

TEST DATA OF PLA150F-36

Regulated DC Power Supply
June 26, 2013

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COSEL CO.,LTD.

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Model

PLA150F-36

Item

Input Current (by Load Current)

Object

1.Graph

—△—

Input Volt.

100V

---□---

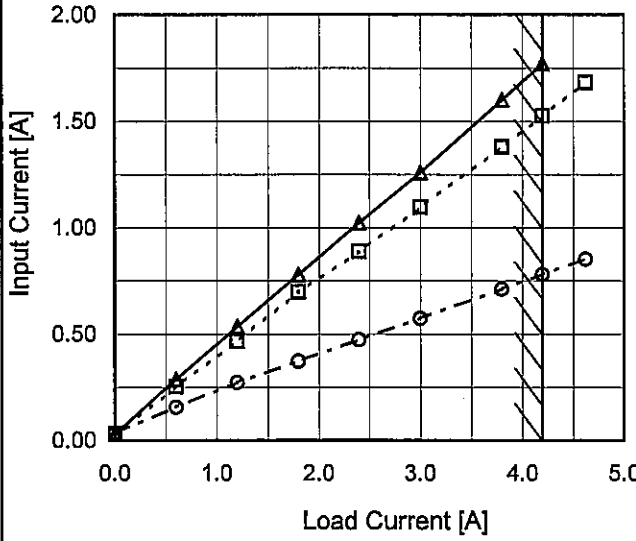
Input Volt.

115V

---○---

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 Current [A]		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
0.00	0.032	0.030	0.034
0.60	0.289	0.254	0.158
1.20	0.537	0.467	0.274
1.80	0.781	0.698	0.373
2.40	1.025	0.888	0.474
3.00	1.262	1.096	0.575
3.80	1.600	1.381	0.713
4.20	1.771	1.525	0.782
4.62	-	1.682	0.854
--	-	-	-
--	-	-	-

COSEL

Model

PLA150F-36

Item

Input Power (by Load Current)

Object

1.Graph

—△—

Input Volt. 100V

---□---

Input Volt. 115V

-·-○-·-

Input Volt. 230V

Input Power [W]

500

400

300

200

100

0

0.0 1.0 2.0 3.0 4.0 5.0

Load Current [A]

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. 115[V]	Input Volt. 230[V]
0.00	1.3	1.2	0.9
0.60	27.4	27.1	27.2
1.20	51.8	51.1	51.2
1.80	76.3	76.0	74.8
2.40	100.5	99.6	97.9
3.00	124.9	123.8	121.3
3.80	158.7	157.1	153.2
4.20	175.8	174.0	169.4
4.62	-	191.9	186.5
--	-	-	-
--	-	-	-

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Model	PLA150F-36
Item	Efficiency (by Input Voltage)
Object	

1.Graph

□

Load 50%

△

Load 100%

Input Voltage [V]	Load 50% Efficiency [%]	Load 100% Efficiency [%]
85	85.4	85.4 ※1
100	86.2	87.2 ※2
115	86.6	87.3
200	88.1	89.4
230	88.4	90.0
264	88.9	90.1
280	88.9	90.2
--	-	-
--	-	-

Temperature

25°C

Testing Circuitry

Figure A

2.Values

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
85	85.4	85.4 ※1
100	86.2	87.2 ※2
115	86.6	87.3
200	88.1	89.4
230	88.4	90.0
264	88.9	90.1
280	88.9	90.2
--	-	-
--	-	-

※1:Load 80%

※2:Load 90%

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

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COSEL

Model	PLA150F-36
Item	Efficiency (by Load Current)
Object	

1.Graph

—△—

Input Volt.

100V

---□---

Input Volt.

115V

---○---

Input Volt.

230V

Efficiency [%]

Load Current [A]

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

Temperature
25°C

Testing Circuitry
Figure A

2.Values

Load Current [A]	Efficiency [%]		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
0.00	-	-	-
0.60	78.3	79.0	78.9
1.20	83.3	84.5	84.3
1.80	85.3	85.6	87.0
2.40	86.3	87.1	88.6
3.00	86.9	87.5	89.3
3.80	87.2	87.4	89.9
4.20	87.0	87.3	90.0
4.62	-	87.1	89.9
--	-	-	-
--	-	-	-

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Model	PLA150F-36
Item	Power Factor (by Input Voltage)
Object	_____

1.Graph

Legend:

- Load 50%
- △--- Load 100%

Input Voltage [V]	Power Factor (Load 50%)	Power Factor (Load 100%)
85	0.988	0.994 ※1
100	0.981	0.993 ※2
115	0.959	0.991
200	0.907	0.960
230	0.888	0.951
264	0.492	0.581
280	0.482	0.501

