



TEST DATA OF MODULE 2K

(ACE series)

Regulated DC power supply
Jun.14.2003

Approved by :

K.Shibutani

Design Manager

Prepared by :

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Design Engineer

COSEL CO.,LTD.



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(Final Page 12)

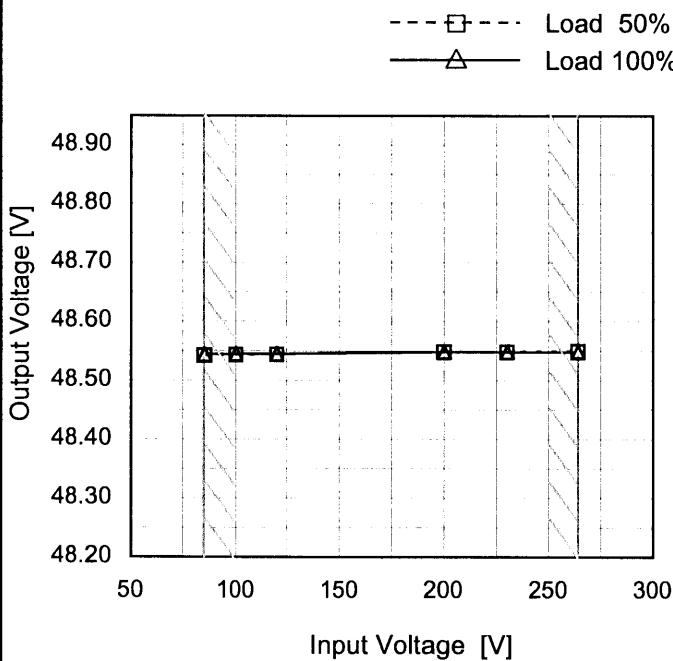
Model MODULE 2K

Item Line Regulation

Object +48V7A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

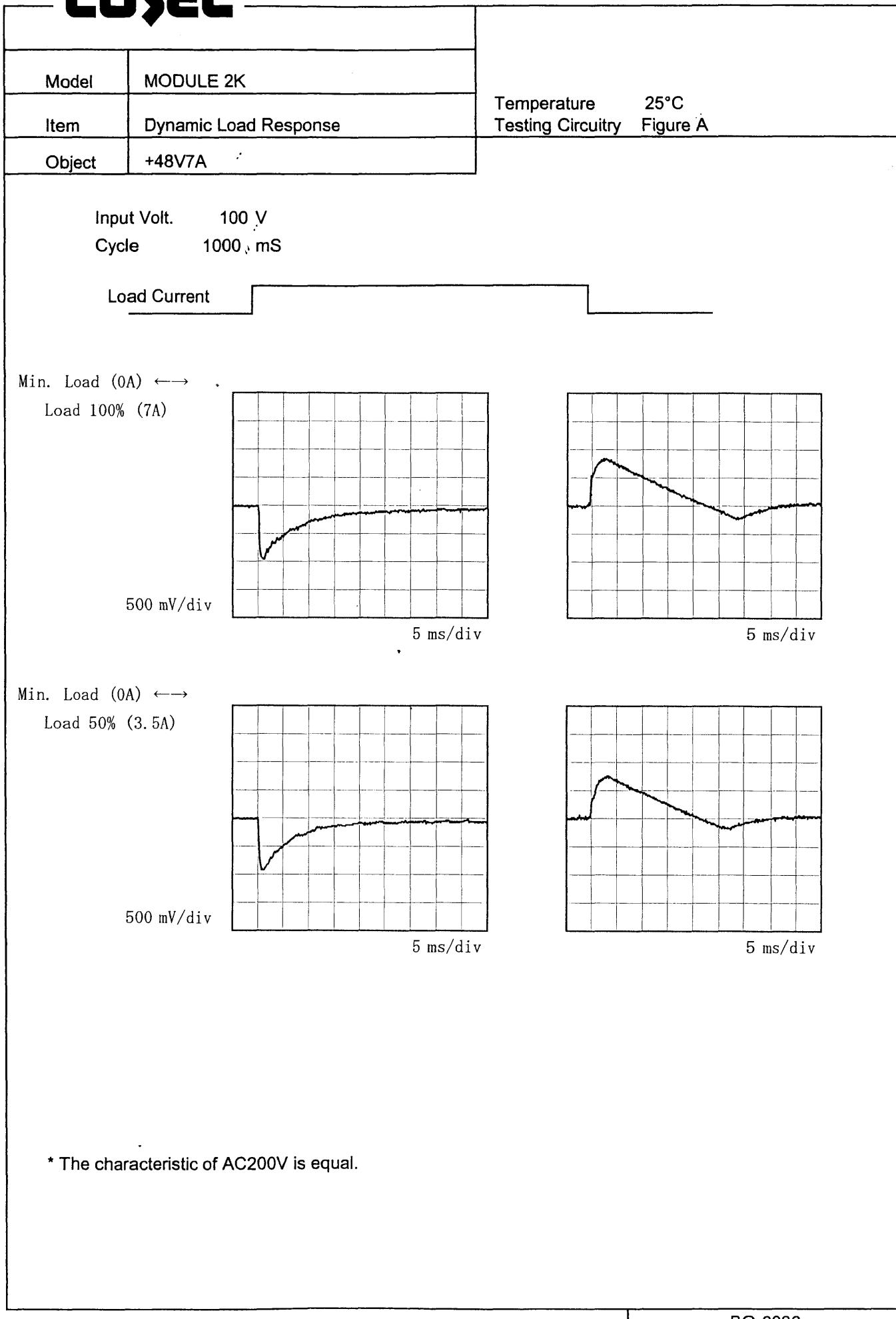


Note: Slanted line shows the range of the rated input voltage.

2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
85	48.542	48.544
100	48.543	48.545
120	48.544	48.545
200	48.548	48.548
230	48.548	48.548
264	48.549	48.548
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Model	MODULE 2K																																																					
Item	Load Regulation	Temperature Testing Circuitry	25°C Figure A																																																			
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1.Graph	<p>Output Voltage [V]</p> <p>Load Current [A]</p> <p>Input Volt. 100V</p> <p>Input Volt. 200V</p> <p>Input Volt. 230V</p>																																																					
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Model	MODULE 2K	Temperature Testing Circuitry 25°C Figure A																																			
Item	Ripple Voltage (by Load Current)																																				
Object	+48V7A																																				
1.Graph		2.Values																																			
