

TEST DATA OF KHNA30F-12

Regulated DC Power Supply
April 28, 2014

Approved by : Yukihiro Takehashi
Yukihiro Takehashi Design Manager

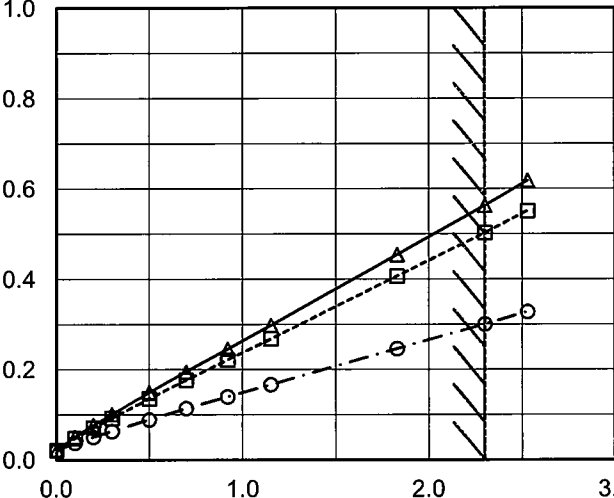
Prepared by : Yasunari Hirano
Yasunari Hirano Design Engineer

COSEL CO.,LTD.

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(Final Page 25)

Model		KHNA30F-12		Temperature 25°C																																																				
Item		Input Current (by Load Current)		Testing Circuitry Figure A																																																				
Object																																																								
1.Graph		<div><div>—△—</div>Input Volt. 100V</div> <div><div>---□---</div>Input Volt. 115V</div> <div><div>-·-○-·-</div>Input Volt. 230V</div>		2.Values																																																				
<div><div><div>Input Current [A]</div><div></div></div></div>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Input Current [A]</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>0.022</td><td>0.022</td><td>0.021</td></tr><tr><td>0.10</td><td>0.051</td><td>0.048</td><td>0.038</td></tr><tr><td>0.20</td><td>0.077</td><td>0.071</td><td>0.051</td></tr><tr><td>0.30</td><td>0.101</td><td>0.093</td><td>0.064</td></tr><tr><td>0.50</td><td>0.149</td><td>0.136</td><td>0.089</td></tr><tr><td>0.70</td><td>0.195</td><td>0.177</td><td>0.114</td></tr><tr><td>0.92</td><td>0.245</td><td>0.222</td><td>0.140</td></tr><tr><td>1.15</td><td>0.298</td><td>0.268</td><td>0.167</td></tr><tr><td>1.83</td><td>0.454</td><td>0.407</td><td>0.246</td></tr><tr><td>2.30</td><td>0.563</td><td>0.502</td><td>0.301</td></tr><tr><td>2.53</td><td>0.618</td><td>0.551</td><td>0.328</td></tr></table>		Load Current [A]	Input Current [A]			Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]	0.00	0.022	0.022	0.021	0.10	0.051	0.048	0.038	0.20	0.077	0.071	0.051	0.30	0.101	0.093	0.064	0.50	0.149	0.136	0.089	0.70	0.195	0.177	0.114	0.92	0.245	0.222	0.140	1.15	0.298	0.268	0.167	1.83	0.454	0.407	0.246	2.30	0.563	0.502	0.301	2.53	0.618	0.551	0.328		
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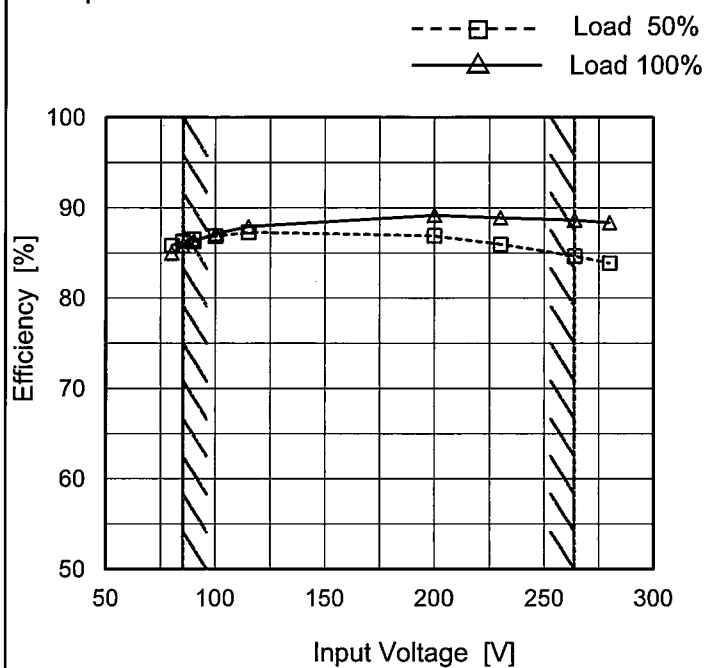
Model KHNA30F-12

Item Efficiency (by Input Voltage)

Object

Temperature 25°C
Testing Circuitry Figure A

1. Graph

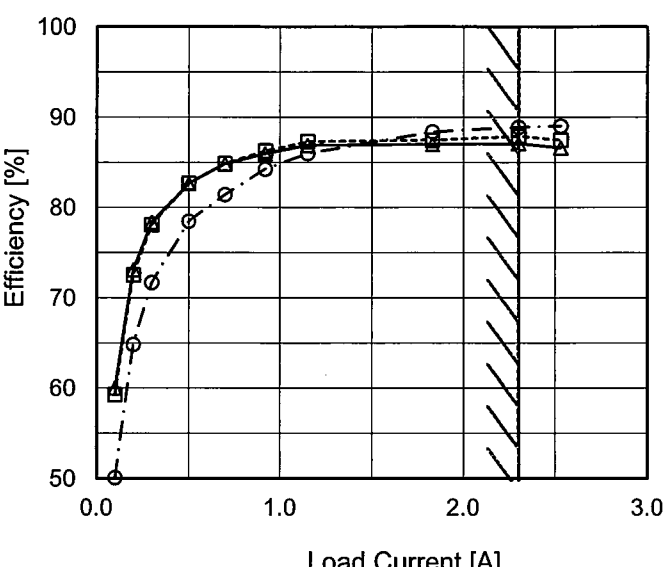


Note: Slanted line shows the range of the rated input voltage.

