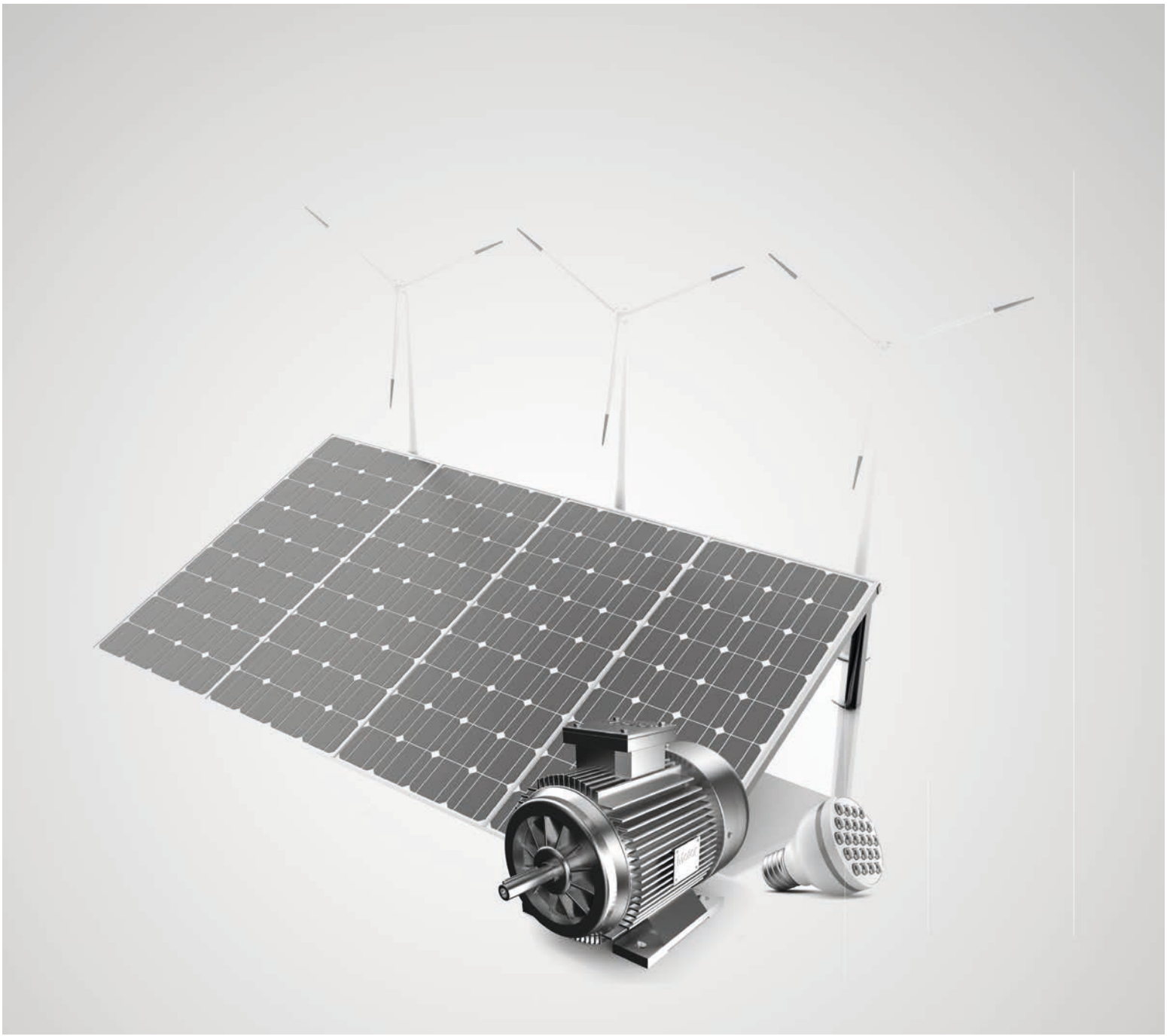
EMC PARTNER

EMISSION MEASUREMENT

Power Frequency Testing



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optimized for electronic media

Smart navigation through technical
specifications. Click the green links.

