COSEL

参考資料

TEST DATA OF TUNS700F48

Regulated DC Power Supply
May 28, 2015

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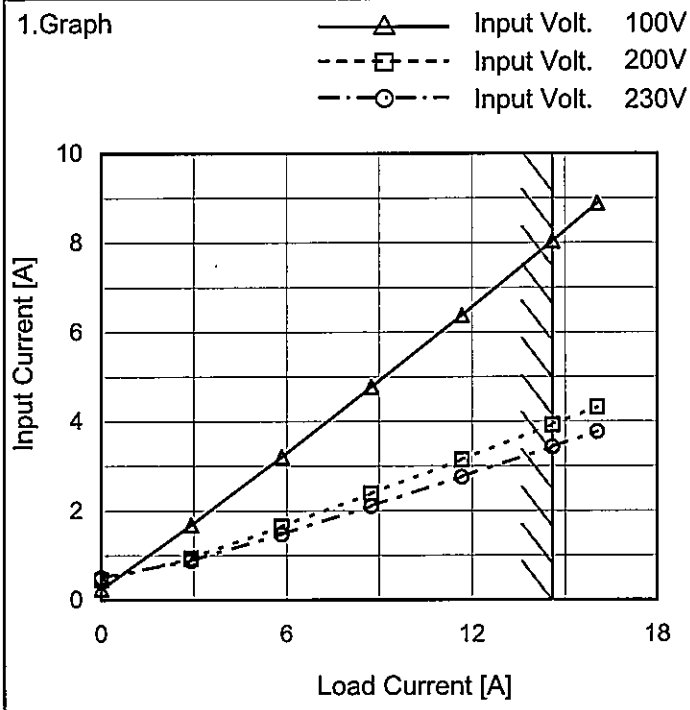
Model	TUNS700F48
Item	Input Current (by Load Current)
Object	———————

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. 200[V]	Input Volt. 230[V]
0.0	0.242	0.442	0.504
2.9	1.684	0.936	0.882
5.8	3.205	1.644	1.472
8.8	4.780	2.384	2.104
11.7	6.380	3.142	2.758
14.6	8.040	3.920	3.426
16.1	8.890	4.320	3.768
---	-	-	-
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---	-	-	-
---	-	-	-

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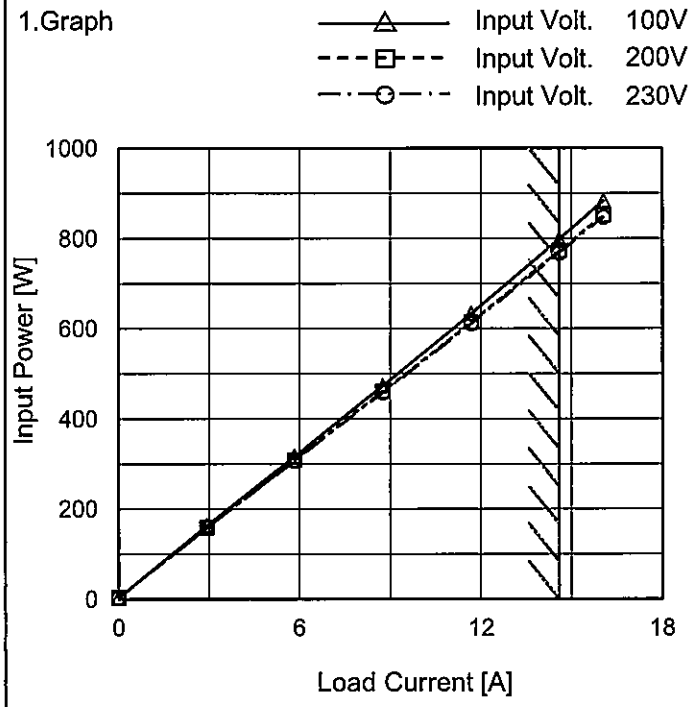
Model	TUNS700F48
Item	Input Power (by Load Current)
Object	————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

2.Values

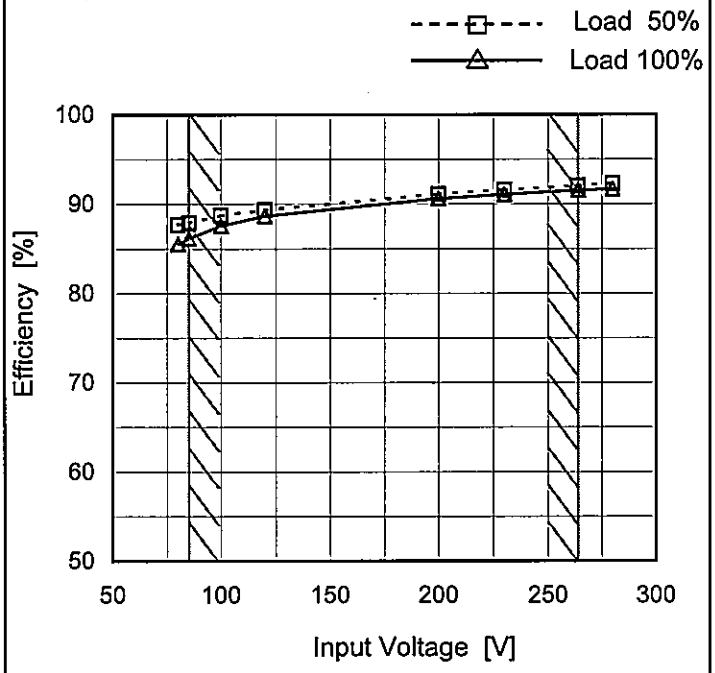
Load Current [A]	Input Power [W]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.0	3.4	3.3	3.3
2.9	163.2	158.0	158.0
5.8	316.5	308.0	307.0
8.8	473.0	461.0	458.0
11.7	633.0	614.0	611.0
14.6	798.0	772.0	767.0
16.1	883.0	851.0	847.0
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	TUNS700F48
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	87.7	85.5
85	87.9	86.2
100	88.7	87.6
120	89.3	88.7
200	91.1	90.6
230	91.6	91.1
264	92.0	91.6
280	92.3	91.7
--	-	-

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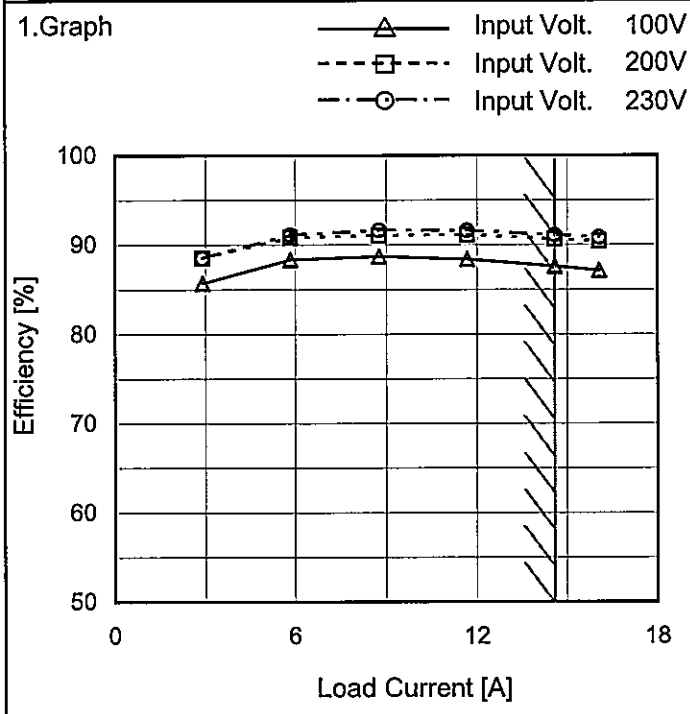
Model	TUNS700F48
Item	Efficiency (by Load Current)
Object	————————

