

TEST DATA OF GHA300F-48

Regulated DC Power Supply
April 19, 2013

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COSEL CO.,LTD.

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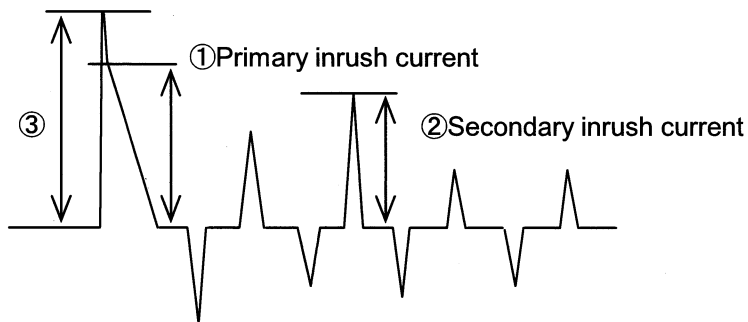
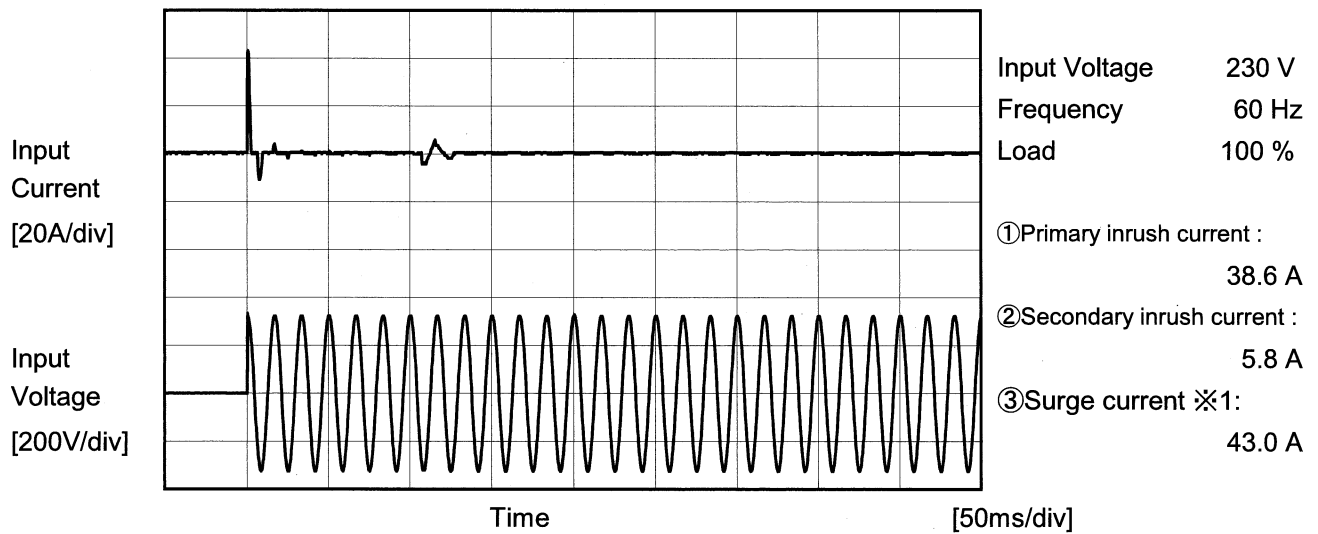
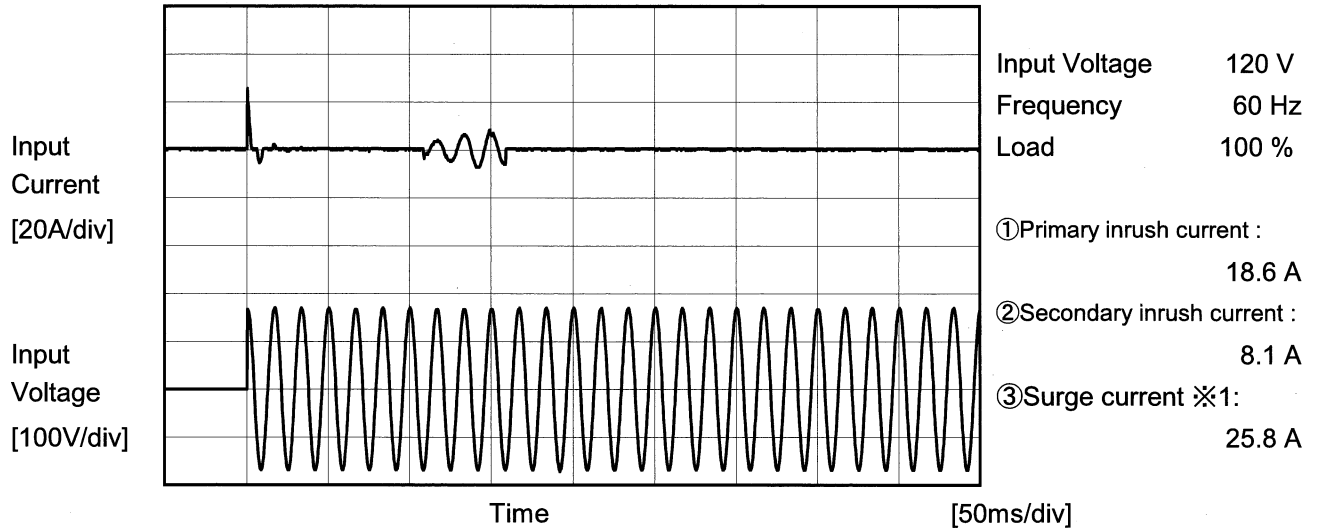
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Model		GHA300F-48	
Item		Temperature	25°C
Object		Testing Circuitry	Figure A



