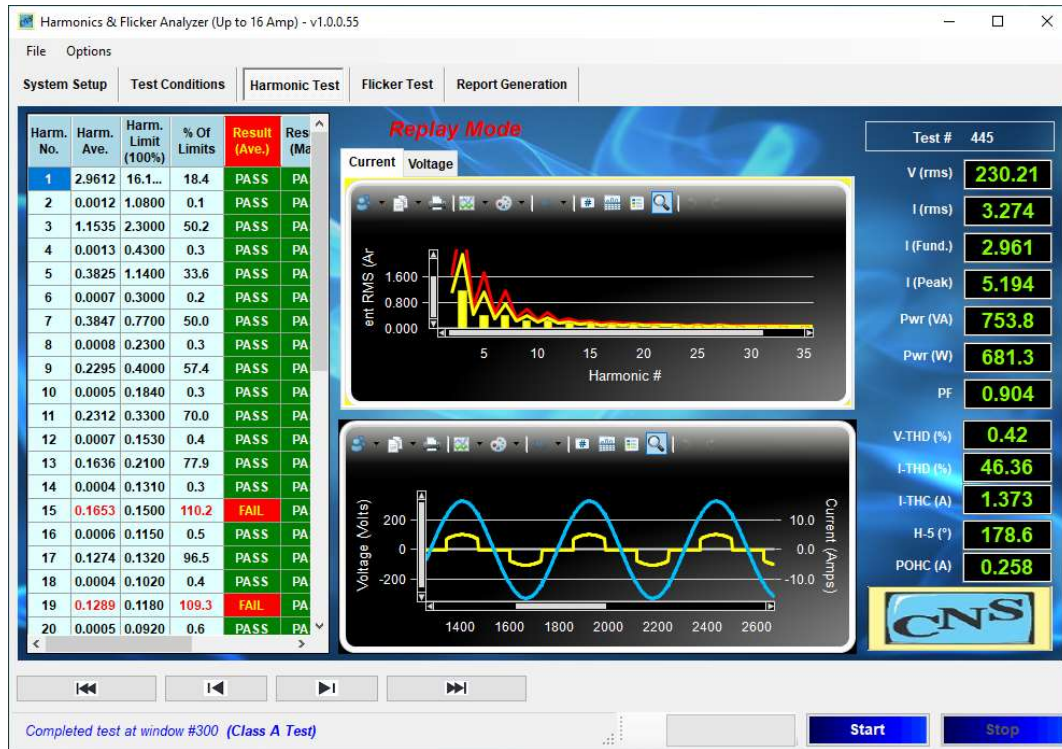




# HFA-16/75 1 & 3 Phase Harmonics & Flicker Analyzer Specifications



IEC 61000-3-2 Ed. 3.2 & Ed. 5.0

IEC 61000-3-3 Ed. 1.2 and 3.0

IEC 61000-3-11 Ed. 1 & 2

IEC 61000-3-12 Ed. 1 & 2

(including GB/T 14549 for China, NMX-J-550/3-2 for Mexico, JIS-C 61000-3-2 : 2019 for Japan and GB 17625.2-2007 for China)

- 16 bit USB based data acquisition – works with Laptops & Desktop PC's
- Very accurate Windows-7, 8, 10 compatible power analyzer with data storage
- Control for most power sources incl. Ametek® Pacific Power® Teseq® etc.
- ISO-17025 Accredited Calibration with detailed data available
- Built-in Reference Impedance per IECTR 60725 available
- Small form factor works with 120 & 220/230 public power supply



**Computer & Networking Services Inc.**

Calibration Lab: 12625 Danielson Ct. #112  
Office: 15820 Crystal View Lane  
Poway CA 9206 - USA

Tel: +1-858-486-5432  
Tel: +1-858-486-4707  
[www.cnspoway.com](http://www.cnspoway.com)

# Advanced reporting, data storage & replay features

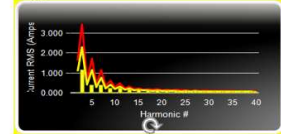
Test File: H:20200418\_445  
 EUT: HFC-III  
 Test Standard: Test per IEC 61000-3-2 Ed. 5.0 - 2018  
 Test Class: (Class A Test)  
 Test Result: **FAIL - 100% average**  
 Test Date: 2/28/2018  
 Start Time: 3:56:50  
 Stop Time:  
 Test Duration (min): 1

