参考資料

COSEL

TEST DATA OF MODULE U

(ACE series)

Regulated DC power supply
Jun.19.2003

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M.Hamaguchi Design Engineer

COSEL CO.,LTD.

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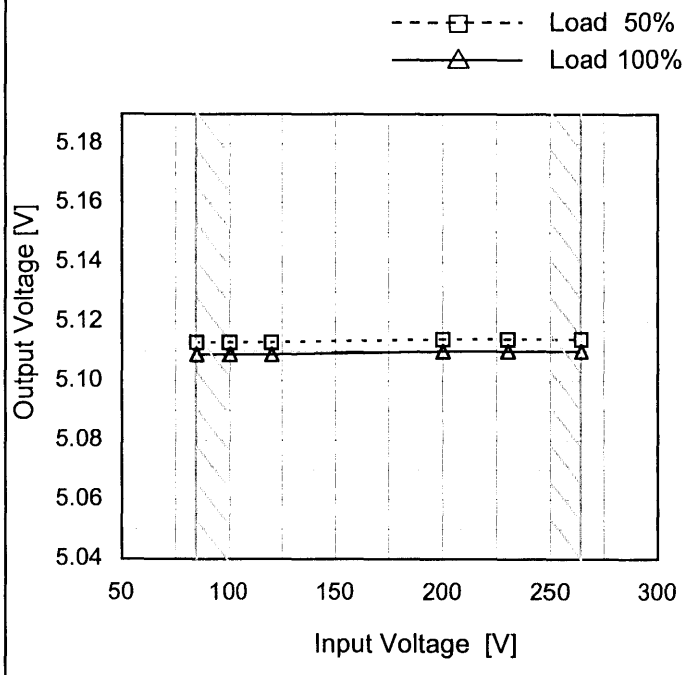
Object +5V10A

1.Graph

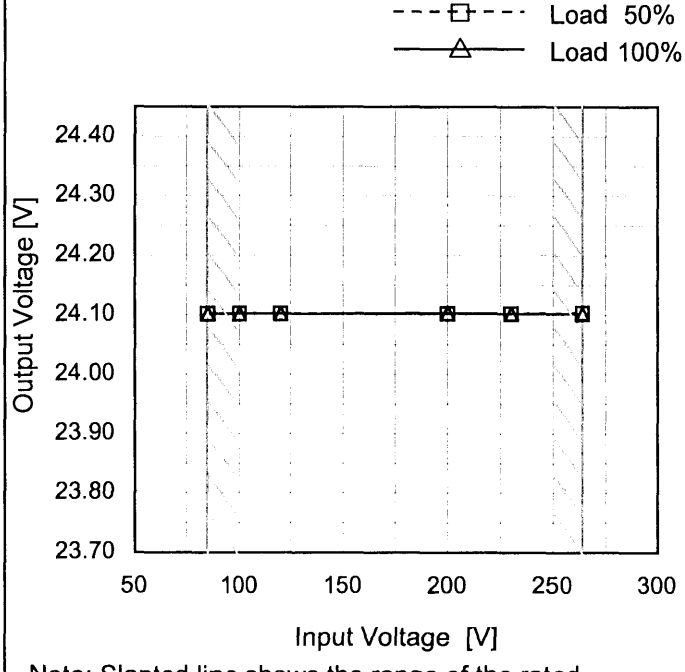


2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
85	5.113	5.109
100	5.113	5.109
120	5.113	5.109
200	5.114	5.110
230	5.114	5.110
264	5.114	5.110
--	-	-
--	-	-
--	-	-

Object +24V2.1A

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%
85	24.102	24.102
100	24.102	24.102
120	24.102	24.102
200	24.102	24.103
230	24.102	24.102
264	24.103	24.102
--	-	-
--	-	-
--	-	-

BC-0910

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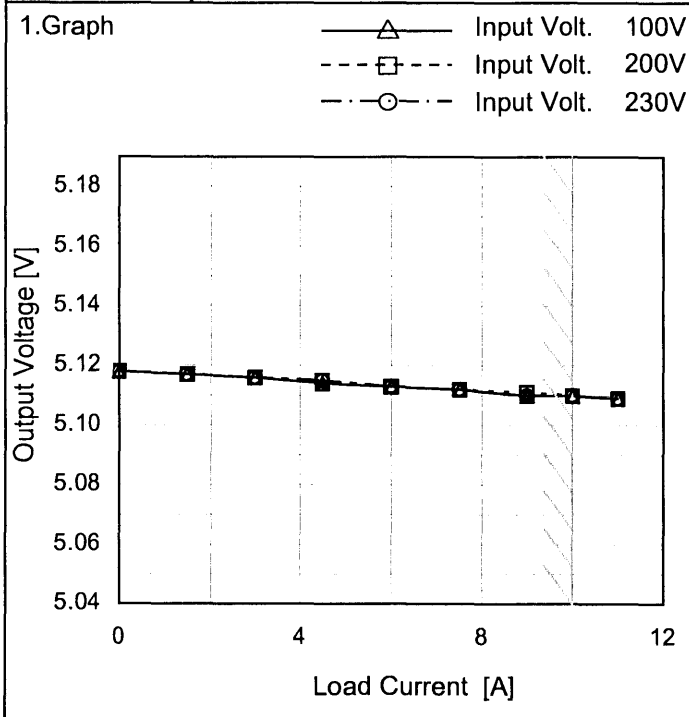
Model	MODULE U
Item	Load Regulation
Object	+5V10A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

