

TEST DATA OF PLA600F-24

Regulated DC Power Supply
August 19, 2011

Approved by : Katsumi Ishikawa Design Manager

Prepared by : Shintaro Oki Design Engineer

COSEL CO.,LTD.

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Model		PLA600F-24		Temperature Testing Circuitry	25°C Figure A																																																			
Item		Input Current (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>Input Current [A]</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">Input Current [A]</th></tr><tr><th>Input Volt. 100[V]</th><th>Input Volt. 115[V]</th><th>Input Volt. 230[V]</th></tr><tr><td>0.0</td><td>0.172</td><td>0.177</td><td>0.290</td></tr><tr><td>4.0</td><td>1.488</td><td>1.300</td><td>0.742</td></tr><tr><td>8.0</td><td>2.558</td><td>2.236</td><td>1.194</td></tr><tr><td>12.0</td><td>3.638</td><td>3.166</td><td>1.656</td></tr><tr><td>16.0</td><td>4.750</td><td>4.120</td><td>2.114</td></tr><tr><td>20.0</td><td>5.870</td><td>5.080</td><td>2.576</td></tr><tr><td>24.0</td><td>7.030</td><td>6.060</td><td>3.048</td></tr><tr><td>25.0</td><td>7.310</td><td>6.310</td><td>3.164</td></tr><tr><td>27.5</td><td>-</td><td>6.930</td><td>3.458</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]	Input Current [A]			Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]	0.0	0.172	0.177	0.290	4.0	1.488	1.300	0.742	8.0	2.558	2.236	1.194	12.0	3.638	3.166	1.656	16.0	4.750	4.120	2.114	20.0	5.870	5.080	2.576	24.0	7.030	6.060	3.048	25.0	7.310	6.310	3.164	27.5	-	6.930	3.458	--	-	-	-	--	-	-	-
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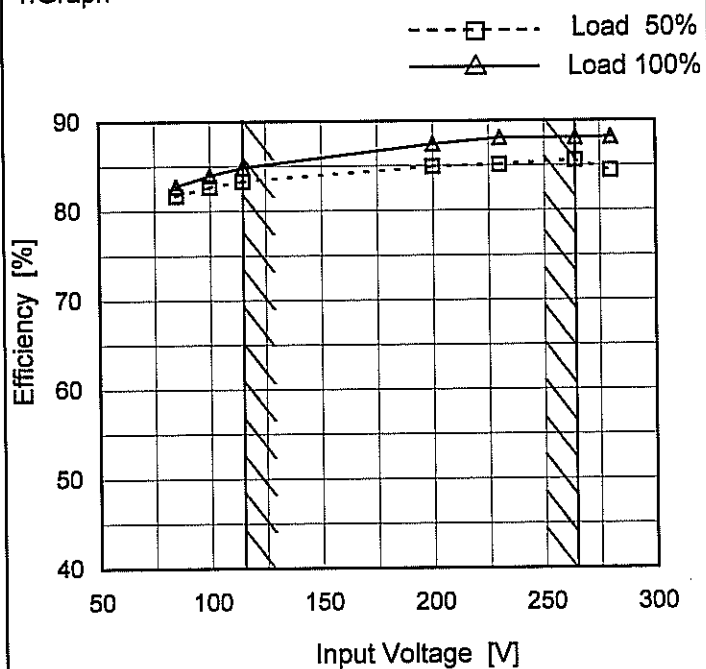
Model PLA600F-24

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%
85	81.7	82.8 ※1
100	82.7	84.0 ※2
115	83.3	84.9
200	84.9	87.4
230	85.1	88.1
264	85.6	88.1
280	84.4	88.2
--	-	-
--	-	-

※1: Load 80%

※2: Load 90%

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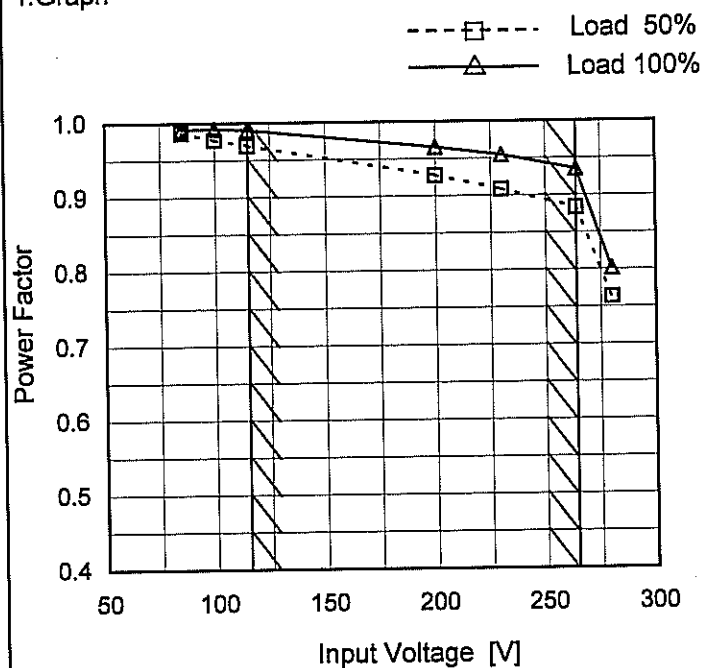
Model PLA600F-24

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	0.987	0.992 ※1
100	0.977	0.992 ※2
115	0.969	0.990
200	0.928	0.965
230	0.909	0.955
264	0.883	0.935
280	0.763	0.802
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--	-	-