2. Values

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
80	85.8	85.0
85	86.3	85.8
90	86.5	86.3
100	86.9	87.1
115	87.3	87.9
200	86.9	89.2
230	86.0	88.9
264	84.7	88.6
280	83.9	88.4

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Model		KHNA30F-12	
Item		Efficiency (by Load Current)	
Object			
1.Graph			
		—△— Input Volt. 100V	
		---□--- Input Volt. 115V	
		-·-○-·- Input Volt. 230V	
			
Note: Slanted line shows the range of the rated load current.			

Temperature		25°C	
Testing Circuitry		Figure A	
2.Values			
Load Current [A]	Efficiency [%]		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
0.00	-	-	-
0.10	60.0	59.3	50.1
0.20	73.1	72.5	64.9
0.30	78.4	78.1	71.7
0.50	82.7	82.7	78.5
0.70	84.8	84.9	81.4
0.92	86.0	86.3	84.3
1.15	86.9	87.3	86.0
1.83	87.0	87.5	88.4
2.30	87.1	87.9	88.9
2.53	86.6	87.5	89.0

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Model		KHNA30F-12	
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]

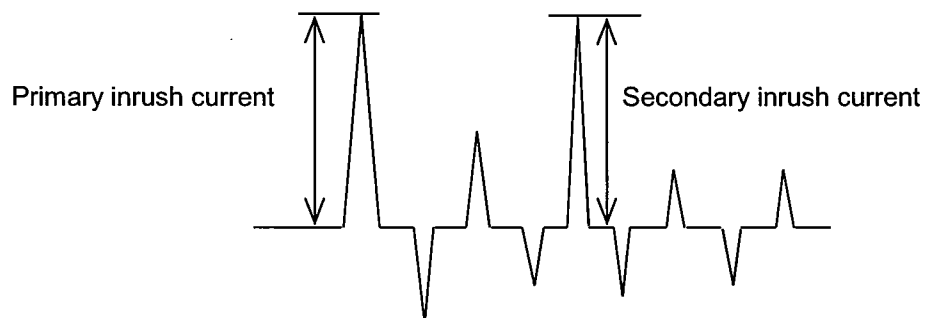
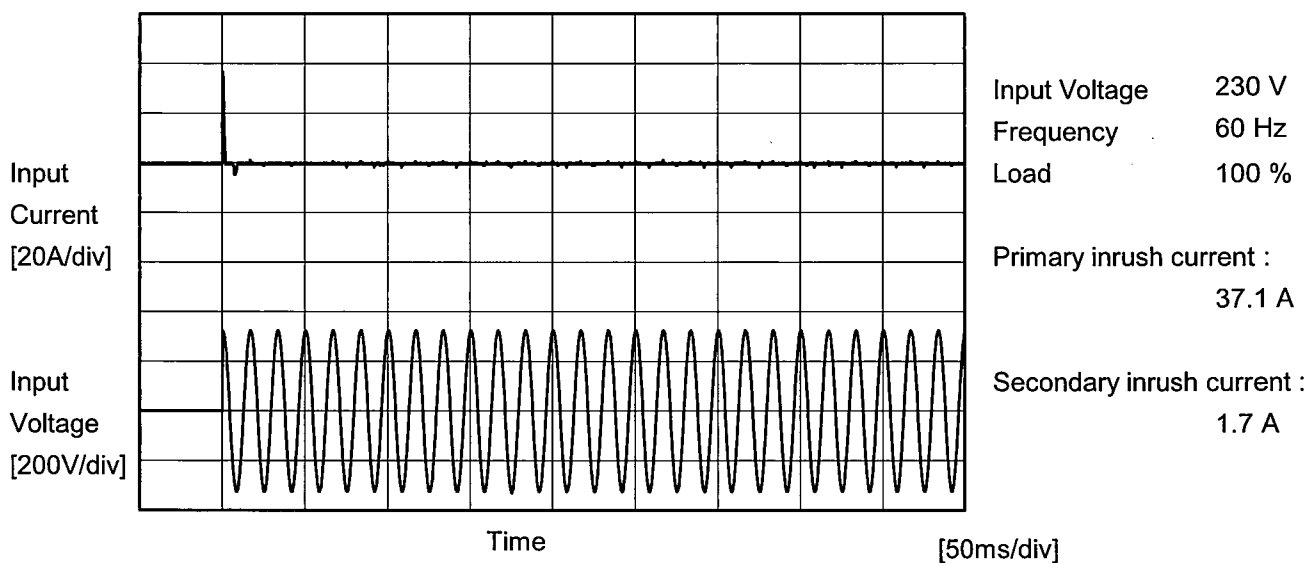
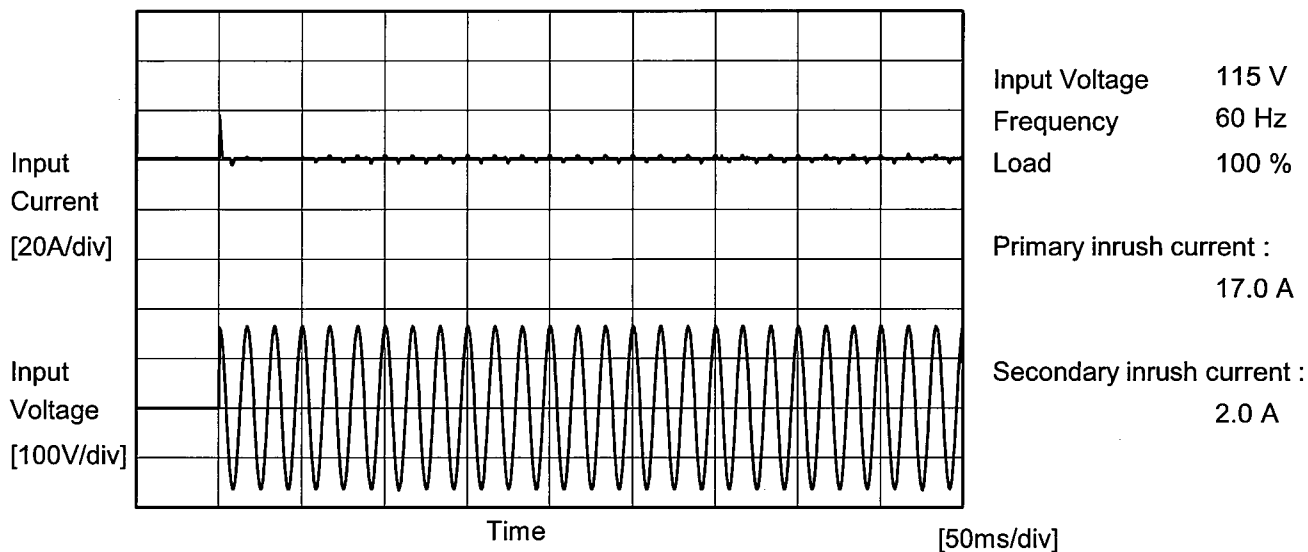
<



