TEST DATA OF WMA75F-48

Regulated DC Power Supply
November 9, 2020

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

Temperature 25°C
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1.Graph

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

Input Current [A] vs Load Current [A]

2.Values

Load Current [A]	Input Current [A]		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
0.0	0.026	0.029	0.049
0.3	0.308	0.303	0.195
0.6	0.566	0.532	0.327
0.9	0.822	0.756	0.459
1.2	1.089	0.983	0.592
1.5	-	1.210	0.728
1.6	-	1.290	0.776
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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Model	WMA75F-48
Item	Input Power (by Load Current)
Object	———————

Temperature   25°C
Testing Circuitry   Figure A

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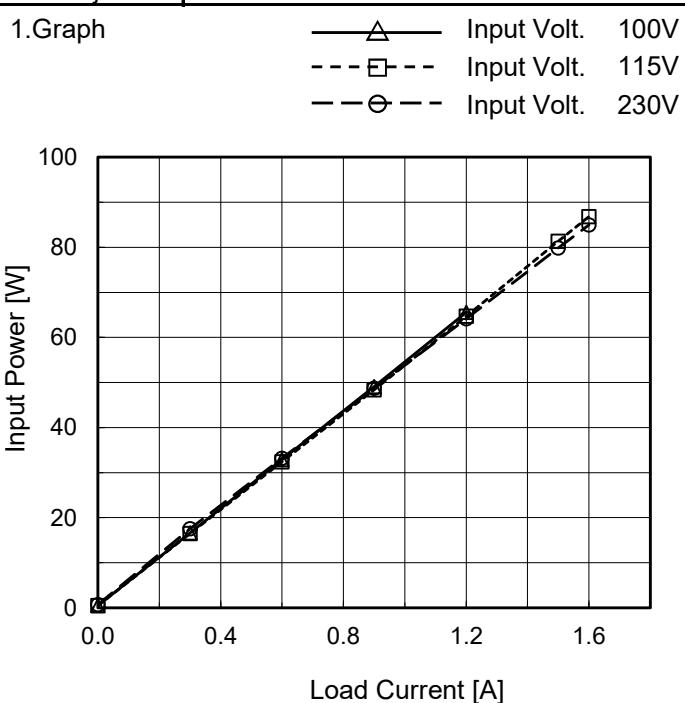
————△———— Input Volt.   100V
– – –☐– – – Input Volt.   115V
— —⊖— — Input Volt.   230V

2.Values

Load Current [A]	Input Power [W]		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
0.0	0.46	0.48	0.73
0.3	16.62	16.46	17.52
0.6	32.87	32.42	33.14
0.9	49.08	48.37	48.70
1.2	65.59	64.73	64.14
1.5	-	81.31	79.84
1.6	-	86.80	84.98
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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Model	WMA75F-48
Item	Efficiency (by Input Voltage)
Object	——————————

Temperature   25°C
Testing Circuitry   Figure A

1.Graph

- - -□- - - Load 50%
——△—— Load 100%

Efficiency [%] vs Input Voltage [V]

2.Values

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
85	87.5	-
100	88.6	-
115	89.2	88.7
200	89.0	90.4
230	88.4	90.3
240	88.1	90.2
264	87.3	89.8
--	-	-
--	-	-

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Model	WMA75F-48
Item	Efficiency (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]	Efficiency [%]		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
0.0	-	-	-
0.3	86.1	86.9	81.6
0.6	87.4	88.6	86.6
0.9	87.7	89.0	88.3
1.2	87.6	88.7	89.5
1.5	-	88.4	89.9
1.6	-	88.3	90.1
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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Model	WMA75F-48
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%	Power Factor Load 100%
85	0.594	-
100	0.563	-
115	0.538	0.574
200	0.464	0.487
230	0.445	0.466
240	0.441	0.461
264	0.429	0.448
--	-	-
--	-	-

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Model	WMA75F-48
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
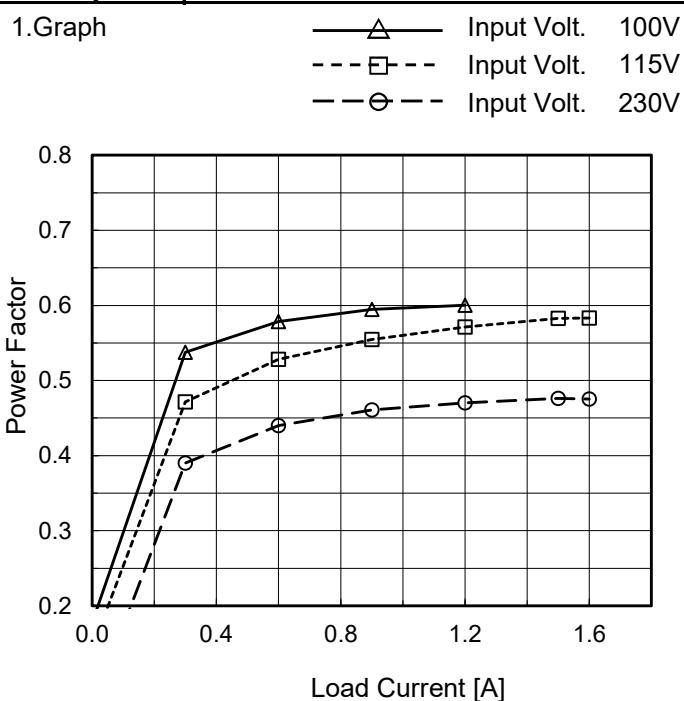
Power Factor vs Load Current [A]

