

TEST DATA OF PJA1500F-48

Regulated DC Power Supply
May 2, 2017

Approved by : Katsumi Ishikawa Ishikawa
Katsumi Ishikawa Design Manager

Prepared by : Soshi Nakamura Nakamura
Soshi Nakamura Design Engineer

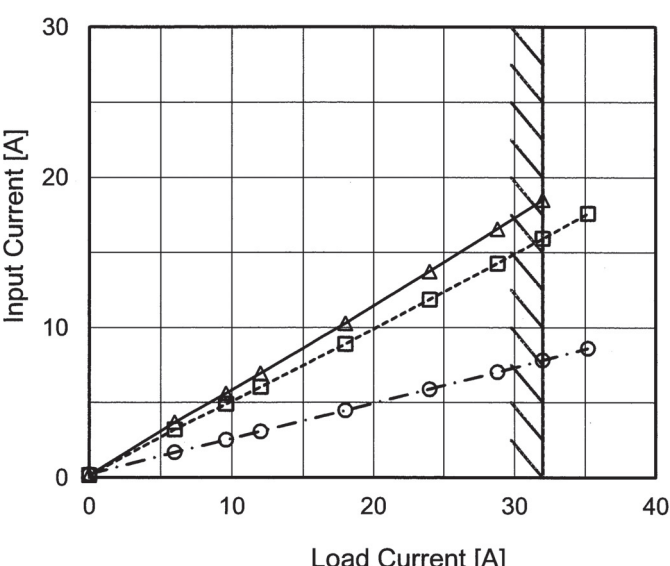
COSEL CO.,LTD.

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Model		PJA1500F-48																																																				
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1.Graph		2.Values																																																				
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Model		PJA1500F-48		Temperature Testing Circuitry	25°C Figure A																																																			
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Model		PJA1500F-48	
Item		Efficiency (by Input Voltage)	
Object			

1.Graph

Load 50%

Load 100%

Efficiency [%]

100

90

80

70

60

50

50

100

150

200

250

300

Input Voltage [V]

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

2.Values

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
85	84.7	83.8 ※1
100	85.5	84.7 ※2
115	86.2	85.2
200	87.6	87.7
230	88.1	88.1
264	88.5	88.6
280	88.8	88.8
--	-	-
--	-	-

※1:Load 80%

※2:Load 90%

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Model		PJA1500F-48		Temperature 25°C																																																				
Item		Efficiency (by Load Current)		Testing Circuitry Figure A																																																				
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Model		PJA1500F-48	
Item		Power Factor (by Input Voltage)	
Object			

1.Graph

Load 50%

Load 100%

Power Factor

1.0

0.9

0.8

0.7

0.6

0.5

0.4

50

100

150

200

250

300

Input Voltage [V]

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

2.Values

Input Voltage [V]	Power Factor	
	Load 50%	Load 100%
85	0.997	0.999 ※1
100	0.995	0.998 ※2
115	0.990	0.997
200	0.973	0.989
230	0.959	0.982
264	0.939	0.969
280	0.864	0.960
--	-	-
--	-	-

