



**Newton's4th Ltd**



7949



# IEC61000 EMC TEST SYSTEMS

IEC61000-3-2  
IEC61000-3-3  
IEC61000-3-11  
IEC61000-3-12  
IEC61000-4-11  
IEC61000-4-13  
IEC61000-4-14  
IEC61000-4-17  
IEC61000-4-28  
IEC61000-4-29

**EMC Test Solutions from the worlds leading IEC61000 test system Manufacturer**



**N4L EMC Test Systems - The most comprehensive ISO17025  
Harmonics and Flicker Calibration coverage in the market**

## EMC Test Systems

Newtons4th(N4L) design and manufacture a wide range of EMC test systems to meet the needs of modern test laboratories. N4L's high quality instrumentation, accompanied by customized intuitive test software provide highly accurate measurements presented in a clear and concise manner to the user. Sophisticated reporting functions allow the user to rapidly and efficiently export data to excel, producing detailed, professional test reports for end customers.

## UKAS ISO17025 Accreditation

N4L PPA55xx series of power analyzers and impedance networks provide fully compliant Harmonics and Flicker test solutions, with direct accreditation available via N4L's internal UKAS ISO17025 calibration laboratory. Certified by NPL (National Physical Laboratory) in the UK, the N4L PPA55xx provides reliable, accurate measurements compliant to the latest test standards (IEC61000-3-2/3 and IEC61000-3-11/12).

In combination with an N4L Impedance Network and a compliant AC Source, you will be equipped to provide fully compliant Harmonics and Flicker measurements.

The level and coverage of accreditation available from the N4L UKAS ISO17025 test laboratory is unrivalled in the industry, the scope of accreditation includes the following;

**IEC61000-4-15:** Pinst (Sinusoidal and Rectangular Modulation), Pst, Frequency Changes, Distorted Voltage with Multiple Zero Crossings, Harmonics with Sidebands, Phase Jumps, Rectangular Changes with Duty Cycle

**IEC61000-4-7:** Current Harmonic Amplitude



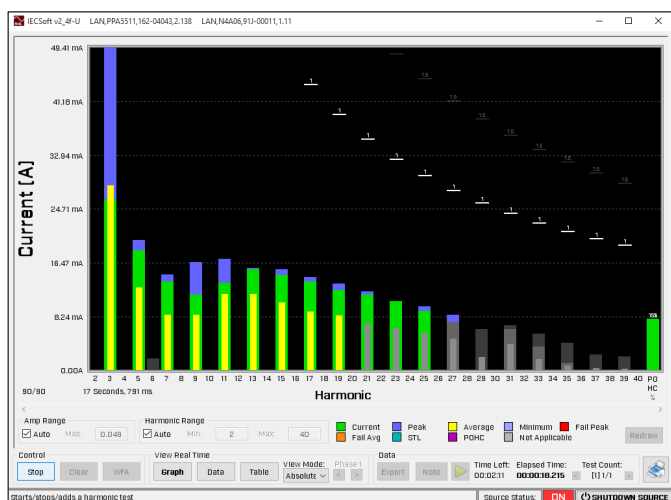
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## IEC61000-3-2 / IEC61000-3-12 (Current Harmonics)

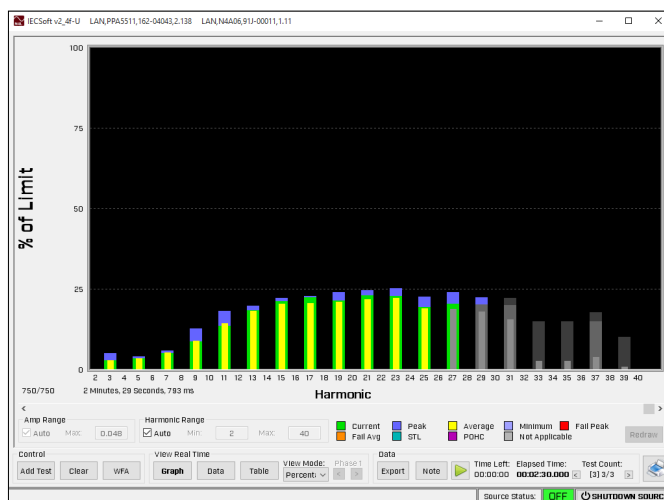
The IEC61000-3-2 and IEC61000-3-12 standards refer to the measurement techniques described within the IEC61000-4-7 measurement standard. IEC61000-4-7 details the exact measurement techniques and principles required of an instrumentation manufacturer. The PPA55x1 complies to all aspects of the IEC61000-4-7 standard, thus the PPA55x1 inherently complies to IEC61000-3-2 and IEC61000-3-12. UKAS ISO17025 accreditation is also available from N4L's internal ISO17025 accredited laboratory, this provides the highest level of calibration for an IEC61000-3-2/3-12 harmonics analyzer.

## “IECSoft” Software - Harmonic Test Interface

An important aspect of any compliant test system is the HMI(Human Machine Interface), N4L have spent many years developing and improving the IEC61000-3-2/12 user interface which has matured into an intuitive, comprehensive analysis and review mechanism for the test engineer. Features such as real time pass/fail flags, live graphical update of limit levels, data point export for complete test “replay”, as well as a thorough reporting function.



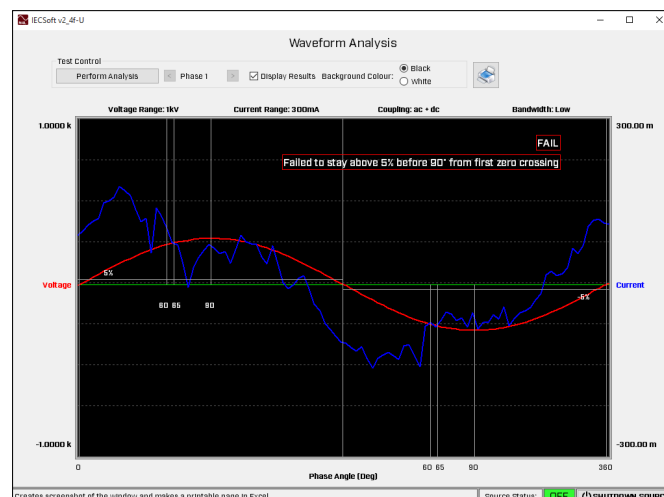
Real time update of colour coded graphical display, including active limit indication



Percentage of limit view normalises each harmonic result to 100% of limit





Individual Harmonics graphed, providing a deeper understanding of DUT behaviour



Unique “Waveform Analysis” mode, providing automated pass/fail result

### Harmonics Export Function

The export function integrated into the IECSoft EMC test software suite is a vital aspect of any EMC compliance measurement. IECSoft provides a comprehensive export function directly to excel, this enables the user to edit the report as required to meet internal procedural requirements.

