参考資料

COSEL

TEST DATA OF PMA100F-48

Regulated DC Power Supply
June 4, 2010

Approved by : Katsumi Ishikawa
Katsumi Ishikawa — Design Manager

Prepared by : Shintaro Oki
Shintaro Oki — Design Engineer

COSEL CO.,LTD.

COSEL

CONTENTS

1.Input Current (by Load Current) ・・・・・・・・・・・・・・・・・・・・・・・・ 1
2.Input Power (by Load Current) ・・・・・・・・・・・・・・・・・・・・・・・・ 2
3.Efficiency (by Input Voltage) ・・・・・・・・・・・・・・・・・・・・・・・・ 3
4.Efficiency (by Load Current) ・・・・・・・・・・・・・・・・・・・・・・・・ 4
5.Power Factor (by Input Voltage) ・・・・・・・・・・・・・・・・・・・・・・・ 5
6.Power Factor (by Load Current) ・・・・・・・・・・・・・・・・・・・・・・・ 6
7.Inrush Current ・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・ 7
8.Leakage Current ・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・ 8
9.Line Regulation ・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・ 9
10.Load Regulation ・・・・・・・・・・・・・・・・・・・・・・・・・・・・・ 10
11.Dynamic Load Response ・・・・・・・・・・・・・・・・・・・・・・・・・・ 11
12.Ripple Voltage (by Load Current) ・・・・・・・・・・・・・・・・・・・・・ 12
13.Ripple-Noise ・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・ 13
14.Ripple Voltage (by Ambient Temperature) ・・・・・・・・・・・・・・・・・ 14
15.Ambient Temperature Drift ・・・・・・・・・・・・・・・・・・・・・・・・ 15
16.Output Voltage Accuracy ・・・・・・・・・・・・・・・・・・・・・・・・・ 16
17.Time Lapse Drift ・・・・・・・・・・・・・・・・・・・・・・・・・・・・・ 17
18.Rise and Fall Time ・・・・・・・・・・・・・・・・・・・・・・・・・・・・ 18
19.Hold-Up Time ・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・ 19
20.Instantaneous Interruption Compensation ・・・・・・・・・・・・・・・・・ 20
21.Minimum Input Voltage for Regulated Output Voltage ・・・・・・・・・・・ 21
22.Overcurrent Protection ・・・・・・・・・・・・・・・・・・・・・・・・・・ 22
23.Overvoltage Protection ・・・・・・・・・・・・・・・・・・・・・・・・・・ 23
24.Figure of Testing Circuitry ・・・・・・・・・・・・・・・・・・・・・・・・ 24

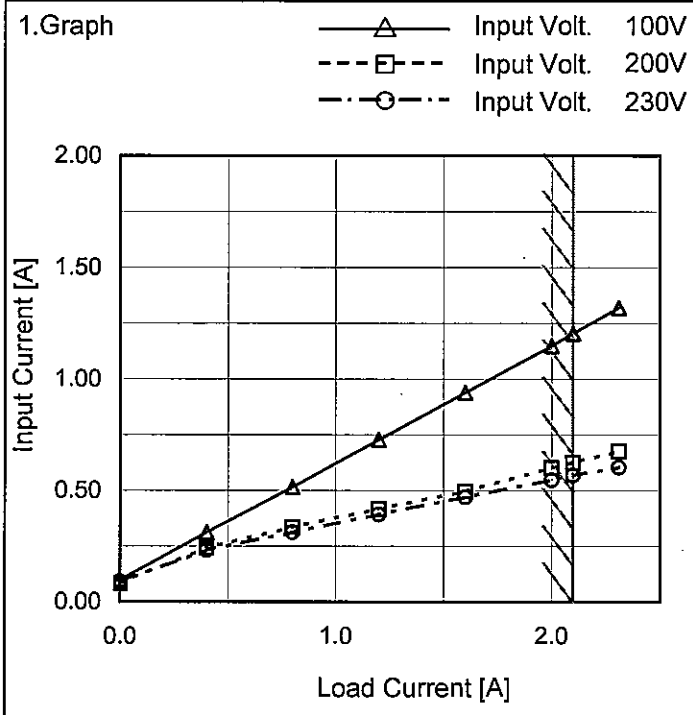
(Final Page 24)

COSEL

Model	PMA100F-48
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	0.098	0.083	0.090
0.40	0.312	0.241	0.231
0.80	0.515	0.335	0.312
1.20	0.727	0.416	0.392
1.60	0.938	0.496	0.470
2.00	1.148	0.600	0.546
2.10	1.204	0.625	0.568
2.31	1.319	0.676	0.604
--	-	-	-
--	-	-	-
--	-	-	-

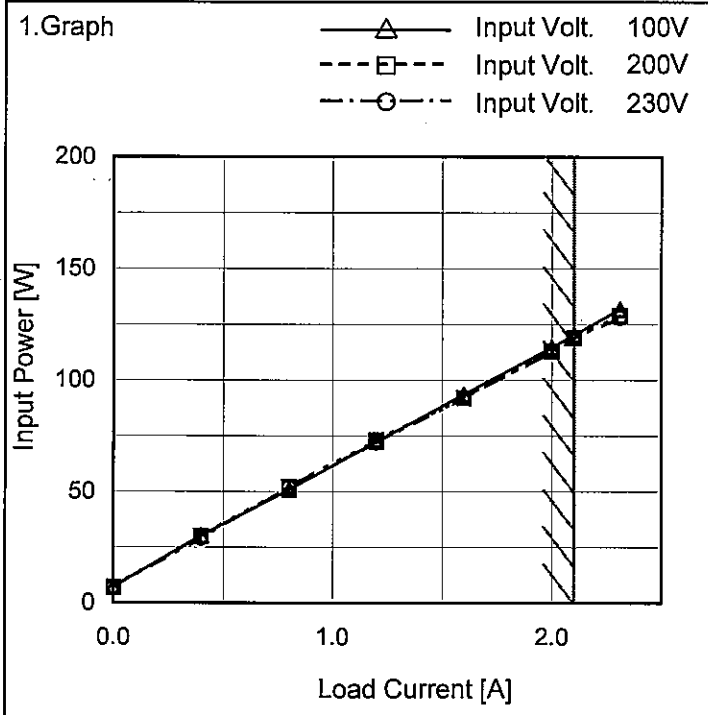
BC-10434

COSEL

Model	PMA100F-48
Item	Input Power (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

