

TEST DATA OF LFA100F-12

Regulated DC Power Supply
November 18, 2010

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Daisuke Sumiwa Design Engineer

COSEL CO.,LTD.

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(Final Page 25)

Model LFA100F-12

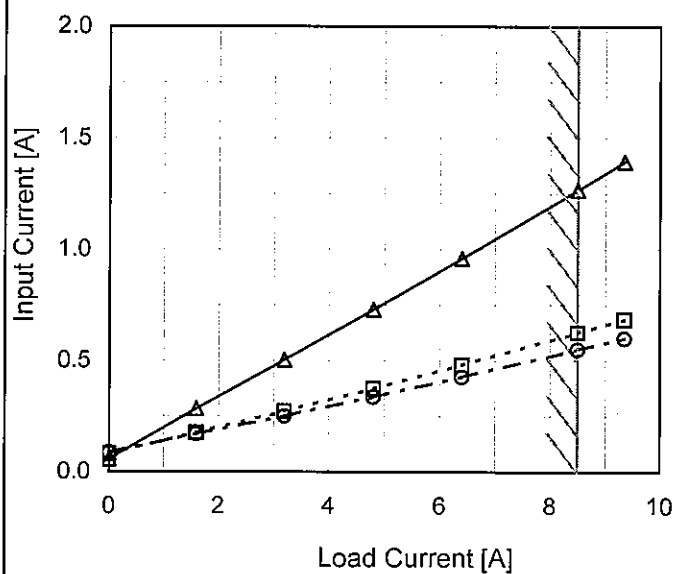
Item Input Current (by Load Current)

Object

Temperature 25°C
Testing Circuitry Figure A

1. Graph

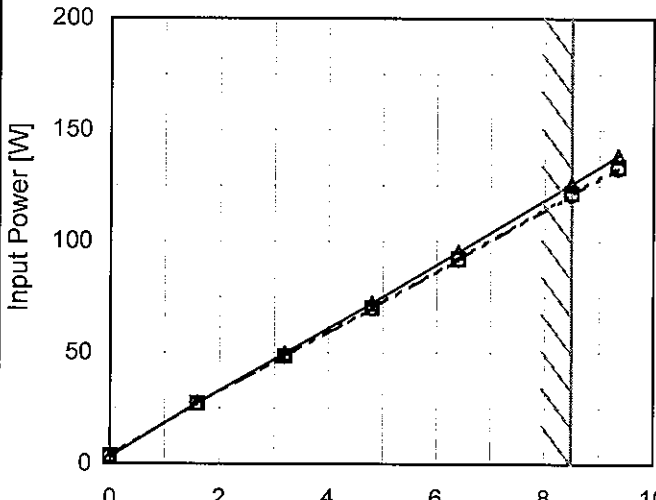
—△— Input Volt. 100V
 ---□--- Input Volt. 200V
 -·-○-·- Input Volt. 230V



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

2. Values

Load Current [A]	Input Current [A]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	0.056	0.079	0.087
1.60	0.283	0.176	0.169
3.20	0.503	0.272	0.250
4.80	0.728	0.374	0.336
6.40	0.958	0.481	0.427
8.50	1.266	0.626	0.550
9.35	1.393	0.685	0.600
--	-	-	-
--	-	-	-
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Model		LFA100F-12		Temperature 25°C																																																				
Item		Input Power (by Load Current)		Testing Circuitry Figure A																																																				
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1.Graph		<div><div>—△—</div>Input Volt. 100V</div> <div><div>---□---</div>Input Volt. 200V</div> <div><div>-○-</div>Input Volt. 230V</div>		2.Values																																																				
<div><div>Input Power [W]</div><div></div><div>Load Current [A]</div></div>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Input Power [W]</th></tr><tr><th>Input Volt. 100[V]</th><th>Input Volt. 200[V]</th><th>Input Volt. 230[V]</th></tr><tr><td>0.00</td><td>3.1</td><td>3.4</td><td>3.5</td></tr><tr><td>1.60</td><td>27.4</td><td>27.1</td><td>27.1</td></tr><tr><td>3.20</td><td>49.7</td><td>48.4</td><td>48.3</td></tr><tr><td>4.80</td><td>72.1</td><td>70.1</td><td>69.8</td></tr><tr><td>6.40</td><td>95.2</td><td>92.3</td><td>91.8</td></tr><tr><td>8.50</td><td>125.8</td><td>121.7</td><td>121.0</td></tr><tr><td>9.35</td><td>138.5</td><td>133.6</td><td>132.7</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></table>		Load Current [A]	Input Power [W]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	0.00	3.1	3.4	3.5	1.60	27.4	27.1	27.1	3.20	49.7	48.4	48.3	4.80	72.1	70.1	69.8	6.40	95.2	92.3	91.8	8.50	125.8	121.7	121.0	9.35	138.5	133.6	132.7	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-		
Load Current [A]	Input Power [W]																																																							
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BC-10476

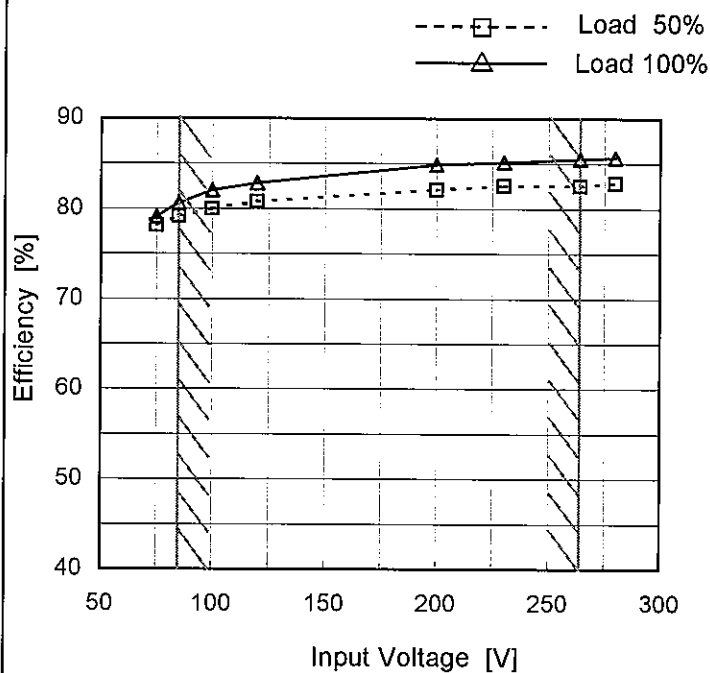
Model LFA100F-12

Item Efficiency (by Input Voltage)

Object

 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]	Efficiency [%]	
	Load 50%	Load 100%
75	78.2	79.2
85	79.1	80.6
100	80.0	82.1
120	80.7	82.8
200	82.1	84.9
230	82.5	85.2
264	82.5	85.5
280	82.8	85.7
--	-	-

