

TEST DATA OF LHA50F-24

Regulated DC Power Supply
September 13, 2019

Approved by : Junya Kaneda
Junya Kaneda Design Manager

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COSEL CO.,LTD.

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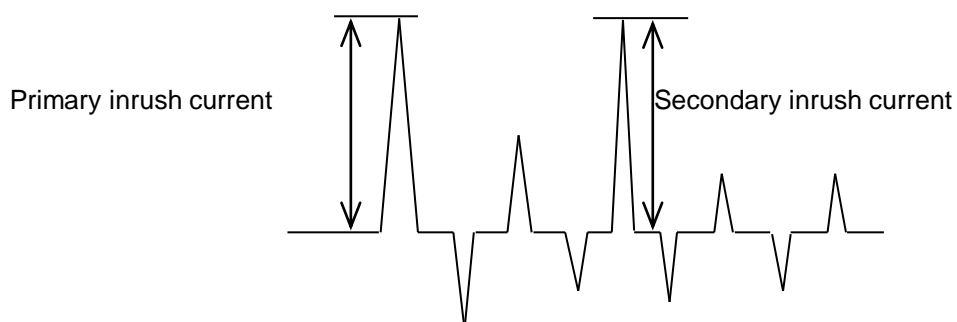
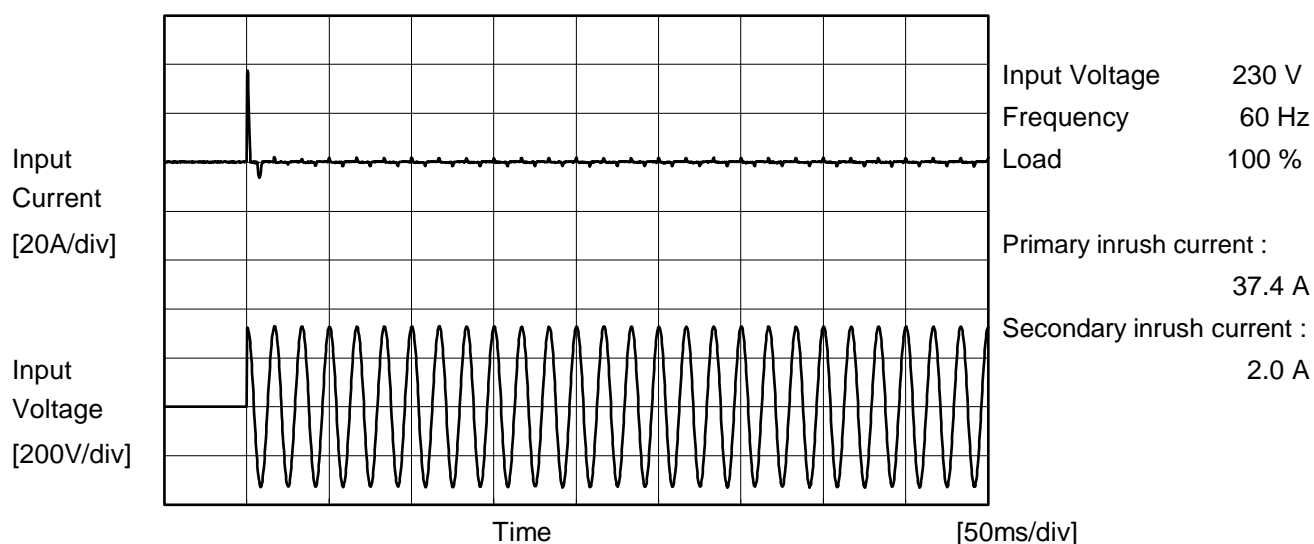
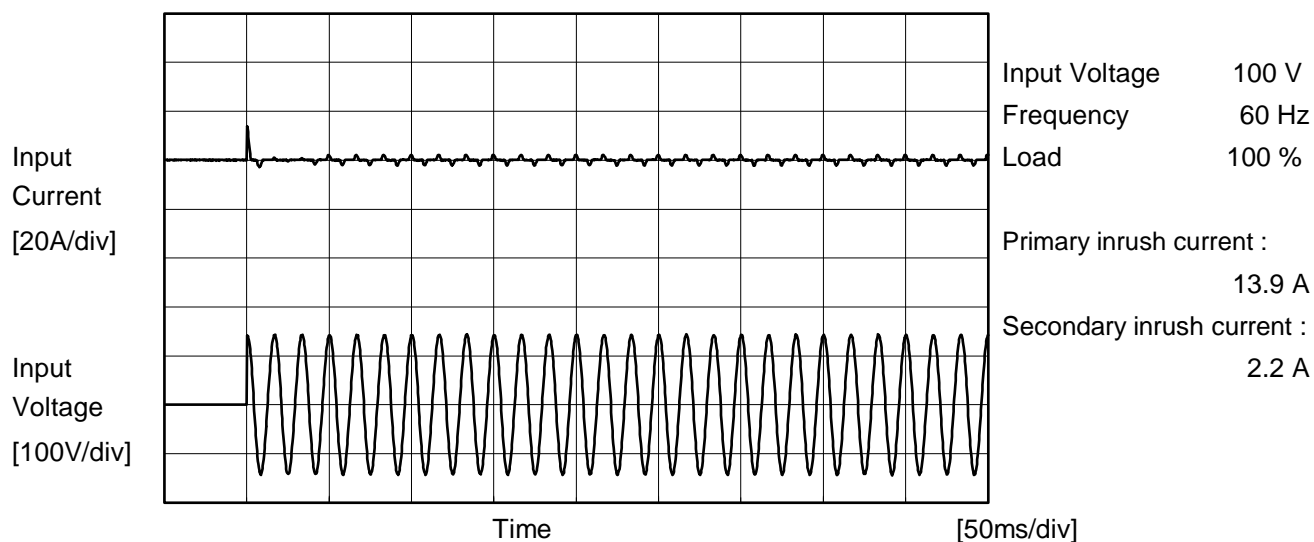
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Model	LHA50F-24	Temperature 25°C Testing Circuitry Figure A	
Item	Inrush Current		
Object			





