

TEST DATA OF SPLFA50F-12

Regulated DC Power Supply

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Takahiro yoneda Design Manager

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Hiroaki Kitamura Design Engineer

COSEL CO.,LTD.

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(Final Page 24)

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Model	SPLFA50F-12																																																						
Item	Input Current (by Load Current)	Temperature 25°C	Testing Circuitry Figure A																																																				
Object	_____	_____	_____																																																				
1.Graph	—△— Input Volt. 100V ---□--- Input Volt. 200V ---○--- Input Volt. 230V	2.Values																																																					
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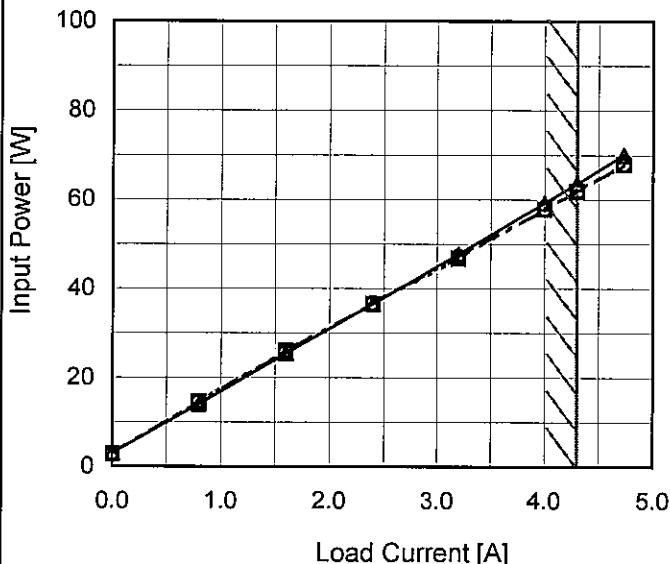
Model SPLFA50F-12

Item Input Power (by Load Current)

Object _____

1. Graph

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

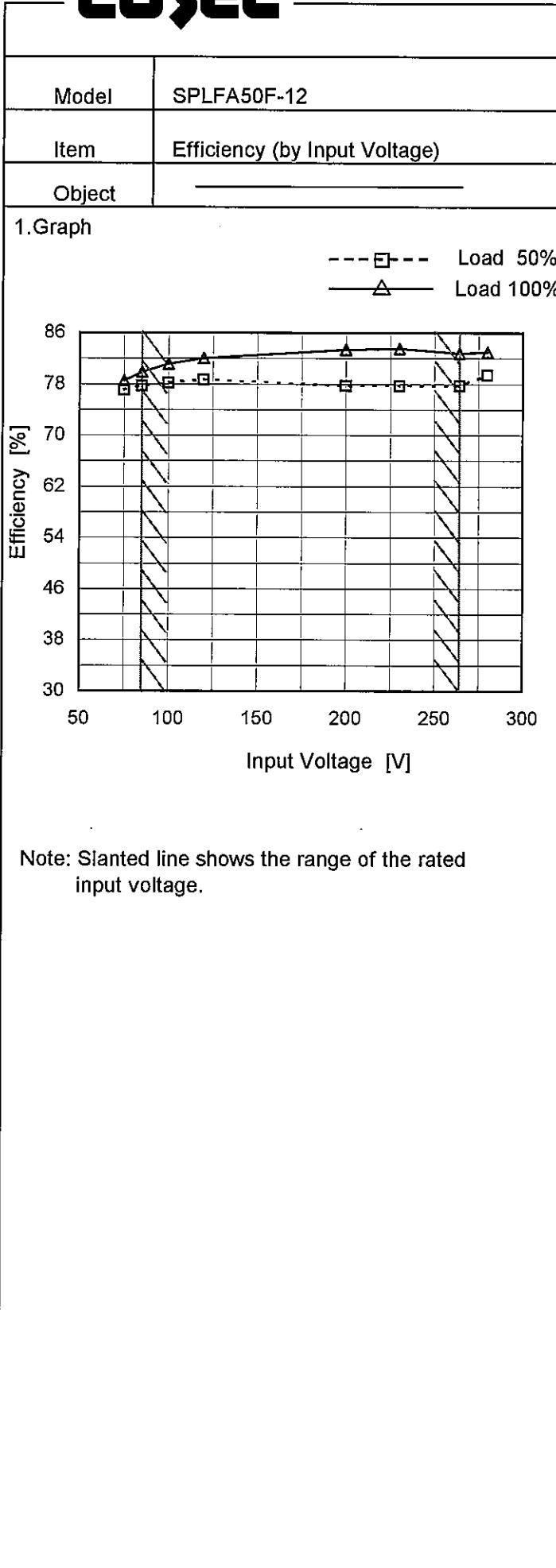


Note: Slanted line shows the range of the rated load current.

Temperature 25°C
 Testing Circuitry Figure A

2. Values

Load Current [A]	Input Power [W]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	3.00	2.80	2.90
0.80	14.00	14.50	14.60
1.60	25.40	26.00	25.70
2.40	36.60	36.60	36.70
3.20	47.70	46.80	47.20
4.00	59.20	57.80	57.80
4.30	63.60	61.90	61.80
4.73	70.00	67.90	67.80
--	-	-	-
--	-	-	-
--	-	-	-

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Temperature 25°C
Testing Circuitry Figure A

2. Values

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
75	77.1	78.6
85	77.7	79.9
100	78.2	81.1
120	78.7	82.0
200	77.7	83.4
230	77.7	83.5
264	77.7	82.8
280	79.4	83.0
--	-	-