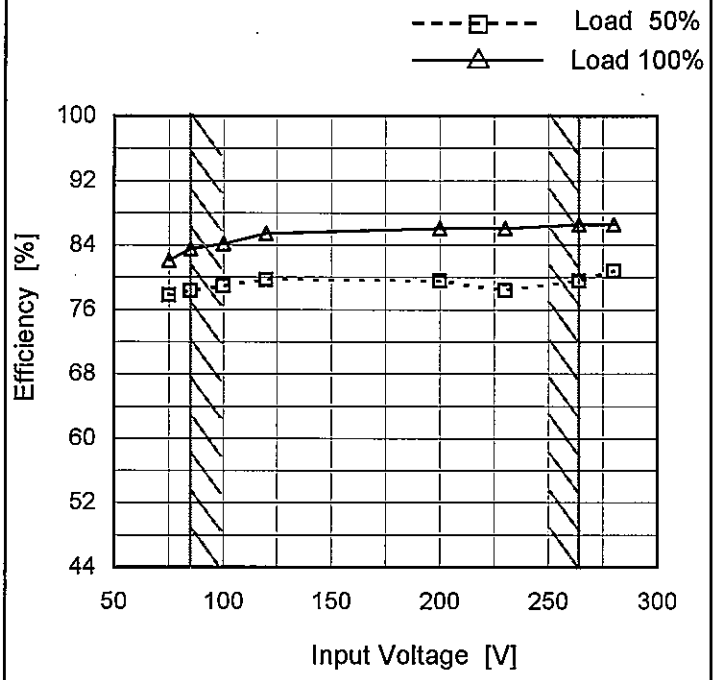
Load Current [A]	Input Power [W]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	7.0	7.0	7.0
0.40	30.2	30.0	29.0
0.80	50.9	52.0	52.0
1.20	72.3	73.0	72.0
1.60	93.6	92.0	92.0
2.00	114.6	113.0	113.0
2.10	120.3	119.0	119.0
2.31	131.7	129.0	128.0
---	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	PMA100F-48
Item	Efficiency (by Input Voltage)
Object	———————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

2.Values

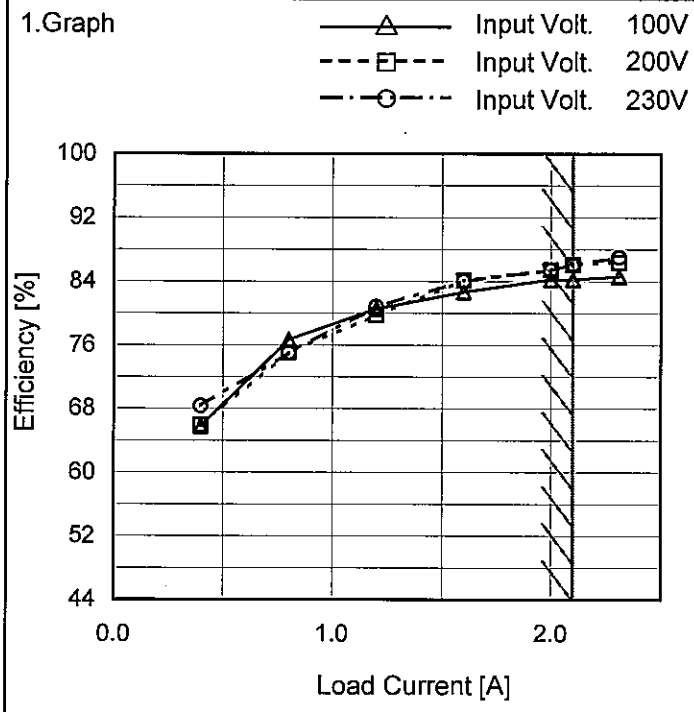
Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
75	77.8	82.1
85	78.4	83.6
100	78.9	84.2
120	79.7	85.5
200	79.5	86.1
230	78.4	86.1
264	79.6	86.5
280	80.8	86.5
--	-	-

COSEL

Model	PMA100F-48
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

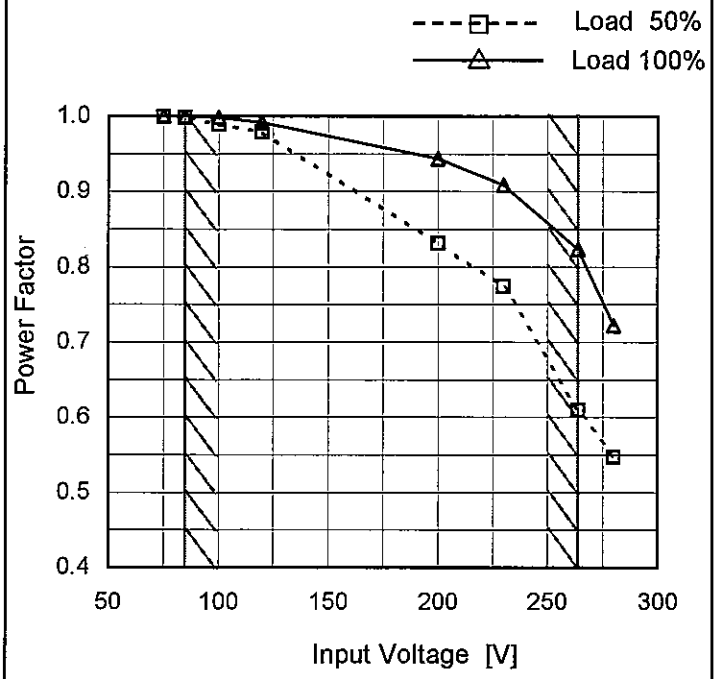
Load Current [A]	Efficiency [%]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	-	-	-
0.40	65.8	65.9	68.3
0.80	76.7	75.0	75.0
1.20	80.5	79.7	80.8
1.60	82.7	84.1	84.0
2.00	84.2	85.4	85.4
2.10	84.2	86.1	86.1
2.31	84.6	86.4	87.0
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	PMA100F-48
Item	Power Factor (by Input Voltage)
Object	———————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

2.Values

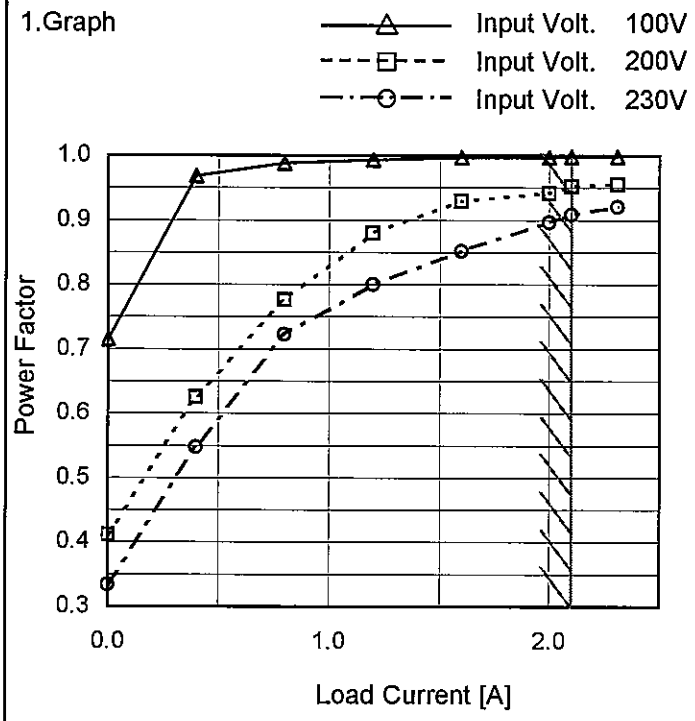
Input Voltage [V]	Power Factor	
	Load 50%	Load 100%
75	0.999	0.999
85	0.998	0.999
100	0.989	0.998
120	0.979	0.992
200	0.831	0.944
230	0.774	0.908
264	0.610	0.824
280	0.548	0.722
--	-	-

COSEL

Model	PMA100F-48
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.

