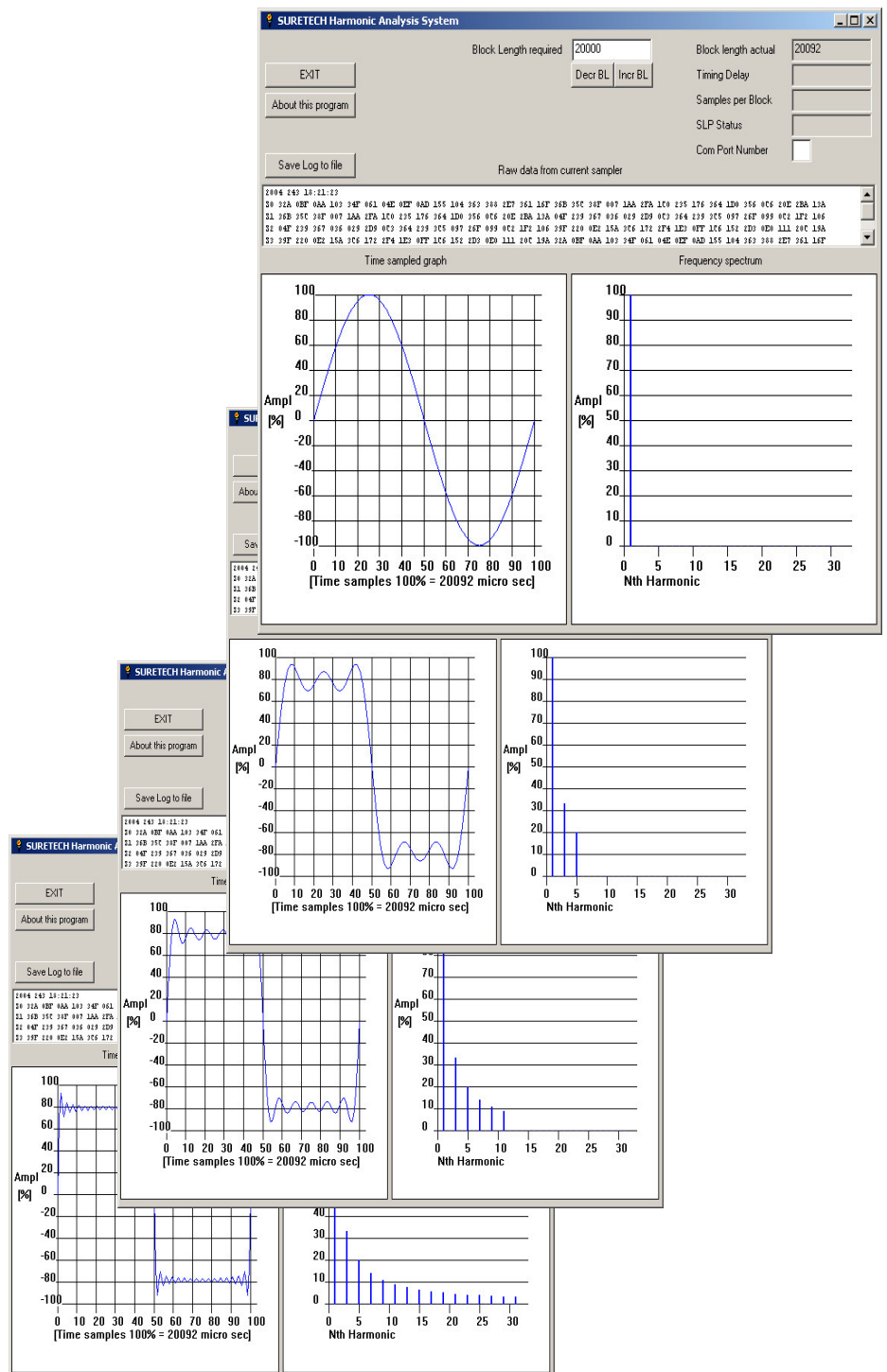# SURETECH
Harmonic Analysis Sampling System

The SURETECH HASS (Harmonic Analysis Sampling System) samples (measures) 50/60Hz current (or voltage), and yields the amplitude of its harmonics. Fundamental frequencies of 50 or 60Hz are sampled with a fast A-D converter, and signal processed to yield all frequency components up to the 31st harmonic. The HASS is connected to conventional CTs (5Amp or 1amp), single phase, 3phase or multi-phase. Samples are downloaded to the user's computer directly into the RS232 port. Any of these parameters could also be sent to analog outputs that feed 4-20mA, or 0-5Vdc etc, after suitable analog or digital processing is done. The HASS can be connected to protection CTs, as it can withstand over 120Amps for a few seconds. The SURETECH HASS is the most cost-effective method to sample, measure and log harmonics, with its' built in data logger, and Windows processing system.

