参考資料

COSEL

TEST DATA OF LHA100F-12

Regulated DC Power Supply
September 4, 2019

Approved by : Junya Kaneda
Junya Kaneda — Design Manager

Prepared by : Shuto Takai
Shuto Takai — Design Engineer

COSEL CO.,LTD.

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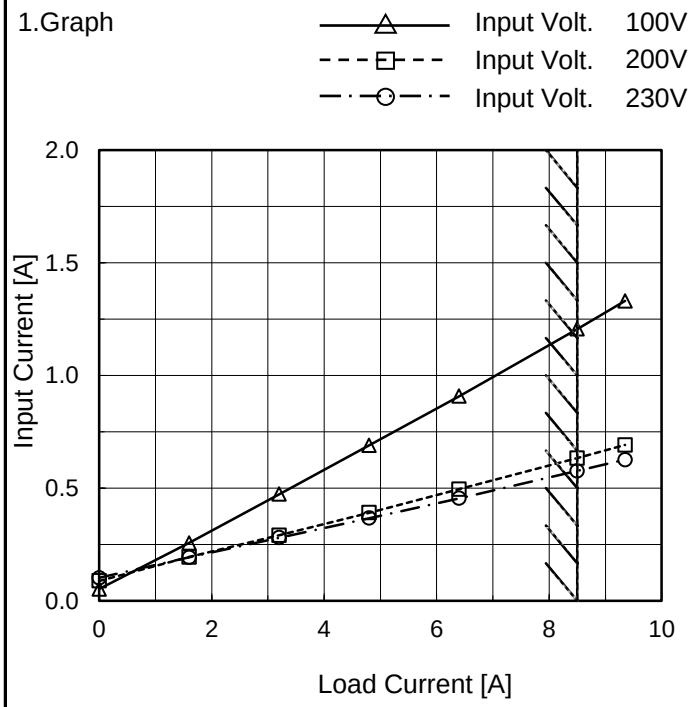
Item	Input Current (by Load Current)
Object	————————

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]	Input Current [A]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	0.052	0.088	0.102
1.60	0.257	0.194	0.193
3.20	0.474	0.291	0.280
4.80	0.690	0.391	0.367
6.40	0.908	0.495	0.455
8.50	1.207	0.633	0.576
9.35	1.331	0.691	0.626
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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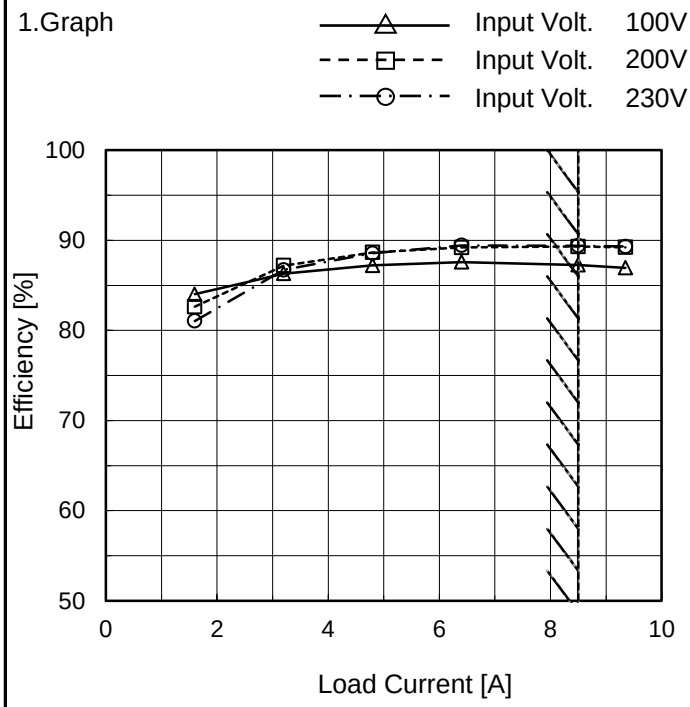
Model	LHA100F-12
Item	Efficiency (by Load Current)
Object	————————

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	-	-	-
1.60	84.0	82.6	81.0
3.20	86.3	87.2	86.7
4.80	87.2	88.7	88.6
6.40	87.6	89.2	89.4
8.50	87.3	89.3	89.4
9.35	87.0	89.2	89.3
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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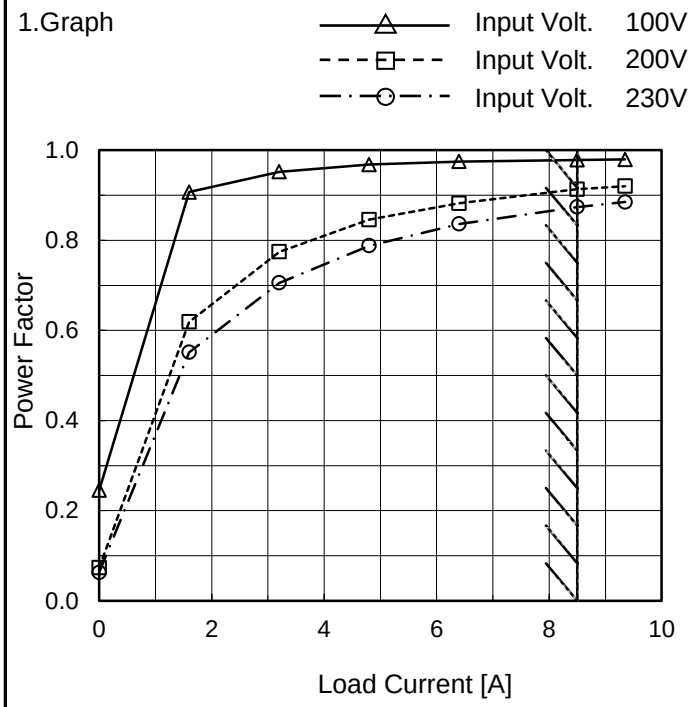
Model	LHA100F-12
Item	Power Factor (by Load Current)
Object	————————

