

TEST DATA OF SNTUNS100F05

Regulated DC Power Supply
July 23, 2013

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Takahiro Yoneda Design Manager

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COSEL CO.,LTD.

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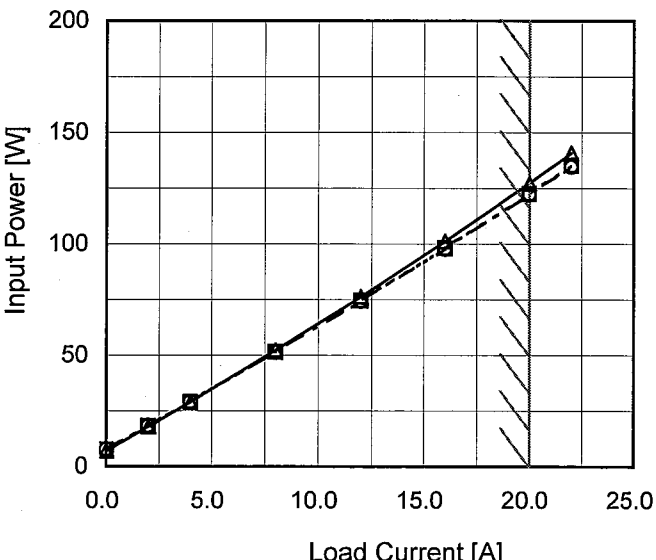
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Object		_____					
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Model		SNTUNS100F05																																																				
Item		Power Factor (by Load Current)																																																				
Object																																																						
1.Graph		2.Values																																																				
<div><div><div>—△—</div><div>Input Volt. 100V</div></div><div><div>---□---</div><div>Input Volt. 200V</div></div><div><div>-·-○-·-</div><div>Input Volt. 230V</div></div></div> <p>Power Factor</p> <p>Load Current [A]</p> <p>Note: Slanted line shows the range of the rated load current.</p>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Power Factor</th></tr><tr><th>Input Volt. 100[V]</th><th>Input Volt. 200[V]</th><th>Input Volt. 230[V]</th></tr><tr><td>0.0</td><td>0.644</td><td>0.224</td><td>0.173</td></tr><tr><td>2.0</td><td>0.887</td><td>0.497</td><td>0.366</td></tr><tr><td>4.0</td><td>0.938</td><td>0.656</td><td>0.528</td></tr><tr><td>8.0</td><td>0.967</td><td>0.787</td><td>0.714</td></tr><tr><td>12.0</td><td>0.973</td><td>0.853</td><td>0.797</td></tr><tr><td>16.0</td><td>0.983</td><td>0.893</td><td>0.844</td></tr><tr><td>20.0</td><td>0.988</td><td>0.917</td><td>0.874</td></tr><tr><td>22.0</td><td>0.989</td><td>0.928</td><td>0.886</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr></table>		Load Current [A]	Power Factor			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	0.0	0.644	0.224	0.173	2.0	0.887	0.497	0.366	4.0	0.938	0.656	0.528	8.0	0.967	0.787	0.714	12.0	0.973	0.853	0.797	16.0	0.983	0.893	0.844	20.0	0.988	0.917	0.874	22.0	0.989	0.928	0.886	--	-	-	-	--	-	-	-	--	-	-	-
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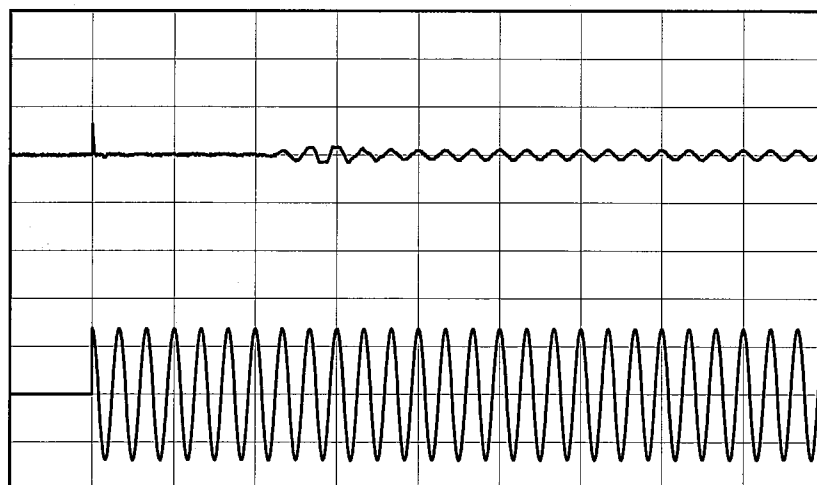
BC-10701

COSEL

Model	SNTUNS100F05	Temperature 25°C Testing Circuitry Figure A	
Item	Inrush Current		
Object	_____		

Input
Current
[20A/div]

