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参考資料

TEST DATA OF TUNS100F24

Regulated DC Power Supply
April 11, 2012

Approved by : Takayuki Fukuda
Takayuki Fukuda — Design Manager

Prepared by : Yuichiro Ohashi
Yuichiro Ohashi — Design Engineer

COSEL CO.,LTD.

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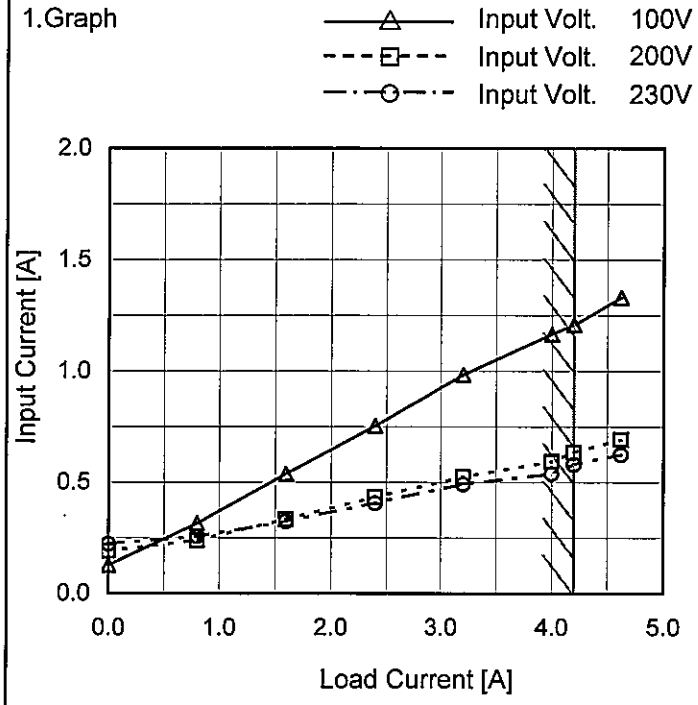

Note: Slanted line shows the range of the rated load current.

2.Values

Load Current [A]	Input Current [A]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.0	0.127	0.191	0.223
0.8	0.317	0.239	0.256
1.6	0.539	0.333	0.323
2.4	0.754	0.432	0.406
3.2	0.984	0.524	0.491
4.0	1.166	0.593	0.539
4.2	1.208	0.635	0.581
4.6	1.331	0.693	0.625
--	-	-	-
--	-	-	-
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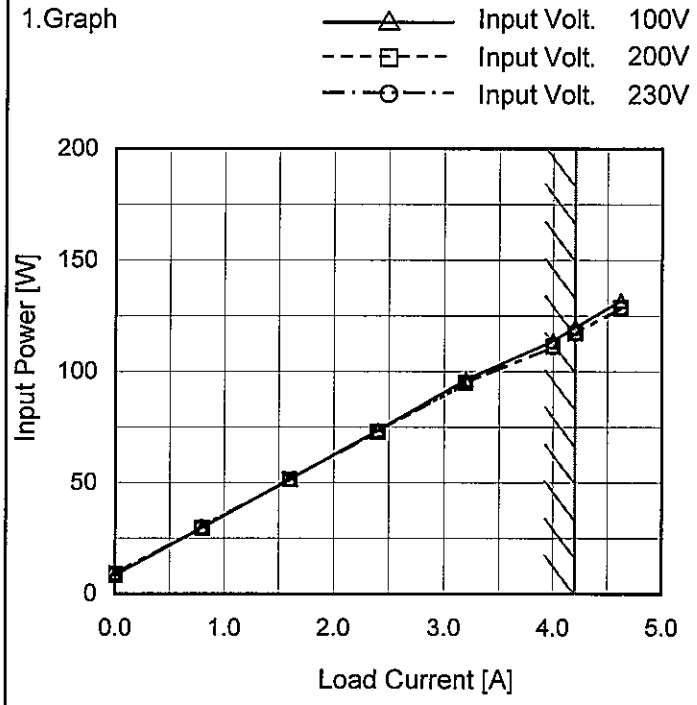
Model	TUNS100F24
Item	Input Power (by Load Current)
Object	———————

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	8.5	9.0	8.9
0.8	29.7	29.7	30.1
1.6	51.6	51.5	51.4
2.4	73.6	72.9	73.0
3.2	96.4	94.8	94.8
4.0	113.8	111.2	111.1
4.2	119.8	117.2	117.1
4.6	131.8	128.6	128.4
--	-	-	-
--	-	-	-
--	-	-	-

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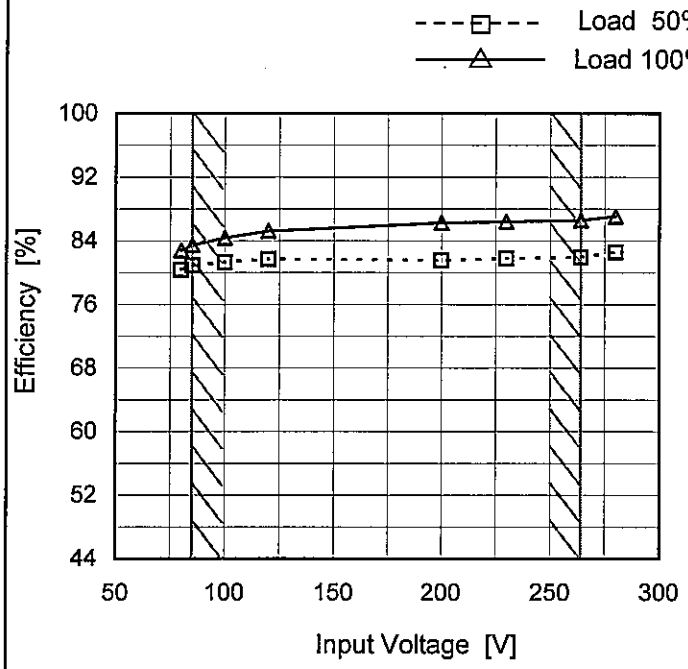
Model	TUNS100F24
Item	Efficiency (by Input Voltage)
Object	———————————

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	80.4	82.8
85	80.9	83.4
100	81.3	84.4
120	81.7	85.2
200	81.5	86.3
230	81.8	86.4
264	81.9	86.6
280	82.6	87.1
--	-	-

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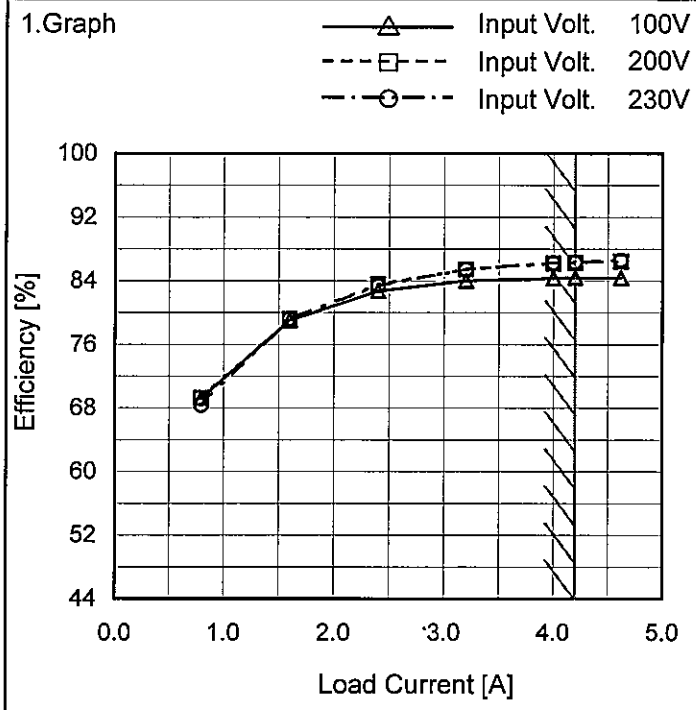
Model	TUNS100F24
Item	Efficiency (by Load Current)
Object	———————

