



TEST DATA OF PJMA1000F-24

Regulated DC Power Supply
January 21, 2021

Approved by :

A handwritten signature in black ink that reads "Takashi Kajii".

Takashi Kajii

Design Manager

Prepared by :

A handwritten signature in black ink that reads "Ryo Takahashi".

Ryo Takahashi

Design Engineer

COSEL CO.,LTD.



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(Final Page 24)

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Model	PJMA1000F-24	Temperature Testing Circuitry	25°C Figure A																																																			
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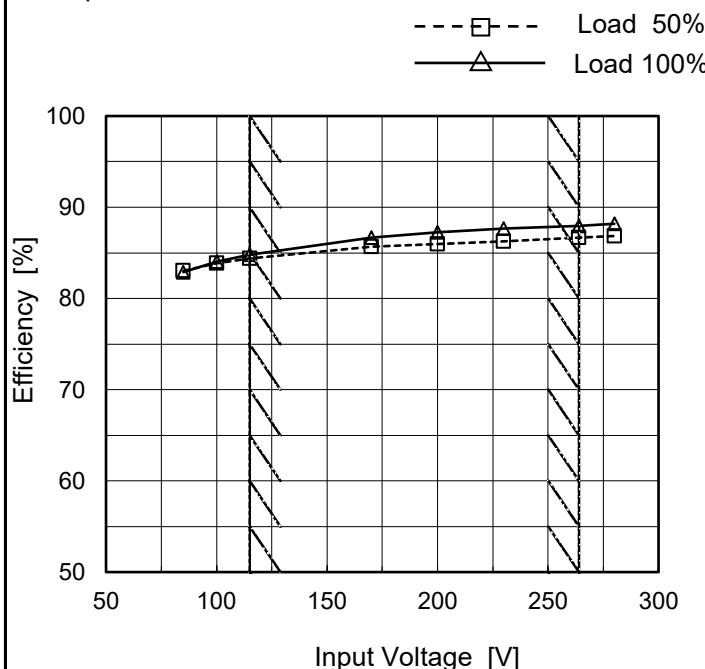
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Model	PJMA1000F-24
Item	Efficiency (by Input Voltage)
Object	_____

1.Graph


 Temperature 25°C
 Testing Circuitry Figure A

2.Values

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
85	83.0	82.9 ※1
100	83.9	84.0 ※2
115	84.4	84.8
170	85.7	86.7
200	86.0	87.3
230	86.2	87.6
264	86.7	88.0
280	86.8	88.2
--	-	-

※1: Load 80%

※2: Load 90%

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

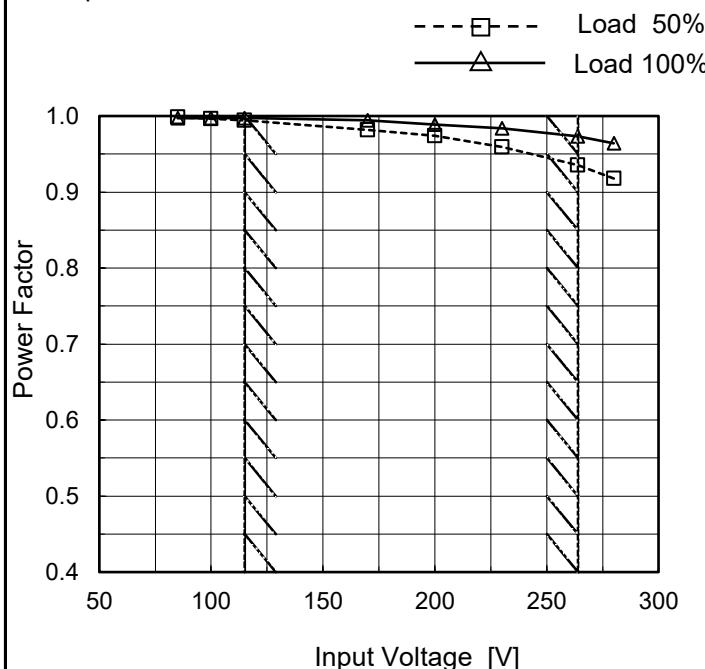
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Object	_____

1.Graph


 Temperature 25°C
 Testing Circuitry Figure A

2.Values

Input Voltage [V]	Power Factor	
	Load 50%	Load 100%
85	0.998	0.997 ※1
100	0.996	0.997 ※2
115	0.995	0.998
170	0.982	0.994
200	0.974	0.989
230	0.959	0.984
264	0.935	0.973
280	0.918	0.964
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※1: Load 80%

