

# TEST DATA OF MODULE G

(ACE series)

Regulated DC power supply  
July.14.2003

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**COSEL CO.,LTD.**

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Model	MODULE G	Temperature 25°C																																	
Item	Line Regulation	Testing Circuitry Figure A																																	
Object	+18V8.5A																																		
<p>1.Graph</p> <p>---□--- Load 50% —△— Load 100%</p> <p>Note: Slanted line shows the range of the rated input voltage.</p>		<p>2.Values</p> <table border="1"> <thead> <tr> <th rowspan="2">Input Voltage [V]</th> <th colspan="2">Output Voltage [V]</th> </tr> <tr> <th>Load 50%</th> <th>Load 100%</th> </tr> </thead> <tbody> <tr> <td>85</td> <td>18.172</td> <td>18.171</td> </tr> <tr> <td>100</td> <td>18.172</td> <td>18.170</td> </tr> <tr> <td>120</td> <td>18.172</td> <td>18.170</td> </tr> <tr> <td>200</td> <td>18.174</td> <td>18.169</td> </tr> <tr> <td>230</td> <td>18.173</td> <td>18.169</td> </tr> <tr> <td>264</td> <td>18.173</td> <td>18.168</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>		Input Voltage [V]	Output Voltage [V]		Load 50%	Load 100%	85	18.172	18.171	100	18.172	18.170	120	18.172	18.170	200	18.174	18.169	230	18.173	18.169	264	18.173	18.168	--	-	-	--	-	-	--	-	-
Input Voltage [V]	Output Voltage [V]																																		
	Load 50%	Load 100%																																	
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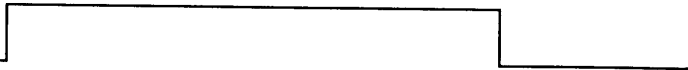
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<p>Output Voltage [V]</p> <p>Load Current [A]</p>			<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="3">Output Voltage [V]</th> </tr> <tr> <th>Input Volt. 100[V]</th> <th>Input Volt. 200[V]</th> <th>Input Volt. 230[V]</th> </tr> </thead> <tbody> <tr><td>0.00</td><td>18.174</td><td>18.177</td><td>18.176</td></tr> <tr><td>1.50</td><td>18.172</td><td>18.175</td><td>18.174</td></tr> <tr><td>3.00</td><td>18.171</td><td>18.175</td><td>18.173</td></tr> <tr><td>4.50</td><td>18.170</td><td>18.173</td><td>18.173</td></tr> <tr><td>6.00</td><td>18.169</td><td>18.172</td><td>18.172</td></tr> <tr><td>7.50</td><td>18.169</td><td>18.171</td><td>18.170</td></tr> <tr><td>8.50</td><td>18.168</td><td>18.170</td><td>18.169</td></tr> <tr><td>9.35</td><td>18.168</td><td>18.169</td><td>18.168</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> </tbody> </table>		Load Current [A]	Output Voltage [V]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	0.00	18.174	18.177	18.176	1.50	18.172	18.175	18.174	3.00	18.171	18.175	18.173	4.50	18.170	18.173	18.173	6.00	18.169	18.172	18.172	7.50	18.169	18.171	18.170	8.50	18.168	18.170	18.169	9.35	18.168	18.169	18.168	--	-	-	-	--	-	-	-	--	-	-	-
Load Current [A]	Output Voltage [V]																																																						
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0.00	18.174	18.177	18.176																																																				
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Note: Slanted line shows the range of the rated load current.																																																							



Model		MODULE G	
Item		Temperature	25°C
Object		Testing Circuitry	Figure A
		+18V8.5A	