※1 The specification of the primary inrush current means that the surge current to a built-in noise filter (0.2msec or less : waveform ③) is excluded.



COSEL		Temperature 25°C Testing Circuitry Figure B
Model	GHA300F-48	
Item	Leakage Current	
Object	_____	

1.Results

[mA]

Standards		Input Volt.			Note
		100 [V]	120 [V]	240 [V]	
IEC60601	Both phases	0.08	0.09	0.17	Operation
	One of phases	0.14	0.15	0.31	Stand by

The value for "One of phases" is the reference value only.

2.Condition

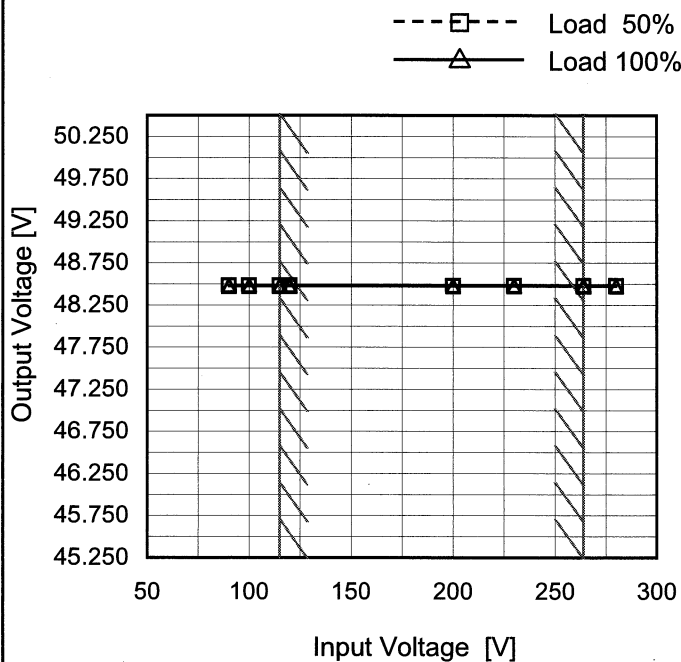
Leakage current value is concluded after measuring both phases of AC input and by choosing the larger one.



Model	GHA300F-48
Item	Line Regulation
Object	+48V6.3A

Temperature 25°C
Testing Circuitry Figure A

1. Graph



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

2. Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
90	48.481	48.476 ※1
100	48.480	48.477 ※2
115	48.480	48.476
120	48.480	48.478
200	48.478	48.477
230	48.478	48.479
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※1: Load 80%
 ※2: Load 88%




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1.0	48.467	48.470	48.472																																																					
2.1	48.466	48.469	48.471																																																					
3.2	48.466	48.469	48.471																																																					
4.2	48.467	48.469	48.470																																																					
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<p>Note: Slanted line shows the range of the rated load current.</p>																																																								



Model	GHA300F-48
Item	Dynamic Load Response
Object	+48V 6.3A

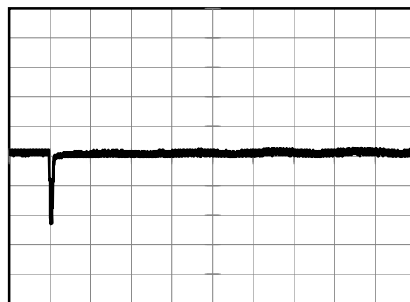
Temperature 25°C
Testing Circuitry Figure A

