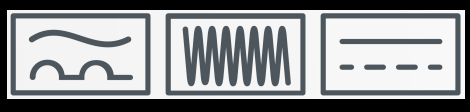
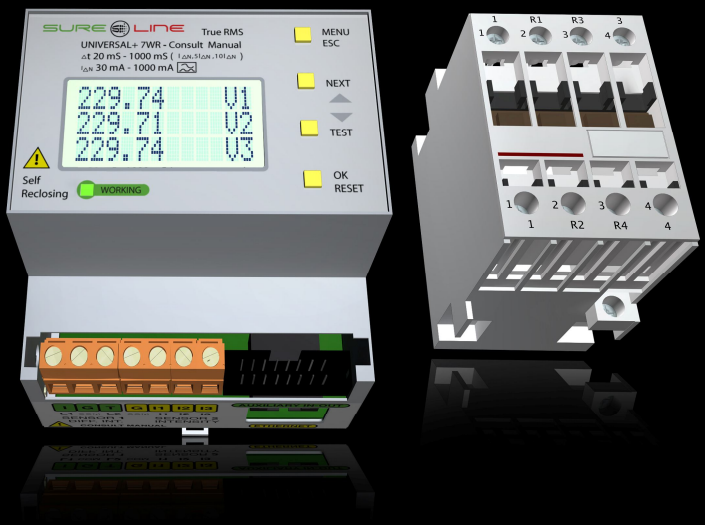
Universal tele-programmable, tele-controllable protection and mains analysis unit with WebServer and Modbus TCP/IP
Automatic reclosures with built-in motor-drive. Graphic and numerical display in real time. RMS, Peak, AC and DC measurements
Differential I. protection and analysis, type A / B. RMS, Peak, AC and DC measurements. Auto-refreshing differential I. oscilloscope
Oscilloscope event-logger with pre-trigger, differential intensity channel (600-event built-in memory)
Oscilloscope event-logger with pre-trigger, voltaje and intensity channels (600-event built-in memory)
Oscilloscope and 64-harmonic spectrum, 7 auto-refreshing channels (distortion range in % and V – A, + THD value)
THD measurement and alarm as from 2-63, programmable by harmonic and harmonics bracket
Proactive measurements of 1600 electrical parameters + temperature and humidity
Relays with alarms, timers, time programmer, input control and manual control
Graphical history (months, days, hours and minutes) of energy, costs and emissions with built-in 3-year memory
Tele-management, sizing, surveillance, energy maintenance and I/O control. Precisions: (V, I): ±0.2% and ±0.4%

UNIVERSAL+ 7WR M1
Built-in reclosure motor-drive command for MCB from 6 to 63A, 2 and 4-pole



UNIVERSAL+ 7WR M2. Command external reclosure motor-drive for external MCB
Moulded case from 80 to 250A, 4-pole (breaking capacity up to 100kA)
MCB from10 to 125A, 2 and 4-pole (breaking capacity up to 50kA)
MCB from 6 to 63A, 2 and 4-pole (breaking capacity up to 15kA)



UNIVERSAL+ 7WR M3
External reclosure relay/contactor command from 25 to 1250A, 2 and 4- pole

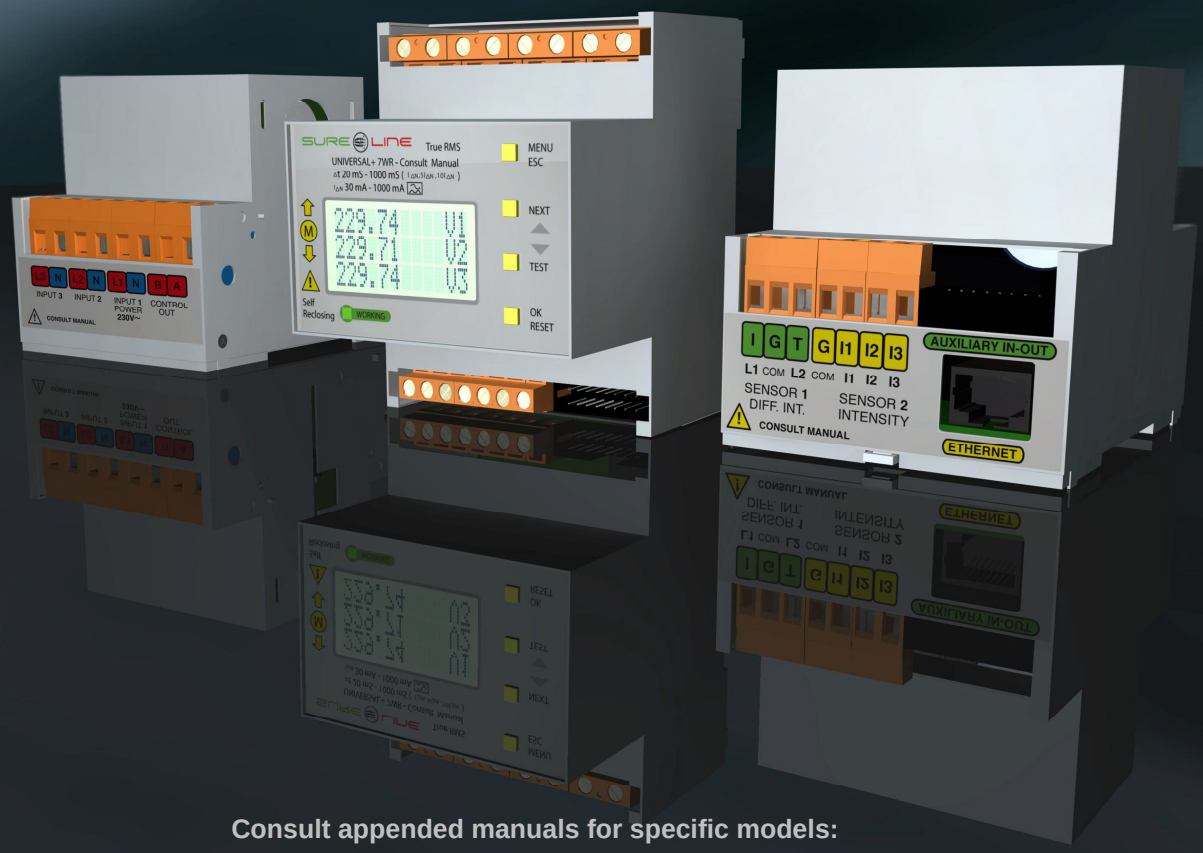
Generic UNIVERSAL+ 7WR M1, M2 and M3 manual

With software version V3.15

Generic user's/installer's manual - UNIVERSAL+ 7WR M1, M2 and M3

It is essential that the user/installer fully understand the present manual prior to using the unit. Should any doubt arise, please refer to the Authorised Distributor or the Manufacturer

Published in Spain by Safeline, S.L. 16th Edition (June 2020)



Consult appended manuals for specific models:

Annex-manual - UNIVERSAL+ 7WR M1 Differential, type A

Annex-manual - UNIVERSAL+ 7WR M1 Differential, type B

Annex-manual - UNIVERSAL+ 7WR M2 Differential, type A

Annex-manual - UNIVERSAL+ 7WR M3 Differential, type A

Manual Safeline Web Service

Instruction manual - DatawatchPro software

Instruction manual - UNIVERSAL+ 7WR IN OUT

Instruction manual - UNIVERSAL+ 7WR accessories

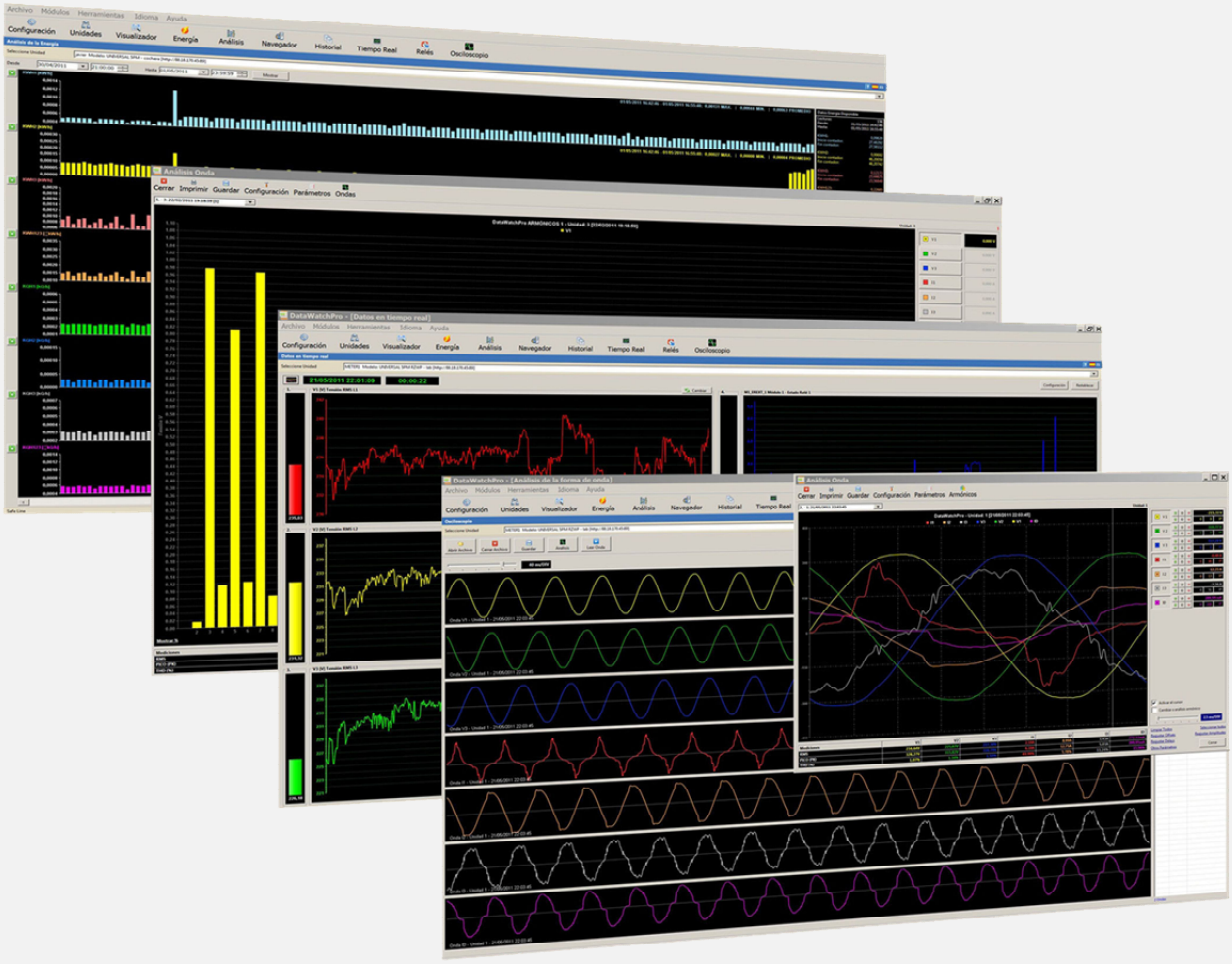
Command configuration (protection device upon power supply cut-off):

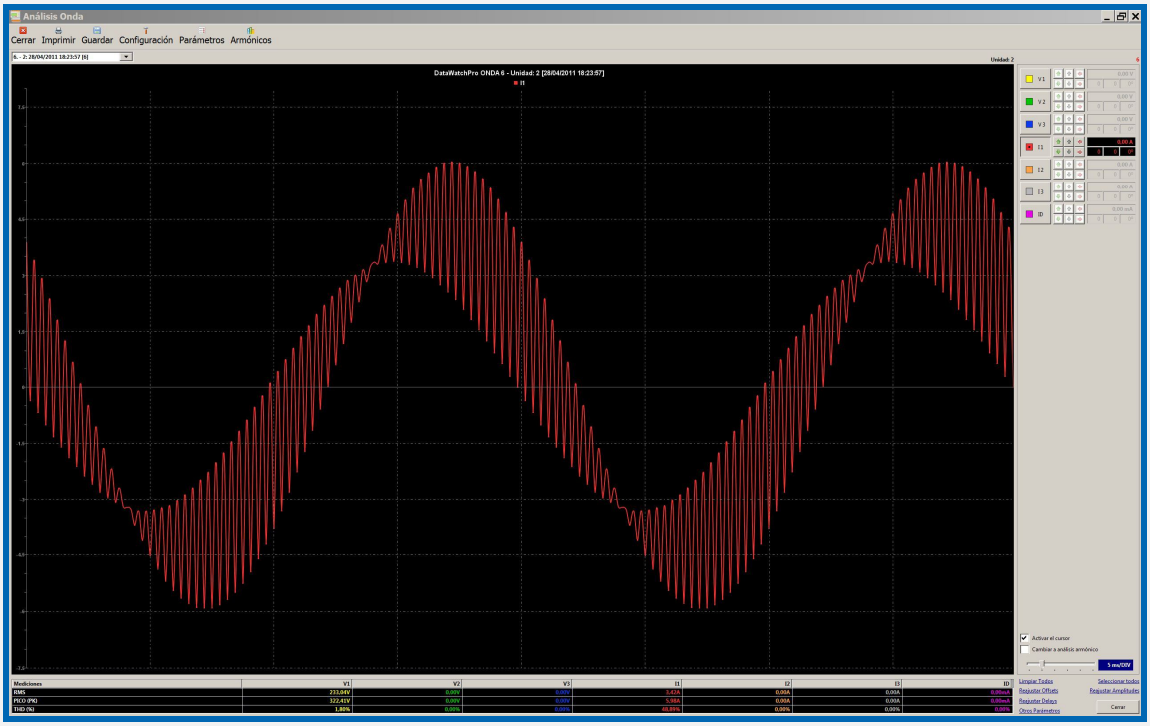
M1 = Command 1 (Command built-in reclosure motor-drive for MCB from 6 to 63A, 2 and 4-pole, Icu up to 15kA)

M2 = Command 2 (Command external reclosure motor-drive, for external MCB)
Moulded case from 80 to 250A, 4-pole (Icu up to 100kA)
MCB from 10 to125A, 2 and 4-pole (Icu up to 50kA)
MCB from 6 to 63A, 2 and 4-pole (Icu up to 15kA)

M3 = Command 3 (External reclosure relay/contactor command from 25 to 1250A, 2 and 4- pole)

M5 = Command 5 (Tripping of SHUNT TRIP DEVICE for external MCB, manual reclosure 2 and 4-pole)
Intensity depends on external MCB



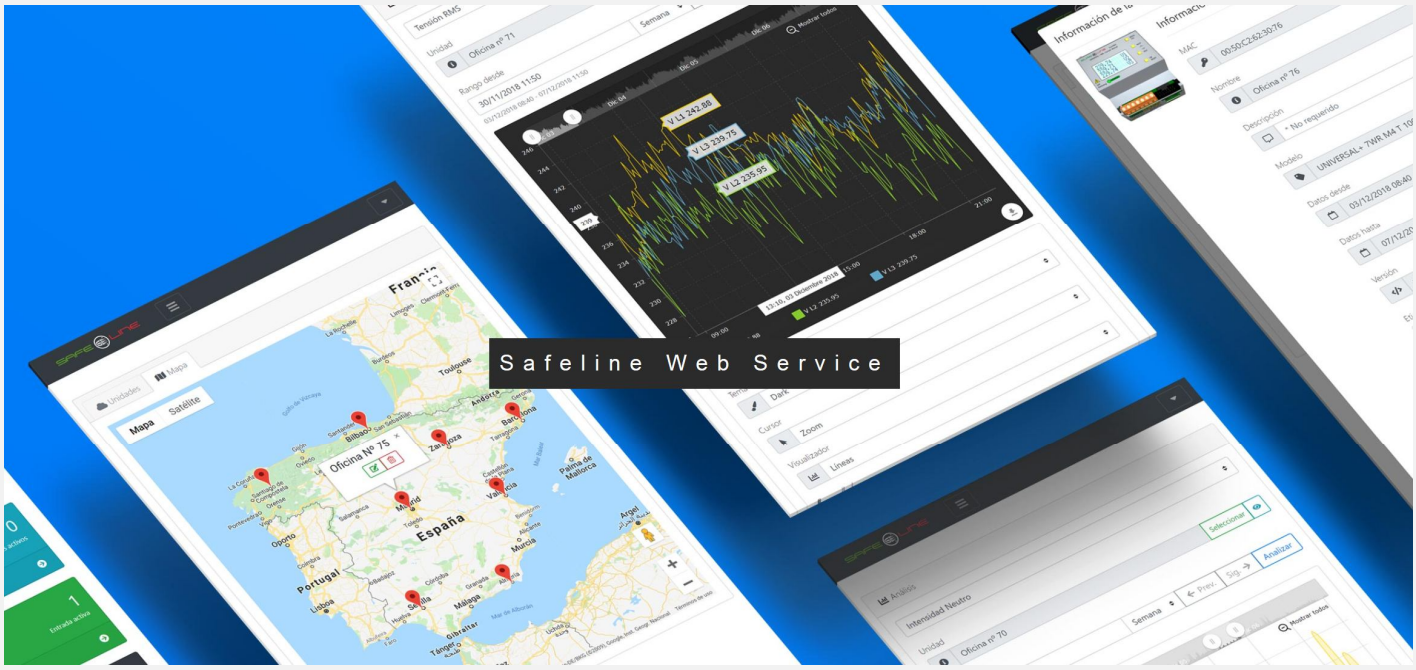


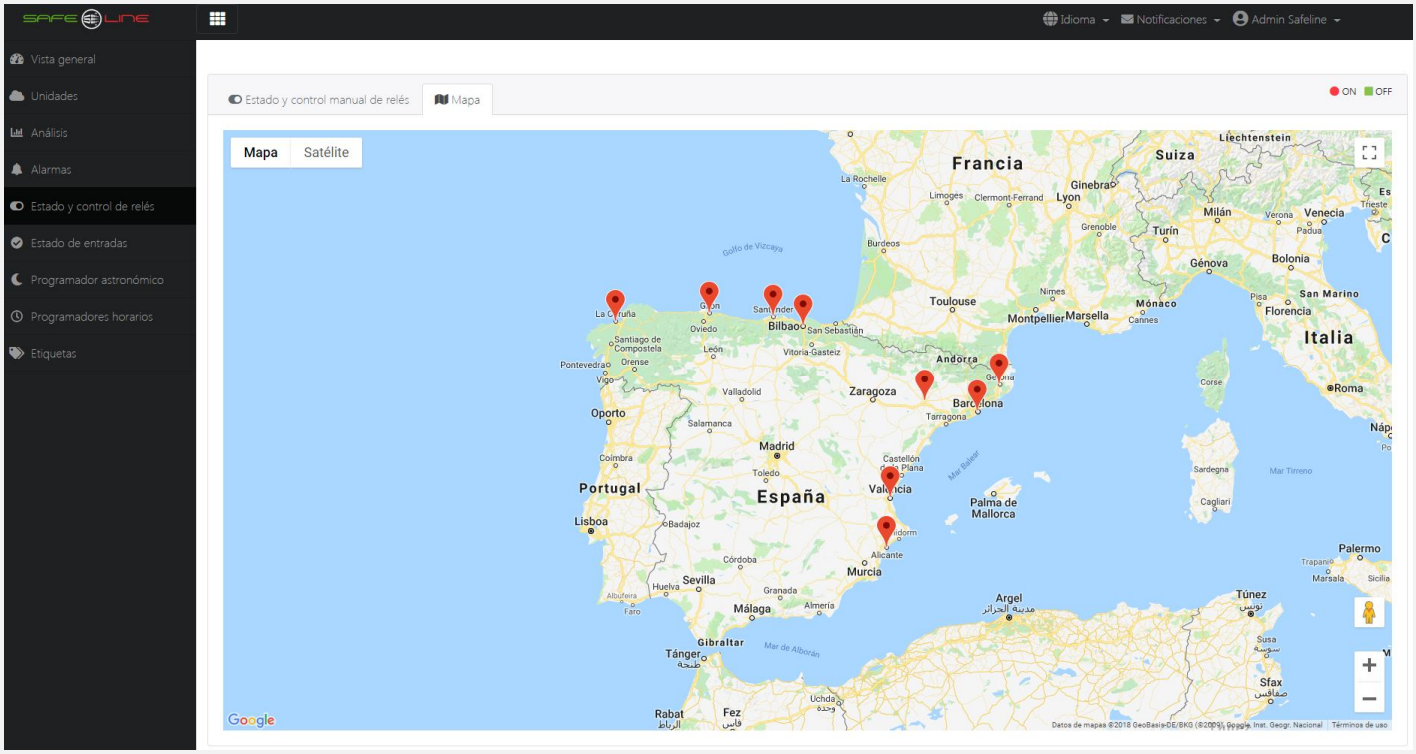
Important: Depending on the versions of the software and of the UNIVERSAL+ 7WR model (consult these on the identifying label on the side of the unit and on its display and/or WebServer), different protections/alarms, measurements and characteristics are included. These are to be found in the corresponding manuals and synoptic tables.

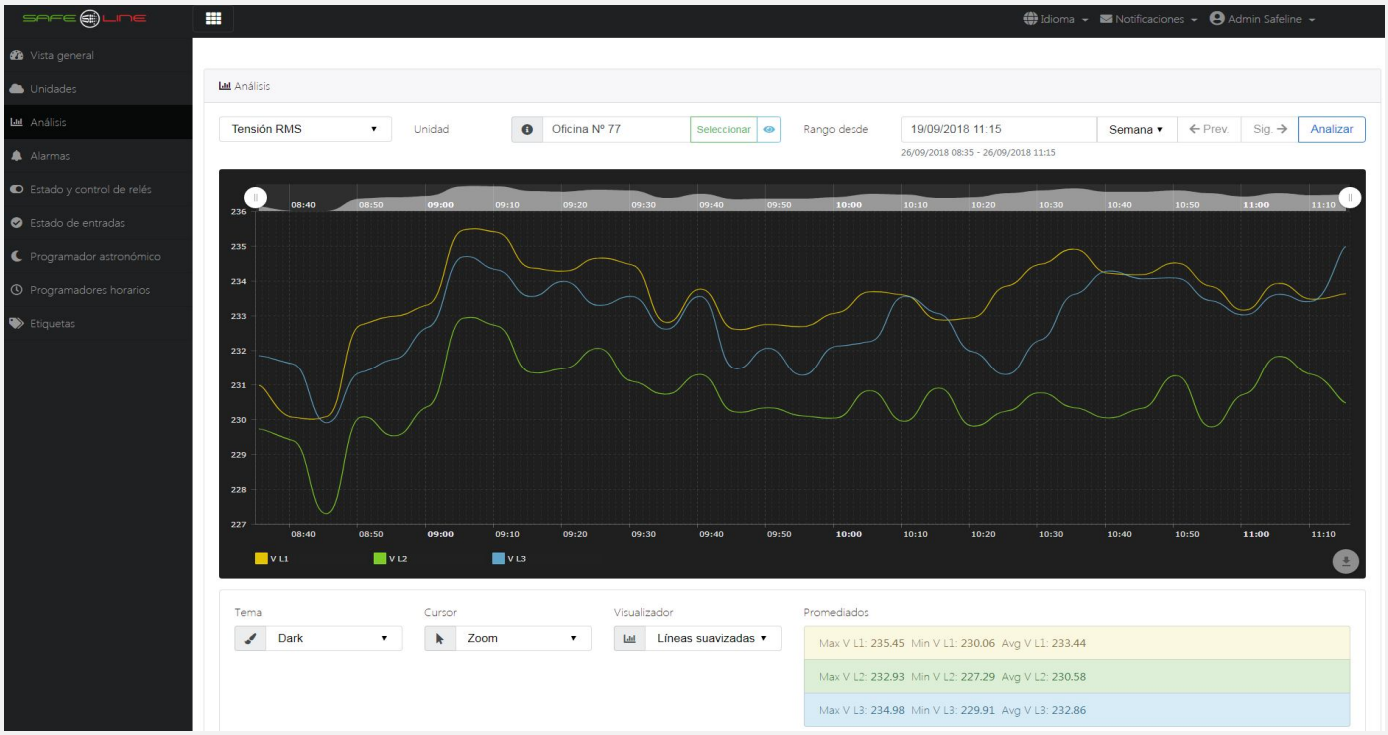
Specially designed for operation with “Safeline Web Service” administration software

