

TEST DATA OF PCA300F-48

Regulated DC Power Supply
March 11, 2019

Approved by : Koji Todo
Koji Todo Design Manager

Prepared by : Yuya Takeda
Yuya Takeda Design Engineer

COSEL CO.,LTD.



CONTENTS

1.Input Current (by Load Current)	1
2.Efficiency (by Load Current)	2
3.Power Factor (by Load Current)	3
4.Inrush Current	4
5.Leakage Current	5
6.Line Regulation	6
7.Load Regulation	7
8.Ripple-Noise	7
9.Dynamic Load Response	8
10.Rise and Fall Time	9
11.Hold-Up Time	10
12.Instantaneous Interruption Compensation	11
13.Overcurrent Protection	12
14.Ambient Temperature Drift	13
15.Minimum Input Voltage for Regulated Output Voltage	13
16.Overvoltage Protection	13
17.Figure of Testing Circuitry	14

(Final Page 15)

COSEL

Model	PCA300F-48																																																					
Item	Input Current (by Load Current)																																																					
Object	_____																																																					
1.Graph	<p>Legend:</p> <ul style="list-style-type: none"> — ▲ — Input Volt. 100V - - □ - - Input Volt. 200V - · ○ - · Input Volt. 230V 																																																					
2.Values	<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="3">Input Current [A]</th> </tr> <tr> <th>Input Volt. 100[V]</th> <th>Input Volt. 200[V]</th> <th>Input Volt. 230[V]</th> </tr> </thead> <tbody> <tr> <td>0.0</td> <td>0.206</td> <td>0.145</td> <td>0.157</td> </tr> <tr> <td>1.0</td> <td>0.683</td> <td>0.392</td> <td>0.365</td> </tr> <tr> <td>2.0</td> <td>1.183</td> <td>0.642</td> <td>0.580</td> </tr> <tr> <td>3.0</td> <td>1.694</td> <td>0.892</td> <td>0.800</td> </tr> <tr> <td>4.0</td> <td>2.212</td> <td>1.143</td> <td>1.019</td> </tr> <tr> <td>5.0</td> <td>2.744</td> <td>1.402</td> <td>1.244</td> </tr> <tr> <td>6.0</td> <td>3.286</td> <td>1.663</td> <td>1.474</td> </tr> <tr> <td>7.0</td> <td>3.830</td> <td>1.928</td> <td>1.702</td> </tr> <tr> <td>7.7</td> <td>4.220</td> <td>2.118</td> <td>1.863</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]	Input Current [A]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	0.0	0.206	0.145	0.157	1.0	0.683	0.392	0.365	2.0	1.183	0.642	0.580	3.0	1.694	0.892	0.800	4.0	2.212	1.143	1.019	5.0	2.744	1.402	1.244	6.0	3.286	1.663	1.474	7.0	3.830	1.928	1.702	7.7	4.220	2.118	1.863	--	-	-	-	--	-	-	-
Load Current [A]	Input Current [A]																																																					
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]																																																			
0.0	0.206	0.145	0.157																																																			
1.0	0.683	0.392	0.365																																																			
2.0	1.183	0.642	0.580																																																			
3.0	1.694	0.892	0.800																																																			
4.0	2.212	1.143	1.019																																																			
5.0	2.744	1.402	1.244																																																			
6.0	3.286	1.663	1.474																																																			
7.0	3.830	1.928	1.702																																																			
7.7	4.220	2.118	1.863																																																			
--	-	-	-																																																			
--	-	-	-																																																			
Note:	Slanted line shows the range of the rated load current.																																																					

COSEL

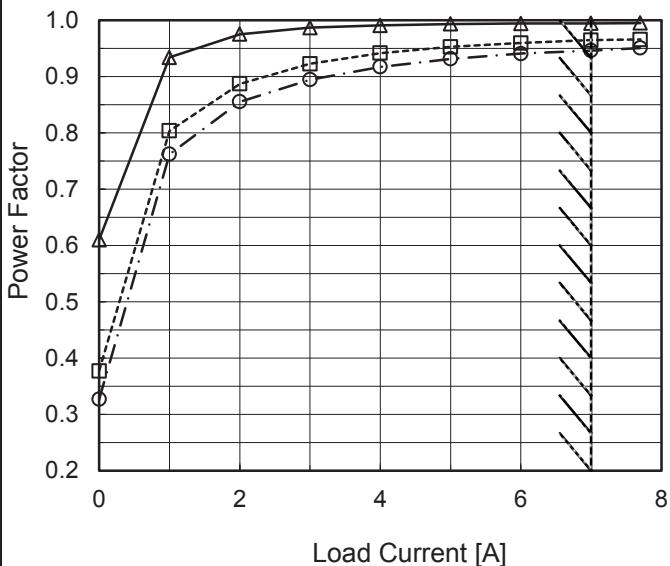
Model	PCA300F-48																																																					
Item	Efficiency (by Load Current)																																																					
Object	_____																																																					
1.Graph	<p>Graph showing Efficiency (%) vs Load Current (A) for PCA300F-48 at 25°C. The graph plots Efficiency (%) on the Y-axis (44 to 100) against Load Current [A] on the X-axis (0 to 8). Three curves are shown for different input voltages: 100V (solid line with open triangle markers), 200V (dashed line with open square markers), and 230V (dash-dot line with open circle markers). All curves show efficiency increasing with load current. A slanted line on the right side of the graph indicates the rated load current range.</p> <table border="1"> <thead> <tr> <th>Load Current [A]</th> <th>Input Volt. 100[V]</th> <th>Input Volt. 200[V]</th> <th>Input Volt. 230[V]</th> </tr> </thead> <tbody> <tr><td>1.0</td><td>75.9</td><td>76.9</td><td>75.6</td></tr> <tr><td>2.0</td><td>84.5</td><td>85.5</td><td>85.3</td></tr> <tr><td>3.0</td><td>87.0</td><td>88.3</td><td>88.3</td></tr> <tr><td>4.0</td><td>88.4</td><td>89.9</td><td>90.0</td></tr> <tr><td>5.0</td><td>88.8</td><td>90.5</td><td>90.7</td></tr> <tr><td>6.0</td><td>88.9</td><td>90.8</td><td>90.9</td></tr> <tr><td>7.0</td><td>88.8</td><td>90.9</td><td>91.2</td></tr> <tr><td>7.7</td><td>88.8</td><td>90.9</td><td>91.2</td></tr> </tbody> </table>			Load Current [A]	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	1.0	75.9	76.9	75.6	2.0	84.5	85.5	85.3	3.0	87.0	88.3	88.3	4.0	88.4	89.9	90.0	5.0	88.8	90.5	90.7	6.0	88.9	90.8	90.9	7.0	88.8	90.9	91.2	7.7	88.8	90.9	91.2															
Load Current [A]	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]																																																			
1.0	75.9	76.9	75.6																																																			
2.0	84.5	85.5	85.3																																																			
3.0	87.0	88.3	88.3																																																			
4.0	88.4	89.9	90.0																																																			
5.0	88.8	90.5	90.7																																																			
6.0	88.9	90.8	90.9																																																			
7.0	88.8	90.9	91.2																																																			
7.7	88.8	90.9	91.2																																																			
2.Values	<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</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>0.0</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>1.0</td><td>75.9</td><td>76.9</td><td>75.6</td></tr> <tr><td>2.0</td><td>84.5</td><td>85.5</td><td>85.3</td></tr> <tr><td>3.0</td><td>87.0</td><td>88.3</td><td>88.3</td></tr> <tr><td>4.0</td><td>88.4</td><td>89.9</td><td>90.0</td></tr> <tr><td>5.0</td><td>88.8</td><td>90.5</td><td>90.7</td></tr> <tr><td>6.0</td><td>88.9</td><td>90.8</td><td>90.9</td></tr> <tr><td>7.0</td><td>88.8</td><td>90.9</td><td>91.2</td></tr> <tr><td>7.7</td><td>88.8</td><td>90.9</td><td>91.2</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]	Efficiency [%]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	0.0	-	-	-	1.0	75.9	76.9	75.6	2.0	84.5	85.5	85.3	3.0	87.0	88.3	88.3	4.0	88.4	89.9	90.0	5.0	88.8	90.5	90.7	6.0	88.9	90.8	90.9	7.0	88.8	90.9	91.2	7.7	88.8	90.9	91.2	--	-	-	-	--	-	-	-
Load Current [A]	Efficiency [%]																																																					
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]																																																			
0.0	-	-	-																																																			
1.0	75.9	76.9	75.6																																																			
2.0	84.5	85.5	85.3																																																			
3.0	87.0	88.3	88.3																																																			
4.0	88.4	89.9	90.0																																																			
5.0	88.8	90.5	90.7																																																			
6.0	88.9	90.8	90.9																																																			
7.0	88.8	90.9	91.2																																																			
7.7	88.8	90.9	91.2																																																			
--	-	-	-																																																			
--	-	-	-																																																			
Note:	Slanted line shows the range of the rated load current.																																																					

