

TEST DATA OF PLA150F-12

Regulated DC Power Supply
May 23, 2013

Approved by : Katsumi Ishikawa
Katsumi Ishikawa Design Manager

Prepared by : Naoki Fujita
Naoki Fujita Design Engineer

COSEL CO.,LTD.



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COSEL																																																						
Model	PLA150F-12	Temperature	25°C																																																			
Item	Input Current (by Load Current)	Testing Circuitry	Figure A																																																			
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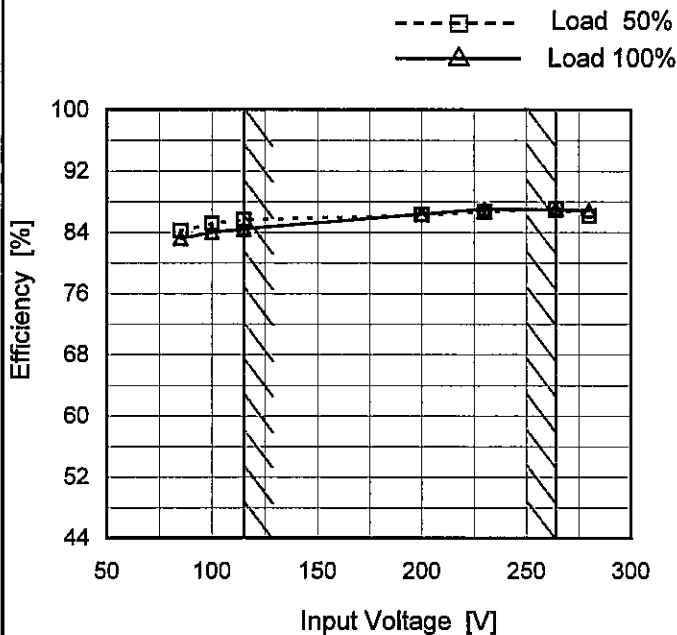
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Model	PLA150F-12
Item	Efficiency (by Input Voltage)
Object	_____

Temperature 25°C
Testing Circuitry Figure A

1. Graph



2. Values

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
85	84.2	83.2 ※1
100	85.1	84.0 ※2
115	85.6	84.5
200	86.3	86.4
230	86.7	87.1
264	87.1	87.0
280	86.1	86.9
-	-	-
-	-	-

※1: Load 80%
 ※2: Load 90%



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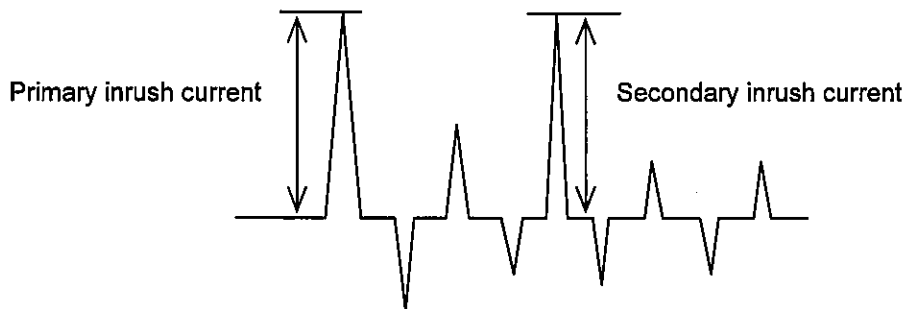
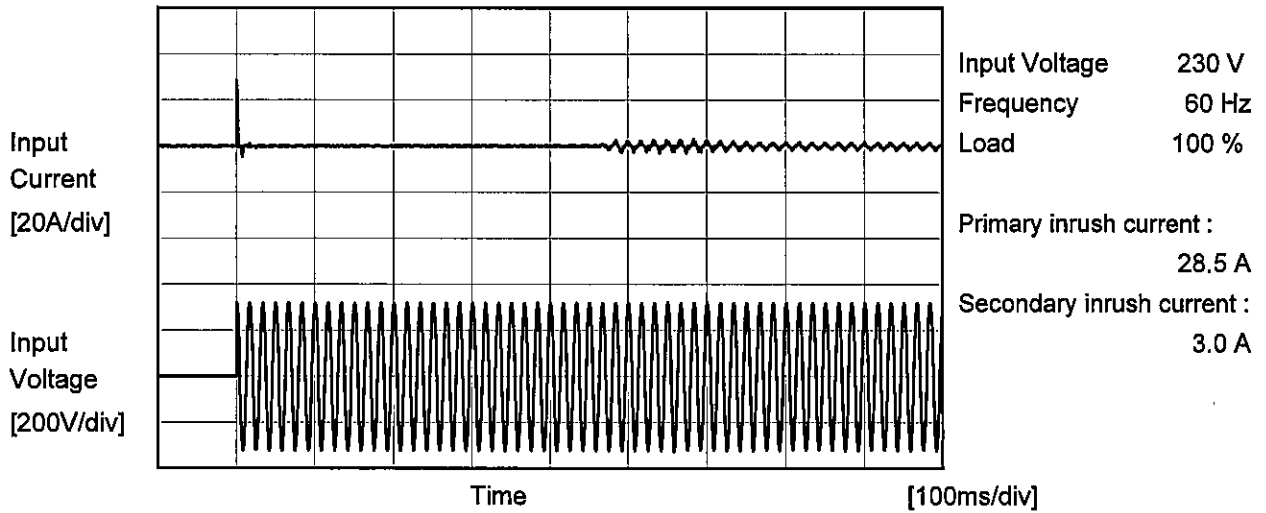
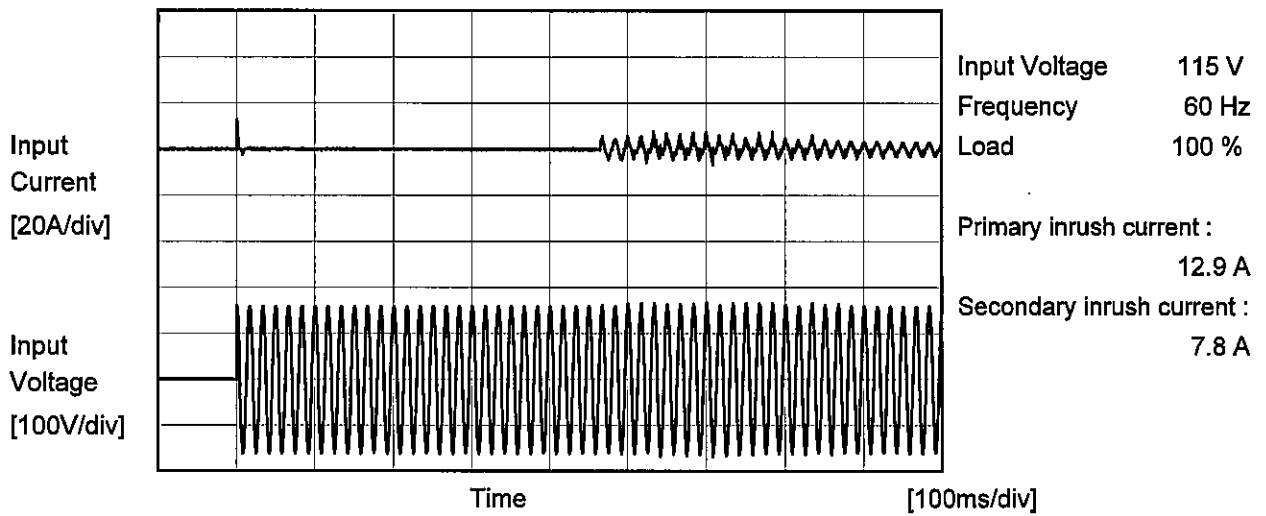
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Model		PLA150F-12	Temperature		25°C
Item		Inrush Current	Testing Circuitry		Figure A
Object		_____			





