

TEST DATA OF PLA150F-24

Regulated DC Power Supply
May 23, 2013

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Katsumi Ishikawa Design Manager

Prepared by : Naoki Fujita
Naoki Fujita Design Engineer

COSEL CO.,LTD.



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<p>Model PLA150F-24</p>		<p>Temperature 25°C Testing Circuitry Figure A</p>																																																			
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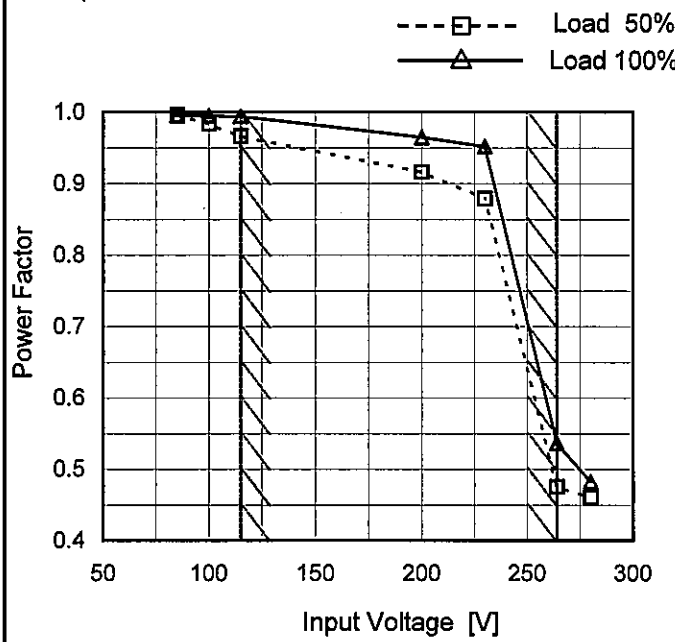
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Model	PLA150F-24
Item	Power Factor (by Input Voltage)
Object	_____

Temperature 25°C
Testing Circuitry Figure A

1. Graph



2. Values

Input Voltage [V]	Power Factor	
	Load 50%	Load 100%
85	0.996	0.995 ※1
100	0.983	0.995 ※2
115	0.966	0.994
200	0.916	0.965
230	0.879	0.952
264	0.475	0.537
280	0.460	0.483
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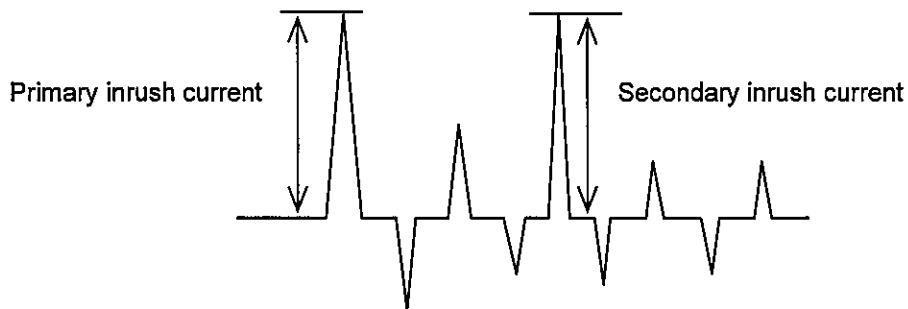
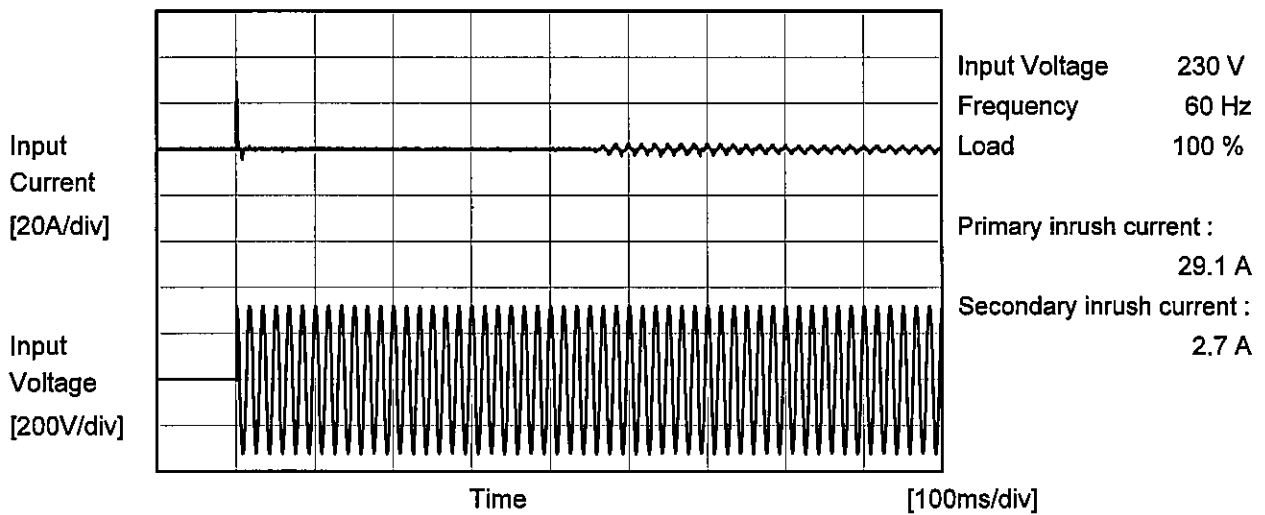
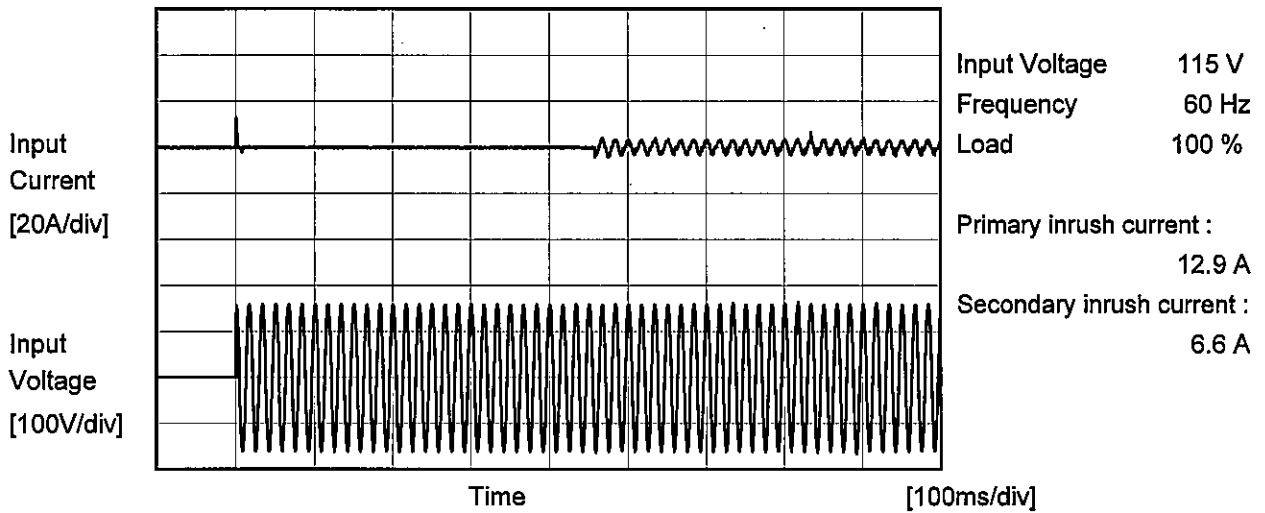
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COSEL		
Model	PLA150F-24	Temperature 25°C Testing Circuitry Figure A
Item	Inrush Current	
Object	_____	





