



# TEST DATA OF MODULE S

(ACE series)

Regulated DC power supply  
Jun.19.2003

Approved by :   
K. Shibutani Design Manager

Prepared by :   
M. Hamaguchi Design Engineer

**COSEL CO.,LTD.**

## CONTENTS

1.Line Regulation . . . . .	1
2.Load Regulation . . . . .	2
3.Dynamic Load Response . . . . .	3
4.Ripple Voltage (by Load Current) . . . . .	5
5.Ripple-Noise . . . . .	7
6.Ripple Voltage (by Ambient Temperature) . . . . .	9
7.Ambient Temperature Drift . . . . .	10
8.Output Voltage Accuracy . . . . .	11
9.Time Lapse Drift . . . . .	12
10.Overcurrent Protection . . . . .	13
11.Overvoltage Protection . . . . .	14
12.Figure of Testing Circuitry . . . . .	15

(Final Page 15)



<p>Model MODULE S</p> <p>Item Line Regulation</p> <p>Object +5V10A</p>		<p>Temperature 25°C</p> <p>Testing Circuitry Figure A</p>																																
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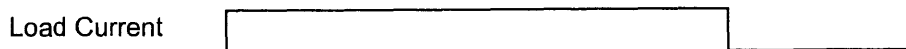


<p>Model MODULE S</p>		<p>Temperature 25°C Testing Circuitry Figure A</p>																																																				
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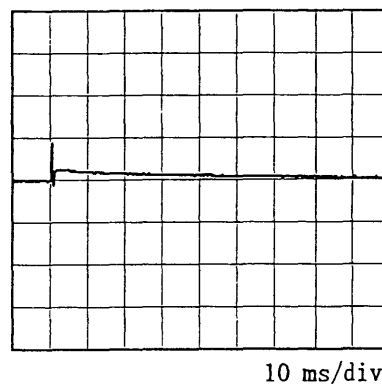
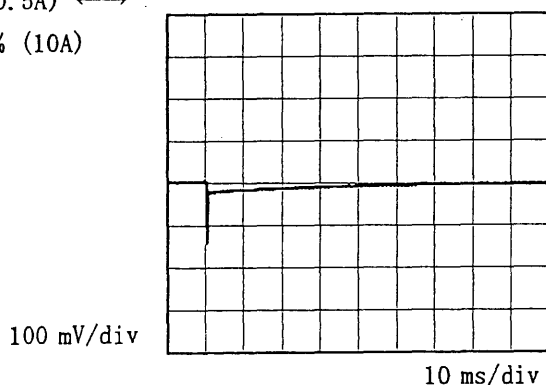


Model		MODULE S	Temperature 25°C Testing Circuitry Figure A
Item		Dynamic Load Response	
Object		+5V10A	

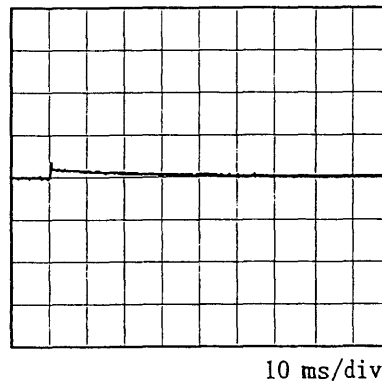
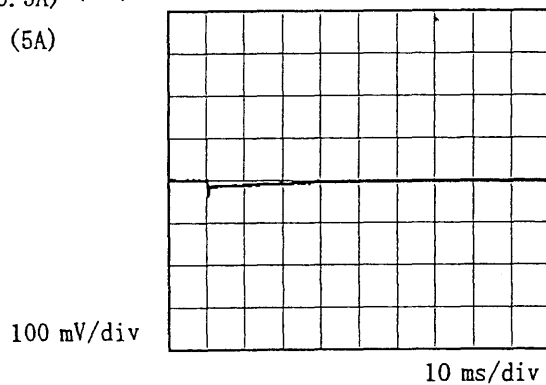
Input Volt. 100 V  
Cycle 1000 mS



Min. Load (0.5A) ←→  
Load 100% (10A)



Min. Load (0.5A) ←→  
Load 50% (5A)



\* The characteristic of AC200V is equal.

