portable and self-contained 40 and 100 MHz

OX 7042
OX 7102
OX 7104

From the laboratory to the field, from diagnostics to appraisals, for desktop/portable use, a unique instrument!

- Five complementary tools in one: OSCILLOSCOPE; MULTIMETER; FFT ANALYZER; HARMONIC ANALYZER; and RECORDER

- Sampling rate 1 GS/s in one-shot and 50 GS/s in ETS - memory depth of 2.5 k per channel in "Oscilloscope" mode

- 2 or 4 isolated measurement channels, 600 V, Cat III, and up to 8 curves on screen

- "Real time" FFT analysis standard and calculation functions on the channels

- 2 or 4 digital multimeters, TRMS, 8,000 points, 50 kHz, independent

- Colour LCD touch screen

- 33 direct command keys and "Windows-like" menus on screen

- ProbiX input terminals (plug and play) and associated smart sensors

- Multi-interface communication connector: RS232, Centronics, and Ethernet with WEB server

metrix® A Brand of

CHAUVIN ARNOUX GROUP

When it comes to innovation, Metrix doesn't settle for just introducing the first self-contained portable four-isolated-channel 600 V / cat. III oscilloscope on the market. In their ergonomics, versatility, safety, and various communication capabilities, series OX 7000 instruments are designed to deliver the best available ratio of safety and services to convenience of use.

On the performance side, they are tops in category with their 12-bit / 1 GigaSamples-per-second converter, sampling rate of 50 GS/s on periodic signals, and capture of transients down to 2 ns.

To make "modern" mean "efficient", touch-screen control with "Windows-like" menus is backed up by 33 keys specialized solely for direct access to commonly-used functions. Again for the sake of efficiency in the field, series OX 7000 instruments incorporate the patented new **Probi𝗫** system of "plug and play" accessories, individual isolation of each of the measurement channels, a range of remote management capabilities based on the Ethernet link with WEB server, and a number of built-in instruments, notably a multimeter.

## Direct access, intuitive navigation

The "Windows-like" ergonomics simplifies user familiarization - often difficult with oscilloscopes. For the first time, a Man-Machine Interface provides access to all functions in at least three different ways, for different levels of mastery of the instrument. The touch screen makes navigation smooth and seamless. The various menus can be opened or pulled down using the stylus, which is also used for direct action on such graphic elements as cursors, triggers, etc.