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	-	-	-
2.9	85.7	88.5	88.5
5.8	88.4	90.8	91.1
8.8	88.7	91.0	91.6
11.7	88.4	91.1	91.6
14.6	87.6	90.6	91.1
16.1	87.1	90.4	90.8
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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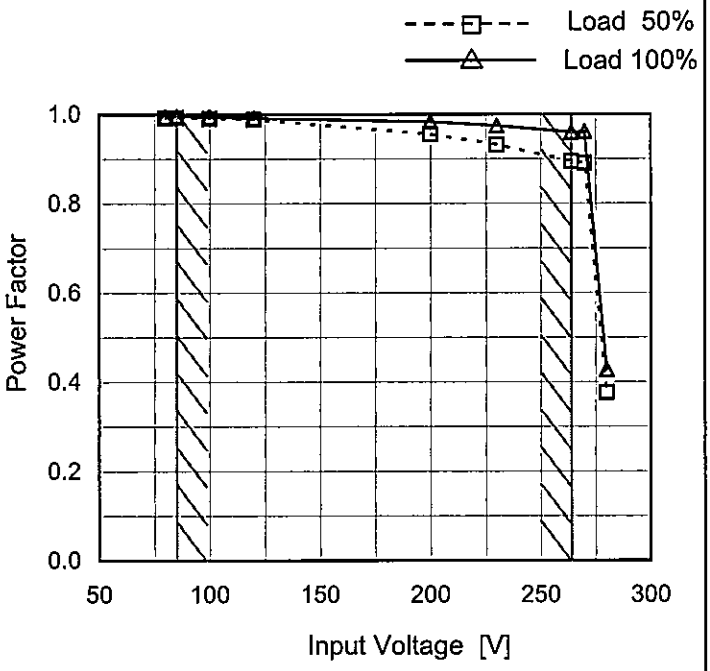
Model	TUNS700F48
Item	Power Factor (by Input Voltage)
Object	———————

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	0.993	0.995
85	0.993	0.996
100	0.990	0.995
120	0.988	0.992
200	0.955	0.983
230	0.932	0.975
264	0.894	0.960
270	0.891	0.961
280	0.376	0.428

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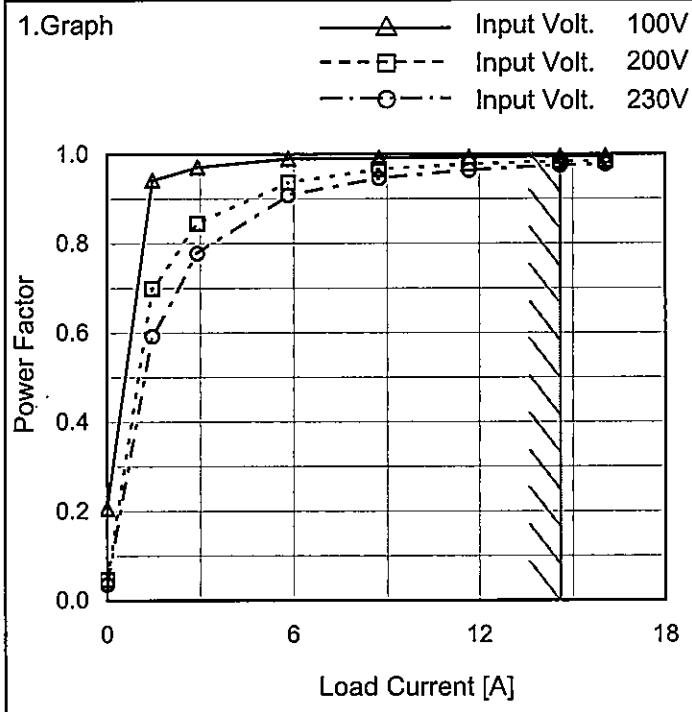
Model	TUNS700F48
Item	Power Factor (by Load Current)
Object	———————

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	0.206	0.047	0.036
1.5	0.942	0.699	0.592
2.9	0.971	0.845	0.778
5.8	0.990	0.936	0.908
8.8	0.992	0.966	0.946
11.7	0.994	0.978	0.964
14.6	0.995	0.983	0.975
16.1	0.995	0.985	0.978
--	-	-	-
--	-	-	-
--	-	-	-

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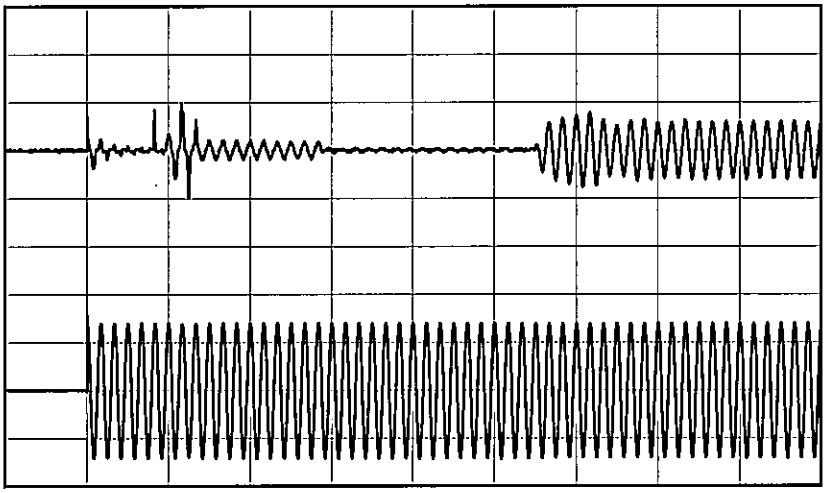
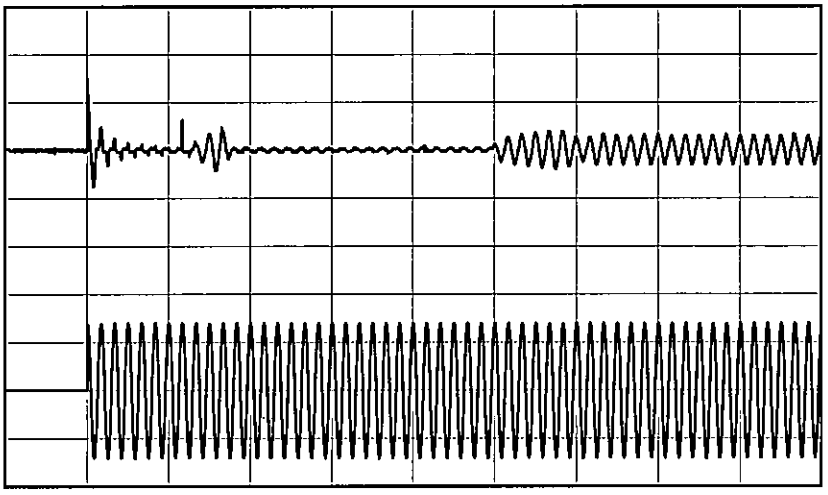
Model	TUNS700F48		
Item	Inrush Current	Temperature	25°C
Object	————————	Testing Circuitry	Figure A



