

TEST DATA OF LHA15F-3R3-Y

Regulated DC Power Supply
February 2, 2022

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Design Manager

Prepared by : Naofumi Nakada
Design Engineer

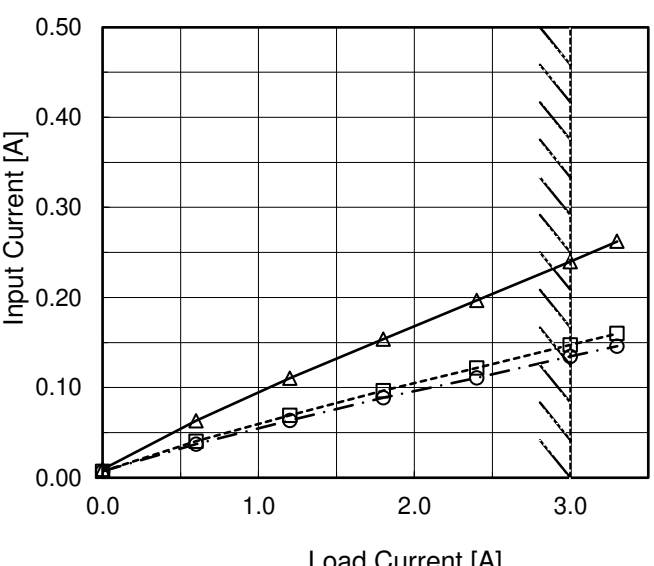
COSEL CO.,LTD.

