

TEST DATA OF PCA1000F-48

Regulated DC Power Supply
February 22, 2019

Approved by : Koji Todo
Koji Todo Design Manager

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Terumasa Araki Design Engineer

COSEL CO.,LTD.

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Model		PCA1000F-48		Temperature		25°C																																																				
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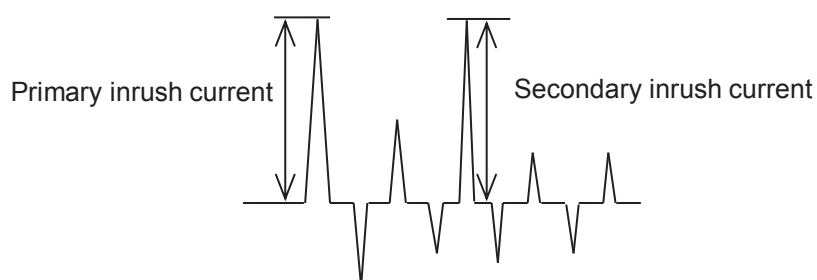
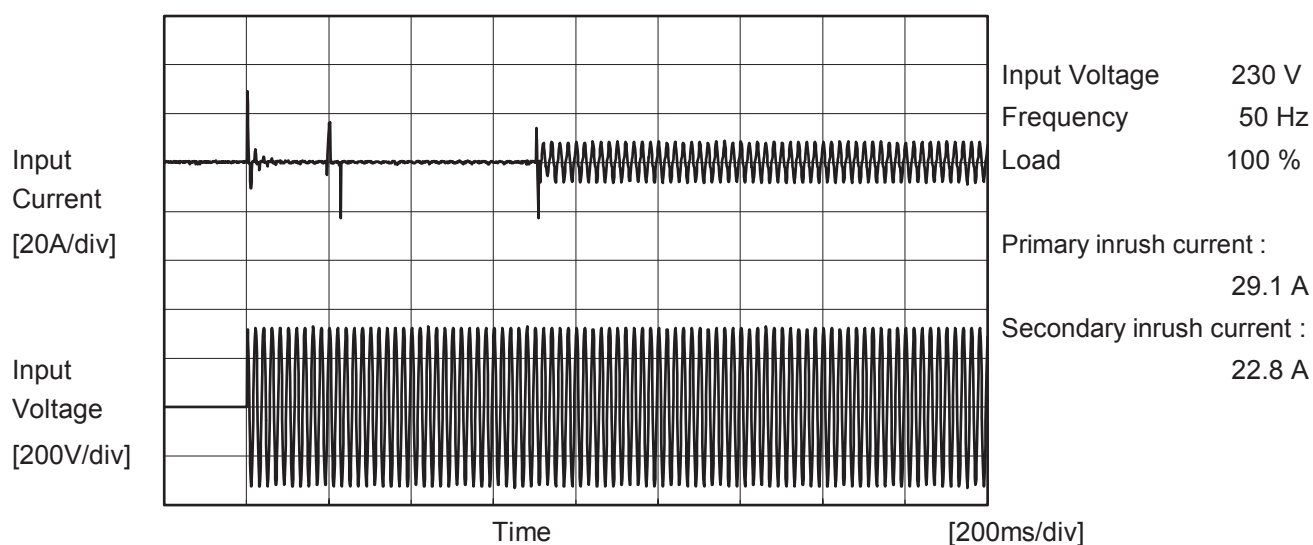
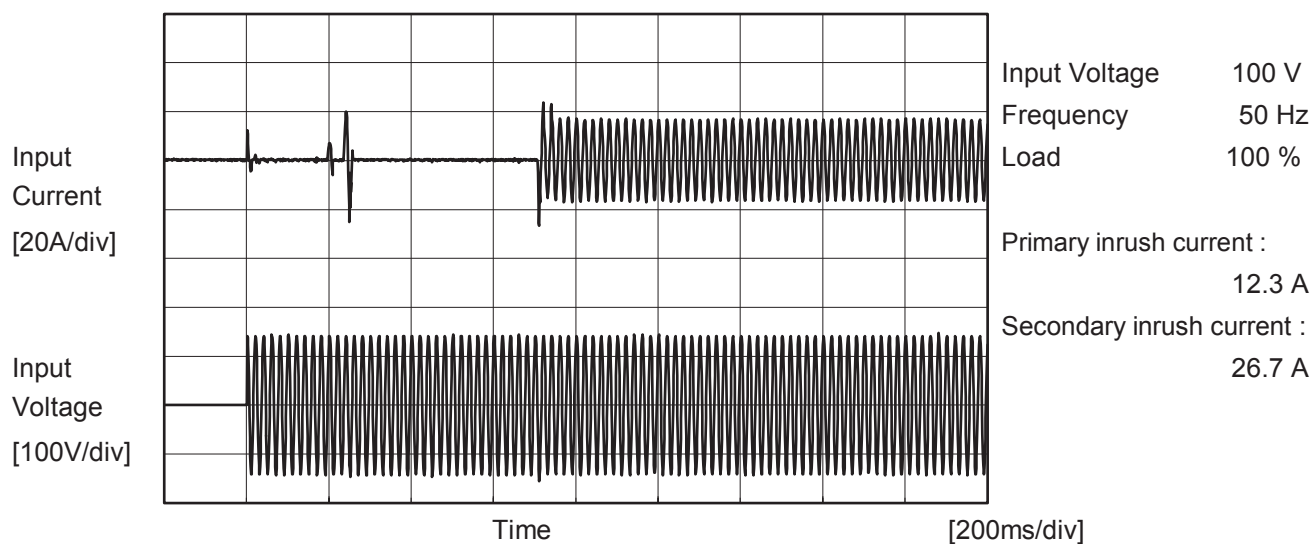
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Model	PCA1000F-48	Temperature 25°C Testing Circuitry Figure A	
Item	Inrush Current		
Object			





