COSEL

参考資料

TEST DATA OF KHEA30F-24

Regulated DC Power Supply
November 15, 2013

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COSEL CO.,LTD.

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CONTENTS

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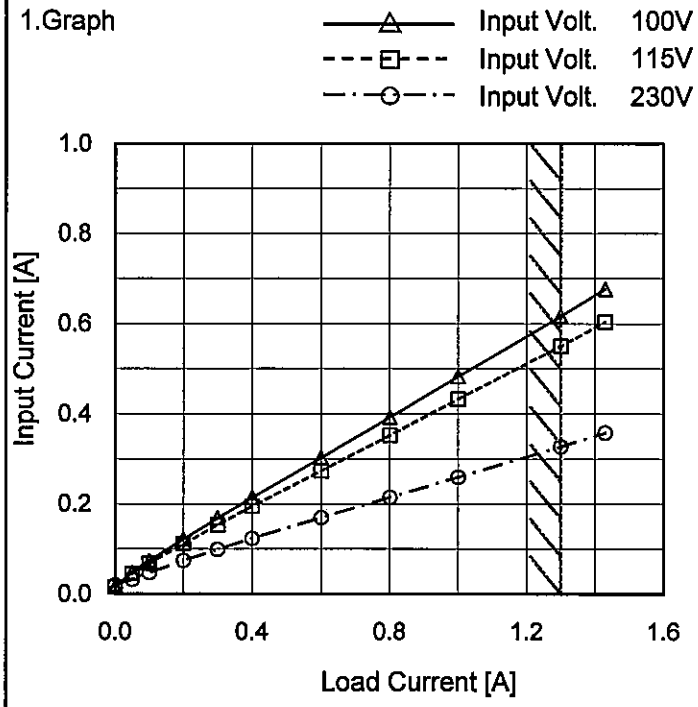
Model	KHEA30F-24
Item	Input Current (by Load Current)
Object	

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 Current [A]		
	Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
0.00	0.016	0.015	0.020
0.05	0.049	0.045	0.032
0.10	0.074	0.068	0.048
0.20	0.122	0.112	0.075
0.30	0.169	0.154	0.099
0.40	0.214	0.195	0.123
0.60	0.303	0.273	0.170
0.80	0.392	0.352	0.215
1.00	0.483	0.433	0.260
1.30	0.617	0.551	0.328
1.43	0.676	0.604	0.358

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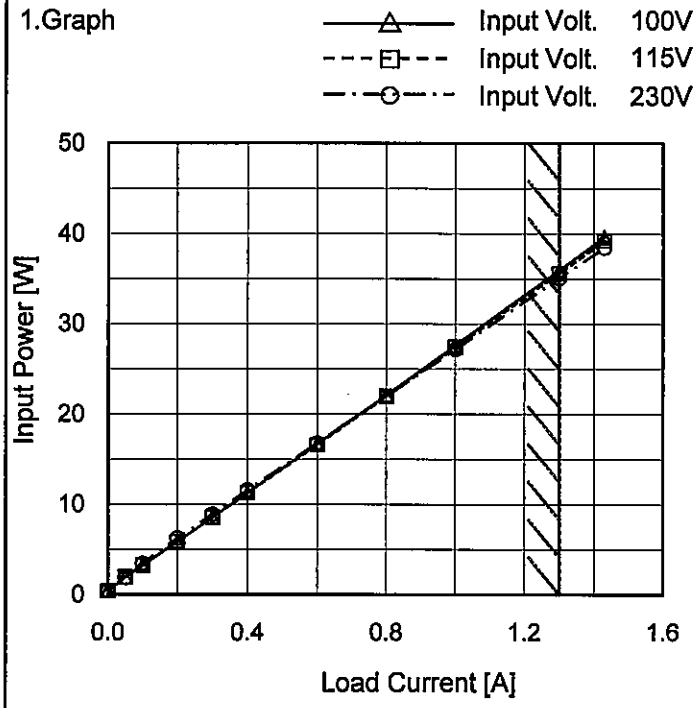
Model	KHEA30F-24
Item	Input Power (by Load Current)
Object	———————

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	0.46	0.42	0.45
0.05	1.94	1.95	1.90
0.10	3.26	3.27	3.47
0.20	5.90	5.89	6.29
0.30	8.61	8.59	8.93
0.40	11.31	11.28	11.59
0.60	16.69	16.61	16.81
0.80	22.12	21.97	22.00
1.00	27.64	27.44	27.20
1.30	36.01	35.65	35.10
1.43	39.64	39.24	38.50

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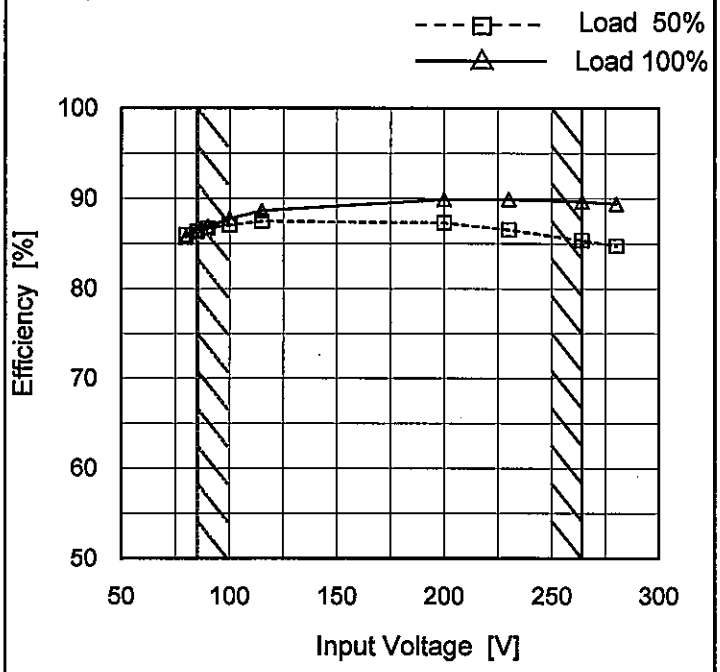
Model	KHEA30F-24
Item	Efficiency (by Input Voltage)
Object	

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	86.0	85.7
85	86.4	86.4
90	86.7	87.0
100	87.1	87.8
115	87.5	88.6
200	87.3	89.9
230	86.5	89.9
264	85.4	89.6
280	84.8	89.4

