参考資料

COSEL

TEST DATA OF GHA500F-24-SNF

Regulated DC Power Supply
May 8, 2015

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COSEL CO.,LTD.

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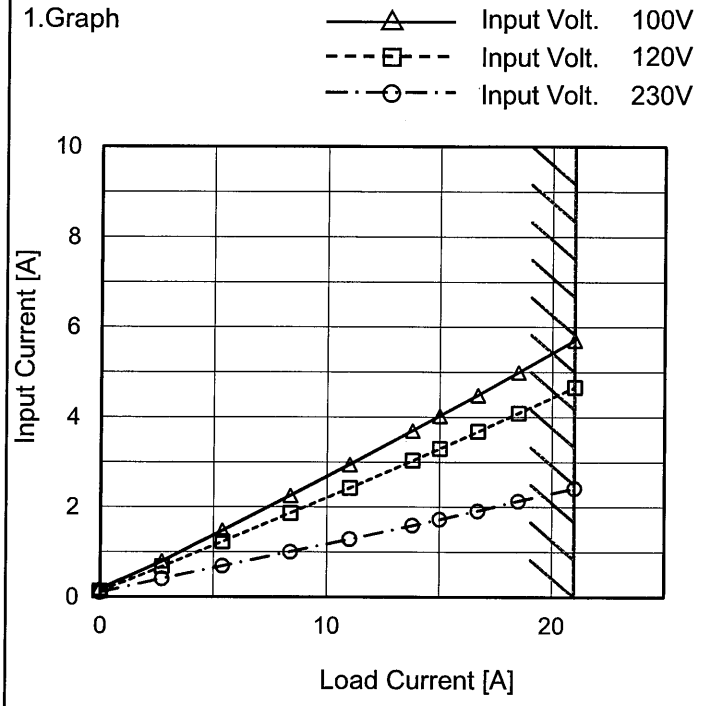
Model	GHA500F-24-SNF
Item	Input Current (by Load Current)
Object	————————

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	0.187	0.132	0.104
2.7	0.797	0.677	0.410
5.4	1.477	1.230	0.690
8.4	2.255	1.864	1.006
11.0	2.944	2.422	1.285
13.8	3.700	3.034	1.592
15.0	4.024	3.296	1.726
16.7	4.489	3.680	1.916
18.5	4.996	4.090	2.135
21.0	5.706	4.660	2.418
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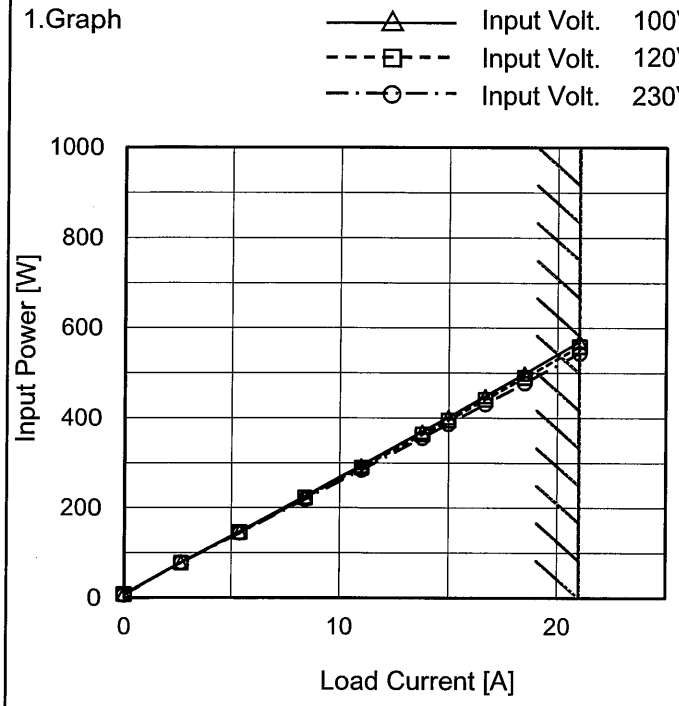
Model	GHA500F-24-SNF
Item	Input Power (by Load Current)
Object	————————

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	8.1	7.8	6.7
2.7	77.9	77.9	78.2
5.4	146.7	145.6	144.4
8.4	224.9	222.6	219.0
11.0	293.7	289.5	284.4
13.8	369.1	363.0	355.6
15.0	401.6	394.8	387.0
16.7	448.3	441.0	431.0
18.5	498.7	490.0	478.0
21.0	569.8	559.0	544.0
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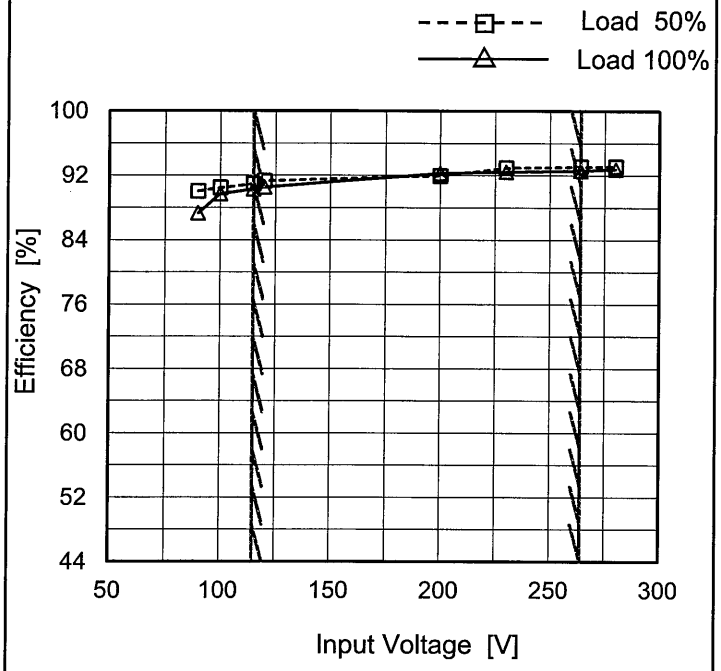
Model	GHA500F-24-SNF
Item	Efficiency (by Input Voltage)
Object	――――――――

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	90.1	87.3 ※1
100	90.5	89.7 ※2
115	91.0	90.3
120	91.3	90.6
200	92.0	92.3
230	92.9	92.5
264	93.1	92.6
280	93.1	92.8
--	-	-