2.Values

Load Current [A]	Power Factor		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
0.0	0.177	0.144	0.065
0.3	0.537	0.472	0.390
0.6	0.579	0.528	0.440
0.9	0.595	0.555	0.461
1.2	0.600	0.571	0.470
1.5	-	0.583	0.476
1.6	-	0.583	0.475
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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Model	WMA75F-48		
Item	Inrush Current	Temperature	25°C
		Testing Circuitry	Figure A
Object	———————		

Input Current [20A/div]

Input Voltage [100V/div]

Time [50ms/div]

Input Voltage 115 V
Frequency 50 Hz
Load 100 %

Primary inrush current
18.8 A
Secondary inrush current
3.3 A

Input Current [20A/div]

Input Voltage [200V/div]

Time [50ms/div]

Input Voltage 230 V
Frequency 50 Hz
Load 100 %

Primary inrush current
48.8 A
Secondary inrush current
3.9 A

Primary inrush current   Secondary inrush current

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Model	WMA75F-48
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-48
Item	Line Regulation
Object	+48V1.6A

Temperature 25°C
Testing Circuitry Figure A

1.Graph
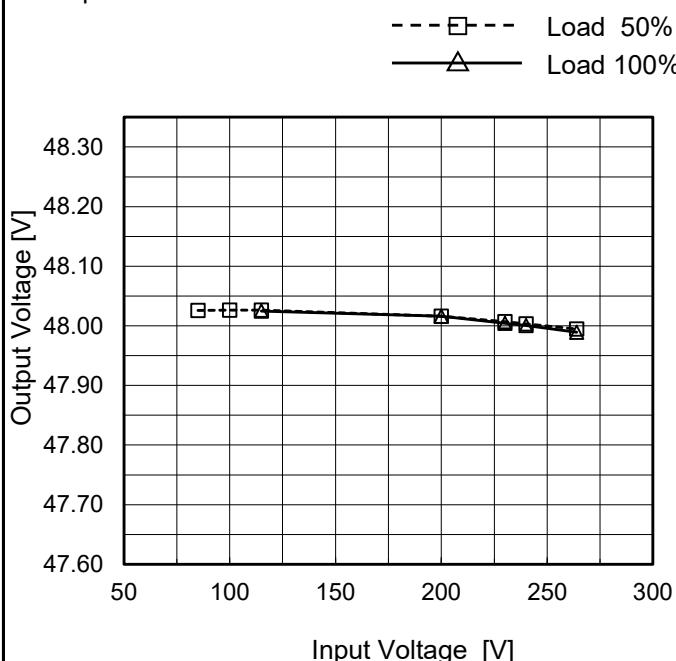
2.Values

--- ⊟ --- Load 50%
—△— Load 100%

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
85	48.026	-
100	48.026	-
115	48.027	48.025
200	48.016	48.016
230	48.007	48.004
240	48.004	48.000
264	47.995	47.989
--	-	-
--	-	-

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Model	WMA75F-48
Item	Load Regulation
Object	+48V1.6A

Temperature   25°C
Testing Circuitry   Figure A

1.Graph

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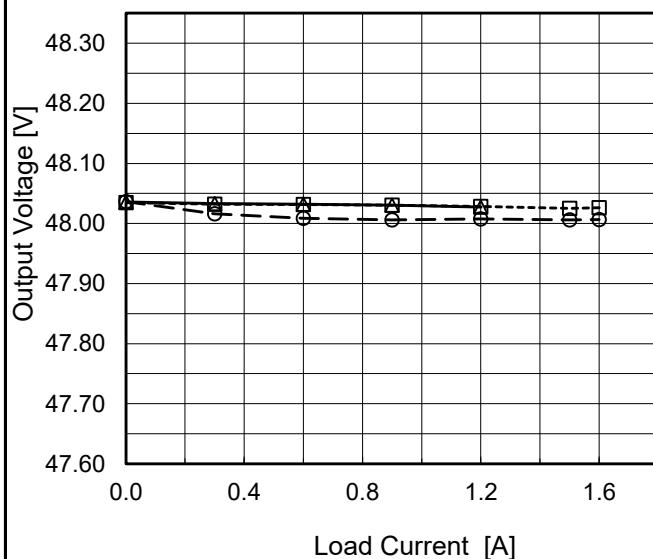
2.Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
0.0	48.036	48.035	48.036
0.3	48.033	48.032	48.016
0.6	48.032	48.032	48.009
0.9	48.031	48.030	48.006
1.2	48.027	48.028	48.008
1.5	-	48.025	48.006
1.6	-	48.026	48.007
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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Model	WMA75F-48
Item	Dynamic Load Response
Object	+48V1.6A

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% (1.6A)

200 mV/div

20 ms/div   20 ms/div

Min.Load (0A)←→
    Load 50% (0.8A)

200 mV/div

20 ms/div   20 ms/div

Load 50% (0.8A)←→
    Load 100% (1.6A)