		Temperature 25°C Testing Circuitry Figure B
Model	PCA1000F-48	
Item	Leakage Current	
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	0.11	0.29	0.31	Operation
		One of phases	0.22	0.56	0.59	Stand by
IEC62368-1	Figure B-2	Both phases	0.10	0.28	0.30	Operation
		One of phases	0.22	0.56	0.60	Stand by
	Figure B-3	Both phases	0.11	0.29	0.31	Operation
		One of phases	0.22	0.57	0.61	Stand by
IEC60601-1	Figure B-4	Both phases	0.11	0.28	0.29	Operation
		One of phases	0.22	0.55	0.57	Stand by

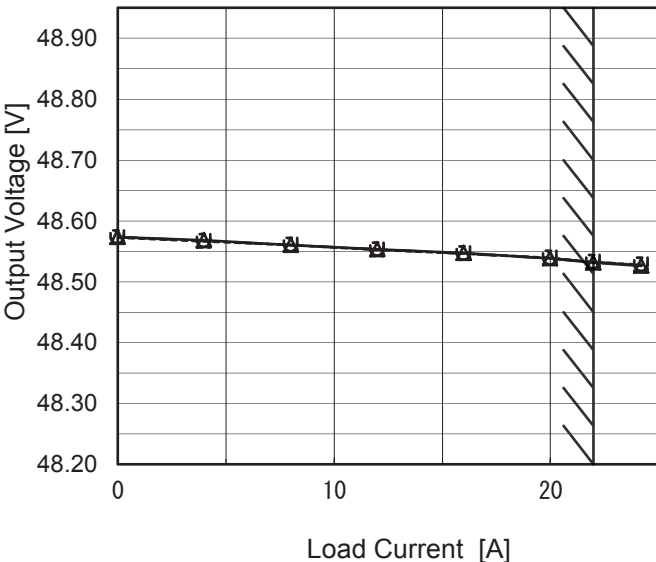
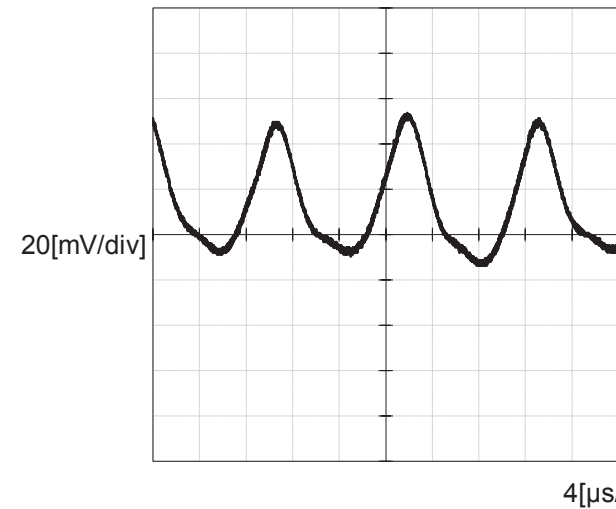
The value for "One of phases" is the reference value only.