※1 : Load 80%
※2 : Load 88%

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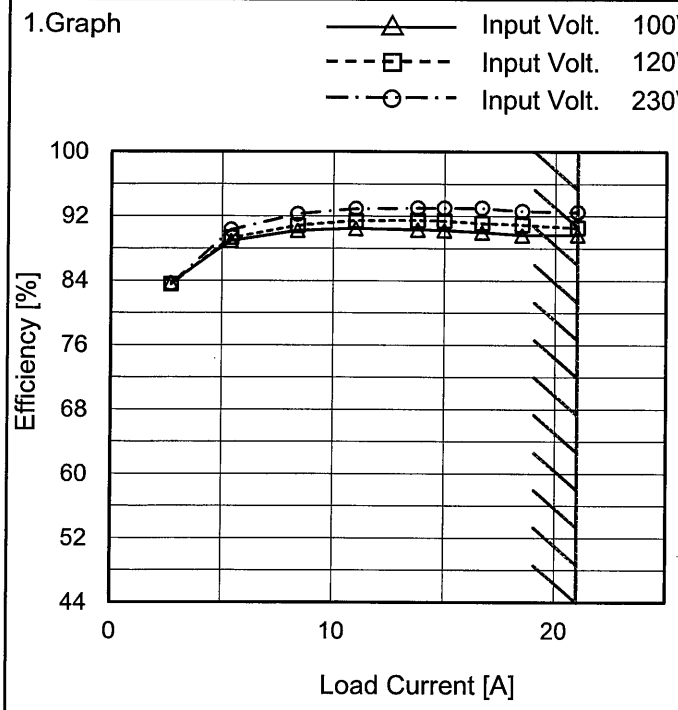
Model	GHA500F-24-SNF
Item	Efficiency (by Load Current)
Object	———————

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	-	-	-
2.7	83.7	83.6	83.5
5.4	88.9	89.3	90.3
8.4	90.2	90.9	92.3
11.0	90.5	91.4	93.0
13.8	90.3	91.5	93.0
15.0	90.3	91.4	93.0
16.7	90.0	91.1	93.0
18.5	89.7	90.9	92.6
21.0	89.7	90.6	92.5
--	-	-	-

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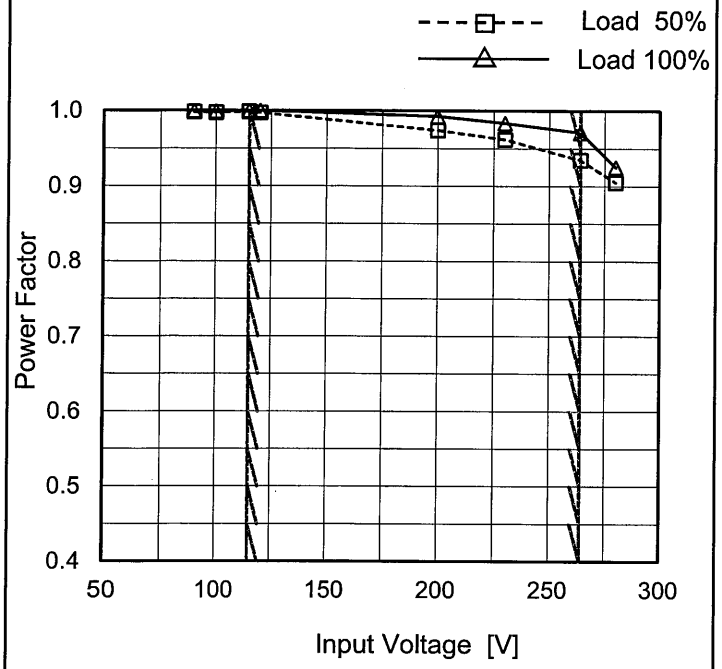
Model	GHA500F-24-SNF
Item	Power Factor (by Input Voltage)
Object	――――――――――

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	0.999 ※1
100	0.998	0.999 ※2
115	0.999	0.999
120	0.997	0.999
200	0.974	0.993
230	0.962	0.984
264	0.935	0.972
280	0.905	0.925
--	-	-

※1 : Load 80%
※2 : Load 88%

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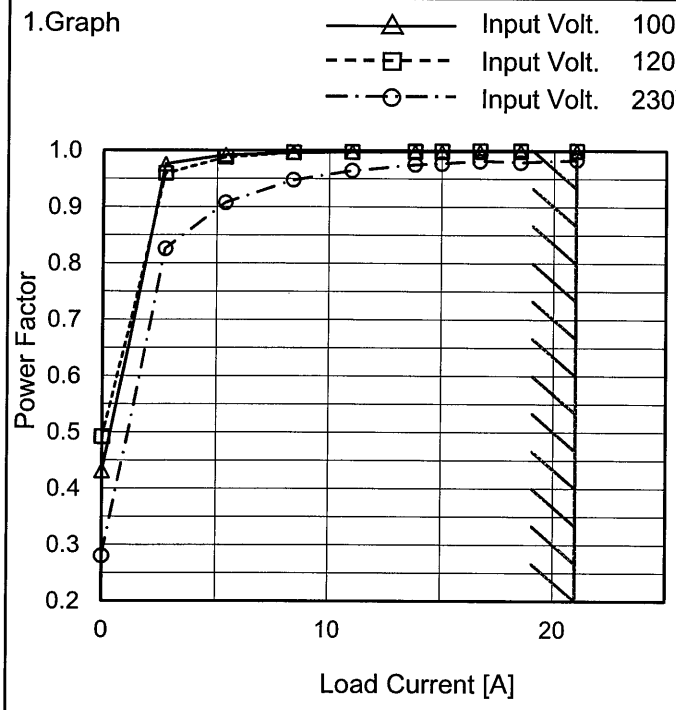
Model	GHA500F-24-SNF
Item	Power Factor (by Load Current)
Object	————————

