COSEL

参考資料

TEST DATA OF KHEA30F-12

Regulated DC Power Supply
April 28, 2014

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COSEL CO.,LTD.

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Model	KHEA30F-12
Item	Input Current (by Load Current)
Object	————————

Temperature 25°C
Testing Circuitry Figure A

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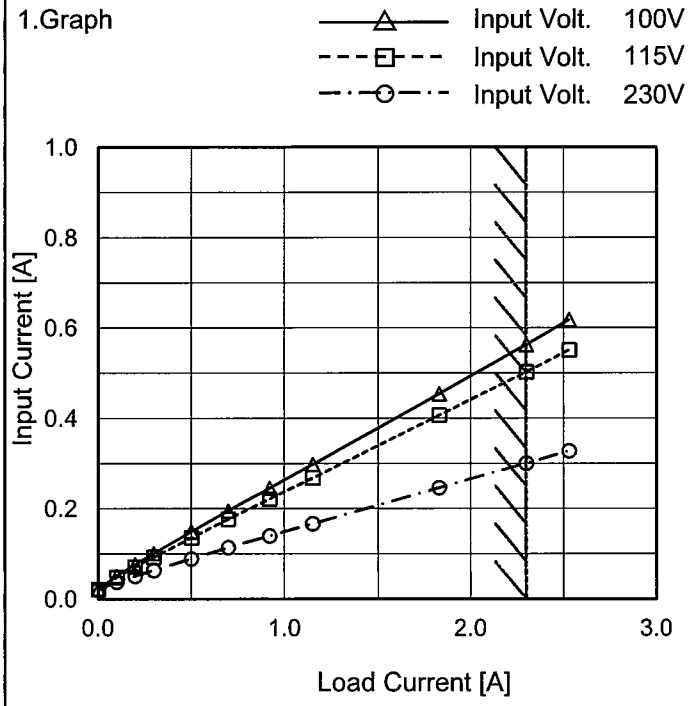

Note: Slanted line shows the range of the rated load current.

2.Values

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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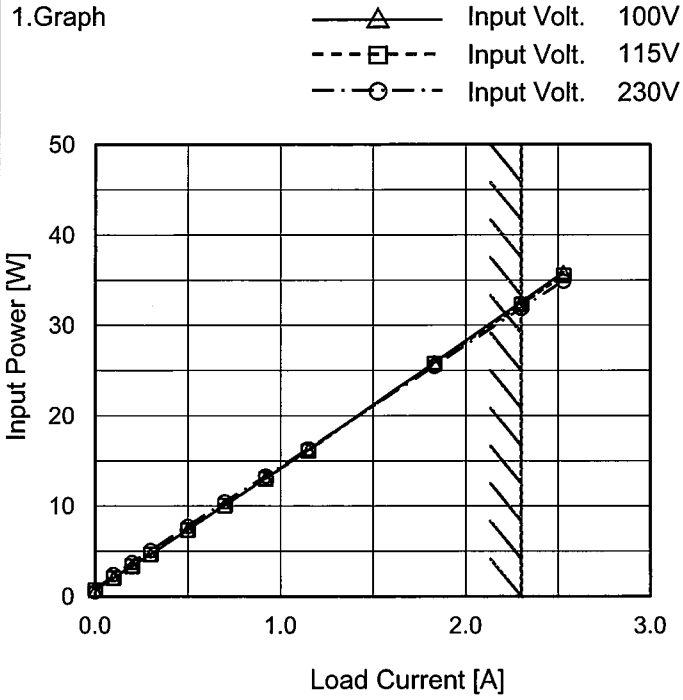
COSEL

Model	KHEA30F-12
Item	Input Power (by Load Current)
Object	———————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

2.Values

Load Current [A]	Input Power [W]		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
0.00	0.68	0.73	0.55
0.10	2.03	2.06	2.44
0.20	3.34	3.37	3.76
0.30	4.66	4.68	5.10
0.50	7.38	7.38	7.77
0.70	10.07	10.07	10.49
0.92	13.06	13.02	13.33
1.15	16.18	16.12	16.35
1.83	25.91	25.77	25.50
2.30	32.58	32.29	31.90
2.53	35.89	35.53	34.90

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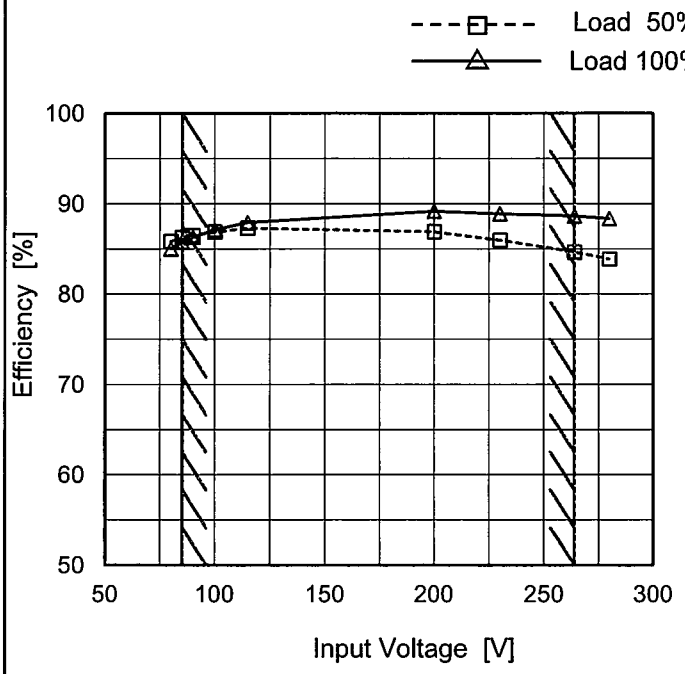
COSEL

Model	KHEA30F-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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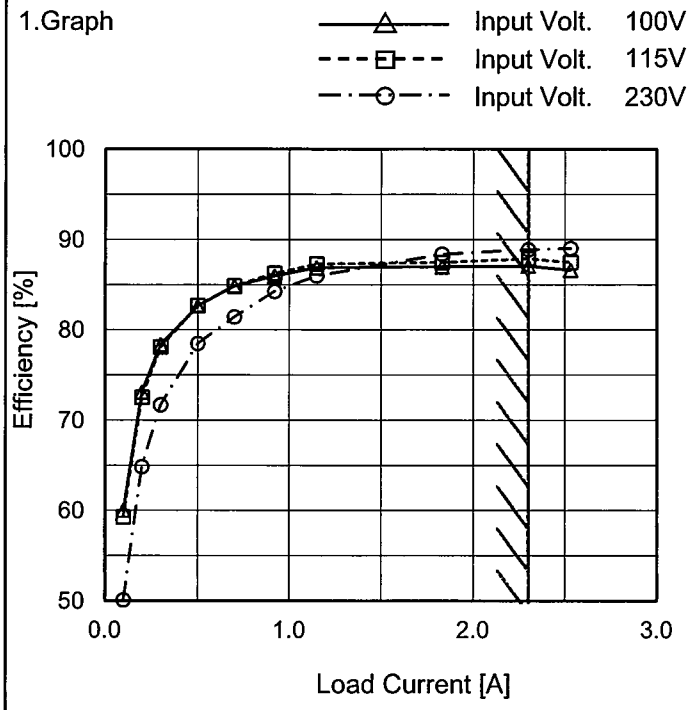
Model	KHEA30F-12
Item	Efficiency (by Load Current)
Object	———————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

