

TEST DATA OF WDA60F-12

Regulated DC Power Supply
August 17, 2022

Approved by : Takashi Kajii
Design Manager

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Design Engineer

COSEL CO.,LTD.

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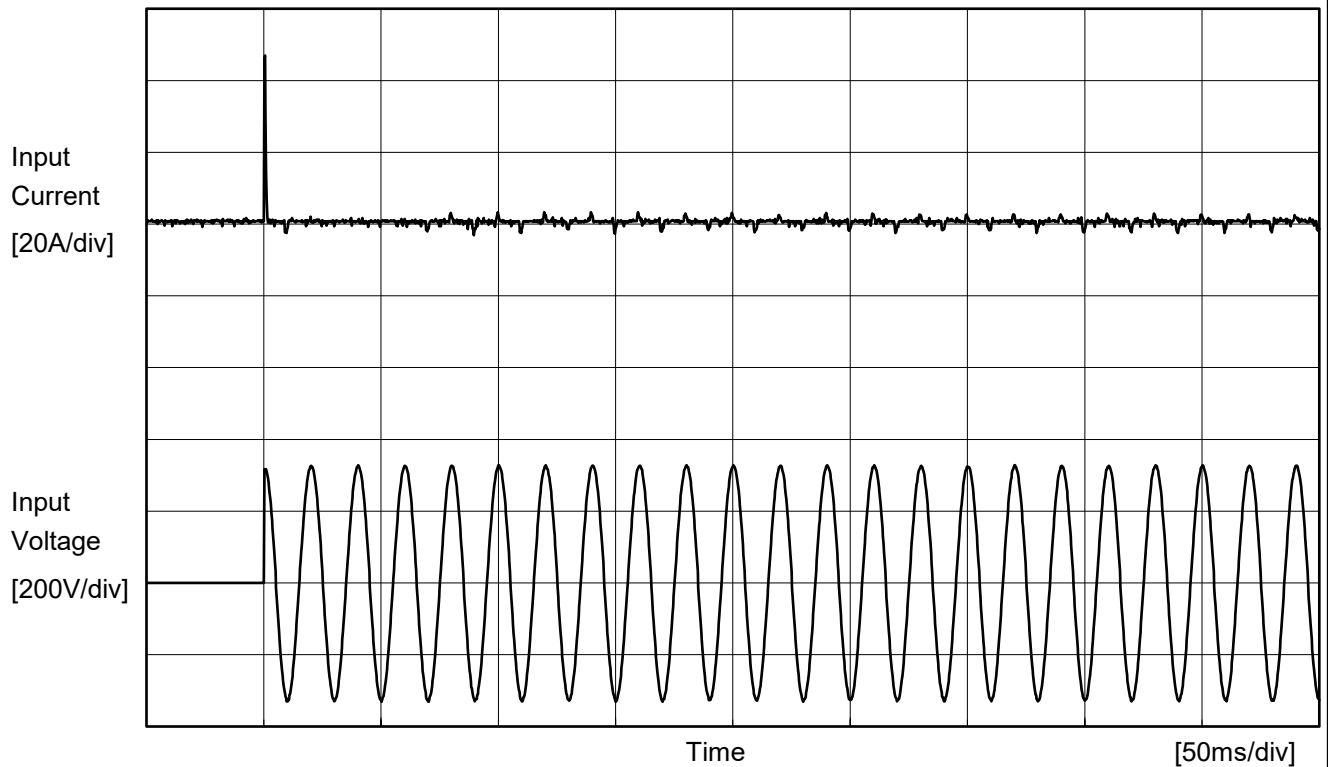
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<div><div>Efficiency [%]</div><div><div>100</div><div>92</div><div>84</div><div>76</div><div>68</div><div>60</div></div><div><div>0</div><div>2</div><div>4</div><div>6</div></div><div>Load Current [A]</div></div>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Efficiency [%]</th></tr><tr><th>Input Volt. 115[V]</th><th>Input Volt. 230[V]</th><th>Input Volt. 264[V]</th></tr><tr><td>0</td><td>-</td><td>-</td><td>-</td></tr><tr><td>1</td><td>85.0</td><td>80.6</td><td>78.3</td></tr><tr><td>2</td><td>86.6</td><td>84.8</td><td>83.3</td></tr><tr><td>3</td><td>86.6</td><td>86.1</td><td>85.0</td></tr><tr><td>4</td><td>86.0</td><td>86.9</td><td>86.3</td></tr><tr><td>5</td><td>85.2</td><td>87.1</td><td>86.6</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><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. 115[V]	Input Volt. 230[V]	Input Volt. 264[V]	0	-	-	-	1	85.0	80.6	78.3	2	86.6	84.8	83.3	3	86.6	86.1	85.0	4	86.0	86.9	86.3	5	85.2	87.1	86.6	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
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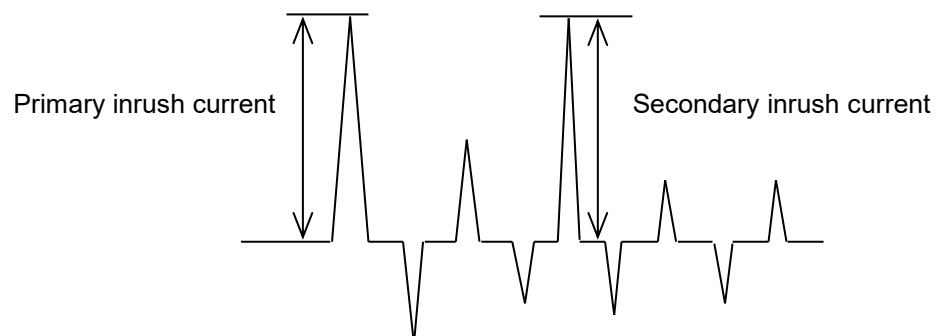
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Model	WDA60F-12	Temperature 25°C Testing Circuitry Figure A	
Item	Inrush Current		
Object	+12V5A		