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	-	-	-
0.8	69.3	69.3	68.4
1.6	79.0	79.1	79.2
2.4	82.7	83.5	83.4
3.2	84.0	85.4	85.4
4.0	84.3	86.2	86.3
4.2	84.4	86.3	86.4
4.6	84.4	86.5	86.6
--	-	-	-
--	-	-	-
--	-	-	-

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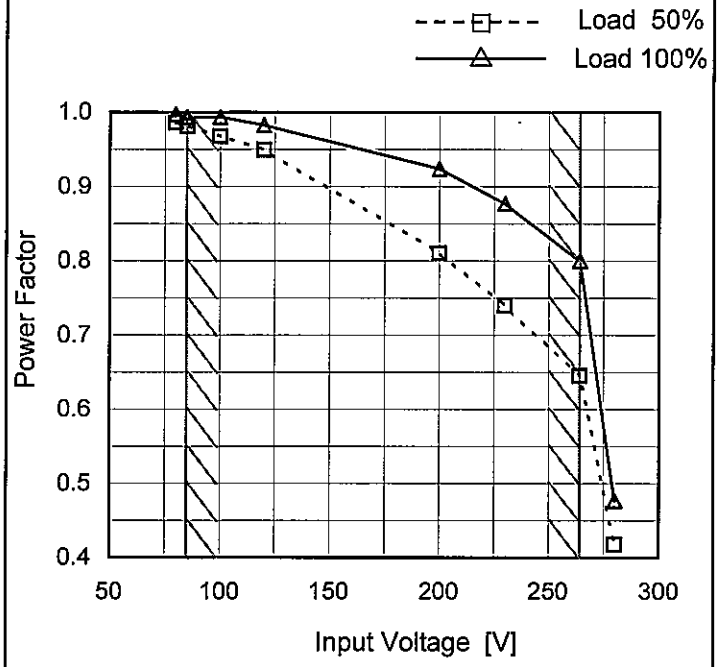
Model	TUNS100F24
Item	Power Factor (by Input Voltage)
Object	――――――――

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	0.986	0.998
85	0.981	0.993
100	0.967	0.993
120	0.950	0.983
200	0.810	0.924
230	0.740	0.877
264	0.645	0.800
280	0.418	0.477
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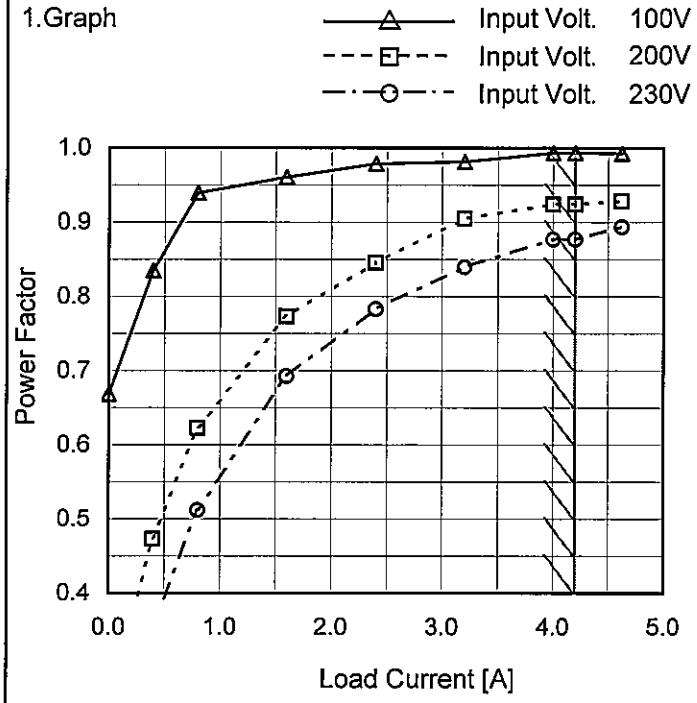
Model	TUNS100F24
Item	Power Factor (by Load Current)
Object	————————

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	0.669	0.236	0.174
0.4	0.835	0.473	0.352
0.8	0.940	0.623	0.512
1.6	0.961	0.773	0.693
2.4	0.979	0.846	0.783
3.2	0.982	0.905	0.840
4.0	0.993	0.924	0.877
4.2	0.993	0.924	0.877
4.6	0.992	0.929	0.894
--	-	-	-
--	-	-	-

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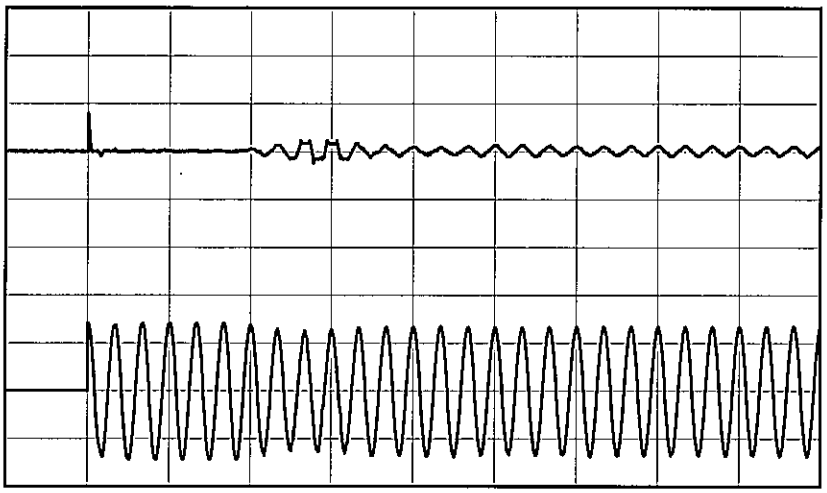
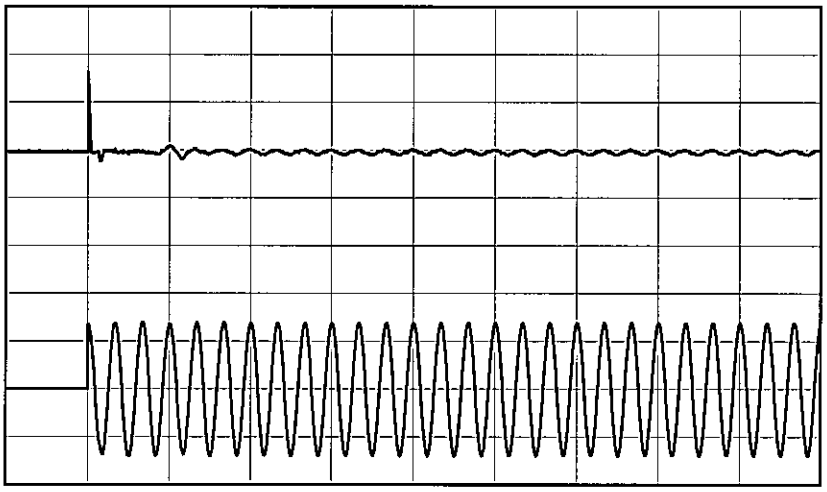
Model	TUNS100F24		
Item	Inrush Current	Temperature	25°C
		Testing Circuitry	Figure A
Object	———————		



