



# TEST DATA OF PBW30F-12

Regulated DC Power Supply  
Sep 29, 2005

Approved by : Kuniaki Nagahara  
Kuniaki Nagahara Design Manager

Prepared by : Akito Joboji  
Akito Joboji Design Engineer

**COSEL CO.,LTD.**



## CONTENTS

1.Input Current (by Load Current) . . . . .	1
2.Input Power (by Load Current) . . . . .	2
3.Efficiency (by Input Voltage) . . . . .	3
4.Efficiency (by Load Current) . . . . .	4
5.Power Factor (by Input Voltage) . . . . .	5
6.Power Factor (by Load Current) . . . . .	6
7.Inrush Current . . . . .	7
8.Leakage Current . . . . .	8
9.Line Regulation . . . . .	9
10.Load Regulation . . . . .	10
11.Dynamic Load Response . . . . .	11
12.Ripple Voltage (by Load Current) . . . . .	13
13.Ripple-Noise . . . . .	15
14.Ripple Voltage (by Ambient Temperature) . . . . .	17
15.Ambient Temperature Drift . . . . .	18
16.Output Voltage Accuracy . . . . .	19
17.Time Lapse Drift . . . . .	20
18.Rise and Fall Time . . . . .	21
19.Hold-Up Time . . . . .	23
20.Instantaneous Interruption Compensation . . . . .	25
21.Minimum Input Voltage for Regulated Output Voltage . . . . .	27
22.Overcurrent Protection . . . . .	28
23.Ovvervoltage Protection . . . . .	29
24.Figure of Testing Circuitry . . . . .	30

(Final Page 30)

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Model	PBW30F-12	Temperature	25°C																																															
Item	Input Current (by Load Current)	Testing Circuitry	Figure A																																															
Object	—	—	—																																															
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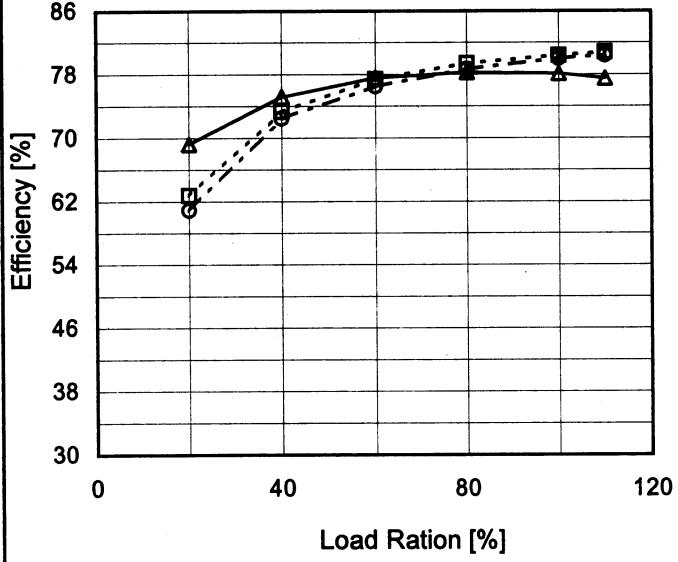
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<p>The graph plots Efficiency [%] on the y-axis (30 to 86) against Input Voltage [V] on the x-axis (50 to 300). Two data series are shown: Load 50% (dashed line with square markers) and Load 100% (solid line with triangle markers). Both series show efficiency increasing slightly with input voltage. A slanted line indicates the rated input voltage range.</p> <table border="1"> <thead> <tr> <th>Input Voltage [V]</th> <th>Efficiency Load 50% [%]</th> <th>Efficiency Load 100% [%]</th> </tr> </thead> <tbody> <tr><td>75</td><td>75.4</td><td>73.8</td></tr> <tr><td>85</td><td>76.1</td><td>76.1</td></tr> <tr><td>100</td><td>76.9</td><td>78.0</td></tr> <tr><td>120</td><td>77.2</td><td>79.6</td></tr> <tr><td>200</td><td>75.7</td><td>80.6</td></tr> <tr><td>230</td><td>74.7</td><td>80.2</td></tr> <tr><td>264</td><td>72.9</td><td>79.4</td></tr> <tr><td>280</td><td>72.2</td><td>79.0</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> </tbody> </table>				Input Voltage [V]	Efficiency Load 50% [%]	Efficiency Load 100% [%]	75	75.4	73.8	85	76.1	76.1	100	76.9	78.0	120	77.2	79.6	200	75.7	80.6	230	74.7	80.2	264	72.9	79.4	280	72.2	79.0	--	-	-
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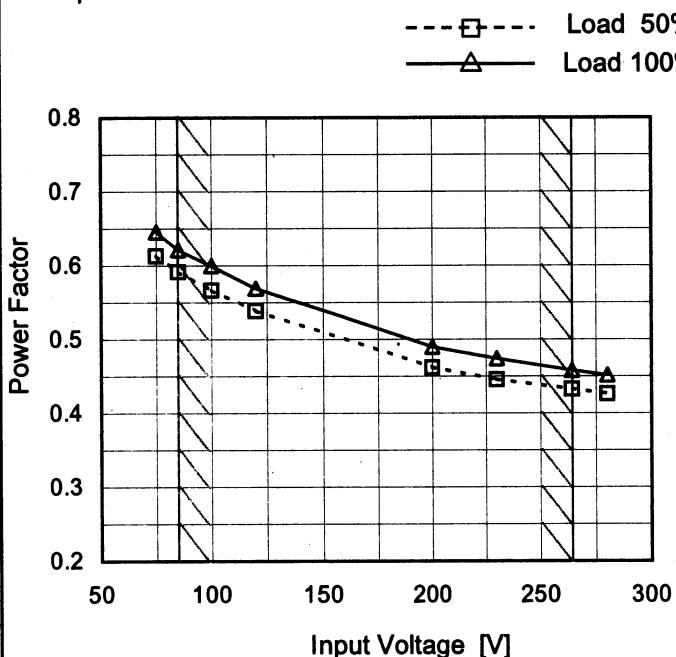
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Model	PBW30F-12
Item	Power Factor (by Input Voltage)
Object	_____

