COSEL

TEST DATA OF PBA600F-12

Regulated DC Power Supply
Oct.10. 2003

Approved by : *Kuniaki Nagahara*

Kuniaki Nagahara   Design Manager

Prepared by : *Haruki Morita*

Haruki Morita   Design Engineer

COSEL CO.,LTD.

CO$EL

CONTENTS

(Final Page 24)

COSEL

Model	PBA600F-12
Item	Input Current (by Load Current)
Object	————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph

——△—— Input Volt. 100V
---□--- Input Volt. 200V
—·—○—·— 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. 200[V]	Input Volt. 230[V]
0.0	0.210	0.198	0.190
8.0	1.546	0.794	0.716
16.0	2.644	1.312	1.152
24.0	3.786	1.854	1.620
32.0	4.950	2.412	2.098
40.0	6.130	2.978	2.588
48.0	7.370	3.554	3.088
53.0	8.110	3.930	3.404
58.3	8.980	4.320	3.746
--	-	-	-
--	-	-	-

BC-3517

CO$EL

Model	PBA600F-12
Item	Input Power (by Load Current)
Object	
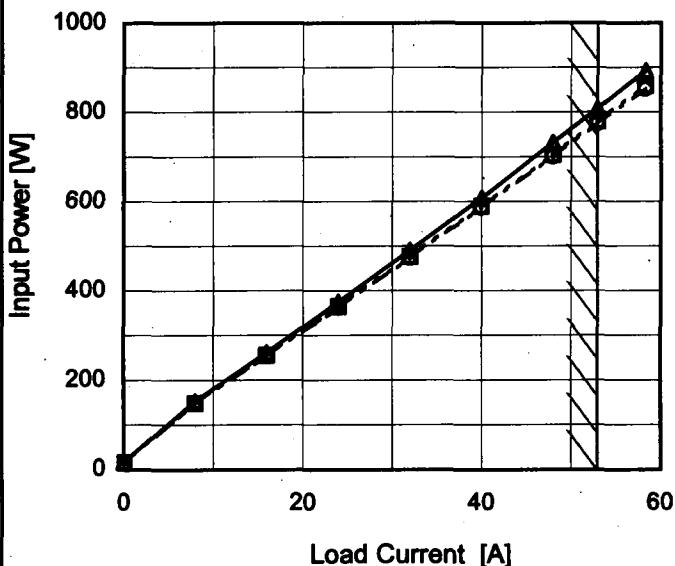
Temperature 25°C
Testing Circuitry Figure A

1.Graph

———△——— Input Volt. 100V
– – –☐– – – Input Volt. 200V
—·—○—·— 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. 200[V]	Input Volt. 230[V]
0.0	16.2	16.0	14.0
8.0	152.7	149.0	149.0
16.0	261.6	256.0	254.0
24.0	375.1	365.0	363.0
32.0	491.0	477.0	474.0
40.0	608.0	590.0	587.0
48.0	732.0	705.0	701.0
53.0	808.0	780.0	775.0
58.3	893.0	859.0	853.0
---	-	-	-
---	-	-	-

BC-3517

CO$EL

Model	PBA600F-12
Item	Efficiency (by Input Voltage)
Object	————————
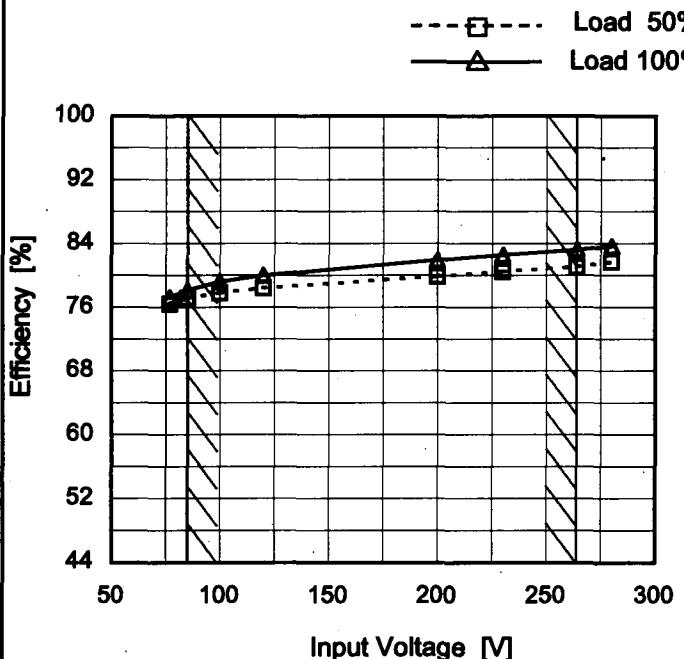
Temperature	25°C
Testing Circuitry	Figure A

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%
77	76.4	77.2
85	77.2	78.2
100	77.8	79.2
120	78.4	80.0
200	79.9	82.0
230	80.5	82.6
264	81.1	83.2
280	81.7	83.7
--	-	-

BC-3517

COSEL

Model	PBA600F-12
Item	Efficiency (by Load Current)
Object	

Temperature	25°C
Testing Circuitry	Figure A

1.Graph

— △ — Input Volt. 100V
- - - ☐ - - - Input Volt. 200V
— · —○— · — Input Volt. 230V

Efficiency [%] vs 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. 200[V]	Input Volt. 230[V]
0.0	-	-	-
8.0	62.9	64.4	64.4
16.0	73.6	75.2	75.8
24.0	77.1	79.3	79.7
32.0	78.6	80.9	81.4
40.0	79.4	81.8	82.2
48.0	79.1	82.1	82.6
53.0	79.1	82.0	82.5
58.3	78.8	81.9	82.4
--	-	-	-
--	-	-	-

