COSEL

TEST DATA OF PLA300F-48

Regulated DC Power Supply
August 28, 2017

Approved by : *Yukihiro Takehashi*

Yukihiro Takehashi   Design Manager

Prepared by : *Atsushi Nishikawa*

Atsushi Nishikawa   Design Engineer

COSEL CO.,LTD.

CO$EL

CONTENTS

(Final Page 25)

COSEL

| Model	PLA300F-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.
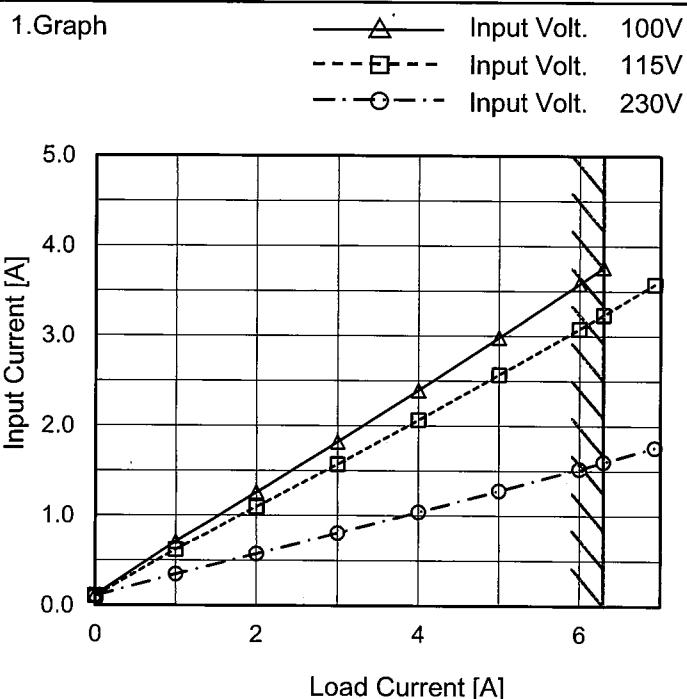
2.Values

Load Current [A]	Input Current [A]		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
0.00	0.115	0.106	0.106
1.00	0.709	0.620	0.348
2.00	1.258	1.096	0.577
3.00	1.819	1.570	0.807
4.00	2.394	2.064	1.042
5.00	2.981	2.568	1.280
6.00	3.582	3.079	1.523
6.30	3.763	3.234	1.598
6.93	-	3.576	1.761
--	-	-	-
--	-	-	-

BC-11205

CO$EL

Model	PLA300F-48
Item	Input Power (by Load Current)
Object	
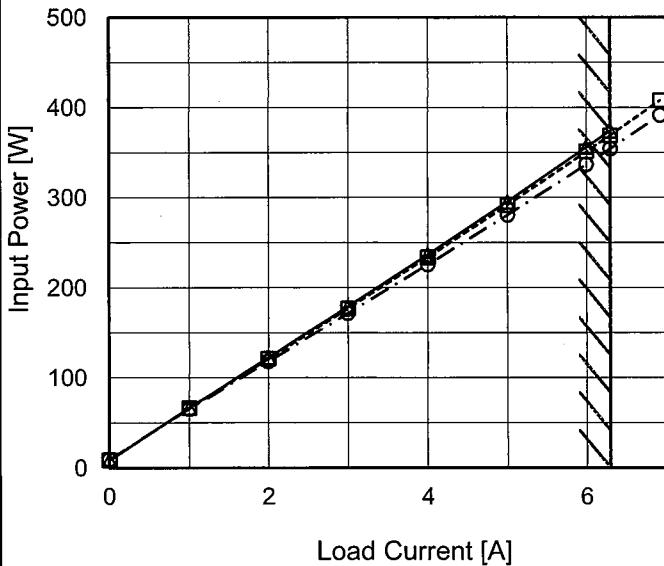
Temperature   25°C
Testing Circuitry   Figure A

1.Graph

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

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	8.6	8.6	9.4
1.00	66.9	66.4	65.6
2.00	122.6	121.2	118.3
3.00	178.9	176.9	171.6
4.00	236.7	233.7	225.7
5.00	295.5	291.6	280.6
6.00	356.0	351.0	336.9
6.30	373.9	368.9	354.3
6.93	-	407.9	391.6
--	-	-	-
--	-	-	-

BC-11205

CO$EL

Model	PLA300F-48
Item	Efficiency (by Input Voltage)
Object	————————
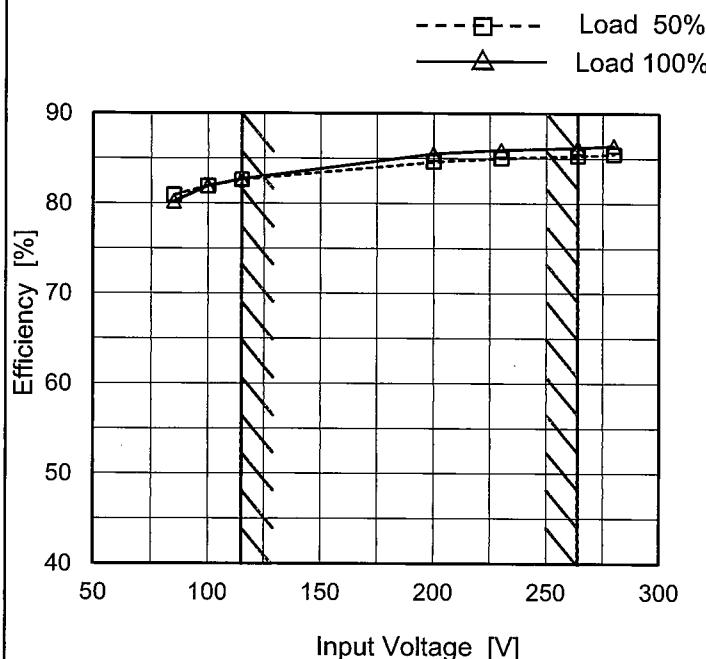
Temperature 25°C
Testing Circuitry Figure A

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	80.9	80.2 ※1
100	81.9	81.9 ※2
115	82.6	82.7
200	84.6	85.5
230	85.0	86.0
264	85.3	86.2
280	85.5	86.4
--	-	-
--	-	-

