TEST DATA OF WMA75F-12

Regulated DC Power Supply
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Approved by : *Takashi Kajii*
Design Manager

Prepared by : *Takeshi Natsuno*
Design Engineer

COSEL CO.,LTD.

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Model	WMA75F-12
Item	Input Current (by Load Current)
Object	——————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph
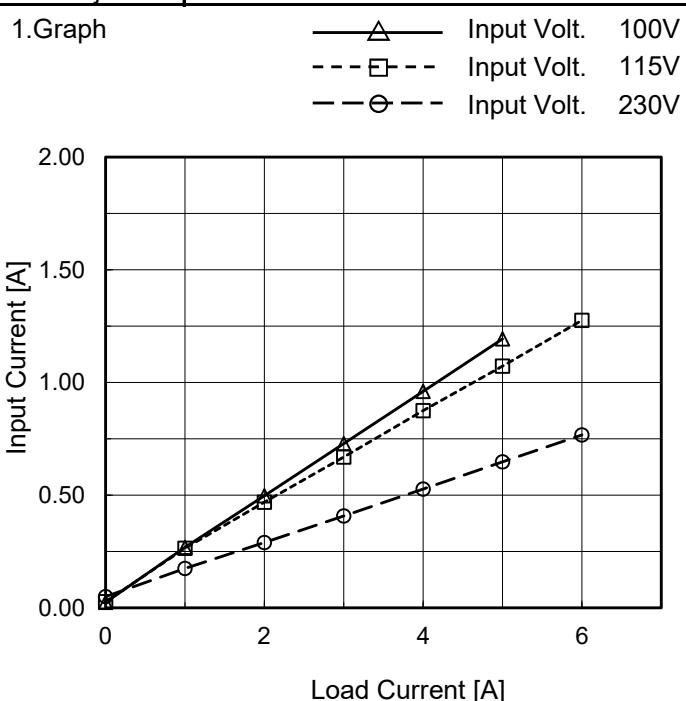
—△— Input Volt. 100V
---☐--- Input Volt. 115V
——⊖—— Input Volt. 230V

2.Values

Load Current [A]	Input Current [A]		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
0	0.024	0.027	0.049
1	0.268	0.264	0.174
2	0.498	0.468	0.290
3	0.729	0.670	0.408
4	0.960	0.875	0.527
5	1.194	1.073	0.648
6	-	1.276	0.767
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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Model	WMA75F-12
Item	Input Power (by Load Current)
Object	————————

Temperature   25°C
Testing Circuitry   Figure A

1.Graph

—△— Input Volt.   100V
---▣--- Input Volt.   115V
—⊖— Input Volt.   230V
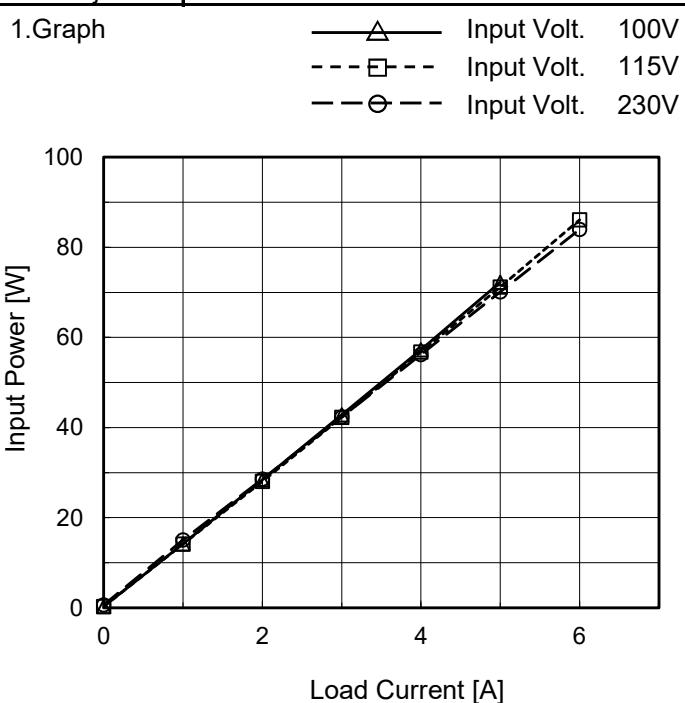
Input Power [W] vs Load Current [A]

2.Values

Load Current [A]	Input Power [W]		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
0	0.27	0.29	0.59
1	14.23	14.10	15.06
2	28.44	28.07	28.53
3	42.83	42.26	42.36
4	57.27	56.76	56.22
5	72.23	71.18	70.11
6	-	86.09	83.99
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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Model	WMA75F-12
Item	Efficiency (by Input Voltage)
Object	

Temperature 25°C
Testing Circuitry Figure A

1.Graph

- - -☐- - - Load 50%
———△——— Load 100%

2.Values

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
85	83.8	-
100	85.0	-
115	85.6	84.3
200	85.7	85.9
230	85.3	86.0
240	85.1	86.0
264	84.4	85.8
--	-	-
--	-	-

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Model	WMA75F-12

Item	Efficiency (by Load Current)

Object	————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph

		Input Volt.	100V
		Input Volt.	115V
		Input Volt.	230V

Efficiency [%]

Load Current [A]

2.Values

Load Current [A]	Efficiency [%]		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
0	-	-	-
1	84.3	85.1	79.6
2	84.5	85.6	84.2
3	84.2	85.3	85.1
4	84.0	84.7	85.5
5	83.2	84.5	85.7
6	-	83.8	85.9
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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Model	WMA75F-12
Item	Power Factor (by Input Voltage)
Object	————————

Temperature　　25°C
Testing Circuitry　Figure A

1.Graph

- - - ⊡ - - -　Load　50%
————△————　Load 100%

2.Values

Input Voltage [V]	Power Factor	
	Load　50%	Load 100%
85	0.592	-
100	0.562	-
115	0.537	0.573
200	0.460	0.484
230	0.441	0.463
240	0.436	0.458
264	0.424	0.445
--	-	-
--	-	-