Model		LFA100F-12		Temperature 25°C																																																				
Item		Efficiency (by Load Current)		Testing Circuitry Figure A																																																				
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<div><div><div><div><div></div><div></div></div><div><div></div><div></div></div><div><div></div><div></div></div></div><div><div>Input Volt. 100V</div><div>Input Volt. 200V</div><div>Input Volt. 230V</div></div></div><p>Efficiency [%]</p><p>Load Current [A]</p></div>				<table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Efficiency [%]</th></tr><tr><th>Input Volt. 100[V]</th><th>Input Volt. 200[V]</th><th>Input Volt. 230[V]</th></tr><tr><td>0.00</td><td>-</td><td>-</td><td>-</td></tr><tr><td>1.60</td><td>70.7</td><td>71.5</td><td>70.7</td></tr><tr><td>3.20</td><td>78.2</td><td>80.0</td><td>80.5</td></tr><tr><td>4.80</td><td>80.9</td><td>83.2</td><td>83.4</td></tr><tr><td>6.40</td><td>81.6</td><td>84.4</td><td>84.6</td></tr><tr><td>8.50</td><td>82.1</td><td>84.9</td><td>85.2</td></tr><tr><td>9.35</td><td>81.9</td><td>85.4</td><td>85.0</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></table>		Load Current [A]	Efficiency [%]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	0.00	-	-	-	1.60	70.7	71.5	70.7	3.20	78.2	80.0	80.5	4.80	80.9	83.2	83.4	6.40	81.6	84.4	84.6	8.50	82.1	84.9	85.2	9.35	81.9	85.4	85.0	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
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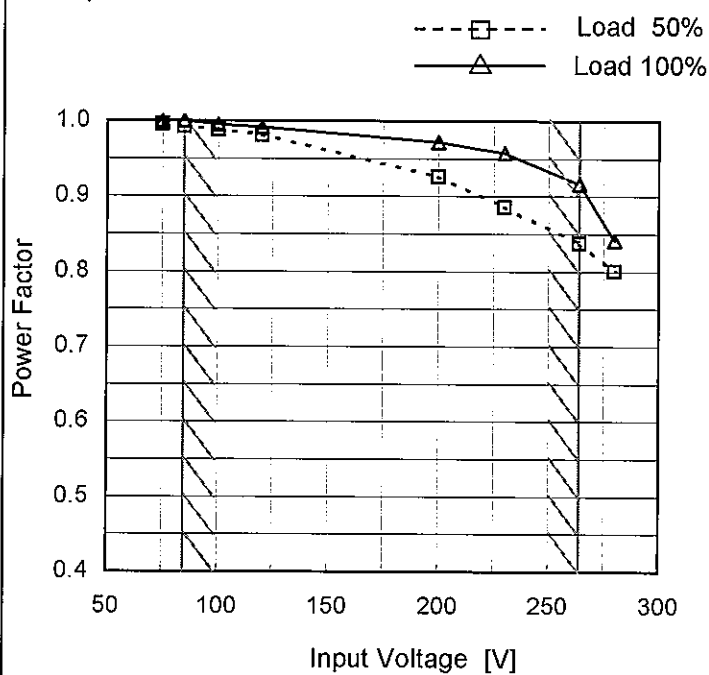
Model LFA100F-12

Item Power Factor (by Input Voltage)

Object

Temperature 25°C
Testing Circuitry Figure A

1. Graph



2. Values

Input Voltage [V]	Power Factor	
	Load 50%	Load 100%
75	0.995	0.999
85	0.992	0.999
100	0.988	0.995
120	0.982	0.991
200	0.926	0.972
230	0.886	0.957
264	0.838	0.916
280	0.800	0.842
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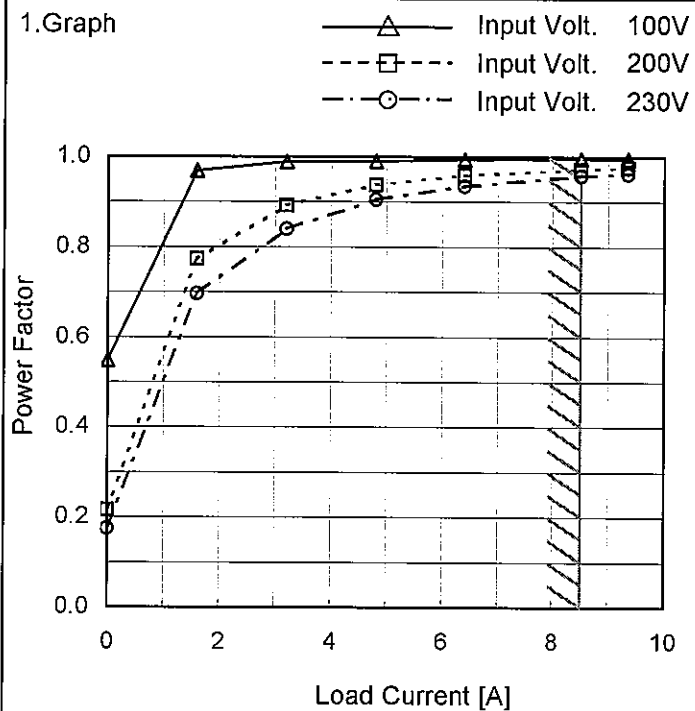
Model LFA100F-12

Item Power Factor (by Load Current)

