



TEST DATA OF LDA300W-24

(200V INPUT)

Regulated DC Power Supply

Date : Feb. 22. 1997

Approved by : K. Nagahara
Design Manager

Prepared by : Y. Mano
Design Engineer

コーセル株式会社
COSEL CO., LTD.

CONTENTS

1. Line Regulation	1
静的入力変動	
2. Efficiency	2
効率	
3. Hold-Up Time	3
出力保持時間	
4. Instantaneous Interruption Compensation	4
瞬時停電保障	
5. Load Regulation	5
静的負荷変動	
6. Ripple Voltage (by Load Current)	6
リップル電圧(負荷電流特性)	
7. Ripple-Noise	7
リップルノイズ	
8. Overcurrent Protection	8
過電流保護	
9. Overvoltage Protection	9
過電圧保護	
10. Inrush Current	10
突入電流	
11. Dynamic Load Responce	11
動的負荷変動	
12. Rise and Fall Time	12
立上り、立下り時間	
13. Ambient Temperature Drift	13
周囲温度変動	
14. Minimum Input Voltage for Regulated Output Voltage	14
最低レギュレーション電圧	
15. Ripple Voltage (by Ambient Temperature)	15
リップル電圧(周囲温度特性)	
16. Time Lapse Drift	16
経時ドリフト	
17. Voltage Accuracy	17
定電圧精度	
18. Condensation	18
結露特性	
19. Leakage Current	19
漏洩電流	
20. Line Noise Tolerance	20
入力雑音耐量	
21. Conducted Emission	21
雑音端子電圧	
22. Figure of Testing Circuitry	22
測定回路図	

(Final Page 23)

COSEL

Model LDA300W-24

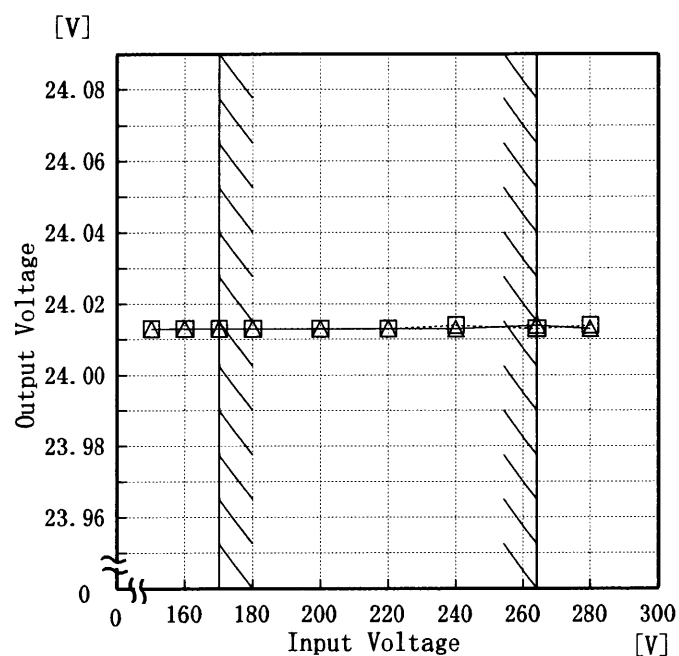
Item Line Regulation 静的入力変動

Object +24V14A

Temperature 25°C
Testing Circuitry Figure A

1. Graph

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



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

(注) 斜線は定格入力電圧範囲を示す。

2. Values

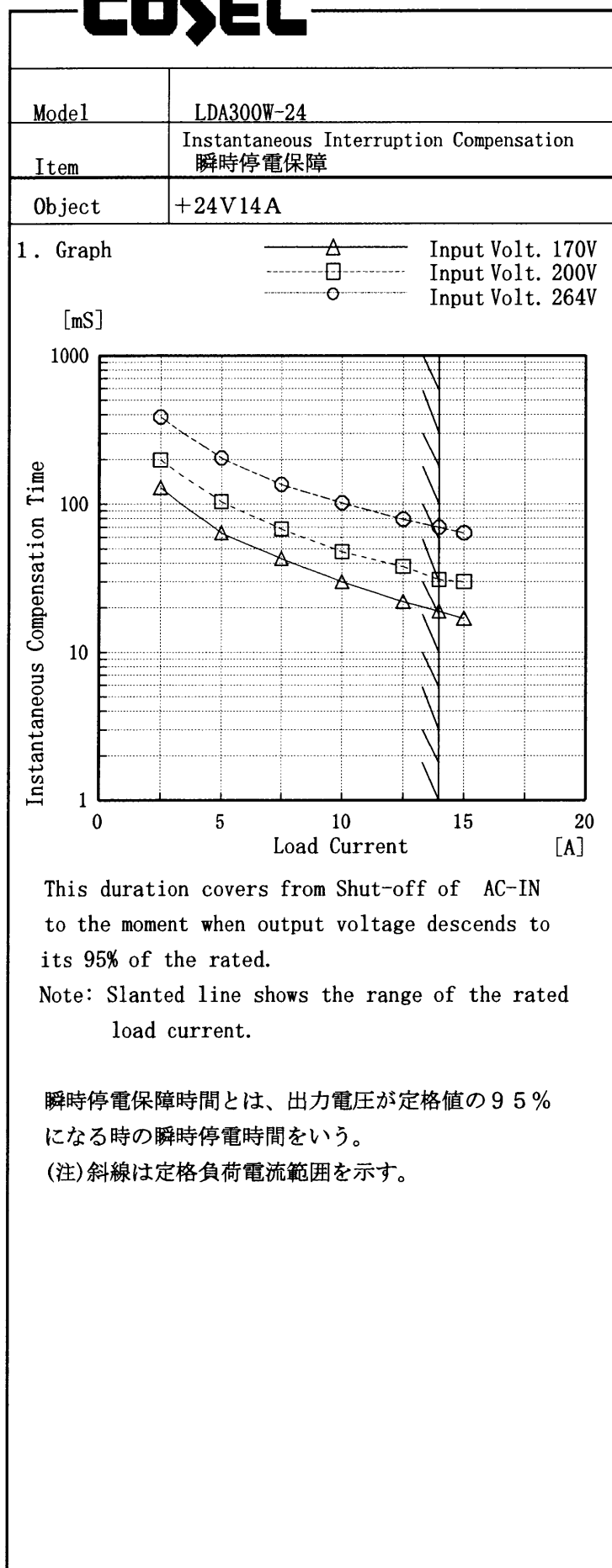
Input Voltage [V]	Load 50%	Load 100%
	Output Volt. [V]	Output Volt. [V]
150	24.013	24.013
160	24.013	24.013
170	24.013	24.013
180	24.013	24.013
200	24.013	24.013
220	24.013	24.013
240	24.014	24.013
264	24.013	24.014
280	24.014	24.013

