

ALL-IN-ONE RELAY TEST SET

▶ **MENTOR 12**



SMC
EURO

www.eurosmc.com



MENTOR 12

“All in One” System for electromechanical, electronic, and numerical protection relay testing



INNOVATION

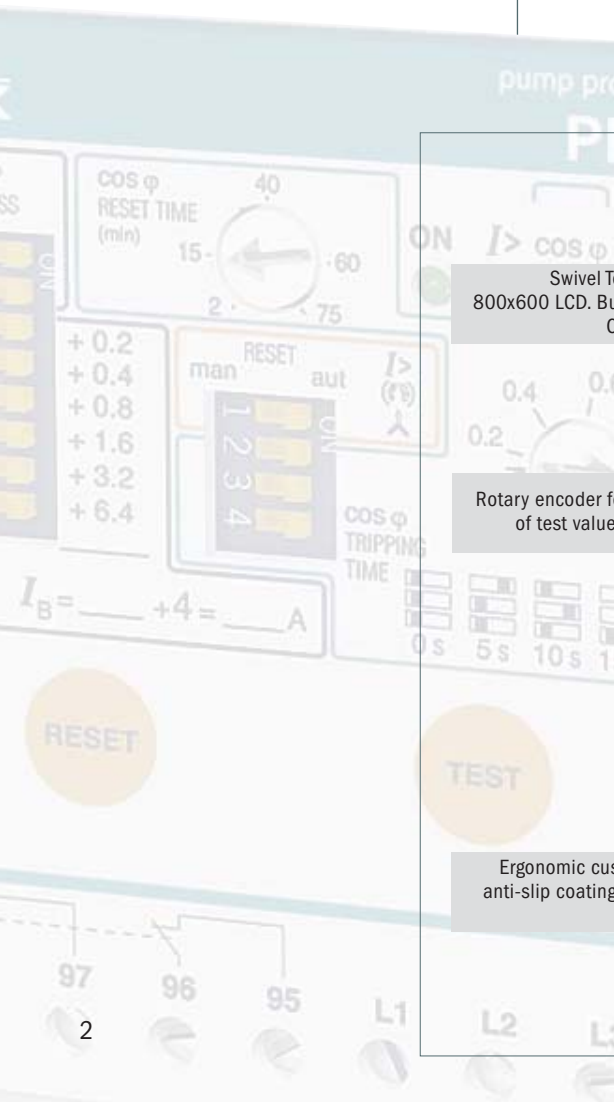
The new Mentor 12 universal platform revolutionizes the traditional relay testing concepts. With more than 20 years in designing and developing test equipment, EuroSMC has launched a product which exceeds the expectations of the most demanding professionals in this field.

The Mentor 12 has everything you need to test relays of any type, including the routine procedures and results saved in memory by the user for later repetition and reference. No external computer is required, except for existing and upcoming remote control applications that are not part of the built-in software. Also incorporated is an auxiliary voltage supply source to energize the relay under test when required.

Based on the success obtained from the PTE family of relay testing products, EuroSMC has equipped the Mentor 12 with a fast, powerful yet simple manual control interface that allows the expert user to verify the response of any relay in seconds. For the more complex or repetitive jobs, however, a full set of pre-defined, fully configurable test tools will assist the operator for an efficient, safe and error-free testing.

Your Mentor 12 will never become obsolete because all its functional elements are completely programmable. You can upgrade its software over the internet and install plug-and-play hardware options with no external assistance.

Ultra-compact output amplifiers, energy saving system, self-regulated ventilation, automatic auto-resetting protections with dynamic status reports, safety indicators, etc., we have charged the Mentor 12 with state-of-the-art features to keep it in perfect shape and ready at all times.



Swivel Touch-Sensitive 800x600 LCD. Built-in Windows CE® computer .

Rotary encoder for adjustment of test values and sliders.

Ergonomic custom case with anti-slip coating and transport handles.