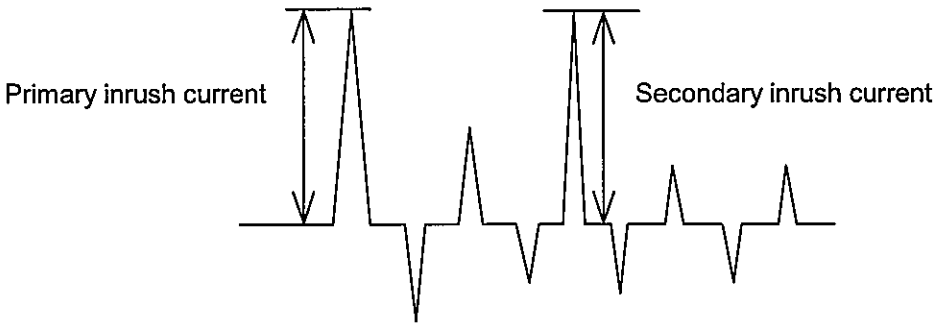
Input Voltage 100 V
Frequency 60 Hz
Load 100 %

Primary inrush current :
14.0 A
Secondary inrush current :
19.8 A



Input Voltage 230 V
Frequency 60 Hz
Load 100 %

Primary inrush current :
30.0 A
Secondary inrush current :
12.6 A



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Model	TUNS70048		
Item	Leakage Current	Temperature	25°C
Object	———————	Testing Circuitry	Figure B

1.Results

[mA]

Standards		Input Volt.			Note
		100 [V]	200 [V]	240[V]	
IEC60950-1	Both phases	0.16	0.33	0.40	Operation
	One of phase	0.30	0.63	0.77	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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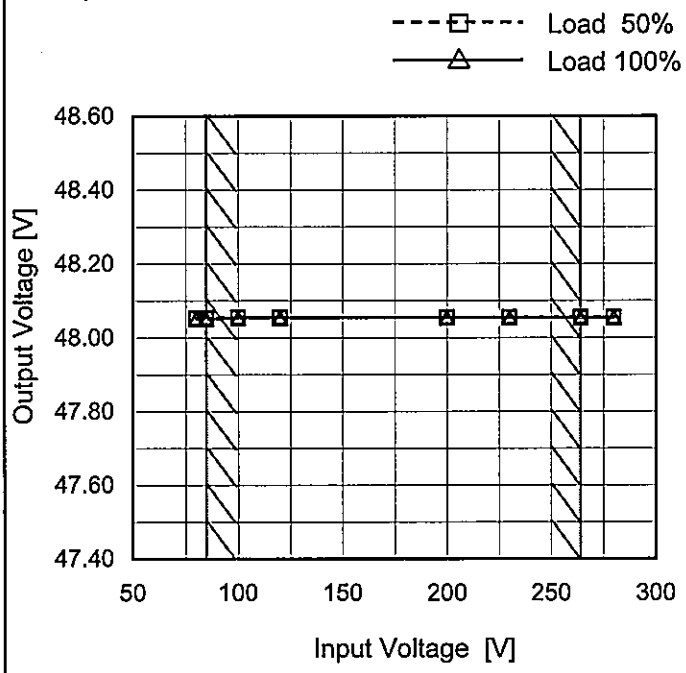
Model	TUNS700F48
Item	Line Regulation
Object	+48V14.6A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

2.Values

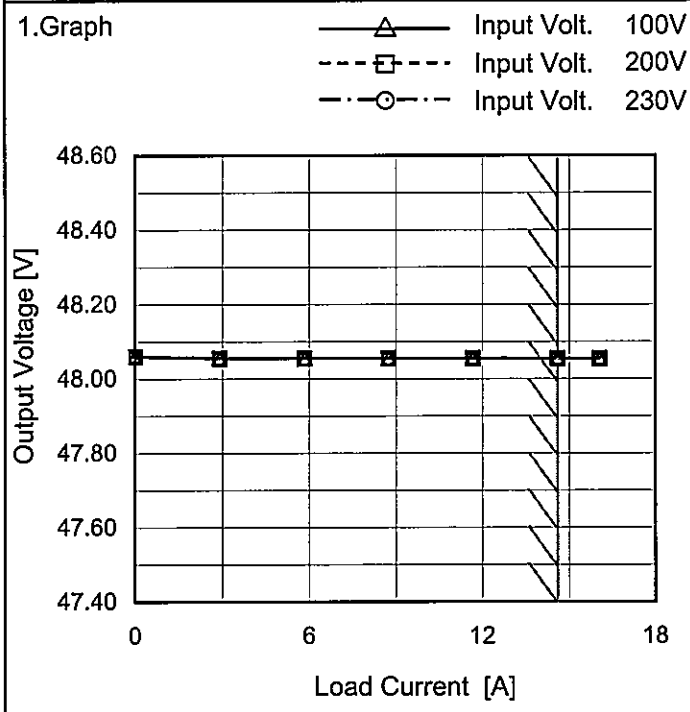
Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
80	48.053	48.052
85	48.053	48.052
100	48.055	48.054
120	48.055	48.054
200	48.055	48.054
230	48.055	48.054
264	48.055	48.054
280	48.055	48.054
--	-	-

COSEL

Model	TUNS700F48
Item	Load Regulation
Object	+48V14.6A

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	48.060	48.060	48.060
2.9	48.055	48.055	48.055
5.8	48.055	48.055	48.055
8.8	48.055	48.055	48.055
11.7	48.055	48.055	48.055
14.6	48.054	48.054	48.054
16.1	48.054	48.054	48.054
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	TUNS700F48
Item	Dynamic Load Response
Object	+48V 14.6A

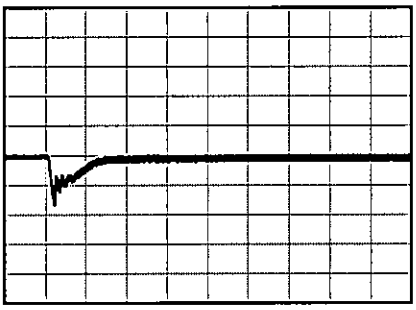
Temperature 25℃
Testing Circuitry Figure A

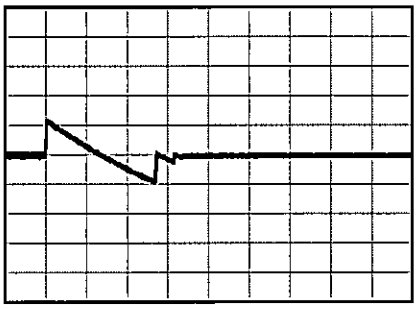
Input Volt. 100V
Cycle 1000ms

Load Current

14.6A / 100us

Min.Load (0A)⟷
Load 100%(14.6A)



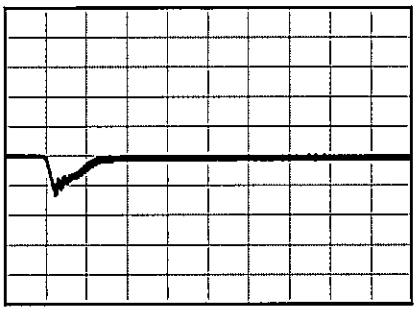


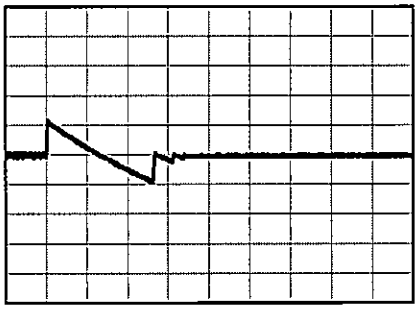
1 V/div

400 us/div

20 ms/div

Min.Load (0A)⟷
Load 50%(7.3A)



