

TEST DATA OF PLA300F-15

Regulated DC Power Supply
August 28, 2017

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Yukihiro Takehashi Design Manager

Prepared by : Atsushi Nishikawa
Atsushi Nishikawa Design Engineer

COSEL CO.,LTD.



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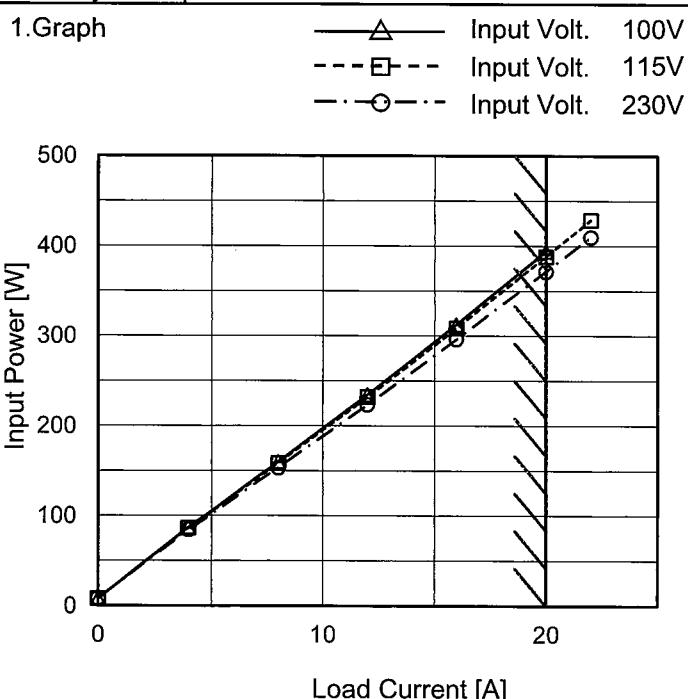
(Final Page 25)

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Model	PLA300F-15																																																						
Item	Input Current (by Load Current)	Temperature	25°C																																																				
Object	Testing Circuitry	Figure A																																																					
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Model	PLA300F-15
Item	Input Power (by Load Current)
Object	_____



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

Temperature 25°C
Testing Circuitry Figure A

2. Values

Load Current [A]	Input Power [W]		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
0	7.9	7.9	8.4
4	87.1	86.3	84.5
8	159.8	158.4	153.3
12	234.7	232.0	223.5
16	312.8	308.5	296.2
20	394.1	388.2	371.5
22	-	428.7	409.9
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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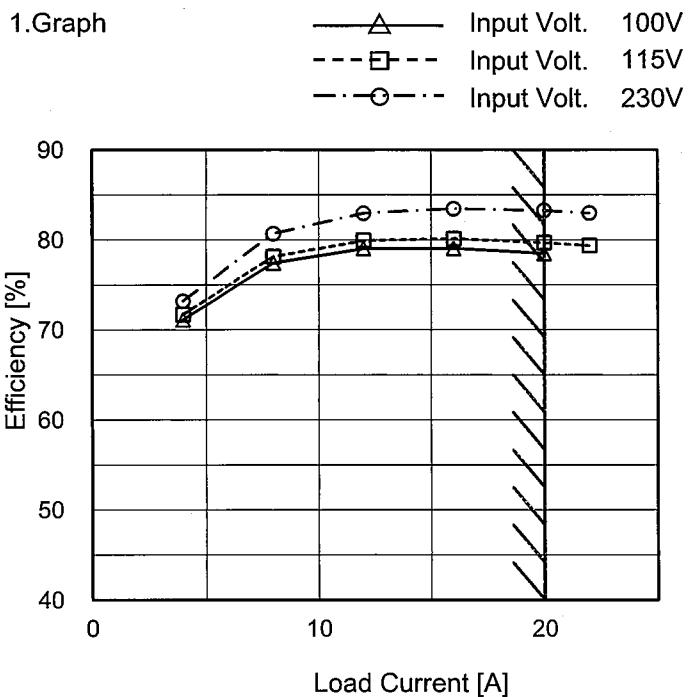
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<p>The graph plots Efficiency [%] on the y-axis (40 to 90) against Input Voltage [V] on the x-axis (50 to 300). Two data series are shown: Load 50% (dashed line with square markers) and Load 100% (solid line with triangle markers). Both series show efficiency increasing slightly as input voltage increases. Two vertical slanted lines indicate the rated input voltage range.</p> <table border="1"> <thead> <tr> <th>Input Voltage [V]</th> <th>Load 50% [%]</th> <th>Load 100% [%]</th> </tr> </thead> <tbody> <tr><td>100</td><td>78.2</td><td>77.6</td></tr> <tr><td>115</td><td>79.2</td><td>79.3</td></tr> <tr><td>200</td><td>81.9</td><td>82.8</td></tr> <tr><td>230</td><td>82.3</td><td>83.4</td></tr> <tr><td>264</td><td>82.9</td><td>83.8</td></tr> <tr><td>280</td><td>82.9</td><td>84.0</td></tr> </tbody> </table>				Input Voltage [V]	Load 50% [%]	Load 100% [%]	100	78.2	77.6	115	79.2	79.3	200	81.9	82.8	230	82.3	83.4	264	82.9	83.8	280	82.9	84.0											
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Model PLA300F-15

Item Efficiency (by Load Current)

Object _____



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

 Temperature 25°C
 Testing Circuitry Figure A

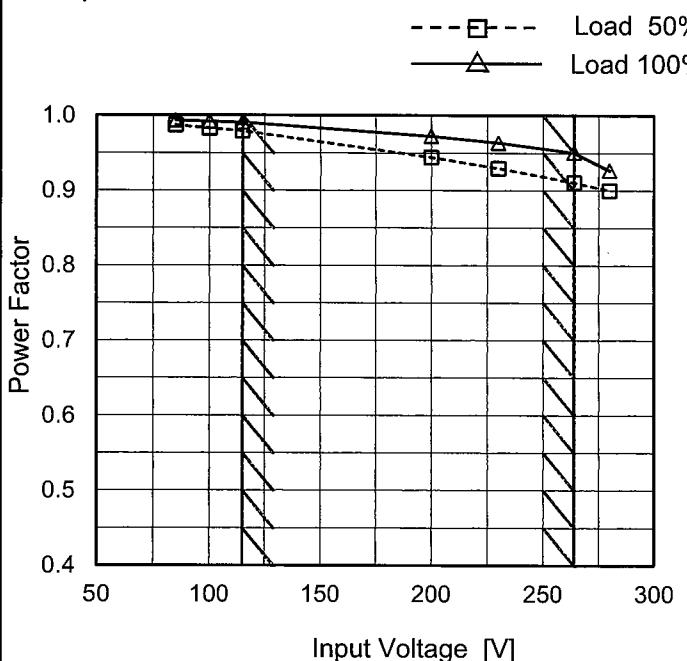
2. Values

Load Current [A]	Efficiency [%]		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
0	-	-	-
4	71.1	71.7	73.2
8	77.4	78.1	80.7
12	79.0	79.9	83.0
16	79.1	80.1	83.5
20	78.5	79.7	83.3
22	-	79.4	83.0
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	PLA300F-15
Item	Power Factor (by Input Voltage)
Object	—