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Model	WMA75F-12
Item	Power Factor (by Load Current)
Object	————————

Temperature   25°C
Testing Circuitry   Figure A

1.Graph

△ —— Input Volt. 100V
-- □ -- Input Volt. 115V
— ⊖ — Input Volt. 230V
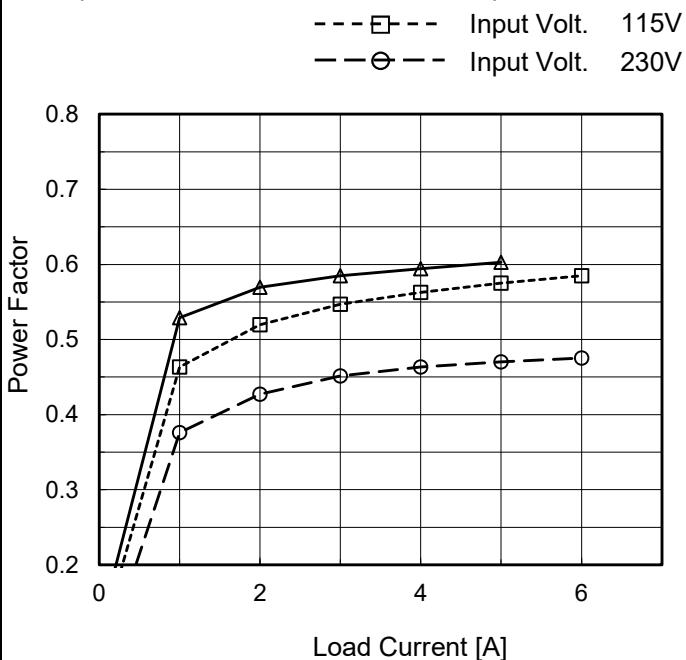
2.Values

Load Current [A]	Power Factor		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
0	0.113	0.093	0.053
1	0.529	0.463	0.376
2	0.569	0.520	0.427
3	0.585	0.547	0.451
4	0.594	0.563	0.463
5	0.603	0.575	0.470
6	-	0.585	0.475
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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Model	WMA75F-12
Item	Inrush Current
Object	————————

Temperature	25°C
Testing Circuitry	Figure A

Input
Current
[20A/div]

Input
Voltage
[100V/div]

Time   [50ms/div]

Input Voltage   115 V
Frequency   50 Hz
Load   100 %

Primary inrush current
                              19.2 A
Secondary inrush current
                              3.2 A

Input
Current
[20A/div]

Input
Voltage
[200V/div]

Time   [50ms/div]

Input Voltage   230 V
Frequency   50 Hz
Load   100 %

Primary inrush current
                              47.2 A
Secondary inrush current
                              3.3 A

Primary inrush current   Secondary inrush current

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Model	WMA75F-12
Item	Leakage Current
Object	

Temperature 25°C
Testing Circuitry Figure B

1.Results

[mA]

Standards	Measuring Method	Input Volt.			Note
		100 [V]	115 [V]	230 [V]	
IEC60601-1	Both phases	0.14	0.16	0.35	Operation
	One of phases	0.22	0.25	0.57	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	WMA75F-12
Item	Line Regulation
Object	+12V6A

Temperature   25°C
Testing Circuitry   Figure A

1.Graph
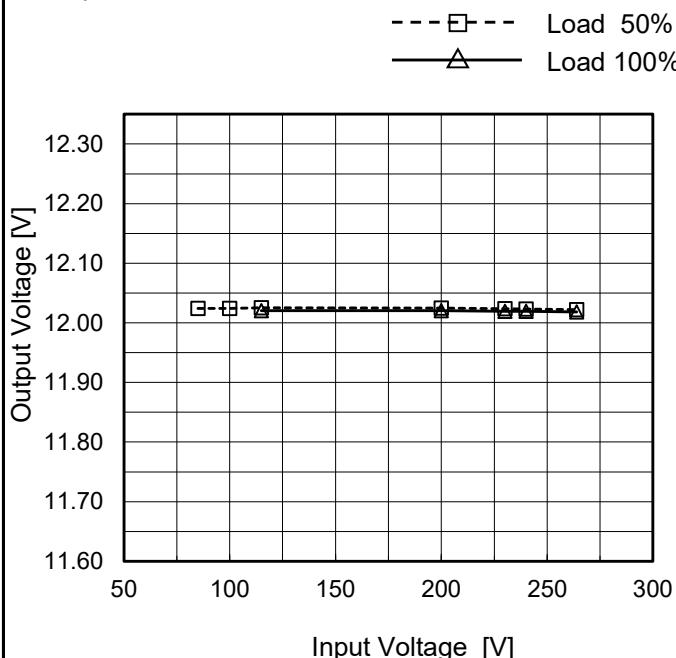
--□-- Load 50%
—△— Load 100%

2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
85	12.024	-
100	12.024	-
115	12.025	12.020
200	12.025	12.021
230	12.024	12.020
240	12.023	12.019
264	12.022	12.018
--	-	-
--	-	-

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Model	WMA75F-12
Item	Load Regulation
Object	+12V6A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

	Input Volt.	100V
	Input Volt.	115V
	Input Volt.	230V

Output Voltage [V] vs Load Current [A]
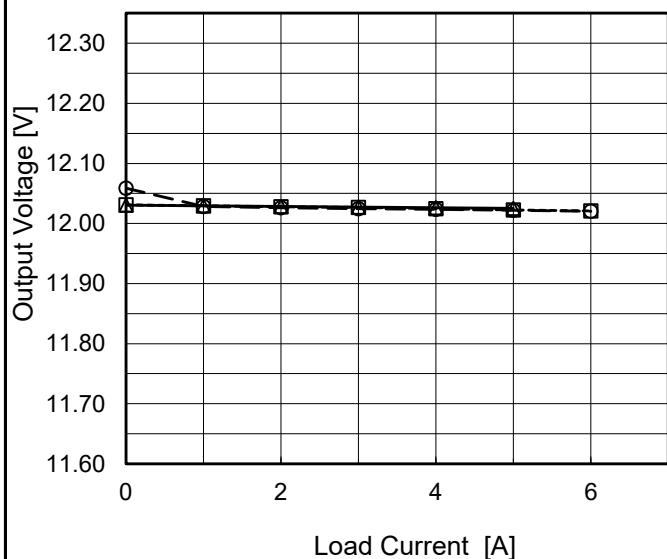
2.Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
0	12.030	12.031	12.059
1	12.030	12.029	12.028
2	12.028	12.028	12.026
3	12.027	12.027	12.025
4	12.026	12.025	12.023
5	12.025	12.023	12.022
6	-	12.021	12.021
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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Model	WMA75F-12
Item	Dynamic Load Response
Object	+12V6A

