

TEST DATA OF PMA30F-24

Regulated DC Power Supply
June 4, 2010

Approved by : Katsumi Ishikawa Design Manager

Prepared by : Tsutomu Okano Design Engineer

COSEL CO.,LTD.

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(Final Page 24)

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Model		PMA30F-24		Temperature 25°C																																																				
Item		Input Power (by Load Current)		Testing Circuitry Figure A																																																				
Object																																																								
1.Graph		<div><div>—△—</div>Input Volt. 100V</div> <div><div>---□---</div>Input Volt. 200V</div> <div><div>---○---</div>Input Volt. 230V</div>		2.Values																																																				
<div><div>Input Power [W]</div><div>Load Current [A]</div></div>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Input Power [W]</th></tr><tr><th>Input Volt. 100[V]</th><th>Input Volt. 200[V]</th><th>Input Volt. 230[V]</th></tr><tr><td>0.00</td><td>2.30</td><td>2.60</td><td>2.90</td></tr><tr><td>0.20</td><td>7.60</td><td>7.90</td><td>8.00</td></tr><tr><td>0.40</td><td>13.30</td><td>13.40</td><td>13.90</td></tr><tr><td>0.60</td><td>19.00</td><td>19.20</td><td>19.20</td></tr><tr><td>0.80</td><td>24.70</td><td>24.80</td><td>25.10</td></tr><tr><td>1.00</td><td>30.70</td><td>30.30</td><td>30.60</td></tr><tr><td>1.20</td><td>36.90</td><td>35.80</td><td>36.10</td></tr><tr><td>1.30</td><td>40.00</td><td>38.60</td><td>38.80</td></tr><tr><td>1.43</td><td>44.10</td><td>42.30</td><td>42.50</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]	Input Power [W]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	0.00	2.30	2.60	2.90	0.20	7.60	7.90	8.00	0.40	13.30	13.40	13.90	0.60	19.00	19.20	19.20	0.80	24.70	24.80	25.10	1.00	30.70	30.30	30.60	1.20	36.90	35.80	36.10	1.30	40.00	38.60	38.80	1.43	44.10	42.30	42.50	--	-	-	-	--	-	-	-		
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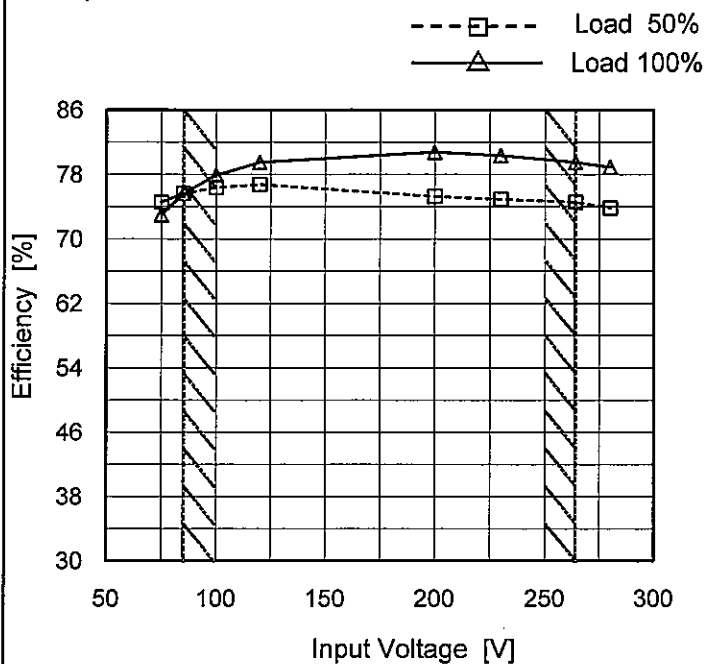
Model PMA30F-24

Item Efficiency (by Input Voltage)

Object

Temperature 25°C
Testing Circuitry Figure A

1. Graph



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

2. Values

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
75	74.6	73.0
85	75.7	75.6
100	76.4	77.9
120	76.8	79.5
200	75.3	80.8
230	74.9	80.3
264	74.6	79.5
280	73.9	78.9
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Model	PMA30F-24
Item	Power Factor (by Input Voltage)
Object	_____

1.Graph

□

Load 50%

—

△

—

Load 100%

Power Factor

Input Voltage [V]

