COSEL

TEST DATA OF PJA300F-48

Regulated DC Power Supply
August 4, 2017

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Model	PJA300F-48
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

Load Current [A]

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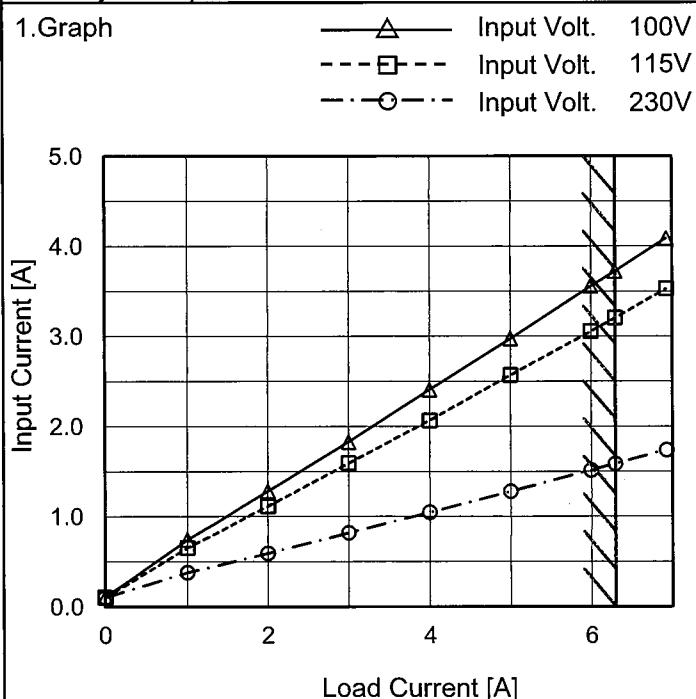
2.Values

Load Current [A]	Input Current [A]		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
0.00	0.108	0.105	0.105
1.00	0.743	0.654	0.381
2.00	1.283	1.115	0.594
3.00	1.828	1.592	0.821
4.00	2.406	2.066	1.048
5.00	2.975	2.570	1.279
6.00	3.557	3.056	1.515
6.30	3.721	3.205	1.587
6.93	4.088	3.528	1.739
--	-	-	-
--	-	-	-

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Model	PJA300F-48
Item	Input Power (by Load Current)
Object	————————
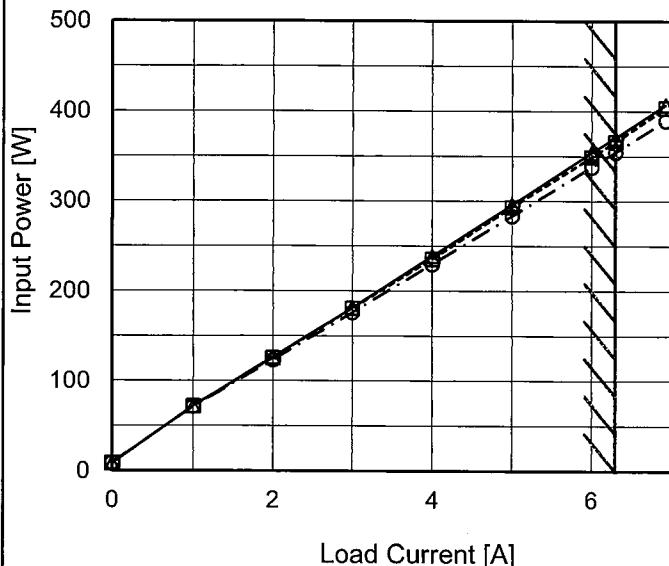
Temperature 25°C
Testing Circuitry Figure A

1.Graph

——△—— Input Volt. 100V
— — ⊟ — — Input Volt. 115V
—·—○—·— Input Volt. 230V

Load Current [A]

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	8.2	8.6	8.8
1.00	72.2	71.8	71.5
2.00	126.5	125.6	123.3
3.00	181.3	180.7	176.1
4.00	238.8	235.4	229.8
5.00	295.9	293.3	283.5
6.00	354.1	349.2	338.0
6.30	370.4	366.2	354.5
6.93	407.2	403.7	389.6
--	-	-	-
--	-	-	-

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Model	PJA300F-48
Item	Efficiency (by Input Voltage)
Object	

Temperature   25°C
Testing Circuitry   Figure A

1.Graph

- - - ▣ - - -   Load 50%
———△———   Load 100%

Efficiency [%] vs Input Voltage [V]

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

2.Values

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
85	79.6	80.7 ※1
100	80.4	82.6
115	80.8	83.5
200	82.7	85.8
230	83.0	86.1
264	83.1	86.3
280	83.1	86.5
--	-	-
--	-	-

※1 : Load 80%

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Model	PJA300F-48
Item	Efficiency (by Load Current)
Object	————————
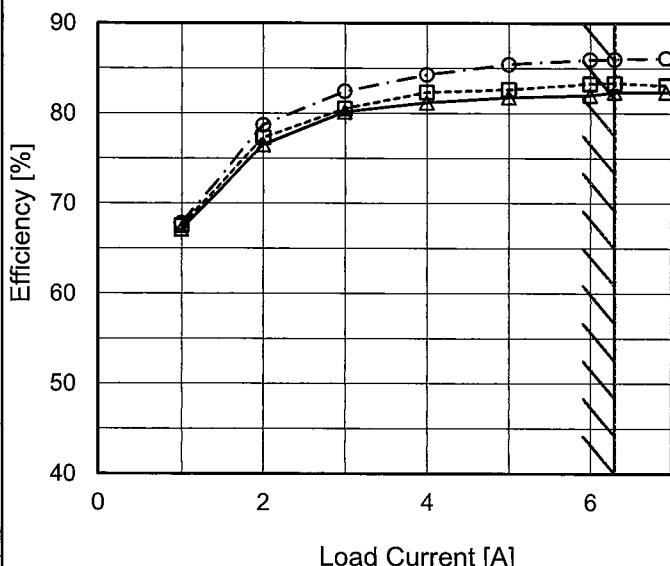
Temperature   25°C
Testing Circuitry   Figure A

1.Graph

——△—— Input Volt.   100V
– – –⊟– – – Input Volt.   115V
—·—◯—·· Input Volt.   230V

Efficiency [%] vs Load Current [A]

2.Values

Load Current [A]	Efficiency [%]		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
0.00	-	-	-
1.00	67.1	67.5	67.8
2.00	76.5	77.3	78.7
3.00	80.2	80.5	82.4
4.00	81.2	82.3	84.3
5.00	81.8	82.6	85.5
6.00	82.0	83.3	86.0
6.30	82.3	83.4	86.0
6.93	82.4	83.1	86.2
--	-	-	-
--	-	-	-

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

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Model	PJA300F-48
Item	Power Factor (by Input Voltage)
Object	

