



TEST DATA OF LHA300F-24-Y

Regulated DC Power Supply
August 28, 2019

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COSEL CO.,LTD.

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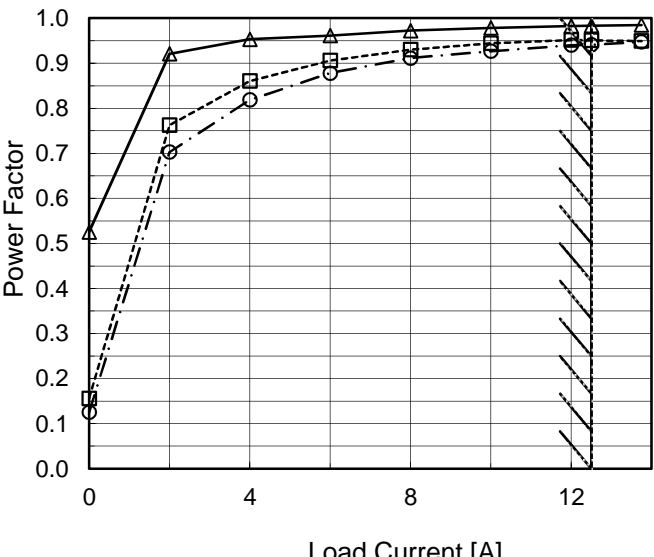


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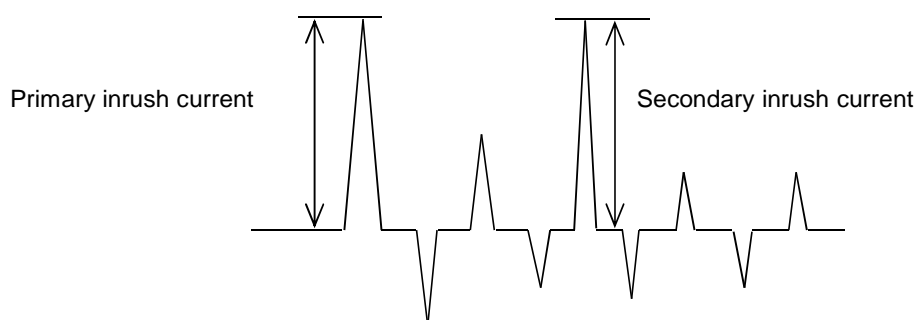
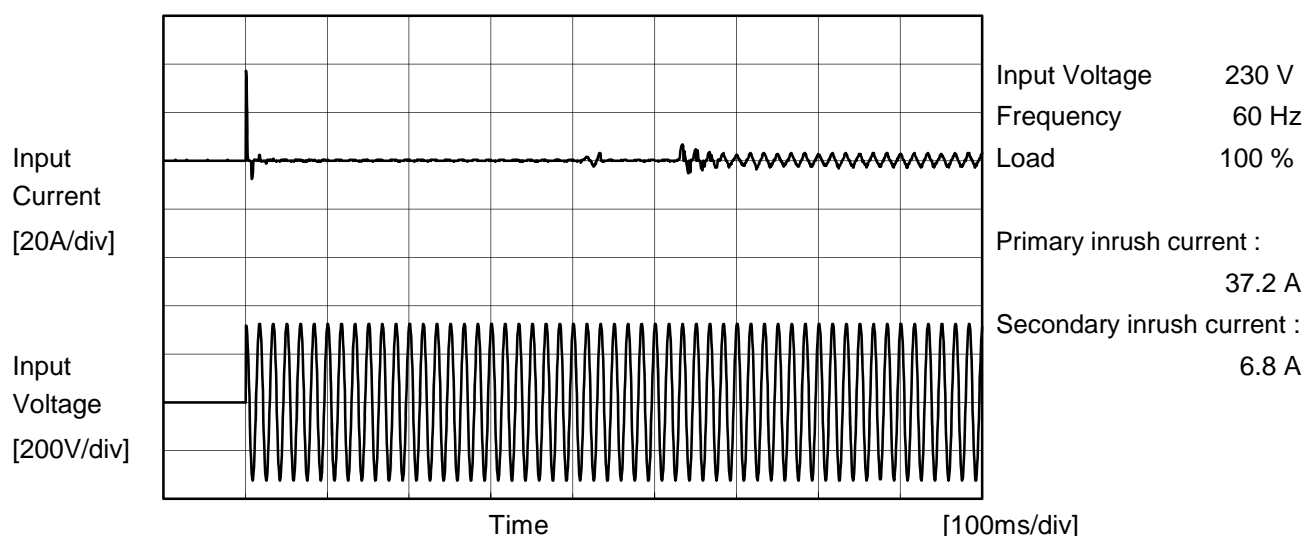
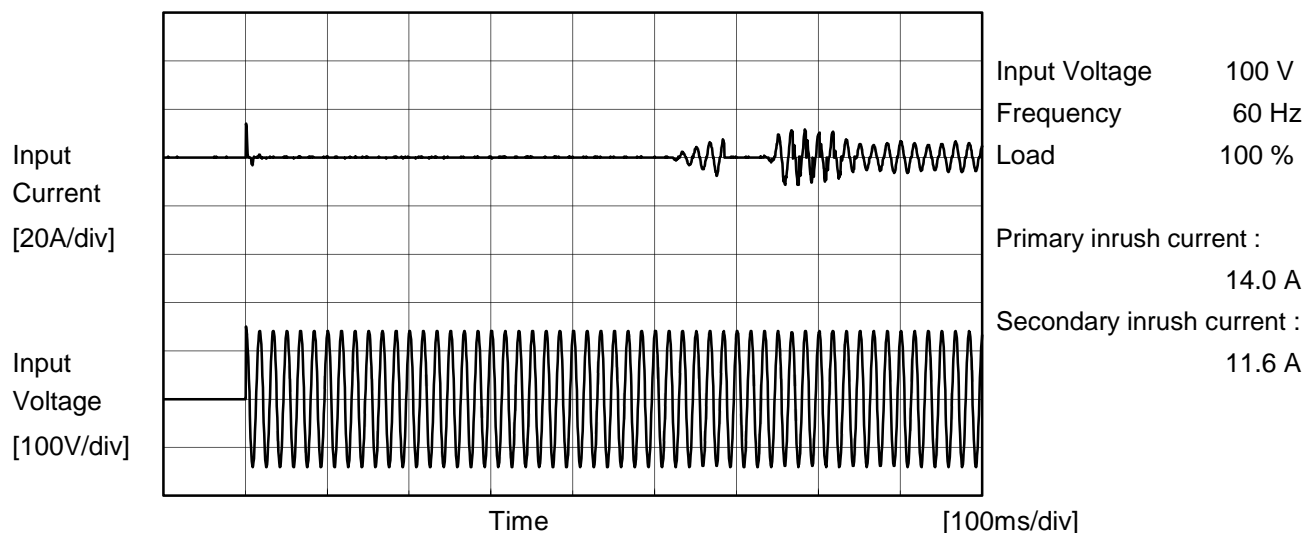
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Model		LHA300F-24-Y	Temperature 25°C Testing Circuitry Figure A
Item		Inrush Current	
Object		_____	





