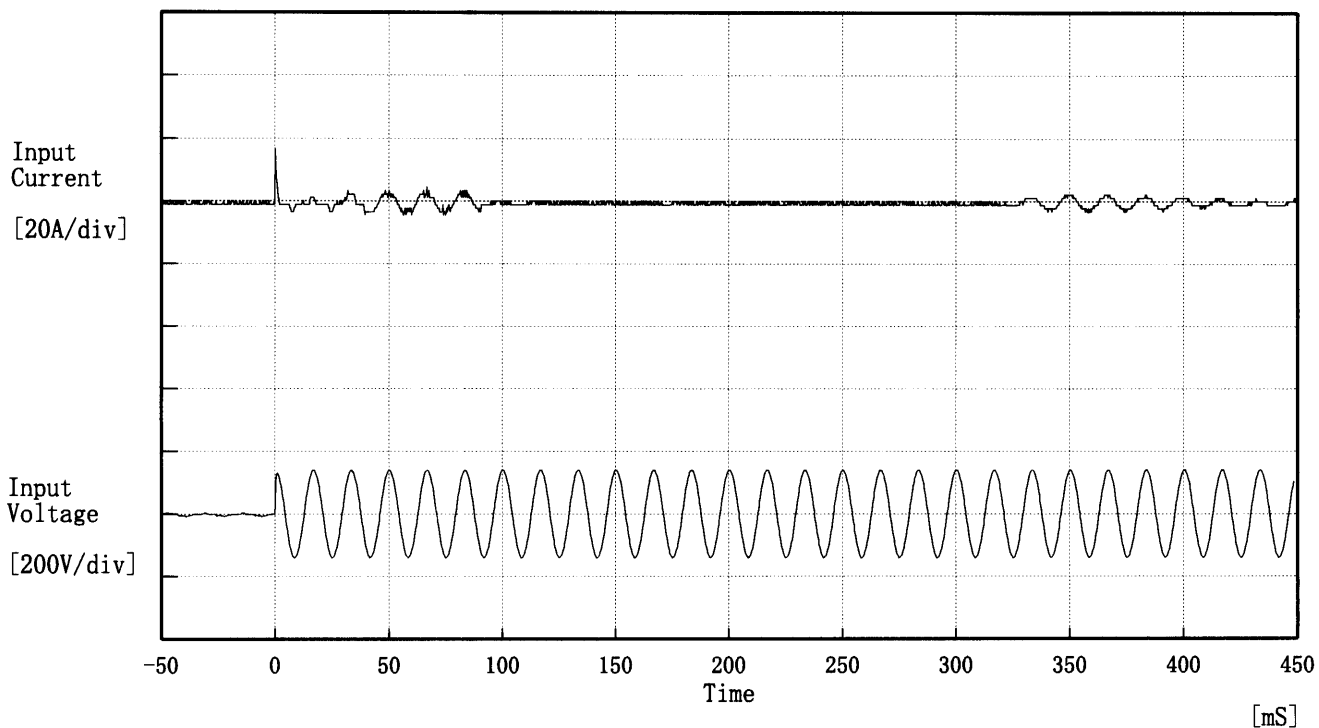
Model		PAA100F-3	Temperature		25°C																																																							
Item		Overcurrent Protection 過電流保護	Testing Circuitry		Figure A																																																							
Object		+3V20.0A																																																										
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<p> Input Volt. 85 V Input Volt. 100 V Input Volt. 132 V </p>			<table border="1"> <thead> <tr> <th rowspan="2">Output Voltage [V]</th> <th>Input Volt. 85[V]</th> <th>Input Volt. 100[V]</th> <th>Input Volt. 132[V]</th> </tr> <tr> <th>Load Current [A]</th> <th>Load Current [A]</th> <th>Load Current [A]</th> </tr> </thead> <tbody> <tr><td>3.00</td><td>—</td><td>—</td><td>—</td></tr> <tr><td>2.85</td><td>23.99</td><td>24.01</td><td>24.00</td></tr> <tr><td>2.70</td><td>23.99</td><td>24.01</td><td>24.00</td></tr> <tr><td>2.40</td><td>23.99</td><td>24.03</td><td>24.03</td></tr> <tr><td>2.10</td><td>24.08</td><td>24.10</td><td>24.09</td></tr> <tr><td>1.80</td><td>24.11</td><td>24.14</td><td>24.15</td></tr> <tr><td>1.50</td><td>24.22</td><td>24.25</td><td>24.25</td></tr> <tr><td>1.20</td><td>24.27</td><td>24.29</td><td>24.30</td></tr> <tr><td>0.90</td><td>24.24</td><td>24.27</td><td>24.27</td></tr> <tr><td>0.60</td><td>24.24</td><td>24.25</td><td>24.24</td></tr> <tr><td>0.30</td><td>24.20</td><td>24.22</td><td>24.22</td></tr> <tr><td>0.00</td><td>24.16</td><td>24.17</td><td>24.18</td></tr> </tbody> </table>			Output Voltage [V]	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]	Load Current [A]	Load Current [A]	Load Current [A]	3.00	—	—	—	2.85	23.99	24.01	24.00	2.70	23.99	24.01	24.00	2.40	23.99	24.03	24.03	2.10	24.08	24.10	24.09	1.80	24.11	24.14	24.15	1.50	24.22	24.25	24.25	1.20	24.27	24.29	24.30	0.90	24.24	24.27	24.27	0.60	24.24	24.25	24.24	0.30	24.20	24.22	24.22	0.00	24.16	24.17	24.18
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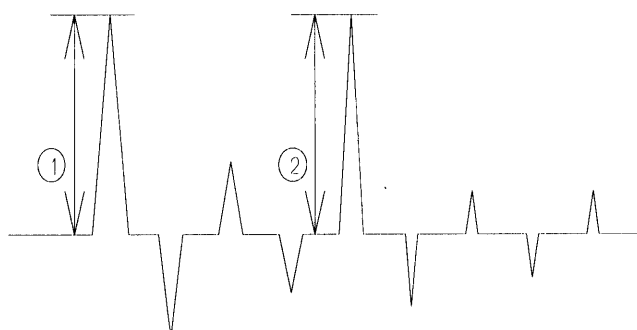
Model		PAA100F-3		Testing Circuitry Figure A																																																			
Item		Overvoltage Protection 過電圧保護																																																					
Object		+3V20.0A																																																					
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COSEL

