

TEST DATA OF SPLFA50F-24

Regulated DC Power Supply
May 18, 2011

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COSEL CO.,LTD.

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(Final Page 24)

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Model		SPLFA50F-24	
Item		Input Current (by Load Current)	
Object			
1. Graph		2. Values	

—△—

Input Volt.

100V

---□---

Input Volt.

200V

-·-○-·-

Input Volt.

230V

Input Current [A]

Load Current [A]

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

Load Current [A]	Input Current [A]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	0.046	0.034	0.033
0.40	0.151	0.094	0.085
0.80	0.264	0.154	0.138
1.20	0.376	0.204	0.189
1.60	0.489	0.253	0.237
2.00	0.604	0.311	0.280
2.10	0.633	0.326	0.291
2.31	0.695	0.356	0.317
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Model SPLFA50F-24

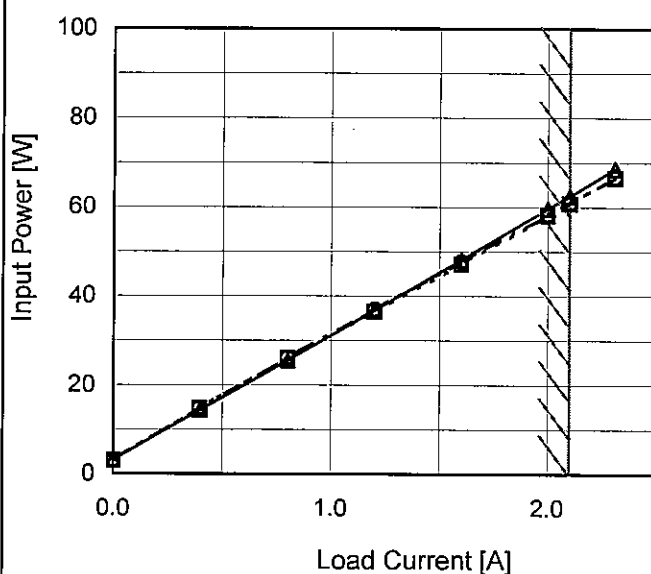
Item Input Power (by Load Current)

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 Power [W]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	3.10	3.00	3.00
0.40	14.30	14.70	14.80
0.80	25.50	26.10	26.10
1.20	36.80	36.50	37.00
1.60	48.10	47.10	47.70
2.00	59.60	58.10	58.30
2.10	62.40	60.80	60.90
2.31	68.60	66.60	66.70
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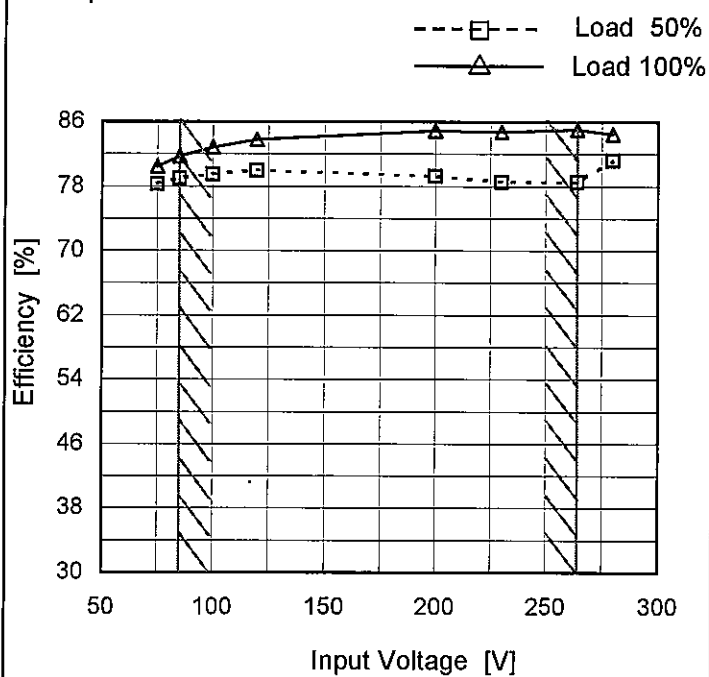
Model SPLFA50F-24

Item Efficiency (by Input Voltage)

Object

Temperature 25°C
Testing Circuitry Figure A

1. Graph

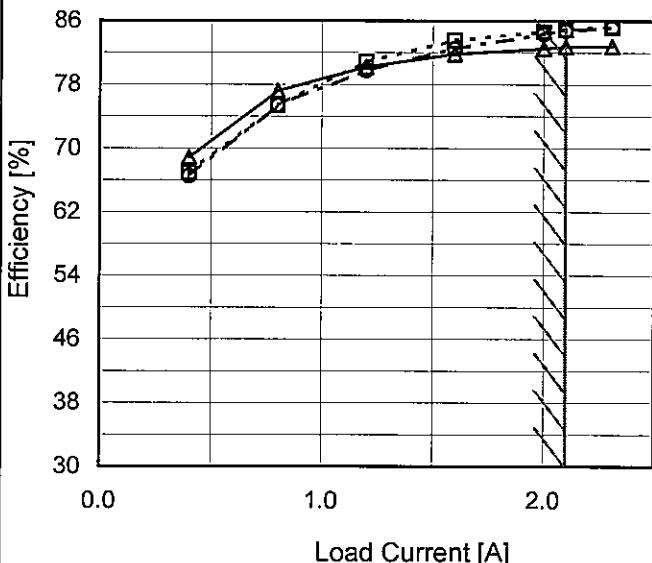


Note: Slanted line shows the range of the rated input voltage.