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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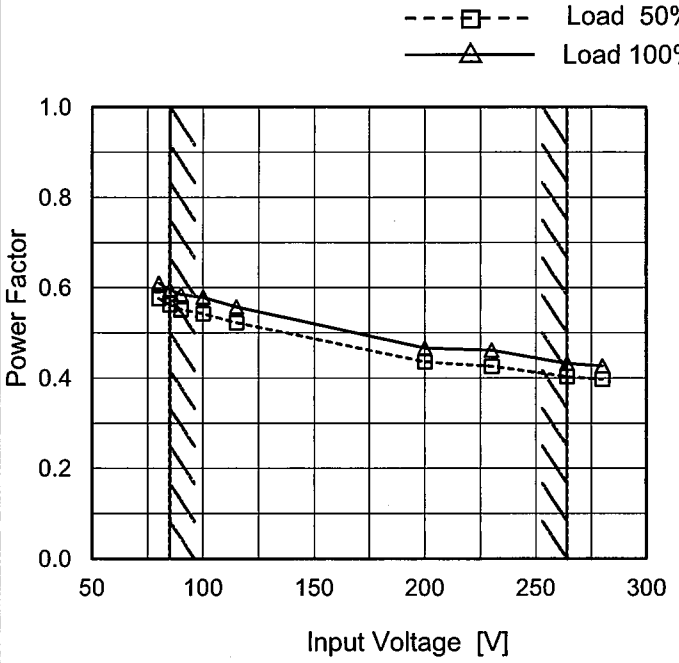
Model	KHEA30F-12
Item	Power Factor (by Input Voltage)
Object	———————————

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]	Power Factor	
	Load 50%	Load 100%
80	0.576	0.611
85	0.563	0.596
90	0.552	0.585
100	0.543	0.579
115	0.523	0.558
200	0.436	0.467
230	0.426	0.462
264	0.404	0.433
280	0.397	0.427

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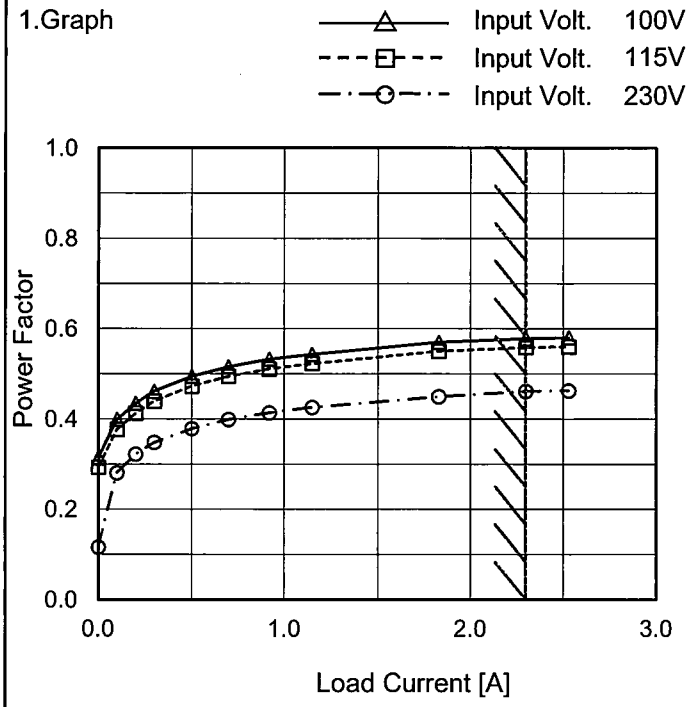
Model	KHEA30F-12
Item	Power Factor (by Load Current)
Object	————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

2.Values

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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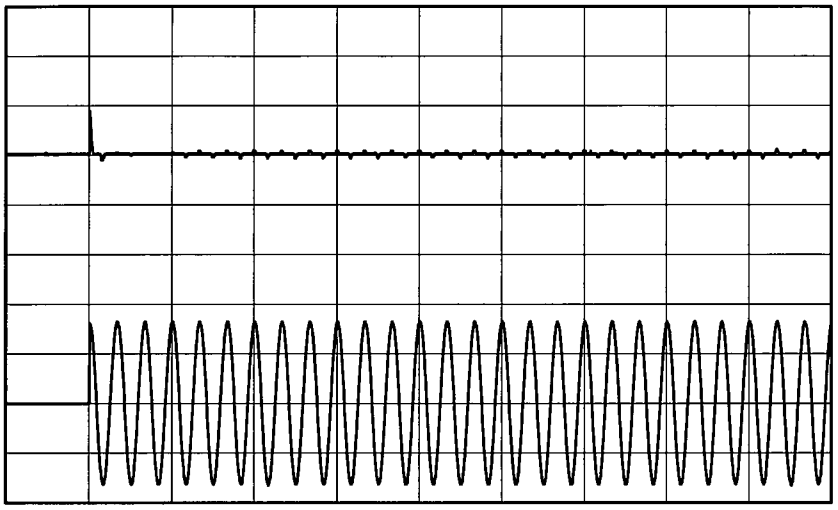
Model	KHEA30F-12
Item	Inrush Current
Object	———————

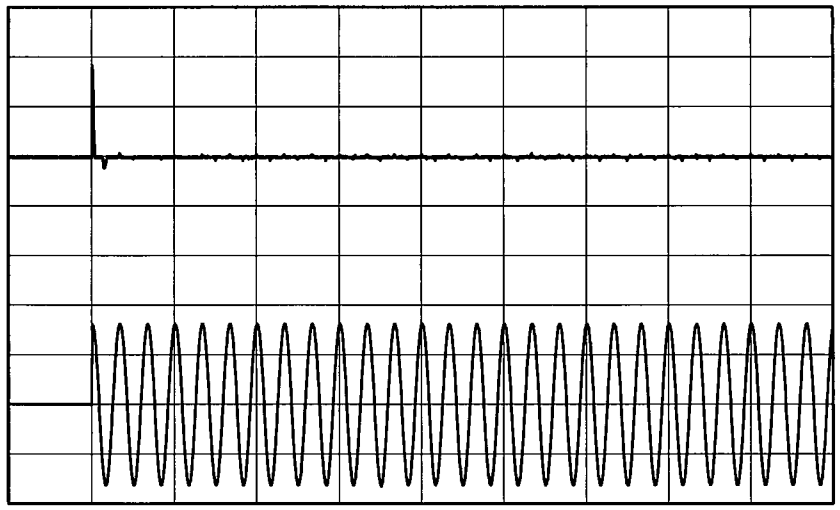
Temperature 25°C
Testing Circuitry Figure A



