TEST DATA OF WMA75F-24

Regulated DC Power Supply
November 9, 2020

Approved by : Takashi Kajii
Design Manager

Prepared by : Takeshi Natsuno
Design Engineer

COSEL CO.,LTD.

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CONTENTS

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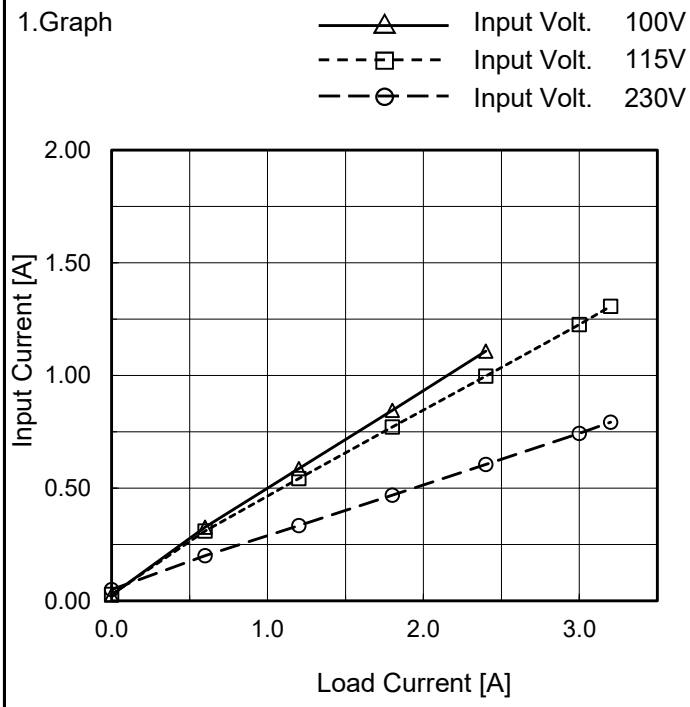
Model	WMA75F-24
Item	Input Current (by Load Current)
Object	———————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

Load Current [A]	Input Current [A]		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
0.0	0.026	0.028	0.049
0.6	0.326	0.310	0.200
1.2	0.587	0.543	0.334
1.8	0.845	0.772	0.469
2.4	1.109	0.998	0.605
3.0	-	1.227	0.742
3.2	-	1.307	0.792
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

BC-11650

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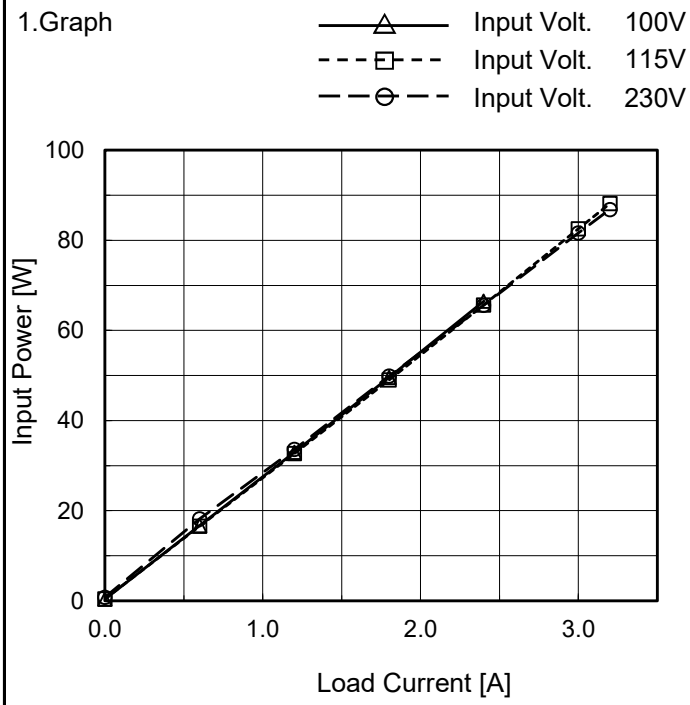
Model	WMA75F-24
Item	Input Power (by Load Current)
Object	————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



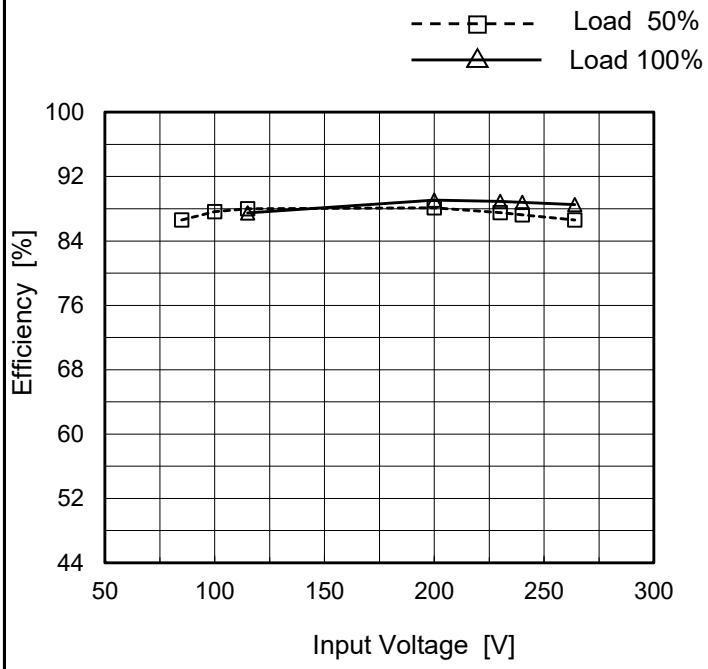
2.Values

Load Current [A]	Input Power [W]		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
0.0	0.37	0.40	0.74
0.6	16.66	16.57	18.20
1.2	32.96	32.67	33.63
1.8	49.56	49.01	49.90
2.4	66.47	65.66	65.58
3.0	-	82.55	81.63
3.2	-	88.15	86.85
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

Model	WMA75F-24
Item	Efficiency (by Input Voltage)
Object	———————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
85	86.6	-
100	87.6	-
115	88.0	87.5
200	88.1	89.1
230	87.5	88.9
240	87.2	88.8
264	86.6	88.5
--	-	-
--	-	-

