metrix® Analyser-Oscilloscopes

Portable stand-alone instruments from 40 to 200 MHz

OX 7042
OX 7062
OX 7102
OX 7104
OX 7202
OX 7204

- 5 complementary tools in a single instrument: **OSCILLOSCOPE, FFT ANALYSER, MULTIMETER/WATTMETER, HARMONIC ANALYSER on voltage/current/power and RECORDER**
- NEW **Bandwidth up to 200 MHz, versions with 2 or 4 isolated channels (600 V Cat. III)**
- NEW **Sampling rate 2.5 GS/s in one-shot mode and 100 GS/s in ETS mode**
- NEW **Memory depth of up to 50,000 points per channel (OSCILLOSCOPE and RECORDER modes) (option)**
- Standard "real-time" FFT analysis and calculation functions on channels
- 2 or 4 independent TRMS digital multimeters (8,000 counts, 200 kHz)
- NEW **Triggering on measurement thresholds in OSCILLOSCOPE and MULTIMETER modes**
- NEW **HX0072 and HX0073 *FLEX* current sensors powered by the instrument**
- NEW **HX0075 application module for your power measurements**
- NEW Monochrome LCD or colour TFT touch screen with LED backlighting
- 33 direct-access keys and "windows-like" menu on screen
- Probix "plug & play" input terminals and smart sensors
- Multi-interface communication: RS232, USB, Centronics and Ethernet
- NEW **Large storage capacity on removable SD card**
- NEW **Web server with cursors and automatic measurements and FTP server/client**

metrix® A Brand of CHAUVIN ARNOUX GROUP

A UNIQUE INSTRUMENT

From the point of view of innovation, Metrix has not just contented itself with launching the first portable, stand-alone oscilloscope with four 600 V / Cat. III isolated channels on the market. Indeed, everything about the OX 7000 models, including their ergonomics, versatility, safety and various communication features, has been designed to offer the best possible trade-off between safety, service and comfortable use. In performance terms, they are at the top of their category with their brand new 12 bit / 1 GS/s converter, a sampling rate of 50 GS/s on periodic signals and capture of transients lasting 2 ns or more. Because modern means more efficient, these models can be controlled using either the "Windows-like" menus on the touch screen or 33 dedicated keys offering direct access to the most frequently-used functions. For even better performance in the field, the OX 7000 models offer a new patented system of "plug and play" accessories, individual insulation of each of the measurement channels, the extensive remote management possibilities offered by the Ethernet link with a WEB server and a variety of built-in instruments, including a 200 kHz multi-channel multimeter.

Direct access and intuitive navigation

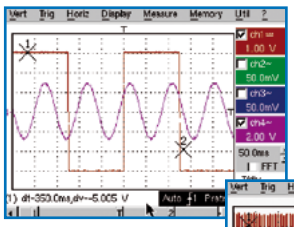
The "Windows-like" ergonomics facilitate user familiarization with the oscilloscope -usually considered difficult. The touch screen makes navigation smooth and easy. The various menus can be opened using the stylus which can also be used to modify the graphical elements such as the cursors, triggers, etc.

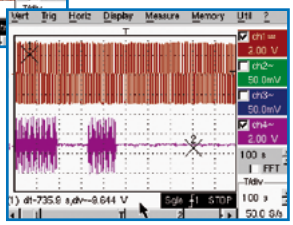
*With their 2 or 4 isolated channels (600 V Cat. III), their advanced trigger functions, integrated FFT, mathematical calculations on the curves and WEB server, the 200 MHz OX 7202 and OX 7204 will be particularly appreciated in **ELECTRONIC MAINTENANCE**.*

*The OX 7042's extra-large monochrome or colour screen, 40 MHz bandwidth, 2 isolated 600 V Cat. III channels and harmonic analyser module will make it particularly interesting for **INDUSTRIAL MAINTENANCE** professionals.*

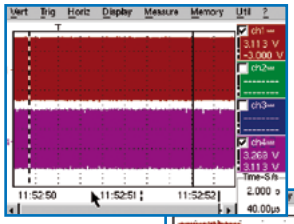
50,000-POINT MEMORY

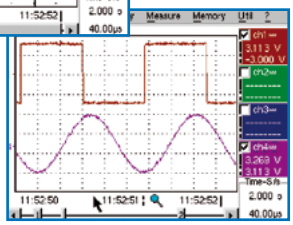
Availability of the memory:
- in one-shot mode for time bases from 10 ms to 200 s/div
- in ETS mode for all time bases





SCOPE MODE:
Optimization of the duration/resolution trade-off
- example 1: for a 1 µs resolution, 50 ms duration.
- example 2: for a 100 s duration, 2 ms resolution.





RECORDER MODE:
Acquisition of 50,000 samples,
maximum resolution 40 µs,
x 100 zoom (one mains period).

