参考資料

COSEL

TEST DATA OF GHA500F-30-SNF

Regulated DC Power Supply
December 7, 2015

Approved by : Kenji Shiho
Kenji Shiho Design Manager

Prepared by : Masashi Shibata
Masashi Shibata Design Engineer

COSEL CO.,LTD.

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CONTENTS

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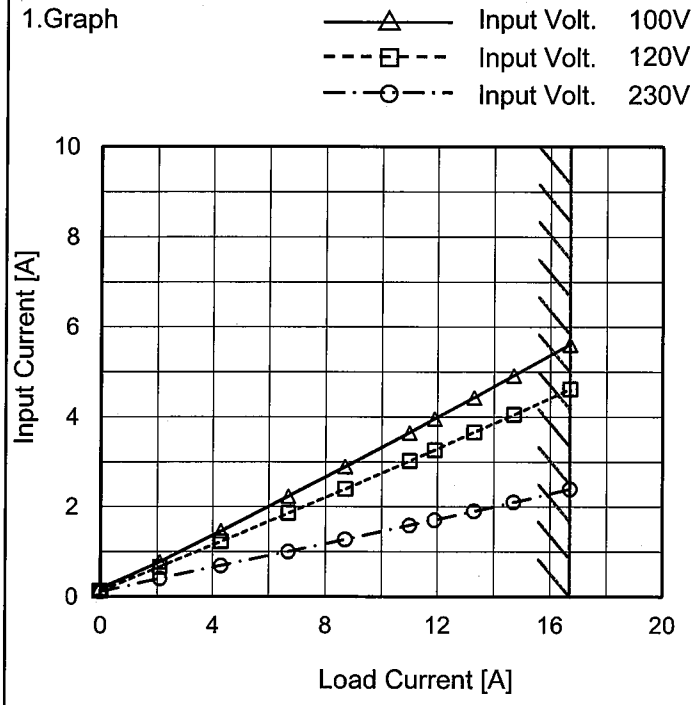
Model	GHA500F-30-SNF
Item	Input Current (by Load Current)
Object	———————

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. 120[V]	Input Volt. 230[V]
0.0	0.188	0.132	0.114
2.1	0.774	0.664	0.408
4.3	1.466	1.230	0.692
6.7	2.234	1.862	1.006
8.7	2.894	2.396	1.272
11.0	3.650	3.022	1.588
11.9	3.960	3.266	1.710
13.3	4.430	3.664	1.906
14.7	4.920	4.050	2.104
16.7	5.610	4.620	2.394
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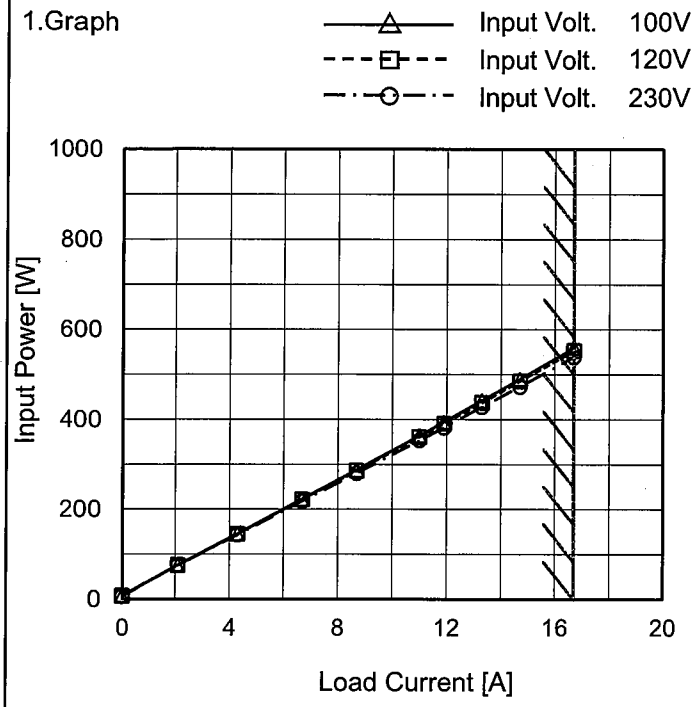
Model	GHA500F-30-SNF
Item	Input Power (by Load Current)
Object	————————

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. 120[V]	Input Volt. 230[V]
0.0	7.2	7.5	6.0
2.1	75.1	75.6	75.0
4.3	144.9	144.9	143.0
6.7	222.3	221.4	218.0
8.7	287.6	285.7	280.0
11.0	363.9	360.9	354.0
11.9	394.0	390.6	382.0
13.3	442.0	437.1	428.0
14.7	490.0	485.0	473.0
16.7	560.0	553.0	539.0
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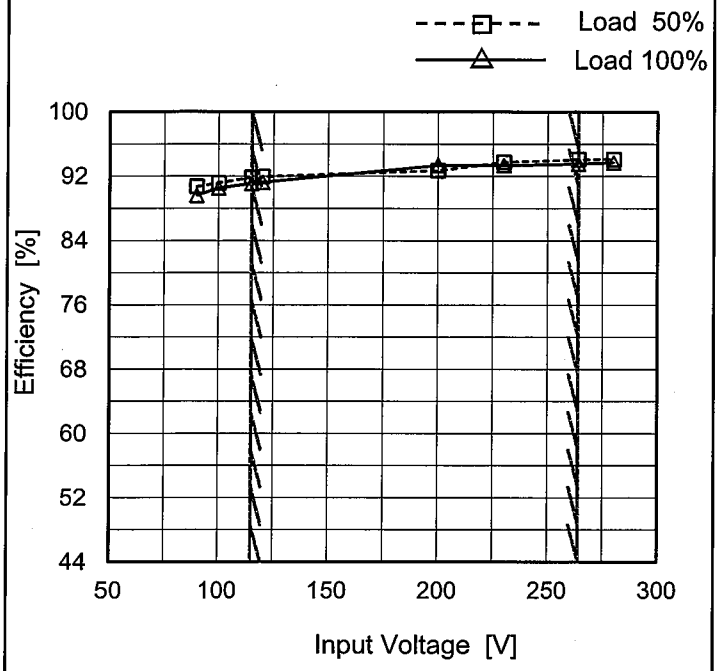
Model	GHA500F-30-SNF
Item	Efficiency (by Input Voltage)
Object	――――――――

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%
90	90.7	89.6 ※1
100	91.2	90.5 ※2
115	91.9	91.1
120	92.0	91.3
200	92.7	93.4
230	93.8	93.4
264	94.1	93.6
280	94.1	93.7
--	-	-