※1：Load 80%
※2：Load 90%

BC-11205

COSEL

Model	PLA300F-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

Load Current [A]

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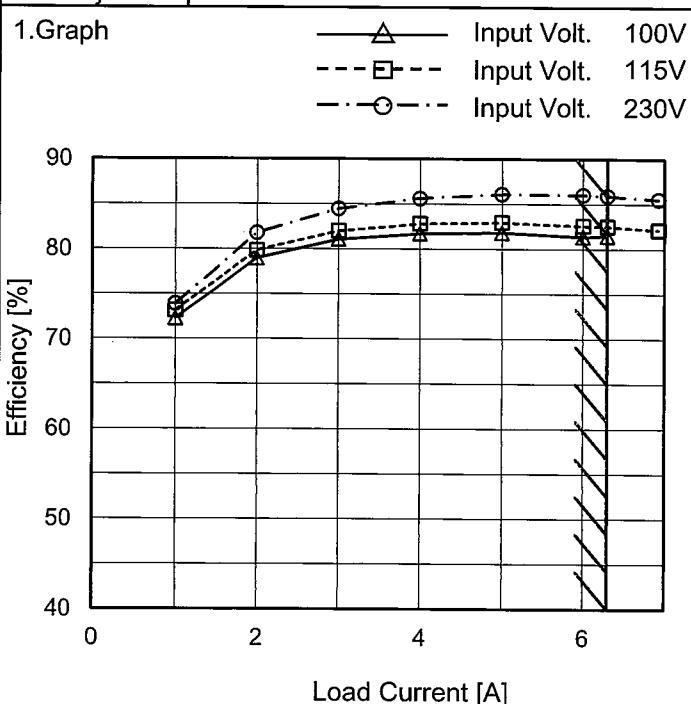
2.Values

Load Current [A]	Efficiency [%]		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
0.00	-	-	-
1.00	72.3	73.2	73.9
2.00	78.9	79.9	81.8
3.00	81.1	82.0	84.5
4.00	81.7	82.8	85.6
5.00	81.8	83.0	86.1
6.00	81.4	82.6	86.0
6.30	81.5	82.5	85.9
6.93	-	82.1	85.5
--	-	-	-
--	-	-	-

BC-11205

COSEL

Model	PLA300F-48
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	0.987	0.993 ※1
100	0.983	0.992 ※2
115	0.978	0.990
200	0.942	0.971
230	0.927	0.963
264	0.908	0.951
280	0.897	0.905
--	-	-
--	-	-

※1 : Load 80%
※2 : Load 90%

BC-11205

CO$EL

Model	PLA300F-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

Power Factor

Load Current [A]

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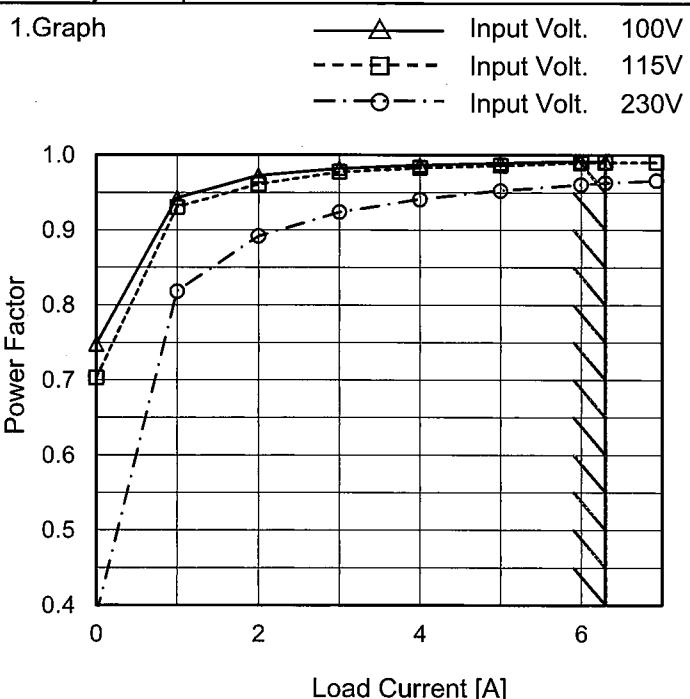
2.Values

Load Current [A]	Power Factor		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
0.00	0.748	0.703	0.386
1.00	0.943	0.931	0.818
2.00	0.973	0.961	0.892
3.00	0.982	0.978	0.924
4.00	0.987	0.983	0.941
5.00	0.990	0.986	0.953
6.00	0.992	0.990	0.961
6.30	0.992	0.990	0.963
6.93	-	0.991	0.966
--	-	-	-
--	-	-	-

BC-11205

CO$EL

Model	PLA300F-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	115 V
Frequency	60 Hz
Load	100 %

Primary inrush current :
14.2 A
Secondary inrush current :
7.7 A

Input Current [20A/div]

Input Voltage [200V/div]

Time [100ms/div]

Input Voltage	230 V
Frequency	60 Hz
Load	100 %

Primary inrush current :
31.2 A
Secondary inrush current :
4.0 A

Primary inrush current   Secondary inrush current

BC-11205

COSEL

Model	PLA300F-48	
Item	Leakage Current	Temperature 25°C Testing Circuitry Figure B
Object	————————	