*In the field of **ELECTRONIC MAINTENANCE**, your favourites will be the OX 7102 and OX 7104 - 100 MHz - with their 2 or 4 isolated 600 V cat. III channels, advanced triggering functions, built-in FFT, mathematical calculations on curves, and WEB server*
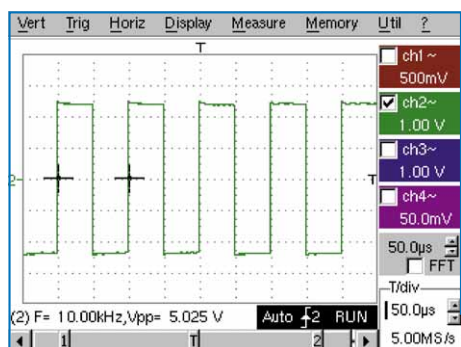
*The vast monochrome or colour screen of series OX 7042 instruments, their 40 MHz pass band, their 2 isolated 600-V cat. III channels, and their optional harmonic analyzer modules will be of special interest to professionals in **INDUSTRIAL MAINTENANCE**.*
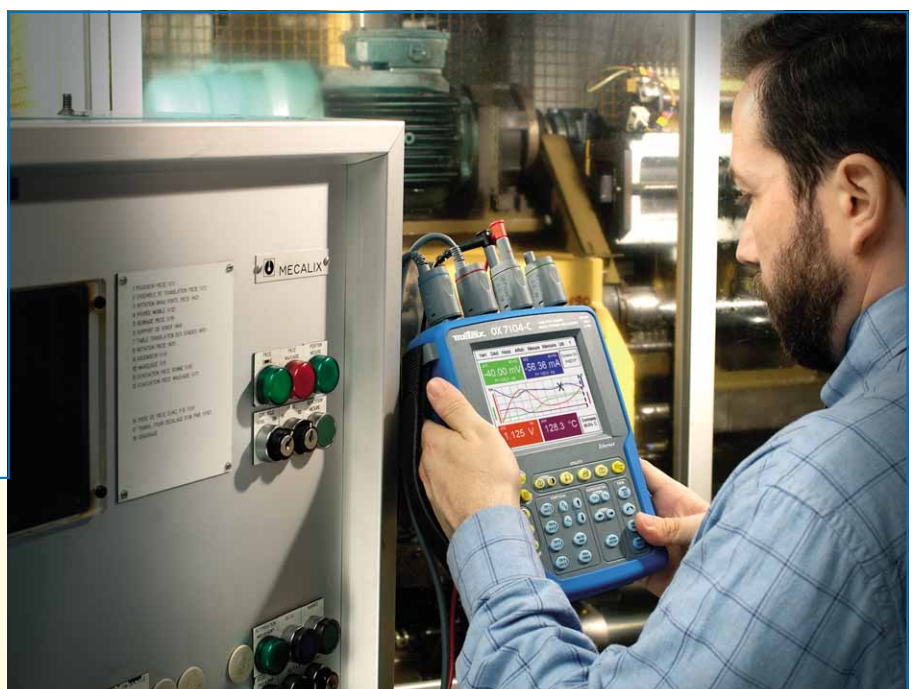
The oscilloscope, multimeter, harmonics analyzer, and recorder modes are directly accessible on the front panel of the instrument.
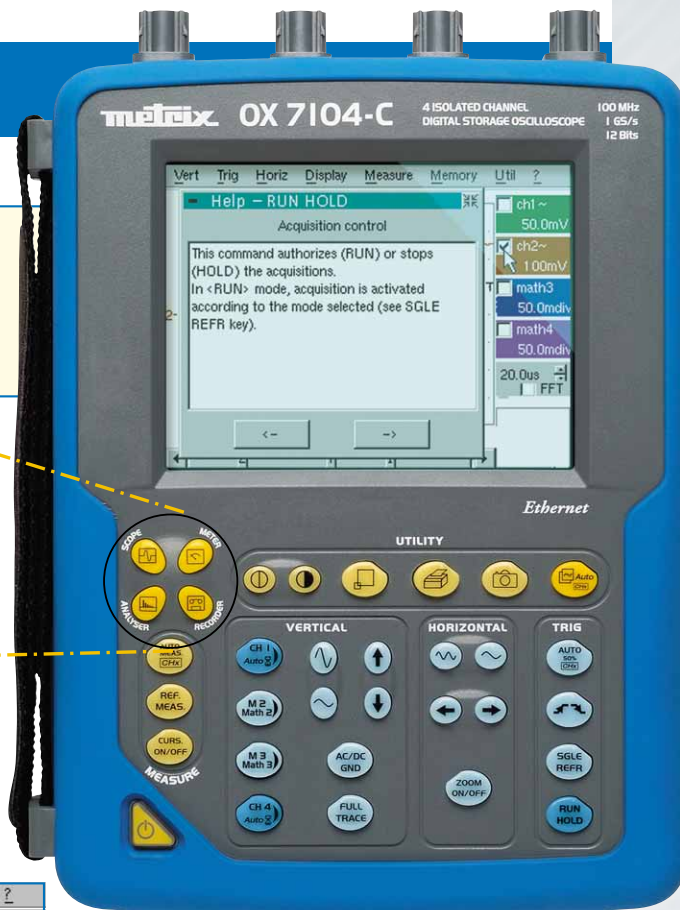
There are 33 keys for direct access to the various parameters and modes of the instrument. Context-sensitive on-line help (in five languages) concerning the keys of the device is available on screen.

The trace display zone is vast (110 x 75 mm) in "FULL SCREEN" mode, so a screen capture contains no superfluous information or menus.