※1 : Load 80%
※2 : Load 88%

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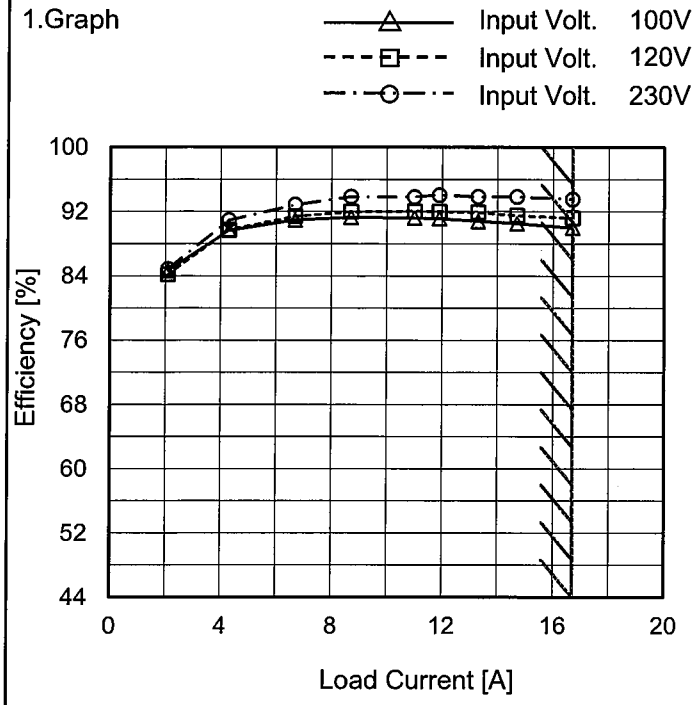
Model	GHA500F-30-SNF
Item	Efficiency (by Load Current)
Object	———————

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. 120[V]	Input Volt. 230[V]
0.0	-	-	-
2.1	84.6	84.2	84.9
4.3	89.7	89.7	91.0
6.7	91.0	91.4	92.9
8.7	91.3	92.0	93.9
11.0	91.2	92.1	93.8
11.9	91.2	92.0	94.1
13.3	90.8	91.9	93.9
14.7	90.5	91.5	93.9
16.7	90.0	91.2	93.6
--	-	-	-

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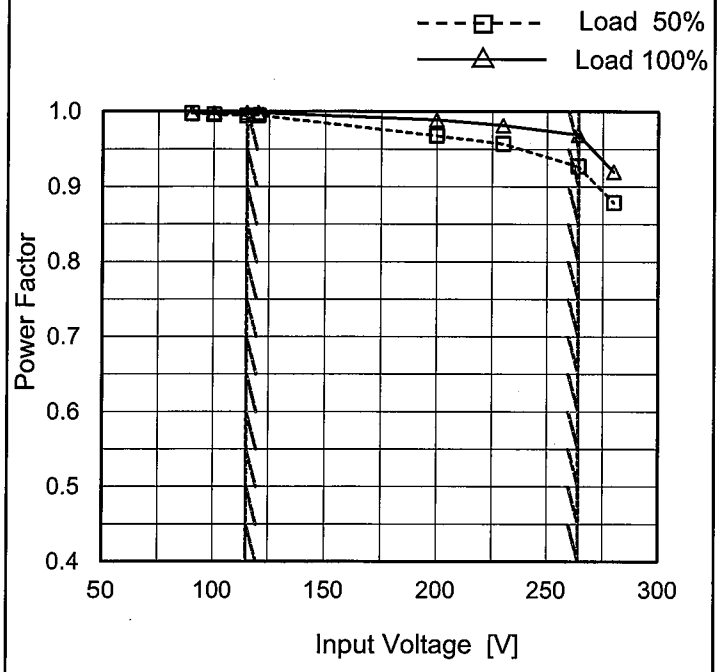
Model	GHA500F-30-SNF
Item	Power Factor (by Input Voltage)
Object	———————————

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%
90	0.998	0.998 ※1
100	0.996	0.998 ※2
115	0.995	0.999
120	0.995	0.999
200	0.968	0.989
230	0.957	0.982
264	0.927	0.969
280	0.879	0.920
--	-	-

※1 : Load 80%
※2 : Load 88%

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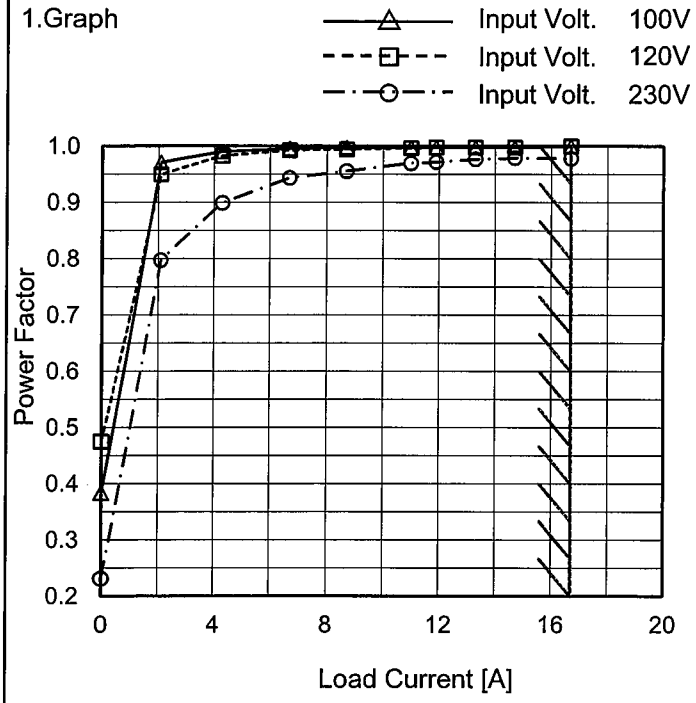
Model	GHA500F-30-SNF
Item	Power Factor (by Load Current)
Object	———————

