

# TEST DATA OF FETA7000ST-48

Regulated DC Power Supply  
March 1, 2018

Approved by : Koji Todo Design Manager  
Koji Todo

Prepared by : Nobuto Kawataka Design Engineer  
Nobuto Kawataka

**COSEL CO.,LTD.**

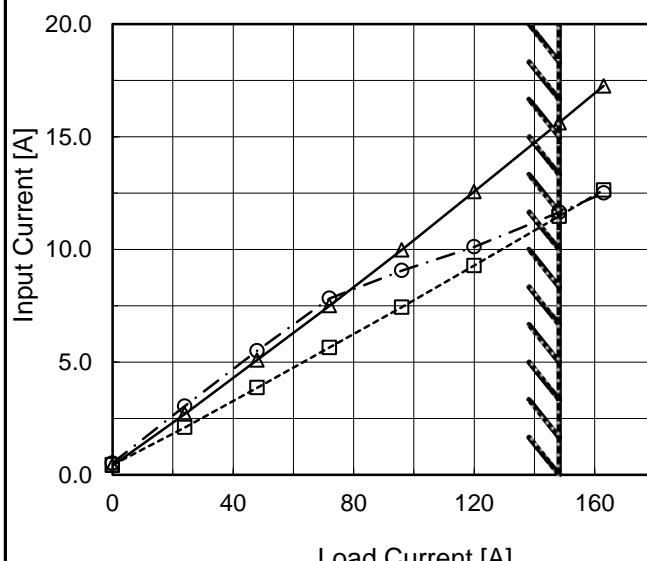


## CONTENTS

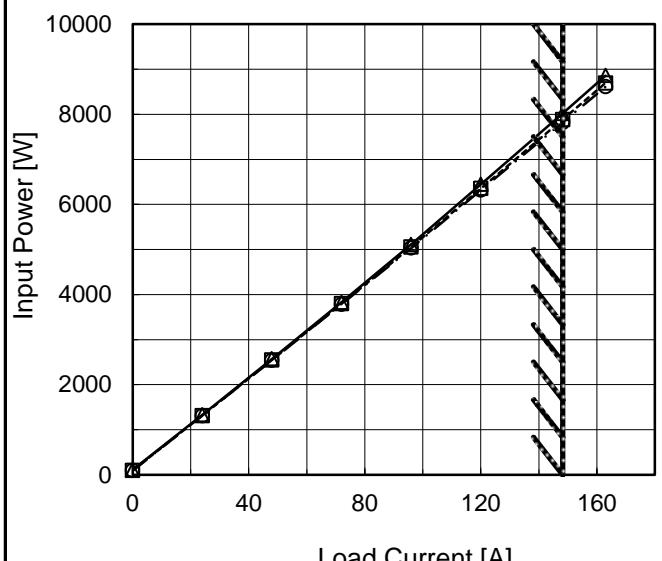
1.Input Current (by Load Current) . . . . .	1
2.Input Power (by Load Current) . . . . .	2
3.Efficiency (by Input Voltage) . . . . .	3
4.Efficiency (by Load Current) . . . . .	4
5.Power Factor (by Input Voltage) . . . . .	5
6.Power Factor (by Load Current) . . . . .	6
7.Inrush Current . . . . .	7
8.Leakage Current . . . . .	8
9.Line Regulation . . . . .	9
10.Load Regulation . . . . .	10
11.Dynamic Load Response . . . . .	11
12.Ripple Voltage (by Load Current) . . . . .	12
13.Ripple-Noise . . . . .	13
14.Ripple Voltage (by Ambient Temperature) . . . . .	14
15.Ambient Temperature Drift . . . . .	15
16.Output Voltage Accuracy . . . . .	16
17.Time Lapse Drift . . . . .	17
18.Rise and Fall Time . . . . .	18
19.Hold-Up Time . . . . .	19
20.Instantaneous Interruption Compensation . . . . .	20
21.Minimum Input Voltage for Regulated Output Voltage . . . . .	21
22.Overcurrent Protection . . . . .	22
23.Oversupply Protection . . . . .	23
24.Figure of Testing Circuitry . . . . .	24

(Final Page 24)

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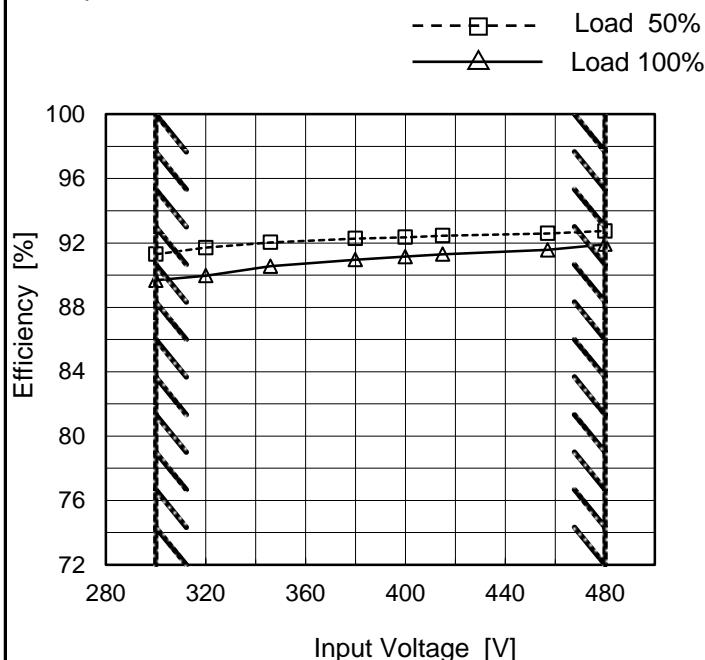
Note: Slanted line shows the range of the rated load current.

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Model	FETA7000ST-48
Item	Efficiency (by Input Voltage)
Object	_____

Input      3  $\phi$  4-Wire  
 Temperature      25°C  
 Testing Circuitry      Figure A

## 1.Graph



## 2.Values

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
300	91.3	89.7
320	91.7	90.0
346	92.0	90.6
380	92.3	91.0
400	92.4	91.2
415	92.5	91.3
457	92.6	91.6
480	92.7	91.9
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Note: Slanted line shows the range of the rated input voltage.