COSEL

Model	PCA300F-48
Item	Power Factor (by Load Current)
Object	_____

1.Graph

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



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

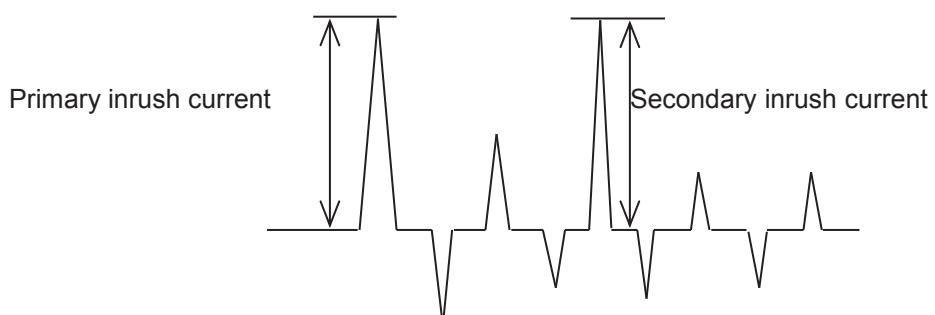
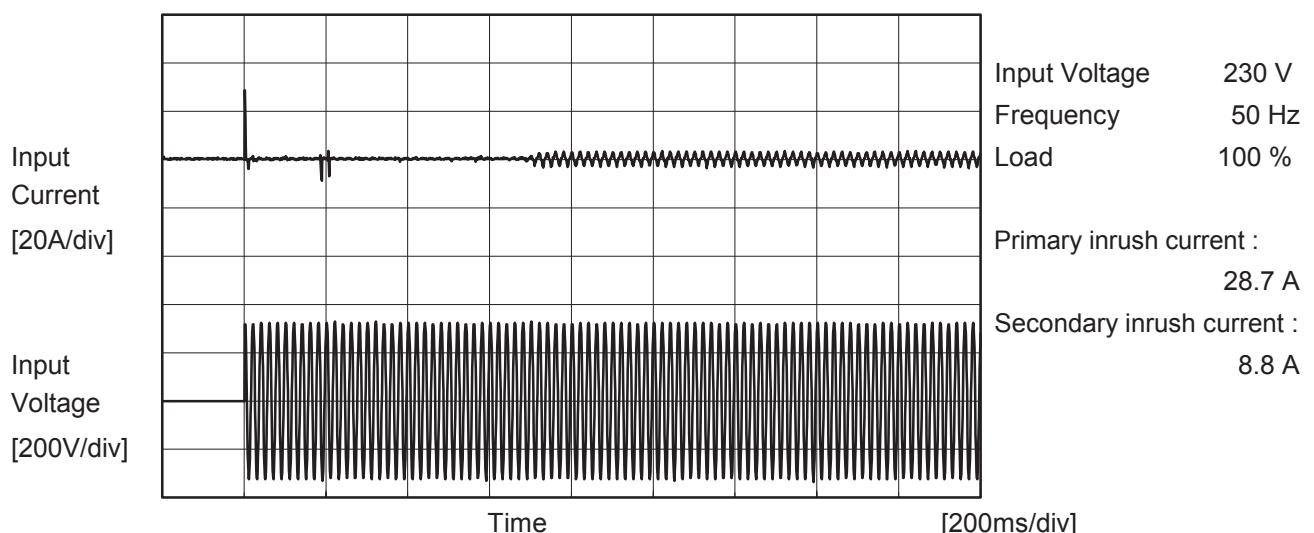
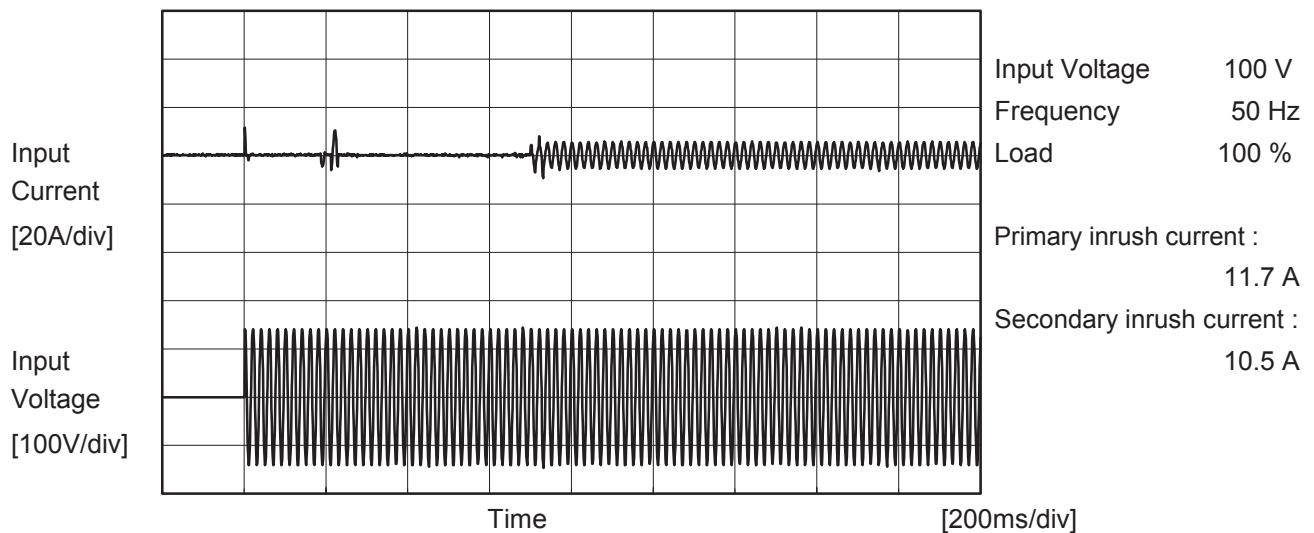
 Temperature 25°C
 Testing Circuitry Figure A