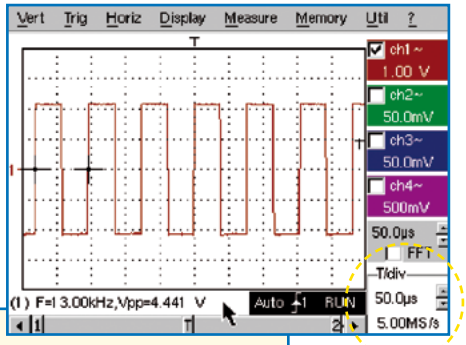
OX 7000 oscilloscopes,
Simplicity serving performance

USER-FRIENDLY PERFORMANCE

The oscilloscope, multimeter, harmonic analyser and recorder modes are directly accessible on the instrument's front panel.

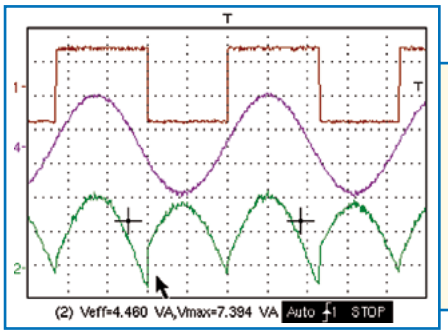
There are 33 keys for direct access to the instrument's various parameters and modes. Contextual online help concerning the keys on the instrument (in five languages) is available on screen.

A removable µSD card can be used to stored up to 2 GB of data.

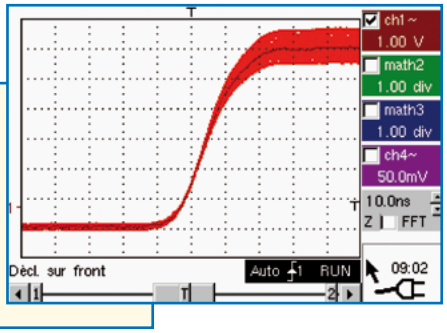


Contextual display area

(Oscilloscope mode)
With the touch screen, the menus in five languages give access to all the functions without exception. The stylus can be used to modify the different graphical elements. The contextual display area clearly indicates the active settings.



The extra-large display area for traces (110 x 75 mm) in "FULL SCREEN" mode ensures that screenshots are not cluttered by superfluous information or menus.



In oscilloscope mode, the new totalizing function can be used to record the variations of a signal over time. This is particularly useful for checking signal amplitude or frequency instabilities, modulations and jitters.

SEVERAL INSTRUMENTS IN ONE FOR COMPREHENSIVE, ACCURATE DIAGNOSTICS

A 200 kHz multi-channel TRMS digital multimeter

Just like for the 4 "instrument" modes, you can access the multimeter simply by pressing the corresponding key. The OX 7000 models are genuine 2 or 4-channel TRMS digital multimeters offering the following measurements:

- amplitude (DC or AC voltage and current, power, thermocouples, etc.)
- resistance, continuity, capacitance
- component test, etc.

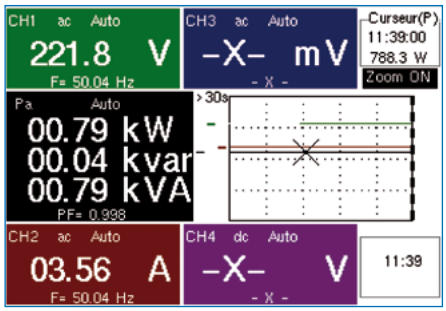
Temperature can be measured with the Pt 100 and Pt 1000 sensors. By using 1 or 2 thresholds per channel to monitor the measurements, you can capture faults as short as 48 ms, and you can set the fault duration, beginning at 48 ms. The instrument also allows you to record a list of time/date-stamped faults (up to 100).

The values measured can be recorded automatically on all the active channels over a period from 5 minutes to 1 month.

The power measurement function now offers simultaneous display of the active, apparent and reactive power values.

The precise value of the cursor position is displayed at the top of the screen.

It is also possible to zoom on this part.



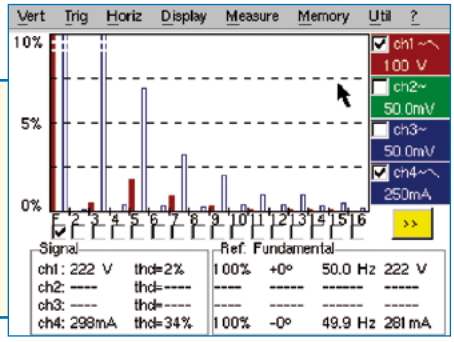
Specifications	2 or 4-channel multimeter - 8,000 counts - TRMS
AC, DC and AC + DC voltages	600.0 mV to 600.0 VRMS or 800 mV to 800.0 VDC - accuracy VDC 0.5 % R + 5 D - bandwidth 200 kHz
General specifications	2 or 4 channels - 8,000 counts max. & bargraph - Min/Max - TRMS - Time/date-stamped graphic recording
Resistance	80.00 Ω to 32.00 MΩ - Accuracy 0.5 % R + 25 D - 10 ms quick continuity test
Other measurements	Capacitance from 5.000 nF to 5.00 mF / Frequency 200.0 kHz - 3.3 V diode test

