

# TEST DATA OF WDA60F-48

Regulated DC Power Supply  
August 17, 2022

Approved by : Takashi Kajii  
Design Manager

Prepared by : Jeonghoon Yi  
Design Engineer

**COSEL CO.,LTD.**

## CONTENTS

1.Input Current (by Load Current) . . . . .	1
2.Efficiency (by Load Current) . . . . .	2
3.Power Factor (by Load Current) . . . . .	3
4.Inrush Current . . . . .	4
5.Leakage Current . . . . .	5
6.Line Regulation . . . . .	6
7.Load Regulation . . . . .	7
8.Ripple-Noise . . . . .	7
9.Dynamic Load Response . . . . .	8
10.Rise and Fall Time . . . . .	9
11.Hold-Up Time . . . . .	10
12.Instantaneous Interruption Compensation . . . . .	11
13.Overcurrent Protection . . . . .	12
14.Ambient Temperature Drift . . . . .	13
15.Minimum Input Voltage for Regulated Output Voltage . . . . .	13
16.Overvoltage Protection . . . . .	13
17.Figure of Testing Circuitry . . . . .	14

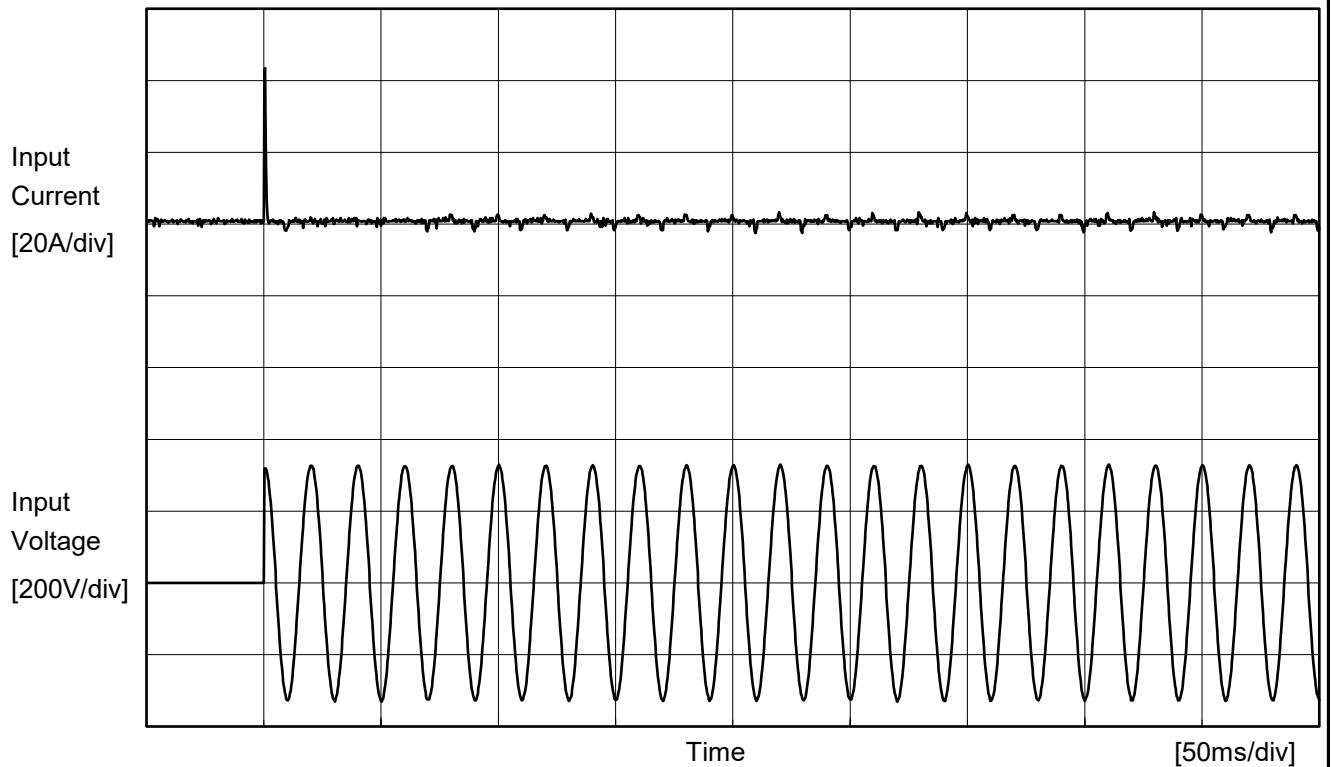
(Final Page 15)

