

# TEST DATA OF KHEA30F-5

Regulated DC Power Supply  
April 28, 2014

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Yukihiro Takehashi Design Manager

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Yasunari Hirano Design Engineer

**COSEL CO.,LTD.**

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Model		KHEA30F-5	
Item		Power Factor (by Input Voltage)	
Object			

1.Graph

Load 50%

Load 100%

Power Factor

1.0

0.8

0.6

0.4

0.2

0.0

50

100

150

200

250

300

Input Voltage [V]

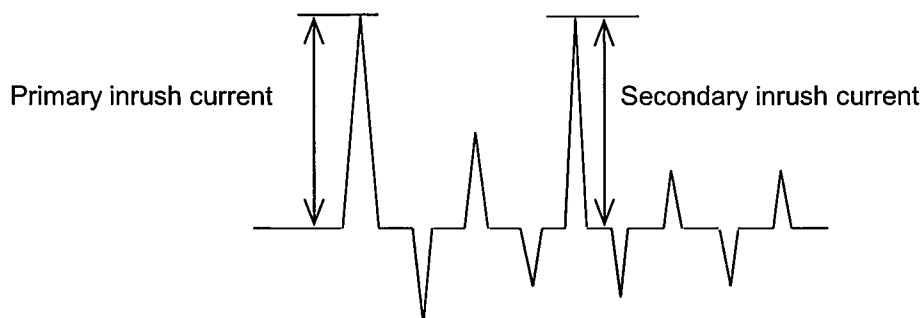
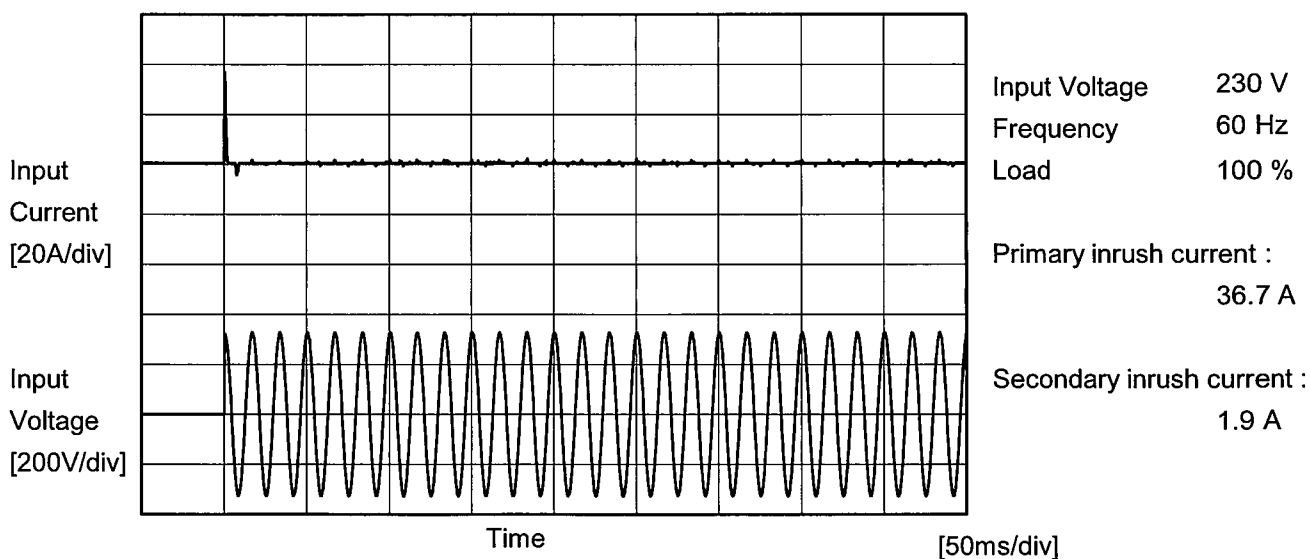
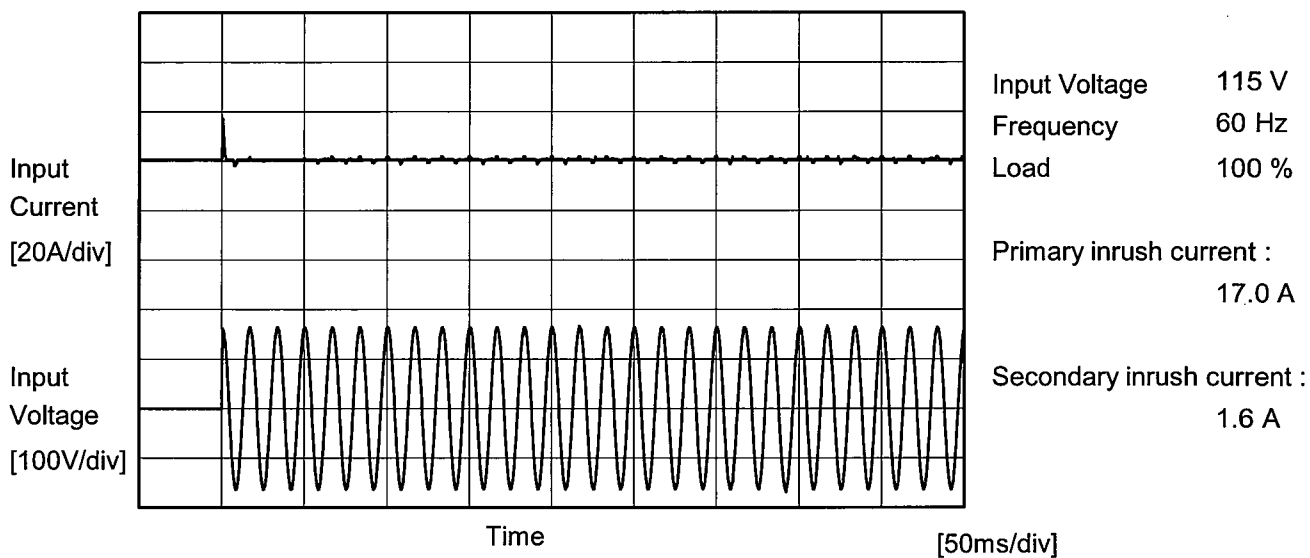
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Model	KHEA30F-5	Temperature 25°C Testing Circuitry Figure A	
Item	Inrush Current		
Object			



