



TEST DATA OF PAA50F-24
(100V INPUT)

Regulated DC Power Supply

Date : Sep.1. 1996

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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		PAA50F-24		Temperature		25°C																																	
Item		Line Regulation 静的入力変動		Testing Circuitry		Figure A																																	
Object		+ 2 4 V 2 . 2 A																																					
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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、AC入力断から出力電圧が、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>																																							

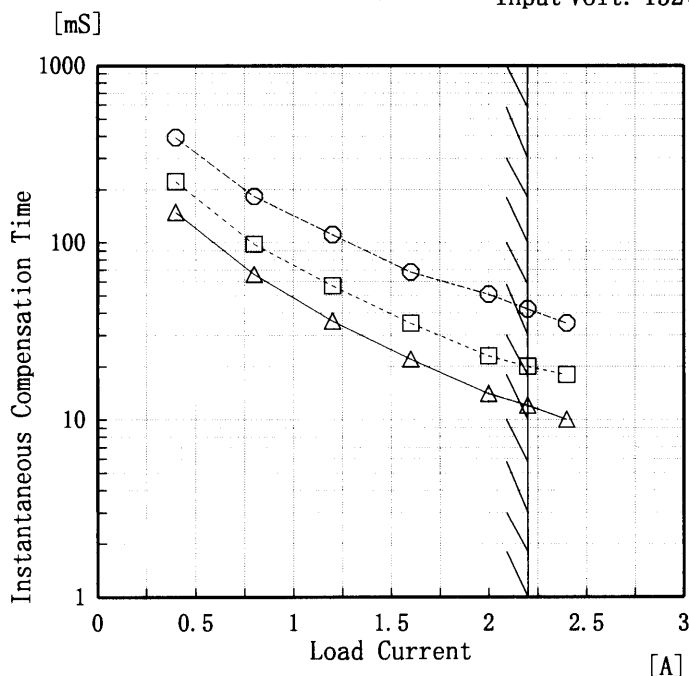


Model	PAA50F-24
Item	Instantaneous Interruption Compensation 瞬時停電保障
Object	+ 2 4 V 2 . 2 A

Testing Circuitry Figure A

1. Graph

—△— Input Volt. 85V
 - - -□- - - Input Volt. 100V
 - - -○- - - Input Volt. 132V



This duration counts between Shut-off and on of input voltage automatically.

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	—	—	—
0.4	148	222	392
0.8	66	98	182
1.2	36	57	111
1.6	22	35	68
2.0	14	23	51
2.2	12	20	42
2.4	10	18	35
—	—	—	—
—	—	—	—
—	—	—	—



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



<p>Model PAA50F-24</p> <p>Item Ripple-Noise リップルノイズ</p> <p>Object +24V 2.2A</p>		<p>Temperature 25°C</p> <p>Testing Circuitry Figure A</p>																																						
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<p>Fig. Complex Ripple Wave Form</p> <p>図 リップル波形詳細図</p>																																								



<p>Model PAA50F-24</p> <p>Item Overcurrent Protection 過電流保護</p> <p>Object +24V2.2A</p>		<p>Temperature 25°C</p> <p>Testing Circuitry Figure A</p>																																																							
<p>1. Graph</p> <p>[V]</p> <p>----- Input Volt. 85 V _____ Input Volt. 100 V _____ Input Volt. 132 V</p> <p>Output Voltage</p> <p>Load Current [A]</p> <p>Note: Slanted line shows the range of the rated load current.</p> <p>(注)斜線は定格負荷電流範囲を示す。</p>		<p>2. Values</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>24.00</td><td>3.28</td><td>3.18</td><td>3.00</td></tr> <tr><td>22.80</td><td>3.28</td><td>3.19</td><td>3.02</td></tr> <tr><td>21.60</td><td>3.29</td><td>3.20</td><td>3.05</td></tr> <tr><td>19.20</td><td>3.30</td><td>3.23</td><td>3.10</td></tr> <tr><td>16.80</td><td>3.34</td><td>3.25</td><td>3.15</td></tr> <tr><td>14.40</td><td>3.37</td><td>3.29</td><td>3.20</td></tr> <tr><td>12.00</td><td>3.40</td><td>3.34</td><td>3.27</td></tr> <tr><td>9.60</td><td>3.44</td><td>3.39</td><td>3.34</td></tr> <tr><td>7.20</td><td>3.49</td><td>3.46</td><td>3.40</td></tr> <tr><td>4.80</td><td>3.56</td><td>3.53</td><td>3.45</td></tr> <tr><td>2.40</td><td>3.65</td><td>3.54</td><td>3.40</td></tr> <tr><td>0.00</td><td>3.55</td><td>3.51</td><td>3.36</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]	24.00	3.28	3.18	3.00	22.80	3.28	3.19	3.02	21.60	3.29	3.20	3.05	19.20	3.30	3.23	3.10	16.80	3.34	3.25	3.15	14.40	3.37	3.29	3.20	12.00	3.40	3.34	3.27	9.60	3.44	3.39	3.34	7.20	3.49	3.46	3.40	4.80	3.56	3.53	3.45	2.40	3.65	3.54	3.40	0.00	3.55	3.51	3.36
Output Voltage [V]	Input Volt. 85[V]	Input Volt. 100[V]		Input Volt. 132[V]																																																					
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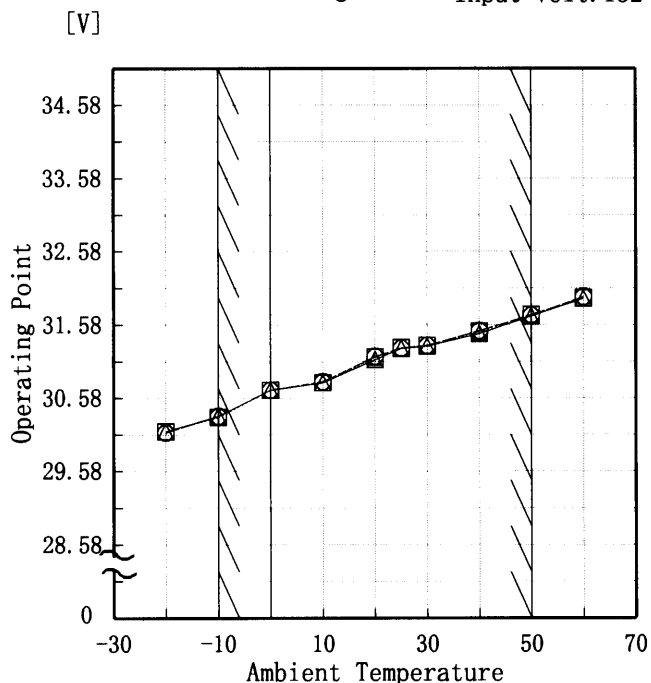
COSEL

