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参考資料

TEST DATA OF PLA50F-24

Regulated DC Power Supply
June 24, 2014

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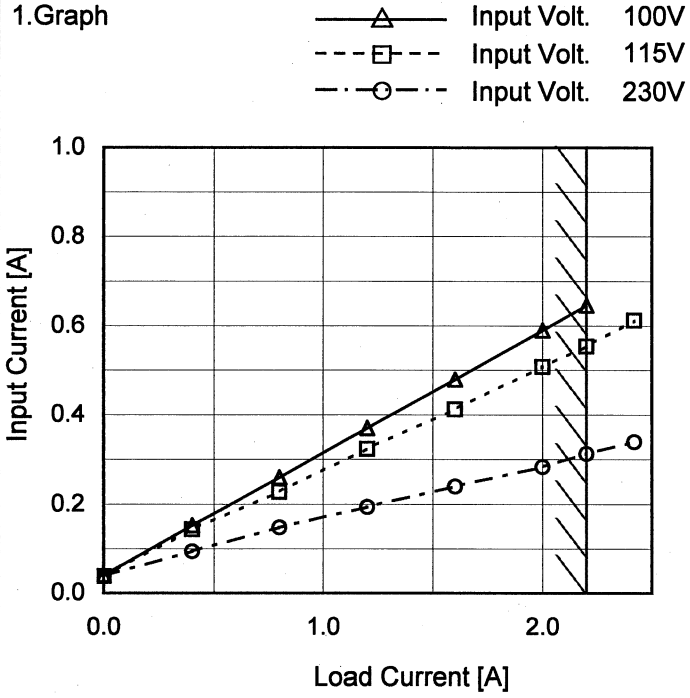
Model	PLA50F-24
Item	Input Current (by Load Current)
Object	————————

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. 115[V]	Input Volt. 230[V]
0.00	0.040	0.038	0.038
0.40	0.153	0.144	0.094
0.80	0.260	0.228	0.148
1.20	0.371	0.324	0.194
1.60	0.479	0.412	0.240
2.00	0.590	0.508	0.284
2.20	0.646	0.554	0.313
2.42	-	0.612	0.340
--	-	-	-
--	-	-	-
--	-	-	-

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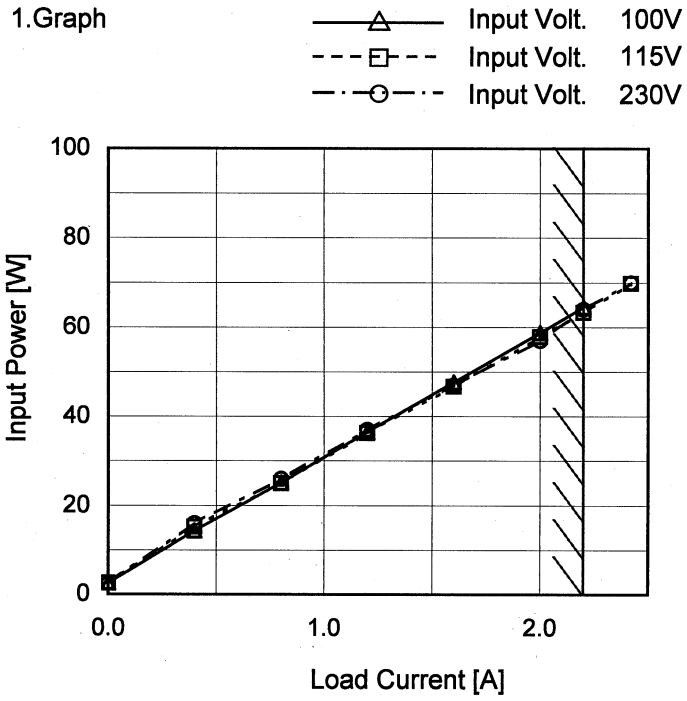
Model	PLA50F-24
Item	Input Power (by Load Current)
Object	———————

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. 115[V]	Input Volt. 230[V]
0.00	2.60	2.60	2.50
0.40	14.40	15.20	16.00
0.80	25.20	25.00	26.00
1.20	36.60	36.30	37.00
1.60	47.70	46.70	47.00
2.00	58.80	57.80	57.00
2.20	64.50	63.30	64.00
2.42	-	69.80	70.00
---	-	-	-
---	-	-	-
---	-	-	-

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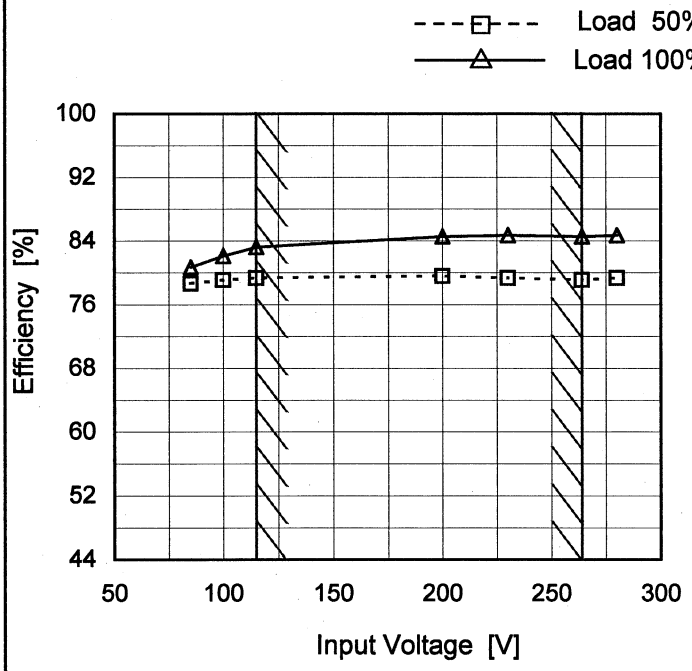
Model	PLA50F-24
Item	Efficiency (by Input Voltage)
Object	———————

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%
85	78.6	80.7 ※1
100	79.1	82.1 ※2
115	79.3	83.2
200	79.6	84.6
230	79.3	84.7
264	79.1	84.6
280	79.3	84.7
--	-	-
--	-	-

※1:Load 80%
※2:Load 90%

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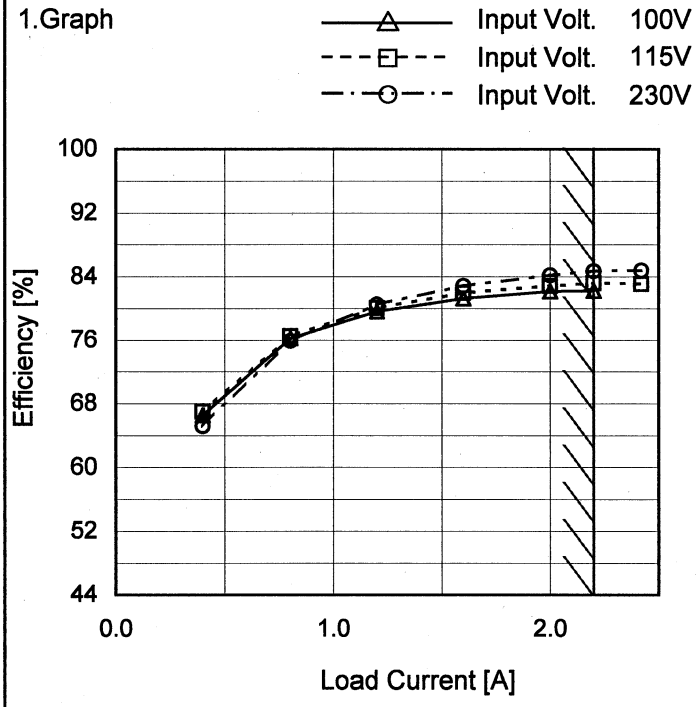
Model	PLA50F-24
Item	Efficiency (by Load Current)
Object	————————