**COSEL**

		Temperature 25°C Testing Circuitry Figure B
Model	KHEA30F-5	
Item	Leakage Current	
Object	_____	

## 1.Results

[mA]

Standards		Input Volt.			Note
		100 [V]	115 [V]	240 [V]	
DEN-AN	Both phases	0.13	0.15	0.32	Operation
	One of phases	0.27	0.31	0.69	Stand by
IEC60950-1	Both phases	0.20	0.22	0.46	Operation
	One of phases	0.41	0.46	0.70	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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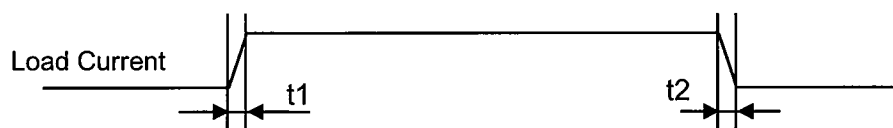
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1.Graph		2.Values																																																				
<div><div><div><div><div></div><div>△</div></div><div>—</div><div>Input Volt. 100V</div></div><div><div><div></div><div>□</div></div><div>- - -</div><div>Input Volt. 115V</div></div><div><div><div></div><div>○</div></div><div>- · - · -</div><div>Input Volt. 230V</div></div></div><div><p>Output Voltage [V]</p><p>Load Current [A]</p></div><p>Note: Slanted line shows the range of the rated load current.</p></div>		<table><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. 115[V]</th><th>Input Volt. 230[V]</th></tr><tr><td>0.00</td><td>5.082</td><td>5.082</td><td>5.082</td></tr><tr><td>0.25</td><td>5.080</td><td>5.080</td><td>5.080</td></tr><tr><td>0.50</td><td>5.079</td><td>5.079</td><td>5.079</td></tr><tr><td>0.75</td><td>5.079</td><td>5.079</td><td>5.079</td></tr><tr><td>1.00</td><td>5.078</td><td>5.078</td><td>5.079</td></tr><tr><td>1.50</td><td>5.078</td><td>5.078</td><td>5.078</td></tr><tr><td>2.00</td><td>5.077</td><td>5.077</td><td>5.078</td></tr><tr><td>2.50</td><td>5.077</td><td>5.077</td><td>5.078</td></tr><tr><td>4.00</td><td>5.074</td><td>5.074</td><td>5.074</td></tr><tr><td>5.00</td><td>5.072</td><td>5.071</td><td>5.070</td></tr><tr><td>5.50</td><td>5.070</td><td>5.068</td><td>5.066</td></tr></table>		Load Current [A]	Output Voltage [V]			Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]	0.00	5.082	5.082	5.082	0.25	5.080	5.080	5.080	0.50	5.079	5.079	5.079	0.75	5.079	5.079	5.079	1.00	5.078	5.078	5.079	1.50	5.078	5.078	5.078	2.00	5.077	5.077	5.078	2.50	5.077	5.077	5.078	4.00	5.074	5.074	5.074	5.00	5.072	5.071	5.070	5.50	5.070	5.068	5.066
Load Current [A]	Output Voltage [V]																																																					
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# COSEL

