



TEST DATA OF ZUW1R51215  
(12.0V INPUT)

Regulated DC Power Supply

Date : June 14, 1996

Approved by :           *T. Sugimori*            
Design Manager

Prepared by :           *K. Shimano*            
Design Engineer

コーセル株式会社  
COSEL CO., LTD.

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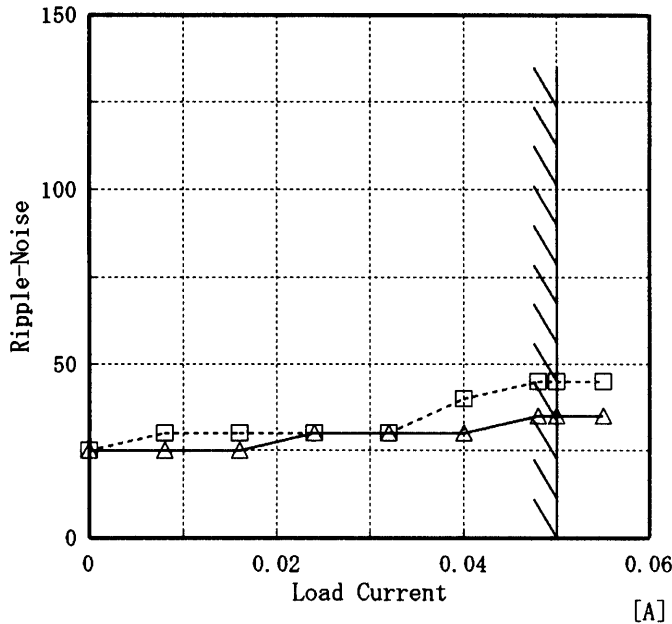
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Model	ZUW1R51215	Temperature	25°C
Item	Ripple-Noise リップルノイズ	Testing Circuitry	Figure A

Object +15V 0.05A

1. Graph  
 [mV]  
 -----□----- Input Volt. 9.0V  
 -----△----- Input Volt. 18.0V



2. Values

Load current [A]	Input Volt. 9.0 [V]	Input Volt. 18.0 [V]
	Ripple-Noise [mV]	Ripple-Noise [mV]
0.000	25	25
0.008	30	25
0.016	30	25
0.024	30	30
0.032	30	30
0.040	40	30
0.048	45	35
0.050	45	35
0.055	45	35
—	—	—
—	—	—

Ripple-Noise is shown as p-p in the figure below.  
 Note: Slanted line shows the range of the rated load current.

リップルノイズは、下図 p-p 値で示される。  
 (注)斜線は定格負荷電流範囲を示す。

T1: Due to AC Input Line  
 入力商用周期  
 T2: Due to Switching  
 スイッチング周期

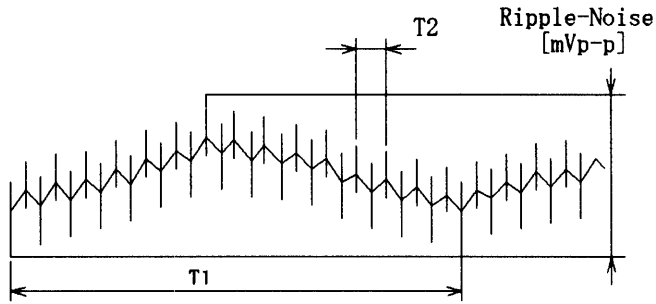
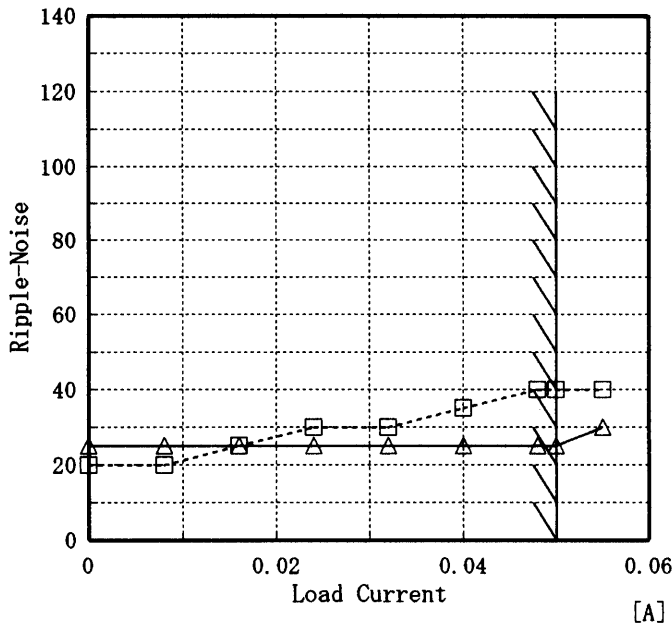


Fig. Complex Ripple Wave Form  
 図 リップル波形詳細図



Model	ZUW1R51215	Temperature	25°C
Item	Ripple-Noise リップルノイズ	Testing Circuitry	Figure A
Object	-15V0.05A		

1. Graph	-----□----- Input Volt. 9.0V
[mV]	-----△----- Input Volt. 18.0V



2. Values

Load current [A]	Input Volt. 9.0 [V]	Input Volt. 18.0 [V]
	Ripple-Noise [mV]	Ripple-Noise [mV]
0.000	20	25
0.008	20	25
0.016	25	25
0.024	30	25
0.032	30	25
0.040	35	25
0.048	40	25
0.050	40	25
0.055	40	30
—	—	—
—	—	—

Ripple-Noise is shown as p-p in the figure below.  
 Note: Slanted line shows the range of the rated load current.