200 mV/div

20 ms/div   20 ms/div

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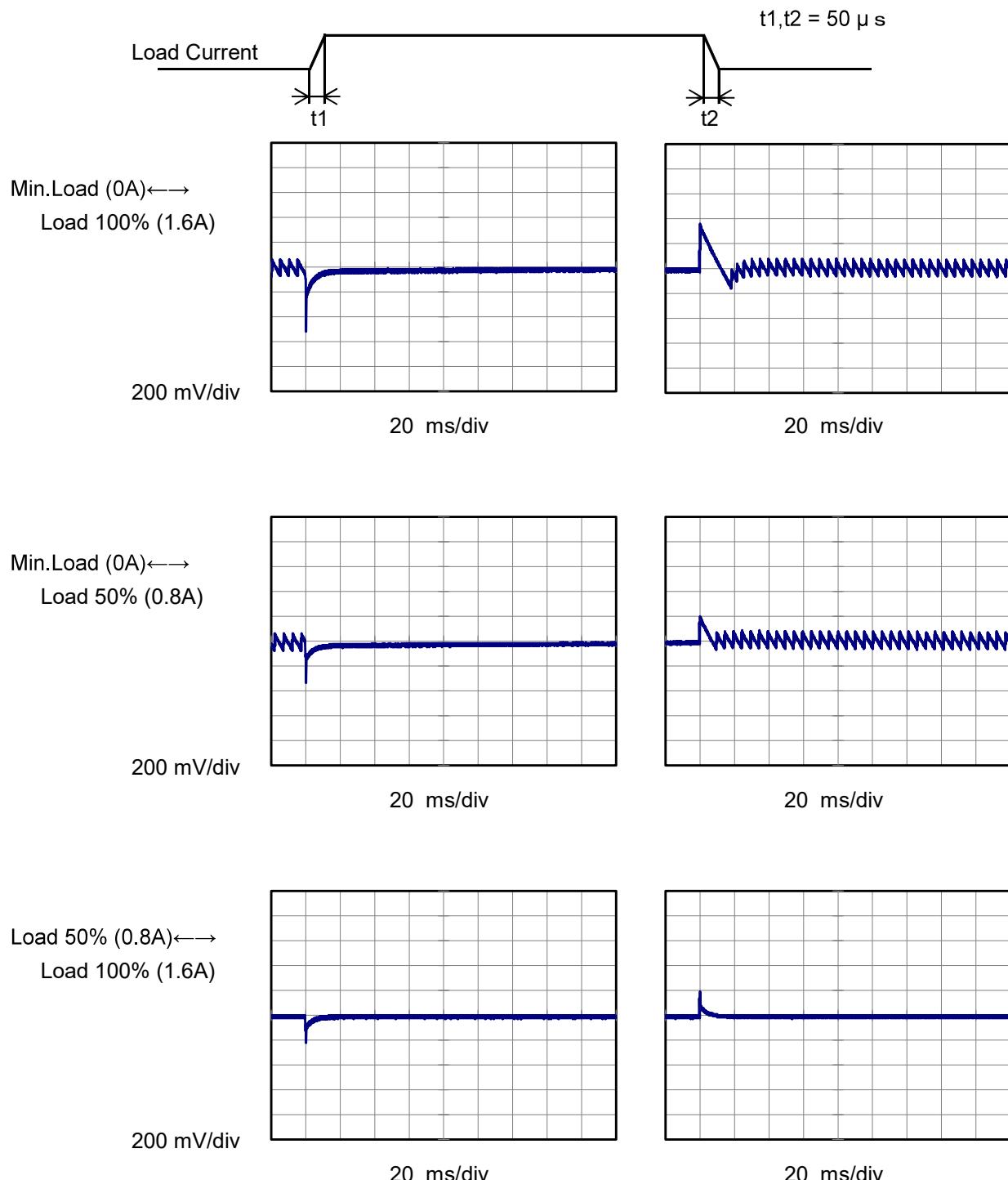
Model	WMA75F-48
Item	Ripple-Noise (by Load Current)
Object	+48V1.6A

Temperature   25°C
Testing Circuitry   Figure C

1.Graph

2.Values

— △ — Input Volt.   115V
– –⊖– – Input Volt.   230V
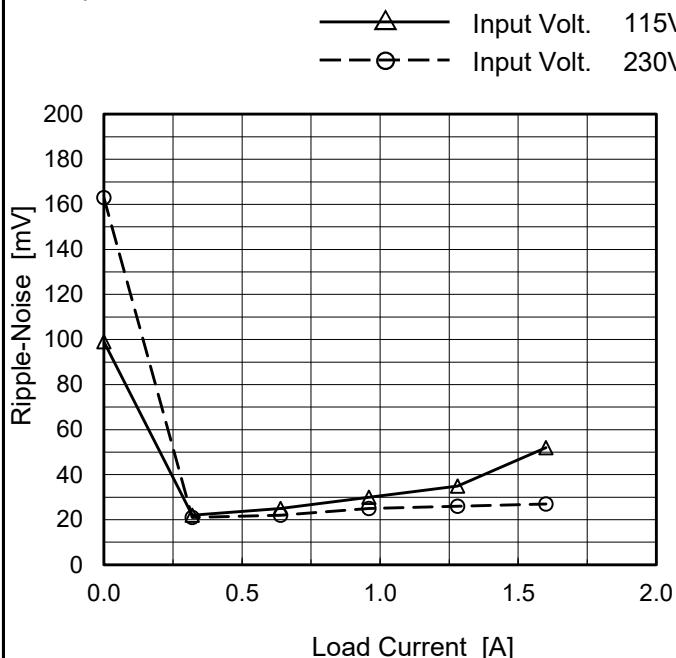
Load Current [A]