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	PCA1000F-48		
Item	Line Regulation	Temperature	25°C
Object	+48V22A	Testing Circuitry	Figure A
1.Graph		2.Values	
<div><div><div><div><div>---</div><div>□</div><div>---</div></div><div>Load 50%</div></div><div><div>—</div><div>△</div><div>—</div></div><div>Load 100%</div></div><div><div><div>Output Voltage [V]</div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></di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Model		PCA1000F-48		Temperature		25°C																																																		
Item		Load Regulation		Testing Circuitry		Figure A																																																		
Object		+48V22A		2.Values																																																				
1.Graph		<div><div><div><div></div></div><div></div><div>Input Volt. 100V</div></div><div><div></div></div><div>Input Volt. 200V</div></div> <div><div></div></div> <div>Input Volt. 230V</div> <div></div> <div>Note: Slanted line shows the range of the rated load current.</div>						<table><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><tr><td>0.0</td><td>48.573</td><td>48.572</td><td>48.573</td></tr><tr><td>4.0</td><td>48.568</td><td>48.566</td><td>48.568</td></tr><tr><td>8.0</td><td>48.560</td><td>48.560</td><td>48.560</td></tr><tr><td>12.0</td><td>48.553</td><td>48.553</td><td>48.554</td></tr><tr><td>16.0</td><td>48.547</td><td>48.546</td><td>48.546</td></tr><tr><td>20.0</td><td>48.538</td><td>48.539</td><td>48.538</td></tr><tr><td>22.0</td><td>48.531</td><td>48.532</td><td>48.532</td></tr><tr><td>24.2</td><td>48.526</td><td>48.528</td><td>48.528</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></table>		Load Current [A]	Output Voltage [V]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	0.0	48.573	48.572	48.573	4.0	48.568	48.566	48.568	8.0	48.560	48.560	48.560	12.0	48.553	48.553	48.554	16.0	48.547	48.546	48.546	20.0	48.538	48.539	48.538	22.0	48.531	48.532	48.532	24.2	48.526	48.528	48.528	--	-	-	-	--	-	-	-
Load Current [A]	Output Voltage [V]																																																							
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Item		Ripple-Noise		Temperature		25°C																																																		
Object		+48V22A		Testing Circuitry		Figure C																																																		
1.Graph		<div><div>Input Voltage 200V</div><div>Load 100%</div><div></div></div>																																																						