POWER FREQUENCY TESTING

QUALITY AND RELIABILITY OF THE POWER NETWORK

The power network is an essential element of daily lives. Ensuring quality and reliability of the network requires monitoring generation and distribution elements as well as loads attached to it. Modern electronics present, increasingly, non-linear loads to the network that can cause distortion or in extreme cases even damage. Electronic equipment should be tested for the following parameters

Generation of:

- Current Harmonics
- Flicker

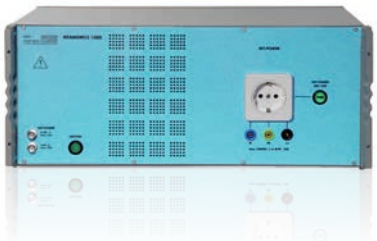
Susceptibility to:

- Voltage variations
- Frequency variations
- Interharmonics

EMISSION MEASUREMENT

HAR1000-1P is the single phase version and comprises a power source (amplifier technology), line impedance network, harmonics and flicker analyzer, all in a single unit. HAR-EXT1000 added to HAR1000-1P provides full three phase capability.

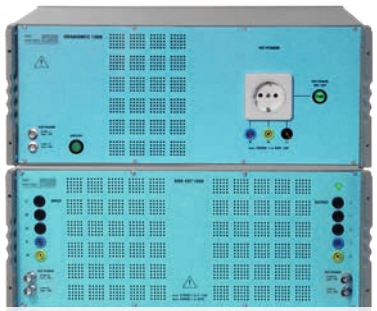
The hardware is controlled from a powerful computer based software (HARCS).



1-Phase Harmonics & Flicker Testing

HAR1000-1P

Test system measures and simulates disturbances in the 230V/50Hz and 115V/60Hz public power supplies.



3-Phase Harmonics & Flicker Testing

HAR1000-1P & HAR-EXT1000

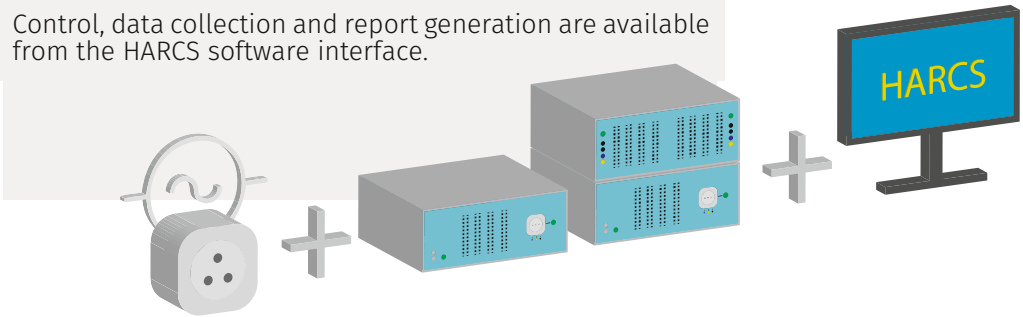
HAR-EXT1000 adds 2 further phases to the HAR1000-1P.

Simple connection without any hardware modifications means this powerful extension can be added at any time to an existing single phase system.

A system that fits your requirements

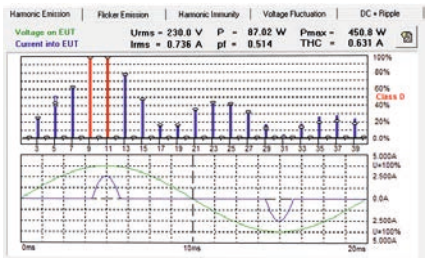
HAR1000 System can be used directly with the local power network to offer an efficient price effective solution.

Control, data collection and report generation are available from the HARCS software interface.