		Temperature 25°C Testing Circuitry Figure B
Model	LHA50F-24	
Item	Leakage Current	
Object	_____	

1.Results

[mA]

Standards	Testing Circuitry	Measuring Method	Input Volt.			Note
			100 [V]	230 [V]	240 [V]	
DEN-AN	Figure B-1	Both phases	0.08	0.21	0.22	Operation
		One of phases	0.16	0.42	0.45	Stand by
IEC62368-1	Figure B-2	Both phases	0.11	0.26	0.26	Operation
		One of phases	0.16	0.38	0.40	Stand by
	Figure B-3	Both phases	0.11	0.26	0.27	Operation
		One of phases	0.16	0.38	0.40	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	LHA50F-24																																		
Item	Line Regulation	Temperature	25°C																																
Object	+24V2.1A	Testing Circuitry	Figure A																																
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Model	LHA50F-24	Temperature 25°C Testing Circuitry Figure A
Item	Dynamic Load Response	
Object	+24V2.1A	

Input Volt. 230 V
Cycle 1000 ms

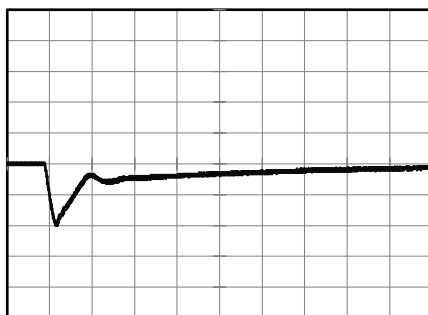
t1,t2 = 50 μ s



Min.Load (0A) ←→
Load 100% (2.1A)

200 mV/div

800 μ s/div

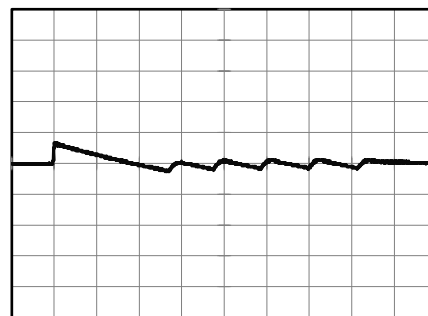
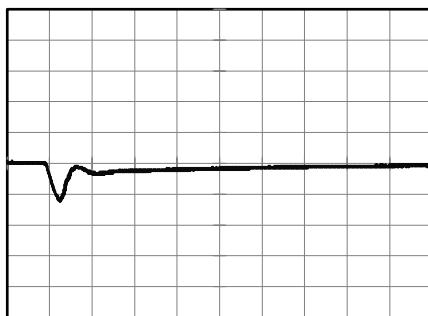