- 4 -

BC-3517

CO$EL

Model	PBA600F-12
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%
77	0.991	0.996
85	0.993	0.999
100	0.992	0.998
120	0.995	0.996
200	0.988	0.995
230	0.978	0.990
264	0.963	0.982
280	0.830	0.866
--	-	-

BC-3517

CO$EL

Model	PBA600F-12
Item	Power Factor (by Load Current)
Object	

Temperature   25°C
Testing Circuitry   Figure A

1.Graph

———△——— Input Volt. 100V
— — ☐ — — Input Volt. 200V
—·—○—·— Input Volt. 230V

Power Factor (y-axis), **Load Current [A]** (x-axis)

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]
0.0	0.771	0.400	0.318
8.0	0.989	0.937	0.903
16.0	0.991	0.977	0.958
24.0	0.992	0.984	0.976
32.0	0.994	0.990	0.983
40.0	0.995	0.992	0.988
48.0	0.996	0.993	0.989
53.0	0.999	0.994	0.991
58.3	0.998	0.994	0.992
--	-	-	-
--	-	-	-

BC-3517

CO$EL

Model	PBA600F-12
Item	Inrush Current
Object	

Temperature 25°C
Testing Circuitry Figure A

Input Current [20A/div]

Input Voltage [100V/div]

Time [100mS/div]
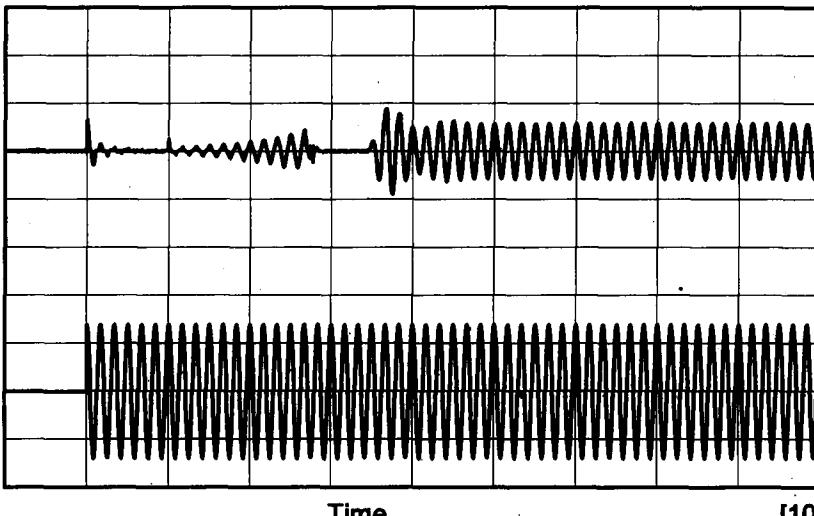
Input Voltage 100 V
Frequency 60 Hz
Load 100 %

Primary inrush current :
13.2 A

Secondary inrush current :
18.0 A

Input Current [20A/div]

Input Voltage [200V/div]

Time [100mS/div]
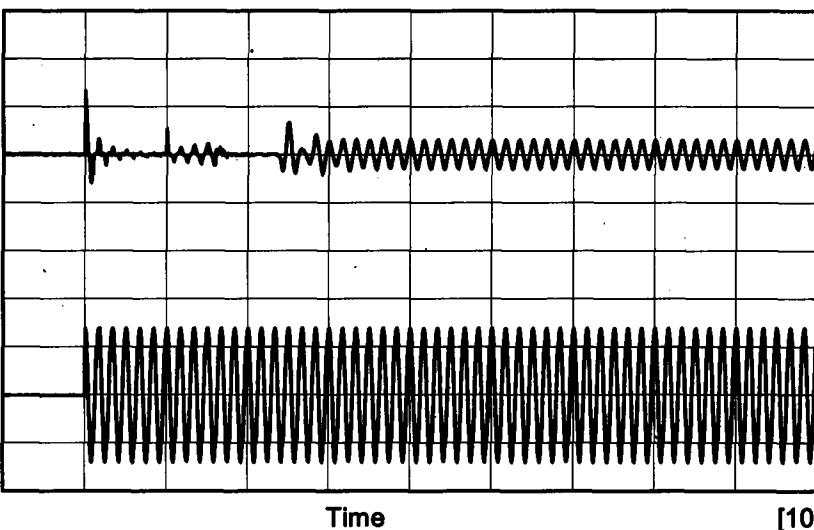
Input Voltage 200 V
Frequency 60 Hz
Load 100 %

Primary inrush current :
26.7 A

Secondary inrush current :
13.5 A

Primary inrush current   Secondary inrush current

BC-3517

CO$EL
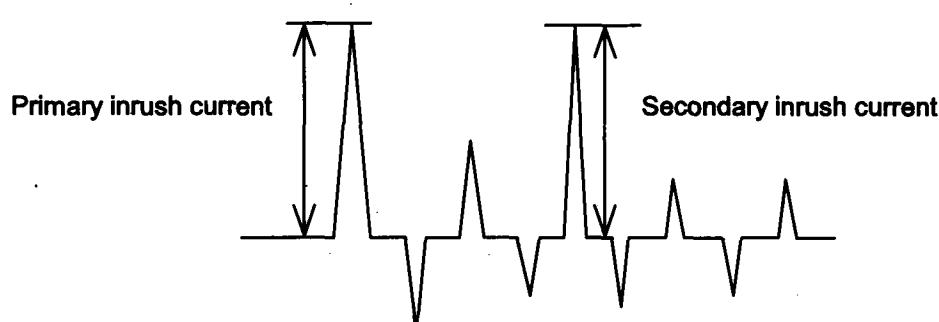
Model	PBA600F-12		Temperature	25°C
Item	Leakage Current		Testing Circuitry	Figure B
Object				