Model	PAA100F-3	Temperature	25°C
Item	Inrush Current 突入電流	Testing Circuitry	Figure A
Object	_____		



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

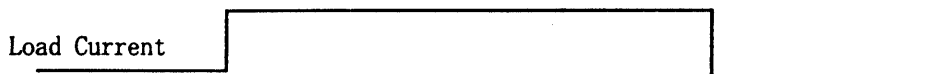


COSEL

Model	PAA100F-3	Temperature	25°C
Item	Dynamic Load Responce 動的負荷変動	Testing Circuitry	Figure A
Object	+3V20.0A		

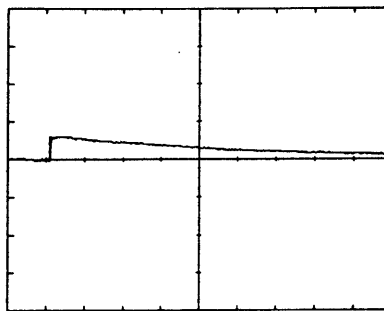
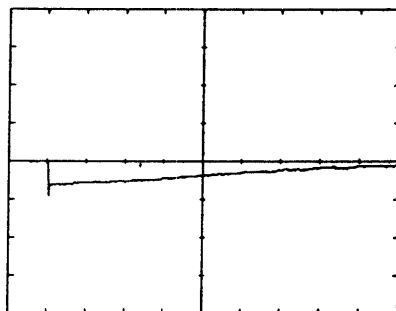
Input Volt. 100 V

Cycle 1000 mS



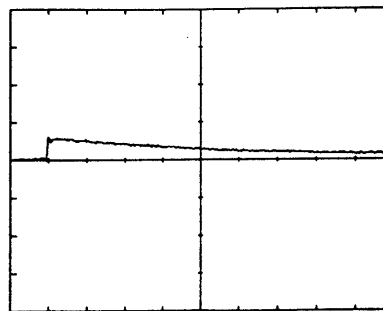
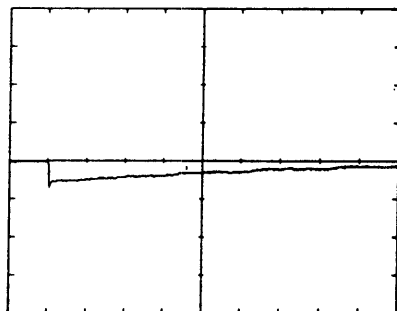
Load 0% ↔

