

# TEST DATA OF WMA100F-12

Regulated DC Power Supply  
October 31, 2023

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Design Manager

Prepared by : Yuya Sakai  
Design Engineer

**COSEL CO.,LTD.**

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(Final Page 15)

Model

WMA100F-12

Item

Input Current (by Load Current)

Object

+12V8.4A

1.Graph

—△—

Input Volt.

115V

---□---

Input Volt.

230V

-·-○-·-

Input Volt.

264V

Input Current [A]

2.0

1.5

1.0

0.5

0.0

0

2

4

6

8

Load Current [A]

2.Values

Load Current [A]	Input Current [A]		
	Input Volt. 115[V]	Input Volt. 230[V]	Input Volt. 264[V]
0.0	0.030	0.058	0.066
1.5	0.361	0.239	0.218
3.0	0.660	0.405	0.367
4.5	0.958	0.575	0.519
6.0	1.251	0.746	0.675
7.5	1.550	0.919	0.831
8.4	1.732	1.023	0.924
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

Temperature

25°C

Testing Circuitry

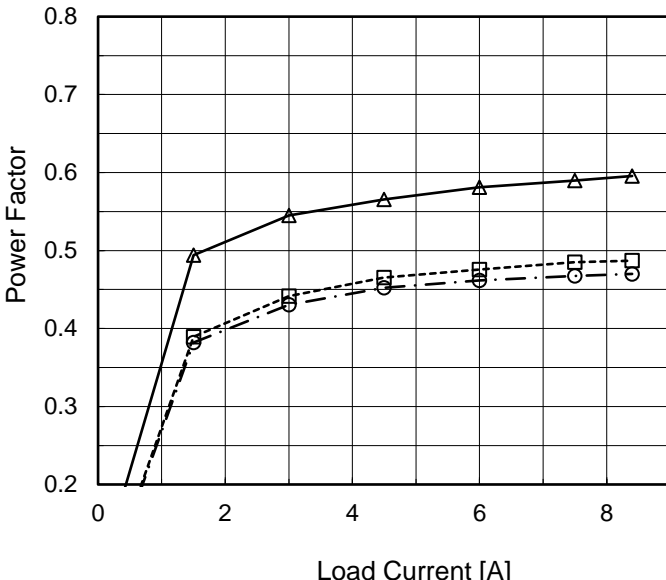
Figure A

- 1 -

BC-11950



Model		WMA100F-12		Temperature25°C Testing CircuitryFigure A																																																			
Item		Efficiency (by Load Current)																																																					
Object		+12V8.4A																																																					
1.Graph <div><div><div>—△—</div>Input Volt.115V</div><div><div>---□---</div>Input Volt.230V</div><div><div>-·-○-·-</div>Input Volt.264V</div><table><tr><th>Load Current [A]</th><th>115V [%]</th><th>230V [%]</th><th>264V [%]</th></tr><tr><td>0.0</td><td>-</td><td>-</td><td>-</td></tr><tr><td>1.5</td><td>87.2</td><td>83.5</td><td>81.4</td></tr><tr><td>3.0</td><td>86.8</td><td>87.2</td><td>86.2</td></tr><tr><td>4.5</td><td>86.4</td><td>87.5</td><td>87.0</td></tr><tr><td>6.0</td><td>86.0</td><td>88.0</td><td>87.4</td></tr><tr><td>7.5</td><td>85.5</td><td>87.6</td><td>87.6</td></tr><tr><td>8.4</td><td>85.0</td><td>87.8</td><td>87.8</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></div>					Load Current [A]	115V [%]	230V [%]	264V [%]	0.0	-	-	-	1.5	87.2	83.5	81.4	3.0	86.8	87.2	86.2	4.5	86.4	87.5	87.0	6.0	86.0	88.0	87.4	7.5	85.5	87.6	87.6	8.4	85.0	87.8	87.8	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-			
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Model		WMA100F-12	Temperature 25°C Testing Circuitry Figure A																																																				
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1.Graph		<div><div>—△—</div>Input Volt. 115V</div> <div><div>---□---</div>Input Volt. 230V</div> <div><div>-·-○-·-</div>Input Volt. 264V</div> 	2.Values																																																				
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- 3 -