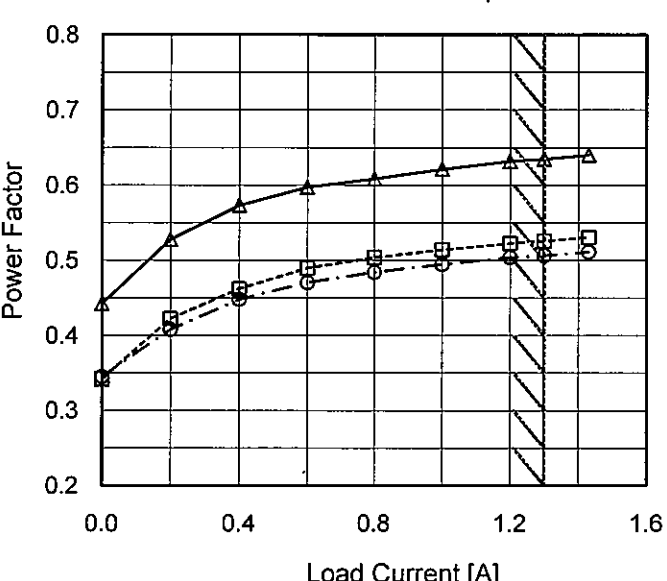
Note: Slanted line shows the range of the rated input voltage.

Temperature	25°C
Testing Circuitry	Figure A

2.Values

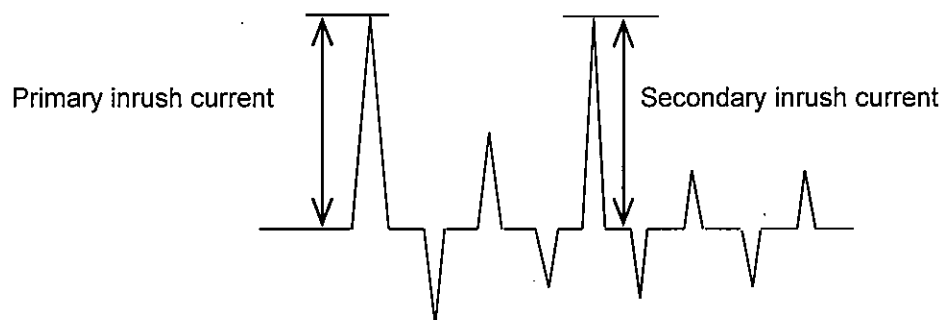
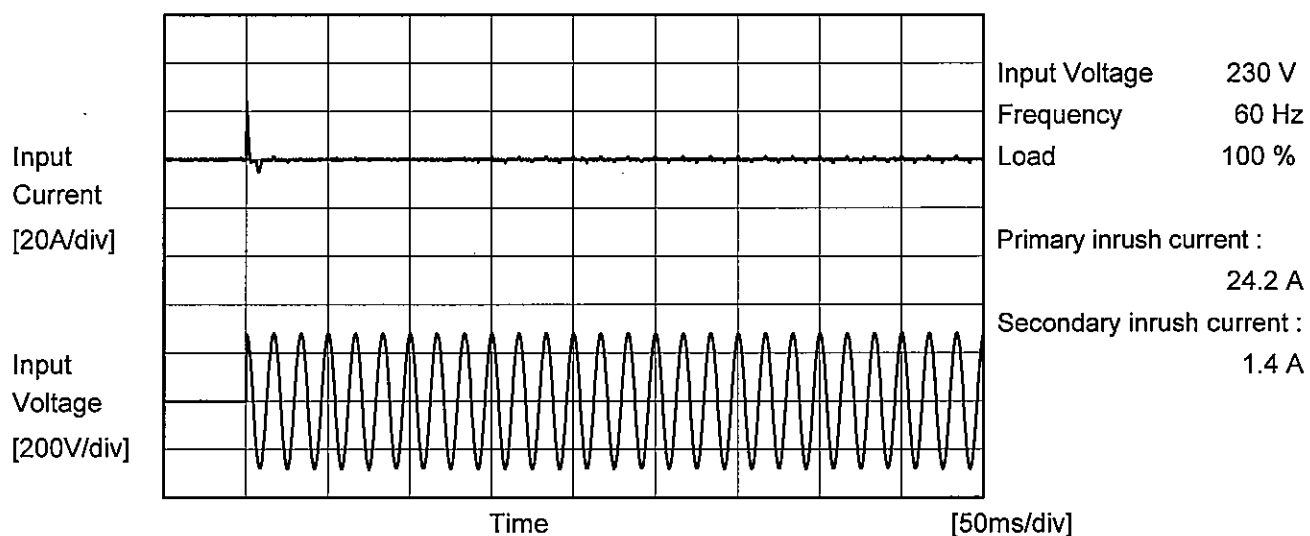
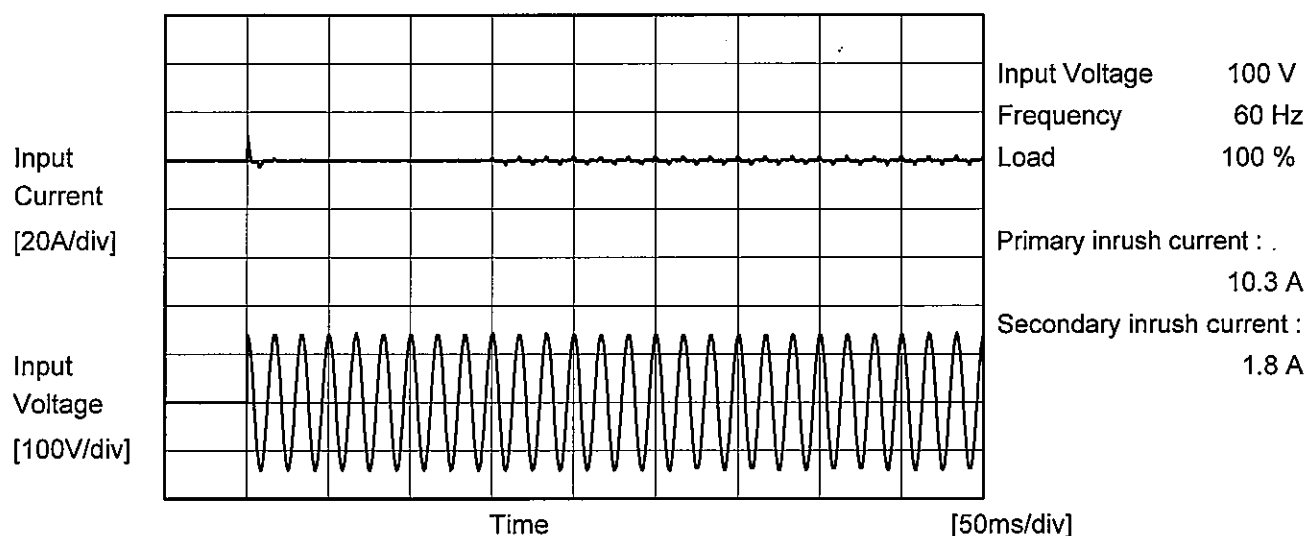
Input Voltage [V]	Power Factor	
	Load 50%	Load 100%
75	0.647	0.686
85	0.622	0.662
100	0.596	0.634
120	0.567	0.603
200	0.489	0.520
230	0.471	0.502
264	0.452	0.484
280	0.448	0.477
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Model		PMA30F-24		Temperature		25°C																																																				
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<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>Note: Slanted line shows the range of the rated load current.</p>				<table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Power Factor</th></tr><tr><th>Input Volt. 100[V]</th><th>Input Volt. 200[V]</th><th>Input Volt. 