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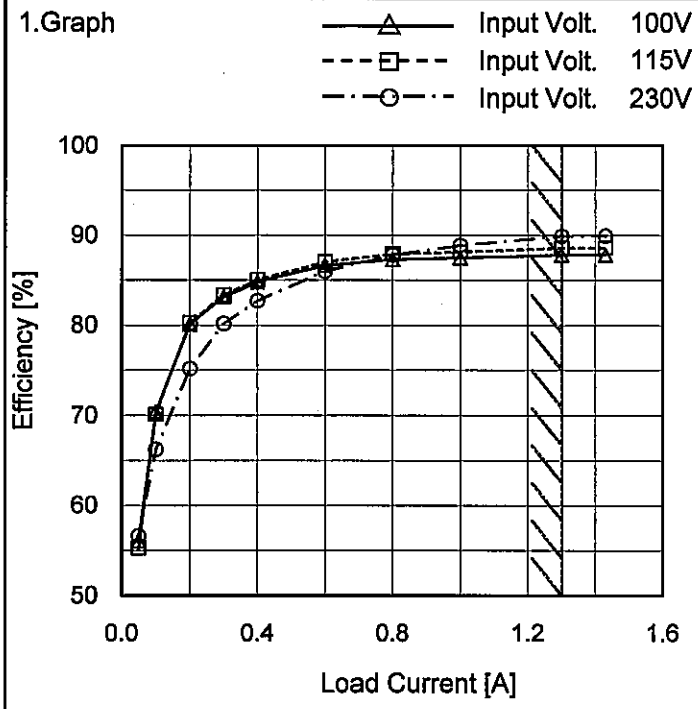
Model	KHEA30F-24
Item	Efficiency (by Load Current)
Object	———————

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	-	-	-
0.05	56.1	55.3	56.6
0.10	70.4	70.1	66.2
0.20	80.1	80.3	75.2
0.30	83.1	83.4	80.2
0.40	84.8	85.0	82.7
0.60	86.6	87.0	86.0
0.80	87.3	87.9	87.8
1.00	87.5	88.1	88.9
1.30	87.8	88.6	89.9
1.43	87.8	88.6	89.9

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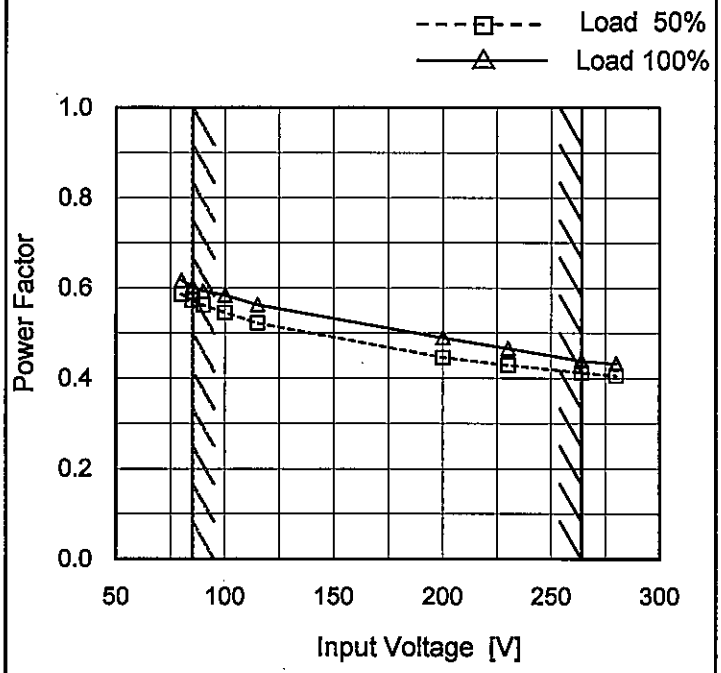
Model	KHEA30F-24
Item	Power Factor (by Input Voltage)
Object	

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	0.586	0.617
85	0.573	0.604
90	0.562	0.593
100	0.546	0.584
115	0.523	0.563
200	0.446	0.490
230	0.429	0.466
264	0.413	0.439
280	0.406	0.432

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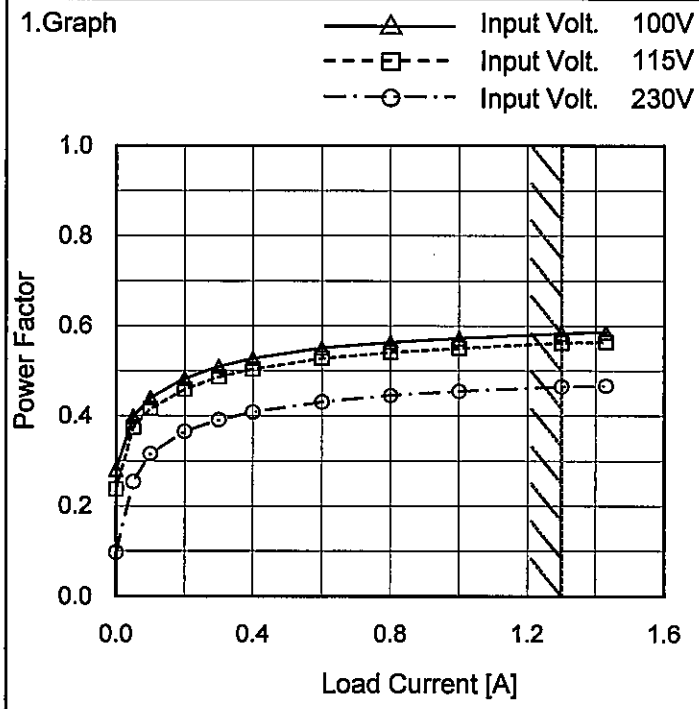
Model	KHEA30F-24
Item	Power Factor (by Load Current)
Object	———————

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	0.281	0.238	0.098
0.05	0.399	0.375	0.255
0.10	0.440	0.416	0.317
0.20	0.483	0.459	0.366
0.30	0.510	0.487	0.391
0.40	0.528	0.504	0.408
0.60	0.551	0.528	0.431
0.80	0.564	0.542	0.445
1.00	0.572	0.551	0.455
1.30	0.584	0.563	0.466
1.43	0.586	0.565	0.467

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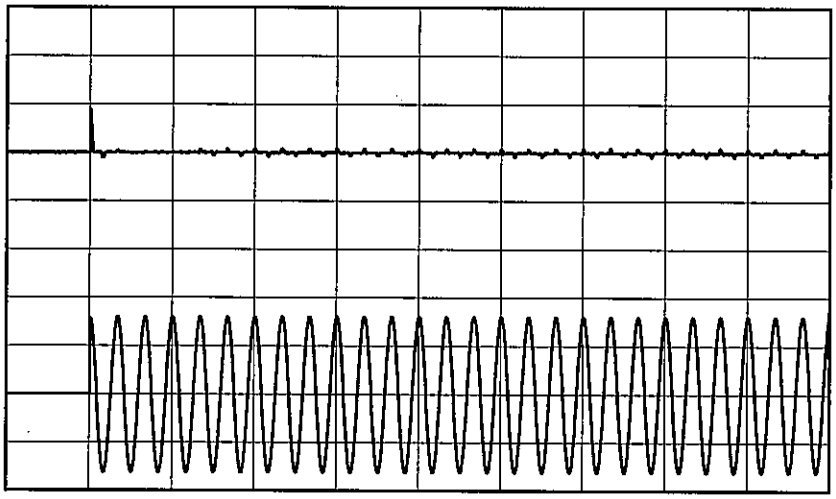
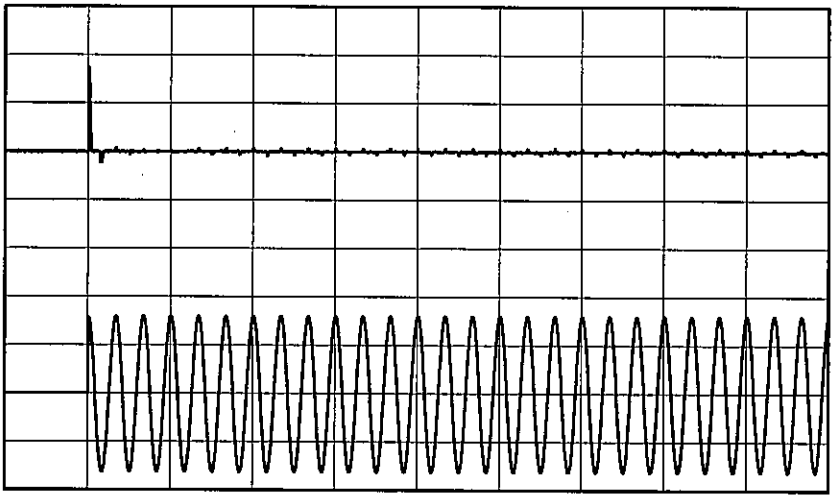
Model	KHEA30F-24
Item	Inrush Current
Object	———————