Temperature	25°C
Testing Circuitry	Figure A

1.Graph

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

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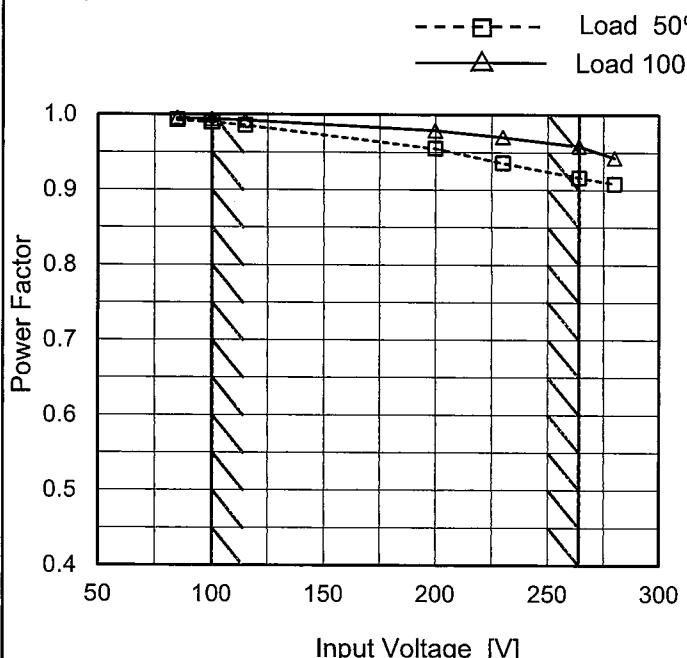
2.Values

Input Voltage [V]	Power Factor	
	Load 50%	Load 100%
85	0.993	0.996 ※1
100	0.990	0.994
115	0.986	0.992
200	0.955	0.979
230	0.936	0.970
264	0.917	0.959
280	0.908	0.943
--	-	-
--	-	-