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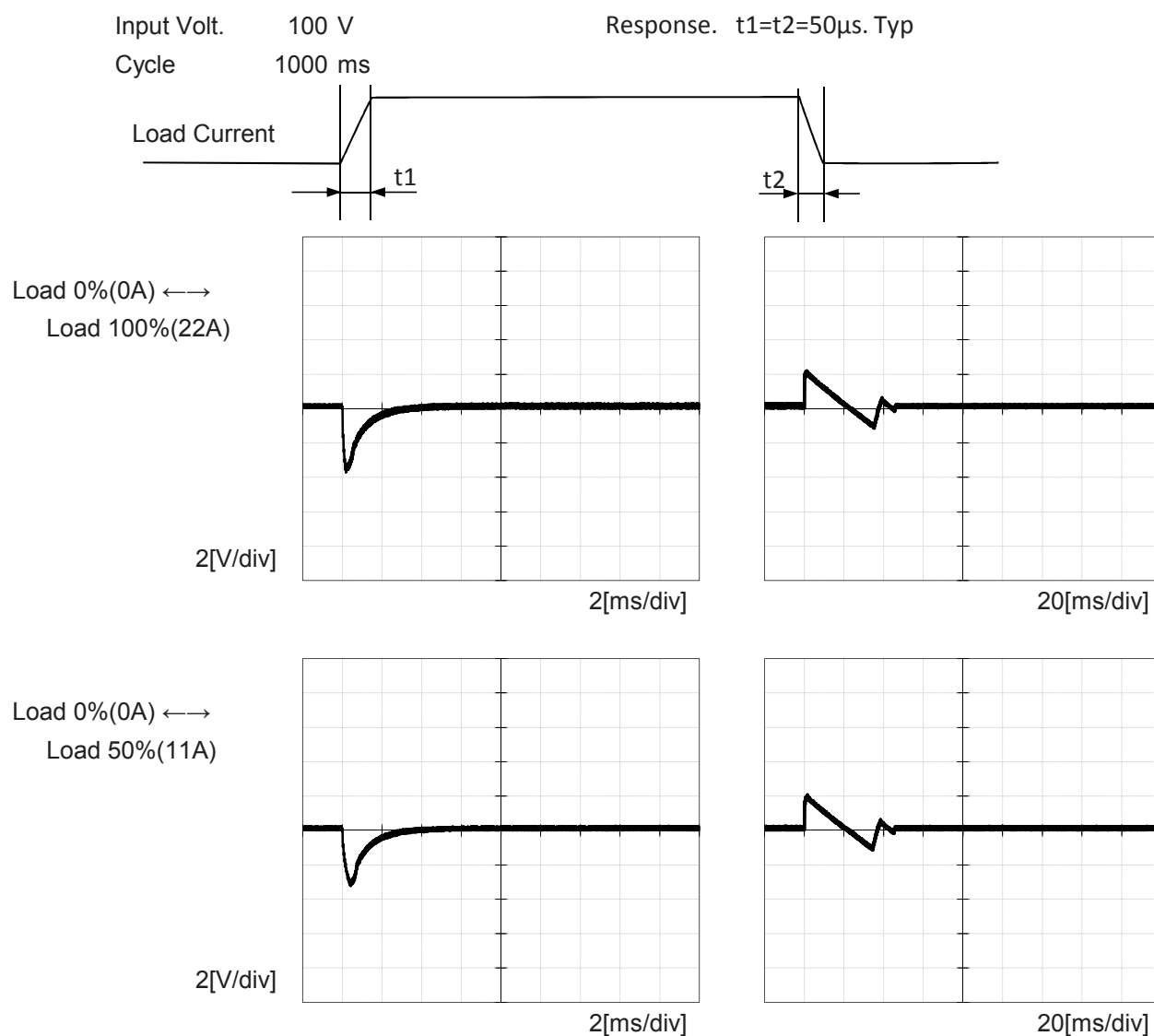
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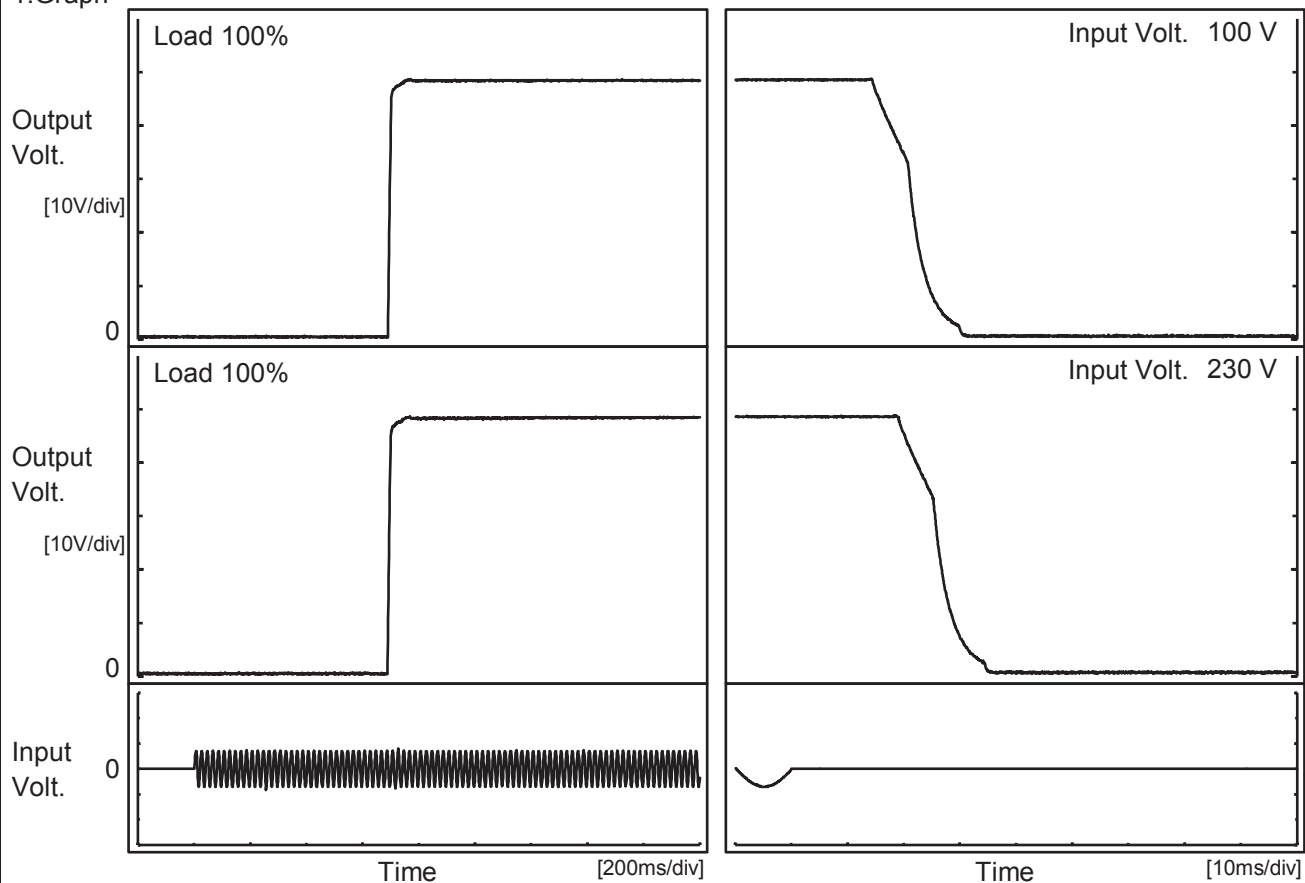
Model	PCA1000F-48	Temperature 25°C Testing Circuitry Figure A	
Item	Dynamic Load Response		
Object	+48V22A		