Temperature 25°C
Testing Circuitry Figure A



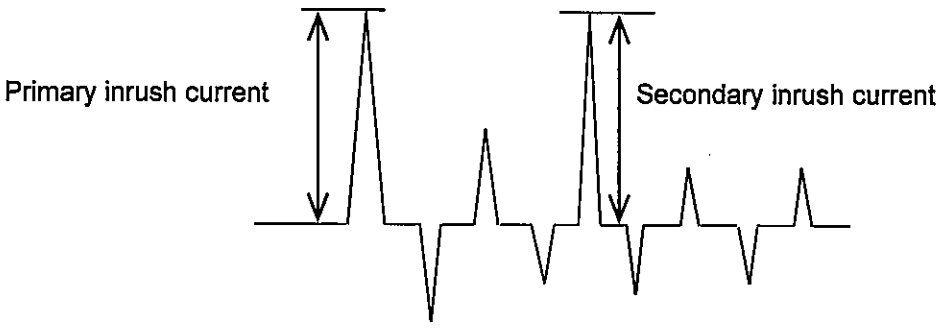
Input Voltage 115 V
Frequency 60 Hz
Load 100 %

Primary inrush current :
17.8 A
Secondary inrush current :
2.0 A



Input Voltage 230 V
Frequency 60 Hz
Load 100 %

Primary inrush current :
34.7 A
Secondary inrush current :
1.6 A



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Model	KHEA30F-24		
Item	Leakage Current	Temperature	25°C
Object	———————	Testing Circuitry	Figure B

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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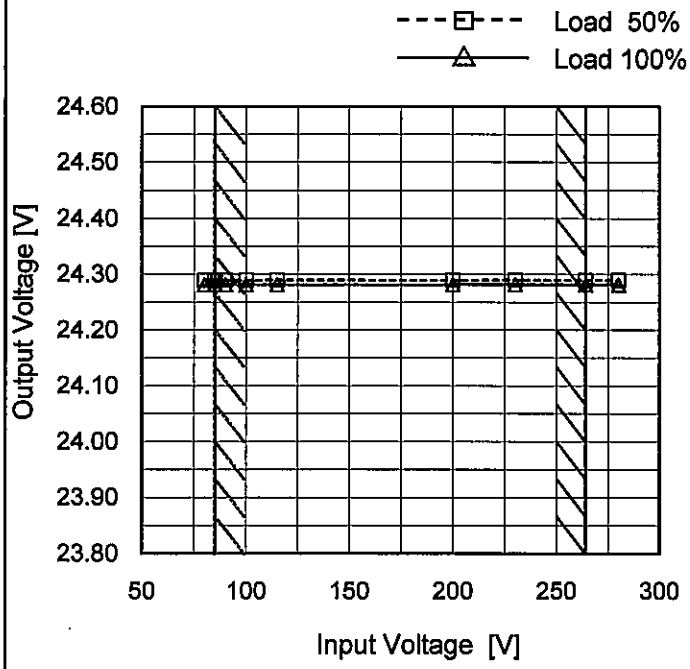
Model	KHEA30F-24
Item	Line Regulation
Object	+24V1.3A

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	24.289	24.281
85	24.290	24.282
90	24.290	24.281
100	24.289	24.282
115	24.290	24.282
200	24.290	24.282
230	24.290	24.282
264	24.290	24.282
280	24.290	24.282

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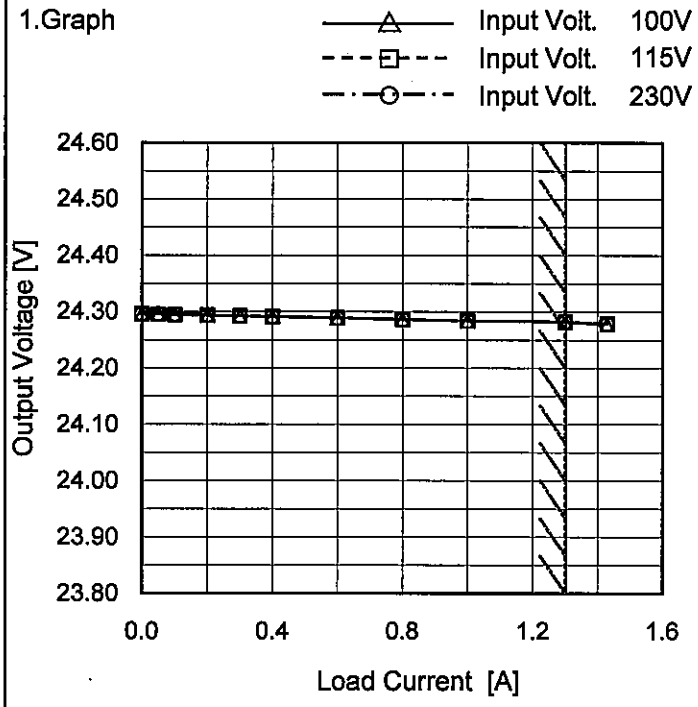
Model	KHEA30F-24
Item	Load Regulation
Object	+24V1.3A

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	24.296	24.296	24.297
0.05	24.296	24.295	24.296
0.10	24.295	24.295	24.295
0.20	24.293	24.293	24.294
0.30	24.292	24.292	24.293
0.40	24.291	24.291	24.291
0.60	24.289	24.289	24.289
0.80	24.286	24.287	24.286
1.00	24.284	24.284	24.284
1.30	24.282	24.282	24.282
1.43	24.278	24.279	24.279

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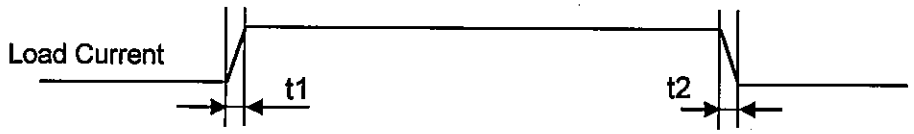
Model	KHEA30F-24
Item	Dynamic Load Response
Object	+24V1.3A