※1：Load 80%

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Model	PJA300F-48

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
```


Load Current [A]

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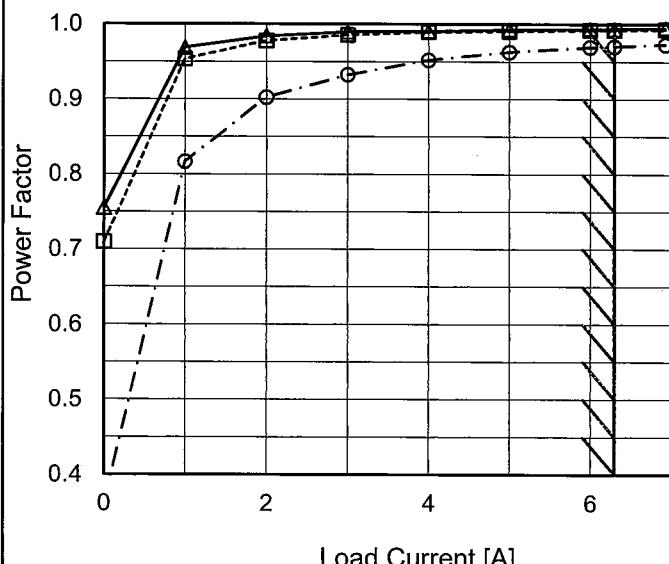
2.Values

Load Current [A]	Power Factor		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
0.00	0.755	0.710	0.362
1.00	0.969	0.954	0.816
2.00	0.984	0.978	0.902
3.00	0.990	0.985	0.932
4.00	0.991	0.990	0.952
5.00	0.993	0.991	0.963
6.00	0.994	0.992	0.970
6.30	0.994	0.992	0.971
6.93	0.995	0.993	0.973
--	-	-	-
--	-	-	-

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Model	PJA300F-48
Item	Inrush Current
Object	———————

Temperature   25°C
Testing Circuitry   Figure A

Input Current [20A/div]

Input Voltage [100V/div]

Time   [100ms/div]

Input Voltage   100 V
Frequency   60 Hz
Load   100 %

Primary inrush current :
         12.9A
Secondary inrush current :
         7.1A

Input Current [20A/div]

Input Voltage [200V/div]

Time   [100ms/div]

Input Voltage   230 V
Frequency   60 Hz
Load   100 %

Primary inrush current :
         33.4 A
Secondary inrush current :
         2.6 A

Primary inrush current   Secondary inrush current

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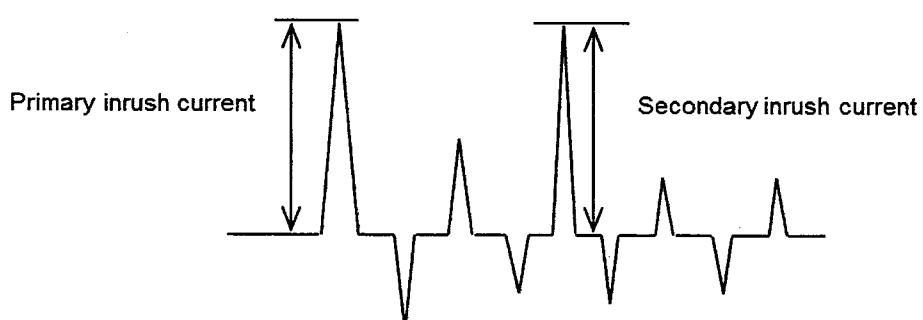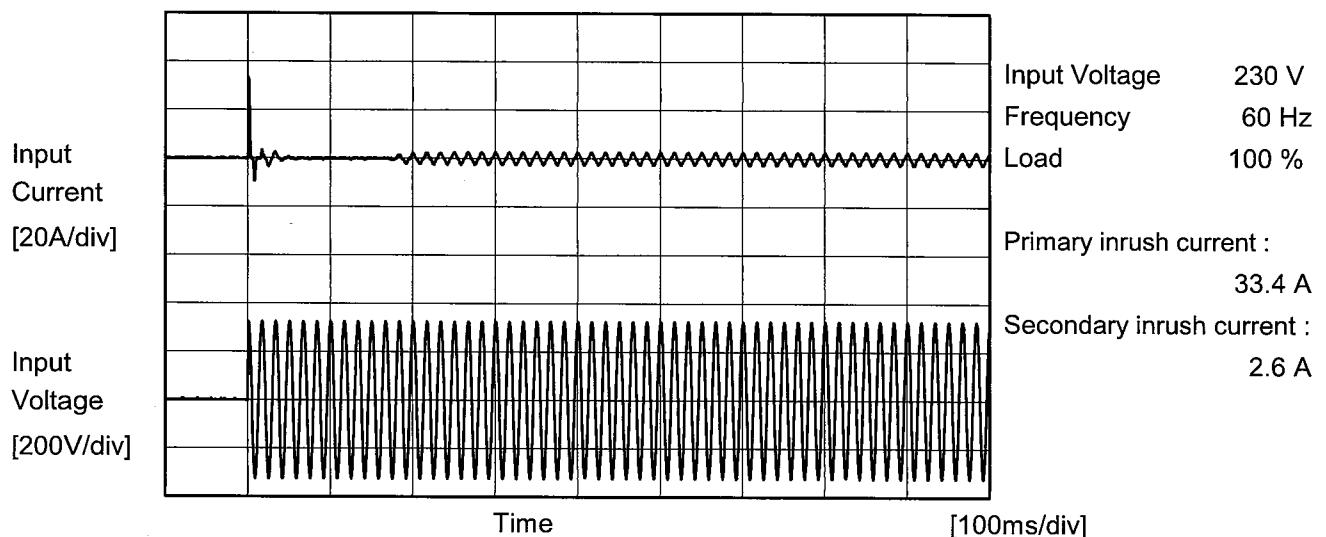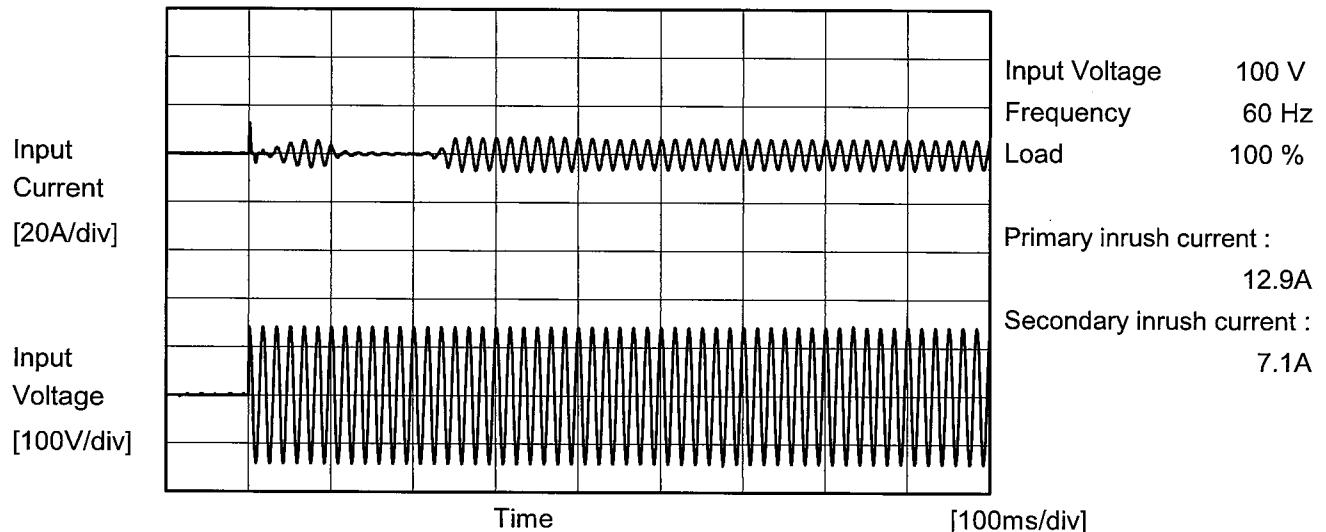
Model	PJA300F-48
Item	Leakage Current
Object	——————————

Temperature　　25°C
Testing Circuitry　　Figure B

1.Results

[mA]

Standards	Testing Circuitry	Measuring Method	Input Volt.			Note
			100 [V]	115 [V]	240 [V]	
DEN-AN	Figure B-1	Both phases	0.13	0.15	0.33	Operation
		One of phases	0.24	0.27	0.60	Stand by
IEC62368-1	Figure B-2	Both phases	0.14	0.16	0.35	Operation