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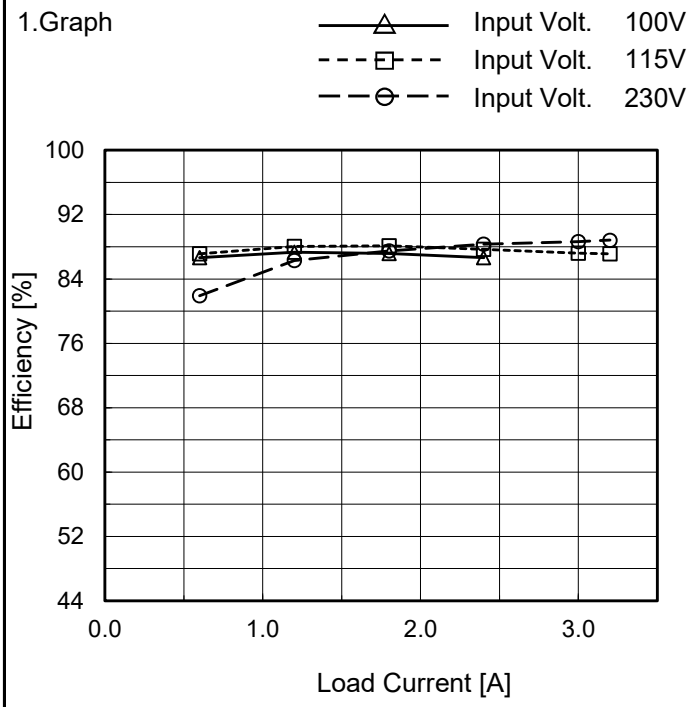
Model	WMA75F-24
Item	Efficiency (by Load Current)
Object	————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

Load Current [A]	Efficiency [%]		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
0.0	-	-	-
0.6	86.7	87.1	81.9
1.2	87.3	88.1	86.3
1.8	87.2	88.1	87.5
2.4	86.6	87.7	88.3
3.0	-	87.2	88.7
3.2	-	87.1	88.8
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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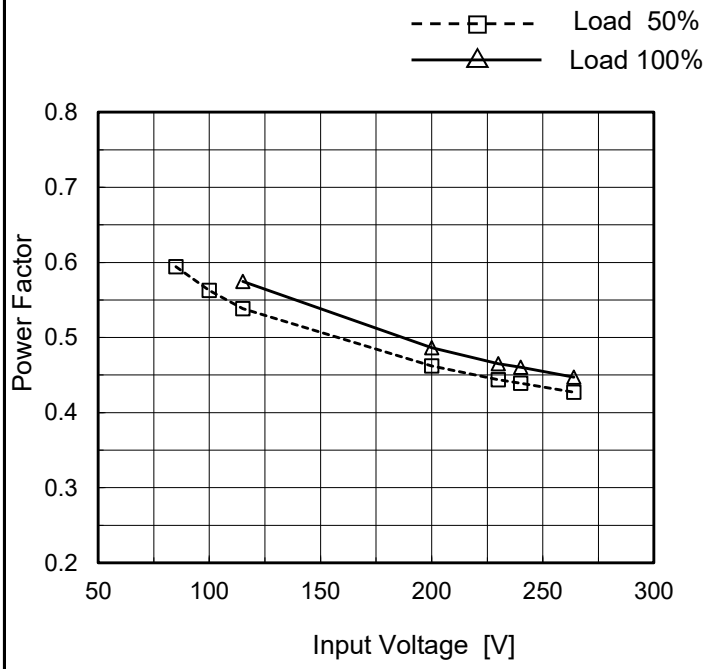
Model	WMA75F-24
Item	Power Factor (by Input Voltage)
Object	————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

Input Voltage [V]	Power Factor	
	Load 50%	Load 100%
85	0.594	-
100	0.563	-
115	0.538	0.575
200	0.462	0.486
230	0.444	0.465
240	0.439	0.460
264	0.427	0.447
--	-	-
--	-	-

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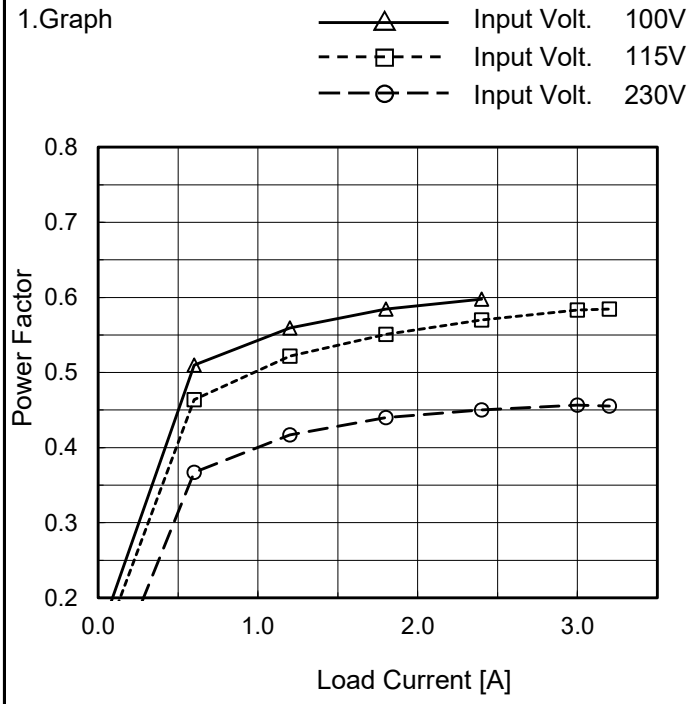
Model	WMA75F-24
Item	Power Factor (by Load Current)
Object	————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