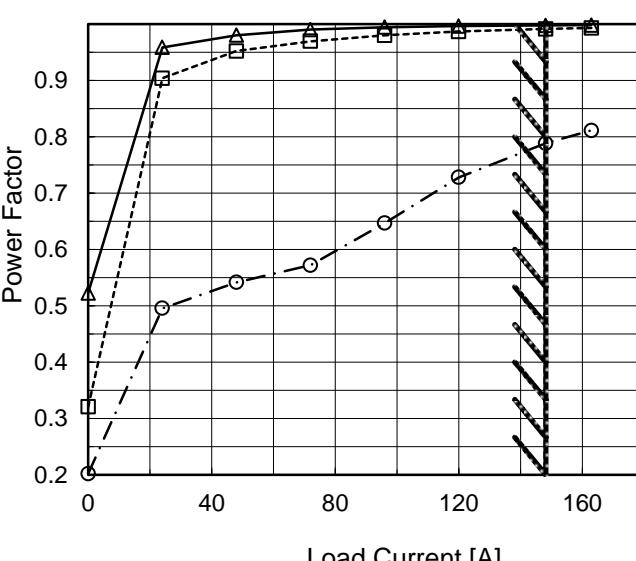
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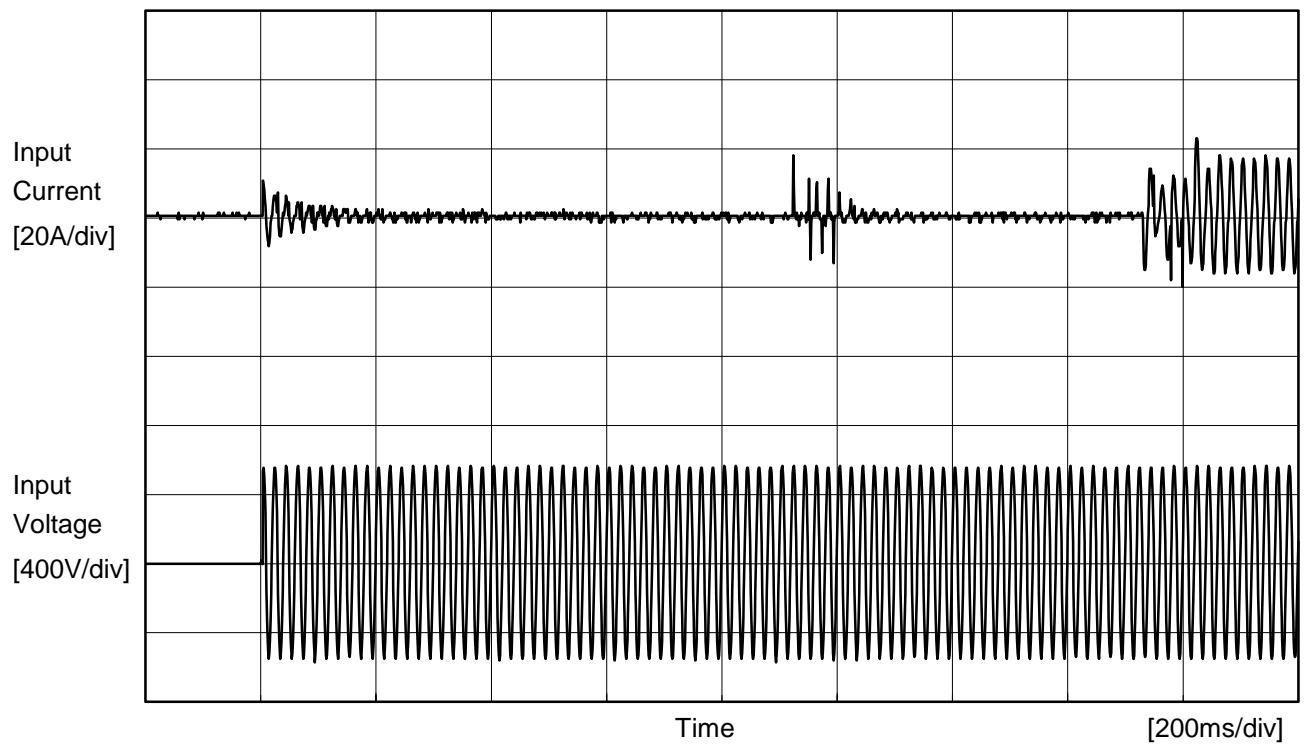
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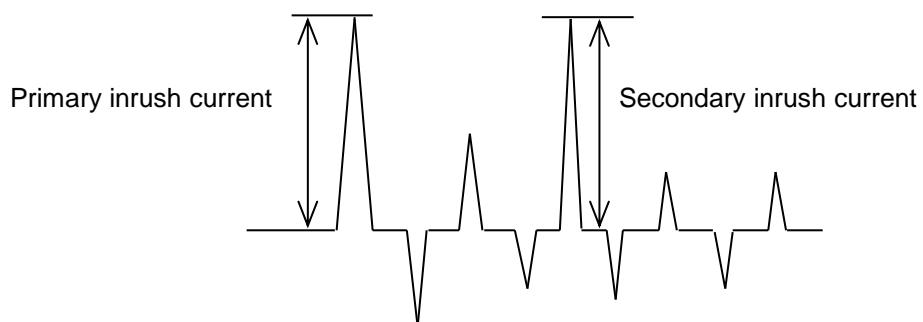
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Model	FETA7000ST-48	Input	3φ 4-Wire
Item	Inrush Current	Temperature	25°C
Object	_____	Testing Circuitry	Figure A



Input Voltage      400 V  
 Frequency          50 Hz  
 Load                100 %

Primary inrush current    10.8 A  
 Secondary inrush current    23.1 A





Model	FETA7000ST-48	Input	3φ 4-Wire
Item	Leakage Current	Temperature	25°C
Object	_____	Testing Circuitry	Figure B

### 1. Results

Standards	Leakage Current [mA]		
	Input Volt. 300 [V]	Input Volt. 400 [V]	Input Volt. 480 [V]
(B)IEC60950-1	2.70	3.40	4.40