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. 120[V]	Input Volt. 230[V]
0.0	0.383	0.475	0.231
2.1	0.972	0.950	0.798
4.3	0.990	0.983	0.899
6.7	0.996	0.993	0.944
8.7	0.998	0.994	0.956
11.0	0.998	0.997	0.970
11.9	0.998	0.998	0.972
13.3	0.998	0.998	0.977
14.7	0.998	0.998	0.979
16.7	0.999	0.999	0.978
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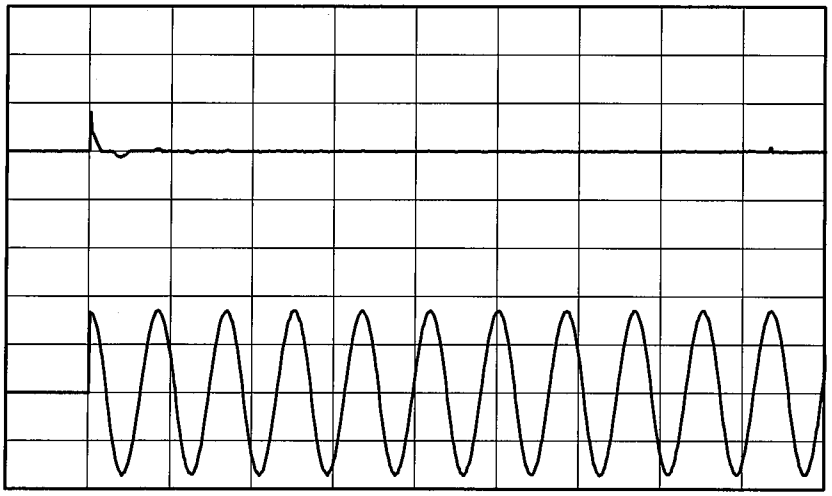
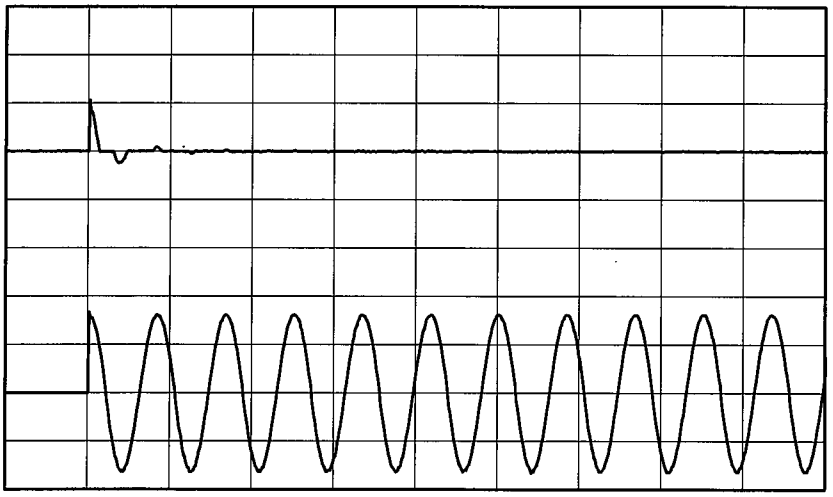
Model	GHA500F-30-SNF
Item	Inrush Current
Object	————

Temperature 25°C
Testing Circuitry Figure A



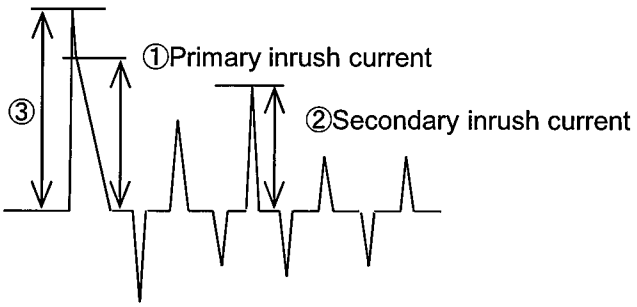
Input Voltage 120 V
Frequency 60 Hz
Load 100 %

①Primary inrush current :
20.4A
②Secondary inrush current :
2.4A
③Surge current ※1:
40.8A



Input Voltage 230 V
Frequency 60 Hz
Load 100 %

①Primary inrush current :
40.2A
②Secondary inrush current :
4.2A
③Surge current ※1:
53.0A



※1 The specification of the primary inrush current means that the surge current to a built-in noise filter (0.4msec or less : waveform ③) is excluded.

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Model	GHA500F-30-SNF	
Item	Leakage Current	Temperature 25°C Testing Circuitry Figure B
Object	———————	

1.Results

[mA]

Standards		Input Volt.			Note
		100 [V]	120 [V]	240 [V]	
IEC60601	Both phases	0.07	0.09	0.17	Operation
	One of phases	0.13	0.15	0.32	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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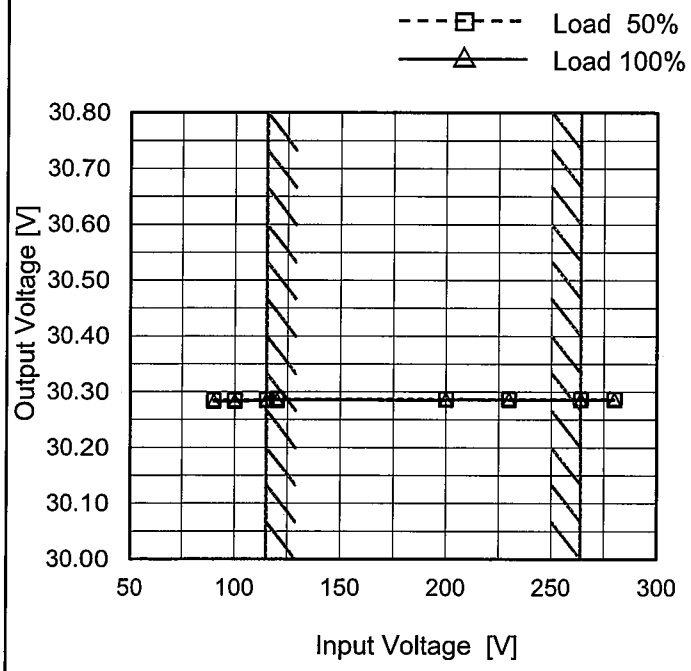
Model	GHA500F-30-SNF
Item	Line Regulation
Object	+30V16.7A

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%
90	30.285	30.283 ※1
100	30.285	30.283 ※2
115	30.286	30.285
120	30.287	30.285
200	30.287	30.286
230	30.287	30.286
264	30.287	30.286
280	30.287	30.286
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※1 : Load 80%
※2 : Load 88%

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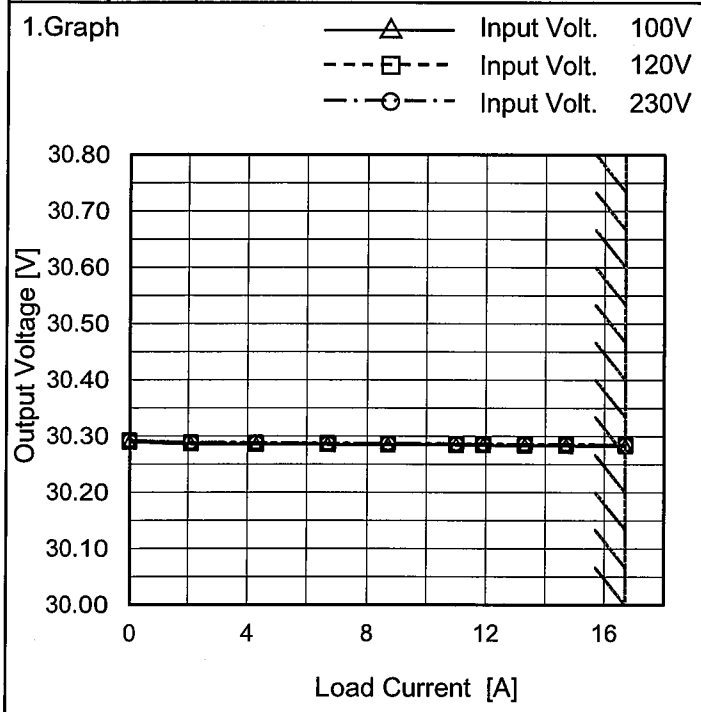
Model	GHA500F-30-SNF
Item	Load Regulation
Object	+30V16.7A

