



## TEST DATA OF LFA75F-48

Regulated DC Power Supply  
August 10, 2009

Approved by : Yoshiaki Shimizu  
Yoshiaki Shimizu Design Manager

Prepared by : Koji Takahashi  
Koji Takahashi Design Engineer

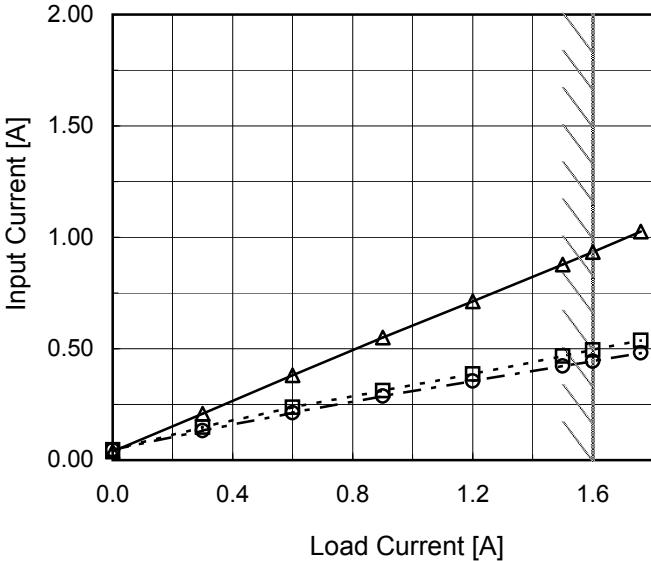
**COSEL CO.,LTD.**

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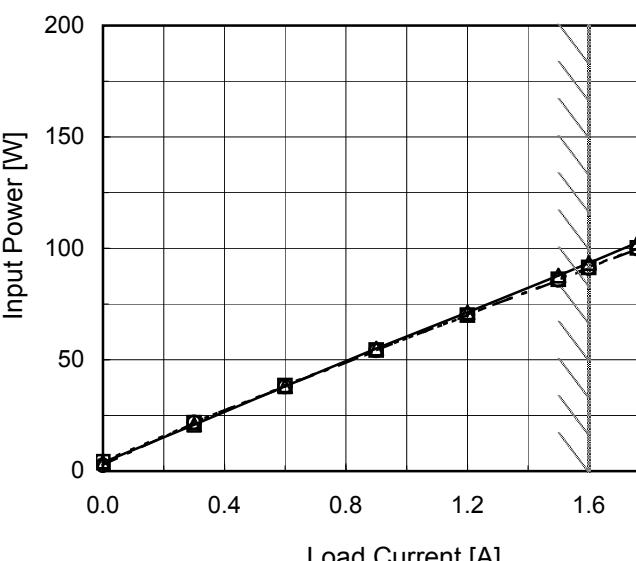
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Model	LFA75F-48																																																					
Item	Input Current (by Load Current)	Temperature	25°C																																																			
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1.Graph	<p style="text-align: center;"> <span style="display: inline-block; width: 15px; height: 15px; border: 1px solid black; border-radius: 50%; margin-right: 5px;"></span> Input Volt. 100V  <span style="display: inline-block; width: 15px; height: 15px; border: 1px dashed black; border-radius: 50%; margin-right: 5px;"></span> Input Volt. 200V  <span style="display: inline-block; width: 15px; height: 15px; border: 1px dashed black; border-radius: 50%; border: 1px solid black; margin-right: 5px;"></span> Input Volt. 230V     </p>  <p>The graph plots Input Power [W] on the Y-axis (0 to 200) against Load Current [A] on the X-axis (0.0 to 1.6). Three data series are shown for input voltages 100V, 200V, and 230V. The 100V curve starts at (0,0) and ends at approximately (1.6, 100). The 200V curve starts at (0,0) and ends at approximately (1.6, 90). The 230V curve starts at (0,0) and ends at approximately (1.6, 80). A slanted line is drawn from (0,0) to (1.6, 100), representing the rated load current range.</p>																																																						
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<p>The graph plots Efficiency [%] on the y-axis (30 to 86) against Input Voltage [V] on the x-axis (50 to 300). Two data series are shown: Load 50% (dashed line with square markers) and Load 100% (solid line with triangle markers). Both series show efficiency increasing with input voltage. A vertical slanted line indicates the rated input voltage range.</p> <table border="1"> <thead> <tr> <th>Input Voltage [V]</th> <th>Efficiency Load 50% [%]</th> <th>Efficiency Load 100% [%]</th> </tr> </thead> <tbody> <tr><td>75</td><td>77.4</td><td>80.9</td></tr> <tr><td>85</td><td>78.3</td><td>81.8</td></tr> <tr><td>100</td><td>79.2</td><td>82.9</td></tr> <tr><td>120</td><td>80.0</td><td>83.6</td></tr> <tr><td>200</td><td>79.2</td><td>84.7</td></tr> <tr><td>230</td><td>79.3</td><td>84.9</td></tr> <tr><td>264</td><td>79.2</td><td>84.6</td></tr> <tr><td>280</td><td>79.5</td><td>84.5</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> </tbody> </table>		Input Voltage [V]	Efficiency Load 50% [%]	Efficiency Load 100% [%]	75	77.4	80.9	85	78.3	81.8	100	79.2	82.9	120	80.0	83.6	200	79.2	84.7	230	79.3	84.9	264	79.2	84.6	280	79.5	84.5	--	-	-		
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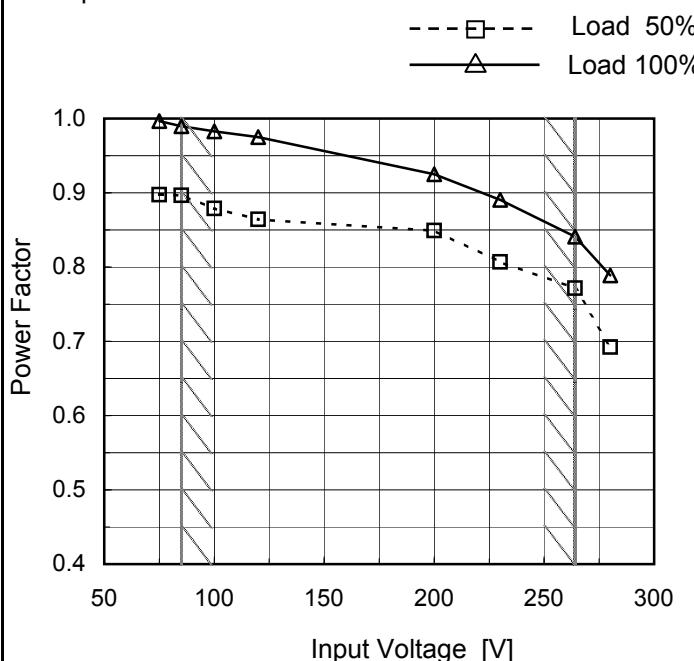
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Model	LFA75F-48
Item	Power Factor (by Input Voltage)
Object	_____

