



Supplemental test data
(参考資料)

Date of issue: Jun. 28, 2011

Test Data

Model Number: OZ-015-24

Model Name: DC POWER SUPPLY

INPUT: 85V - 264V AC, 50 / 60 Hz

OUTPUT: 24 V 0.7A

Minimum load : 0W

Rated load :16.8W

Approved by : Makoto Urabe (QA manager)

Designed by : A. Takeda (R&D engineer)

Tested by : Kohei Sawada (Evaluation test engineer)

Nipron Co., Ltd.

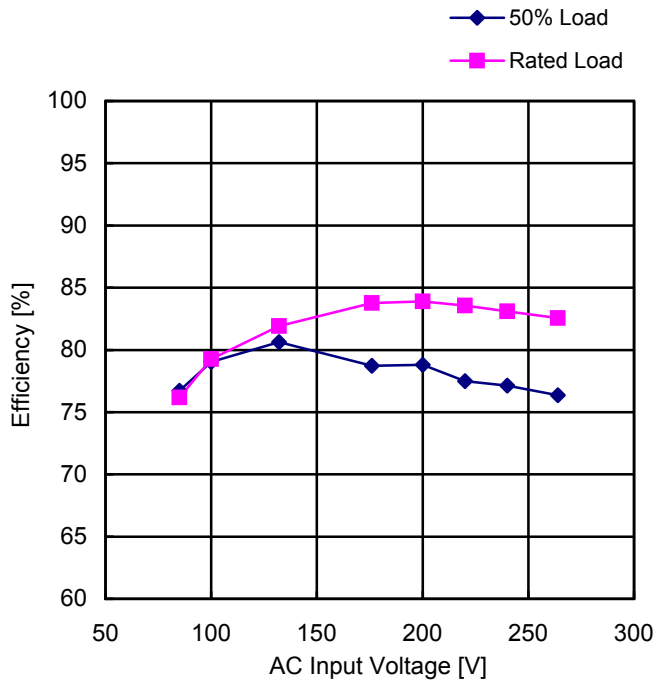
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Model	OZ-15-24	Temperature: 25°C																																					
Item	Input Current (by Load Power)																																						
		<table border="1"> <thead> <tr> <th rowspan="2">Load Power [W]</th> <th colspan="4">Input Current [A rms]</th> </tr> <tr> <th>Input Voltage 85V AC</th> <th>Input Voltage 100V AC</th> <th>Input Voltage 240V AC</th> <th>Input Voltage 264V AC</th> </tr> </thead> <tbody> <tr> <td>0.0</td> <td>0.03</td> <td>0.03</td> <td>0.03</td> <td>0.04</td> </tr> <tr> <td>4.2</td> <td>0.13</td> <td>0.11</td> <td>0.07</td> <td>0.07</td> </tr> <tr> <td>8.4</td> <td>0.22</td> <td>0.19</td> <td>0.11</td> <td>0.11</td> </tr> <tr> <td>12.6</td> <td>0.30</td> <td>0.26</td> <td>0.15</td> <td>0.14</td> </tr> <tr> <td>16.8</td> <td>0.39</td> <td>0.34</td> <td>0.18</td> <td>0.17</td> </tr> </tbody> </table>				Load Power [W]	Input Current [A rms]				Input Voltage 85V AC	Input Voltage 100V AC	Input Voltage 240V AC	Input Voltage 264V AC	0.0	0.03	0.03	0.03	0.04	4.2	0.13	0.11	0.07	0.07	8.4	0.22	0.19	0.11	0.11	12.6	0.30	0.26	0.15	0.14	16.8	0.39	0.34	0.18	0.17
Load Power [W]	Input Current [A rms]																																						
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8.4	0.22	0.19	0.11	0.11																																			
12.6	0.30	0.26	0.15	0.14																																			
16.8	0.39	0.34	0.18	0.17																																			

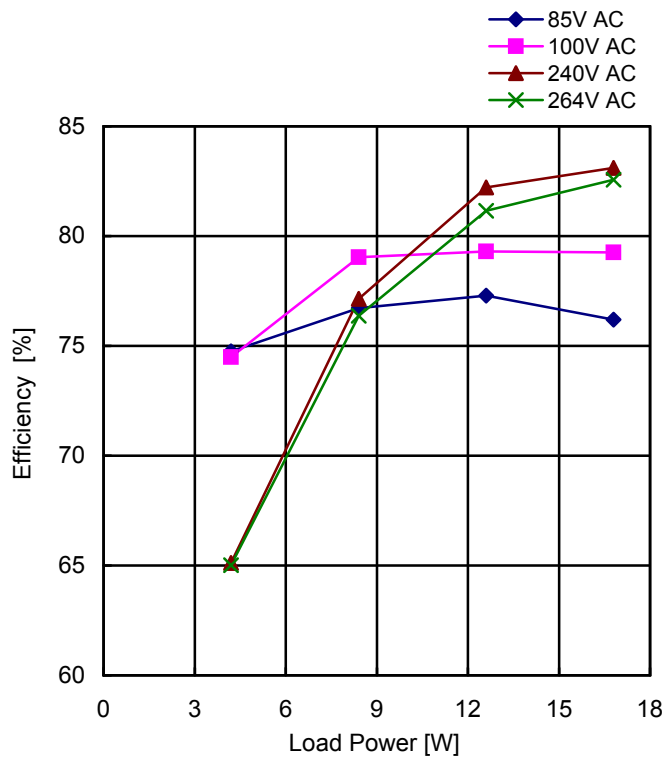
Model	OZ-15-24	Temperature: 25°C
Item	Efficiency	

■ Efficiency (by Input Voltage)



