



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.Overvoltage Protection	29
24.Figure of Testing Circuitry	30

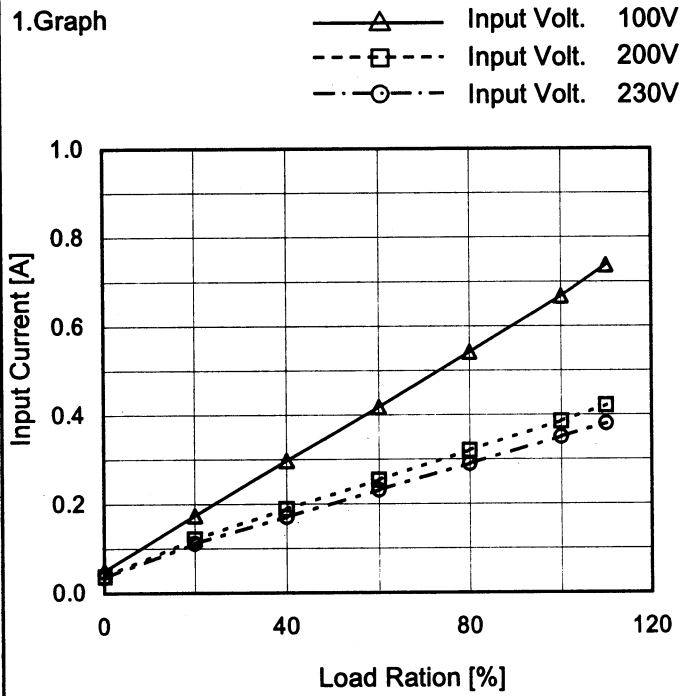
(Final Page 30)



Model	PBW30F-12
Item	Input Current (by Load Current)
Object	_____

Temperature 25°C
Testing Circuitry Figure A

1. Graph



2. Values

Load Ration [%]	Input Current [A]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0	0.050	0.037	0.035
20	0.174	0.122	0.111
40	0.298	0.189	0.171
60	0.418	0.255	0.231
80	0.542	0.320	0.290
100	0.668	0.386	0.351
110	0.737	0.422	0.381
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-



Model		PBW30F-12		Temperature 25°C																																																				
Item		Input Power (by Load Current)		Testing Circuitry Figure A																																																				
Object		_____																																																						
1. Graph			2. Values																																																					
<p> —△— Input Volt. 100V - - - □ - - - Input Volt. 200V - · - ○ - · - - Input Volt. 230V </p>			<table border="1"> <thead> <tr> <th rowspan="2">Load Ration [%]</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> </thead> <tbody> <tr><td>0</td><td>2.05</td><td>2.45</td><td>2.73</td></tr> <tr><td>20</td><td>9.07</td><td>10.00</td><td>10.31</td></tr> <tr><td>40</td><td>16.68</td><td>17.10</td><td>17.30</td></tr> <tr><td>60</td><td>24.25</td><td>24.30</td><td>24.60</td></tr> <tr><td>80</td><td>32.06</td><td>31.60</td><td>31.90</td></tr> <tr><td>100</td><td>40.16</td><td>39.00</td><td>39.20</td></tr> <tr><td>110</td><td>44.50</td><td>42.70</td><td>42.90</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> </tbody> </table>			Load Ration [%]	Input Power [W]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	0	2.05	2.45	2.73	20	9.07	10.00	10.31	40	16.68	17.10	17.30	60	24.25	24.30	24.60	80	32.06	31.60	31.90	100	40.16	39.00	39.20	110	44.50	42.70	42.90	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
Load Ration [%]	Input Power [W]																																																							
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]																																																					
0	2.05	2.45	2.73																																																					
20	9.07	10.00	10.31																																																					
40	16.68	17.10	17.30																																																					
60	24.25	24.30	24.60																																																					
80	32.06	31.60	31.90																																																					
100	40.16	39.00	39.20																																																					
110	44.50	42.70	42.90																																																					
--	-	-	-																																																					
--	-	-	-																																																					
--	-	-	-																																																					
--	-	-	-																																																					



Model		PBW30F-12		Temperature 25°C Testing Circuitry Figure A																																
Item		Efficiency (by Input Voltage)																																		
Object		_____																																		
1. Graph			2. Values																																	
<p>---□--- Load 50% —△— Load 100%</p>			<table border="1"> <thead> <tr> <th rowspan="2">Input Voltage [V]</th> <th colspan="2">Efficiency [%]</th> </tr> <tr> <th>Load 50%</th> <th>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%	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	--	-	-
Input Voltage [V]	Efficiency [%]																																			
	Load 50%	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																																		
--	-	-																																		
<p>Note: Slanted line shows the range of the rated input voltage.</p>																																				



Model		PBW30F-12		Temperature	25°C																																																			
Item		Efficiency (by Load Current)		Testing Circuitry	Figure A																																																			
Object		_____																																																						
1.Graph			—△— Input Volt. 100V	2.Values																																																				
			- - □ - - Input Volt. 200V																																																					
			- · - ○ - · - Input Volt. 230V																																																					
			<table border="1"> <thead> <tr> <th rowspan="2">Load Ration [%]</th> <th colspan="3">Efficiency [%]</th> </tr> <tr> <th>Input Volt. 100[V]</th> <th>Input Volt. 200[V]</th> <th>Input Volt. 230[V]</th> </tr> </thead> <tbody> <tr><td>0</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>20</td><td>69.2</td><td>62.8</td><td>60.9</td></tr> <tr><td>40</td><td>75.2</td><td>73.3</td><td>72.5</td></tr> <tr><td>60</td><td>77.6</td><td>77.4</td><td>76.5</td></tr> <tr><td>80</td><td>78.3</td><td>79.4</td><td>78.7</td></tr> <tr><td>100</td><td>78.1</td><td>80.4</td><td>80.0</td></tr> <tr><td>110</td><td>77.5</td><td>80.8</td><td>80.4</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> </tbody> </table>			Load Ration [%]	Efficiency [%]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	0	-	-	-	20	69.2	62.8	60.9	40	75.2	73.3	72.5	60	77.6	77.4	76.5	80	78.3	79.4	78.7	100	78.1	80.4	80.0	110	77.5	80.8	80.4	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
Load Ration [%]	Efficiency [%]																																																							
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]																																																					
0	-	-	-																																																					
20	69.2	62.8	60.9																																																					
40	75.2	73.3	72.5																																																					
60	77.6	77.4	76.5																																																					
80	78.3	79.4	78.7																																																					
100	78.1	80.4	80.0																																																					
110	77.5	80.8	80.4																																																					
--	-	-	-																																																					
--	-	-	-																																																					
--	-	-	-																																																					
--	-	-	-																																																					



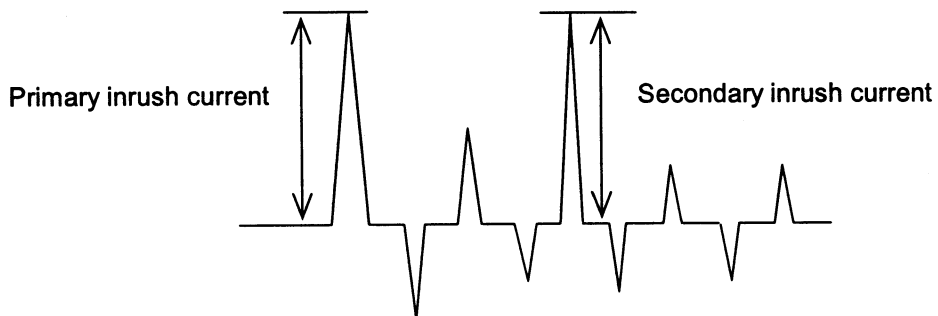
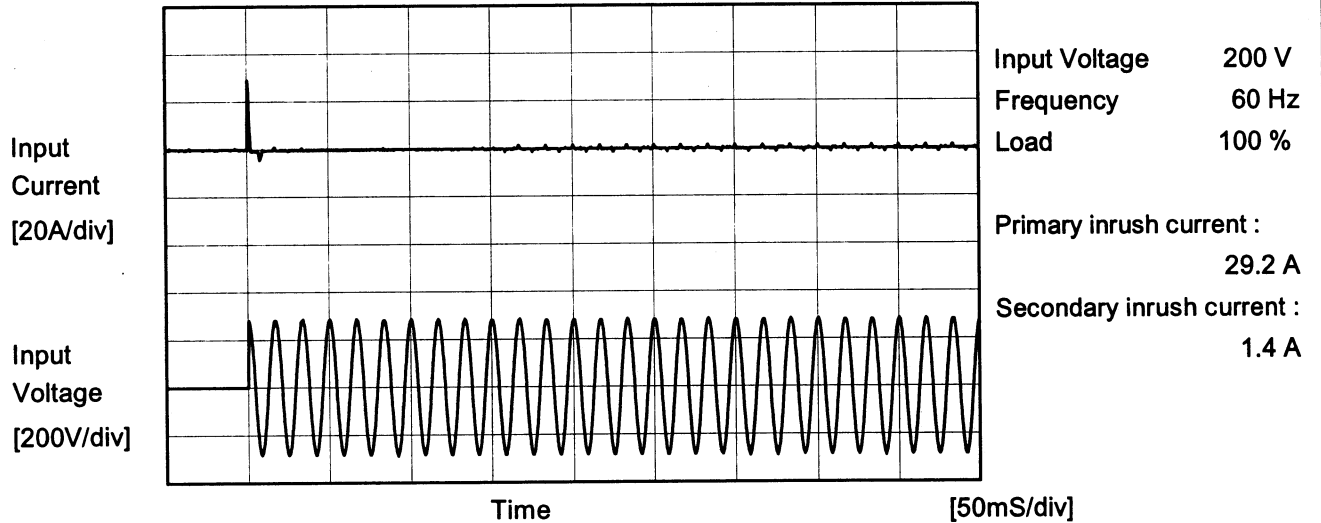
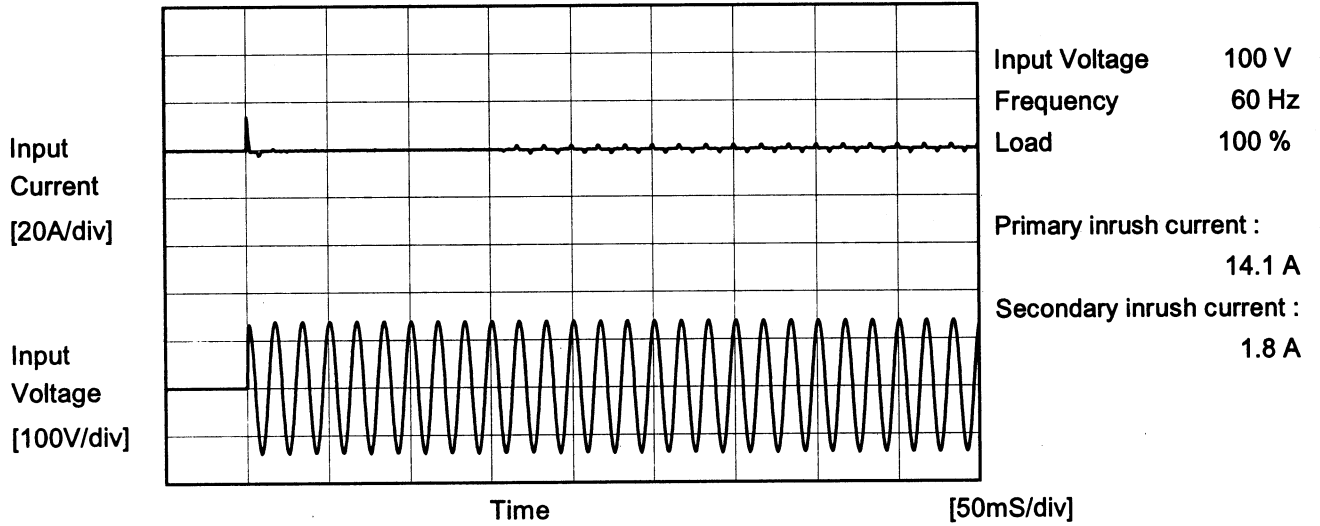
Model		PBW30F-12		Temperature		25°C																																	
Item		Power Factor (by Input Voltage)		Testing Circuitry		Figure A																																	
Object		_____																																					
1. Graph				2. Values																																			
<p>---□--- Load 50% —△— Load 100%</p>				<table border="1"> <thead> <tr> <th rowspan="2">Input Voltage [V]</th> <th colspan="2">Power Factor</th> </tr> <tr> <th>Load 50%</th> <th>Load 100%</th> </tr> </thead> <tbody> <tr> <td>75</td> <td>0.614</td> <td>0.646</td> </tr> <tr> <td>85</td> <td>0.592</td> <td>0.621</td> </tr> <tr> <td>100</td> <td>0.567</td> <td>0.600</td> </tr> <tr> <td>120</td> <td>0.539</td> <td>0.569</td> </tr> <tr> <td>200</td> <td>0.462</td> <td>0.490</td> </tr> <tr> <td>230</td> <td>0.446</td> <td>0.474</td> </tr> <tr> <td>264</td> <td>0.433</td> <td>0.458</td> </tr> <tr> <td>280</td> <td>0.426</td> <td>0.452</td> </tr> <tr> <td>--</td> <td>-</td> <td>-</td> </tr> </tbody> </table>				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	--	-	-
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																																					
--	-	-																																					
<p>Note: Slanted line shows the range of the rated input voltage.</p>																																							