1.Results

[mA]
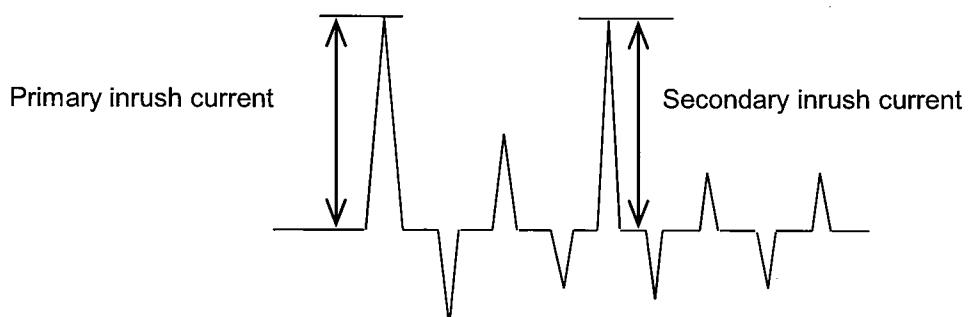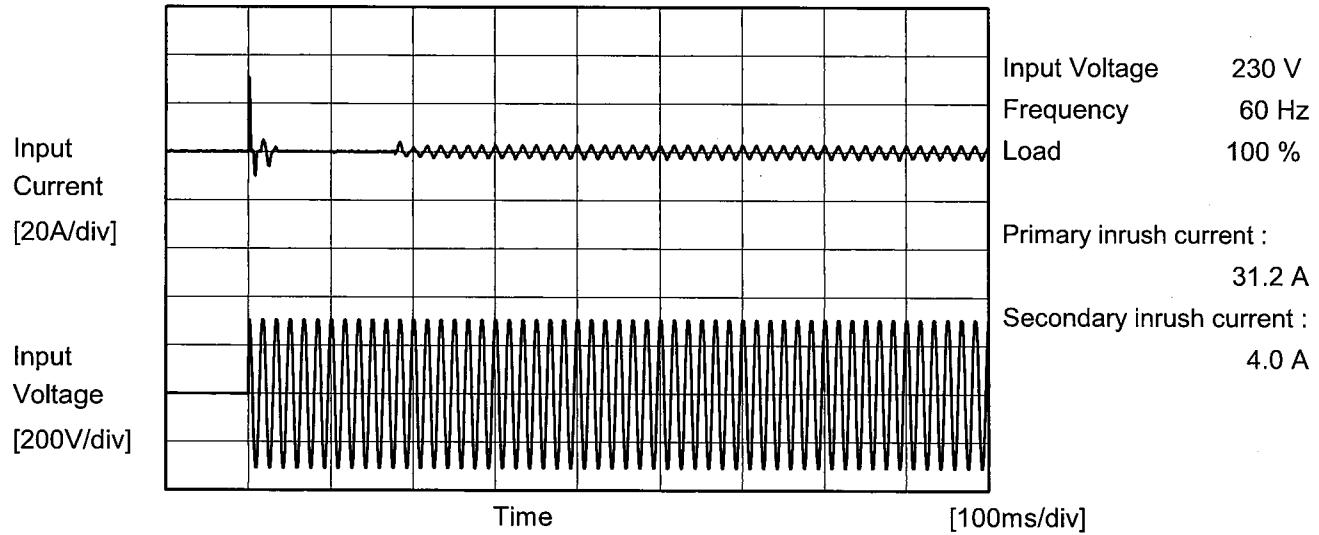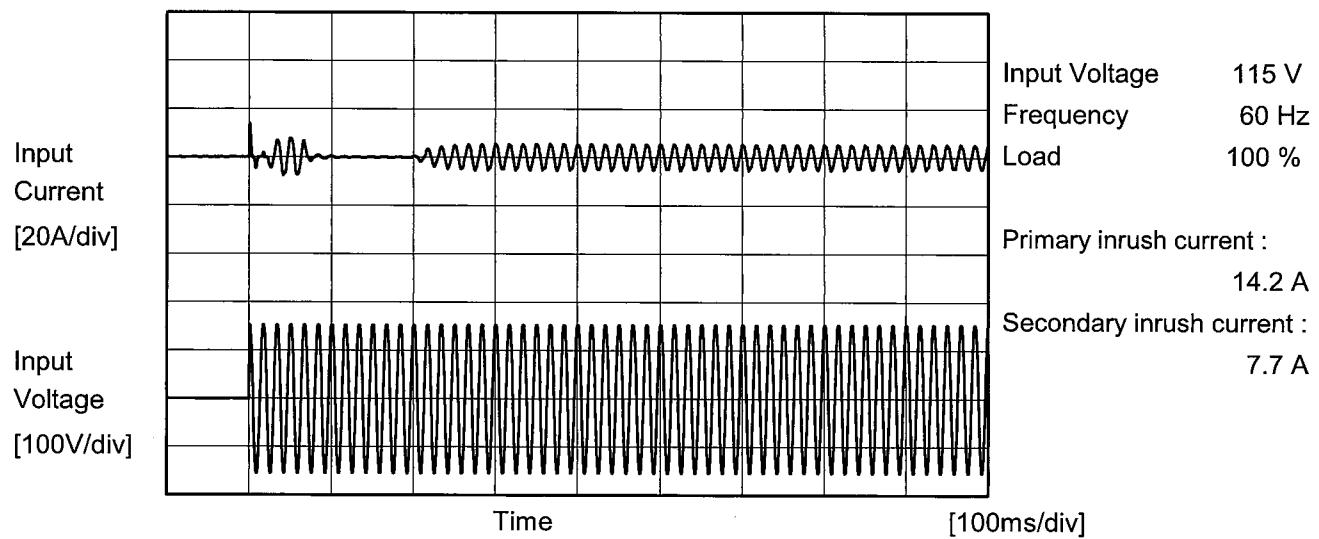
Standards		Input Volt.			Note
		100 [V]	115 [V]	240 [V]	
DEN-AN	Both phases	0.24	0.28	0.44	Operation
	One of phases	0.30	0.30	0.60	Stand by
IEC60950-1	Both phases	0.17	0.18	0.40	Operation
	One of phases	0.24	0.28	0.60	Stand by

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.