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. 115[V]	Input Volt. 230[V]
0.00	-	-	-
0.40	66.6	67.0	65.2
0.80	76.2	76.5	75.9
1.20	79.7	80.1	80.5
1.60	81.3	82.0	82.9
2.00	82.2	82.9	84.2
2.20	82.3	83.2	84.7
2.42	-	83.1	84.8
--	-	-	-
--	-	-	-
--	-	-	-

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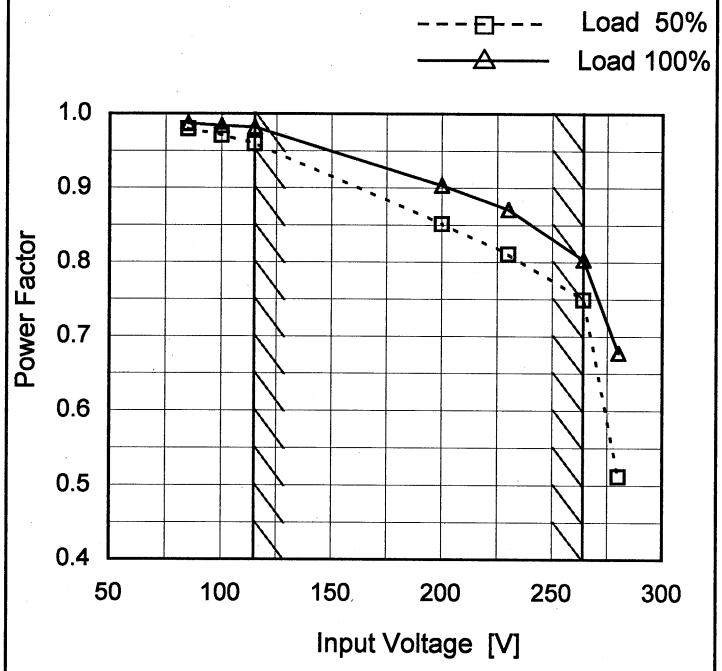
Model	PLA50F-24
Item	Power Factor (by Input Voltage)
Object	———————

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%
85	0.980	0.987 ※1
100	0.971	0.984 ※2
115	0.960	0.982
200	0.852	0.903
230	0.811	0.871
264	0.749	0.804
280	0.512	0.678
--	-	-
--	-	-

※1:Load 80%
※2:Load 90%

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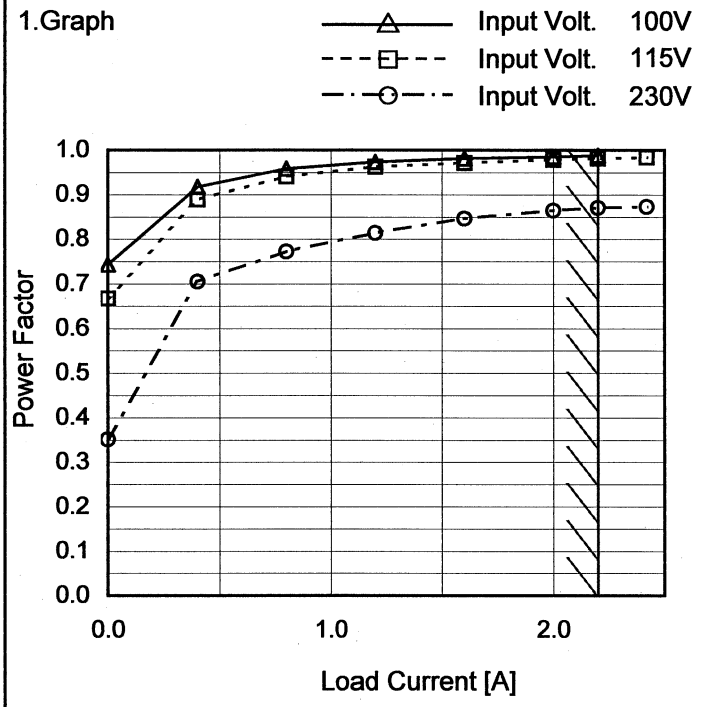
Model	PLA50F-24
Item	Power Factor (by Load Current)
Object	————————

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. 115[V]	Input Volt. 230[V]
0.00	0.743	0.667	0.351
0.40	0.918	0.889	0.705
0.80	0.958	0.940	0.772
1.20	0.973	0.963	0.814
1.60	0.981	0.971	0.846
2.00	0.985	0.978	0.864
2.20	0.988	0.982	0.871
2.42	-	0.983	0.873
---	-	-	-
---	-	-	-
---	-	-	-

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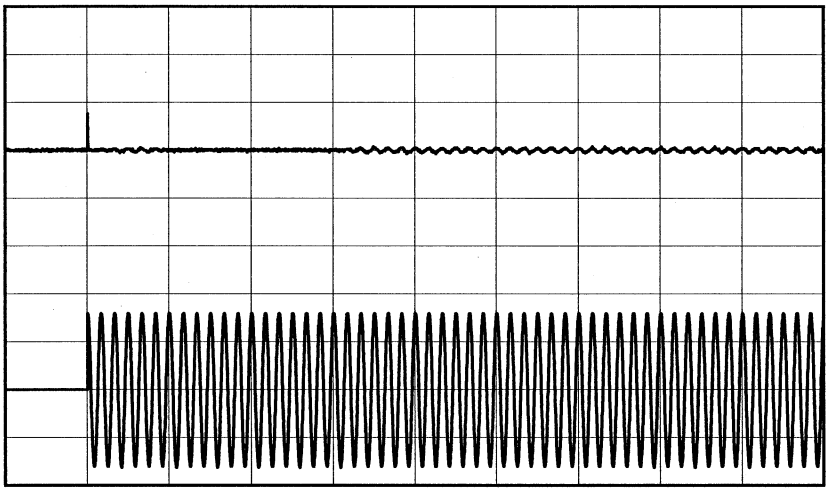
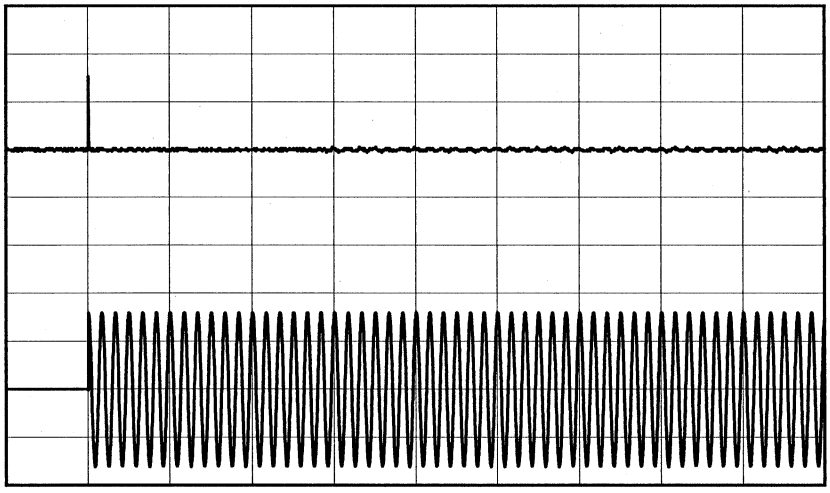
Model	PLA50F-24
Item	Inrush Current
Object	————————