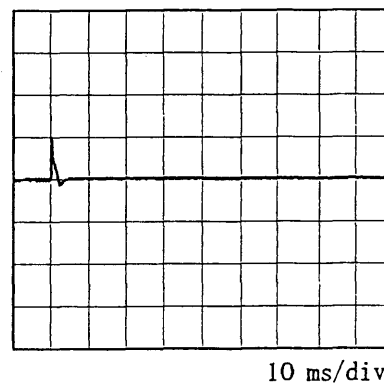
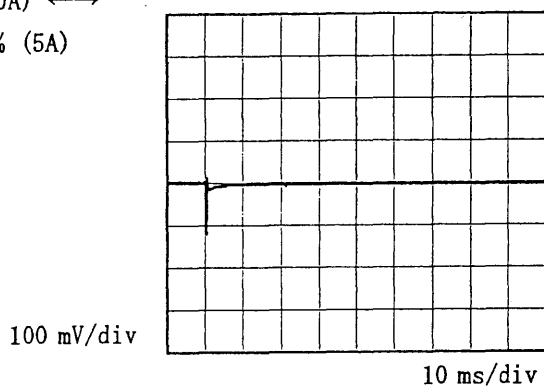


Model		MODULE S	Temperature 25°C Testing Circuitry Figure A
Item		Dynamic Load Response	
Object		+5V5A	

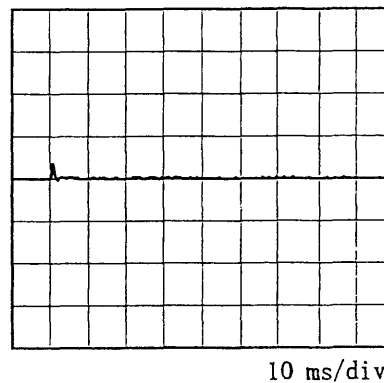
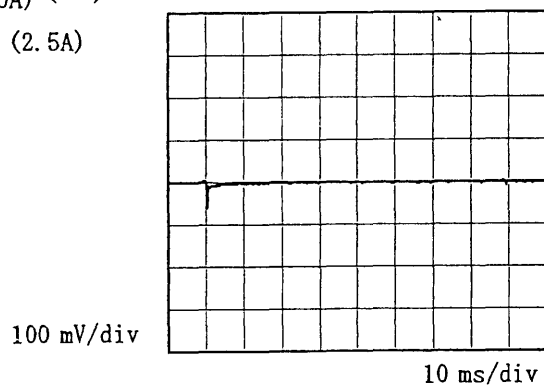
Input Volt. 100 V  
Cycle 1000 mS

Load Current

Min. Load (0A) ←→  
Load 100% (5A)



Min. Load (0A) ←→  
Load 50% (2.5A)



\* The characteristic of AC200V is equal.



Model		MODULE S		Temperature 25°C																																							
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<p>                     —△— Input Volt. 100V                      - - -○- - - Input Volt. 200V                 </p> <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>				<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="2">Ripple Voltage [mV]</th> </tr> <tr> <th>Input Volt. 100 [V]</th> <th>Input Volt. 200 [V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>20</td><td>20</td></tr> <tr><td>1.5</td><td>20</td><td>20</td></tr> <tr><td>3.0</td><td>25</td><td>25</td></tr> <tr><td>4.5</td><td>25</td><td>25</td></tr> <tr><td>6.0</td><td>25</td><td>25</td></tr> <tr><td>7.5</td><td>30</td><td>30</td></tr> <tr><td>9.0</td><td>30</td><td>30</td></tr> <tr><td>10.0</td><td>30</td><td>30</td></tr> <tr><td>11.0</td><td>30</td><td>30</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> </tbody> </table>		Load Current [A]	Ripple Voltage [mV]		Input Volt. 100 [V]	Input Volt. 200 [V]	0.0	20	20	1.5	20	20	3.0	25	25	4.5	25	25	6.0	25	25	7.5	30	30	9.0	30	30	10.0	30	30	11.0	30	30	--	-	-	--	-	-
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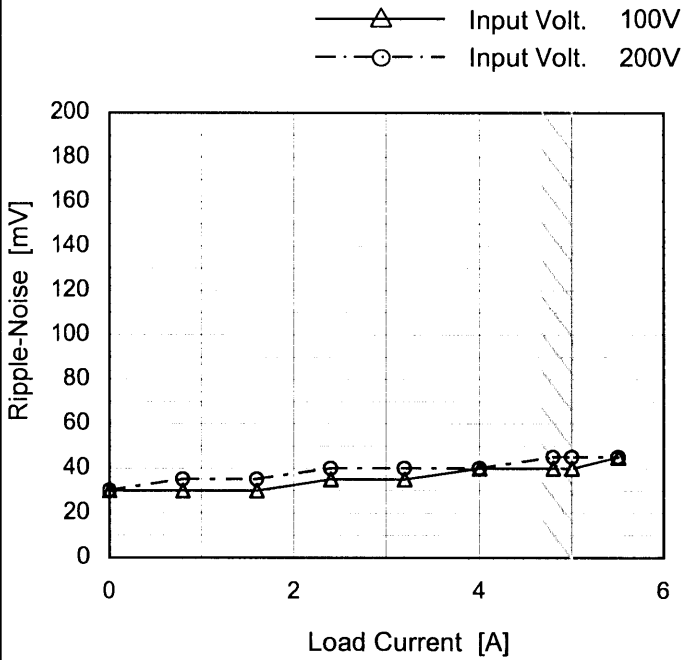