Load 100 %



Load 0% ↔

Load 50 %



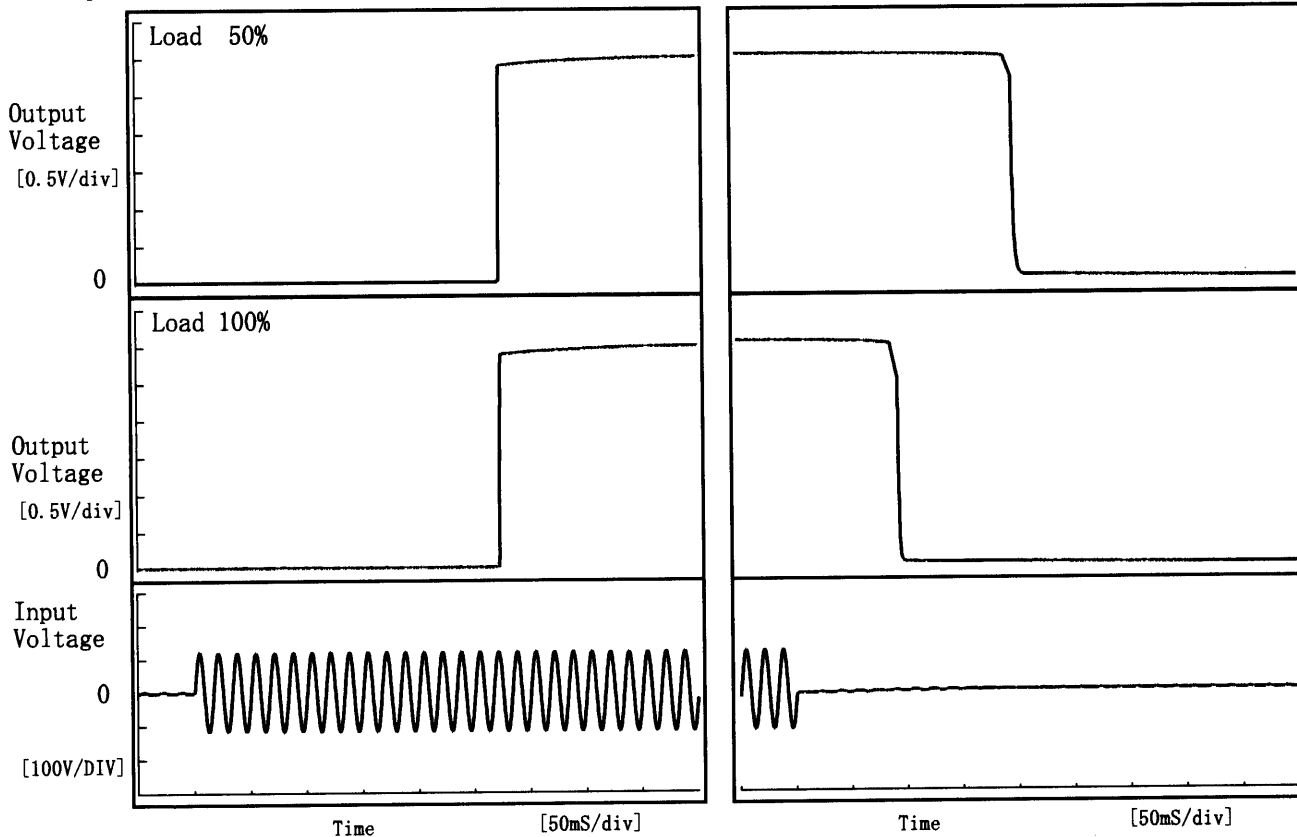
50 mV/div

10 mS/div

Model	PAA100F-3	Temperature	25°C
Item	Rise and Fall Time 立上り、立下り時間	Testing Circuitry	Figure A
Object	+3V20.0A		

1. Graph

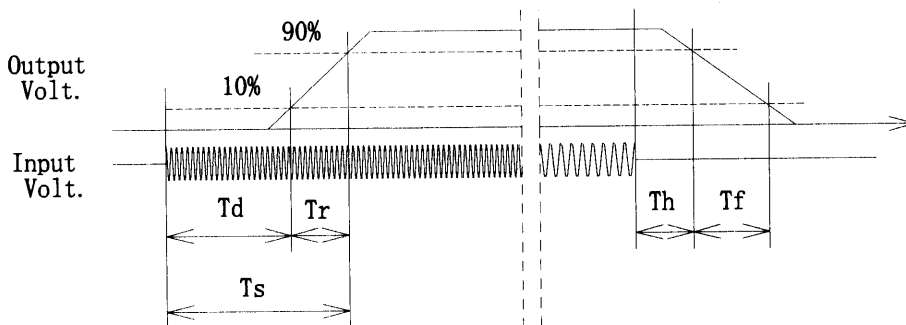
Input Volt. 85 V



2. Values

[mS]

Load \ Time	T d	T r	T s	T h	T f
50 %	273.0	1.0	274.0	196.0	4.5
100 %	272.8	1.3	274.0	90.3	5.8





Model		PAA100F-3		Testing Circuitry Figure A																																																				
Item		Ambient Temperature Drift 周囲温度変動																																																						
Object		+3V20.0A																																																						
1. Graph		<p> <input type="checkbox"/> —△— Input Volt. 85V <input type="checkbox"/> - - - □ - - - Input Volt. 100V <input type="checkbox"/> ····· ○ ····· Input Volt. 132V </p>		2. Values																																																				
<p>[V]</p> <p>Ambient Temperature [°C]</p> <p>Load 100%</p>		<table border="1"> <thead> <tr> <th rowspan="2">Temperature [°C]</th> <th>Input Volt. 85[V]</th> <th>Input Volt. 100[V]</th> <th>Input Volt. 132[V]</th> </tr> <tr> <th>Output Volt. [V]</th> <th>Output Volt. [V]</th> <th>Output Volt. [V]</th> </tr> </thead> <tbody> <tr><td>-20</td><td>3.026</td><td>3.025</td><td>3.025</td></tr> <tr><td>-10</td><td>3.021</td><td>3.021</td><td>3.021</td></tr> <tr><td>0</td><td>3.016</td><td>3.016</td><td>3.016</td></tr> <tr><td>10</td><td>3.011</td><td>3.011</td><td>3.011</td></tr> <tr><td>20</td><td>3.006</td><td>3.006</td><td>3.006</td></tr> <tr><td>25</td><td>3.004</td><td>3.004</td><td>3.003</td></tr> <tr><td>30</td><td>3.001</td><td>3.001</td><td>3.001</td></tr> <tr><td>40</td><td>2.996</td><td>2.996</td><td>2.995</td></tr> <tr><td>50</td><td>2.990</td><td>2.990</td><td>2.990</td></tr> <tr><td>60</td><td>2.985</td><td>2.985</td><td>2.985</td></tr> <tr><td>—</td><td>—</td><td>—</td><td>—</td></tr> </tbody> </table>		Temperature [°C]	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]	Output Volt. [V]	Output Volt. [V]	Output Volt. [V]	-20	3.026	3.025	3.025	-10	3.021	3.021	3.021	0	3.016	3.016	3.016	10	3.011	3.011	3.011	20	3.006	3.006	3.006	25	3.004	3.004	3.003	30	3.001	3.001	3.001	40	2.996	2.996	2.995	50	2.990	2.990	2.990	60	2.985	2.985	2.985	—	—	—	—		
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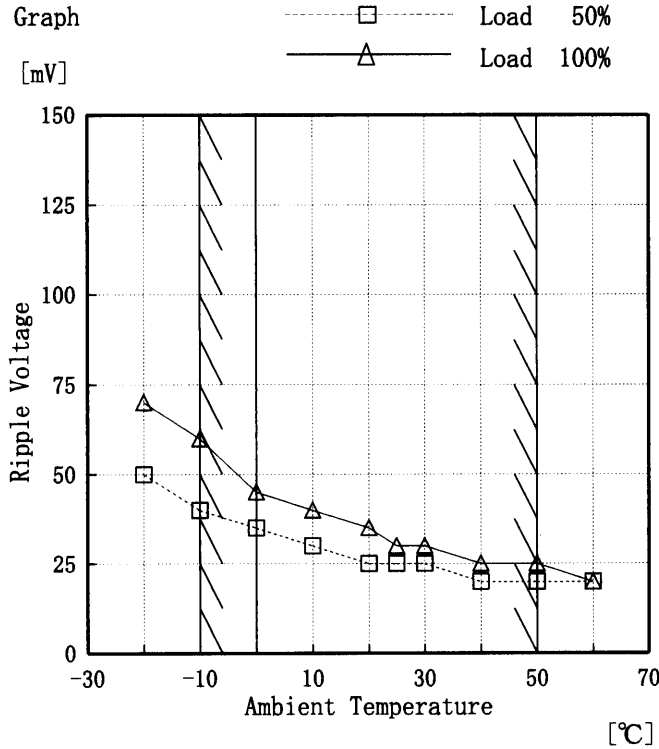
Model		PAA100F-3																																					
Item		Minimum Input Voltage for Regulated Output Voltage 最低レギュレーション電圧																																					
Object		+3V20.0A																																					
1. Graph		2. Values																																					
<p>Legend: □ Load 50% △ Load 100%</p>		<table border="1"> <thead> <tr> <th>Ambient Temp. [°C]</th> <th>Load 50% Input Volt. [V]</th> <th>Load 100% Input Volt. [V]</th> </tr> </thead> <tbody> <tr><td>-20</td><td>70</td><td>71</td></tr> <tr><td>-10</td><td>68</td><td>68</td></tr> <tr><td>0</td><td>68</td><td>68</td></tr> <tr><td>10</td><td>65</td><td>65</td></tr> <tr><td>20</td><td>64</td><td>65</td></tr> <tr><td>25</td><td>64</td><td>64</td></tr> <tr><td>30</td><td>64</td><td>64</td></tr> <tr><td>40</td><td>62</td><td>62</td></tr> <tr><td>50</td><td>60</td><td>61</td></tr> <tr><td>60</td><td>60</td><td>60</td></tr> <tr><td>—</td><td>—</td><td>—</td></tr> </tbody> </table>		Ambient Temp. [°C]	Load 50% Input Volt. [V]	Load 100% Input Volt. [V]	-20	70	71	-10	68	68	0	68	68	10	65	65	20	64	65	25	64	64	30	64	64	40	62	62	50	60	61	60	60	60	—	—	—
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Model	PAA100F-3
Item	Ripple Voltage (by Ambient Temp.) リップル電圧 (周囲温度特性)
Object	+3V20.0A