Load Current [A]	Power Factor		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
0.0	0.145	0.122	0.050
0.6	0.510	0.464	0.367
1.2	0.559	0.522	0.417
1.8	0.584	0.551	0.440
2.4	0.598	0.570	0.450
3.0	-	0.583	0.457
3.2	-	0.585	0.455
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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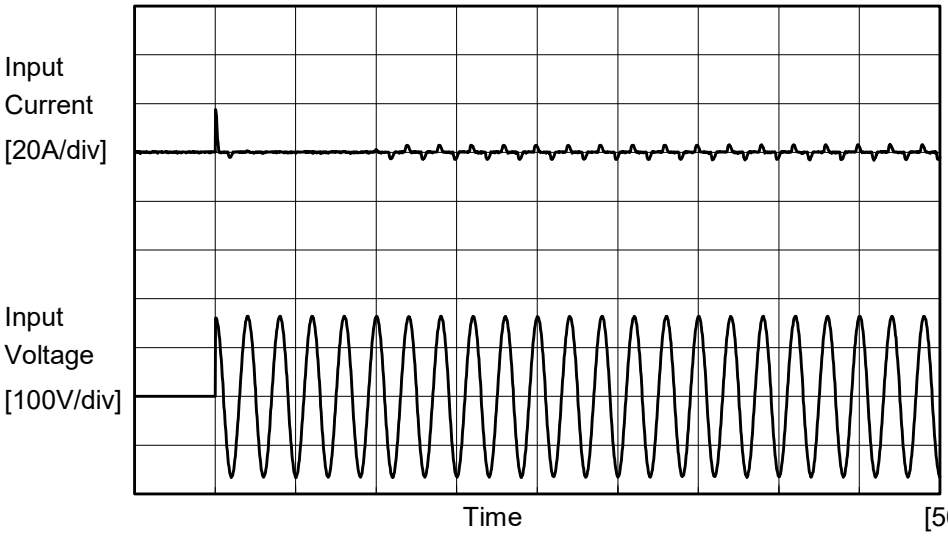
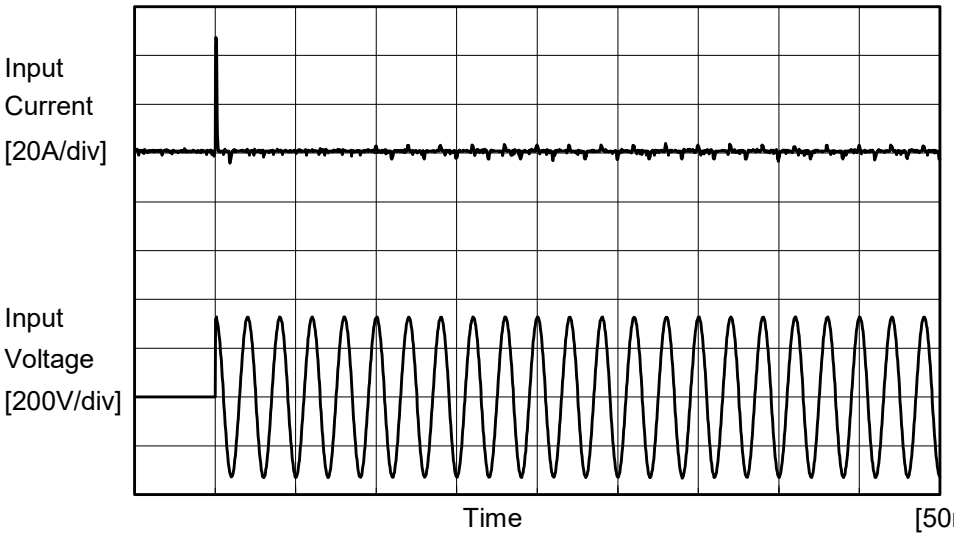
Model	WMA75F-24
Item	Inrush Current
Object	————————

Temperature 25°C
Testing Circuitry Figure A



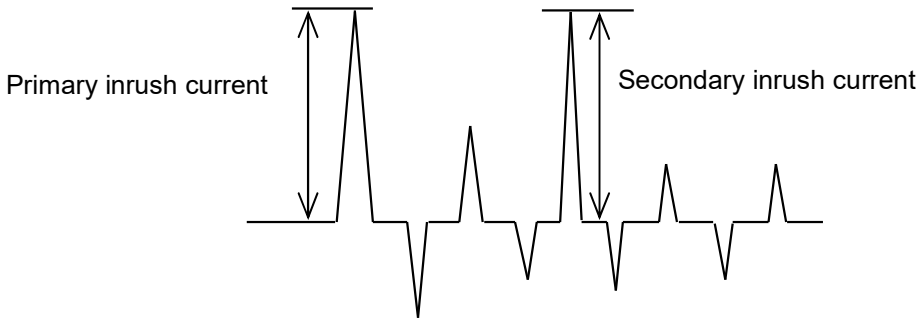
Input Voltage 115 V
Frequency 50 Hz
Load 100 %

Primary inrush current
17.6 A
Secondary inrush current
3.3 A



Input Voltage 230 V
Frequency 50 Hz
Load 100 %

Primary inrush current
47.1 A
Secondary inrush current
3.7 A



Model	WMA75F-24	
Item	Leakage Current	Temperature 25°C Testing Circuitry Figure B
Object	———————————	

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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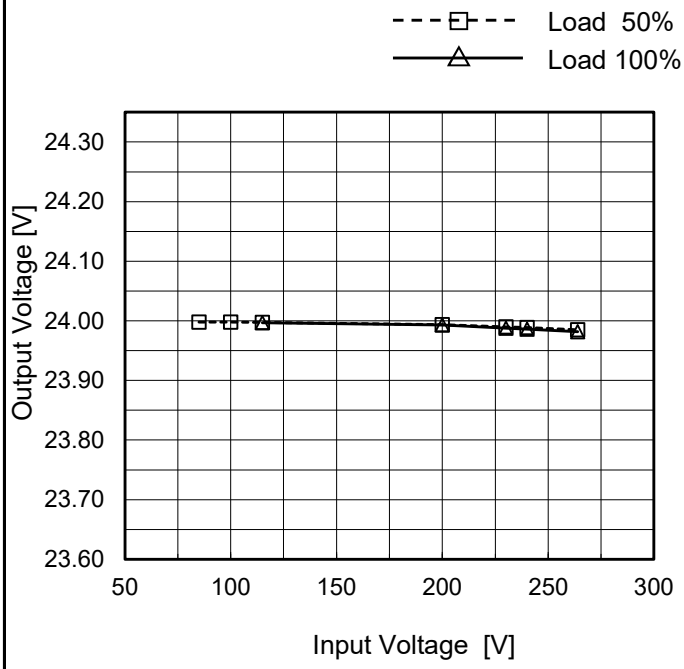
Model	WMA75F-24
Item	Line Regulation
Object	+24V3.2A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

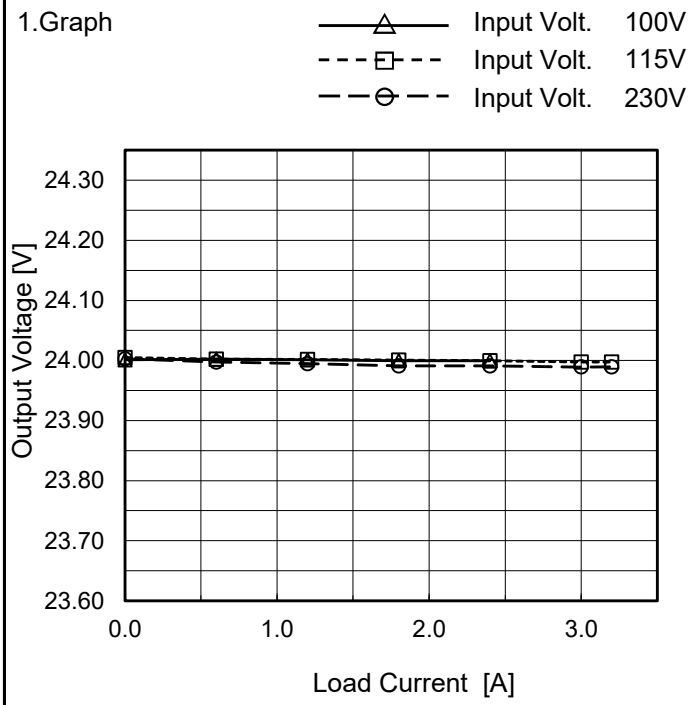
Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
85	23.998	-
100	23.998	-
115	23.997	23.997
200	23.994	23.993
230	23.990	23.988
240	23.989	23.986
264	23.985	23.982
--	-	-
--	-	-