1.Results

[mA]

Standards		Input Volt.			Note
		100[V]	200[V]	240[V]	
DEN-AN	Both phases	0.30	0.47	0.58	Operation
	One of phase	0.38	0.77	0.98	stand by
IEC60950	Both phases	0.24	0.42	0.56	Operation
	One of phase	0.34	0.77	0.91	stand by

The value for "One phase" 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-3517

CO$EL

Model	PBA600F-12
Item	Line Regulation
Object	+12V53A

Temperature	25°C
Testing Circuitry	Figure A

1.Graph

- - - ⊡ - - - Load 50%
———△——— Load 100%

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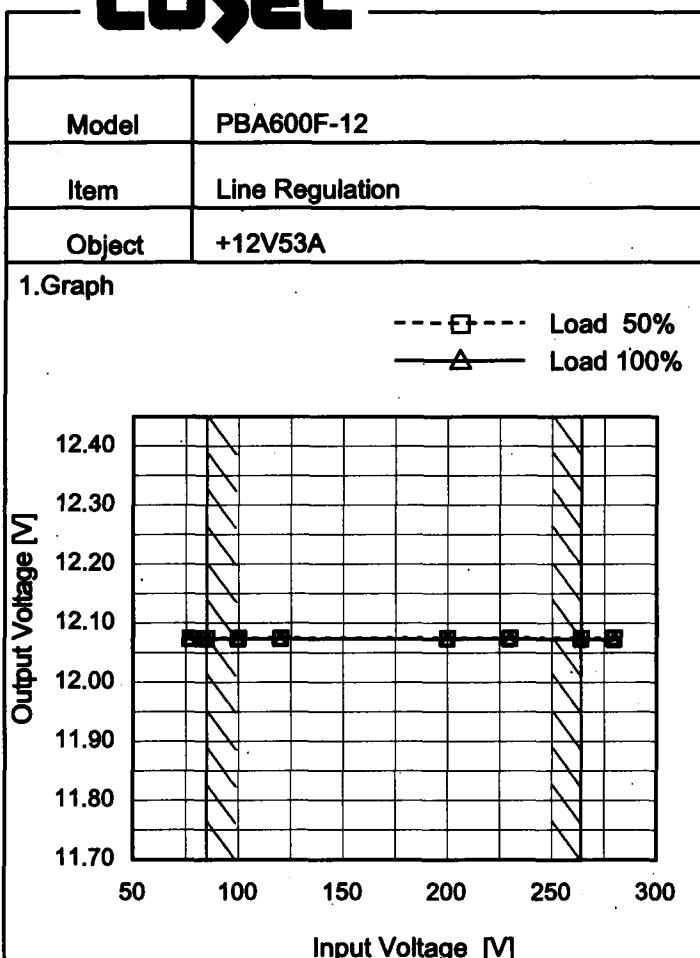
2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
77	12.075	12.074
85	12.075	12.074
100	12.075	12.074
120	12.075	12.074
200	12.075	12.074
230	12.075	12.073
264	12.075	12.073
280	12.075	12.073
---	-	-

BC-3517

COSEL

Model	PBA600F-12
Item	Load Regulation
Object	+12V53A
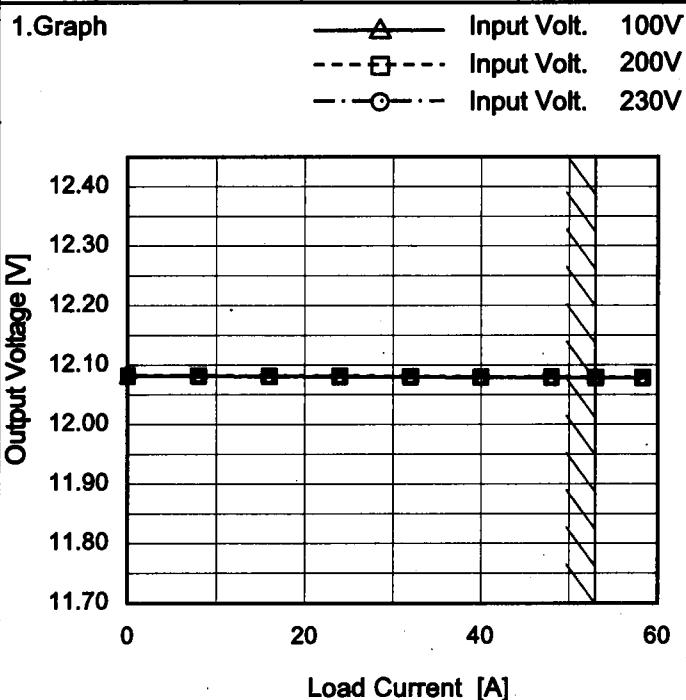
Temperature 25°C
Testing Circuitry Figure A

1.Graph

— △ — Input Volt. 100V
--- □ --- Input Volt. 200V
— · —○— · — 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. 200[V]	Input Volt. 230[V]
0.0	12.082	12.083	12.083
8.0	12.081	12.082	12.082
16.0	12.081	12.082	12.081
24.0	12.081	12.081	12.081
32.0	12.080	12.081	12.080
40.0	12.079	12.080	12.080
48.0	12.079	12.080	12.079
53.0	12.078	12.079	12.079
58.3	12.078	12.079	12.078
--	-	-	-
--	-	-	-

