参考資料

COSEL

TEST DATA OF MODULE Z

(ACE series)

Regulated DC Power Supply
Jan.8. 2004

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Prepared by : J.Asano　Design Engineer

COSEL CO.,LTD.

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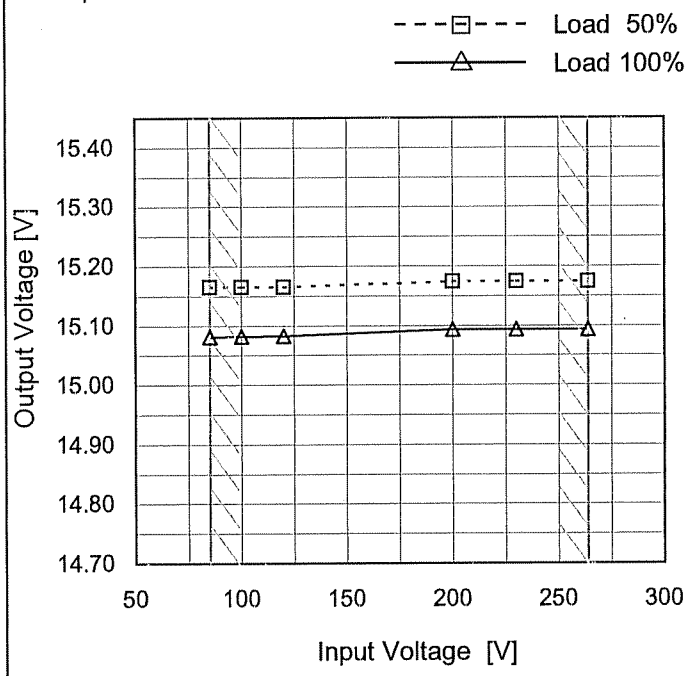
1.Graph

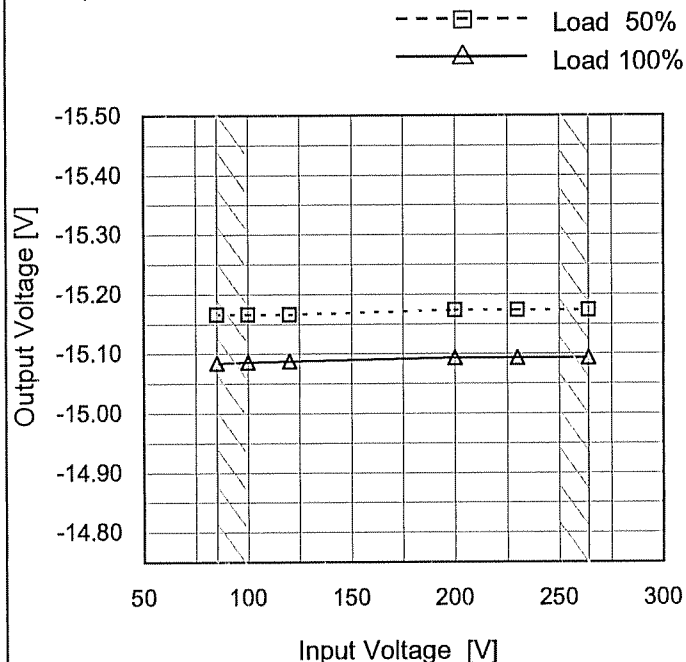


2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
85	15.165	15.081
100	15.165	15.082
120	15.165	15.083
200	15.174	15.093
230	15.174	15.093
264	15.174	15.093
--	-	-
--	-	-
--	-	-

Object	-15V2.5A

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	-15.166	-15.084
100	-15.166	-15.086
120	-15.166	-15.087
200	-15.173	-15.093
230	-15.173	-15.093
264	-15.173	-15.093
--	-	-
--	-	-
--	-	-

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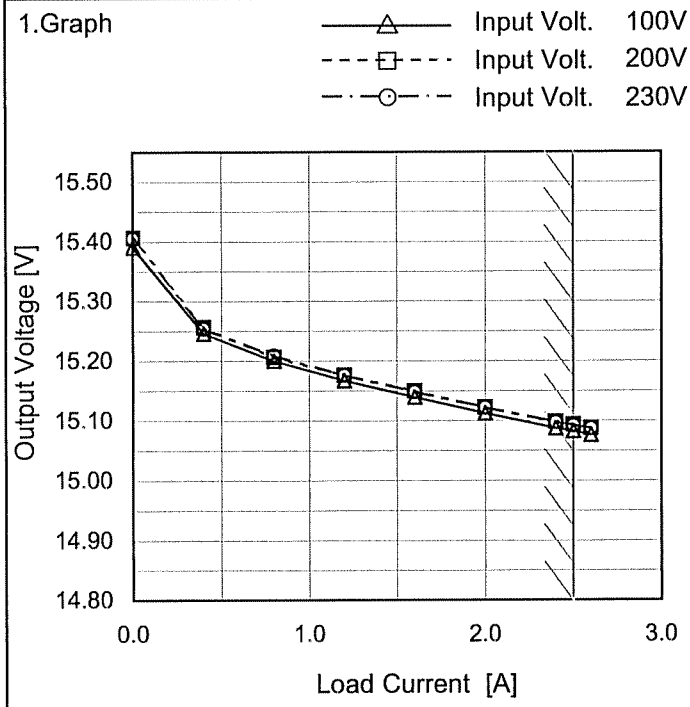
Model	MODULE Z
Item	Load Regulation

