

TEST DATA OF PJA100F-12

Regulated DC Power Supply
August 30, 2016

Approved by : Yukihiro Takehashi
Yukihiro Takehashi Design Manager

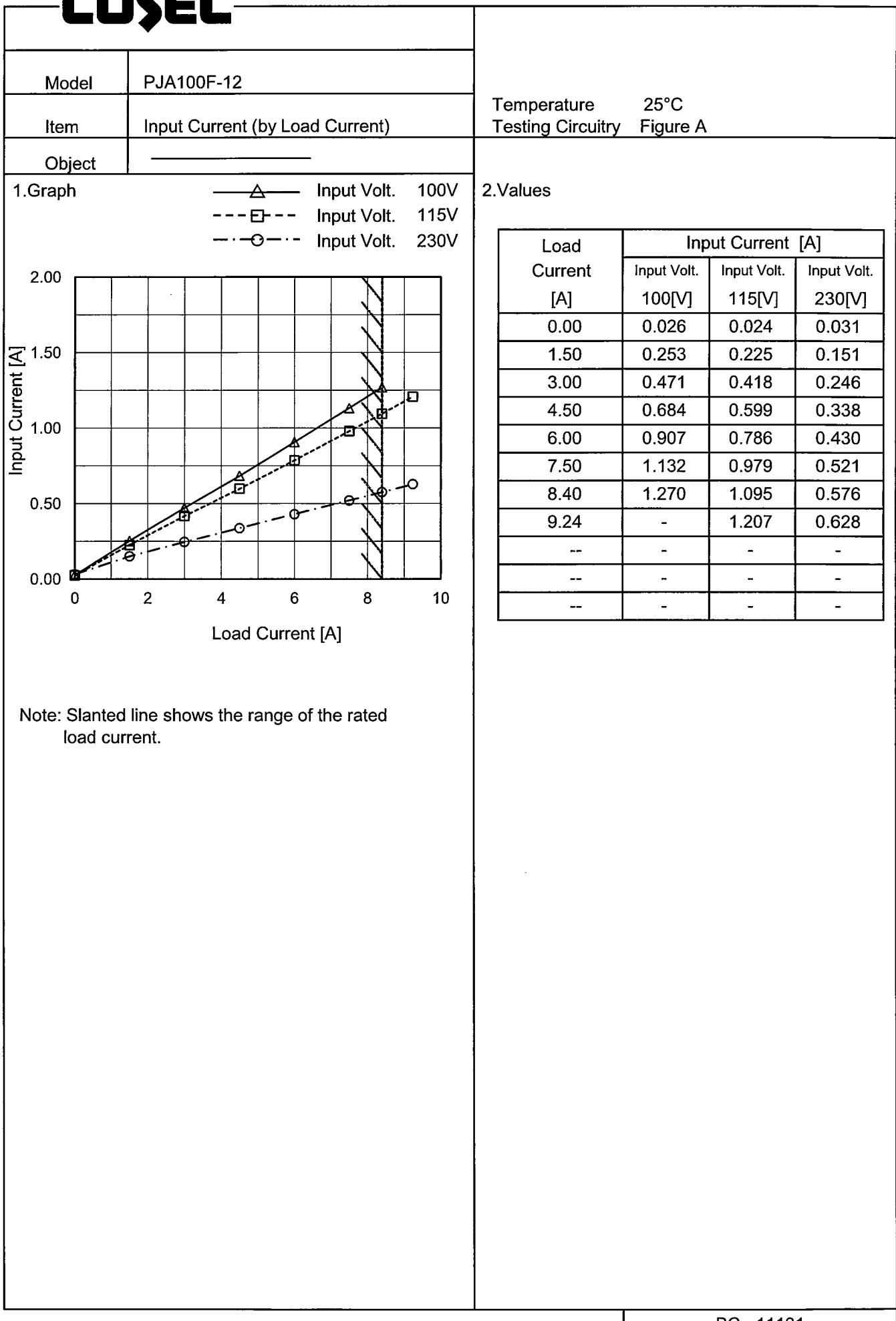
Prepared by : Atsushi Nishikawa
Atsushi Nishikawa Design Engineer

COSEL CO.,LTD.

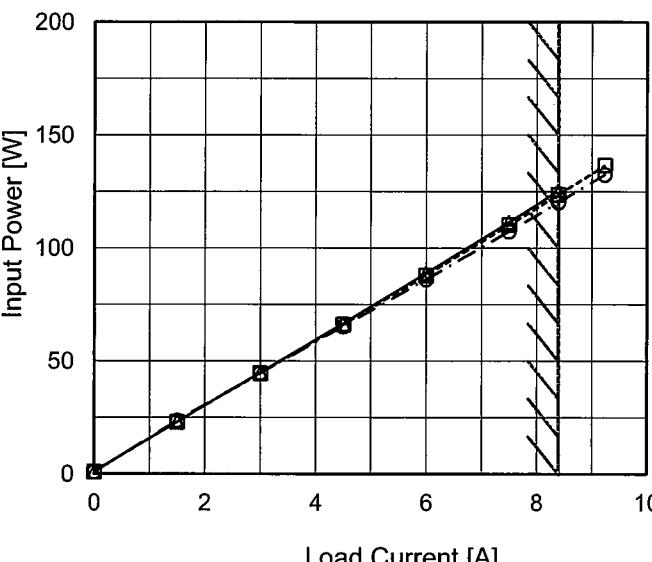
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(Final Page 25)

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Model	PJA100F-12	Temperature Testing Circuitry 25°C Figure A																																																			
Item	Input Power (by Load Current)																																																				
Object	_____																																																				
1.Graph	<p style="text-align: center;"> —△— Input Volt. 100V ---□--- Input Volt. 115V ---○--- Input Volt. 230V </p>  <p>The graph plots Input Power [W] on the Y-axis (0 to 200) against Load Current [A] on the X-axis (0 to 10). Three curves are shown for different input voltages: 100V (solid line with triangle markers), 115V (dashed line with square markers), and 230V (dotted line with circle markers). A slanted line from the origin to approximately (8.4, 130) indicates the rated load current range.</p>	2.Values																																																			
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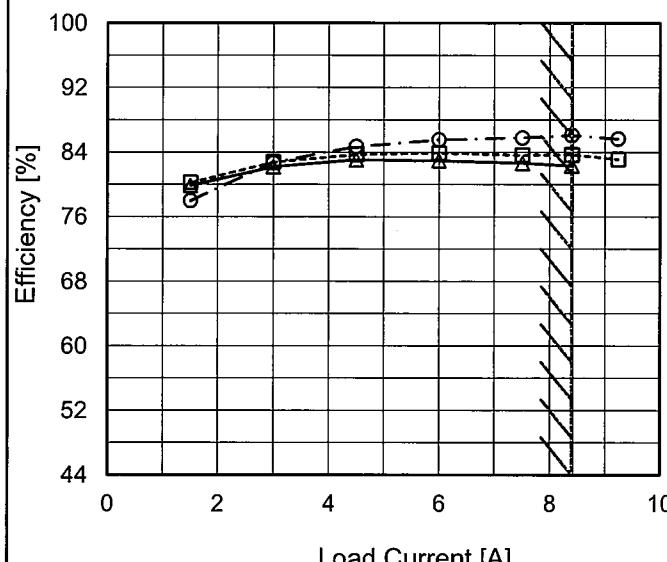
Note: Slanted line shows the range of the rated load current.