Model	PAA50F-24
Item	Overtoltage Protection 過電圧保護
Object	+24V 2.2A

Testing Circuitry Figure A

1. Graph

\triangle Input Volt. 85 V
 \square Input Volt. 100 V
 \circ Input Volt. 132 V



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

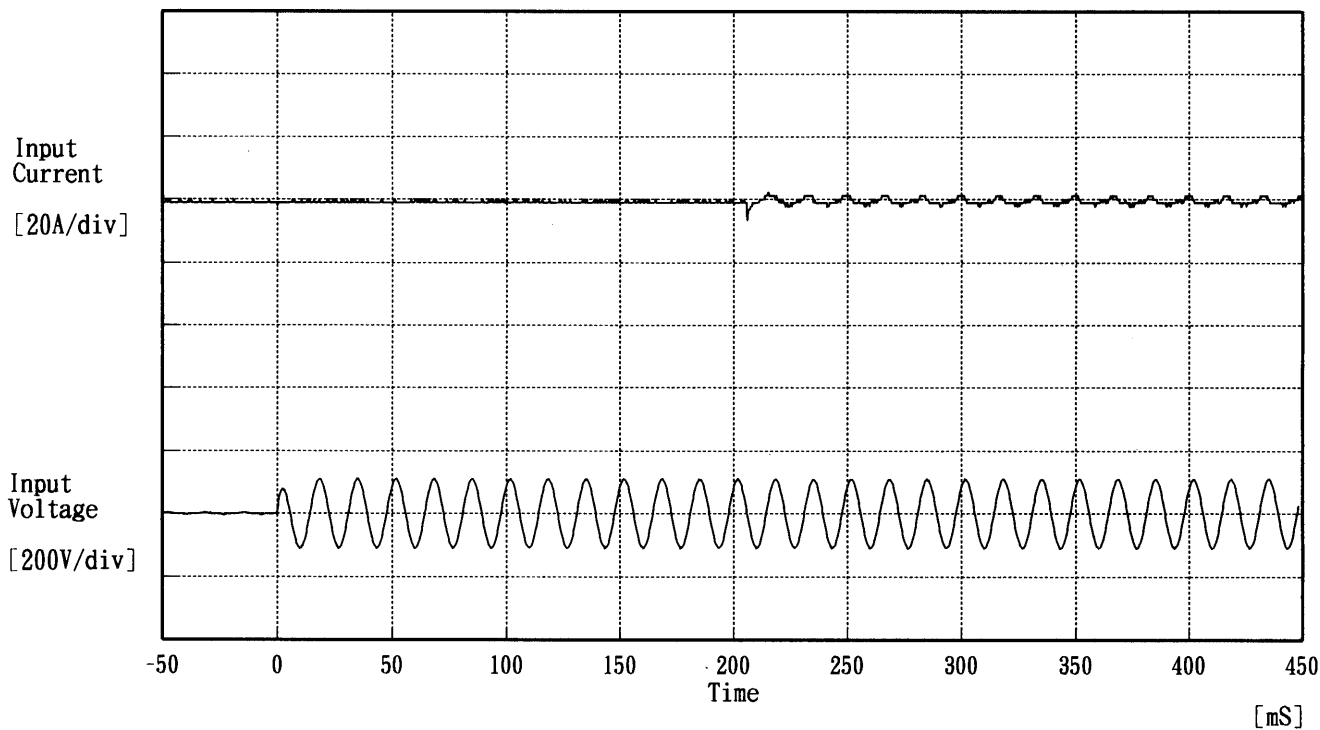
(注) 斜線は定格周囲温度範囲を示す。

2. Values

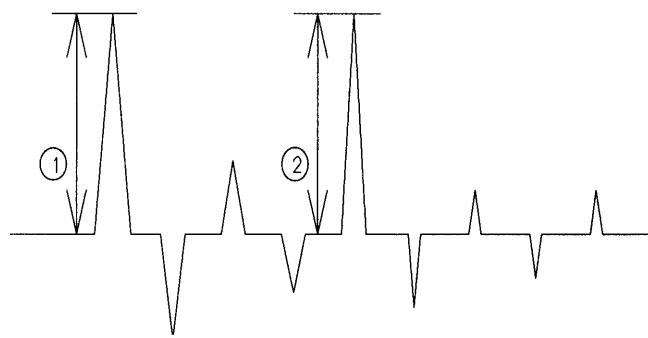
Ambient Temp. [°C]	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
	Operating Point [V]		
-20	30.12	30.12	30.11
-10	30.33	30.32	30.33
0	30.69	30.69	30.69
10	30.79	30.79	30.80
20	31.11	31.14	31.15
25	31.26	31.27	31.26
30	31.29	31.30	31.30
40	31.46	31.49	31.50
50	31.70	31.72	31.71
60	31.94	31.95	31.96
—	—	—	—



Model		PAA50F-24	Temperature 25°C Testing Circuitry Figure A
Item		Inrush Current 突入電流	
Object		_____	



