



TEST DATA OF LDA100W-3

(200V INPUT)

Regulated DC Power Supply
Jan.5. 2005

Approved by : J.Uchida Design Manager
J.Uchida

Prepared by : A.Kawai' Design Engineer
A.Kawai

COSEL CO.,LTD.



CONTENTS

1.Input Current (by Load Current)	1
2.Input Power (by Load Current)	2
3.Efficiency (by Input Voltage)	3
4.Efficiency (by Load Current)	4
5.Inrush Current	5
6.Line Regulation	6
7.Load Regulation	7
8.Dynamic Load Response	8
9.Ripple Voltage (by Load Current)	9
10.Ripple-Noise	10
11.Ripple Voltage (by Ambient Temperature)	11
12.Ambient Temperature Drift	12
13.Output Voltage Accuracy	13
14.Time Lapse Drift	14
15.Rise and Fall Time	15
16.Hold-Up Time	16
17.Instantaneous Interruption Compensation	17
18.Minimum Input Voltage for Regulated Output Voltage	18
19.Overcurrent Protection	19
20.Overvoltage Protection	20
21.Figure of Testing Circuitry	21

(Final Page 21)

COSEL

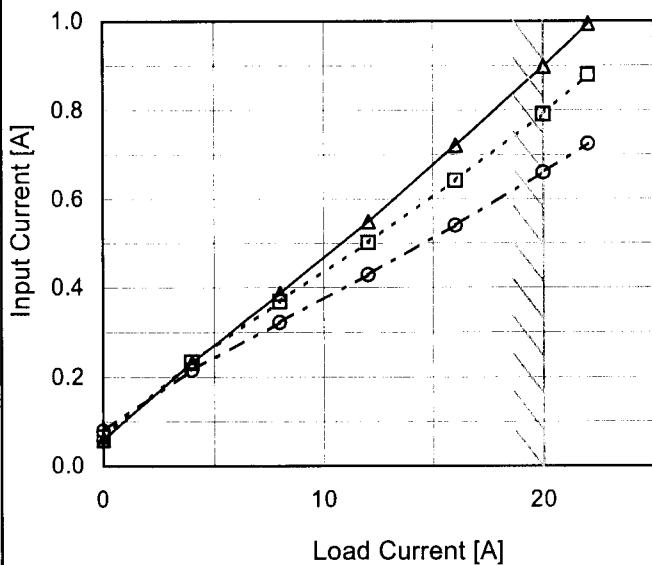
Model LDA100W-3

Item Input Current (by Load Current)

Object _____

1.Graph

—△— Input Volt. 170V
 - - -□--- Input Volt. 200V
 - - ○--- Input Volt. 264V



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

 Temperature 25°C
 Testing Circuitry Figure A

2.Values

Load Current [A]	Input Current [A]		
	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
0	0.059	0.067	0.080
4	0.233	0.235	0.216
8	0.387	0.369	0.322
12	0.549	0.502	0.429
16	0.721	0.642	0.540
20	0.899	0.792	0.660
22	0.994	0.880	0.725
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

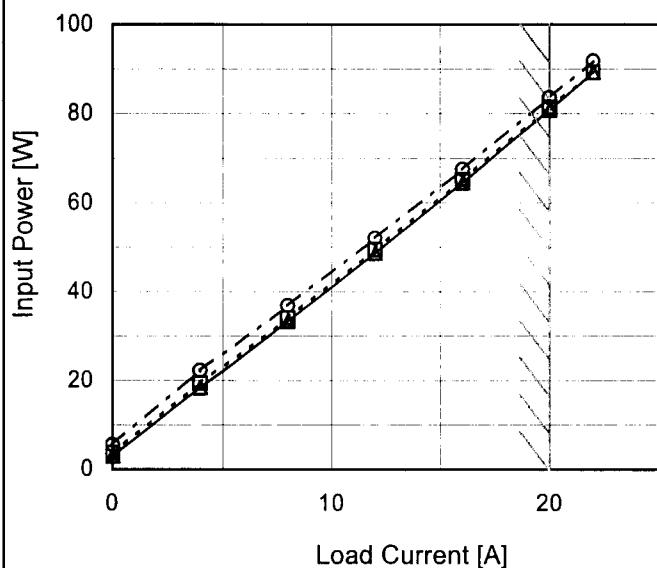
Model LDA100W-3

Item Input Power (by Load Current)

Object _____

1. Graph

—△— Input Volt. 170V
 - -□--- Input Volt. 200V
 - -○--- Input Volt. 264V



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

 Temperature 25°C
 Testing Circuitry Figure A

2. Values

Load Current [A]	Input Power [W]		
	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
0	3.00	3.70	5.50
4	18.40	19.40	22.30
8	33.40	34.10	36.90
12	48.70	49.50	52.10
16	64.60	65.30	67.60
20	80.90	81.50	83.60
22	89.30	89.30	91.80
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

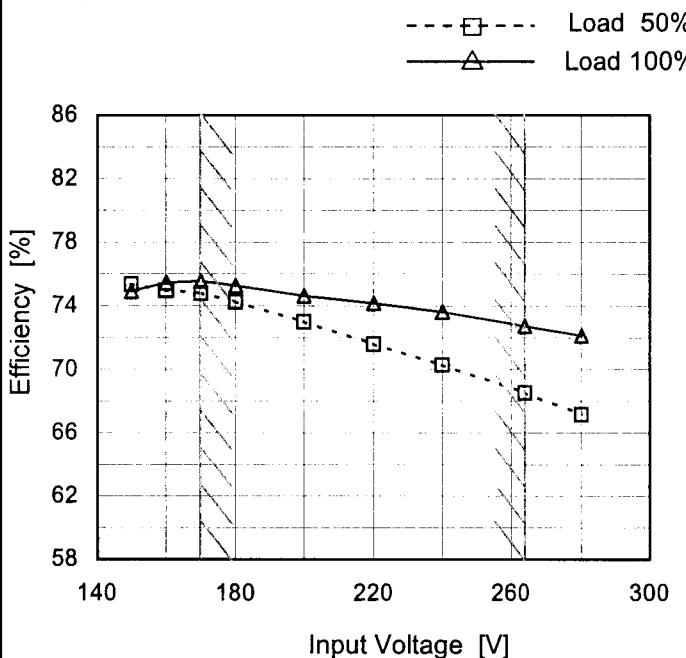
COSEL

Model LDA100W-3

Item Efficiency (by Input Voltage)