<p>Model MODULE S</p> <p>Item Ripple-Noise</p> <p>Object +5V10A</p>		<p>Temperature 25°C</p> <p>Testing Circuitry Figure A</p>																																						
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Model	MODULE S	Temperature	25°C
Item	Ripple-Noise	Testing Circuitry	Figure A
Object	+5V5A		

1. Graph



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.

2. Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
0.0	30	30
0.8	30	35
1.6	30	35
2.4	35	40
3.2	35	40
4.0	40	40
4.8	40	45
5.0	40	45
5.5	45	45
--	-	-
--	-	-

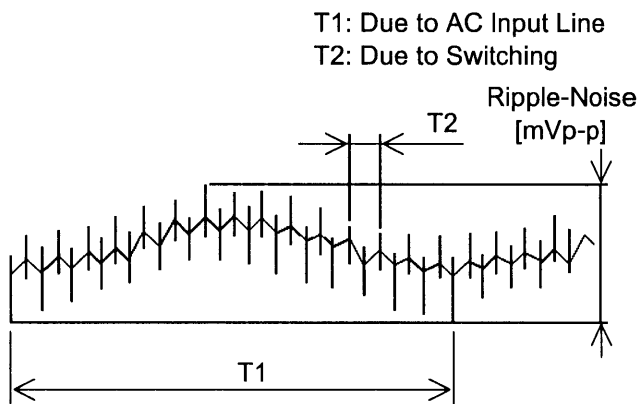


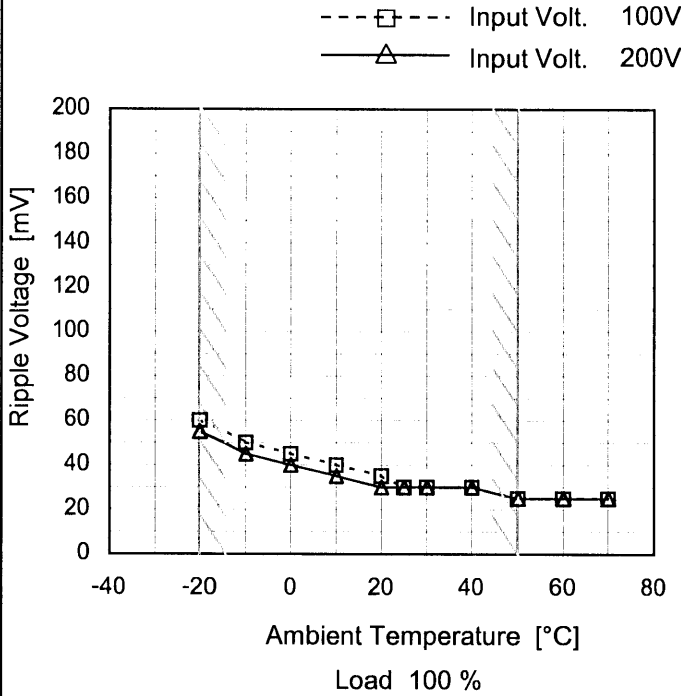
Fig. Complex Ripple Wave Form



Model	MODULE S
Item	Ripple Voltage (by Ambient Temp.)
Object	+5V10A

Testing Circuitry Figure A

1.Graph

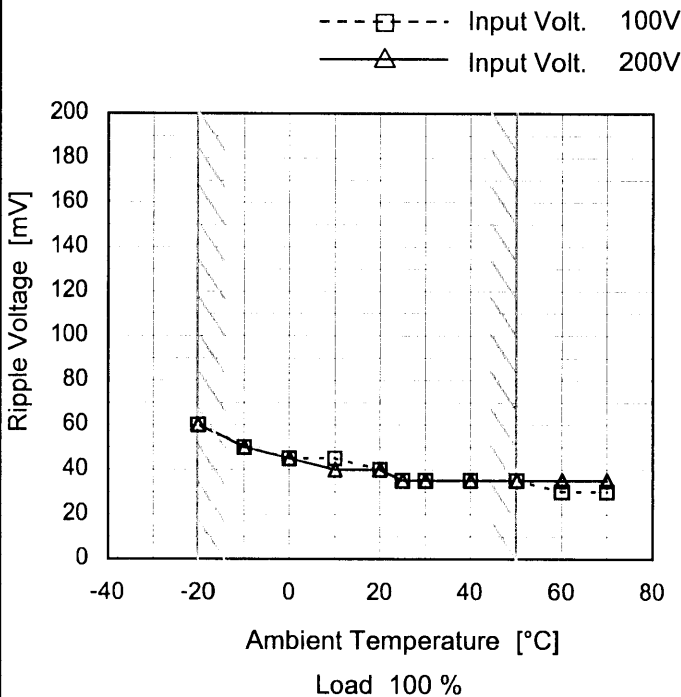


2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
-20	60	55
-10	50	45
0	45	40
10	40	35
20	35	30
25	30	30
30	30	30
40	30	30
50	25	25
60	25	25
70	25	25

Object	+5V5A
--------	-------

1.Graph



2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
-20	60	60
-10	50	50
0	45	45
10	45	40
20	40	40
25	35	35
30	35	35
40	35	35
50	35	35
60	30	35
70	30	35

Measured by 20 MHz Oscilloscope.  
 Note: Slanted line shows the range of the rated ambient temperature.



<p>Model      MODULE S</p>																																																						
<p>Item        Ambient Temperature Drift</p>		<p>Testing Circuitry    Figure A</p>																																																				
<p>Object      +5V10A</p>																																																						
