



TEST DATA OF ADA600F

ADA600F-24
(200V INPUT)

Regulated DC power supply
Jan. 23, 2003

Approved by : Kuniaki Nagahara
Kuniaki Nagahara Design Manager

Prepared by : Koji Todo
Koji Todo Design Engineer

INPUT : AC 170~264V

OUTPUT : V1: 24V 25A

コーワセル株式会社
COSEL CO.,LTD.



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COSEL

Model	ADA600F (ADA600F-24)	Temperature	25°C																																
Item	Line Regulation 静的入力変動	Testing Circuitry	Figure A																																
Object	V1:+24V25A																																		
1. Graph		2. Values																																	
<p>The graph plots Output Voltage [V] on the y-axis (23.60 to 24.30) against Input Voltage [V] on the x-axis (140 to 300). Two horizontal dashed lines represent Load 50% and Load 100%. A slanted line shows the range of the rated input voltage.</p>		<table border="1"> <thead> <tr> <th rowspan="2">Input Voltage [V]</th> <th colspan="2">Output Voltage [V]</th> </tr> <tr> <th>Load 50%</th> <th>Load 100%</th> </tr> </thead> <tbody> <tr><td>150</td><td>23.987</td><td>23.982</td></tr> <tr><td>160</td><td>23.988</td><td>23.982</td></tr> <tr><td>170</td><td>23.990</td><td>23.982</td></tr> <tr><td>180</td><td>23.991</td><td>23.981</td></tr> <tr><td>200</td><td>23.992</td><td>23.981</td></tr> <tr><td>220</td><td>23.993</td><td>23.980</td></tr> <tr><td>240</td><td>23.994</td><td>23.978</td></tr> <tr><td>264</td><td>23.994</td><td>23.979</td></tr> <tr><td>280</td><td>23.995</td><td>23.977</td></tr> </tbody> </table>		Input Voltage [V]	Output Voltage [V]		Load 50%	Load 100%	150	23.987	23.982	160	23.988	23.982	170	23.990	23.982	180	23.991	23.981	200	23.992	23.981	220	23.993	23.980	240	23.994	23.978	264	23.994	23.979	280	23.995	23.977
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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。

Model	ADA600F (ADA600F-24)																																																					
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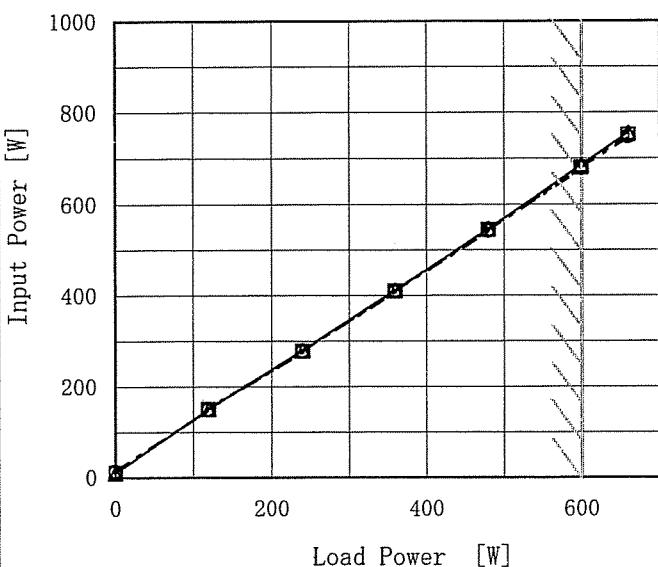
Note: Slanted line shows the range of the rated load power.

(注) 斜線は定格電力範囲を示す。

Model	ADA600F (ADA600F-24)
Item	Input Power (by Load Power) 入力電力 (負荷電力特性)
Object	_____

1. Graph

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



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

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Temperature 25°C
Testing Circuitry Figure A

2. Values

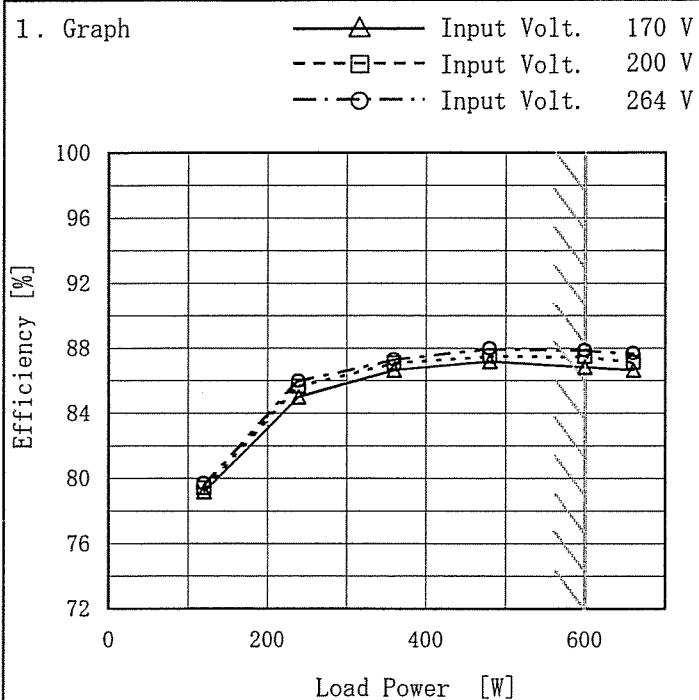
Load Power [W]	Input Power [W]		
	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
0	9.6	10.4	12.9
120	150.2	149.8	149.3
240	280.0	277.9	276.9
360	412.0	410.0	409.0
480	546.0	544.0	541.0
600	685.0	680.0	677.0
660	755.0	751.0	746.0
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Model	ADA600F (ADA600F-24)	Temperature	25°C																																		
Item	Efficiency (by Input Voltage) 効率(入力電圧特性)	Testing Circuitry	Figure A																																		
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<p>Efficiency [%]</p> <p>Input Voltage [V]</p> <p>Legend: ---□--- Load 50% —△— Load 100%</p>			<table border="1"> <thead> <tr> <th rowspan="2">Input Voltage [V]</th> <th colspan="2">Efficiency [%]</th> </tr> <tr> <th>Load 50%</th> <th>Load 100%</th> </tr> </thead> <tbody> <tr><td>150</td><td>85.9</td><td>86.4</td></tr> <tr><td>160</td><td>86.2</td><td>86.9</td></tr> <tr><td>170</td><td>86.2</td><td>86.9</td></tr> <tr><td>180</td><td>86.4</td><td>87.2</td></tr> <tr><td>200</td><td>86.7</td><td>87.4</td></tr> <tr><td>220</td><td>86.8</td><td>87.7</td></tr> <tr><td>240</td><td>87.0</td><td>87.8</td></tr> <tr><td>264</td><td>87.0</td><td>87.8</td></tr> <tr><td>280</td><td>87.0</td><td>88.1</td></tr> </tbody> </table>			Input Voltage [V]	Efficiency [%]		Load 50%	Load 100%	150	85.9	86.4	160	86.2	86.9	170	86.2	86.9	180	86.4	87.2	200	86.7	87.4	220	86.8	87.7	240	87.0	87.8	264	87.0	87.8	280	87.0	88.1
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<p>Note: Slanted line shows the range of the rated input voltage.</p> <p>(注) 斜線は定格入力電圧範囲を示す。</p>																																					