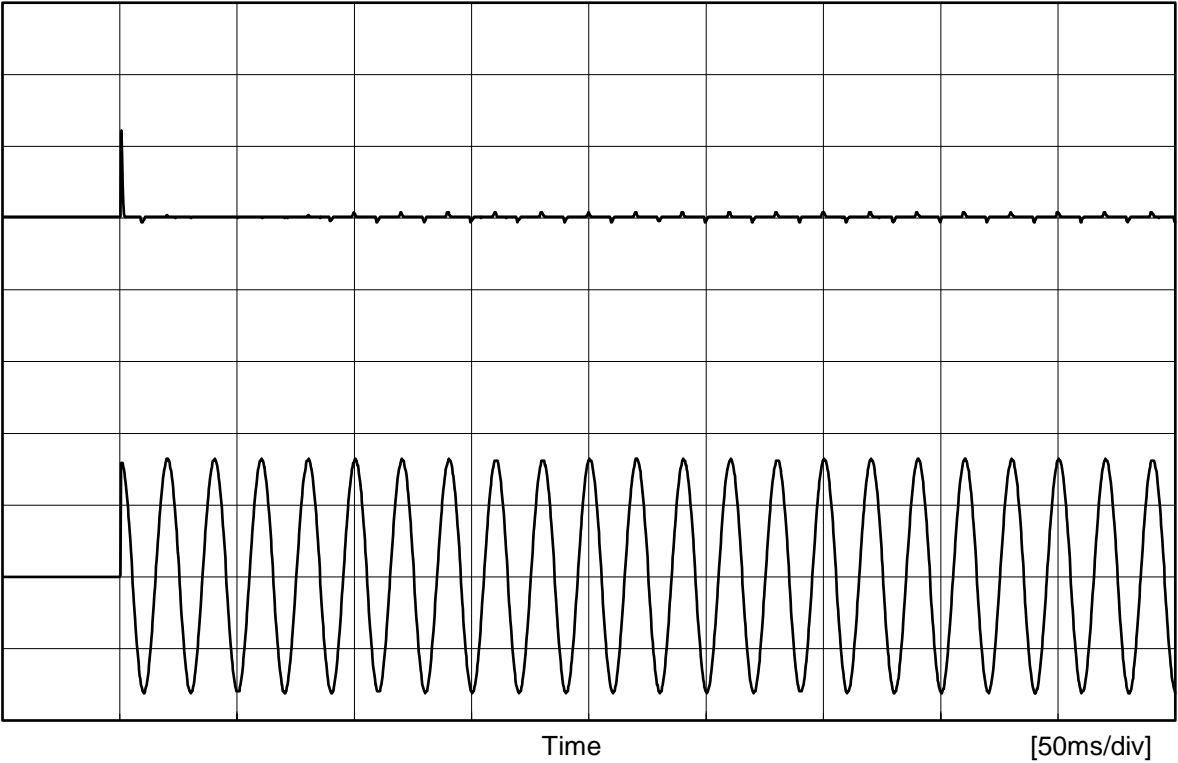
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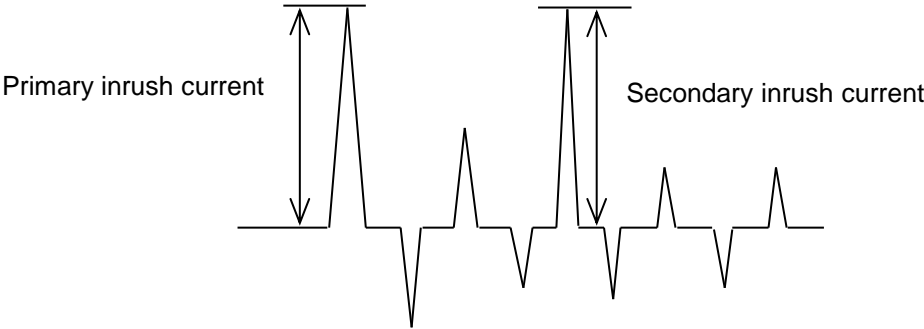
Model		WMA100F-12	Temperature 25°C Testing Circuitry Figure A
Item		Inrush Current	
Object		+12V8.4A	

Input  
Current  
[50A/div]

Input  
Voltage  
[200V/div]



Input Voltage	230 V
Frequency	50 Hz
Load	100 %
Primary inrush current	60.6 A
Secondary inrush current	3.6 A



		Temperature 25°C Testing Circuitry Figure C
Model	WMA100F-12	
Item	Leakage Current	
Object	+12V8.4A	

### 1.Results

Standards	Testing Circuitry	Measuring Method	Input Volt.			Note
			115 [V]	240 [V]	264 [V]	
IEC60601-1	Figure C-1	Both phases	0.14	0.31	0.34	Operation
		One of phases	0.22	0.50	0.56	Stand by
IEC62368-1	Figure C-2	Both phases	0.14	0.32	0.35	Operation
		One of phases	0.22	0.51	0.57	Stand by
	Figure C-3	Both phases	0.14	0.31	0.35	Operation
		One of phases	0.22	0.50	0.56	Stand by