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]	Power Factor	
	Load 50%	Load 100%
85	0.987	0.994 ※1
100	0.983	0.992 ※2
115	0.979	0.991
200	0.944	0.973
230	0.930	0.964
264	0.911	0.951
280	0.900	0.927
--	-	-
--	-	-

※1: Load 80%

※2: Load 90%

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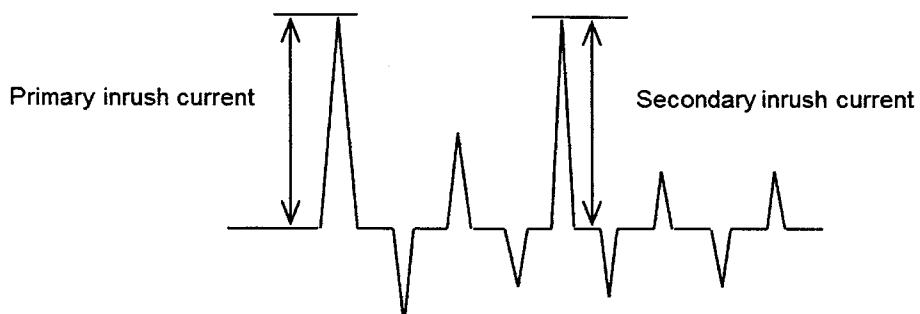
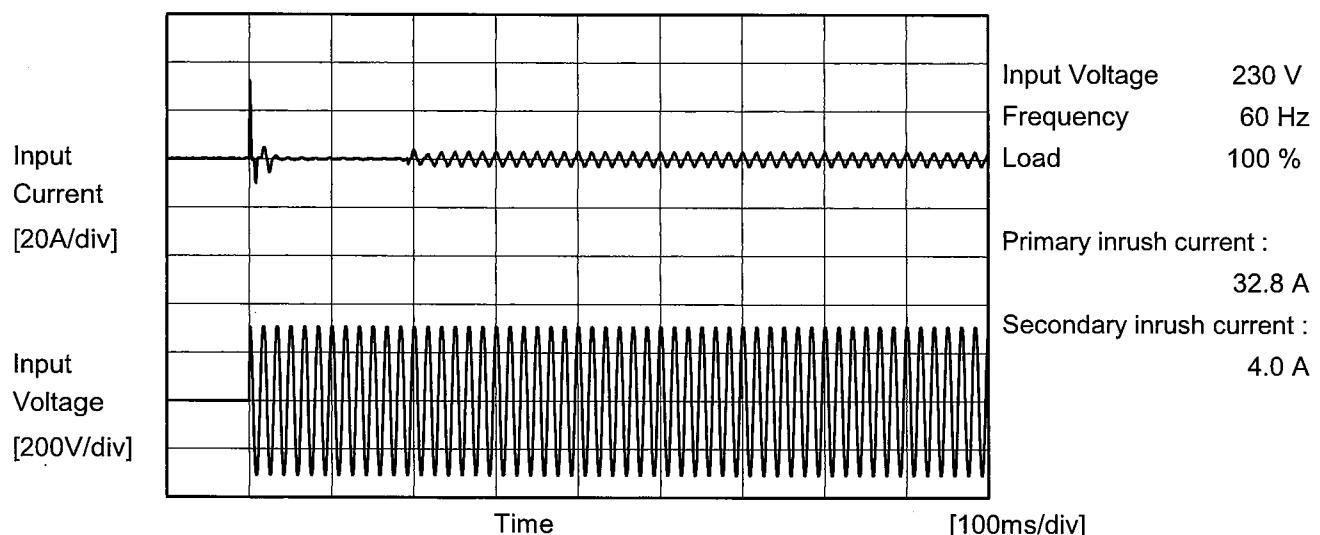
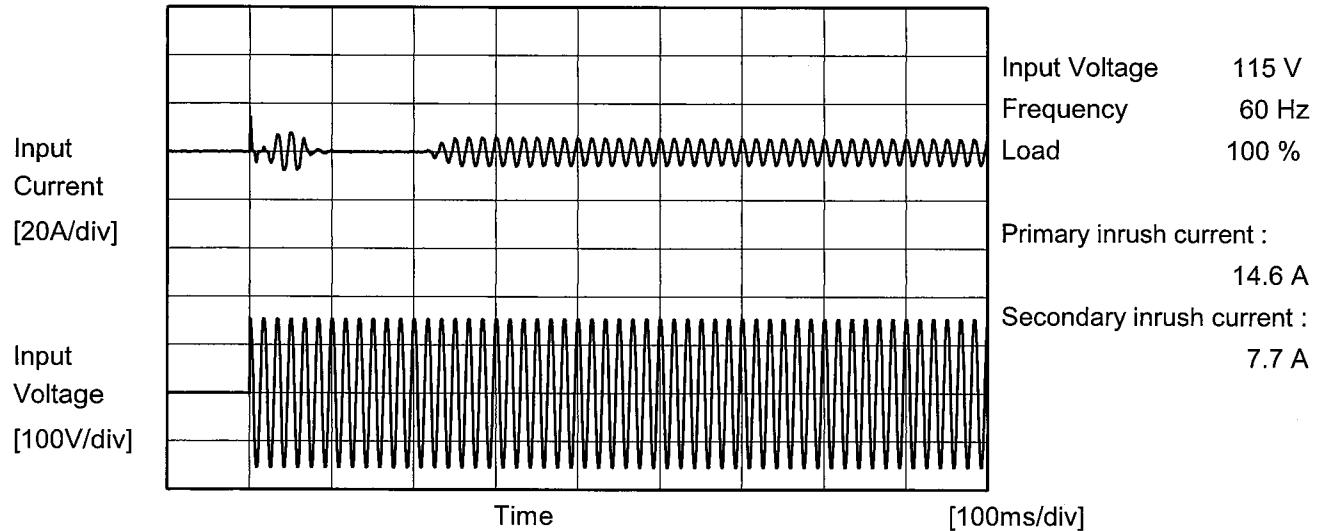
COSEL

Model PLA300F-15

Temperature 25°C
Testing Circuitry Figure A

Item Inrush Current

Object _____





Model	PLA300F-15	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	0.24	0.28	0.44	Operation
	One of phases	0.30	0.30	0.60	Stand by
IEC60950-1	Both phases	0.17	0.18	0.40	Operation
	One of phases	0.24	0.28	0.60	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.

