



CPFE1000F-12


EVALUATION DATA

Tested By: Carlos San Pedro / 	Date : 8/23/2011
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Name/Signature

Checked By: Phong Ly / 	Date : 8/23/2011
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Approved By: Greg Laufman / 	Date : 8/23/2011
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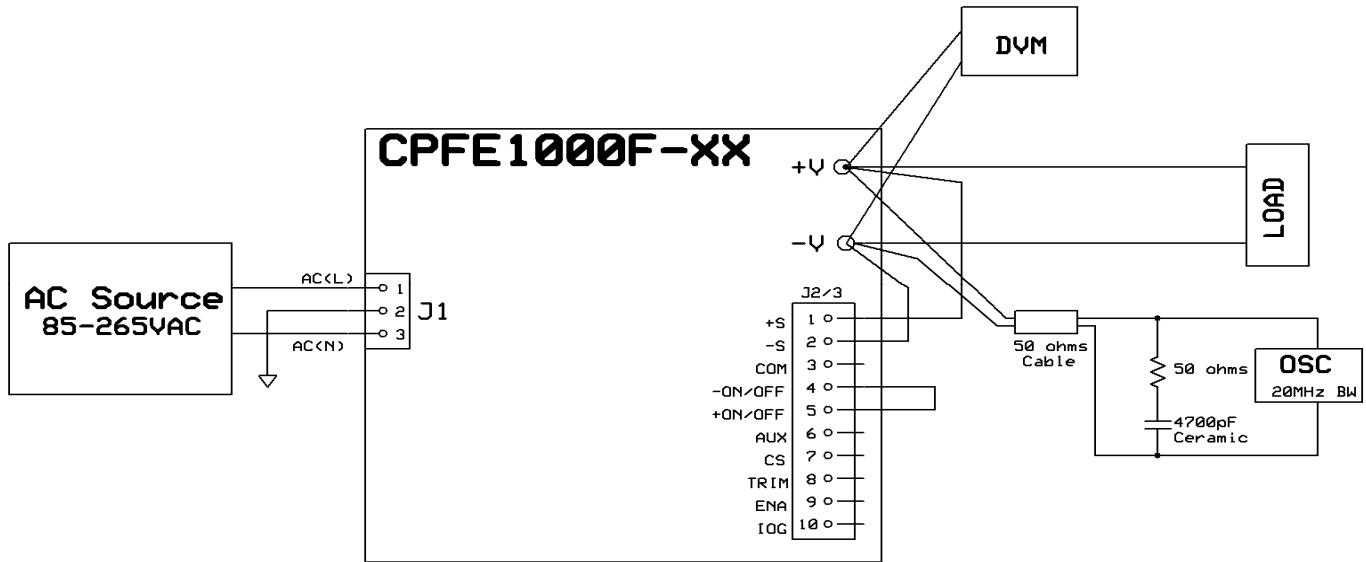
Test Equipment used:

Digital Multi-Meter (DMM) - Model: Fluke 45
Power Source - Model: Kikusui DCR4000L
Electronic Load - Model: Chroma 63201
Digital Power Meter - Model: Yokogawa WT1010
Oscilloscope - Model: LeCroy Waverunner 6050
Leakage Tester - Associate Research Model no. 620L

Terminology used

V_{in}	Input Voltage	I_o	Output Current
V_o	Output Voltage	T_{bp}	Base Plate Temperature
V_{cnt}	Control Voltage	T_a	Ambient Temperature
I_{in}	Input Current	f	Frequency
P_{in}	Input Power	Eff.....	Efficiency
P_o	Output Power	PF.....	Power factor

1. Test set-ups



2. Characteristics

2.1 Line and Load Regulation:

Condition Tbp = 25°C

Vo measured across output studs using local sense connections.

Io \ Vin	85 VAC	115 VAC	230 VAC	265 VAC	Line Regulation	
0% Load	12.136	12.135	12.133	12.133	0.003	0.006%
25% Load	12.138	12.139	12.139	12.139	0.001	0.002%
50% Load	12.132	12.133	12.133	12.134	0.002	0.004%
75% Load	12.128	12.129	12.13	12.131	0.003	0.006%
100% Load	12.126	12.127	12.128	12.129	0.003	0.006%
Load Regulation	0.012	0.012	0.011	0.01		
	0.025%	0.025%	0.023%	0.021%		

Vo measured across output studs using remote sense connections.

Io \ Vin	85 VAC	115 VAC	230 VAC	265 VAC	Line Regulation	
0% Load	12.042	12.042	12.043	12.043	0.001	0.002%
25% Load	12.048	12.049	12.049	12.049	0.001	0.002%
50% Load	12.049	12.05	12.05	12.051	0.002	0.004%
75% Load	12.052	12.052	12.052	12.052	0	0.000%
100% Load	12.053	12.054	12.057	12.058	0.005	0.010%
Load Regulation	0.011	0.012	0.014	0.015		
	0.023%	0.025%	0.029%	0.031%		

2.2 Input turn ON/OFF voltage characteristics.

Condition Tbp = 25°C

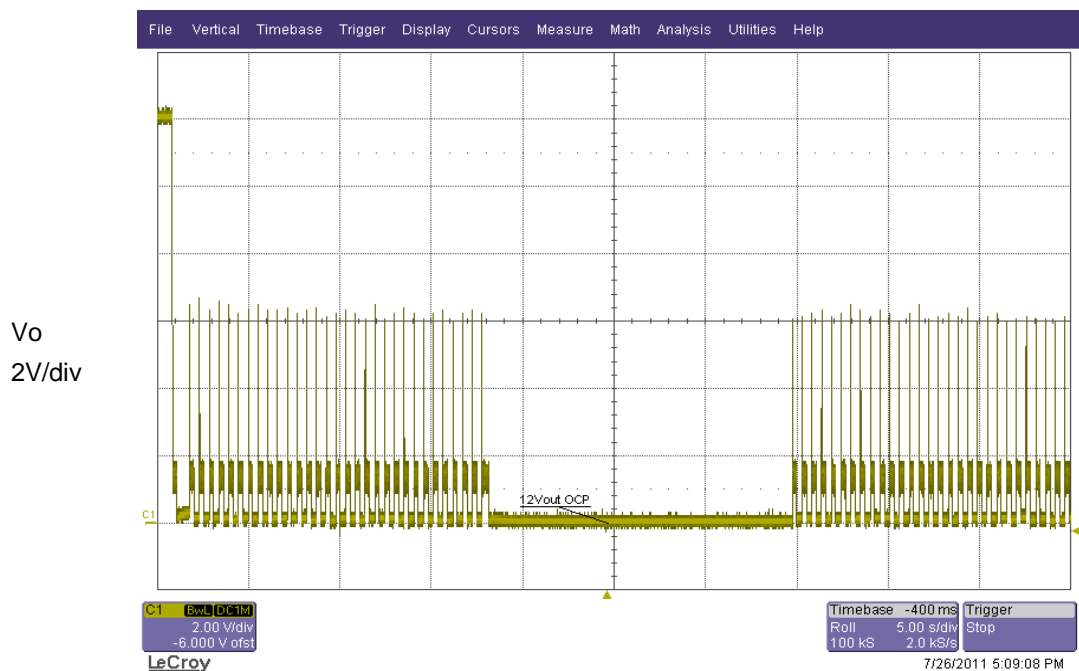
	0% Load	100%Load
Turn ON Voltage	77.6VAC	73.4VAC
Turn OFF Voltage	69.9VAC	75VAC

