COSEL

参考資料

TEST DATA OF LHA10F-15

Regulated DC Power Supply
February 2, 2022

Approved by : Tetsukazu Okamoto
Design Manager

Prepared by : Naofumi Nakada
Design Engineer

COSEL CO.,LTD.

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Object	————————

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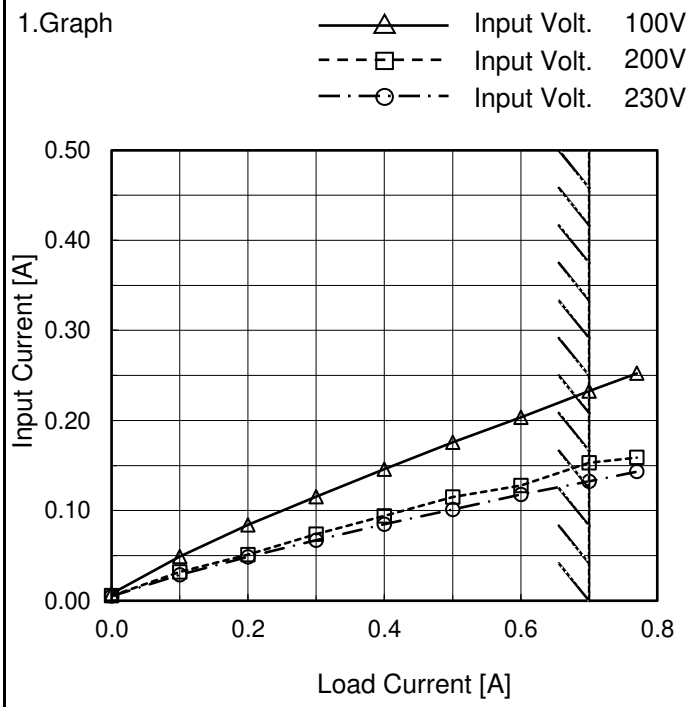

Note: Slanted line shows the range of the rated load current.

2.Values

Load Current [A]	Input Current [A]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	0.008	0.006	0.005
0.10	0.049	0.032	0.029
0.20	0.084	0.051	0.049
0.30	0.116	0.074	0.067
0.40	0.146	0.094	0.085
0.50	0.176	0.115	0.101
0.60	0.203	0.128	0.118
0.70	0.233	0.153	0.133
0.77	0.252	0.159	0.143
--	-	-	-
--	-	-	-

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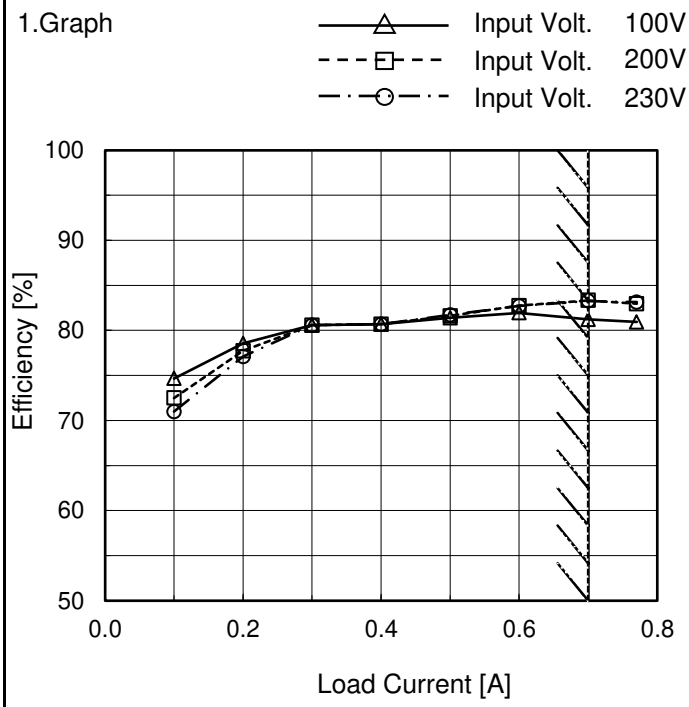
Model	LHA10F-15
Item	Efficiency (by Load Current)
Object	————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Note: Slanted line shows the range of the rated load current.

2.Values

Load Current [A]	Efficiency [%]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	-	-	-
0.10	74.7	72.5	71.0
0.20	78.5	77.7	77.1
0.30	80.6	80.6	80.6
0.40	80.7	80.7	80.7
0.50	81.4	81.6	81.7
0.60	82.0	82.7	82.7
0.70	81.2	83.3	83.3
0.77	80.9	83.0	83.2
--	-	-	-
--	-	-	-

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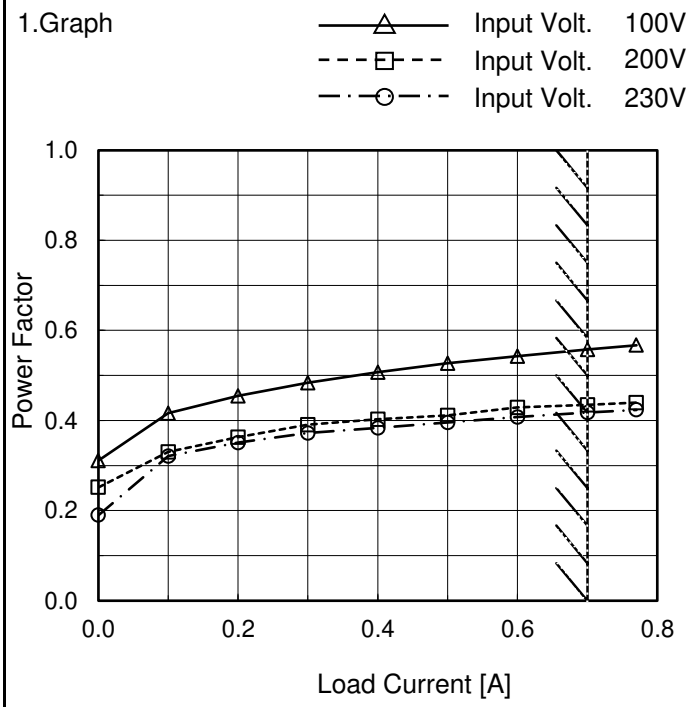
Model	LHA10F-15
Item	Power Factor (by Load Current)
Object	————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Note: Slanted line shows the range of the rated load current.