Object _____

1. Graph



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

 Temperature 25°C
 Testing Circuitry Figure A

2. Values

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
150	75.4	74.9
160	75.0	75.5
170	74.8	75.6
180	74.3	75.3
200	73.0	74.6
220	71.6	74.2
240	70.3	73.6
264	68.5	72.7
280	67.2	72.1

COSEL

Model	LDA100W-3	Temperature Testing Circuitry 25°C Figure A																																																			
Item	Efficiency (by Load Current)																																																				
Object	_____																																																				
1.Graph		2.Values																																																			
<p>The graph plots Efficiency [%] on the y-axis (30 to 86) against Load Current [A] on the x-axis (0 to 20). Three curves are shown for Input Volt. 170V (triangles), Input Volt. 200V (squares), and Input Volt. 264V (circles). All curves show efficiency increasing with load current. A slanted line on the graph indicates the rated load current range.</p>		<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="3">Efficiency [%]</th> </tr> <tr> <th>Input Volt. 170[V]</th> <th>Input Volt. 200[V]</th> <th>Input Volt. 264[V]</th> </tr> </thead> <tbody> <tr><td>0</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>4</td><td>65.8</td><td>62.4</td><td>54.3</td></tr> <tr><td>8</td><td>72.6</td><td>71.1</td><td>65.7</td></tr> <tr><td>12</td><td>74.7</td><td>73.5</td><td>69.8</td></tr> <tr><td>16</td><td>75.1</td><td>74.3</td><td>71.7</td></tr> <tr><td>20</td><td>74.9</td><td>74.4</td><td>72.5</td></tr> <tr><td>22</td><td>74.7</td><td>74.7</td><td>72.6</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> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> </tbody> </table>	Load Current [A]	Efficiency [%]			Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]	0	-	-	-	4	65.8	62.4	54.3	8	72.6	71.1	65.7	12	74.7	73.5	69.8	16	75.1	74.3	71.7	20	74.9	74.4	72.5	22	74.7	74.7	72.6	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
Load Current [A]	Efficiency [%]																																																				
	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]																																																		
0	-	-	-																																																		
4	65.8	62.4	54.3																																																		
8	72.6	71.1	65.7																																																		
12	74.7	73.5	69.8																																																		
16	75.1	74.3	71.7																																																		
20	74.9	74.4	72.5																																																		
22	74.7	74.7	72.6																																																		
--	-	-	-																																																		
--	-	-	-																																																		
--	-	-	-																																																		
--	-	-	-																																																		

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

COSEL

Model LDA100W-3

Item Inrush Current

Object

Temperature 25°C
Testing Circuitry Figure AInput
Current
[20A/div]Input
Voltage
[200V/div]

Time

[50ms/div]

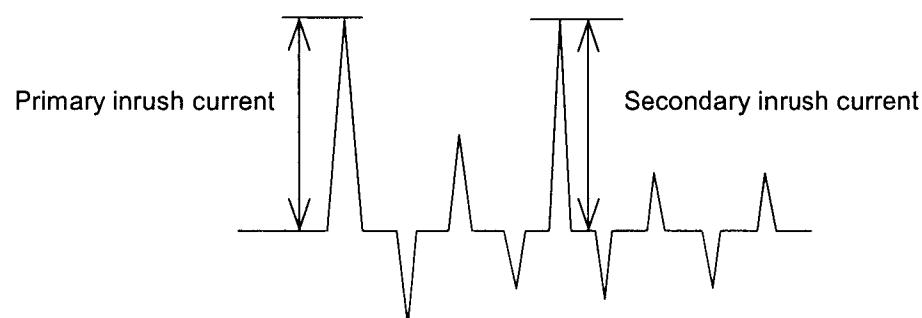
Input Voltage 200 V

Frequency 60 Hz

Load 100 %

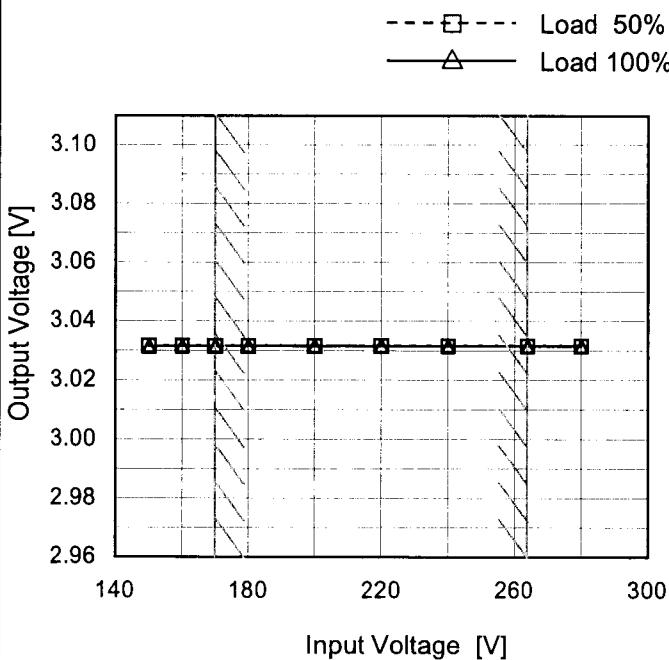
Primary inrush current 37.6 A

Secondary inrush current 2.4 A



COSEL

Model	LDA100W-3
Item	Line Regulation
Object	+3V20A

1. Graph


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

 Temperature 25°C
 Testing Circuitry Figure A

2. Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
150	3.032	3.032
160	3.032	3.032
170	3.032	3.032
180	3.032	3.032
200	3.032	3.032
220	3.032	3.032
240	3.032	3.032
264	3.032	3.032
280	3.032	3.032

