

Sefram

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SEFRAM 8460

A new family of thermal recorders 6 to 36 channels

Capabilities

- 6 to 36 analogue channels
- Measurement boards :
 - 6 isolated channels universal input, 500V AC or 1000VDC
 - 12 channels multiplexed board (voltage, temperature, pt100)
 - 6 isolated channels for strain gauge, with voltage, pt100 and thermocouples
 - 6 isolated channels 1000V AC or 2000V DC
- 16 logical channels
- 270 mm paper width
- 15.4 inches panoramic TFT touch screen
- 500Gb hard disk, with fast transfer
- Interface: Ethernet, 6 x USB, VGA
- Power analysis (50Hz, 60Hz, 400Hz, 1kHz) for single and dual networks
- IRIG board option
- WiFi option
- IEC1010 : CAT III - 600V



NEW



A modular system

The new 8460 family is designed to match all your applications in the future. If your applications change, your 8460 can be upgraded with a mix of various measurement boards (4 measurement boards available).

A panoramic touch screen to ease the operation

With its 15.4 inches touch screen, using the 8460 is like a game: the man-machine interface has been designed to be intuitive, all menus are clear and simple and the user's manual can be displayed on the recorder if needed.

Various analysis functions

The new 8460 will provide many automatic measurements, various triggers, the power analysis mode,... All is done to simplify the analysis of complex signals.

A connected instrument

With its 6 USB interfaces, the LAN interface or through WiFi communication, you can remote control your recorder or download your records. With Virtual Network Computing software (not included), view and control your 8460 from your computer or your tablet.... Just like if you have the recorder in front of you!



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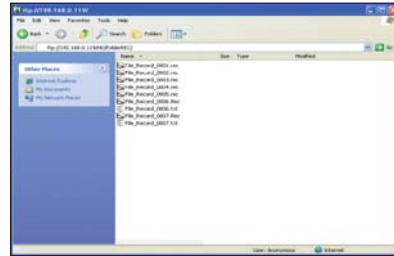
► A modular concept for all your applications

Communication and simplified data export:



With Virtual Network Computing software, you remote control your 8460 from a computer or a tablet.

FTP : easy transfer of records



FTP or TCP-IP transfer of files and recorded data display.

WiFi



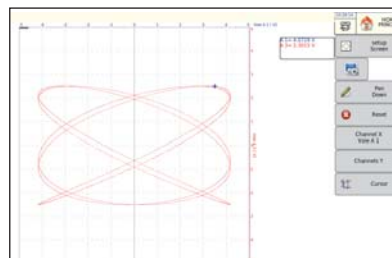
With the WiFi interface (option) you can take the best benefit of remote control of your recorder. All functions, all modes can be remote controlled.

Several operating modes



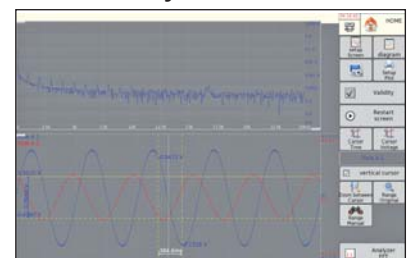
Expert mode: user will access to all parameters of the setup.
User mode: restricted access.

XY mode with pen-up and pen-down.



With an efficient XY mode, your 8460 will replace your old analogue XY plotter.

FFT Analysis



Real time FFT analysis.

► Energy / Power Analysis

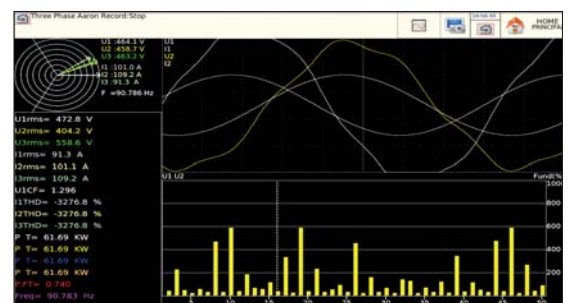
A very powerful analysis for single phase, dual phases or three phases networks. Analysis is provided with Fresnel diagram or oscilloscope mode.