Input Voltage	230 V
Frequency	50 Hz
Load	100 %

Primary inrush current	46.6 A
Secondary inrush current	0.0 A



		Temperature 25°C Testing Circuitry Figure C
Model	WDA60F-12	
Item	Leakage Current	
Object	+12V5A	

1.Results

[mA]

Standards	Testing Circuitry	Measuring Method	Input Volt.			Note
			115 [V]	240 [V]	264 [V]	
DEN-AN	Figure C-1	Both phases	0.14	0.32	0.35	Operation
		One of phases	0.26	0.58	0.64	Stand by
IEC62368-1	Figure C-2	Both phases	0.14	0.30	0.33	Operation
		One of phases	0.25	0.58	0.60	Stand by
	Figure C-3	Both phases	0.13	0.29	0.33	Operation
		One of phases	0.24	0.54	0.60	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		WDA60F-12	
Item		Line Regulation	
Object		+12V5A	

1.Graph

Load 50%

Load 100%

Output Voltage [V]

Output Voltage [V]

12.80

12.60

12.40

12.20

12.00

11.80

11.60

11.40

50

100

150

200

250

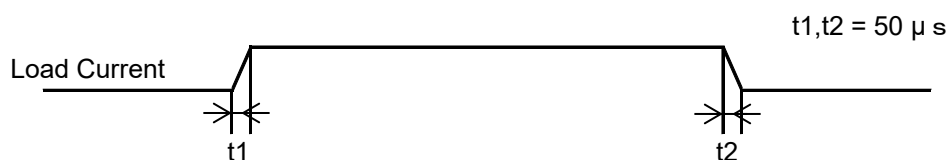
300

Input Voltage [V]

Model	WDA60F-12	Temperature	25°C																																																			
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Model	WDA60F-12	Temperature 25°C Testing Circuitry Figure A
Item	Dynamic Load Response	
Object	+12V5A	

Input Volt. 230 V
Cycle 1000 ms



Min.Load (0A) ←→
Load 100% (5A)

100 mV/div

20 ms/div

20 ms/div

Min.Load (0A) ←→
Load 50% (2.5A)

100 mV/div

20 ms/div

20 ms/div

Load 50% (2.5A) ←→
Load 100% (5A)