Temperature 25˚C
Testing Circuitry Figure A

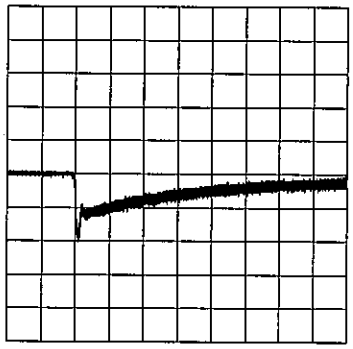
Input Volt. 230 V
Cycle 1000 ms

Response. t1=t2=50us. Typ

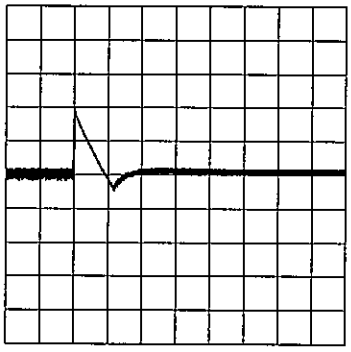


Min.Load (0A) ⟷
Load 100% (1.3A)

200mV/div



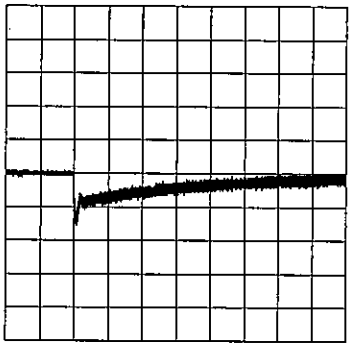
2 ms/div



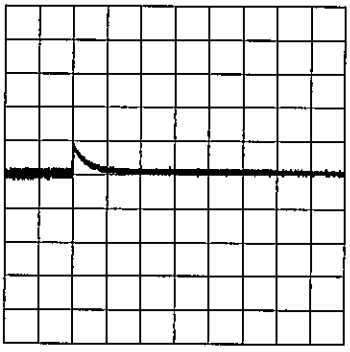
20 ms/div

Load 30%(0.39A) ⟷
Load 100% (1.3A)

200mV/div



2 ms/div



20 ms/div

* The characteristic of AC115V is equal.

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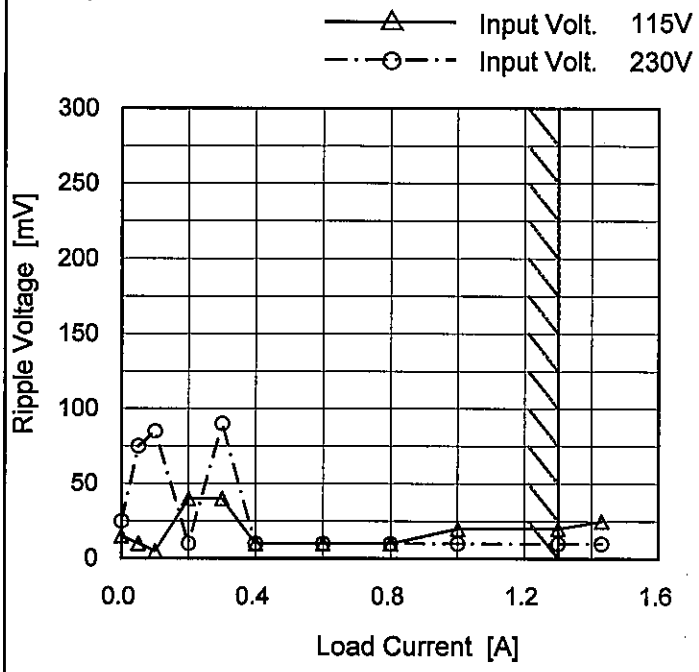
Model	KHEA30F-24
Item	Ripple Voltage (by Load Current)
Object	+24V1.3A

Temperature 25°C
Testing Circuitry Figure C

1.Graph



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

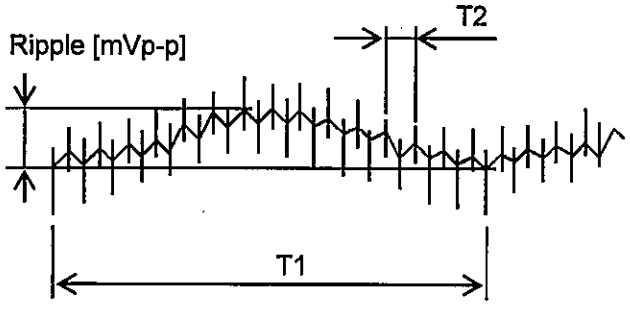


Fig. Complex Ripple Wave Form

2.Values

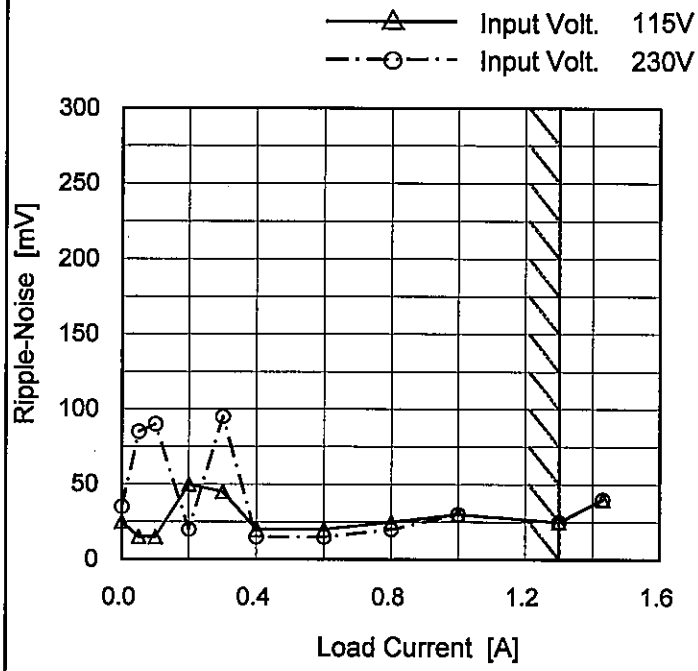
Load Current [A]	Ripple Voltage [mV] Input Volt. 115 [V]	Ripple Voltage [mV] Input Volt. 230 [V]
0.00	15	25
0.05	10	75
0.10	5	85
0.20	40	10
0.30	40	90
0.40	10	10
0.60	10	10
0.80	10	10
1.00	20	10
1.30	20	10
1.43	25	10

COSEL

Model	KHEA30F-24
Item	Ripple-Noise
Object	+24V1.3A

Temperature 25°C
Testing Circuitry Figure C

1.Graph



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.