BC-3517

CO$EL

Model	PBA600F-12
Item	Dynamic Load Response
Object	+12V53A

Temperature	25°C
Testing Circuitry	Figure A

Input Volt.   100 V

Cycle   1000 mS

Load Current
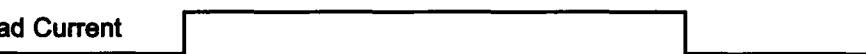
Min.Load (0A) ←→
Load 100% (53A)

100mV/div
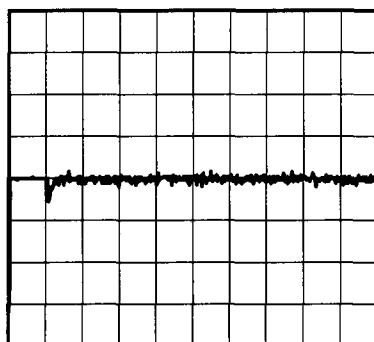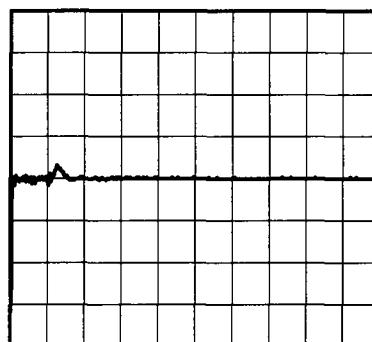
10ms/div   10ms/div

Min.Load (0A) ←→
Load 50% (26.5A)

100mV/div
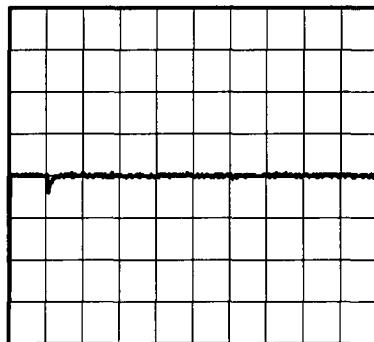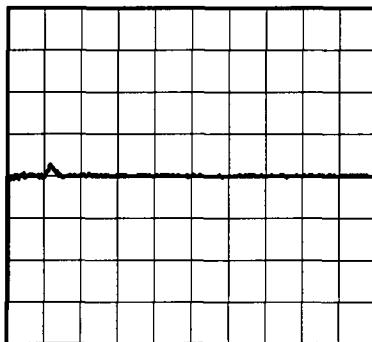
10ms/div   10ms/div

* The characteristic of AC200V is equal.

BC-3517

CO$EL

Model	PBA600F-12
Item	Ripple Voltage (by Load Current)
Object	+12V53A

Temperature   25°C
Testing Circuitry   Figure A

1.Graph

————△———— Input Volt.   100V
—·—○—·— Input Volt.   200V

Ripple Voltage [mV] vs Load Current [A]

2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
0.0	20	20
8.0	25	25
16.0	30	30
24.0	30	30
32.0	30	30
40.0	30	30
48.0	35	35
53.0	40	40
58.3	40	40
--	-	-
--	-	-
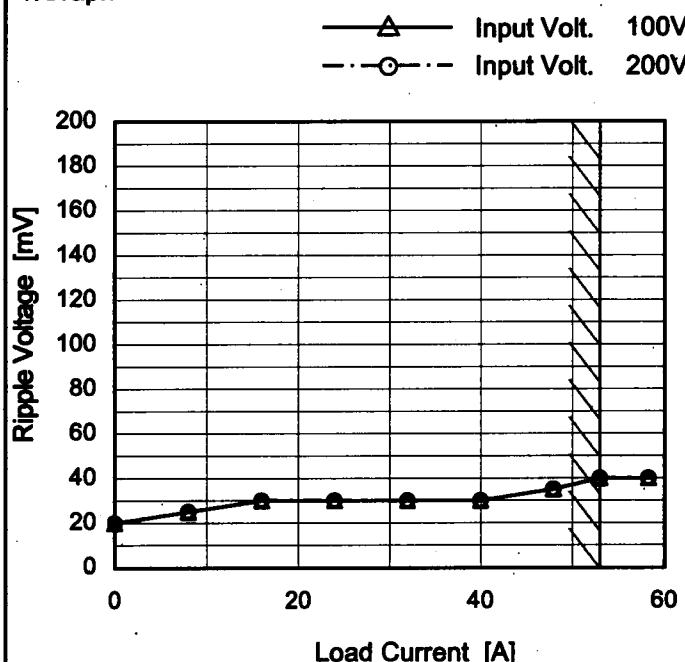
Measured by 20 MHz Oscilloscope.
Ripple Voltage is shown as p-p in the figure below.
Note: Slanted line shows the range of the rated
       load current.

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

Fig. Complex Ripple Wave Form

BC-3517
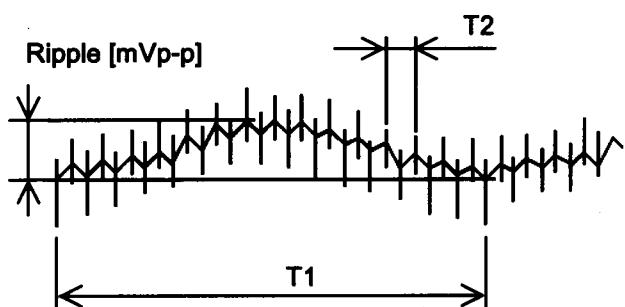
COSEL

Model	PBA600F-12
Item	Ripple-Noise
Object	+12V53A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

```
———△——— Input Volt.  100V
—·—○—·—  Input Volt.  200V
```