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% (6A)

200 mV/div

20 ms/div   20 ms/div

Min.Load (0A)←→
Load 50% (3A)

200 mV/div

20 ms/div   20 ms/div

Load 50% (3A)←→
Load 100% (6A)

200 mV/div

20 ms/div   20 ms/div

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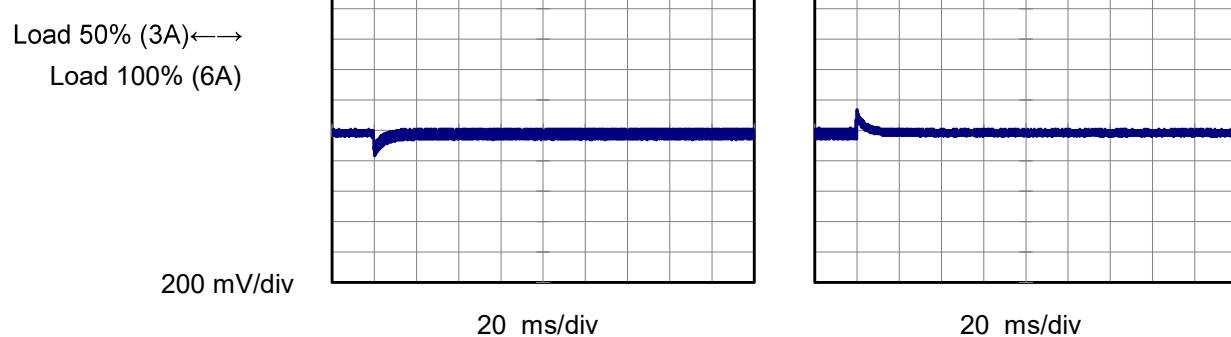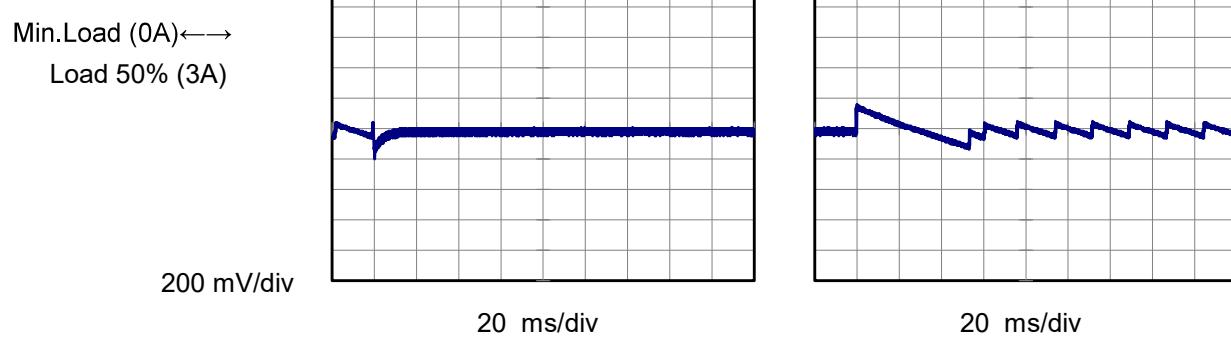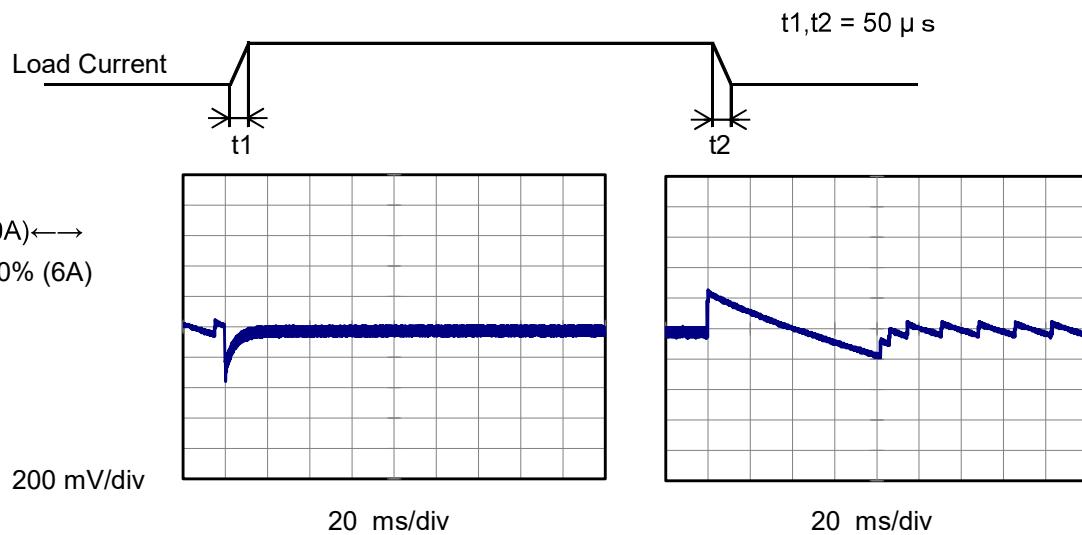
Model	WMA75F-12
Item	Ripple-Noise (by Load Current)
Object	+12V6A