Object

Temperature 25°C
Testing Circuitry Figure A

1. Graph



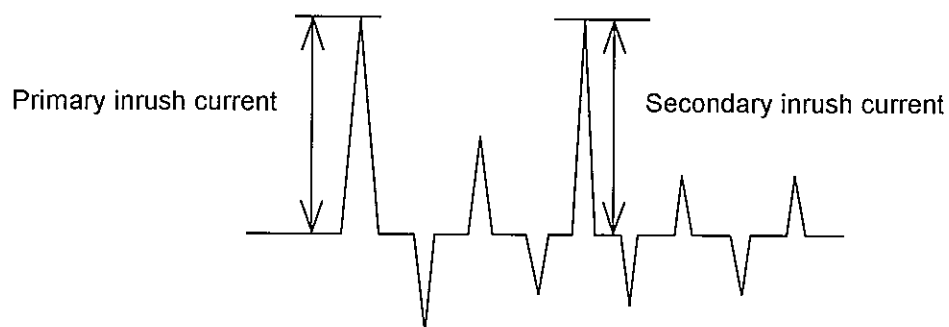
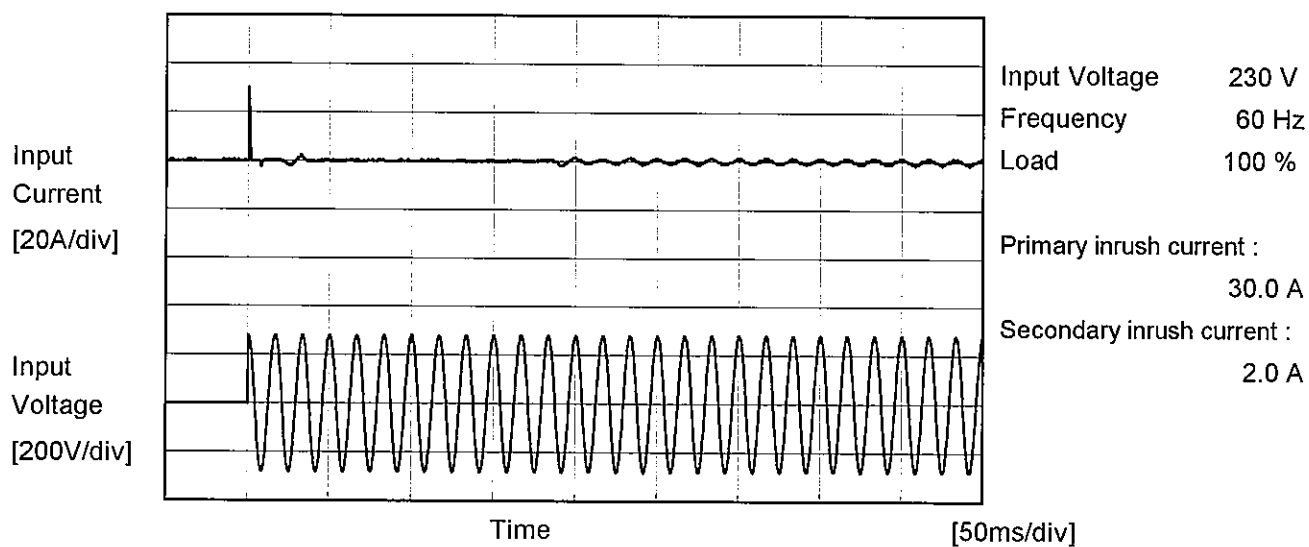
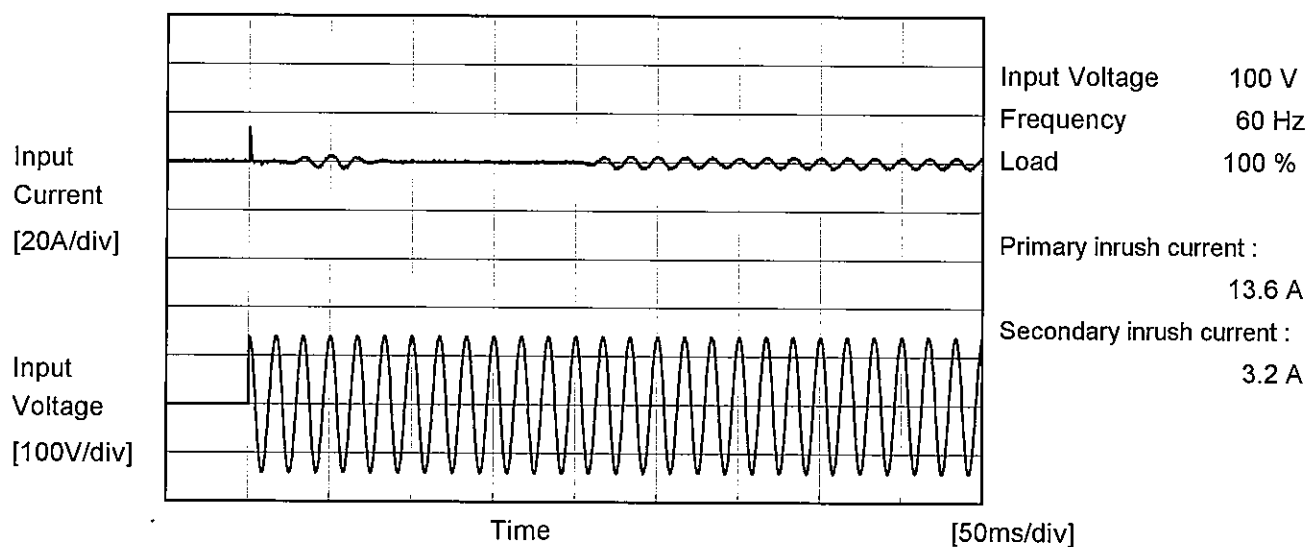
Note: Slanted line shows the range of the rated load current.

2. Values

Load Current [A]	Power Factor		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	0.548	0.217	0.175
1.60	0.968	0.772	0.697
3.20	0.988	0.891	0.840
4.80	0.990	0.937	0.904
6.40	0.995	0.958	0.935
8.50	0.995	0.972	0.957
9.35	0.996	0.975	0.962
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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Model	LFA100F-12	Temperature	25°C
Item	Inrush Current	Testing Circuitry	Figure A
Object	_____		



		Temperature 25°C Testing Circuitry Figure B
Model	LFA100F-12	
Item	Leakage Current	
Object		

1.Results

[mA]

Standards		Input Volt.			Note
		100 [V]	200 [V]	240 [V]	
DEN-AN	Both phases	0.27	0.34	0.37	Operation
	One of phase	0.25	0.55	0.67	stand by
IEC60950-1	Both phases	0.13	0.28	0.33	Operation
	One of phase	0.25	0.52	0.64	stand by

The value for "One phase" is the reference value only.

2.Condition

Leakage current value is concluded after measuring both phases of AC input and by choosing the larger one.

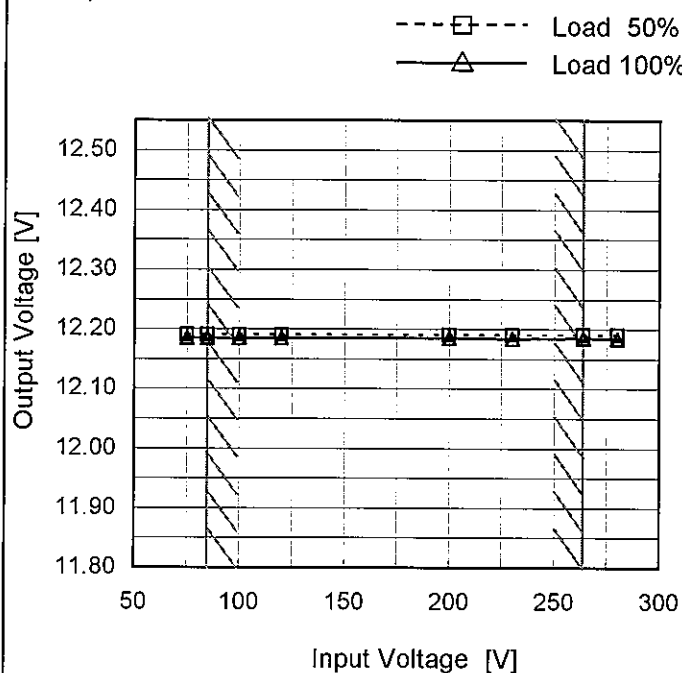
Model LFA100F-12

Item Line Regulation

Object +12V8.5A

 Temperature 25°C
 Testing Circuitry Figure A

1. Graph



2. Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
75	12.191	12.185
85	12.191	12.185
100	12.190	12.185
120	12.190	12.185
200	12.190	12.185
230	12.190	12.185
264	12.190	12.185
280	12.190	12.184
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Model LFA100F-12