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Model	ADA600F (ADA600F-24)
Item	Efficiency (by Load Power) 効率(負荷電力特性)
Object	_____



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

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Temperature 25°C
Testing Circuitry Figure A

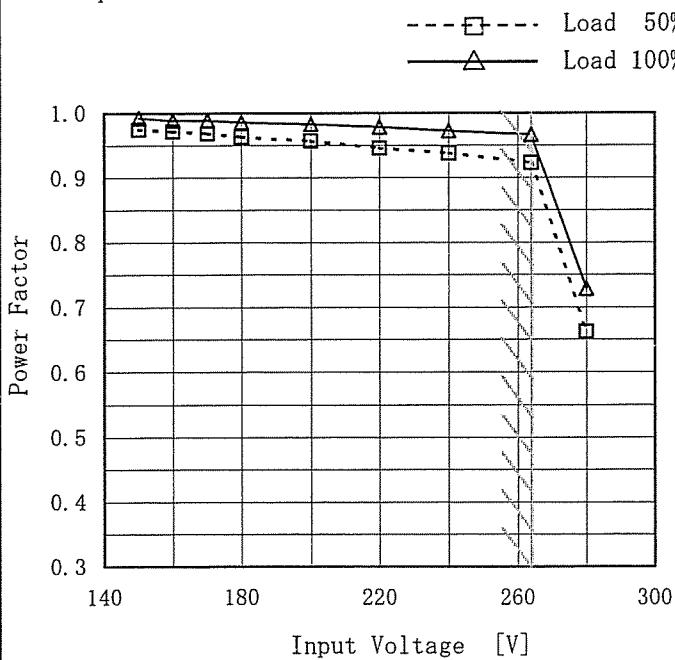
2. Values

Load Power [W]	Efficiency [%]		
	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
0	—	—	—
120	79.2	79.4	79.7
240	85.0	85.6	86.0
360	86.6	87.1	87.3
480	87.2	87.5	88.0
600	86.8	87.5	87.9
660	86.6	87.1	87.7
---	—	—	—
---	—	—	—
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Model	ADA600F (ADA600F-24)
Item	Power Factor (by Input Voltage) 力率(入力電圧特性)
Object	_____

Temperature 25°C
Testing Circuitry Figure A

1. Graph



2. Values

Input Voltage [V]	Power Factor	
	Load 50%	Load 100%
150	0.975	0.993
160	0.972	0.988
170	0.969	0.988
180	0.964	0.986
200	0.957	0.983
220	0.946	0.978
240	0.938	0.973
264	0.924	0.967
280	0.663	0.729

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

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Model	ADA600F (ADA600F-24)																																																					
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Note: Slanted line shows the range of the rated load power.

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Item	Hold-Up Time (by Load Power) 出力保持時間 (負荷電力特性)	Temperature Testing Circuitry	25°C Figure A																																																			
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<p style="text-align: center;"> △ Input Volt. 170V □ Input Volt. 200V ○ Input Volt. 264V </p>		<table border="1"> <thead> <tr> <th rowspan="2">Load Power [W]</th> <th colspan="3">Time [mS]</th> </tr> <tr> <th>Input Volt. 170[V]</th> <th>Input Volt. 200[V]</th> <th>Input Volt. 264[V]</th> </tr> </thead> <tbody> <tr><td>0</td><td>—</td><td>—</td><td>—</td></tr> <tr><td>120</td><td>149</td><td>170</td><td>172</td></tr> <tr><td>240</td><td>62</td><td>86</td><td>88</td></tr> <tr><td>360</td><td>45</td><td>46</td><td>55</td></tr> <tr><td>480</td><td>39</td><td>40</td><td>43</td></tr> <tr><td>600</td><td>29</td><td>31</td><td>33</td></tr> <tr><td>660</td><td>26</td><td>28</td><td>29</td></tr> <tr><td>---</td><td>—</td><td>—</td><td>—</td></tr> <tr><td>---</td><td>—</td><td>—</td><td>—</td></tr> <tr><td>---</td><td>—</td><td>—</td><td>—</td></tr> <tr><td>---</td><td>—</td><td>—</td><td>—</td></tr> </tbody> </table>	Load Power [W]	Time [mS]			Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]	0	—	—	—	120	149	170	172	240	62	86	88	360	45	46	55	480	39	40	43	600	29	31	33	660	26	28	29	---	—	—	—	---	—	—	—	---	—	—	—	---	—	—	—
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Note: Slanted line shows the range of the rated load power.