BC-0701

COSEL

Model		LDA300W-24		Temperature		25℃																																	
Item		Hold-Up Time 出力保持時間		Testing Circuitry		Figure A																																	
Object		+24V14A																																					
1. Graph				2. Values																																			
<div><div>-----□----- Load 50%</div><div>-----△----- Load 100%</div></div> <div><p>[mS]</p><p>Hold-Up Time</p><p>Input Voltage</p><p>[V]</p></div>				<table><tr><th rowspan="2">Input Voltage [V]</th><th>Load 50%</th><th>Load 100%</th></tr><tr><th>Hold-Up Time [mS]</th><th>Hold-Up Time [mS]</th></tr><tr><td>150</td><td>32</td><td>11</td></tr><tr><td>160</td><td>39</td><td>15</td></tr><tr><td>170</td><td>48</td><td>19</td></tr><tr><td>180</td><td>57</td><td>24</td></tr><tr><td>200</td><td>76</td><td>34</td></tr><tr><td>220</td><td>98</td><td>45</td></tr><tr><td>240</td><td>121</td><td>57</td></tr><tr><td>264</td><td>152</td><td>72</td></tr><tr><td>280</td><td>174</td><td>84</td></tr></table>				Input Voltage [V]	Load 50%	Load 100%	Hold-Up Time [mS]	Hold-Up Time [mS]	150	32	11	160	39	15	170	48	19	180	57	24	200	76	34	220	98	45	240	121	57	264	152	72	280	174	84
Input Voltage [V]	Load 50%	Load 100%																																					
	Hold-Up Time [mS]	Hold-Up Time [mS]																																					
150	32	11																																					
160	39	15																																					
170	48	19																																					
180	57	24																																					
200	76	34																																					
220	98	45																																					
240	121	57																																					
264	152	72																																					
280	174	84																																					
<p>This duration covers from Shut-off of input voltage to the moment when output voltage descends to the rated range of voltage accuracy.</p> <p>Note: Slanted line shows the range of the rated input voltage.</p> <p>出力保持時間とは、AC入力断から出力電圧が、定電圧精度の規格範囲を保持しているところまでの時間。</p> <p>(注)斜線は定格入力電圧範囲を示す。</p>																																							

COSEL

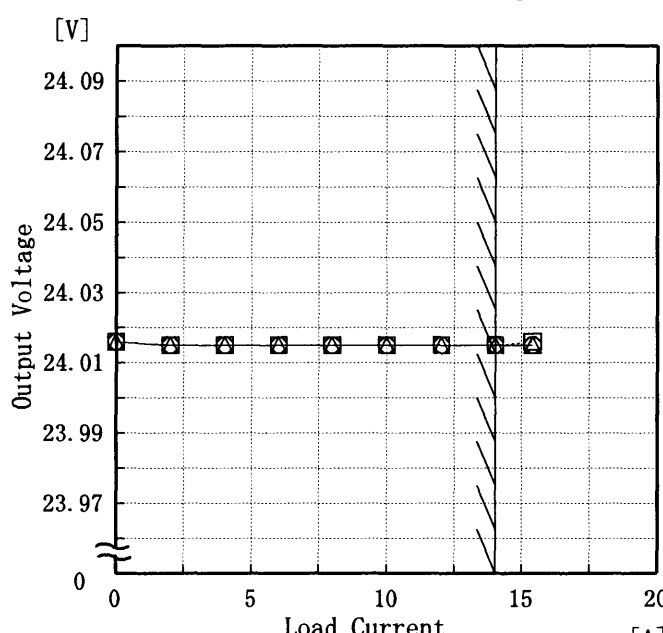


Testing Circuitry Figure A 25°C

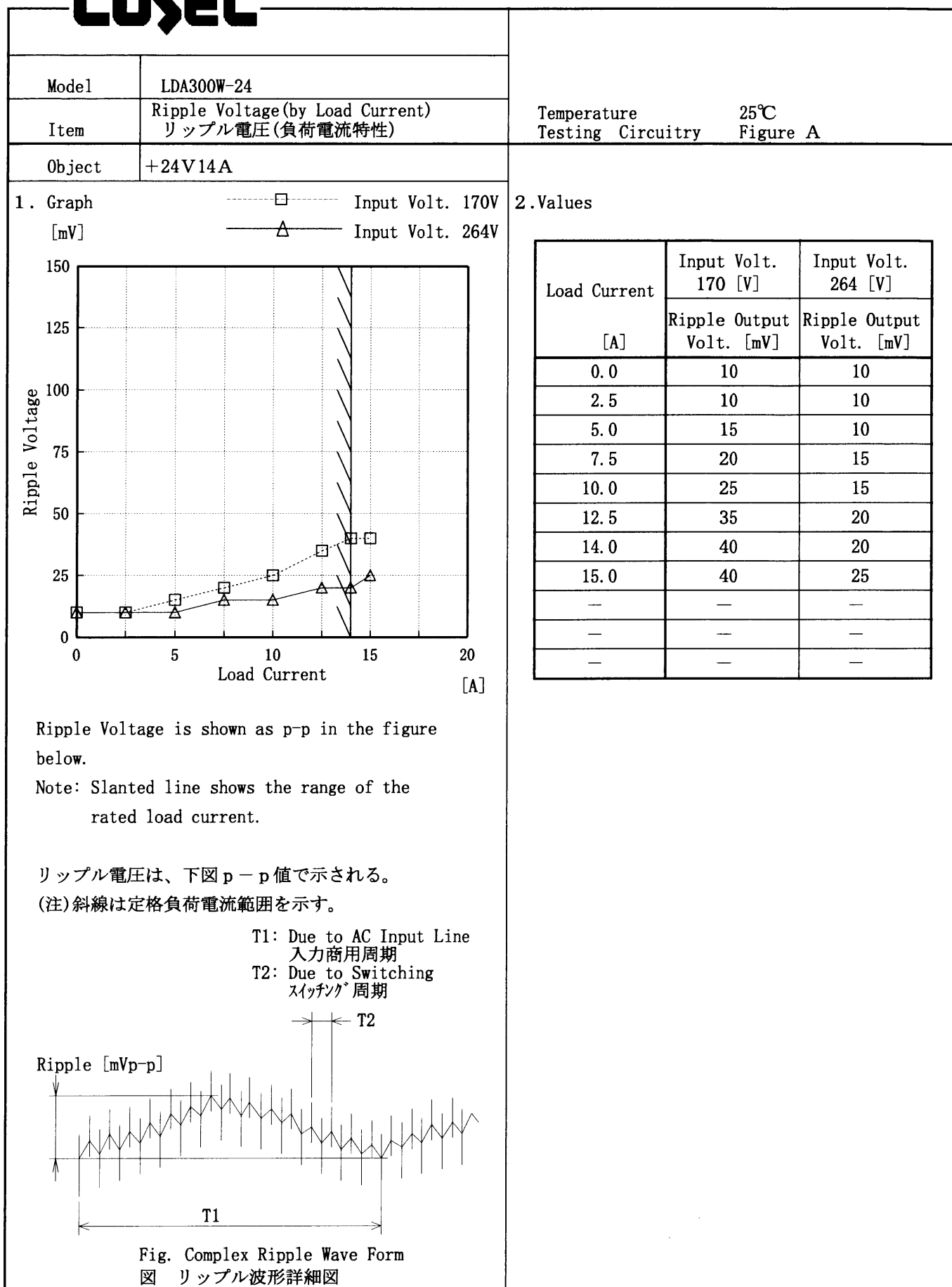
2. Values

Load Current [A]	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
	Time [mS]		
0.0	—	—	—
2.5	129	198	387
5.0	64	104	204
7.5	43	68	136
10.0	30	48	102
12.5	22	38	79
14.0	19	31	70
15.0	17	30	64
—	—	—	—
—	—	—	—
—	—	—	—

