COSEL

TEST DATA OF LHA75F-12

Regulated DC Power Supply
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COSEL CO.,LTD.

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Model	LHA75F-12
Item	Input Current (by Load Current)
Object	————————

Temperature   25°C
Testing Circuitry   Figure A

1.Graph

——△—— Input Volt.   100V
- - -⊟- - - Input Volt.   200V
—·—⊙—·— Input Volt.   230V

Input Current [A] vs Load Current [A]

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	0.059	0.100	0.115
1.20	0.219	0.186	0.188
2.40	0.381	0.260	0.254
3.60	0.544	0.334	0.320
4.80	0.711	0.410	0.387
6.00	0.883	0.491	0.455
6.30	0.926	0.511	0.472
6.93	1.019	0.554	0.510
--	-	-	-
--	-	-	-
--	-	-	-

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Model	LHA75F-12
Item	Efficiency (by Load Current)
Object	———————

Temperature   25°C
Testing Circuitry   Figure A

1.Graph

————△———— Input Volt.   100V
— — —□— — — Input Volt.   200V
—·—○—·— Input Volt.   230V

Efficiency [%] vs Load Current [A]

2.Values

Load Current [A]	Efficiency [%]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	-	-	-
1.20	77.2	76.1	74.9
2.40	82.1	83.0	82.6
3.60	83.8	85.1	85.0
4.80	84.4	86.0	86.1
6.00	84.6	86.2	86.5
6.30	84.6	86.4	86.6
6.93	84.6	86.4	86.6
--	-	-	-
--	-	-	-
--	-	-	-

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

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Model	LHA75F-12
Item	Power Factor (by Load Current)
Object	————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph

Input Volt. 100V
Input Volt. 200V
Input Volt. 230V

Power Factor vs Load Current [A]

2.Values

Load Current [A]	Power Factor		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	0.229	0.046	0.048
1.20	0.860	0.513	0.448
2.40	0.928	0.673	0.601
3.60	0.956	0.766	0.696
4.80	0.969	0.824	0.759
6.00	0.975	0.858	0.804
6.30	0.976	0.864	0.812
6.93	0.976	0.877	0.827
--	-	-	-
--	-	-	-
--	-	-	-

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

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Model	LHA75F-12
Item	Inrush Current
Object	————————
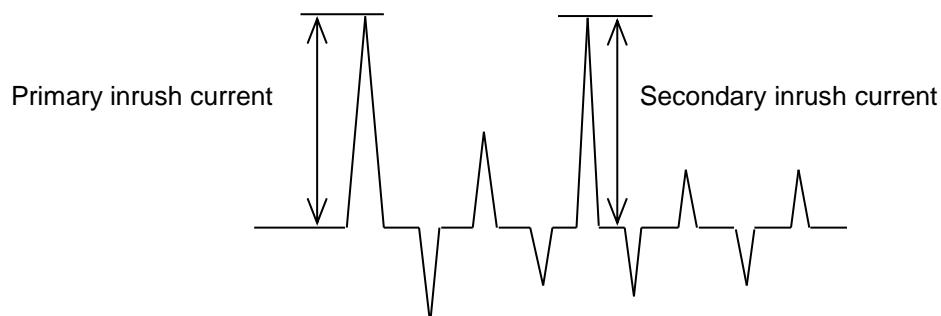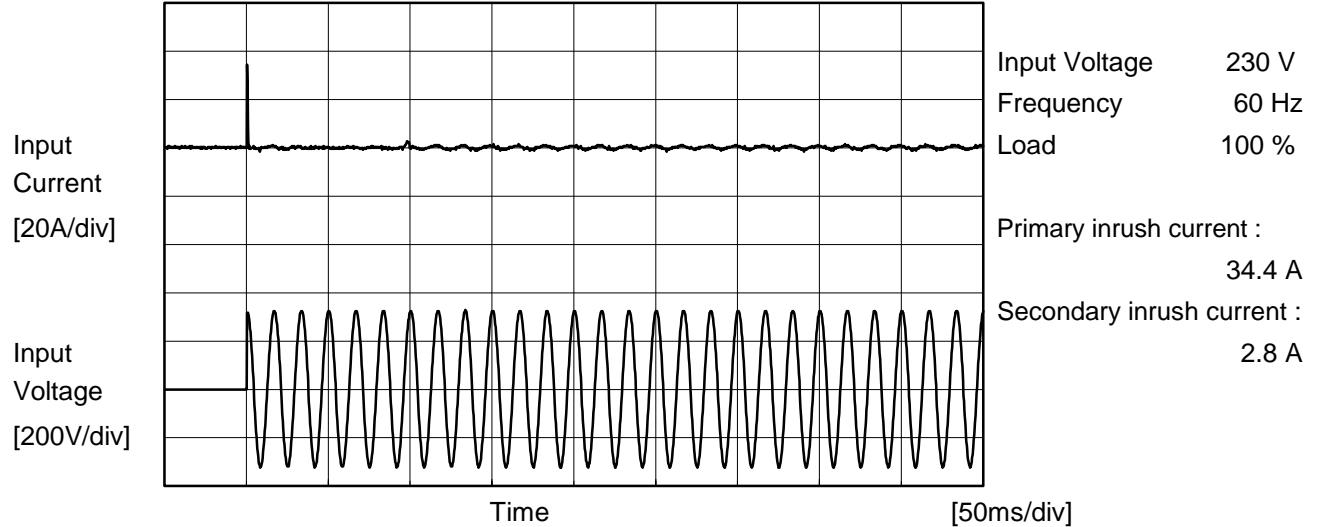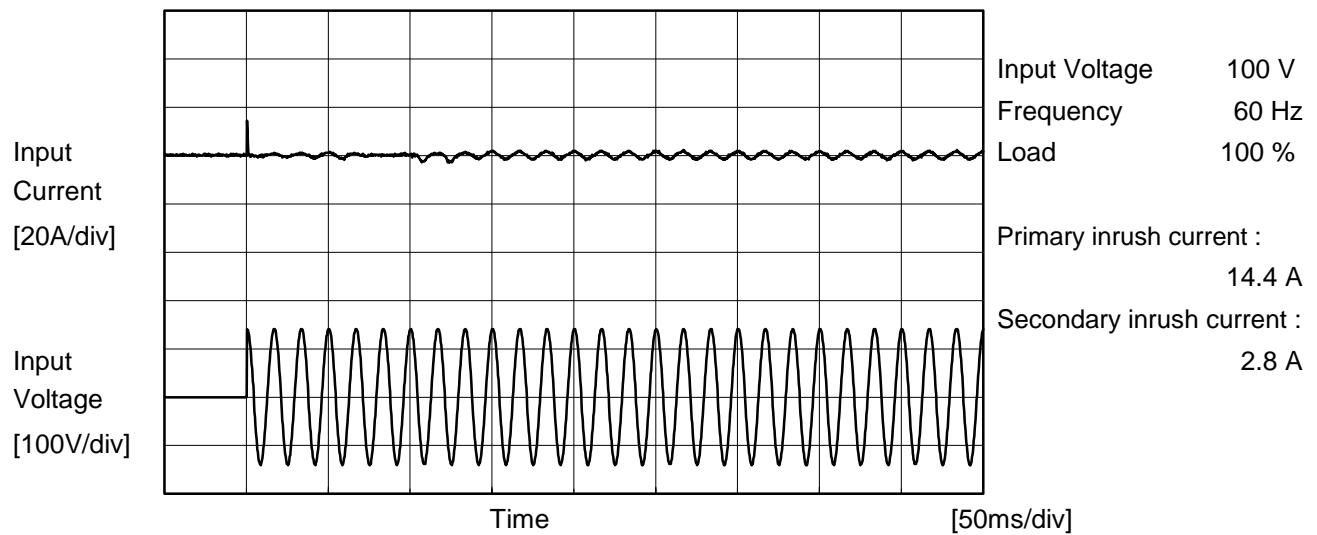
Temperature 25°C
Testing Circuitry Figure A