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. 120[V]	Input Volt. 230[V]
0.0	30.290	30.292	30.292
2.1	30.286	30.289	30.289
4.3	30.286	30.288	30.288
6.7	30.285	30.288	30.287
8.7	30.285	30.287	30.287
11.0	30.284	30.287	30.287
11.9	30.284	30.286	30.286
13.3	30.284	30.286	30.286
14.7	30.283	30.286	30.286
16.7	30.283	30.285	30.286
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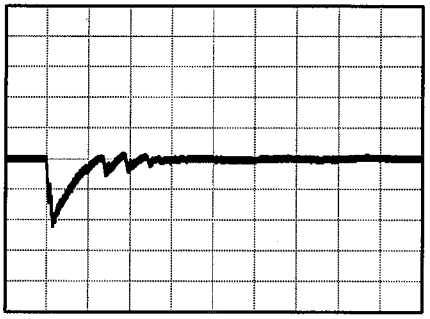
Model	GHA500F-30-SNF		
Item	Dynamic Load Response	Temperature Testing Circuitry	25℃ Figure A
Object	+30V 16.7A		

Input Volt. 120V
Cycle 1000ms

Load Current

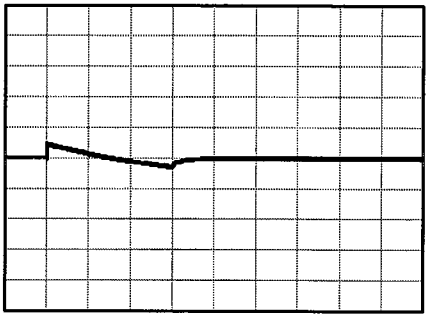
16.7A / 50us

Min.Load (0A)←→
Load 100%(16.7A)



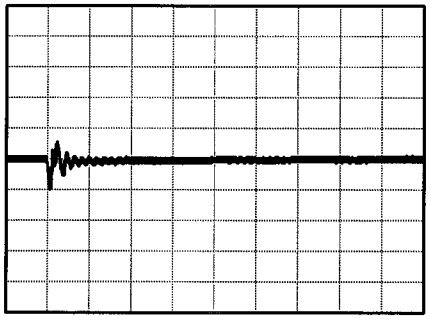
1 V/div

4 ms/div



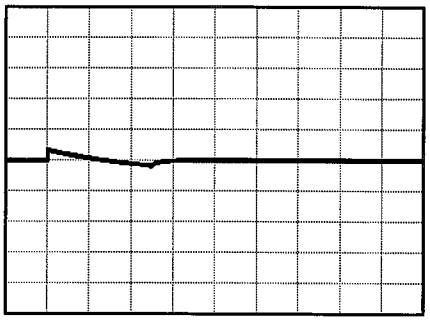
40 ms/div

Min.Load (0A)←→
Load 50%(8.35A)



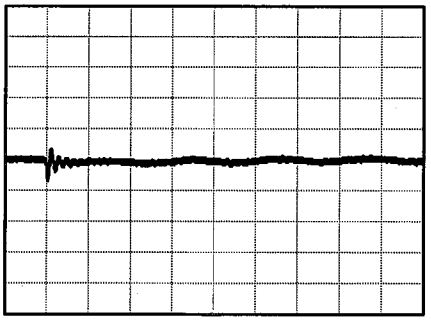
1 V/div

4 ms/div



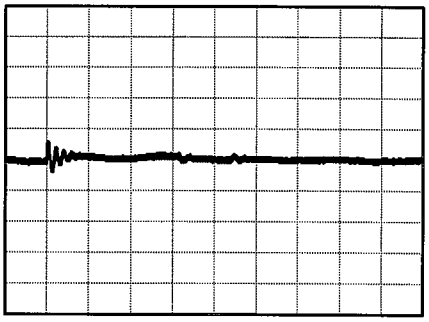
40 ms/div

Load 50% (8.35A)←→
Load 100% (16.7A)



500 mV/div

4 ms/div



4 ms/div

Note : With recommended external capacitor 3300 μF

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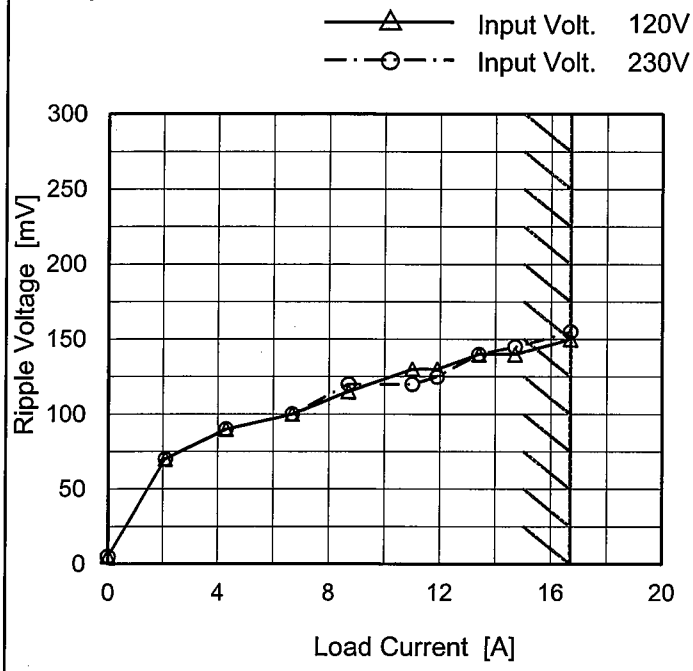
Model	GHA500F-30-SNF
Item	Ripple Voltage (by Load Current)
Object	+30V16.7A

Temperature 25°C
Testing Circuitry Figure A

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.