 Temperature 25°C  
 Testing Circuitry Figure A

## 1.Graph



## 2.Values

Input Voltage [V]	Power Factor	
	Load 50%	Load 100%
75	0.614	0.646
85	0.592	0.621
100	0.567	0.600
120	0.539	0.569
200	0.462	0.490
230	0.446	0.474
264	0.433	0.458
280	0.426	0.452
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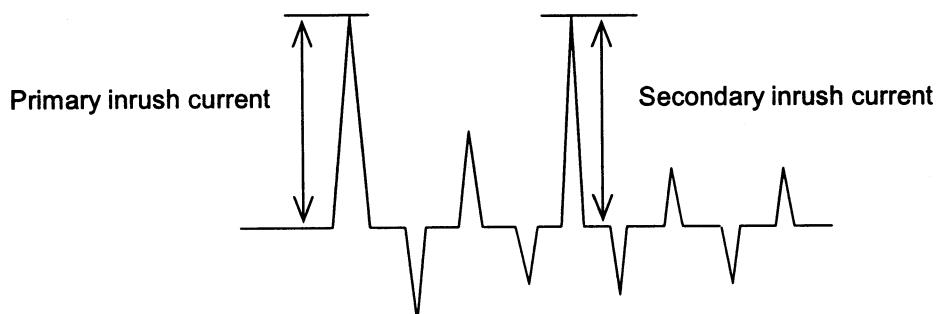
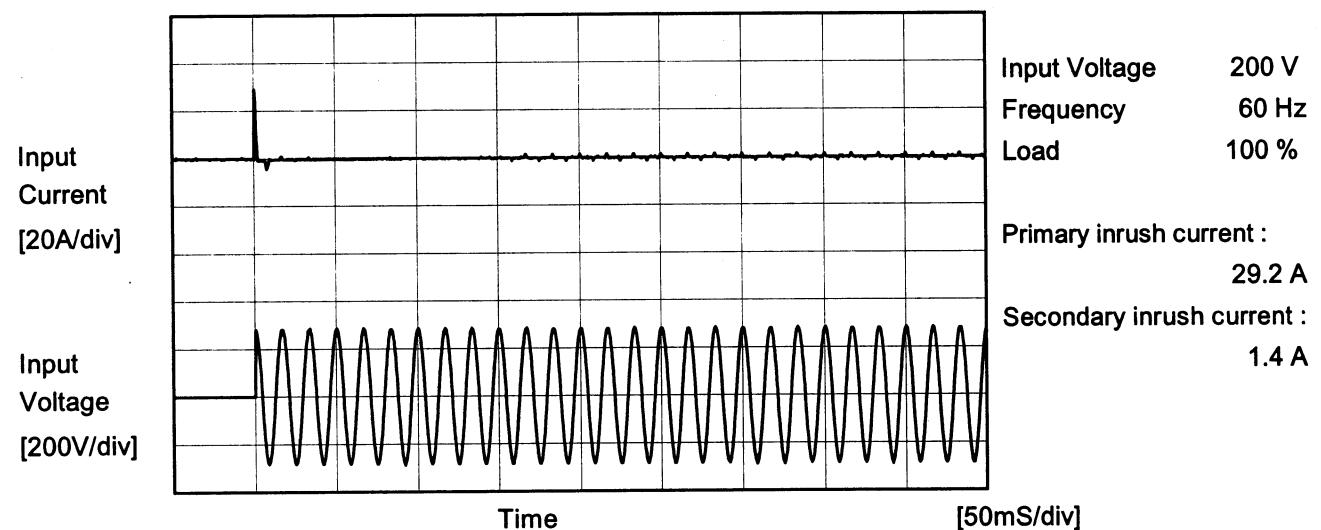
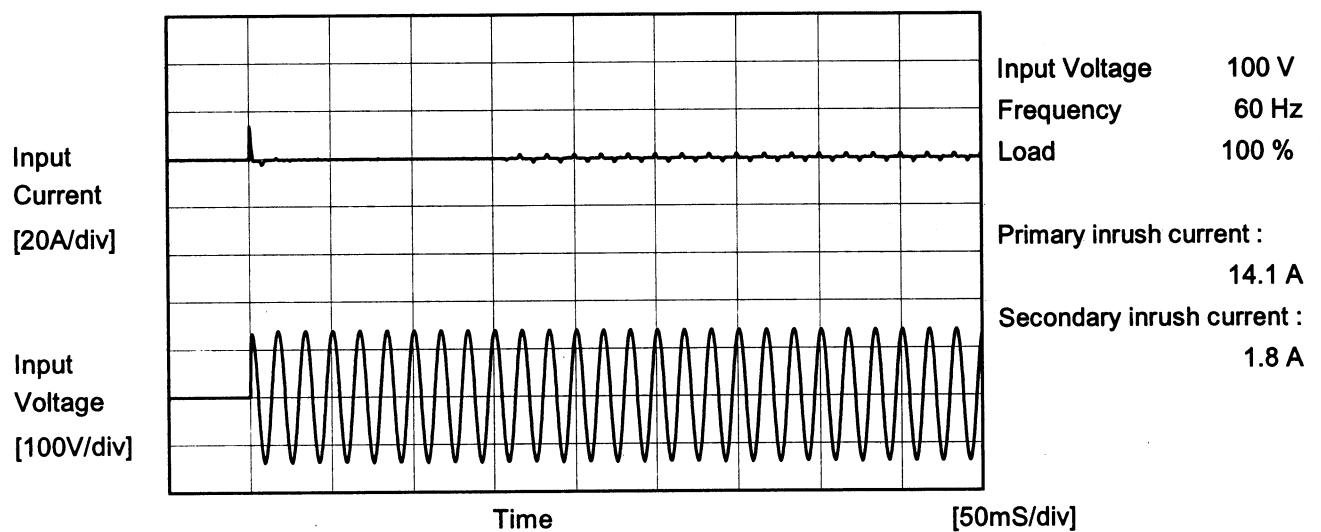
Note: Slanted line shows the range of the rated input voltage.

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Model	PBW30F-12		
Item	Power Factor (by Load Current)		
Object	_____		
1.Graph	—△— Input Volt. 100V - -□--- Input Volt. 200V - -○--- Input Volt. 230V		
Temperature	25°C		
Testing Circuitry	Figure A		
2.Values			
Load Ration [%]	Power Factor		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0	0.407	0.329	0.338
20	0.520	0.410	0.404
40	0.560	0.452	0.440
60	0.579	0.477	0.462
80	0.592	0.493	0.478
100	0.601	0.505	0.486
110	0.604	0.507	0.489
--	-	-	-
--	-	-	-
--	-	-	-
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Model	PBW30F-12	Temperature Testing Circuitry	25°C
Item	Inrush Current	Circuitry	Figure A
Object	_____		





Model	PBW30F-12	Temperature	25°C
Item	Leakage Current	Testing Circuitry	Figure B
Object	<hr/>		

### 1. Results

[mA]

Standards		Input Volt.			Note
		100 [V]	200 [V]	240 [V]	
DEN-AN	Both phases	0.15	0.32	0.39	Operation
	One of phase	0.30	0.64	0.79	stand by
IEC60950	Both phases	0.19	0.44	0.52	Operation
	One of phase	0.29	0.64	0.79	stand by