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Model		LHA15F-3R3-Y		Temperature 25°C																																																				
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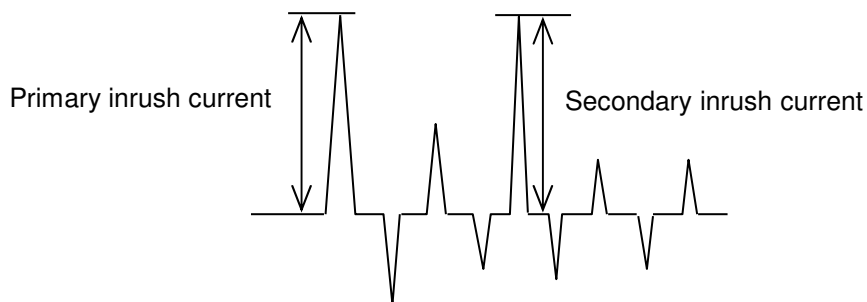
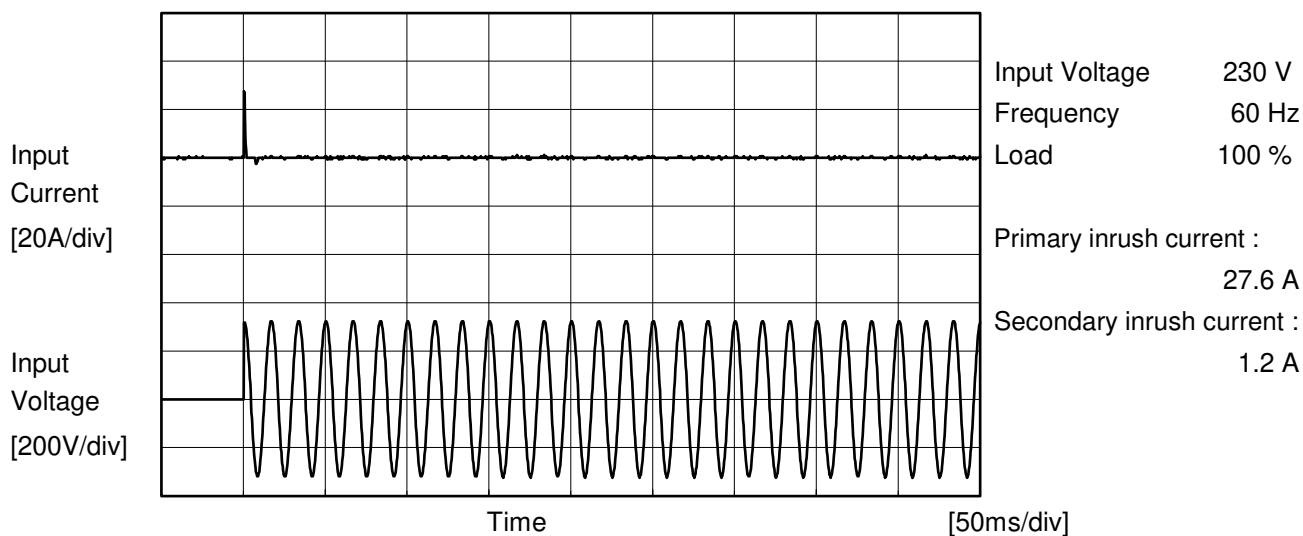
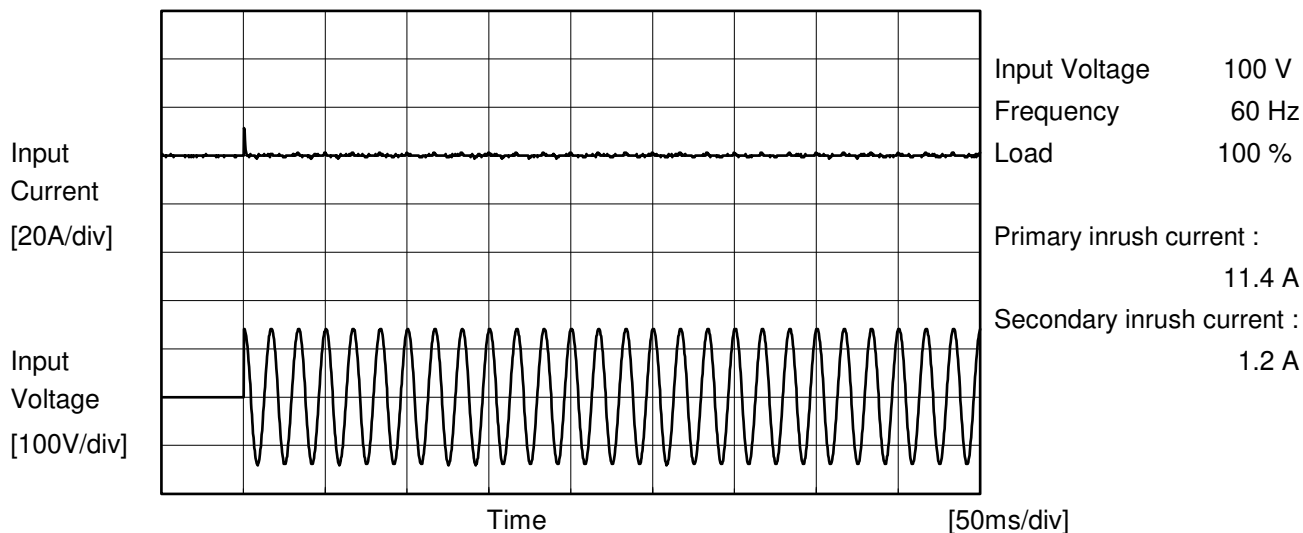
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Model		LHA15F-3R3-Y	Temperature Testing Circuitry	25° C Figure A
Item		Inrush Current		
Object		_____		





LOREL		Temperature 25°C Testing Circuitry Figure B
Model	LHA15F-3R3-Y	
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	0.02	0.05	0.05	Operation
		One of phases	0.03	0.07	0.07	Stand by
IEC62368-1	Figure B-2	Both phases	0.02	0.05	0.05	Operation
		One of phases	0.03	0.07	0.07	Stand by
	Figure B-3	Both phases	0.02	0.05	0.05	Operation
		One of phases	0.03	0.07	0.07	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	LHA15F-3R3-Y																																		
Item	Line Regulation	Temperature	25°C																																
		Testing Circuitry	Figure A																																
Object	+3.3V3A																																		
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Model		LHA15F-3R3-Y	Temperature 25°C Testing Circuitry Figure A
Item		Dynamic Load Response	
Object		+3.3V3A	

Input Volt. 230 V
Cycle 1000 ms



Min.Load (0A) \longleftrightarrow
Load 100% (3A)

200 mV/div

1 ms/div

4 ms/div

Min.Load (0A) \longleftrightarrow
Load 50% (1.5A)