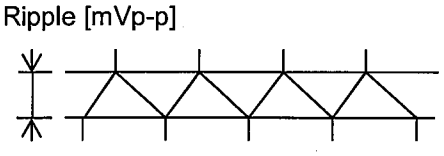


Fig.Complex Ripple Wave Form

2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 120 [V]	Input Volt. 230 [V]
0.0	5	5
2.1	70	70
4.3	90	90
6.7	100	100
8.7	115	120
11.0	130	120
11.9	130	125
13.4	140	140
14.7	140	145
16.7	150	155
--	-	-

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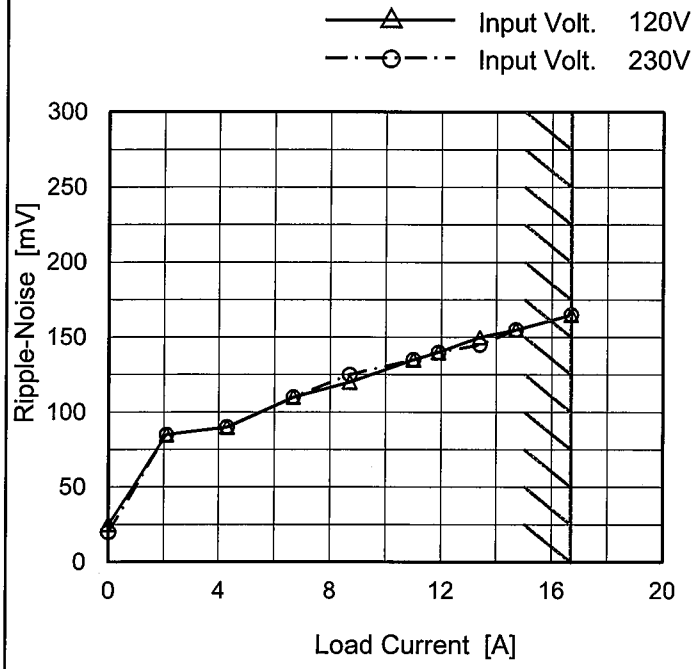
Model	GHA500F-30-SNF
Item	Ripple-Noise
Object	+30V16.7A

Temperature 25°C
Testing Circuitry Figure A

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.

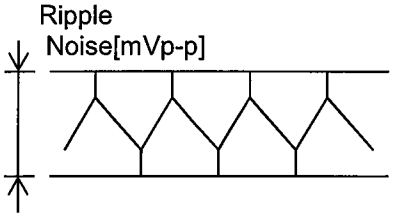


Fig.Complex Ripple Noise Wave Form

2.Values

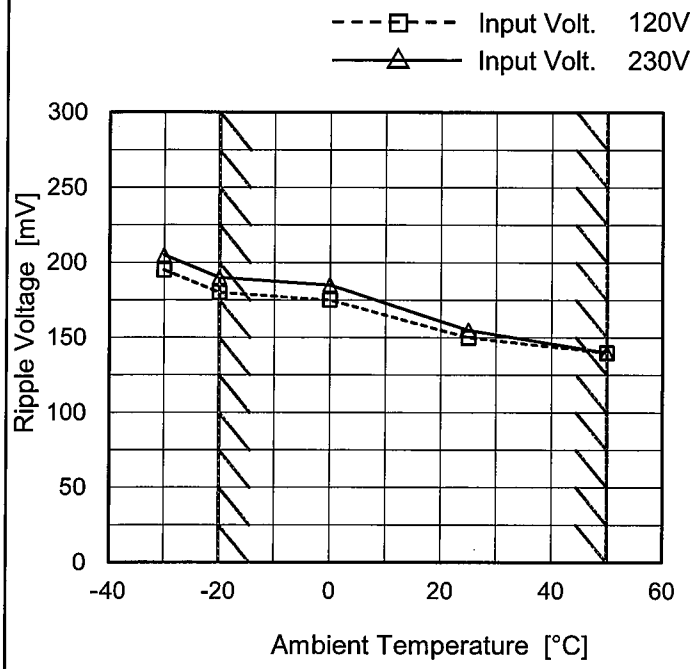
Load Current [A]	Ripple-Noise [mV] Input Volt. 120 [V]	Ripple-Noise [mV] Input Volt. 230 [V]
0.0	25	20
2.1	85	85
4.3	90	90
6.7	110	110
8.7	120	125
11.0	135	135
11.9	140	140
13.4	150	145
14.7	155	155
16.7	165	165
--	-	-

COSEL

Model	GHA500F-30-SNF
Item	Ripple Voltage (by Ambient Temp.)
Object	+30V16.7A

Testing Circuitry Figure A

1.Graph



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. 120 [V]	Input Volt. 230 [V]
-30	195	205
-20	180	190
0	175	185
25	150	155
50	140	140
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

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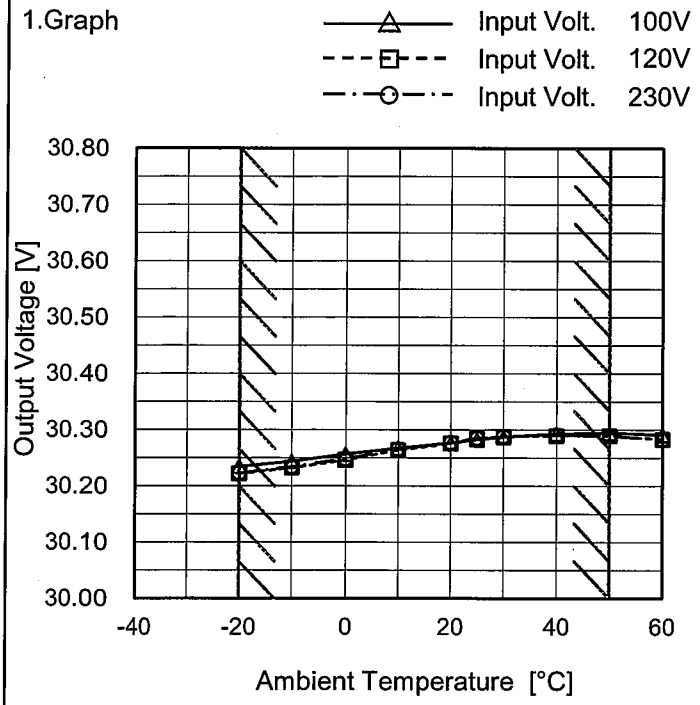
Model	GHA500F-30-SNF
Item	Ambient Temperature Drift
Object	+30V16.7A

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. 120[V]	Input Volt. 230[V]
-20	30.235	30.222	30.223
-10	30.244	30.233	30.234
0	30.257	30.246	30.248
10	30.268	30.264	30.266
20	30.277	30.276	30.277
25	30.283	30.285	30.286
30	30.287	30.288	30.288
40	30.293	30.290	30.291
50	30.295	30.289	30.289
60	30.292	30.283	30.283
--	-	-	-

Note: In case of Input Volt. 100V, Load 88%.
Other case Load 100%.