Temperature 25°C
Testing Circuitry Figure C

1.Graph

———△——— Input Volt.　115V
——─⊖—— Input Volt.　230V

Ripple-Noise [mV] vs Load Current [A]
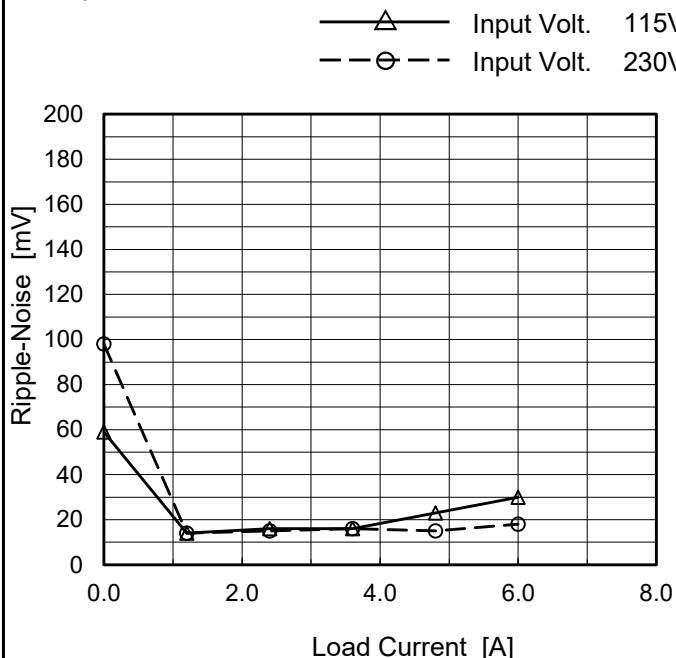
2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 115 [V]	Input Volt. 230 [V]
0.0	59	98
1.2	14	14
2.4	16	15
3.6	16	16
4.8	23	15
6.0	30	18
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

Measured by 20 MHz Oscilloscope.
Ripple-Noise is shown as p-p in the figure below.

T1: Due to AC Input Line
T2: Due to Switching
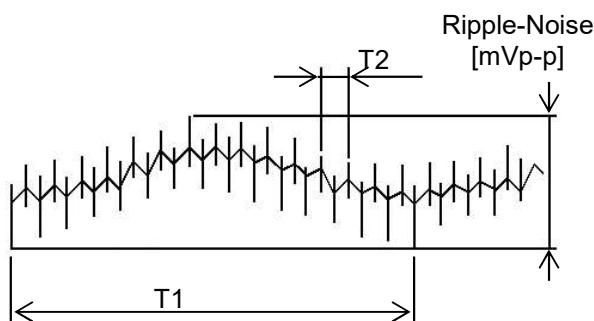
Fig. Complex Ripple Wave Form

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Model	WMA75F-12		
Item	Ripple-Noise (by Ambient Temp.)	Testing Circuitry	Figure C
Object	+12V6A		

1.Graph

2.Values

- - - ⊡ - - - Input Volt. 115V

⎯⎯△⎯⎯ Input Volt. 230V

Ambient Temperature [°C]

Load 100 %

Measured by 20 MHz Oscilloscope.
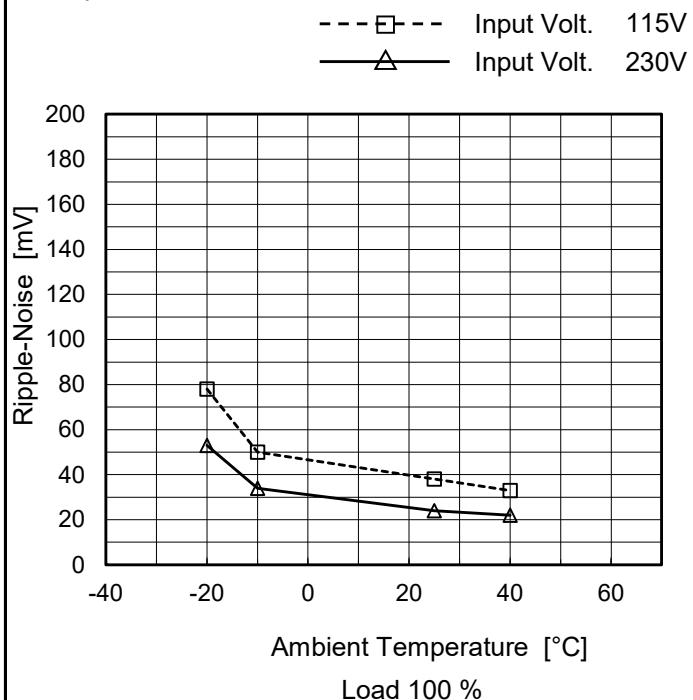
Ambient Temperature [°C]	Ripple-Noise [mV]	
	Input Volt. 115 [V]	Input Volt. 230[V]
-20	78	53
-10	50	34
25	38	24
40	33	22
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

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Model	WMA75F-12
Item	Ambient Temperature Drift
Object	+12V6A

Testing Circuitry   Figure A

1.Graph

—△—	Input Volt.	100V
---☐---	Input Volt.	115V
—⊖—	Input Volt.	230V

Ambient Temperature [°C]

Load 100%
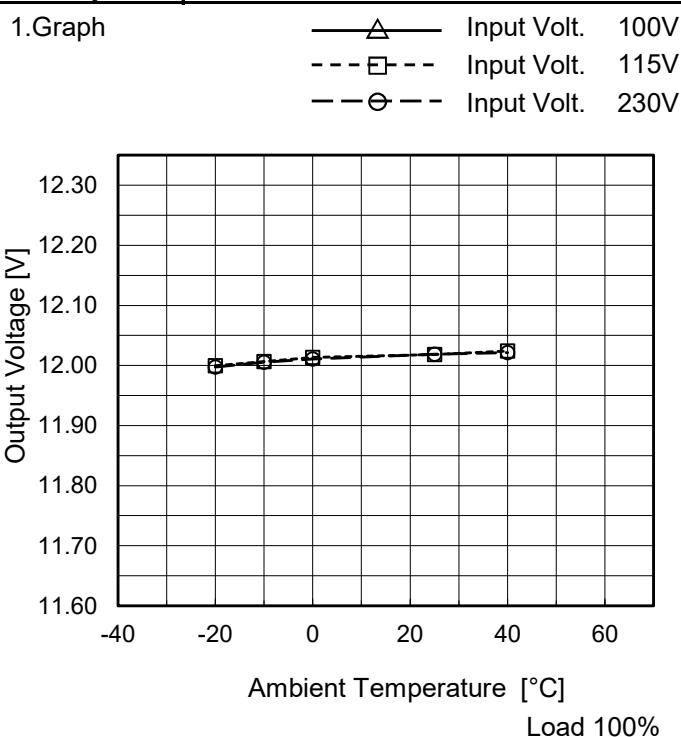
2.Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
-20	-	12.000	11.998
-10	-	12.007	12.005
0	-	12.013	12.011
25	-	12.018	12.019
40	-	12.024	12.022
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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Model	WMA75F-12	
Item	Output Voltage Accuracy	Testing Circuitry Figure A
Object	+12V6A	

