参考資料

TEST DATA OF PCA600F-32

Regulated DC Power Supply
March 14, 2018

Approved by : Koji Todo
Koji Todo Design Manager

Prepared by : Masanobu Shima
Masanobu Shima Design Engineer

COSEL CO.,LTD.

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Object	————————

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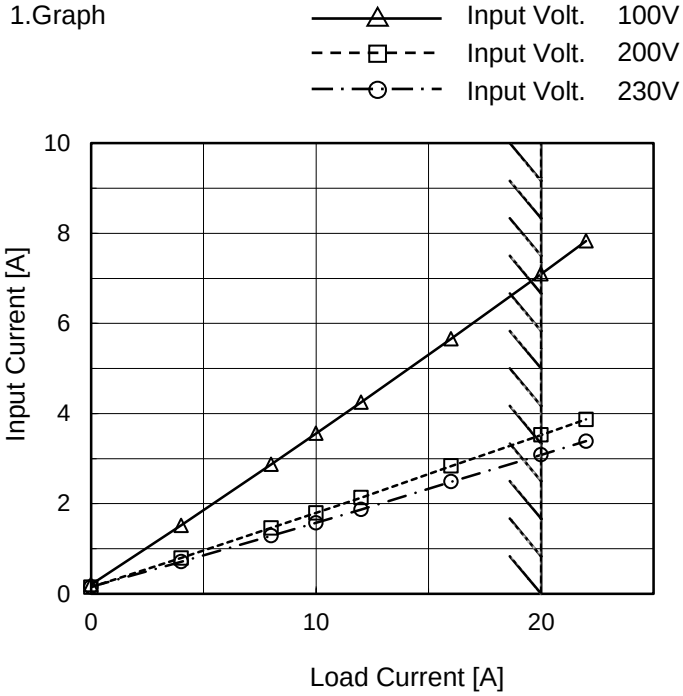

Note: Slanted line shows the range of the rated load current.

2.Values

Load Current [A]	Input Current [A]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.0	0.203	0.147	0.155
4.0	1.518	0.793	0.710
8.0	2.870	1.459	1.285
10.0	3.560	1.793	1.575
12.0	4.250	2.131	1.870
16.0	5.660	2.835	2.486
20.0	7.100	3.524	3.086
22.0	7.830	3.870	3.386
--	-	-	-
--	-	-	-
--	-	-	-

BC-11260

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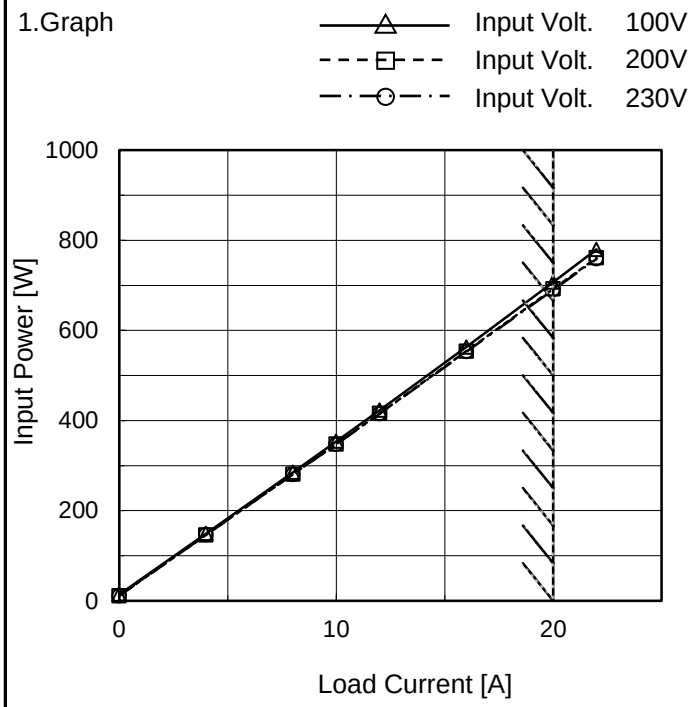
Model	PCA600F-32
Item	Input Power (by Load Current)
Object	————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

2.Values

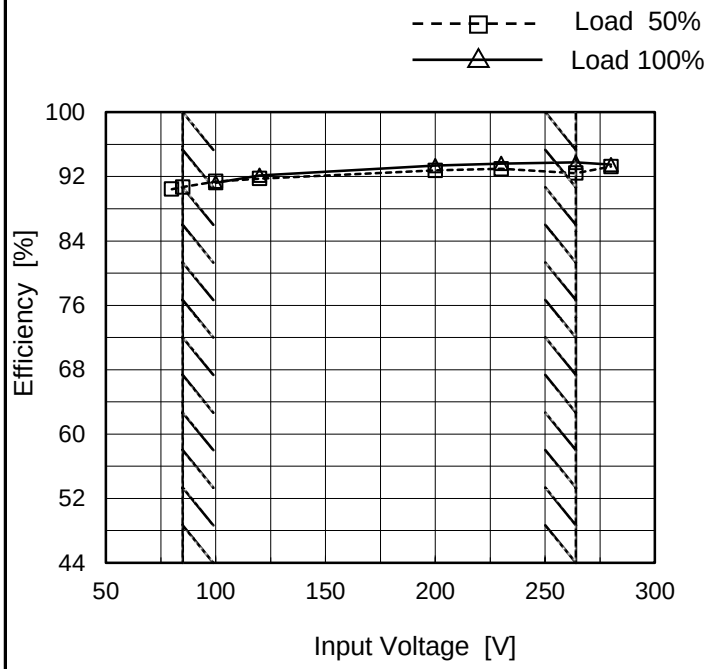
Load Current [A]	Input Power [W]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.0	14.1	10.9	11.0
4.0	149.3	146.1	146.3
8.0	284.9	280.6	280.2
10.0	354.0	347.7	347.0
12.0	423.0	415.6	415.0
16.0	563.0	553.8	553.0
20.0	707.0	692.0	690.0
22.0	780.0	761.0	759.0
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	PCA600F-32
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

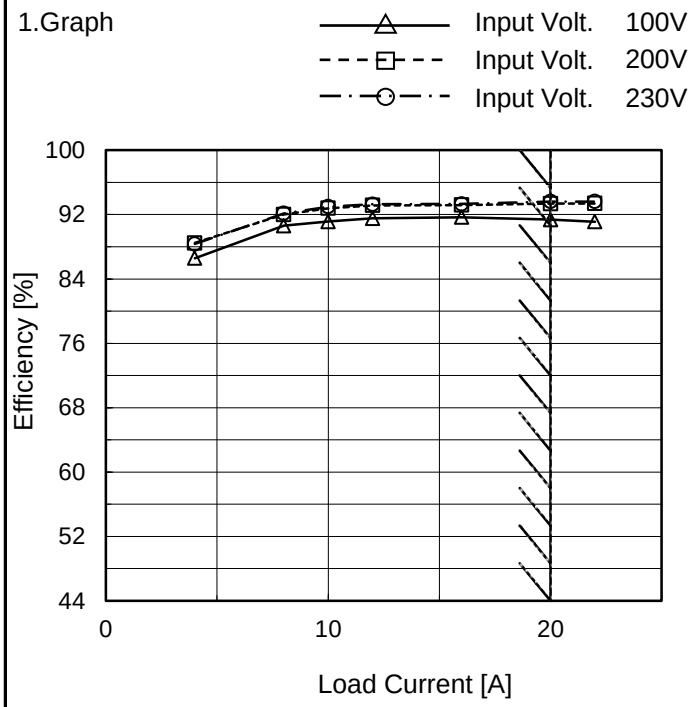
Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
80	90.4	-
85	90.7	-
100	91.4	91.2
120	91.7	92.1
200	92.8	93.4
230	93.0	93.6
264	92.4	93.8
280	93.2	93.5
--	-	-