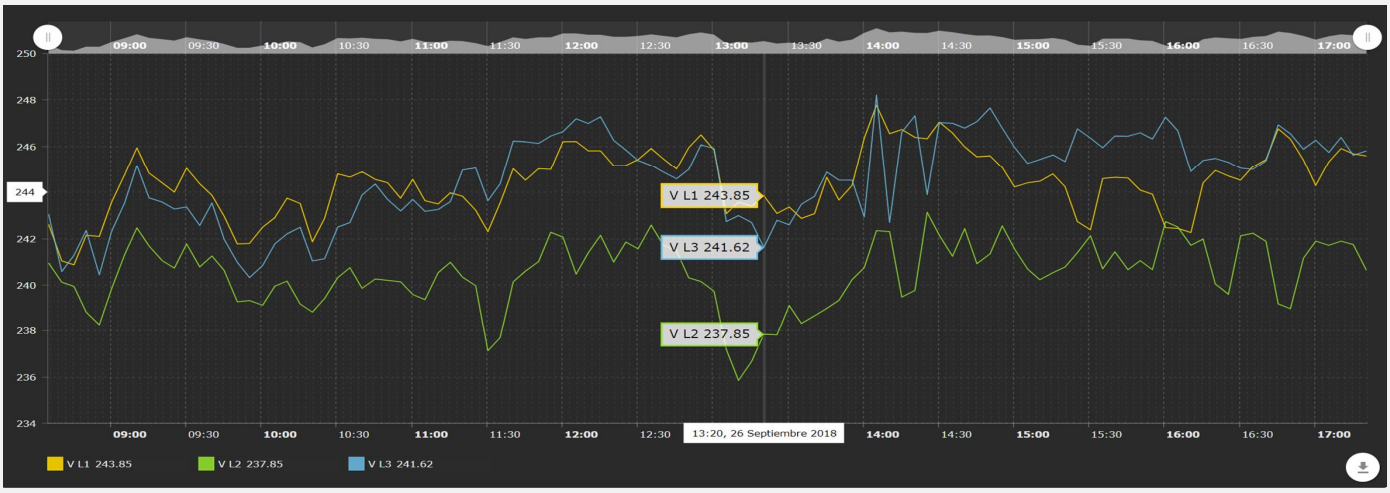
Safeline Web Service V1.1.0

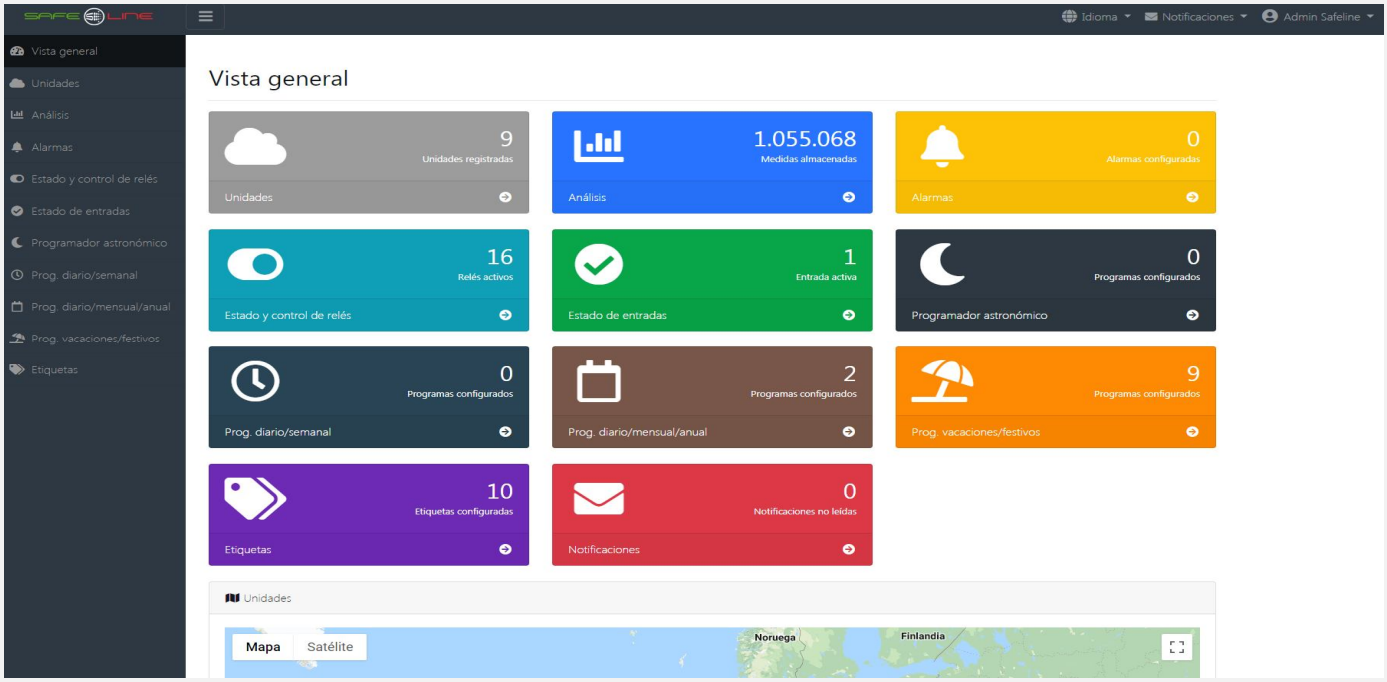
Administration and control software via Internet/Intranet for Sureline Universal+ 7WR units
Storage of measurement and I/O status data sent by the units
Unit register and geographical location management from map via Google Maps
Weekly astronomical programmer for each geographical location (output relays) assignable to groups of units
Thousands of independent hourly programmers (assignable to groups of units):
- Daily / weekly
- Daily / monthly / yearly
- Daily / monthly/ yearly (vacations and holidays)
Output relay management and logical input management
Graphical analysis of measurements
Management of measurement alarms and logical input for each unit, with notifications via e-mail
Unit management by labels. Attribute search engine.
Auto-register of units in the server
Administration capacity: 16000 Sureline units






Idioma
Notificaciones
Admin Safeline
Vista general
Unidades
Análisis
Alarmas
Estado y control de relés
Estado de entradas
Programador astronómico
Programadores horarios
Etiquetas
Análisis
Tensión RMS
Unidad
Oficina Nº 77
Seleccionar
Rango desde
19/09/2018 11:15
Semana
Prev.
Sig.
Analizar
26/09/2018 08:35 - 26/09/2018 11:15
V L1
V L2
V L3
Tema
Dark
Cursor
Zoom
Visualizador
Líneas suavizadas
Promediados
Max V L1: 235.45 Min V L1: 230.06 Avg V L1: 233.44
Max V L2: 232.93 Min V L2: 227.29 Avg V L2: 230.58
Max V L3: 234.98 Min V L3: 229.91 Avg V L3: 232.86


V L1 243.85
V L3 241.62
V L2 237.85
13:20, 26 Septiembre 2018
V L1 243.85
V L2 237.85
V L3 241.62


Idioma
Notificaciones
Admin Safeline
Vista general
Unidades
Análisis
Alarmas
Estado y control de relés
Estado de entradas
Programador astronómico
Prog. diario/semanal
Prog. diario/mensual/anual
Prog. vacaciones/festivos
Etiquetas
Vista general
9
Unidades registradas
Unidades
1.055.068
Medidas almacenadas
Análisis
0
Alarmas configuradas
Alarmas
16
Relés activos
Estado y control de relés
1
Entrada activa
Estado de entradas
0
Programas configurados
Programador astronómico
0
Programas configurados
Prog. diario/semanal
2
Programas configurados
Prog. diario/mensual/anual
9
Programas configurados
Prog. vacaciones/festivos
10
Etiquetas configuradas
Etiquetas
0
Notificaciones no leídas
Notificaciones
Unidades
Mapa
Satélite
Noruega
Finlandia

I N D E X

Chapter 1 – Introduction

Chapter 2 – Synoptic tables of characteristics, single-phase 2-pole and three-phase 4-pole

Chapter 3 – USER'S GUIDE (Surfing the WebServer through Internet/Intranet)

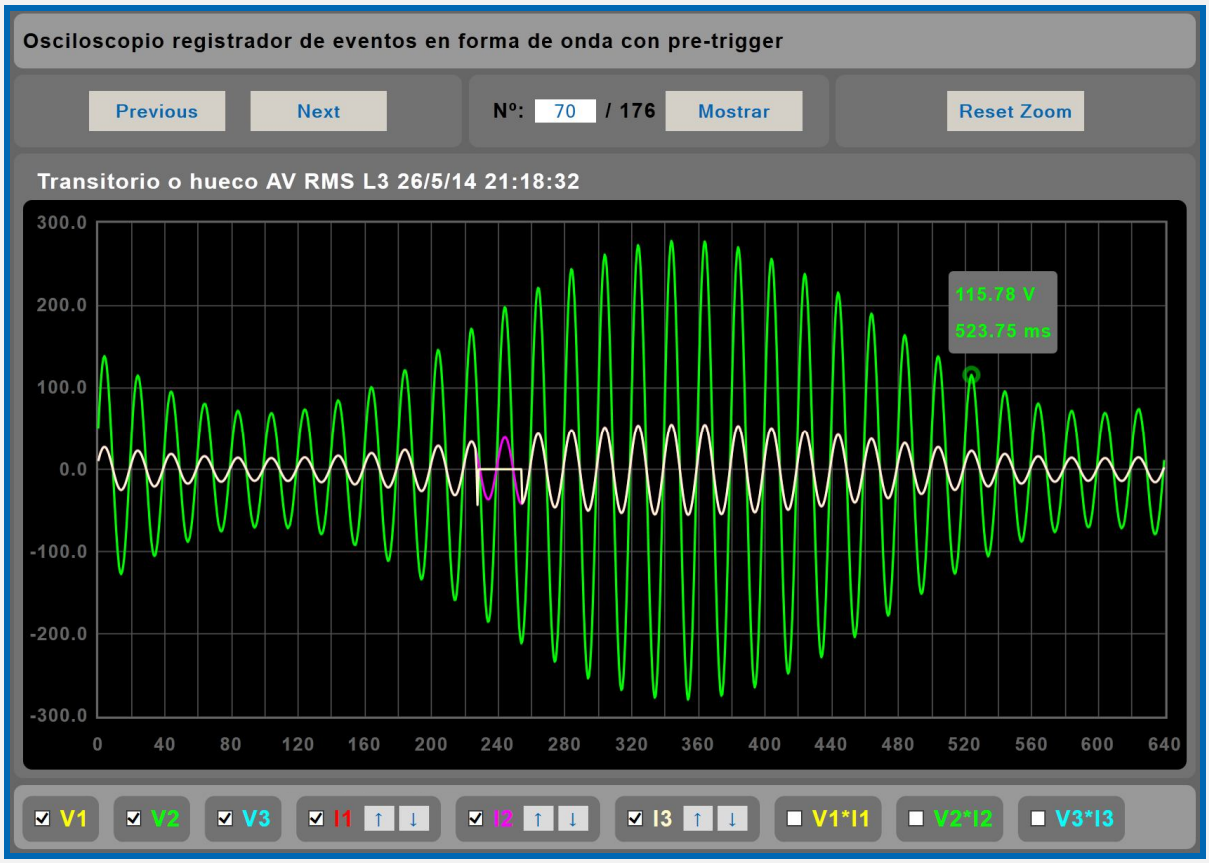
Chapter 4 – DataWatchPro professional software

Chapter 5 – General description

Chapter 6 – Installation Guide (Internet/Intranet configuration)

Chapter 7 – Glossary and formulae

Chapter 8 – External I/O modules



Chapter 1 – Introduction

1.1 Introduction

The "UNIVERSAL+ 7WR" family is a series of units with WebServer designed to provide electrical protection, control and monitoring in real time via Internet/Intranet, permitting electrical installations to be protected and any process whatsoever to be automised with inputs/outputs. These units are totally autonomous and, once configured, can communicate with each other via Internet/Intranet to enable or disable relays/functions/processes

SURELINE incorporates a highly advanced and innovative technology. Presentation: standard (EN 50 022) enclosure for 35mm DIN rail. This is a compact unit monitored by a microcomputer and is highly stable due to its built-in double process monitor (Watchdog). Moreover, it affords useful operative and safety features such as: restoration of parameters to factory-set values, read-only mode in Internet/Intranet, customisable user code, easy installation, programmability, etc.

Universal concept, this UNIVERSAL+ 7WR unit brings together all the necessary functions for a correct and optimum protection, analysis, management, control, surveillance and maintenance of electrical installations

Protections/alarms, programmable in both value and delay, with automatic reclosures (both intelligent and sequential)

MCB- from 6 to 63A ,2 and 4-pole. (M1)
Moulded case MCB from 80 to 250A 4-pole (M2)
25 to 1250A, 2 and 4-pole contactor. Alarms up to 10,000A (M3)

Differential protection and analysis, type A / F / B. RMS, Peak, AC and DC measurements. Differential intensity oscilloscope.

Graphic and numerical display. RMS, Peak, AC and DC measurements. Differential intensity oscilloscope with autoscale and automatic or manual Y axis scale. Includes measurement cursor. Continuously refreshed display (every 1.5 secs.).
"Real-time" chart recorder for 300 registers with autoscale and automatic or manual Y axis scale, with temporary maximum, minimum and average measurements. Includes measurement cursor. Continuously refreshed display (every 1.5 secs.).

Oscilloscope event-logger in waveform with pre-trigger and autoscale differential intensity channel:

One capture channel for each event: ID.
One record length mode set at 960ms with pre-trigger at 840ms.
600-event storage capacity in built-in memory. Display via WebServer.
Trigger by alarms whose value and delay can be enabled and programmed. Chronological register by type of alarm.
Display via webServer with horizontal zoom functions, Value and time measurement cursor.

Oscilloscope cum event logger in wave-form with pre-trigger and autoscale voltage and intensity channel.

6 channels V1, V2, V3, I1, I2, I3, with captures for each event
Three modes of record length in 6 channels 160ms, 320ms and 640ms (pre-trigger: 40ms, 80ms and 160ms).
+ three modes of record length in 6 channels 20s, 40s y 80s (pre-trigger 5s, 10s y 20s).
600-event storage in built-in memory. Display via WebServer and DataWatchPro
Trigger for alarms which can be enabled and are programmable in value and delay. Chronological record for each type of alarm.
Display via WebServer with horizontal zoom functions. Multi-channel measurement, value and time cursor, etc.
Display via DataWatchPro with offset control functions, amplitude, time base, horizontal shift zoom, multi-channel measurement, value and time cursor, etc.

Analysis of 7-channel harmonics spectrum (63 harmonics, range in % and V - A value)

Harmonics spectrum with autoscale (V1, V2, V3, I1, I2, I3 and differential I. with 64 harmonics
Measuremets of 64 harmonics with power, distortion factor (range in % and value V – A) and power factor +THD.

7-channel oscilloscope with autoscale

7-channel oscilloscope with autoscale and automatic or manual Y axis scale and 3 mathematical V*I. channels. Includes instantaeous value measurement cursor in all channels. Continuously refreshed display (every 1.5 secs.).

Graphic energy, costs and emissions log with built-in 3-year memory (optional) Active and reactive energy consumption log. Bar and line graphic display via WebServer in monthly, daily, hourly and 5-minute intervals.

A reduced, independent alternative option for data recording as opposed to the professional software (DataWatchPro) .

WebServer in real time. Display refreshment rate every 1.5 secs. for all variable parameters

Modbus TCP/IP communication protocol and TCP/IP. HTTP protocol. WebServer via Ethernet. For user application (customized software)

Multi-interaction between remote units via Internet/Intranet for all the UNIVERSAL+ 7WR and 7WR MINI ranges

Automation/telecontrol multiplied by other remote modules

Chronological historical data recorder for LOG alarms and conditions

Alarm central. Tele-management and automation via 10 logical outputs (relays) and 10 logical inputs

Alarms. Programmable enablement/disablement of 10 relays + 4 relays A, B, C and D of a remote UNIVERSAL+ 7WR unit via Internet/Intranet by one or more alarms

Reception of TCP/IP commands from other remote UNIVERSAL+ 7WR units via Internet/Intranet.

For the enablement/disablement of relays A and B

DataWatchPro: Professional software with data base and analysis of graphic data

Multi-thread communication with a multitude of remote units via Internet (reading and commando).
Chronological recorder of 200 data in data base for each unit .

Specially designed for operation with "Safeline Web Service" administration software

Administration and control software via Internet/Intranet for Sureline Universal+ 7WR units
Storage of measurement and I/O status data sent by the units
Unit register and geographical location management from map via Google Maps
Weekly astronomical programmer for each geographical location (output relays) assignable to groups of units
Thousands of independent hourly programmers (assignable to groups of units):
- Daily / weekly
- Daily / monthly / yearly
- Daily / monthly/ yearly (vacations and holidays)
Output relay management and logical input management
Graphical analysis of measurements
Management of measurement alarms and logical input for each unit, with notifications via e-mail
Unit management by labels. Attribute search engine.
Auto-register of units in the server
Administration capacity: 16000 Sureline units

Other: Energy management, sizing and surveillance
Mains line quality analysis
Programmable automation/telecontrol for relays with level alarms in time frame
Maximum and minimum measurement logs and individual alarm counters
Central measurement and data unit (mains analysis) 200 parameters

Simple, rapid WEB access via Internet with no need for Software

The WebServer permits all the unit's parameters to be displayed in real time on any PC, smartphone, tablet, PDA etc, and to be configured via Internet/Intranet conveniently, easily and clearly

Built to allow reconnection of the new digital counters

With the "CT" option, the unit's power supply goes into a high impedance state after a set time of a power cut. This function allows the new new digital counters to be reconnected subsequent to a cut-off due to over-consumption.

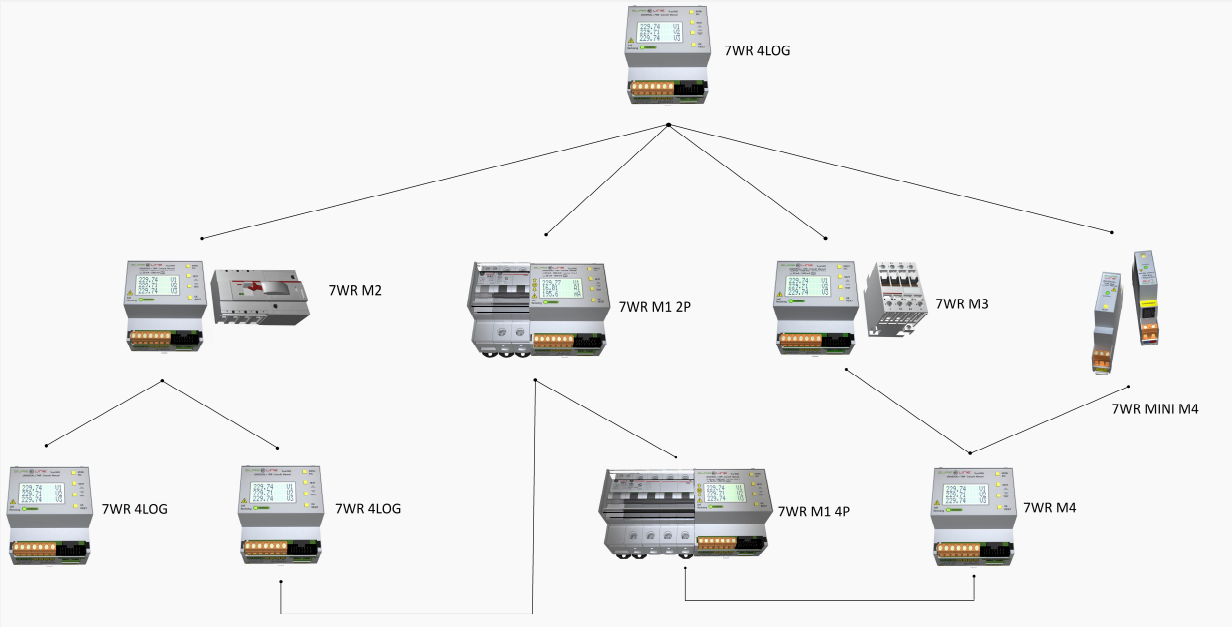
Multi-interaction between remote units via Internet / Intranet

The different UNIVERSAL+ 7WR M1, M2, M3, M4, M5, Rogoswki M4, MINI M4, 4LOG, XREM and 6LIR units are all compatible with each other. Hence, they all all share the multi-interaction function between remote units via Internet. For example, when one or more alarms is enabled in the M1, M2, M3, M4, M5, Rogoswki M4 and MINI M4 protection/metering units of the UNIVERSAL+ 7WR family, these can send an order to a 7WR 4LOG to enable an automated process.
Likewise, when a pre-established condition is met in a 7WR 4LOG process, the unit can send an order to the different UNIVERSAL+ 7WR M1, M2, M3, M4, M5, Rogoswki M4, MINI M4, 4LOG, XREM and 6LIR units to enable their remote relays via Internet.

The M1, M2, M3, M4, M5, Rogoswki M4, MINI M4 y 4LOG units pertaining to the UNIVERSAL+ 7WR family can also communicate with a 7WR XREM or 7WR 6LIR unit in order to enable or disable any of their four remote relays (A, B, C and D) via Internet.

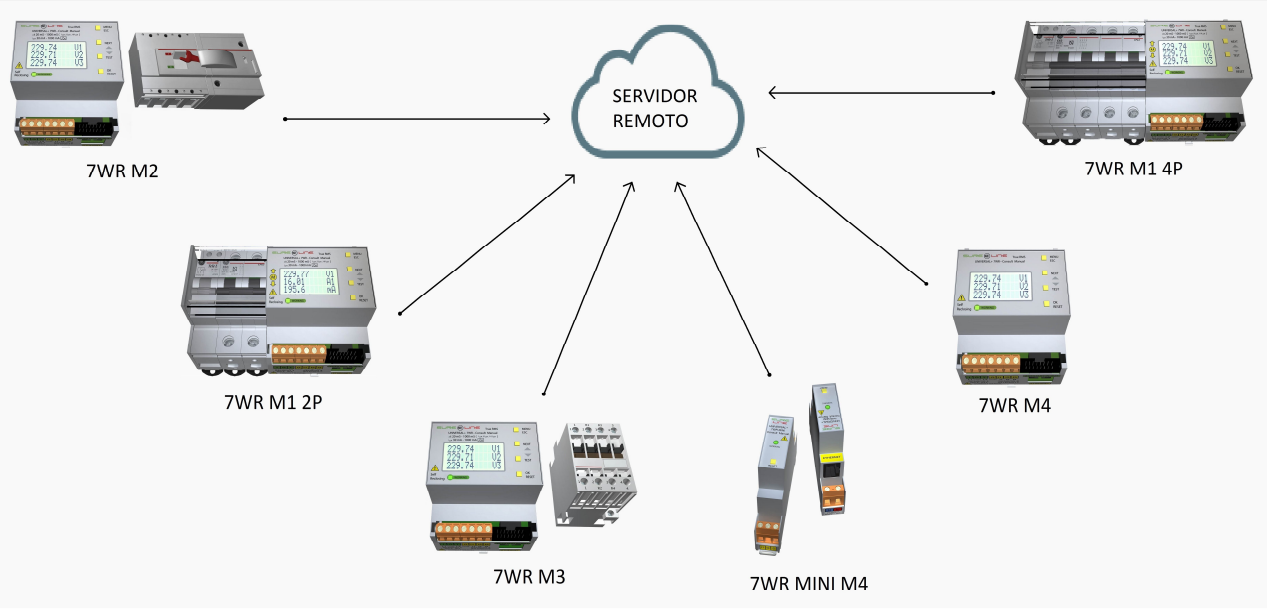
Each 7WR M1, M2, M3, M4, M5, Rogoswki M4 and MINI M4 unit can communicate with another 7WR M1, M2, M3, M4, M5, Rogoswki M4 or MINI M4 unit. They communicate with each other to enable or disable relays A and B remotely via Internet.

Each 7WR 4LOG unit can communicate with four more units and these, in turn, with four more and so on progressively. This increases the process and input/output power and scalability for specific requirements. These units can communicate with each other in order to enable inputs and processes in general, enable or disable relays, functions... etc.



Automatic data dispatch to a remote server via Internet:

By enabling “Remote server TCP/IP configuration”, the unit automatically dispatches the data file (Slist.json) to a remote server. This file is dispatched every 5 minutes (in sync with the internal clock) and includes a complete list of measurements and I/O status in json format.



1.2 Simplified nomenclature

Please, refer to complete nomenclature in the corresponding manuals:
Annex-manual - UNIVERSAL+ 7WR M1 (Command 1)
Annex-manual - UNIVERSAL+ 7WR M2 (Command 2)
Annex-manual - UNIVERSAL+ 7WR M3 (Command 3)

UNIVERSAL+ 7WR:

Nomenclature:

7WR – [ ] – [ ]
1 2

1- Command configuration (protection device for mains cut-off).

[**M1**] = Command 1 (Built-in reclosure motor-drive command for MCB from 6 to 63A, 2 and 4-pole)

[**M2**] = Command 2 (Command external reclosure motor-drive, for external MCB, 2 and 4-pole)

[**M3**] = Command 3 (External reclosure relay/contactor command from 25 to 1250A, 2 and 4- pole)

2 - Phases.

[**T**] = Three-phase 4-pole

[**M**] = Single-phase 2-pole

Built to allow reconnection of the new digital counters

With the "CT" option, the unit's power supply goes into a high impedance state after a set time of a power cut. This function allows the new new digital counters to be reconnected subsequent to a cut-off due to over-consumption.