Model	KHEA30F-5	Temperature	25° C
Item	Dynamic Load Response	Testing Circuitry	Figure A
Object	+5V5A		

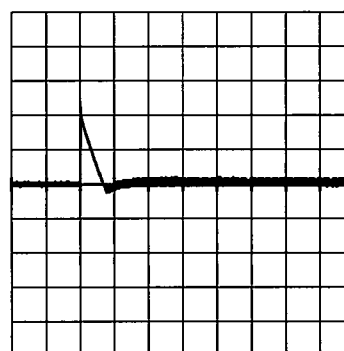
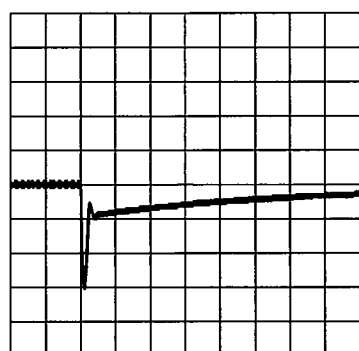
Input Volt. 230 V  
Cycle 1000 ms

Response.  $t_1=t_2=50\mu s$ . Typ



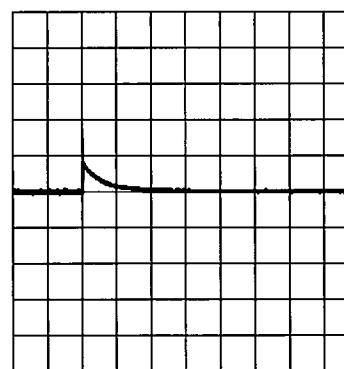
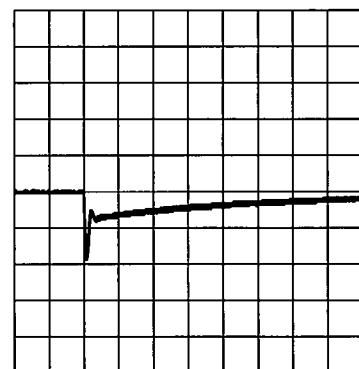
Min.Load (0A)  $\longleftrightarrow$   
Load 100% (5A)

200mV/div



Load 30%(1.5A)  $\longleftrightarrow$   
Load 100% (5A)

200mV/div



\* The characteristic of AC115V is equal.