COSEL

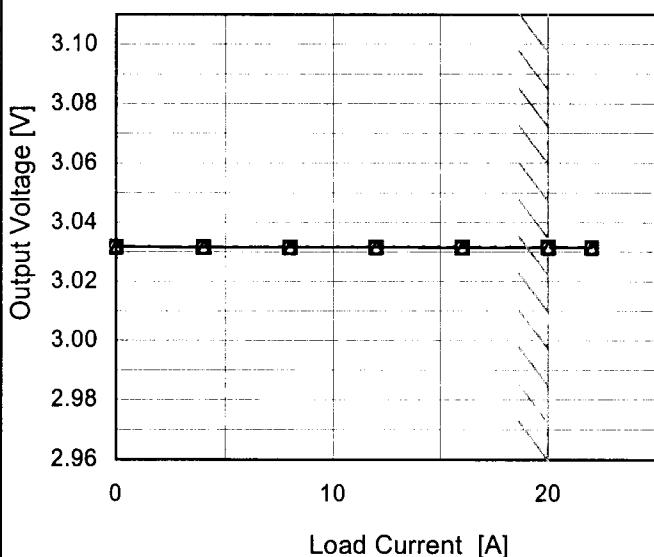
Model LDA100W-3

Item Load Regulation

Object +3V20A

1.Graph

—△— Input Volt. 170V
 - - -□--- Input Volt. 200V
 - -○--- Input Volt. 264V

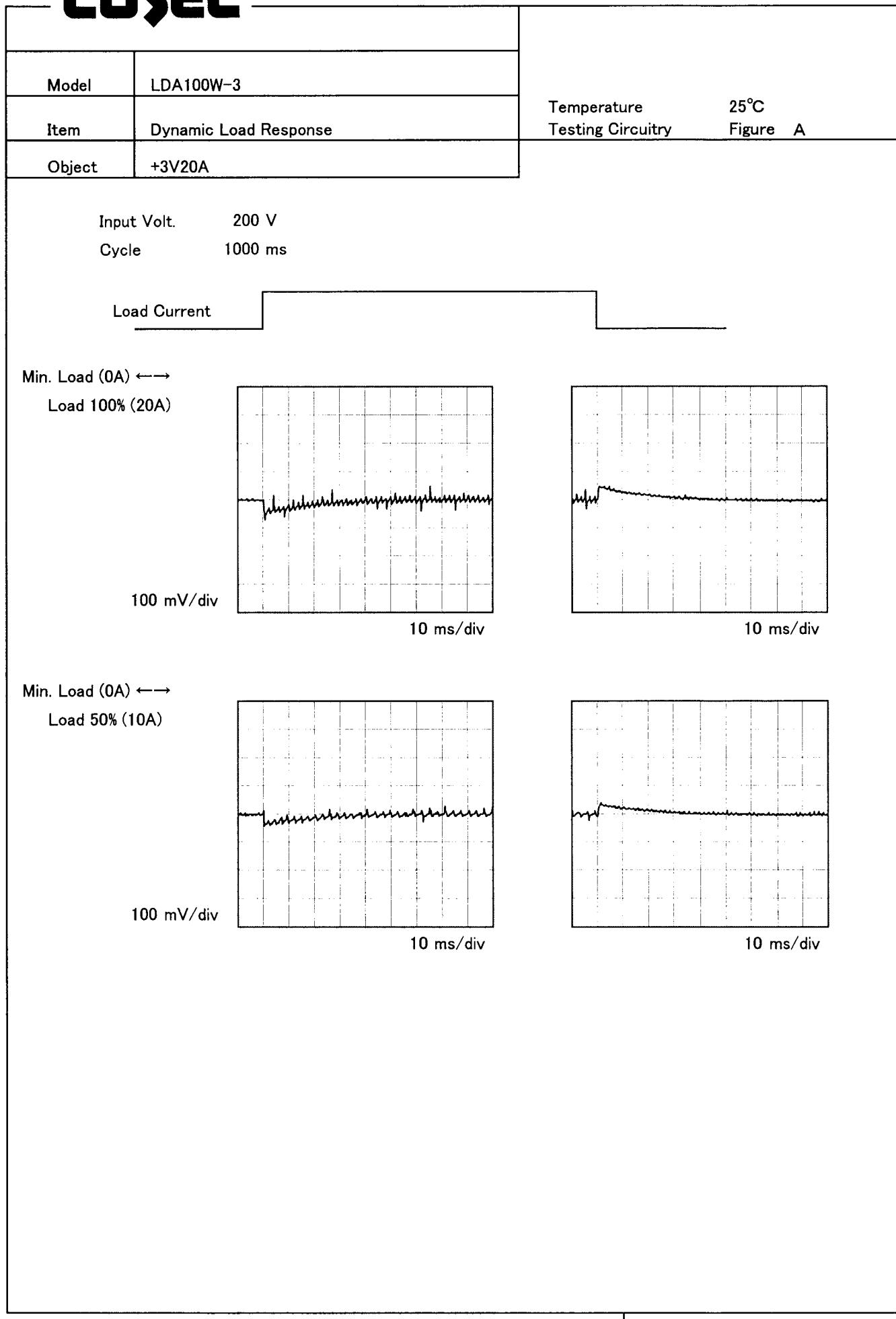


Note: Slanted line shows the range of the rated load current.

