

# TEST DATA OF PBA1000F-3R3

Regulated DC Power Supply  
Mar.30, 2004

Approved by : Kuniaki Nagahara  
Kuniaki Nagahara Design Manager

Prepared by : Kazunari Uotani  
Kazunari Uotani Design Engineer

**COSEL CO.,LTD.**

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Model		PBA1000F-3R3		Temperature 25°C																																																				
Item		Input Current (by Load Current)		Testing Circuitry Figure A																																																				
Object																																																								
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<div><div><div>—△—</div><div>---□---</div><div>---○---</div></div><div><div>Input Volt.</div><div>Input Volt.</div><div>Input Volt.</div></div><div><div>100V</div><div>200V</div><div>230V</div></div></div> <p>Input Current [A]</p> <p>Load Current [A]</p>				<table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Input Current [A]</th></tr><tr><th>Input Volt. 100[V]</th><th>Input Volt. 200[V]</th><th>Input Volt. 230[V]</th></tr><tr><td>0</td><td>0.298</td><td>0.227</td><td>0.237</td></tr><tr><td>40</td><td>2.138</td><td>1.144</td><td>1.014</td></tr><tr><td>80</td><td>3.780</td><td>1.958</td><td>1.722</td></tr><tr><td>120</td><td>5.490</td><td>2.774</td><td>2.438</td></tr><tr><td>160</td><td>7.190</td><td>3.620</td><td>3.164</td></tr><tr><td>200</td><td>9.000</td><td>4.490</td><td>3.915</td></tr><tr><td>220</td><td>9.940</td><td>4.940</td><td>4.297</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr></table>		Load Current [A]	Input Current [A]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	0	0.298	0.227	0.237	40	2.138	1.144	1.014	80	3.780	1.958	1.722	120	5.490	2.774	2.438	160	7.190	3.620	3.164	200	9.000	4.490	3.915	220	9.940	4.940	4.297	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
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<div><div>Input Power [W]</div><div><div>Load Current [A]</div></div></div>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Input Power [W]</th></tr><tr><th>Input Volt. 100[V]</th><th>Input Volt. 200[V]</th><th>Input Volt. 230[V]</th></tr><tr><td>0</td><td>22.2</td><td>17.0</td><td>15.0</td></tr><tr><td>40</td><td>199.8</td><td>198.0</td><td>198.0</td></tr><tr><td>80</td><td>364.0</td><td>359.0</td><td>358.0</td></tr><tr><td>120</td><td>535.0</td><td>525.0</td><td>523.0</td></tr><tr><td>160</td><td>705.0</td><td>694.0</td><td>691.0</td></tr><tr><td>200</td><td>889.0</td><td>870.0</td><td>865.0</td></tr><tr><td>220</td><td>983.0</td><td>960.0</td><td>953.0</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr></table>		Load Current [A]	Input Power [W]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	0	22.2	17.0	15.0	40	199.8	198.0	198.0	80	364.0	359.0	358.0	120	535.0	525.0	523.0	160	705.0	694.0	691.0	200	889.0	870.0	865.0	220	983.0	960.0	953.0	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
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Model		PBA1000F-3R3	
Item		Efficiency (by Input Voltage)	
Object			

1.Graph

Load 50%

Load 100%

Efficiency [%]

100

92

84

76

68

60

52

44

50

100

150

200

250

300

Input Voltage [V]

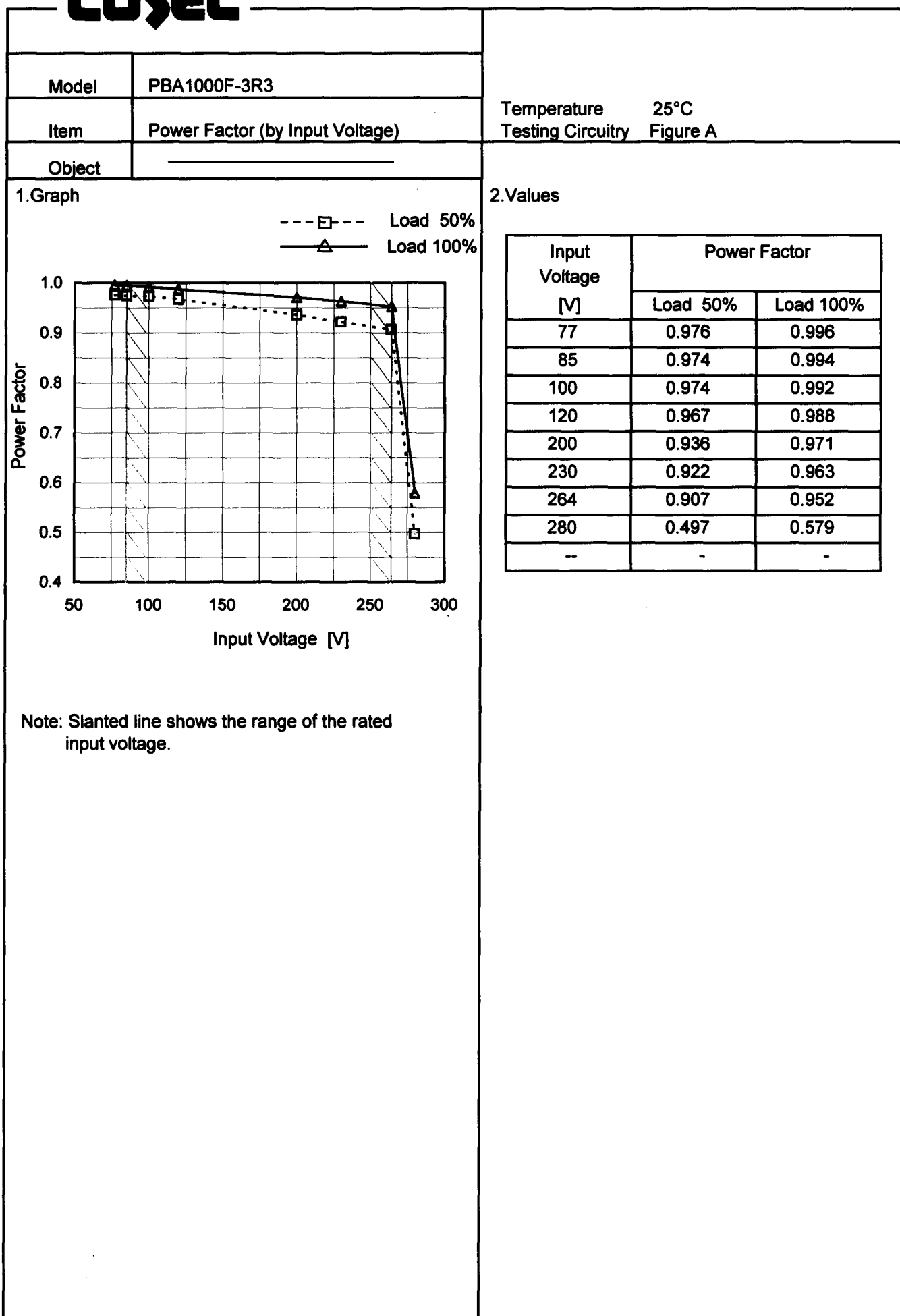
Note: Slanted line shows the range of the rated input voltage.