A harmonic ANALYSER (option)

Harmonic analysis is carried out up to the 61st order to comply with the requirements of the EN 50160 standard (THD on 50 orders minimum), with a fundamental frequency of 40 to 450 Hz. It is possible to preselect the frequency of the fundamental for the standards (50 Hz, 60 Hz and 400 Hz). This function helps to improve analysis performance and allows measurement when the level of a harmonic order is greater than the fundamental.

It is possible to view the harmonic analyses of two or four channels simultaneously.

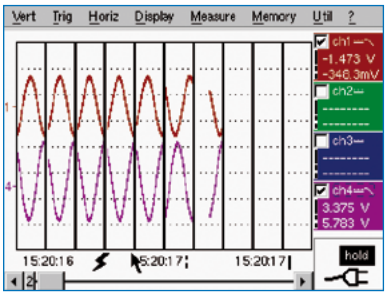
The "vertical zoom" (button on front panel) can be used to adjust the dynamic range to the requirements (0-100 %, 0-50 %, 0-25 %, or 0-10 %).



Harmonic ANALYSER (option)	
Multi-channel analysis	2 or 4 depending on model - 61 orders - frequency of fundamental from 40 to 450 Hz in auto or manual mode
Processing	Permanent display: total RMS value & THD - selected order: %F, phase, freq, VRMS

A RECORDER (option)

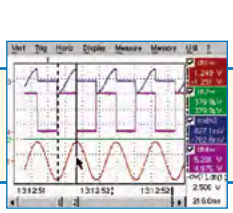
To monitor the variations of physical or mechanical phenomena over time, a genuine high-speed digital recorder can be incorporated into the instrument as a software module. This allows acquisition rates of up to 40 µs between 2 measurements and the recordings can cover a whole month.

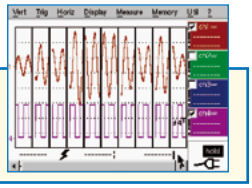


Automatic fault capture is possible by monitoring 1 or 2 thresholds per channel. The fault duration can be set from 160 µs to approximately 8 days. It is also possible to carry out this monitoring on tolerance windows. The capture function triggers storage of the phenomenon observed in long-term memory (up to 50,000 points) or automatic capture of successive time/date-stamped faults (max. 500 faults). The "faults" are automatically stored either in the internal memory or on an FTP server (PC hard disk).

The analysis can be carried out on the instrument, using the cursors and automatic measurements. It is also possible to perform mathematical calculations between the channels or to export standard "TXT" files into a spreadsheet.

Display in normal mode and in fault capture mode



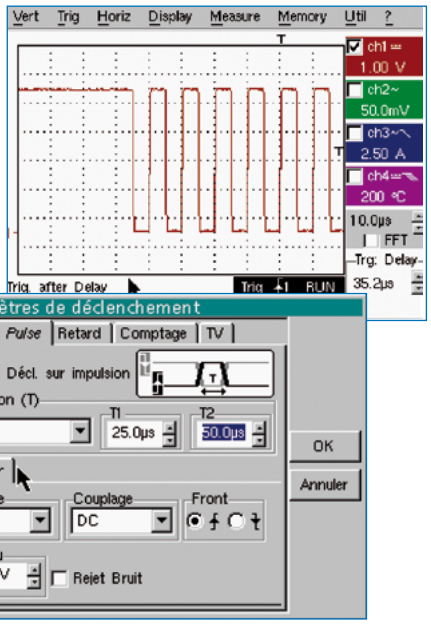


RECORDER (option)	
Acquisition rate	Sampling interval of 800 µs to 17 min 51 s - (standard memory 2,500 points) Sampling interval of 40 µs to 53.5 s - (with 50,000-point memory extension)
Recording duration	2 s to approx. 1 month
Acquisition mode	Conditioned by thresholds or windows - "Normal" acquisition or up to 500 faults
Processing	Time/date-stamped graphic recording, conversion and units of physical quantities, measurements using cursors and event searches, file format compatible with standard spreadsheet (".TXT")

SOPHISTICATED AND OFTEN UNPRECEDENTED FUNCTIONS

An OSCILLOSCOPE with complex trigger functions so that you only record what you need

Metrix OX 7000 oscilloscopes are the first models in this category to offer advanced triggering modes which are not just limited to a primary edge or pulse-width trigger.
The **delay mode** allows users to observe any event with the maximum resolution, even if it occurs a long time after the effective trigger and even if it occurs on 2 different channels.
The **counting mode** makes it possible to count events prior to triggering so that you can check the content of digital frames, for example. Lastly, the trigger can also be associated with an "auxiliary" signal different from the "primary" signal.
A new function offering triggering on thresholds can be used to acquire or analyse the triggering signal, as well as to search for a condition on an automatic measurement (level, duration, etc.).