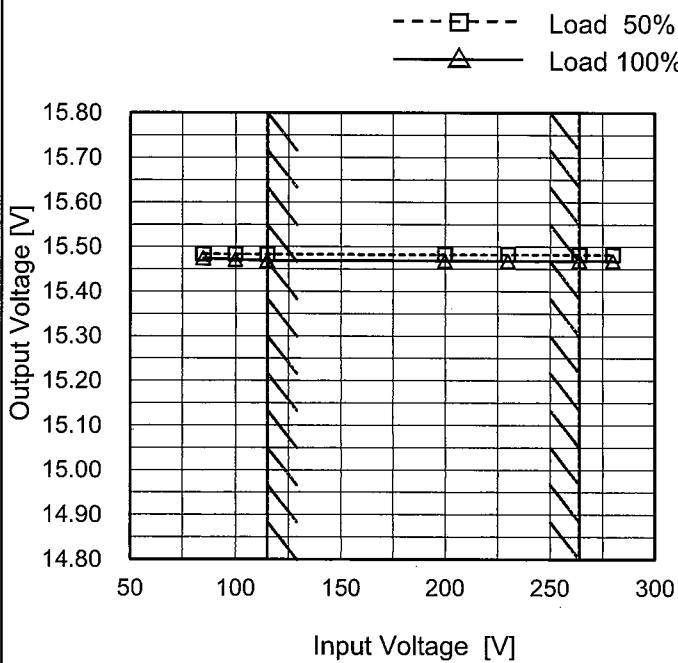
COSEL

Model PLA300F-15

Item Line Regulation

Object +15V20A

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	15.484	15.475 ※1
100	15.483	15.472 ※2
115	15.483	15.469
200	15.483	15.468
230	15.483	15.468
264	15.482	15.469
280	15.482	15.469
--	-	-
--	-	-

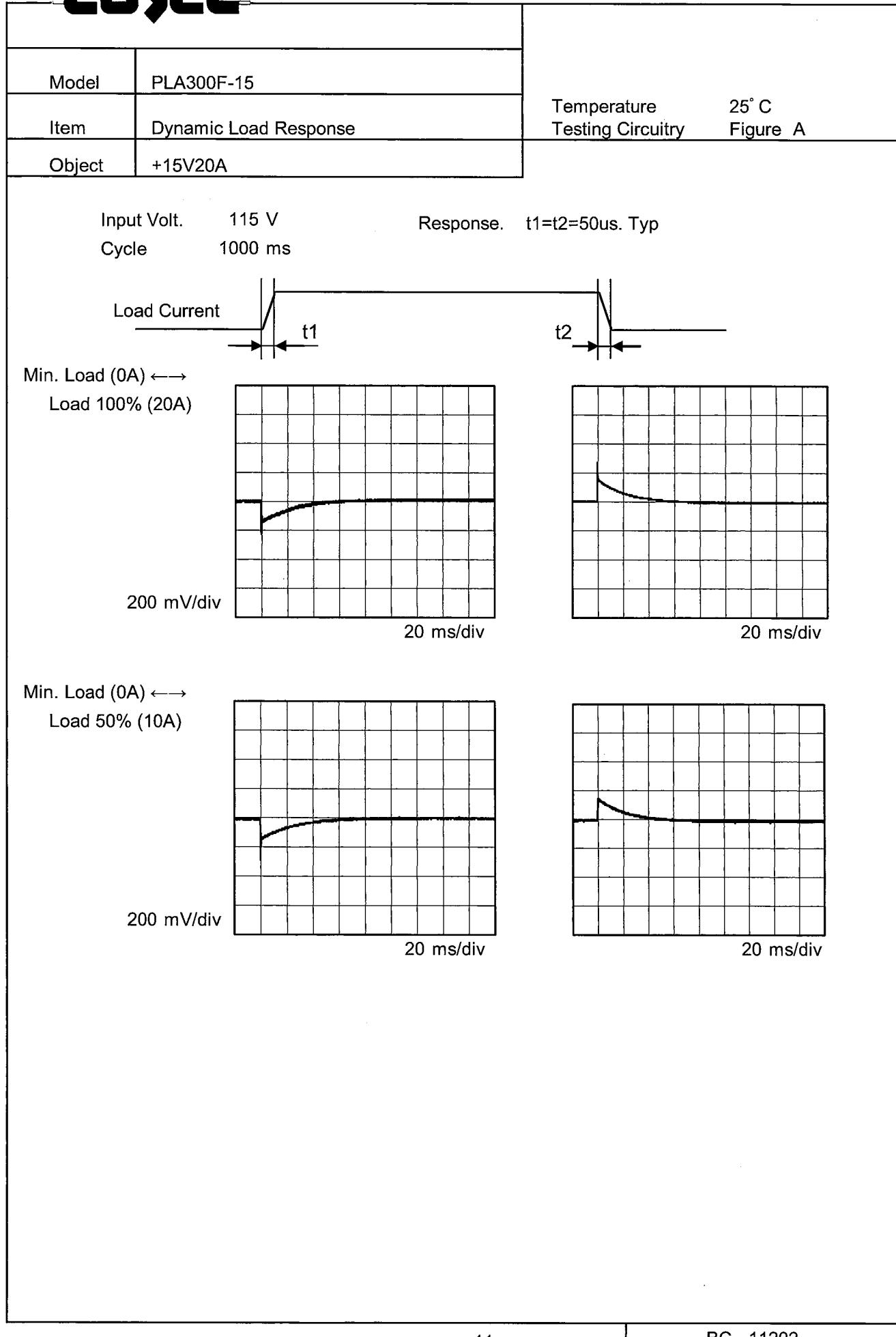
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Load Current [A]	Output Voltage [V]																																																						
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]																																																				
0	15.493	15.493	15.494																																																				
4	15.486	15.486	15.486																																																				
8	15.481	15.482	15.482																																																				
12	15.477	15.477	15.477																																																				
16	15.471	15.472	15.472																																																				
20	15.465	15.466	15.466																																																				
22	-	15.462	15.463																																																				
--	-	-	-																																																				
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--	-	-	-																																																				
Note:	Slanted line shows the range of the rated load current.																																																						