 Temperature 25°C  
 Testing Circuitry Figure A

## 1.Graph



## 2.Values

Input Voltage [V]	Power Factor	
	Load 50%	Load 100%
75	0.898	0.996
85	0.897	0.990
100	0.879	0.983
120	0.864	0.975
200	0.849	0.925
230	0.807	0.891
264	0.772	0.841
280	0.692	0.789
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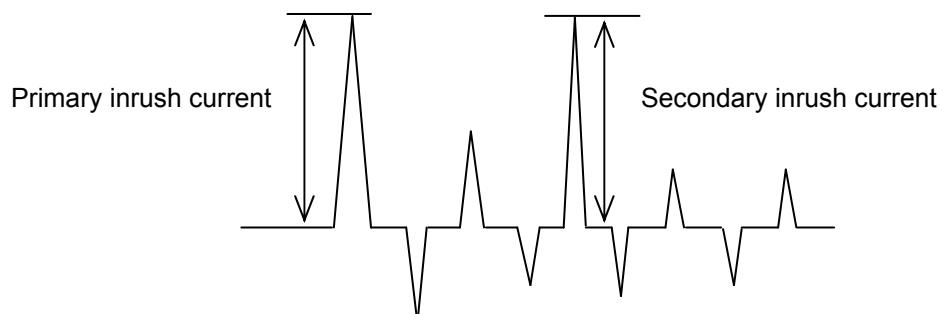
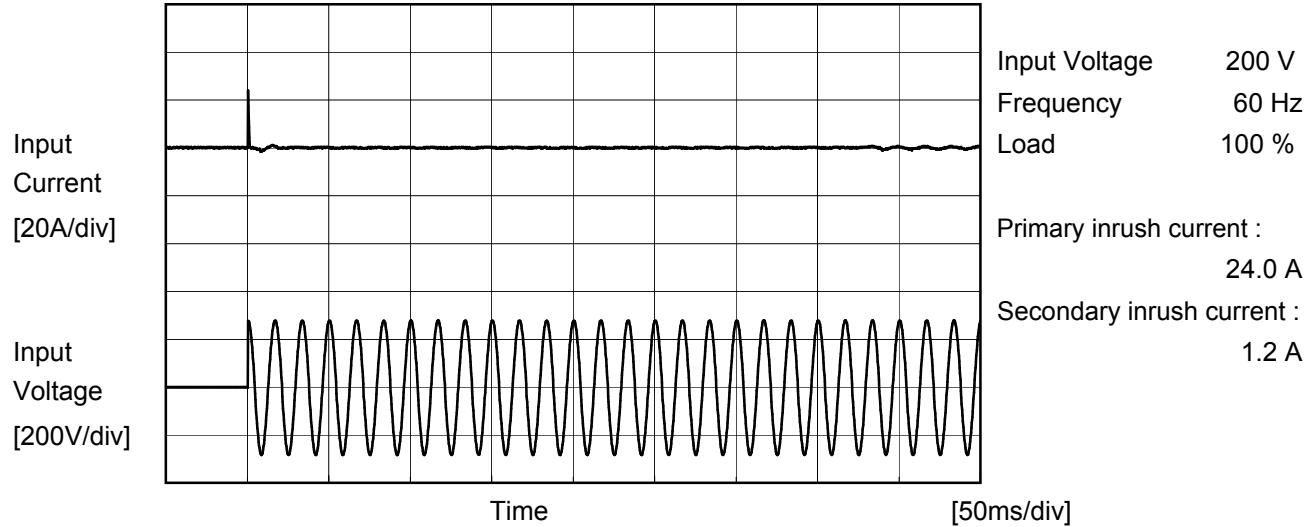
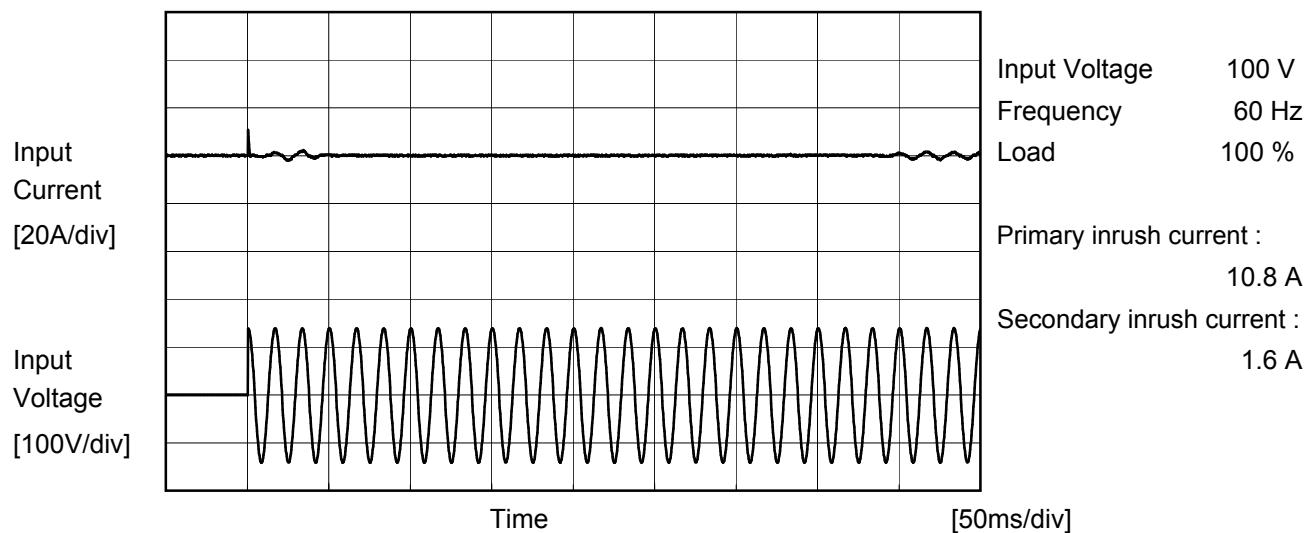
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Model	LFA75F-48	Temperature	25°C
Item	Inrush Current	Testing Circuitry	Figure A
Object	_____		