COSEL		
Model	PLA150F-12	
Item	Leakage Current	Temperature 25°C Testing Circuitry Figure B
Object	_____	

1.Results

[mA]

Standards		Input Volt.			Note
		100[V]	115[V]	240[V]	
DEN-AN	Both phases	0.45	0.50	0.65	Operation
	One of phases	0.30	0.35	0.78	Stand by
IEC60950-1	Both phases	0.30	0.31	0.55	Operation
	One of phases	0.27	0.31	0.72	Stand by

The value for "One of phases" is the reference value only.

2.Condition

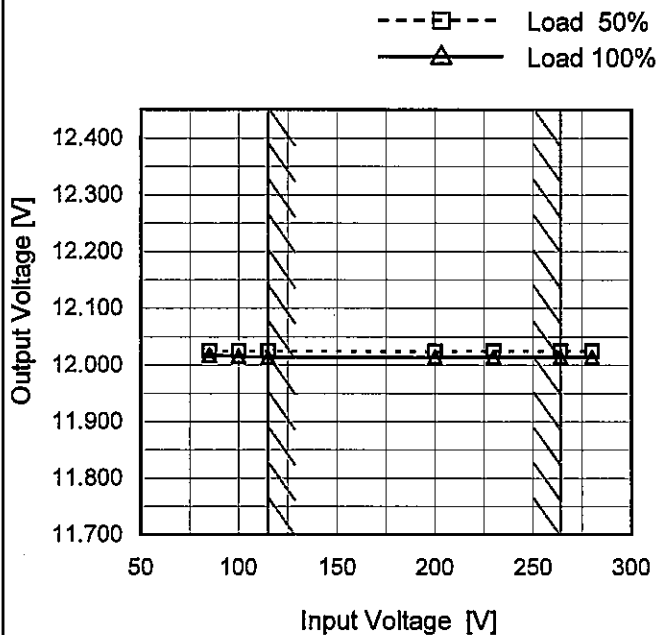
Leakage current value is concluded after measuring both phases of AC input and by choosing the larger one.