Temperature 25°C
Testing Circuitry Figure A

Object +15V2.5A

1.Graph

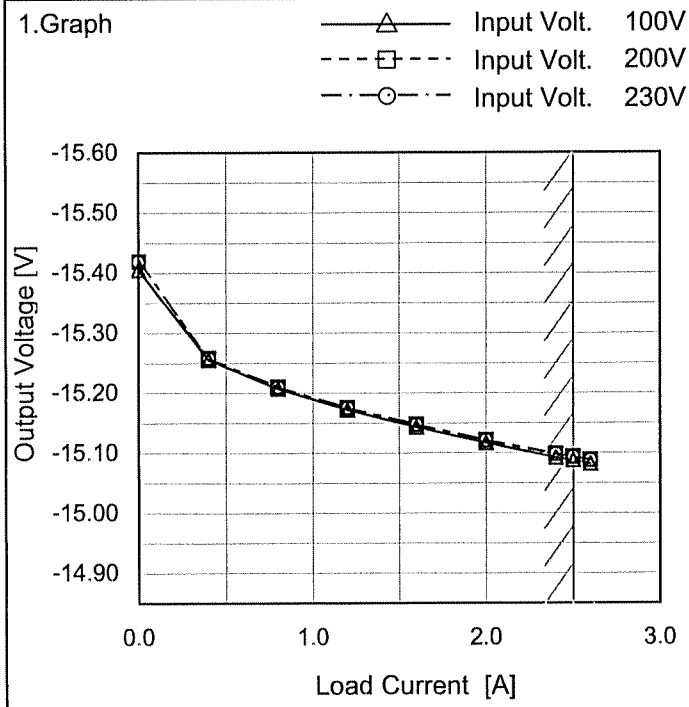


2.Values

Load Current [A]	Output Voltage [V] Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.0	15.390	15.406	15.405
0.4	15.246	15.256	15.254
0.8	15.200	15.206	15.209
1.2	15.167	15.176	15.176
1.6	15.139	15.149	15.148
2.0	15.112	15.122	15.122
2.4	15.087	15.098	15.097
2.5	15.082	15.093	15.092
2.6	15.076	15.087	15.087
--	-	-	-
--	-	-	-

Object -15V2.5A

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	-15.405	-15.419	-15.419
0.4	-15.255	-15.258	-15.258
0.8	-15.207	-15.210	-15.210
1.2	-15.172	-15.175	-15.175
1.6	-15.143	-15.147	-15.147
2.0	-15.117	-15.121	-15.121
2.4	-15.092	-15.098	-15.098
2.5	-15.088	-15.093	-15.093
2.6	-15.082	-15.088	-15.088
--	-	-	-
--	-	-	-

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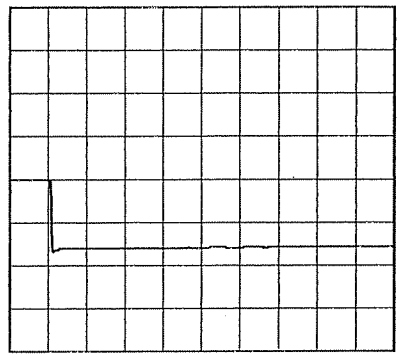
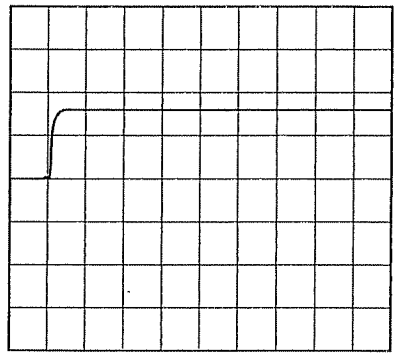
Model	MODULE Z
Item	Dynamic Load Response
Object	+15V2.5A

Temperature 25°C
Testing Circuitry Figure A

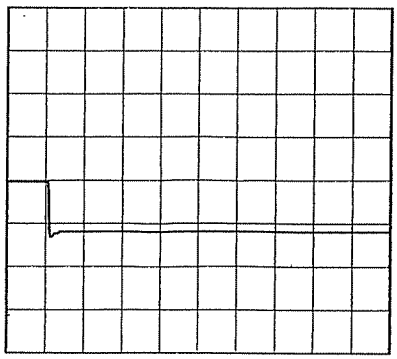
Input Volt. 100 V
Cycle 1000 ms

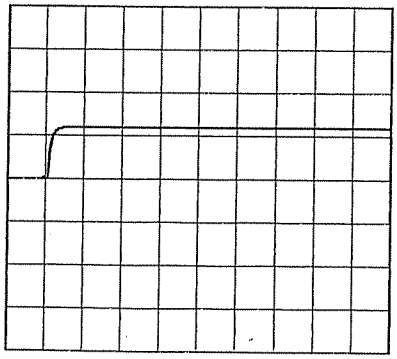
Min. Load (0 A) -- Load 100% (2.5 A)





Min. Load (0 A) -- Load 50% (1.25 A)





* The characteristic of AC200V is equal.

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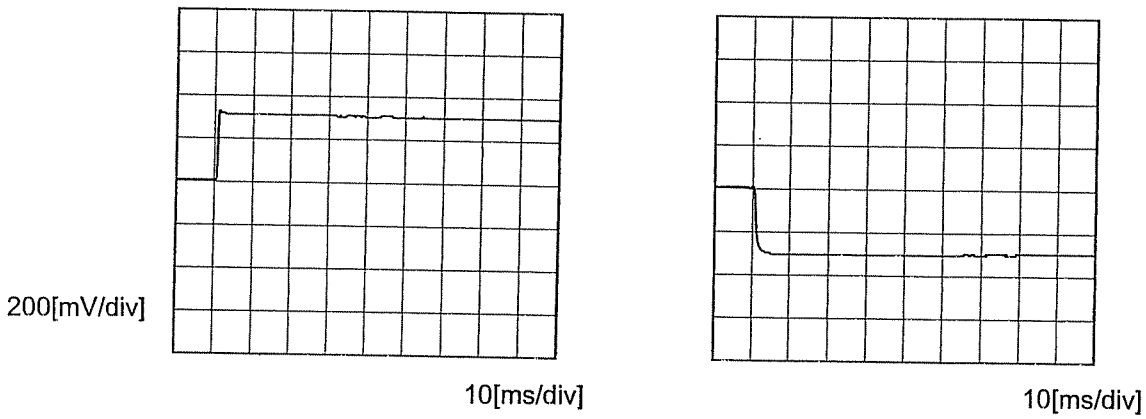
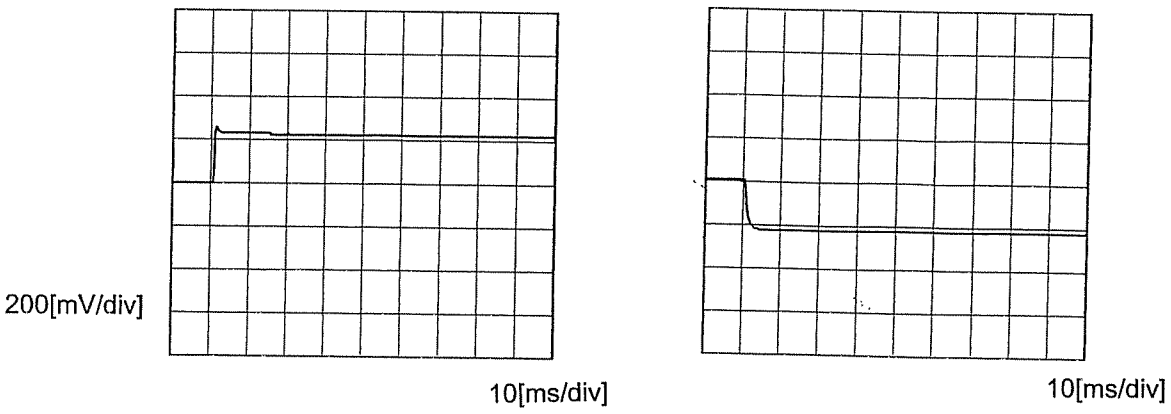
Model	MODULE Z	
Item	Dynamic Load Response	Temperature 25°C Testing Circuitry Figure A
Object	-15V2.5A	