COSEL

Model LDA300W-24		Temperature 25°C																																																	
Item	Load Regulation 静的負荷変動	Testing Circuitry Figure A																																																	
Object	+24V14A																																																		
1. Graph <div style="display: flex; align-items: center; margin-top: 10px;"> <div style="margin-right: 10px;"> <div style="border-bottom: 1px solid black; width: 20px; margin-bottom: 2px;"></div>△ </div> <div style="margin-right: 10px;"> <div style="border-bottom: 1px dashed black; width: 20px; margin-bottom: 2px;"></div>□ </div> <div> <div style="border-bottom: 1px dotted black; width: 20px; margin-bottom: 2px;"></div>○ </div> <div> Input Volt. 170V Input Volt. 200V Input Volt. 264V </div> </div> 		2. Values <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>Load Current</th><th>Input Volt. 170[V]</th><th>Input Volt. 200[V]</th><th>Input Volt. 264[V]</th></tr> <tr> <th>[A]</th><th>Output Volt. [V]</th><th>Output Volt. [V]</th><th>Output Volt. [V]</th></tr> </thead> <tbody> <tr><td>0.0</td><td>24.016</td><td>24.016</td><td>24.016</td></tr> <tr><td>2.0</td><td>24.015</td><td>24.015</td><td>24.015</td></tr> <tr><td>4.0</td><td>24.015</td><td>24.015</td><td>24.015</td></tr> <tr><td>6.0</td><td>24.015</td><td>24.015</td><td>24.015</td></tr> <tr><td>8.0</td><td>24.015</td><td>24.015</td><td>24.015</td></tr> <tr><td>10.0</td><td>24.015</td><td>24.015</td><td>24.015</td></tr> <tr><td>12.0</td><td>24.015</td><td>24.015</td><td>24.015</td></tr> <tr><td>14.0</td><td>24.015</td><td>24.015</td><td>24.015</td></tr> <tr><td>15.4</td><td>24.015</td><td>24.016</td><td>24.015</td></tr> <tr><td>—</td><td>—</td><td>—</td><td>—</td></tr> </tbody> </table>		Load Current	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]	[A]	Output Volt. [V]	Output Volt. [V]	Output Volt. [V]	0.0	24.016	24.016	24.016	2.0	24.015	24.015	24.015	4.0	24.015	24.015	24.015	6.0	24.015	24.015	24.015	8.0	24.015	24.015	24.015	10.0	24.015	24.015	24.015	12.0	24.015	24.015	24.015	14.0	24.015	24.015	24.015	15.4	24.015	24.016	24.015	—	—	—	—
Load Current	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]																																																
[A]	Output Volt. [V]	Output Volt. [V]	Output Volt. [V]																																																
0.0	24.016	24.016	24.016																																																
2.0	24.015	24.015	24.015																																																
4.0	24.015	24.015	24.015																																																
6.0	24.015	24.015	24.015																																																
8.0	24.015	24.015	24.015																																																
10.0	24.015	24.015	24.015																																																
12.0	24.015	24.015	24.015																																																
14.0	24.015	24.015	24.015																																																
15.4	24.015	24.016	24.015																																																
—	—	—	—																																																
Note: Slanted line shows the range of the rated load current. (注) 斜線は定格負荷電流範囲を示す。																																																			

COSEL



COSEL

Model		LDA300W-24	
Item		Ripple-Noise リップルノイズ	
Object		+24V14A	
1. Graph		2. Values	

<

COSEL

Model LDA300W-24

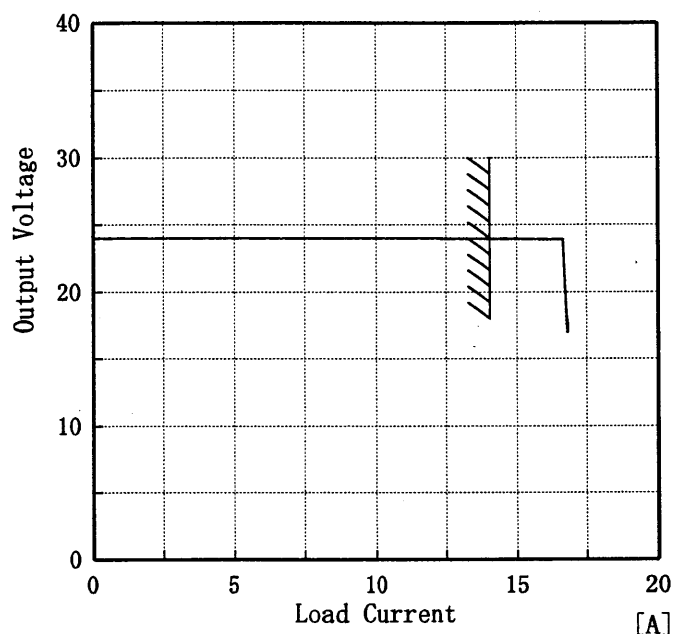
Item Overcurrent Protection
過電流保護

Object +24V14A

Temperature 25°C
Testing Circuitry Figure A

1. Graph

[V]



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

Hiccap operation occurs when the output voltage is under 17V.

(注)斜線は定格負荷電流範囲を示す。

17V以下は間欠動作となる。

2. Values

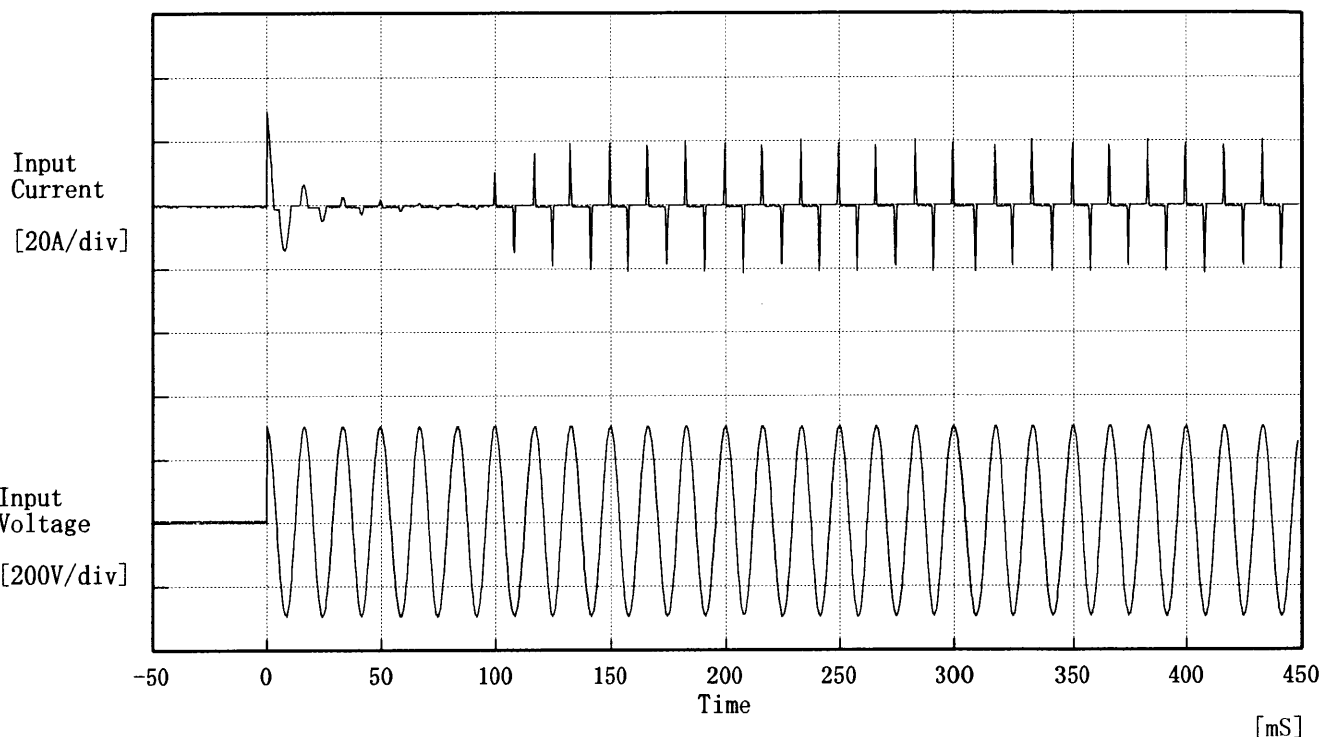
Output Voltage [V]	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
	Load Current [A]	Load Current [A]	Load Current [A]
24.00	16.65	16.76	16.80
22.80	16.65	16.66	16.64
21.60	16.67	16.68	16.68
19.20	16.72	16.73	16.74
16.80	—	—	—
14.40	—	—	—
12.00	—	—	—
9.60	—	—	—
7.20	—	—	—
4.80	—	—	—
2.40	—	—	—
0.00	—	—	—