リップルノイズは、下図 p-p 値で示される。  
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 T2: Due to Switching  
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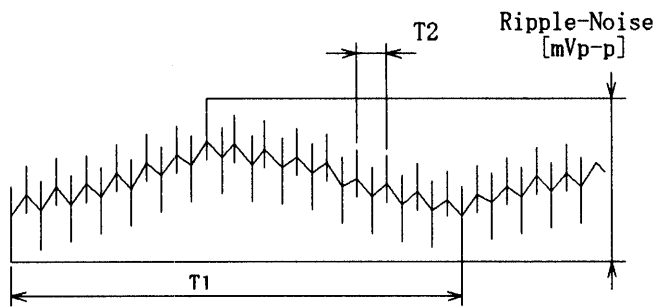


Fig. Complex Ripple Wave Form  
 図 リップル波形詳細図



<p>Model ZUW1R51215</p> <p>Item Overcurrent Protection 過電流保護</p> <p>Object +15V0.05A</p>		<p>Temperature 25°C</p> <p>Testing Circuitry Figure A</p>																																																								
<p>1. Graph</p> <p>[V]</p> <p>Input Volt. 9.0 V Input Volt. 12.0 V Input Volt. 18.0 V</p> <p>Output Voltage [V]</p> <p>Load Current [A]</p>		<p>2. Values</p> <table border="1"> <thead> <tr> <th rowspan="2">Output Voltage [V]</th> <th>Input Volt. 9.0[V]</th> <th>Input Volt. 12.0[V]</th> <th>Input Volt. 18.0[V]</th> </tr> <tr> <th>Load Current [A]</th> <th>Load Current [A]</th> <th>Load Current [A]</th> </tr> </thead> <tbody> <tr><td>15.00</td><td>0.080</td><td>0.100</td><td>0.106</td></tr> <tr><td>14.25</td><td>0.110</td><td>0.124</td><td>0.109</td></tr> <tr><td>13.50</td><td>0.114</td><td>0.126</td><td>0.109</td></tr> <tr><td>12.00</td><td>0.120</td><td>0.131</td><td>0.110</td></tr> <tr><td>10.50</td><td>0.126</td><td>0.134</td><td>0.110</td></tr> <tr><td>9.00</td><td>0.131</td><td>0.137</td><td>0.109</td></tr> <tr><td>7.50</td><td>0.137</td><td>0.138</td><td>0.106</td></tr> <tr><td>6.00</td><td>0.142</td><td>0.138</td><td>0.103</td></tr> <tr><td>4.50</td><td>0.146</td><td>0.137</td><td>0.101</td></tr> <tr><td>3.00</td><td>0.152</td><td>0.139</td><td>0.105</td></tr> <tr><td>1.50</td><td>0.159</td><td>0.144</td><td>0.114</td></tr> <tr><td>0.00</td><td>0.189</td><td>0.231</td><td>0.179</td></tr> </tbody> </table>		Output Voltage [V]	Input Volt. 9.0[V]	Input Volt. 12.0[V]	Input Volt. 18.0[V]	Load Current [A]	Load Current [A]	Load Current [A]	15.00	0.080	0.100	0.106	14.25	0.110	0.124	0.109	13.50	0.114	0.126	0.109	12.00	0.120	0.131	0.110	10.50	0.126	0.134	0.110	9.00	0.131	0.137	0.109	7.50	0.137	0.138	0.106	6.00	0.142	0.138	0.103	4.50	0.146	0.137	0.101	3.00	0.152	0.139	0.105	1.50	0.159	0.144	0.114	0.00	0.189	0.231	0.179
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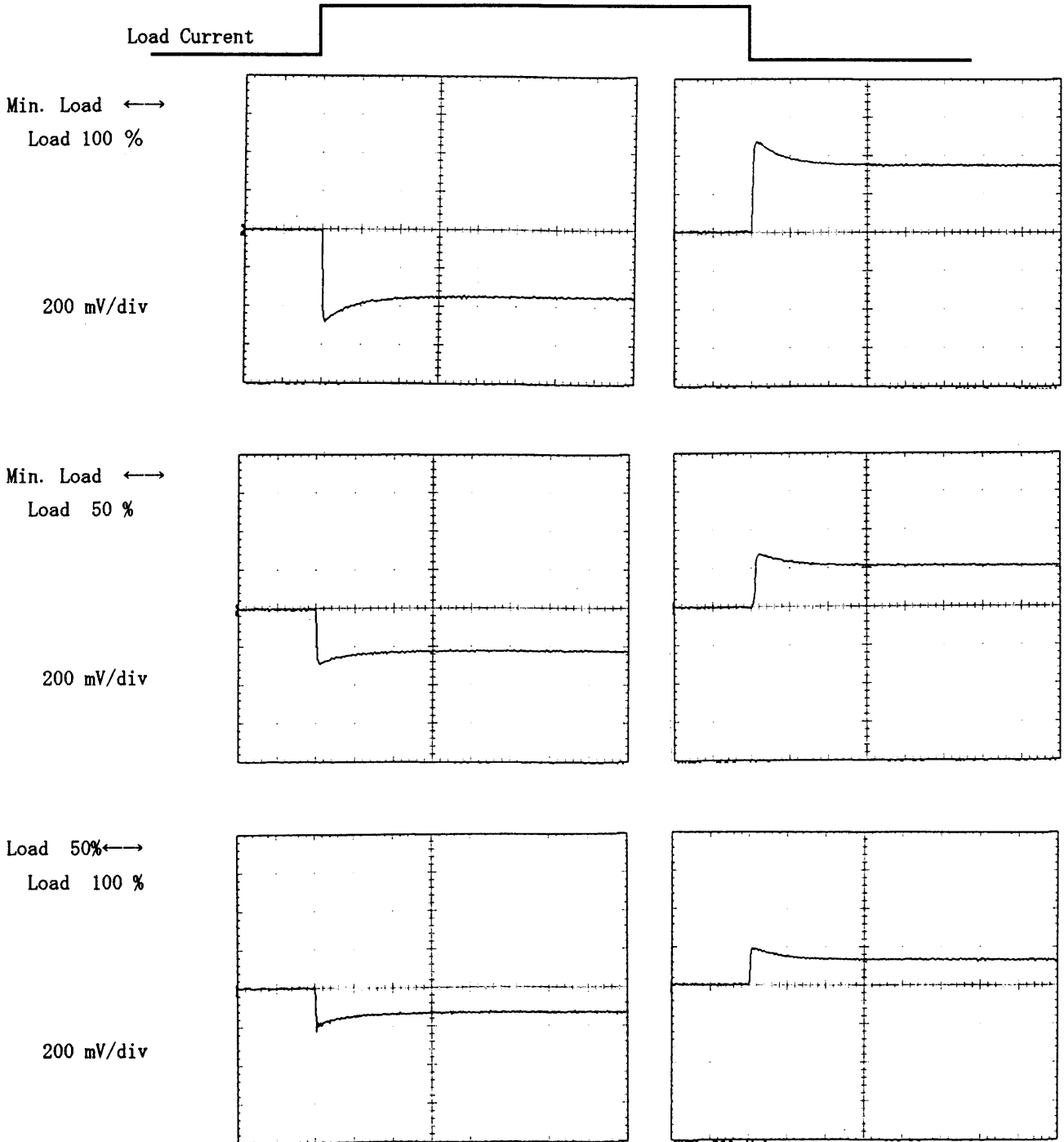
# COSEL

