EMC Test Solutions from the world's leading IEC61000 test system Manufacturer

N4L EMC Test Systems - The most comprehensive ISO17025 Harmonics and Flicker Calibration coverage in the market
EMC Test Systems
Newton’s4th® (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

**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 PPA55xx complies to all aspects of the IEC61000-4-7 standard, thus the PPA55xx 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.

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 PPA5x1 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 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_{test} if necessary. Pinst, IFS, PST, PLT, D, Dmax, Dc and Tmax are also updated during any test.
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.

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.
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.

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

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

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

Test Complete - DUT passed

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 Test Details

Test report for IEC61000-4-11

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IEC Soft V2.4f
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.

**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

**IEC61000-3-2 Compliant Current Input, including Harmonic Accuracy**
Low Impedance (Fully Compliant) 3mΩ Max 50Arms
- 0.01% Rdg+0.038% Rng+(0.004%×kHz)+3µV

**IEC61000-3-2 Compliant Voltage Input**
Range
- 300mVpk ~ 3000Vpk (1000Vrms) in 9 ranges
- 0.01% Rdg+0.038% Rng+(0.004%×kHz)+5mV

**IEC61000-3-11 Flicker Accuracy**
- Pst 3%
- Plt 3%
- Pinst 5%
- d(c), d(max), d(t) 3%

**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
- [0.03%+0.03%/pf+(0.01%×kHz)/pf] Rdg+0.02%VA Rng

**40-400Hz**
- [0.03%+0.03%/pf+(0.01%×kHz)/pf] Rdg+0.02%VA Rng

**Crest Factor**
20(Voltage and Current)

**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
- Power, RS232, USB, GPIB

**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

**Impedance 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**
- Rn = 0.24Ω JXn = 0.15Ω @ 50Hz
- Rn = 0.16Ω JXn = 0.10Ω @ 50Hz

**Current Rating**
- IMP16x 16Arms per phase
- IMP753 75Arms per phase

**IEC61000 Harmonics and Flicker Analyzer**

PPA5531 Harmonics and Flicker Analyzer
# AC Power Source Specification

## N4A03 (1 Phase)  
- **Nominal Output Power**: 3,000VA
- **Compliant Standards**: IEC61000-3-2:2014 (Single Phase)
- **Output**: 0-300Vrms
- **Output Voltage (DC)**: 0-425V DC
- **Maximum Continuous Output Power (AC)**: 3000VA
- **Maximum Inrush (3 Second) Output Power (DC)**: 6000VA
- **Maximum Output Current (Continuous)**: 10Arms
- **Minimum Slew Rate**: 3V/us
- **Output Voltage Stability**: Better than 0.1%
- **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 Imax*1.41]/RMS Load Current

## N4A06 (1 Phase)  
- **Nominal Output Power**: 6,000VA
- **Compliant Standards**: IEC61000-3-2:2014 (Single Phase)
- **Output**: 0-300Vrms
- **Output Voltage (DC)**: 0-425V DC
- **Maximum Continuous Output Power (AC)**: 6000VA
- **Maximum Inrush (3 Second) Output Power (DC)**: 12000VA
- **Maximum Output Current (Continuous)**: 20Arms
- **Minimum Slew Rate**: 3V/us
- **Output Voltage Stability**: Better than 0.1%
- **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 Imax*1.41]/RMS Load Current

## N4A18 (3 Phase)  
- **Nominal Output Power**: 18,000VA
- **Compliant Standards**: IEC61000-3-2:2014 (Single/Three Phase)
- **Output**: 0-300Vrms
- **Output Voltage (DC)**: 0-425V DC
- **Maximum Continuous Output Power (AC)**: 18,000VA
- **Maximum Inrush (3 Second) Output Power (DC)**: 36,000VA
- **Maximum Output Current (Continuous)**: 20Arms (Per Phase)
- **Minimum Slew Rate**: 3V/us
- **Output Voltage Stability**: Better than 0.1%
- **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 Imax*1.41]/RMS Load Current

## N4A30 (3 Phase)  
- **Nominal Output Power**: 30,000VA
- **Compliant Standards**: IEC61000-3-2:2014 (Single/Three Phase)
- **Output**: 0-300Vrms
- **Output Voltage (DC)**: 0-425V DC
- **Maximum Continuous Output Power (AC)**: 30,000VA
- **Maximum Inrush (3 Second) Output Power (DC)**: 60,000VA
- **Maximum Output Current (Continuous)**: 32Arms (Per Phase)
- **Minimum Slew Rate**: 3V/us
- **Output Voltage Stability**: Better than 0.1%
- **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 Imax*1.41]/RMS Load Current

## N4A67 (3 Phase)  
- **Nominal Output Power**: 67,500VA
- **Compliant Standards**: IEC61000-3-2:2014 (Single/Three Phase)
- **Output**: 0-300Vrms
- **Output Voltage (DC)**: 0-425V DC
- **Maximum Continuous Output Power (AC)**: 67,500VA
- **Maximum Inrush (3 Second) Output Power (DC)**: 90,000VA
- **Maximum Output Current (Continuous)**: 75Arms (Per Phase)
- **Minimum Slew Rate**: 3V/us
- **Output Voltage Stability**: Better than 0.1%
- **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 Imax*1.41]/RMS Load Current

## General  
- **Dimensions**: 281mm x 471mm x 513mm
- **Weight**: 30kg
- **Input Voltage**: 230V AC +/- 10% 1PH
- **Input Frequency**: 45-65Hz
- **Input Current**: 24Arms
- **Efficiency**: Better than 80%

*Pre-Compliant due to rise/fall time of generator*

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![IMP163 3 Phase 16Arms/Phase Impedance Network](image-url)
### Overview of IEC61000 Test Systems

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

**Newtons4th**  
Contact your local N4L Distributor for further details

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.

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Document ref: EMC-SYSTEMS/1