BC - 11205

CO$EL

Model	PLA300F-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.
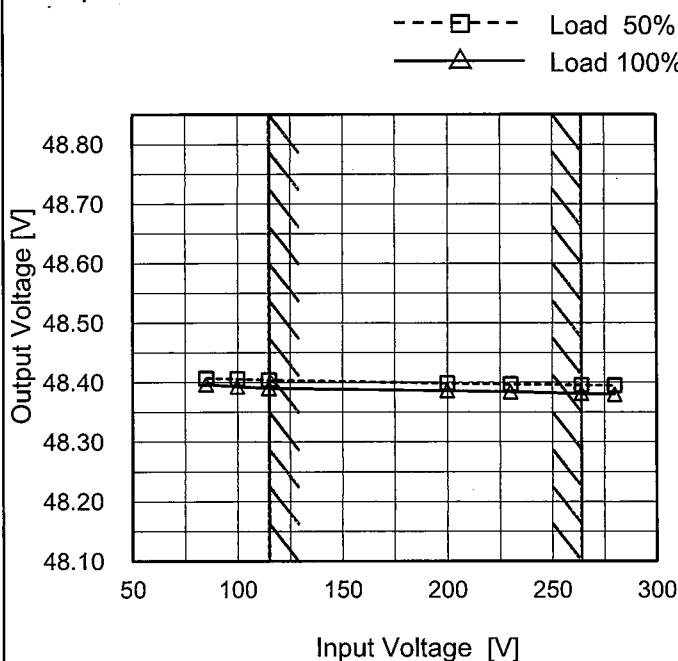
2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
85	48.407	48.397 ※1
100	48.406	48.393 ※2
115	48.404	48.390
200	48.399	48.386
230	48.397	48.384
264	48.396	48.382
280	48.395	48.380
--	-	-
--	-	-

※1：Load 80%
※2：Load 90%

BC-11205

CO$EL

Model	PLA300F-48
Item	Load Regulation
Object	+48V6.3A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

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

Output Voltage [V] vs 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	48.455	48.456	48.455
1.00	48.424	48.423	48.419
2.00	48.412	48.411	48.405
3.00	48.408	48.407	48.400
4.00	48.403	48.402	48.393
5.00	48.399	48.398	48.388
6.00	48.395	48.394	48.385
6.30	48.394	48.393	48.384
6.93	-	48.391	48.383
--	-	-	-
--	-	-	-

BC-11205

COSEL

Model	PLA300F-48
Item	Dynamic Load Response
Object	+48V6.3A

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% (6.3A)

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

Min. Load (0A) ⟵⟶

Load 50% (3.15A)

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

BC-11205

CO$EL

Model	PLA300F-48
Item	Ripple Voltage (by Load Current)
Object	+48V6.3A

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.
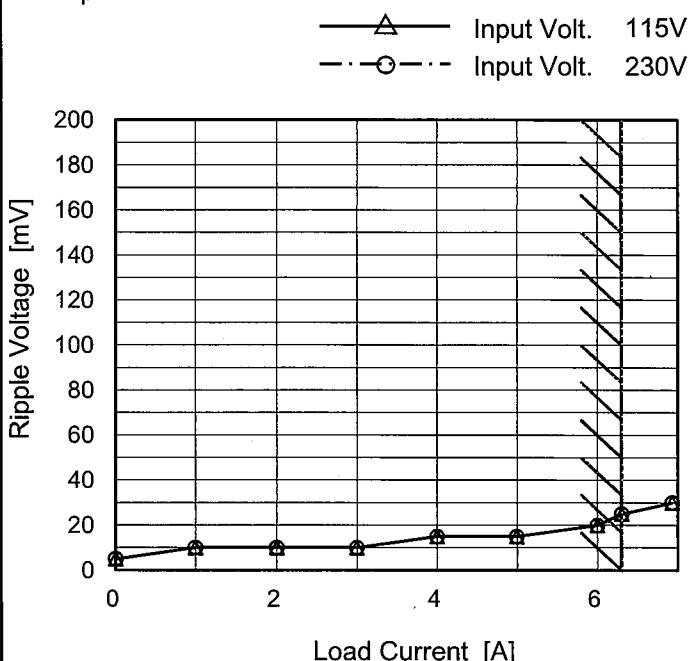
2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 115 [V]	Input Volt. 230 [V]
0.00	5	5
1.00	10	10
2.00	10	10
3.00	10	10
4.00	15	15
5.00	15	15
6.00	20	20
6.30	25	25
6.93	30	30
--	-	-
--	-	-

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

Ripple [mVp-p]

Fig. Complex Ripple Wave Form

- 12 -

BC-11205

CO$EL

Model	PLA300F-48
Item	Ripple-Noise
Object	+48V6.3A

Temperature   25°C
Testing Circuitry   Figure C

1.Graph

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

Ripple-Noise [mV] vs Load Current [A]
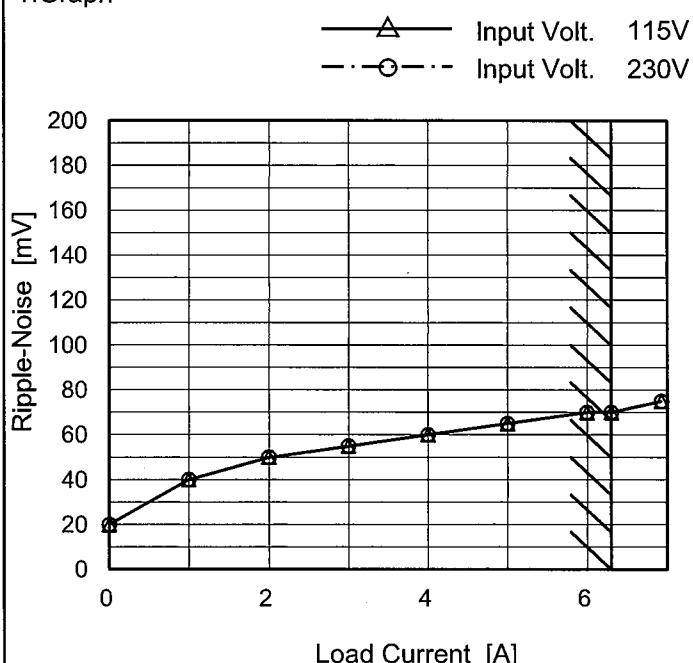
Load Current [A]

2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 115 [V]	Input Volt. 230 [V]
0.00	20	20
1.00	40	40
2.00	50	50
3.00	55	55
4.00	60	60
5.00	65	65
6.00	70	70
6.30	70	70
6.93	75	75
--	-	-
--	-	-

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

BC-11205

CO$EL
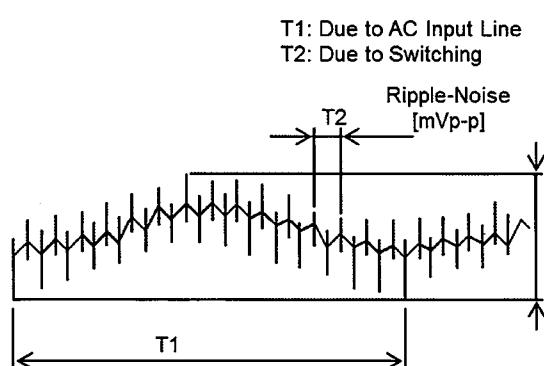
Model	PLA300F-48
Item	Ripple Voltage (by Ambient Temp.)
Object	+48V6.3A