Input
Voltage
[100V/div]



Time

[50ms/div]

Input Voltage 100 V

Frequency 60 Hz

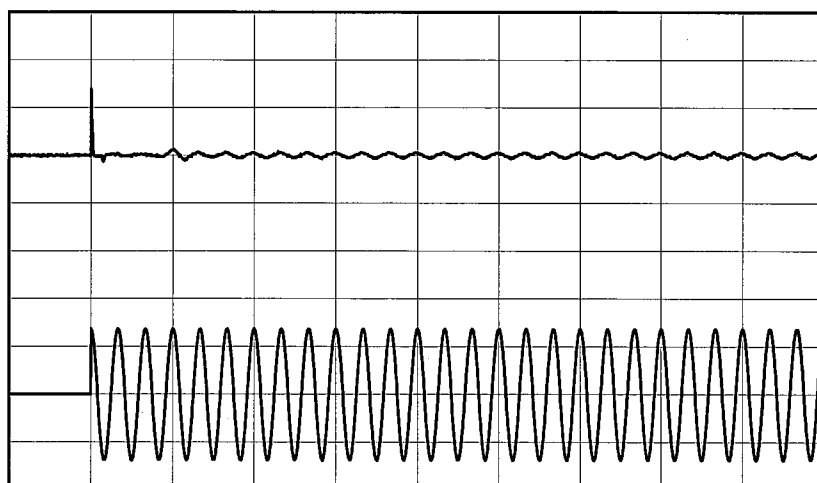
Load 100 %

Primary inrush current :
12.6 A

Secondary inrush current :
3.3 A

Input
Current
[20A/div]

Input
Voltage
[200V/div]



Time

[50ms/div]

Input Voltage 200 V

Frequency 60 Hz

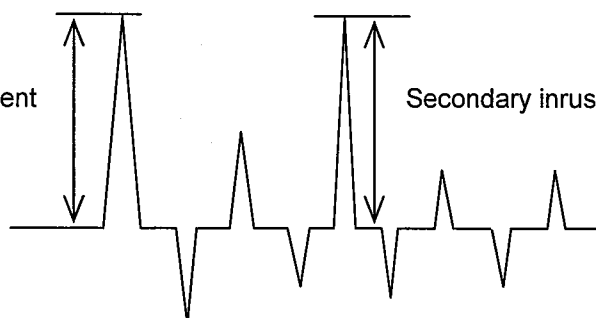
Load 100 %

Primary inrush current :
27.8 A

Secondary inrush current :
2.4 A

Primary inrush current

Secondary inrush current



COSEL

		Temperature 25°C Testing Circuitry Figure B
Model	SNTUNS100F05	
Item	Leakage Current	
Object	_____	

1.Results

[mA]

Standards		Input Volt.			Note
		100 [V]	200 [V]	240 [V]	
IEC60950-1	Both phases	0.18	0.38	0.50	Operation
	One of phases	0.32	0.74	0.96	Stand by

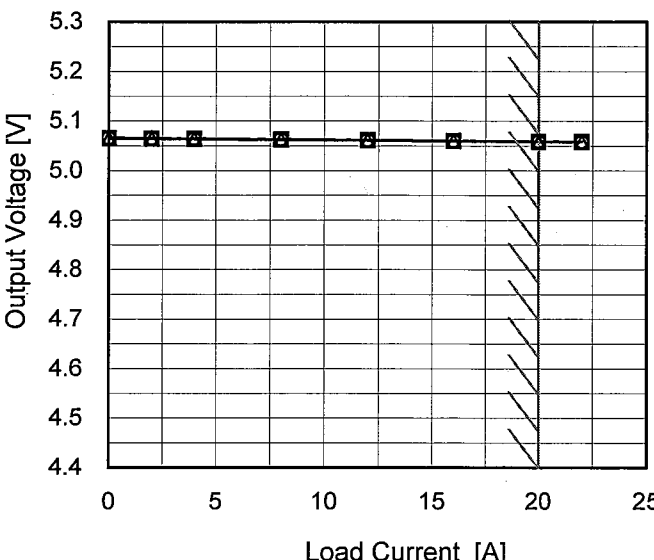
The value for "One of phases" is the reference value only.

2.Condition

Leakage current value is concluded after measuring both phases of AC input and by choosing the larger one.