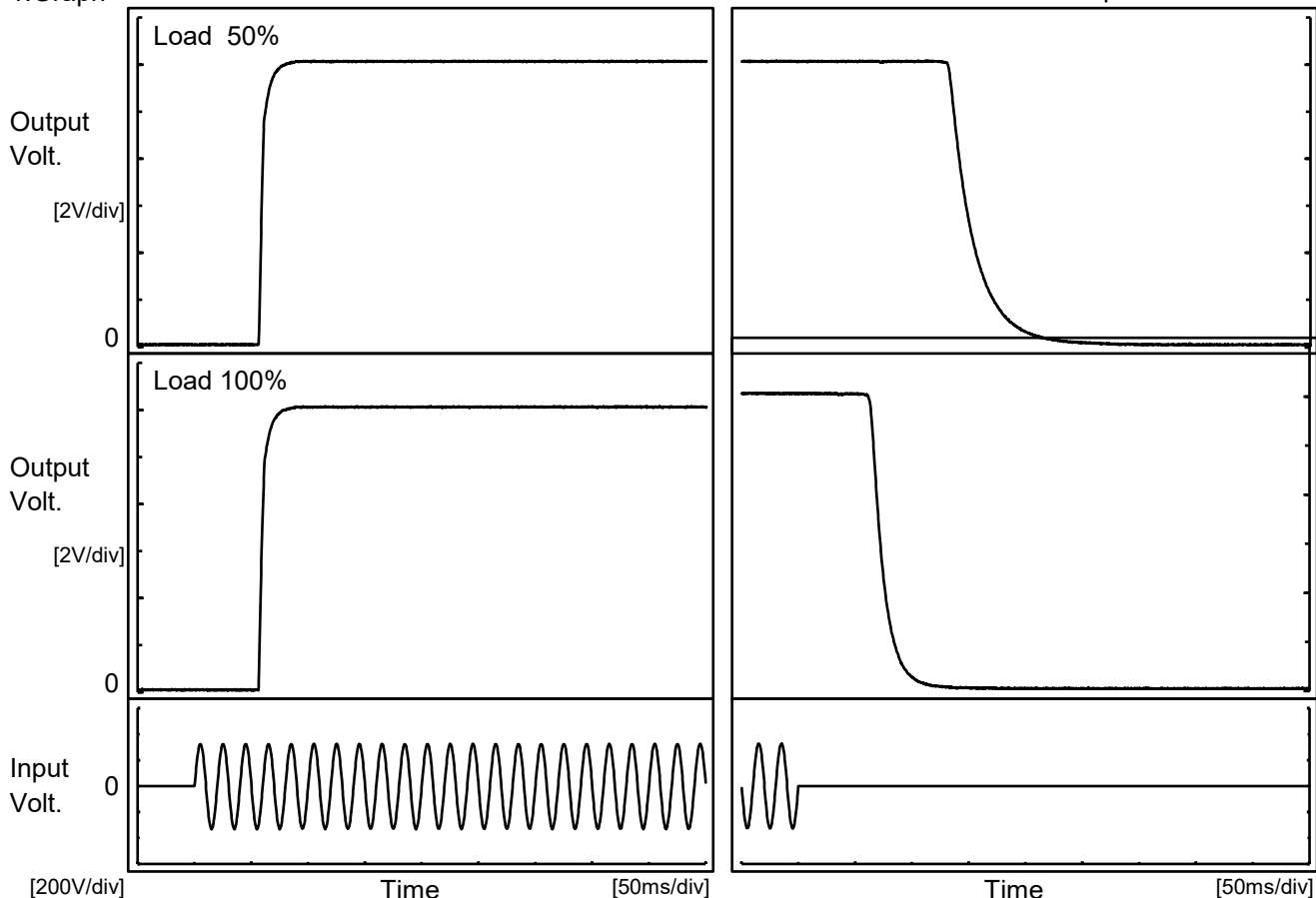
100 mV/div

20 ms/div

20 ms/div

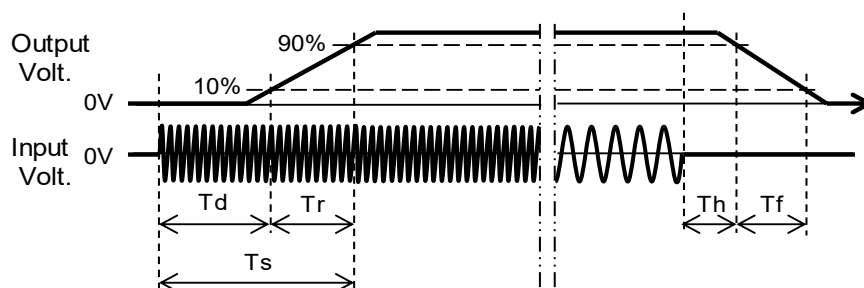
Model	WDA60F-12	Temperature 25°C Testing Circuitry Figure A
Item	Rise and Fall Time	
Object	+12V5A	