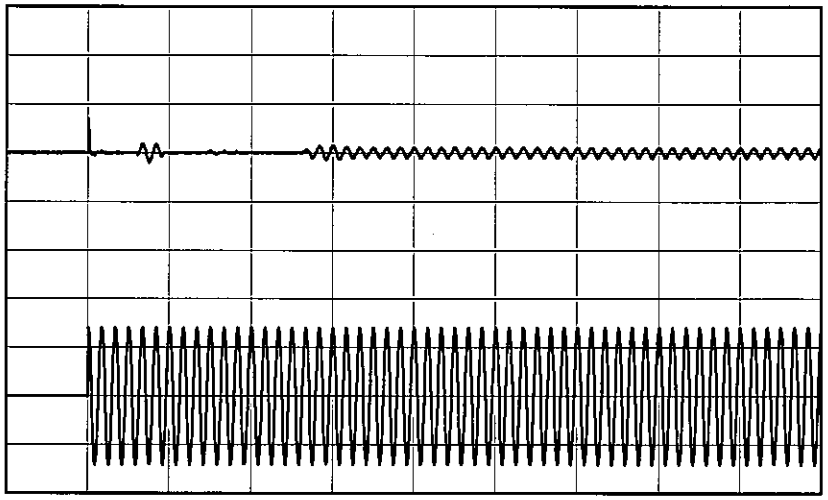
2.Values

Load Current [A]	Power Factor		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	0.714	0.412	0.333
0.40	0.968	0.625	0.547
0.80	0.988	0.776	0.722
1.20	0.993	0.880	0.800
1.60	0.997	0.929	0.852
2.00	0.997	0.942	0.897
2.10	0.998	0.952	0.908
2.31	0.998	0.956	0.921
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

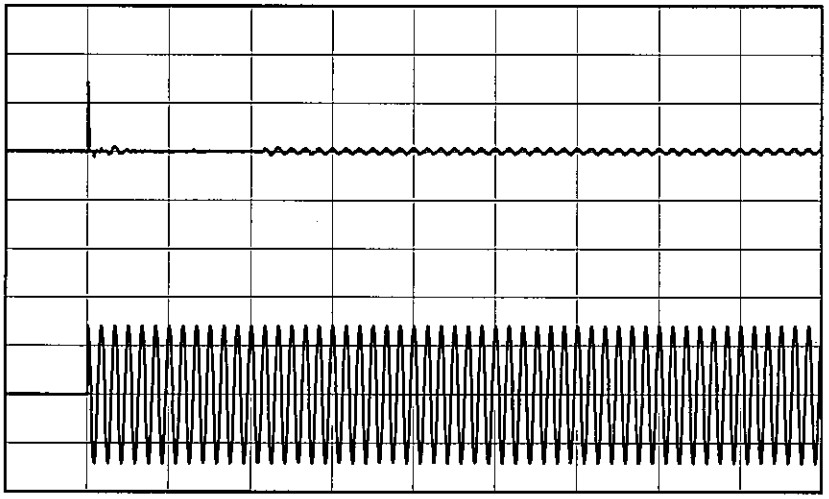
Model	PMA100F-48
Item	Inrush Current
Object	————————

Temperature 25°C
Testing Circuitry Figure A



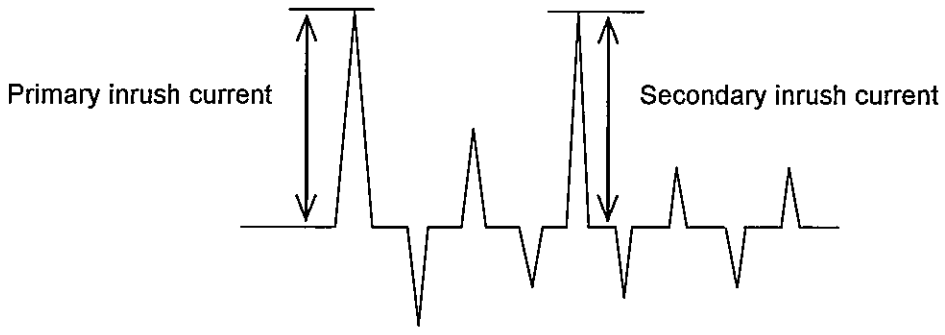
Input Voltage 100 V
Frequency 60 Hz
Load 100 %

Primary inrush current :
13.8 A
Secondary inrush current :
3.9 A



Input Voltage 230 V
Frequency 60 Hz
Load 100 %

Primary inrush current :
28.5 A
Secondary inrush current :
1.8 A



BC-10434

COSEL

Model	PMA100F-48	
Item	Leakage Current	Temperature 25°C Testing Circuitry Figure B
Object	———————	

1.Results

[mA]

Standards		Input Volt.			Note
		100 [V]	200 [V]	240 [V]	
IEC60601	Both phases	0.04	0.10	0.16	Operation
	One of phases	0.09	0.19	0.22	Stand by

The value for "One of phases" is the reference value only.

2.Condition

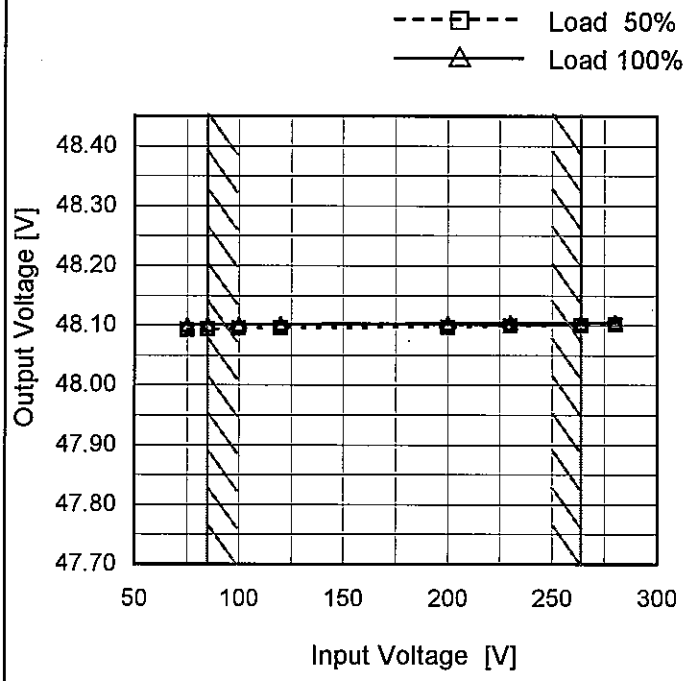
Leakage current value is concluded after measuring both phases of AC input and by choosing the larger one.