04th May 2016 - 08:43:55		Page 1/15		IECSoft v2.4f			
		<div>IEC61000-3-2:2014</div> <div>Fluctuating Harmonics</div>					
Instrument Details							
Instrument Model		PPA5511					
Instrument Serial		162-04043					
Instrument Firmware		2.138					
Instrument Last Calibrated		02nd February 2015					
Instrument Version		Standard					
Source Model		N4A06					
Source Serial		91J-00011					
Source Frequency		50.000 Hz					
Source Voltage RMS		230.000 V					
Source Settling Time		10 s					
Test Settings							
Class		Class D					
Mode		Measure					
Equipment Under Test							
Brand		Unbranded					
Model		TRW211WS					
Serial		3434908					
Impedance Network ID		91G-11335					
Test Conditions							
		User Entered			Measured		
Rated Voltage		230.000 V			230.069 V		
Rated Current		4.600 A			992.193 mA		
Rated Frequency		50.000 Hz			49.999 Hz		
Rated Power		400.000 W			181.809 W		
Additional Test Information							
Measured Power Factor		0.6199					
Max Current THD		17.75%					
Max THC		0.0536A					
Max Power		288.051 W					
Max F.Current		1.277 A					
Average F.Current		874.781 mA					
Minimum Current		3A					
Test Duration		2.5 minutes					
Additional Test Details							
Operator		Applications					
Lab Name		N4L					
Location		Leics, UK					
Notes							
Signature							
Results		Phase 1: FAIL - AVERAGE & PEAK					

04th May 2016 - 08:43:55		Ph:1 Page 2/15		IECSoft v2. 4f			
IEC61000-3-2:2014 Fluctuating Harmonics							
Instrument Details							
Instrument Model		PPA5511					
Instrument Serial		162-04043					
Instrument Firmware		2.138					
Equipment Under Test							
Brand		Unbranded					
Model		TRW211WS					
Serial		3434908					
Harmonic Difference							
Harmonic	Lowest		Highest		Limit		Status
	Average (A)	Test #	Average (A)	Test #	Allowance (A)	Difference (A)	
2	0	1	0.000004	3	0	0.000004	PASS
3	0.026425	1	0.026948	3	0.046233	0.000523	PASS
4	0	1	0	3	0	0	PASS
5	0.01827	1	0.018691	3	0.025836	0.000421	PASS
6	0	3	0.000014	1	0	0.000014	PASS
7	0.013636	1	0.014261	3	0.013598	0.000625	PASS
8	0	1	0	3	0	0	PASS
9	0.01171	1	0.012132	3	0.006799	0.000422	PASS
10	0	1	0.000001	3	0	0.000001	PASS
11	0.01351	1	0.013681	3	0.004759	0.000171	PASS
12	0	1	0	3	0	0	PASS
13	0.014495	1	0.014659	3	0.004027	0.000164	PASS
14	0	1	0	3	0	0	PASS
15	0.013833	1	0.014275	3	0.00349	0.000442	PASS
16	0	1	0	3	0	0	PASS
17	0.012738	3	0.012796	1	0.00308	0.000058	PASS
18	0	1	0	3	0	0	PASS
19	0.011593	3	0.011857	1	0.002755	0.000264	PASS
20	0	1	0	3	0	0	PASS
21	0.010707	1	0.010911	3	0.002493	0.000204	PASS
22	0	1	0	3	0	0	PASS
23	0.009389	1	0.010102	3	0.002276	0.000713	PASS
24	0.00005	3	0.000069	1	0	0.00002	PASS
25	0.008008	3	0.008477	1	0.002094	0.000469	PASS
26	0.000023	3	0.000051	1	0	0.000028	PASS
27	0.006877	1	0.007284	3	0.001939	0.000407	PASS
28	0	1	0	3	0	0	PASS
29	0.003537	1	0.006486	3	0.001805	0.002949	FAIL
30	0	1	0	3	0	0	PASS
31	0.00464	1	0.005309	3	0.001689	0.00067	PASS
32	0	3	0.000001	1	0	0.000001	PASS
33	0.000872	3	0.002616	1	0.001586	0.001744	FAIL
34	0	1	0	3	0	0	PASS
35	0.000607	1	0.000843	3	0.001496	0.000236	PASS
36	0	1	0	3	0	0	PASS
37	0.000334	1	0.001104	3	0.001415	0.00077	PASS
38	0	1	0	3	0	0	PASS
39	0.000231	3	0.000275	1	0.001342	0.000044	PASS
40	0	1	0	3	0	0	PASS
Key:							
Allowance		Maximum Difference allowed in Amps					
Good		The difference is less than 50% of the allowance					
OK		The difference is between 50% of the allowance and 75% of the allowance					
Poor		The difference is between 75% of the allowance and 100% of the allowance					
Fail		The difference has exceeded the allowance					

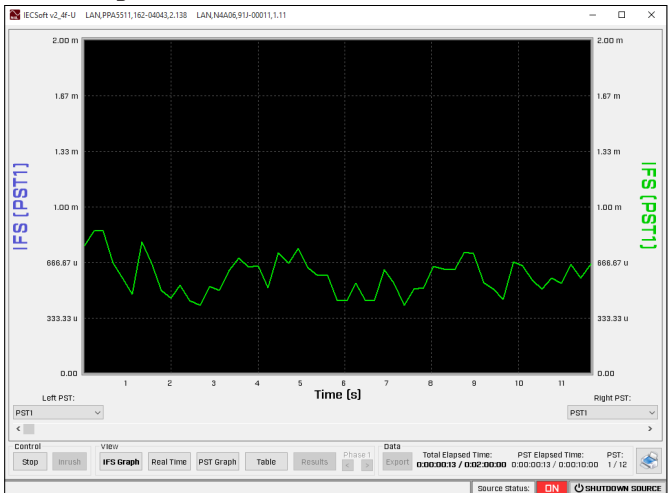
### IEC61000-3-3 / IEC61000-3-11 (Flicker IEC61000-4-15)

N4L provide complaint measurements to the latest test protocols/limits specified within IEC61000-3-3 and IEC61000-3-11. The PPA55x1 Precision Power Analyzer complies fully with IEC61000-4-15 which dictates both the hardware and firmware requirements for compliance to IEC61000-3-3/11. N4L are currently the only Flickermeter manufacturer in the world\* to offer complete coverage of the IEC61000-4-15 standard with ISO17025 accreditation. This optional ISO17025 calibration procedure is performed within N4L's ISO17025 UKAS calibration laboratory and covers all aspects of the IEC Flicker test standards.