Input
Current
[20A/div]

Input
Voltage
[100V/div]

Input Voltage 100 V
Frequency 60 Hz
Load 100 %

Primary inrush current :
14.4 A
Secondary inrush current :
2.8 A

Time [50ms/div]

Input
Current
[20A/div]

Input
Voltage
[200V/div]

Input Voltage 230 V
Frequency 60 Hz
Load 100 %

Primary inrush current :
34.4 A
Secondary inrush current :
2.8 A

Time [50ms/div]

Primary inrush current

Secondary inrush current

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Model	LHA75F-12		
Item	Leakage Current	Temperature	25°C
Object	———————	Testing Circuitry	Figure B

1.Results

[mA]

| Standards	Testing Circuitry	Measuring Method	Input Volt.			Note
			100 [V]	230 [V]	240 [V]	
DEN-AN	Figure B-1	Both phases	0.13	0.34	0.36	Operation
		One of phases	0.26	0.67	0.71	Stand by
IEC62368-1	Figure B-2	Both phases	0.11	0.28	0.29	Operation
		One of phases	0.21	0.56	0.58	Stand by
	Figure B-3	Both phases	0.11	0.28	0.30	Operation
		One of phases	0.21	0.55	0.58	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	LHA75F-12
Item	Line Regulation
Object	+12V6.3A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

--- ⊟ --- Load 50%
——△—— Load 100%

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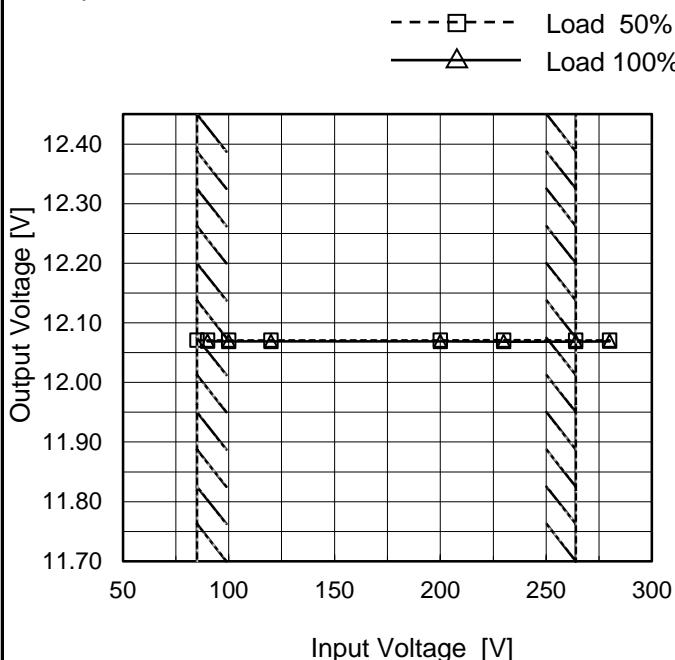
2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
85	12.071	-
90	12.071	12.069
100	12.071	12.069
120	12.071	12.069
200	12.071	12.069
230	12.071	12.069
264	12.071	12.069
280	12.071	12.069
--	-	-

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Model	LHA75F-12
Item	Load Regulation
Object	+12V6.3A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

———△——— Input Volt. 100V
– – –⊟– – – Input Volt. 200V
—·—○—·— Input Volt. 230V

Output Voltage [V] vs Load Current [A]