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

Temperature 25°C
Testing Circuitry Figure A

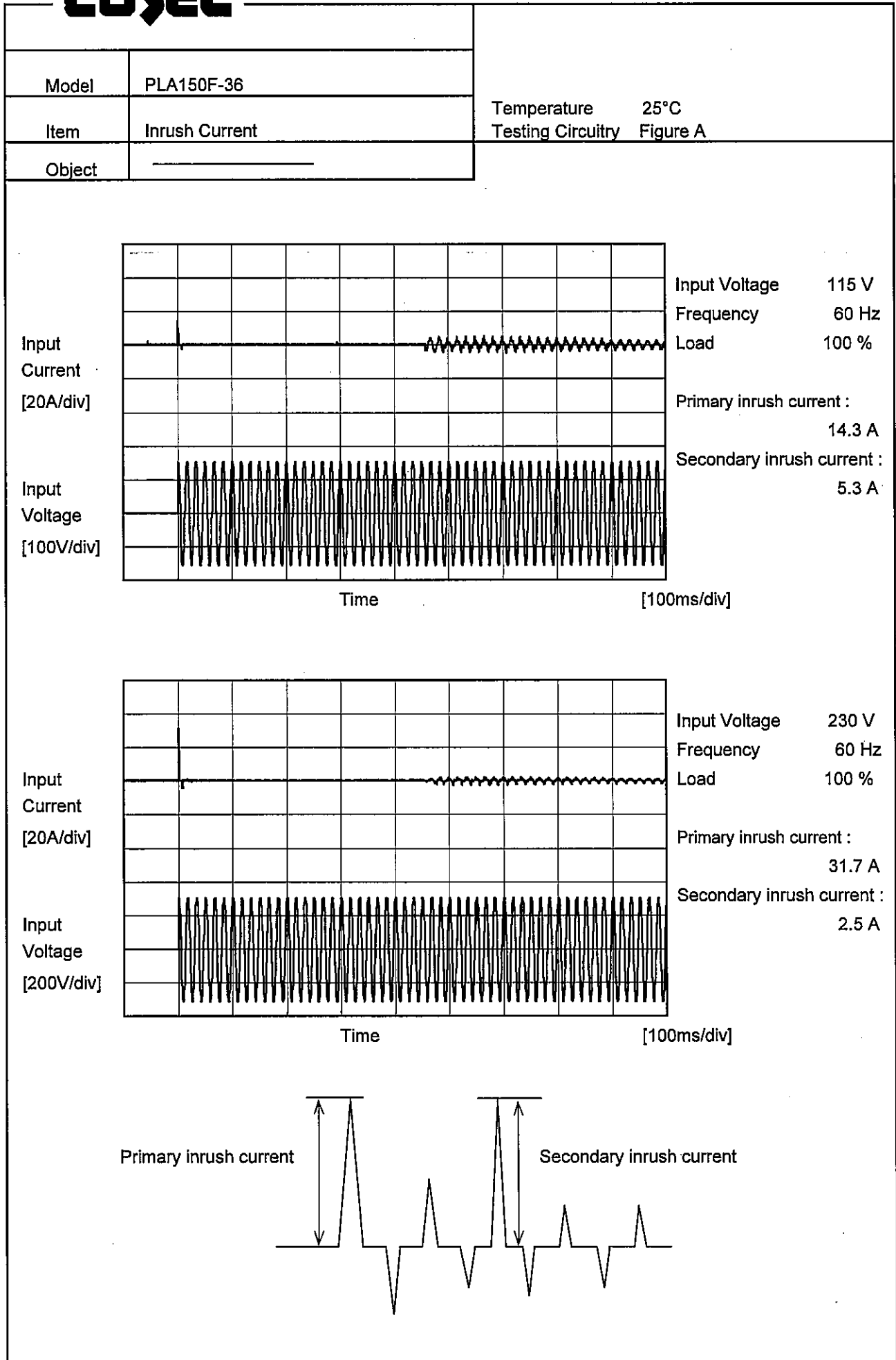
2.Values

Input Voltage [V]	Power Factor	
	Load 50%	Load 100%
85	0.988	0.994 ※1
100	0.981	0.993 ※2
115	0.959	0.991
200	0.907	0.960
230	0.888	0.951
264	0.492	0.581
280	0.482	0.501
---	-	-
---	-	-

※1:Load 80%
※2:Load 90%



Model		PLA150F-36																																																				
Item		Power Factor (by Load Current)																																																				
Object																																																						
1.Graph		2.Values																																																				
<div><div><div>—△—</div><div>Input Volt.</div><div>100V</div></div><div><div>- - □ - -</div><div>Input Volt.</div><div>115V</div></div><div><div>- - ○ - -</div><div>Input Volt.</div><div>230V</div></div></div> <p>Power Factor</p> <p>Load Current [A]</p>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Power Factor</th></tr><tr><th>Input Volt. 100[V]</th><th>Input Volt. 115[V]</th><th>Input Volt. 230[V]</th></tr><tr><td>0.00</td><td>0.482</td><td>0.414</td><td>0.157</td></tr><tr><td>0.60</td><td>0.949</td><td>0.931</td><td>0.749</td></tr><tr><td>1.20</td><td>0.966</td><td>0.952</td><td>0.814</td></tr><tr><td>1.80</td><td>0.978</td><td>0.963</td><td>0.872</td></tr><tr><td>2.40</td><td>0.980</td><td>0.976</td><td>0.899</td></tr><tr><td>3.00</td><td>0.990</td><td>0.983</td><td>0.917</td></tr><tr><td>3.80</td><td>0.993</td><td>0.990</td><td>0.937</td></tr><tr><td>4.20</td><td>0.994</td><td>0.991</td><td>0.951</td></tr><tr><td>4.62</td><td>-</td><td>0.993</td><td>0.953</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]	Power Factor			Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]	0.00	0.482	0.414	0.157	0.60	0.949	0.931	0.749	1.20	0.966	0.952	0.814	1.80	0.978	0.963	0.872	2.40	0.980	0.976	0.899	3.00	0.990	0.983	0.917	3.80	0.993	0.990	0.937	4.20	0.994	0.991	0.951	4.62	-	0.993	0.953	--	-	-	-	--	-	-	-
Load Current [A]	Power Factor																																																					
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Note: Slanted line shows the range of the rated load current.																																																						