2. Values

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
75	78.3	80.4
85	79.0	81.7
100	79.5	82.9
120	80.0	83.8
200	79.2	84.9
230	78.5	84.7
264	78.5	85.0
280	81.2	84.5
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Model		SPLFA50F-24		Temperature		25°C																																																				
Item		Efficiency (by Load Current)		Testing Circuitry		Figure A																																																				
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<div><div><div>—△—</div><div>Input Volt.</div><div>100V</div></div><div><div>---□---</div><div>Input Volt.</div><div>200V</div></div><div><div>---○---</div><div>Input Volt.</div><div>230V</div></div></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>0.40</td><td>68.8</td><td>66.9</td><td>66.5</td></tr><tr><td>0.80</td><td>77.2</td><td>75.4</td><td>75.4</td></tr><tr><td>1.20</td><td>80.2</td><td>80.9</td><td>79.8</td></tr><tr><td>1.60</td><td>81.8</td><td>83.5</td><td>82.5</td></tr><tr><td>2.00</td><td>82.5</td><td>84.6</td><td>84.3</td></tr><tr><td>2.10</td><td>82.7</td><td>84.9</td><td>84.8</td></tr><tr><td>2.31</td><td>82.8</td><td>85.2</td><td>85.1</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	-	-	-	0.40	68.8	66.9	66.5	0.80	77.2	75.4	75.4	1.20	80.2	80.9	79.8	1.60	81.8	83.5	82.5	2.00	82.5	84.6	84.3	2.10	82.7	84.9	84.8	2.31	82.8	85.2	85.1	--	-	-	-	--	-	-	-	--	-	-	-
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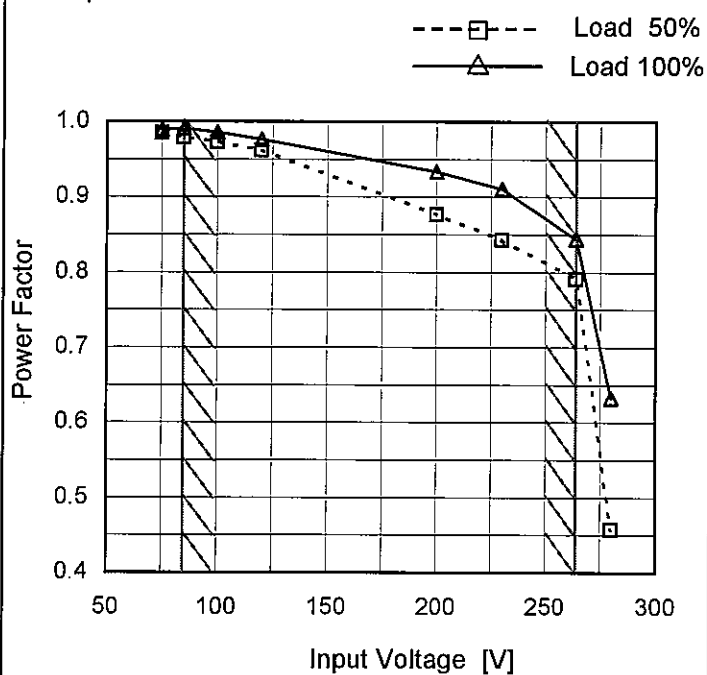
Model SPLFA50F-24

Item Power Factor (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]	Power Factor	
	Load 50%	Load 100%
75	0.985	0.989
85	0.979	0.991
100	0.973	0.986
120	0.961	0.976
200	0.876	0.934
230	0.844	0.910
264	0.791	0.844
280	0.457	0.633
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Model SPLFA50F-24

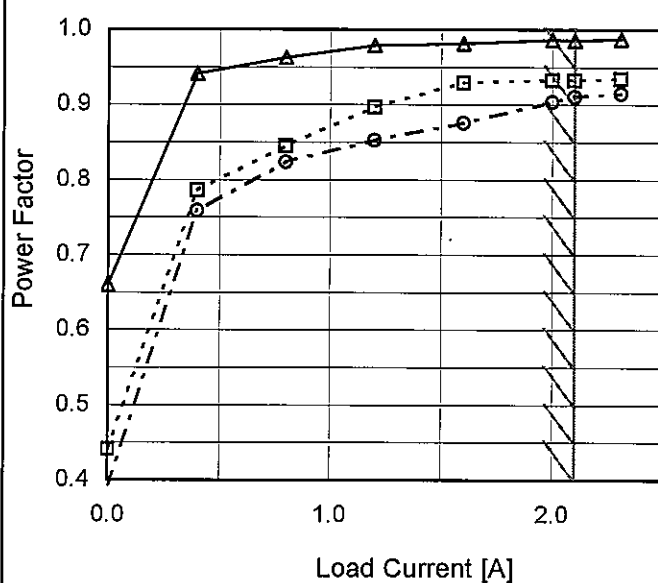
Item Power Factor (by Load Current)

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

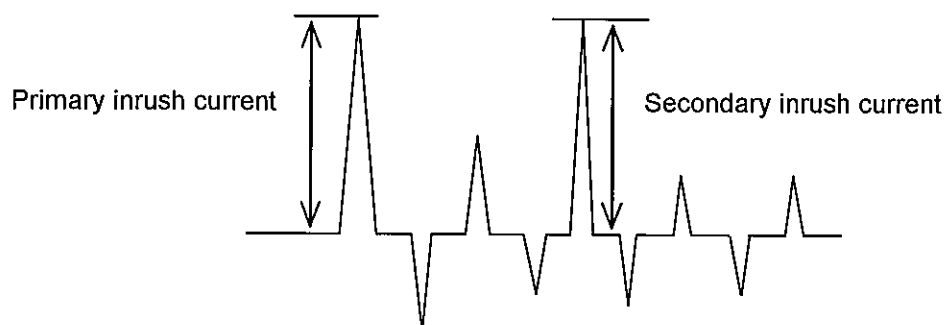
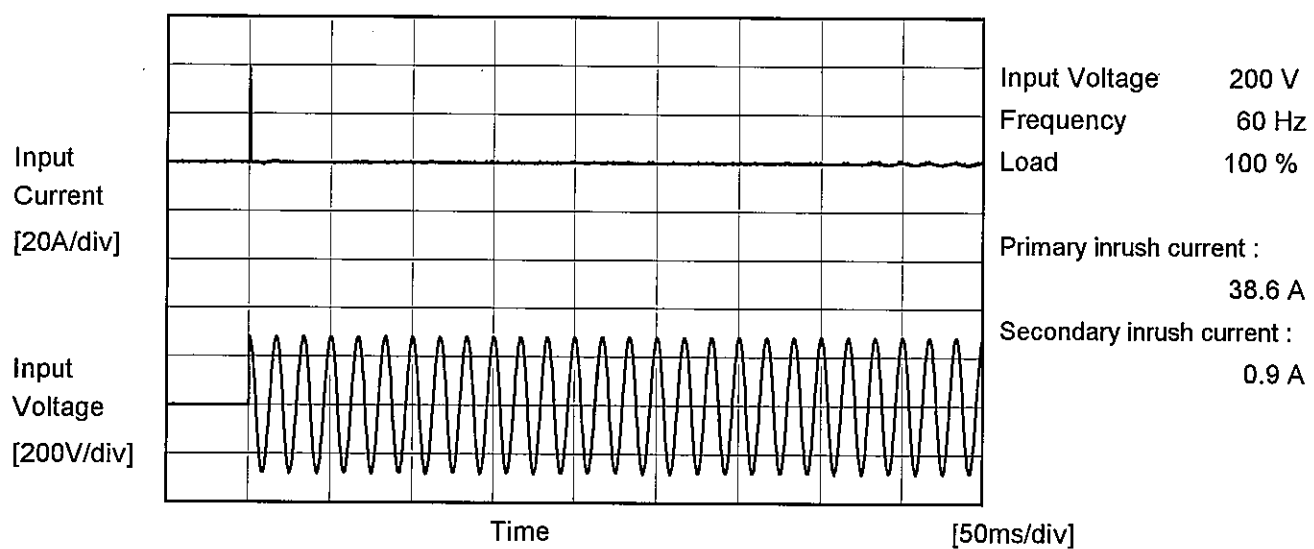
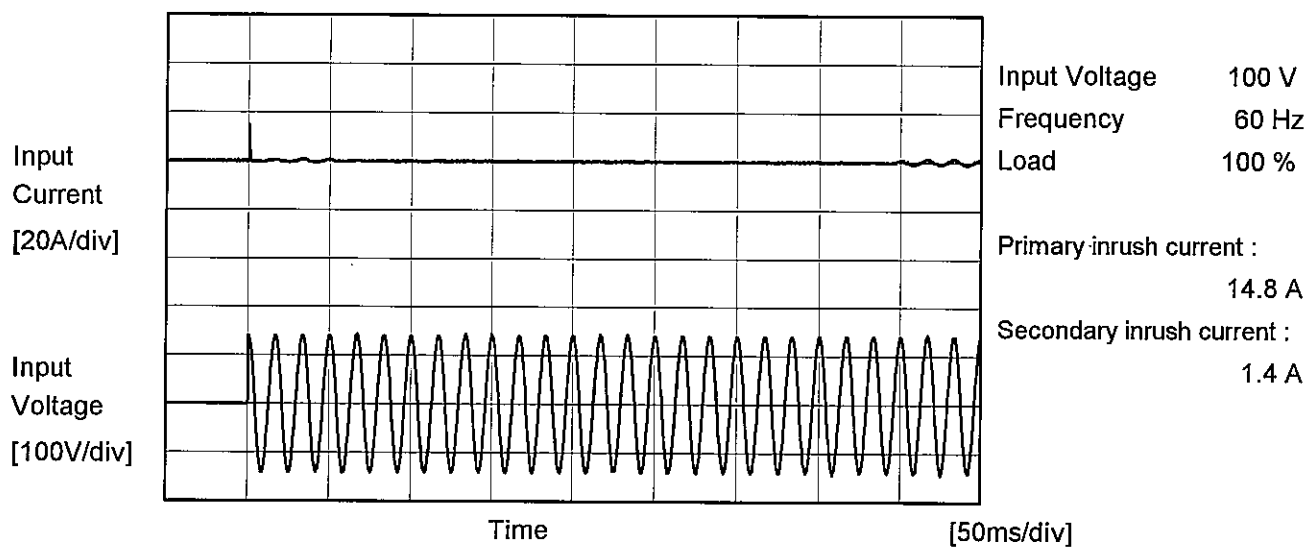
Load Current [A]	Power Factor		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	0.660	0.441	0.390
0.40	0.941	0.786	0.759
0.80	0.962	0.845	0.823
1.20	0.979	0.897	0.853
1.60	0.982	0.929	0.875
2.00	0.987	0.933	0.904
2.10	0.986	0.933	0.910
2.31	0.987	0.934	0.915
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--	-	-	-
--	-	-	-