2.Values

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
77	74.3	73.5
85	74.2	74.1
100	74.7	74.9
120	74.7	75.6
200	75.5	76.5
230	75.7	77.0
264	76.0	77.2
280	78.6	78.2
--	-	-

# COSEL

Model		PBA1000F-3R3		Temperature Testing Circuitry	25°C Figure A																																																			
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Load Current [A]	Efficiency [%]																																																							
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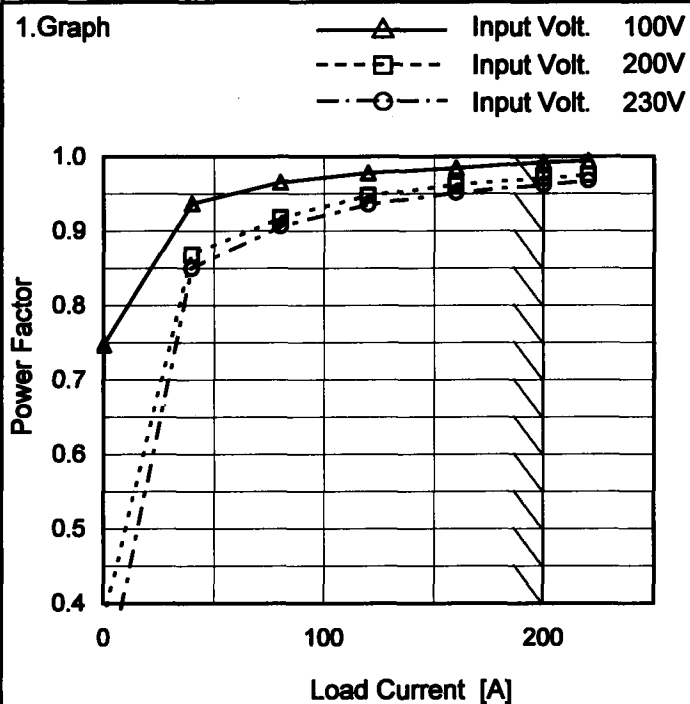
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**Model** PBA1000F-3R3

**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.

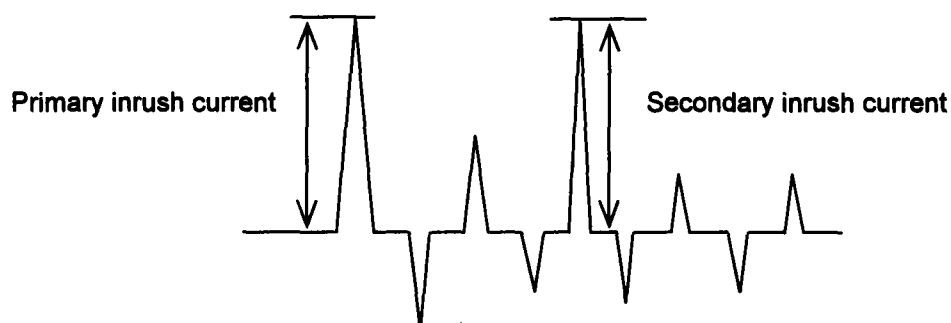
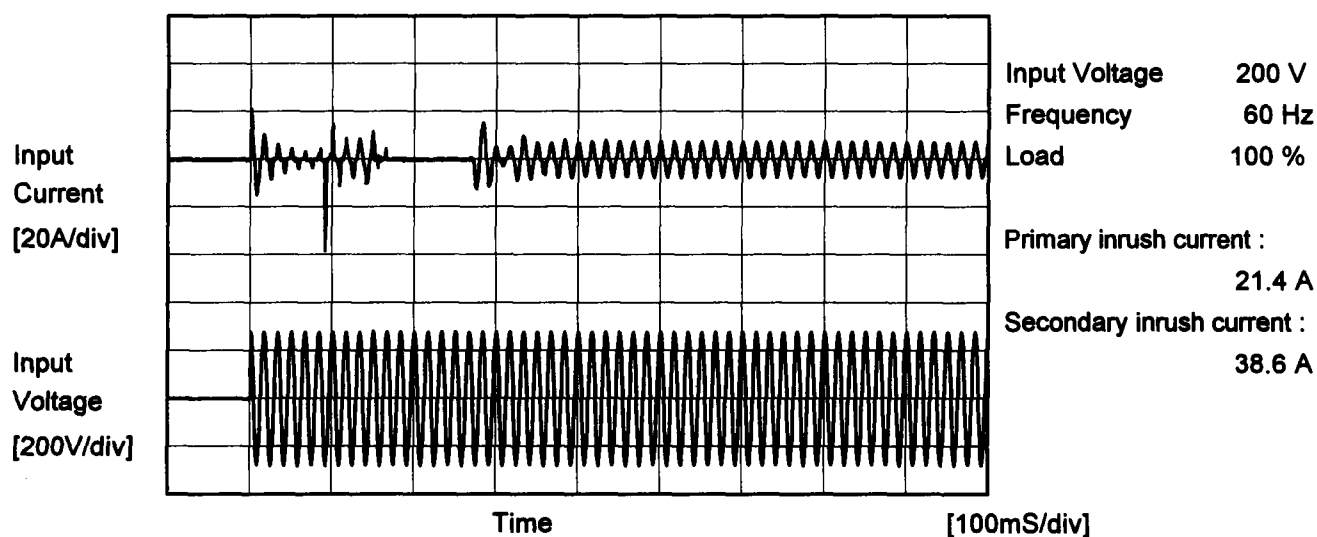
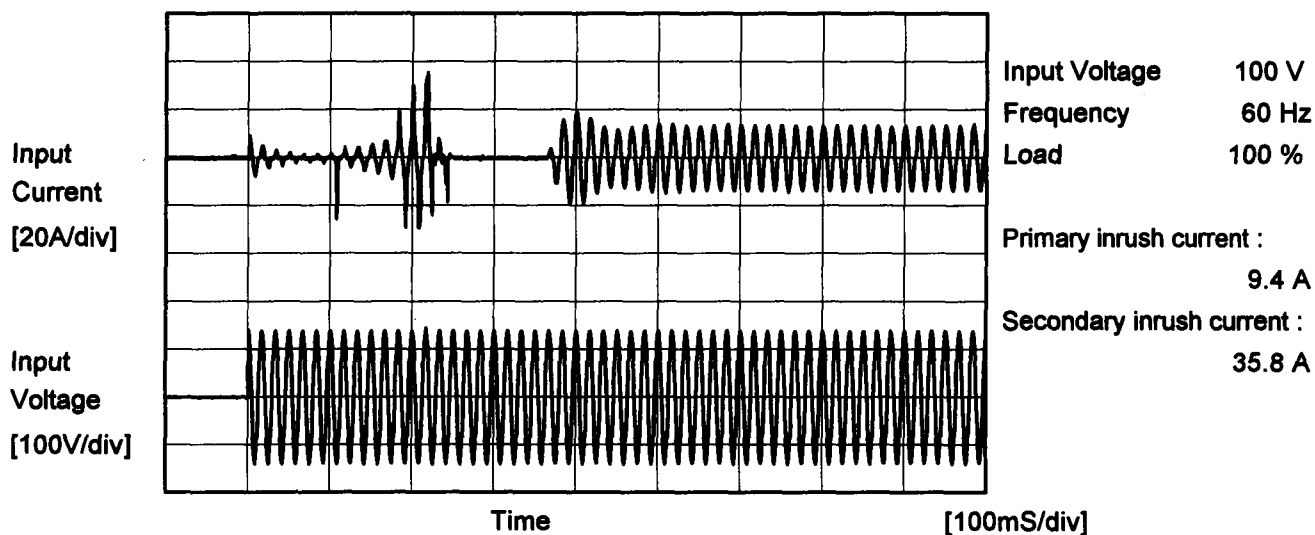
**2. Values**