4 ms/div

Min.Load (0A) ←→
Load 50% (1.05A)

200 mV/div

800 μ s/div

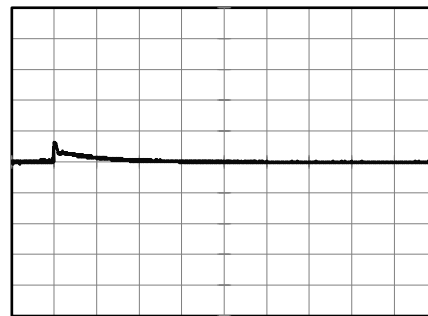
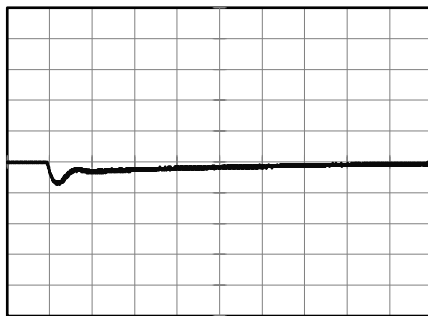


4 ms/div

Load 50% (1.05A) ←→
Load 100% (2.1A)

200 mV/div

800 μ s/div



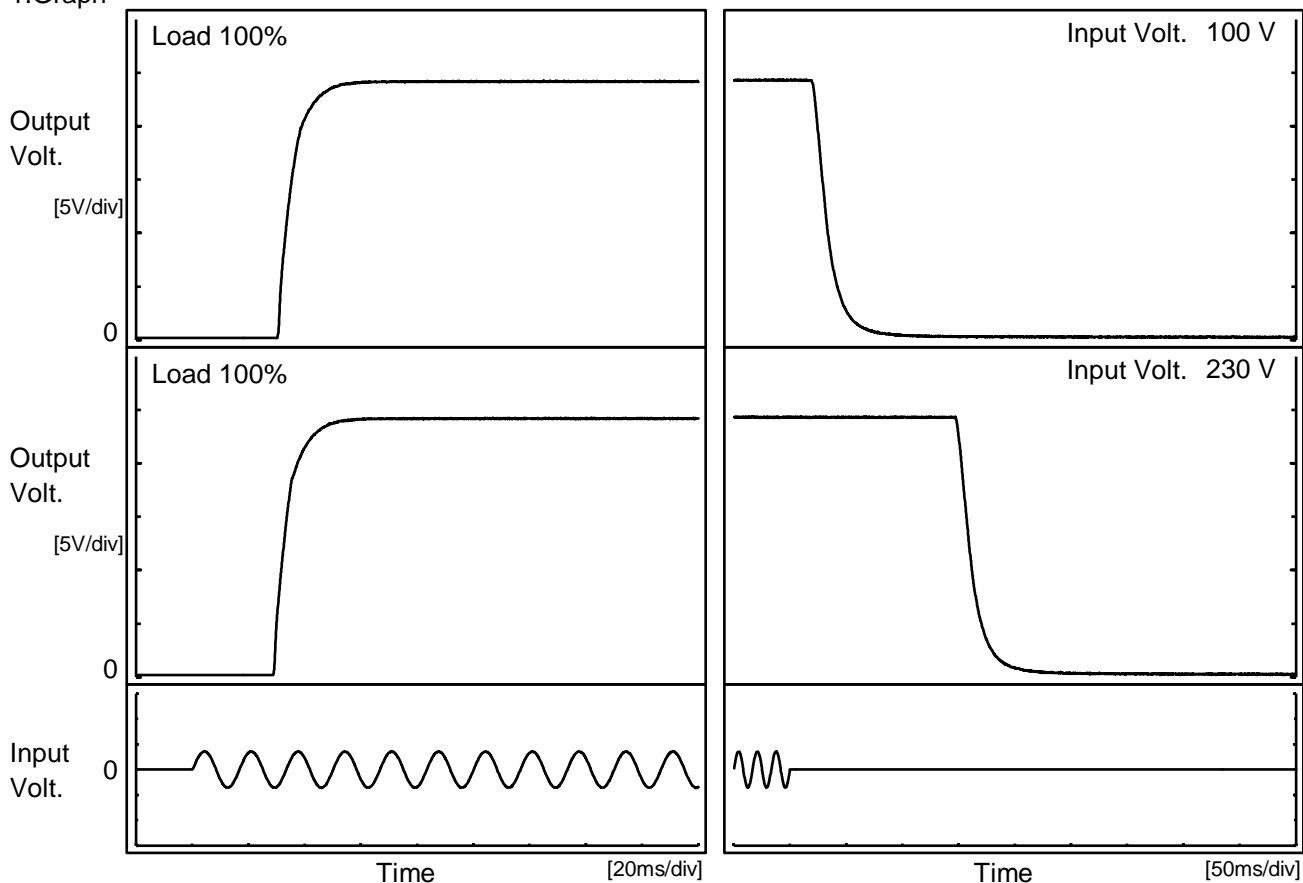
4 ms/div

Model		LHA50F-24	Temperature		25°C
Item		Ripple-Noise(by Load Current)	Testing Circuitry		Figure C
Object		+24V2.1A			
1.Graph			2.Values		
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Model		LHA50F-24																																						
Item		Ambient Temperature Drift	Testing Circuitry Figure A																																					
Object		+24V2.1A																																						
1.Graph																																								
		—△— Input Volt. 100V																																						
		---□--- Input Volt. 200V																																						
		-·-○-·- Input Volt. 230V																																						
<div><div>Output Voltage [V]</div><div><table border="1"><caption>Graph Data (Approximate)</caption><thead><tr><th>Ambient Temperature [°C]</th><th>100V Input [V]</th><th>200V Input [V]</th><th>230V Input [V]</th></tr></thead><tbody><tr><td>-20</td><td>24.006</td><td>24.007</td><td>24.006</td></tr><tr><td>-15</td><td>24.016</td><td>24.017</td><td>24.017</td></tr><tr><td>-10</td><td>24.018</td><td>24.019</td><td>24.018</td></tr><tr><td>0</td><td>24.024</td><td>24.025</td><td>24.024</td></tr><tr><td>25</td><td>24.026</td><td>24.026</td><td>24.026