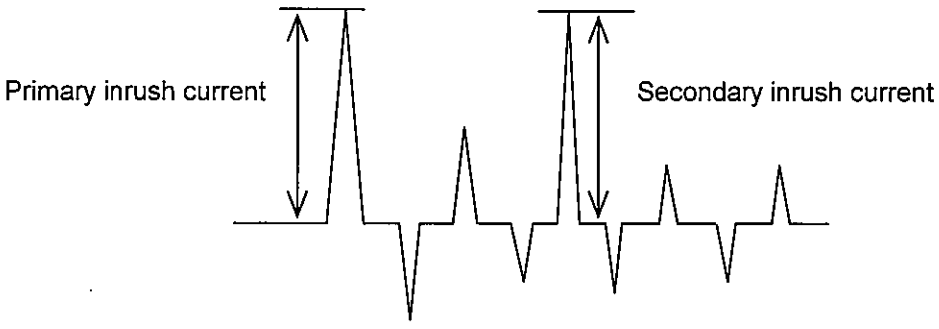
Input Voltage 100 V
Frequency 60 Hz
Load 100 %

Primary inrush current :
15.8 A
Secondary inrush current :
5.0 A



Input Voltage 200 V
Frequency 60 Hz
Load 100 %

Primary inrush current :
33.1 A
Secondary inrush current :
3.3 A



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Model	TUNS100F24	
Item	Leakage Current	Temperature 25°C Testing Circuitry Figure B
Object	———————————	

1.Results

[mA]

Standards		Input Volt.			Note
		100 [V]	200 [V]	264[V]	
IEC60950-1	Both phases	0.17	0.37	0.49	Operation
	One of phase	0.22	0.48	0.65	stand by

The value for "One phase" 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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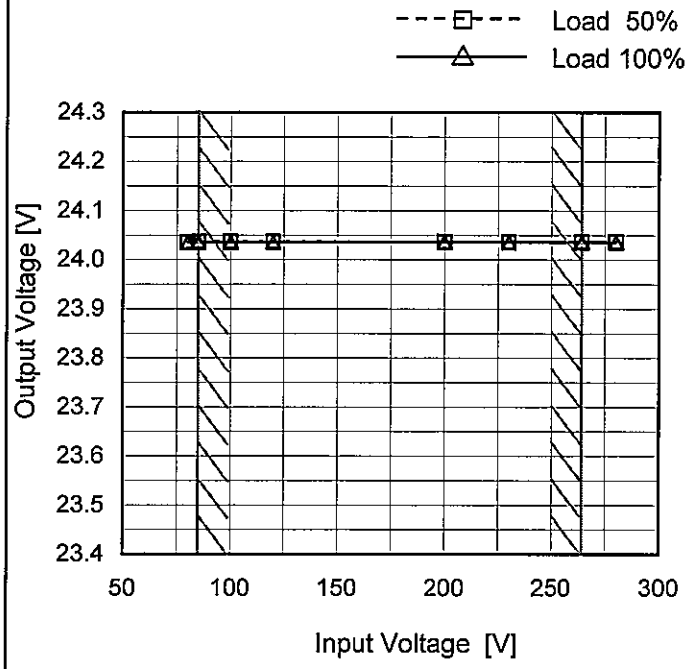
Model	TUNS100F24
Item	Line Regulation
Object	+24V4.2A

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	24.036	24.035
85	24.037	24.036
100	24.037	24.036
120	24.037	24.036
200	24.036	24.036
230	24.037	24.036
264	24.037	24.036
280	24.037	24.036
--	-	-

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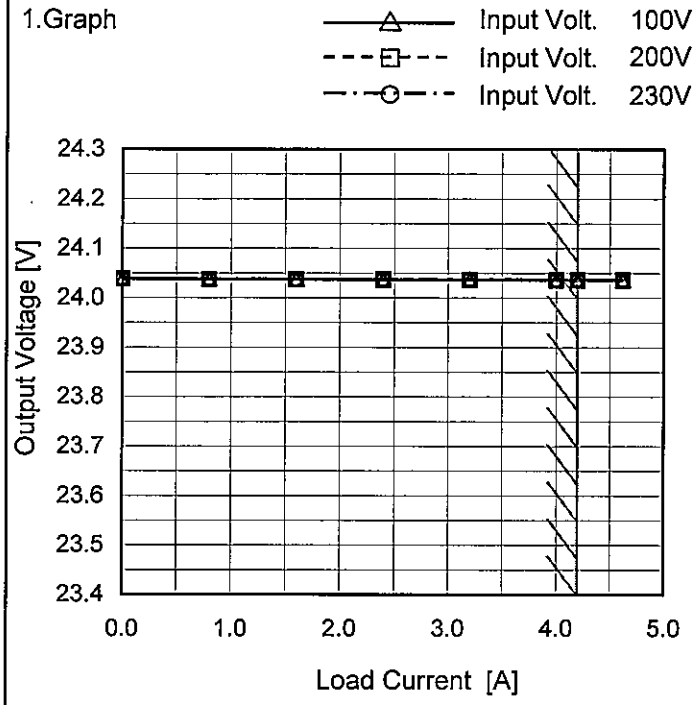
Model	TUNS100F24
Item	Load Regulation
Object	+24V4.2A

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	24.039	24.039	24.039
0.8	24.038	24.038	24.038
1.6	24.037	24.037	24.038
2.4	24.037	24.037	24.037
3.2	24.037	24.037	24.037
4.0	24.036	24.036	24.037
4.2	24.036	24.036	24.037
4.6	24.036	24.036	24.036
--	-	-	-
--	-	-	-
--	-	-	-

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Model	TUNS100F24
Item	Dynamic Load Response
Object	+24V4.2A

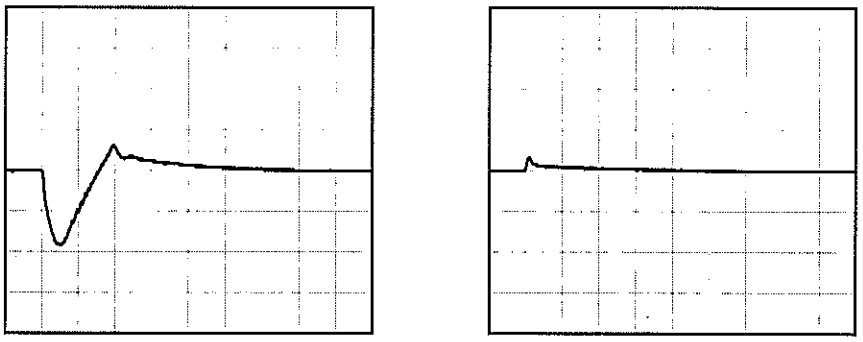
Temperature 25°C
Testing Circuitry Figure A