COSEL



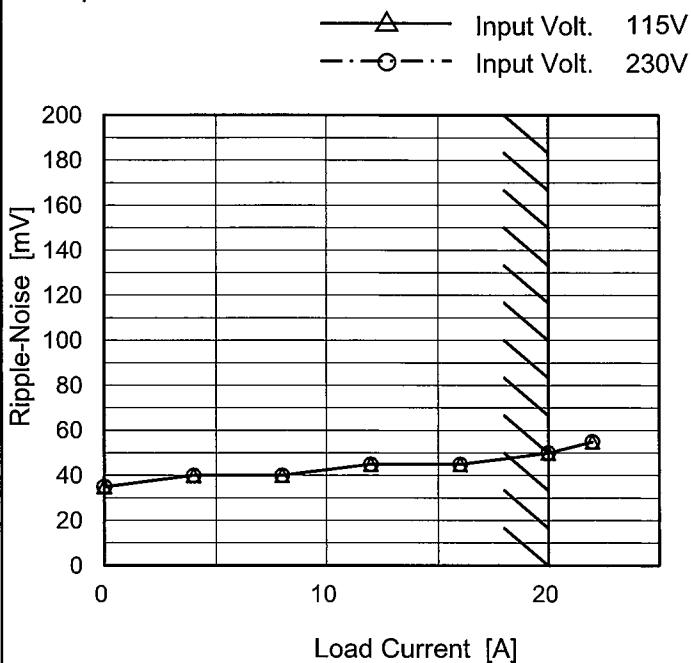
COSEL

Model	PLA300F-15																																							
Item	Ripple Voltage (by Load Current)	Temperature 25°C Testing Circuitry Figure C																																						
Object	+15V20A																																							
1. Graph																																								
<p>Graph showing Ripple Voltage [mV] vs Load Current [A]. The Y-axis ranges from 0 to 200 mV, and the X-axis ranges from 0 to 20 A. Two curves are plotted: one for Input Volt. 115V (solid line with open circles) and one for Input Volt. 230V (dashed line with open triangles). Both curves show a slight increase in ripple voltage as load current increases. A slanted line indicates the range of rated load current.</p>																																								
2. Values																																								
<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="2">Ripple Voltage [mV]</th> </tr> <tr> <th>Input Volt. 115 [V]</th> <th>Input Volt. 230 [V]</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>5</td> <td>5</td> </tr> <tr> <td>4</td> <td>10</td> <td>10</td> </tr> <tr> <td>8</td> <td>10</td> <td>10</td> </tr> <tr> <td>12</td> <td>10</td> <td>10</td> </tr> <tr> <td>16</td> <td>15</td> <td>15</td> </tr> <tr> <td>20</td> <td>30</td> <td>30</td> </tr> <tr> <td>22</td> <td>35</td> <td>35</td> </tr> <tr> <td>--</td> <td>-</td> <td>-</td> </tr> </tbody> </table>			Load Current [A]	Ripple Voltage [mV]		Input Volt. 115 [V]	Input Volt. 230 [V]	0	5	5	4	10	10	8	10	10	12	10	10	16	15	15	20	30	30	22	35	35	--	-	-	--	-	-	--	-	-	--	-	-
Load Current [A]	Ripple Voltage [mV]																																							
	Input Volt. 115 [V]	Input Volt. 230 [V]																																						
0	5	5																																						
4	10	10																																						
8	10	10																																						
12	10	10																																						
16	15	15																																						
20	30	30																																						
22	35	35																																						
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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> <p>T1: Due to AC Input Line T2: Due to Switching</p> <p>Fig. Complex Ripple Wave Form</p>																																								

COSEL

Model	PLA300F-15
Item	Ripple-Noise
Object	+15V20A

1. Graph



Temperature 25°C
Testing Circuitry Figure C

2. Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 115 [V]	Input Volt. 230 [V]
0	35	35
4	40	40
8	40	40
12	45	45
16	45	45
20	50	50
22	55	55
--	-	-
--	-	-
--	-	-
--	-	-

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.

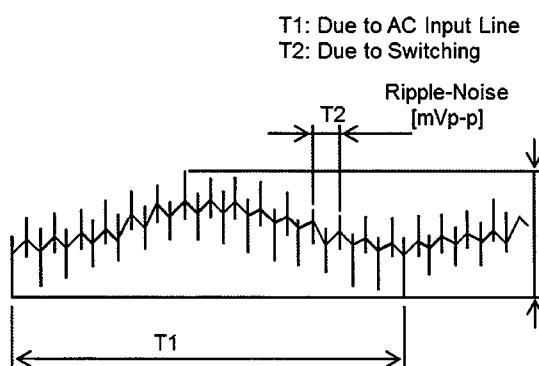


Fig. Complex Ripple Wave Form

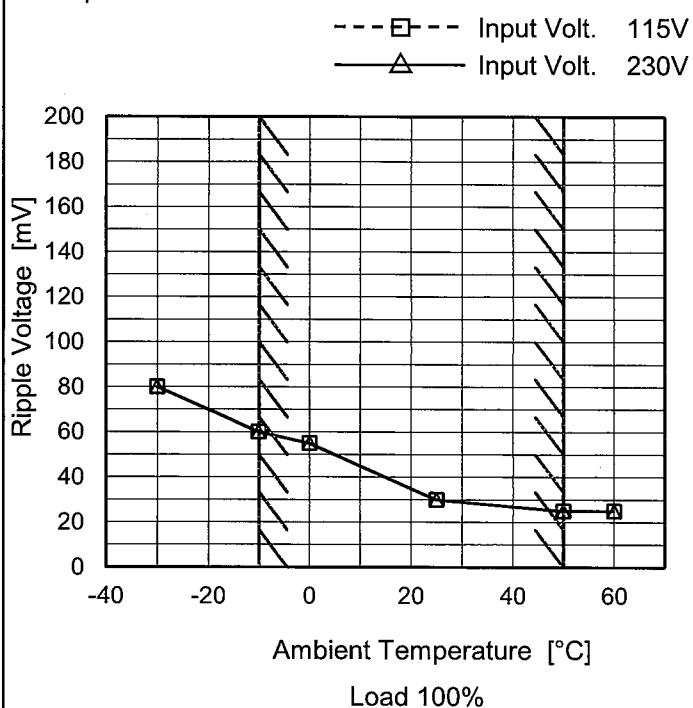
COSEL

Model PLA300F-15

Item Ripple Voltage (by Ambient Temp.)

Object +15V20A

1. Graph



Testing Circuitry Figure C

2. Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Input Volt. 115 [V]	Input Volt. 230 [V]
-30	80	80
-10	60	60
0	55	55
25	30	30
50	25	25
60	25	25
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

Measured by 20 MHz Oscilloscope.

Ripple-Noise is shown as p-p in the figure below.