※2: Load 90%

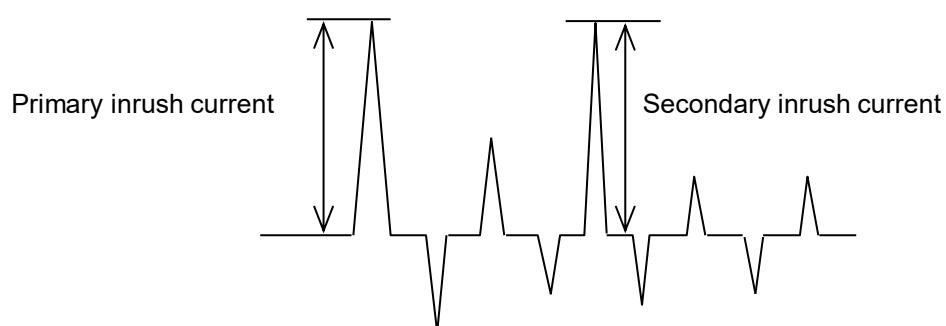
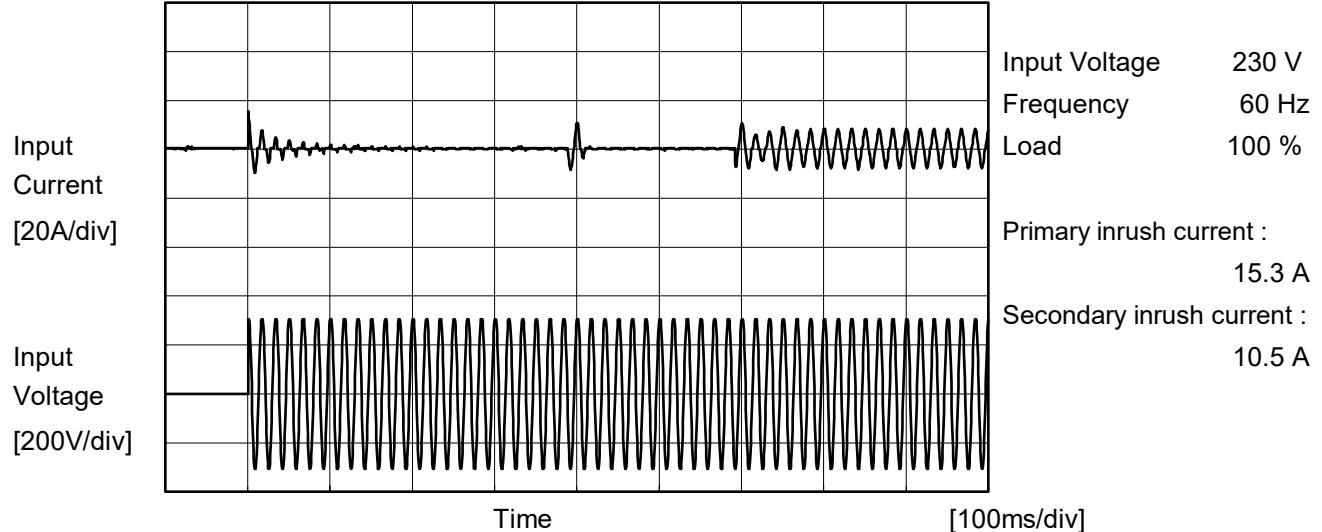
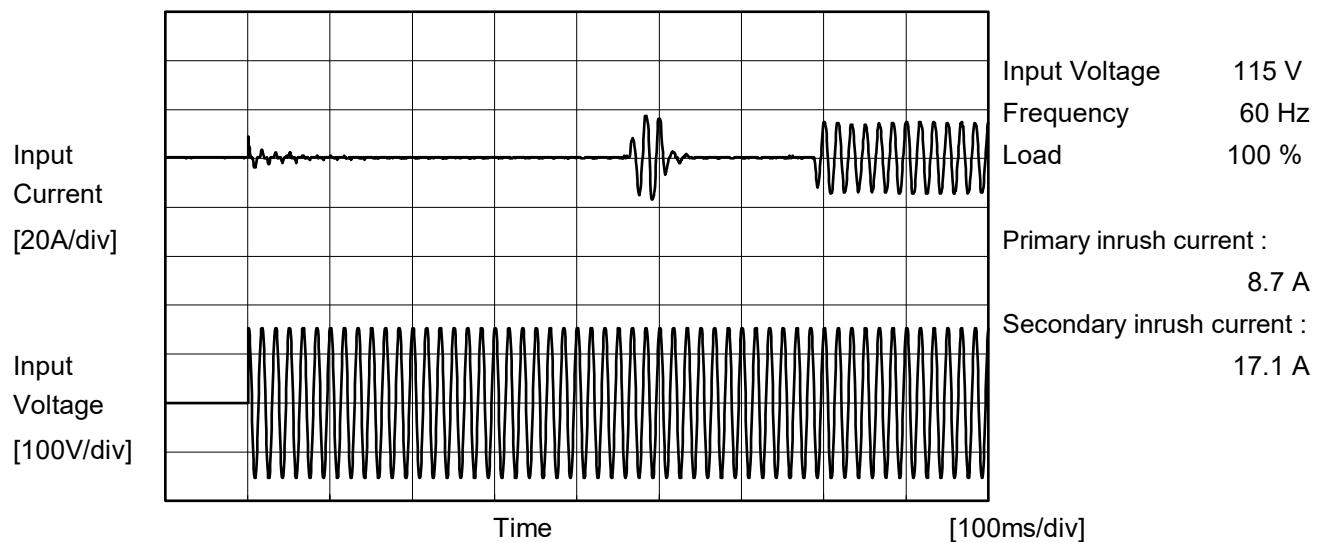
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Model	PJMA1000F-24	Temperature	25°C
Item	Inrush Current	Testing Circuitry	Figure A
Object	_____		