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	0.245	0.073	0.063
1.60	0.907	0.619	0.552
3.20	0.952	0.774	0.705
4.80	0.968	0.846	0.788
6.40	0.975	0.882	0.836
8.50	0.978	0.913	0.874
9.35	0.980	0.920	0.885
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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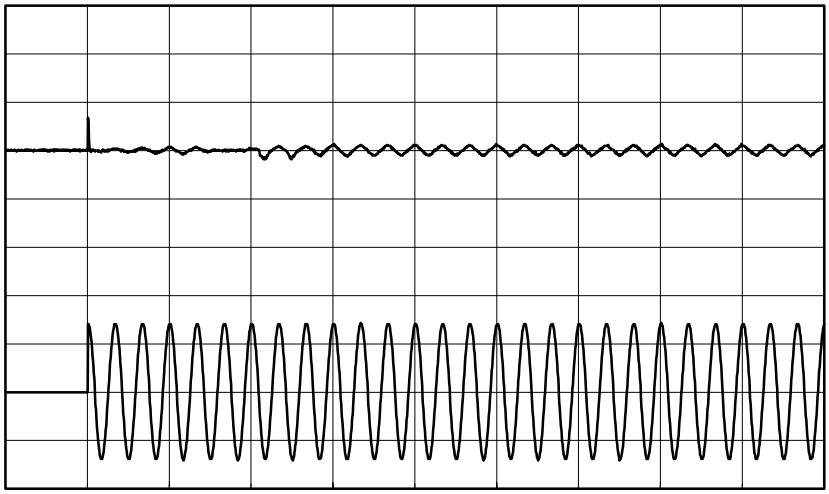
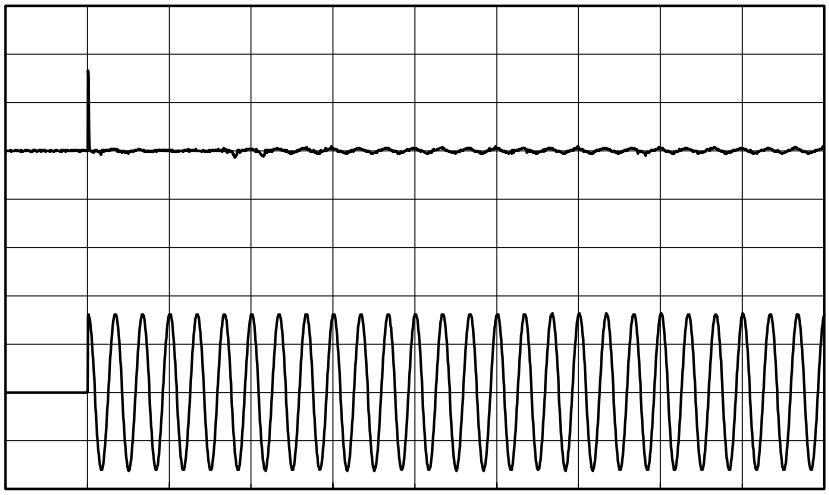
Model	LHA100F-12	
Item	Inrush Current	Temperature 25°C Testing Circuitry Figure A
Object	————————	



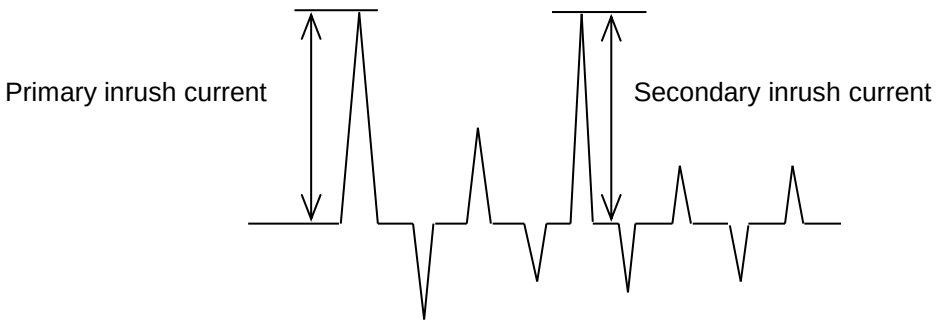
Input Voltage 100 V
Frequency 60 Hz
Load 100 %

Primary inrush current :
13.6 A
Secondary inrush current :
3.6 A



Input Voltage 230 V
Frequency 60 Hz
Load 100 %

Primary inrush current :
33.2 A
Secondary inrush current :
2.8 A



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Model	LHA100F-12	
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	0.16	0.33	0.34	Operation
		One of phases	0.25	0.65	0.67	Stand by
IEC62368-1	Figure B-2	Both phases	0.11	0.26	0.27	Operation
		One of phases	0.20	0.52	0.54	Stand by
	Figure B-3	Both phases	0.10	0.26	0.27	Operation
		One of phases	0.20	0.52	0.55	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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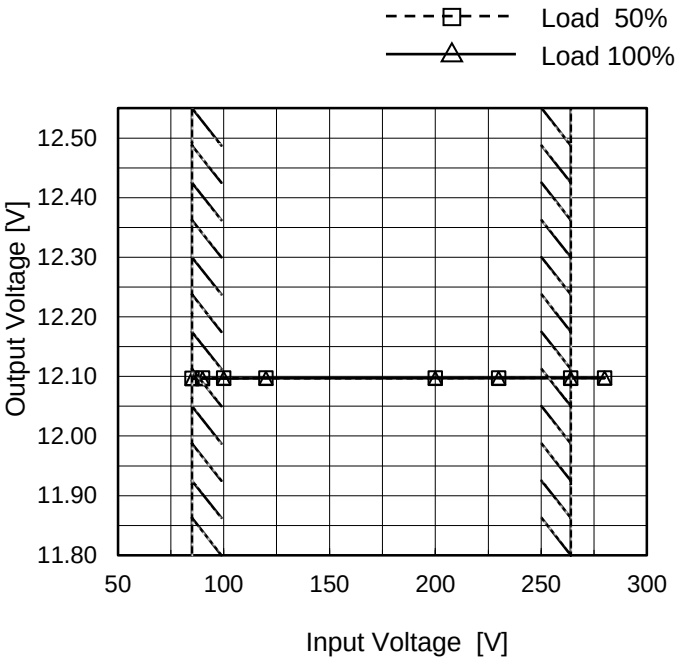
Model	LHA100F-12
Item	Line Regulation
Object	+12V8.5A