[illegible]

COSEL

Model	SNTUNS100F05																																																					
Item	Load Regulation	Temperature	25°C																																																			
		Testing Circuitry	Figure A																																																			
Object	+5V20A																																																					
1.Graph		2.Values																																																				
<div><div><div>—△—</div><div>Input Volt. 100V</div></div><div><div>---□---</div><div>Input Volt. 200V</div></div><div><div>-·-○-·-</div><div>Input Volt. 230V</div></div></div>  <p>Output Voltage [V]</p> <p>Load Current [A]</p> <p>Note: Slanted line shows the range of the rated load current.</p>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Output Voltage [V]</th></tr><tr><th>Input Volt. 100[V]</th><th>Input Volt. 200[V]</th><th>Input Volt. 230[V]</th></tr><tr><td>0.0</td><td>5.065</td><td>5.066</td><td>5.066</td></tr><tr><td>2.0</td><td>5.065</td><td>5.065</td><td>5.065</td></tr><tr><td>4.0</td><td>5.064</td><td>5.064</td><td>5.064</td></tr><tr><td>8.0</td><td>5.063</td><td>5.063</td><td>5.063</td></tr><tr><td>12.0</td><td>5.061</td><td>5.061</td><td>5.062</td></tr><tr><td>16.0</td><td>5.060</td><td>5.060</td><td>5.060</td></tr><tr><td>20.0</td><td>5.059</td><td>5.059</td><td>5.059</td></tr><tr><td>22.0</td><td>5.058</td><td>5.058</td><td>5.058</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr></table>		Load Current [A]	Output Voltage [V]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	0.0	5.065	5.066	5.066	2.0	5.065	5.065	5.065	4.0	5.064	5.064	5.064	8.0	5.063	5.063	5.063	12.0	5.061	5.061	5.062	16.0	5.060	5.060	5.060	20.0	5.059	5.059	5.059	22.0	5.058	5.058	5.058	--	-	-	-	--	-	-	-	--	-	-	-
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BC-10701



Model	SNTUNS100F05	Temperature 25°C Testing Circuitry Figure A
Item	Dynamic Load Response	
Object	+5V20A	

Input Volt. 100 V
Cycle 1000 ms

Load Current

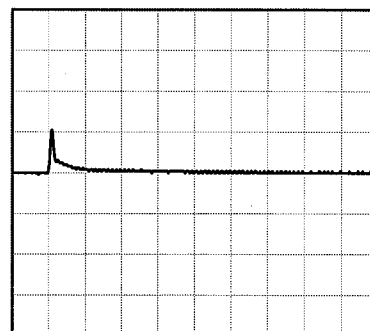
20 A/50us

Min. Load (0A) ↔
Load 100% (20A)

200 mV/div



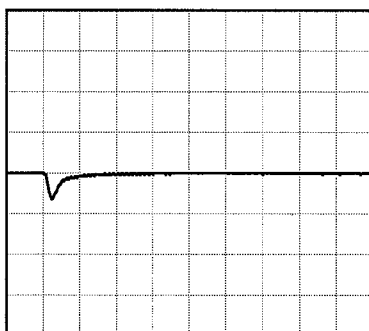
200 μs/div



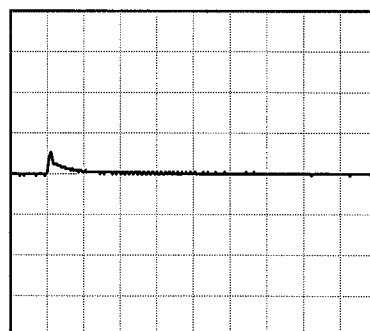
200 μs/div

Min. Load (0A) ↔
Load 50% (10A)

200 mV/div



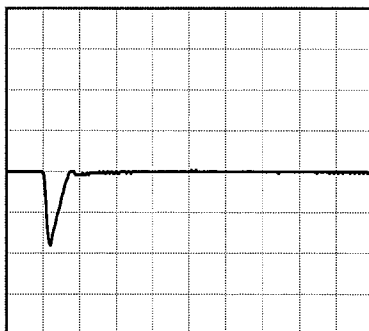
200 μs/div



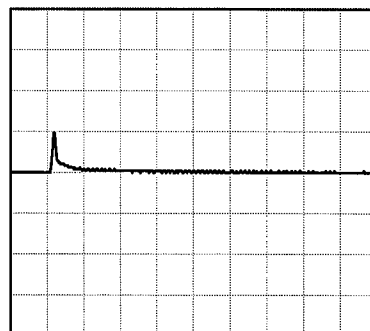
200 μs/div

Load 10% (2A) ↔
Load 100% (20A)