Model		PBW30F-12		Temperature 25°C																																																				
Item		Power Factor (by Load Current)		Testing Circuitry Figure A																																																				
Object		_____																																																						
1.Graph			—△— Input Volt. 100V - - □ - - Input Volt. 200V - · ○ · - Input Volt. 230V																																																					
			2.Values																																																					
			<table border="1"> <thead> <tr> <th rowspan="2">Load Ration [%]</th> <th colspan="3">Power Factor</th> </tr> <tr> <th>Input Volt. 100[V]</th> <th>Input Volt. 200[V]</th> <th>Input Volt. 230[V]</th> </tr> </thead> <tbody> <tr><td>0</td><td>0.407</td><td>0.329</td><td>0.338</td></tr> <tr><td>20</td><td>0.520</td><td>0.410</td><td>0.404</td></tr> <tr><td>40</td><td>0.560</td><td>0.452</td><td>0.440</td></tr> <tr><td>60</td><td>0.579</td><td>0.477</td><td>0.462</td></tr> <tr><td>80</td><td>0.592</td><td>0.493</td><td>0.478</td></tr> <tr><td>100</td><td>0.601</td><td>0.505</td><td>0.486</td></tr> <tr><td>110</td><td>0.604</td><td>0.507</td><td>0.489</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> </tbody> </table>			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	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
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																																																					
--	-	-	-																																																					
--	-	-	-																																																					
--	-	-	-																																																					
--	-	-	-																																																					



Model		PBW30F-12	Temperature 25°C Testing Circuitry Figure A
Item		Inrush Current	
Object		_____	





COSEL		Temperature 25°C Testing Circuitry Figure B
Model	PBW30F-12	
Item	Leakage Current	
Object	_____	

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

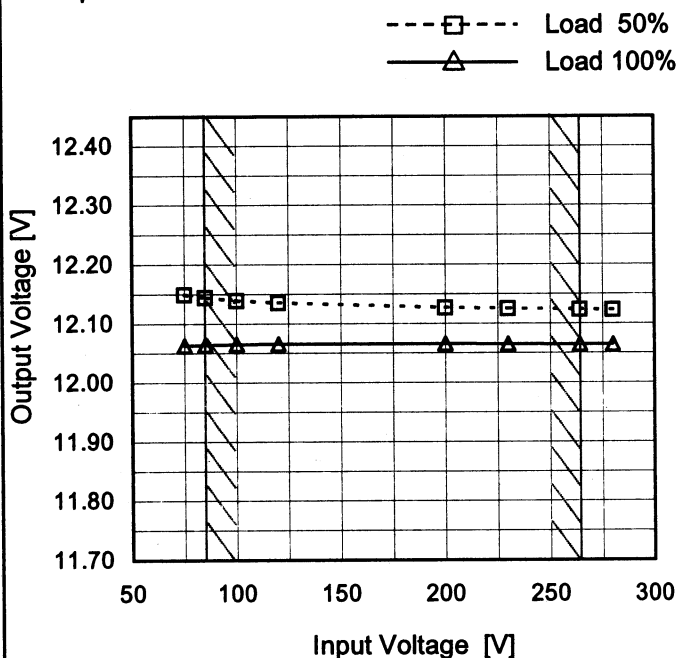
Leakage current value is concluded after measuring both phases of AC input and by choosing the larger one.



Model	PBW30F-12
Item	Line Regulation
Object	+12V1.3A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

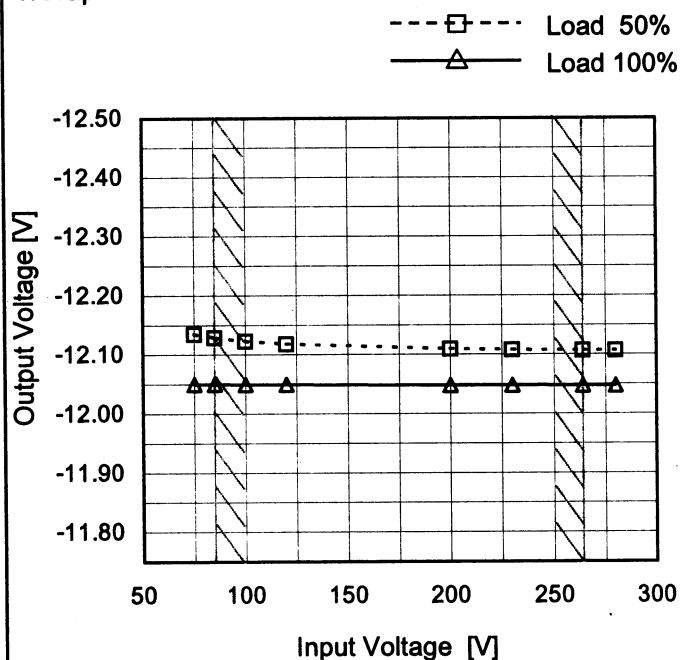


2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
75	12.149	12.063
85	12.144	12.064
100	12.139	12.065
120	12.135	12.066
200	12.127	12.066
230	12.125	12.065
264	12.124	12.065
280	12.123	12.065
--	-	-

Object	-12V1.3A
--------	----------

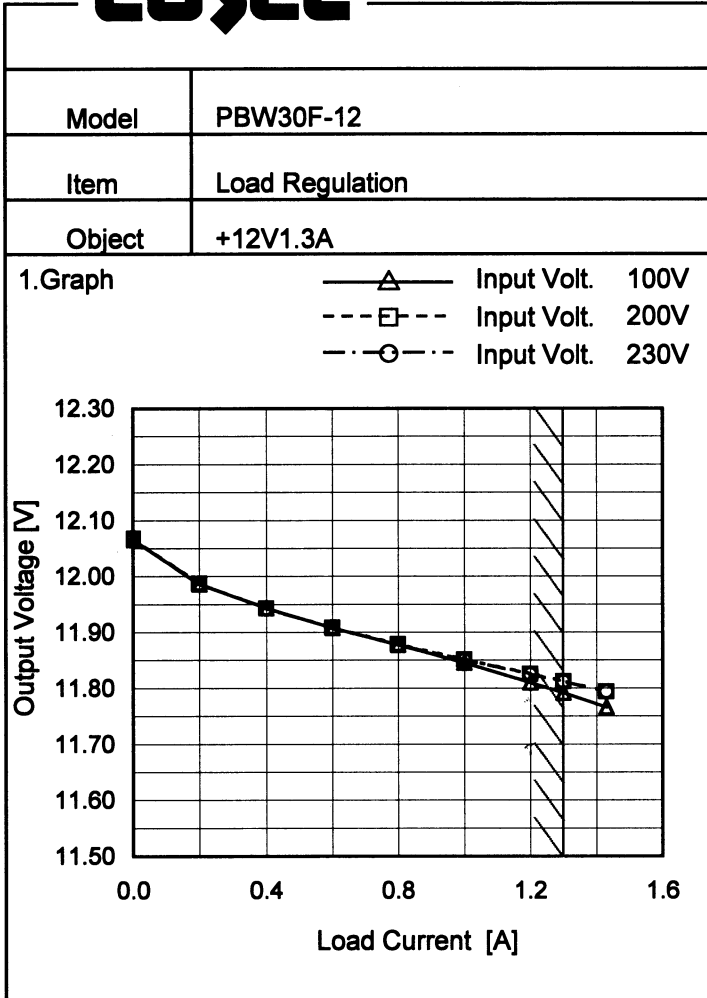
1.Graph



2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
75	-12.135	-12.050
85	-12.129	-12.050
100	-12.123	-12.050
120	-12.118	-12.049
200	-12.109	-12.048
230	-12.108	-12.048
264	-12.107	-12.048
280	-12.107	-12.048
--	-	-