Model		WDA60F-48		Temperature 25°C Testing Circuitry Figure A																																																				
Item		Input Current (by Load Current)																																																						
Object		+48V1.3A																																																						
1.Graph		<div><div><div>—△—</div><div>---□---</div><div>---○---</div></div><div><div>Input Volt. 115V</div><div>Input Volt. 230V</div><div>Input Volt. 264V</div></div></div> <div><div><div>Input Current [A]</div><div>2.00</div><div>1.50</div><div>1.00</div><div>0.50</div><div>0.00</div></div><div><div>0</div><div>0.5</div><div>1</div><div>1.5</div></div><div>Load Current [A]</div></div>		2.Values																																																				
				<table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Input 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>0.00</td><td>0.029</td><td>0.049</td><td>0.055</td></tr><tr><td>0.26</td><td>0.266</td><td>0.179</td><td>0.167</td></tr><tr><td>0.52</td><td>0.463</td><td>0.296</td><td>0.271</td></tr><tr><td>0.78</td><td>0.653</td><td>0.410</td><td>0.376</td></tr><tr><td>1.04</td><td>0.842</td><td>0.524</td><td>0.476</td></tr><tr><td>1.30</td><td>1.034</td><td>0.633</td><td>0.579</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]	Input Current [A]			Input Volt. 115[V]	Input Volt. 230[V]	Input Volt. 264[V]	0.00	0.029	0.049	0.055	0.26	0.266	0.179	0.167	0.52	0.463	0.296	0.271	0.78	0.653	0.410	0.376	1.04	0.842	0.524	0.476	1.30	1.034	0.633	0.579	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
Load Current [A]	Input Current [A]																																																							
	Input Volt. 115[V]	Input Volt. 230[V]	Input Volt. 264[V]																																																					
0.00	0.029	0.049	0.055																																																					
0.26	0.266	0.179	0.167																																																					
0.52	0.463	0.296	0.271																																																					
0.78	0.653	0.410	0.376																																																					
1.04	0.842	0.524	0.476																																																					
1.30	1.034	0.633	0.579																																																					
--	-	-	-																																																					
--	-	-	-																																																					
--	-	-	-																																																					
--	-	-	-																																																					
--	-	-	-																																																					

Model		WDA60F-48		Temperature 25°C Testing Circuitry Figure A																																																				
Item		Efficiency (by Load Current)																																																						
Object		+48V1.3A																																																						
1.Graph		<div><div><div>—△—</div>Input Volt. 115V</div><div><div>---□---</div>Input Volt. 230V</div><div><div>-·-○-·-</div>Input Volt. 264V</div></div> <p>Efficiency [%]</p> <p>Load Current [A]</p>		2.Values																																																				
				<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>0.00</td><td>-</td><td>-</td><td>-</td></tr><tr><td>0.26</td><td>86.9</td><td>81.5</td><td>78.6</td></tr><tr><td>0.52</td><td>88.8</td><td>86.6</td><td>85.1</td></tr><tr><td>0.78</td><td>89.2</td><td>88.2</td><td>87.0</td></tr><tr><td>1.04</td><td>89.0</td><td>88.8</td><td>88.8</td></tr><tr><td>1.30</td><td>88.5</td><td>89.9</td><td>89.2</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]	0.00	-	-	-	0.26	86.9	81.5	78.6	0.52	88.8	86.6	85.1	0.78	89.2	88.2	87.0	1.04	89.0	88.8	88.8	1.30	88.5	89.9	89.2	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
Load Current [A]	Efficiency [%]																																																							
	Input Volt. 115[V]	Input Volt. 230[V]	Input Volt. 264[V]																																																					
0.00	-	-	-																																																					
0.26	86.9	81.5	78.6																																																					
0.52	88.8	86.6	85.1																																																					
0.78	89.2	88.2	87.0																																																					
1.04	89.0	88.8	88.8																																																					
1.30	88.5	89.9	89.2																																																					
--	-	-	-																																																					
--	-	-	-																																																					
--	-	-	-																																																					
--	-	-	-																																																					
--	-	-	-																																																					