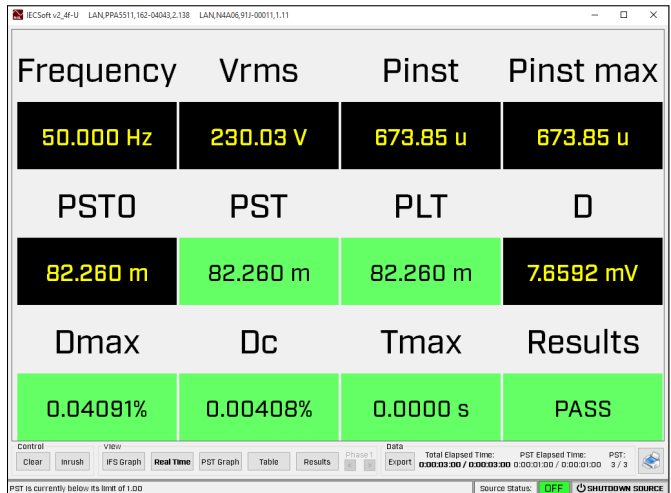
### “IECSoft” Software Flicker Test Interface

IECSoft's Flicker measurement mode incorporates an intuitive step by step style setup procedure, guiding the user through the test configuration. Remote control of the N4L N4A AC Power Source is handled automatically by IECSoft, test procedures include selection of d[t] parameters and calculation of Z<sub>test</sub> if necessary. Pinst, IFS, PST, PLT, D, Dmac, Dc and Tmax are also updated during any test.

\* According to N4L research 2014



IFS recorded real time, for in depth post test analysis



Real time display indicating current test status

data	Phase	Time	Frequency [Hz]	Vrms [V]	Pmax	Pmin	PST	PLT	D	Dmax [s]	Dc [s]	Time [s]
135	1	+00:00:32.184	50.0000	228.7400	0.0005	0.0014	0.0823	0.0000	0.0000	0.0047	0.0335	0.0050
136	1	+00:00:32.401	50.0000	228.7400	0.0008	0.0014	0.0823	0.0000	0.0000	0.0017	0.0335	0.0050
137	1	+00:00:32.642	50.0000	228.7400	0.0005	0.0014	0.0823	0.0000	0.0000	0.0025	0.0335	0.0050
138	1	+00:00:32.889	50.0000	228.7400	0.0005	0.0014	0.0823	0.0000	0.0000	0.0017	0.0335	0.0050
139	1	+00:00:33.119	50.0000	228.7400	0.0007	0.0014	0.0823	0.0000	0.0000	0.0048	0.0335	0.0050
140	1	+00:00:33.384	50.0000	228.7400	0.0007	0.0014	0.0823	0.0000	0.0000	0.0164	0.0335	0.0050
141	1	+00:00:33.589	50.0000	228.7400	0.0008	0.0014	0.0823	0.0000	0.0000	0.0123	0.0335	0.0050
142	1	+00:00:33.842	50.0000	228.7400	0.0010	0.0014	0.0823	0.0000	0.0000	0.0148	0.0335	0.0050
143	1	+00:00:34.0...	50.0000	228.7400	0.0007	0.0014	0.0823	0.0000	0.0000	0.0175	0.0335	0.0050
144	1	+00:00:34.325	50.0000	228.7400	0.0008	0.0014	0.0823	0.0000	0.0000	0.0100	0.0335	0.0050
145	1	+00:00:34.559	50.0000	228.7400	0.0007	0.0014	0.0823	0.0000	0.0000	0.0098	0.0335	0.0050
146	1	+00:00:34.789	50.0000	228.7400	0.0007	0.0014	0.0823	0.0000	0.0000	0.0135	0.0335	0.0050
147	1	+00:00:35.018	50.0000	228.7400	0.0005	0.0014	0.0823	0.0000	0.0000	0.0182	0.0335	0.0050
148	1	+00:00:35.271	50.0000	228.7400	0.0008	0.0014	0.0823	0.0000	0.0000	0.0024	0.0335	0.0050
149	1	+00:00:35.522	50.0000	228.7400	0.0008	0.0014	0.0823	0.0000	0.0000	0.0033	0.0335	0.0050
150	1	+00:00:35.783	50.0000	228.7400	0.0007	0.0014	0.0823	0.0000	0.0000	0.0148	0.0335	0.0050
151	1	+00:00:36.0...	50.0000	228.7400	0.0008	0.0014	0.0823	0.0000	0.0000	0.0110	0.0335	0.0050
152	1	+00:00:36.232	50.0000	228.7400	0.0008	0.0014	0.0823	0.0000	0.0000	0.0237	0.0335	0.0050
153	1	+00:00:36.474	50.0000	228.7400	0.0007	0.0014	0.0823	0.0000	0.0000	0.0118	0.0335	0.0050
154	1	+00:00:36.7...	50.0000	228.7400	0.0010	0.0014	0.0823	0.0000	0.0000	0.0041	0.0335	0.0050
155	1	+00:00:36.935	50.0000	228.7400	0.0007	0.0014	0.0823	0.0000	0.0000	0.0078	0.0335	0.0050
156	1	+00:00:37.178	50.0000	228.7400	0.0007	0.0014	0.0823	0.0000	0.0000	0.0064	0.0335	0.0050
157	1	+00:00:37.419	50.0000	228.7400	0.0005	0.0014	0.0823	0.0000	0.0000	0.0073	0.0335	0.0050
158	1	+00:00:37.658	50.0000	228.7400	0.0008	0.0014	0.0823	0.0000	0.0000	0.0087	0.0335	0.0050
159	1	+00:00:37.893	50.0000	228.7400	0.0005	0.0014	0.0823	0.0000	0.0000	0.0207	0.0335	0.0050
160	1	+00:00:38.141	50.0000	228.7400	0.0005	0.0014	0.0823	0.0000	0.0000	0.0013	0.0335	0.0050
161	1	+00:00:38.388	50.0000	228.7400	0.0008	0.0014	0.0823	0.0000	0.0000	0.0144	0.0335	0.0050
162	1	+00:00:38.6...	50.0000	228.7400	0.0008	0.0014	0.0823	0.0000	0.0000	0.0040	0.0335	0.0050
163	1	+00:00:38.899	50.0000	228.7400	0.0005	0.0014	0.0823	0.0000	0.0000	0.0019	0.0335	0.0050
164	1	+00:00:39.130	50.0000	228.7400	0.0007	0.0014	0.0823	0.0000	0.0000	0.0006	0.0335	0.0050
165	1	+00:00:39.378	50.0000	228.7400	0.0008	0.0014	0.0823	0.0000	0.0000	0.0038	0.0335	0.0050
166	1	+00:00:39.612	50.0000	228.7400	0.0007	0.0014	0.0823	0.0000	0.0000	0.0070	0.0335	0.0050
167	1	+00:00:39.855	50.0000	228.7300	0.0008	0.0014	0.0823	0.0000	0.0000	0.0033	0.0335	0.0050

