COSEL

TEST DATA OF PLA50F-5

Regulated DC Power Supply
June 24, 2014

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Model	PLA50F-5
Item	Input Current (by Load Current)
Object	————

Temperature   25°C
Testing Circuitry   Figure A

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	0.040	0.038	0.038
2.0	0.180	0.154	0.106
4.0	0.298	0.256	0.160
6.0	0.416	0.365	0.212
8.0	0.545	0.472	0.268
8.8	-	0.516	0.292
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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

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Model	PLA50F-5
Item	Input Power (by Load Current)
Object	————
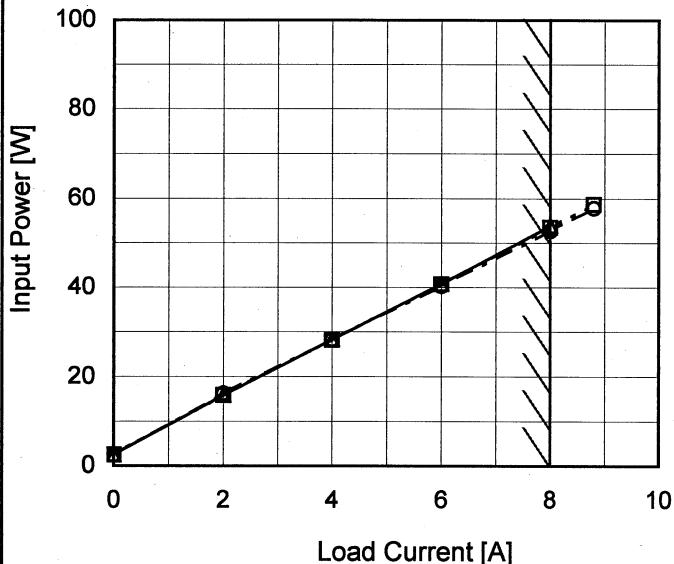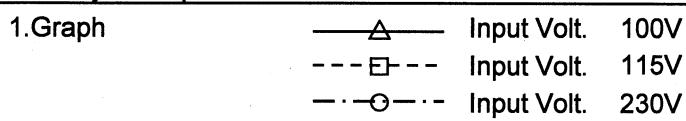
Temperature   25°C
Testing Circuitry   Figure A

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	2.50	2.50	2.40
2.0	15.90	15.90	16.20
4.0	28.30	28.20	28.30
6.0	40.80	40.70	40.30
8.0	53.90	53.50	52.70
8.8	-	58.70	57.80
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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

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Model	PLA50F-5
Item	Efficiency (by Input Voltage)
Object	————————
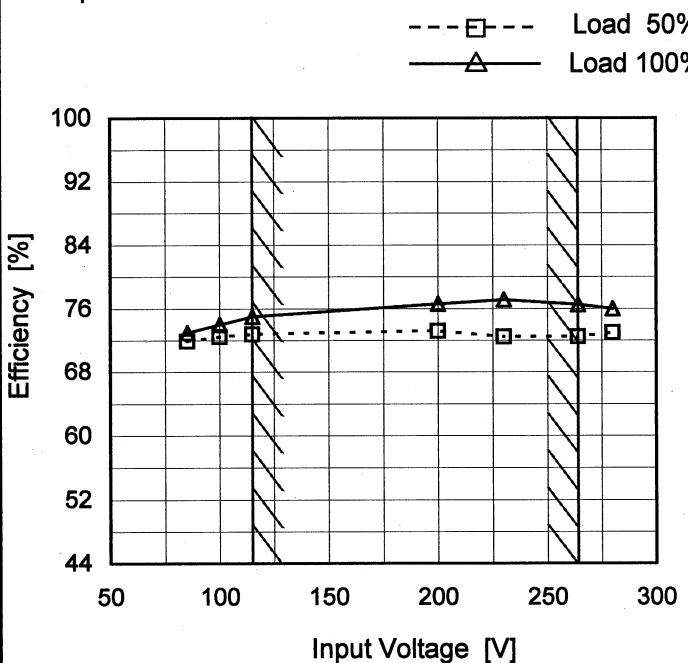
Temperature   25°C
Testing Circuitry   Figure A

1.Graph

- - - ⊟ - - -   Load 50%

——— △ ———   Load 100%

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

2.Values

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
85	71.9	73.0 ※1
100	72.5	74.0 ※2
115	72.8	75.0
200	73.2	76.6
230	72.5	77.1
264	72.5	76.5
280	73.0	76.0
--	-	-
--	-	-

※1：Load 80%

※2：Load 90%

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Model	PLA50F-5
Item	Efficiency (by Load Current)
Object	

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.
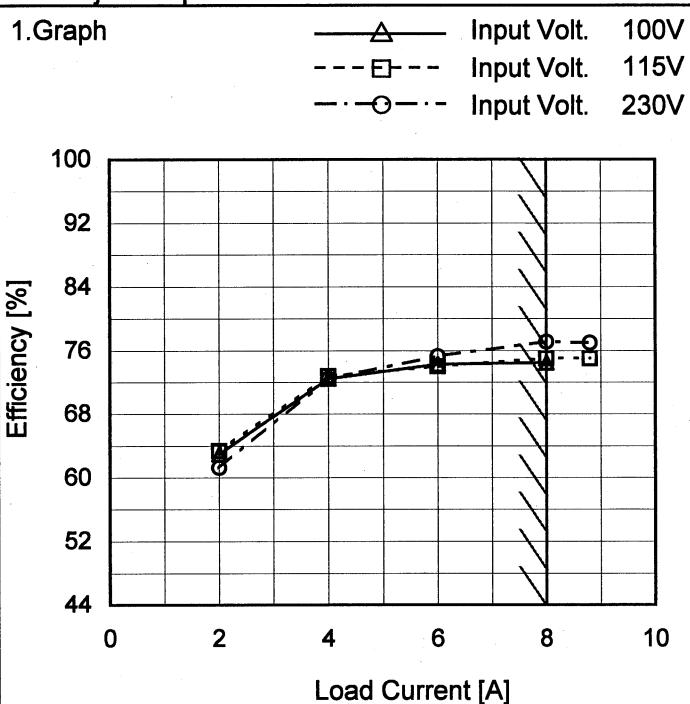
2.Values