<p>1.Graph</p> <p> <span style="display: inline-block; width: 100px; border-bottom: 1px solid black; margin-right: 5px;"></span>△<span style="margin-left: 5px;">Input Volt. 100V</span>  <span style="display: inline-block; width: 100px; border-bottom: 1px dashed black; margin-right: 5px;"></span>□<span style="margin-left: 5px;">Input Volt. 200V</span>  <span style="display: inline-block; width: 100px; border-bottom: 1px dash-dot black; margin-right: 5px;"></span>○<span style="margin-left: 5px;">Input Volt. 230V</span> </p> <p style="text-align: center;">Ambient Temperature [°C]</p> <p style="text-align: right;">Load 100%</p>		<p>2.Values</p> <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>5.084</td><td>5.085</td><td>5.085</td></tr> <tr><td>-10</td><td>5.085</td><td>5.087</td><td>5.087</td></tr> <tr><td>0</td><td>5.087</td><td>5.088</td><td>5.088</td></tr> <tr><td>10</td><td>5.089</td><td>5.090</td><td>5.090</td></tr> <tr><td>20</td><td>5.091</td><td>5.091</td><td>5.091</td></tr> <tr><td>25</td><td>5.092</td><td>5.092</td><td>5.092</td></tr> <tr><td>30</td><td>5.091</td><td>5.091</td><td>5.091</td></tr> <tr><td>40</td><td>5.091</td><td>5.090</td><td>5.090</td></tr> <tr><td>50</td><td>5.090</td><td>5.089</td><td>5.089</td></tr> <tr><td>60</td><td>5.088</td><td>5.086</td><td>5.086</td></tr> <tr><td>70</td><td>5.085</td><td>5.084</td><td>5.083</td></tr> </tbody> </table>		Ambient Temperature [°C]	Output Voltage [V]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	-20	5.084	5.085	5.085	-10	5.085	5.087	5.087	0	5.087	5.088	5.088	10	5.089	5.090	5.090	20	5.091	5.091	5.091	25	5.092	5.092	5.092	30	5.091	5.091	5.091	40	5.091	5.090	5.090	50	5.090	5.089	5.089	60	5.088	5.086	5.086	70	5.085	5.084	5.083
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<b>COSEL</b>		Testing Circuitry Figure A
Model	MODULE S	
Item	Output Voltage Accuracy	