Model	PLA150F-12
Item	Line Regulation
Object	+12V12.5A

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]	Output Voltage [V]	
	Load 50%	Load 100%
85	12.024	12.018 ※1
100	12.024	12.016 ※2
115	12.024	12.014
200	12.024	12.014
230	12.024	12.014
264	12.024	12.014
280	12.024	12.014
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--	-	-

※1: Load 80%
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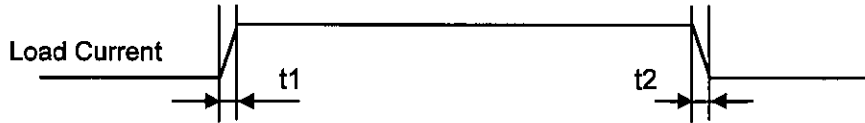
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COSEL

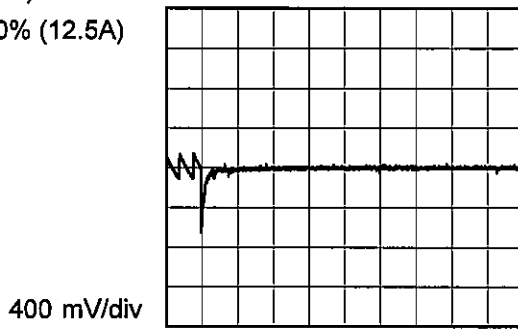
Model	PLA150F-12	Temperature	25° C
Item	Dynamic Load Response	Testing Circuitry	Figure A
Object	+12V12.5A		

Input Volt. 115 V
Cycle 1000 ms

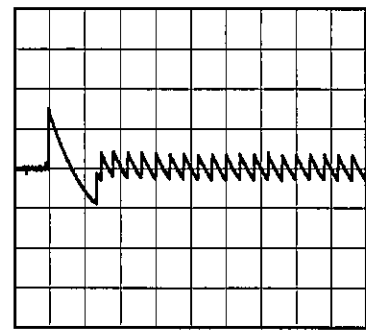
Response. $t_1=t_2=50\mu\text{s}$. Typ



Min. Load (0A) ←→
Load 100% (12.5A)

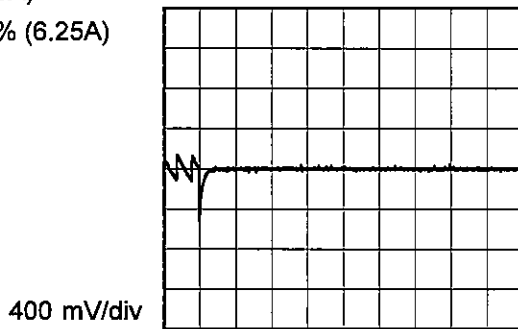


200 ms/div

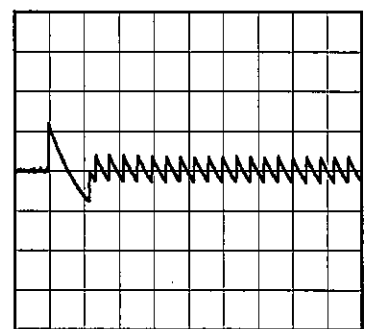


200 ms/div

Min. Load (0A) ←→
Load 50% (6.25A)



200 ms/div



200 ms/div



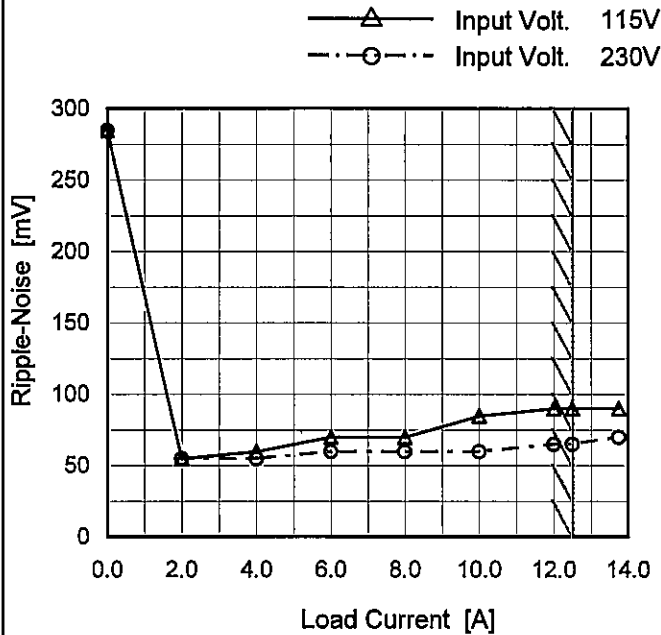
Model		PLA150F-12		Temperature 25°C Testing Circuitry Figure C																																							
Item		Ripple Voltage (by Load Current)																																									
Object		+12V12.5A																																									
1. Graph			2. Values																																								
			<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="2">Ripple Voltage [mV]</th> </tr> <tr> <th>Input Volt. 115 [V]</th> <th>Input Volt. 230 [V]</th> </tr> </thead> <tbody> <tr><td>0.00</td><td>260</td><td>265</td></tr> <tr><td>2.00</td><td>35</td><td>35</td></tr> <tr><td>4.00</td><td>35</td><td>35</td></tr> <tr><td>6.00</td><td>45</td><td>40</td></tr> <tr><td>8.00</td><td>45</td><td>40</td></tr> <tr><td>10.00</td><td>45</td><td>40</td></tr> <tr><td>12.00</td><td>45</td><td>40</td></tr> <tr><td>12.50</td><td>50</td><td>40</td></tr> <tr><td>13.75</td><td>55</td><td>45</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. 115 [V]	Input Volt. 230 [V]	0.00	260	265	2.00	35	35	4.00	35	35	6.00	45	40	8.00	45	40	10.00	45	40	12.00	45	40	12.50	50	40	13.75	55	45	--	-	-	--	-	-
Load Current [A]	Ripple Voltage [mV]																																										
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<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	PLA150F-12
Item	Ripple-Noise
Object	+12V12.5A