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	0.431	0.492	0.280
2.7	0.976	0.959	0.826
5.4	0.993	0.988	0.908
8.4	0.996	0.996	0.948
11.0	0.998	0.998	0.964
13.8	0.998	0.999	0.975
15.0	0.999	0.999	0.977
16.7	0.999	0.999	0.982
18.5	0.999	0.999	0.980
21.0	0.999	0.999	0.984
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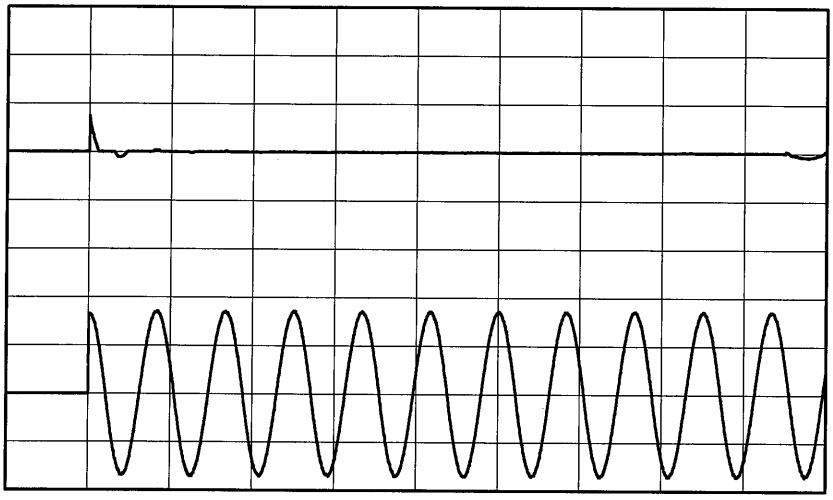
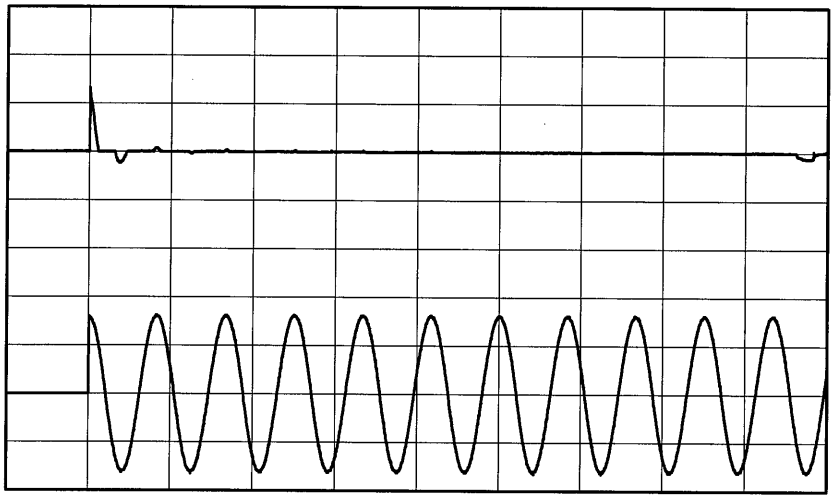
Model	GHA500F-24-SNF
Item	Inrush Current
Object	————————

Temperature 25°C
Testing Circuitry Figure A



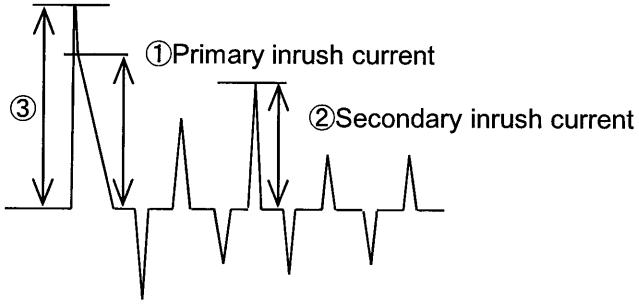
Input Voltage 120 V
Frequency 60 Hz
Load 100 %

①Primary inrush current :
23.2A
②Secondary inrush current :
4.7A
③Surge current ※1:
36.9 A



Input Voltage 230 V
Frequency 60 Hz
Load 100 %

①Primary inrush current :
43.2 A
②Secondary inrush current :
6.4A
③Surge current ※1:
66.4A



※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-24-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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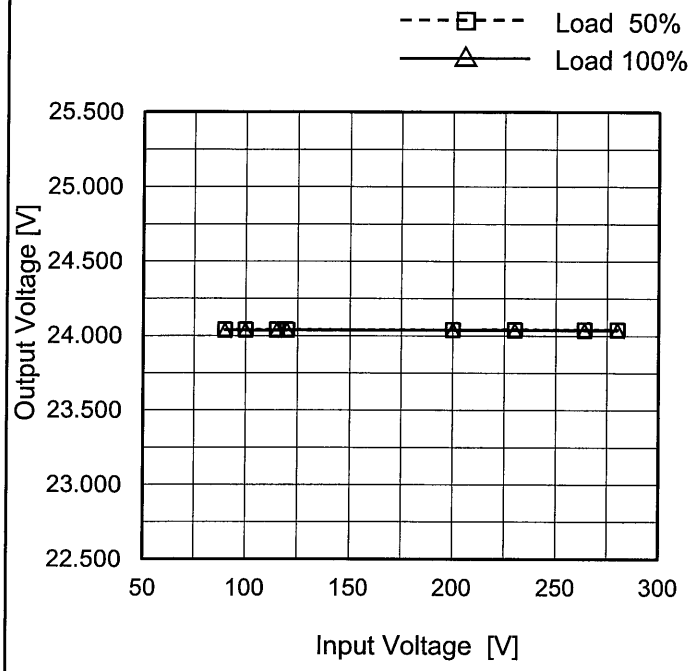
Model	GHA500F-24-SNF
Item	Line Regulation
Object	+24V21A

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	24.041	24.037 ※1
100	24.041	24.038 ※2
115	24.041	24.037
120	24.041	24.038
200	24.041	24.038
230	24.042	24.038
264	24.042	24.038
280	24.042	24.039
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※1 : Load 80%
※2 : Load 88%

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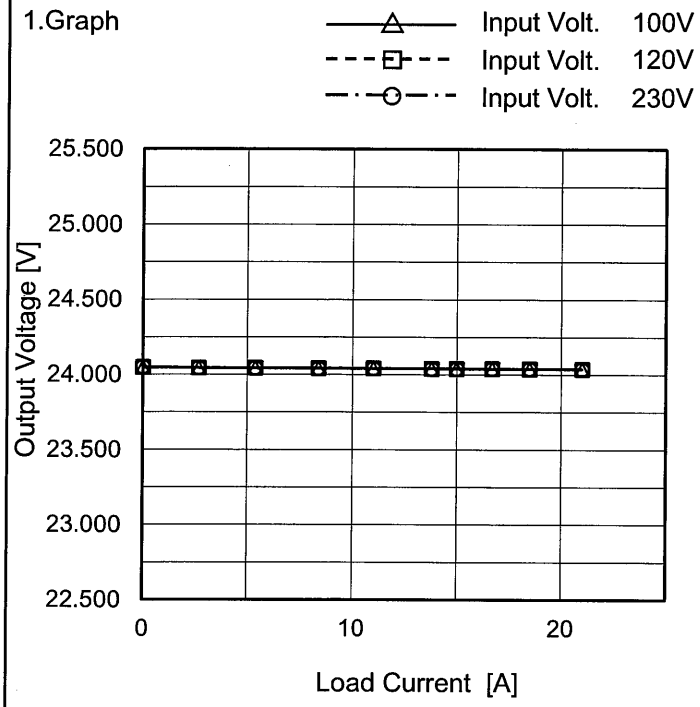
Model	GHA500F-24-SNF
Item	Load Regulation
Object	+24V21A