Model		KHNA30F-12		Temperature Testing Circuitry	25°C Figure A																																																			
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<div><div>Power Factor</div><div><div>Load Current [A]</div></div></div>		<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. 115[V]</th><th>Input Volt. 230[V]</th></tr><tr><td>0.00</td><td>0.314</td><td>0.293</td><td>0.116</td></tr><tr><td>0.10</td><td>0.399</td><td>0.377</td><td>0.281</td></tr><tr><td>0.20</td><td>0.435</td><td>0.413</td><td>0.322</td></tr><tr><td>0.30</td><td>0.461</td><td>0.439</td><td>0.348</td></tr><tr><td>0.50</td><td>0.495</td><td>0.473</td><td>0.379</td></tr><tr><td>0.70</td><td>0.516</td><td>0.495</td><td>0.399</td></tr><tr><td>0.92</td><td>0.533</td><td>0.511</td><td>0.414</td></tr><tr><td>1.15</td><td>0.543</td><td>0.523</td><td>0.426</td></tr><tr><td>1.83</td><td>0.570</td><td>0.550</td><td>0.450</td></tr><tr><td>2.30</td><td>0.579</td><td>0.558</td><td>0.462</td></tr><tr><td>2.53</td><td>0.580</td><td>0.560</td><td>0.463</td></tr></table>				Load Current [A]	Power Factor			Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]	0.00	0.314	0.293	0.116	0.10	0.399	0.377	0.281	0.20	0.435	0.413	0.322	0.30	0.461	0.439	0.348	0.50	0.495	0.473	0.379	0.70	0.516	0.495	0.399	0.92	0.533	0.511	0.414	1.15	0.543	0.523	0.426	1.83	0.570	0.550	0.450	2.30	0.579	0.558	0.462	2.53	0.580	0.560	0.463
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Model		KHNA30F-12	
Item		Inrush Current	Temperature 25°C Testing Circuitry Figure A
Object			



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		Temperature 25°C Testing Circuitry Figure B
Model	KHNA30F-12	
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.