Temperature 25°C
Testing Circuitry Figure A



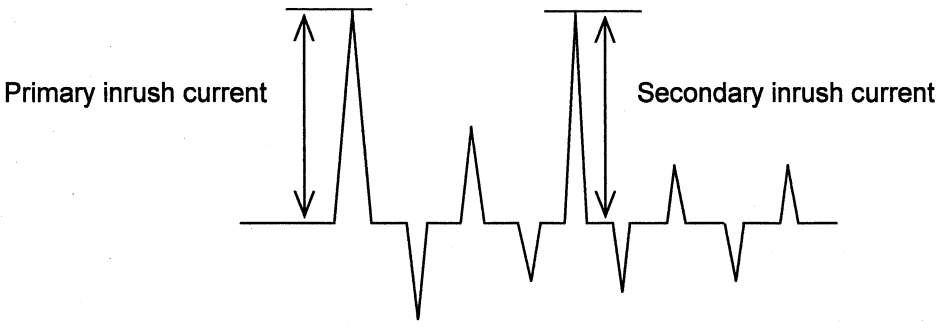
Input Voltage 115 V
Frequency 60 Hz
Load 100 %

Primary inrush current :
15.3 A
Secondary inrush current :
1.5 A



Input Voltage 230 V
Frequency 60 Hz
Load 100 %

Primary inrush current :
30.6 A
Secondary inrush current :
1.2 A



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Model	PLA50F-24	
Item	Leakage Current	Temperature 25°C Testing Circuitry Figure B
Object	———————————	

1.Results

[mA]

Standards		Input Volt.			Note
		100 [V]	115 [V]	240 [V]	
DEN-AN	Both phases	0.11	0.13	0.25	Operation
	One of phases	0.18	0.20	0.46	Stand by
IEC60950-1	Both phases	0.11	0.13	0.28	Operation
	One of phases	0.17	0.19	0.43	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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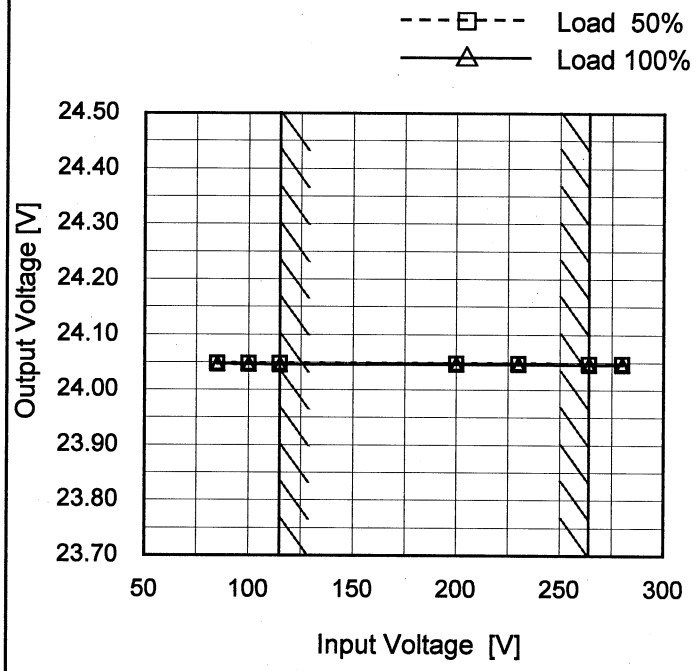
Model	PLA50F-24
Item	Line Regulation
Object	+24V2.2A

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%
85	24.048	24.047 ※1
100	24.048	24.046 ※2
115	24.048	24.046
200	24.048	24.046
230	24.048	24.046
264	24.048	24.046
280	24.048	24.046
--	-	-
--	-	-

※1:Load 80%
※2:Load 90%

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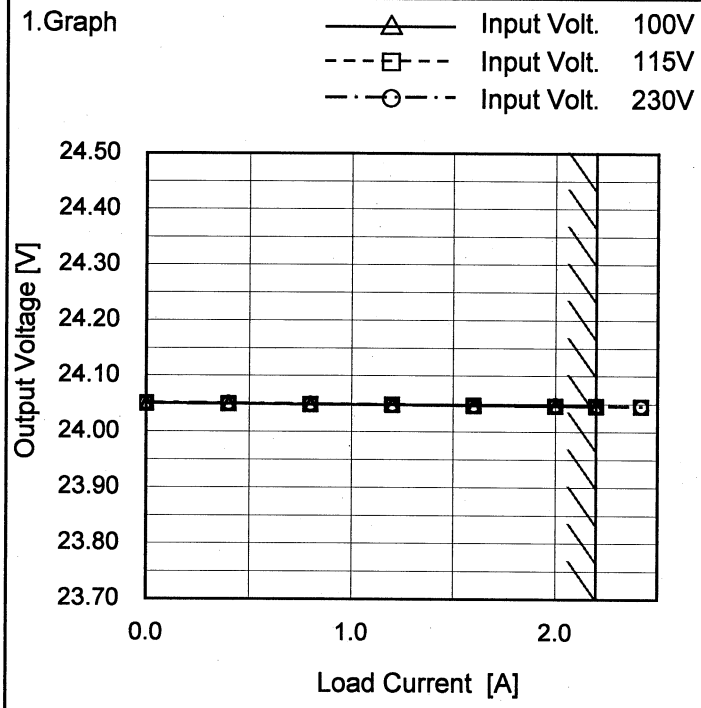
Model	PLA50F-24
Item	Load Regulation
Object	+24V2.2A

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. 115[V]	Input Volt. 230[V]
0.00	24.051	24.051	24.051
0.40	24.050	24.050	24.050
0.80	24.049	24.049	24.049
1.20	24.048	24.048	24.048
1.60	24.047	24.047	24.047
2.00	24.047	24.046	24.047
2.20	24.046	24.046	24.046
2.42	-	24.046	24.046
--	-	-	-
--	-	-	-
--	-	-	-

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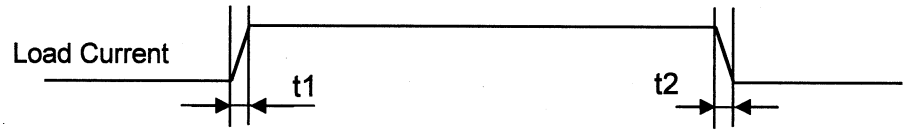
Model	PLA50F-24
Item	Dynamic Load Response
Object	+24V2.2A