Temperature 25°C
Testing Circuitry Figure C

1. Graph



2. Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 115 [V]	Input Volt. 230 [V]
0.00	285	285
2.00	55	55
4.00	60	55
6.00	70	60
8.00	70	60
10.00	85	60
12.00	90	65
12.50	90	65
13.75	90	70
--	-	-
--	-	-

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.

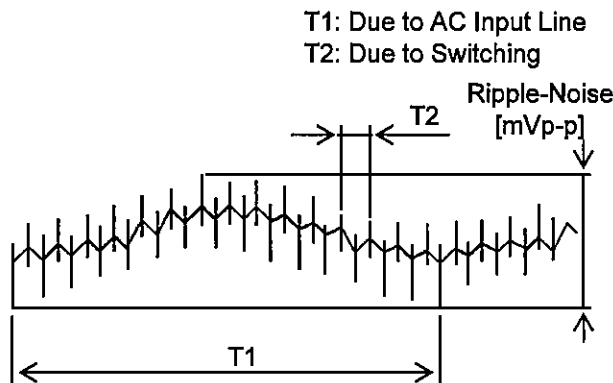


Fig. Complex Ripple Wave Form



COSEL																																											
Model	PLA150F-12																																										
Item	Ripple Voltage (by Ambient Temp.)	Testing Circuitry Figure C																																									
Object	+12V12.5A																																										
<p>1.Graph</p> <div style="text-align: right;"> <p>---□--- Input Volt. 115V</p> <p>—△— Input Volt. 230V</p> </div> <p style="text-align: center;">Ambient Temperature [°C]</p> <p style="text-align: center;">Load 100%</p>		<p>2.Values</p> <table border="1"> <thead> <tr> <th rowspan="2">Ambient Temperature [°C]</th> <th colspan="2">Ripple Voltage [mV]</th> </tr> <tr> <th>Input Volt. 115 [V]</th> <th>Input Volt. 230 [V]</th> </tr> </thead> <tbody> <tr><td>-20</td><td>120</td><td>120</td></tr> <tr><td>-10</td><td>100</td><td>95</td></tr> <tr><td>0</td><td>80</td><td>75</td></tr> <tr><td>25</td><td>50</td><td>40</td></tr> <tr><td>40</td><td>40</td><td>30</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>	Ambient Temperature [°C]	Ripple Voltage [mV]		Input Volt. 115 [V]	Input Volt. 230 [V]	-20	120	120	-10	100	95	0	80	75	25	50	40	40	40	30	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-
Ambient Temperature [°C]	Ripple Voltage [mV]																																										
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<p>Measured by 20 MHz Oscilloscope.</p> <p>Note: Slanted line shows the range of the rated ambient temperature.</p>																																											

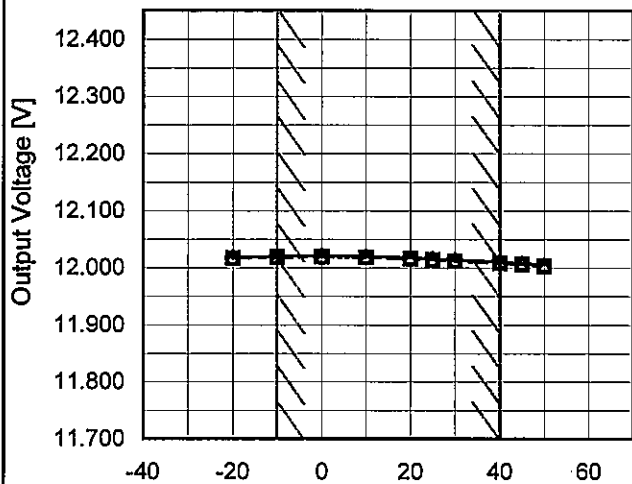


Model	PLA150F-12
Item	Ambient Temperature Drift
Object	+12V12.5A

Testing Circuitry Figure A

1.Graph

- △— Input Volt. 100V
- Input Volt. 115V
- Input Volt. 230V



Ambient Temperature [°C]

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. 115[V]	Input Volt. 230[V]
-20	12.019	12.016	12.017
-10	12.020	12.018	12.018
0	12.021	12.019	12.019
10	12.021	12.018	12.018
20	12.018	12.016	12.016
25	12.016	12.014	12.014
30	12.015	12.012	12.012
40	12.011	12.008	12.008
45	12.009	12.006	12.006
50	12.006	12.003	12.003
--	-	-	-

Note: In case of Input Volt. 100V, Load 90%.
Other case Load 100%.