2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 115 [V]	Input Volt. 230 [V]
0.00	25	35
0.05	15	85
0.10	15	90
0.20	50	20
0.30	45	95
0.40	20	15
0.60	20	15
0.80	25	20
1.00	30	30
1.30	25	25
1.43	40	40

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

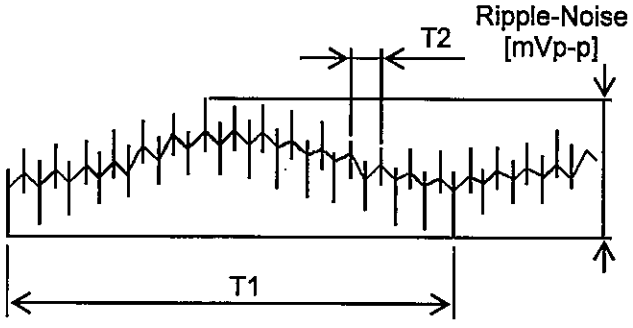


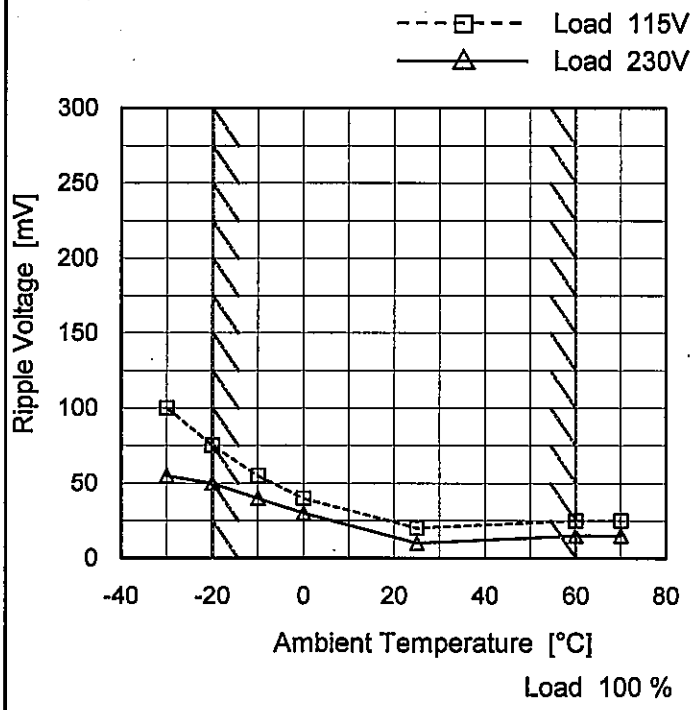
Fig. Complex Ripple Wave Form

COSEL

Model	KHEA30F-24
Item	Ripple Voltage (by Ambient Temp.)
Object	+24V1.3A

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

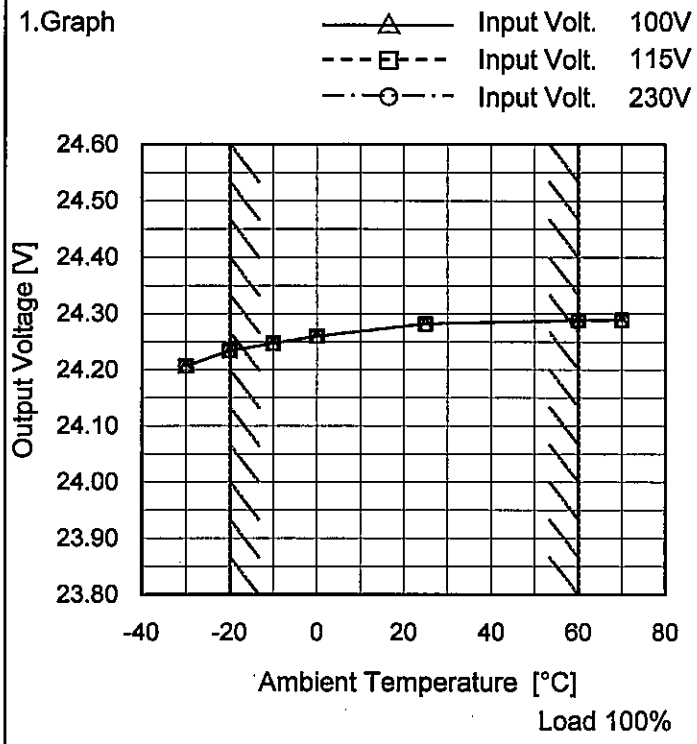
Ambient Temperature [°C]	Ripple Voltage [mV]	
	Input Volt. 115 [V]	Input Volt. 230 [V]
-30	100	55
-20	75	50
-10	55	40
0	40	30
25	20	10
60	25	15
70	25	15
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	KHEA30F-24
Item	Ambient Temperature Drift
Object	+24V1.3A

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	24.207	24.207	24.207
-20	24.234	24.234	24.234
-10	24.247	24.247	24.247
0	24.260	24.260	24.260
25	24.282	24.282	24.282
60	24.288	24.288	24.288
70	24.288	24.289	24.289
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	KHEA30F-24	
Item	Output Voltage Accuracy	Testing Circuitry Figure A
Object	+24V1.3A	

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 - 1.3A

* 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	60	230	0	24.315	±41	±0.2
Minimum Voltage	-20	100	1.3	24.234		

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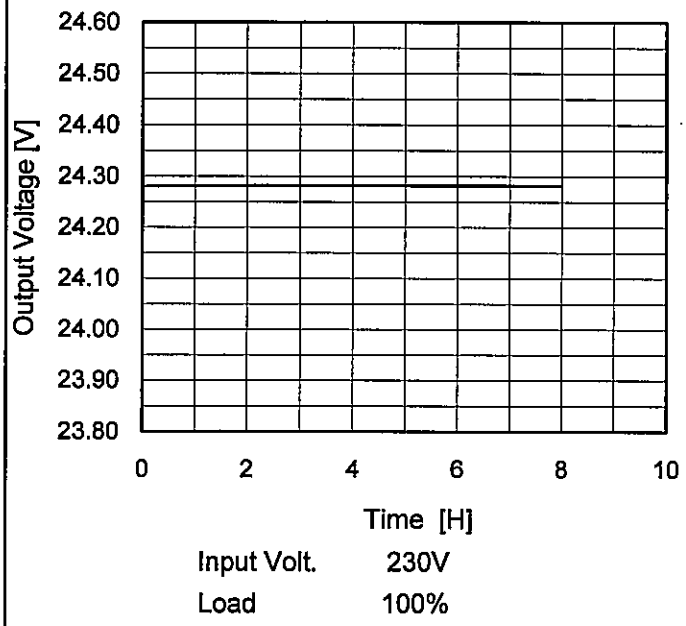
Model	KHEA30F-24
Item	Time Lapse Drift
Object	+24V1.3A

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	24.279
0.5	24.281
1.0	24.281
2.0	24.281
3.0	24.282
4.0	24.282
5.0	24.282
6.0	24.282
7.0	24.282
8.0	24.282