 Temperature 25°C
 Testing Circuitry Figure A

2.Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
0	3.032	3.032	3.032
4	3.032	3.032	3.032
8	3.032	3.032	3.032
12	3.032	3.032	3.032
16	3.032	3.032	3.032
20	3.032	3.032	3.032
22	3.032	3.032	3.032
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

COSEL

Model	LDA100W-3																																							
Item	Ripple Voltage (by Load Current)	Temperature 25°C Testing Circuitry Figure A																																						
Object	+3V20A																																							
1. Graph																																								
<p>—△— Input Volt. 170V ---○--- Input Volt. 264V</p>																																								
2. Values																																								
<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="2">Ripple Voltage [mV]</th> </tr> <tr> <th>Input Volt. 170 [V]</th> <th>Input Volt. 264 [V]</th> </tr> </thead> <tbody> <tr><td>0</td><td>10</td><td>10</td></tr> <tr><td>4</td><td>20</td><td>20</td></tr> <tr><td>8</td><td>20</td><td>20</td></tr> <tr><td>12</td><td>25</td><td>25</td></tr> <tr><td>16</td><td>25</td><td>25</td></tr> <tr><td>20</td><td>25</td><td>25</td></tr> <tr><td>22</td><td>25</td><td>25</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]	Ripple Voltage [mV]		Input Volt. 170 [V]	Input Volt. 264 [V]	0	10	10	4	20	20	8	20	20	12	25	25	16	25	25	20	25	25	22	25	25	--	-	-	--	-	-	--	-	-	--	-	-
Load Current [A]	Ripple Voltage [mV]																																							
	Input Volt. 170 [V]	Input Volt. 264 [V]																																						
0	10	10																																						
4	20	20																																						
8	20	20																																						
12	25	25																																						
16	25	25																																						
20	25	25																																						
22	25	25																																						
--	-	-																																						
--	-	-																																						
--	-	-																																						
--	-	-																																						
<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>T1: Due to AC Input Line T2: Due to Switching</p>																																								
Fig. Complex Ripple Wave Form																																								

Model	LDA100W-3	Temperature Testing Circuitry 25°C Figure A																				
Item	Ripple-Noise																					
Object	+3V20A																					
1. Graph		2. Values																				
<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 20 A. Two curves are plotted: one for Input Volt. 170V (solid line with solid circles) and one for Input Volt. 264V (dashed line with open circles). Both curves show an increase in Ripple-Noise with Load Current. A slanted line indicates the range of the rated load current.</p> <table border="1"> <thead> <tr> <th>Load Current [A]</th> <th>Ripple-Noise [mV] (Input Volt. 170V)</th> <th>Ripple-Noise [mV] (Input Volt. 264V)</th> </tr> </thead> <tbody> <tr><td>0</td><td>25</td><td>25</td></tr> <tr><td>4</td><td>35</td><td>35</td></tr> <tr><td>8</td><td>40</td><td>40</td></tr> <tr><td>12</td><td>45</td><td>45</td></tr> <tr><td>16</td><td>50</td><td>50</td></tr> <tr><td>20</td><td>55</td><td>55</td></tr> </tbody> </table>		Load Current [A]	Ripple-Noise [mV] (Input Volt. 170V)	Ripple-Noise [mV] (Input Volt. 264V)	0	25	25	4	35	35	8	40	40	12	45	45	16	50	50	20	55	55
Load Current [A]	Ripple-Noise [mV] (Input Volt. 170V)	Ripple-Noise [mV] (Input Volt. 264V)																				
0	25	25																				
4	35	35																				
8	40	40																				
12	45	45																				
16	50	50																				
20	55	55																				
<p>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>																						
<p>Fig. Complex Ripple Wave Form</p> <p>T1: Due to AC Input Line T2: Due to Switching</p> <p>Ripple-Noise [mVp-p]</p> <p>T1</p> <p>T2</p>																						

Model	LDA100W-3																																				
Item	Ripple Voltage (by Ambient Temp.)	Testing Circuitry	Figure A																																		
Object	+3V20A																																				
1. Graph		2. Values																																			
<p>Graph showing Ripple Voltage [mV] vs Ambient Temperature [°C]. The Y-axis ranges from 0 to 200 mV, and the X-axis ranges from -30 to 70 °C. Two data series are plotted: Load 50% (dashed line with open squares) and Load 100% (solid line with solid triangles). Both series show a slight increase in ripple voltage as ambient temperature increases. A slanted line indicates the rated ambient temperature range.</p> <table border="1"> <thead> <tr> <th>Ambient Temperature [°C]</th> <th>Ripple Voltage [mV] (Load 50%)</th> <th>Ripple Voltage [mV] (Load 100%)</th> </tr> </thead> <tbody> <tr><td>-30</td><td>25</td><td>30</td></tr> <tr><td>-10</td><td>20</td><td>25</td></tr> <tr><td>0</td><td>20</td><td>25</td></tr> <tr><td>10</td><td>20</td><td>25</td></tr> <tr><td>20</td><td>15</td><td>20</td></tr> <tr><td>25</td><td>15</td><td>20</td></tr> <tr><td>30</td><td>15</td><td>20</td></tr> <tr><td>40</td><td>10</td><td>15</td></tr> <tr><td>50</td><td>10</td><td>15</td></tr> <tr><td>60</td><td>10</td><td>10</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> </tbody> </table>		Ambient Temperature [°C]	Ripple Voltage [mV] (Load 50%)	Ripple Voltage [mV] (Load 100%)	-30	25	30	-10	20	25	0	20	25	10	20	25	20	15	20	25	15	20	30	15	20	40	10	15	50	10	15	60	10	10	--	-	-
Ambient Temperature [°C]	Ripple Voltage [mV] (Load 50%)	Ripple Voltage [mV] (Load 100%)																																			
-30	25	30																																			
-10	20	25																																			
0	20	25																																			
10	20	25																																			
20	15	20																																			
25	15	20																																			
30	15	20																																			
40	10	15																																			
50	10	15																																			
60	10	10																																			
--	-	-																																			
<p>Input Volt. 200V</p> <p>Measured by 20 MHz Oscilloscope.</p> <p>Note: Slanted line shows the range of the rated ambient temperature.</p>																																					