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		Temperature 25°C Testing Circuitry Figure B
Model	PLA150F-36	
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

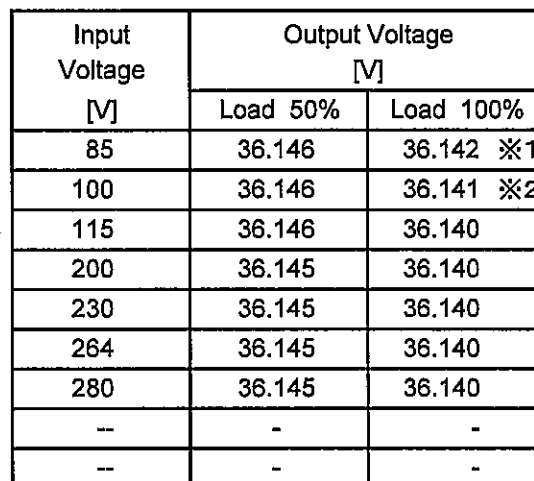
The value for "One of phases" is the reference value only.

2.Condition

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

Temperature	25°C
Testing Circuitry	Figure A

2.Values



※2: Load 90%

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Model		PLA150F-36																																																	
Item		Load Regulation																																																	
Object		+36V4.2A																																																	
1.Graph		2.Values																																																	
<div><div><div>—△—</div><div>---□---</div><div>---○---</div></div><div><div>Input Volt.</div><div>Input Volt.</div><div>Input Volt.</div></div><div><div>100V</div><div>115V</div><div>230V</div></div></div> <div><table><thead><tr><th>Load Current [A]</th><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>36.310</td><td>36.309</td><td>36.308</td></tr><tr><td>0.60</td><td>36.175</td><td>36.174</td><td>36.174</td></tr><tr><td>1.20</td><td>36.147</td><td>36.146</td><td>36.146</td></tr><tr><td>1.80</td><td>36.145</td><td>36.145</td><td>36.144</td></tr><tr><td>2.40</td><td>36.145</td><td>36.145</td><td>36.143</td></tr><tr><td>3.00</td><td>36.143</td><td>36.143</td><td>36.143</td></tr><tr><td>3.80</td><td>36.141</td><td>36.141</td><td>36.140</td></tr><tr><td>4.20</td><td>36.140</td><td>36.140</td><td>36.140</td></tr><tr><td>4.62</td><td>-</td><td>36.140</td><td>36.139</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr></tbody></table></div> <div><p>Note: Slanted line shows the range of the rated load current.</p></div>		Load Current [A]	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]	0.00	36.310	36.309	36.308	0.60	36.175	36.174	36.174	1.20	36.147	36.146	36.146	1.80	36.145	36.145	36.144	2.40	36.145	36.145	36.143	3.00	36.143	36.143	36.143	3.80	36.141	36.141	36.140	4.20	36.140	36.140	36.140	4.62	-	36.140	36.139	--	-	-	-	--	-	-	-		
Load Current [A]	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]																																																
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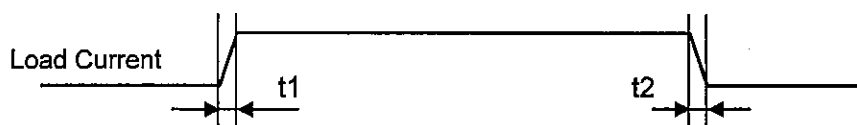
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Model	PLA150F-36	Temperature Testing Circuitry	25° C Figure A
Item	Dynamic Load Response		
Object	+36V4.2A		

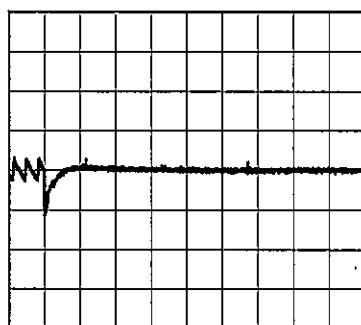
Input Volt. 115 V
Cycle 1000 ms

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

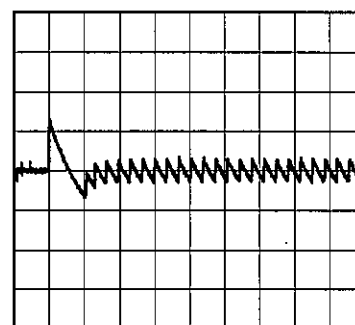


Min. Load (0A) \longleftrightarrow
Load 100% (4.2A)

400 mV/div



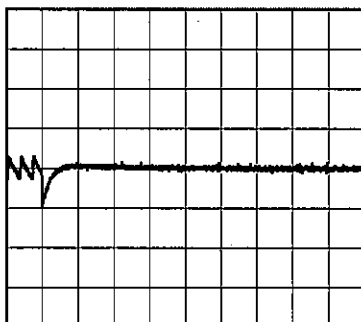
200 ms/div



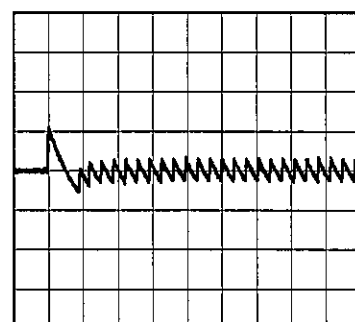
200 ms/div

Min. Load (0A) \longleftrightarrow
Load 50% (2.1A)