COSEL		
Model	PLA150F-24	Temperature 25°C Testing Circuitry Figure B
Item	Leakage Current	
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.



COSEL																																			
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Item	Line Regulation	Testing Circuitry	Figure A																																
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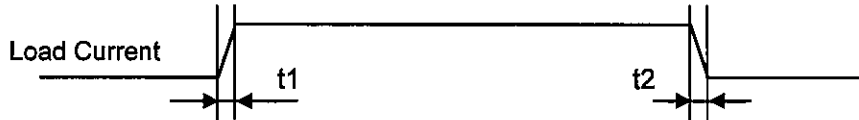
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<p>1.Graph</p> <p> —△— Input Volt. 100V ---□--- Input Volt. 115V -·-○-·- Input Volt. 230V </p> <p style="text-align: center;">Load Current [A]</p>		<p>2.Values</p> <table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="3">Output Voltage [V]</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>24.261</td><td>24.262</td><td>24.264</td></tr> <tr><td>1.00</td><td>24.156</td><td>24.157</td><td>24.162</td></tr> <tr><td>2.00</td><td>24.144</td><td>24.145</td><td>24.145</td></tr> <tr><td>3.00</td><td>24.143</td><td>24.143</td><td>24.143</td></tr> <tr><td>4.00</td><td>24.141</td><td>24.142</td><td>24.142</td></tr> <tr><td>5.00</td><td>24.141</td><td>24.141</td><td>24.140</td></tr> <tr><td>6.00</td><td>24.140</td><td>24.139</td><td>24.138</td></tr> <tr><td>6.40</td><td>24.140</td><td>24.139</td><td>24.138</td></tr> <tr><td>7.04</td><td>-</td><td>24.137</td><td>24.137</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]	Output Voltage [V]			Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]	0.00	24.261	24.262	24.264	1.00	24.156	24.157	24.162	2.00	24.144	24.145	24.145	3.00	24.143	24.143	24.143	4.00	24.141	24.142	24.142	5.00	24.141	24.141	24.140	6.00	24.140	24.139	24.138	6.40	24.140	24.139	24.138	7.04	-	24.137	24.137	--	-	-	-	--	-	-	-
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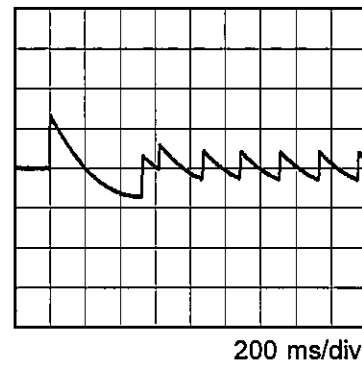
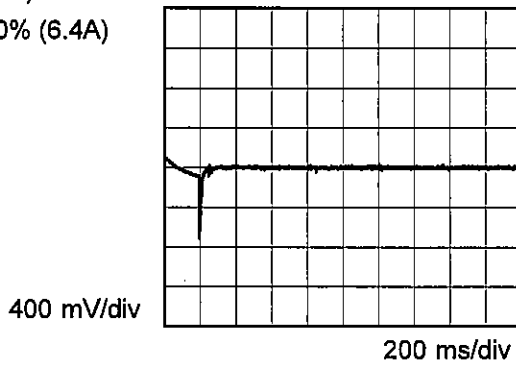
Model		PLA150F-24	
Item		Dynamic Load Response	Temperature 25° C Testing Circuitry Figure A
Object		+24V6.4A	