200 mV/div

1 ms/div

4 ms/div

Load 50% (1.5A) \longleftrightarrow
Load 100% (3A)

200 mV/div

1 ms/div

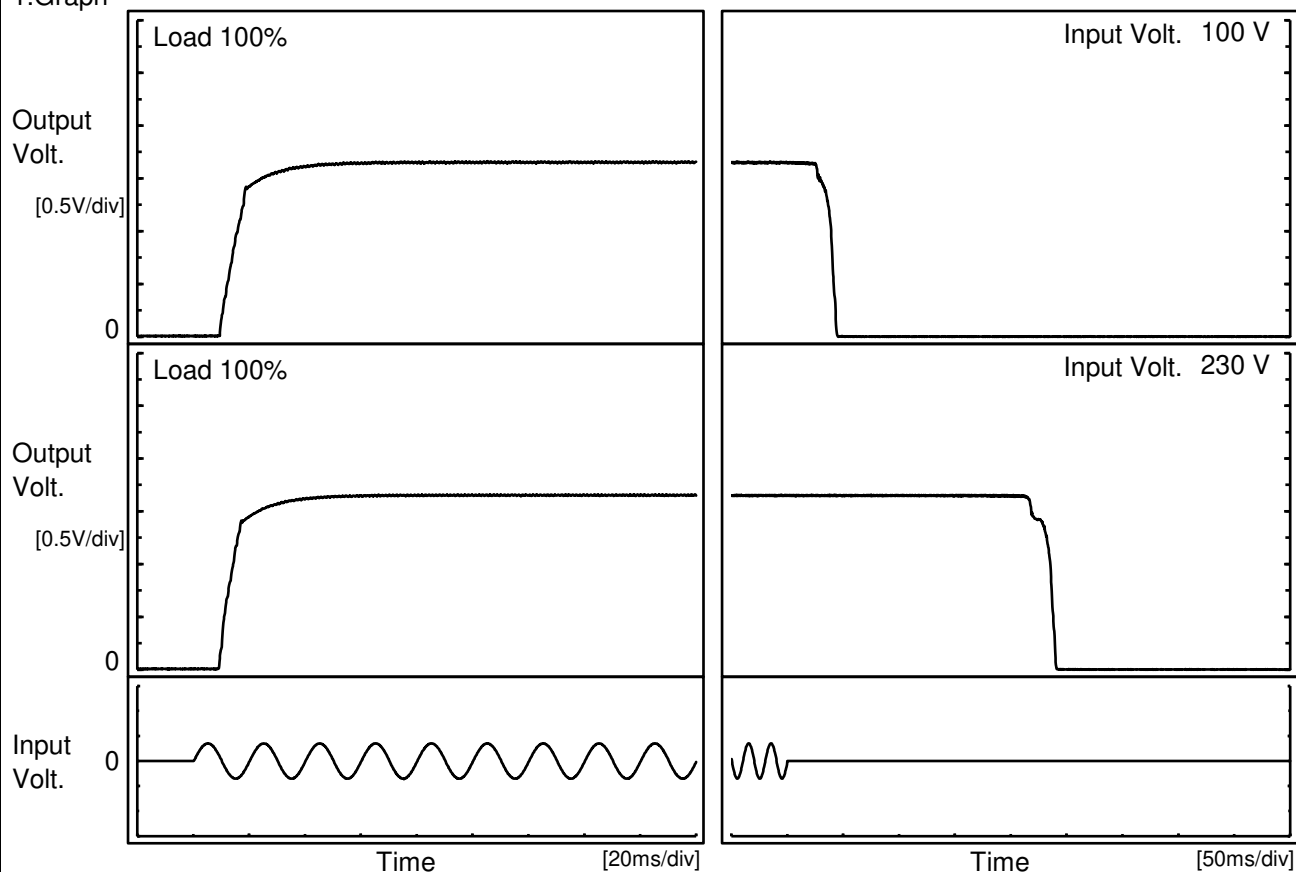
4 ms/div

Model		LHA15F-3R3-Y	Temperature Testing Circuitry	25°C Figure C
Item		Ripple-Noise(by Load Current)		
Object		+3.3V3A		
1.Graph			2.Values	
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Model		LHA15F-3R3-Y																																																				
Item		Ambient Temperature Drift																																																				
Object		+3.3V3A																																																				
1.Graph		2.Values																																																				
<div><div><div><div><div>—△—</div><div>Input Volt. 100V</div></div><div><div>---□---</div><div>Input Volt. 200V</div></div><div><div>---○---</div><div>Input Volt. 230V</div></div></div><p>Output Voltage [V]</p><p>Ambient Temperature [°C]</p><p>Load 100%</p><p>Note: Slanted line shows the range of the rated ambient temperature.</p></div></div>		<table><tr><th rowspan="2">Ambient Temperature [°C]</th><th colspan="3">Output Voltage [V]</th></tr><tr><th>Input Volt. 100[V]</th><th>Input Volt. 200[V]</th><th>Input Volt. 230[V]</th></tr><tr><td>-20</td><td>3.302</td><td>3.302</td><td>3.302</td></tr><tr><td>-15</td><td>3.304</td><td>3.305</td><td>3.305</td></tr><tr><td>-10</td><td>3.306</td><td>3.308</td><td>3.308</td></tr><tr><td>0</td><td>3.311</td><td>3.312</td><td>3.312</td></tr><tr><td>25</td><td>3.318</td><td>3.319</td><td>3.319</td></tr><tr><td>40</td><td>3.321</td><td>3.322</td><td>3.323</td></tr><tr><td>50</td><td>3.323</td><td>3.324</td><td>3.324</td></tr><tr><td>60</td><td>3.325</td><td>3.326</td><td>3.326</td></tr><tr><td>70</td><td>3.326</td><td>3.328</td><td>3.327</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr></table>		Ambient Temperature [°C]	Output Voltage [V]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	-20	3.302	3.302	3.302	-15	3.304	3.305	3.305	-10	3.306	3.308	3.308	0	3.311	3.312	3.312	25	3.318	3.319	3.319	40	3.321	3.322	3.323	50	3.323	3.324	3.324	60	3.325	3.326	3.326	70	3.326	3.328	3.327	--	-	-	-	--	-	-	-