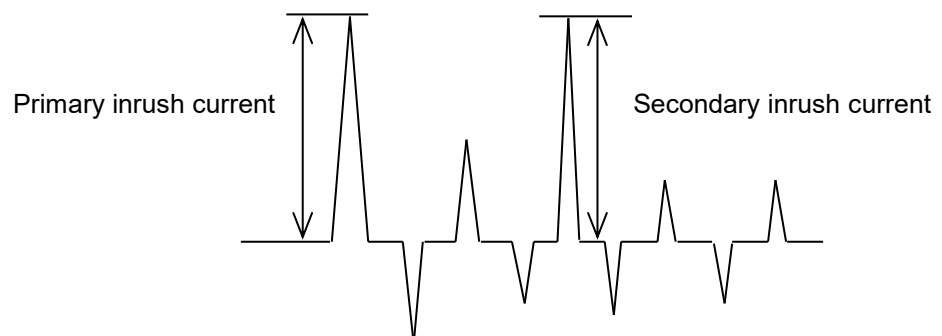
Model		WDA60F-48		Temperature 25°C Testing Circuitry Figure A																																																				
Item		Power Factor (by Load Current)																																																						
Object		+48V1.3A																																																						
1.Graph		<div><div><div>—△—</div>Input Volt. 115V</div><div><div>---□---</div>Input Volt. 230V</div><div><div>---○---</div>Input Volt. 264V</div></div> <table><thead><tr><th>Load Current [A]</th><th>115V</th><th>230V</th><th>264V</th></tr></thead><tbody><tr><td>0.00</td><td>0.134</td><td>0.051</td><td>0.043</td></tr><tr><td>0.26</td><td>0.467</td><td>0.372</td><td>0.359</td></tr><tr><td>0.52</td><td>0.528</td><td>0.424</td><td>0.409</td></tr><tr><td>0.78</td><td>0.559</td><td>0.451</td><td>0.434</td></tr><tr><td>1.04</td><td>0.580</td><td>0.467</td><td>0.448</td></tr><tr><td>1.30</td><td>0.594</td><td>0.478</td><td>0.458</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></tbody></table>		Load Current [A]	115V	230V	264V	0.00	0.134	0.051	0.043	0.26	0.467	0.372	0.359	0.52	0.528	0.424	0.409	0.78	0.559	0.451	0.434	1.04	0.580	0.467	0.448	1.30	0.594	0.478	0.458	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	2.Values				
Load Current [A]	115V	230V	264V																																																					
0.00	0.134	0.051	0.043																																																					
0.26	0.467	0.372	0.359																																																					
0.52	0.528	0.424	0.409																																																					
0.78	0.559	0.451	0.434																																																					
1.04	0.580	0.467	0.448																																																					
1.30	0.594	0.478	0.458																																																					
--	-	-	-																																																					
--	-	-	-																																																					
--	-	-	-																																																					
--	-	-	-																																																					
--	-	-	-																																																					
		<table><thead><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Power Factor</th></tr><tr><th>Input Volt. 115[V]</th><th>Input Volt. 230[V]</th><th>Input Volt. 264[V]</th></tr></thead><tbody><tr><td>0.00</td><td>0.134</td><td>0.051</td><td>0.043</td></tr><tr><td>0.26</td><td>0.467</td><td>0.372</td><td>0.359</td></tr><tr><td>0.52</td><td>0.528</td><td>0.424</td><td>0.409</td></tr><tr><td>0.78</td><td>0.559</td><td>0.451</td><td>0.434</td></tr><tr><td>1.04</td><td>0.580</td><td>0.467</td><td>0.448</td></tr><tr><td>1.30</td><td>0.594</td><td>0.478</td><td>0.458</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></tbody></table>				Load Current [A]	Power Factor			Input Volt. 115[V]	Input Volt. 230[V]	Input Volt. 264[V]	0.00	0.134	0.051	0.043	0.26	0.467	0.372	0.359	0.52	0.528	0.424	0.409	0.78	0.559	0.451	0.434	1.04	0.580	0.467	0.448	1.30	0.594	0.478	0.458	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
Load Current [A]	Power Factor																																																							
	Input Volt. 115[V]	Input Volt. 230[V]	Input Volt. 264[V]																																																					
0.00	0.134	0.051	0.043																																																					
0.26	0.467	0.372	0.359																																																					
0.52	0.528	0.424	0.409																																																					
0.78	0.559	0.451	0.434																																																					
1.04	0.580	0.467	0.448																																																					
1.30	0.594	0.478	0.458																																																					
--	-	-	-																																																					
--	-	-	-																																																					
--	-	-	-																																																					
--	-	-	-																																																					
--	-	-	-																																																					

Model	WDA60F-48	Temperature 25°C Testing Circuitry Figure A	
Item	Inrush Current		
Object	+48V1.3A		



Input Voltage 230 V  
Frequency 50 Hz  
Load 100 %

Primary inrush current 42.9 A  
Secondary inrush current 0.0 A



		Temperature 25°C Testing Circuitry Figure C
Model	WDA60F-48	
Item	Leakage Current	
Object	+48V1.3A	

## 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-48		Temperature25°C Testing CircuitryFigure A
Item		Line Regulation		
Object		+48V1.3A		
1.Graph				
<div><div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div>&lt;</div></div></div></div>				



Model	WDA60F-48																																																		
Item	Load Regulation	Temperature	25°C																																																
Object	+48V1.3A	Testing Circuitry	Figure A																																																
1.Graph		2.Values																																																	
<div><div><div><div></div></div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div></div> <div><div>Input Volt. 115V</div><div>Input Volt. 230V</div><div>Input Volt. 264V</div></div> <table><thead><tr><th>Load Current [A]</th><th>Output Voltage [V] (115V)</th><th>Output Voltage [V] (230V)</th><th>Output Voltage [V] (264V)</th></tr></thead><tbody><tr><td>0.00</td><td>48.180</td><td>48.177</td><td>48.179</td></tr><tr><td>0.26</td><td>48.175</td><td>48.163</td><td>48.156</td></tr><tr><td>0.52</td><td>48.174</td><td>48.159</td><td>48.147</td></tr><tr><td>0.78</td><td>48.172</td><td>48.157</td><td>48.143</td></tr><tr><td>1.04</td><td>48.172</td><td>48.154</td><td>48.137</td></tr><tr><td>1.30</td><td>48.170</td><td>48.156</td><td>48.141</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></tbody></table>		Load Current [A]	Output Voltage [V] (115V)	Output Voltage [V] (230V)	Output Voltage [V] (264V)	0.00	48.180	48.177	48.179	0.26	48.175	48.163	48.156	0.52	48.174	48.159	48.147	0.78	48.172	48.157	48.143	1.04	48.172	48.154	48.137	1.30	48.170	48.156	48.141	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Load Current [A]	Output Voltage [V] (115V)	Output Voltage [V] (230V)	Output Voltage [V] (264V)																																																
0.00	48.180	48.177	48.179																																																
0.26	48.175	48.163	48.156																																																
0.52	48.174	48.159	48.147																																																
0.78	48.172	48.157	48.143																																																
1.04	48.172	48.154	48.137																																																
1.30	48.170	48.156	48.141																																																
--	--	--	--																																																
--	--	--	--																																																
--	--	--	--																																																
--	--	--	--																																																
--	--	--	--																																																
Item	Ripple-Noise	Temperature	25°C																																																
Object	+48V1.3A	Testing Circuitry	Figure B																																																
1.Graph																																																			
<div><div>Input Voltage230V</div><div>Load100%</div><div><div>20[mV/div]</div><div>10[ms/div]</div></div></div>																																																			