Input Volt. 100 V
Cycle 1000 ms

Min. Load (0 A) -- Load 100% (2.5 A)



Min. Load (0 A) -- Load 50% (1.25 A)



* The characteristic of AC200V is equal.

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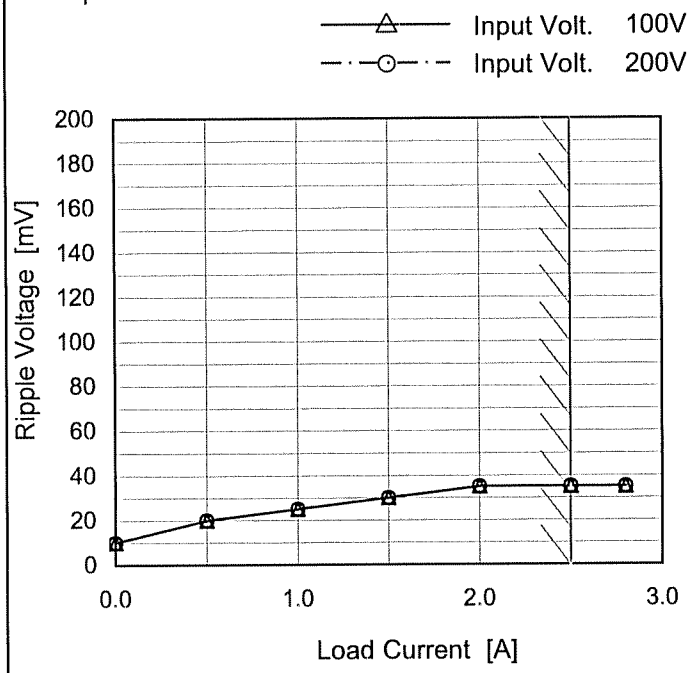
Model	MODULE Z
Item	Ripple Voltage (by Load Current)
Object	+15V2.5A

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

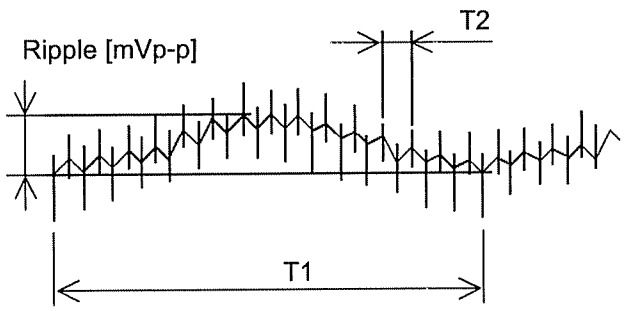


Fig. Complex Ripple Wave Form

2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
0.0	10	10
0.5	20	20
1.0	25	25
1.5	30	30
2.0	35	35
2.5	35	35
2.8	35	35
--	-	-
--	-	-
--	-	-
--	-	-

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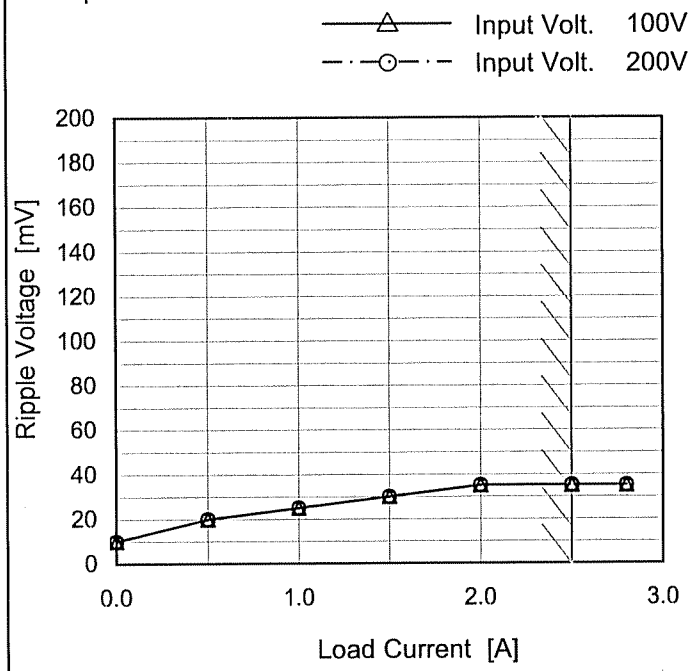
Model	MODULE Z
Item	Ripple Voltage (by Load Current)
Object	-15V2.5A

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

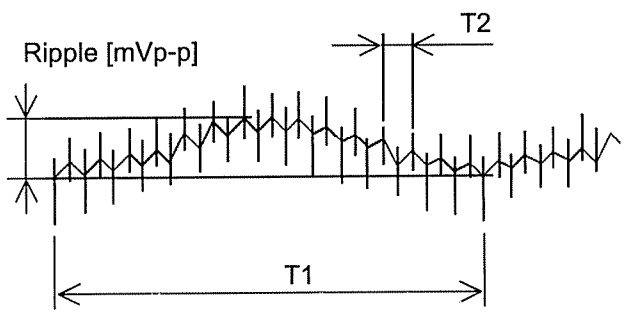


Fig. Complex Ripple Wave Form

2.Values

Load Current [A]	Ripple Voltage [mV] Input Volt. 100 [V]	Ripple Voltage [mV] Input Volt. 200 [V]
0.0	10	10
0.5	20	20
1.0	25	25
1.5	30	30
2.0	35	35
2.5	35	35
2.8	35	35
--	-	-
--	-	-
--	-	-
--	-	-