Load Current [A]	Power Factor		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0	0.747	0.378	0.278
40	0.937	0.868	0.850
80	0.966	0.918	0.906
120	0.978	0.948	0.936
160	0.985	0.963	0.952
200	0.992	0.971	0.962
220	0.994	0.976	0.968
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—



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Model	PBA1000F-3R3	Temperature    25°C Testing Circuitry   Figure A	
Item	Inrush Current		
Object	_____		





		Temperature 25°C Testing Circuitry Figure B
Model	PBA1000F-3R3	
Item	Leakage Current	
Object		

## 1.Results

[mA]

Standards		Input Volt.			Note
		100[V]	200[V]	240[V]	
DEN-AN	Both phases	0.20	0.40	0.42	Operation
	One of phase	0.35	0.73	0.78	stand by
IEC60950	Both phases	0.21	0.40	0.52	Operation
	One of phase	0.36	0.72	0.87	stand by

The value for "One phase" is the reference value only.

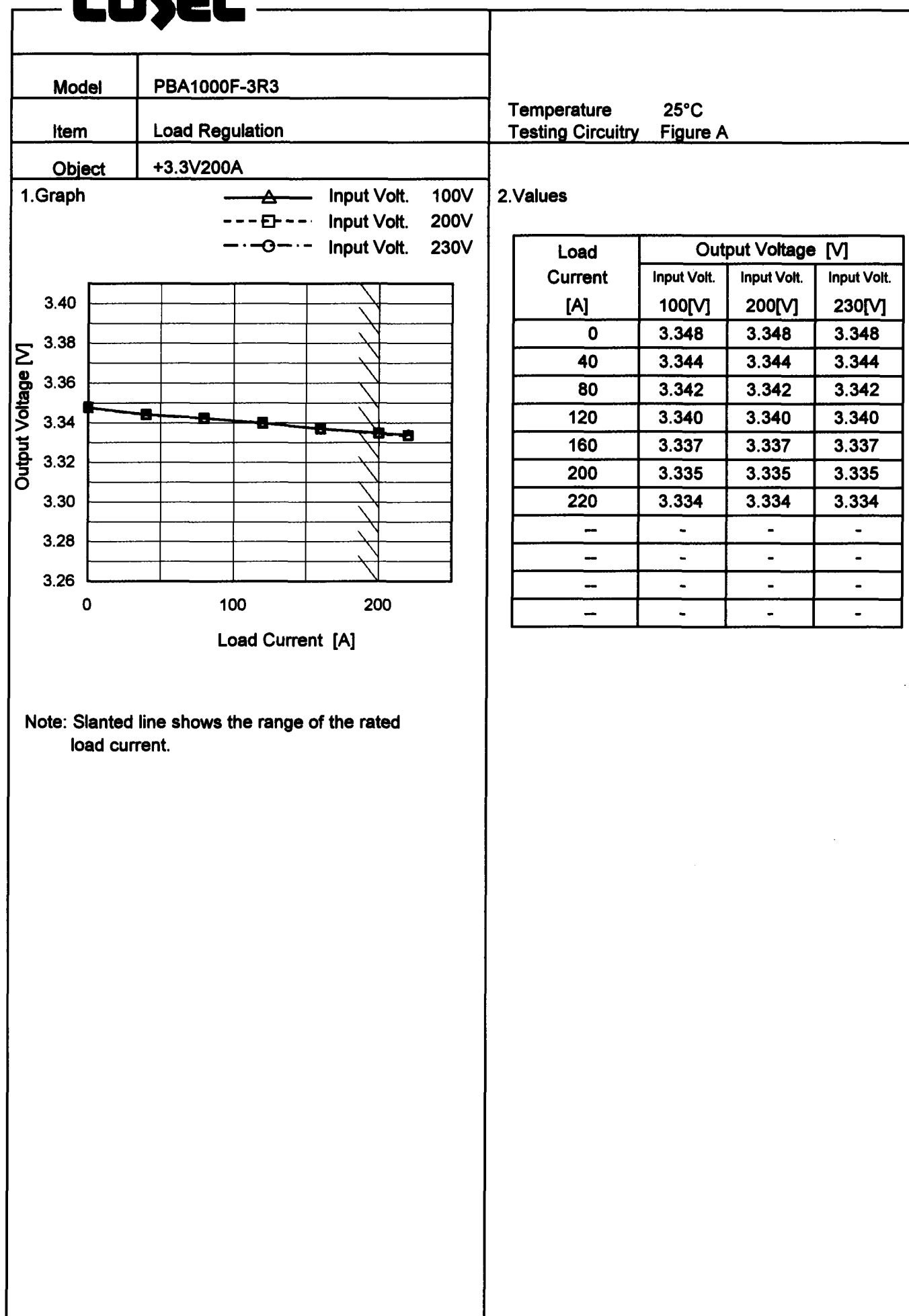
## 2.Condition

Leakage current value is concluded after measuring both phases of AC input and by choosing the larger one.

