COSEL

参考資料

TEST DATA OF PMA15F-24

Regulated DC Power Supply
June 4, 2010

Approved by : Katsumi Ishikawa
Katsumi Ishikawa — Design Manager

Prepared by : Tsutomu Okano
Tsutomu Okano — Design Engineer

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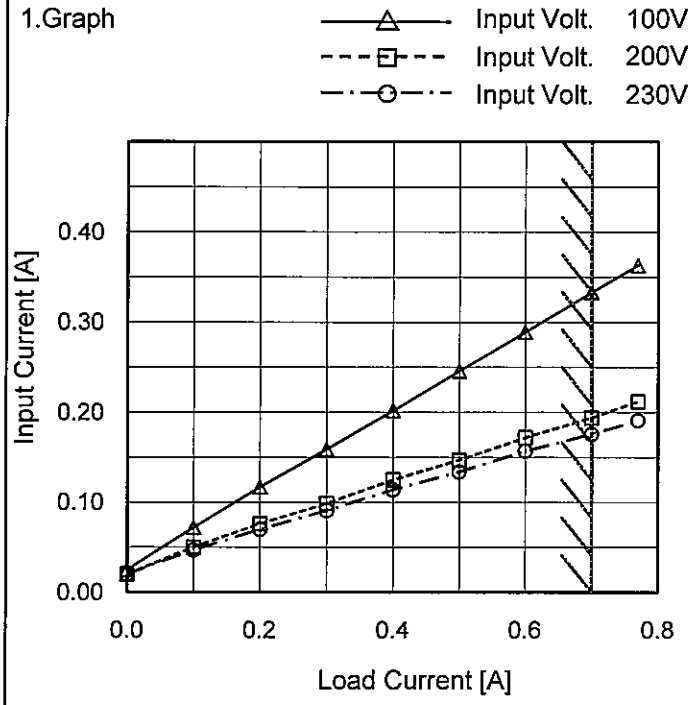
Model	PMA15F-24
Item	Input Current (by Load Current)
Object	———————

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	0.025	0.020	0.020
0.10	0.072	0.050	0.047
0.20	0.117	0.076	0.070
0.30	0.159	0.099	0.091
0.40	0.202	0.125	0.114
0.50	0.246	0.147	0.134
0.60	0.289	0.172	0.157
0.70	0.333	0.194	0.176
0.77	0.363	0.212	0.191
--	-	-	-
--	-	-	-

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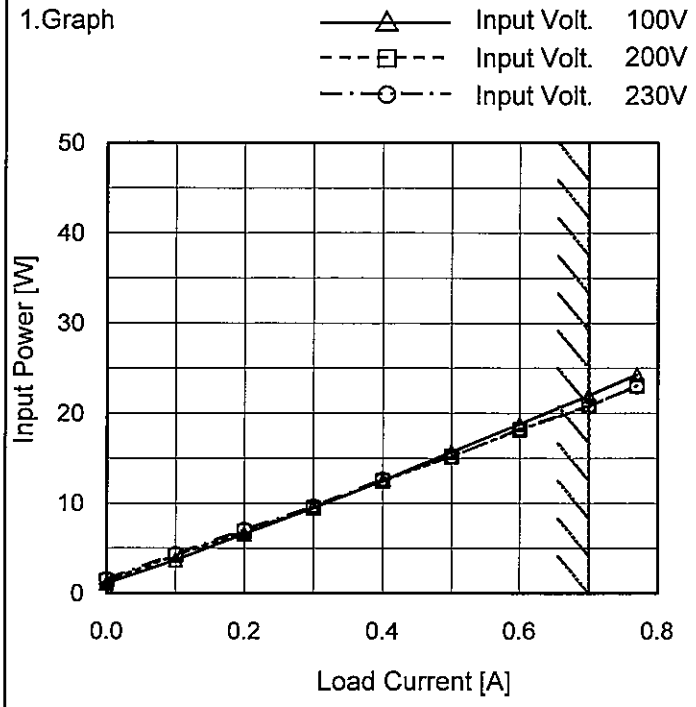
Model	PMA15F-24
Item	Input Power (by Load Current)
Object	———————

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	1.10	1.40	1.60
0.10	3.70	4.20	4.40
0.20	6.60	6.90	7.10
0.30	9.50	9.50	9.70
0.40	12.50	12.50	12.70
0.50	15.70	15.20	15.20
0.60	18.80	18.20	18.30
0.70	22.00	20.80	20.90
0.77	24.30	23.10	23.00
--	-	-	-
--	-	-	-

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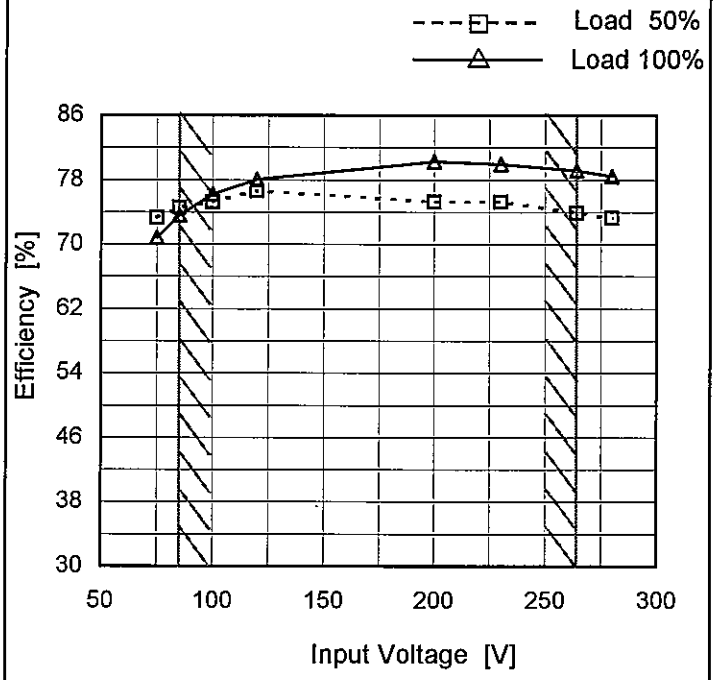
Model	PMA15F-24
Item	Efficiency (by Input Voltage)
Object	————————

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	73.3	70.8
85	74.6	73.6
100	75.2	76.2
120	76.6	78.0
200	75.2	80.3
230	75.2	79.9
264	73.9	79.2
280	73.3	78.4
--	-	-