Model	PJMA1000F-24	Temperature	25°C
Item	Leakage Current	Testing Circuitry	Figure B
Object	<hr/>		

1. Results

Standards		Input Volt.			Note
		100 [V]	115 [V]	240 [V]	
IEC60601-1	Both phases	0.11	0.10	0.25	Operation
	One of phases	0.18	0.22	0.49	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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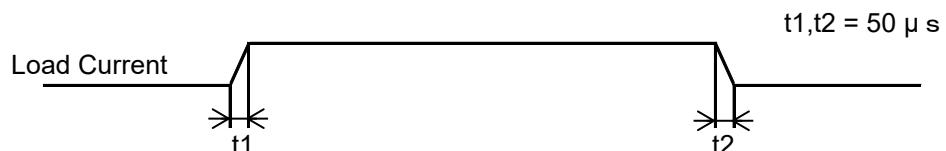
Note: Slanted line shows the range of the rated input voltage.

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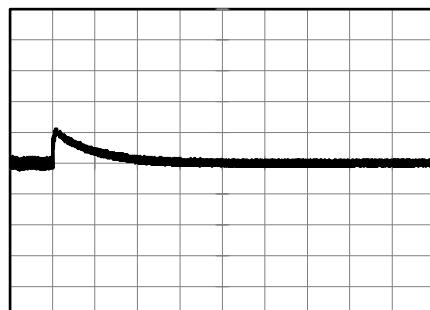
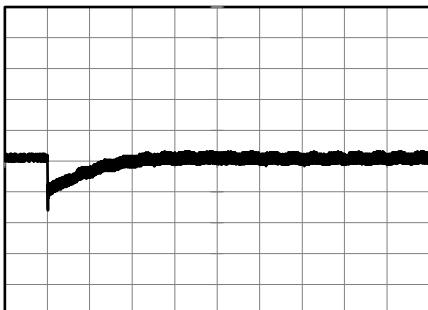
Model	PJMA1000F-24	Temperature Testing Circuitry	25°C Figure A																																																			
Item	Load Regulation																																																					
Object	+24V42A																																																					
1.Graph	<p>—△— Input Volt. 100V - - - □ - - Input Volt. 115V - - ○ - - Input Volt. 230V</p>																																																					
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Load Current [A]	Output Voltage [V]																																																					
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COSEL

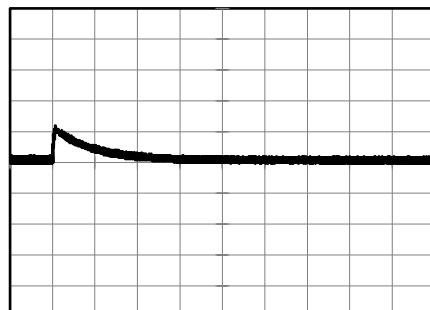
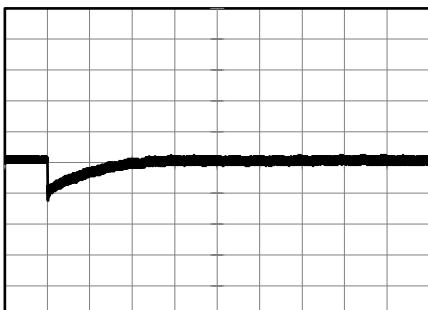
Model	PJMA1000F-24
Item	Dynamic Load Response
Object	+24V42A

Temperature 25°C
Testing Circuitry Figure AInput Volt. 115 V
Cycle 1000 msMin.Load (0A)↔
Load 100% (42A)

200mV/div

Min.Load (0A)↔
Load 50% (21A)

200mV/div



COSEL

Model	PJMA1000F-24																																							
Item	Ripple Voltage (by Load Current)	Temperature Testing Circuitry 25°C Figure C																																						
Object	+24V42A																																							
1.Graph																																								
<p>Graph showing Ripple Voltage [mV] vs Load Current [A]. The graph shows two curves: one for Input Volt. 115V (solid line with triangle markers) and one for Input Volt. 230V (dashed line with circle markers). The x-axis represents Load Current [A] from 0 to 50. The y-axis represents Ripple Voltage [mV] from 0 to 250. A vertical dashed line is drawn at approximately 42 A, indicating the rated load current range.</p> <table border="1"> <thead> <tr> <th>Load Current [A]</th> <th>Ripple Voltage [mV] (Input Volt. 115V)</th> <th>Ripple Voltage [mV] (Input Volt. 230V)</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>15</td><td>10</td></tr> <tr><td>10.5</td><td>20</td><td>25</td></tr> <tr><td>21.0</td><td>20</td><td>25</td></tr> <tr><td>31.5</td><td>30</td><td>30</td></tr> <tr><td>42.0</td><td>35</td><td>30</td></tr> <tr><td>46.2</td><td>25</td><td>35</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> </tbody> </table>			Load Current [A]	Ripple Voltage [mV] (Input Volt. 115V)	Ripple Voltage [mV] (Input Volt. 230V)	0.0	15	10	10.5	20	25	21.0	20	25	31.5	30	30	42.0	35	30	46.2	25	35	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-		
Load Current [A]	Ripple Voltage [mV] (Input Volt. 115V)	Ripple Voltage [mV] (Input Volt. 230V)																																						
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Load Current [A]	Ripple Voltage [mV]																																							
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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>Fig. Complex Ripple Wave Form</p>																																								