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Model	PBA1000F-3R3	Temperature 25°C Testing Circuitry Figure A																															
Item	Line Regulation																																
Object	+3.3V200A																																
1.Graph		2.Values																															
<div><div><div>---□---</div><div>Load 50%</div></div><div><div>—△—</div><div>Load 100%</div></div></div> <table><thead><tr><th>Input Voltage [V]</th><th>Output Voltage [V] Load 50%</th><th>Output Voltage [V] Load 100%</th></tr></thead><tbody><tr><td>77</td><td>3.341</td><td>3.335</td></tr><tr><td>85</td><td>3.341</td><td>3.335</td></tr><tr><td>100</td><td>3.341</td><td>3.335</td></tr><tr><td>120</td><td>3.341</td><td>3.335</td></tr><tr><td>200</td><td>3.341</td><td>3.334</td></tr><tr><td>230</td><td>3.341</td><td>3.334</td></tr><tr><td>264</td><td>3.341</td><td>3.334</td></tr><tr><td>280</td><td>3.341</td><td>3.334</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></tbody></table>		Input Voltage [V]	Output Voltage [V] Load 50%	Output Voltage [V] Load 100%	77	3.341	3.335	85	3.341	3.335	100	3.341	3.335	120	3.341	3.335	200	3.341	3.334	230	3.341	3.334	264	3.341	3.334	280	3.341	3.334	--	-	-		
Input Voltage [V]	Output Voltage [V] Load 50%	Output Voltage [V] Load 100%																															
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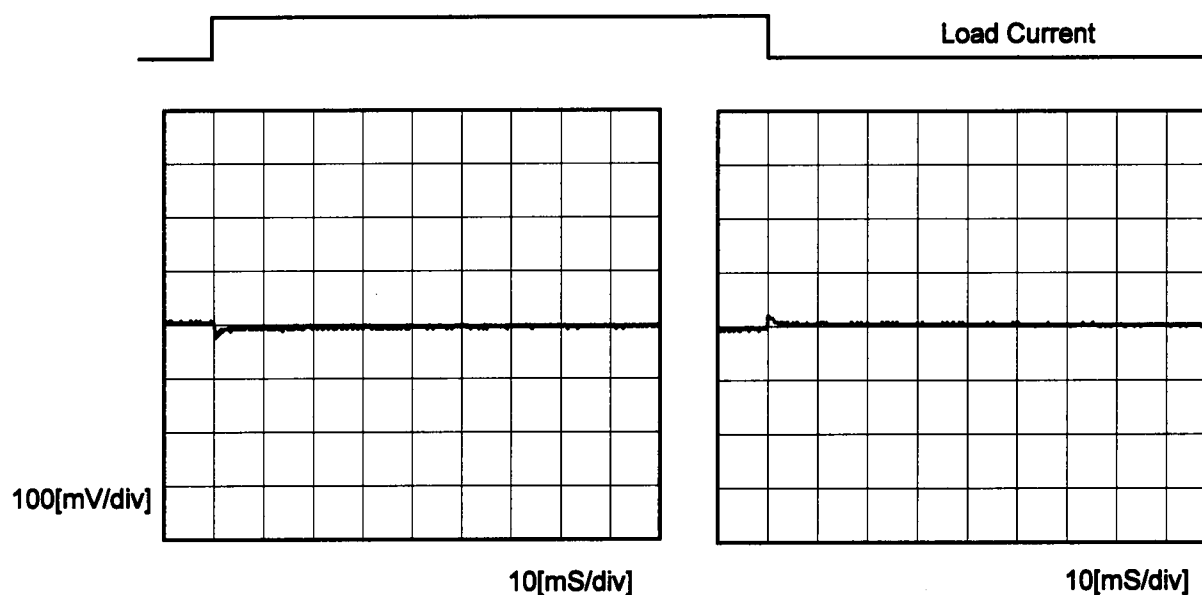
**COSEL**

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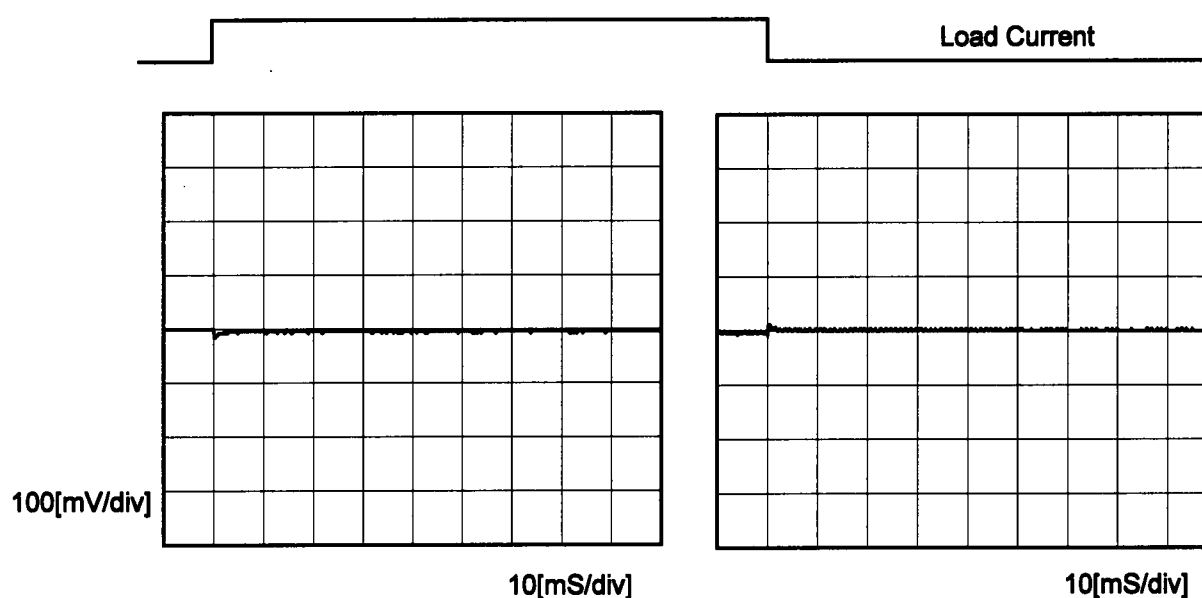
Model	PBA1000F-3R3	Temperature Testing Circuitry	25°C Figure A
Item	Dynamic Load Response		
Object	+3.3V200A		

Input Volt. 100 V  
Cycle 1000 mS

Min. Load ( 0 A ) -- Load 100% ( 200 A )



Min. Load ( 0 A ) -- Load 50% ( 100 A )