Input Volt. 115 V
Cycle 1000 ms

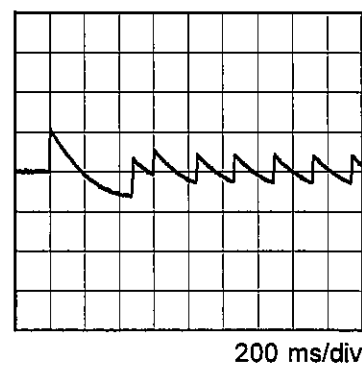
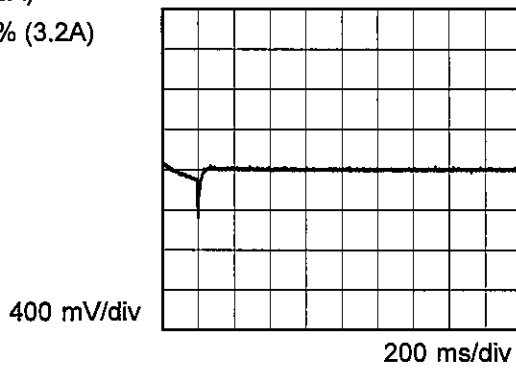
Response. $t_1=t_2=50\mu\text{s}$. Typ



Min. Load (0A) ←→
Load 100% (6.4A)



Min. Load (0A) ←→
Load 50% (3.2A)

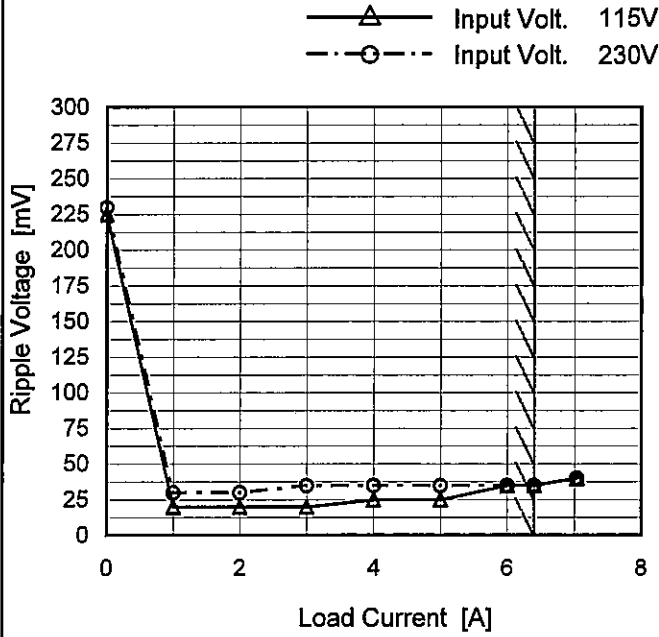




Model	PLA150F-24
Item	Ripple Voltage (by Load Current)
Object	+24V6.4A

Temperature 25°C
Testing Circuitry Figure C

1. Graph



2. Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 115 [V]	Input Volt. 230 [V]
0.00	225	230
1.00	20	30
2.00	20	30
3.00	20	35
4.00	25	35
5.00	25	35
6.00	35	35
6.40	35	35
7.04	40	40
--	-	-
--	-	-

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.