230[V]</th></tr><tr><td>0.00</td><td>0.442</td><td>0.342</td><td>0.345</td></tr><tr><td>0.20</td><td>0.528</td><td>0.422</td><td>0.408</td></tr><tr><td>0.40</td><td>0.573</td><td>0.462</td><td>0.448</td></tr><tr><td>0.60</td><td>0.597</td><td>0.490</td><td>0.471</td></tr><tr><td>0.80</td><td>0.608</td><td>0.504</td><td>0.485</td></tr><tr><td>1.00</td><td>0.621</td><td>0.514</td><td>0.495</td></tr><tr><td>1.20</td><td>0.632</td><td>0.523</td><td>0.504</td></tr><tr><td>1.30</td><td>0.635</td><td>0.526</td><td>0.507</td></tr><tr><td>1.43</td><td>0.640</td><td>0.531</td><td>0.511</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]	Power Factor			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	0.00	0.442	0.342	0.345	0.20	0.528	0.422	0.408	0.40	0.573	0.462	0.448	0.60	0.597	0.490	0.471	0.80	0.608	0.504	0.485	1.00	0.621	0.514	0.495	1.20	0.632	0.523	0.504	1.30	0.635	0.526	0.507	1.43	0.640	0.531	0.511	--	-	-	-	--	-	-	-
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Model	PMA30F-24	Temperature 25°C Testing Circuitry Figure A	
Item	Inrush Current		
Object			