Input Volt. 100 V
Cycle 1000 ms

Load Current

4.2 A/50us

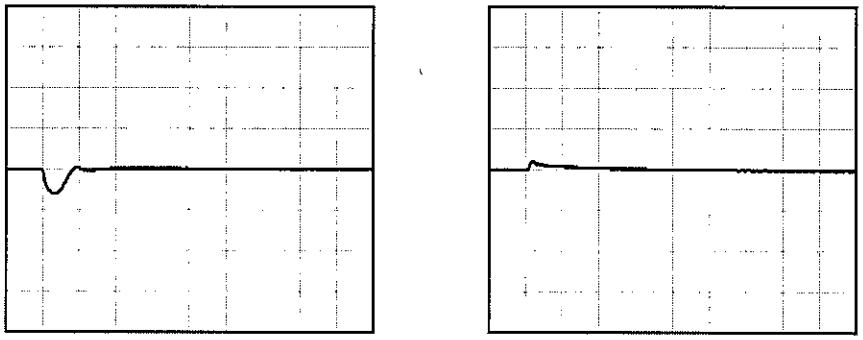
Min. Load (0A) ⟷
Load 100% (4.2A)



500 mV/div

200 µs/div 200 µs/div

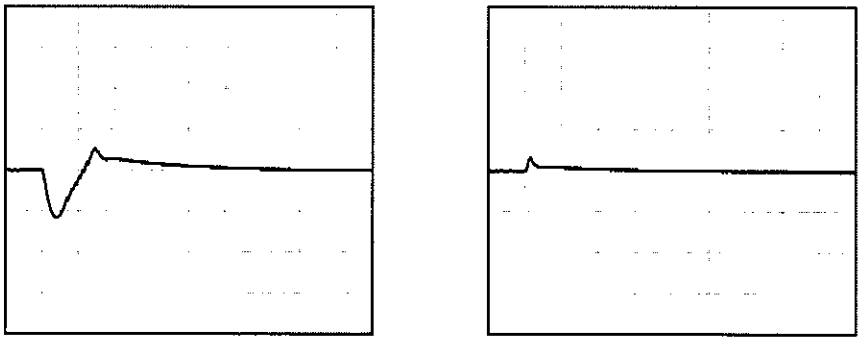
Min. Load (0A) ⟷
Load 50% (2.1A)



500 mV/div

200 µs/div 200 µs/div

Load 10% (0.42A) ⟷
Load 100% (4.2A)



500 mV/div

200 µs/div 200 µs/div

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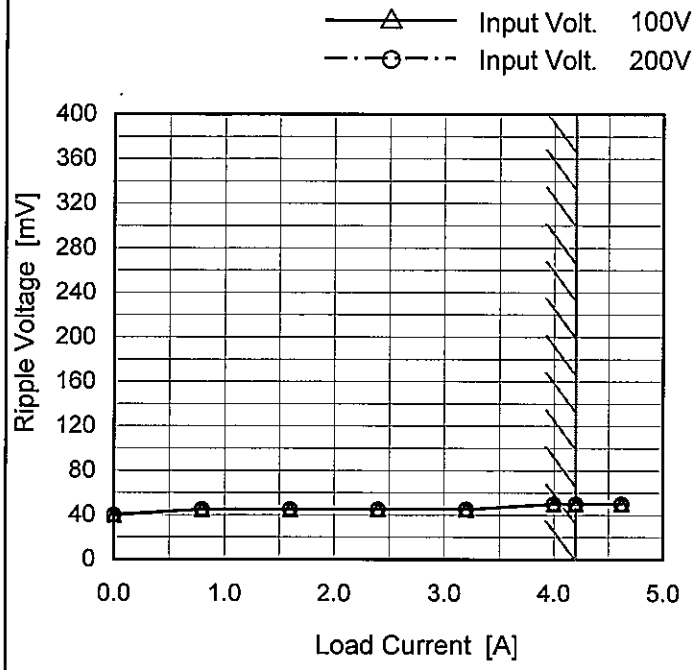
Model	TUNS100F24
Item	Ripple Voltage (by Load Current)
Object	+24V4.2A

Temperature 25°C
Testing Circuitry Figure C

1.Graph



Measured by 100 MHz Oscilloscope.
Ripple Voltage 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 Voltage [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
0.0	40	40
0.8	45	45
1.6	45	45
2.4	45	45
3.2	45	45
4.0	50	50
4.2	50	50
4.6	50	50
--	-	-
--	-	-
--	-	-

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

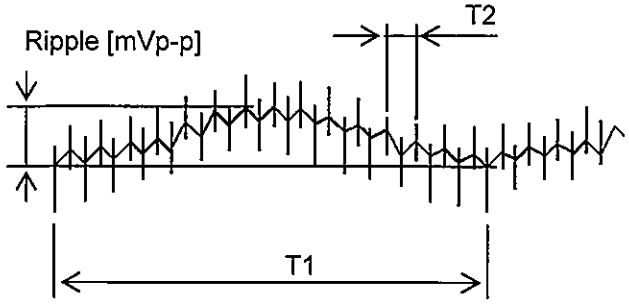


Fig. Complex Ripple Wave Form

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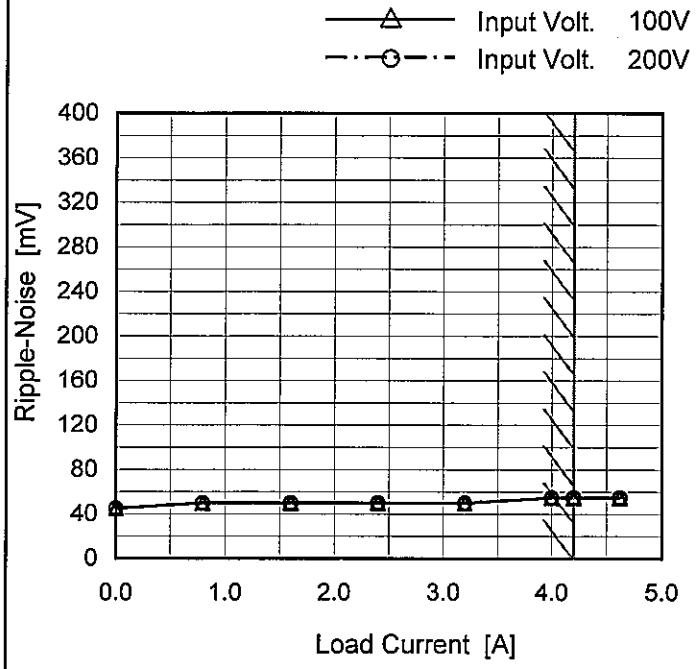
Model	TUNS100F24
Item	Ripple-Noise
Object	+24V4.2A

Temperature 25°C
Testing Circuitry Figure C

1.Graph



Measured by 100 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. 100 [V]	Ripple-Noise [mV] Input Volt. 200 [V]
0.0	45	45
0.8	50	50
1.6	50	50
2.4	50	50
3.2	50	50
4.0	55	55
4.2	55	55
4.6	55	55
--	-	-
--	-	-
--	-	-