Item Load Regulation

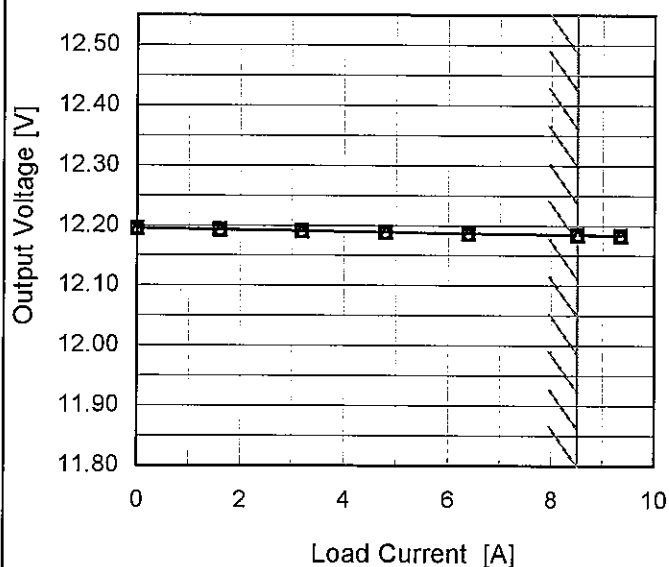
Object +12V8.5A

Temperature 25°C

Testing Circuitry Figure A

1. Graph

—△— Input Volt. 100V
 ---□--- Input Volt. 200V
 -·-○-·- Input Volt. 230V



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

2. Values

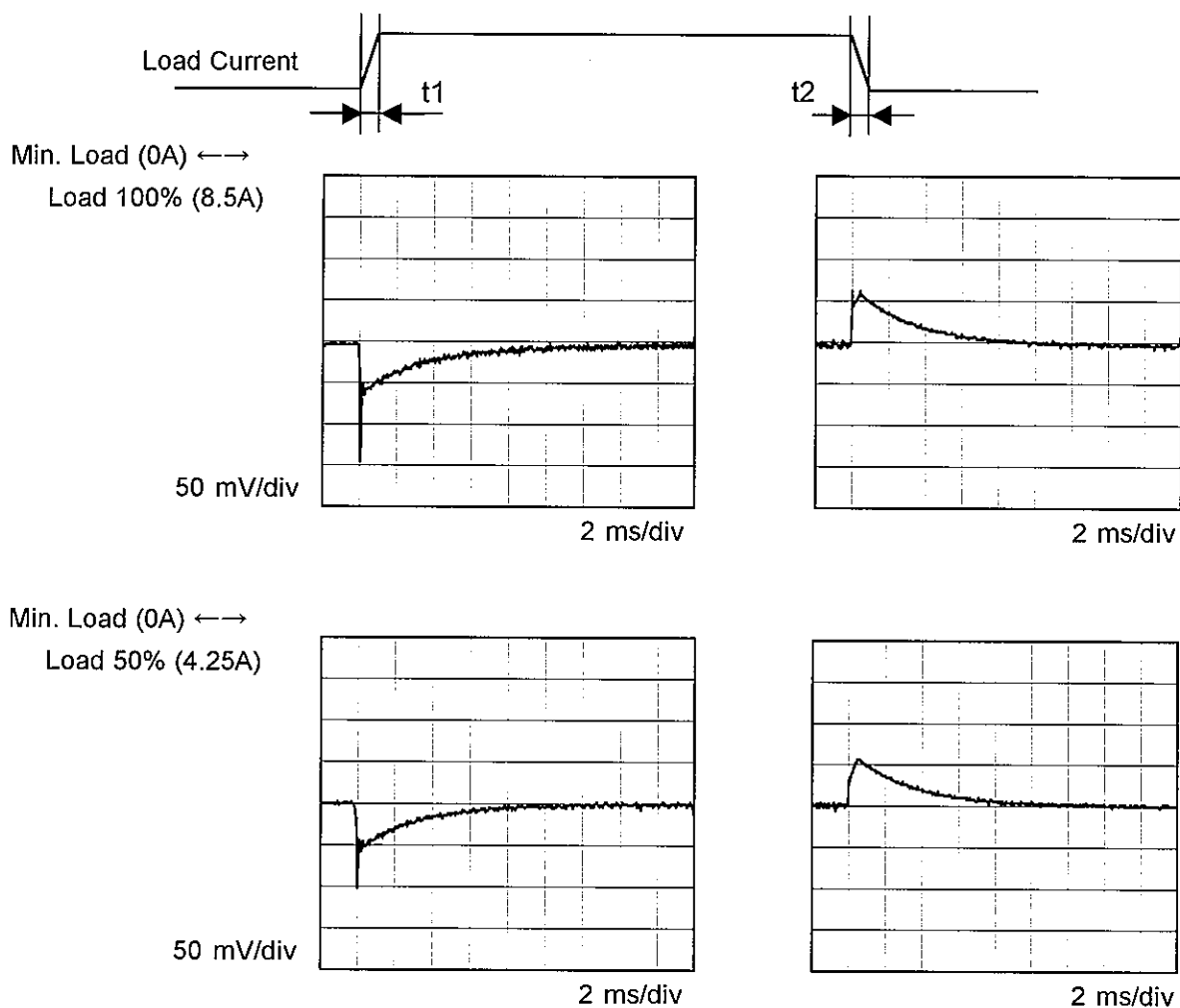
Load Current [A]	Output Voltage [V]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	12.195	12.195	12.195
1.60	12.193	12.193	12.193
3.20	12.191	12.191	12.191
4.80	12.189	12.189	12.189
6.40	12.187	12.187	12.187
8.50	12.185	12.185	12.185
9.35	12.184	12.184	12.184
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	LFA100F-12	Temperature Testing Circuitry	25°C Figure A
Item	Dynamic Load Response		
Object	+12V8.5A		

Input Volt. 100 V
Cycle 1000 ms

Response. $t_1=t_2=50\mu\text{s}$. Typ



Model	LFA100F-12																																								
Item	Ripple Voltage (by Load Current)	Temperature	25°C																																						
Object	+12V8.5A	Testing Circuitry	Figure C																																						
1.Graph		2.Values																																							
<div><div><div>—△— Input Volt. 100V</div><div>- - -○- - - Input Volt. 230V</div></div><p>Ripple Voltage [mV]</p><p>Load Current [A]</p></div> <div><p>Measured by 20 MHz Oscilloscope.</p><p>Ripple Voltage is shown as p-p in the figure below.</p><p>Note: Slanted line shows the range of the rated load current.</p></div>		<table><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. 230 [V]</th></tr><tr><td>0.00</td><td>20</td><td>20</td></tr><tr><td>1.6</td><td>25</td><td>30</td></tr><tr><td>3.2</td><td>30</td><td>35</td></tr><tr><td>4.8</td><td>35</td><td>35</td></tr><tr><td>6.4</td><td>45</td><td>45</td></tr><tr><td>8.5</td><td>50</td><td>50</td></tr><tr><td>9.35</td><td>50</td><td>50</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></table>		Load Current [A]	Ripple Voltage [mV]		Input Volt. 100 [V]	Input Volt. 230 [V]	0.00	20	20	1.6	25	30	3.2	30	35	4.8	35	35	6.4	45	45	8.5	50	50	9.35	50	50	--	-	-	--	-	-	--	-	-	--	-	-
Load Current [A]	Ripple Voltage [mV]																																								
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<div><div>T1: Due to AC Input Line</div><div>T2: Due to Switching</div><p>Ripple [mVp-p]</p><p>T1</p><p>T2</p></div> <p>Fig. Complex Ripple Wave Form</p>																																									

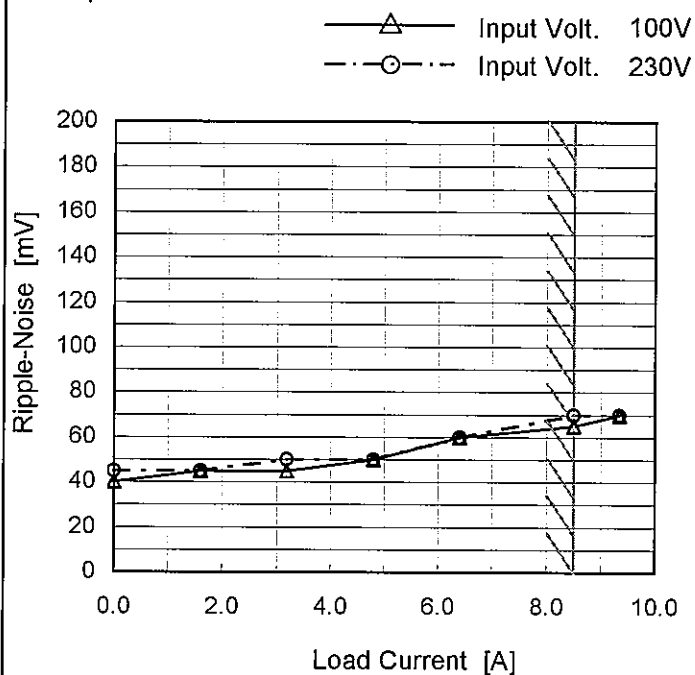
Model LFA100F-12

Item Ripple-Noise

Object +12V8.5A

 Temperature 25°C
 Testing Circuitry Figure C

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. 230 [V]
0.00	40	45
1.60	45	45
3.20	45	50
4.80	50	50
6.40	60	60
8.50	65	70
9.35	70	70
--	-	-
--	-	-
--	-	-
--	-	-