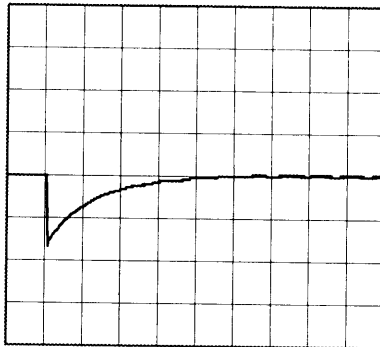
Input Volt. 100 V  
 Cycle 1000 ms

Load Current

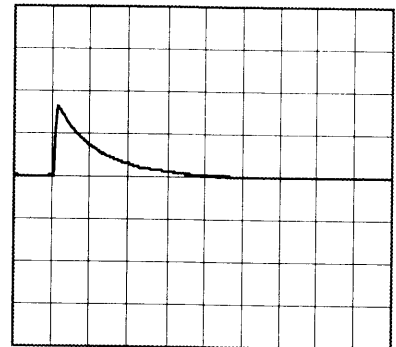


Min. Load (0A) ←→  
 Load 100% (8.5A)

100 mV/div



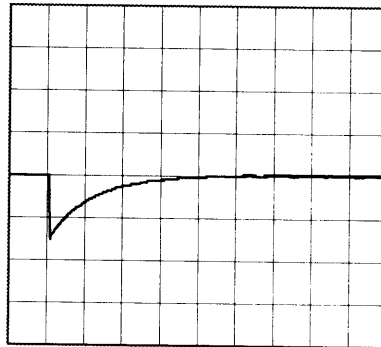
10 ms/div



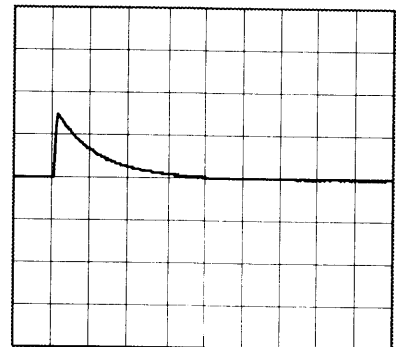
10 ms/div

Min. Load (0A) ←→  
 Load 50% (4.25A)

100 mV/div



10 ms/div



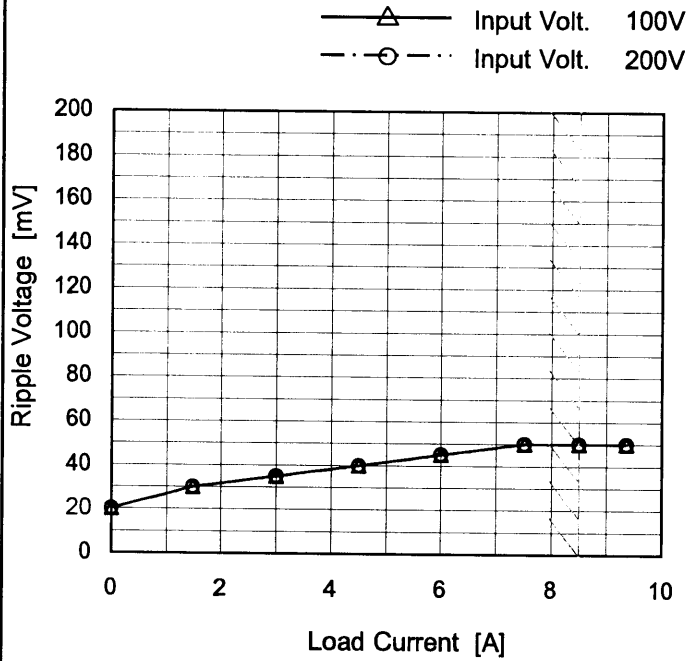
10 ms/div

\*The characteristic of AC200V is equal.

Model	MODULE G
Item	Ripple Voltage (by Load Current)
Object	+18V8.5A

Temperature 25°C  
Testing Circuitry Figure A

1. Graph



2. Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
0.00	20	20
1.50	30	30
3.00	35	35
4.50	40	40
6.00	45	45
7.50	50	50
8.50	50	50
9.35	50	50
--	-	-
--	-	-
--	-	-

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.