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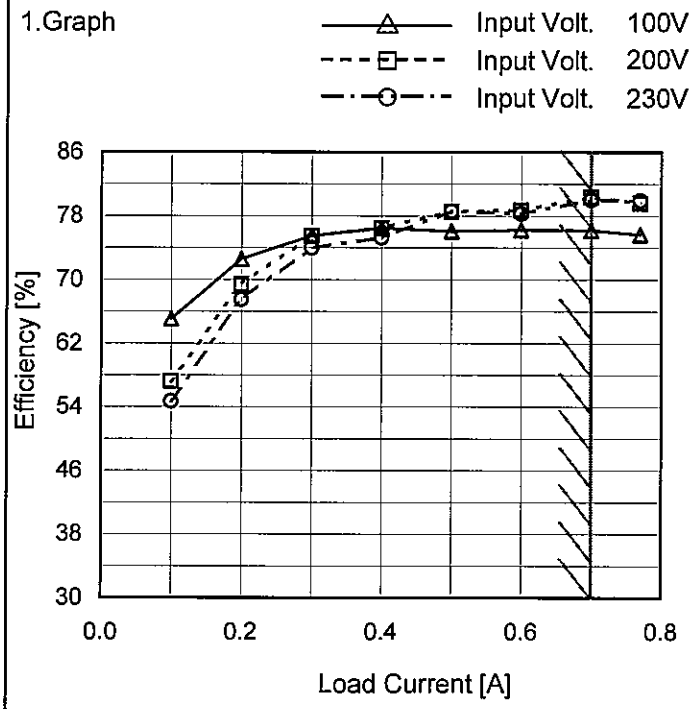
Model	PMA15F-24
Item	Efficiency (by Load Current)
Object	————————

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	-	-	-
0.10	65.0	57.2	54.7
0.20	72.6	69.4	67.5
0.30	75.5	75.5	74.0
0.40	76.5	76.5	75.3
0.50	76.1	78.6	78.6
0.60	76.2	78.7	78.3
0.70	76.2	80.4	80.0
0.77	75.7	79.6	79.9
--	-	-	-
---	-	-	-

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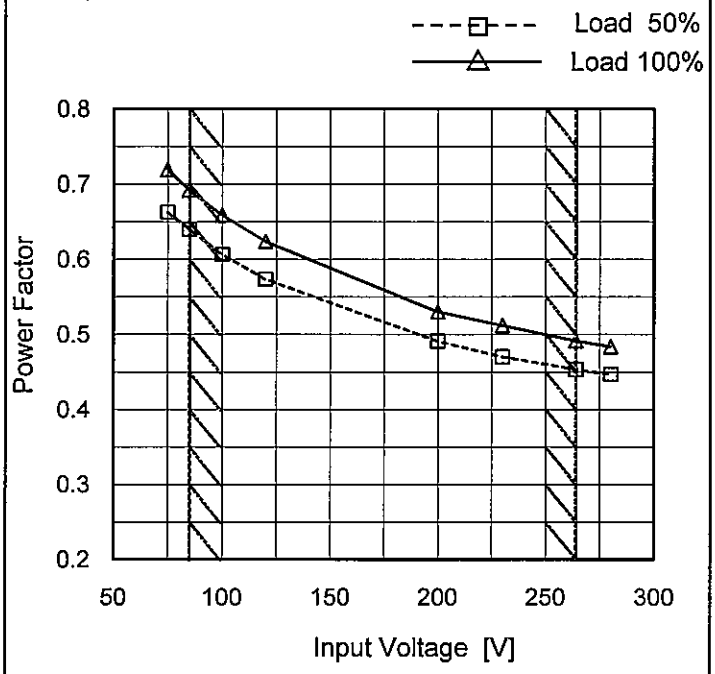
Model	PMA15F-24
Item	Power Factor (by Input Voltage)
Object	———————————

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	0.663	0.720
85	0.640	0.692
100	0.607	0.659
120	0.574	0.624
200	0.491	0.531
230	0.470	0.512
264	0.454	0.492
280	0.447	0.484
--	-	-

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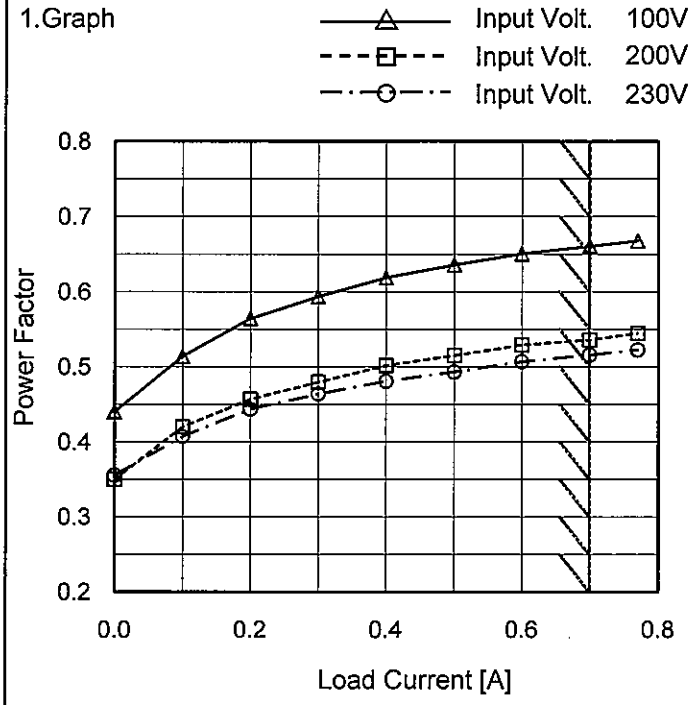
Model	PMA15F-24
Item	Power Factor (by Load Current)
Object	————————

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	0.440	0.350	0.356
0.10	0.514	0.420	0.407
0.20	0.564	0.457	0.444
0.30	0.594	0.480	0.464
0.40	0.619	0.502	0.481
0.50	0.636	0.515	0.494
0.60	0.651	0.529	0.507
0.70	0.661	0.536	0.516
0.77	0.668	0.545	0.523
--	-	-	-
--	-	-	-