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

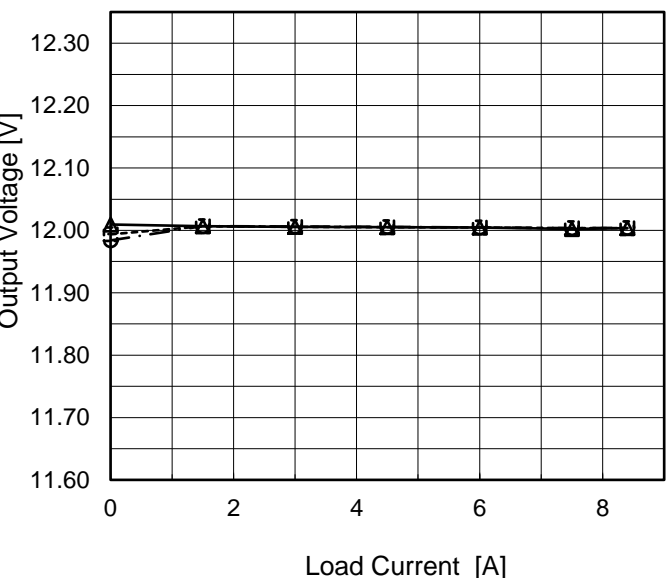
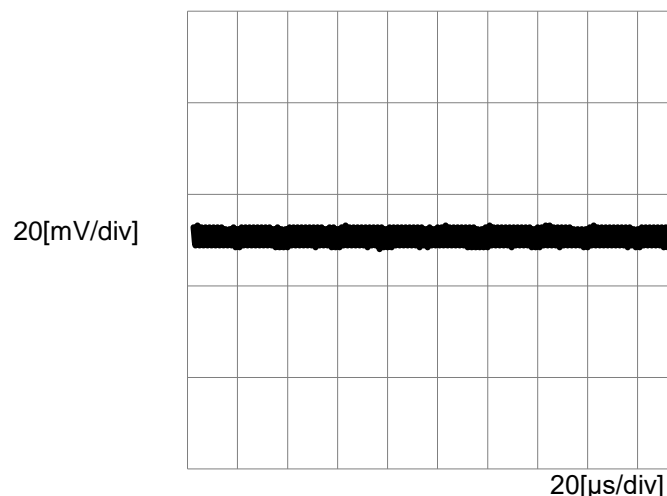
### 2.Condition

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







Model	WMA100F-12	Temperature 25°C																																																				
Item	Load Regulation	Testing Circuitry Figure A																																																				
Object	+12V8.4A																																																					
1.Graph		2.Values																																																				
<div><div><div>—△—</div><div>Input Volt.</div><div>115V</div></div><div><div>---□---</div><div>Input Volt.</div><div>230V</div></div><div><div>-·-○-·-</div><div>Input Volt.</div><div>264V</div></div></div> 		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Output Voltage [V]</th></tr><tr><th>Input Volt. 115[V]</th><th>Input Volt. 230[V]</th><th>Input Volt. 264[V]</th></tr><tr><td>0.0</td><td>12.009</td><td>11.994</td><td>11.984</td></tr><tr><td>1.5</td><td>12.006</td><td>12.007</td><td>12.007</td></tr><tr><td>3.0</td><td>12.006</td><td>12.006</td><td>12.006</td></tr><tr><td>4.5</td><td>12.005</td><td>12.005</td><td>12.006</td></tr><tr><td>6.0</td><td>12.004</td><td>12.005</td><td>12.005</td></tr><tr><td>7.5</td><td>12.002</td><td>12.004</td><td>12.004</td></tr><tr><td>8.4</td><td>12.004</td><td>12.004</td><td>12.004</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]	Output Voltage [V]			Input Volt. 115[V]	Input Volt. 230[V]	Input Volt. 264[V]	0.0	12.009	11.994	11.984	1.5	12.006	12.007	12.007	3.0	12.006	12.006	12.006	4.5	12.005	12.005	12.006	6.0	12.004	12.005	12.005	7.5	12.002	12.004	12.004	8.4	12.004	12.004	12.004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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Item	Ripple-Noise	Temperature 25°C																																																				
Object	+12V8.4A	Testing Circuitry Figure B																																																				
1.Graph																																																						
<div><div>Input Voltage230V</div><div>Load100%</div></div> 																																																						
		BC-11950																																																				



Model	WMA100F-12	Temperature 25°C Testing Circuitry Figure A
Item	Dynamic Load Response	
Object	+12V8.4A	

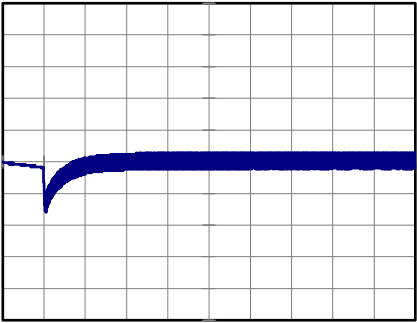
Input Volt. 230 V  
Cycle 1000 ms

t1,t2 = 50  $\mu$  s

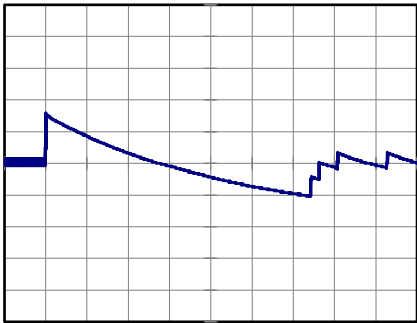


Min.Load (0A) $\longleftrightarrow$   
Load 100% (8.4A)