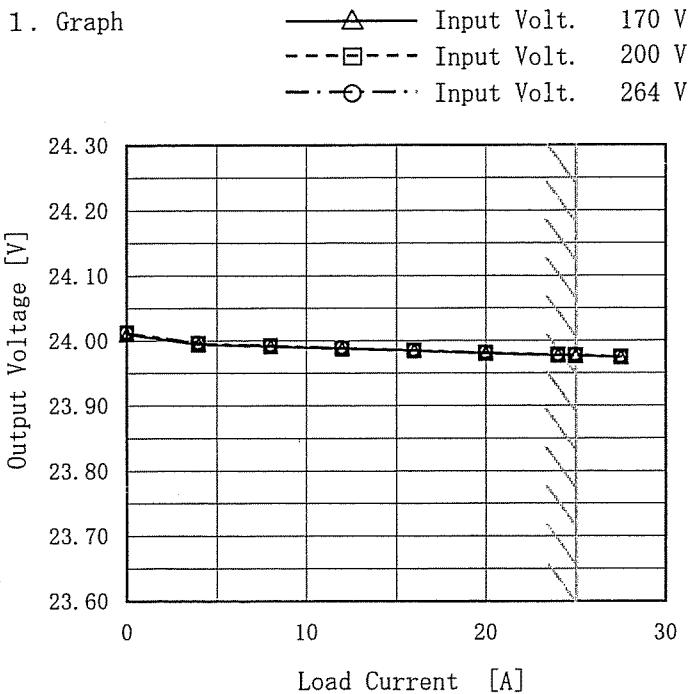
(注) 斜線は定格電力範囲を示す。

COSEL

Model ADA600F (ADA600F-24)

Item Load Regulation
靜的負荷變動

Object V1:+24V25A



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。

Temperature 25°C
Testing Circuitry Figure A

2. Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
0.0	24.010	24.013	24.013
4.0	23.994	23.996	23.996
8.0	23.991	23.993	23.993
12.0	23.988	23.988	23.989
16.0	23.984	23.985	23.986
20.0	23.981	23.981	23.982
24.0	23.977	23.978	23.978
25.0	23.976	23.977	23.978
27.5	23.974	23.975	23.975
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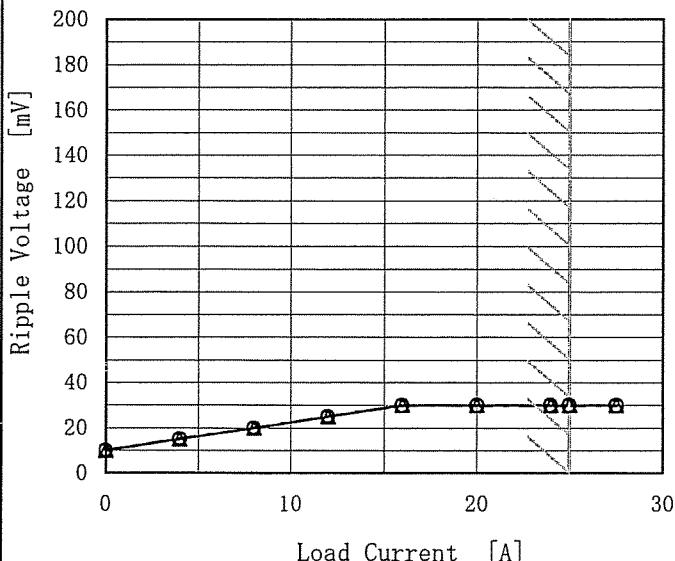
COSEL

Model	ADA600F (ADA600F-24)
Item	Ripple Voltage (by Load Current) リップル電圧 (負荷特性)
Object	V1:+24V25A

Temperature 25°C
Testing Circuitry Figure A

1. Graph

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



2. Values

Load Current [A]	Ripple Output Voltage [mV]	
	Input Volt. 170[V]	Input Volt. 264[V]
0.0	10	10
4.0	15	15
8.0	20	20
12.0	25	25
16.0	30	30
20.0	30	30
24.0	30	30
25.0	30	30
27.5	30	30
--	--	--
--	--	--

Ripple Voltage is shown as p-p in the figure below.

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

リップル電圧は、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

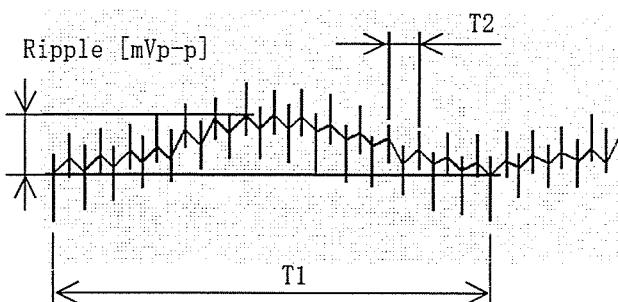


Fig. Complex Ripple Wave Form
図 リップル波形詳細図

Model ADA600F (ADA600F-24)

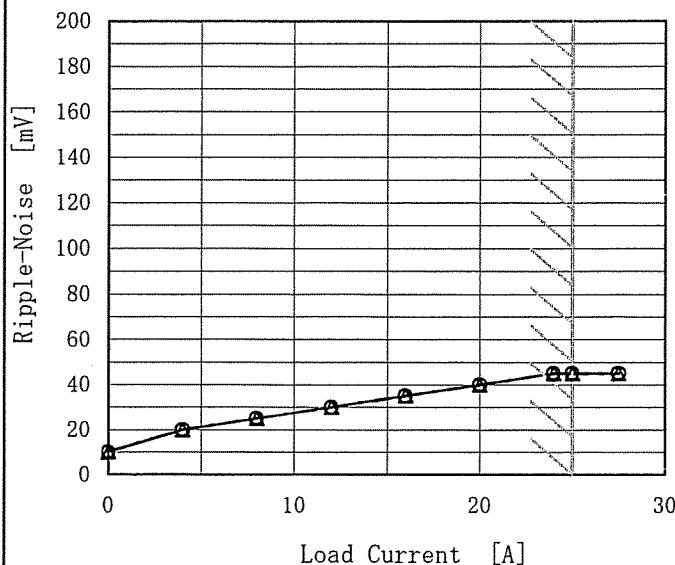
Item Ripple-Noise
リップルノイズ

Object V1:+24V25A

Temperature 25°C
Testing Circuitry Figure A

1. Graph

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



2. Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 170[V]	Input Volt. 264[V]
0.0	10	10
4.0	20	20
8.0	25	25
12.0	30	30
16.0	35	35
20.0	40	40
24.0	45	45
25.0	45	45
27.5	45	45
---	—	—
---	—	—

