Sefram
Data Acquisition Solution

dataTec
Mess- und Prüftechnik, Die Experten.

SEFRAM 8460

A new family of oscillographic thermal recorders 6 to 36 channels

Capabilities

- 6 oscillographic 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

2 YEARS WARRANTY

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).

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 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 oscillographic recorder if needed.

A connected instrument

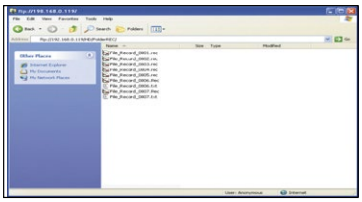
With its 6 USB interfaces, the LAN interface or through WiFi communication, you can remote control your recorder or download your records. With Virtual Network Computing software (not included), view and control your 8460 from your computer or your tablet.... Just like if you have the recorder in front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

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.

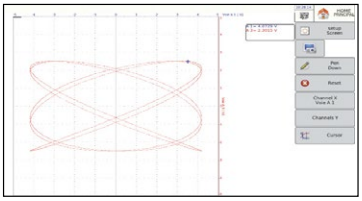
WiFi

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

Several operating modes

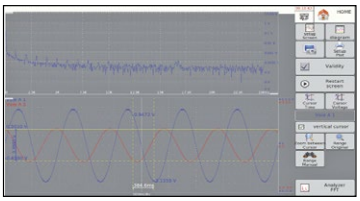
Expert mode: user will access to all parameters of the setup.
User mode: restricted access.

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.

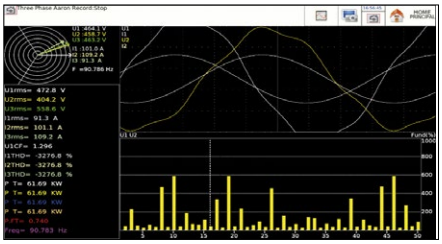
Energy / Power Analysis

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

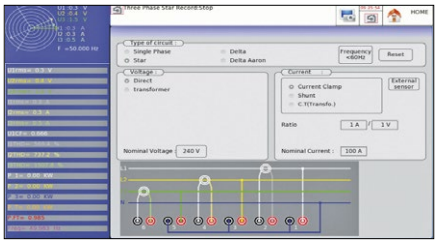
Capabilities

- 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

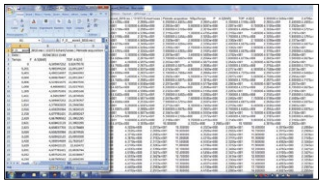
To suit your specific and various applications, you can configure and select all printing parameters (including plotting mode f(t) or text), paper speed (1mm/h to 200mm/s), number of traces or grid pattern.
For all channels, you can add annotations, specifying the date, the time, the paper speed and the channel names.

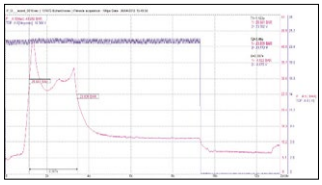
Sefram Viewer

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

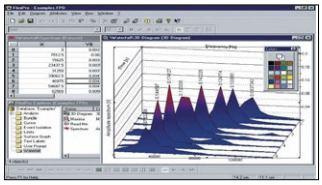


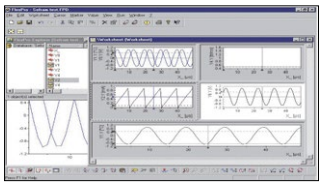


FLEXPRO™: a powerful software for your data analysis

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 recorsd 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 oscilloscope-type 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 (6Ms/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, Zin = 4,7kohms) 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	370 x 440 x195 mm
Weight (with one board installed)	11kg
Recording and traces	
Paper width	270mm
Paper speed	direct mode: 1mm/h up to 200mm/s mixted mode: 1mm/h up to 50mm/s memory tranxcription: 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	±0,2% ±0,2% of offset
Max. RMS AC+DC voltage	1000V AC
Bandwidth (-3dB)	26kHz (depending on range)
Crest factor	2,2 (with max. 2000Vpeak)
Imput impedance	11MΩ for ranges <10V 10MΩ for ranges ≥10V
Sécurité	CAT III - 1000V and CAT IV - 600V
Frequency	
Sensitivity	100mVrms. Min
Duty cycle	10% min.
Frequency range	10Hz to 100kHz
Basic accuracy	±0,02% of full scale
Sampling	
Resolution	14 bit
Sampling rate	1Ms/s per channel max.
Bandwidth	
Analogue input bandwidth	Range ≥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	
DC voltage ranges	1mV to 1000 V	
Max offset	± 5 ranges (except 1000V)	
Accuracy	± 0,1% ± 10 µV ± 0,2% offset	
TRMS AC+DC	200 mV to 500 V	
Bandwidth (-3dB)	(- 3 dB) : 5 Hz - 100 kHz	
Crest factor	4	
Frequency		
Sensitivity	300 mV rms min.	
Duty cycle minimum	10%	
Frequency range	10Hz to 100 kHz	
Basic accuracy	0,2% of full scale	
Maximum input voltage	± 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 to 2320°C	50°C to 2000°C
Accuracy	Cold junction compensation : ±1,25°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% to +100%	
Bandwidth		
Analogue input bandwidth to -3dB	range ≤ 1V : 100kHz range ≤ 50m V to 1V : 50kHz	
Programmable digital filters	10 Hz, 100 Hz,1 kHz,10 kHz	
Input impedance (DC)	>25M Ω for range <1V 1 M Ω for upper ranges	
Input capacitance	150pF	
Maximum input voltage	between one channel and the frame ground ± 500V between 2 terminals of one channel ± 500V Isolation between frame ground and channel >100MΩ at 500VDC	

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Specifications - Multiplexed board

Channels	12	
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 à 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 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 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% to +100%	
Bandwidth		
Analog input bandwidth to -3dB	1 kHz to -3 dB	
Programmable digital filters	0,01Hz to 50Hz	
Input impedance (DC)	2 M Ω range >5V 10M Ω (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	
984603000	IRIG board*	
916006000	6 isolated channels high voltage board	
902402000	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 10A AC, 100mV/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)		
984605000	case for 8460	
FLEXPRO® analysis software		
100081	Flexpro® View (basic version)	
100082	Flexpro® Full	

Strain Gauge board - Specifications

Channels:	6
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
(entre les entrées, entre entrée et masse tiroir)	
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
Résolution	16 bits
Offset drift	100 kéch/s (10µs)
Sampling rate	100ppm/°C ±1 µV/°C
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 (symetrical ±1V and ±2.5V)
Gauge rate	2 (ajustable 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 bits
Sampling rate	10µs/100 kéch/s
Bandwidth	
3 dB bandwidth	>18 KHz
Analogue filter (low pass 60dB/decade)	1KHz,100Hz
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