### 2. Condition

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

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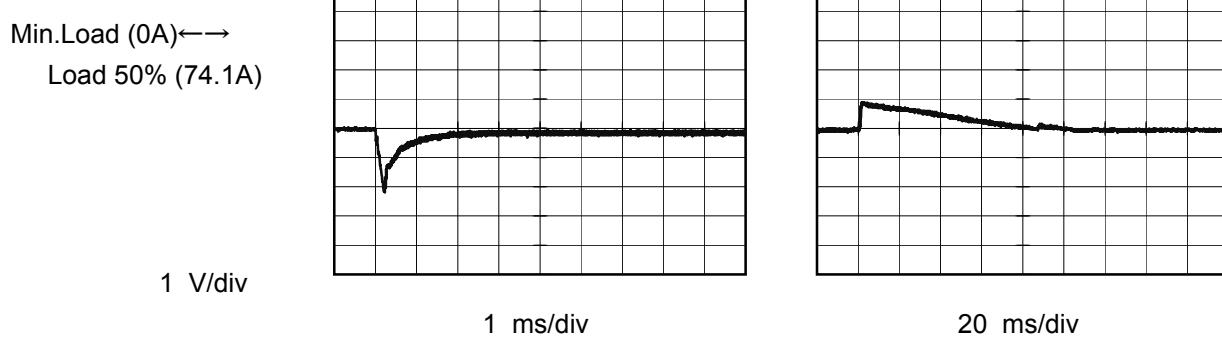
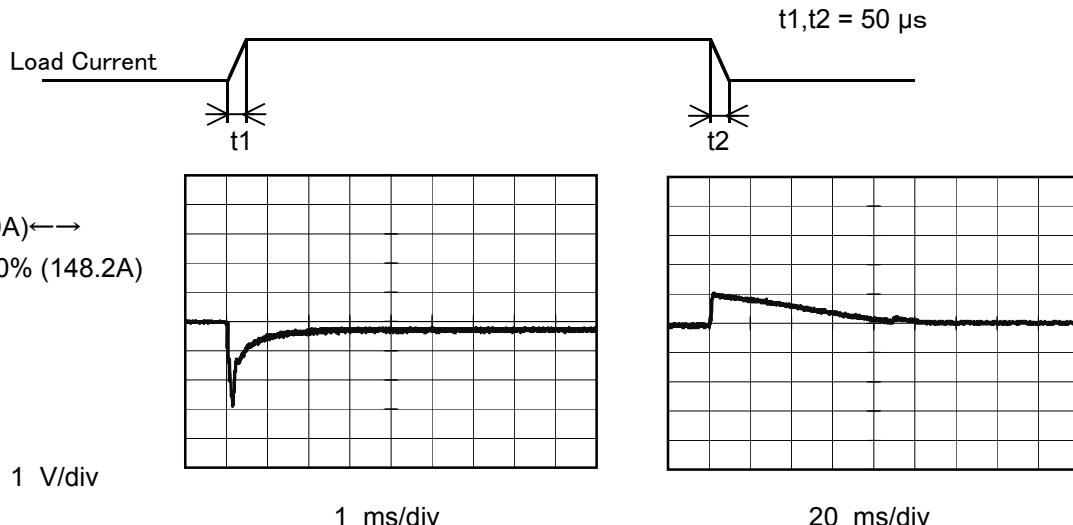
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Object	+48V148.2A	Testing Circuitry	Figure A																																																			
1.Graph		2.Values																																																				
<p>The graph plots Output Voltage [V] on the Y-axis (47.8 to 49.0) against Load Current [A] on the X-axis (0 to 160). Three data series are shown for Input Volt. 300V (solid line with open triangles), Input Volt. 400V (dashed line with open squares), and Input Volt. 480V (dash-dot line with open circles). All curves show a slight decrease in output voltage as load current increases. A vertical dashed line at approximately 148A marks the rated load current.</p>		<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="3">Output Voltage [V]</th> </tr> <tr> <th>Input Volt. 300[V]</th> <th>Input Volt. 400[V]</th> <th>Input Volt. 480[V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>48.59</td><td>48.59</td><td>48.58</td></tr> <tr><td>20.0</td><td>48.47</td><td>48.48</td><td>48.47</td></tr> <tr><td>40.0</td><td>48.43</td><td>48.44</td><td>48.44</td></tr> <tr><td>60.0</td><td>48.39</td><td>48.40</td><td>48.39</td></tr> <tr><td>80.0</td><td>48.34</td><td>48.35</td><td>48.35</td></tr> <tr><td>100.0</td><td>48.30</td><td>48.30</td><td>48.30</td></tr> <tr><td>120.0</td><td>48.25</td><td>48.25</td><td>48.25</td></tr> <tr><td>140.0</td><td>48.20</td><td>48.20</td><td>48.20</td></tr> <tr><td>148.2</td><td>48.18</td><td>48.18</td><td>48.19</td></tr> <tr><td>163.0</td><td>48.15</td><td>48.15</td><td>48.15</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> </tbody> </table>		Load Current [A]	Output Voltage [V]			Input Volt. 300[V]	Input Volt. 400[V]	Input Volt. 480[V]	0.0	48.59	48.59	48.58	20.0	48.47	48.48	48.47	40.0	48.43	48.44	48.44	60.0	48.39	48.40	48.39	80.0	48.34	48.35	48.35	100.0	48.30	48.30	48.30	120.0	48.25	48.25	48.25	140.0	48.20	48.20	48.20	148.2	48.18	48.18	48.19	163.0	48.15	48.15	48.15	--	-	-	-
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--	-	-	-																																																			
Note: Slanted line shows the range of the rated load current.																																																						

**COSEL**

Model	FETA7000ST-48
Item	Dynamic Load Response
Object	+48V148.2A

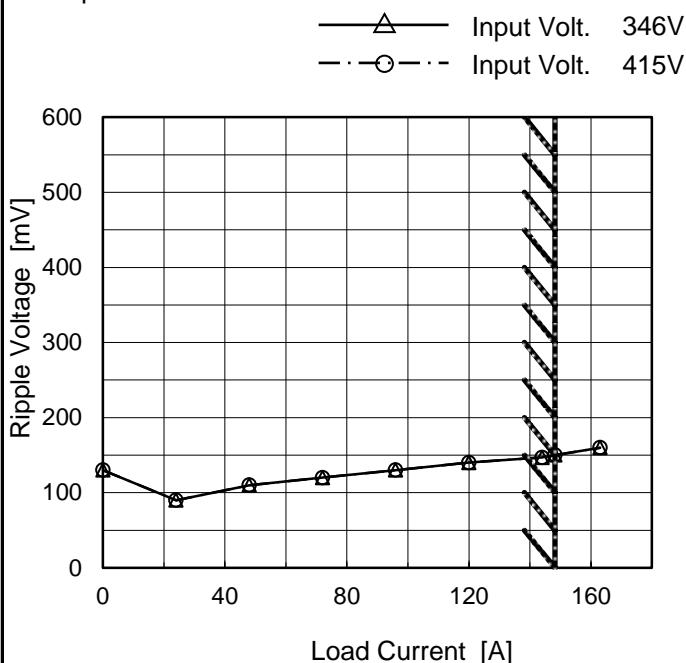
Temperature 25°C  
Testing Circuitry Figure AInput Volt. 200 V  
Cycle 1000 ms