COSEL

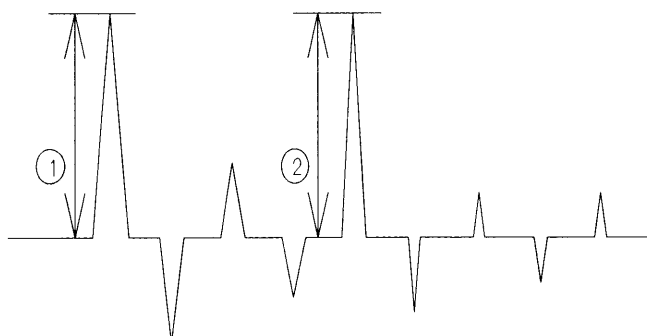
Model		LDA300W-24	Testing Circuitry Figure A																																											
Item		Overvoltage Protection 過電圧保護																																												
Object		+24V14A																																												
1. Graph		<div><div><div>—△—</div><div>—□—</div><div>—○—</div></div><div>Input Volt. 170 V</div><div>Input Volt. 200 V</div><div>Input Volt. 264 V</div></div> <div><div><div>[V]</div><div><div>Ambient Temperature [°C]</div></div></div></div> <div><div><div>Ambient Temp.</div><div>Input Volt.</div><div>170[V]</div><div>Input Volt.</div><div>200[V]</div><div>Input Volt.</div><div>264[V]</div></div><div><div>[°C]</div><div>Operating Point [V]</div></div><table><tr><td>-20</td><td>29.72</td><td>29.72</td><td>29.72</td></tr><tr><td>-10</td><td>29.89</td><td>29.89</td><td>29.89</td></tr><tr><td>0</td><td>30.06</td><td>30.06</td><td>30.06</td></tr><tr><td>10</td><td>30.29</td><td>30.29</td><td>30.29</td></tr><tr><td>20</td><td>30.48</td><td>30.48</td><td>30.48</td></tr><tr><td>25</td><td>30.57</td><td>30.57</td><td>30.57</td></tr><tr><td>30</td><td>30.66</td><td>30.66</td><td>30.66</td></tr><tr><td>40</td><td>30.87</td><td>30.87</td><td>30.87</td></tr><tr><td>50</td><td>31.08</td><td>31.08</td><td>31.08</td></tr><tr><td>60</td><td>31.26</td><td>31.26</td><td>31.26</td></tr><tr><td>—</td><td>—</td><td>—</td><td>—</td></tr></table></div> <div><div>Note: Slanted line shows the range of the rated ambient temperature.</div><div>(注)斜線は定格周囲温度範囲を示す。</div></div>	-20	29.72	29.72	29.72	-10	29.89	29.89	29.89	0	30.06	30.06	30.06	10	30.29	30.29	30.29	20	30.48	30.48	30.48	25	30.57	30.57	30.57	30	30.66	30.66	30.66	40	30.87	30.87	30.87	50	31.08	31.08	31.08	60	31.26	31.26	31.26	—	—	—	—
-20	29.72	29.72	29.72																																											
-10	29.89	29.89	29.89																																											
0	30.06	30.06	30.06																																											
10	30.29	30.29	30.29																																											
20	30.48	30.48	30.48																																											
25	30.57	30.57	30.57																																											
30	30.66	30.66	30.66																																											
40	30.87	30.87	30.87																																											
50	31.08	31.08	31.08																																											
60	31.26	31.26	31.26																																											
—	—	—	—																																											

COSEL

Model	LDA300W-24	Temperature	25°C
Item	Inrush Current 突入電流	Testing Circuitry	Figure A
Object			



Input Voltage 200 V
 Frequency 60 Hz
 Load 100 %
 Inrush Current
 ① 29.40 [A]
 ② 21.60 [A]



COSEL

Model	LDA300W-24	Temperature 25℃ Testing Circuitry Figure A
Item	Dynamic Load Responce 動的負荷変動	
Object	+24V14A	

Input Volt. 200 V

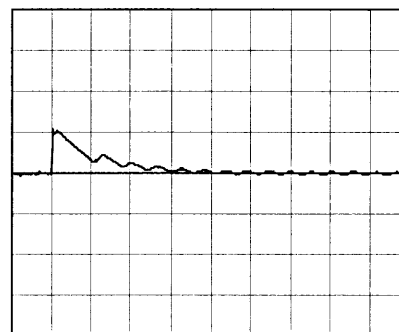
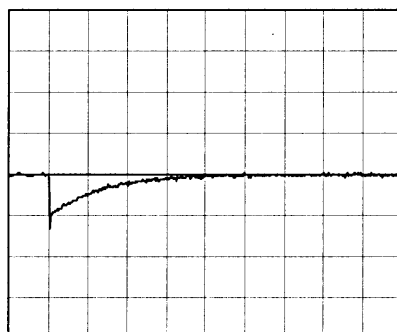
Cycle 1000 mS

Load Current



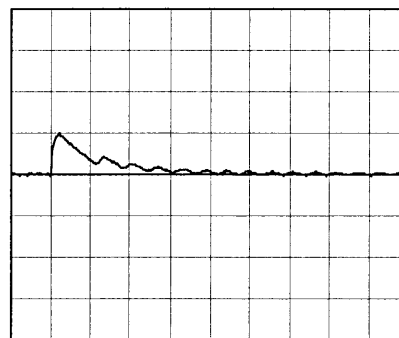
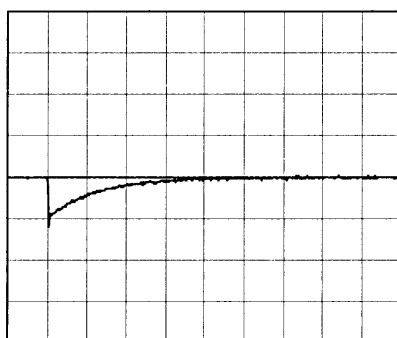
Min. Load \longleftrightarrow