2.3 Efficiency and Power factor vs. Output power and Input Voltage, Standby Input Power

Condition Tbp = 25°C

Vin	Iin	Pin	PF	Vo	Io	Po	Eff	Load
85 VAC	0.785	49.7	0.807	12.038	0	0	N/A	0%
115 VAC	0.795	48.32	0.553	12.04	0	0	N/A	
230 VAC	1.418	45.72	0.142	12.041	0	0	N/A	
265 VAC	1.653	44.5	0.102	12.042	0	0	N/A	
85 VAC	3.002	243	0.9951	12.05	14.99	180.6295	74.33%	25%
115 VAC	2.224	238.8	0.975	12.052	14.99	180.6595	75.65%	
230 VAC	1.763	230	0.592	12.053	14.99	180.6745	78.55%	
265 VAC	1.907	228	0.473	12.053	14.99	180.6745	79.24%	
85 VAC	5.515	456.7	0.9997	12.053	30.01	361.7105	79.20%	50%
115 VAC	4.064	451	0.9956	12.055	30.01	361.7706	80.22%	
230 VAC	2.435	433.9	0.8124	12.056	30.01	361.8006	83.38%	
265 VAC	2.421	430.1	0.708	12.056	30.01	361.8006	84.12%	
85 VAC	8.337	682.1	0.9996	12.057	45.03	542.9267	79.60%	75%
115 VAC	6.014	674.2	0.9984	12.059	45.03	543.0168	80.54%	
230 VAC	3.245	648.5	0.9008	12.062	45.03	543.1519	83.76%	
265 VAC	3.089	642.7	0.828	12.062	45.03	543.1519	84.51%	
85 VAC	11.166	923.3	0.9999	12.064	60.05	724.4432	78.46%	100%
115 VAC	8.056	906.9	0.9993	12.066	60.05	724.5633	79.89%	
230 VAC	4.161	873.8	0.9389	12.066	60.05	724.5633	82.92%	
265 VAC	3.841	866.7	0.8916	12.066	60.05	724.5633	83.60%	

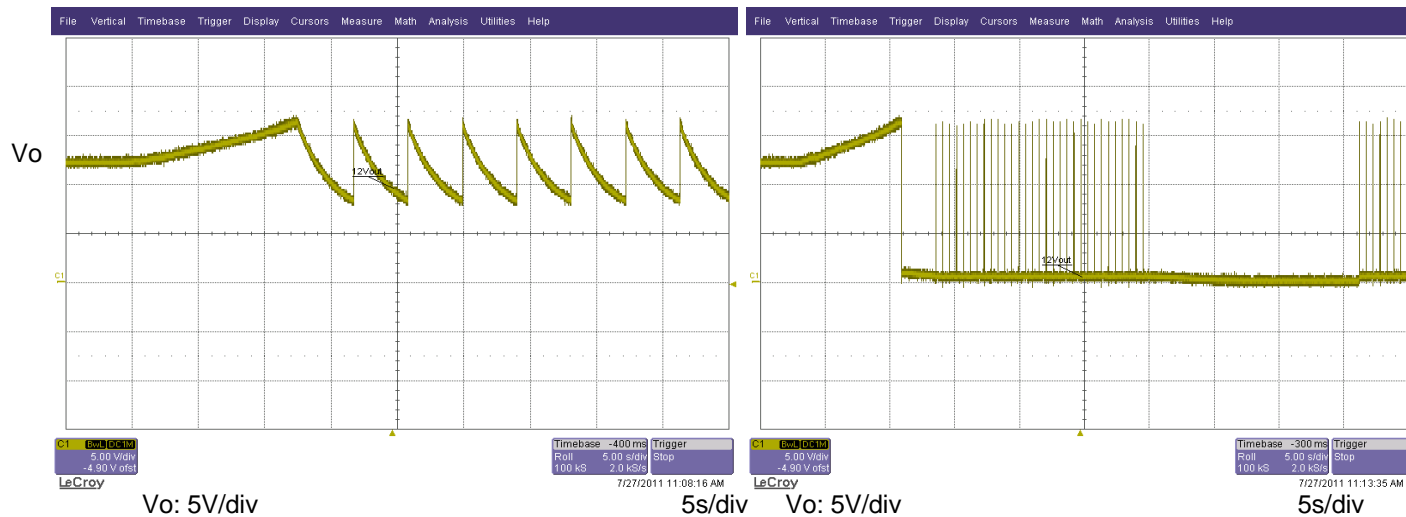
2.4 Over current protection (OCP) characteristics.



Output Voltage hiccups during OCP mode.
(18s Hiccup & 16s turn off)

5s/div

2.5 Over voltage protection (OVP) characteristics.



Vo: 5V/div

5s/div

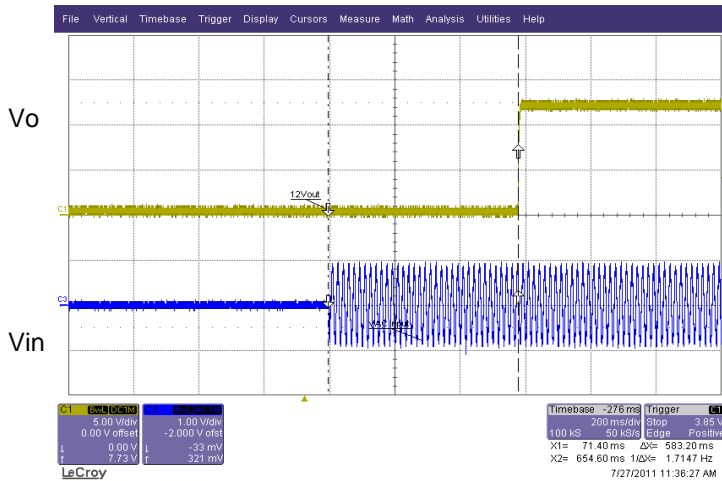
Vo: 5V/div

5s/div

Output Voltage during OVP mode (0% Load)

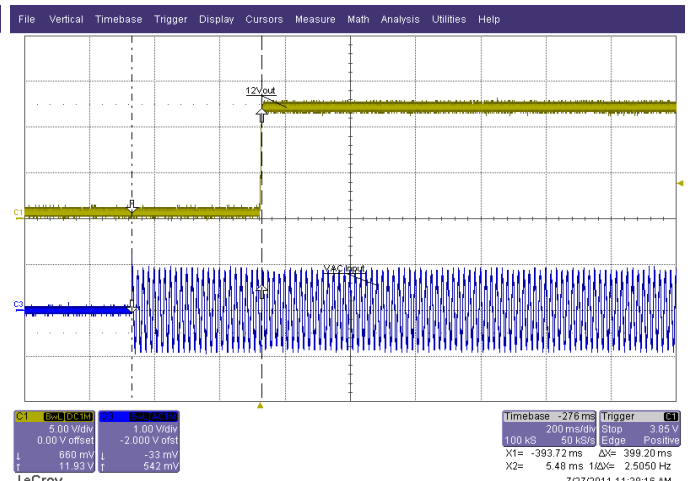
Output Voltage during OVP mode (100% Load)