<p>Graph showing Ripple Voltage [mV] vs Load Current [A]. The Y-axis ranges from 0 to 200 mV, and the X-axis ranges from 0 to 8 A. Two curves are shown: one for Input Volt. 100V (solid line with open circles) and one for Input Volt. 200V (dashed line with open circles). Both curves show a slight increase in ripple voltage as load current increases, eventually leveling off.</p> <table border="1"> <thead> <tr> <th>Load Current [A]</th> <th>Input Volt. 100 [V] [mV]</th> <th>Input Volt. 200 [V] [mV]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>20</td><td>20</td></tr> <tr><td>1.0</td><td>40</td><td>40</td></tr> <tr><td>2.0</td><td>40</td><td>40</td></tr> <tr><td>3.0</td><td>40</td><td>40</td></tr> <tr><td>4.0</td><td>40</td><td>40</td></tr> <tr><td>5.0</td><td>40</td><td>40</td></tr> <tr><td>6.0</td><td>40</td><td>40</td></tr> <tr><td>7.0</td><td>40</td><td>40</td></tr> <tr><td>7.7</td><td>40</td><td>40</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. 100 [V] [mV]	Input Volt. 200 [V] [mV]	0.0	20	20	1.0	40	40	2.0	40	40	3.0	40	40	4.0	40	40	5.0	40	40	6.0	40	40	7.0	40	40	7.7	40	40	--	-	-	--	-	-
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<p>Measured by 20 MHz Oscilloscope. Ripple Voltage is shown as p-p in the figure below. Note: Slanted line shows the range of the rated load current.</p>																																					
<p>Fig. Complex Ripple Wave Form</p> <p>Diagram illustrating a complex ripple wave form. The vertical axis is labeled "Ripple [mVp-p]". The horizontal axis shows two time intervals: T1, which is the full width of the waveform, and T2, which is a much smaller, higher-frequency component superimposed on T1. The T2 component consists of many small, sharp peaks.</p>																																					