COSEL

Model	GHA500F-30-SNF
Item	Output Voltage Accuracy
Object	+30V16.7A

Testing Circuitry Figure A

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 - 50°C
Input Voltage : 115 - 264V
Load Current : 0 - 16.7A

* 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	50	230	0	30.286	±35	±0.1
Minimum Voltage	-20	115	16.7	30.217		

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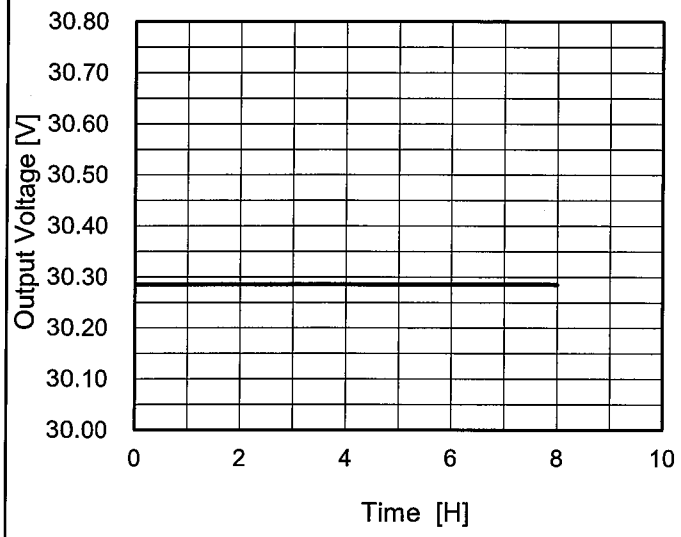
Model	GHA500F-30-SNF
Item	Time Lapse Drift
Object	+30V16.7A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Input Volt. 230V
Load 100%

2.Values

Time since start [H]	Output Voltage [V]
0.0	30.286
0.5	30.285
1.0	30.285
2.0	30.286
3.0	30.285
4.0	30.285
5.0	30.285
6.0	30.286
7.0	30.286
8.0	30.286

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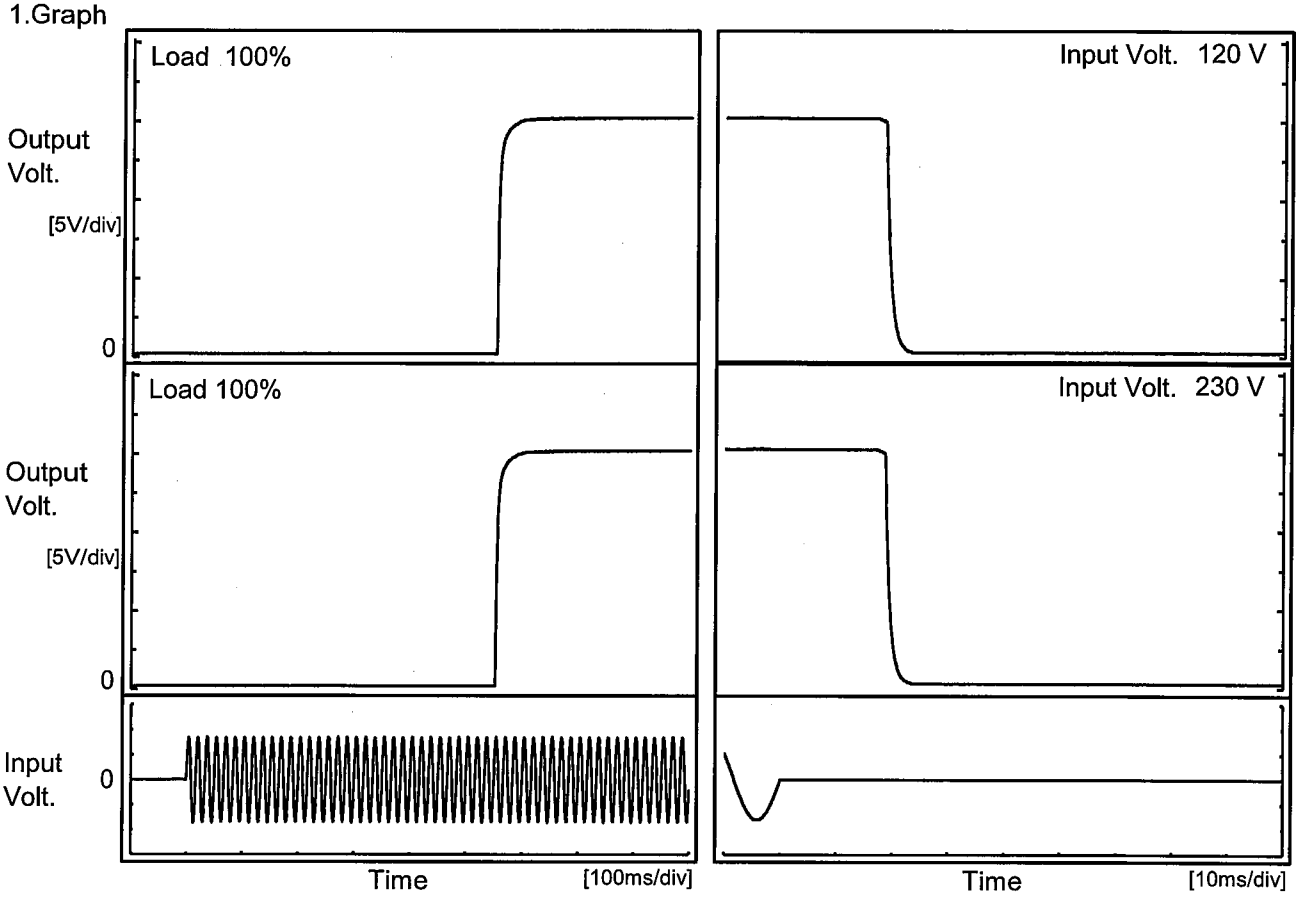
Model	GHA500F-30-SNF
Item	Rise and Fall Time
Object	+30V16.7A

Temperature 25°C
Testing Circuitry Figure A

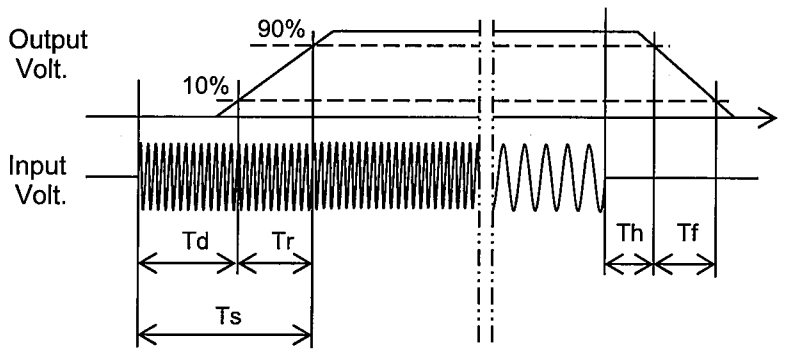
1.Graph



2.Values

[ms]

Input Volt. \ Time	Td	Tr	Ts	Th	Tf
120V	553.5	10.5	564.0	18.8	1.8
230V	552.0	10.5	562.5	18.8	1.8