Load Current [A]	Efficiency [%]		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
0.0	-	-	-
2.0	63.0	63.4	61.3
4.0	72.5	72.8	72.5
6.0	74.3	74.0	75.3
8.0	74.5	75.0	77.1
8.8	-	75.0	77.0
---	-	-	-
---	-	-	-
---	-	-	-
---	-	-	-
---	-	-	-

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Model	PLA50F-5
Item	Power Factor (by Input Voltage)
Object	————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph

--- ⊟ --- Load 50%
——— △ ——— Load 100%

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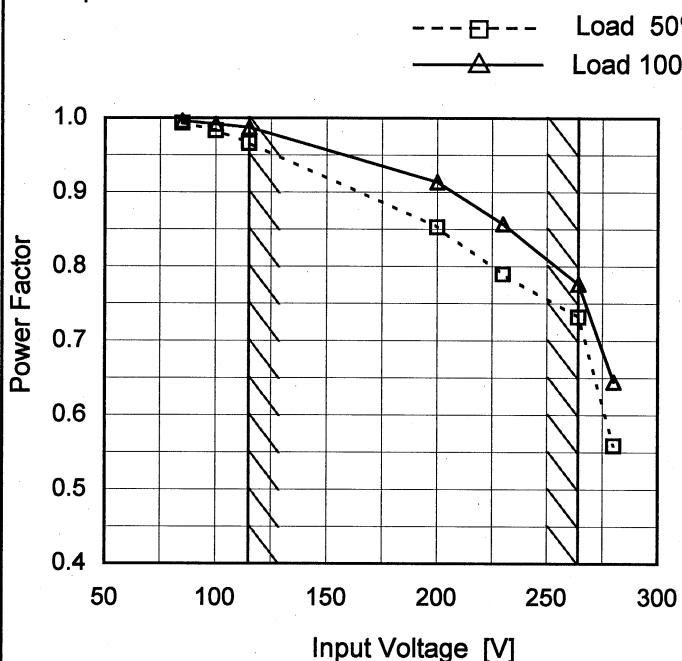
2.Values

Input Voltage [V]	Power Factor	
	Load 50%	Load 100%
85	0.993	0.996 ※1
100	0.983	0.992 ※2
115	0.966	0.987
200	0.853	0.914
230	0.789	0.857
264	0.732	0.776
280	0.559	0.645
--	-	-
--	-	-

※1：Load 80%
※2：Load 90%

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Model	PLA50F-5
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]
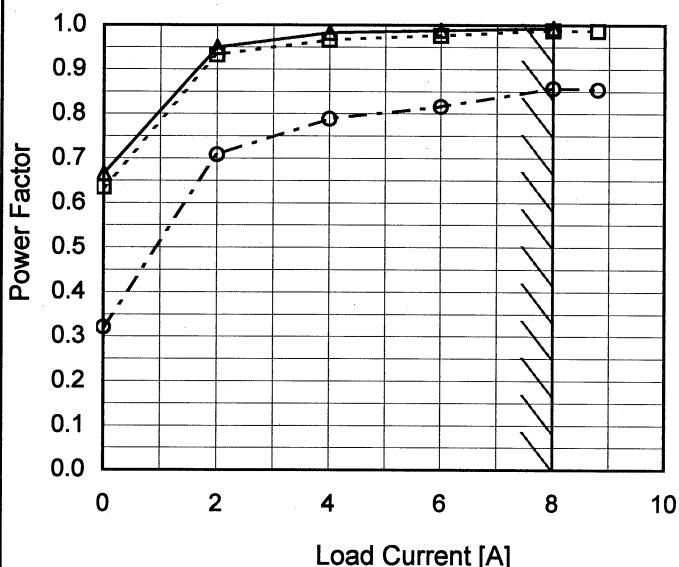
2.Values

Load Current [A]	Power Factor		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
0.0	0.666	0.635	0.321
2.0	0.950	0.932	0.708
4.0	0.983	0.966	0.789
6.0	0.988	0.976	0.816
8.0	0.993	0.987	0.857
8.8	-	0.987	0.854
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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

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Model	PLA50F-5
Item	Inrush Current
Object	————————

Temperature 25°C
Testing Circuitry Figure A

Input
Current
[20A/div]

Input
Voltage
[100V/div]

Time   [100ms/div]

Input Voltage   115 V
Frequency   60 Hz
Load   100 %

Primary inrush current :
                       12.9 A
Secondary inrush current :
   1.5 A

Input
Current
[20A/div]

Input
Voltage
[200V/div]

Time   [100ms/div]

Input Voltage   230 V
Frequency   60 Hz
Load   100 %

Primary inrush current :
                       27.9 A
Secondary inrush current :
                       1.2 A