Model	WDA60F-48	Temperature 25°C Testing Circuitry Figure A
Item	Dynamic Load Response	
Object	+48V1.3A	

Input Volt. 230 V  
Cycle 1000 ms

$t_1, t_2 = 50 \mu s$

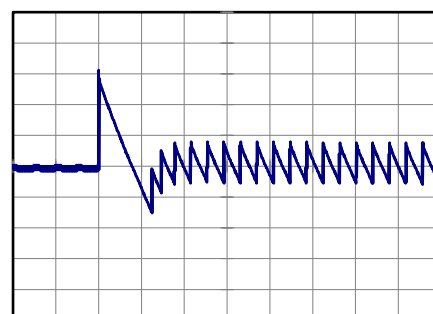
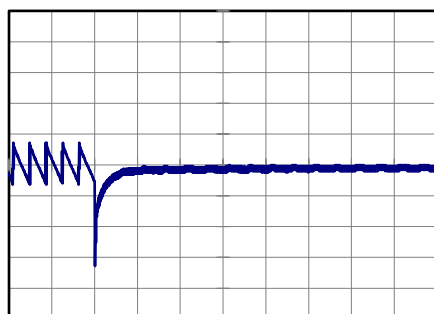
Load Current



Min.Load (0A) ←→  
Load 100% (1.3A)

100 mV/div

20 ms/div

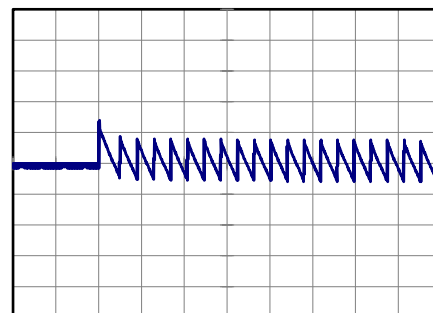
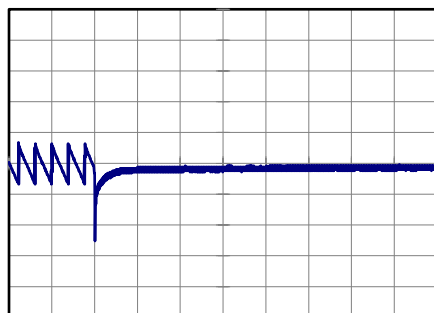


20 ms/div

Min.Load (0A) ←→  
Load 50% (0.65A)

100 mV/div

20 ms/div

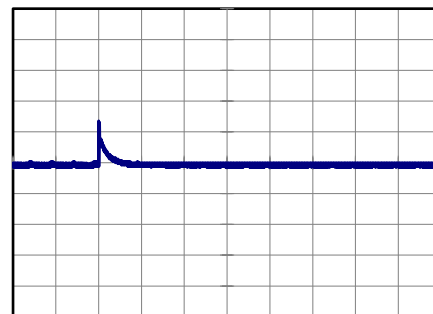
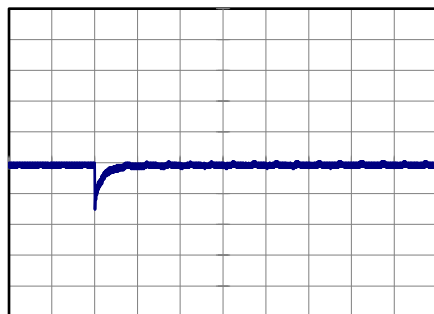


20 ms/div

Load 50% (0.65A) ←→  
Load 100% (1.3A)