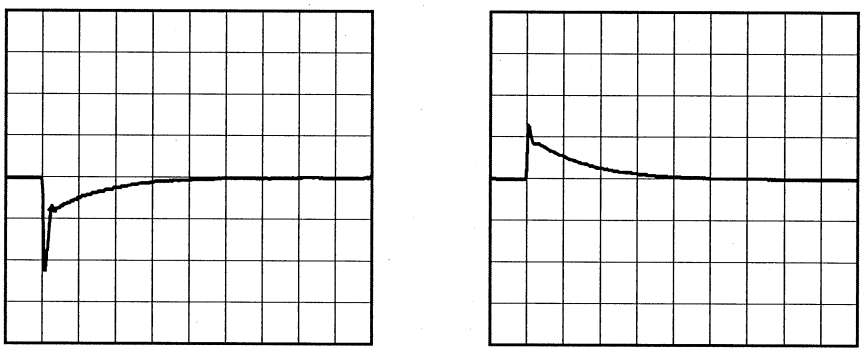
Temperature 25°C
Testing Circuitry Figure A

Input Volt. 115 V
Cycle 1000 ms

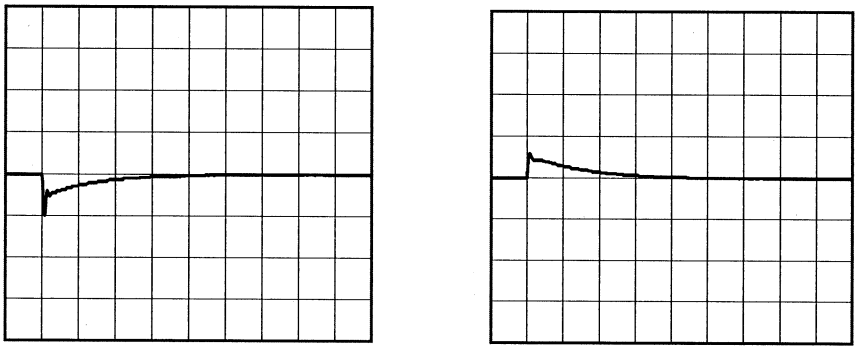
Response. t1=t2=50us. Typ



Min. Load (0A) ⟷
Load 100% (2.2A)



Min. Load (0A) ⟷
Load 50% (1.1A)



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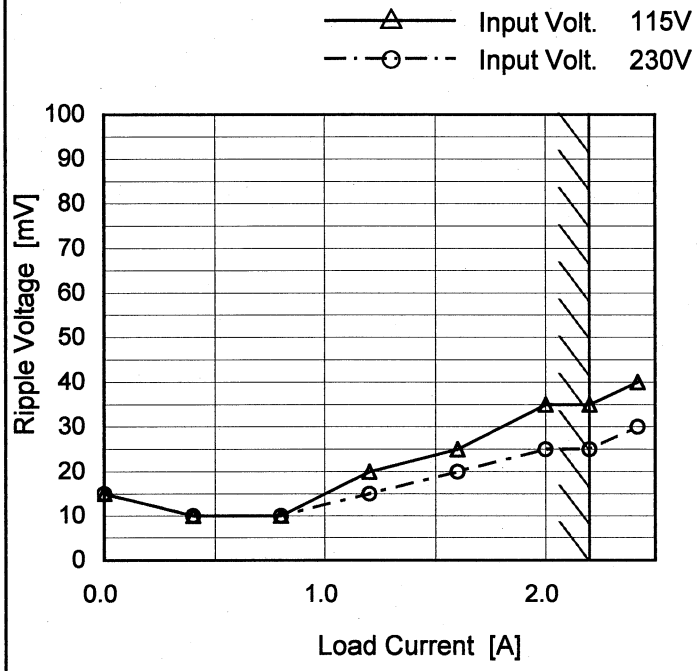
Model	PLA50F-24
Item	Ripple Voltage (by Load Current)
Object	+24V2.2A

Temperature 25°C
Testing Circuitry Figure C

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

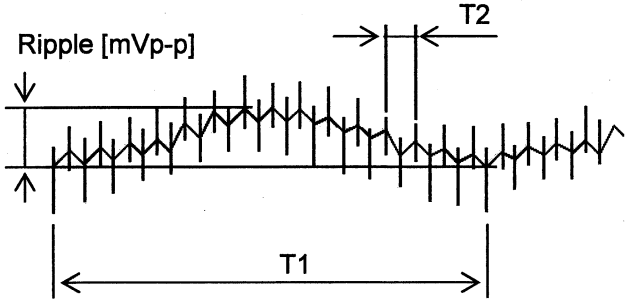


Fig. Complex Ripple Wave Form

2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 115 [V]	Input Volt. 230 [V]
0.00	15	15
0.40	10	10
0.80	10	10
1.20	20	15
1.60	25	20
2.00	35	25
2.20	35	25
2.42	40	30
--	-	-
--	-	-
--	-	-

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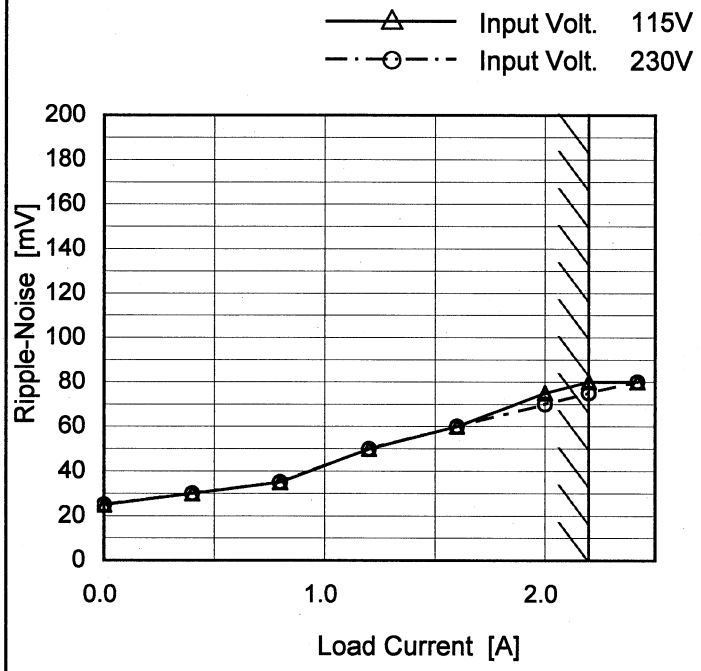
Model	PLA50F-24
Item	Ripple-Noise
Object	+24V2.2A

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

2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 115 [V]	Input Volt. 230 [V]
0.00	25	25
0.40	30	30
0.80	35	35
1.20	50	50
1.60	60	60
2.00	75	70
2.20	80	75
2.42	80	80
--	-	-
--	-	-
--	-	-