COSEL

Model	PCA600F-32
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. 200[V]	Input Volt. 230[V]
0.0	-	-	-
4.0	86.6	88.5	88.3
8.0	90.6	92.0	92.2
10.0	91.1	92.8	93.0
12.0	91.5	93.1	93.3
16.0	91.7	93.2	93.3
20.0	91.4	93.4	93.6
22.0	91.1	93.4	93.6
--	-	-	-
--	-	-	-
--	-	-	-

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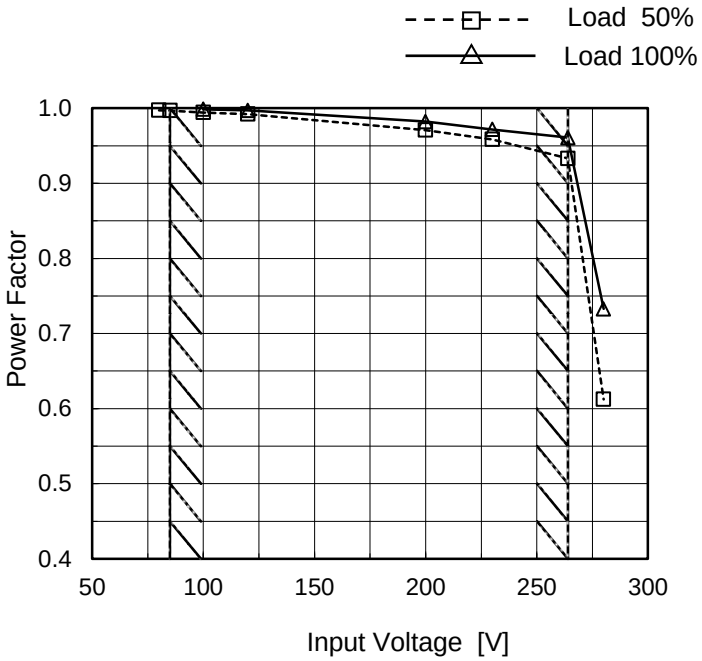
Model	PCA600F-32
Item	Power Factor (by Input Voltage)
Object	————————

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	0.997	-
85	0.997	-
100	0.994	0.999
120	0.992	0.997
200	0.971	0.982
230	0.959	0.972
264	0.933	0.961
280	0.612	0.733
--	-	-

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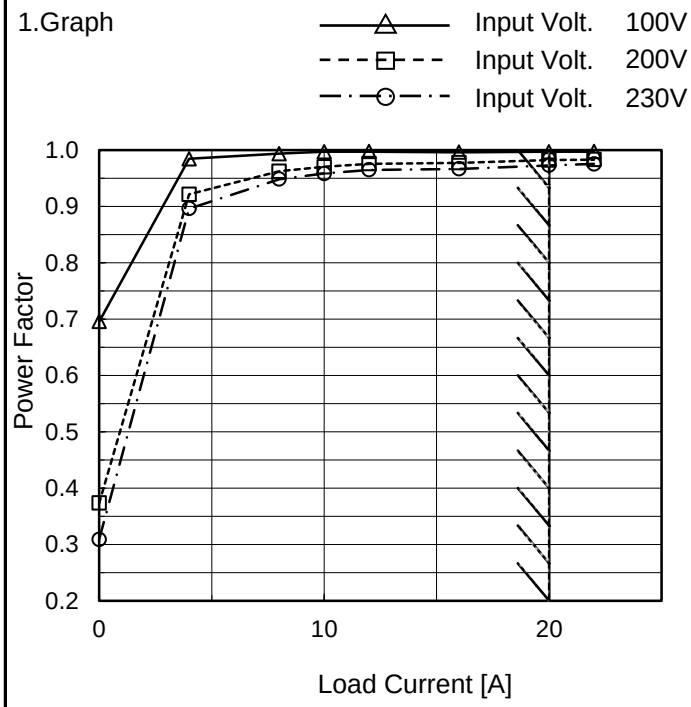
Model	PCA600F-32
Item	Power Factor (by Load Current)
Object	————————

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. 200[V]	Input Volt. 230[V]
0.0	0.696	0.373	0.309
4.0	0.985	0.922	0.896
8.0	0.994	0.963	0.949
10.0	0.997	0.971	0.959
12.0	0.998	0.976	0.965
16.0	0.996	0.978	0.967
20.0	0.997	0.983	0.973
22.0	0.997	0.983	0.976
--	-	-	-
--	-	-	-
--	-	-	-

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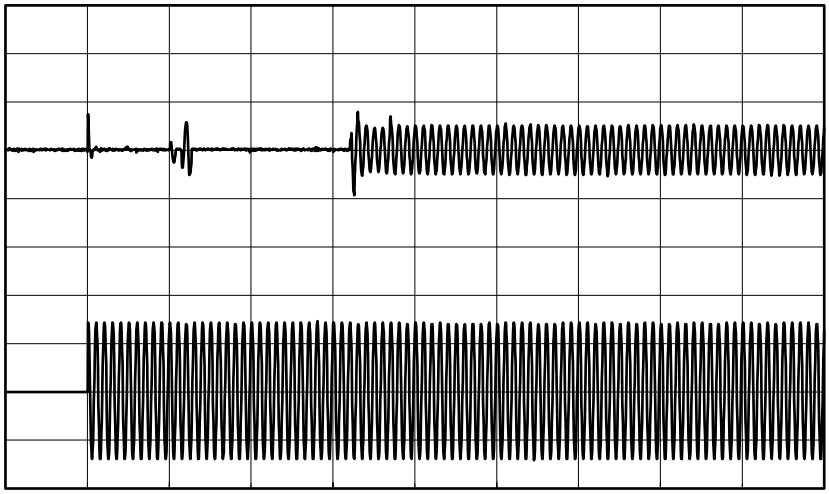
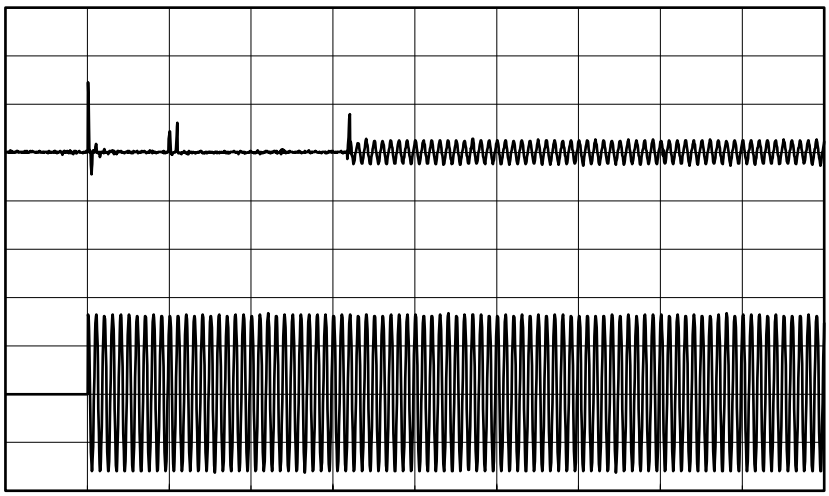
Model	PCA600F-32
Item	Inrush Current
Object	————————