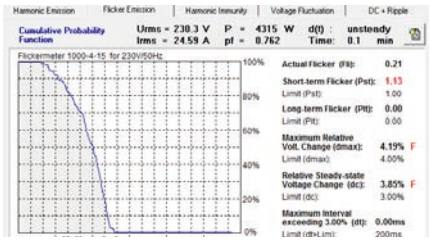


DATA COLLECTION AND REPORT GENERATION WITH HARCS

HARCS is a powerful test and development tool, integrating control, data collection and report generation into one convenient user package.



- A real-time oscilloscope view shows voltage and current as monitored on the test object.
- Graphic and tabular presentation of real time measurement data combined with the recorder function make HARCS a powerful development tool.



- Verification of both harmonic and flicker measurement circuits can be performed directly from the software.
- HARCS IMMUNITY extends HARCS software to include Inter-harmonic immunity and voltage variation tests.

UNIQUE FEATURES

Integrated test and measurement system with powerful and flexible user software.

Compact Test Solutions

Measurement of Harmonics & Flicker combined with generation of disturbance signals.

Powerful analysis Tool

Collect data and replay later using the RECORDER function. Allows detailed analysis of results compared with the test object functions.

Automatic Pass / Fail indication

Continuous monitoring of mains input power together with analysis of test data to generate pass or fail indications.

From one make three

HAR1000-1P single phase system expandable to three phases with the addition of HAR-EXT1000. No expensive rework, simply connect the external unit and start testing.

STANDARDS – BASIS FOR TESTING

Power network testing is included in many product and generic standards covering both household and industrial applications. All these are based on the IEC standards.

International Electrotechnical Committee (IEC)

IEC 61000-3-2

Limits - Limits for harmonic current emissions (equipment input current <= 16 A per phase)

IEC 61000-3-3

Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current <= 16 A per phase and not subject to conditional connection

IEC 61000-4-7

Testing and measurement techniques - General guide on harmonics and interharmonics measurements and instrumentation, for power supply systems and equipment connected thereto

IEC 61000-4-15

Testing and measurement techniques - Flickermeter - Functional and design specifications

IEC/TR 60725

Consideration of reference impedances and public supply network impedances for use in determining disturbance characteristics of electrical equipment having a rated current = < 75 A per phase

IEC 61000-4-13

Testing and measurement techniques - Harmonics and interharmonics including mains signalling at a.c. power port, low frequency immunity tests.

IEC 61000-4-14

Testing and measurement techniques - Voltage fluctuation immunity test.

IEC 61000-4-28

Variation of power frequency, immunity test for equipment with input current not exceeding 16 A per phase

Technical Specifications

PS3 POWER SOURCE

PS3

Application	general purpose 1-phase AC/DC power source
Standards	IEC61000-4-28
Together with HAR1000	IEC61000-3-2, IEC61000-3-3 (PS3 is not necessarily required for har&flicker testing)
Together with IMU	IEC61000-4-8, -4-16, -4-19, -4-29
Input	AC 100 V – 240 V, 47 – 63 Hz
Output voltage	AC 50 – 250 V, DC 24 – 350 V
Output frequency	DC – 400 Hz
Output current	max. 16A @ 115V/60 Hz, 10A @ 230V/50 Hz
	max. 16A @ 170V/DC
Output power	max. 3 kVA or 3 kW
Features	4 quick-set buttons on front panel (one programmable via PS3SOFT-EXT)
Protection	overload, overcurrent, over temperature
Dimensions	19” unit, 2 UH
Weight	18 kg
Requires (only for IMU)	RS485-RS232 ADAPTER
Controlled by	HAR1000, IMU or software (PS3SOFT-EXT)
Optional accessories	PS3SOFT-EXT software: remote control, IEC61000-4-28 test routine, programming of quick-set button from front panel