1.Output Voltage Accuracy

  This is defined as the value of the output voltage, regulation load, ambient temperature and
  input voltage varied at random in the range as specified below.

      Temperature   : -20 - 40°C
       Input Voltage : 100 - 230V
      Load Current   : 0 - 6A

  * Output Voltage Accuracy = ±(Maximum of Output Voltage - Minimum of Output Voltage) / 2

  * Output Voltage Accuracy (Ratio) = $\dfrac{\text{Output Voltage Accuracy}}{\text{Rated Output Voltage}}$ × 100

2.Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	40	200	0	12.055	±30	±0.3
Minimum Voltage	-20	132	6	11.996		

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Model	WMA75F-12
Item	Time Lapse Drift
Object	+12V6A

Temperature   25°C
Testing Circuitry   Figure A

1.Graph

Time [H]
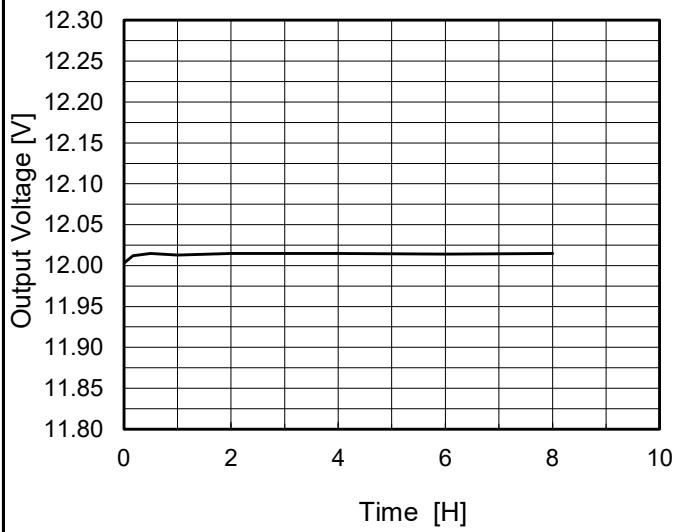
Input Volt.   115V
Load   100%

2.Values

Time since start [H]	Output Voltage [V]
0.0	12.003
0.2	12.012
0.5	12.015
1.0	12.013
2.0	12.015
4.0	12.015
6.0	12.014
8.0	12.015

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Model	WMA75F-12
Item	Rise and Fall Time
Object	+12V6A

Temperature　　　25°C
Testing Circuitry　Figure A

1.Graph

Load 100%

Output Volt.

[2V/div]

0

Input Volt. 115 V

Load 100%

Output Volt.

[2V/div]

0

Input Volt. 230 V

Input Volt.

0

Time　　　　　　　[50ms/div]