COSEL

Model	PMA100F-48
Item	Line Regulation
Object	+48V2.1A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

2.Values

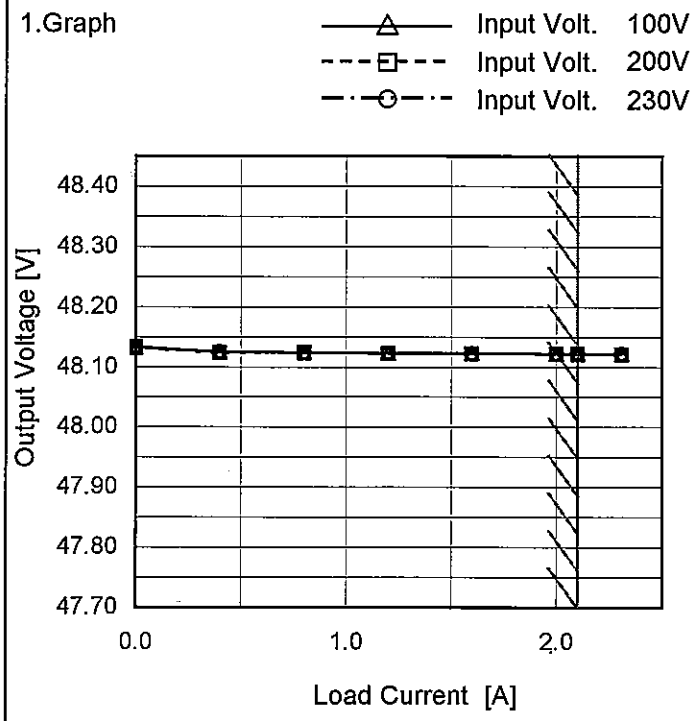
Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
75	48.093	48.101
85	48.094	48.101
100	48.095	48.101
120	48.096	48.102
200	48.097	48.103
230	48.099	48.104
264	48.101	48.105
280	48.101	48.106
--	-	-

COSEL

Model	PMA100F-48
Item	Load Regulation
Object	+48V2.1A

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	48.133	48.133	48.133
0.40	48.125	48.123	48.125
0.80	48.124	48.124	48.124
1.20	48.123	48.122	48.123
1.60	48.123	48.122	48.122
2.00	48.122	48.121	48.122
2.10	48.122	48.122	48.122
2.31	48.122	48.121	48.121
--	-	-	-
--	-	-	-
--	-	-	-

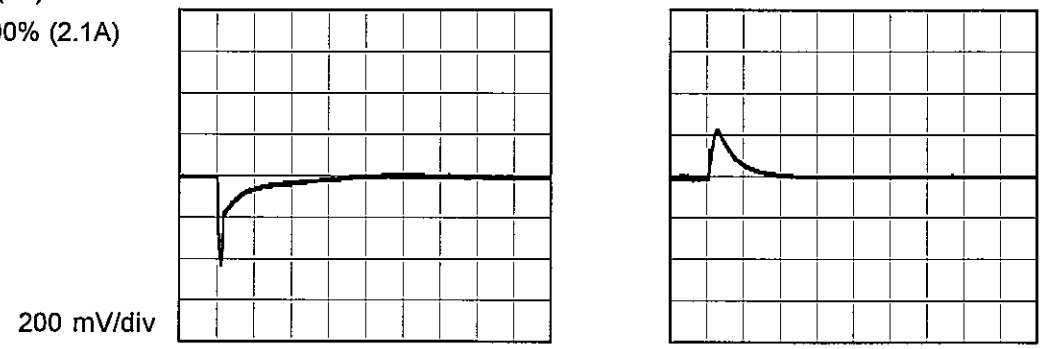
COSEL

Model	PMA100F-48		
Item	Dynamic Load Response	Temperature Testing Circuitry	25˚C Figure A
Object	+48V2.1A		

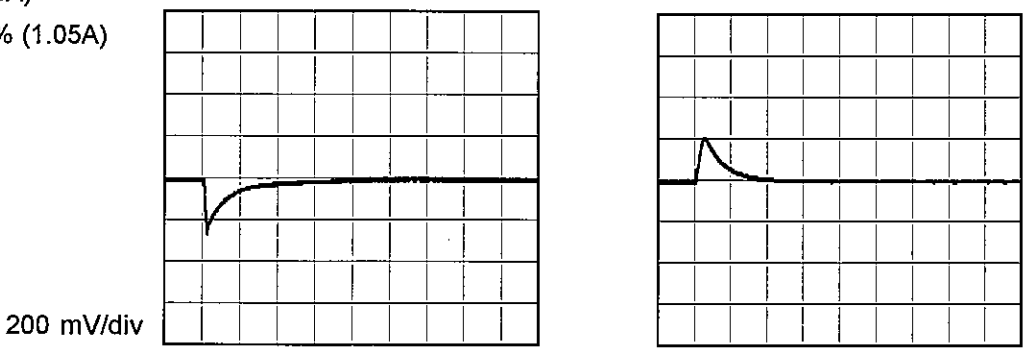
Input Volt. 100 V
Cycle 1000 ms

Response. t1=t2=50us. Typ

Min. Load (0A) ⟷
Load 100% (2.1A)



Min. Load (0A) ⟷
Load 50% (1.05A)

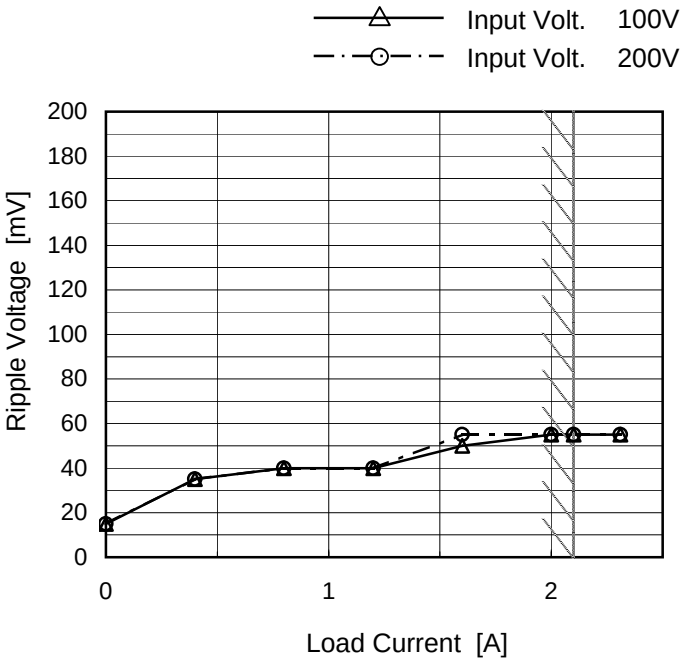


COSEL

Model	PMA100F-48
Item	Ripple Voltage (by Load Current)
Object	+48V2.1A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Measured by 20 MHz Oscilloscope.
Ripple Voltage 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