Model	ZUW1R51215	Temperature	25°C
Item	Dynamic Load Responce 動的負荷変動	Testing Circuitry	Figure A
Object	+15V0.05A		

Input Volt. 12.0 V

Cycle 100 mS

Load Current



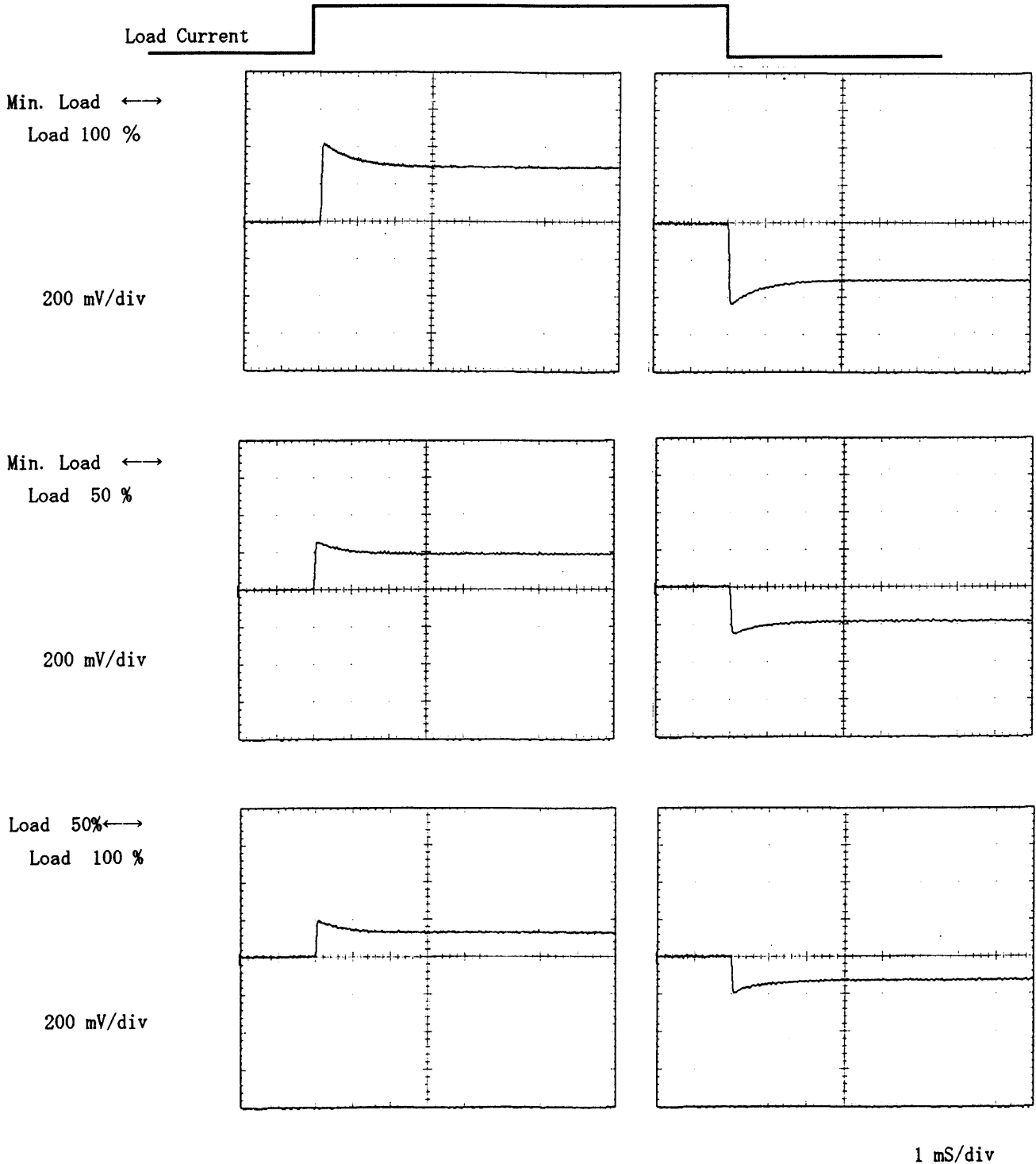
1 mS/div



Model	ZUW1R51215	Temperature	25°C