100 mV/div

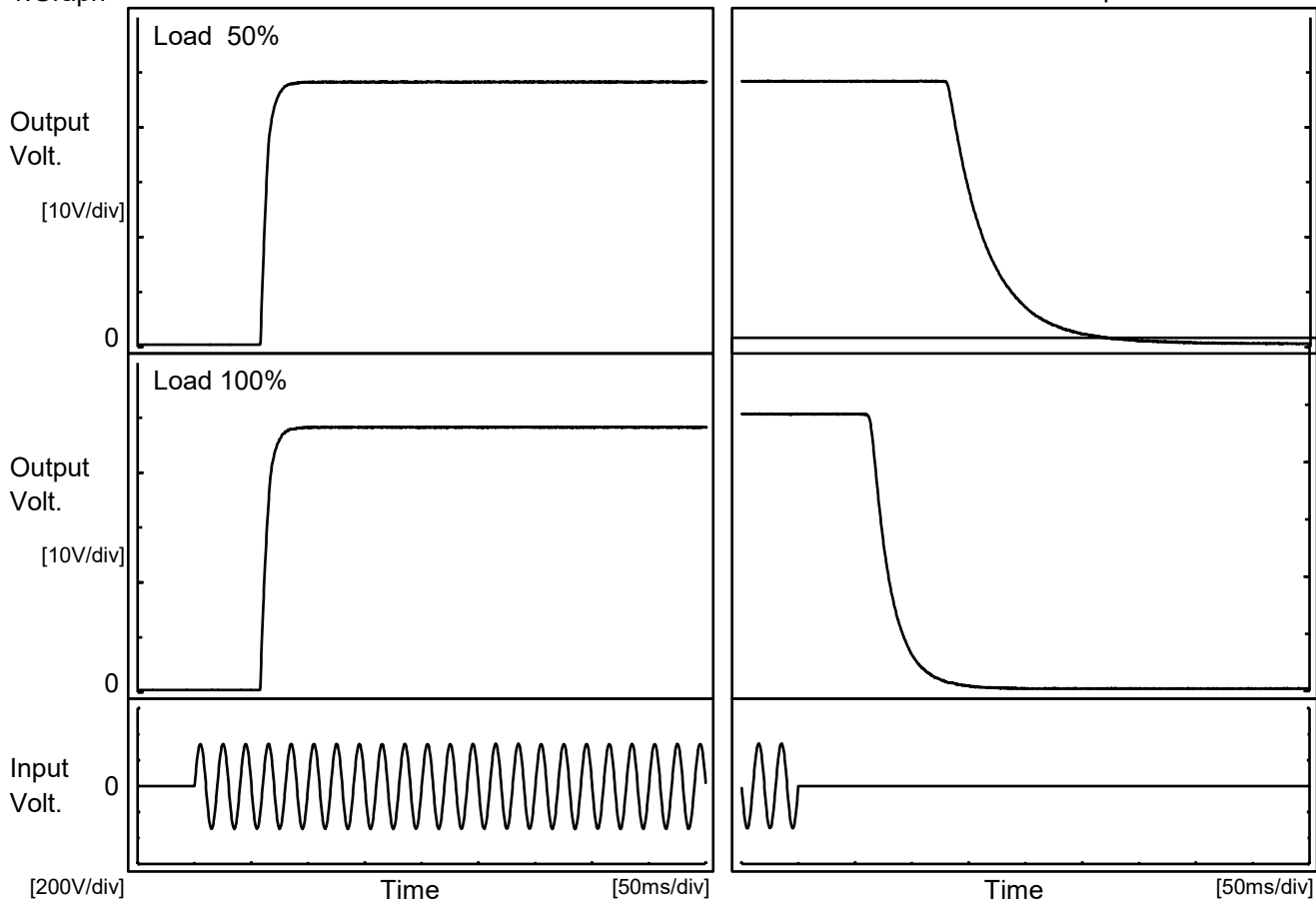
20 ms/div



20 ms/div

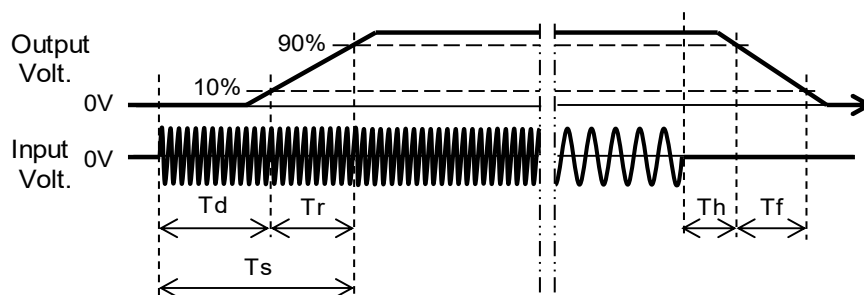
Model	WDA60F-48	Temperature 25°C Testing Circuitry Figure A
Item	Rise and Fall Time	
Object	+48V1.3A	

### 1.Graph



### 2.Values

		[ms]				
Load	Time	Td	Tr	Ts	Th	Tf
50 %		58.8	11.3	70.1	135.0	78.0
100 %		58.8	11.8	70.6	65.5	38.5