AC Input Voltage [V]	Efficiency [%]	
	50% Load	Rated Load
85	76.71	76.19
100	79.03	79.26
132	80.64	81.91
176	78.74	83.77
200	78.81	83.90
220	77.50	83.56
240	77.14	83.10
264	76.36	82.57

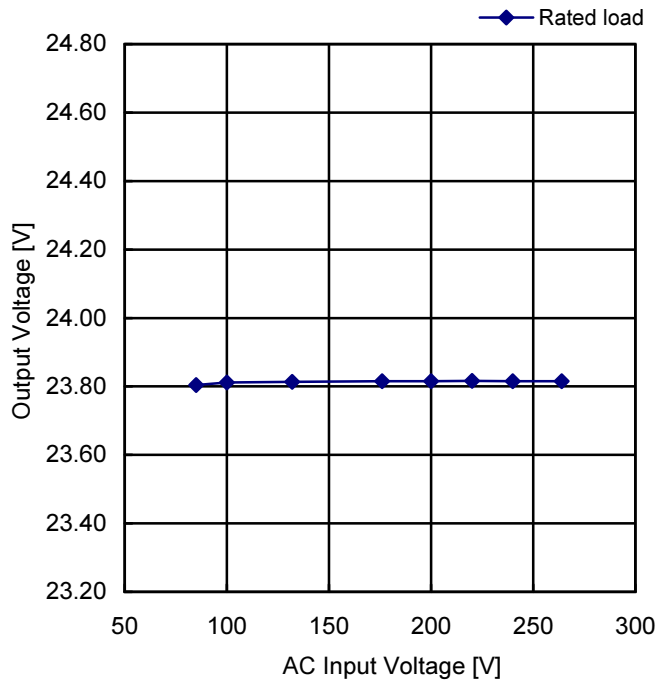
■ Efficiency (by Load Power)



Load Power [W]	Efficiency [%]			
	Input Voltage 85V AC	Input Voltage 100V AC	Input Voltage 240V AC	Input Voltage 264V AC
4.2	74.75	74.48	65.11	65.01
8.4	76.71	79.03	77.14	76.36
12.6	77.28	79.30	82.22	81.15
16.8	76.19	79.26	83.10	82.57

Model	OZ-15-24	Temperature: 25°C
Item	Line Regulation	

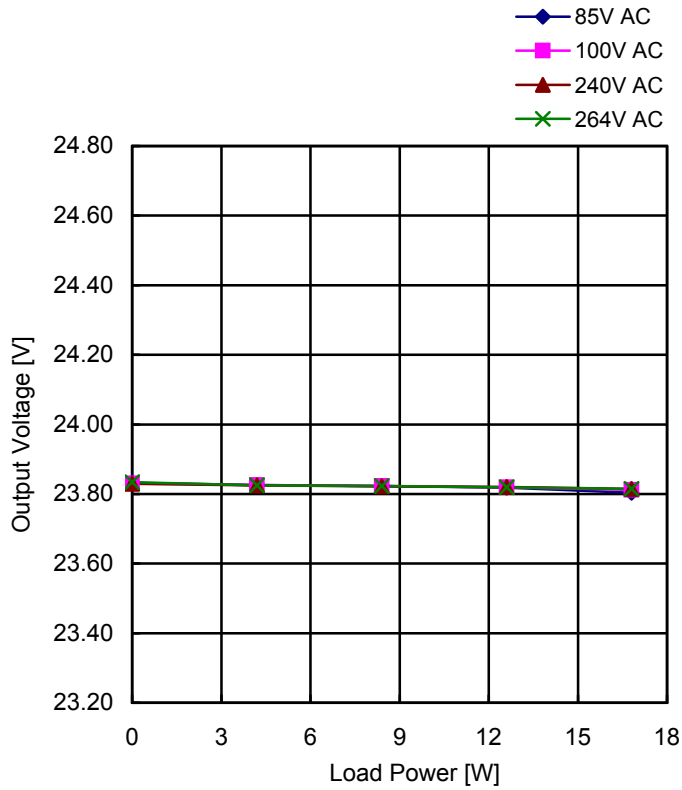
24V/0.7A



AC Input Voltage [V]	Output Voltage [V]
85	23.804
100	23.812
132	23.813
176	23.815
200	23.815
220	23.816
240	23.815
264	23.815

Model	OZ-15-24	Temperature: 25°C
Item	Load Regulation	

24V

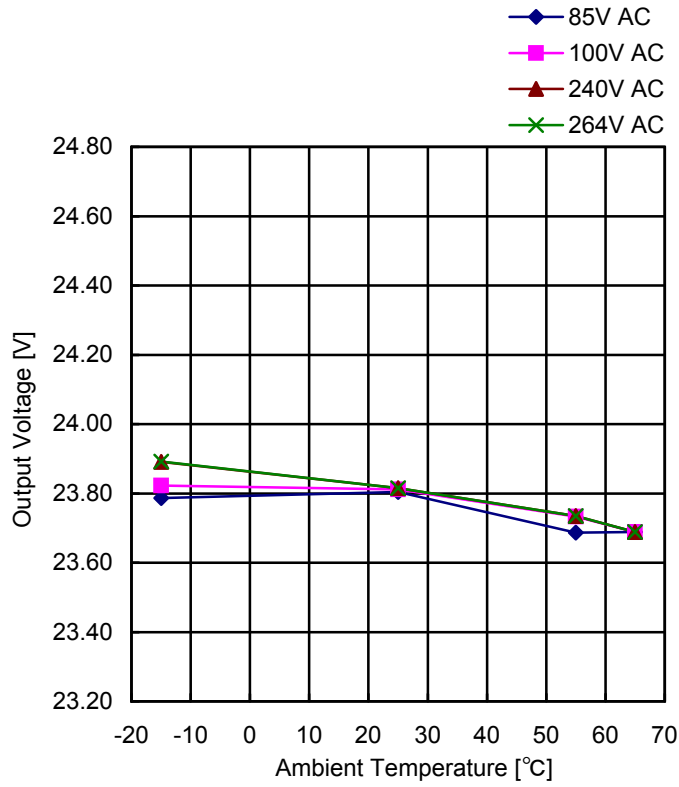


Load Power [W]	Output Voltage [V]			
	Input Voltage 85V AC	Input Voltage 100V AC	Input Voltage 240V AC	Input Voltage 264V AC
0.0	23.832	23.830	23.829	23.834
4.2	23.826	23.826	23.825	23.825
8.4	23.823	23.823	23.822	23.823
12.6	23.818	23.819	23.820	23.819
16.8	23.804	23.812	23.815	23.815
-	-	-	-	-