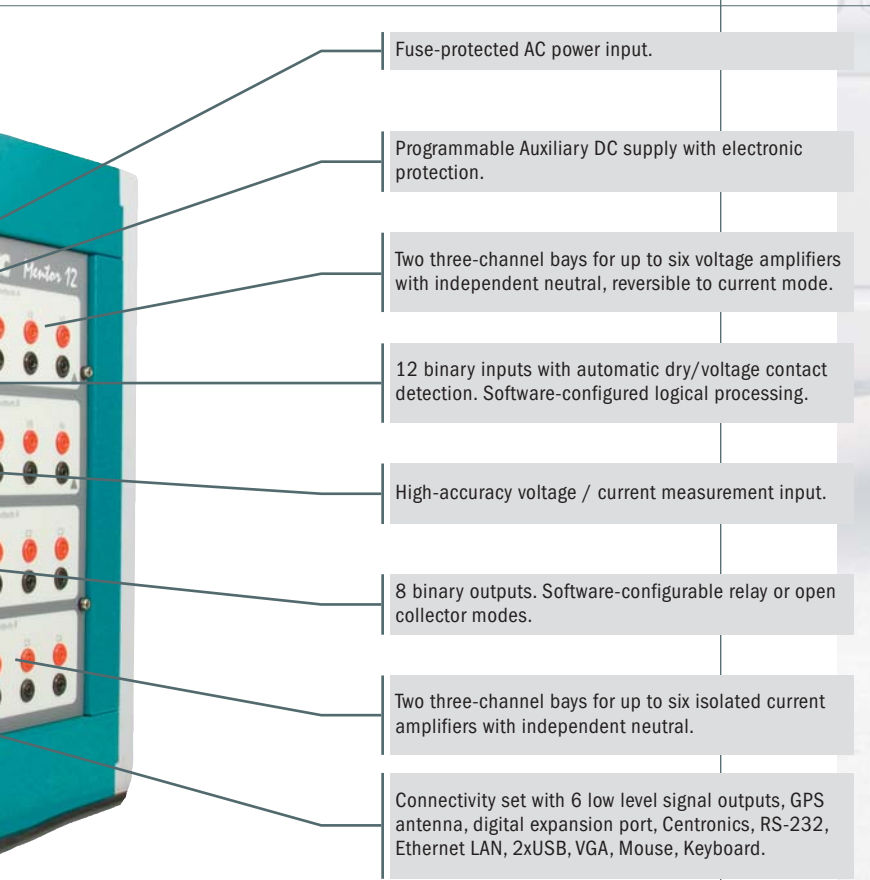
SIMPLICITY

The Mentor 12 is controlled via a touch screen panel and a rotary selector. An external mouse and keyboard can also be used if desired. The multilingual menus, neat and complete, appear to know what you want to do next. The entire test process and test results are immediately displayed in numerical and graphic forms, with a complete set of feedback indicators and a real-time representation of power vectors. Easier, impossible.

You only need turn on the Mentor 12, connect it to the relay, and select the desired test on the menu. You will see the process and the results on the screen. Now, name it and save it so you can repeat the test or examine the results in the future.

If you have a COMTRADE file stored on a USB pen drive, just plug it into the Mentor 12 and it will reproduce the signal onto the relay in a matter of seconds.

The VGA connector can be used, for example, to cast the screen image on the wall with an overhead projector. This provides a simple, convenient way to train other people on the Mentor 12's operation.



MENTOR 12



Low Level Output Connectors

POWER

A state-of-the-art, fully programmable digital waveform generation engine constitutes the heart of the Mentor 12. It is able to control twelve independent low-level signal paths to the output section, producing extremely accurate signals with a 3-kHz bandwidth. These signals are then driven to the output amplifiers for a stable, distortion-free 100 VA testing power. Prior to being amplified, these signals are also available at the low-level output connectors to test and calibrate transducers, energy meters and sensor- or Rogowski coil-based protective relays, as well as to be externally amplified for applications that require greater current or voltage limits.

The output amplifiers of the Mentor 12 deliver a stable and efficient output, with a power curve adapted to the most demanding test conditions. The unit can be charged with up to 6 current and 6 voltage amplifiers, each of which supply top-quality 100 VA/W permanent power simultaneously. The resulting 1,200 VA aggregated power allows for the complete three-phase testing of two relays at the same time, including the logical scheme and messaging functions, simulated and recorded by the 8 binary outputs and 8 inputs available in the Mentor 12.