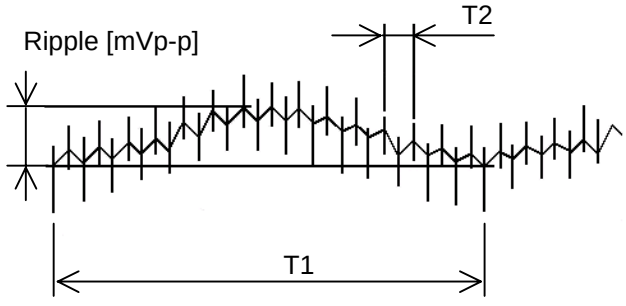


Fig. Complex Ripple Wave Form

2.Values

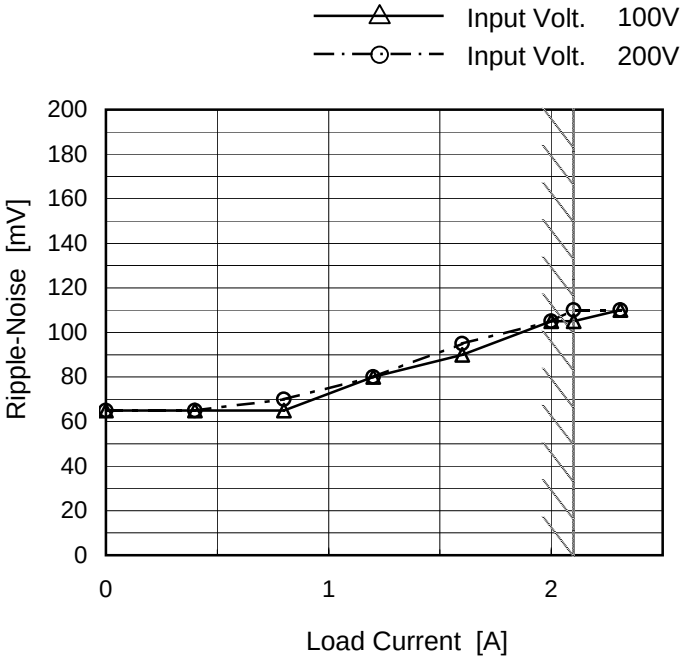
Load Current [A]	Ripple Voltage [mV] Input Volt. 100 [V]	Ripple Voltage [mV] Input Volt. 200 [V]
0.00	15	15
0.40	35	35
0.80	40	40
1.20	40	40
1.60	50	55
2.00	55	55
2.10	55	55
2.31	55	55
--	-	-
--	-	-
--	-	-

COSEL

Model	PMA100F-48
Item	Ripple-Noise
Object	+48V2.1A

Temperature 25°C
Testing Circuitry Figure A

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

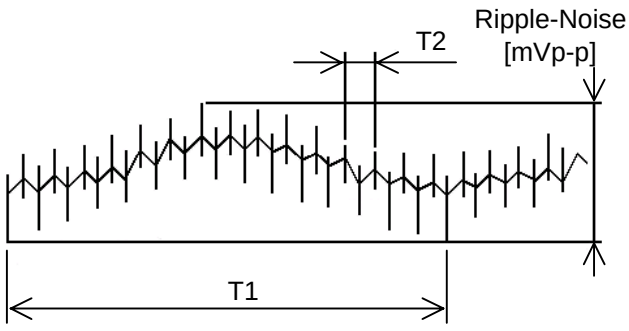


Fig. Complex Ripple Wave Form

2.Values

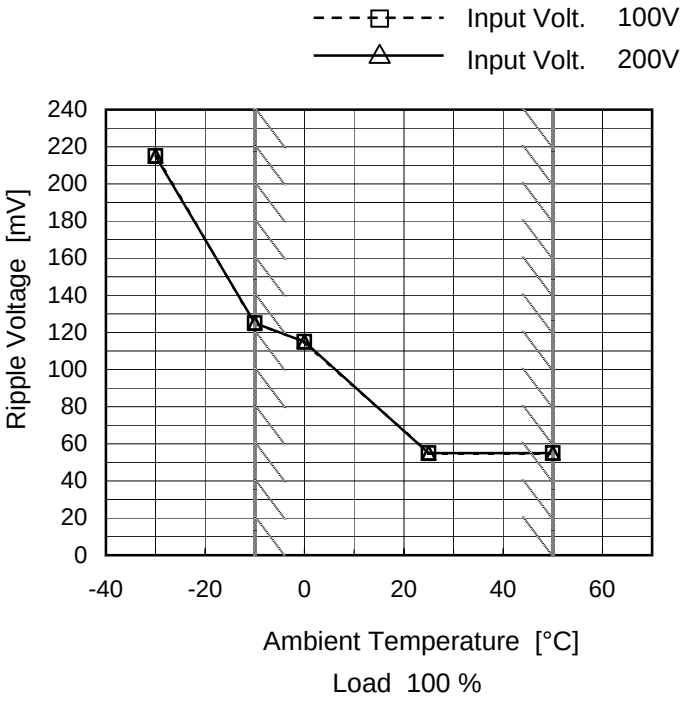
Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
0.00	65	65
0.40	65	65
0.80	65	70
1.20	80	80
1.60	90	95
2.00	105	105
2.10	105	110
2.31	110	110
--	-	-
--	-	-
--	-	-

COSEL

Model	PMA100F-48
Item	Ripple Voltage (by Ambient Temp.)
Object	+48V2.1A

Testing Circuitry Figure A

1.Graph



Load 100 %

Measured by 20 MHz Oscilloscope.

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

2.Values

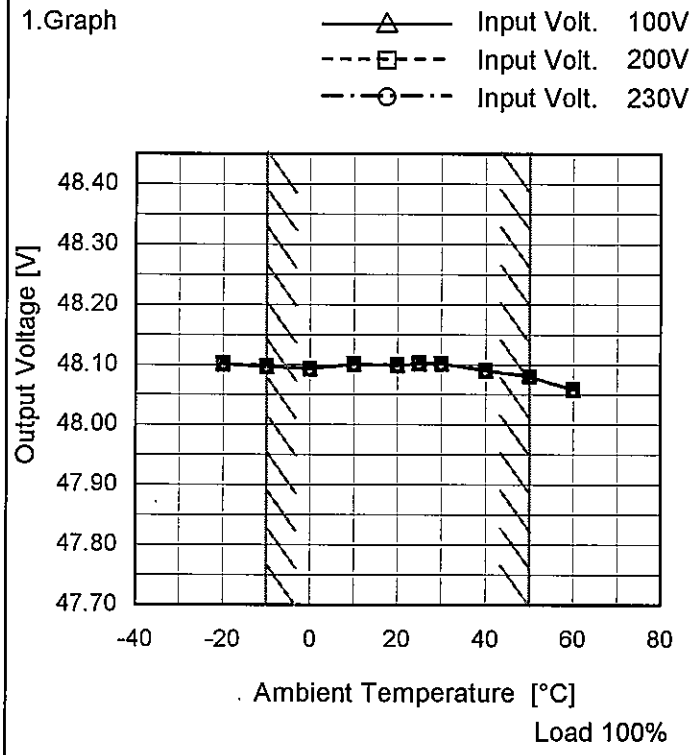
Ambient Temperature [°C]	Ripple Voltage [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
-30	215	215
-10	125	125
0	115	115
25	55	55
50	55	55
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	PMA100F-48
Item	Ambient Temperature Drift
Object	+48V2.1A