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. [°C]	Load 50%	Load 100%
	Ripple Output Volt. [mV]	Ripple Output Volt. [mV]
-20	50	70
-10	40	60
0	35	45
10	30	40
20	25	35
25	25	30
30	25	30
40	20	25
50	20	25
60	20	20
—	—	—



COSEL																								
Model	PAA100F-3	Temperature 25 °C																						
Item	Time Lapse Drift 経時ドリフト	Testing Circuitry Figure A																						
Object	+3V20.0A																							
<p>1. Graph</p> <p>[V]</p> <p>Output Voltage [V]</p> <p>Time [H]</p> <p>Input Volt. 100V Load 100%</p>		<p>2. Values</p> <table border="1"> <thead> <tr> <th>Time since start [H]</th> <th>Output Voltage [V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>3.007</td></tr> <tr><td>0.5</td><td>3.001</td></tr> <tr><td>1.0</td><td>3.000</td></tr> <tr><td>2.0</td><td>3.001</td></tr> <tr><td>3.0</td><td>3.001</td></tr> <tr><td>4.0</td><td>3.000</td></tr> <tr><td>5.0</td><td>3.001</td></tr> <tr><td>6.0</td><td>3.001</td></tr> <tr><td>7.0</td><td>3.001</td></tr> <tr><td>8.0</td><td>3.001</td></tr> </tbody> </table>	Time since start [H]	Output Voltage [V]	0.0	3.007	0.5	3.001	1.0	3.000	2.0	3.001	3.0	3.001	4.0	3.000	5.0	3.001	6.0	3.001	7.0	3.001	8.0	3.001
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7.0	3.001																							
8.0	3.001																							



Model		PAA100F-3	Testing Circuitry Figure A
Item		Output Voltage Accuracy 定電圧精度	
Object		+3V20.0A	

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 : 85~132 V
- Load Current : 0.0~20.0 A

* Output Voltage Accuracy = $\pm(\text{Maximum of Output Voltage} - \text{Minimum of Output Voltage}) / 2$

* 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 -10~50 °C
- 入力電圧 85~132 V
- 負荷電流 0.0~20.0 A

* 定電圧精度(変動値) = $\pm(\text{出力電圧の最高値} - \text{出力電圧の最低値}) / 2$

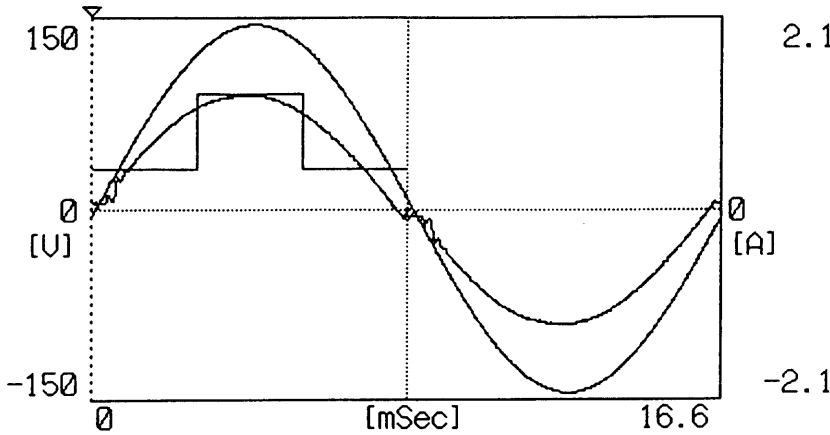
* 定電圧精度(変動率) = $\frac{\text{変動値}}{\text{定格出力電圧}} \times 100$