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Model SPLFA50F-24

Item Inrush Current

Object

Temperature 25°C
Testing Circuitry Figure A

Model		SPLFA50F-24	Temperature 25°C Testing Circuitry 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-24																																																																
Item	Line Regulation	Temperature	25°C																																																														
Object	+24V2.1A	Testing Circuitry	Figure A																																																														
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<div><div><div>---□---</div><div>Load 50%</div></div><div><div>---△---</div><div>Load 100%</div></div></div> <table><thead><tr><th>Input Voltage [V]</th><th>Output Voltage [V] Load 50%</th><th>Output Voltage [V] Load 100%</th></tr></thead><tbody><tr><td>75</td><td>24.629</td><td>24.620</td></tr><tr><td>85</td><td>24.629</td><td>24.619</td></tr><tr><td>100</td><td>24.628</td><td>24.619</td></tr><tr><td>120</td><td>24.628</td><td>24.619</td></tr><tr><td>200</td><td>24.628</td><td>24.619</td></tr><tr><td>230</td><td>24.628</td><td>24.619</td></tr><tr><td>264</td><td>24.628</td><td>24.619</td></tr><tr><td>280</td><td>24.628</td><td>24.619</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></tbody></table>		Input Voltage [V]	Output Voltage [V] Load 50%	Output Voltage [V] Load 100%	75	24.629	24.620	85	24.629	24.619	100	24.628	24.619	120	24.628	24.619	200	24.628	24.619	230	24.628	24.619	264	24.628	24.619	280	24.628	24.619	--	-	-	<table><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>75</td><td>24.629</td><td>24.620</td></tr><tr><td>85</td><td>24.629</td><td>24.619</td></tr><tr><td>100</td><td>24.628</td><td>24.619</td></tr><tr><td>120</td><td>24.628</td><td>24.619</td></tr><tr><td>200</td><td>24.628</td><td>24.619</td></tr><tr><td>230</td><td>24.628</td><td>24.619</td></tr><tr><td>264</td><td>24.628</td><td>24.619</td></tr><tr><td>280</td><td>24.628</td><td>24.619</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></tbody></table>		Input Voltage [V]	Output Voltage [V]		Load 50%	Load 100%	75	24.629	24.620	85	24.629	24.619	100	24.628	24.619	120	24.628	24.619	200	24.628	24.619	230	24.628	24.619	264	24.628	24.619	280	24.628	24.619	--	-	-
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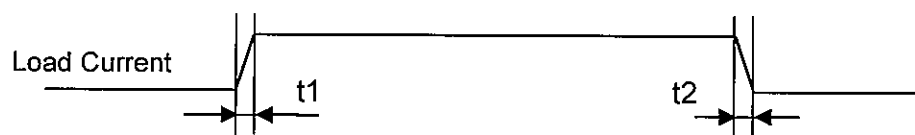
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Note: Slanted line shows the range of the rated load current.																																																						

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Model	SPLFA50F-24	Temperature	25°C
Item	Dynamic Load Response	Testing Circuitry	Figure A
Object	+24V2.1A		

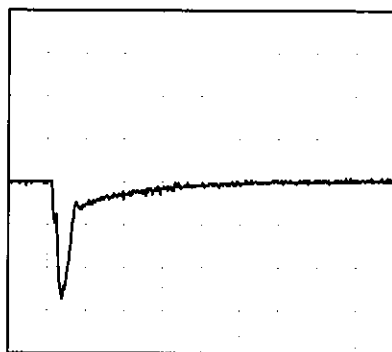
Input Volt. 100 V
Cycle 1000 ms

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

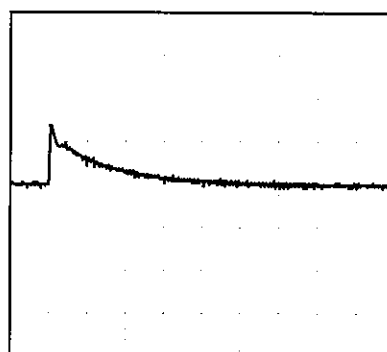


Min. Load (0A) \longleftrightarrow
Load 100% (2.1A)