Load 100 %



Min. Load \longleftrightarrow

Load 50 %



100 mV/div

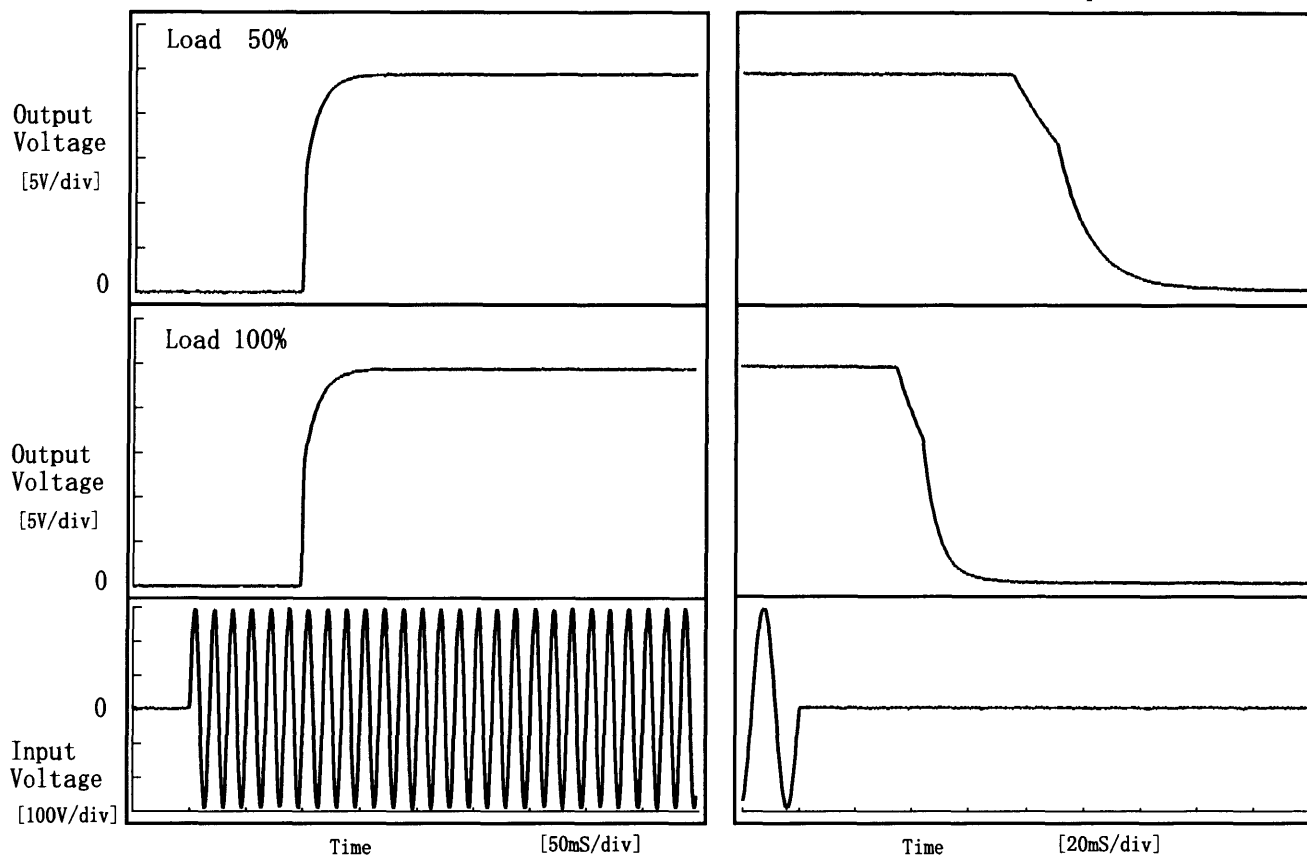
10 mV/div

COSEL

Model	LDA300W-24	Temperature	25°C
Item	Rise and Fall Time 立上り、立下り時間	Testing Circuitry	Figure A
Object	+24V14A		

1. Graph

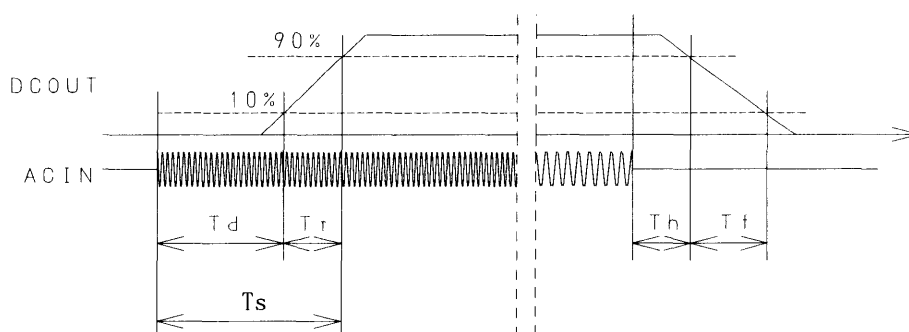
Input Volt. 200 V



2. Values

[mS]

Load \ Time	T _d	T _r	T _s	T _h	T _f
50 %	98.3	17.8	116.0	79.8	34.8
100 %	98.3	17.8	116.0	37.8	17.8



COSEL

Model LDA300W-24

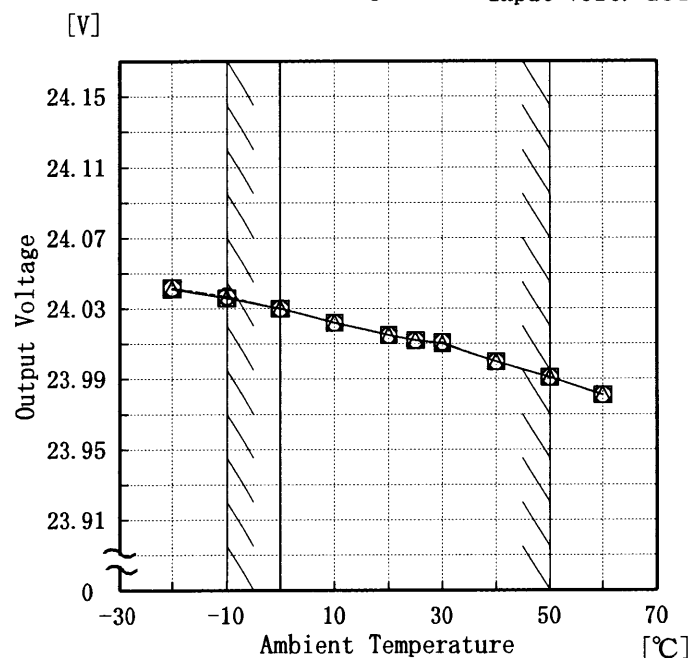
Item Ambient Temperature Drift
周囲温度変動

Object +24V14A

Testing Circuitry Figure A

1. Graph

—△— Input Volt. 170V
 - - -□- - - Input Volt. 200V
 - - -○- - - Input Volt. 264V



2. Values

Temperature	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
[°C]	Output Volt. [V]	Output Volt. [V]	Output Volt. [V]
-20	24.041	24.042	24.042
-10	24.036	24.036	24.037
0	24.030	24.030	24.030
10	24.022	24.022	24.022
20	24.015	24.015	24.015
25	24.012	24.012	24.012
30	24.010	24.011	24.011
40	24.000	24.000	24.000
50	23.991	23.991	23.991
60	23.981	23.981	23.981
—	—	—	—