Primary inrush current   Secondary inrush current

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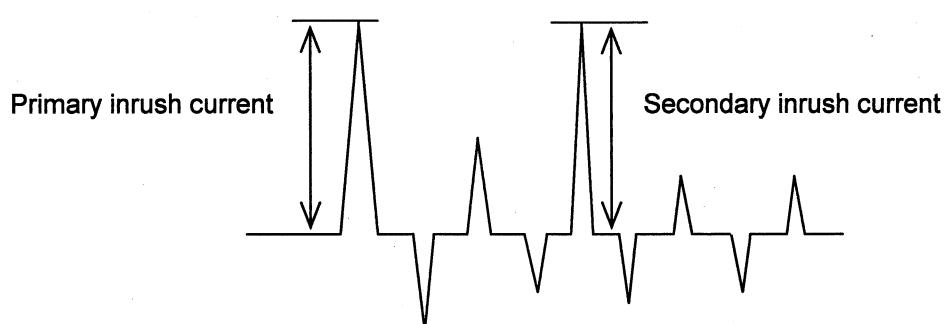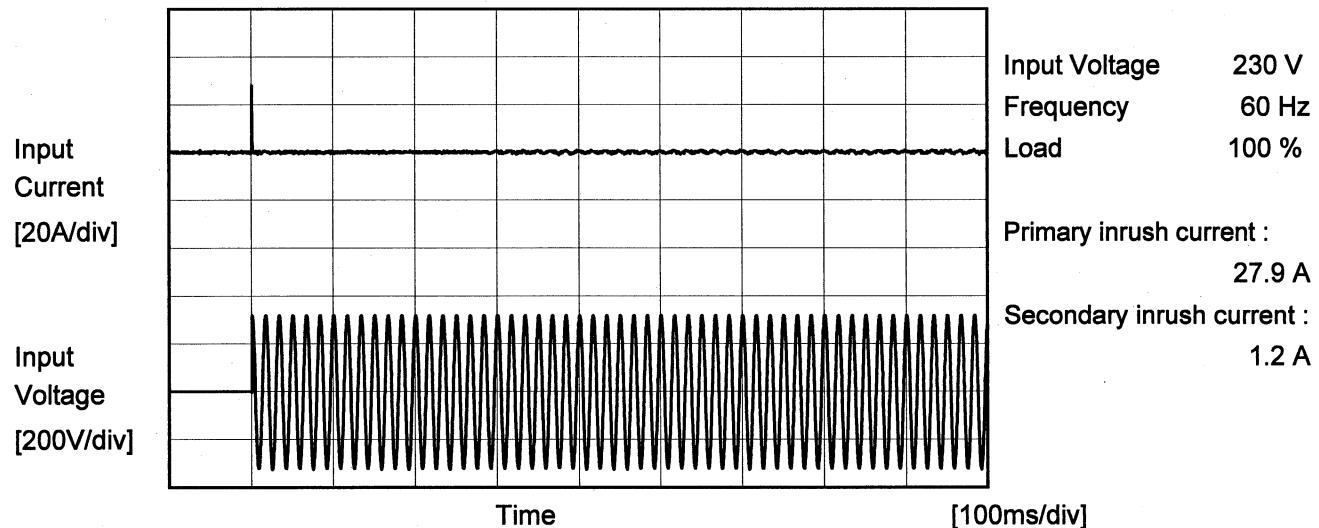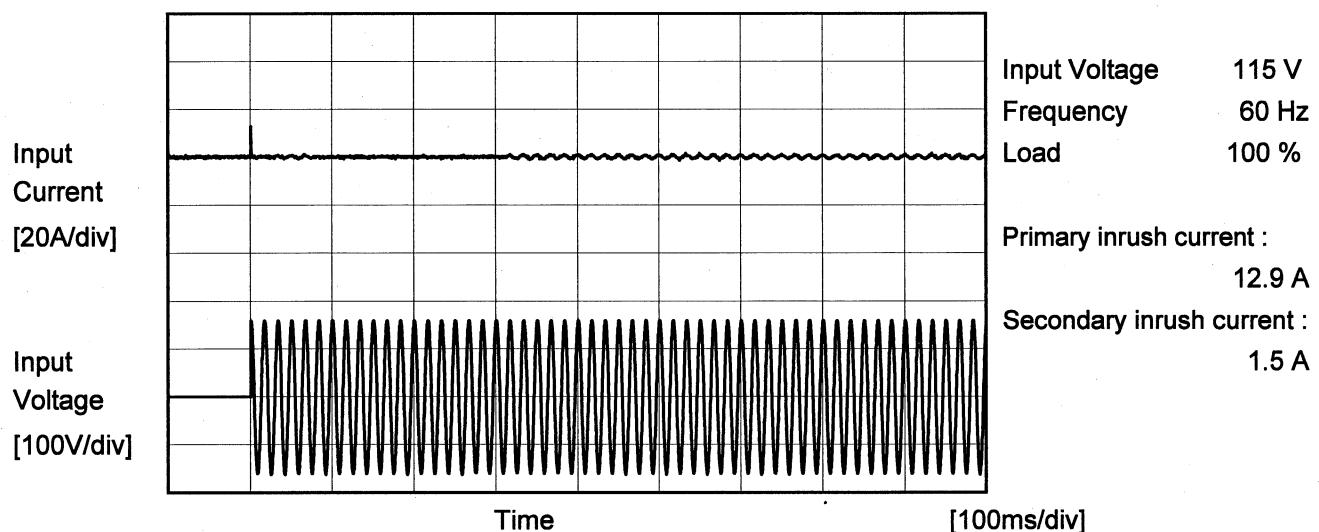
Model	PLA50F-5
Item	Leakage Current
Object	

Temperature   25°C
Testing Circuitry   Figure B

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-5
Item	Line Regulation
Object	+5V8A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

--- ⊟ --- Load 50%
—— △ —— Load 100%

Output Voltage [V] vs Input Voltage [V]

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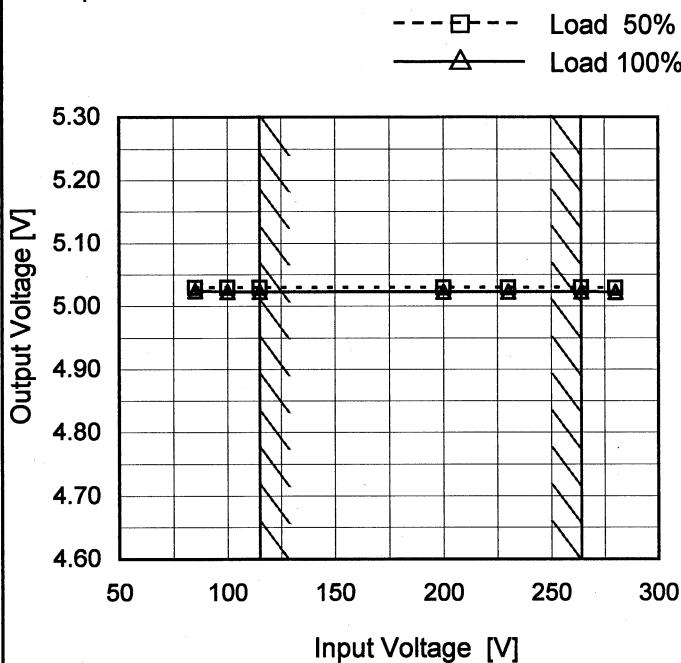
2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
85	5.029	5.024 ※1
100	5.029	5.023 ※2
115	5.029	5.023
200	5.029	5.023
230	5.029	5.023
264	5.029	5.023
280	5.029	5.022
--	-	-
--	-	-