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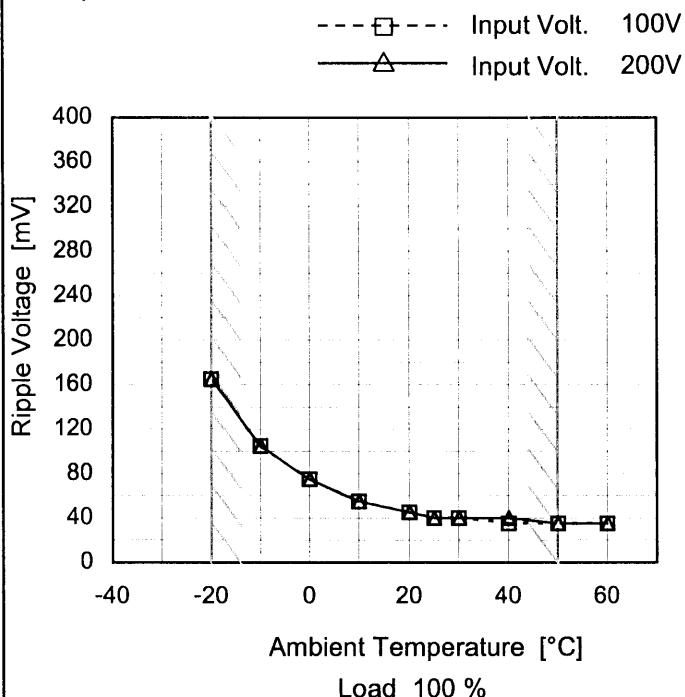
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Item	Ripple-Noise	Temperature 25°C Testing Circuitry Figure A																																							
Object	+48V7A																																								
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<p>Graph showing Ripple-Noise [mV] vs Load Current [A]. The Y-axis ranges from 0 to 200 mV, and the X-axis ranges from 0 to 8 A. Two curves are plotted: one for Input Volt. 100V (solid line with open circles) and one for Input Volt. 200V (dashed line with open triangles). Both curves show a slight increase in noise as load current increases. A slanted line indicates the rated load current range.</p>		2.Values																																							
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Measured by 20 MHz Oscilloscope. Ripple-Noise is shown as p-p in the figure below. Note: Slanted line shows the range of the rated load current.																																									
<p>Diagram illustrating a Complex Ripple Wave Form. The diagram shows a waveform with two main components: T1 (AC Input Line noise) and T2 (Switching noise). The total noise level is indicated by a vertical double-headed arrow labeled "Ripple-Noise [mVp-p]".</p>																																									
Fig. Complex Ripple Wave Form																																									

Model MODULE 2K

Item Ripple Voltage (by Ambient Temp.)

Object +48V7A

1. Graph



Measured by 20 MHz Oscilloscope.

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

Testing Circuitry Figure A

2. Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
-20	165	165
-10	105	105
0	75	75
10	55	55
20	45	45
25	40	40
30	40	40
40	35	40
50	35	35
60	35	35
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Model	MODULE 2K																																																					
Item	Ambient Temperature Drift																																																					
Object	+48V7A																																																					
1.Graph	<p>Output Voltage [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 100%</p> <ul style="list-style-type: none"> —△— Input Volt. 100V - -□-- Input Volt. 200V - -○-- Input Volt. 230V 																																																					
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Model	MODULE 2K	Testing Circuitry Figure A
Item	Output Voltage Accuracy	
Object	+48V7A	

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 : -20 - 50°C

Input Voltage : 85 - 264V

Load Current : 0 - 7A

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

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

2. Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	25	264	0	48.593	±39	±0.1
Minimum Voltage	-20	85	7	48.516		

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Model	MODULE 2K	Temperature	25°C																						
Item	Time Lapse Drift	Testing Circuitry	Figure A																						
Object	+48V7A																								
1.Graph			2.Values																						
<p>Output Voltage [V]</p> <p>Time [H]</p> <p>Input Volt. 100V Load 100%</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>48.059</td></tr> <tr><td>0.5</td><td>48.067</td></tr> <tr><td>1.0</td><td>48.068</td></tr> <tr><td>2.0</td><td>48.069</td></tr> <tr><td>3.0</td><td>48.069</td></tr> <tr><td>4.0</td><td>48.069</td></tr> <tr><td>5.0</td><td>48.069</td></tr> <tr><td>6.0</td><td>48.069</td></tr> <tr><td>7.0</td><td>48.069</td></tr> <tr><td>8.0</td><td>48.069</td></tr> </tbody> </table>	Time since start [H]	Output Voltage [V]	0.0	48.059	0.5	48.067	1.0	48.068	2.0	48.069	3.0	48.069	4.0	48.069	5.0	48.069	6.0	48.069	7.0	48.069	8.0	48.069
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* The characteristic of AC200V is equal.