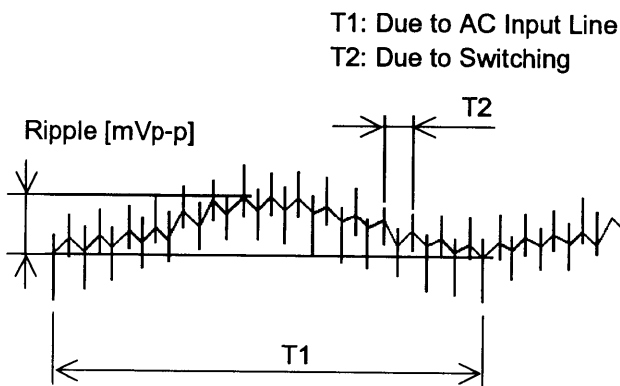
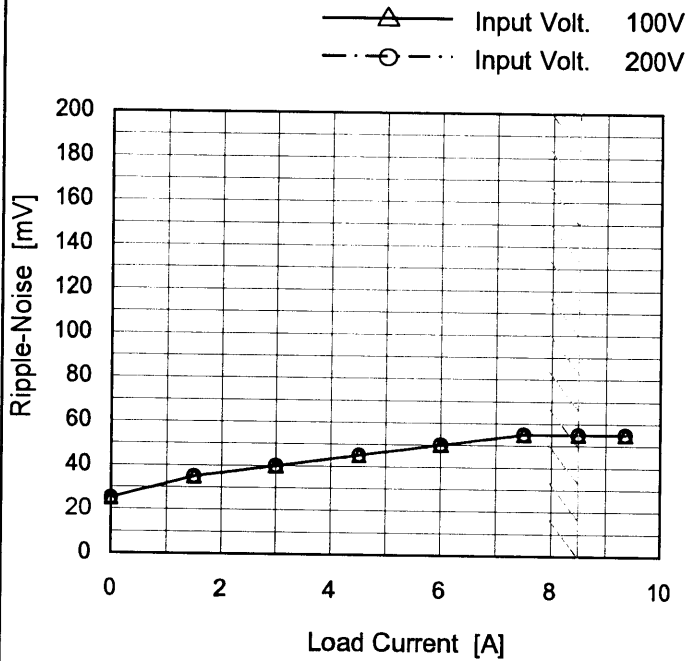


Fig. Complex Ripple Wave Form

Model	MODULE G
Item	Ripple-Noise
Object	+18V8.5A

Temperature 25°C  
Testing Circuitry Figure A

1. Graph



2. Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
0.00	25	25
1.50	35	35
3.00	40	40
4.50	45	45
6.00	50	50
7.50	55	55
8.50	55	55
9.35	55	55
--	-	-
--	-	-
--	-	-

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.