Item	Dynamic Load Responce 動的負荷変動	Testing Circuitry	Figure A
Object	-15V0.05A		

Input Volt. 12.0 V  
Cycle 100 mS

Load Current

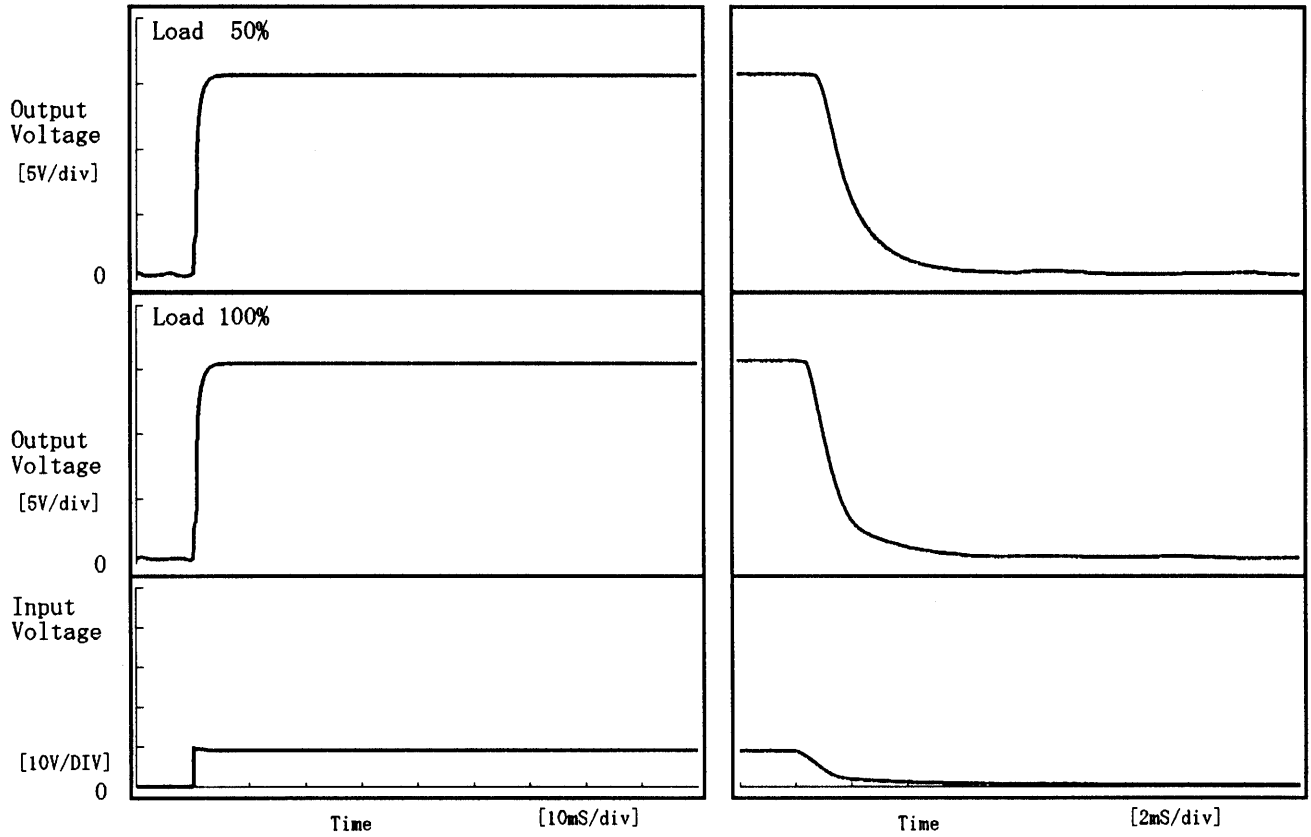




Model	ZUW1R51215	Temperature	25°C
Item	Rise and Fall Time 立上り、立下り時間	Testing Circuitry	Figure A
Object	+15V0.05A		

