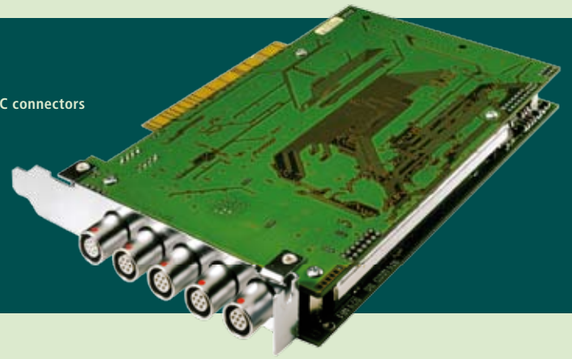
General technical specification of Hurricane

The following data refer to the 16-channel versions of Hurricane with LEMO7 or BNC connectors based on up to 4x HARMONIE-PCI data acquisition cards.
Customized versions on request possible.

Harmonie-PCI versions:

- 4ch LEMO7 input connectors
- 4ch BNC input connectors
- 8ch DSUB input connectors



Technical specifications

Input channels 1-16:

Resolution:	16 bit in time signal 20 bit in level calculation
Real-time bandwidth	20 kHz
THD+N	> 80 dB
Cross-talk attenuation	> 80 dB
Noise	< 1.4 µV (A) < 2.2 µV (lin. 20 Hz...20 kHz)
Sampling rate	51.2 kHz
Digital splitting factor	1/2/4/8... 1024 (via DSP)
Anti-aliasing filter	yes (0...22.4kHz)
Max input voltage	V_{Peak} (overmodulation reserve 1dB)
Ranges	±0.1 V, ±0.3 V, ±1.0 V, ±3.0 V, ±10V,
Overload detection	indicator for out-of-band frequency
Phase mismatch	< 0.1° at gain –20 dB (20 Hz ... 20 kHz)
Offset adjust	yes
Input filter	DC, AC 0.15 Hz, HP 10 Hz, LP 2 kHz
Channel cascading for dynamic expansion	channel 1-2, channel 3-4 ... Channels 15-16
Sensor power supply LEMO7	microphone ±14 V, +200 V; ICP 2 mA
Sensor power supply BNC	ICP 2 mA

SLOW channels:	via AUX (for LEMO7 version only)
Resolution:	12 bit
Sampling rate	total 50 Hz (100 Hz, 200 Hz)
Input voltage	0...15V for 5 channels
Input resistance	12 kW for channels 5-9 2.5 kW for channel 10 and 11

Output 1-8:

Sampling rate	51.2 kHz
Bandwidth	0...22.4kHz
Max. output voltage	±3.16 Vpeak
Attenuation	+10 dB...-50 dB in 1dB steps

Trigger/Tacho Input:	via AUX (LEMO version) or BNC
Frequency	1/60 Hz...1 MHz
Input voltage	min TTL, max +15 V

Internal PC:

Processor	Intel dual Core embedded
RAM	2 GByte
HDD	256 Gbyte SSD
Interfaces	4x USB, LAN, 3x RS232, VGA, PS/2
Cooling	passive cooling system (0 dB)

Power supply:

DC input	10 ... 33 VDC
AC adapter	115/230 VDC included
Back-up battery	14.4 V Lilon V-Mount (optional) with external charger

Weights and measures:

Dimensions	240 x 230 x 115 mm³
Weight	6.5 kg

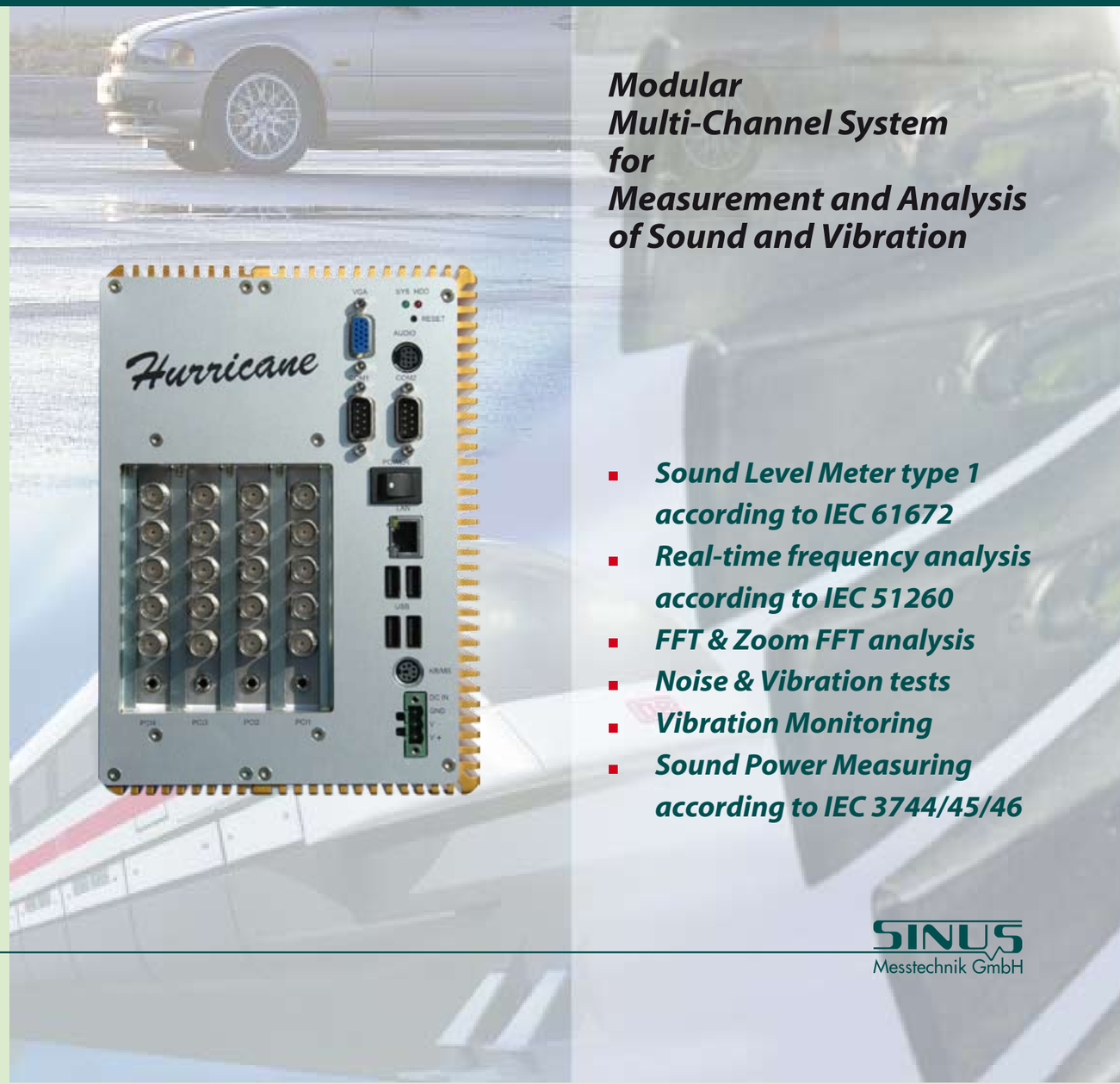
Environmental conditions:

Temperature range	-10°C...+40°C
Humidity	30...90%

SINUS Messtechnik GmbH

Foepplstrasse 13
D-04347 Leipzig
Tel.: +49 - 341 - 24429 - 0
Fax: +49 - 341 - 24429 - 99
www.soundbook.de

Hurricane™



Modular Multi-Channel System for Measurement and Analysis of Sound and Vibration

- *Sound Level Meter type 1 according to IEC 61672*
- *Real-time frequency analysis according to IEC 51260*
- *FFT & Zoom FFT analysis*
- *Noise & Vibration tests*
- *Vibration Monitoring*
- *Sound Power Measuring according to IEC 3744/45/46*

SINUS Messtechnik GmbH

Hurricane™

Multi-channel System for Sound and Vibration Measurement and Analysis in Mobile and Stationary Applications

SINUS Messtechnik GmbH

This powerful and versatile system features small dimensions and minimum power consumption. Its integrated sensor interface allows commonly used sensors to be connected for noise and vibration measurements.

Apart from four input and output channels for highly dynamic signals, **Hurricane** has additional inputs for tacho signals and slowly-fluctuating measurement data.
This makes Hurricane especially suitable for measurements in vehicles and on test stands.

Hurricane was developed for use in the following fields:

- Car manufacturer and their subcontractors
  - Design and development
  - Quality assurance
- Engineering services
- Environmental and labor protection

With **SAMURAI™** SINUS Messtechnik offers a complete modular software package for noise and vibration measurement & analysis.