Chapter 2 – Synoptic tables of characteristics, UNIVERSAL+ 7WR M1, M2 and M3

UNIVERSAL+ 7WR (3-year guarantee)	7WR						
Command configuration (protection device)	M1		M2		M3		
Single-phase 2-pole (M) only L1 / Three-phase 4-pole (T) L1, L2, L3	M	T	M	T	M	T	
Oscilloscope event-logger in waveform with pre-trigger and autoscale. 6 channels V1, V2, V3, I1, I2, I3, with captures for each event Option "W" **Three modes of record length in 6 channels 160ms, 320ms and 640ms (pre-trigger: 40ms, 80ms and 160ms)** **+ three modes of record length in 6 channels 20s, 40s y 80s (pre-trigger 5s, 10s y 20s)** **600-event storage in built-in memory. Display via WebServer and DataWatchPro** **Trigger for alarms which can be enabled and are programmable in value and delay. Chronological record for each type of alarm.** **Display via WebServer with horizontal zoom functions. Multi-channel measurement, value and time cursor, 3 mathematical V*I channels, etc.** **Display via DataWatchPro with offset control functions, amplitude, time base, horizontal shift zoom, multi-channel measurement, value and time cursor, etc.**							
Alarm: ΔV Pk (voltage difference) L1, L2, L3, set delay (transients and fast micro-cuts)	●	●	●	●	●	●	
Alarm: ΔV RMS (voltage difference) L1, L2, L3, set delay (transients and dips)	●	●	●	●	●	●	
Alarm: RMS overvoltage L1, L2, L3	●	●	●	●	●	●	
Alarm: Pk overvoltage L1, L2, L3	●	●	●	●	●	●	
Alarm: RMS intensity L1, L2, L3	●	●	●	●	●	●	
Alarm: Pk intensity L1, L2, L3	●	●	●	●	●	●	
Alarm: Voltage THD (total harmonic distortion) L1, L2, L3	●	●	●	●	●	●	
Alarm: Intensity THD (total harmonic distortion) L1, L2, L3	●	●	●	●	●	●	
Alarm: Over-frequency L1, L2, L3 and Alarm: Low frequency L1, L2, L3	●	●	●	●	●	●	
Remote input 1 and Remote input 2 (digital inputs). **External trigger**	●	●	●	●	●	●	
Historical logger LOG, connection, disconnection and alarm information log (connection and disconnection log) **Alarm and disconnection/connection chronological logger. With measurement value and year, month, day, hour and minute.**							
RMS overvoltage L1, L2, L3 and Pk overvoltage L1, L2, L3L1, L2, L3	●	●	●	●	●	●	
RMS low voltage L1, L2, L3	●	●	●	●	●	●	
RMS intensity L1, L2, L3 and Pk intensity L1, L2, L3	●	●	●	●	●	●	
RMS differential intensity (IDn RMS) and Pk differential intensity (ID Pk)	●	●	●	●	●	●	
Neutral intensity		●		●		●	
Power1 W L1, L2, L3	●	●	●	●	●	●	
Power2 W L1, L2, L3 (MDI, programmable from 10 secs. to 15 mins.)	●	●	●	●	●	●	
Power factor L1, L2, L3	●	●	●	●	●	●	
Voltage THD (total harmonic distortion) L1, L2, L3 and Intensity THD (total harmonic distortion) L1, L2, L3	●	●	●	●	●	●	
Voltage unbalance L1, L2, L3 and Intensity unbalance L1, L2, L3		●		●		●	
Phase sequence		●		●		●	
Over-temperature and Low temperature	●	●	●	●	●	●	
Over-humidity and Low humidity	●	●	●	●	●	●	
Over-frequency L1, L2, L3 and Low frequency L1, L2, L3	●	●	●	●	●	●	
Remote input 1 and Remote input 2 (digital inputs)	●	●	●	●	●	●	
Time programmer	●	●	●	●	●	●	
AC power failure (Power OFF) and Connection AC supply (Power ON)	●	●	●	●	●	●	
7-channel oscilloscope with autoscale and offset control functions, amplitude, time base, delay/advance in degrees, multi-channel measurement cursor, Measurement of RMS, Pk, THD, etc. (display in DataWatchPro) **7-channel oscilloscope with autoscale** and automatic or manual Y axis scale and 3 mathematical V*I. channels. Includes instantaeous value measurement cursor in all channels. Continuously refreshed display (every 1.5 secs.). (Display via Webserver)							
Voltage V1, Intensity I1 (Display on WebServer and DataWatchPro)	●	●	●	●	●	●	
Voltage V2, Intensity I2 (Display on WebServer and DataWatchPro)		●		●		●	
Voltage V3, Intensity I3 (Display on WebServer and DataWatchPro)		●		●		●	
Differential intensity ID (Display on WebServer and DataWatchPro)	●	●	●	●	●	●	
Analysis of 7-channel harmonics spectrum with autoscale (63 harmonics, range en % and value V - A). **Multi-channel measurement cursor and simultaneous analysis of 1, 2, 3, 4, 5, 6 and 7 channels.** (display in DataWatchPro) **Analysis: harmonics spectrum with autoscale (V1, V2, V3, I1, I2, I3 and differential I. with 64 harmonics, range in % and value V - A).** **Display with continuous refreshment (every 1.5 secs.). Includes measurement cursor** (display on WebServer)							
Voltage V1, Intensity I1 (Display on WebServer and DataWatchPro)	●	●	●	●	●	●	
Voltage V2, Intensity I2 (Display on WebServer and DataWatchPro)		●		●		●	
Voltage V3, Intensity I3 (Display on WebServer and DataWatchPro)		●		●		●	
Differential intensity ID (Display on WebServer and DataWatchPro)	●	●	●	●	●	●	
Modbus TCP/IP, Port 502, and TCP/IP. HTTP communication protocol . WebServer.							
Measurements (Reading)	●	●	●	●	●	●	
Oscilloscope event-logger counters (Reading)	●	●	●	●	●	●	
Alarm counters (Reading) and Energy counters (Reading)	●	●	●	●	●	●	
Maximum and minimum measurements (Reading)	●	●	●	●	●	●	
Digital outputs (relays) (Reading / Writing of 10outputs) and Digital inputs (Reading of 10 inputs)	●	●	●	●	●	●	
Graphic energy log, costs and emissions with (optional) built-in memory. Graphicactive and reactive energy bar and line display in WebServer. Includes measurement cursor. Option "G" **Energy log (L1 single-phase or ∑L1,2 and 3 three-phase) with built-in 3-year memory**							
5-minute interval active and reactive energy consumption log (3-year memory storage)	●	●	●	●	●	●	
Hourly active and reactive energy consumption log (3-year memory storage)	●	●	●	●	●	●	
Daily interval active and reactive energy consumption log (3-year memory storage)	●	●	●	●	●	●	
Monthly interval active and reactive energy consumption log (3-year memory storage)	●	●	●	●	●	●	
Oscilloscope event-logger in waveform with pre-trigger and autoscale differential intensity channel Option "D" One capture channel for each event: Id. One record length mode set at 960ms with pre-trigger at 840ms. 600-event storage capacity in built-in memory. Display via WebServer. Trigger by alarms whose value and delay can be enabled and programmed. Chronological register by type of alarm. Display via WebServer with horizontal zoom functions, Value and time measurement cursor.							
Alarm: Differential intensity - RMS (IDn RMS)	●	●	●	●	●	●	
Alarm: Differential intensity - Pk (ID Pk)	●	●	●	●	●	●	
Remote input 1 (digital input). **External trigger**	●	●	●	●	●	●	
Remote input 2 (digital input). **External trigger**	●	●	●	●	●	●	
Multi-interaction between remote units via Internet/Intranet for UNIVERSAL+ 7WR range, M1, M2, M3, M4, MINI M4, 4LOG, 4REM, 6LIR, 6PHAR and 6PHR. They are totally autonomous and, once configured, can communicate remotely with each other via Internet/Intranet to enable or disable their relays A, B, C and D when a programed event occurs.							
WebServer in real time, display with continuous refreshment (every 1.5 secs.) of measurements, max/min measurements, energy counters, alarm counters, input/output status, event log (LOG), unit information and clock – for UNIVERSAL+ 7WR M1, M2, M3, M4 and MINI M4 units							
Alarm central, Tele-control and automation via 10 logical outputs (relays) and 10 logical inputs. For the whole UNIVERSAL+ 7WR M1 range, M2 and M3 units, by means of a range of external modules.							

UNIVERSAL+ 7WR (3-year guarantee)	7WR						
Command configuration (protection device)	M1		M2		M3		
Single-phase 2-pole (M) only L1 / Three-phase 4-pole (T) L1, L2, L3	M	T	M	T	M	T	
Differential protection and analysis, type A / B. RMS, Peak, AC and DC measurements. Differential intensity oscilloscope.							
Graphic and numerical display. RMS, Peak, AC and DC measurements Differential intensity oscilloscope with autoscale and automatic or manual Y axis scale. Includes measurement cursor Continuously refreshed display (every 1.5 secs.)	•	•	•	•	•	•	
"Real-time" chart recorder for 300 registers with autoscale and automatic or manual Y axis scale, with temporary maximum, minimum and average measurements. Includes measurement cursor. Continuously refreshed display (every 1.5 secs.).	•	•	•	•	•	•	
Differential, type A. Alternating sinusoidal and rectified alternating sinusoidal	•	•	•	•	•	•	
Differential, type B. Alternating senoidal up to 3kHz, alternating senoidal rectified and direct current DC	•	•					
Built to allow reconnection of the new digital counters	•	•	•	•			
WebServer in real time, display refreshed every 1.5 seconds for variable parameters	•	•	•	•	•	•	
300-event graphic logger, 12 channels (46 measurements) with autoscale and variable refreshment (1-600 secs.) with temporary max. min. avg. measurements							
Current value for 46 measurements	•	•	•	•	•	•	
Temporary maximum value (300 events, 1-60 secs.) for 46 measurements	•	•	•	•	•	•	
Temporary minimum value (300 events, 1-60 secs.) for 46 measurements	•	•	•	•	•	•	
Temporary average value (300 events, 1-60 secs.) for 46 measurements	•	•	•	•	•	•	
Difference in value between maximum and minimum (Max value – Min value) of 46 measurements	•	•	•	•	•	•	
Automatic data dispatch to a remote server via Internet Option "SR"							
By enabling "Remote server TCP/IP configuration", the unit automatically dispatches the data file (Slist.json) to a remote server. This file is dispatched every 5 minutes (in sync with the internal clock)	•	•	•	•	•	•	
Measurements							
True RMS and Pk voltage L1, L2, L3	•	•	•	•	•	•	
True RMS voltage between phases L1-2, L2-3, L3-1		•		•		•	
True RMS and Pk intensity with autoscale L1, L2, L3	•	•	•	•	•	•	
Neutral intensity		•		•		•	
True RMS and Pk differential intensity with autoscale	•	•	•	•	•	•	
Voltage THD (total harmonic distortion) L1, L2, L3 and Intensity THD (total harmonic distortion) L1, L2, L3	•	•	•	•	•	•	
Voltage THD L1, L2, L3 of intensity L1, L2, L3 as from harmonic 2 – 63, programmable by harmonic and harmonic range	•	•	•	•	•	•	
Voltage unbalance L1, L2, L3		•		•		•	
Intensity unbalance L1, L2, L3		•		•		•	
Voltage crest factor L1, L2, L3	•	•	•	•	•	•	
Intensity crest factor L1, L2, L3	•	•	•	•	•	•	
Temperature, relative humidity	•	•	•	•	•	•	
Relative temperature and humidity of 6 remote UNIVERSAL+ 7WR TH sensors via Internet/Intranet	•	•	•	•	•	•	
Line frequency L1, L2, L3	•	•	•	•	•	•	
Line impedance L1, L2, L3	•	•	•	•	•	•	
Apparent power L1, L2, L3, ∑L123	•	•	•	•	•	•	
Active power L1, L2, L3, ∑L123	•	•	•	•	•	•	
Requested power L1, L2, L3, L123 and Returned power L1, L2, L3, ∑L123	•	•	•	•	•	•	
Reactive inductive power L1, L2, L3, ∑L123 and Reactive capacitive power L1, L2, L3, ∑L123	•	•	•	•	•	•	
Power factor L1, L2, L3	•	•	•	•	•	•	
Active power W L1, L2, L3, (Maximeter-integration programmable from 10 secs. to 15 mins.)	•	•	•	•	•	•	
Active imported energy counters L1, L2, L3, ∑L123 from 0000000,00001 to 9999999,99999 kWh	•	•	•	•	•	•	
Active exported energy counters L1, L2, L3, ∑L123 from 0000000,00001 to 9999999,99999 kWh	•	•	•	•	•	•	
Reactive energy counters L1, L2, L3, ∑L123 from 0000000,00001 to 9999999,99999 kQh	•	•	•	•	•	•	
DC voltage (Vdc) L1, L2, L3	•	•	•	•	•	•	
AC voltage (Vac) L1, L2, L3	•	•	•	•	•	•	
DC intensity (Idc) L1, L2, L3	•	•	•	•	•	•	
AC intensity (Iac) L1, L2, L3	•	•	•	•	•	•	
DC power(Wdc) L1, L2, L3	•	•	•	•	•	•	
AC power (Wac) L1, L2, L3	•	•	•	•	•	•	
Differential intensity DC (IDdc)	•	•	•	•	•	•	
Differential intensity AC (IDac)	•	•	•	•	•	•	
Voltage %HD (harmonic distortion) L1, L2, L3 of harmonic k 0 to 63 (64 harmonics)	•	•	•	•	•	•	
Intensity %HD (harmonic distortion) L1, L2, L3, of harmonic k 0 to 63 (64 harmonics)	•	•	•	•	•	•	
Voltage L1, L2, L3, of harmonic k 0 to 63 (64 harmonics)	•	•	•	•	•	•	
Intensity L1, L2, L3, of harmonic k 0 to 63 (64 harmonics)	•	•	•	•	•	•	

UNIVERSAL+ 7WR (3-year guarantee)	7WR						
Command configuration (protection device)	M1		M2		M3		
Single-phase 2-pole (M) only L1 / Three-phase 4-pole (T) L1, L2, L3	M	T	M	T	M	T	
Protections/alarms: programmable in value and delay with automatic reclosure/intelligent reclosure (only commands 1,2 and 3) **Alarms: programmable in value and delay** (commands 1,2,3 and 4)							
RMS overvoltage L1, L2, L3	●	●	●	●	●	●	
Set overvoltage: >300V RMS L1, L2, L3 (Progressive voltage/time trip curve - EN 50550 Standard)	●	●	●	●	●	●	
Set overvoltage: >350V RMS L1, L2, L3 (Progressive voltage/time trip curve - EN 50550 Standard)	●	●	●	●	●	●	
Set overvoltage: >400V RMS L1, L2, L3 (Progressive voltage/time trip curve - EN 50550 Standard)	●	●	●	●	●	●	
Pk overvoltage L1, L2, L3	●	●	●	●	●	●	
RMS low voltage L1, L2, L3	●	●	●	●	●	●	
RMS intensity L1, L2, L3	●	●	●	●	●	●	
Pk intensity L1, L2, L3	●	●	●	●	●	●	
RMS differential intensity (IDn RMS)	●	●	●	●	●	●	
Pk differential intensity (ID Pk)	●	●	●	●	●	●	
Neutral intensity		●		●		●	
Power1 W L1, L2, L3	●	●	●	●	●	●	
Power2 W L1, L2, L3 (Maximeter-integration programmable from 10 secs to 15 mins.)	●	●	●	●	●	●	
Power factor L1, L2, L3	●	●	●	●	●	●	
Voltage and Intensity L1, L2, L3 From 2-63, programmable by harmonic and harmonics bracket.	●	●	●	●	●	●	
Voltage unbalance L1, L2, L3		●		●		●	
Intensity unbalance L1, L2, L3		●		●		●	
Over-temperature	●	●	●	●	●	●	
Low temperature	●	●	●	●	●	●	
Over-humidity	●	●	●	●	●	●	
Low humidity	●	●	●	●	●	●	
Over-frequency L1, L2, L3	●	●	●	●	●	●	
Low frequency L1, L2, L3	●	●	●	●	●	●	
Phase sequence		●		●		●	
Remote input 1 (digital input)	●	●	●	●	●	●	
Remote input 2 (digital input)	●	●	●	●	●	●	
Time programmer	●	●	●	●	●	●	
Preemptive cut-off in the event of AC power failure – insufficient supply (not programmable)	●	●	●	●	●	●	
Phase failure L1, L2, L3 (not programmable)		●		●		●	
Individual MCB cut-off counters / ancillary contactor							
Event-counter for waveform logger L1, L2, L3.	●	●	●	●	●	●	
Overvoltages V1, V2, V3.	●	●	●	●	●	●	
Low voltages V1, V2, V3.	●	●	●	●	●	●	
Intensity I1, I2, I3.	●	●	●	●	●	●	
Differential intensity	●	●	●	●	●	●	
Neutral intensity.		●		●		●	
Power1 L1, L2, L3	●	●	●	●	●	●	
Power2 W L1, L2, L3 (Maximeter-integration programmable from 10 secs to 15 mins.)	●	●	●	●	●	●	
Voltage unbalance V1, V2, V3.		●		●		●	
Intensity unbalance I1, I2, I3.		●		●		●	
Voltage THD (total harmonic distortion) V1, V2, V3.	●	●	●	●	●	●	
Intensity THD (total harmonic distortion) I1, I2, I3.	●	●	●	●	●	●	
Over-temperature and Low temperature.	●	●	●	●	●	●	
Over-humidity and Low humidity.	●	●	●	●	●	●	
Over-frequency V1, V2, V3.	●	●	●	●	●	●	
Low frequency V1, V2, V3.	●	●	●	●	●	●	
Power factor L1, L2, L3.	●	●	●	●	●	●	
Time programmer.	●	●	●	●	●	●	
Phase sequence.		●		●		●	
MCB (circuit-breaker).	●	●	●	●			
Remote input 1 (digital input)	●	●	●	●	●	●	
Remote input 2 (digital input)	●	●	●	●	●	●	
Locking	●	●	●	●	●	●	
Power OFF (AC power failure)	●	●	●	●	●	●	
Total counter	●	●	●	●	●	●	
Total accumulated counter (undeletable)	●	●	●	●	●	●	
Precisions available in ±0.2% and ±0.4% , in intensity and voltage							
Basic precision: ± 0.2%	●	●	●	●	●	●	
Basic precision: ± 0.4%	●	●	●	●	●	●	
Measurements for 64 harmonics, distortion factor, harmonic distortion (rango in % and valor V – A) +THD							
Graphic and numerical display in WebServer.	●	●	●	●	●	●	

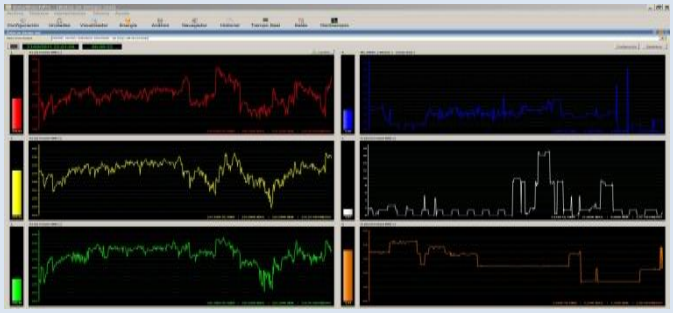
UNIVERSAL+ 7WR (3-year guarantee)	7WR					
Command configuration (protection device)	M1		M2		M3	
Single-phase 2-pole (M) only L1 / Three-phase 4-pole (T) L1, L2, L3	M	T	M	T	M	T
Real, incremental, test of differential (perform routinely)						
Real, incremental, manual test of differential **(differential tester)**	●	●	●	●	●	●
Incremental autotest of differential **(before reclosing)**	●	●	●	●	●	●
Autotest of differential every 1 sec.	●	●	●	●	●	●
Circuit-breaker trip test	●	●	●	●		
Maximum and minimum measurement logs						
Maximum: voltage L1, L2 and L3	●	●	●	●	●	●
Maximum: voltage unbalance L1, L2 and L3		●		●		●
Maximum: intensity L1, L2 and L3	●	●	●	●	●	●
Maximum: differential intensity	●	●	●	●	●	●
Maximum: neutral intensity		●		●		●
Maximum: intensity unbalance L1, L2 and L3		●		●		●
Maximum: frequency V1, V2 and V3	●	●	●	●	●	●
Maximum: voltage THD (total harmonic distortion) L1, L2 and L3	●	●	●	●	●	●
Maximum: intensity THD (total harmonic distortion) L1, L2 and L3	●	●	●	●	●	●
Maximum: active power L1, L2 and L3 (Maximeter programmable from 10 secs to 15 mins.)	●	●	●	●	●	●
Maximum: apparent power L1, L2 and L3	●	●	●	●	●	●
Maximum: reactive inductive power L1, L2 and L3	●	●	●	●	●	●
Maximum: reactive capacitive power L1, L2 and L3	●	●	●	●	●	●
Maximum: temperature	●	●	●	●	●	●
Maximum: humidity	●	●	●	●	●	●
Minimum: voltage L1, L2 and L3	●	●	●	●	●	●
Minimum: frequency V1, V2 and V3	●	●	●	●	●	●
Minimum: temperature	●	●	●	●	●	●
Minimum: humidity	●	●	●	●	●	●
Alarms. Programmable enablement/disablement of 10 relays + 4 relays A, B, C and D of a remote UNIVERSAL+ 7WR unit via Internet/Intranet by one or more alarms						
Differential lock	●	●	●	●	●	●
MCB lock (Circuit-breaker)	●	●	●	●		
Intensity lock	●	●	●	●	●	●
Lock upon neutral I, PF, THDI, I unbalance, Power 1 W and Power 2 W	●	●	●	●	●	●
Overvoltage	●	●	●	●	●	●
Low voltage	●	●	●	●	●	●
MCB (Circuit-breaker)	●	●	●	●		
Intensity	●	●	●	●	●	●
Differential intensity	●	●	●	●	●	●
Neutral intensity		●		●		●
Power factor	●	●	●	●	●	●
Voltage THD (total harmonic distortion)	●	●	●	●	●	●
Intensity THD (total harmonic distortion)	●	●	●	●	●	●
Voltage unbalance		●		●		●
Intensity unbalance		●		●		●
Manual OFF from front panel	●	●	●	●	●	●
Manual OFF via Internet/Intranet	●	●	●	●	●	●
Over-temperature and Low temperature	●	●	●	●	●	●
Over-humidity and Low humidity	●	●	●	●	●	●
Over-frequency and Low frequency	●	●	●	●	●	●
Phase sequence		●		●		●
Remote input 1 (digital input)	●	●	●	●	●	●
Remote input 2 (digital input)	●	●	●	●	●	●
Time programmer	●	●	●	●	●	●
Timer 1, 2, 3 and 4 of module 1 (digital input IN1, IN2, IN3 and IN4 of module 1)	●	●	●	●	●	●
Timer 1, 2, 3 and 4 of module 2 (digital input IN1, IN2, IN3 and IN4 of module 2)	●	●	●	●	●	●
Power1 W	●	●	●	●	●	●
Power2 W (Maximeter-integration programmable from 10 secs to 15 mins.)	●	●	●	●	●	●
Reception of TCP/IP commands from other remote UNIVERSAL+ 7WR units via Internet/Intranet.						
For the enablement/disablement of relays A and B	●	●	●	●	●	●
Outstanding characteristics						
True RMS, Peak (Pk), AC and DC measurements (DC in intensity with DC)ine transformers)	●	●	●	●	●	●
Averaged RMS display, programmable 100, 200, 300, 400 and 500ms	●	●	●	●	●	●
Very high-speed MCB cut-off (2P=2ms, 4P=5ms)	●	●	●			
Intelligent reclosures and sequential reclosures	●	●	●	●	●	●
Sequential, automatic or manual reclosures	●	●	●	●	●	●
Backlit,12x3-character screen. Intuitive menus. Long texts: easy to read scroll-down	●	●	●	●	●	●
Chronological log of last cut-off. With value and year, month, day, hour and minute	●	●	●	●	●	●
Chronological log of last alarm. With value and year, month, day, hour and minute	●	●	●	●	●	●
Control external I/O modules: up to14 logical outputs (relays) and 10 logical inputs, temperature and humidity probe, controls for logical inputs (Remotes In) programmable signal-action.	●	●	●	●	●	●
WebServer display, programming and remote control via Internet/Intranet	●	●	●	●	●	●
Independent programmable connection delays: in the event of cut-off by voltage alarms and cut-off in the event of power failure (delay from 0 to 999 s)	●	●	●	●	●	●
Manual connection and disconnection	●	●	●	●	●	●
4-digit protection PIN	●	●	●	●	●	●
Programmable acoustic warnings (enabled or disabled)	●	●	●	●	●	●
Ex-factory default configuration	●	●	●	●	●	●
High-precision time programmer in hours and minutes	●	●	●	●	●	●
Language: configurable in Spanish or English	●	●	●	●	●	●
DataWatchPro: Professional software for PC with database ,graphic data analysis , etc.	●	●	●	●	●	●

DataWatchPro included for all the UNIVERSAL+ 7WR M1, M2, M3, M5, M4, Rogowski M4 and 7WR MINI range

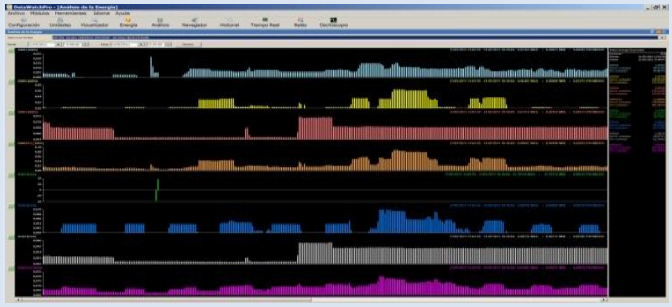
Professional software with database and graphic data analysis

- Multi-thread communication with a multitude of remote units via Internet/Intranet (reading and command)
- 200-parameter chronological logger in database for each unit.
- Independent notifications via e-mail of 249 programmable alarms for each unit
- Programmable automation/tele-control of relays with level alarms in time frame for each unit
- Module: numerical data analysis
- Module: graphic data analysis.
- Module: history analysis

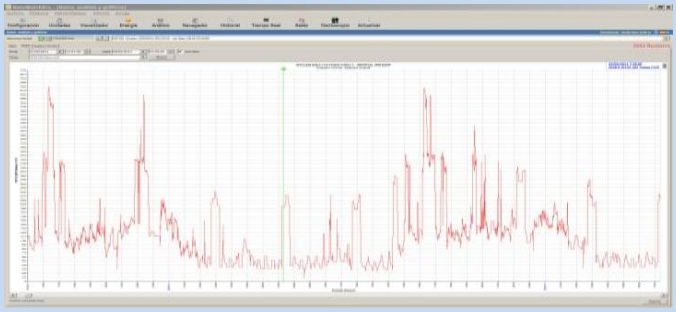
- Module: real time



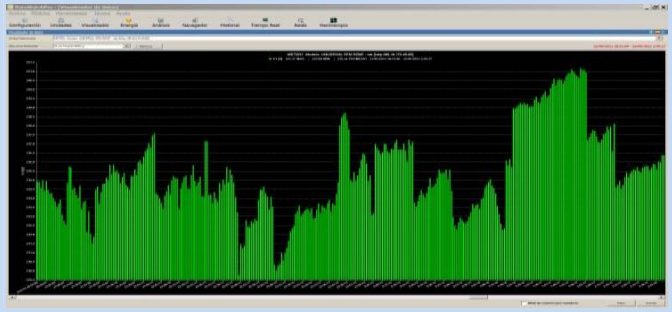
- Module: graphic energy analysis



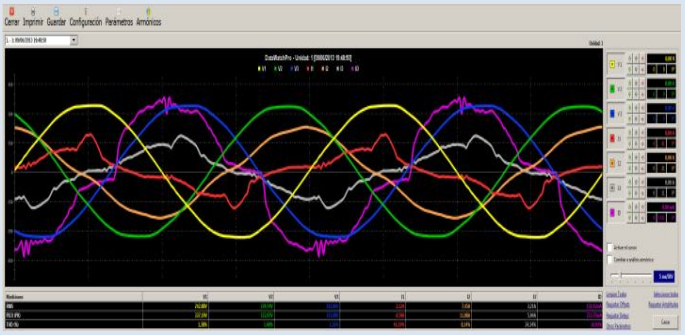
- Module: graphic plotter (graphic long period analysis)



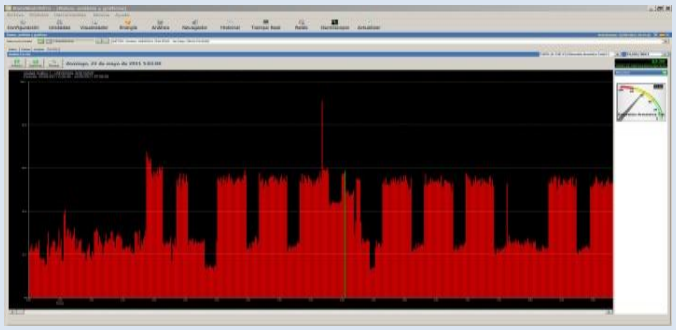
- Module: graphic display (rapid analysis)



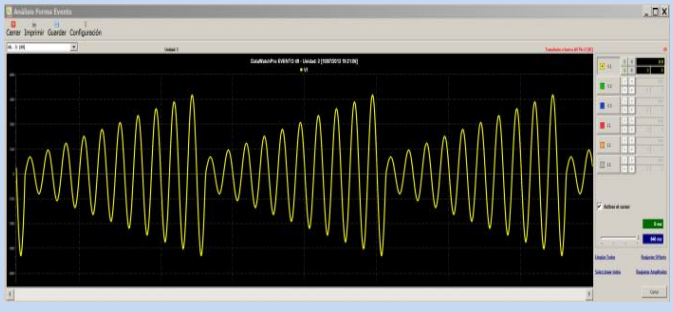
- Module: 7-channel oscilloscope. With autoscale and functions.