Time　　　　　　　[20ms/div]
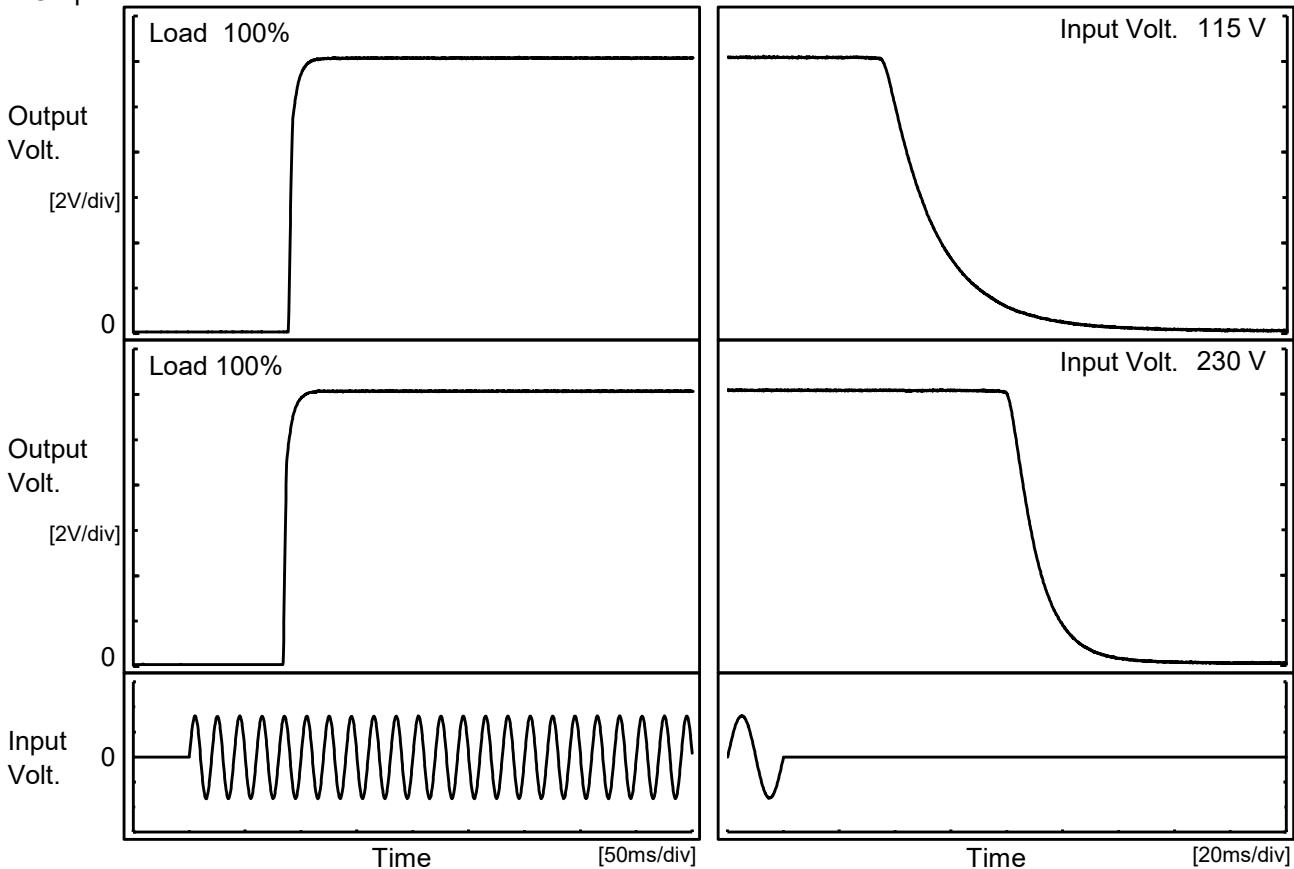
2.Values

[ms]

Input Volt	Time	Td	Tr	Ts	Th	Tf
115 V		89.3	7.5	96.8	16.0	20.7
230 V		84.5	7.5	92.0	82.2	21.1

Output Volt.

90%

10%

Input Volt.

Td　Tr

Th　Tf

Ts

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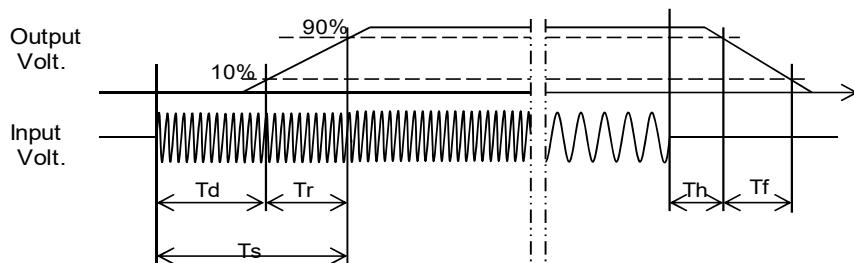
Model	WMA75F-12
Item	Hold-Up Time
Object	+12V6A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

Hold-Up Time [ms] vs Input Voltage [V]
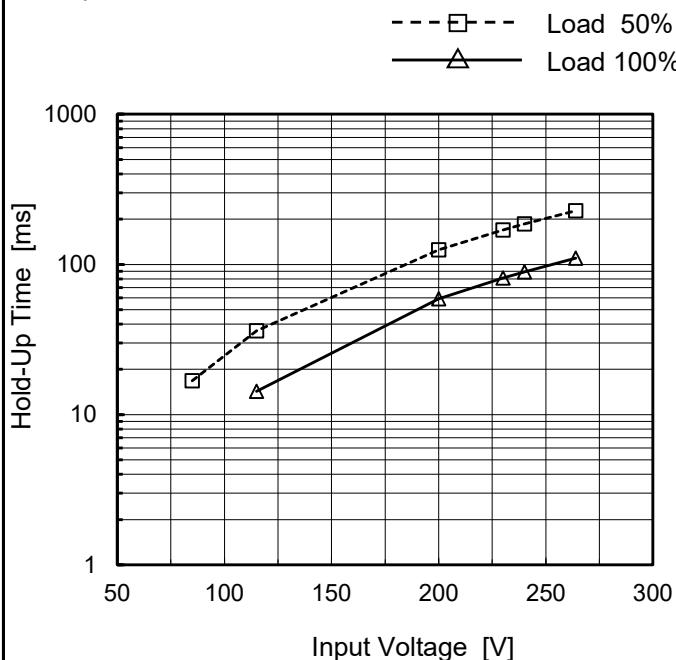
- - -☐- - - Load 50%
——△—— Load 100%

2.Values

Input Voltage [V]	Hold-Up Time [ms]	
	Load 50%	Load 100%
85	17	-
100	26	-
115	36	14
200	125	59
230	169	81
240	186	89
264	228	110
--	-	-
--	-	-

This duration covers from Shut-off of input voltage to the moment when output voltage descends to the rated range of voltage accuracy.

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Model	WMA75F-12
Item	Instantaneous Interruption Compensation
Object	+12V6A

Temperature   25°C
Testing Circuitry   Figure A

1.Graph

————△———— Input Volt. 100V
— — —☐— — — Input Volt. 115V
— —☉— — Input Volt. 230V

Instantaneous Compensation Time [ms] vs Load Current [A]
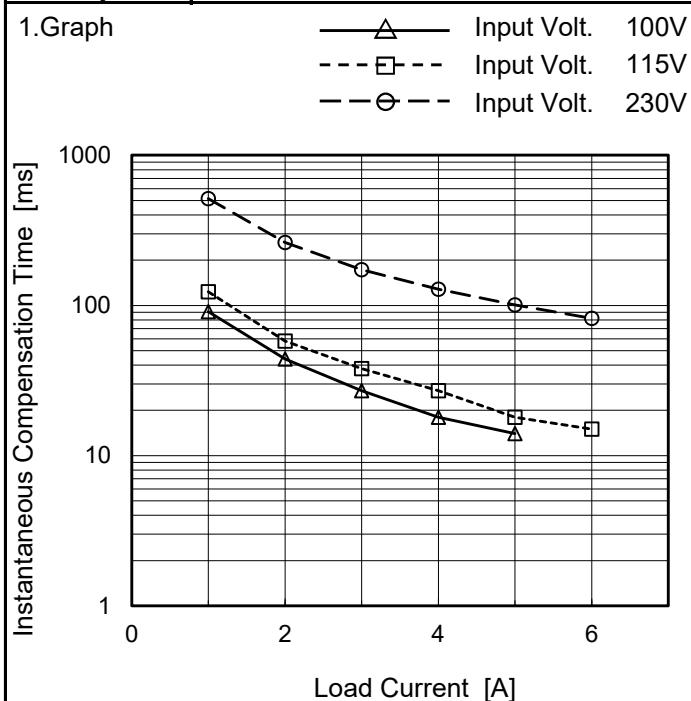
2.Values