**COSEL**

Model	FETA7000ST-48
Item	Ripple Voltage (by Load Current)
Object	+48V148.2A

Input      3φ 4-Wire  
 Temperature      25°C  
 Testing Circuitry      Figure B

## 1.Graph



## 2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 346 [V]	Input Volt. 415 [V]
0.0	130	130
24.0	90	90
48.0	110	110
72.0	120	120
96.0	130	130
120.0	140	140
144.0	147	147
148.2	150	150
163.0	160	160
--	-	-
--	-	-

Measured by 500 MHz Oscilloscope.

Ripple Voltage is shown as p-p in the figure below.

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

Ripple [mVp-p]

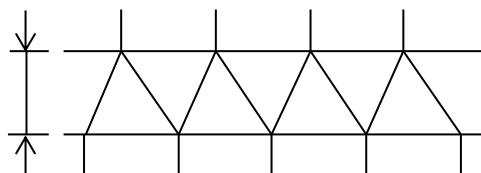


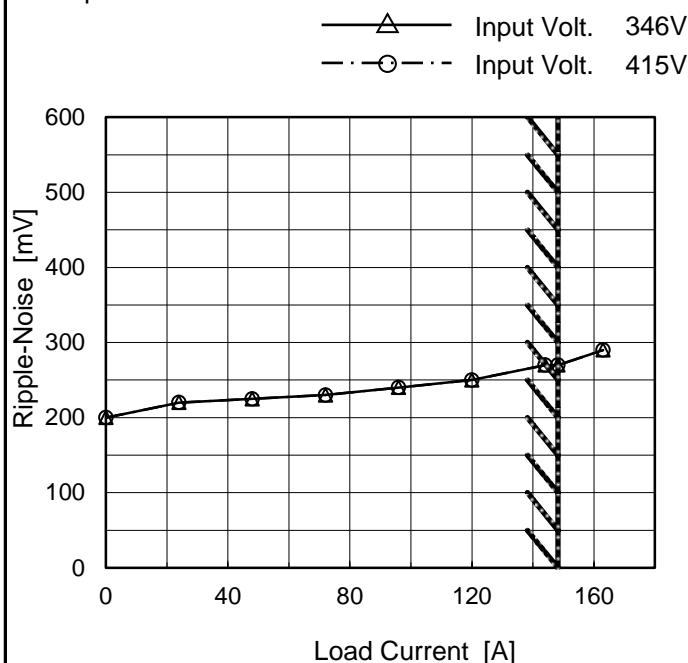
Fig.Complex Ripple Wave Form

**COSEL**

Model	FETA7000ST-48
Item	Ripple-Noise
Object	+48V148.2A

Input            3φ 4-Wire  
 Temperature    25°C  
 Testing Circuitry    Figure B

## 1.Graph



## 2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 346 [V]	Input Volt. 415 [V]
0.0	200	200
24.0	220	220
48.0	225	225
72.0	230	230
96.0	240	240
120.0	250	250
144.0	270	270
148.2	270	270
163.0	290	290
--	-	-
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Measured by MHz Oscilloscope.

Ripple-Noise is shown as p-p in the figure below.

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

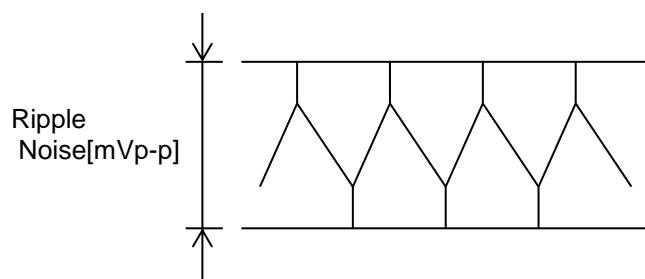


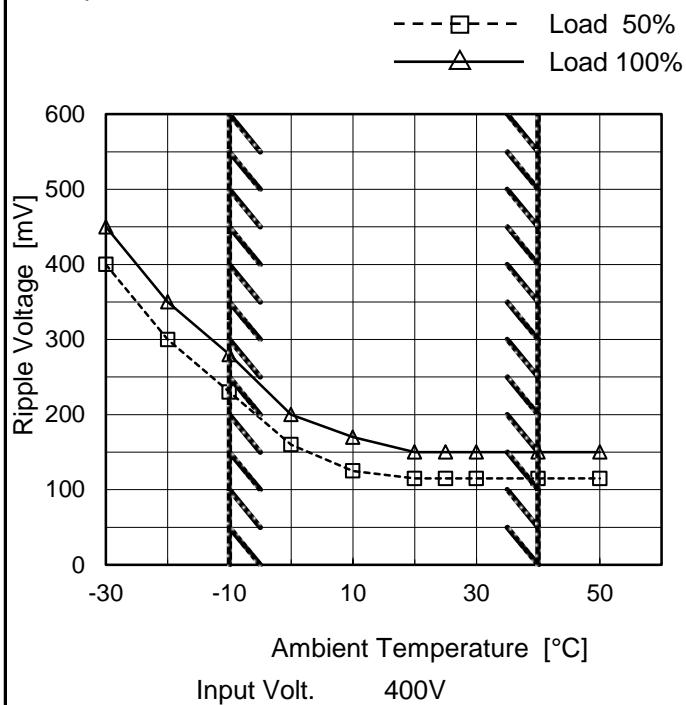
Fig.Complex Ripple Noise Wave Form

**COSEL**

Model	FETA7000ST-48
Item	Ripple Voltage (by Ambient Temp.)
Object	+48V148.2A

 Input Testing Circuitry 3φ 4-Wire  
 Figure A

## 1.Graph



## 2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-30	400	450
-20	300	350
-10	230	280
0	160	200
10	125	170
20	115	150
25	115	150
30	115	150
40	115	150
50	115	150
--	-	-

Measured by 500 MHz Oscilloscope.