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	12.097	-
90	12.097	12.096
100	12.097	12.097
120	12.097	12.097
200	12.097	12.097
230	12.097	12.097
264	12.097	12.097
280	12.097	12.097
--	-	-

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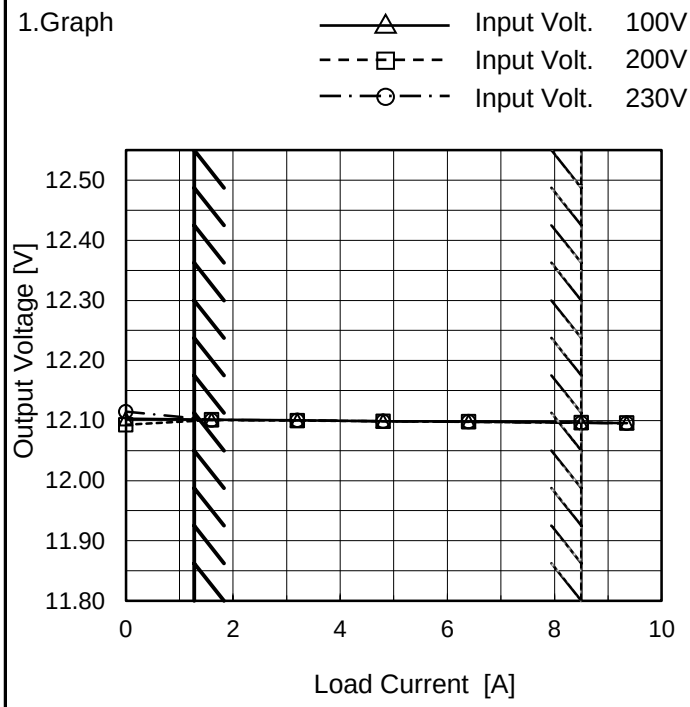
Model	LHA100F-12
Item	Load Regulation
Object	+12V8.5A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

2.Values

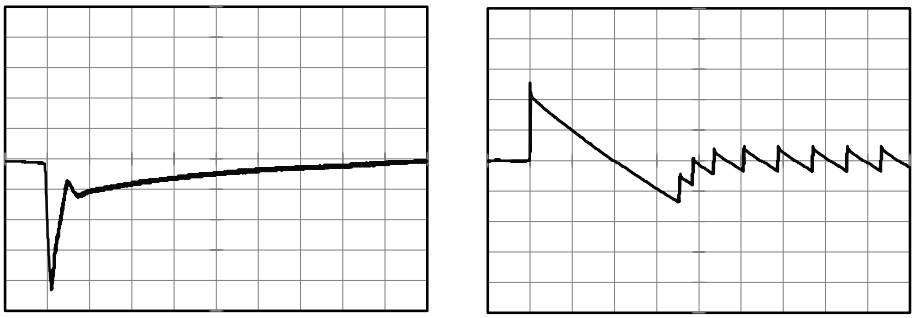
Load Current [A]	Output Voltage [V]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	12.103	12.093	12.115
1.60	12.101	12.101	12.101
3.20	12.100	12.100	12.100
4.80	12.099	12.099	12.099
6.40	12.098	12.098	12.098
8.50	12.097	12.097	12.096
9.35	12.096	12.096	12.095
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

Model	LHA100F-12	
Item	Dynamic Load Response	Temperature 25°C Testing Circuitry Figure A
Object	+12V8.5A	

Input Volt. 12 V

Cycle 1000 ms

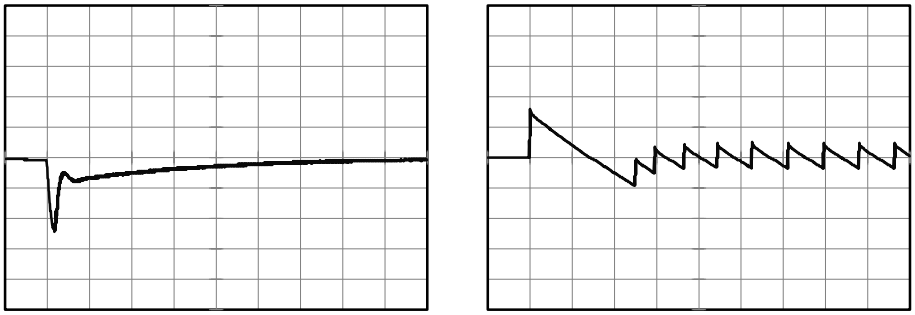
Min.Load (0A)←→
Load 100% (8.5A)



200 mV/div

1 ms/div 10 ms/div

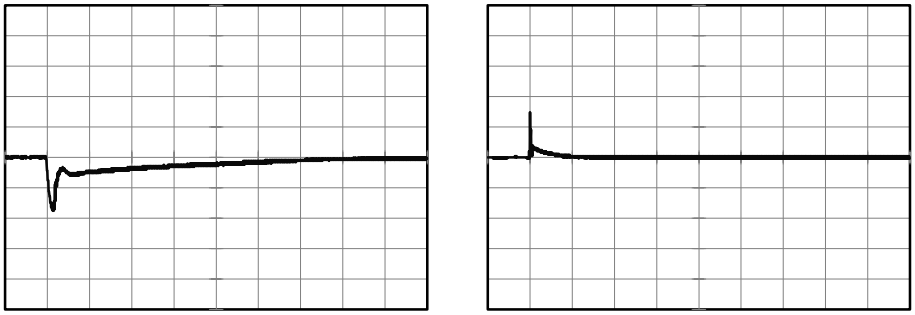
Min.Load (0A)←→
Load 50% (4.25A)