Testing Circuitry   Figure C

1.Graph

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


Ambient Temperature [°C]

Load 100%

Measured by 20 MHz Oscilloscope.
Note: Slanted line shows the range of the rated
      ambient temperature.
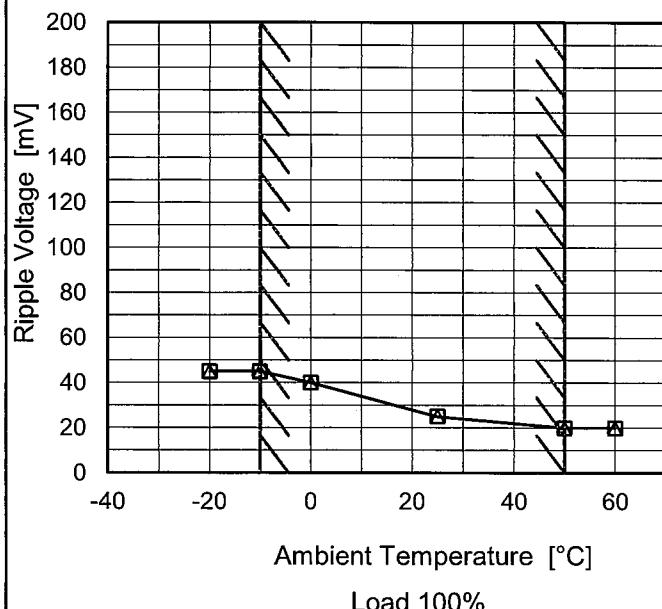
2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Input Volt. 115 [V]	Input Volt. 230 [V]
-20	45	45
-10	45	45
0	40	40
25	25	25
50	20	20
60	20	20
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

BC-11205

CO$EL

Model	PLA300F-48
Item	Ambient Temperature Drift
Object	+48V6.3A
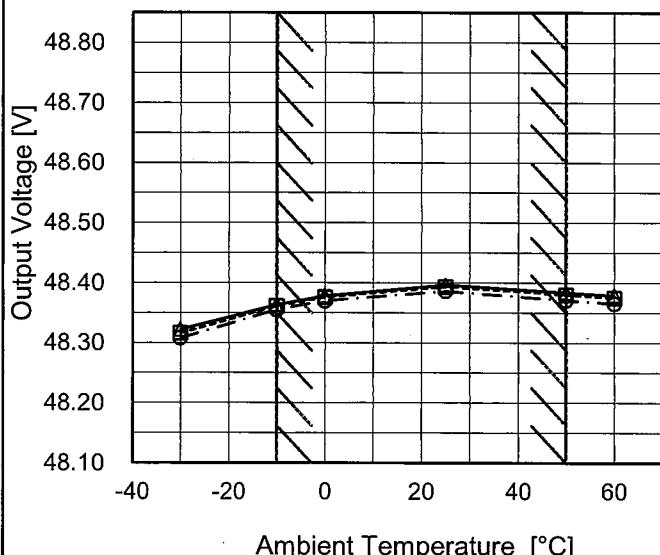
Testing Circuitry   Figure A

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]
-30	48.322	48.316	48.308
-10	48.363	48.361	48.355
0	48.378	48.376	48.370
25	48.397	48.394	48.386
50	48.384	48.380	48.371
60	48.379	48.375	48.365
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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

BC-11205

CO$EL

Model	PLA300F-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 : 115 - 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	25	115	0	48.456	±51	±0.1
Minimum Voltage	-10	230	6.3	48.355		

BC-11205

COSEL

Model	PLA300F-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 AC115V is equal.

2.Values

Time since start [H]	Output Voltage [V]
0.0	48.391
0.5	48.382
1.0	48.382
2.0	48.383
3.0	48.383
4.0	48.383
5.0	48.383
6.0	48.383
7.0	48.383
8.0	48.383

BC-11205

CO$EL

Model	PLA300F-48
Item	Rise and Fall Time
Object	+48V6.3A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

Load 100% (top left) — Output Volt. [10V/div]

Input Volt. 115 V (top right) — Output Volt.

Load 100% (middle left) — Output Volt. [10V/div]

Input Volt. 230 V (middle right) — Output Volt.

Input Volt.