COSEL

Model	WMA75F-24
Item	Load Regulation
Object	+24V3.2A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

Load Current [A]	Output Voltage [V] Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
0.0	24.001	24.005	24.003
0.6	24.002	24.002	23.997
1.2	24.001	24.002	23.995
1.8	24.000	24.001	23.991
2.4	24.000	24.000	23.991
3.0	-	23.997	23.989
3.2	-	23.997	23.990
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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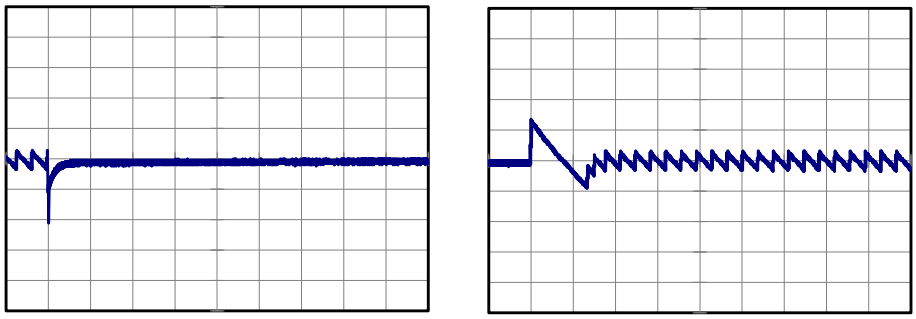
Model	WMA75F-24
Item	Dynamic Load Response
Object	+24V3.2A

Temperature 25°C
Testing Circuitry Figure A

Input Volt. 230 V
Cycle 1000 ms

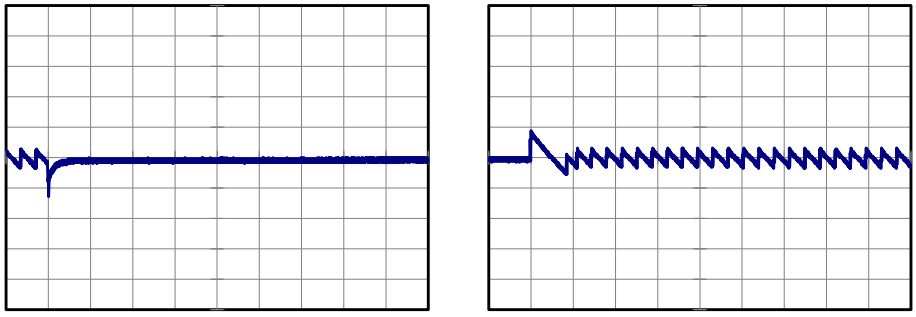
Min.Load (0A)←→
Load 100% (3.2A)



200 mV/div

20 ms/div 20 ms/div

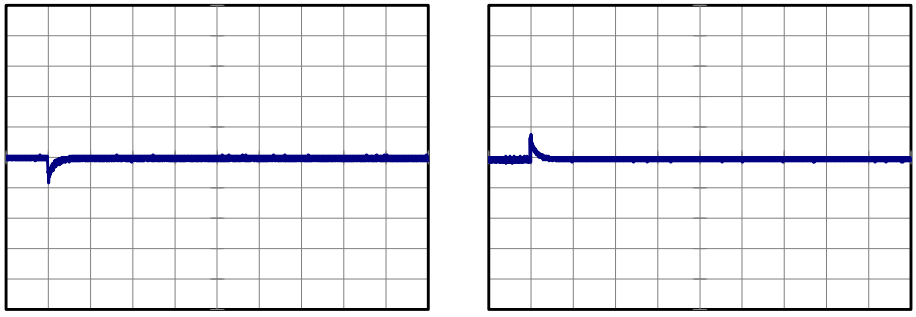
Min.Load (0A)←→
Load 50% (1.6A)



200 mV/div

20 ms/div 20 ms/div

Load 50% (1.6A)←→
Load 100% (3.2A)



200 mV/div

20 ms/div 20 ms/div

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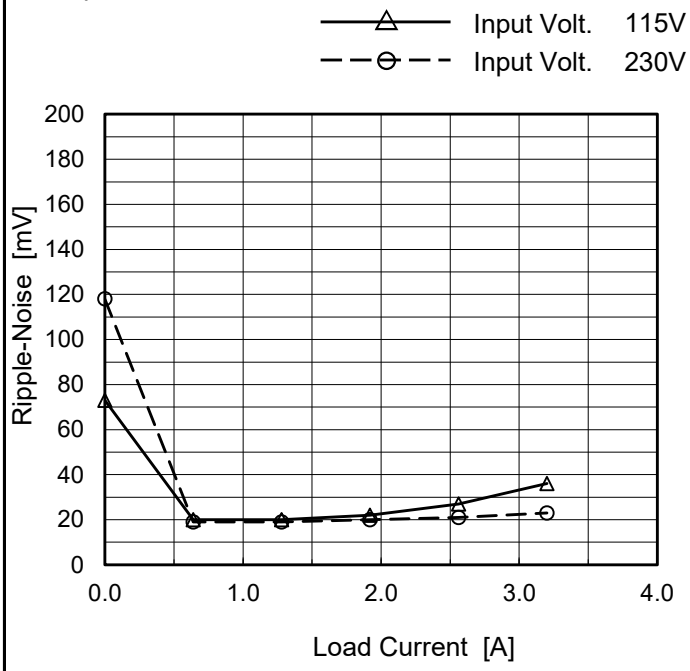
Model	WMA75F-24
Item	Ripple-Noise (by Load Current)
Object	+24V3.2A

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.