2.Values

Load Current [A]	Power Factor		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	0.311	0.252	0.190
0.10	0.416	0.330	0.321
0.20	0.455	0.363	0.351
0.30	0.484	0.391	0.372
0.40	0.507	0.403	0.383
0.50	0.527	0.411	0.396
0.60	0.543	0.429	0.408
0.70	0.558	0.435	0.417
0.77	0.567	0.440	0.424
--	-	-	-
--	-	-	-

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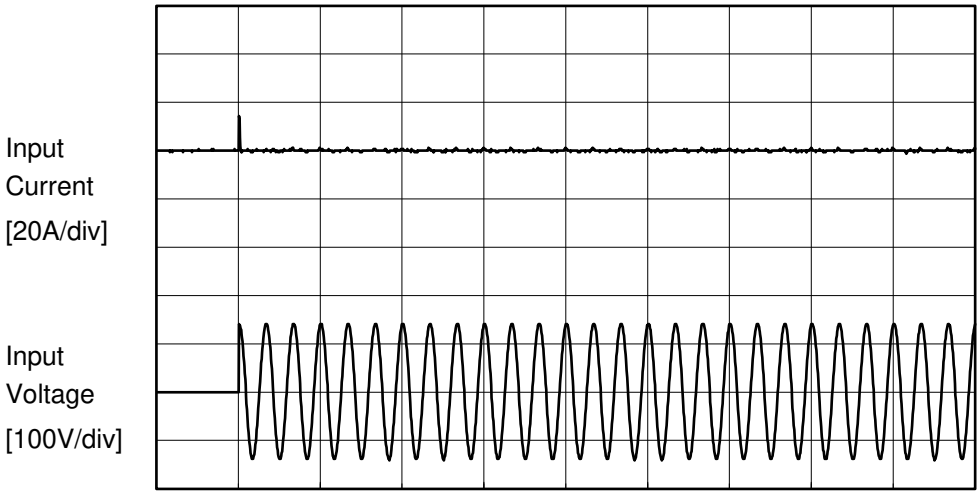
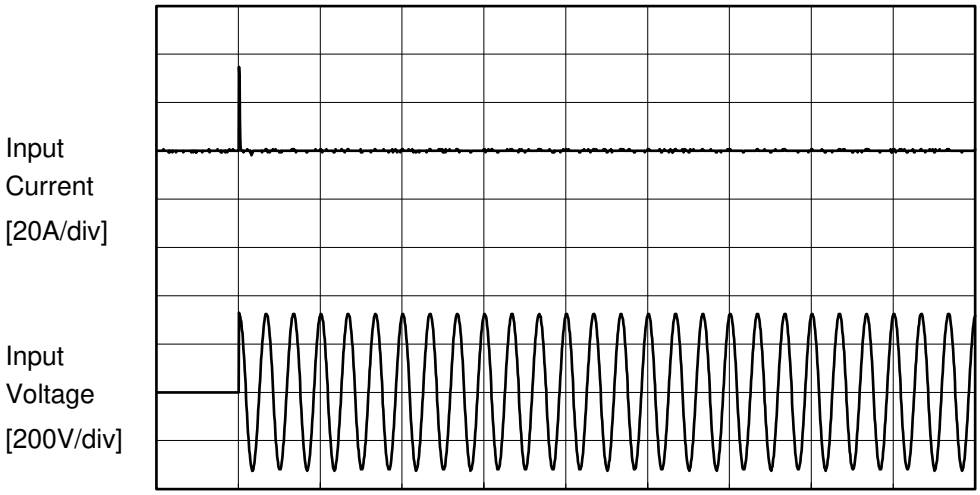
Model	LHA10F-15		
Item	Inrush Current	Temperature	25° C
		Testing Circuitry	Figure A
Object	――――――		



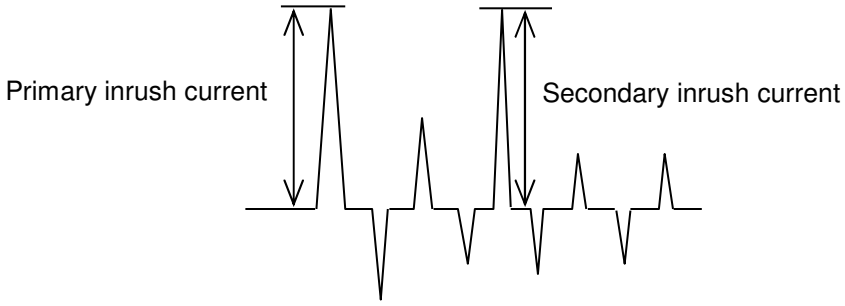
Input Voltage 100 V
Frequency 60 Hz
Load 100 %

Primary inrush current :
14.4 A
Secondary inrush current :
1.2 A



Input Voltage 230 V
Frequency 60 Hz
Load 100 %

Primary inrush current :
34.8 A
Secondary inrush current :
0.6 A



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Model	LHA10F-15	
Item	Leakage Current	Temperature 25°C Testing Circuitry Figure B
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	0.03	0.09	0.09	Operation
		One of phases	0.05	0.13	0.13	Stand by
IEC62368-1	Figure B-2	Both phases	0.03	0.09	0.09	Operation
		One of phases	0.05	0.13	0.13	Stand by
	Figure B-3	Both phases	0.03	0.09	0.09	Operation
		One of phases	0.05	0.13	0.13	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.