2.6 Output rise and fall characteristics



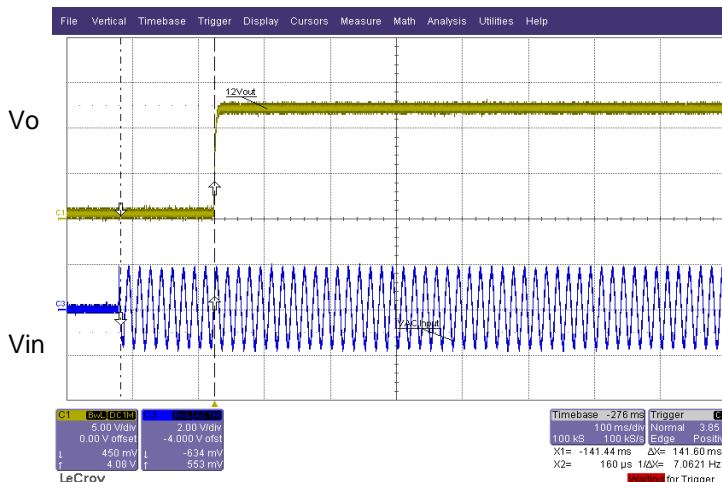
Vin: 200V/div Vo: 5V/div 200ms/div

Output rise (0% Load, 115Vac input)



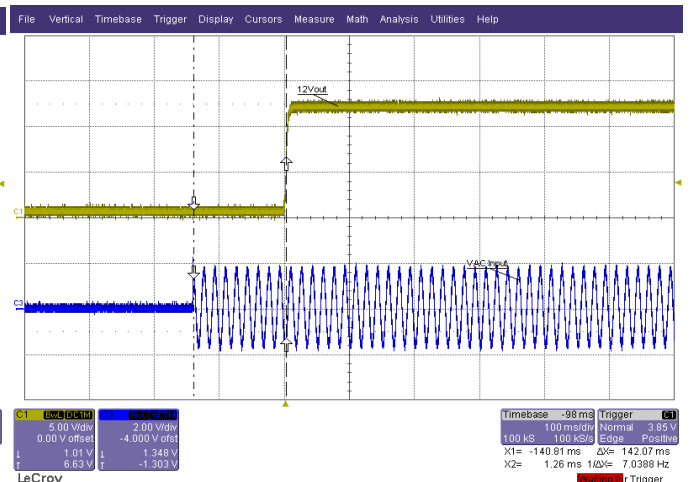
Vin: 200V/div Vo: 5V/div 200ms/div

Output rise (100% Load, 115Vac input)



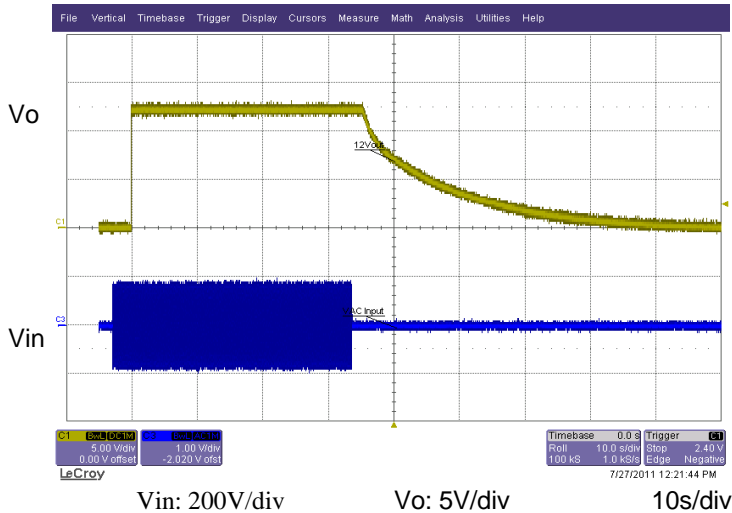
Vin: 400V/div Vo: 5V/div 100ms/div

Output rise (0% Load, 230Vac input)



Vin: 400V/div Vo: 5V/div 100ms/div

Output rise (100% Load, 230Vac input)

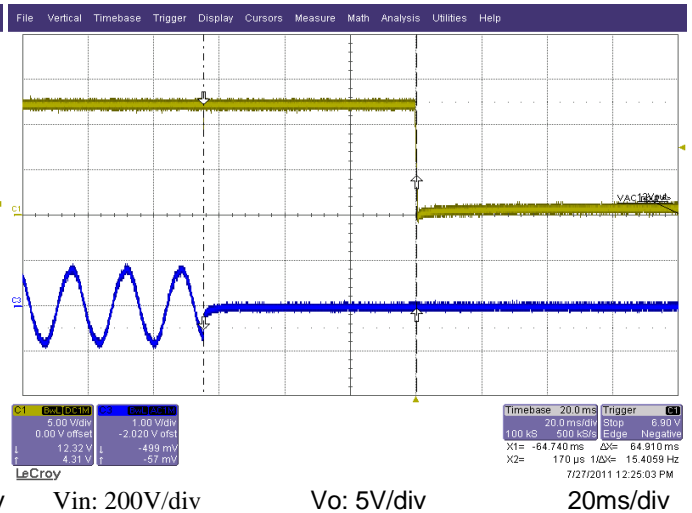


Vin: 200V/div

Vo: 5V/div

10s/div

Output fall (0% load, 115Vac input)

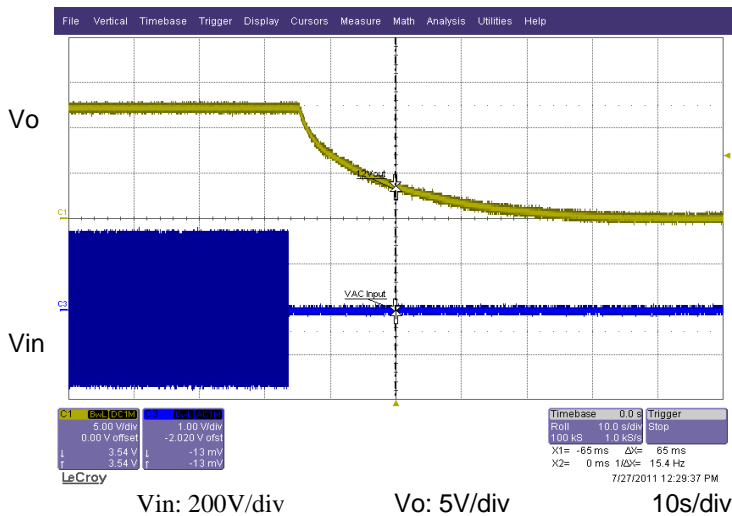


Vin: 200V/div

Vo: 5V/div

20ms/div

Output fall (100% load, 115Vac input)