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

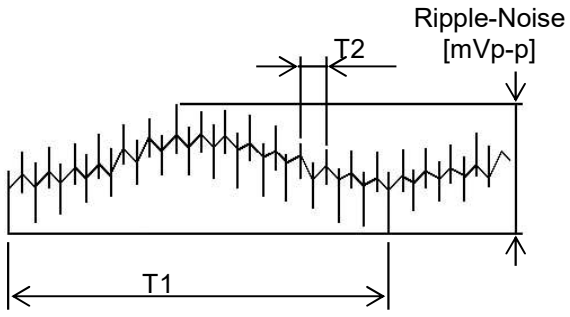


Fig. Complex Ripple Wave Form

2.Values

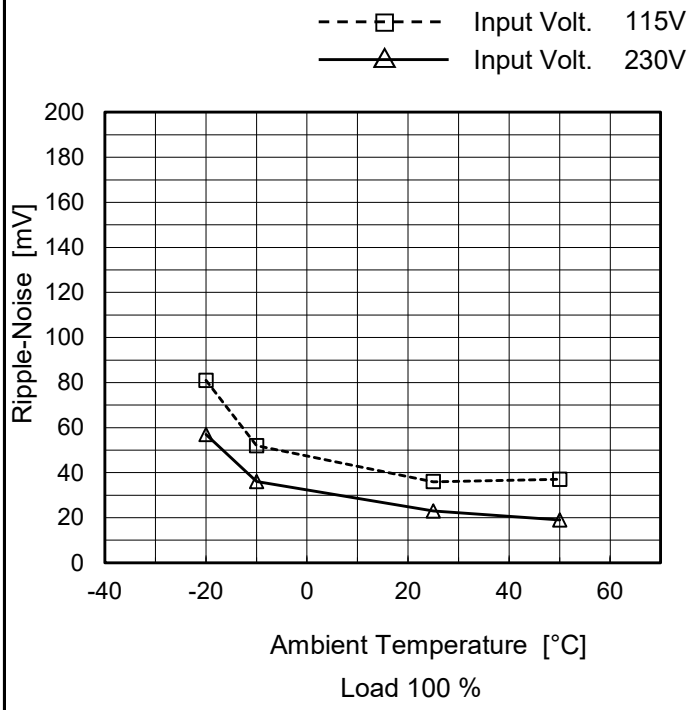
Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 115 [V]	Input Volt. 230 [V]
0.00	73	118
0.64	20	19
1.28	20	19
1.92	22	20
2.56	27	21
3.20	36	23
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	WMA75F-24
Item	Ripple-Noise (by Ambient Temp.)
Object	+24V3.2A

Testing Circuitry Figure C

1.Graph



Load 100 %

Measured by 20 MHz Oscilloscope.

2.Values

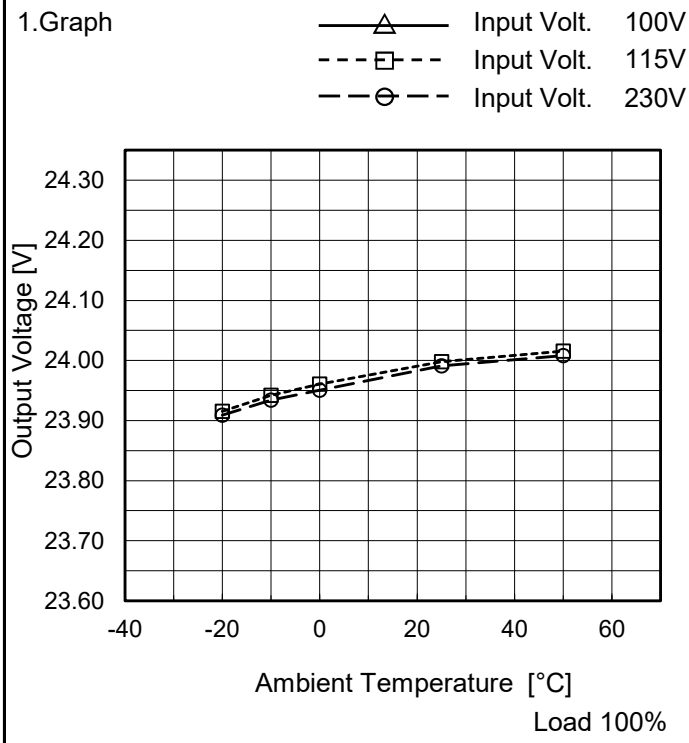
Ambient Temperature [°C]	Ripple-Noise [mV]	
	Input Volt. 115 [V]	Input Volt. 230[V]
-20	81	57
-10	52	36
25	36	23
50	37	19
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	WMA75F-24
Item	Ambient Temperature Drift
Object	+24V3.2A

Testing Circuitry Figure A

1.Graph



2.Values

Ambient Temperature [°C]	Output Voltage [V] Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
-20	-	23.915	23.909
-10	-	23.942	23.934
0	-	23.961	23.951
25	-	23.998	23.991
50	-	24.015	24.008
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

Model	WMA75F-24	
Item	Output Voltage Accuracy	Testing Circuitry Figure A
Object	+24V3.2A	

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 - 3.2A

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

$$\text{* Output Voltage Accuracy (Ratio)} = \frac{\text{Output Voltage Accuracy}}{\text{Rated Output Voltage}} \times 100$$

2.Values

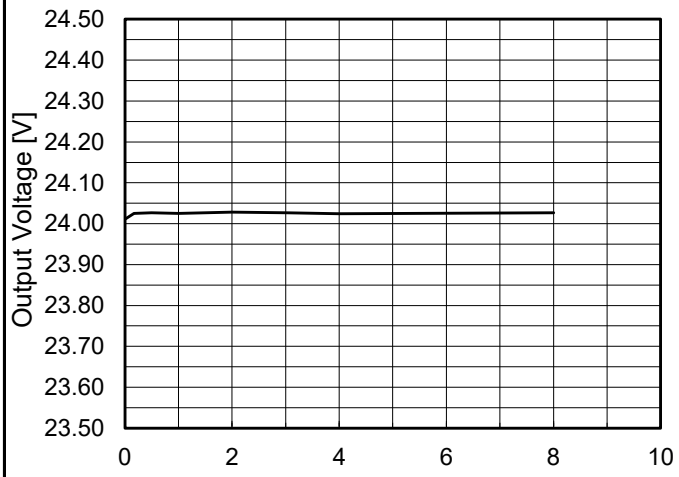
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	50	230	0	24.027	±57	±0.2
Minimum Voltage	-20	100	3.2	23.914		