※1: Load 80%

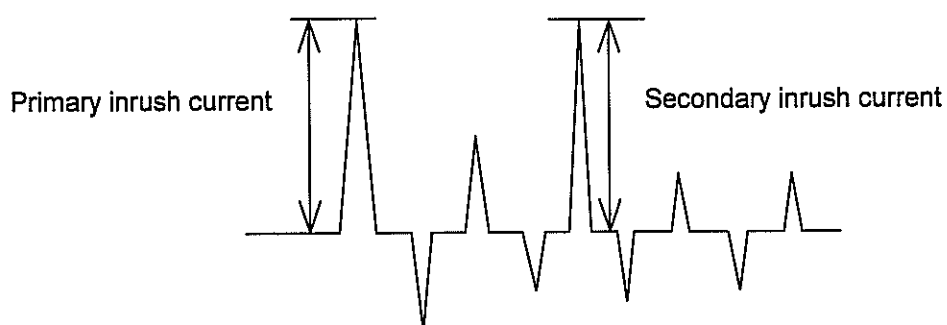
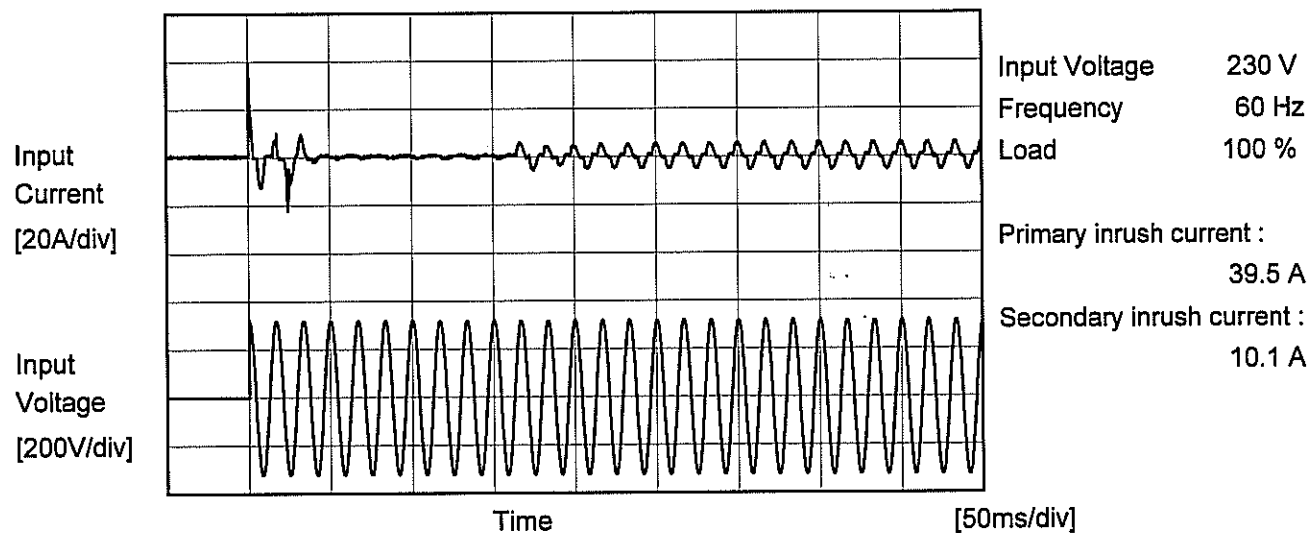
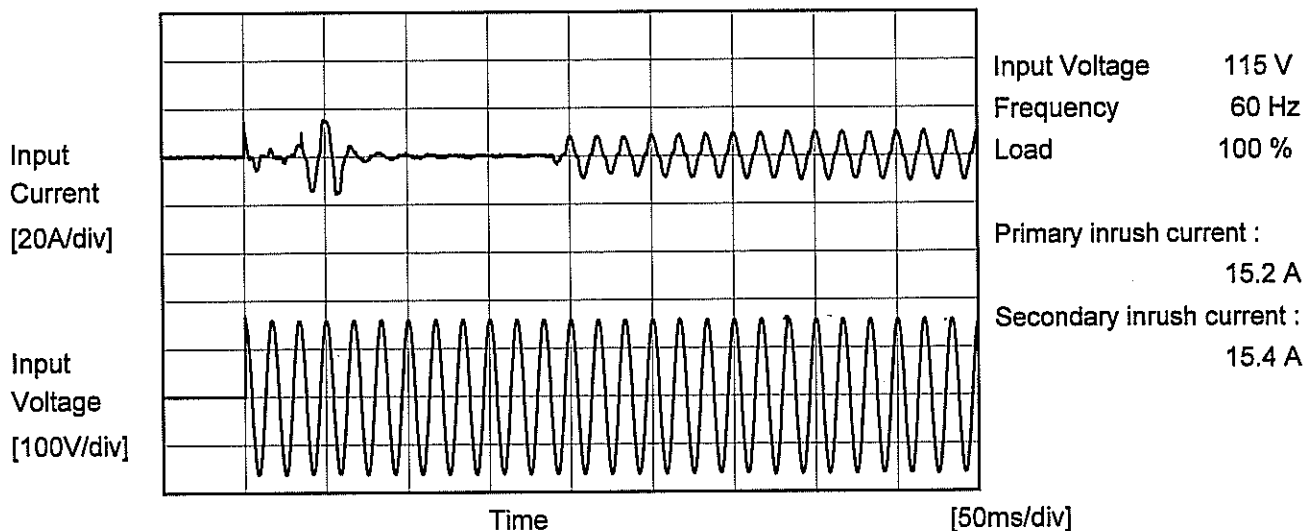
※2: Load 90%

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Model	PLA600F-24	Temperature	25°C
Item	Inrush Current	Testing Circuitry	Figure A
Object			



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		Temperature 25°C Testing Circuitry Figure B
Model	PLA600F-24	
Item	Leakage Current	
Object	_____	

1.Results

[mA]

Standards		Input Volt.			Note
		100 [V]	115 [V]	240 [V]	
DEN-AN	Both phases	0.31	0.33	0.66	Operation
	One of phases	0.43	0.51	1.10	Stand by
IEC60950-1	Both phases	0.25	0.29	0.64	Operation
	One of phases	0.44	0.50	1.10	Stand by