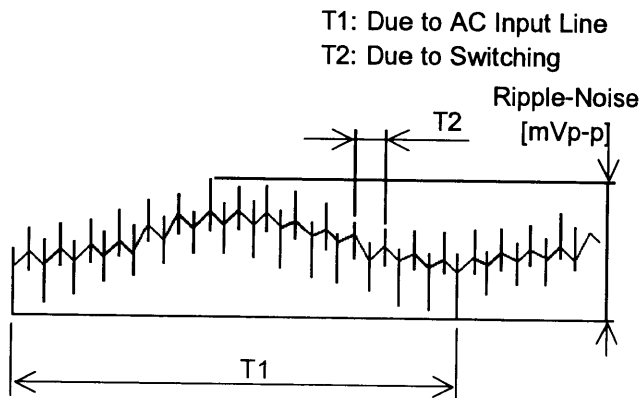


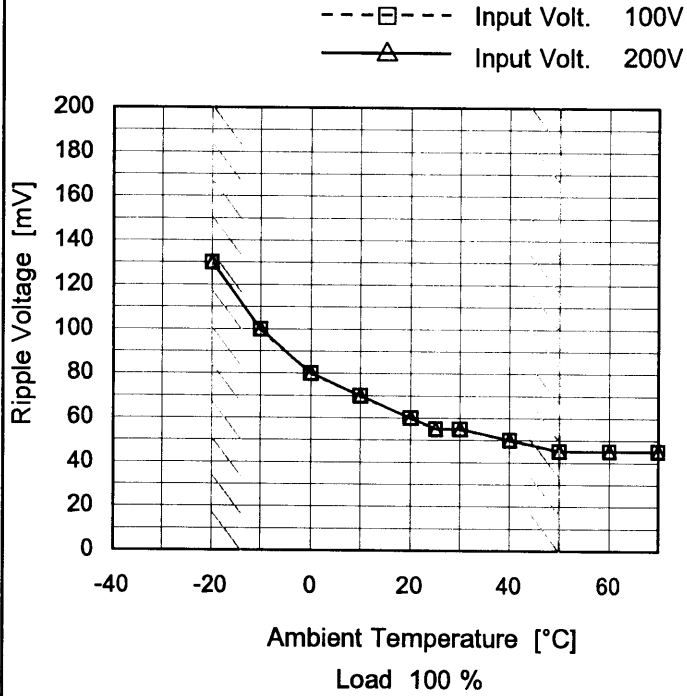
Fig. Complex Ripple Wave Form



Model	MODULE G
Item	Ripple Voltage (by Ambient Temp.)
Object	+18V8.5A

Testing Circuitry Figure A

1. Graph



2. Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
-20	130	130
-10	100	100
0	80	80
10	70	70
20	60	60
25	55	55
30	55	55
40	50	50
50	45	45
60	45	45
70	45	45

Measured by 20 MHz Oscilloscope.

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





Model		MODULE G		Testing Circuitry Figure A																																																			
Item		Ambient Temperature Drift																																																					
Object		+18V8.5A																																																					
1.Graph		<p>                     —△— Input Volt. 100V                      - - - □ - - - Input Volt. 200V                      - - - ○ - - - Input Volt. 230V                 </p> <p>Output Voltage [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 100%</p>																																																					
2.Values		<table border="1"> <thead> <tr> <th rowspan="2">Ambient Temperature [°C]</th> <th colspan="3">Output Voltage [V]</th> </tr> <tr> <th>Input Volt. 100[V]</th> <th>Input Volt. 200[V]</th> <th>Input Volt. 230[V]</th> </tr> </thead> <tbody> <tr><td>-20</td><td>18.229</td><td>18.229</td><td>18.228</td></tr> <tr><td>-10</td><td>18.216</td><td>18.215</td><td>18.213</td></tr> <tr><td>0</td><td>18.202</td><td>18.202</td><td>18.201</td></tr> <tr><td>10</td><td>18.194</td><td>18.193</td><td>18.193</td></tr> <tr><td>20</td><td>18.185</td><td>18.185</td><td>18.184</td></tr> <tr><td>25</td><td>18.182</td><td>18.182</td><td>18.182</td></tr> <tr><td>30</td><td>18.178</td><td>18.177</td><td>18.177</td></tr> <tr><td>40</td><td>18.166</td><td>18.166</td><td>18.165</td></tr> <tr><td>50</td><td>18.151</td><td>18.151</td><td>18.150</td></tr> <tr><td>60</td><td>18.135</td><td>18.135</td><td>18.134</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> </tbody> </table>			Ambient Temperature [°C]	Output Voltage [V]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	-20	18.229	18.229	18.228	-10	18.216	18.215	18.213	0	18.202	18.202	18.201	10	18.194	18.193	18.193	20	18.185	18.185	18.184	25	18.182	18.182	18.182	30	18.178	18.177	18.177	40	18.166	18.166	18.165	50	18.151	18.151	18.150	60	18.135	18.135	18.134	--	-	-	-
Ambient Temperature [°C]	Output Voltage [V]																																																						
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]																																																				
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10	18.194	18.193	18.193																																																				
20	18.185	18.185	18.184																																																				
25	18.182	18.182	18.182																																																				
30	18.178	18.177	18.177																																																				
40	18.166	18.166	18.165																																																				
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<p>Note: Slanted line shows the range of the rated ambient temperature.</p>																																																							