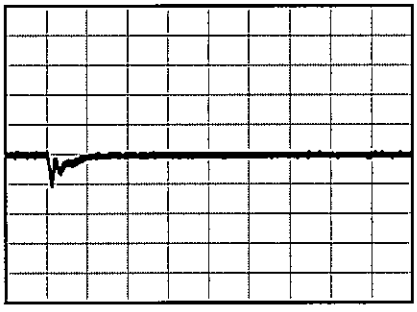


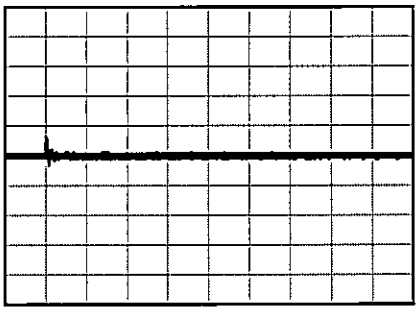
1 V/div

400 us/div

20 ms/div

Load 10% (1.46A)⟷
Load 100% (14.6A)





1 V/div

400 us/div

20 ms/div

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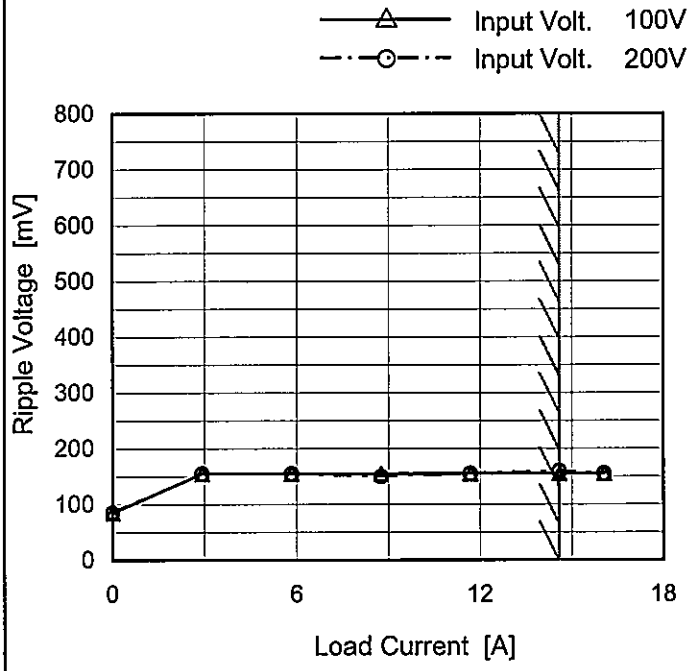
Model	TUNS700F48
Item	Ripple Voltage (by Load Current)
Object	+48V14.6A

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.

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

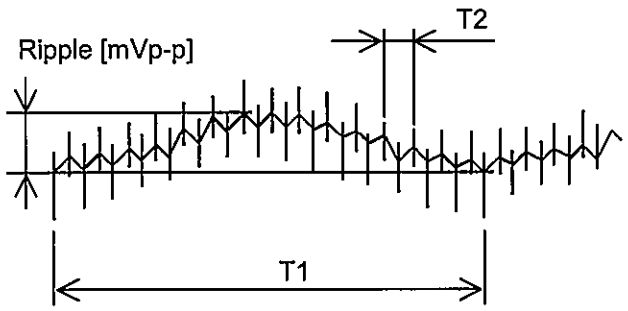


Fig. Complex Ripple Wave Form

2.Values

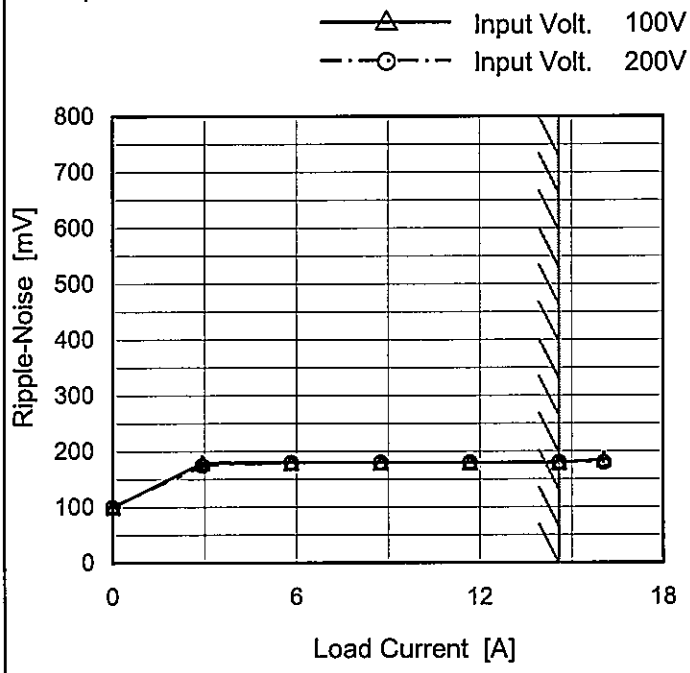
Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
0.0	85	85
2.9	155	155
5.8	155	155
8.8	155	150
11.7	155	155
14.6	155	160
16.1	155	155
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	TUNS700F48
Item	Ripple-Noise
Object	+48V14.6A

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]	Input Volt. 200 [V]
0.0	100	100
2.9	180	175
5.8	180	180
8.8	180	180
11.7	180	180
14.6	180	180
16.1	185	180
--	-	-
--	-	-
--	-	-
--	-	-

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

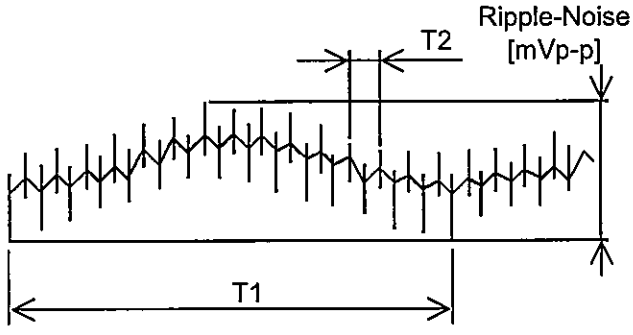
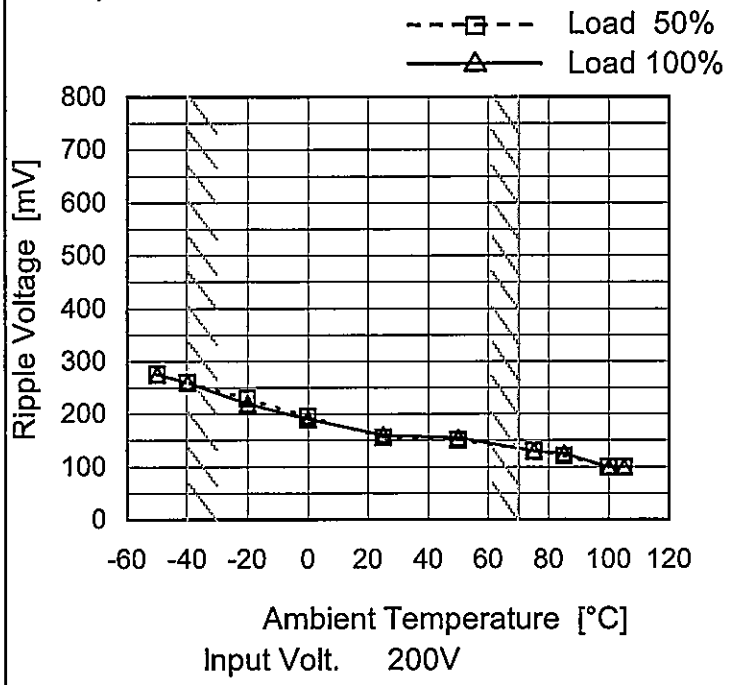


Fig. Complex Ripple Wave Form

Model	TUNS700F48
Item	Ripple Voltage (by Ambient Temp.)
Object	+48V14.6A

Testing Circuitry Figure C

1.Graph



Input Volt. 200V

Measured by 100 MHz Oscilloscope.
Note: Slanted line shows the range of the rated ambient temperature.