Model	LFA75F-48	Temperature	25°C
Item	Leakage Current	Testing Circuitry	Figure B
Object	_____		

### 1. Results

[mA]

Standards		Input Volt.			Note
		100 [V]	200 [V]	240 [V]	
DEN-AN	Both phases	0.13	0.26	0.32	Operation
	One of phases	0.22	0.45	0.57	Stand by
IEC60950	Both phases	0.14	0.30	0.38	Operation
	One of phases	0.22	0.44	0.54	Stand by

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

### 2. Condition

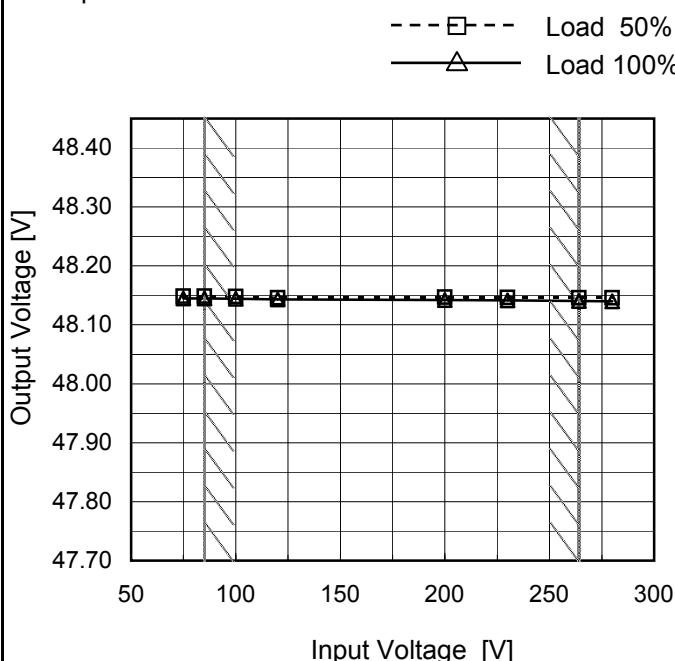
Leakage current value is concluded after measuring both phases of AC input and by choosing the larger one.

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Model	LFA75F-48
Item	Line Regulation
Object	+48V1.6A