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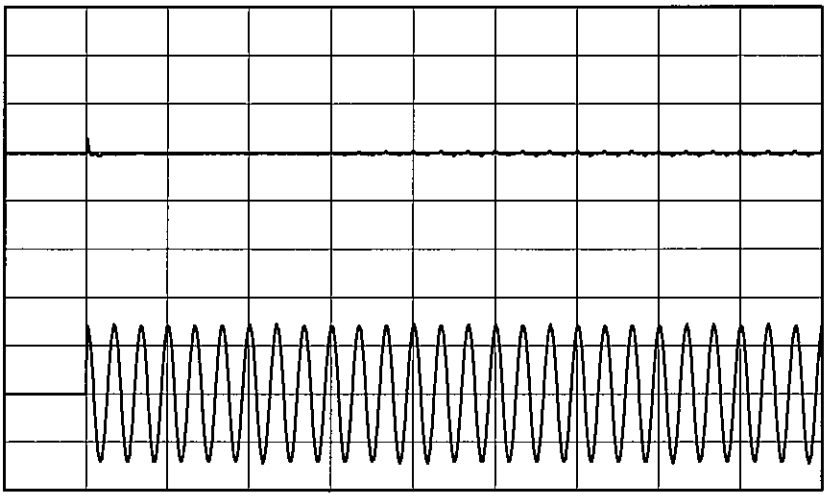
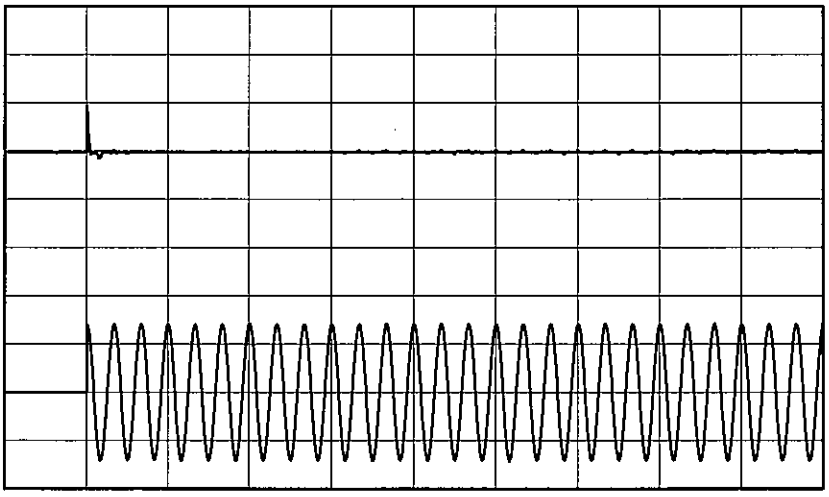
Model	PMA15F-24
Item	Inrush Current
Object	———————

Temperature 25°C
Testing Circuitry Figure A



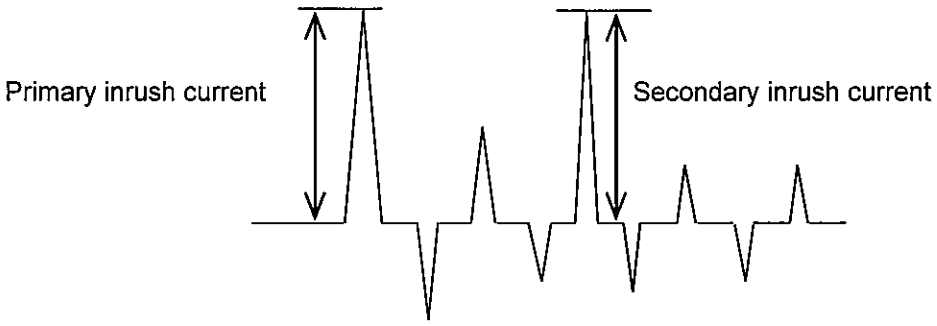
Input Voltage 100 V
Frequency 60 Hz
Load 100 %

Primary inrush current :
6.3 A
Secondary inrush current :
1.1 A



Input Voltage 230 V
Frequency 60 Hz
Load 100 %

Primary inrush current :
19.3 A
Secondary inrush current :
0.9 A



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Model	PMA15F-24		
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	0.02	0.04	0.05	Operation
	One of phases	0.03	0.07	0.08	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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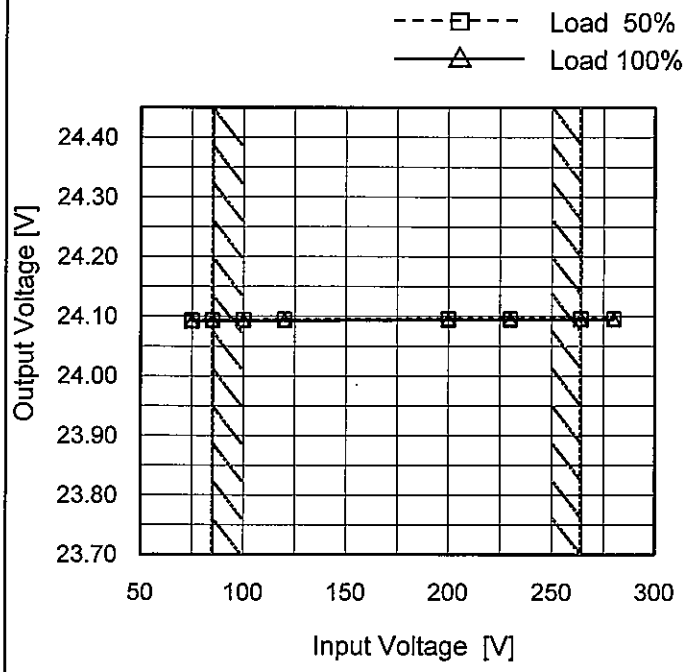
Model	PMA15F-24
Item	Line Regulation
Object	+24V0.7A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

2.Values

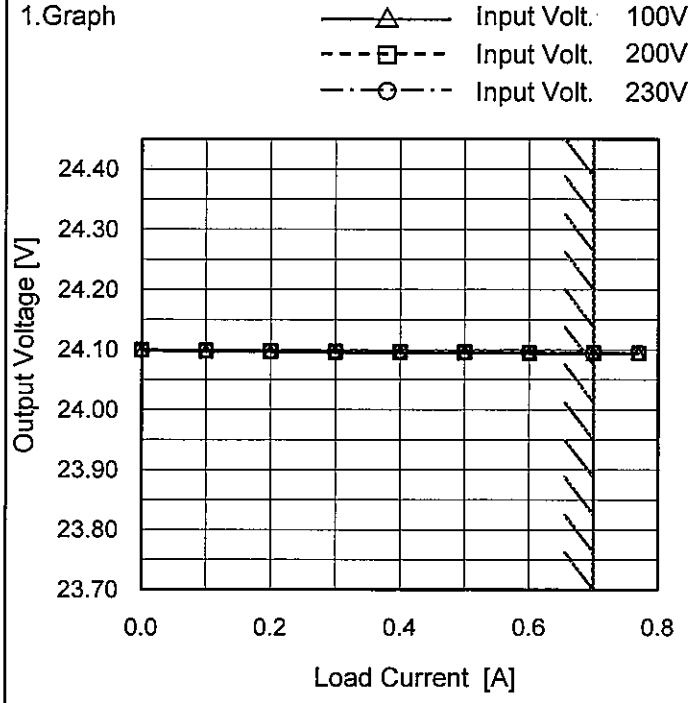
Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
75	24.093	24.092
85	24.094	24.093
100	24.095	24.093
120	24.095	24.093
200	24.096	24.094
230	24.096	24.094
264	24.096	24.095
280	24.096	24.095
--	-	-