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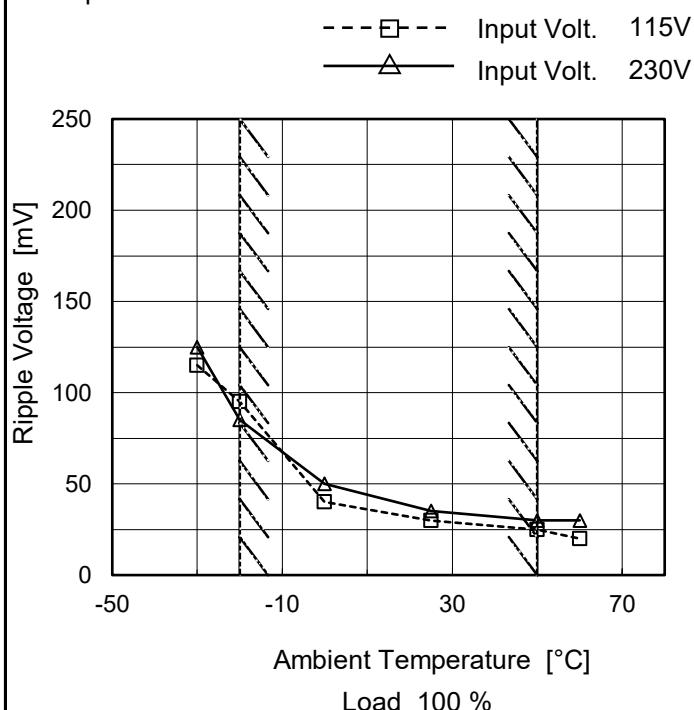
Model	PJMA1000F-24	Temperature Testing Circuitry	25°C Figure C																																						
Item	Ripple-Noise																																								
Object	+24V42A																																								
1. Graph			2. Values																																						
<p>Graph showing Ripple-Noise [mV] vs Load Current [A]. The Y-axis ranges from 0 to 250 mV, and the X-axis ranges from 0 to 50 A. Two curves are plotted: Input Volt. 115V (solid line with triangle markers) and Input Volt. 230V (dashed line with circle markers). Both curves show a slight increase in noise as load current increases from 0 to 40A, followed by a sharp rise at the rated load current of 42A. A vertical dashed line marks the rated load current at 42A.</p>			<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="2">Ripple-Noise [mV]</th> </tr> <tr> <th>Input Volt. 115 [V]</th> <th>Input Volt. 230 [V]</th> </tr> </thead> <tbody> <tr> <td>0.0</td> <td>20</td> <td>20</td> </tr> <tr> <td>10.5</td> <td>20</td> <td>25</td> </tr> <tr> <td>21.0</td> <td>40</td> <td>30</td> </tr> <tr> <td>31.5</td> <td>35</td> <td>25</td> </tr> <tr> <td>42.0</td> <td>35</td> <td>35</td> </tr> <tr> <td>46.2</td> <td>35</td> <td>35</td> </tr> <tr> <td>--</td> <td>-</td> <td>-</td> </tr> </tbody> </table>	Load Current [A]	Ripple-Noise [mV]		Input Volt. 115 [V]	Input Volt. 230 [V]	0.0	20	20	10.5	20	25	21.0	40	30	31.5	35	25	42.0	35	35	46.2	35	35	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-
Load Current [A]	Ripple-Noise [mV]																																								
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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>Diagram illustrating the complex Ripple Wave Form. The diagram shows a waveform with two distinct components: T1, which is the high-frequency noise component, and T2, which is the low-frequency switching component. The total Ripple-Noise is indicated as [mVp-p].</p>																																									

Fig. Complex Ripple Wave Form

COSEL

Model	PJMA1000F-24
Item	Ripple Voltage (by Ambient Temp.)
Object	+24V42A

1. Graph



Measured by 20 MHz Oscilloscope.