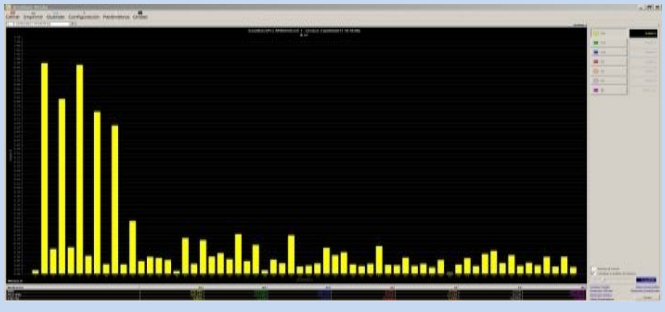
- Module: daily analysis



- Module: 6-channel oscilloscope event-logger in waveform with pre-trigger and autoscale (optional).



- Module: 7-channel harmonics spectrum . with autoscale (63 harmonics, range in % and value V - A).



Chapter 3 – USER'S GUIDE (Surfing the WebServer through Internet/Intranet) (please, refer to synoptical tables of characteristics)

Quick and simple access via Internet / Intranet with no need for software.

WebServer in real time, display of all variable parameters continuously refreshed (every 1,5 secs.)

Permits all the unit's parameters to be displayed and configured via Internet/Intranet on any PC, MAC, smartphone, tablet or PDA conveniently, easily and clearly.
In order for the data dispatch and command reception of the WebServer to function correctly, a good quality Internet connection or an Internet line connection (optic fibre or similar) is imperative.

It has three customizable styles in six colours for its display on the website. These styles and colours are memorised in each browser through the use of cookies.

We recommend the Internet Explorer 11 browser for greater Internet/Intranet speed

3.1 WEB page: Home, PIN

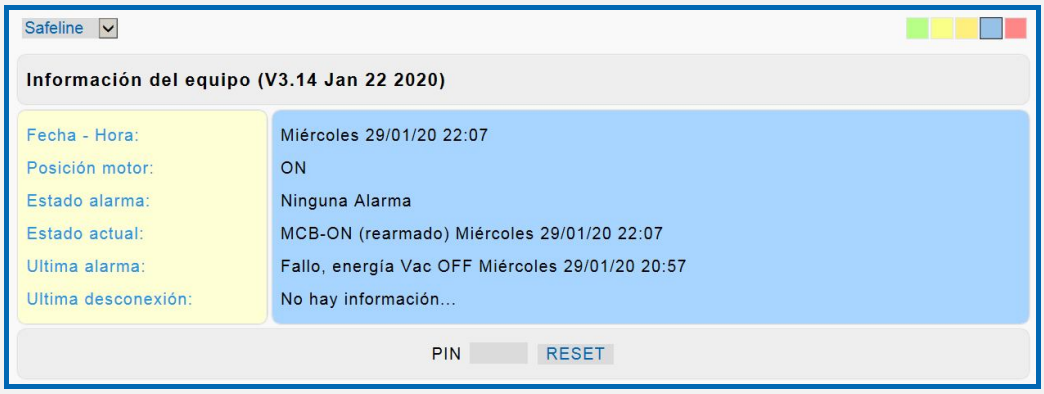
Presentation and request for access PIN.

Surfing:

The first page displayed upon accessing the unit is the welcome page where the user's PIN is requested. The default PIN enabled at the factory is "1, 2, 3, 4". Once said PIN has been entered, the main page is accessed. Surfing with the WebServer is simple and intuitive since it is organized with the following 14 main buttons.

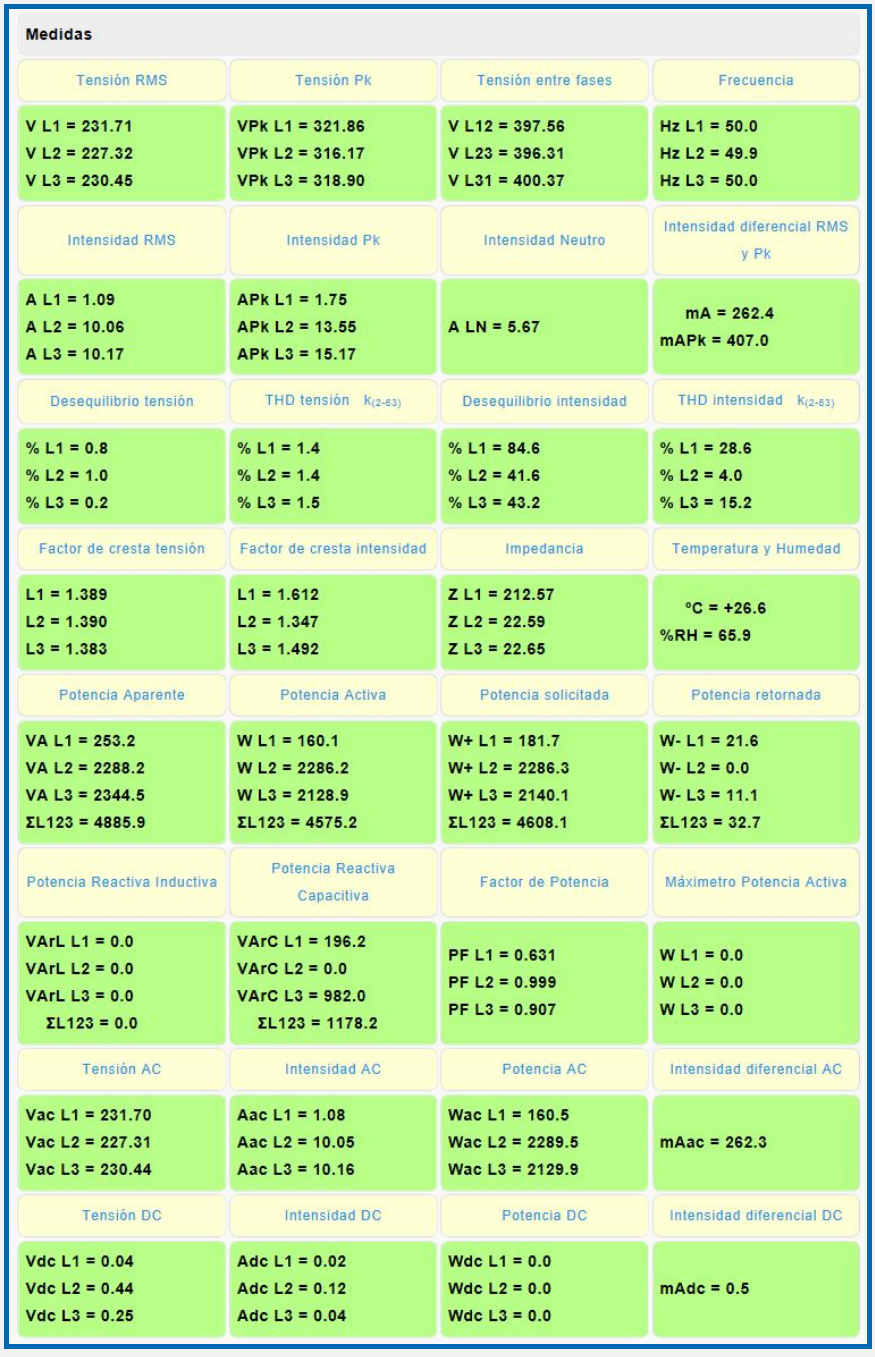
3.2 WEB page: Box “Measures and events”, section “unit information”

The following frame displays the current information in real time and is continuously refreshed (every 1,5 secs).



3.2.1. WEB page: Box “Measures and events”, section “Measurements”

The following frame displays the measurements in real time and is continuously refreshed (every 1,5 secs).



3.2.2 WEB page: Box “Measures and events”, section “Energy counters”

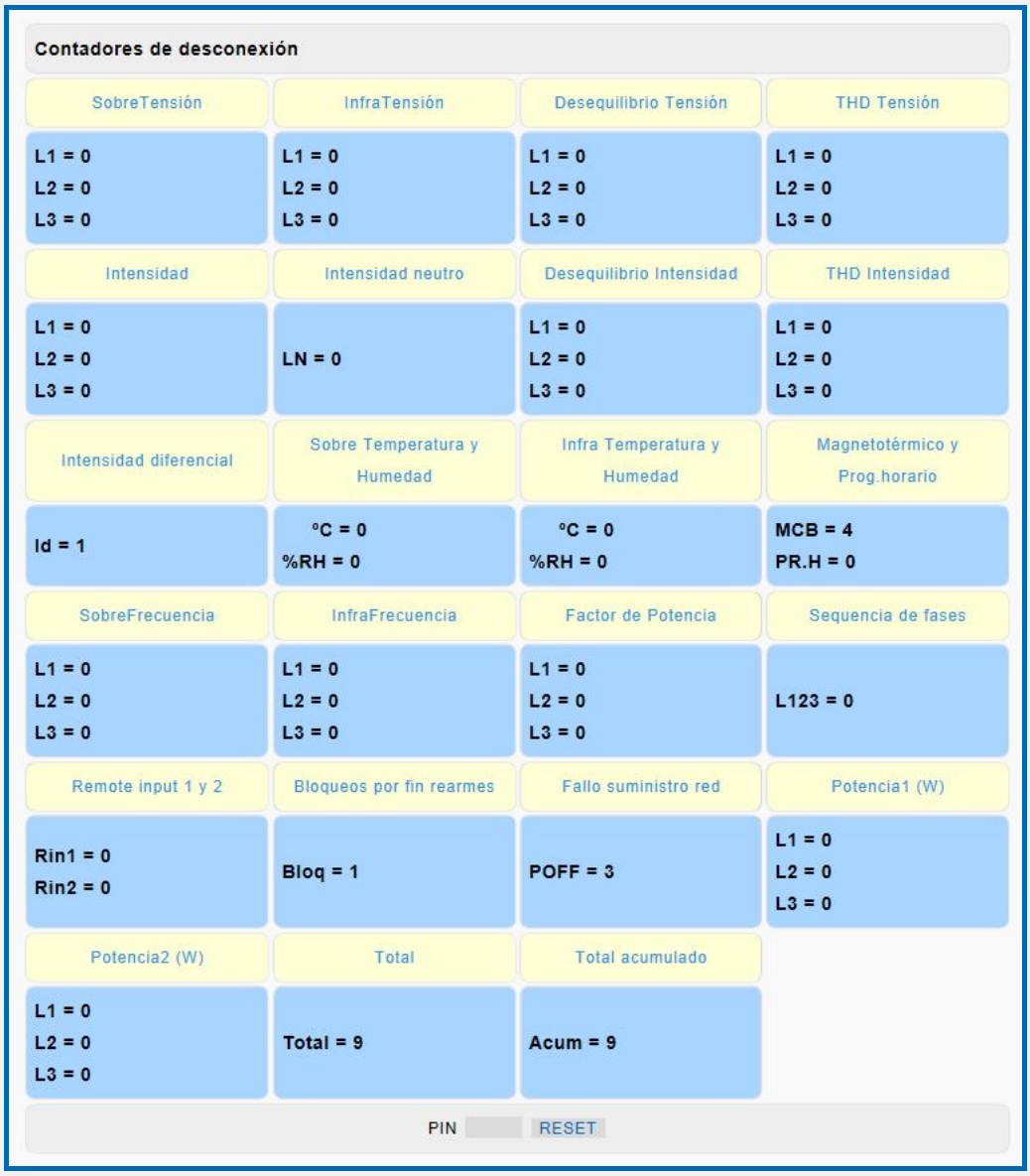
The following frame displays the measurements of the energy counters in real time and is continuously refreshed (every 1,5 secs).

3.2.3 WEB page: Box “Measures and events”, section “Maximum and minimum values”

The following frame displays the maximum and minimum measurements in real time and is continuously refreshed (every 1,5 secs).

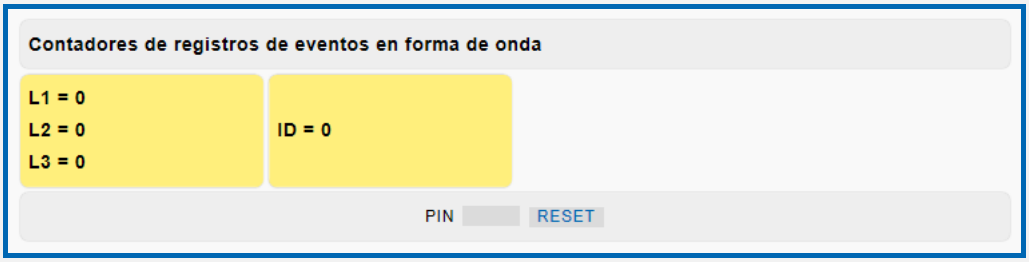
3.2.4 WEB page: Box “Measures and events”, section “MCB cut-off counters / ancillary contactor”

The frame below shows the values of the cut-off counters in real time, display continuously refreshed (every 1,5 secs.).



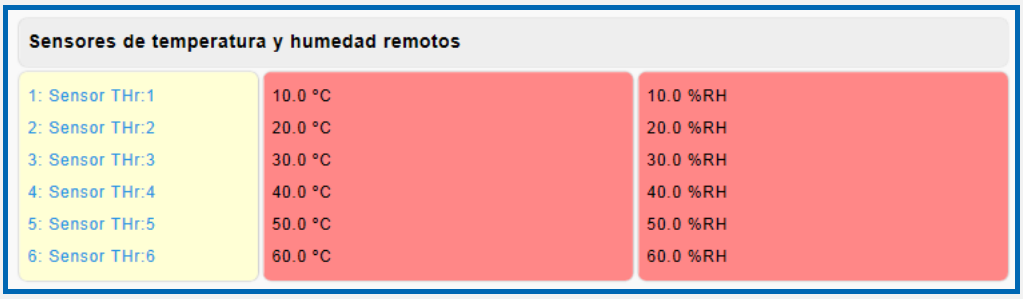
3.2.5 WEB page: Box “Measures and events”, section “Event-logger counters in waveform”

The frame below shows the values of the event-counters as captured by:
the oscilloscope event-logger with V-I pre-trigger and the oscilloscope event-logger with differential intensity pre-trigger in real time and with continuously refreshed display (every1.5 secs). Remote input triggers 1 and 2 are not included.



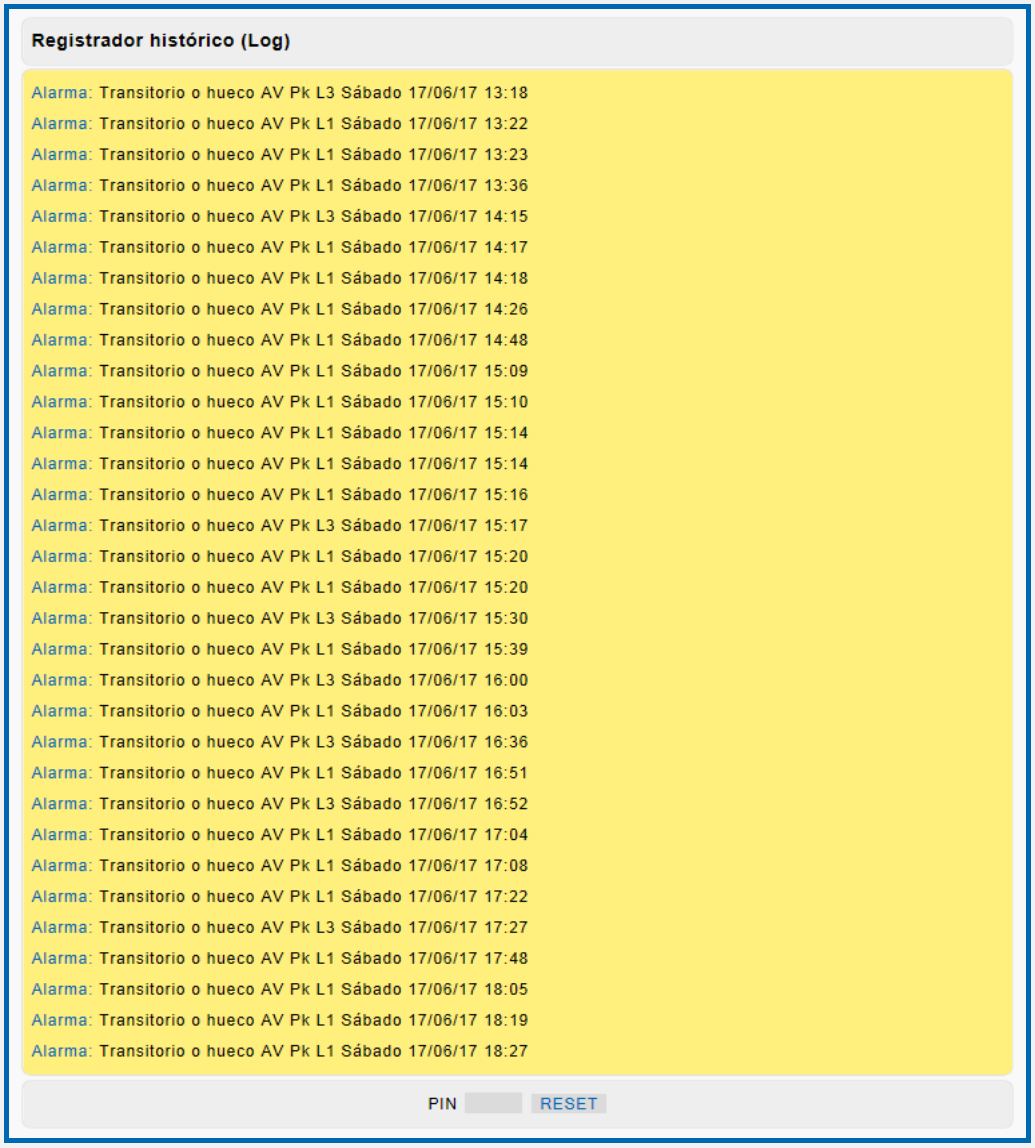
3.2.6 WEB page Box: “Measures and events”, section “Remote temperature and humidity sensors”

The box below shows the six measurements for temperature and humidity sent via Internet/Intranet by the remote **UNIVERSAL+ 7WR TH** units. Real-time display with continuous refreshment (every 1.5 secs) of the data. Consult UNIVERSAL+ 7WR TH manual.



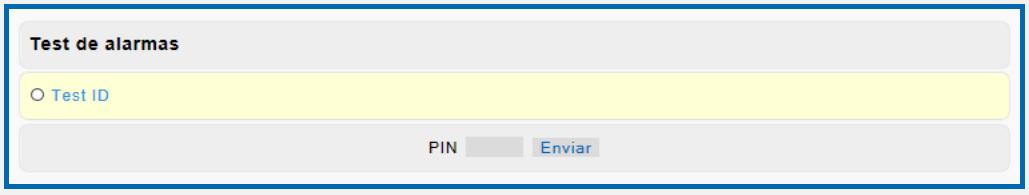
3.2.7 WEB page: Box “Measures and events”, section “Historical logger - LOG”

The following frame displays the data pertaining to the LOG (32 events FIFO battery), alarm connection/disconnection and information log. Chronological alarm and disconnection/connection logger. With measurement value and year, month, day, hour and minute. In real time and continuously refreshed (every 1,5 secs).



3.2.8 WEB page: Box “Measures and events”, section “Alarm test”

Tests carried out on the website. The following box shows the incremental, real manual test for differential intensity protection.

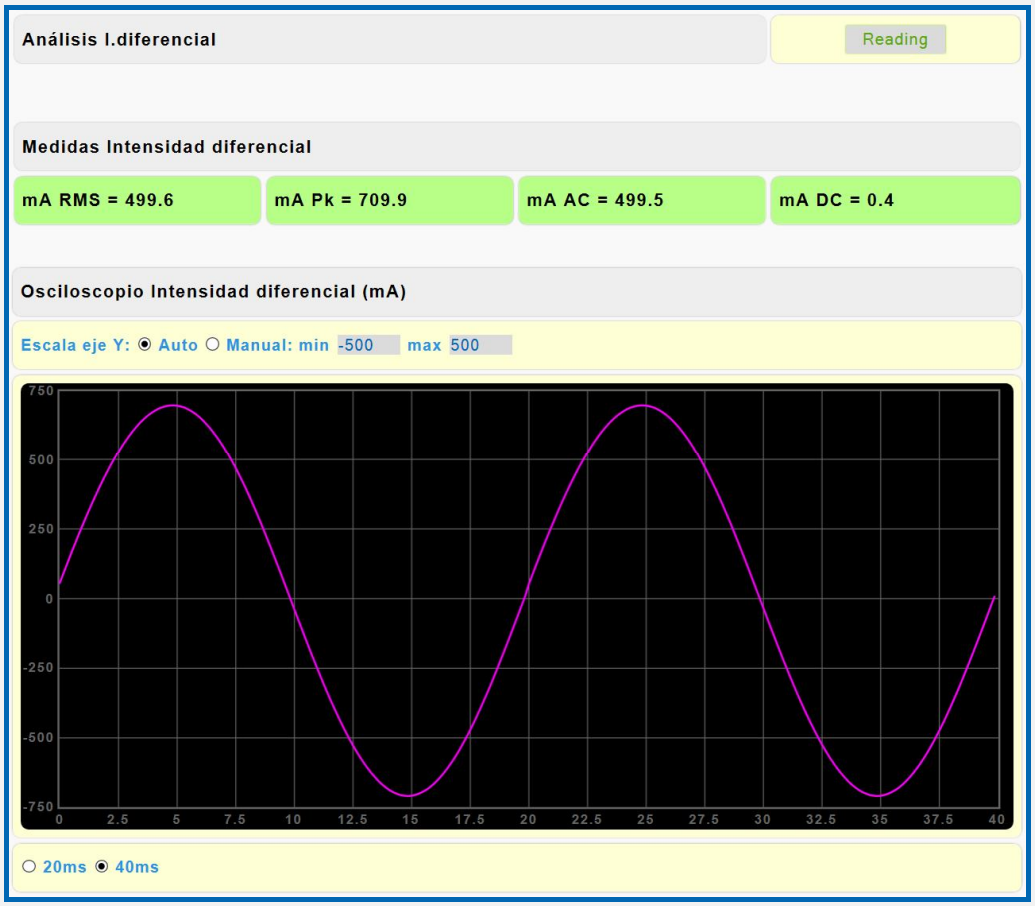


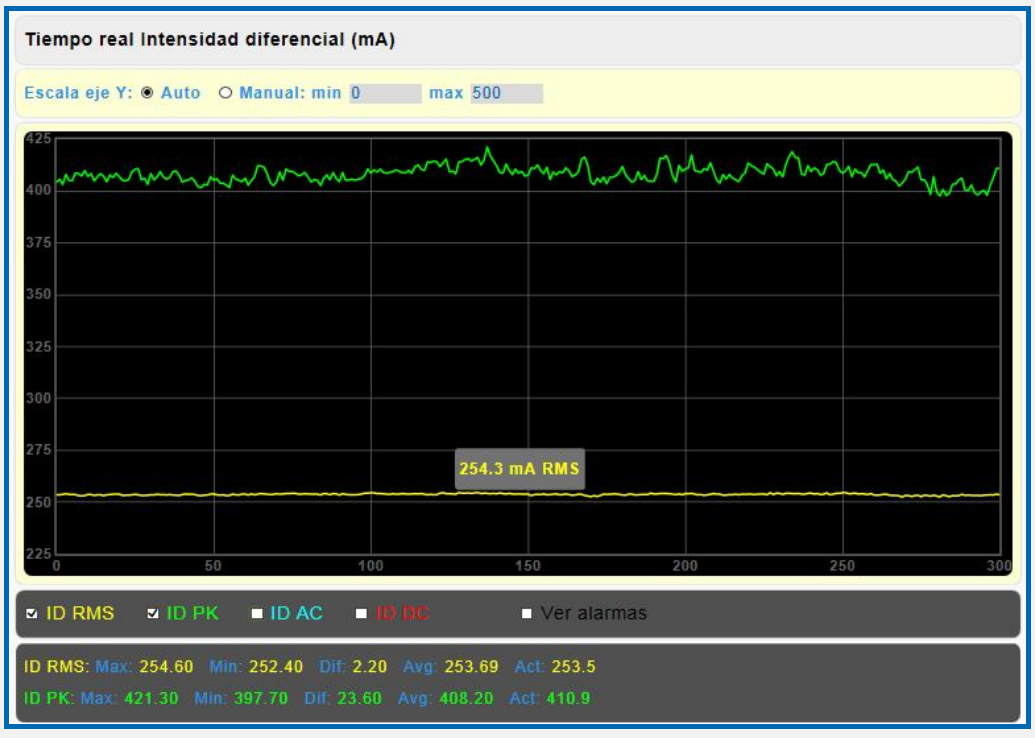
3.3 WEB page: Box "Analysis differential I.", Type A / B

Graphic and numerical display. RMS, Peak, AC and DC measurements. Differential intensity oscilloscope with autoscale and automatic or manual Y axis scale. Includes measurement cursor. Continuously refreshed display (every 1.5 secs.).