Capabilities

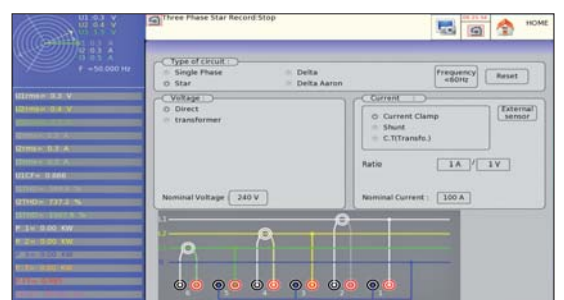
- Single phase, dual phases, three phases networks
- Dual networks analysis
- Up to 24 parameters memorized (U, I, W, Wh, ...)
- Network frequency: 40, 50, 60, 400, 1000 Hz
- Fresnel Diagram
- Oscilloscope mode
- Harmonics up to rank 50
- Memorization of harmonics
- 16 calculated values : mean value, RMS value, peak value, crest factor, THD, DF, active power, apparent power, reactive power, power factor (cos), energy,...
- Real time word file of calculated values



Measurements are done with the voltage input (direct) of the universal board and accessories clamps (standard clamps or flexible clamps)



Harmonics up to rank 50 (calculation and memorization)



► Highly flexible printing



To suit your specific and various applications, you can configure and select all printing parameters (including plotting mode f(t) or text), paper speed (1mm/h to 100mm/s), number of traces or grid pattern.

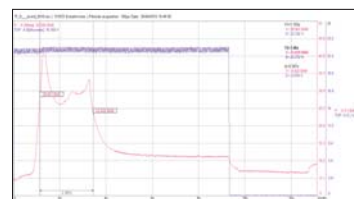
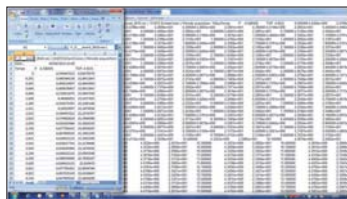
For all channels, you can add annotations, specifying the date, the time, the paper speed and the channel names.

► Sefram Viewer

This licence free software is supplied with each recorder. It allows the visualization of the recordings and the data transfer to other applications. SEFRAM Viewer makes the acquired signal analysis easier.

Capabilities

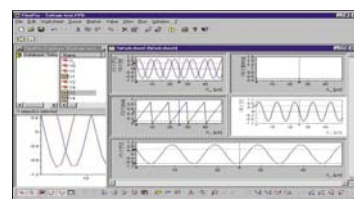
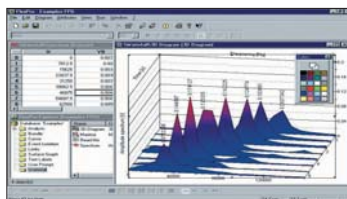
- Curve printing
- Display of values (text)
- Cursors and zoom
- File concatenation
- 8 math calculations
- Up to 120 characters text notes
- Bitmap, Excel®, txt, csv export
- Easy setup of curves display



► FLEXPRO™ : a powerful software for your data analysis.

With Flexpro® :

- More than 100 functions of statistical and math analysis
- Powerful graphical display
- Measurement report editing



► IRIG board option

This factory option allows to synchronise the instrument (and the timestamping of records) with an IRIG clock signal in order to have a better time accuracy.

