

**Sefram**  
Sefram

# SEFRAM DAS 1600

**Make sure to visit  
our Website**

<http://www.sefram.fr>

## **6 to 72 channels Data Acquisition Solution to cover all your applications**

### **Capabilities**

- 6 to 72 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
- 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)
- Internal battery option
- IRIG board option
- WiFi option
- MIL-STD-810G option (shock and vibration)
- Option: Bus CAN and LIN analysis
- IEC1010 : CAT III - 600V



### **A modular system**

The new DAS1600 family is designed to match all your applications in the future. If your applications change, your DAS1600 can be upgraded with an extension chassis. The extension chassis will add 3 slots and then you can have up to 72 analogue channels or mix various measurement boards.

### **A panoramic touch screen to ease the operation**

With its 15.4 inches touch screen, using the DAS1600 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 DAS1600 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 DAS1600 from your computer or your tablet.... Just like if you have the recorder in front of you!



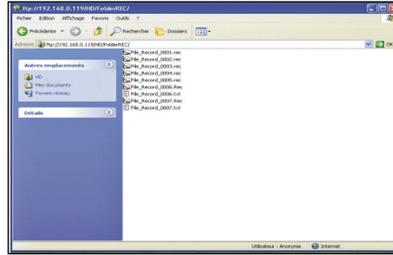
## ► A modular concept for all your applications

Communication and simplified data export:



With Virtual Network Computing software, you remote control your DAS1600 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 device.

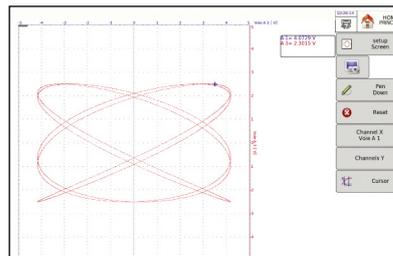
All functions, all modes can be remote controlled.

Several operating modes



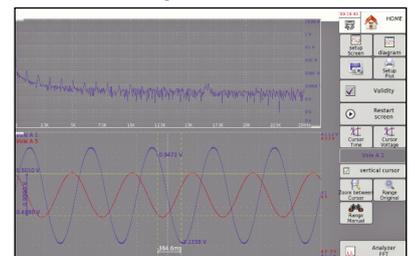
Expert mode: user will access to all parameters of the setup.  
User mode: restricted access.

XY mode with pen-up and pen-down.



With an efficient XY mode, your DAS1600 will replace your old analogue XY plotter.

FFT Analysis



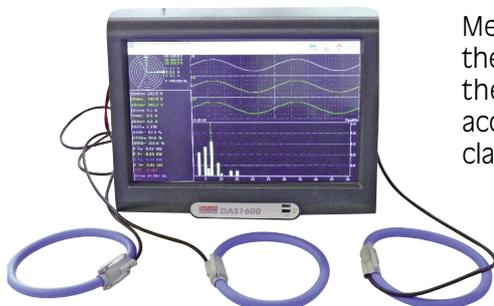
Real time FFT analysis.

## ► Energy / Power Analysis

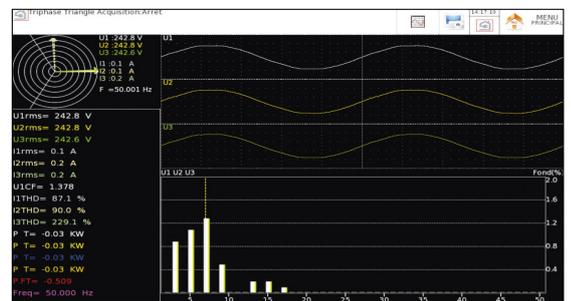
A very powerful analysis for single phase, dual phases or three phases networks. Analysis is provided with Fresnel diagram or oscilloscope mode.

### Capabilities

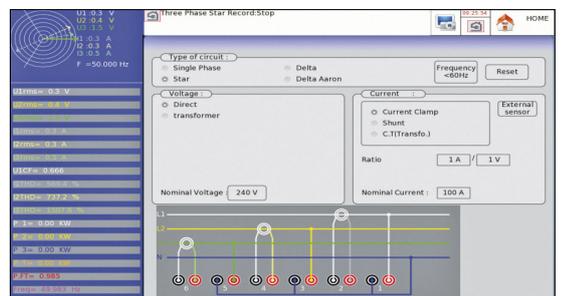
- Single phase, dual phases, three phases networks
- Up to 24 parameters memorized (U, I, W, Wh, ...)
- Network frequency: 40, 50, 60, 400, 1000 Hz
- Fresnel Diagram
- Oscilloscope mode
- Harmonics up to rank 50
- Memorization of harmonics
- 16 calculated values : mean value, RMS value, peak value, crest 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)

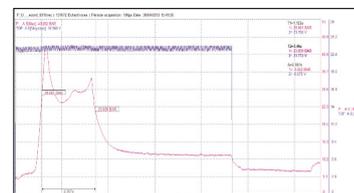
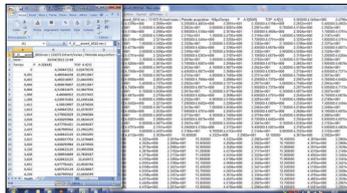