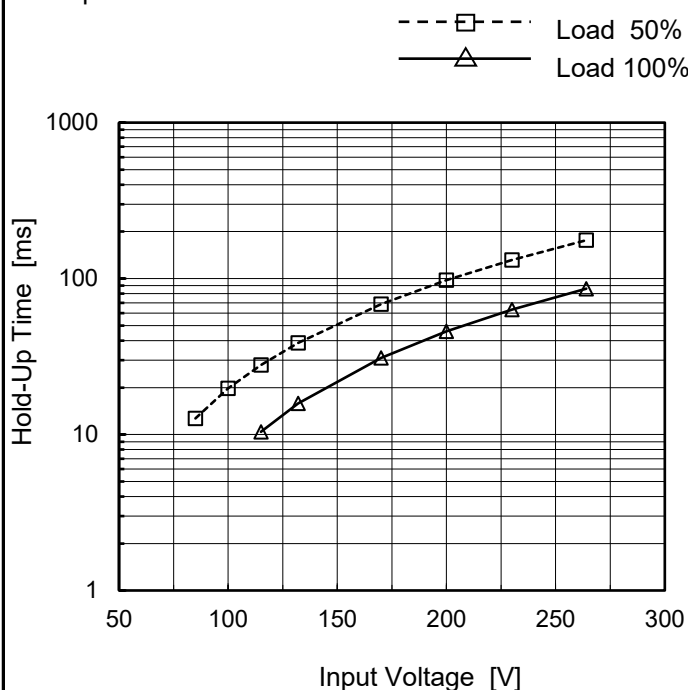
Model WDA60F-48

Item Hold-Up Time

Object +48V1.3A

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	13	-
100	20	-
115	28	10
132	39	16
170	68	31
200	98	46
230	132	63
264	176	86
--	-	-

Model		WDA60F-48		Temperature 25°C Testing Circuitry Figure A																																																																																																				
Item		Instantaneous Interruption Compensation																																																																																																						
Object		+48V1.3A																																																																																																						
1.Graph				2.Values																																																																																																				
<div><div><div><div><div></div><div></div></div><div><div></div><div></div></div></div><div><div></div><div></div></div><div><div></div><div></div></div></div><div><div>Input Volt.</div><div>115V</div></div><div><div>Input Volt.</div><div>230V</div></div><div><div>Input Volt.</div><div>264V</div></div></div> <div><table border="1"><caption>Data for Graph 1: Instantaneous Compensation Time vs Load Current</caption><thead><tr><th>Load Current [A]</th><th>115V [ms]</th><th>230V [ms]</th><th>264V [ms]</th></tr></thead><tbody><tr><td>0.00</td><td>-</td><td>-</td><td>-</td></tr><tr><td>0.26</td><td>79</td><td>328</td><td>435</td></tr><tr><td>0.52</td><td>38</td><td>168</td><td>225</td></tr><tr><td>0.78</td><td>24</td><td>113</td><td>149</td></tr><tr><td>1.04</td><td>17</td><td>83</td><td>112</td></tr><tr><td>1.30</td><td>12</td><td>65</td><td>88</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></tbody></table></div>				Load Current [A]	115V [ms]	230V [ms]	264V [ms]	0.00	-	-	-	0.26	79	328	435	0.52	38	168	225	0.78	24	113	149	1.04	17	83	112	1.30	12	65	88	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	<table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Time [ms]</th></tr><tr><th>Input Volt. 115[V]</th><th>Input Volt. 230[V]</th><th>Input Volt. 264[V]</th></tr><tr><td>0.00</td><td>-</td><td>-</td><td>-</td></tr><tr><td>0.26</td><td>79</td><td>328</td><td>435</td></tr><tr><td>0.52</td><td>38</td><td>168</td><td>225</td></tr><tr><td>0.78</td><td>24</td><td>113</td><td>149</td></tr><tr><td>1.04</td><td>17</td><td>83</td><td>112</td></tr><tr><td>1.30</td><td>12</td><td>65</td><td>88</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]	Time [ms]			Input Volt. 115[V]	Input Volt. 230[V]	Input Volt. 264[V]	0.00	-	-	-	0.26	79	328	435	0.52	38	168	225	0.78	24	113	149	1.04	17	83	112	1.30	12	65	88	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
Load Current [A]	115V [ms]	230V [ms]	264V [ms]																																																																																																					
0.00	-	-	-																																																																																																					
0.26	79	328	435																																																																																																					
0.52	38	168	225																																																																																																					
0.78	24	113	149																																																																																																					
1.04	17	83	112																																																																																																					
1.30	12	65	88																																																																																																					
--	-	-	-																																																																																																					
--	-	-	-																																																																																																					
--	-	-	-																																																																																																					
--	-	-	-																																																																																																					
--	-	-	-																																																																																																					
Load Current [A]	Time [ms]																																																																																																							
	Input Volt. 115[V]	Input Volt. 230[V]	Input Volt. 264[V]																																																																																																					
0.00	-	-	-																																																																																																					
0.26	79	328	435																																																																																																					
0.52	38	168	225																																																																																																					
0.78	24	113	149																																																																																																					
1.04	17	83	112																																																																																																					
1.30	12	65	88																																																																																																					
--	-	-	-																																																																																																					
--	-	-	-																																																																																																					
--	-	-	-																																																																																																					
--	-	-	-																																																																																																					
--	-	-	-																																																																																																					

Model	WDA60F-48	Temperature25°C Testing CircuitryFigure A																																																																
Item	Overcurrent Protection																																																																	
Object	+48V1.3A																																																																	
1.Graph		2.Values																																																																
<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>48</td><td>1.65</td><td>1.99</td><td>2.08</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]	48	1.65	1.99	2.08	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
Output Voltage [V]	Load Current [A]																																																																	
	Input Volt. 115[V]	Input Volt. 230[V]	Input Volt. 264[V]																																																															
48	1.65	1.99	2.08																																																															
--	-	-	-																																																															
--	-	-	-																																																															
--	-	-	-																																																															
--	-	-	-																																																															
--	-	-	-																																																															
--	-	-	-																																																															
--	-	-	-																																																															
--	-	-	-																																																															
--	-	-	-																																																															
--	-	-	-																																																															
--	-	-	-																																																															
--	-	-	-																																																															
--	-	-	-																																																															