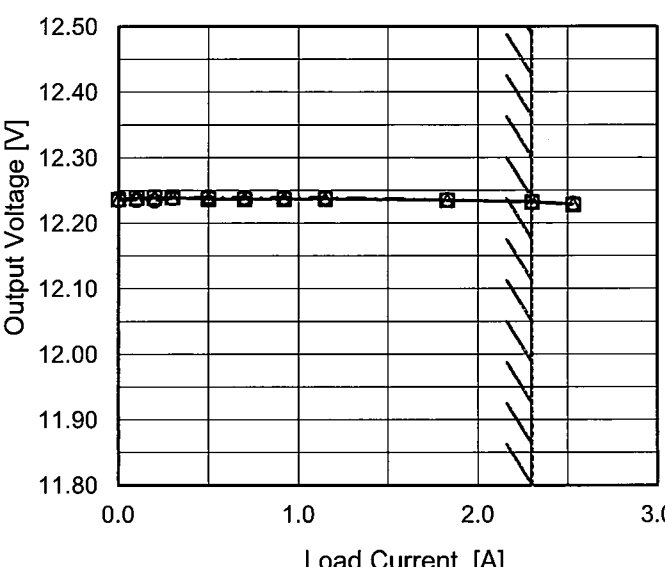
2.Condition

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



Model	KHNA30F-12																																
Item	Line Regulation																																
Object	+12V2.3A																																
1.Graph		Temperature 25°C Testing Circuitry Figure A																															
<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>80</td><td>12.237</td><td>12.235</td></tr><tr><td>85</td><td>12.237</td><td>12.234</td></tr><tr><td>90</td><td>12.237</td><td>12.234</td></tr><tr><td>100</td><td>12.237</td><td>12.233</td></tr><tr><td>115</td><td>12.237</td><td>12.232</td></tr><tr><td>200</td><td>12.238</td><td>12.232</td></tr><tr><td>230</td><td>12.239</td><td>12.232</td></tr><tr><td>264</td><td>12.240</td><td>12.233</td></tr><tr><td>280</td><td>12.240</td><td>12.234</td></tr></tbody></table>		Input Voltage [V]	Output Voltage [V] Load 50%	Output Voltage [V] Load 100%	80	12.237	12.235	85	12.237	12.234	90	12.237	12.234	100	12.237	12.233	115	12.237	12.232	200	12.238	12.232	230	12.239	12.232	264	12.240	12.233	280	12.240	12.234	2.Values	
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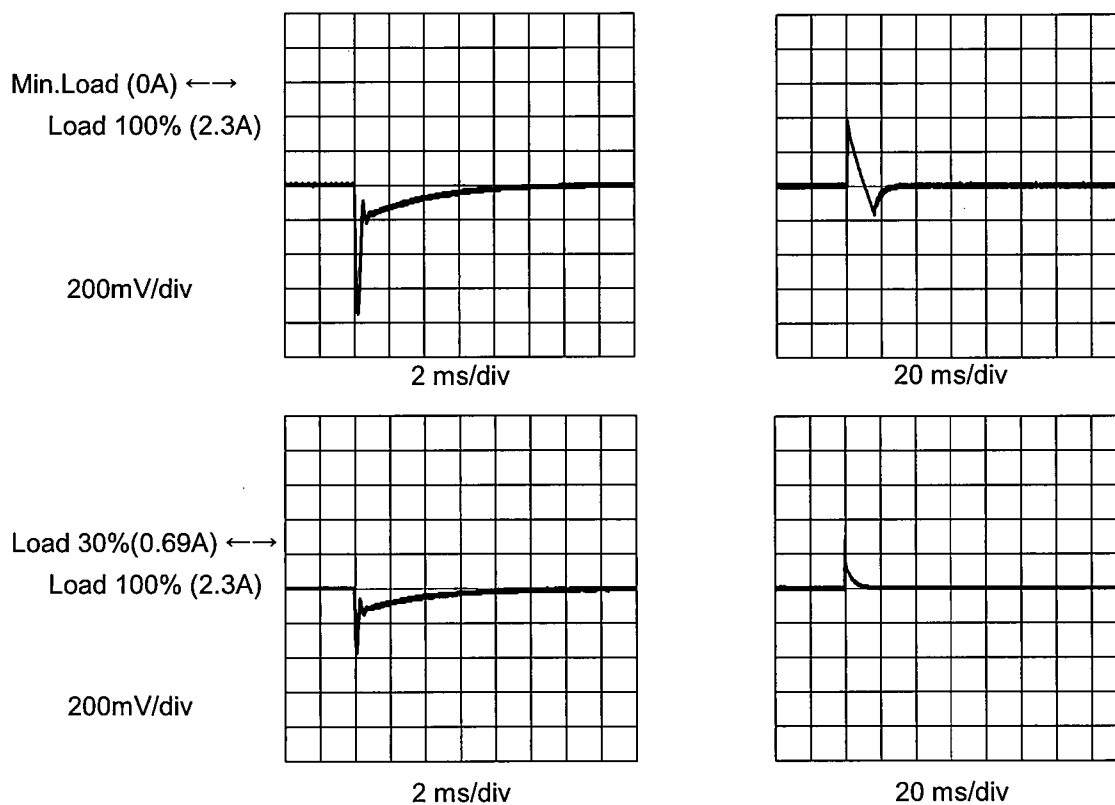
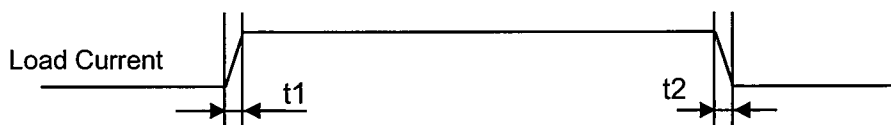
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<div><div><div>—△—</div><div>Input Volt.</div><div>100V</div></div><div><div>---□---</div><div>Input Volt.</div><div>115V</div></div><div><div>---○---</div><div>Input Volt.</div><div>230V</div></div></div> 		<table><tr><th rowspan="2">Load Current [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>12.237</td><td>12.236</td><td>12.236</td></tr><tr><td>0.10</td><td>12.238</td><td>12.239</td><td>12.236</td></tr><tr><td>0.20</td><td>12.239</td><td>12.239</td><td>12.235</td></tr><tr><td>0.30</td><td>12.239</td><td>12.240</td><td>12.238</td></tr><tr><td>0.50</td><td>12.237</td><td>12.237</td><td>12.240</td></tr><tr><td>0.70</td><td>12.237</td><td>12.237</td><td>12.239</td></tr><tr><td>0.92</td><td>12.237</td><td>12.237</td><td>12.239</td></tr><tr><td>1.15</td><td>12.237</td><td>12.237</td><td>12.239</td></tr><tr><td>1.83</td><td>12.235</td><td>12.235</td><td>12.236</td></tr><tr><td>2.30</td><td>12.233</td><td>12.232</td><td>12.232</td></tr><tr><td>2.53</td><td>12.229</td><td>12.228</td><td>12.230</td></tr></table>		Load Current [A]	Output Voltage [V]			Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]	0.00	12.237	12.236	12.236	0.10	12.238	12.239	12.236	0.20	12.239	12.239	12.235	0.30	12.239	12.240	12.238	0.50	12.237	12.237	12.240	0.70	12.237	12.237	12.239	0.92	12.237	12.237	12.239	1.15	12.237	12.237	12.239	1.83	12.235	12.235	12.236	2.30	12.233	12.232	12.232	2.53	12.229	12.228	12.230
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Note: Slanted line shows the range of the rated load current.																																																						



Model	KHNA30F-12	Temperature	25° C
Item	Dynamic Load Response	Testing Circuitry	Figure A
Object	+12V2.3A		

Input Volt. 230 V
Cycle 1000 ms

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



* The characteristic of AC115V is equal.