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



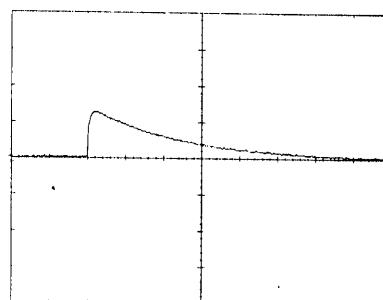
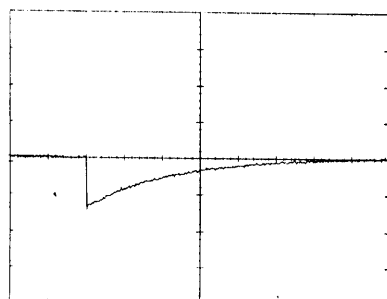


Model	PAA50F-24	Temperature 25°C Testing Circuitry Figure A
Item	Dynamic Load Responce 動的負荷変動	
Object	+ 2.4 V 2.2 A	

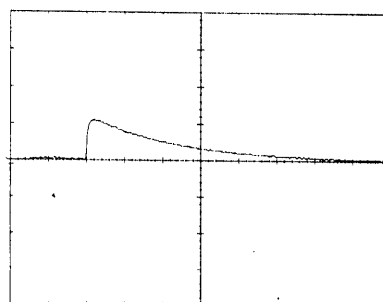
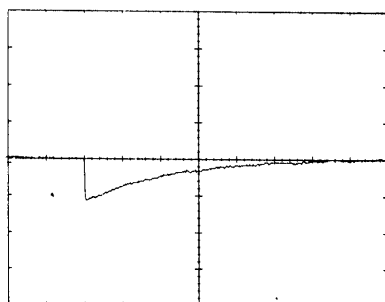
Input Volt. 100 V
Cycle 200 mS



Min. Load ↔
Load 100 %



Min. Load ↔
Load 50 %



100 mV/div

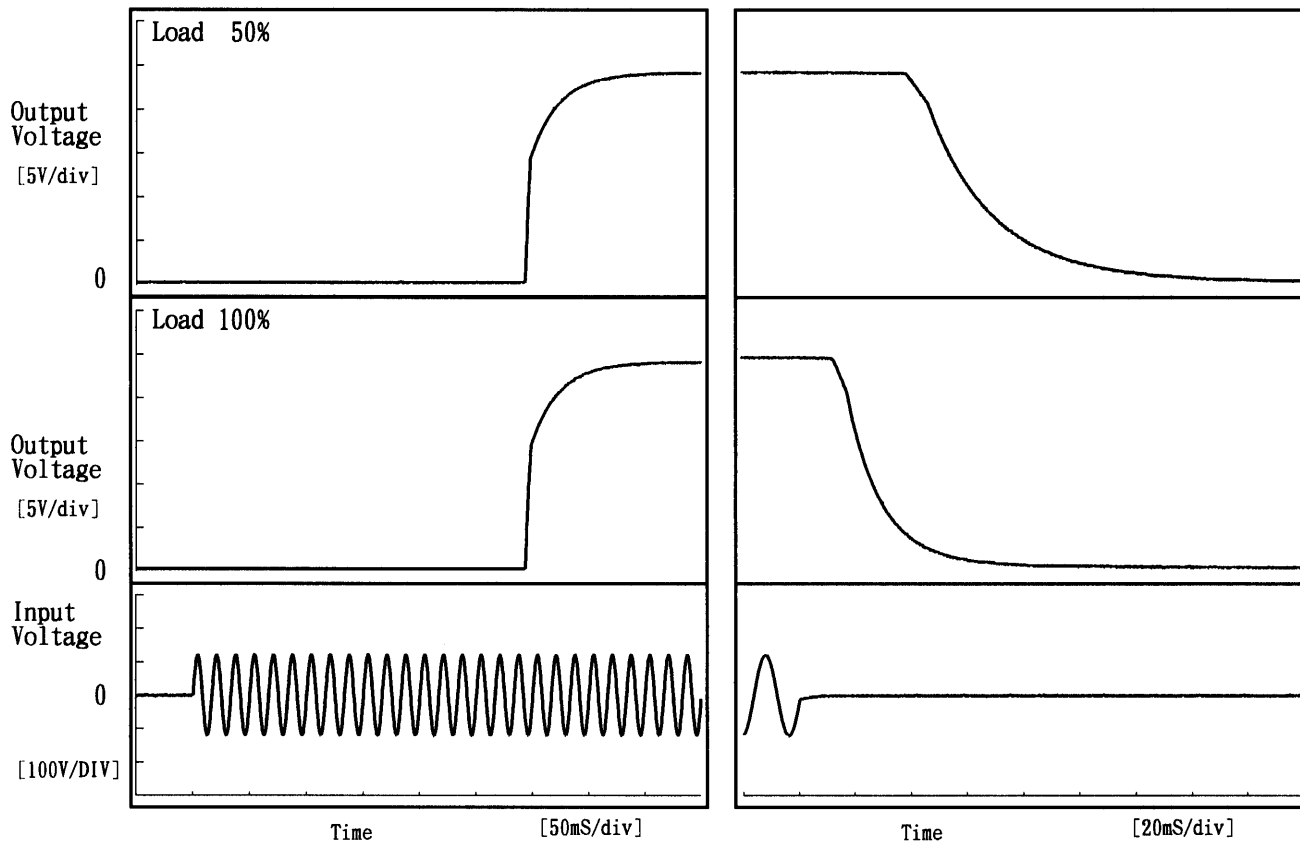
10 mS/div



Model	PAA50F-24	Temperature	25°C
Item	Rise and Fall Time 立上り、立下り時間	Testing Circuitry	Figure A
Object	+24V 2.2A		