Input Volt. 120V
Cycle 1000ms

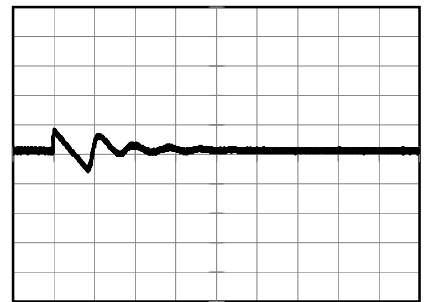
Load Current  6.3A / 50us

Min.Load (0A) ←→
Load 100%(6.3A)

1 V/div



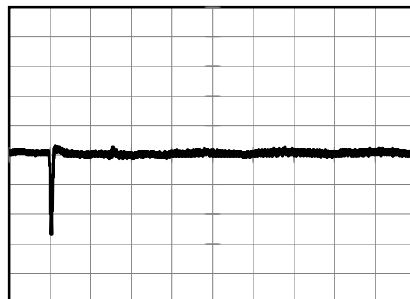
4 ms/div



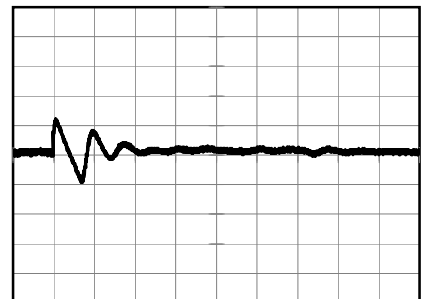
4 ms/div

Min.Load (0A) ←→
Load 50%(3.15A)

500 mV/div



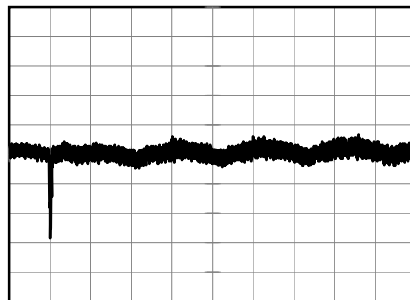
4 ms/div



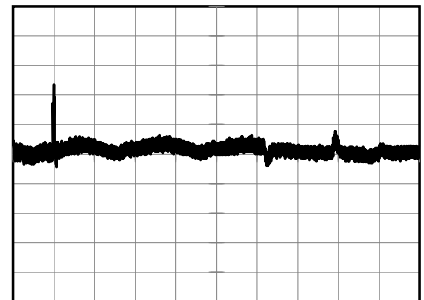
4 ms/div

Load 10% (0.63A) ←→
Load 100% (6.3A)