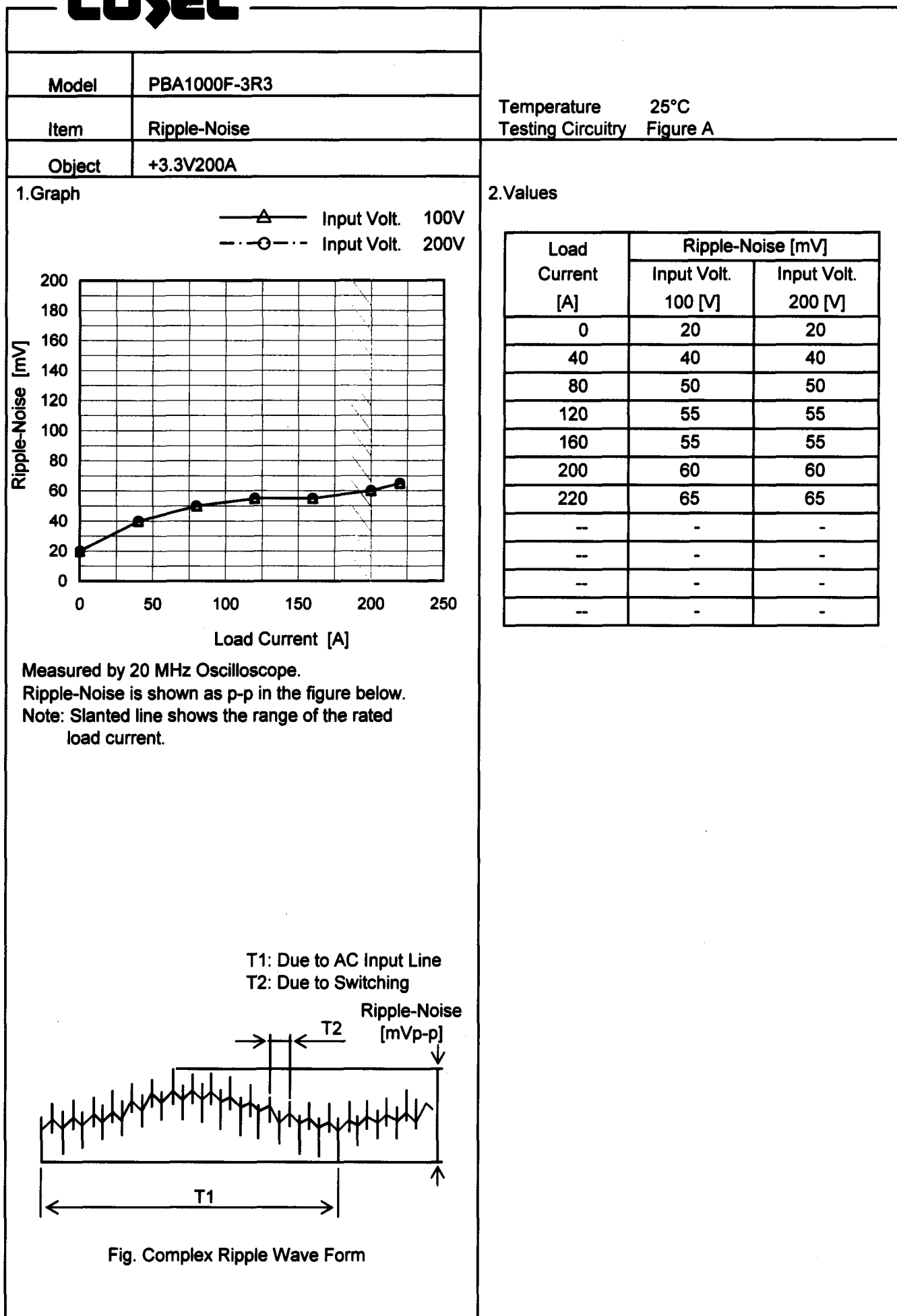


\* The characteristic of AC200V is equal.

# COSEL

Model	PBA1000F-3R3																																								
Item	Ripple Voltage (by Load Current)	Temperature	25°C																																						
Object	+3.3V200A	Testing Circuitry	Figure A																																						
1.Graph		2.Values																																							
<div><div><div>—△— Input Volt. 100V</div><div>- - -○- - - Input Volt. 200V</div></div><div>Ripple Voltage [mV]</div><div>Load Current [A]</div></div> <div><p>Measured by 20 MHz Oscilloscope.</p><p>Ripple Voltage is shown as p-p in the figure below.</p><p>Note: Slanted line shows the range of the rated load current.</p></div> <div><div>T1: Due to AC Input Line</div><div>T2: Due to Switching</div><div>Ripple [mVp-p]</div><div>T1</div><div>T2</div></div> <div>Fig. Complex Ripple Wave Form</div>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="2">Ripple Voltage [mV]</th></tr><tr><th>Input Volt. 100 [V]</th><th>Input Volt. 200 [V]</th></tr><tr><td>0</td><td>15</td><td>15</td></tr><tr><td>40</td><td>25</td><td>25</td></tr><tr><td>80</td><td>30</td><td>30</td></tr><tr><td>120</td><td>35</td><td>35</td></tr><tr><td>160</td><td>40</td><td>40</td></tr><tr><td>200</td><td>45</td><td>45</td></tr><tr><td>220</td><td>45</td><td>45</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></table>		Load Current [A]	Ripple Voltage [mV]		Input Volt. 100 [V]	Input Volt. 200 [V]	0	15	15	40	25	25	80	30	30	120	35	35	160	40	40	200	45	45	220	45	45	--	-	-	--	-	-	--	-	-	--	-	-
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# COSEL



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Model		PBA1000F-3R3																																								
Item		Ripple Voltage (by Ambient Temp.)																																								
Object		+3.3V200A																																								
1.Graph																																										
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Ambient Temperature [°C]	Input Volt. 100 [V]	Input Volt. 200 [V]																																								
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# COSEL