400 mV/div



200 ms/div



200 ms/div

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Model		PLA150F-36	
Item		Ripple Voltage (by Load Current)	
Object		+36V4.2A	

1.Graph

△

Input Volt. 115V

○

Input Volt. 230V

400

360

320

280

240

200

160

120

80

40

0

0.0

1.0

2.0

3.0

4.0

5.0

Ripple Voltage [mV]

Load Current [A]

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 115 [V]	Input Volt. 230 [V]
0.00	315	315
0.60	50	50
1.20	30	30
1.80	30	30
2.40	25	20
3.00	25	20
3.80	25	20
4.20	35	30
4.62	35	35
--	-	-
--	-	-

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.

T1: Due to AC Input Line

T2: Due to Switching

Ripple [mVp-p]

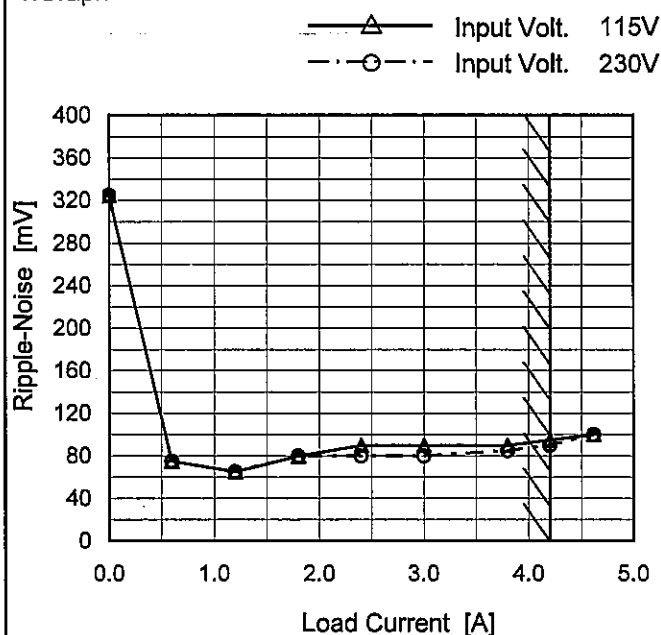
Fig. Complex Ripple Wave Form

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Model	PLA150F-36
Item	Ripple-Noise
Object	+36V4.2A

Temperature 25°C
Testing Circuitry Figure A

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. 115 [V]	Input Volt. 230 [V]
0.00	325	325
0.60	75	75
1.20	65	65
1.80	80	80
2.40	90	80
3.00	90	80
3.60	90	85
4.20	95	90
4.62	100	100
--	-	-
--	-	-

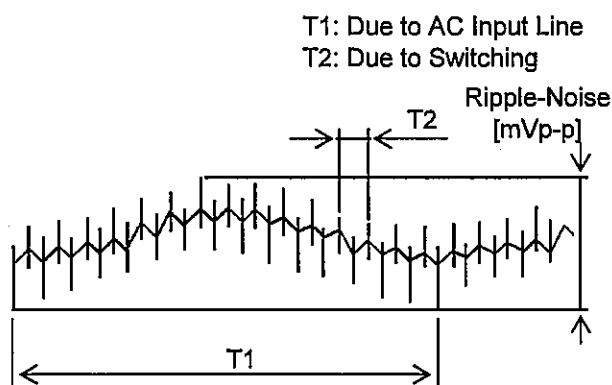
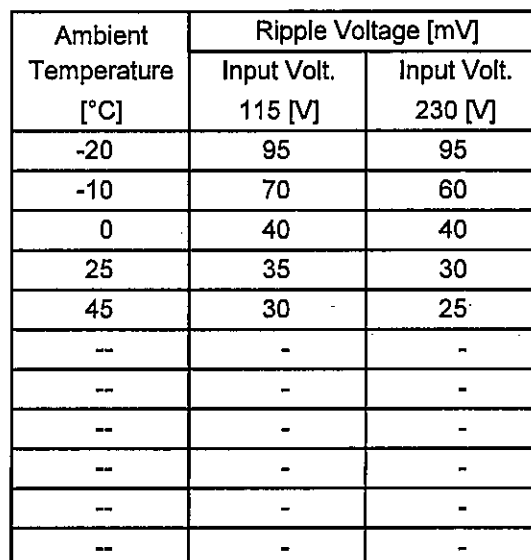