## ► Sefram Viewer

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

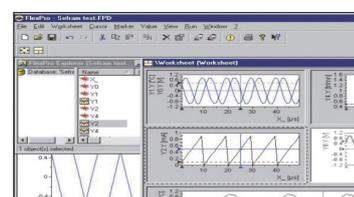
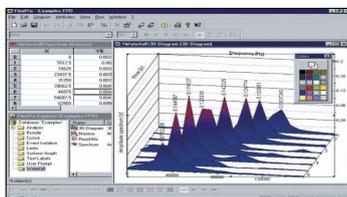
- Curve printing
- Display of values (text)
- Cursors and zoom
- File concatenation
- 8 math calculations
- Up to 120 characters text notes
- Bitmap, Excel®, txt, csv export
- Easy setup of curves display



## ► 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



## ► Internal battery option

This factory option allows you to protect your important campaign against main power break and allows measurement campaigns where the main power is not available.

### Capabilities

- Autonomy with internal battery: 2hours minimum
- Charging time: < 3 hours (instrument off)
- Charging time: < 6 heures (instrument on)
- Battery status indicated on the menu bar of the instrument

## ► 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

### Compatibility guide for DAS1600 options and boards

|  | Wifi option | Extension chassis | IRIG option |
|--|-------------|-------------------|-------------|
| Wifi option                            | -           | ✓                 | ✓           |
| Battery option*                        | ✓           | -                 | ✓           |
| IRIG option*                           | ✓           | ✓                 | -           |
| Extension chassis (3 slots)*           | ✓           | -                 | ✓           |
| 6 isolated channels high voltage board | ✓           | ✓                 | ✓           |
| 12 multiplexed channels board          | ✓           | ✓                 | ✓           |
| 6 universal isolated input board       | ✓           | ✓                 | ✓           |
| 6 isolated input strain gauge board    | ✓           | ✓                 | ✓           |

\*: factory option

**COMMON FEATURES (FOR ALL MODELS OF THE FAMILY)**
**DISPLAY**

15,4 inches TFT touch screen, with backlight  
Resolution 1280 x 800 dots  
fit) 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 ( 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 47 VA max  
Operating temperature 0°C to +40°C  
Storage temperature -20°C to +60°C  
Maximum operating RH 80% max.  
Dimensions (without add. chassis) 298 x 394 x 218 mm  
Dimensions with add. Chassis 298 x 394 x 295 mm  
Weight (with one board installed) 8kg (10kg with add. chassis)

**SPECIFICATIONS - UNIVERSAL INPUT BOARD**

Channels : 6 per board

**VOLTAGE**

DC voltage ranges: 1mV to 1000 V  
Max offset: ± 5 ranges ( except 1000V)  
Accuracy: ± 0,1% ± 10. V ± 0,2% offset  
TRMS AC+DC : 200 mV to 500 V  
Bandwidth (-3dB): 5Hz to 100kHz  
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 ± 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 : ±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% à +100%

**BANDWIDTH**

Analogue input bandwidth (-3dB) range 1V: 100kHz  
range ≤ 50mV : 20kHz min  
10Hz, 100Hz, 1kHz, 10kHz  
Programmable digital filters >25MΩ for range <1V  
1MΩ for upper ranges  
Input impedance (DC) 150pF typ.  
Input capacitance between one channel and the frame ground ± 500V  
Maximum input voltage between 2 terminals of one channel ± 500V  
Isolation between frame ground and channel >100MΩ at 500VDC

**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)  
Input 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)



# DAS 1600

Data Acquisition Solution

## SPECIFICATIONS - MULTIPLEXED BOARD

|                    |                                     |                |
|--------------------|-------------------------------------|----------------|
| Channels :         | 12 per board                        |                |
| <b>VOLTAGE</b>     |                                     |                |
| 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                                 |                |
| <b>TEMPERATURE</b> |                                     |                |
| Sensor             | Using environnement                 | Ranges         |
| PT100 (2,3,4 Wire) | -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<br>± 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 |
| 916005000 | Additionaln chassis with 3 slots*                    |
| 916006000 | 6 isolated channels high voltage board               |
| 916003000 | IRIC board*  |
| 916001000 | Battery board*                                       |
| 916004500 | Wifi communication option                            |
| 916007000 | Rack mounting kit for DAS1600/800                    |
| 916009500 | MIL-STD-810G 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, 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)

|           |  |
|-----------|--|
| 914007500 | For DAS1600 without additional chassis |
| 914008000 | For DAS1600 without additional chassis |

## FLEXPRO® ANALYSIS SOFTWARE

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

FTDAS1600 A 01 - Specifications can be updated without notice

## STRAIN GAUGE BOARD - SPECIFICATIONS

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



For assistance and ordering



32, rue Edouard Martel - BP55- 42009 - St Etienne - cedex 2  
Tél. +33 (0) 4.77.59.01.01  
Fax. +33 (0) 4.77.57.23.23  
Web : www.sefram.fr - e-mail : sales@sefram.fr

1997/7001