200 mV/div

1 ms/div 10 ms/div

Load 50% (4.25A)←→
Load 100% (8.5A)



200 mV/div

1 ms/div 10 ms/div

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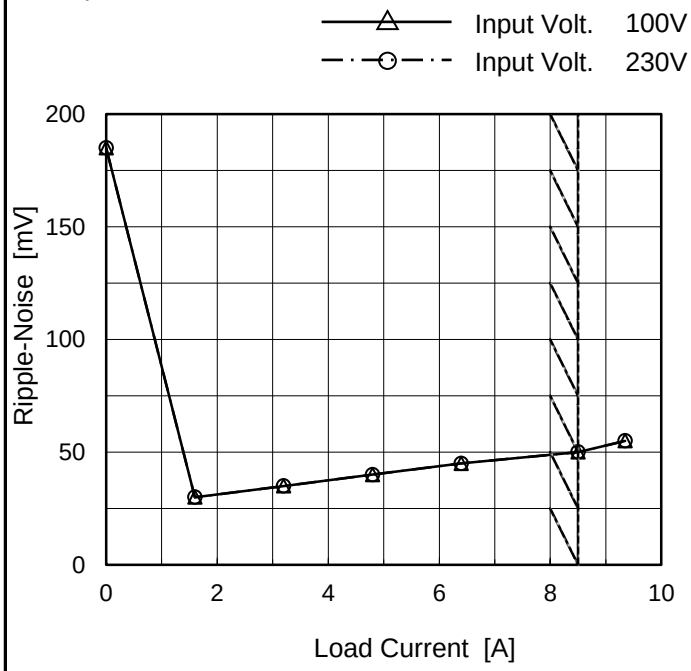
Model	LHA100F-12
Item	Ripple-Noise（by Load Current)
Object	+12V8.5A

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.

T1: Due to AC Input Line
T2: Due to Switching

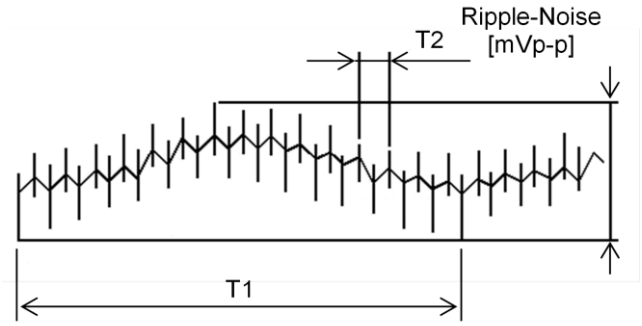


Fig. Complex Ripple Wave Form

2.Values

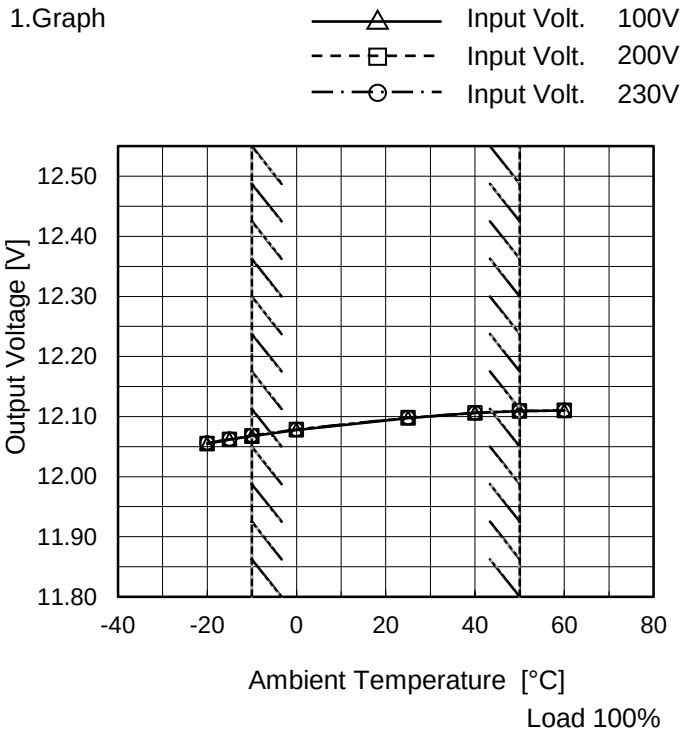
Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 100 [V]	Input Volt. 230 [V]
0.00	185	185
1.60	30	30
3.20	35	35
4.80	40	40
6.40	45	45
8.50	50	50
9.35	55	55
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	LHA100F-12
Item	Ambient Temperature Drift
Object	+12V8.5A

Testing Circuitry Figure A

1.Graph



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	12.055	12.055	12.056
-15	12.062	12.062	12.062
-10	12.067	12.068	12.068
0	12.078	12.078	12.079
25	12.098	12.098	12.098
40	12.106	12.106	12.106
50	12.109	12.109	12.109
60	12.110	12.110	12.110
--	-	-	-
--	-	-	-
--	-	-	-