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Model	KHNA30F-12																																						
Item	Ripple Voltage (by Load Current)	Temperature	25°C																																				
		Testing Circuitry	Figure C																																				
Object	+12V2.3A																																						
1.Graph		2.Values																																					
<div>Input Volt. 115V Input Volt. 230V</div> <table><thead><tr><th>Load Current [A]</th><th>115V [mV]</th><th>230V [mV]</th></tr></thead><tbody><tr><td>0.00</td><td>10</td><td>45</td></tr><tr><td>0.10</td><td>10</td><td>30</td></tr><tr><td>0.20</td><td>10</td><td>55</td></tr><tr><td>0.30</td><td>10</td><td>10</td></tr><tr><td>0.50</td><td>50</td><td>40</td></tr><tr><td>0.70</td><td>10</td><td>10</td></tr><tr><td>0.92</td><td>10</td><td>10</td></tr><tr><td>1.15</td><td>10</td><td>10</td></tr><tr><td>1.83</td><td>25</td><td>15</td></tr><tr><td>2.30</td><td>40</td><td>20</td></tr><tr><td>2.53</td><td>45</td><td>20</td></tr></tbody></table>		Load Current [A]	115V [mV]	230V [mV]	0.00	10	45	0.10	10	30	0.20	10	55	0.30	10	10	0.50	50	40	0.70	10	10	0.92	10	10	1.15	10	10	1.83	25	15	2.30	40	20	2.53	45	20		
Load Current [A]	115V [mV]	230V [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>																																							
<div>T1: Due to AC Input Line T2: Due to Switching</div>																																							
Fig. Complex Ripple Wave Form																																							

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Model	KHNA30F-12																																								
Item	Ripple-Noise	Temperature	25°C																																						
Object	+12V2.3A	Testing Circuitry	Figure C																																						
1.Graph		2.Values																																							
<div><div>Input Volt. 115V Input Volt. 230V</div><div>Ripple-Noise [mV]</div><div>Load Current [A]</div></div> <div><div>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.</div></div>		<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>15</td><td>60</td></tr><tr><td>0.10</td><td>15</td><td>45</td></tr><tr><td>0.20</td><td>15</td><td>65</td></tr><tr><td>0.30</td><td>15</td><td>20</td></tr><tr><td>0.50</td><td>65</td><td>55</td></tr><tr><td>0.70</td><td>25</td><td>25</td></tr><tr><td>0.92</td><td>25</td><td>25</td></tr><tr><td>1.15</td><td>25</td><td>25</td></tr><tr><td>1.83</td><td>35</td><td>40</td></tr><tr><td>2.30</td><td>40</td><td>45</td></tr><tr><td>2.53</td><td>50</td><td>50</td></tr></table>		Load Current [A]	Ripple-Noise [mV]		Input Volt. 115 [V]	Input Volt. 230 [V]	0.00	15	60	0.10	15	45	0.20	15	65	0.30	15	20	0.50	65	55	0.70	25	25	0.92	25	25	1.15	25	25	1.83	35	40	2.30	40	45	2.53	50	50
Load Current [A]	Ripple-Noise [mV]																																								
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<div><div>T1: Due to AC Input Line T2: Due to Switching</div><div>Ripple-Noise [mVp-p]</div><div>T1</div><div>T2</div></div> <div>Fig. Complex Ripple Wave Form</div>																																									



Model	KHNA30F-12																																								
Item	Ripple Voltage (by Ambient Temp.)		Testing Circuitry Figure C																																						
Object	+5V5A																																								
1.Graph		2.Values																																							
<div><div><div>---□---</div><div>Load 115V</div></div><div><div>—△—</div><div>Load 230V</div></div></div> <p>Measured by 20 MHz Oscilloscope. Note: Slanted line shows the range of the rated ambient temperature.</p>		<table><tr><th rowspan="2">Ambient Temperature [°C]</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>-30</td><td>95</td><td>45</td></tr><tr><td>-20</td><td>70</td><td>30</td></tr><tr><td>-10</td><td>55</td><td>25</td></tr><tr><td>0</td><td>45</td><td>20</td></tr><tr><td>25</td><td>40</td><td>20</td></tr><tr><td>60</td><td>20</td><td>15</td></tr><tr><td>70</td><td>20</td><td>20</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></table>		Ambient Temperature [°C]	Ripple Voltage [mV]		Input Volt. 115 [V]	Input Volt. 230 [V]	-30	95	45	-20	70	30	-10	55	25	0	45	20	25	40	20	60	20	15	70	20	20	--	-	-	--	-	-	--	-	-	--	-	-
Ambient Temperature [°C]	Ripple Voltage [mV]																																								
	Input Volt. 115 [V]	Input Volt. 230 [V]																																							
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Model	KHNA30F-12																																																						
Item	Ambient Temperature Drift		Testing Circuitry Figure A																																																				
Object	+12V2.3A																																																						
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>12.253</td><td>12.250</td><td>12.250</td></tr><tr><td>-20</td><td>12.250</td><td>12.249</td><td>12.249</td></tr><tr><td>-10</td><td>12.248</td><td>12.247</td><td>12.248</td></tr><tr><td>0</td><td>12.246</td><td>12.245</td><td>12.245</td></tr><tr><td>25</td><td>12.233</td><td>12.232</td><td>12.232</td></tr><tr><td>60</td><td>12.218</td><td>12.217</td><td>12.217</td></tr><tr><td>70</td><td>12.209</td><td>12.208</td><td>12.208</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	12.253	12.250	12.250	-20	12.250	12.249	12.249	-10	12.248	12.247	12.248	0	12.246	12.245	12.245	25	12.233	12.232	12.232	60	12.218	12.217	12.217	70	12.209	12.208	12.208	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
Ambient Temperature [°C]	Output Voltage [V]																																																						
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Note: Slanted line shows the range of the rated ambient temperature.																																																							



CUSEL			
Model	KHNA30F-12		
Item	Output Voltage Accuracy		Testing Circuitry Figure A
Object	+12V2.3A		