Model	PBA1000F-3R3																																																			
Item	Ambient Temperature Drift																																																			
Object	+3.3V200A																																																			
1.Graph		2.Values																																																		
<div><div><div>—△— Input Volt. 100V</div><div>---□--- Input Volt. 200V</div><div>---○--- Input Volt. 230V</div></div><div><p>Output Voltage [V]</p><p>Ambient Temperature [°C]</p><p>Load 100%</p></div></div> <div>Note: Slanted line shows the range of the rated ambient temperature.</div> <div><table><tr><th rowspan="2">Ambient Temperature [°C]</th><th colspan="3">Output Voltage [V]</th></tr><tr><th>Input Volt. 100[V]</th><th>Input Volt. 200[V]</th><th>Input Volt. 230[V]</th></tr><tr><td>-30</td><td>3.341</td><td>3.341</td><td>3.341</td></tr><tr><td>-20</td><td>3.340</td><td>3.340</td><td>3.340</td></tr><tr><td>-10</td><td>3.339</td><td>3.339</td><td>3.339</td></tr><tr><td>0</td><td>3.339</td><td>3.339</td><td>3.339</td></tr><tr><td>10</td><td>3.339</td><td>3.339</td><td>3.339</td></tr><tr><td>25</td><td>3.338</td><td>3.338</td><td>3.338</td></tr><tr><td>30</td><td>3.338</td><td>3.337</td><td>3.337</td></tr><tr><td>40</td><td>3.336</td><td>3.335</td><td>3.335</td></tr><tr><td>50</td><td>3.333</td><td>3.333</td><td>3.332</td></tr><tr><td>60</td><td>3.328</td><td>3.327</td><td>3.326</td></tr><tr><td>—</td><td>-</td><td>-</td><td>-</td></tr></table></div>		Ambient Temperature [°C]	Output Voltage [V]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	-30	3.341	3.341	3.341	-20	3.340	3.340	3.340	-10	3.339	3.339	3.339	0	3.339	3.339	3.339	10	3.339	3.339	3.339	25	3.338	3.338	3.338	30	3.338	3.337	3.337	40	3.336	3.335	3.335	50	3.333	3.333	3.332	60	3.328	3.327	3.326	—	-	-	-
Ambient Temperature [°C]	Output Voltage [V]																																																			
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]																																																	
-30	3.341	3.341	3.341																																																	
-20	3.340	3.340	3.340																																																	
-10	3.339	3.339	3.339																																																	
0	3.339	3.339	3.339																																																	
10	3.339	3.339	3.339																																																	
25	3.338	3.338	3.338																																																	
30	3.338	3.337	3.337																																																	
40	3.336	3.335	3.335																																																	
50	3.333	3.333	3.332																																																	
60	3.328	3.327	3.326																																																	
—	-	-	-																																																	

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



		Testing Circuitry Figure A
Model	PBA1000F-3R3	
Item	Output Voltage Accuracy	
Object	+3.3V200A	

### 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 - 200A

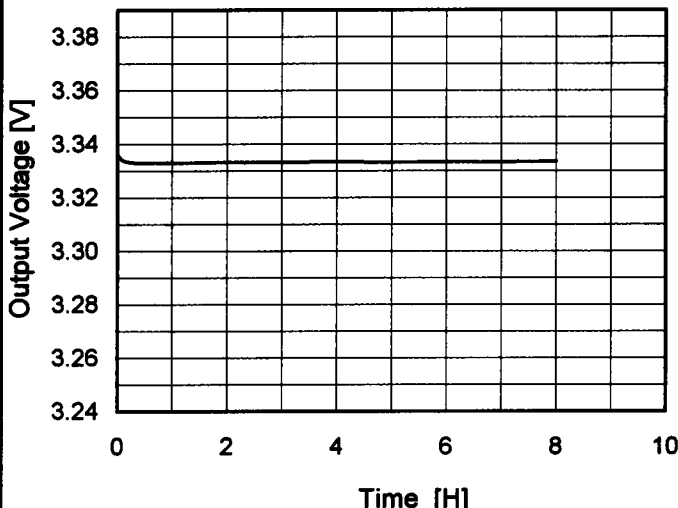
\* Output Voltage Accuracy =  $\pm(\text{Maximum of Output Voltage} - \text{Minimum of Output Voltage}) / 2$

\* 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	-20	264	0	3.353	±12	±0.4
Minimum Voltage	50	264	200	3.330		