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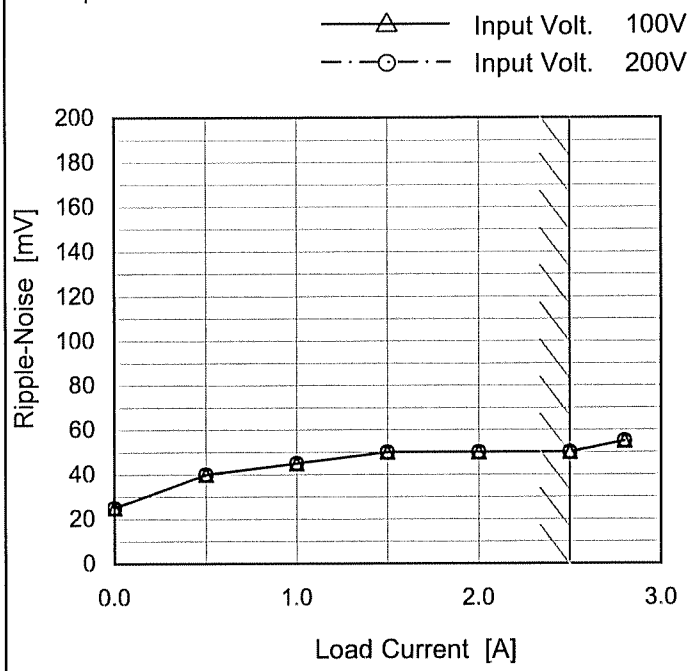
Model	MODULE Z
Item	Ripple-Noise
Object	+15V2.5A

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]	Ripple-Noise [mV] Input Volt. 200 [V]
0.0	25	25
0.5	40	40
1.0	45	45
1.5	50	50
2.0	50	50
2.5	50	50
2.8	55	55
--	-	-
--	-	-
--	-	-
--	-	-

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

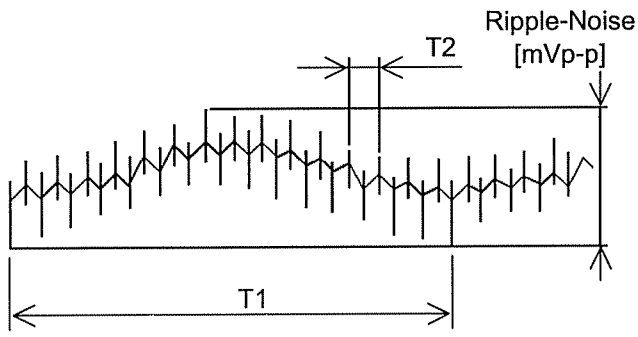


Fig. Complex Ripple Wave Form

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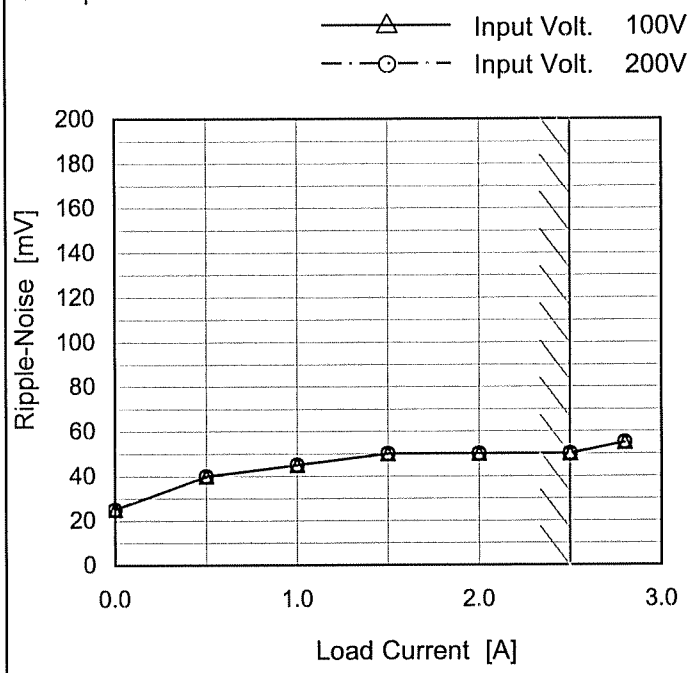
Model	MODULE Z
Item	Ripple-Noise
Object	-15V2.5A

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]	Ripple-Noise [mV] Input Volt. 200 [V]
0.0	25	25
0.5	40	40
1.0	45	45
1.5	50	50
2.0	50	50
2.5	50	50
2.8	55	55
--	-	-
--	-	-
--	-	-
--	-	-