※1:Load 80%

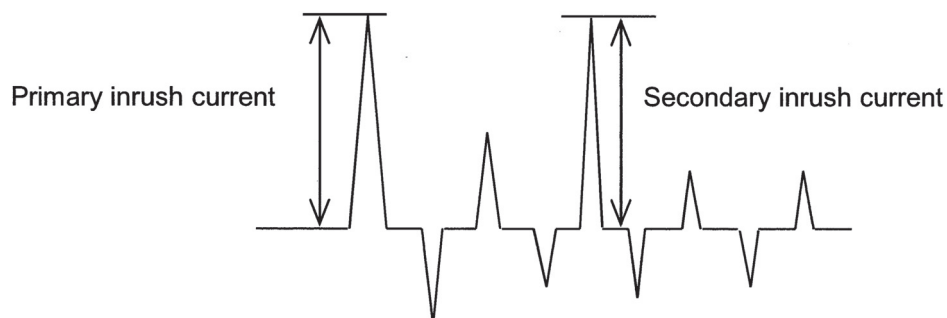
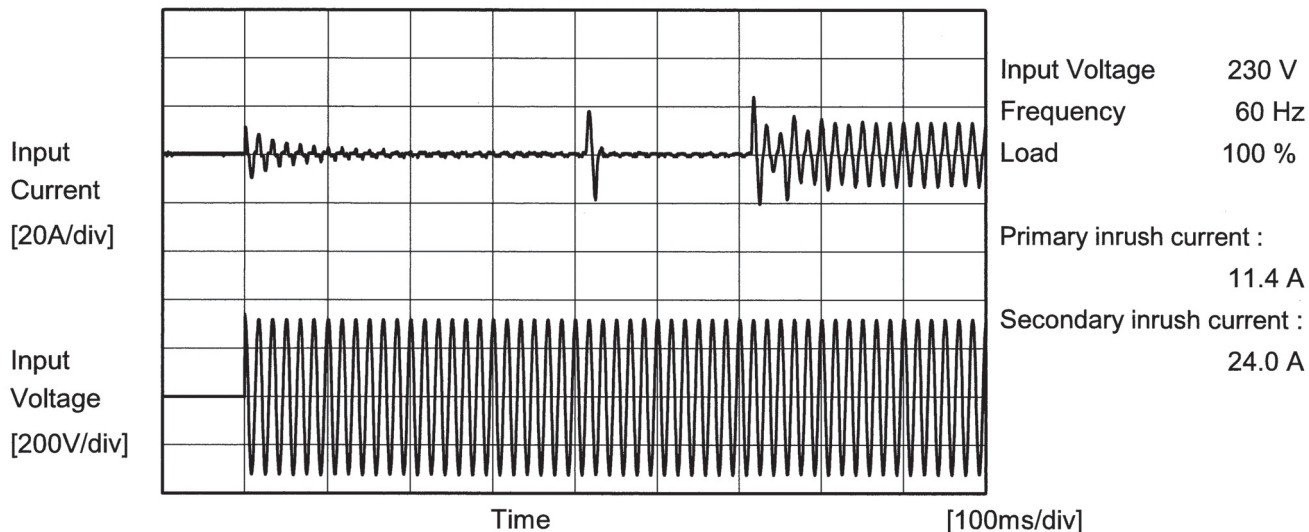
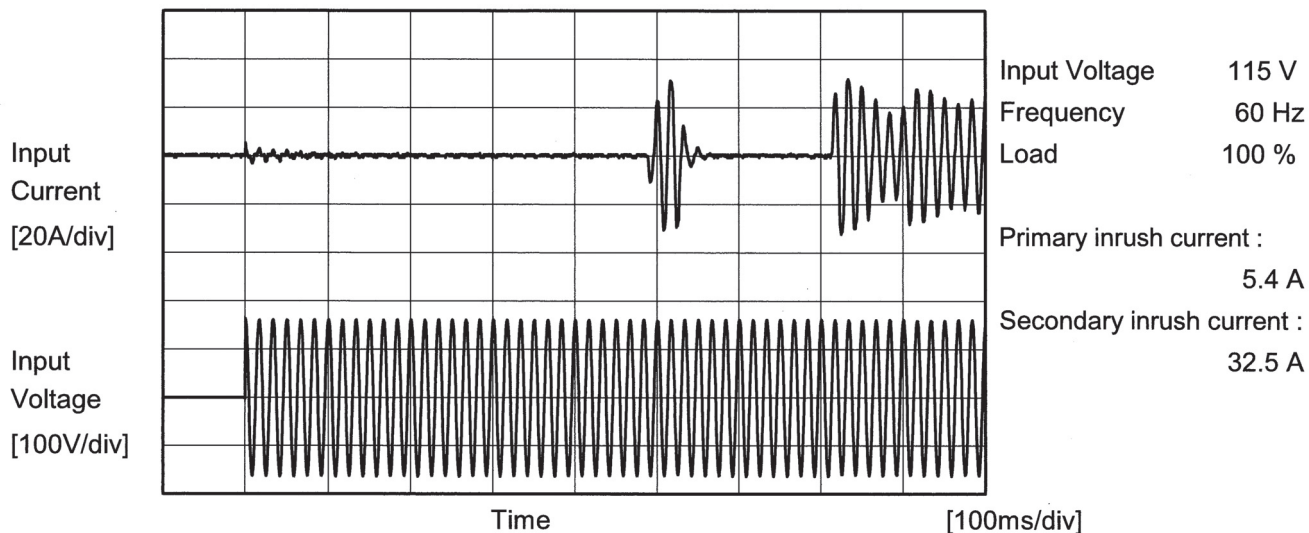
※2:Load 90%

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Model		PJA1500F-48	Temperature 25°C Testing Circuitry Figure A
Item		Inrush Current	
Object		_____	





Model		PJA1500F-48	Temperature 25°C Testing Circuitry Figure B
Item		Leakage Current	
Object		_____	

1.Results

[mA]

Standards	Testing Circuitry	Measuring Method	Input Volt.			Note
			100 [V]	115 [V]	240 [V]	
DEN-AN	Figure B-1	Both phases	0.42	0.46	0.89	Operation
		One of phases	0.57	0.66	1.50	Stand by
IEC62368-1	Figure B-2	Both phases	0.37	0.43	0.90	Operation
		One of phases	0.58	0.68	1.50	Stand by
	Figure B-3	Both phases	0.28	0.33	0.69	Operation
		One of phases	0.48	0.55	1.20	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		PJA1500F-48	
Item		Line Regulation	
Object		+48V32A	

1.Graph

□

Load 50%

△

Load 100%

Output Voltage [V]

50.00

49.00

48.00

47.00

46.00

50

100

150

200

250

300

Input Voltage [V]