1.Graph



2.Values

		[ms]				
Load	Time	Td	Tr	Ts	Th	Tf
50 %		57.3	8.0	65.3	134.5	47.0
100 %		57.0	8.3	65.3	64.8	24.3



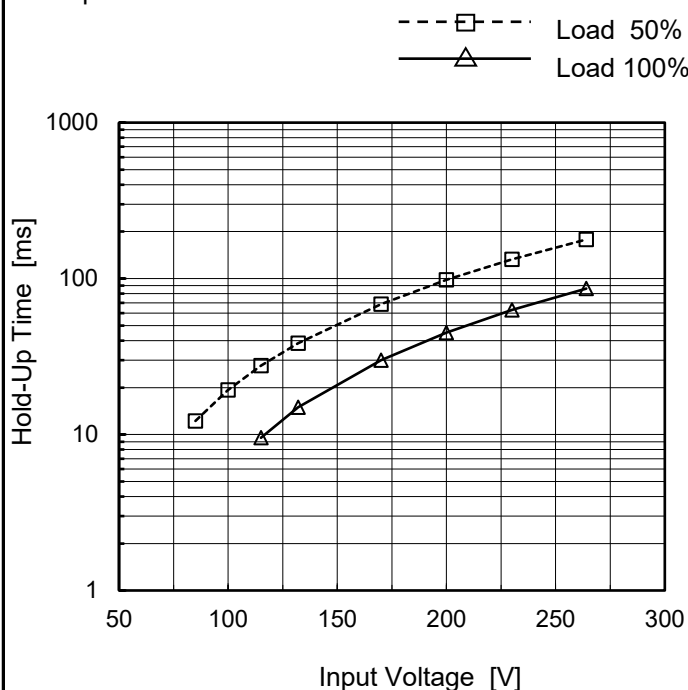
Model WDA60F-12

Item Hold-Up Time

Object +12V5A

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.

2.Values

Input Voltage [V]	Hold-Up Time [ms]	
	Load 50%	Load 100%
85	12	-
100	19	-
115	28	10
132	39	15
170	69	30
200	98	45
230	133	63
264	178	86
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<div><div><div></div><div>Input Volt. 115V</div></div><div><div></div><div>Input Volt. 230V</div></div><div><div></div><div>Input Volt. 264V</div></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="3">Load Current [A]</th></tr><tr><th>Input Volt. 115[V]</th><th>Input Volt. 230[V]</th><th>Input Volt. 264[V]</th></tr><tr><td>12</td><td>6.50</td><td>7.90</td><td>8.31</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><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><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><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><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr></table>		Output Voltage [V]	Load Current [A]			Input Volt. 115[V]	Input Volt. 230[V]	Input Volt. 264[V]	12	6.50	7.90	8.31	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
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		Testing Circuitry Figure A
Model	WDA60F-12	
Item	Ambient Temperature Drift	
Object	+12V5A	

1.Values

Load 100%

Ambient Temperature[°C]	Output Voltage [V]		
	Input Volt. 115V	Input Volt. 230V	Input Volt. 264V
-20	11.970	11.973	11.973
25	12.035	12.038	12.037
40	12.053	12.053	12.051

Item	Minimum Input Voltage for Regulated Output Voltage	Testing Circuitry Figure A
Object	+12V5A	

1.Values

Ambient Temperature[°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	45	81
25	45	79
40	45	79

Item	Overvoltage Protection	Testing Circuitry Figure A
Object	+12V5A	

1.Values

Load 0%

Ambient Temperature[°C]	Operating Point [V]	
	Input Volt. 115V	Input Volt. 264V
-20	15.89	15.89
25	16.26	16.19
40	16.33	16.33