Load Power [W]	Load Condition	
	Load Current [A]	
	24V	
0.0	0.00	
4.2	0.175	
8.4	0.35	
12.6	0.525	
16.8	0.70	
-	-	

Model	OZ-15-24
Item	Ambient Temperature Drift

24V



Ambient Temp. (°C)	Output Voltage [V]			
	Input Voltage 85V AC	Input Voltage 100V AC	Input Voltage 240V AC	Input Voltage 264V AC
-15	23.787	23.823	23.891	23.892
25	23.804	23.812	23.815	23.815
55	23.687	23.733	23.735	23.735
65	23.689	23.689	23.689	23.689

Load Condition

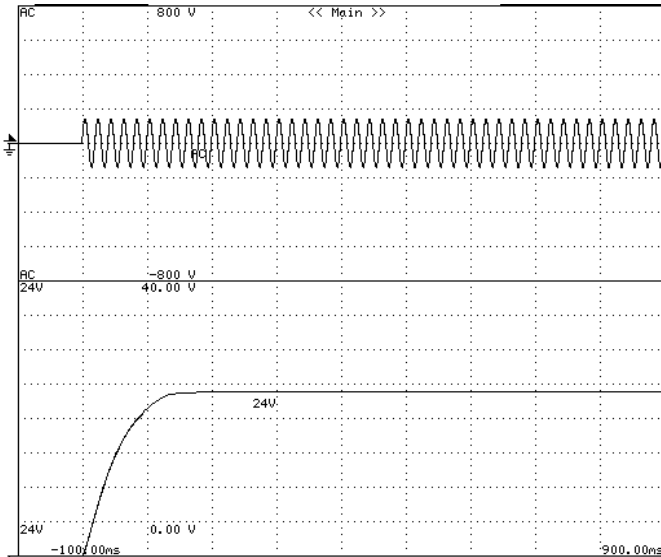
Ambient Temp. (°C)	Load Current [A]
	24V
-15	0.70
25	0.70
55	0.70
65	0.49

Model	OZ-015-24	Temperature: 25°C
Item	Output Rise Characteristics (at AC Power ON)	