200 mV/div



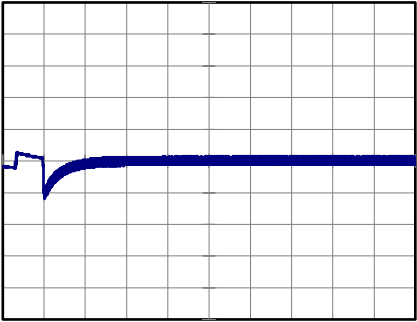
20 ms/div



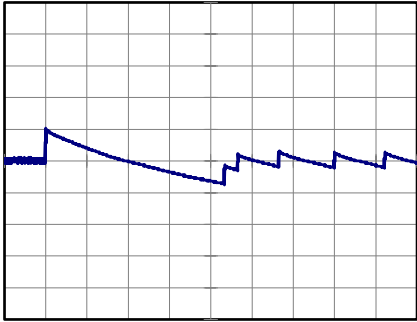
40 ms/div

Load 0% (0A) $\longleftrightarrow$   
Load 50% (4.2A)

200 mV/div



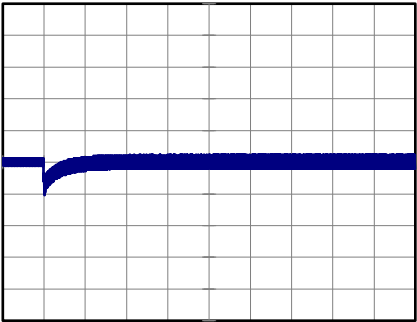
20 ms/div



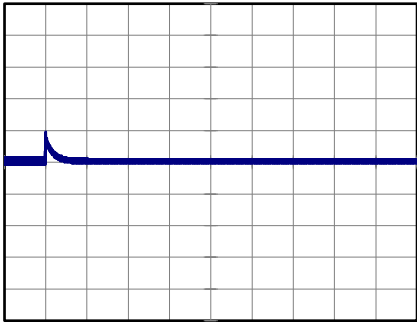
40 ms/div

Load 50% (4.2A) $\longleftrightarrow$   
Load 100% (8.4A)