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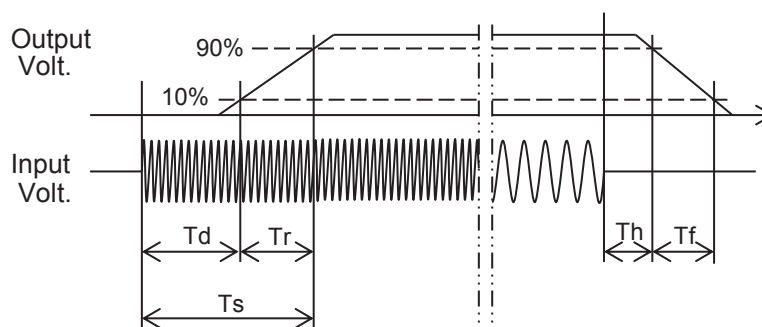
Model	PCA1000F-48	Temperature 25°C Testing Circuitry Figure A
Item	Rise and Fall Time	
Object	+48V22A	

1.Graph



2.Values

		[ms]				
Input Volt.	Time	Td	Tr	Ts	Th	Tf
100 V		692.0	10.0	702.0	16.1	10.7
230 V		690.0	10.0	700.0	20.7	10.6



Model		PCA1000F-48		Temperature 25°C																																	
Item		Hold-Up Time		Testing Circuitry Figure A																																	
Object		+48V22A																																			
1.Graph				2.Values																																	
<div><div><div><div></div><div></div><div></div></div><div><div></div><div></div><div></div></div></div><div><div>Load 50%</div><div>Load 100%</div></div></div> <table><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>29</td><td>-</td></tr><tr><td>85</td><td>29</td><td>-</td></tr><tr><td>100</td><td>29</td><td>15</td></tr><tr><td>120</td><td>29</td><td>15</td></tr><tr><td>200</td><td>38</td><td>19</td></tr><tr><td>230</td><td>39</td><td>19</td></tr><tr><td>264</td><td>39</td><td>19</td></tr><tr><td>280</td><td>41</td><td>20</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></tbody></table>				Input Voltage [V]	Hold-Up Time [ms]		Load 50%	Load 100%	80	29	-	85	29	-	100	29	15	120	29	15	200	38	19	230	39	19	264	39	19	280	41	20	--	-	-		
Input Voltage [V]	Hold-Up Time [ms]																																				
	Load 50%	Load 100%																																			
80	29	-																																			
85	29	-																																			
100	29	15																																			
120	29	15																																			
200	38	19																																			
230	39	19																																			
264	39	19																																			
280	41	20																																			
--	-	-																																			
<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>																																					