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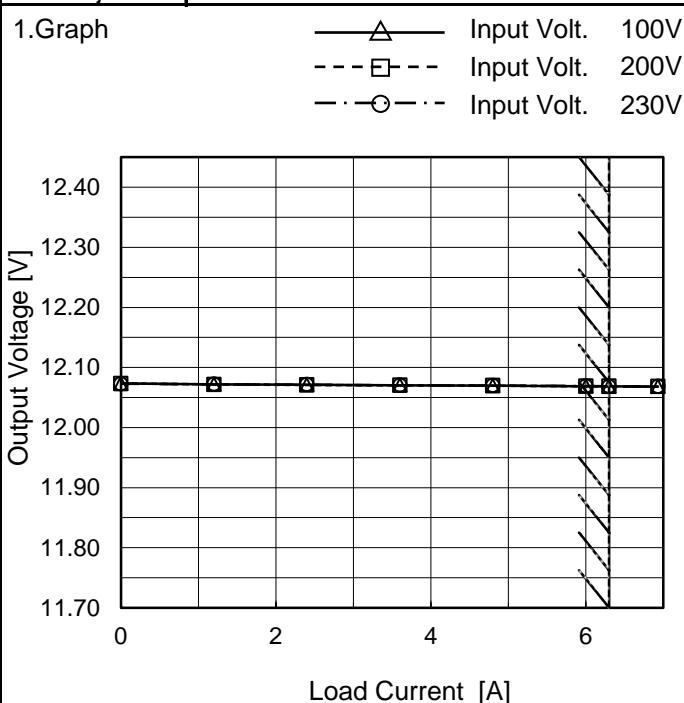
2.Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	12.073	12.073	12.073
1.20	12.072	12.072	12.072
2.40	12.071	12.071	12.071
3.60	12.070	12.070	12.070
4.80	12.070	12.070	12.070
6.00	12.069	12.069	12.069
6.30	12.069	12.069	12.069
6.93	12.068	12.068	12.068
--	-	-	-
--	-	-	-
--	-	-	-

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Model	LHA75F-12
Item	Dynamic Load Response
Object	+12V6.3A

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% (6.3A)

200 mV/div

1　ms/div

10　ms/div

Min.Load (0A)←→
　Load 50% (3.15A)

200 mV/div

1　ms/div

10　ms/div

Load 50% (3.15A)←→
　Load 100% (6.3A)

200 mV/div

1　ms/div

10　ms/div

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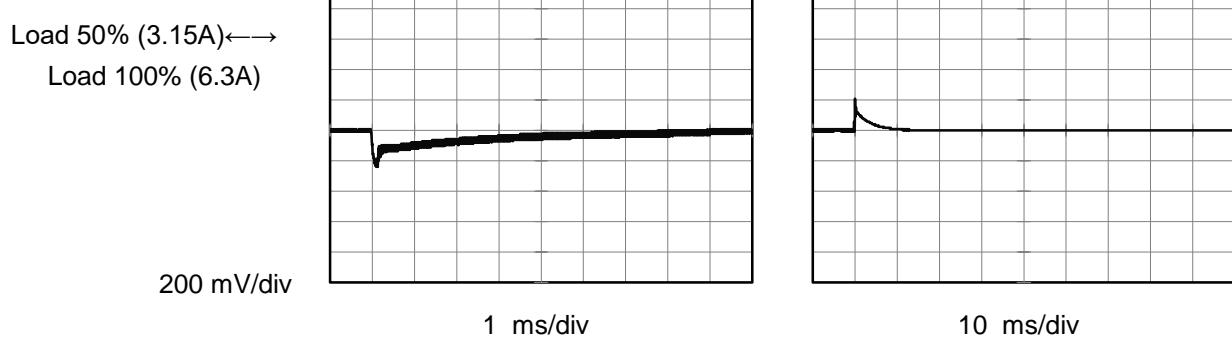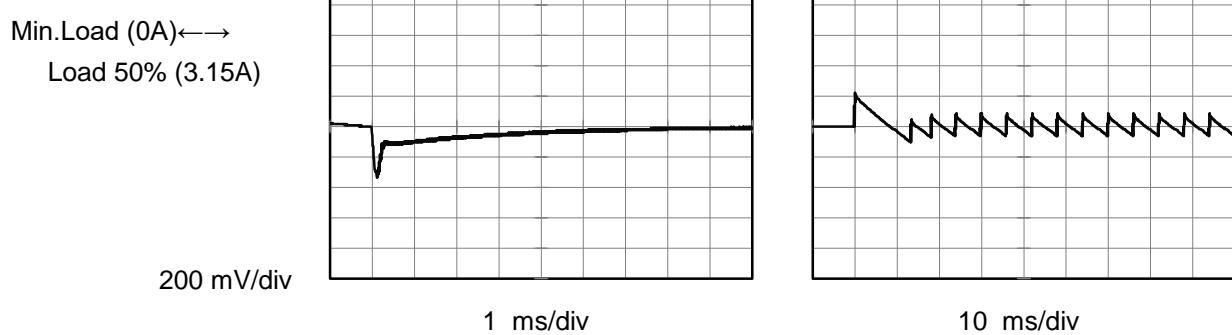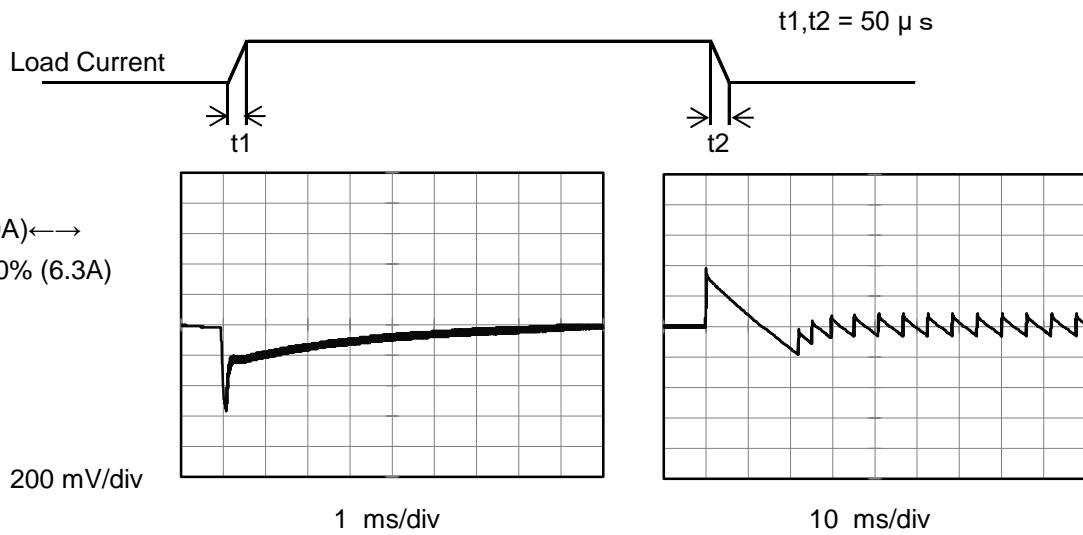
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Model	LHA75F-12
Item	Ripple-Noise（by Load Current)
Object	+12V6.3A