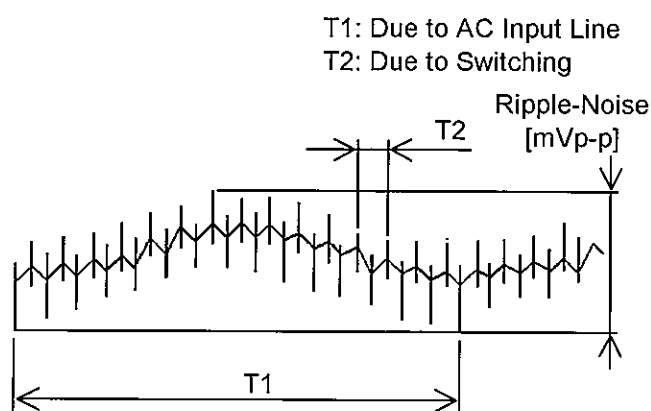


Fig. Complex Ripple Wave Form

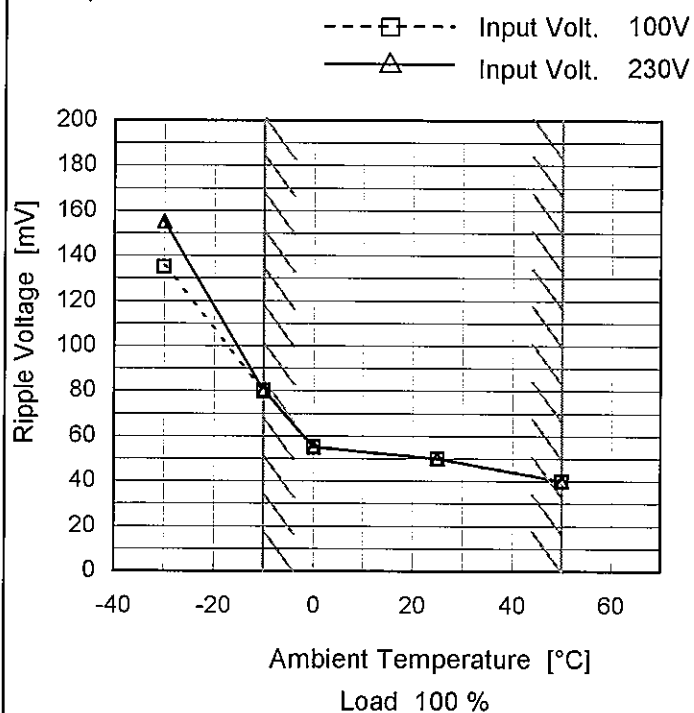
Model LFA100F-12

Item Ripple Voltage (by Ambient Temp.)

Object +12V8.5A

Testing Circuitry Figure C

1. Graph



Measured by 20 MHz Oscilloscope.

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

2. Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Input Volt. 100 [V]	Input Volt. 230 [V]
-30	135	155
-10	80	80
0	55	55
25	50	50
50	40	40
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

Model LFA100F-12

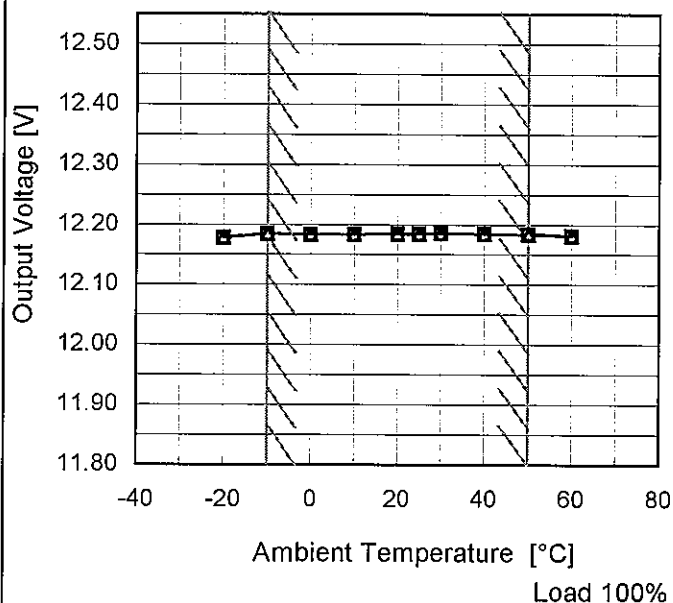
Item Ambient Temperature Drift

Object +12V8.5A

Testing Circuitry Figure A

1. Graph

—△— Input Volt. 100V
 ---□--- Input Volt. 200V
 ---○--- Input Volt. 230V



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

2. Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
-20	12.178	12.178	12.178
-10	12.184	12.184	12.184
0	12.184	12.184	12.184
10	12.184	12.184	12.184
20	12.184	12.184	12.184
25	12.185	12.185	12.185
30	12.185	12.185	12.185
40	12.185	12.185	12.185
50	12.184	12.184	12.184
60	12.182	12.182	12.181
--	-	-	-

		Testing Circuitry Figure A
Model	LFA100F-12	
Item	Output Voltage Accuracy	
Object	+12V8.5A	

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 : -10 - 50°C

Input Voltage : 85 - 264V

Load Current : 0 - 8.5A

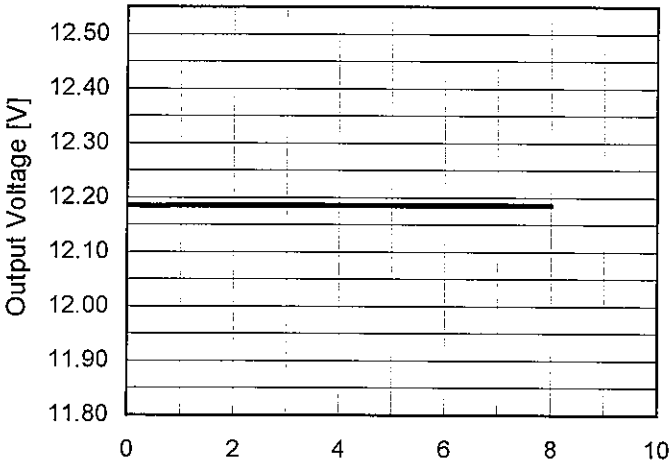
* Output Voltage Accuracy = $\pm(\text{Maximum of Output Voltage} - \text{Minimum of Output Voltage}) / 2$

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

2. Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	30	85	0	12.195	±6	±0.1
Minimum Voltage	10	85	8.5	12.184		

COSEL

LFA100F-12																									
Model	LFA100F-12	Temperature	25°C																						
Item	Time Lapse Drift	Testing Circuitry	Figure A																						
Object	+12V8.5A																								
1.Graph		2.Values																							
<div><p>Output Voltage [V]</p><p>Time [H]</p><p>Input Volt. 100V</p><p>Load 100%</p></div>		<table><tr><th>Time since start [H]</th><th>Output Voltage [V]</th></tr><tr><td>0.0</td><td>12.185</td></tr><tr><td>0.5</td><td>12.184</td></tr><tr><td>1.0</td><td>12.185</td></tr><tr><td>2.0</td><td>12.185</td></tr><tr><td>3.0</td><td>12.185</td></tr><tr><td>4.0</td><td>12.185</td></tr><tr><td>5.0</td><td>12.185</td></tr><tr><td>6.0</td><td>12.185</td></tr><tr><td>7.0</td><td>12.185</td></tr><tr><td>8.0</td><td>12.185</td></tr></table>		Time since start [H]	Output Voltage [V]	0.0	12.185	0.5	12.184	1.0	12.185	2.0	12.185	3.0	12.185	4.0	12.185	5.0	12.185	6.0	12.185	7.0	12.185	8.0	12.185
Time since start [H]	Output Voltage [V]																								
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7.0	12.185																								
8.0	12.185																								
* The characteristic of AC230V is equal.																									