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 : -20 - 60°C

Input Voltage : 85 - 264V

Load Current : 0 - 2.3A

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

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

2. Values

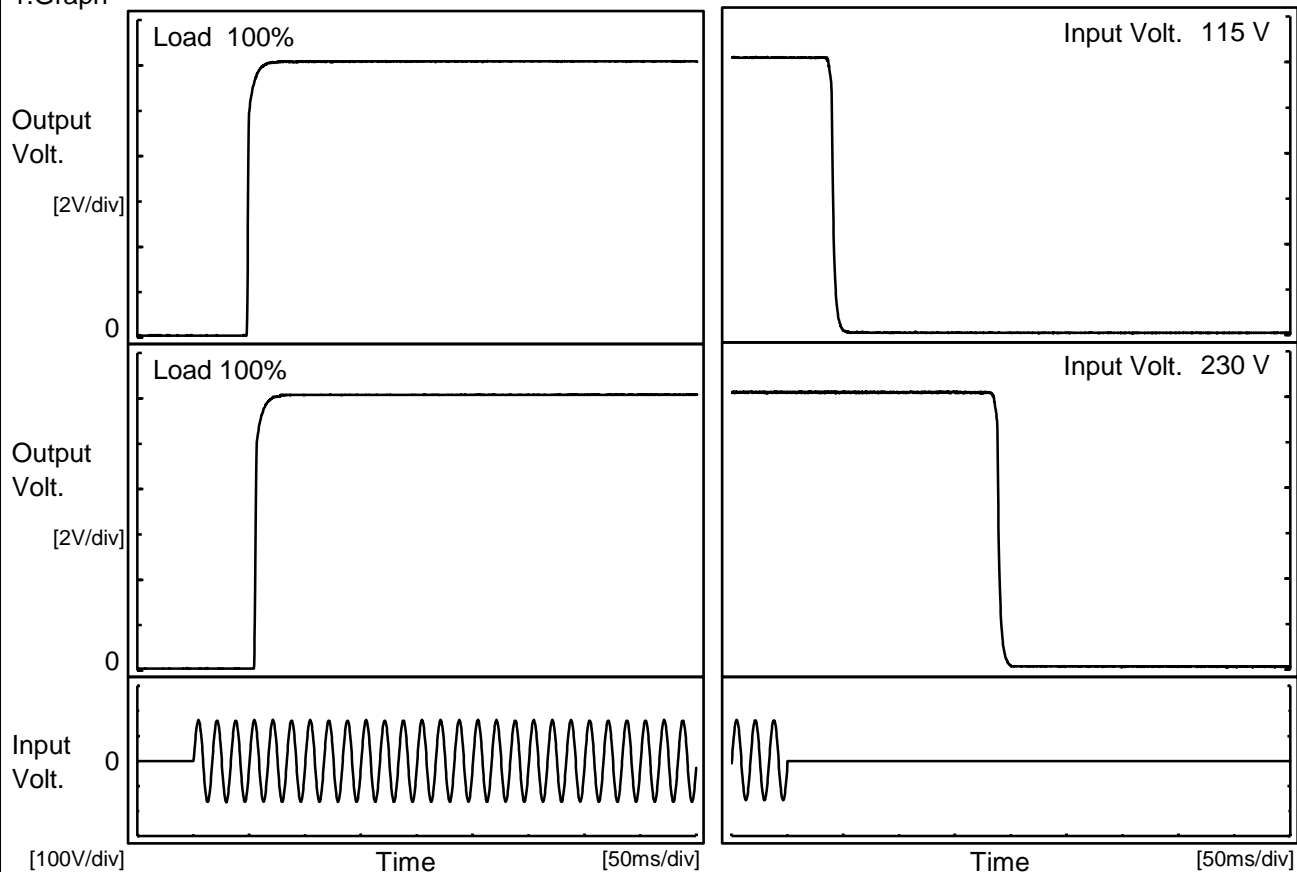
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	-20	100	2.3	12.250	±17	±0.1
Minimum Voltage	60	230	2.3	12.217		



Model		KHNA30F-12		Temperature		25°C	
Item		Time Lapse Drift		Testing Circuitry		Figure A	
Object		+12V2.3A					
1.Graph				2.Values			
<div><div><div>Output Voltage [V]</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></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></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></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></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></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></di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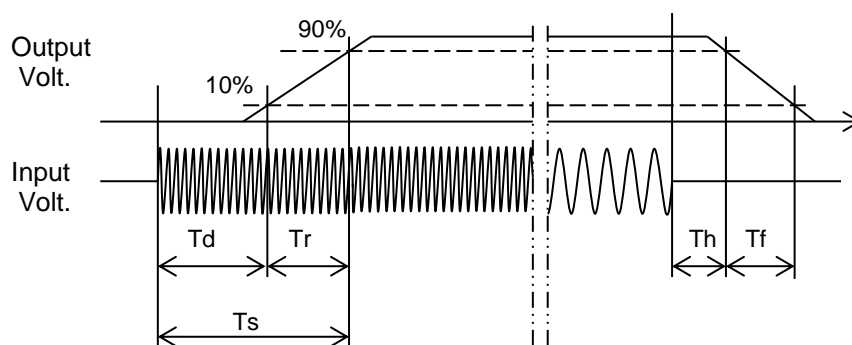
Model	KHNA30F-12	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+12V2.3A		

1.Graph



2.Values

Input Volt \ Time	Td	Tr	Ts	Th	Tf
115V	48.3	4.5	52.8	39.5	4.8
230V	54.8	4.5	59.3	187.8	4.8