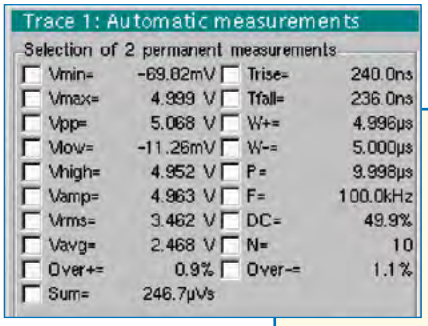
Effective triggering on the channel will occur after a delay of 35.2 µs in relation to the auxiliary source.

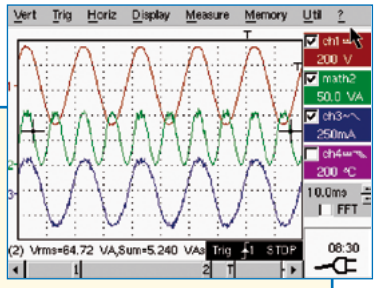
New & unique on the market!

For the "Oscilloscope" and "Multimeter" modes, fault capture is possible after setting a "Software" trigger based on monitoring the tolerance interval. It is also possible to store and automatically restart threshold overrun captures.

Comprehensive automatic measurements for precise analysis

With a single click, the automatic measurements window displays all the 19 parameters of a signal.
For unambiguous analysis, two markers indicate the portion of the signal where the first automatic measurement was made.
A specific measurement area can then be selected by framing it with the manual cursors to ensure reliable, more accurate results.
Direct comparison of two traces is possible by ticking the "reference memory difference" box, so that the signal's 19 parameters are displayed as deviations.

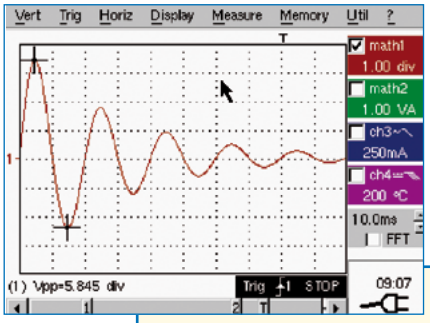




If mathematical functions, scaling values or physical units are defined, these measurements will take them into account so as to avoid interpretation errors due to direct readings. In this way, an almost infinite number of measurements (current, power, etc.) are available with genuine 4-digit resolution thanks to the 12-bit converter developed by Metrix.

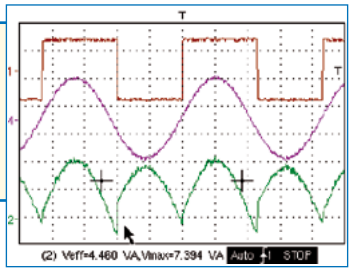
The MATH functions

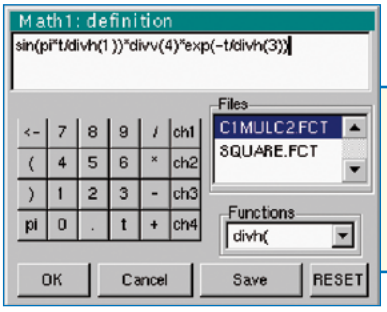
In oscilloscope mode, the math functions (1, 2, 3 and 4) can be used to define a mathematical function for each of the traces, as well as vertical scaling with definition of the actual physical unit.
The screen of the mathematical editor is capable of displaying 4 calculated traces on which all the automatic or cursor measurements remain available. This means that it is possible to examine the waveforms such as the power (U x I), for example, and carry out all the associated measurements.
A large number of operators are available, such as +, -, x and /, but these oscilloscopes also offer sine, cosine, exponential, logarithm, square root, etc., allowing users to develop specific applications.



Many complex functions are editable, including simulation of a trace on the basis of its mathematical equation and therefore modelling of an expected result.
There is almost infinite capacity for saving the functions created so that they can be recalled subsequently.

When two channels are multiplied, it is possible to view the result after scaling, with its physical unit (W for example) and the original curves (in this example, the current and the voltage).





The "MATH" functions can be input very easily using the simplified menu in "Standard" mode or the equation generator in "Advanced" mode.