(oscilloscope mode)
Thanks to the touch screen, the menus, in five languages, take you straight to all of the functions. The stylus can be used to act on the various graphic elements.
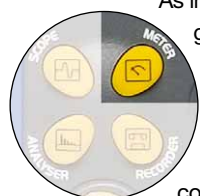*The context-sensitive display zone reports the adjustment in progress unambiguously.*
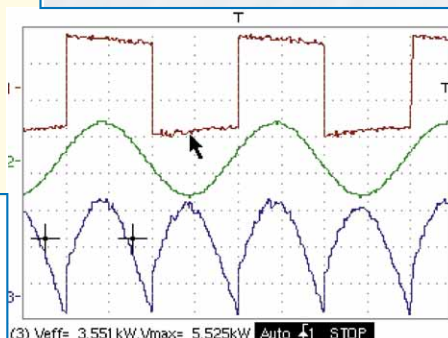
A MULTIPLE INSTRUMENT FOR COMPLETE, PRECISE DIAGNOSTICS

### A multi-channel 8,000-point TRMS digital MULTIMETER

As in the four "instrument" modes, a single press on the specialized key gives access to the multimeter. Series OX 7000 instruments include a veritable two- or four-channel TRMS digital multimeter - the basic instrument for all diagnostics - to make measurements of amplitude (AC and DC voltage and current, power, thermocouples, etc.), resistance, continuity, and capacitance and to test components. The PT 100 and PT 1000 configurations can be used to measure a temperature based on the 100 and 1000 Ω resistive sensors. Here again, all types of sensors used provide scaling and the use of their true physical unit for the greatest possible convenience and efficiency.
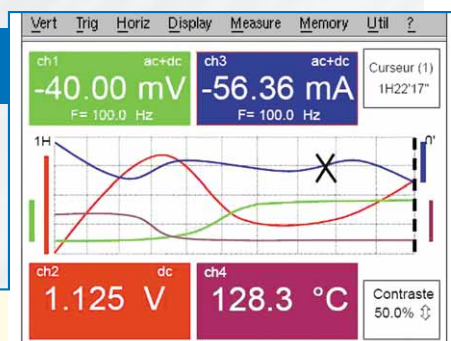
Automatic recording of the measured values in memory is performed on all active channels, making possible surveillance of a period lasting from 5 minutes to 24 hours.

| CHARACTERISTICS	MULTIMETER, 2 or 4 channels - 8,000 points - TRMS
AC, DC, AC + DC voltages	400.0 mV to 600.0 V$_{RMS}$ or 800.0 V$_{DC}$ - precision V$_{DC}$ 0.5 % L + 5 D - pass bandwidth 50 kHz
Resistance	80.00 Ω to 32.00 MΩ - precision 0.5 % L+ 5 D - Rapid 10-ms continuity test
Other measurements	Capacitance, 5.000 nF to 50.00 mF / Frequency 200.0 MHz - 3.3 V diode test

3
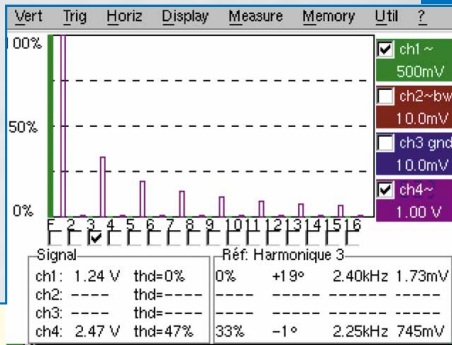
The result of the harmonic analysis is displayed in bargraph form.

The status zone indicates:
- *the total RMS voltage of the signal in V, the harmonic factor in %*
- *for the selected harmonic or fundamental, the value in % of the fundamental, the phase in ° with respect to the fundamental, the frequency in Hz, the RMS voltage in V.*

A harmonic ANALYZER (option)
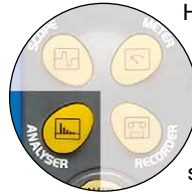
Harmonic analysis is a basic function for all users in the fields of power distribution, electrical engineering, and power electronics. The instrument can display the first 32 orders of signals having fundamental frequencies between 40 Hz and 5 kHz. It is possible to display the harmonic analyses of two or four channels simultaneously.

| HARMONIC ANALYZER (option)	
Analysis span	Even or odd orders up to 31, or first 16 orders - in the 2 or 4 channels
Operation	Permanent display: total RMS value & harmonic factor Order selected: %F, phase, freq, V$_{RMS}$

A RECORDER (option)

For all professional users who must track variations of physical or mechanical phenomena, a veritable high-speed digital recorder can be incorporated in the instrument in the form of a software module. It allows acquisition rates equivalent to as little as 500 µs between two measurements, and the records can cover an entire month.