# COSEL

Model	KHEA30F-5																																								
Item	Ripple Voltage (by Load Current)	Temperature	25°C																																						
Object	+5V5A	Testing Circuitry	Figure C																																						
1.Graph		2.Values																																							
<div><div><div>—△— Input Volt. 115V</div><div>-·-○-·- Input Volt. 230V</div></div><div>Ripple Voltage [mV]</div><div>Load Current [A]</div></div>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="2">Ripple Voltage [mV]</th></tr><tr><th>Input Volt. 115 [V]</th><th>Input Volt. 230 [V]</th></tr><tr><td>0.00</td><td>25</td><td>45</td></tr><tr><td>0.25</td><td>35</td><td>40</td></tr><tr><td>0.50</td><td>30</td><td>50</td></tr><tr><td>0.75</td><td>35</td><td>10</td></tr><tr><td>1.00</td><td>10</td><td>10</td></tr><tr><td>1.50</td><td>10</td><td>10</td></tr><tr><td>2.00</td><td>10</td><td>10</td></tr><tr><td>2.50</td><td>10</td><td>10</td></tr><tr><td>4.00</td><td>20</td><td>15</td></tr><tr><td>5.00</td><td>40</td><td>20</td></tr><tr><td>5.50</td><td>50</td><td>25</td></tr></table>		Load Current [A]	Ripple Voltage [mV]		Input Volt. 115 [V]	Input Volt. 230 [V]	0.00	25	45	0.25	35	40	0.50	30	50	0.75	35	10	1.00	10	10	1.50	10	10	2.00	10	10	2.50	10	10	4.00	20	15	5.00	40	20	5.50	50	25
Load Current [A]	Ripple Voltage [mV]																																								
	Input Volt. 115 [V]	Input Volt. 230 [V]																																							
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<div>Measured by 20 MHz Oscilloscope.</div> <div>Ripple Voltage is shown as p-p in the figure below.</div> <div>Note: Slanted line shows the range of the rated load current.</div>																																									
<div><div>T1: Due to AC Input Line</div><div>T2: Due to Switching</div><div>Ripple [mVp-p]</div><div>T1</div><div>T2</div></div>																																									
Fig. Complex Ripple Wave Form																																									

# COSEL

Model	KHEA30F-5	Temperature 25°C Testing Circuitry Figure C																																							
Item	Ripple-Noise																																								
Object	+5V5A																																								
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>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>		<table><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><tr><td>0.00</td><td>35</td><td>55</td></tr><tr><td>0.25</td><td>40</td><td>50</td></tr><tr><td>0.50</td><td>40</td><td>75</td></tr><tr><td>0.75</td><td>50</td><td>20</td></tr><tr><td>1.00</td><td>20</td><td>15</td></tr><tr><td>1.50</td><td>25</td><td>20</td></tr><tr><td>2.00</td><td>30</td><td>20</td></tr><tr><td>2.50</td><td>30</td><td>35</td></tr><tr><td>4.00</td><td>35</td><td>40</td></tr><tr><td>5.00</td><td>60</td><td>55</td></tr><tr><td>5.50</td><td>70</td><td>55</td></tr></table>		Load Current [A]	Ripple-Noise [mV]		Input Volt. 115 [V]	Input Volt. 230 [V]	0.00	35	55	0.25	40	50	0.50	40	75	0.75	50	20	1.00	20	15	1.50	25	20	2.00	30	20	2.50	30	35	4.00	35	40	5.00	60	55	5.50	70	55
Load Current [A]	Ripple-Noise [mV]																																								
	Input Volt. 115 [V]	Input Volt. 230 [V]																																							
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<div><div>T1: Due to AC Input Line</div><div>T2: Due to Switching</div></div> <p>Fig. Complex Ripple Wave Form</p>																																									



Model		KHEA30F-5
Item		Ripple Voltage (by Ambient Temp.)
Object		+5V5A

1.Graph

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□

---

Load 115V

—

△

—

Load 230V

300

250

200

150

100

50

0

Ripple Voltage [mV]

-40

-20

0

20

40

60

80

Ambient Temperature [°C]

Load 100 %

Measured by 20 MHz Oscilloscope.