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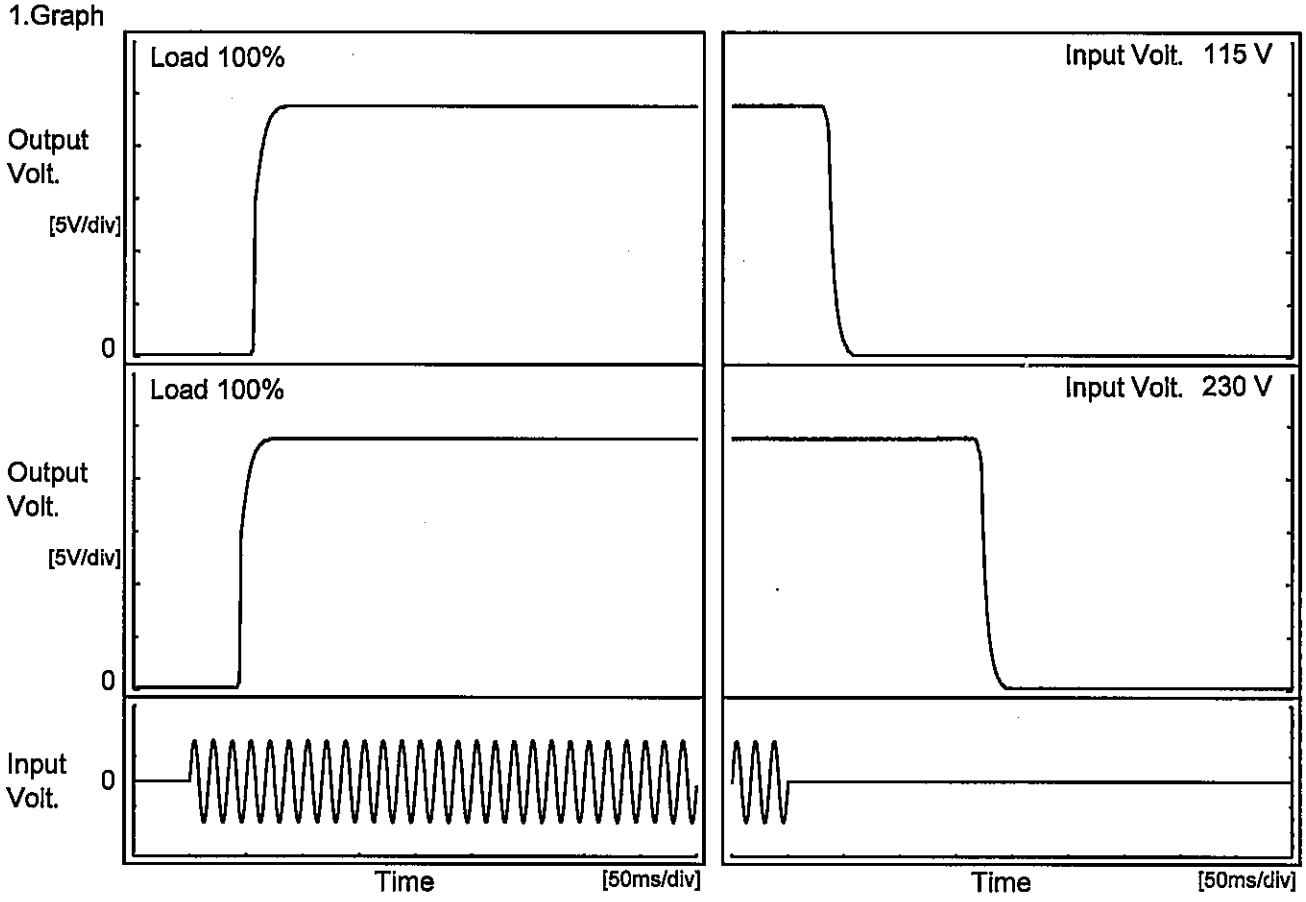
Model	KHEA30F-24
Item	Rise and Fall Time
Object	+24V1.3A

Temperature 25°C
Testing Circuitry Figure A

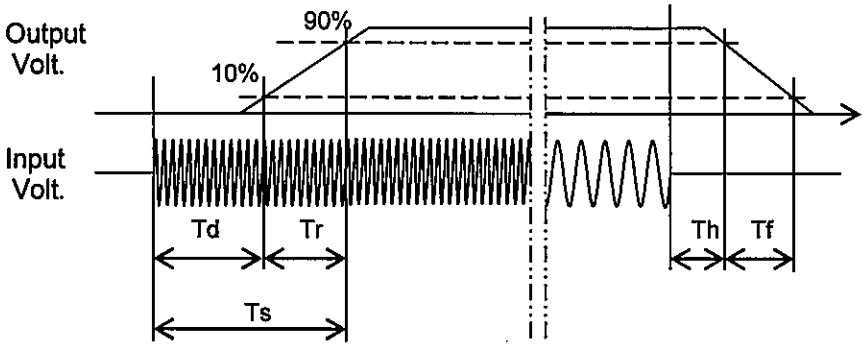
1.Graph



2.Values

[ms]

Input Volt. \ Time	Td	Tr	Ts	Th	Tf
115 V	56.5	11.5	68.0	36.3	11.0
230 V	44.3	11.5	55.8	172.3	11.0



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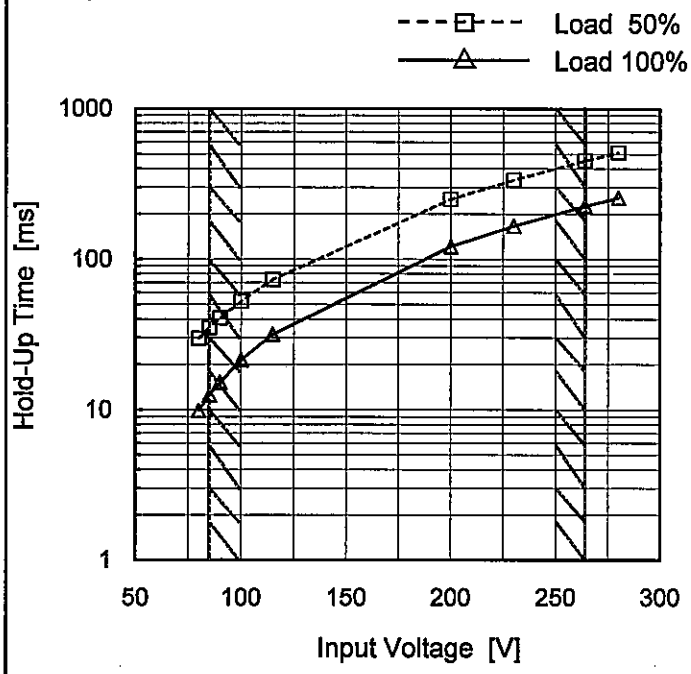
Model	KHEA30F-24
Item	Hold-Up Time
Object	+24V1.3A

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	30	10
85	35	13
90	41	15
100	53	21
115	73	32
200	251	122
230	337	166
264	454	226
280	514	257