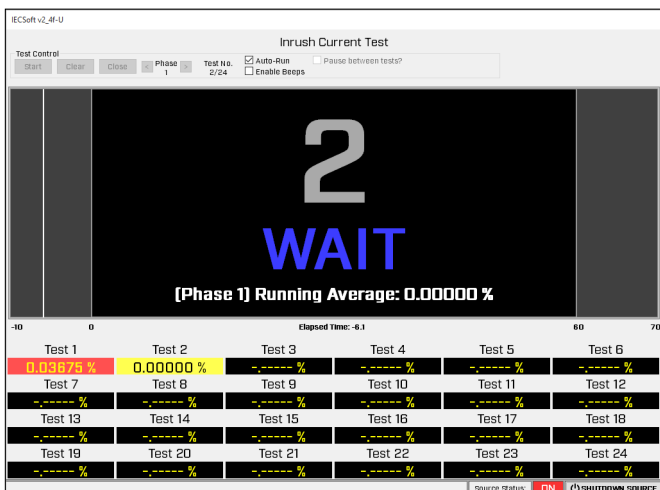
Every data return is recorded and saved within the IECsoft software package



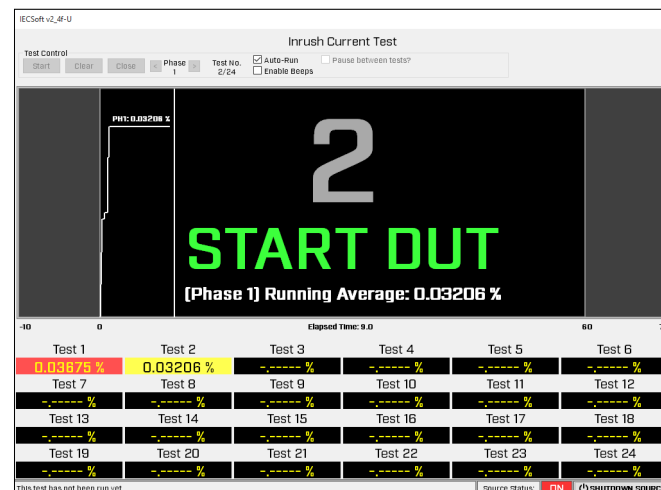
Classifier Probability Graph

## Inrush Testing [dmax]

For products utilising manual switching as a method of initiating and ending operation, a “dmax” test known as the “Inrush test” is required. This involves a succession of 24 switching events that are recorded and the arithmetic mean (excluding the highest and lowest dmax values) is calculated. An intuitive user interface has been developed for this task which guides the test engineer through the process and provides prompts to perform the switching event. Statistical analysis is also automated within the software, removing this burden from the user. This results in reduced test times and eliminates the risk of a mathematical error.



Wait command indicated by the “Inrush test” user interface



“Start OUT” Command to prompt user to operate manual switch

## Flicker Export Function

The flicker export function exports all recorded data including DUT test data and flicker results, export options include the ability to lock the exported spreadsheet as well as formatting the report into a single or multiple worksheet. The user also has the ability to import their own company logo, which is exported within the final report.

Export

Export to

☒ Excel
☐ .CSV
☐ .N4LIEC

Settings

Page Size

☒ A4
☐ Japanese A4 Option 1
☐ Japanese A4 Option 2
☐ Letter

Invalid test data

☐ Show
☒ Hide

Number Format

☒ Standard
☐ Engineering
☐ Scientific

☒ Phase 1
☐ Phase 2
☐ Phase 3

☐ Single worksheet

☒ Make Excel document read-only?

File Location:

Set Logo

Edit OUT

OK


Cancel

Export user interface

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IEC Soft V2.4f



IEC61000-3-3:2013 Ed.3.0

Flickermeter



Instrument Model		PPA5511
Instrument Serial		162-04043
Instrument Firmware		2.138
Instrument Last Calibrated		02nd February 2015
Instrument Version		Standard
Source Model		N4A06
Source Serial		911-00011
Source Frequency		50.000 Hz
Source Voltage RMS		230.000 V
Source Settling time		10 s
Test Settings		
Class	Voltage	
Mode	Normal - 4%	
Minimum Current	10A	
PST	1.00 minutes	
PLT	3 PSTs	
Equipment Under Test		
Brand	Unbranded	
Model	TRW211WS	
Serial	3434908	
Impedance Network ID	91G-11335	
Test Conditions		
User Entered		Measured
Rated Voltage	230.000 V	229.726 V
Rated Current	4.600 A	N/A
Rated Frequency	50.000 Hz	50.000 Hz
Rated Power	400.000 W	N/A
D max	0.0428% (Limit: 4%)	
T max	0.0000 s (Limit: 0.5 s)	
DL max	0.0008% (Limit: 3.3%)	
Additional Test Details		
Operator	Applications	
Lab Name	N4L	
Location	Leics, UK	
Notes		
Signature		
Results		Phase1: PASS

IEC61000-4-15 - Flicker Simulation

N4A power sources are able to simulate flicker waveforms in order to test flickermeters for correct operation. This mode can also be used to create an environment in which products are tested for susceptibility against flicker on the supply line, this is useful as voltage modulations on the supply line can cause instability within input regulation circuitry.