LOSEL		Temperature 25°C Testing Circuitry Figure B
Model	LHA300F-24-Y	
Item	Leakage Current	
Object	_____	

1.Results

Standards	Testing Circuitry	Measuring Method	Input Volt.			Note
			100 [V]	230 [V]	240 [V]	
DEN-AN	Figure B-1	Both phases	0.16	0.39	0.41	Operation
		One of phases	0.27	0.69	0.72	Stand by
IEC62368-1	Figure B-2	Both phases	0.16	0.38	0.39	Operation
		One of phases	0.27	0.67	0.70	Stand by
	Figure B-3	Both phases	0.16	0.38	0.39	Operation
		One of phases	0.27	0.66	0.70	Stand by

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

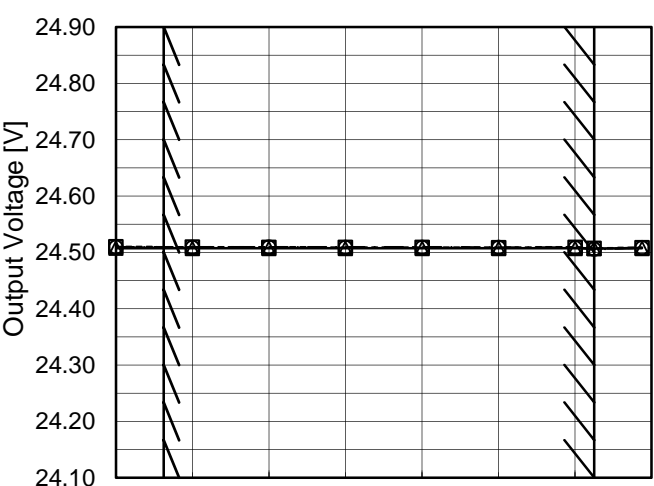
2.Condition

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



Model		LHA300F-24-Y	Temperature25°C Testing CircuitryFigure A
Item		Line Regulation	
Object		+24V12.5A	
1.Graph		<div><div><div><div><div></div></div><div></div></div><div><div></div></div><div></div></div><div><div></div></div><div></div></div> <div><div></div></div> <div></div> <div><div></div></div> <div></div> <div><div></div></div> <div></div> <div><div></div></div> <div></div> <div><div></div></div> <div></div> <div><div></div></div> <div></div> <div><div></div></div> <div></div> <div><div></div></div> <div></div> <div><div></div></div> <div></div> <div><div></div></div> <div></div> <div><div></div></div> <div></div> <div><div></div></div> <div></div> <div><div></div></div> <div></div> <div><div></div></div> <div></div> <div><div></div></div> <div></div> <div><div></div></div> <div></div> <div><div></div></div> <div></div> <div><div></div></div> <div></div> <div><div></div></div> <div></div> <div><div></div></div> <div></div> <div><div></div></div> <div></div> <div><div></div></div> <div></div> <div><div></div></div> <div></div> <div><div></div></div> <div></div> 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Model		LHA300F-24-Y	Temperature Testing Circuitry	25°C Figure A																																																			
Item		Load Regulation																																																					
Object		+24V12.5A																																																					
1.Graph																																																							
		—△—	Input Volt.	100V																																																			
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		---○---	Input Volt.	230V																																																			
																																																							