		One of phases	0.25	0.29	0.65	Stand by
	Figure B-3	Both phases	0.14	0.16	0.32	Operation
		One of phases	0.24	0.27	0.59	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	PJA300F-48
Item	Line Regulation
Object	+48V6.3A
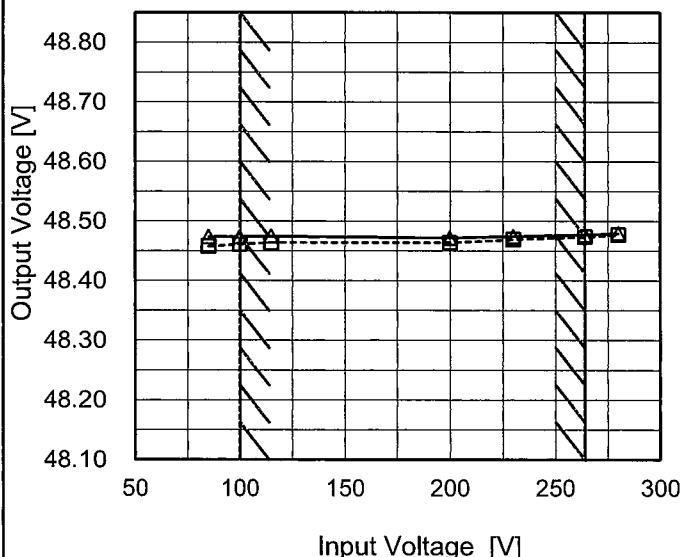
Temperature 25°C
Testing Circuitry Figure A

1.Graph

--- ⊟ --- Load 50%
—— △ —— Load 100%

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

2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
85	48.458	48.474 ※1
100	48.461	48.474
115	48.464	48.475
200	48.464	48.472
230	48.470	48.475
264	48.474	48.477
280	48.477	48.480
--	-	-
--	-	-

※1:Load 80%

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Model	PJA300F-48
Item	Load Regulation
Object	+48V6.3A

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.
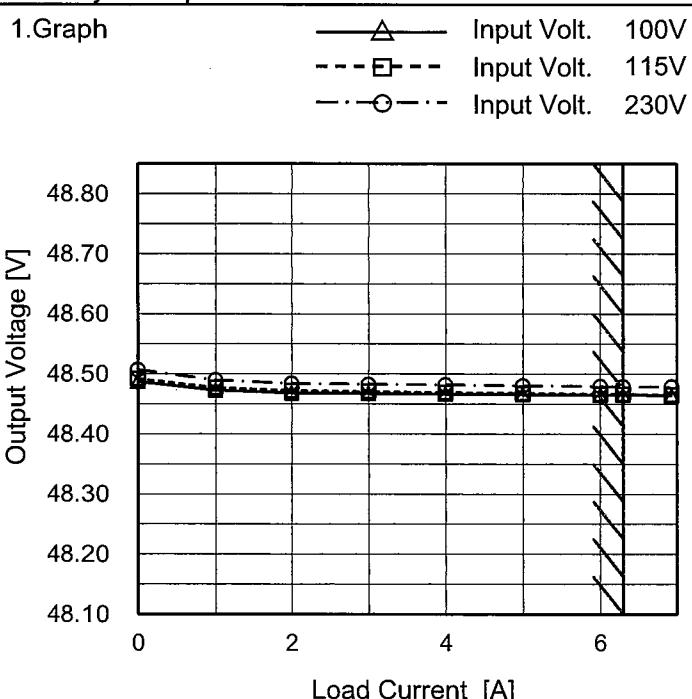
2.Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
0.00	48.487	48.492	48.507
1.00	48.473	48.477	48.490
2.00	48.469	48.472	48.484
3.00	48.468	48.471	48.483
4.00	48.467	48.469	48.482
5.00	48.466	48.468	48.481
6.00	48.465	48.467	48.479
6.30	48.465	48.467	48.479
6.93	48.464	48.466	48.479
--	-	-	-
--	-	-	-

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Model	PJA300F-48
Item	Dynamic Load Response
Object	+48V6.3A

Temperature 25° C
Testing Circuitry Figure A

Input Volt. 100 V   Response. t1=t2=50us. Typ
Cycle 1000 ms

Load Current   t1   t2

Min. Load (0A) ⟵⟶
Load 100% (6.3A)

500 mV/div   20ms/div   20ms/div

Min. Load (0A) ⟵⟶
Load 50% (3.15A)

500 mV/div   20ms/div   20ms/div

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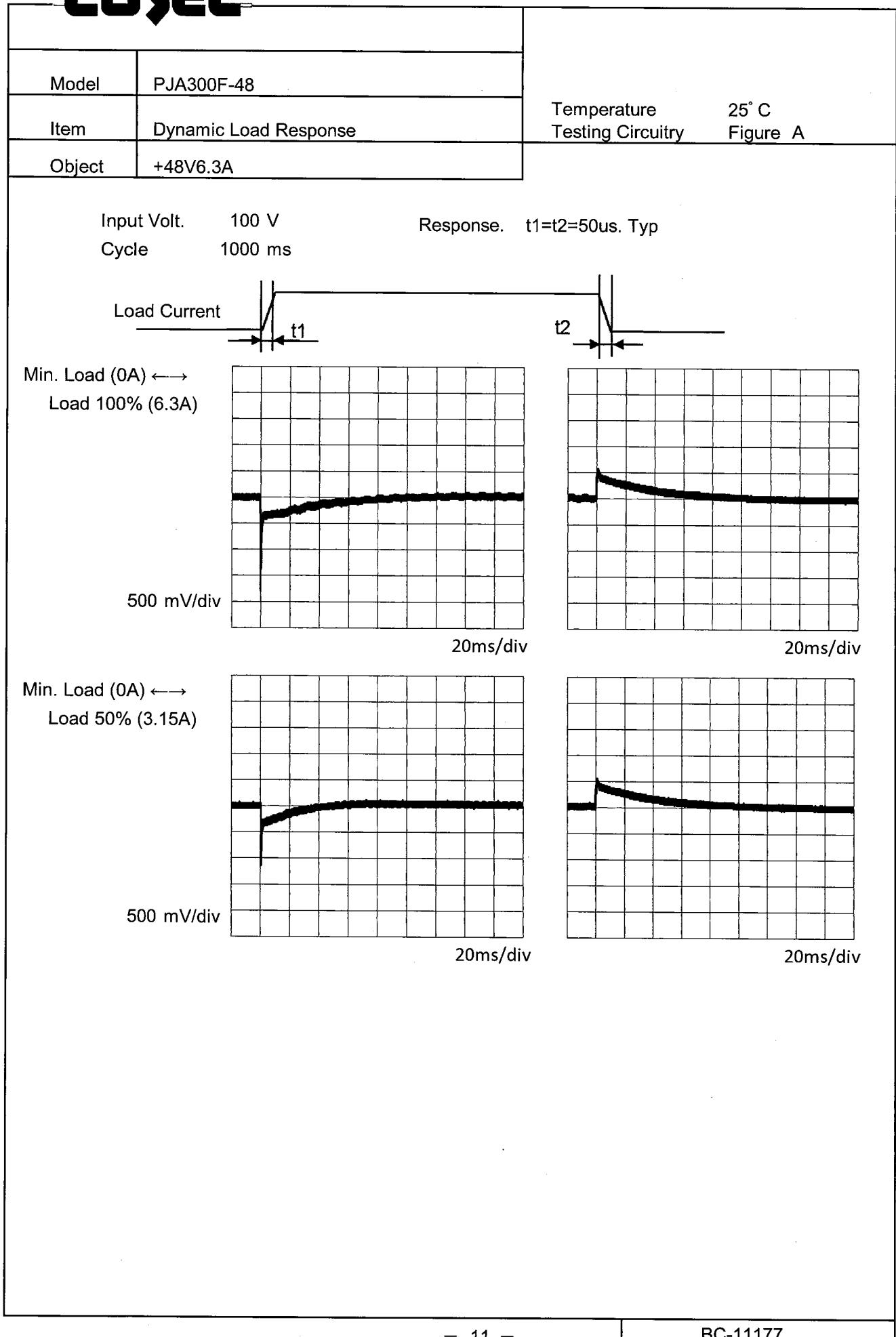
Model	PJA300F-48
Item	Ripple Voltage (by Load Current)
Object	+48V6.3A

Temperature   25°C
Testing Circuitry   Figure C

1.Graph