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	24.049	24.049	24.050
2.7	24.045	24.044	24.044
5.4	24.044	24.043	24.043
8.4	24.043	24.042	24.042
11.0	24.041	24.041	24.041
13.8	24.041	24.041	24.041
15.0	24.040	24.040	24.040
16.7	24.040	24.039	24.040
18.5	24.038	24.039	24.039
21.0	24.038	24.038	24.038
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Model	GHA500F-24-SNF		
Item	Dynamic Load Response	Temperature Testing Circuitry	25℃ Figure A
Object	+24V 21A		

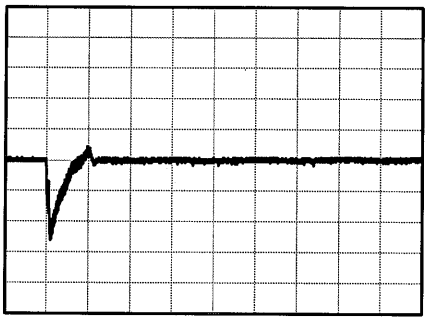
Input Volt. 120V
Cycle 1000ms

Load Current

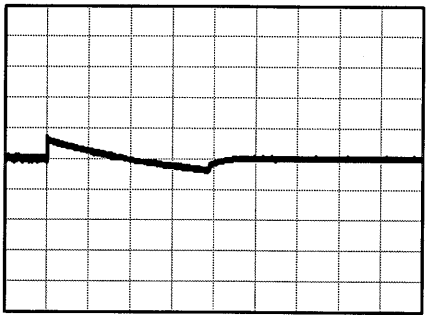
21A / 50us

Min.Load (0A)←→
Load 100%(21A)

500 mV/div



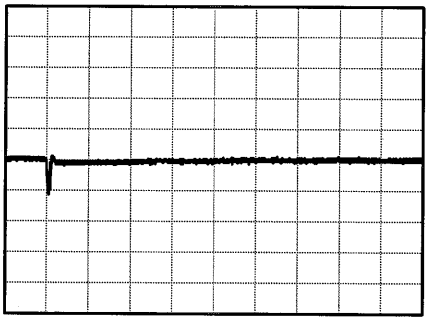
4 ms/div



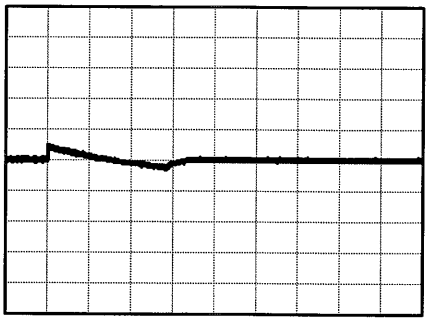
40 ms/div

Min.Load (0A)←→
Load 50%(10.5A)

500 mV/div



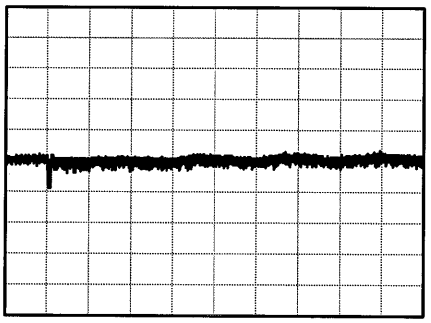
4 ms/div



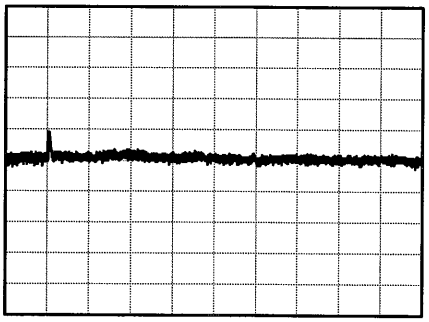
40 ms/div

Load 50% (10.5A)←→
Load 100% (21A)

200 mV/div



4 ms/div



4 ms/div

Note : With recommended external capacitor 3300 μF

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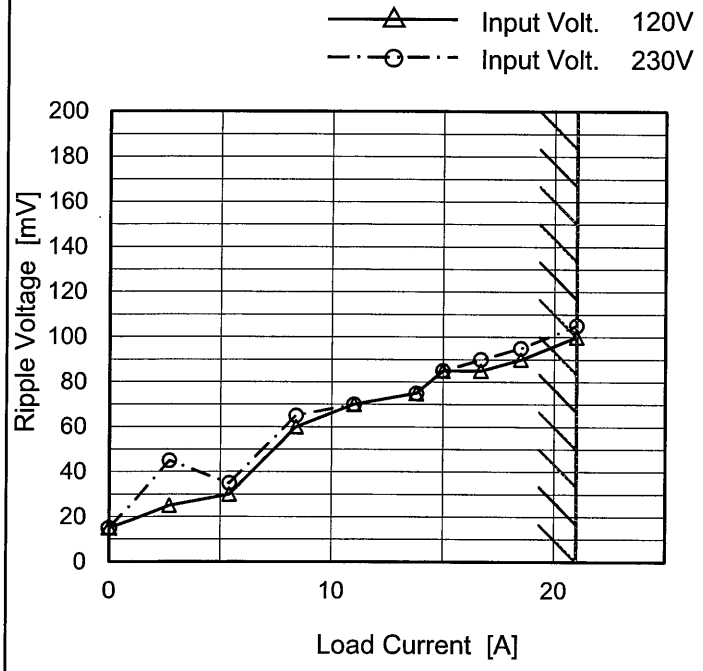
Model	GHA500F-24-SNF
Item	Ripple Voltage (by Load Current)
Object	+24V21A

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.