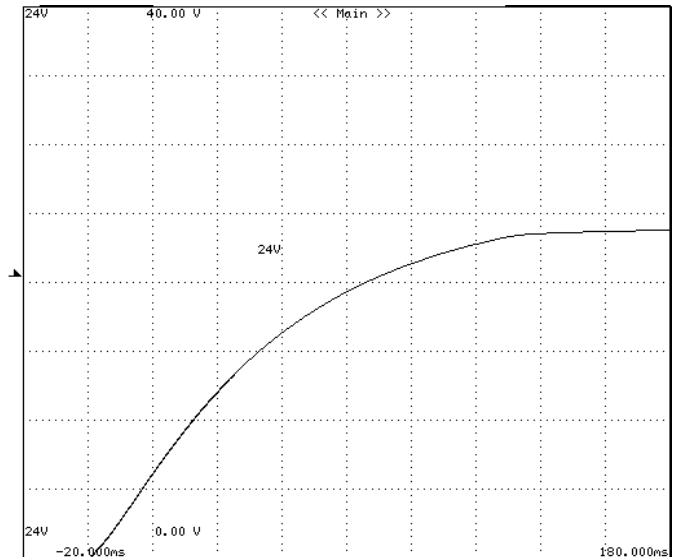
Input: 100V AC
Load: Rated Load

Timebase Range: 100ms/div

Vertical Sensitivity: 5V/div
Timebase Range: 20ms/div



All Output Start-up Sequence

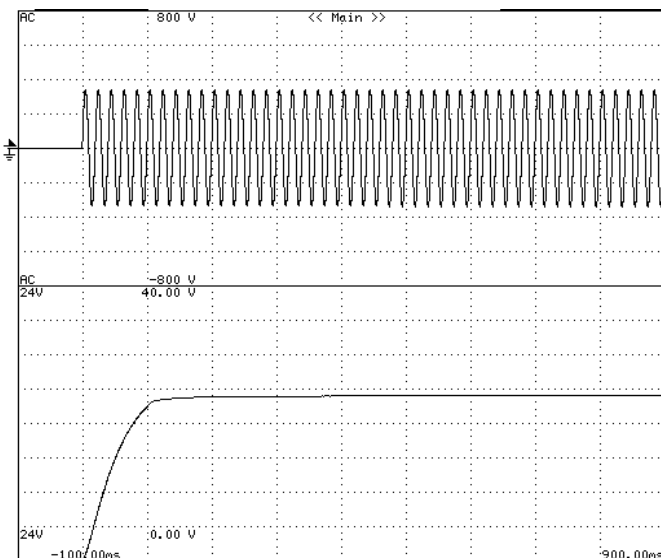


24V DC Output Rise Characteristics

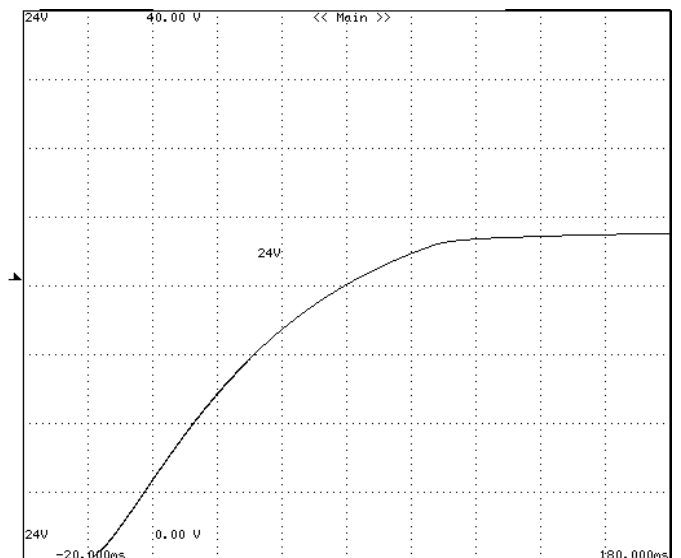
Input: 240V AC
Load: Rated Load

Timebase Range: 100ms/div

Vertical Sensitivity: 5V/div
Timebase Range: 20ms/div



All Output Start-up Sequence



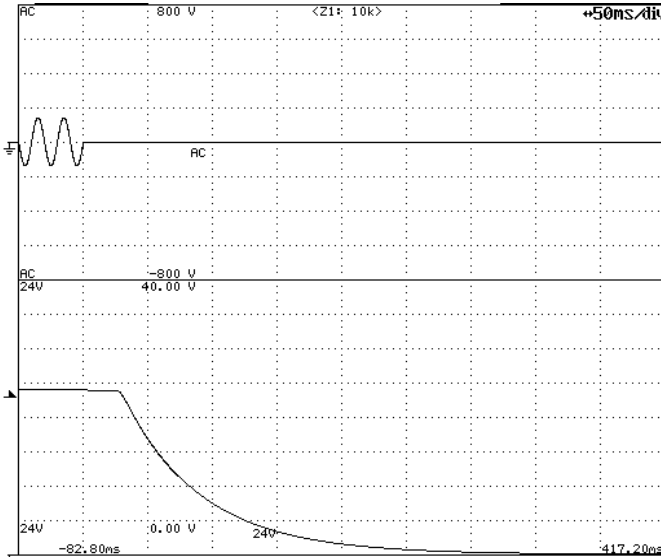
24V DC Output Rise Characteristics

Model	OZ-015-24	Temperature: 25°C
Item	Output Fall Characteristics (at AC Power OFF)	

Input: 100V AC
Load: Rated Load

Timebase Range: 50ms/div

Timebase Range: 10ms/div



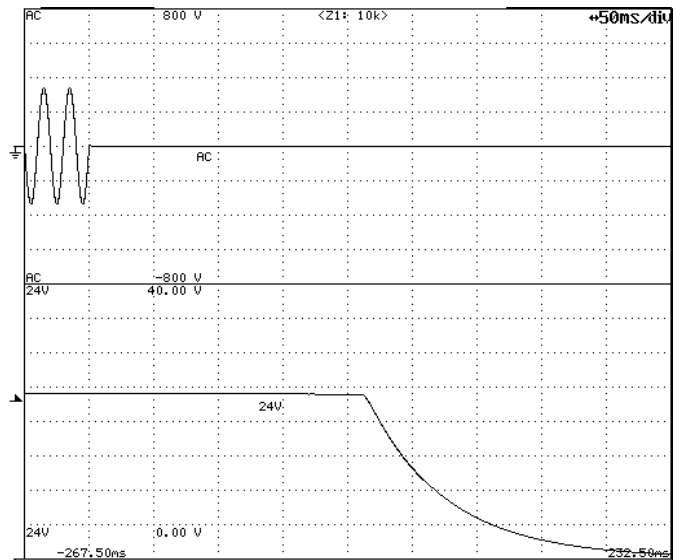
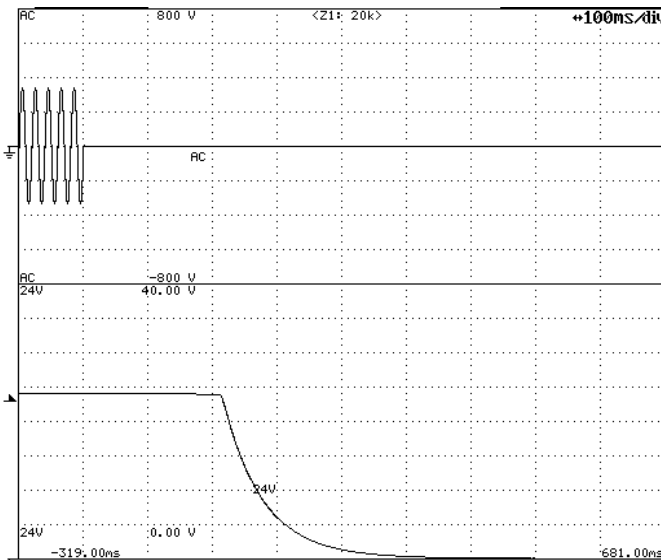
Output Fall Characteristics

Output Fall Characteristics (magnification)

Input: 240V AC
Load: Rated Load

Timebase Range: 100ms/div

Timebase Range: 50ms/div



Output Fall Characteristics

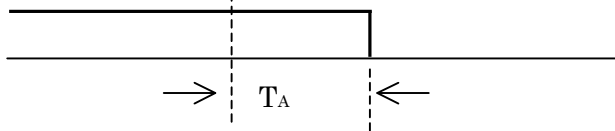
Output Fall Characteristics (magnification)