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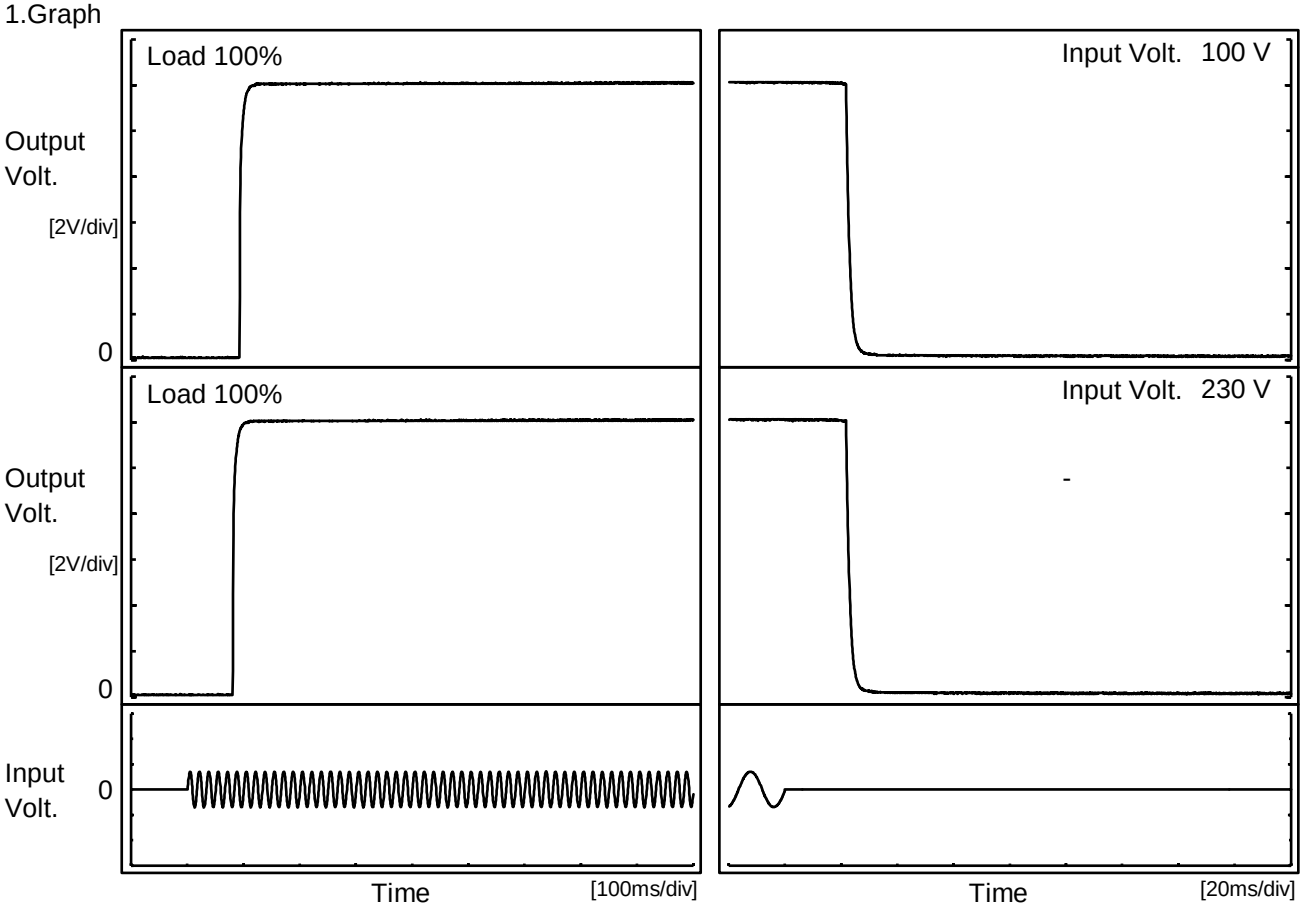
Model	LHA100F-12	
Item	Rise and Fall Time	Temperature 25°C Testing Circuitry Figure A
Object	+12V8.5A	

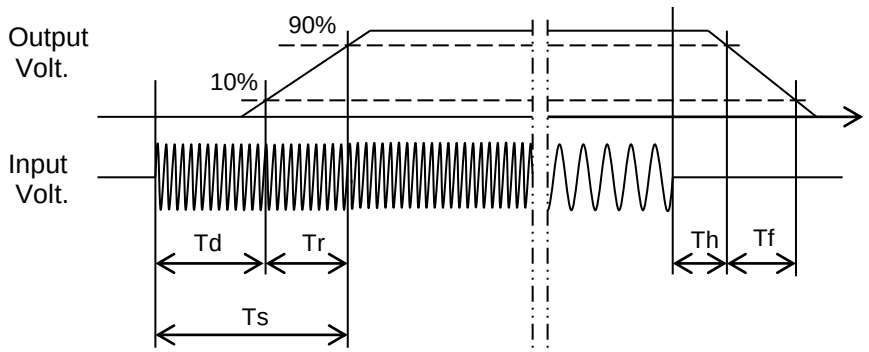
1.Graph



2.Values

[ms]

Input Volt. \ Time	Td	Tr	Ts	Th	Tf
100 V	93.5	7.0	100.5	21.8	2.8
230 V	81.5	7.0	88.5	21.8	2.8