		Temperature 25°C Testing Circuitry Figure B
Model	PMA30F-24	
Item	Leakage Current	
Object	_____	

1.Results

[mA]

Standards		Input Volt.			Note
		100 [V]	200 [V]	240 [V]	
IEC60601	Both phases	0.03	0.06	0.08	Operation
	One of phases	0.04	0.10	0.12	Stand by

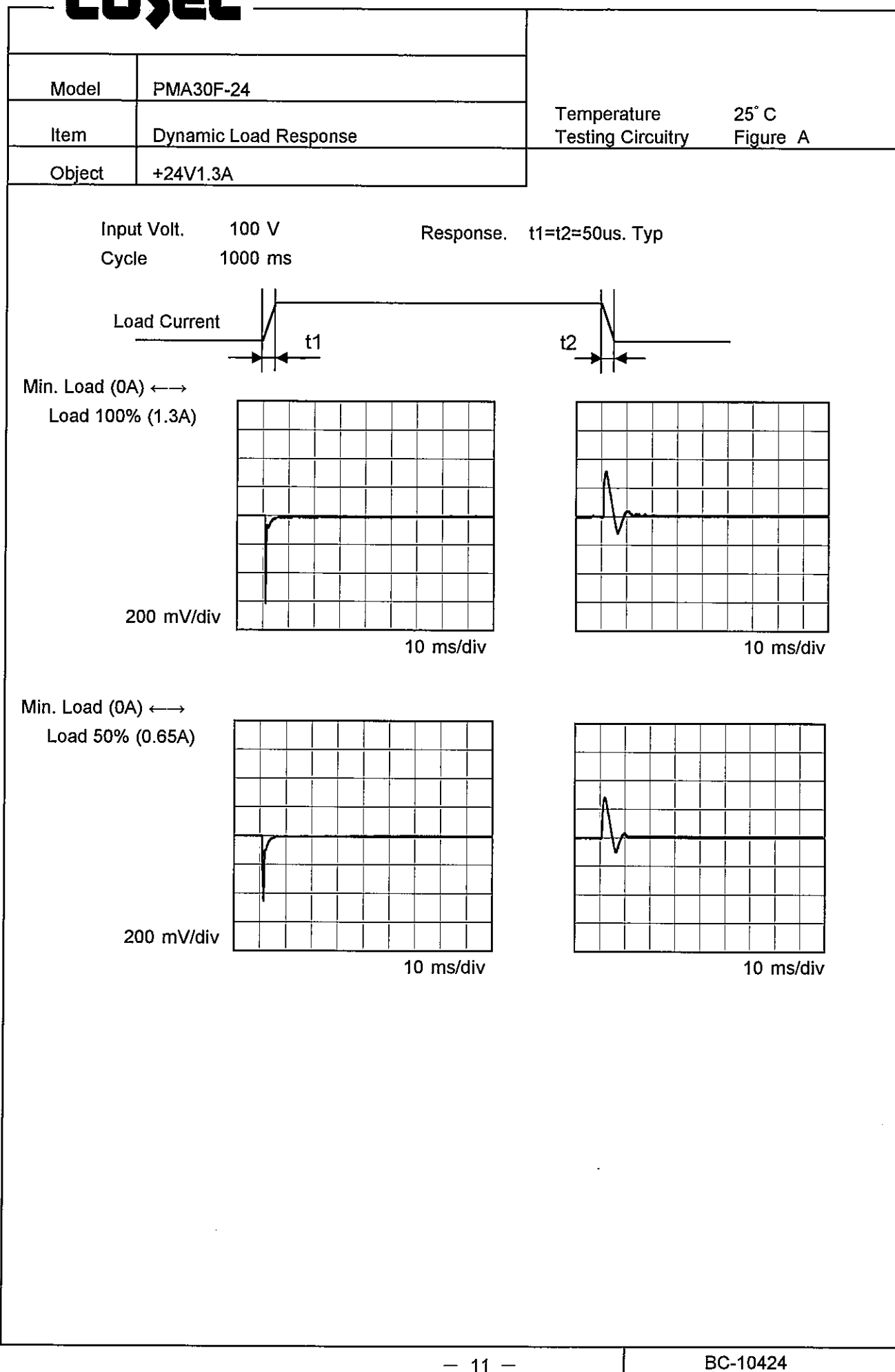
The value for "One of phases" is the reference value only.

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	PMA30F-24																																
Item	Line Regulation	Temperature	25°C																														
		Testing Circuitry	Figure A																														
Object	+24V1.3A																																
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<div><div><div>---□---</div><div>Load 50%</div></div><div><div>—△—</div><div>Load 100%</div></div></div> <table><thead><tr><th>Input Voltage [V]</th><th>Output Voltage [V] Load 50%</th><th>Output Voltage [V] Load 100%</th></tr></thead><tbody><tr><td>75</td><td>24.013</td><td>24.008</td></tr><tr><td>85</td><td>24.014</td><td>24.010</td></tr><tr><td>100</td><td>24.015</td><td>24.011</td></tr><tr><td>120</td><td>24.016</td><td>24.013</td></tr><tr><td>200</td><td>24.018</td><td>24.016</td></tr><tr><td>230</td><td>24.019</td><td>24.016</td></tr><tr><td>264</td><td>24.019</td><td>24.017</td></tr><tr><td>280</td><td>24.019</td><td>24.017</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></tbody></table> <p>Note: Slanted line shows the range of the rated input voltage.</p>		Input Voltage [V]	Output Voltage [V] Load 50%	Output Voltage [V] Load 100%	75	24.013	24.008	85	24.014	24.010	100	24.015	24.011	120	24.016	24.013	200	24.018	24.016	230	24.019	24.016	264	24.019	24.017	280	24.019	24.017	--	-	-		
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Model		PMA30F-24	
Item		Ambient Temperature Drift	
Object		+24V1.3A	
1.Graph		2.Values	