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

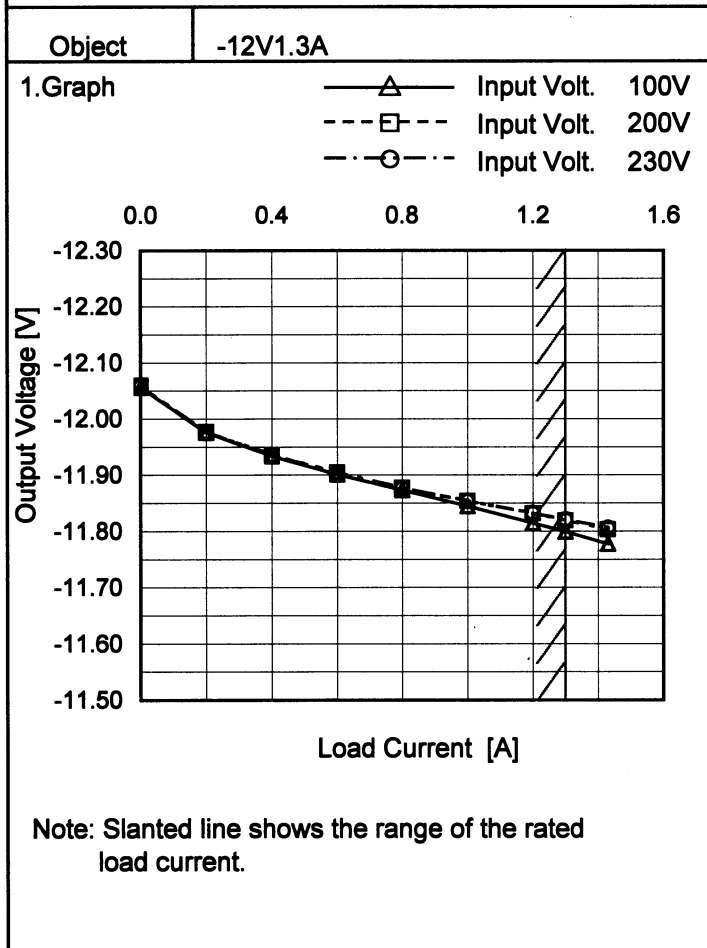


Temperature 25°C
Testing Circuitry Figure A

2.Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	12.066	12.068	12.067
0.20	11.986	11.987	11.987
0.40	11.943	11.943	11.943
0.60	11.908	11.909	11.907
0.80	11.878	11.879	11.878
1.00	11.846	11.852	11.851
1.20	11.810	11.826	11.825
1.30	11.792	11.812	11.812
1.43	11.766	11.794	11.794
--	-	-	-
--	-	-	-

-12V: Rated output current 1



2.Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[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
--	-	-	-
--	-	-	-

+12V: Rated output current 1



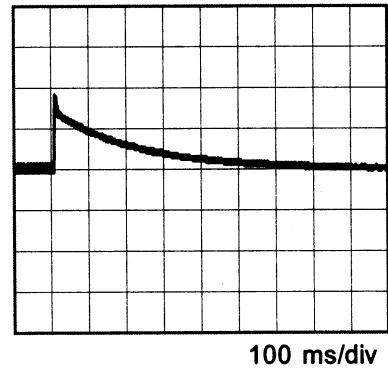
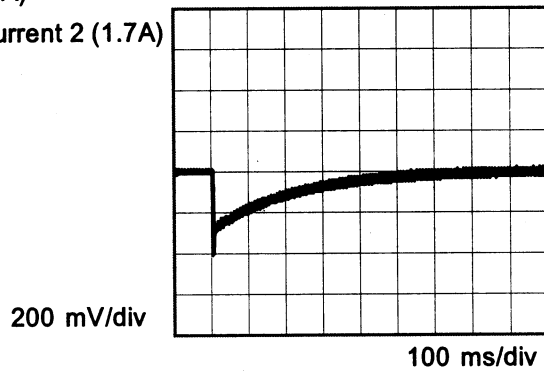
Model		PBW30F-12	
Item		Temperature	25°C
Object		Testing Circuitry	Figure A
		+12V1.3A	

Input Volt. 100 V
Cycle 1000 ms



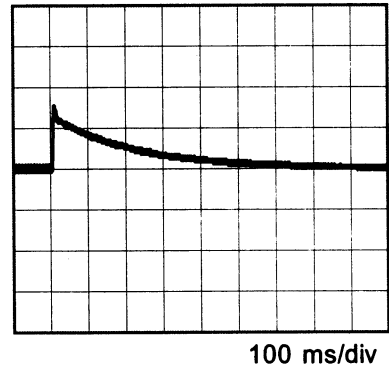
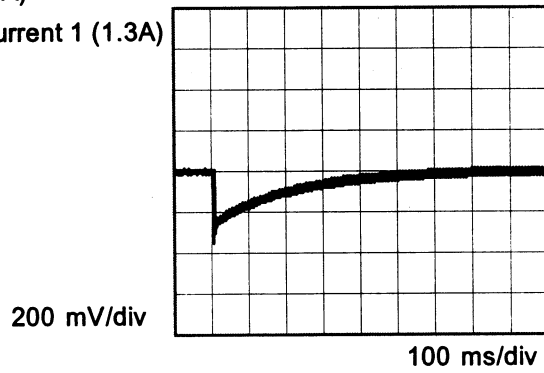
Min. Load (0A) ←→

Output current 2 (1.7A)
* -12V: 0.9A



Min. Load (0A) ←→

Output current 1 (1.3A)
* -12V: 1.3A



* The characteristic of AC200V is equal.



Model	PBW30F-12	Temperature	25°C
Item	Dynamic Load Response	Testing Circuitry	Figure A
Object	-12V1.3A		

Input Volt. 100 V
Cycle 1000 ms

Load Current

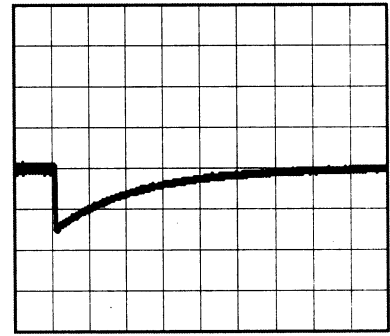
Min. Load (0A) ←→

Output current 2 (1.7A)
* +12V: 0.9A

200 mV/div



100 ms/div



100 ms/div

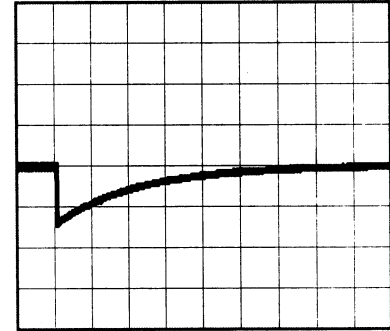
Min. Load (0A) ←→

Output current 1 (1.3A)
* +12V: 1.3A

200 mV/div



100 ms/div



100 ms/div

* The characteristic of AC200V is equal.



Model		PBW30F-12		Temperature 25°C Testing Circuitry Figure A																																						
Item		Ripple Voltage (by Load Current)																																								
Object		+12V1.3A																																								
1. Graph <div style="text-align: right; margin-right: 50px;"> —△— Input Volt. 100V -·-○-·- Input Volt. 200V </div> <p style="text-align: center;">Ripple Voltage [mV]</p> <p style="text-align: center;">Load Current [A]</p>			2. Values <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <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> </thead> <tbody> <tr><td>0.00</td><td>5</td><td>5</td></tr> <tr><td>0.20</td><td>10</td><td>5</td></tr> <tr><td>0.40</td><td>10</td><td>5</td></tr> <tr><td>0.60</td><td>15</td><td>5</td></tr> <tr><td>0.80</td><td>15</td><td>5</td></tr> <tr><td>1.00</td><td>20</td><td>5</td></tr> <tr><td>1.20</td><td>25</td><td>10</td></tr> <tr><td>1.30</td><td>25</td><td>10</td></tr> <tr><td>1.43</td><td>30</td><td>10</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> </tbody> </table> <p style="text-align: center;">-12V: Rated output current 1</p>		Load Current [A]	Ripple Voltage [mV]		Input Volt. 100 [V]	Input Volt. 200 [V]	0.00	5	5	0.20	10	5	0.40	10	5	0.60	15	5	0.80	15	5	1.00	20	5	1.20	25	10	1.30	25	10	1.43	30	10	--	-	-	--	-	-
Load Current [A]	Ripple Voltage [mV]																																									
	Input Volt. 100 [V]	Input Volt. 200 [V]																																								
0.00	5	5																																								
0.20	10	5																																								
0.40	10	5																																								
0.60	15	5																																								
0.80	15	5																																								
1.00	20	5																																								
1.20	25	10																																								
1.30	25	10																																								
1.43	30	10																																								
--	-	-																																								
--	-	-																																								
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																																										
<p style="text-align: center;">Ripple [mVp-p]</p> <p style="text-align: center;">T1</p> <p style="text-align: center;">T2</p>																																										
Fig. Complex Ripple Wave Form																																										