Model	PCA1000F-48																																																					
Item	Instantaneous Interruption Compensation	Temperature	25°C																																																			
Object	+48V22A	Testing Circuitry	Figure A																																																			
1.Graph		2.Values																																																				
<div><div><div>—△—</div><div>Input Volt.</div><div>100V</div></div><div><div>---□---</div><div>Input Volt.</div><div>200V</div></div><div><div>-·-○-·-</div><div>Input Volt.</div><div>230V</div></div></div> <p>Instantaneous Compensation Time [ms]</p> <p>Load Current [A]</p> <p>Note: Slanted line shows the range of the rated load current.</p>		<table><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><tr><td>0.0</td><td>-</td><td>-</td><td>-</td></tr><tr><td>4.0</td><td>66</td><td>91</td><td>93</td></tr><tr><td>8.0</td><td>46</td><td>62</td><td>61</td></tr><tr><td>12.0</td><td>30</td><td>45</td><td>45</td></tr><tr><td>16.0</td><td>19</td><td>29</td><td>31</td></tr><tr><td>20.0</td><td>16</td><td>23</td><td>22</td></tr><tr><td>22.0</td><td>15</td><td>20</td><td>20</td></tr><tr><td>24.2</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><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr></table>		Load Current [A]	Time [ms]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	0.0	-	-	-	4.0	66	91	93	8.0	46	62	61	12.0	30	45	45	16.0	19	29	31	20.0	16	23	22	22.0	15	20	20	24.2	14	17	18	--	-	-	-	--	-	-	-	--	-	-	-
Load Current [A]	Time [ms]																																																					
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]																																																			
0.0	-	-	-																																																			
4.0	66	91	93																																																			
8.0	46	62	61																																																			
12.0	30	45	45																																																			
16.0	19	29	31																																																			
20.0	16	23	22																																																			
22.0	15	20	20																																																			
24.2	14	17	18																																																			
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--	-	-	-																																																			
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Model		PCA1000F-48		Temperature Testing Circuitry	25°C Figure A																																												
Item		Overcurrent Protection																																															
Object		+48V22A																																															
1.Graph				2.Values																																													
<div><div><div></div><div>Input Volt. 100V</div></div><div><div></div><div>Input Volt. 230V</div></div></div> <p>Note: Slanted line shows the range of the rated load current.</p> <p>Hiccup mode activates when the output voltage is from 24 to 0V.</p>				<table><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. 230[V]</th></tr><tr><td>45.6</td><td>25.24</td><td>25.22</td></tr><tr><td>43.2</td><td>25.25</td><td>25.24</td></tr><tr><td>38.4</td><td>25.30</td><td>25.28</td></tr><tr><td>33.6</td><td>25.32</td><td>25.31</td></tr><tr><td>28.8</td><td>25.39</td><td>25.31</td></tr><tr><td>24.0</td><td>25.36</td><td>25.31</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></table>		Output Voltage [V]	Load Current [A]		Input Volt. 100[V]	Input Volt. 230[V]	45.6	25.24	25.22	43.2	25.25	25.24	38.4	25.30	25.28	33.6	25.32	25.31	28.8	25.39	25.31	24.0	25.36	25.31	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-
Output Voltage [V]	Load Current [A]																																																
	Input Volt. 100[V]	Input Volt. 230[V]																																															
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Model	PCA1000F-48		
Item	Ambient Temperature Drift	Testing Circuitry Figure A	
Object	+48V22A		
1.Values		Load 100%	
Ambient Temperature[°C]	Output Voltage [V]		
	Input Volt. 100V	Input Volt. 200V	Input Volt. 230V
-20	48.402	48.401	48.401
25	48.536	48.534	48.535
40	48.594	48.594	48.595
50	-	48.625	48.626
Item	Minimum Input Voltage for Regulated Output Voltage	Testing Circuitry Figure A	
Object	+48V22A		
1.Values			
Ambient Temperature[°C]	Input Voltage [V]		
	Load 50%	Load 100%	
-20	74	78	
25	74	79	
40	74	79	
Item	Overvoltage Protection	Testing Circuitry Figure A	
Object	+48V22A		
1.Values		Load 0%	
Ambient Temperature[°C]	Operating Point [V]		
	Input Volt. 100V	Input Volt. 230V	
-20	61.65	61.65	
25	61.65	61.65	
40	61.65	61.65	
50	61.65	61.65	