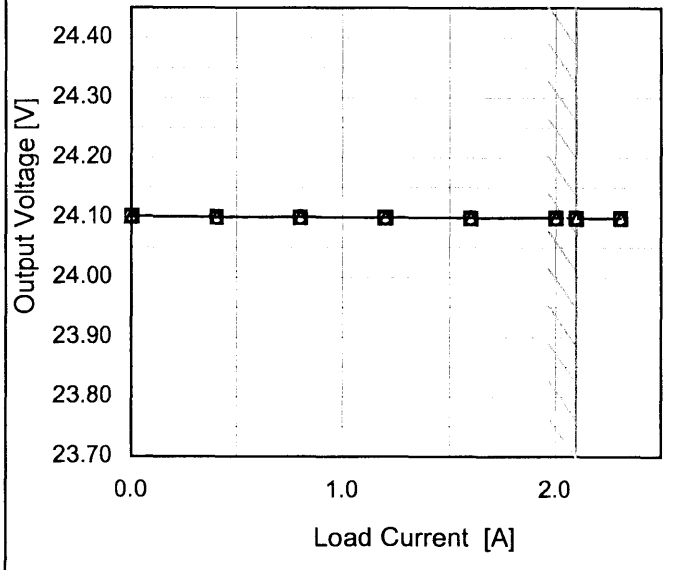


2.Values

Load Current [A]	Output Voltage [V] Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.0	5.118	5.118	5.118
1.5	5.117	5.117	5.117
3.0	5.116	5.116	5.116
4.5	5.114	5.115	5.115
6.0	5.113	5.113	5.113
7.5	5.112	5.112	5.112
9.0	5.110	5.111	5.110
10.0	5.110	5.110	5.110
11.0	5.109	5.109	5.109
--	-	-	-
--	-	-	-

Object	+24V2.1A

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]
0.00	24.102	24.102	24.102
0.40	24.101	24.101	24.100
0.80	24.101	24.100	24.100
1.20	24.100	24.100	24.100
1.60	24.100	24.099	24.099
2.00	24.100	24.099	24.099
2.10	24.099	24.099	24.099
2.31	24.099	24.099	24.098
--	-	-	-
--	-	-	-
--	-	-	-

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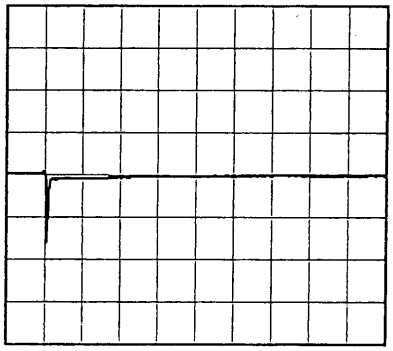
Model	MODULE U
Item	Dynamic Load Response
Object	+5V10A

Temperature 25°C
Testing Circuitry Figure A

Input Volt. 100 V
Cycle 1000 mS

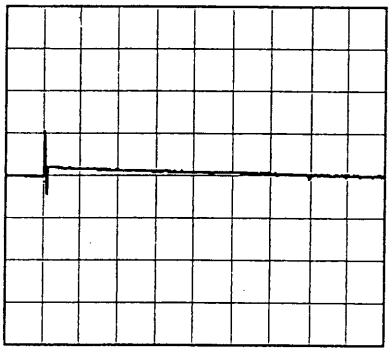
Load Current

Min. Load (0.5A) ⟷
Load 100% (10A)



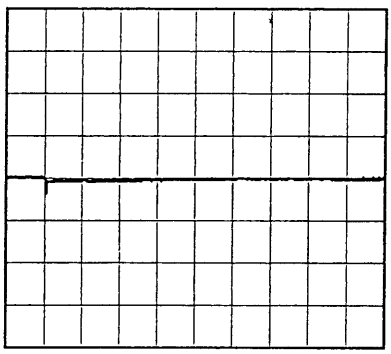
100 mV/div

10 ms/div



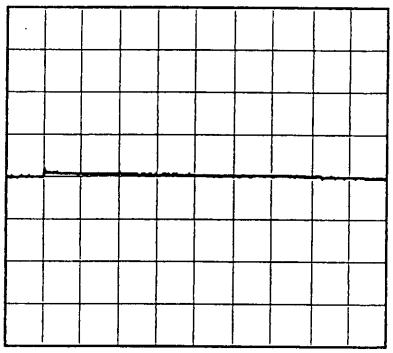
10 ms/div

Min. Load (0.5A) ⟷
Load 50% (5A)



100 mV/div

10 ms/div



10 ms/div

* The characteristic of AC200V is equal.

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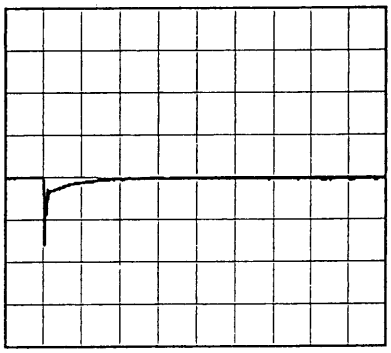
Model	MODULE U
Item	Dynamic Load Response
Object	+24V2.1A

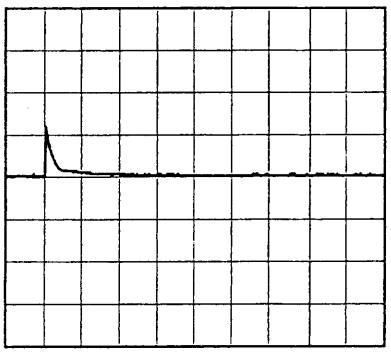
Temperature 25°C
Testing Circuitry Figure A

Input Volt. 100 V
Cycle 1000 mS

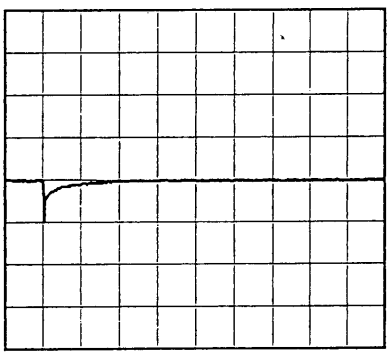
Load Current

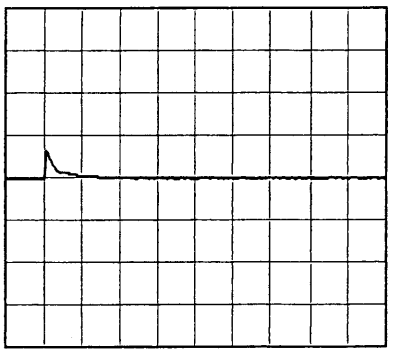
Min. Load (0A) ⟷
Load 100% (2.1A)





Min. Load (0A) ⟷
Load 50% (1.05A)





* The characteristic of AC200V is equal.