Time [100ms/div]   Time [50ms/div]
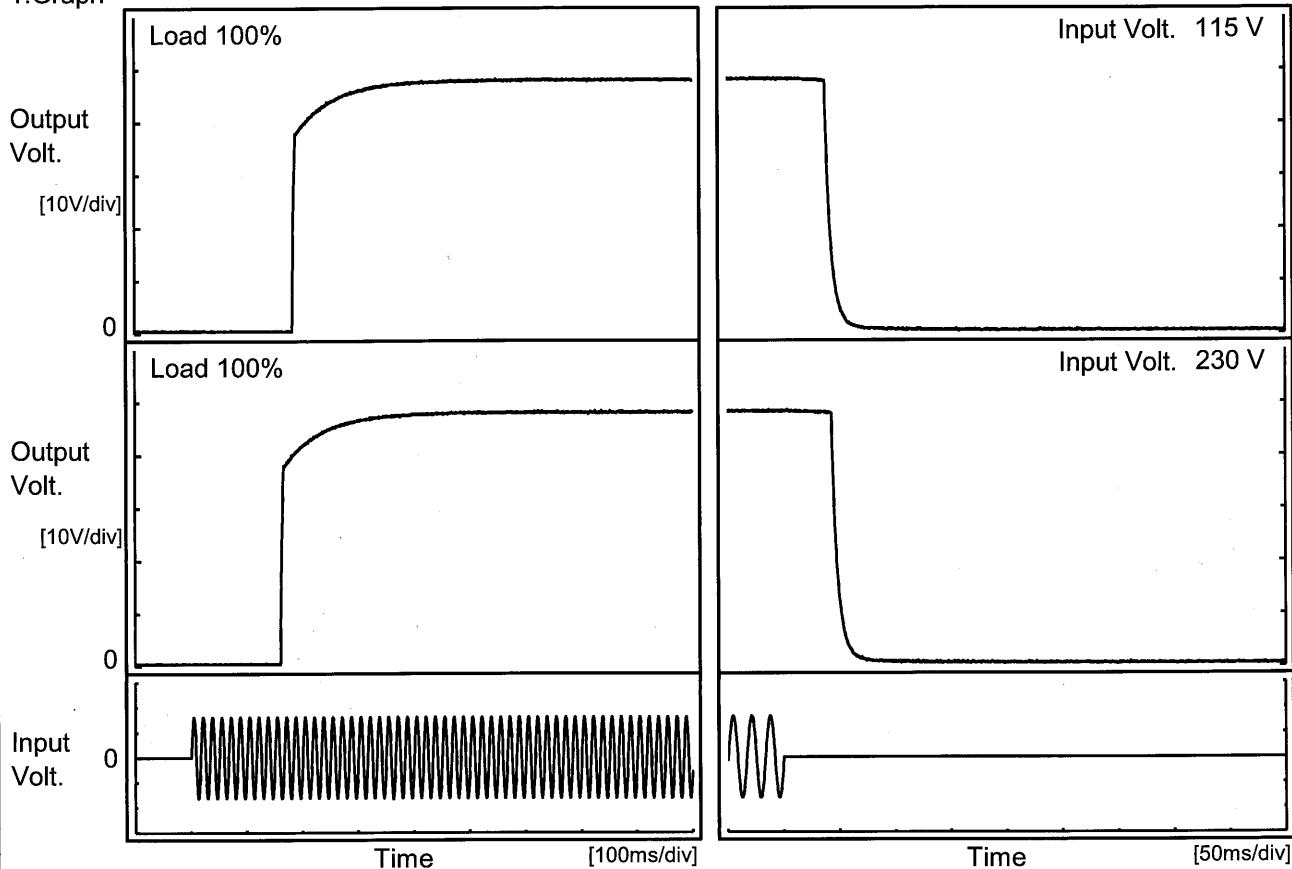
2.Values   [ms]

Input Volt. \ Time	Td	Tr	Ts	Th	Tf
115 V	184.5	61.0	245.5	37.8	12.5
230 V	162.0	60.0	222.0	43.5	12.5

Output Volt.   90%   10%

Input Volt.

Td   Tr   Th   Tf

Ts

- 18 -

BC-11205

CO$EL
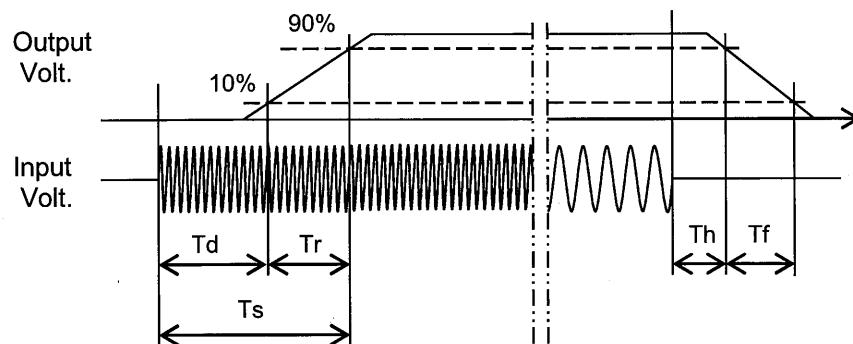
Model	PLA300F-48
Item	Hold-Up Time
Object	+48V6.3A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

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


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.
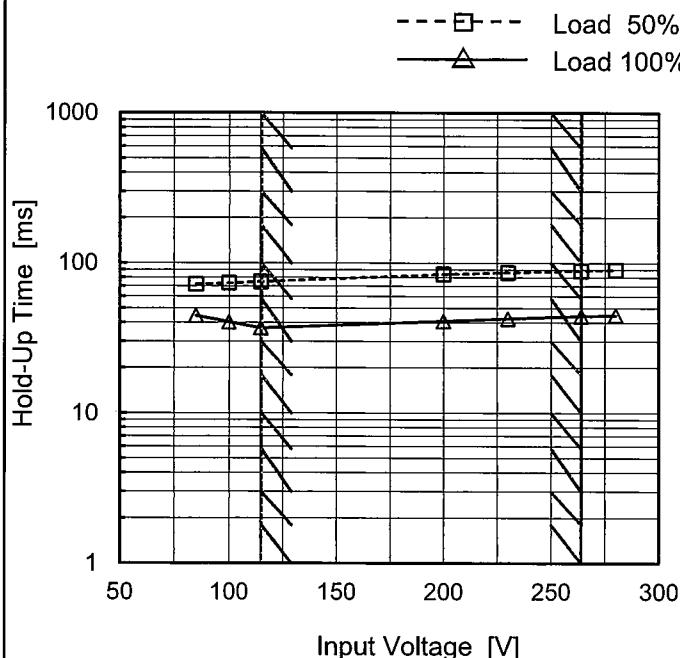
2.Values

Input Voltage [V]	Hold-Up Time [ms]	
	Load 50%	Load 100%
85	72	45 ※1
100	73	40 ※2
115	75	37
200	84	41
230	87	43
264	89	44
280	90	45
--	-	-
--	-	-

※1:Load 80%
※2:Load 90%

BC-11205

COSEL

Model	PLA300F-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] 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]
0.00	-	-	-
1.00	215	222	256
2.00	114	120	135
3.00	77	79	90
4.00	55	56	68
5.00	45	46	54
6.00	37	38	44
6.30	35	36	40
6.93	-	30	38
--	-	-	-
--	-	-	-