COSEL

Model

LDA300W-24

Item

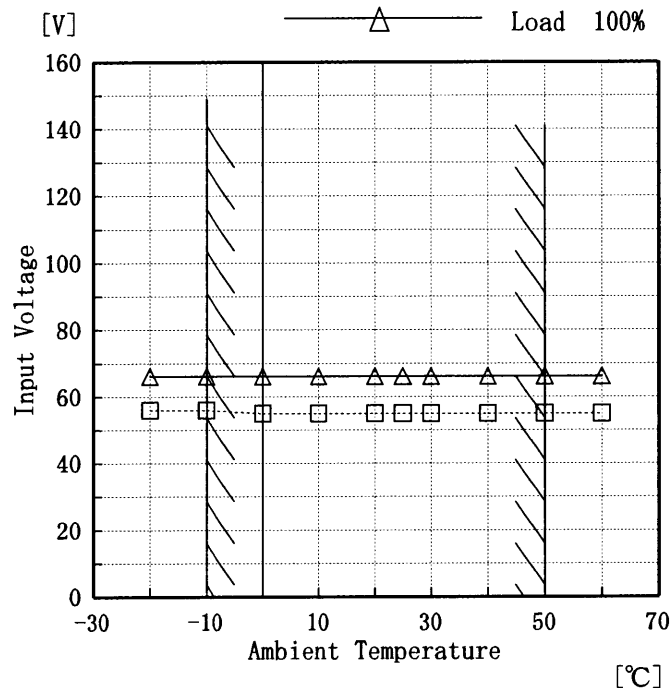
Minimum Input Voltage for Regulated Output Voltage
最低レギュレーション電圧

Object

+24V14A

Testing Circuitry Figure A

1. Graph



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。

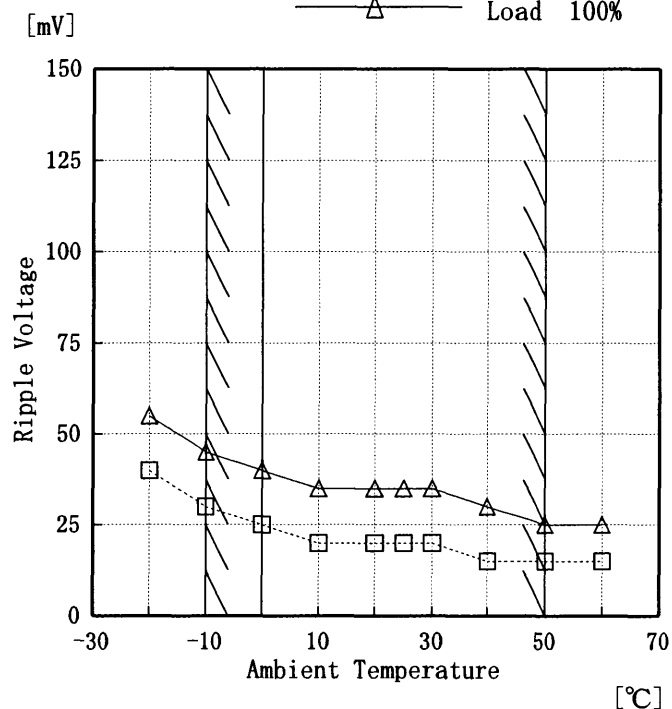
2. Values

Ambient Temp. [°C]	Load 50% Input Volt. [V]	Load 100% Input Volt. [V]
-20	56	66
-10	56	66
0	55	66
10	55	66
20	55	66
25	55	66
30	55	66
40	55	66
50	55	66
60	55	66
—	—	—

COSEL

Model	LDA300W-24
Item	Ripple Voltage (by Ambient Temp.) リップル電圧 (周囲温度特性)
Object	+24V14A

1. Graph



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

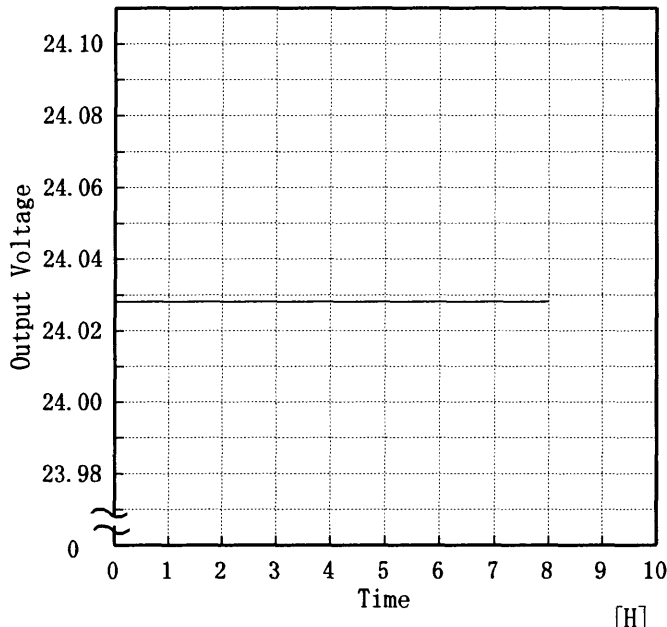
(注)斜線は定格周囲温度範囲を示す。

Testing Circuitry Figure A

2. Values

Ambient Temp. [°C]	Load 50%	Load 100%
	Ripple Output Volt. [mV]	Ripple Output Volt. [mV]
-20	40	55
-10	30	45
0	25	40
10	20	35
20	20	35
25	20	35
30	20	35
40	15	30
50	15	25
60	15	25
—	—	—

COSEL

COSEL																									
Model	LDA300W-24																								
Item	Time Lapse Drift 経時ドリフト	Temperature	25 ℃																						
Object	+24V14A	Testing Circuitry	Figure A																						
1. Graph		2.Values																							
<div>[V]</div> <div></div> <div>Input Volt. 200V</div> <div>Load 100%</div>		<table><tr><th>Time since start [H]</th><th>Output Voltage [V]</th></tr><tr><td>0.0</td><td>24.028</td></tr><tr><td>0.5</td><td>24.028</td></tr><tr><td>1.0</td><td>24.028</td></tr><tr><td>2.0</td><td>24.028</td></tr><tr><td>3.0</td><td>24.028</td></tr><tr><td>4.0</td><td>24.028</td></tr><tr><td>5.0</td><td>24.028</td></tr><tr><td>6.0</td><td>24.028</td></tr><tr><td>7.0</td><td>24.028</td></tr><tr><td>8.0</td><td>24.028</td></tr></table>		Time since start [H]	Output Voltage [V]	0.0	24.028	0.5	24.028	1.0	24.028	2.0	24.028	3.0	24.028	4.0	24.028	5.0	24.028	6.0	24.028	7.0	24.028	8.0	24.028
Time since start [H]	Output Voltage [V]																								
0.0	24.028																								
0.5	24.028																								
1.0	24.028																								
2.0	24.028																								
3.0	24.028																								
4.0	24.028																								
5.0	24.028																								
6.0	24.028																								
7.0	24.028																								
8.0	24.028																								

-16-

BC-0701

COSEL

Model	LDA300W-24	Testing Circuitry Figure A
Item	Output Voltage Accuracy 定電圧精度	
Object	+24V14A	

Output Voltage Accuracy

This is defined as the maximum value of the output voltage regulation load, temperature and input voltage vary at random in the range as specified below.