1. Graph

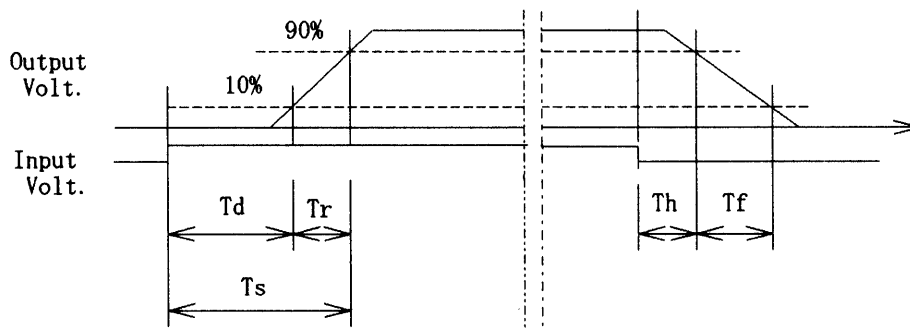
Input Volt. 9.0 V



2. Values

[mS]

Load \ Time	T d	T r	T s	T h	T f
50 %	0.10	1.40	1.50	1.12	2.79
100 %	0.10	1.50	1.60	0.67	2.60

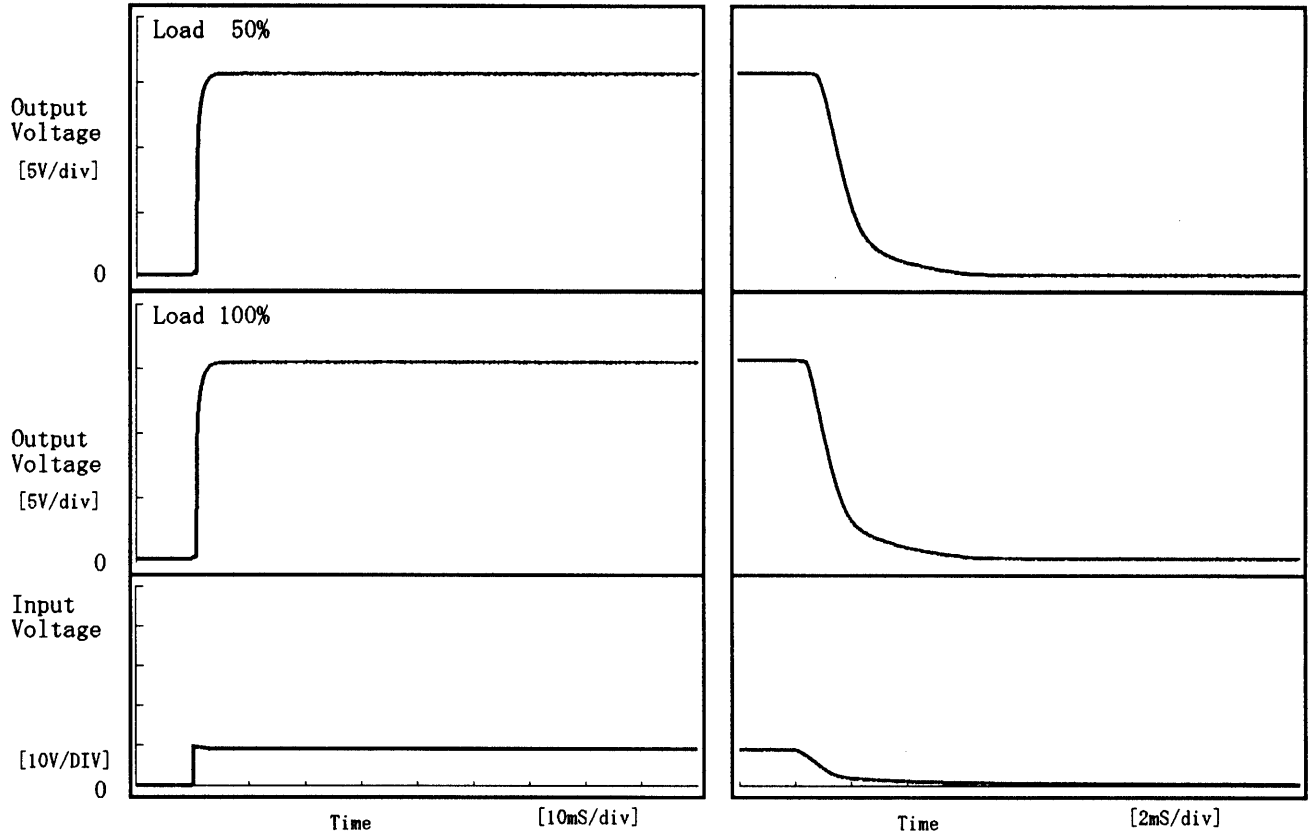




Model	ZUW1R51215	Temperature	25°C
Item	Rise and Fall Time 立上り、立下り時間	Testing Circuitry	Figure A
Object	-15V0.05A		