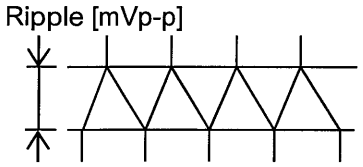


Fig.Complex Ripple Wave Form

2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 120 [V]	Input Volt. 230 [V]
0.0	15	15
2.7	25	45
5.4	30	35
8.4	60	65
11.0	70	70
13.8	75	75
15.0	85	85
16.7	85	90
18.5	90	95
21.0	100	105
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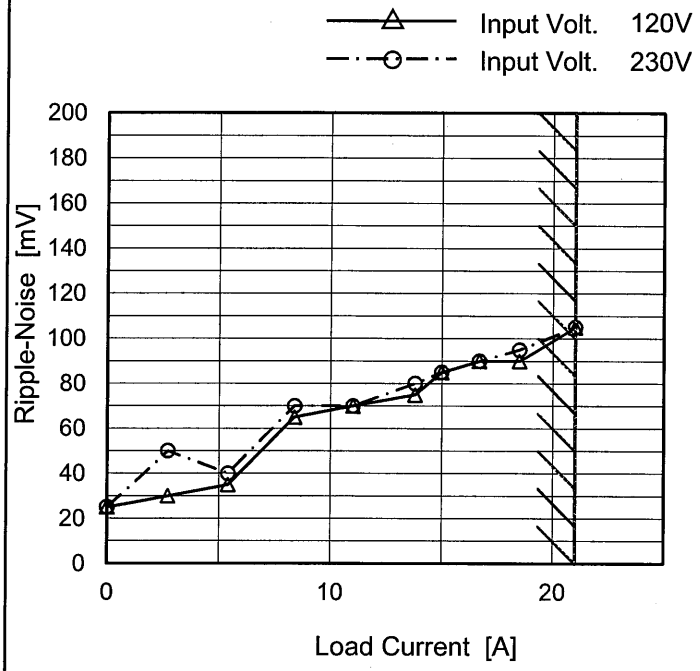
Model	GHA500F-24-SNF
Item	Ripple-Noise
Object	+24V21A

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.

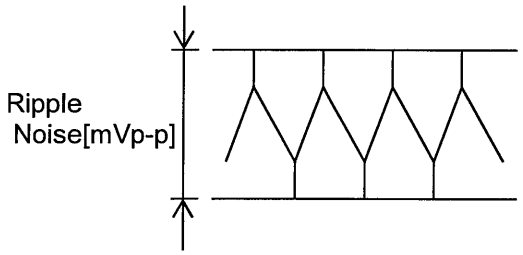


Fig.Complex Ripple Noise Wave Form

2.Values

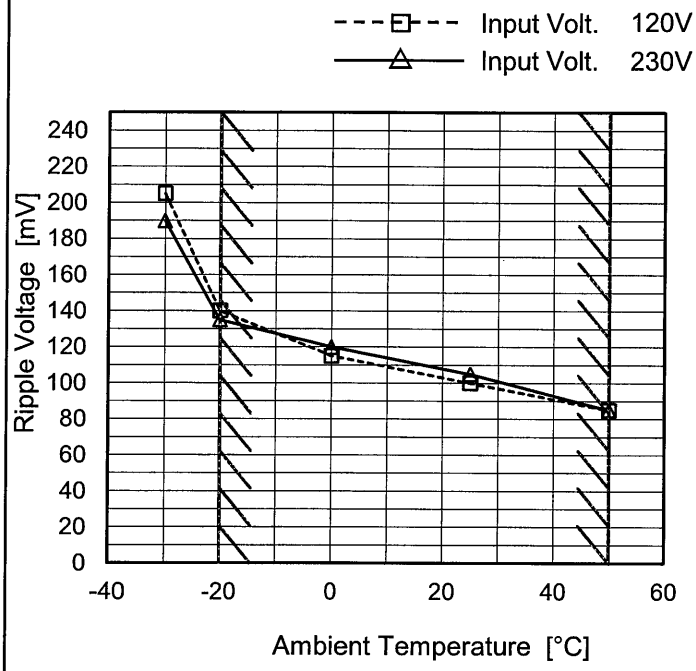
Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 120 [V]	Input Volt. 230 [V]
0.0	25	25
2.7	30	50
5.4	35	40
8.4	65	70
11.0	70	70
13.8	75	80
15.0	85	85
16.7	90	90
18.5	90	95
21.0	105	105
--	-	-

COSEL

Model	GHA500F-24-SNF
Item	Ripple Voltage (by Ambient Temp.)
Object	+24V21A

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	205	190
-20	140	135
0	115	120
25	100	105
50	85	85
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

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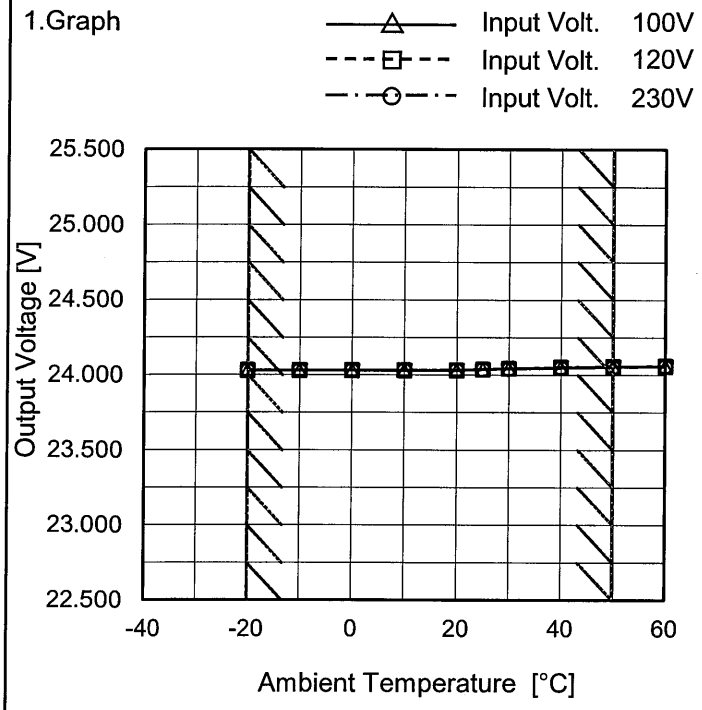
Model	GHA500F-24-SNF
Item	Ambient Temperature Drift
Object	+24V21A

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	24.030	24.031	24.029
-10	24.029	24.031	24.030
0	24.030	24.031	24.030
10	24.030	24.031	24.030
20	24.032	24.032	24.032
25	24.038	24.038	24.038
30	24.043	24.043	24.043
40	24.050	24.052	24.051
50	24.056	24.057	24.056
60	24.060	24.061	24.059
--	-	-	-

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

COSEL

Model	GHA500F-24-SNF
Item	Output Voltage Accuracy
Object	+24V21A

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 - 21A

* 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	115	0	24.071	±21	±0.1
Minimum Voltage	-20	115	21	24.029		