2.Values																																																							
<table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Output Voltage [V]</th></tr><tr><th>Input Volt. 100[V]</th><th>Input Volt. 200[V]</th><th>Input Volt. 230[V]</th></tr><tr><td>0.00</td><td>24.508</td><td>24.510</td><td>24.509</td></tr><tr><td>2.00</td><td>24.507</td><td>24.509</td><td>24.509</td></tr><tr><td>4.00</td><td>24.507</td><td>24.509</td><td>24.509</td></tr><tr><td>6.00</td><td>24.507</td><td>24.509</td><td>24.509</td></tr><tr><td>8.00</td><td>24.507</td><td>24.509</td><td>24.509</td></tr><tr><td>10.00</td><td>24.507</td><td>24.509</td><td>24.509</td></tr><tr><td>12.00</td><td>24.507</td><td>24.509</td><td>24.509</td></tr><tr><td>12.50</td><td>24.507</td><td>24.507</td><td>24.506</td></tr><tr><td>13.75</td><td>24.507</td><td>24.509</td><td>24.509</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr></table>					Load Current [A]	Output Voltage [V]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	0.00	24.508	24.510	24.509	2.00	24.507	24.509	24.509	4.00	24.507	24.509	24.509	6.00	24.507	24.509	24.509	8.00	24.507	24.509	24.509	10.00	24.507	24.509	24.509	12.00	24.507	24.509	24.509	12.50	24.507	24.507	24.506	13.75	24.507	24.509	24.509	--	-	-	-	--	-	-	-
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Note: Slanted line shows the range of the rated load current.																																																							

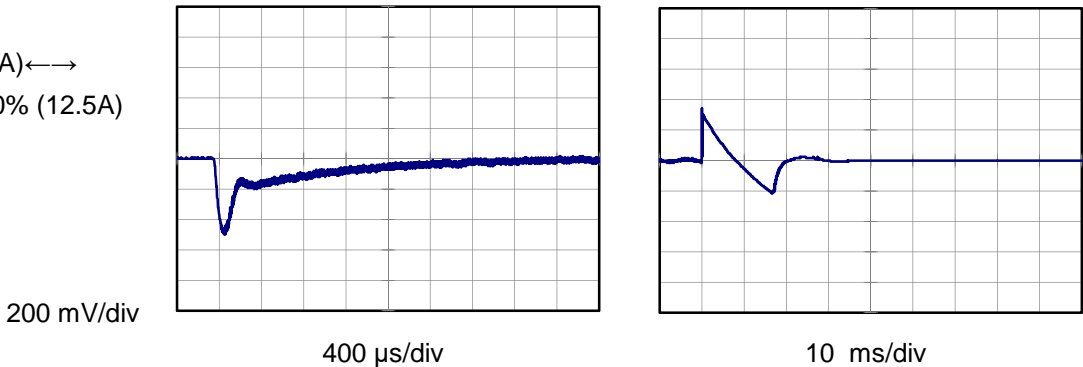


Model	LHA300F-24-Y	Temperature Testing Circuitry	25°C Figure A
Item	Dynamic Load Response		
Object	+24V12.5A		