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		Testing Circuitry Figure A
Model	PMA30F-24	
Item	Output Voltage Accuracy	
Object	+24V1.3A	

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 : 85 - 264V

Load Current : 0 - 1.3A

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

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

2. Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	-10	200	0	24.045	±20	±0.1
Minimum Voltage	50	85	1.3	24.005		

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Item		Time Lapse Drift																							
Object		+24V1.3A																							
1.Graph		2.Values																							
<div><div><div>24.40</div><div>24.30</div><div>24.20</div><div>24.10</div><div>24.00</div><div>23.90</div><div>23.80</div><div>23.70</div></div><div><div>0</div><div>2</div><div>4</div><div>6</div><div>8</div><div>10</div></div><div><div>Output Voltage [V]</div><div>Time [H]</div></div><div><div>Input Volt. 230V</div><div>Load 100%</div></div></div>		<table><tr><th>Time since start [H]</th><th>Output Voltage [V]</th></tr><tr><td>0.0</td><td>24.021</td></tr><tr><td>0.5</td><td>24.017</td></tr><tr><td>1.0</td><td>24.017</td></tr><tr><td>2.0</td><td>24.017</td></tr><tr><td>3.0</td><td>24.017</td></tr><tr><td>4.0</td><td>24.017</td></tr><tr><td>5.0</td><td>24.017</td></tr><tr><td>6.0</td><td>24.017</td></tr><tr><td>7.0</td><td>24.017</td></tr><tr><td>8.0</td><td>24.017</td></tr></table>		Time since start [H]	Output Voltage [V]	0.0	24.021	0.5	24.017	1.0	24.017	2.0	24.017	3.0	24.017	4.0	24.017	5.0	24.017	6.0	24.017	7.0	24.017	8.0	24.017
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* The characteristic of AC100V is equal.																									

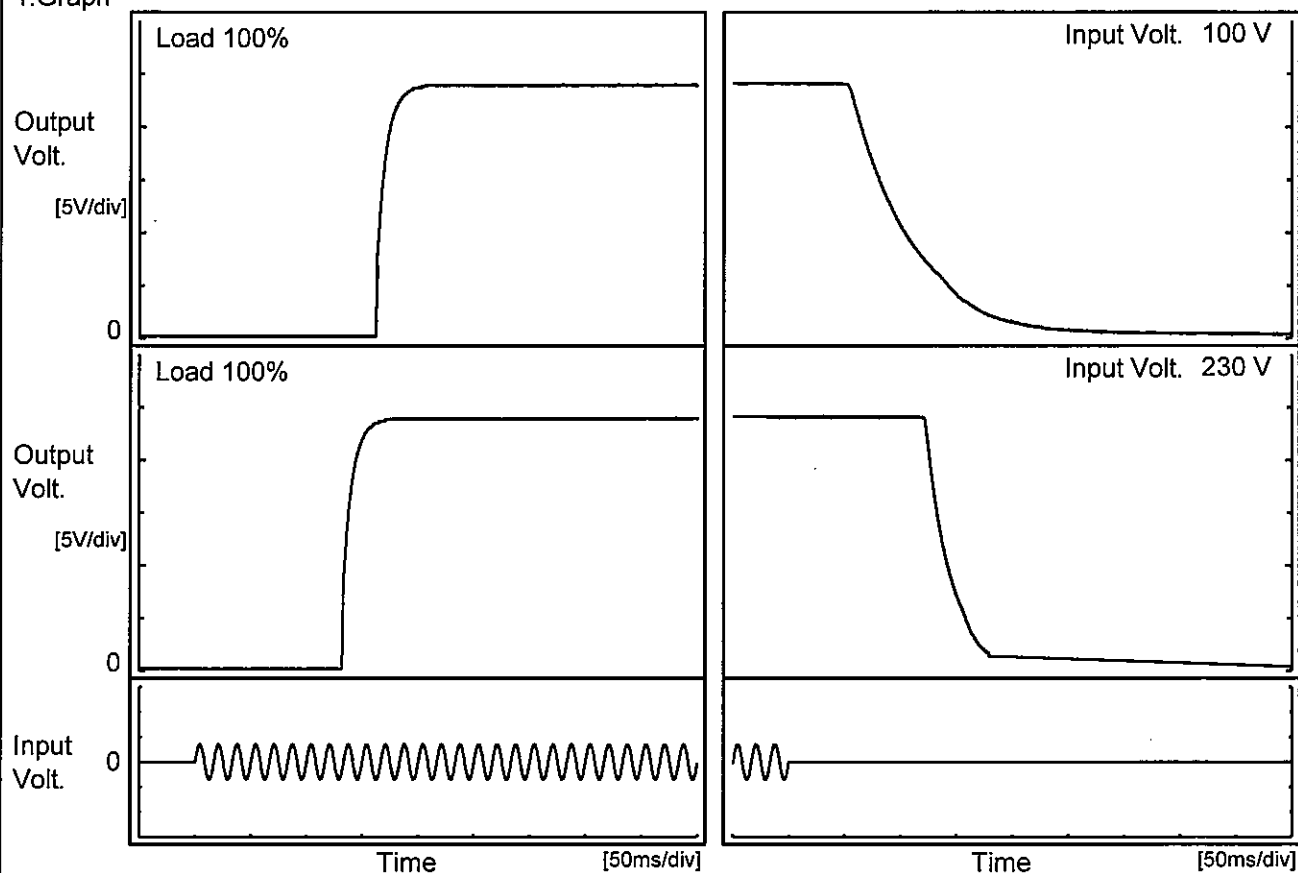
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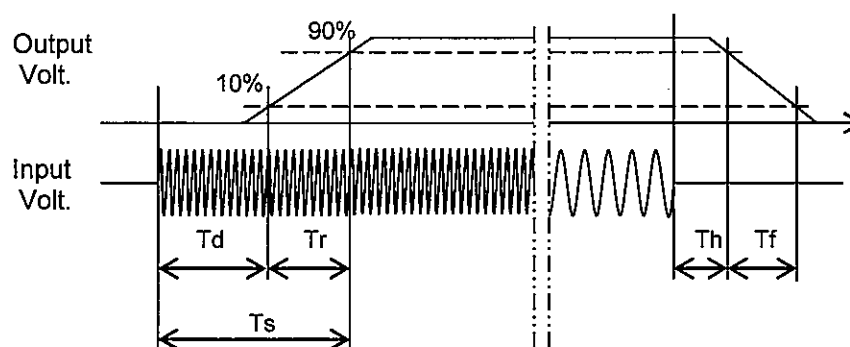
Model	PMA30F-24	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+24V1.3A		