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

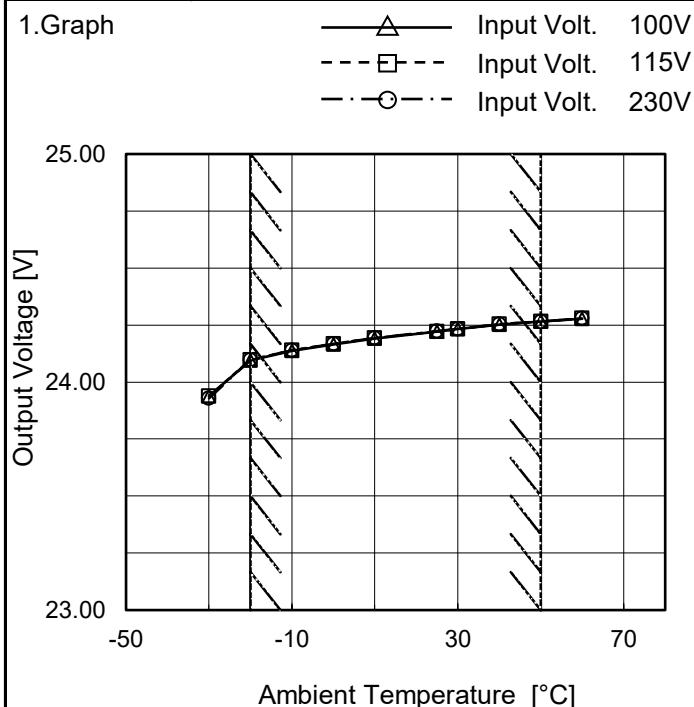
Testing Circuitry Figure C

2. Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Input Volt. 115 [V]	Input Volt. 230 [V]
-30	115	125
-20	95	85
0	40	50
25	30	35
50	25	30
60	20	30
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	PJMA1000F-24
Item	Ambient Temperature Drift
Object	+24V42A



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]
-30	23.938	23.938	23.929
-20	24.096	24.097	24.098
-10	24.138	24.139	24.140
0	24.166	24.167	24.167
10	24.191	24.192	24.193
25	24.221	24.222	24.222
30	24.233	24.233	24.234
40	24.252	24.253	24.253
50	24.266	24.266	24.267
60	24.278	24.279	24.279
--	-	-	-

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



Model	PJMA1000F-24
Item	Output Voltage Accuracy
Object	+24V42A

Testing Circuitry Figure A

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 - 42A

* 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	50	230	0	24.268	±86	±0.4
Minimum Voltage	-20	115	42	24.097		