IEC61000-4-11 - Voltage Dips, Short Interruptions and Voltage Variations

IEC61000-4-11 defines test protocols and measurement techniques for electrical and electronic equipment connected to low-voltage supply networks. IECSoft provides an easy to configure user interface, in which a number of product configurations can be added to the test sequences. Covering all classes, including class “X” - the software offers the flexibility required for product committees to define a wide range of test levels.

IEC Soft V2.4f-U   LAN,N4A06,91J-00011,1.11

IEC61000-4-11: Voltage Dips, Short Interruptions and Voltage Variations

Test Overview

Test Sequence Settings

Sequence Details

Number of Configurations: 1

Sequence Class: 2

Class test sequences: 4

Total test sequences: 4

Test Details:

Voltage Dips

0.00% during 0.5 cycles

0.00% during 1.0 cycles

70.00% during 25.0 cycles

Voltage Interruptions

0.00% during 250.0 cycles

Configurations

Configuration: 1 / 1

Nominal Voltage (UT): 230.00

Frequency: 50.00

EUT Details:

EUT Type: Fan

Input port tested: 1A

Operation mode: Standard

Connection: N/A

Cables: L-N-PE

Peripherals: N/A

Test Setup Notes: Max Load

General Notes:

Start testing

Configure

Clear

Close

Test overview interface - Detailing the class, number of sequences and test details

IEC Soft V2.4f-U   LAN,N4A06,91J-00011,1.11

IEC61000-4-11: Voltage Dips, Short Interruptions and Voltage Variations

Add/Edit Configuration

Configuration: 1 / 1

Configure details

Nominal Voltage (UT): 230.00

Frequency: 50 Hz

EUT Details

Sequence Class: Class 1 Class 2 Class 3

My Sequence Add Edit Remove

EUT Type: Fan

EUT input port tested: 1A

EUT operation mode: Standard

Connections: N/A

Cables: L-N-PE

Peripherals: N/A

Test Setup Notes: Max Load

General Notes:

Save and Return

Remove

Configuration interface - Select class, product details and nominal voltage/frequency

IEC Soft V2.4f-U   LAN,N4A06,91J-00011,1.11

IEC61000-4-11: Voltage Dips, Short Interruptions and Voltage Variations

Test Sequence

Class 2 - Sequence 1: Dip 0.00% during 0.5 cycles

Configuration: 1   Nominal Voltage (UT): 230.00 V   Frequency: 50.00 Hz

Event Trigger: Manual Automatic

Duration: Cycles   Event time: Cycles

Start Source   Trigger Event   Stop Source

AC Source ON

AC Source Activated

Waiting for Event...

Result: Undetermined

Notes:

Previous   Save and Return   Next

Test sequence - AC Source ON awaiting manual initiation of test sequence.

IEC Soft V2.4f-U   LAN,N4A06,91J-00011,1.11

IEC61000-4-11: Voltage Dips, Short Interruptions and Voltage Variations

Test Sequence

Class 2 - Sequence 1: Dip 0.00% during 0.5 cycles

Configuration: 1   Nominal Voltage (UT): 230.00 V   Frequency: 50.00 Hz

Event Trigger: Manual Automatic

Duration: Cycles   Event time: Cycles

Start Source   Trigger Event   Stop Source

AC Source OFF

Source Deactivated

Event Complete

Test Completed

Result: Pass

Notes: No effect on product operation


Previous   Save and Return   Next

Test Complete - DUT passed


05th May 2016 - 14:51:55

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IEC Soft V2.4f



IEC61000-4-11:2004



Voltage Dips, Short Interruptions and Voltage

Source Details

Source Model	N4A06
Source Serial	91J-00011
Source Firmware	1.11

Equipment Under Test

Brand	Unbranded
Model	TRW211WS
Serial	3434908
Impedance Network ID	91G-11335
Rated Voltage	230 V
Rated Current	4.6A
Rated Frequency	50-60 Hz
Rated Power	400W

Additional Test Details

Operator	Applications
Lab Name	N4L
Location	Leics, UK
Notes	
Signature	

Test report for IEC61000-4-11

05th May 2016 - 14:51:55		Page 2/5	IEC Soft V2.4f
IEC61000-4-11: Voltage Dips, Short Interruptions and Voltage Variations			
Instrument Details			
Source Model	N4A06		
Source Serial	91J-00011		
Source Firmware	1.11		
Equipment Under Test			
Brand	Unbranded		
Model	TRW211WS		
Serial	3434908		
Equipment Under Test			
EUT Type	Fan		
Input Port	1A		
Operating Mode	Standard		
Connections	N/A		
Cables	L-N-PE		
Peripherals	N/A		
Setup Notes	Max Load		
General Notes			
Configuration Settings			
Nominal Voltage (U1)	230.00 V		
Frequency	50.00 Hz		
Sequence Class	2		
Test Results 1/4			
Test Type	Dip		
Test Level	0.00%		
Duration in cycles	0.5		
Test Notes	No effect on product operation		
Test Results	Pass		

IEC61000-4-11 Test Details

## IEC61000-4-13 - Harmonic and Interharmonic Susceptibility

As mains supply lines can suffer from harmonic and interharmonic interference, IEC61000-4-13 defines the harmonic and interharmonic levels upon which products must be tested. IECSoft provides a simple user interface to create test programmes for each class of product.