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 115 [V]	Input Volt. 230 [V]
0.00	99	163
0.32	22	21
0.64	25	22
0.96	30	25
1.28	35	26
1.60	52	27
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

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
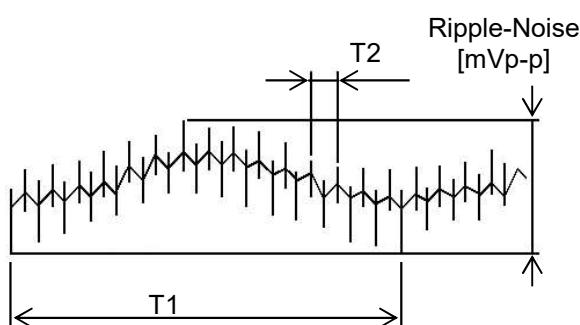
Fig. Complex Ripple Wave Form

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Model	WMA75F-48
Item	Ripple-Noise (by Ambient Temp.)
Object	+48V1.6A
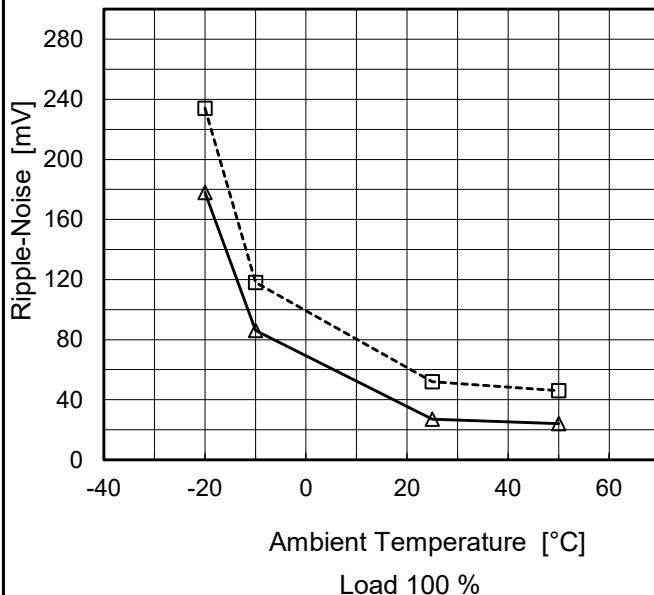
Testing Circuitry   Figure C

1.Graph

--- ⊟ --- Input Volt. 115V
—△— Input Volt. 230V

Ambient Temperature [°C]

Load 100 %

Measured by 20 MHz Oscilloscope.

2.Values

Ambient Temperature [°C]	Ripple-Noise [mV]	
	Input Volt. 115 [V]	Input Volt. 230[V]
-20	234	178
-10	118	86
25	52	27
50	46	24
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

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Model	WMA75F-48
Item	Ambient Temperature Drift
Object	+48V1.6A

Testing Circuitry   Figure A

1.Graph

⎯△⎯ Input Volt.   100V
- - -⊟- - - Input Volt.   115V
— —⊖— — Input Volt.   230V

Output Voltage [V]

Ambient Temperature [°C]

Load 100%
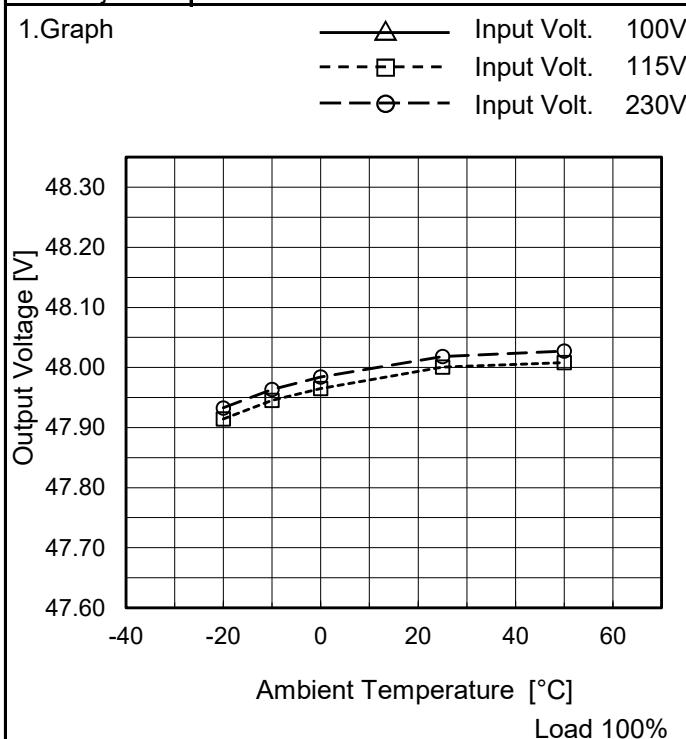
2.Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
-20	-	47.914	47.933
-10	-	47.945	47.963
0	-	47.965	47.984
25	-	48.001	48.018
50	-	48.008	48.027
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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Model	WMA75F-48	
Item	Output Voltage Accuracy	Testing Circuitry Figure A
Object	+48V1.6A	