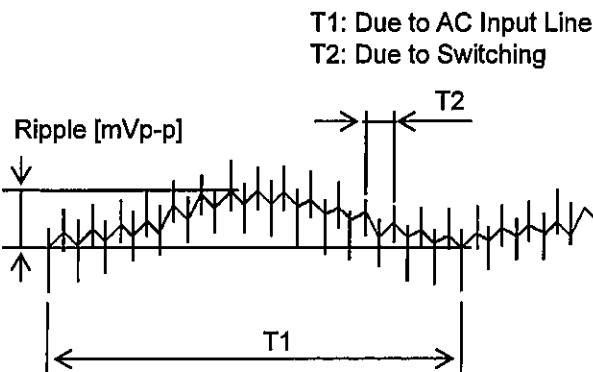


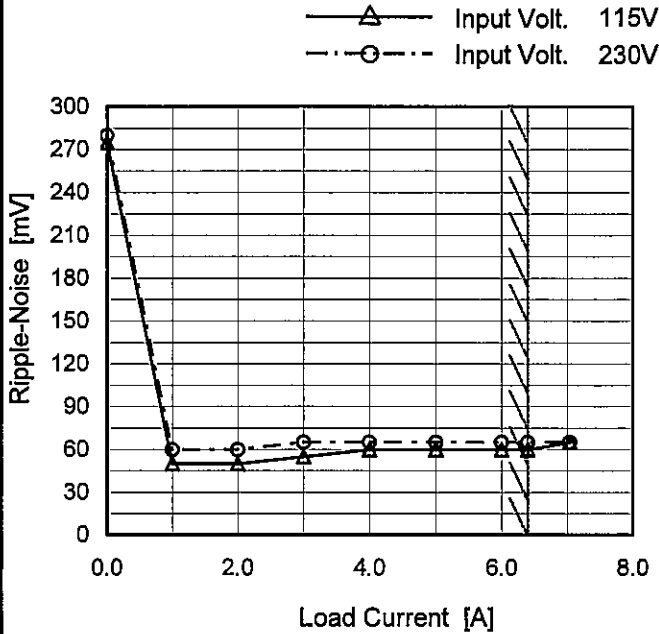
Fig. Complex Ripple Wave Form



Model	PLA150F-24
Item	Ripple-Noise
Object	+24V6.4A

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	275	280
1.00	50	60
2.00	50	60
3.00	55	65
4.00	60	65
5.00	60	65
6.00	60	65
6.40	60	65
7.04	65	65
--	-	-
--	-	-

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.

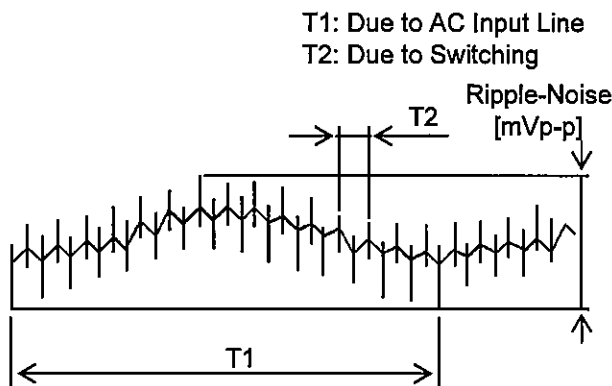


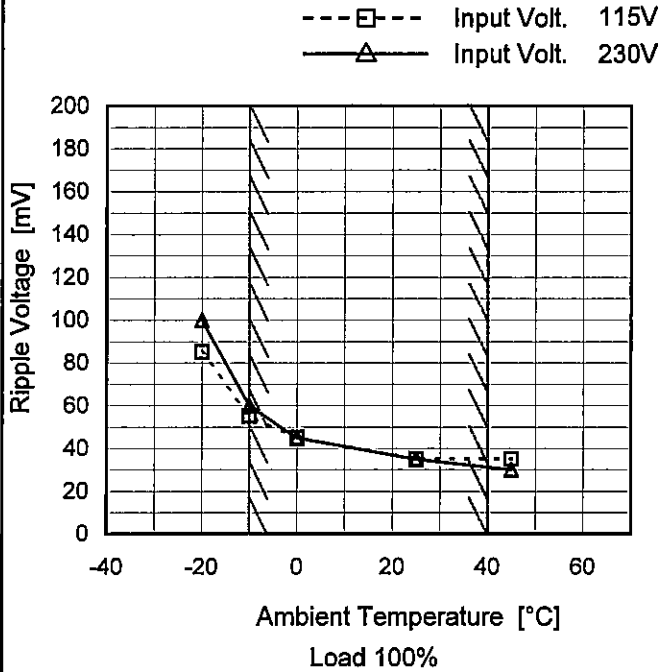
Fig. Complex Ripple Wave Form



Model	PLA150F-24
Item	Ripple Voltage (by Ambient Temp.)
Object	+24V6.4A

Testing Circuitry Figure C

1. Graph



2. Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Input Volt. 115 [V]	Input Volt. 230 [V]
-20	85	100
-10	55	60
0	45	45
25	35	35
45	35	30
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-

Measured by 20 MHz Oscilloscope.
 Note: Slanted line shows the range of the rated ambient temperature.