200 mV/div



20 ms/div

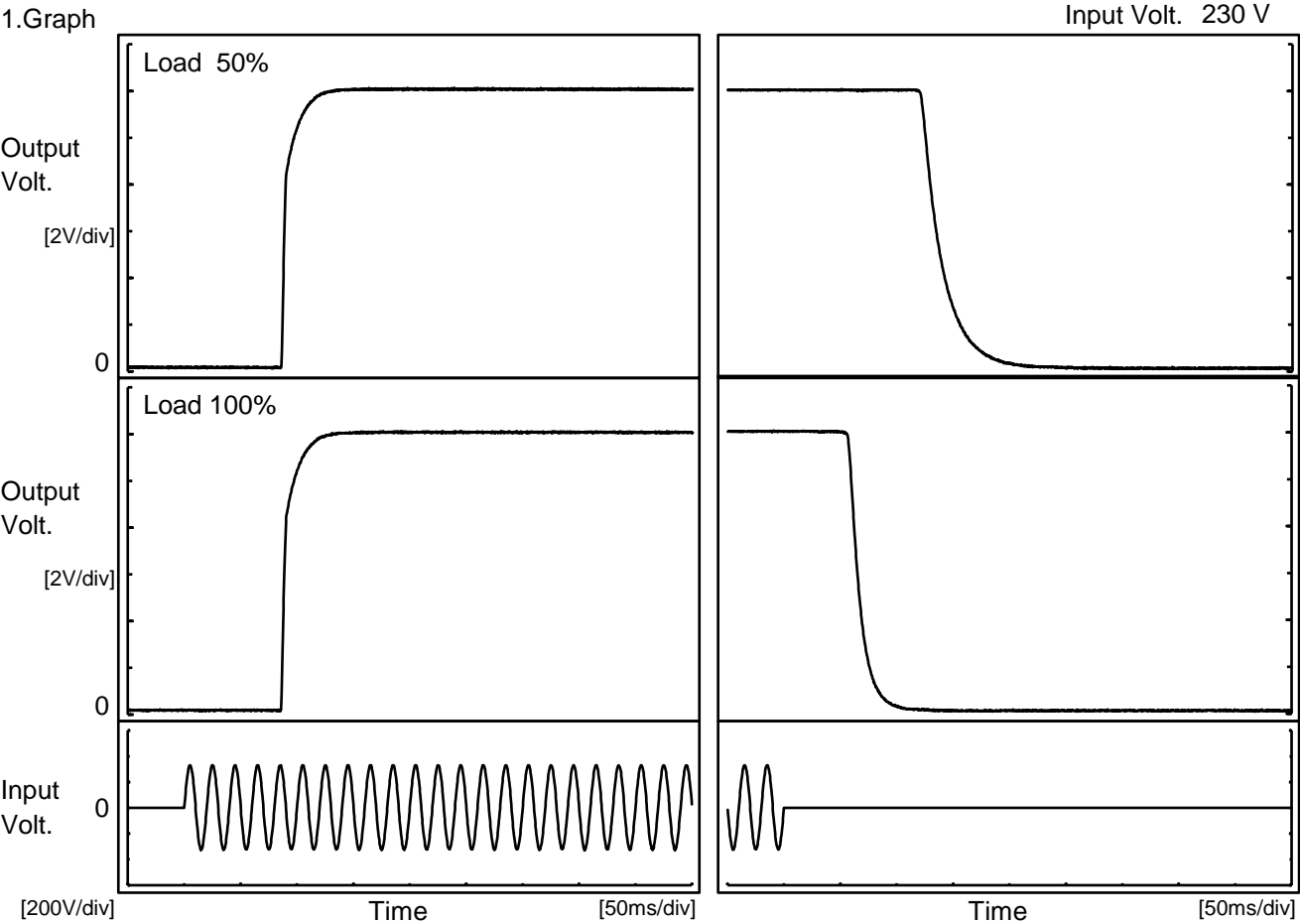


40 ms/div



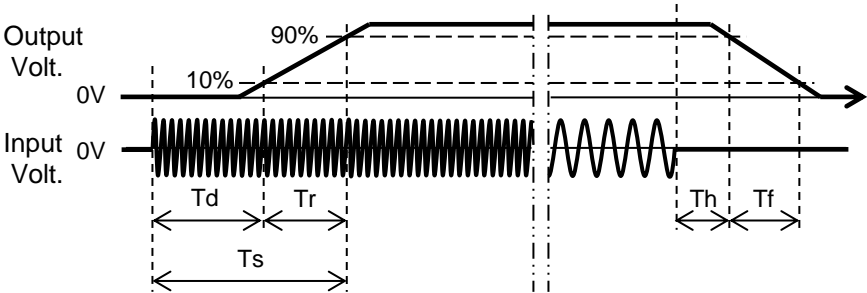
Model		WMA100F-12	Temperature 25°C Testing Circuitry Figure A
Item		Rise and Fall Time	
Object		+12V8.4A	

1.Graph



2.Values

		[ms]				
Load	Time	Td	Tr	Ts	Th	Tf
50 %		86.8	17.0	103.8	123.5	41.5
100 %		86.5	17.0	103.5	58.3	22.0