Fig. Complex Ripple Wave Form

Testing Circuitry Figure A

2.Values



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

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Model		PLA150F-36																																																				
Item		Ambient Temperature Drift																																																				
Object		+36V4.2A																																																				
1.Graph		2.Values																																																				
<div><div><div>—△—</div><div>---□---</div><div>---○---</div></div><div><div>Input Volt.</div><div>Input Volt.</div><div>Input Volt.</div></div><div><div>100V</div><div>115V</div><div>230V</div></div></div> <div><p>Output Voltage [V]</p><p>Ambient Temperature [°C]</p><p>Note: Slanted line shows the range of the rated ambient temperature.</p></div>		<table><tr><th rowspan="2">Ambient Temperature [°C]</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><tr><td>-20</td><td>36.039</td><td>36.039</td><td>36.039</td></tr><tr><td>-10</td><td>36.068</td><td>36.068</td><td>36.068</td></tr><tr><td>0</td><td>36.096</td><td>36.096</td><td>36.095</td></tr><tr><td>10</td><td>36.115</td><td>36.115</td><td>36.115</td></tr><tr><td>20</td><td>36.135</td><td>36.135</td><td>36.135</td></tr><tr><td>25</td><td>36.141</td><td>36.140</td><td>36.140</td></tr><tr><td>35</td><td>36.157</td><td>36.156</td><td>36.156</td></tr><tr><td>45</td><td>36.170</td><td>36.170</td><td>36.169</td></tr><tr><td>55</td><td>36.180</td><td>36.179</td><td>36.178</td></tr><tr><td>65</td><td>36.192</td><td>36.192</td><td>36.191</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr></table> <p>Note: In case of Input Volt. 100V, Load 90%. Other case Load 100%.</p>		Ambient Temperature [°C]	Output Voltage [V]			Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]	-20	36.039	36.039	36.039	-10	36.068	36.068	36.068	0	36.096	36.096	36.095	10	36.115	36.115	36.115	20	36.135	36.135	36.135	25	36.141	36.140	36.140	35	36.157	36.156	36.156	45	36.170	36.170	36.169	55	36.180	36.179	36.178	65	36.192	36.192	36.191	--	-	-	-
Ambient Temperature [°C]	Output Voltage [V]																																																					
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]																																																			
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0	36.096	36.096	36.095																																																			
10	36.115	36.115	36.115																																																			
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45	36.170	36.170	36.169																																																			
55	36.180	36.179	36.178																																																			
65	36.192	36.192	36.191																																																			
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Model		PLA150F-36	Testing Circuitry Figure A
Item		Output Voltage Accuracy	
Object		+36V4.2A	

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 : 1.26 - 4.2A

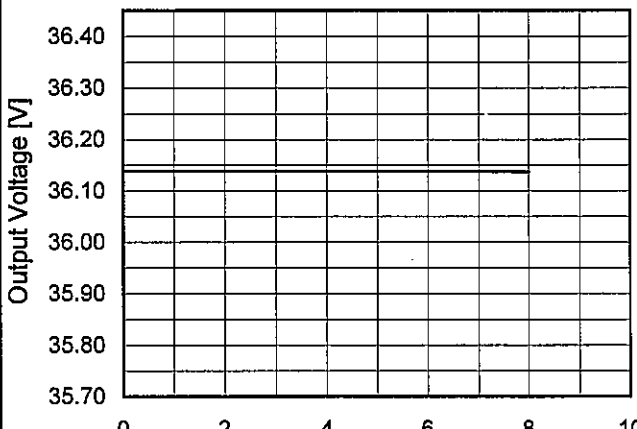
* Output Voltage Accuracy = $\pm(\text{Maximum of Output Voltage} - \text{Minimum of Output Voltage}) / 2$

* 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	45	115	1.26	36.180	±56	±0.2
Minimum Voltage	-10	264	4.2	36.068		

COSEL

Model	PLA150F-36																								
Item	Time Lapse Drift	Temperature	25°C																						
		Testing Circuitry	Figure A																						
Object	+36V4.2A																								
1.Graph		2.Values																							
<div><p>Output Voltage [V]</p><p>Time [H]</p><p>Input Volt. 230V</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>36.140</td></tr><tr><td>0.5</td><td>36.139</td></tr><tr><td>1.0</td><td>36.139</td></tr><tr><td>2.0</td><td>36.138</td></tr><tr><td>3.0</td><td>36.138</td></tr><tr><td>4.0</td><td>36.138</td></tr><tr><td>5.0</td><td>36.138</td></tr><tr><td>6.0</td><td>36.138</td></tr><tr><td>7.0</td><td>36.138</td></tr><tr><td>8.0</td><td>36.137</td></tr></table>		Time since start [H]	Output Voltage [V]	0.0	36.140	0.5	36.139	1.0	36.139	2.0	36.138	3.0	36.138	4.0	36.138	5.0	36.138	6.0	36.138	7.0	36.138	8.0	36.137
Time since start [H]	Output Voltage [V]																								
0.0	36.140																								
0.5	36.139																								
1.0	36.139																								
2.0	36.138																								
3.0	36.138																								
4.0	36.138																								
5.0	36.138																								
6.0	36.138																								
7.0	36.138																								
8.0	36.137																								
* The characteristic of AC115V is equal.																									