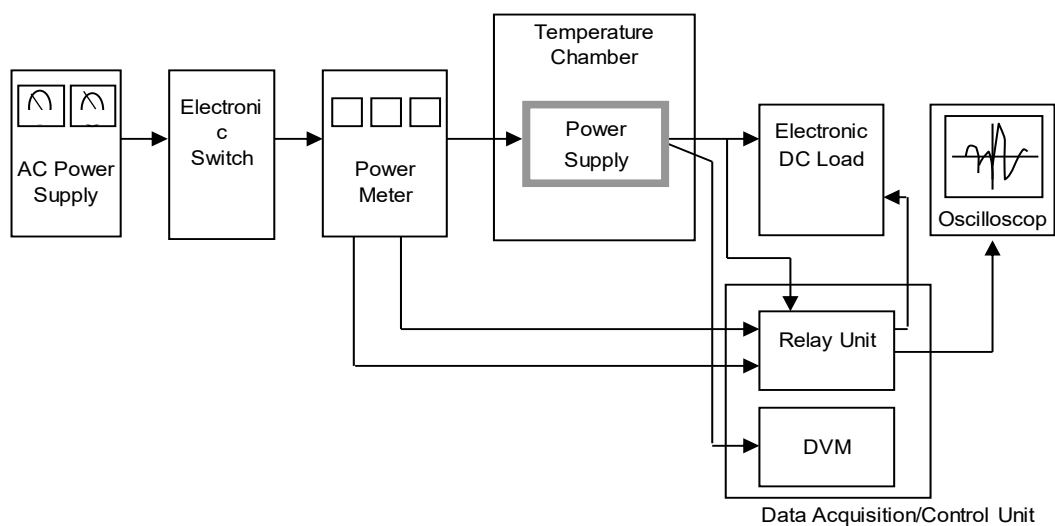
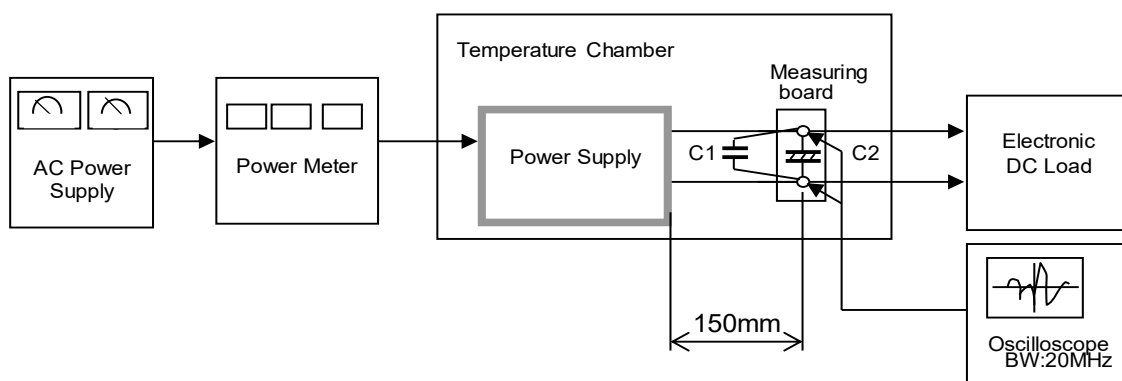


Figure A



$C1 = 0.1 \mu F$
(Ceramic capacitor)

$C2 = 47 \mu F$
(Electrolytic capacitor)

Figure B

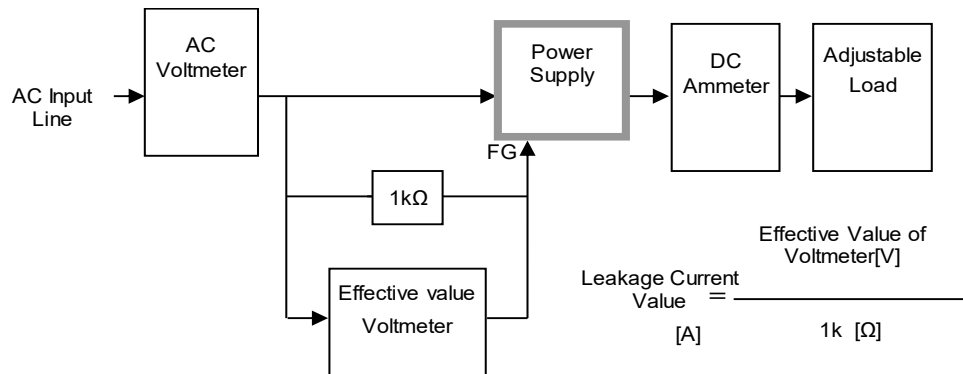


Figure C-1 (DEN-AN)