Temperature 25°C
Testing Circuitry Figure A



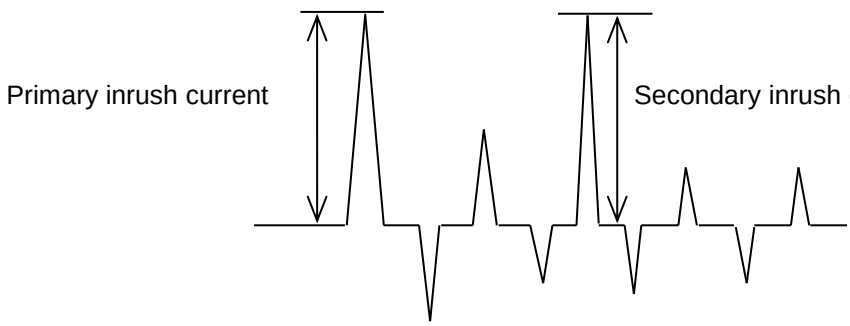
Input Voltage 100 V
Frequency 50 Hz
Load 100 %

Primary inrush current :
15.0 A
Secondary inrush current :
18.6 A



Input Voltage 230 V
Frequency 50 Hz
Load 100 %

Primary inrush current :
29.1 A
Secondary inrush current :
15.9 A



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Model	PCA600F-32	
Item	Leakage Current	Temperature 25°C Testing Circuitry Figure B
Object	———————	

1.Results

[mA]

Standards	Testing Circuitry	Measuring Method	Input Volt.			Note
			100 [V]	230 [V]	240 [V]	
DEN-AN	Figure B-1	Both phases	0.13	0.30	0.31	Operation
		One of phases	0.25	0.56	0.58	Stand by
IEC62368-1	Figure B-2	Both phases	0.12	0.29	0.30	Operation
		One of phases	0.25	0.54	0.56	Stand by
	Figure B-3	Both phases	0.12	0.29	0.30	Operation
		One of phases	0.25	0.54	0.57	Stand by
IEC60601-1	Figure B-4	Both phases	0.12	0.29	0.30	Operation
		One of phases	0.24	0.53	0.55	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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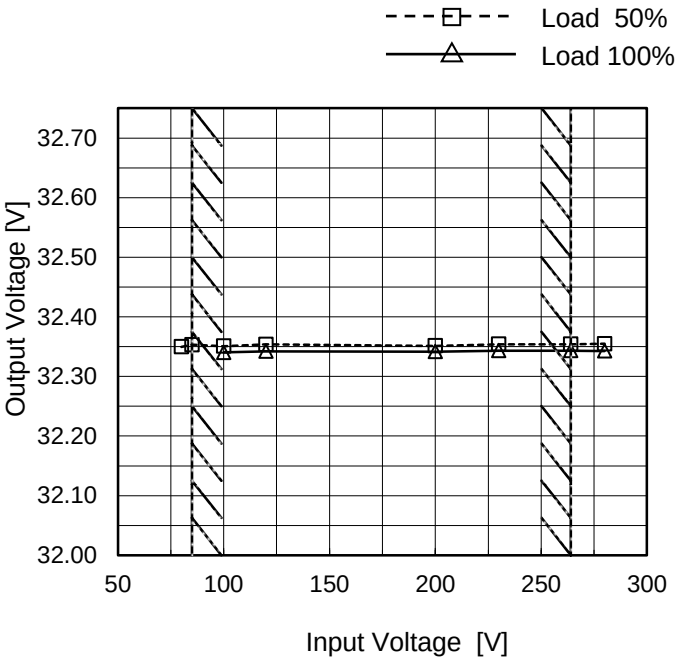
Model	PCA600F-32
Item	Line Regulation
Object	+32V20A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

2.Values

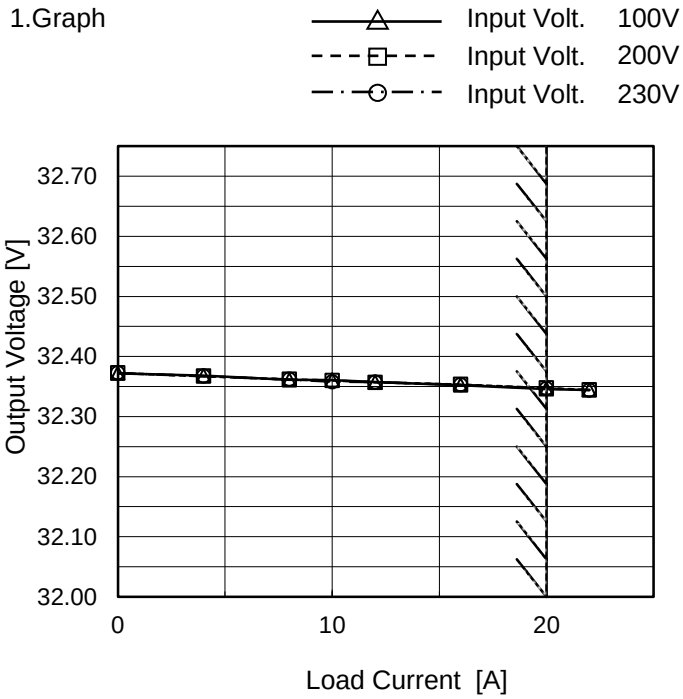
Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
80	32.350	-
85	32.353	-
100	32.351	32.340
120	32.354	32.342
200	32.351	32.342
230	32.354	32.343
264	32.354	32.343
280	32.355	32.343
--	-	-

COSEL

Model	PCA600F-32
Item	Load Regulation
Object	+32V20A

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. 200[V]	Input Volt. 230[V]
0.0	32.372	32.373	32.373
4.0	32.368	32.367	32.367
8.0	32.361	32.362	32.362
10.0	32.361	32.360	32.358
12.0	32.357	32.357	32.357
16.0	32.352	32.353	32.353
20.0	32.346	32.347	32.347
22.0	32.344	32.344	32.344
--	-	-	-
--	-	-	-
--	-	-	-

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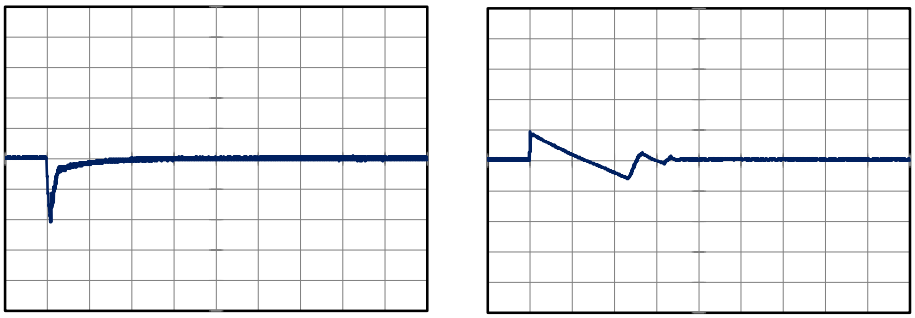
Model	PCA600F-32		
Item	Dynamic Load Response	Temperature	25°C
		Testing Circuitry	Figure A
Object	+32V20A		

Input Volt. 100 V
Cycle 1000 ms

Min.Load (0A)←→
Load 100% (20A)