Temperature   25°C
Testing Circuitry   Figure C

1.Graph

————△———— Input Volt.   100V
—·—○—·—·— Input Volt.   230V
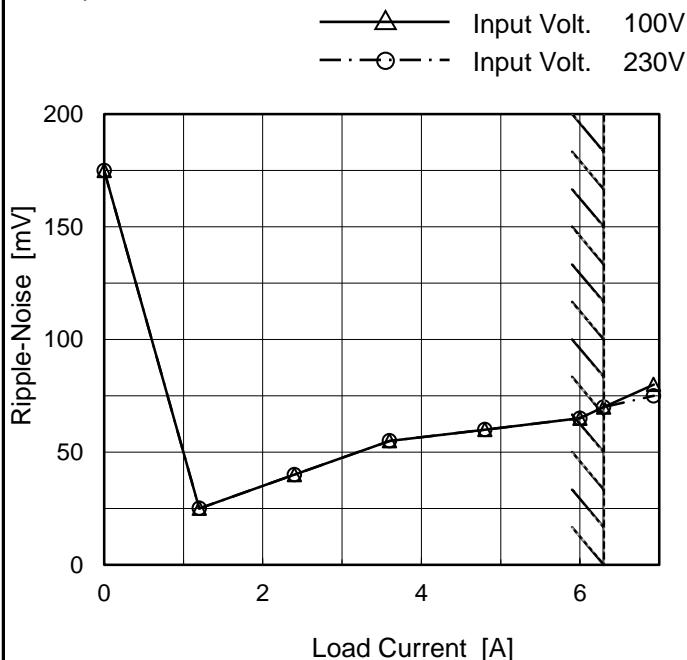
Load Current [A]

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.

2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 100 [V]	Input Volt. 230 [V]
0.00	175	175
1.20	25	25
2.40	40	40
3.60	55	55
4.80	60	60
6.00	65	65
6.30	70	70
6.93	80	75
--	-	-
--	-	-
--	-	-

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

Ripple-Noise
[mVp-p]

T2

T1
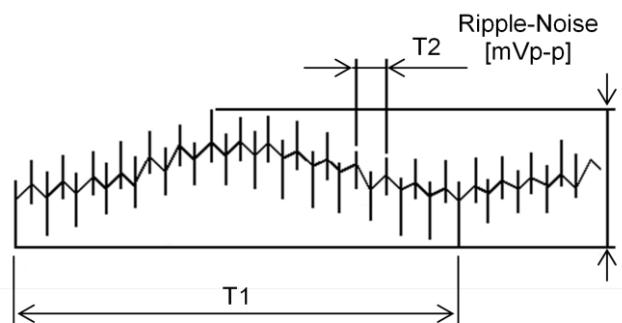
Fig. Complex Ripple Wave Form

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Model	LHA75F-12
Item	Ambient Temperature Drift
Object	+12V6.3A

Testing Circuitry   Figure A

1.Graph

— △ — Input Volt. 100V
--- ⊟ --- Input Volt. 200V
—·— ○ —·— Input Volt. 230V

Output Voltage [V]

Ambient Temperature [°C]

Load 100%

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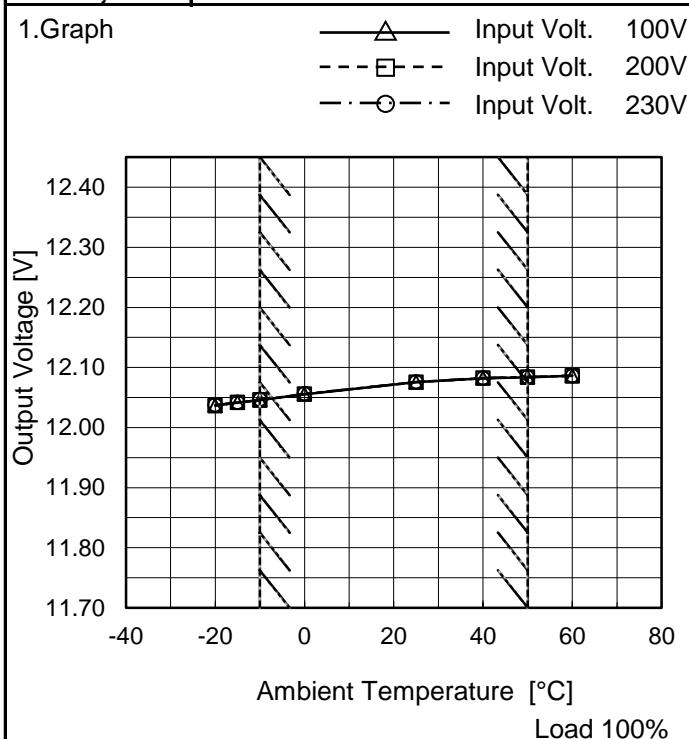
2.Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
-20	12.037	12.037	12.037
-15	12.042	12.042	12.042
-10	12.046	12.046	12.046
0	12.056	12.056	12.056
25	12.076	12.076	12.076
40	12.082	12.082	12.082
50	12.084	12.084	12.084
60	12.086	12.086	12.086
--	-	-	-
--	-	-	-
--	-	-	-

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Model	LHA75F-12		
Item	Rise and Fall Time	Temperature	25°C
		Testing Circuitry	Figure A
Object	+12V6.3A		

1.Graph

Load 100%

Output Volt.