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Model	SPLFA50F-12	Temperature	25°C																																																			
Item	Efficiency (by Load Current)	Testing Circuitry	Figure A																																																			
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1.Graph		2.Values																																																				
<p>The graph plots Efficiency [%] on the Y-axis (30 to 86) against Load Current [A] on the X-axis (0.0 to 5.0). Three data series are shown: Input Volt. 100V (solid line with open triangle markers), Input Volt. 200V (dashed line with open square markers), and Input Volt. 230V (dash-dot line with open circle markers). All curves show efficiency increasing with load current. A diagonal hatched line represents the rated load current range, which is approximately between 3.5A and 4.5A.</p>		<table border="1"> <thead> <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> </thead> <tbody> <tr><td>0.000</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>0.800</td><td>68.9</td><td>66.5</td><td>66.0</td></tr> <tr><td>1.600</td><td>75.9</td><td>74.1</td><td>75.0</td></tr> <tr><td>2.400</td><td>78.9</td><td>78.9</td><td>78.7</td></tr> <tr><td>3.200</td><td>80.4</td><td>81.9</td><td>81.2</td></tr> <tr><td>4.000</td><td>81.0</td><td>82.9</td><td>82.9</td></tr> <tr><td>4.300</td><td>81.0</td><td>83.2</td><td>83.4</td></tr> <tr><td>4.730</td><td>81.0</td><td>83.5</td><td>83.6</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> </tbody> </table>		Load Current [A]	Efficiency [%]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	0.000	-	-	-	0.800	68.9	66.5	66.0	1.600	75.9	74.1	75.0	2.400	78.9	78.9	78.7	3.200	80.4	81.9	81.2	4.000	81.0	82.9	82.9	4.300	81.0	83.2	83.4	4.730	81.0	83.5	83.6	--	-	-	-	--	-	-	-	--	-	-	-
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Item	Power Factor (by Input Voltage)	Temperature 25°C Testing Circuitry Figure A																																
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<p>Power Factor</p> <p>Input Voltage [V]</p> <p>Load 50% (dashed line with squares)</p> <p>Load 100% (solid line with triangles)</p>																																		
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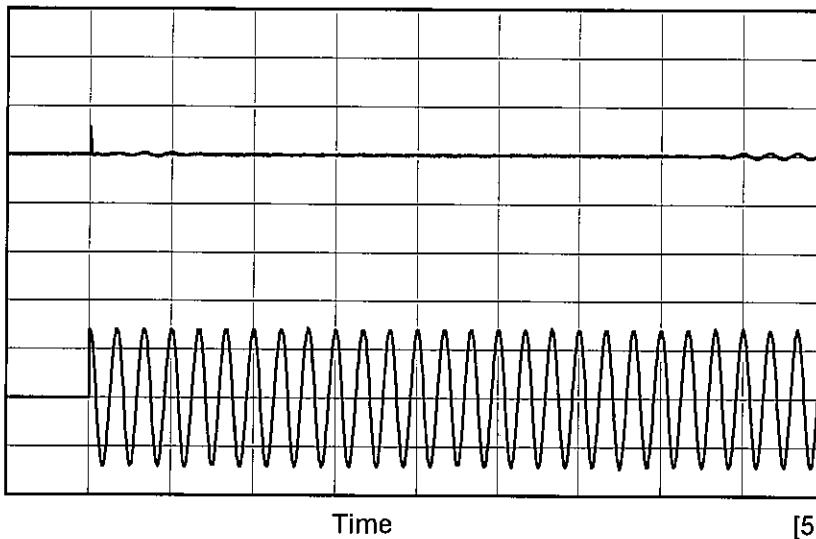
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Note:	Slanted line shows the range of the rated load current.																																																					

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Model SPLFA50F-12

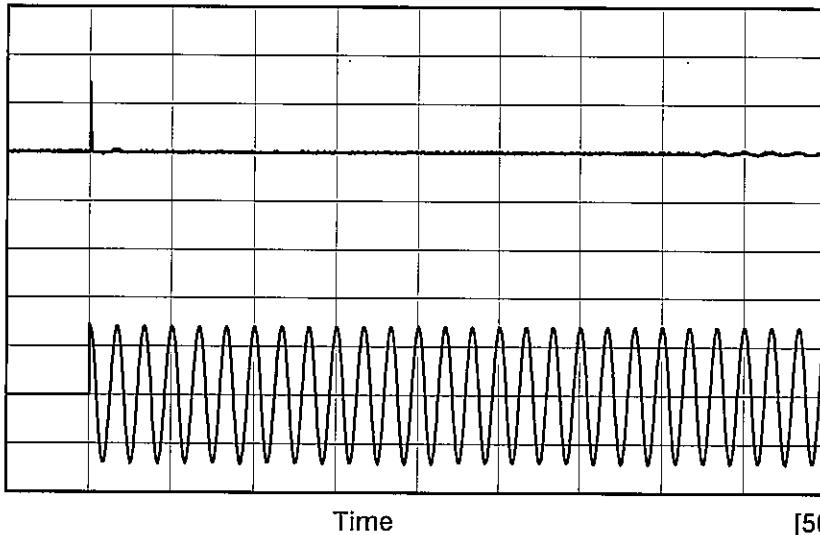
Item Inrush Current

Object _____

Temperature 25°C
Testing Circuitry Figure AInput
Current
[20A/div]Input
Voltage
[100V/div]

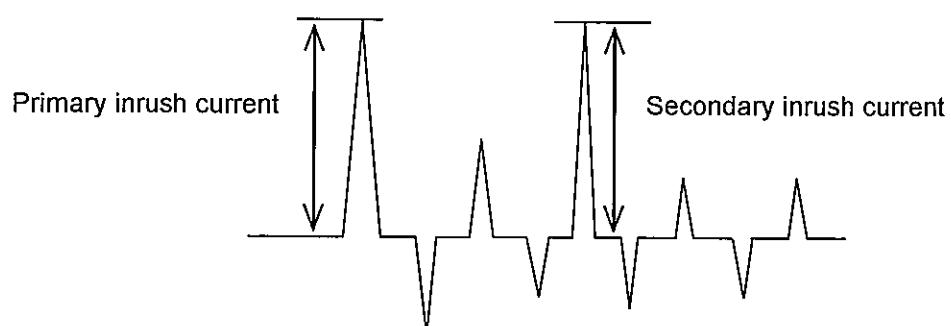
Input Voltage 100 V
Frequency 60 Hz
Load 100 %

Primary inrush current : 11.1 A
Secondary inrush current : 1.3 A

Input
Current
[20A/div]Input
Voltage
[200V/div]

Input Voltage 200 V
Frequency 60 Hz
Load 100 %

Primary inrush current : 28.7 A
Secondary inrush current : 0.9 A





Model	SPLFA50F-12	Temperature Testing Circuitry 25°C Figure B
Item	Leakage Current	
Object	_____	

1. Results

Standards		Input Volt.			Note
		100 [V]	200 [V]	240 [V]	
DEN-AN	Both phases	0.15	0.25	0.31	Operation
	One of phases	0.20	0.47	0.57	Stand by
IEC60950-1	Both phases	0.17	0.28	0.33	Operation
	One of phases	0.22	0.45	0.53	Stand by

The value for "One of phases" 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.