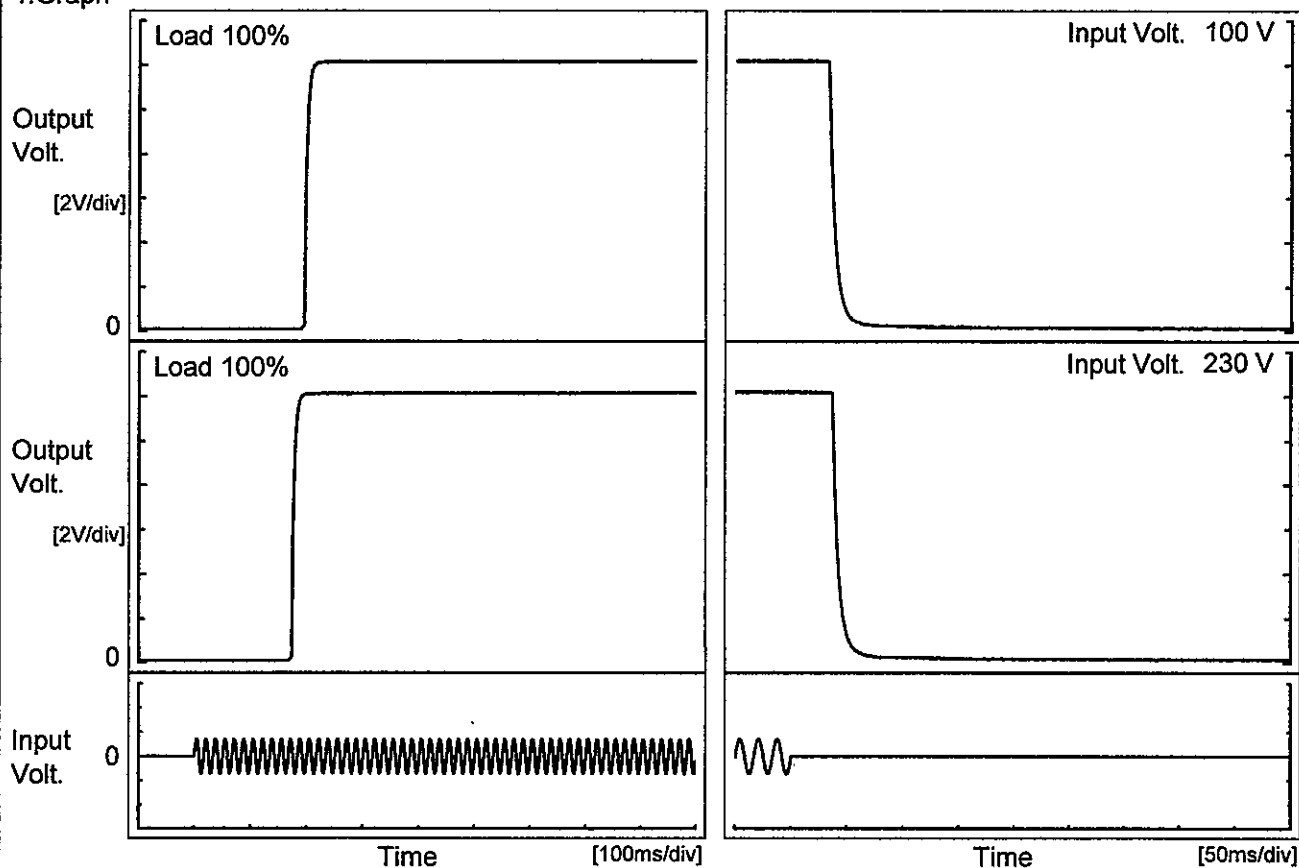
- 17 -

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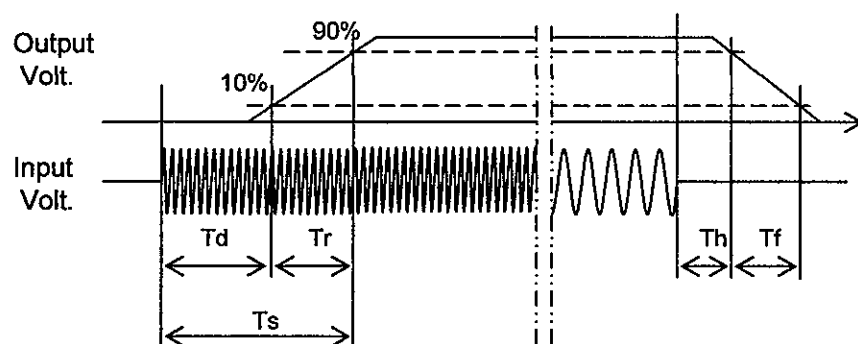
Model	LFA100F-12	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+12V8.5A		

1. Graph



2. Values

Input Volt.	Time	Td	Tr	Ts	Th	Tf
100 V		196.0	8.0	204.0	34.0	12.8
230 V		174.0	8.0	182.0	37.5	13.0



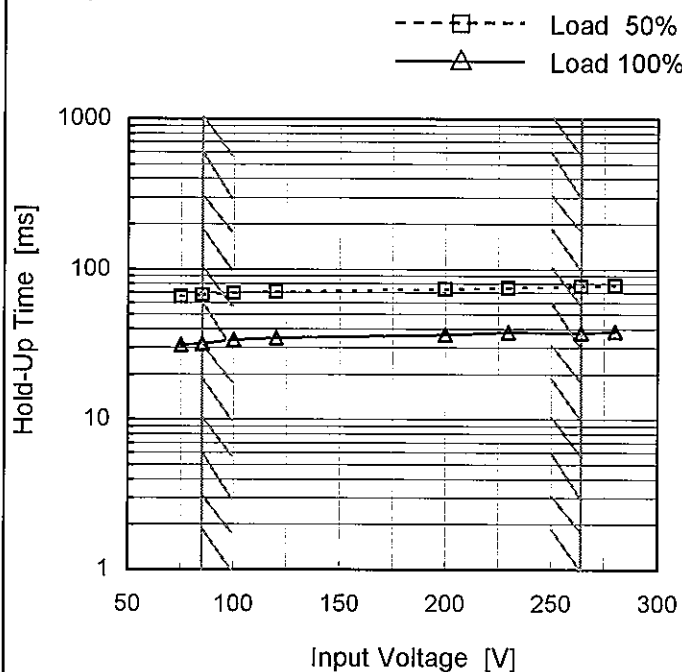
Model LFA100F-12

Item Hold-Up Time

Object +12V8.5A

 Temperature 25°C
 Testing Circuitry Figure A

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.