200 mV/div



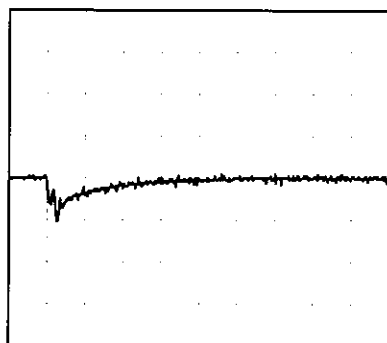
4 ms/div



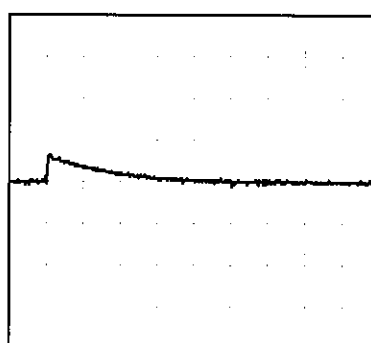
4 ms/div

Min. Load (0A) \longleftrightarrow
Load 50% (1.05A)

200 mV/div



4 ms/div



4 ms/div

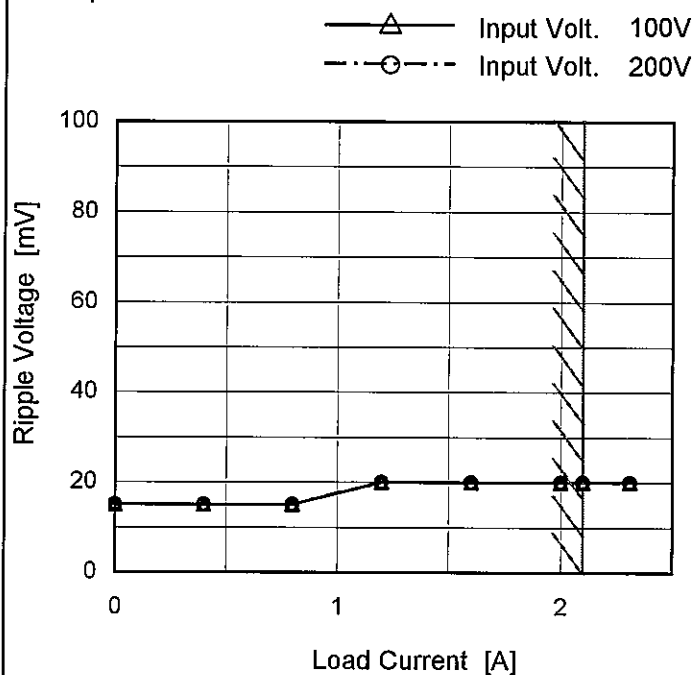
Model SPLFA50F-24

Item Ripple Voltage (by Load Current)

Object +24V2.1A

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	15	15
0.40	15	15
0.80	15	15
1.20	20	20
1.60	20	20
2.00	20	20
2.10	20	20
2.31	20	20
--	-	-
--	-	-
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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.

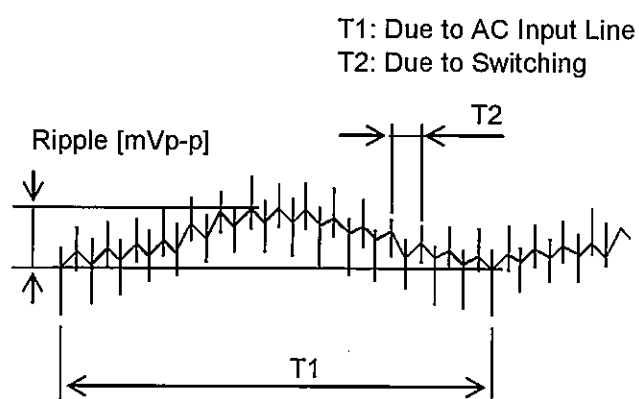
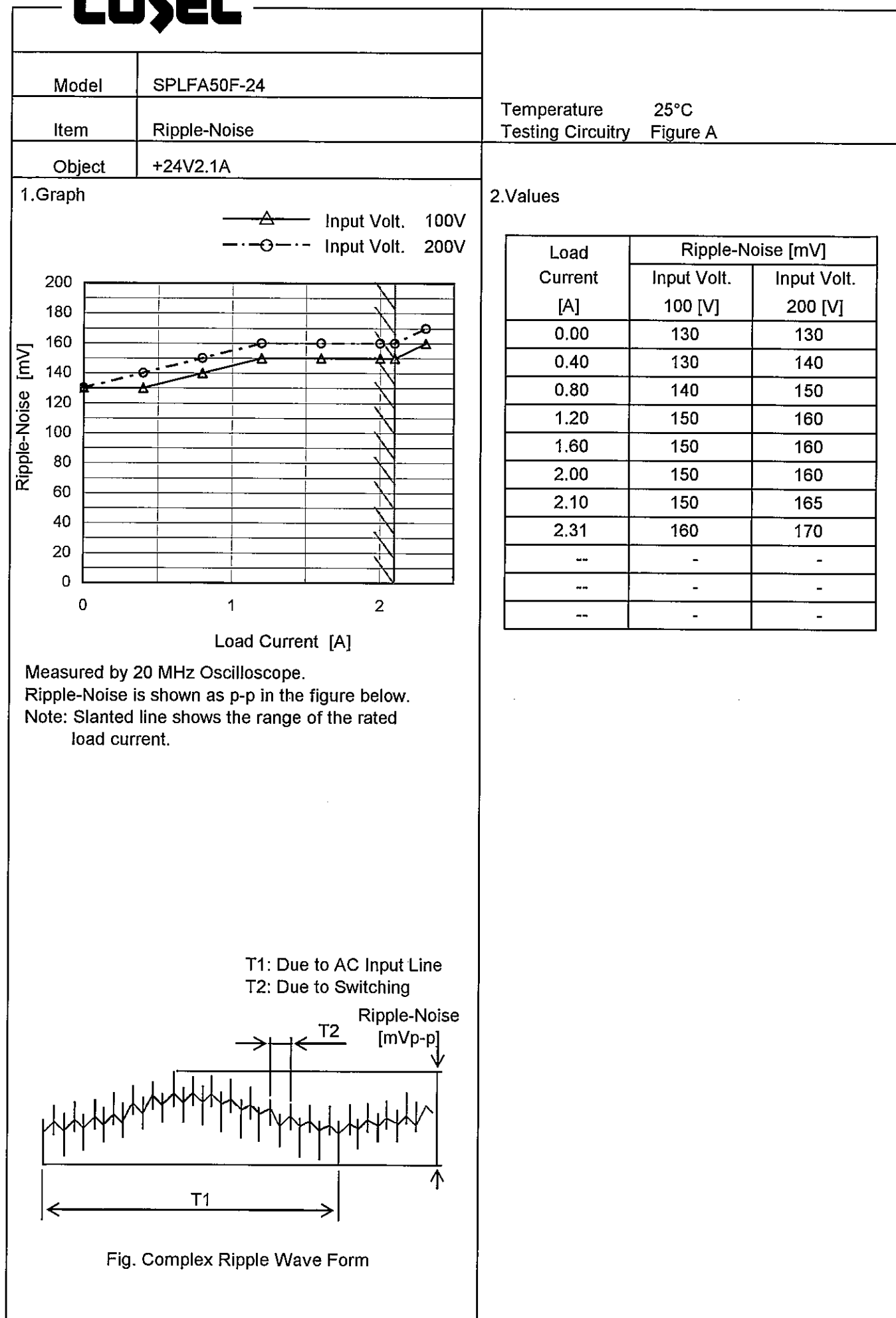