200 mV/div

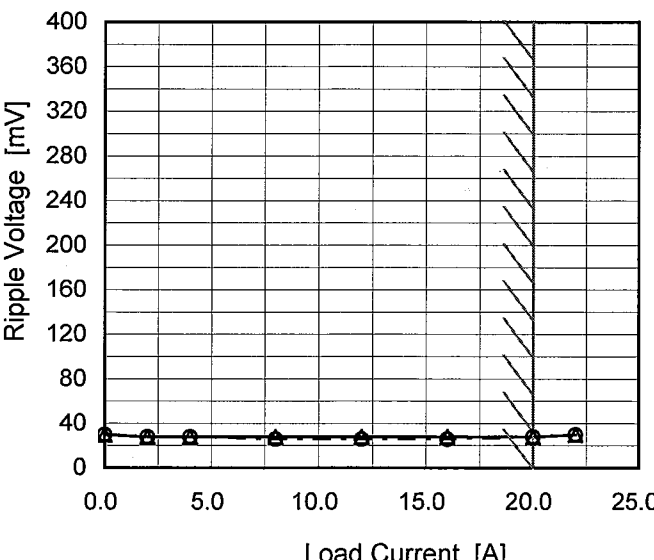
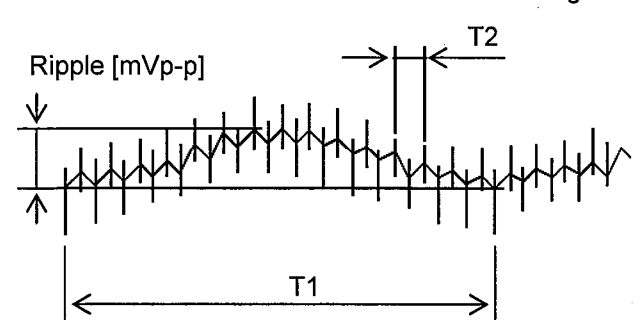


200 μs/div



200 μs/div

COSEL

Model		SNTUNS100F05																																							
Item		Ripple Voltage (by Load Current)																																							
Object		+5V20A																																							
1.Graph		2.Values																																							
<div><div><div>—△— Input Volt. 100V</div><div>-·-○-·- Input Volt. 200V</div></div></div>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="2">Ripple Voltage [mV]</th></tr><tr><th>Input Volt. 100 [V]</th><th>Input Volt. 200 [V]</th></tr><tr><td>0.0</td><td>30</td><td>30</td></tr><tr><td>2.0</td><td>28</td><td>28</td></tr><tr><td>4.0</td><td>28</td><td>28</td></tr><tr><td>8.0</td><td>28</td><td>26</td></tr><tr><td>12.0</td><td>28</td><td>26</td></tr><tr><td>16.0</td><td>28</td><td>26</td></tr><tr><td>20.0</td><td>28</td><td>28</td></tr><tr><td>22.0</td><td>30</td><td>30</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></table>		Load Current [A]	Ripple Voltage [mV]		Input Volt. 100 [V]	Input Volt. 200 [V]	0.0	30	30	2.0	28	28	4.0	28	28	8.0	28	26	12.0	28	26	16.0	28	26	20.0	28	28	22.0	30	30	--	-	-	--	-	-	--	-	-
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<div><div>Measured by 100 MHz Oscilloscope.</div><div>Ripple Voltage is shown as p-p in the figure below.</div><div>Note: Slanted line shows the range of the rated load current.</div></div>																																									
<div><div><div>T1: Due to AC Input Line</div><div>T2: Due to Switching</div></div></div>																																									
<div><div>Fig. Complex Ripple Wave Form</div></div>																																									

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BC-10701

COSEL

Model	SNTUNS100F05		
Item	Ripple-Noise	Temperature	25°C
Object	+5V20A	Testing Circuitry	Figure C
1.Graph		2.Values	
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[illegible]

Model		SNTUNS100F05																																																				
Item		Ambient Temperature Drift																																																				
Object		+5V20A																																																				
1.Graph		2.Values																																																				
<div><div><div>—△—</div><div>Input Volt. 100V</div></div><div><div>---□---</div><div>Input Volt. 200V</div></div><div><div>---○---</div><div>Input Volt. 230V</div></div></div> <p>Output Voltage [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 100%</p>		<table><tr><th rowspan="2">Ambient Temperature [°C]</th><th colspan="3">Output Voltage [V]</th></tr><tr><th>Input Volt. 100[V]</th><th>Input Volt. 200[V]</th><th>Input Volt. 230[V]</th></tr><tr><td>-30</td><td>5.046</td><td>5.046</td><td>5.046</td></tr><tr><td>-20</td><td>5.048</td><td>5.048</td><td>5.048</td></tr><tr><td>-10</td><td>5.049</td><td>5.049</td><td>5.049</td></tr><tr><td>0</td><td>5.051</td><td>5.051</td><td>5.051</td></tr><tr><td>25</td><td>5.059</td><td>5.059</td><td>5.059</td></tr><tr><td>50</td><td>5.066</td><td>5.067</td><td>5.067</td></tr><tr><td>70</td><td>5.072</td><td>5.072</td><td>5.072</td></tr><tr><td>85</td><td>5.074</td><td>5.074</td><td>5.074</td></tr><tr><td>95</td><td>5.076</td><td>5.076</td><td>5.076</td></tr><tr><td>100</td><td>5.076</td><td>5.076</td><td>5.076</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr></table>		Ambient Temperature [°C]	Output Voltage [V]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	-30	5.046	5.046	5.046	-20	5.048	5.048	5.048	-10	5.049	5.049	5.049	0	5.051	5.051	5.051	25	5.059	5.059	5.059	50	5.066	5.067	5.067	70	5.072	5.072	5.072	85	5.074	5.074	5.074	95	5.076	5.076	5.076	100	5.076	5.076	5.076	--	-	-	-
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Note: Slanted line shows the range of the rated ambient temperature.																																																						