Model	OZ-015-24	Temperature: 25°C
Item	Instantaneous Interruption Compensation (by Load Power)	

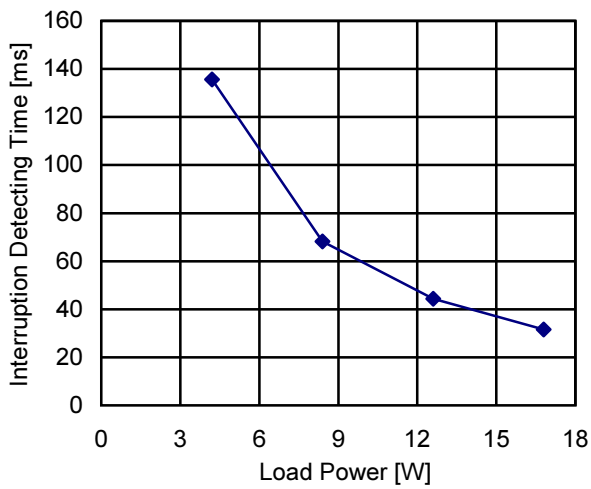
Input Voltage



Output Voltage



Input Voltage:100V AC



Load Power [W]	Interruption Detecting Time [ms]
	Ouput Voltage
	T_A
4.2	135.6
8.4	68.2
12.6	44.4
16.8	31.6

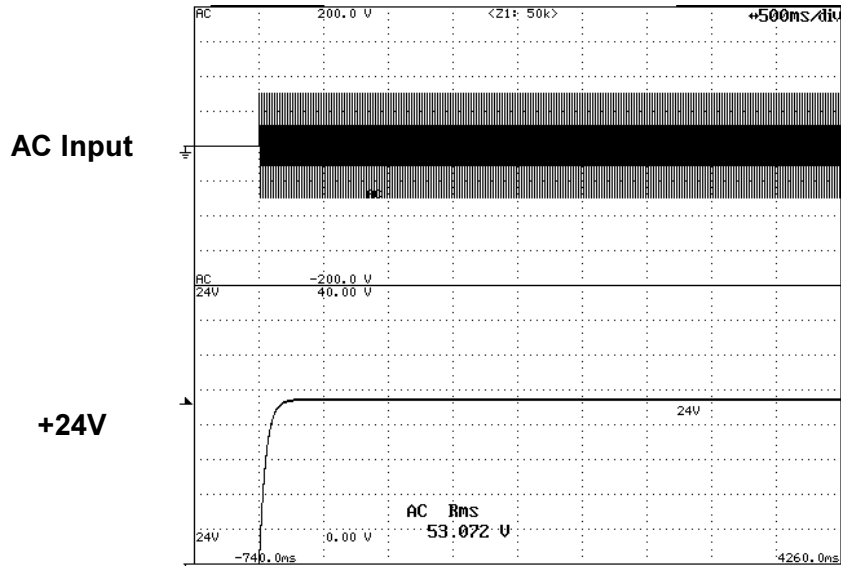
Input Voltage:240V AC



Load Power [W]	Interruption Detecting Time [ms]
	Ouput Voltage
	T_A
4.2	772.2
8.4	422.2
12.6	288.4
16.8	236.6

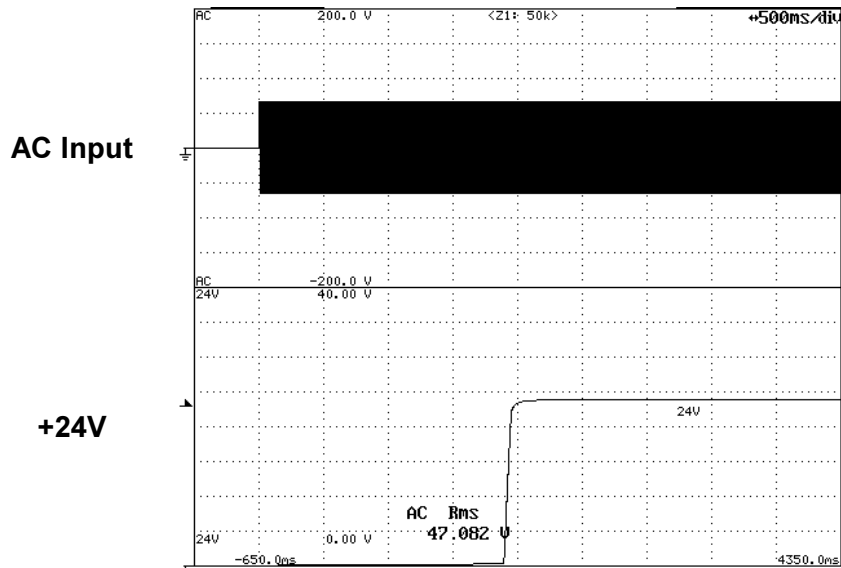
Model	OZ-015-24	Temperature: 25°C
Item	Start-Up Voltage	