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

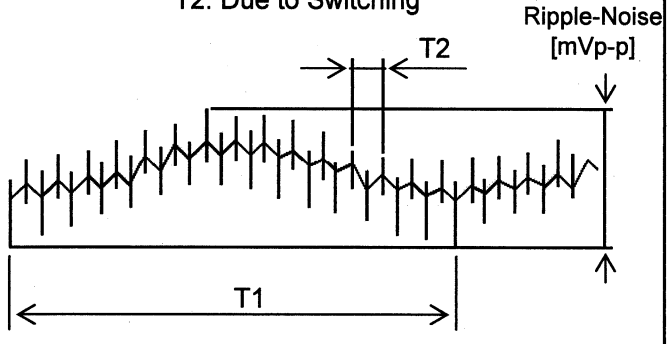


Fig. Complex Ripple Wave Form

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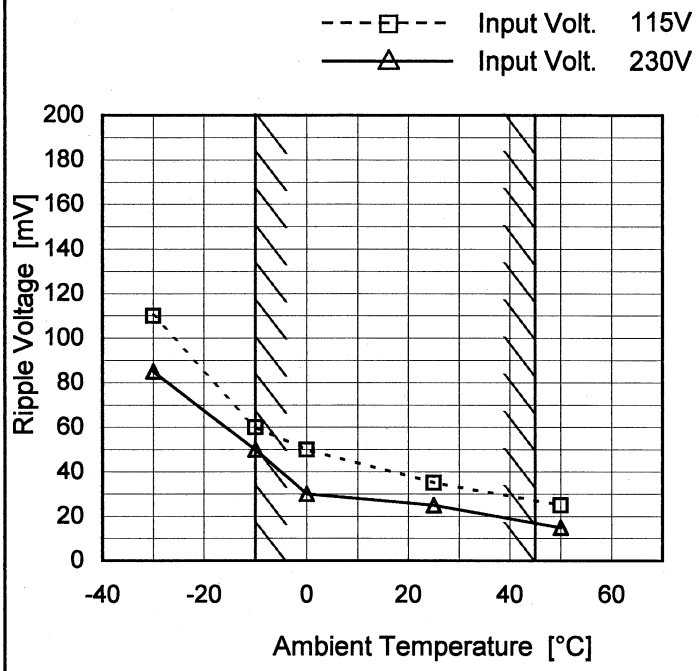
Model	PLA50F-24
Item	Ripple Voltage (by Ambient Temp.)
Object	+24V2.2A

Testing Circuitry Figure C

1.Graph



Measured by 20 MHz Oscilloscope.

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

2.Values

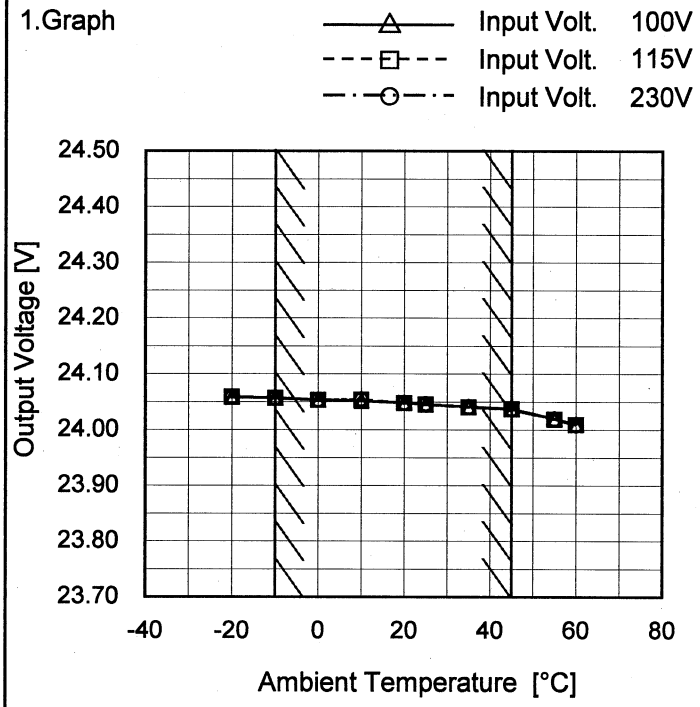
Ambient Temperature [°C]	Ripple Voltage [mV]	
	Input Volt. 115 [V]	Input Volt. 230 [V]
-30	110	85
-10	60	50
0	50	30
25	35	25
50	25	15
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	PLA50F-24
Item	Ambient Temperature Drift
Object	+24V2.2A

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. 115[V]	Input Volt. 230[V]
-20	24.059	24.058	24.058
-10	24.057	24.056	24.056
0	24.053	24.053	24.053
10	24.052	24.053	24.054
20	24.048	24.048	24.048
25	24.046	24.046	24.046
35	24.041	24.041	24.040
45	24.038	24.037	24.037
55	24.020	24.019	24.019
60	24.010	24.009	24.009
--	-	-	-

Note: In case of Input Volt. 100V, Load 90%.
Other case Load 100%.

COSEL

Model	PLA50F-24	
Item	Output Voltage Accuracy	Testing Circuitry Figure A
Object	+24V2.2A	

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 : -10 - 45°C
Input Voltage : 115 - 264V
Load Current : 0 - 2.2A

* 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	-10	115	0	24.061	±13	±0.1
Minimum Voltage	45	264	2.2	24.036		

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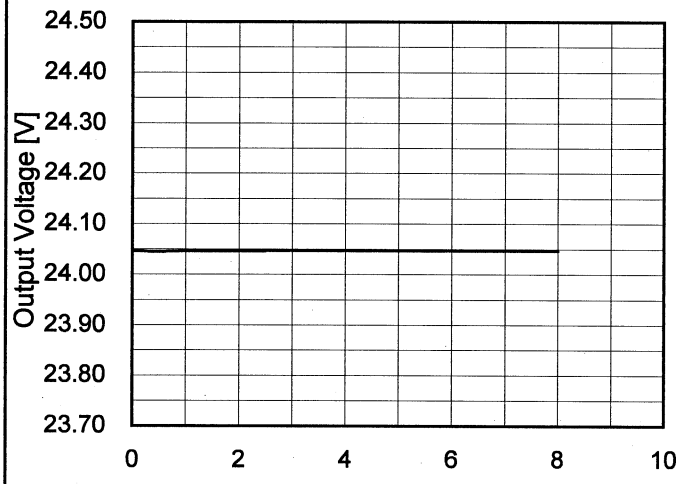
Model	PLA50F-24
Item	Time Lapse Drift
Object	+24V2.2A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Input Volt. 230V
Load 100%

* The characteristic of AC115V is equal.