COSEL

Model	PMA15F-24
Item	Load Regulation
Object	+24V0.7A

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	24.099	24.100	24.099
0.10	24.097	24.099	24.099
0.20	24.097	24.098	24.098
0.30	24.096	24.097	24.097
0.40	24.095	24.097	24.097
0.50	24.095	24.096	24.096
0.60	24.094	24.096	24.096
0.70	24.094	24.095	24.095
0.77	24.094	24.095	24.095
--	-	-	-
--	-	-	-

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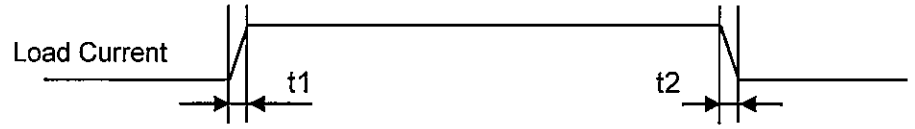
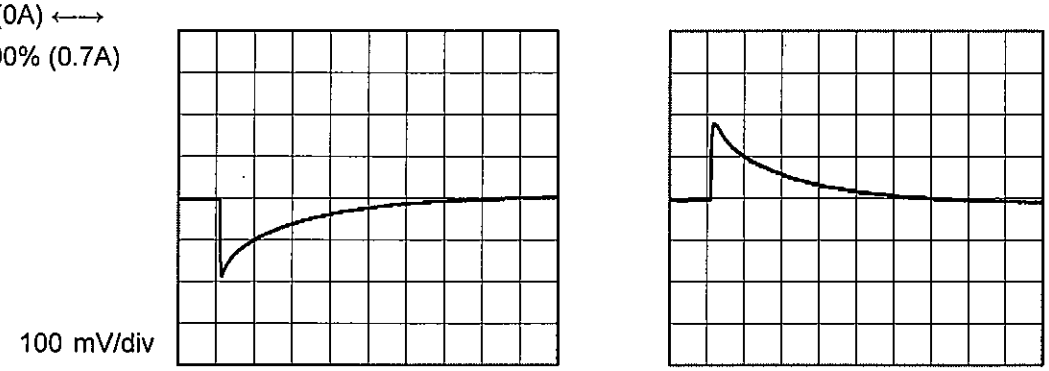
Model	PMA15F-24		
Item	Dynamic Load Response	Temperature Testing Circuitry	25˚C Figure A
Object	+24V0.7A		

Input Volt. 100 V
Cycle 1000 ms

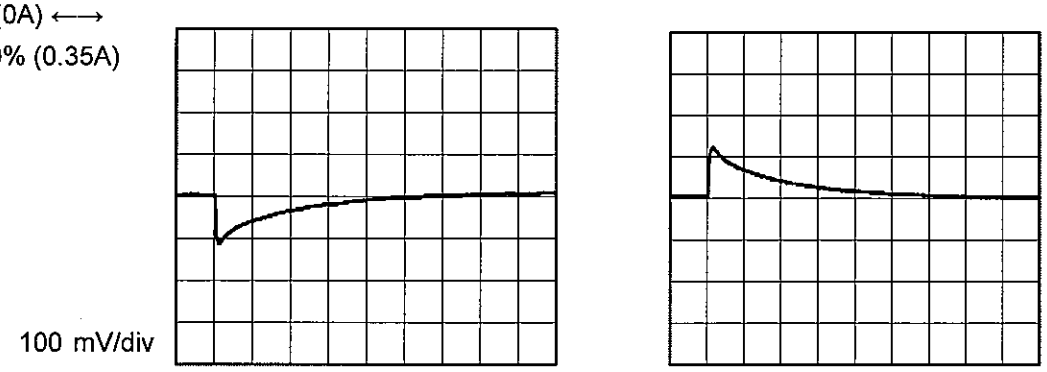
Response. t1=t2=50us. Typ



Min. Load (0A) ⟷
Load 100% (0.7A)



Min. Load (0A) ⟷
Load 50% (0.35A)



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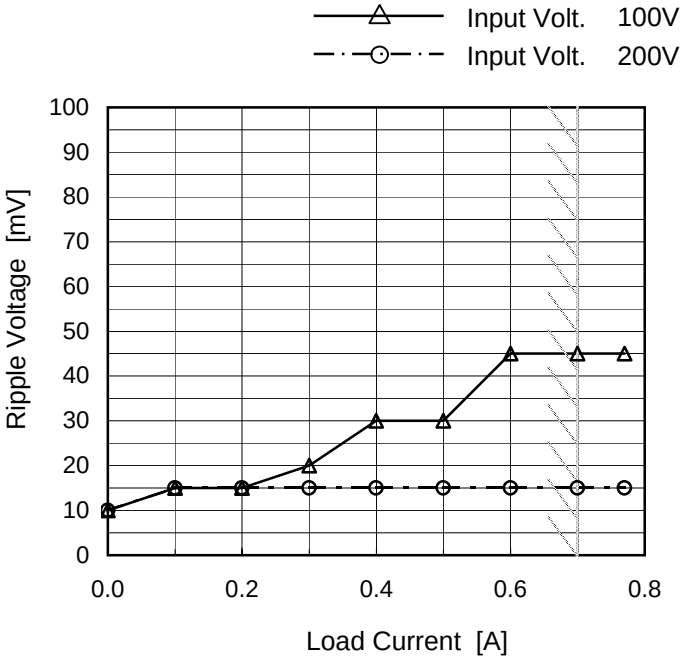
Model	PMA15F-24
Item	Ripple Voltage (by Load Current)
Object	+24V0.7A

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

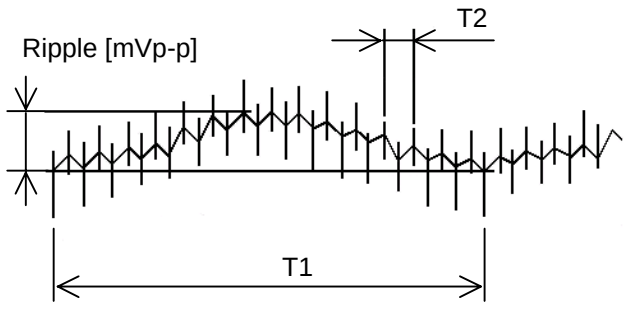


Fig. Complex Ripple Wave Form

2.Values

Load Current [A]	Ripple Voltage [mV] Input Volt. 100 [V]	Ripple Voltage [mV] Input Volt. 200 [V]
0.00	10	10
0.10	15	15
0.20	15	15
0.30	20	15
0.40	30	15
0.50	30	15
0.60	45	15
0.70	45	15
0.77	45	15
--	-	-
--	-	-