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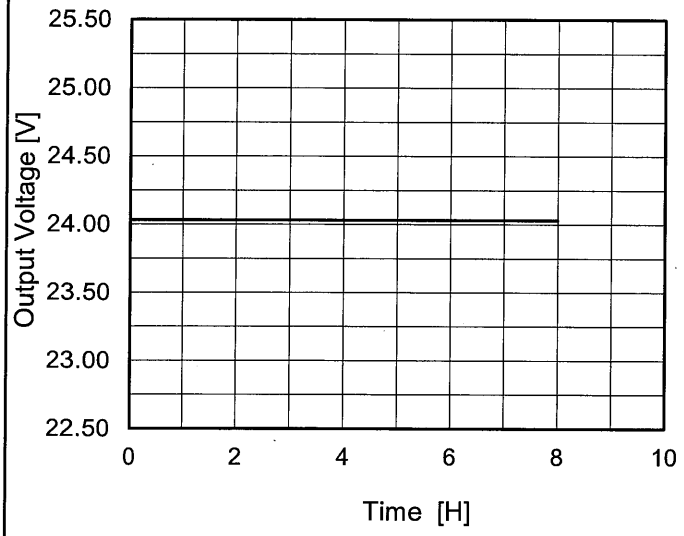
Model	GHA500F-24-SNF
Item	Time Lapse Drift
Object	+24V21A

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	24.031
0.5	24.030
1.0	24.030
2.0	24.030
3.0	24.030
4.0	24.030
5.0	24.030
6.0	24.030
7.0	24.030
8.0	24.031

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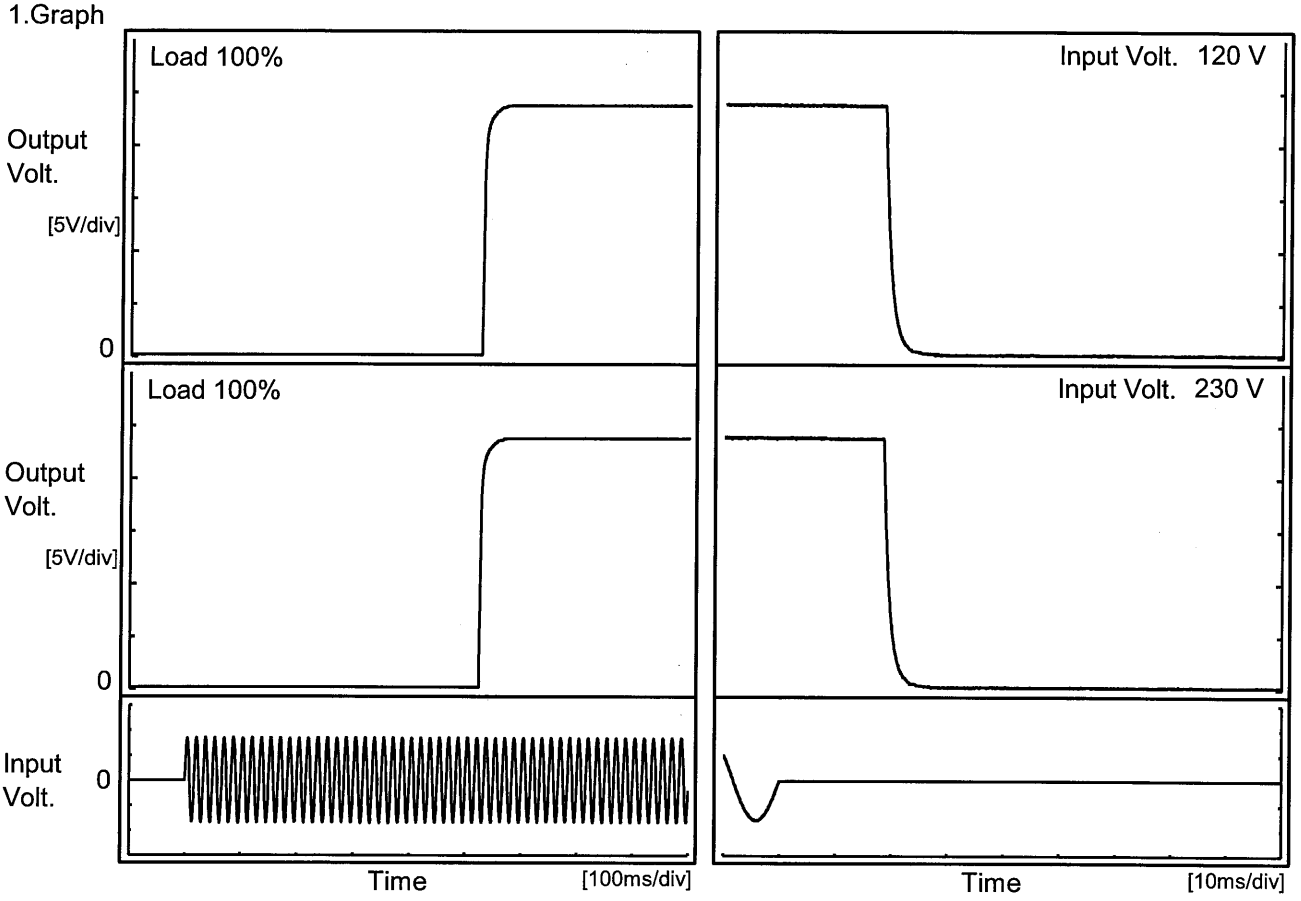
Model	GHA500F-24-SNF
Item	Rise and Fall Time
Object	+24V21A

Temperature 25°C
Testing Circuitry Figure A

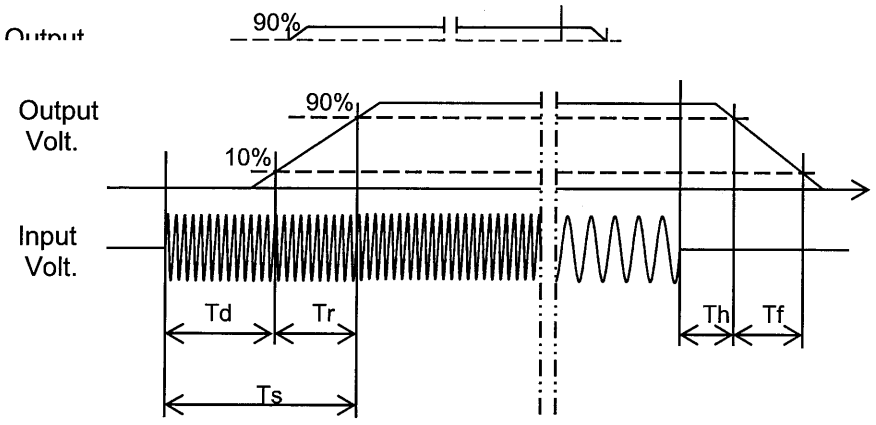
1.Graph



2.Values

[ms]

Input Volt. \ Time	Td	Tr	Ts	Th	Tf
120 V	529.0	10.0	539.0	18.9	2.4
230 V	524.5	10.0	534.5	18.7	2.4