Input Voltage 115 V
Frequency 60 Hz
Load 100 %

Primary inrush current :
17.0 A

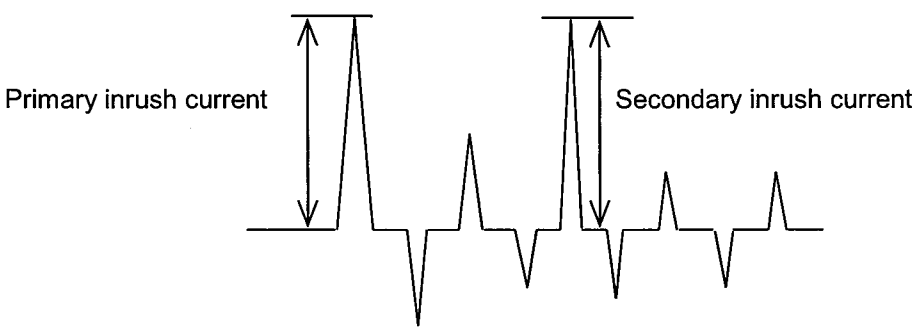
Secondary inrush current :
2.0 A



Input Voltage 230 V
Frequency 60 Hz
Load 100 %

Primary inrush current :
37.1 A

Secondary inrush current :
1.7 A



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Model	KHEA30F-12	
Item	Leakage Current	Temperature 25°C Testing Circuitry Figure B
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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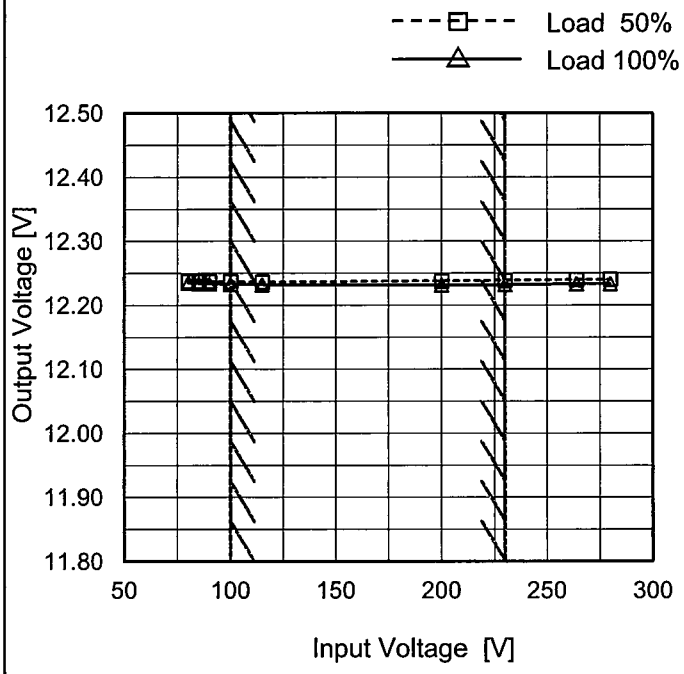
Model	KHEA30F-12
Item	Line Regulation
Object	+12V2.3A

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]	Output Voltage [V]	
	Load 50%	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

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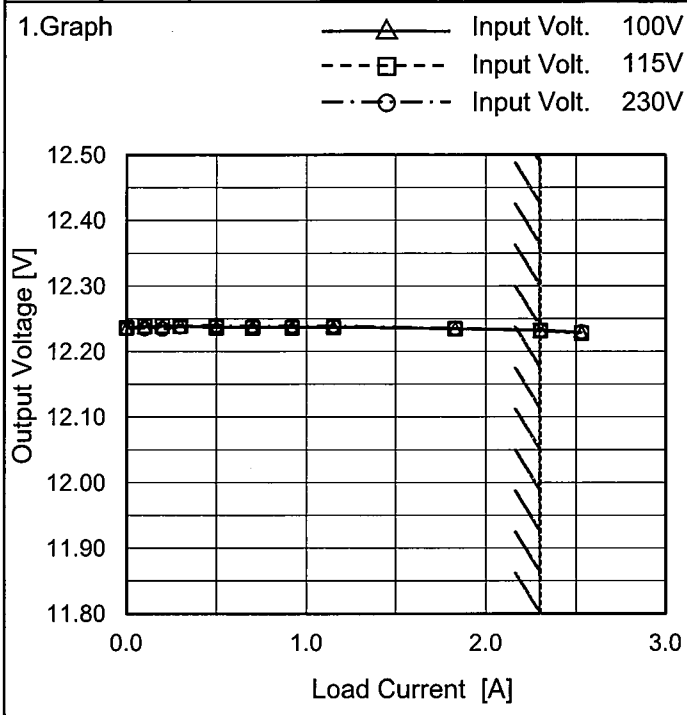
Model	KHEA30F-12
Item	Load Regulation
Object	+12V2.3A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

2.Values

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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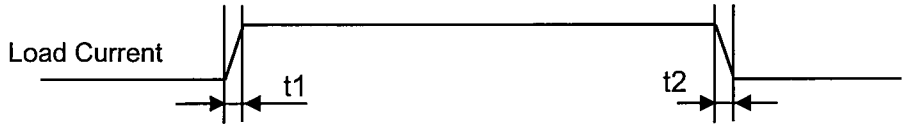
Model	KHEA30F-12
Item	Dynamic Load Response
Object	+12V2.3A

Temperature 25˚C
Testing Circuitry Figure A

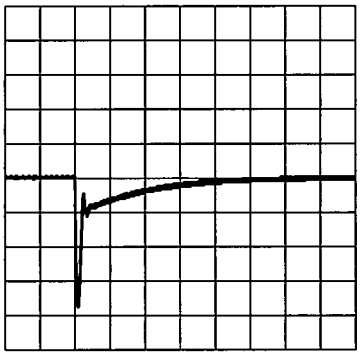
Input Volt. 230 V
Cycle 1000 ms

Response. t1=t2=50us. Typ

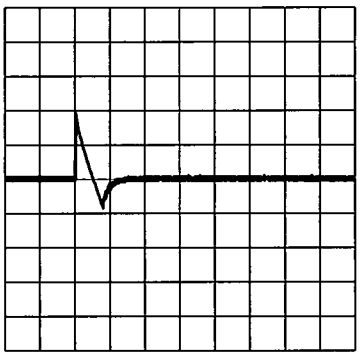


Min.Load (0A) ←→
Load 100% (2.3A)