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

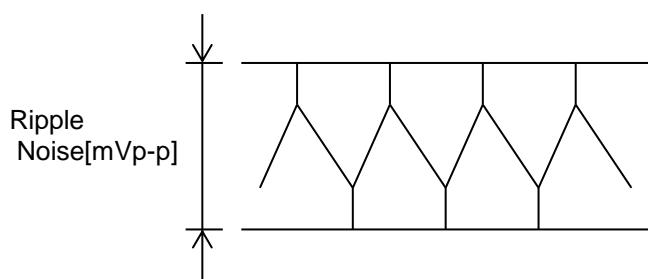
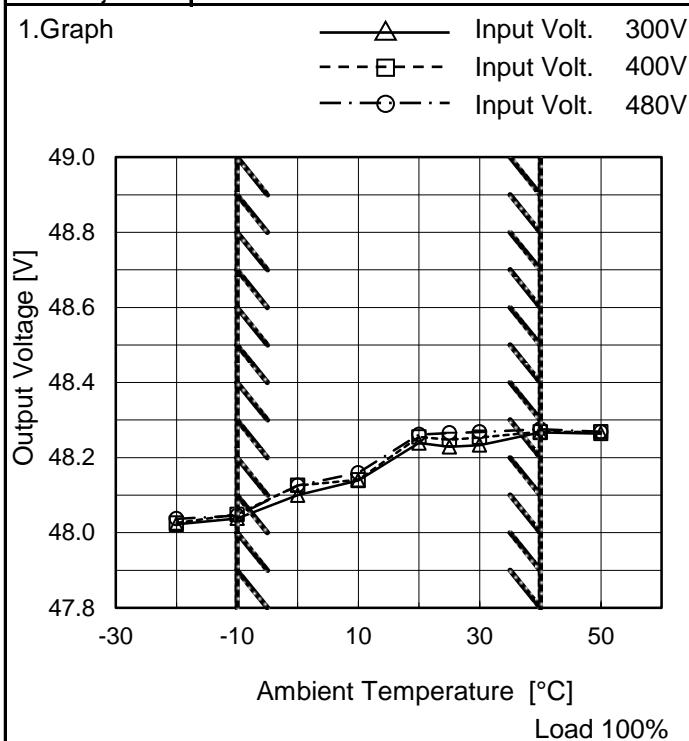


Fig.Complex Ripple Noise Wave Form

**COSEL**

Model	FETA7000ST-48
Item	Ambient Temperature Drift
Object	+48V148.2A


 Input Testing Circuitry 3φ 4-Wire  
 Figure A

## 2.Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 300[V]	Input Volt. 400[V]	Input Volt. 480[V]
-20	48.022	48.026	48.037
-10	48.038	48.049	48.046
0	48.100	48.126	48.126
10	48.139	48.141	48.160
20	48.239	48.255	48.261
25	48.229	48.248	48.266
30	48.233	48.254	48.268
40	48.267	48.269	48.276
50	48.264	48.268	48.269
--	-	-	-
--	-	-	-

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



Model	FETA7000ST-48	Input Testing Circuitry      3φ 4-Wire Figure A
Item	Output Voltage Accuracy	
Object	+48V148.2A	

### 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 - 40°C

Input Voltage : 300 - 480V

Load Current : 0 - 148.2A

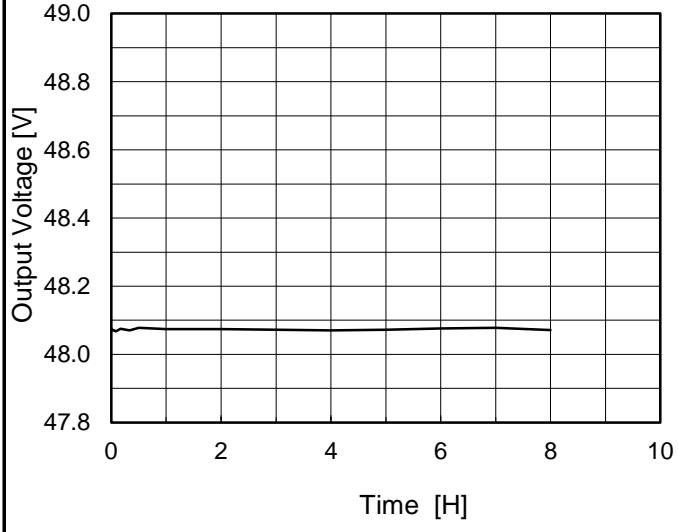
\* Output Voltage Accuracy = ±(Maximum of Output Voltage - Minimum of Output Voltage) / 2

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

### 2. Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	40	480	0	48.669	±316	±0.7
Minimum Voltage	-10	300	148.2	48.038		

