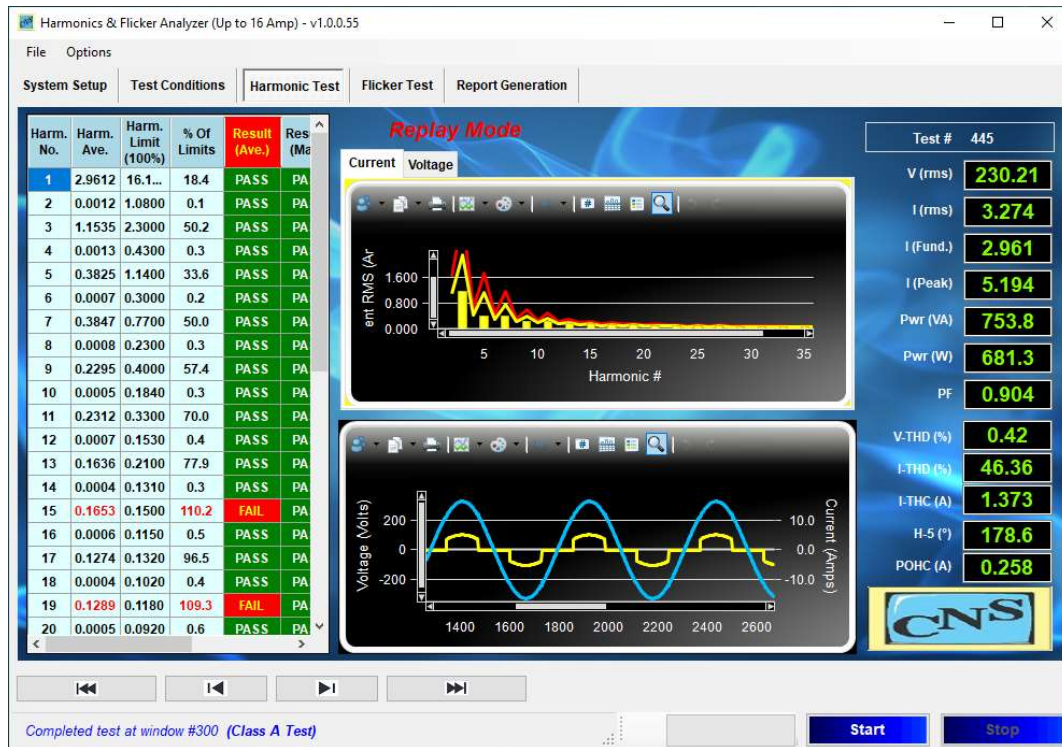


HFA-16/75 1 & 3 Phase Harmonics & Flicker Analyzer Specifications



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

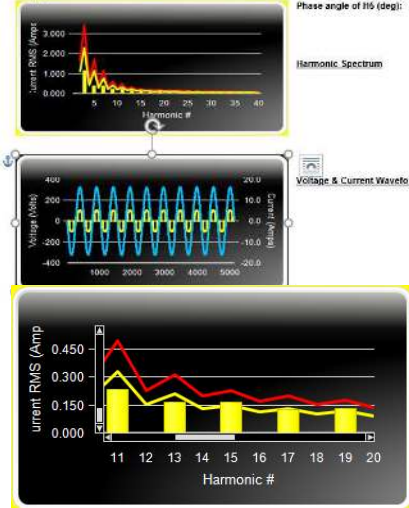
www.cnspoway.com

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 - 2010
Test Class: (Class A Test)
Test Result: **FAIL - 100% average**
Test Date: 2020/01/18
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: CMS
Comments: Operating

General Test Data: (Phase A)
Vrms (Volts): 230.16
I rms (Amps): 3.276
L rms (Amps): 2.861
L peak (Amps): 6.263
V THD (%): 0.449
PCHC (A): 0.238
L THC (A): 1.372
Frequency (Hz): 50.00
Power (VA): 754.1
Power (W): 681.1
Power Factor: 0.903
I THD (%): 48.358
PCHC Limit (A): 0.250
Max. Pwr (Min / Max) 600.0W/815.0W
Phase angle of H5 (deg):