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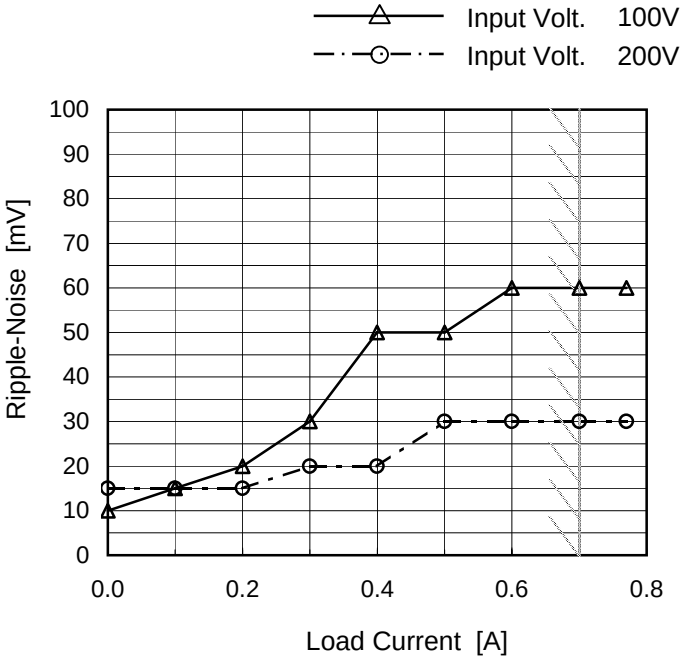
Model	PMA15F-24
Item	Ripple-Noise
Object	+24V0.7A

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

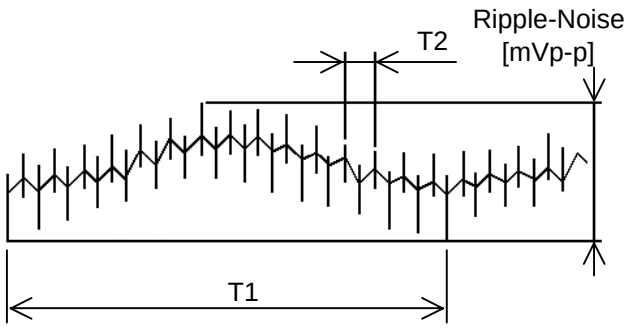


Fig. Complex Ripple Wave Form

2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
0.00	10	15
0.10	15	15
0.20	20	15
0.30	30	20
0.40	50	20
0.50	50	30
0.60	60	30
0.70	60	30
0.77	60	30
--	-	-
--	-	-

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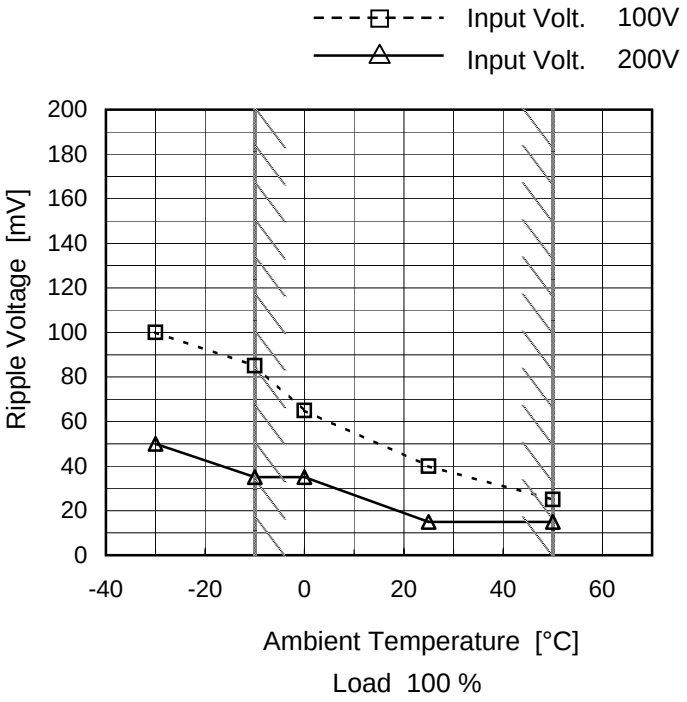
Model	PMA15F-24
Item	Ripple Voltage (by Ambient Temp.)
Object	+24V0.7A

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	100	50
-10	85	35
0	65	35
25	40	15
50	25	15
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

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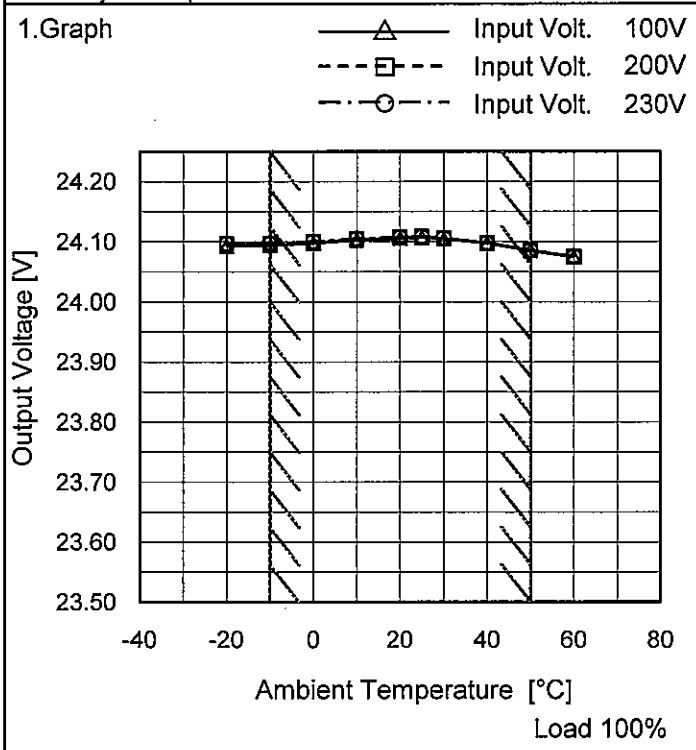
Model	PMA15F-24
Item	Ambient Temperature Drift
Object	+24V0.7A

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	24.093	24.096	24.097
-10	24.094	24.097	24.097
0	24.098	24.100	24.101
10	24.103	24.105	24.105
20	24.106	24.108	24.108
25	24.107	24.109	24.109
30	24.105	24.106	24.107
40	24.097	24.099	24.099
50	24.085	24.086	24.087
60	24.075	24.076	24.076
--	-	-	-

COSEL

Model	PMA15F-24	
Item	Output Voltage Accuracy	Testing Circuitry Figure A
Object	+24V0.7A	

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 - 0.7A

* 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	25	264	0	24.113	±14	±0.1
Minimum Voltage	50	85	0.7	24.085		