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

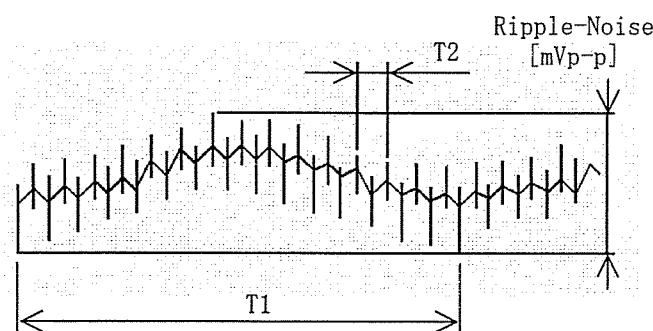


Fig. Complex Ripple Wave Form
 図 リップル波形詳細図

COSEL

Model	ADA600F (ADA600F-24)	Temperature Testing Circuitry	25°C Figure A																																																			
Item	Overcurrent Protection 過電流保護																																																					
Object	V1:+24V25A	2. Values																																																				
1. Graph	<p>— Input Volt. 170 V — Input Volt. 200 V - - - Input Volt. 264 V</p>																																																					
	<p>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。</p> <p>Intermittent operation occurs when the output voltage is from 14.4V to 0V. 14.4V～0V間は、間欠モードとなる。</p>																																																					
	<table border="1"> <thead> <tr> <th rowspan="2">Output Voltage [V]</th> <th colspan="3">Load Current [A]</th> </tr> <tr> <th>170[V]</th> <th>200[V]</th> <th>264[V]</th> </tr> </thead> <tbody> <tr><td>24.0</td><td>31.76</td><td>34.37</td><td>34.35</td></tr> <tr><td>22.8</td><td>34.78</td><td>34.78</td><td>34.81</td></tr> <tr><td>21.6</td><td>34.98</td><td>34.99</td><td>35.03</td></tr> <tr><td>19.2</td><td>35.40</td><td>35.40</td><td>35.40</td></tr> <tr><td>16.8</td><td>35.70</td><td>35.68</td><td>35.67</td></tr> <tr><td>14.4</td><td>35.92</td><td>35.91</td><td>35.91</td></tr> <tr><td>--</td><td>--</td><td>--</td><td>--</td></tr> <tr><td>--</td><td>--</td><td>--</td><td>--</td></tr> <tr><td>--</td><td>--</td><td>--</td><td>--</td></tr> <tr><td>--</td><td>--</td><td>--</td><td>--</td></tr> <tr><td>--</td><td>--</td><td>--</td><td>--</td></tr> </tbody> </table>			Output Voltage [V]	Load Current [A]			170[V]	200[V]	264[V]	24.0	31.76	34.37	34.35	22.8	34.78	34.78	34.81	21.6	34.98	34.99	35.03	19.2	35.40	35.40	35.40	16.8	35.70	35.68	35.67	14.4	35.92	35.91	35.91	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Output Voltage [V]	Load Current [A]																																																					
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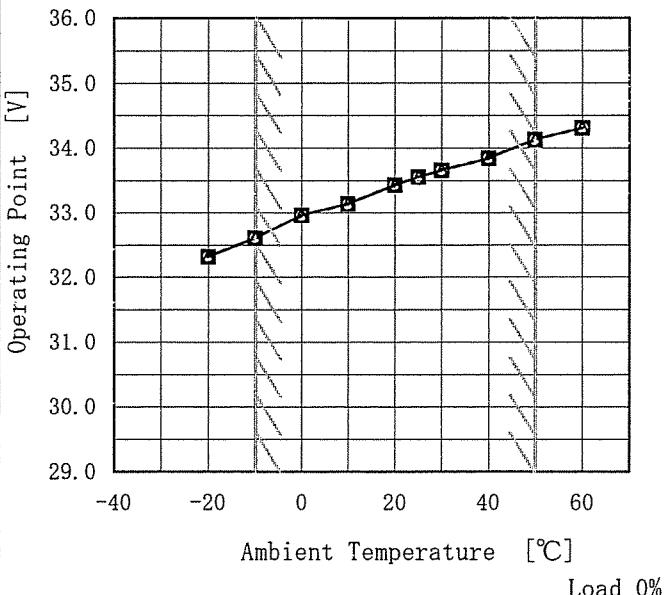
Model	ADA600F (ADA600F-24)
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Item	Overvoltage Protection 過電圧保護
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Object	V1:+24V25A
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1. Graph

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

Testing Circuitry Figure A

2. Values

Ambient Temperature [°C]	Operating Point [V]		
	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
-20	32.32	32.32	32.32
-10	32.61	32.61	32.61
0	32.96	32.96	32.96
10	33.14	33.14	33.14
20	33.43	33.43	33.43
25	33.55	33.55	33.55
30	33.66	33.66	33.66
40	33.84	33.84	33.84
50	34.13	34.13	34.13
60	34.31	34.31	34.31
---	—	—	—

COSEL

Model ADA600F (ADA600F-24)