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BC-10701



		Testing Circuitry Figure A
Model	SNTUNS100F05	
Item	Output Voltage Accuracy	
Object	+5V20A	

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 - 95°C

Input Voltage : 85 - 264V

Load Current : 0 - 20A

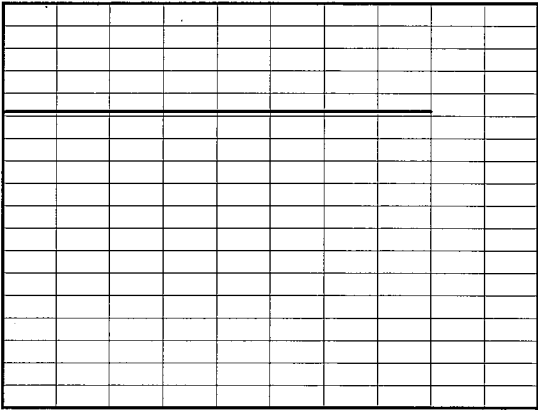
* Output Voltage Accuracy = $\pm(\text{Maximum of Output Voltage} - \text{Minimum of Output Voltage}) / 2$

* 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	95	200	0	5.079	±16	±0.3
Minimum Voltage	-20	85	20	5.048		

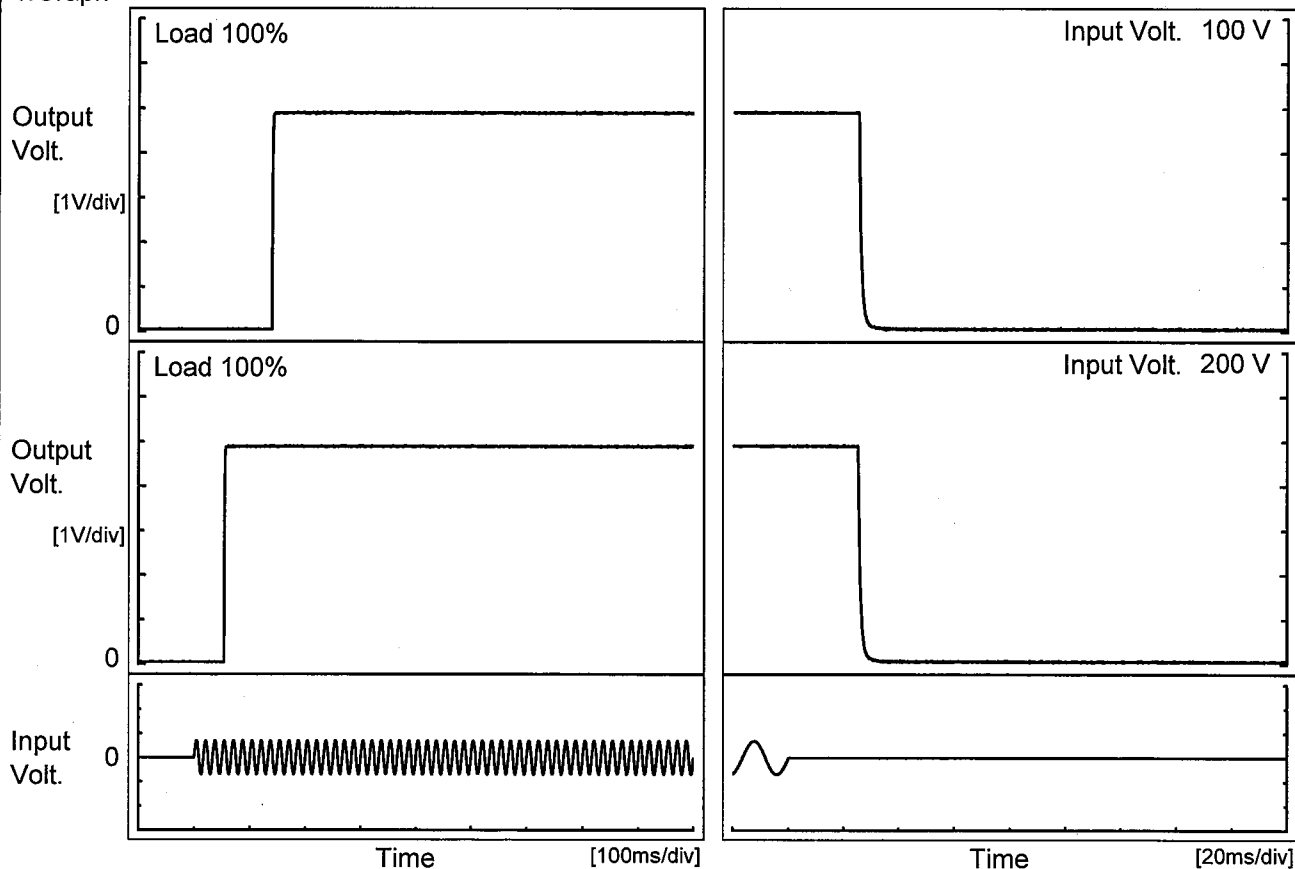
COSEL

Model	SNTUNS100F05																								
Item	Time Lapse Drift	Temperature	25°C																						
Object	+5V20A	Testing Circuitry	Figure A																						
1.Graph		2.Values																							
<div><div><div>5.3</div><div>5.2</div><div>5.1</div><div>5.0</div><div>4.9</div><div>4.8</div><div>4.7</div><div>4.6</div><div>4.5</div><div>4.4</div></div><div></div><div><div>0.0</div><div>2.0</div><div>4.0</div><div>6.0</div><div>8.0</div><div>10.0</div></div><div><div>Time [H]</div><div>Input Volt. 100V</div><div>Load 100%</div></div></div>		<table><tr><th>Time since start [H]</th><th>Output Voltage [V]</th></tr><tr><td>0.0</td><td>5.057</td></tr><tr><td>0.5</td><td>5.061</td></tr><tr><td>1.0</td><td>5.061</td></tr><tr><td>2.0</td><td>5.061</td></tr><tr><td>3.0</td><td>5.061</td></tr><tr><td>4.0</td><td>5.061</td></tr><tr><td>5.0</td><td>5.061</td></tr><tr><td>6.0</td><td>5.061</td></tr><tr><td>7.0</td><td>5.061</td></tr><tr><td>8.0</td><td>5.061</td></tr></table>		Time since start [H]	Output Voltage [V]	0.0	5.057	0.5	5.061	1.0	5.061	2.0	5.061	3.0	5.061	4.0	5.061	5.0	5.061	6.0	5.061	7.0	5.061	8.0	5.061
Time since start [H]	Output Voltage [V]																								
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7.0	5.061																								
8.0	5.061																								
* The characteristic of AC200V is equal.																									

COSEL

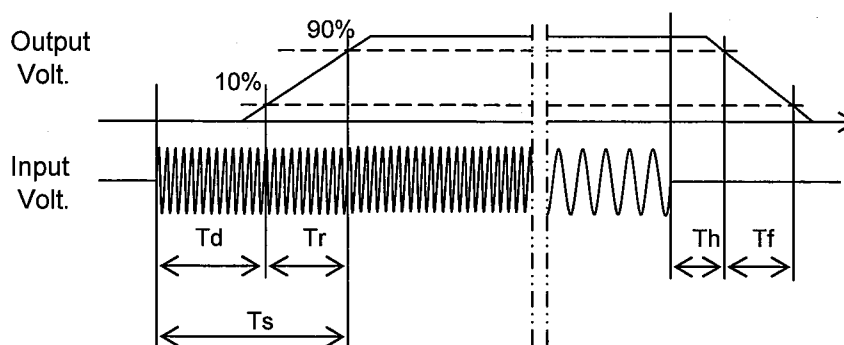
Model	SNTUNS100F05	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+5V20A		

1. Graph



2. Values

Input Volt. \ Time	Td	Tr	Ts	Th	Tf
100 V	140.0	1.5	141.5	25.6	1.8
200 V	54.0	1.5	55.5	25.5	1.9



COSEL

Model		SNTUNS100F05	
Item		Hold-Up Time	
Object		+5V20A	
1.Graph		2.Values	

1000

100

10

1

50

100

150

200

250

300

Hold-Up Time [ms]

Input Voltage [V]

□

Load 50%

—

△

—

Load 100%

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.

Input Voltage [V]	Hold-Up Time [ms]	
	Load 50%	Load 100%
80	51	26
85	51	26
100	51	26
120	51	26
200	51	26
230	51	26
264	51	26
280	52	25
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BC-10701