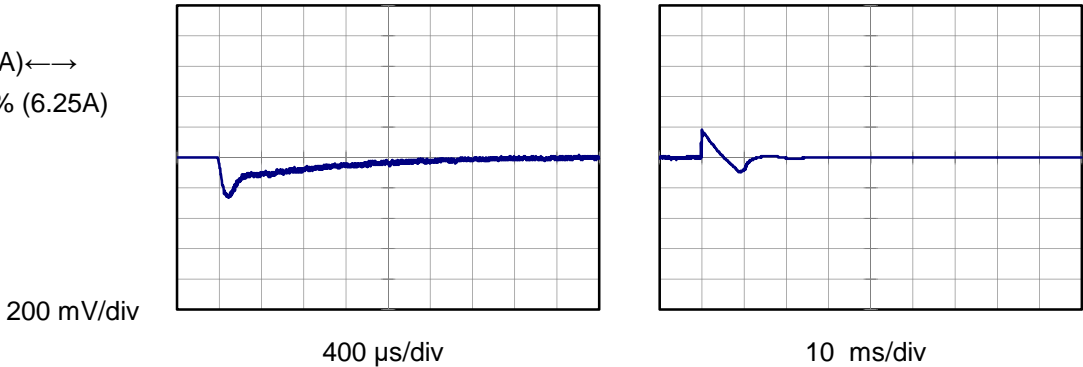
Input Volt. 230 V
Cycle 1000 ms



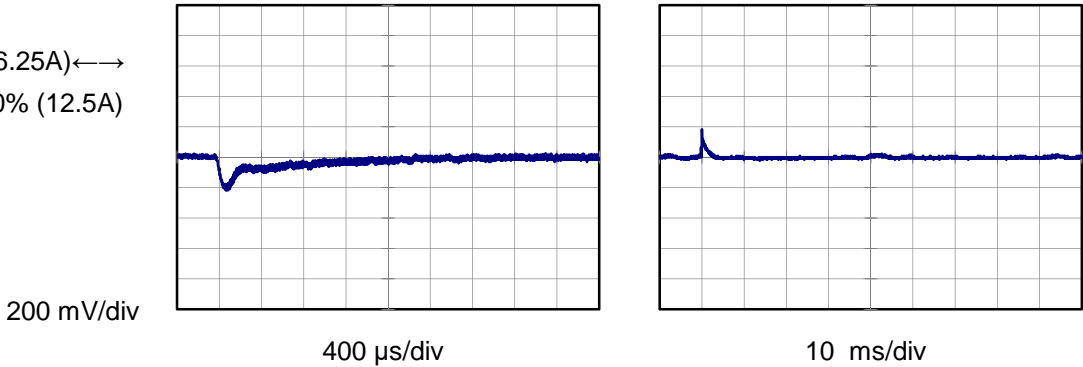
Min.Load (0A) ←→
Load 100% (12.5A)



Min.Load (0A) ←→
Load 50% (6.25A)



Load 50% (6.25A) ←→
Load 100% (12.5A)



COSEL			
Model	LHA300F-24-Y	Temperature 25°C Testing Circuitry Figure C	
Item	Ripple-Noise (by Load Current)		
Object	+24V12.5A		
1.Graph		2.Values	
<div><div><div><div><div></div><div></div></div><div><div></div><div></div></div></div><div><div></div><div></div></div><div><div></div><div></div></div></div><div><div></div><div></div></div><div><div></div><div></div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> 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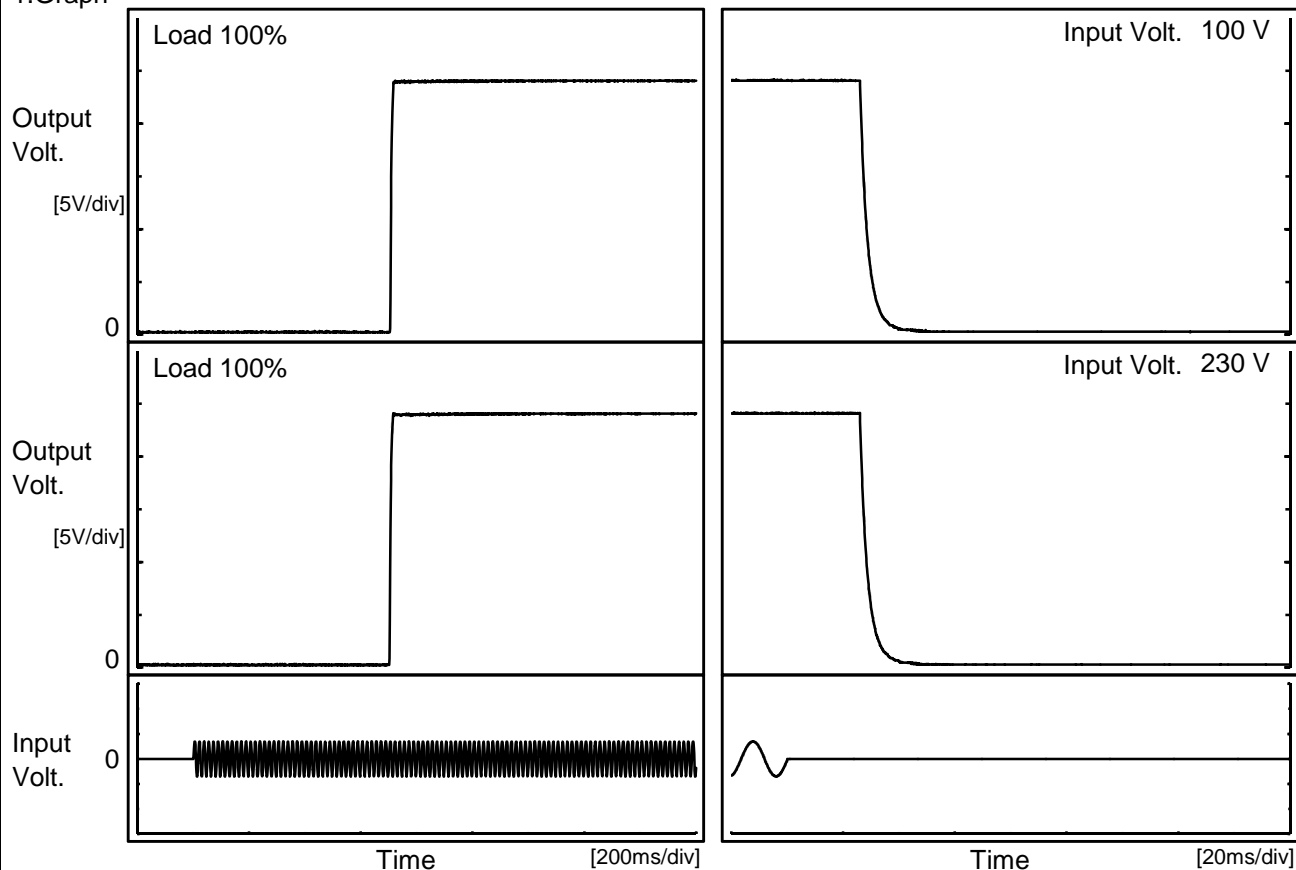