200 mV/div



4 ms/div



4 ms/div

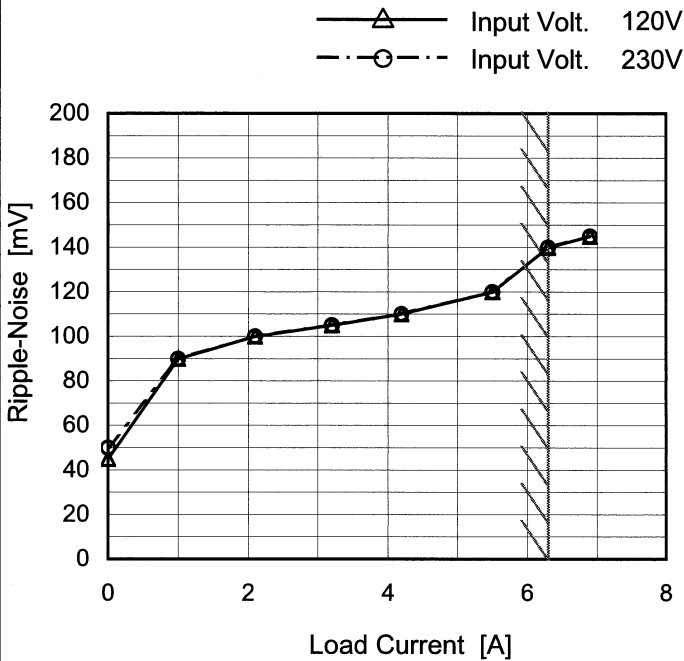


Model		GHA300F-48	Temperature 25°C Testing Circuitry Figure A																																						
Item		Ripple Voltage (by Load Current)																																							
Object		+48V6.3A	2.Values																																						
1.Graph																																									
<p> </p>			<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="2">Ripple Voltage [mV]</th> </tr> <tr> <th>Input Volt. 120 [V]</th> <th>Input Volt. 230 [V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>20</td><td>15</td></tr> <tr><td>1.0</td><td>40</td><td>45</td></tr> <tr><td>2.1</td><td>50</td><td>60</td></tr> <tr><td>3.2</td><td>70</td><td>75</td></tr> <tr><td>4.2</td><td>80</td><td>85</td></tr> <tr><td>5.5</td><td>100</td><td>105</td></tr> <tr><td>6.3</td><td>120</td><td>120</td></tr> <tr><td>6.9</td><td>125</td><td>125</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. 120 [V]	Input Volt. 230 [V]	0.0	20	15	1.0	40	45	2.1	50	60	3.2	70	75	4.2	80	85	5.5	100	105	6.3	120	120	6.9	125	125	--	-	-	--	-	-	--	-	-
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<p>Measured by 20 MHz Oscilloscope. Ripple Voltage is shown as p-p in the figure below. Note: Slanted line shows the range of the rated load current.</p>																																									
<p>Ripple [mVp-p]</p>																																									
Fig.Complex Ripple Wave Form																																									



Model	GHA300F-48	Temperature	25°C
Item	Ripple-Noise	Testing Circuitry	Figure A
Object	+48V6.3A		

1.Graph



2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 120 [V]	Input Volt. 230 [V]
0.0	45	50
1.0	90	90
2.1	100	100
3.2	105	105
4.2	110	110
5.5	120	120
6.3	140	140
6.9	145	145
--	-	-
--	-	-
--	-	-

Measured by 20 MHz Oscilloscope.
 Ripple-Noise is shown as p-p in the figure below.
 Note: Slanted line shows the range of the rated load current.

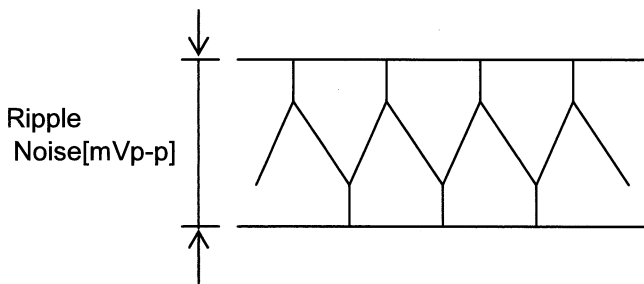


Fig.Complex Ripple Noise Wave Form



Model		GHA300F-48																																											
Item		Ripple Voltage (by Ambient Temp.)	Testing Circuitry Figure A																																										
Object		+48V6.3A																																											
1.Graph			2.Values																																										
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Model		GHA300F-48		Testing Circuitry Figure A																																																				
Item		Ambient Temperature Drift																																																						
Object		+48V6.3A																																																						
1.Graph		<p> —△— Input Volt. 100V ---□--- Input Volt. 120V -·-○-·- Input Volt. 230V </p>		2.Values																																																				
		<table border="1"> <thead> <tr> <th rowspan="2">Ambient Temperature [°C]</th> <th colspan="3">Output Voltage [V]</th> </tr> <tr> <th>Input Volt. 100[V]</th> <th>Input Volt. 120[V]</th> <th>Input Volt. 230[V]</th> </tr> </thead> <tbody> <tr><td>-20</td><td>48.287</td><td>48.290</td><td>48.285</td></tr> <tr><td>-10</td><td>48.329</td><td>48.331</td><td>48.333</td></tr> <tr><td>0</td><td>48.371</td><td>48.373</td><td>48.376</td></tr> <tr><td>10</td><td>48.417</td><td>48.419</td><td>48.421</td></tr> <tr><td>20</td><td>48.456</td><td>48.457</td><td>48.460</td></tr> <tr><td>25</td><td>48.462</td><td>48.463</td><td>48.463</td></tr> <tr><td>30</td><td>48.474</td><td>48.476</td><td>48.478</td></tr> <tr><td>40</td><td>48.499</td><td>48.500</td><td>48.501</td></tr> <tr><td>50</td><td>48.527</td><td>48.527</td><td>48.529</td></tr> <tr><td>60</td><td>48.534</td><td>48.537</td><td>48.535</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> </tbody> </table>				Ambient Temperature [°C]	Output Voltage [V]			Input Volt. 100[V]	Input Volt. 120[V]	Input Volt. 230[V]	-20	48.287	48.290	48.285	-10	48.329	48.331	48.333	0	48.371	48.373	48.376	10	48.417	48.419	48.421	20	48.456	48.457	48.460	25	48.462	48.463	48.463	30	48.474	48.476	48.478	40	48.499	48.500	48.501	50	48.527	48.527	48.529	60	48.534	48.537	48.535	--	-	-	-
Ambient Temperature [°C]	Output Voltage [V]																																																							
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<p>Note: Slanted line shows the range of the rated ambient temperature.</p>		<p>Note: In case of Input Volt. 100V, Load 88%. Other case Load 100%.</p>																																																						