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

2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Input Volt. 115 [V]	Input Volt. 230 [V]
-30	65	30
-20	50	25
-10	45	20
0	40	20
25	40	20
60	45	25
70	45	25
--	-	-
--	-	-
--	-	-
--	-	-



# COSEL

Model	KHEA30F-5																																																					
Item	Ambient Temperature Drift	Testing Circuitry    Figure A																																																				
Object	+5V5A																																																					
1.Graph		2.Values																																																				
<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>Output Voltage [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 100%</p>		<table><tr><th rowspan="2">Ambient Temperature [°C]</th><th colspan="3">Output Voltage [V]</th></tr><tr><th>Input Volt. 100[V]</th><th>Input Volt. 115[V]</th><th>Input Volt. 230[V]</th></tr><tr><td>-30</td><td>5.081</td><td>5.080</td><td>5.079</td></tr><tr><td>-20</td><td>5.079</td><td>5.078</td><td>5.078</td></tr><tr><td>-10</td><td>5.075</td><td>5.074</td><td>5.073</td></tr><tr><td>0</td><td>5.072</td><td>5.071</td><td>5.071</td></tr><tr><td>25</td><td>5.072</td><td>5.071</td><td>5.070</td></tr><tr><td>60</td><td>5.066</td><td>5.065</td><td>5.064</td></tr><tr><td>70</td><td>5.064</td><td>5.063</td><td>5.062</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><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr></table>		Ambient Temperature [°C]	Output Voltage [V]			Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]	-30	5.081	5.080	5.079	-20	5.079	5.078	5.078	-10	5.075	5.074	5.073	0	5.072	5.071	5.071	25	5.072	5.071	5.070	60	5.066	5.065	5.064	70	5.064	5.063	5.062	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
Ambient Temperature [°C]	Output Voltage [V]																																																					
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Note: Slanted line shows the range of the rated ambient temperature.																																																						

**COSEL**

		Testing Circuitry Figure A
Model	KHEA30F-5	
Item	Output Voltage Accuracy	
Object	+5V5A	

### 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 - 60°C

Input Voltage : 85 - 264V

Load Current : 0 - 5A

\* 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	-20	100	0	5.079	±8	±0.2
Minimum Voltage	60	230	5	5.064		