※1:Load 80%
※2:Load 90%

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Model	PLA50F-5
Item	Load Regulation
Object	+5V8A
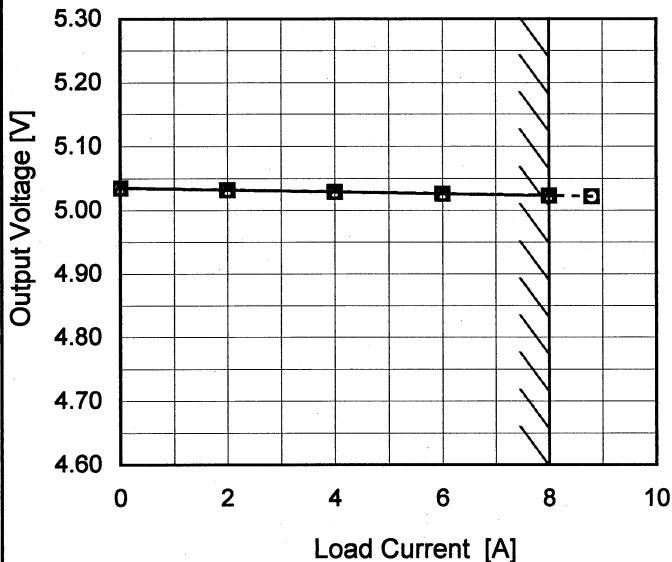
Temperature   25°C
Testing Circuitry   Figure A

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

Load Current [A]	Output Voltage [V]		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
0.0	5.035	5.035	5.035
2.0	5.032	5.032	5.032
4.0	5.029	5.029	5.029
6.0	5.026	5.026	5.026
8.0	5.023	5.023	5.023
8.8	-	5.022	5.022
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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Model	PLA50F-5
Item	Dynamic Load Response
Object	+5V8A

Temperature	25°C
Testing Circuitry	Figure A

Input Volt.   115 V   Response.   t1=t2=50us. Typ
Cycle   1000 ms

Load Current   t1   t2

Min. Load (0A) ←→
Load 100% (8A)

100 mV/div

4 ms/div   4 ms/div

Min. Load (0A) ←→
Load 50% (4A)

100 mV/div

4 ms/div   4 ms/div

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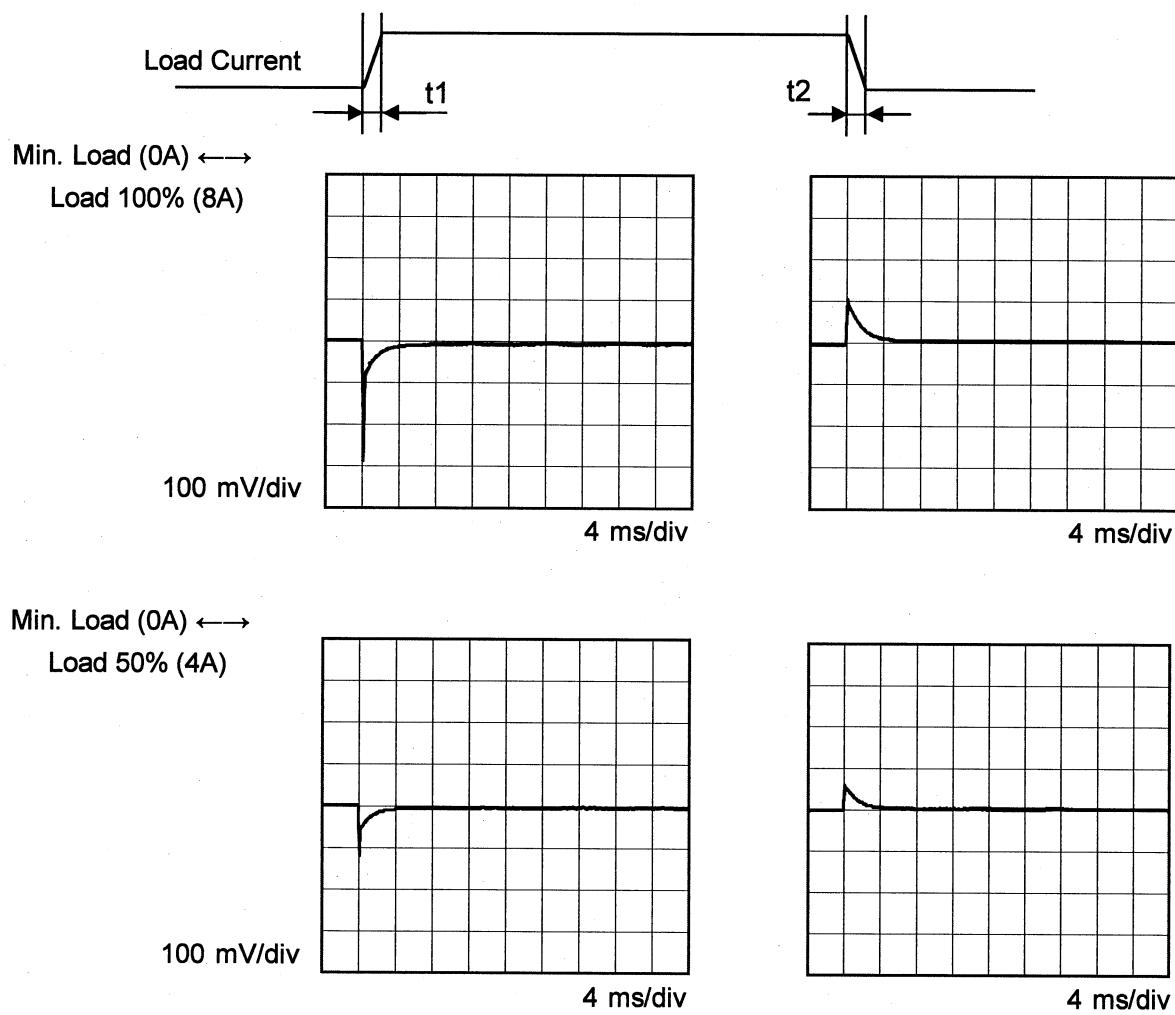
Model	PLA50F-5
Item	Ripple Voltage (by Load Current)
Object	+5V8A

Temperature   25°C
Testing Circuitry   Figure C

1.Graph

———△——— Input Volt.   115V

—·—○—··— Input Volt.   230V

Load Current [A]