SOPHISTICATED AND OFTEN UNPRECEDENTED FUNCTIONS

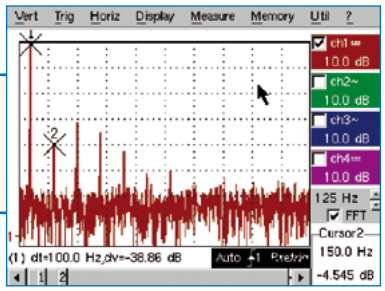
Real-time Fast Fourier Transform (FFT) for signal frequency analysis

FFT is used to calculate the discrete representation of a signal in the frequency domain from its representation in the time domain, on the basis of 2,500 points. It is often crucial for effective diagnosis when carrying out qualitative signal analysis:

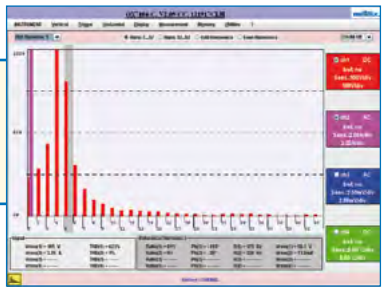
- measurement of the different harmonics, sub-harmonics and non-harmonics, as well as signal distortion,
- analysis of a pulse response,
- search for noise source in logical circuits,
- etc.

Several weighting windows are available, as well as 2 display modes: linear or logarithmic (scale in dB). The 2 cursors can then be used to make accurate measurements of the frequency lines, levels and attenuations, taking advantage of the 80 dB dynamic range provided by the 12 bit / 2.5 GS/s conversion.
The autoset function helps to obtain optimum spectrum display so that a graphic zoom can then be applied in order to analyse all the details of the spectrum.

FFT with a rectangular window and a linear scale.



FFT with a rectangular window and a linear scale.



File management

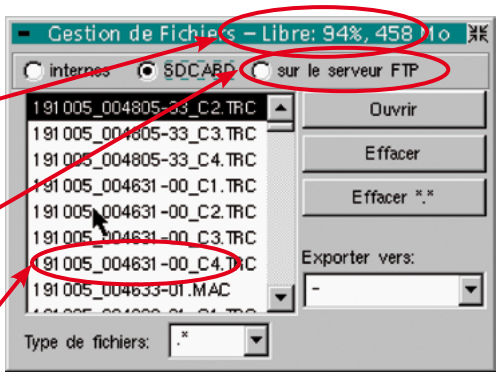
Each of the traces can be displayed instantly as a reference by pressing a single key for immediate comparison and deviation measurements. Back-ups are possible in two formats: .TRC for recall to the screen or .TXT for direct export into another standard Windows application, such as a spreadsheet.

On the oscilloscope, it is also very simple to copy, transfer or delete files from the 3 storage areas accessible (oscilloscope, µSD card, PC hard disk).

Management of remaining storage capacity (% and size in kB)

Storage possible on FTP server (PC hard disk)

Plain-language default name with format "date/time/number"



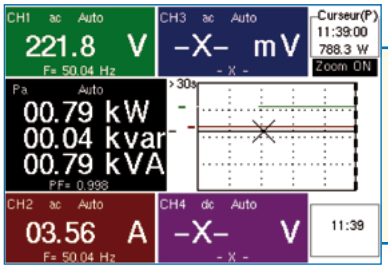
POWER MEASUREMENTS

Intended for "electrical energy" and "power electronics" applications, the OX 7042* and OX 7104* models are now available in new "Power" versions, with accessories and a dedicated application module.
With this module, it is now possible to analyse harmonics on the single-phase apparent power in **ANALYSER MODE,** in particular for motor diagnostics. Furthermore, it covers harmonics up to the 61st order, thus complying with the EN 50160 standard (minimum requirement: 50th order).

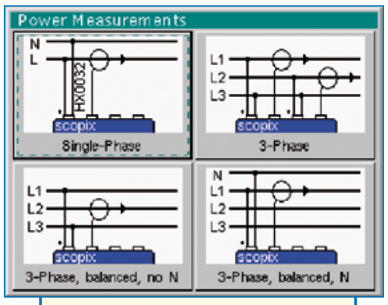
* These models are delivered with all the software options available (see last page).