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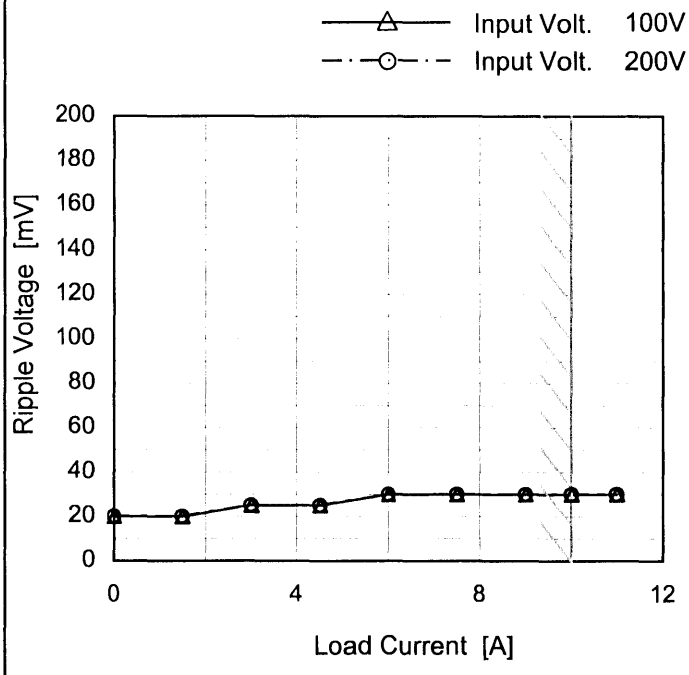
Model	MODULE U
Item	Ripple Voltage (by Load Current)
Object	+5V10A

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.

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

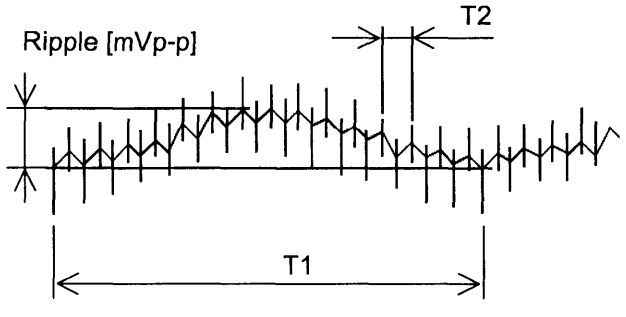


Fig. Complex Ripple Wave Form

2.Values

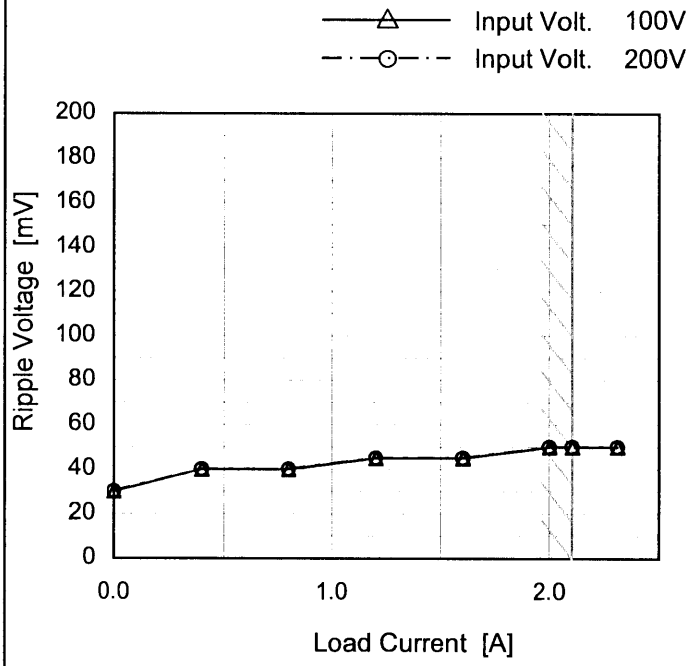
Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
0.0	20	20
1.5	20	20
3.0	25	25
4.5	25	25
6.0	30	30
7.5	30	30
9.0	30	30
10.0	30	30
11.0	30	30
--	-	-
--	-	-

COSEL

Model	MODULE U
Item	Ripple Voltage (by Load Current)
Object	+24V2.1A

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.

2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
0.00	30	30
0.40	40	40
0.80	40	40
1.20	45	45
1.60	45	45
2.00	50	50
2.10	50	50
2.31	50	50
--	-	-
--	-	-
--	-	-