Model	SNTUNS100F05																																																						
Item	Instantaneous Interruption Compensation																																																						
Object	+5V20A																																																						
1.Graph		2.Values																																																					
<div><div><div>—△—</div><div>Input Volt. 100V</div></div><div><div>---□---</div><div>Input Volt. 200V</div></div><div><div>---○---</div><div>Input Volt. 230V</div></div></div> <div>Instantaneous Compensation Time [ms]</div> <div>Load Current [A]</div>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Time [ms]</th></tr><tr><th>Input Volt. 100[V]</th><th>Input Volt. 200[V]</th><th>Input Volt. 230[V]</th></tr><tr><td>0.0</td><td>-</td><td>-</td><td>-</td></tr><tr><td>2.0</td><td>200</td><td>200</td><td>200</td></tr><tr><td>4.0</td><td>117</td><td>117</td><td>117</td></tr><tr><td>8.0</td><td>63</td><td>62</td><td>62</td></tr><tr><td>12.0</td><td>42</td><td>42</td><td>42</td></tr><tr><td>16.0</td><td>31</td><td>32</td><td>31</td></tr><tr><td>20.0</td><td>24</td><td>25</td><td>24</td></tr><tr><td>22.0</td><td>22</td><td>22</td><td>22</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr></table>			Load Current [A]	Time [ms]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	0.0	-	-	-	2.0	200	200	200	4.0	117	117	117	8.0	63	62	62	12.0	42	42	42	16.0	31	32	31	20.0	24	25	24	22.0	22	22	22	--	-	-	-	--	-	-	-	--	-	-	-
Load Current [A]	Time [ms]																																																						
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2.0	200	200	200																																																				
4.0	117	117	117																																																				
8.0	63	62	62																																																				
12.0	42	42	42																																																				
16.0	31	32	31																																																				
20.0	24	25	24																																																				
22.0	22	22	22																																																				
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Note: Slanted line shows the range of the rated load current.																																																							

Model

SNTUNS100F05

Item

Minimum Input Voltage
for Regulated Output Voltage

Object

+5V20A

1.Graph

---□---

Load 50%

—△—

Load 100%

Input Voltage [V]

100

80

60

40

20

0

-60

-20

20

60

100

Ambient Temperature [°C]

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

2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-30	69	67
-20	68	67
-10	68	67
0	68	67
25	67	67
50	69	70
70	70	72
85	69	70
95	72	73
100	74	75
--	-	-

- 21 -

BC-10701

COSEL

Model	SNTUNS100F05																																														
Item	Overcurrent Protection	Temperature	25°C																																												
Object	+5V20A	Testing Circuitry	Figure A																																												
1.Graph		2.Values																																													
<div><div><div></div>Input Volt. 100V</div><div><div></div>Input Volt. 200V</div></div> <p>Note: Slanted line shows the range of the rated load current.</p>		<table><tr><th rowspan="2">Output Voltage [V]</th><th colspan="2">Load Current [A]</th></tr><tr><th>Input Volt. 100[V]</th><th>Input Volt. 200[V]</th></tr><tr><td>5.00</td><td>20.78</td><td>20.70</td></tr><tr><td>4.75</td><td>24.20</td><td>24.20</td></tr><tr><td>4.50</td><td>24.55</td><td>24.54</td></tr><tr><td>4.00</td><td>25.38</td><td>25.36</td></tr><tr><td>3.50</td><td>26.20</td><td>26.18</td></tr><tr><td>3.00</td><td>27.12</td><td>27.11</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></table>		Output Voltage [V]	Load Current [A]		Input Volt. 100[V]	Input Volt. 200[V]	5.00	20.78	20.70	4.75	24.20	24.20	4.50	24.55	24.54	4.00	25.38	25.36	3.50	26.20	26.18	3.00	27.12	27.11	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-
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<div><div><div>—△—</div><div>Input Volt. 100V</div></div><div><div>---□---</div><div>Input Volt. 200V</div></div></div> <p>Operating Point [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 0%</p> <p>Note: Slanted line shows the range of the rated ambient temperature.</p>																																								
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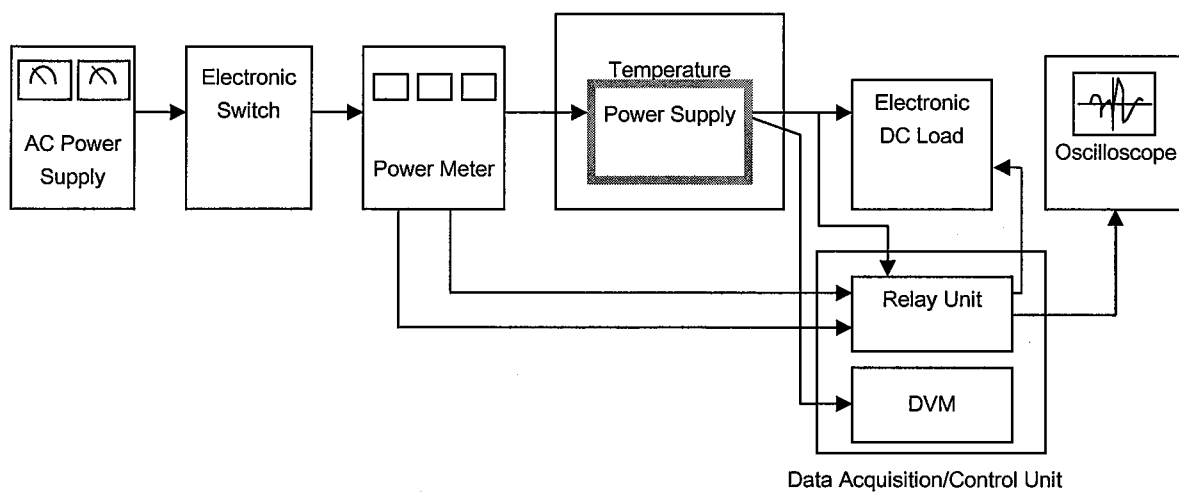