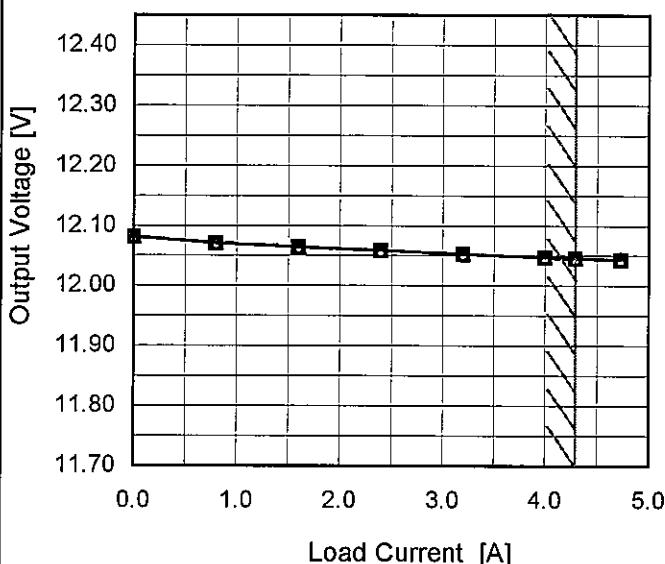


Model	SPLFA50F-12																																	
Item	Line Regulation	Temperature 25°C Testing Circuitry Figure A																																
Object	+12V4.3A																																	
1.Graph																																		
<p style="text-align: center;"> ---□--- Load 50% —△— Load 100% </p> <p>Output Voltage [V]</p> <p>Input Voltage [V]</p>																																		
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Model	SPLFA50F-12
Item	Load Regulation
Object	+12V4.3A

1. Graph

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



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

Temperature 25°C
Testing Circuitry Figure A

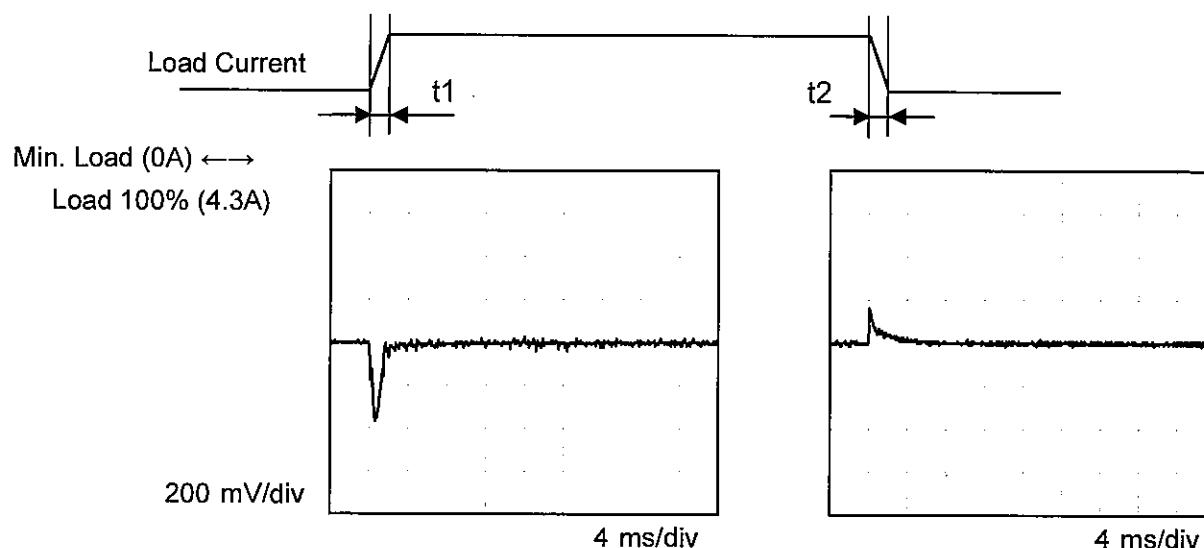
2. Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	12.081	12.081	12.081
0.80	12.071	12.071	12.071
1.60	12.064	12.064	12.064
2.40	12.059	12.058	12.058
3.20	12.053	12.052	12.052
4.00	12.047	12.047	12.047
4.30	12.046	12.045	12.045
4.73	12.044	12.043	12.043
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--	-	-	-
--	-	-	-

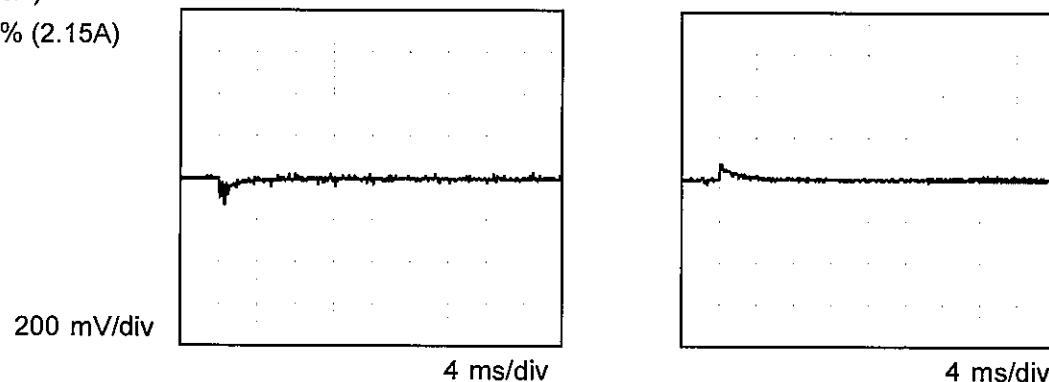
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Model	SPLFA50F-12	Temperature Testing Circuitry 25°C Figure A
Item	Dynamic Load Response	
Object	+12V4.3A	