IECSoft v2.4f-U LAN,N4A06,91J-00011,1.11

IEC61000-4-13: Harmonics and Interharmonics low frequency immunity tests

EUT Setup

EUT Details

EUT Type: Inverter Fan

EUT input port tested: Main AC Input

EUT operation mode: Low

Connections: L-N-PE

Cables: N/A

Peripherals: N/A

Test Setup Notes: Low speed

General Notes: N/A

Test Settings

Nominal Voltage: 230 V

Frequency: 50Hz

Test Class: Class 1

Tests to run

Flat curve and Overswing

Individual Harmonics and Interharmonics

Sweep in Frequencies

Next

IEC61000-4-13 EUT Setup interface including class selection

IECSoft v2.4f-U LAN,N4A06,91J-00011,1.11

IEC61000-4-13: Harmonics and Interharmonics low frequency immunity tests

Test Level Settings

Frequency: 50Hz

Nominal Voltage: 230V

Test Class 1

Harmonic Combination Levels

Flat Curve Voltage Ratio: 1.01330

Test levels as a percentage of Nominal Voltage

Flat Curve Voltage Level: 95.0 %

H3: 4.0 %

H5: 3.0 %

Sweep in Frequency Levels

Test levels as a percentage of Nominal Voltage

16.5Hz to 100.0Hz: 2.000 %

100.0Hz to 500.0Hz: 5.000 %

500.0Hz to 1000.0Hz: 4.000 %

1000.0Hz to 1500.0Hz: 2.000 %

1500.0Hz to 2000.0Hz: 2.000 %

Meister Curve Levels

Test levels as a percentage of Nominal Voltage

16.5Hz to 100.0Hz: N/A %

100.0Hz to 500.0Hz: N/A %

500.0Hz to 1000.0Hz: N/A %

1000.0Hz to 2000.0Hz: N/A %

Previous

Next

Test programme details including harmonic combination and frequency sweep

IECSoft v2.4f-U LAN,N4A06,91J-00011,1.11

IEC61000-4-13: Harmonics and Interharmonics low frequency immunity tests

Schedule

Frequency: 50Hz

Nominal Voltage: 230V

Test Class 1

Test

Status

Harmonic Combination

Pending...

Test Now

Sweep in Frequencies

Pending...

Test Now

Individual Harmonics

Pending...

Test Now

Meister Curve

Pending...

Test Now

Cancel

Export

IEC61000-4-13 Test Schedule

IECSoft v2.4f-U LAN,N4A06,91J-00011,1.11

IEC61000-4-13: Harmonics and Interharmonics low frequency immunity tests

Sweep in Frequency Testing

Frequency: 50Hz

Nominal Voltage: 230V

Test Class 1

Testing

Start Source

Source Status: ON

Stop Source

Begin SIF test

Pause

Test Begun

Elapsed Time: 7 s

Currently Testing: Frequency 16.500

SIF test Running...

Frequency change in: 11 s

Voltage 4.600

Result:

Notes:

Save and Return

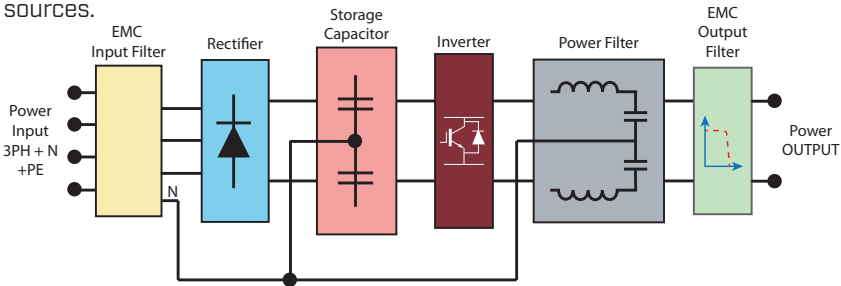
Sweep in Frequency test in progress

## Waveforms

As mains supply lines can suffer from harmonic and interharmonic interference, IEC61000-4-13 defines the harmonic and interharmonic levels upon which products must be tested. IECSoft provides a simple user interface to create test programmes for each class of product.

## Power Source Schematic

N4A Advanced Power Amplifiers feature proprietary noise suppression analogue electronics known as "6 leg modulation" topology which produces an output waveform during high loads with less than 0.1% THD. This level of distortion has only previously been possible with linear power sources.





## IEC61000 EMC TEST SYSTEM SPECIFICATION:

### PPA55x1 Harmonics and Flicker Analyzer

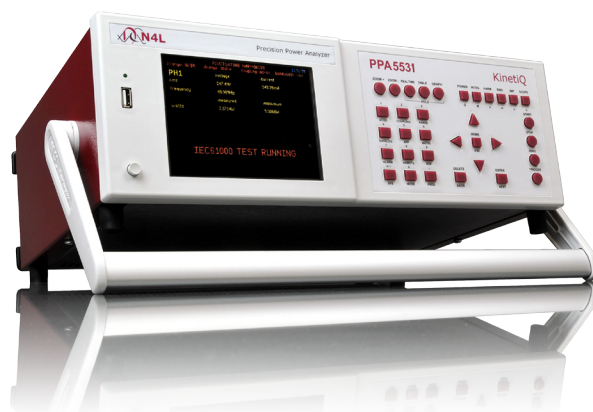
		PPA55x1 Harmonics and Flicker Analyzer	
Bandwidth			
		DC,10mHz ~ 1MHz - PPA55x1 - Low Impedance Shunt (50Arms)	
IEC61000 Voltage Input			
	Range	300mVpk ~ 3000Vpk(1000Vrms) in 9 ranges	
		0.01% Rdg+0.038% Rng+(0.004%×kHz)+5mV	
	Range	300μVpk ~ 3Vpk in 9 ranges 【BNC connector 3Vpk max input】	
		0.01%Rdg+0.038%Rng+(0.004%×kHz)+3μV	
IEC61000-3-2 Compliant Current Input, including Harmonic Accuracy			
	Low Impedance (Fully Compliant) 3mΩ Max 50Arms		100mApk ~ 1000Apk(50Arms)
			0.01% Rdg+0.038% Rng+(0.004%×kHz)+ 900μA
External input (External shunt Current sensor)	BNC Connector (Max input 3Vpk)		300μVpk ~ 3Vpk in 9 ranges
			0.01% Rdg+0.038% Rng+(0.004%×kHz)+ 3μV
Phase Accuracy			
	0.005deg+(0.01deg×kHz) 【PPA5500-LC(10Arms), PPA5500(30Arms)】 0.01deg+(0.02deg×kHz) 【PPA5500-HC(50Arms)】		
IEC61000-3-3 + IEC61000-3-11 Flicker Accuracy			
Pst	3%		
Plt	3%		
Pinst	5%		
d(c), d(max), d(t)	3%		
IEC61000-3-2 + IEC61000-3-12 Harmonics Accuracy			
	0.1% of rms current		
Power Accuracy			
	[0.03%+0.03%/pf+(0.01%×kHz)/pf] Rdg+0.03%VA Rng		
40-400Hz	[0.03%+0.03%/pf+(0.01%×kHz)/pf] Rdg+0.02%VA Rng		
General			
Crest Factor	20(Voltage and Current)		
Sample Rate	2.2Ms/s on all channels, No-Gap		
IEC Modes	IEC61000 Harmonics and Flicker (PPA5500), IEC62301 Standby Power		
Application Modes	PWM Motor Drive, Ballast, Inrush, Power Transformer, Standby Power, Fluctuating Harmonics, Flicker Meter		
CMRR - Common Mode Rejection Ratio			
	250V @ 50Hz - ≥ 1mA (150dB)		
	100V @ 100kHz - ≥ 3mA (130dB)		