Item	Temperature [°C]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy(Ration) [%]
Maximum Voltage	-10	85	0.0	3.025	±18	±0.6
Minimum Voltage	50	132	20.0	2.989		



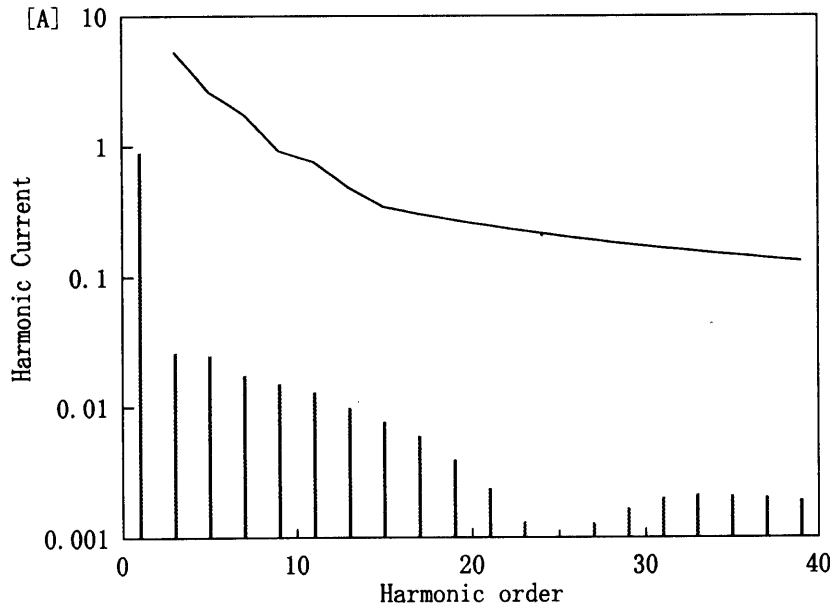
Model		PAA100F-3	Temperature	25°C
Item		Harmonic Current 高調波電流	Testing Circuitry	Figure E
Object				

1. Input Current Waveform



Conditions	Values
Input Voltage [V]	100.3
Input Current [A]	0.9
Active Power [W]	89.8
Apparent Power [VA]	90.4
Frequency [Hz]	60
Power Factor	0.993
Output Power [W]	60

2. Harmonic Current



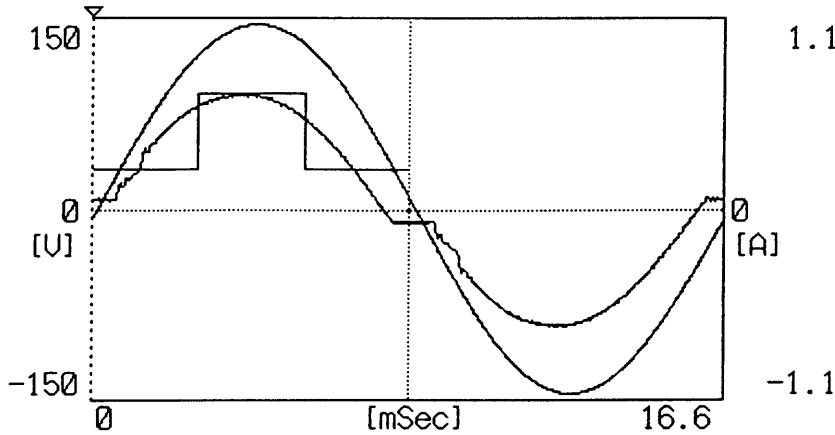
Harmonics order 高調波次数	Limits 限度値 [A]	Values 測定値 [A]
1	—	0.89701
2	—	0.00039
3	5.29000	0.02633
4	—	0.00011
5	2.62200	0.02496
6	—	0.00016
7	1.77100	0.01761
8	—	0.00016
9	0.92000	0.01509
10	—	0.00014
11	0.75900	0.01304
12	—	0.00014
13	0.48300	0.00989
14	—	0.00010
15	0.34500	0.00772
16	—	0.00013
17	0.30441	0.00602
18	—	0.00012
19	0.27237	0.00393
20	—	0.00015
21	0.24643	0.00237
22	—	0.00011
23	0.22500	0.00132
24	—	0.00012
25	0.20700	0.00088
26	—	0.00008
27	0.19167	0.00128
28	—	0.00007
29	0.17845	0.00167
30	—	0.00008
31	0.16694	0.00201
32	—	0.00008
33	0.15682	0.00213
34	—	0.00007
35	0.14786	0.00207
36	—	0.00006
37	0.13986	0.00203
38	—	0.00005
39	0.13269	0.00192
40	—	0.00005

— Harmonic Current
 高調波電流
 - - - Limits for Class A equipment of even harmonics
 クラスAの機器に対する高調波偶数次限度値