"Real-time" chart recorder for 300 registers with autoscale and automatic or manual Y axis scale, with temporary maximum, minimum and average measurements. Includes measurement cursor. Continuously refreshed display (every 1.5 secs.).

In order to view this WebServer page correctly, the PC, MAC, smartphone, tablet or PDA must have Internet access. If working on an Intranet network, one must have an Intranet server with its data files uploaded. These files are easily installed in any computer (consult UNIVERSAL+ Apache manual).



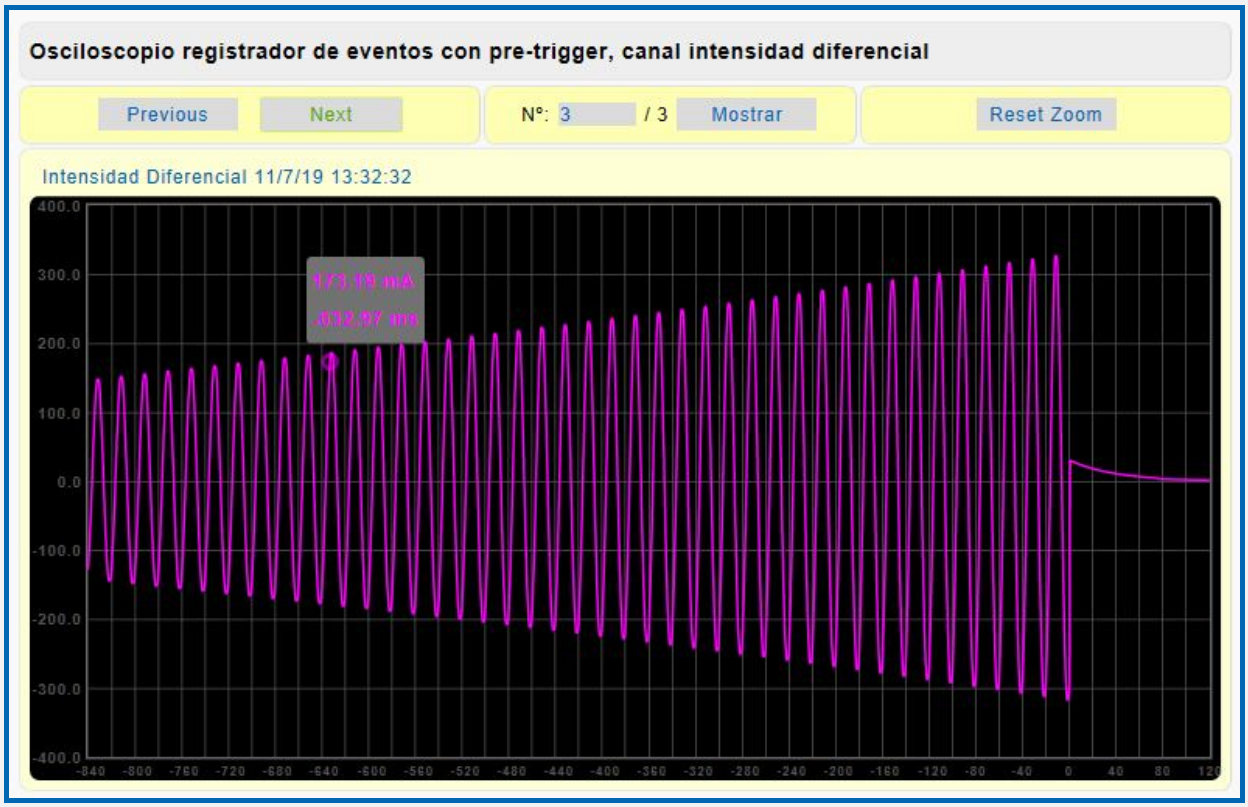


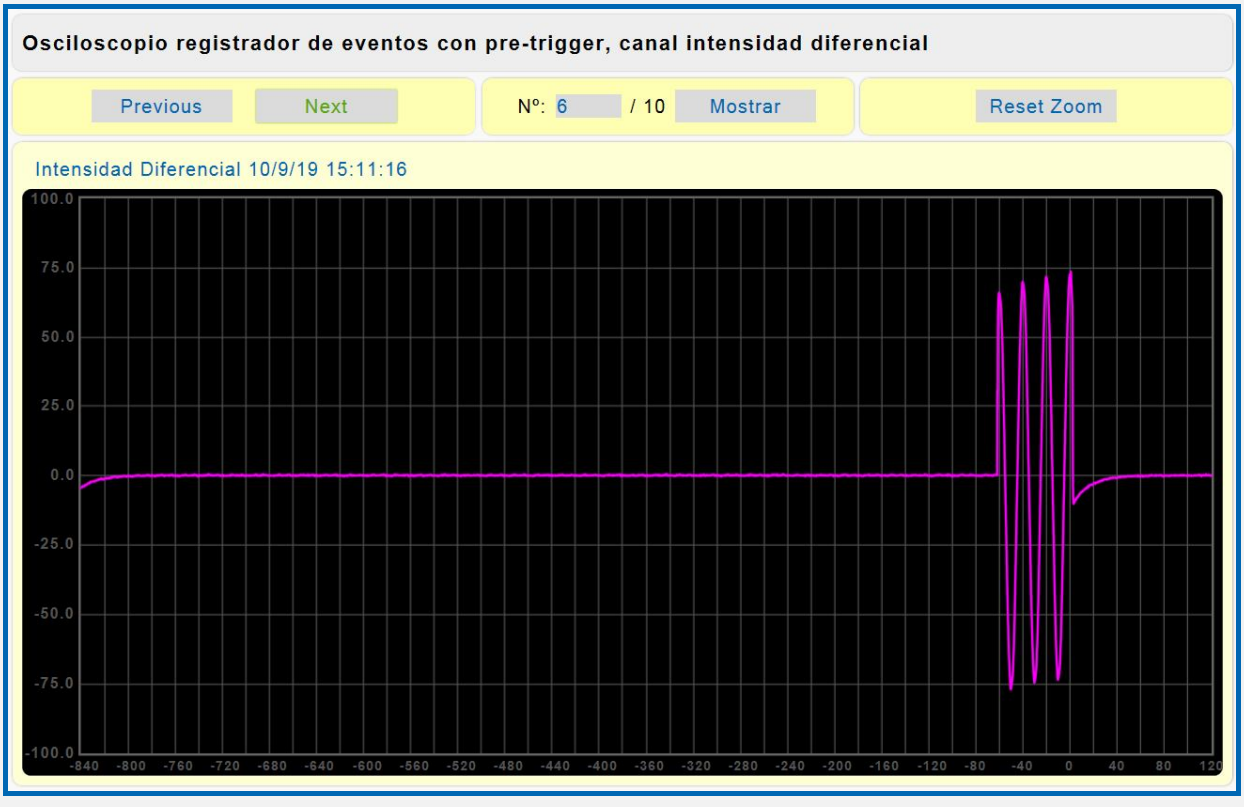
3.4 WEB page: Box " Differential I. event-logger" (version D)

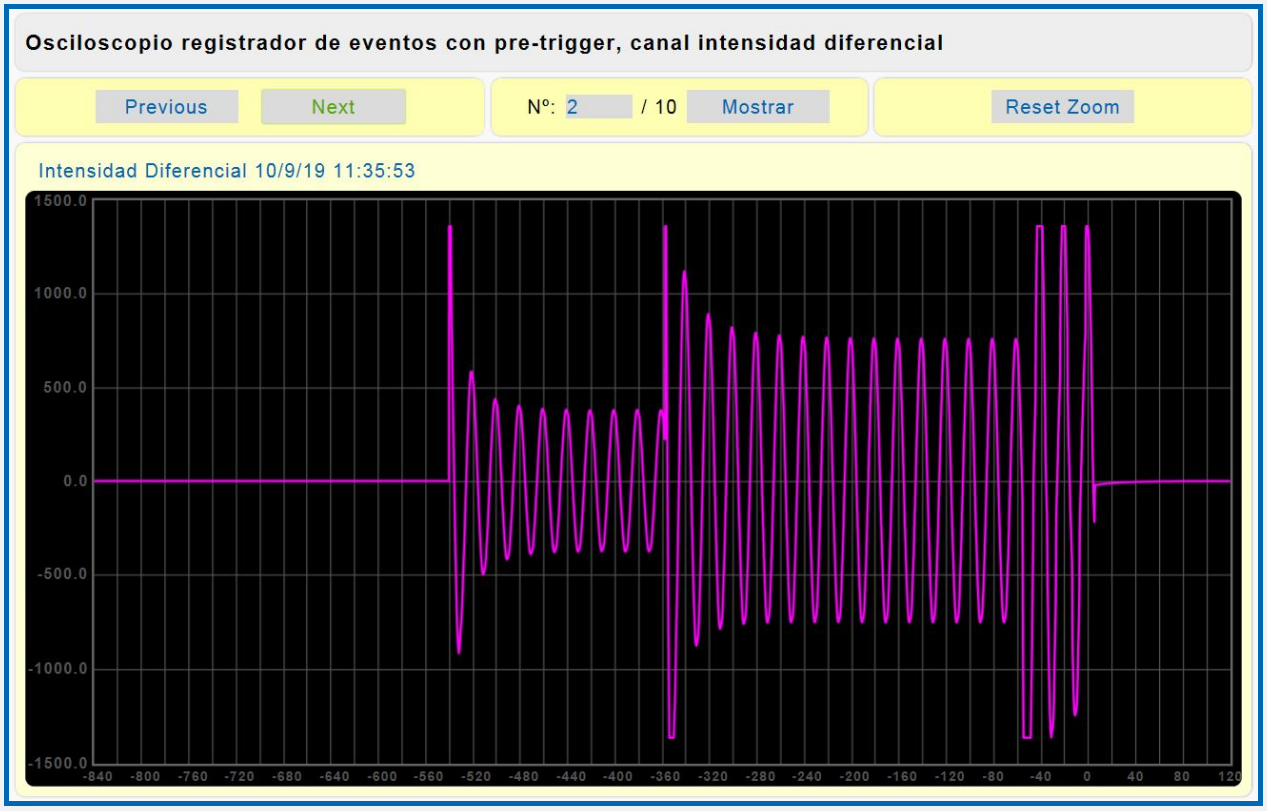
Oscilloscope event-logger in waveform with pre-trigger and autoscale differential intensity channel:

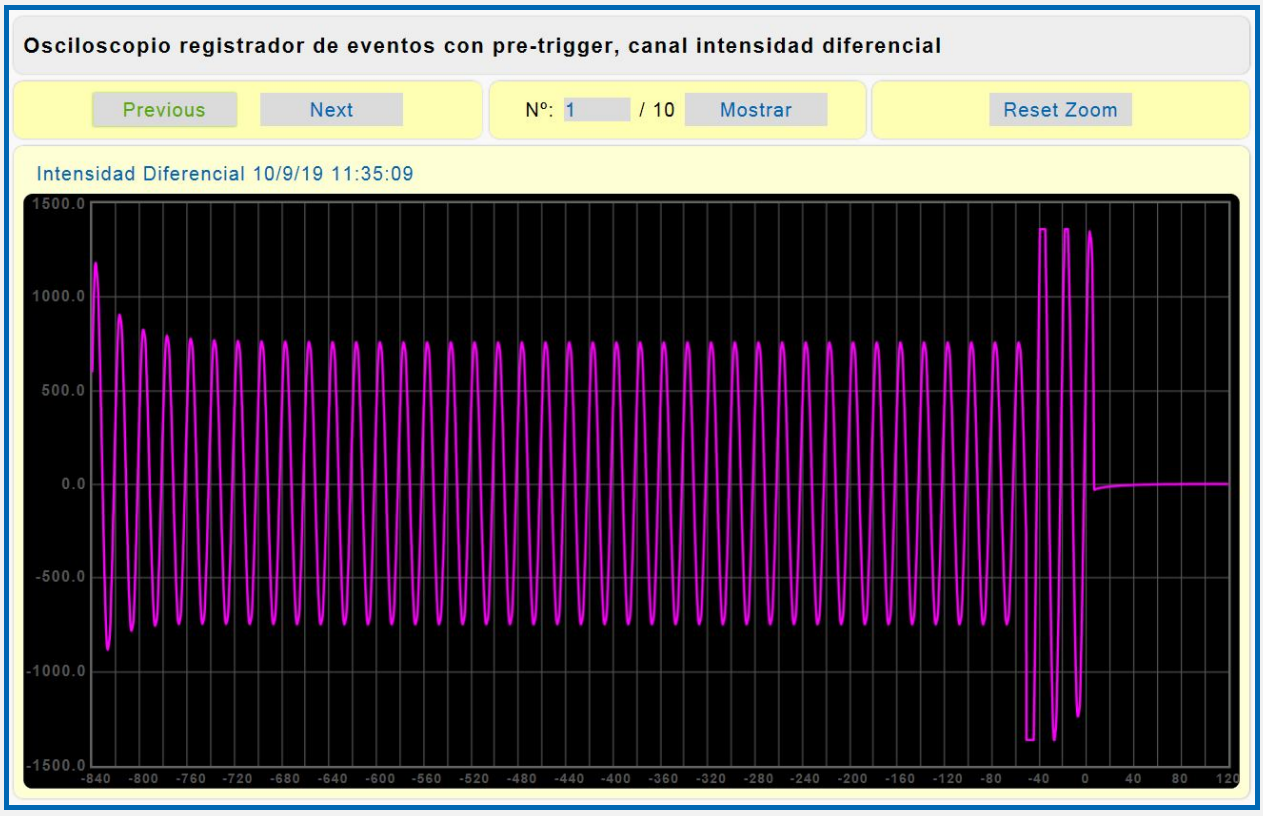
One capture channel for each event: Id.
One record length mode set at 960ms with pre-trigger at 840ms.
600-event storage capacity in built-in memory. Display via WebServer.
Trigger by alarms whose value and delay can be enabled and programmed. Chronological register by type of alarm.
Display via webServer with horizontal zoom functions, Value and time measurement cursor.

In order to view this WebServer page correctly, the PC, MAC, smartphone, tablet or PDA must have Internet access. If working on an Intranet network, one must have an Intranet server with its data files uploaded. These files are easily installed in any computer (consult UNIVERSAL+ Apache manual).





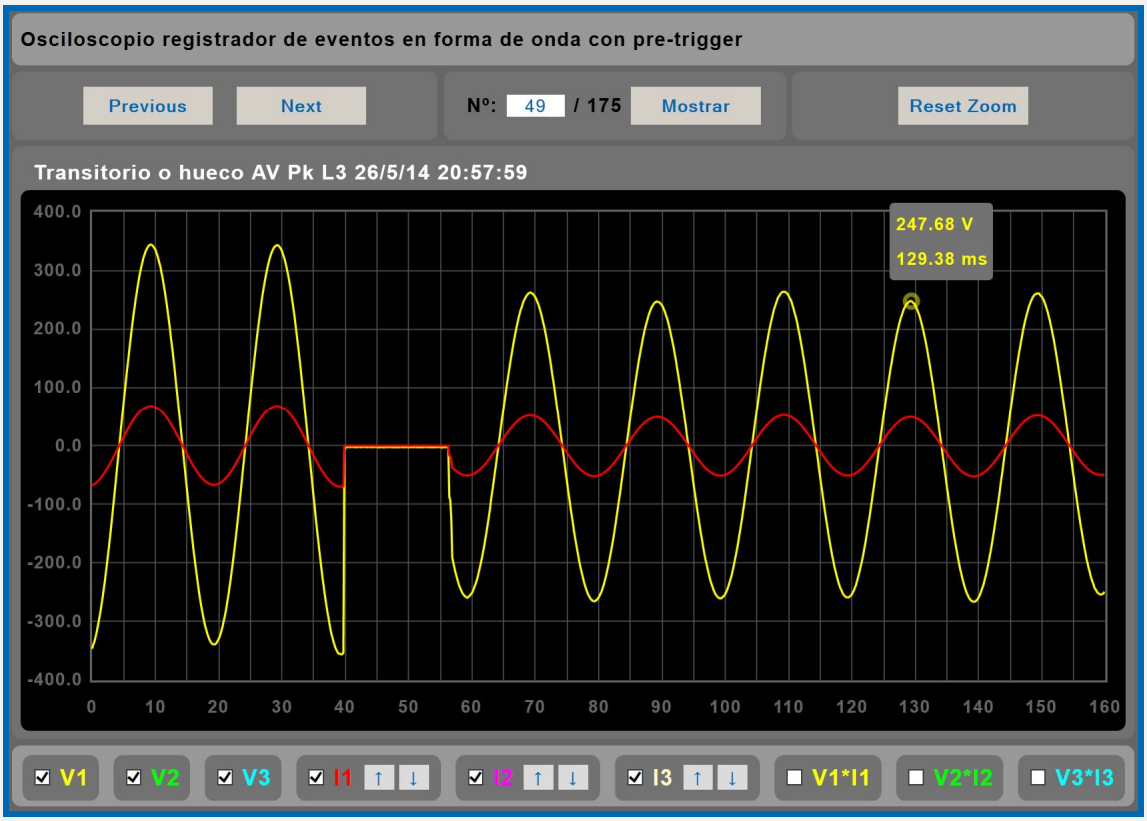

Osciloscopio registrador de eventos con pre-trigger, canal intensidad diferencial
Previous
Next
Nº: 2 / 10
Mostrar
Reset Zoom
Intensidad Diferencial 10/9/19 11:35:53
1500.0
1000.0
500.0
0.0
-500.0
-1000.0
-1500.0
-840 -800 -760 -720 -680 -640 -600 -560 -520 -480 -440 -400 -360 -320 -280 -240 -200 -160 -120 -80 -40 0 40 80 120

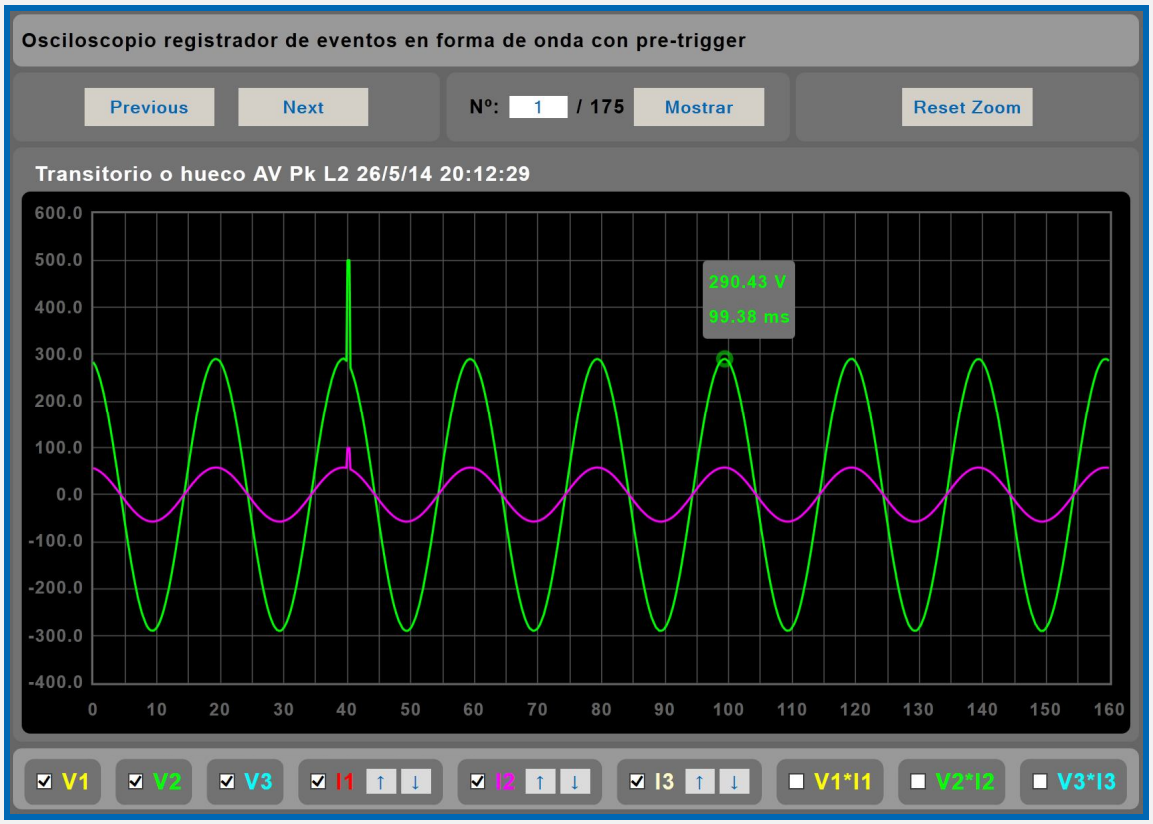

Osciloscopio registrador de eventos con pre-trigger, canal intensidad diferencial
Previous
Next
Nº: 1 / 10
Mostrar
Reset Zoom
Intensidad Diferencial 10/9/19 11:35:09
1500.0
1000.0
500.0
0.0
-500.0
-1000.0
-1500.0
-840 -800 -760 -720 -680 -640 -600 -560 -520 -480 -440 -400 -360 -320 -280 -240 -200 -160 -120 -80 -40 0 40 80 120

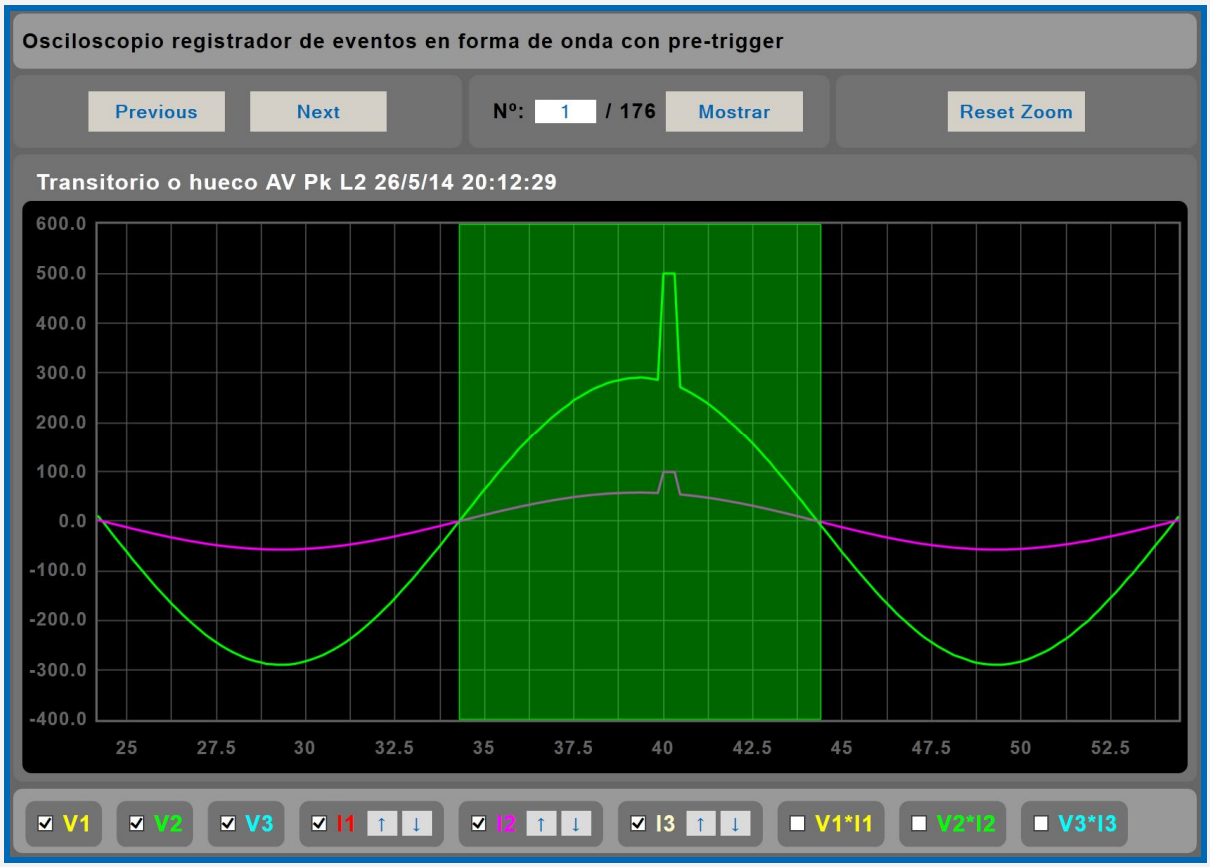
3.5 WEB page: Box “Event-logger V - I” (version W).