FLEXIBILITY

You might not need twelve channels right now. Start with a smaller configuration and add more channels when you need them. The Mentor 12's amplifiers are plug and play. You just remove the unit's side cover, slide the amplifier(s) in, turn the unit on and continue working. The new amplifiers will be recognized and added to all the test and configuration screens by the Mentor 12 automatically.



Regardless the number of amplifiers in your Mentor 12, you can also combine them in series and in parallel to attain greater voltage and current levels. The output configuration screen displays a menu with all the possible combinations and a visual guide to help you at connecting the relay. There is no need to calculate partial current, voltage or phase angle values as the Mentor 12 manages and shows each group of combined channels as if it were a single "virtual" one.

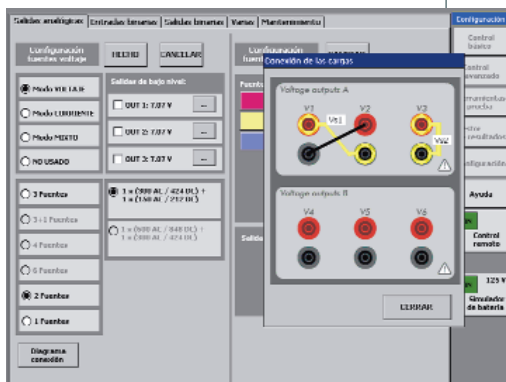
Furthermore, each voltage amplifier can be switched to current mode by a simple touch on the configuration screen. This feature allows, for example, to convert a Mentor 12 3v3i (3 voltage + 3 current channels) to a six-current test set when the need for testing three-phase differential relay arises.

You can accurately measure the output from a transducer, an energy meter or any other measurement device by connecting it to the analogue or binary inputs while injecting known quantities with the Mentor 12.

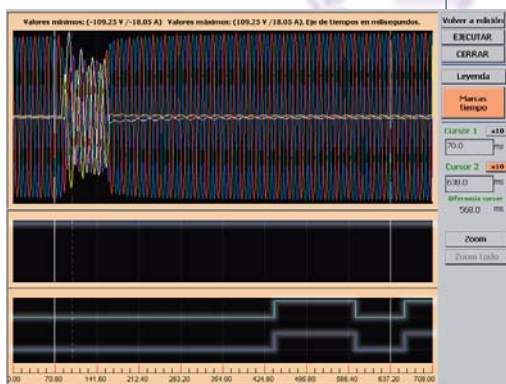
PRODUCTIVITY

The Mentor 12's human interface is organized to complete the job safely and accurately in the shortest possible time. Locating the necessary controls and the relevant test information will take just a few seconds to the untrained expert. The Basic Control virtual panel has been designed especially for him. Adjusting a few values and testing a handful of trip points in the relay is a snap, thanks to the touch-sensitive panel and the rotary knob. There is no need to even look at the relay, as its response is displayed on the control screen in real time.

Do you need to reproduce transient fault recordings? The Mentor 12 includes this feature as standard. You only need to copy your COMTRADE files into a USB pendrive, plug it into the unit and press Playback. If you want, you can assign each current and voltage signal in the recording to specific current and voltage channels for the playback. And, naturally, you can also map the recorded binary information and the response of the relay to any of the binary outputs and inputs in the Mentor 12 respectively, discard the unneeded signal's sections or adjust the best transformation ratio for the playback. Now, press Playback and examine the streamed signals and the relay's reactions in the screen.



Combining two voltage channels in series



COMTRADE transient playback



The saved collection of user-defined and customized test routines will provide a valuable asset of ready-to-use test tools for each relay type and protective function. You only need to choose one from the list in the Results Manager and press Execute. The Mentor 12 attaches the results of the last execution to each test recorded.