 Temperature 25°C  
 Testing Circuitry Figure A

## 1.Graph



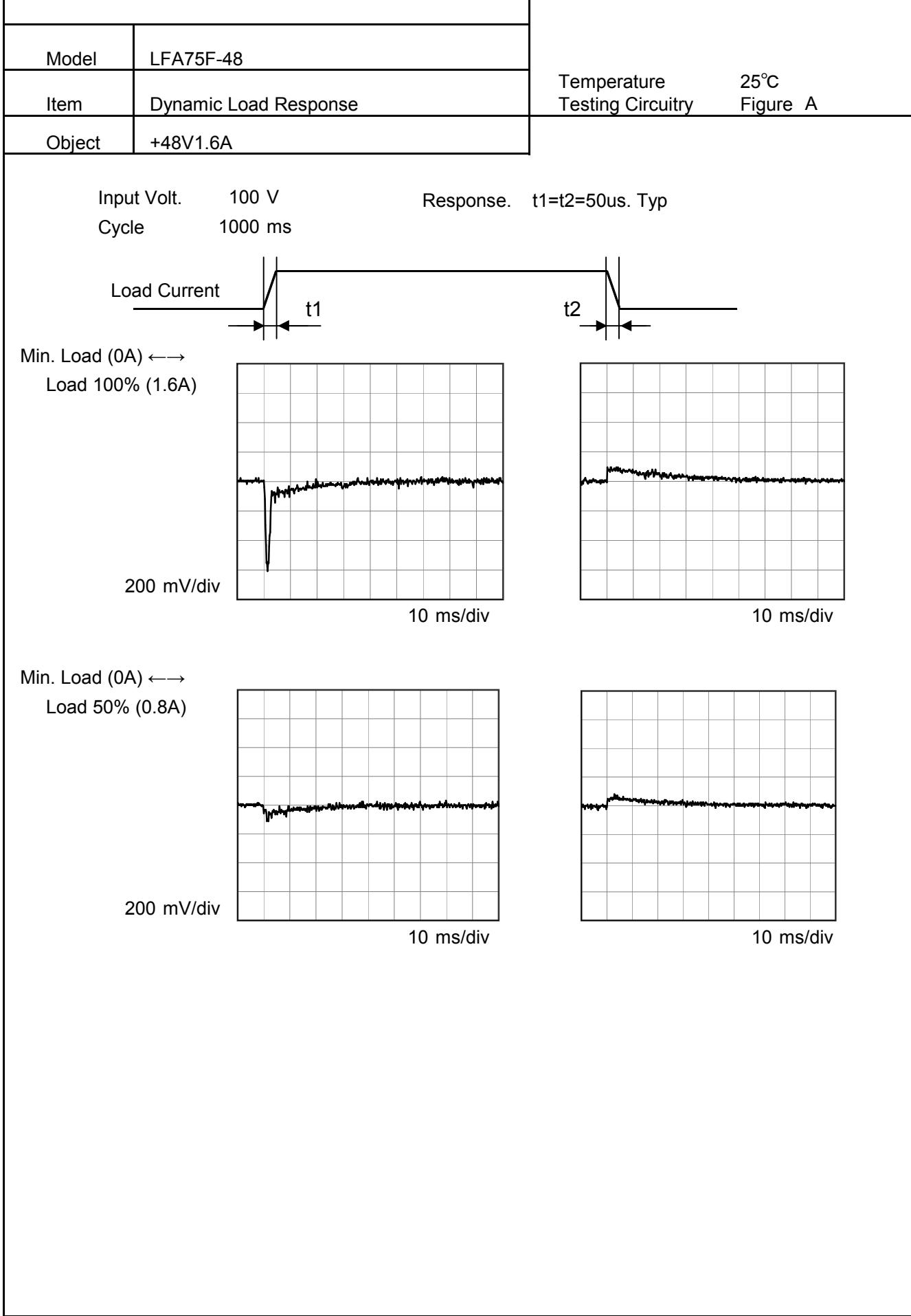
## 2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
75	48.148	48.145
85	48.148	48.145
100	48.148	48.144
120	48.146	48.143
200	48.147	48.142
230	48.147	48.141
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<p>Output Voltage [V]</p> <p>Load Current [A]</p> <p>Legend:</p> <ul style="list-style-type: none"> <li>Input Volt. 100V</li> <li>Input Volt. 200V</li> <li>Input Volt. 230V</li> </ul>		<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>0.00</td><td>48.155</td><td>48.155</td><td>48.154</td></tr> <tr><td>0.30</td><td>48.148</td><td>48.150</td><td>48.149</td></tr> <tr><td>0.60</td><td>48.146</td><td>48.147</td><td>48.147</td></tr> <tr><td>0.90</td><td>48.145</td><td>48.146</td><td>48.145</td></tr> <tr><td>1.20</td><td>48.144</td><td>48.144</td><td>48.144</td></tr> <tr><td>1.50</td><td>48.143</td><td>48.143</td><td>48.142</td></tr> <tr><td>1.60</td><td>48.143</td><td>48.142</td><td>48.142</td></tr> <tr><td>1.76</td><td>48.142</td><td>48.140</td><td>48.140</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> </tbody> </table>		Load Current [A]	Output Voltage [V]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	0.00	48.155	48.155	48.154	0.30	48.148	48.150	48.149	0.60	48.146	48.147	48.147	0.90	48.145	48.146	48.145	1.20	48.144	48.144	48.144	1.50	48.143	48.143	48.142	1.60	48.143	48.142	48.142	1.76	48.142	48.140	48.140	--	-	-	-	--	-	-	-	--	-	-	-
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**COSEL**

**COSEL**

Model	LFA75F-48																																							
Item	Ripple Voltage (by Load Current)	Temperature 25°C Testing Circuitry Figure C																																						
Object	+48V1.6A																																							
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<p>Graph showing Ripple Voltage [mV] vs Load Current [A]. The Y-axis ranges from 0 to 50 mV, and the X-axis ranges from 0.0 to 1.6 A. Two data series are plotted: Input Volt. 100V (solid line with open triangles) and Input Volt. 200V (dashed line with open circles). Both series show a decrease in ripple voltage as load current increases beyond 0.5 A, eventually leveling off around 15 mV. A slanted line indicates the rated load current range.</p>																																								
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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>T1: Due to AC Input Line T2: Due to Switching</p> <p>Fig. Complex Ripple Wave Form</p>																																								