In **MULTIMETER MODE**, the power measurements are developed as follows:

- single-phase power
- 3-phase power on balanced network without neutral
- 3-phase power on balanced network with neutral
- 3-wire 3-phase power (method with 2 wattmeters)



Display of apparent, active and reactive power and the PF



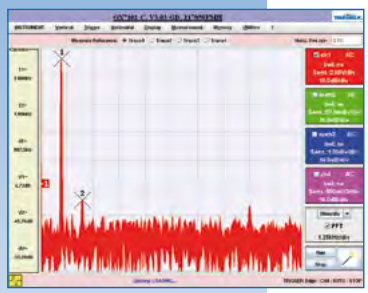
Selection of the type of network supplying the load

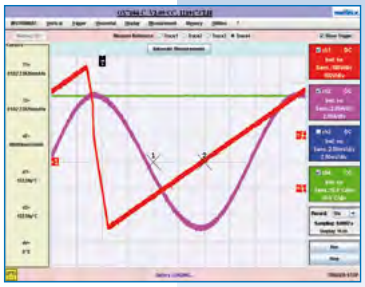
There are 2 new ProbiX accessories dedicated to power measurements:

◀ **HX0072** (Amp*FLEX*™ 5 A to 3,500 A / 200 kHz), energy distribution and machines

HX0073 (Amp*FLEX*™ 1 A to 350 A / 3 MHz), switchboards and power electronics ▶

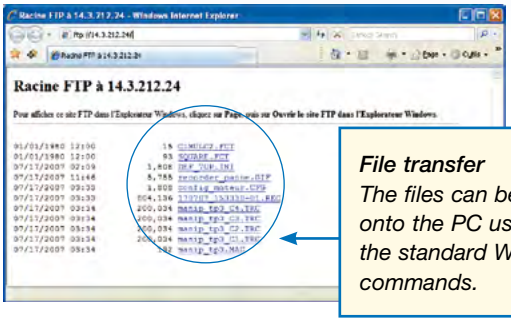
NO MORE PROBLEMS WITH DISTANCE AND EQUIPMENT



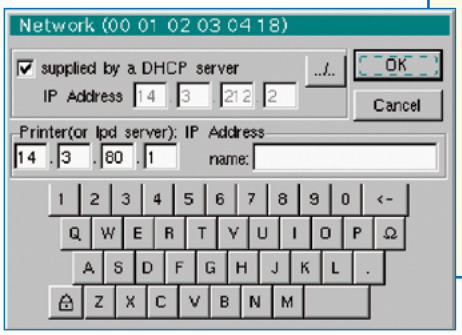


The ETHERNET interface and the new "SCOPENET" WEB server open the way for new ways of working and communicating, locally or remotely, as well as a level of comfort and efficiency which users quickly learn to rely on. To establish communication, all the other items of equipment (printer, PC, etc.) need to have IP addresses, like the OX 7000. In this way, even when you are on the road, you can print out your results on a network printer or exchange files between the OX and a computer. You can also communicate with the instrument remotely from any PC, view the traces in real time and control the instrument using the control panel.
Whether local or remote, these transfer and exchange operations can be carried out simply, quickly and without installing any software on the computer, thanks to the Web and FTP servers and to the new "SCOPEADMIN" utility. For the first time, these portable oscilloscopes for industrial and electronic maintenance help to solve the traditional problems linked to printing, back-up and documentation of the traces. The distance between the maintenance site and the office becomes virtual.

Use of the WEB server



File transfer
The files can be copied onto the PC using the standard Windows commands.



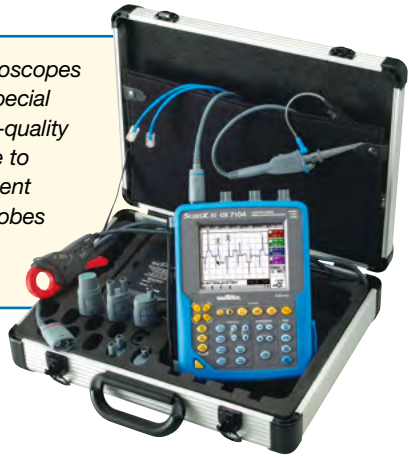
It is really simple to configure communications because, in most cases, the instrument's IP address is supplied automatically by the local server.
All you have to do is enter the address of the printer to be used.

ProbiX SYSTEM SMART PROBES AND ADAPTERS

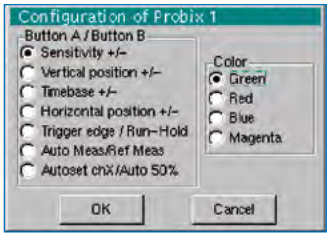
The ProbiX system guarantees quick, error-free implementation of the instrument, a crucial advantage with equipment used for troubleshooting. For flawless compatibility, it is always possible to connect BNC accessories and standard banana leads via the safety adapters supplied.

Interchangeable plastic rings can be used to match the accessory's colour to the channel's colour. The oscilloscope directly powers and calibrates the sensors. Some accessories even include three buttons directly accessible on the probe.

The OX 7000 oscilloscopes are available in a special version with a high-quality metal carrying case to protect the instrument and store all the probes and measurement accessories.