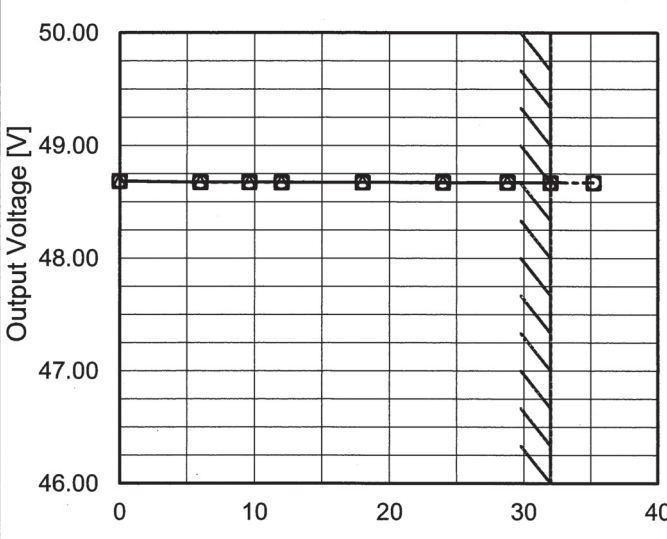
Note: Slanted line shows the range of the rated input voltage.

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
85	48.668	48.667 ※1
100	48.668	48.667 ※2
115	48.667	48.667
200	48.668	48.668
230	48.668	48.668
264	48.668	48.668
280	48.667	48.668
--	-	-
--	-	-

※1:Load 80%

※2:Load 90%

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Load Current [A]	Output Voltage [V]																																																							
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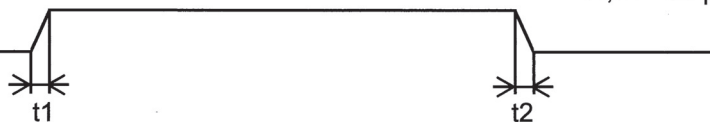
COSEL

Model	PJA1500F-48	Temperature	25°C
Item	Dynamic Load Response	Testing Circuitry	Figure A
Object	+48V32A		

Input Volt. 115 V
Cycle 1000 ms

$t_1, t_2 = 50 \mu s$ Typ

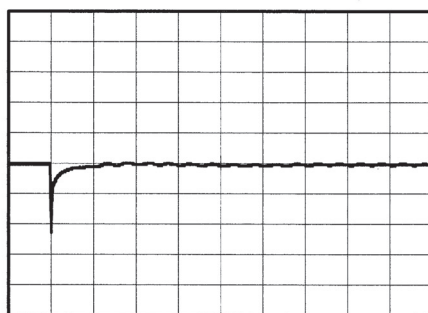
Load Current



Min.Load (0A) ←→
Load 100% (32A)

500 mV/div

20 ms/div

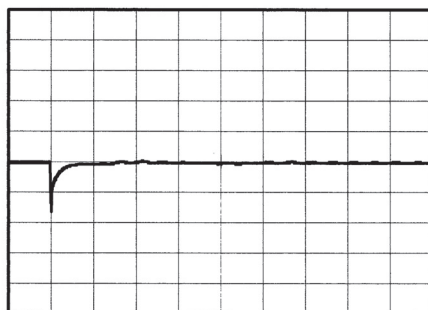


20 ms/div

Min.Load (0A) ←→
Load 50% (16A)

500 mV/div

20 ms/div



20 ms/div

COSEL

Model		PJA1500F-48	
Item		Ripple Voltage (by Load Current)	
Object		+48V32A	
1.Graph		2.Values	

—△— Input Volt. 115V
-·-○-·- Input Volt. 230V

Load Current [A]	Input Volt. 115 [V]	Input Volt. 230 [V]
0.0	30	30
6.0	45	45
9.6	50	50
12.0	50	50
18.0	60	60
24.0	70	70
28.8	75	70
32.0	90	80
35.2	90	85
--	-	-
--	-	-

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

Fig. Complex Ripple Wave Form

COSEL

Model		PJA1500F-48	Temperature Testing Circuitry	25°C Figure C
Item		Ripple-Noise		
Object		+48V32A		

1.Graph

—△—

Input Volt.

115V

-·-○-·-

Input Volt.

230V

Ripple-Noise [mV]

200

180

160

140

120

100

80

60

40

20

0

0

10

20

30

40

Load Current [A]

<

COSEL

Model		PJA1500F-48
Item		Ripple Voltage (by Ambient Temp.)
Object		+48V32A

1.Graph

</

COSEL

Model		PJA1500F-48	
Item		Ambient Temperature Drift	
Object		+48V32A	

1.Graph

△

Input Volt. 100V

□

Input Volt. 115V

○

Input Volt. 230V

Output Voltage [V]



COSEL		Testing Circuitry Figure A
Model	PJA1500F-48	
Item	Output Voltage Accuracy	
Object	+48V32A	