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	48.100	48.102	48.101
-10	48.097	48.097	48.098
0	48.093	48.093	48.093
10	48.101	48.102	48.101
20	48.099	48.100	48.099
25	48.102	48.103	48.103
30	48.101	48.102	48.102
40	48.090	48.091	48.091
50	48.081	48.080	48.080
60	48.058	48.059	48.058
--	-	-	-

COSEL

Model	PMA100F-48	
Item	Output Voltage Accuracy	Testing Circuitry Figure A
Object	+48V2.1A	

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 : -10 - 50°C
Input Voltage : 85 - 264V
Load Current : 0 - 2.1A

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

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

2.Values

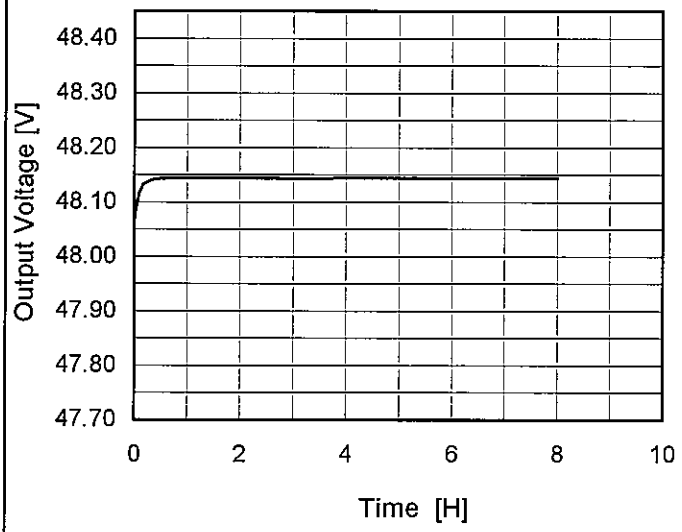
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	30	200	0	48.109	±15	±0.1
Minimum Voltage	50	264	2.1	48.080		

COSEL

Model	PMA100F-48
Item	Time Lapse Drift
Object	+48V2.1A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Input Volt. 100V
Load 100%

* The characteristic of AC200V is equal.

2.Values

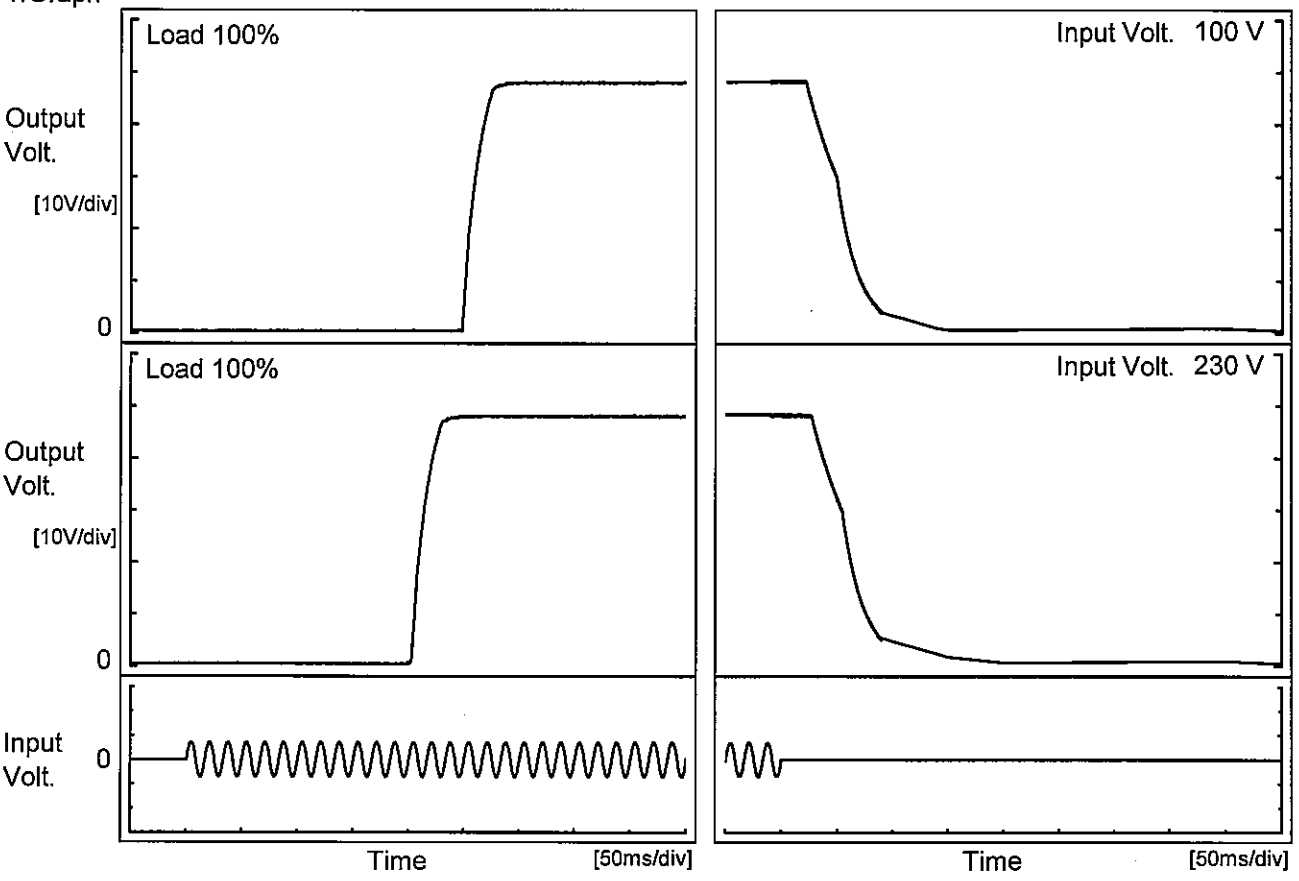
Time since start [H]	Output Voltage [V]
0.0	48.064
0.5	48.144
1.0	48.144
2.0	48.144
3.0	48.144
4.0	48.144
5.0	48.144
6.0	48.144
7.0	48.144
8.0	48.144

COSEL

Model	PMA100F-48
Item	Rise and Fall Time
Object	+48V2.1A

Temperature 25°C
Testing Circuitry Figure A

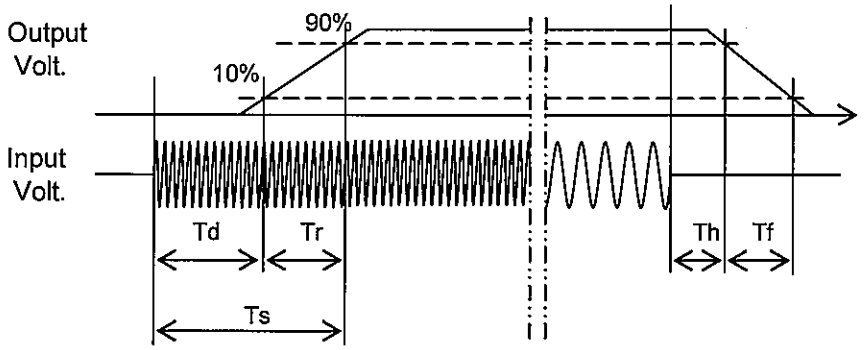
1.Graph



2.Values

[ms]