2. Values

Input Voltage [V]	Hold-Up Time [ms]	
	Load 50%	Load 100%
75	66	31
85	68	32
100	69	34
120	71	35
200	74	37
230	75	38
264	77	38
280	78	39
--	-	-

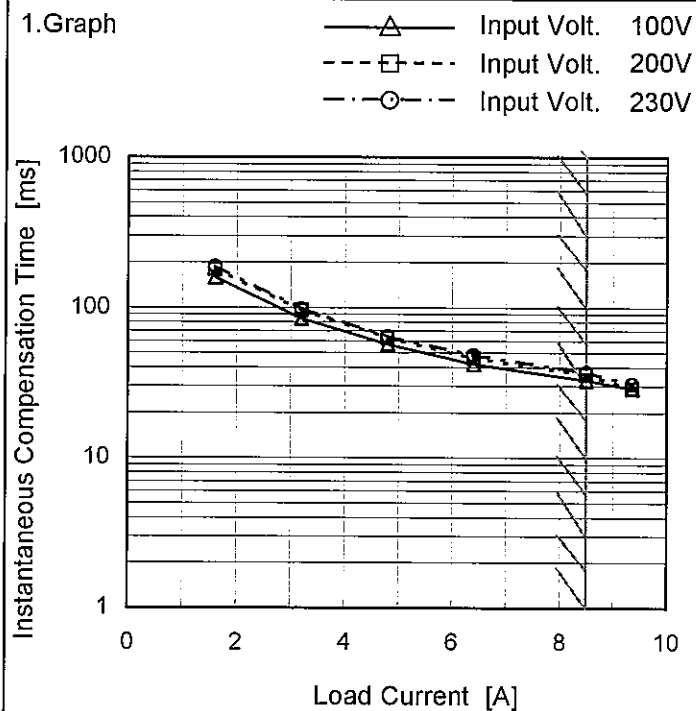
Model LFA100F-12

Item Instantaneous Interruption Compensation

Object +12V8.5A

Temperature 25°C
Testing Circuitry Figure A

1. Graph



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

2. Values.

Load Current [A]	Time [ms]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	-	-	-
1.60	158	180	187
3.20	84	96	98
4.80	57	63	64
6.40	42	46	48
8.50	33	36	37
9.35	29	29	31
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

Model

LFA100F-12

Item

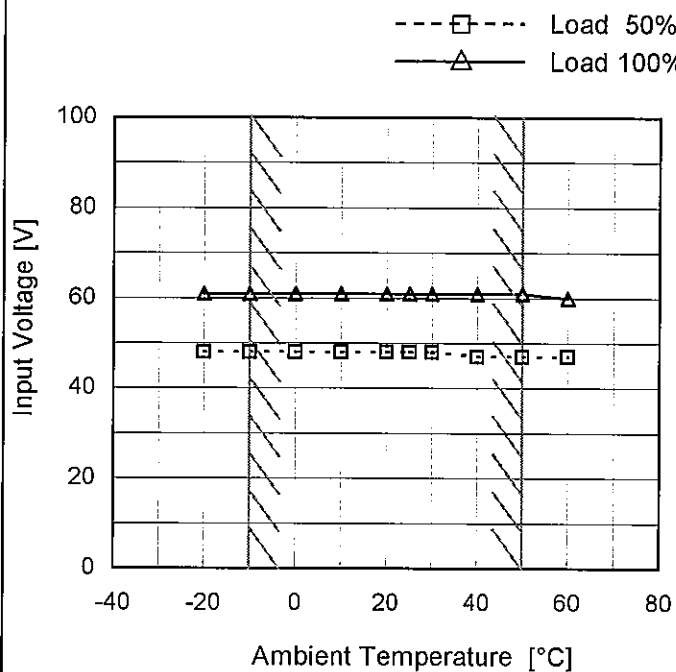
Minimum Input Voltage
for Regulated Output Voltage

Object

+12V8.5A

Testing Circuitry Figure A

1. Graph



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

2. Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	48	61
-10	48	61
0	48	61
10	48	61
20	48	61
25	48	61
30	48	61
40	47	61
50	47	61
60	47	60
--	-	-

Model LFA100F-12

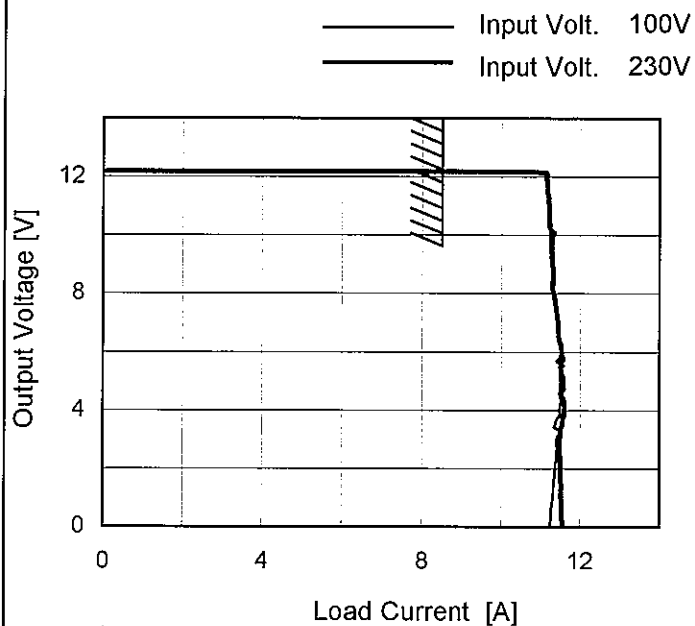
Item Overcurrent Protection

Object +12V8.5A

Temperature 25°C

Testing Circuitry Figure A

1. Graph



2. Values

Output Voltage [V]	Load Current [A]	
	Input Volt. 100[V]	Input Volt. 230[V]
12.0	9.94	8.92
11.4	11.16	11.19
10.8	11.19	11.20
9.6	11.30	11.27
8.4	11.34	11.31
7.2	11.41	11.41
6.0	11.50	11.52
4.8	11.49	11.57
3.6	11.40	11.54
2.4	11.39	11.48
1.2	11.48	11.53
0.0	11.15	11.49

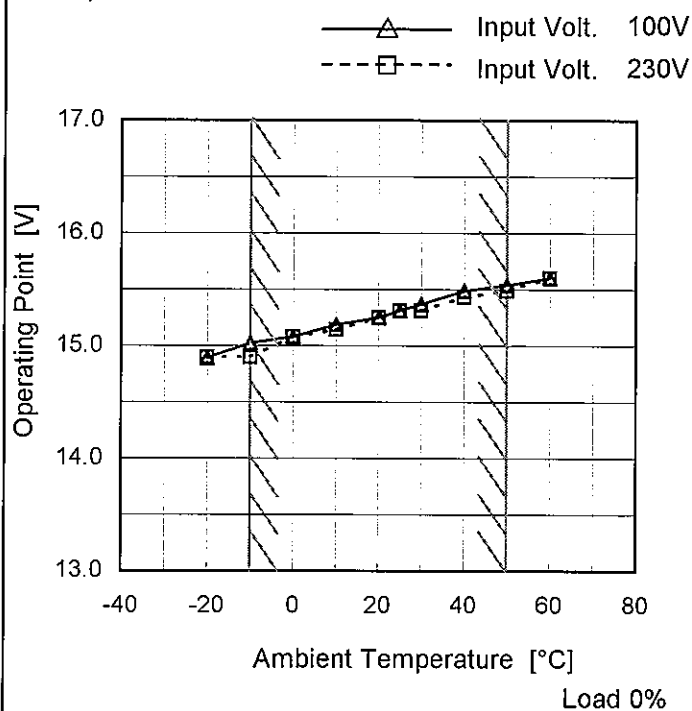
Model LFA100F-12

Item Overvoltage Protection

Object +12V8.5A

Testing Circuitry Figure A

1. Graph



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

2. Values

Ambient Temperature [°C]	Operating Point [V]	
	Input Volt. 100[V]	Input Volt. 230[V]
-20	14.89	14.90
-10	15.02	14.90
0	15.08	15.08
10	15.19	15.14
20	15.25	15.25
25	15.31	15.31
30	15.37	15.31
40	15.49	15.43
50	15.54	15.49
60	15.60	15.60
--	-	-