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

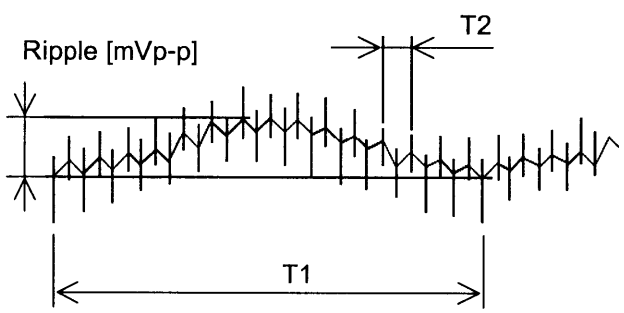


Fig. Complex Ripple Wave Form

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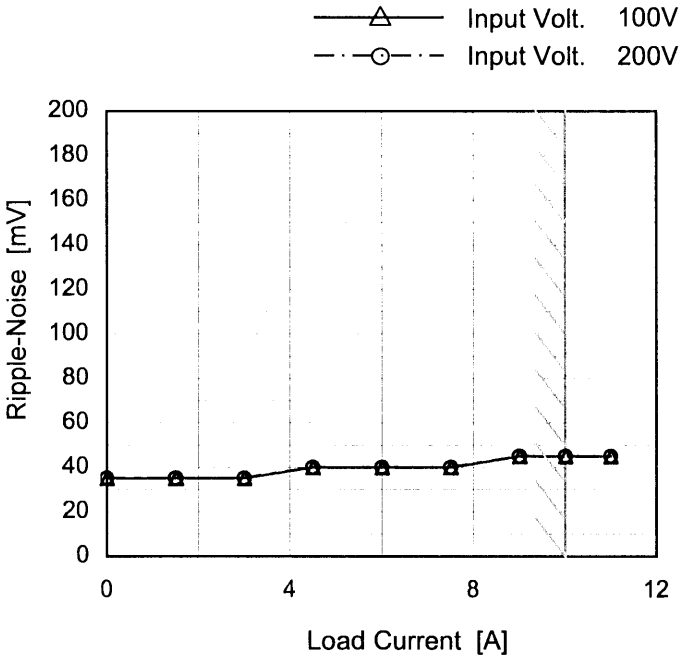
Model	MODULE U
Item	Ripple-Noise
Object	+5V10A

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.

2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
0.0	35	35
1.5	35	35
3.0	35	35
4.5	40	40
6.0	40	40
7.5	40	40
9.0	45	45
10.0	45	45
11.0	45	45
--	-	-
--	-	-

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

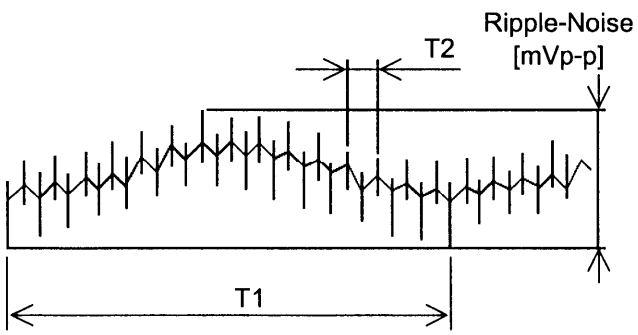


Fig. Complex Ripple Wave Form

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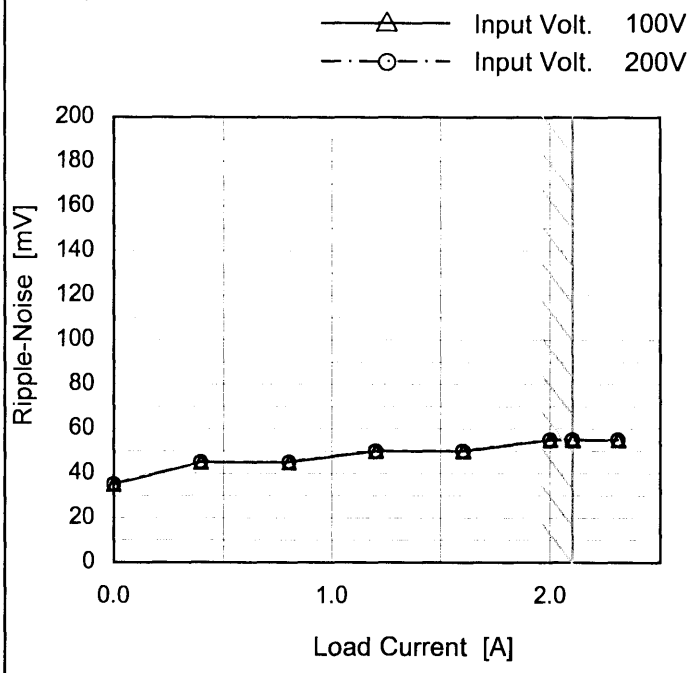
Model	MODULE U
Item	Ripple-Noise
Object	+24V2.1A

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.

2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
0.00	35	35
0.40	45	45
0.80	45	45
1.20	50	50
1.60	50	50
2.00	55	55
2.10	55	55
2.31	55	55
--	-	-
--	-	-
--	-	-

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

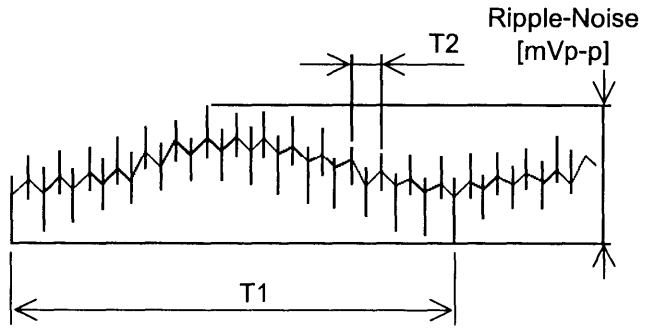


Fig. Complex Ripple Wave Form

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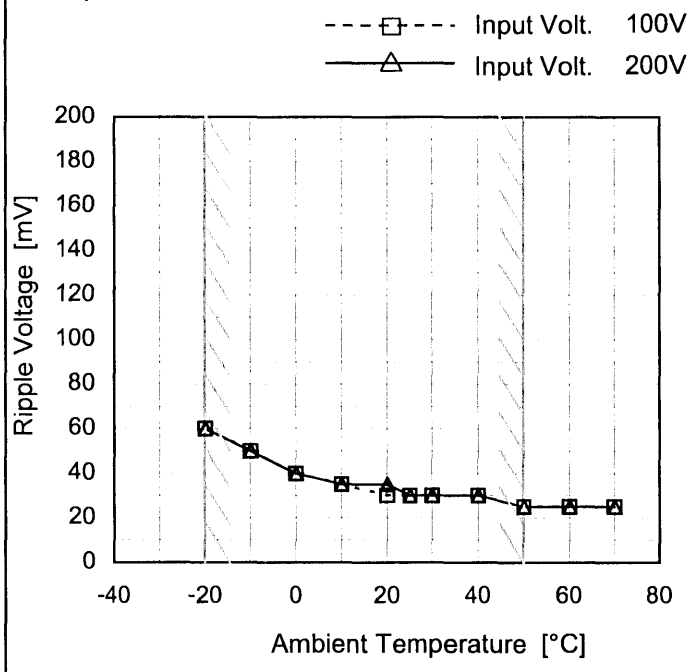
Model	MODULE U
Item	Ripple Voltage (by Ambient Temp.)
Object	+5V10A