2.Values

Time since start [H]	Output Voltage [V]
0.0	24.046
0.5	24.045
1.0	24.046
2.0	24.046
3.0	24.047
4.0	24.047
5.0	24.047
6.0	24.047
7.0	24.047
8.0	24.047

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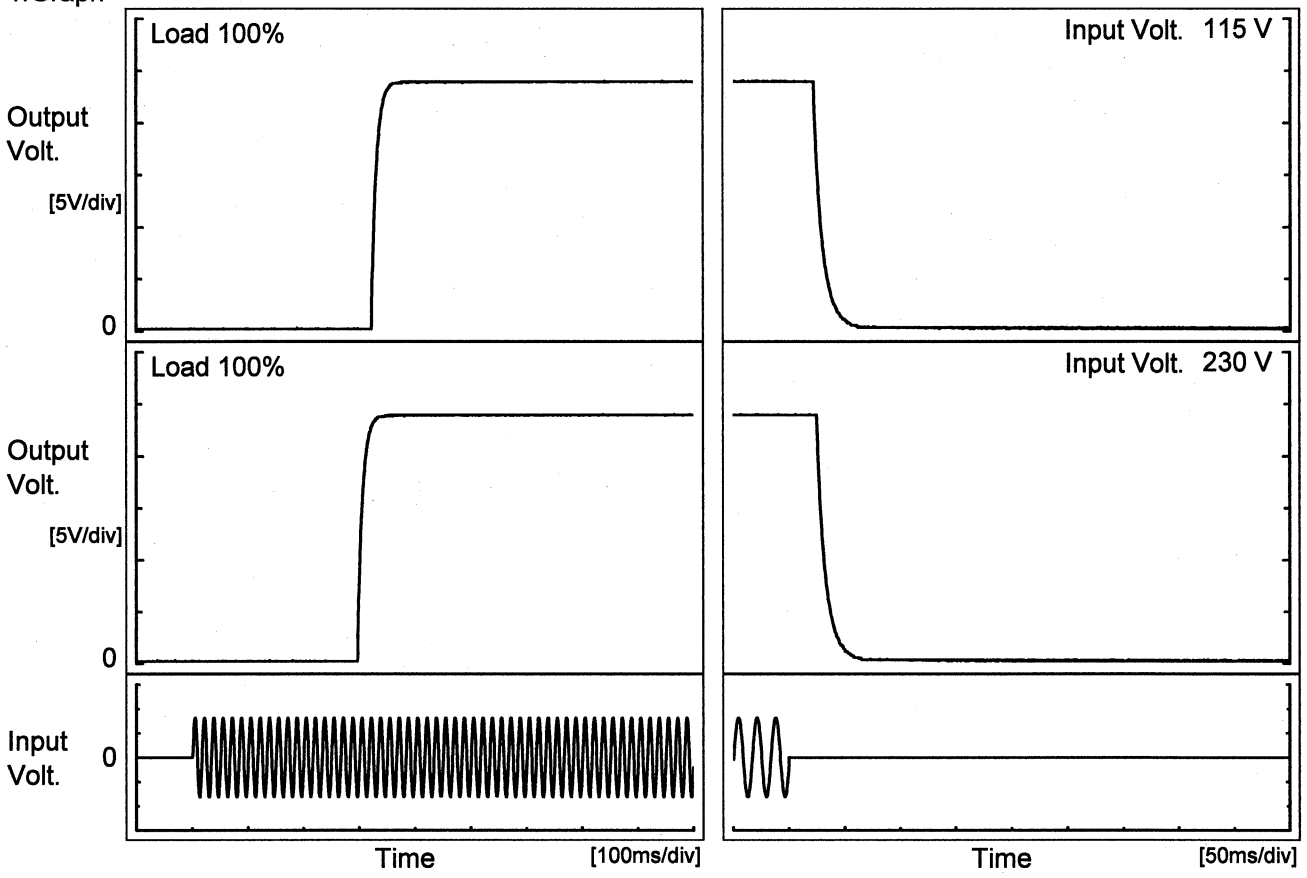
Model	PLA50F-24
Item	Rise and Fall Time
Object	+24V2.2A

Temperature 25°C
Testing Circuitry Figure A

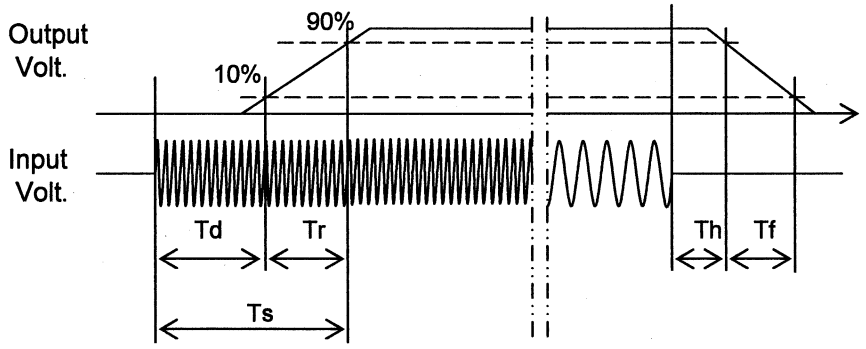
1.Graph



2.Values

[ms]

Input Volt. \ Time	Td	Tr	Ts	Th	Tf
115 V	323.0	20.0	343.0	22.3	17.3
230 V	297.5	20.0	317.5	25.5	17.3

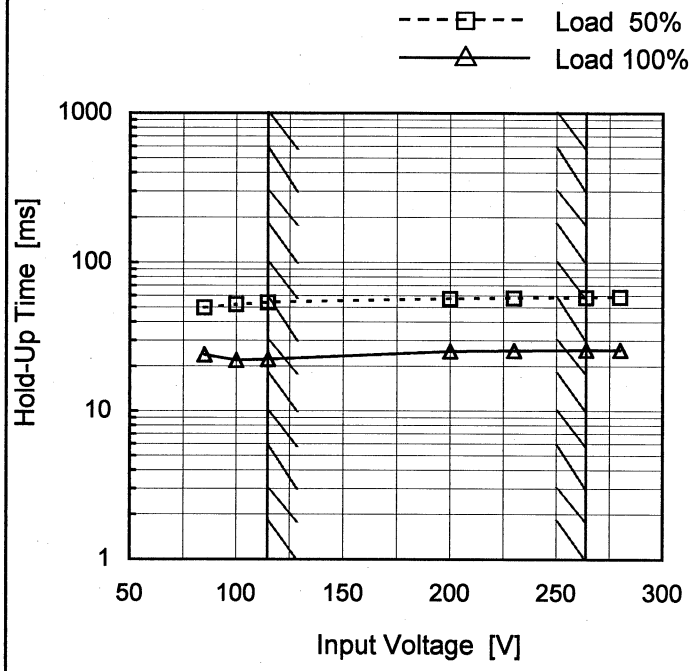


COSEL

Model	PLA50F-24
Item	Hold-Up Time
Object	+24V2.2A

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

2.Values

Input Voltage [V]	Hold-Up Time [ms]	
	Load 50%	Load 100%
85	50	24 ※1
100	52	22 ※2
115	54	22
200	57	25
230	58	26
264	58	26
280	59	26
--	-	-
--	-	-