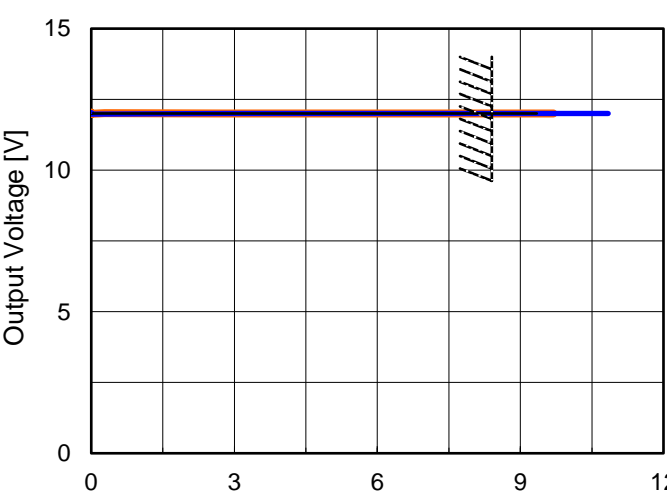




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<div><div><div><div><div></div><div></div></div><div><div></div><div></div></div></div><div><div></div><div></div></div></div><div><div><div>1000</div><div>100</div><div>10</div><div>1</div></div><div><div>50</div><div>100</div><div>150</div><div>200</div><div>250</div><div>300</div></div></div><div>Hold-Up Time [ms]</div><div>Input Voltage [V]</div></div> <p>This duration covers from Shut-off of input voltage to the moment when output voltage descends to the rated range of voltage accuracy.</p>																																		
<table><tr><th rowspan="2">Input Voltage [V]</th><th colspan="2">Hold-Up Time [ms]</th></tr><tr><th>Load 50%</th><th>Load 100%</th></tr><tr><td>85</td><td>11</td><td>-</td></tr><tr><td>100</td><td>17</td><td>-</td></tr><tr><td>115</td><td>25</td><td>11</td></tr><tr><td>200</td><td>90</td><td>43</td></tr><tr><td>230</td><td>122</td><td>59</td></tr><tr><td>240</td><td>134</td><td>65</td></tr><tr><td>264</td><td>165</td><td>81</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></table>			Input Voltage [V]	Hold-Up Time [ms]		Load 50%	Load 100%	85	11	-	100	17	-	115	25	11	200	90	43	230	122	59	240	134	65	264	165	81	--	-	-	--	-	-
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<div>1.Graph</div> <div><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><div>- · -○- · -</div><div>Input Volt.</div><div>264V</div></div></div><div><div>Instantaneous Compensation Time [ms]</div><div><table><tr><th>Load Current [A]</th><th>115V [ms]</th><th>230V [ms]</th><th>264V [ms]</th></tr><tr><td>1.5</td><td>81</td><td>351</td><td>595</td></tr><tr><td>3.0</td><td>37</td><td>175</td><td>234</td></tr><tr><td>4.5</td><td>22</td><td>114</td><td>154</td></tr><tr><td>6.0</td><td>15</td><td>84</td><td>114</td></tr><tr><td>7.5</td><td>7</td><td>65</td><td>89</td></tr><tr><td>8.4</td><td>7</td><td>57</td><td>78</td></tr></table></div><div>Load Current [A]</div></div></div><div>2.Values</div><div><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>0.0</td><td>-</td><td>-</td><td>-</td></tr><tr><td>1.5</td><td>81</td><td>351</td><td>595</td></tr><tr><td>3.0</td><td>37</td><td>175</td><td>234</td></tr><tr><td>4.5</td><td>22</td><td>114</td><td>154</td></tr><tr><td>6.0</td><td>15</td><td>84</td><td>114</td></tr><tr><td>7.5</td><td>7</td><td>65</td><td>89</td></tr><tr><td>8.4</td><td>7</td><td>57</td><td>78</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></div></div>			Load Current [A]	115V [ms]	230V [ms]	264V [ms]	1.5	81	351	595	3.0	37	175	234	4.5	22	114	154	6.0	15	84	114	7.5	7	65	89	8.4	7	57	78	Load Current [A]	Time [ms]			Input Volt. 115[V]	Input Volt. 230[V]	Input Volt. 264[V]	0.0	-	-	-	1.5	81	351	595	3.0	37	175	234	4.5	22	114	154	6.0	15	84	114	7.5	7	65	89	8.4	7	57	78	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
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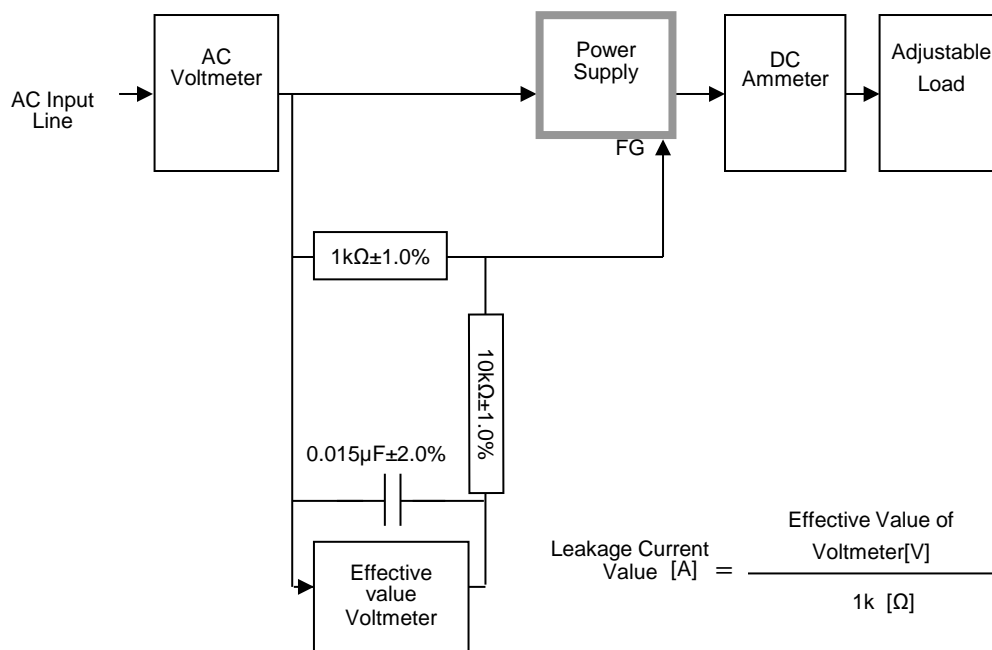
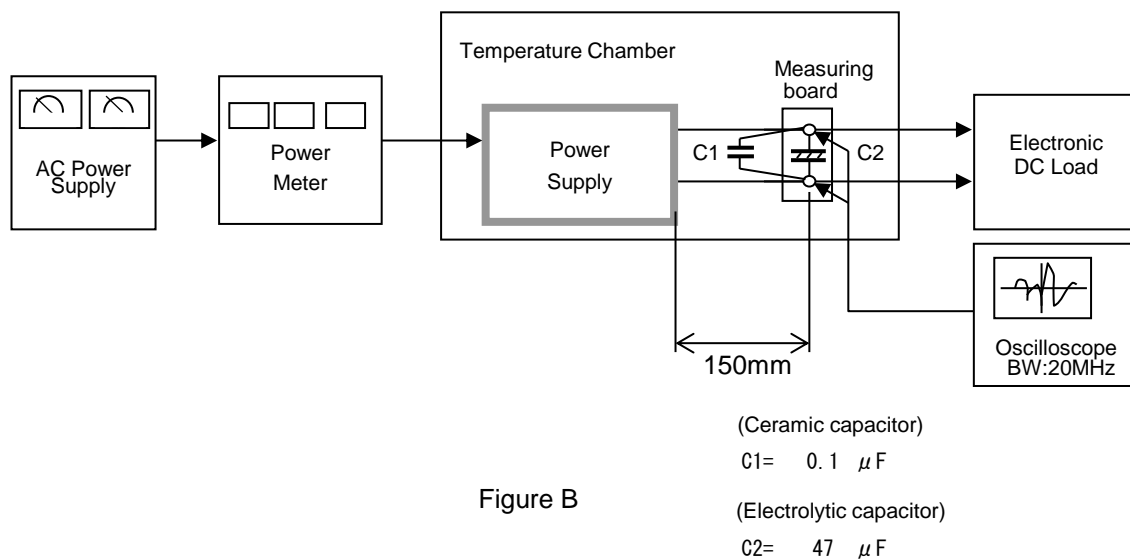
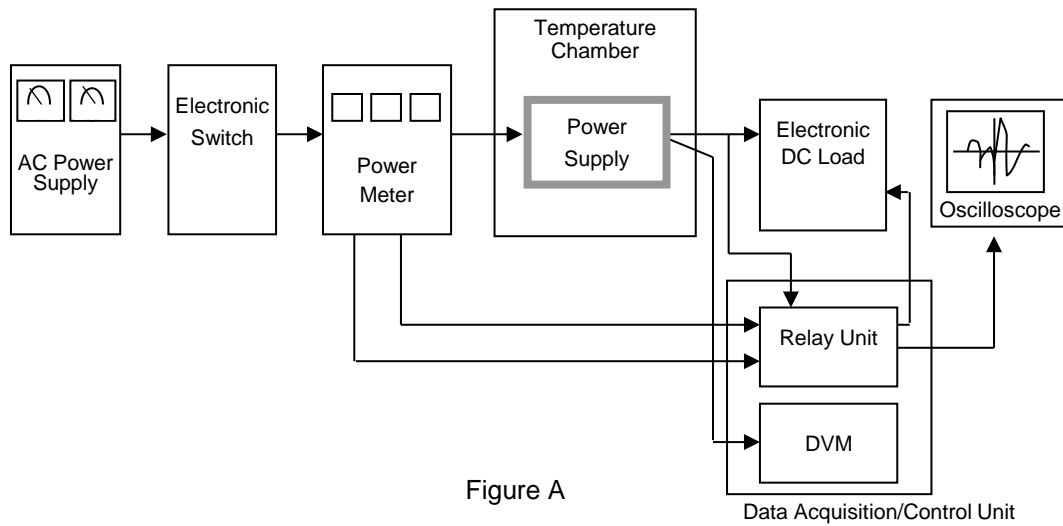
Model		WMA100F-12		Temperature Testing Circuitry	25°C Figure A																																																															
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		Testing Circuitry    Figure A	
Model	WMA100F-12		
Item	Ambient Temperature Drift		
Object	+12V8.4A		
1.Values <span style="float:right">Load 100%</span>			
Ambient Temperature[°C]	Output Voltage [V]		
	Input Volt. 115V	Input Volt. 230V	Input Volt. 264V
-20	11.993	11.993	11.993
25	12.004	12.005	12.004
40	12.000	11.999	11.999
Item	Minimum Input Voltage for Regulated Output Voltage	Testing Circuitry    Figure A	
Object	+12V8.4A		
1.Values			
Ambient Temperature[°C]	Input Voltage [V]		
	Load 50%	Load 100%	
-20	46	80	
25	46	80	
40	46	79	
Item	Overvoltage Protection	Testing Circuitry    Figure A	
Object	+12V8.4A		
1.Values <span style="float:right">Load 0%</span>			
Ambient Temperature[°C]	Operating Point [V]		
	Input Volt. 115V	Input Volt. 264V	
-20	15.61	15.66	
25	15.99	15.92	
40	16.05	16.09	