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

### 2. Condition

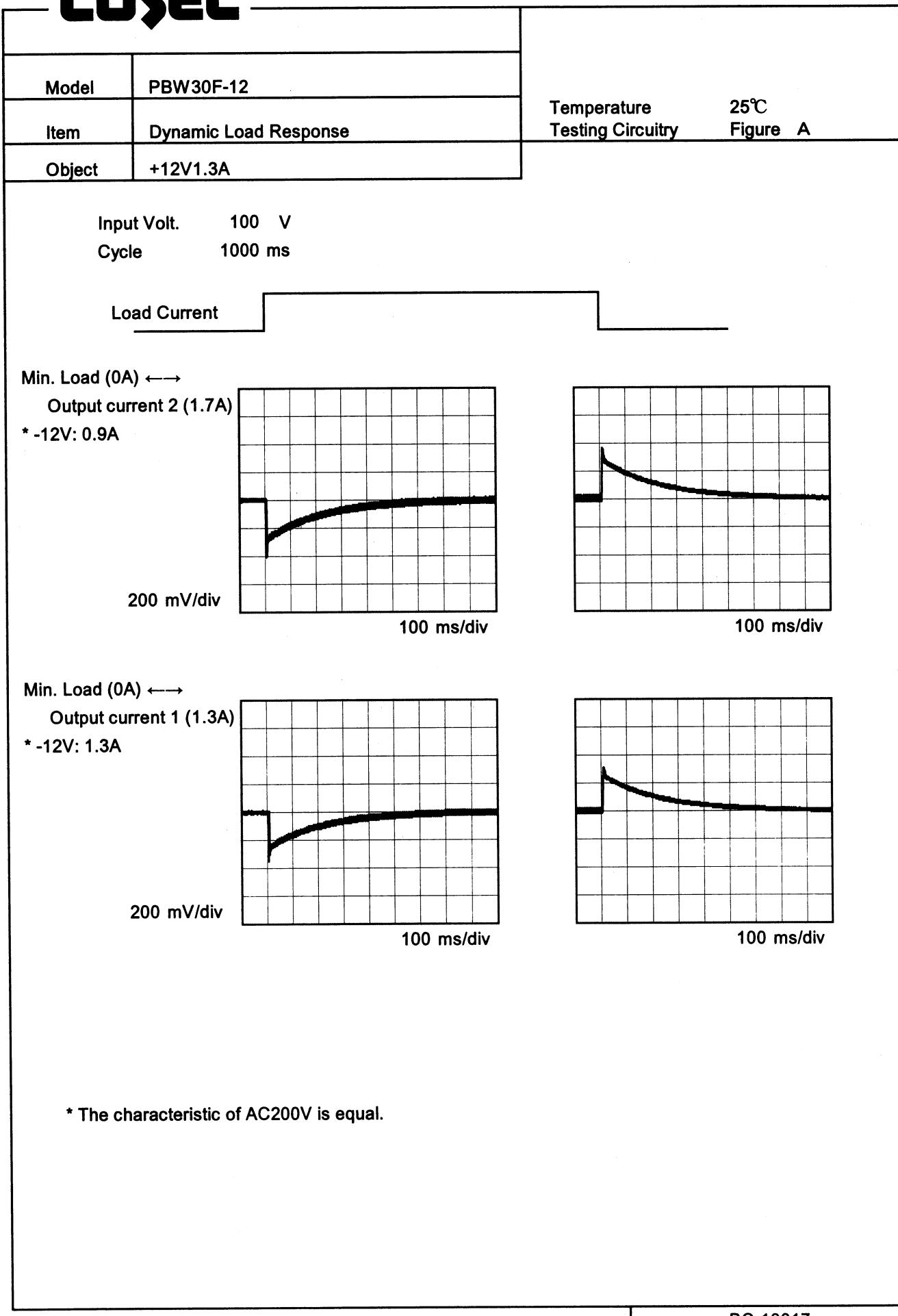
Leakage current value is concluded after measuring both phases of AC input and by choosing the larger one.

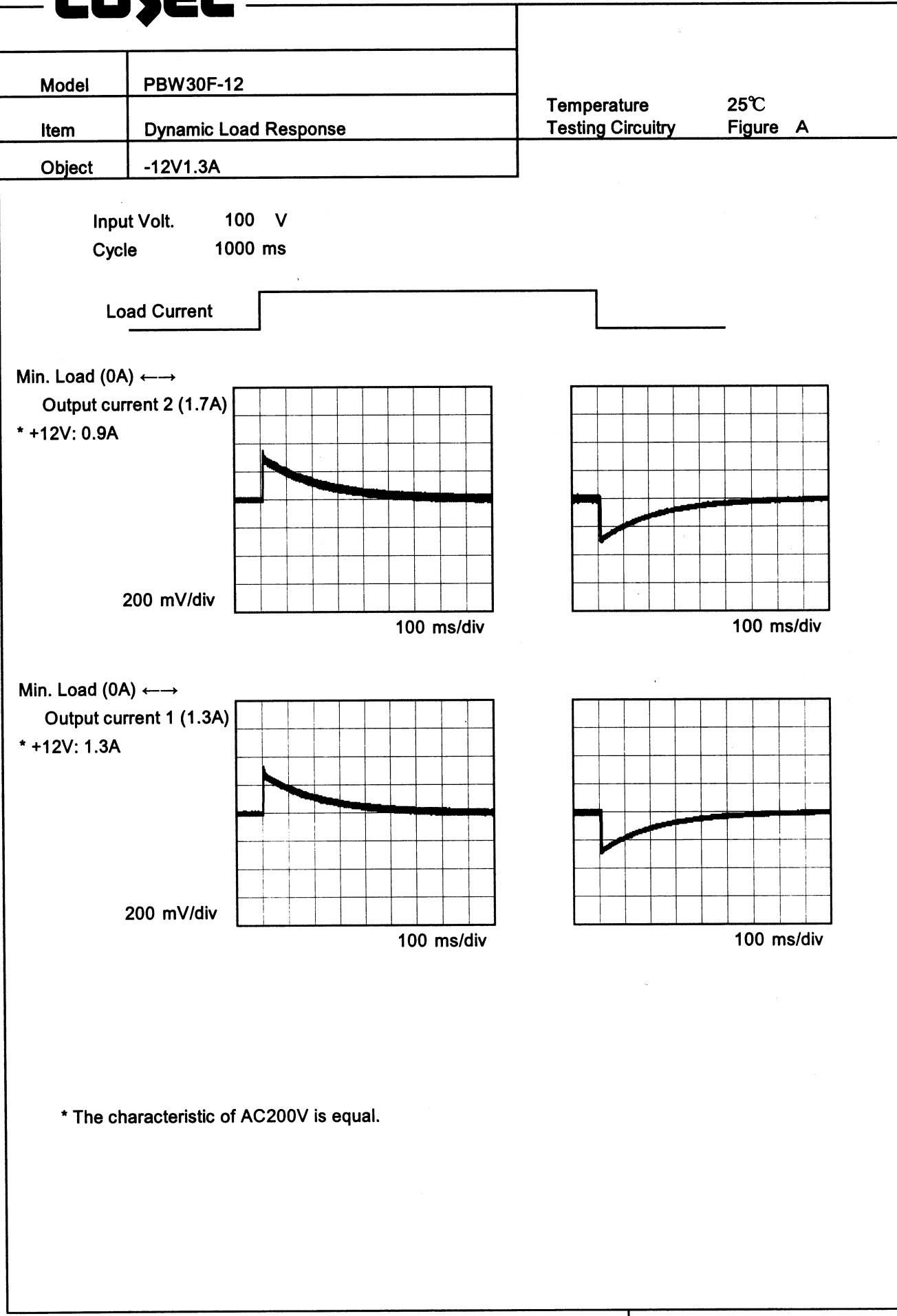
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1.Graph	<p style="text-align: center;"> <span style="color: black;">△</span> Input Volt. 100V  <span style="color: black;">□</span> Input Volt. 200V  <span style="color: black;">○</span> Input Volt. 230V         </p> <table border="1"> <caption>Data for -12V1.3A Graph</caption> <thead> <tr> <th>Load Current [A]</th> <th>100V [V]</th> <th>200V [V]</th> <th>230V [V]</th> </tr> </thead> <tbody> <tr><td>0.00</td><td>-12.057</td><td>-12.060</td><td>-12.060</td></tr> <tr><td>0.20</td><td>-11.976</td><td>-11.977</td><td>-11.977</td></tr> <tr><td>0.40</td><td>-11.934</td><td>-11.936</td><td>-11.936</td></tr> <tr><td>0.60</td><td>-11.902</td><td>-11.905</td><td>-11.905</td></tr> <tr><td>0.80</td><td>-11.873</td><td>-11.878</td><td>-11.878</td></tr> <tr><td>1.00</td><td>-11.845</td><td>-11.854</td><td>-11.854</td></tr> <tr><td>1.20</td><td>-11.815</td><td>-11.832</td><td>-11.832</td></tr> <tr><td>1.30</td><td>-11.799</td><td>-11.820</td><td>-11.821</td></tr> <tr><td>1.43</td><td>-11.778</td><td>-11.804</td><td>-11.806</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> </tbody> </table>	Load Current [A]	100V [V]	200V [V]	230V [V]	0.00	-12.057	-12.060	-12.060	0.20	-11.976	-11.977	-11.977	0.40	-11.934	-11.936	-11.936	0.60	-11.902	-11.905	-11.905	0.80	-11.873	-11.878	-11.878	1.00	-11.845	-11.854	-11.854	1.20	-11.815	-11.832	-11.832	1.30	-11.799	-11.820	-11.821	1.43	-11.778	-11.804	-11.806	--	-	-	-	--	-	-	-					
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Model	PBW30F-12	Temperature Testing Circuitry 25°C Figure A																																						
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Object	+12V1.3A																																							
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**COSEL**