2.Values

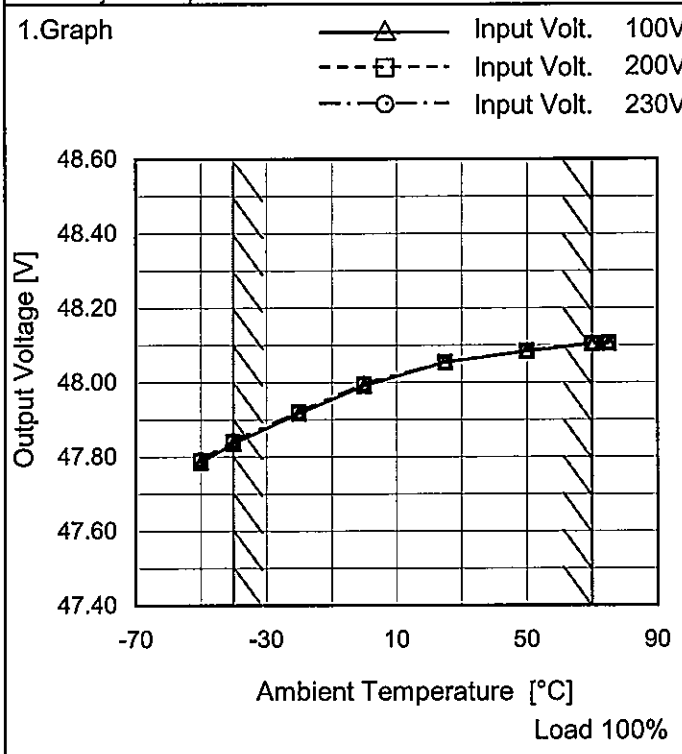
Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-50	275	275
-40	260	260
-20	230	220
0	195	190
25	155	160
50	150	155
75	130	130
85	120	125
100	100	100
105	100	100
--	-	-

COSEL

Model	TUNS700F48
Item	Ambient Temperature Drift
Object	+48V14.6A

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]
-50	47.785	47.789	47.793
-40	47.836	47.839	47.843
-20	47.917	47.920	47.922
0	47.991	47.994	47.996
25	48.054	48.054	48.054
50	48.083	48.084	48.085
70	48.104	48.105	48.105
75	48.105	48.106	48.107
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	TUNS700F48	
Item	Output Voltage Accuracy	Testing Circuitry Figure A
Object	+48V14.6A	

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 - 70°C
Input Voltage : 85 - 264V
Load Current : 0 - 14.6A

* 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

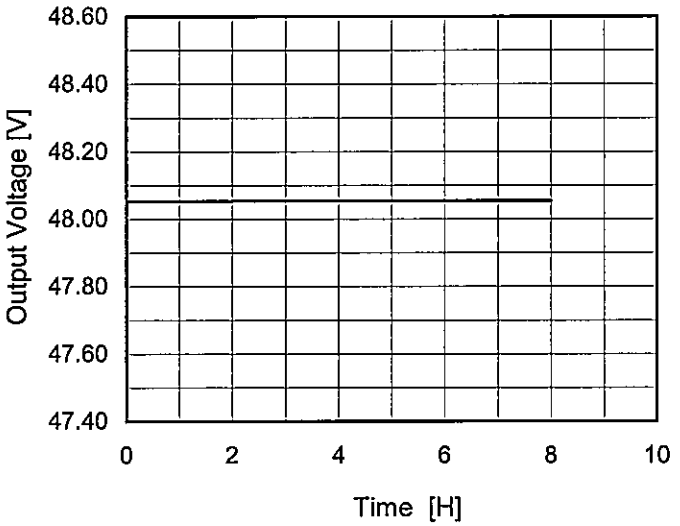
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	70	85	0	48.110	±137	±0.3
Minimum Voltage	-40	85	14.6	47.836		

COSEL

Model	TUNS70048
Item	Time Lapse Drift
Object	+48V14.6A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Input Volt. 100V
Load 100%

* The characteristic of AC200V is equal.