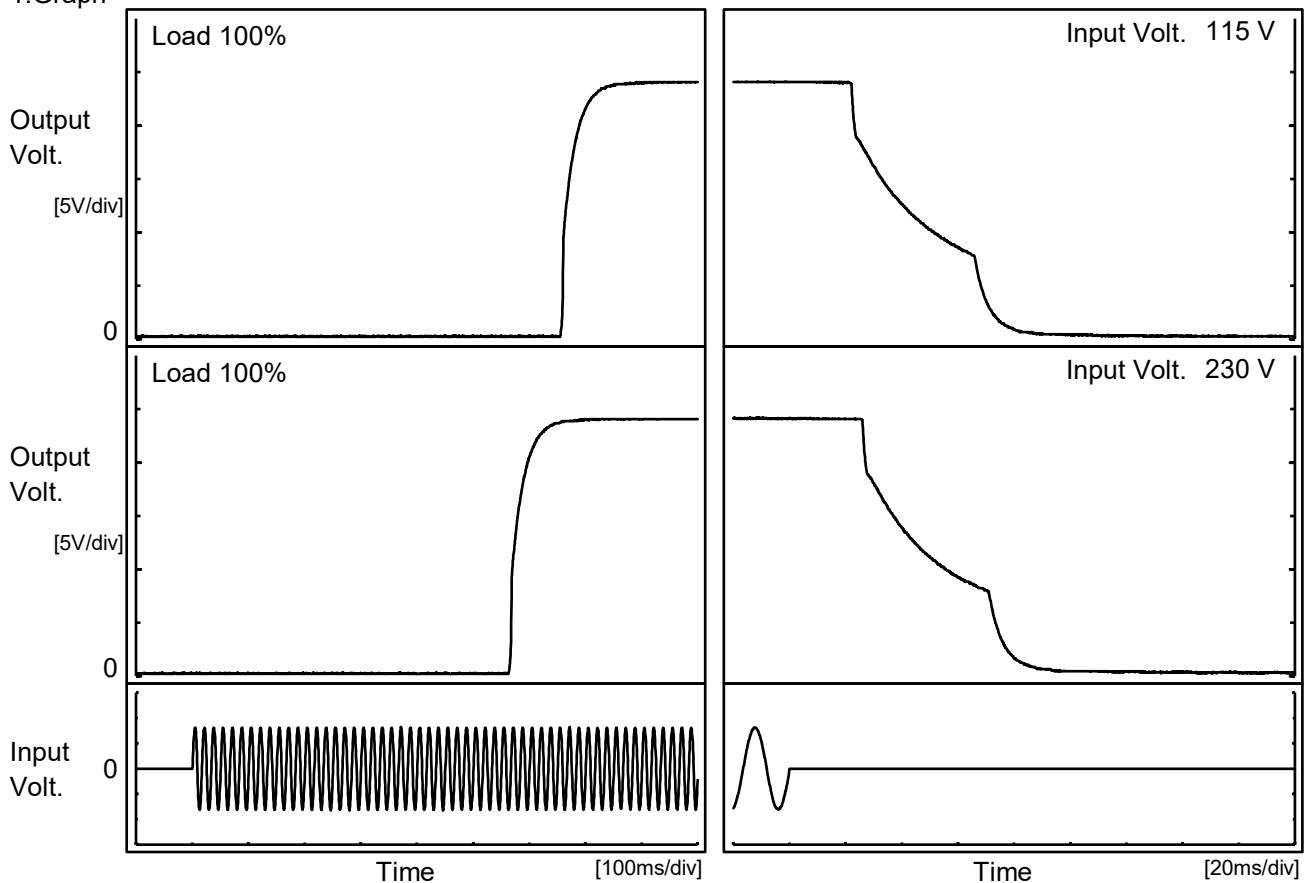
COSEL

Model	PJMA1000F-24	Temperature Testing Circuitry	25°C Figure A																						
Item	Time Lapse Drift																								
Object	+24V42A																								
1.Graph			2.Values																						
<p>Output Voltage [V]</p> <p>Time [H]</p> <p>Input Volt. 115V 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>24.115</td></tr> <tr><td>0.5</td><td>24.129</td></tr> <tr><td>1.0</td><td>24.130</td></tr> <tr><td>2.0</td><td>24.130</td></tr> <tr><td>3.0</td><td>24.130</td></tr> <tr><td>4.0</td><td>24.129</td></tr> <tr><td>5.0</td><td>24.129</td></tr> <tr><td>6.0</td><td>24.129</td></tr> <tr><td>7.0</td><td>24.129</td></tr> <tr><td>8.0</td><td>24.129</td></tr> </tbody> </table>	Time since start [H]	Output Voltage [V]	0.0	24.115	0.5	24.129	1.0	24.130	2.0	24.130	3.0	24.130	4.0	24.129	5.0	24.129	6.0	24.129	7.0	24.129	8.0	24.129
Time since start [H]	Output Voltage [V]																								
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8.0	24.129																								

COSEL

Model	PJMA1000F-24	Temperature Testing Circuitry	25°C
Item	Rise and Fall Time		Figure A
Object	+24V42A		

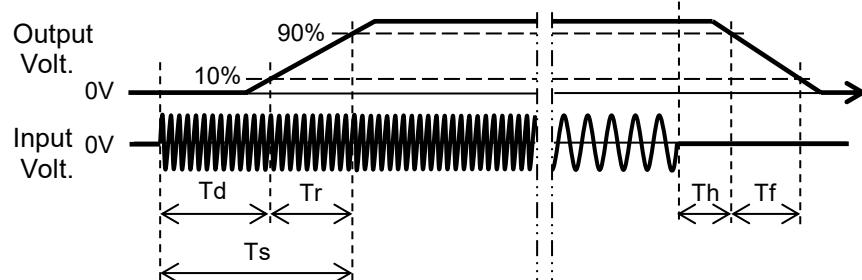
1.Graph



2.Values

[ms]

Input Volt.	Time	Td	Tr	Ts	Th	Tf
115 V		659.0	43.5	702.5	22.5	49.5
230 V		567.5	43.0	610.5	26.5	50.7



COSEL

Model	PJMA1000F-24	Temperature Testing Circuitry	25°C Figure A																																
Item	Hold-Up Time																																		
Object	+24V42A																																		
1.Graph			2.Values																																
<p>Graph showing Hold-Up Time [ms] vs Input Voltage [V] for PJMA1000F-24 at 25°C. The Y-axis is logarithmic from 1 to 1000 ms. The X-axis ranges from 50 to 300 V. Two curves are shown: Load 50% (dashed line with squares) and Load 100% (solid line with triangles). Both curves show a minimum hold-up time around 120-130V and a sharp increase above 250V. 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>49</td> <td>29 ※1</td> </tr> <tr> <td>100</td> <td>50</td> <td>26 ※2</td> </tr> <tr> <td>115</td> <td>51</td> <td>23</td> </tr> <tr> <td>170</td> <td>53</td> <td>25</td> </tr> <tr> <td>200</td> <td>55</td> <td>25</td> </tr> <tr> <td>230</td> <td>57</td> <td>26</td> </tr> <tr> <td>264</td> <td>57</td> <td>27</td> </tr> <tr> <td>280</td> <td>57</td> <td>27</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	49	29 ※1	100	50	26 ※2	115	51	23	170	53	25	200	55	25	230	57	26	264	57	27	280	57	27	--	-	-
Input Voltage [V]	Hold-Up Time [ms]																																		
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230	57	26																																	
264	57	27																																	
280	57	27																																	
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<p>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.</p>																																			

COSEL

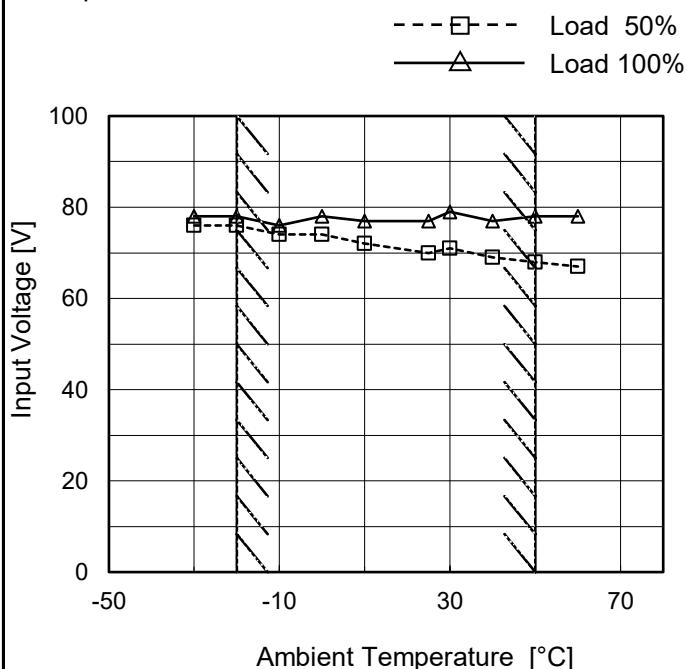
Model	PJMA1000F-24	Temperature Testing Circuitry	25°C Figure A																																																			
Item	Instantaneous Interruption Compensation																																																					
Object	+24V42A																																																					
1.Graph	<p>—△— Input Volt. 100V - - -□--- Input Volt. 115V - · -○--- Input Volt. 230V</p>																																																					
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Load Current [A]	Time [ms]																																																					
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Note:	Slanted line shows the range of the rated load current.																																																					