COSEL		Testing Circuitry Figure A
Model	GHA300F-48	
Item	Output Voltage Accuracy	
Object	+48V6.3A	

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 : 115 - 264V

Load Current : 0 - 6.3A

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

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

2. Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	50	120	0	48.535	±125	±0.3
Minimum Voltage	-20	230	6.3	48.285		

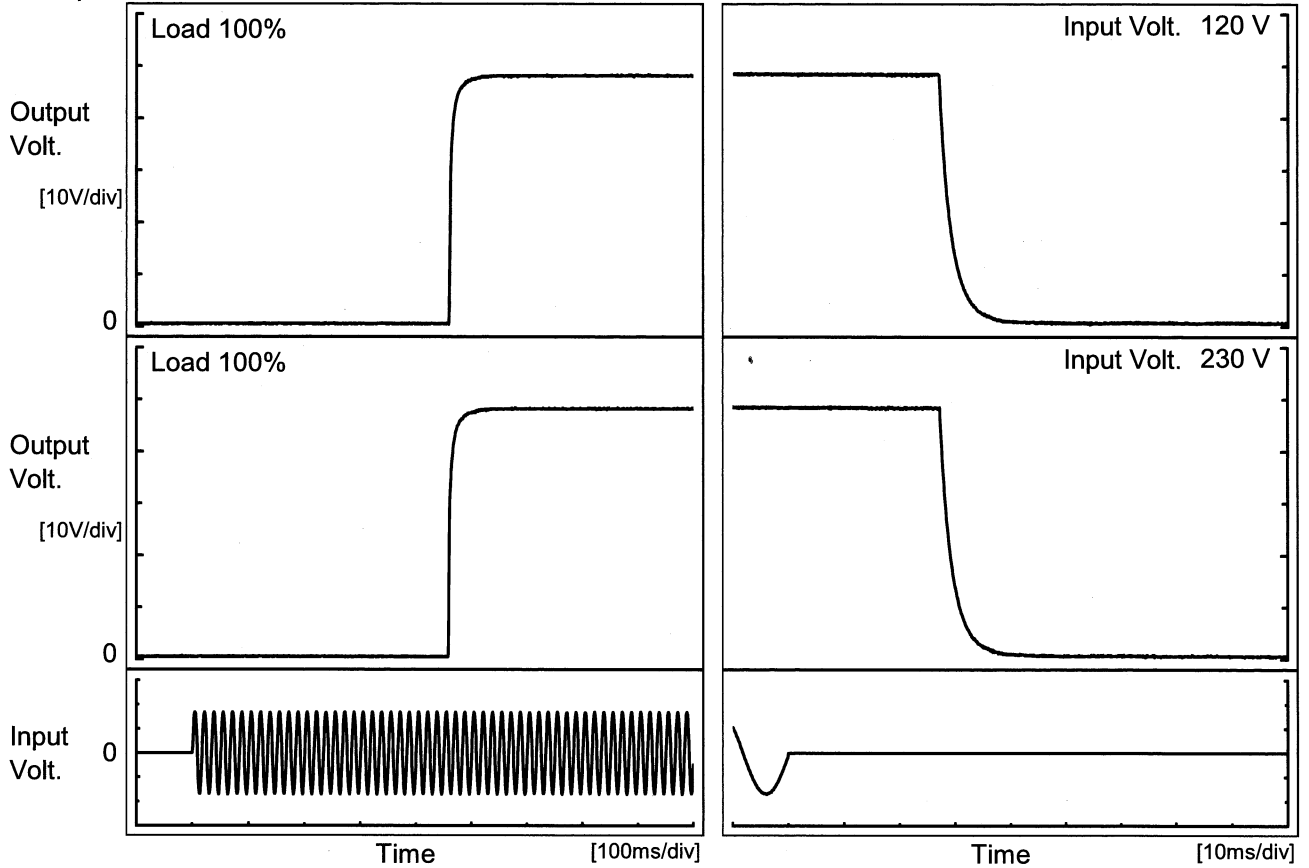


COSEL																								
Model	GHA300F-48																							
Item	Time Lapse Drift	Temperature 25°C Testing Circuitry Figure A																						
Object	+48V6.3A																							
<p>1.Graph</p> <p style="text-align: center;">Time [H]</p> <p style="text-align: center;">Input Volt. 230V Load 100%</p>		<p>2.Values</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>48.480</td></tr> <tr><td>0.5</td><td>48.473</td></tr> <tr><td>1.0</td><td>48.473</td></tr> <tr><td>2.0</td><td>48.473</td></tr> <tr><td>3.0</td><td>48.473</td></tr> <tr><td>4.0</td><td>48.473</td></tr> <tr><td>5.0</td><td>48.473</td></tr> <tr><td>6.0</td><td>48.473</td></tr> <tr><td>7.0</td><td>48.473</td></tr> <tr><td>8.0</td><td>48.474</td></tr> </tbody> </table>	Time since start [H]	Output Voltage [V]	0.0	48.480	0.5	48.473	1.0	48.473	2.0	48.473	3.0	48.473	4.0	48.473	5.0	48.473	6.0	48.473	7.0	48.473	8.0	48.474
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7.0	48.473																							
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<p>* The characteristic of AC120V is equal.</p>																								



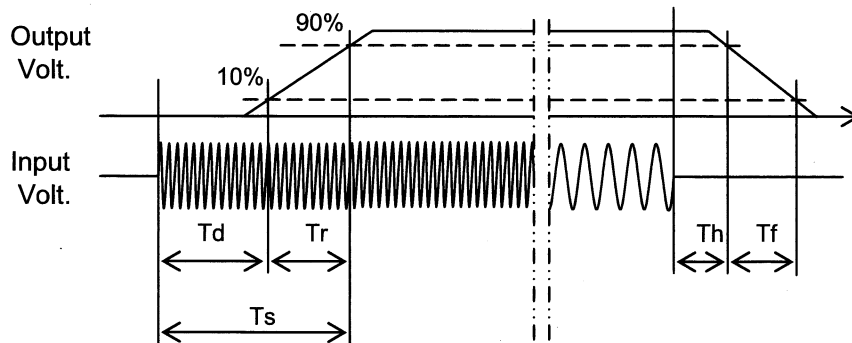
Model		GHA300F-48	Temperature		25°C
Item		Rise and Fall Time	Testing Circuitry		Figure A
Object		+48V6.3A			

1. Graph



2. Values

Input Volt.	Time	Td	Tr	Ts	Th	Tf
120 V		461.0	13.0	474.0	27.3	5.2
230 V		459.5	12.5	472.0	27.4	5.3