</td></tr><tr><td>40</td><td>24.037</td><td>24.038</td><td>24.037</td></tr><tr><td>50</td><td>24.037</td><td>24.037</td><td>24.037</td></tr><tr><td>60</td><td>24.038</td><td>24.039</td><td>24.038</td></tr></tbody></table></div><div>Ambient Temperature [°C]</div><div>Load 100%</div></div>					Ambient Temperature [°C]	100V Input [V]	200V Input [V]	230V Input [V]	-20	24.006	24.007	24.006	-15	24.016	24.017	24.017	-10	24.018	24.019	24.018	0	24.024	24.025	24.024	25	24.026	24.026	24.026	40	24.037	24.038	24.037	50	24.037	24.037	24.037	60	24.038	24.039	24.038
Ambient Temperature [°C]	100V Input [V]	200V Input [V]	230V Input [V]																																					
-20	24.006	24.007	24.006																																					
-15	24.016	24.017	24.017																																					
-10	24.018	24.019	24.018																																					
0	24.024	24.025	24.024																																					
25	24.026	24.026	24.026																																					
40	24.037	24.038	24.037																																					
50	24.037	24.037	24.037																																					
60	24.038	24.039	24.038																																					
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. 200[V]	Input Volt. 230[V]																																				
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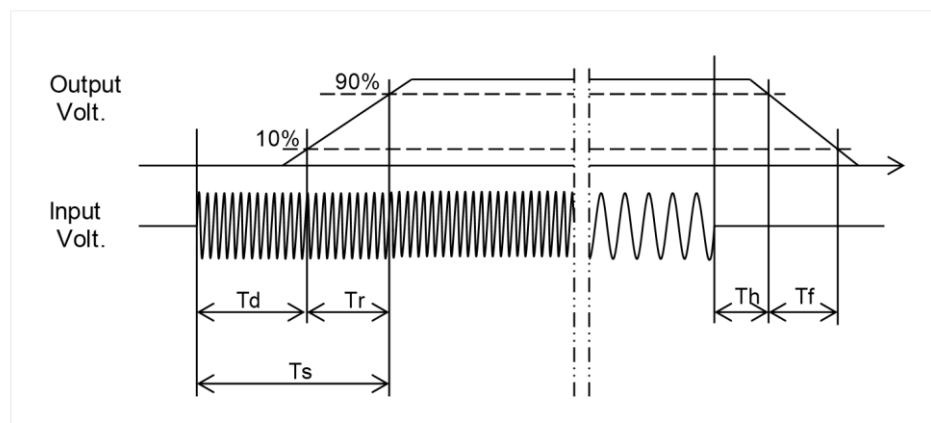
Model	LHA50F-24		
Item	Rise and Fall Time	Temperature	25°C
Object	+24V2.1A	Testing Circuitry	Figure A