2.Values

Load Current [A]	Power Factor		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.0	0.610	0.377	0.327
1.0	0.934	0.804	0.762
2.0	0.975	0.887	0.855
3.0	0.987	0.923	0.895
4.0	0.991	0.942	0.917
5.0	0.993	0.953	0.932
6.0	0.995	0.960	0.941
7.0	0.995	0.965	0.946
7.7	0.995	0.966	0.951
--	-	-	-
--	-	-	-

COSEL

Model	PCA300F-48	Temperature	25°C
Item	Inrush Current	Testing Circuitry	Figure A
Object	_____		





Model	PCA300F-48	Temperature	25°C
Item	Leakage Current	Testing Circuitry	Figure B
Object	_____		

1. Results

[mA]

Standards	Testing Circuitry	Measuring Method	Input Volt.			Note
			100 [V]	230 [V]	240 [V]	
DEN-AN	Figure B-1	Both phases	0.13	0.30	0.31	Operation
		One of phases	0.24	0.55	0.58	Stand by
IEC62368-1	Figure B-2	Both phases	0.13	0.29	0.31	Operation
		One of phases	0.22	0.54	0.57	Stand by
	Figure B-3	Both phases	0.13	0.29	0.30	Operation
		One of phases	0.24	0.54	0.56	Stand by
IEC60601-1	Figure B-4	Both phases	0.12	0.30	0.31	Operation
		One of phases	0.24	0.55	0.58	Stand by

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

2. Condition

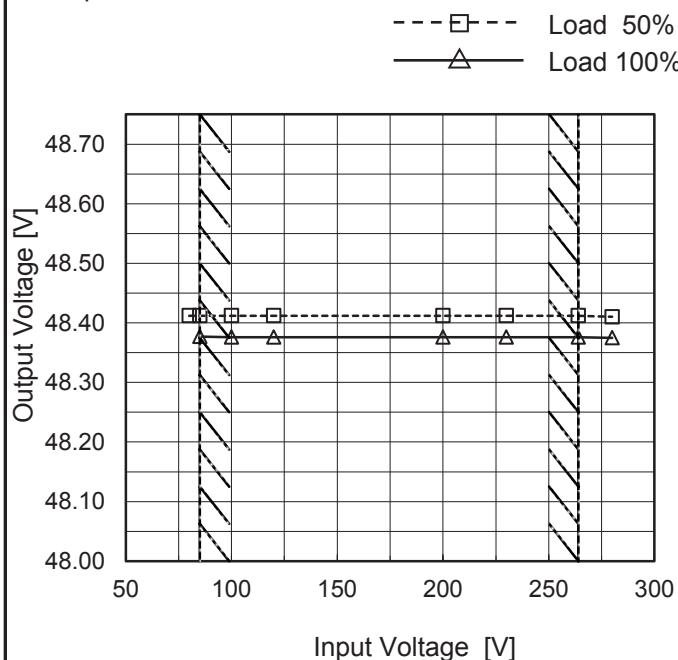
Leakage current value is concluded after measuring both phases of AC input and by choosing the larger one.