<p>Model GHA300F-48</p> <p>Item Hold-Up Time</p> <p>Object +48V6.3A</p>		<p>Temperature 25°C</p> <p>Testing Circuitry Figure A</p>																																
<p>1.Graph</p> <p>---□--- Load 50%</p> <p>—△— Load 100%</p>		<p>2.Values</p> <table border="1"> <thead> <tr> <th rowspan="2">Input Voltage [V]</th> <th colspan="2">Hold-Up Time [ms]</th> </tr> <tr> <th>Load 50%</th> <th>Load 100%</th> </tr> </thead> <tbody> <tr> <td>90</td> <td>53</td> <td>34 ※1</td> </tr> <tr> <td>100</td> <td>53</td> <td>30 ※2</td> </tr> <tr> <td>115</td> <td>53</td> <td>27</td> </tr> <tr> <td>120</td> <td>53</td> <td>27</td> </tr> <tr> <td>200</td> <td>52</td> <td>27</td> </tr> <tr> <td>230</td> <td>53</td> <td>27</td> </tr> <tr> <td>264</td> <td>53</td> <td>27</td> </tr> <tr> <td>280</td> <td>53</td> <td>27</td> </tr> <tr> <td>--</td> <td>-</td> <td>-</td> </tr> </tbody> </table> <p>※1: Load 80%</p> <p>※2: Load 88%</p>	Input Voltage [V]	Hold-Up Time [ms]		Load 50%	Load 100%	90	53	34 ※1	100	53	30 ※2	115	53	27	120	53	27	200	52	27	230	53	27	264	53	27	280	53	27	--	-	-
Input Voltage [V]	Hold-Up Time [ms]																																	
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<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>Model GHA300F-48</p>		<p>Temperature 25°C Testing Circuitry Figure A</p>																																																			
<p>Item</p>	<p>Instantaneous Interruption Compensation</p>																																																				
<p>Object</p>	<p>+48V6.3A</p>																																																				
<p>1.Graph</p> <p> Input Volt. 100V Input Volt. 120V Input Volt. 230V </p> <p style="text-align: center;">Instantaneous Compensation Time [ms]</p> <p style="text-align: center;">Load Current [A]</p>		<p>2.Values</p> <table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="3">Time [ms]</th> </tr> <tr> <th>Input Volt. 100[V]</th> <th>Input Volt. 120[V]</th> <th>Input Volt. 230[V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>1.0</td><td>142</td><td>147</td><td>154</td></tr> <tr><td>2.1</td><td>74</td><td>74</td><td>76</td></tr> <tr><td>3.2</td><td>48</td><td>49</td><td>51</td></tr> <tr><td>4.2</td><td>38</td><td>39</td><td>39</td></tr> <tr><td>5.5</td><td>30</td><td>30</td><td>30</td></tr> <tr><td>6.3</td><td>25</td><td>27</td><td>27</td></tr> <tr><td>6.9</td><td>-</td><td>23</td><td>23</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 Current [A]	Time [ms]			Input Volt. 100[V]	Input Volt. 120[V]	Input Volt. 230[V]	0.0	-	-	-	1.0	142	147	154	2.1	74	74	76	3.2	48	49	51	4.2	38	39	39	5.5	30	30	30	6.3	25	27	27	6.9	-	23	23	--	-	-	-	--	-	-	-	--	-	-	-
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COSEL																																								
Model	GHA300F-48																																							