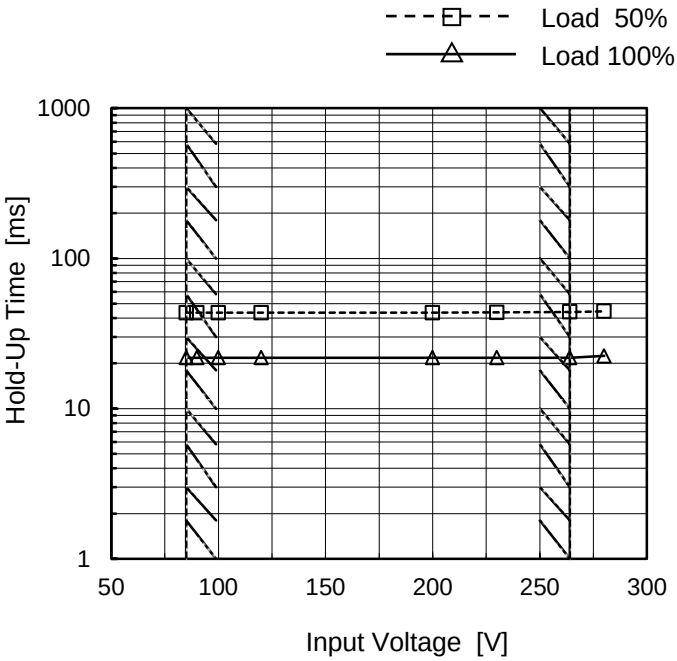


COSEL

Model	LHA100F-12
Item	Hold-Up Time
Object	+12V8.5A

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

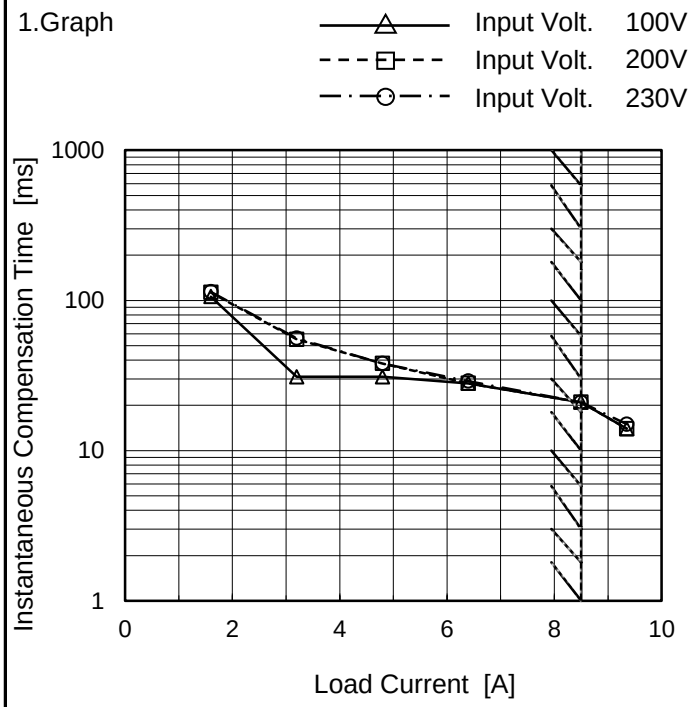
Input Voltage [V]	Hold-Up Time [ms]	
	Load 50%	Load 100%
85	44	-
90	44	22
100	44	22
120	44	22
200	44	22
230	44	22
264	44	22
280	44	22
--	-	-

COSEL

Model	LHA100F-12
Item	Instantaneous Interruption Compensation
Object	+12V8.5A

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	-	-	-
1.60	106	113	114
3.20	31	55	56
4.80	31	38	38
6.40	28	28	29
8.50	21	21	21
9.35	14	14	15
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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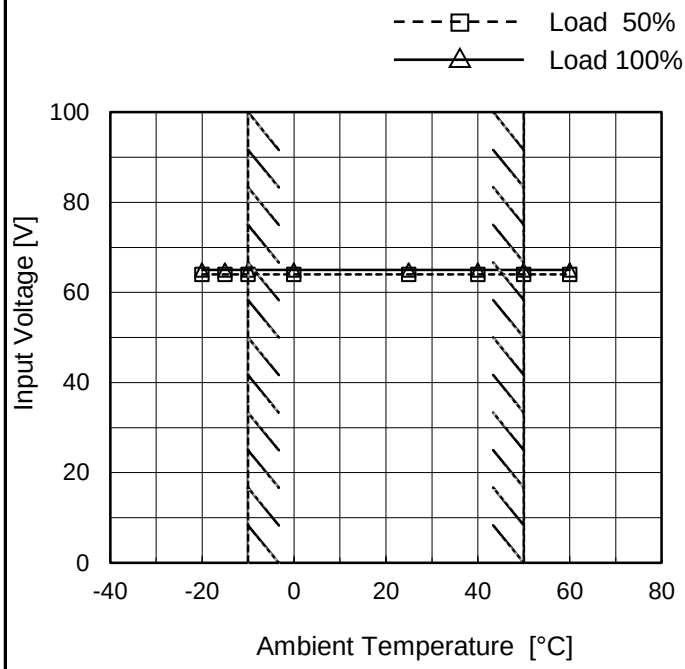
Model	LHA100F-12
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+12V8.5A

Testing Circuitry Figure A

1.Graph



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

2.Values

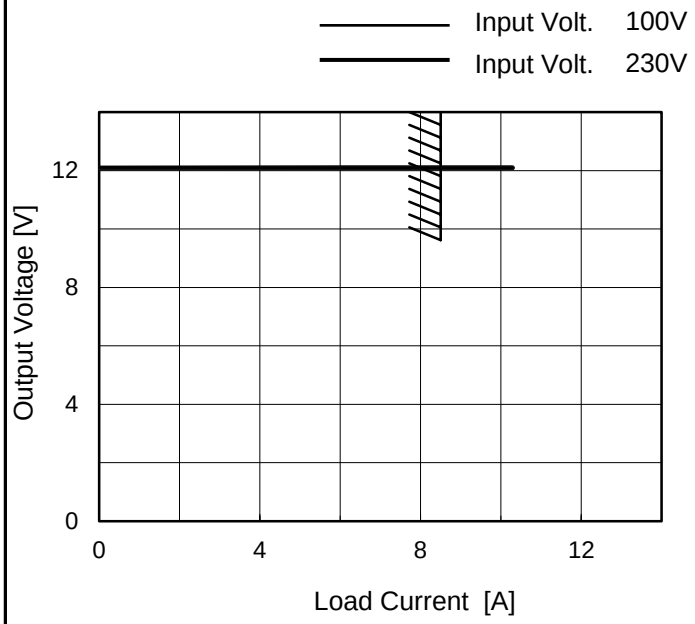
Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	64	65
-15	64	65
-10	64	65
0	64	65
25	64	65
40	64	65
50	64	65
60	64	65
--	-	-
--	-	-
--	-	-