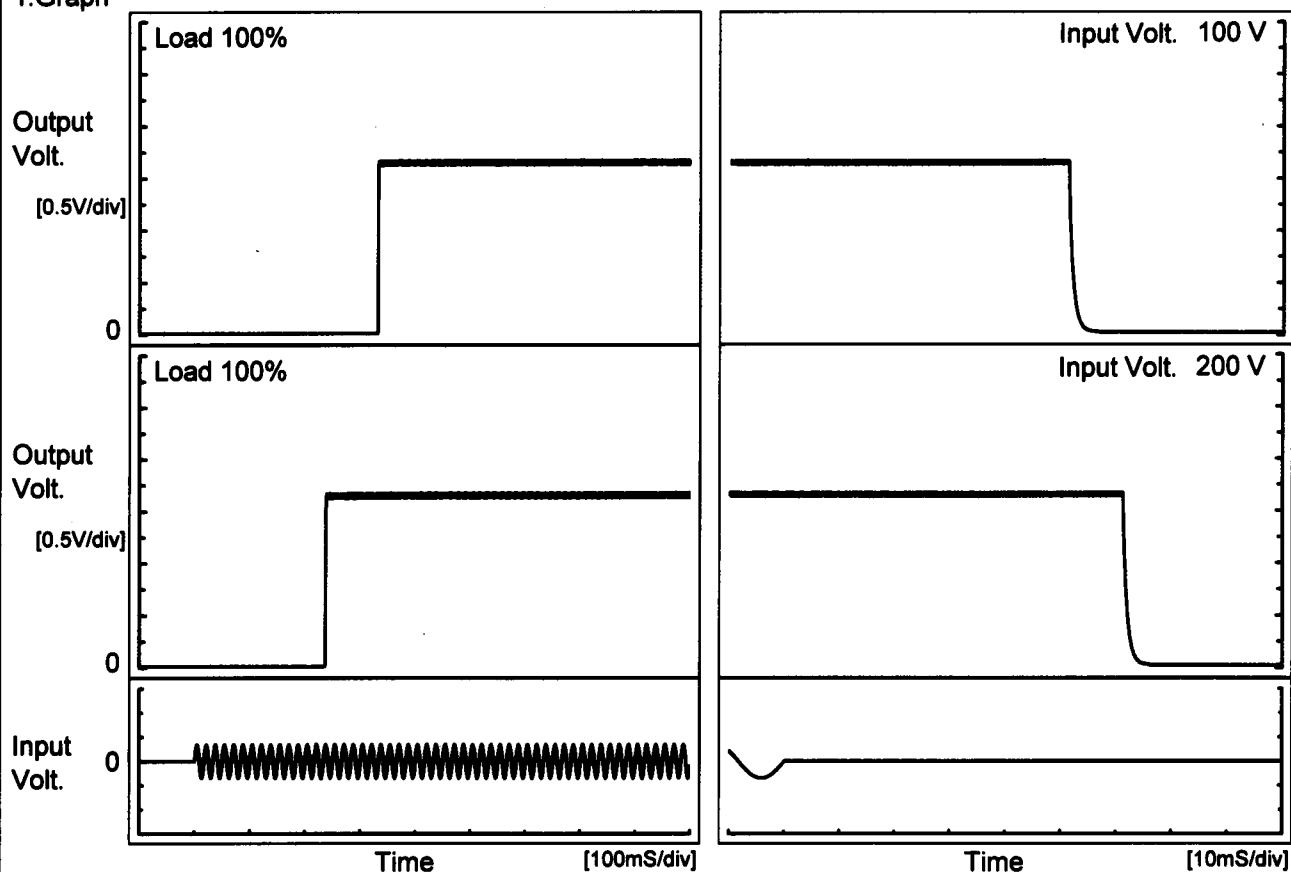
**COSEL**

Model	PBA1000F-3R3	Temperature 25°C Testing Circuitry Figure A																							
Item	Time Lapse Drift																								
Object	+3.3V200A																								
1.Graph		2.Values																							
<div><p>Output Voltage [V]</p><p>Time [H]</p><p>Input Volt. 100V Load 100%</p></div>		<table><tr><th>Time since start [H]</th><th>Output Voltage [V]</th></tr><tr><td>0.0</td><td>3.337</td></tr><tr><td>0.5</td><td>3.333</td></tr><tr><td>1.0</td><td>3.333</td></tr><tr><td>2.0</td><td>3.333</td></tr><tr><td>3.0</td><td>3.333</td></tr><tr><td>4.0</td><td>3.333</td></tr><tr><td>5.0</td><td>3.333</td></tr><tr><td>6.0</td><td>3.333</td></tr><tr><td>7.0</td><td>3.333</td></tr><tr><td>8.0</td><td>3.334</td></tr></table>		Time since start [H]	Output Voltage [V]	0.0	3.337	0.5	3.333	1.0	3.333	2.0	3.333	3.0	3.333	4.0	3.333	5.0	3.333	6.0	3.333	7.0	3.333	8.0	3.334
Time since start [H]	Output Voltage [V]																								
0.0	3.337																								
0.5	3.333																								
1.0	3.333																								
2.0	3.333																								
3.0	3.333																								
4.0	3.333																								
5.0	3.333																								
6.0	3.333																								
7.0	3.333																								
8.0	3.334																								
* The characteristic of AC200V is equal.																									

# COSEL

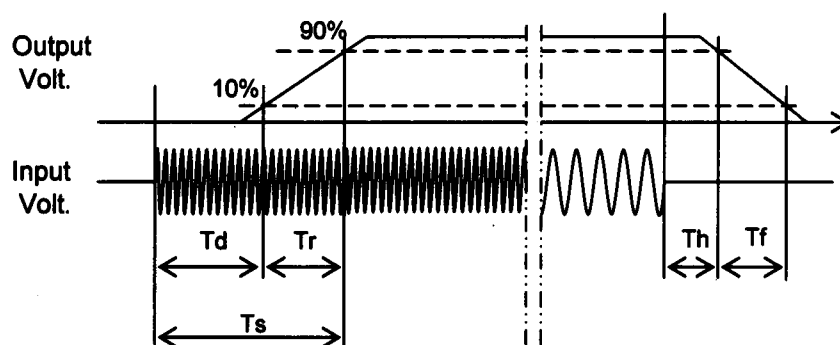
Model	PBA1000F-3R3	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+3.3V200A		

## 1. Graph



## 2. Values

Input Volt. \ Time	Td	Tr	Ts	Th	Tf
100 V	331.0	1.5	332.5	51.4	1.8
200 V	236.5	1.5	238.0	61.3	1.8



# COSEL

Model	PBA1000F-3R3																																
Item	Hold-Up Time	Temperature	25°C																														
		Testing Circuitry	Figure A																														
Object	+3.3V200A																																
1.Graph		2.Values																															
<div><div><div>---□---</div><div>Load 50%</div></div><div><div>—△—</div><div>Load 100%</div></div></div> <p>The graph shows Hold-Up Time [mS] on a logarithmic y-axis (1 to 1000) versus Input Voltage [V] on a linear x-axis (50 to 300). Two data series are plotted: Load 50% (dashed line with square markers) and Load 100% (solid line with triangle markers). Both series show a slight increase in hold-up time with increasing input voltage. A slanted line indicates the range of the rated input voltage.</p> <table border="1"><thead><tr><th>Input Voltage [V]</th><th>Load 50% [mS]</th><th>Load 100% [mS]</th></tr></thead><tbody><tr><td>77</td><td>106</td><td>44</td></tr><tr><td>85</td><td>109</td><td>47</td></tr><tr><td>100</td><td>115</td><td>51</td></tr><tr><td>120</td><td>119</td><td>55</td></tr><tr><td>200</td><td>127</td><td>61</td></tr><tr><td>230</td><td>128</td><td>62</td></tr><tr><td>264</td><td>129</td><td>63</td></tr><tr><td>280</td><td>132</td><td>65</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></tbody></table>		Input Voltage [V]	Load 50% [mS]	Load 100% [mS]	77	106	44	85	109	47	100	115	51	120	119	55	200	127	61	230	128	62	264	129	63	280	132	65	--	-	-		
Input Voltage [V]	Load 50% [mS]	Load 100% [mS]																															
77	106	44																															
85	109	47																															
100	115	51																															
120	119	55																															
200	127	61																															
230	128	62																															
264	129	63																															
280	132	65																															
--	-	-																															
<p>This duration covers from Shut-off of input voltage to the moment when output voltage descends to the rated range of voltage accuracy.</p> <p>Note: Slanted line shows the range of the rated input voltage.</p>																																	

# COSEL

Model	PBA1000F-3R3		
Item	Instantaneous Interruption Compensation	Temperature	25°C
Object	+3.3V200A	Testing Circuitry	Figure A
1. Graph		2. Values	
<div><div><div>Instantaneous Compensation Time [mS]</div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></d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# COSEL

Model

PBA1000F-3R3

Item

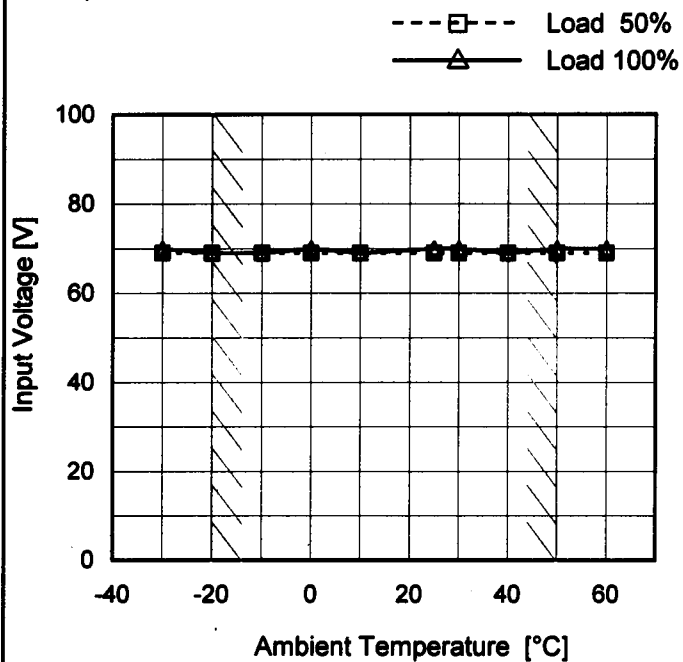
Minimum Input Voltage  
for Regulated Output Voltage