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 : -20 - 50°C

Input Voltage : 115 - 264V

Load Current : 0 - 32A

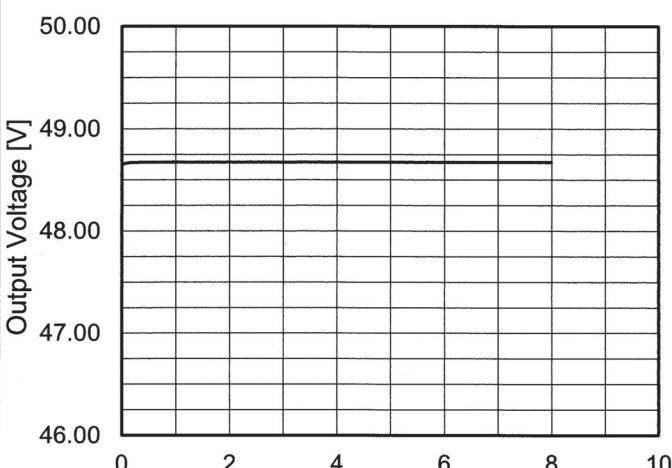
* Output Voltage Accuracy = $\pm(\text{Maximum of Output Voltage} - \text{Minimum of Output Voltage}) / 2$

* 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	50	264	0	48.712	±154	±0.3
Minimum Voltage	-20	115	32	48.405		