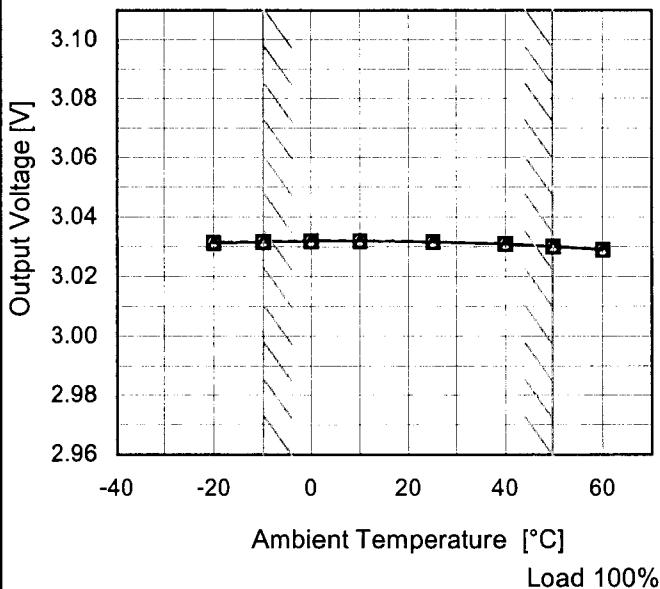
COSEL

Model LDA100W-3

Item Ambient Temperature Drift

Object +3V20A

- 1.Graph
- △— Input Volt. 170V
 - -□- - Input Volt. 200V
 - -○- - Input Volt. 264V



Testing Circuitry Figure A

2.Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
-20	3.031	3.031	3.031
-10	3.032	3.032	3.032
0	3.032	3.032	3.032
10	3.032	3.032	3.032
25	3.032	3.032	3.032
40	3.031	3.031	3.031
50	3.030	3.030	3.030
60	3.029	3.029	3.029
--	-	-	-
--	-	-	-
--	-	-	-

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



Model	LDA100W-3	Testing Circuitry Figure A
Item	Output Voltage Accuracy	
Object	+3V20A	

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 : -10 - 50°C

Input Voltage : 170 - 264V

Load Current : 0 - 20A

* 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	-10	170	0	3.032	± 1	± 0.1
Minimum Voltage	50	200	0	3.030		

COSEL

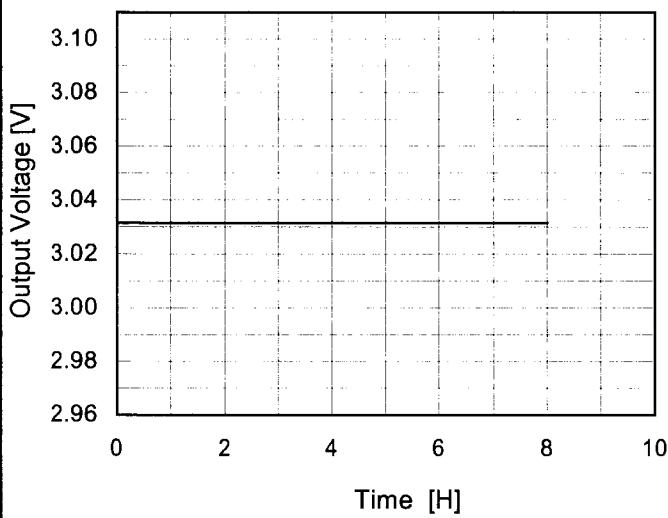
Model LDA100W-3

Item Time Lapse Drift

Object +3V20A

Temperature 25°C
Testing Circuitry Figure A

1. Graph

Input Volt. 200V
Load 100%

2. Values

Time since start [H]	Output Voltage [V]
0.0	3.032
0.5	3.032
1.0	3.032
2.0	3.032
3.0	3.032
4.0	3.032
5.0	3.032
6.0	3.032
7.0	3.032
8.0	3.032