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Model	KHNA30F-12																																		
Item	Hold-Up Time	Temperature	25°C																																
		Testing Circuitry	Figure A																																
Object	+12V2.3A																																		
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>80</td><td>34</td><td>12</td></tr><tr><td>85</td><td>39</td><td>14</td></tr><tr><td>90</td><td>45</td><td>18</td></tr><tr><td>100</td><td>59</td><td>24</td></tr><tr><td>115</td><td>82</td><td>36</td></tr><tr><td>200</td><td>278</td><td>135</td></tr><tr><td>230</td><td>374</td><td>185</td></tr><tr><td>264</td><td>502</td><td>251</td></tr><tr><td>280</td><td>567</td><td>286</td></tr></table>		Input Voltage [V]	Hold-Up Time [ms]		Load 50%	Load 100%	80	34	12	85	39	14	90	45	18	100	59	24	115	82	36	200	278	135	230	374	185	264	502	251	280	567	286
Input Voltage [V]	Hold-Up Time [ms]																																		
	Load 50%	Load 100%																																	
80	34	12																																	
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Model	KHNA30F-12																																																					
Item	Instantaneous Interruption Compensation		Temperature 25°C Testing Circuitry Figure A																																																			
Object	+12V2.3A																																																					
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>Instantaneous Compensation Time [ms]</p> <p>Load Current [A]</p> <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">Time [ms]</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>-</td><td>-</td><td>-</td></tr><tr><td>0.10</td><td>499</td><td>680</td><td>-</td></tr><tr><td>0.20</td><td>301</td><td>412</td><td>1740</td></tr><tr><td>0.30</td><td>213</td><td>290</td><td>1265</td></tr><tr><td>0.50</td><td>136</td><td>186</td><td>818</td></tr><tr><td>0.70</td><td>97</td><td>136</td><td>602</td></tr><tr><td>0.92</td><td>73</td><td>104</td><td>465</td></tr><tr><td>1.15</td><td>59</td><td>82</td><td>374</td></tr><tr><td>1.83</td><td>35</td><td>49</td><td>237</td></tr><tr><td>2.30</td><td>24</td><td>36</td><td>185</td></tr><tr><td>2.53</td><td>20</td><td>30</td><td>167</td></tr></table>		Load Current [A]	Time [ms]			Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]	0.00	-	-	-	0.10	499	680	-	0.20	301	412	1740	0.30	213	290	1265	0.50	136	186	818	0.70	97	136	602	0.92	73	104	465	1.15	59	82	374	1.83	35	49	237	2.30	24	36	185	2.53	20	30	167
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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>Ambient Temperature [°C]</th><th>Load 50% [V]</th><th>Load 100% [V]</th></tr></thead><tbody><tr><td>-30</td><td>49</td><td>67</td></tr><tr><td>-20</td><td>47</td><td>66</td></tr><tr><td>-10</td><td>46</td><td>64</td></tr><tr><td>0</td><td>46</td><td>63</td></tr><tr><td>25</td><td>44</td><td>61</td></tr><tr><td>60</td><td>43</td><td>59</td></tr><tr><td>70</td><td>42</td><td>59</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>		Ambient Temperature [°C]	Load 50% [V]	Load 100% [V]	-30	49	67	-20	47	66	-10	46	64	0	46	63	25	44	61	60	43	59	70	42	59	--	-	-	--	-	-	--	-	-	--	-	-		
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Model		KHNA30F-12		Temperature		25°C																																																
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Object		+12V2.3A																																																				
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<div><div><div></div><div>Input Volt. 115V</div></div><div><div></div><div>Input Volt. 230V</div></div></div> <p>Note: Slanted line shows the range of the rated load current.</p> <p>Intermittent operation occurs when overcurrent protection is activated.</p>				<table><tr><th rowspan="2">Output Voltage [V]</th><th colspan="2">Load Current [A]</th></tr><tr><th>Input Volt. 115[V]</th><th>Input Volt. 230[V]</th></tr><tr><td>12.24</td><td>3.03</td><td>3.04</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><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><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></table>				Output Voltage [V]	Load Current [A]		Input Volt. 115[V]	Input Volt. 230[V]	12.24	3.03	3.04	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-
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		<table><tr><th rowspan="2">Ambient Temperature [°C]</th><th colspan="2">Operating Point [V]</th></tr><tr><th>Input Volt. 115[V]</th><th>Input Volt. 230[V]</th></tr><tr><td>-30</td><td>15.80</td><td>15.80</td></tr><tr><td>-20</td><td>15.80</td><td>15.80</td></tr><tr><td>-10</td><td>15.90</td><td>15.90</td></tr><tr><td>0</td><td>16.10</td><td>16.10</td></tr><tr><td>25</td><td>16.30</td><td>16.30</td></tr><tr><td>60</td><td>16.30</td><td>16.30</td></tr><tr><td>70</td><td>16.40</td><td>16.40</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></table>	Ambient Temperature [°C]	Operating Point [V]		Input Volt. 115[V]	Input Volt. 230[V]	-30	15.80	15.80	-20	15.80	15.80	-10	15.90	15.90	0	16.10	16.10	25	16.30	16.30	60	16.30	16.30	70	16.40	16.40	--	-	-	--	-	-	--	-	-	--	-	-
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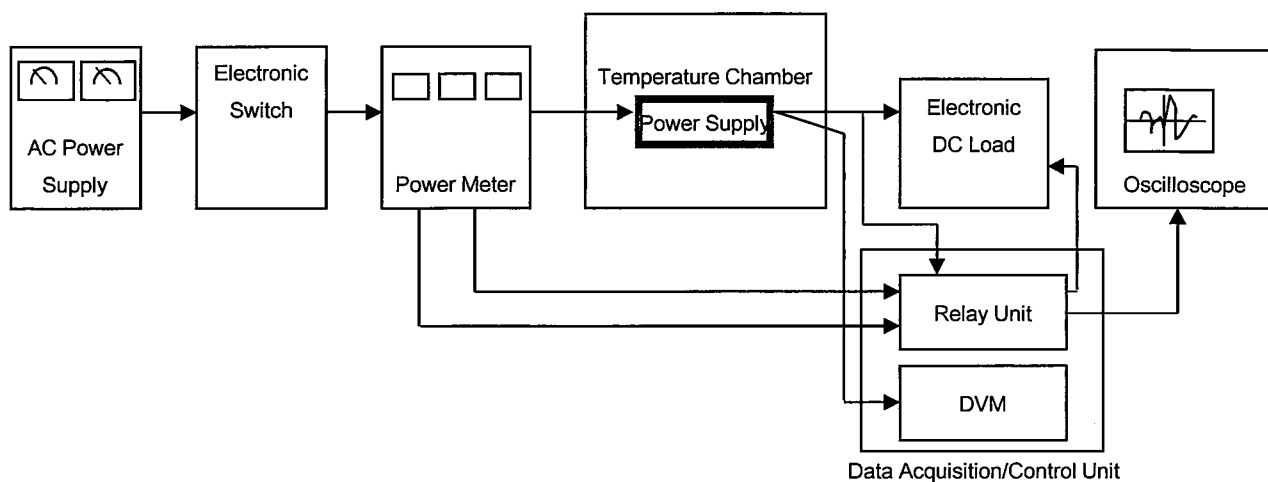