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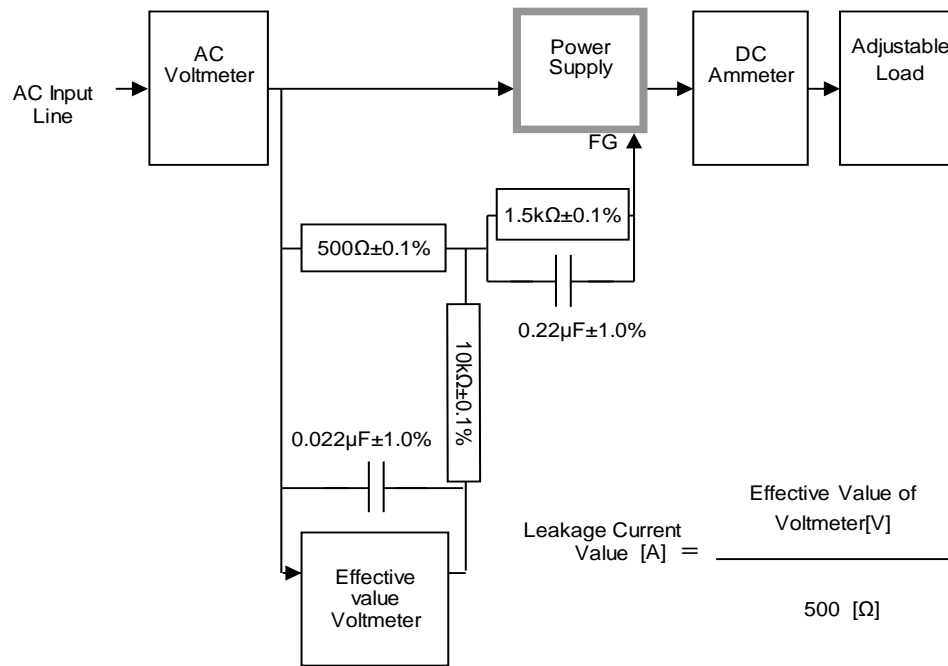