200mV/div



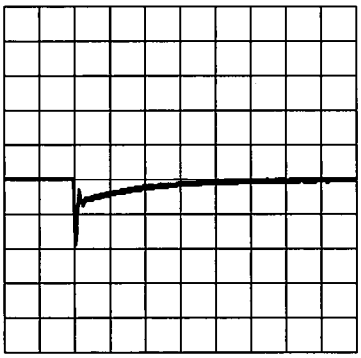
2 ms/div



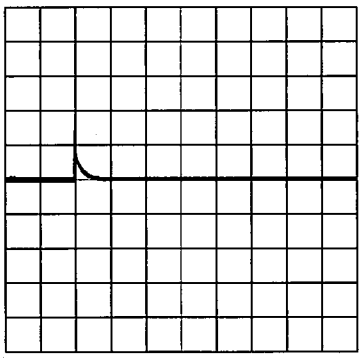
20 ms/div

Load 30%(0.69A) ←→
Load 100% (2.3A)

200mV/div



2 ms/div



20 ms/div

＊The characteristic of AC115V is equal.

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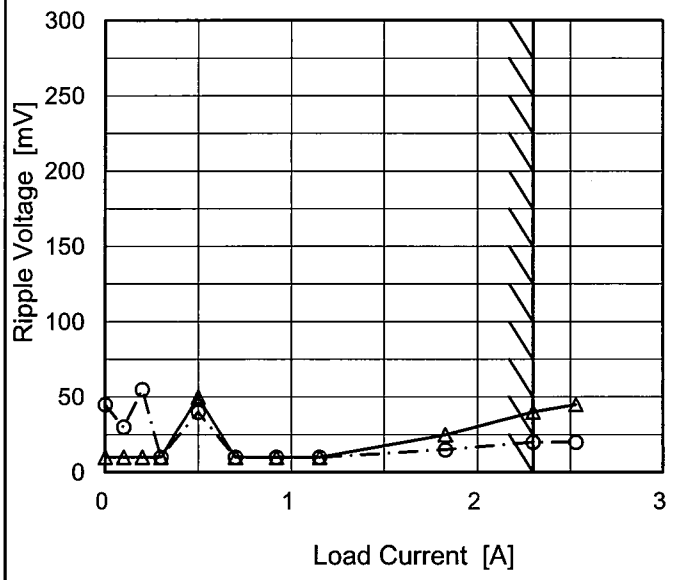
Model	KHEA30F-12
Item	Ripple Voltage (by Load Current)
Object	+12V2.3A

Temperature 25°C
Testing Circuitry Figure C

1.Graph

Input Volt. 115V
Input Volt. 230V



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.

T1: Due to AC Input Line
T2: Due to Switching

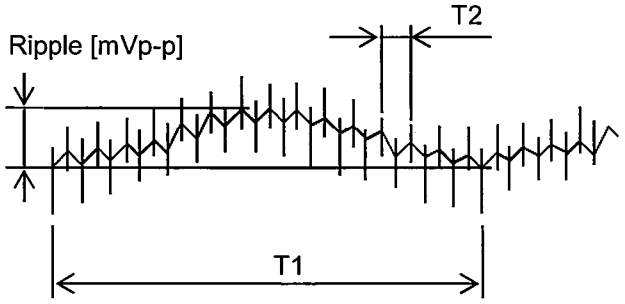


Fig. Complex Ripple Wave Form

2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 115 [V]	Input Volt. 230 [V]
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

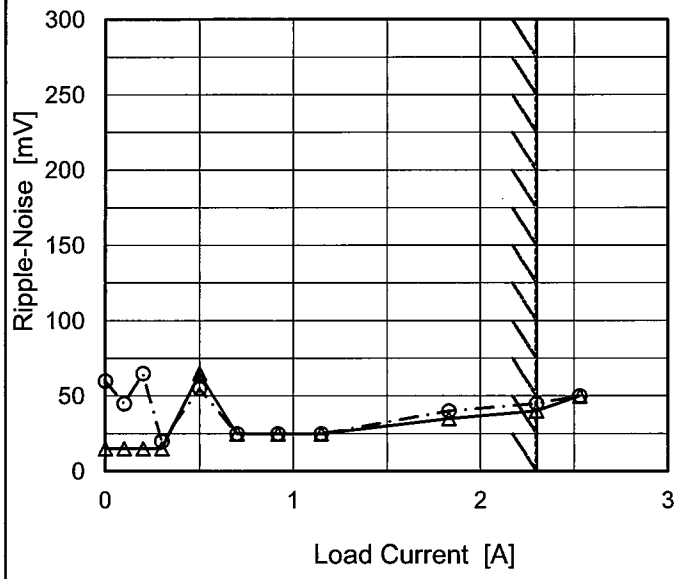
COSEL

Model	KHEA30F-12
Item	Ripple-Noise
Object	+12V2.3A

Temperature 25°C
Testing Circuitry Figure C

1.Graph

Input Volt. 115V
Input Volt. 230V



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.