Item	Minimum Input Voltage for Regulated Output Voltage	Testing Circuitry Figure A																																						
Object	+48V6.3A																																							
<p>1. Graph</p> <p style="text-align: right;"> ---□--- Load 50% —△— Load 100% </p>		<p>2. Values</p> <table border="1"> <thead> <tr> <th rowspan="2">Ambient Temperature [°C]</th> <th colspan="2">Input Voltage [V]</th> </tr> <tr> <th>Load 50%</th> <th>Load 100%</th> </tr> </thead> <tbody> <tr><td>-20</td><td>72</td><td>73</td></tr> <tr><td>-10</td><td>72</td><td>73</td></tr> <tr><td>0</td><td>72</td><td>73</td></tr> <tr><td>10</td><td>72</td><td>73</td></tr> <tr><td>20</td><td>72</td><td>73</td></tr> <tr><td>25</td><td>72</td><td>73</td></tr> <tr><td>30</td><td>72</td><td>73</td></tr> <tr><td>40</td><td>72</td><td>74</td></tr> <tr><td>50</td><td>72</td><td>74</td></tr> <tr><td>60</td><td>72</td><td>74</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> </tbody> </table>	Ambient Temperature [°C]	Input Voltage [V]		Load 50%	Load 100%	-20	72	73	-10	72	73	0	72	73	10	72	73	20	72	73	25	72	73	30	72	73	40	72	74	50	72	74	60	72	74	--	-	-
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Model	GHA300F-48	Temperature	25°C																																												
Item	Overcurrent Protection	Testing Circuitry	Figure A																																												
Object	+48V6.3A																																														
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<p>1.Graph</p> <div style="text-align: right;"> <p>—△— Input Volt. 120V</p> <p>---□--- Input Volt. 230V</p> </div> <p style="text-align: center;">Ambient Temperature [°C]</p> <p style="text-align: right;">Load 0%</p> <p>Note: Slanted line shows the range of the rated ambient temperature.</p>		<p>2.Values</p> <table border="1"> <thead> <tr> <th rowspan="2">Ambient Temperature [°C]</th> <th colspan="2">Operating Point [V]</th> </tr> <tr> <th>Input Volt. 120[V]</th> <th>Input Volt. 230[V]</th> </tr> </thead> <tbody> <tr><td>-20</td><td>56.26</td><td>56.26</td></tr> <tr><td>-10</td><td>56.96</td><td>56.96</td></tr> <tr><td>0</td><td>57.55</td><td>57.55</td></tr> <tr><td>10</td><td>58.25</td><td>58.25</td></tr> <tr><td>20</td><td>58.84</td><td>58.84</td></tr> <tr><td>25</td><td>59.19</td><td>59.19</td></tr> <tr><td>30</td><td>59.48</td><td>59.48</td></tr> <tr><td>40</td><td>60.09</td><td>60.09</td></tr> <tr><td>50</td><td>60.78</td><td>60.78</td></tr> <tr><td>60</td><td>61.37</td><td>61.37</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> </tbody> </table>	Ambient Temperature [°C]	Operating Point [V]		Input Volt. 120[V]	Input Volt. 230[V]	-20	56.26	56.26	-10	56.96	56.96	0	57.55	57.55	10	58.25	58.25	20	58.84	58.84	25	59.19	59.19	30	59.48	59.48	40	60.09	60.09	50	60.78	60.78	60	61.37	61.37	--	-	-
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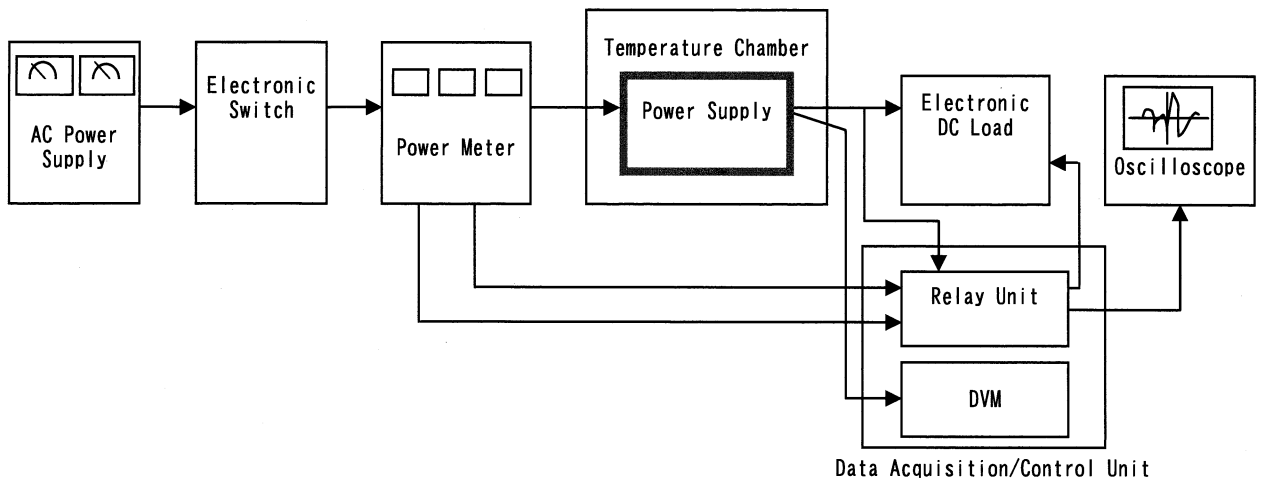