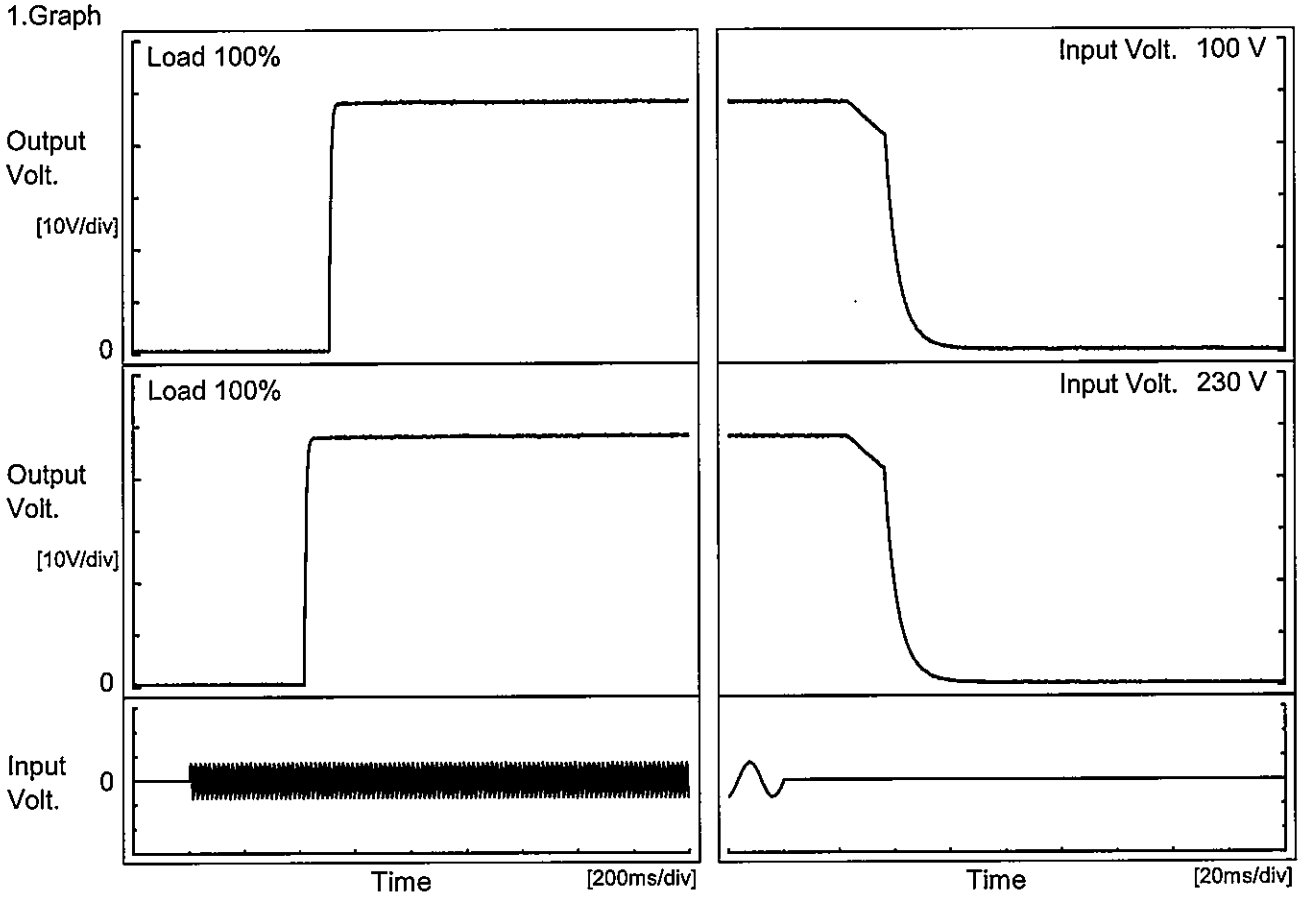
2.Values

Time since start [H]	Output Voltage [V]
0.0	48.044
0.5	48.052
1.0	48.053
2.0	48.054
3.0	48.054
4.0	48.054
5.0	48.054
6.0	48.054
7.0	48.054
8.0	48.054

COSEL

Model	TUNS700F48	
Item	Rise and Fall Time	Temperature 25°C Testing Circuitry Figure A
Object	+48V14.6A	

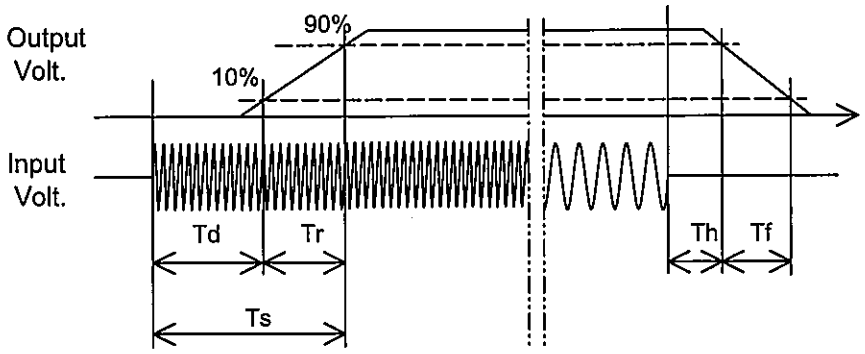
1.Graph



2.Values

[ms]

Input Volt. \ Time	Td	Tr	Ts	Th	Tf
100 V	509.0	13.0	522.0	32.8	14.2
230 V	419.0	13.0	432.0	32.1	14.7

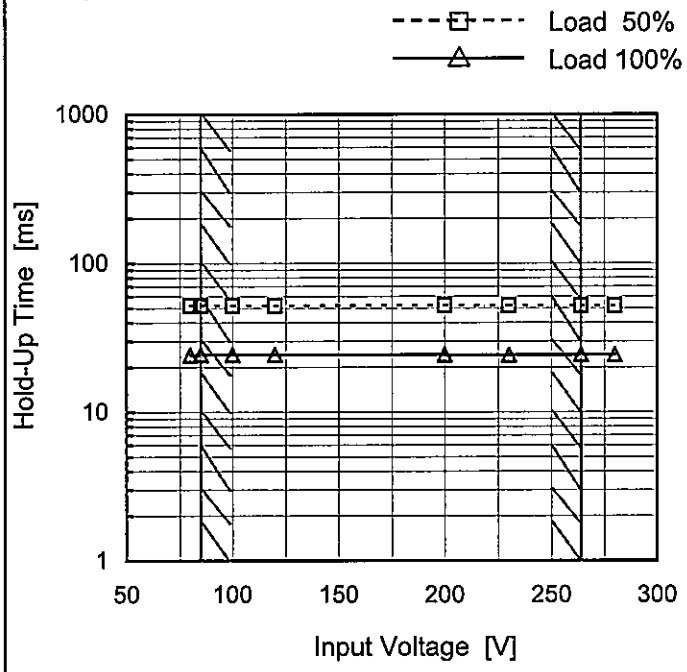


COSEL

Model	TUNS700F48
Item	Hold-Up Time
Object	+48V14.6A

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

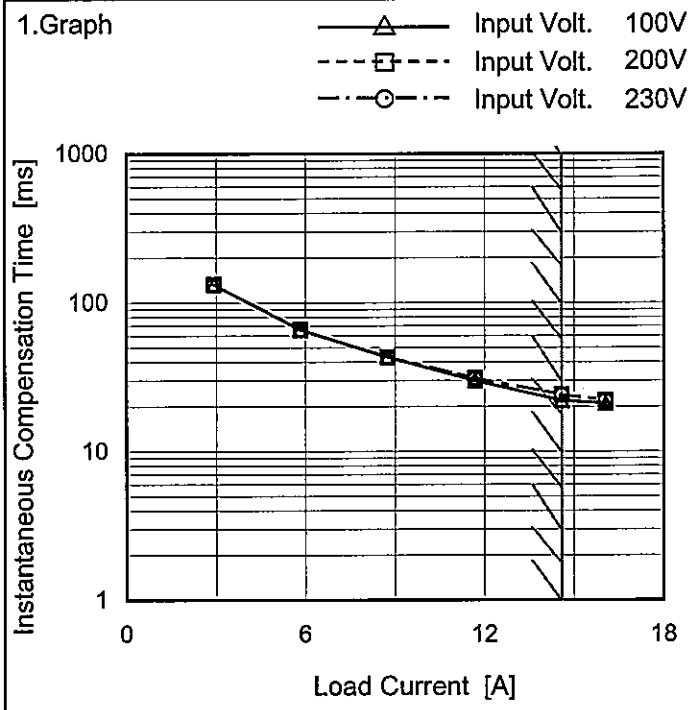
Input Voltage [V]	Hold-Up Time [ms]	
	Load 50%	Load 100%
80	52	24
85	52	24
100	52	24
120	52	24
200	52	24
230	52	24
264	52	24
280	52	24
--	-	-

COSEL

Model	TUNS700F48
Item	Instantaneous Interruption Compensation
Object	+48V14.6A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

2.Values

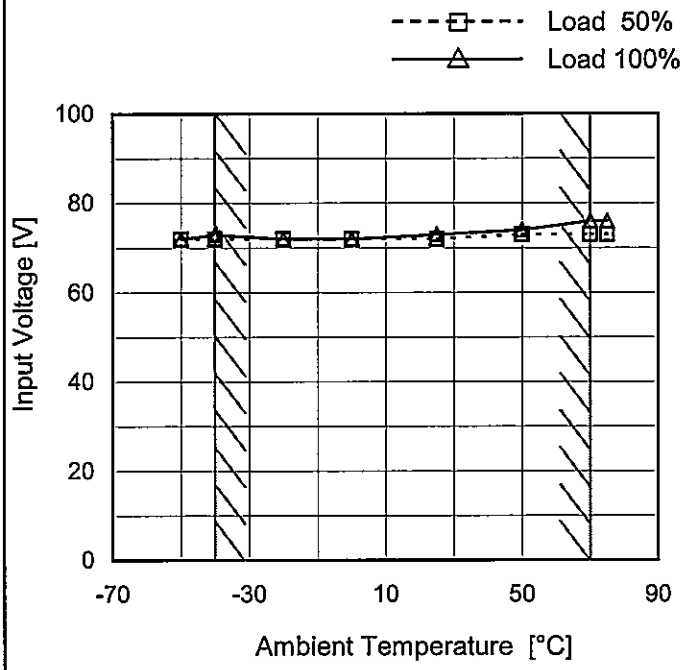
Load Current [A]	Time [ms]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.0	-	-	-
2.9	133	133	133
5.8	66	66	66
8.8	43	43	43
11.7	30	31	31
14.6	22	24	24
16.1	21	22	22
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	TUNS700F48
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+48V14.6A

