



# TEST DATA OF MODULE U

(RB series)

Regulated DC Power Supply  
July 21, 2020

Approved by : Satoshi Uetani  
Design Manager

Prepared by : Yutaka Murai  
Design Engineer

**COSEL CO.,LTD.**



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<p>Model      MODULE U</p>		<p>Temperature      25°C Testing Circuitry      Figure A</p>																																
<p>Item      Line Regulation</p>																																		
<p>Object      +48V5A</p>																																		
<p>1. Graph</p> <p style="text-align: right;">             --- □ --- Load 50%              ——— △ ——— Load 100%         </p> <p>Note: Slanted line shows the range of the rated input voltage.</p>		<p>2. Values</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>85</td><td>48.450</td><td>48.450</td></tr> <tr><td>90</td><td>48.451</td><td>48.451</td></tr> <tr><td>100</td><td>48.452</td><td>48.452</td></tr> <tr><td>120</td><td>48.452</td><td>48.452</td></tr> <tr><td>200</td><td>48.452</td><td>48.452</td></tr> <tr><td>230</td><td>48.452</td><td>48.452</td></tr> <tr><td>264</td><td>48.453</td><td>48.453</td></tr> <tr><td>280</td><td>48.453</td><td>48.453</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> </tbody> </table>	Input Voltage [V]	Output Voltage [V]		Load 50%	Load 100%	85	48.450	48.450	90	48.451	48.451	100	48.452	48.452	120	48.452	48.452	200	48.452	48.452	230	48.452	48.452	264	48.453	48.453	280	48.453	48.453	--	-	-
Input Voltage [V]	Output Voltage [V]																																	
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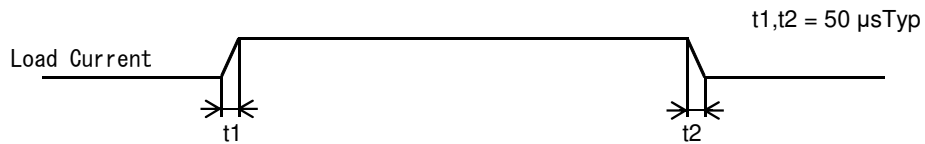


Model		MODULE U		Temperature 25°C																																																				
Item		Load Regulation		Testing Circuitry Figure A																																																				
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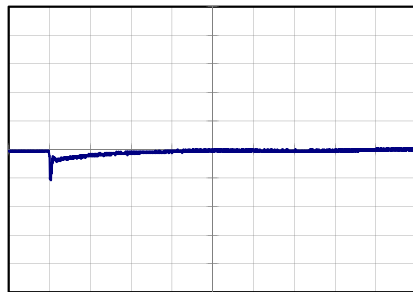
Model	MODULE U	Temperature 25°C Testing Circuitry Figure A
Item	Dynamic Load Response	
Object	+48V5A	

Input Volt. 100 V  
Cycle 1000 ms

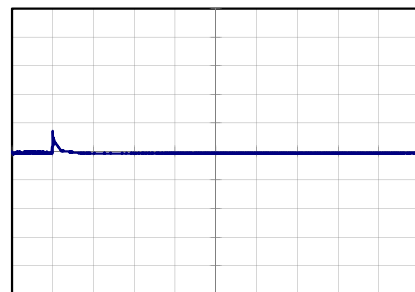


Min.Load (0A) ←→  
Load 100% (5A)

500 mV/div



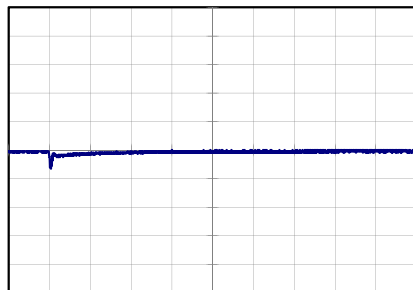
2 ms/div



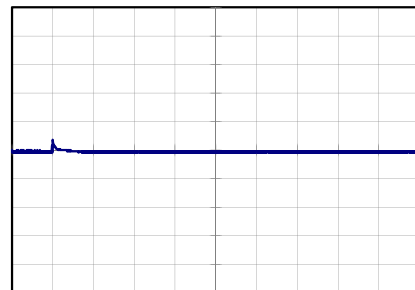
10 ms/div

Min.Load (0A) ←→  
Load 50% (2.5A)