Item Inrush Current
突入電流

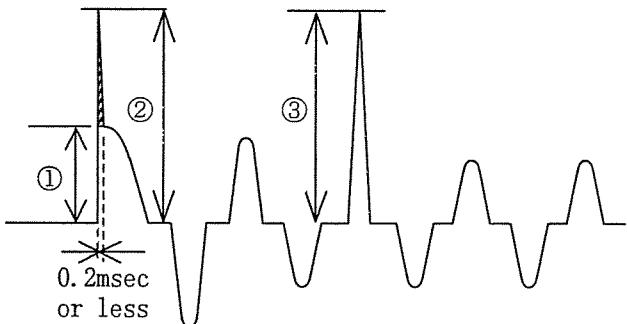
Object

Temperature 25°C
Testing Circuitry Figure AInput
Current
[20A/div]Input
Voltage
[200V/div]

Time [50mS/div]

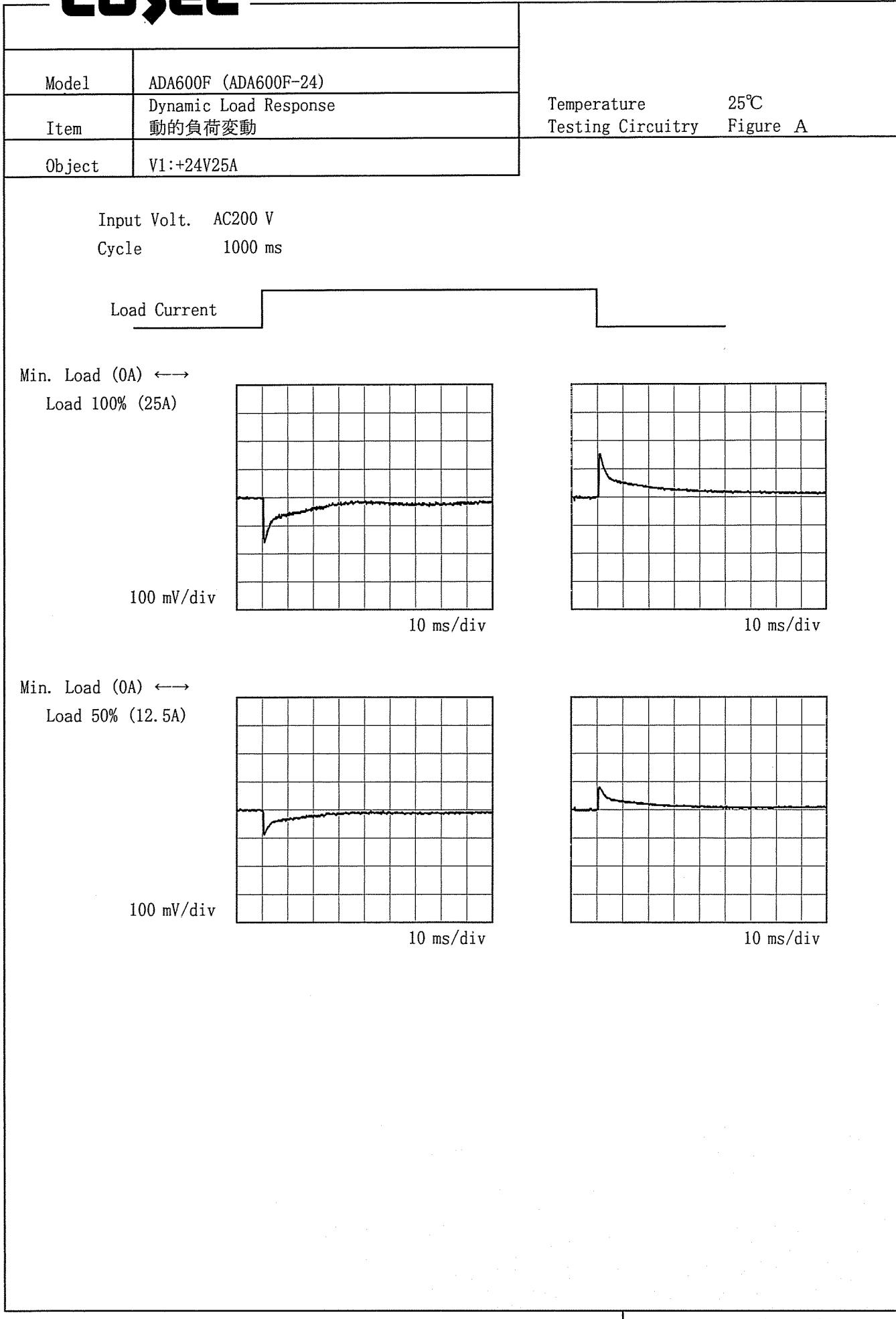
Input Voltage 200 V
 Frequency 60 Hz
 Load 100 %
 Inrush Current

- ① 20.6 [A]
- ② 38.1 [A] (0.2msec or less)*1
- ③ 21.6 [A]