Fig. Complex Ripple Wave Form



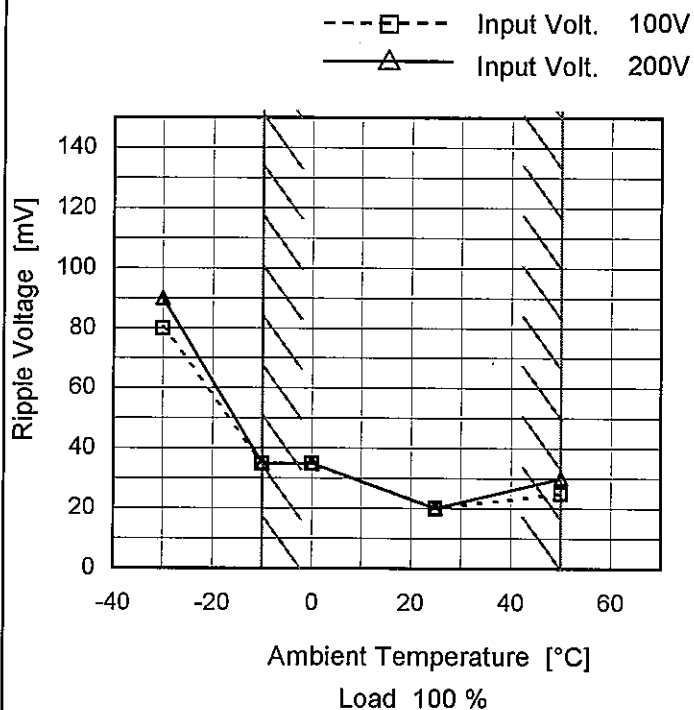
Model SPLFA50F-24

Item Ripple Voltage (by Ambient Temp.)

Object +24V2.1A

Testing Circuitry Figure A

1. Graph



Measured by 20 MHz Oscilloscope.

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

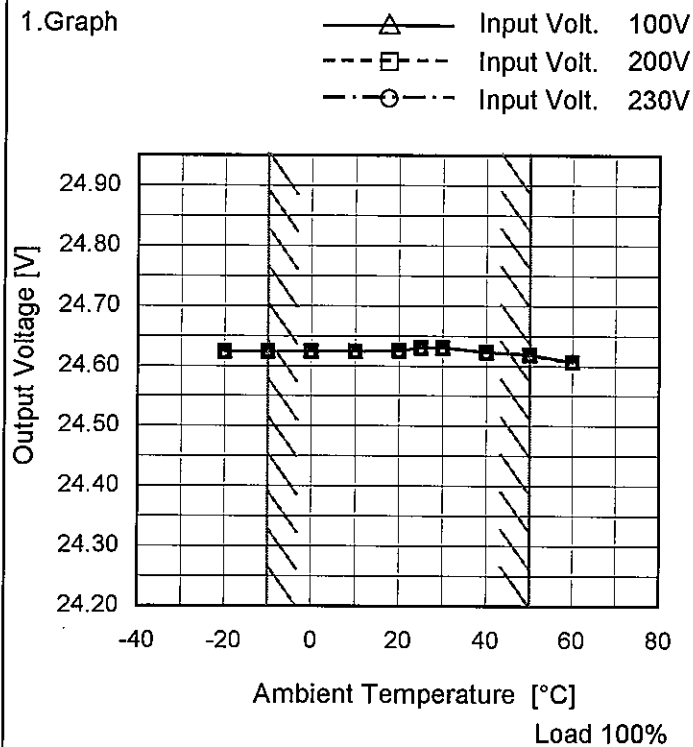
2. Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
-30	80	90
-10	35	35
0	35	35
25	20	20
50	25	30
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

Model	SPLFA50F-24
Item	Ambient Temperature Drift
Object	+24V2.1A

Testing Circuitry Figure A

1. Graph



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	24.624	24.624	24.625
-10	24.624	24.624	24.625
0	24.624	24.624	24.624
10	24.624	24.624	24.624
20	24.626	24.625	24.625
25	24.630	24.630	24.630
30	24.630	24.630	24.630
40	24.623	24.623	24.623
50	24.618	24.618	24.618
60	24.607	24.606	24.606
--	-	-	-

		Testing Circuitry Figure A
Model	SPLFA50F-24	
Item	Output Voltage Accuracy	
Object	+24V2.1A	

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 - 2.1A

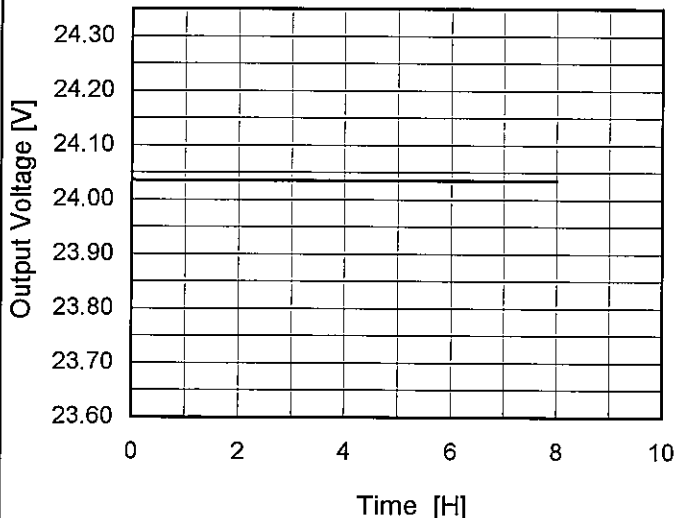
* Output Voltage Accuracy = $\pm(\text{Maximum of Output Voltage} - \text{Minimum of Output Voltage}) / 2$

* 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]	Ration [%]
Maximum Voltage	30	264	0	24.648	±15	±0.1
Minimum Voltage	50	85	2.1	24.618		

COSEL

Model	SPLFA50F-24																								
Item	Time Lapse Drift	Temperature	25°C																						
Object	+24V2.1A	Testing Circuitry	Figure A																						
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>24.042</td></tr><tr><td>0.5</td><td>24.035</td></tr><tr><td>1.0</td><td>24.035</td></tr><tr><td>2.0</td><td>24.035</td></tr><tr><td>3.0</td><td>24.035</td></tr><tr><td>4.0</td><td>24.035</td></tr><tr><td>5.0</td><td>24.035</td></tr><tr><td>6.0</td><td>24.035</td></tr><tr><td>7.0</td><td>24.036</td></tr><tr><td>8.0</td><td>24.036</td></tr></table>		Time since start [H]	Output Voltage [V]	0.0	24.042	0.5	24.035	1.0	24.035	2.0	24.035	3.0	24.035	4.0	24.035	5.0	24.035	6.0	24.035	7.0	24.036	8.0	24.036
Time since start [H]	Output Voltage [V]																								
0.0	24.042																								
0.5	24.035																								
1.0	24.035																								
2.0	24.035																								
3.0	24.035																								
4.0	24.035																								
5.0	24.035																								
6.0	24.035																								
7.0	24.036																								
8.0	24.036																								
* The characteristic of AC200V is equal.																									