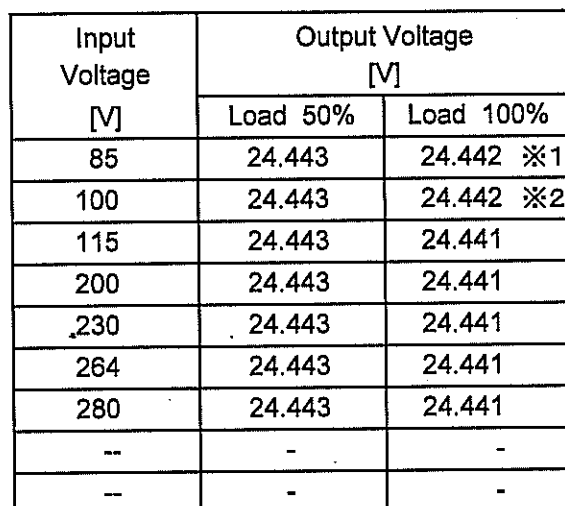
The value for "One of phases" is the reference value only.

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%

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

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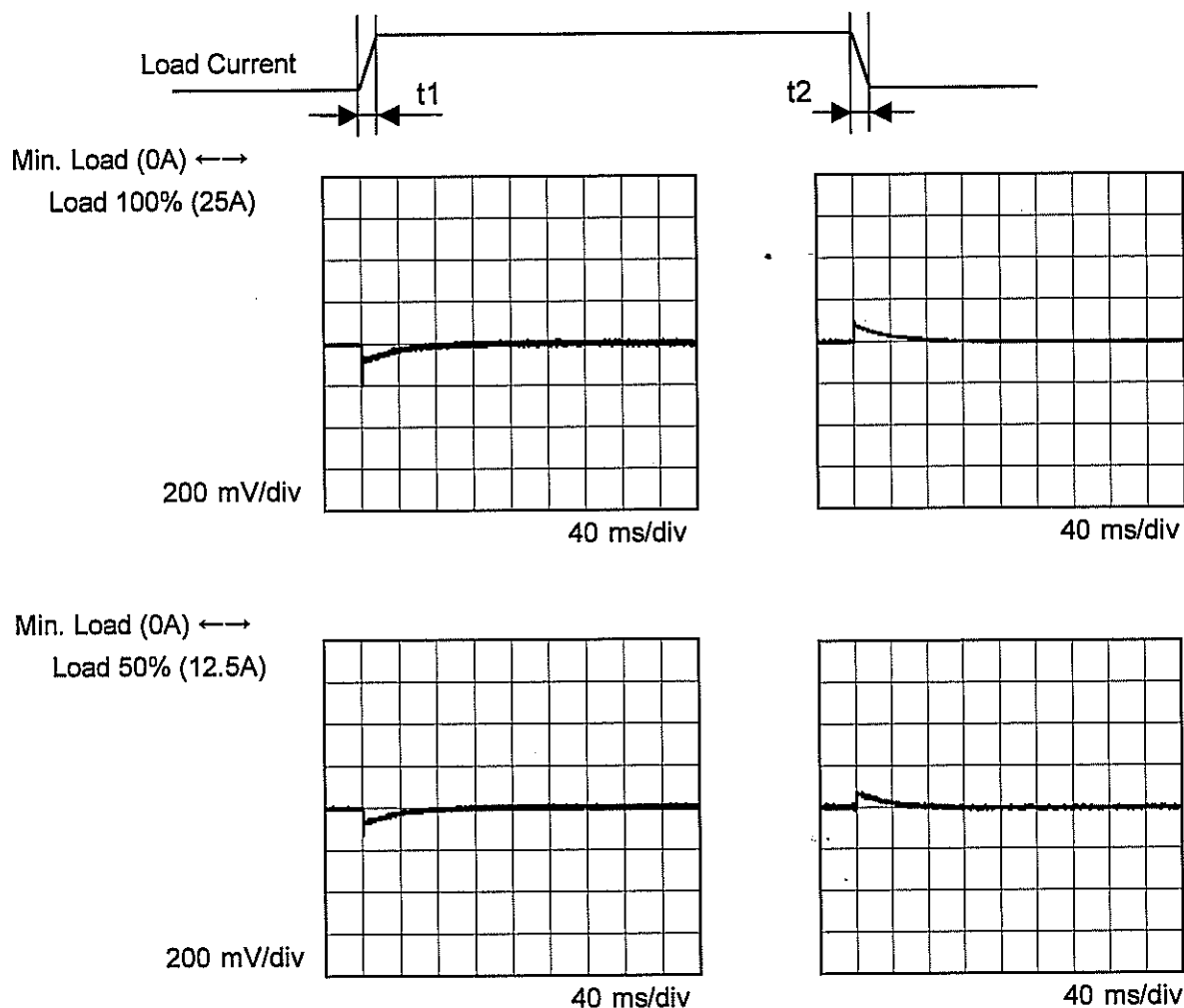
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Item	Dynamic Load Response		
Object	+24V25A		

Input Volt. 115 V
Cycle 1000 ms

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



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Model		PLA600F-24		Temperature 25°C																																							
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Load Current [A]	Ripple Voltage [mV]																																										
	Input Volt. 115 [V]	Input Volt. 230 [V]																																									
0.0	35	35																																									
4.0	15	15																																									
8.0	15	15																																									
12.0	15	15																																									
16.0	20	20																																									
20.0	20	20																																									
24.0	25	25																																									
25.0	25	25																																									
27.5	25	25																																									
—	-	-																																									
--	-	-																																									
<div><div>Measured by 20 MHz Oscilloscope.</div><div>Ripple Voltage is shown as p-p in the figure below.</div><div>Note: Slanted line shows the range of the rated load current.</div></div>																																											
<div><div><div>T1: Due to AC Input Line</div><div>T2: Due to Switching</div></div><div><div>Y-axis: Ripple [mVp-p]</div><div>X-axis: Time</div></div></div>																																											
Fig. Complex Ripple Wave Form																																											