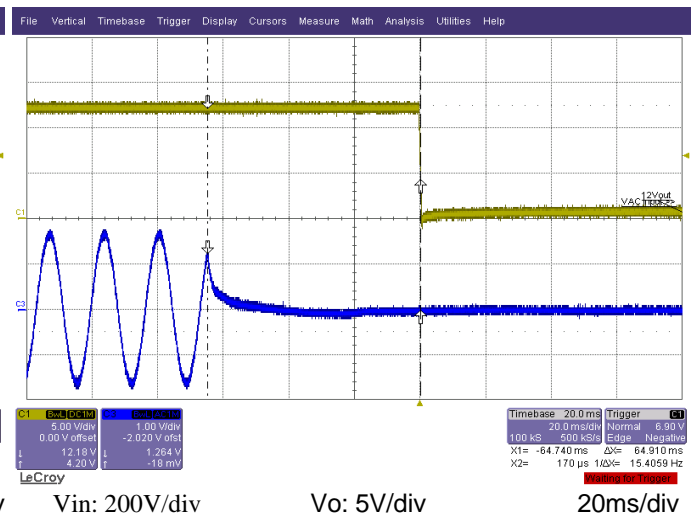


Vin: 200V/div

Vo: 5V/div

10s/div

Output fall (0% load, 230Vac input)



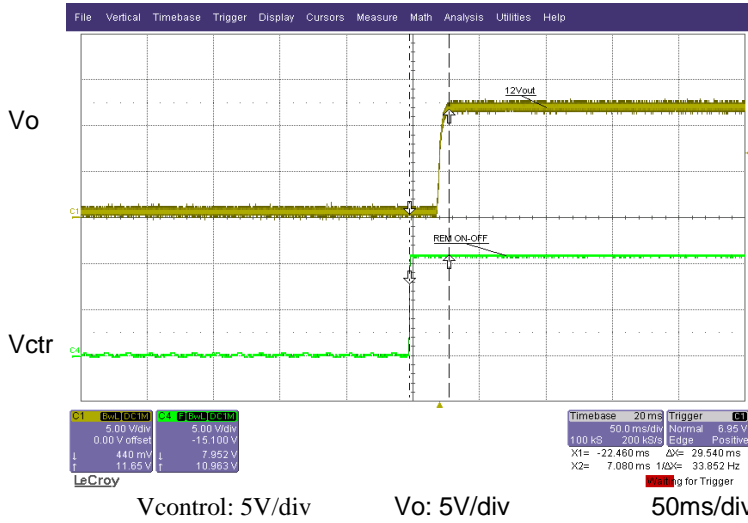
Vin: 200V/div

Vo: 5V/div

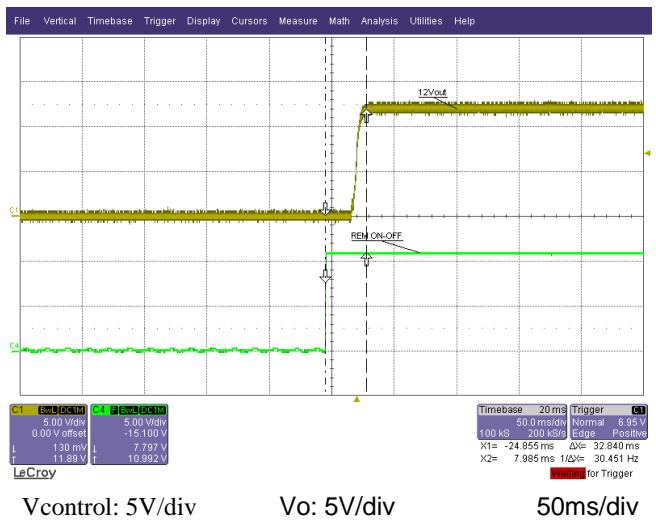
20ms/div

Output fall (100% load, 230Vac input)

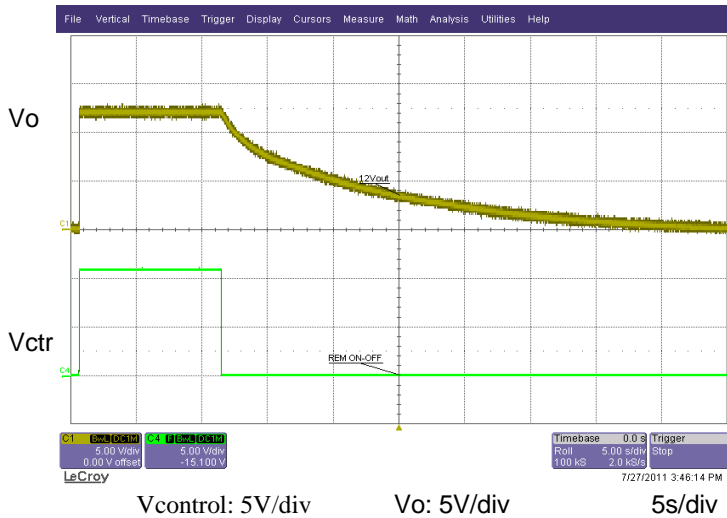
2.7 Output rise and fall characteristics with ON/OFF control.



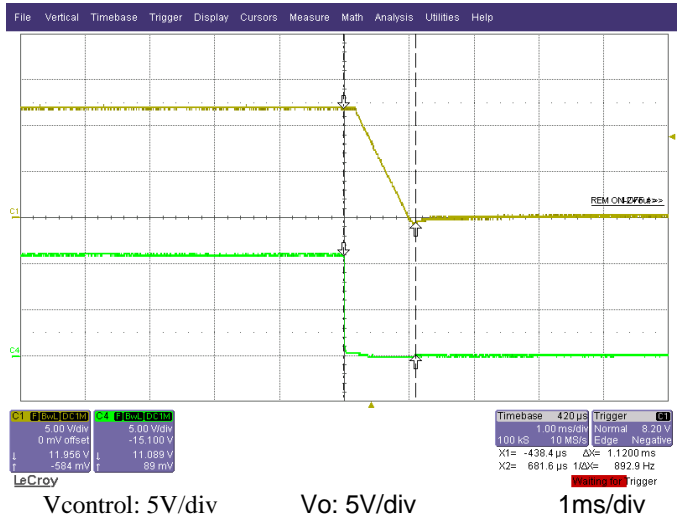
Output rise with ON/OFF control
(0% load, 115Vac input)



Output rise with ON/OFF control
(100% load, 115Vac input)