Figure A

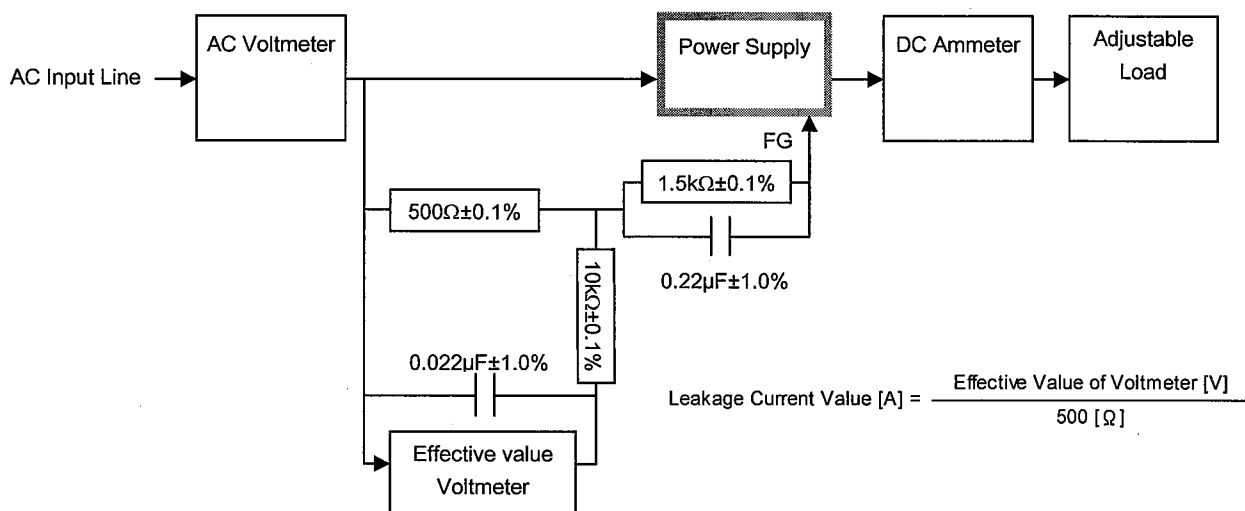


Figure B (IEC60950-1)

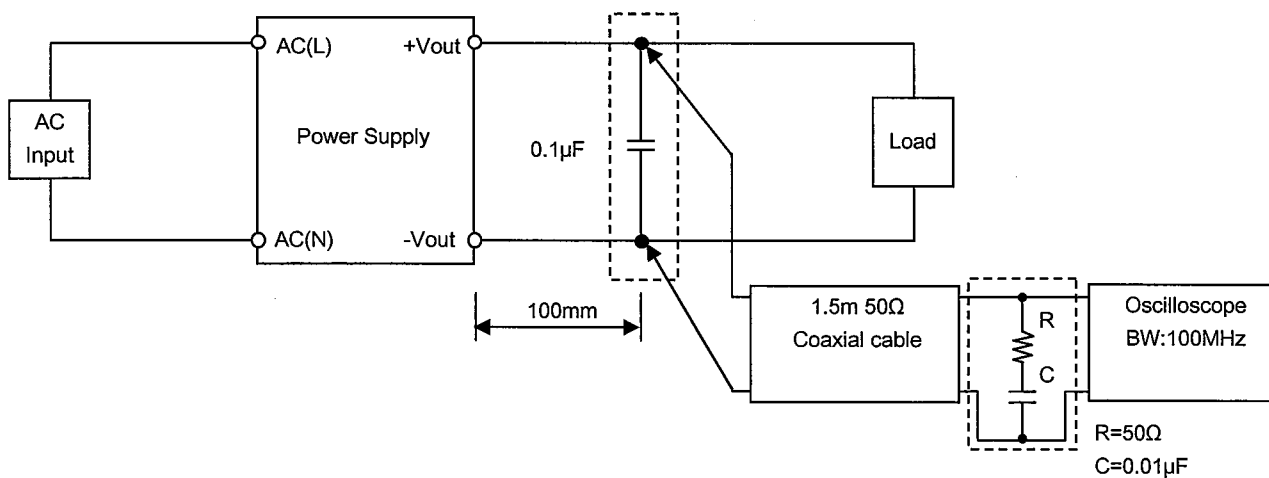


Figure C