COSEL

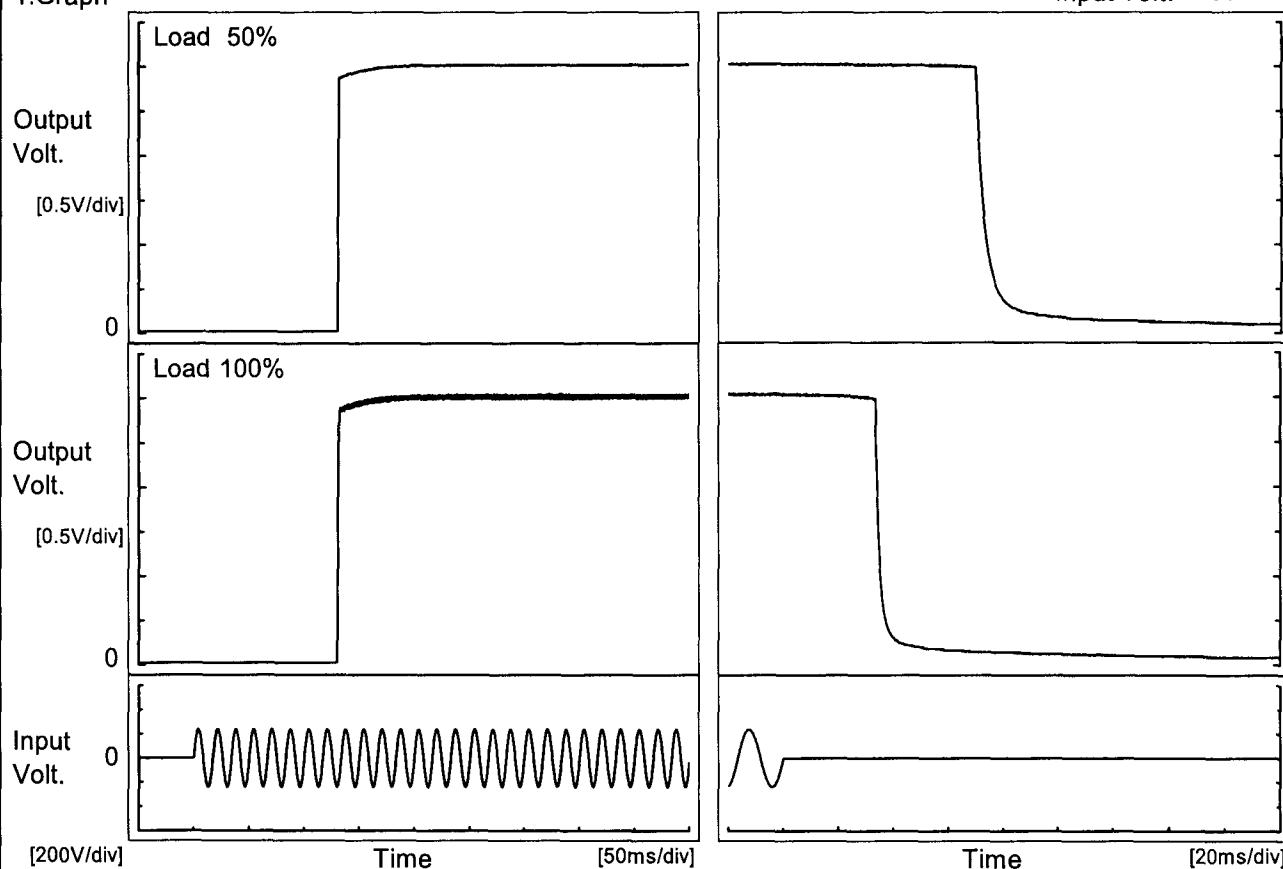
Model LDA100W-3

Item Rise and Fall Time

Temperature 25°C
Testing Circuitry Figure A

Object +3V20A

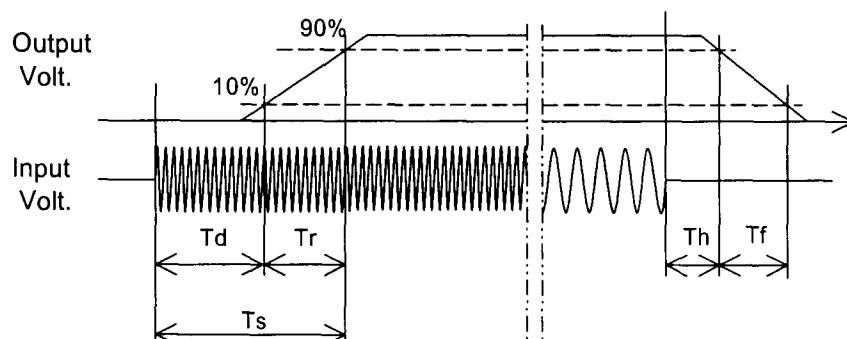
1. Graph



2. Values

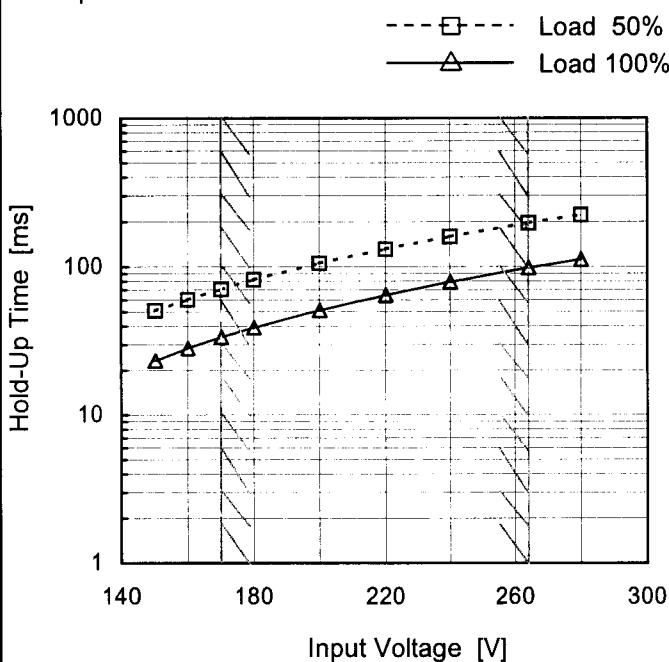
[ms]

Load	Time	Td	Tr	Ts	Th	Tf
50 %		129.5	2.0	131.5	70.3	11.7
100 %		130.0	1.8	131.8	33.4	6.2



Model	LDA100W-3
Item	Hold-Up Time
Object	+3V20A

1. Graph



This duration covers from Shut-off of input voltage to the moment when output voltage descends to the rated range of voltage accuracy.
 Note: Slanted line shows the range of the rated input voltage.

Temperature 25°C
 Testing Circuitry Figure A

2. Values

Input Voltage [V]	Hold-Up Time [ms]	
	Load 50%	Load 100%
150	51	23
160	60	28
170	71	34
180	82	39
200	106	51
220	132	65
240	159	79
264	197	98
280	222	112

COSEL

Model	LDA100W-3	Temperature	25°C																																																			
Item	Instantaneous Interruption Compensation	Testing Circuitry	Figure A																																																			
Object	+3V20A																																																					
1.Graph	<p>Legend:</p> <ul style="list-style-type: none"> Input Volt. 170V Input Volt. 200V Input Volt. 264V 																																																					
2.Values	<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="3">Time [ms]</th> </tr> <tr> <th>Input Volt. 170[V]</th> <th>Input Volt. 200[V]</th> <th>Input Volt. 264[V]</th> </tr> </thead> <tbody> <tr><td>0</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>4</td><td>169</td><td>247</td><td>439</td></tr> <tr><td>8</td><td>88</td><td>131</td><td>242</td></tr> <tr><td>12</td><td>56</td><td>88</td><td>166</td></tr> <tr><td>16</td><td>43</td><td>65</td><td>124</td></tr> <tr><td>20</td><td>31</td><td>51</td><td>99</td></tr> <tr><td>22</td><td>29</td><td>45</td><td>88</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> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> </tbody> </table>			Load Current [A]	Time [ms]			Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]	0	-	-	-	4	169	247	439	8	88	131	242	12	56	88	166	16	43	65	124	20	31	51	99	22	29	45	88	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
Load Current [A]	Time [ms]																																																					
	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]																																																			
0	-	-	-																																																			
4	169	247	439																																																			
8	88	131	242																																																			
12	56	88	166																																																			
16	43	65	124																																																			
20	31	51	99																																																			
22	29	45	88																																																			
--	-	-	-																																																			
--	-	-	-																																																			
--	-	-	-																																																			
--	-	-	-																																																			
Note:	Slanted line shows the range of the rated load current.																																																					