Source Qualification: Compliance with IEC61000-3-2  
 Power Source Distortion: **OK**  
 Customer: IEC  
 Test By: CNS  
 Comments: Operating

General Test Data: (Phase A)  
 Vrms (Volts): 230.16 Frequency (Hz): 50.00  
 Lrms (Amps): 2.276 Power (VA): 754.1  
 Lfund (Amps): 2.561 Power (W): 681.4  
 Lpeak (Amps): 5.263 Power Factor: 0.903  
 V-THD (%): 0.419 I-THD (%): 46.358  
 PTHC (A): 0.258 PTHC Limit (A): 0.250  
 LTHC (A): 1.373 Meas. Pwr (Min / Max) 680.9W/681.5W

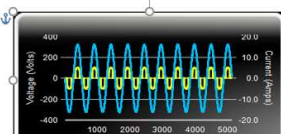
• Easy to understand reports in RTF, can be opened by any Windows program, no need for Word®. Parameters exceeding limits are identified

Harm.No.	Harm. Ave.	Harm. Limit (100%)	% Of Limits	Result (Ave.)	Result (Max.)	Harm. Win.	Harm. Win. (150%)	% Of Max
2	0.0012	1.0000	0.1	PASS	PASS	0.0017	1.6200	0.1
3	1.1535	2.3000	50.2	PASS	PASS	1.1538	3.4500	33.4
4	0.0013	0.4300	0.3	PASS	PASS	0.0027	0.8400	0.3
5	0.2825	1.1400	24.8	PASS	PASS	0.2828	0.8400	33.4
6	0.0007	0.3000	0.2	PASS	PASS	0.0016	0.3849	0.4
7	0.2847	0.7700	37.0	PASS	PASS	0.2849	0.3849	73.5
8	0.0008	0.2300	0.3	PASS	PASS	0.0023	0.5774	0.4
9	0.2295	0.4000	57.4	PASS	PASS	0.2297	0.5774	39.7
10	0.0005	0.1840	0.3	PASS	PASS	0.0015	0.3849	0.4
11	0.2312	0.3300	70.0	PASS	PASS	0.2313	0.3849	59.9
12	0.0007	0.1530	0.4	PASS	PASS	0.0022	0.5774	0.4
13	0.1636	0.2100	77.9	PASS	PASS	0.1638	0.3849	42.5
14	0.0004	0.1310	0.3	PASS	PASS	0.0013	0.3849	0.3
15	0.1653	0.1500	110.2	FAIL	PASS	0.1655	0.3849	42.8
16	0.0006	0.1150	0.5	PASS	PASS	0.0021	0.5774	0.4
17	0.1274	0.1320	96.5	PASS	PASS	0.1275	0.3849	33.1
18	0.0004	0.1020	0.4	PASS	PASS	0.0013	0.3849	0.3
19	0.1228	0.1100	109.2	FAIL	PASS	0.1231	0.3849	32.0
20	0.0005	0.0920	0.6	PASS	PASS	0.0021	0.5774	0.4
21	0.1041	0.1070	97.3	PASS	PASS	0.1043	0.3849	27.1
22	0.0004	0.0830	0.4	PASS	PASS	0.0013	0.3849	0.3
23	0.1058	0.0970	109.1	FAIL	PASS	0.1059	0.3849	27.5
24	0.0005	0.0760	0.6	PASS	PASS	0.0021	0.5774	0.4
25	0.0881	0.0900	97.8	PASS	PASS	0.0882	0.3849	22.8
26	0.0003	0.0700	0.5	PASS	PASS	0.0013	0.3849	0.3
27	0.0897	0.0830	108.1	FAIL	PASS	0.0899	0.3849	23.1
28	0.0005	0.0650	0.8	PASS	PASS	0.0021	0.5774	0.4
29	0.0762	0.0770	99.0	PASS	PASS	0.0763	0.3849	20.0
30	0.0004	0.0610	0.6	PASS	PASS	0.0013	0.3849	0.3
31	0.0780	0.0720	108.3	FAIL	PASS	0.0781	0.3849	19.8
32	0.0005	0.0570	0.9	PASS	PASS	0.0021	0.5774	0.4
33	0.0672	0.0680	98.9	PASS	PASS	0.0673	0.3849	18.8
34	0.0003	0.0540	0.6	PASS	PASS	0.0013	0.3849	0.3
35	0.0690	0.0640	107.8	FAIL	PASS	0.0691	0.3849	18.5
36	0.0005	0.0510	0.9	PASS	PASS	0.0020	0.5774	0.4
37	0.0691	0.0600	109.2	FAIL	PASS	0.0692	0.3849	18.2
38	0.0003	0.0480	0.7	PASS	PASS	0.0013	0.3849	0.3
39	0.0620	0.0570	108.7	FAIL	PASS	0.0621	0.3849	17.9
40	0.0004	0.0460	0.8	PASS	PASS	0.0015	0.3849	0.4