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Model	PJA100F-12	Temperature Testing Circuitry	25°C Figure A																																
Item	Efficiency (by Input Voltage)																																		
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 <p>The graph shows efficiency increasing from approximately 78% at 1.5A to 84% at 5A, then remaining relatively flat up to 9A. A slanted line starts at (1.5, 78) and ends at (9, 84), indicating the rated load current range.</p>																																																						
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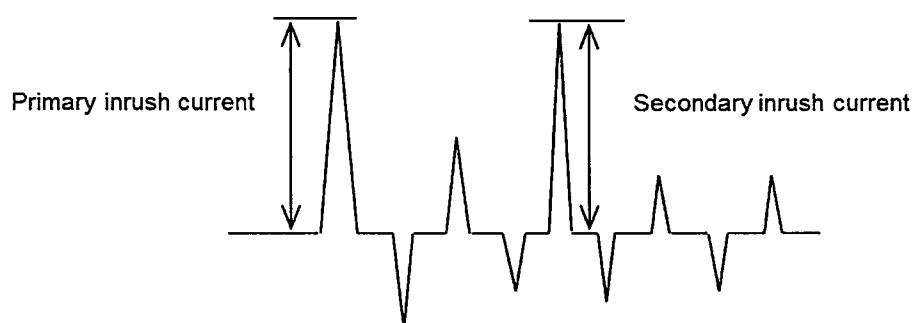
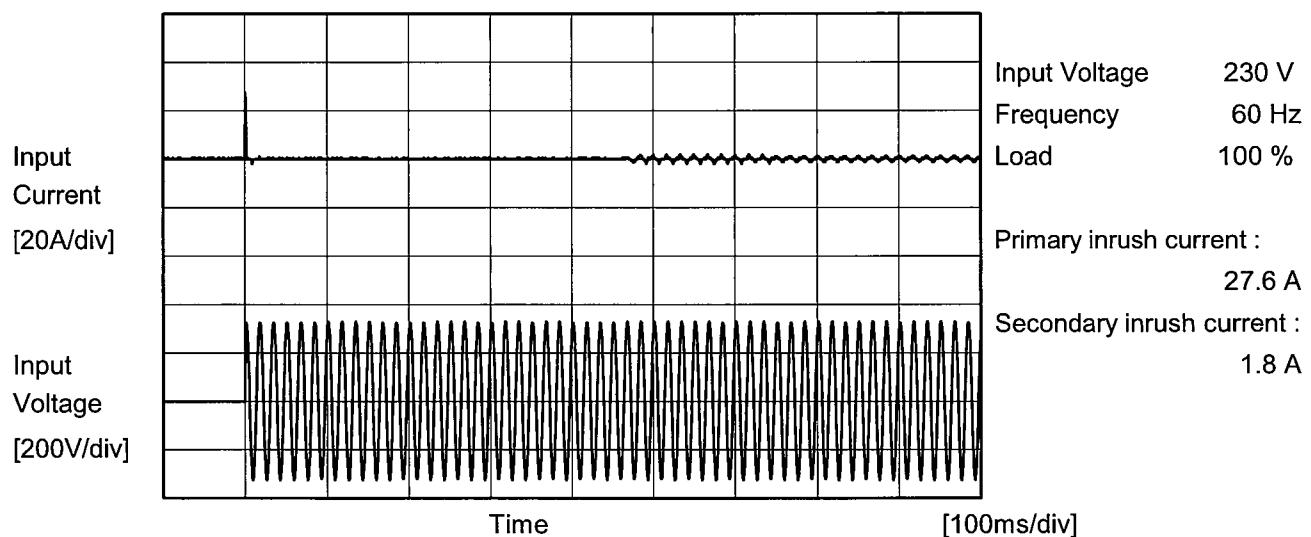
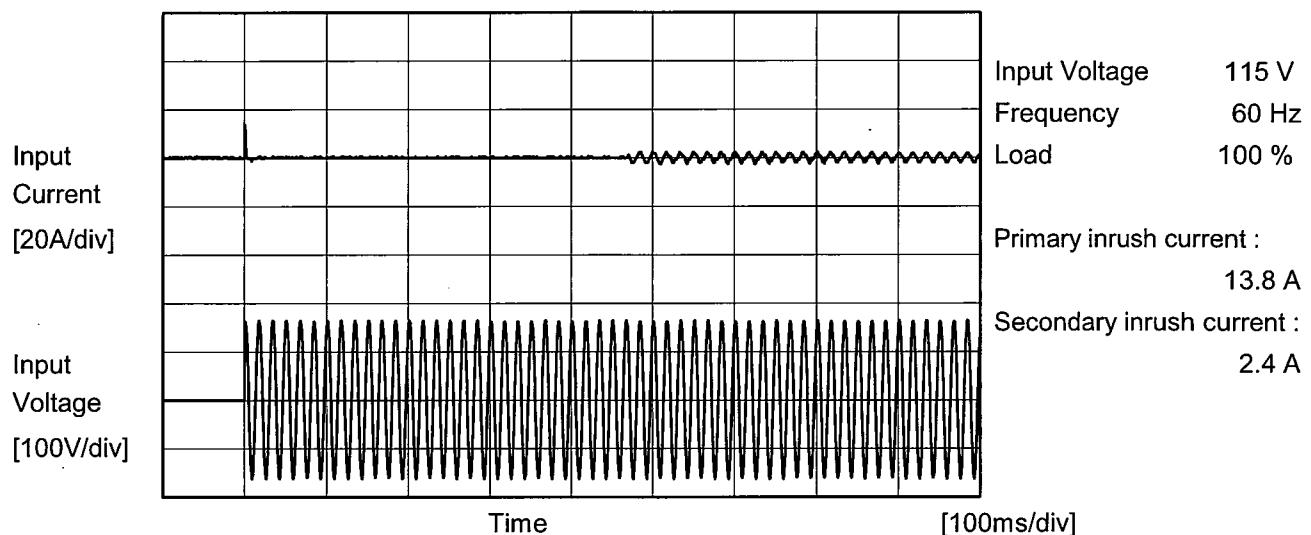
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Note: Slanted line shows the range of the rated load current.