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.
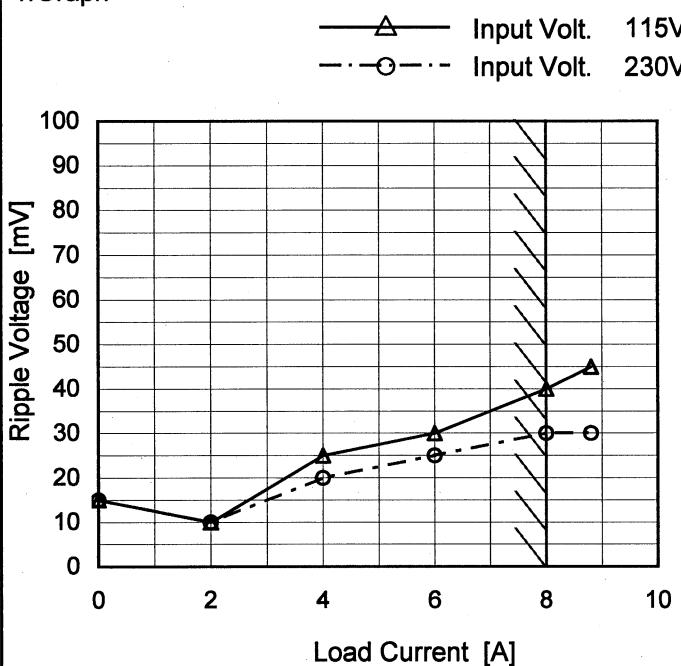
2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 115 [V]	Input Volt. 230 [V]
0.0	15	15
2.0	10	10
4.0	25	20
6.0	30	25
8.0	40	30
8.8	45	30
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

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

Ripple [mVp-p]

T2

T1

Fig. Complex Ripple Wave Form

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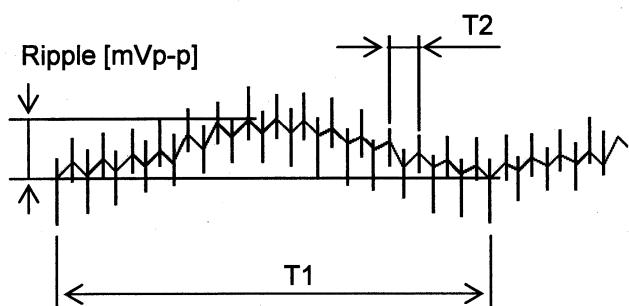
Model	PLA50F-5
Item	Ripple-Noise
Object	+5V8A

Temperature   25°C
Testing Circuitry   Figure C

1.Graph

——△—— Input Volt.   115V
—·—○—·— Input Volt.   230V

Ripple-Noise [mV] vs Load Current [A]
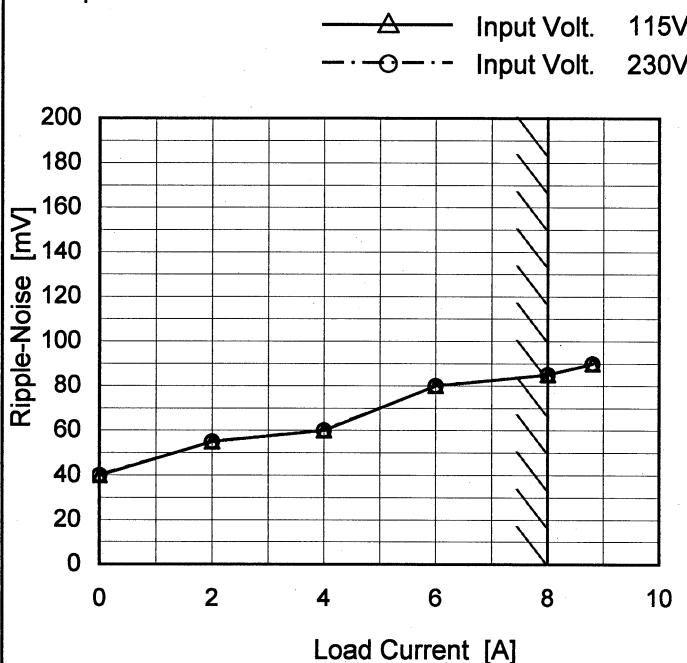
Measured by 20 MHz Oscilloscope.
Ripple-Noise is shown as p-p in the figure below.
Note: Slanted line shows the range of the rated
       load current.

2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 115 [V]	Input Volt. 230 [V]
0.0	40	40
2.0	55	55
4.0	60	60
6.0	80	80
8.0	85	85
8.8	90	90
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

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

Ripple-Noise [mVp-p]

T2

T1

Fig. Complex Ripple Wave Form

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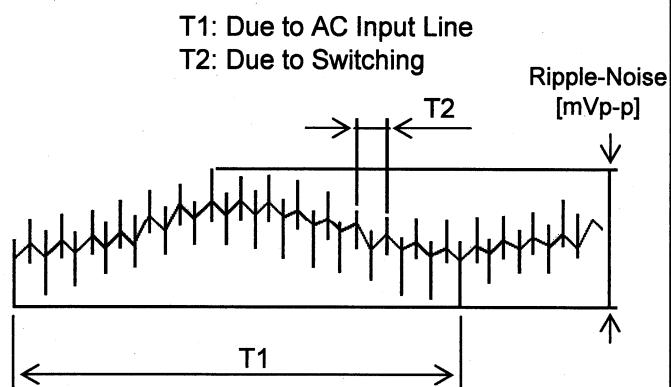
Model	PLA50F-5
Item	Ripple Voltage (by Ambient Temp.)
Object	+5V8A

Testing Circuitry   Figure C

1.Graph

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

Ambient Temperature [°C]
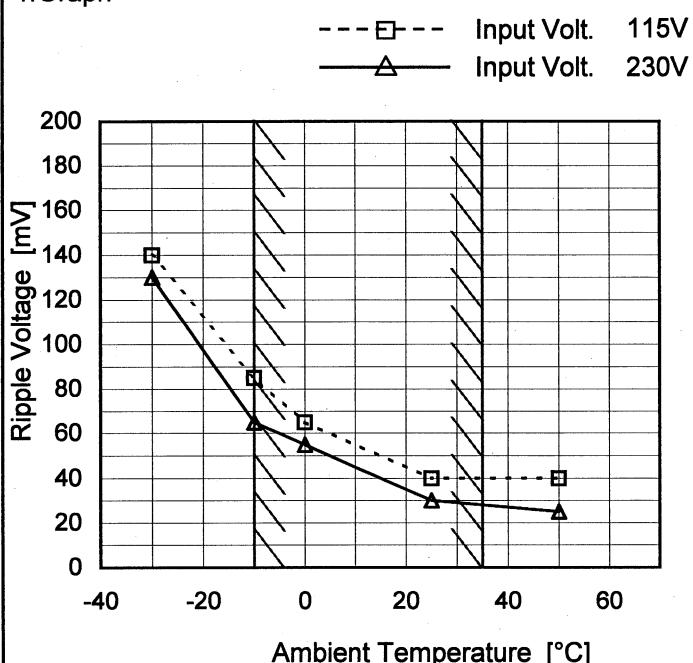
Measured by 20 MHz Oscilloscope.
Note: Slanted line shows the range of the rated
       ambient temperature.