Object

+3.3V200A

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%
-30	69	70
-20	69	69
-10	69	69
0	69	70
10	69	69
25	69	70
30	69	70
40	69	69
50	69	70
60	69	70
--	-	-

**COSEL**

Model		PBA1000F-3R3	
Item		Overcurrent Protection	
Object		+3.3V200A	

1.Graph

Input Volt. 100V

Input Volt. 200V

Output Voltage [V]



# COSEL

Model		PBA1000F-3R3	
Item		Overvoltage Protection	
Object		+3.3V200A	

1.Graph

—△—

Input Volt. 100V

---□---

Input Volt. 200V

Operating Point [V]

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	4.24	4.24
-20	4.24	4.24
-10	4.24	4.24
0	4.24	4.24
10	4.24	4.24
25	4.24	4.24
30	4.24	4.24
40	4.23	4.23
50	4.23	4.23
60	4.23	4.23
--	-	-

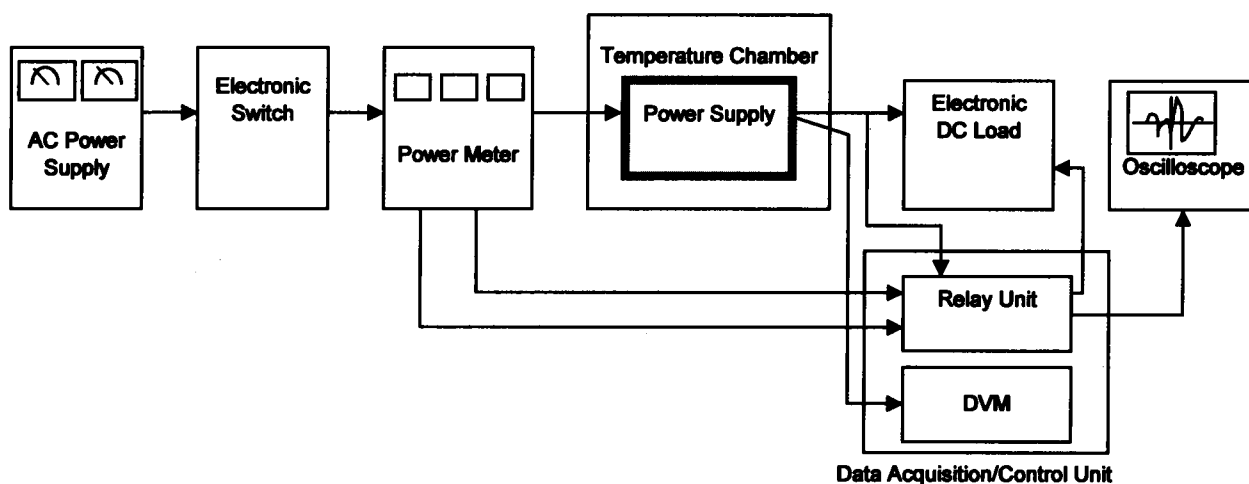


Figure A

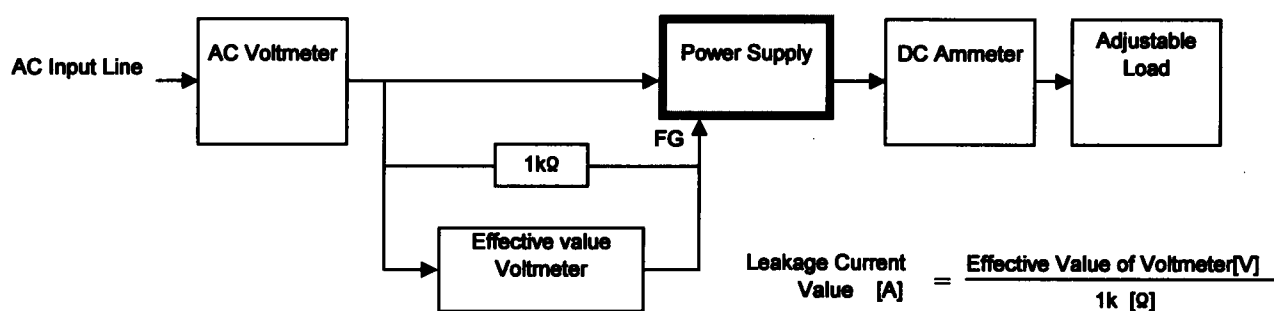


Figure B ( DEN-AN )

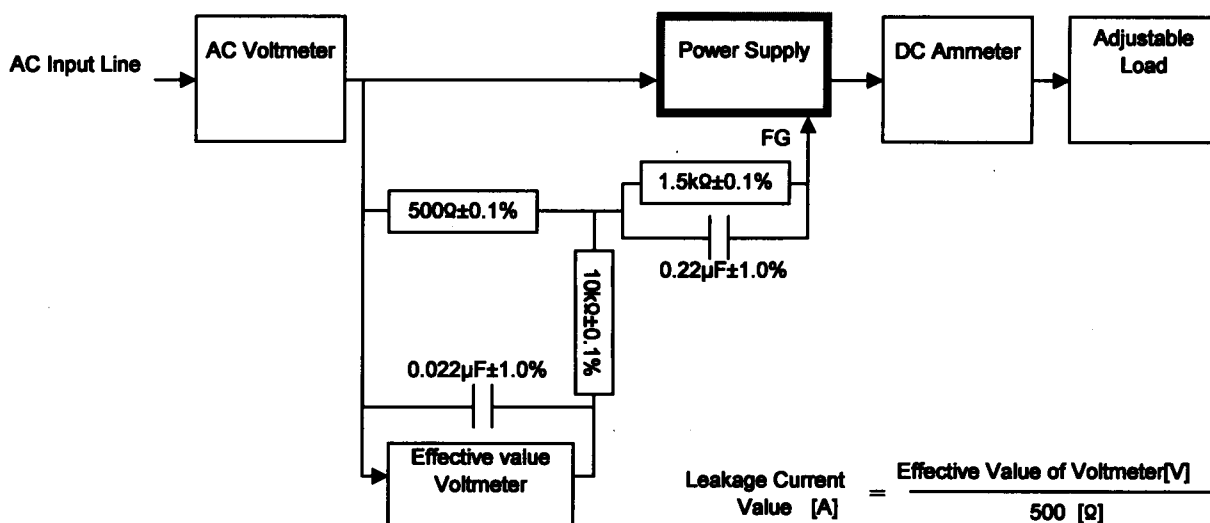


Figure B ( IEC60950 )