T1: Due to AC Input Line
T2: Due to Switching

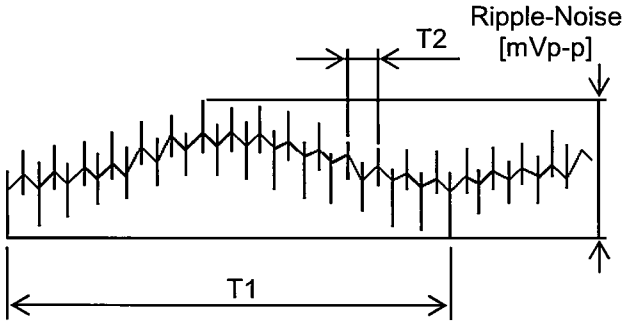


Fig. Complex Ripple Wave Form

2.Values

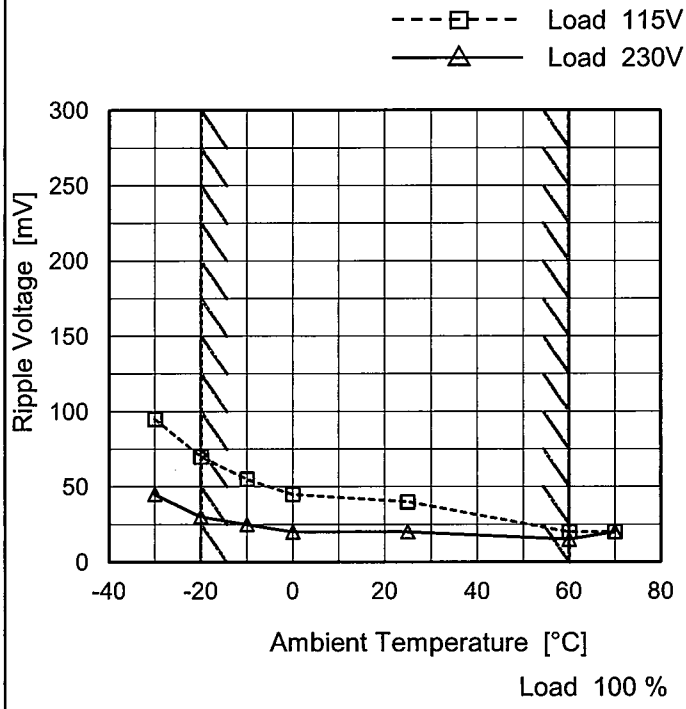
Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 115 [V]	Input Volt. 230 [V]
0.00	15	60
0.10	15	45
0.20	15	65
0.30	15	20
0.50	65	55
0.70	25	25
0.92	25	25
1.15	25	25
1.83	35	40
2.30	40	45
2.53	50	50

COSEL

Model	KHEA30F-12
Item	Ripple Voltage (by Ambient Temp.)
Object	+5V5A

Testing Circuitry Figure C

1.Graph



Load 100 %

Measured by 20 MHz Oscilloscope.
Note: Slanted line shows the range of the rated ambient temperature.

2.Values

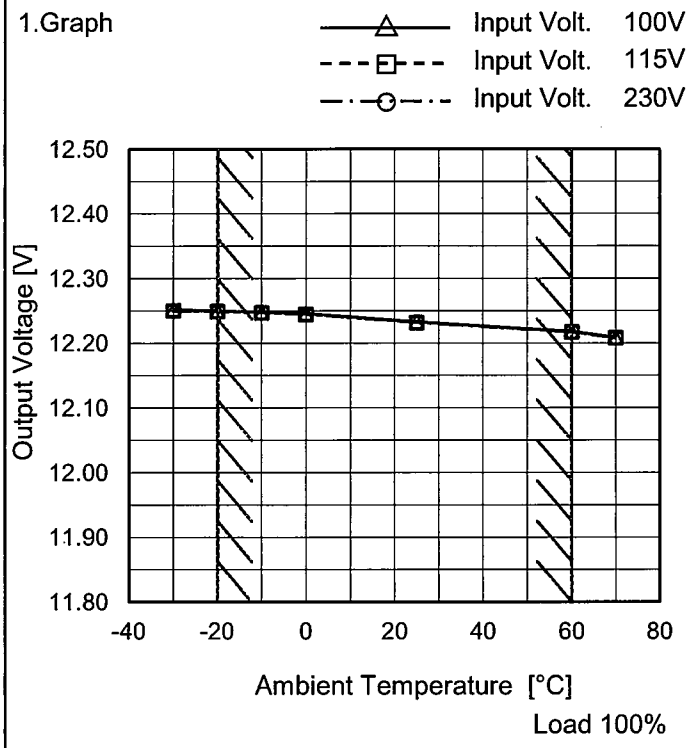
Ambient Temperature [°C]	Ripple Voltage [mV]	
	Input Volt. 115 [V]	Input Volt. 230 [V]
-30	95	45
-20	70	30
-10	55	25
0	45	20
25	40	20
60	20	15
70	20	20
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	KHEA30F-12
Item	Ambient Temperature Drift
Object	+12V2.3A

Testing Circuitry Figure A

1.Graph



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

2.Values

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
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	KHEA30F-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 = ±(Maximum of Output Voltage - 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	-20	100	2.3	12.250	±17	±0.1
Minimum Voltage	60	230	2.3	12.217		

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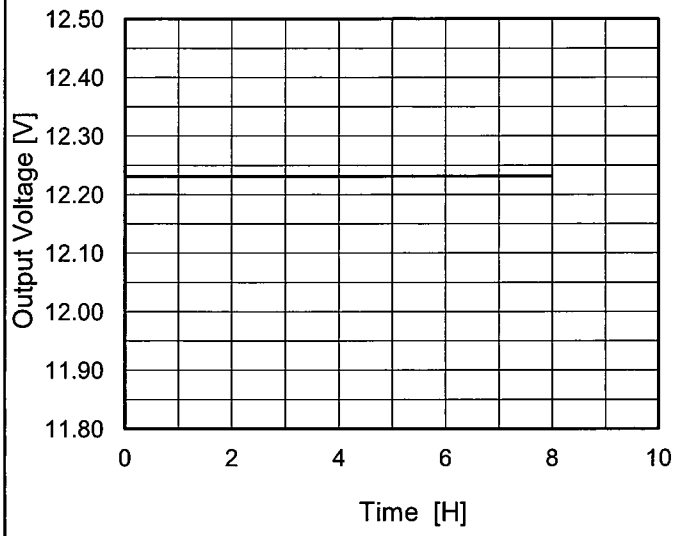
Model	KHEA30F-12
Item	Time Lapse Drift
Object	+12V2.3A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Input Volt. 230V
Load 100%

* The characteristic of AC115V is equal.

2.Values

Time since start [H]	Output Voltage [V]
0.0	12.232
0.5	12.231
1.0	12.231
2.0	12.231
3.0	12.231
4.0	12.231
5.0	12.231
6.0	12.231
7.0	12.231
8.0	12.231