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Model	PJA100F-12	Temperature	25°C
Item	Inrush Current	Testing Circuitry	Figure A
Object	_____		





Model	PJA100F-12	Temperature	25°C
Item	Leakage Current	Testing Circuitry	Figure B
Object	_____		

1. Results

Standards		Input Volt.			Note
		100 [V]	115 [V]	240 [V]	
DEN-AN	Both phases	0.19	0.21	0.42	Operation
	One of phases	0.28	0.32	0.71	Stand by
IEC60950-1	Both phases	0.14	0.16	0.43	Operation
	One of phases	0.26	0.31	0.72	Stand by

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

2. Condition

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

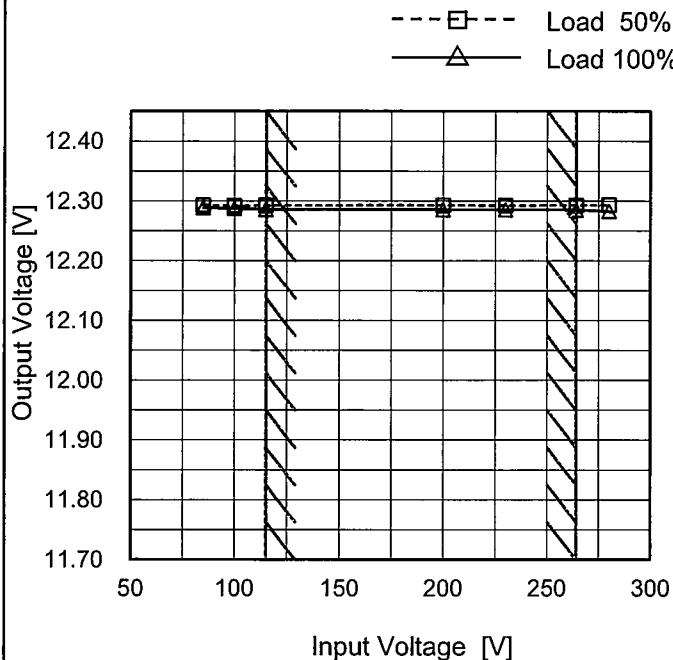
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Model PJA100F-12

Item Line Regulation

Object +12V8.4A

1. Graph



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

Temperature 25°C
Testing Circuitry Figure A

2. Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
85	12.293	12.289 ※1
100	12.292	12.288 ※2
115	12.292	12.286
200	12.293	12.286
230	12.293	12.286
264	12.293	12.285
280	12.293	12.283
--	-	-
--	-	-

※1: Load 80%

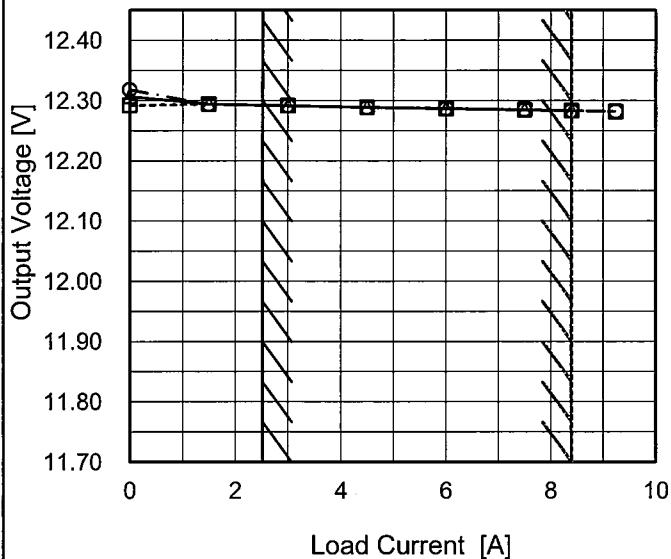
※2: Load 90%

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Model	PJA100F-12
Item	Load Regulation
Object	+12V8.4A