COSEL

Model	LHA100F-12
Item	Overcurrent Protection
Object	+12V8.5A

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

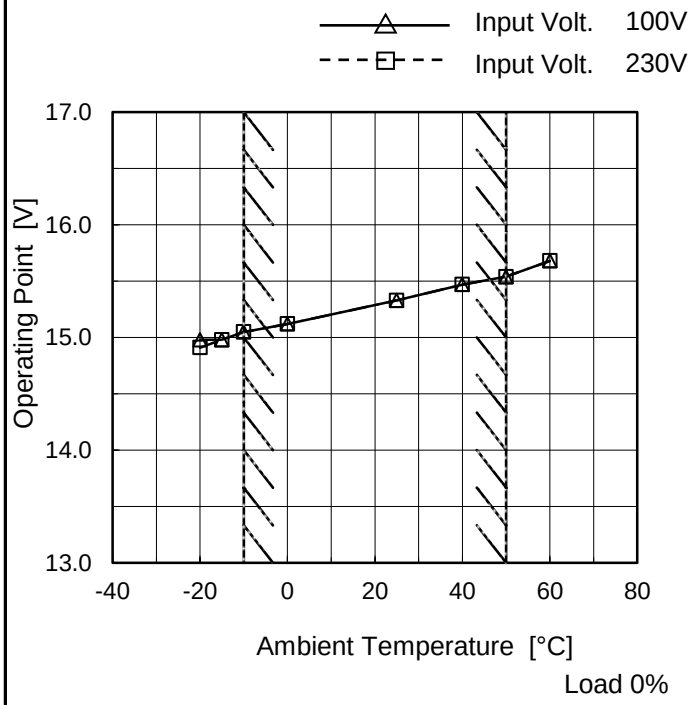
Output Voltage [V]	Load Current [A]	
	Input Volt. 100[V]	Input Volt. 230[V]
12.0	10.29	10.29
11.4	-	-
10.8	-	-
9.6	-	-
8.4	-	-
7.2	-	-
6.0	-	-
4.8	-	-
3.6	-	-
2.4	-	-
1.2	-	-
0.0	-	-

COSEL

Model	LHA100F-12
Item	Overvoltage Protection
Object	+12V8.5A

Testing Circuitry Figure A

1.Graph



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	14.98	14.91
-15	14.98	14.98
-10	15.05	15.05
0	15.12	15.12
25	15.33	15.33
40	15.47	15.47
50	15.54	15.54
60	15.68	15.68
--	-	-
--	-	-
--	-	-

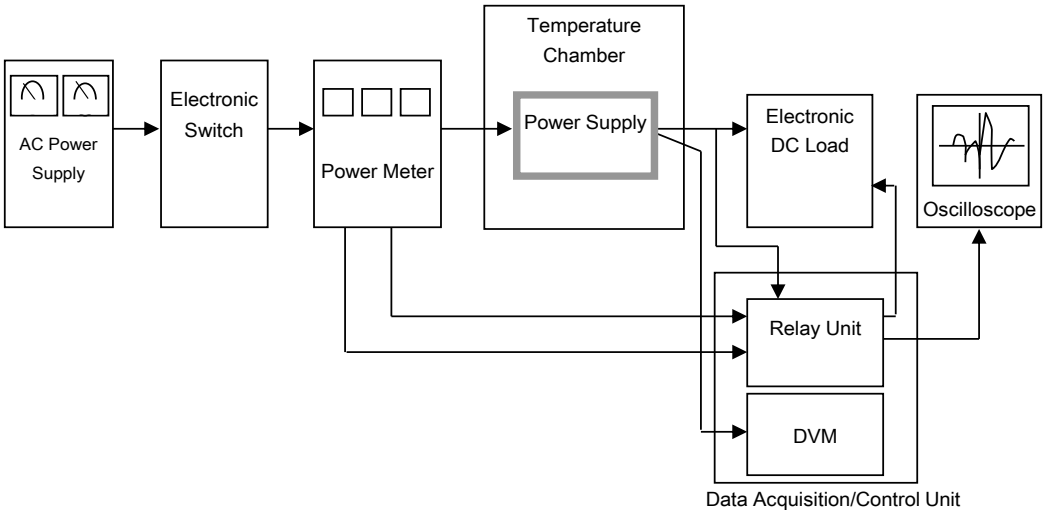


Figure A

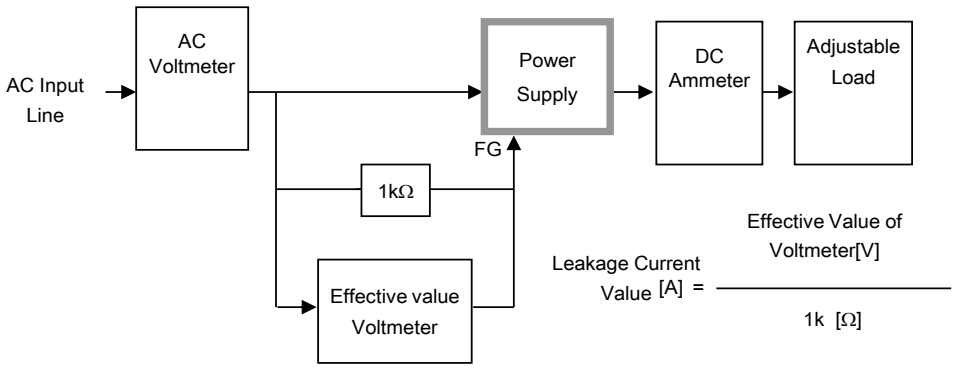


Figure B-1 (DEN-AN)