BC-11205

CO$EL

Model	PLA300F-48
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+48V6.3A
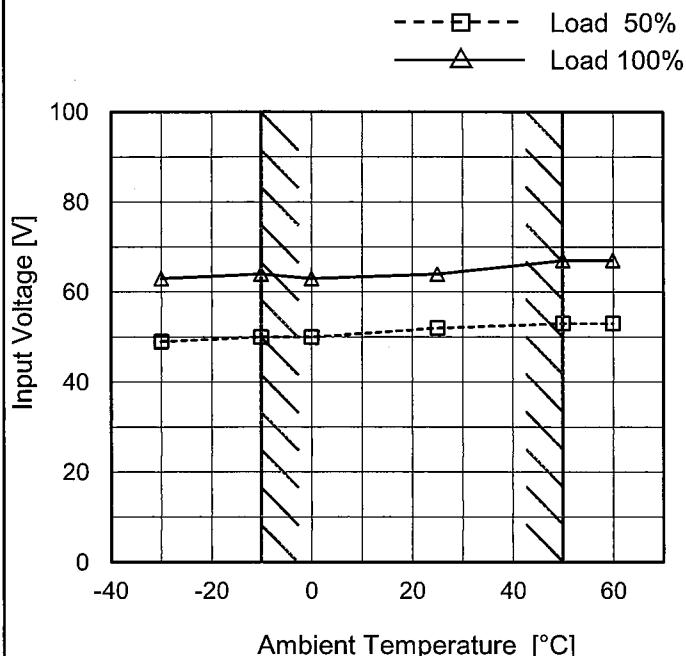
Testing Circuitry   Figure A

1.Graph

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

Input Voltage [V] vs 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	49	63
-10	50	64
0	50	63
25	52	64
50	53	67
60	53	67
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

BC-11205

COSEL

Model	PLA300F-48
Item	Overcurrent Protection
Object	+48V6.3A
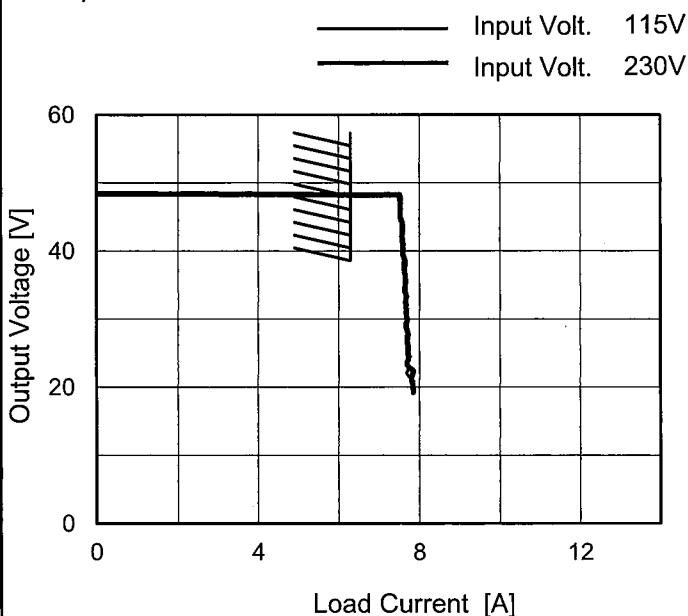
Temperature   25°C
Testing Circuitry   Figure A

1.Graph

——————— Input Volt.   115V
——————— Input Volt.   230V

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

2.Values

Output Voltage [V]	Load Current [A]	
	Input Volt. 115[V]	Input Volt. 230[V]
45.6	7.55	7.53
43.2	7.48	7.52
38.4	7.61	7.64
33.6	7.66	7.67
28.8	7.68	7.66
24.0	7.72	7.73
19.2	7.86	7.84
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

BC-11205

CO$EL

Model	PLA300F-48
Item	Overvoltage Protection
Object	+48V6.3A
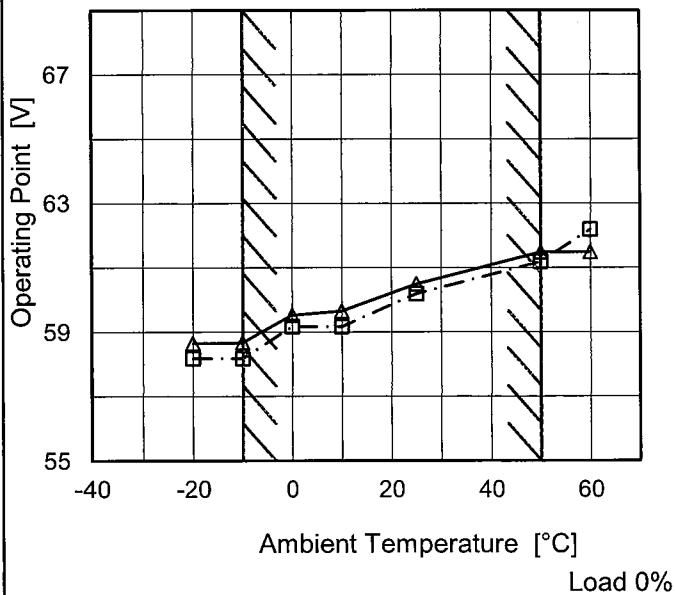
Testing Circuitry   Figure A

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	58.65	58.18
-10	58.67	58.18
0	59.52	59.17
10	59.65	59.17
25	60.49	60.19
50	61.48	61.19
60	61.49	62.19
--	-	-
--	-	-
--	-	-
--	-	-