COSEL

Model	PJMA1000F-24
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+24V42A

Testing Circuitry Figure A

1.Graph



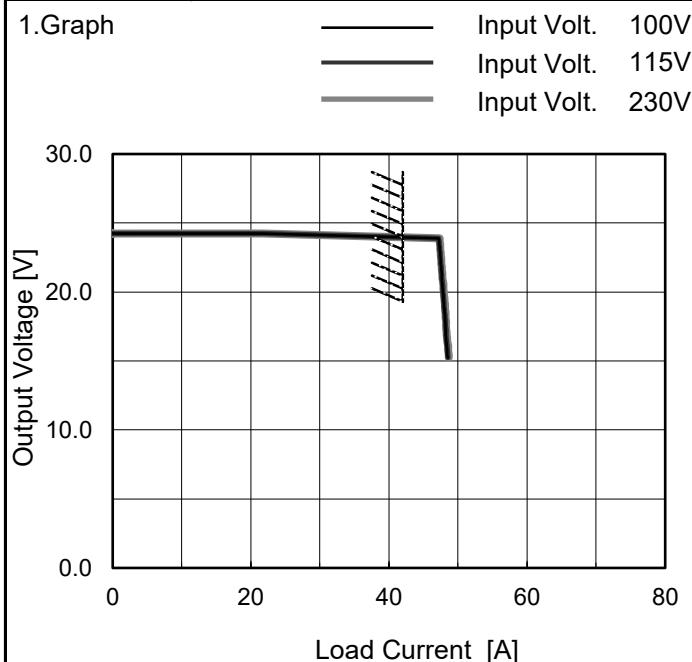
2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-30	76	78
-20	76	78
-10	74	76
0	74	78
10	72	77
25	70	77
30	71	79
40	69	77
50	68	78
60	67	78
--	-	-

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

COSEL

Model	PJMA1000F-24
Item	Overcurrent Protection
Object	+24V42A



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

Temperature 25°C
Testing Circuitry Figure A

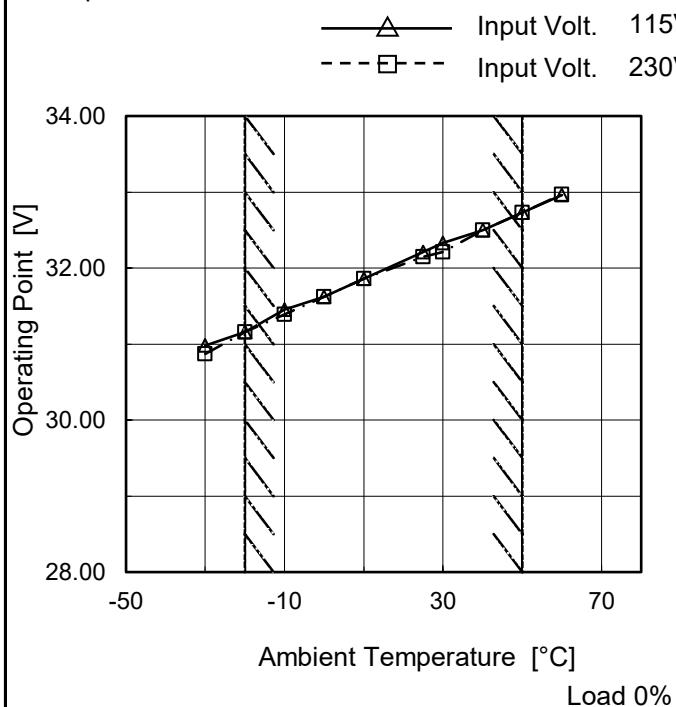
2. Values

Output Voltage [V]	Load Current [A]		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
22.8	47.40	47.39	47.50
21.6	47.57	47.59	47.68
19.2	47.91	47.93	48.05
16.8	48.23	48.26	48.37
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	PJMA1000F-24
Item	Oversupply Protection
Object	+24V42A

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.	Input Volt.
115[V]	115[V]	230[V]
-30	30.93	30.87
-20	31.16	31.16
-10	31.39	31.39
0	31.62	31.62
10	31.86	31.86
25	32.15	32.15
30	32.21	32.21
40	32.50	32.50
50	32.73	32.73
60	32.96	32.97
--	-	-