[2V/div]

0

Input Volt. 100 V

Load 100%

Output Volt.

[2V/div]

0

Input Volt. 230 V

Input Volt.

0

Time [100ms/div]

Time [20ms/div]
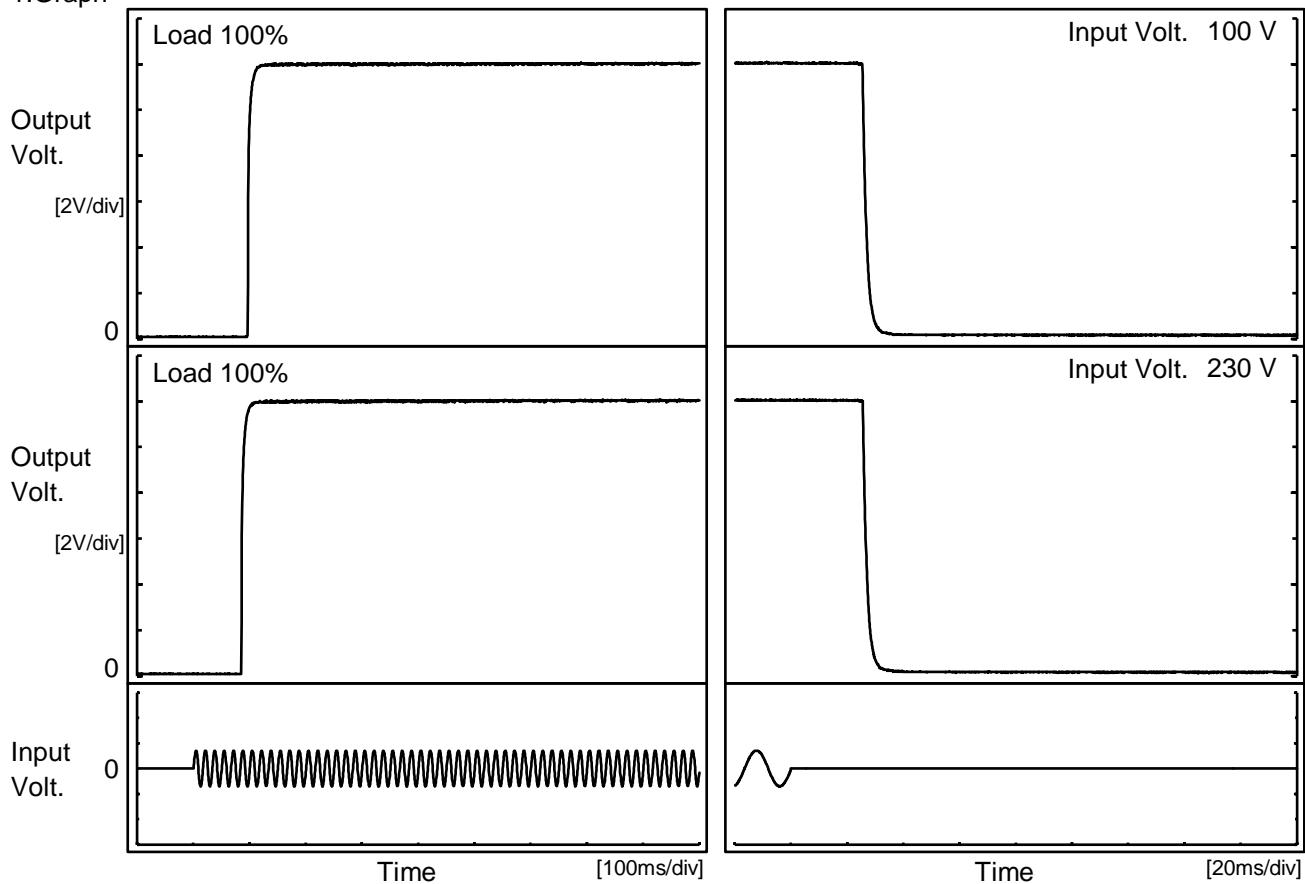
2.Values [ms]

Input Volt. / Time	Td	Tr	Ts	Th	Tf
100 V	97.0	7.5	104.5	25.5	3.3
230 V	86.0	7.0	93.0	25.6	3.3

Output Volt.

90%

10%

Input Volt.

Td Tr Th Tf

Ts

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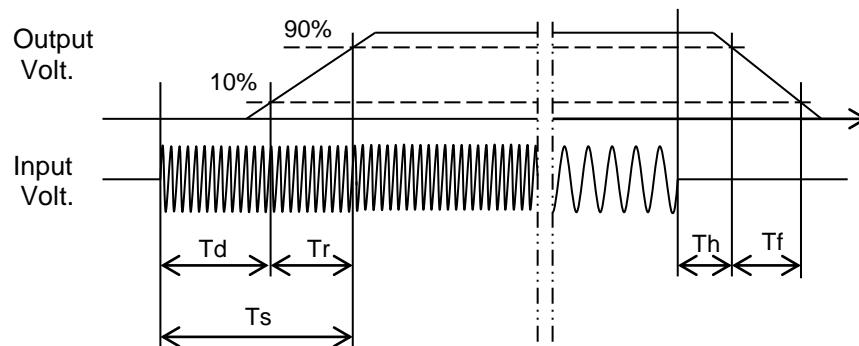
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Model	LHA75F-12
Item	Hold-Up Time
Object	+12V6.3A