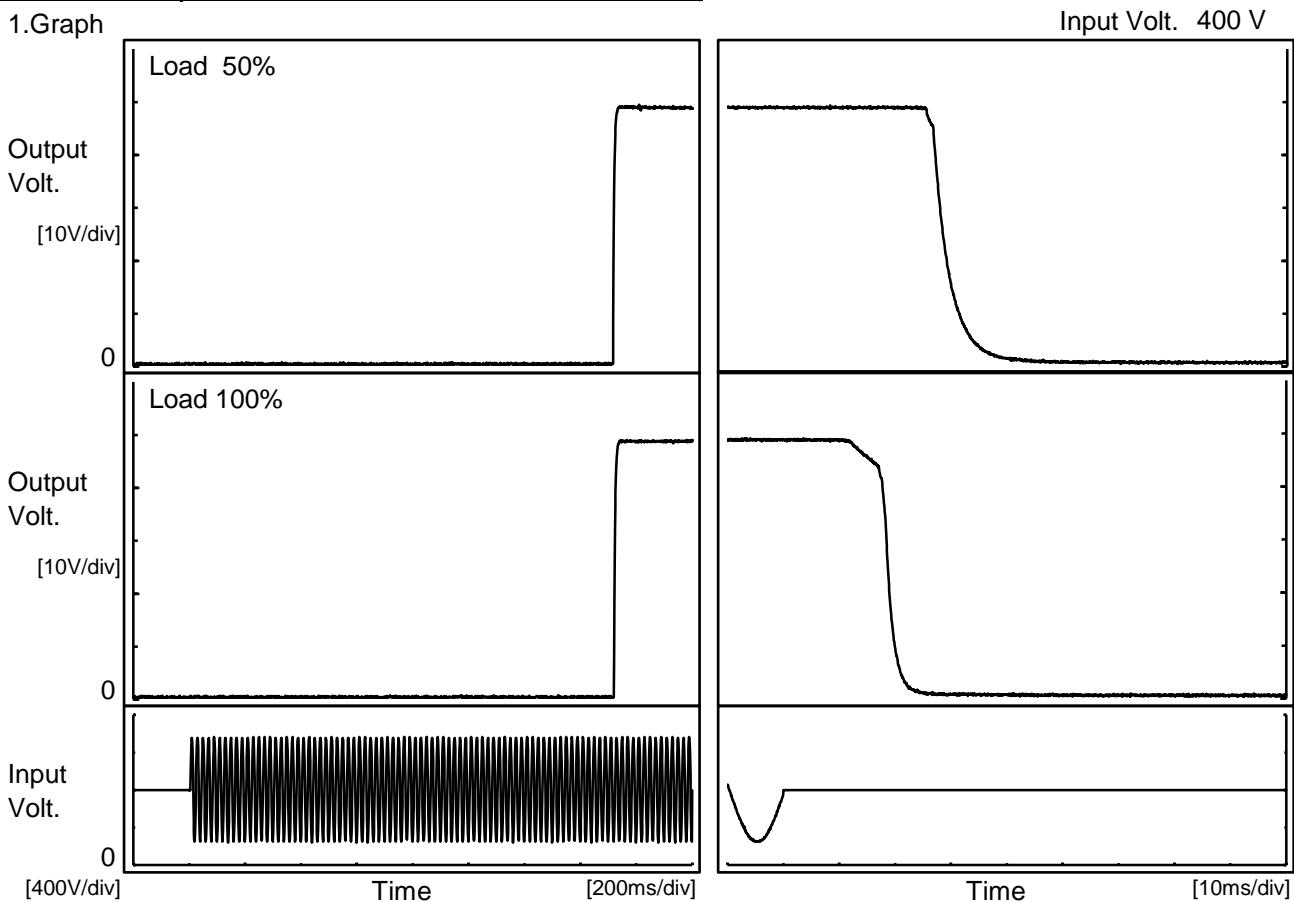
**COSEL**

Model	FETA7000ST-48	Input	3φ 4-Wire																						
Item	Time Lapse Drift	Temperature	25°C																						
Object	+48V148.2A	Testing Circuitry	Figure A																						
1. Graph			2. Values																						
 <p>Output Voltage [V]</p> <p>Time [H]</p> <p>Input Volt. 400V 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>48.076</td></tr> <tr><td>0.5</td><td>48.078</td></tr> <tr><td>1.0</td><td>48.074</td></tr> <tr><td>2.0</td><td>48.075</td></tr> <tr><td>3.0</td><td>48.072</td></tr> <tr><td>4.0</td><td>48.070</td></tr> <tr><td>5.0</td><td>48.073</td></tr> <tr><td>6.0</td><td>48.076</td></tr> <tr><td>7.0</td><td>48.078</td></tr> <tr><td>8.0</td><td>48.071</td></tr> </tbody> </table>	Time since start [H]	Output Voltage [V]	0.0	48.076	0.5	48.078	1.0	48.074	2.0	48.075	3.0	48.072	4.0	48.070	5.0	48.073	6.0	48.076	7.0	48.078	8.0	48.071
Time since start [H]	Output Voltage [V]																								
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**COSEL**

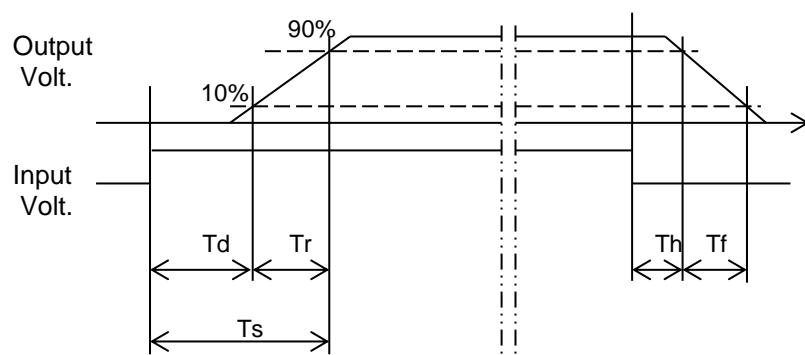
Model	FETA7000ST-48	Input	3 $\phi$ 4-Wire
Item	Rise and Fall Time	Temperature	25°C
Object	+48V148.2A	Testing Circuitry	Figure A

## 1. Graph



## 2. Values

Load	Time	Td	Tr	Ts	Th	Tf	[ms]
50 %		1515.0	7.0	1522.0	26.9	6.7	
100 %		1518.0	8.0	1526.0	17.1	3.8	

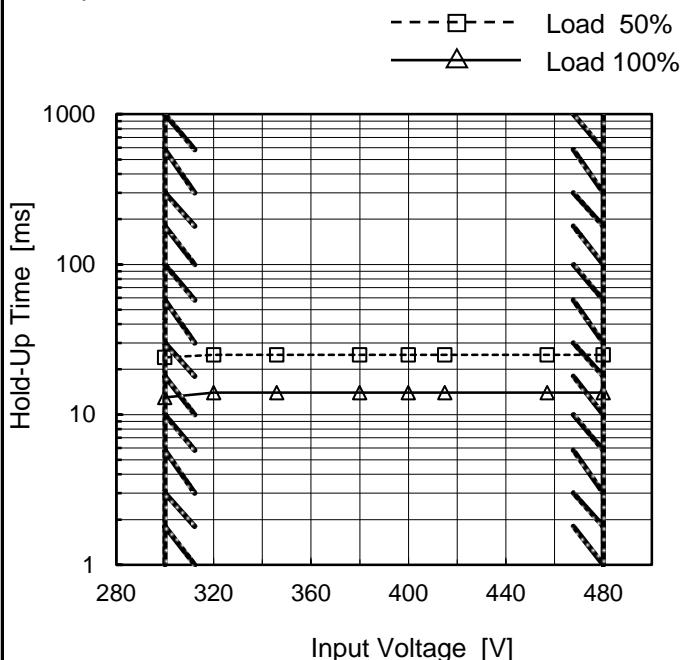


**COSEL**

Model	FETA7000ST-48
Item	Hold-Up Time
Object	+48V148.2A

Input      3  $\phi$  4-Wire  
 Temperature      25°C  
 Testing Circuitry      Figure A

## 1. Graph



## 2. Values

Input Voltage [V]	Hold-Up Time [ms]	
	Load 50%	Load 100%
300	24	13
320	25	14
346	25	14
380	25	14
400	25	14
415	25	14
457	25	14
480	25	14
--	-	-

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.