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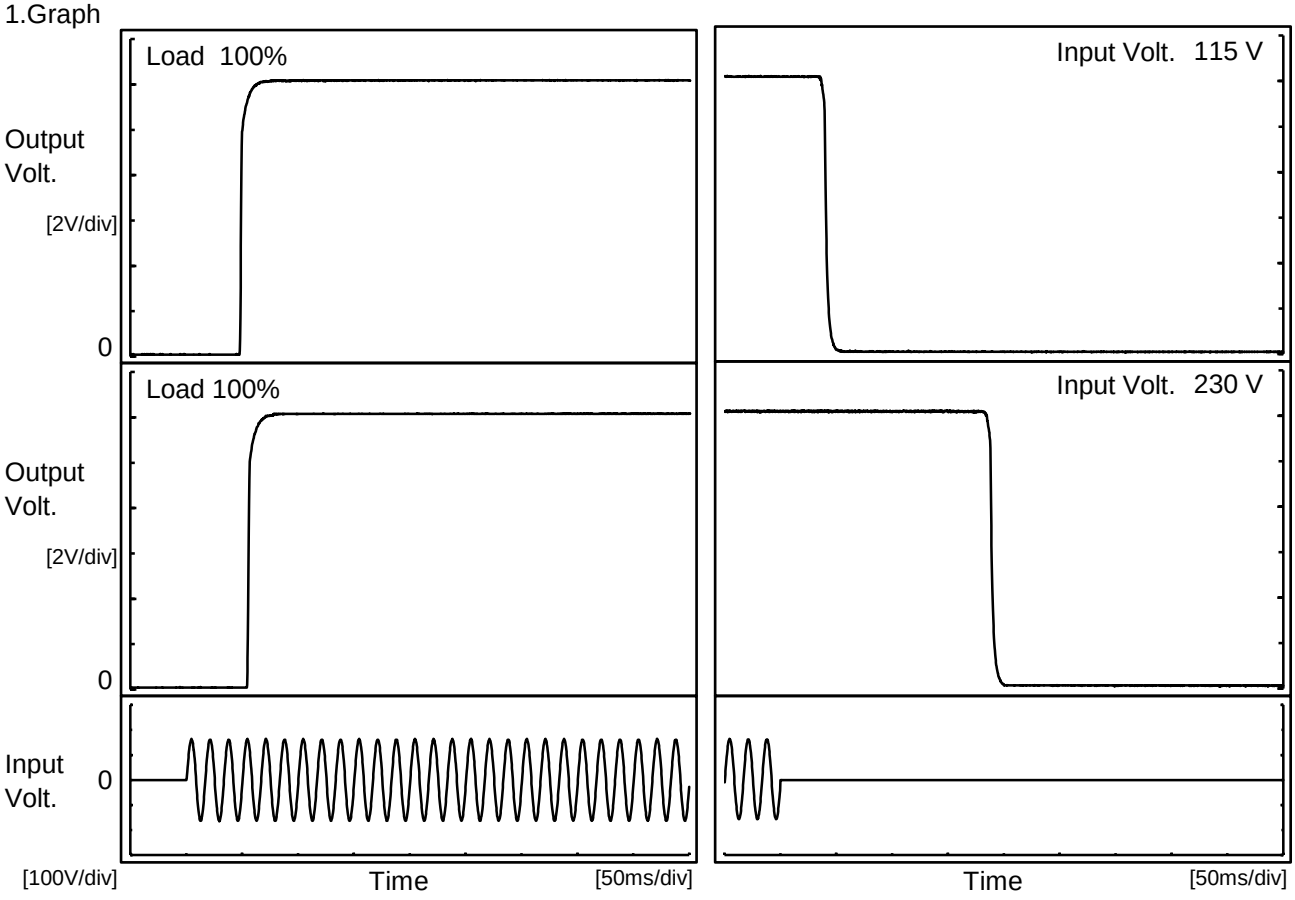
Model	KHEA30F-12
Item	Rise and Fall Time
Object	+12V2.3A

Temperature 25°C
Testing Circuitry Figure A

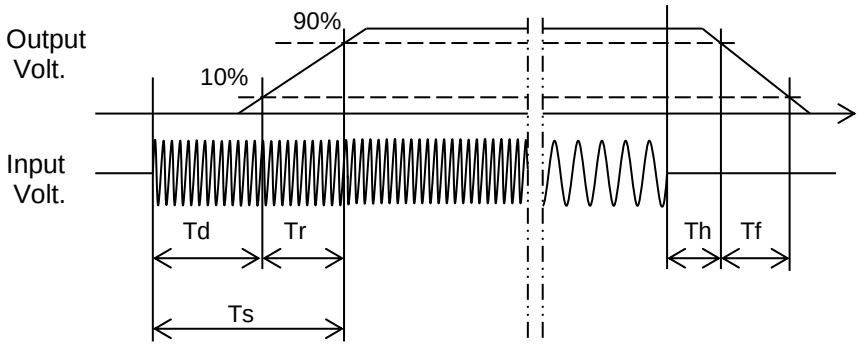
1.Graph



2.Values

[ms]

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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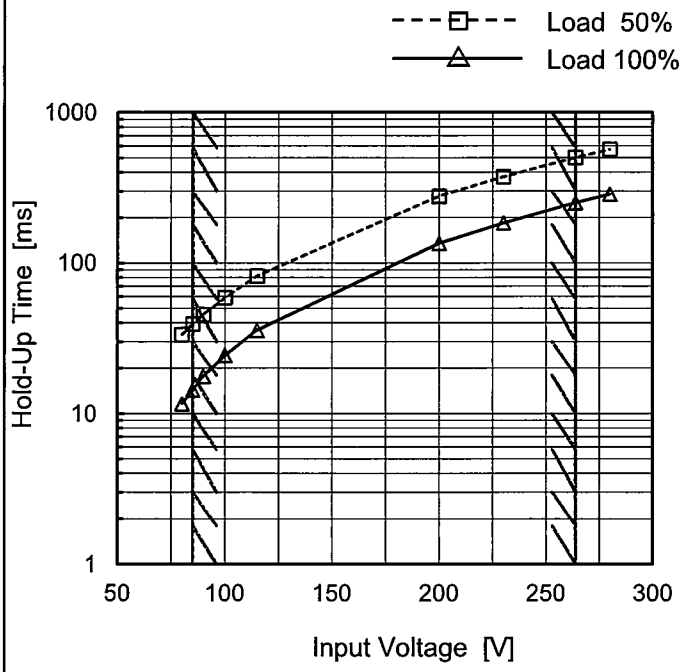
Model	KHEA30F-12
Item	Hold-Up Time
Object	+12V2.3A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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.

2.Values

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

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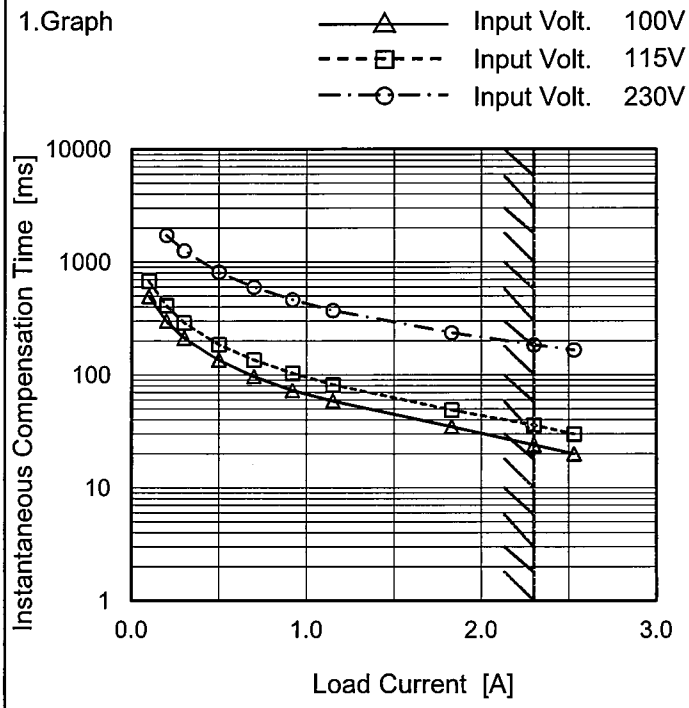
Model	KHEA30F-12
Item	Instantaneous Interruption Compensation
Object	+12V2.3A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