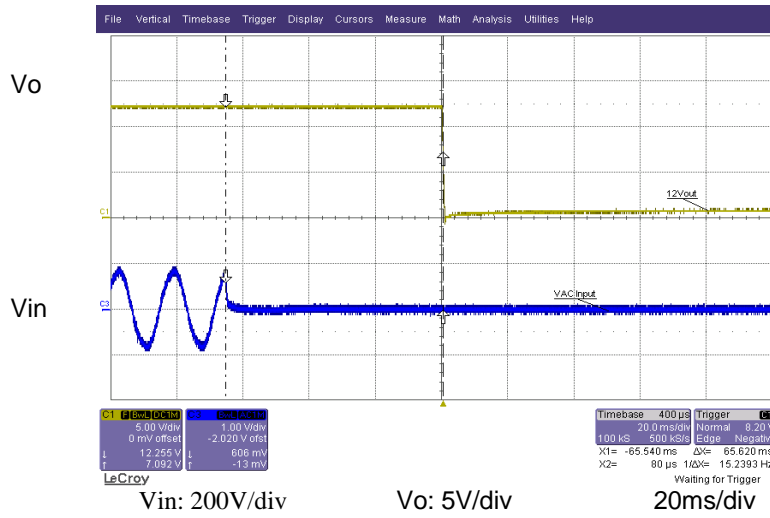


Output fall with ON/OFF control
(0% load, 115Vac input)



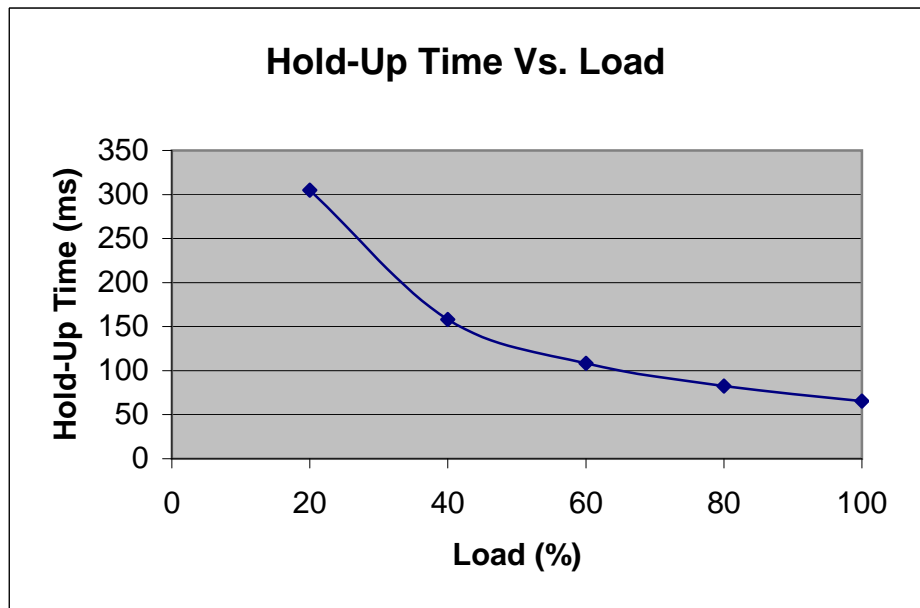
Output fall with ON/OFF control
(100% load, 115Vac input)

2.8 Hold up time characteristics

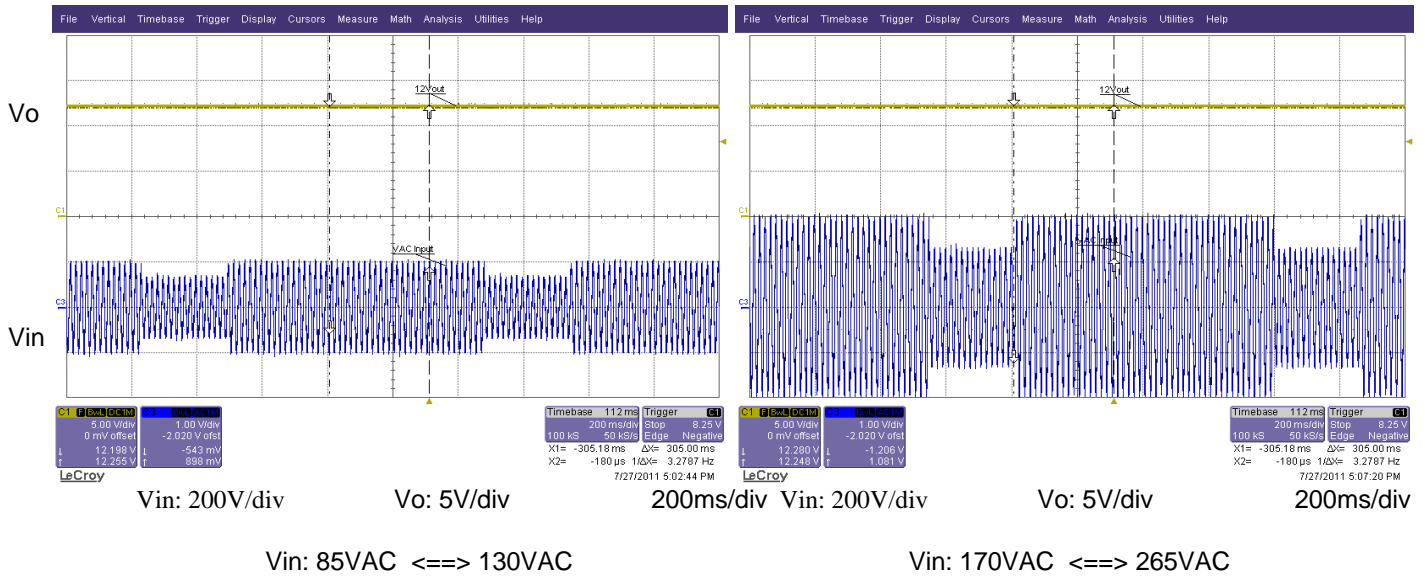


Hold up time (100% Load, 115Vac input)

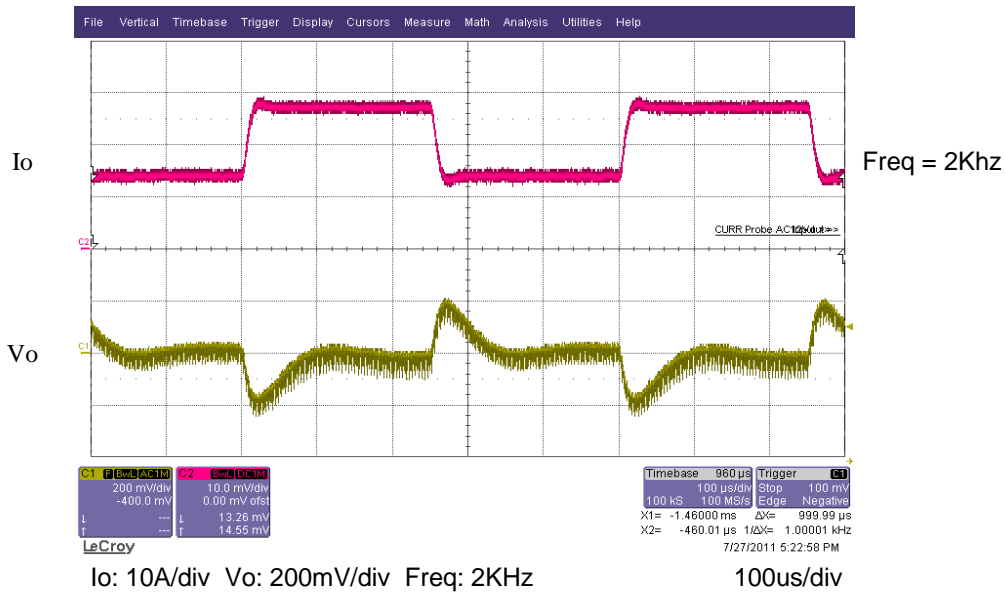
Load (%)	Hold up time (ms)
20	304.9
40	158.1
60	108.2
80	82.5
100	65.6