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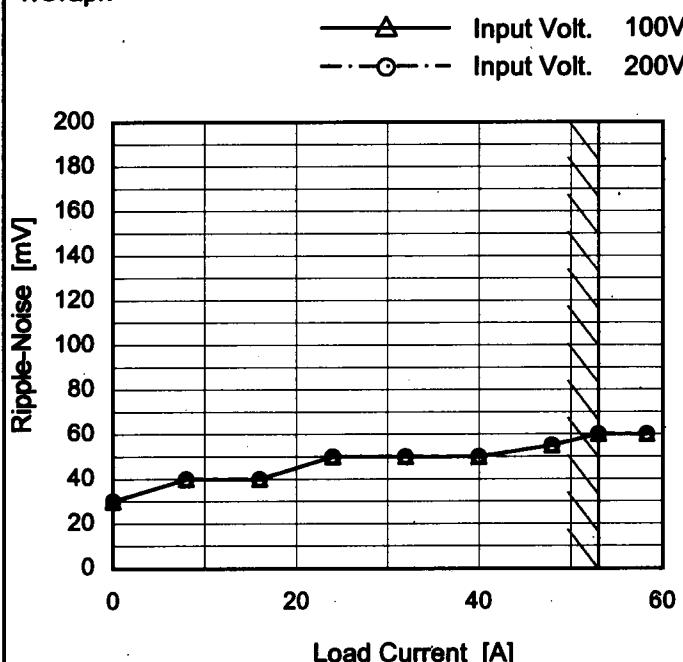
Load Current [A]

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. 200 [V]
0.0	30	30
8.0	40	40
16.0	40	40
24.0	50	50
32.0	50	50
40.0	50	50
48.0	55	55
53.0	60	60
58.3	60	60
--	-	-
--	-	-

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

Ripple-Noise [mVp-p]

T2

T1

Fig. Complex Ripple Wave Form

BC-3517
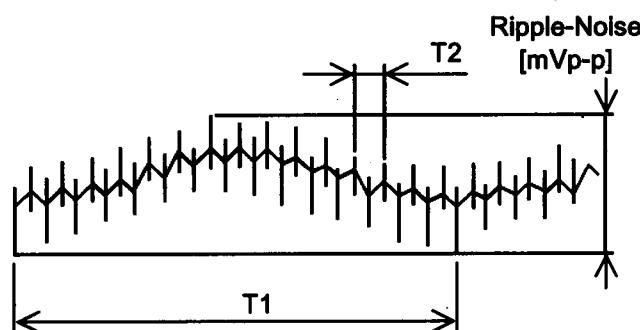
COSEL

Model	PBA600F-12
Item	Ripple Voltage (by Ambient Temp.)
Object	+12V53A

Testing Circuitry Figure A

1.Graph

--- ⊟ --- Input Volt.   100V
—— △ —— Input Volt.   200V

Ambient Temperature [°C]
Load 100 %
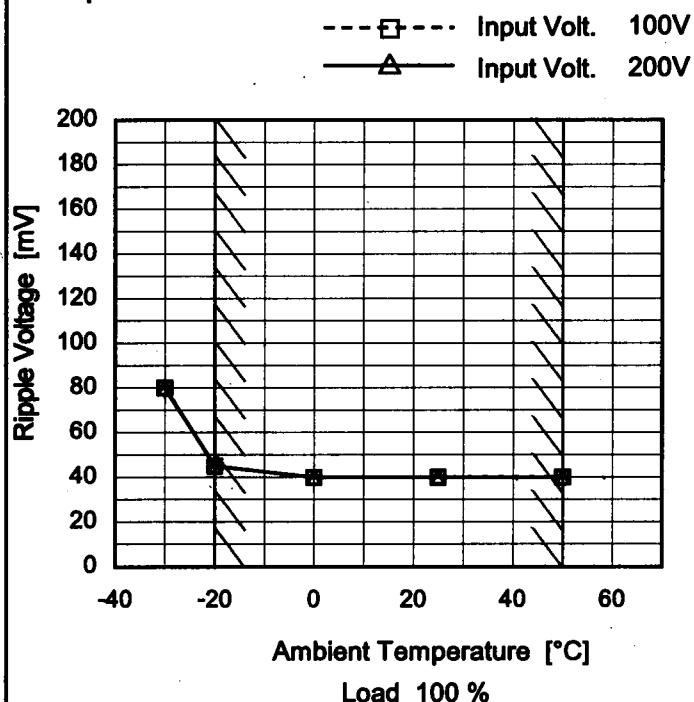
Measured by 20 MHz Oscilloscope.

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. 200 [V]
-30	80	80
-20	45	45
0	40	40
25	40	40
50	40	40
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

BC-3517

COSEL

Model	PBA600F-12
Item	Ambient Temperature Drift
Object	+12V53A
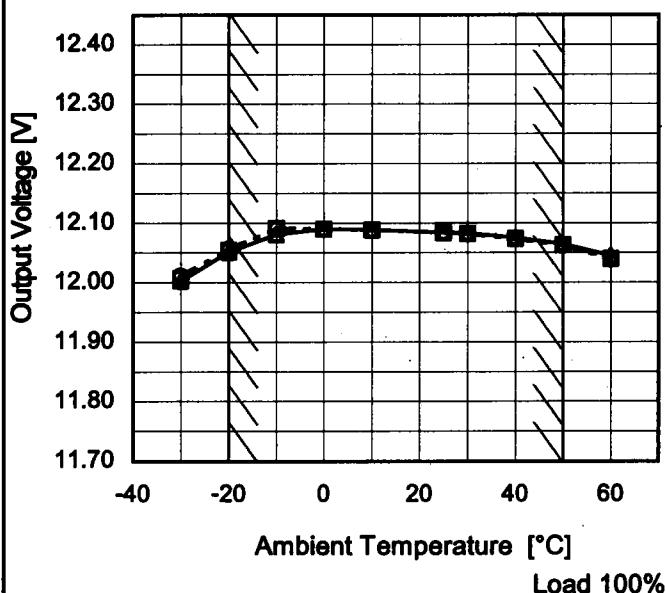
Testing Circuitry   Figure A