Figure A

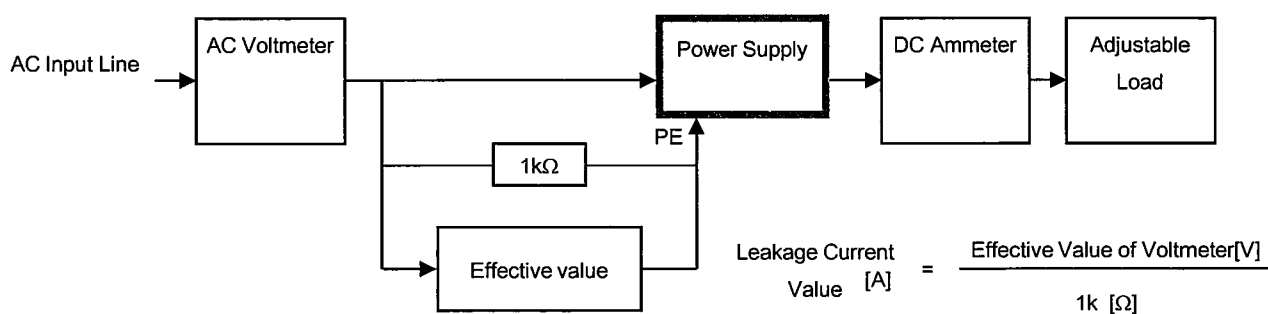


Figure B (DEN-AN)

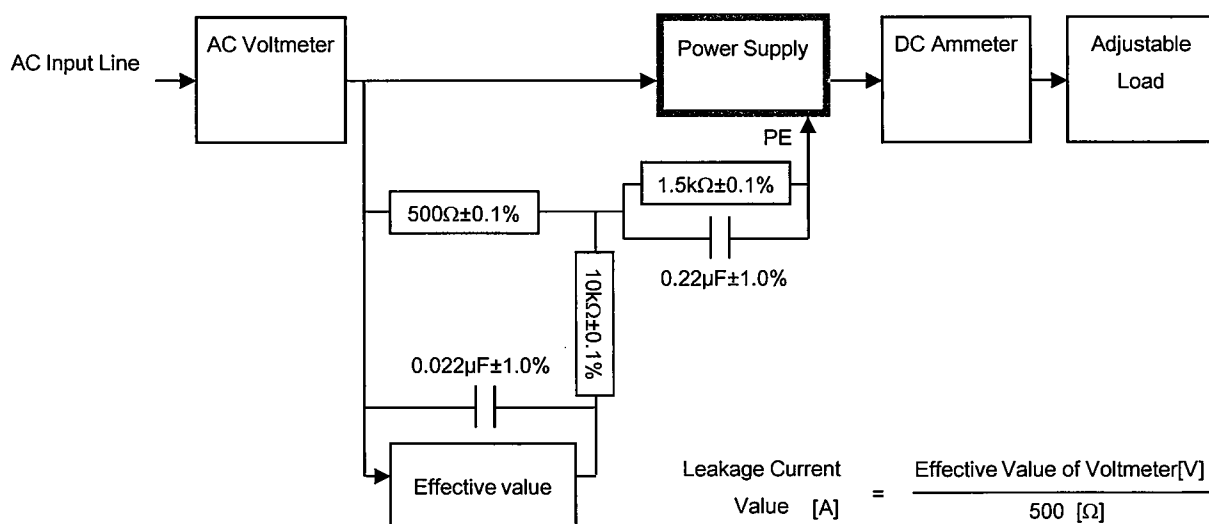


Figure B (IEC60950-1)

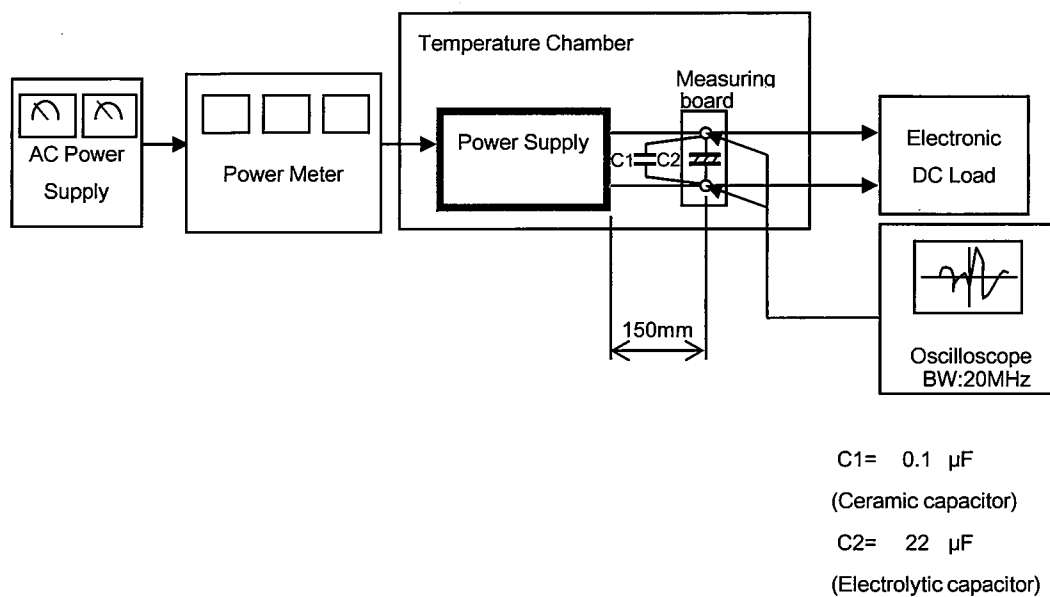


Figure C