BC-11205
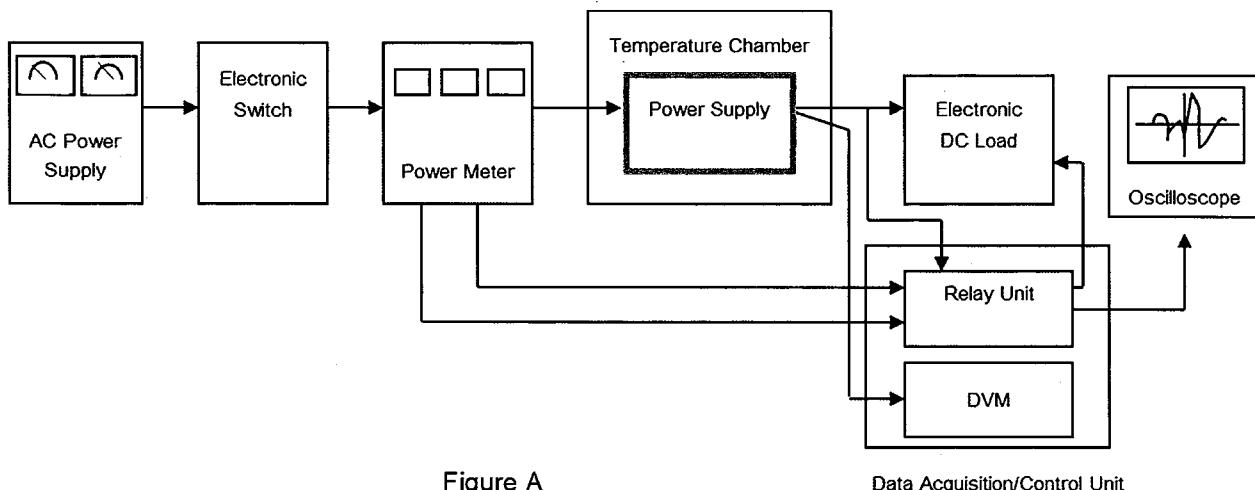
Figure A

Data Acquisition/Control Unit

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

Figure B (DEN-AN)

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

Figure B (IEC60950-1)

BC - 11205

Temperature Chamber

Measuring board

AC Power Supply

Power Meter

Power Supply

C1 C2

Electronic DC Load

Oscilloscope BW:20MHz

150mm
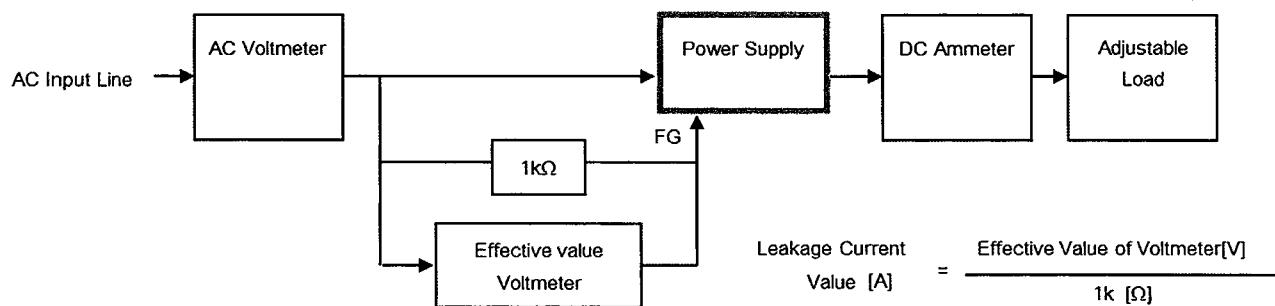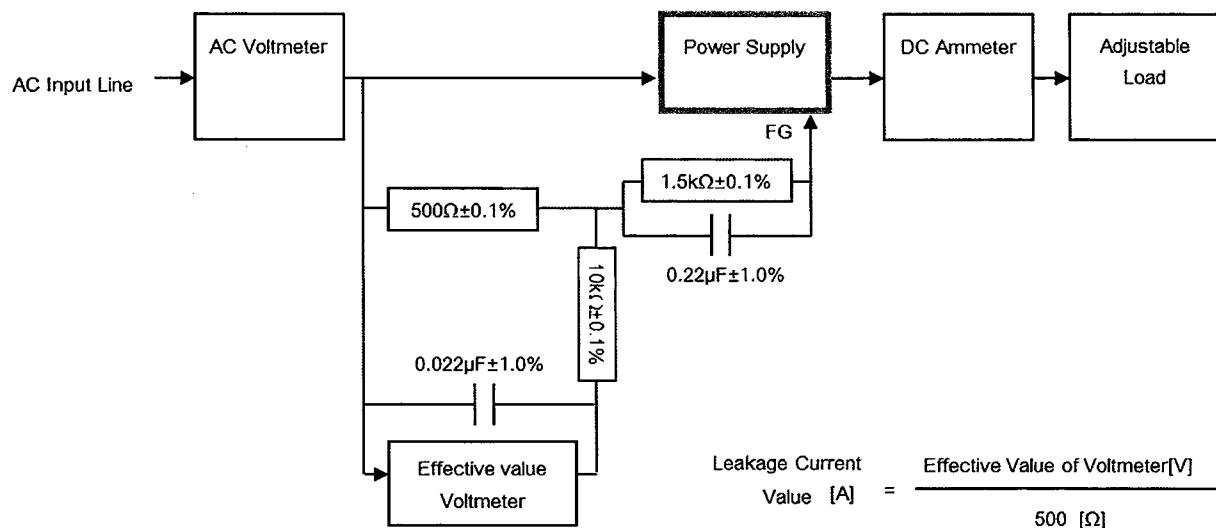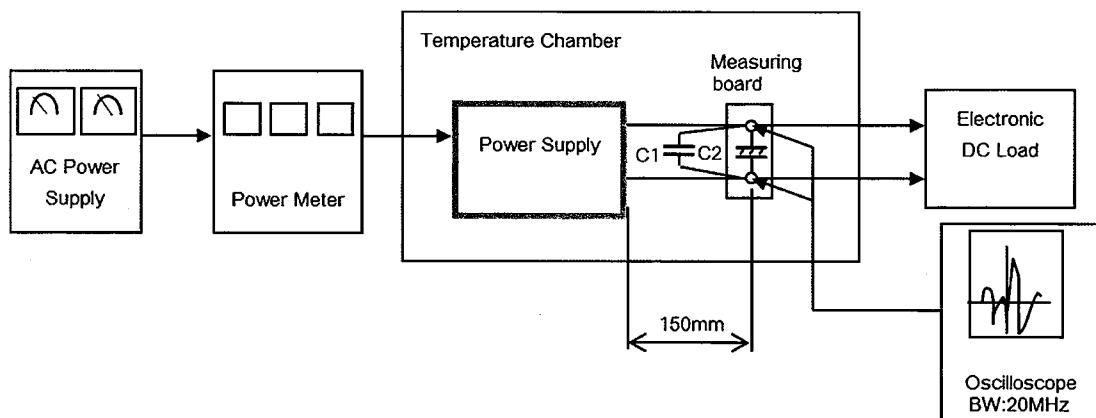
C1= 0.1 μF
(Ceramic capacitor)

C2= 22 μF
(Electrolytic capacitor)

Figure C

BC - 11205