1.Graph

───△─── Input Volt.   100V
--- ⊟ --- Input Volt.   200V
─·─○─·─ Input Volt.   230V

Ambient Temperature [°C]

Load 100%

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]
-30	12.003	12.007	12.011
-20	12.051	12.054	12.057
-10	12.081	12.092	12.091
0	12.090	12.090	12.090
10	12.089	12.088	12.088
25	12.085	12.084	12.084
30	12.083	12.082	12.081
40	12.076	12.074	12.073
50	12.065	12.063	12.062
60	12.045	12.040	12.038
--	-	-	-

BC-3517

COSEL

Model	PBA600F-12
Item	Output Voltage Accuracy
Object	+12V53A

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   : -20 - 50°C

Input Voltage   : 85 - 264V

Load Current   : 0 - 53A

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

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

2.Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	-20	264	0	12.096	±21	±0.2
Minimum Voltage	50	264	53	12.055		

BC-3517

参考資料

COSEL

Model	PBA600F-12
Item	Time Lapse Drift
Object	+12V53A
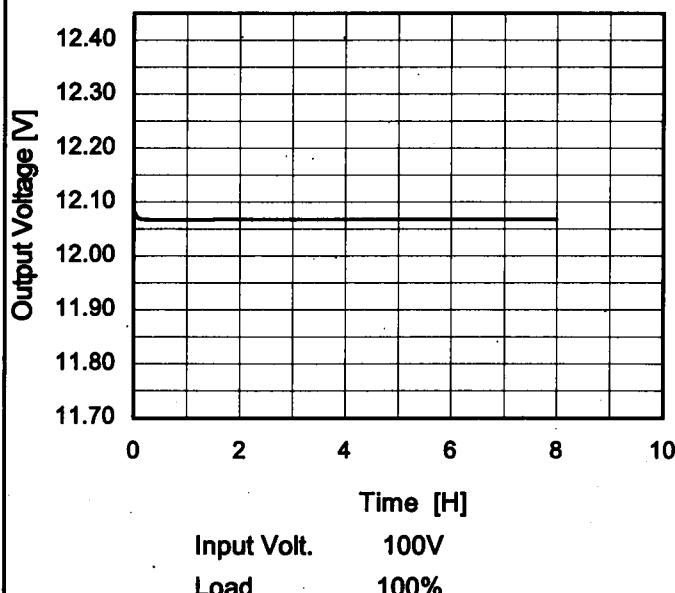
Temperature 25°C
Testing Circuitry Figure A

1.Graph

Input Volt.   100V
Load   100%

* The characteristic of AC200V is equal.

2.Values

Time since start [H]	Output Voltage [V]
0.0	12.085
0.5	12.067
1.0	12.067
2.0	12.068
3.0	12.068
4.0	12.068
5.0	12.068
6.0	12.068
7.0	12.068
8.0	12.068

BC-3517

COSEL

Model	PBA600F-12
Item	Rise and Fall Time
Object	+12V53A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

Load 100%

Output Volt.

[2V/div]

0

Input Volt. 100 V

Load 100%

Output Volt.

[2V/div]

0

Input Volt. 200 V

Input Volt.

0

Time [100mS/div]