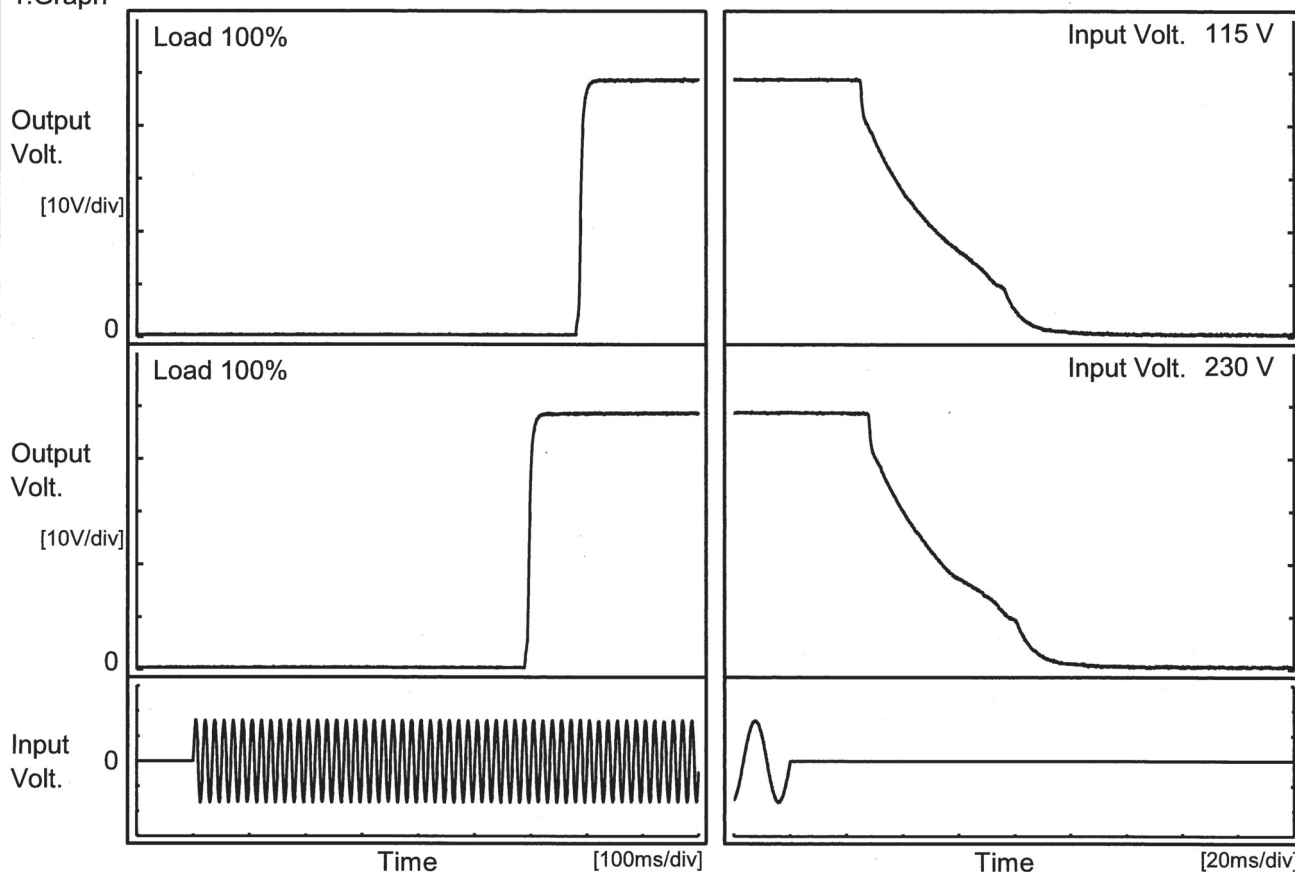
COSEL

LUCEL																									
Model	PJA1500F-48																								
Item	Time Lapse Drift	Temperature	25°C																						
Object	+48V32A	Testing Circuitry	Figure A																						
1.Graph		2.Values																							
<div><p>Output Voltage [V]</p><p>Time [H]</p><p>Input Volt. 230V</p><p>Load 100%</p></div>		<table><thead><tr><th>Time since start [H]</th><th>Output Voltage [V]</th></tr></thead><tbody><tr><td>0.0</td><td>48.649</td></tr><tr><td>0.5</td><td>48.673</td></tr><tr><td>1.0</td><td>48.673</td></tr><tr><td>2.0</td><td>48.673</td></tr><tr><td>3.0</td><td>48.673</td></tr><tr><td>4.0</td><td>48.673</td></tr><tr><td>5.0</td><td>48.673</td></tr><tr><td>6.0</td><td>48.673</td></tr><tr><td>7.0</td><td>48.673</td></tr><tr><td>8.0</td><td>48.673</td></tr></tbody></table>		Time since start [H]	Output Voltage [V]	0.0	48.649	0.5	48.673	1.0	48.673	2.0	48.673	3.0	48.673	4.0	48.673	5.0	48.673	6.0	48.673	7.0	48.673	8.0	48.673
Time since start [H]	Output Voltage [V]																								
0.0	48.649																								
0.5	48.673																								
1.0	48.673																								
2.0	48.673																								
3.0	48.673																								
4.0	48.673																								
5.0	48.673																								
6.0	48.673																								
7.0	48.673																								
8.0	48.673																								
* The characteristic of AC115V is equal.																									

COSEL

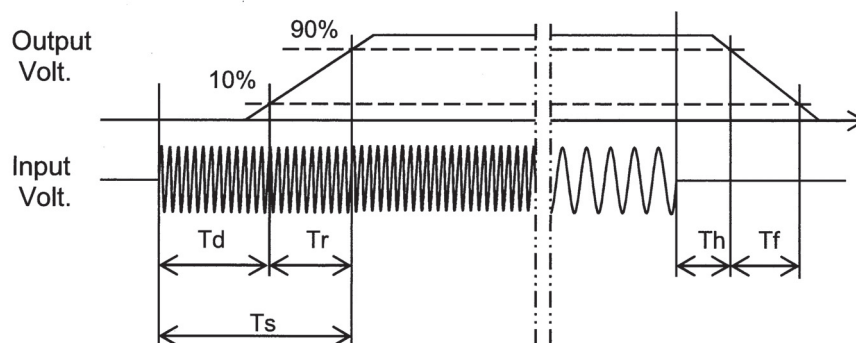
Model	PJA1500F-48	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+48V32A		

1.Graph



2.Values

Input Volt.	Time	Td	Tr	Ts	Th	Tf
115 V		686.0	10.0	696.0	25.7	54.5
230 V		594.0	10.0	604.0	28.5	56.0



COSEL

Model		PJA1500F-48	Temperature 25°C Testing Circuitry Figure A																																
Item		Hold-Up Time																																	
Object		+48V32A																																	
1.Graph		<div><div><div>---</div><div>□</div><div>---</div></div><div>Load 50%</div><div><div>---</div><div>△</div><div>---</div></div><div>Load 100%</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>85</td><td>51</td><td>31 ※1</td></tr><tr><td>100</td><td>53</td><td>27 ※2</td></tr><tr><td>115</td><td>54</td><td>25</td></tr><tr><td>200</td><td>59</td><td>27</td></tr><tr><td>230</td><td>59</td><td>28</td></tr><tr><td>264</td><td>59</td><td>28</td></tr><tr><td>280</td><td>59</td><td>28</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></tbody></table>	Input Voltage [V]	Hold-Up Time [ms]		Load 50%	Load 100%	85	51	31 ※1	100	53	27 ※2	115	54	25	200	59	27	230	59	28	264	59	28	280	59	28	--	-	-	--	-	-	2.Values
Input Voltage [V]	Hold-Up Time [ms]																																		
	Load 50%	Load 100%																																	
85	51	31 ※1																																	
100	53	27 ※2																																	
115	54	25																																	
200	59	27																																	
230	59	28																																	
264	59	28																																	
280	59	28																																	
--	-	-																																	
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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.																																			
		※1:Load 80%	※2:Load 90%																																