HAR1000

HAR1000: harmonics analyzer

Standards	IEC61000-3-2, IEC61000-4-7 latest editions
Application	harmonics measurement up to 16A (1-phase)
EUT supply	100 – 125 V or 200 – 250 V
	max. 16 A continuous (inrush current ≥ 500 A)
Measurement u(t), i(t)	
Resolution	14 bits
Ranges i(t)	auto, 0.25A, 0.5A, 1A, 2A, 5A, 10A, 25A, 50A
Tolerance i(t) measurement	< 0.2 % on entire measurement domain
Voltage drop across shunt	< 0.15 V up to 16 A
Range u(t)	≤ 250 V
Harmonics	1st up to 40th for both current and voltage
Accuracy	≤ 0.5 %
Analysis	
Continuous	Irms, Ipeak, Urms, Upeak,
	crest factor, power factor, apparent power,
	frequency, THD(i), THD(u)
Frequency accuracy	≤ 0.1 %
Display current and voltage	in real time, time domain or frequency domain
FFT current 1st to 40th	real-time rectangular windows, synchronous
	4096 points over 16 periods (320ms @ 50 Hz,
	267ms @ 60 Hz), no gaps, no overlapping
FFT voltage 1st to 40th	real-time rectangular windows, synchronous
	4096 points over 16 periods
	no gaps, no overlapping
Classes (IEC)	A, B, C, D, X: automatic Pass/Fail indication
	automatic determination of class D
Fluctuating harmonics (IEC)	in real time, over 16 periods, 1.5 s filter
Accuracy meas. & analysis	< 5% of permissible limits or < 0.2% of rated
	EUT current, whichever is greater

HAR1000: flicker analyser & flicker impedance

Standards	IEC61000-3-3, IEC61000-4-15 latest editions
Application	flicker measurement up to 16A (1-phase)
EUT supply	100 – 125 V or 200 – 250 V
	max. 16 A continuous (inrush current ≥ 500 A)
Flicker measurements	100 per second
Flicker display	cumulative probability, histogram
Classification of values	in 668 logarithmic divided flicker classes
Automatic pass/fail for	Pst, Plt, dUmax, , dUc, dt
Parameters displayed	Urms, Irms, power, p. factor, frequency, Pst,
	Plt, dUmax, , dUc, dt, P50s, P10s, P3s, P1s, P0s
Accuracy	< 0,5% for Urms, Irms, < 5 % for all other
Flicker impedance	hardware
1-p line impedance	0.4 Ω + j·0.25 Ω (phase & neutral)
1-p Z (alternative)	0.24 Ω + j·0.15 Ω (phase only)
1-p Z (alternative)	0.16 Ω + j·0.10 Ω (neutral only)
3-p line impedance	0.24 Ω + j·0.15 Ω (phase only)
3-p line impedance	0.16 Ω + j·0.10 Ω (neutral only)

HAR1000: 1-phase power source included in HAR1000-1P

Standards	IEC61000-3-2, IEC61000-3-3 latest editions
Application	clean power source as per IEC61000-3-2, -3-3
Technology	amplifier technology
EUT supply voltage	100 – 125 V or 200 – 250 V
EUT supply frequency	either 50 Hz or 60 Hz
EUT supply current	max. 16 A continuous (inrush current ≥ 500 A)
Banwidth power source	DC- 6 kHz
EUT power	max. 4000 VA
Power regulation @ 230 V	line voltage ± 66 V for EUT current up to 8 A
	line voltage ± 33 V for EUT current 8 A – 16 A
Additional power correction	± 15 V
Load change regulation	< 0.05 %
Response time	10 µs @ 0 – 100 % load change
Output impedance	< 3 mΩ
THD	< 0.5 %
Voltage harmonics	< 0.9 % for 3rd harmonic
	< 0.4 % for 5th harmonic
	< 0.3 % for 7th harmonic
	< 0.2 % for 9th harmonic
	< 0.2 % for 2nd to 10th harmonics
	< 0.1 % for 11th to 40th harmonics

HAR1000 supply, weight, dimensions, climatic conditions, other

Operating voltage	115 or 230 V (50/60 Hz) ± 10%
Power consumption	ON < 800 VA, standby < 100 VA