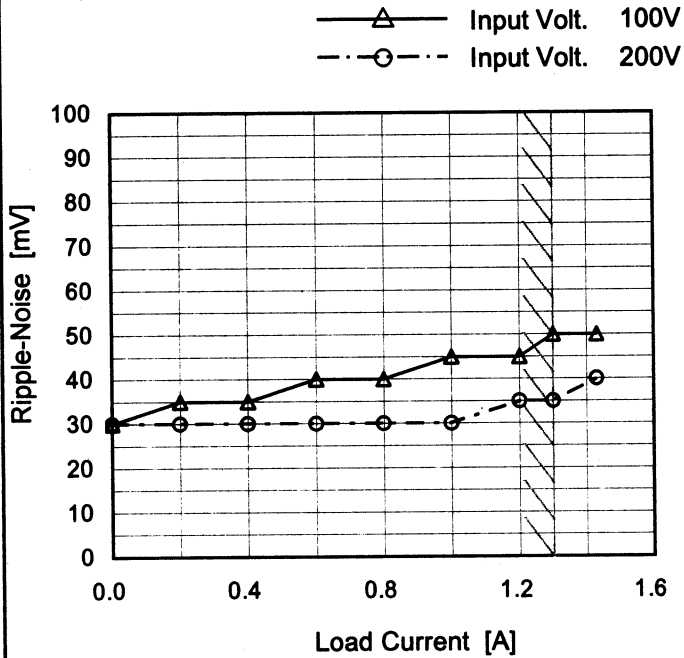
<table border="1"> <tr> <td>Model</td> <td>PBW30F-12</td> </tr> <tr> <td>Item</td> <td>Ripple Voltage (by Load Current)</td> </tr> <tr> <td>Object</td> <td>-12V1.3A</td> </tr> </table>		Model	PBW30F-12	Item	Ripple Voltage (by Load Current)	Object	-12V1.3A	Temperature 25°C Testing Circuitry Figure A																																
Model	PBW30F-12																																							
Item	Ripple Voltage (by Load Current)																																							
Object	-12V1.3A																																							
<p>1. Graph</p> <div style="text-align: right;"> —△— Input Volt. 100V -·-○-·- Input Volt. 200V </div> <p>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.</p>		<p>2. Values</p> <table border="1"> <thead> <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> </thead> <tbody> <tr><td>0.00</td><td>5</td><td>5</td></tr> <tr><td>0.20</td><td>10</td><td>5</td></tr> <tr><td>0.40</td><td>15</td><td>5</td></tr> <tr><td>0.60</td><td>15</td><td>5</td></tr> <tr><td>0.80</td><td>20</td><td>5</td></tr> <tr><td>1.00</td><td>20</td><td>5</td></tr> <tr><td>1.20</td><td>20</td><td>5</td></tr> <tr><td>1.30</td><td>25</td><td>10</td></tr> <tr><td>1.43</td><td>30</td><td>10</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>	Load Current [A]	Ripple Voltage [mV]		Input Volt. 100 [V]	Input Volt. 200 [V]	0.00	5	5	0.20	10	5	0.40	15	5	0.60	15	5	0.80	20	5	1.00	20	5	1.20	20	5	1.30	25	10	1.43	30	10	--	-	-	--	-	-
Load Current [A]	Ripple Voltage [mV]																																							
	Input Volt. 100 [V]	Input Volt. 200 [V]																																						
0.00	5	5																																						
0.20	10	5																																						
0.40	15	5																																						
0.60	15	5																																						
0.80	20	5																																						
1.00	20	5																																						
1.20	20	5																																						
1.30	25	10																																						
1.43	30	10																																						
--	-	-																																						
--	-	-																																						
<p>T1: Due to AC Input Line T2: Due to Switching</p> <p>Fig. Complex Ripple Wave Form</p>																																								



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	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
--	-	-
--	-	-

-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.

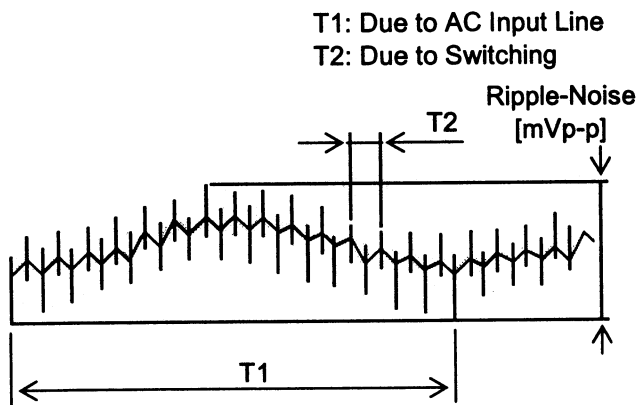


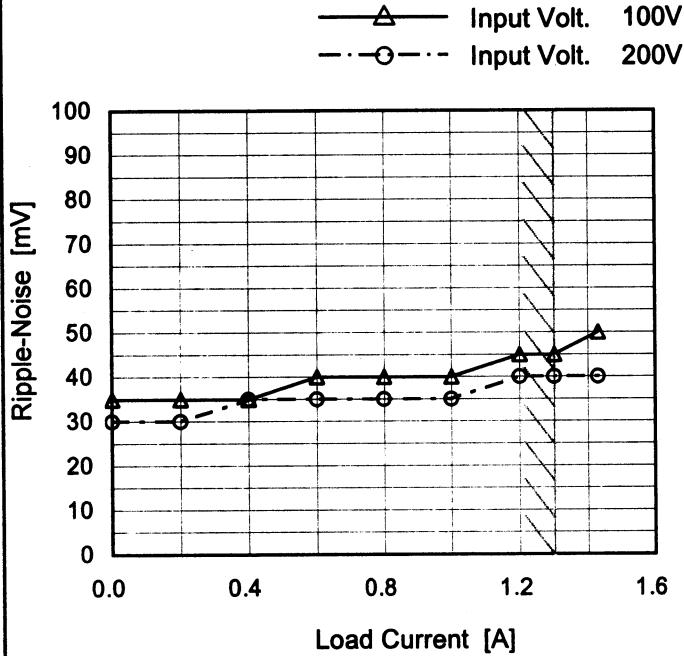
Fig. Complex Ripple Wave Form



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.

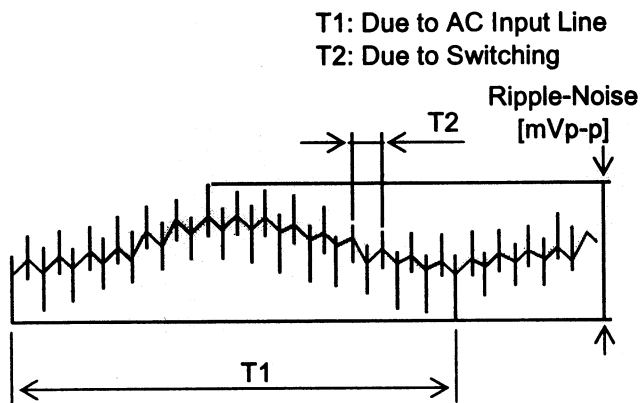


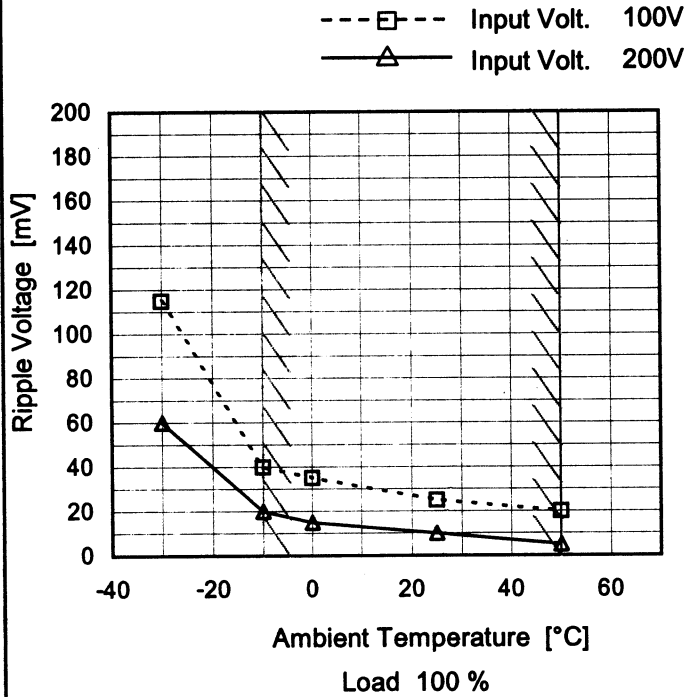
Fig. Complex Ripple Wave Form



Model	PBW30F-12
Item	Ripple Voltage (by Ambient Temp.)
Object	+12V1.3A

Testing Circuitry Figure A

1.Graph



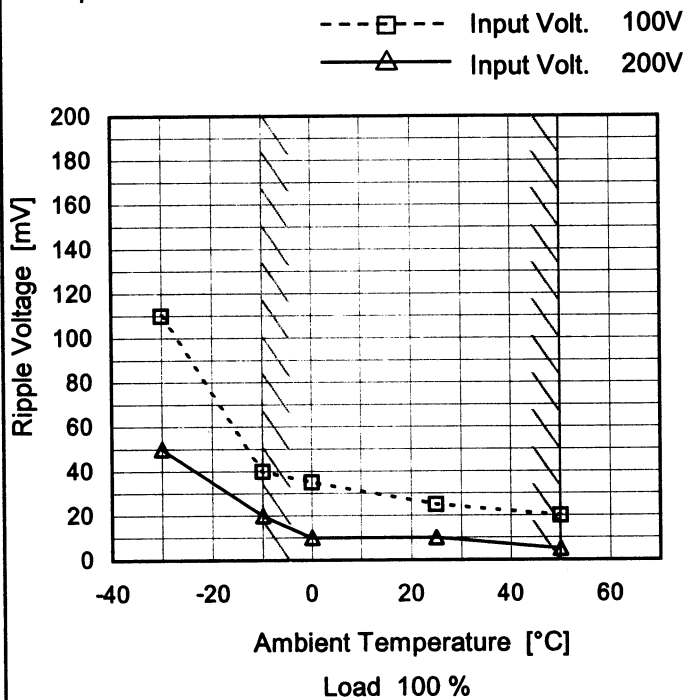
2.Values

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
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