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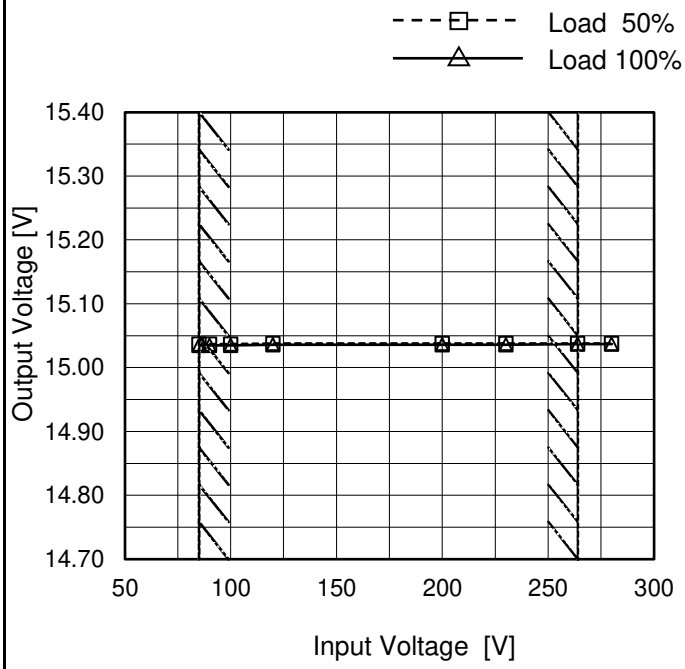
Model	LHA10F-15
Item	Line Regulation
Object	+15V0.7A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Note: Slanted line shows the range of the rated input voltage.

2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
85	15.037	15.035
90	15.037	15.035
100	15.037	15.035
120	15.038	15.036
200	15.038	15.036
230	15.038	15.036
264	15.038	15.037
280	15.038	15.037
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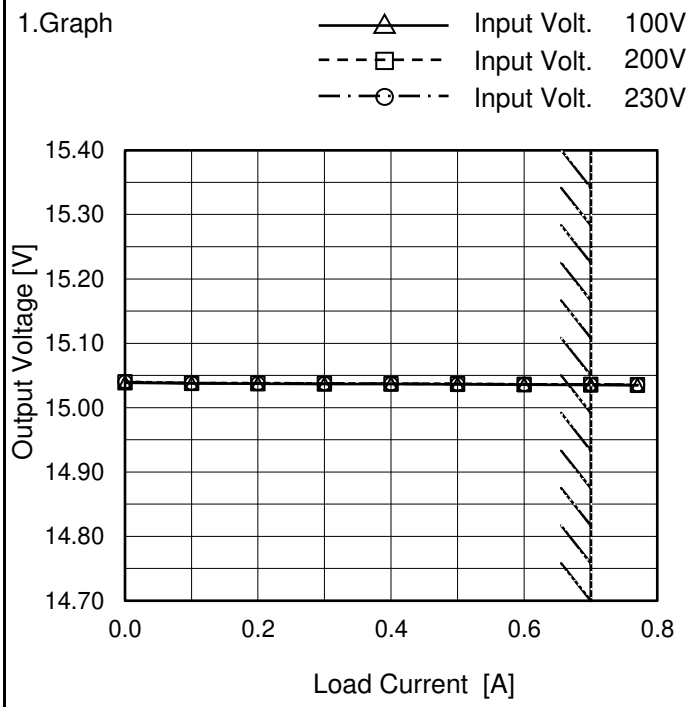
Model	LHA10F-15
Item	Load Regulation
Object	+15V0.7A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Note: Slanted line shows the range of the rated load current.

2.Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	15.039	15.040	15.040
0.10	15.038	15.038	15.038
0.20	15.037	15.038	15.038
0.30	15.037	15.038	15.038
0.40	15.036	15.037	15.037
0.50	15.036	15.037	15.037
0.60	15.036	15.036	15.036
0.70	15.035	15.036	15.036
0.77	15.035	15.036	15.036
--	-	-	-
--	-	-	-

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Model	LHA10F-15
Item	Dynamic Load Response
Object	+15V0.7A

Temperature 25°C
Testing Circuitry Figure A

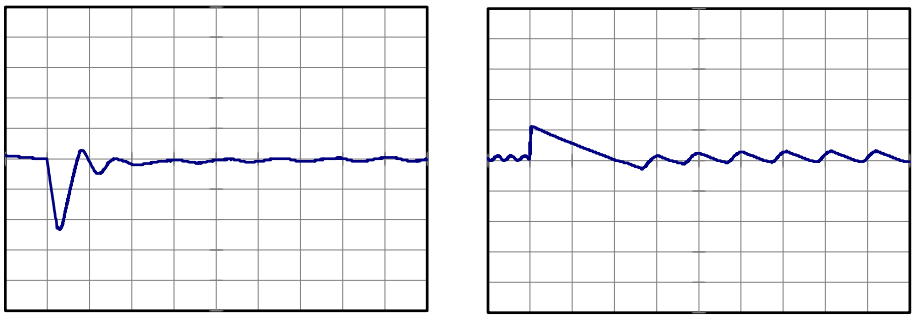
Input Volt. 230 V
Cycle 1000 ms

t1,t2 = 50 μs

Load Current

t1 t2

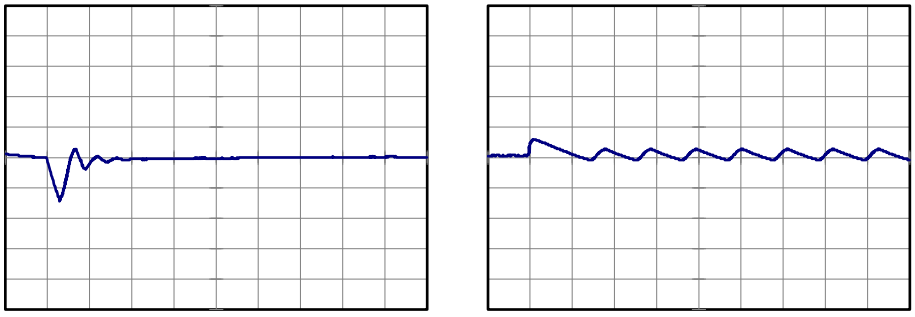
Min.Load (0A)←→
Load 100% (0.7A)