1.Graph

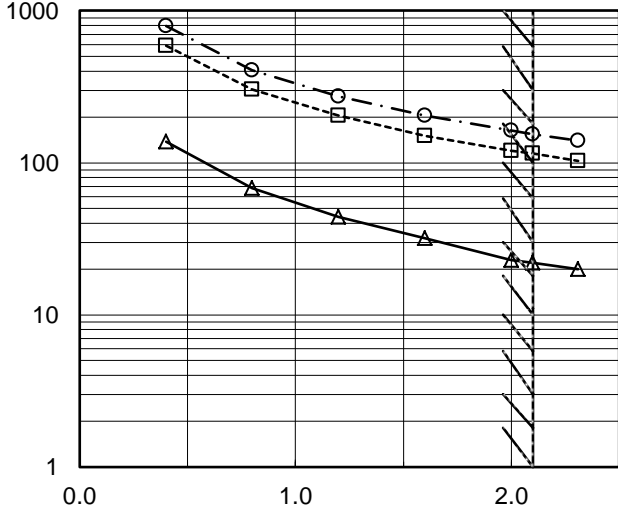


2.Values

		[ms]				
Input Volt.	Time	Td	Tr	Ts	Th	Tf
100 V		31.0	11.3	42.3	22.8	28.0
230 V		29.5	11.3	40.8	150.8	28.0



Model		LHA50F-24	Temperature		25°C																																
Item		Hold-Up Time	Testing Circuitry		Figure A																																
Object		+24V2.1A																																			
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>Load 50%</div></div><div><div></div><div></div></div><div>Load 100%</div></div> <div><div>Hold-Up Time [ms]</div><div>1000</div><div>100</div><div>10</div><div>1</div><div>50</div><div>100</div><div>150</div><div>200</div><div>250</div><div>300</div><div>Input Voltage [V]</div></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><p>Note: Slanted line shows the range of the rated input voltage.</p></div>			<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>34</td><td>-</td></tr><tr><td>90</td><td>39</td><td>16</td></tr><tr><td>100</td><td>50</td><td>21</td></tr><tr><td>120</td><td>76</td><td>35</td></tr><tr><td>200</td><td>231</td><td>112</td></tr><tr><td>230</td><td>311</td><td>153</td></tr><tr><td>264</td><td>418</td><td>208</td></tr><tr><td>280</td><td>477</td><td>237</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></table>			Input Voltage [V]	Hold-Up Time [ms]		Load 50%	Load 100%	85	34	-	90	39	16	100	50	21	120	76	35	200	231	112	230	311	153	264	418	208	280	477	237	--	-	-
Input Voltage [V]	Hold-Up Time [ms]																																				
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264	418	208																																			
280	477	237																																			
--	-	-																																			

Model		LHA50F-24	Temperature25°C Testing CircuitryFigure A
Item		Instantaneous Interruption Compensation	
Object		+24V2.1A	
1.Graph			
		—△— Input Volt. 100V	2.Values
		---□--- Input Volt. 200V	
		-·-○-·- Input Volt. 230V	
Instantaneous Compensation Time [ms]			
Load Current [A]			
Note: Slanted line shows the range of the rated load current.			