Model	PBW30F-12	Temperature Testing Circuitry	25°C Figure A																																			
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<p>Figure showing a complex ripple wave form. The Y-axis is labeled "Ripple [mVp-p]". The wave form consists of two main components: T1 (due to AC input line) and T2 (due to switching).</p>																																						
<p>Fig. Complex Ripple Wave Form</p>																																						

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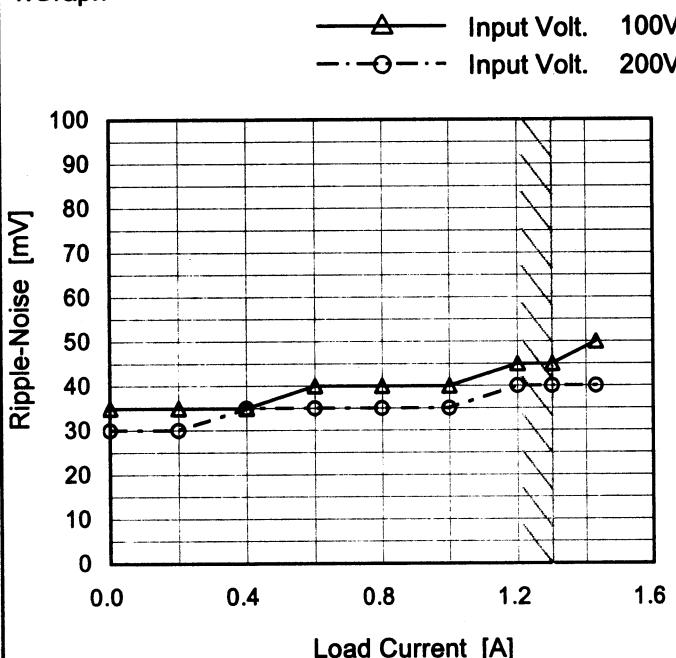
Model	PBW30F-12	Temperature Testing Circuitry 25°C Figure A																																			
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<p>Graph showing Ripple-Noise [mV] vs Load Current [A]. The Y-axis ranges from 0 to 100 mV, and the X-axis ranges from 0.0 to 1.6 A. Two sets of data points are plotted: one for Input Volt. 100V (solid line with triangle markers) and one for Input Volt. 200V (dashed line with circle markers). A slanted line at approximately 1.3A indicates the rated load current range.</p> <table border="1"> <thead> <tr> <th>Load Current [A]</th> <th>Ripple-Noise [mV] (Input Volt. 100V)</th> <th>Ripple-Noise [mV] (Input Volt. 200V)</th> </tr> </thead> <tbody> <tr><td>0.00</td><td>30</td><td>30</td></tr> <tr><td>0.20</td><td>35</td><td>30</td></tr> <tr><td>0.40</td><td>35</td><td>30</td></tr> <tr><td>0.60</td><td>40</td><td>30</td></tr> <tr><td>0.80</td><td>40</td><td>30</td></tr> <tr><td>1.00</td><td>45</td><td>30</td></tr> <tr><td>1.20</td><td>45</td><td>35</td></tr> <tr><td>1.30</td><td>50</td><td>35</td></tr> <tr><td>1.43</td><td>50</td><td>40</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> </tbody> </table>		Load Current [A]	Ripple-Noise [mV] (Input Volt. 100V)	Ripple-Noise [mV] (Input Volt. 200V)	0.00	30	30	0.20	35	30	0.40	35	30	0.60	40	30	0.80	40	30	1.00	45	30	1.20	45	35	1.30	50	35	1.43	50	40	--	-	-	--	-	-
Load Current [A]	Ripple-Noise [mV] (Input Volt. 100V)	Ripple-Noise [mV] (Input Volt. 200V)																																			
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<p>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.</p>		-12V: Rated output current 1																																			
<p>Fig. Complex Ripple Wave Form</p> <p>The diagram illustrates a complex ripple wave form. It features a waveform with two distinct time intervals labeled T1 and T2. T1 represents the total period of the noise, while T2 represents the period of the switching component. The vertical distance between the peaks and troughs is indicated by a double-headed arrow and labeled "Ripple-Noise [mVp-p]".</p>																																					

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Model	PBW30F-12
Item	Ripple-Noise
Object	-12V1.3A

Temperature 25°C  
Testing Circuitry Figure A

## 1.Graph



## 2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
0.00	35	30
0.20	35	30
0.40	35	35
0.60	40	35
0.80	40	35
1.00	40	35
1.20	45	40
1.30	45	40
1.43	50	40
--	-	-
--	-	-

+12V: Rated output current 1

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.

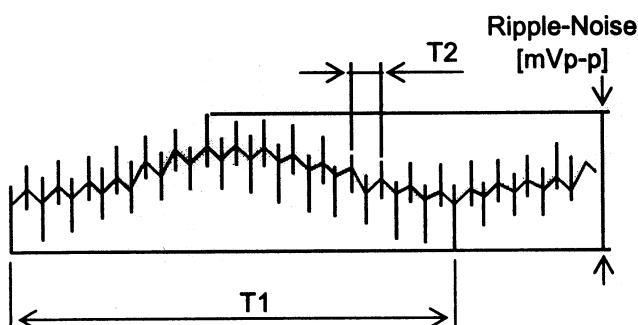
T1: Due to AC Input Line  
T2: Due to Switching

Fig. Complex Ripple Wave Form

**COSEL**

Model	PBW30F-12																																								
Item	Ripple Voltage (by Ambient Temp.)	Testing Circuitry	Figure A																																						
Object	+12V1.3A																																								
1.Graph		2.Values																																							
<p>--- □ --- Input Volt. 100V — △ — Input Volt. 200V</p> <p>Ripple Voltage [mV]</p> <p>Ambient Temperature [°C]</p> <p>Load 100 %</p>		<table border="1"> <thead> <tr> <th rowspan="2">Ambient Temperature [°C]</th> <th colspan="2">Ripple Voltage [mV]</th> </tr> <tr> <th>Input Volt. 100 [V]</th> <th>Input Volt. 200 [V]</th> </tr> </thead> <tbody> <tr><td>-30</td><td>115</td><td>60</td></tr> <tr><td>-10</td><td>40</td><td>20</td></tr> <tr><td>0</td><td>35</td><td>15</td></tr> <tr><td>25</td><td>25</td><td>10</td></tr> <tr><td>50</td><td>20</td><td>5</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> <tr><td>--</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> </tbody> </table> <p>-12V: Rated output current 1</p>		Ambient Temperature [°C]	Ripple Voltage [mV]		Input Volt. 100 [V]	Input Volt. 200 [V]	-30	115	60	-10	40	20	0	35	15	25	25	10	50	20	5	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-
Ambient Temperature [°C]	Ripple Voltage [mV]																																								
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Model	PBW30F-12	Testing Circuitry Figure A																																																						
Item	Ambient Temperature Drift																																																							
Object	+12V1.3A																																																							
1.Graph	<p>—△— Input Volt. 100V        - - -□- - - Input Volt. 200V        - - -○- - - Input Volt. 230V</p> <p>Output Voltage [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 100%</p>																																																							
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Note:	Slanted line shows the range of the rated ambient temperature.																																																							