- 13 -

BC-11340

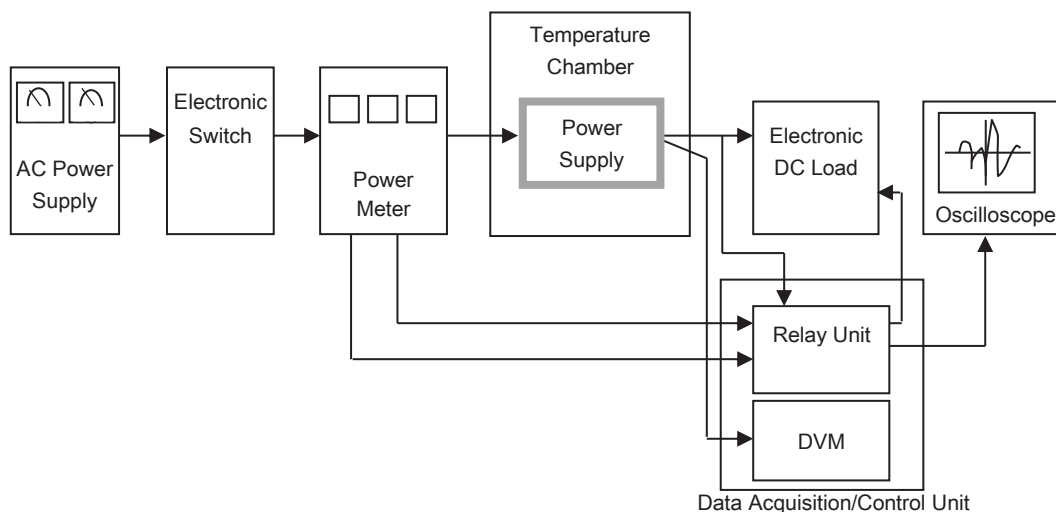


Figure A

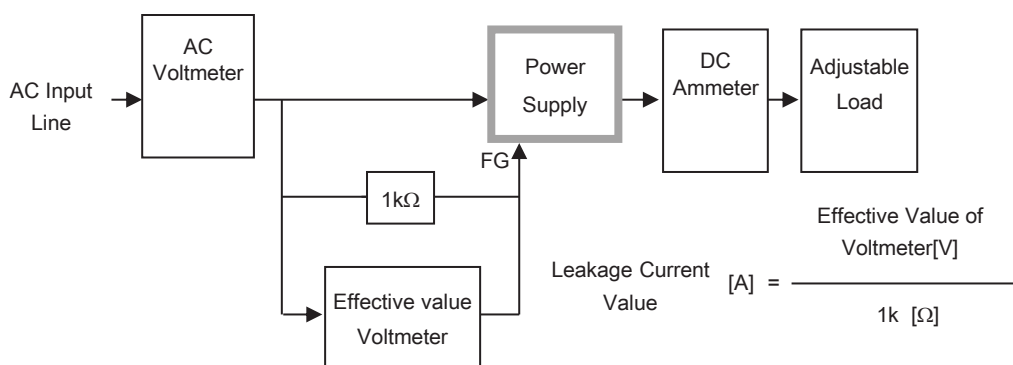


Figure B-1 (DEN-AN)

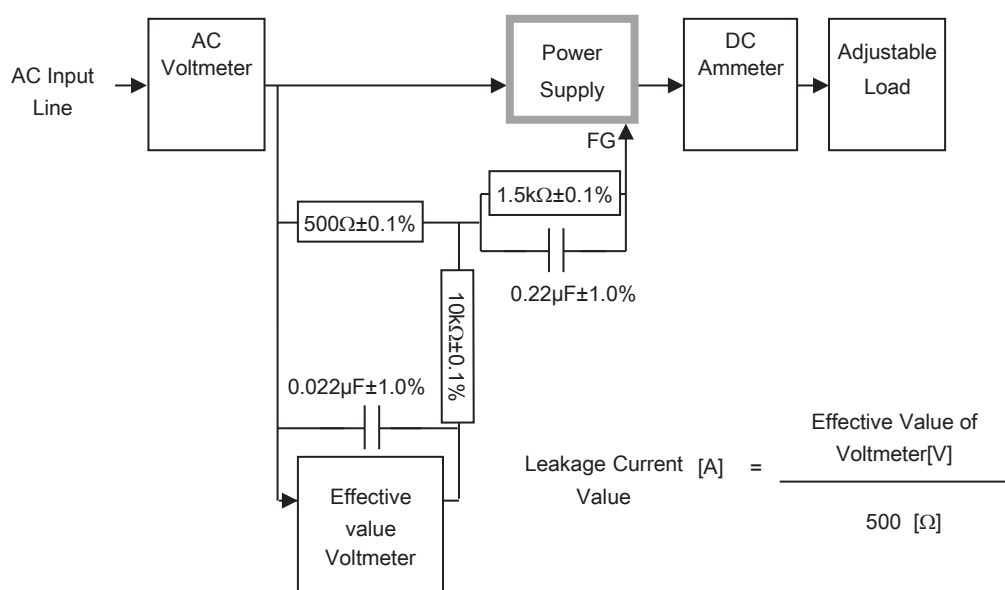


Figure B-2 (IEC62368-1 refer to IEC60990 Fig.4)