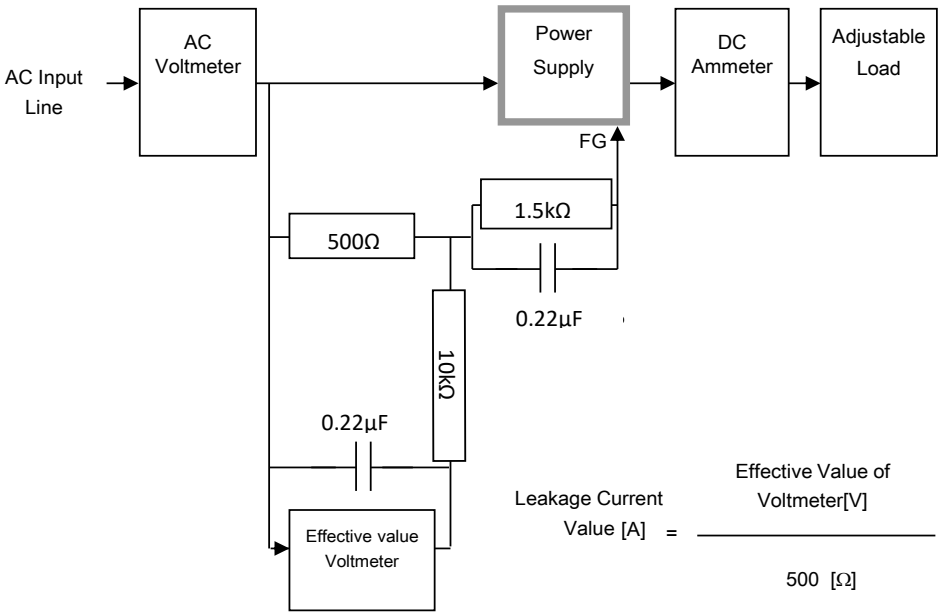


Figure B-2 (IEC62368-1 refer to IEC60990 Fig.4)

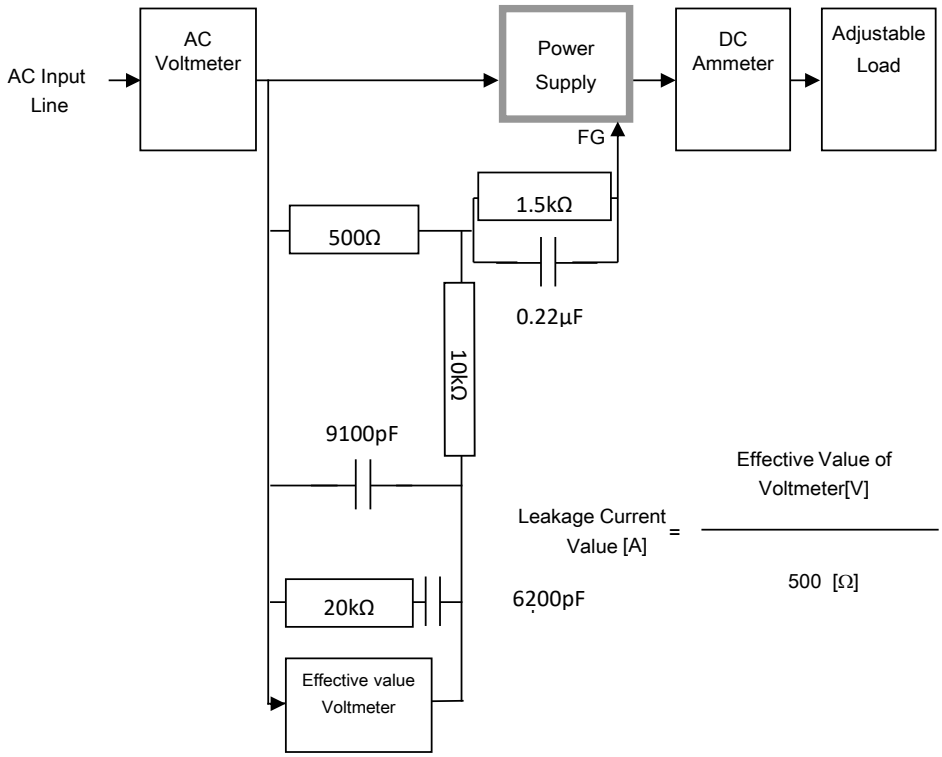
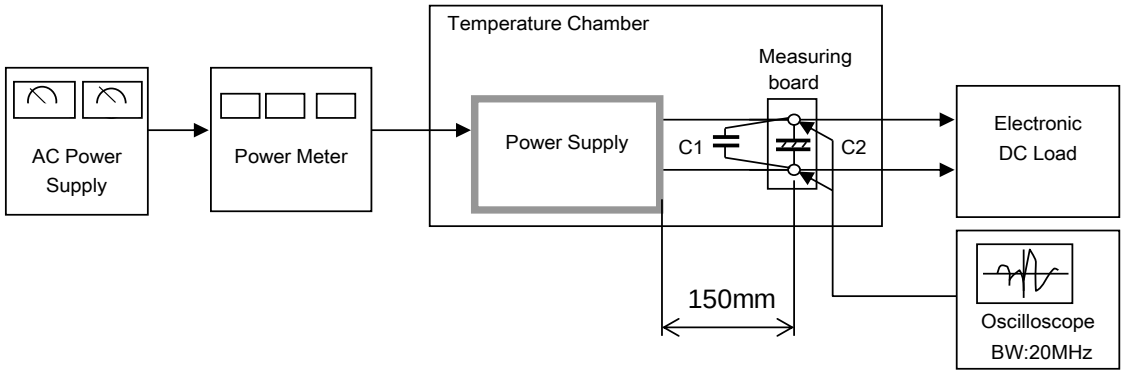


Figure B-3 (IEC62368-1 refer to IEC60990 Fig.5)



C1= 0.1 μF
(Film capacitor)
C2= 22 μF
(Electrolytic capacitor)

Figure C