COSEL

Model	PCA300F-48
Item	Line Regulation
Object	+48V7A

 Temperature 25°C
 Testing Circuitry Figure A

1.Graph

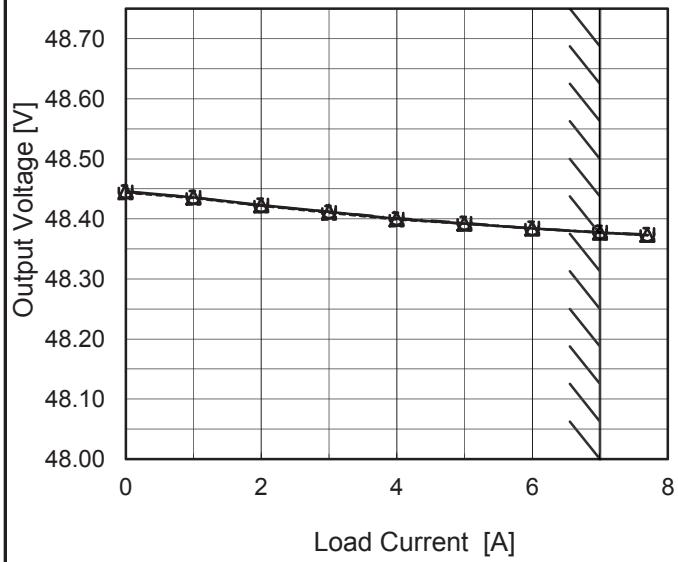
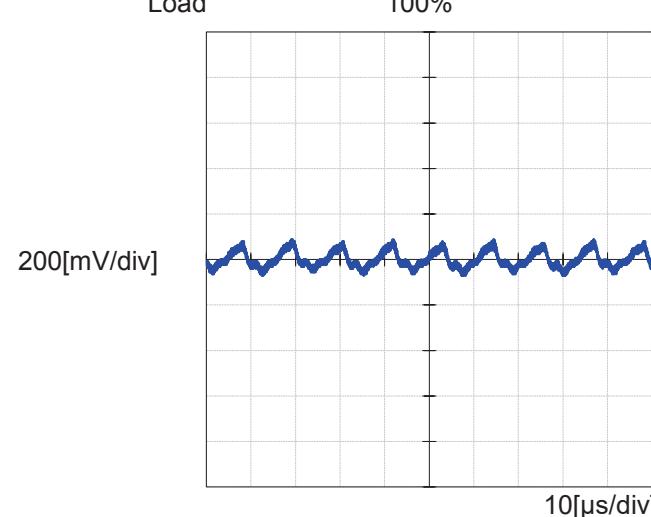


2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
80	48.412	-
85	48.412	48.377
100	48.412	48.376
120	48.412	48.376
200	48.412	48.376
230	48.412	48.376
264	48.412	48.376
280	48.410	48.375
--	-	-

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

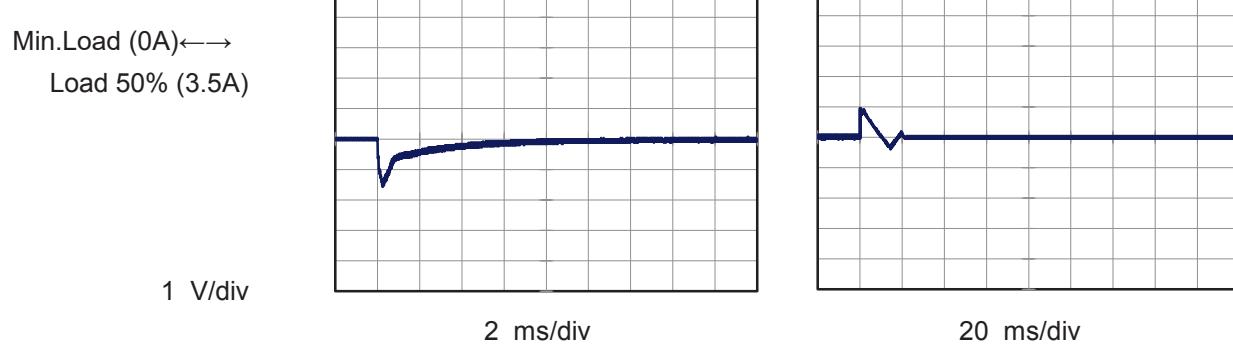
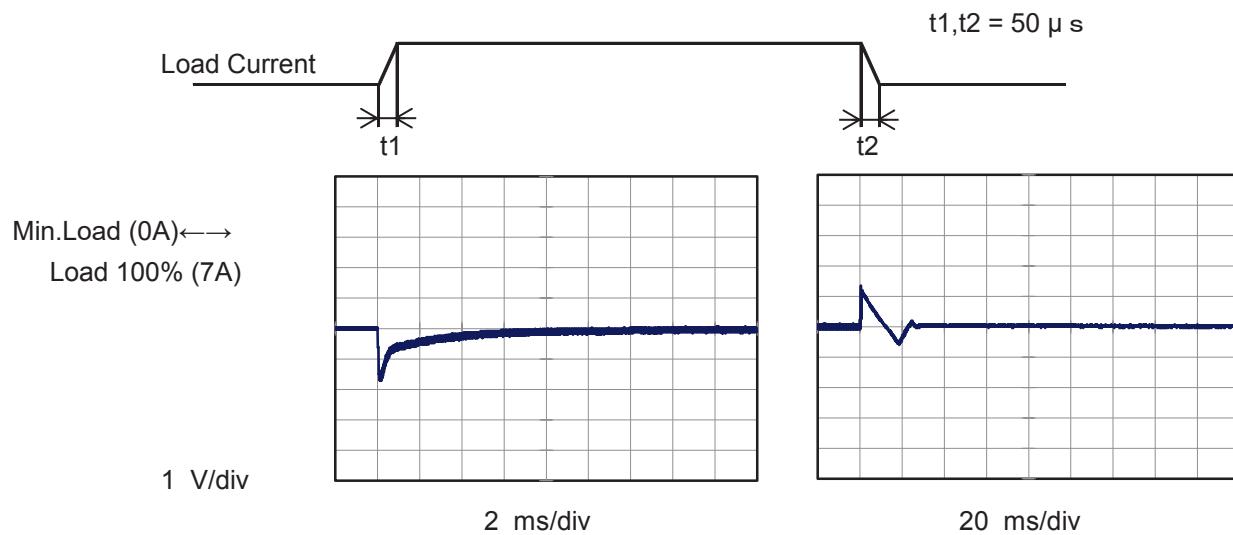
COSEL