-12V: Rated output current 1

Object	-12V1.3A
--------	----------

1.Graph

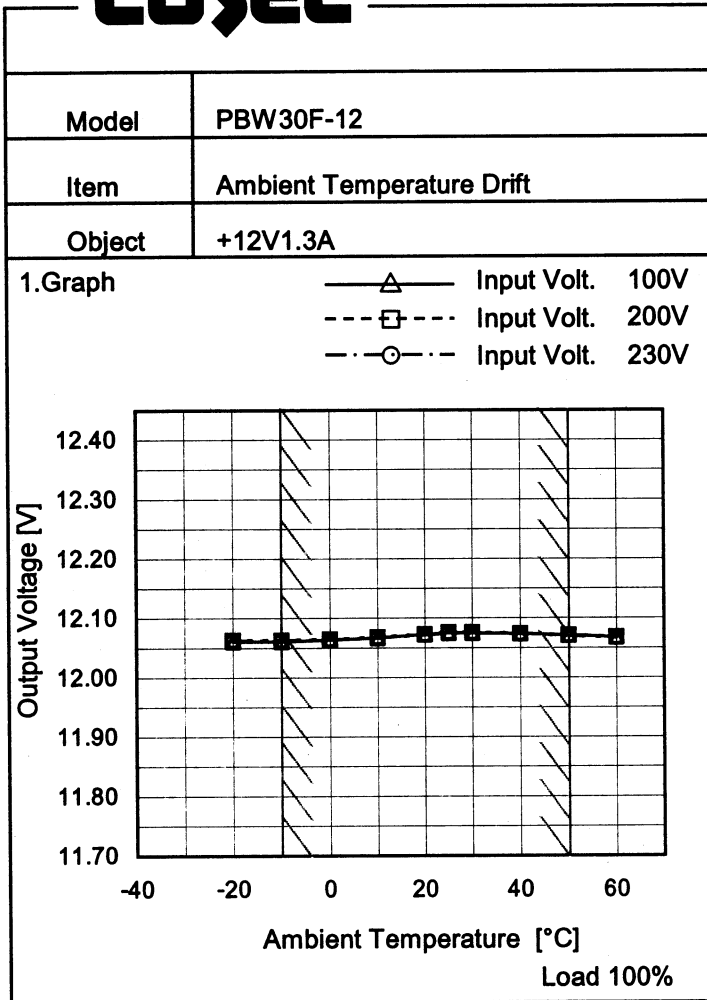


2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
-30	110	50
-10	40	20
0	35	10
25	25	10
50	20	5
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

+12V: Rated output current 1

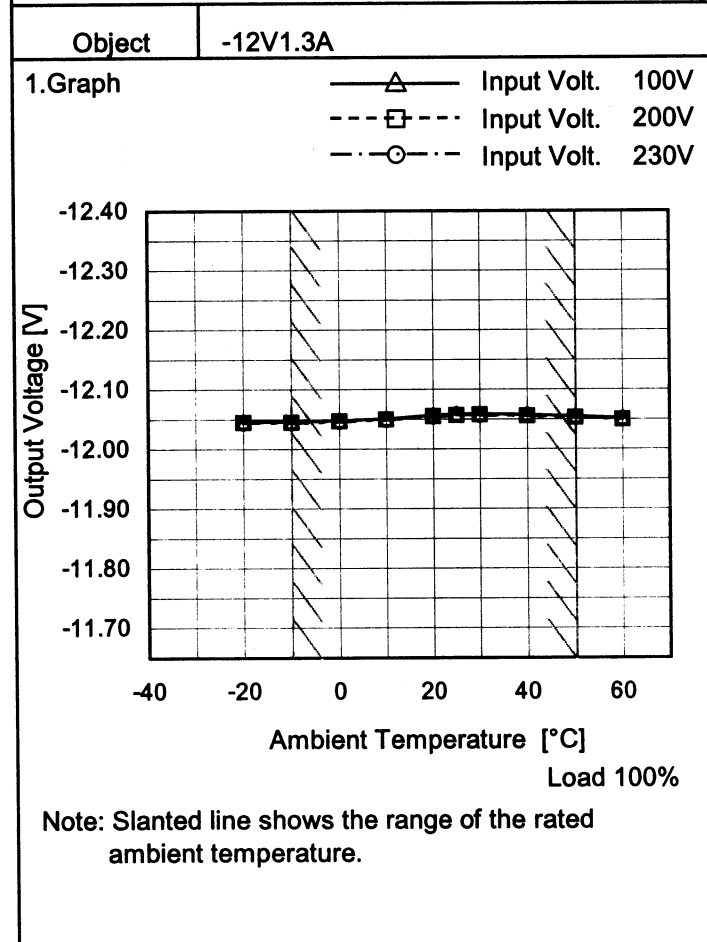
Measured by 20 MHz Oscilloscope.
Note: Slanted line shows the range of the rated ambient temperature.



Testing Circuitry Figure A

2.Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
-20	12.061	12.063	12.062
-10	12.061	12.063	12.062
0	12.064	12.065	12.064
10	12.067	12.068	12.067
20	12.073	12.073	12.072
25	12.075	12.076	12.075
30	12.075	12.076	12.075
40	12.074	12.074	12.074
50	12.071	12.071	12.070
60	12.068	12.068	12.067
--	-	-	-



2.Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
-20	-12.046	-12.045	-12.044
-10	-12.046	-12.045	-12.044
0	-12.048	-12.047	-12.046
10	-12.051	-12.050	-12.049
20	-12.057	-12.055	-12.054
25	-12.059	-12.057	-12.057
30	-12.059	-12.058	-12.057
40	-12.058	-12.056	-12.056
50	-12.055	-12.053	-12.053
60	-12.052	-12.050	-12.050
--	-	-	-



COSEL		Testing Circuitry Figure A
Model	PBW30F-12	
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 = $\pm(\text{Maximum of Output Voltage} - \text{Minimum of Output Voltage}) / 2$

* 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]	Output		Value [mV]	Ration [%]	
			Current[A]	Voltage[V]			
Maximum Voltage	50	85	0	12.344	±142	±1.2	
Minimum Voltage	-10	85	1.3	12.061			