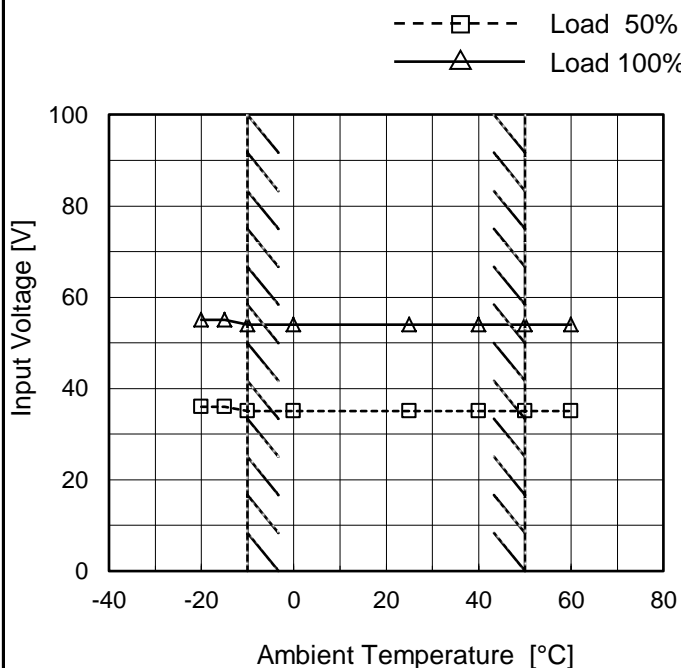
Model LHA50F-24

Item Minimum Input Voltage
for Regulated Output Voltage

Object +24V2.1A

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	36	55
-15	36	55
-10	35	54
0	35	54
25	35	54
40	35	54
50	35	54
60	35	54
--	-	-
--	-	-
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Model	LHA50F-24																																														
Item	Overcurrent Protection	Temperature	25°C																																												
Object	+24V2.1A	Testing Circuitry	Figure A																																												
1.Graph		2.Values																																													
<div><div><div></div>Input Volt. 100V</div><div><div></div>Input Volt. 230V</div></div> <p>Note: Slanted line shows the range of the rated load current.</p> <p>Overcurrent protection is Hiccup mode.</p>		<table><tr><th rowspan="2">Output Voltage [V]</th><th colspan="2">Load Current [A]</th></tr><tr><th>Input Volt. 100[V]</th><th>Input Volt. 230[V]</th></tr><tr><td>24.0</td><td>2.62</td><td>2.58</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><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. 100[V]	Input Volt. 230[V]	24.0	2.62	2.58	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Output Voltage [V]	Load Current [A]																																														
	Input Volt. 100[V]	Input Volt. 230[V]																																													
24.0	2.62	2.58																																													
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Model		LHA50F-24
Item		Overvoltage Protection
Object		+24V2.1A
1.Graph		2.Values

—△—

Input Volt. 100V

---□---

Input Volt. 230V

Operating Point [V]

Ambient Temperature [°C]

Load 0%

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

Ambient Temperature [°C]	Operating Point [V]	
	Input Volt. 100[V]	Input Volt. 230[V]
-20	29.81	29.81
-15	29.94	29.94
-10	30.08	30.08
0	30.28	30.28
25	30.82	30.82
40	31.09	31.09
50	31.29	31.29
60	31.57	31.57
--	-	-
--	-	-
--	-	-