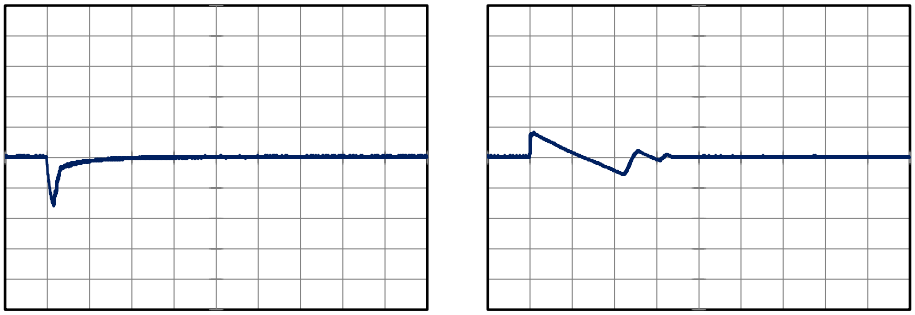


1 V/div

2 ms/div

10 ms/div

Min.Load (0A)←→
Load 50% (10A)



1 V/div

2 ms/div

10 ms/div

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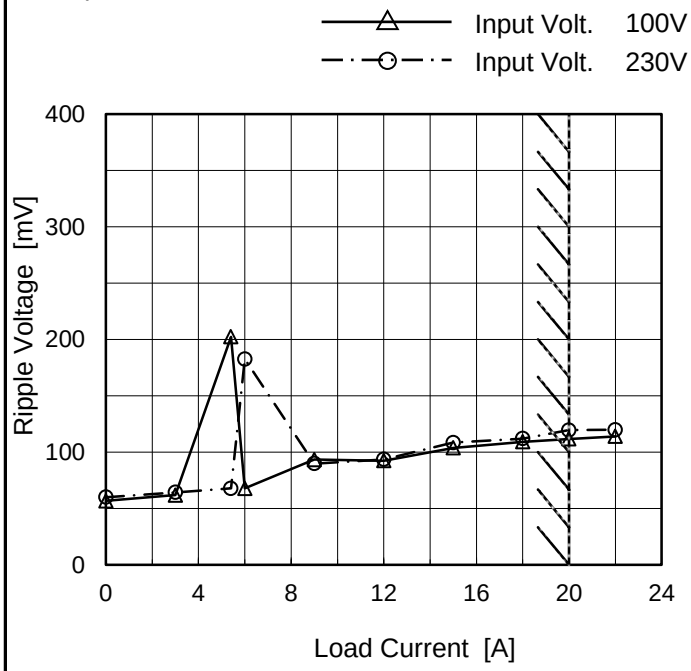
Model	PCA600F-32
Item	Ripple Voltage (by Load Current)
Object	+32V20A

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

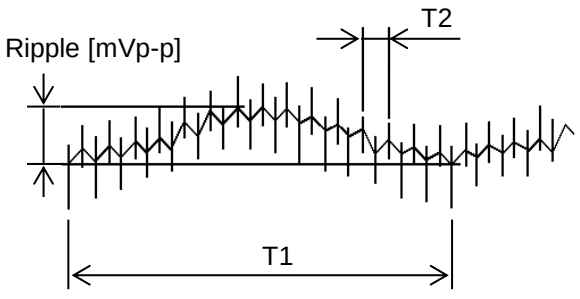


Fig. Complex Ripple Wave Form

2.Values

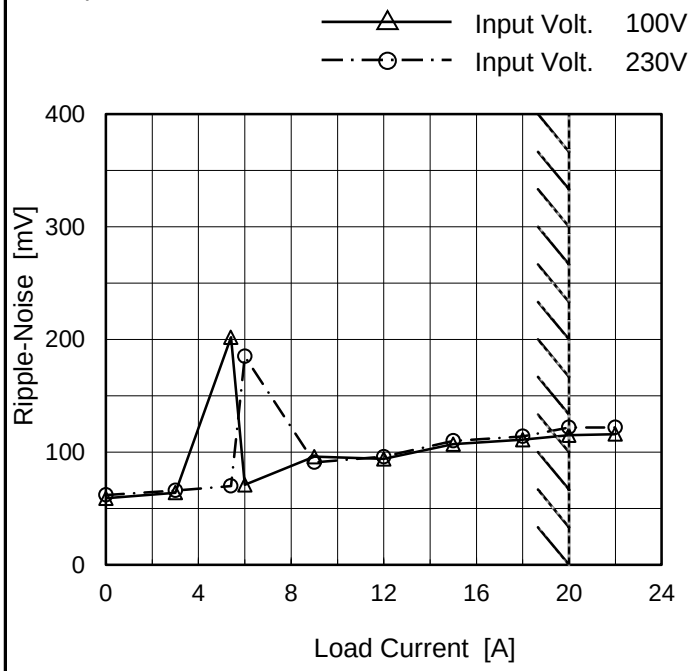
Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 100 [V]	Input Volt. 230 [V]
0.0	57	60
3.0	62	64
5.4	202	68
6.0	68	183
9.0	93	90
12.0	92	94
15.0	104	108
18.0	109	112
20.0	112	120
22.0	114	120
--	-	-

COSEL

Model	PCA600F-32
Item	Ripple-Noise
Object	+32V20A

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.

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

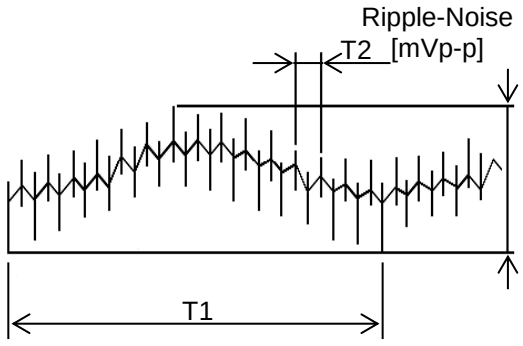


Fig. Complex Ripple Wave Form

2.Values

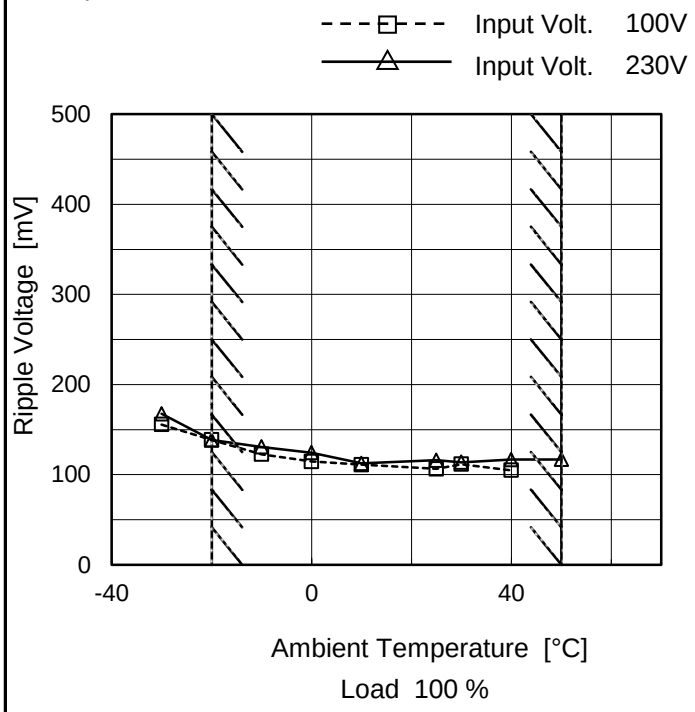
Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 100 [V]	Input Volt. 230 [V]
0.0	59	62
3.0	64	66
5.4	202	70
6.0	71	185
9.0	96	91
12.0	94	96
15.0	107	110
18.0	111	114
20.0	115	122
22.0	116	122
--	-	-

COSEL

Model	PCA600F-32
Item	Ripple Voltage (by Ambient Temp.)
Object	+32V20A

Testing Circuitry Figure C

1.Graph



Measured by 20 MHz Oscilloscope.