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

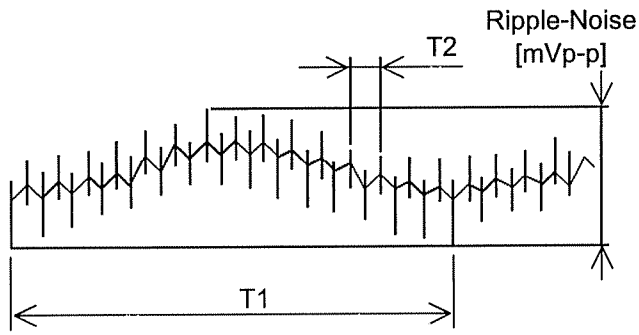


Fig. Complex Ripple Wave Form

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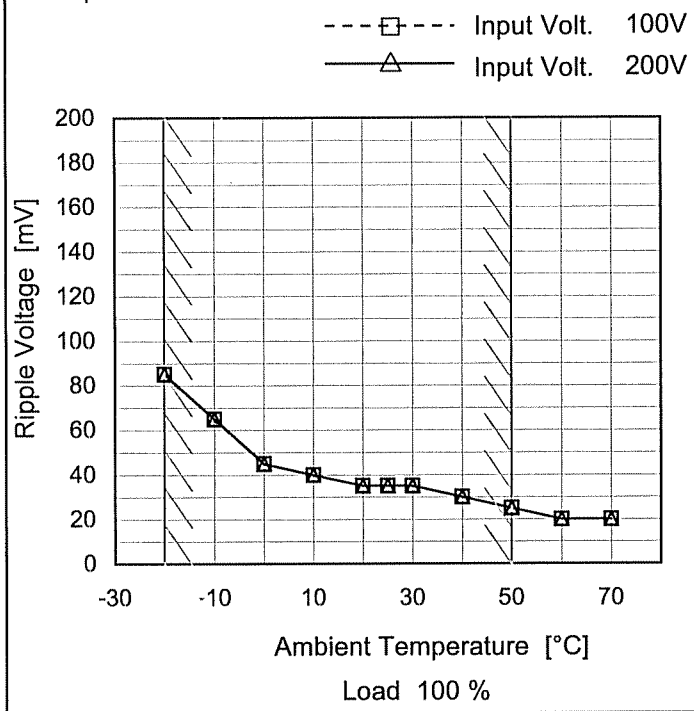
Model	MODULE Z
Item	Ripple Voltage (by Ambient Temp.)
Object	+15V2.5A

Testing Circuitry Figure A

1.Graph



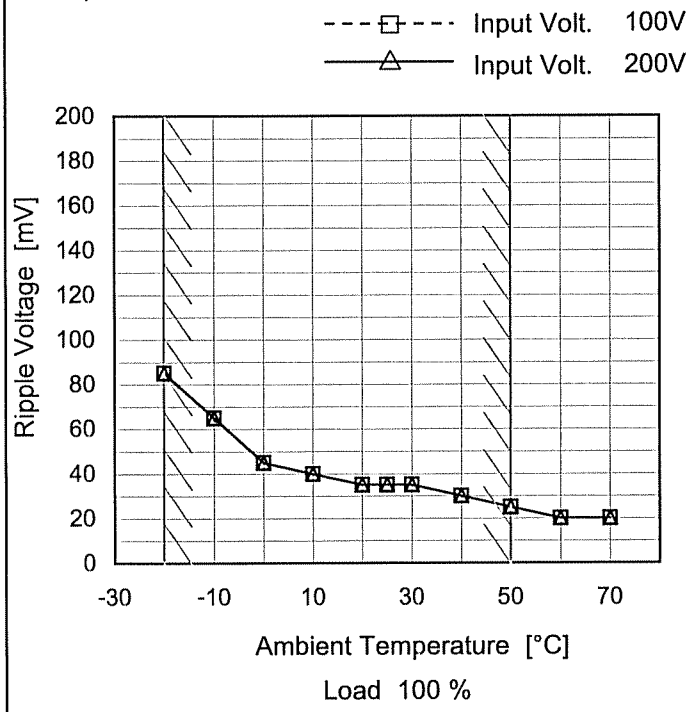
Load 100 %

2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
-20	85	85
-10	65	65
0	45	45
10	40	40
20	35	35
25	35	35
30	35	35
40	30	30
50	25	25
60	20	20
70	20	20

Object	-15V2.5A

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	85	85
-10	65	65
0	45	45
10	40	40
20	35	35
25	35	35
30	35	35
40	30	30
50	25	25
60	20	20
70	20	20

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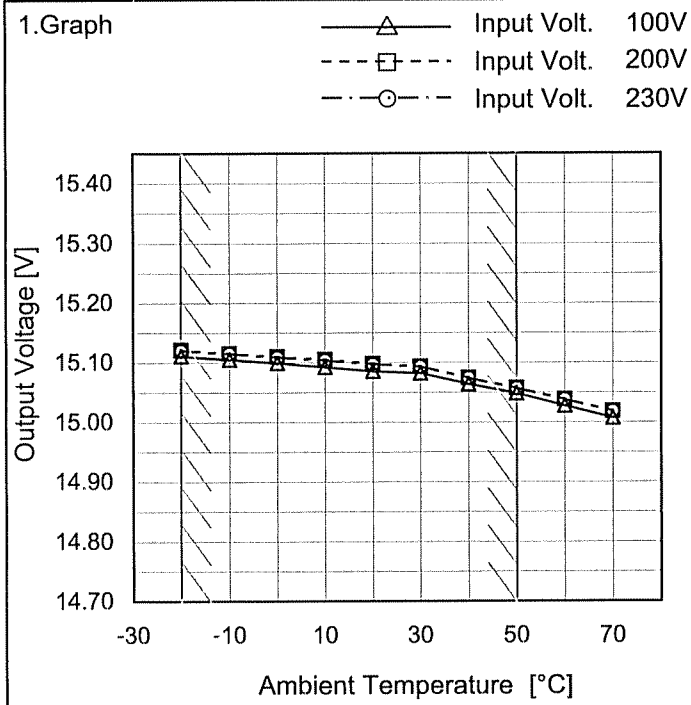
Model	MODULE Z
Item	Ambient Temperature Drift
Object	+15V2.5A