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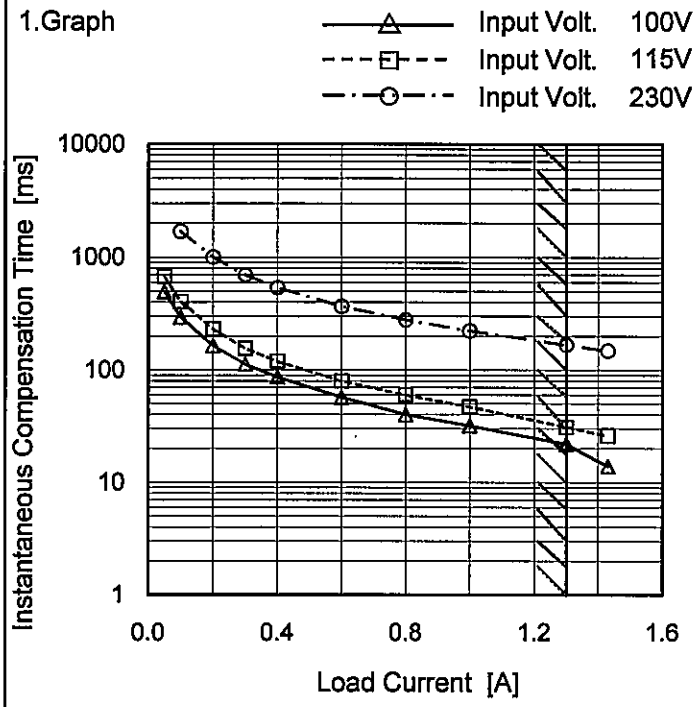
Model	KHEA30F-24
Item	Instantaneous Interruption Compensation
Object	+24V1.3A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

2.Values

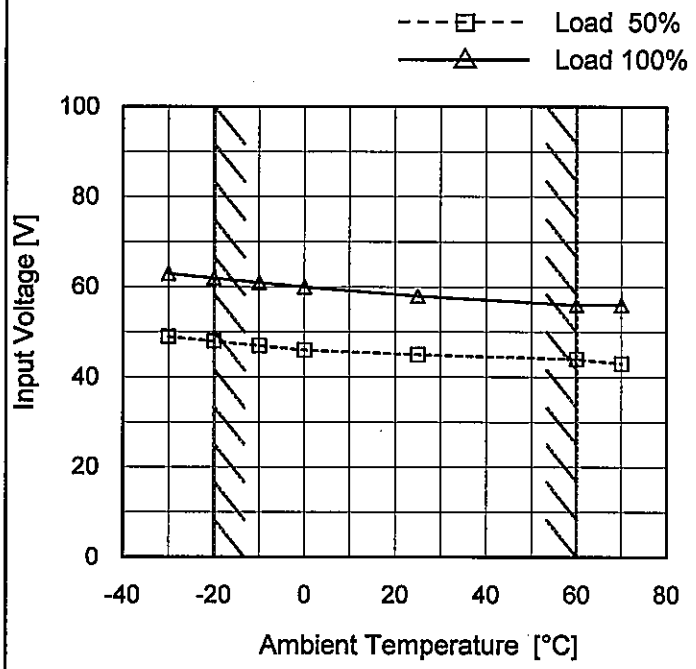
Load Current [A]	Time [ms] Input Volt. 100[V]	Input Volt. 115[V]	Input Volt. 230[V]
0.00	-	-	-
0.05	496	679	-
0.10	293	404	1695
0.20	165	230	1006
0.30	113	156	698
0.40	87	120	539
0.60	57	80	366
0.80	40	60	278
1.00	32	47	223
1.30	22	31	168
1.43	14	26	149

COSEL

Model	KHEA30F-24
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+24V1.3A

Testing Circuitry Figure A

1.Graph



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

2.Values

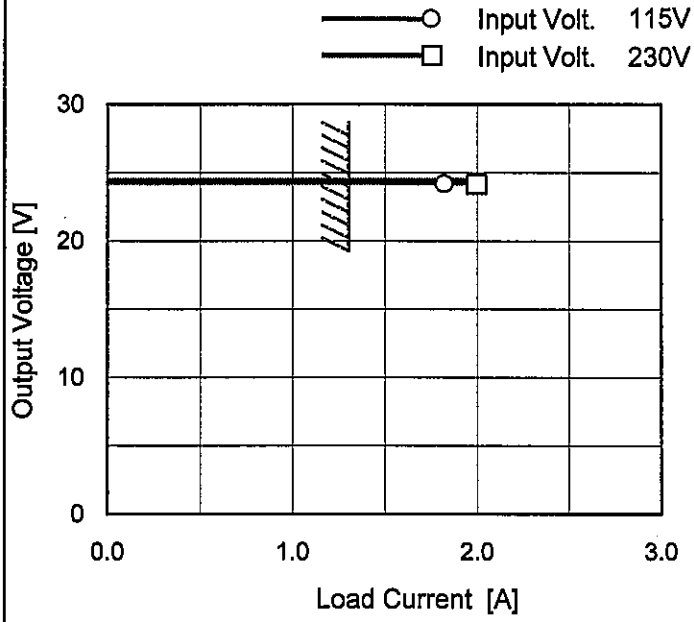
Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-30	49	63
-20	48	62
-10	47	61
0	46	60
25	45	58
60	44	56
70	43	56
---	-	-
---	-	-
---	-	-
---	-	-

COSEL

Model	KHEA30F-24
Item	Overcurrent Protection
Object	+24V1.3A

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]
24.3	1.80	1.98
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

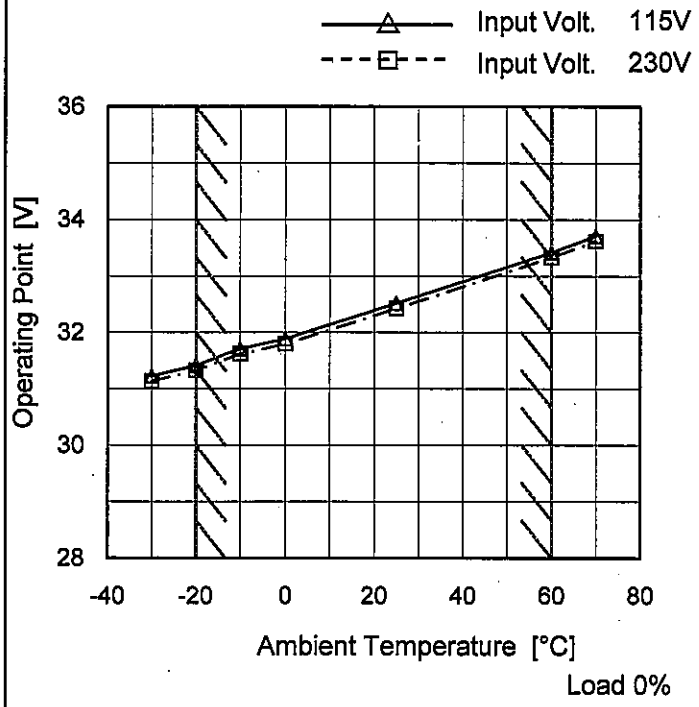
BC-10772

COSEL

Model	KHEA30F-24
Item	Overvoltage Protection
Object	+24V1.3A

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	31.23	31.14
-20	31.42	31.33
-10	31.71	31.62
0	31.89	31.80
25	32.52	32.43
60	33.42	33.33
70	33.71	33.62
--	-	-
--	-	-
--	-	-
--	-	-