Temperature   25°C
Testing Circuitry   Figure A

1.Graph

2.Values

```
- - - ⊟ - - -   Load  50%
———△———   Load 100%
```


Hold-Up Time [ms] vs Input Voltage [V]
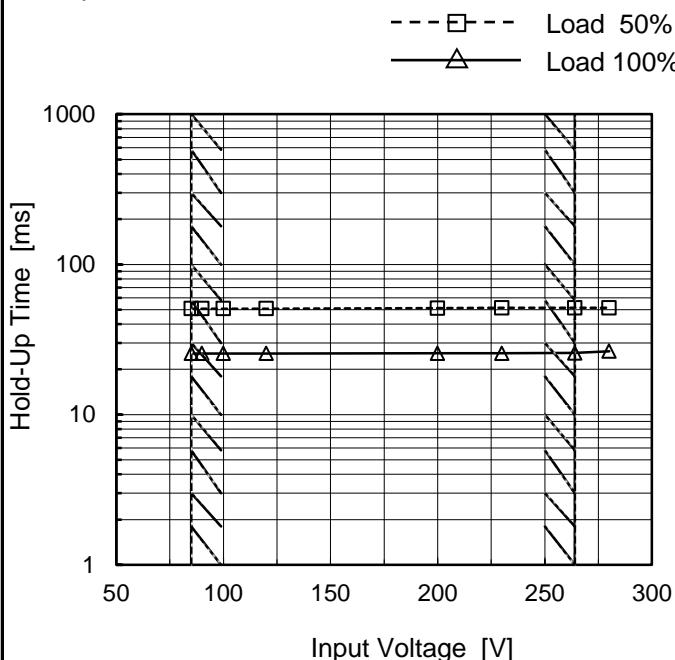
Input Voltage [V]	Hold-Up Time [ms]	
	Load 50%	Load 100%
85	51	-
90	51	26
100	51	26
120	51	26
200	51	26
230	51	26
264	51	26
280	51	26
--	-	-

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.

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Model	LHA75F-12
Item	Instantaneous Interruption Compensation
Object	+12V6.3A

Temperature　　25°C
Testing Circuitry　Figure A

1.Graph

—△— Input Volt.　100V
---☐--- Input Volt.　200V
—·—○—·— Input Volt.　230V

Load Current [A]

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	-	-	-
1.20	122	129	130
2.40	31	64	64
3.60	31	44	45
4.80	31	32	32
6.00	26	26	26
6.30	23	24	25
6.93	22	22	22
--	-	-	-
--	-	-	-
--	-	-	-

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Model	LHA75F-12
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+12V6.3A

Testing Circuitry   Figure A

1.Graph

--- ⊟ --- Load 50%

——△—— Load 100%

Input Voltage [V]

Ambient Temperature [°C]

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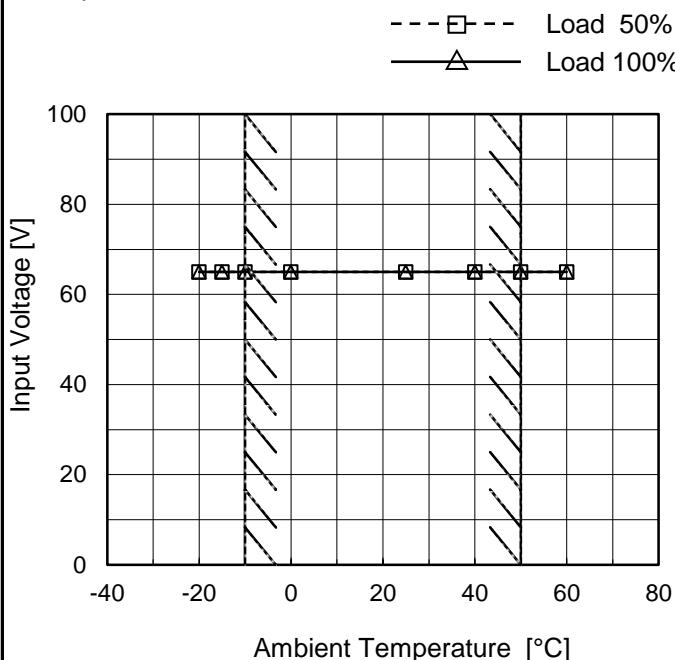
2.Values

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

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COSEL

Model	LHA75F-12
Item	Overcurrent Protection
Object	+12V6.3A

Temperature　　　25°C
Testing Circuitry　　Figure A

1.Graph

———— Input Volt.　100V

———— Input Volt.　230V

Output Voltage [V]
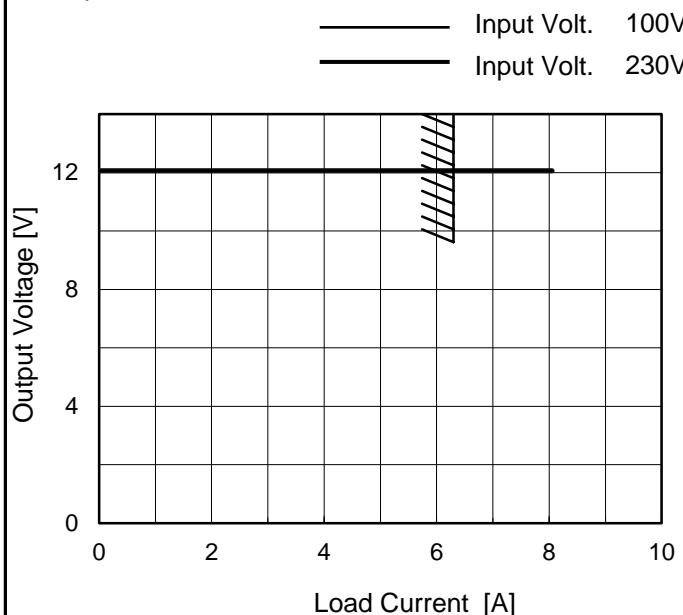
Load Current [A]

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	8.05	8.05
11.4	-	-
10.8	-	-
9.6	-	-
8.4	-	-
7.2	-	-
6.0	-	-
4.8	-	-
3.6	-	-
2.4	-	-
1.2	-	-
0.0	-	-