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

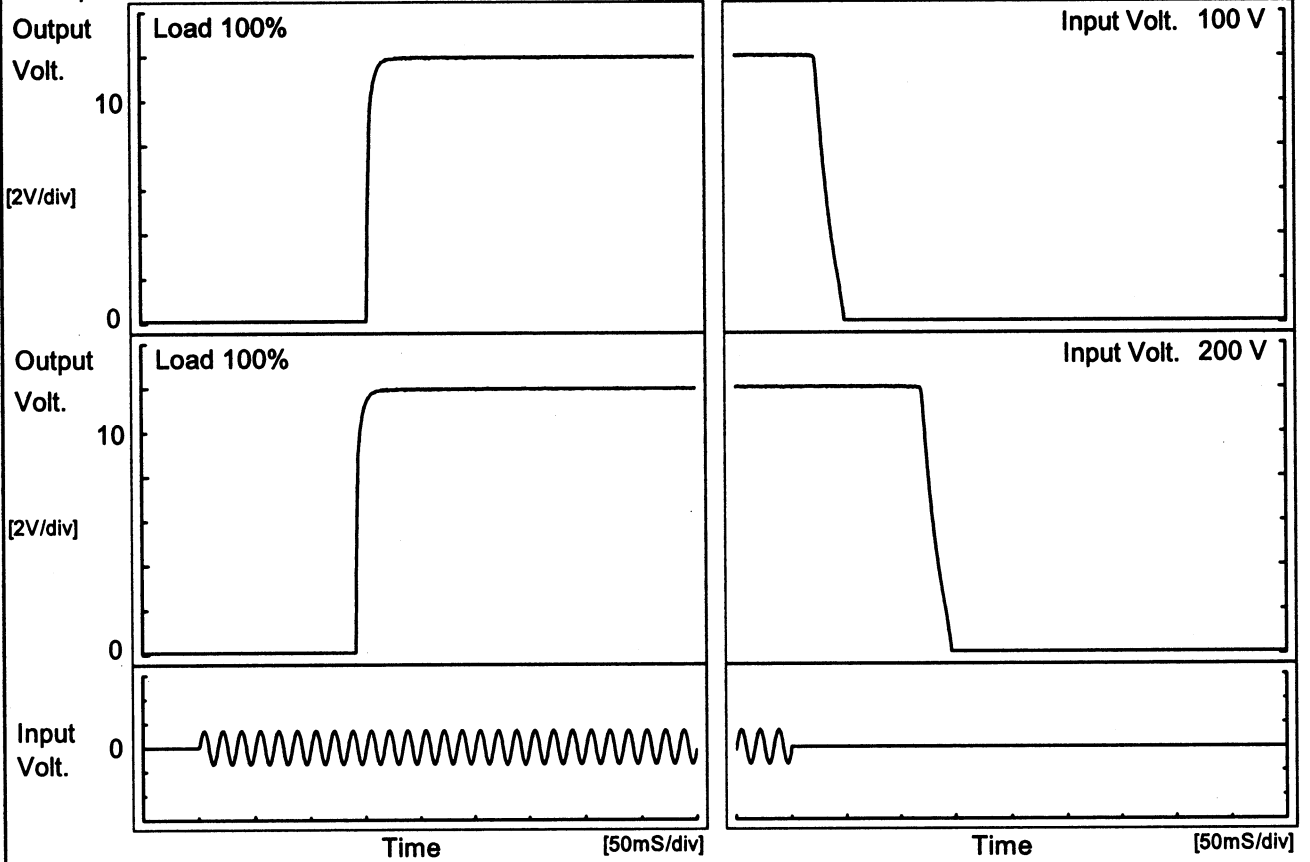


COSEL																									
Model	PBW30F-12	Temperature	25°C																						
Item	Time Lapse Drift	Testing Circuitry	Figure A																						
Object	+12V1.3A																								
<p>1.Graph</p> <p style="text-align: center;">Time [H]</p> <p style="text-align: center;">Input Volt. 100V Load 100%</p>		<p>2.Values</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
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																								
Object	-12V1.3A																								
<p>1.Graph</p> <p style="text-align: center;">Time [H]</p> <p style="text-align: center;">Input Volt. 100V Load 100%</p>		<p>2.Values</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>-12.049</td></tr> <tr><td>0.5</td><td>-12.050</td></tr> <tr><td>1.0</td><td>-12.050</td></tr> <tr><td>2.0</td><td>-12.050</td></tr> <tr><td>3.0</td><td>-12.049</td></tr> <tr><td>4.0</td><td>-12.049</td></tr> <tr><td>5.0</td><td>-12.049</td></tr> <tr><td>6.0</td><td>-12.049</td></tr> <tr><td>7.0</td><td>-12.049</td></tr> <tr><td>8.0</td><td>-12.049</td></tr> </tbody> </table>		Time since start [H]	Output Voltage [V]	0.0	-12.049	0.5	-12.050	1.0	-12.050	2.0	-12.050	3.0	-12.049	4.0	-12.049	5.0	-12.049	6.0	-12.049	7.0	-12.049	8.0	-12.049
Time since start [H]	Output Voltage [V]																								
0.0	-12.049																								
0.5	-12.050																								
1.0	-12.050																								
2.0	-12.050																								
3.0	-12.049																								
4.0	-12.049																								
5.0	-12.049																								
6.0	-12.049																								
7.0	-12.049																								
8.0	-12.049																								
<p>* The characteristic of AC200V is equal.</p>																									



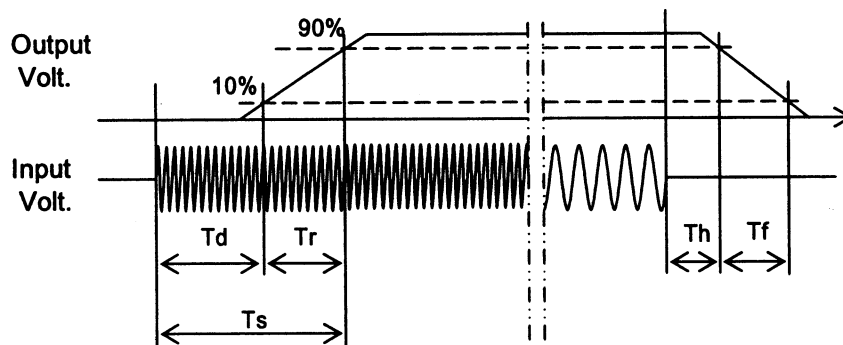
Model	PBW30F-12	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+12V1.3A		

1. Graph



2. Values

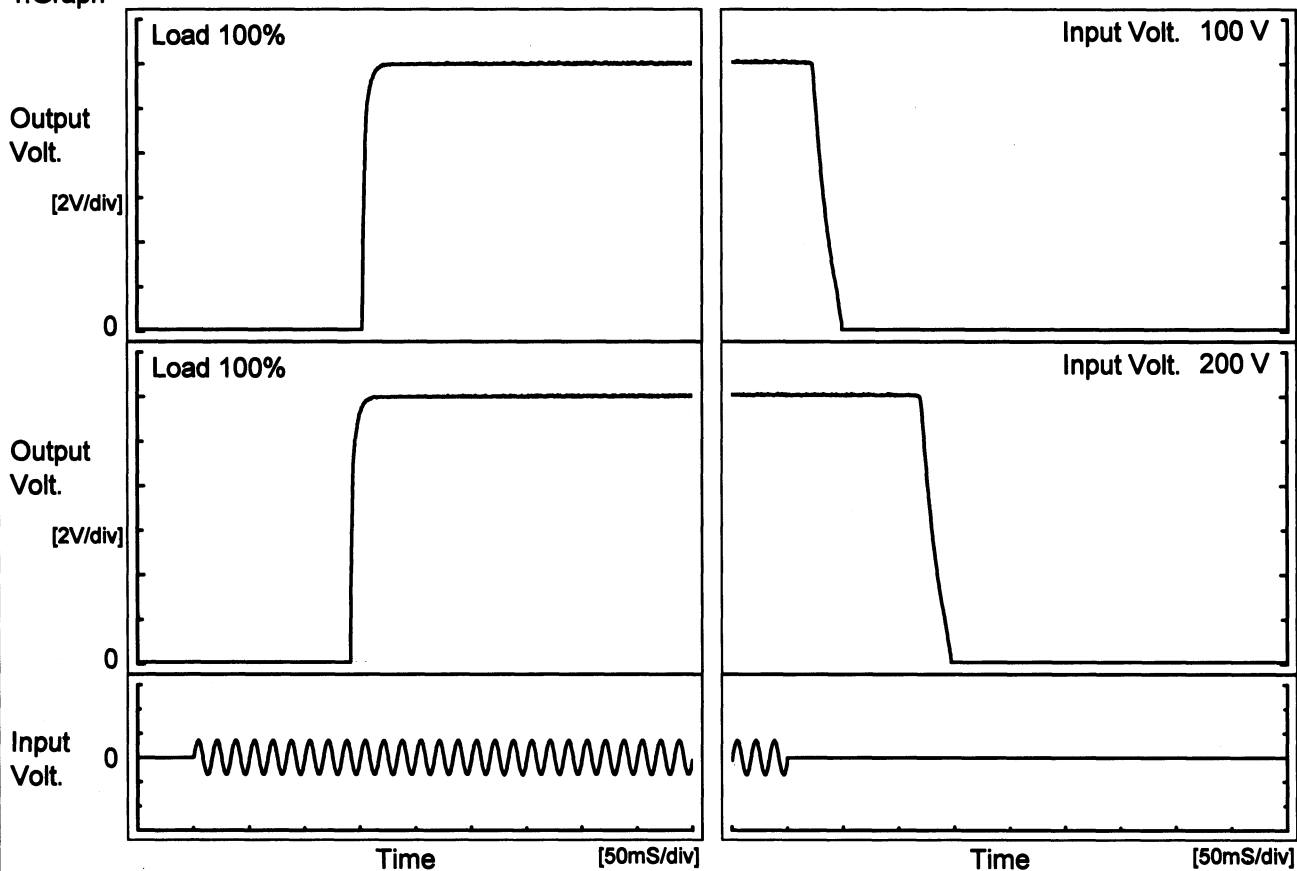
Input Volt. \ Time	Td	Tr	Ts	Th	Tf
100 V	152.3	7.5	159.8	24.0	21.8
200 V	141.3	7.3	148.6	121.3	22.5





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

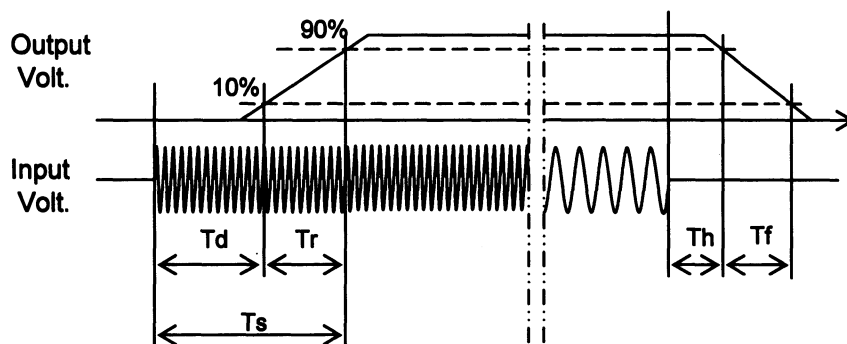
1. Graph



2. Values

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

[mS]

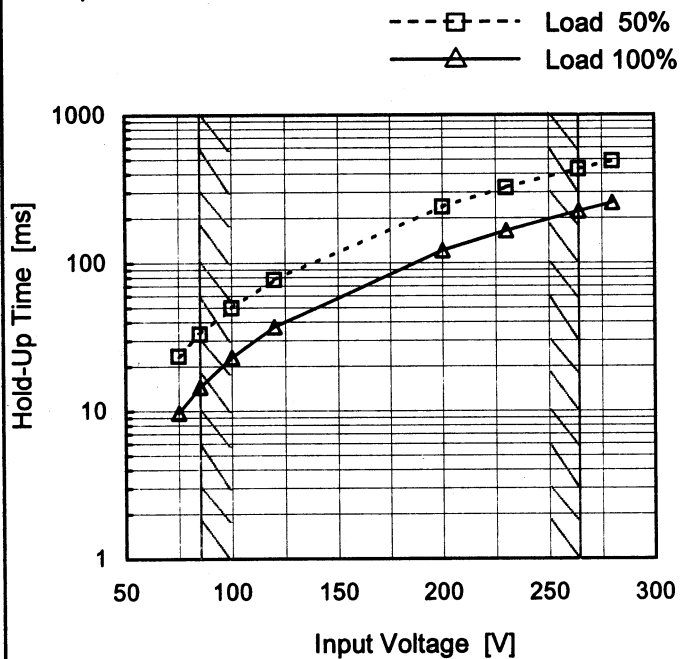




Model	PBW30F-12
Item	Hold-Up Time
Object	+12V1.3A

Temperature 25°C
Testing Circuitry Figure A

1. Graph



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

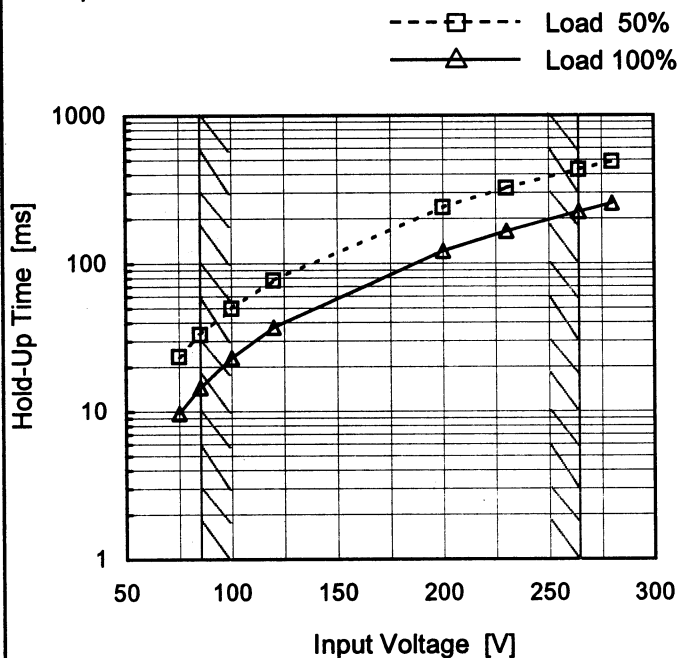
Input Voltage [V]	Hold-Up Time [ms]	
	Load 50%	Load 100%
75	24	10
85	33	15
100	50	23
120	77	37
200	239	121
230	322	165
264	430	223
280	487	254
--	-	-