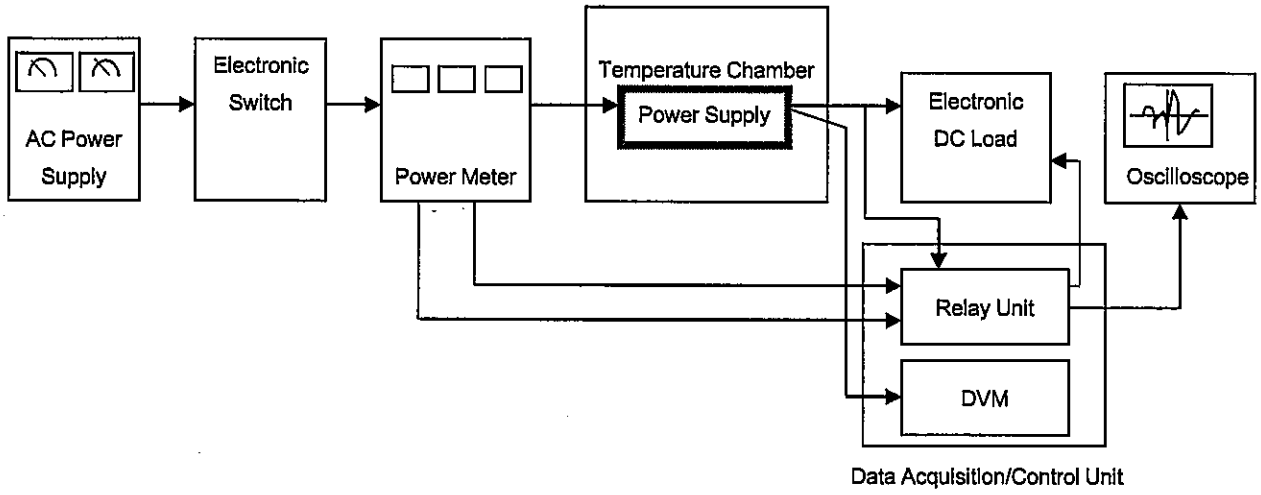


Figure A

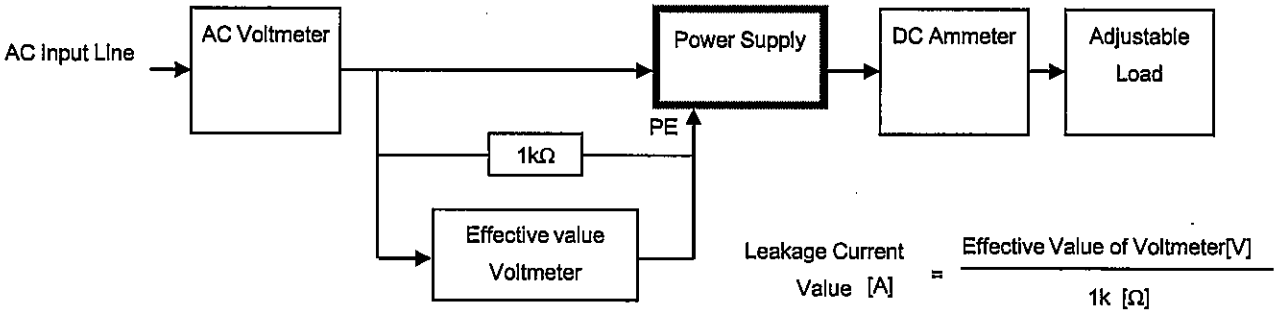


Figure B (DEN-AN)

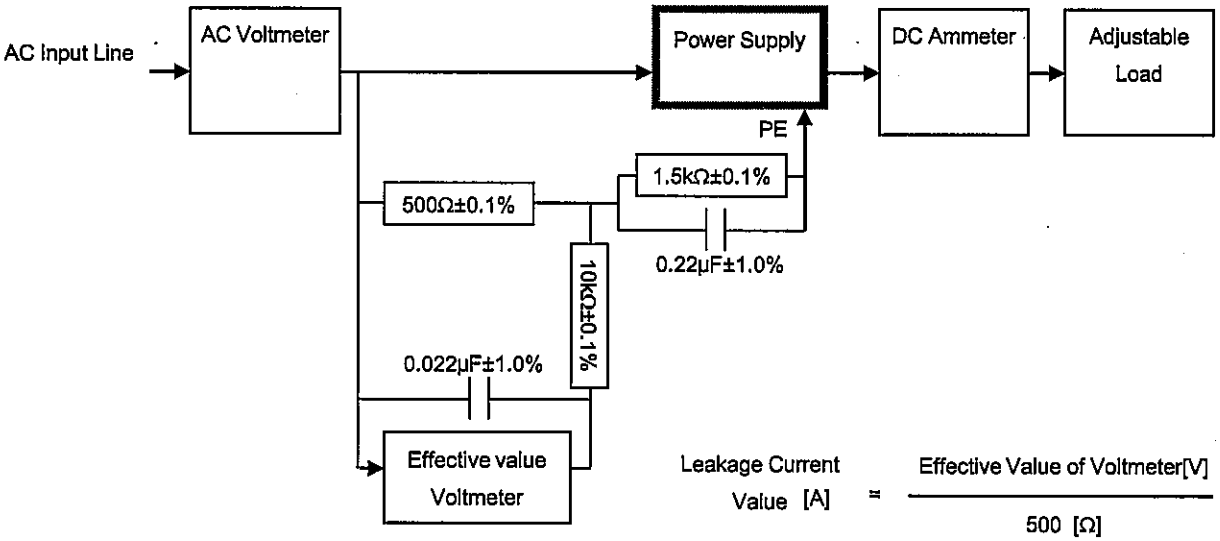
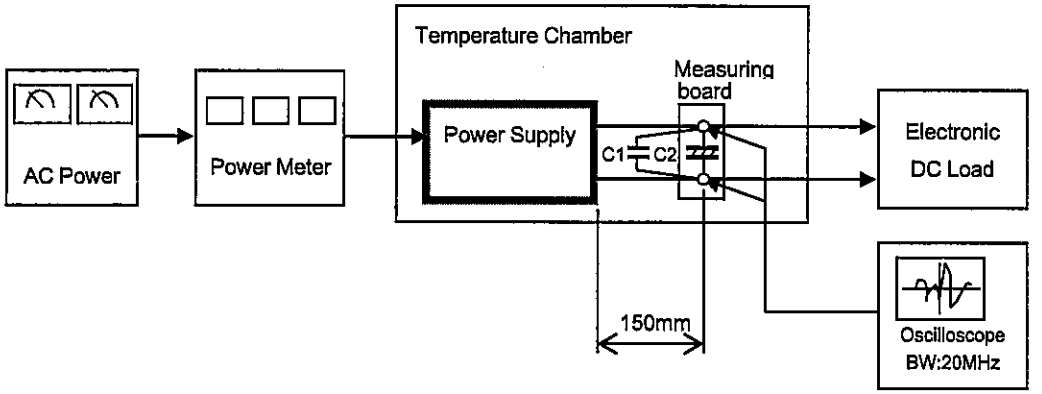


Figure B (IEC60950-1)



C1= 0.1 μF
(Ceramic capacitor)

C2= 22 μF
(Electrolytic capacitor)

Figure C