The users concerned will find features familiar from "Paper recorders" and "Digital recorders", notably monitoring of thresholds and tolerance windows with triggering of long-term storage of the phenomenon observed (50,000 measurements) and the automatic capture of successive timestamped faults (50 1,000-measurement windows).

The analysis can be performed on the instrument itself (even mathematical calculations using values from more than one channel) or standard ".TXT" files exported to a spreadsheet.
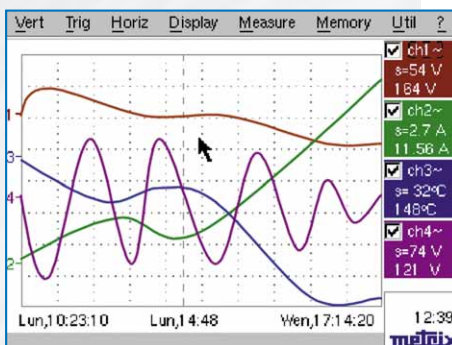
Thanks to the Probix system, the Instrument manages a great variety of sensors (voltage, current, temperature, 0-10V, 4-20mA, etc.) and displays the signals in their original physical magnitude (scale and unit).
The measurement cursors (the last acquisition and the mobile cursor) can be used with the zoom to perform a fine analysis of the signals being acquired or already acquired.

| RECORDER (option)	
Acquisition rate	Sampling interval from 500 µs to 10 mn
Duration of recording	From 25 s to 34 d 16 h 20 mn
Acquisition mode	Conditional on thresholds or windows - "Normal" or "50-fault" acquisition
Operation	Timestamped graphic recording, conversion and units of physical quantities, measurements using cursors and search for events, standard file format usable in spreadsheets (".TXT")

THE OSCILLOSCOPE, VERY SOPHISTICATED AND OFTEN UNIQUE FUNCTIONS:

Complex triggering functions to record only what is necessary
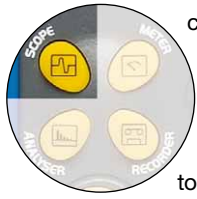
Series **OX 7000** instruments from Metrix are the first oscilloscopes in this category to offer sophisticated triggering functions that go beyond primary triggering on a front or even on a pulse duration. The **delay mode** allows observation of any event with maximum resolution, even if it occurs long after the actual triggering. The **counting mode** makes it possible to count events prior to triggering, in order to check the content of digital frames, for example. Finally, triggering can also be associated with a **TV** signal.

*Actual triggering in the channel occurs after a delay of 35.2 µs with respect to the auxiliary source*
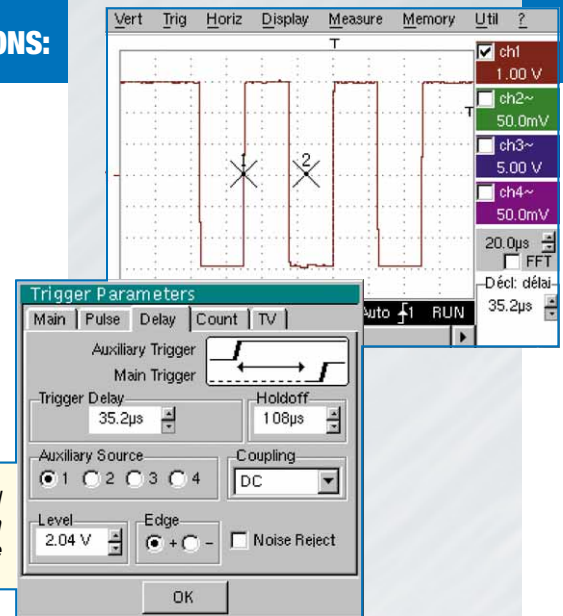
Complete automatic measurements for a precise analysis

The automatic measurements window displays, in a single gesture, all of the 18 parameters of a signal. For an unambiguous analysis, two markers identify the portion of the signal where the first automatic measurement was made. A specific measurement zone can then be selected by outlining it with manual cursors, for a reliable and more precise result.