Model	PCA300F-48	Temperature	25°C																																																			
Item	Load Regulation	Testing Circuitry	Figure A																																																			
Object	+48V7A																																																					
1.Graph	<p>—△— Input Volt. 100V - - -□--- Input Volt. 200V - - -○--- Input Volt. 230V</p> 																																																					
2.Values	<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="3">Output Voltage [V]</th> </tr> <tr> <th>Input Volt. 100[V]</th> <th>Input Volt. 200[V]</th> <th>Input Volt. 230[V]</th> </tr> </thead> <tbody> <tr> <td>0.0</td> <td>48.446</td> <td>48.444</td> <td>48.445</td> </tr> <tr> <td>1.0</td> <td>48.436</td> <td>48.435</td> <td>48.436</td> </tr> <tr> <td>2.0</td> <td>48.423</td> <td>48.422</td> <td>48.422</td> </tr> <tr> <td>3.0</td> <td>48.412</td> <td>48.410</td> <td>48.412</td> </tr> <tr> <td>4.0</td> <td>48.400</td> <td>48.399</td> <td>48.401</td> </tr> <tr> <td>5.0</td> <td>48.392</td> <td>48.392</td> <td>48.393</td> </tr> <tr> <td>6.0</td> <td>48.384</td> <td>48.384</td> <td>48.384</td> </tr> <tr> <td>7.0</td> <td>48.377</td> <td>48.377</td> <td>48.378</td> </tr> <tr> <td>7.7</td> <td>48.373</td> <td>48.373</td> <td>48.374</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]	Output Voltage [V]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	0.0	48.446	48.444	48.445	1.0	48.436	48.435	48.436	2.0	48.423	48.422	48.422	3.0	48.412	48.410	48.412	4.0	48.400	48.399	48.401	5.0	48.392	48.392	48.393	6.0	48.384	48.384	48.384	7.0	48.377	48.377	48.378	7.7	48.373	48.373	48.374	--	-	-	-	--	-	-	-
Load Current [A]	Output Voltage [V]																																																					
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]																																																			
0.0	48.446	48.444	48.445																																																			
1.0	48.436	48.435	48.436																																																			
2.0	48.423	48.422	48.422																																																			
3.0	48.412	48.410	48.412																																																			
4.0	48.400	48.399	48.401																																																			
5.0	48.392	48.392	48.393																																																			
6.0	48.384	48.384	48.384																																																			
7.0	48.377	48.377	48.378																																																			
7.7	48.373	48.373	48.374																																																			
--	-	-	-																																																			
--	-	-	-																																																			
Note:	Slanted line shows the range of the rated load current.																																																					
Item	Ripple-Noise	Temperature	25°C																																																			
Object	+48V7A	Testing Circuitry	Figure C																																																			
1.Graph	<p>Input Voltage 200V Load 100%</p> 																																																					

COSEL

Model	PCA300F-48	Temperature	25°C
Item	Dynamic Load Response	Testing Circuitry	Figure A
Object	+48V7A		

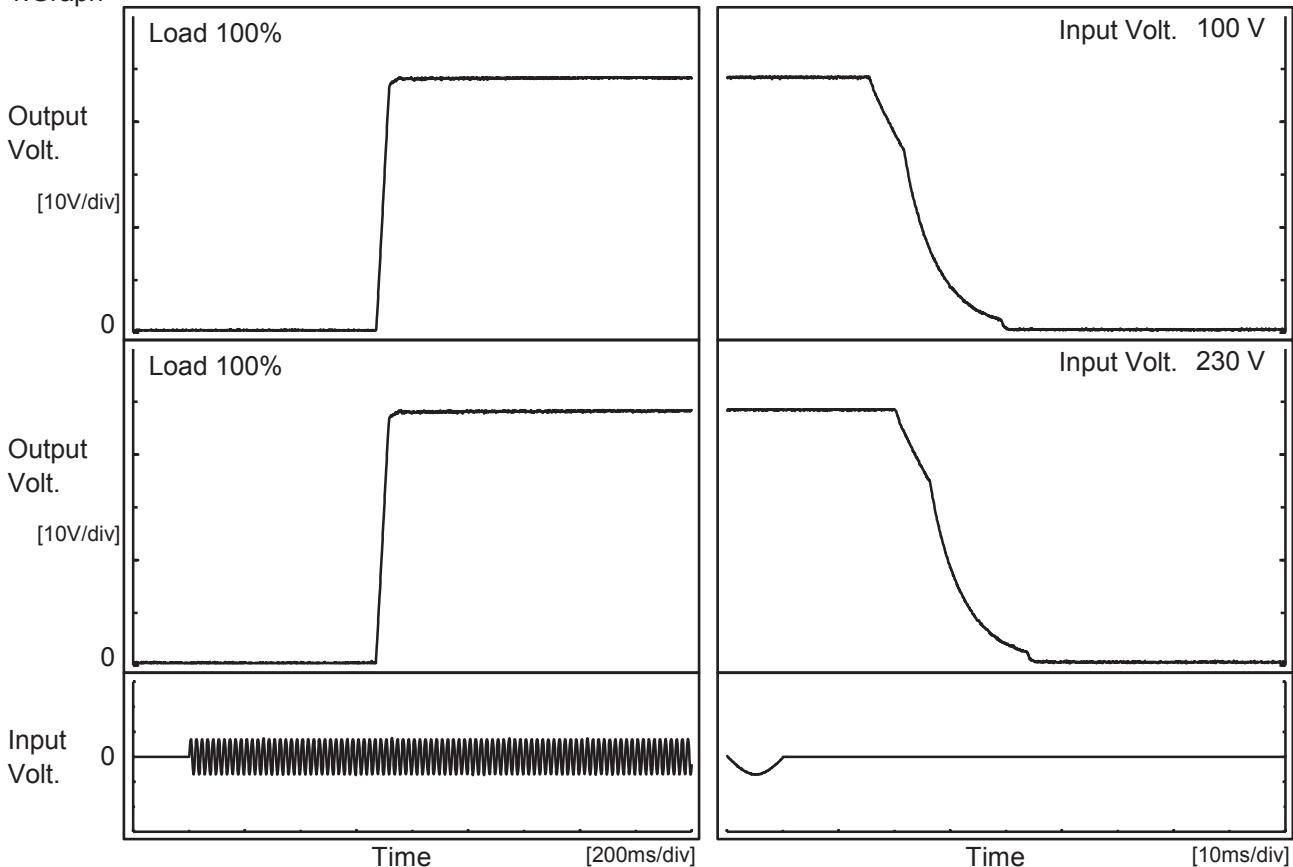
Input Volt. 200 V
 Cycle 1000 ms



COSEL

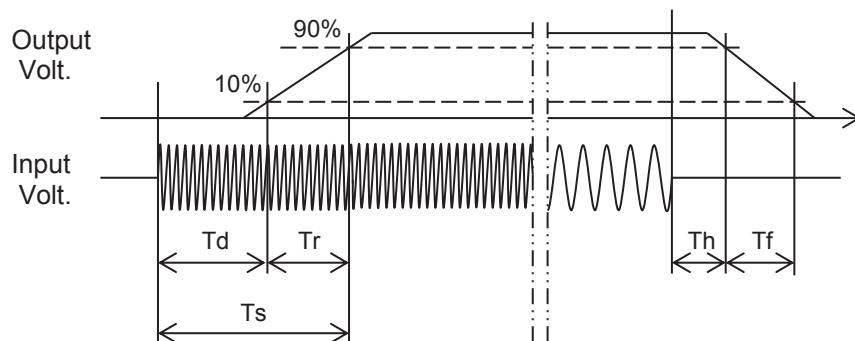
Model	PCA300F-48	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+48V7A		