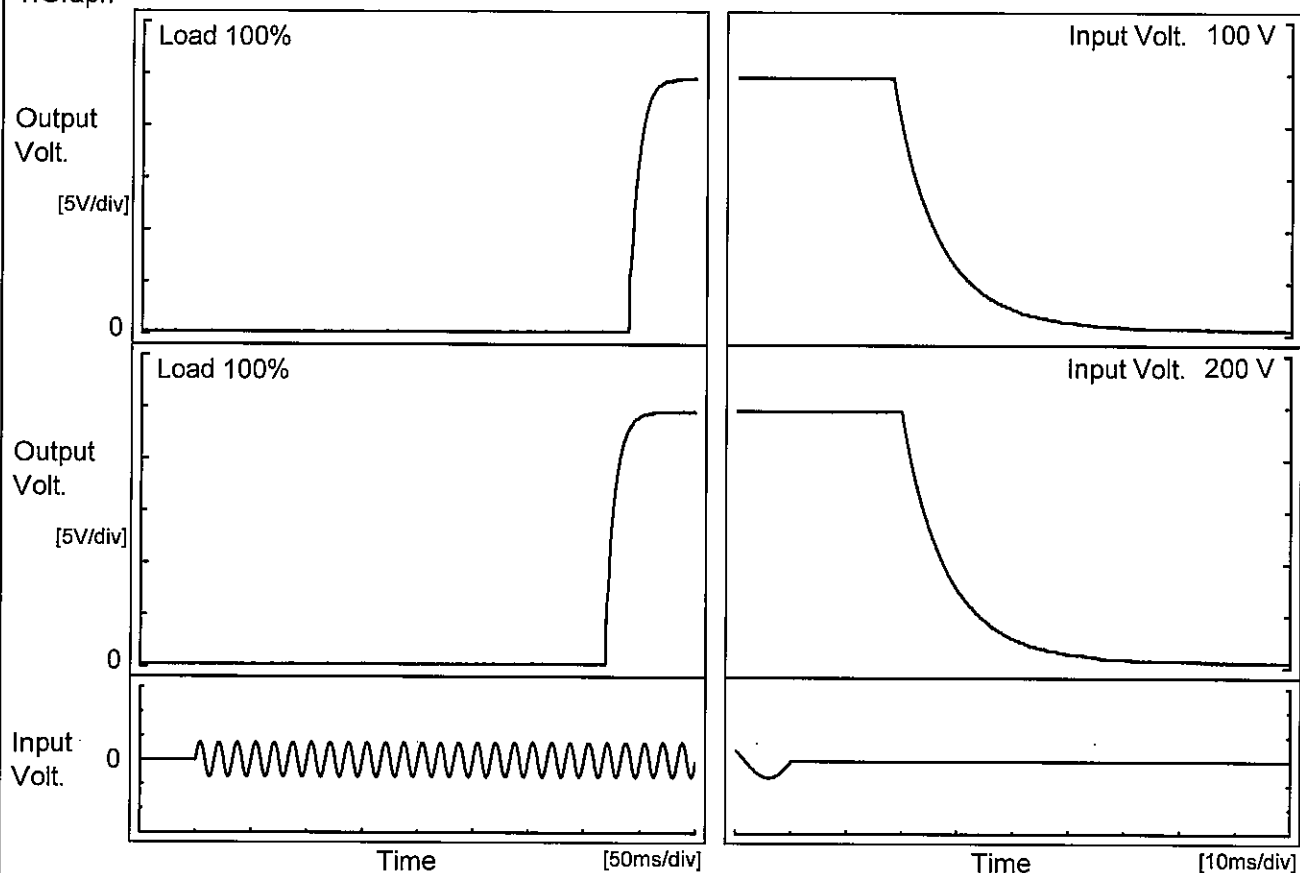
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COSEL

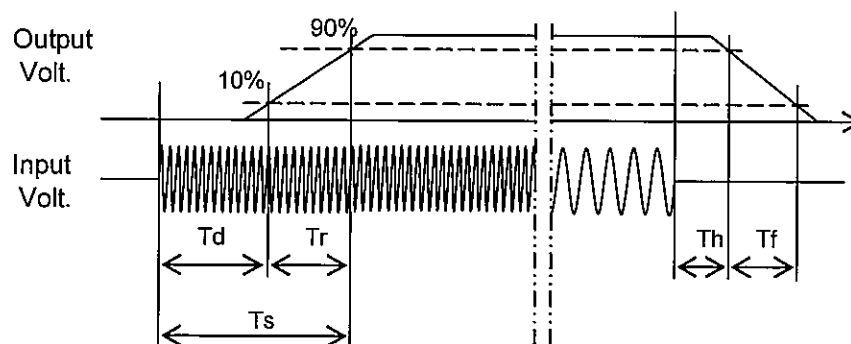
Model	SPLFA50F-24	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+24V2.1A		

1. Graph



2. Values

Input Volt.	Time	Td	Tr	Ts	Th	Tf
100 V		389.3	16.8	406.1	19.0	20.3
200 V		369.5	16.8	386.3	20.9	20.2



Model	SPLFA50F-24																																		
Item	Hold-Up Time	Temperature	25°C																																
Object	+24V2.1A	Testing Circuitry	Figure A																																
1.Graph		2.Values																																	
<div><div><div>---□---</div><div>Load 50%</div></div><div><div>—△—</div><div>Load 100%</div></div></div> <table><thead><tr><th rowspan="2">Input Voltage [V]</th><th colspan="2">Hold-Up Time [ms]</th></tr><tr><th>Load 50%</th><th>Load 100%</th></tr></thead><tbody><tr><td>75</td><td>46</td><td>16</td></tr><tr><td>85</td><td>47</td><td>17</td></tr><tr><td>100</td><td>48</td><td>18</td></tr><tr><td>120</td><td>49</td><td>19</td></tr><tr><td>200</td><td>50</td><td>20</td></tr><tr><td>230</td><td>51</td><td>20</td></tr><tr><td>264</td><td>51</td><td>21</td></tr><tr><td>280</td><td>54</td><td>21</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></tbody></table>		Input Voltage [V]	Hold-Up Time [ms]		Load 50%	Load 100%	75	46	16	85	47	17	100	48	18	120	49	19	200	50	20	230	51	20	264	51	21	280	54	21	--	-	-		
Input Voltage [V]	Hold-Up Time [ms]																																		
	Load 50%	Load 100%																																	
75	46	16																																	
85	47	17																																	
100	48	18																																	
120	49	19																																	
200	50	20																																	
230	51	20																																	
264	51	21																																	
280	54	21																																	
--	-	-																																	
<p>This duration covers from Shut-off of input voltage to the moment when output voltage descends to the rated range of voltage accuracy.</p> <p>Note: Slanted line shows the range of the rated input voltage.</p>																																			