Testing Circuitry Figure A

1.Graph



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

2.Values

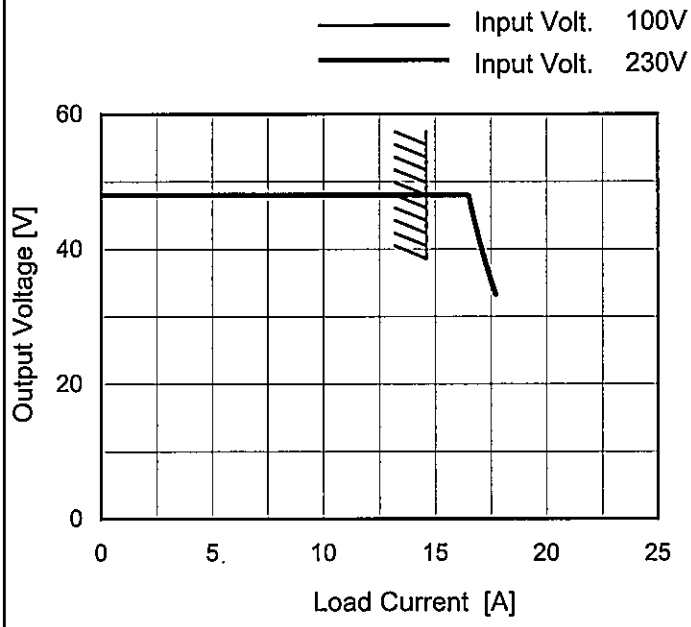
Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-50	72	72
-40	72	73
-20	72	72
0	72	72
25	72	73
50	73	74
70	73	76
75	73	76
--	-	-
--	-	-
--	-	-

COSEL

Model	TUNS700F48
Item	Overcurrent Protection
Object	+48V14.6A

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 33.6V to 0V.

2.Values

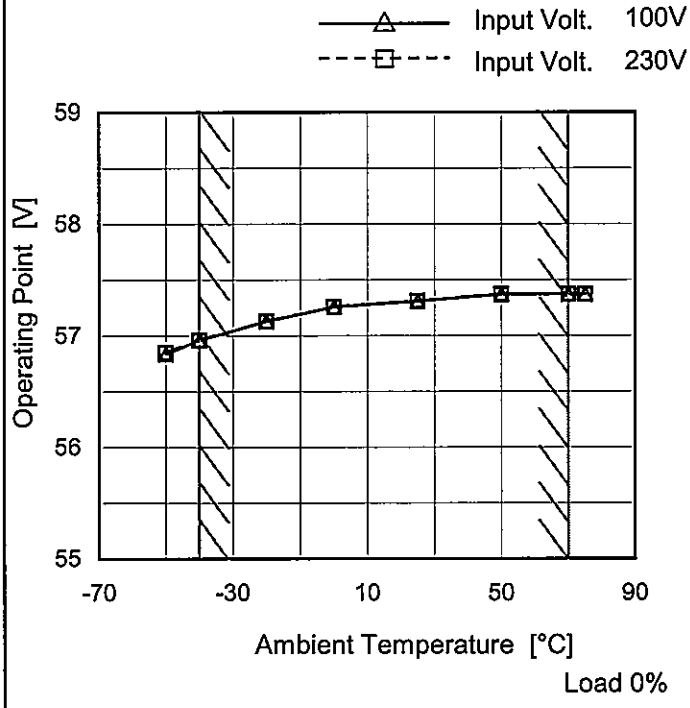
Output Voltage [V]	Load Current [A]	
	Input Volt. 100[V]	Input Volt. 230[V]
48.0	14.67	14.67
45.6	16.66	16.66
43.2	16.84	16.85
38.4	17.24	17.23
33.6	17.71	17.66
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	TUNS700F48
Item	Overvoltage Protection
Object	+48V14.6A

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]
-50	56.84	56.85
-40	56.96	56.96
-20	57.13	57.13
0	57.26	57.26
25	57.31	57.31
50	57.37	57.37
70	57.37	57.37
75	57.37	57.37
--	-	-
--	-	-
--	-	-

COSEL

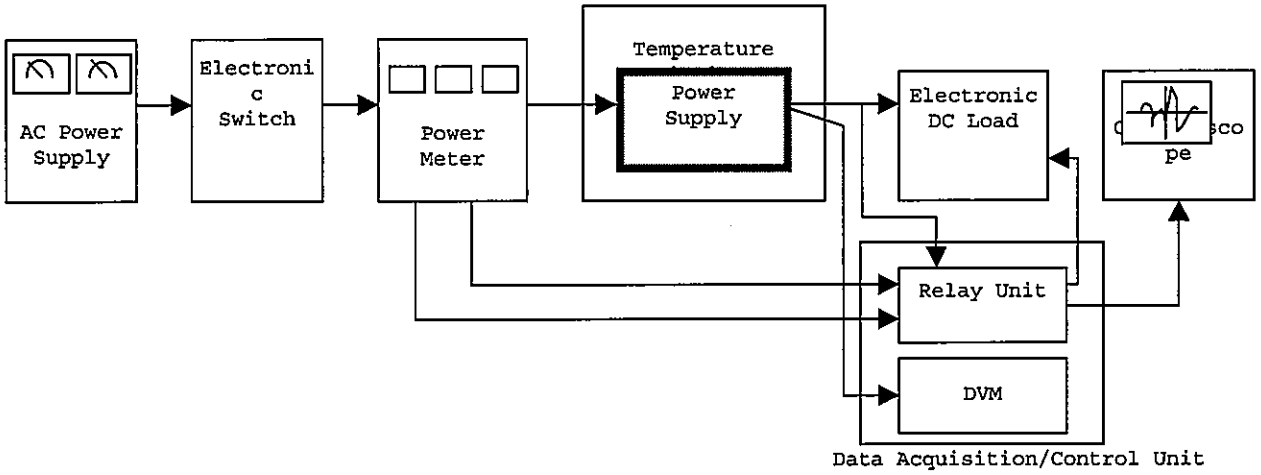


Figure A

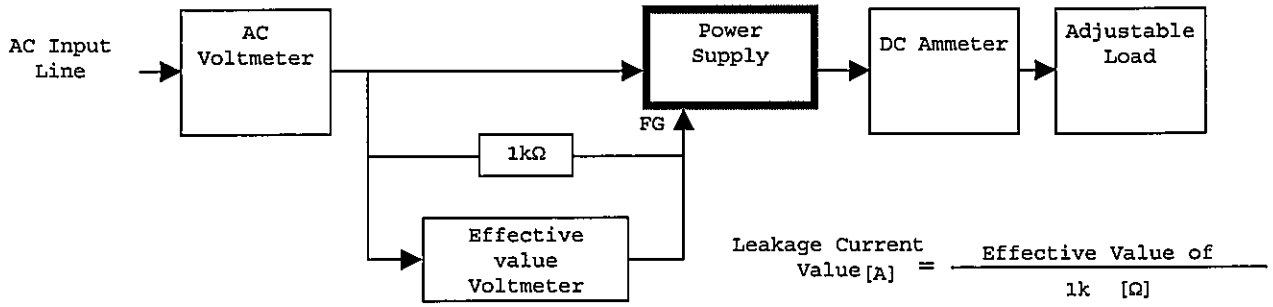


Figure B (DEN-AN)