Harmon.	Harmon. Avc.	Harmon. Limit (100%)	% Of Limits	Result (Avc.)	Result (Max.)	Harmon. Wm.	Harmon. Wm. Limit (100%)	% Of Max	Harmon. No.	Harmon. Value	Harmon. Limit	% Of Limits	% Of Wm Limit	Result
2	0.0012	1.0000	0.1	PASS	PASS	0.0017	1.8000	0.1	2	0.1453	0.4000	36.3	0.001	OK
3	1.1635	2.3000	50.2	PASS	PASS	1.1530	2.4000	48.0	3	0.0237	2.8700	0.8	0.001	OK
4	0.0012	0.4200	0.3	PASS	PASS	0.0027	0.6400	0.4	4	0.0304	0.4800	6.3	0.017	OK
5	0.0020	1.4400	0.1	PASS	PASS	0.0020	1.6000	0.1	5	0.1295	0.3200	40.5	0.007	OK
6	0.0007	0.3600	0.2	PASS	PASS	0.0016	0.6000	0.3	6	0.0275	0.4600	6.1	0.012	OK
7	0.0047	0.7700	60.0	PASS	PASS	0.0049	0.8400	58.3	7	0.1062	0.5800	18.3	0.001	OK
8	0.0003	0.2200	0.1	PASS	PASS	0.0027	0.4000	6.8	8	0.0136	0.4600	2.9	0.005	OK
9	0.0255	0.4000	6.4	PASS	PASS	0.0207	0.4000	5.2	9	0.1249	0.4000	31.2	0.004	OK
10	0.0005	0.1840	0.3	PASS	PASS	0.0015	0.3000	0.5	10	0.0215	0.4600	4.7	0.010	OK
11	0.2312	0.3300	70.0	PASS	PASS	0.2313	0.3300	70.1	11	0.1073	0.2300	46.7	0.047	OK
12	0.0007	0.1500	0.4	PASS	PASS	0.0022	0.2500	0.9	12	0.0106	0.2300	4.6	0.005	OK
13	0.1638	0.2100	77.9	PASS	PASS	0.1638	0.2100	77.9	13	0.0077	0.2300	3.4	0.004	OK
14	0.0004	0.1310	0.3	PASS	PASS	0.0013	0.2000	0.6	14	0.0196	0.2300	8.5	0.009	OK
15	0.1651	0.1600	103.2	FAIL	FAIL	0.1655	0.1600	103.4	15	0.1127	0.2300	49.0	0.040	OK
16	0.0006	0.1150	0.5	PASS	PASS	0.0021	0.1800	1.2	16	0.0231	0.2300	10.0	0.010	OK
17	0.1274	0.1320	96.5	PASS	PASS	0.1276	0.1320	96.6	17	0.0106	0.2300	4.6	0.005	OK
18	0.0004	0.1020	0.4	PASS	PASS	0.0012	0.1600	0.8	18	0.0112	0.2300	4.9	0.005	OK
19	0.1285	0.1180	108.9	FAIL	FAIL	0.1291	0.1180	109.4	19	0.0106	0.2300	4.6	0.005	OK
20	0.0005	0.0920	0.6	PASS	PASS	0.0021	0.1400	1.5	20	0.0231	0.2300	10.0	0.010	OK
21	0.1041	0.1070	97.3	PASS	PASS	0.1043	0.1070	97.4	21	0.0106	0.2300	4.6	0.005	OK
22	0.0004	0.0830	0.4	PASS	PASS	0.0013	0.1300	1.0	22	0.0106	0.2300	4.6	0.005	OK
23	0.1065	0.0970	109.8	FAIL	FAIL	0.1065	0.0970	109.8	23	0.0106	0.2300	4.6	0.005	OK
24	0.0005	0.0760	0.6	PASS	PASS	0.0021	0.1100	1.9	24	0.0106	0.2300	4.6	0.005	OK
25	0.0001	0.0600	0.1	PASS	PASS	0.0002	0.0900	0.2	25	0.0106	0.2300	4.6	0.005	OK
26	0.0003	0.0500	0.6	PASS	PASS	0.0013	0.0800	1.6	26	0.0106	0.2300	4.6	0.005	OK
27	0.0007	0.0430	1.6	PASS	PASS	0.0009	0.0600	1.5	27	0.0106	0.2300	4.6	0.005	OK
28	0.0005	0.0360	0.8	PASS	PASS	0.0021	0.0500	4.2	28	0.0106	0.2300	4.6	0.005	OK
29	0.0002	0.0270	0.8	PASS	PASS	0.0003	0.0400	0.7	29	0.0106	0.2300	4.6	0.005	OK
30	0.0004	0.0200	2.0	PASS	PASS	0.0013	0.0300	4.3	30	0.0106	0.2300	4.6	0.005	OK
31	0.0780	0.0730	106.9	FAIL	FAIL	0.0781	0.0730	106.9	31	0.0106	0.2300	4.6	0.005	OK
32	0.0005	0.0670	0.8	PASS	PASS	0.0021	0.0900	2.3	32	0.0106	0.2300	4.6	0.005	OK
33	0.0012	0.0600	2.0	PASS	PASS	0.0013	0.0800	1.6	33	0.0106	0.2300	4.6	0.005	OK
34	0.0003	0.0480	0.6	PASS	PASS	0.0013	0.0600	2.2	34	0.0106	0.2300	4.6	0.005	OK
35	0.0006	0.0400	1.5	PASS	PASS	0.0009	0.0500	1.8	35	0.0106	0.2300	4.6	0.005	OK
36	0.0005	0.0340	0.9	PASS	PASS	0.0020	0.0400	5.0	36	0.0106	0.2300	4.6	0.005	OK
37	0.0001	0.0300	0.3	PASS	PASS	0.0002	0.0400	0.5	37	0.0106	0.2300	4.6	0.005	OK
38	0.0003	0.0260	0.7	PASS	PASS	0.0013	0.0300	4.3	38	0.0106	0.2300	4.6	0.005	OK
39	0.0002	0.0200	0.7	PASS	PASS	0.0003	0.0200	1.5	39	0.0106	0.2300	4.6	0.005	OK
40	0.0004	0.0160	2.5	PASS	PASS	0.0013	0.0200	6.5	40	0.0106	0.2300	4.6	0.005	OK

Zoomed current harmonics showing H15 just over the limit

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

• 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

AFX Power Source is selected

Pwr Src Control :

Configure

On

Off

Voltage Frequency

230.0 50.00

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
- ☐ IEC61000-3.2 Ed. 3.2
- ☒ IEC61000-3.3 Ed. 3.1
- ☐ 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 Rsce 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

☒ 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

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 L x 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



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