Applications:

✓ General power system harmonic analysis (50/60Hz)
✓ General laboratory use
✓ Computer related loads and electronic ballasts etc. used on power systems, draw large harmonic currents
✓ Design better UPS systems for power system filtering
✓ QOS (Quality Of Supply) analysis
✓ Spurious power system trips can be caused by harmonics
✓ Multiple analog outputs could be provided for dynamic UPS control of harmonics

General Features:

✓ Current (or Voltage) input is sensed directly from CTs, or 110V/220Vac, or directly from our SURETECH HV sensors for current or voltage
✓ RS-232 interface to control and upload data to PC / laptop
✓ Windows application runs on PC computer for monitoring, processing and PC logging of sampled data
✓ FFT (Fast Fourier Transform) processing is performed and updated in real time
✓ Aluminium enclosure for panel or DIN rail mounting, with screw terminal connections
✓ Surge suppression on inputs and outputs
✓ Wide range of auxiliary power supply options available, 90V to 260V is standard
✓ Backup to provide support for design, use, installation, and maintenance information

HASS Functional Description:

Parameter	Description	
CT / VT inputs	• 5Amp or 1Amp AC CT • 260Vac VT • SURETECH Current Sensors from 1A to 100kA AC • SURETECH Voltage Sensors from 1kV to 500kV AC	
Hardware Sampling Module (HSM)	• Signal conditioning front end has a protected buffer to CT / VT • Anti-aliasing filter is 8th order Butterworth with cut-off frequency: 1.5kHz • A-D converter sampled resolution = 0.1% • Sampling rate is settable by user in steps of 1 micro-second • Max sampling rate = 10kHz • Fundamental frequency (1st harmonic) can vary from 20Hz to 80Hz (ie. Block frequency) • 10x gain block can be inserted for low level signals • Sampled waveforms are processed to show harmonic frequency components out to 31st • Real time clock has battery to update it through power downs • 1Mbyte Data Flash memory can be used to log samples over a week or more • Aluminium enclosure dimensions: 140x100x120mm	
Windows Software Module (WSM)	• Time window presents oscilloscope picture of sampled waveform • Frequency window presents a spectrum analyser picture of sampled waveform • Raw data window shows the sampled time stamped data • Time and date of HSM can be synchronised to PC clock • Standard Windows files manage captured data • Captured data can be further processed with your favourite spreadsheet, such as Excel • Complex frequency can be made available	

HASS Configuration options:

The Harmonic Analysis Sampling System consists of two main modules, the hardware sampling module (HSM), and the Windows software module (WSM). The hardware sampling module is connected to the power system to measure current / voltage, and has an integral microprocessor to perform fast sampling, RS232 output, as well as data logging to on board data flash memory. The Windows software module inputs data from the HSM and provides a Graphical User Interface (GUI) to facilitate control of the HSM, by means of mouse selections. Two types of logging are possible, by using the HSM in standalone mode without a PC; or logging with the PC in real time.

Configuration options	Description	
Number of phases	• Single; 3 phase; N phase (enquire)	
Sensor type	• 1Amp CT; 5Amp CT • 0-260Vac VT • SURETECH Current sensors (Rogowski, Hall Effect) • SURETECH Voltage sensors (Capacitive, Resistive, and RC)	
Aux PSU	• 90-260V ac or dc • Battery 12V, 24V, 36V	
Harmonic Calculator	• Windows Software Module can be packaged alone as a calculator • Provides stand-alone calculator, useful to capture oscilloscope time samples • Generate time samples in a spreadsheet, and loads them into WSM for frequency analysis	
Serial Connection	• RS 232, 19200Baud	
Outputs	• Windows files contain data (standard) • Optional extra outputs can be configured for special customer needs such as: Multiple 4-20mA allocated to any harmonic or combinations; 0-5V; 0-10V; NO/NC relay contact	

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