COSEL		
Model	PLA150F-12	
Item	Output Voltage Accuracy	Testing Circuitry Figure A
Object	+12V12.5A	

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 - 40°C

Input Voltage : 115 - 264V

Load Current : 3.75 - 12.5A

* 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

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	0	115	3.75	12.033	±13	±0.1
Minimum Voltage	40	115	12.5	12.008		

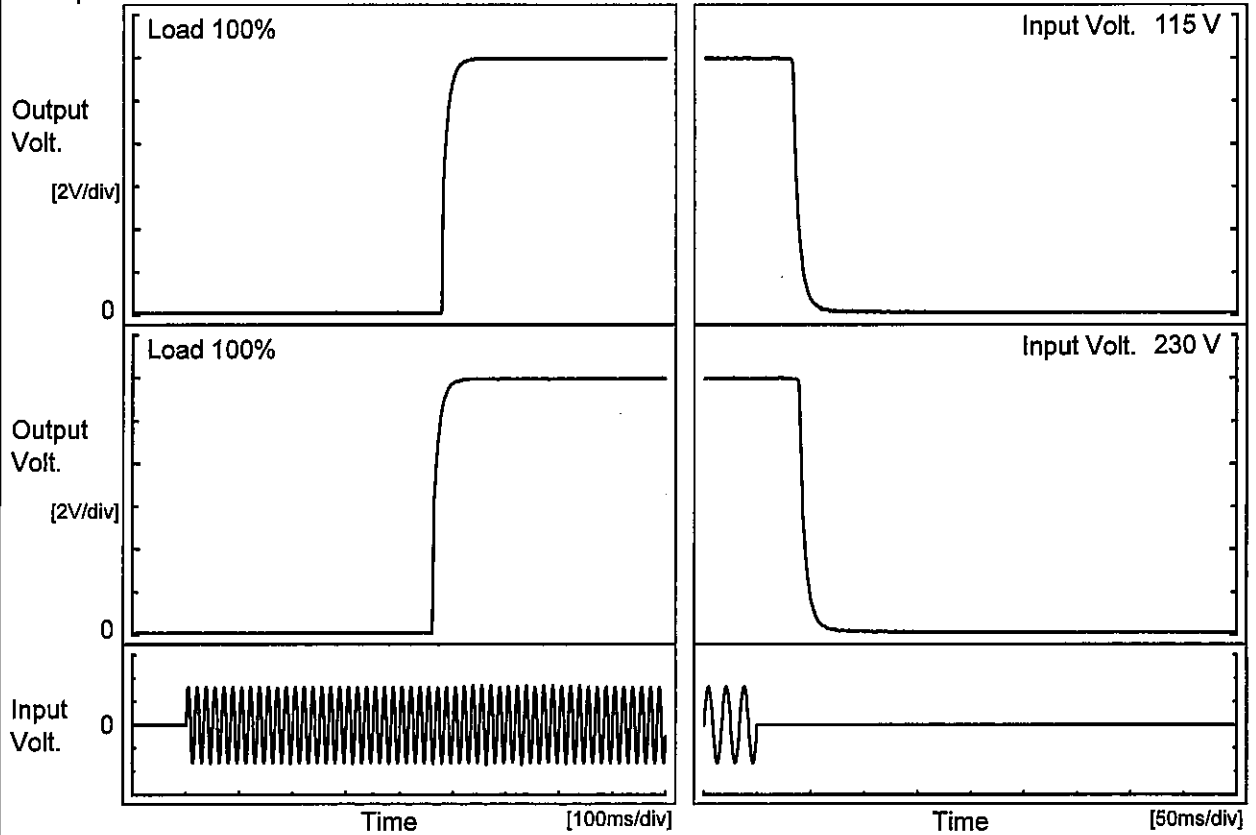


COSEL																								
Model	PLA150F-12																							
Item	Time Lapse Drift	Temperature 25°C Testing Circuitry Figure A																						
Object	+12V12.5A																							
<p>1.Graph</p> <p style="text-align: center;">Time [H]</p> <p>Input Volt. 230V Load 100%</p>		<p>2.Values</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>12.014</td></tr> <tr><td>0.5</td><td>12.013</td></tr> <tr><td>1.0</td><td>12.012</td></tr> <tr><td>2.0</td><td>12.012</td></tr> <tr><td>3.0</td><td>12.012</td></tr> <tr><td>4.0</td><td>12.012</td></tr> <tr><td>5.0</td><td>12.012</td></tr> <tr><td>6.0</td><td>12.012</td></tr> <tr><td>7.0</td><td>12.012</td></tr> <tr><td>8.0</td><td>12.012</td></tr> </tbody> </table>	Time since start [H]	Output Voltage [V]	0.0	12.014	0.5	12.013	1.0	12.012	2.0	12.012	3.0	12.012	4.0	12.012	5.0	12.012	6.0	12.012	7.0	12.012	8.0	12.012
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6.0	12.012																							
7.0	12.012																							
8.0	12.012																							
<p>* The characteristic of AC115V is equal.</p>																								