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　-　50°C

Input Voltage　:　100　-　230V

Load Current　:　0　-　1.6A

* 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	50	100	0	48.038	±53	±0.1
Minimum Voltage	-20	100	1.6	47.933		

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Model	WMA75F-48
Item	Time Lapse Drift
Object	+48V1.6A

Temperature 25°C
Testing Circuitry Figure A

1.Graph
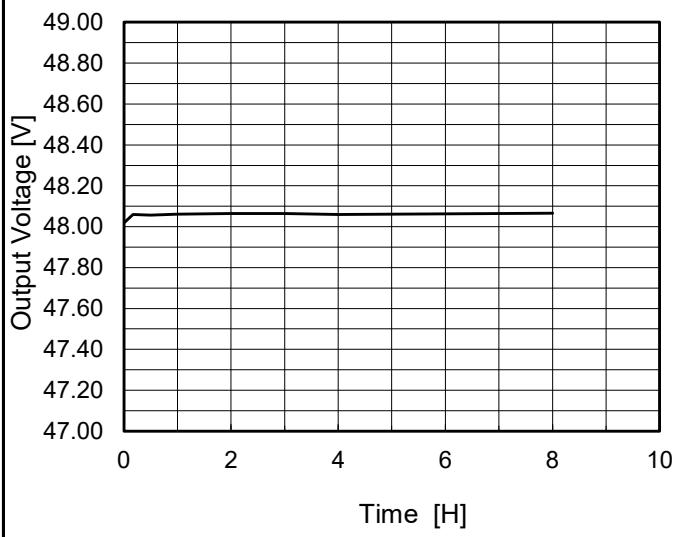
Input Volt. 115V
Load 100%

2.Values

Time since start [H]	Output Voltage [V]
0.0	48.019
0.2	48.059
0.5	48.057
1.0	48.061
2.0	48.065
3.0	48.064
4.0	48.060
8.0	48.066

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Model	WMA75F-48		
Item	Rise and Fall Time	Temperature	25°C
		Testing Circuitry	Figure A
Object	+48V1.6A		

1.Graph

Load 100%

Output Volt.

[10V/div]

0

Input Volt. 115 V

Load 100%

Output Volt.

[10V/div]

0

Input Volt. 230 V

Input Volt.

0

Time   [50ms/div]

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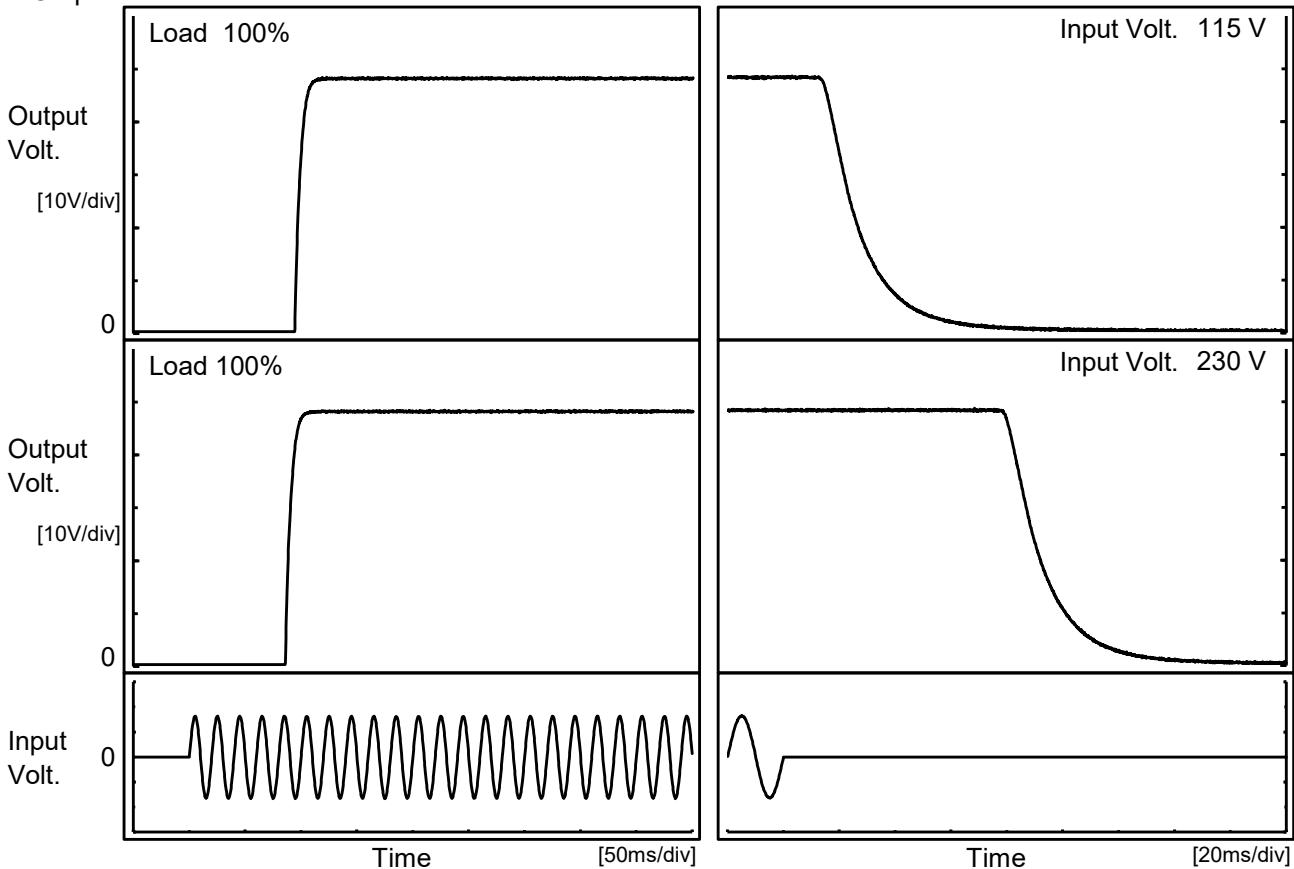
2.Values   [ms]