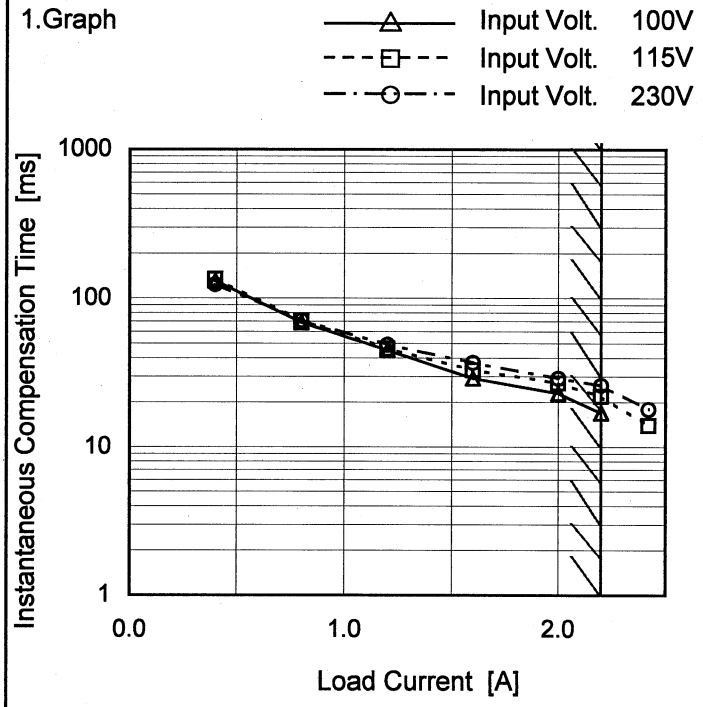
※1:Load 80%
※2:Load 90%

COSEL

Model	PLA50F-24
Item	Instantaneous Interruption Compensation
Object	+24V2.2A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

2.Values

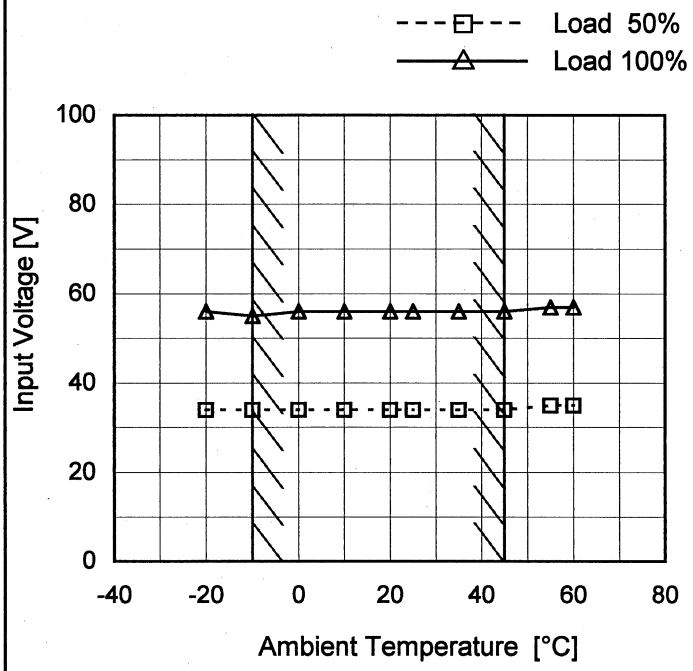
Load Current [A]	Time [ms]		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
0.00	-	-	-
0.40	131	135	124
0.80	69	71	71
1.20	45	46	49
1.60	29	33	37
2.00	23	27	29
2.20	17	22	26
2.42	-	14	18
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	PLA50F-24
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+24V2.2A

Testing Circuitry Figure A

1.Graph



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

2.Values

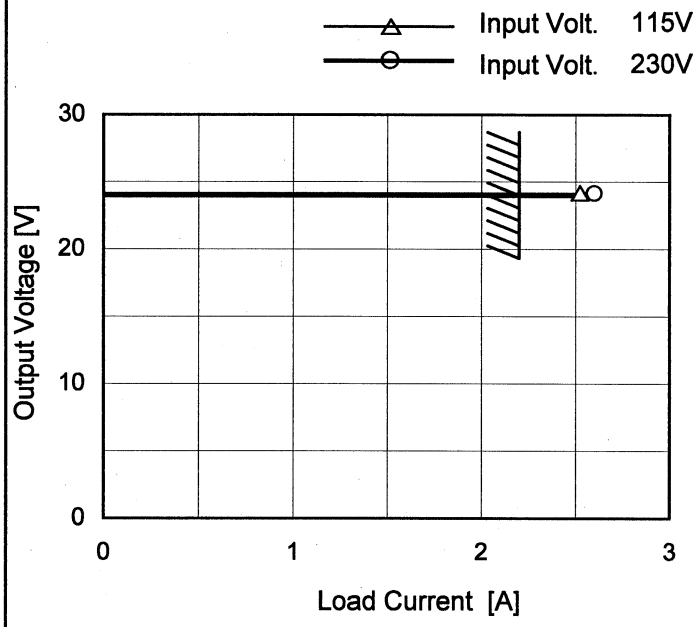
Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	34	56
-10	34	55
0	34	56
10	34	56
20	34	56
25	34	56
35	34	56
45	34	56
55	35	57
60	35	57
--	-	-

COSEL

Model	PLA50F-24
Item	Overcurrent Protection
Object	+24V2.2A

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 less than rated output voltage.

2.Values

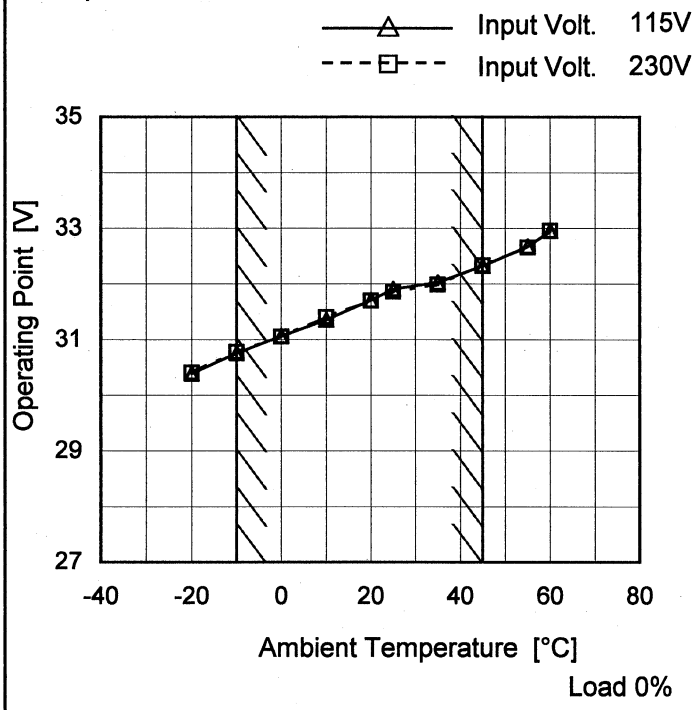
Output Voltage [V]	Load Current [A]	
	Input Volt. 115[V]	Input Volt. 230[V]
24.0	2.51	2.58
22.8	-	-
21.6	-	-
19.2	-	-
16.8	-	-
14.4	-	-
12.0	-	-
9.6	-	-
7.2	-	-
4.8	-	-
2.4	-	-
0.0	-	-

COSEL

Model	PLA50F-24
Item	Overvoltage Protection
Object	+24V2.2A

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. 115[V]	Input Volt. 230[V]
-20	30.39	30.41
-10	30.76	30.78
0	31.07	31.06
10	31.36	31.41
20	31.71	31.70
25	31.91	31.86
35	32.03	31.99
45	32.33	32.34
55	32.68	32.66
60	32.96	32.96
--	-	-