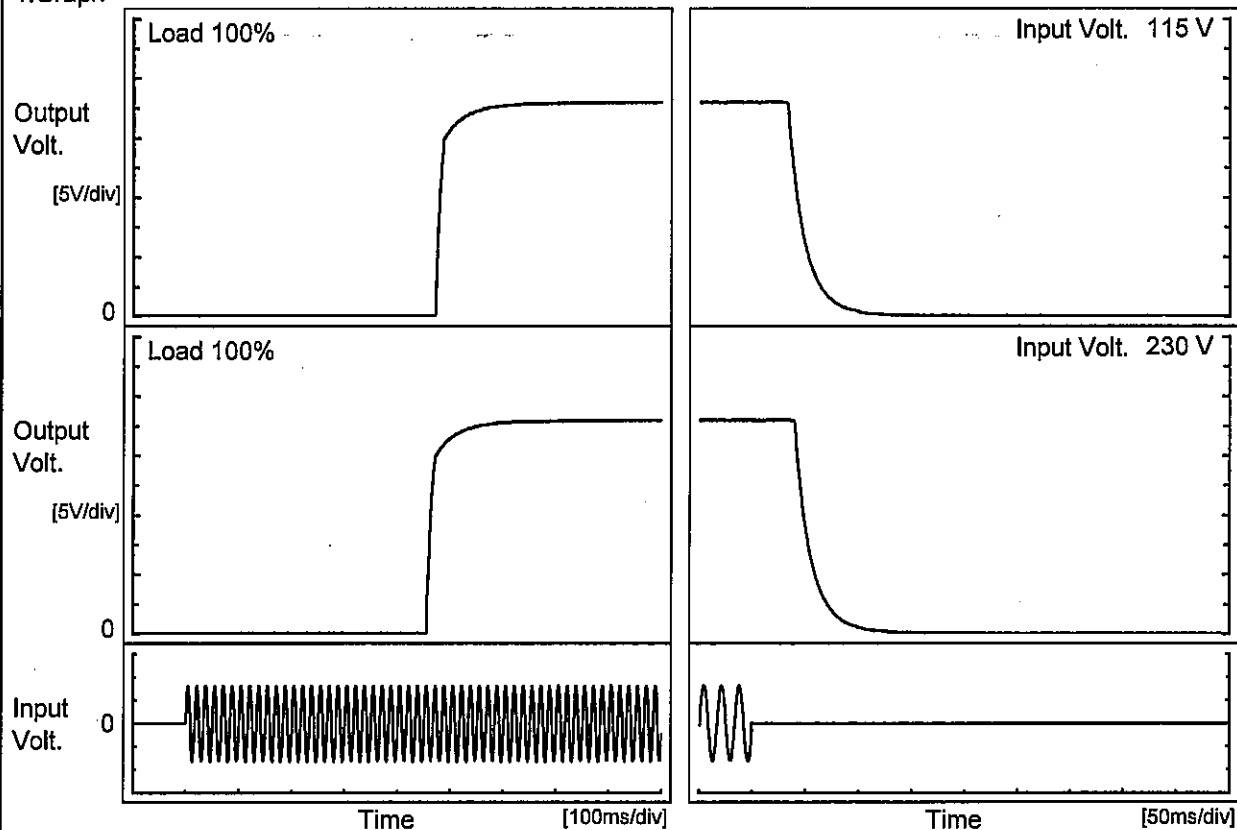
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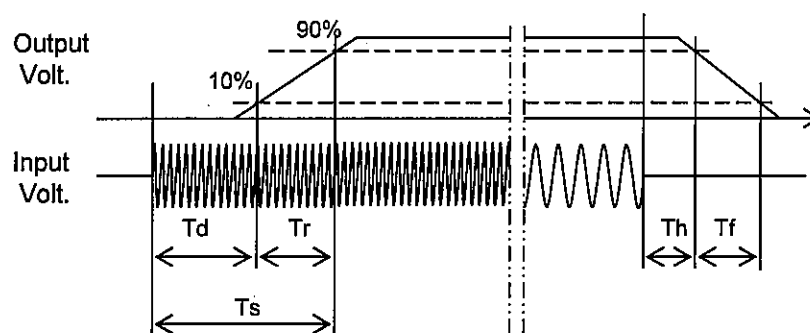
Model	PLA150F-36	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+15V40A		

1.Graph



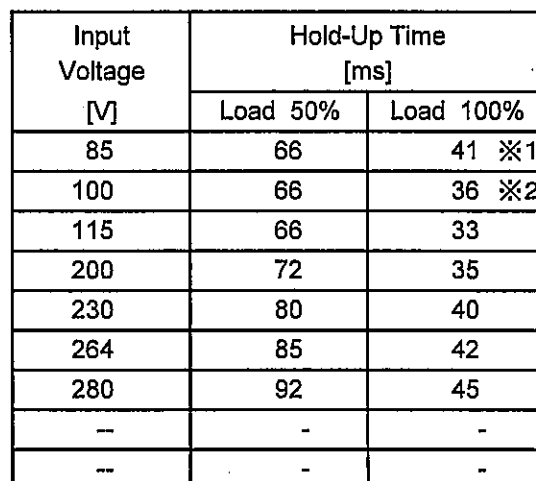
2.Values

Input Volt.	Time	Td	Tr	Ts	Th	Tf
115 V		471.0	39.0	510.0	47.3	38.3
230 V		455.5	37.0	492.5	54.3	37.5