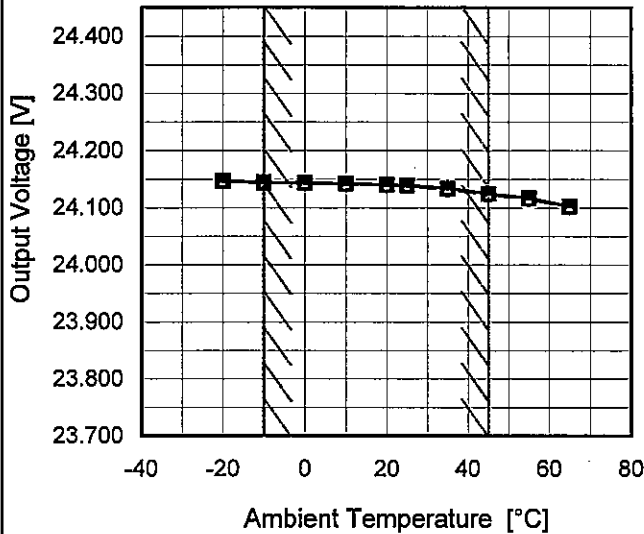


Model	PLA150F-24
Item	Ambient Temperature Drift
Object	+24V6.4A

Testing Circuitry Figure A

1. Graph

- △— Input Volt. 100V
- Input Volt. 115V
- 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. 115[V]	Input Volt. 230[V]
-20	24.147	24.147	24.146
-10	24.145	24.144	24.144
0	24.144	24.143	24.142
10	24.143	24.142	24.141
20	24.141	24.140	24.139
25	24.140	24.139	24.138
35	24.135	24.133	24.132
45	24.125	24.124	24.123
55	24.117	24.116	24.115
65	24.103	24.102	24.101
--	-	-	-

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



COSEL		
Model	PLA150F-24	
Item	Output Voltage Accuracy	Testing Circuitry Figure A
Object	+24V6.4A	

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 - 45°C

Input Voltage : 115 - 264V

Load Current : 1.92 - 6.4A

* 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	-10	230	1.92	24.151	±14	±0.1
Minimum Voltage	45	264	6.4	24.123		

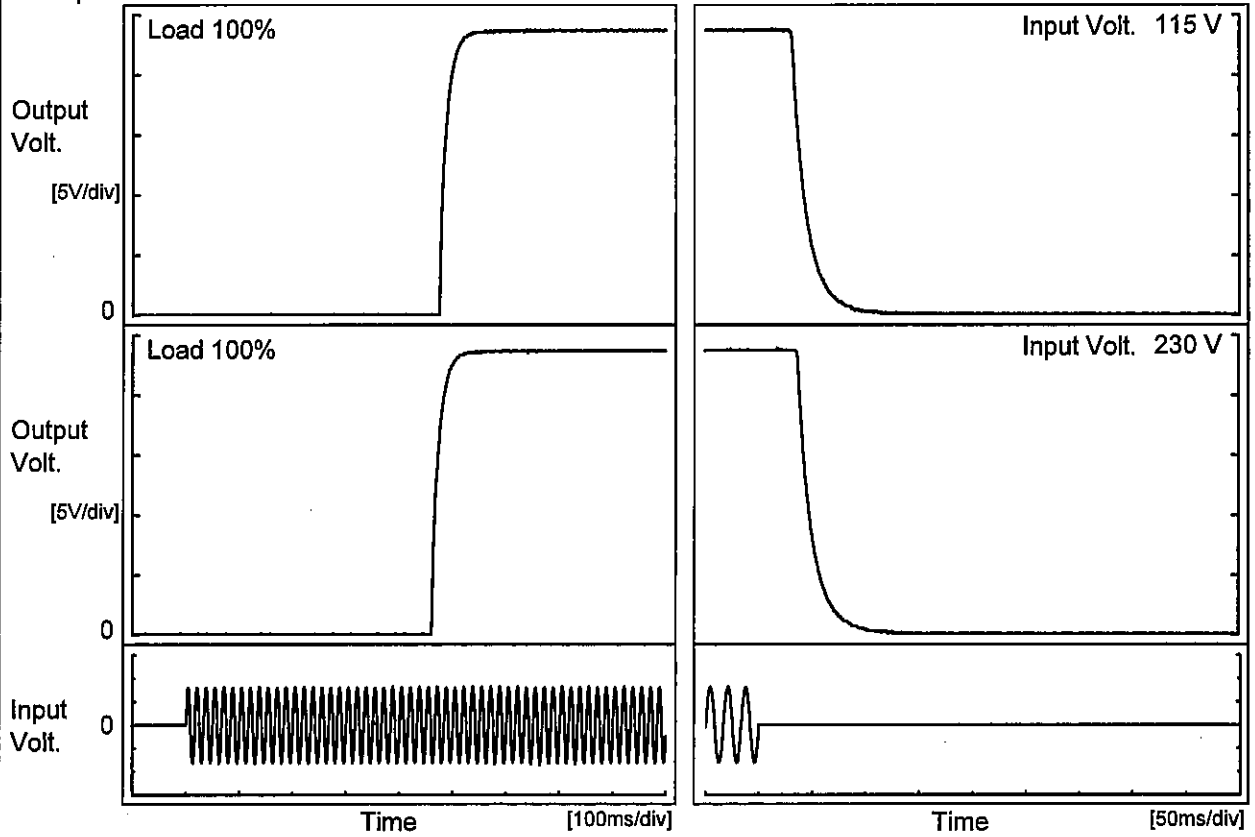


COSEL																								
Model	PLA150F-24																							
Item	Time Lapse Drift	Temperature 25°C Testing Circuitry Figure A																						
Object	+24V6.4A																							
<p>1. Graph</p> <p style="text-align: center;">Time [H]</p> <p style="text-align: center;">Input Volt. 230V 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>24.138</td></tr> <tr><td>0.5</td><td>24.137</td></tr> <tr><td>1.0</td><td>24.137</td></tr> <tr><td>2.0</td><td>24.137</td></tr> <tr><td>3.0</td><td>24.137</td></tr> <tr><td>4.0</td><td>24.137</td></tr> <tr><td>5.0</td><td>24.137</td></tr> <tr><td>6.0</td><td>24.137</td></tr> <tr><td>7.0</td><td>24.137</td></tr> <tr><td>8.0</td><td>24.137</td></tr> </tbody> </table>	Time since start [H]	Output Voltage [V]	0.0	24.138	0.5	24.137	1.0	24.137	2.0	24.137	3.0	24.137	4.0	24.137	5.0	24.137	6.0	24.137	7.0	24.137	8.0	24.137
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7.0	24.137																							
8.0	24.137																							
<p>* The characteristic of AC115V is equal.</p>																								