- Timer operation setup and preferences
- External measurement configuration
- Event logger

Basic Control virtual panel

Control panel for voltage and current outputs

Adjustment of test quantities, phase angles and frequencies

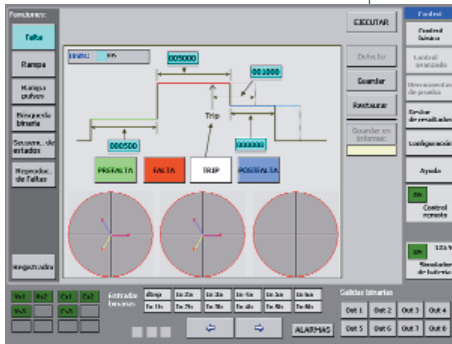
Channel selection, memory and dynamic fault shortcuts

Output On/off indicators

- Indicator / access to the alarm reports
- Multifunction display (timer, pulse, analogue, etc.)
- Binary outputs activation / status
- Auxiliary DC supply control / setup
- Remote control activation / setup
- Binary inputs status indicators
- Adjustment digit selection

Test Setup & Results Storage Management Menu

MENTOR 12

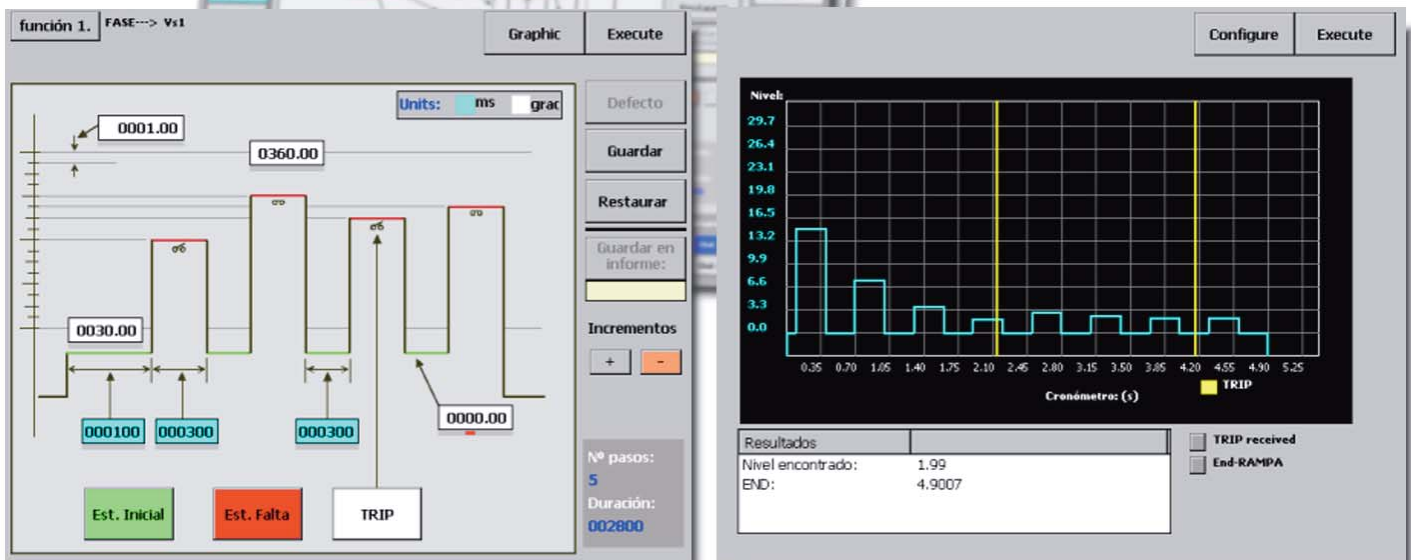


Fault function setup screen

ADVANCED TEST FUNCTIONS

The Advanced Control button gives way to a number of powerful, yet easy to use functions to locate and test trip points in any type of relay. Each function features a graphical representation of the test with fields containing the adjustable parameters. The State Sequencer – a simple programmable multi-step tool– and the Binary Search are among the expert’s favorites. A three-state Fault function, a Single/Double Ramp, a Pulse Ramp and the Transient Playback complete the Advanced set.

You immediately realize what each function does when you see it. Setting up the test is like filling out a form with fields on the function’s sections, each value being instantaneously checked and validated by the Mentor 12. You can also determine how the relay’s output must be processed, discarding irrelevant trips or specifying a combination of contacts as required for trip validation. Press Execute now. The test progress is displayed in an oscillographic fashion, with electrical values evolving along the ramp and trip points being stamped on the timeline as they take place. At the end, type a name and a brief description and save it all for future use. Since storage takes place on removable USB pendrives, your capacity is virtually unlimited, as is your freedom to transfer the data to your PC or to another Mentor 12.