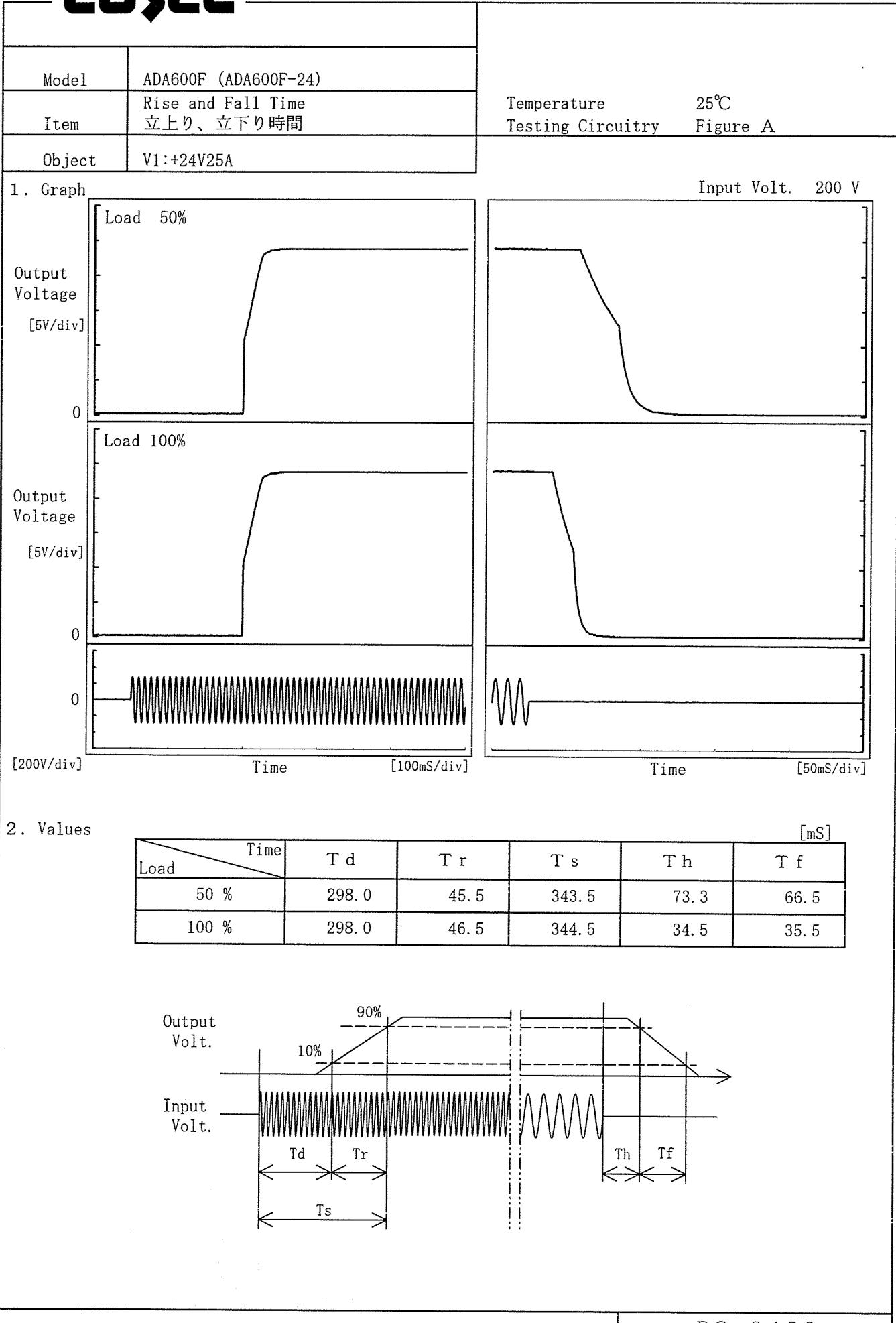


*1 The specification of the inrush current (primary surge) means that the surge current to a built-in noise filter (0.2msec or less : waveform ②) is excluded.

本製品の突入電流(1次サージ)の仕様は、内蔵ノイズフィルタ部への
サージ電流(0.2msec以下:波形②)を除きます。

COSEL

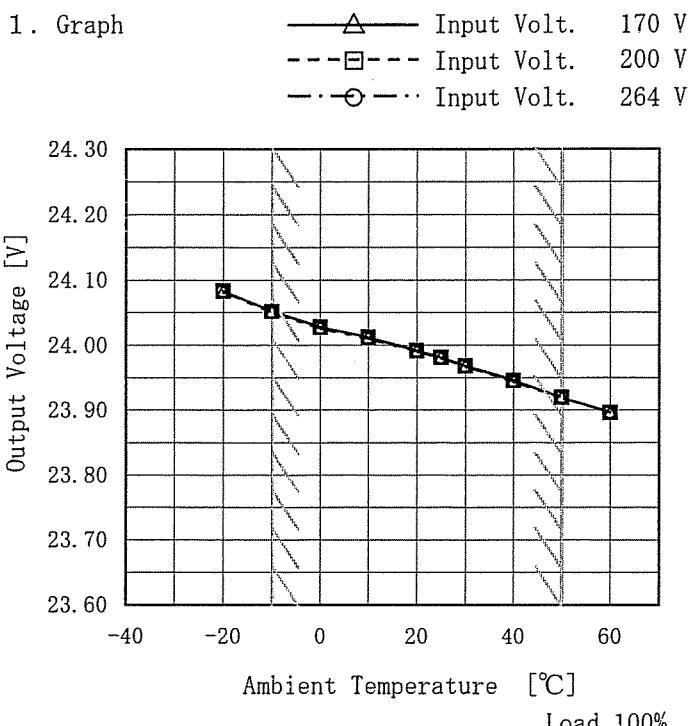
COSEL



Model ADA600F (ADA600F-24)

Item Ambient Temperature Drift
周囲温度変動

Object V1:+24V25A



Testing Circuitry Figure A

2. Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
-20	24.083	24.084	24.083
-10	24.052	24.051	24.051
0	24.028	24.028	24.027
10	24.012	24.012	24.011
20	23.992	23.992	23.991
25	23.982	23.982	23.981
30	23.968	23.968	23.968
40	23.947	23.946	23.945
50	23.920	23.921	23.920
60	23.896	23.897	23.896
--	—	—	—

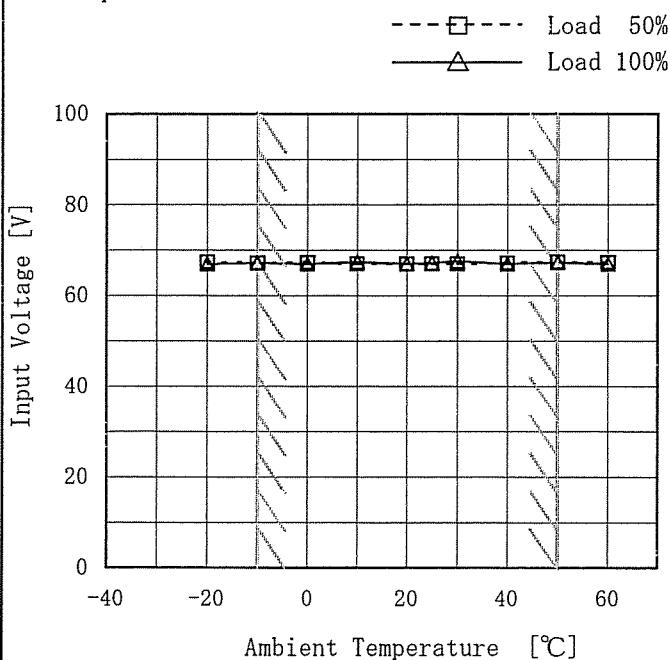
Note: Slanted line shows the range of the rated ambient temperature.