2.Values

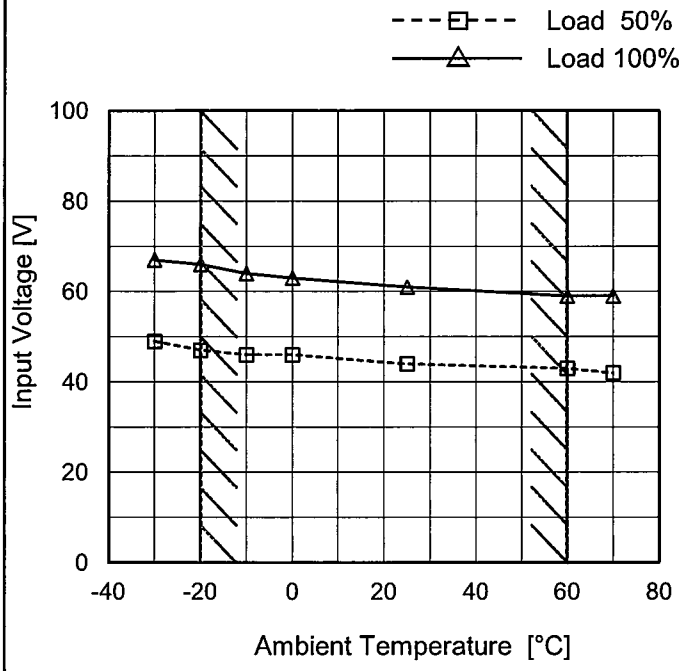
Load Current [A]	Time [ms] Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
0.00	-	-	-
0.10	499	680	-
0.20	301	412	1740
0.30	213	290	1265
0.50	136	186	818
0.70	97	136	602
0.92	73	104	465
1.15	59	82	374
1.83	35	49	237
2.30	24	36	185
2.53	20	30	167

COSEL

Model	KHEA30F-12
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+12V2.3A

Testing Circuitry Figure A

1.Graph



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

2.Values

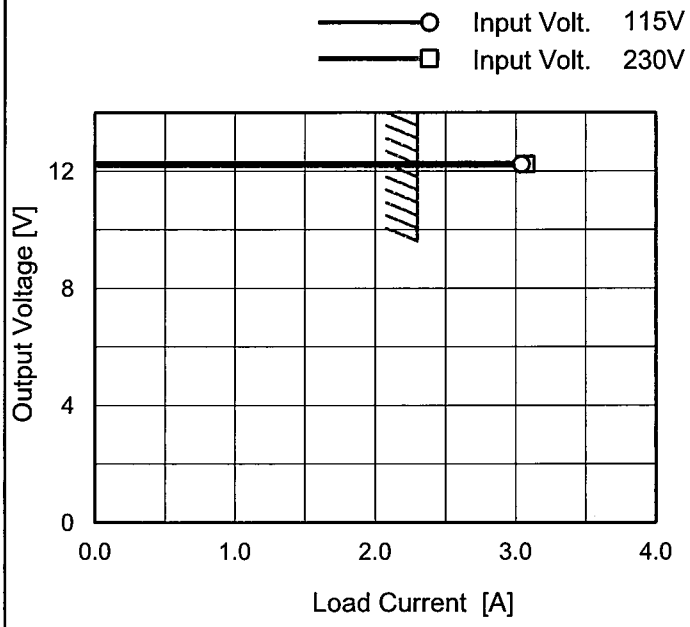
Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-30	49	67
-20	47	66
-10	46	64
0	46	63
25	44	61
60	43	59
70	42	59
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	KHEA30F-12
Item	Overcurrent Protection
Object	+12V2.3A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

Intermittent operation occurs when overcurrent protection is activated.

2.Values

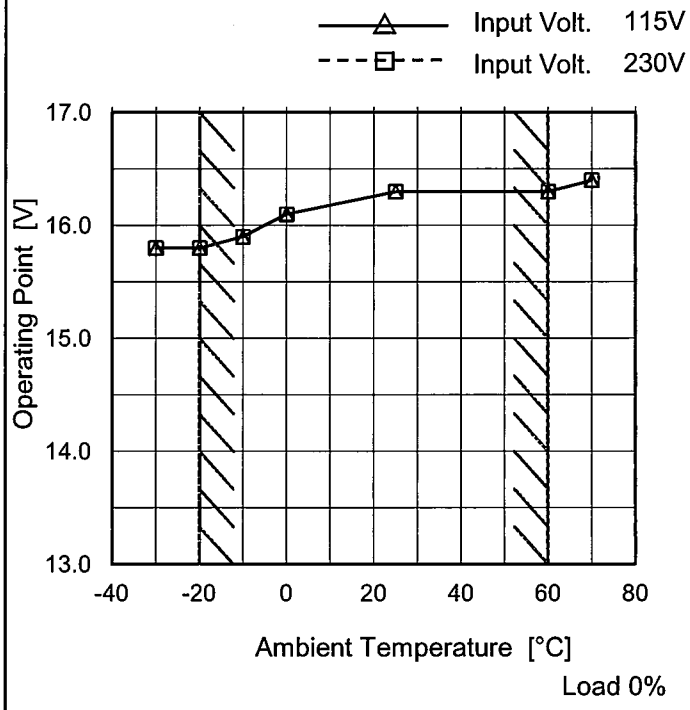
Output Voltage [V]	Load Current [A]	
	Input Volt. 115[V]	Input Volt. 230[V]
12.24	3.03	3.04
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	KHEA30F-12
Item	Overvoltage Protection
Object	+12V2.3A

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. 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
--	-	-
--	-	-
--	-	-
--	-	-