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 (AVR 1) : 0 - 10A (AVR 2): 0 - 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

Object	+5V10A		Output		Output Voltage Accuracy	
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	25	264	0	5.100	±8	±0.2
Minimum Voltage	-20	85	10	5.085		

Object	+5V5A		Output		Output Voltage Accuracy	
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	50	200	0	5.032	±15	±0.3
Minimum Voltage	-20	85	5	5.002		



<b>COSEL</b>																									
Model	MODULE S	Temperature	25°C																						
Item	Time Lapse Drift	Testing Circuitry	Figure A																						
Object	+5V10A																								
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<p>* The characteristic of AC200V is equal.</p>																									



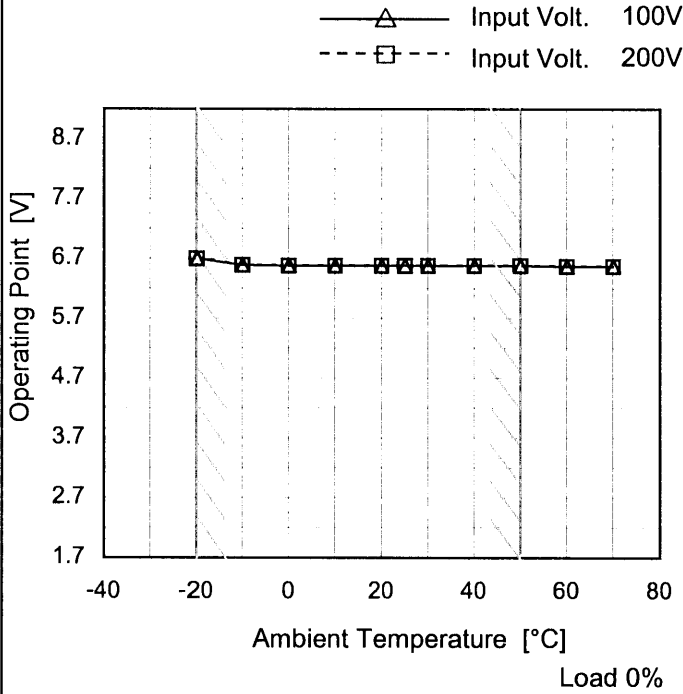
<b>COSEL</b>																																															
Model	MODULE S	Temperature	25°C																																												
Item	Overcurrent Protection	Testing Circuitry	Figure A																																												
Object	+5V10A																																														
<p>1.Graph</p> <div style="text-align: right;"> <p>———— Input Volt. 100V</p> <p>———— Input Volt. 200V</p> </div> <p style="text-align: center;">Load Current [A]</p> <p>Intermittent operation occurs when the output voltage is from 3V to 0V.</p>		<p>2.Values</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>5.00</td><td>11.17</td><td>11.33</td></tr> <tr><td>4.75</td><td>11.28</td><td>11.44</td></tr> <tr><td>4.50</td><td>11.37</td><td>11.54</td></tr> <tr><td>4.00</td><td>11.58</td><td>11.67</td></tr> <tr><td>3.50</td><td>11.69</td><td>11.75</td></tr> <tr><td>3.00</td><td>11.79</td><td>11.91</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]	5.00	11.17	11.33	4.75	11.28	11.44	4.50	11.37	11.54	4.00	11.58	11.67	3.50	11.69	11.75	3.00	11.79	11.91	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-
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Model	MODULE S
Item	Oversvoltage Protection
Object	+5V10A