1. Graph

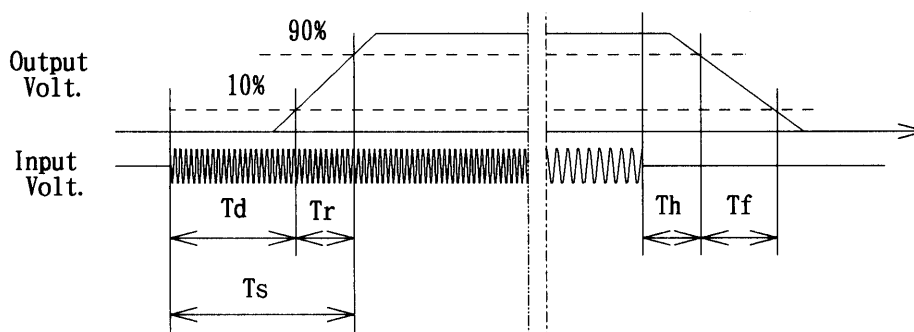
Input Volt. 85 V



2. Values

[mS]

Load \ Time	T d	T r	T s	T h	T f
50 %	293.8	40.0	333.8	43.6	55.1
100 %	294.0	40.5	334.5	15.8	30.5





Model		PAA50F-24		Testing Circuitry Figure A																																																				
Item		Ambient Temperature Drift 周囲温度変動																																																						
Object		+24V2.2A																																																						
1. Graph		<p> △ Input Volt. 85V □ Input Volt. 100V ○ Input Volt. 132V </p>		2. Values																																																				
<p>[V]</p> <p style="text-align: center;">Ambient Temperature [°C]</p> <p style="text-align: right;">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>24.274</td><td>24.274</td><td>24.274</td></tr> <tr><td>-10</td><td>24.270</td><td>24.270</td><td>24.270</td></tr> <tr><td>0</td><td>24.261</td><td>24.261</td><td>24.261</td></tr> <tr><td>10</td><td>24.248</td><td>24.248</td><td>24.248</td></tr> <tr><td>20</td><td>24.234</td><td>24.233</td><td>24.233</td></tr> <tr><td>25</td><td>24.227</td><td>24.227</td><td>24.227</td></tr> <tr><td>30</td><td>24.221</td><td>24.221</td><td>24.221</td></tr> <tr><td>40</td><td>24.202</td><td>24.202</td><td>24.202</td></tr> <tr><td>50</td><td>24.188</td><td>24.188</td><td>24.188</td></tr> <tr><td>60</td><td>24.173</td><td>24.173</td><td>24.173</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	24.274	24.274	24.274	-10	24.270	24.270	24.270	0	24.261	24.261	24.261	10	24.248	24.248	24.248	20	24.234	24.233	24.233	25	24.227	24.227	24.227	30	24.221	24.221	24.221	40	24.202	24.202	24.202	50	24.188	24.188	24.188	60	24.173	24.173	24.173	-	-	-	-		
Temperature [°C]	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]																																																					
	Output Volt. [V]	Output Volt. [V]	Output Volt. [V]																																																					
-20	24.274	24.274	24.274																																																					
-10	24.270	24.270	24.270																																																					
0	24.261	24.261	24.261																																																					
10	24.248	24.248	24.248																																																					
20	24.234	24.233	24.233																																																					
25	24.227	24.227	24.227																																																					
30	24.221	24.221	24.221																																																					
40	24.202	24.202	24.202																																																					
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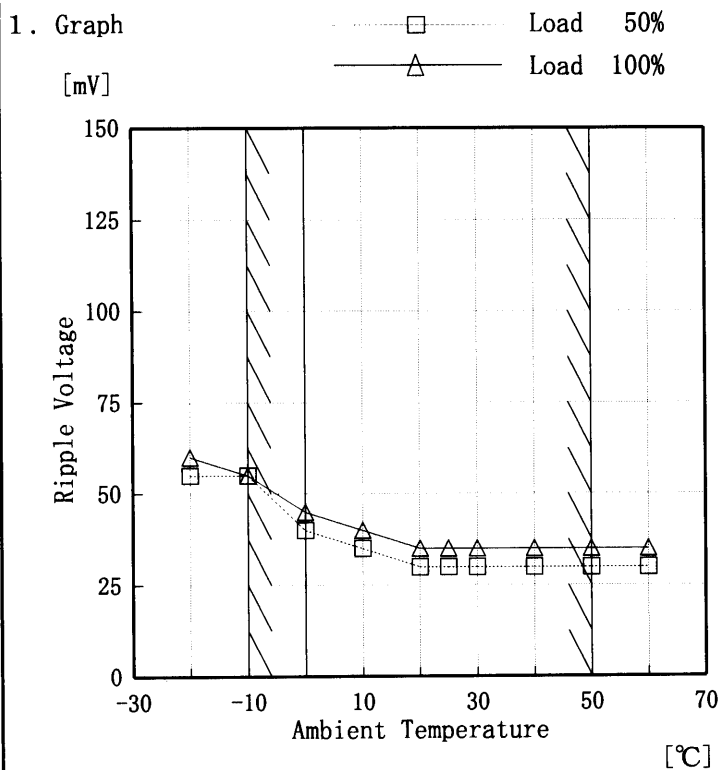


Model		PAA50F-24		Testing Circuitry Figure A																																				
Item		Minimum Input Voltage for Regulated Output Voltage 最低レギュレーション電圧																																						
Object		+24V2.2A																																						
1. Graph		-----□----- Load 50% -----△----- Load 100%		2. Values																																				
[V] 100 80 60 40 20 0 Input Voltage				<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>54</td><td>61</td></tr> <tr><td>-10</td><td>53</td><td>60</td></tr> <tr><td>0</td><td>49</td><td>55</td></tr> <tr><td>10</td><td>44</td><td>50</td></tr> <tr><td>20</td><td>42</td><td>48</td></tr> <tr><td>25</td><td>43</td><td>48</td></tr> <tr><td>30</td><td>43</td><td>48</td></tr> <tr><td>40</td><td>43</td><td>48</td></tr> <tr><td>50</td><td>43</td><td>49</td></tr> <tr><td>60</td><td>43</td><td>49</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	54	61	-10	53	60	0	49	55	10	44	50	20	42	48	25	43	48	30	43	48	40	43	48	50	43	49	60	43	49	—	—	—
Ambient Temp. [°C]	Load 50% Input Volt. [V]	Load 100% Input Volt. [V]																																						
-20	54	61																																						
-10	53	60																																						
0	49	55																																						
10	44	50																																						
20	42	48																																						
25	43	48																																						
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—	—	—																																						
-30 -10 10 30 50 70 Ambient Temperature [°C]																																								
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。																																								