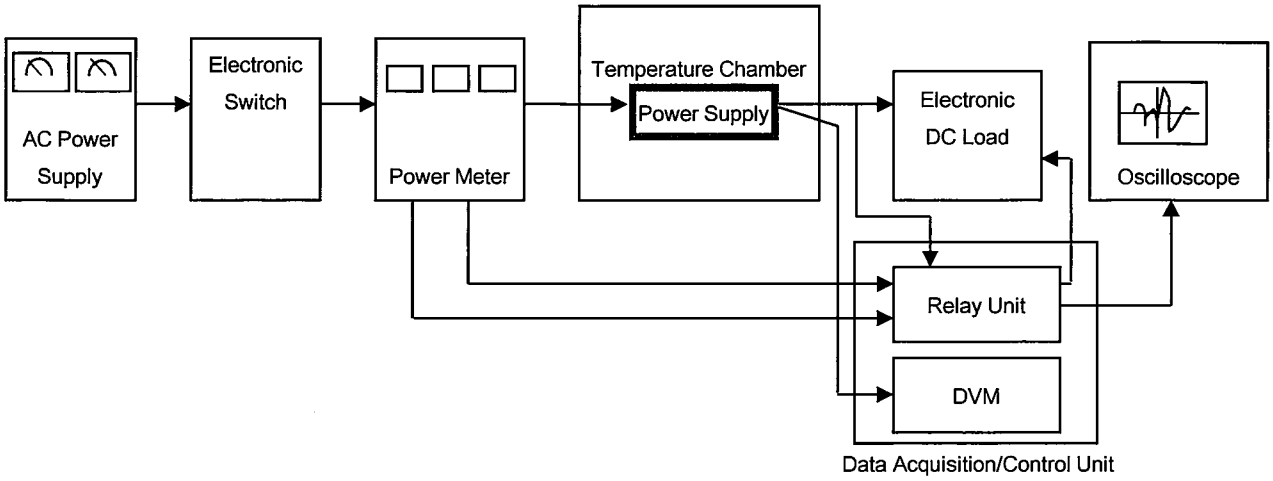


Figure A

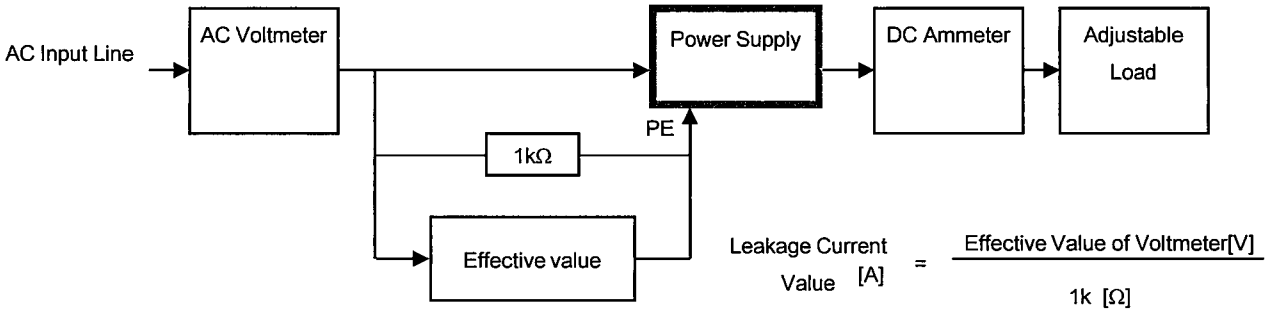


Figure B (DEN-AN)

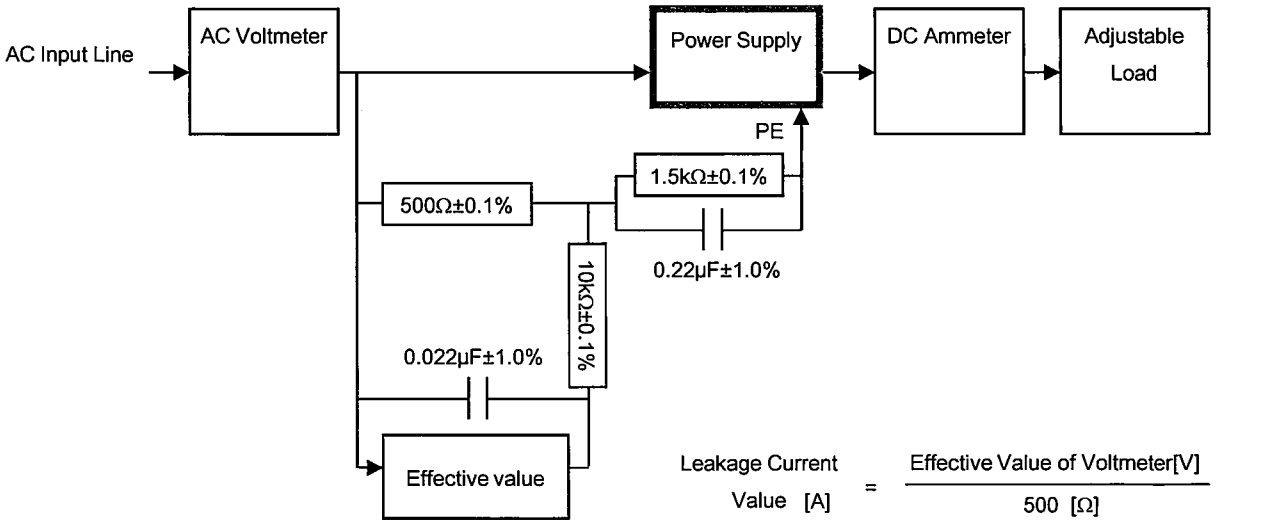
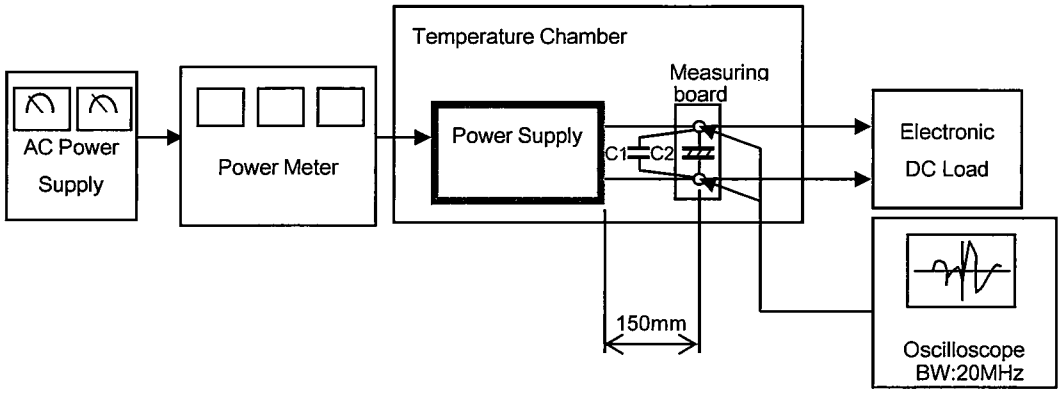


Figure B (IEC60950-1)



C1= 0.1 μF
(Ceramic capacitor)
C2= 22 μF
(Electrolytic capacitor)

Figure C