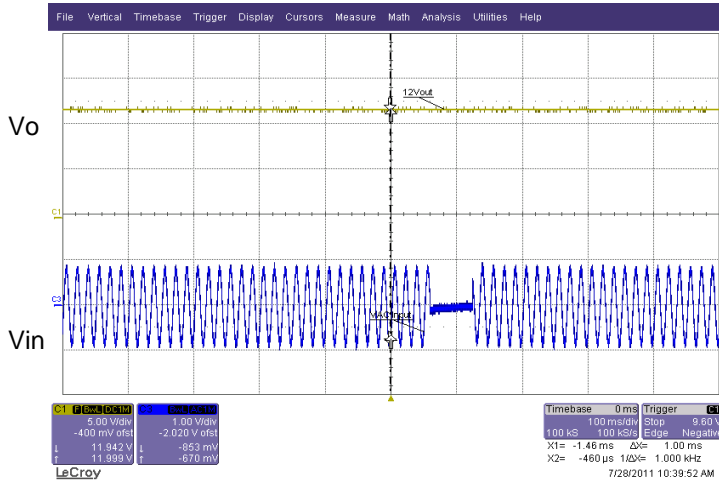
2.9 Dynamic line response characteristics



2.10 Dynamic load response characteristics



2.11 Response to brownout characteristics

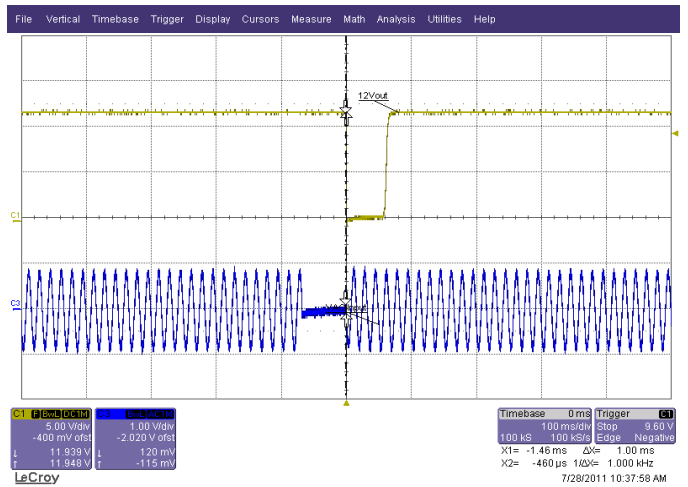


Vin: 200V/div

Vo: 5V/div

100ms/div

Vin: 115VAC - 62mS Dropout

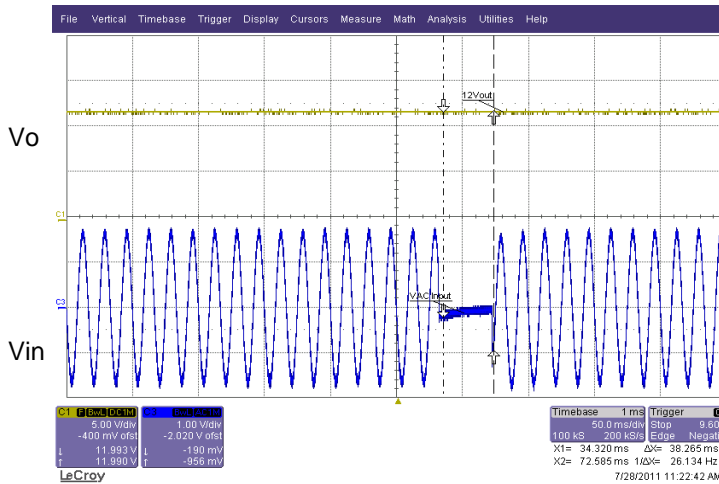


Vin: 200V/div

Vo: 5V/div

100ms/div

Vin: 115VAC - 63mS Dropout

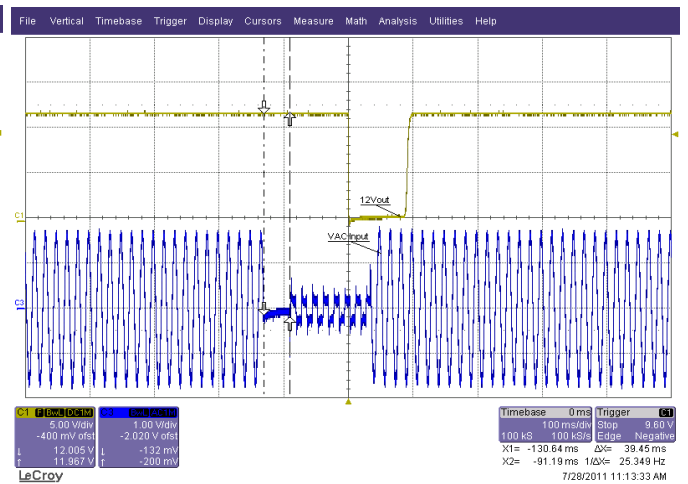


Vin: 250V/div

Vo: 20V/div

50ms/div

Vin: 230VAC - 38mS Dropout



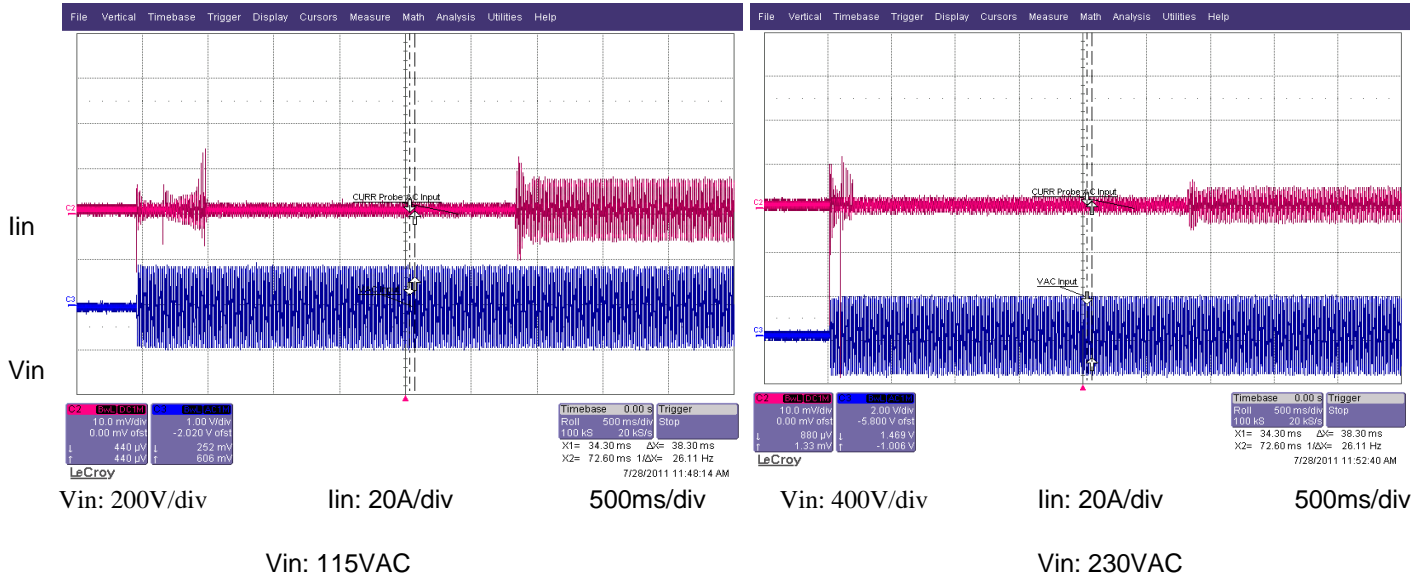
Vin: 250V/div

Vo: 20V/div

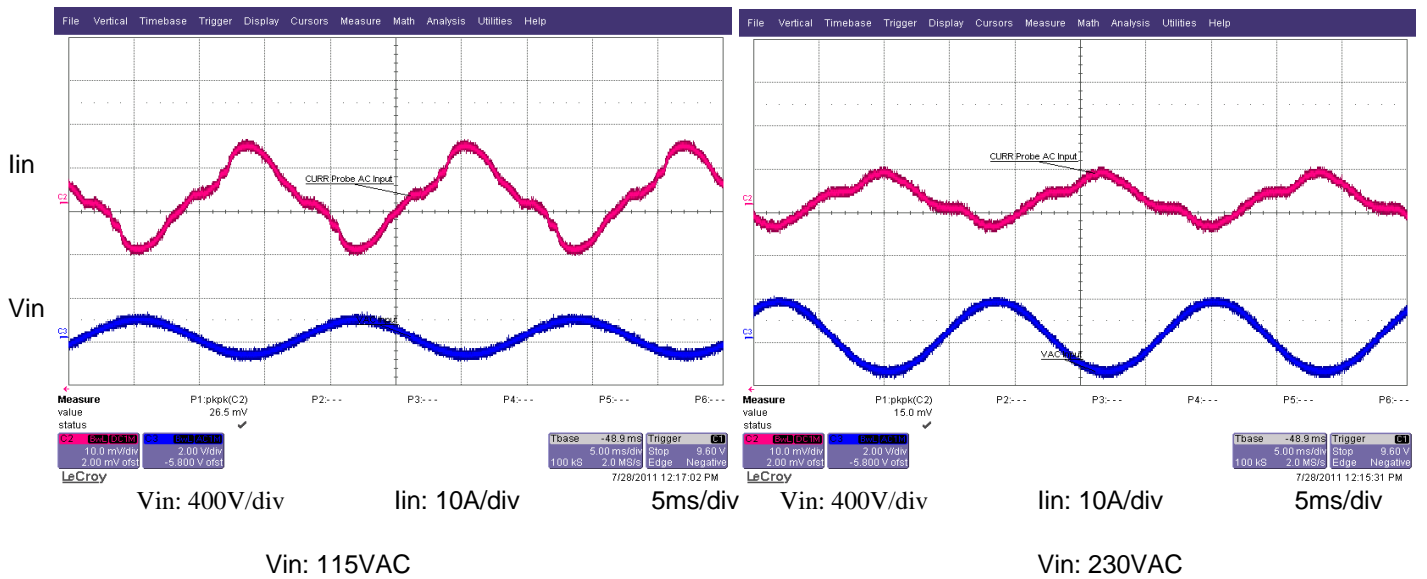
50ms/div

Vin: 230VAC - 39mS Dropout

2.12 Inrush current characteristics

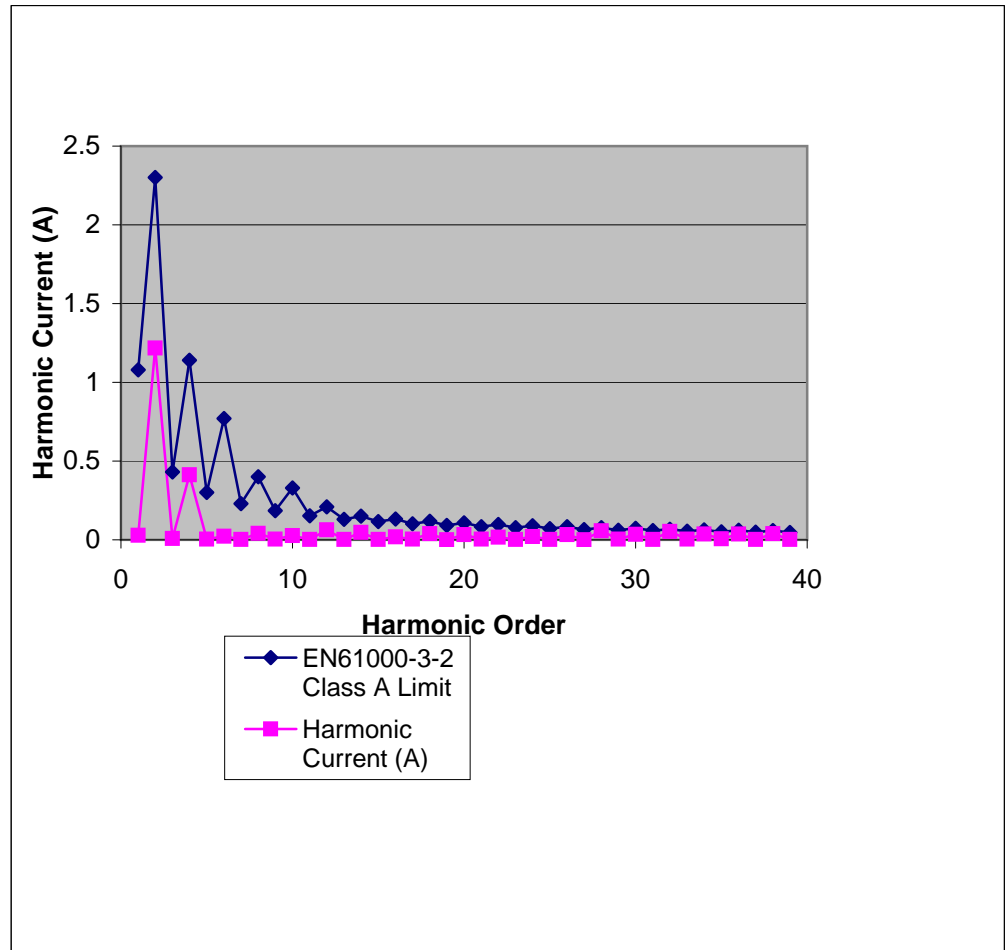