Binary Search function setup

Binary Search progress and results display

AVAILABLE OPTIONS

Like any other products manufactured by EuroSMC, the Mentor 12 includes all the accessories required for the job. However, a range of optional components is also offered to better match your particular needs or preferences.

Output Channels

One of the greatest advantages of the Mentor 12 is its modular design. You can start with a basic 6-channel unit and add more channels later on. The plug and play technology makes adding or replacing channels an easy operation, with no need to return the unit to the factory.



The minimum configuration is three 0-25A current channels and three 0-150V voltage channels that can be individually turned into 0-5A current from the configuration menu. Each one provides 100 VA permanent power concurrently, and works in the 0 (DC) to 3,000 Hz frequency bandwidth. This basic six-channel configuration provides a complete three-phase V/I test platform with the possibility of setting up six simultaneous current sources for differential relay testing.

GPS / IRIX-B synchronization

As the Mentor 12 is preinstalled with an external antenna connector, you can always order the optional GPS receiver module and plug it inside the unit for end-to-end testing. If the conditions are not suitable for adequate GPS reception, you can choose the IRIX-B interface to take the time reference from the existing bus in the substation instead.

Software

The Mentor 12's standard equipment build up one of the most advanced basic configurations available on the market.

The intrinsic possibilities of this top-technology product are virtually unlimited. Therefore, we recommend you refer to your equipment supplier for additional test modules and remote control applications by EuroSMC or third-party vendors.

We at EuroSMC S.A. appreciate your interest and will be happy to answer any questions that you may post on the Mentor 12 or any other product in our catalogue.

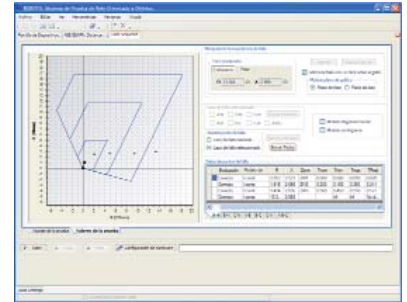


Nylon Bag

Ideal option for short-distance transportation. 20-mm padding for adequate protection inside the car's trunk, adding no significant weight to the equipment. The screen, connections panel and ventilation grid can be uncovered, so there is no need to extract the Mentor 12 from the bag for testing.

External Software

For a high degree of automation of the test process, consider our optional Eurotest® RTS relay testing software for Windows®. This application provides a comprehensive and continuously updated library of pre-defined test routines for the most common relay types, and a test definition assistant to create custom routines for double-click testing and reporting. Eurotest® RTS stores all the test definitions and results in a Microsoft Access®-compatible database and must be run in an external computer.



Function-specific test modules and applications are also available at EuroSMC for special cases like distance, differential relays, etc.



Typical Mentor 12 hardware configurations

MODEL'S NAME	OUTPUT CHANNELS		TYPICAL APPLICATIONS
3v 3i	6	3 voltage (0-150 V or 0-5 A) + 3 current channels (0-25 A), with 100 VA each.	Single- and three-phase testing of any type of relay, transducers and meters. Up to 600 VA total output power. Full-range transient playback.
4v 3i	7	4 voltage (0-150 V or 0-5 A) + 3 current channels (0-25 A), with 100 VA each.	Adequate for synchronizing relays. Direct three-phase testing with neutral voltage elements and a current up to 5 A. Capable for testing three phase differential relays.
4v 4i	8	4 voltage (0-150 V or 0-5 A) + 4 current channels (0-25 A), with 100 VA each.	A fourth current supply up to 25 A for devices with neutral element. Single phase test up to 100 A with 400 VA of power. Testing single phase differential relays with up to 25 A.
3v 6i	9	3 voltage (0-150 V or 0-5 A) + 6 current channels (0-25 A), with 100 VA each.	Three- phase electromechanical relays. Direct testing of differential relays with triple windings, maintaining the connection class. Up to 50A current per channel.
6v 3i	9	6 voltage (0-150 V or 0-5 A) + 3 current channels (0-25 A), with 100 VA each.	Calibration of low voltage measurement converters and energy meters. Fault tests of high impedance relays, directional detection of differential neutral with high voltage setting and moderate current setting.
4v 6i	10	4 voltage (0-150 V or 0-5 A) + 6 current channels (0-25 A), with 100 VA each.	Single- and three-phase testing with high current settings Differential relay testing.
6v 6i	12	6 voltage (0-150 V or 0-5 A) + 6 current channels (0-25 A), with 100 VA each.	Testing of 2 relays simultaneously. Three-phase transformer differential testing on quadruple windings.