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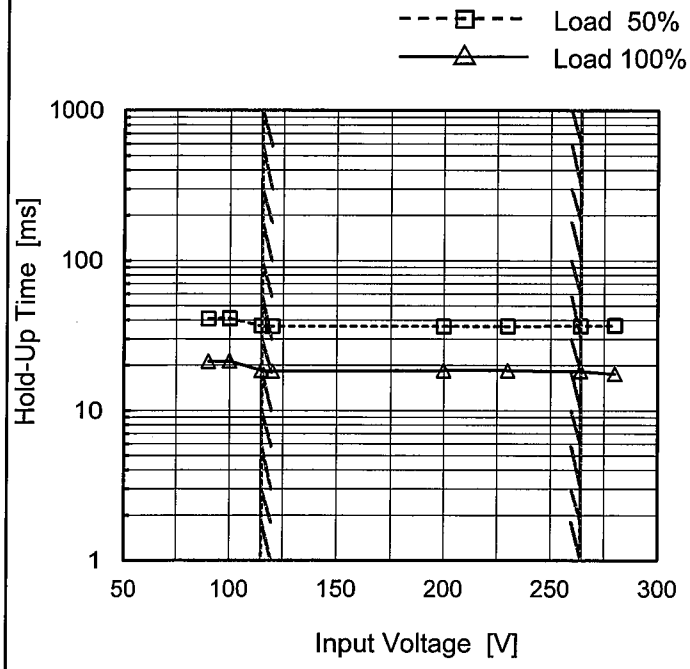
Model	GHA500F-30-SNF
Item	Hold-Up Time
Object	+30V16.7A

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%
90	41	21 ※1
100	41	21 ※2
115	37	19
120	36	18
200	36	19
230	37	19
264	37	18
280	37	18
--	-	-

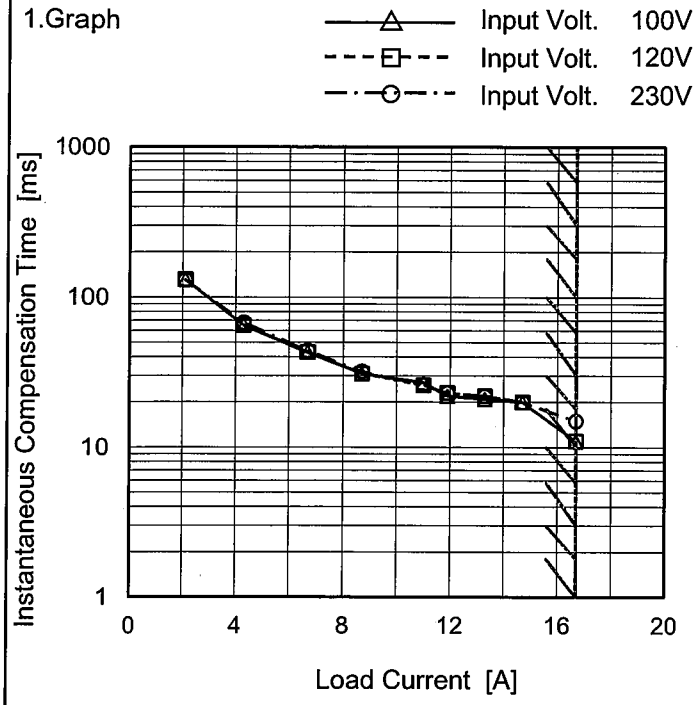
※1 : Load 80%
※2 : Load 88%

COSEL

Model	GHA500F-30-SNF
Item	Instantaneous Interruption Compensation
Object	+30V16.7A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

2.Values

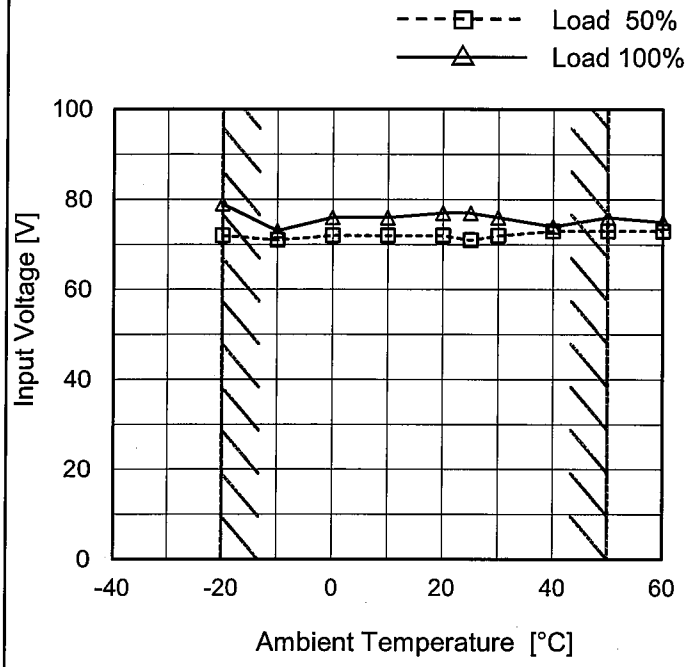
Load Current [A]	Time [ms]		
	Input Volt. 100[V]	Input Volt. 120[V]	Input Volt. 230[V]
0.0	-	-	-
2.1	131	131	130
4.3	65	65	68
6.7	43	43	44
8.7	31	31	32
11.0	27	26	26
11.9	22	23	23
13.3	21	22	22
14.7	20	20	20
16.7	11	11	15
--	-	-	-

COSEL

Model	GHA500F-30-SNF
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+30V16.7A

Testing Circuitry Figure A

1.Graph



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

2.Values

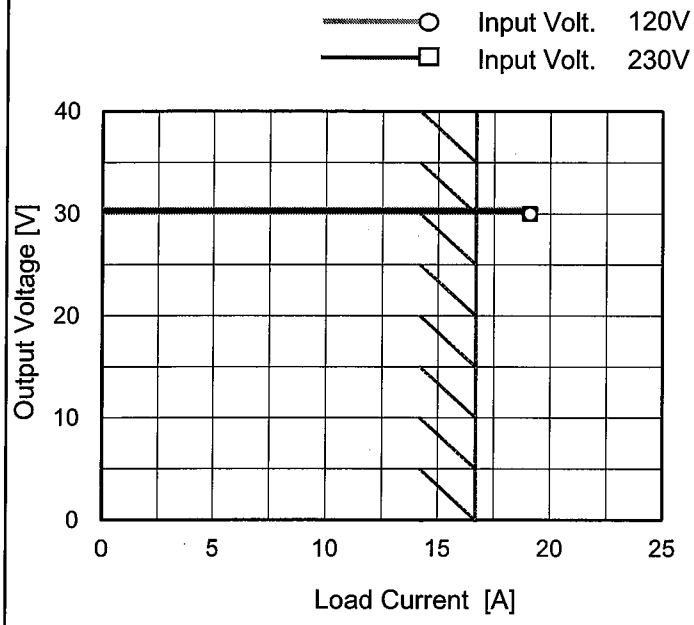
Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	72	79
-10	71	73
0	72	76
10	72	76
20	72	77
25	71	77
30	72	76
40	73	74
50	73	76
60	73	75
--	-	-