Testing Circuitry Figure A

1.Graph

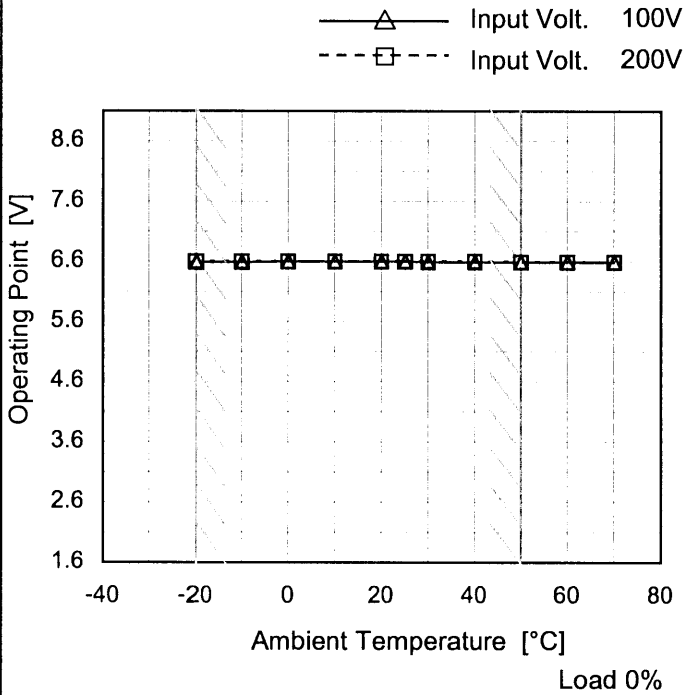


2.Values

Ambient Temperature [°C]	Operating Point [V]	
	Input Volt. 100[V]	Input Volt. 200[V]
-20	6.69	6.69
-10	6.58	6.58
0	6.57	6.57
10	6.57	6.57
20	6.57	6.57
25	6.57	6.57
30	6.57	6.57
40	6.57	6.57
50	6.57	6.57
60	6.56	6.56
70	6.56	6.56

Object	+5V5A
--------	-------

1.Graph



2.Values

Ambient Temperature [°C]	Operating Point [V]	
	Input Volt. 100[V]	Input Volt. 200[V]
-20	6.62	6.63
-10	6.62	6.63
0	6.63	6.63
10	6.63	6.63
20	6.63	6.63
25	6.63	6.63
30	6.62	6.63
40	6.62	6.63
50	6.62	6.62
60	6.62	6.62
70	6.62	6.62