2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Input Volt. 115 [V]	Input Volt. 230 [V]
-30	140	130
-10	85	65
0	65	55
25	40	30
50	40	25
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

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Model	PLA50F-5
Item	Ambient Temperature Drift
Object	+5V8A
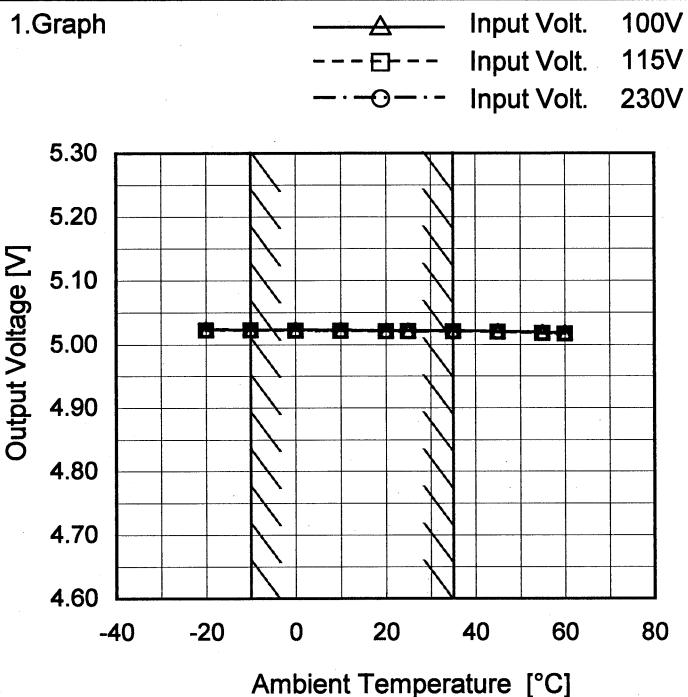
Testing Circuitry   Figure A

1.Graph

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

Ambient Temperature [°C]

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	5.024	5.023	5.023
-10	5.024	5.022	5.022
0	5.023	5.022	5.022
10	5.023	5.022	5.022
20	5.022	5.021	5.021
25	5.022	5.021	5.021
35	5.022	5.021	5.021
45	5.021	5.020	5.020
55	5.019	5.018	5.018
60	5.019	5.017	5.017
--	-	-	-

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

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Model	PLA50F-5
Item	Output Voltage Accuracy
Object	+5V8A

Testing Circuitry   Figure A

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 - 35°C
Input Voltage   :   115 - 264V
Load Current   :   0 - 8A

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

* Output Voltage Accuracy (Ration) = $\dfrac{\text{Output Voltage Accuracy}}{\text{Rated Output Voltage}}$ × 100

2.Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	-10	264	0	5.035	±7	±0.1
Minimum Voltage	35	230	8	5.021		

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Model	PLA50F-5
Item	Time Lapse Drift
Object	+5V8A

Temperature   25°C
Testing Circuitry   Figure A

1.Graph

Time [H]

Input Volt.   230V
Load   100%

* The characteristic of AC115V is equal.

2.Values

Time since start [H]	Output Voltage [V]
0.0	5.021
0.5	5.020
1.0	5.020
2.0	5.020
3.0	5.020
4.0	5.020
5.0	5.020
6.0	5.020
7.0	5.020
8.0	5.020

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Model	PLA50F-5
Item	Rise and Fall Time
Object	+5V8A

Temperature   25°C
Testing Circuitry   Figure A

1.Graph

Load 100%
Output Volt. [1V/div]
0

Input Volt. 115 V

Load 100%
Output Volt. [1V/div]
0

Input Volt. 230 V

Input Volt. 0

Time   [100ms/div]