———△——— Input Volt.   100V
— · —○— · — Input Volt.   230V

Ripple Voltage [mV] vs Load Current [A]
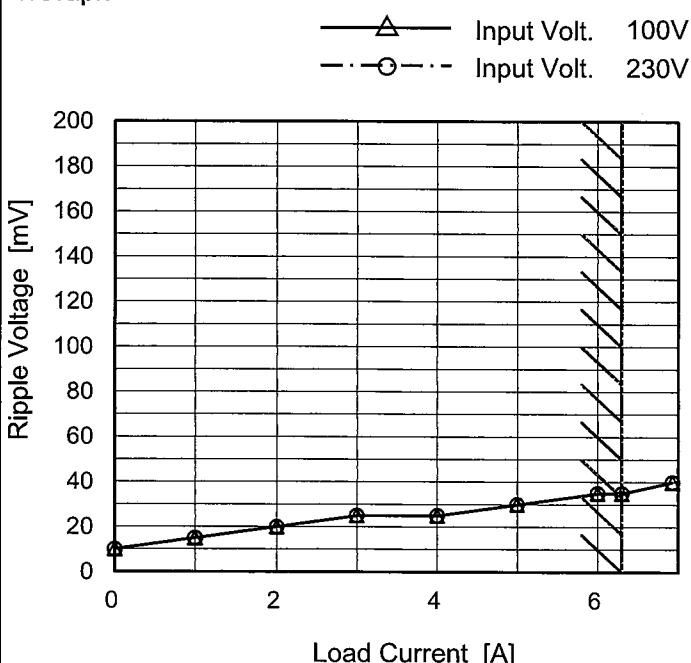
Load Current [A]

2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 100 [V]	Input Volt. 230 [V]
0.00	10	10
1.00	15	15
2.00	20	20
3.00	25	25
4.00	25	25
5.00	30	30
6.00	35	35
6.30	35	35
6.93	40	40
--	-	-
--	-	-

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

T2

Ripple [mVp-p]

T1

Fig. Complex Ripple Wave Form

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Model	PJA300F-48
Item	Ripple-Noise
Object	+48V6.3A

Temperature   25°C
Testing Circuitry   Figure C

1.Graph

——△—— Input Volt.   100V
—·—○—·— Input Volt.   230V

Ripple-Noise [mV]

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. 100 [V]	Input Volt. 230 [V]
0.00	15	15
1.00	20	20
2.00	25	25
3.00	30	30
4.00	30	30
5.00	35	35
6.00	40	40
6.30	40	40
6.93	45	45
--	-	-
--	-	-

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	PJA300F-48
Item	Ripple Voltage (by Ambient Temp.)
Object	+48V6.3A

Testing Circuitry   Figure C

1.Graph

--- ⊟ --- Input Volt.   100V
——— △ ——— Input Volt.   230V

Ripple Voltage [mV] vs Ambient Temperature [°C]

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. 230 [V]
-30	110	110
-10	55	55
0	55	55
25	40	40
50	40	40
60	40	40
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

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Model	PJA300F-48
Item	Ambient Temperature Drift
Object	+48V6.3A

1.Graph

————△———— Input Volt.   100V
- - - ⊟ - - - Input Volt.   115V
—·—⊖—·— Input Volt.   230V
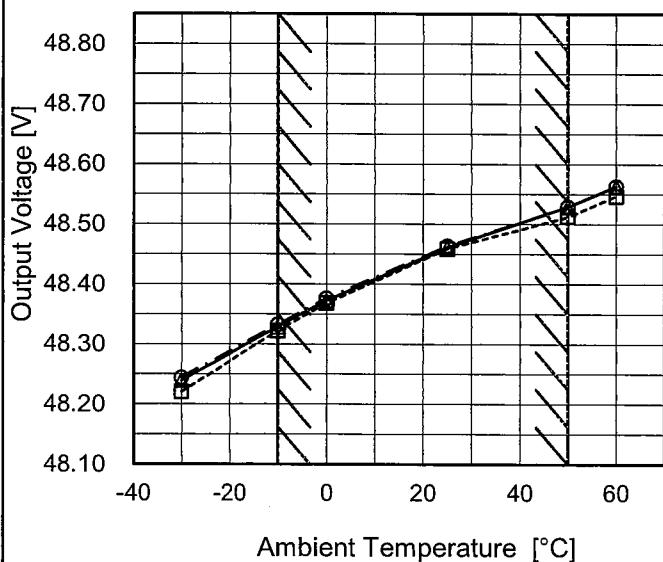
Ambient Temperature [°C]

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]
-30	48.239	48.221	48.244
-10	48.328	48.322	48.332