1. Graph

—△— Input Volt. 100V
 - -□--- Input Volt. 115V
 - -○--- Input Volt. 230V

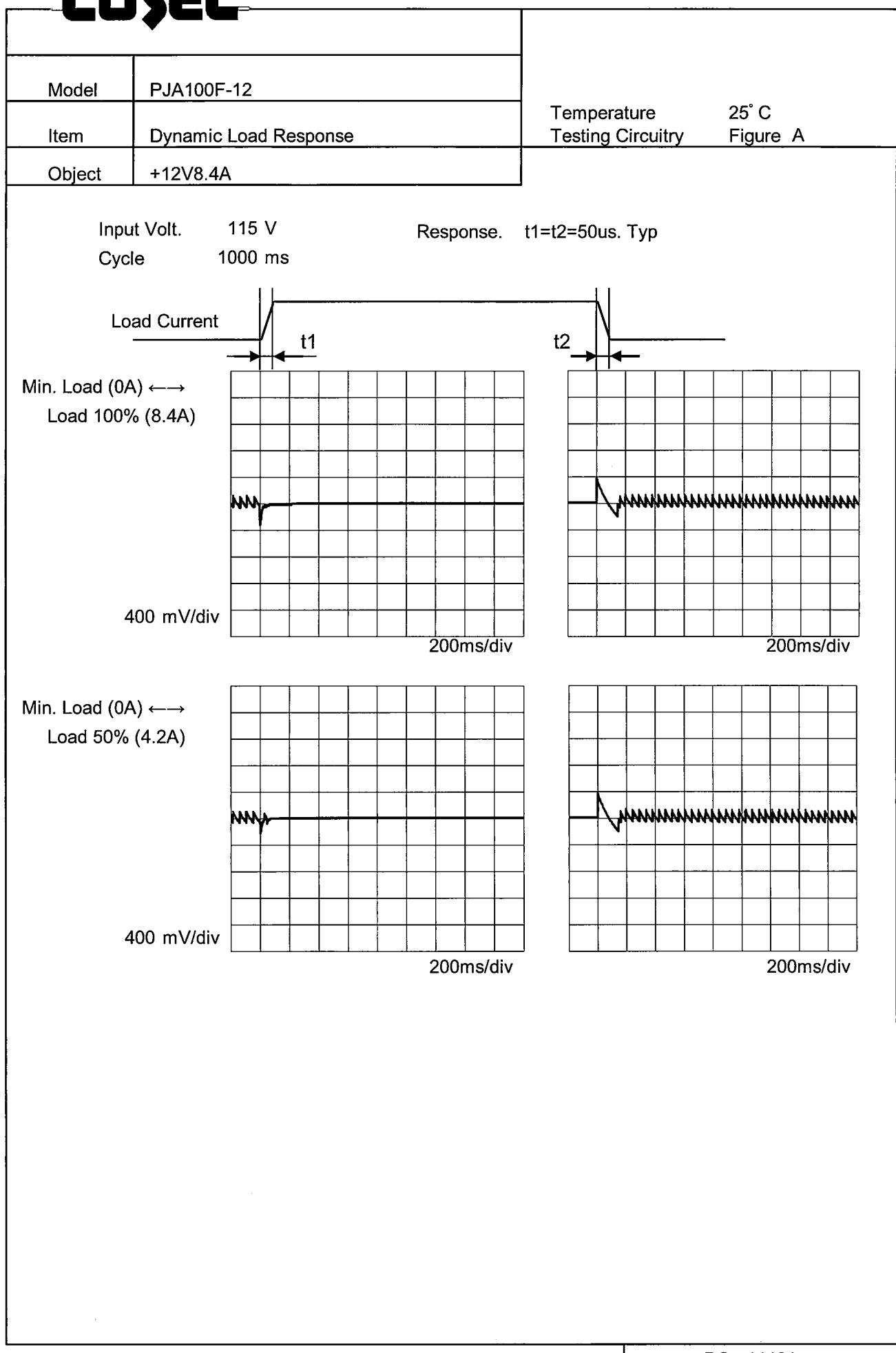


Note: Slanted line shows the range of the rated load current.

Temperature 25°C
Testing Circuitry Figure A

2. Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
0.00	12.307	12.292	12.318
1.50	12.294	12.294	12.294
3.00	12.292	12.292	12.292
4.50	12.289	12.289	12.289
6.00	12.287	12.287	12.287
7.50	12.285	12.285	12.285
8.40	12.283	12.283	12.283
9.24	-	12.282	12.282
--	-	-	-
--	-	-	-
--	-	-	-

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Model	PJA100F-12																																				
Item	Ripple Voltage (by Load Current)	Temperature 25°C Testing Circuitry Figure C																																			
Object	+12V8.4A																																				
1.Graph		2.Values																																			
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<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>T1: Due to AC Input Line T2: Due to Switching</p>																																					
<p>Fig. Complex Ripple Wave Form</p>																																					

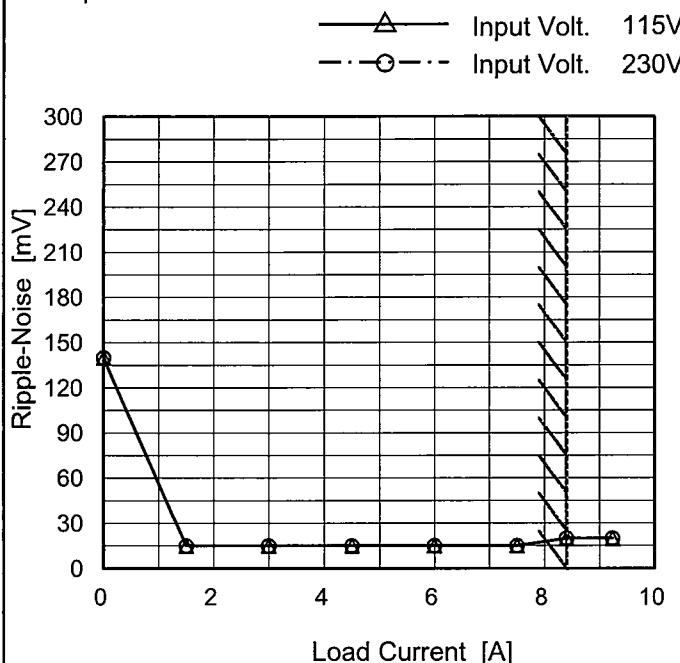
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Model PJA100F-12

Item Ripple-Noise

Object +12V8.4A

1. Graph



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.

Temperature 25°C
Testing Circuitry Figure C

2. Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 115 [V]	Input Volt. 230 [V]
0.00	140	140
1.50	15	15
3.00	15	15
4.50	15	15
6.00	15	15
7.50	15	15
8.40	20	20
9.24	20	20
--	-	-
--	-	-
--	-	-

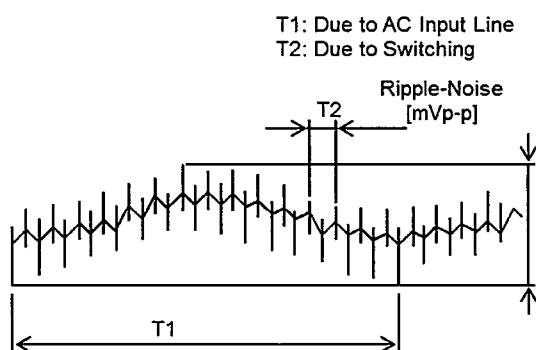


Fig. Complex Ripple Wave Form

COSEL

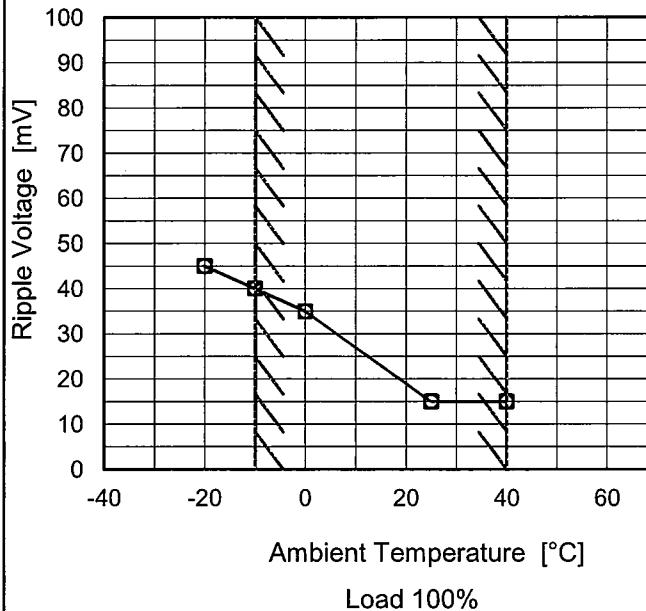
Model PJA100F-12

Item Ripple Voltage (by Ambient Temp.)