2.13 Input current waveforms

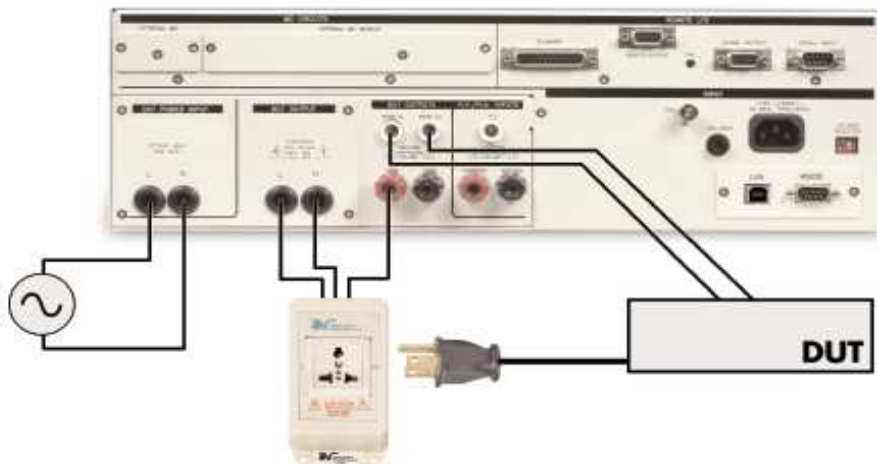
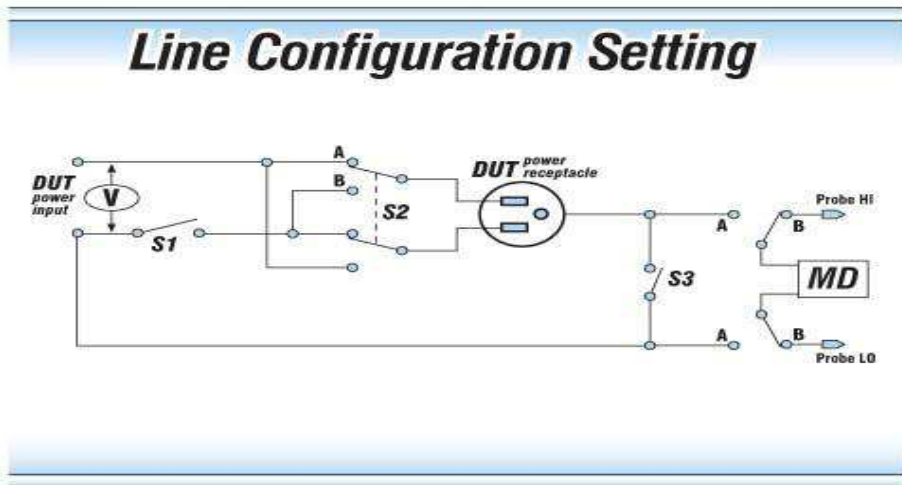


2.14 Input current harmonics

CPFE1000F-48		
Vin	230 VAC	
Freq	50 HZ	
Io	60 ADC	
Vo	12VDC	
Iin	3.971	
ATHD	23.66	
Harmonics	Limit (A)	A
2	1.08	0.022
3	2.3	0.852
4	0.43	0.005
5	1.14	0.287
6	0.3	0.002
7	0.77	0.049
8	0.23	0.001
9	0.4	0.053
10	0.184	0.004
11	0.33	0.059
12	0.153	0.002
13	0.21	0.01
14	0.131	0.005
15	0.15	0.016
16	0.115	0.003
17	0.132	0.011
18	0.102	0.003
19	0.118	0.007
20	0.092	0.003
21	0.107	0.037
22	0.084	0.001
23	0.098	0.019
24	0.077	0.002
25	0.09	0.028
26	0.071	0.002
27	0.083	0.021
28	0.066	0.007
29	0.078	0.024
30	0.061	0.004
31	0.073	0.054
32	0.058	0.005