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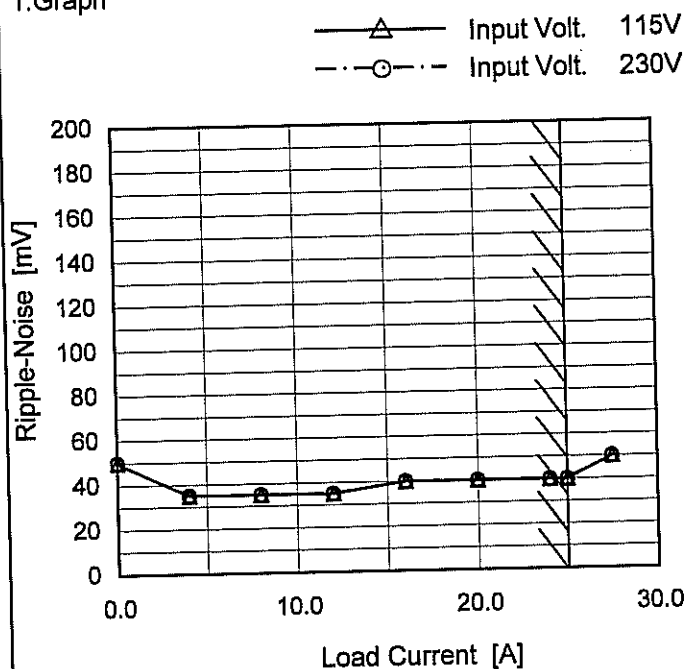
Model PLA600F-24

Item Ripple-Noise

Object +24V25A

Temperature 25°C
Testing Circuitry Figure C

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]
0.0	50	50
4.0	35	35
8.0	35	35
12.0	35	35
16.0	40	40
20.0	40	40
24.0	40	40
25.0	40	40
27.5	50	50
--	-	-
--	-	-

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

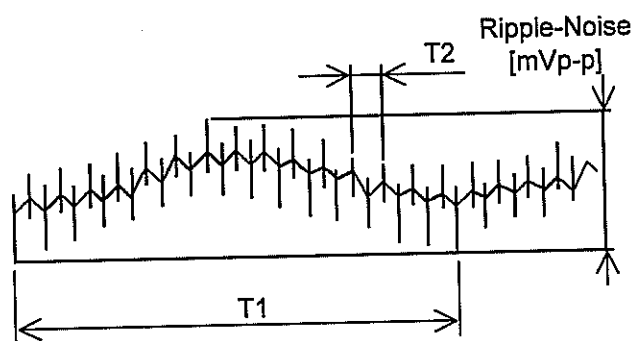


Fig. Complex Ripple Wave Form

COSEL

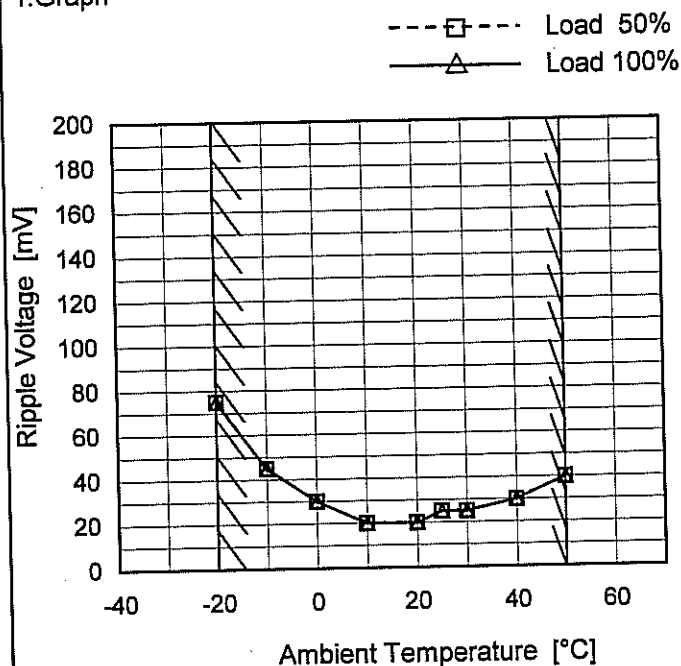
Model PLA600F-24

Item Ripple Voltage (by Ambient Temp.)

Object +24V25A

Testing Circuitry Figure C

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. 115 [V]	Input Volt. 230 [V]
-20	75	75
-10	45	45
0	30	30
10	20	20
20	20	20
25	25	25
30	25	25
40	30	30
50	40	40
--	-	-
--	-	-

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

COSEL

Model PLA600F-24

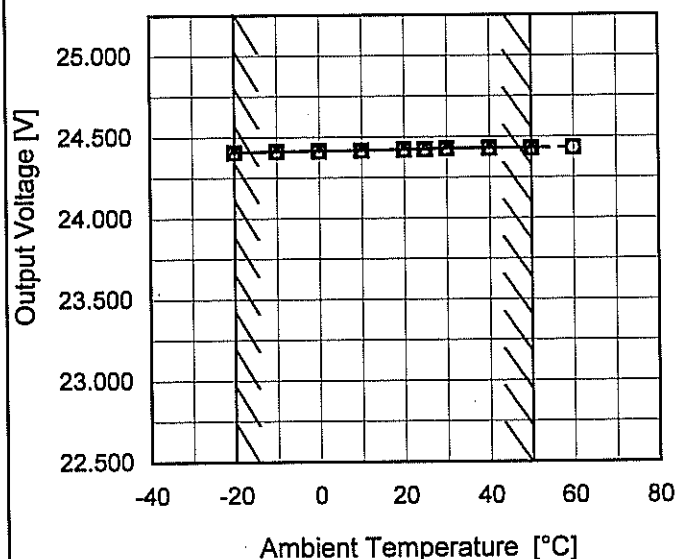
Item Ambient Temperature Drift

Object +24V25A

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	24.408	24.407	24.407
-10	24.412	24.412	24.412
0	24.415	24.415	24.415
10	24.418	24.417	24.417
20	24.422	24.422	24.422
25	24.425	24.424	24.425
30	24.429	24.429	24.429
40	24.431	24.431	24.430
50	24.431	24.430	24.430
60	-	24.431	24.431
--	-	-	-