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

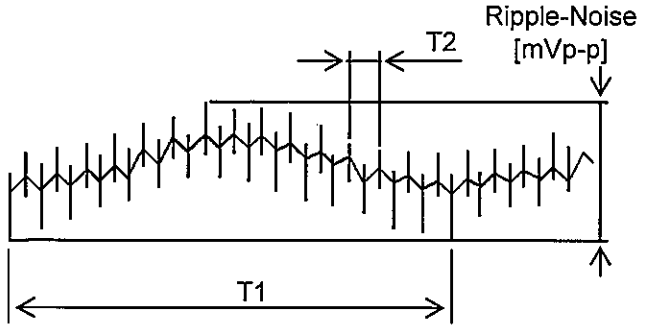


Fig. Complex Ripple Wave Form

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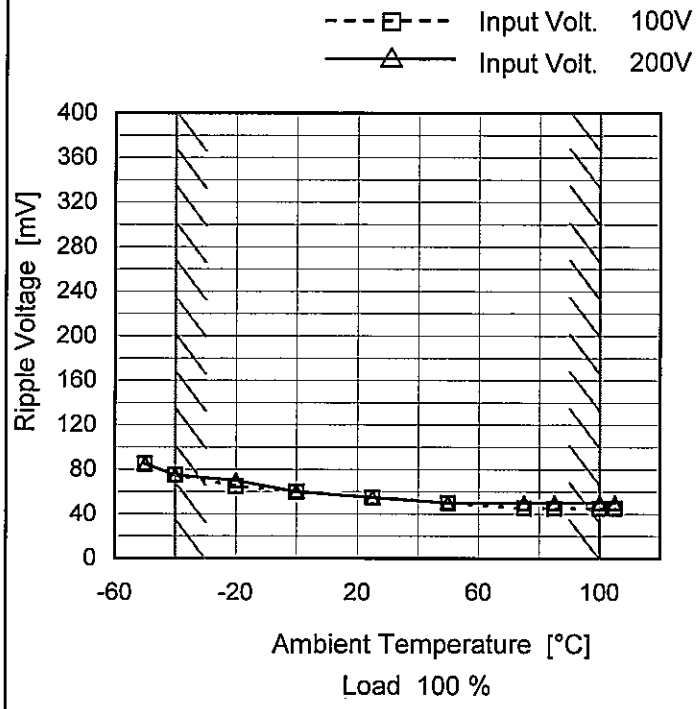
Model	TUNS100F24
Item	Ripple Voltage (by Ambient Temp.)
Object	+24V4.2A

Testing Circuitry Figure C

1.Graph



Measured by 100 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. 200 [V]
-50	85	85
-40	75	75
-20	65	70
0	60	60
25	55	55
50	50	50
75	45	50
85	45	50
100	45	50
105	45	50
--	-	-

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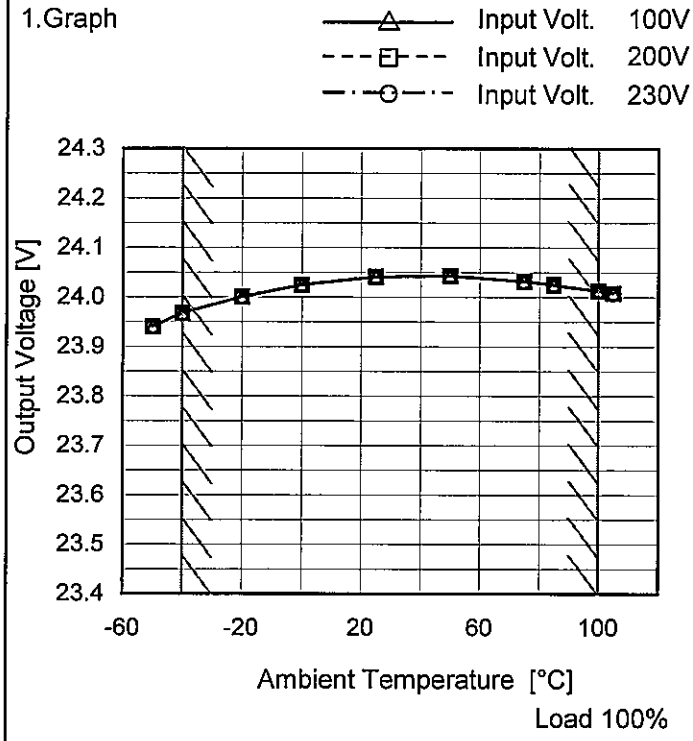
Model	TUNS100F24
Item	Ambient Temperature Drift
Object	+24V4.2A

Testing Circuitry Figure C

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]
-50	23.941	23.940	23.941
-40	23.968	23.968	23.967
-20	24.001	24.001	24.001
0	24.025	24.024	24.024
25	24.041	24.041	24.041
50	24.043	24.043	24.043
75	24.032	24.032	24.032
85	24.025	24.025	24.024
100	24.013	24.013	24.012
105	24.008	24.008	24.007
--	-	-	-

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Model	TUNS100F24	
Item	Output Voltage Accuracy	Testing Circuitry Figure A
Object	+24V4.2A	

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 : -40 - 100°C
Input Voltage : 85 - 264V
Load Current : 0 - 4.2A

* 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	50	85	0	24.047	±42	±0.2
Minimum Voltage	-40	264	0	23.964		

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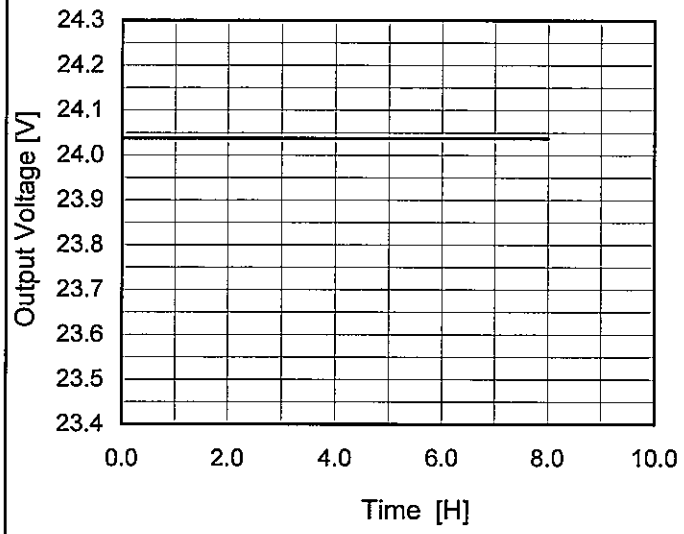
Model	TUNS100F24
Item	Time Lapse Drift
Object	+24V4.2A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Input Volt. 100V
Load 100%

* The characteristic of AC200V is equal.

2.Values

Time since start [H]	Output Voltage [V]
0.0	24.034
0.5	24.038
1.0	24.038
2.0	24.038
3.0	24.038
4.0	24.038
5.0	24.038
6.0	24.038
7.0	24.038
8.0	24.038