**Timebase Range: 500ms/div
Load: Rated Load**



Start-up Voltage: 53.072V AC

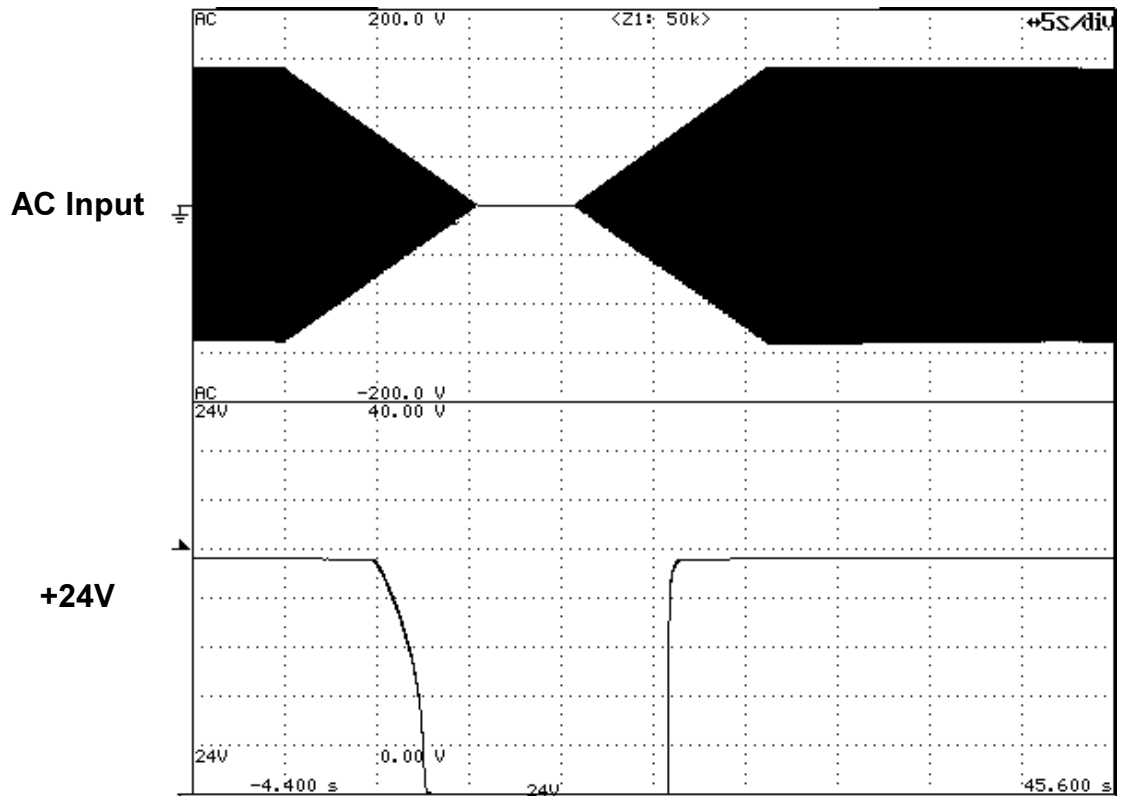
**Timebase Range: 500ms/div
Load: Minimum Load**



Start-up Voltage: 47.082V AC

Model	OZ-015-24	Temperature: 25°C
Item	Input Voltage Sweep Up/Down	

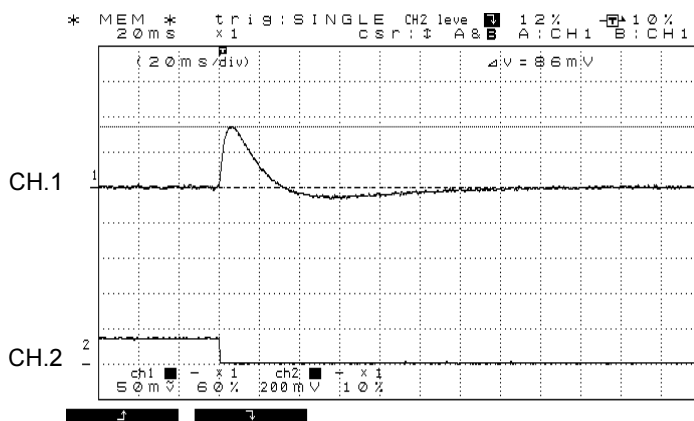
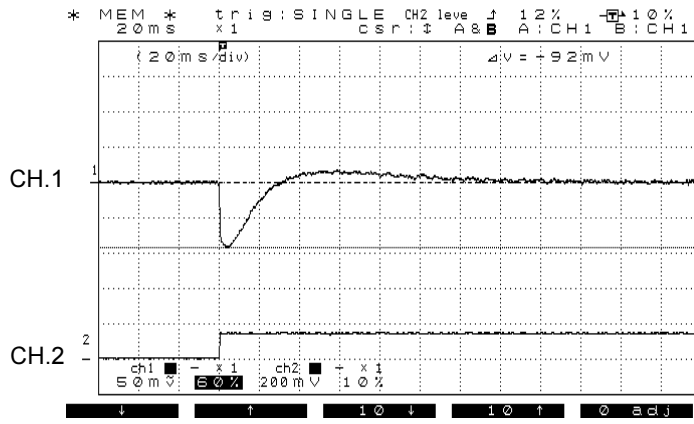
Timebase Range: 5s/div
Load: Rated Load



Sweep Rate: 10Vave/sec

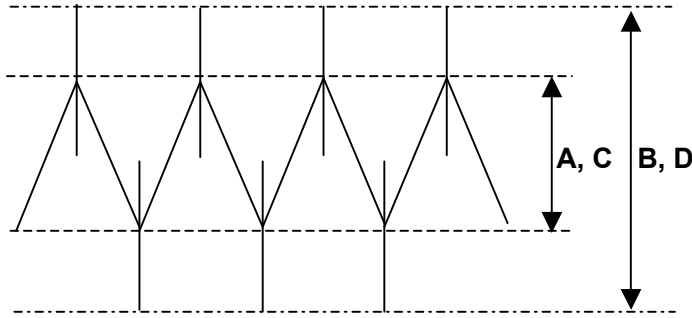
Model	OZ-015-24	Temperature: 25°C
Item	Dynamic Load Response	

+24V DC Output Transient Response Waveforms



Waveform 1	
CH1	Measuring Point: DC Output Voltage
	Vertical Sensitivity: 50mV/div
CH2	Measuring Point: DC Output Current
	Vertical Sensitivity: 1A/div
Timebase Range	20ms/div
Condition	Input: 100V AC
Note: Rated Load(0.7A) ⇒ Minimum load(0A)	