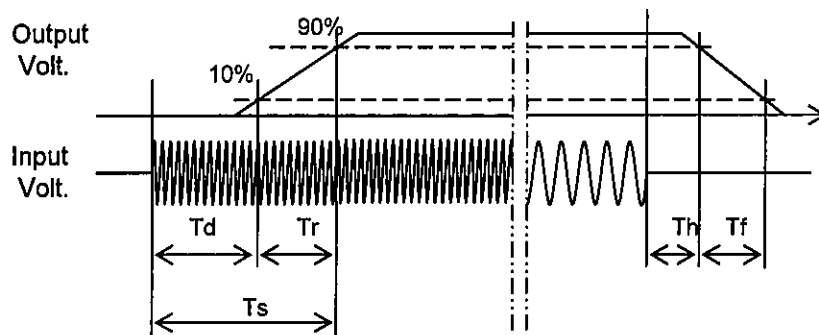
Model	PLA150F-24	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+24V6.4A		

1. Graph



2. Values

Input Volt. \ Time	Td	Tr	Ts	Th	Tf
115 V	475.5	30.0	505.5	32.5	31.3
230 V	462.0	30.0	492.0	38.5	37.3

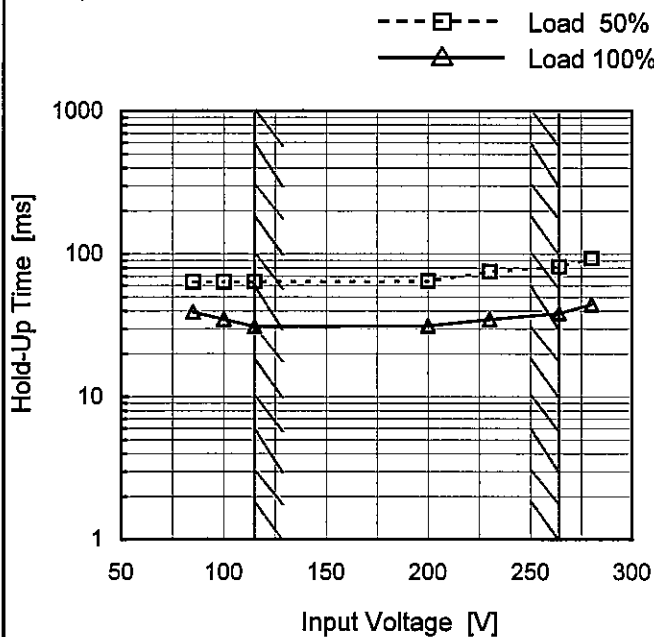




Model	PLA150F-24
Item	Hold-Up Time
Object	+24V6.4A

Temperature 25°C
Testing Circuitry Figure A

1. Graph



2. Values

Input Voltage [V]	Hold-Up Time [ms]	
	Load 50%	Load 100%
85	63	39 ※1
100	63	35 ※2
115	64	31
200	64	31
230	75	35
264	81	39
280	93	45
--	-	-
-	-	-

※1: Load 80%
※2: Load 90%

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.