Testing Circuitry Figure A

1.Graph

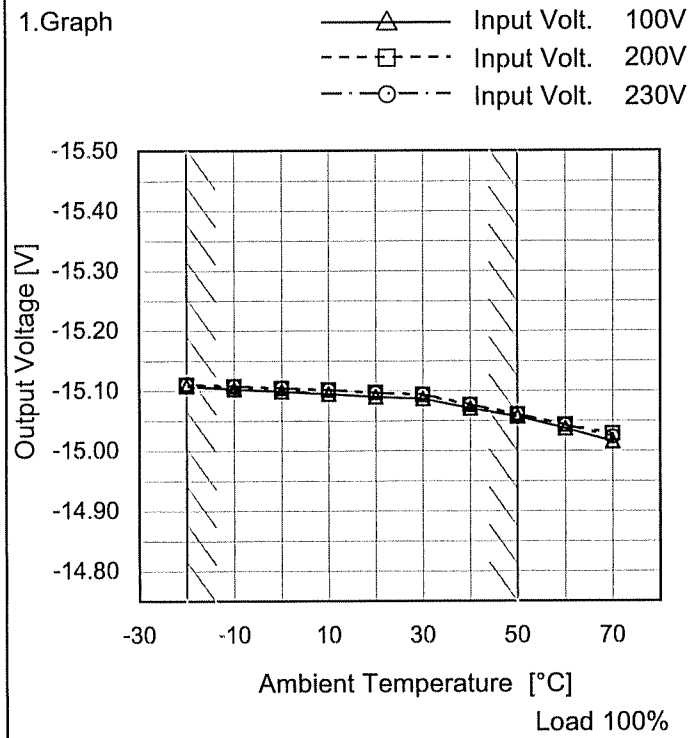


2.Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
-20	15.111	15.121	15.120
-10	15.105	15.115	15.115
0	15.099	15.110	15.109
10	15.092	15.105	15.104
20	15.085	15.098	15.097
30	15.082	15.093	15.093
40	15.064	15.074	15.074
50	15.048	15.057	15.057
60	15.027	15.038	15.038
70	15.007	15.018	15.018
--	-	-	-

Object	-15V2.5A

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]
-20	-15.108	-15.110	-15.111
-10	-15.103	-15.107	-15.108
0	-15.099	-15.104	-15.105
10	-15.095	-15.101	-15.102
20	-15.090	-15.097	-15.097
30	-15.087	-15.093	-15.094
40	-15.071	-15.076	-15.077
50	-15.057	-15.060	-15.061
60	-15.037	-15.043	-15.043
70	-15.015	-15.028	-15.023
--	-	-	-

COSEL

Model	MODULE Z	
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 - 2.5A (AVR 2):0 - 2.5A

* 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	+15V2.5A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	-20	170	0	15.370	±156	±1.0
Minimum Voltage	20	170	2.5	15.058		

Object	-15V2.5A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	25	170	0	-15.386	±163	±1.1
Minimum Voltage	50	170	2.5	-15.060		

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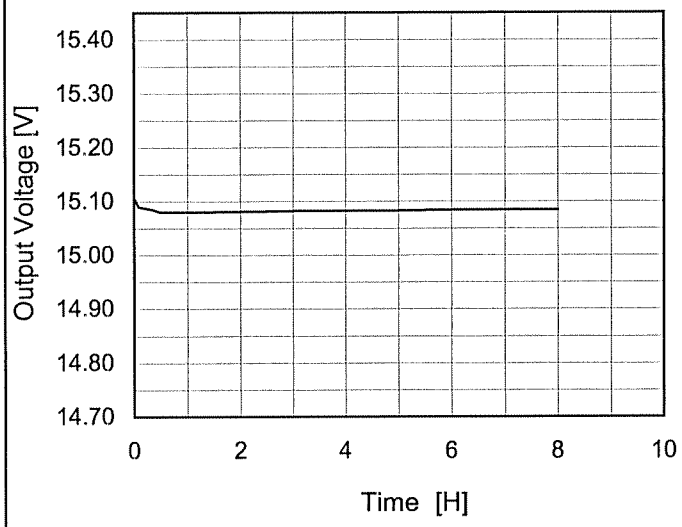
Model	MODULE Z
Item	Time Lapse Drift
Object	+15V2.5A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



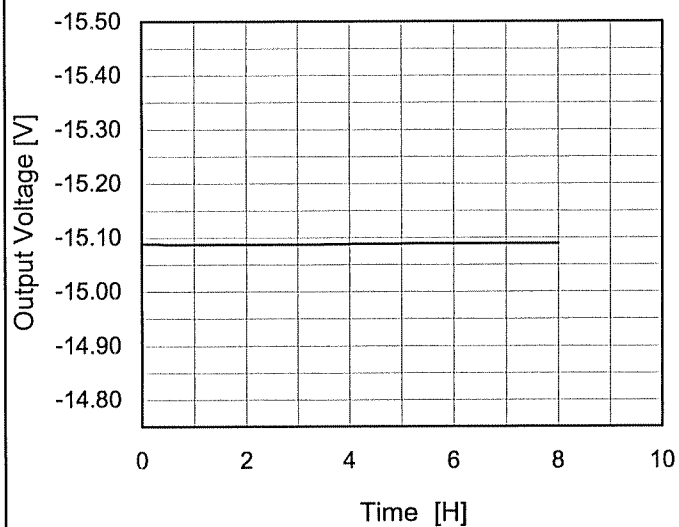
Input Volt. 100V
Load 100%

2.Values

Time since start [H]	Output Voltage [V]
0.0	15.103
0.5	15.080
1.0	15.080
2.0	15.081
3.0	15.082
4.0	15.082
5.0	15.083
6.0	15.084
7.0	15.084
8.0	15.084

Object	-15V2.5A

1.Graph



Input Volt. 100V
Load 100%

* The characteristic of AC200V is equal.

2.Values

Time since start [H]	Output Voltage [V]
0.0	-15.090
0.5	-15.087
1.0	-15.087
2.0	-15.087
3.0	-15.087
4.0	-15.088
5.0	-15.089
6.0	-15.089
7.0	-15.089
8.0	-15.089

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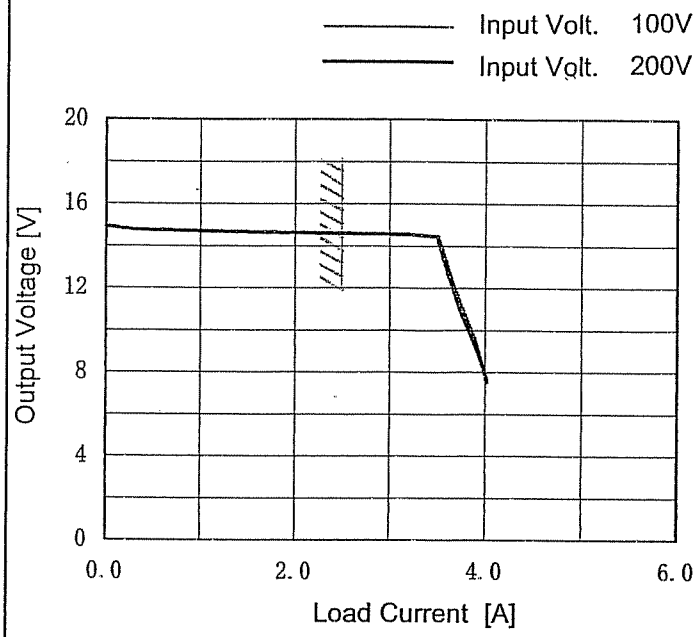
Model	MODULE Z
Item	Overcurrent Protection
Object	+15V2.5A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