A direct comparison of two traces is performed by checking "difference from reference memory", so as to display these 18 parameters of the signal in the form of differences.
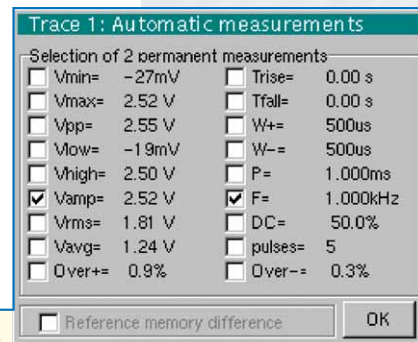
If mathematical functions, scales, or physical units are defined, these measurements allow for them in order to avoid any error of interpretation by a direct reading. This makes a practically infinite number of current and power measurements available with 4-digit resolution, thanks to the 12-bit converter developed by Metrix.
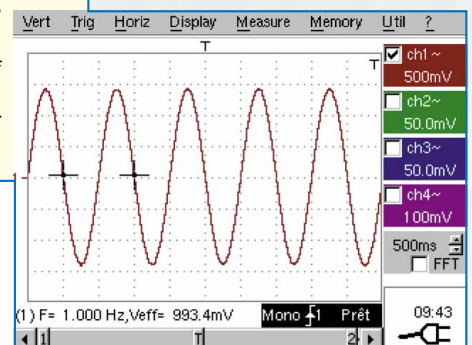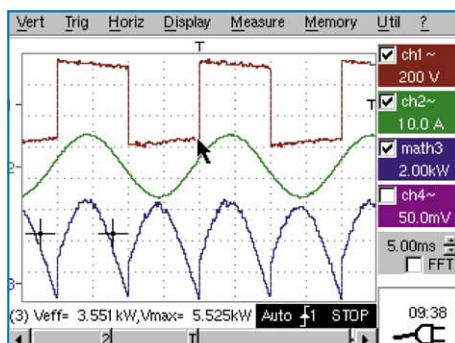
MATH functions

In oscilloscope mode, the math functions (1, 2, 3, and 4) can be used to define, for each of the traces, a mathematical function and vertical scaling with the definition of the true physical unit. The real-time on-screen display capacity of the mathematical editor is 4 calculated trace results, on which all cursor-selected and automatic measurements remain available. It is therefore possible to examine such waveforms as power, for example (U x I), and make all associated measurements.

Many operators are available, for example +, -, x, /, and also sine, cosine, exponent, logarithm, square root, etc., giving access to your particular applications.
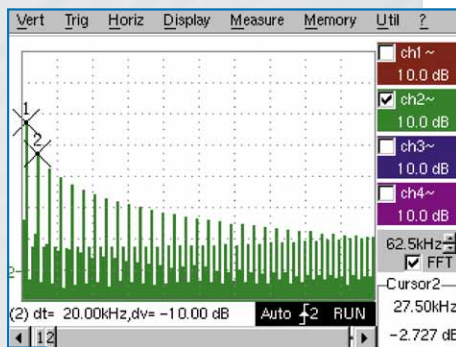
Example of simulation
of a damped sine wave:

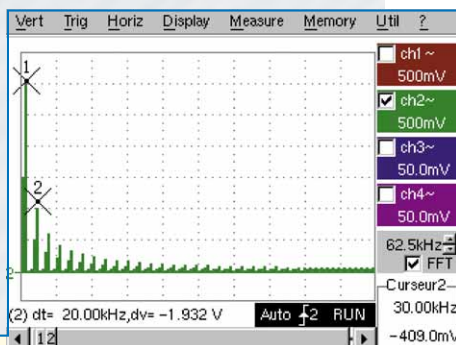*Many complex functions can be edited, including the simulation of a trace from its mathematical equation, and therefore the model of an expected result. All functions created can be stored practically without limit and retrieved for later use.*
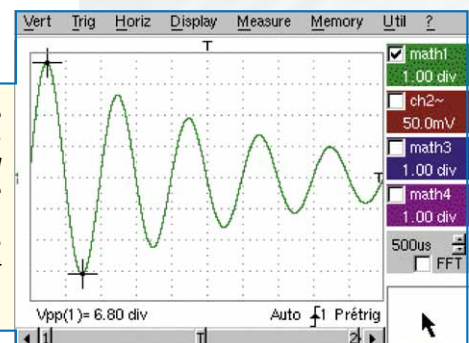
When two channels are multiplied, the result can be displayed to scale, with its physical unit (W, for example), together with the original curves, here the current and the voltage.

5

FFT with a Hanning window and a logarithmic scale.