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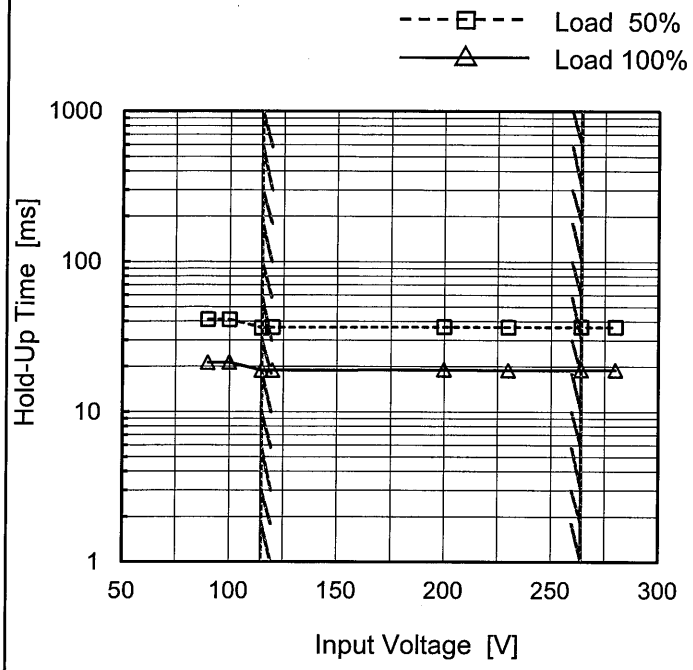
Model	GHA500F-24-SNF
Item	Hold-Up Time
Object	+24V21A

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	36	19
120	37	19
200	37	19
230	37	19
264	37	19
280	37	19
--	-	-

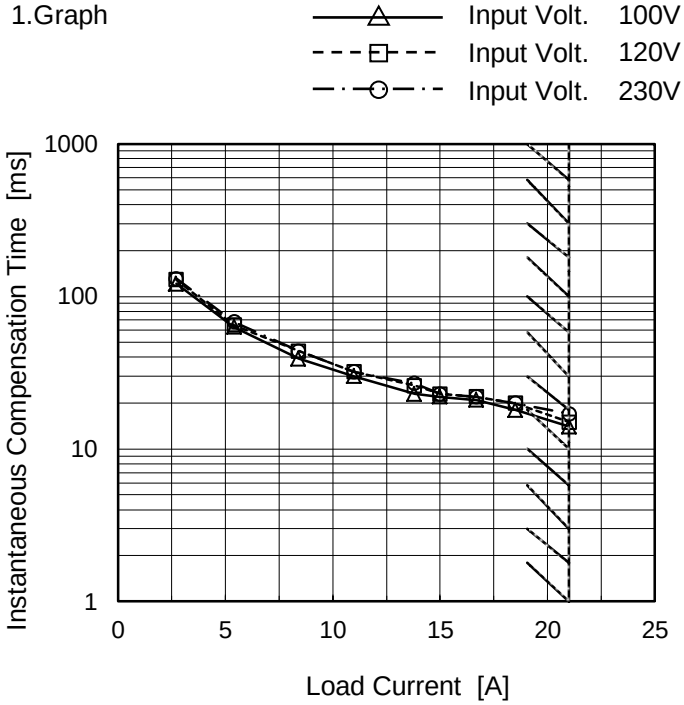
※1 : Load 80%
※2 : Load 88%

COSEL

Model	GHA500F-24-SNF
Item	Instantaneous Interruption Compensation
Object	+24V21A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

2.Values

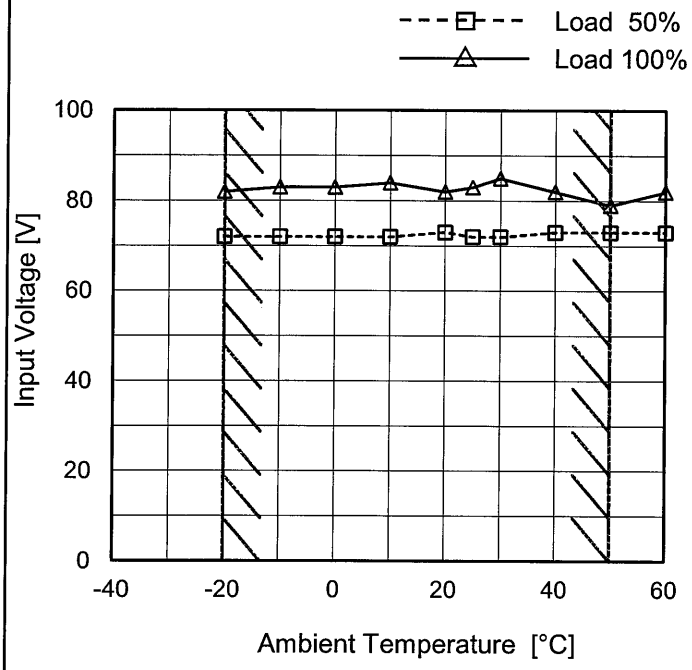
Load Current [A]	Time [ms] Input Volt. 100[V]	Input Volt. 120[V]	Input Volt. 230[V]
0.0	-	-	-
2.7	121	129	131
5.4	63	65	68
8.4	39	44	44
11.0	30	32	32
13.8	23	26	27
15.0	22	23	23
16.7	21	22	22
18.5	18	20	20
21.0	14	15	17
--	-	-	-

COSEL

Model	GHA500F-24-SNF
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+24V21A

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	82
-10	72	83
0	72	83
10	72	84
20	73	82
25	72	83
30	72	85
40	73	82
50	73	79
60	73	82
--	-	-

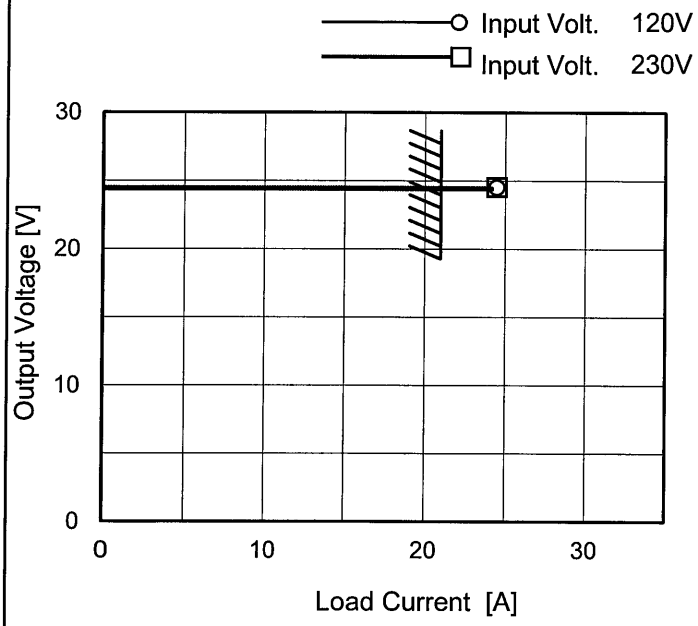
BC-10904

COSEL

Model	GHA500F-24-SNF
Item	Overcurrent Protection
Object	+24V21A

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]
24	24.02	24.02
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