Object +12V8.4A

1. Graph

--- □ --- Input Volt. 115V
 — ▲ — Input Volt. 230V



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

Testing Circuitry Figure C

2. Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Input Volt. 115 [V]	Input Volt. 230 [V]
-20	45	45
-10	40	40
0	35	35
25	15	15
40	15	15
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

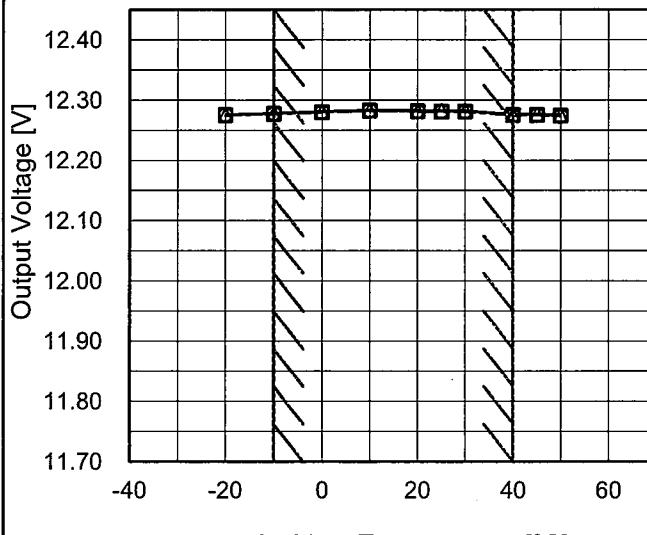
COSEL

Model PJA100F-12

Item Ambient Temperature Drift

Object +12V8.4A

- 1.Graph
- | | |
|--|--|
| | Input Volt. 100V
Input Volt. 115V
Input Volt. 230V |
|--|--|



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. 115[V]	Input Volt. 230[V]
-20	12.276	12.275	12.276
-10	12.278	12.277	12.278
0	12.281	12.280	12.280
10	12.284	12.283	12.283
20	12.283	12.282	12.282
25	12.283	12.281	12.281
30	12.282	12.281	12.281
40	12.276	12.275	12.275
45	12.277	12.275	12.275
50	12.276	12.274	12.273
--	-	-	-

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



Model	PJA100F-12	Testing Circuitry Figure A
Item	Output Voltage Accuracy	
Object	+12V8.4A	

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 - 40°C

Input Voltage : 115 - 264V

Load Current : 2.52 - 8.4A

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

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

2. Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	25	115	3	12.292	± 9	± 0.1
Minimum Voltage	40	230	8.4	12.275		

COSEL

Model	PJA100F-12	Temperature	25°C																						
Item	Time Lapse Drift	Testing Circuitry	Figure A																						
Object	+12V8.4A																								
1.Graph			2.Values																						
<p>Output Voltage [V]</p> <p>Time [H]</p> <p>Input Volt. 230V</p> <p>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>12.283</td></tr> <tr><td>0.5</td><td>12.284</td></tr> <tr><td>1.0</td><td>12.284</td></tr> <tr><td>2.0</td><td>12.284</td></tr> <tr><td>3.0</td><td>12.284</td></tr> <tr><td>4.0</td><td>12.284</td></tr> <tr><td>5.0</td><td>12.284</td></tr> <tr><td>6.0</td><td>12.284</td></tr> <tr><td>7.0</td><td>12.284</td></tr> <tr><td>8.0</td><td>12.284</td></tr> </tbody> </table>	Time since start [H]	Output Voltage [V]	0.0	12.283	0.5	12.284	1.0	12.284	2.0	12.284	3.0	12.284	4.0	12.284	5.0	12.284	6.0	12.284	7.0	12.284	8.0	12.284
Time since start [H]	Output Voltage [V]																								
0.0	12.283																								
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5.0	12.284																								
6.0	12.284																								
7.0	12.284																								
8.0	12.284																								

* The characteristic of AC115V is equal.