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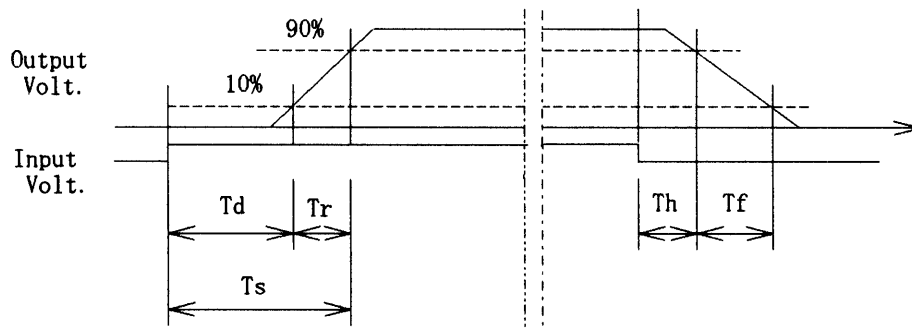
Input Volt. 9.0 V



2. Values

[mS]

Load \ Time	T d	T r	T s	T h	T f
50 %	0.55	0.95	1.50	1.10	2.37
100 %	0.55	1.05	1.60	0.67	2.51





Model		ZUW1R51215		Testing Circuitry Figure A																																																	
Item		Ambient Temperature Drift 周囲温度変動																																																			
Object		+15V0.05A		2. Values																																																	
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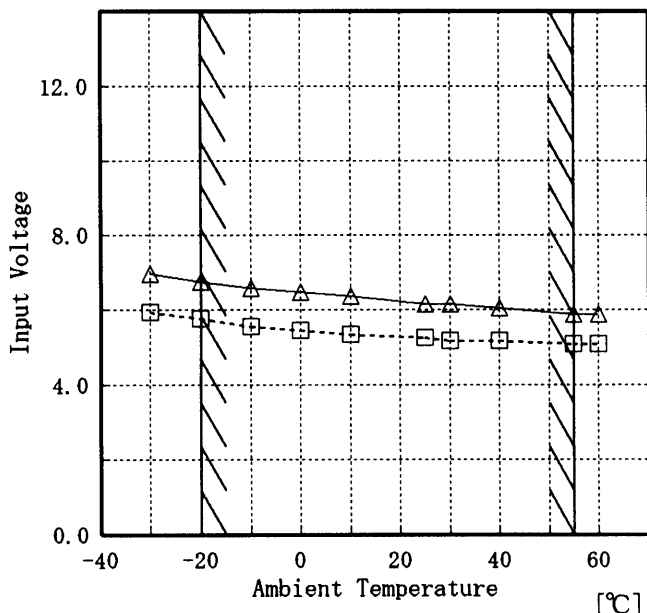


Model	ZUW1R51215
Item	Minimum Input Voltage for Regulated Output Voltage 最低レギュレーション電圧
Object	+15V0.05A

Testing Circuitry Figure A

1. Graph  
[V]

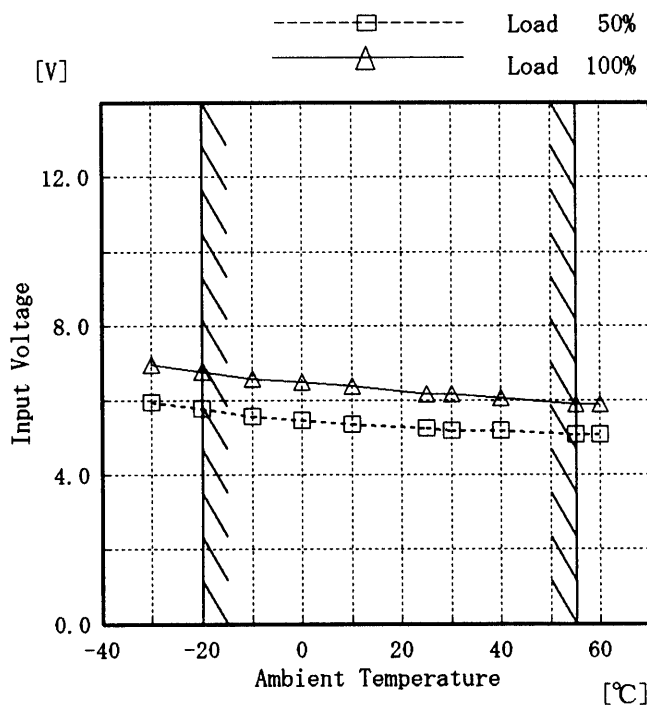
-----□----- Load 50%  
-----△----- Load 100%



2. Values

Ambient Temp. [°C]	Load 50%	Load 100%
	Input Volt. [V]	Input Volt. [V]
-30	6.0	7.0
-20	5.8	6.8
-10	5.6	6.6
0	5.5	6.5
10	5.4	6.4
25	5.3	6.2
30	5.2	6.2
40	5.2	6.1
55	5.1	5.9
60	5.1	5.9
—	—	—

Object	-15V0.05A
--------	-----------



2. Values

Ambient Temp. [°C]	Load 50%	Load 100%
	Input Volt. [V]	Input Volt. [V]
-30	6.0	7.0
-20	5.8	6.8
-10	5.6	6.6
0	5.5	6.5
10	5.4	6.4
25	5.3	6.2
30	5.2	6.2
40	5.2	6.1
55	5.1	5.9
60	5.1	5.9
—	—	—