1. Graph



2. Values

Input Volt.	Time	Td	Tr	Ts	Th	Tf
100 V		163.0	17.3	180.3	24.1	44.5
230 V		132.5	17.3	149.8	124.2	45.2



COSEL

Model	PMA30F-24																																		
Item	Hold-Up Time	Temperature	25°C																																
Object	+24V1.3A	Testing Circuitry	Figure A																																
1.Graph		2.Values																																	
<div><div><div>---□--- Load 50%</div><div>—△— Load 100%</div></div><div>Hold-Up Time [ms]</div><div>Input Voltage [V]</div></div> <div><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></div>		<table><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><tr><td>75</td><td>21</td><td>8</td></tr><tr><td>85</td><td>31</td><td>13</td></tr><tr><td>100</td><td>48</td><td>22</td></tr><tr><td>120</td><td>76</td><td>36</td></tr><tr><td>200</td><td>241</td><td>122</td></tr><tr><td>230</td><td>325</td><td>167</td></tr><tr><td>264</td><td>437</td><td>226</td></tr><tr><td>280</td><td>496</td><td>257</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></table>		Input Voltage [V]	Hold-Up Time [ms]		Load 50%	Load 100%	75	21	8	85	31	13	100	48	22	120	76	36	200	241	122	230	325	167	264	437	226	280	496	257	--	-	-
Input Voltage [V]	Hold-Up Time [ms]																																		
	Load 50%	Load 100%																																	
75	21	8																																	
85	31	13																																	
100	48	22																																	
120	76	36																																	
200	241	122																																	
230	325	167																																	
264	437	226																																	
280	496	257																																	
--	-	-																																	

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BC-10424

COSEL

Model		PMA30F-24	Temperature 25°C Testing Circuitry Figure A																																																				
Item		Instantaneous Interruption Compensation																																																					
Object		+24V1.3A																																																					
1.Graph																																																							
<div>Instantaneous Compensation Time [ms]</div>	<div><div>—△—</div>Input Volt. 100V</div> <div><div>---□---</div>Input Volt. 200V</div> <div><div>---○---</div>Input Volt. 230V</div>			<div>2.Values</div>																																																			
	<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>0.00</td><td>-</td><td>-</td><td>-</td></tr><tr><td>0.20</td><td>139</td><td>422</td><td>539</td></tr><tr><td>0.40</td><td>80</td><td>331</td><td>463</td></tr><tr><td>0.60</td><td>54</td><td>264</td><td>356</td></tr><tr><td>0.80</td><td>39</td><td>201</td><td>272</td></tr><tr><td>1.00</td><td>31</td><td>162</td><td>220</td></tr><tr><td>1.20</td><td>23</td><td>135</td><td>183</td></tr><tr><td>1.30</td><td>22</td><td>122</td><td>170</td></tr><tr><td>1.43</td><td>20</td><td>112</td><td>154</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]	0.00	-	-	-	0.20	139	422	539	0.40	80	331	463	0.60	54	264	356	0.80	39	201	272	1.00	31	162	220	1.20	23	135	183	1.30	22	122	170	1.43	20	112	154	--	-	-	-	--	-	-	-
	Load Current [A]	Time [ms]																																																					
		Input Volt. 100[V]	Input Volt. 200[V]		Input Volt. 230[V]																																																		
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--	-	-	-																																																				
Note: Slanted line shows the range of the rated load current.																																																							