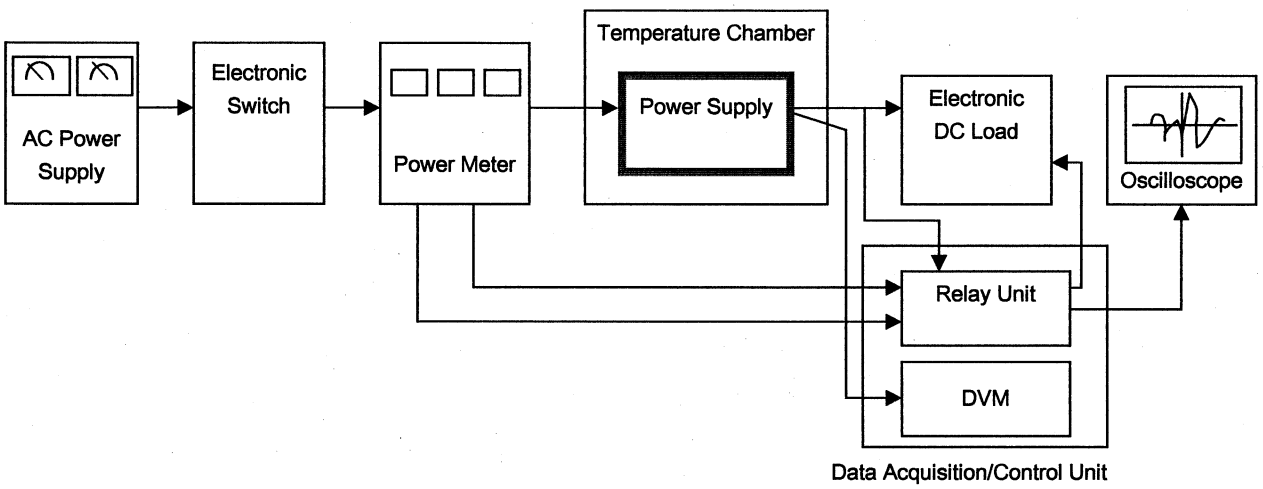


Figure A

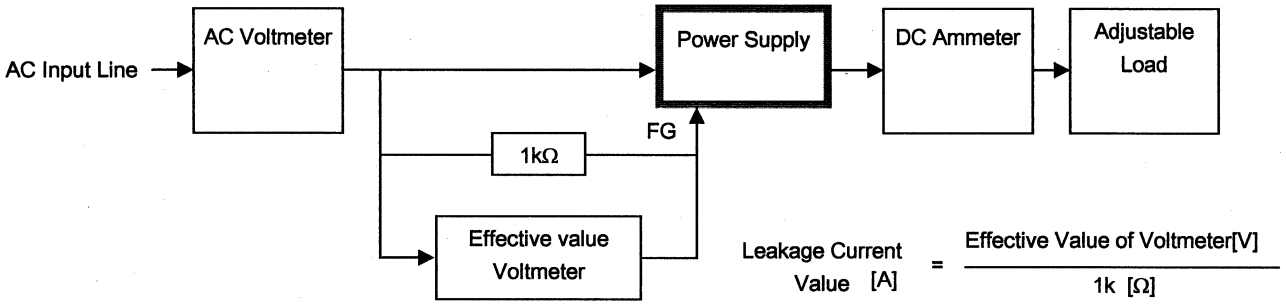


Figure B (DEN-AN)

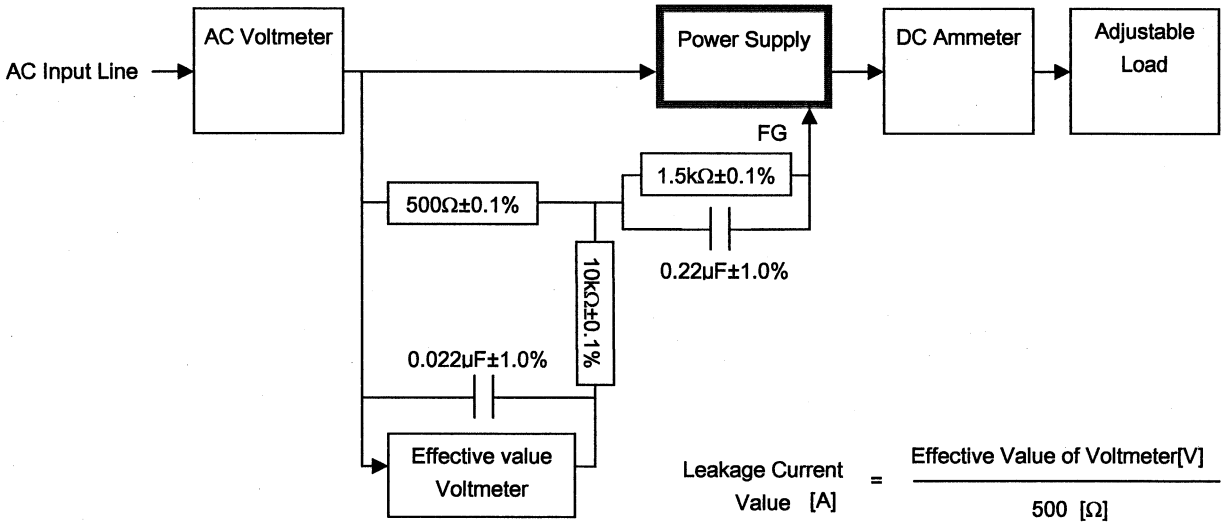


Figure B (IEC60950-1)

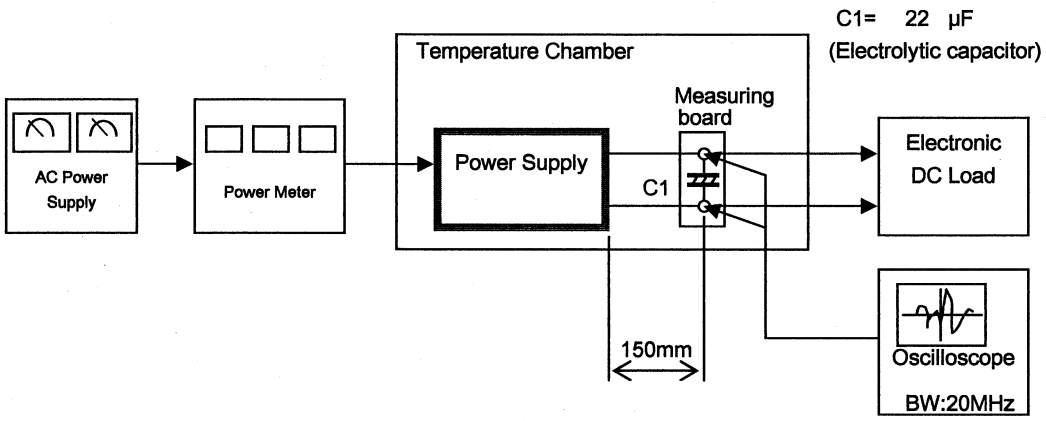

C1= 22 µF
(Electrolytic capacitor)
Temperature Chamber
Measuring board
AC Power Supply
Power Meter
Power Supply
C1
Electronic DC Load
150mm
Oscilloscope
BW:20MHz

Figure C