200 mV/div

1 ms/div 4 ms/div

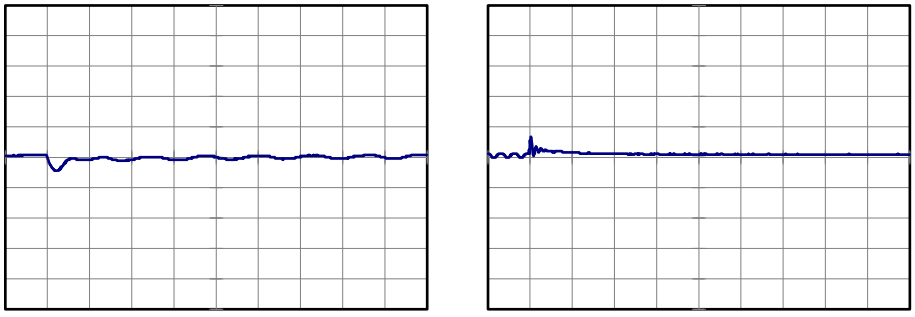
Min.Load (0A)←→
Load 50% (0.35A)



200 mV/div

1 ms/div 4 ms/div

Load 50% (0.35A)←→
Load 100% (0.7A)



200 mV/div

1 ms/div 4 ms/div

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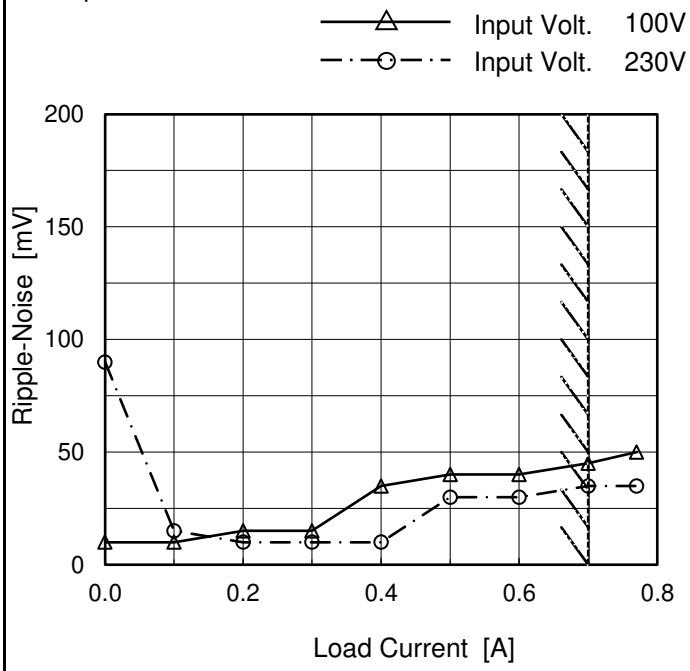
Model	LHA10F-15
Item	Ripple-Noise(by Load Current)
Object	+15V0.7A

Temperature 25°C
Testing Circuitry Figure C

1.Graph



Measured by 20 MHz Oscilloscope.
Ripple-Noise is shown as p-p in the figure below.
Note: Slanted line shows the range of the rated load current.

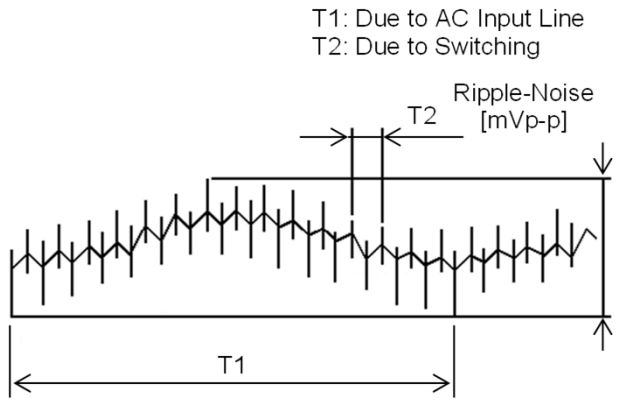


Fig. Complex Ripple Wave Form

2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 100 [V]	Input Volt. 230 [V]
0.00	10	90
0.10	10	15
0.20	15	10
0.30	15	10
0.40	35	10
0.50	40	30
0.60	40	30
0.70	45	35
0.77	50	35
--	-	-
--	-	-

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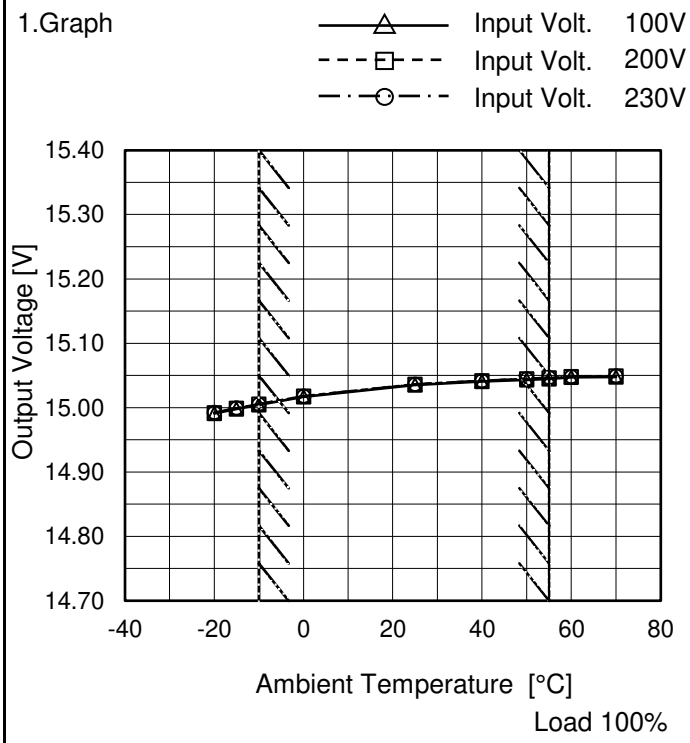
Model	LHA10F-15
Item	Ambient Temperature Drift
Object	+15V0.7A