MENTOR 12



MENTOR 12 TECHNICAL SPECIFICATIONS

POWER OUTPUT

	VOLTAGE AMPLIFIERS	CURRENT AMPLIFIERS
Capacity	3 - 6	3 - 6
Output ranges	0 - 150 V AC / 0 - 5 A AC / 0 - 212 V DC / 0 - 7 A DC	0 - 25 A AC and DC
Power	100 VA continuous @ 37.5 - 150 V AC, 100W	100 VA @ 9.5 A AC, 100 W
Adjustment resolution	5 mV / 0.5 mA	0.5 mA
Reversibility	Yes	No
Accuracy	0.1% of the value ± 0.03% of the range (20-30°) @ 50-60 Hz	
Distortion	0.1 % @ 50-60 Hz (resistive load) / 2 % @ 50-60 Hz (maximum inductive load)	
Isolation	Yes (from mains and between all channels)	
Combined output	Series and Parallel	
Frequency	Adjustment range: 0.0 - 2000 Hz / Bandwidth: 3000 Hz / Resolution: 5 µHz / Accuracy: 1 ppm	
Phase angle	Range: 0.0 - 359.9° / Accuracy: 0.1° / Resolution: 0.001°	

LOW LEVEL OUTPUTS

NUMBER	TYPE	LEVELS	RANGES	ISOLATION	RESOLUTION	ACCURACY	DISTORTION
6	V	0-10 Vpk (1 mA max.)	1	No	250 µV	0.07 %	0.05 %

TIMERS

NUMBER	RESOLUTION	RANGES	ACCURACY
4	0.1 ms	00000.0001 - 99999.9999 sec.	0.001 % +/- 0.1 ms

BINARY INPUTS

NUMBER	TYPE	THRESHOLDS	RANGES	ISOLATION	RESOLUTION	COUNTER FUNCTION
12	Dry or voltage	1.5, 15 V	+/- 400 V (p-p)	6 groups of 2	0.1 ms	Up to 3 kHz. (width: 150 µs) 100 kHz. in 1 group

BINARY OUTPUTS

NUMBER	TYPE	LEVELS	ISOLATION	TIME RESOLUTION
8	Relay or <i>Open Collector</i>	300 Vdc / 300 Vac / 8 A 2000 VA / 240 W	Yes	100 µs

EXT. MEASUREMENT

Vdc MEASUREMENT INPUT	Idc MEASUREMENT INPUT	ACCURACY
± 10 V	± 20 mA	0.02 %

AUXILIAR DC SUPPLY

RANGES	POWER	ACCURACY	RIPPLE
48, 125, 250 Vdc	60 W	5 %	0.2 %

GENERAL

Dimensions	422 x 254 x 511 mm. / 16.6" x 10" x 20.1"
Weight	22.5 kg. / 49.6 lb(6 ch.) - 29.8 Kg /65.6 lb (12 ch.)
Casing	Custom
Consumption	Max. 1600 VA. 100 - 260 V AC, 40 - 70 Hz
Display	Color TFT 800 x 600
Control	Touch panel + rotary encoder
Communications	RS-232, 2 x USB, Ethernet, Centronics, PS2, VGA

SUPPLIED ACCESSORIES

Complete set of test leads with 4-mm banana terminals
16 4-mm adapters to U-shape terminal
1 power cord 260 V/ 16 A
2-m / 6.5 ft. twisted-pair Ethernet cable
RS-232 (ActiveSync®) cable
1 set of 15 assorted replacement fuses
1 PS2 adapter for keyboard and mouse
2 adapters for low level outputs
1 USB Pen Drive 512 Mb.
1 soft organizer bag for cables and accessories
1 User's manual
Certificate of calibration
Sturdy ABS transport case with wheels and extensible handle

DISTRIBUTED BY

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