Input Volt. 100 V
Cycle 1000 ms

Response. $t_1=t_2=50\mu s$. Typ

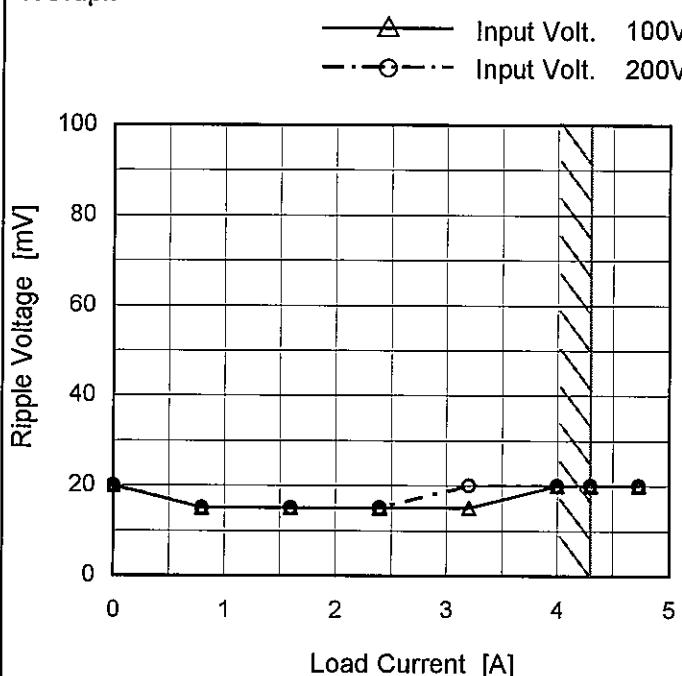
Min. Load (0A) \longleftrightarrow
Load 50% (2.15A)



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Model	SPLFA50F-12
Item	Ripple Voltage (by Load Current)
Object	+12V4.3A

1. Graph



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.

Temperature 25°C
Testing Circuitry Figure A

2. Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
0.000	20	20
0.800	15	15
1.600	15	15
2.400	15	15
3.200	15	20
4.000	20	20
4.300	20	20
4.730	20	20
--	-	-
--	-	-
--	-	-

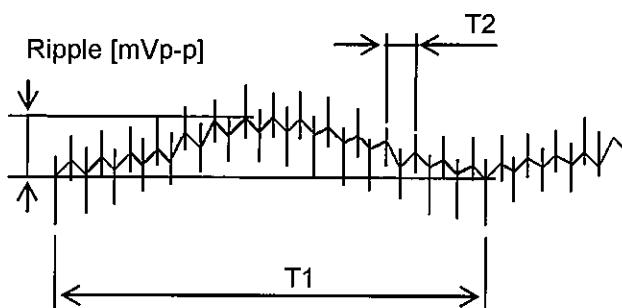
T1: Due to AC Input Line
T2: Due to Switching

Fig. Complex Ripple Wave Form

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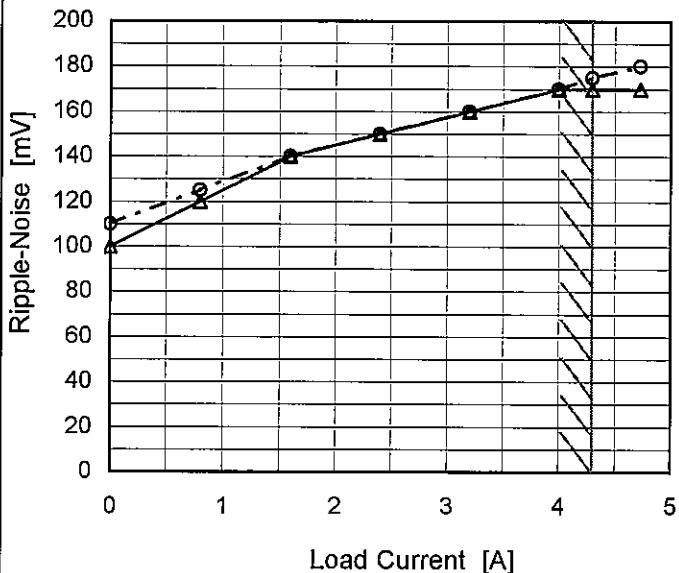
Model SPLFA50F-12

Item Ripple-Noise

Object +12V4.3A

1. Graph

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



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.

Temperature 25°C
Testing Circuitry Figure A

2. Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
0.000	100	110
0.800	120	125
1.600	140	140
2.400	150	150
3.200	160	160
4.000	170	170
4.300	170	175
4.730	170	180
--	-	-
--	-	-
--	-	-

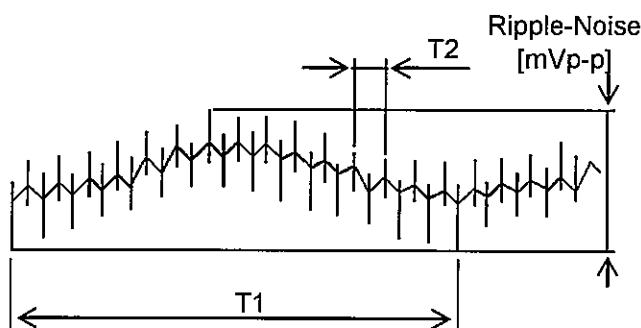
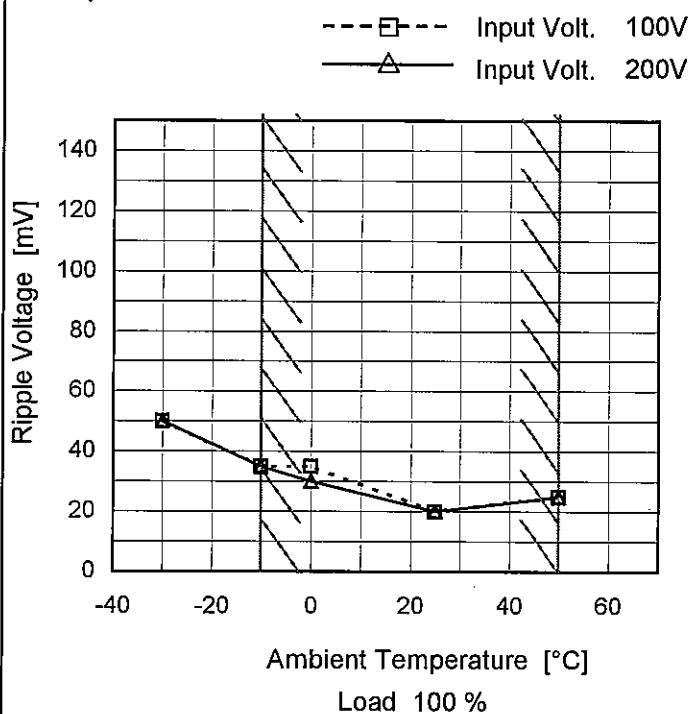
T1: Due to AC Input Line
T2: Due to Switching

Fig. Complex Ripple Wave Form

Model	SPLFA50F-12
Item	Ripple Voltage (by Ambient Temp.)
Object	+12V4.3A

1.Graph



Measured by 20 MHz Oscilloscope.