FFT with a rectangular window and a linear scale.

Real-time fast Fourier transform (FFT) for a frequency analysis of your signals

The FFT is used to calculate - at 2,500 points - the discrete representation of a signal in the frequency domain from its representation in the time domain. It is often a powerful means to an effective diagnostic in an analysis of signal quality:

▶ measurement of the various harmonics and distortion of a signal,
▶ analysis of impulse response,
▶ the search for a noise source in logical circuits,
▶ etc.

Several weighting windows are available, along with 2 representation modes, linear and logarithmic (scale in dB). The 2 cursors can then be used to make precise measurements of frequency spikes, levels, and attenuations, taking advantage of the 80-dB dynamic range allowed by the 12-bit / 1-GS/s conversion.

The autoset makes it easier to obtain an optimum spectral representation on which a graphic zoom can be applied in order to analyze all details of the spectrum.

File management

Each of the traces can be transferred and displayed instantaneously as reference by pressing on a single key for an immediate comparison and difference measurements. Backups are possible in two formats: .TRC, to be called back up on screen; or .TXT, for direct export to another standard "Windows" application, such as a spreadsheet.

The "Windows-like" file management of series OX 7000 instruments lets you keep more than 100 curves, a practically unlimited number of instrument configurations, many, many mathematical functions for re-use, and large series of screen captures in the Windows ".GIF" format for later use.
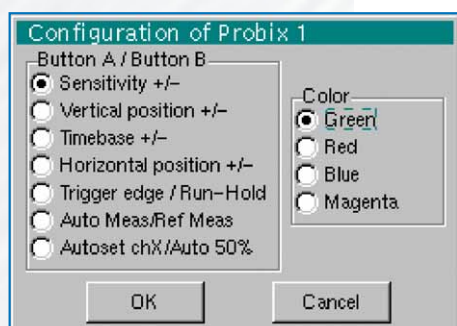
ProbiX SYSTEM: SMART PROBES AND ADAPTERS

The ProbiX system is your assurance that using the instrument will be not only rapid but also, more important, error-free, which is critical for devices used for troubleshooting. For unfailing compatibility, the connection of BNCs and of standard cords is always possible using the safety adapters provided.

An interchangeable plastic ring is used to match the colour of the accessory to the colour of its channel. Power is supplied and the sensors calibrated directly, from the oscilloscope. Some accessories even have three control buttons accessible on the probe itself.

Configuration of the channels and management of the sensors:

The coefficients, scales, and units of the sensors and the channel configurations are managed automatically.

The first two control buttons of the probes are used to directly modify the adjustment parameters of the channel to which they are connected or to copy functions of the front panel of the oscilloscope. The third button is specific to the accessory. On voltage probes, for example, it controls the lighting of the measurement zone. When the connection is made, all preferred parameters stored in the accessories (assignments of buttons 1 and 2, colour) are automatically reactivated. They can be modified using the Probix "pop-up" shown opposite.

Identification of accessories and management of safety:

ProbiX probes and adapters, a sort of "plug and play" of measurement, are recognized immediately when connected. The instrument not only identifies them, but also informs itself of their characteristics. Active safety is built in, notably in the form of safety information and recommendations concerning the accessory used.
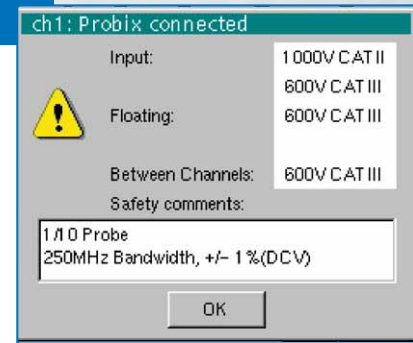
DISTANCE AND EQUIPMENT PROBLEMS ELIMINATED

The ETHERNET interface and its **WEB server** open up new ways of working and communicating, local or remote, with a convenience and effectiveness that will quickly make them necessities. All that is needed for communication is that the other equipment (printer, PC, etc.) should have, like the OX 7000, an IP address.

Thus, even on the road, you can print results on a network printer, exchange files between the OX and a computer. You can also interrogate the instrument remotely from any PC, display the traces in real time, control it using the instrument panel.