Time [10mS/div]
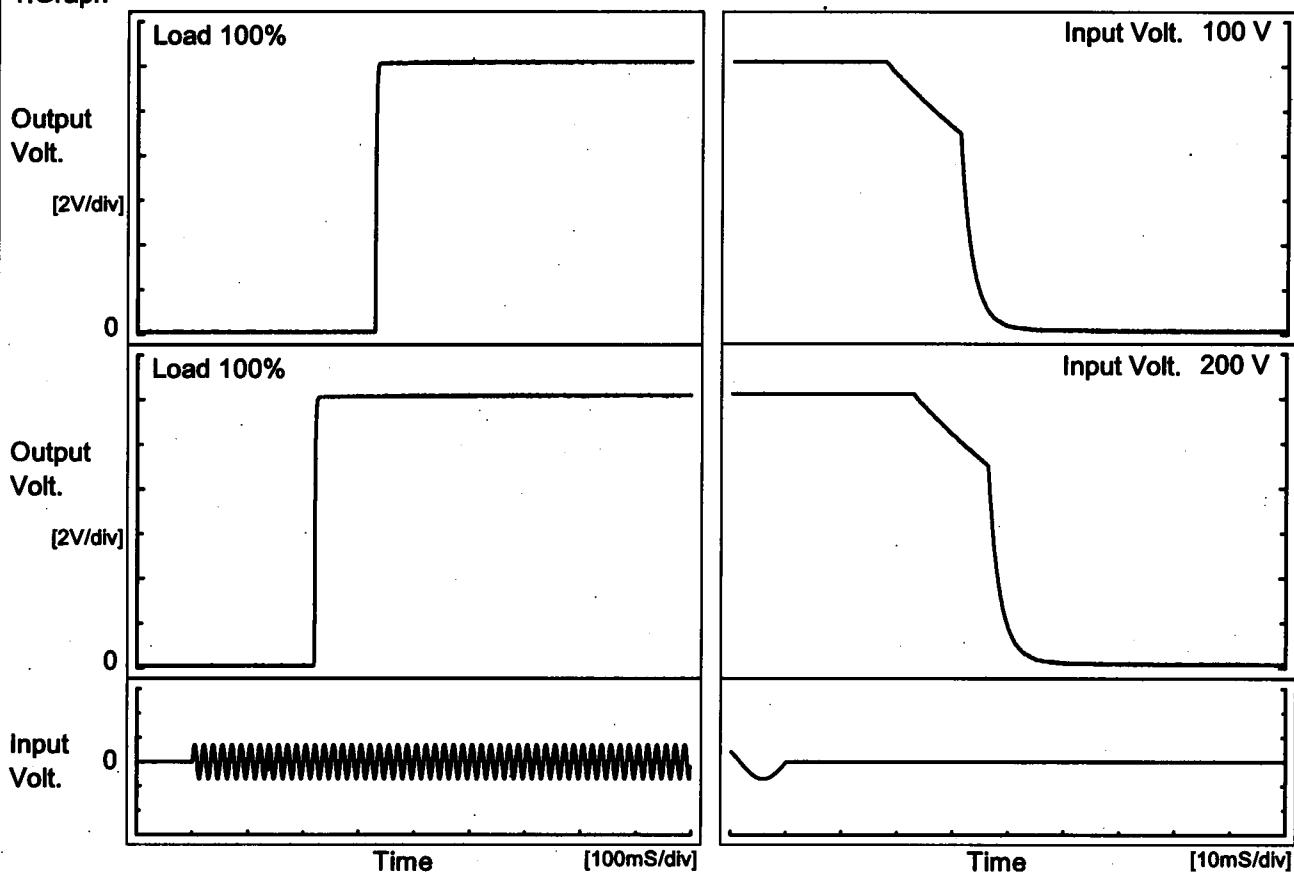
2.Values

[mS]

Input Volt. \ Time	Td	Tr	Ts	Th	Tf
100 V	328.5	3.0	331.5	22.7	13.0
200 V	219.5	3.0	222.5	28.0	13.0

Output Volt.

90%

10%

Input Volt.

Td Tr Th Tf

Ts

BC-3517
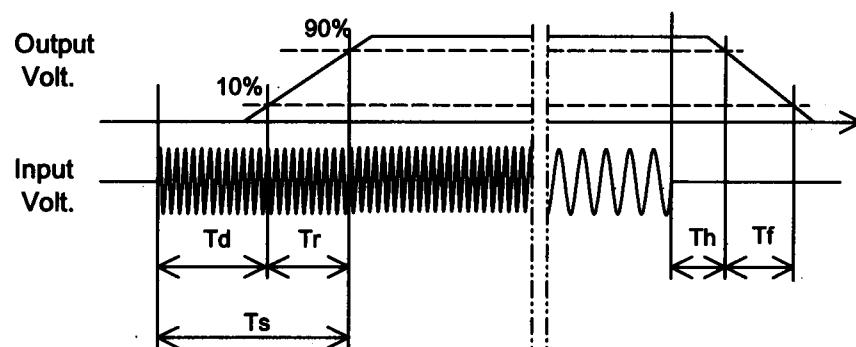
COSEL

Model	PBA600F-12
Item	Hold-Up Time
Object	+12V53A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

--- ☐ --- Load 50%
—△— Load 100%

Input Voltage [V]

2.Values

Input Voltage [V]	Hold-Up Time [mS]	
	Load 50%	Load 100%
77	40	14
85	42	16
100	45	18
120	47	20
200	51	23
230	51	24
264	52	24
280	52	25
--	-	-
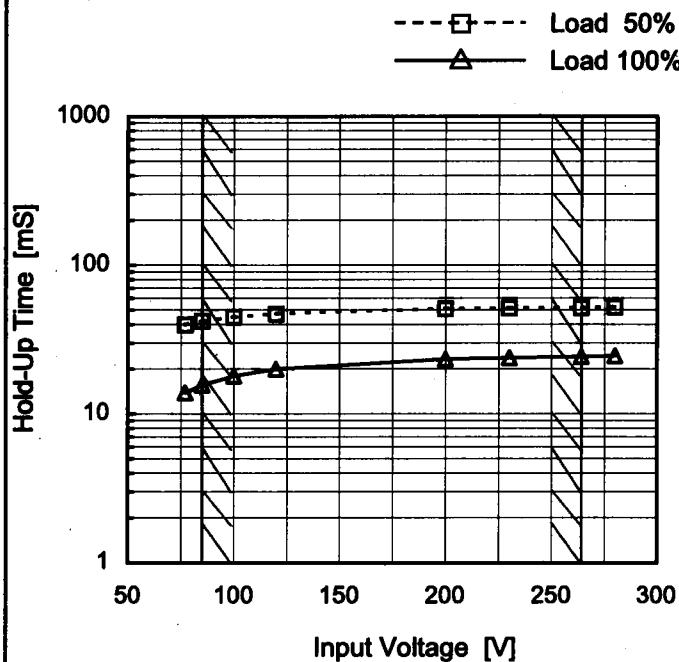
This duration covers from Shut-off of input voltage to the moment when output voltage descends to the rated range of voltage accuracy.
Note: Slanted line shows the range of the rated input voltage.