Input Volt. \ Time	Td	Tr	Ts	Th	Tf
100 V	250.5	21.5	272.0	27.5	57.4
230 V	204.5	22.0	226.5	32.7	57.4



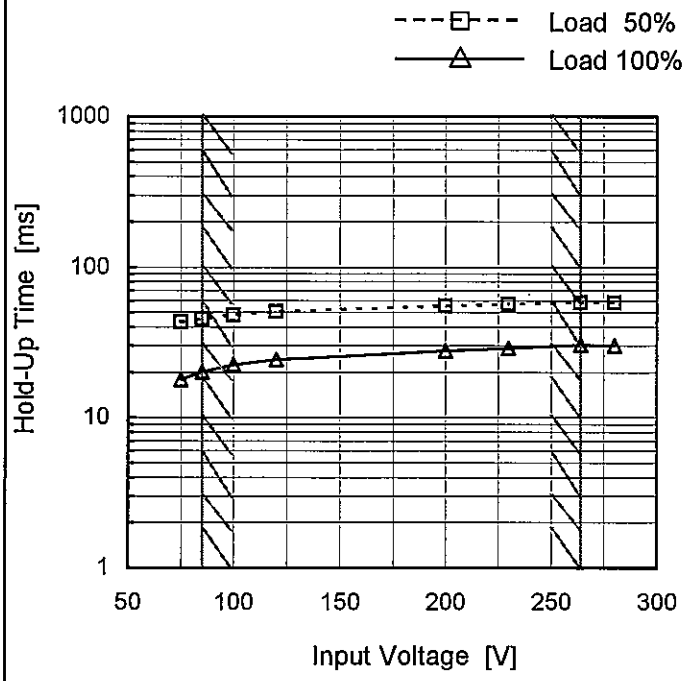
BC-10434

COSEL

Model	PMA100F-48
Item	Hold-Up Time
Object	+48V2.1A

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

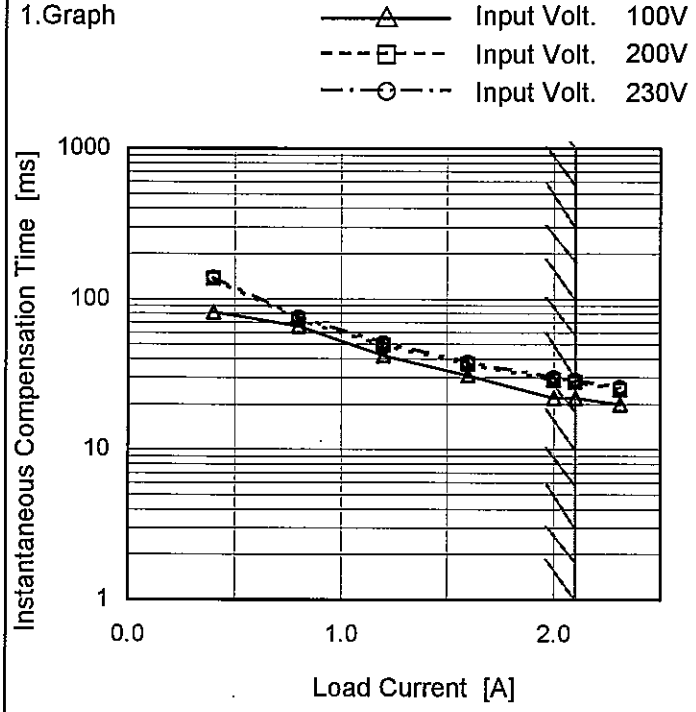
Input Voltage [V]	Hold-Up Time [ms]	
	Load 50%	Load 100%
75	43	18
85	46	20
100	48	22
120	50	24
200	55	28
230	57	29
264	58	30
280	58	30
--	-	-

COSEL

Model	PMA100F-48
Item	Instantaneous Interruption Compensation
Object	+48V2.1A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

2.Values

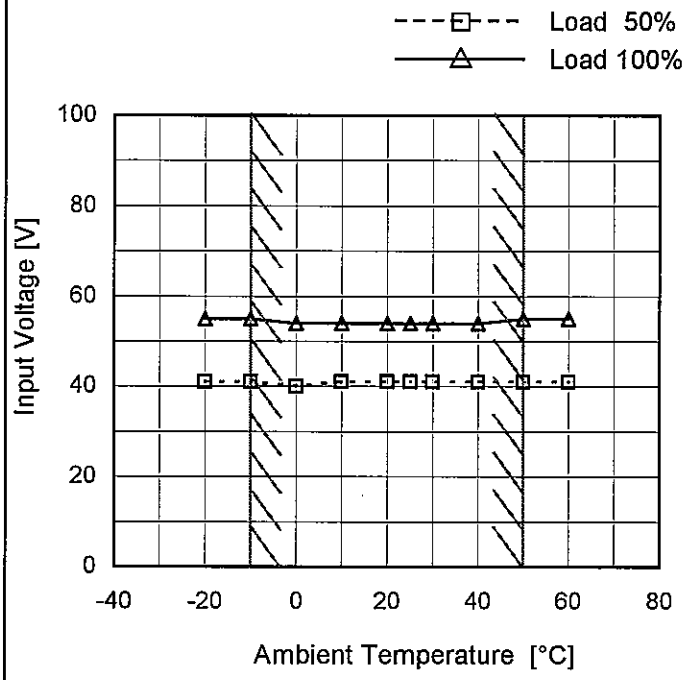
Load Current [A]	Time [ms] Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	-	-	-
0.40	82	136	139
0.80	66	73	76
1.20	42	49	51
1.60	31	37	38
2.00	22	29	30
2.10	22	28	29
2.31	20	25	26
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	PMA100F-48
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+48V2.1A

Testing Circuitry Figure A

1.Graph



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

2.Values

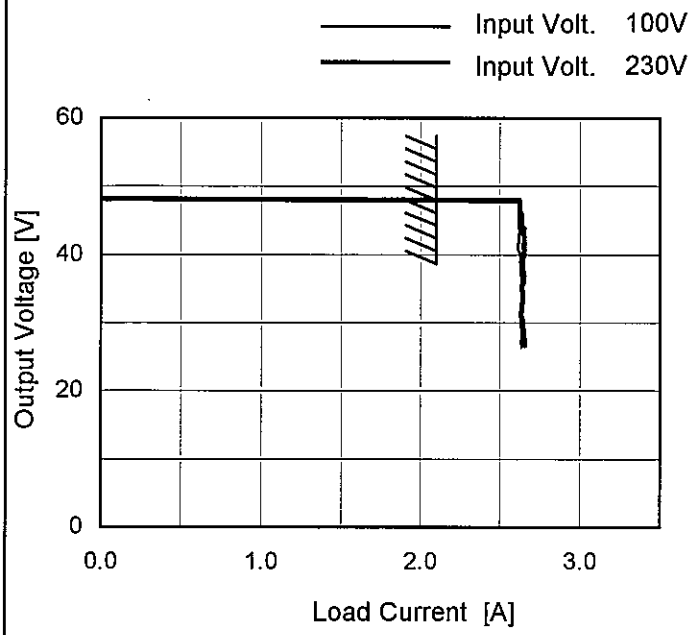
Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	41	55
-10	41	55
0	40	54
10	41	54
20	41	54
25	41	54
30	41	54
40	41	54
50	41	55
60	41	55
--	-	-

COSEL

Model	PMA100F-48
Item	Overcurrent Protection
Object	+48V2.1A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

Intermittent operation occurs when the output voltage is from 0V to 0V.