Testing Circuitry Figure A

1.Graph



Load 100%

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]
-20	14.991	14.992	14.992
-15	14.998	14.999	14.999
-10	15.004	15.005	15.006
0	15.017	15.018	15.018
25	15.035	15.036	15.036
40	15.041	15.042	15.042
50	15.043	15.045	15.045
55	15.045	15.046	15.046
60	15.047	15.048	15.048
70	15.048	15.049	15.049
--	-	-	-

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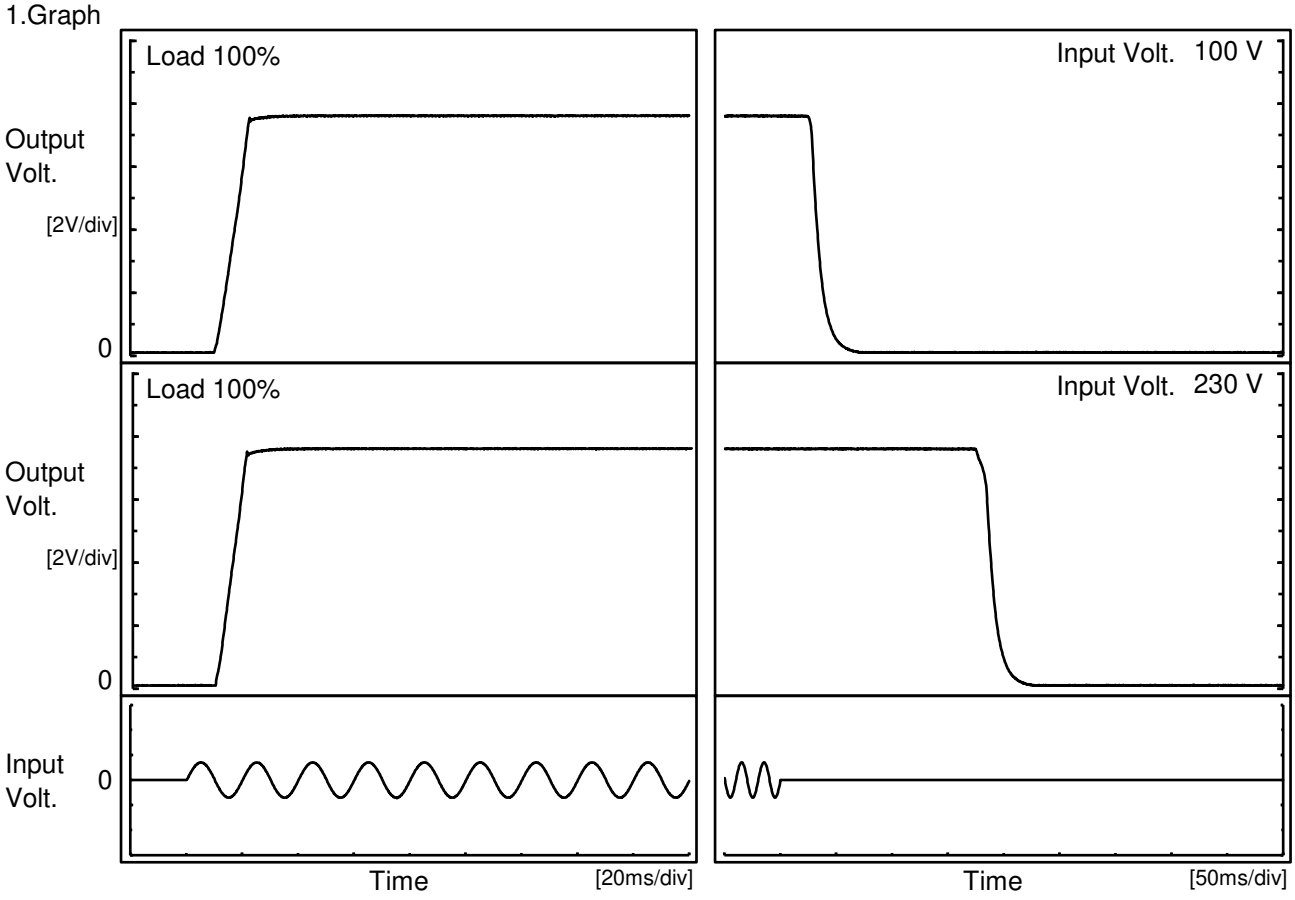
Model	LHA10F-15	
Item	Rise and Fall Time	Temperature 25°C Testing Circuitry Figure A
Object	+15V0.7A	

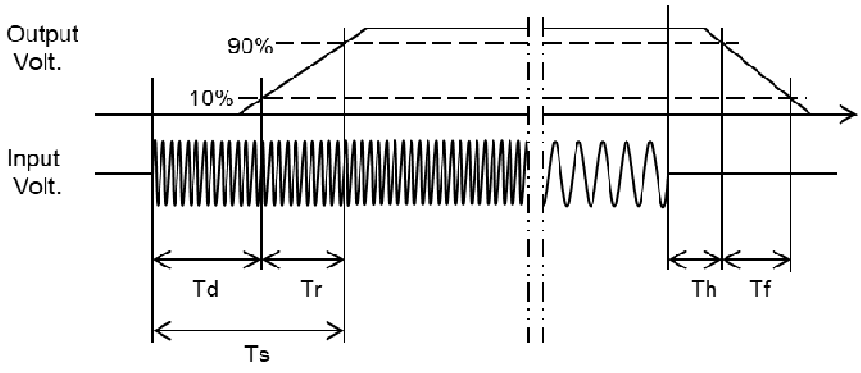
1.Graph



2.Values

[ms]

Input Volt. \ Time	Td	Tr	Ts	Th	Tf
100 V	11.9	9.7	21.6	28.5	17.3
230 V	11.3	8.7	20.0	182.3	18.8