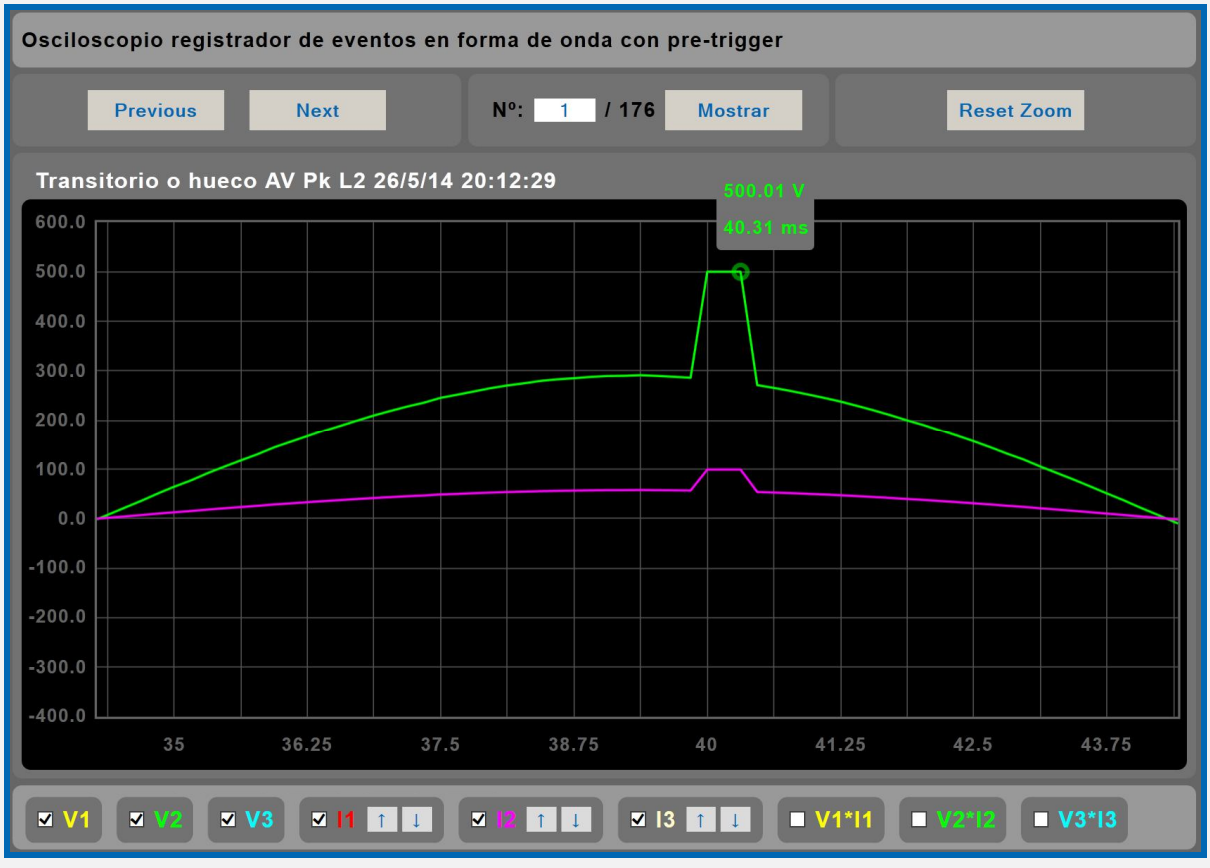
Oscilloscope event-logger in waveform with pre-trigger and autoscale

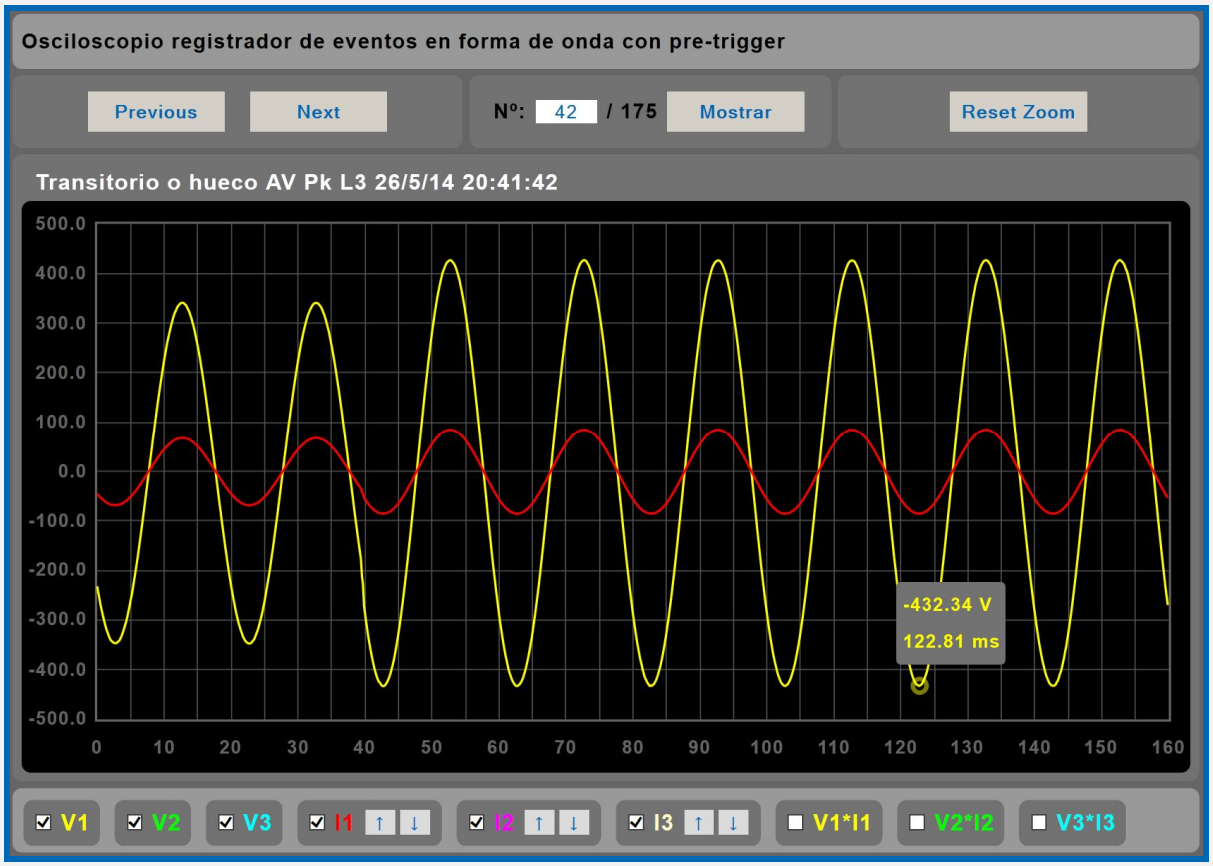
6 channels V1, V2, V3, I1, I2, I3, with captures for each event
Three modes of record length in 6 channels 160ms, 320ms and 640ms (pre-trigger: 40ms, 80ms and 160ms)
+ three modes of record length in 6 channels 20s, 40s y 80s (pre-trigger 5s, 10s y 20s). Only HP versions
600-event storage in built-in memory. Display via WebServer and DataWatchPro.
Trigger for alarms which can be enabled and are programmable in value and delay. Chronological record for each type of alarm.
Display via WebServer with horizontal zoom functions. Multi-channel measurement, value and time cursor, 3 mathematical V*I channels, etc.
Display via DataWatchPro with offset control functions, amplitude, time base, horizontal shift zoom, multi-channel measurement, value and time cursor, etc.
In order to view this WebServer page correctly, the PC, MAC, smartphone, tablet or PDA must have Internet access. If working on an Intranet network, one must have an Intranet server with its data files uploaded. These files are easily installed in any computer (consult UNIVERSAL+ Apache manual).

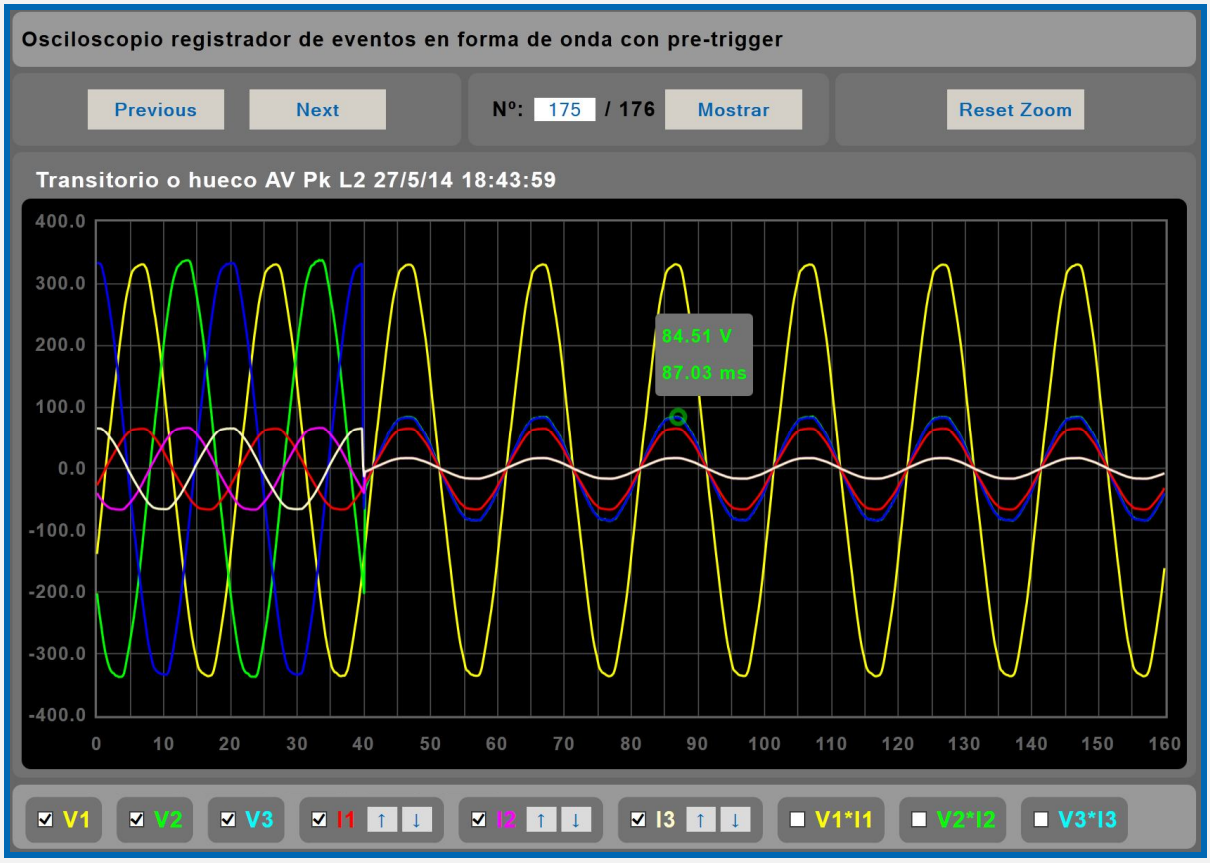


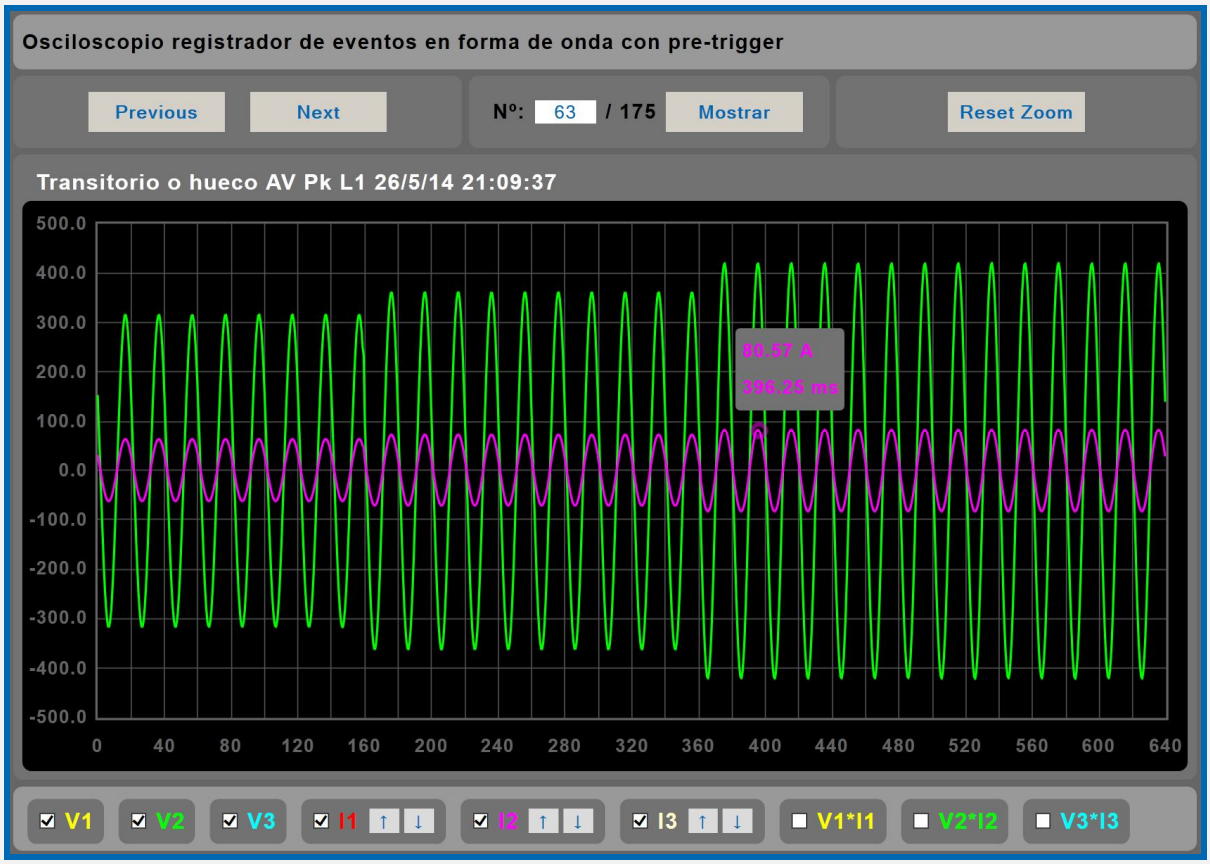


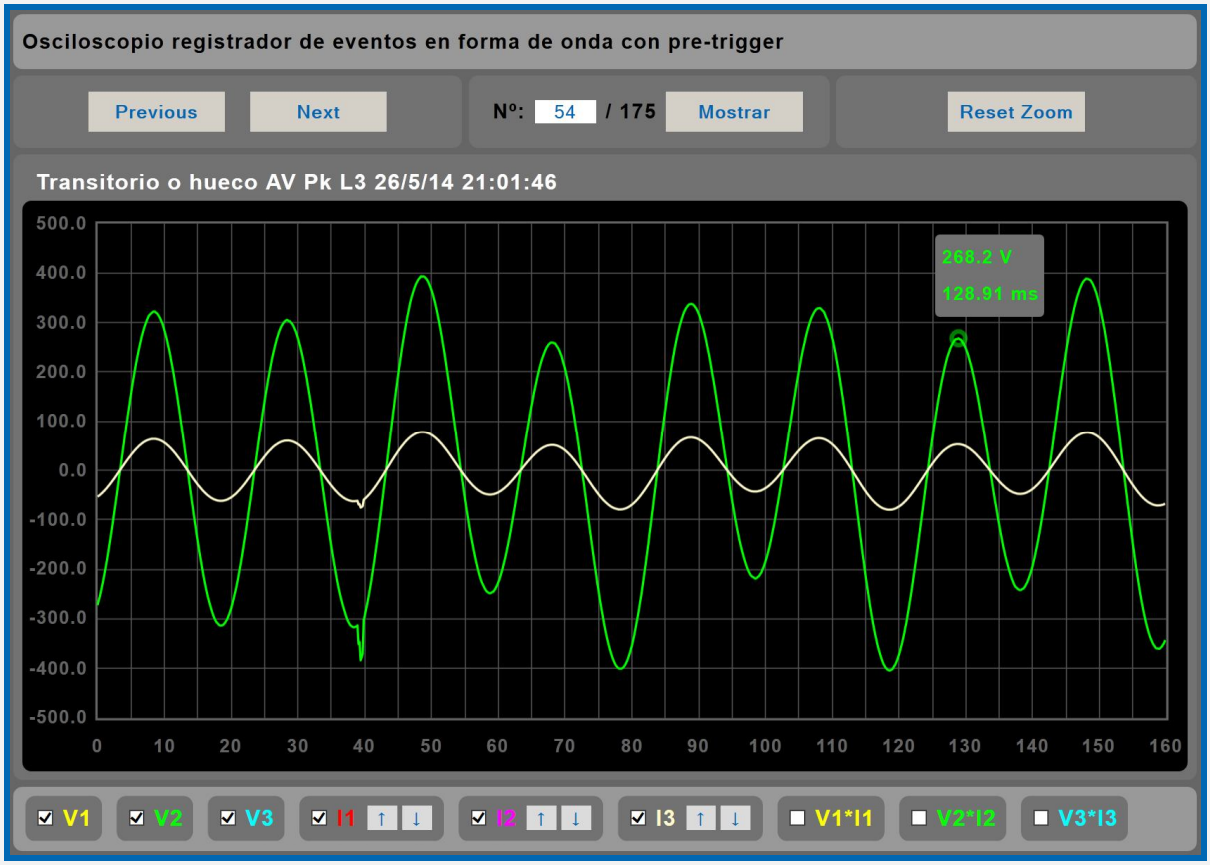

Osciloscopio registrador de eventos en forma de onda con pre-trigger
Previous
Next
Nº: 1 / 176
Mostrar
Reset Zoom
Transitorio o hueco AV Pk L2 26/5/14 20:12:29
600.0
500.0
400.0
300.0
200.0
100.0
0.0
-100.0
-200.0
-300.0
-400.0
25
27.5
30
32.5
35
37.5
40
42.5
45
47.5
50
52.5
V1
V2
V3
I1
I2
I3
V1*I1
V2*I2
V3*I3

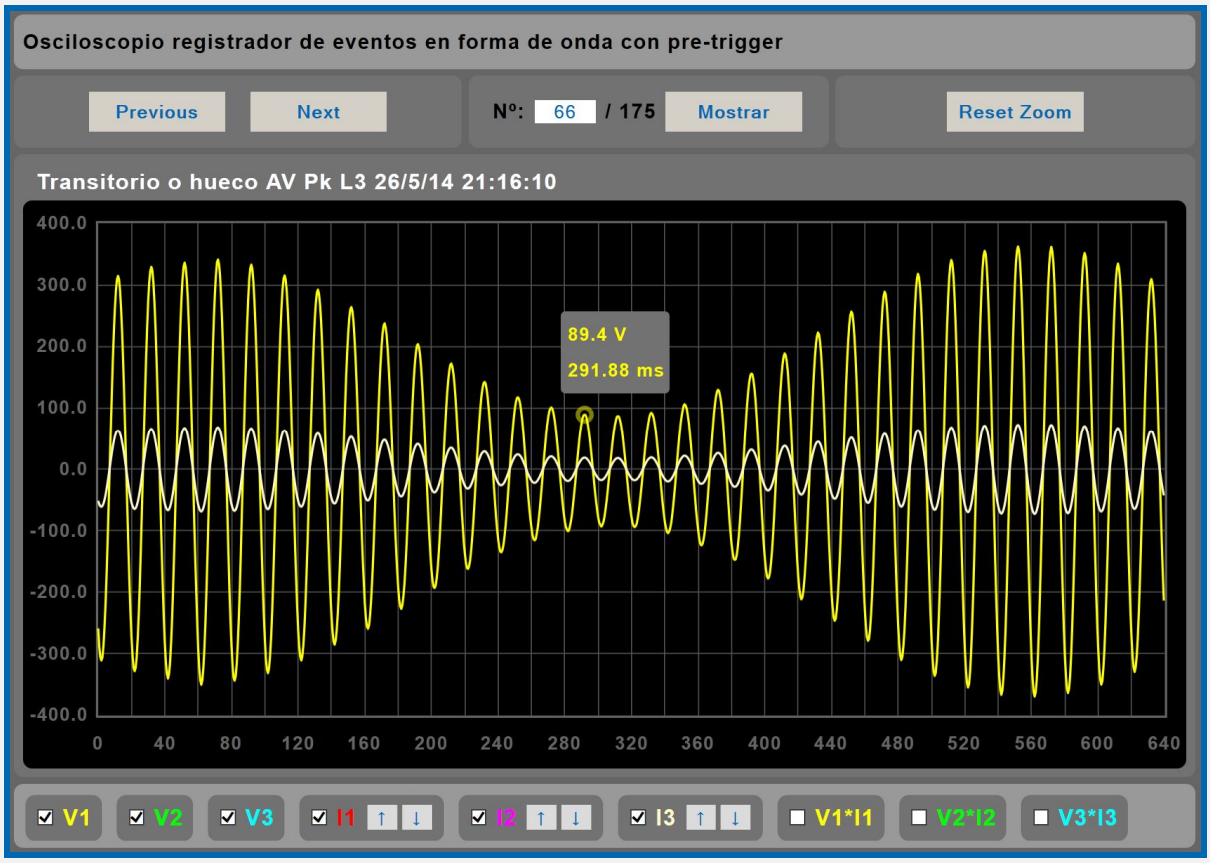

Osciloscopio registrador de eventos en forma de onda con pre-trigger
Previous
Next
Nº: 1 / 176
Mostrar
Reset Zoom
Transitorio o hueco AV Pk L2 26/5/14 20:12:29
500.01 V
40.31 ms
600.0
500.0
400.0
300.0
200.0
100.0
0.0
-100.0
-200.0
-300.0
-400.0
35
36.25
37.5
38.75
40
41.25
42.5
43.75
V1
V2
V3
I1
I2
I3
V1*I1
V2*I2
V3*I3

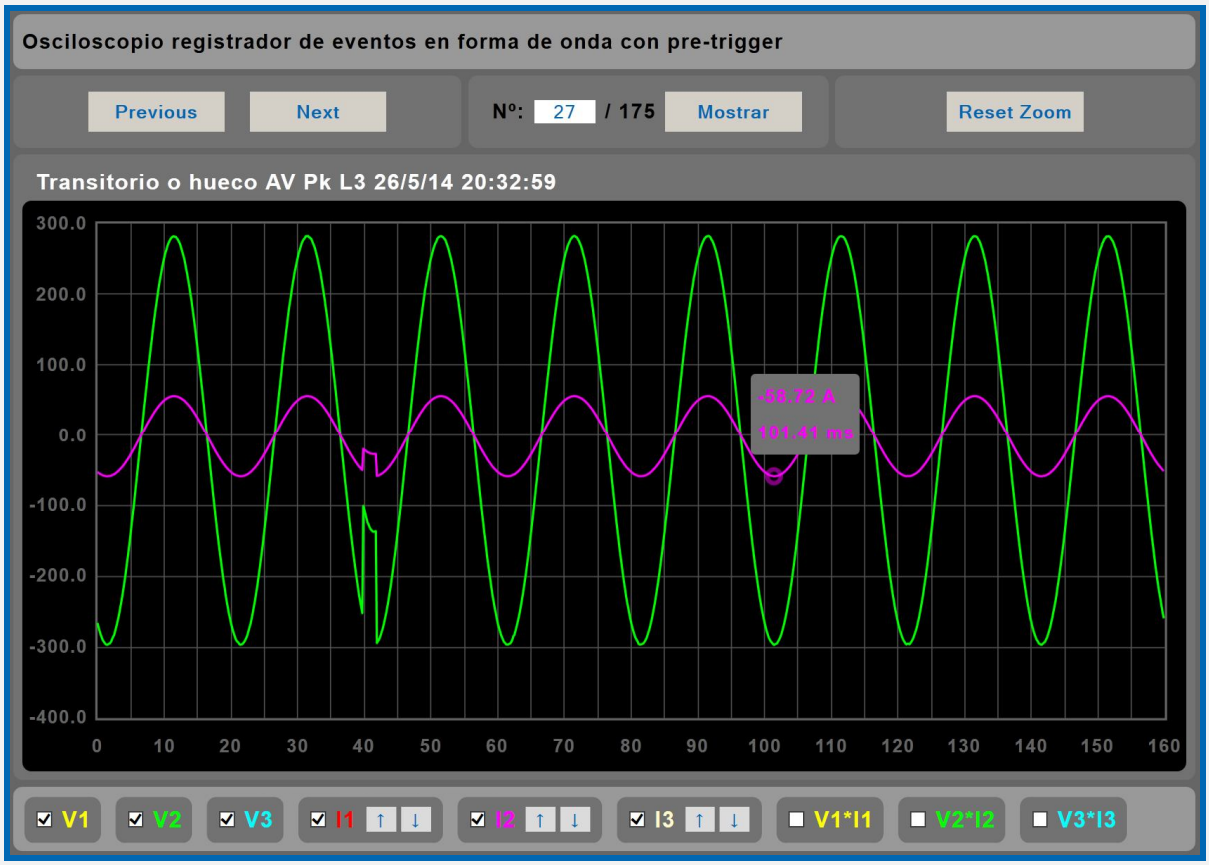

Osciloscopio registrador de eventos en forma de onda con pre-trigger
Previous
Next
Nº: 42 / 175
Mostrar
Reset Zoom
Transitorio o hueco AV Pk L3 26/5/14 20:41:42
500.0
400.0
300.0
200.0
100.0
0.0
-100.0
-200.0
-300.0
-400.0
-500.0
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160
-432.34 V
122.81 ms
V1 V2 V3 I1 I2 I3 V1*I1 V2*I2 V3*I3