Model	PBW30F-12	Testing Circuitry Figure A
Item	Output Voltage Accuracy	

### 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 : 85 - 264V

Load Current (AVR 1) : 0 - 1.3A (AVR 2) : 0 - 1.3A

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

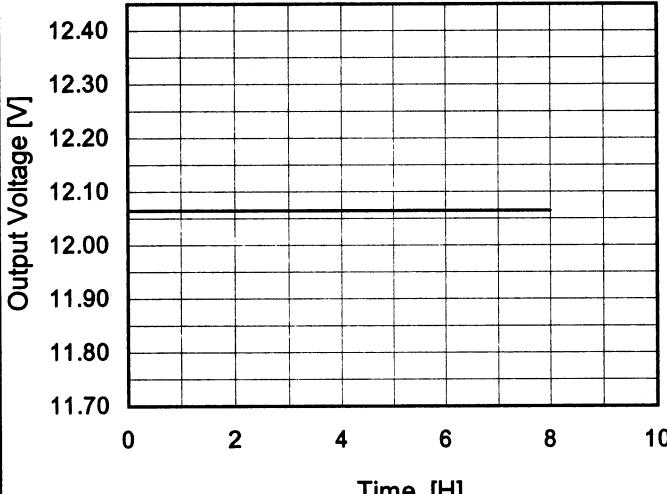
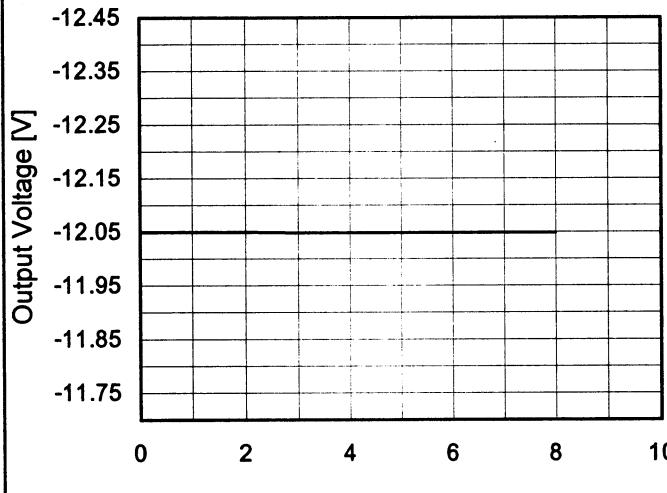
$$\text{* Output Voltage Accuracy (Ration)} = \frac{\text{Output Voltage Accuracy}}{\text{Rated Output Voltage}} \times 100$$

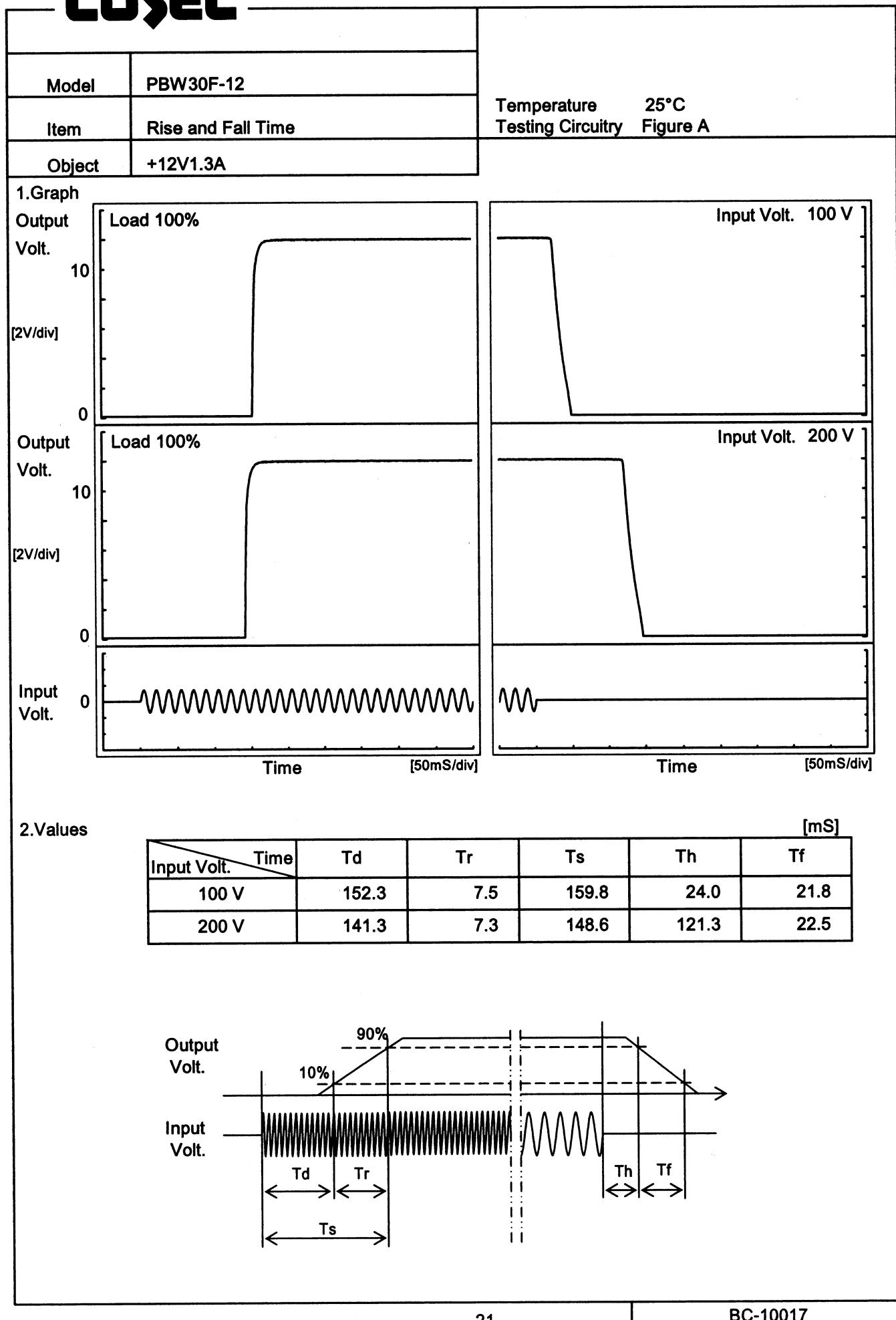
### 2. Values

Object	+12V1.3A		Output		Output Voltage Accuracy	
Item	Temperature [°C]	Input Voltage[V]	Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	50	85		0	12.344	
Minimum Voltage	-10	85	1.3	12.061	±142	±1.2

Object	-12V1.3A		Output		Output Voltage Accuracy	
Item	Temperature [°C]	Input Voltage[V]	Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	50	85		0	-12.355	
Minimum Voltage	-10	264	1.3	-12.044	±156	±1.3