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BC-10424

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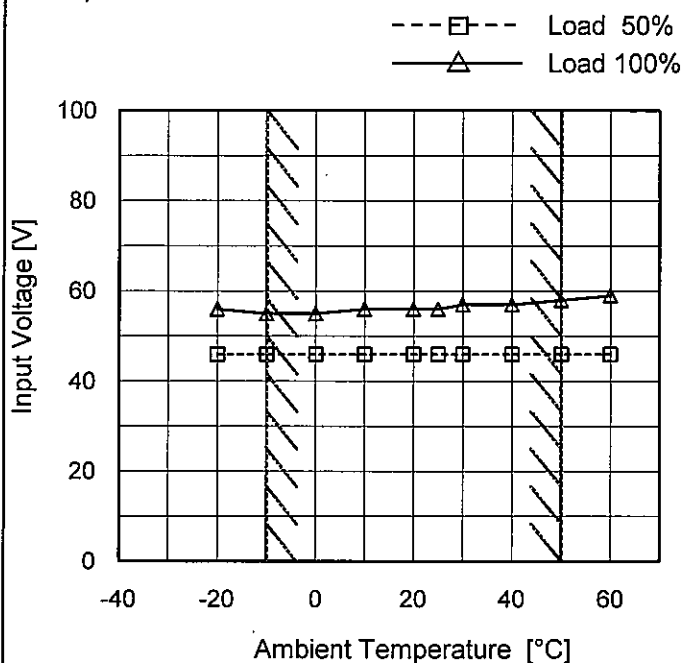
Model PMA30F-24

Item Minimum Input Voltage
for Regulated Output Voltage

Object +24V1.3A

Testing Circuitry Figure A

1. Graph



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

2. Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	46	56
-10	46	55
0	46	55
10	46	56
20	46	56
25	46	56
30	46	57
40	46	57
50	46	58
60	46	59
--	-	-

COSEL

Model		PMA30F-24	
Item		Overcurrent Protection	
Object		+24V1.3A	

1.Graph

△

Input Volt. 100V

○

Input Volt. 230V

30

20

10

0

0.0

1.0

2.0

3.0

4.0

Output Voltage [V]

Load Current [A]

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

2.Values

Output Voltage [V]	Load Current [A]	
	Input Volt. 100[V]	Input Volt. 230[V]
24.0	2.55	3.39
22.8	-	-
21.6	-	-
19.2	-	-
16.8	-	-
14.4	-	-
12.0	-	-
9.6	-	-
7.2	-	-
4.8	-	-
2.4	-	-
0.0	-	-

COSEL

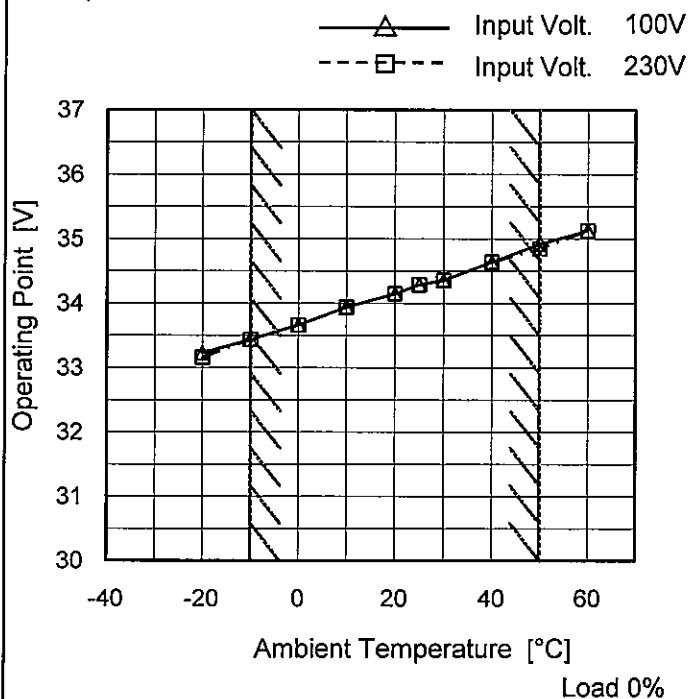
Model PMA30F-24

Item Overvoltage Protection

Object +24V1.3A

Testing Circuitry Figure A

1. Graph



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

2. Values

Ambient Temperature [°C]	Operating Point [V]	
	Input Volt. 100[V]	Input Volt. 230[V]
-20	33.23	33.16
-10	33.44	33.44
0	33.66	33.66
10	33.94	33.94
20	34.15	34.15
25	34.29	34.29
30	34.36	34.36
40	34.64	34.64
50	34.92	34.85
60	35.13	35.13
--	-	-