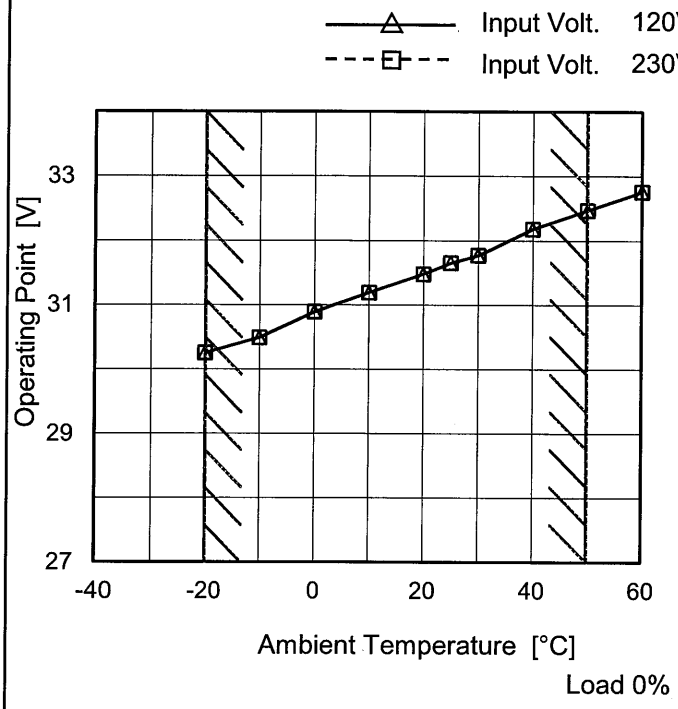
BC-10904

COSEL

Model	GHA500F-24-SNF
Item	Overvoltage Protection
Object	+24V21A

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	30.25	30.25
-10	30.49	30.49
0	30.89	30.89
10	31.19	31.19
20	31.48	31.48
25	31.65	31.65
30	31.77	31.77
40	32.18	32.18
50	32.47	32.47
60	32.76	32.76
--	-	-

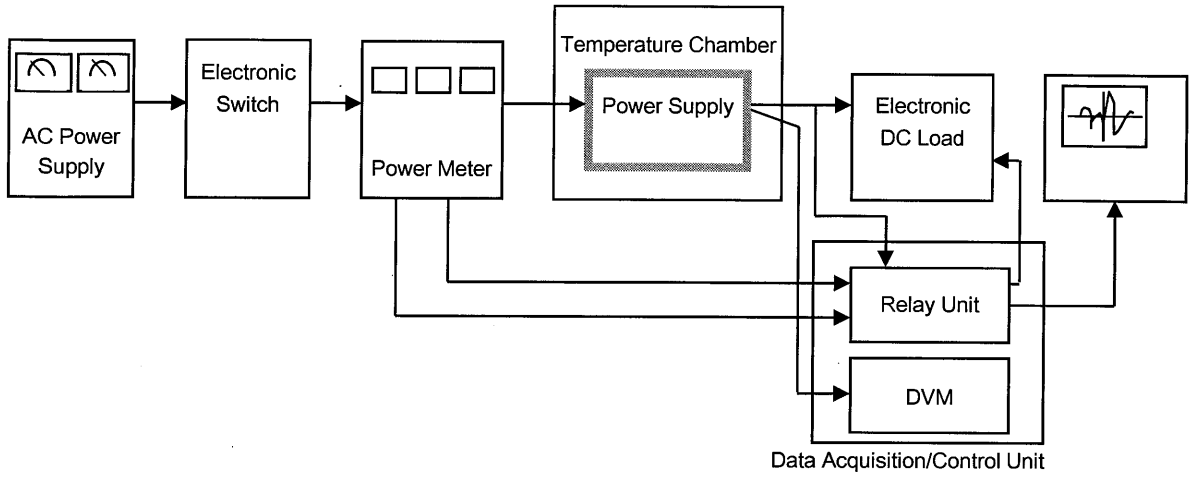


Figure A

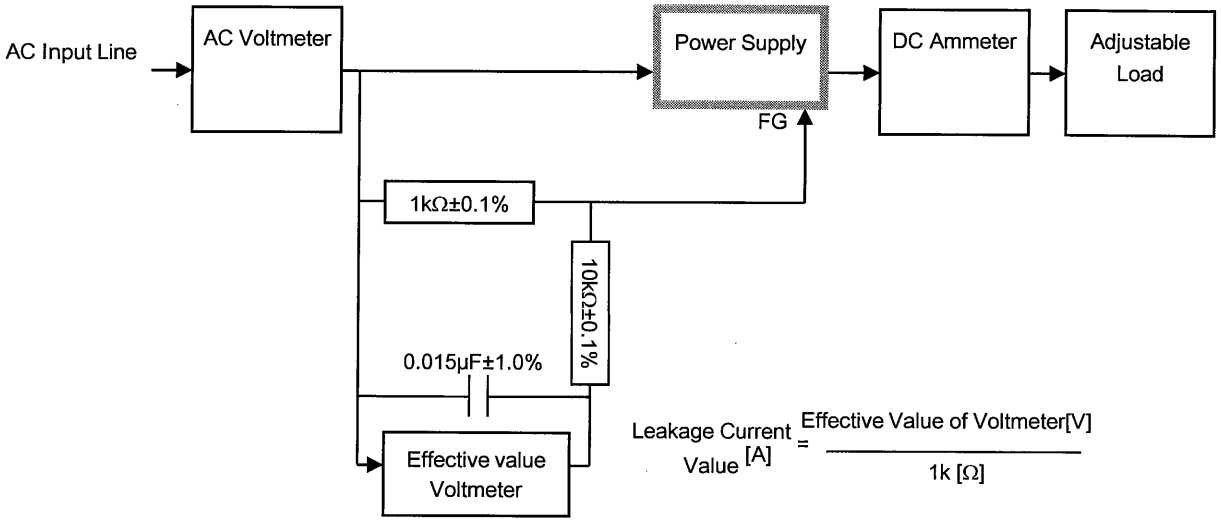


Figure B (IEC60601-1)