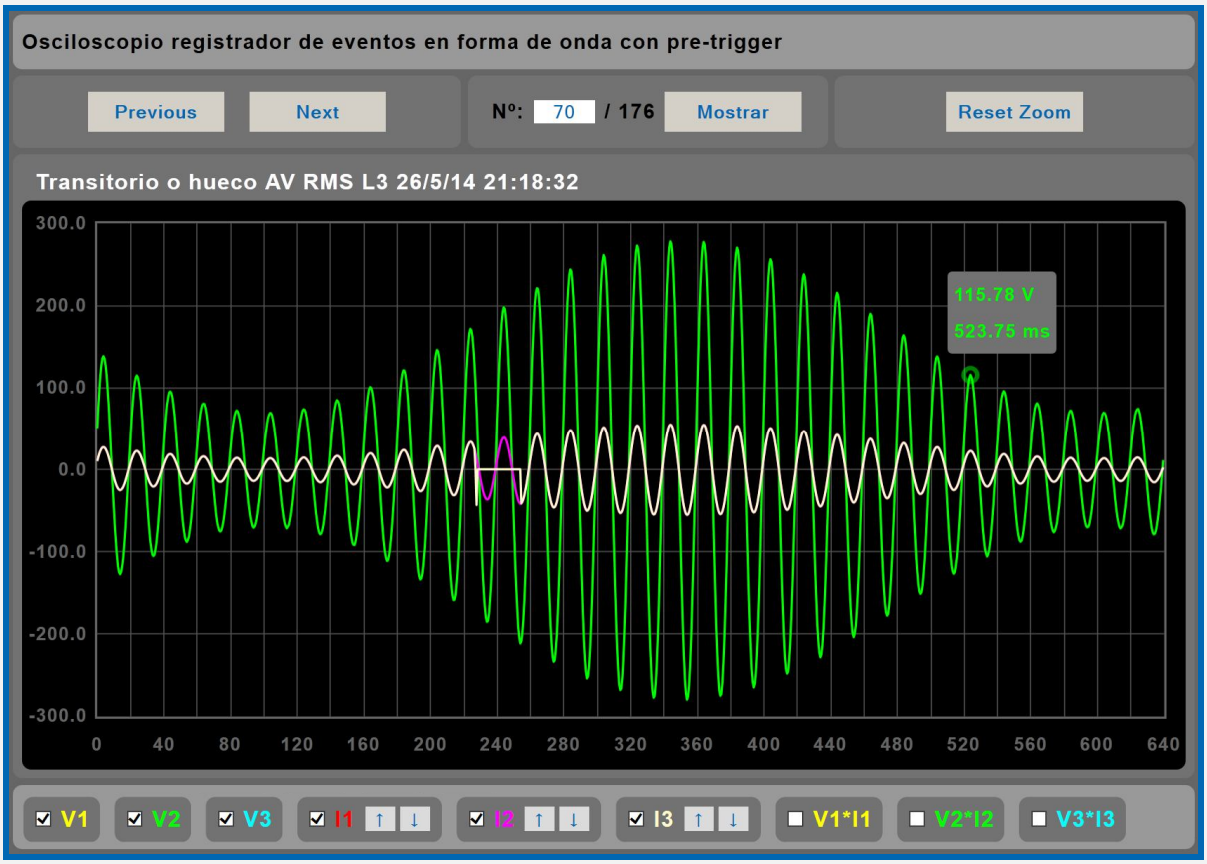

Osciloscopio registrador de eventos en forma de onda con pre-trigger
Previous
Next
Nº: 175 / 176
Mostrar
Reset Zoom
Transitorio o hueco AV Pk L2 27/5/14 18:43:59
400.0
300.0
200.0
100.0
0.0
-100.0
-200.0
-300.0
-400.0
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160
84.51 V
87.03 ms
V1 V2 V3 I1 I2 I3 V1*I1 V2*I2 V3*I3

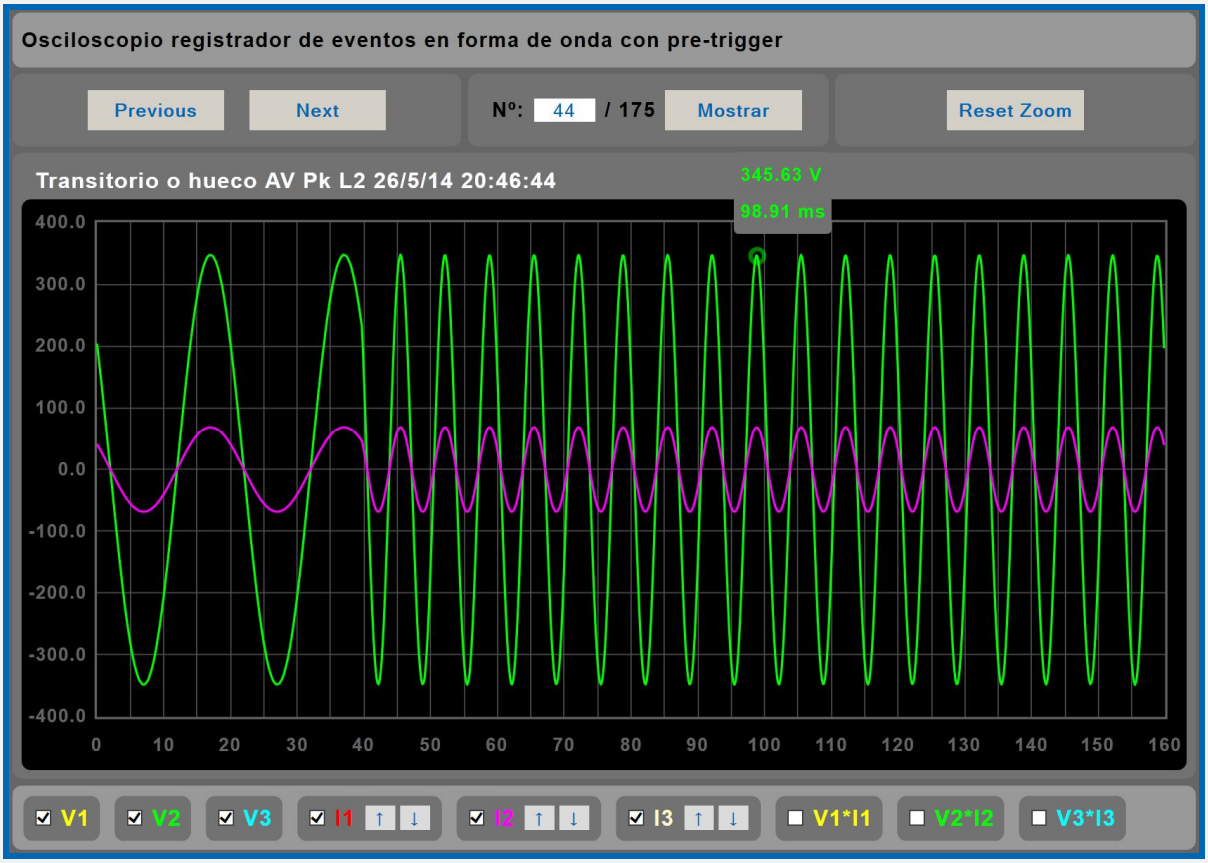

Osciloscopio registrador de eventos en forma de onda con pre-trigger
Previous
Next
Nº: 63 / 175
Mostrar
Reset Zoom
Transitorio o hueco AV Pk L1 26/5/14 21:09:37
80.57 A
396.25 ms
500.0
400.0
300.0
200.0
100.0
0.0
-100.0
-200.0
-300.0
-400.0
-500.0
0 40 80 120 160 200 240 280 320 360 400 440 480 520 560 600 640
V1 V2 V3 I1 I2 I3 V1*I1 V2*I2 V3*I3


Osciloscopio registrador de eventos en forma de onda con pre-trigger
Previous
Next
Nº: 54 / 175
Mostrar
Reset Zoom
Transitorio o hueco AV Pk L3 26/5/14 21:01:46
268.2 V
128.91 ms
500.0
400.0
300.0
200.0
100.0
0.0
-100.0
-200.0
-300.0
-400.0
-500.0
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160
V1 V2 V3 I1 I2 I3 V1*I1 V2*I2 V3*I3


Osciloscopio registrador de eventos en forma de onda con pre-trigger
Previous
Next
Nº: 66 / 175
Mostrar
Reset Zoom
Transitorio o hueco AV Pk L3 26/5/14 21:16:10
400.0
300.0
200.0
100.0
0.0
-100.0
-200.0
-300.0
-400.0
0
40
80
120
160
200
240
280
320
360
400
440
480
520
560
600
640
89.4 V
291.88 ms
V1
V2
V3
I1
I2
I3
V1*I1
V2*I2
V3*I3

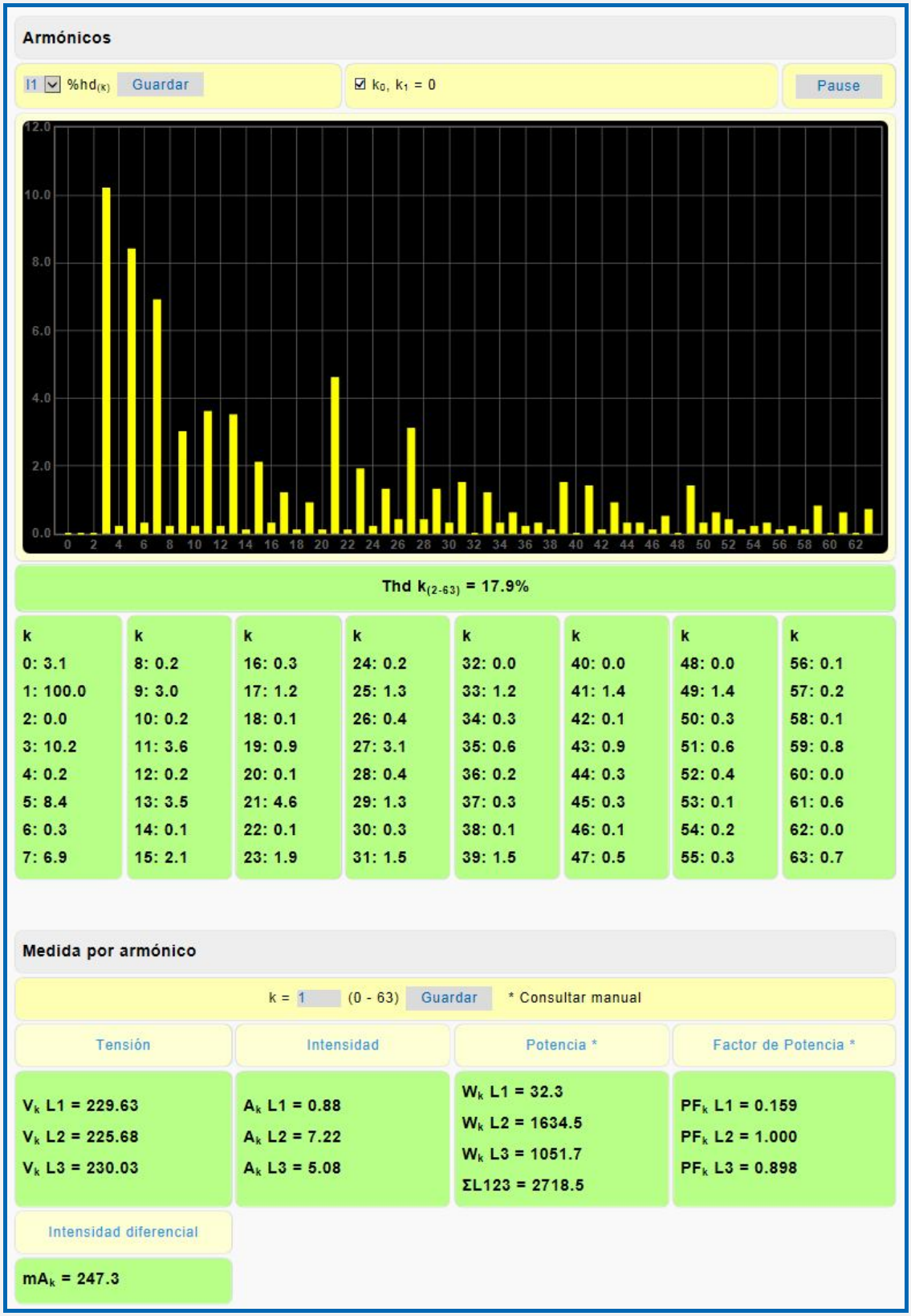

Osciloscopio registrador de eventos en forma de onda con pre-trigger
Previous
Next
Nº: 27 / 175
Mostrar
Reset Zoom
Transitorio o hueco AV Pk L3 26/5/14 20:32:59
300.0
200.0
100.0
0.0
-100.0
-200.0
-300.0
-400.0
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
-98.72 A
101.41 ms
V1
V2
V3
I1
I2
I3
V1*I1
V2*I2
V3*I3


Osciloscopio registrador de eventos en forma de onda con pre-trigger
Previous
Next
Nº: 70 / 176
Mostrar
Reset Zoom
Transitorio o hueco AV RMS L3 26/5/14 21:18:32
115.78 V
523.75 ms
300.0
200.0
100.0
0.0
-100.0
-200.0
-300.0
0 40 80 120 160 200 240 280 320 360 400 440 480 520 560 600 640
V1 V2 V3 I1 I2 I3 V1*I1 V2*I2 V3*I3


Osciloscopio registrador de eventos en forma de onda con pre-trigger
Previous
Next
Nº: 44 / 175
Mostrar
Reset Zoom
Transitorio o hueco AV Pk L2 26/5/14 20:46:44
345.63 V
98.91 ms
400.0
300.0
200.0
100.0
0.0
-100.0
-200.0
-300.0
-400.0
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160
V1 V2 V3 I1 I2 I3 V1*I1 V2*I2 V3*I3

3.6 WEB page: Box “Harmonics”

Harmonics spectrum with autoscale (V1, V2, V3, I1, I2, I3 and differential I., with 64 harmonics)
Measurements of 64 harmonics with power, distortion factor (range in % and value V – A) and power factor +THD. Display continuously refreshed (every 1,5 secs.). Includes measurement cursor. In order to view this WebServer page correctly, the PC, MAC, smartphone, tablet or PDA must have Internet access. If working on an Intranet network, one must have an Intranet server with its data files uploaded. These files are easily installed in any computer (consult UNIVERSAL+ Apache manual).



3.7 WEB page: Box “Real time”

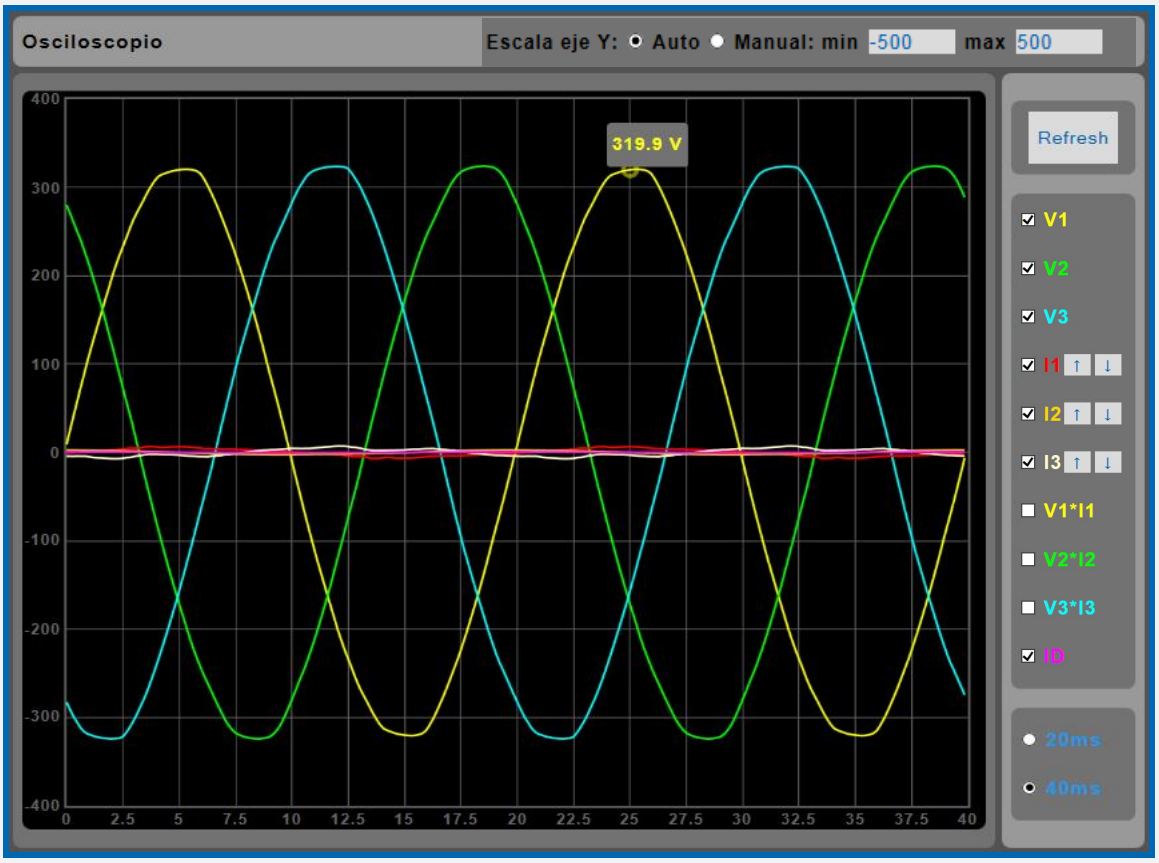
300-event graphic logger, 12 channels (46 measurements) with autoscale and variable refreshment (1-600 secs.). With temporary maximum, minimum and average measurements. Includes 12-channel measurement cursor and alarm channels (V, I and ID). In order to view this WebServer page correctly, the PC, MAC, smartphone, tablet or PDA must have Internet access. If working on an Intranet network, one must have an Intranet server with its data files uploaded. These files are easily installed in any computer (consult UNIVERSAL+ Apache manual).

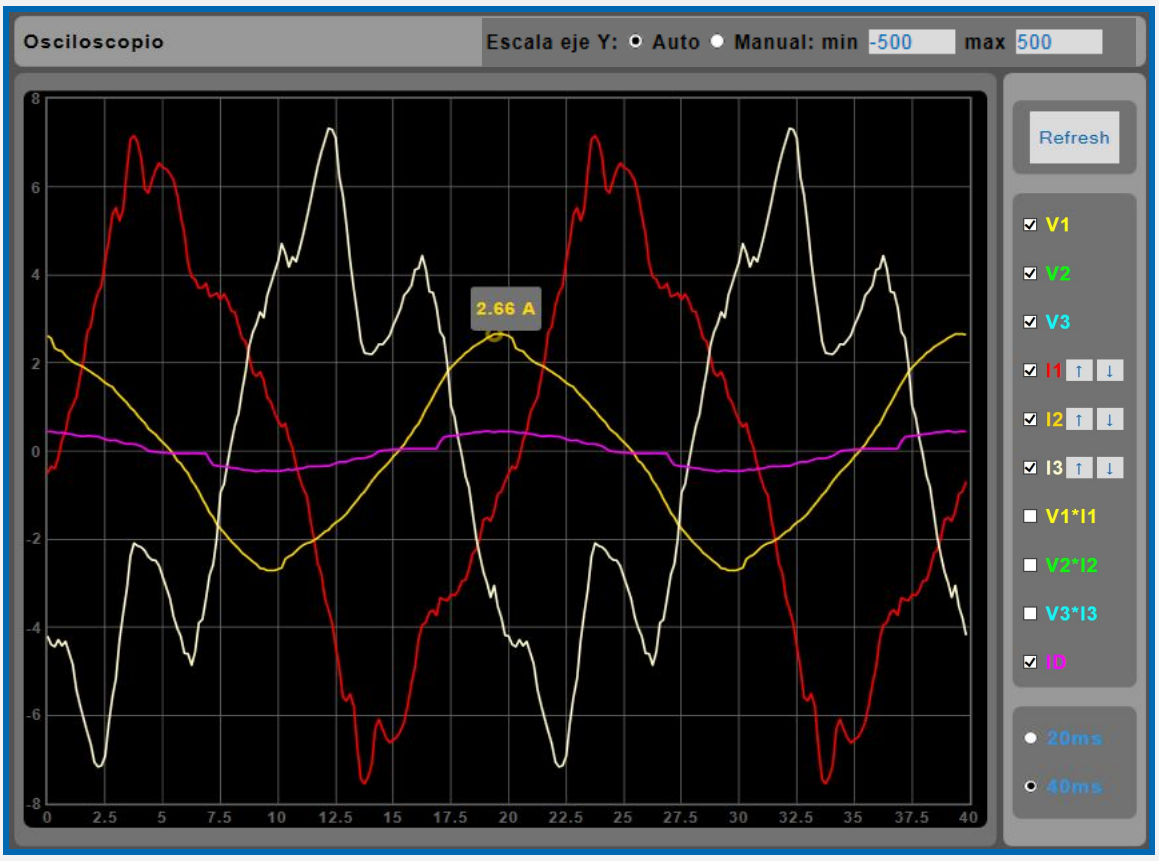

Tiempo real
Refresco: 1 s (1 - 60)
Escala eje X: Auto Manual: min 0 max 500
Ver alarmas
Reading
V1
V2
V3
I1
I2
I3
ID (mA)
Temp.
Hum.
THDI1
THDI2
THDI3
BOX1: Max: 38.40 Min: 18.00 Avg: 24.59 Act: 35.8
BOX2: Max: 8.10 Min: 4.90 Avg: 6.28 Act: 6.3
BOX3: Max: 42.70 Min: 14.30 Avg: 21.17 Act: 15.9


Tiempo real
Refresco: 1 s (1 - 60)
Escala eje X: Auto Manual: min 0 max 500
Ver alarmas
Reading
V1
V2
V3
I1
I2
I3
ID (mA)
Temp.
Hum.
W1
W2
W3
V1: Max: 239.83 Min: 232.56 Avg: 238.08 Act: 239.63
V2: Max: 234.06 Min: 229.40 Avg: 232.44 Act: 233.57
V3: Max: 233.69 Min: 225.95 Avg: 231.44 Act: 231.05
I1: Max: 3.74 Min: 1.33 Avg: 1.83 Act: 1.80
I2: Max: 7.81 Min: 0.82 Avg: 1.56 Act: 2.37
I3: Max: 2.20 Min: 1.90 Avg: 1.94 Act: 1.94
ID: Max: 620.40 Min: 603.30 Avg: 616.34 Act: 620.0
TMP: Max: 15.20 Min: 15.10 Avg: 15.15 Act: +15.2
HUM: Max: 75.50 Min: 74.70 Avg: 75.03 Act: 74.8
BOX1: Max: 855.00 Min: 250.50 Avg: 407.26 Act: 402.9
BOX2: Max: 1694.40 Min: 184.60 Avg: 346.26 Act: 485.6
BOX3: Max: 482.70 Min: 408.50 Avg: 417.31 Act: 416.5

3.8 WEB page: Box “Oscilloscope”

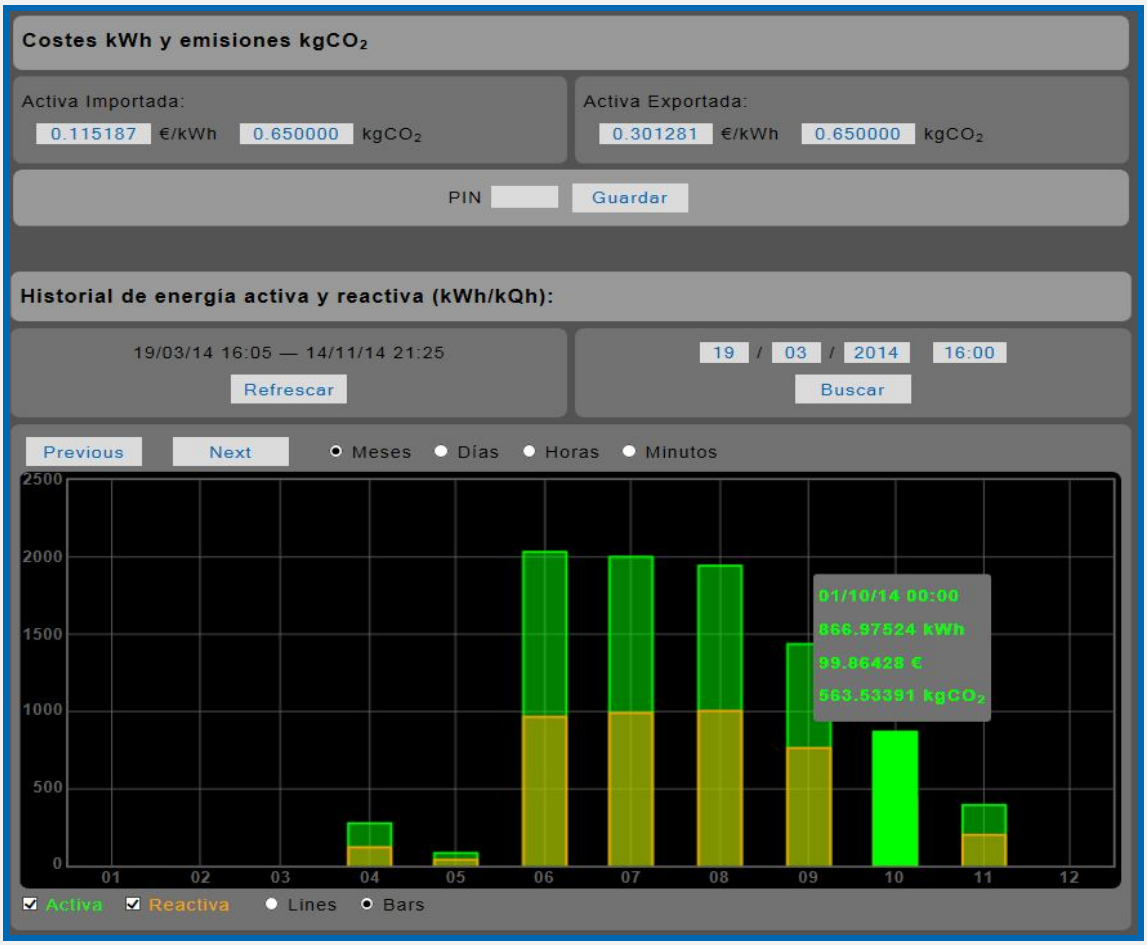
7-channel oscilloscope with autoscale and automatic or manual Y axis scale and 3 mathematical V*I. channels. Includes instantaeous value measurement cursor in all channels. Continuously refreshed display (every 1.5 secs.).
In order to view this WebServer page correctly, the PC, MAC, smartphone, tablet or PDA must have Internet access. If working on an Intranet network, one must have an Intranet server with its data files uploaded. These files are easily installed in any computer (consult UNIVERSAL+ Apache manual).