COSEL

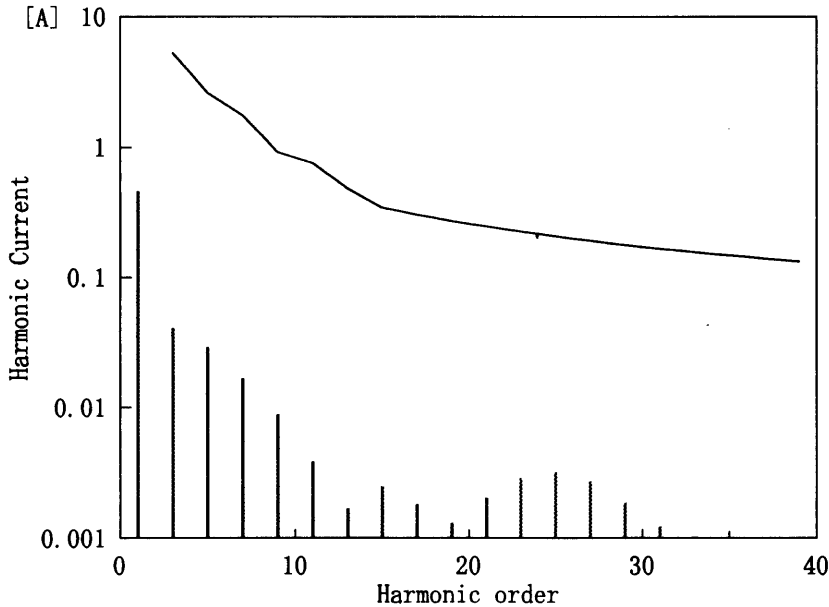
Model	PAA100F-3	Temperature	25°C
Item	Harmonic Current 高調波電流	Testing Circuitry	Figure E
Object			

1. Input Current Waveform



Conditions	Values
Input Voltage [V]	100.5
Input Current [A]	0.47
Active Power [W]	45.9
Apparent Power [VA]	46.9
Frequency [Hz]	60
Power Factor	0.979
Output Power [W]	30

2. Harmonic Current



— Harmonic Current
 高調波電流
 - - - Limits for Class A equipment of even harmonics
 クラスAの機器に対する高調波偶数次限度値

Harmonics order 高調波次数	Limits 限度値 [A]	Values 測定値 [A]
1	—	0.46256
2	—	0.00038
3	5.29000	0.04104
4	—	0.00041
5	2.62200	0.02929
6	—	0.00030
7	1.77100	0.01692
8	—	0.00021
9	0.92000	0.00888
10	—	0.00041
11	0.75900	0.00389
12	—	0.00032
13	0.48300	0.00169
14	—	0.00020
15	0.34500	0.00251
16	—	0.00049
17	0.30441	0.00183
18	—	0.00035
19	0.27237	0.00130
20	—	0.00024
21	0.24643	0.00205
22	—	0.00033
23	0.22500	0.00290
24	—	0.00031
25	0.20700	0.00323
26	—	0.00038
27	0.19167	0.00275
28	—	0.00039
29	0.17845	0.00188
30	—	0.00041
31	0.16694	0.00123
32	—	0.00029
33	0.15682	0.00102
34	—	0.00031
35	0.14786	0.00100
36	—	0.00026
37	0.13986	0.00054
38	—	0.00029
39	0.13269	0.00017
40	—	0.00026



COSEL		
Model	PAA100F-3	
Item	Condensation 結露特性	Testing Circuitry Figure A
Object	+3V20.0A	

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.
- ④ Repeating ①, ② and ③ three times.

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3度行い、異常のないことを確認する。

2. Values

	Times	Output Voltage [V]	Ripple Voltage [mV]	Ripple Noise [mV]
Load 50 %	1	3.007	25	35
	2	3.005	25	35
	3	3.005	25	35
Load 100 %	1	3.006	40	50
	2	3.004	40	50
	3	3.004	40	50

Input Volt. 100 V



Model		PAA100F-3	Testing Circuitry	Figure B
Item		Leakage Current 漏洩電流		
Object		_____		

1. Results

Standards	Leakage Current [mA]		
	Input Volt. 85 [V]	Input Volt. 100 [V]	Input Volt. 132 [V]
(A) DENTORI	0.20	0.24	0.32
(B) UL	0.20	0.24	0.32
(C) CSA	0.20	0.24	0.32

Standards	Leakage Current [mA]		
	Input Volt. 170 [V]	Input Volt. 220 [V]	Input Volt. 264 [V]
(D) VDE	—	—	—

2. Condition

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

交流入力 of 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。

Load 100 %



COSEL		
Model	PAA100F-3	
Item	Line Noise Tolerance 入力雑音耐量	Testing Circuitry Figure C
Object	+3V20.0A	

1. Results

Pulse Width [n S]	MODE	Operating Point of Overvoltage Protection [V] 過電圧保護動作値	DC-like Regulation of Output Voltage 出力電圧の直流的変動
50	COMMON	4.72	no regulation
	NORMAL	4.72	no regulation
1000	COMMON	4.72	no regulation
	NORMAL	4.72	no regulation

Conditions

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

COSEL

Model	PAA100F-3	Testing Circuitry Figure D
Item	Conducted Emission 雑音端子電圧	
Object	_____	