COSEL

Model	WMA75F-24
Item	Time Lapse Drift
Object	+24V3.2A

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	24.011
0.2	24.025
0.5	24.027
1.0	24.025
2.0	24.028
3.0	24.027
4.0	24.024
8.0	24.027

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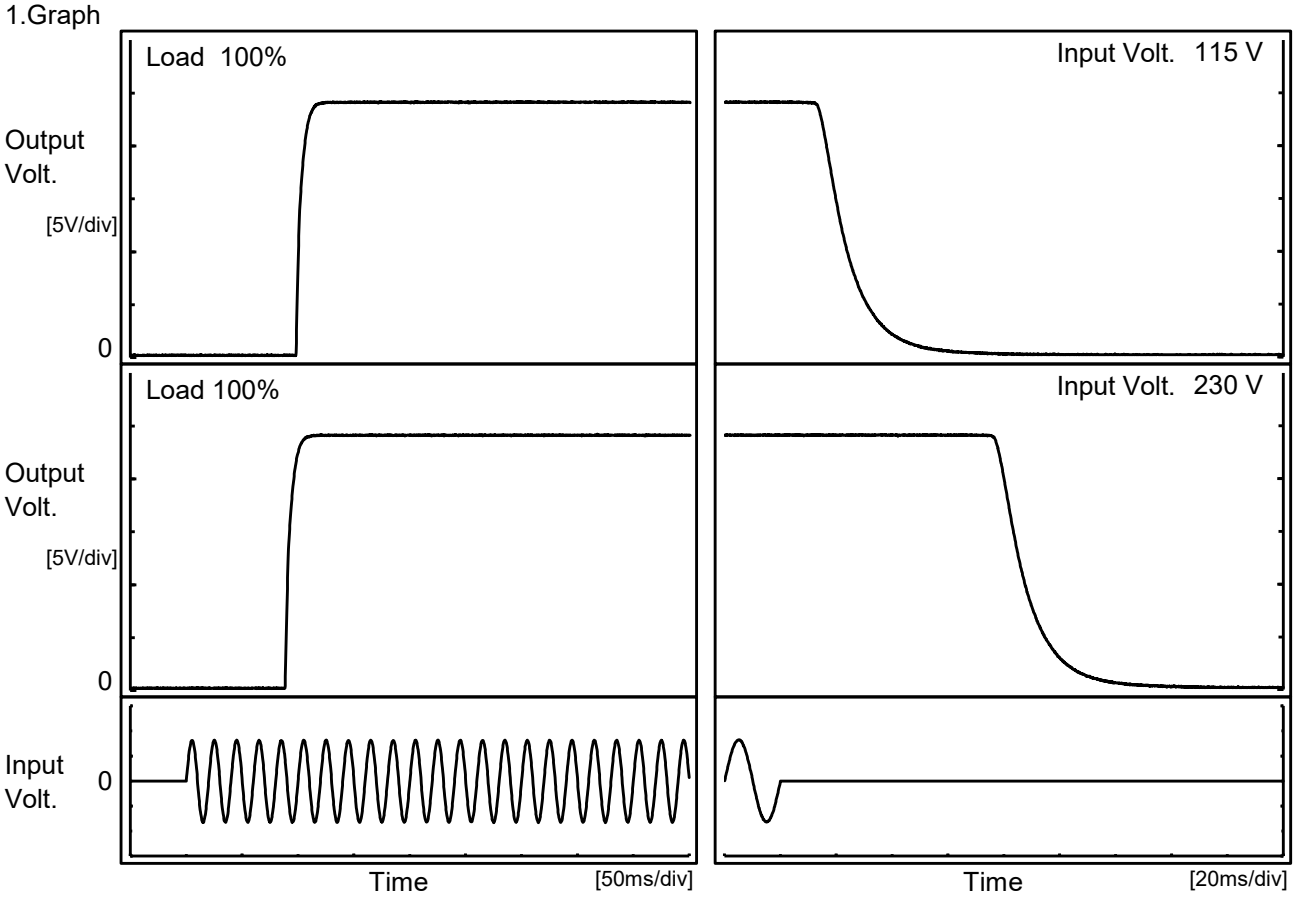
Model	WMA75F-24
Item	Rise and Fall Time
Object	+24V3.2A

Temperature 25°C
Testing Circuitry Figure A

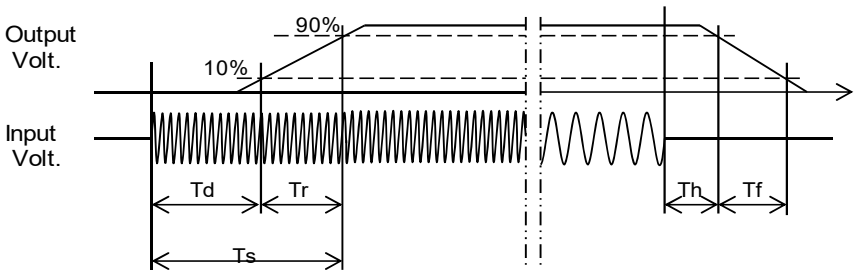
1.Graph



2.Values

[ms]

Input Volt \ Time	Td	Tr	Ts	Th	Tf
115 V	98.5	9.8	108.3	15.2	22.7
230 V	89.0	9.5	98.5	78.7	22.8



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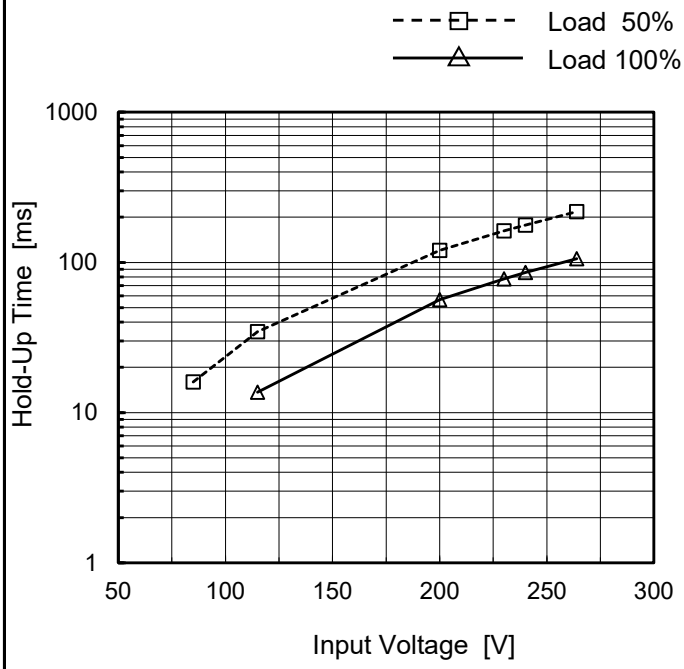
COSEL

Model	WMA75F-24
Item	Hold-Up Time
Object	+24V3.2A

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.