COSEL																																																						
Model	PLA150F-24	Temperature	25°C																																																			
Item	Instantaneous Interruption Compensation	Testing Circuitry	Figure A																																																			
Object	+24V6.4A																																																					
<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>0.0</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>1.2</td><td>185</td><td>185</td><td>184</td></tr> <tr><td>2.4</td><td>82</td><td>82</td><td>85</td></tr> <tr><td>3.6</td><td>54</td><td>54</td><td>57</td></tr> <tr><td>4.8</td><td>43</td><td>42</td><td>41</td></tr> <tr><td>6.0</td><td>32</td><td>32</td><td>33</td></tr> <tr><td>6.4</td><td>31</td><td>29</td><td>28</td></tr> <tr><td>7.0</td><td>23</td><td>24</td><td>26</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. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]	0.0	-	-	-	1.2	185	185	184	2.4	82	82	85	3.6	54	54	57	4.8	43	42	41	6.0	32	32	33	6.4	31	29	28	7.0	23	24	26	--	-	-	-	--	-	-	-	--	-	-	-
Load Current [A]	Time [ms]																																																					
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COSEL																																								
Model	PLA150F-24																																							
Item	Minimum Input Voltage for Regulated Output Voltage	Testing Circuitry Figure A																																						
Object	+24V6.4A																																							
<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>43</td><td>64</td></tr> <tr><td>-10</td><td>43</td><td>65</td></tr> <tr><td>0</td><td>43</td><td>65</td></tr> <tr><td>10</td><td>43</td><td>65</td></tr> <tr><td>20</td><td>44</td><td>65</td></tr> <tr><td>25</td><td>44</td><td>65</td></tr> <tr><td>35</td><td>44</td><td>66</td></tr> <tr><td>45</td><td>44</td><td>66</td></tr> <tr><td>55</td><td>45</td><td>67</td></tr> <tr><td>65</td><td>45</td><td>68</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> </tbody> </table>	Ambient Temperature [°C]	Input Voltage [V]		Load 50%	Load 100%	-20	43	64	-10	43	65	0	43	65	10	43	65	20	44	65	25	44	65	35	44	66	45	44	66	55	45	67	65	45	68	--	-	-
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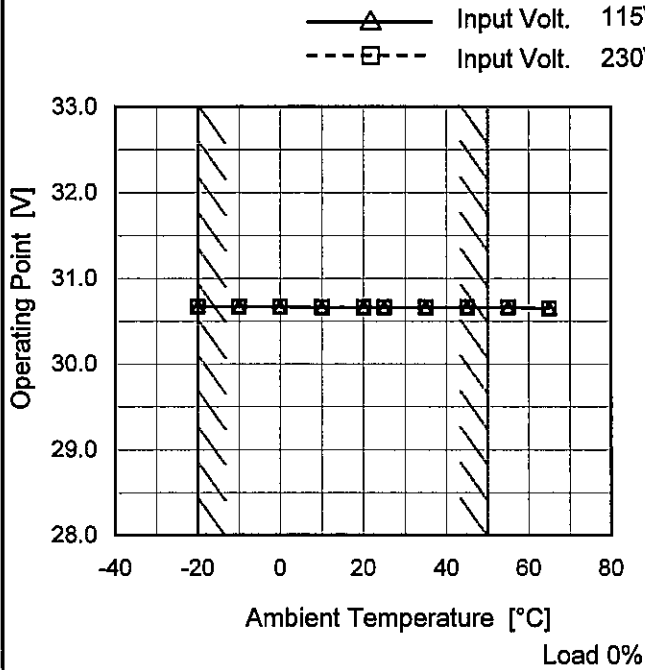
COSEL																																												
Model	PLA150F-24	Temperature	25°C																																									
Item	Overcurrent Protection	Testing Circuitry	Figure A																																									
Object	+24V6.4A																																											
<p>1.Graph</p> <div style="text-align: right;"> <p>————— Input Volt. 115V</p> <p>————— Input Volt. 230V</p> </div> <p style="text-align: center;">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 12V 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>22.8</td><td>7.53</td><td>7.72</td></tr> <tr><td>21.6</td><td>7.42</td><td>7.62</td></tr> <tr><td>19.2</td><td>7.83</td><td>8.04</td></tr> <tr><td>16.8</td><td>8.06</td><td>8.25</td></tr> <tr><td>14.4</td><td>8.30</td><td>8.46</td></tr> <tr><td>12.0</td><td>8.50</td><td>8.55</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]	22.8	7.53	7.72	21.6	7.42	7.62	19.2	7.83	8.04	16.8	8.06	8.25	14.4	8.30	8.46	12.0	8.50	8.55	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-
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Model	PLA150F-24
Item	Overvoltage Protection
Object	+24V6.4A

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	30.67	30.67
-10	30.67	30.67
0	30.67	30.67
10	30.66	30.66
20	30.66	30.66
25	30.66	30.66
35	30.66	30.66
45	30.66	30.66
55	30.66	30.66
65	30.65	30.65
--	-	-