33	0.068	0.014
34	0.054	0.01
35	0.064	0.026
36	0.051	0.003
37	0.061	0.031
38	0.048	0.002
39	0.058	0.019
40	0.046	0.000

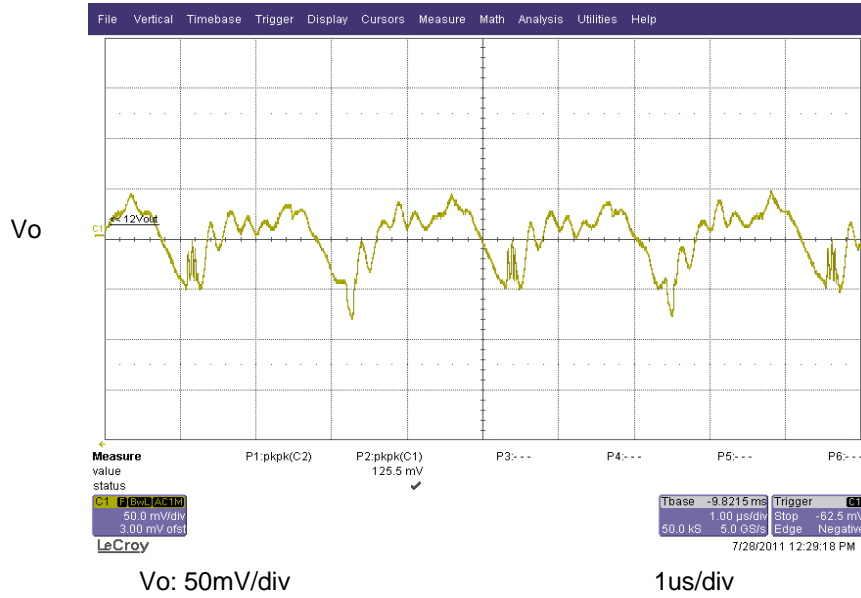


2.15 Leakage current characteristics



PS Vout	Time (s)	Freq (Hz)	Nom.1 115VAC	Nom.2 230VAC	Non.2HI 265VAC	Configuration		
						Neutral	Reverse	GND
48	10	60	<1.5mA	<1.5mA	<1.5mA	Closed	Off	Open
			0.4231	0.9205	1.0760	Closed	Off	Closed
	10	60	0.4209	0.9098	1.0650	Closed	On	Open
			0.0000	0.0001	0.0001	Closed	On	Closed
	10	50	0.3521	0.7681	0.8992	Closed	Off	Open
			0.0000	0.0001	0.0001	Closed	Off	Closed
	10	50	0.3511	0.7593	0.8910	Closed	On	Open
			0.0000	0.0001	0.0001	Closed	On	Closed

2.16 Output ripple and noise waveforms



Vin: 115VAC