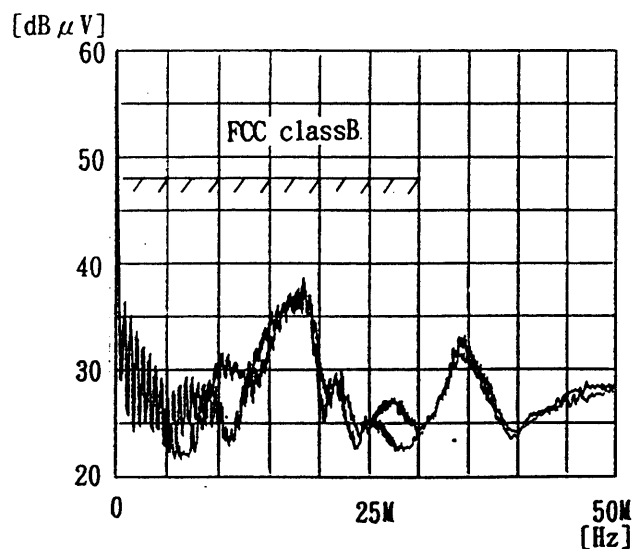
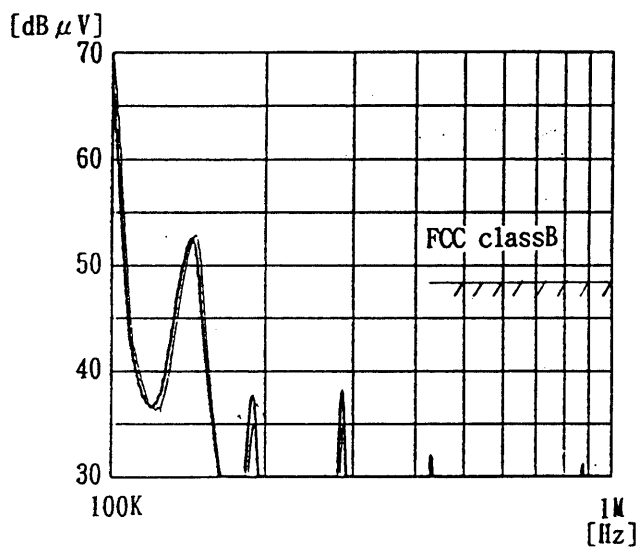
1. Graph

Remarks

Input Volt. 100 V
Load 100 %

Note: Slanted line shows the range of Tolerance.
(注)斜線は許容値を示す。

NO	Standards	Standards Complied	Frequency [MHz]	Tolerance [dB/μV]
1	FCC class A		0.45~1.6	60
			1.6~30	69.5
2	FCC class B	○	0.45~30	48
3	VCCI -1		0.15~0.5	79
			0.5~30	73
4	VCCI -2	○	0.15~0.5	66-56
			0.5~5	56
			5~30	60
5	VDE class A		0.01~0.15	91-69.5
			0.15~0.5	66
			0.5~30	60
6	CISPR 22 class B		0.15~0.5	66-56
			0.5~5	56
			5~30	60



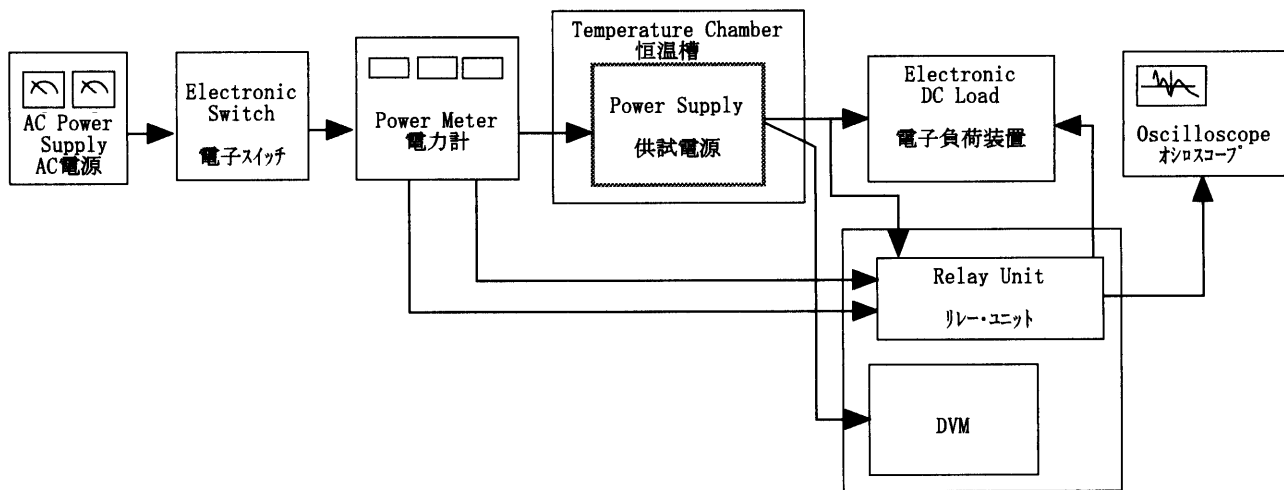


Figure A

Data Acquisition/Control Unit
データ収録システム

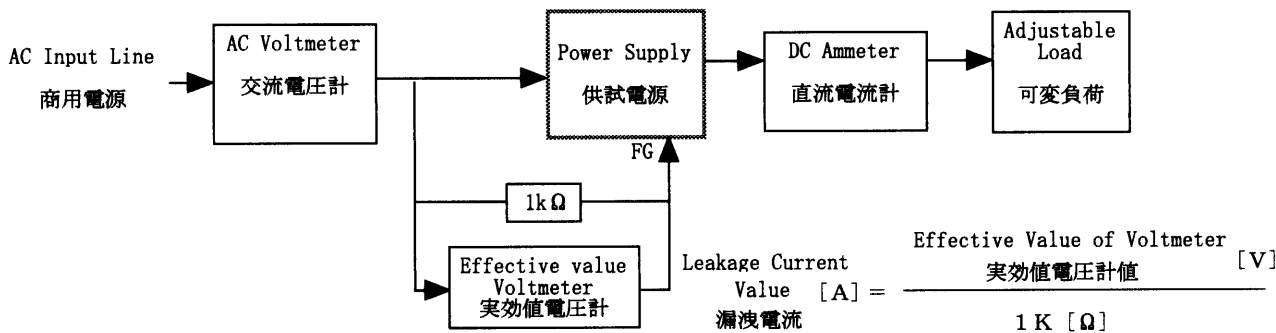


Figure B (DENTORI)