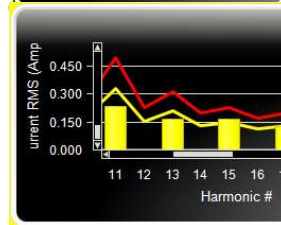


Phase angle of H5 (deg):

Harmonic Spectrum



Voltage & Current Waveform



Zoomed current harmonics showing H15 just over the limit

• Maximum values in individual 200 ms measurement windows are recorded.

- Power source performance is continually monitored per IEC 61000-3-2 clause A.2
- User can zoom in on any data detail in waveform, current spectrum or voltage spectrum, and copy & paste graphs.
- Power source voltage distortion shown from H3

• The system stores raw data – like a data logger - which can be replayed as if you are doing the test in real time. View any 10/12 cycles of 50/60 Hz and scroll back and forth like a video player.

## Easy setup for power sources & impedance control

Interface Connection :

- Manual Control
- Pacific Power Source**
- Ci / Teseq ( Fw < 3.1 )
- Ci / Teseq ( Fw > 4.0 )
- Other

Pwr Src Control :

Configure

On

Off

Voltage: 230.0 Frequency: 50.00

AFX Power Source is selected

Select the power source and easily configure the interface vis RS232 / USB or GPIB.

Select the impedance type and values for Flicker testing including programmable if the source offers it, or using current

Flicker Settings :

Region :

- European
- Japanese**
- Other

Impedance Selections :

- Bypass
- Z-Ref
- Flicker from current**

	Single Phase	Three Phase
R (mOhms)	400	240
L (uH)	796	477

## Select test standard editions and analysis method

Harmonics & Flicker Analyzer (Up to 16 Amp) - v1.0.0.55

File Options

System

- Test Standard: IEC61000-3.2 Ed. 5.0
- Language: IEC61000-3.2 Ed. 3.2
- Sound Wave: IEC61000-3-3 Ed. 3.1
- Test Progress: IEC61000-3-3 Ed. 1.2

**Harmonics JIS-C 61000-3.2** Without Imp.

JIS-C 61000-3.2 Ed. 2.0 - 2011

Select test IEC standard edition or JIS-C 61000-3-2 (some countries still require older editions)

System Configuration :

Harmonics Settings :

Inter-Harmonics  ON

Select inter-harmonics grouping ON or OFF



# Harmonics & Flicker test @ 50 Hz and 60 Hz

Test Settings :  
 Harmonics IEC 61000-3-2

IEC 61000-3-2 Ed. 5.0 - 2018

Class-A  
 Class-B  
 Class-C

Measured  
 Rated Current / PF  
 1.002 A 0.989  
 Dimmer 1.023 A  
 5 W < Eut < 25 W

Class-D

Measured Power  
 Rated Power  
 525 Watt  
 VSD Refrig Rated Pwr.  
 125.0 Watt

Select the test class for harmonics. All Class-C and Class-D test requirements are supported.

Select the desired Flicker test. Simplified method for inrush current as well as "24 x dmax" methods are supported.

Flicker IEC 61000-3-3

IEC 61000-3-3 Ed. 3.1 2017

All parameters  
 Pst - dc - dmax - Tmax  
 dc - dmax - Tmax  
 Inrush current < 20 Amp rms  
 24 x dmax

Dmax Limits

Standard 4% dmax limit  
 6% dmax limit  
 7% dmax limit

Test Volt (V) : 220.0 Test Freq (Hz) : 60 Test Time (Min) : 10.0

Equipment : Flicker per Korean requirements

Customer : Production company Test Operator : CNS Inc.