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

COSEL

Model		PLA600F-24	Testing Circuitry Figure A
Item		Output Voltage Accuracy	
Object		+24V25A	

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 : -20 - 50°C

Input Voltage : 115 - 264V

Load Current : 0 - 25A

* 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	40	115	0	24.437	±15	±0.1
Minimum Voltage	-20	230	25	24.407		

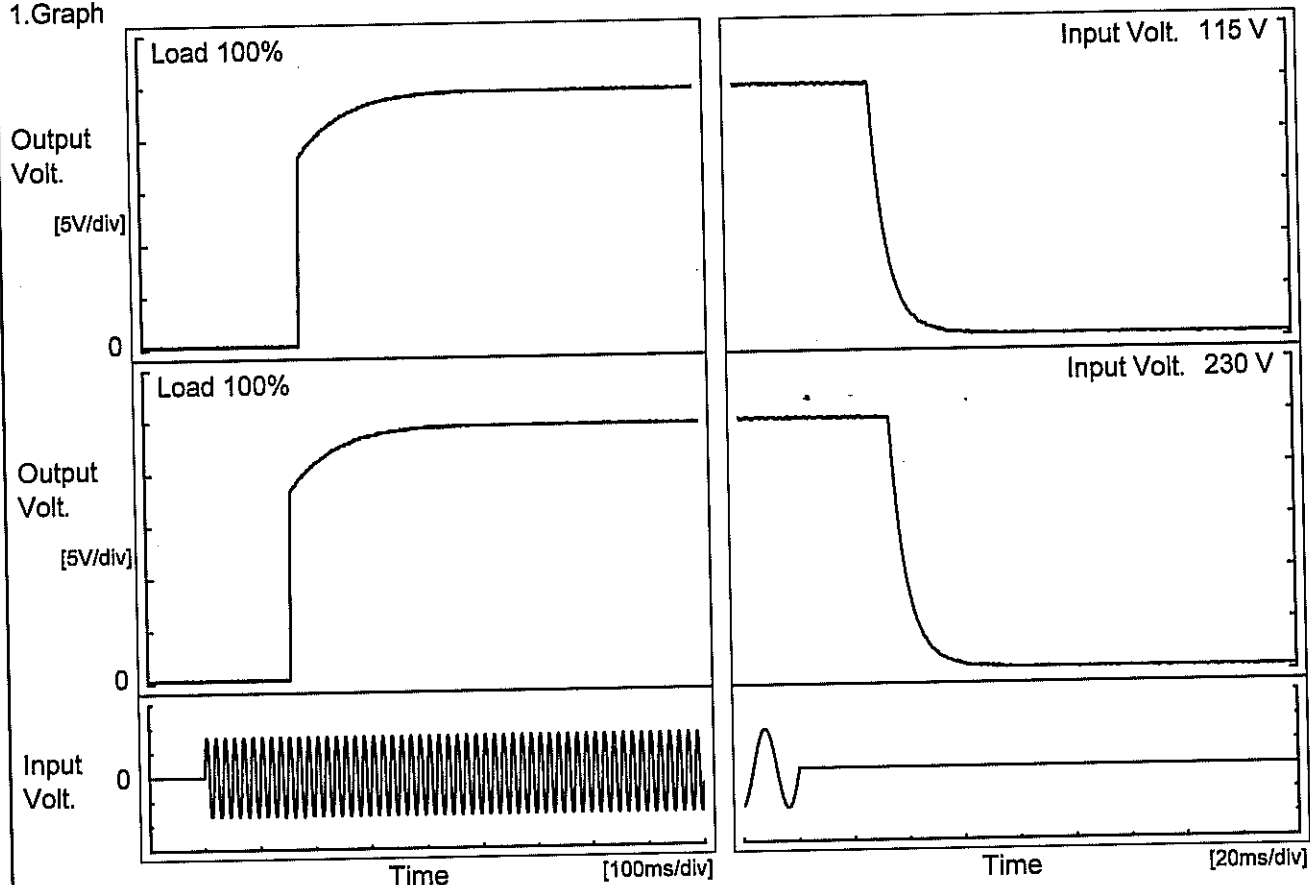
COSEL

COSEL			
Model	PLA600F-24	Temperature 25°C Testing Circuitry Figure A	
Item	Time Lapse Drift		
Object	+24V25A		
1.Graph		2.Values	
<div><div>Output Voltage [V]</div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></di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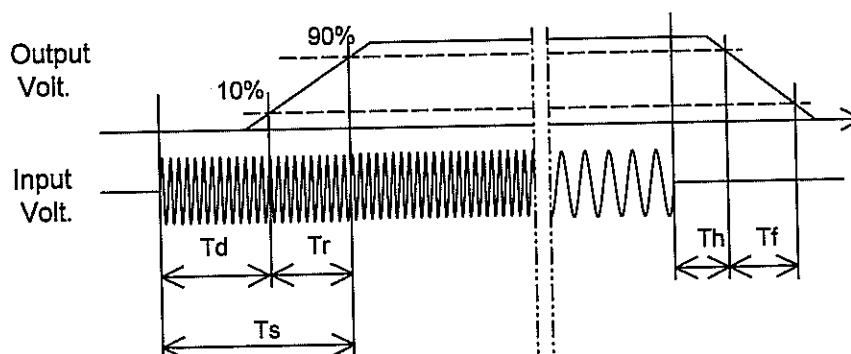
Model	PLA600F-24	Temperature 25°C Testing Circuitry Figure A
Item	Rise and Fall Time	
Object	+24V25A	