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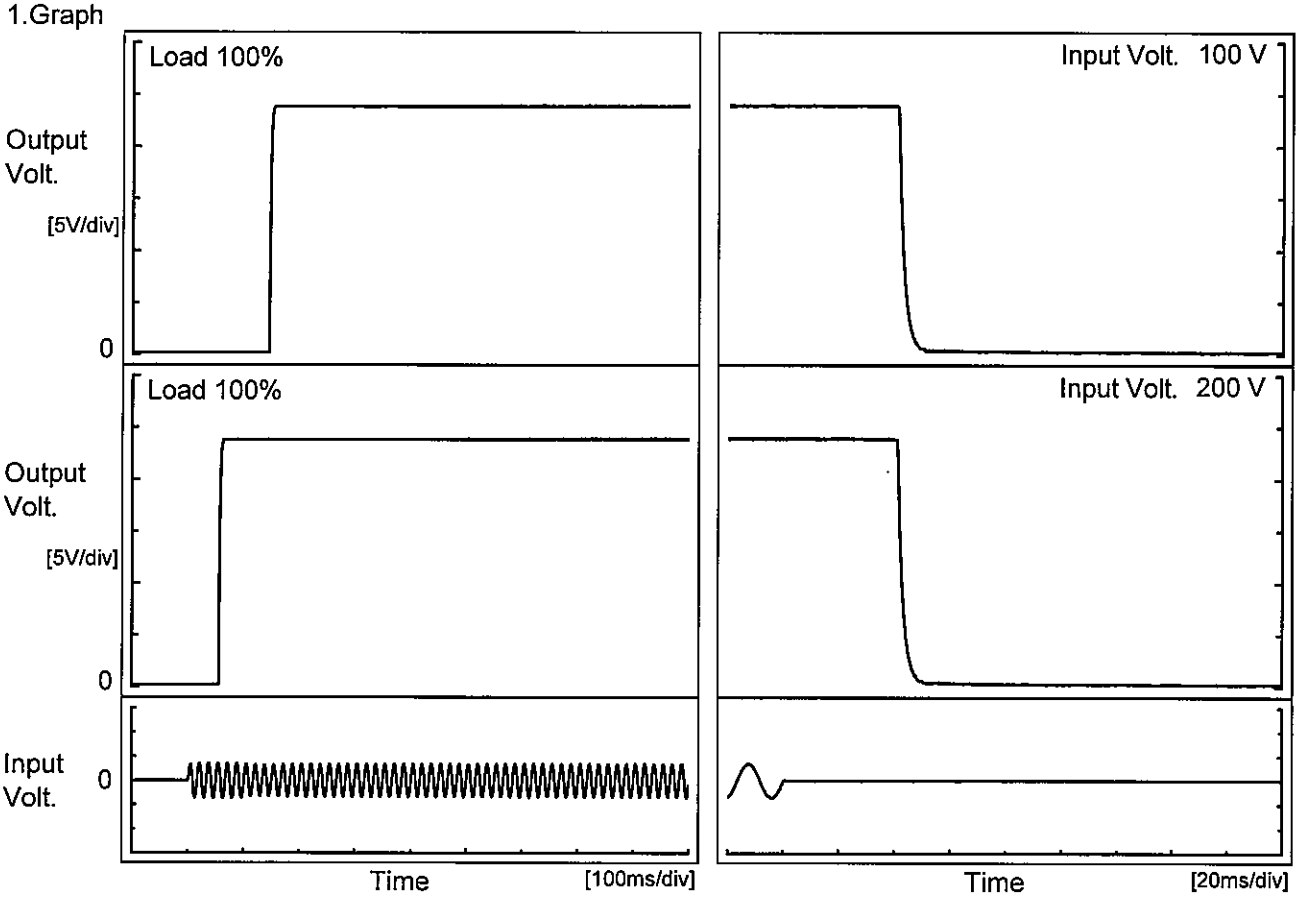
Model	TUNS100F24	
Item	Rise and Fall Time	Temperature 25°C Testing Circuitry Figure A
Object	+24V4.2A	

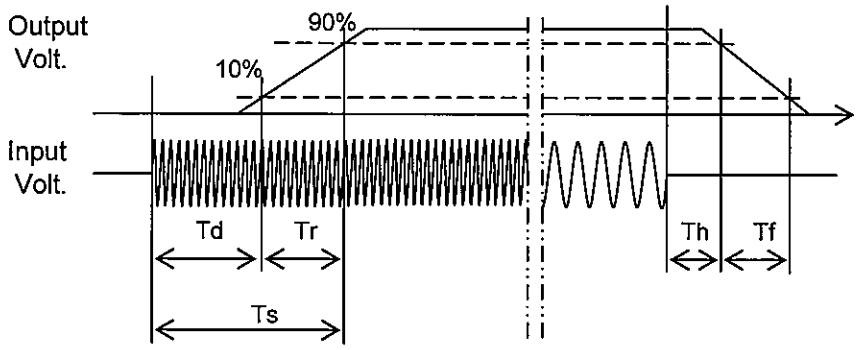
1.Graph



2.Values

[ms]

Input Volt. \ Time	Td	Tr	Ts	Th	Tf
100 V	145.5	2.0	147.5	41.3	4.2
200 V	56.0	2.0	58.0	41.3	4.1



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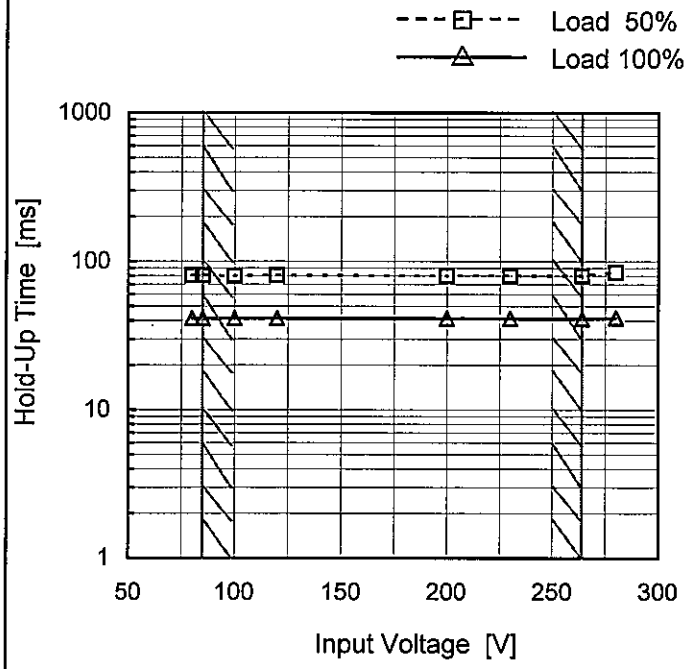
Model	TUNS100F24
Item	Hold-Up Time
Object	+24V4.2A

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	80	41
85	80	41
100	80	41
120	80	41
200	80	41
230	80	41
264	80	41
280	85	42
--	-	-

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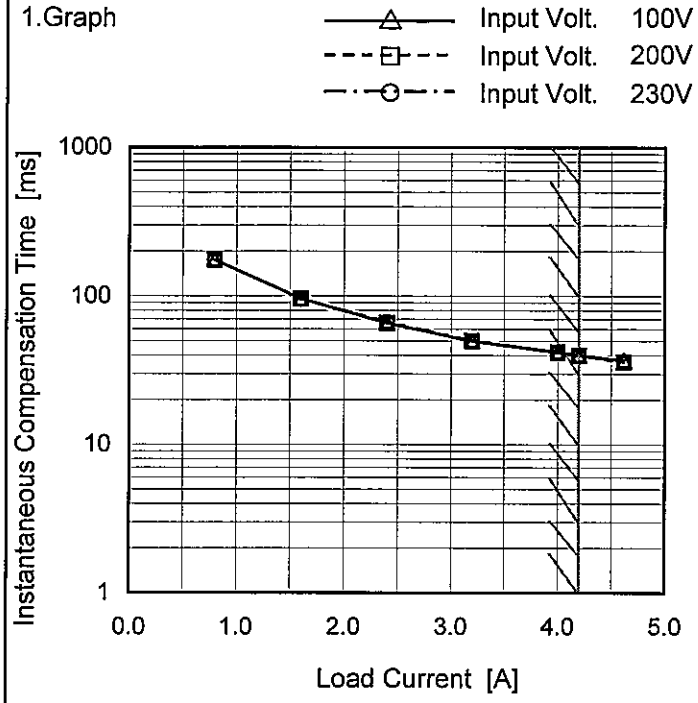
Model	TUNS100F24
Item	Instantaneous Interruption Compensation
Object	+24V4.2A