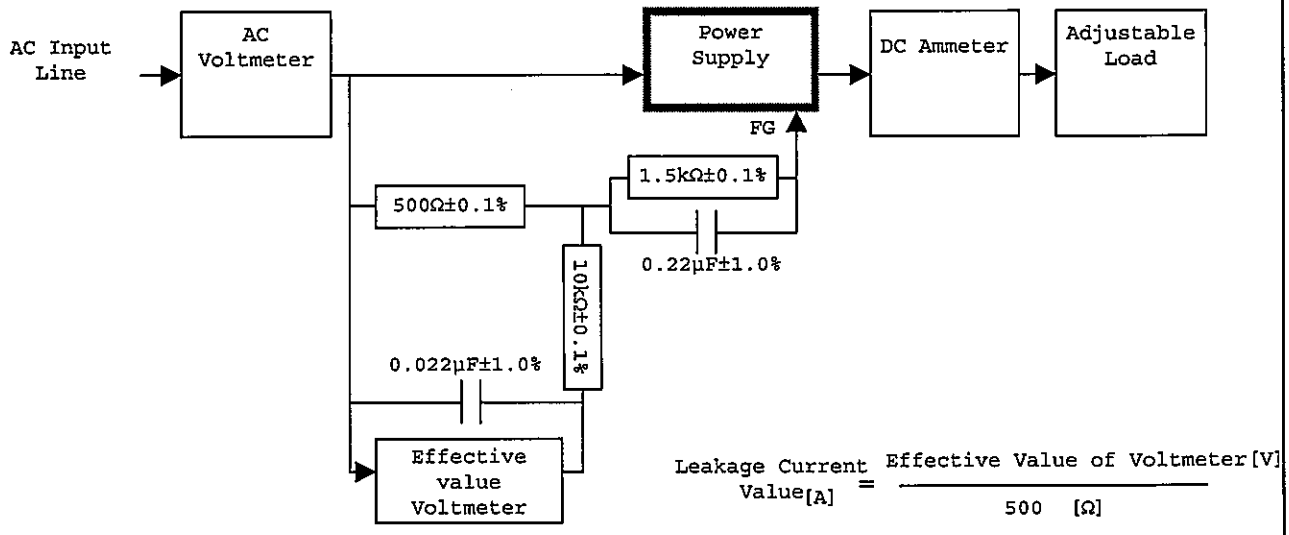
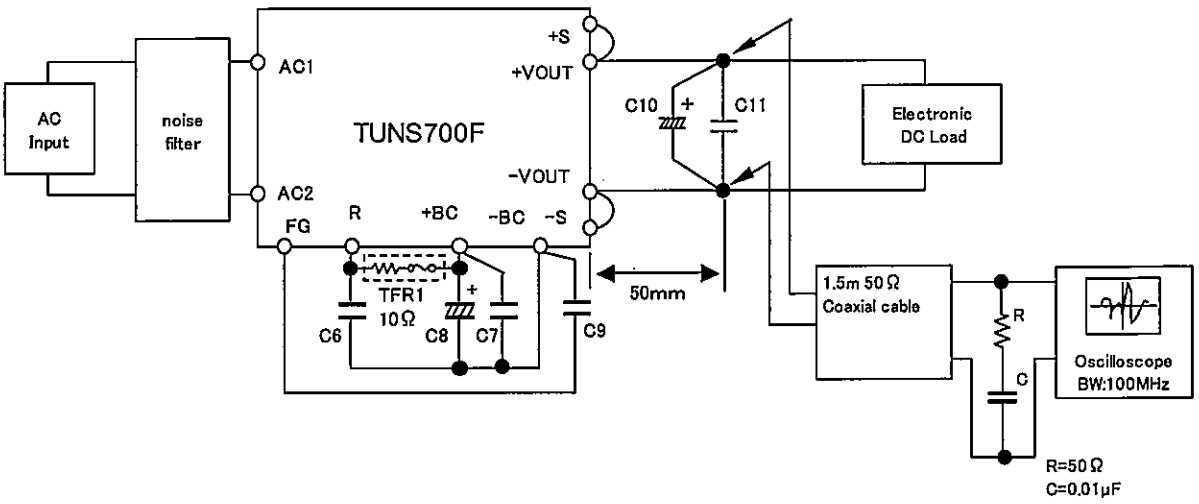


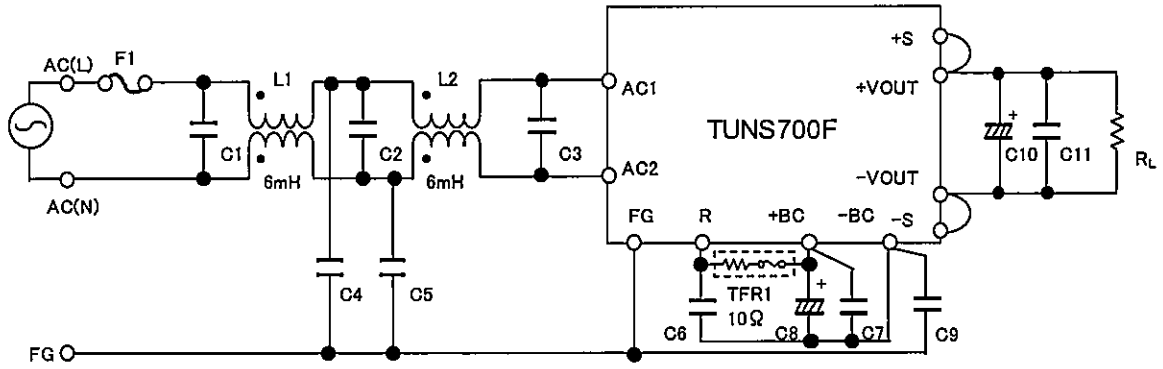
Figure B (IEC60950-1)



C10 : TUNS700F12 2200μF (0≦Tc≦100)
2200μF×3 (-40≦Tc<0)
TUNS700F28 1000μF (0≦Tc≦100)
1000μF×3 (-40≦Tc<0)
TUNS700F48 470μF (0≦Tc≦100)
470μF×3 (-40≦Tc<0)
Tc:Base Plate Temp.

C11 : TUNS700F12 10μF
TUNS700F28 4.7μF
TUNS700F48 2.2μF

Figure C



L1,L2 : ADM-25-12-060T(Ueno)
C1,C2 : 1.5μF 275V Film Capacitor
C3 : 1.5μF 275V Film Capacitor × 2
C4,C5,C9 : 2200pF Ceramic Capacitor
C6,C7 : 0.68μF 450V Film Capacitor × 2
C8 : 390μF 450V Electrolytic Capacitor × 2
C10 : TUNS700F12 2200μF 25V Electrolytic Capacitor
TUNS700F28 1000μF 50V Electrolytic Capacitor
TUNS700F48 470μF 63V Electrolytic Capacitor

C11 : TUNS700F12 10μF Ceramic Capacitor
TUNS700F28 4.7μF Ceramic Capacitor
TUNS700F48 2.2μF Ceramic Capacitor

Figure D