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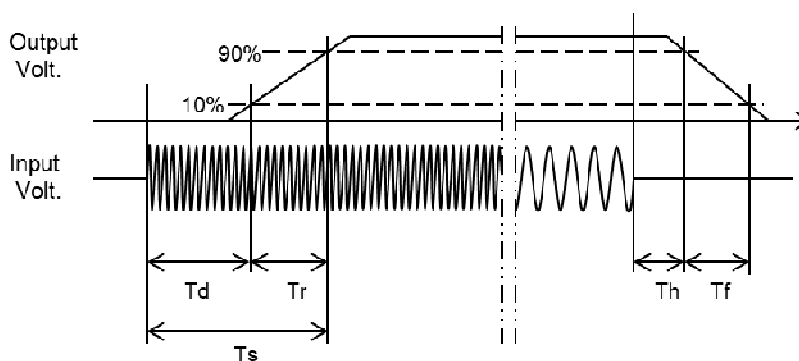
Model	LHA15F-3R3-Y	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+3.3V3A		

1.Graph



2.Values

Input Volt.	Time	Td	Tr	Ts	Th	Tf
100 V		10.1	13.5	23.6	29.5	14.0
230 V		9.8	12.6	22.4	219.3	20.5



Model	LHA15F-3R3-Y																																		
Item	Hold-Up Time	Temperature	25°C																																
		Testing Circuitry	Figure A																																
Object	+3.3V3A																																		
1.Graph		2.Values																																	
<div><div><div><div>---</div><div>□</div><div>---</div></div><div>Load 50%</div></div><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>		<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>53</td><td>15</td></tr><tr><td>90</td><td>60</td><td>20</td></tr><tr><td>100</td><td>77</td><td>27</td></tr><tr><td>120</td><td>117</td><td>47</td></tr><tr><td>200</td><td>348</td><td>158</td></tr><tr><td>230</td><td>468</td><td>218</td></tr><tr><td>264</td><td>624</td><td>300</td></tr><tr><td>280</td><td>707</td><td>340</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></table>		Input Voltage [V]	Hold-Up Time [ms]		Load 50%	Load 100%	85	53	15	90	60	20	100	77	27	120	117	47	200	348	158	230	468	218	264	624	300	280	707	340	--	-	-
Input Voltage [V]	Hold-Up Time [ms]																																		
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--	-	-																																	
<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>																																			