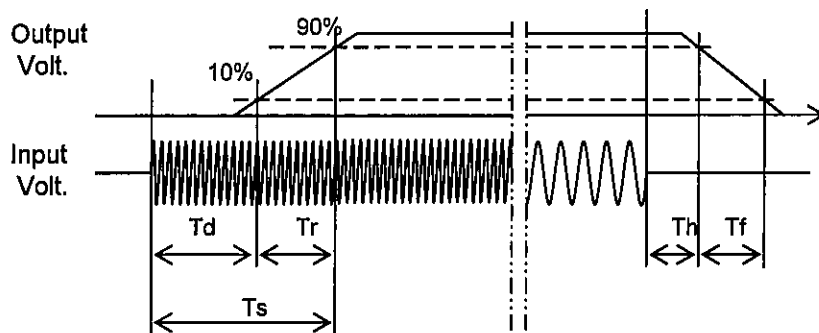
Model	PLA150F-12	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+12V12.5A		

1. Graph



2. Values

Input Volt.	Time	Td	Tr	Ts	Th	Tf
115 V		479.5	21.0	500.5	32.8	12.5
230 V		462.5	21.0	483.5	39.3	12.8





COSEL																																		
Model	PLA150F-12																																	
Item	Hold-Up Time	Temperature 25°C Testing Circuitry Figure A																																
Object	+12V12.5A																																	
<p>1. Graph</p> <p style="text-align: right;"> ---□--- Load 50% —△— Load 100% </p>		<p>2. Values</p> <table border="1"> <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>85</td> <td>68</td> <td>43 ※1</td> </tr> <tr> <td>100</td> <td>68</td> <td>38 ※2</td> </tr> <tr> <td>115</td> <td>68</td> <td>33</td> </tr> <tr> <td>200</td> <td>68</td> <td>33</td> </tr> <tr> <td>230</td> <td>80</td> <td>37</td> </tr> <tr> <td>264</td> <td>86</td> <td>42</td> </tr> <tr> <td>280</td> <td>99</td> <td>47</td> </tr> <tr> <td>--</td> <td>-</td> <td>-</td> </tr> <tr> <td>--</td> <td>-</td> <td>-</td> </tr> </tbody> </table> <p style="text-align: right;"> ※1: Load 80% ※2: Load 90% </p>	Input Voltage [V]	Hold-Up Time [ms]		Load 50%	Load 100%	85	68	43 ※1	100	68	38 ※2	115	68	33	200	68	33	230	80	37	264	86	42	280	99	47	--	-	-	--	-	-
Input Voltage [V]	Hold-Up Time [ms]																																	
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100	68	38 ※2																																
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264	86	42																																
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<p>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.</p>																																		



COSEL																																																						
Model	PLA150F-12	Temperature	25°C																																																			
Item	Instantaneous Interruption Compensation	Testing Circuitry	Figure A																																																			
Object	+12V12.5A																																																					
<p>1. Graph</p> <p> —△— Input Volt. 100V ---□--- Input Volt. 115V -·-○-·- Input Volt. 230V </p> <p style="text-align: center;">Load Current [A]</p>		<p>2. Values</p> <table border="1"> <thead> <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. 115[V]</th> <th>Input Volt. 230[V]</th> </tr> </thead> <tbody> <tr><td>0.00</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>2.00</td><td>105</td><td>105</td><td>108</td></tr> <tr><td>4.00</td><td>102</td><td>102</td><td>103</td></tr> <tr><td>6.00</td><td>69</td><td>69</td><td>72</td></tr> <tr><td>8.00</td><td>52</td><td>52</td><td>55</td></tr> <tr><td>10.00</td><td>39</td><td>40</td><td>43</td></tr> <tr><td>12.00</td><td>31</td><td>31</td><td>34</td></tr> <tr><td>12.50</td><td>30</td><td>31</td><td>32</td></tr> <tr><td>13.75</td><td>27</td><td>27</td><td>28</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. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]	0.00	-	-	-	2.00	105	105	108	4.00	102	102	103	6.00	69	69	72	8.00	52	52	55	10.00	39	40	43	12.00	31	31	34	12.50	30	31	32	13.75	27	27	28	--	-	-	-	--	-	-	-
Load Current [A]	Time [ms]																																																					
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<p>Note: Slanted line shows the range of the rated load current.</p>																																																						