		Testing Circuitry Figure A
Model	WDA60F-48	
Item	Ambient Temperature Drift	
Object	+48V1.3A	

## 1.Values

Load 100%

Ambient Temperature[°C]	Output Voltage [V]		
	Input Volt. 115V	Input Volt. 230V	Input Volt. 264V
-20	47.979	47.960	47.945
25	48.143	48.132	48.117
50	48.187	48.170	48.154

Item	Minimum Input Voltage for Regulated Output Voltage	Testing Circuitry Figure A
Object	+48V1.3A	

## 1.Values

Ambient Temperature[°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	44	80
25	44	79
50	44	79

Item	Overvoltage Protection	Testing Circuitry Figure A
Object	+48V1.3A	

## 1.Values

Load 0%

Ambient Temperature[°C]	Operating Point [V]	
	Input Volt. 115V	Input Volt. 264V
-20	62.85	62.92
25	62.62	62.18
50	63.13	63.28

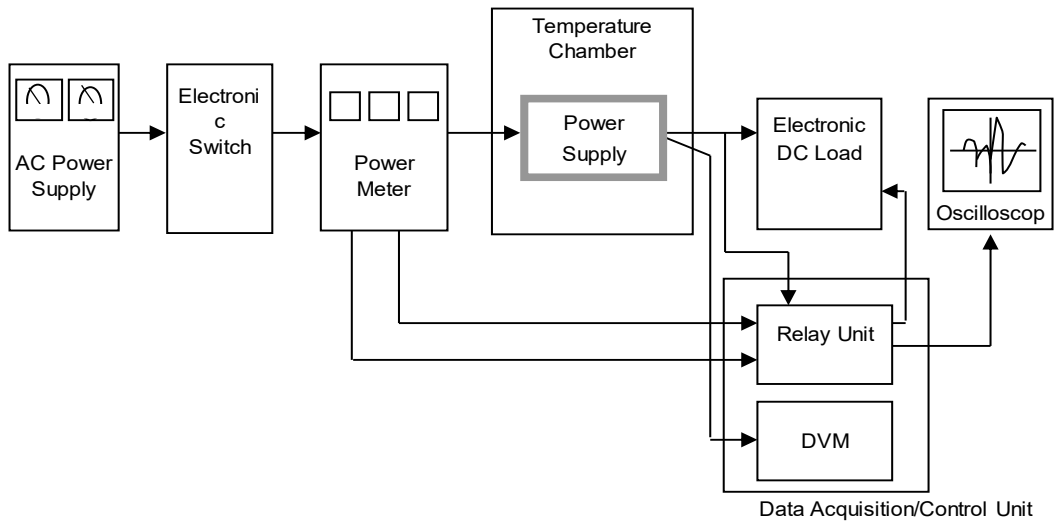
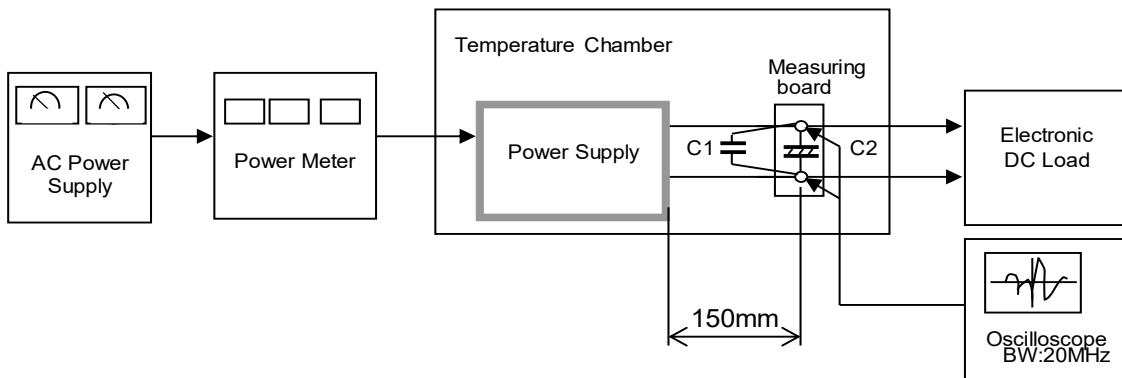


Figure A



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

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

Figure B



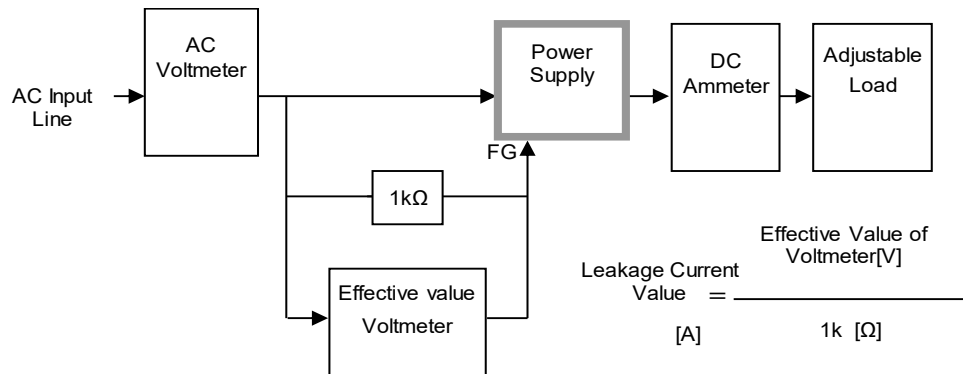


Figure C-1 ( DEN-AN )