2.Values

Input Voltage [V]	Hold-Up Time [ms]	
	Load 50%	Load 100%
85	16	-
100	25	-
115	35	14
200	120	57
230	162	78
240	178	86
264	218	106
--	-	-
--	-	-

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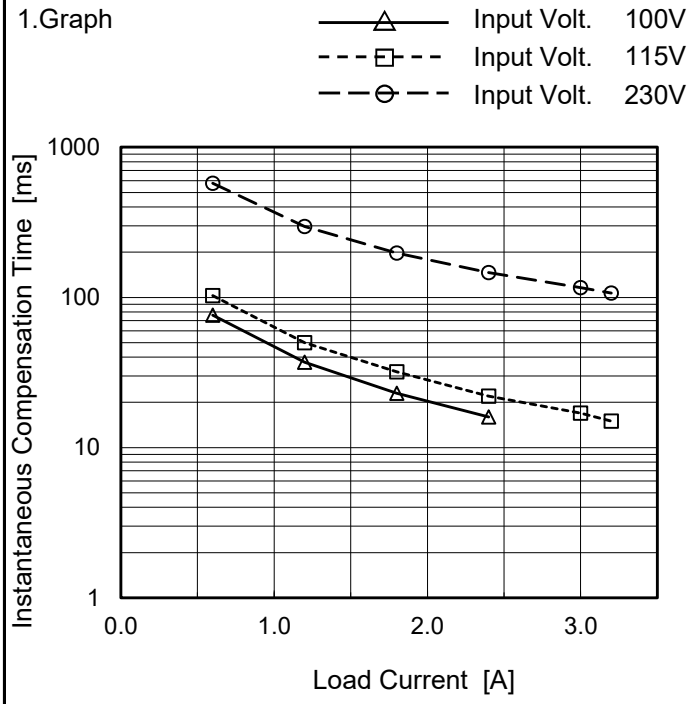
Model	WMA75F-24
Item	Instantaneous Interruption Compensation
Object	+24V3.2A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

Load Current [A]	Time [ms]		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
0.0	-	-	-
0.6	76	103	575
1.2	37	50	297
1.8	23	32	197
2.4	16	22	146
3.0	-	17	116
3.2	-	15	107
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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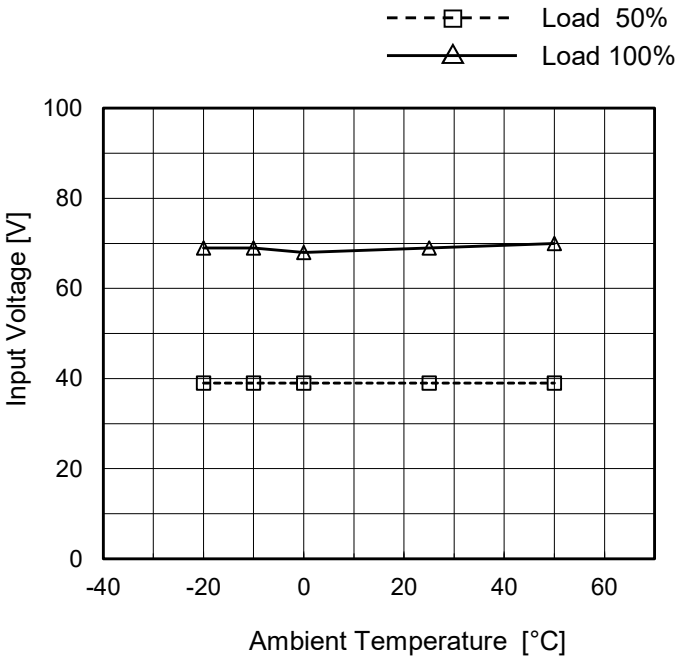
Model	WMA75F-24
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+24V3.2A

Testing Circuitry Figure A

1.Graph



2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	39	69
-10	39	69
0	39	68
25	39	69
50	39	70
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

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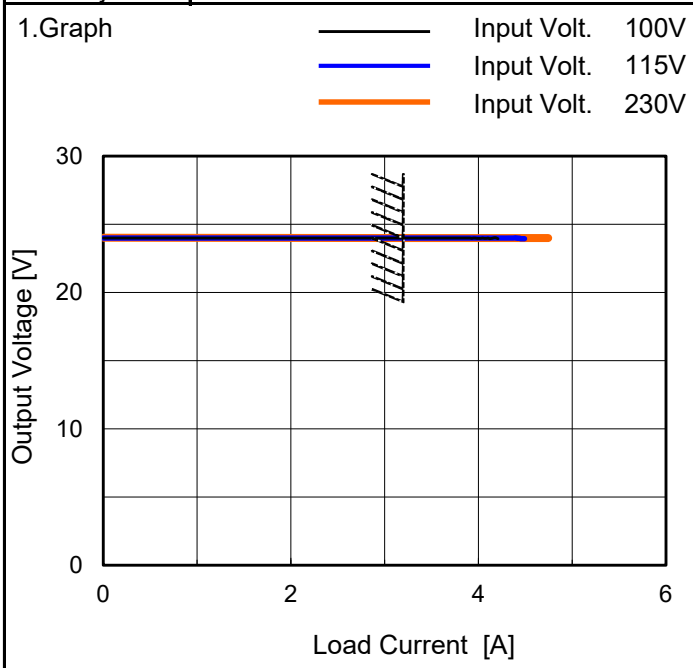
Model	WMA75F-24
Item	Overcurrent Protection
Object	+24V3.2A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