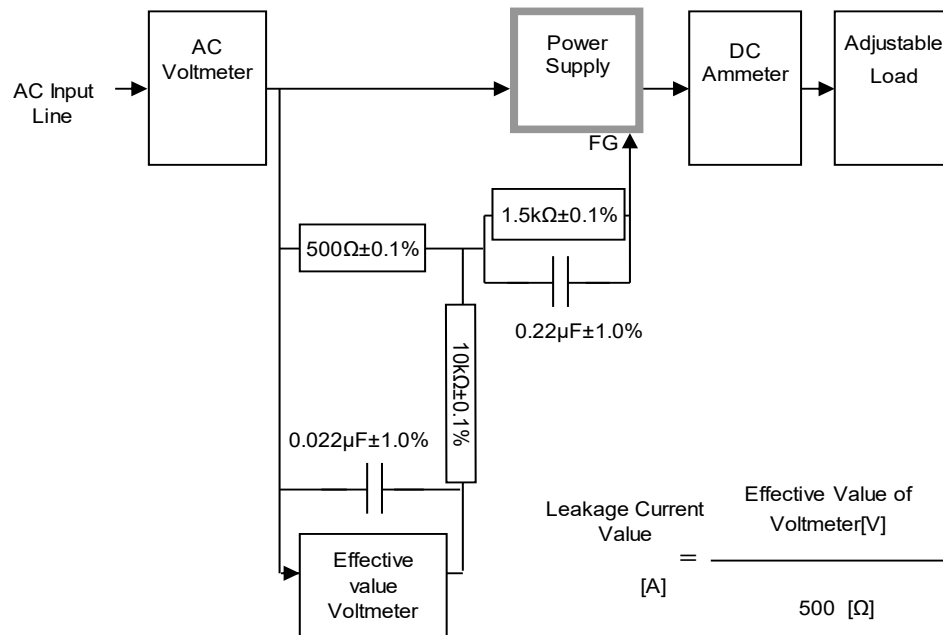


Figure C-2 (IEC62368-1 refer to IEC60990 Fig.4)

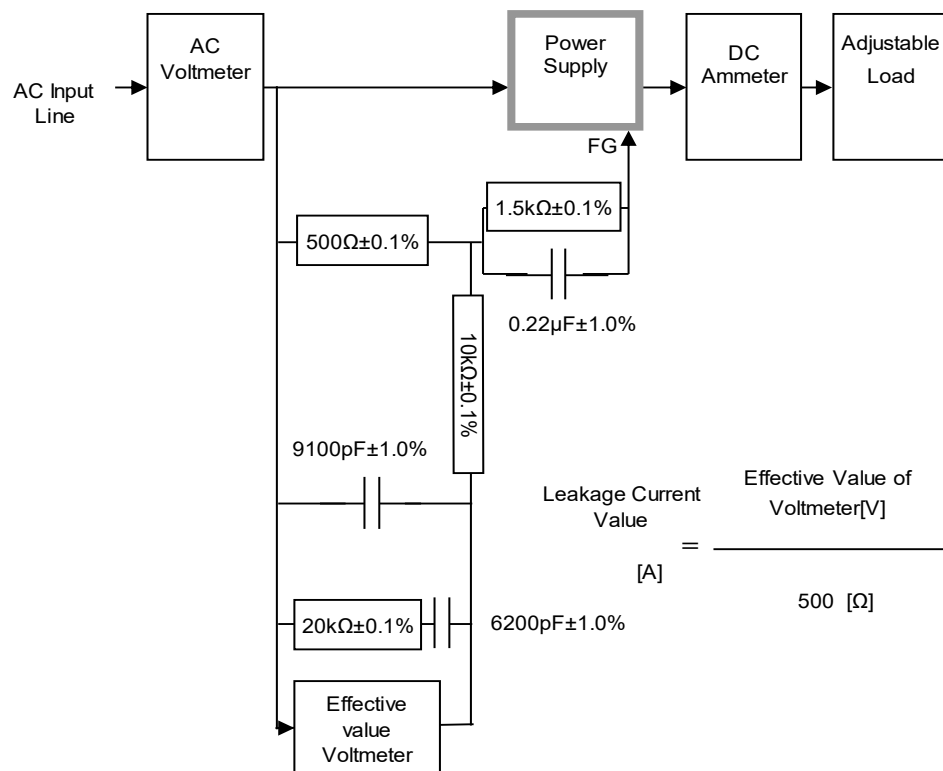


Figure C-3 (IEC62368-1 refer to IEC60990 Fig.5)