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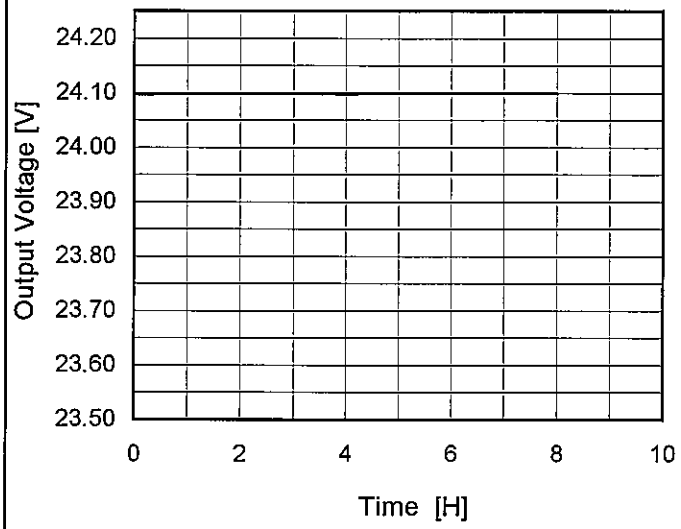
Model	PMA15F-24
Item	Time Lapse Drift
Object	+24V0.7A

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	24.100
0.5	24.098
1.0	24.098
2.0	24.099
3.0	24.099
4.0	24.099
5.0	24.099
6.0	24.099
7.0	24.099
8.0	24.099

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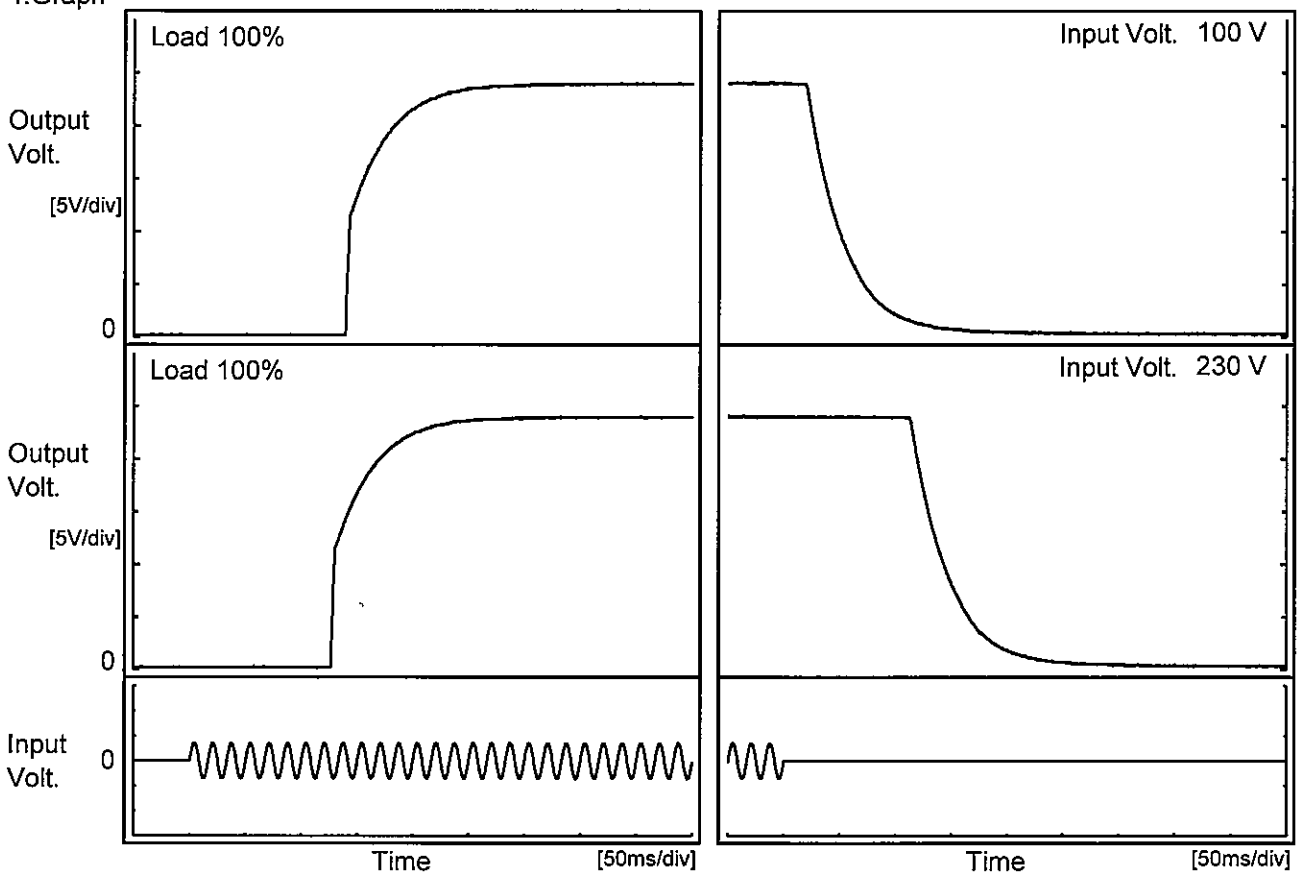
Model	PMA15F-24		
Item	Rise and Fall Time	Temperature	25°C
		Testing Circuitry	Figure A
Object	+24V0.7A		

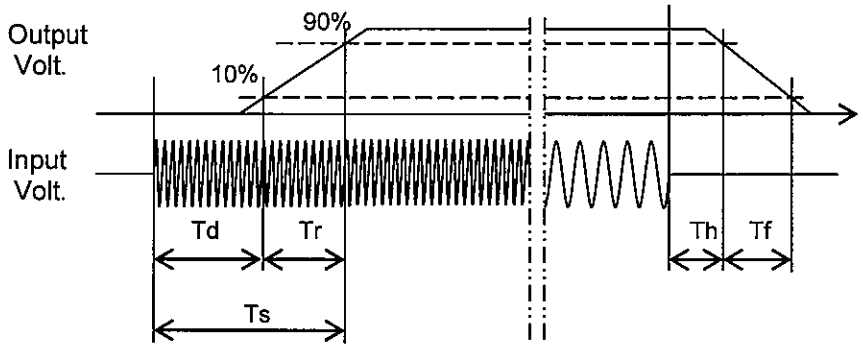
1.Graph



2.Values

[ms]

Input Volt. \ Time	Td	Tr	Ts	Th	Tf
100 V	140.0	63.0	203.0	23.8	70.3
230 V	127.5	62.5	190.0	116.5	70.5