**COSEL**

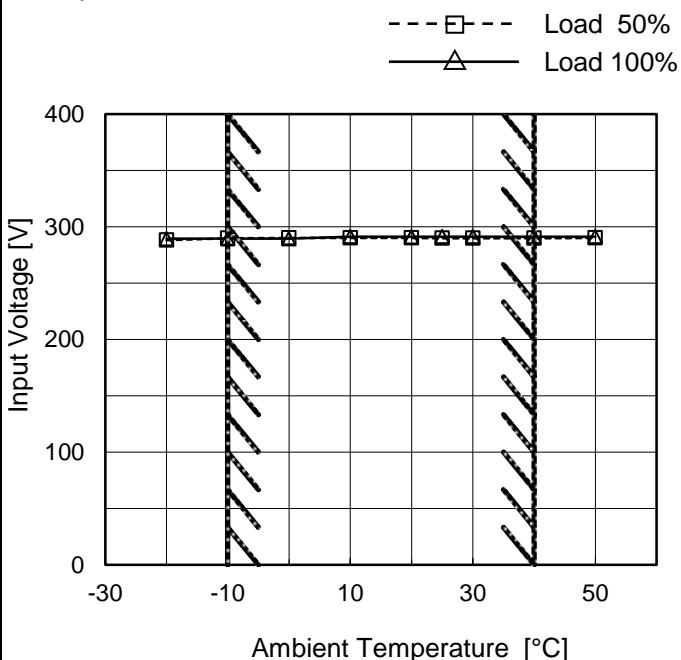
Model	FETA7000ST-48	Input	3 $\phi$ 4-Wire																																																			
Item	Instantaneous Interruption Compensation	Temperature	25°C																																																			
Object	+48V148.2A	Testing Circuitry	Figure A																																																			
1.Graph		2.Values																																																				
		<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="3">Time [ms]</th> </tr> <tr> <th>Input Volt. 300[V]</th> <th>Input Volt. 400[V]</th> <th>Input Volt. 480[V]</th> </tr> </thead> <tbody> <tr> <td>0.0</td><td>-</td><td>-</td><td>-</td></tr> <tr> <td>24.0</td><td>72.7</td><td>74.4</td><td>74.2</td></tr> <tr> <td>48.0</td><td>34.1</td><td>36.4</td><td>36.2</td></tr> <tr> <td>72.0</td><td>22.7</td><td>24.6</td><td>24.1</td></tr> <tr> <td>96.0</td><td>16.5</td><td>17.3</td><td>17.4</td></tr> <tr> <td>120.0</td><td>16.5</td><td>17.1</td><td>17.3</td></tr> <tr> <td>144.0</td><td>14.5</td><td>15.3</td><td>15.2</td></tr> <tr> <td>148.2</td><td>13.8</td><td>14.8</td><td>14.8</td></tr> <tr> <td>163.0</td><td>12.2</td><td>12.5</td><td>12.5</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]	Time [ms]			Input Volt. 300[V]	Input Volt. 400[V]	Input Volt. 480[V]	0.0	-	-	-	24.0	72.7	74.4	74.2	48.0	34.1	36.4	36.2	72.0	22.7	24.6	24.1	96.0	16.5	17.3	17.4	120.0	16.5	17.1	17.3	144.0	14.5	15.3	15.2	148.2	13.8	14.8	14.8	163.0	12.2	12.5	12.5	--	-	-	-	--	-	-	-
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<p>Note: Slanted line shows the range of the rated load current.</p>																																																						

**COSEL**

Model	FETA7000ST-48
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+48V148.2A

Input Testing Circuitry 3 $\phi$  4-Wire  
Figure A

## 1.Graph



## 2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	289	290
-10	290	290
0	291	290
10	291	292
20	291	292
25	290	292
30	290	292
40	290	292
50	291	292
--	-	-
--	-	-

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

**COSEL**

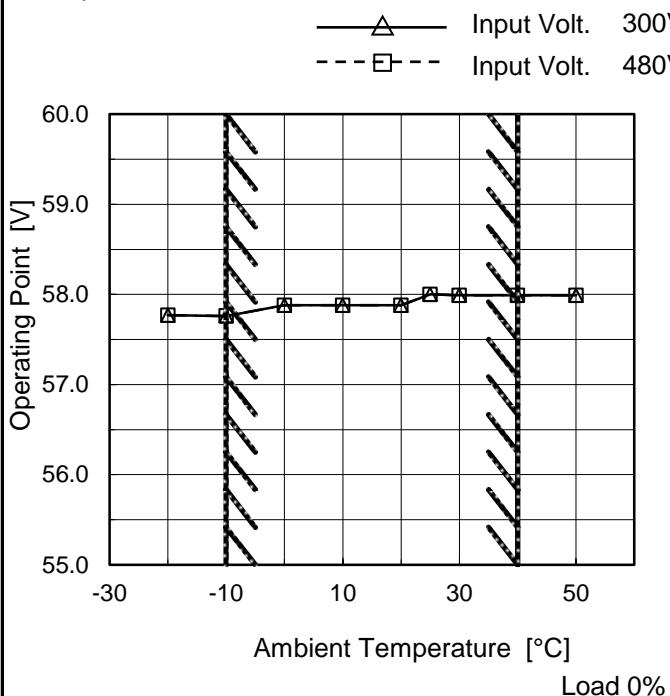
Model	FETA7000ST-48	Input	3 $\phi$ 4-Wire																																																							
Item	Overcurrent Protection	Temperature	25°C																																																							
Object	+48V148.2A	Testing Circuitry	Figure A																																																							
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<p>Output Voltage [V]</p> <p>Load Current [A]</p>		<table border="1"> <thead> <tr> <th rowspan="2">Output Voltage [V]</th> <th colspan="3">Load Current [A]</th> </tr> <tr> <th>Input Volt. 300[V]</th> <th>Input Volt. 400[V]</th> <th>Input Volt. 480[V]</th> </tr> </thead> <tbody> <tr><td>48.310</td><td>177.9</td><td>178.0</td><td>178.0</td></tr> <tr><td>47.070</td><td>179.2</td><td>179.2</td><td>179.2</td></tr> <tr><td>45.630</td><td>179.5</td><td>179.4</td><td>179.5</td></tr> <tr><td>44.270</td><td>179.7</td><td>179.7</td><td>179.7</td></tr> <tr><td>42.980</td><td>179.9</td><td>179.9</td><td>180.0</td></tr> <tr><td>40.620</td><td>180.2</td><td>180.2</td><td>180.3</td></tr> <tr><td>38.500</td><td>180.6</td><td>180.6</td><td>180.6</td></tr> <tr><td>36.620</td><td>180.8</td><td>180.8</td><td>180.8</td></tr> <tr><td>34.080</td><td>181.1</td><td>181.1</td><td>181.2</td></tr> <tr><td>31.880</td><td>181.4</td><td>181.4</td><td>181.5</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> </tbody> </table>		Output Voltage [V]	Load Current [A]			Input Volt. 300[V]	Input Volt. 400[V]	Input Volt. 480[V]	48.310	177.9	178.0	178.0	47.070	179.2	179.2	179.2	45.630	179.5	179.4	179.5	44.270	179.7	179.7	179.7	42.980	179.9	179.9	180.0	40.620	180.2	180.2	180.3	38.500	180.6	180.6	180.6	36.620	180.8	180.8	180.8	34.080	181.1	181.1	181.2	31.880	181.4	181.4	181.5	--	-	-	-	--	-	-	-
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Note: Slanted line shows the range of the rated load current.																																																										