Whether locally or at a distance, these transfer and exchange operations are simple and rapid and do not require special software on the computer, thanks to the WEB server.

These portable oscilloscopes, tools for industrial and electronic maintenance, therefore for the first time eliminate the traditional problems of printing, backups, and the documentation of traces. The distance between the place of troubleshooting and the office becomes virtual.
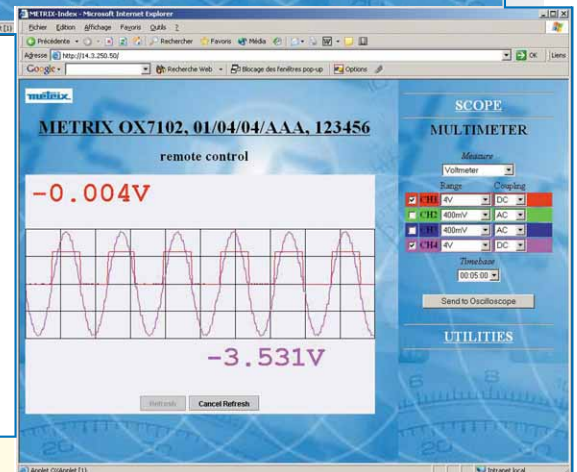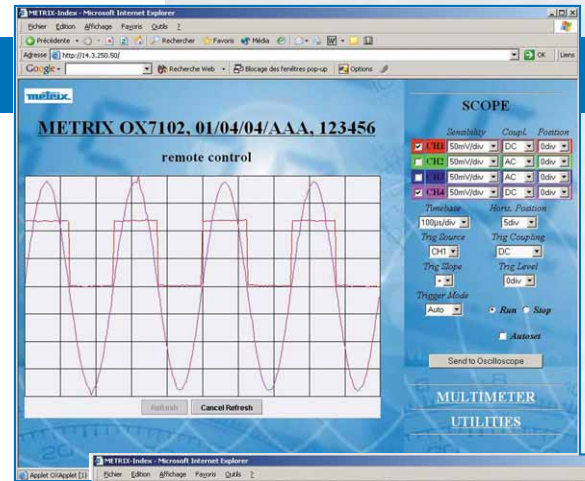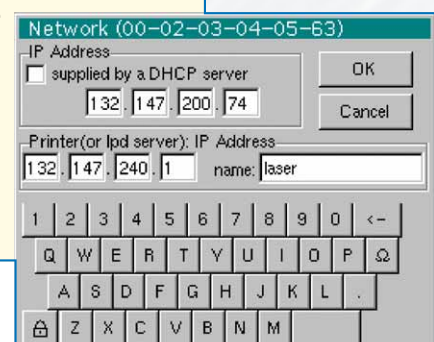
Series OX 7000 instruments are available in a version with a high-quality metallic carrying case to protect the instrument and provide convenient storage for the probes and measurement accessories.

In the oscilloscope or multimeter mode, the web server ensures unparalleled effectiveness, very simply, with no need to install software on the local or remote PC.

Configuring communications is very simple because, in most cases, the IP address of the instrument is provided automatically by the local server; simply enter the address of the printer to be used.

Technical characteristics	OX 7042-C or -M*	OX 7102-C	OX 7104-C**
MAN-MACHINE INTERFACE			
	Color or Black and White* 5.7" (115 x 86 mm) LCD - 320 x 240 - CCFL backlighting (adjustable power-saving switching)		
	Touch screen - "Windows-like" menus and graphic commands		
	5 complete languages, menus & on-line help (French, English, German, Spanish, Italian)		
"PROBIX" CHANNELS 600V CAT III	40 MHz	100 MHz	100 MHz
	2 isolated channels	2 isolated channels	4 isolated channels
	16 ranges from 2.5 mV to 200 V/div		
	"One Click Winzoom" system (direct graphic zoom on screen) - x 5 maximum		
	Probe factors 1 / 10 / 100 / 1000 or scaling to any value definition of the measurement unit		
TIME BASE	35 ranges from 1 ns/div to 200 s/div. - Roll mode from 100 ms to 200 s/div		
	"One Click Winzoom" system (direct graphic zoom on screen) - x 10 maximum		
TRIGGERING	Front, Pulse duration, or Delay (20 ns - 340 s), Count (2-16384), or TV (525 or 625 lines)		
SAMPLING / CHANNEL	12 bits - 50 GS/s in ETS - 1 GS/s in one-shot		
	2,500 points per channel - Memory capacity > 100 curves		
	"Windows-like" file management - Total user memory approx. 2 MB Files in "Windows" formats usable as is on PC: ".TXT", ".BMP", ".GIF", etc.		
	2-ns Glitch mode, Envelope Mode, Averaging (Factors from 2 to 64), XY mode		
OTHER FUNCTIONS			
	Complete autoset in less than 3 s, with recognition of the channels		
	Mathematical functions: FFT, +, -, x, / & Editor of recordable functions		
	Measurements: 3 cursors & 18 automatic measurements - Resolution 12 bits, 4-digit display		
MULTIMETER	2 or 4** channels - 8,000 pts + min/max bargraph - TRMS Timestamped graphic recording (5 mn to 24 h)		
recorder (option)	Timestamped graphic recording from 25 s to 34 d 16 h 20 mn - Conditional on thresholds or windows		
HARMONIC ANALYZER (option)	Even or odd orders up to 31, or first 16 orders - in the 2 or 4** channels		