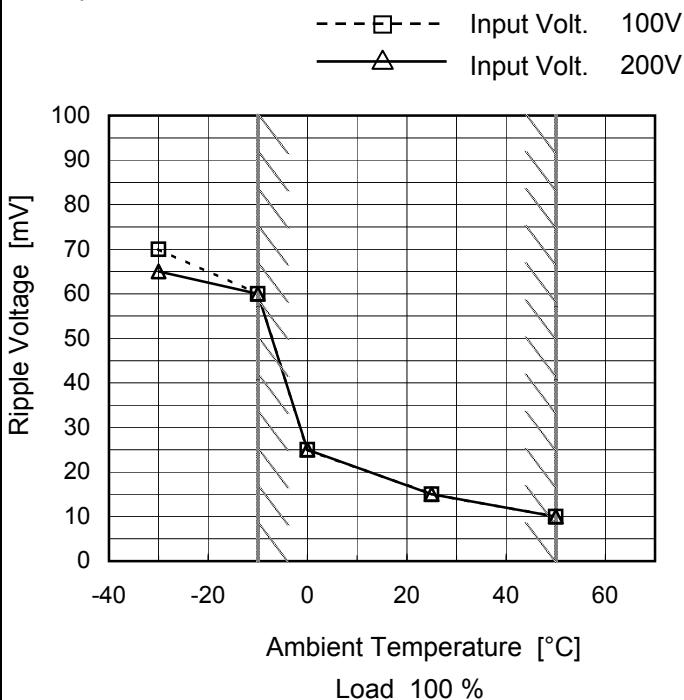
**COSEL**

Model	LFA75F-48																																							
Item	Ripple-Noise	Temperature 25°C Testing Circuitry Figure C																																						
Object	+48V1.6A																																							
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<p>Graph showing Ripple-Noise [mV] vs Load Current [A].</p> <p>Legend:</p> <ul style="list-style-type: none"> <li>Input Volt. 100V (Solid line with open triangle markers)</li> <li>Input Volt. 200V (Dashed line with open circle markers)</li> </ul> <table border="1"> <thead> <tr> <th>Load Current [A]</th> <th>Ripple-Noise [mV] (100V)</th> <th>Ripple-Noise [mV] (200V)</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>50</td><td>60</td></tr> <tr><td>0.30</td><td>85</td><td>85</td></tr> <tr><td>0.60</td><td>90</td><td>90</td></tr> <tr><td>0.90</td><td>105</td><td>110</td></tr> <tr><td>1.20</td><td>110</td><td>115</td></tr> <tr><td>1.50</td><td>110</td><td>115</td></tr> <tr><td>1.60</td><td>110</td><td>115</td></tr> <tr><td>1.76</td><td>115</td><td>120</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-Noise [mV] (100V)	Ripple-Noise [mV] (200V)	0.0	50	60	0.30	85	85	0.60	90	90	0.90	105	110	1.20	110	115	1.50	110	115	1.60	110	115	1.76	115	120	--	-	-	--	-	-	--	-	-		
Load Current [A]	Ripple-Noise [mV] (100V)	Ripple-Noise [mV] (200V)																																						
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<p>Figure showing a complex ripple wave form. The diagram illustrates the measurement of Ripple-Noise [mVp-p].</p> <p>T1: Due to AC Input Line</p> <p>T2: Due to Switching</p> <p>Ripple-Noise [mVp-p]</p>																																								
<p>Fig. Complex Ripple Wave Form</p>																																								

**COSEL**

Model	LFA75F-48
Item	Ripple Voltage (by Ambient Temp.)
Object	+48V1.6A

## 1. Graph



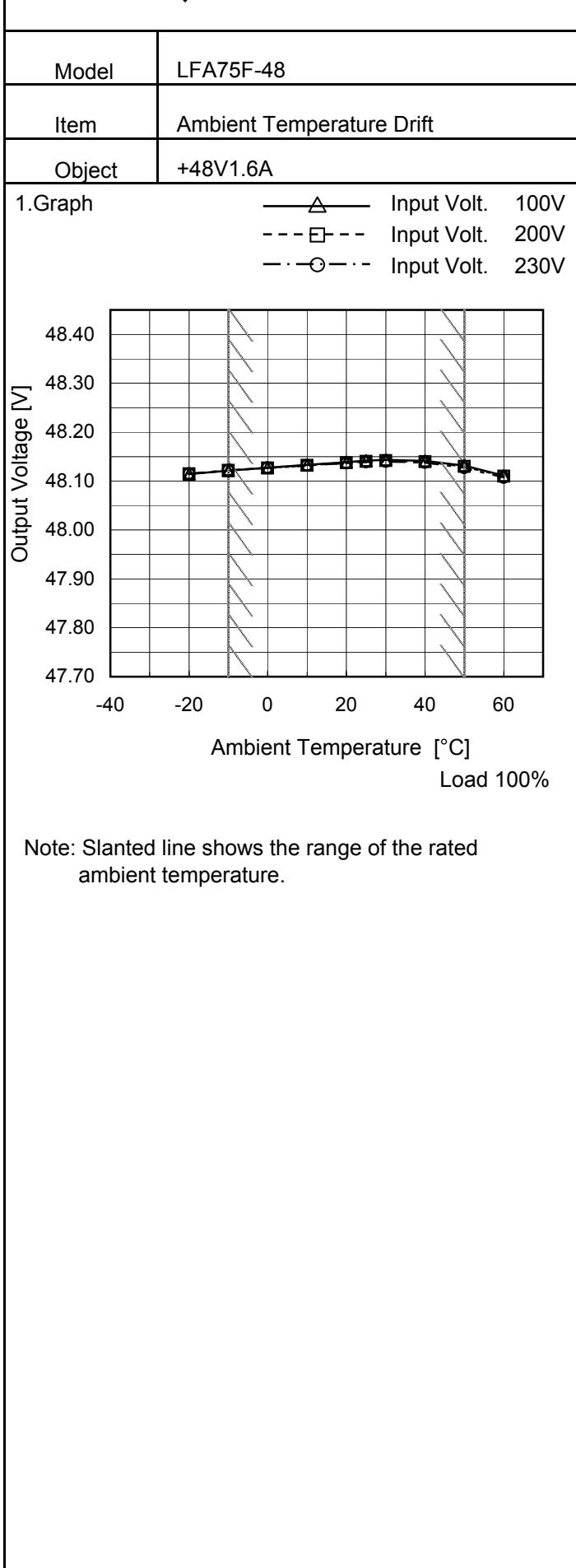
Measured by 20 MHz Oscilloscope.

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. 100 [V]	Input Volt. 200 [V]
-30	70	65
-10	60	60
0	25	25
25	15	15
50	10	10
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-



Testing Circuitry Figure A

## 2.Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
-20	48.114	48.115	48.115
-10	48.122	48.122	48.122
0	48.127	48.127	48.127
10	48.133	48.132	48.132
20	48.139	48.138	48.137
25	48.142	48.140	48.139
30	48.143	48.142	48.140
40	48.142	48.140	48.138
50	48.132	48.130	48.127
60	48.111	48.110	48.107
--	-	-	-



Model	LFA75F-48	Testing Circuitry Figure A
Item	Output Voltage Accuracy	
Object	+48V1.6A	

### 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 - 1.6A

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

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

### 2. Values

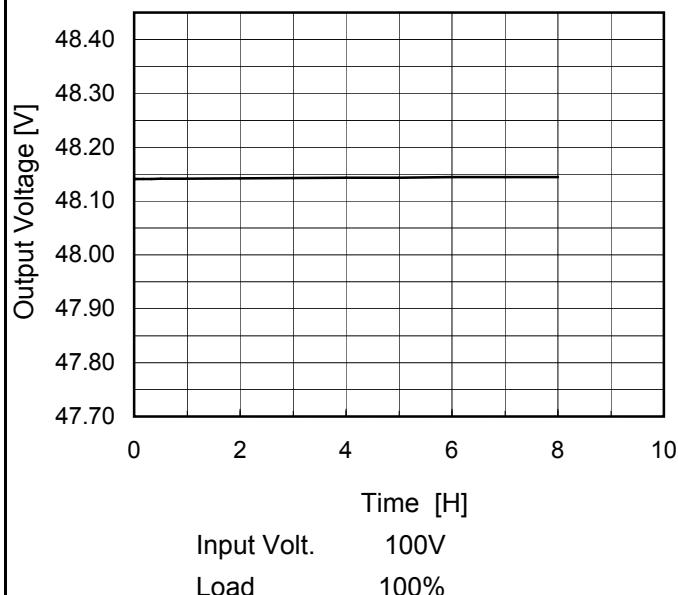
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	30	264	0	48.155	$\pm 17$	$\pm 0.1$
Minimum Voltage	-10	100	1.6	48.122		