COSEL

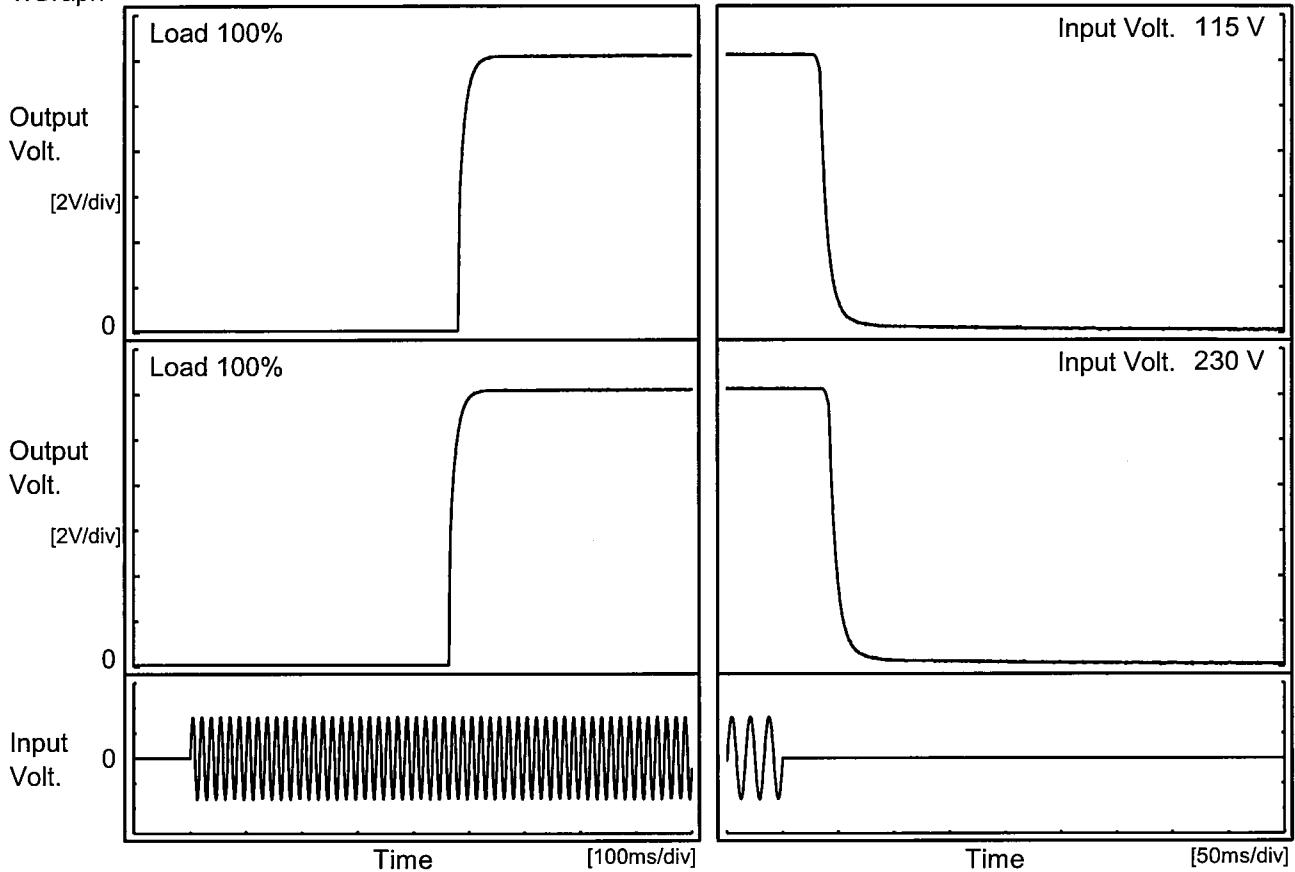
Model PJA100F-12

Item Rise and Fall Time

Object +12V8.4A

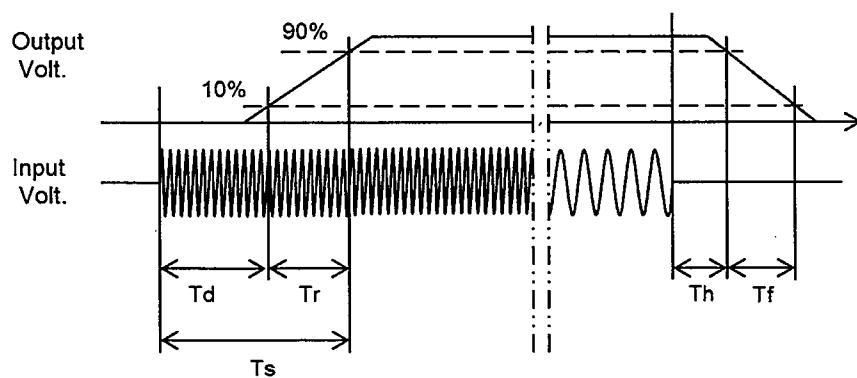
Temperature 25°C
Testing Circuitry Figure A

1. Graph



2. Values

Input Volt.	Time	Td	Tr	Ts	Th	Tf	[ms]
115 V		482.0	20.5	502.5	34.5	16.8	
230 V		464.5	20.5	485.0	42.3	16.5	



COSEL

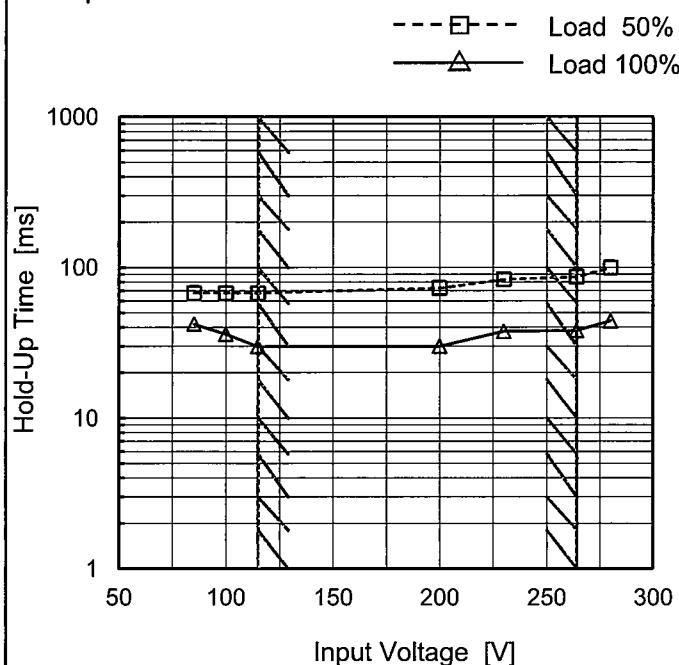
Model PJA100F-12

Item Hold-Up Time

Object +12V8.4A

Temperature 25°C
Testing Circuitry Figure A

1. Graph



2. Values

Input Voltage [V]	Hold-Up Time [ms]	
	Load 50%	Load 100%
85	68	42 ※1
100	68	36 ※2
115	68	30
200	73	30
230	83	38
264	87	38
280	99	44
--	-	-
--	-	-

※1: Load 80%

※2: Load 90%

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.

COSEL

Model	PJA100F-12	Temperature Testing Circuitry 25°C Figure A																																																			
Item	Instantaneous Interruption Compensation																																																				
Object	+12V8.4A																																																				
1.Graph	<p>—△— Input Volt. 100V - -□--- Input Volt. 115V - -○--- Input Volt. 230V</p> <table border="1"> <caption>Data points estimated from Graph 1</caption> <thead> <tr> <th>Load Current [A]</th> <th>100V [ms]</th> <th>115V [ms]</th> <th>230V [ms]</th> </tr> </thead> <tbody> <tr><td>2.0</td><td>200</td><td>180</td><td>150</td></tr> <tr><td>3.0</td><td>150</td><td>130</td><td>100</td></tr> <tr><td>4.0</td><td>120</td><td>100</td><td>80</td></tr> <tr><td>6.0</td><td>80</td><td>60</td><td>40</td></tr> <tr><td>8.0</td><td>50</td><td>40</td><td>30</td></tr> <tr><td>9.24</td><td>-</td><td>22</td><td>32</td></tr> </tbody> </table>	Load Current [A]	100V [ms]	115V [ms]	230V [ms]	2.0	200	180	150	3.0	150	130	100	4.0	120	100	80	6.0	80	60	40	8.0	50	40	30	9.24	-	22	32																								
Load Current [A]	100V [ms]	115V [ms]	230V [ms]																																																		
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	<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. 115[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>1.50</td><td>188</td><td>189</td><td>233</td></tr> <tr><td>3.00</td><td>97</td><td>97</td><td>119</td></tr> <tr><td>4.50</td><td>64</td><td>64</td><td>80</td></tr> <tr><td>6.00</td><td>47</td><td>47</td><td>60</td></tr> <tr><td>7.50</td><td>38</td><td>38</td><td>47</td></tr> <tr><td>8.40</td><td>29</td><td>30</td><td>39</td></tr> <tr><td>9.24</td><td>-</td><td>22</td><td>32</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 Current [A]	Time [ms]			Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]	0.00	-	-	-	1.50	188	189	233	3.00	97	97	119	4.50	64	64	80	6.00	47	47	60	7.50	38	38	47	8.40	29	30	39	9.24	-	22	32	--	-	-	-	--	-	-	-	--	-	-	-	
Load Current [A]	Time [ms]																																																				
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]																																																		
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Note: Slanted line shows the range of the rated load current.