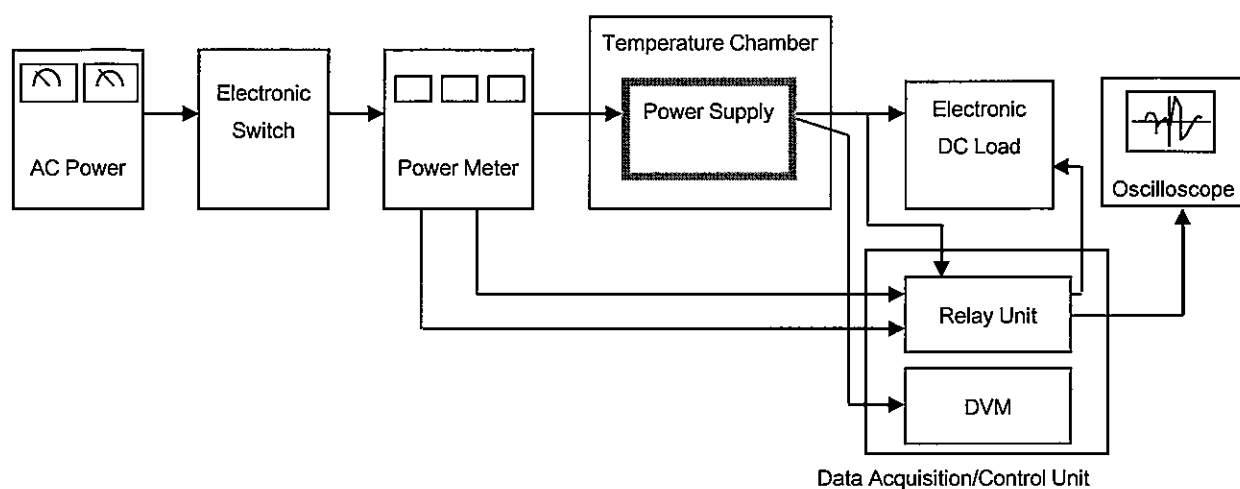


Figure A

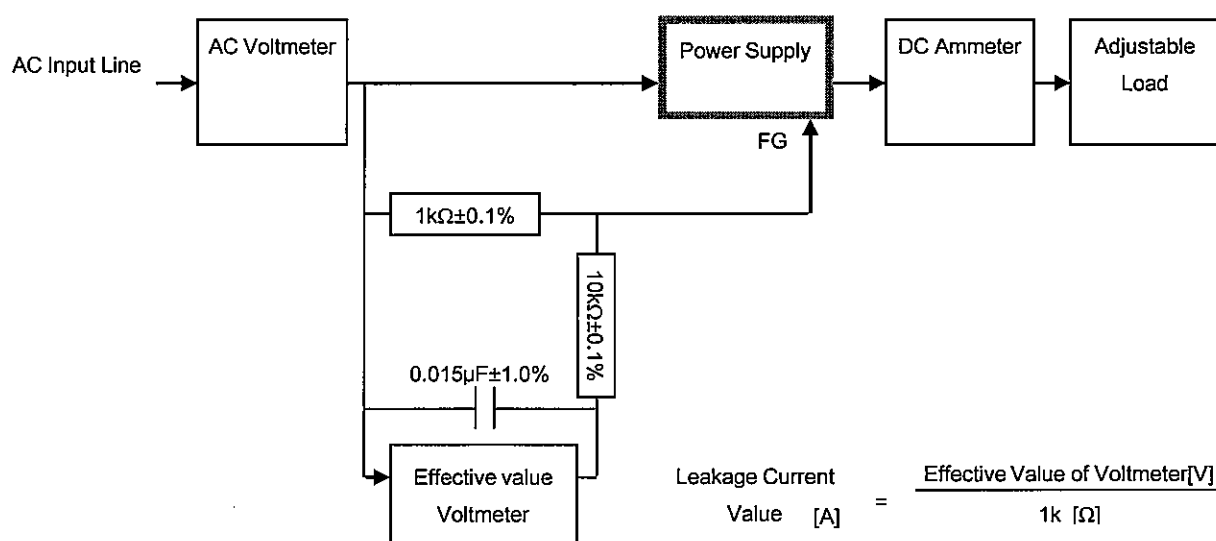


Figure B (IEC60601-1)