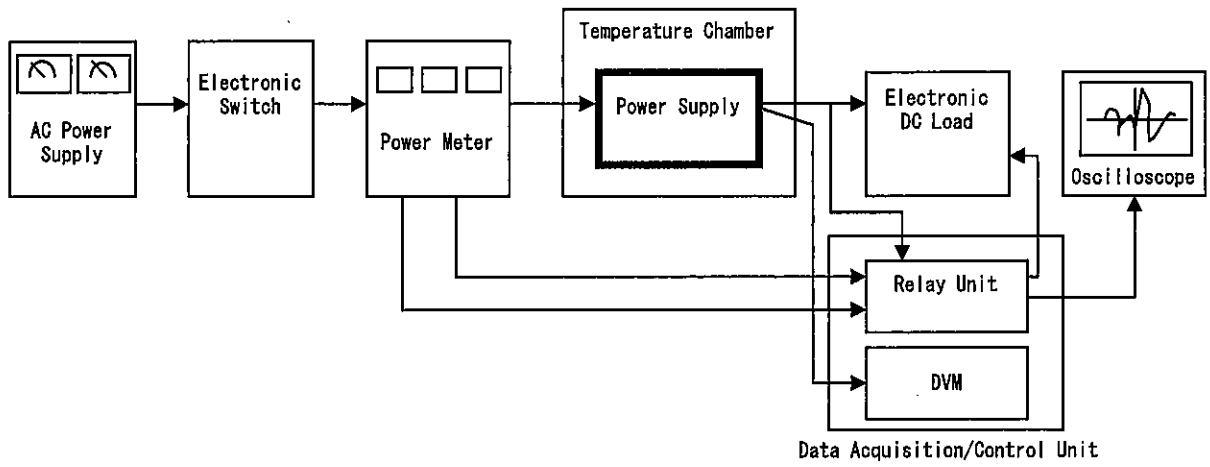


Figure A

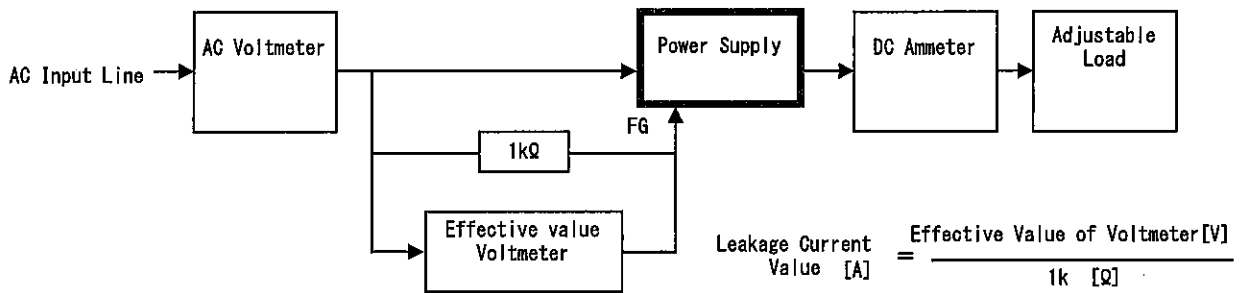


Figure B (DEN-AN)

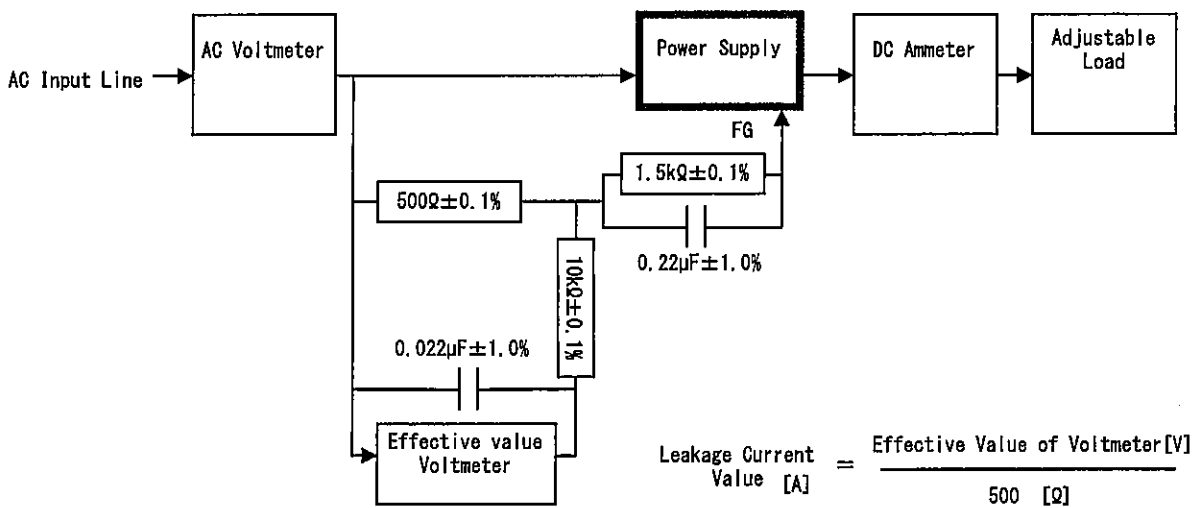


Figure B (IEC60950-1)

COSEL

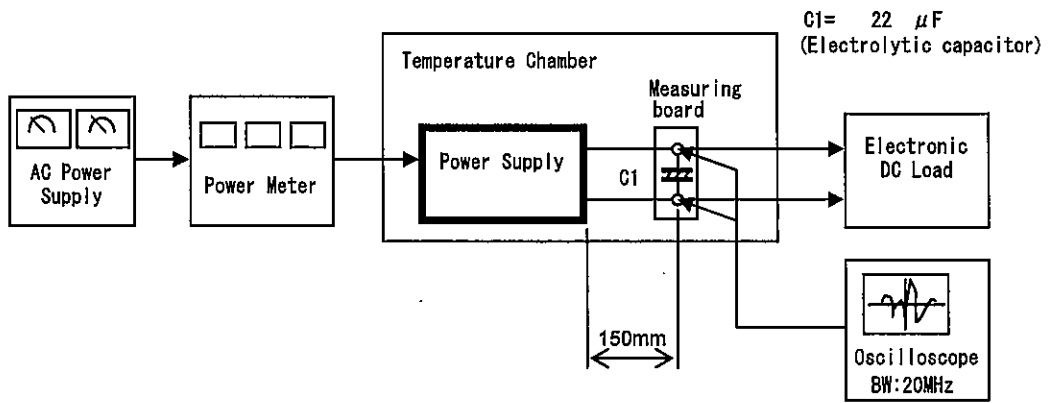


Figure C