BC-3517

CO$EL

Model	PBA600F-12
Item	Instantaneous Interruption Compensation
Object	+12V53A
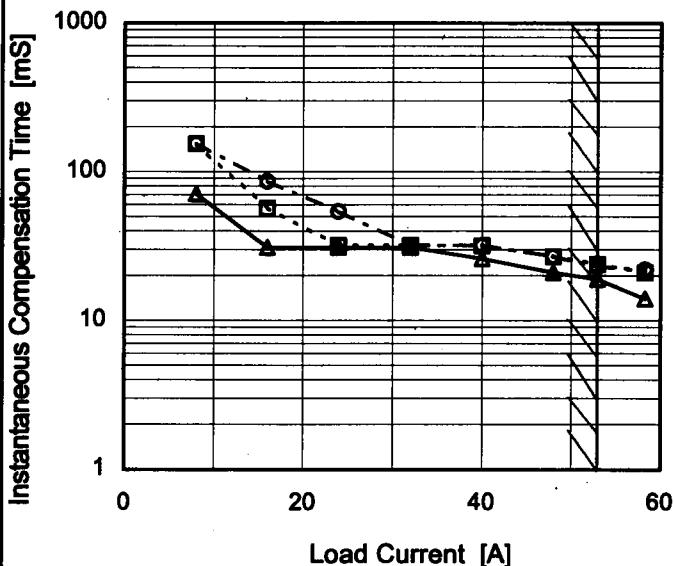
Temperature	25°C
Testing Circuitry	Figure A

1.Graph

———△——— Input Volt. 100V
---⊟--- Input Volt. 200V
—·—○—·— 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. 200[V]	Input Volt. 230[V]
0.0	-	-	-
8.0	71	154	155
16.0	31	57	86
24.0	31	32	54
32.0	31	32	32
40.0	26	32	32
48.0	21	27	27
53.0	19	24	23
58.3	14	21	22
--	-	-	-
--	-	-	-

BC-3517

COSEL

Model	PBA600F-12
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+12V53A
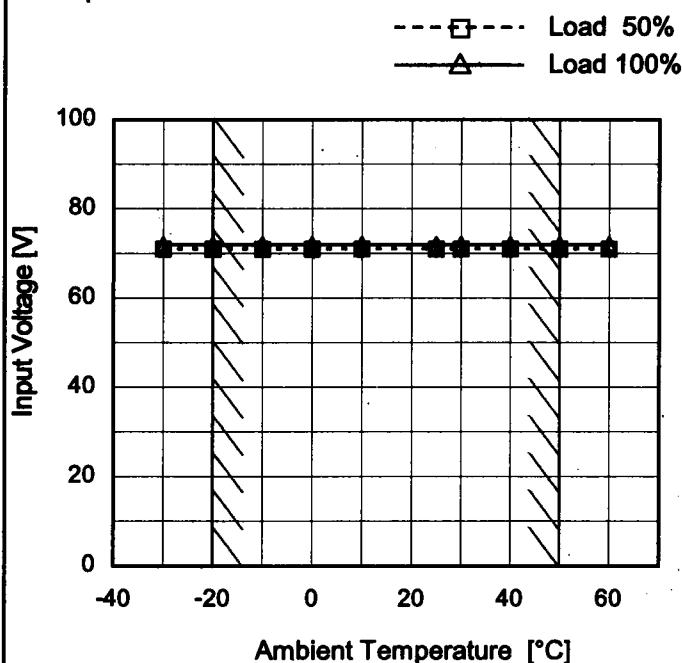
Testing Circuitry　Figure A

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%
-30	71	72
-20	71	72
-10	71	72
0	71	72
10	71	72
25	71	72
30	71	72
40	71	72
50	71	72
60	71	72
--	-	-

BC-3517

COSEL

Model	PBA600F-12
Item	Overcurrent Protection
Object	+12V53A

Temperature　　25°C
Testing Circuitry　Figure A

1.Graph

――――――　Input Volt.　100V
――――――　Input Volt.　200V
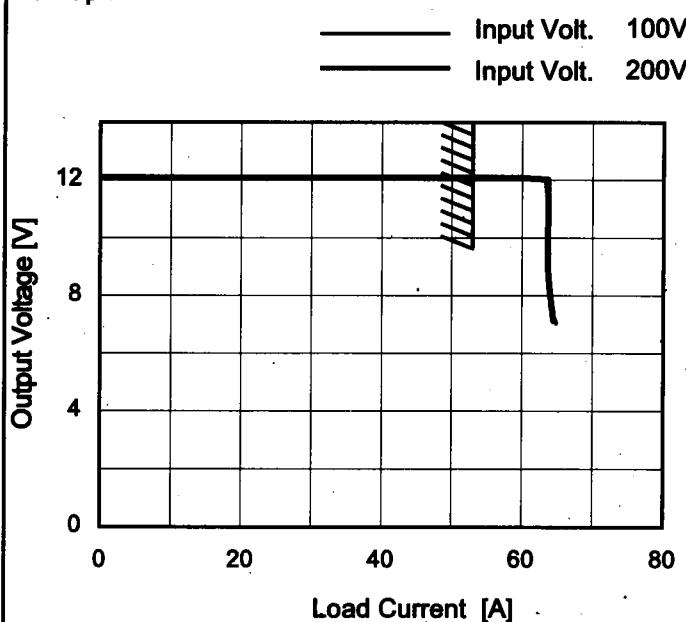
Note: Slanted line shows the range of the rated
load current.

Intermittent opertion occurs when the output
voltage is from 7V to 0V.

2.Values

Output Voltage [V]	Load Current [A]	
	Input Volt. 100[V]	Input Volt. 200[V]
12.0	61.46	60.08
11.4	63.54	63.71
10.8	63.68	63.72
9.6	63.86	63.69
8.4	63.94	63.91
7.2	64.29	64.57
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

BC-3517

COSEL

Model	PBA600F-12
Item	Overvoltage Protection
Object	+12V53A

Testing Circuitry   Figure A

1.Graph

— △ — Input Volt. 100V
--- □ --- Input Volt. 200V

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. 200[V]
-30	15.63	15.63
-20	15.63	15.63
-10	15.63	15.63
0	15.63	15.63
10	15.63	15.63
25	15.63	15.63
30	15.63	15.63
40	15.63	15.63
50	15.63	15.63
60	15.63	15.63
—	-	-

BC-3517

COSEL

Figure A

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

Figure B (DEN-AN)

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

Figure B (IEC60950)

BC-3517