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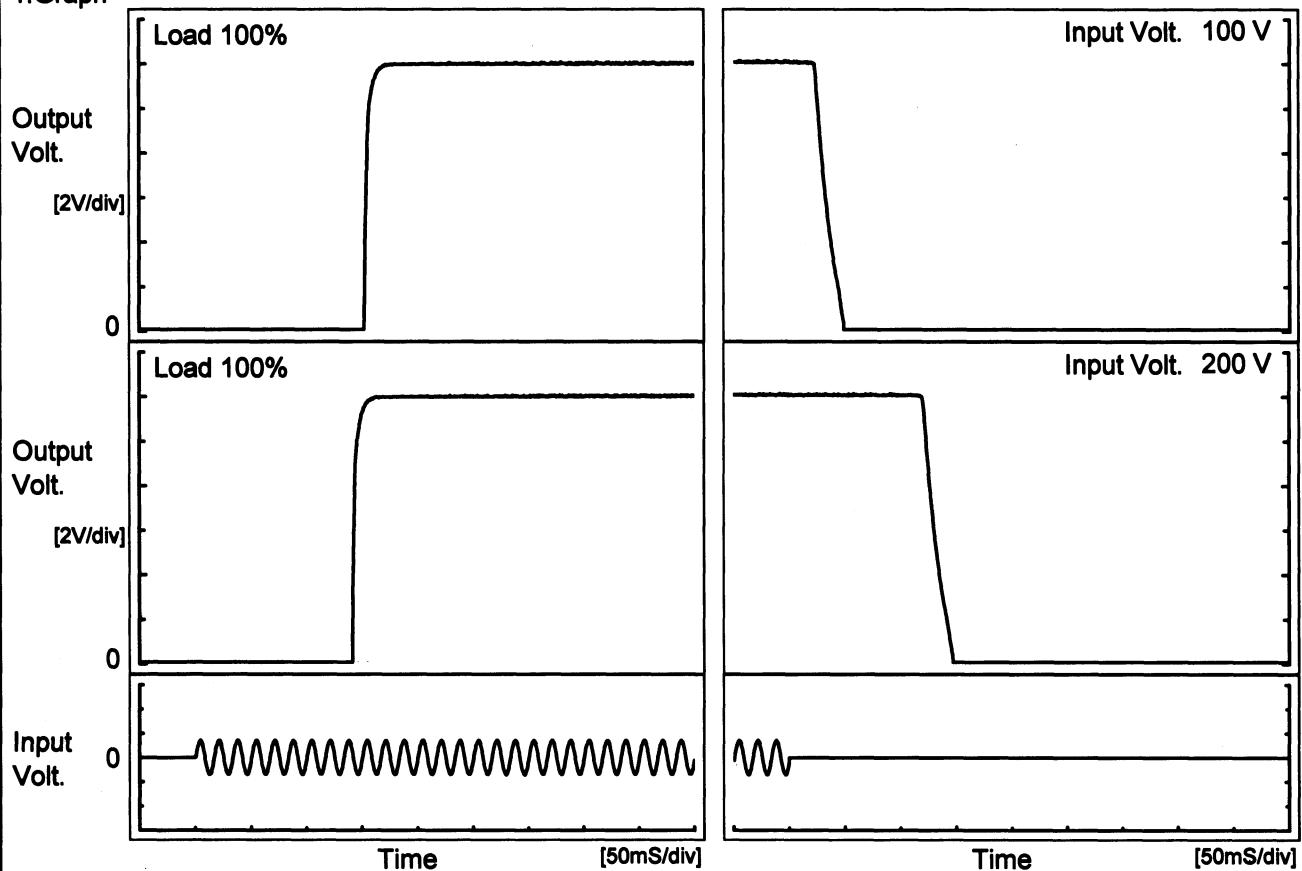
Model	PBW30F-12	Temperature Testing Circuitry	25°C Figure A																						
Item	Time Lapse Drift																								
Object	+12V1.3A																								
1.Graph			2.Values																						
 <p>Output Voltage [V]</p> <p>Time [H]</p> <p>Input Volt. 100V Load 100%</p>			<table border="1"> <thead> <tr> <th>Time since start [H]</th> <th>Output Voltage [V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>12.064</td></tr> <tr><td>0.5</td><td>12.065</td></tr> <tr><td>1.0</td><td>12.065</td></tr> <tr><td>2.0</td><td>12.065</td></tr> <tr><td>3.0</td><td>12.065</td></tr> <tr><td>4.0</td><td>12.065</td></tr> <tr><td>5.0</td><td>12.065</td></tr> <tr><td>6.0</td><td>12.065</td></tr> <tr><td>7.0</td><td>12.065</td></tr> <tr><td>8.0</td><td>12.065</td></tr> </tbody> </table>	Time since start [H]	Output Voltage [V]	0.0	12.064	0.5	12.065	1.0	12.065	2.0	12.065	3.0	12.065	4.0	12.065	5.0	12.065	6.0	12.065	7.0	12.065	8.0	12.065
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**COSEL**

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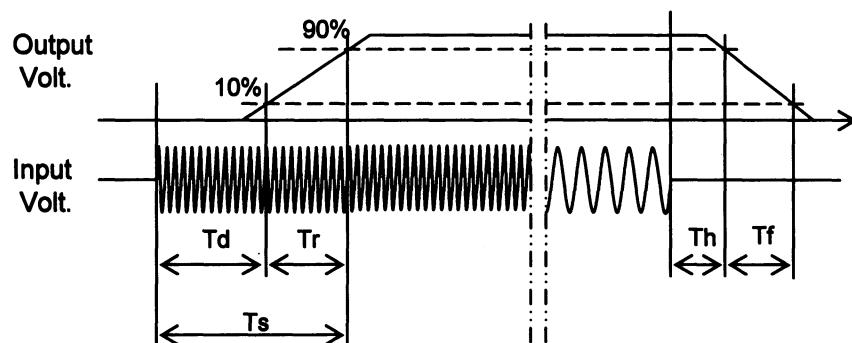
Model	PBW30F-12	Temperature Testing Circuitry 25°C Figure A
Item	Rise and Fall Time	
Object	-12V1.3A	

## 1. Graph



## 2. Values

Input Volt.	Time	Td	Tr	Ts	Th	Tf	[mS]
100 V		152.3	7.3	159.6	24.3	21.5	
200 V		141.5	7.0	148.5	121.8	22.0	



**COSEL**

Model	PBW30F-12	Temperature	25°C																																
Item	Hold-Up Time	Testing Circuitry	Figure A																																
Object	+12V1.3A																																		
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**COSEL**

Model	PBW30F-12	Temperature Testing Circuitry	25°C Figure A																																																			
Item	Instantaneous Interruption Compensation																																																					
Object	+12V1.3A																																																					
1.Graph	<p>—△— Input Volt. 100V        - - -□- - Input Volt. 200V        - - -○- - Input Volt. 230V</p>																																																					
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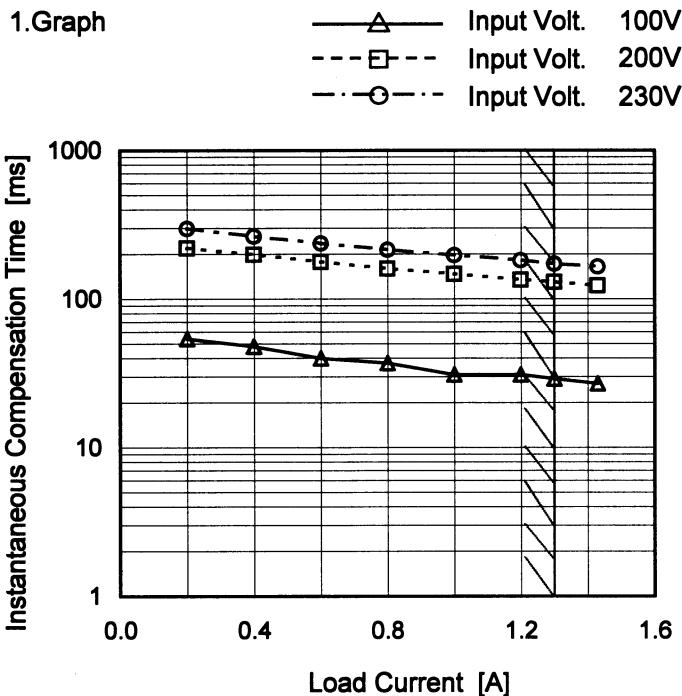
Note: Slanted line shows the range of the rated load current.