Model	OZ-15-24	Load: Rated Load
Item	Ambient Temperature Drift	



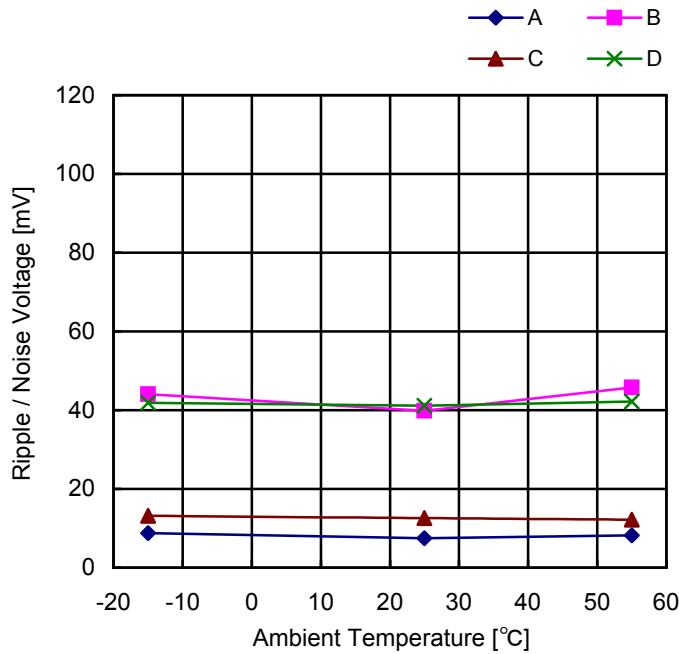
at 100V AC

A: Ripple Voltage (mV_{P-P})
 B: Noise Voltage (mV_{P-P})

at 240V AC

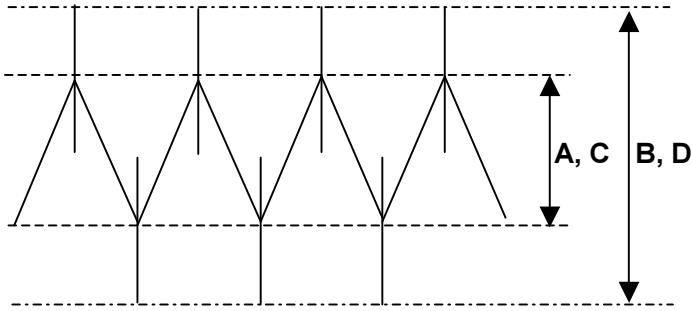
C: Ripple Voltage (mV_{P-P})
 D: Noise Voltage (mV_{P-P})

24V



Ambient Temp. [°C]	Ripple / Noise Voltage [mV]			
	A	B	C	D
-15	8.8	44.1	13.2	41.9
25	7.5	39.8	12.6	41.1
55	8.2	45.8	12.2	42.2

Model	OZ-15-24	Temperature: 25°C
Item	Ambient Temperature Drift	



at 100V AC

A: Ripple Voltage (mV_{P-P})

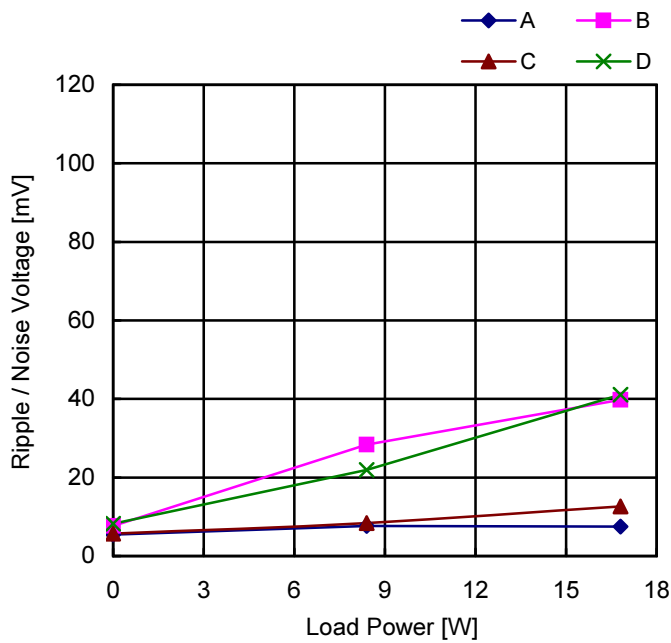
B: Noise Voltage (mV_{P-P})

at 240V AC

C: Ripple Voltage (mV_{P-P})

D: Noise Voltage (mV_{P-P})