1. Graph



2. Values

Input Volt.	Time	Td	Tr	Ts	Th	Tf	[ms]
100 V		676.0	38.0	714.0	17.3	16.3	
230 V		675.0	38.0	713.0	22.1	16.4	



COSEL

Model	PCA300F-48	Temperature	25°C																																
Item	Hold-Up Time	Testing Circuitry	Figure A																																
Object	+48V7A																																		
1. Graph			2. Values																																
<p>The graph illustrates the relationship between input voltage and hold-up time for the PCA300F-48 power supply under two load conditions: 50% load (dashed line with square markers) and 100% load (solid line with triangle markers). The Y-axis represents hold-up time in milliseconds on a logarithmic scale, ranging from 1 to 1000 ms. The X-axis represents input voltage in Volts on a linear scale, ranging from 50 to 300 V. A slanted line on the graph 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>80</td> <td>32</td> <td>-</td> </tr> <tr> <td>85</td> <td>32</td> <td>16</td> </tr> <tr> <td>100</td> <td>32</td> <td>16</td> </tr> <tr> <td>120</td> <td>32</td> <td>16</td> </tr> <tr> <td>200</td> <td>41</td> <td>21</td> </tr> <tr> <td>230</td> <td>41</td> <td>21</td> </tr> <tr> <td>264</td> <td>42</td> <td>21</td> </tr> <tr> <td>280</td> <td>41</td> <td>21</td> </tr> <tr> <td>--</td> <td>-</td> <td>-</td> </tr> </tbody> </table>	Input Voltage [V]	Hold-Up Time [ms]		Load 50%	Load 100%	80	32	-	85	32	16	100	32	16	120	32	16	200	41	21	230	41	21	264	42	21	280	41	21	--	-	-
Input Voltage [V]	Hold-Up Time [ms]																																		
	Load 50%	Load 100%																																	
80	32	-																																	
85	32	16																																	
100	32	16																																	
120	32	16																																	
200	41	21																																	
230	41	21																																	
264	42	21																																	
280	41	21																																	
--	-	-																																	
<p>This duration covers from Shut-off of input voltage to the moment when output voltage descends to the rated range of voltage accuracy.</p> <p>Note: Slanted line shows the range of the rated input voltage.</p>																																			

COSEL

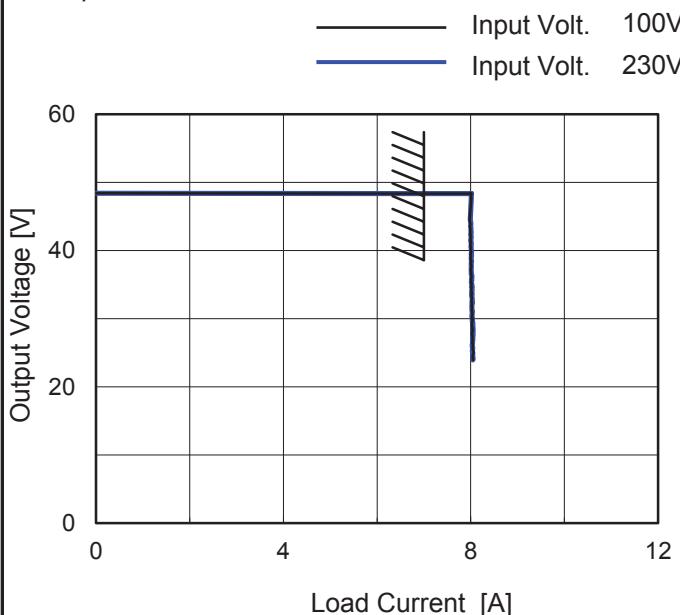
Model	PCA300F-48	Temperature	25°C																																																			
Item	Instantaneous Interruption Compensation	Testing Circuitry	Figure A																																																			
Object	+48V7A																																																					
1.Graph	<p>Graph showing Instantaneous Compensation Time [ms] vs Load Current [A]. The Y-axis is logarithmic from 1 to 1000 ms. The X-axis ranges from 0 to 8 A. Three curves are shown for Input Volt. 100V (triangles), Input Volt. 200V (squares), and Input Volt. 230V (circles). A slanted line indicates the rated load current range.</p> <table border="1"> <thead> <tr> <th>Load Current [A]</th> <th>Input Volt. 100[V]</th> <th>Input Volt. 200[V]</th> <th>Input Volt. 230[V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>1.0</td><td>100</td><td>128</td><td>127</td></tr> <tr><td>2.0</td><td>56</td><td>71</td><td>73</td></tr> <tr><td>3.0</td><td>38</td><td>48</td><td>49</td></tr> <tr><td>4.0</td><td>28</td><td>37</td><td>38</td></tr> <tr><td>5.0</td><td>21</td><td>29</td><td>29</td></tr> <tr><td>6.0</td><td>17</td><td>23</td><td>23</td></tr> <tr><td>7.0</td><td>15</td><td>20</td><td>20</td></tr> <tr><td>7.7</td><td>14</td><td>17</td><td>18</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]	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	0.0	-	-	-	1.0	100	128	127	2.0	56	71	73	3.0	38	48	49	4.0	28	37	38	5.0	21	29	29	6.0	17	23	23	7.0	15	20	20	7.7	14	17	18	--	-	-	-	--	-	-	-			
Load Current [A]	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]																																																			
0.0	-	-	-																																																			
1.0	100	128	127																																																			
2.0	56	71	73																																																			
3.0	38	48	49																																																			
4.0	28	37	38																																																			
5.0	21	29	29																																																			
6.0	17	23	23																																																			
7.0	15	20	20																																																			
7.7	14	17	18																																																			
--	-	-	-																																																			
--	-	-	-																																																			
2.Values	<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>0.0</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>1.0</td><td>100</td><td>128</td><td>127</td></tr> <tr><td>2.0</td><td>56</td><td>71</td><td>73</td></tr> <tr><td>3.0</td><td>38</td><td>48</td><td>49</td></tr> <tr><td>4.0</td><td>28</td><td>37</td><td>38</td></tr> <tr><td>5.0</td><td>21</td><td>29</td><td>29</td></tr> <tr><td>6.0</td><td>17</td><td>23</td><td>23</td></tr> <tr><td>7.0</td><td>15</td><td>20</td><td>20</td></tr> <tr><td>7.7</td><td>14</td><td>17</td><td>18</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. 200[V]	Input Volt. 230[V]	0.0	-	-	-	1.0	100	128	127	2.0	56	71	73	3.0	38	48	49	4.0	28	37	38	5.0	21	29	29	6.0	17	23	23	7.0	15	20	20	7.7	14	17	18	--	-	-	-	--	-	-	-
Load Current [A]	Time [ms]																																																					
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]																																																			
0.0	-	-	-																																																			
1.0	100	128	127																																																			
2.0	56	71	73																																																			
3.0	38	48	49																																																			
4.0	28	37	38																																																			
5.0	21	29	29																																																			
6.0	17	23	23																																																			
7.0	15	20	20																																																			
7.7	14	17	18																																																			
--	-	-	-																																																			
--	-	-	-																																																			
Note:	Slanted line shows the range of the rated load current.																																																					