Model		LHA15F-3R3-Y		Temperature 25°C																																																				
Item		Instantaneous Interruption Compensation		Testing Circuitry Figure A																																																				
Object		+3.3V3A																																																						
1.Graph				2.Values																																																				
<div><div><div>—△—</div><div>Input Volt.</div><div>100V</div></div><div><div>---□---</div><div>Input Volt.</div><div>200V</div></div><div><div>---○---</div><div>Input Volt.</div><div>230V</div></div></div> <p>Instantaneous Compensation Time [ms]</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">Time [ms]</th></tr><tr><th>Input Volt. 100[V]</th><th>Input Volt. 200[V]</th><th>Input Volt. 230[V]</th></tr><tr><td>0.0</td><td>-</td><td>-</td><td>-</td></tr><tr><td>0.6</td><td>194</td><td>433</td><td>591</td></tr><tr><td>1.2</td><td>100</td><td>433</td><td>580</td></tr><tr><td>1.5</td><td>78</td><td>348</td><td>467</td></tr><tr><td>1.8</td><td>64</td><td>290</td><td>388</td></tr><tr><td>2.4</td><td>45</td><td>213</td><td>286</td></tr><tr><td>3.0</td><td>27</td><td>158</td><td>218</td></tr><tr><td>3.3</td><td>22</td><td>132</td><td>187</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. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	0.0	-	-	-	0.6	194	433	591	1.2	100	433	580	1.5	78	348	467	1.8	64	290	388	2.4	45	213	286	3.0	27	158	218	3.3	22	132	187	--	-	-	-	--	-	-	-	--	-	-	-
Load Current [A]	Time [ms]																																																							
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Model		LHA15F-3R3-Y
Item		Minimum Input Voltage for Regulated Output Voltage
Object		+3.3V3A

1.Graph

Load 50%

Load 100%

Input Voltage [V]



Model		LHA15F-3R3-Y	Temperature Testing Circuitry	25°C Figure A																																												
Item		Overcurrent Protection																																														
Object		+3.3V3A																																														
1.Graph			2.Values																																													
<div><div><div></div><div>Input Volt. 100V</div></div><div><div></div><div>Input Volt. 230V</div></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>3.300</td><td>3.69</td><td>3.80</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]	3.300	3.69	3.80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Output Voltage [V]	Load Current [A]																																															
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Model		LHA15F-3R3-Y
Item		Overvoltage Protection
Object		+3.3V3A

1.Graph

—△—

Input Volt. 100V

---□---

Input Volt. 230V

Operating Point [V]

Ambient Temperature [°C]

Load 0%

2.Values

Ambient Temperature [°C]	Operating Point [V]	
	Input Volt. 100[V]	Input Volt. 230[V]
-20	5.45	5.40
-15	5.44	5.39
-10	5.44	5.39
0	5.44	5.39
25	5.42	5.37
40	5.42	5.37
50	5.41	5.36
60	5.40	5.35
70	5.39	5.35
--	-	-
--	-	-