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	-	-	-
0.8	175	175	175
1.6	96	96	95
2.4	66	66	67
3.2	50	50	50
4.0	42	42	42
4.2	40	40	40
4.6	37	36	36
--	-	-	-
--	-	-	-
--	-	-	-

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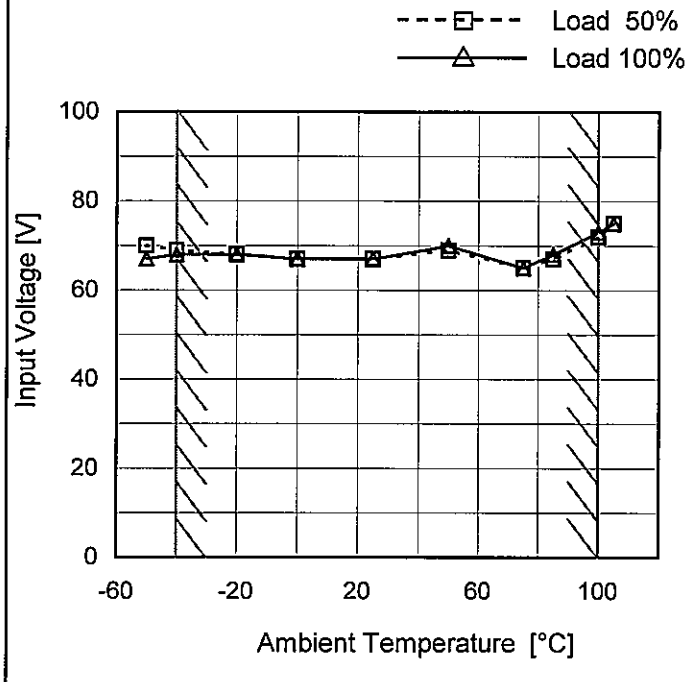
Model	TUNS100F24
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+24V4.2A

Testing Circuitry Figure A

1.Graph



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

2.Values

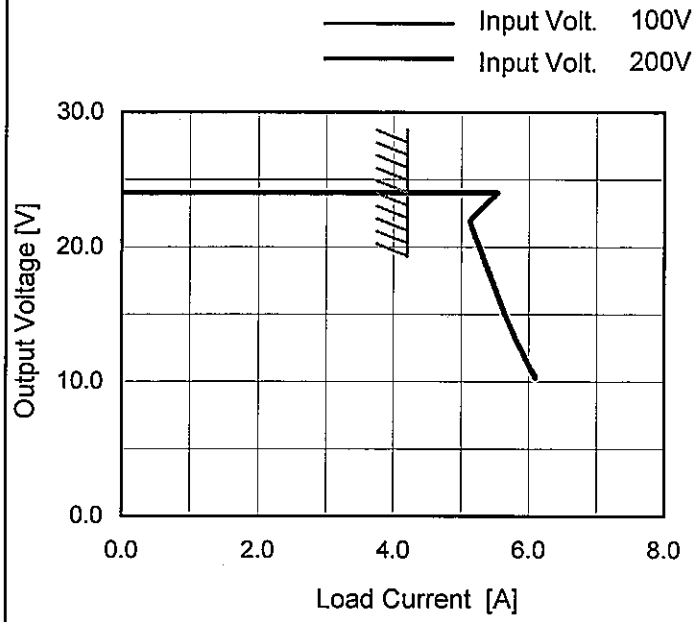
Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-50	70	67
-40	69	68
-20	68	68
0	67	67
25	67	67
50	69	70
75	65	65
85	67	68
100	72	73
105	75	75
--	-	-

COSEL

Model	TUNS100F24
Item	Overcurrent Protection
Object	+24V4.2A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

2.Values

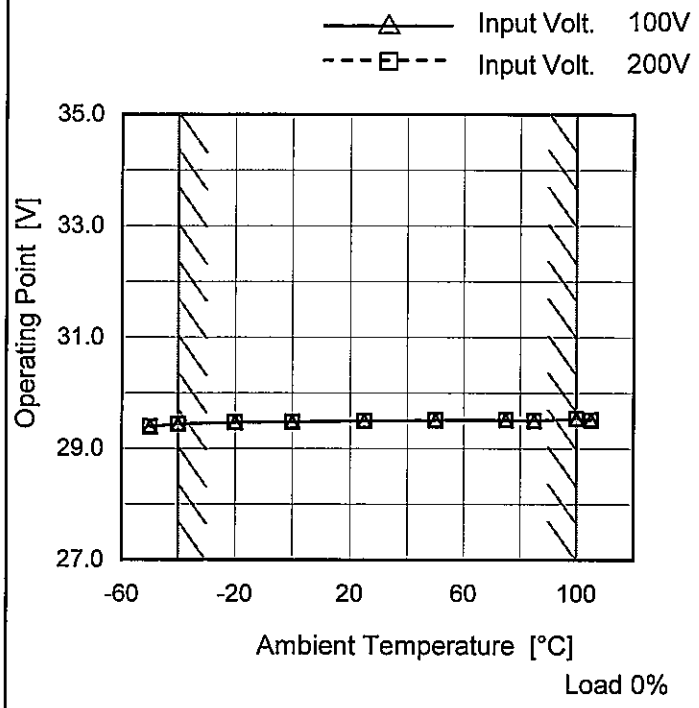
Output Voltage [V]	Load Current [A]	
	Input Volt. 100[V]	Input Volt. 200[V]
24.00	5.53	5.53
22.80	5.12	5.13
21.60	5.14	5.15
19.20	5.32	5.33
16.80	5.51	5.51
14.40	5.70	5.70
12.00	5.93	5.92
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	TUNS100F24
Item	Overvoltage Protection
Object	+24V4.2A

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. 200[V]
-50	29.40	29.40
-40	29.44	29.44
-20	29.47	29.47
0	29.48	29.48
25	29.50	29.50
50	29.51	29.51
75	29.52	29.52
85	29.50	29.50
100	29.54	29.54
105	29.52	29.52
--	-	-