COSEL

Model		PJA1500F-48		Temperature 25°C																																																				
Item		Instantaneous Interruption Compensation		Testing Circuitry Figure A																																																				
Object		+48V32A																																																						
1.Graph		<div><div><div>—△—</div><div>Input Volt. 100V</div></div><div><div>---□---</div><div>Input Volt. 115V</div></div><div><div>---○---</div><div>Input Volt. 230V</div></div></div> <p>Instantaneous Compensation Time [ms]</p> <p>Load Current [A]</p>		2.Values																																																				
		<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. 115[V]</th><th>Input Volt. 230[V]</th></tr><tr><td>0.0</td><td>-</td><td>-</td><td>-</td></tr><tr><td>6.0</td><td>20</td><td>29</td><td>45</td></tr><tr><td>9.6</td><td>19</td><td>27</td><td>36</td></tr><tr><td>12.0</td><td>19</td><td>26</td><td>30</td></tr><tr><td>18.0</td><td>19</td><td>26</td><td>26</td></tr><tr><td>24.0</td><td>19</td><td>26</td><td>26</td></tr><tr><td>28.8</td><td>19</td><td>25</td><td>25</td></tr><tr><td>32.0</td><td>19</td><td>23</td><td>23</td></tr><tr><td>35.2</td><td>-</td><td>21</td><td>21</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. 115[V]	Input Volt. 230[V]	0.0	-	-	-	6.0	20	29	45	9.6	19	27	36	12.0	19	26	30	18.0	19	26	26	24.0	19	26	26	28.8	19	25	25	32.0	19	23	23	35.2	-	21	21	--	-	-	-	--	-	-	-
Load Current [A]	Time [ms]																																																							
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--	-	-	-																																																					
Note: Slanted line shows the range of the rated load current.																																																								

COSEL

Model		PJA1500F-48
Item		Minimum Input Voltage for Regulated Output Voltage
Object		+48V32A

1.Graph

Load 50%

Load 100%

Input Voltage [V]

COSEL

Model		PJA1500F-48		Temperature		25°C																																													
Item		Overcurrent Protection		Testing Circuitry		Figure A																																													
Object		+48V32A																																																	
1.Graph				2.Values																																															
<div><div><div></div><div>Input Volt. 115V</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>				<table><tr><th rowspan="2">Output Voltage [V]</th><th colspan="2">Load Current [A]</th></tr><tr><th>Input Volt. 115[V]</th><th>Input Volt. 230[V]</th></tr><tr><td>45.6</td><td>37.24</td><td>37.30</td></tr><tr><td>43.2</td><td>37.14</td><td>37.16</td></tr><tr><td>38.4</td><td>37.31</td><td>37.45</td></tr><tr><td>33.6</td><td>37.48</td><td>37.51</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><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. 115[V]	Input Volt. 230[V]	45.6	37.24	37.30	43.2	37.14	37.16	38.4	37.31	37.45	33.6	37.48	37.51	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-
Output Voltage [V]	Load Current [A]																																																		
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COSEL

Model		PJA1500F-48
Item		Overvoltage Protection
Object		+48V32A

1.Graph

△

Input Volt. 115V

□

Input Volt. 230V

Operating Point [V]

60

59

58

57

-50

-10

30

70

Ambient Temperature [°C]

Load 0%

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

2.Values

Ambient Temperature [°C]	Operating Point [V]	
	Input Volt. 115[V]	Input Volt. 230[V]
-30	59.39	58.86
-20	59.38	58.85
-10	59.37	58.79
0	59.37	58.79
10	59.37	58.78
25	59.37	58.78
30	59.37	58.78
40	59.37	58.78
50	59.37	58.78
60	59.37	58.78
--	-	-

COSEL

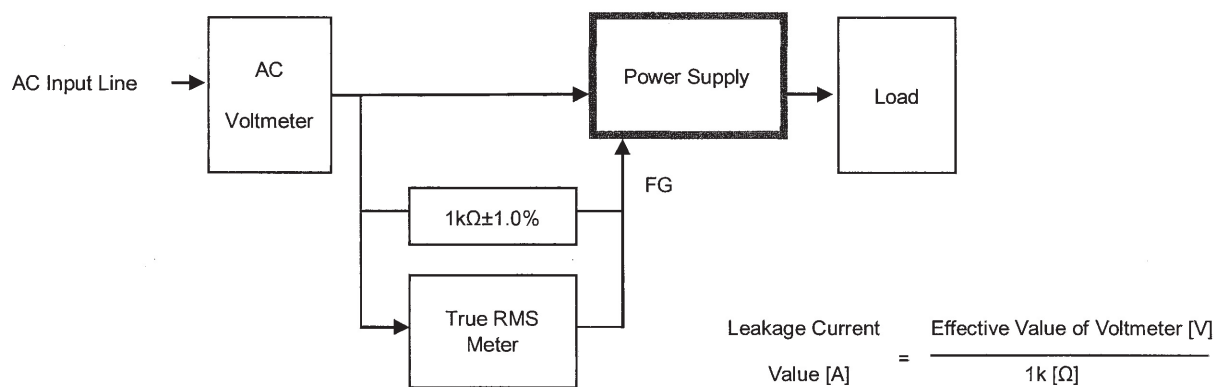
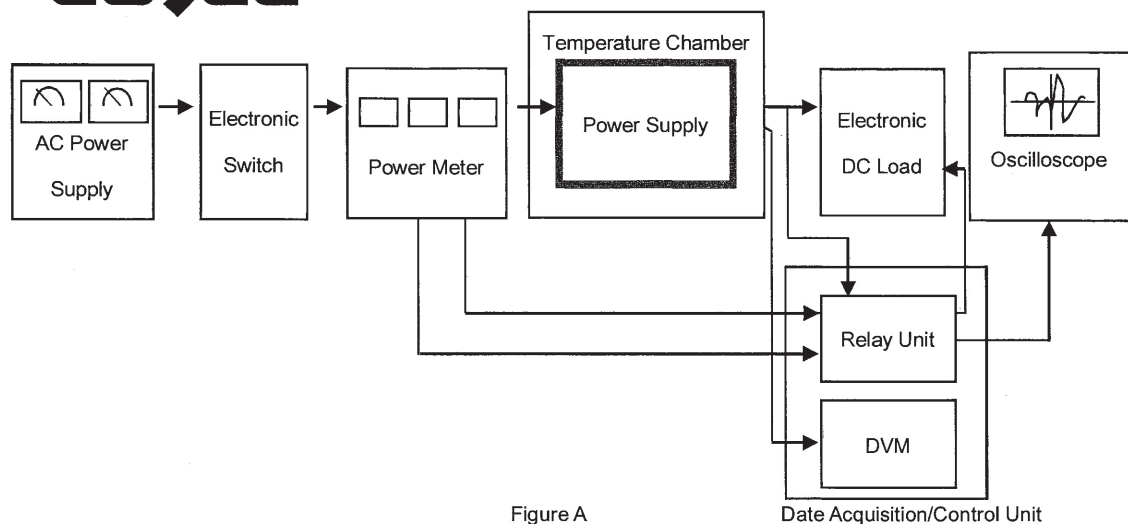