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

2.Values

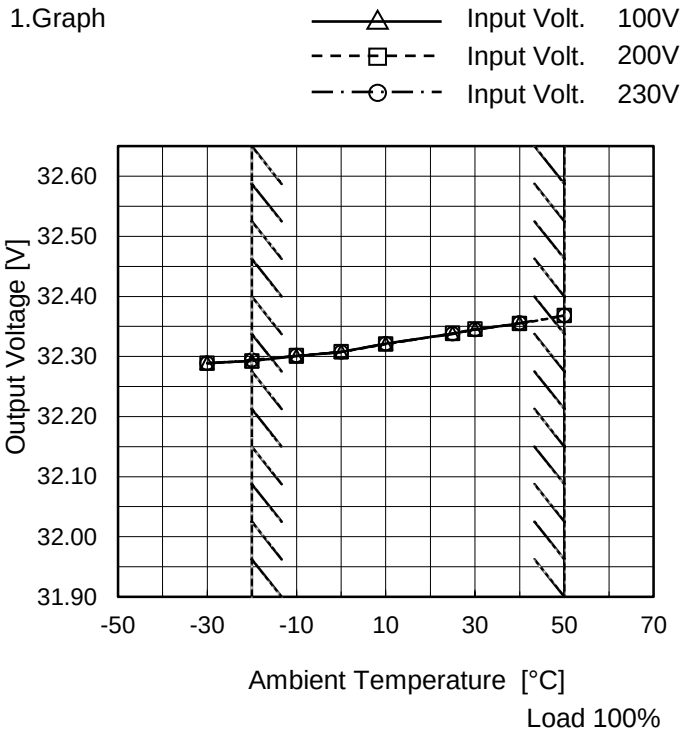
Ambient Temperature [°C]	Ripple Voltage [mV]	
	Input Volt. 100 [V]	Input Volt. 230 [V]
-30	156	168
-20	139	138
-10	123	131
0	115	124
10	111	112
25	106	116
30	112	114
40	105	117
50	-	117
--	-	-
--	-	-

COSEL

Model	PCA600F-32
Item	Ambient Temperature Drift
Object	+32V20A

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. 200[V]	Input Volt. 230[V]
-30	32.289	32.289	32.288
-20	32.293	32.292	32.294
-10	32.300	32.301	32.301
0	32.308	32.308	32.307
10	32.321	32.321	32.321
25	32.338	32.339	32.338
30	32.345	32.346	32.345
40	32.355	32.355	32.356
50	-	32.368	32.368
--	-	-	-
--	-	-	-

Model	PCA600F-32	
Item	Output Voltage Accuracy	Testing Circuitry Figure A
Object	+32V20A	

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 : 85 - 264V
Load Current : 0 - 20A

* 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	32.347	±71	±0.2
Minimum Voltage	-20	90	20	32.206		

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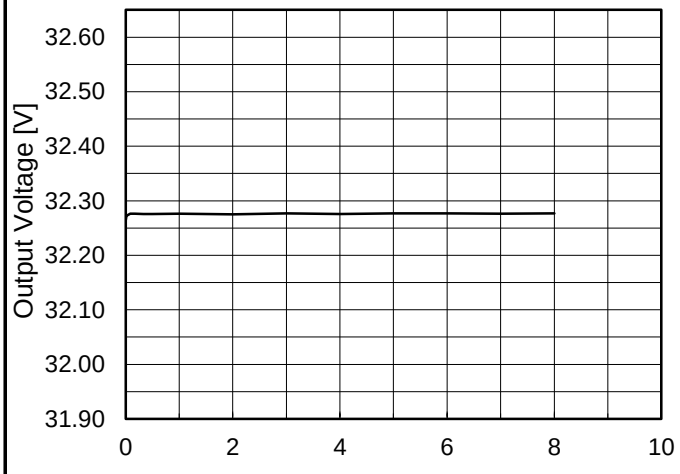
Model	PCA600F-32
Item	Time Lapse Drift
Object	+32V20A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Input Volt. 230V
Load 100%

* The characteristic of AC100V is equal.

2.Values

Time since start [H]	Output Voltage [V]
0.0	32.264
0.5	32.276
1.0	32.276
2.0	32.275
3.0	32.277
4.0	32.276
5.0	32.277
6.0	32.277
7.0	32.276
8.0	32.277

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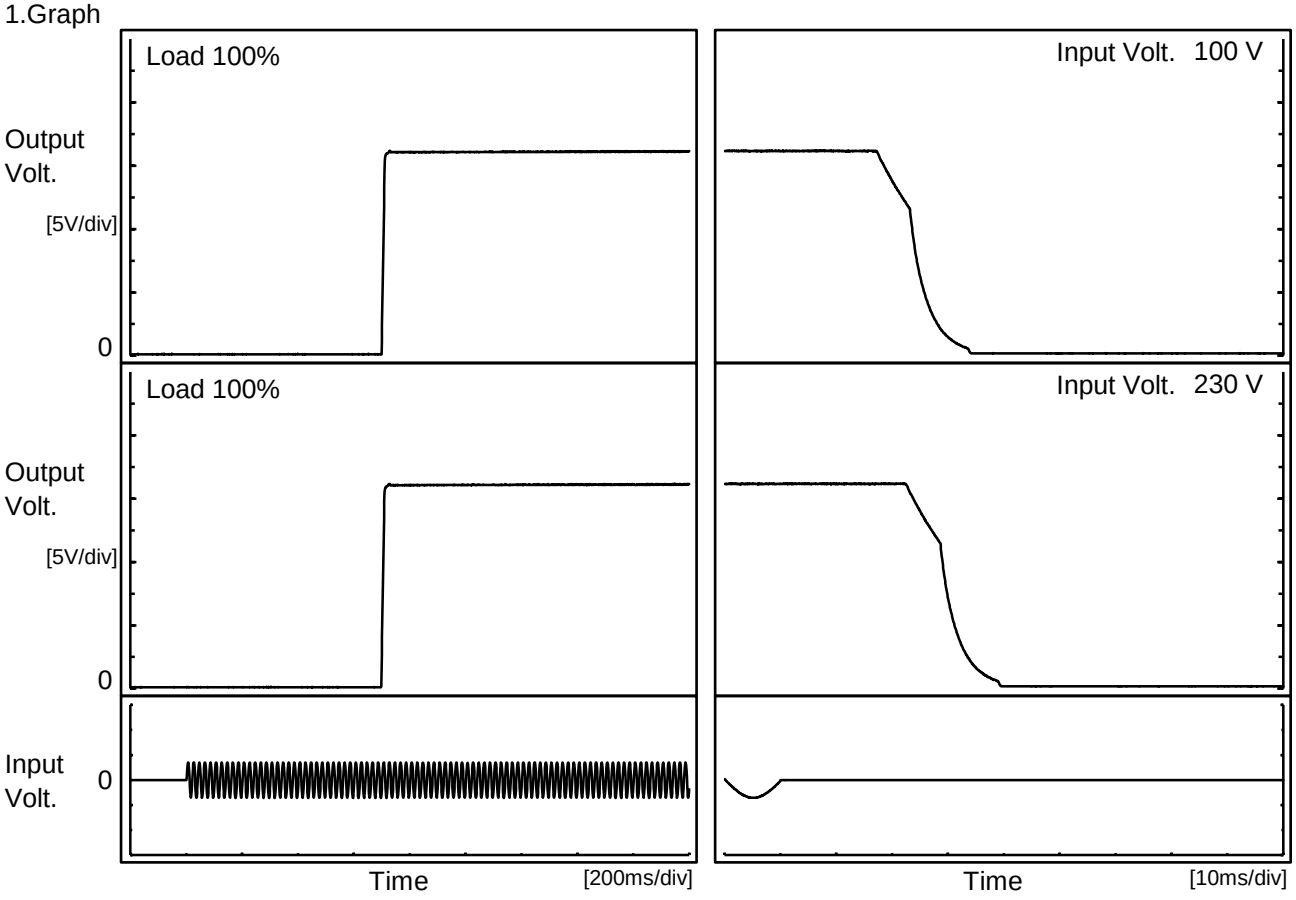
Model	PCA600F-32	
Item	Rise and Fall Time	Temperature 25°C Testing Circuitry Figure A
Object	+32V20A	