Set test conditions for voltage & frequency for either harmonics or Flicker testing

Bigger systems – mainly determined by the power source capability, support harmonics & Flicker for up to 75 A/phase. Systems will generally have a separate Impedance Unit, but Flicker can also be calculated from current per IEC 61000-3-3/11

The user selects the Test Table and R<sub>sce</sub> for IEC 61000-3-12 harmonics and the system automatically applies the correct limit table.

Test Condition Settings

Test Settings :  
 Harmonics (EN / IEC 61000-3-12)  Flicker (EN / IEC 61000-3-11)

IEC 61000-3-12 Ed. 2.0 2011

I-ref 0.00 Amp  Dimmer Test Min.

Table 2: Connection for single phase, non-balanced three phase equipment 33

Table 3: Connection for balanced three phase equipment >=350

Table 4: Connection for balanced three phase equip. under specified 33

5th Harmonic Phase Angle meets Table 4 criteria

Table 5: Connection for balanced three phase equip. under specified >=250

5th Harmonic Phase Angle meets Table 5 criteria

## Standards expertise, support & calibration



Certificate 4044.01

CNS Inc. represents 25 years of IEC standards experience, with participation in several IEC working groups since 1995. The calibration methods pioneered by CNS Inc. are reflected in IEC TR 61000-4-37, and IEC 61000-4-38. CNS Inc. has actively participated in the work on IEC 61000-3-2, IEC 61000-3-3, IEC 61000-4-7, IEC 61000-4-15 and has been accredited for harmonics – Flicker- and general power source calibration since 2016.

All system come with detailed calibration data, and an optional (accredited) ISO-17025 Certificate. CNS Inc. can also answer your questions regarding standards or test methods.

e-mail your questions to [mathieu@cnspoway.com](mailto:mathieu@cnspoway.com)

# Specifications for HFA-1-16S & HFA-1/3-16-19, HFa-3-75

## Electrical

Frequency range of fundamental line component; 45 – 65 Hz

Sampling method; PLL based with 512 samples/cycle (simultaneous per channel), or fixed frequency sampling

Harmonic analysis range; up to harmonic order 200 (10/12 kHz)

Harmonic spectrum display up to harmonic 40, can be expanded to 9 kHz

Voltage input range; 0 – 350 V-rms, + / - 500 Volt peak std, 500 V-rms optional.

Voltage measurement accuracy; 0.1 % + 10 mV, Voltage harmonics; 0.1 % + 0.1 % per 100 Hz + 5 mV

Current input range;

Small form factor; 0 – 20 A-rms.

HFa16 & HFa40; 0 – 36 A-rms (limited by optional Ref. Impedance)

HFa-75; 0 – 120 Amp peak, 0 – 75 A -rms

Current measurement accuracy; 0.1 % + 5 mA in Phase-A, 0.15 % + 5 mA for Phase-B & C of 3 phase units.

Harmonic current accuracy: 0.1 % + 0.02 %/100 Hz+5 mA

Power Factor range & accuracy; -1.000 – 0 - +1.000, +/- 0.003,

Power measurement: 1 – 20000 VA / 1 – 20000 Watt, per phase, measurement accuracy; 0.15% + 0.1 Watt

Phase measurement range; 0 – 360 °, Phase accuracy 50 – 2500 Hz; 0.2° + 0.2° per100 Hz

EUT interface Standard version IEC plug for HFA-1/3S, Schuko and universal plug for HFA-1/3-19, plug-sleeve up to 40 A-rms for HFa75. Rear terminal block for up to 80 A-rms / phase

Optional IEC 60725 Reference Impedance can be built-in (must be ordered separately).

## Mechanical, input power & interface

19" rack version; 16" x 3.5" x 22" ( W x H x D ).

HFa-1S: 7" x 7.5" x 2" ( W x Lx H ) .

Weight; < 20 Lb (9 Kg) without optional Reference Impedance, 40 lb ( 18 Kg) with Reference Impedance

Input power; 100 – 240 Vac 50/60 Hz, max 50 Watt (70 Watt for models with built-in Reference Impedance)

*The small form factor HFA-1S  
Small form factor and  
connection diagram*



The 19" HFa-16-1 with optional built-in Reference Impedance per IEC TR 60725



**Computer & Networking Services Inc.**

Office: 15820 Crystal View Lane  
Calibration Lab. 12625 #112 Danielson Ct.  
Poway CA 9206 - USA

Tel: 858-486-4707

Tel: 858-486-5432

[www.cnspoway.com](http://www.cnspoway.com)