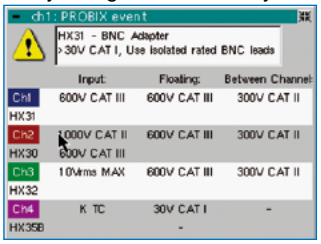
Channel configuration and sensor management



The sensor coefficients, scales and units and the channel configuration are managed automatically. The first two control buttons on the probes can be used to directly modify the parameter settings of the channel to which they are connected. They also control the functions accessible on the front panel of the oscilloscope. The third button is specialized for each accessory. On the voltage probes, for example, it controls lighting of the measurement zone. At connection, all the preferred parameters stored in the accessories (assignment of buttons 1 and 2, colour) are automatically reactivated by means of the Probix "pop-up" shown opposite.

Accessory identification and safety management

A sort of "plug and play" system for measurement, ProbiX probes and adapters are immediately recognized when they are connected. The instrument not only identifies them, but also gathers information on their characteristics. Active safety is built in, notably in the form of safety information and recommendations concerning the accessory used.



TECHNICAL SPECIFICATIONS	OX 7042 (1)	OX 7062	OX 7102	OX 7202	OX 7104	OX 7204
MAN-MACHINE INTERFACE						
Type of display	5.7" B&W (1) LCD screen (115 x 86 mm) - 320 x 240 - CCFL backlighting (adjustable standby time) or 5.7" colour TFT LCD (115 x 86 mm) - 320 x 240 - LED backlighting (adjustable standby time)					
Screen commands	Touch screen - "Windows-like" menus and graphic commands					
Choice of language	Menus and online help in 5 languages (French, English, German, Spanish, Italian)					
OSCILLOSCOPE MODE						
Vertical deflection						
Bandwidth	**40 MHz**	**60 MHz**	**100 MHz**	**200 MHz**	**100 MHz**	**200 MHz**
	15 MHz, 1.5 MHz or 5 kHz bandwidth limiter					
Number of channels	**2 isolated channels**				**4 isolated channels**	
Vertical sensitivity	16 calibres from 2.5 mV - 200 V/div and up to 156 µV/div in vertical zoom mode (12-bit converter) - Accuracy ± 1 %					
Vertical zoom	"One Click Winzoom" system (12-bit converter and direct graphical zoom on screen) - x 16 max.					
Probe factors	1 / 10 / 100 / 1,000 or any scaling - Definition of measurement unit					
Horizontal deflection						
Sweep speed	35 calibres from 1 ns/div to 200 s/div., accuracy ± 0.1 % - Roll mode from 100 ms to 200 s/div					
Horizontal zoom	"One Click Winzoom" system (direct graphical zoom onscreen) - x 100 max					
Triggering						
Mode	On all channels: automatic, triggered, one-shot, auto level 50 %					
Type	Edge, pulse width (20 ns - 20 s), delay (120 ns to 20 s), counting (3 to 16,384 events), TV frame or no. of lines (525 = NTSC or 625 = PAL/SECAM) - Triggering after delay - Continuous adjustment of Trigger position					
On measurement window	On one of the 16 automatic measurements - Acquisition and automatic storage of faults					
Digital memory						
Maximum sampling rate	100 GS/s in ETS mode - 2.5 GS/s in one-shot mode (on each channel) - 12 bits (vertical resolution 0.025 %)					
Memory depth	2,500 points/channel and up to 50,000 points/channel with the "Extended Acquisition Memory" option					
User memory "Windows-like" file management	2 MB for storing various types of files: trace, text, configuration, mathematical functions, print files, image files, etc. + large-capacity removable SD-Card (512 MB to 2 GB)					
GLITCH modes and averaging	2 ns GLITCH Mode, Envelope Mode, Averaging (Factors 2 to 64), XY Mode					
Other functions						
FFT analyser & MATH functions	FFT (Lin or Log) with measurement cursors - Functions: +, -, x, / and mathematical function editor					
Cursors	2 or 3 cursors: simultaneous V and T or Phase - Resolution 12 bits, display 4 digits					
Automatic measurements	19 time or level measurements, Phase measurement - Resolution 12 bits, display 4 digits					
MULTIMETER MODE						
General characteristics	2 or 4 channels - 8,000 counts max. + min/max bargraph - TRMS - Time/date-stamped graphic recording (5 min to 31 days)					
AC, DC and AC + DC voltages	600 mV to 600 VRMS, 800 mV to 800 VDC - VDC accuracy 0.5 % R + 5 D - bandwidth 200 kHz					
Trigger on measurement window	2 or 4 monitored channels, parameterizable fault duration - Up to 100 time/date-stamped faults stored in a ".TXT" file					
Active power and PF	Single-phase - Balanced three-phase (OX 7104 or OX 7204), with or without neutral and using the 2-wattmeter method					
Resistance	80 Ω to 32 MΩ - accuracy 0.5 %R + 25 D - 10 ms quick continuity test					
Other measurements	Temperature (HX0035 = K TC, HX0036 = Pt 100) - Capacitance 5 nF to 5 mF - Frequency 200 kHz - Diode test 3.3 V					
HARMONIC ANALYSER MODE (option)						
Multi-channel analysis	2 or 4 (depending on model), 61 orders, fundamental frequency from 40 to 450 Hz in auto or manual mode					
Simultaneous measurements (voltage/current)	Total RMS value, THD and selected order (% fundamental, phase, frequency, RMS value)					
Single-phase and balanced three-phase power	Harmonic analysis on apparent power with "received/transmitted" indication for each order					
RECORDER MODE (option)						
Sampling duration	2 s to 1 month / 800 µs to 18 min (40 µs to 53 s with the "Extended Memory Acquisition" option)					
Recording conditions	On thresholds or window, simultaneous conditions on several channels, with parameterizable duration starting at 160 µs					
Recording analysis	Scales and physical units, automatic or cursor measurements, time-stamped fault searching, zoom, etc.					
General specifications						
Printing	Network printer via 10 Mb Ethernet (standard), RS232 (standard) or Centronics (option)					
PC communication	10 Mb local Ethernet, USB or RS 232 (option) (max. 115 kbps) - "SX-Metro" PC application software (option)					
Network	10 Mb remote Ethernet, Web server (remote control, "real-time" trace, cursors and automatic measurements) FTP server (file exchange with a PC), FTP client (storage on PC hard disk - unlimited), utility SCOPEADMIN					
Power supply	Mains power supply NiMH battery - Battery life up to 7.5 hrs - Adjustable standby function - Multi-voltage adapter/high-speed charger (standard) - 98-264 V / 47-63 Hz / (15 W)					
Safety / EMC	Safety as per IEC 61010-1 (2001) - EMC as per EN61326-1 - 600 V CAT III					
Mechanical specifications	265 x 195 x 56 mm - 1.9 kg with batteries - Protection IP51 (IP41 for OX 7104 and OX 7204)					