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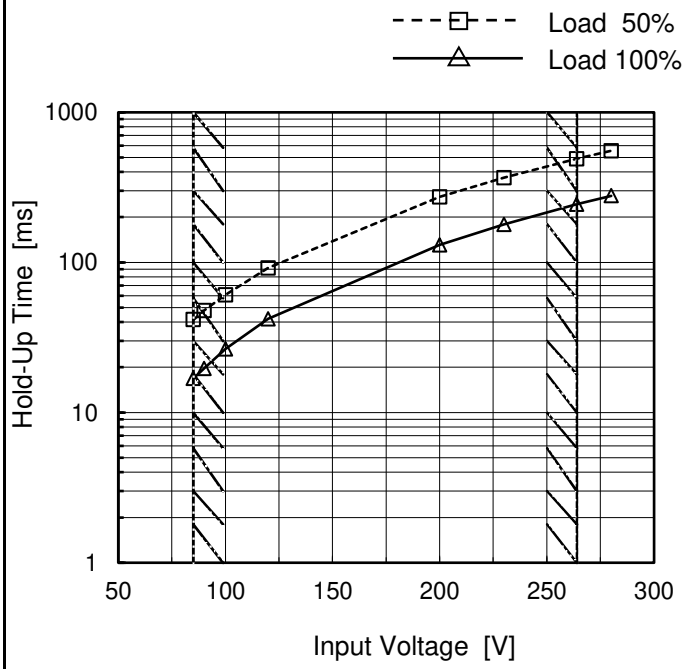
Model	LHA10F-15
Item	Hold-Up Time
Object	+15V0.7A

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.
Note: Slanted line shows the range of the rated input voltage.

2.Values

Input Voltage [V]	Hold-Up Time [ms]	
	Load 50%	Load 100%
85	42	17
90	48	20
100	61	27
120	92	42
200	274	131
230	366	179
264	489	244
280	554	278
--	-	-

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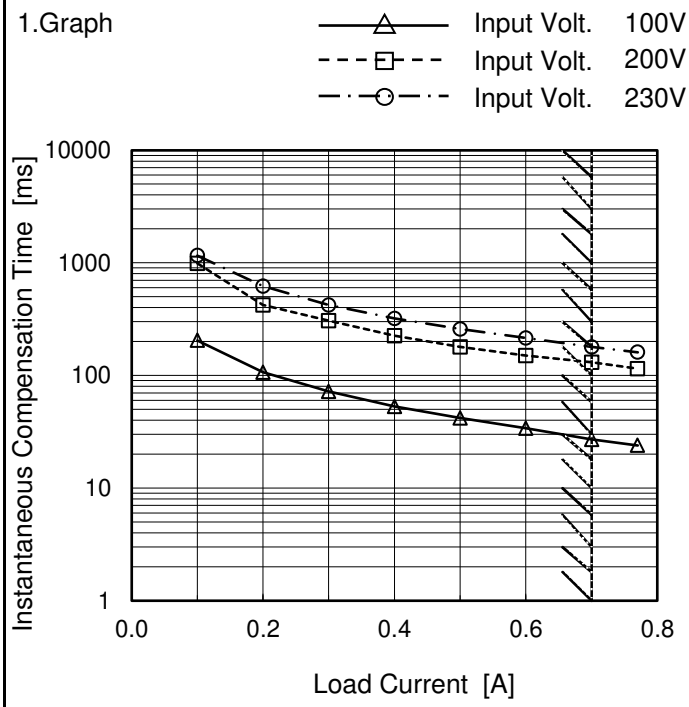
Model	LHA10F-15
Item	Instantaneous Interruption Compensation
Object	+15V0.7A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Note: Slanted line shows the range of the rated load current.

2.Values

Load Current [A]	Time [ms]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	-	-	-
0.10	205	990	1162
0.20	107	421	623
0.30	72	307	423
0.40	53	226	320
0.50	42	179	258
0.60	34	150	215
0.70	27	131	179
0.77	24	115	161
--	-	-	-
--	-	-	-

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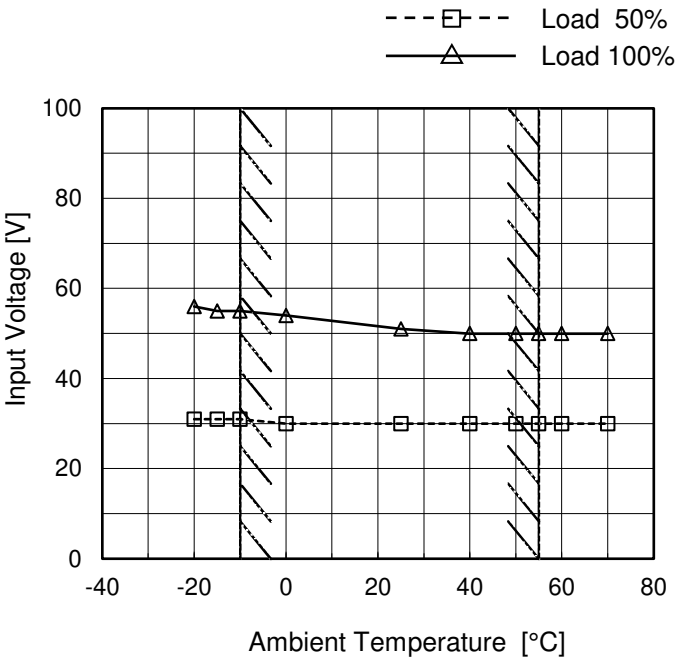
Model	LHA10F-15
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+15V0.7A

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	31	56
-15	31	55
-10	31	55
0	30	54
25	30	51
40	30	50
50	30	50
55	30	50
60	30	50
70	30	50
--	-	-