**COSEL**

Model PBW30F-12

Item Instantaneous Interruption Compensation

Object -12V1.3A


 Temperature 25°C  
 Testing Circuitry Figure A

## 2. Values

Load Current [A]	Time [ms]		
	100[V]	200[V]	230[V]
0.00	-	-	-
0.20	54	220	298
0.40	48	199	265
0.60	40	178	237
0.80	37	160	215
1.00	31	147	197
1.20	31	135	182
1.30	29	130	173
1.43	27	123	165
--	-	-	-
--	-	-	-

+12V: Rated output current 1

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

**COSEL**

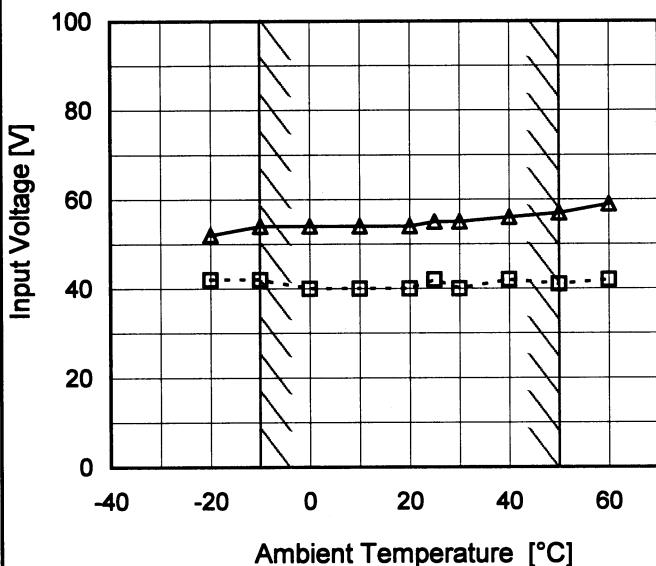
Model PBW30F-12

Item Minimum Input Voltage  
for Regulated Output Voltage

Object +12V1.3A

## 1.Graph

---□--- Load 50%  
—△— Load 100%



Testing Circuitry Figure A

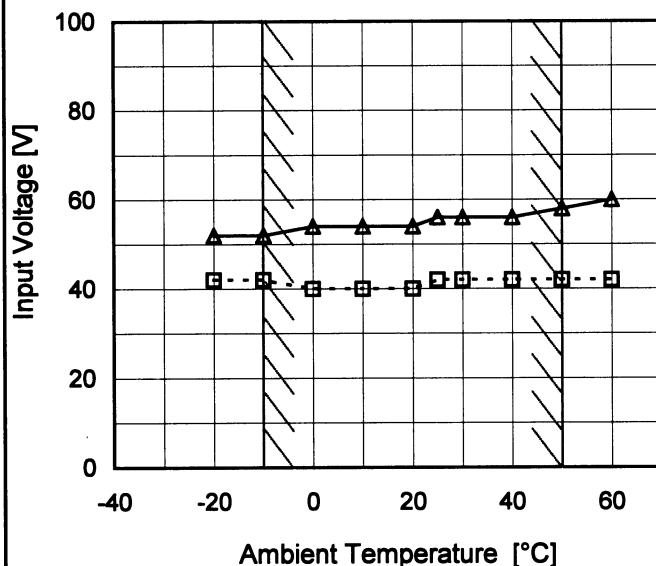
## 2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	42	52
-10	42	54
0	40	54
10	40	54
20	40	54
25	42	55
30	40	55
40	42	56
50	41	57
60	42	59
--	-	-

Object -12V1.3A

## 1.Graph

---□--- Load 50%  
—△— Load 100%



## 2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	42	52
-10	42	52
0	40	54
10	40	54
20	40	54
25	42	56
30	42	56
40	42	56
50	42	58
60	42	60
--	-	-

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

**COSEL**

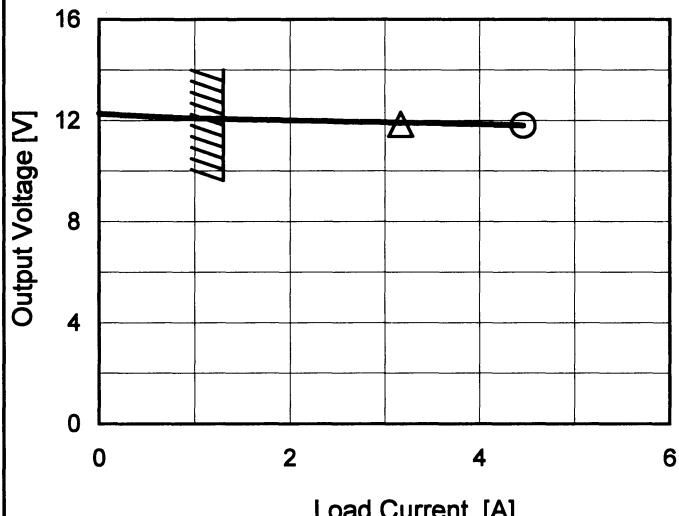
Model PBW30F-12

Item Overcurrent Protection

Object +12V1.3A

## 1. Graph

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

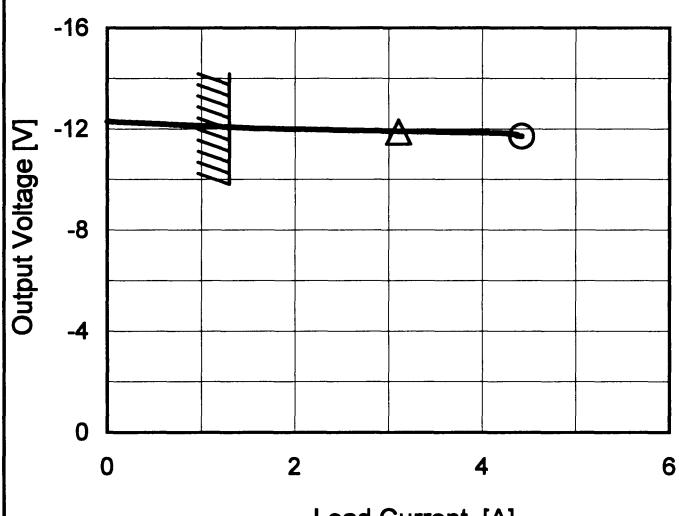


Intermittent operation occurs when the output voltage is less than rated output voltage.

Object -12V1.3A

## 1. Graph

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



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

Intermittent operation occurs when the output voltage is less than rated output voltage.