Figure C-2 ( IEC62368-1 refer to IEC60990 Fig.4 )

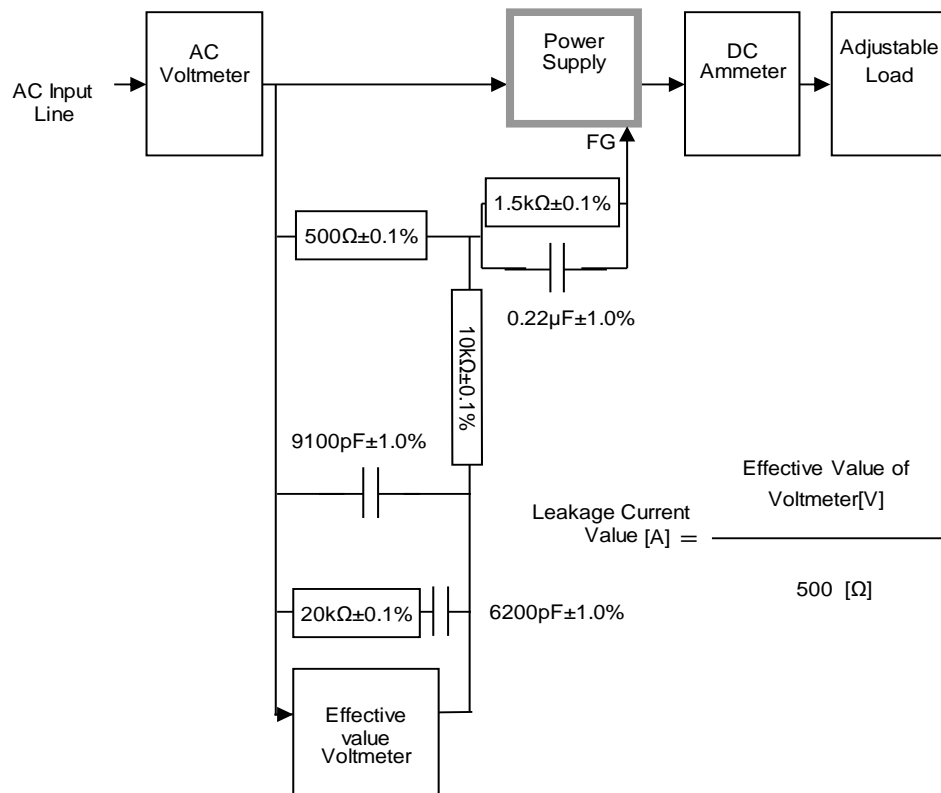


Figure C-3 ( IEC62368-1 refer to IEC60990 Fig.5 )