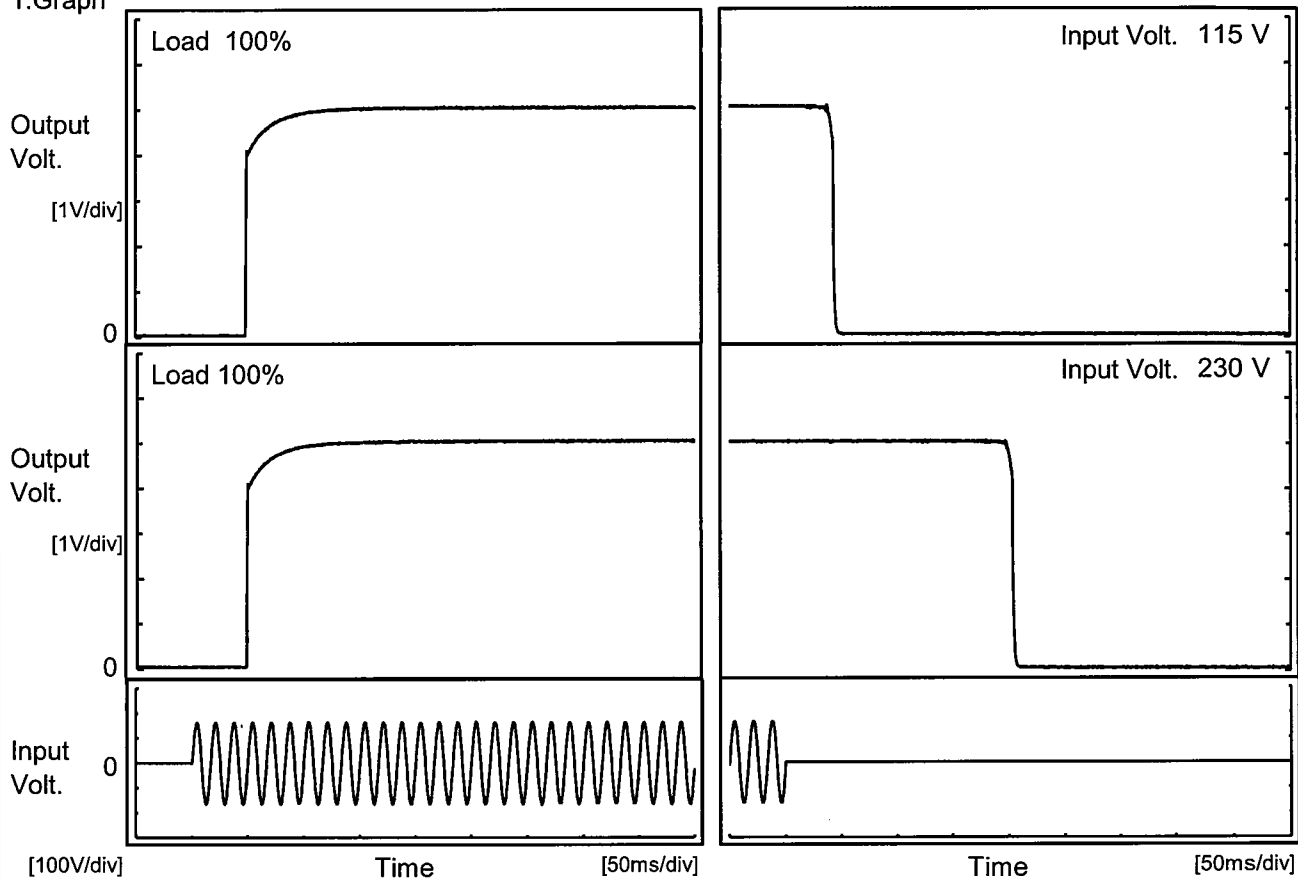
# COSEL

Model	KHEA30F-5	Temperature 25°C Testing Circuitry Figure A																							
Item	Time Lapse Drift																								
Object	+5V5A																								
1.Graph		2.Values																							
<div><div><div>5.30</div><div>5.20</div><div>5.10</div><div>5.00</div><div>4.90</div><div>4.80</div><div>4.70</div><div>4.60</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>5.070</td></tr><tr><td>0.5</td><td>5.068</td></tr><tr><td>1.0</td><td>5.067</td></tr><tr><td>2.0</td><td>5.067</td></tr><tr><td>3.0</td><td>5.067</td></tr><tr><td>4.0</td><td>5.067</td></tr><tr><td>5.0</td><td>5.067</td></tr><tr><td>6.0</td><td>5.067</td></tr><tr><td>7.0</td><td>5.067</td></tr><tr><td>8.0</td><td>5.067</td></tr></table>		Time since start [H]	Output Voltage [V]	0.0	5.070	0.5	5.068	1.0	5.067	2.0	5.067	3.0	5.067	4.0	5.067	5.0	5.067	6.0	5.067	7.0	5.067	8.0	5.067
Time since start [H]	Output Voltage [V]																								
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# COSEL

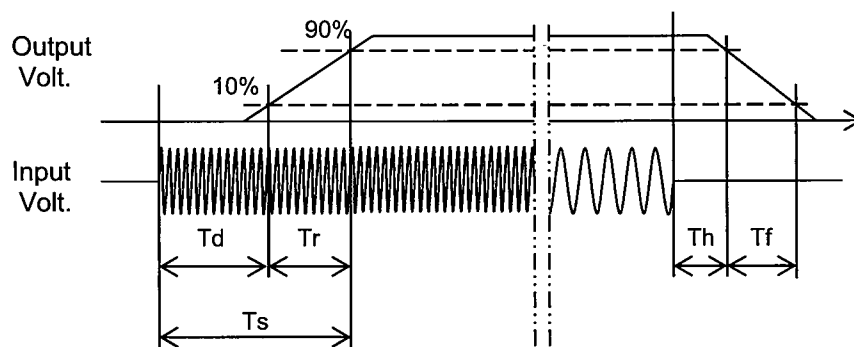
Model	KHEA30F-5	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+5V5A		

## 1. Graph



## 2. Values

Input Volt	Time	Td	Tr	Ts	Th	Tf
115V		48.8	16.3	65.1	41.5	3.3
230V		48.5	15.5	64.0	202.0	3.5