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

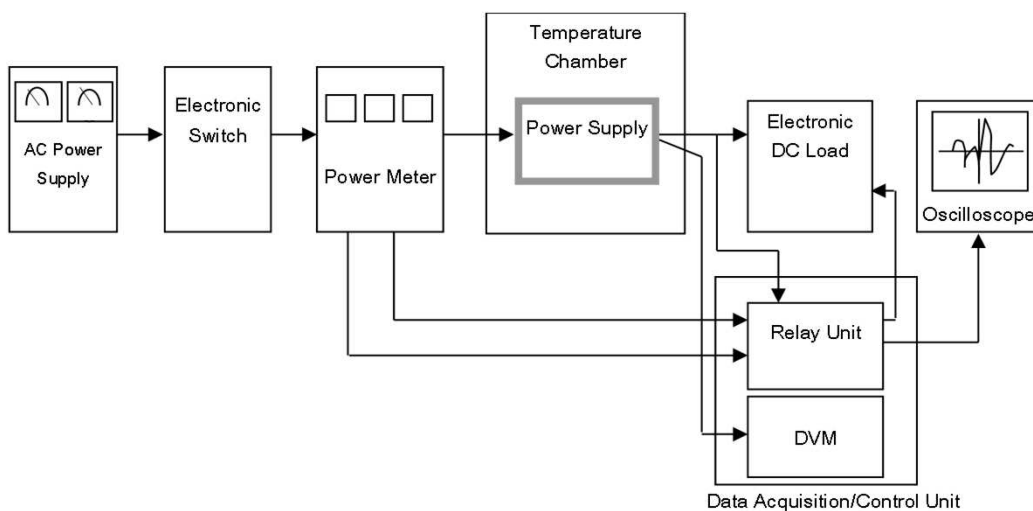


Figure A

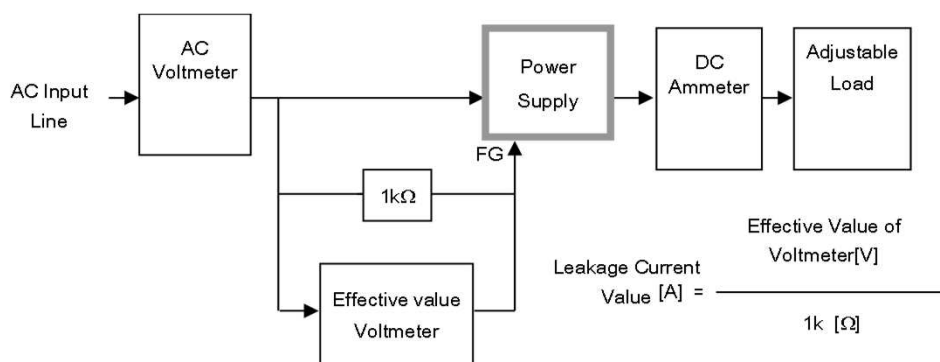


Figure B-1 (DEN-AN)

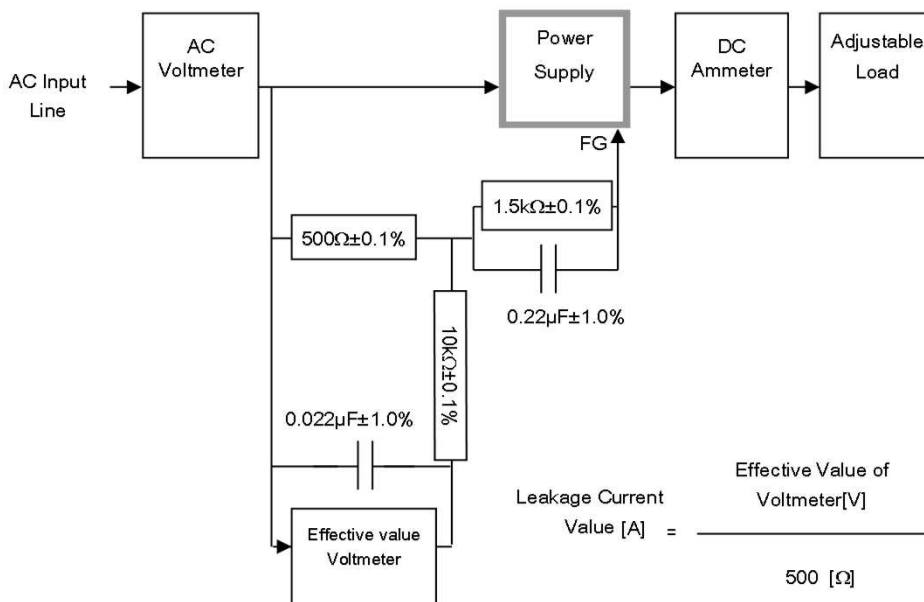


Figure B-2 (IEC62368-1 refer to IEC60990 Fig.4)