Model		LHA300F-24-Y	Testing Circuitry Figure A																																																			
Item		Ambient Temperature Drift																																																				
Object		+24V12.5A																																																				
1.Graph		<div><div><div>—△—</div><div>Input Volt.</div><div>100V</div></div><div><div>---□---</div><div>Input Volt.</div><div>200V</div></div><div><div>---○---</div><div>Input Volt.</div><div>230V</div></div></div> <p>Output Voltage [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 100%</p> <p>Note: Slanted line shows the range of the rated ambient temperature.</p>	2.Values																																																			
		<table><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. 200[V]</th><th>Input Volt. 230[V]</th></tr><tr><td>-20</td><td>24.431</td><td>24.433</td><td>24.434</td></tr><tr><td>-10</td><td>24.452</td><td>24.454</td><td>24.454</td></tr><tr><td>0</td><td>24.469</td><td>24.471</td><td>24.471</td></tr><tr><td>10</td><td>24.475</td><td>24.475</td><td>24.475</td></tr><tr><td>20</td><td>24.496</td><td>24.496</td><td>24.496</td></tr><tr><td>25</td><td>24.507</td><td>24.507</td><td>24.506</td></tr><tr><td>30</td><td>24.508</td><td>24.508</td><td>24.508</td></tr><tr><td>40</td><td>24.510</td><td>24.509</td><td>24.509</td></tr><tr><td>50</td><td>24.512</td><td>24.512</td><td>24.512</td></tr><tr><td>60</td><td>24.515</td><td>24.515</td><td>24.515</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr></table>	Ambient Temperature [°C]	Output Voltage [V]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	-20	24.431	24.433	24.434	-10	24.452	24.454	24.454	0	24.469	24.471	24.471	10	24.475	24.475	24.475	20	24.496	24.496	24.496	25	24.507	24.507	24.506	30	24.508	24.508	24.508	40	24.510	24.509	24.509	50	24.512	24.512	24.512	60	24.515	24.515	24.515	--	-	-	-	
Ambient Temperature [°C]	Output Voltage [V]																																																					
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]																																																			
-20	24.431	24.433	24.434																																																			
-10	24.452	24.454	24.454																																																			
0	24.469	24.471	24.471																																																			
10	24.475	24.475	24.475																																																			
20	24.496	24.496	24.496																																																			
25	24.507	24.507	24.506																																																			
30	24.508	24.508	24.508																																																			
40	24.510	24.509	24.509																																																			
50	24.512	24.512	24.512																																																			
60	24.515	24.515	24.515																																																			
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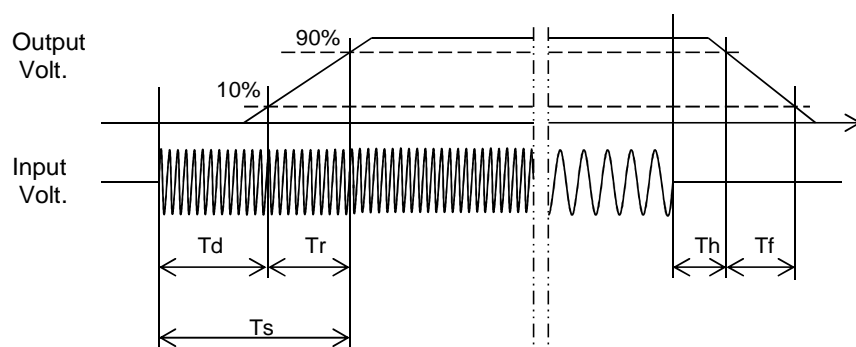
Model	LHA300F-24-Y	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+24V12.5A		

1.Graph



2.Values

Input Volt.	Time	Td	Tr	Ts	Th	Tf
100 V		705.0	8.0	713.0	26.3	6.4
230 V		703.0	8.0	711.0	26.2	6.4



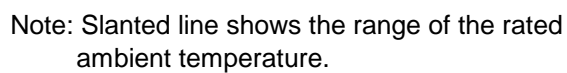


Model	LHA300F-24-Y																																		
Item	Hold-Up Time	Temperature	25°C																																
Object	+24V12.5A	Testing Circuitry	Figure A																																
1.Graph		2.Values																																	
<div><div><div>---□---</div><div>Load 50%</div></div><div><div>—△—</div><div>Load 100%</div></div></div> <table><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>85</td><td>52</td><td>-</td></tr><tr><td>90</td><td>52</td><td>26</td></tr><tr><td>100</td><td>52</td><td>26</td></tr><tr><td>120</td><td>52</td><td>26</td></tr><tr><td>200</td><td>52</td><td>26</td></tr><tr><td>230</td><td>52</td><td>26</td></tr><tr><td>264</td><td>52</td><td>26</td></tr><tr><td>280</td><td>51</td><td>26</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></tbody></table>		Input Voltage [V]	Hold-Up Time [ms]		Load 50%	Load 100%	85	52	-	90	52	26	100	52	26	120	52	26	200	52	26	230	52	26	264	52	26	280	51	26	--	-	-		
Input Voltage [V]	Hold-Up Time [ms]																																		
	Load 50%	Load 100%																																	
85	52	-																																	
90	52	26																																	
100	52	26																																	
120	52	26																																	
200	52	26																																	
230	52	26																																	
264	52	26																																	
280	51	26																																	
--	-	-																																	
<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>																																			