Measurement Parameters	
	W, VA, Var, pf, V & A - rms, rectified mean, AC, DC, Peak, Surge, Crest Factor, Form Factor, Star to Delta Voltage
	Frequency (Hz), Phase (deg), Fundamentals, Impedance
	Harmonics, THD, TIF, THF, TRD, TDD
	Integrated Values, Datalog, Sum and Neutral values
Datalog - Up to 4 user selectable measurement functions (60 with optional PC software)	
Datalog Window	No-Gap analysis, Minimum window 2ms
Memory	10M records into flash RAM (Non-Volatile)

Communication Ports	
RS232	Baud rate up to 38.4kbps, RTS/CTS flow control
LAN	10/100 Base-T Ethernet auto sensing
GPIOB	IEEE488.2 compatible
USB	USB 2.0 and 1.1 compatible
Analogue Output	Bipolar ±10V(BNC)
Speed Input	BNC Bipolar±10V or Pulse count 1Hz to 1MHz 0.01% Rdg
Torque	BNC Bipolar±10V or Pulse count 1Hz to 1MHz 0.01% Rdg
Sync	4 ~ 6 Phase measurement (Master/Slave)
Extension	4 ~ 6 Phase (Master/Slave) + Auxiliary
Standard Accessories	
Leads	Power, RS232, USB, GPIOB
Connection Cables	36A 1.5m long 4mm stackable terminals 1x red, 1x yellow and 2x black per phase (1x red, 1x black with HC version)
Connection Clips	4mm terminated alligator clips - 1x red, 1x yellow and 2x black per phase (1x red and 1x black per phase with PPA5500-HC version)
CD-ROM	IECSOft, CommView2 (RS232/USB/LAN), Command line, Script based communication software
Documents	User manual, Communications manual, Calibration certificate, Quick start guide
Mechanical/Environmental	
Display	320×240 dot full colour TFT, White LED Backlit
Dimensions	130H×400W×315D mm excluding feet
Weight	5.4kg(1 Phase), 6kg(3 Phase)
Safety Isolation	1000Vrms or DC(CATII), 600Vrms or DC(CATIII)
Power supply	90 ~ 265Vrms, 50 ~ 60Hz, 40VAmax

## IMPEDANCE NETWORK SPECIFICATION

	IMP161/3(16Arms) , IMP321/3(32Arms) and IMP753(75Arms) models available
IMP161/3	Fully Compliant to IEC61000-3-3
IMP321/3 & IMP753	Fully Compliant to IEC61000-3-11
Impedance Specification	
	$R_A = 0.24\Omega$ $jX_A = 0.15\Omega$ @ 50Hz $R_N = 0.16\Omega$ $jX_N = 0.10\Omega$ @ 50Hz
Current Rating	
IMP16x	16Arms per phase
IMP753	75Arms per phase



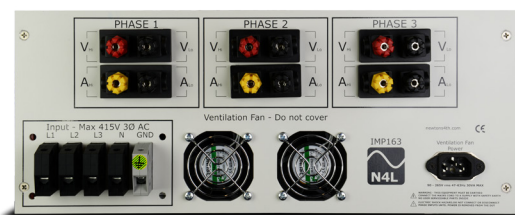
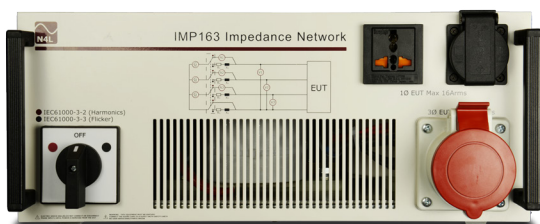
PPA5531 Harmonics and Flicker Analyzer