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Item	Overcurrent Protection	Temperature 25°C Testing Circuitry Figure A																																												
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<p>Note: Slanted line shows the range of the rated load current.</p> <p>Intermittent operation occurs when the output voltage is from 38.4V to 0V.</p>		<table border="1"> <thead> <tr> <th rowspan="2">Output Voltage [V]</th> <th colspan="2">Load Current [A]</th> </tr> <tr> <th>Input Volt. 100[V]</th> <th>Input Volt. 200[V]</th> </tr> </thead> <tbody> <tr><td>48.0</td><td>10.68</td><td>10.71</td></tr> <tr><td>45.6</td><td>10.69</td><td>10.73</td></tr> <tr><td>43.2</td><td>10.72</td><td>10.76</td></tr> <tr><td>38.4</td><td>10.78</td><td>10.84</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> <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> <tr><td>--</td><td>-</td><td>-</td></tr> </tbody> </table>	Output Voltage [V]	Load Current [A]		Input Volt. 100[V]	Input Volt. 200[V]	48.0	10.68	10.71	45.6	10.69	10.73	43.2	10.72	10.76	38.4	10.78	10.84	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-
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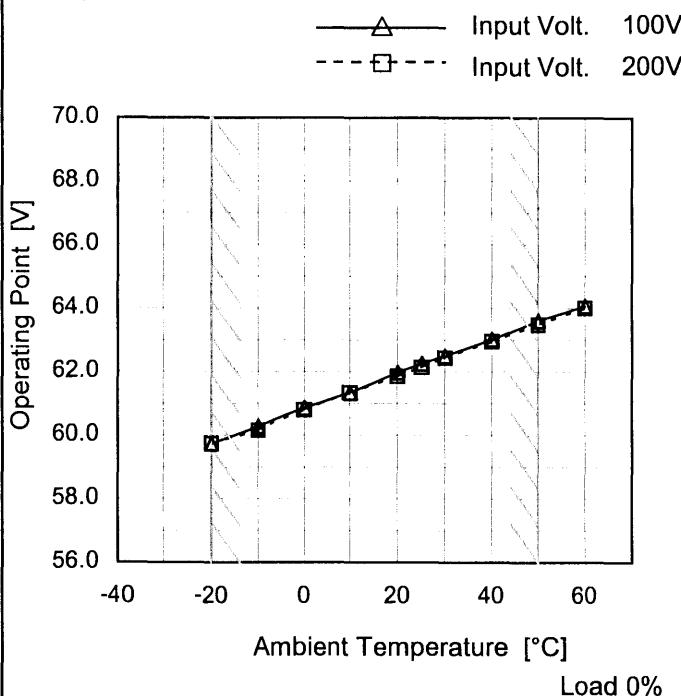
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Model MODULE 2K

Item Overvoltage Protection

Object +48V7A

1.Graph



Testing Circuitry Figure A

2.Values

Ambient Temperature [°C]	Operating Point [V]	
	Input Volt. 100[V]	Input Volt. 200[V]
-20	59.73	59.73
-10	60.27	60.15
0	60.86	60.80
10	61.33	61.33
20	61.97	61.85
25	62.26	62.14
30	62.50	62.44
40	63.02	62.96
50	63.60	63.48
60	64.07	64.01
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Note: Slanted line shows the range of the rated ambient temperature.