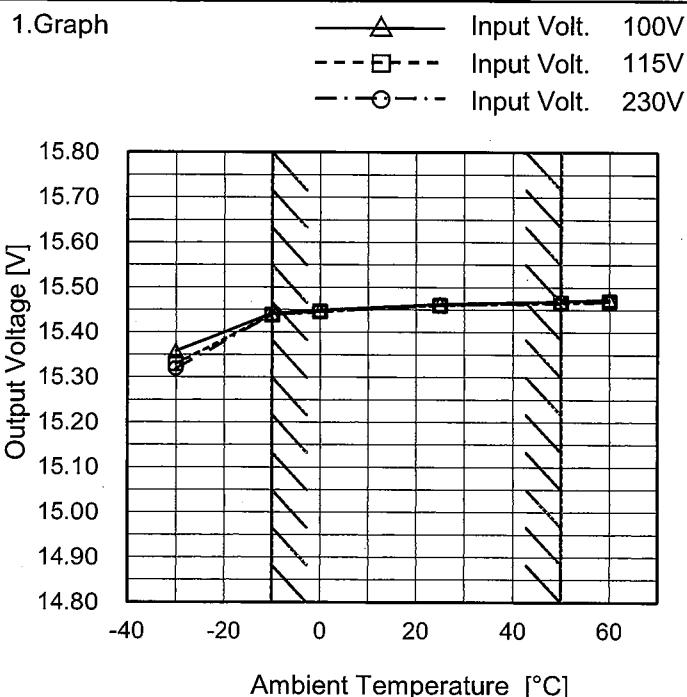
Note: Slanted line shows the range of the rated load current.

COSEL

Model PLA300F-15

Item Ambient Temperature Drift

Object +15V20A



Testing Circuitry Figure A

2. Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
-30	15.358	15.330	15.319
-10	15.442	15.439	15.439
0	15.449	15.446	15.447
25	15.463	15.460	15.460
50	15.469	15.466	15.465
60	15.474	15.469	15.469
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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



Model	PLA300F-15	Testing Circuitry Figure A
Item	Output Voltage Accuracy	
Object	+15V20A	

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 : 115 - 264V

Load Current : 0 - 20A

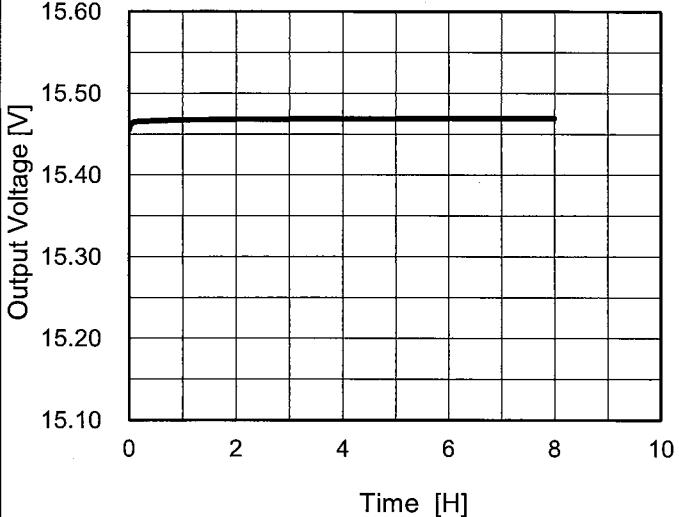
* Output Voltage Accuracy = $\pm(\text{Maximum of Output Voltage} - \text{Minimum of Output Voltage}) / 2$

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

2. Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	25	230	0	15.494	± 28	± 0.2
Minimum Voltage	-10	230	20	15.439		

COSEL

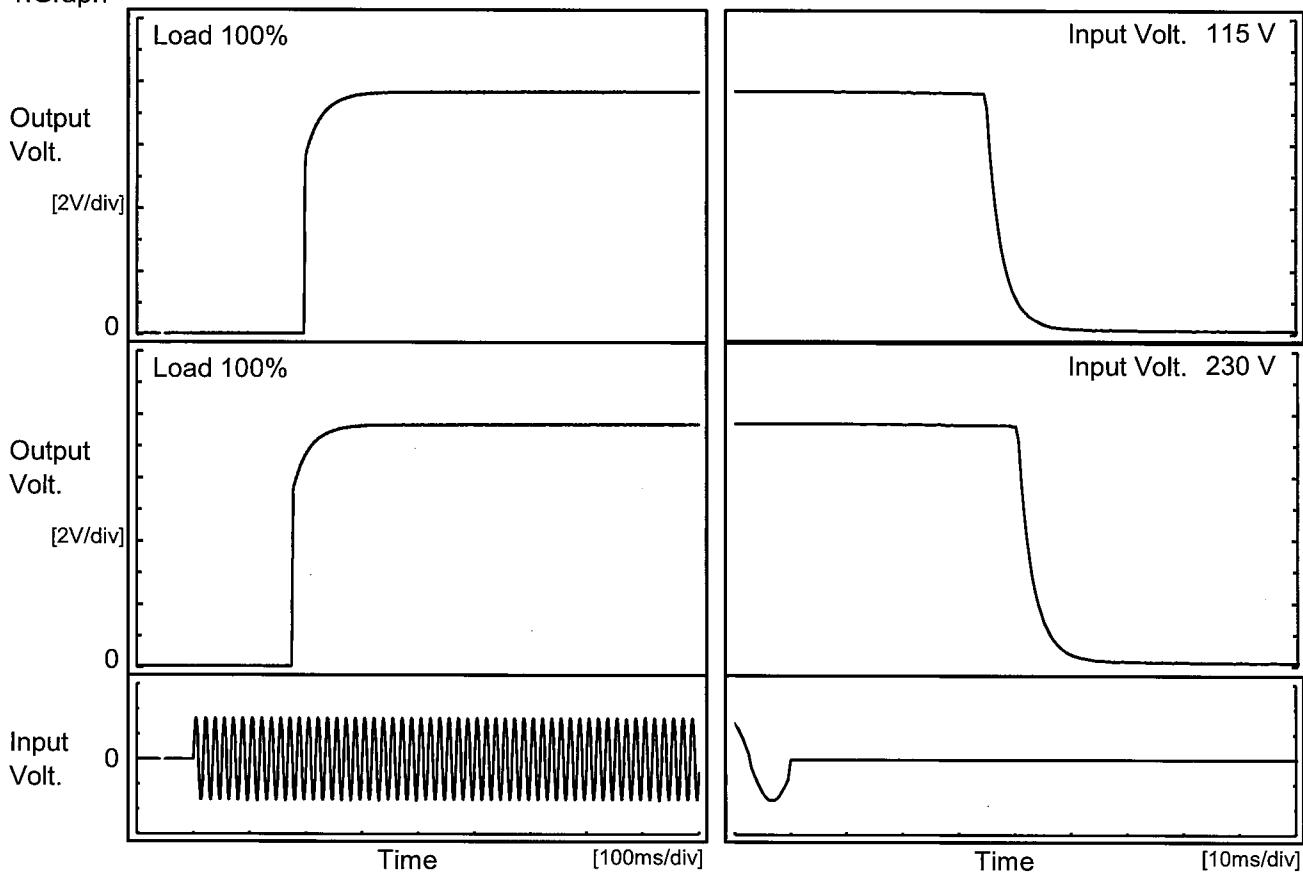
Model	PLA300F-15	Temperature	25°C																						
Item	Time Lapse Drift	Testing Circuitry	Figure A																						
Object	+15V20A																								
1. Graph			2. Values																						
 <p>Output Voltage [V]</p> <p>Time [H]</p> <p>Input Volt. 230V Load 100%</p>			<table border="1"> <thead> <tr> <th>Time since start [H]</th> <th>Output Voltage [V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>15.455</td></tr> <tr><td>0.5</td><td>15.467</td></tr> <tr><td>1.0</td><td>15.467</td></tr> <tr><td>2.0</td><td>15.468</td></tr> <tr><td>3.0</td><td>15.469</td></tr> <tr><td>4.0</td><td>15.469</td></tr> <tr><td>5.0</td><td>15.469</td></tr> <tr><td>6.0</td><td>15.470</td></tr> <tr><td>7.0</td><td>15.470</td></tr> <tr><td>8.0</td><td>15.469</td></tr> </tbody> </table>	Time since start [H]	Output Voltage [V]	0.0	15.455	0.5	15.467	1.0	15.467	2.0	15.468	3.0	15.469	4.0	15.469	5.0	15.469	6.0	15.470	7.0	15.470	8.0	15.469
Time since start [H]	Output Voltage [V]																								
0.0	15.455																								
0.5	15.467																								
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5.0	15.469																								
6.0	15.470																								
7.0	15.470																								
8.0	15.469																								
* The characteristic of AC115V is equal.																									