<b>COSEL</b>		
Model	MODULE G	
Item	Output Voltage Accuracy	Testing Circuitry Figure A
Object	+18V8.5A	

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 - 8.5A

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

\* 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	-20	264	0	18.236	±44	±0.2
Minimum Voltage	50	264	8.5	18.148		

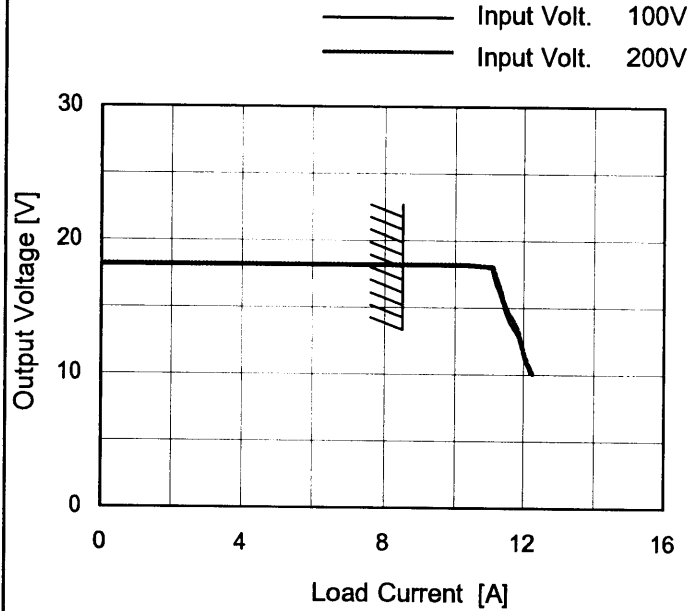


<b>COSEL</b>																								
Model	MODULE G																							
Item	Time Lapse Drift	Temperature 25°C Testing Circuitry Figure A																						
Object	+18V8.5A																							
<p>1.Graph</p> <p style="text-align: center;">Time [H]</p> <p>Input Volt. 100V Load 100%</p>		<p>2.Values</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>18.178</td></tr> <tr><td>0.5</td><td>18.162</td></tr> <tr><td>1.0</td><td>18.162</td></tr> <tr><td>2.0</td><td>18.163</td></tr> <tr><td>3.0</td><td>18.163</td></tr> <tr><td>4.0</td><td>18.163</td></tr> <tr><td>5.0</td><td>18.164</td></tr> <tr><td>6.0</td><td>18.164</td></tr> <tr><td>7.0</td><td>18.164</td></tr> <tr><td>8.0</td><td>18.164</td></tr> </tbody> </table>	Time since start [H]	Output Voltage [V]	0.0	18.178	0.5	18.162	1.0	18.162	2.0	18.163	3.0	18.163	4.0	18.163	5.0	18.164	6.0	18.164	7.0	18.164	8.0	18.164
Time since start [H]	Output Voltage [V]																							
0.0	18.178																							
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8.0	18.164																							
<p>* The characteristic of AC200V is equal.</p>																								

Model	MODULE G
Item	Overcurrent Protection
Object	+18V8.5A

Temperature 25°C  
Testing Circuitry Figure A

1. Graph



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

Intermittent operation occurs when the output voltage is from 10V to 0V.