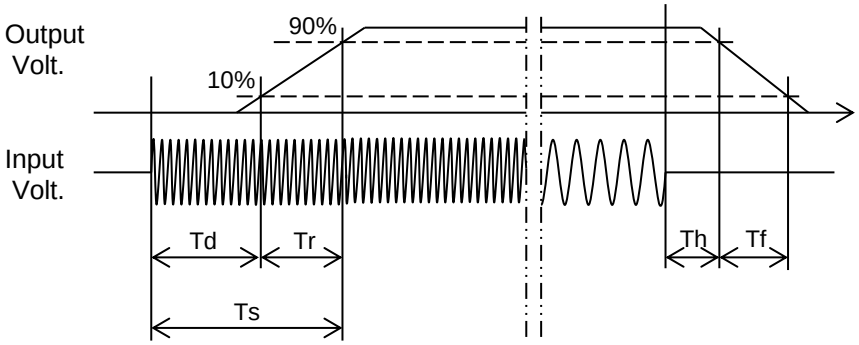
1.Graph



2.Values

[ms]

Input Volt. \ Time	Td	Tr	Ts	Th	Tf
100 V	701.0	9.0	710.0	19.1	10.4
230 V	700.0	9.0	709.0	24.4	10.6

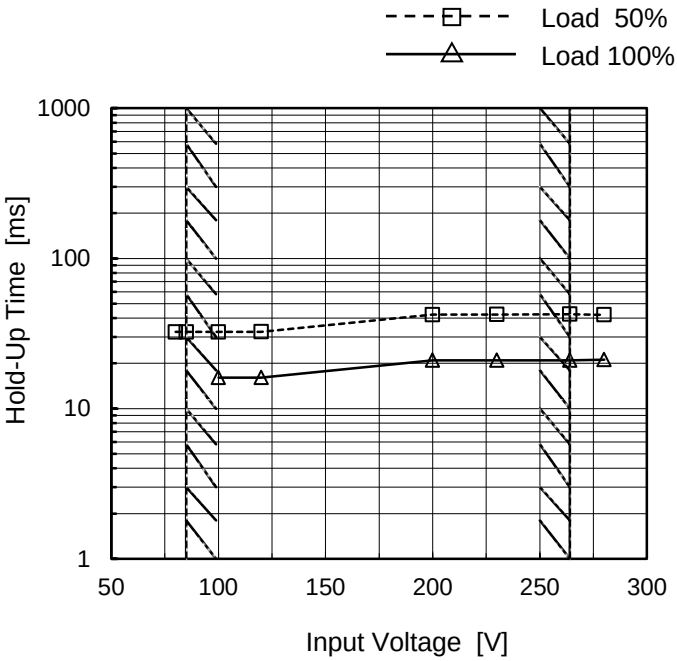


COSEL

Model	PCA600F-32
Item	Hold-Up Time
Object	+32V20A

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

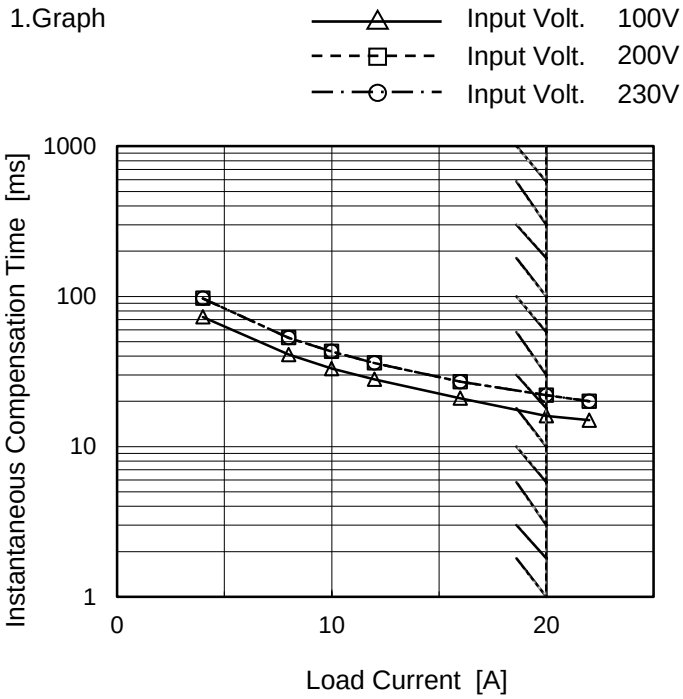
Input Voltage [V]	Hold-Up Time [ms]	
	Load 50%	Load 100%
80	32	-
85	32	-
100	32	16
120	33	16
200	42	21
230	42	21
264	43	21
280	42	21
--	-	-

COSEL

Model	PCA600F-32
Item	Instantaneous Interruption Compensation
Object	+32V20A

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. 200[V]	Input Volt. 230[V]
0.0	-	-	-
4.0	73	97	97
8.0	41	53	53
10.0	33	43	43
12.0	28	36	36
16.0	21	27	27
20.0	16	22	22
22.0	15	20	20
--	-	-	-
--	-	-	-
--	-	-	-

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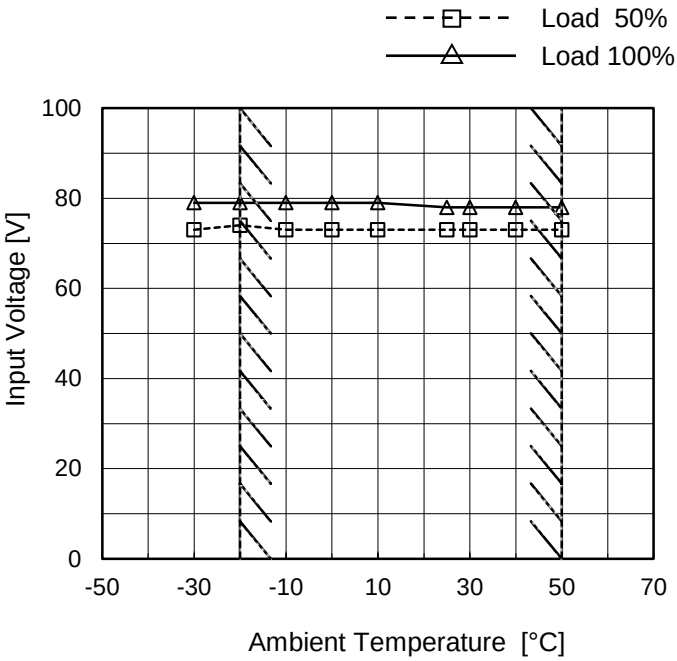
Model	PCA600F-32
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+32V20A