Figure B-1 (DEN-AN)

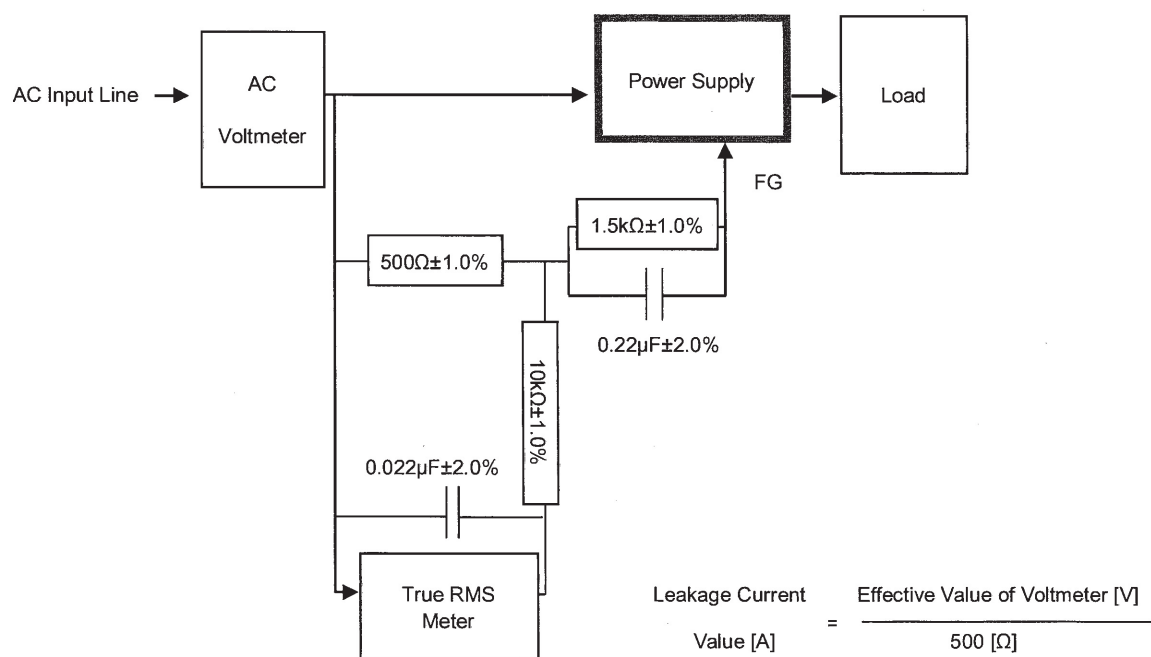


Figure B-2 (IEC62368-1 refer to IEC60990 Fig.4)