(注) 斜線は定格周囲温度範囲を示す。

Model	ADA600F (ADA600F-24)
Item	Minimum Input Voltage for Regulated Output Voltage 最低レギュレーション電圧
Object	V1:+24V25A

Testing Circuitry Figure A

1. Graph



2. Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	67	67
-10	67	67
0	67	67
10	67	67
20	67	67
25	67	67
30	67	68
40	67	67
50	67	67
60	67	67
--	—	—

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。

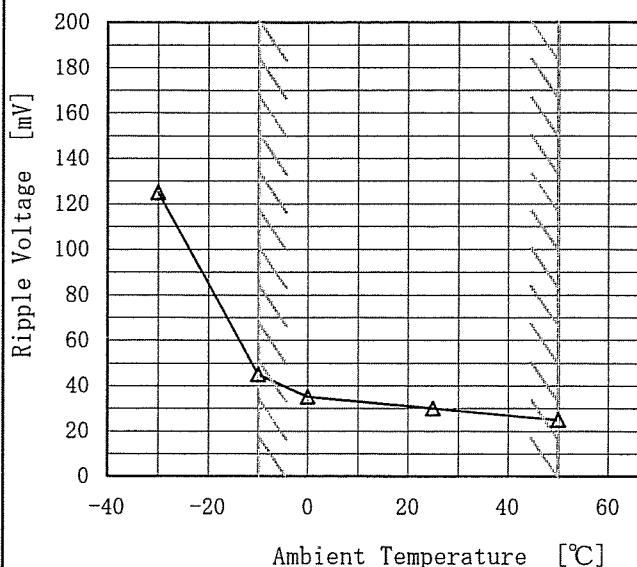
COSEL

Model ADA600F (ADA600F-24)

Item Ripple Voltage (by Ambient Temp.)
リップル電圧 (周囲温度特性)

Object V1:+24V25A

1. Graph



Input Volt. 200 V

Load 100 %

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 Temperature [°C]	Ripple Voltage [mV]
-30	125
-10	45
0	35
25	30
50	25
---	—
---	—
---	—
---	—
---	—
---	—
---	—
---	—

COSEL

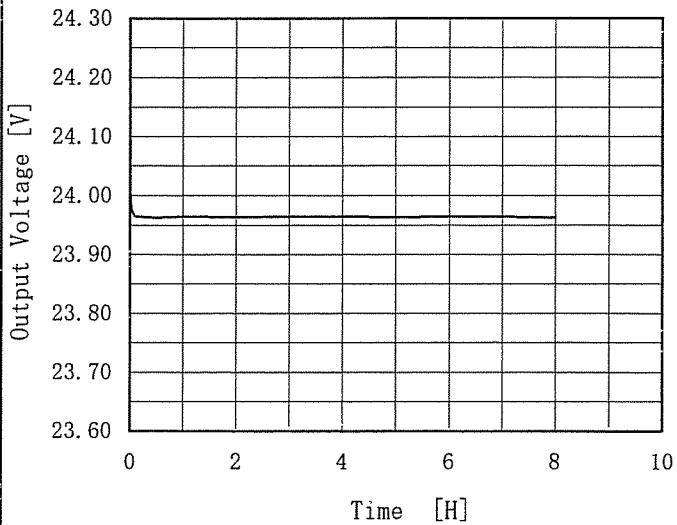
Model ADA600F (ADA600F-24)

Item Time Lapse Drift
経時ドリフト

Object V1:+24V25A

Temperature 25°C
Testing Circuitry Figure A

1. Graph



Input Volt. 200V

Load 100%

2. Values

Time since start [H]	Output Voltage [V]
0.0	24.011
0.5	23.963
1.0	23.964
2.0	23.964
3.0	23.964
4.0	23.964
5.0	23.963
6.0	23.965
7.0	23.964
8.0	23.962



Model	ADA600F (ADA600F-24)	Testing Circuitry Figure A
Item	Output Voltage Accuracy 定電圧精度	
Object	V1:+24V25A	

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 : -10 ~ 50°C

Input Voltage : 170 ~ 264V

Load Current : 0 ~ 25A

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

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

1. 定電圧精度

周囲温度、入力電圧、負荷電流を下記仕様内で、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 ~ 264V

負荷電流 : 0 ~ 25A

* 定電圧精度(変動値) = ±(出力電圧の最高値-出力電圧の最低値) / 2

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

2. Values

Item	Temperature [°C]	Input Voltage [V]	Output		Output Voltage Accuracy	
			Current [A]	Voltage [V]	Value [mV]	Ration [%]
Maximum Voltage	-10	264	0	24.080	±79	±0.3
Minimum Voltage	50	170	25	23.922		



Model	ADA600F (ADA600F-24)	Temperature	25°C
Item	Leakage Current 漏洩電流	Testing Circuitry	Figure B
Object	_____		

1. Results

Standards	Leakage Current [mA]		
	Input Volt. 85 [V]	Input Volt. 100 [V]	Input Volt. 132 [V]
(A) DEN-AN	—	—	—
(B) IEC60950	—	—	—