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

Testing Circuitry Figure A

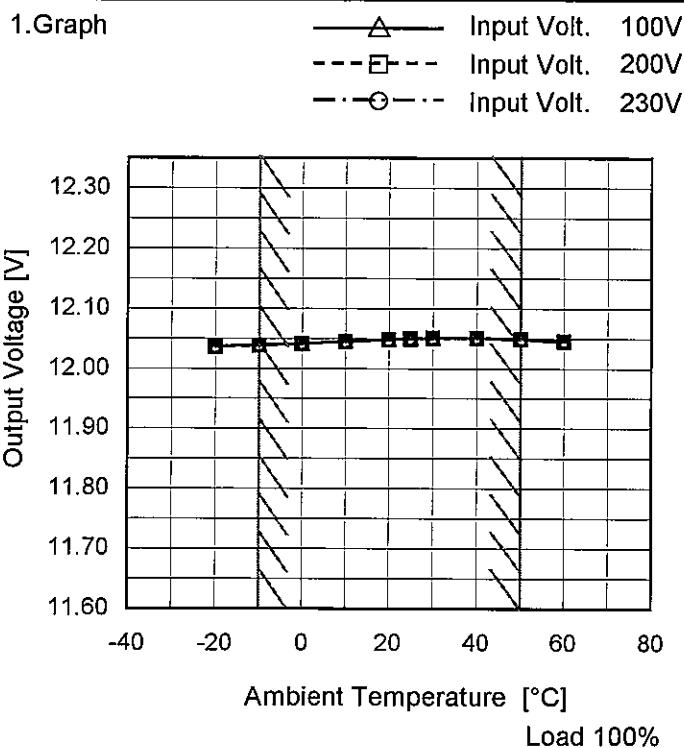
2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
-30	50	50
-10	35	35
0	35	30
25	20	20
50	25	25
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Model SPLFA50F-12

Item Ambient Temperature Drift

Object +12V4.3A



Testing Circuitry Figure A

2. Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
-20	12.036	12.036	12.036
-10	12.039	12.038	12.038
0	12.041	12.041	12.041
10	12.045	12.044	12.044
20	12.048	12.048	12.048
25	12.050	12.049	12.049
30	12.051	12.050	12.050
40	12.051	12.051	12.050
50	12.049	12.049	12.049
60	12.046	12.045	12.045
--	-	-	-

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



Model	SPLFA50F-12	Testing Circuitry Figure A
Item	Output Voltage Accuracy	
Object	+12V4.3A	

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 - 4.3A

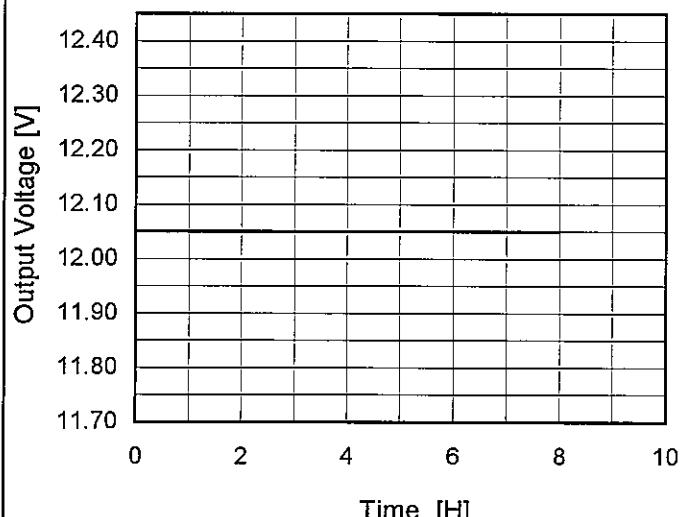
* Output Voltage Accuracy = $\pm(\text{Maximum of Output Voltage} - \text{Minimum of Output Voltage}) / 2$

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

2. Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	40	264	0	12.087	± 25	± 0.2
Minimum Voltage	-10	264	4.3	12.038		

COSEL

Model	SPLFA50F-12	Temperature Testing Circuitry	25°C																						
Item	Time Lapse Drift		Figure A																						
Object	+12V4.3A																								
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>12.055</td></tr> <tr><td>0.5</td><td>12.053</td></tr> <tr><td>1.0</td><td>12.051</td></tr> <tr><td>2.0</td><td>12.050</td></tr> <tr><td>3.0</td><td>12.050</td></tr> <tr><td>4.0</td><td>12.050</td></tr> <tr><td>5.0</td><td>12.050</td></tr> <tr><td>6.0</td><td>12.050</td></tr> <tr><td>7.0</td><td>12.050</td></tr> <tr><td>8.0</td><td>12.050</td></tr> </tbody> </table>	Time since start [H]	Output Voltage [V]	0.0	12.055	0.5	12.053	1.0	12.051	2.0	12.050	3.0	12.050	4.0	12.050	5.0	12.050	6.0	12.050	7.0	12.050	8.0	12.050
Time since start [H]	Output Voltage [V]																								
0.0	12.055																								
0.5	12.053																								
1.0	12.051																								
2.0	12.050																								
3.0	12.050																								
4.0	12.050																								
5.0	12.050																								
6.0	12.050																								
7.0	12.050																								
8.0	12.050																								

* The characteristic of AC200V is equal.