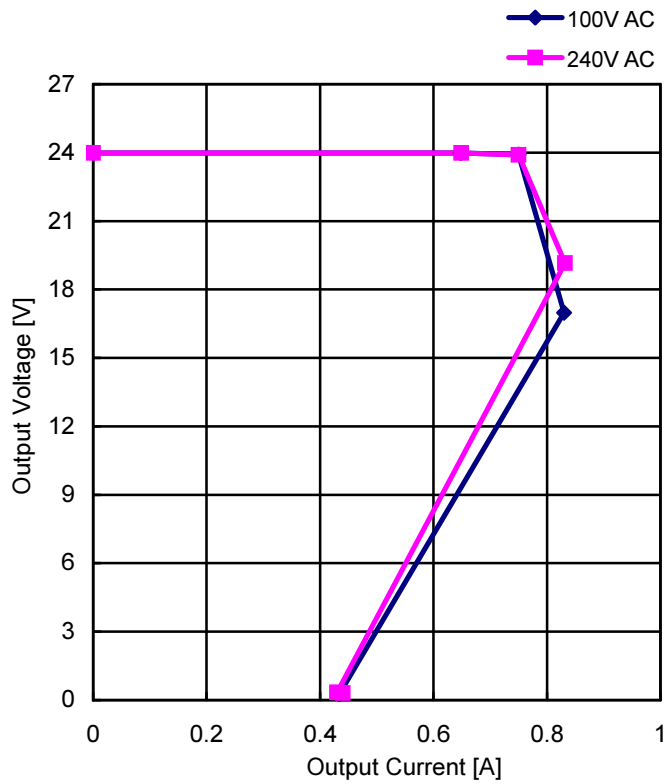
24V



Load Power [W]	Ripple / Noise Voltage [mV]			
	A	B	C	D
0	5.5	7.7	5.7	8.2
8.4	7.7	28.4	8.4	21.9
16.8	7.5	39.8	12.6	41.1

Model	OZ-15-24	Temperature: 25°C
Item	Over-Current Protection	

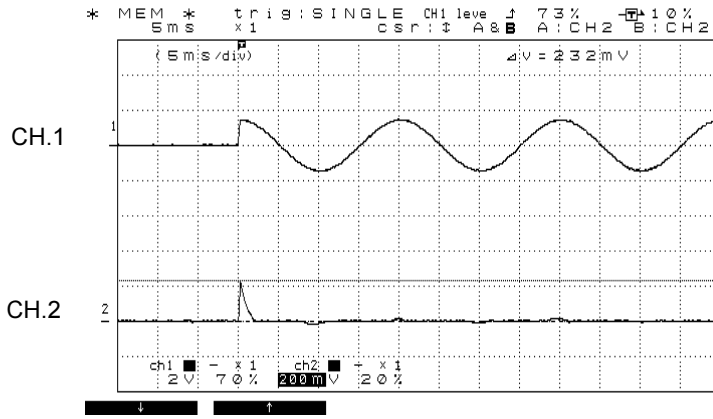
V-I Characteristics of 24V O.C.P



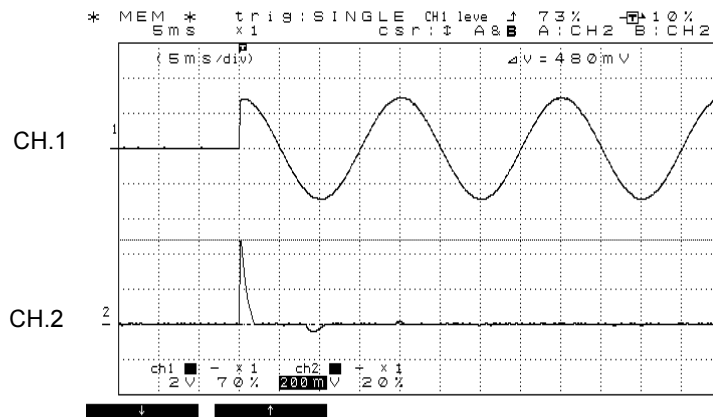
Input Voltage: 100V AC		Input Voltage: 240V AC	
Output Current [A]	Output Voltage [V]	Output Current [A]	Output Voltage [V]
0.00	23.98	0.00	23.99
0.65	23.98	0.65	23.98
0.75	23.91	0.75	23.90
0.83	16.98	0.83	19.16
0.43	0.26	0.43	0.33
0.43	0.26	0.44	0.31

Model	OZ-015-24	Temperature: 25°C
Item	Inrush Current	Load: Rated Load

Inrush Current Waveforms



DATA 1	
CH1	Measuring Point: AC Input Voltage
	Range: 200V/div
CH2	Measuring Point: AC Input Current
	Range: 10A/div
Temporal Axis	5ms/div
Conditions	Input: 100V AC Load: Rated Load
Note: Inrush Current: 11.6A	



DATA 2	
CH1	Measuring Point: AC Input Voltage
	Range: 200V/div
CH2	Measuring Point: AC Input Current
	Range: 10A/div
Temporal Axis	5ms/div
Conditions	Input: 200V AC Load: Rated Load
Note: Inrush Current: 24.0A	

Model	OZ-015-24	Load: Rated Load																																				
Item	Leakage Current																																					
<table border="1"> <thead> <tr> <th>AC Input Voltage [V]</th> <th>Leakage Current [mA]</th> </tr> </thead> <tbody> <tr><td>85</td><td>0.12</td></tr> <tr><td>100</td><td>0.13</td></tr> <tr><td>132</td><td>0.15</td></tr> <tr><td>176</td><td>0.25</td></tr> <tr><td>200</td><td>0.27</td></tr> <tr><td>220</td><td>0.29</td></tr> <tr><td>240</td><td>0.31</td></tr> <tr><td>264</td><td>0.33</td></tr> </tbody> </table>		AC Input Voltage [V]	Leakage Current [mA]	85	0.12	100	0.13	132	0.15	176	0.25	200	0.27	220	0.29	240	0.31	264	0.33	<table border="1"> <thead> <tr> <th>AC Input Voltage [V]</th> <th>Leakage Current [mA]</th> </tr> </thead> <tbody> <tr><td>85</td><td>0.12</td></tr> <tr><td>100</td><td>0.13</td></tr> <tr><td>132</td><td>0.15</td></tr> <tr><td>176</td><td>0.25</td></tr> <tr><td>200</td><td>0.27</td></tr> <tr><td>220</td><td>0.29</td></tr> <tr><td>240</td><td>0.31</td></tr> <tr><td>264</td><td>0.33</td></tr> </tbody> </table>	AC Input Voltage [V]	Leakage Current [mA]	85	0.12	100	0.13	132	0.15	176	0.25	200	0.27	220	0.29	240	0.31	264	0.33
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