500 mV/div



2 ms/div



10 ms/div



<p>Model MODULE U</p>		<p>Temperature 25°C Testing Circuitry Figure B</p>																																						
<p>Item Ripple Voltage (by Load Current)</p>																																								
<p>Object +48V5A</p>																																								
<p>1. Graph</p> <div style="display: flex; align-items: center;"> <div style="margin-right: 20px;"> <p>—△— Input Volt. 100V</p> <p>-·-○-·- Input Volt. 230V</p> </div> </div>		<p>2. Values</p> <table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="2">Ripple Voltage [mV]</th> </tr> <tr> <th>Input Volt. 100 [V]</th> <th>Input Volt. 230 [V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>10</td><td>10</td></tr> <tr><td>1.0</td><td>30</td><td>30</td></tr> <tr><td>2.0</td><td>45</td><td>45</td></tr> <tr><td>3.0</td><td>50</td><td>50</td></tr> <tr><td>4.0</td><td>55</td><td>55</td></tr> <tr><td>5.0</td><td>65</td><td>65</td></tr> <tr><td>5.5</td><td>75</td><td>75</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> </tbody> </table>	Load Current [A]	Ripple Voltage [mV]		Input Volt. 100 [V]	Input Volt. 230 [V]	0.0	10	10	1.0	30	30	2.0	45	45	3.0	50	50	4.0	55	55	5.0	65	65	5.5	75	75	--	-	-	--	-	-	--	-	-	--	-	-
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<div style="text-align: center;"> <p>T1: Due to AC Input Line T2: Due to Switching</p> </div>																																								
<p>Fig. Complex Ripple Wave Form</p>																																								



Model		MODULE U	Temperature 25°C																																							
Item		Ripple-Noise	Testing Circuitry Figure B																																							
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Item		Ripple Voltage (by Ambient Temp.)																																						
Object		+48V5A																																						
1.Graph		<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>---□--- Input Volt. 100V</p> <p>—△— Input Volt. 230V</p> </div> <div style="width: 45%;"> </div> </div>																																						
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Model		MODULE U																																																					
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Object		+48V5A																																																					
1.Graph		<p>—△— Input Volt. 100V</p> <p>- - -□- - - Input Volt. 200V</p> <p>- · -○- · - Input Volt. 230V</p>	2.Values																																																				
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Note: Slanted line shows the range of the rated ambient temperature.																																																							



<b>COSEL</b>		
Model	MODULE U	
Item	Output Voltage Accuracy	Testing Circuitry Figure A
Object	+48V5A	

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 : 0 - 5A

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

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

2. Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	50	264	0	48.503	±115	±0.2
Minimum Voltage	-20	85	5	48.274		



<b>COSEL</b>																								
Model	MODULE U	Temperature 25°C Testing Circuitry Figure A																						
Item	Time Lapse Drift																							
Object	+48V5A																							
1.Graph		2.Values																						
<p style="text-align: center;">Time [H]</p> <p style="text-align: center;">Input Volt. 100V Load 100%</p>		<table border="1"> <thead> <tr> <th>Time since start [H]</th> <th>Output Voltage [V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>48.569</td></tr> <tr><td>0.5</td><td>48.582</td></tr> <tr><td>1.0</td><td>48.582</td></tr> <tr><td>2.0</td><td>48.582</td></tr> <tr><td>3.0</td><td>48.582</td></tr> <tr><td>4.0</td><td>48.582</td></tr> <tr><td>5.0</td><td>48.582</td></tr> <tr><td>6.0</td><td>48.583</td></tr> <tr><td>7.0</td><td>48.582</td></tr> <tr><td>8.0</td><td>48.582</td></tr> </tbody> </table>	Time since start [H]	Output Voltage [V]	0.0	48.569	0.5	48.582	1.0	48.582	2.0	48.582	3.0	48.582	4.0	48.582	5.0	48.582	6.0	48.583	7.0	48.582	8.0	48.582
Time since start [H]	Output Voltage [V]																							
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* The characteristic of AC230V is equal.																								