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

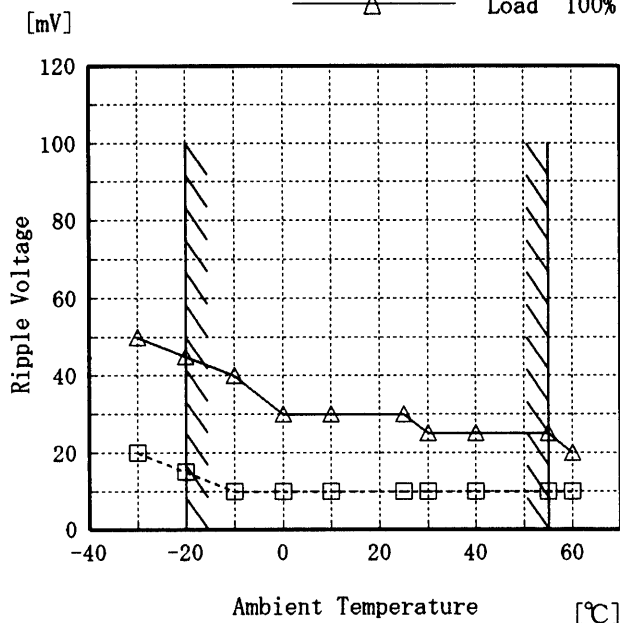
(注)斜線は定格周囲温度範囲を示す。





Model	ZUW1R51215	Testing Circuitry Figure A
Item	Ripple Voltage (by Ambient Temp.) リップル電圧 (周囲温度特性)	
Object	+15V0.05A	

1. Graph -----□----- Load 50%  
-----△----- Load 100%



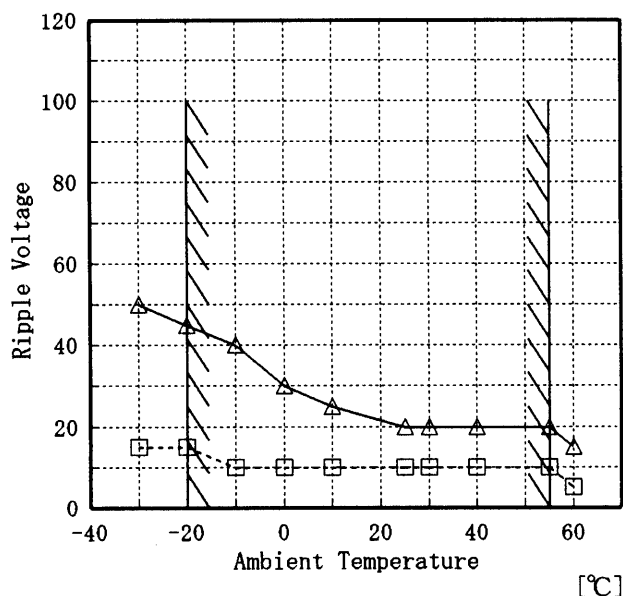
Input Volt. 9.0 V

2. Values

Ambient Temp. [°C]	Load 50%	Load 100%
	Ripple Output Volt. [mV]	Ripple Output Volt. [mV]
-30	20	50
-20	15	45
-10	10	40
0	10	30
10	10	30
25	10	30
30	10	25
40	10	25
55	10	25
60	10	20
—	—	—

Object -15V0.05A

1. Graph -----□----- Load 50%  
-----△----- Load 100%



Input Volt. 9.0 V

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

(注)斜線は定格周囲温度範囲を示す。

2. Values

Ambient Temp. [°C]	Load 50%	Load 100%
	Ripple Output Volt. [mV]	Ripple Output Volt. [mV]
-30	15	50
-20	15	45
-10	10	40
0	10	30
10	10	25
25	10	20
30	10	20
40	10	20
55	10	20
60	5	15
—	—	—



<b>COSEL</b>																									
Model	ZUW1R51215	Temperature	25 °C																						
Item	Time Lapse Drift 経時ドリフト	Testing Circuitry	Figure A																						
Object	+15V0.05A																								
1. Graph		2. Values																							
<div style="display: flex; align-items: flex-start;"> <div style="margin-right: 20px;"> <p>[V]</p> <p style="text-align: center;">Time [H]</p> </div> <table border="1" style="border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="padding: 5px;">Time since start [H]</th> <th style="padding: 5px;">Output Voltage [V]</th> </tr> </thead> <tbody> <tr><td style="padding: 5px;">0.0</td><td style="padding: 5px;">15.239</td></tr> <tr><td style="padding: 5px;">0.5</td><td style="padding: 5px;">15.239</td></tr> <tr><td style="padding: 5px;">1.0</td><td style="padding: 5px;">15.240</td></tr> <tr><td style="padding: 5px;">2.0</td><td style="padding: 5px;">15.240</td></tr> <tr><td style="padding: 5px;">3.0</td><td style="padding: 5px;">15.240</td></tr> <tr><td style="padding: 5px;">4.0</td><td style="padding: 5px;">15.240</td></tr> <tr><td style="padding: 5px;">5.0</td><td style="padding: 5px;">15.240</td></tr> <tr><td style="padding: 5px;">6.0</td><td style="padding: 5px;">15.240</td></tr> <tr><td style="padding: 5px;">7.0</td><td style="padding: 5px;">15.240</td></tr> <tr><td style="padding: 5px;">8.0</td><td style="padding: 5px;">15.240</td></tr> </tbody> </table> </div>		Time since start [H]	Output Voltage [V]	0.0	15.239	0.5	15.239	1.0	15.240	2.0	15.240	3.0	15.240	4.0	15.240	5.0	15.240	6.0	15.240	7.0	15.240	8.0	15.240		
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Model		ZUW1R51215	Testing Circuitry Figure A
Item		Output Voltage Accuracy 定電圧精度	