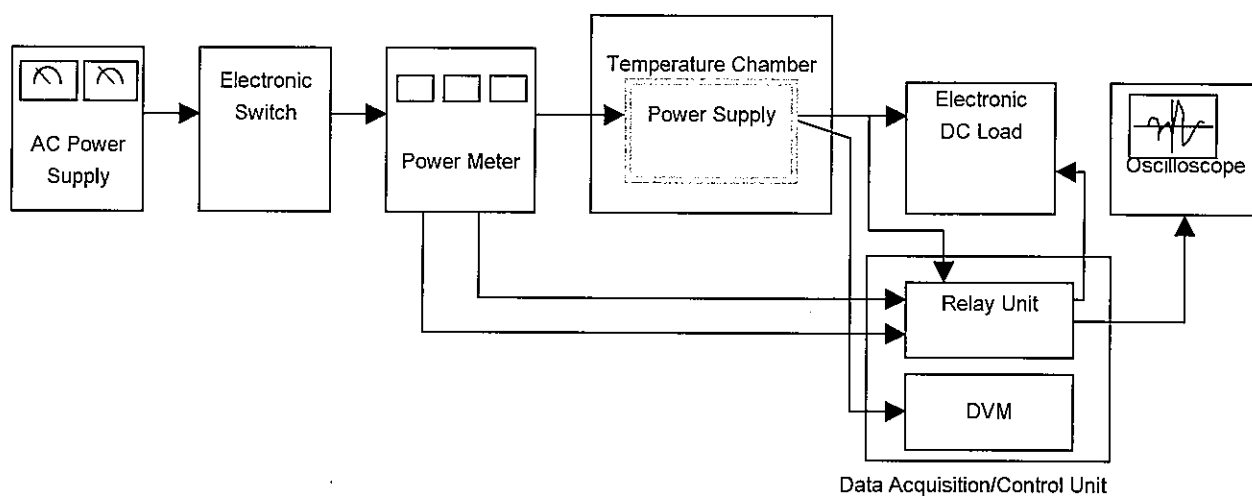


Figure A

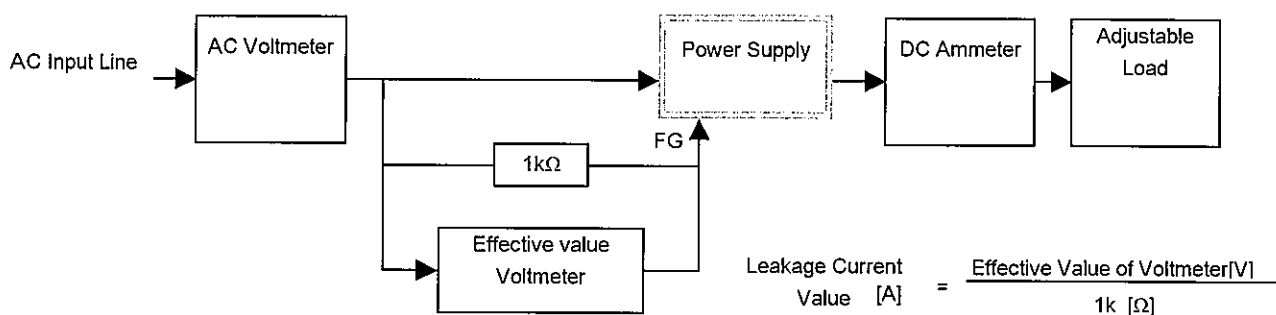


Figure B (DEN-AN)

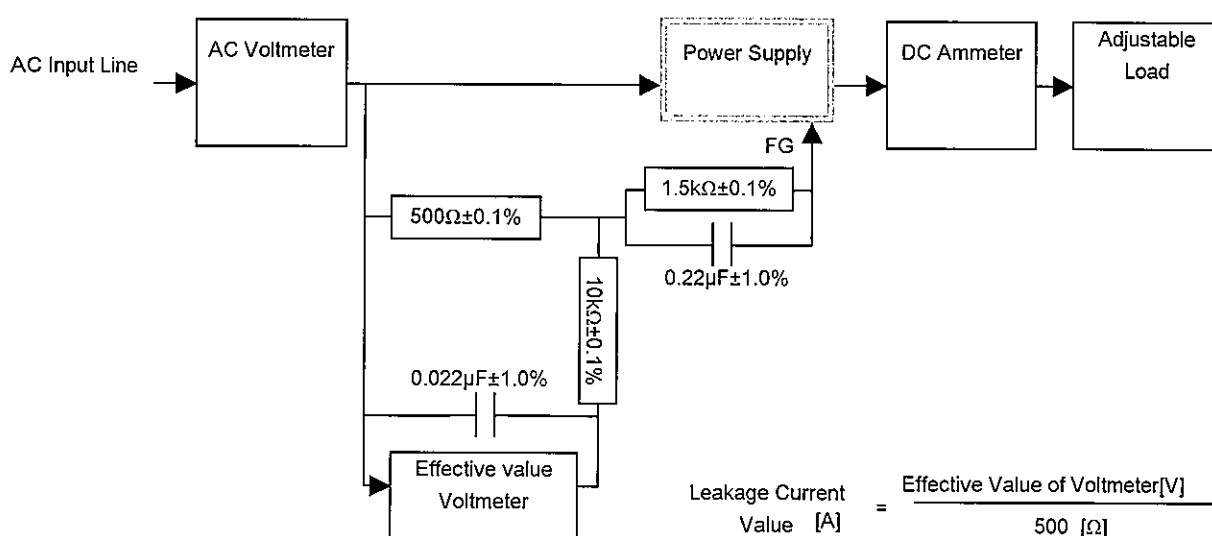


Figure B (IEC60950-1)

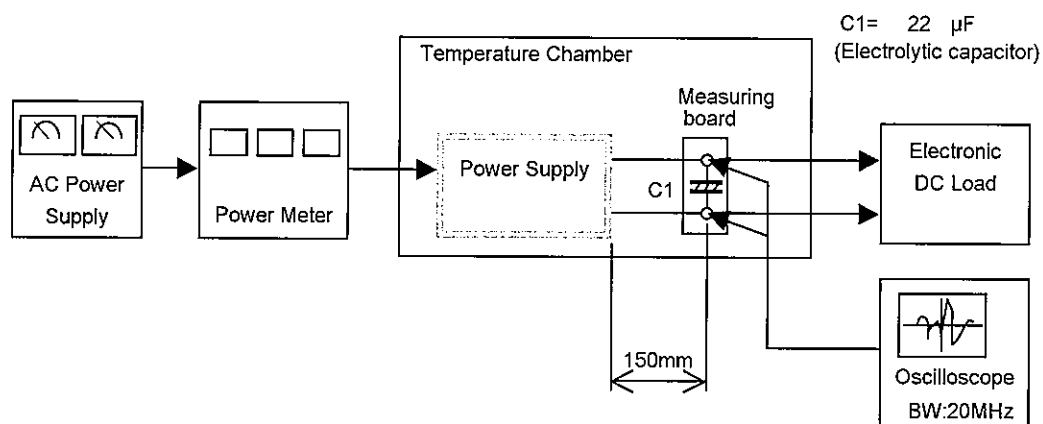


Figure C