Testing Circuitry Figure A

1.Graph



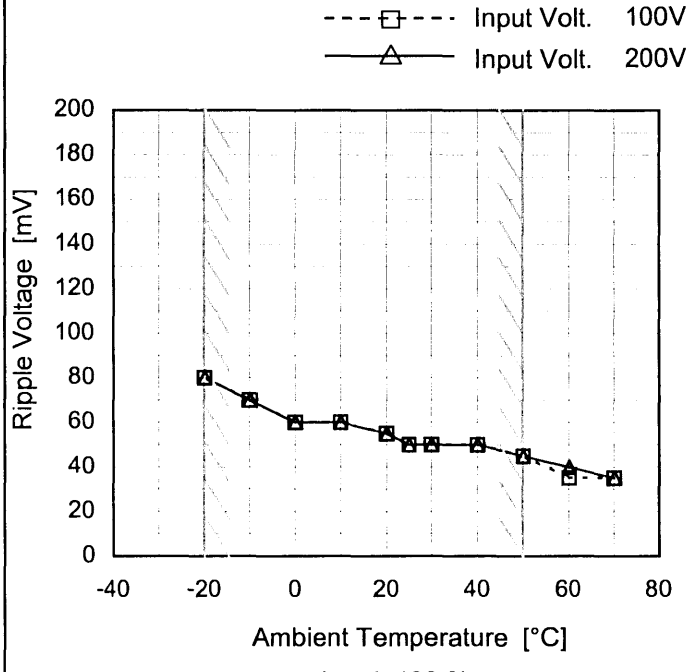
Load 100 %

2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
-20	60	60
-10	50	50
0	40	40
10	35	35
20	30	35
25	30	30
30	30	30
40	30	30
50	25	25
60	25	25
70	25	25

Object	+24V2.1A

1.Graph



Load 100 %

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. 200 [V]
-20	80	80
-10	70	70
0	60	60
10	60	60
20	55	55
25	50	50
30	50	50
40	50	50
50	45	45
60	35	40
70	35	35

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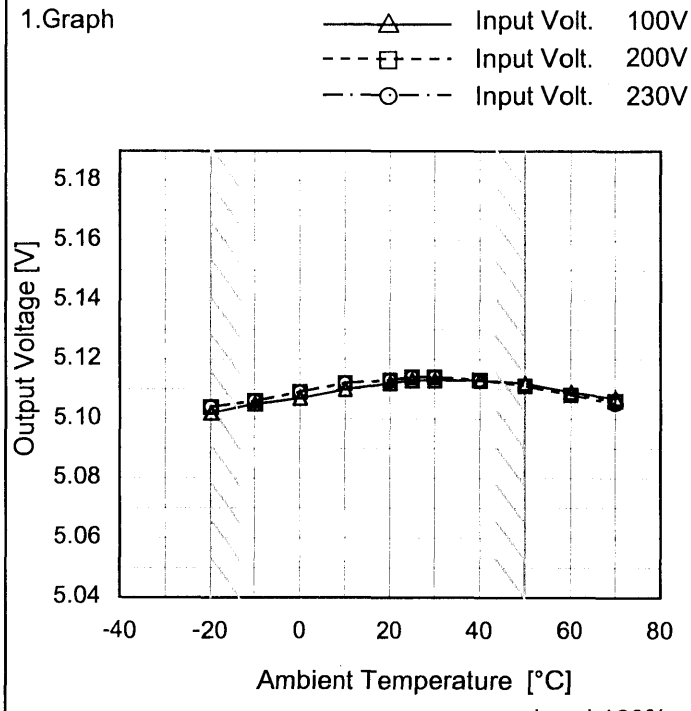
Model	MODULE U
Item	Ambient Temperature Drift
Object	+5V10A

Testing Circuitry Figure A

1.Graph



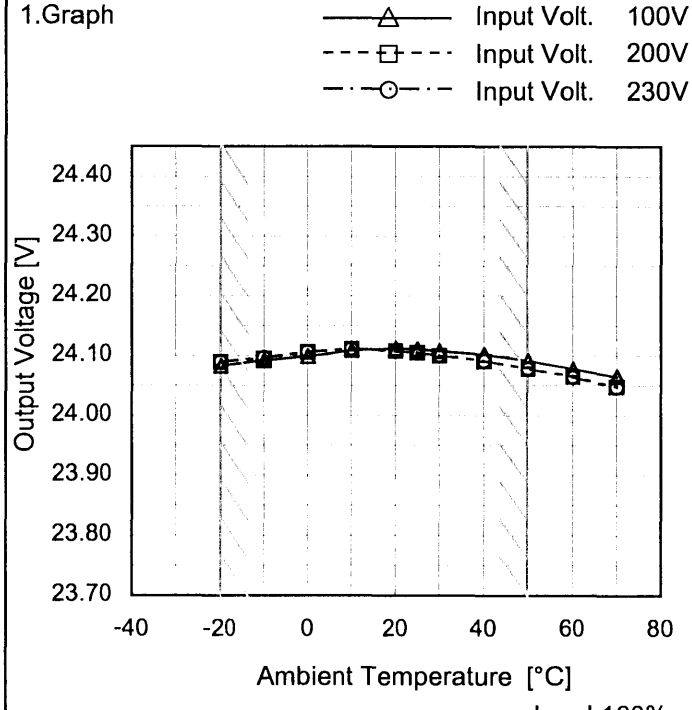
Load 100%

2.Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
-20	5.102	5.104	5.104
-10	5.105	5.106	5.106
0	5.107	5.109	5.109
10	5.110	5.112	5.112
20	5.112	5.113	5.113
25	5.113	5.114	5.114
30	5.113	5.114	5.114
40	5.113	5.113	5.113
50	5.112	5.111	5.111
60	5.109	5.108	5.108
70	5.107	5.106	5.105