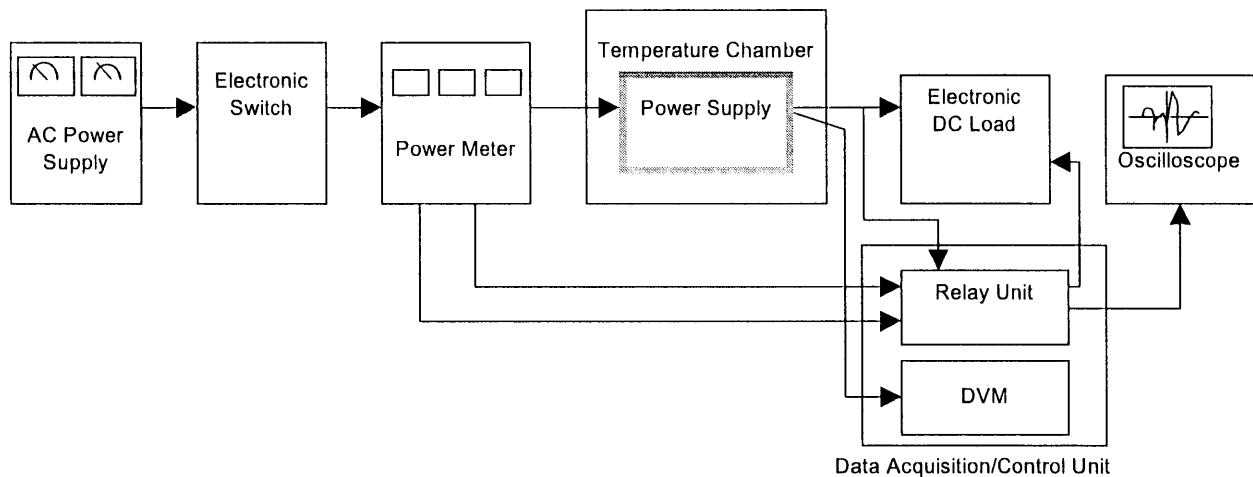


Figure A

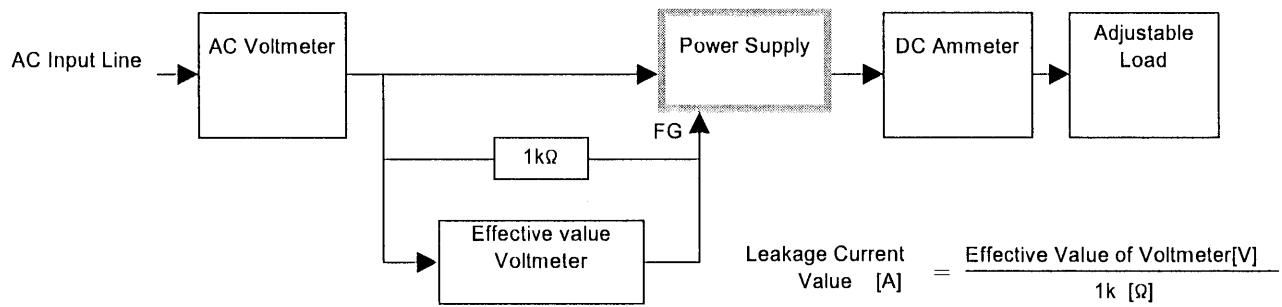


Figure B (DEN-AN)

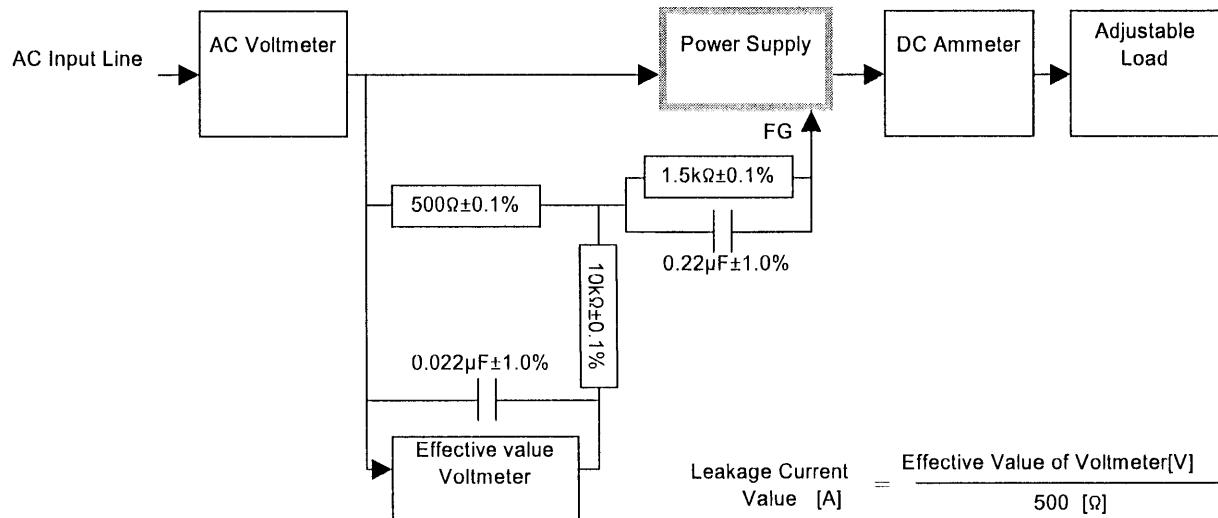


Figure B (IEC60950)