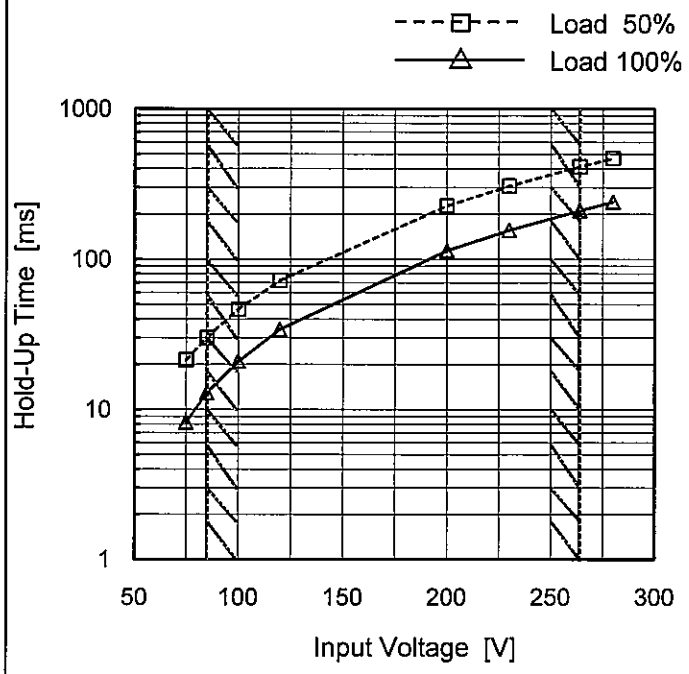


COSEL

Model	PMA15F-24
Item	Hold-Up Time
Object	+24V0.7A

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

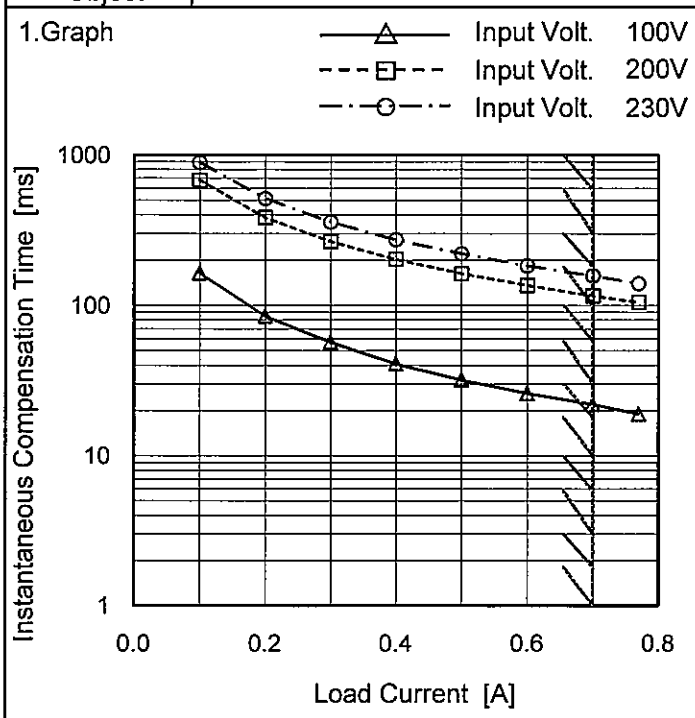
Input Voltage [V]	Hold-Up Time [ms]	
	Load 50%	Load 100%
75	21	8
85	30	13
100	47	21
120	72	34
200	227	114
230	307	156
264	413	211
280	469	240
--	-	-

COSEL

Model	PMA15F-24
Item	Instantaneous Interruption Compensation
Object	+24V0.7A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

2.Values

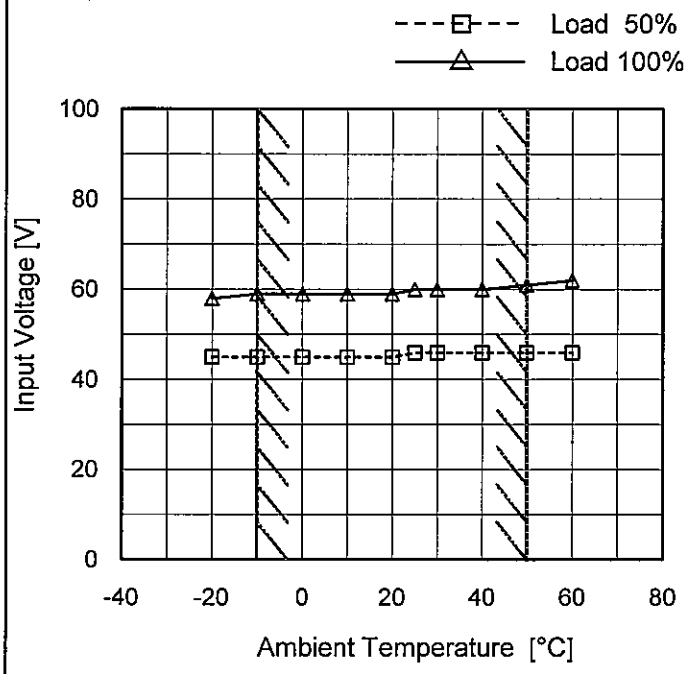
Load Current [A]	Time [ms] Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	-	-	-
0.10	164	680	893
0.20	85	384	514
0.30	57	267	359
0.40	41	203	274
0.50	32	163	221
0.60	26	136	184
0.70	22	116	158
0.77	19	105	140
--	-	-	-
--	-	-	-

COSEL

Model	PMA15F-24
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+24V0.7A

Testing Circuitry Figure A

1.Graph



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

2.Values

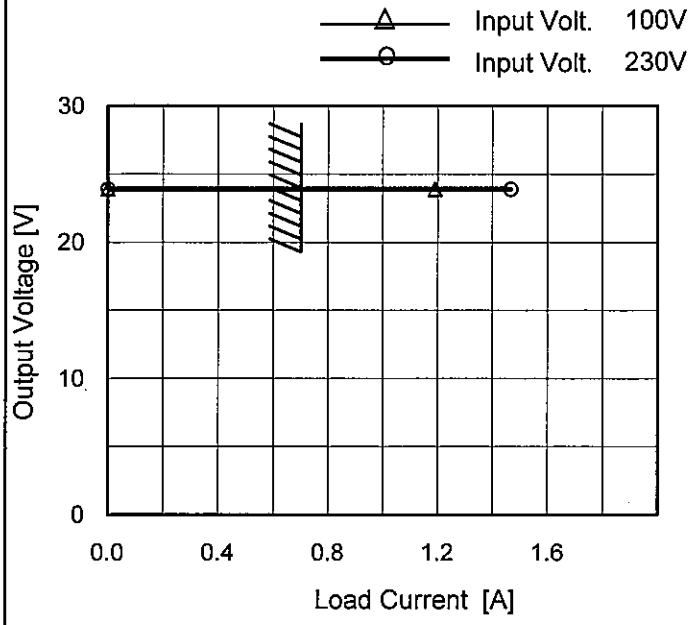
Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	45	58
-10	45	59
0	45	59
10	45	59
20	45	59
25	46	60
30	46	60
40	46	60
50	46	61
60	46	62
--	-	-