Model	LHA300F-24-Y																																																					
Item	Instantaneous Interruption Compensation	Temperature	25°C																																																			
Object	+24V12.5A	Testing Circuitry	Figure A																																																			
1.Graph		2.Values																																																				
<div><div><div>—△—</div><div>Input Volt.</div><div>100V</div></div><div><div>---□---</div><div>Input Volt.</div><div>200V</div></div><div><div>---○---</div><div>Input Volt.</div><div>230V</div></div></div> <div>Instantaneous Compensation Time [ms]</div> <div>Load Current [A]</div>		<table><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. 200[V]</th><th>Input Volt. 230[V]</th></tr><tr><td>0.00</td><td>-</td><td>-</td><td>-</td></tr><tr><td>2.00</td><td>140</td><td>154</td><td>155</td></tr><tr><td>4.00</td><td>78</td><td>79</td><td>80</td></tr><tr><td>6.00</td><td>53</td><td>54</td><td>54</td></tr><tr><td>8.00</td><td>39</td><td>39</td><td>39</td></tr><tr><td>10.00</td><td>29</td><td>31</td><td>31</td></tr><tr><td>12.00</td><td>26</td><td>26</td><td>27</td></tr><tr><td>12.50</td><td>25</td><td>24</td><td>24</td></tr><tr><td>13.75</td><td>19</td><td>20</td><td>20</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr></table>		Load Current [A]	Time [ms]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	0.00	-	-	-	2.00	140	154	155	4.00	78	79	80	6.00	53	54	54	8.00	39	39	39	10.00	29	31	31	12.00	26	26	27	12.50	25	24	24	13.75	19	20	20	--	-	-	-	--	-	-	-
Load Current [A]	Time [ms]																																																					
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]																																																			
0.00	-	-	-																																																			
2.00	140	154	155																																																			
4.00	78	79	80																																																			
6.00	53	54	54																																																			
8.00	39	39	39																																																			
10.00	29	31	31																																																			
12.00	26	26	27																																																			
12.50	25	24	24																																																			
13.75	19	20	20																																																			
--	-	-	-																																																			
--	-	-	-																																																			
Note: Slanted line shows the range of the rated load current.																																																						

Testing Circuitry Figure A

2.Values



Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	64	63
-10	64	63
0	64	63
10	64	63
20	64	63
25	64	63
30	64	63
40	64	63
50	64	63
60	64	64
--	-	-