**COSEL**

Model	FETA7000ST-48
Item	Overvoltage Protection
Object	+48V148.2A

 Input Testing Circuitry 3φ 4-Wire  
 Figure A

## 1.Graph



## 2.Values

Ambient Temperature [°C]	Operating Point [V]	
	Input Volt. 300[V]	Input Volt. 480[V]
-20	57.8	57.8
-10	57.8	57.8
0	57.9	57.9
10	57.9	57.9
20	57.9	57.9
25	58.0	58.0
30	58.0	58.0
40	58.0	58.0
50	58.0	58.0
--	-	-
--	-	-

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

COSEL

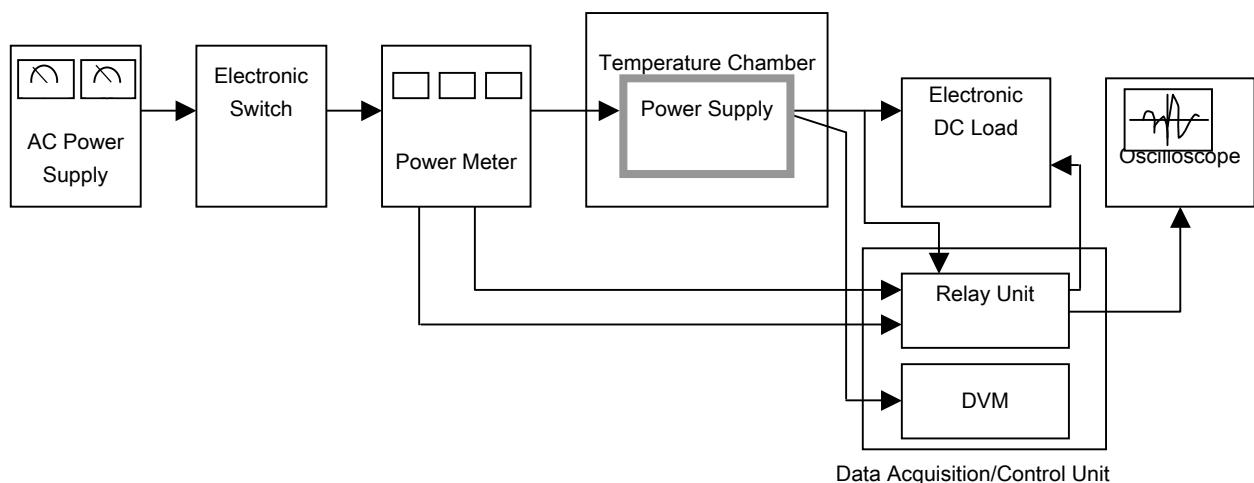


Figure A

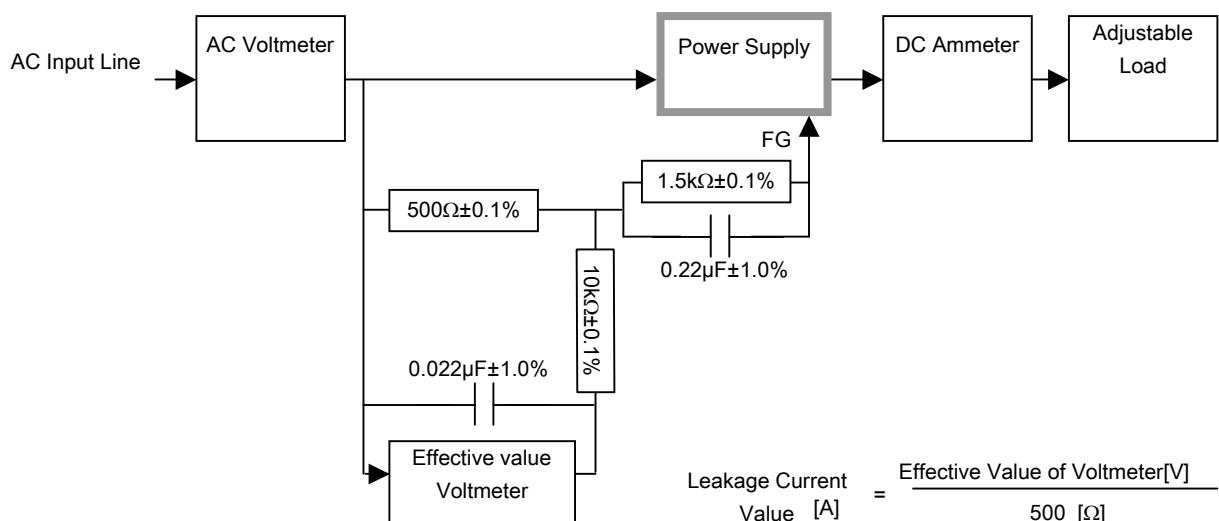


Figure B ( IEC60950-1 )