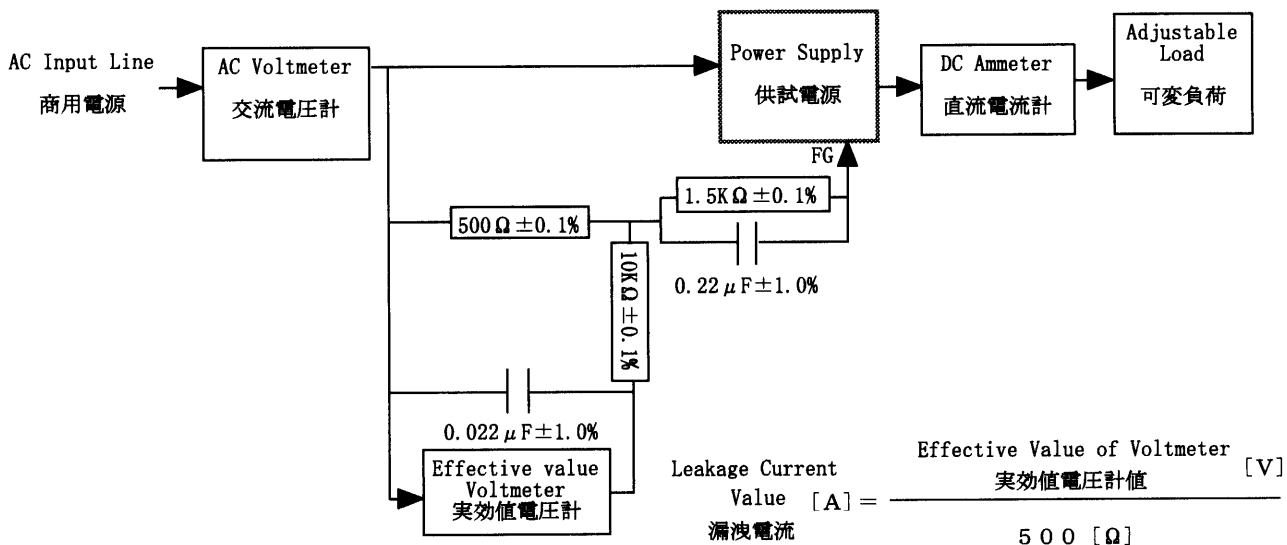


Figure B (UL, CSA, VDE)

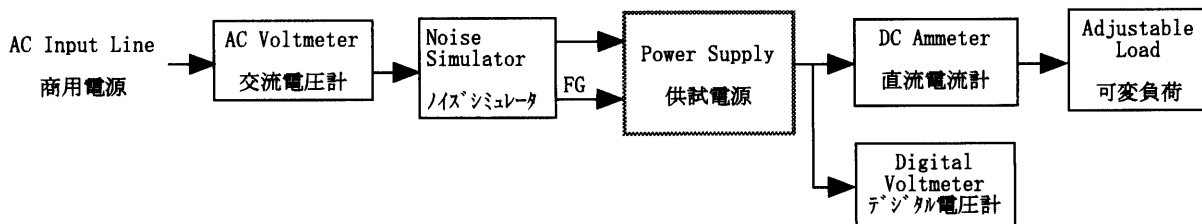


Figure C

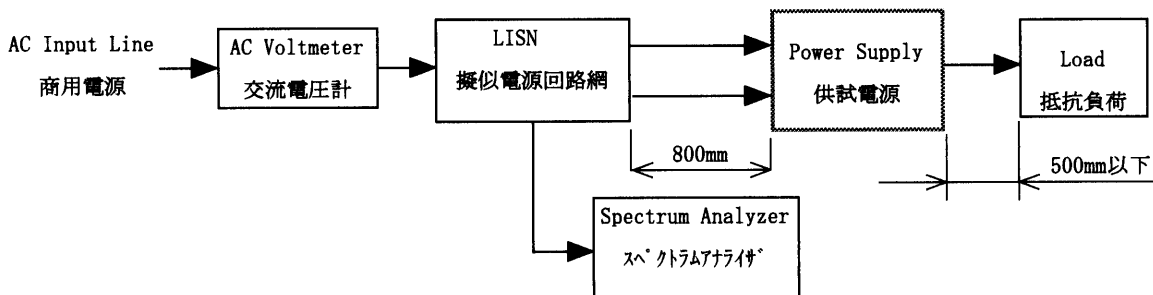


Figure D

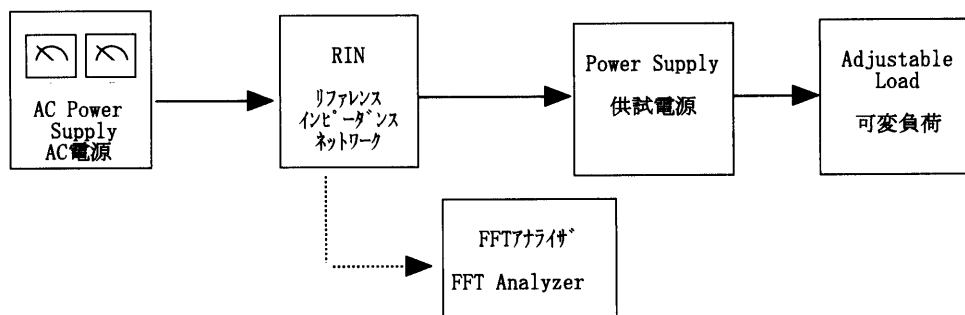


Figure E