Model		LHA300F-24-Y	Temperature Testing Circuitry	25°C Figure A																																															
Item		Overcurrent Protection																																																	
Object		+24V12.5A																																																	
1.Graph			2.Values																																																
<div><div><div></div><div>Input Volt. 100V</div></div><div><div></div><div>Input Volt. 230V</div></div></div> <div><div>Output Voltage [V]</div><div>Load Current [A]</div></div> <p>Note: Slanted line shows the range of the rated load current.</p> <p>Overcurrent protection is Hiccup mode.</p>			<table><tr><th rowspan="2">Output Voltage [V]</th><th colspan="2">Load Current [A]</th></tr><tr><th>Input Volt. 100[V]</th><th>Input Volt. 230[V]</th></tr><tr><td>24</td><td>17.65</td><td>17.65</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><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><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><tr><td>--</td><td>-</td><td>-</td></tr></table>		Output Voltage [V]	Load Current [A]		Input Volt. 100[V]	Input Volt. 230[V]	24	17.65	17.65	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-
Output Voltage [V]	Load Current [A]																																																		
	Input Volt. 100[V]	Input Volt. 230[V]																																																	
24	17.65	17.65																																																	
--	-	-																																																	
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Model		LHA300F-24-Y	Testing Circuitry Figure A																																					
Item		Overvoltage Protection																																						
Object		+24V12.5A																																						
1.Graph			2.Values																																					
<div><div><div><div><div></div><div>—△—</div><div>Input Volt. 100V</div></div><div><div>---□---</div><div>Input Volt. 230V</div></div></div><div><p>Operating Point [V]</p><p>Ambient Temperature [°C]</p><p>Load 0%</p></div><p>Note: Slanted line shows the range of the rated ambient temperature.</p></div><table><tr><th rowspan="2">Ambient Temperature [°C]</th><th colspan="2">Operating Point [V]</th></tr><tr><th>Input Volt. 100[V]</th><th>Input Volt. 230[V]</th></tr><tr><td>-20</td><td>30.26</td><td>30.26</td></tr><tr><td>-10</td><td>30.50</td><td>30.50</td></tr><tr><td>0</td><td>30.67</td><td>30.67</td></tr><tr><td>10</td><td>30.90</td><td>30.90</td></tr><tr><td>20</td><td>31.08</td><td>31.08</td></tr><tr><td>25</td><td>31.20</td><td>31.20</td></tr><tr><td>30</td><td>31.31</td><td>31.20</td></tr><tr><td>40</td><td>31.49</td><td>31.49</td></tr><tr><td>50</td><td>31.67</td><td>31.67</td></tr><tr><td>60</td><td>31.90</td><td>31.90</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></table></div>			Ambient Temperature [°C]	Operating Point [V]		Input Volt. 100[V]	Input Volt. 230[V]	-20	30.26	30.26	-10	30.50	30.50	0	30.67	30.67	10	30.90	30.90	20	31.08	31.08	25	31.20	31.20	30	31.31	31.20	40	31.49	31.49	50	31.67	31.67	60	31.90	31.90	--	-	-
Ambient Temperature [°C]	Operating Point [V]																																							
	Input Volt. 100[V]	Input Volt. 230[V]																																						
-20	30.26	30.26																																						
-10	30.50	30.50																																						
0	30.67	30.67																																						
10	30.90	30.90																																						
20	31.08	31.08																																						
25	31.20	31.20																																						
30	31.31	31.20																																						
40	31.49	31.49																																						
50	31.67	31.67																																						
60	31.90	31.90																																						
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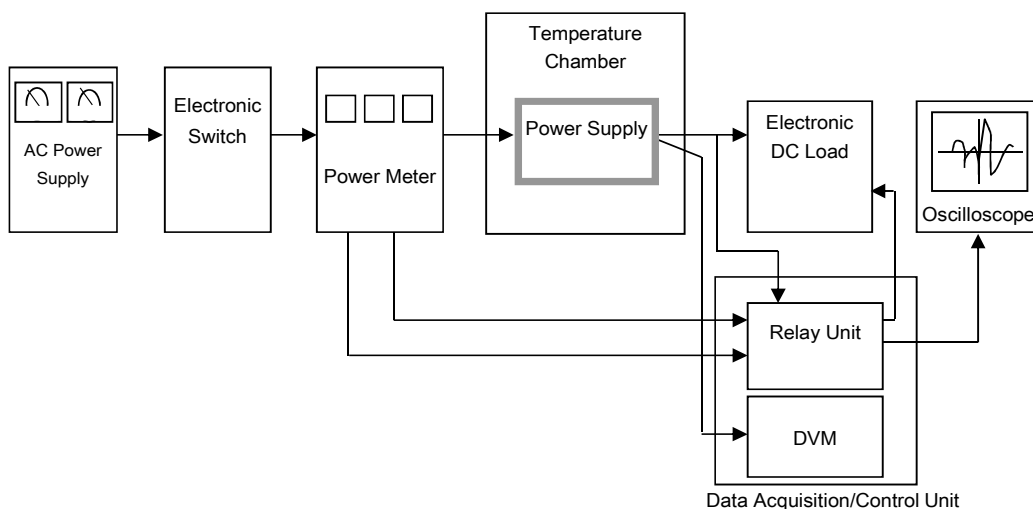


Figure A

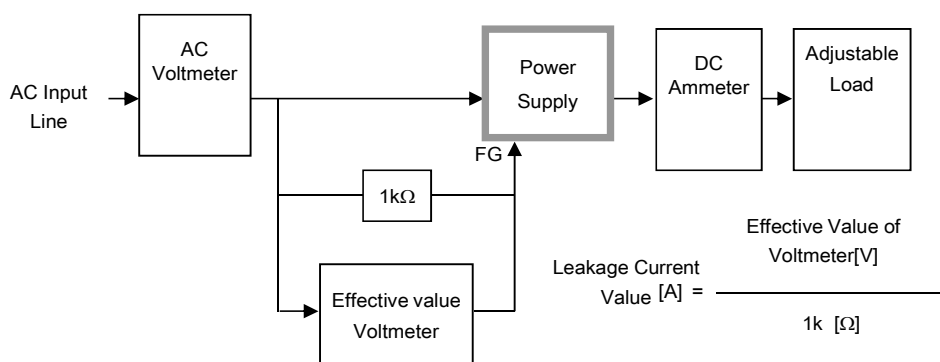


Figure B-1 (DEN-AN)

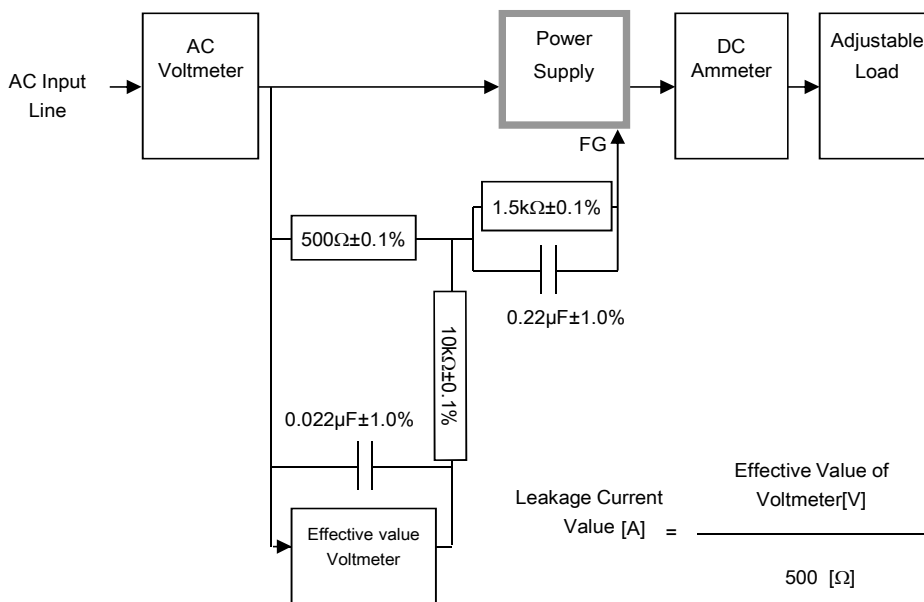


Figure B-2 (IEC62368-1 refer to IEC60990 Fig.4)