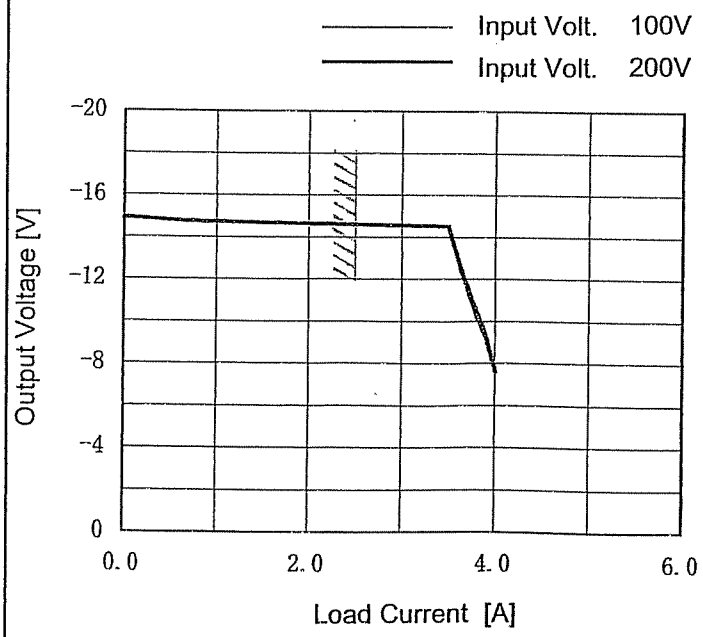
Intermittent operation occurs when the output voltage is from 7.5V to 0V.

2.Values

Output Voltage [V]	Load Current [A]	
	Input Volt. 100[V]	Input Volt. 200[V]
15.00	2.50	2.50
14.25	3.51	3.52
13.50	3.56	3.57
12.00	3.66	3.68
10.50	3.79	3.81
9.00	3.91	3.92
7.50	4.02	4.00
---	-	-
---	-	-
---	-	-
---	-	-
---	-	-

Object	-15V2.5A

1.Graph



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

Intermittent operation occurs when the output voltage is from 7.5V to 0V.

2.Values

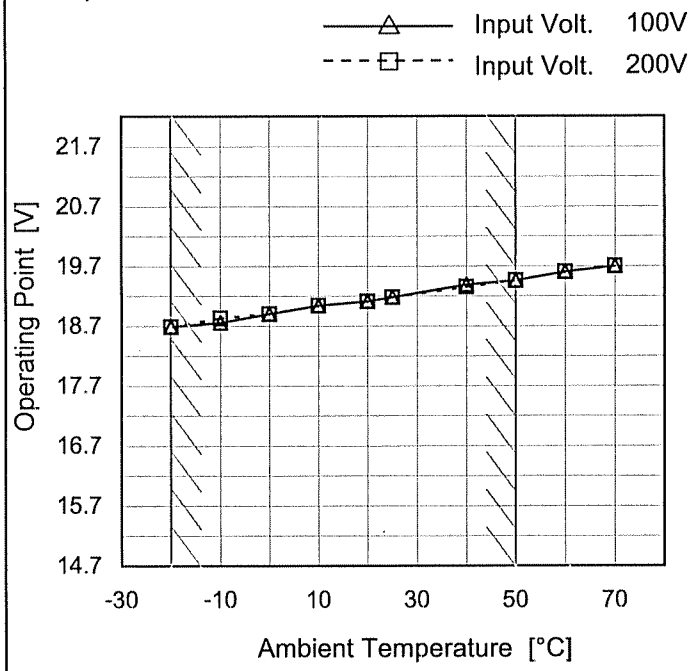
Output Voltage [V]	Load Current [A]	
	Input Volt. 100[V]	Input Volt. 200[V]
-15.0	2.50	2.50
-14.3	3.51	3.53
-13.5	3.56	3.58
-12.0	3.66	3.68
-10.5	3.78	3.81
-9.0	3.92	3.92
-7.5	4.01	4.00
---	-	-
---	-	-
---	-	-
---	-	-
---	-	-

COSEL

Model	MODULE Z
Item	Overvoltage Protection
Object	+15V2.5A

Testing Circuitry Figure A

1.Graph



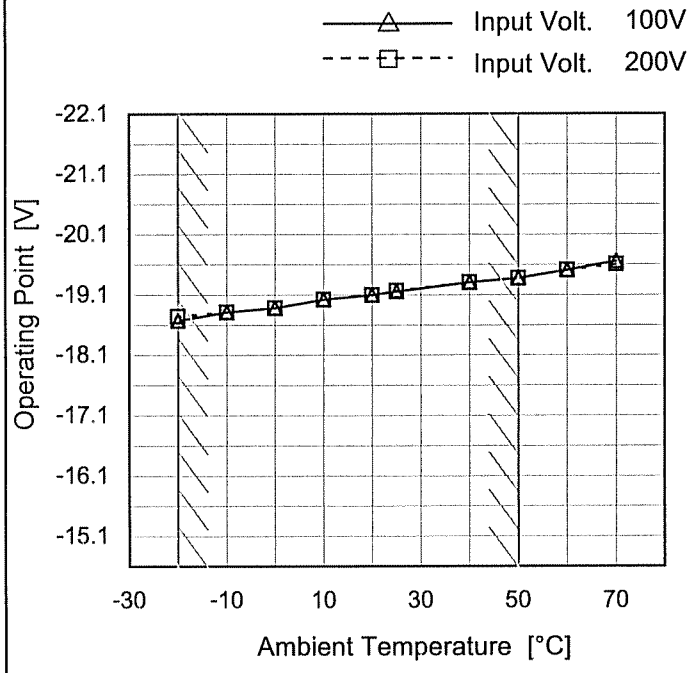
Load 0%

2.Values

Ambient Temperature [°C]	Operating Point [V] Input Volt. 100[V]	Operating Point [V] Input Volt. 200[V]
-20	18.69	18.69
-10	18.76	18.83
0	18.90	18.90
10	19.04	19.04
20	19.11	19.11
25	19.18	19.18
40	19.39	19.35
50	19.46	19.46
60	19.60	19.60
70	19.70	19.70
--	-	-