Standards	Leakage Current [mA]		
	Input Volt. 170 [V]	Input Volt. 240 [V]	Input Volt. 264 [V]
(B) IEC60950	0.31	0.44	0.51

2. Condition

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

交流入力の各相について測定し、その大きい方を漏洩電流測定値とする。

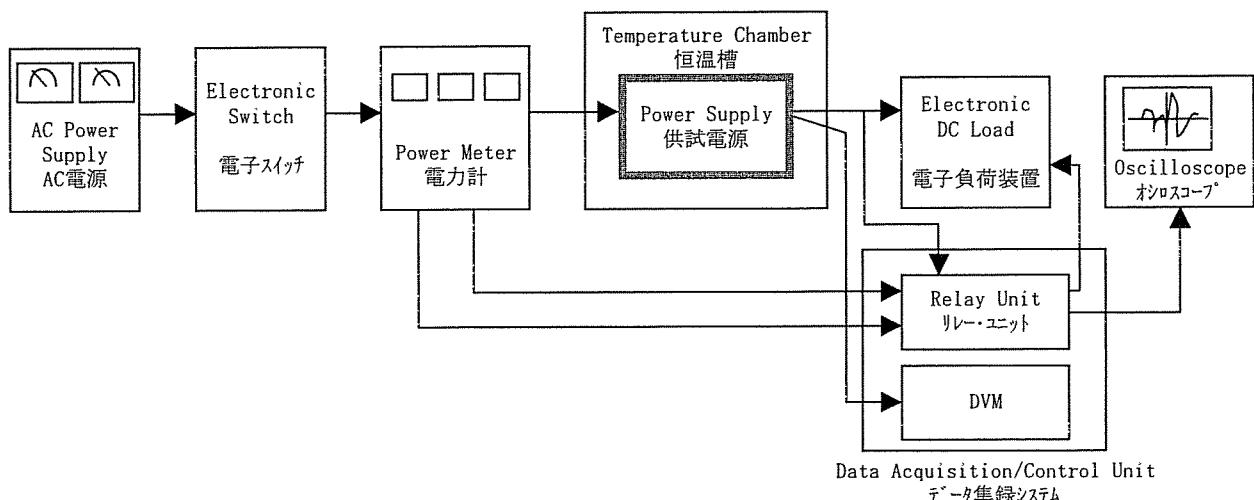


Figure A

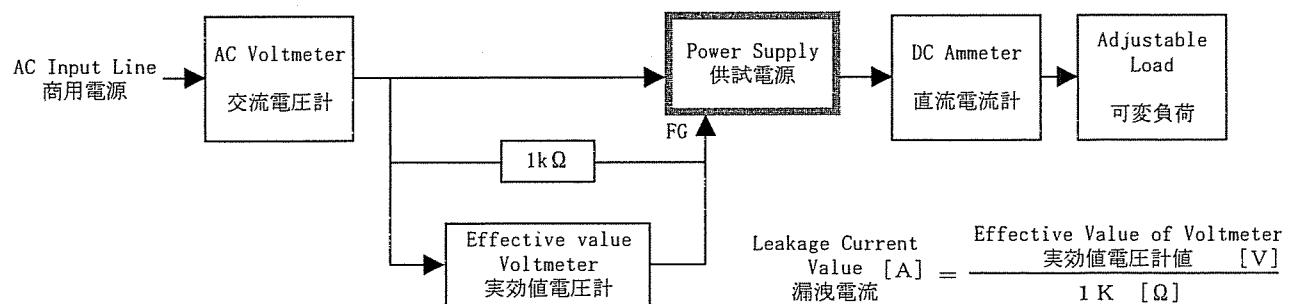


Figure B (DEN-AN)

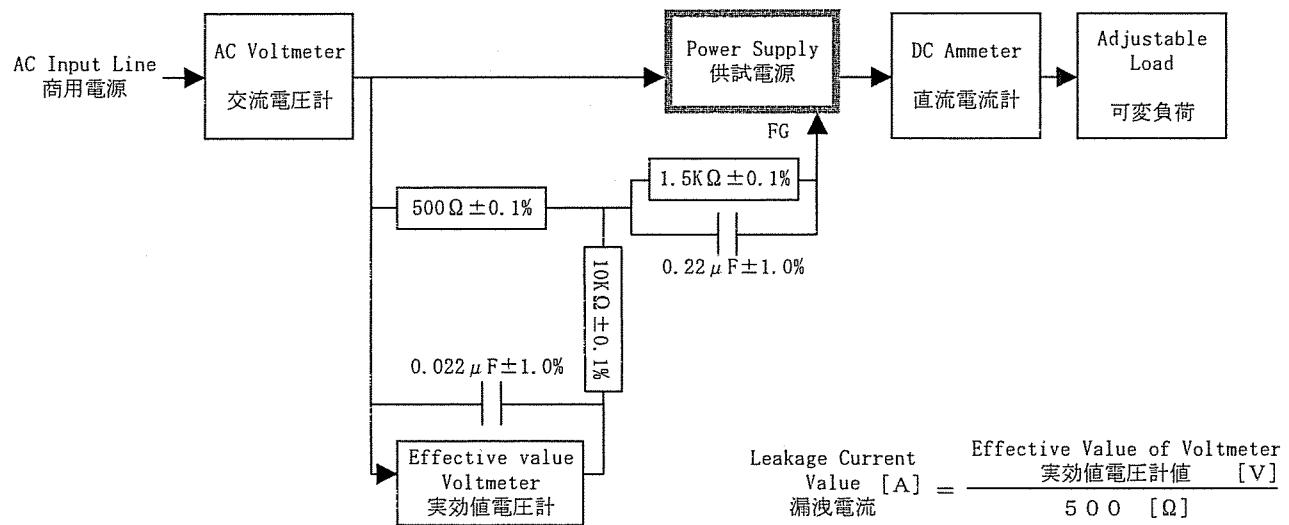


Figure B (IEC60950)