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COSEL

Model	LHA75F-12
Item	Overvoltage Protection
Object	+12V6.3A

Testing Circuitry   Figure A

1.Graph

———△——— Input Volt.   100V
– – –⊟– – – Input Volt.   230V

Ambient Temperature [°C]

Load 0%

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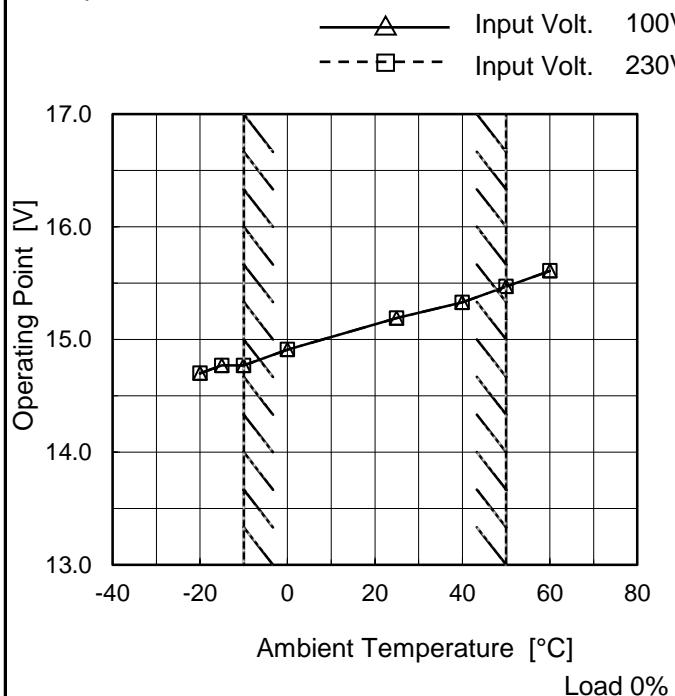
2.Values

Ambient Temperature [°C]	Operating Point [V]	
	Input Volt. 100[V]	Input Volt. 230[V]
-20	14.70	14.70
-15	14.77	14.77
-10	14.77	14.77
0	14.91	14.91
25	15.19	15.19
40	15.33	15.33
50	15.47	15.47
60	15.61	15.61
--	-	-
--	-	-
--	-	-

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Figure A

$$\text{Leakage Current Value } [A] = \frac{\text{Effective Value of Voltmeter}[V]}{1k\ [\Omega]}$$

Figure B-1 (DEN-AN)

$$\text{Leakage Current Value } [A] = \frac{\text{Effective Value of Voltmeter}[V]}{500\ [\Omega]}$$
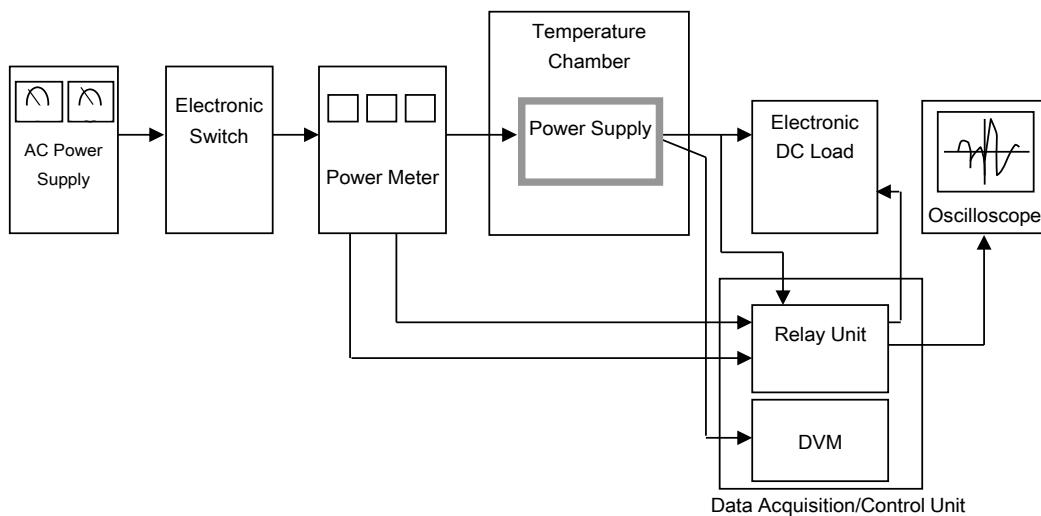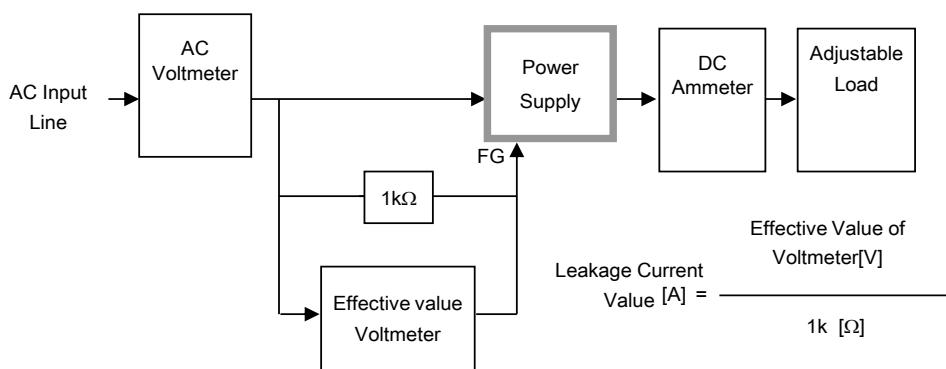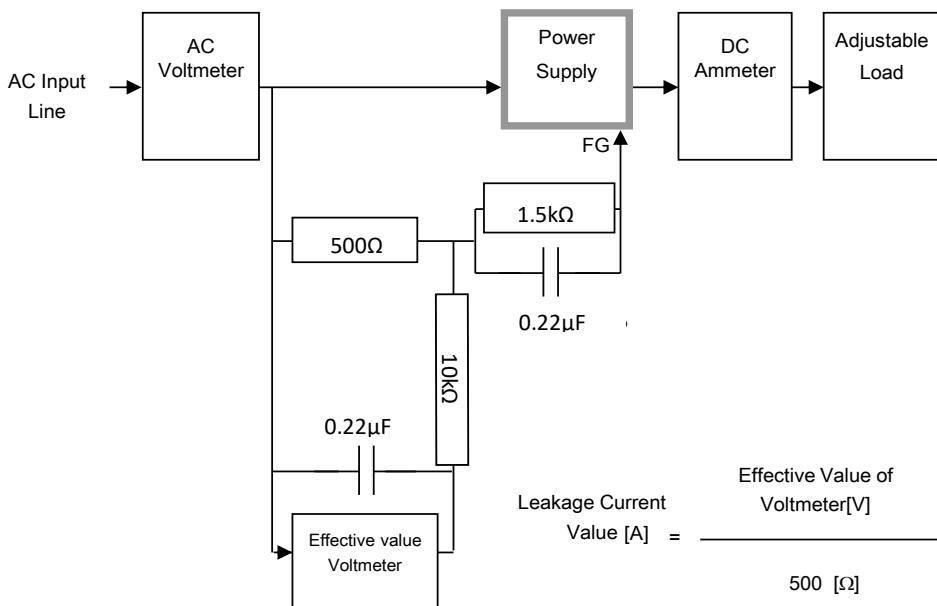
Figure B-2 (IEC62368-1 refer to IEC60990 Fig.4)