Additional we offer from competent partners a wide range of application software. The driver for Windows7 allows to create customized software through the user.
A clearly-documented driver interface for Windows is

SAMURAI contains the following virtual measuring devices as basic features for each channel:

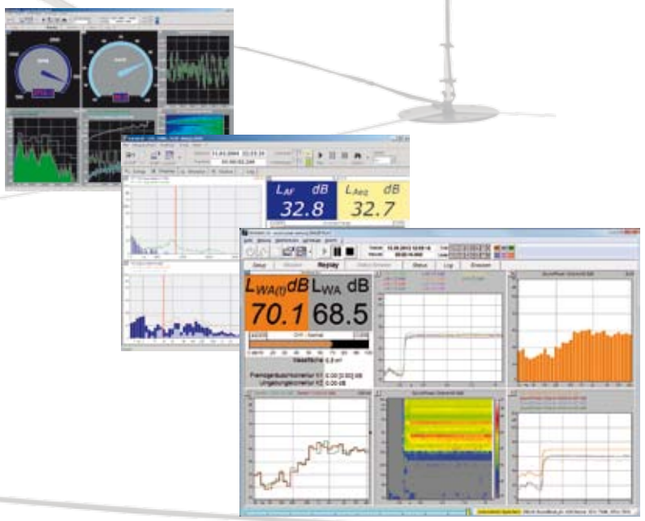
Sound level meter
Class 1 SLM according to IEC 61672-1 allowing simultaneous measurements with the frequency weightings A, C, Z and the time weightings Fast, Slow, Impulse. The SLM also supports the processing of percentiles, automatic impulse detection, measurement of Takt-maximal levels, impulsive and low-frequency characteristics as well as intelligent markers and triggers.

Frequency analyzer
Real-time 1/3 octave analysis from 1/3 octave center frequencies of 0.04 Hz ... 40 kHz (class 1 according to IEC 61260) and FFT analysis of 100 ... 25600 lines, each feature including freely adjustable averaging modes and storage intervals. In addition the sum levels are displayed and stored.

Sound signal storage
Triggered storage of the time signal from DC up to 40 kHz with freely adjustable decimation option (up to 200 Hz) to reduce data volumes.

Reverberation time measurement
Measurement of the reverberation time in 1/3 octaves. Excitation types: switched-off noise, impulse and sine-sweep. The 2 signal outputs are used for output of the generated signals.

Several sound level meters and frequency analyzers with different parameters can be applied for each channel.



Recommended Software options for Hurricane:

Option: Post-Processing
This option offers a new analysis from stored or imported samples. The data browser allows a comfortable selection and cut of the time signals which have to be analyzed in post process.

Option: Sound power measurement
The sound power in 1/3 octaves and as a sum is measured in real-time or sequentially using various geometries and numbers of microphones (e.g. 4, 10 or 20).

Option: Automation
Automatic comparison of a frequency analysis with reference spectra and their management as well as automatic detection by the device and start of an application (e. g. to send an email).

Option: Building acoustics (SAMBA)
The whole acoustic testing of airborne noise and impact sound insulation is organized according to ISO 717 and ISO 140. The measurements are prepared (rooms, partitions, measuring tasks) and performed; the results are then provided in printable form.

Option: Building vibration
Measurement of building vibration according to DIN 4150 with the 3D-Seismometer and assessment of the vibration impacts on people in buildings with the KB (t) value

Option: Fractional octaves
This option provides 1/1 to 1/48 octaves up to 40 kHz in real-time (filters comply with class 1, IEC 61260).

Option: Human **V**ibration **M**ulti **A**nalyzer
The **HVMA** allows the 3-channel measurements according to all filter curves of the ISO 8041 and the calculation of the resultant vectors for hand-arm or whole body vibrations.

Option: Monitoring
Transfer of Sound Level Meter & 1/3 octave values with selectable time intervals and MP3-export of sound during a running measurement.

Option: Multi-Generator
This option additionally provides the signal types: sine, rectangle, triangle, impulse, multi-sine, sine-sweep (lin and log), pseudo-noise and the synchronized output of *.wav files.

Option: NoiseCam
Together with sound signal storage, this webcam-based solution allows video documentation with measurement values blended-in and the export to a multimedia standard format.

Option: Order tracking
This option allows measurement and display of spectra versus order of a basic frequency or RPM of a rotating machine.

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Option: Transfer FRF
The transfer function of a structure is obtained using an impulse hammer and a triax accelerometer. The data storage corresponds with the measurement's geometry.

Option: Vibration Meter
Double integration of the time signal as well as filtering according
to the standards ISO 2954, ISO 7919 and DIN ISO 10816

Option: Remote client and TCP/IP interface
These options allow all features of SAMURAI to be controlled via network and integrated into a complex measuring system.

Other software options on request