Temperature 25°C  
Testing Circuitry Figure A

## 2. Values

Output Voltage [V]	Load Current [A]	
	Input Volt. 100[V]	Input Volt. 200[V]
12	3.19	4.46
11.4	-	-
10.8	-	-
9.6	-	-
8.4	-	-
7.2	-	-
6	-	-
4.8	-	-
3.6	-	-
2.4	-	-
1.2	-	-
0	-	-

-12V: Rated output current 1

## 2. Values

Output Voltage [V]	Load Current [A]	
	Input Volt. 100[V]	Input Volt. 200[V]
-12	3.11	4.42
-11.4	-	-
-10.8	-	-
-9.6	-	-
-8.4	-	-
-7.2	-	-
-6	-	-
-4.8	-	-
-3.6	-	-
-2.4	-	-
-1.2	-	-
0	-	-

+12V: Rated output current 1

**COSEL**

<p><b>Model</b> PBW30F-12</p> <p><b>Item</b> Overvoltage Protection</p> <p><b>Object</b> +12V1.3A</p>	<b>Testing Circuitry Figure A</b>																																						
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	<table border="1"> <thead> <tr> <th rowspan="2">Ambient Temperature [°C]</th> <th colspan="2">Operating Point [V]</th> </tr> <tr> <th>Input Volt. 100[V]</th> <th>Input Volt. 200[V]</th> </tr> </thead> <tbody> <tr> <td>-20</td><td>-20.22</td><td>-20.22</td></tr> <tr> <td>-10</td><td>-20.29</td><td>-20.29</td></tr> <tr> <td>0</td><td>-20.43</td><td>-20.43</td></tr> <tr> <td>10</td><td>-20.56</td><td>-20.56</td></tr> <tr> <td>20</td><td>-20.69</td><td>-20.69</td></tr> <tr> <td>25</td><td>-20.76</td><td>-20.76</td></tr> <tr> <td>30</td><td>-20.83</td><td>-20.83</td></tr> <tr> <td>40</td><td>-20.96</td><td>-20.96</td></tr> <tr> <td>50</td><td>-21.10</td><td>-21.10</td></tr> <tr> <td>60</td><td>-21.23</td><td>-21.23</td></tr> <tr> <td>--</td><td>-</td><td>-</td></tr> </tbody> </table>		Ambient Temperature [°C]	Operating Point [V]		Input Volt. 100[V]	Input Volt. 200[V]	-20	-20.22	-20.22	-10	-20.29	-20.29	0	-20.43	-20.43	10	-20.56	-20.56	20	-20.69	-20.69	25	-20.76	-20.76	30	-20.83	-20.83	40	-20.96	-20.96	50	-21.10	-21.10	60	-21.23	-21.23	--	-
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<p>Note: Slanted line shows the range of the rated ambient temperature.</p>																																							

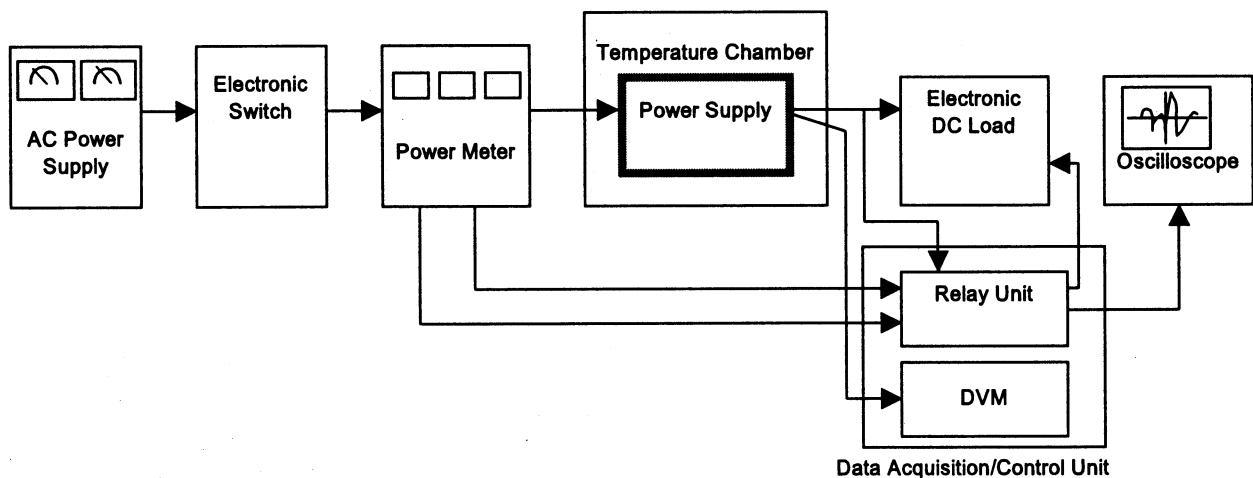


Figure A

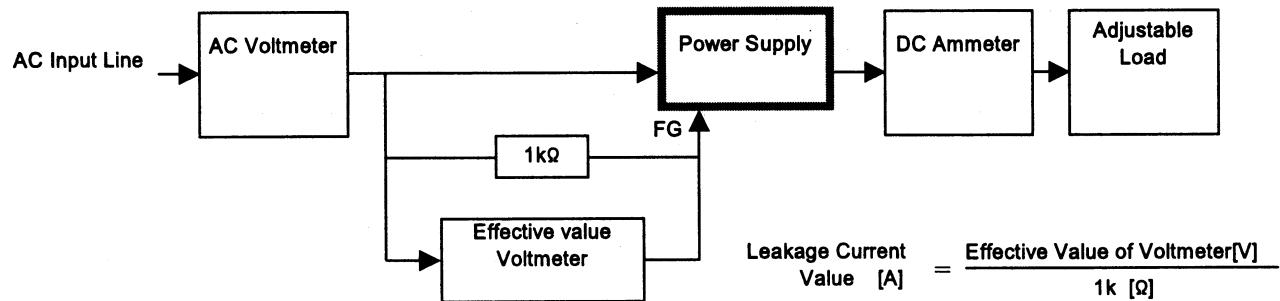


Figure B ( DEN-AN )

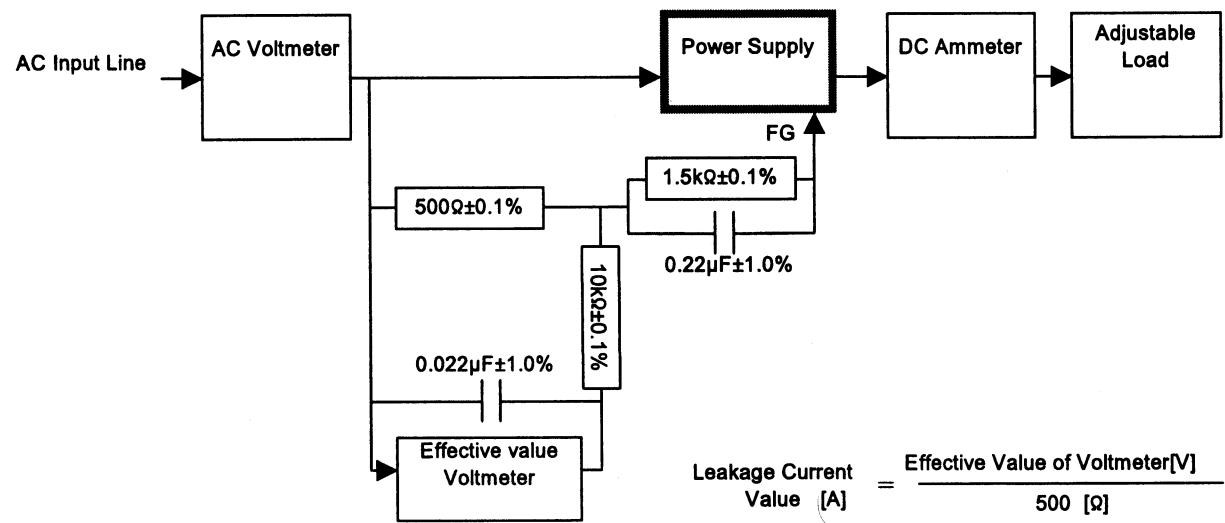


Figure B ( IEC60950 )