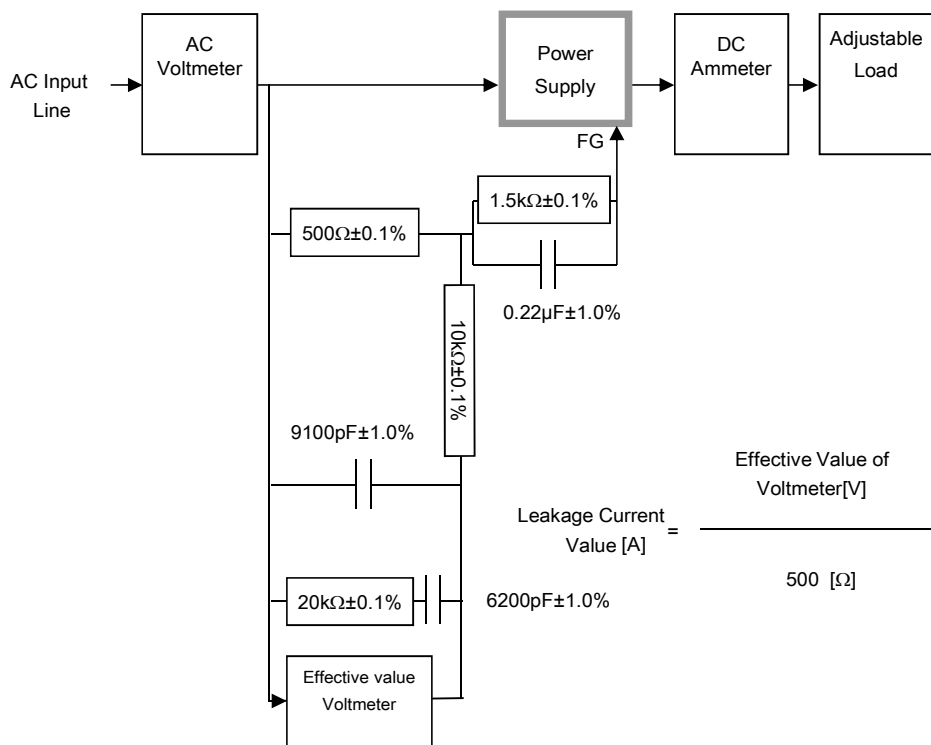


Figure B-3 (IEC62368-1 refer to IEC60990 Fig.5)

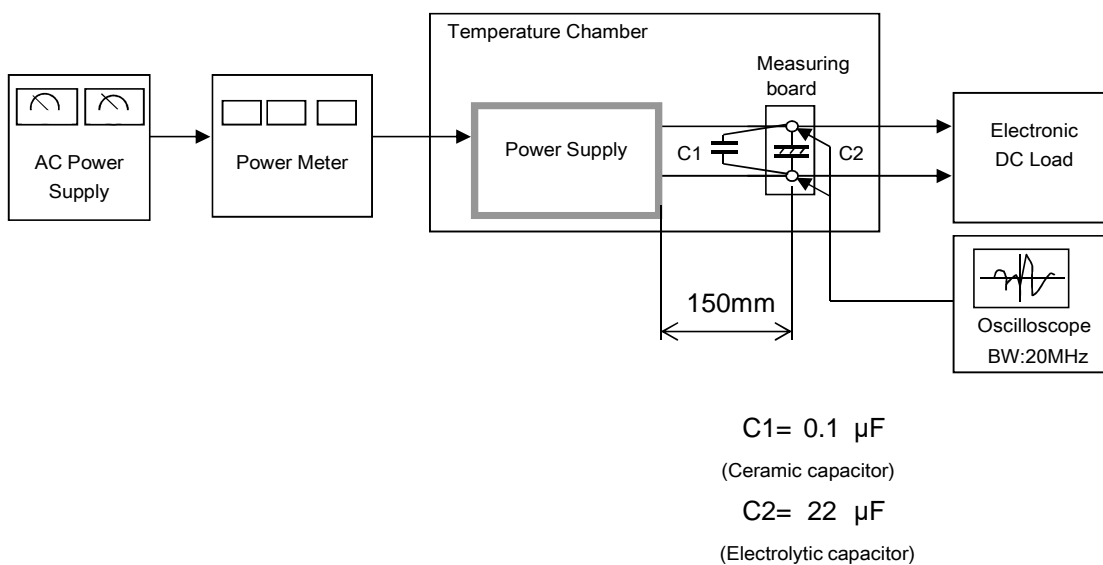


Figure C