1. Graph



2. Values

		[ms]				
Input Volt.	Time	Td	Tr	Ts	Th	Tf
115 V		184.0	69.5	253.5	29.6	13.3
230 V		159.0	69.5	228.5	35.0	13.3



COSEL

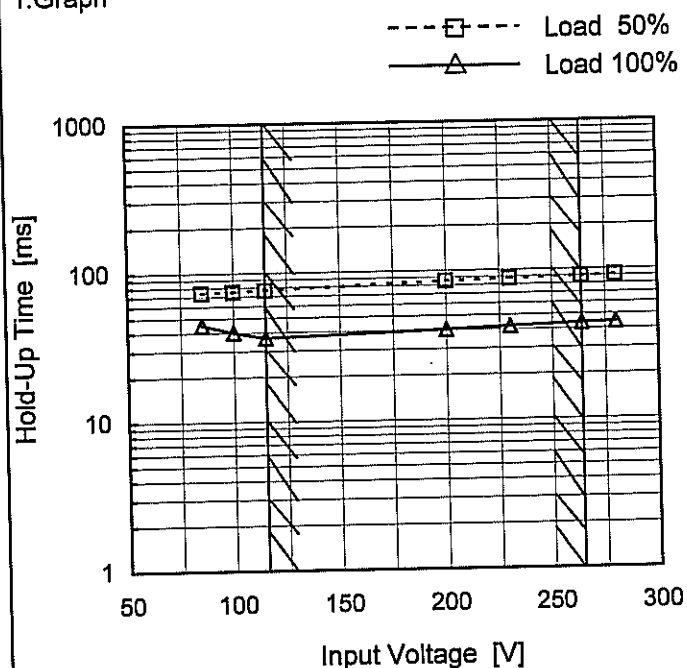
Model PLA600F-24

Item Hold-Up Time

Object +24V25A

Temperature 25°C
Testing Circuitry Figure A

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.

2. Values

Input Voltage [V]	Hold-Up Time [ms]	
	Load 50%	Load 100%
85	74	45 ※1
100	75	40 ※2
115	77	37
200	85	40
230	88	42
264	90	44
280	91	44
--	-	-
--	-	-

※1: Load 80%

※2: Load 90%



Model		PLA600F-24		Temperature 25°C																																																				
Item		Instantaneous Interruption Compensation		Testing Circuitry Figure A																																																				
Object		+24V25A																																																						
1.Graph		<div><div><div>—△—</div><div>Input Volt. 100V</div></div><div><div>---□---</div><div>Input Volt. 115V</div></div><div><div>---○---</div><div>Input Volt. 230V</div></div></div> <div><div>Instantaneous Compensation Time [ms]</div><div><div>10000</div><div>1000</div><div>100</div><div>10</div><div>1</div></div><div><div>0</div><div>10</div><div>20</div><div>30</div></div><div>Load Current [A]</div></div>		2.Values																																																				
		<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>0.0</td><td>-</td><td>-</td><td>-</td></tr><tr><td>4.0</td><td>139</td><td>148</td><td>162</td></tr><tr><td>8.0</td><td>81</td><td>86</td><td>90</td></tr><tr><td>12.0</td><td>62</td><td>64</td><td>72</td></tr><tr><td>16.0</td><td>47</td><td>48</td><td>54</td></tr><tr><td>20.0</td><td>37</td><td>38</td><td>44</td></tr><tr><td>24.0</td><td>30</td><td>30</td><td>36</td></tr><tr><td>25.0</td><td>28</td><td>29</td><td>35</td></tr><tr><td>27.5</td><td>-</td><td>26</td><td>31</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]	0.0	-	-	-	4.0	139	148	162	8.0	81	86	90	12.0	62	64	72	16.0	47	48	54	20.0	37	38	44	24.0	30	30	36	25.0	28	29	35	27.5	-	26	31	--	-	-	-	--	-	-	-
Load Current [A]	Time [ms]																																																							
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]																																																					
0.0	-	-	-																																																					
4.0	139	148	162																																																					
8.0	81	86	90																																																					
12.0	62	64	72																																																					
16.0	47	48	54																																																					
20.0	37	38	44																																																					
24.0	30	30	36																																																					
25.0	28	29	35																																																					
27.5	-	26	31																																																					
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--	-	-	-																																																					
Note: Slanted line shows the range of the rated load current.																																																								

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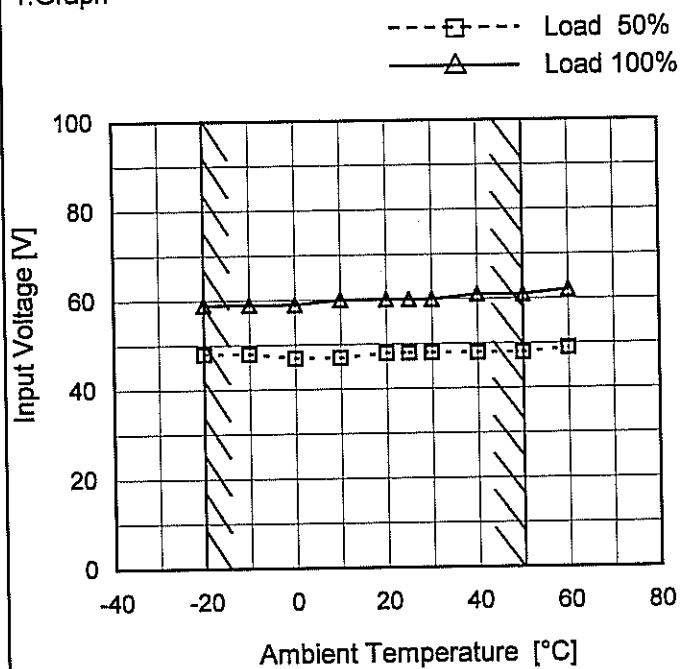
Model PLA600F-24