Capabilities

- Synchronisation of records with an IRIG clock
- Resynchronisation of acquisition data every seconde
- Compatible with IRIG format: IRIG-A133, A132, A003, A002, B123, B122, B003, B002 and AFNOR NFS 87-500
- Amplitude of IRIG signal : from 600 mVpp up to 8Vpp
- Input impedance: 50 Ohms
- BNC input

COMMON FEATURES (FOR ALL MODELS OF THE FAMILY)
DISPLAY

15,4 inches TFT touch screen, with backlight
 Resolution 1280 x 800 dots
 f(t) and XY display capability
 Functions: zoom, cursors, zoom between cursors
 Math and scaling functions ($Y = aX + B$)
 20 automatic measurements available

MEMORY

Memorization of setup
 Memory 128 Mwords, in segments
 Internal hard disk 500Gb, with fast transfer (6 Ms/s)

INTERFACES AND I/O

Interfaces 6 x USB (2 on the front panel, 4 on the rear panel),
 VGA, Ethernet
 Logical channels 16 logical channels (V max: 24V, $Z_{in} = 4,7\text{kohms}$)
 Sensor supply 12V / 0,2A max (non floating)
 Alarm output 3 output, with 1 relay (24V/100mA)
 and 2 x TTL 5V

POWER ANALYSIS FUNCTION

(this function can be used with one universal board and accessories for current measurements)

Networks single phase, dual phases, three phases
 Frequency 50-60Hz, 400Hz and 1000Hz
 Display oscilloscope, Fresnel diagram
 Harmonics calculated up to rank 50,
 with recording capabilities
 Measurements 24 measurements: U and I (mean values,
 RMS, peak), crest factor, power (active,
 reactive, apparent), power factor, harmonics,
 THD, DF, frequency, energy,...

GENERAL AND ENVIRONMENT

Power supply 90VAC to 264VAC, 47Hz to 63Hz
 Consumption 230VA max, 60w without print
 Operating temperature 0°C to +40°C
 Storage temperature -20°C to +60°C
 Maximum operating RH 80% max.
 Dimensions 298 x 394 x 218 mm
 Weight 11kg
 (with one board installed)

RECORDING AND TRACES

Paper width 270 mm
 Paper speed direct mode: 1mm/h up to 100mm/s
 mixed mode: 1mm/h up to 50mm/s
 memory transcription: 10mm/s max
 quick advance: 100mm/s
 external control: 50mm/s
 test mode: from 1 line/s to 1 line/h
 Resolution accuracy y axis: 8 dots per mm
 X axis: 16 dots per mm up to 50mm/s
 and 8 dots for higher speed
 XY mode: 8 dots per mm
 Accuracy in relation to graticule: 0,01%
 Graticule 5 pré-programmed graticules

SPECIFICATIONS - 6 ISOLATED HIGH VOLTAGE CHANNELS BOARD

Channels: 6
 DC voltage: ranges from 100mV to 2000V
 Max. offset: ± 5 ranges (limited at 2000V max)
 Accuracy $\pm 0,2\%$ $\pm 0,2\%$ of offset
 Max. RMS AC+DC voltage: 1000V AC
 Bandwidth (-3dB): 26kHz (depending on range)
 Crest factor: 2,2 (with max. 2000V/peak)
 Input impedance: 11M Ω for ranges <10V
 10M Ω for ranges $\geq 10V$
 Sécurité: CAT III - 1000V and CAT IV - 600V

FREQUENCY

Sensitivity: 100mVrms. Min
 Duty cycle: 10% min.
 Frequency range: 10Hz to 100kHz
 Basic accuracy: $\pm 0,02\%$ of full scale

SAMPLING

Resolution: 14 bit
 Sampling rate: 1Ms/s per channel max.

BANDWIDTH

Analogue input bandwidth: Range $\geq 100V$: 26kHz
 Ranges from 10V to 100V: 20kHz
 Ranges < 10V: 3kHz
 Programmable analogue filters: 10kHz, 1kHz, 100Hz (pente 60dB/decade)

SPECIFICATIONS - UNIVERSAL INPUT BOARD

Channels : 6 per board

VOLTAGE

DC voltage ranges: 1mV to 1000 V
 Max offset: ± 5 ranges (except 1000V)
 Accuracy: $\pm 0,1\%$ $\pm 10 \mu V \pm 0,2\%$ offset
 TRMS AC+DC : 200 mV to 500 V
 Bandwidth (-3dB): 5Hz to 500Hz
 Crest factor : 2,2