Model	PAA50F-24
Item	Ripple Voltage (by Ambient Temp.) リップル電圧 (周囲温度特性)
Object	+ 2 4 V 2 . 2 A

Testing Circuitry Figure A



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	55	60
-10	55	55
0	40	45
10	35	40
20	30	35
25	30	35
30	30	35
40	30	35
50	30	35
60	30	35
—	—	—



COSEL																								
Model	PAA50F-24	Temperature 25 °C Testing Circuitry Figure A																						
Item	Time Lapse Drift 経時ドリフト																							
Object	+24V2.2A																							
<p>1. Graph</p> <p>[V]</p> <p style="text-align: center;">Time [H]</p> <p style="text-align: center;">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>24.267</td></tr> <tr><td>0.5</td><td>24.246</td></tr> <tr><td>1.0</td><td>24.246</td></tr> <tr><td>2.0</td><td>24.246</td></tr> <tr><td>3.0</td><td>24.246</td></tr> <tr><td>4.0</td><td>24.245</td></tr> <tr><td>5.0</td><td>24.245</td></tr> <tr><td>6.0</td><td>24.246</td></tr> <tr><td>7.0</td><td>24.246</td></tr> <tr><td>8.0</td><td>24.246</td></tr> </tbody> </table>	Time since start [H]	Output Voltage [V]	0.0	24.267	0.5	24.246	1.0	24.246	2.0	24.246	3.0	24.246	4.0	24.245	5.0	24.245	6.0	24.246	7.0	24.246	8.0	24.246
Time since start [H]	Output Voltage [V]																							
0.0	24.267																							
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4.0	24.245																							
5.0	24.245																							
6.0	24.246																							
7.0	24.246																							
8.0	24.246																							



Model		PAA50F-24	Testing Circuitry Figure A
Item		Output Voltage Accuracy 定電圧精度	
Object		+24V 2.2A	

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 : 0.0~2.2 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 0.0~2.2 A

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

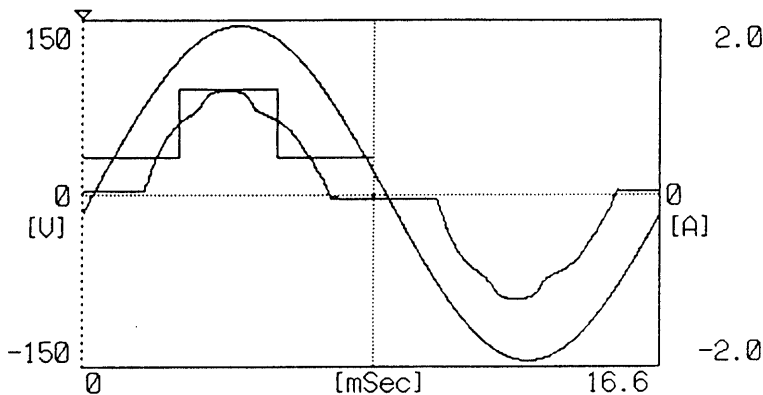
* 定電圧精度(変動率) = $\frac{\text{変動値}}{\text{定格出力電圧}} \times 100$

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	24.277	±44	±0.2
Minimum Voltage	50	132	2.2	24.190		



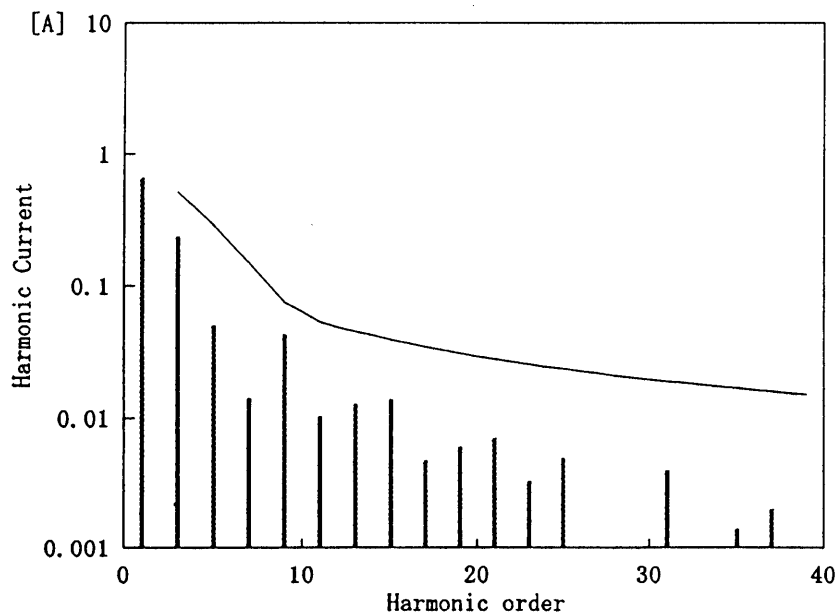
Model	PAA50F-24	Temperature	25°C
Item	Harmonic Current 高調波電流	Testing Circuitry	Figure E
Object			

1. Input Current Waveform



Conditions	Values
Input Voltage [V]	100.6
Input Current [A]	0.71
Active Power [W]	65.9
Apparent Power [VA]	71
Frequency [Hz]	60
Power Factor	0.928
Output Power [W]	52.8