Temperature : -10~50 °C

Input Voltage : 170~264 V

Load Current : 0~14 A

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

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

定電圧精度

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 : -10~50 °C

入力電圧 : 170~264 V

負過電流 : 0~14 A

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

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

Item	Temperature [°C]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy (Ratio) [%]
Maximum Voltage	-10	264	0	24.038	±23	±0.096
Minimum Voltage	50	170	14	23.992		

COSEL

LUCEL

Model	LDA300W-24
Item	Condensation 結露特性
Object	+24V14A

Testing Circuitry Figure A

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 45%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45%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	24.06	35	50
	2	24.06	35	50
	3	24.06	35	50
Load 100 %	1	24.06	35	50
	2	24.06	35	50
	3	24.06	35	50

Input Volt. 200 V

-18-

BC-0701

COSEL

Model	LDA300W-24	Testing Circuitry Figure B
Item	Leakage Current 漏洩電流	
Object	+24V14A	

1. Results

Standards	Leakage Current [mA]		
	Input Volt. 85 [V]	Input Volt. 100 [V]	Input Volt. 132 [V]
(A) DENTORI	—	—	—
(B) UL	—	—	—
(C) C S A	—	—	—

Standards	Leakage Current [mA]		
	Input Volt. 170 [V]	Input Volt. 220 [V]	Input Volt. 264 [V]
(D) V D E	0.32	0.37	0.52

2. Condition

Leakage current value is concluded after measuring both phases of AC input and by choosing the larger one.

交流入力 of 両相について測定し、その大きい方を漏洩電流測定値とする。

Load 100 %

COSEL

LUCEL

Model	LDA300W-24
Item	Line Noise Tolerance 入力雑音耐量
Object	+24V14A

Testing Circuitry Figure C

1. Results

Pulse Width [n S]	MODE	Operating Point of Overvoltage Protection [V] 過電圧保護動作値	DC-like Regulation of Output Voltage 出力電圧の直流的変動
50	COMMON	30.49	no regulation
	NORMAL	30.49	no regulation
1000	COMMON	30.49	no regulation
	NORMAL	30.49	no regulation

Conditions

Input Voltage :200 V

Pulse Voltage :2000 V

Pulse Cycle :10 mS

Pulse Input Duration:1 min. or more

Load :100 %

-20-

BC-0701

COSEL

Model	LDA300W-24	Testing Circuitry Figure D
Item	Conducted Emission 雑音端子電圧	
Object	+24V14A	

1. Graph

Remarks

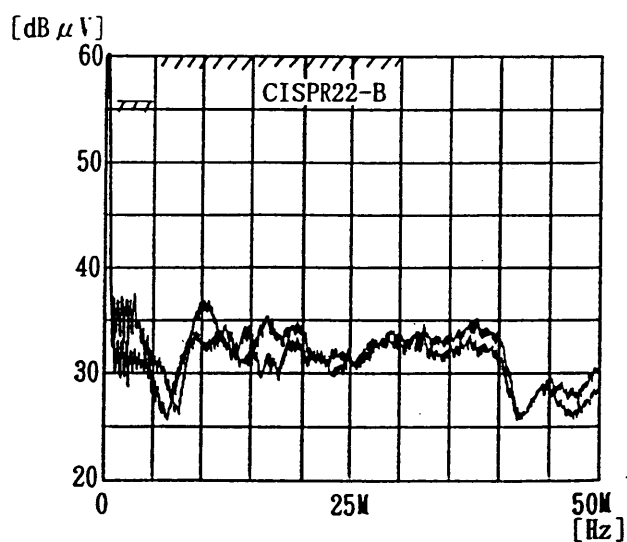
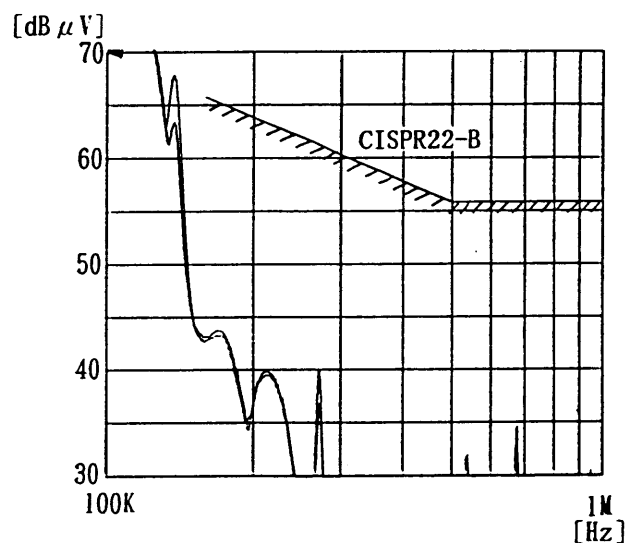
Input Volt. 240 V

Load 100 %

Note: Slanted line shows the range of Tolerance.

(注) 斜線は許容値を示す。

NO	Standards	Standards Complied	Frequency [MHz]	Tolerance [dB/μV]
1	FCC Class A		0.45~1.6	60
			1.6~30	69.5
2	FCC Class B		0.45~30	48
3	VCCI -1		0.15~0.5	79
			0.5~30	73
4	VCCI -2		0.15~0.5	66-56
			0.5~5	56
			5~30	60
5	CISPR 22 Class A (EN55022)		0.15~0.5	79
			0.5~30	73
6	CISPR 22 Class B (EN55022)	○	0.15~0.5	66-56
			0.5~5	56
			5~30	60