Item Minimum Input Voltage
for Regulated Output Voltage

Object +24V25A

Testing Circuitry Figure A

1. Graph



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

2. Values

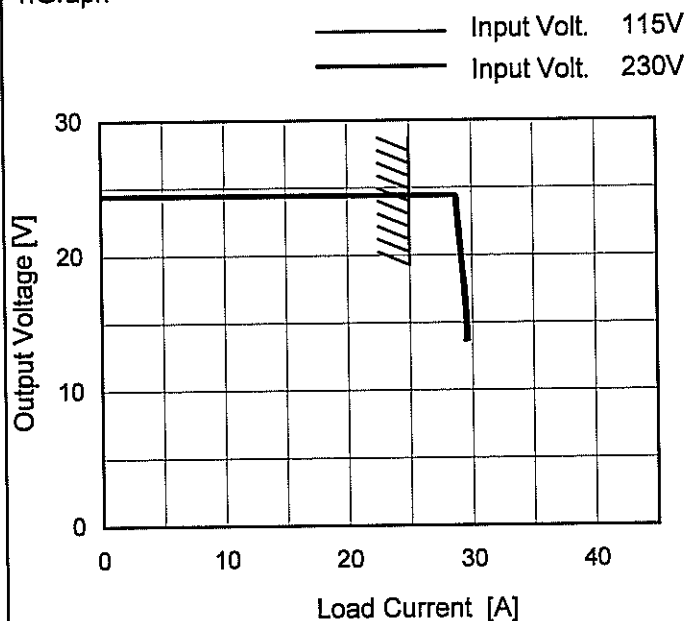
Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	48	59
-10	48	59
0	47	59
10	47	60
20	48	60
25	48	60
30	48	60
40	48	61
50	48	61
60	49	62
--	-	-

COSEL

Model	PLA600F-24
Item	Overcurrent Protection
Object	+24V25A

Temperature 25°C
Testing Circuitry Figure A

1. Graph



2. Values

Output Voltage [V]	Load Current [A]	
	Input Volt. 115[V]	Input Volt. 230[V]
22.8	29.02	28.83
21.6	29.13	28.95
19.2	29.35	29.19
16.8	29.56	29.40
14.4	29.74	29.53
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

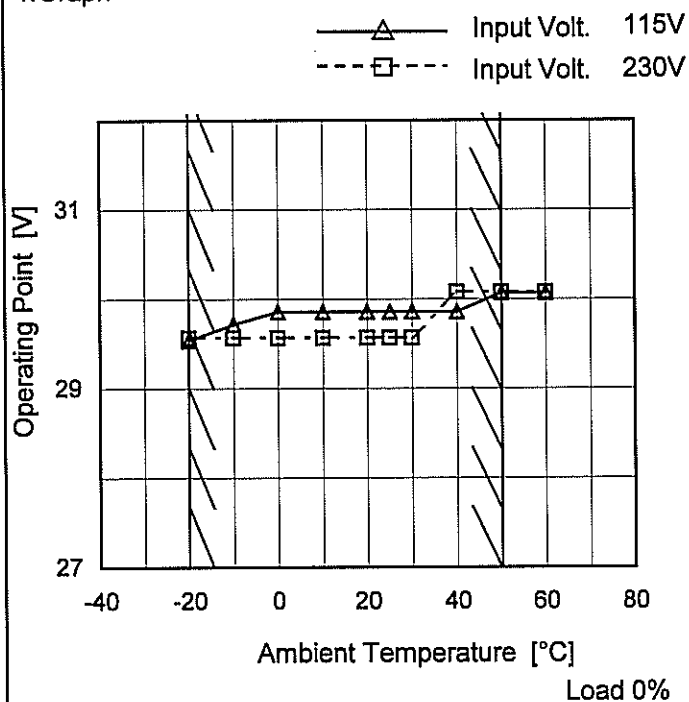
Model PLA600F-24

Item Overvoltage Protection

Object +24V25A

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	29.54	29.57
-10	29.72	29.57
0	29.86	29.57
10	29.86	29.57
20	29.86	29.57
25	29.86	29.57
30	29.86	29.57
40	29.86	30.08
50	30.07	30.08
60	30.07	30.08
—	—	—