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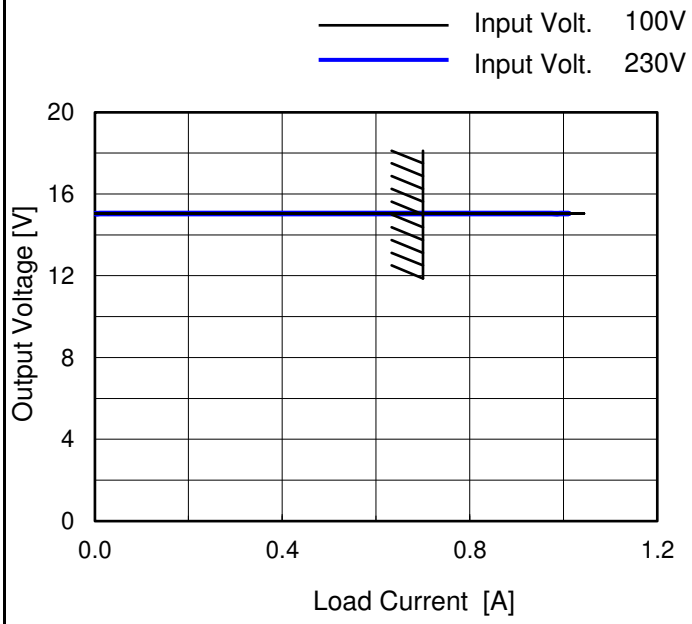
Model	LHA10F-15
Item	Overcurrent Protection
Object	+15V0.7A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Note: Slanted line shows the range of the rated load current.

Overcurrent protection is Hiccup mode.

2.Values

Output Voltage [V]	Load Current [A]	
	Input Volt. 100[V]	Input Volt. 230[V]
15.00	1.04	1.01
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-

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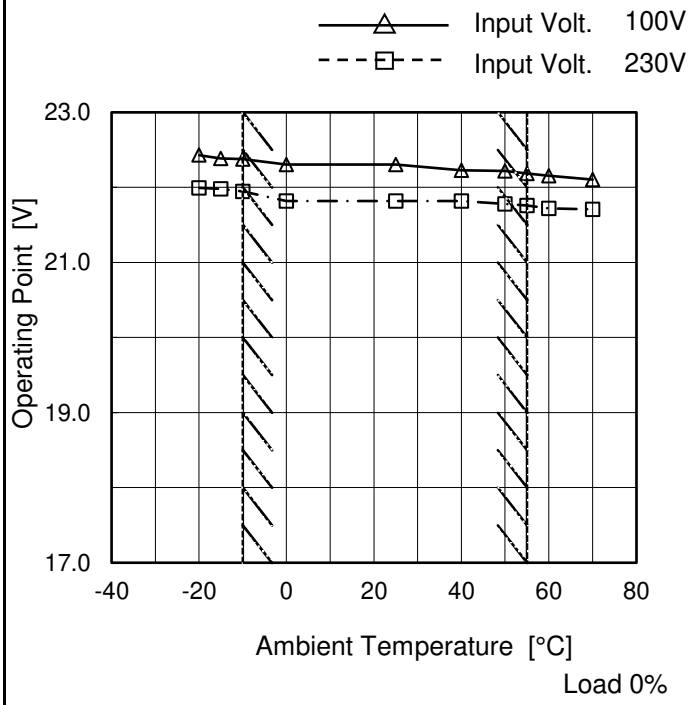
Model	LHA10F-15
Item	Overvoltage Protection
Object	+15V0.7A

Testing Circuitry Figure A

1.Graph



Load 0%

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

2.Values

Ambient Temperature [°C]	Operating Point [V]	
	Input Volt. 100[V]	Input Volt. 230[V]
-20	22.43	21.99
-15	22.38	21.98
-10	22.37	21.95
0	22.30	21.82
25	22.30	21.82
40	22.23	21.82
50	22.22	21.78
55	22.18	21.76
60	22.15	21.72
70	22.10	21.71
--	-	-

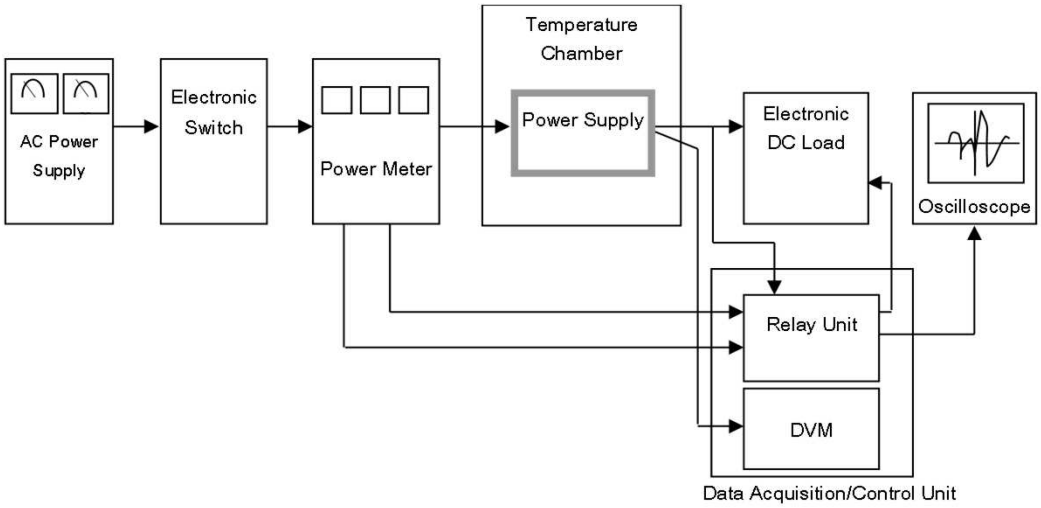


Figure A

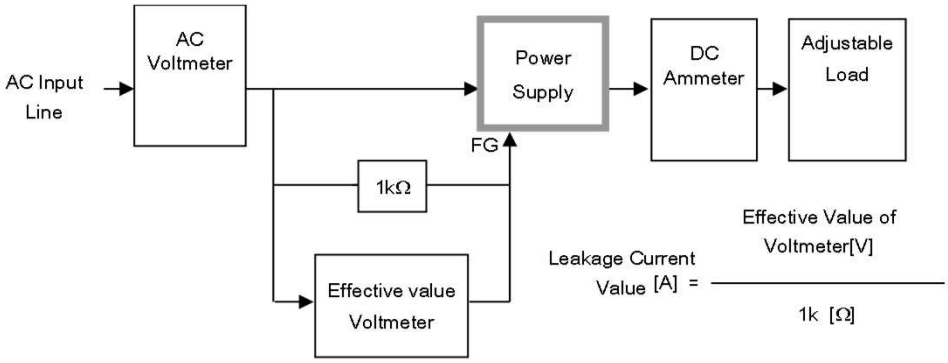


Figure B-1 (DEN-AN)