2. Harmonic Current



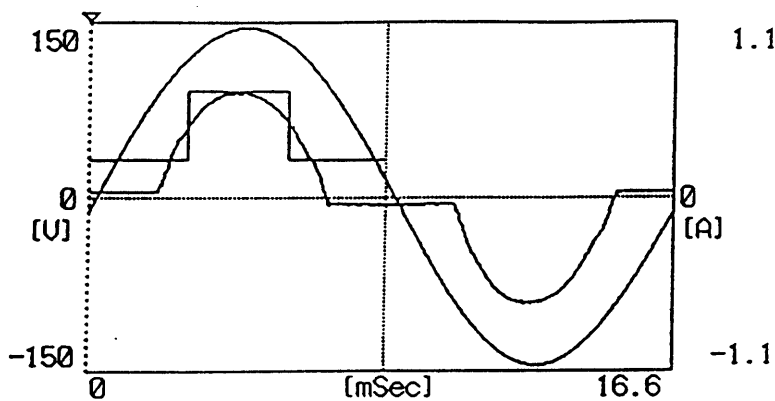
— Harmonic Current
 高調波電流
 - - - Limits for Class D equipment
 クラスDの機器に対する限度値

Harmonics order 高調波次数	Limits 限度値 [A]	Values 測定値 [A]
1	—	0.660
2	—	0.000
3	0.512	0.238
4	—	0.000
5	0.286	0.050
6	—	0.000
7	0.151	0.014
8	—	0.000
9	0.075	0.043
10	—	0.000
11	0.053	0.010
12	—	0.000
13	0.045	0.013
14	—	0.000
15	0.039	0.014
16	—	0.000
17	0.034	0.005
18	—	0.000
19	0.031	0.006
20	—	0.000
21	0.028	0.007
22	—	0.000
23	0.025	0.003
24	—	0.000
25	0.023	0.005
26	—	0.000
27	0.021	0.000
28	—	0.000
29	0.020	0.000
30	—	0.000
31	0.019	0.004
32	—	0.000
33	0.018	0.000
34	—	0.000
35	0.017	0.001
36	—	0.000
37	0.016	0.002
38	—	0.000
39	0.015	0.001
40	—	0.000

COSEL

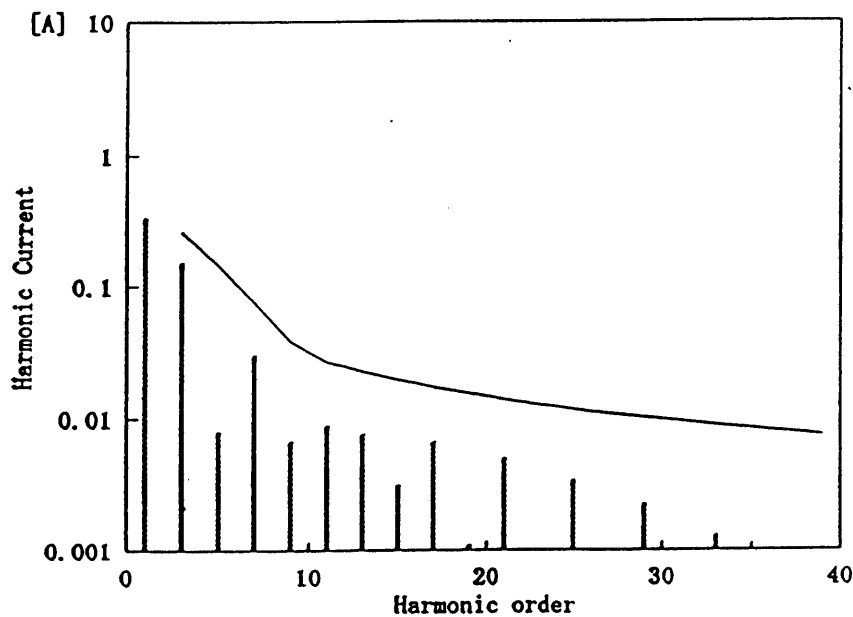
Model	PAA50F-24	Temperature	25°C
Item	Harmonic Current 高調波電流	Testing Circuitry	Figure E
Object			

1. Input Current Waveform



Conditions	Values
Input Voltage [V]	100.7
Input Current [A]	0.37
Active Power [W]	33.4
Apparent Power [VA]	37.3
Frequency [Hz]	60
Power Factor	0.895
Output Power [W]	26.4

2. Harmonic Current



— Harmonic Current
 高調波電流
 - - - Limits for Class D equipment
 クラスD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	—	0.335
2	—	0.000
3	0.259	0.153
4	—	0.000
5	0.145	0.008
6	—	0.000
7	0.076	0.031
8	—	0.000
9	0.038	0.007
10	—	0.000
11	0.027	0.009
12	—	0.000
13	0.023	0.008
14	—	0.000
15	0.020	0.003
16	—	0.000
17	0.017	0.007
18	—	0.000
19	0.015	0.001
20	—	0.000
21	0.014	0.005
22	—	0.000
23	0.013	0.000
24	—	0.000
25	0.012	0.004
26	—	0.000
27	0.011	0.001
28	—	0.000
29	0.010	0.002
30	—	0.000
31	0.009	0.001
32	—	0.000
33	0.009	0.001
34	—	0.000
35	0.008	0.001
36	—	0.000
37	0.008	0.001
38	—	0.000
39	0.008	0.001
40	—	0.000