0	48.372	48.368	48.376
25	48.461	48.459	48.463
50	48.529	48.513	48.529
60	48.563	48.547	48.563
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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Model	PJA300F-48
Item	Output Voltage Accuracy
Object	+48V6.3A

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 - 50°C

Input Voltage : 100 - 264V

Load Current   : 0 - 6.3A

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

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

2.Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	50	230	6.3	48.529	±104	±0.2
Minimum Voltage	-10	115	6.3	48.322		

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Model	PJA300F-48
Item	Time Lapse Drift
Object	+48V6.3A

Temperature   25°C
Testing Circuitry   Figure A

1.Graph

Input Volt.   230V
Load   100%

* The characteristic of AC100V is equal.

2.Values

Time since start [H]	Output Voltage [V]
0.0	48.403
0.5	48.494
1.0	48.494
2.0	48.496
3.0	48.496
4.0	48.497
5.0	48.498
6.0	48.498
7.0	48.499
8.0	48.499

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Model	PJA300F-48
Item	Rise and Fall Time
Object	+48V6.3A

Temperature　　25°C
Testing Circuitry　　Figure A

1.Graph

Load 100%

Output Volt. [10V/div]

0

Input Volt. 100 V

Load 100%

Output Volt. [10V/div]

0

Input Volt. 230 V

Input Volt. 0

Time [100ms/div]

Time [50ms/div]
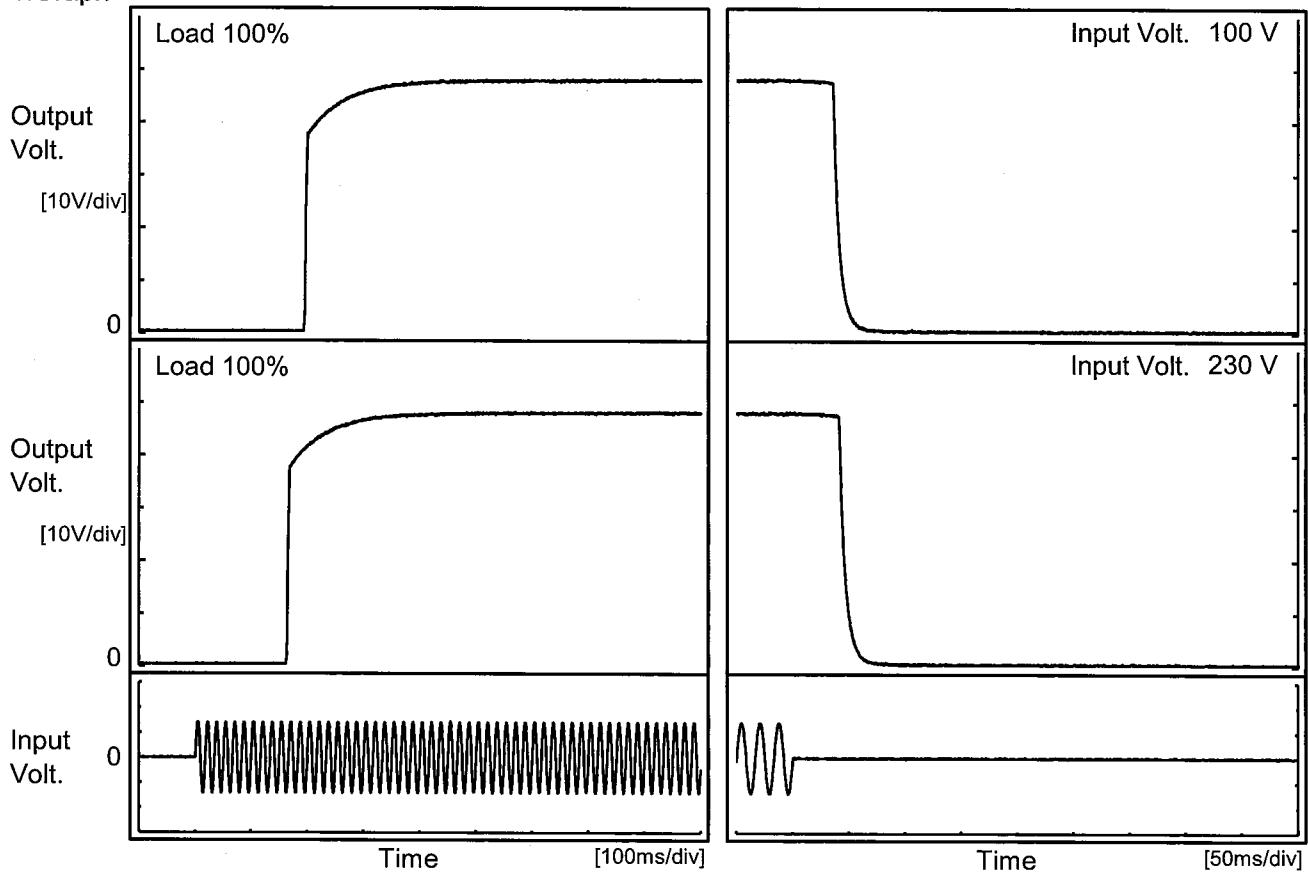
2.Values

[ms]

Input Volt. ＼ Time	Td	Tr	Ts	Th	Tf
100 V	195.5	65.0	257.5	36.8	12.5
230 V	164.5	60.0	224.5	42.3	12.5

Output Volt.
90%
10%

Input Volt.

Td　Tr　Ts　Th　Tf

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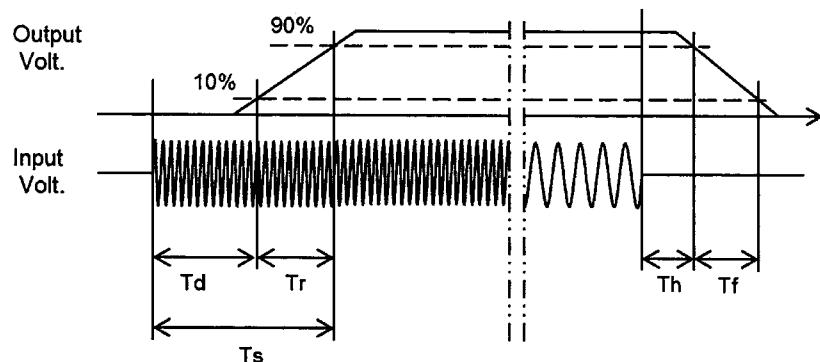
Model	PJA300F-48
Item	Hold-Up Time
Object	+48V6.3A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