Testing Circuitry Figure A

1.Graph



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

2.Values

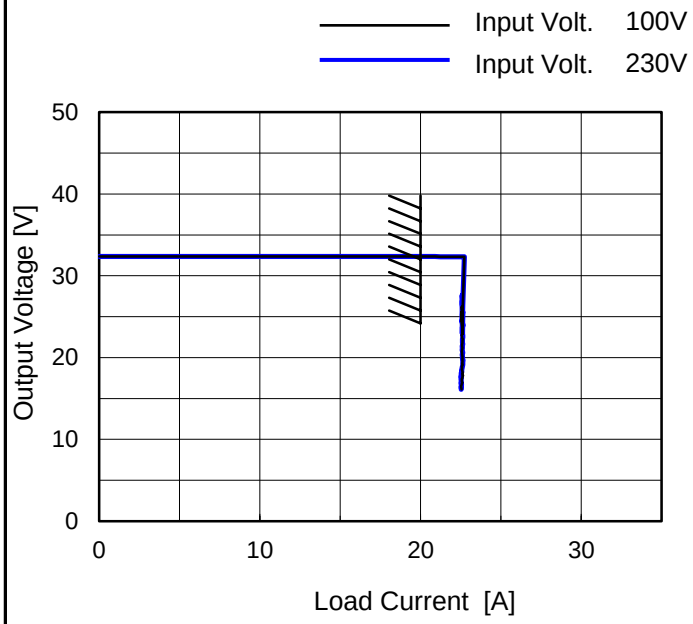
Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-30	73	79
-20	74	79
-10	73	79
0	73	79
10	73	79
25	73	78
30	73	78
40	73	78
50	73	78
--	-	-
--	-	-

COSEL

Model	PCA600F-32
Item	Overcurrent Protection
Object	+32V20A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

Intermittent operation occurs when the output voltage is from 16V to 0V.

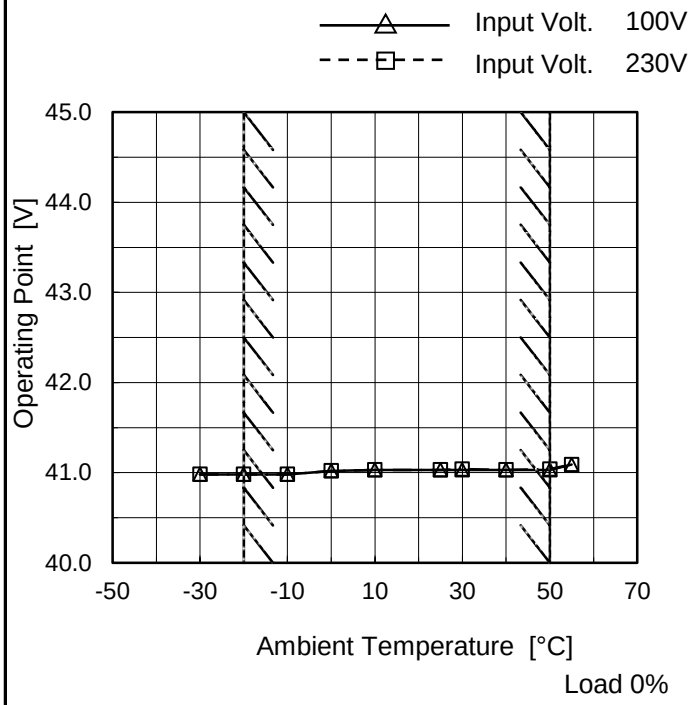
2.Values

Output Voltage [V]	Load Current [A]	
	Input Volt. 100[V]	Input Volt. 230[V]
30.4	22.98	22.98
28.8	22.61	22.60
25.6	22.60	22.60
22.4	22.59	22.62
19.2	22.59	22.63
16.0	22.54	22.53
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

Model	PCA600F-32
Item	Overvoltage Protection
Object	+32V20A

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. 100[V]	Input Volt. 230[V]
-30	40.98	40.98
-20	40.98	40.98
-10	40.98	40.98
0	41.02	41.02
10	41.03	41.03
25	41.03	41.03
30	41.03	41.04
40	41.03	41.03
50	41.03	41.04
55	41.09	41.09
--	-	-

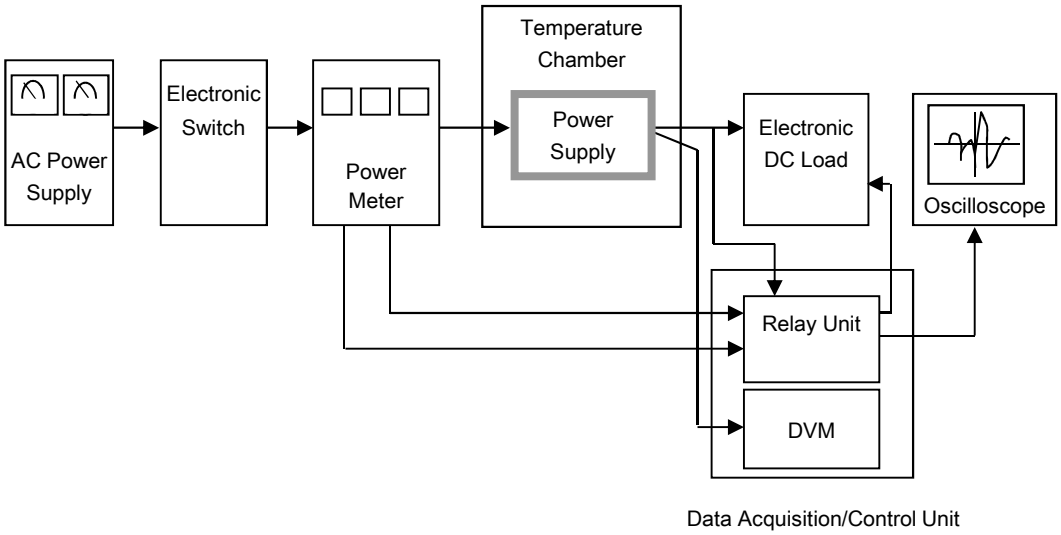


Figure A

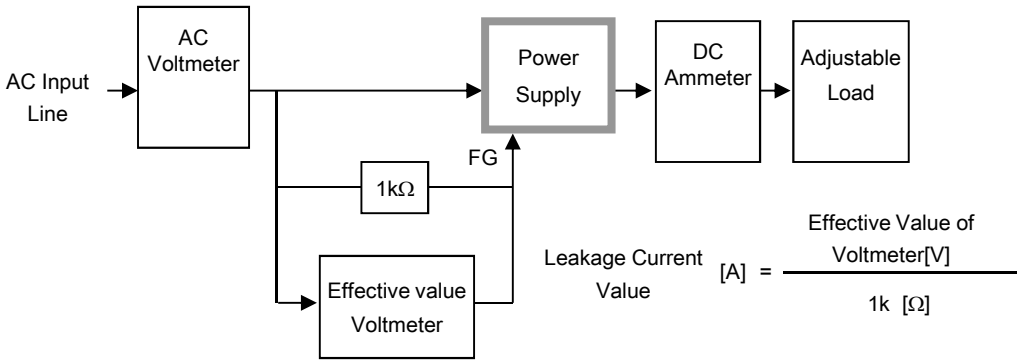


Figure B-1 (DEN-AN)