COSEL																																								
Model	PLA150F-12																																							
Item	Minimum Input Voltage for Regulated Output Voltage	Testing Circuitry Figure A																																						
Object	+12V12.5A																																							
<p>1.Graph</p> <p style="text-align: right;"> ---□--- Load 50% ---△--- Load 100% </p>		<p>2.Values</p> <table border="1"> <thead> <tr> <th rowspan="2">Ambient Temperature [°C]</th> <th colspan="2">Input Voltage [V]</th> </tr> <tr> <th>Load 50%</th> <th>Load 100%</th> </tr> </thead> <tbody> <tr><td>-20</td><td>42</td><td>61</td></tr> <tr><td>-10</td><td>43</td><td>61</td></tr> <tr><td>0</td><td>43</td><td>61</td></tr> <tr><td>10</td><td>43</td><td>61</td></tr> <tr><td>20</td><td>43</td><td>61</td></tr> <tr><td>25</td><td>43</td><td>61</td></tr> <tr><td>30</td><td>43</td><td>61</td></tr> <tr><td>40</td><td>44</td><td>61</td></tr> <tr><td>45</td><td>44</td><td>61</td></tr> <tr><td>50</td><td>44</td><td>61</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> </tbody> </table>	Ambient Temperature [°C]	Input Voltage [V]		Load 50%	Load 100%	-20	42	61	-10	43	61	0	43	61	10	43	61	20	43	61	25	43	61	30	43	61	40	44	61	45	44	61	50	44	61	--	-	-
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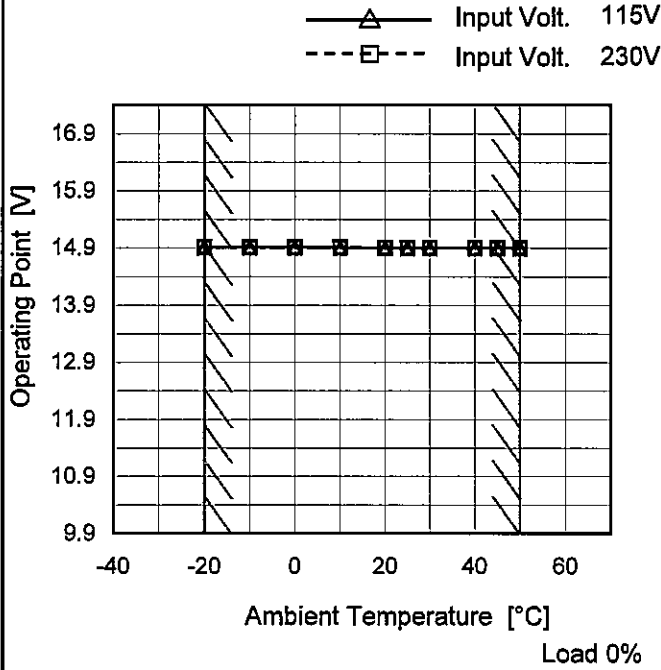
COSEL																																															
Model	PLA150F-12	Temperature	25°C																																												
Item	Overcurrent Protection	Testing Circuitry	Figure A																																												
Object	+12V12.5A																																														
<p>1.Graph</p> <div style="text-align: right;"> <p>————— Input Volt. 115V</p> <p>————— Input Volt. 230V</p> </div> <p style="text-align: center;">Output Voltage [V]</p> <p style="text-align: center;">Load Current [A]</p> <p>Note: Slanted line shows the range of the rated load current.</p> <p>Intermittent operation occurs when the output voltage is from 6.8V 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. 115[V]</th> <th>Input Volt. 230[V]</th> </tr> </thead> <tbody> <tr><td>11.4</td><td>16.05</td><td>16.55</td></tr> <tr><td>10.8</td><td>16.54</td><td>16.60</td></tr> <tr><td>9.6</td><td>16.26</td><td>16.79</td></tr> <tr><td>8.4</td><td>16.60</td><td>17.16</td></tr> <tr><td>7.2</td><td>17.02</td><td>17.58</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> <tr><td>--</td><td>-</td><td>-</td></tr> </tbody> </table>		Output Voltage [V]	Load Current [A]		Input Volt. 115[V]	Input Volt. 230[V]	11.4	16.05	16.55	10.8	16.54	16.60	9.6	16.26	16.79	8.4	16.60	17.16	7.2	17.02	17.58	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-
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Model	PLA150F-12
Item	Oversvoltage Protection
Object	+12V12.5A

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. 115[V]	Input Volt. 230[V]
-20	14.95	14.95
-10	14.95	14.95
0	14.95	14.95
10	14.95	14.95
20	14.94	14.94
25	14.94	14.94
30	14.94	14.94
40	14.94	14.94
45	14.94	14.94
50	14.94	14.94
--	-	-