COSEL

Model	PLA300F-15
Item	Rise and Fall Time
Object	+15V20A

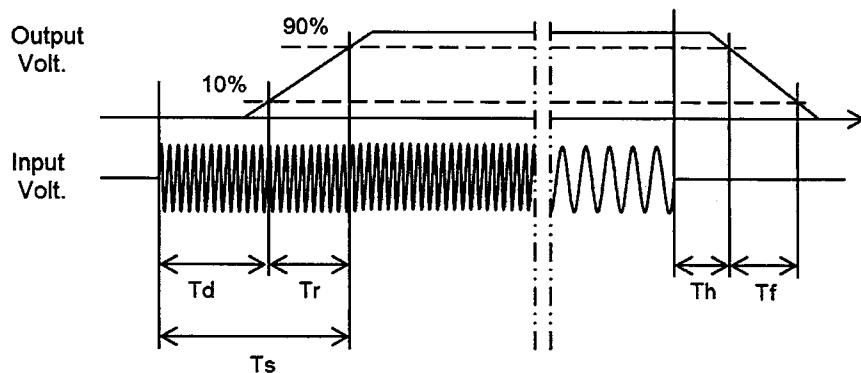
Temperature 25°C
Testing Circuitry Figure A

1. Graph



2. Values

Input Volt.	Time	Td	Tr	Ts	Th	Tf
115 V		197.0	26.0	223.0	35.0	6.0
230 V		175.5	26.5	202.0	40.5	6.0



COSEL

Model	PLA300F-15	Temperature Testing Circuitry 25°C Figure A																																
Item	Hold-Up Time																																	
Object	+15V20A																																	
1. Graph		2. Values																																
<p>Graph showing Hold-Up Time [ms] vs Input Voltage [V] for PLA300F-15 at 25°C. The Y-axis is logarithmic from 1 to 1000 ms. The X-axis ranges from 50 to 300 V. Two data series are shown: Load 50% (dashed line with squares) and Load 100% (solid line with triangles). Both series show a minimum hold-up time around 115V and 264V. A slanted line indicates the rated input voltage range.</p>		<table border="1"> <thead> <tr> <th rowspan="2">Input Voltage [V]</th> <th colspan="2">Hold-Up Time [ms]</th> </tr> <tr> <th>Load 50%</th> <th>Load 100%</th> </tr> </thead> <tbody> <tr><td>85</td><td>68</td><td>42 ※1</td></tr> <tr><td>100</td><td>69</td><td>38 ※2</td></tr> <tr><td>115</td><td>71</td><td>34</td></tr> <tr><td>200</td><td>80</td><td>38</td></tr> <tr><td>230</td><td>82</td><td>40</td></tr> <tr><td>264</td><td>84</td><td>41</td></tr> <tr><td>280</td><td>85</td><td>42</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> </tbody> </table> <p>※1: Load 80% ※2: Load 90%</p>	Input Voltage [V]	Hold-Up Time [ms]		Load 50%	Load 100%	85	68	42 ※1	100	69	38 ※2	115	71	34	200	80	38	230	82	40	264	84	41	280	85	42	--	-	-	--	-	-
Input Voltage [V]	Hold-Up Time [ms]																																	
	Load 50%	Load 100%																																
85	68	42 ※1																																
100	69	38 ※2																																
115	71	34																																
200	80	38																																
230	82	40																																
264	84	41																																
280	85	42																																
--	-	-																																
--	-	-																																

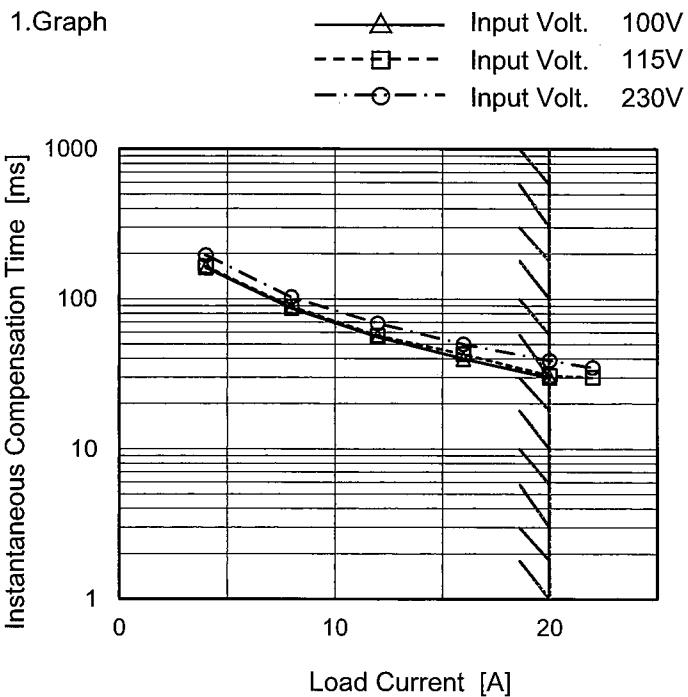
This duration covers from Shut-off of input voltage to the moment when output voltage descends to the rated range of voltage accuracy.
Note: Slanted line shows the range of the rated input voltage.