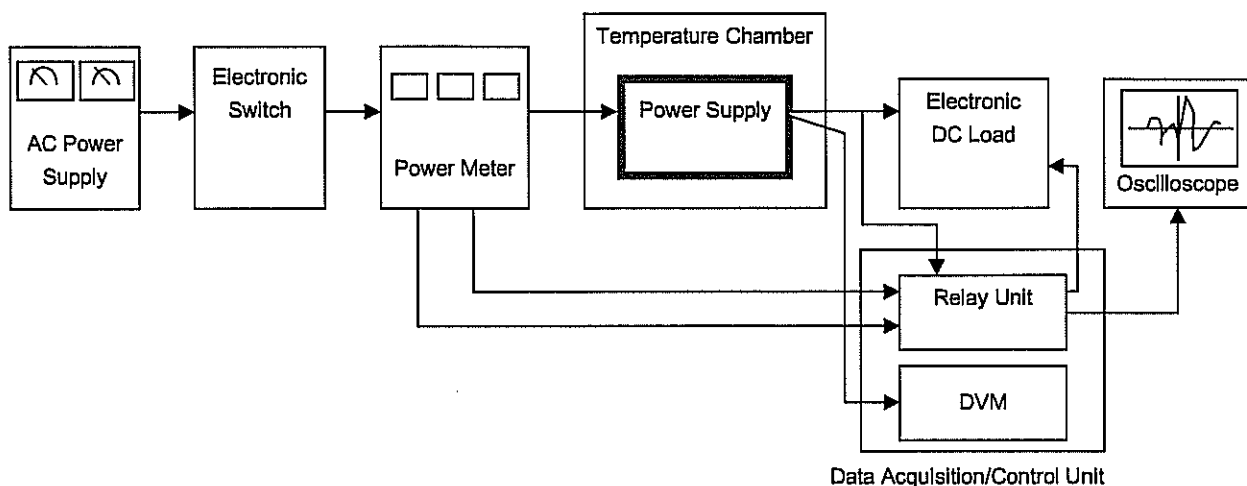


Figure A

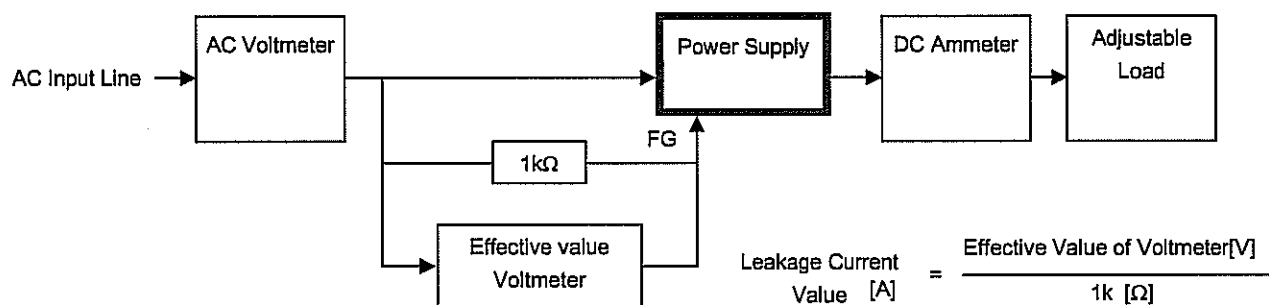


Figure B (DEN-AN)

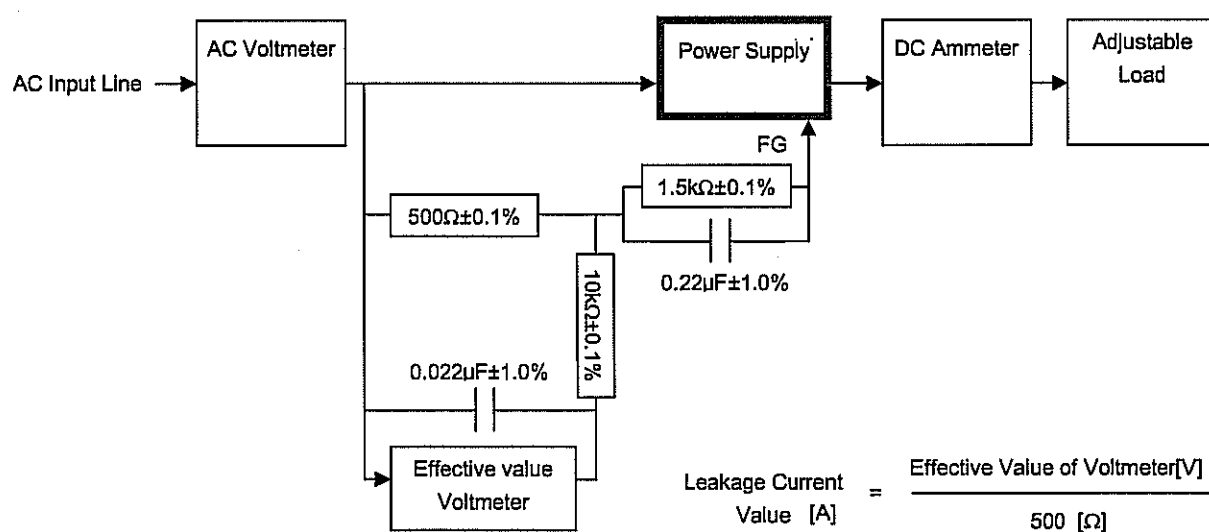


Figure B (IEC60950-1)

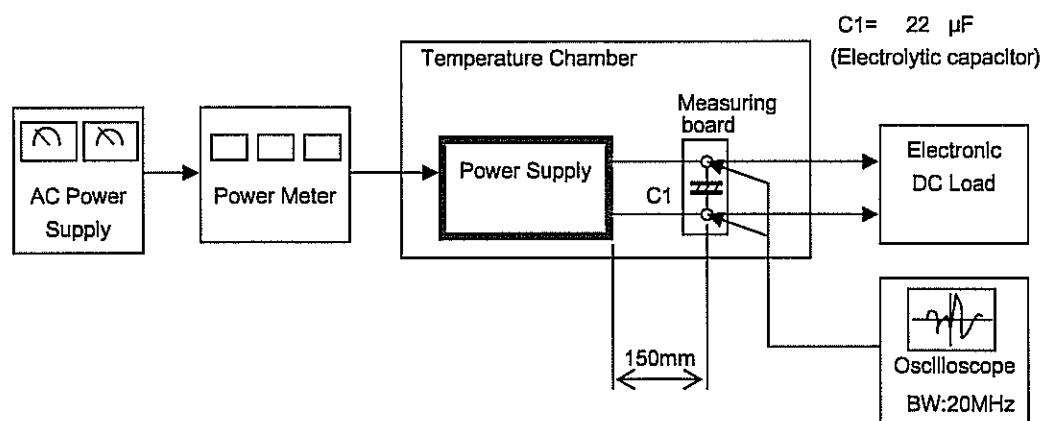


Figure C