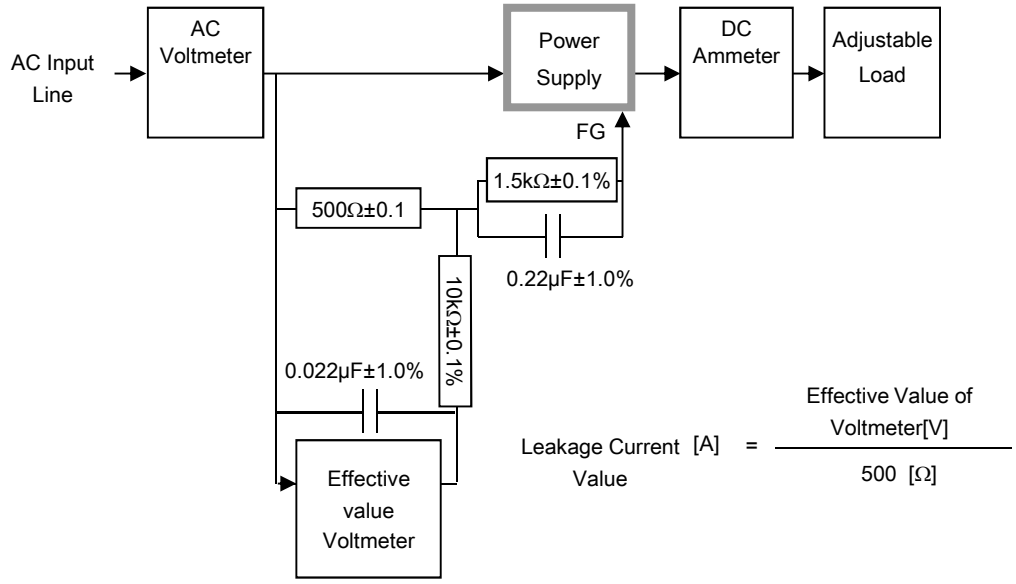


Figure B-2 (IEC62368-1 refer to IEC60990 Fig.4)

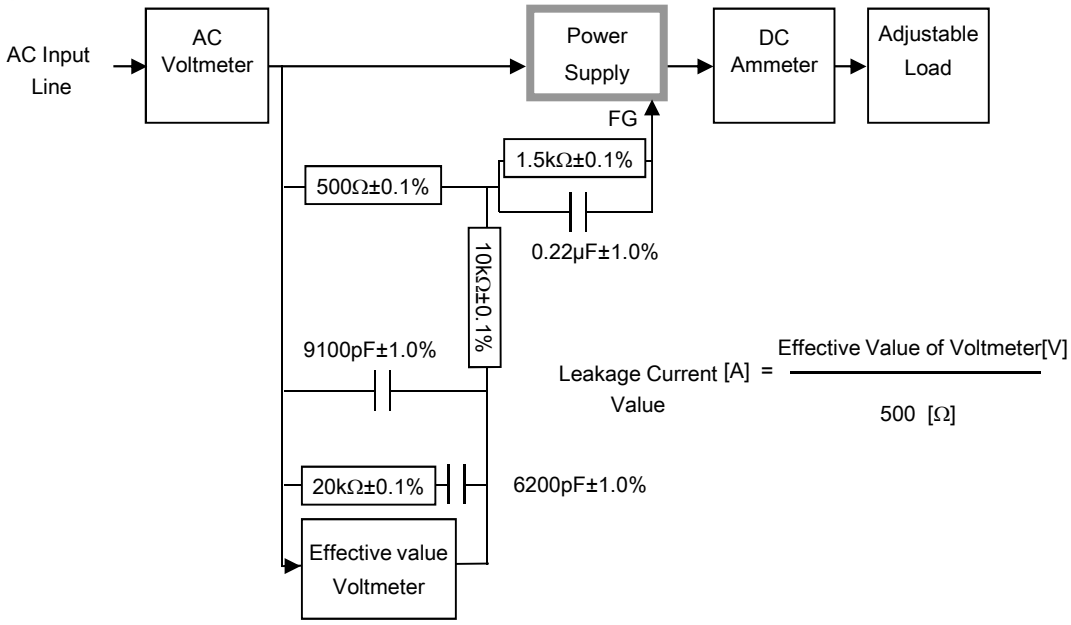


Figure B-3 (IEC62368-1 refer to IEC60990 Fig.5)

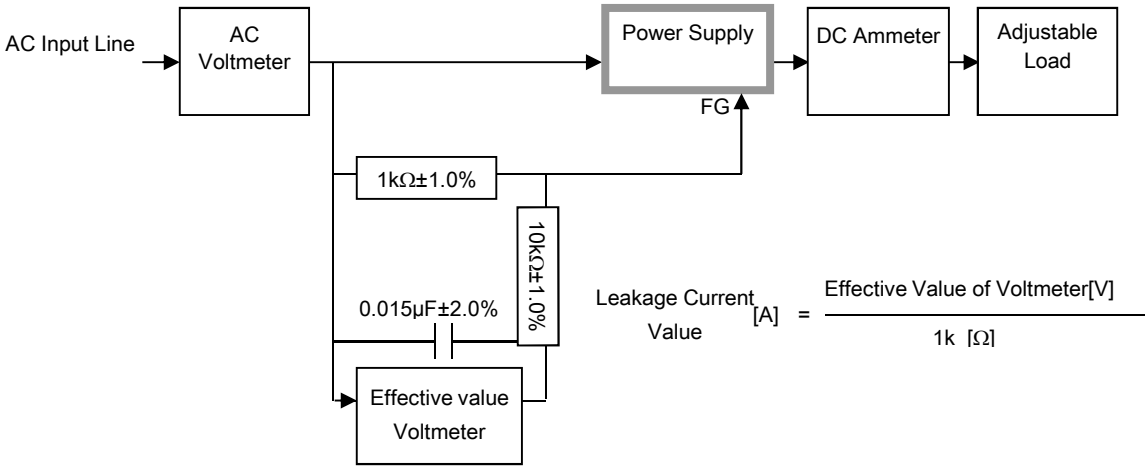


Figure B-4 (IEC60601-1)

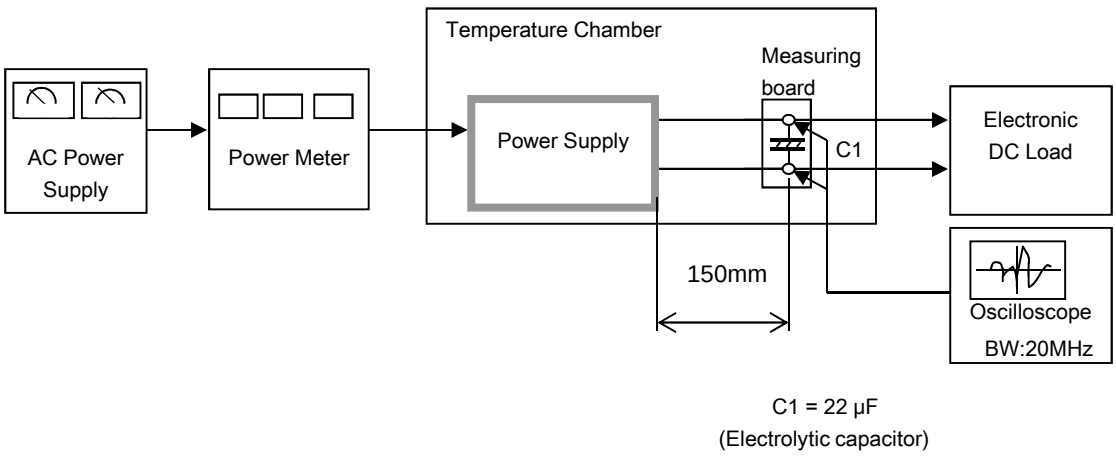


Figure C