Load Current [A]	Time [ms]		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
0	-	-	-
1	91	123	515
2	44	58	262
3	27	38	173
4	18	27	128
5	14	18	101
6	-	15	82
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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Model	WMA75F-12
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+12V6A

Testing Circuitry   Figure A

1.Graph

Input Voltage [V] vs Ambient Temperature [°C]
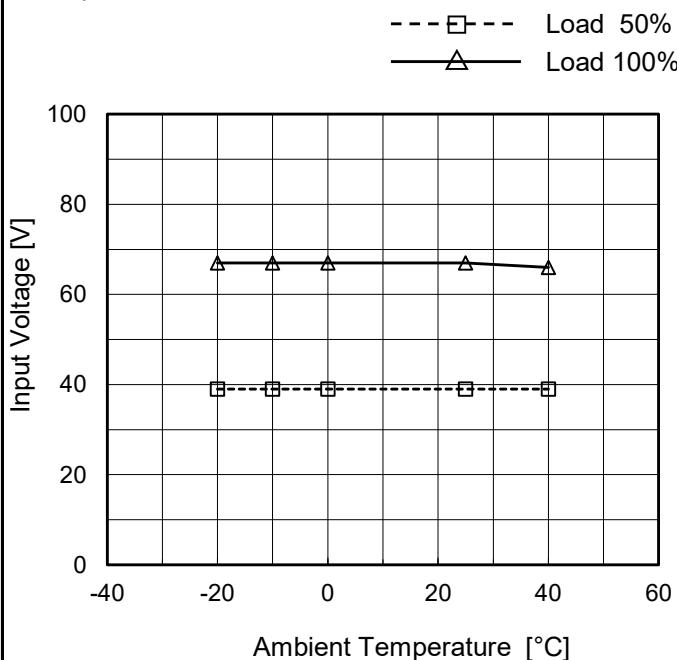
- - - ☐ - - - Load 50%
——△—— Load 100%

2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	39	67
-10	39	67
0	39	67
25	39	67
40	39	66
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

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Model	WMA75F-12
Item	Overcurrent Protection
Object	+12V6A

Temperature　25°C
Testing Circuitry　Figure A

1.Graph

—————— Input Volt. 100V

—————— Input Volt. 115V

—————— Input Volt. 230V

2.Values

Output Voltage [V] vertical axis, values 0, 4, 8, 12

Load Current [A] horizontal axis, values 0, 4, 8, 12
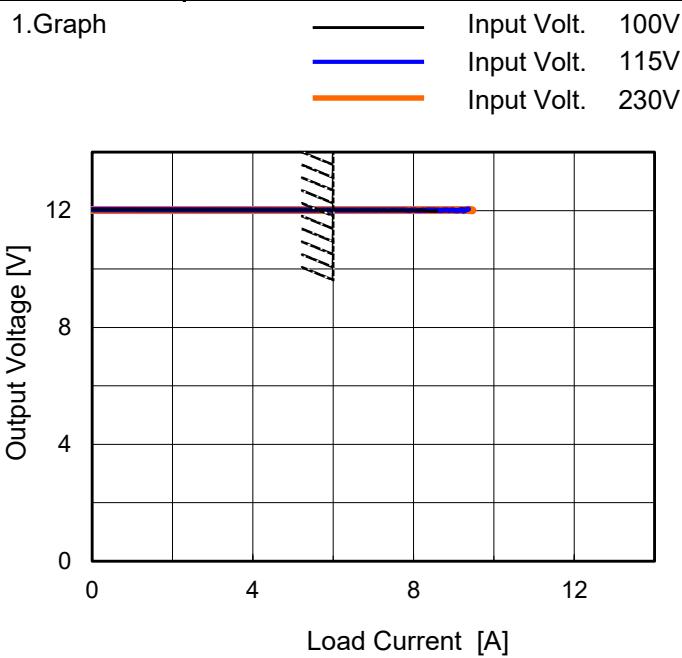
Note: Slanted line shows the range of the rated load current.

Output Voltage [V]	Load Current [A]		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
12	8.50	9.25	9.47
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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Model	WMA75F-12
Item	Overvoltage Protection
Object	+12V6A

Testing Circuitry   Figure A

1.Graph

```
——△——  Input Volt.   115V
- - -□- - -  Input Volt.   230V
```

Operating Point [V] vs Ambient Temperature [°C]

Load 0%
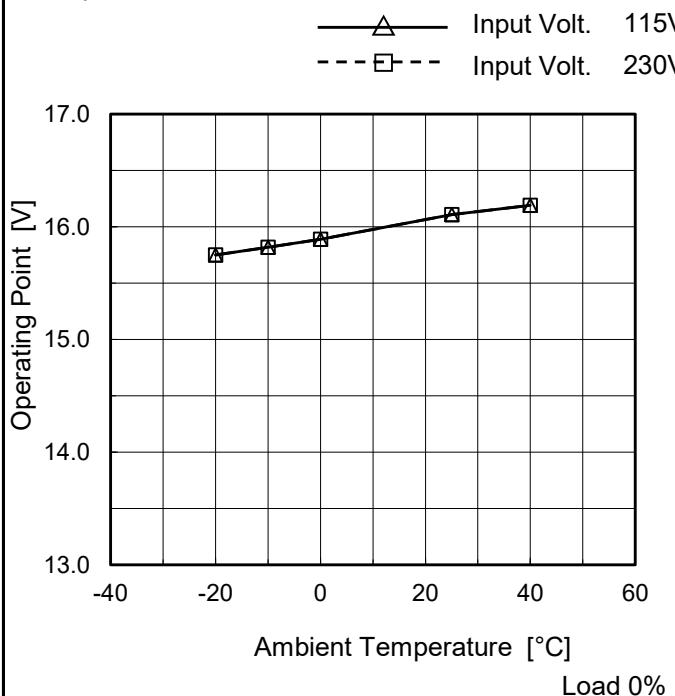
2.Values

Ambient Temperature [°C]	Operating Point [V]	
	Input Volt. 115[V]	Input Volt. 230[V]
-20	15.75	15.75
-10	15.82	15.82
0	15.89	15.89
25	16.11	16.11
40	16.19	16.19
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