COSEL

Model	PCA300F-48
Item	Overcurrent Protection
Object	+48V7A

 Temperature 25°C
 Testing Circuitry Figure A

1. Graph



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

Hiccup mode activates when the output voltage is from 24V to 0V.

2. Values

Output Voltage [V]	Load Current [A]	
	Input Volt. 100[V]	Input Volt. 230[V]
45.6	8.01	8.02
43.2	8.00	8.00
38.4	8.01	8.02
33.6	8.01	8.03
28.8	8.03	8.04
24.0	8.05	8.05
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-



Model	PCA300F-48	
Item	Ambient Temperature Drift	Testing Circuitry Figure A
Object	+48V7A	

1.Values

Load 100%

Ambient Temperature[°C]	Output Voltage [V]		
	Input Volt. 100V	Input Volt. 200V	Input Volt. 230V
-20	48.143	48.141	48.141
25	48.351	48.352	48.352
50	48.485	48.484	48.485

Item	Minimum Input Voltage for Regulated Output Voltage	Testing Circuitry Figure A
Object	+48V7A	

1.Values

Ambient Temperature[°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	73	79
25	73	79
50	73	79

Item	Overvoltage Protection	Testing Circuitry Figure A
Object	+48V7A	

1.Values

Load 0%

Ambient Temperature[°C]	Operating Point [V]	
	Input Volt. 100V	Input Volt. 230V
-20	61.29	61.29
25	61.52	61.52
50	61.59	61.60

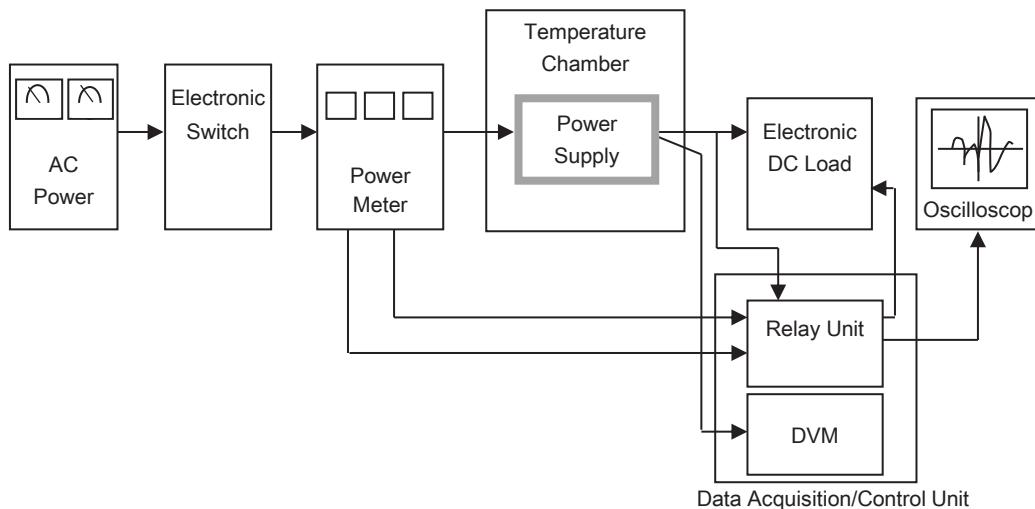


Figure A

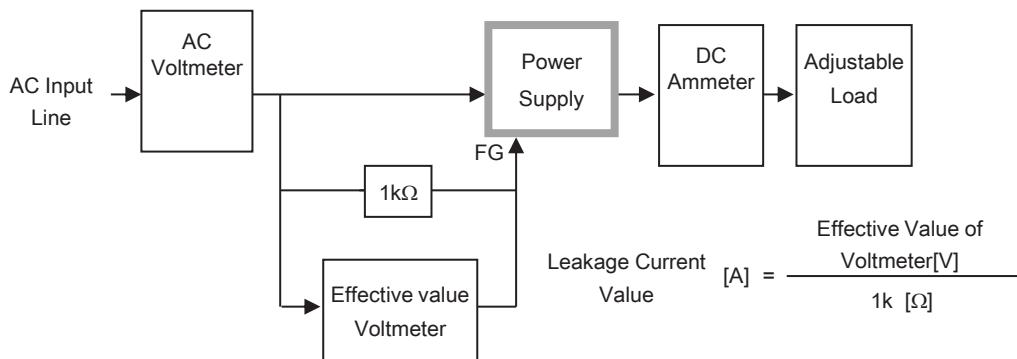


Figure B-1 (DEN-AN)