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AC Input Line → AC Voltmeter → Power Supply → DC Ammeter → Adjustable Load

FG

500Ω

1.5kΩ

0.22µF

10kΩ

9100pF

20kΩ

6200pF

Effective value Voltmeter

Leakage Current Value [A] $=$ $\dfrac{\text{Effective Value of Voltmeter[V]}}{500\ [\Omega]}$
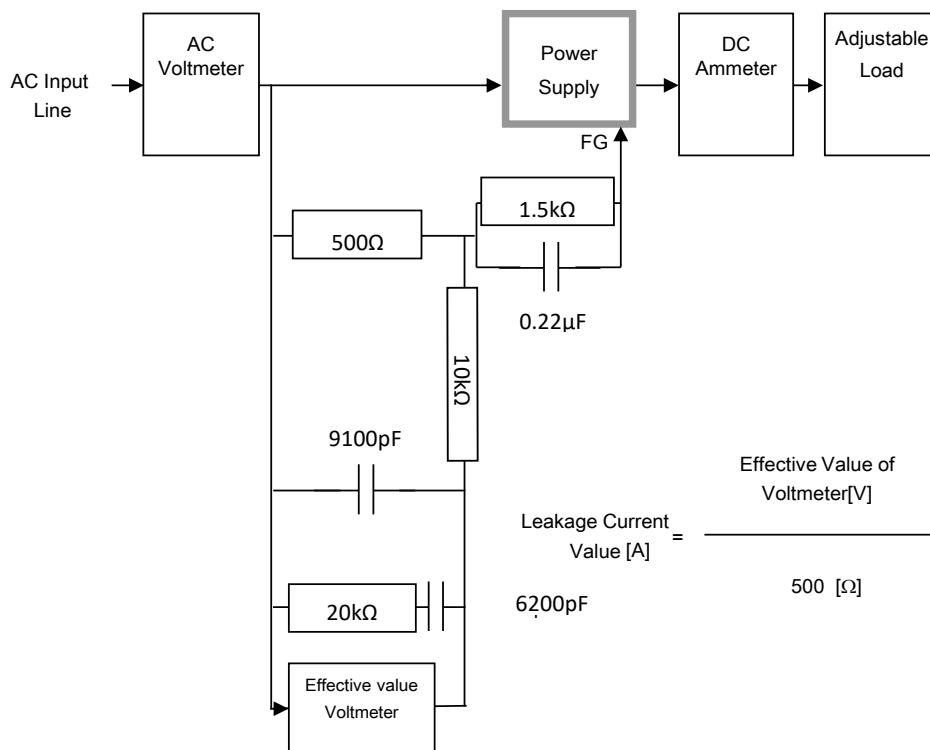
Figure B-3 (IEC62368-1 refer to IEC60990 Fig.5)

Temperature Chamber

AC Power Supply → Power Meter → Power Supply

Measuring board

C1

C2

Electronic DC Load

150mm

Oscilloscope BW:20MHz
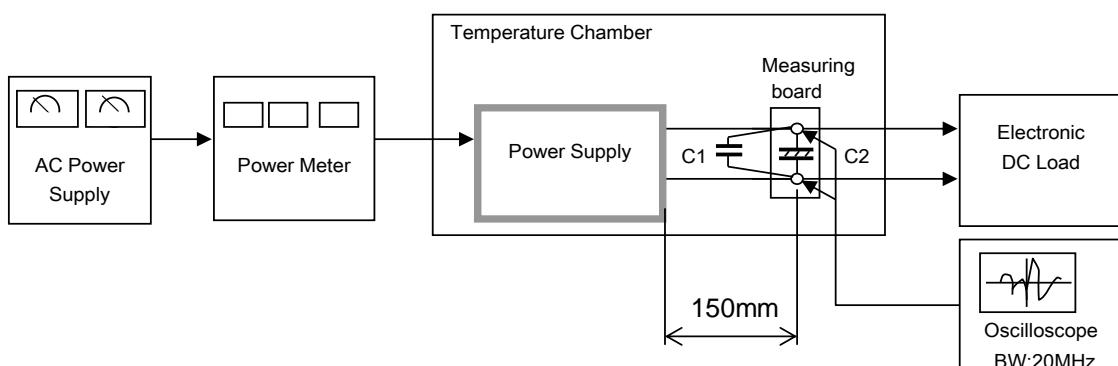
C1= 0.1 µF
(Film capacitor)
C2= 22 µF
(Electrolytic capacitor)

Figure C

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