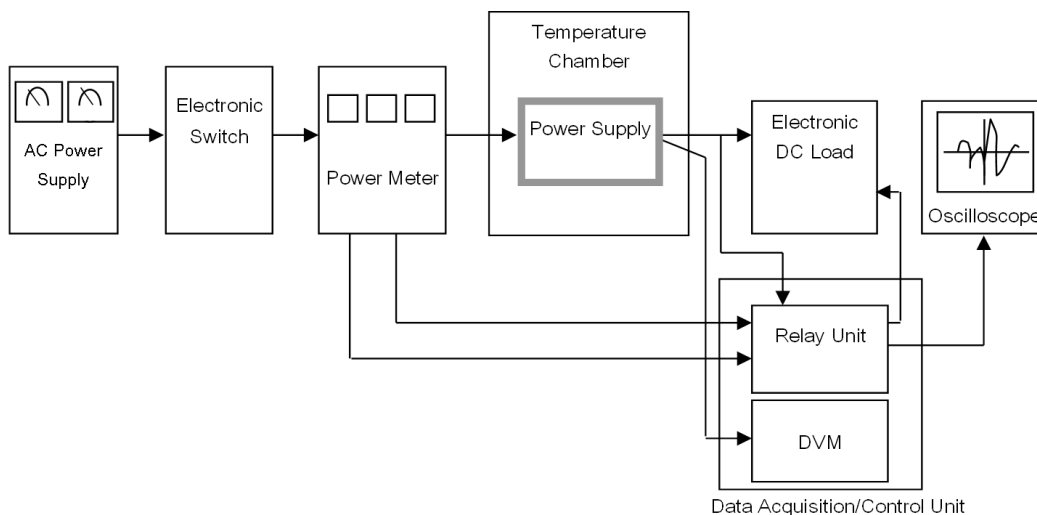


Figure A

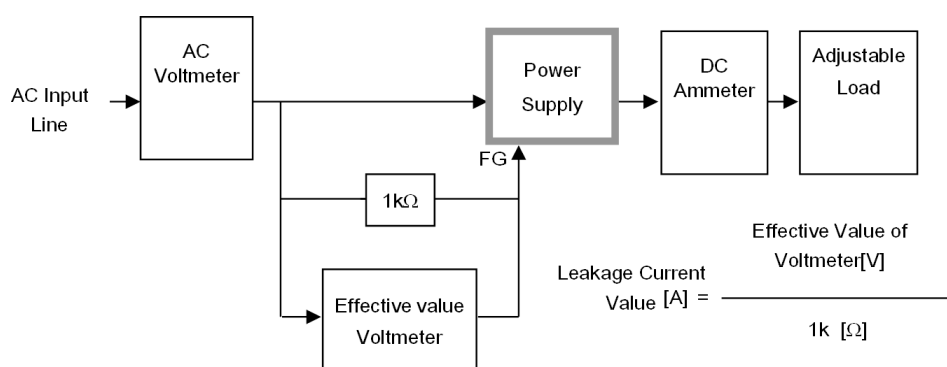


Figure B-1 (DEN-AN)

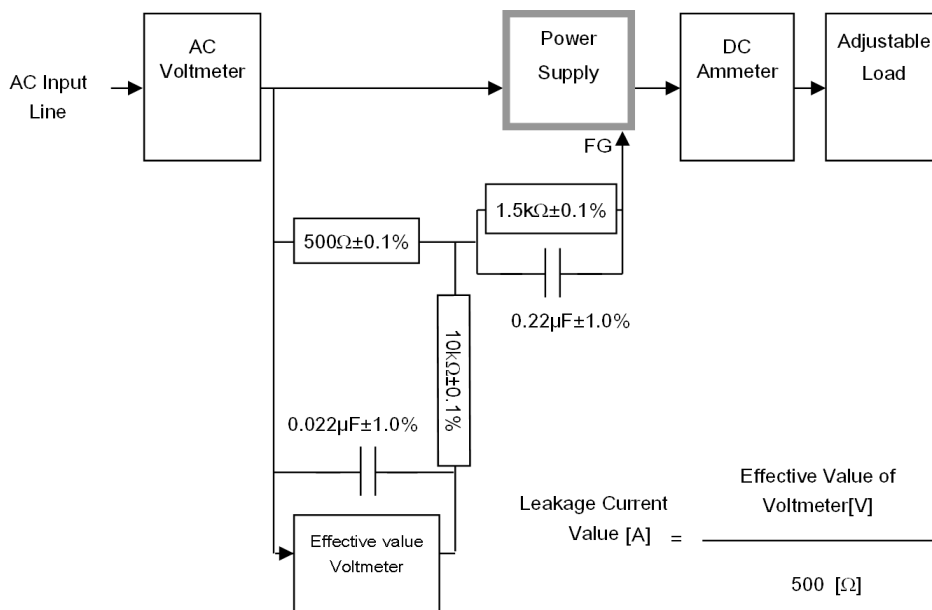


Figure B-2 (IEC62368-1 refer to IEC60990 Fig.4)