Input Volt ＼ Time	Td	Tr	Ts	Th	Tf
115	94.8	9.5	104.3	16.2	28.7
230	86.3	9.8	96.1	81.4	28.6

Output Volt.

90%

10%

Input Volt.

Td   Tr

Th   Tf

Ts

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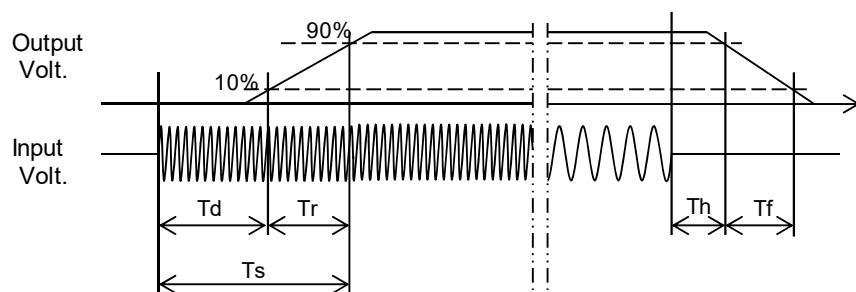
COSEL

Model	WMA75F-48
Item	Hold-Up Time
Object	+48V1.6A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

- - -▫- - - Load 50%
——△—— Load 100%

Hold-Up Time [ms] vs Input Voltage [V]
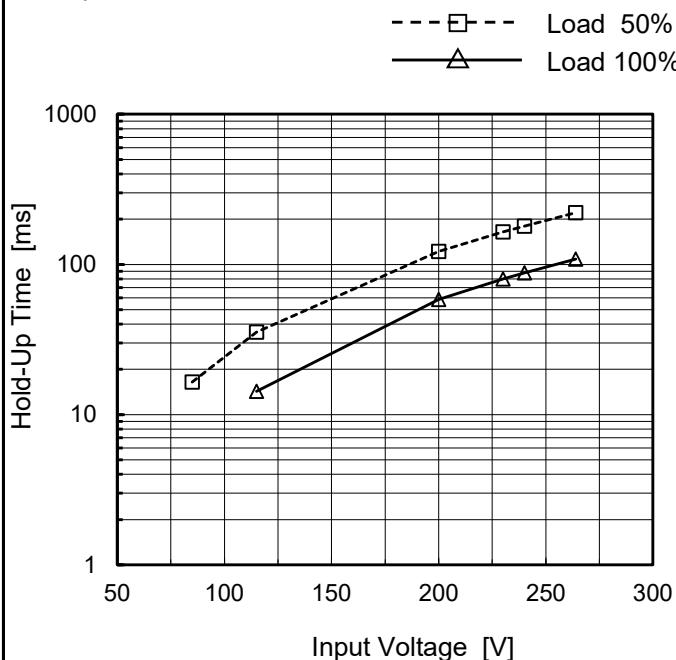
2.Values

Input Voltage [V]	Hold-Up Time [ms]	
	Load 50%	Load 100%
85	17	-
100	25	-
115	35	14
200	122	58
230	164	80
240	180	88
264	221	109
--	-	-
--	-	-

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-48
Item	Instantaneous Interruption Compensation
Object	+48V1.6A