**COSEL**

Model	LFA75F-48
Item	Time Lapse Drift
Object	+48V1.6A

Temperature 25°C  
 Testing Circuitry Figure A

## 1.Graph



## 2.Values

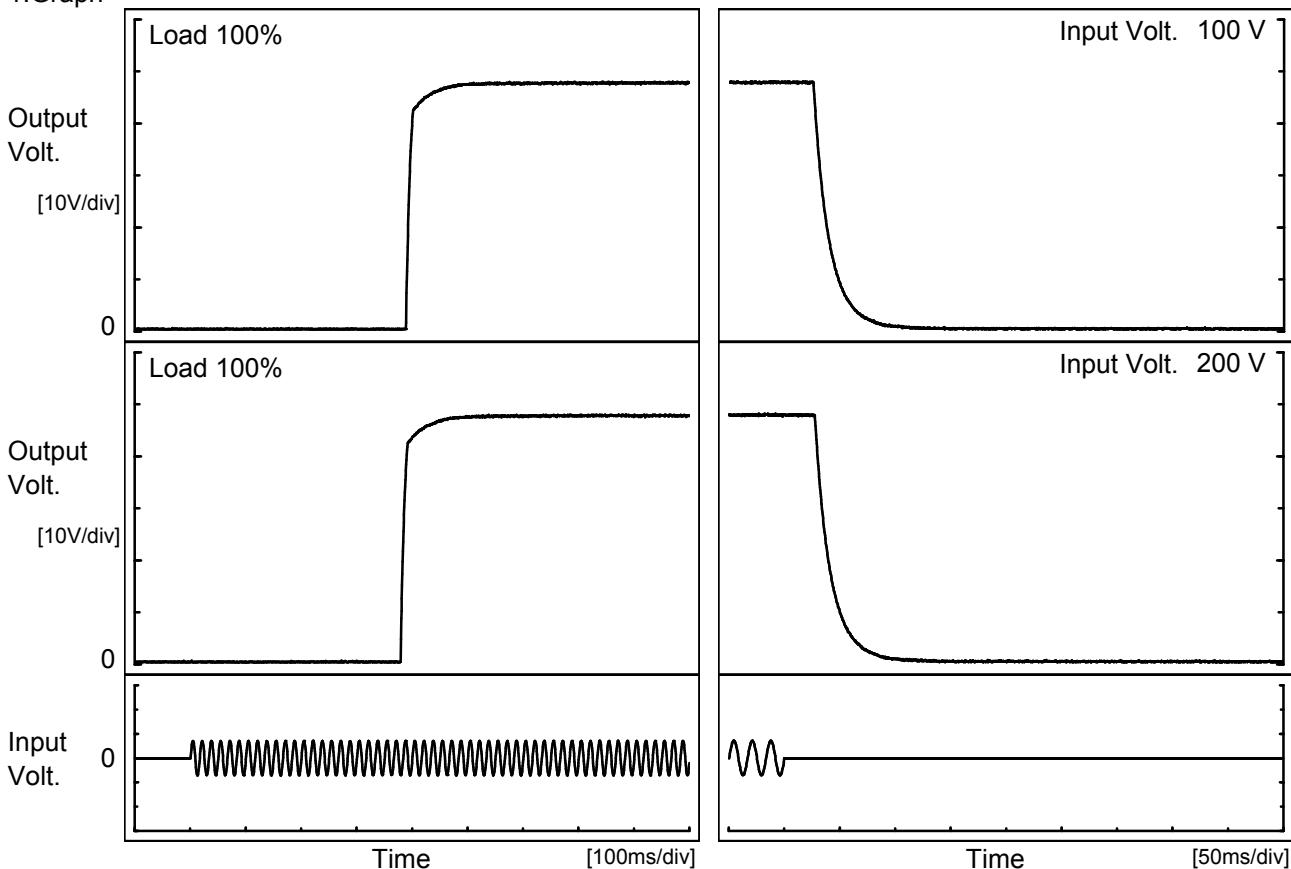
Time since start [H]	Output Voltage [V]
0.0	48.141
0.5	48.142
1.0	48.142
2.0	48.142
3.0	48.143
4.0	48.143
5.0	48.144
6.0	48.144
7.0	48.144
8.0	48.144

\* The characteristic of AC200V is equal.

**COSEL**

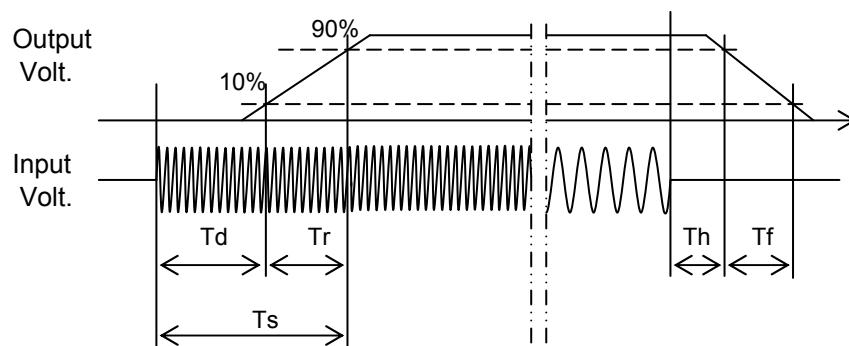
Model	LFA75F-48	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+48V1.6A		