Time   [50ms/div]
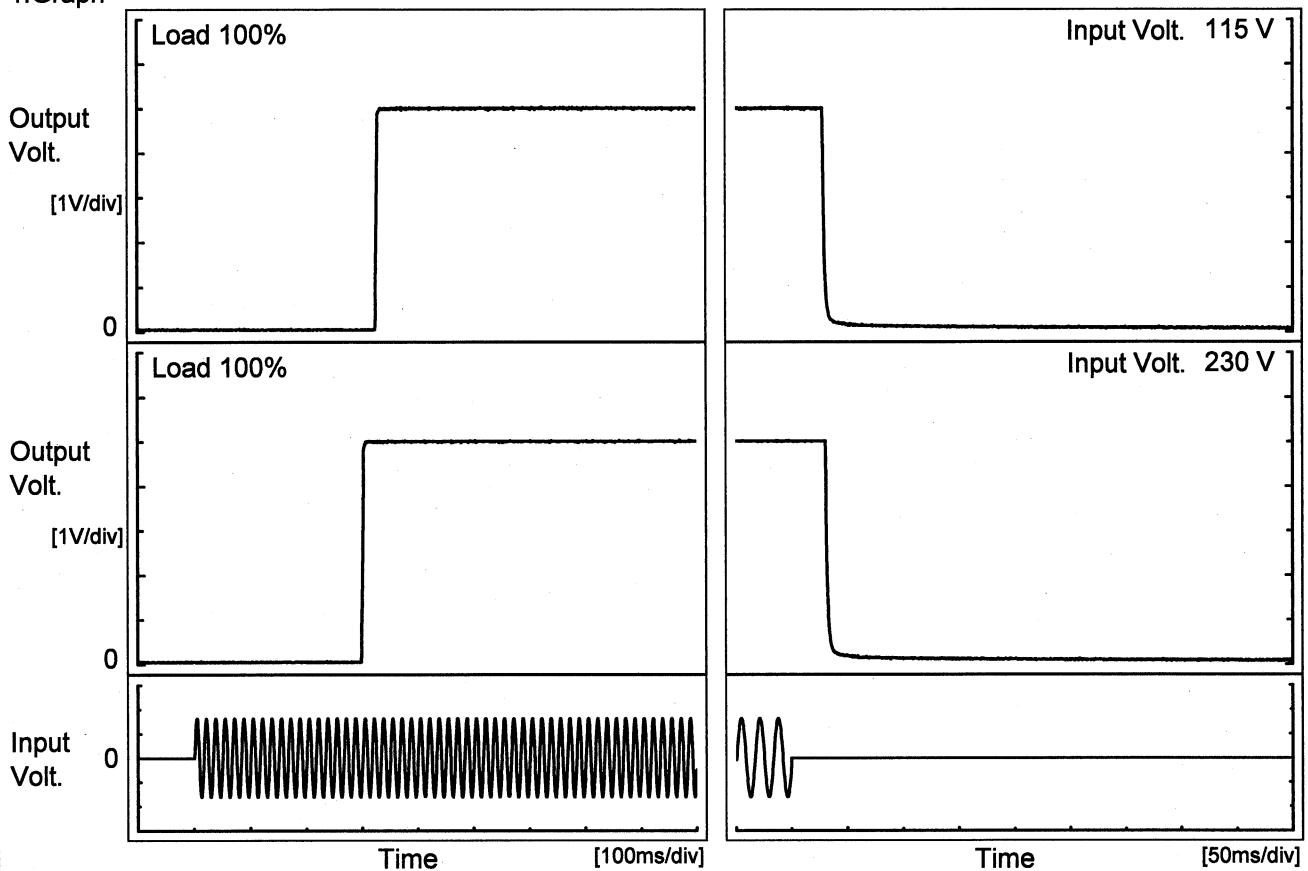
2.Values

[ms]

Input Volt. \ Time	Td	Tr	Ts	Th	Tf
115 V	325.0	3.5	328.5	28.3	4.0
230 V	299.5	3.5	303.0	31.0	4.0

Output Volt.
90%
10%

Input Volt.

Td   Tr   Th   Tf

Ts

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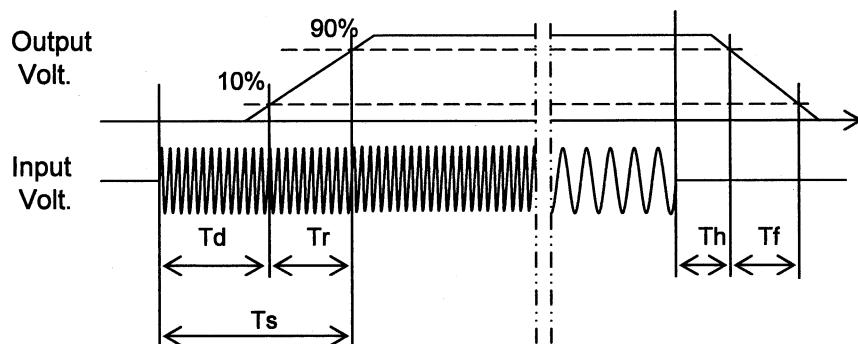
COSEL

Model	PLA50F-5
Item	Hold-Up Time
Object	+5V8A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

- - - ⊟ - - - Load 50%
———△——— Load 100%

Hold-Up Time [ms] vs Input Voltage [V]
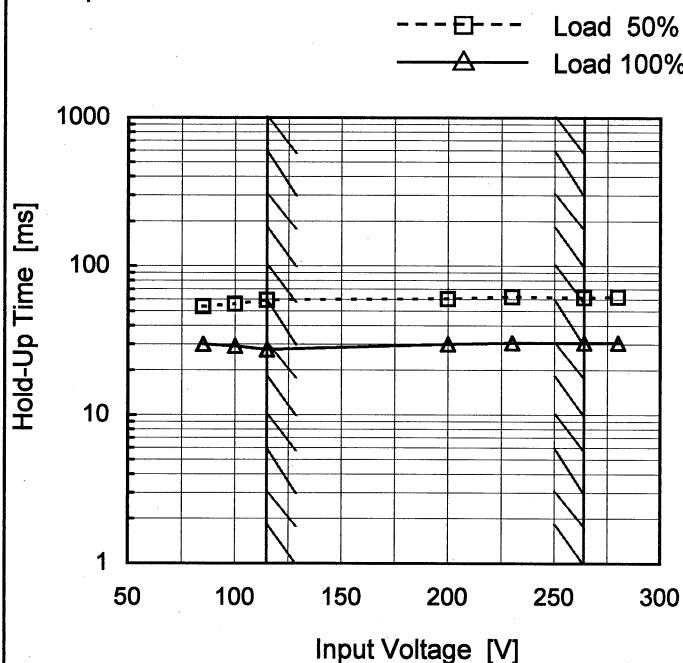
This duration covers from Shut-off of input voltage to the moment when output voltage descends to the rated range of voltage accuracy.
Note: Slanted line shows the range of the rated input voltage.

2.Values

Input Voltage [V]	Hold-Up Time [ms]	
	Load 50%	Load 100%
85	54	30 ※1
100	56	29 ※2
115	59	28
200	60	30
230	62	31
264	62	31
280	62	31
--	-	-
--	-	-

※1：Load 80%
※2：Load 90%

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Model	PLA50F-5
Item	Instantaneous Interruption Compensation
Object	+5V8A

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]

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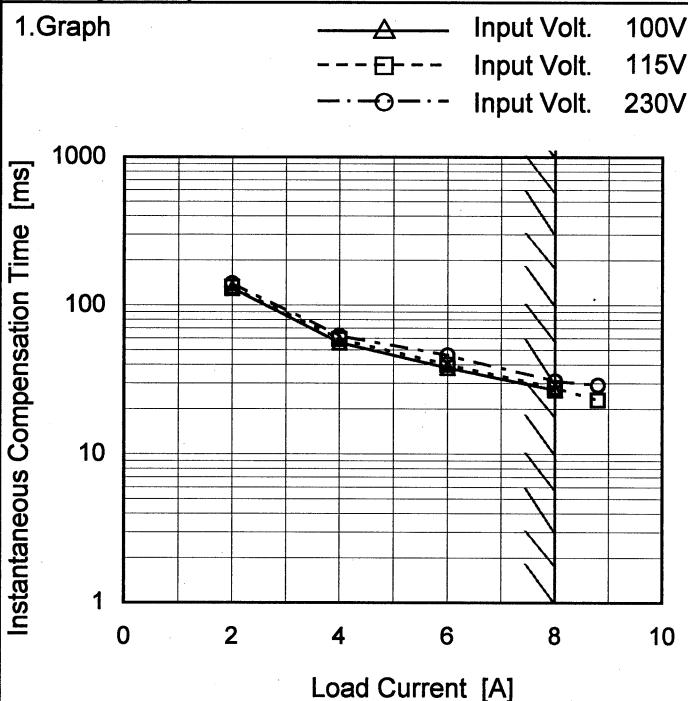
2.Values