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



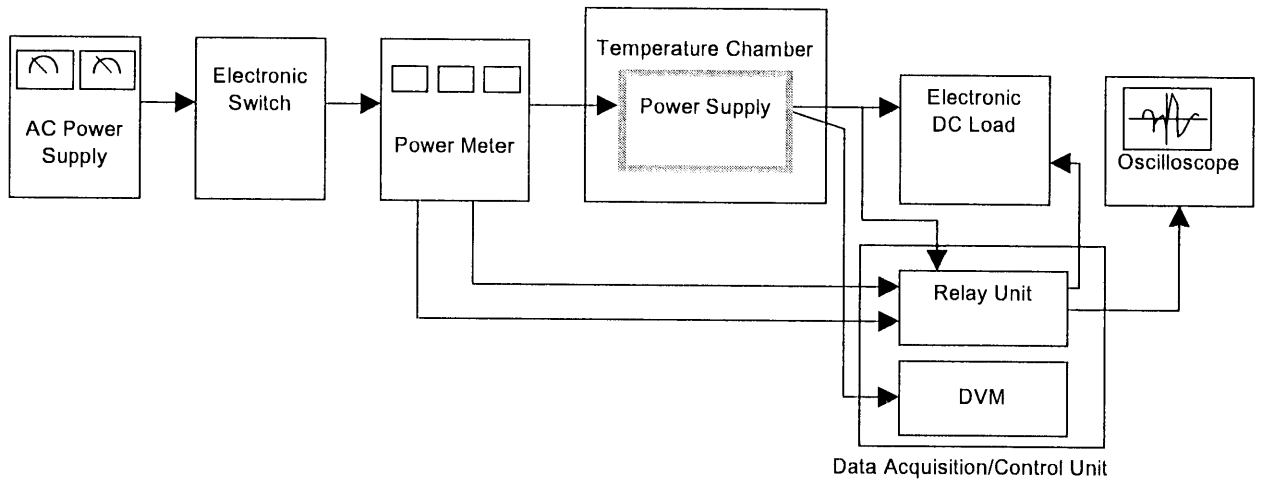


Figure A

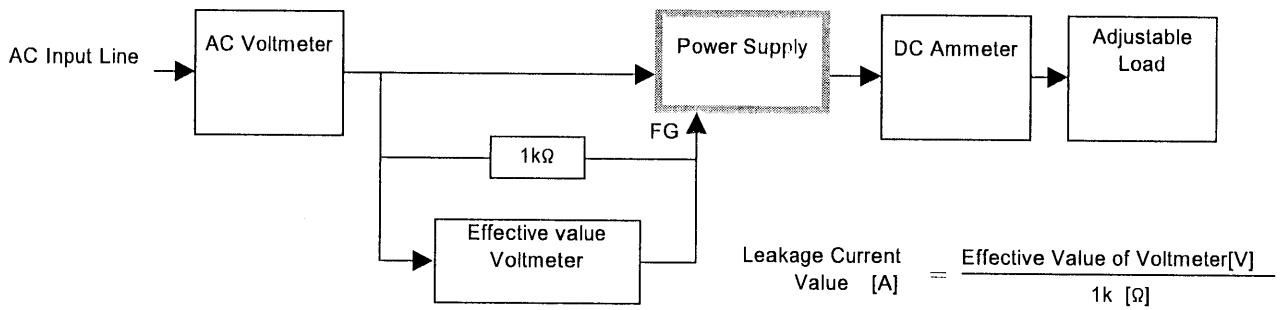


Figure B ( DEN-AN )

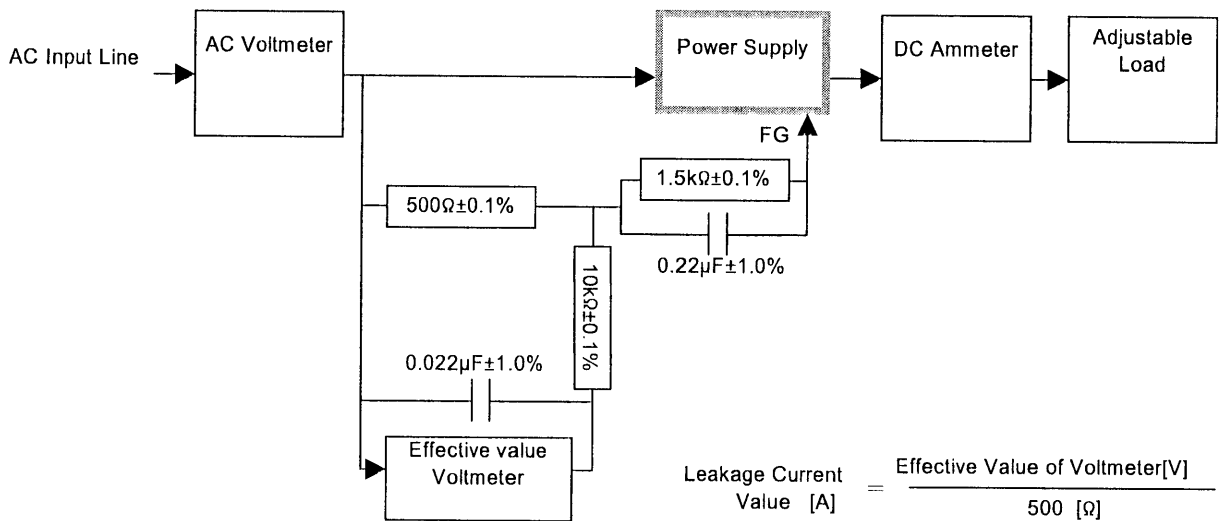


Figure B ( IEC60950 )