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]
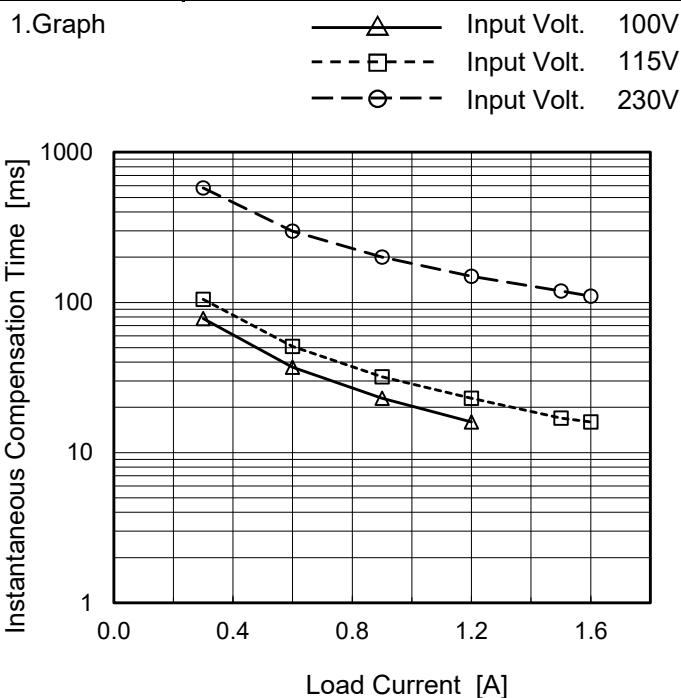
2.Values

Load Current [A]	Time [ms]		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
0.0	-	-	-
0.3	78	105	579
0.6	37	51	298
0.9	23	32	200
1.2	16	23	149
1.5	-	17	119
1.6	-	16	110
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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Model	WMA75F-48
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+48V1.6A

Testing Circuitry　　Figure A

1.Graph

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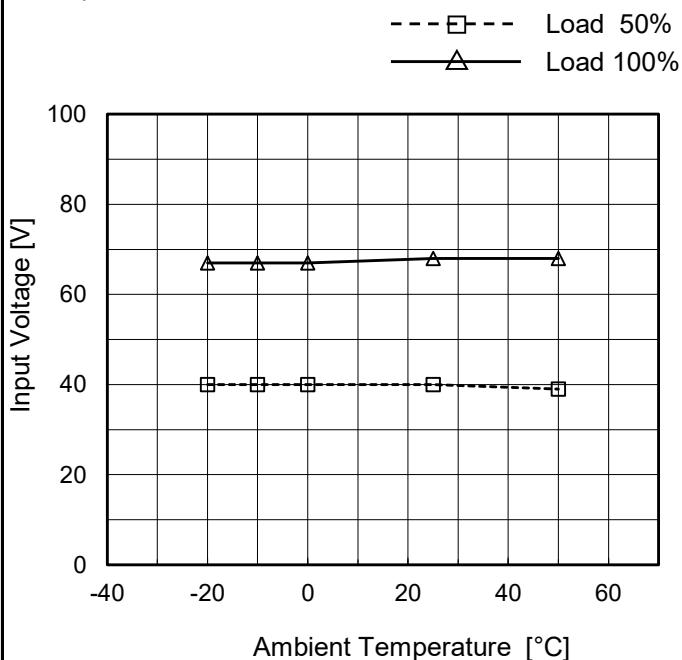
Input Voltage [V] vs Ambient Temperature [°C]

2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	40	67
-10	40	67
0	40	67
25	40	68
50	39	68
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

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Model	WMA75F-48
Item	Overcurrent Protection
Object	+48V1.6A

Temperature   25°C
Testing Circuitry   Figure A

1.Graph

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

Load Current [A]

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

2.Values

Output Voltage [V]	Load Current [A]		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
48	2.14	2.28	2.38
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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COSEL

Model	WMA75F-48
Item	Overvoltage Protection
Object	+48V1.6A

Testing Circuitry   Figure A

1.Graph

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

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

Load 0%
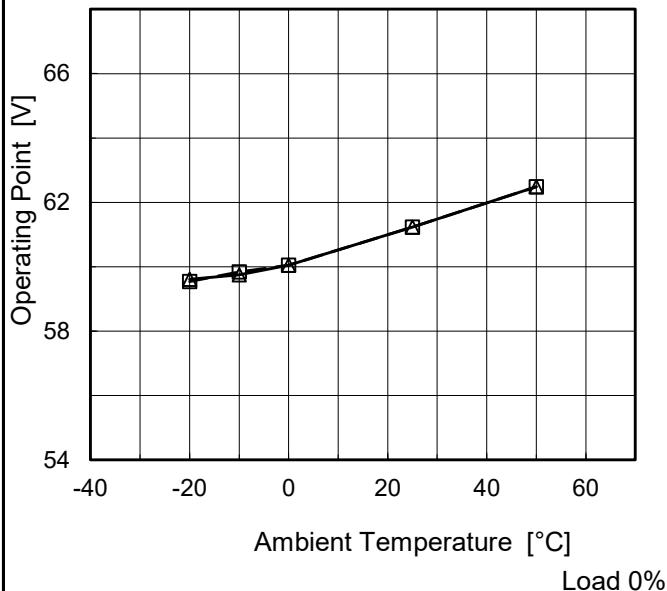
2.Values

Ambient Temperature [°C]	Operating Point [V]	
	Input Volt. 115[V]	Input Volt. 230[V]
-20	59.61	59.54
-10	59.76	59.84
0	60.05	60.05
25	61.23	61.23
50	62.48	62.48
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