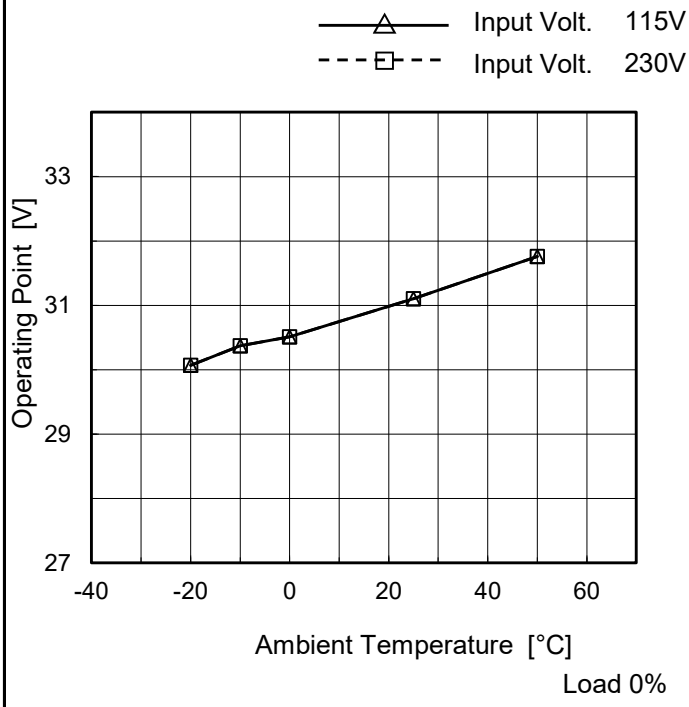
2.Values

Output Voltage [V]	Load Current [A]		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
24	4.12	4.49	4.75
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

Model	WMA75F-24
Item	Overvoltage Protection
Object	+24V3.2A

Testing Circuitry Figure A

1.Graph



Load 0%

2.Values

Ambient Temperature [°C]	Operating Point [V]	
	Input Volt. 115[V]	Input Volt. 230[V]
-20	30.07	30.07
-10	30.30	30.37
0	30.51	30.51
25	31.10	31.10
50	31.76	31.76
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

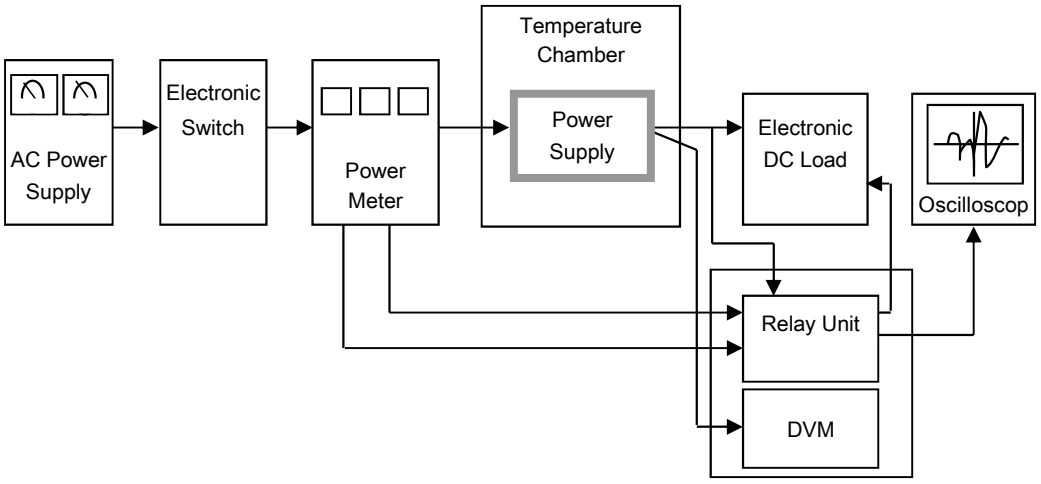


Figure A

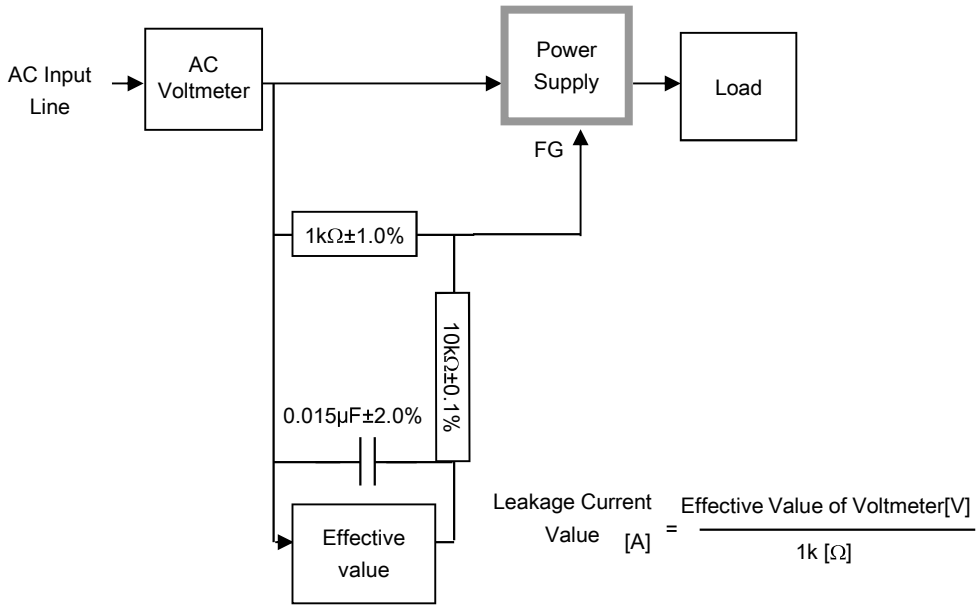
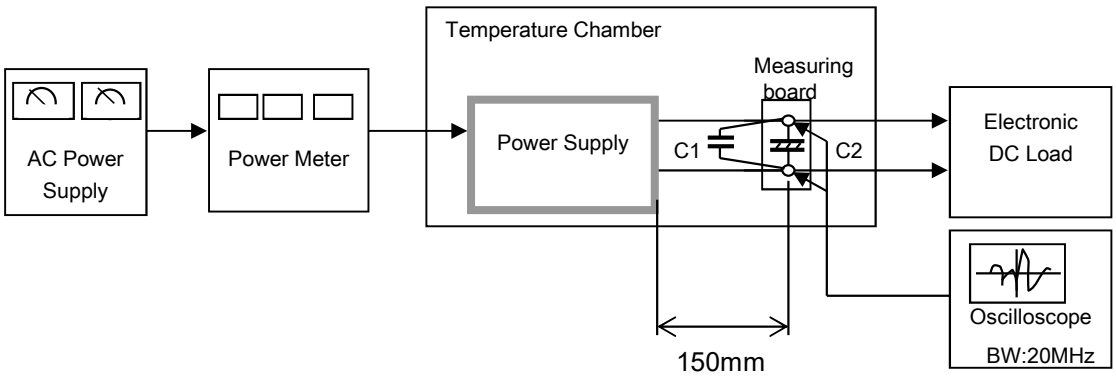


Figure B (IEC60601-1)



(Ceramic capacitor)
C1= 0.1 μF

(Electrolytic capacitor)
C2= 47 μF

Figure C