Figure A

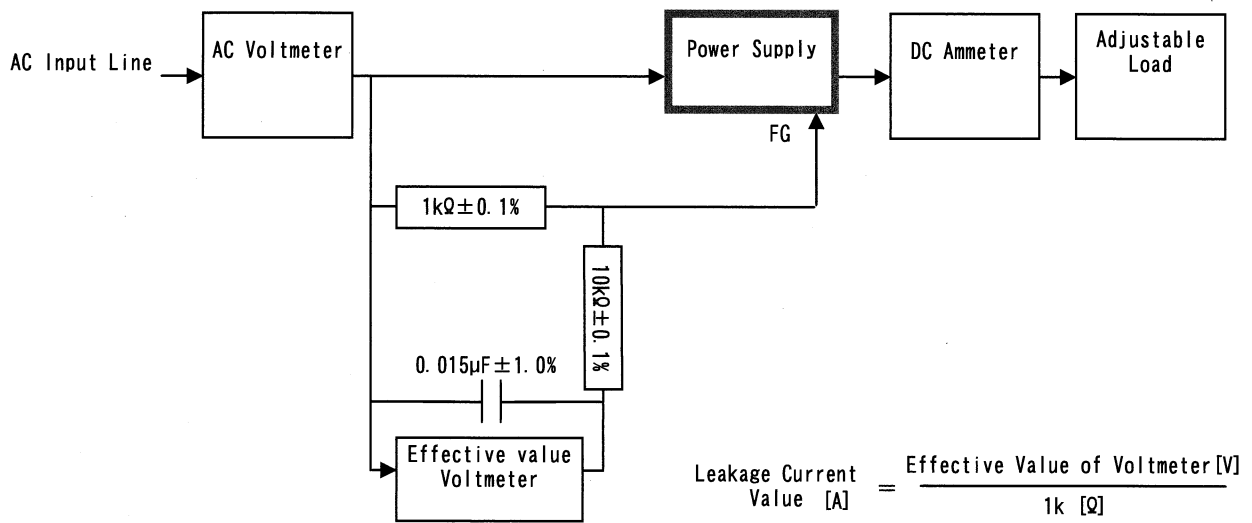


Figure B (IEC60601-1)