COSEL

Model		PAA50F-24																																	
Item		Condensation 結露特性																																	
Object		+ 24 V 2.2 A																																	
		Testing Circuitry Figure A																																	
<p>1. Condensation test</p> <p>Testing procedure is as follows.</p> <p>① Keeping and cooling the unit in a tank at -10°C for an hour with the input off.</p> <p>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.</p> <p>③ Testing electrical characteristics (Output Voltage, Ripple Voltage, Ripple noise) of the unit to confirm there be no fault.</p> <p>④ Repeating ①, ② and ③ three times.</p> <p>1. 結露特性試験</p> <p>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（出力電圧、リップル、リップルノイズ）の測定を3度行い、異常のないことを確認する。</p>																																			
<p>2. Values</p> <table border="1"> <thead> <tr> <th></th> <th>Times</th> <th>Output Voltage [V]</th> <th>Ripple Voltage [mV]</th> <th>Ripple Noise [mV]</th> </tr> </thead> <tbody> <tr> <td rowspan="3">Load 50%</td> <td>1</td> <td>24.232</td> <td>30</td> <td>35</td> </tr> <tr> <td>2</td> <td>24.233</td> <td>30</td> <td>35</td> </tr> <tr> <td>3</td> <td>24.232</td> <td>30</td> <td>35</td> </tr> <tr> <td rowspan="3">Load 100%</td> <td>1</td> <td>24.231</td> <td>40</td> <td>45</td> </tr> <tr> <td>2</td> <td>24.231</td> <td>40</td> <td>45</td> </tr> <tr> <td>3</td> <td>24.231</td> <td>40</td> <td>45</td> </tr> </tbody> </table> <p style="text-align: right;">Input Volt. 100 V</p>						Times	Output Voltage [V]	Ripple Voltage [mV]	Ripple Noise [mV]	Load 50%	1	24.232	30	35	2	24.233	30	35	3	24.232	30	35	Load 100%	1	24.231	40	45	2	24.231	40	45	3	24.231	40	45
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— 21 —																																			
				BC-0531																															



Model		PAA50F-24	Testing Circuitry Figure A
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	0.16	0.18	0.28
(B) UL	0.13	0.19	0.24
(C) C S A	0.13	0.19	0.24

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

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。

Load 100 %

(A) Input Resistance :1KΩ

(B) Input Resistance :1.5KΩ
Input Capacitance :0.15 μF

(C) Input Resistance :1.5KΩ
Input Capacitance :0.15 μF

(D) Input Resistance :2KΩ
Input Capacitance :0.1 μF



Model		PAA50F-24	Testing Circuitry Figure C
Item		Line Noise Tolerance 入力雑音耐量	
Object		+ 2 4 V 2 . 2 A	

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	31.22	no regulation
	NORMAL	31.21	no regulation
1000	COMMON	31.21	no regulation
	NORMAL	31.21	no regulation

Conditions

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



Model		PAA50F-24
Item		Conducted Emission 雑音端子電圧
Object		_____

Testing Circuitry Figure D

1. Graph

Remarks

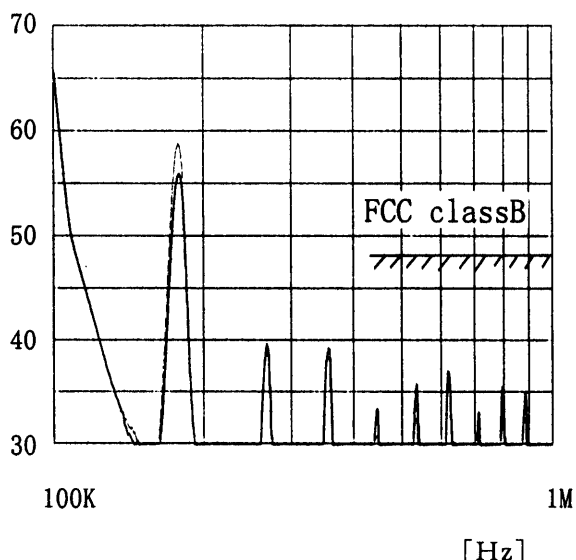
Input Volt. 120 V
Load 100 %

Note: Slanted line shows the range of Tolerance.