Model	PBW30F-12
Item	Hold-Up Time
Object	-12V1.3A

Temperature 25°C
Testing Circuitry Figure A

1. Graph



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

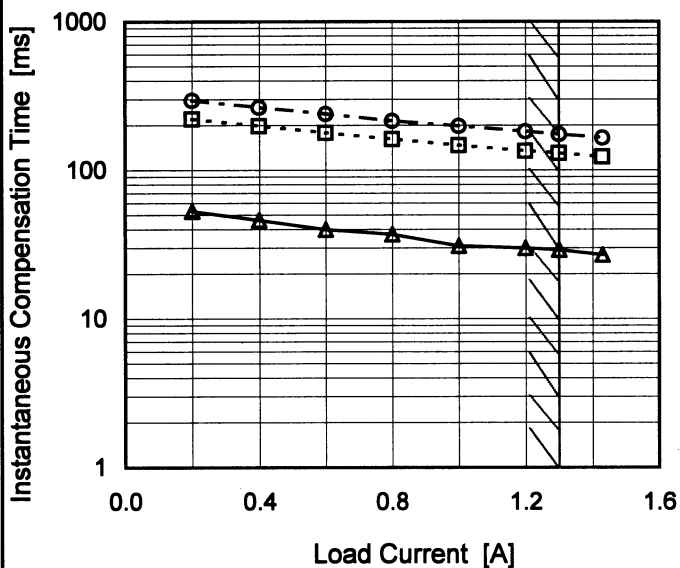
Input Voltage [V]	Hold-Up Time [ms]	
	Load 50%	Load 100%
75	24	10
85	33	15
100	50	23
120	77	37
200	239	121
230	322	165
264	430	223
280	487	254
--	-	-



Model	PBW30F-12
Item	Instantaneous Interruption Compensation
Object	+12V1.3A

Temperature 25°C
Testing Circuitry Figure A

1.Graph
 —△— Input Volt. 100V
 - - □ - - Input Volt. 200V
 ···○··· Input Volt. 230V



2.Values

Load Current [A]	Time [ms]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	-	-	-
0.20	53	221	295
0.40	46	198	265
0.60	40	179	239
0.80	37	162	215
1.00	31	147	198
1.20	30	135	182
1.30	29	130	174
1.43	27	123	165
--	-	-	-
--	-	-	-

-12V: Rated output current 1

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



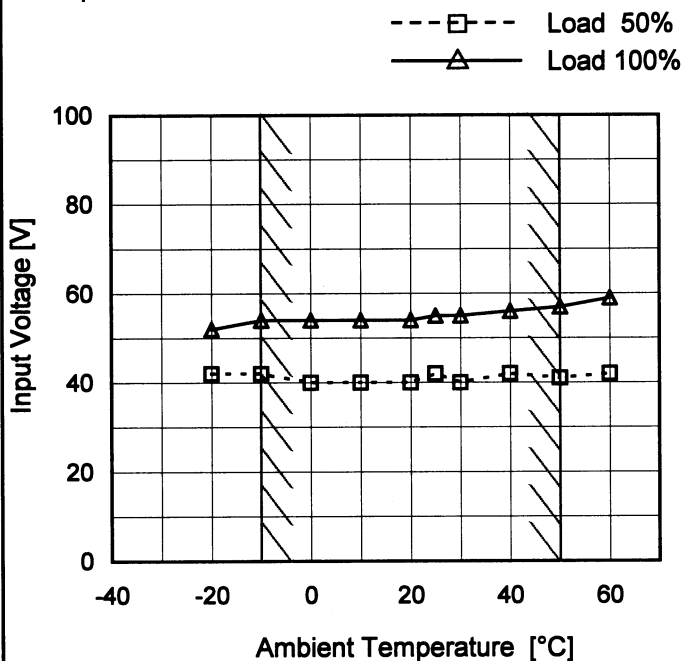
<p>Model PBW30F-12</p>		<p>Temperature 25°C Testing Circuitry Figure A</p>																																																			
<p>Item Instantaneous Interruption Compensation</p>																																																					
<p>Object -12V1.3A</p>																																																					
<p>1. Graph</p> <p> —△— Input Volt. 100V - - □ - - Input Volt. 200V ···○··· Input Volt. 230V </p> <p>Instantaneous Compensation Time [ms]</p> <p>Load Current [A]</p>		<p>2. Values</p> <table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="3">Time [ms]</th> </tr> <tr> <th>Input Volt. 100[V]</th> <th>Input Volt. 200[V]</th> <th>Input Volt. 230[V]</th> </tr> </thead> <tbody> <tr><td>0.00</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>0.20</td><td>54</td><td>220</td><td>298</td></tr> <tr><td>0.40</td><td>48</td><td>199</td><td>265</td></tr> <tr><td>0.60</td><td>40</td><td>178</td><td>237</td></tr> <tr><td>0.80</td><td>37</td><td>160</td><td>215</td></tr> <tr><td>1.00</td><td>31</td><td>147</td><td>197</td></tr> <tr><td>1.20</td><td>31</td><td>135</td><td>182</td></tr> <tr><td>1.30</td><td>29</td><td>130</td><td>173</td></tr> <tr><td>1.43</td><td>27</td><td>123</td><td>165</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> </tbody> </table> <p>+12V: Rated output current 1</p>	Load Current [A]	Time [ms]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 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	--	-	-	-	--	-	-	-
Load Current [A]	Time [ms]																																																				
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 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																																																		
--	-	-	-																																																		
--	-	-	-																																																		
<p>Note: Slanted line shows the range of the rated load current.</p>																																																					



Model	PBW30F-12
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+12V1.3A

Testing Circuitry Figure A

1. Graph

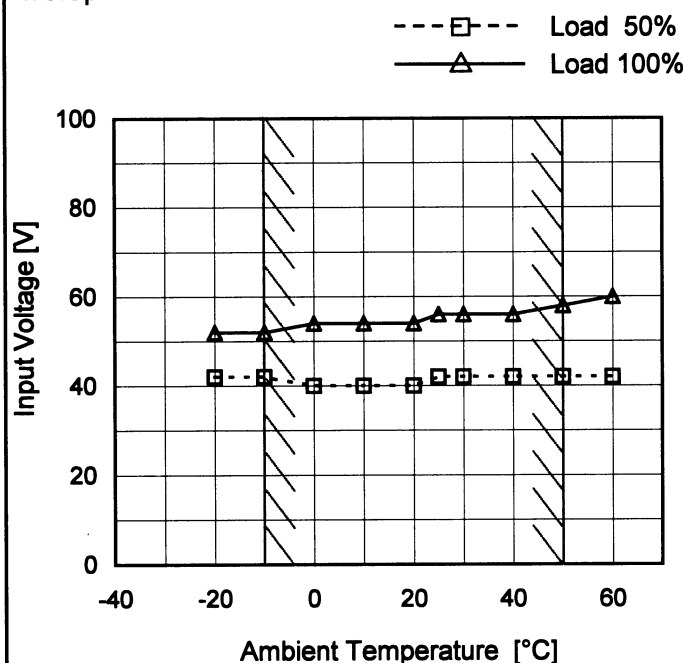


2. Values

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



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.