2. Values

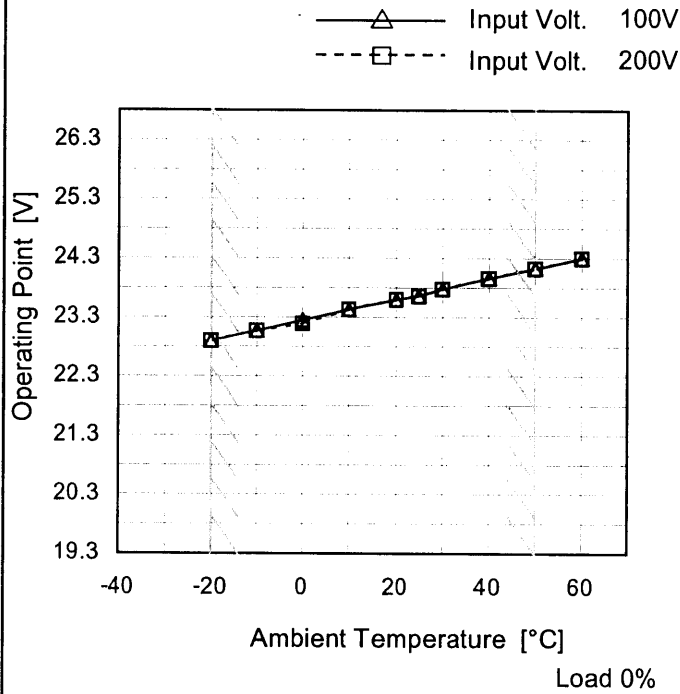
Output Voltage [V]	Load Current [A]	
	Input Volt. 100[V]	Input Volt. 200[V]
18.0	11.04	11.10
17.1	11.14	11.22
16.2	11.26	11.34
14.4	11.50	11.61
12.6	11.88	11.91
10.8	12.08	12.10
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-



Model	MODULE G
Item	Overvoltage Protection
Object	+18V8.5A

Testing Circuitry Figure A

1. Graph



2. Values

Ambient Temperature [°C]	Operating Point [V]	
	Input Volt. 100[V]	Input Volt. 200[V]
-20	22.86	22.86
-10	23.03	23.03
0	23.21	23.15
10	23.39	23.39
20	23.56	23.56
25	23.62	23.62
30	23.74	23.74
40	23.92	23.92
50	24.09	24.09
60	24.26	24.26
--	-	-