Object	+24V2.1A

1.Graph



Load 100%

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]
-20	24.083	24.089	24.089
-10	24.092	24.095	24.096
0	24.099	24.106	24.106
10	24.109	24.111	24.111
20	24.112	24.108	24.107
25	24.111	24.105	24.104
30	24.108	24.100	24.100
40	24.102	24.091	24.091
50	24.092	24.078	24.078
60	24.078	24.065	24.064
70	24.065	24.048	24.047

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Model	MODULE U	
Item	Output Voltage Accuracy	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 : 85 - 264V
Load Current (AVR 1) : 0 - 10A (AVR 2) : 0 - 2.1A

* Output Voltage Accuracy = ±(Maximum of Output Voltage - Minimum of Output Voltage) / 2

* Output Voltage Accuracy (Ration) = $\frac{\text{Output Voltage Accuracy}}{\text{Rated Output Voltage}} \times 100$

2.Values

Object	+5V10A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	25	264	0	5.122	±10	±0.2
Minimum Voltage	-20	100	10	5.103		

Object	+24V2.1A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	25	264	0	24.108	±15	±0.1
Minimum Voltage	50	100	2.1	24.078		

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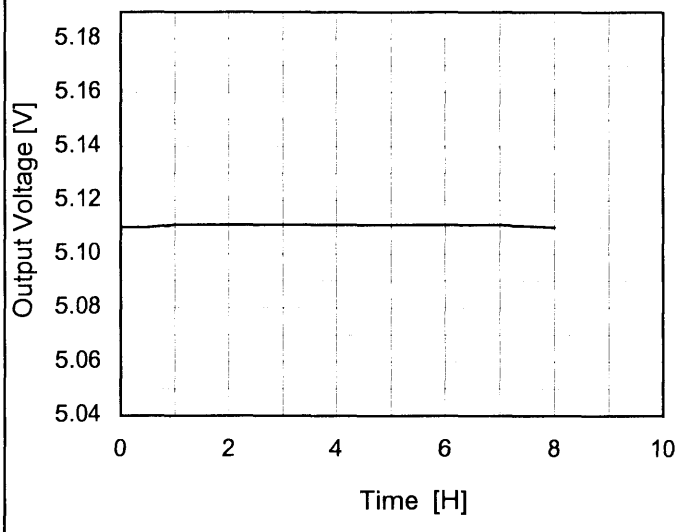
Model	MODULE U
Item	Time Lapse Drift
Object	+5V10A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



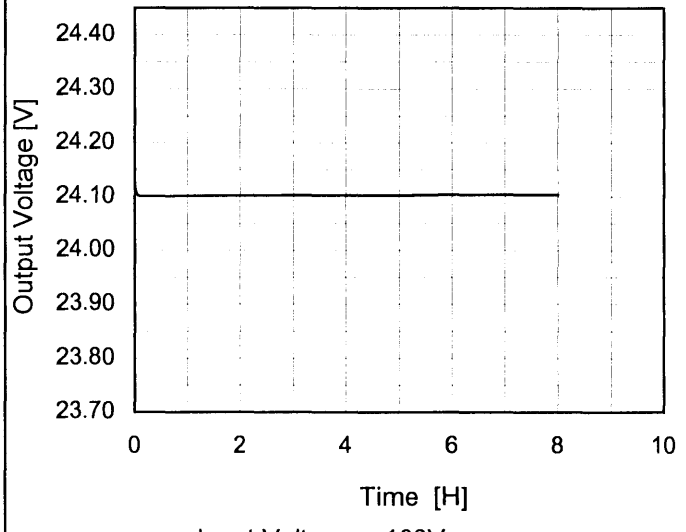
Input Volt. 100V
Load 100%

2.Values

Time since start [H]	Output Voltage [V]
0.0	5.109
0.5	5.110
1.0	5.111
2.0	5.111
3.0	5.111
4.0	5.111
5.0	5.111
6.0	5.111
7.0	5.111
8.0	5.110

Object	+24V2.1A

1.Graph



Input Volt. 100V
Load 100%

* The characteristic of AC200V is equal.

2.Values

Time since start [H]	Output Voltage [V]
0.0	24.118
0.5	24.101
1.0	24.102
2.0	24.102
3.0	24.103
4.0	24.103
5.0	24.103
6.0	24.104
7.0	24.104
8.0	24.104

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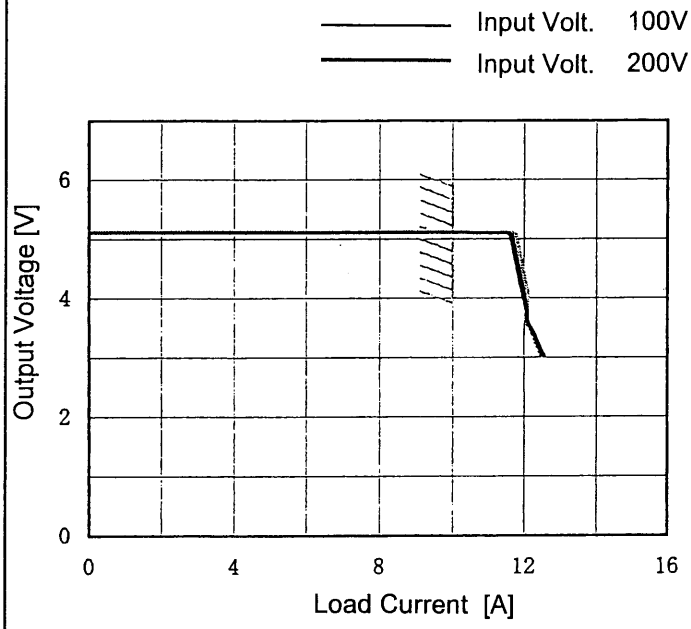
Model	MODULE U
Item	Overcurrent Protection