COSEL

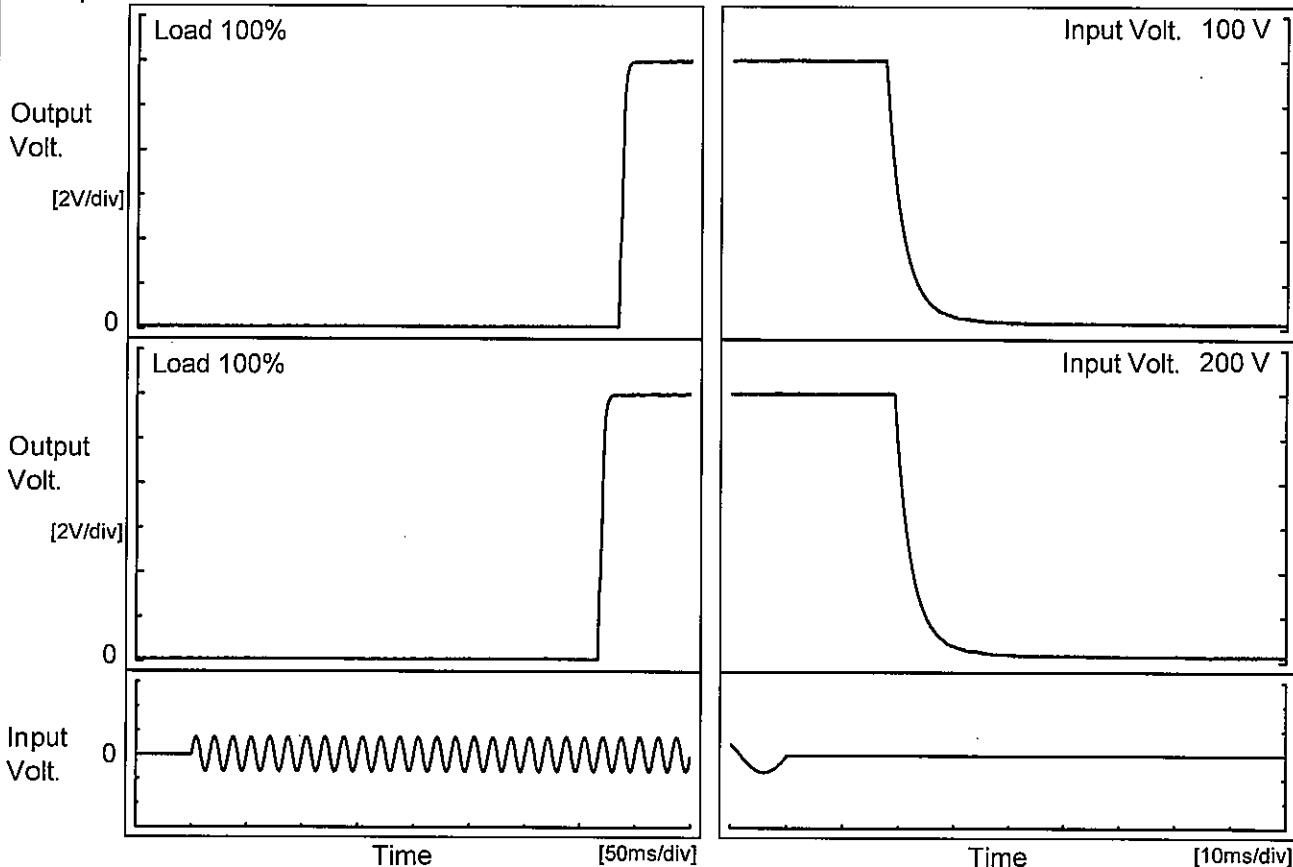
Model SPLFA50F-12

Item Rise and Fall Time

Object +12V4.3A

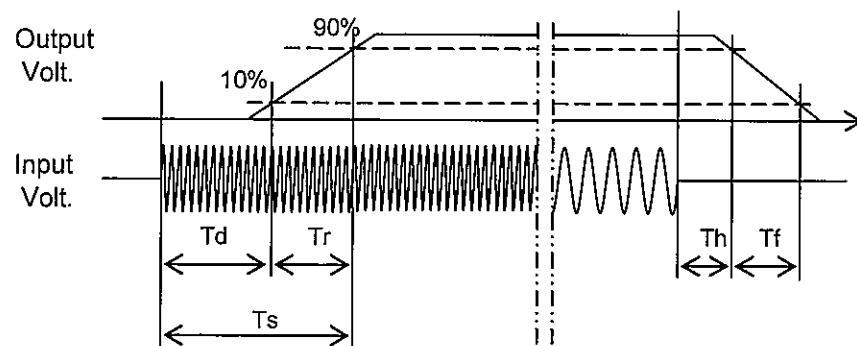
Temperature 25°C
Testing Circuitry Figure A

1. Graph



2. Values

Input Volt.	Time	Td	Tr	Ts	Th	Tf	[ms]
100 V		384.8	6.0	390.8	17.8	7.4	
200 V		367.3	5.8	373.1	19.6	7.3	

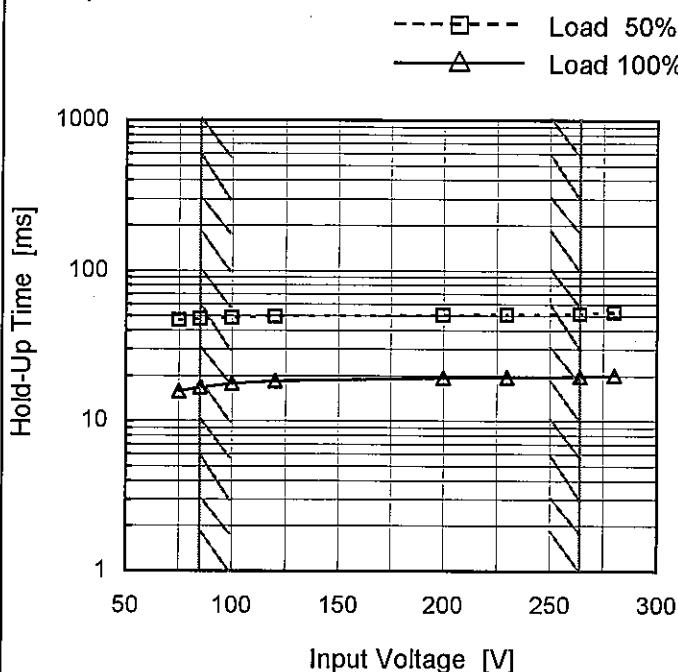


Model SPLFA50F-12

Item Hold-Up Time

Object +12V4.3A

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%
75	47	16
85	48	17
100	49	18
120	50	18
200	51	19
230	51	20
264	52	20
280	53	20
--	-	-