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Figure A

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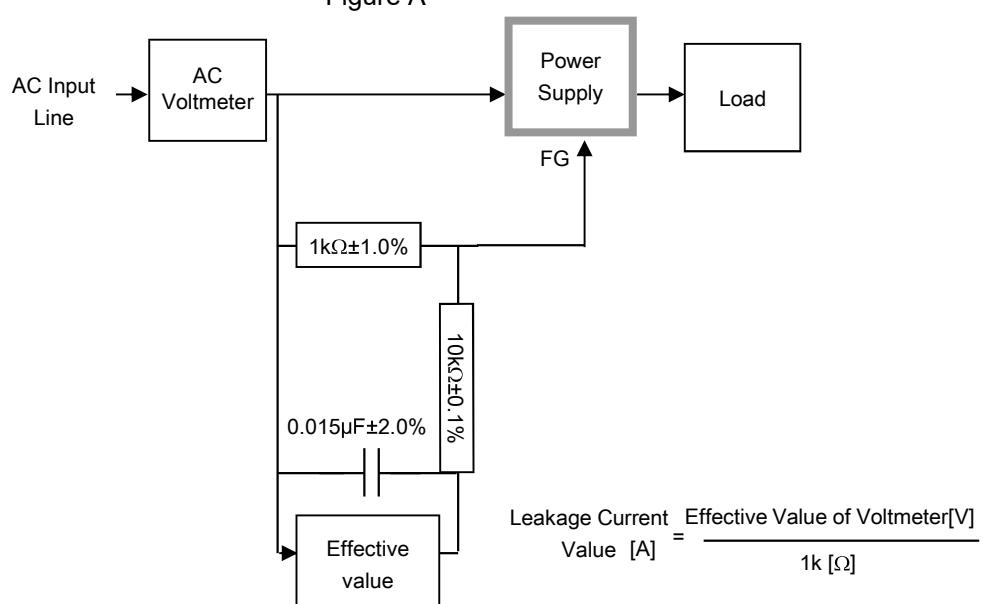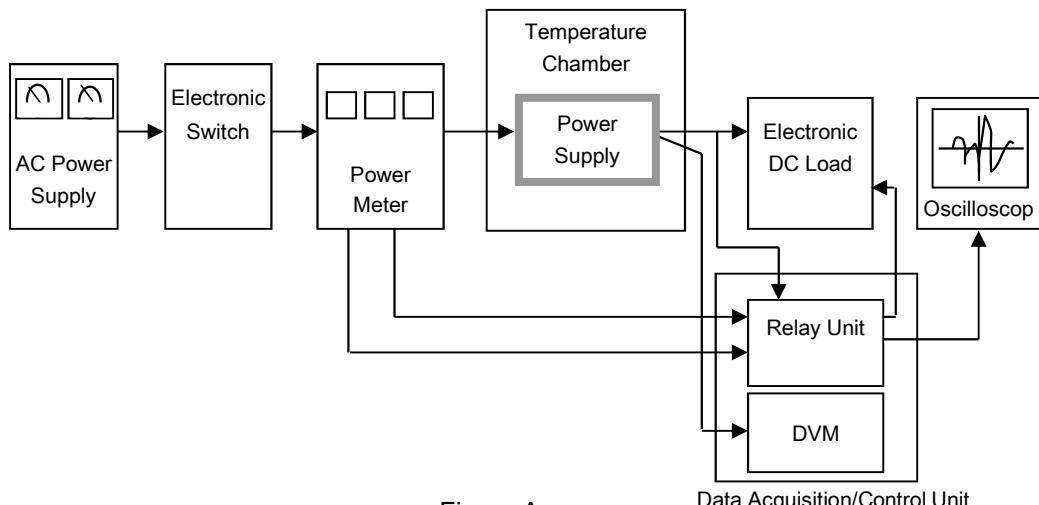
Figure B (IEC60601-1)
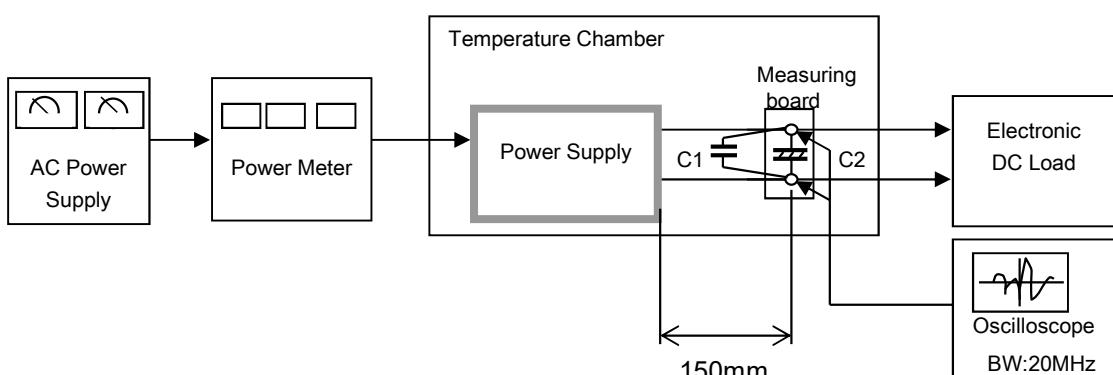
(Ceramic capacitor)
C1= 0.1 µF

(Electrolytic capacitor)
C2= 47 µF

Figure C

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