Temperature 25°C
Testing Circuitry Figure A

Object +5V10A

1.Graph



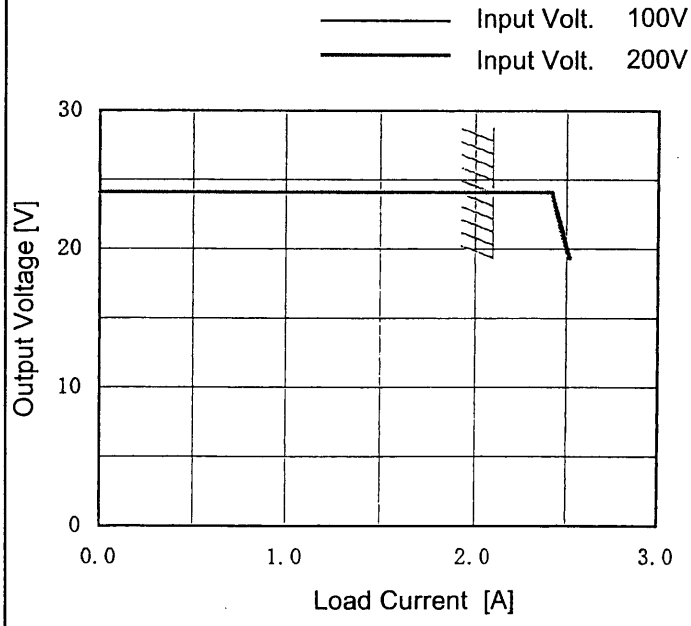
Intermittent operation occurs when the output voltage is from 3V to 0V.

2.Values

Output Voltage [V]	Load Current [A]	
	Input Volt. 100[V]	Input Volt. 200[V]
5.00	11.68	11.83
4.75	11.77	11.93
4.50	11.86	12.03
4.00	12.04	12.10
3.50	12.21	12.16
3.00	12.56	12.52
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

Object +24V2.1A

1.Graph



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

Intermittent operation occurs when the output voltage is from 19.2V to 0V.

2.Values

Output Voltage [V]	Load Current [A]	
	Input Volt. 100[V]	Input Volt. 200[V]
24.00	2.43	2.42
22.80	2.45	2.44
21.60	2.48	2.47
19.20	2.52	2.52
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

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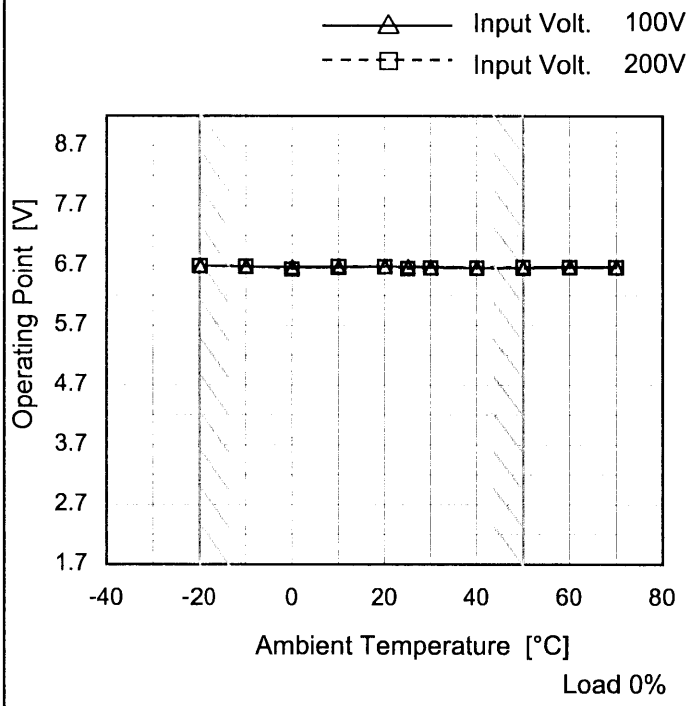
Model	MODULE U
Item	Overvoltage Protection
Object	+5V10A

Testing Circuitry Figure A

1.Graph



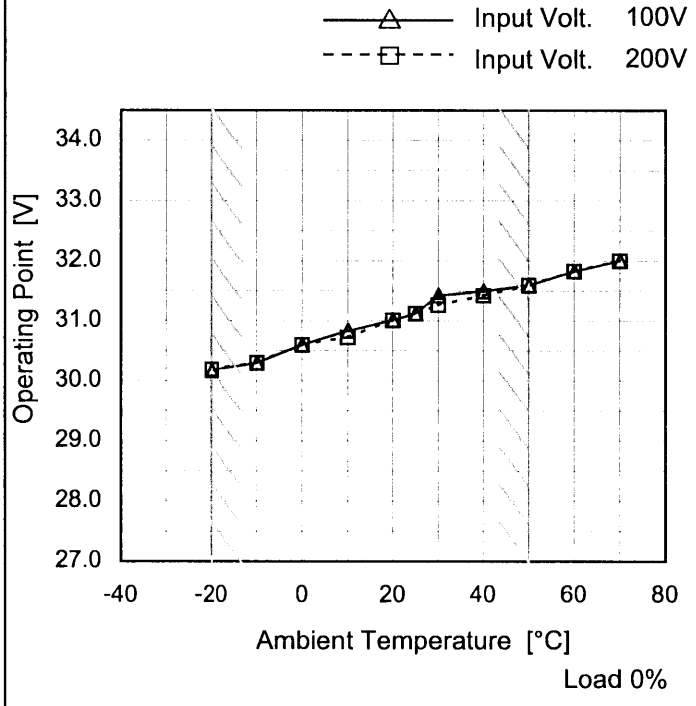
Load 0%

2.Values

Ambient Temperature [°C]	Operating Point [V]	
	Input Volt. 100[V]	Input Volt. 200[V]
-20	6.67	6.67
-10	6.66	6.66
0	6.64	6.61
10	6.64	6.66
20	6.66	6.65
25	6.65	6.62
30	6.64	6.63
40	6.63	6.63
50	6.63	6.64
60	6.64	6.64
70	6.64	6.64