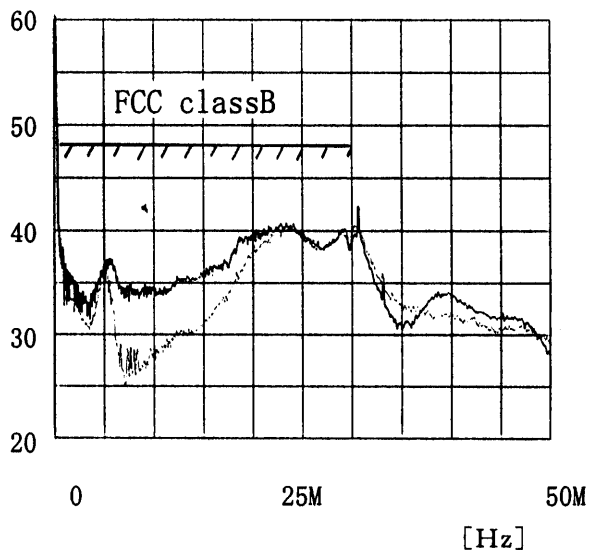
(注)斜線は許容値を示す。

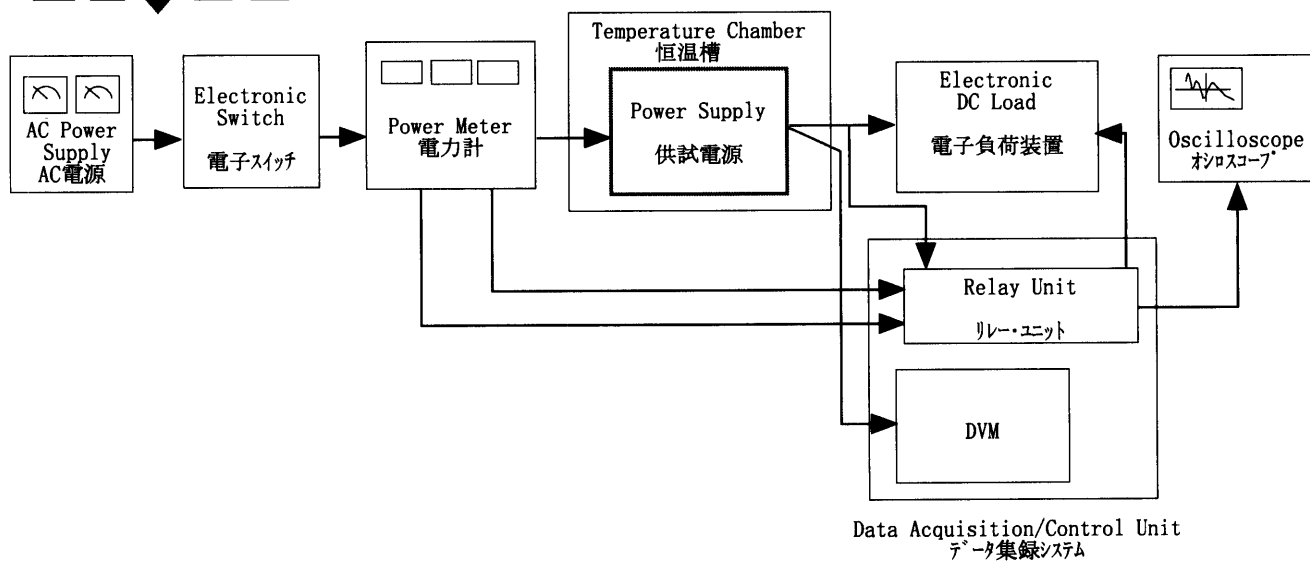
[dB μ V]

NO	Standards	Standards Complied	Frequency [MHz]	Tolerance [dB μ V]
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

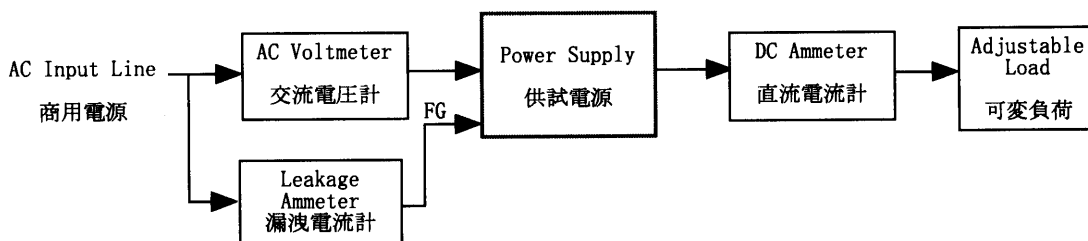


[dB μ V]

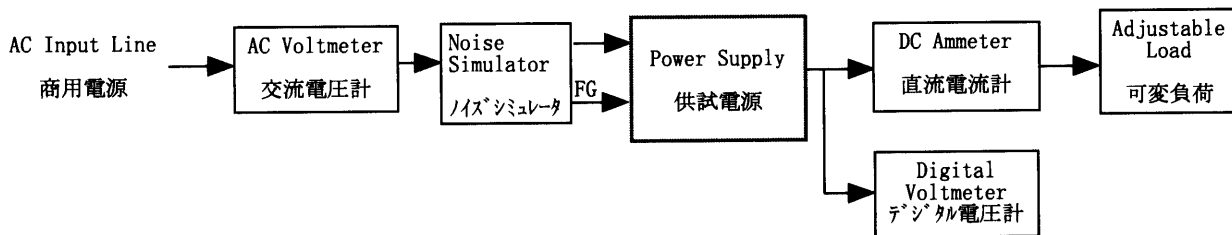




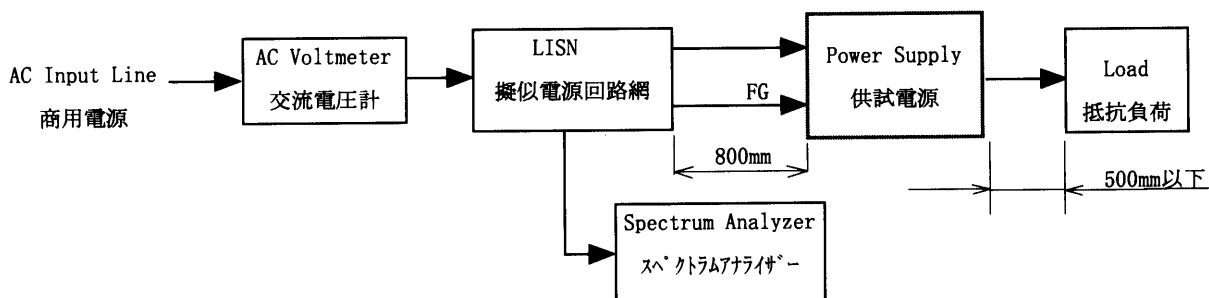
Testing Circuitry Figure A



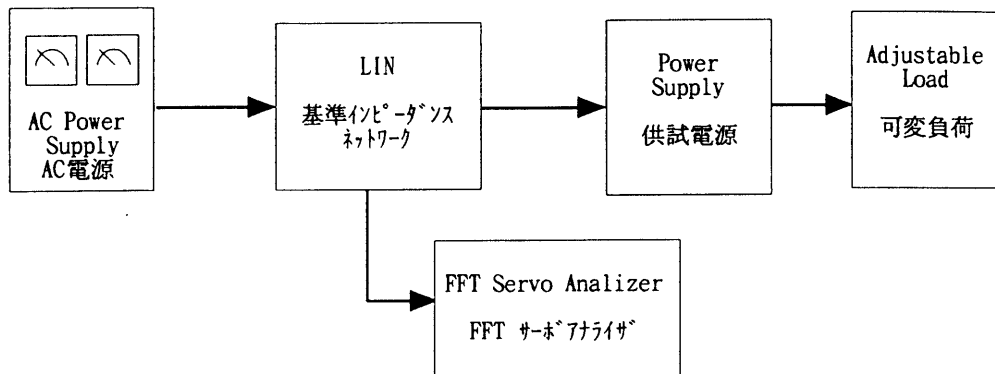
Testing Circuitry Figure B



Testing Circuitry Figure C



Testing Circuitry Figure D



Testing Circuitry Figure E