Model		SPLFA50F-24		Temperature 25°C																																																				
Item		Instantaneous Interruption Compensation		Testing Circuitry Figure A																																																				
Object		+24V2.1A																																																						
1.Graph				2.Values																																																				
<div><div><div><div>—△—</div><div>Input Volt. 100V</div></div><div><div>---□---</div><div>Input Volt. 200V</div></div><div><div>---○---</div><div>Input Volt. 230V</div></div></div><div><div><div>Instantaneous Compensation Time [ms]</div><div><div>Load Current [A]</div></div></div></div></div>				<table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Time [ms]</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>0.40</td><td>99</td><td>122</td><td>123</td></tr><tr><td>0.80</td><td>53</td><td>64</td><td>64</td></tr><tr><td>1.20</td><td>36</td><td>39</td><td>43</td></tr><tr><td>1.60</td><td>27</td><td>30</td><td>31</td></tr><tr><td>2.00</td><td>19</td><td>21</td><td>22</td></tr><tr><td>2.10</td><td>15</td><td>19</td><td>19</td></tr><tr><td>2.31</td><td>11</td><td>13</td><td>13</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]	Time [ms]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	0.00	-	-	-	0.40	99	122	123	0.80	53	64	64	1.20	36	39	43	1.60	27	30	31	2.00	19	21	22	2.10	15	19	19	2.31	11	13	13	--	-	-	-	--	-	-	-	--	-	-	-
Load Current [A]	Time [ms]																																																							
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]																																																					
0.00	-	-	-																																																					
0.40	99	122	123																																																					
0.80	53	64	64																																																					
1.20	36	39	43																																																					
1.60	27	30	31																																																					
2.00	19	21	22																																																					
2.10	15	19	19																																																					
2.31	11	13	13																																																					
--	-	-	-																																																					
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--	-	-	-																																																					
Note: Slanted line shows the range of the rated load current.																																																								

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Model

SPLFA50F-24

Item

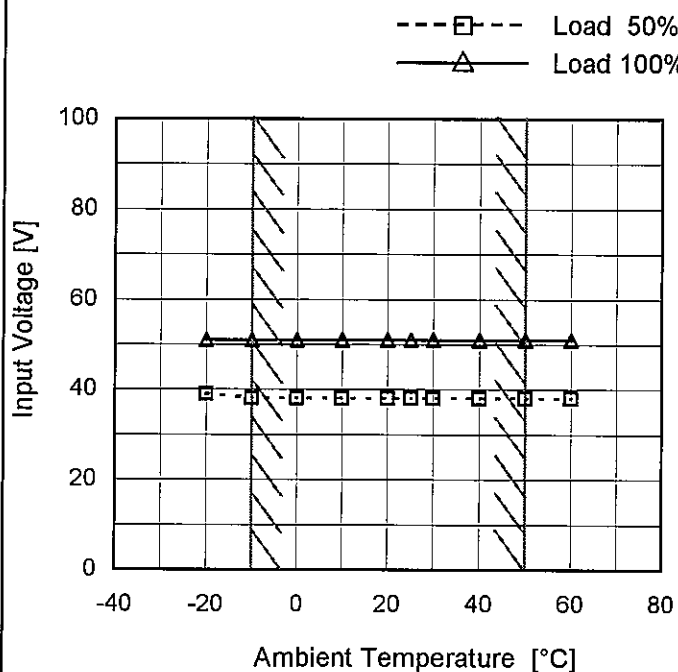
Minimum Input Voltage
for Regulated Output Voltage

Object

+24V2.1A

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	39	51
-10	38	51
0	38	51
10	38	51
20	38	51
25	38	51
30	38	51
40	38	51
50	38	51
60	38	51
--	-	-

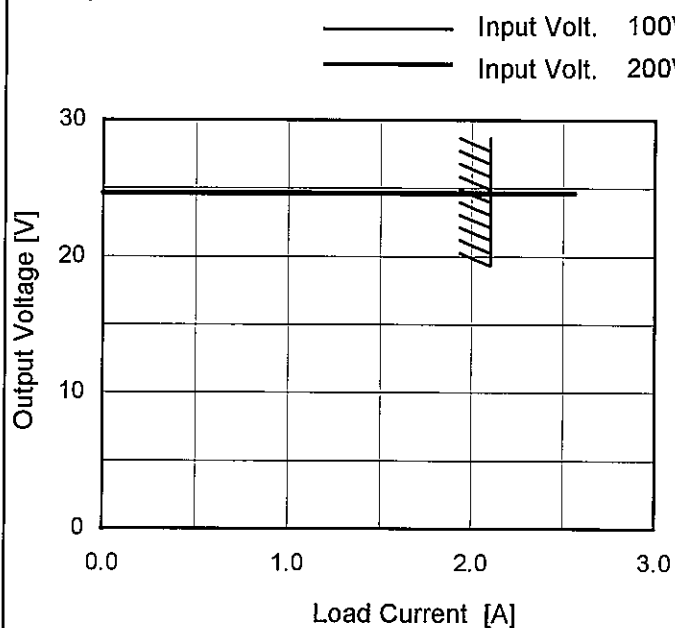
Model SPLFA50F-24

Item Overcurrent Protection

Object +24V2.1A

Temperature 25°C
Testing Circuitry Figure A

1. Graph



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

2. Values

Output Voltage [V]	Load Current [A]	
	Input Volt. 100[V]	Input Volt. 200[V]
24.0	2.53	2.56
22.8	-	-
21.6	-	-
19.2	-	-
16.8	-	-
14.4	-	-
12.0	-	-
9.6	-	-
7.2	-	-
4.8	-	-
2.4	-	-
0.0	-	-