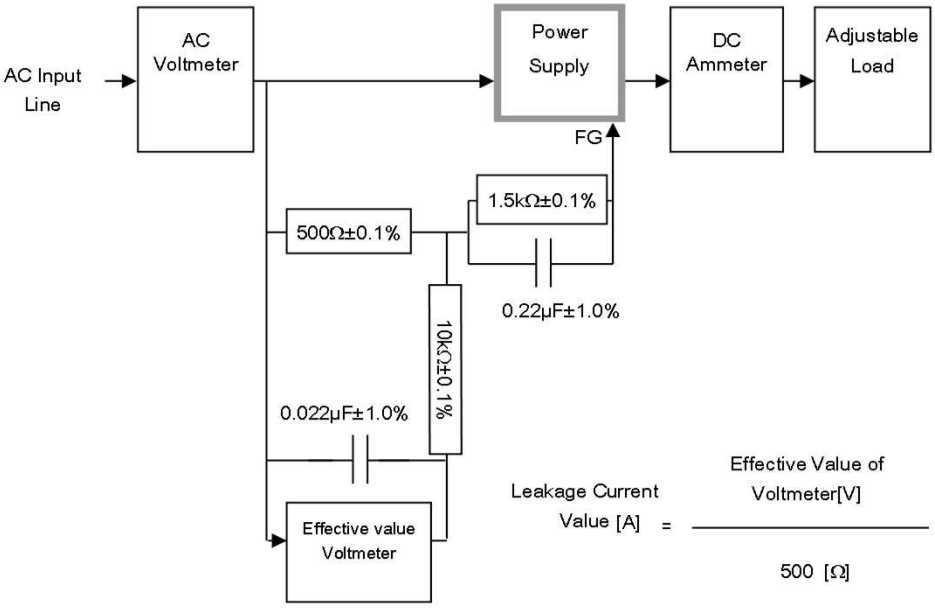


Figure B-2 (IEC62368-1 refer to IEC60990 Fig.4)

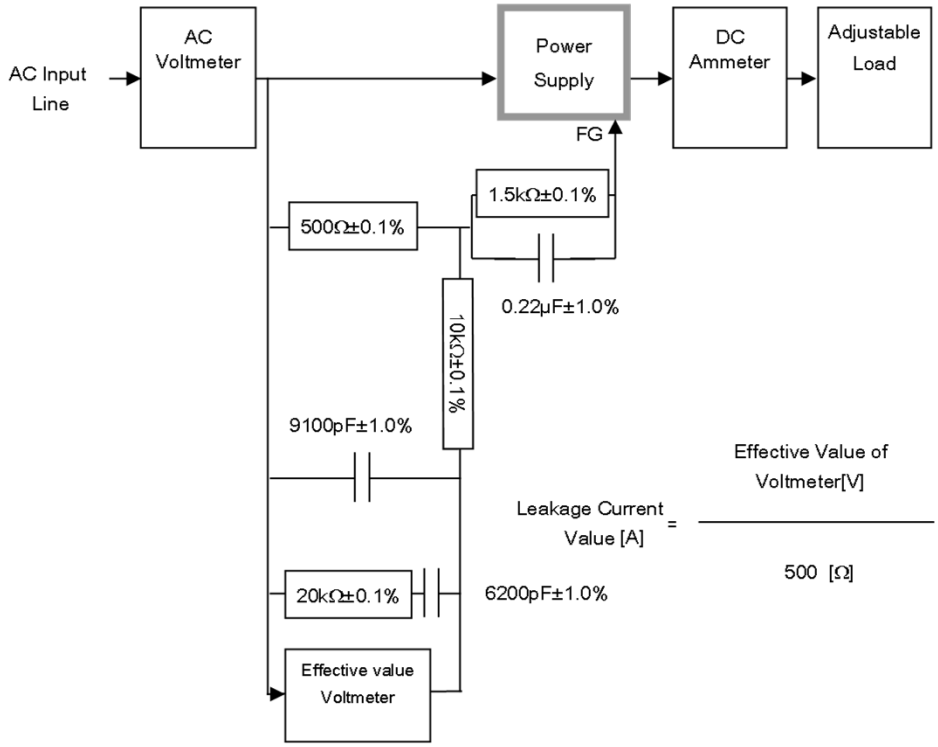
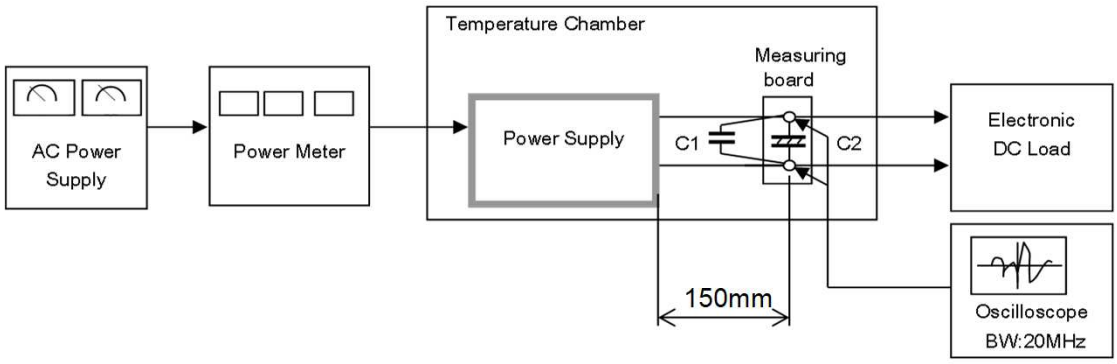


Figure B-3 (IEC62368-1 refer to IEC60990 Fig.5)



C1= 0.1 μF
(Ceramic capacitor)

C2= 22 μF
(Electrolytic capacitor)

Figure C