COSEL

Model	GHA500F-30-SNF
Item	Overcurrent Protection
Object	+30V16.7A

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

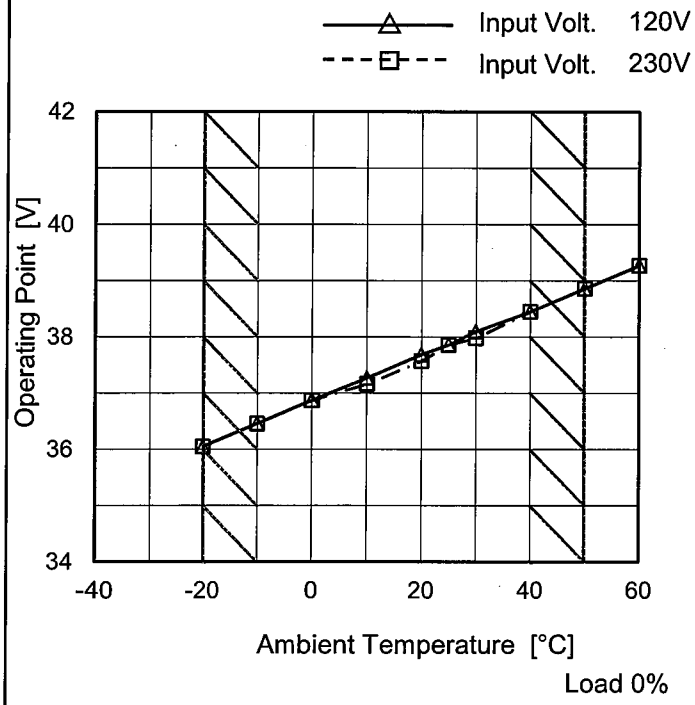
Output Voltage [V]	Load Current [A]	
	Input Volt. 120[V]	Input Volt. 230[V]
30	19.09	19.10
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	GHA500F-30-SNF
Item	Overvoltage Protection
Object	+30V16.7A

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. 120[V]	Input Volt. 230[V]
-20	36.05	36.05
-10	36.46	36.46
0	36.87	36.87
10	37.27	37.16
20	37.69	37.57
25	37.86	37.86
30	38.10	37.98
40	38.45	38.45
50	38.86	38.86
60	39.27	39.27
--	-	-

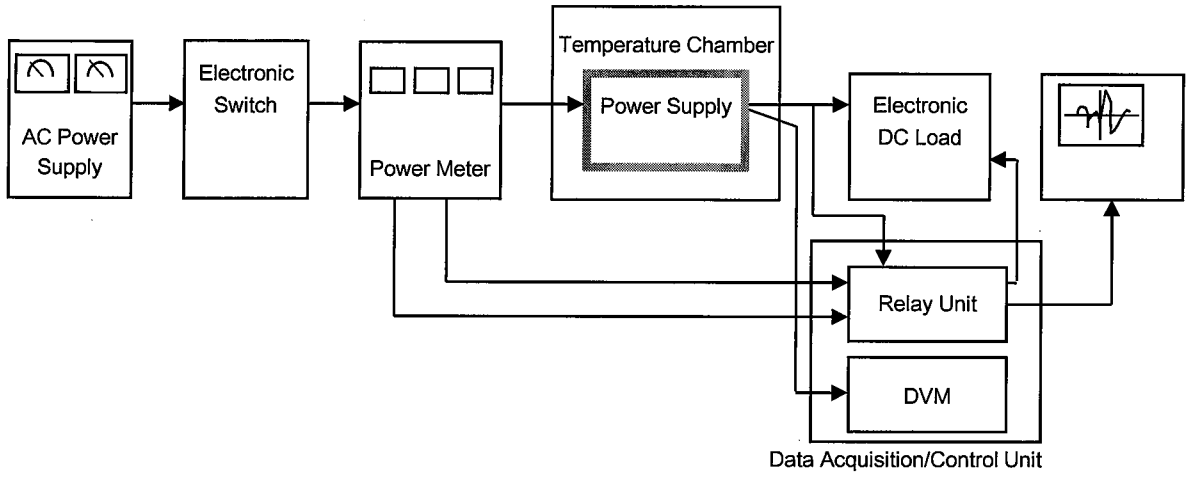


Figure A

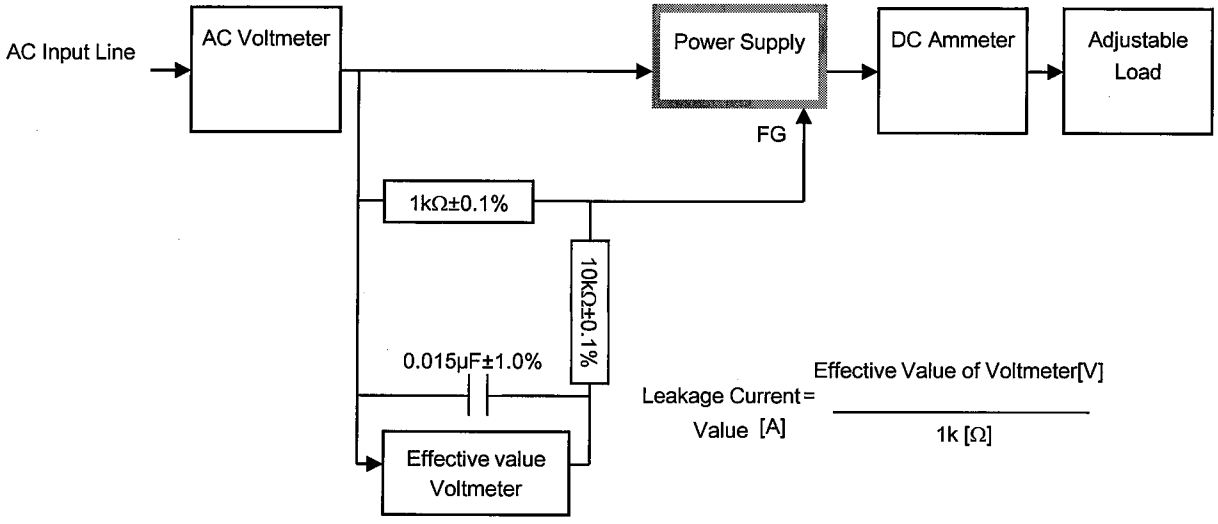


Figure B (IEC60601-1)