FREQUENCY

Sensitivity 300mV rms min.
 Duty cycle 10%
 Frequency range 10Hz to 100 kHz
 Basic accuracy 0,2% of full scale
 Maximum input voltage $\pm 500VDC$ or 440V AC (sine)

TEMPERATURE

Sensor	Using environnement	Ranges
J	-20°C to 1200°C	20°C to 2000°C
K	-250°C to 1370°C	20°C to 2000°C
T	-200°C to 400°C	20°C to 500°C
S	-50°C to 1760°C	50°C to 2000°C
B	-200°C to 1820°C	50°C to 2000°C
E	-250°C to 1000°C	20°C to 1000°C
N	-250°C to 1300°C	20°C to 1000°C
W5	0 à 2320°C	50°C to 2000°C
Accuracy	Cold junction compensation : $\pm 1,25^\circ C$	

SAMPLING

Resolution 14 bits
 Sampling rate 1M sample/sec per channel
 Memory length 32M word in segments of up to 128 Blocks
 Triggering Positive edge, negative edge, on logical
 input, delay, Go No Go.
 Pre trigger -100% à +100%

BANDWIDTH

Analogue input bandwidth (-3dB) range 1V: 100kHz
 range $\leq 50mV$: 50kHz min
 10Hz, 100Hz, 1kHz, 10kHz
 Programmable digital filters $> 25M\Omega$ for range <1V
 1M Ω for upper ranges
 Input impedance (DC) 150pF typ.
 Input capacitance between one channel and the frame ground $\pm 500V$
 Maximum input voltage between 2 terminals of one channel $\pm 500V$
 Isolation between frame ground and channel $> 100M\Omega$ at 500VDC



SPECIFICATIONS - MULTIPLEXED BOARD

Channels :	12 per board	
VOLTAGE		
DC voltage ranges:	1mV to 50 V	
Max offset:	± 5 ranges	
Accuracy:	± 0,1% ± 10µV ± 0,1% offset	
TRMS AC+DC :	200mV to 50V.	
Bandwidth (-3dB):	5Hz to 100Hz	
Crest factor :	2,2	
TEMPERATURE		
Sensor	Using environnement	Ranges
PT100 (2,3,4 Fils)	-200°C to 850°C	20°C to 1000°C
J	-20°C to 1200°C	20°C to 2000°C
K	-250°C to 1370°C	20°C to 2000°C
T	-200°C à 400°C	20°C to 500°C
S	-50°C to 1760°C	50°C to 2000°C
B	-200°C to 1820°C	50°C to 2000°C
E	-250°C to 1000°C	20°C to 1000°C
N	-250°C to 1300°C	20°C to 1000°C
W5	0 to 2320°C	50°C to 2000°C
Accuracy	Cold junction compensation: ±1,25°C	
SAMPLING		
Resolution	16 Bits	
Sampling rate	200µs maxi. (5K sample/s)	
Memory length	32M word in segments of up to 128 Blocks	
Triggering	Positive edge, negative edge, on logical input, delay, Go No Go.	
Pre trigger	-100% à +100%	
BANDWIDTH		
Analog input bandwidth (-3dB)	1kHz at -3dB	
Programmable digital filters	0,1Hz to 50Hz	
Input impedance (DC)	2 MΩ ranges >5V	
Input capacitance	10MΩ (150pF) for other ranges	
Maximum input voltage	between one channel and the frame ground ± 50V between 2 terminals of one channel ± 50V all input are differential, non isolated	
Common mode voltage (max.)	± 5V for ranges < 5V ± 50V for ranges > 5V	

MEASUREMENT BOARDS AND OPTIONS (* = FACTORY OPTION)

984405500	16 isolated logical channels module
910007000	Logical channels cords
984402000	12 channels multiplexed board
984401000	6 isolated channels universal board
984402500	6 isolated channels strain gauge / temperature board
916006000	6 isolated channels high voltage board
916003000	IRIG board*
916004500	Wifi communication option