Weight	25 kg
W x d x h	45 x 57 x 19 cm
Version	19“ unit, 4 UH

Temperature range	10 – 35 °C
Humidity	< 80 % non-condensing

Included articles	
Software	HARCS software included (for latest Windows)
Power cord	with country plug
User manual	with conformity declaration
Calibration certificate	factory calibration

HAR-EXT1000 (EXTENSION TO 3-PHASE)

HAR-EXT1000: extension for 3-phase EUTs 16A/phase

Standards	IEC61000-3-2, IEC61000-4-7,
	IEC61000-3-3, IEC61000-4-15 latest editions
Application	extends functionality of HAR1000 to 3-phase
EUT supply	3 x 200 V, 3 x 380 V up to 3 x 440 V
	max. 16 A/phase cont. (inrush current ≥ 500 A)
	max. 3 x 4000 VA (together with HAR1000-1P)
Harmonics & flicker	capabilities as the ones of HAR1000-1P
Weight	40 kg
W x d x h	45 x 57 x 19 cm
Version	19“ unit, 4 UH
Temperature range	10 – 35 °C
Humidity	< 80 % non-condensing
Included articles	
Power cord	with country plug
User manual	with conformity declaration
Calibration certificate	factory calibration
Requires	HAR1000-1P

SOFTWARE

HARCS-IMMUNITY

Standards	IEC61000-4-13, IEC61000-4-14
Application	applies immunity signals generated by HAR1000's internal power source
EUT supply	see HAR1000 power source
Order information	can be ordered only with HAR1000, not later
Requires	HAR1000-1P

PS3SOFT-EXT

Standards	IEC61000-4-14, IEC610004-28
Application	Voltage and frequency fluctuation tests tests using PS3. Adjust voltage and frequency of PS3 power supply.
Order information	can be ordered only with PS3
Requires	PS3

THE EMC PARTNER PRODUCT RANGE

Find further brochures on our website emc-partner.com/brochures or contact your local representative for a hardcopy.

IMMUNITY TESTS

Transient Test Systems for all EMC tests on electronic equipment. ESD, EFT, surge, AC dips, AC magnetic field, surge magnetic field, common mode, damped oscillatory and DC dips. According to IEC and EN 61000-4-2, -4, -5, -8, -9, -10, -11, -12, -13, -14, -16, -18, -19, -29.

LIGHTNING TESTS

Impulse test equipment and accessories for aircraft, military and telecom applications. Complete solutions for RTCA / DO-160 and EUROCAE / ED-14 for indirect lighting on aircraft systems, MIL-STD-461 tests CS106, CS115, CS116, CS117, CS118 and Telecom, ITU-T .K44 basic and enhanced tests for impulse, power contact and power induction.

COMPONENT TESTS

Impulse generators for testing varistors, gas discharge tubes (GDT), surge protective devices (SPDs), X / Y capacitors, circuit breakers, electricity meters, protection relays, insulation material, suppressor diodes, connectors, chokes, fuses, resistors, emc-gaskets, cables, etc.

EMISSION MEASUREMENTS

Measurement of Harmonics and Flicker in 1-phase and 3-phase electrical and electronic products according to IEC /EN 61000-3-2 and 61000-3-3 . HARCS Immunity software adds interharmonic tests, voltage variation according to IEC/EN 61000-4-13, -4-14.

SYSTEM AUTOMATION

A full range of accessories enhance the test systems. Test cabinets, test pistols, adapters and remote control software, simplify interfacing with the EUT. Programmable PSU, EMC hardened for frequencies from 16.7Hz to 400Hz. PS3-SOFT-EXT complies with IEC / EN 61000-4-14 and -4-28.

SERVICE

Our committment starts with a quality management system backing up our ISO 17025 accreditation. With the SCS number 146, EMC PARTNER provides accredited calibration and repairs. Our customer support team is at your service!

For further information please do not hesitate to contact your local EMC PARTNER AG representative.
Visit our website for more information and contact details.

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