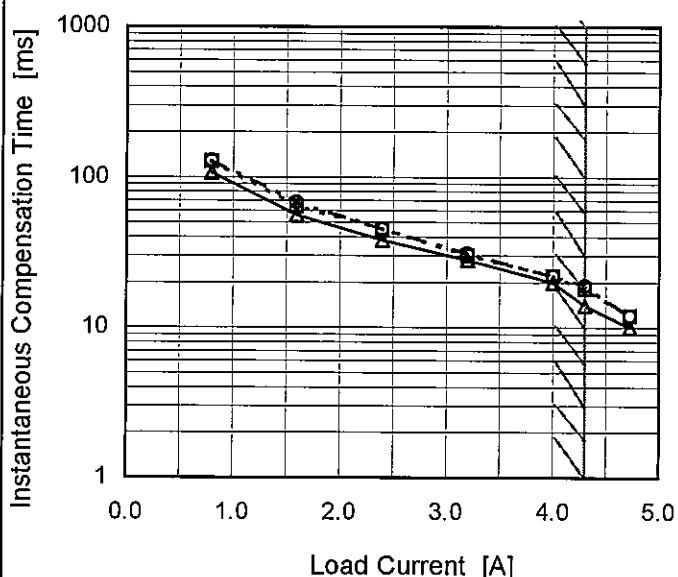
Model SPLFA50F-12

Item Instantaneous Interruption Compensation

Object +12V4.3A

1. Graph

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



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

Temperature 25°C
 Testing Circuitry Figure A

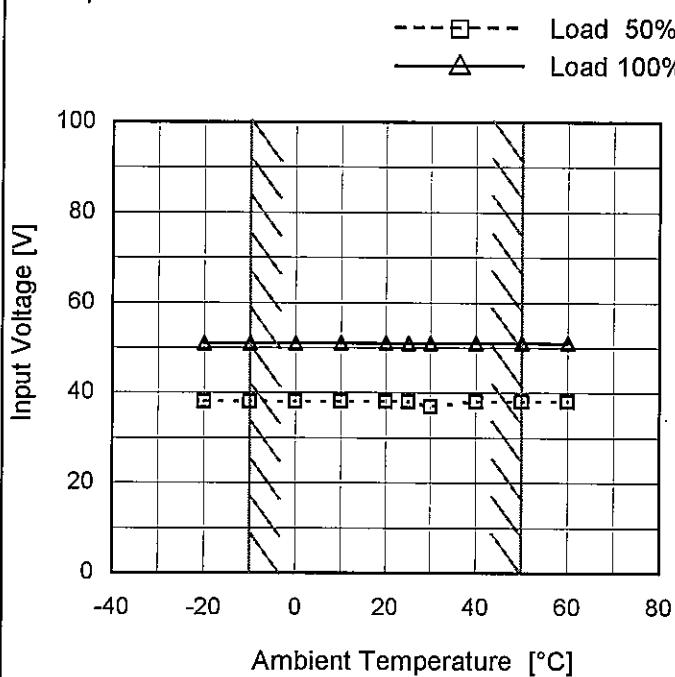
2. Values

Load Current [A]	Time [ms]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	-	-	-
0.80	107	128	129
1.60	56	64	68
2.40	38	45	45
3.20	28	30	31
4.00	20	22	22
4.30	14	18	19
4.73	10	12	12
--	-	-	-
--	-	-	-
--	-	-	-

Model	SPLFA50F-12
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+12V4.3A

Testing Circuitry Figure A

1. Graph



2. Values

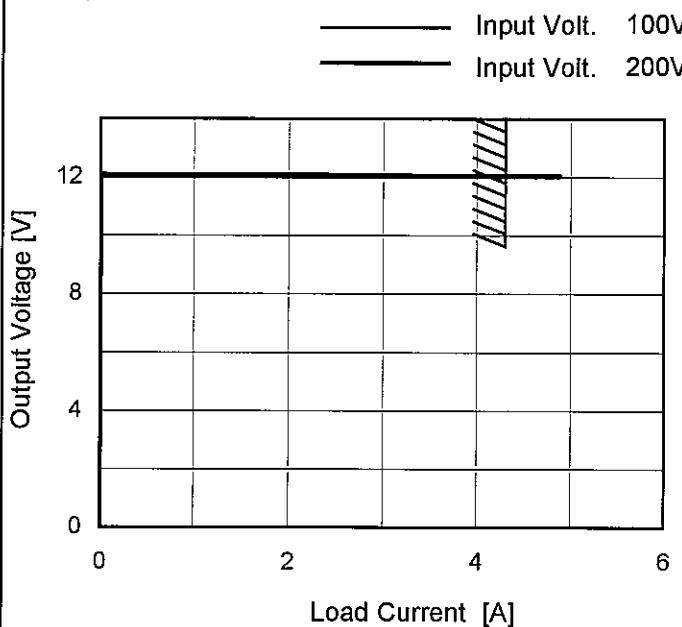
Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	38	51
-10	38	51
0	38	51
10	38	51
20	38	51
25	38	51
30	37	51
40	38	51
50	38	51
60	38	51
--	-	-

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

Model	SPLFA50F-12
Item	Overcurrent Protection
Object	+12V4.3A

Temperature 25°C
Testing Circuitry Figure A

1. Graph

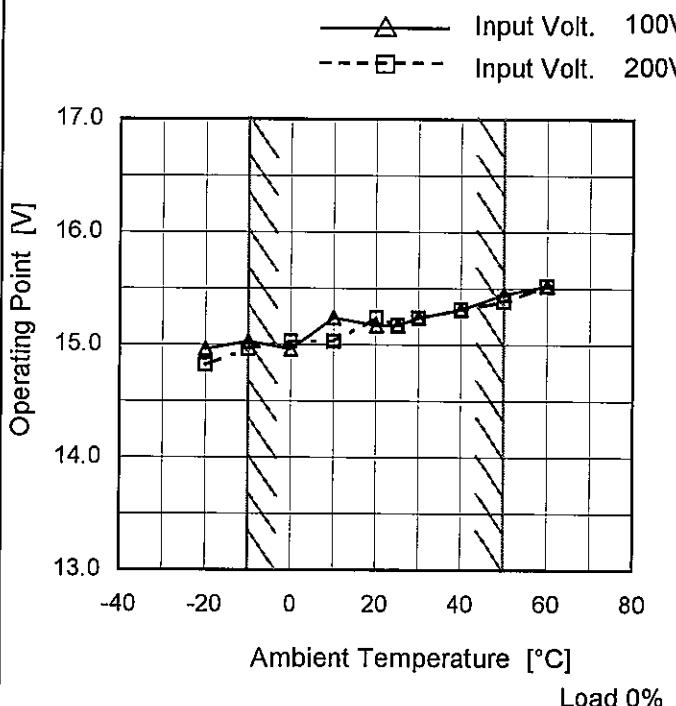


2. Values

Output Voltage [V]	Load Current [A]	
	Input Volt. 100[V]	Input Volt. 200[V]
12.0	4.90	4.89
11.4	-	-
10.8	-	-
9.6	-	-
8.4	-	-
7.2	-	-
6.0	-	-
4.8	-	-
3.6	-	-
2.4	-	-
1.2	-	-
0.0	-	-