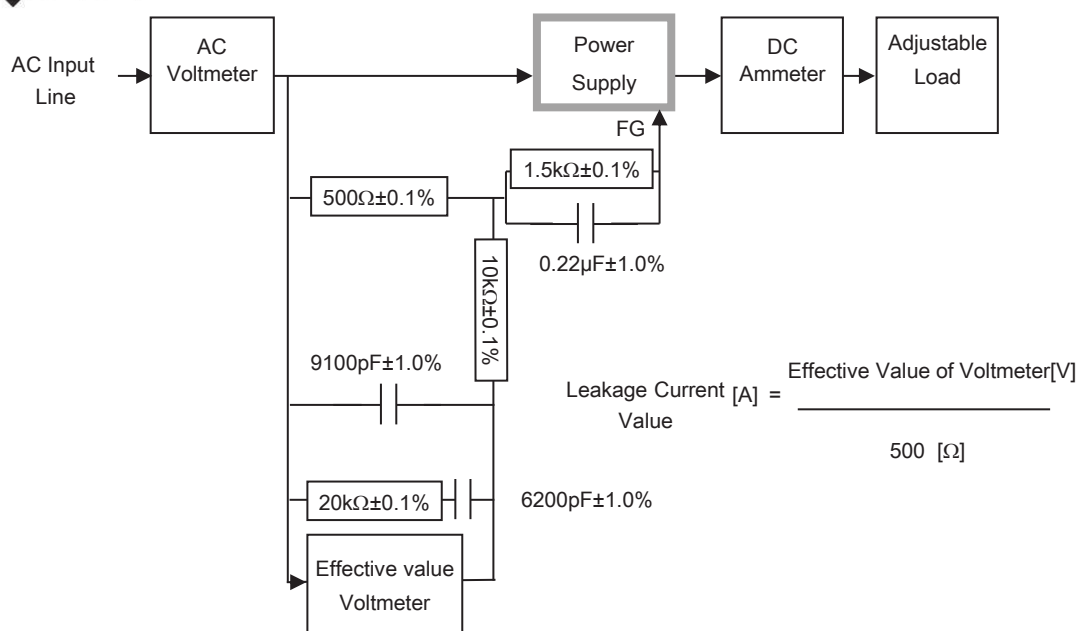


Figure B-3 (IEC62368-1 refer to IEC60990 Fig.5)

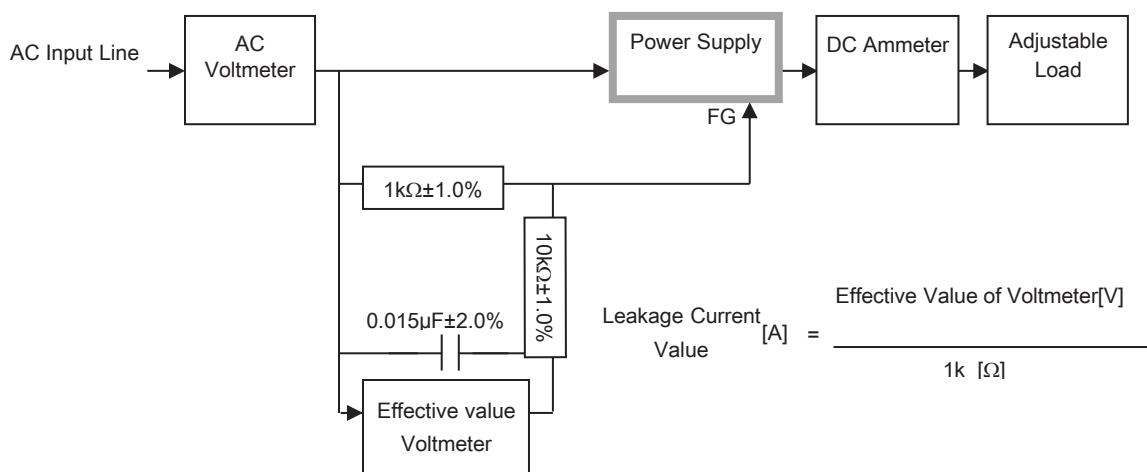


Figure B-4 (IEC60601-1)

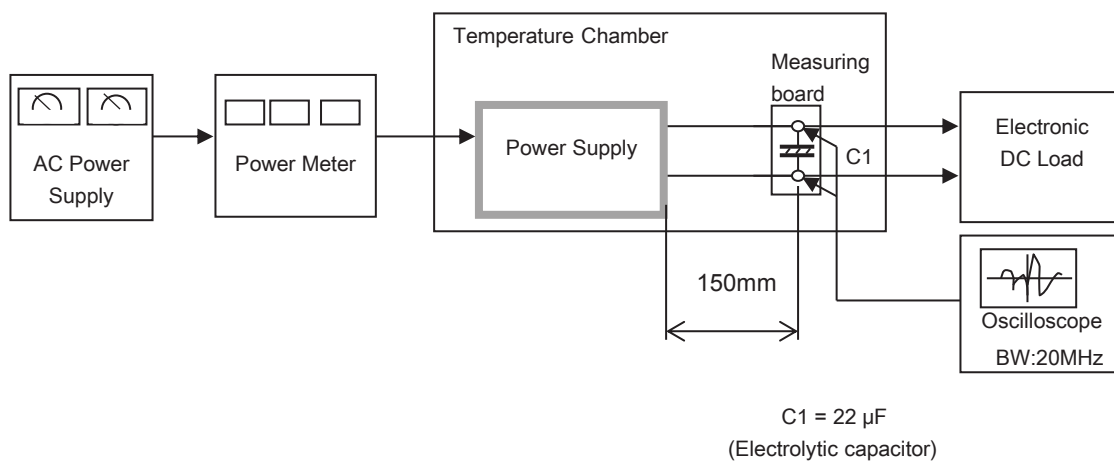


Figure C