COSEL

Model PLA300F-15

Item Instantaneous Interruption Compensation

Object +15V20A



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

Temperature 25°C
Testing Circuitry Figure A

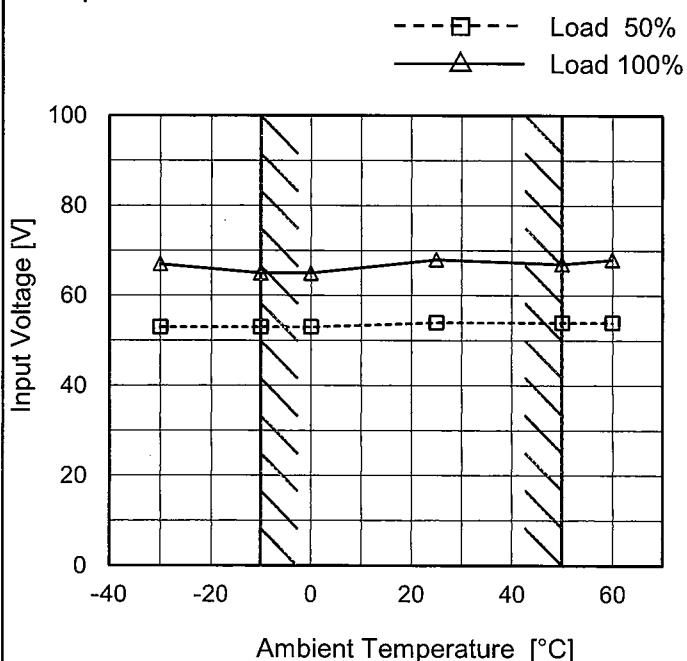
2. Values

Load Current [A]	Time [ms]		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
0	-	-	-
4	162	165	196
8	87	89	103
12	56	57	69
16	40	43	50
20	30	31	39
22	-	30	35
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	PLA300F-15
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+15V20A

1. Graph



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

Testing Circuitry Figure A

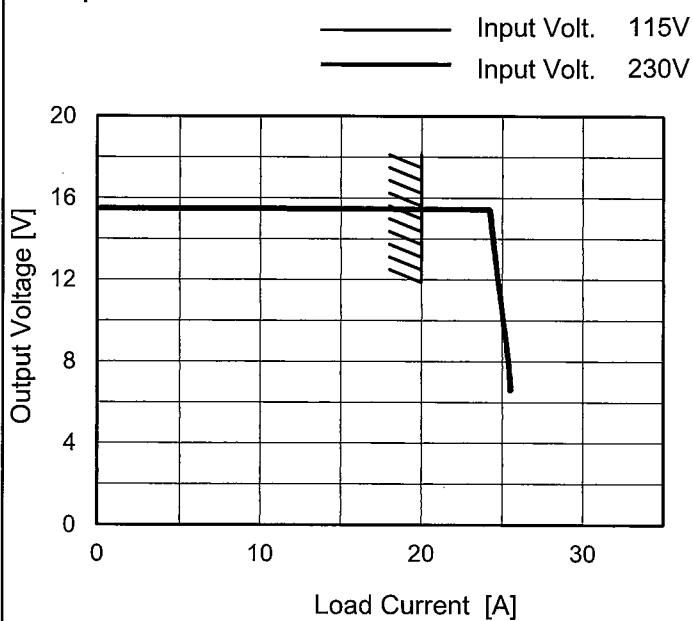
2. Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-30	53	67
-10	53	65
0	53	65
25	54	68
50	54	67
60	54	68
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	PLA300F-15
Item	Overcurrent Protection
Object	+15V20A

1.Graph



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

Temperature 25°C
Testing Circuitry Figure A

2.Values

Output Voltage [V]	Load Current [A]	
	Input Volt. 115[V]	Input Volt. 230[V]
14.25	24.50	24.40
13.50	24.60	24.51
12.00	24.80	24.74
10.50	25.04	24.99
9.00	25.29	25.25
7.50	25.50	25.45
6.00	25.65	25.27
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

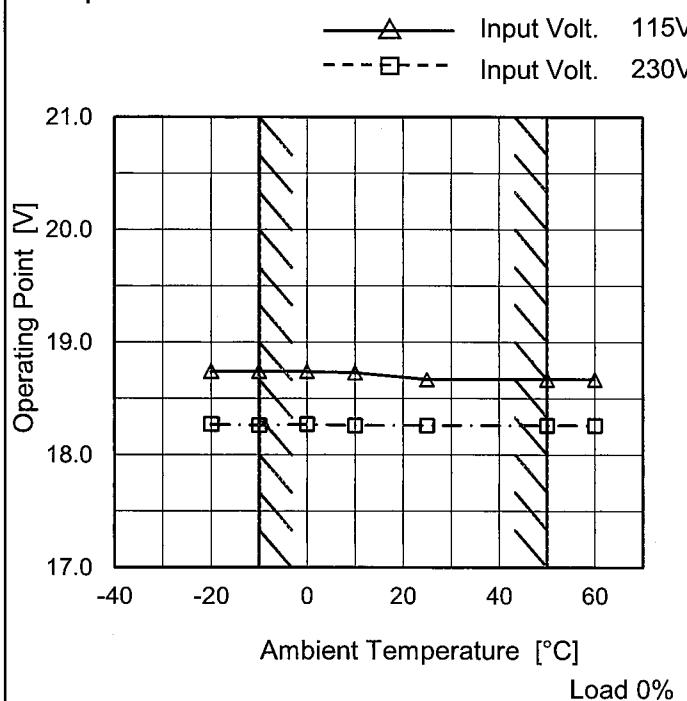
COSEL

Model PLA300F-15

Item Overvoltage Protection

Object +15V20A

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	18.74	18.27
-10	18.74	18.26
0	18.74	18.27
10	18.73	18.26
25	18.67	18.26
50	18.67	18.26
60	18.67	18.26
--	-	-
--	-	-
--	-	-
--	-	-