Model	SPLFA50F-12
Item	Overvoltage Protection
Object	+12V4.3A

1. Graph



Testing Circuitry Figure A

2. Values

Ambient Temperature [°C]	Operating Point [V]	
	Input Volt. 100[V]	Input Volt. 200[V]
-20	14.96	14.82
-10	15.03	14.96
0	14.96	15.03
10	15.24	15.03
20	15.17	15.24
25	15.17	15.17
30	15.24	15.24
40	15.31	15.31
50	15.45	15.38
60	15.52	15.52
--	-	-

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

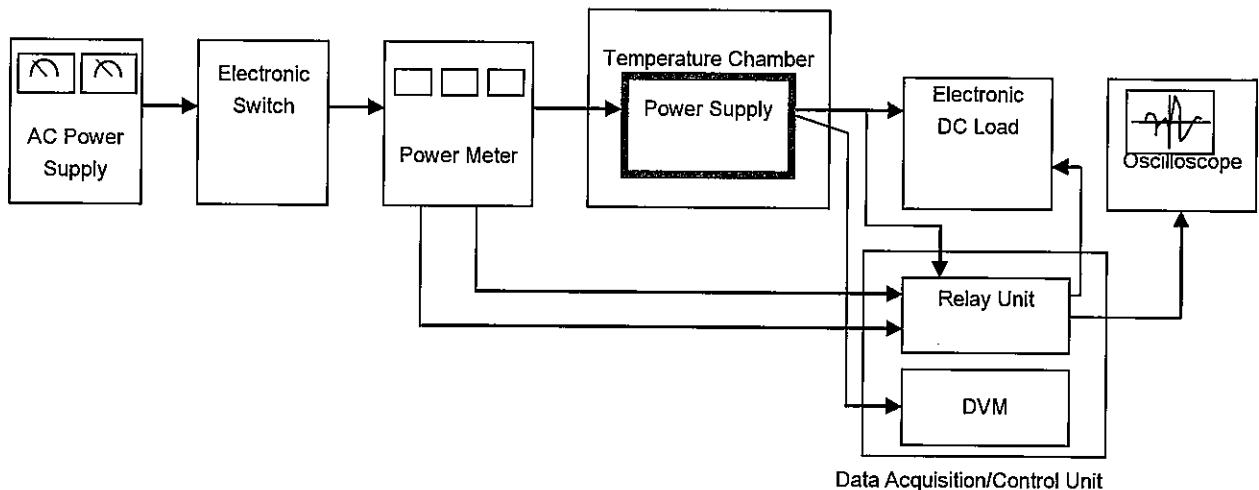


Figure A

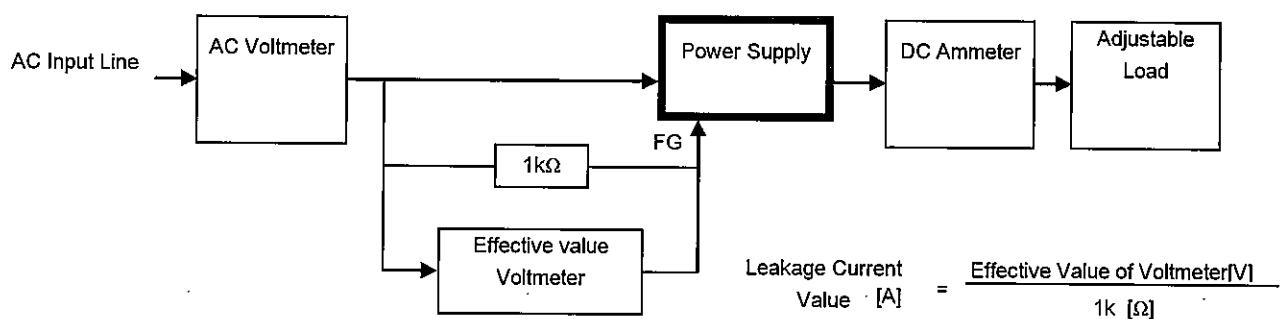


Figure B (DEN-AN)

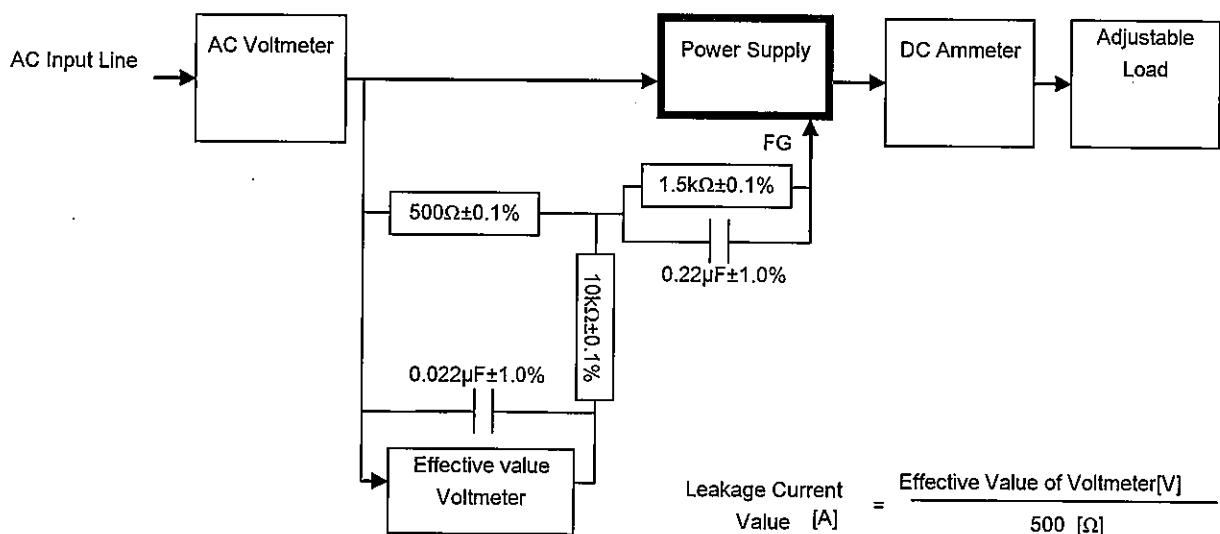


Figure B (IEC60950-1)