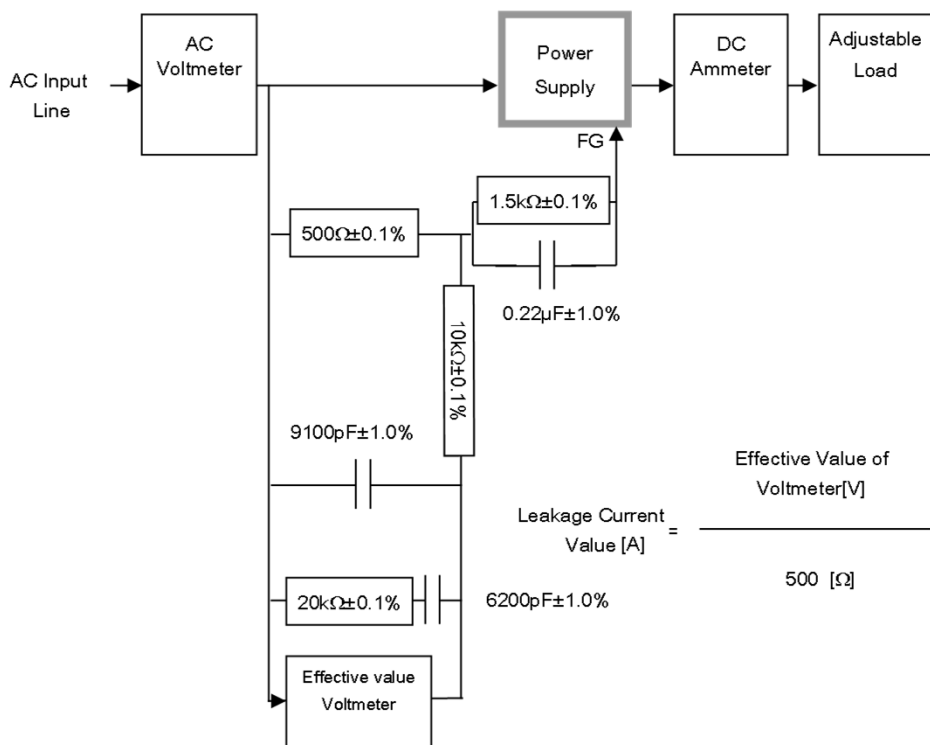


Figure B-3 (IEC62368-1 refer to IEC60990 Fig.5)

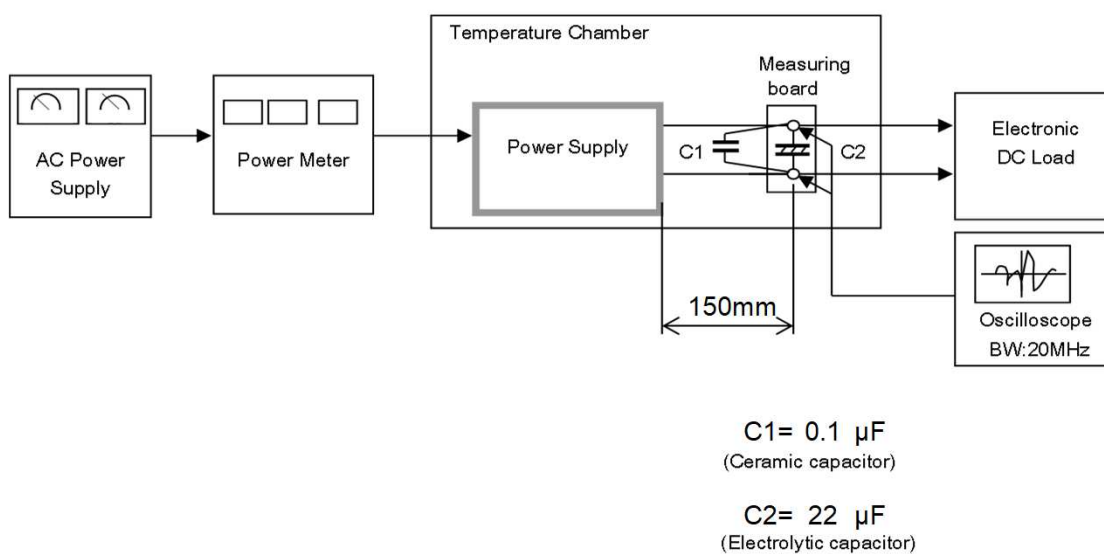


Figure C