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 : -20~55 °C

Input Voltage : 9.0~18.0 V

Load Current ( AVR 1 ) : 0.00~0.05 A

( AVR 2 ) : 0.00~0.05 A

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

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

定電圧精度

周囲温度、入力電圧、負荷を下記仕様内で、任意に変動させたときの出力電圧の変動をいう。

周囲温度 -20~55 °C

入力電圧 9.0~18.0 V

負荷電流 (AVR 1) 0.00~0.05 A

(AVR 2) 0.00~0.05 A

\* 定電圧精度(変動値) =  $\pm(\text{出力電圧の最高値} - \text{出力電圧の最低値}) / 2$

$$* \text{定電圧精度(変動率)} = \frac{\text{変動値}}{\text{定格出力電圧}} \times 100$$

Object +15V0.05A

Item	Temperature [°C]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy(Ration) [%]
Maximum Voltage	-20	12.0	0.05	15.235	±155	±1.1
Minimum Voltage	55	9.0	0.00	14.925		

Object -15V0.05A

Item	Temperature [°C]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy(Ration) [%]
Maximum Voltage	-20	12.0	0.05	-15.245	±163	±1.1
Minimum Voltage	55	9.0	0.00	-14.920		



Model		ZUW1R51215	Testing Circuitry	Figure A
Item		Condensation 結露特性		
Object		+15V 0.05A		

1. Condensation test

Testing procedure is as follows.

- ① Keeping and cooling the unit in a tank at -10°C for an hour with the input off.
- ② Taking it out of the tank and dewing itself in a room where the temperature is 25°C and the humidity is 40%RH.
- ③ Testing electrical characteristics of the unit to confirm there be no fault.
- ④ Repeating ①, ② and ③ three times.

1. 結露特性試験

入力を切った状態で、恒温槽で-10°Cに冷却しておき、約1時間後に恒温槽から取り出し、室温25°C、湿度40%RHの状態におき結露させ、その電気的特性の測定を3度行い、異常のないことを確認する。

2. Values

	Times	Output Voltage [V]	Ripple Voltage [mV]	Ripple Noise [mV]
Load 50%	1	15.011	5	30
	2	15.102	5	30
	3	15.098	5	30
Load 100%	1	14.976	25	45
	2	15.002	25	45
	3	14.936	25	45

Input Volt. 12.0 V



Model		ZUW1R51215	Testing Circuitry Figure A
Item		Condensation 結露特性	
Object		-15V 0.05A	

1. Condensation test

Testing procedure is as follows.

- ① Keeping and cooling the unit in a tank at -10°C for an hour with the input off.
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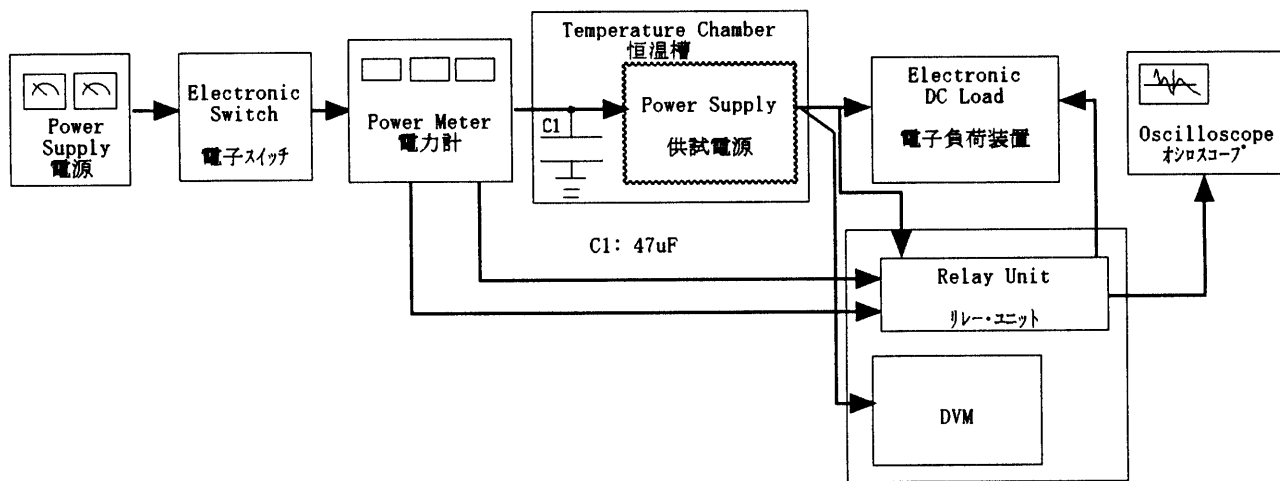
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2. Values

	Times	Output Voltage [V]	Ripple Voltage [mV]	Ripple Noise [mV]
Load 50%	1	-14.987	5	30
	2	-14.975	5	30
	3	-14.996	5	30
Load 100%	1	-14.856	20	35
	2	-14.888	20	35
	3	-14.905	20	35

Input Volt. 12.0 V



Data Acquisition/Control Unit  
データ集録システム

Figure A