Object	-15V2.5A

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]	Operating Point [V] Input Volt. 200[V]
-20	-18.69	-18.76
-10	-18.83	-18.83
0	-18.90	-18.90
10	-19.04	-19.04
20	-19.11	-19.11
25	-19.17	-19.18
40	-19.32	-19.32
50	-19.39	-19.39
60	-19.52	-19.52
70	-19.67	-19.62
--	-	-

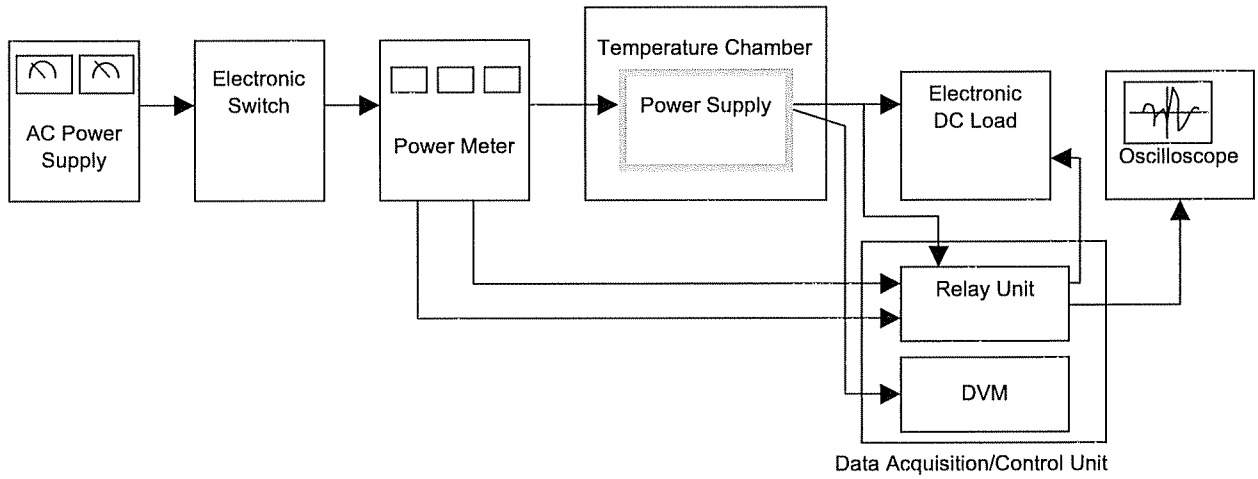


Figure A

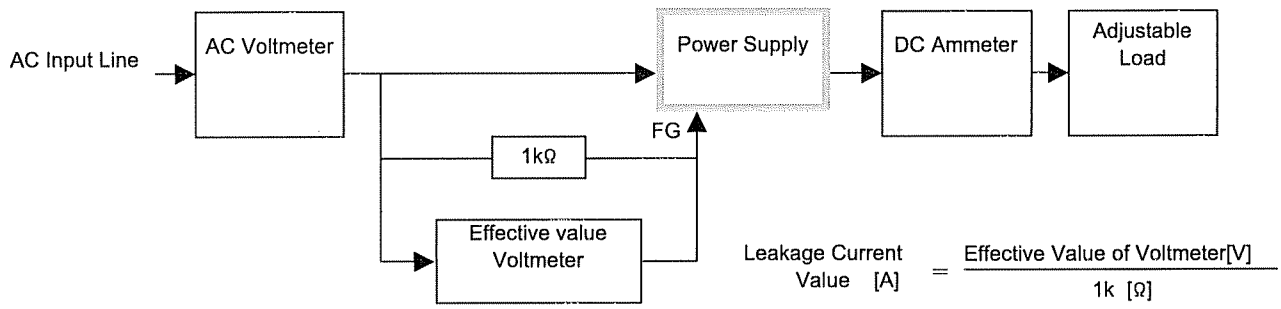


Figure B (DEN-AN)

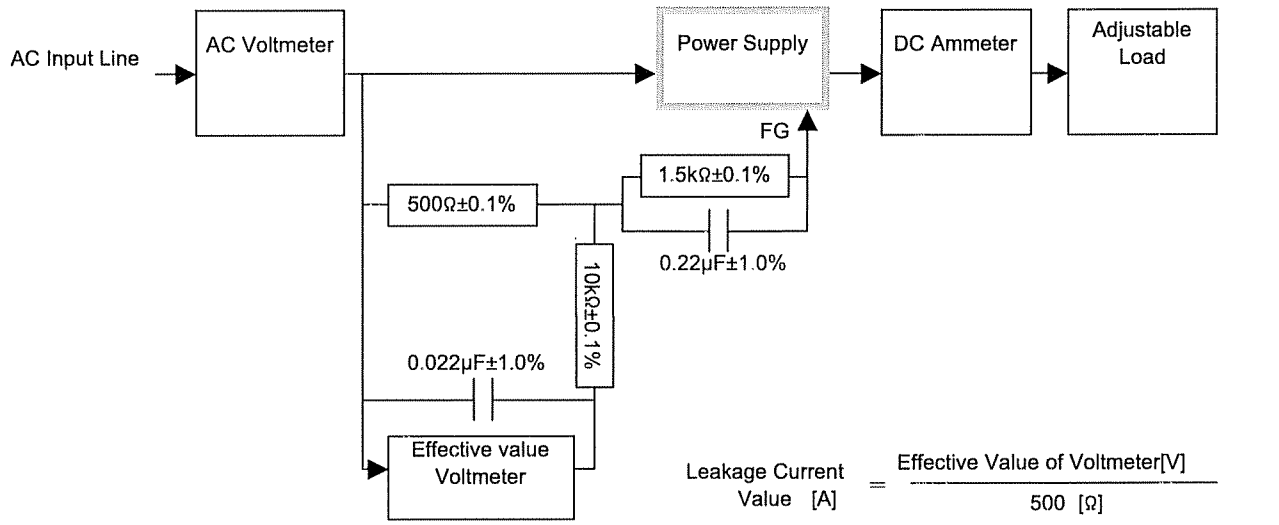


Figure B (IEC60950)