General specifications

Ethernet Network Printing (standard) RS232 or Centronics (options)	11 B&W and Color drivers: IBM Proprinter, Epson ESC/P, Canon HP PCL, Seiko DPU411, Postscript Image files: ".BMP" approx. 10 kB, ".GIF" approx. 5 kB (storage in memory, transfer by CA 232 or Ethernet)		
Communication with PC	Local via 10 MB Ethernet or RS 232 (option) - Remote via 10 Mb Ethernet and web server "Sx-Metro" application software for PC (option)		
Supply by battery or Adapter / Line charger	9 V / 3.8 Ah Battery pack - Approximately 4 h between charges - Adjustable power-saving switching Multi-voltage, 98-254 V / 47-63 Hz - Fast charge in 2 hours (oscilloscope off)		
Mechanical characteristics	250 (h) x 190 (w) x 55 (d) mm - 1.9 kg with batteries - IP51 protection		

N.B.: detailed technical documentation including all characteristics is available on request.

To order:

OX7042-M: portable oscilloscope, 2 x 40 MHz, B&W
OX7042-C: portable oscilloscope, 2 x 40 MHz, colour
OX7102-C: portable oscilloscope, 2 x 100 MHz colour

Accessories provided:

1 Instrument, 1 adapter/line charger,
1 9.6-V - 3.8-Ah NiMH battery pack,
1 Probix 1/10 probe, 1 Probix BNC adapter,
1 Probix banana adapter, dia. 4 mm,
1 set of cords, diameter 4 mm, banana,
1 crossed Ethernet cord and
1 operating manual on CD-ROM.

To order:

OX7042-MK: portable oscilloscope, 2 x 40 MHz, B&W - kit
OX7042-CK: portable oscilloscope, 2 x 40 MHz colour - kit
OX7102-CK: portable oscilloscope, 2 x 100 MHz colour - kit
OX7104-CK: portable oscilloscope, 4 x 100 MHz colour - kit

Accessories provided:

1 Instrument, 1 adapter/line charger,
1 9.6-V - 3.8-Ah NiMH battery pack,
2 Probix 1/10 probes, 2 Probix BNC adapters,
1 Probix banana adapter, dia. 4 mm,
1 set of cords, diameter 4 mm, banana,
1 crossed Ethernet cord, 1 straight Ethernet cord,
1 SX-METRO/P kit including the RS232 cable,
1 carrying case and 1 operating manual on CD-ROM.

Accessories:

HX0028: harmonic analyzers
HX0029: recorder
HX0030: PROBIX 1/10 probe, 250 MHz, 1000 V
HX0031: PROBIX BNC adapter
HX0032: PROBIX 50 Ω adapter
HX0033: PROBIX banana adapter
HX0034: PROBIX current clamp
HX0035: PROBIX K thermocouple adapter
HX0038: carrying case
HX0039: ethernet/standard
HX0040: ethernet/crossed
HX0041: RS 232/CENTRONICS adapter
HX0042: RS 232/9-contact D-SUB cord
SX-METRO/P: data processing software

for information

906 211 098 - Ed.3 -VS 07/05. Characteristics subject to modifications according to technological developments.