CURRENT CLAMPS

A1257	Kit with 3 flexible clamps 30A/300A/3000A AC for three phases measurements
A1287	Flexible clamp 30A/300A/3000A AC
SP201	Current clamp 200A AC, 10mV/1A, D 15mm
SP221	Current clamp 100A AC, 10mV/1A, D 15mm
SP230	Current clamp 1200A AC, 10mV/1A, D 50mm
SP261	Current clamp 1200A AC+DC, 1mV/1A, D 50mm
SP270	Current clamp 2000A AC, 1mV/1A, D 70mm

SHUNTS

910007100	Shunt 0,01 ohm 3A max
910007200	Shunt 0,1 ohm 1A max
989006000	Shunt 1 ohm 0,5A max
912008000	Shunt 10 ohms 0,15A max
989007000	Shunt 50 ohms 0,05A max
207030301	Shunt 0,01 ohm 30A max
207030500	Shunt 0,001 ohm 50A max

TRANSPORTATION CASE (TROLLEY)

914007500	For 8460
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FLEXPRO® ANALYSIS SOFTWARE

100081	Flexpro® View (basic version)
100082	Flexpro® Full

STRAIN GAUGE BOARD - SPECIFICATIONS

Channels	6 (fully isolated)
Measurements	Strain gauge, voltage, thermocouple and current with optional external shunt
Input	differential, fully isolated
Input impedance	2 MΩ for ranges < 1 Volt 1 MΩ for ranges ≥ 1 Volt
Maximum input voltage	200V DC
(Between one input and ground, or between ground and mechanical chassis)	
Input voltage	± 50V
Isolation	>100 MΩ under 500V
(between channels and mechanical chassis)	
Input connectors	Fast plug-in / plug-out, 6 contacts per channel

All accuracies are given with 1Hz filter

VOLTAGE MEASUREMENT

Maximum range	50 V
Lowest range	1 mV
Maximum offset	±50V limited at ± 5 ranges
Accuracy	± 0.1% of full scale ± 10µV ± 0.1% of offset
Resolution	16 bit
Offset drift	100ppm/°C ± 1 µV/°C
Sampling rate	100kHz (or 10µs)
Noise	<30µV without filter

STRAIN GAUGE MEASUREMENT

The unit is µSTR (micro strain)	2000µSTR = 1 mV/V
Bridge	Full bridge (4 and 6 wires), half bridge
Automatic balancing range	±25000 µSTR
Bridge supply voltages	2V and 5V (symmetrical ±1V and ±2.5V)
Gauge rate	2 (adjustable between 1.8 and 2.2)
Maximum range	50 000 µSTR
Minimum range	1000 µSTR
Maximum offset	±50000µSTR
Accuracy	± 0.1% of full scale ± 5µSTR ± 0.1% of offset
Resolution	16 bit
Sampling rate	100kHz (or 10µs)
Offset drift	100ppm/°C ± 1 µV/°C

BANDWIDTH

3 dB bandwidth	>18 KHz
Analogue filter	
(low pass 60dB/decade)	1KHz, 100Hz, 10Hz
Low pass (digital)	1 Hz, 0.1 Hz, 0.01 Hz, 0.001 Hz

Temperature measurement

Cold junction compensation for J,K,T,S,N,E,
W5 thermocouples : ± 1.25 °C

Sensor	Maximum possible range	Range
COUPLE J	-210°C to 1200 °C	20 °C to 2000 °C
COUPLE K	-250°C to 1370 °C	20 °C to 2000 °C
COUPLE T	-200°C to 400 °C	20 °C to 500 °C
COUPLE S	-50°C to 1760 °C	50 °C to 2000 °C
COUPLE B	200°C to 1820 °C	50 °C to 2000 °C
COUPLE E	-250°C to 1000 °C	20 °C to 1000 °C
COUPLE N	-250°C to 1300 °C	20 °C to 1000 °C
COUPLE W5	0°C to 2320 °C	50 °C to 2000 °C

FT 8460 A 00 - Specifications can be updated without notice

Sefram



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