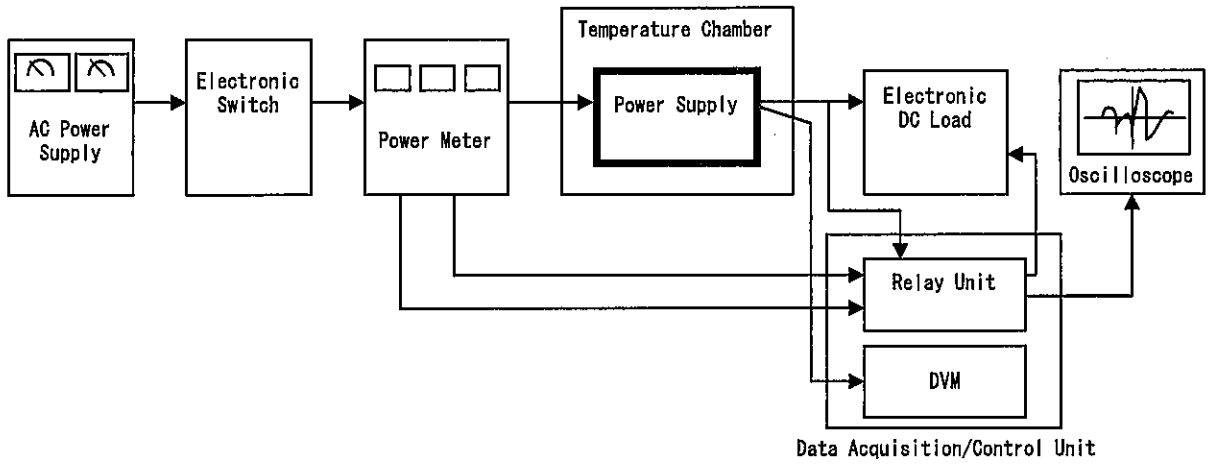


Figure A

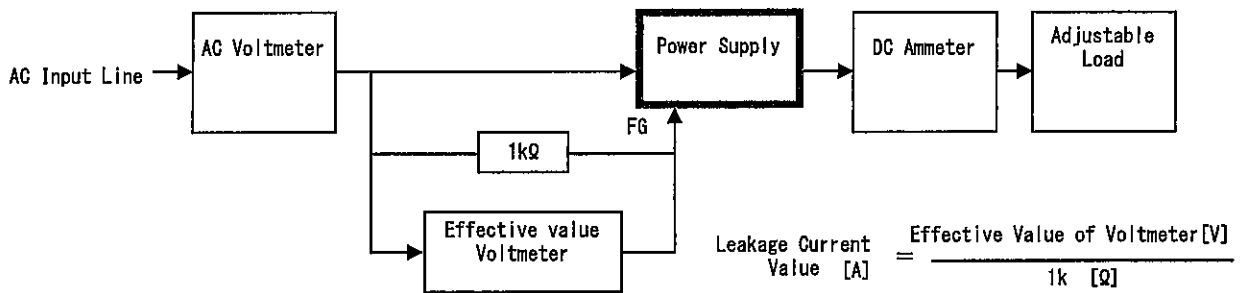


Figure B (DEN-AN)

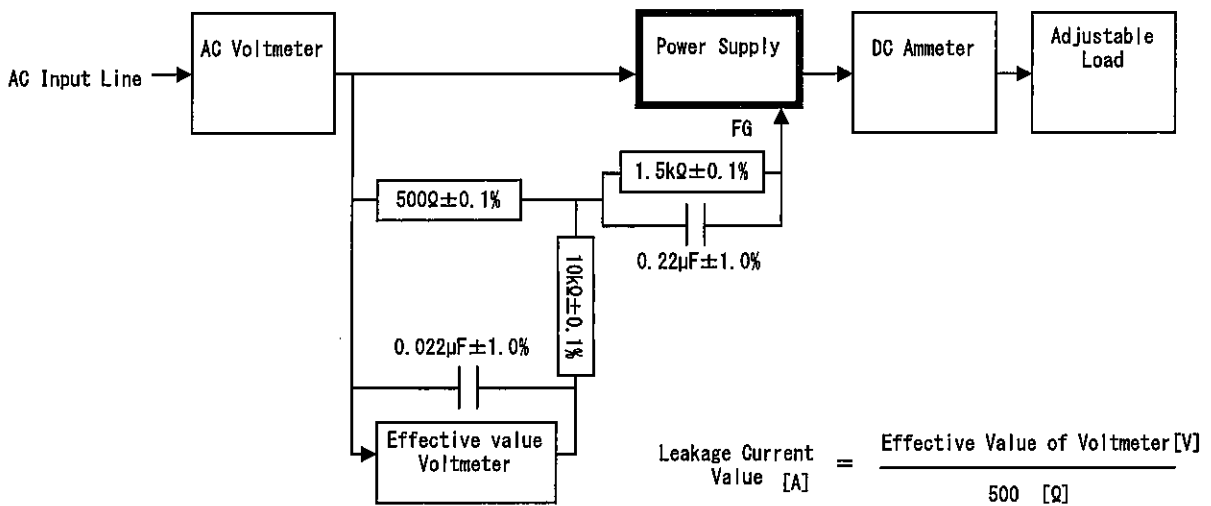


Figure B (IEC60950-1)

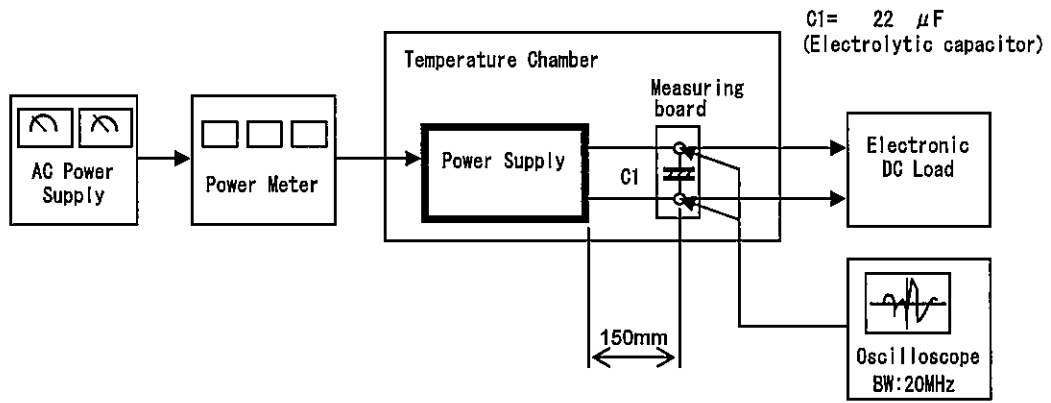


Figure C