COSEL

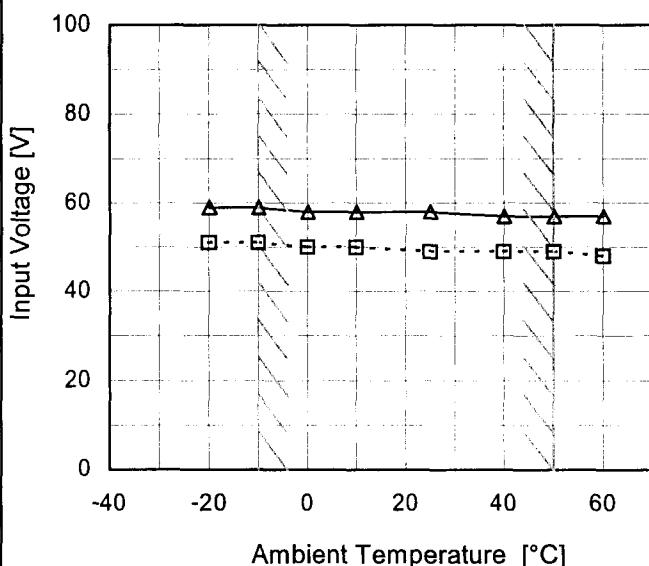
Model LDA100W-3

Item Minimum Input Voltage
for Regulated Output Voltage

Object +3V20A

1. Graph

---□--- Load 50%
 —△— Load 100%



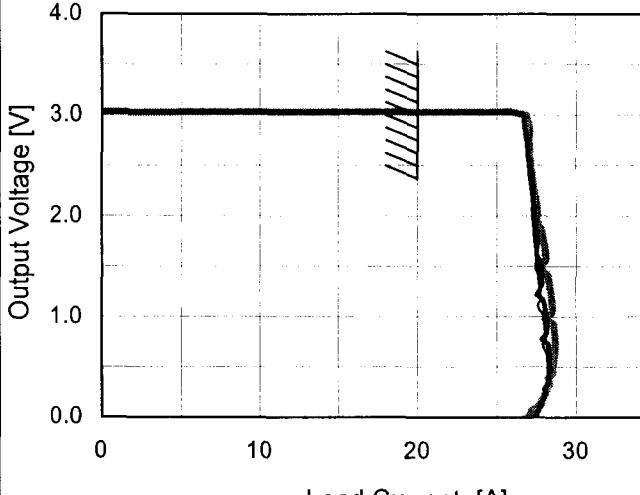
Note: Slanted line shows the range of the rated ambient temperature.

Testing Circuitry Figure A

2. Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	51	59
-10	51	59
0	50	58
10	50	58
25	49	58
40	49	57
50	49	57
60	48	57
--	-	-
--	-	-
--	-	-

COSEL

Model	LDA100W-3					
Item	Overcurrent Protection					
Object	+3V20A					
1.Graph						
 <p>The graph plots Output Voltage [V] on the Y-axis (0.0 to 4.0) against Load Current [A] on the X-axis (0 to 30). Three curves represent different input voltages: 170V (top), 200V (middle), and 264V (bottom). All curves show a constant output voltage until a certain load current is reached, after which the output voltage drops sharply. A slanted line is drawn across the graph, starting from approximately (18, 3.0) and ending at (28, 0.5), indicating the range of the rated load current.</p>						
<p>Note: Slanted line shows the range of the rated load current.</p>						
Temperature 25°C Testing Circuitry Figure A						
2.Values						
Output Voltage [V]	Load Current [A]					
	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]			
3.00	21.01	23.52	21.32			
2.85	26.77	26.77	27.07			
2.70	26.85	26.90	27.04			
2.40	27.04	27.25	27.25			
2.10	27.25	27.34	27.55			
1.80	27.35	27.54	27.89			
1.50	27.48	27.75	27.91			
1.20	27.80	27.56	28.47			
0.90	28.05	28.20	28.64			
0.60	28.20	28.33	28.67			
0.30	28.13	28.01	28.17			
0.00	27.24	27.09	26.61			

COSEL

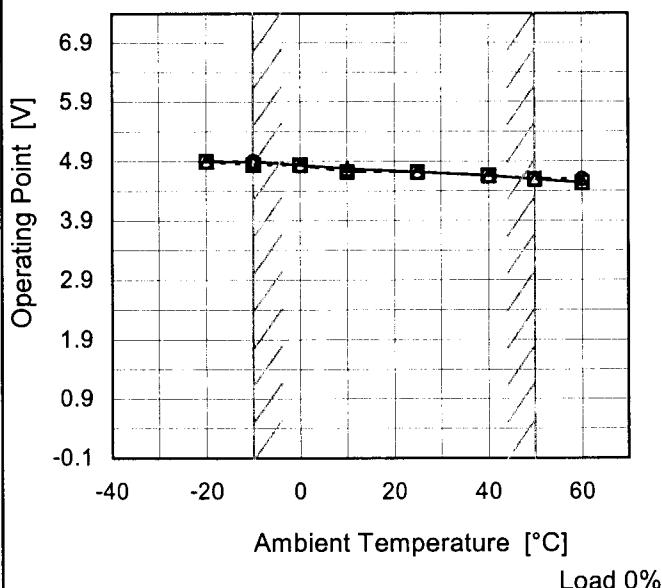
Model LDA100W-3

Item Overvoltage Protection

Object +3V20A

1.Graph

—△— Input Volt. 170V
 - - -□- - Input Volt. 200V
 - - -○- - Input Volt. 264V



Note: Slanted line shows the range of the rated ambient temperature.
 Load 0%

Testing Circuitry Figure A

2.Values

Ambient Temperature [°C]	Operating Point [V]		
	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
-20	4.95	4.95	4.95
-10	4.95	4.89	4.95
0	4.89	4.89	4.89
10	4.83	4.77	4.77
25	4.77	4.77	4.77
40	4.71	4.71	4.71
50	4.65	4.65	4.65
60	4.59	4.59	4.65
--	-	-	-
--	-	-	-
--	-	-	-