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Figure A

$$\text{Leakage Current Value [A]} = \frac{\text{Effective Value of Voltmeter[V]}}{1k\ [\Omega]}$$
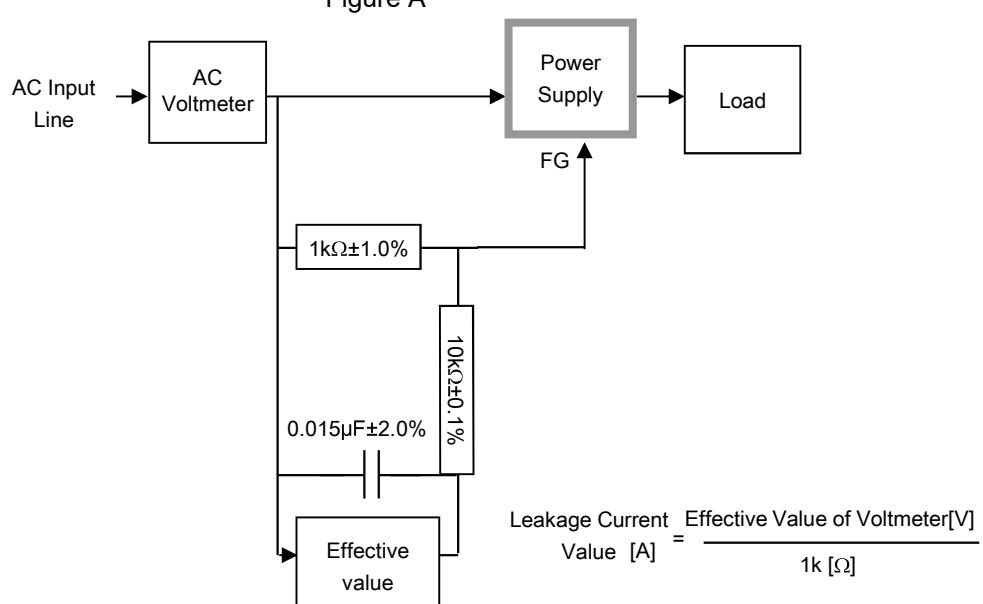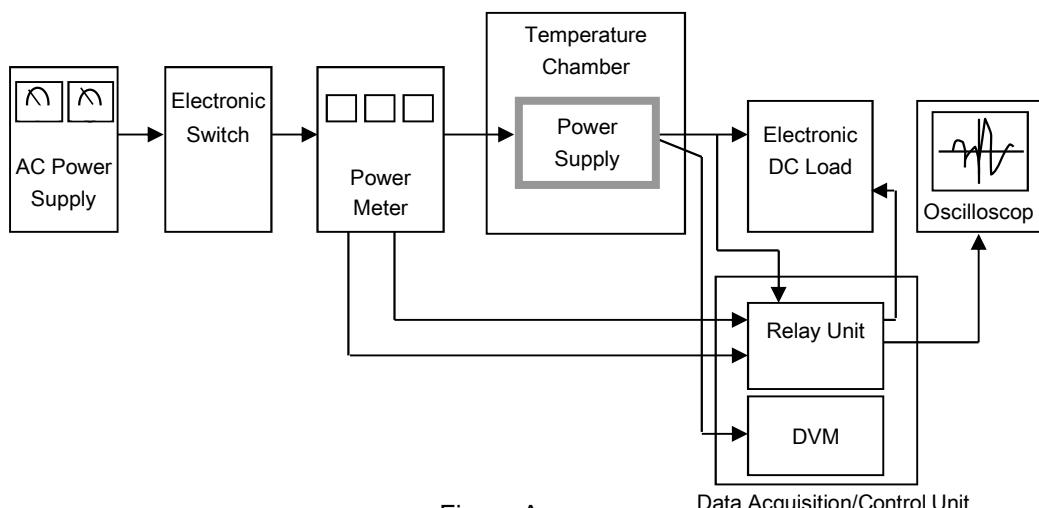
Figure B (IEC60601-1)
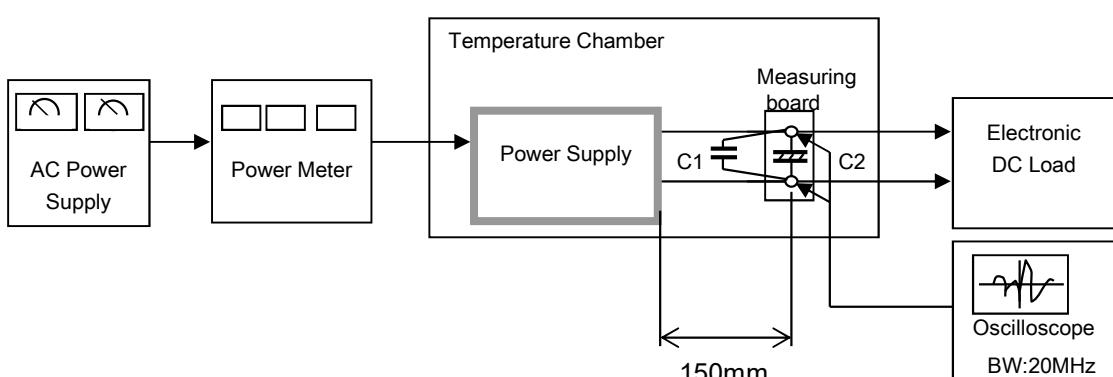
(Ceramic capacitor)
C1= 0.1 µF

(Electrolytic capacitor)
C2= 47 µF

Figure C

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