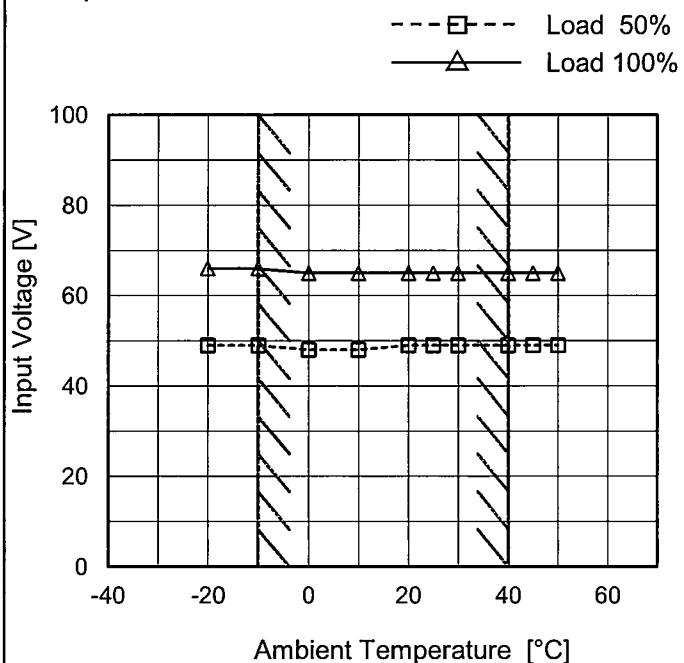
COSEL

Model PJA100F-12

Item Minimum Input Voltage
for Regulated Output Voltage

Object +12V8.4A

1. Graph



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

Testing Circuitry Figure A

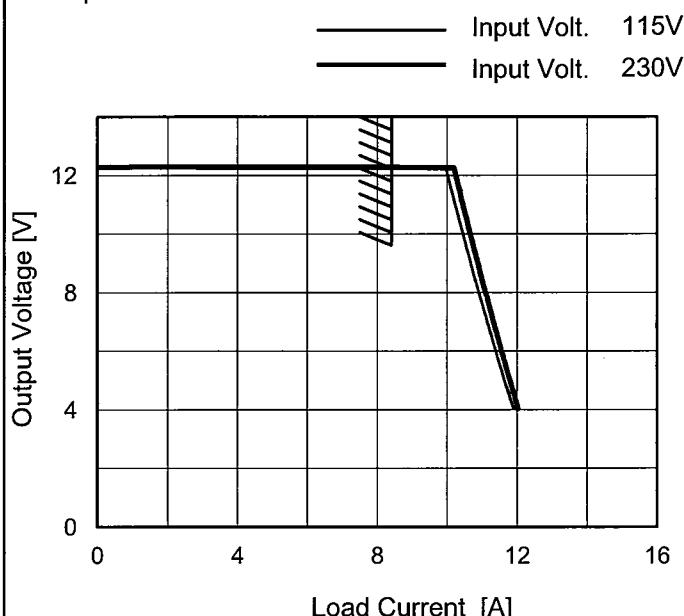
2. Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	49	66
-10	49	66
0	48	65
10	48	65
20	49	65
25	49	65
30	49	65
40	49	65
45	49	65
50	49	65
--	-	-

COSEL

Model	PJA100F-12
Item	Overcurrent Protection
Object	+12V8.4A

1. Graph



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

Intermittent operation occurs when the output voltage is from 4.0V to 0V.

Temperature 25°C
Testing Circuitry Figure A

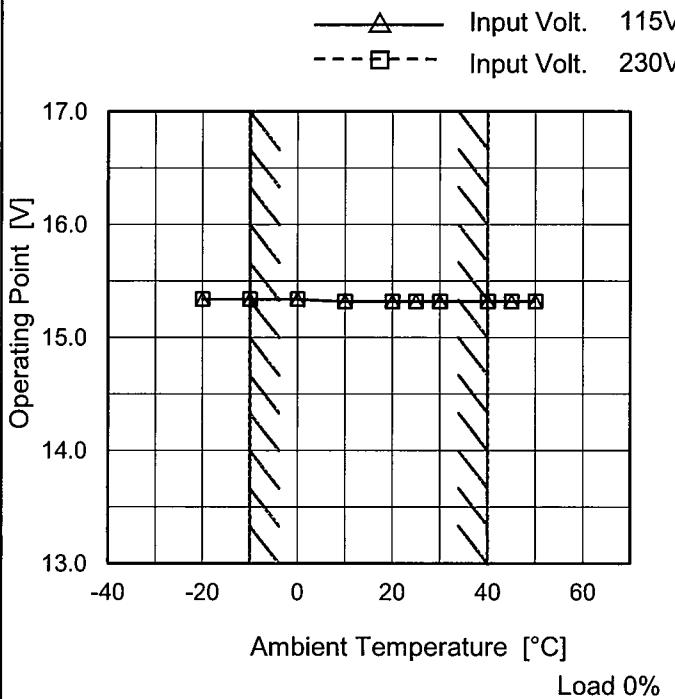
2. Values

Output Voltage [V]	Load Current [A]	
	Input Volt. 115[V]	Input Volt. 230[V]
11.4	10.15	10.38
10.8	10.28	10.48
9.6	10.52	10.75
8.4	10.79	11.00
7.2	11.09	11.28
6.0	11.38	11.55
4.8	11.69	11.83
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-



Model	PJA100F-12
Item	Overvoltage Protection
Object	+12V8.4A

1. Graph



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

Testing Circuitry Figure A

2. Values

Ambient Temperature [°C]	Operating Point [V]	
	Input Volt. 115[V]	Input Volt. 230[V]
-20	15.34	15.34
-10	15.34	15.34
0	15.34	15.34
10	15.32	15.32
20	15.32	15.32
25	15.32	15.32
30	15.32	15.32
40	15.32	15.32
45	15.32	15.32
50	15.32	15.32
--	-	-