## AC POWER SOURCE SPECIFICATION

	N4A03 (1 Phase)	N4A06 (1 Phase)	N4A18 (3 Phase)	N4A30 (3 Phase)	N4A67 (3 Phase)
Nominal Output Power	3,000VA	6,000VA	18,000VA	30,000VA	67,500kVA
Compliant Standards	IEC61000-3-2:2014 (Single Phase) IEC61000-3-3:2013 (Single Phase) IEC61000-4-11:2004 (Single Phase) IEC61000-4-13:2009 (Single Phase) IEC61000-4-14:1999 (Single Phase) IEC61000-4-17:2009 (Single Phase) IEC61000-4-28:2000 (Single Phase) †IEC61000-4-29:2001 (Single Phase)		IEC61000-3-2:2014 (Single/Three Phase) IEC61000-3-3:2013 (Single/Three Phase) IEC61000-3-12:2005 (Single/Three Phase) IEC61000-3-11:2000 (Single/Three Phase) IEC61000-4-11:2004 (Single/Three Phase) IEC61000-4-13:2009 (Single/Three Phase) IEC61000-4-14:1999 (Single/Three Phase) IEC61000-4-17:2009 (Single Phase) IEC61000-4-28:2000 (Single/Three Phase) †IEC61000-4-29:2001 (Single Phase)		
Output					
Output Voltage (AC)	0-300Vrms				
Output Voltage (DC)	0-425V DC				
Maximum Continuous Output Power (AC)	3000VA	6000VA	18,000VA	30,000VA	67,500VA
Maximum Inrush (3 Second) Output Power (DC)	6000VA	12000VA	36,000VA	60,000VA	90,000VA
Maximum Output Current (Continuous)	10Arms	20Arms	20Arms (Per Phase)	32Arms (Per Phase)	75Arms (Per Phase)
Maximum Output Current (Inrush)	20Arms	40Arms	40Arms (Per Phase)	64Arms (Per Phase)	100Arms (Per Phase)
Output Frequency	DC - 1kHz	DC - 1kHz	DC - 1kHz	DC - 1kHz	DC - 1kHz
Min Slew Rate	3V/us	3V/us	3V/us	3V/us	3V/us
Output Voltage Stability	Better than 0.1%				
Output Voltage Accuracy	Better than 0.5%				
THD	Better than 0.3%▲				
Output Noise	<500mVrms				
Recovery Time of Output Waveform	Better than 50us				
Max Compensated drop on wires (w.r.t voltage setting)	5%				
Recovery Time of Drop on Wires	Less than 200ms				
Maximum Crest Factor	[Inrush I <sub>max</sub> x 1.41]/RMS Load Current				
General					
Dimensions	281mm x 471mm x 513mm		1785mm x 930mm x 755mm	1785mm x 930mm x 755mm	1800mm x 1200mm x 800mm
Weight	30kg	45kg	740kg		1300kg
Input Voltage	230V AC +/- 10% 1PH	400V AC +/- 10% 3PH			
Input Frequency	45-65Hz				
Operating Temperature	0-35degC				
Input Current	24Arms	16Arms Phase / 27A Neutral	60A continuous 120A inrush / Phase	80A continuous 160A inrush / Phase	160A continuous 220A inrush / Phase
Efficiency	Better than 80%				

† Pre-compliant due to rise/fall time of generator

$\Delta$ At Nominal Voltage with Linear Load



IMP163 3 Phase 16Arms/Phase Impedance Network



## Overview of IEC61000 Test Systems

	IEC61000 Test Systems		
System Configuration			
Overall System Description	Single Phase 16A IEC61000 EMC Test System	Single+Three Phase 16A IEC61000 EMC Test System	Single+Three Phase up to 75A IEC61000 EMC Test System
Power Source	N4A06	N4A18	N4A67
Harmonics and Flicker Analyzer	PPA5511 Combined Harmonics and Flicker + Power Analyzer	PPA5531 Combined Harmonics and Flicker + Power Analyzer	PPA5531 Combined Harmonics and Flicker + Power Analyzer
Optional Impedance Network (For compliant Flicker testing)	IMP161	IMP163	IMP753
Standards (Limits)	IEC61000-3-2:2014 (Single Phase) IEC61000-3-3:2013 (Single Phase) IEC61000-4-11:2004 (Single Phase) IEC61000-4-13:2009 (Single Phase) IEC61000-4-14:1999 (Single Phase) IEC61000-4-17:2009 (Single Phase) IEC61000-4-28:2000 (Single Phase) †IEC61000-4-29:2001 (Single Phase)	IEC61000-3-2:2014 (Single/Three Phase) IEC61000-3-3:2013 (Single/Three Phase) IEC61000-3-12:2005 (Single/Three Phase) IEC61000-3-11:2000 (Single/Three Phase) IEC61000-4-11:2004 (Single/Three Phase) IEC61000-4-13:2009 (Single/Three Phase) IEC61000-4-14:1999 (Single/Three Phase) IEC61000-4-17:2009 (Single Phase) IEC61000-4-28:2000 (Single/Three Phase) †IEC61000-4-29:2001 (Single Phase)	IEC61000-3-2:2014 (Single/Three Phase) IEC61000-3-3:2013 (Single/Three Phase) IEC61000-3-12:2005 (Single/Three Phase) IEC61000-3-11:2000 (Single/Three Phase) IEC61000-4-11:2004 (Single/Three Phase) IEC61000-4-13:2009 (Single/Three Phase) IEC61000-4-14:1999 (Single/Three Phase) IEC61000-4-17:2009 (Single Phase) IEC61000-4-28:2000 (Single/Three Phase) †IEC61000-4-29:2001 (Single Phase)
Measurement Standards	IEC61000-4-7 IEC61000-4-15	IEC61000-4-7 IEC61000-4-15	IEC61000-4-7 IEC61000-4-15
Output Power	6kVA	18kVA	67kVA
Software Included	IECSOft IEC61000 Test Suite		
Accreditation	Optional UKAS ISO17025 IEC61000 Harmonics and Flicker Certification of PPA5511	Optional UKAS ISO17025 IEC61000 Harmonics and Flicker Certification of PPA5531	Optional UKAS ISO17025 IEC61000 Harmonics and Flicker Certification of PPA5531
Power Measurement Parameters	W, VA, Var, pf, V & A - rms, rectified mean, AC, DC, Peak, Surge, Crest Factor, Form Factor, Star to Delta Voltage Frequency (Hz), Phase (deg), Fundamentals, Impedance Harmonics, THD, TIF, THF, TRD, TDD Integrated Values, Datalog, Sum and Neutral values		
Impedance Network	IMP161 Single Phase 16A Impedance Network	IMP163 Three Phase 16A Impedance Network	IMP753 Three Phase 75A Impedance Network
ISO17025 UKAS Cetification	Optional - Power Analyzer Calibration	Optional - Power Analyzer Calibration	Optional - Power Analyzer Calibration
Integration of Equipment	Analyzer + Impedance Network fully integrated into rack system		



All specifications at 23°C ± 5°C. These specifications are quoted in good faith but Newtons4th reserves the right to amend any specification at any time without notice

### Newtons4th

Newtons4th Ltd (abbreviated to N4L) was established in 1997 to design, manufacture and support innovative electronic equipment to a worldwide market, specialising in sophisticated test equipment particularly related to phase measurement. The company was founded on the principle of using the latest technology and sophisticated analysis techniques in order to provide our customers with accurate, easy to use instruments at a lower price than has been traditionally associated with these types of measurements

Flexibility in our products and an attitude to providing the solutions that our customers really want has allowed us to develop many innovative functions in our ever increasing product range



THE QUEEN'S AWARDS  
FOR ENTERPRISE:  
INNOVATION  
2010



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