COSEL

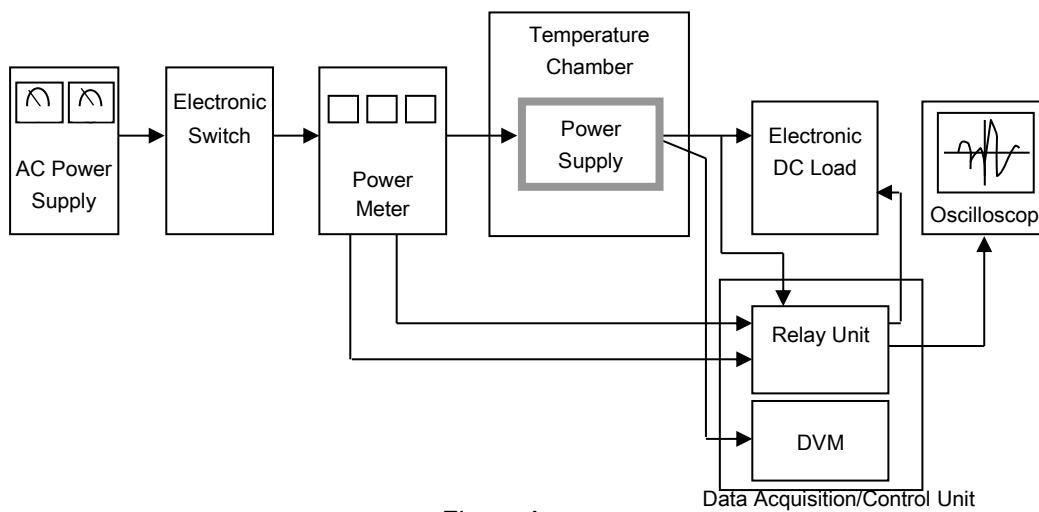


Figure A

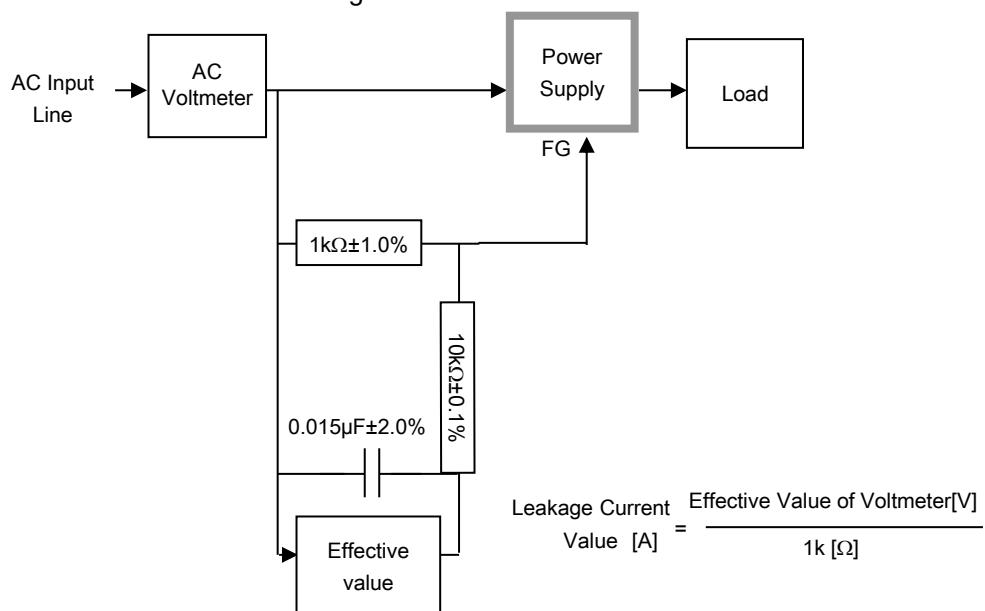


Figure B (IEC60601-1)

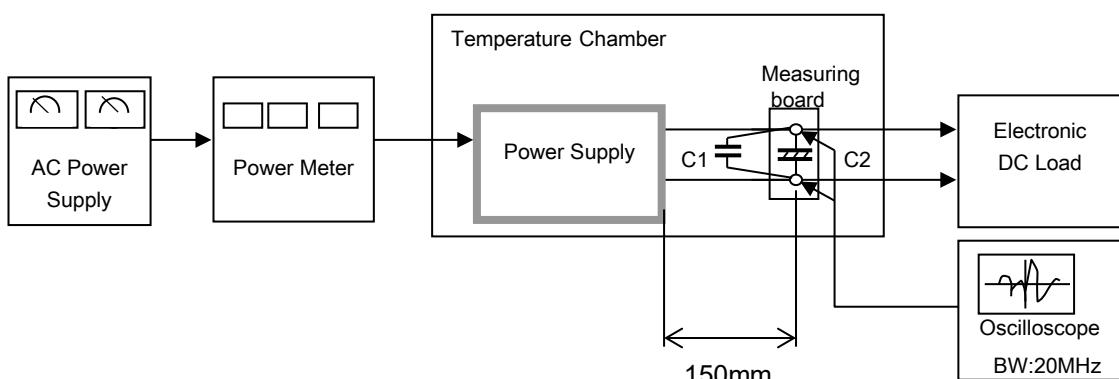
(Ceramic capacitor)
C1= 0.1 µF(Electrolytic capacitor)
C2= 22 µF

Figure C