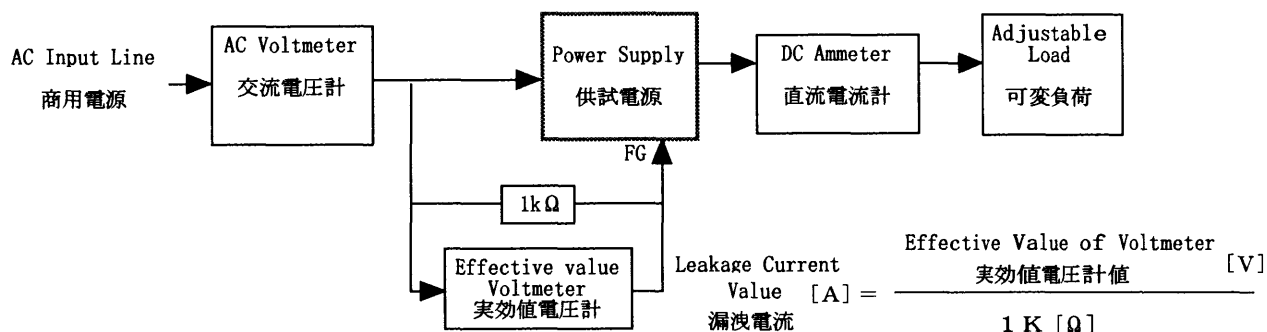
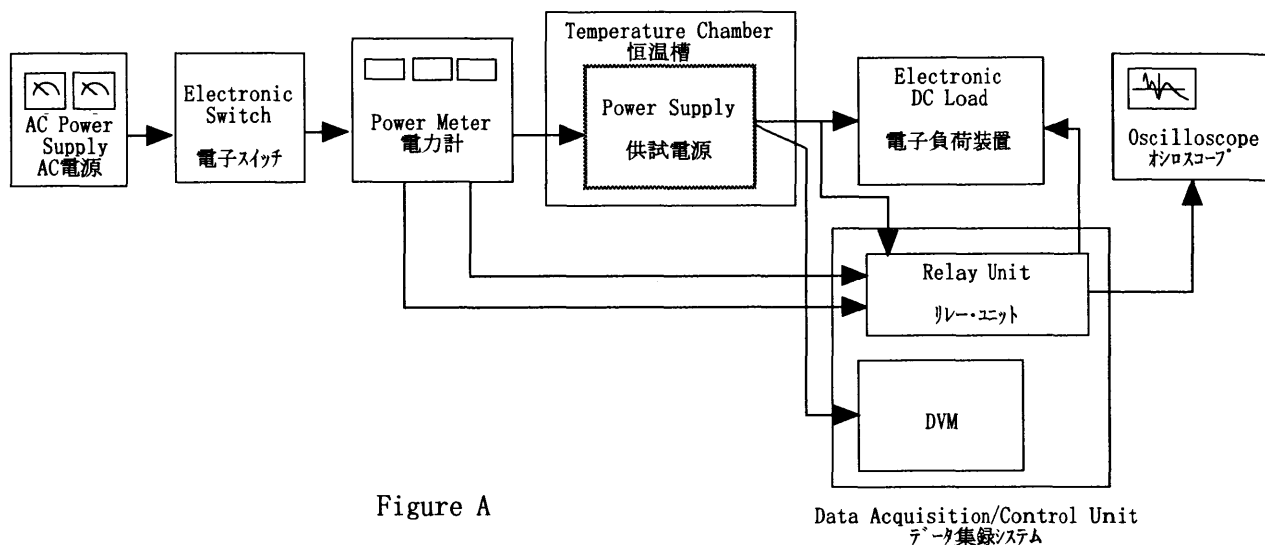


Figure B (DENTORI)

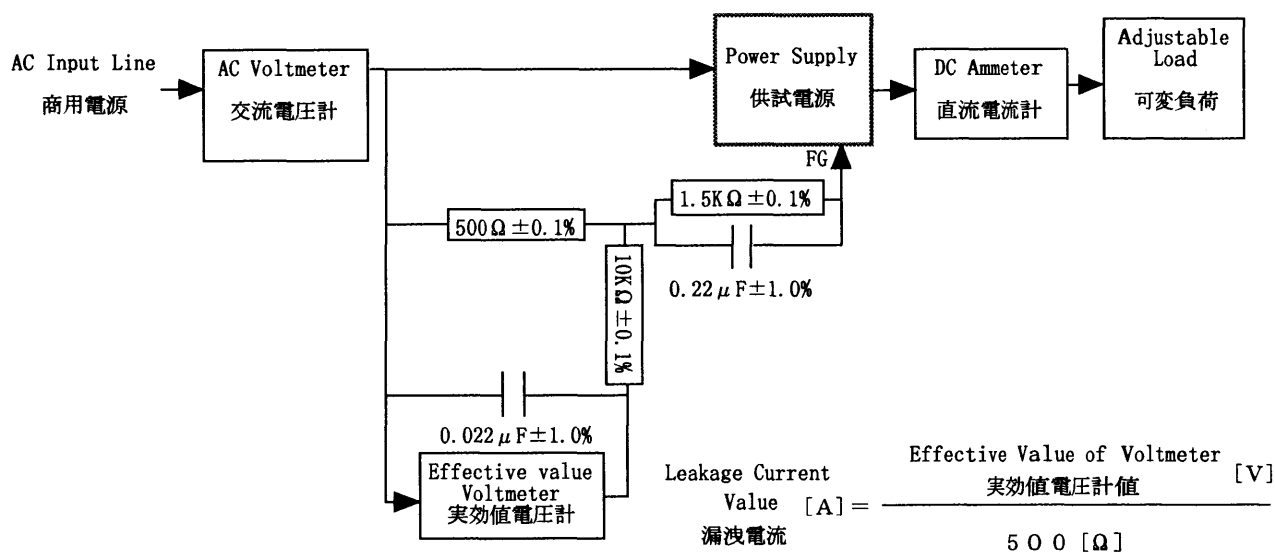


Figure B (UL, CSA, VDE)

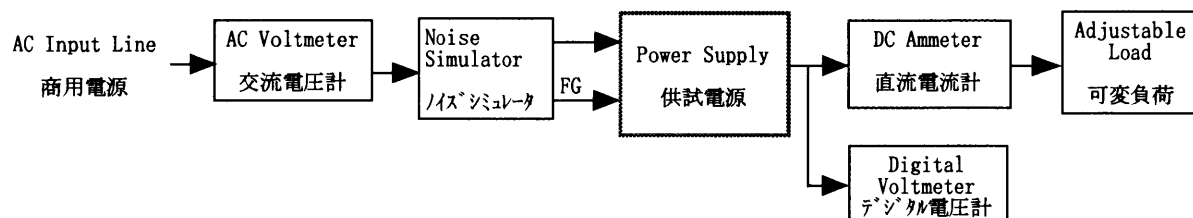


Figure C

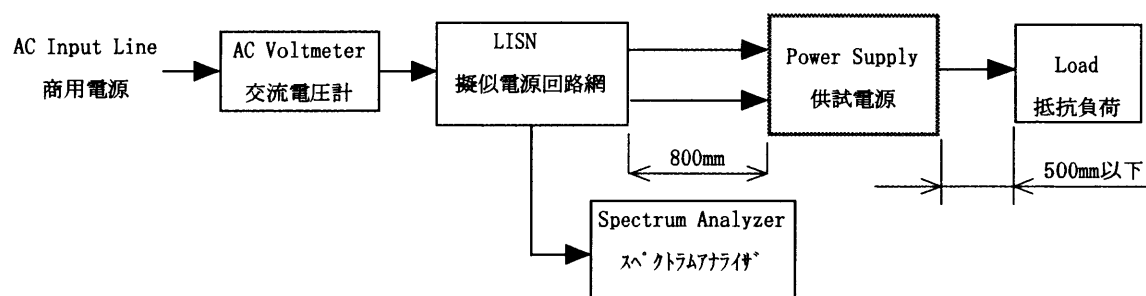


Figure D

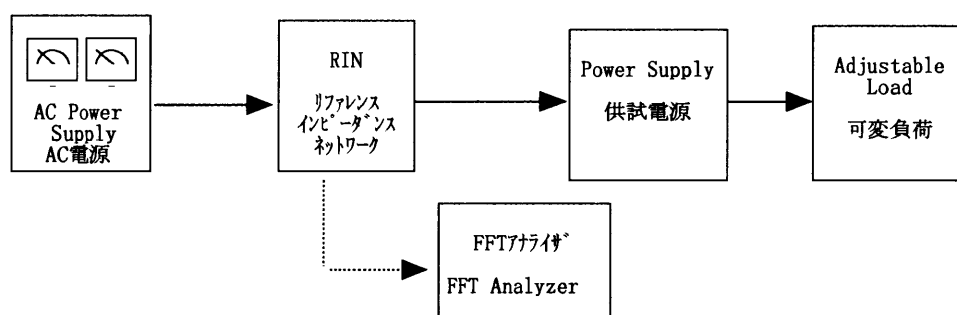


Figure E