--- ⊟ --- Load 50%
——△—— Load 100%

Hold-Up Time [ms] vs Input Voltage [V]

2.Values

| Input Voltage [V]	Hold-Up Time [ms]	
	Load 50%	Load 100%
85	68	36 ※1
100	70	37
115	71	37
200	80	41
230	82	42
264	85	44
280	85	45
--	-	-
--	-	-

※1：Load 80%
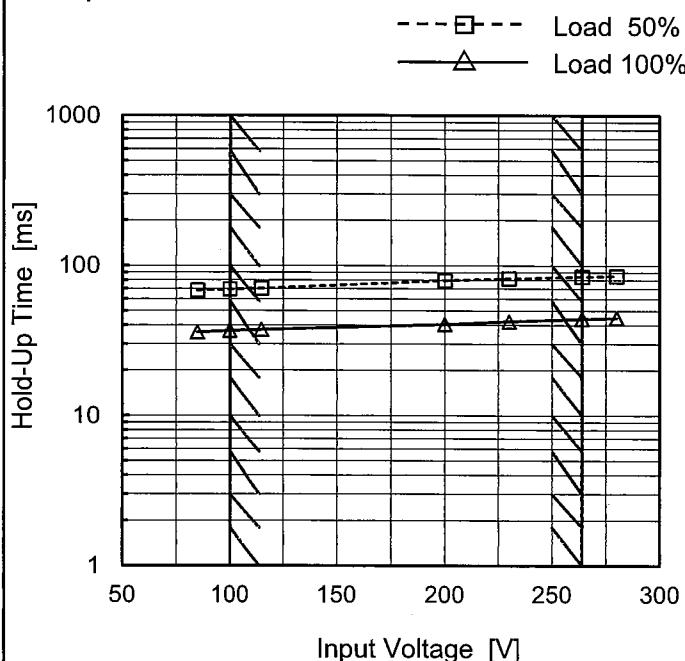
This duration covers from Shut-off of input
voltage to the moment when output voltage
descends to the rated range of voltage accuracy.
Note: Slanted line shows the range of the rated
      input voltage.

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Model	PJA300F-48
Item	Instantaneous Interruption Compensation
Object	+48V6.3A

Temperature   25°C
Testing Circuitry   Figure A

1.Graph

——△—— Input Volt.   100V
---☐--- Input Volt.   115V
—·—○—·— Input Volt.   230V

Instantaneous Compensation Time [ms]

Load Current [A]

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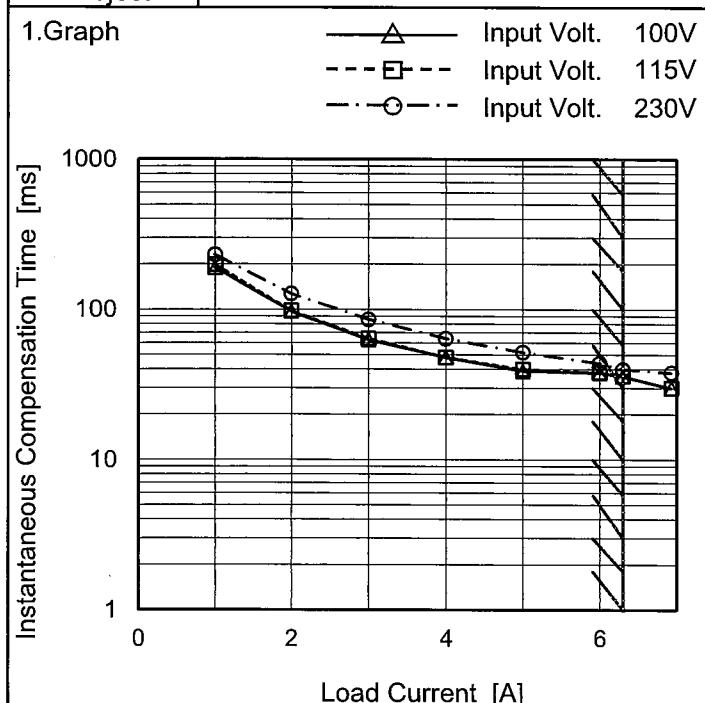
2.Values

Load Current [A]	Time [ms]		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
0.00	-	-	-
1.00	189	198	231
2.00	97	98	127
3.00	63	64	86
4.00	48	48	64
5.00	39	40	52
6.00	38	38	44
6.30	36	36	40
6.93	30	30	38
--	-	-	-
--	-	-	-

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Model	PJA300F-48
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+48V6.3A

Testing Circuitry   Figure A

1.Graph

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


Ambient Temperature [°C]

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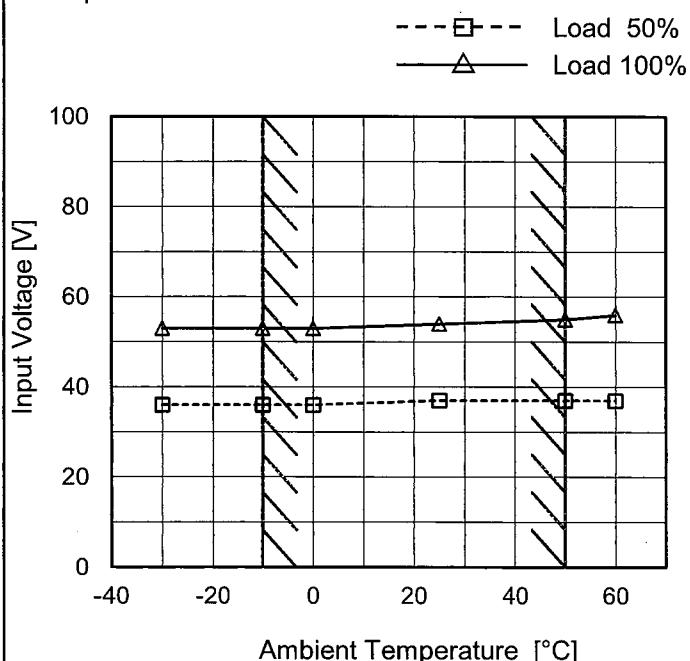
2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-30	36	53
-10	36	53
0	36	53
25	37	54
50	37	55
60	37	56
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

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Model	PJA300F-48