Model		MODULE U	Testing Circuitry Figure A																																						
Item		Overvoltage Protection																																							
Object		+48V5A																																							
1.Graph		<p> <span style="display: inline-block; width: 10px; border-bottom: 1px solid black; margin-right: 5px;"></span> <span style="display: inline-block; width: 10px; border-bottom: 1px dashed black; margin-right: 5px;"></span> </p> <p> <span style="display: inline-block; width: 10px; border-bottom: 1px solid black; margin-right: 5px;"></span> △ Input Volt. 100V  <span style="display: inline-block; width: 10px; border-bottom: 1px dashed black; margin-right: 5px;"></span> □ Input Volt. 230V                 </p> <p style="text-align: right;">Load 0%</p>	2.Values																																						
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Ambient Temperature [°C]	Operating Point [V]																																								
	Input Volt. 100[V]	Input Volt. 230[V]																																							
-30	59.64	59.58																																							
-20	60.13	60.06																																							
-10	60.62	60.55																																							
0	61.11	61.04																																							
10	61.60	61.53																																							
25	62.30	62.30																																							
30	62.58	62.52																																							
40	63.08	63.01																																							
50	63.35	63.36																																							
60	63.78	63.78																																							
--	-	-																																							
<p>Note: Slanted line shows the range of the rated ambient temperature.</p>																																									

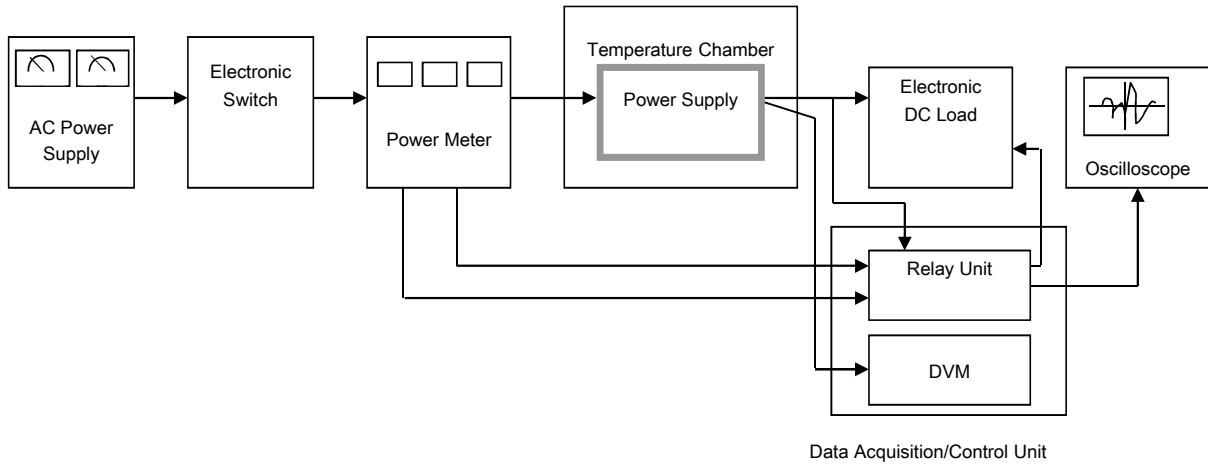


Figure A

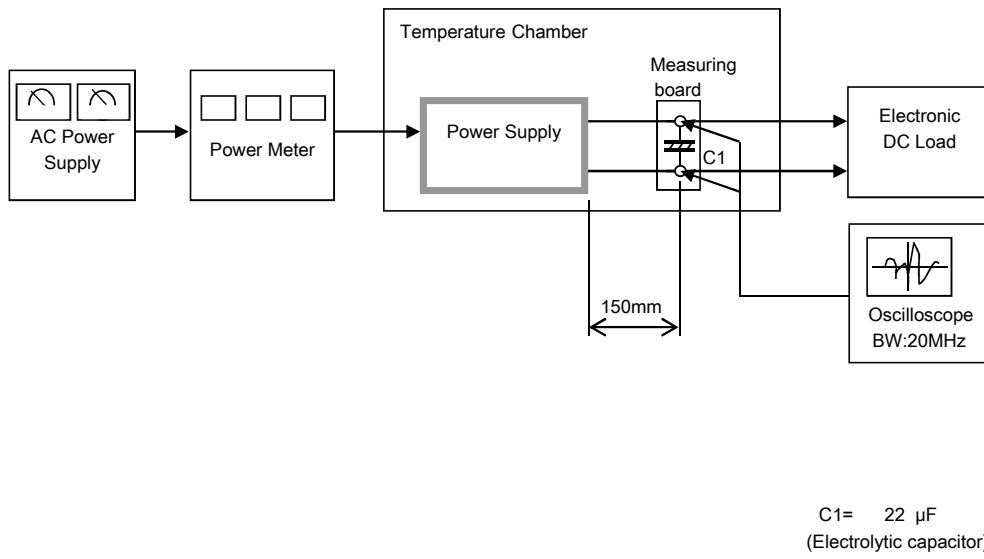


Figure B