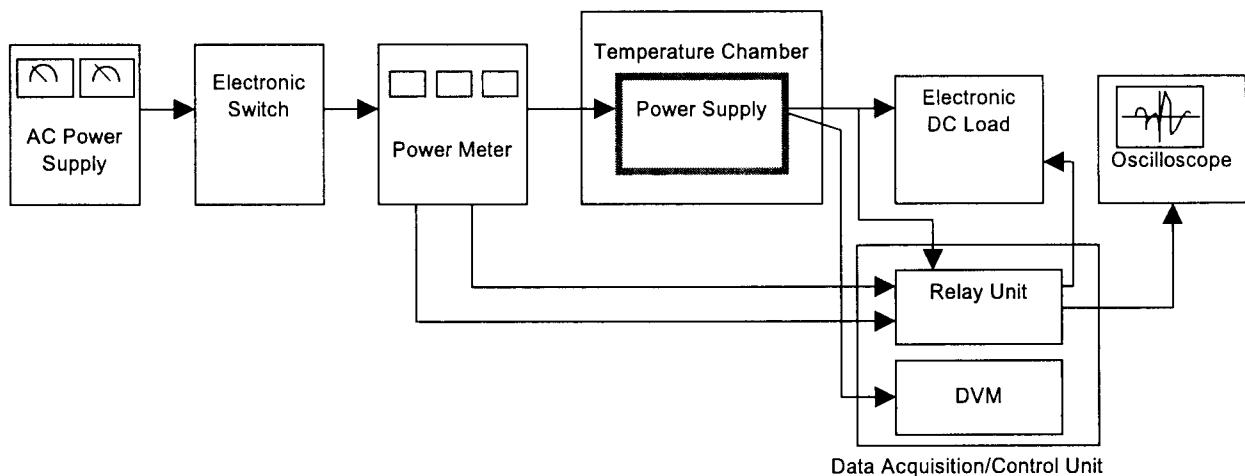


Figure A

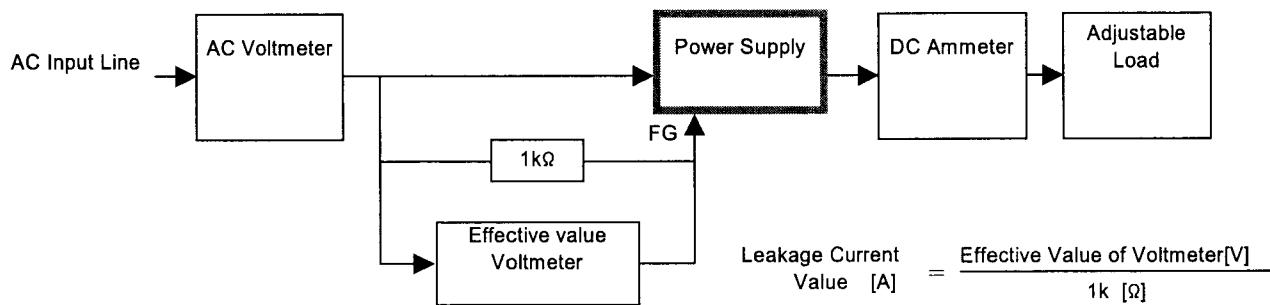


Figure B (DEN-AN)

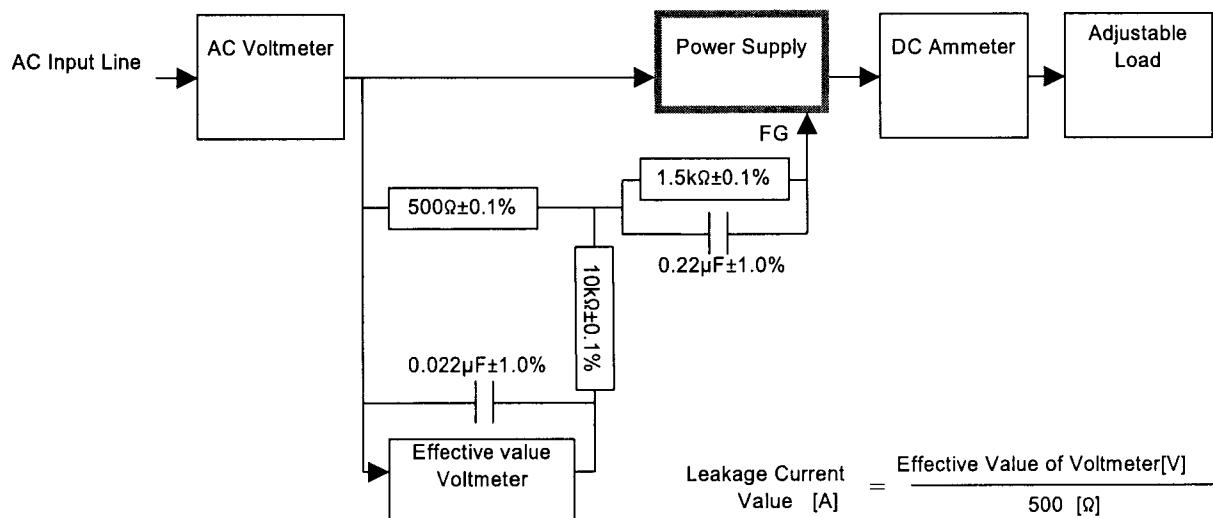


Figure B (IEC60950)