2.Values

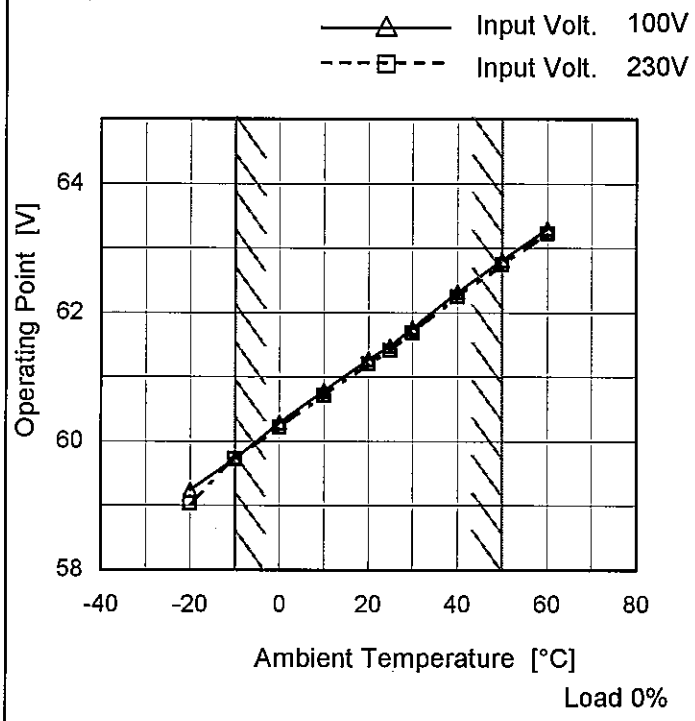
Output Voltage [V]	Load Current [A]	
	Input Volt. 100[V]	Input Volt. 230[V]
48.0	2.56	2.56
45.6	2.58	2.64
43.2	2.66	2.65
38.4	2.57	2.62
33.6	2.59	2.57
28.8	2.64	2.68
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	PMA100F-48
Item	Overvoltage Protection
Object	+48V2.1A

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	59.24	59.03
-10	59.73	59.73
0	60.29	60.22
10	60.78	60.71
20	61.27	61.20
25	61.48	61.41
30	61.76	61.69
40	62.32	62.25
50	62.81	62.74
60	63.30	63.23
--	-	-

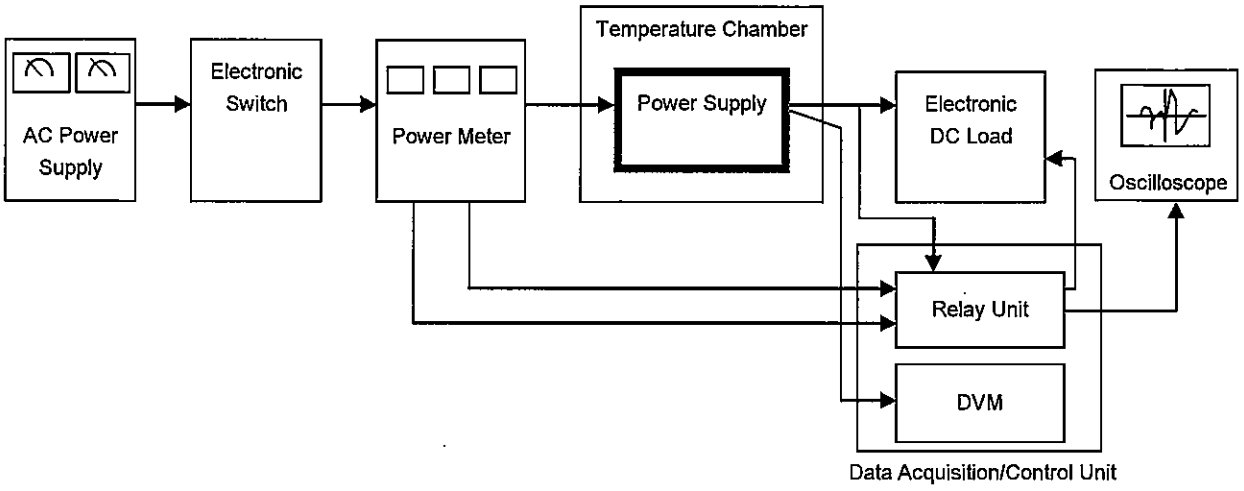


Figure A

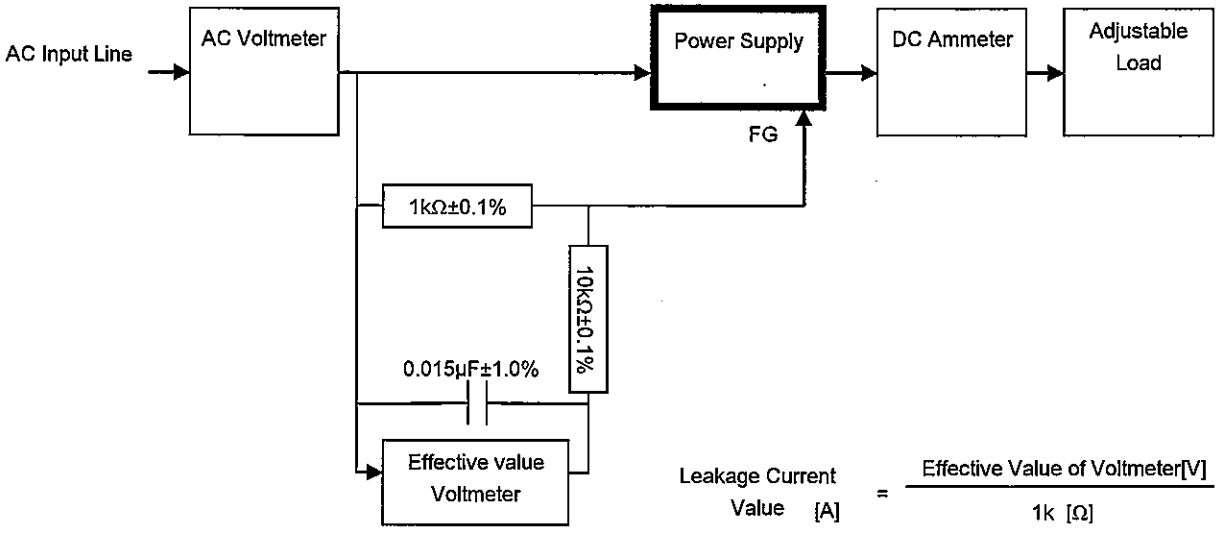


Figure B (IEC60601-1)