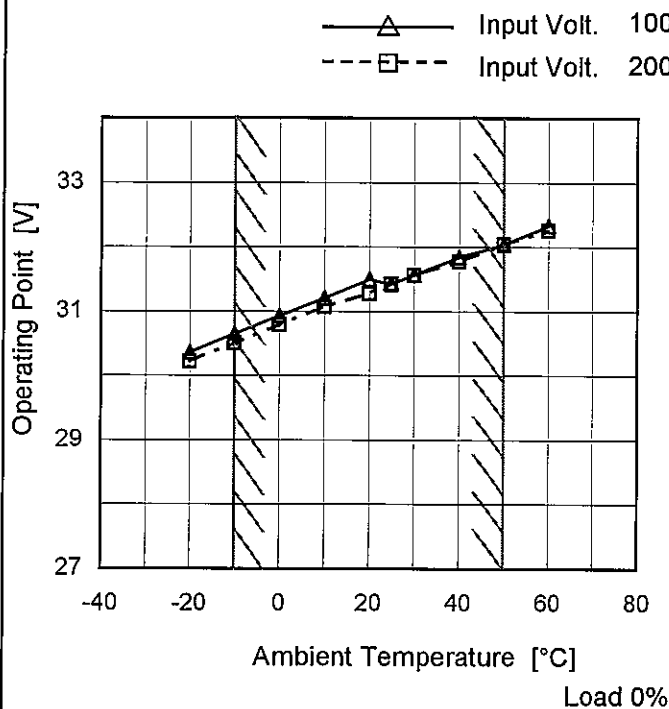
Model SPLFA50F-24

Item Overvoltage Protection

Object +24V2.1A

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. 200[V]
-20	30.36	30.22
-10	30.65	30.50
0	30.93	30.79
10	31.21	31.07
20	31.49	31.28
25	31.42	31.42
30	31.56	31.56
40	31.84	31.77
50	32.04	32.04
60	32.33	32.26
--	-	-

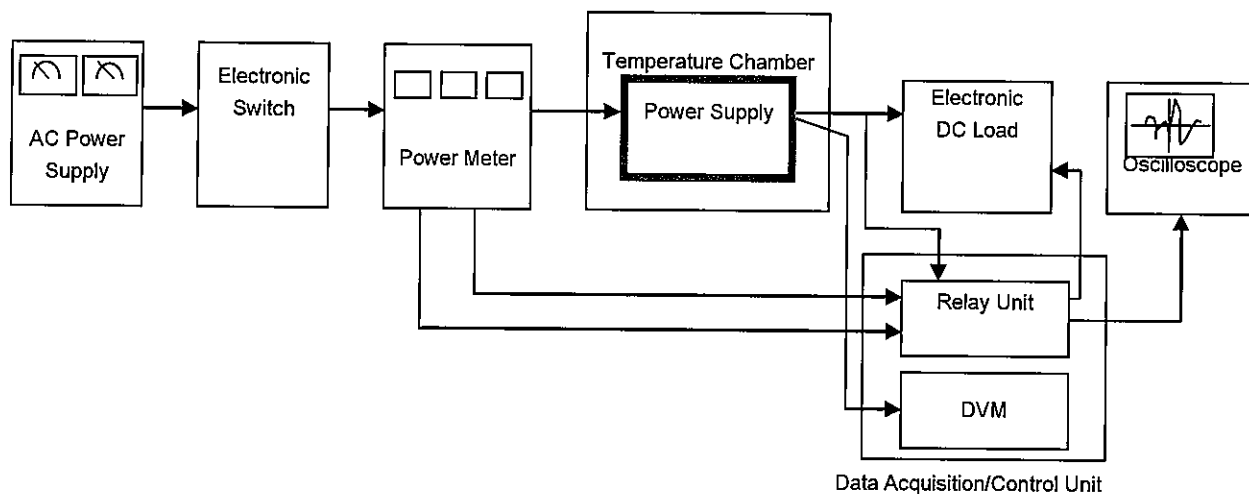


Figure A

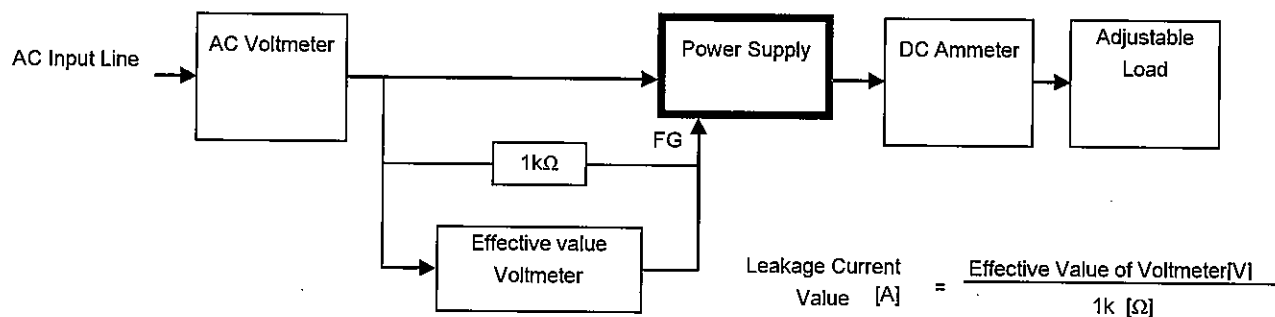


Figure B (DEN-AN)

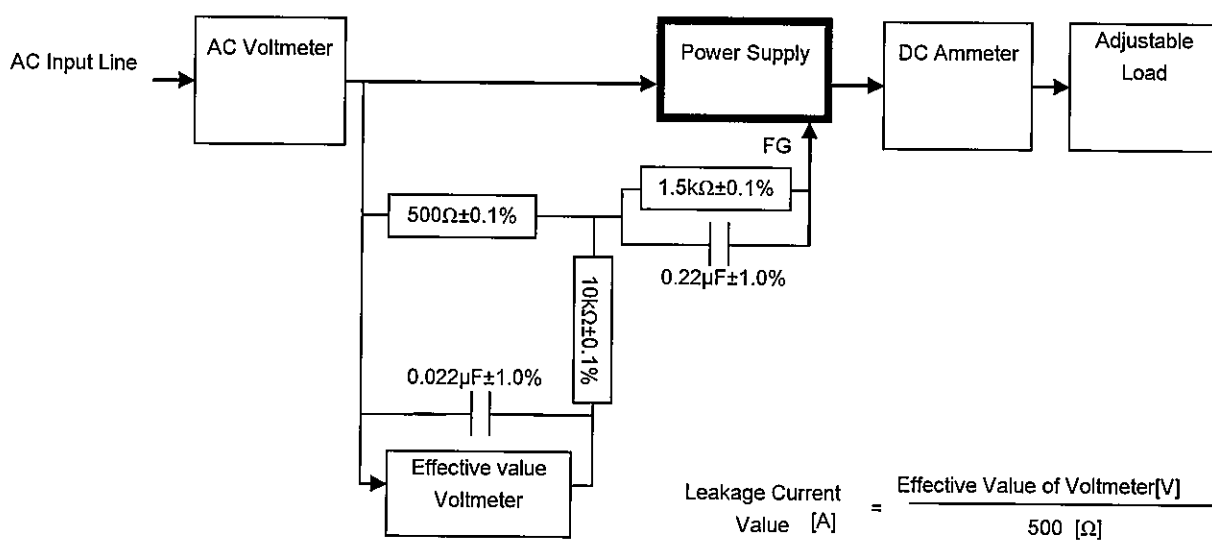


Figure B (IEC60950-1)