Load Current [A]	Time [ms]		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
0.0	-	-	-
2.0	130	133	140
4.0	56	59	62
6.0	38	40	46
8.0	27	28	31
8.8	-	23	29
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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Model	PLA50F-5
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+5V8A
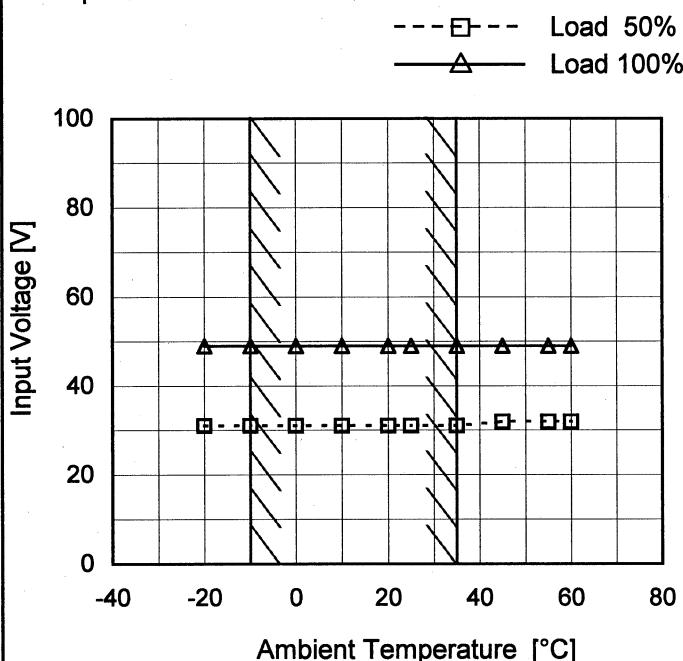
Testing Circuitry   Figure A

1.Graph

```
--- ☐ --- Load  50%
——— △ ——— Load 100%
```


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

2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	31	49
-10	31	49
0	31	49
10	31	49
20	31	49
25	31	49
35	31	49
45	32	49
55	32	49
60	32	49
--	-	-

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Model	PLA50F-5
Item	Overcurrent Protection
Object	+5V8A

Temperature   25°C
Testing Circuitry   Figure A

1.Graph

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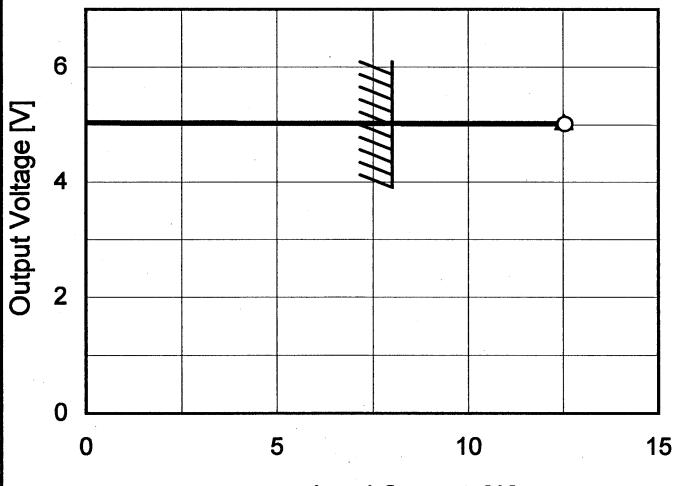
Load Current [A]

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]
5.00	12.30	12.32
4.75	-	-
4.50	-	-
4.00	-	-
3.50	-	-
3.00	-	-
2.50	-	-
2.00	-	-
1.50	-	-
1.00	-	-
0.50	-	-
0.00	-	-

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Model	PLA50F-5
Item	Overvoltage Protection
Object	+5V8A
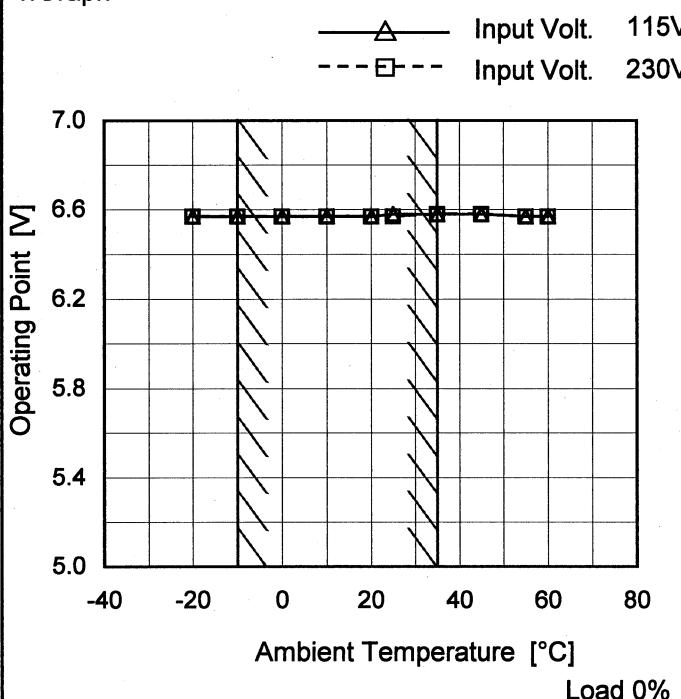
Testing Circuitry   Figure A

1.Graph

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

Ambient Temperature [°C]

Load 0%

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	6.57	6.57
-10	6.57	6.57
0	6.57	6.57
10	6.57	6.57
20	6.57	6.57
25	6.58	6.57
35	6.58	6.58
45	6.58	6.58
55	6.57	6.57
60	6.57	6.57
--	-	-

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COSEL

Figure A

$$\text{Leakage Current Value [A]} = \frac{\text{Effective Value of Voltmeter[V]}}{1k\ [\Omega]}$$

Figure B (DEN-AN)

$$\text{Leakage Current Value [A]} = \frac{\text{Effective Value of Voltmeter[V]}}{500\ [\Omega]}$$

Figure B (IEC60950-1)

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Figure C

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