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

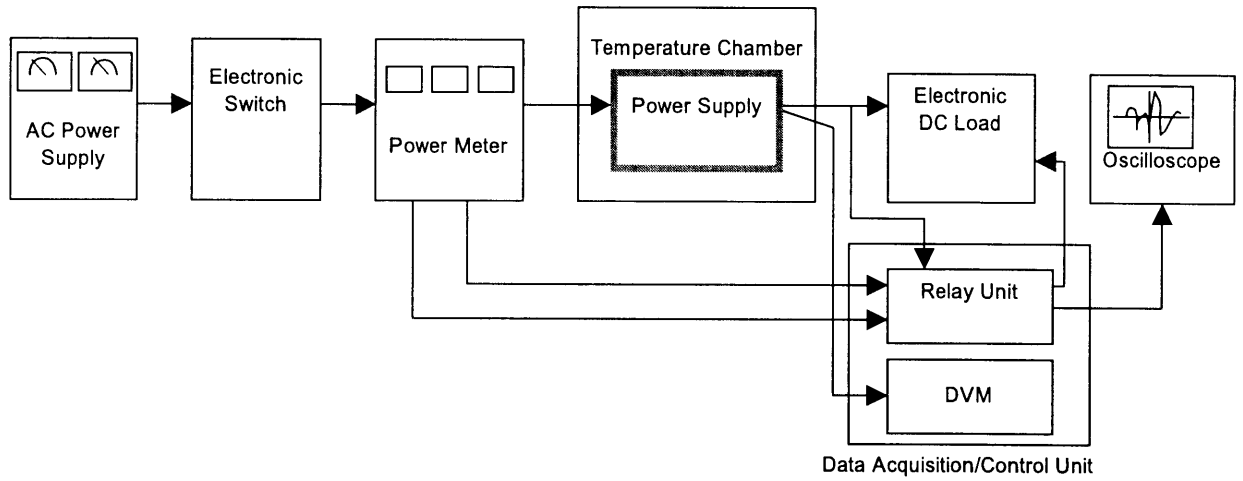


Figure A

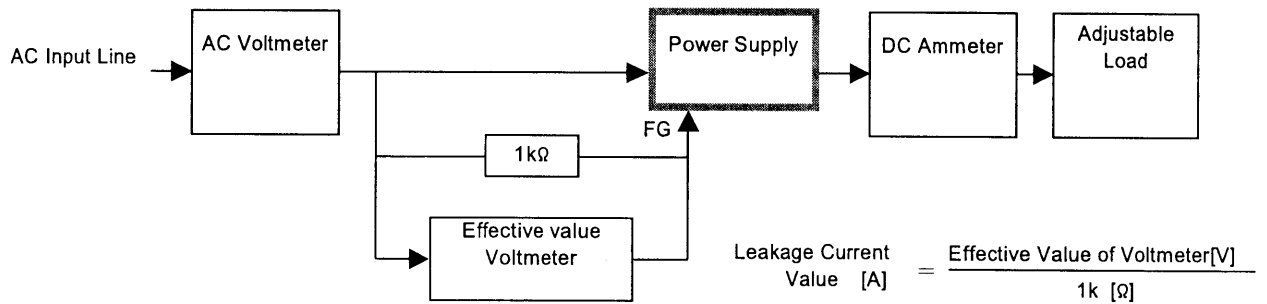


Figure B ( DEN-AN )

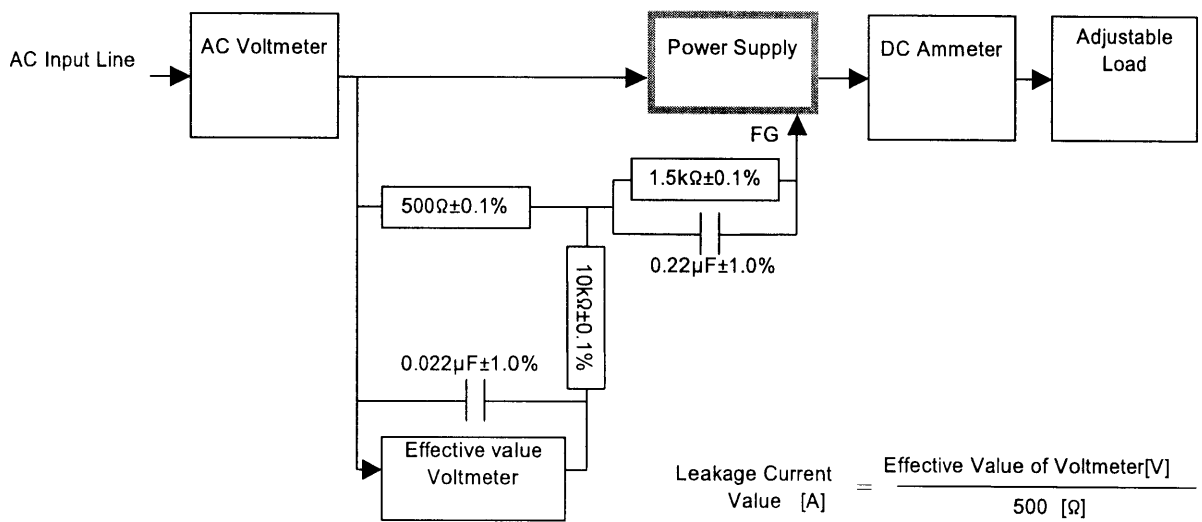


Figure B ( IEC60950 )