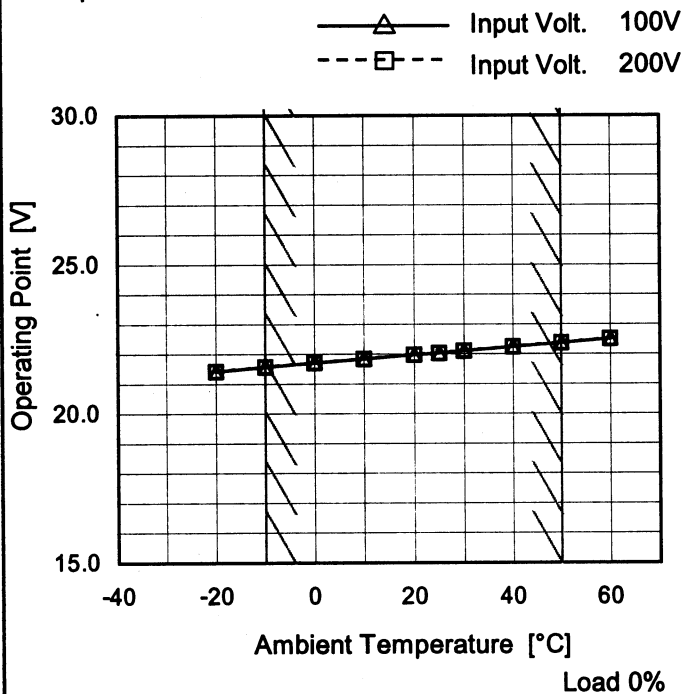
Model PBW30F-12		Temperature 25°C Testing Circuitry Figure A																																										
Item Overcurrent Protection																																												
Object +12V1.3A																																												
1.Graph <p> —△— Input Volt. 100V —○— Input Volt. 200V </p> <p>Intermittent operation occurs when the output voltage is less than rated output voltage.</p>		2.Values <table border="1"> <thead> <tr> <th rowspan="2">Output Voltage [V]</th> <th colspan="2">Load Current [A]</th> </tr> <tr> <th>Input Volt. 100[V]</th> <th>Input Volt. 200[V]</th> </tr> </thead> <tbody> <tr><td>12</td><td>3.19</td><td>4.46</td></tr> <tr><td>11.4</td><td>-</td><td>-</td></tr> <tr><td>10.8</td><td>-</td><td>-</td></tr> <tr><td>9.6</td><td>-</td><td>-</td></tr> <tr><td>8.4</td><td>-</td><td>-</td></tr> <tr><td>7.2</td><td>-</td><td>-</td></tr> <tr><td>6</td><td>-</td><td>-</td></tr> <tr><td>4.8</td><td>-</td><td>-</td></tr> <tr><td>3.6</td><td>-</td><td>-</td></tr> <tr><td>2.4</td><td>-</td><td>-</td></tr> <tr><td>1.2</td><td>-</td><td>-</td></tr> <tr><td>0</td><td>-</td><td>-</td></tr> </tbody> </table> <p>-12V:Rated output current 1</p>	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	-	-	
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	-	-																																										
Object -12V1.3A																																												
1.Graph <p> —△— Input Volt. 100V —○— Input Volt. 200V </p> <p>Note: Slanted line shows the range of the rated load current.</p> <p>Intermittent operation occurs when the output voltage is less than rated output voltage.</p>			2.Values <table border="1"> <thead> <tr> <th rowspan="2">Output Voltage [V]</th> <th colspan="2">Load Current [A]</th> </tr> <tr> <th>Input Volt. 100[V]</th> <th>Input Volt. 200[V]</th> </tr> </thead> <tbody> <tr><td>-12</td><td>3.11</td><td>4.42</td></tr> <tr><td>-11.4</td><td>-</td><td>-</td></tr> <tr><td>-10.8</td><td>-</td><td>-</td></tr> <tr><td>-9.6</td><td>-</td><td>-</td></tr> <tr><td>-8.4</td><td>-</td><td>-</td></tr> <tr><td>-7.2</td><td>-</td><td>-</td></tr> <tr><td>-6</td><td>-</td><td>-</td></tr> <tr><td>-4.8</td><td>-</td><td>-</td></tr> <tr><td>-3.6</td><td>-</td><td>-</td></tr> <tr><td>-2.4</td><td>-</td><td>-</td></tr> <tr><td>-1.2</td><td>-</td><td>-</td></tr> <tr><td>0</td><td>-</td><td>-</td></tr> </tbody> </table> <p>+12V:Rated output current 1</p>	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	-	-
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	-	-																																										



Model	PBW30F-12
Item	Overvoltage Protection
Object	+12V1.3A

Testing Circuitry Figure A

1.Graph

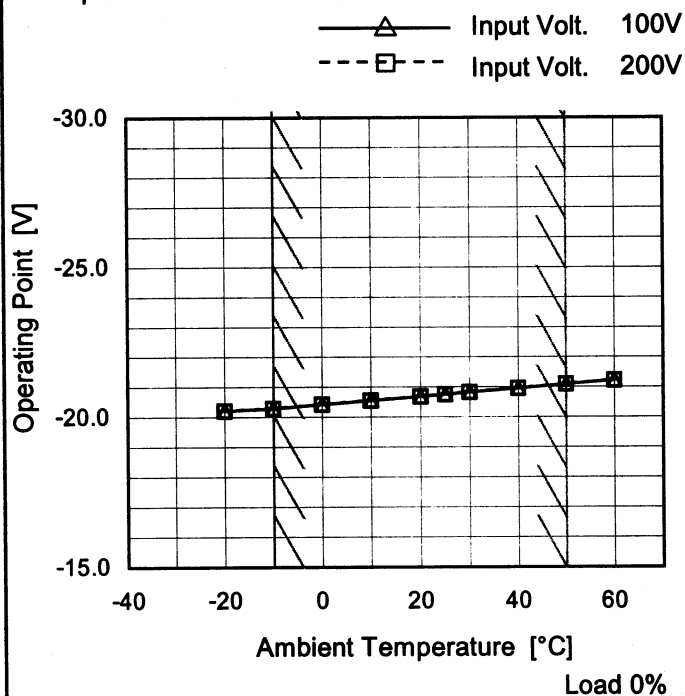


2.Values

Ambient Temperature [°C]	Operating Point [V]	
	Input Volt. 100[V]	Input Volt. 200[V]
-20	21.43	21.43
-10	21.57	21.57
0	21.71	21.71
10	21.84	21.84
20	21.98	21.98
25	22.04	22.04
30	22.11	22.11
40	22.25	22.25
50	22.38	22.38
60	22.52	22.52
--	-	-

Object	-12V1.3A
--------	----------

1.Graph



2.Values

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
--	-	-

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

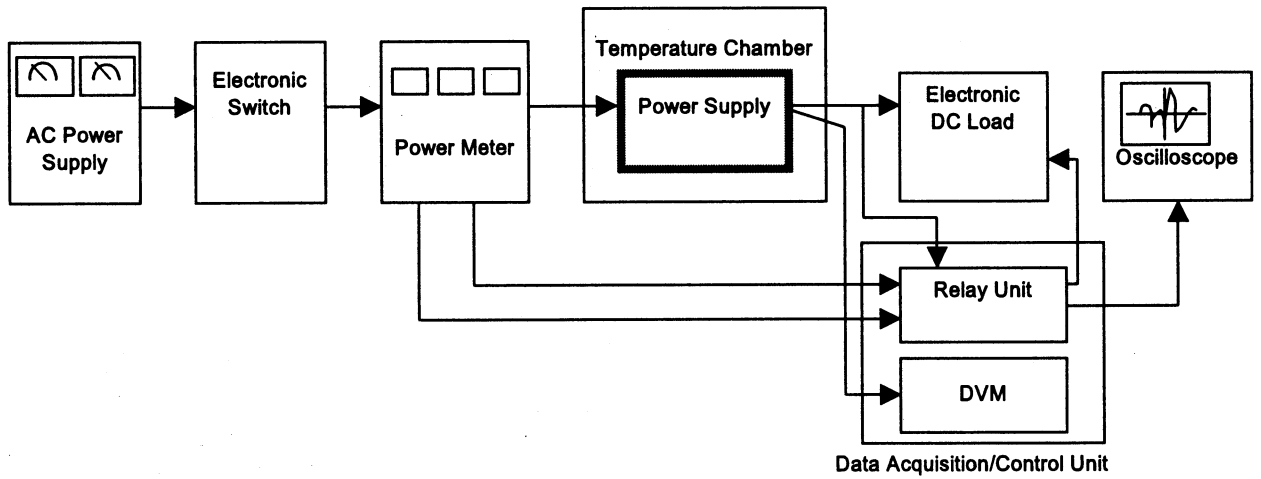


Figure A

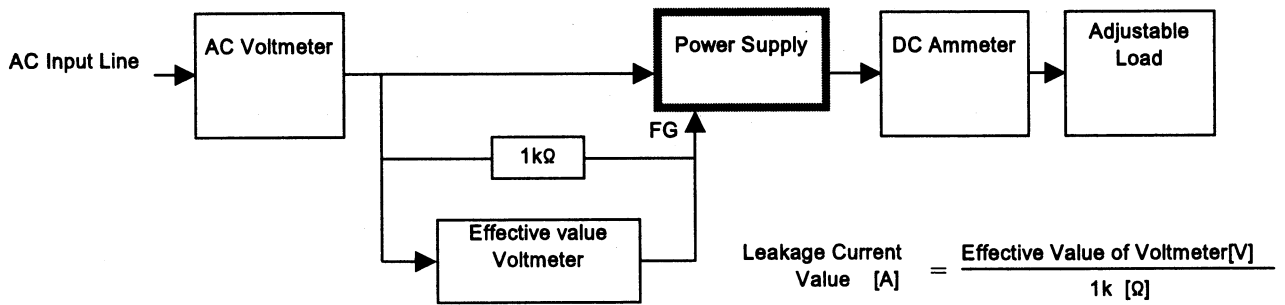


Figure B (DEN-AN)

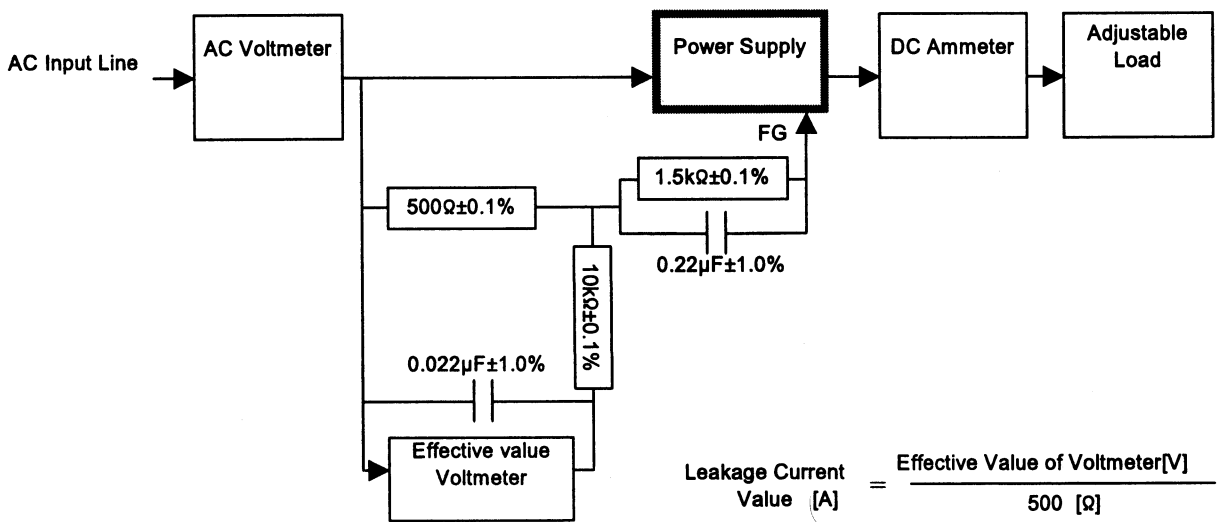


Figure B (IEC60950)