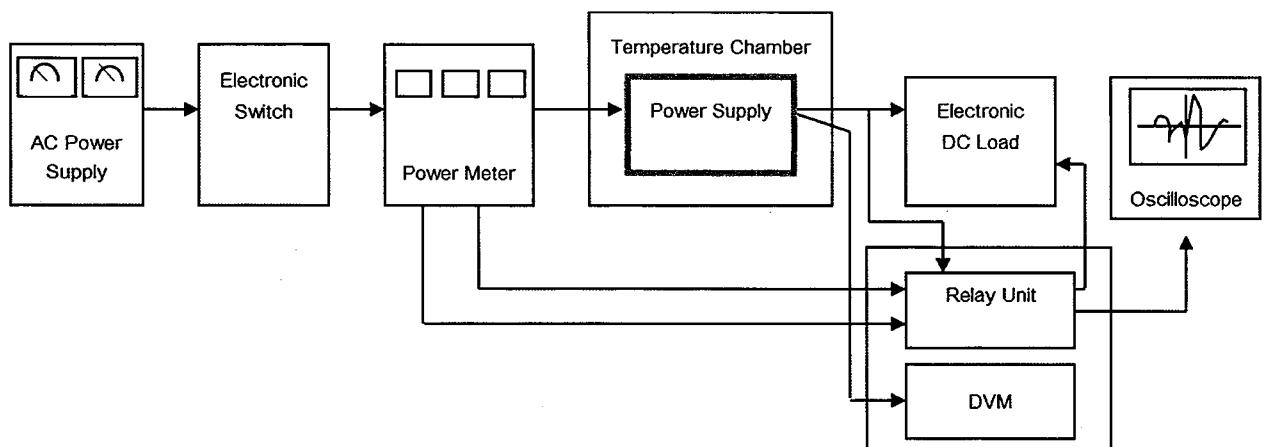


Figure A

Data Acquisition/Control Unit

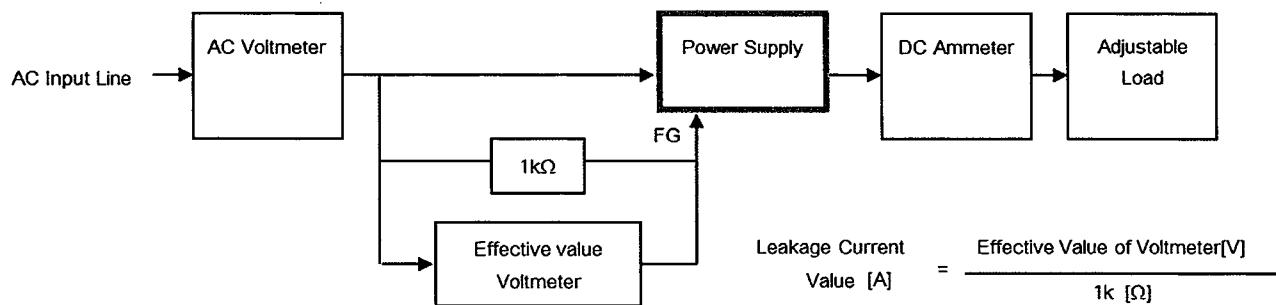


Figure B (DEN-AN)

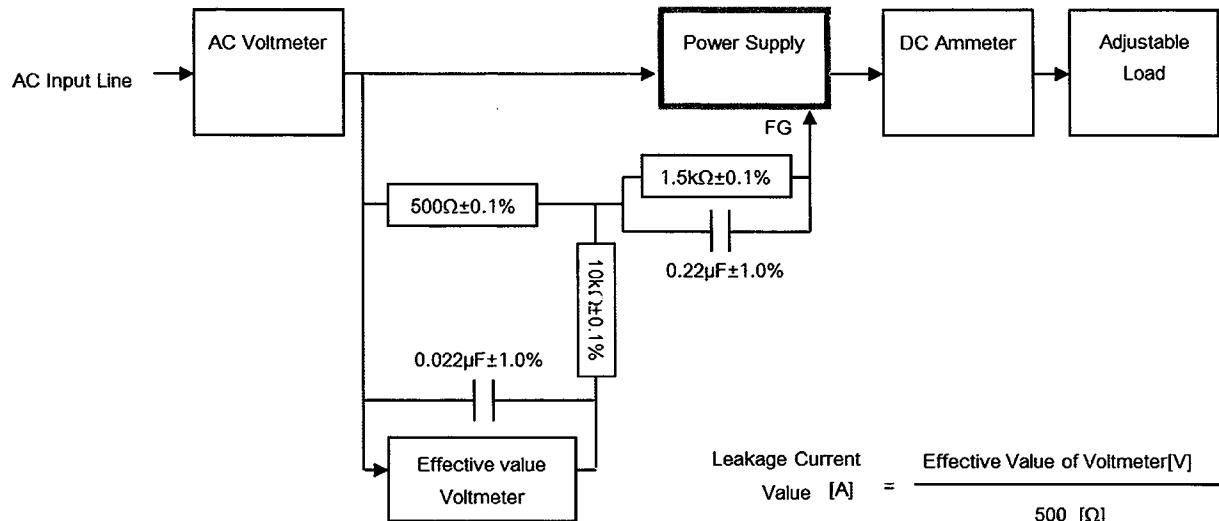
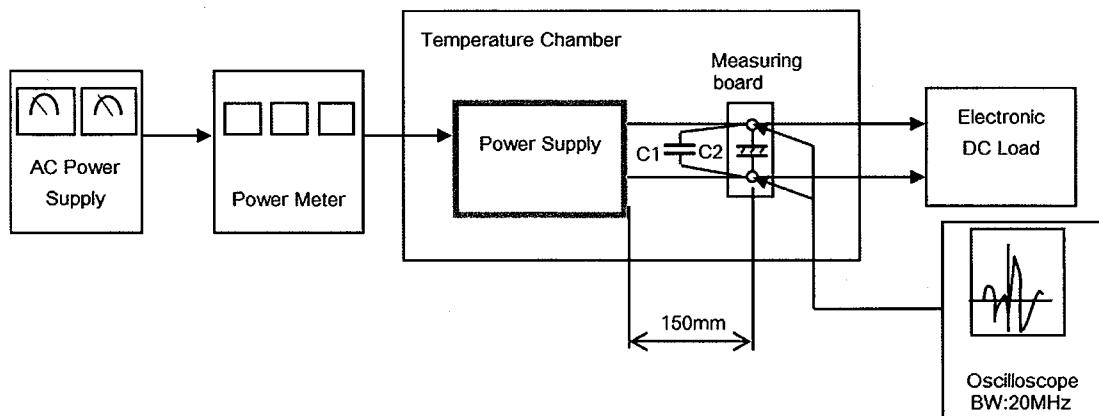


Figure B (IEC60950-1)



C1= 0.1 μ F
(Ceramic capacitor)

C2= 22 μ F
(Electrolytic capacitor)

Figure C