COSEL

Model	PMA15F-24
Item	Overcurrent Protection
Object	+24V0.7A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

2.Values

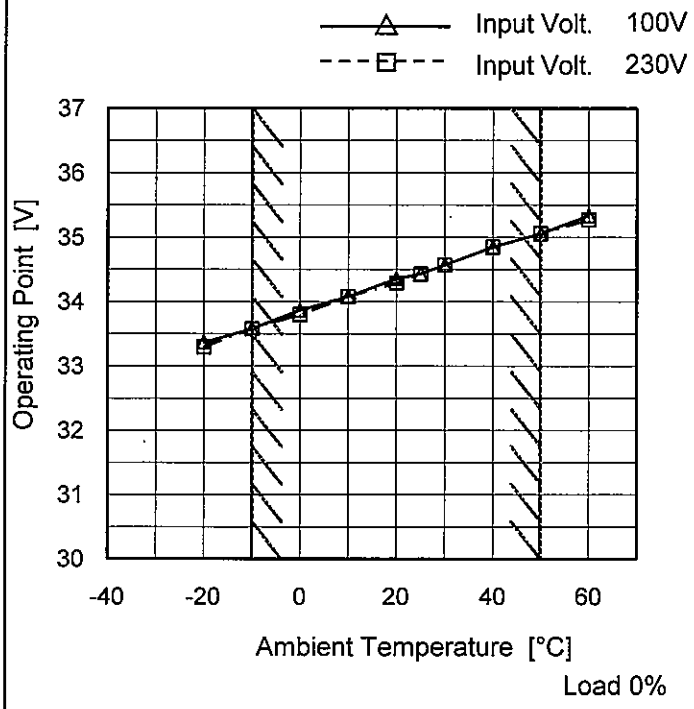
Output Voltage [V]	Load Current [A]	
	Input Volt. 100[V]	Input Volt. 230[V]
24.0	1.19	1.47
22.8	-	-
21.6	-	-
19.2	-	-
16.8	-	-
14.4	-	-
12.0	-	-
9.6	-	-
7.2	-	-
4.8	-	-
2.4	-	-
0.0	-	-

COSEL

Model	PMA15F-24
Item	Overvoltage Protection
Object	+24V0.7A

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	33.37	33.30
-10	33.58	33.58
0	33.87	33.80
10	34.08	34.08
20	34.36	34.29
25	34.43	34.43
30	34.57	34.57
40	34.85	34.85
50	35.06	35.06
60	35.34	35.27
--	-	-

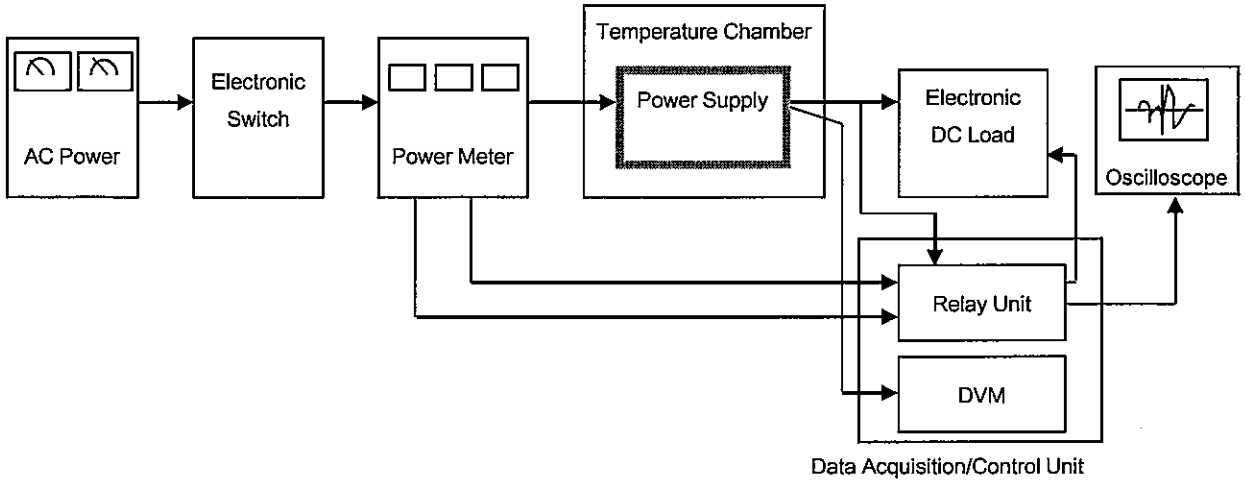


Figure A

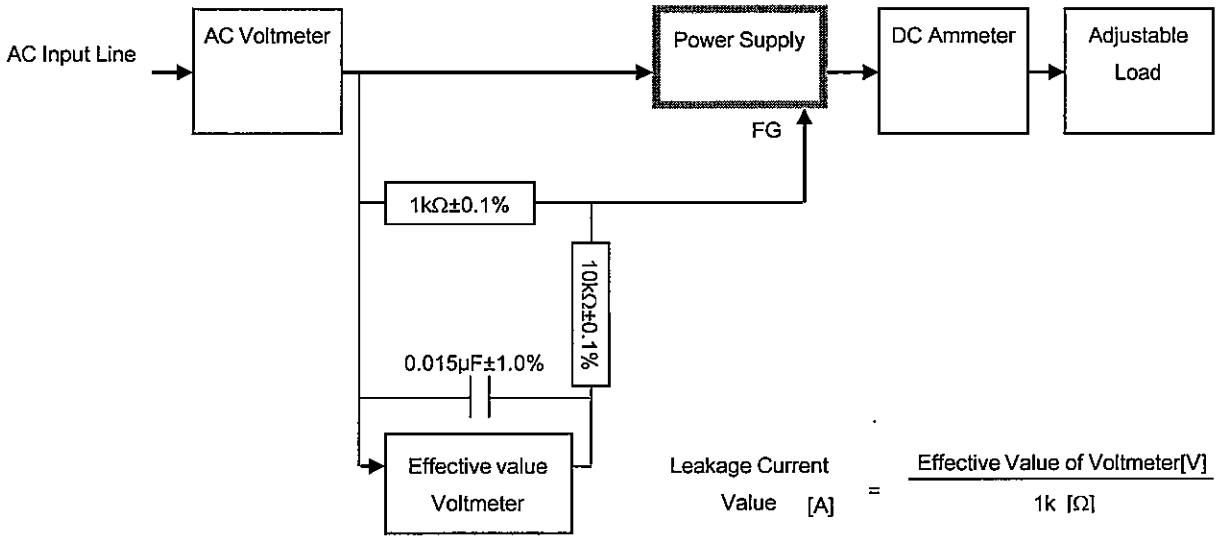


Figure B (IEC60601-1)