## 1. Graph



## 2. Values

Input Volt.	Time	Td	Tr	Ts	Th	Tf	[ms]
100 V		390.0	20.5	410.5	27.0	32.5	
200 V		380.5	19.5	400.0	28.8	32.3	



**COSEL**

Model	LFA75F-48	Temperature	25°C																																
Item	Hold-Up Time	Testing Circuitry	Figure A																																
Object	+48V1.6A																																		
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Input Voltage [V]	Hold-Up Time [ms]																																		
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200	52	26																																	
230	52	26																																	
264	53	26																																	
280	54	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.</p> <p>Note: Slanted line shows the range of the rated input voltage.</p>																																			

**COSEL**

Model	LFA75F-48	Temperature	25°C																																																			
Item	Instantaneous Interruption Compensation	Testing Circuitry	Figure A																																																			
Object	+48V1.6A																																																					
1.Graph	<p>Legend:</p> <ul style="list-style-type: none"> <li>Input Volt. 100V</li> <li>Input Volt. 200V</li> <li>Input Volt. 230V</li> </ul>																																																					
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Note:	Slanted line shows the range of the rated load current.																																																					

**COSEL**

Model	LFA75F-48																																							
Item	Minimum Input Voltage for Regulated Output Voltage																																							
Object	+48V1.6A																																							
1.Graph																																								
<p>Input Voltage [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 50% (dashed line)</p> <p>Load 100% (solid line)</p>																																								
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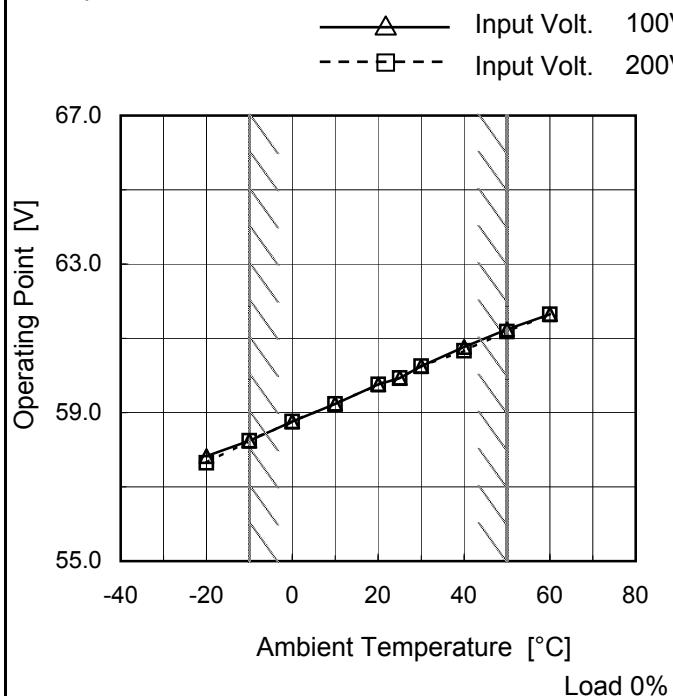
**COSEL**

Model	LFA75F-48																																										
Item	Overcurrent Protection	Temperature      25°C Testing Circuitry      Figure A																																									
Object	+48V1.6A																																										
1.Graph																																											
		2.Values																																									
<p>Note: Slanted line shows the range of the rated load current.</p> <p>Intermittent operation occurs when the output voltage is less than rated output voltage.</p>		<table border="1"> <thead> <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. 200[V]</th> </tr> </thead> <tbody> <tr><td>48.0</td><td>1.91</td><td>1.91</td></tr> <tr><td>45.6</td><td>-</td><td>-</td></tr> <tr><td>43.2</td><td>-</td><td>-</td></tr> <tr><td>38.4</td><td>-</td><td>-</td></tr> <tr><td>33.6</td><td>-</td><td>-</td></tr> <tr><td>28.8</td><td>-</td><td>-</td></tr> <tr><td>24.0</td><td>-</td><td>-</td></tr> <tr><td>19.2</td><td>-</td><td>-</td></tr> <tr><td>14.4</td><td>-</td><td>-</td></tr> <tr><td>9.6</td><td>-</td><td>-</td></tr> <tr><td>4.8</td><td>-</td><td>-</td></tr> <tr><td>0.0</td><td>-</td><td>-</td></tr> </tbody> </table>	Output Voltage [V]	Load Current [A]		Input Volt. 100[V]	Input Volt. 200[V]	48.0	1.91	1.91	45.6	-	-	43.2	-	-	38.4	-	-	33.6	-	-	28.8	-	-	24.0	-	-	19.2	-	-	14.4	-	-	9.6	-	-	4.8	-	-	0.0	-	-
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**COSEL**

Model	LFA75F-48
Item	Overvoltage Protection
Object	+48V1.6A

## 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. 100[V]	Input Volt. 200[V]
-20	57.83	57.65
-10	58.24	58.24
0	58.76	58.76
10	59.23	59.23
20	59.76	59.76
25	59.93	59.93
30	60.25	60.25
40	60.77	60.66
50	61.24	61.18
60	61.65	61.65
--	-	-