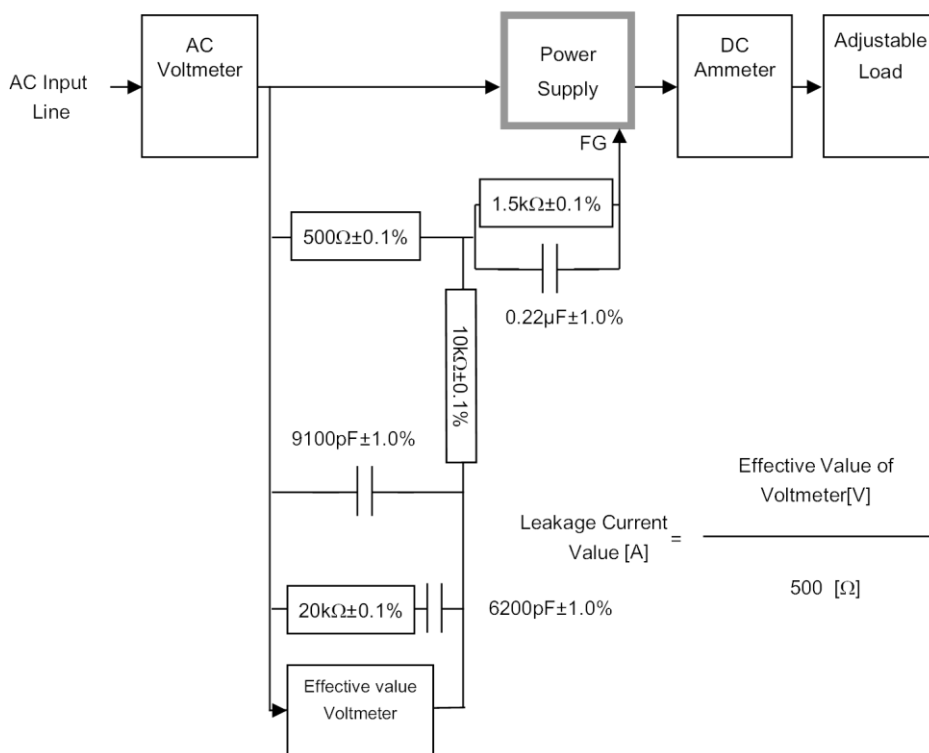


Figure B-3 (IEC62368-1 refer to IEC60990 Fig.5)

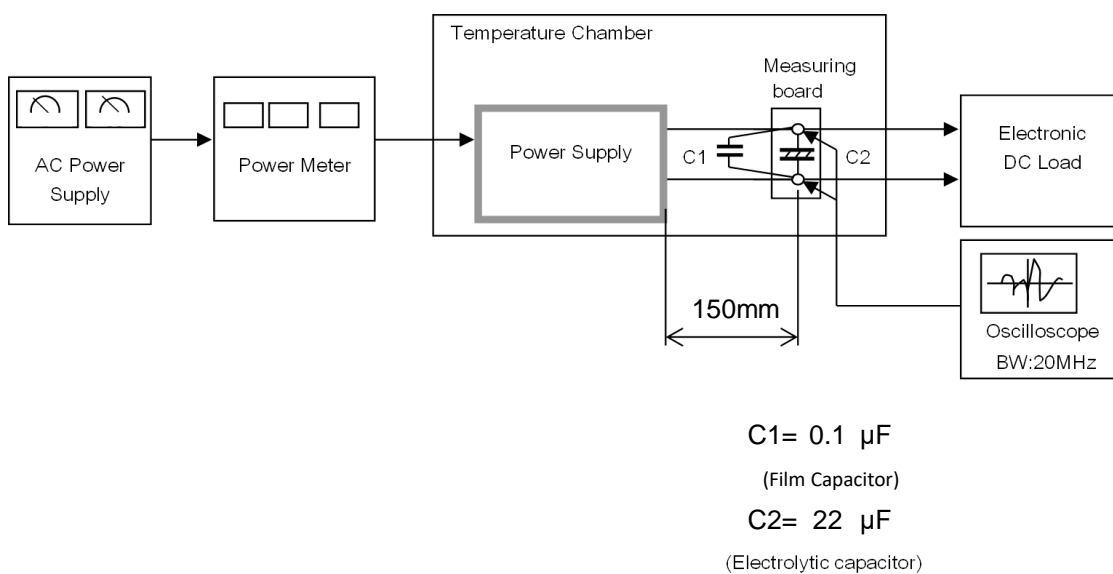


Figure C