Object	+24V2.1A

1.Graph



Load 0%

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]
-20	30.21	30.22
-10	30.33	30.33
0	30.63	30.63
10	30.86	30.75
20	31.04	31.04
25	31.15	31.15
30	31.45	31.29
40	31.52	31.45
50	31.62	31.62
60	31.85	31.85
70	32.03	32.03

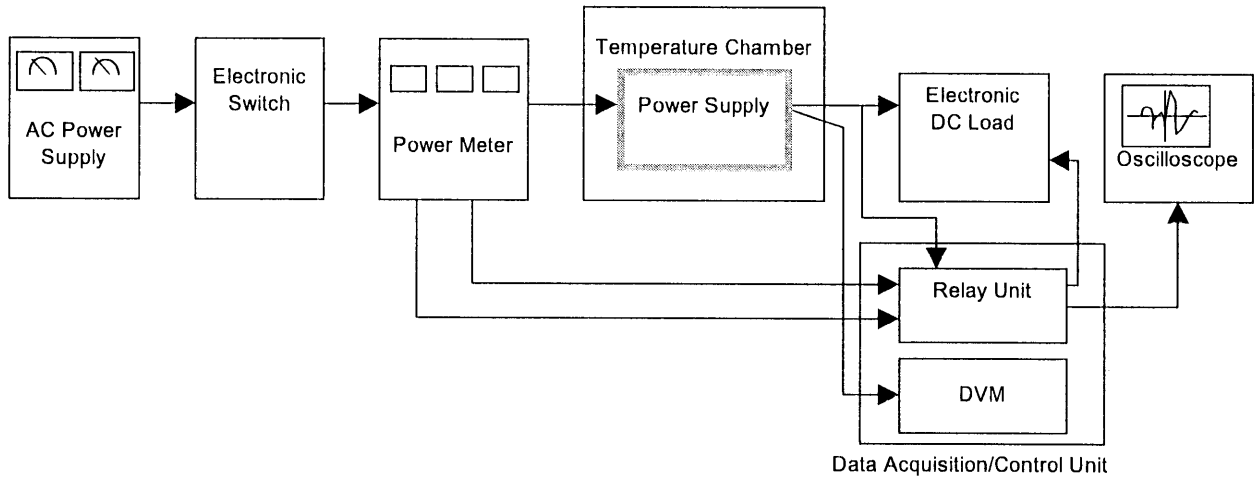


Figure A

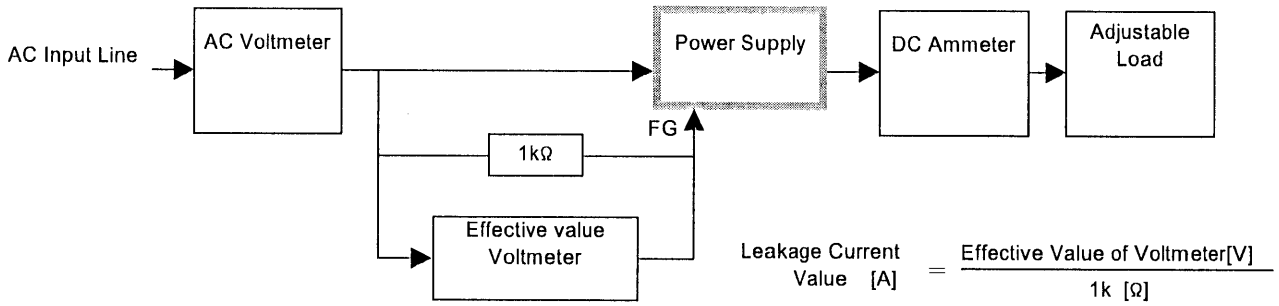


Figure B (DEN-AN)

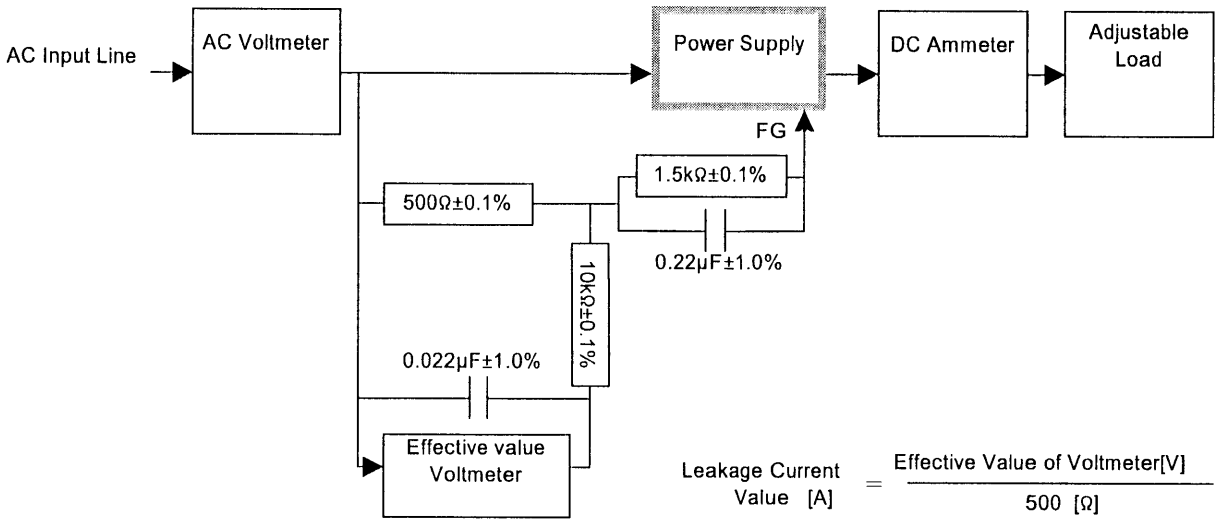


Figure B (IEC60950)