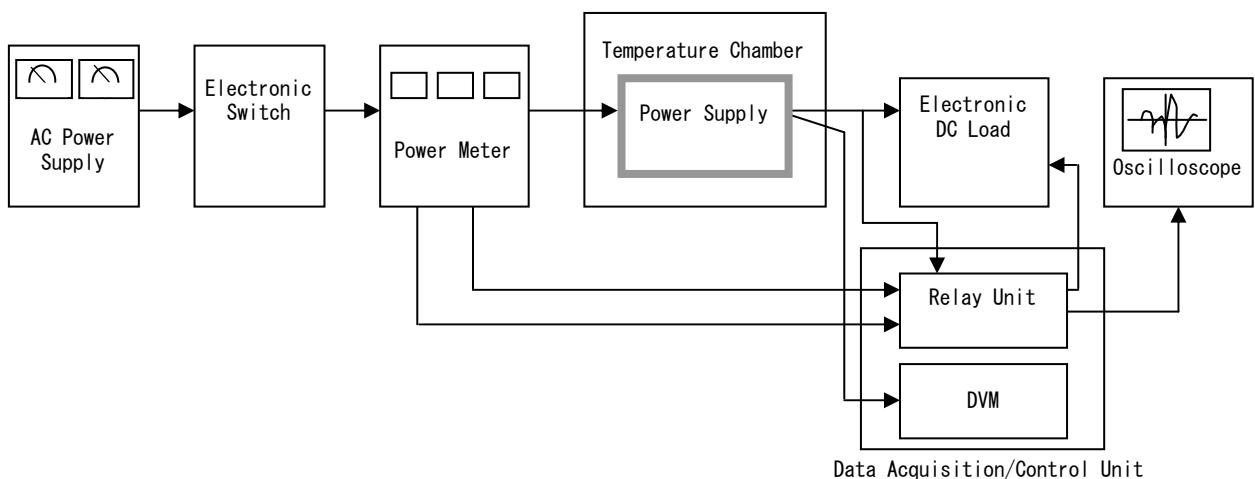


Figure A

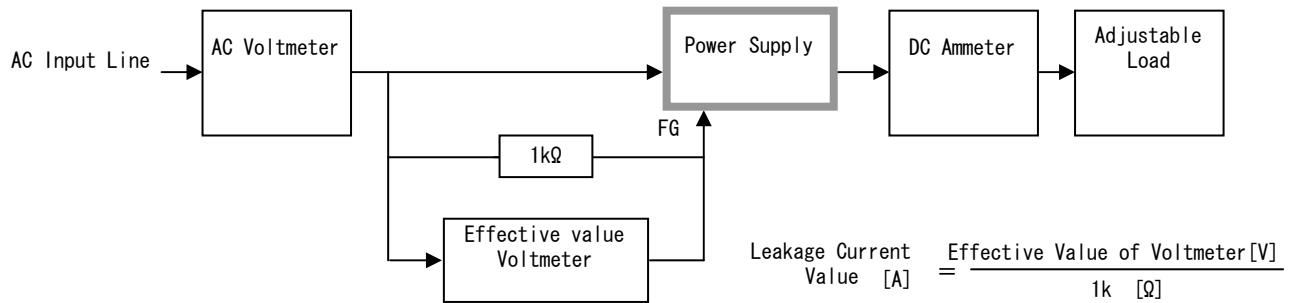


Figure B ( DEN-AN )

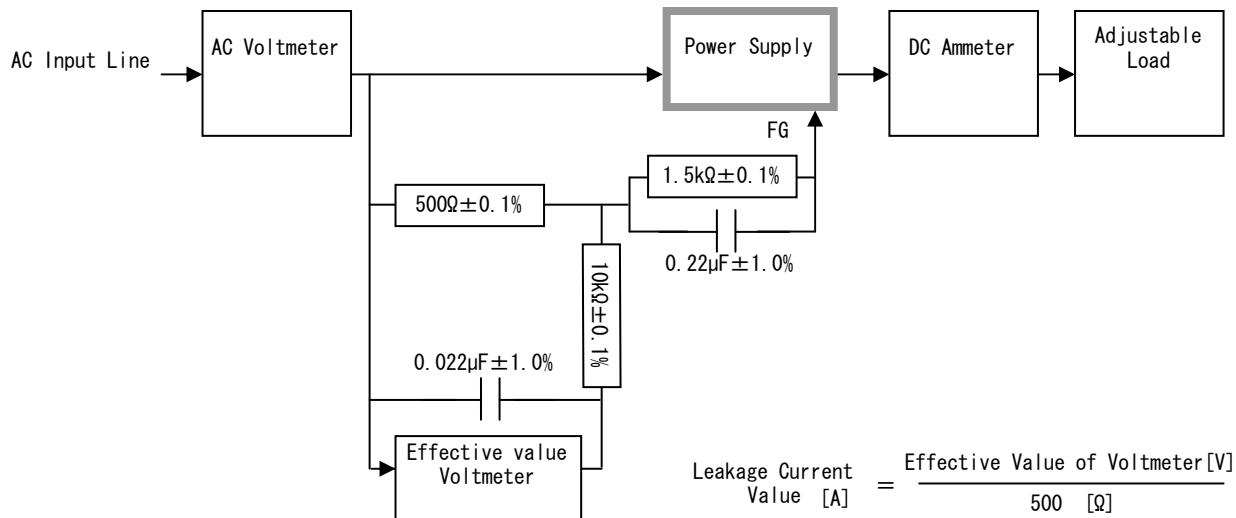


Figure B ( IEC60950-1 )

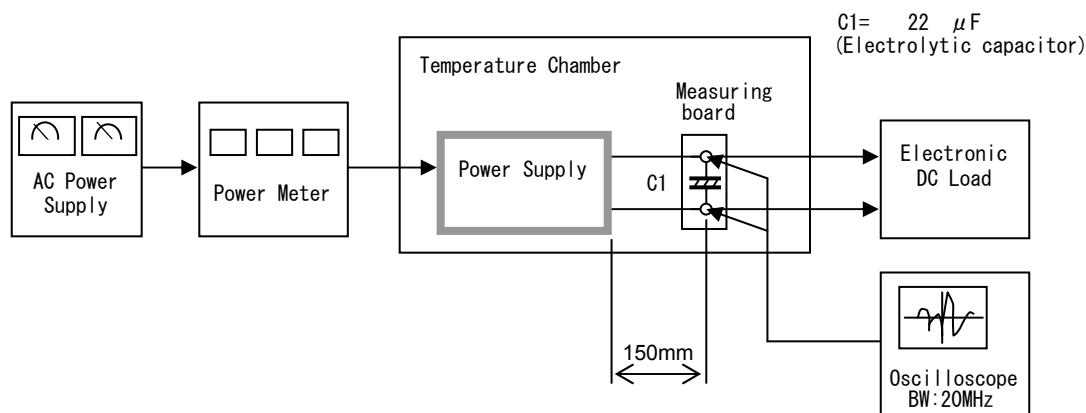


Figure C