Temperature 25°C
Testing Circuitry Figure A

2.Values



※2: Load 90%

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Model		PLA150F-36		Temperature		25°C																																																				
Item		Instantaneous Interruption Compensation		Testing Circuitry		Figure A																																																				
Object		+36V4.2A																																																								
1.Graph				2.Values																																																						
<div><div><div>—△—</div><div>Input Volt.</div><div>100V</div></div><div><div>---□---</div><div>Input Volt.</div><div>115V</div></div><div><div>---○---</div><div>Input Volt.</div><div>230V</div></div></div> <p>Instantaneous Compensation Time [ms]</p> <p>Load Current [A]</p> <p>Note: Slanted line shows the range of the rated load current.</p>				<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. 115[V]</th><th>Input Volt. 230[V]</th></tr><tr><td>0.00</td><td>-</td><td>-</td><td>-</td></tr><tr><td>0.60</td><td>222</td><td>222</td><td>271</td></tr><tr><td>1.20</td><td>113</td><td>114</td><td>140</td></tr><tr><td>1.80</td><td>76</td><td>79</td><td>96</td></tr><tr><td>2.40</td><td>56</td><td>56</td><td>72</td></tr><tr><td>3.00</td><td>47</td><td>47</td><td>56</td></tr><tr><td>3.80</td><td>37</td><td>37</td><td>45</td></tr><tr><td>4.20</td><td>31</td><td>31</td><td>40</td></tr><tr><td>4.62</td><td>-</td><td>27</td><td>34</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. 115[V]	Input Volt. 230[V]	0.00	-	-	-	0.60	222	222	271	1.20	113	114	140	1.80	76	79	96	2.40	56	56	72	3.00	47	47	56	3.80	37	37	45	4.20	31	31	40	4.62	-	27	34	--	-	-	-	--	-	-	-
Load Current [A]	Time [ms]																																																									
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]																																																							
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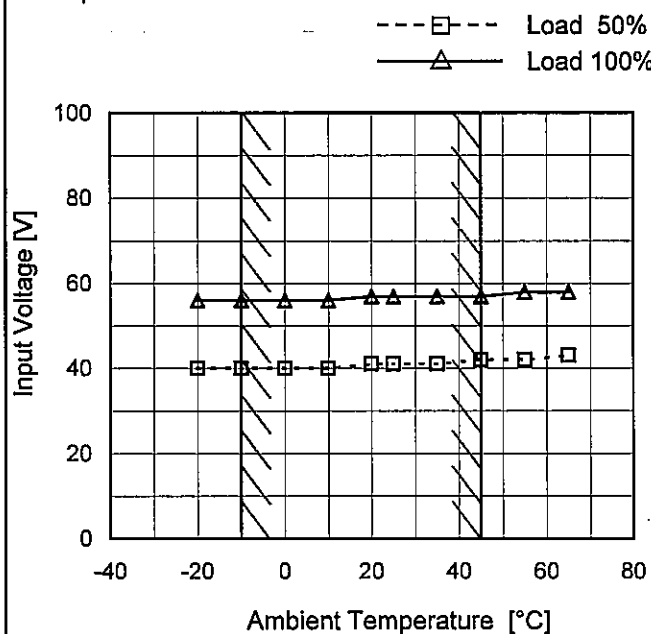
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Model	PLA150F-36
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+36V4.2A

1.Graph



Testing Circuitry Figure A

2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	40	56
-10	40	56
0	40	56
10	40	56
20	41	57
25	41	57
35	41	57
45	42	57
55	42	58
65	43	58
--	-	-

Model	PLA150F-36																																														
Item	Overcurrent Protection	Temperature	25°C																																												
Object	+36V4.2A	Testing Circuitry	Figure A																																												
1.Graph		2.Values																																													
<div><div><div></div>Input Volt. 115V</div><div><div></div>Input Volt. 230V</div></div> <p>Note: Slanted line shows the range of the rated load current.</p>		<table><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><tr><td>34.2</td><td>4.80</td><td>4.94</td></tr><tr><td>32.4</td><td>4.74</td><td>4.86</td></tr><tr><td>28.8</td><td>4.99</td><td>5.14</td></tr><tr><td>25.2</td><td>5.14</td><td>5.30</td></tr><tr><td>21.6</td><td>5.29</td><td>5.46</td></tr><tr><td>18.0</td><td>5.48</td><td>5.63</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></table>		Output Voltage [V]	— Load Current [A]		Input Volt. 115[V]	Input Volt. 230[V]	34.2	4.80	4.94	32.4	4.74	4.86	28.8	4.99	5.14	25.2	5.14	5.30	21.6	5.29	5.46	18.0	5.48	5.63	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-
Output Voltage [V]	— Load Current [A]																																														
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COSEL

LOREL

Model	PLA150F-36
Item	Overvoltage Protection
Object	+36V4.2A

1.Graph

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

Operating Point [V]

Ambient Temperature [°C]

Load 0%

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

Testing Circuitry Figure A .

2.Values

Ambient Temperature [°C]	Operating Point [V]	
	Input Volt. 115[V]	Input Volt. 230[V]
-20	44.49	44.49
-10	44.66	44.66
0	45.07	45.07
10	45.36	45.36
20	45.65	45.65
25	45.88	45.88
35	46.24	46.24
45	46.59	46.59
55	46.94	46.94
65	47.29	47.29
--	-	-

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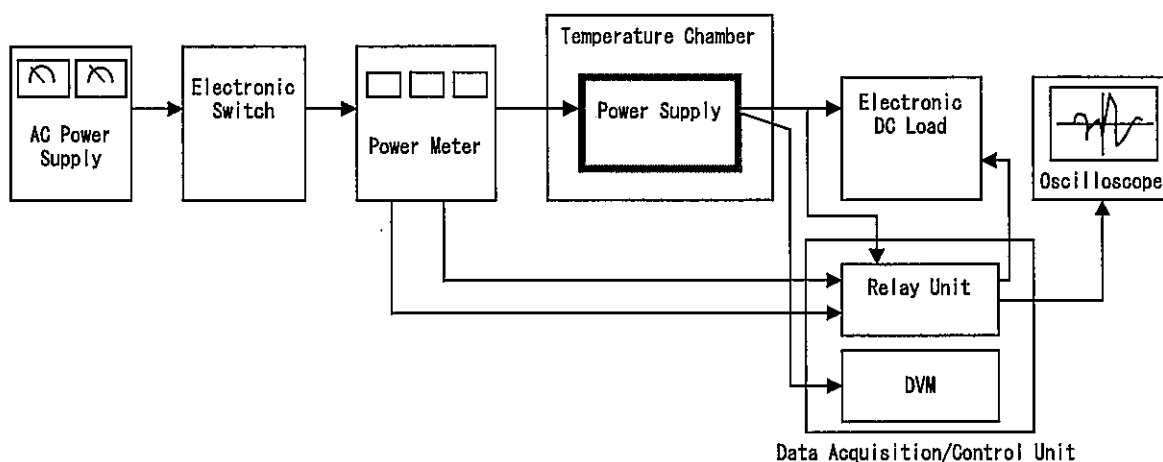