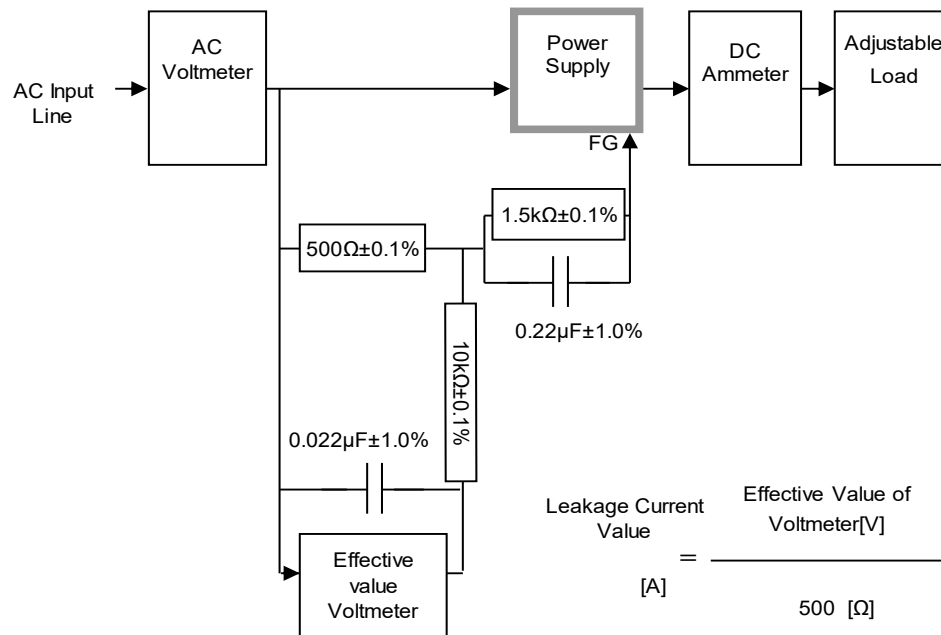


Figure C-2 ( IEC62368-1 refer to IEC60990 Fig.4 )

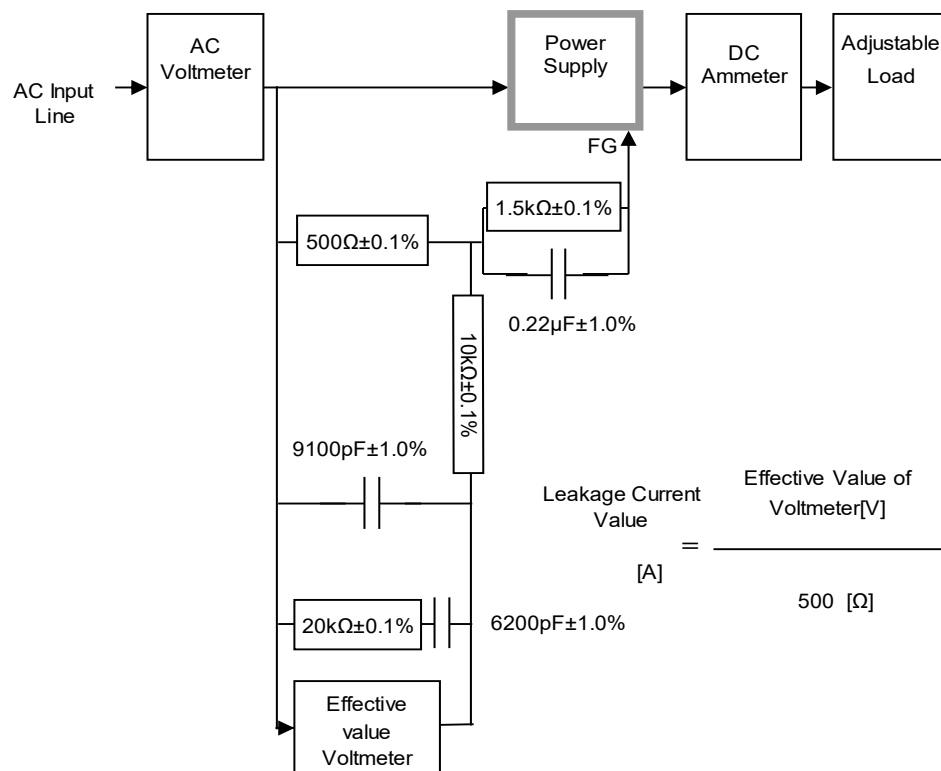


Figure C-3 ( IEC62368-1 refer to IEC60990 Fig.5 )