Model	KHEA30F-5	Temperature 25°C Testing Circuitry Figure A	
Item	Hold-Up Time		
Object	+5V5A		
1.Graph		2.Values	
<div><div><div><div></div><div></div></div><div><div></div><div></div></div></div><div><div></div><div></div></div><div><div></div><div></div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> 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Model		KHEA30F-5	Temperature 25°C Testing Circuitry Figure A																																																				
Item		Instantaneous Interruption Compensation																																																					
Object		+5V5A																																																					
1.Graph		<div><div>—△—</div>Input Volt. 100V</div> <div><div>- -□- -</div>Input Volt. 115V</div> <div><div>- -○- -</div>Input Volt. 230V</div> <div><div>Instantaneous Compensation Time [ms]</div><div>10000</div><div>1000</div><div>100</div><div>10</div><div>1</div><div>0</div><div>2</div><div>4</div><div>6</div><div>Load Current [A]</div></div>	2.Values																																																				
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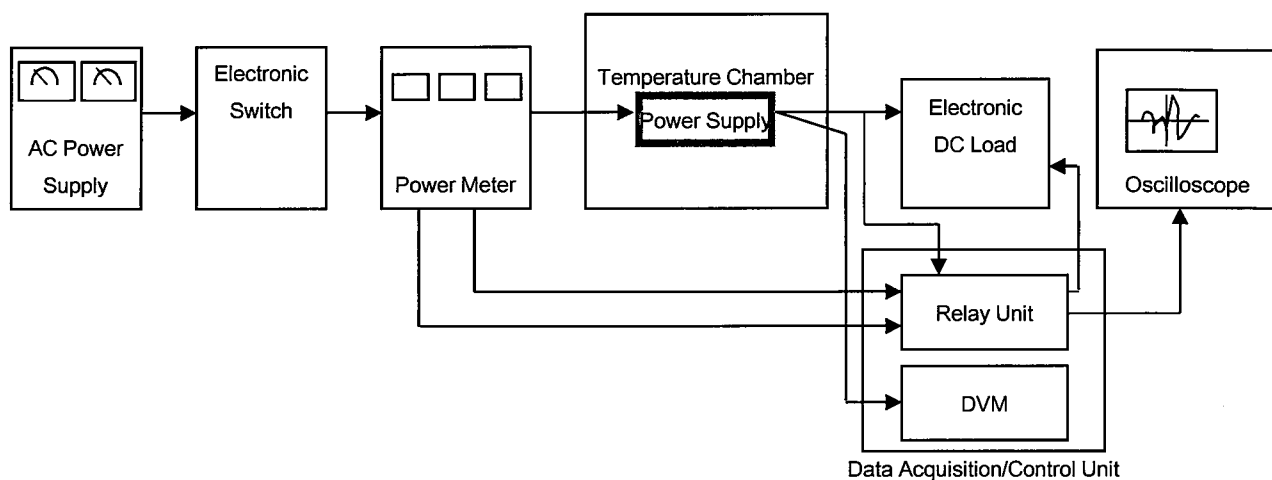


Figure A

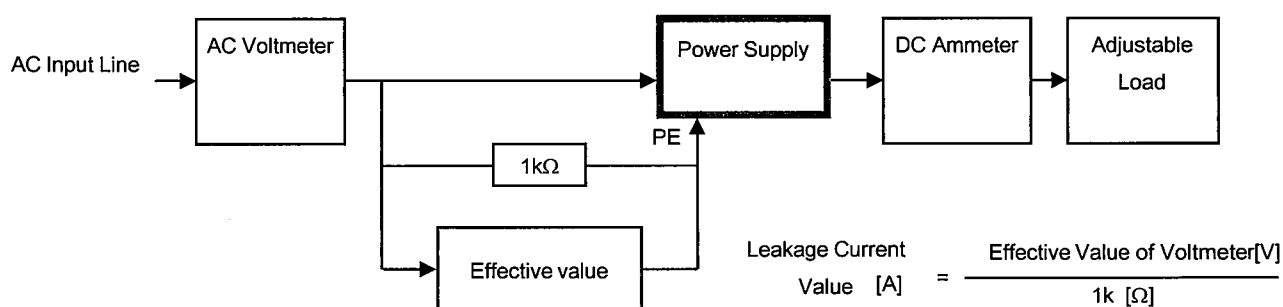


Figure B ( DEN-AN )