Figure A

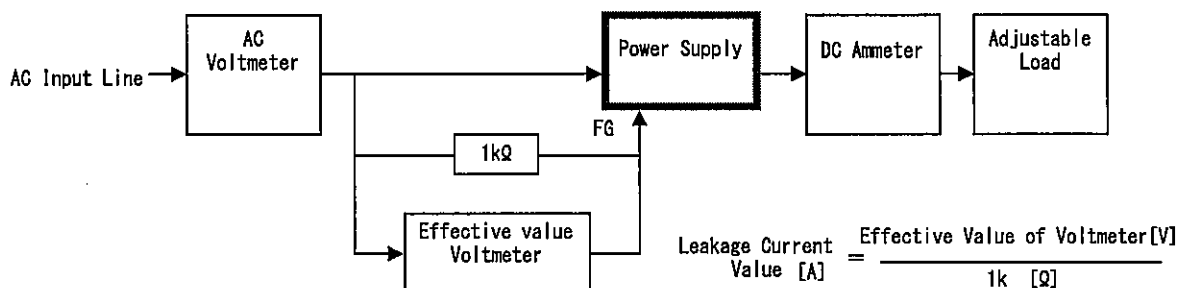


Figure B (DEN-AN)

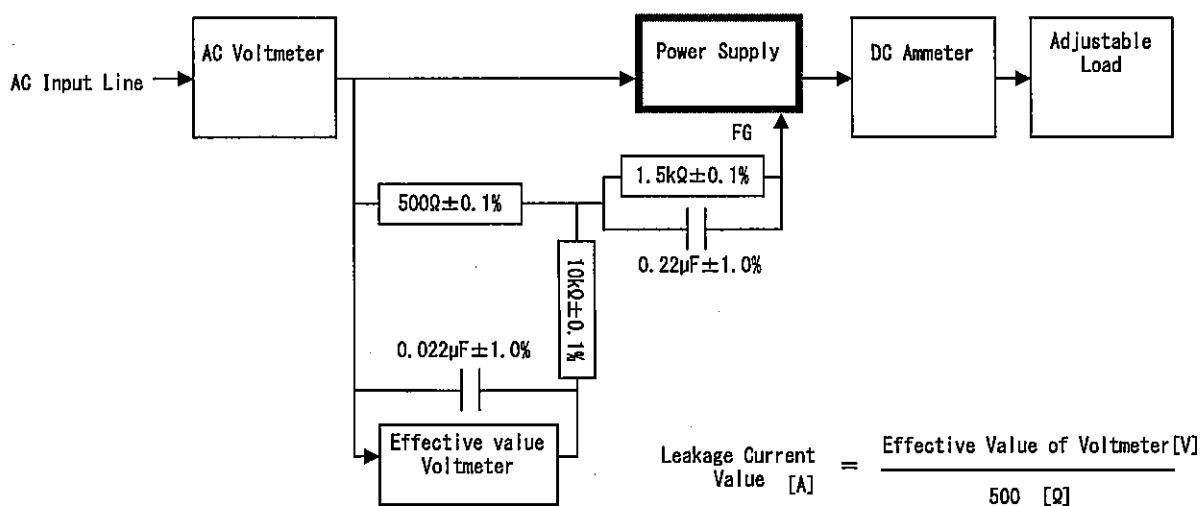


Figure B (IEC60950-1)

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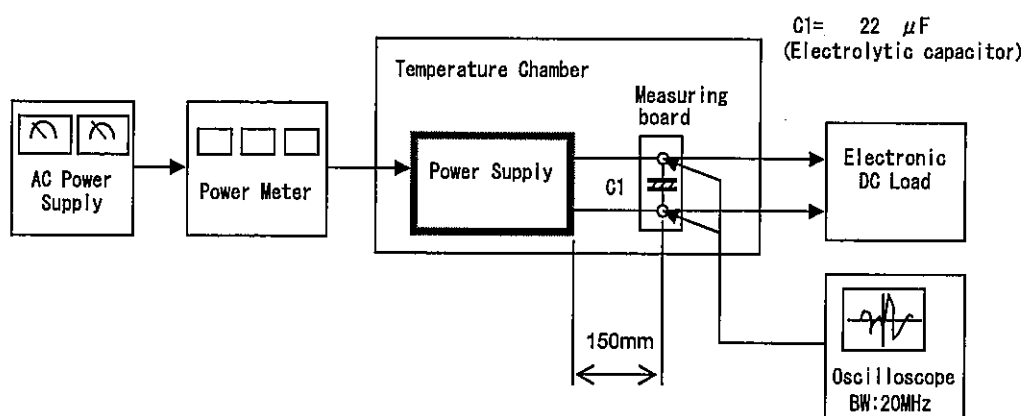


Figure C