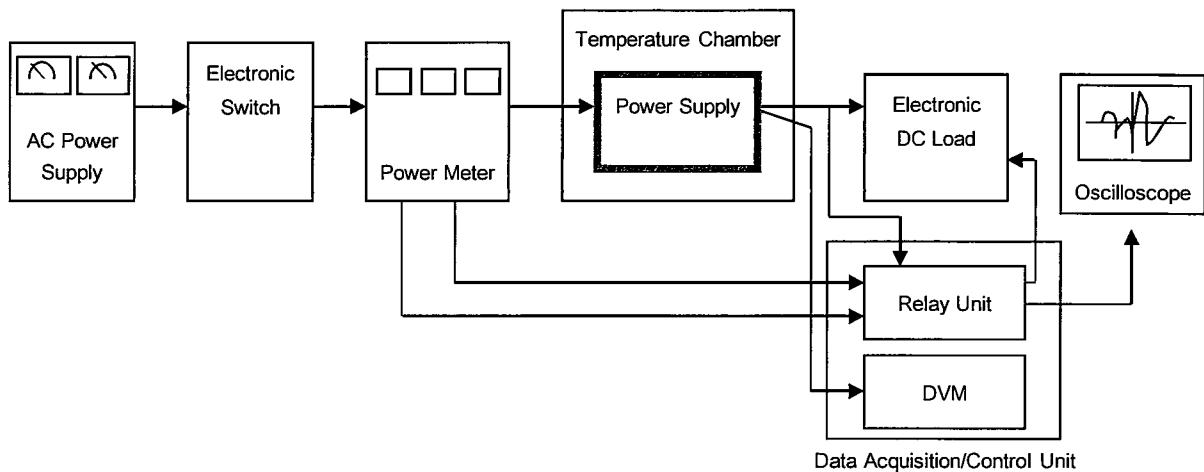


Figure A

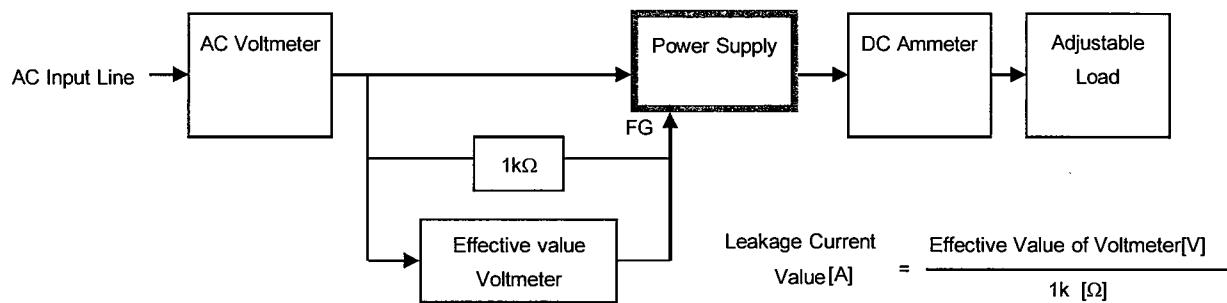


Figure B (DEN-AN)

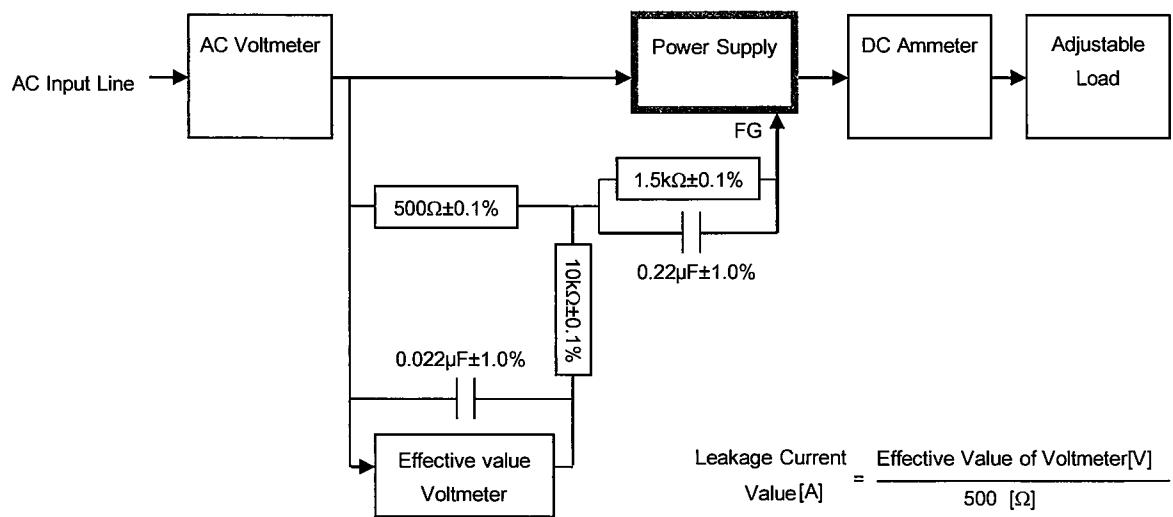
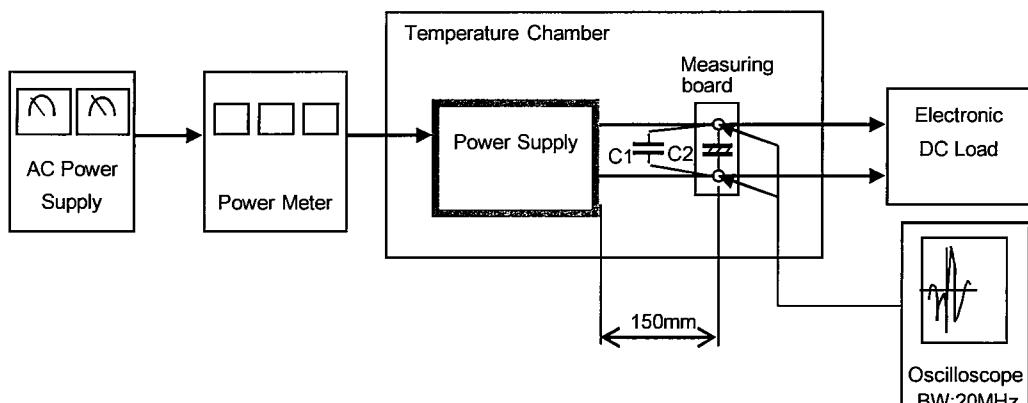


Figure B (IEC60950-1)

COSELC1= 0.1 μF

(Ceramic capacitor)

C2= 22 μF

(Electrolytic capacitor)

Figure C