(1) depending on model

Ref for ordering	State at delivery
OX7042-MSD OX7042-CSD OX7062-CSD OX7102-CSD OX7202-CSD OX7204-CSD	**Version ❶** oscilloscope in cardboard box with: external power supply/battery charger, NiMH battery pack, magnetic stylus, 1/10 Probix HX0030B probe for 2-ch. version and 2 probes for 4-ch. version, Probix HX0031 BNC adapter for 2-ch. version and 2 adapters for 4-ch. version, Probix HX0033 Ø 4 mm banana adapter, set of Ø 4 mm banana leads + test probe, HX0040 crossed-Ethernet cable, HX0084 USB cable, µSD card with minimum capacity of 1 GB and SD-Card adapter, operating and programming manual and LW/LV drivers on CD-Rom.
OX7042P-CSDK OX7104P-CSDK	Same as **version ❶** + 1/10 Probix HX0030B probe, Probix HX0031 BNC adapter, HX0072 and HX0073 *FLEX* current probes, 2 HX0071 industrial accessories kits for HX0030B Probix probe, HX0039 straight-Ethernet cable, SX-METRO/P processing software (all software options installed) and carrying case.
OX7104-CSDO OX7204-CSDO	Same as **version ❶** + 2 x 1/10 Probix HX0030B probes, SX-METRO/P processing software with harmonics, logger and 50 KB options installed, carrying case.

OPTIONAL ACCESSORIES

Software options

HX0028: "Harmonic analysis" option
HX0029: "Recorder" option
HX0075: "Power measurement" option
HX0077: "Acquisition memory extension" option

Probix accessories

HX0030B: Probix 1/10 probe 250 MHz - 600 V CAT III - 1000 V CAT II
HX0031: Probix BNC adapter - BW 250 MHz
HX0032: Probix 50 Ω BNC Adapter - BW 250 MHz
HX0033: Probix banana adapter
HX0034: Clamp-on ammeter 80 A peak, AC/DC, BW 1 MHz
HX0035B: Adapter for K thermocouple, -40 °C to +1,250 °C
HX0036: Adapter for Pt100, -100 °C to +500 °C
HX0071: Industrial accessories kit for HX0030B
HX0072: Probix Amp*FLEX* current probe, 5 A to 3,500 A - 200 kHz
HX0073: Probix MiniAmp*FLEX* current probe, 1 A to 350 A - 3 MHz

Metrological communication

HX0039: Straight RJ45 Ethernet cable
HX0040: Crossed RJ45 Ethernet cable
HX0041: RS232 / Centronics adapter
HX0042: 9-pin RS232 / SUBD cable
HX0055: USB master / RS232 adapter
SX-METRO/P: Data processing software
HX0084: USB cable

Transport / Power supply

HX0038: Carrying case
HX0057: Fully-equipped Scopix case
HX0061: 10 to 60 VDC vehicle power supply
HX0063: Battery and external charger accessory

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