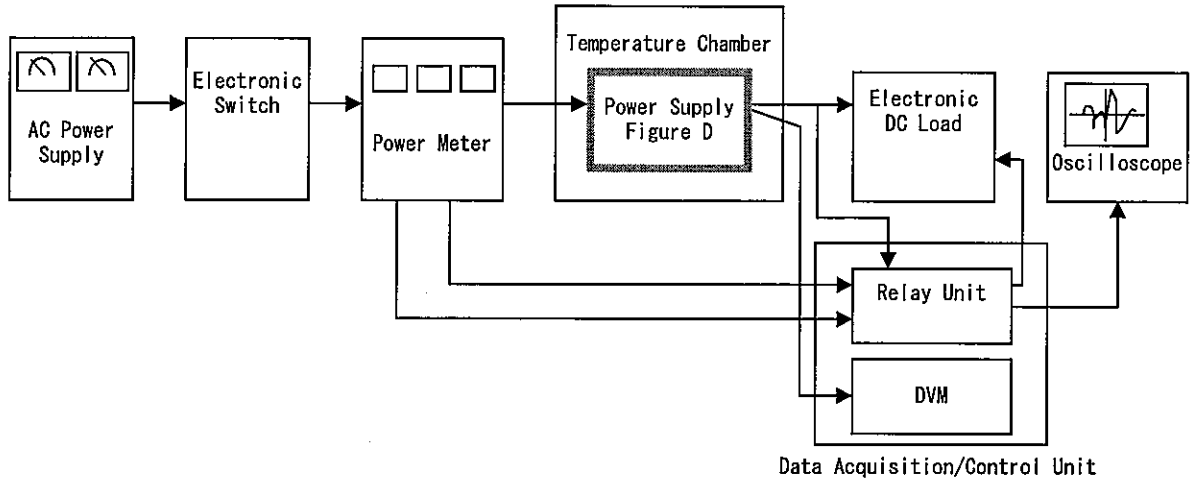


Figure A

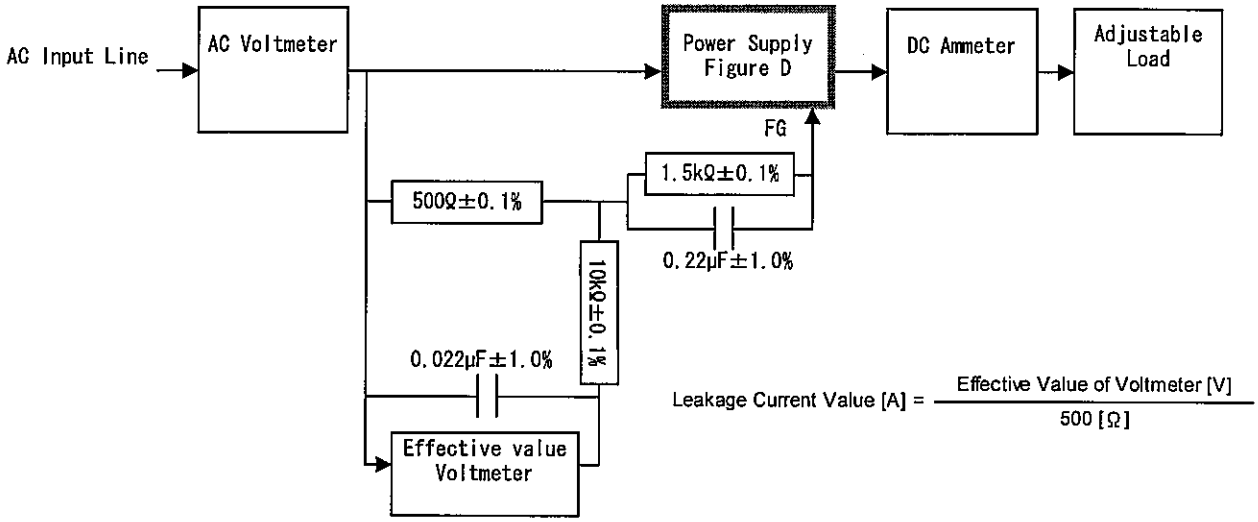
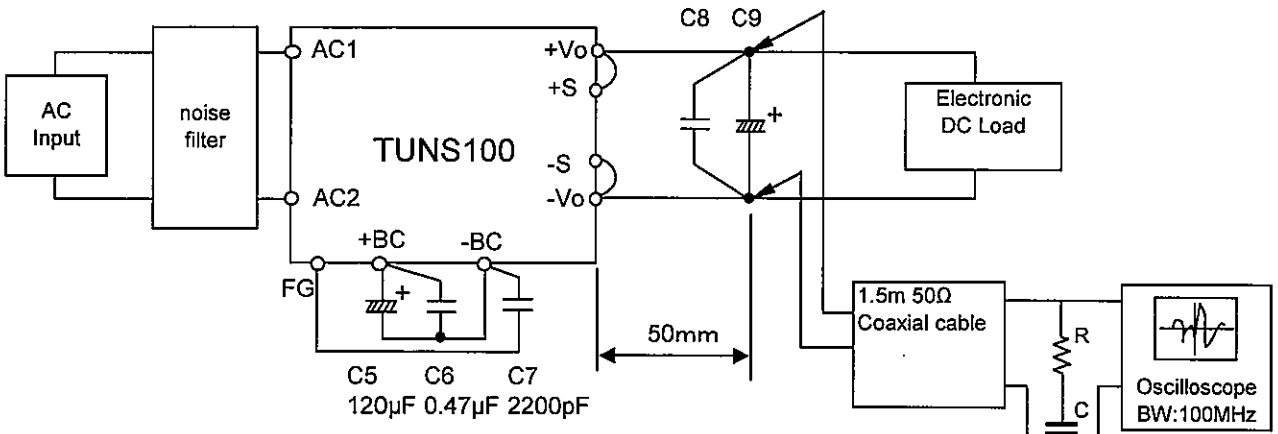


Figure B (IEC60950-1)

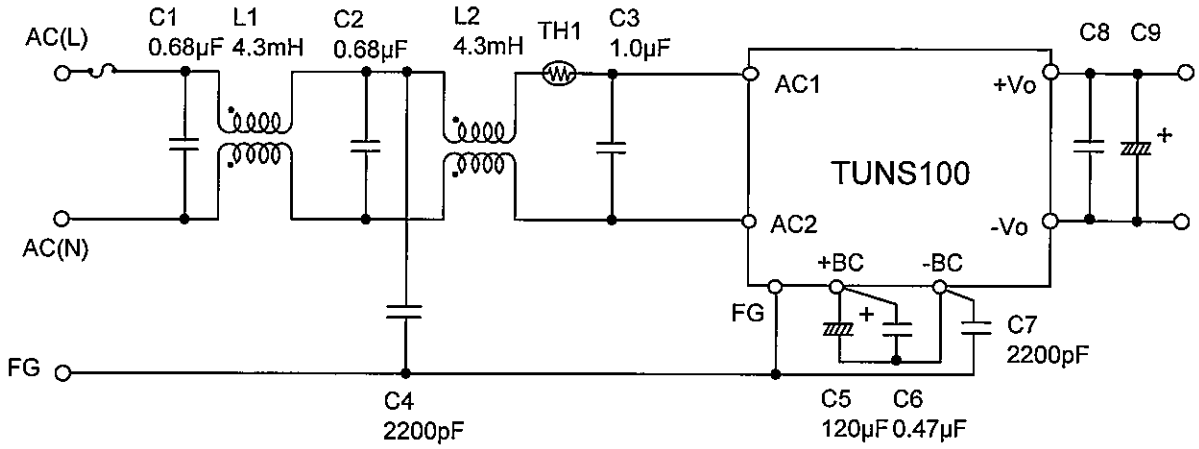


C8 : TUNS100F05 10μF
TUNS100F12 10μF
TUNS100F24 4.7μF

C9 : TUNS100F05 2200μF (0≦Tc≦100)
2200μF×3 (-40≦Tc<0)
TUNS100F12 470μF (0≦Tc≦100)
470μF×3 (-40≦Tc<0)
TUNS100F24 220μF (0≦Tc≦100)
220μF×3 (-40≦Tc<0)

Tc : Base Plate Temp.

Figure C



L1,L2 : SSB11V-R17043(NEC TOKIN)

TH1 : 8D2-11(SEMITEC)

C8 : TUNS100F05 10μF

TUNS100F12 10μF

TUNS100F24 4.7μF

C9 : TUNS100F05 2200μF (0≦Tc≦100)

2200μF×3 (-40≦Tc<0)

TUNS100F12 470μF (0≦Tc≦100)

470μF×3 (-40≦Tc<0)

TUNS100F24 220μF (0≦Tc≦100)

220μF×3 (-40≦Tc<0)

Tc : Base Plate Temp.

Figure D