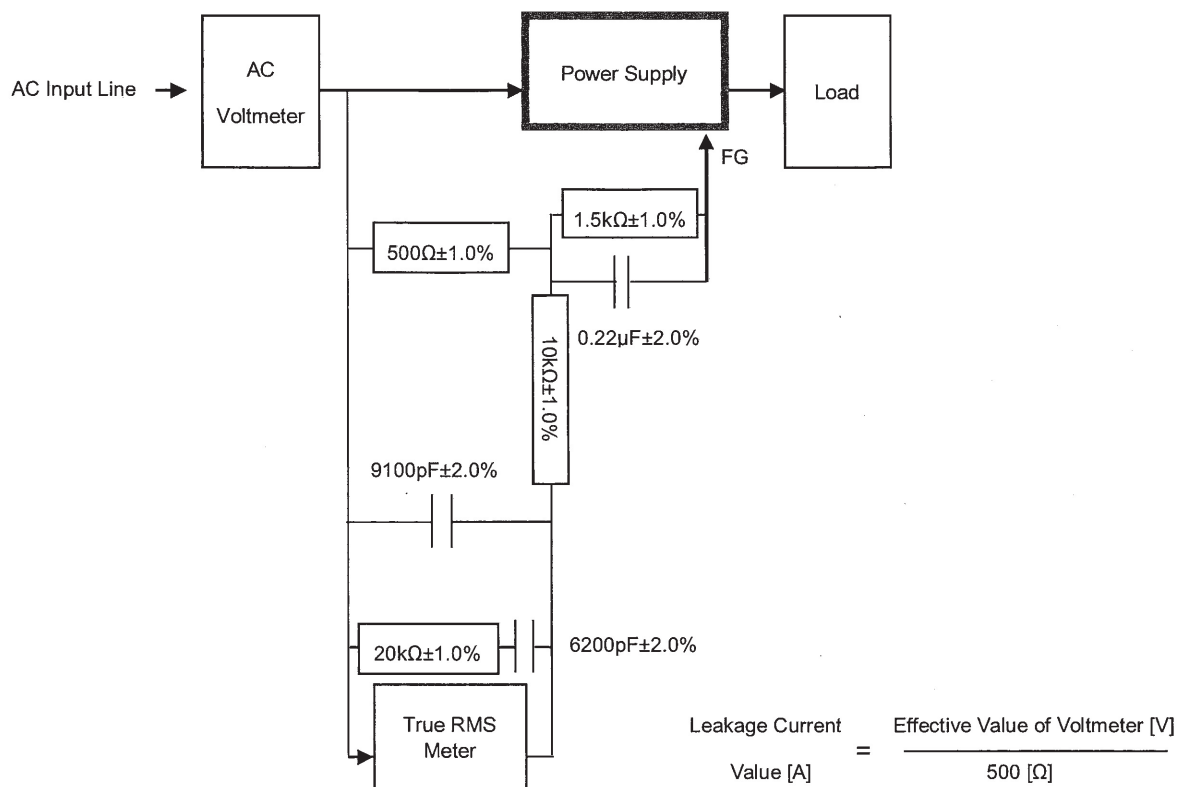


Figure B-3 (IEC62368-1 refer to IEC60990 Fig.5)

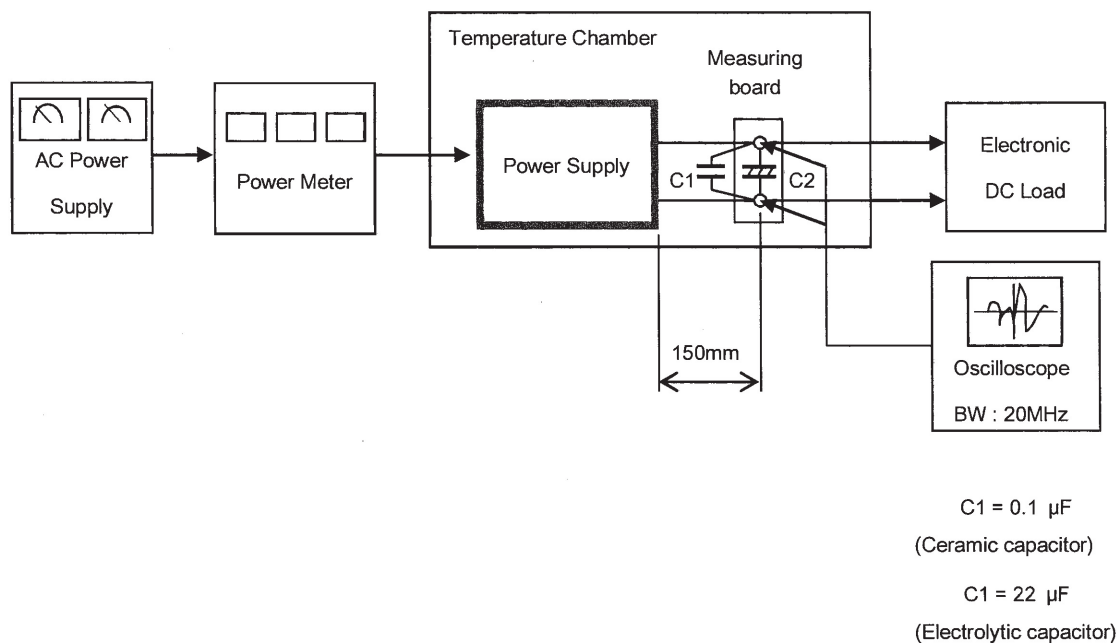


Figure C