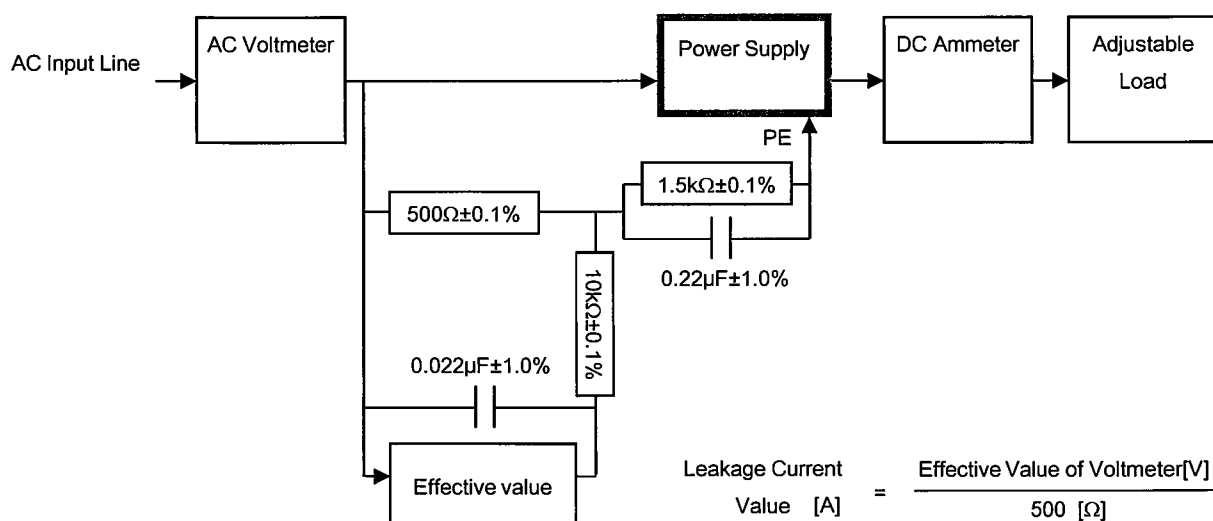


Figure B ( IEC60950-1 )

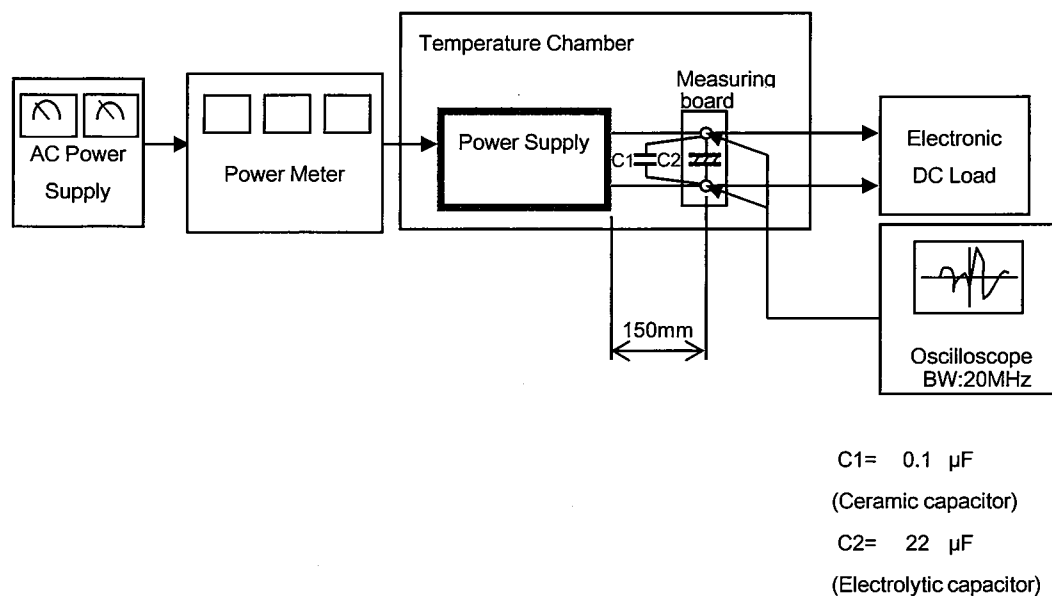


Figure C