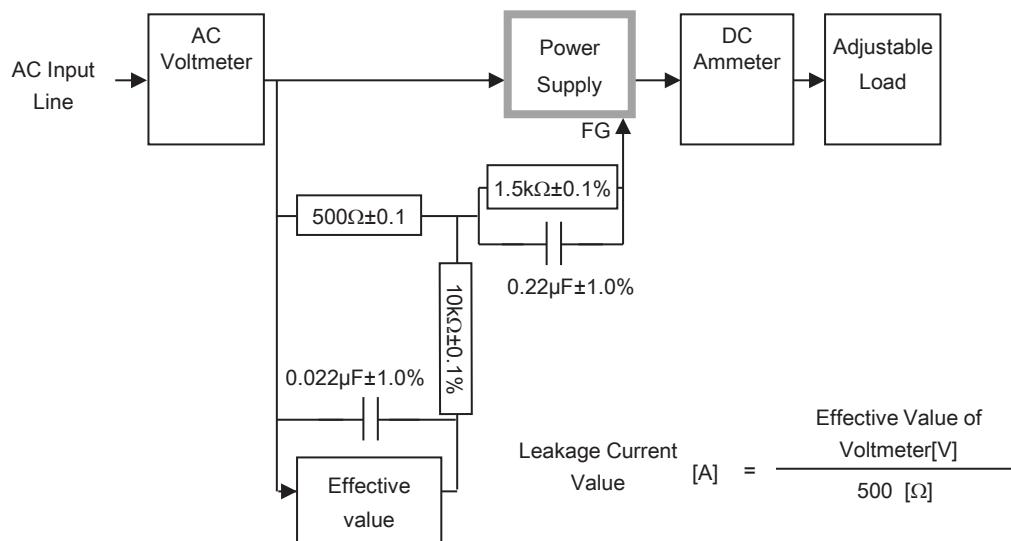


Figure B-2 (IEC62368-1 refer to IEC60990 Fig.4)

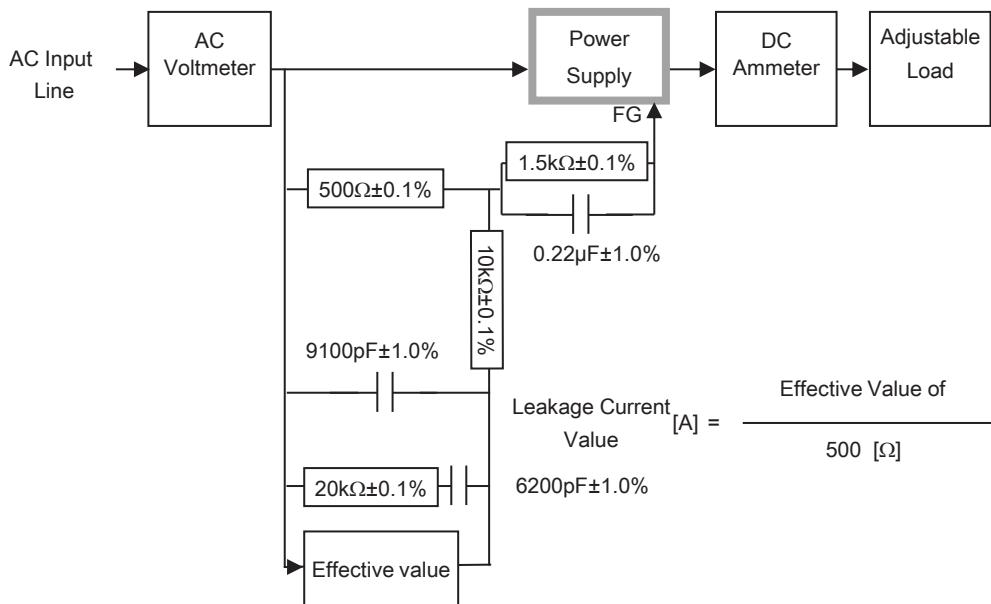


Figure B-3 (IEC62368-1 refer to IEC60990 Fig.5)

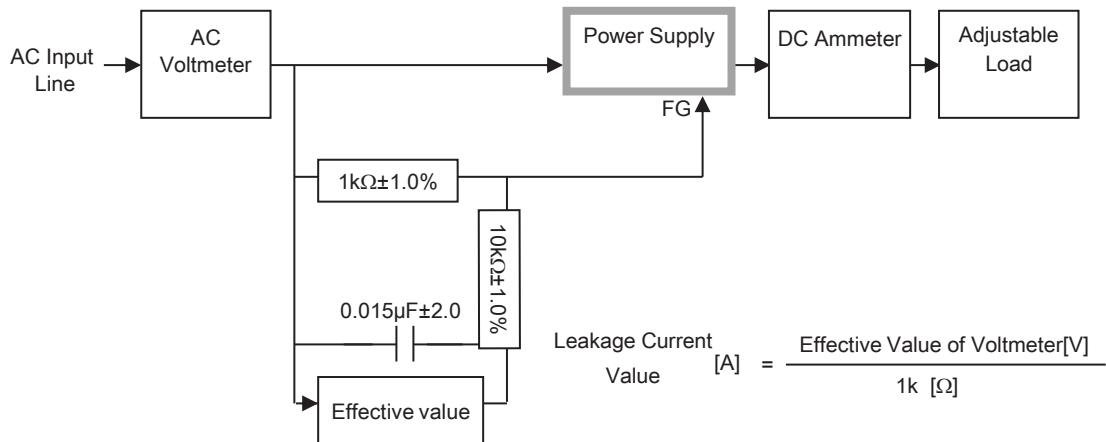
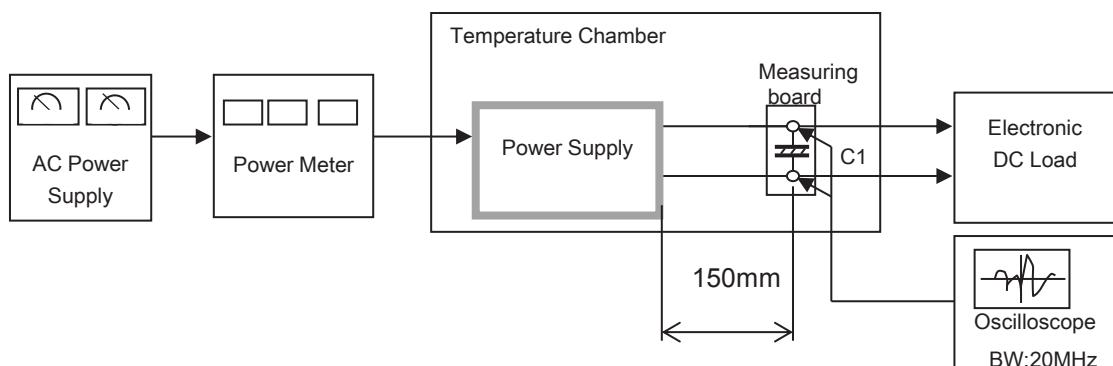


Figure B-4 (IEC60601-1)



$C1 = 22 \mu F$
(Electrolytic capacitor)

Figure C