Item	Overcurrent Protection
Object	+48V6.3A
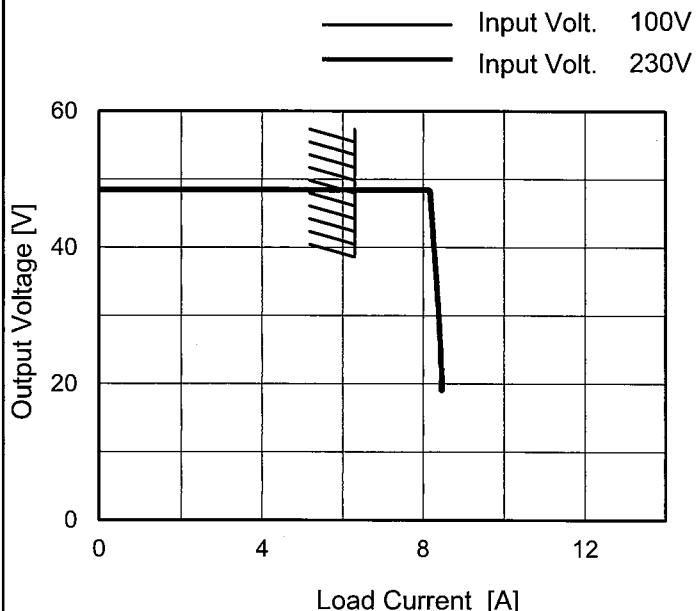
Temperature   25°C
Testing Circuitry   Figure A

1.Graph

———— Input Volt.   100V

———— Input Volt.   230V

Load Current [A]

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]
45.6	8.25	8.20
43.2	8.27	8.23
38.4	8.32	8.28
33.6	8.38	8.35
28.8	8.44	8.40
24.0	8.48	8.43
19.2	8.51	8.45
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

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Model	PJA300F-48
Item	Overvoltage Protection
Object	+48V6.3A
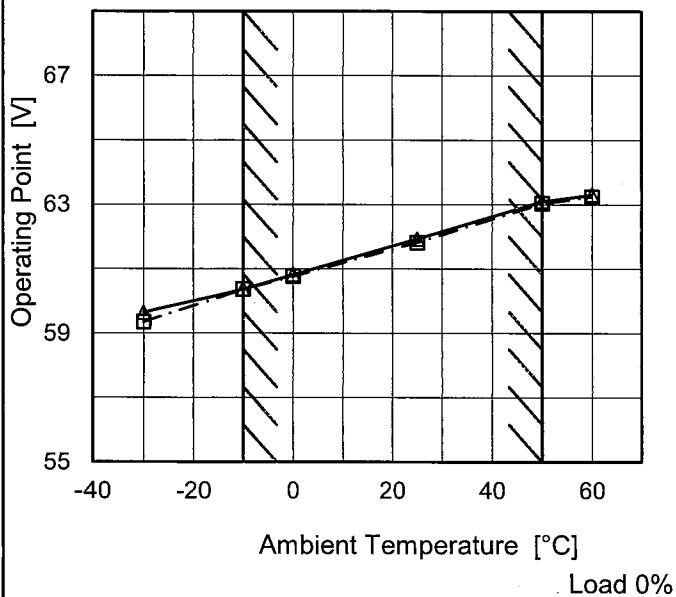
Testing Circuitry   Figure A

1.Graph

———△——— Input Volt.   100V
- - -□- - - 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. 100[V]	Input Volt. 230[V]
-30	59.64	59.35
-10	60.36	60.36
0	60.82	60.77
25	61.93	61.82
50	63.10	63.04
60	63.30	63.24
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

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CO$EL

Figure A

Data Acquisition/Control Unit

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

Figure B-1 (DEN-AN)

$$\text{Leakage Current Value [A]} = \frac{\text{Effective Value of Voltmeter[V]}}{500\ [\Omega]}$$
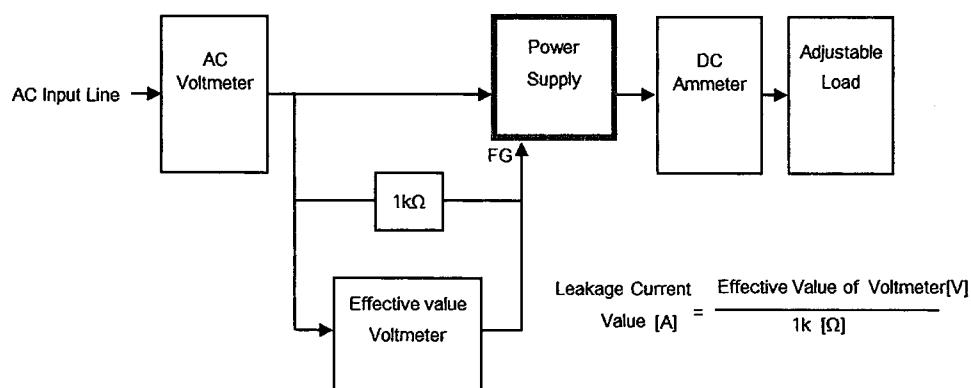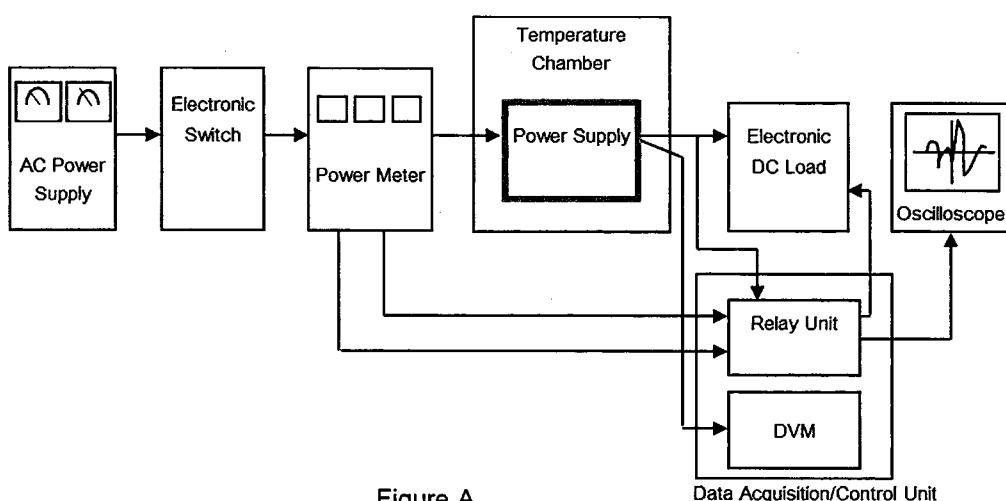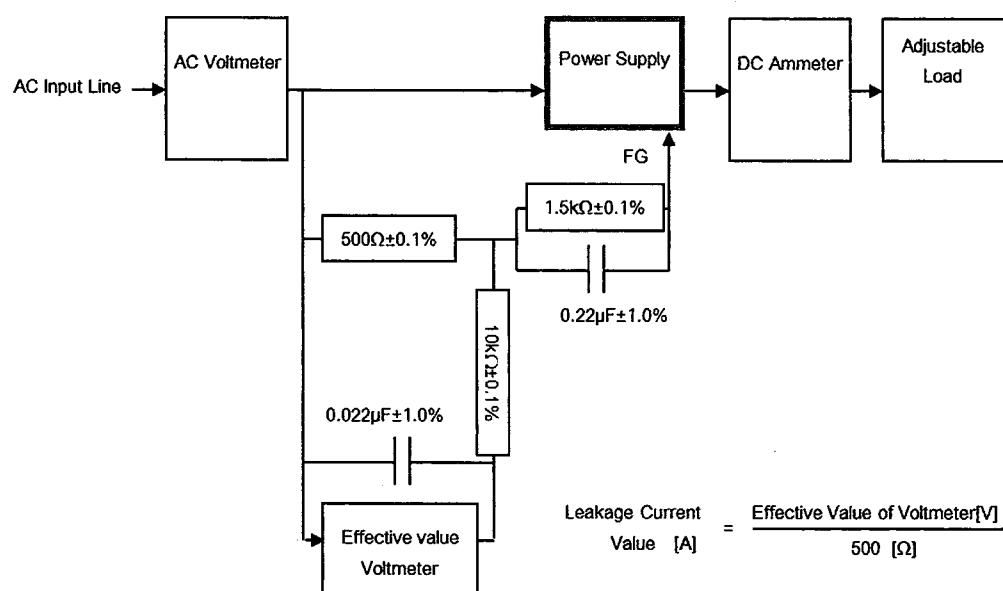
Figure B-2 (IEC62368-1 refer to IEC60990 Fig.4)

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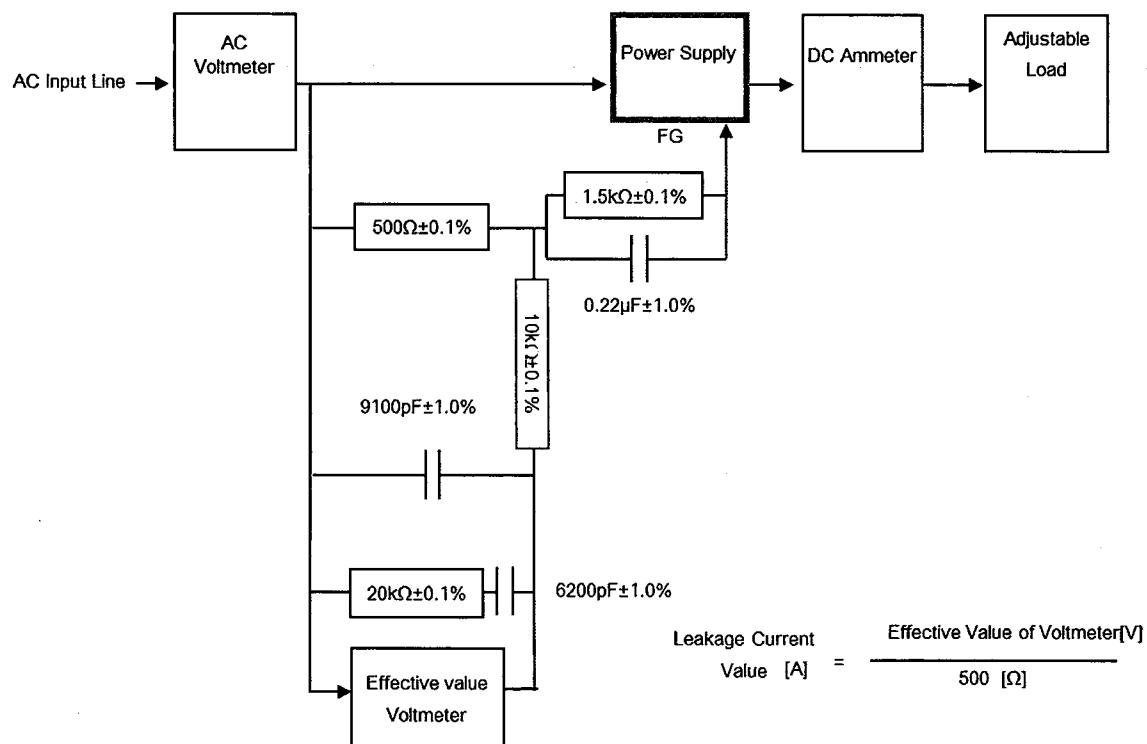
Figure B-3 (IEC62368-1 refer to IEC60990 Fig.5)

$$\text{Leakage Current Value [A]} = \frac{\text{Effective Value of Voltmeter[V]}}{500 \ [\Omega]}$$
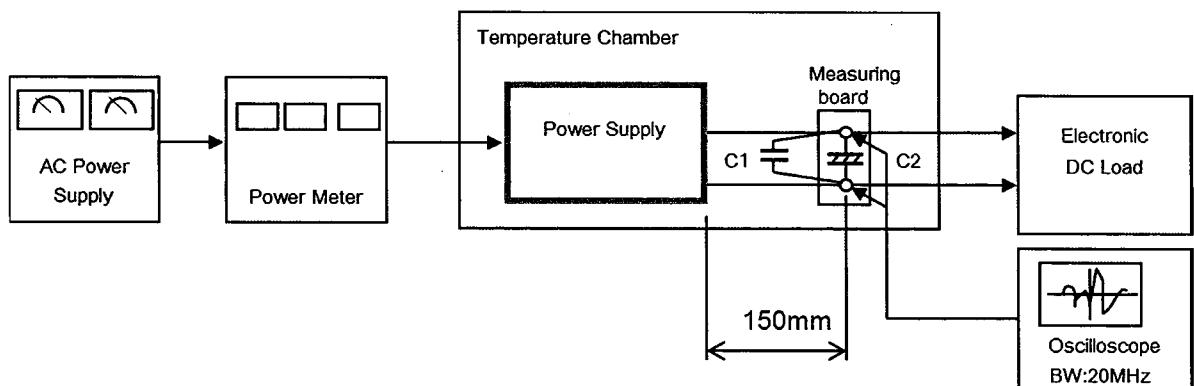
C1= 0.1 μF
(Ceramic capacitor)

C2= 22 μF
(Electrolytic capacitor)

Figure C

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