3.9 WEB page: Box “Energy log” (G version)

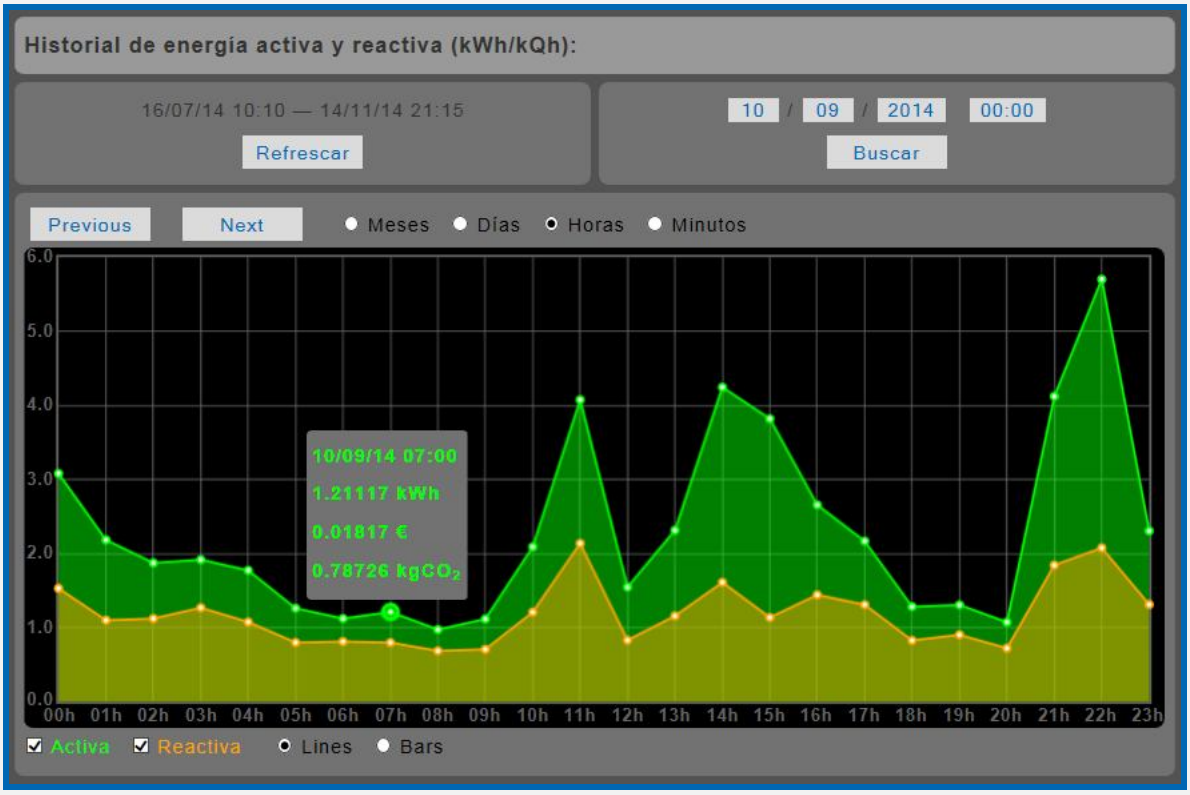
Option “G”: Energy log (L1 single-phase or ∑L1,2 and 3 three-phase) with built-in 3-year memory
Graphic history (months, days, hours and minutes) for energy, costs and emissions with built-in 3-year memory (option G).
Active and reactive energy consumption log. Bar and line graphic display in WebServer showing months, days, hours and 5-minute intervals.
Includes measurement cursor in both (active and reactive) channels.
The emissions ratio is the amount of carbon emitted into the atmosphere to produce 1kWh. The European ratio is approximately 0.65 kgCO2 per kWh.
The data in the energy log can be exported to EXCEL, PDF and DOC files. cf. WEB page box “Extensions”.
In order to view this WebServer page correctly, the PC, MAC, smartphone, tablet or PDA must have Internet access. If working on an Intranet network, one must have an Intranet server with its data files uploaded. These files are easily installed in any computer (consult UNIVERSAL+ Apache manual).



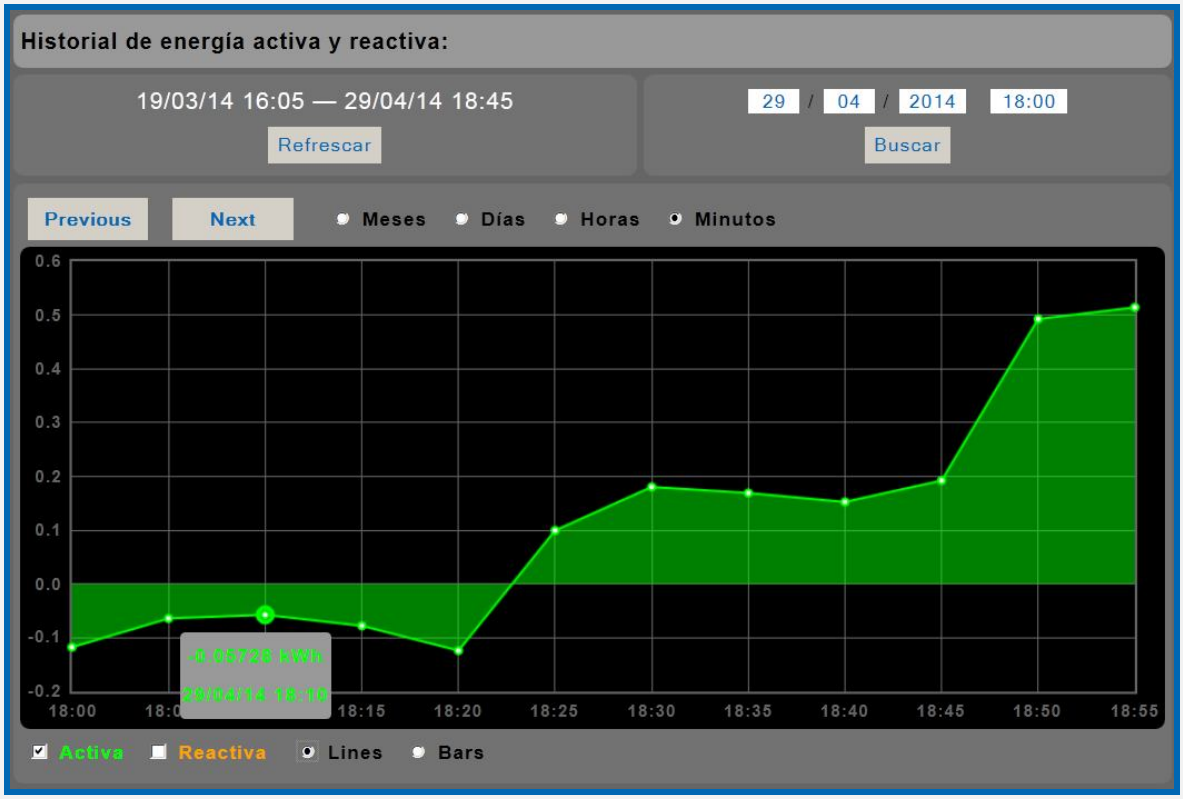

Costes kWh y emisiones kgCO2
Activa Importada:
0.015000 €/kWh 0.650000 kgCO2
Activa Exportada:
0.301281 €/kWh 0.650000 kgCO2
PIN
Guardar
Historial de energía activa y reactiva (kWh/kQh):
16/07/14 10:10 — 14/11/14 21:15
Refrescar
01 / 09 / 2014 00:00
Buscar
Previous
Next
Meses
Días
Horas
Minutos
23/09/14 00:00
64.7776 kWh
0.97166 €
42.10544 kgCO2
Activa
Reactiva
Lines
Bars


Historial de energía activa y reactiva (kWh/kQh):
16/07/14 10:10 — 14/11/14 21:15
Refrescar
01 / 09 / 2014 00:00
Buscar
Previous
Next
Meses
Días
Horas
Minutos
23/09/14 00:00
64.7776 kWh
0.97166 €
42.10544 kgCO2
Activa
Reactiva
Lines
Bars


Costes kWh y emisiones kgCO2
Activa Importada:
0.015000 €/kWh 0.650000 kgCO2
Activa Exportada:
0.301281 €/kWh 0.650000 kgCO2
PIN
Guardar
Historial de energía activa y reactiva (kWh/kQh):
16/07/14 10:10 — 14/11/14 21:15
Refrescar
10 / 09 / 2014 00:00
Buscar
Previous
Next
Meses
Días
Horas
Minutos
10/09/14 04:00
1.7717 kWh
0.02658 €
1.15161 kgCO2
00h 01h 02h 03h 04h 05h 06h 07h 08h 09h 10h 11h 12h 13h 14h 15h 16h 17h 18h 19h 20h 21h 22h 23h
Activa
Reactiva
Lines
Bars

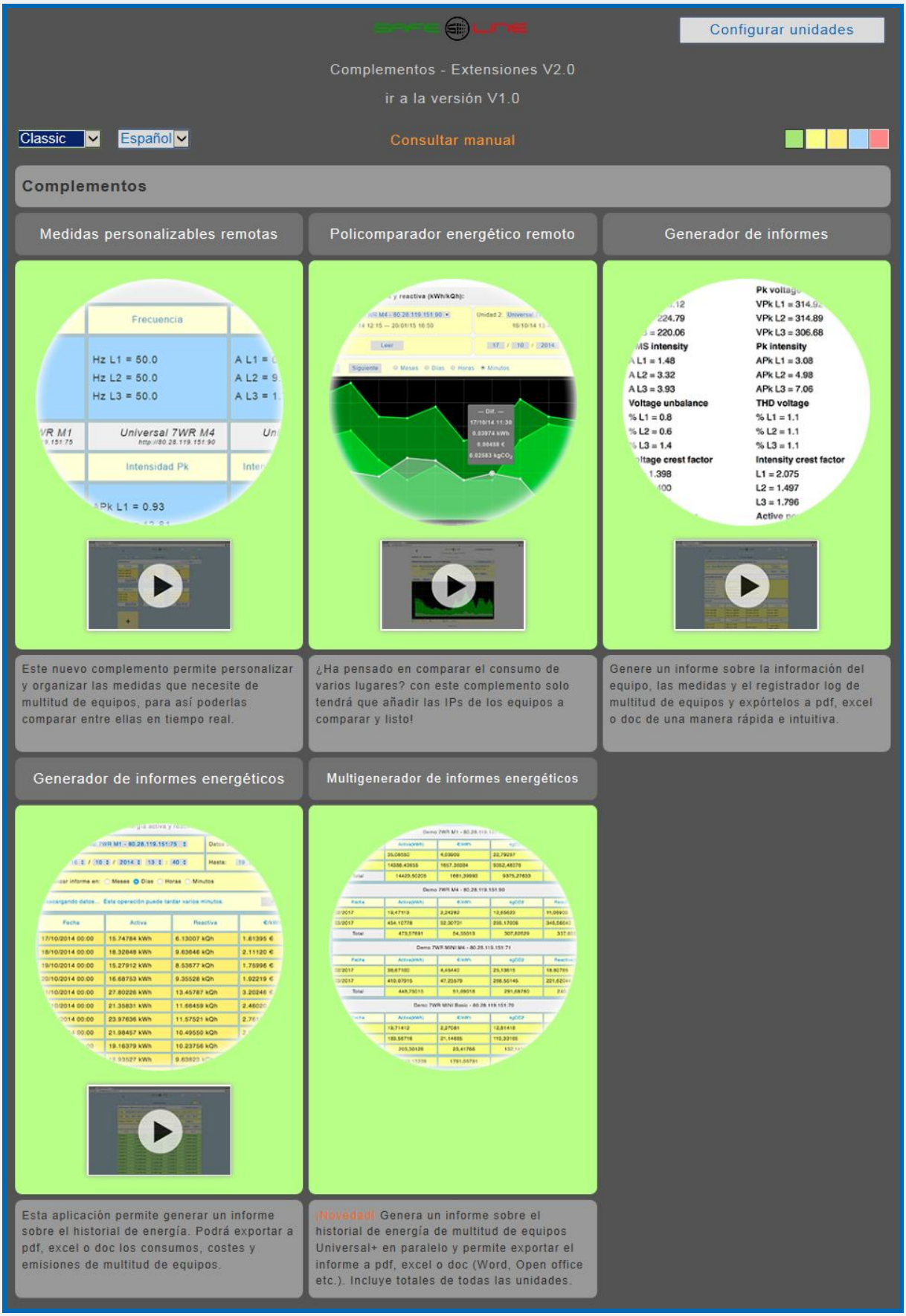

Historial de energía activa y reactiva (kWh/kQh):
16/07/14 10:10 — 14/11/14 21:15
Refrescar
10 / 09 / 2014 00:00
Buscar
Previous
Next
Meses
Días
Horas
Minutos
10/09/14 07:00
1.21117 kWh
0.01817 €
0.78726 kgCO2
00h 01h 02h 03h 04h 05h 06h 07h 08h 09h 10h 11h 12h 13h 14h 15h 16h 17h 18h 19h 20h 21h 22h 23h
Activa
Reactiva
Lines
Bars


Historial de energía activa y reactiva (kWh/kQh):
16/07/14 10:10 — 14/11/14 21:25
Refrescar
10 / 09 / 2014 00:00
Buscar
Previous
Next
Meses
Días
Horas
Minutos
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
10/09/14 00:40
0.11575 kQh
00:00
00:05
00:10
00:15
00:20
00:25
00:30
00:35
00:40
00:45
00:50
00:55
Activa
Reactiva
Lines
Bars


Historial de energía activa y reactiva:
19/03/14 16:05 — 29/04/14 18:45
Refrescar
29 / 04 / 2014 18:00
Buscar
Previous
Next
Meses
Días
Horas
Minutos
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
-0.2
18:00
18:15
18:20
18:25
18:30
18:35
18:40
18:45
18:50
18:55
Activa
Reactiva
Lines
Bars

3.10 WEB paje Box “Extensions” (G version)

A window with the web apps hosted on the server www.safeline.es is opened.
Remote customisable measurements, remote energy poli-comparator, report generator and energy report generator..
These useful web apps include an explanatory video.
The web apps and report generators permit the user to export the data stored in the unit to EXCEL, PDF and DOC files for further processing in EXCEL, Word or for generating a PDF file directly. Likewise, assessment reports can be made.
In order to view this website correctly the PC, MAC, smartphone, tablet or PDA browser must have Internet access.



3.11 WEB page: Box “Input/output status”

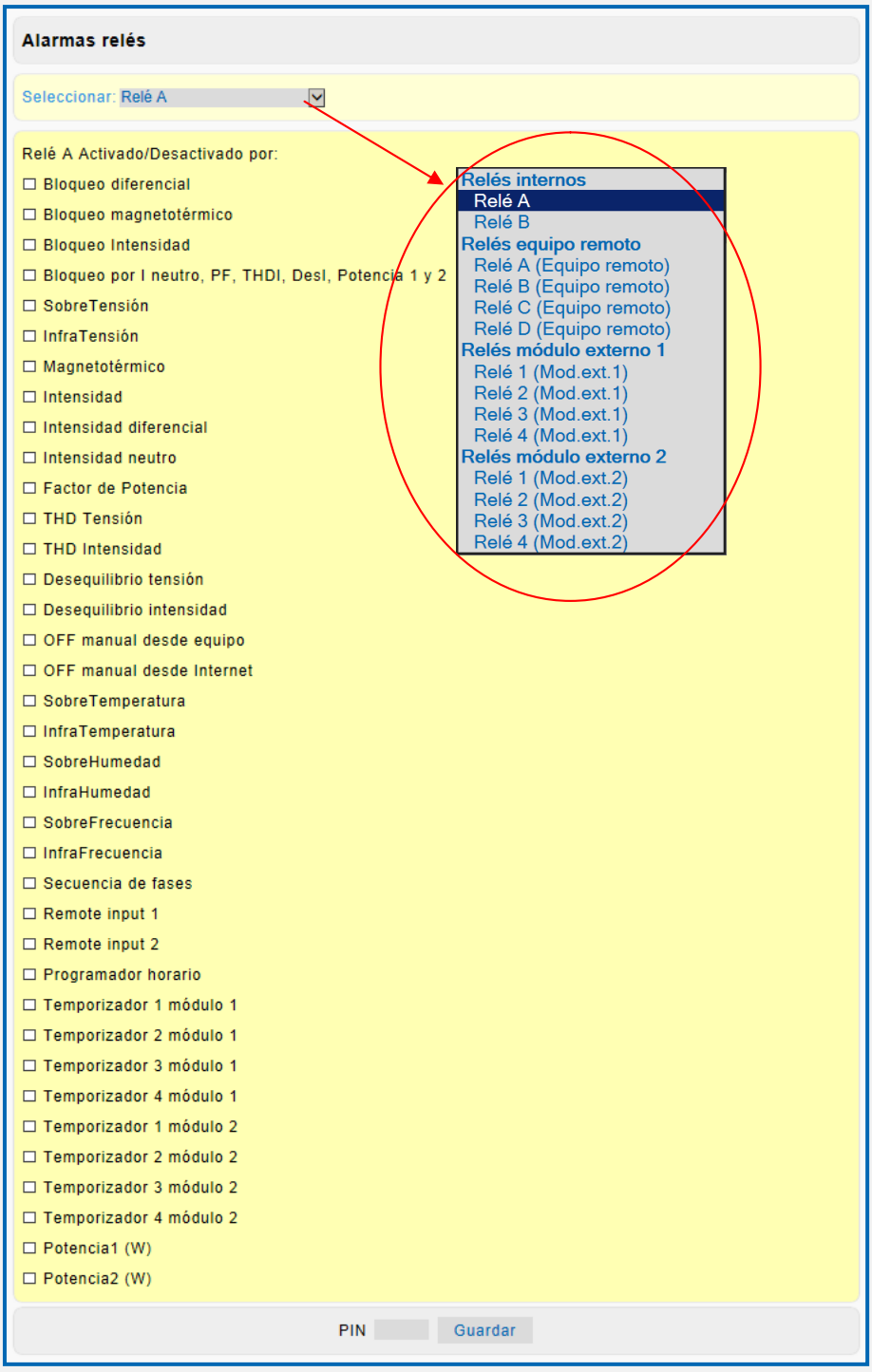
The following frame displays the status of the 10 logical outputs (relays), 10 logical inputs and values of the timers in real time and is continuously refreshed (every 1,5 secs).

3.12 WEB page: Box “Manual relay control”

Name / Edit each relay. The following frame permits the user to manually change the status of the 10 logical outputs (relays) and the four remote relays A, B, C and D (multi-interaction between remote units via Internet/Intranet). Name / Edit each relay.

3.13 WEB page: Box “Relay alarms”

The following frame permits the user to allot one or more alarms for the enablement/disablement of 10 relays and of relays A, B, C and D of a remote unit via Internet/Intranet.

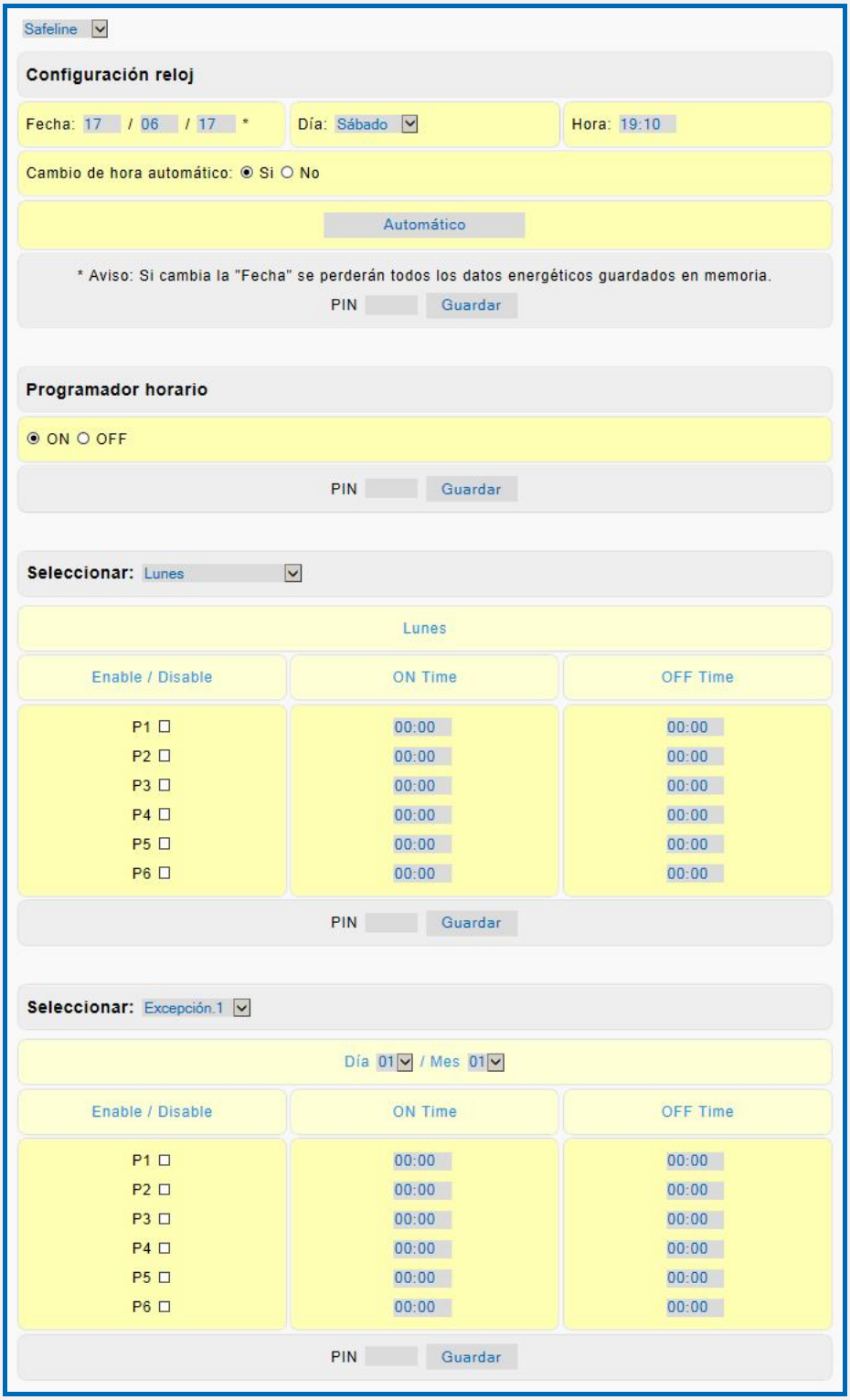


3.14 WEB page: Box “Relay timers”

The following frame permits the user to program the timing value of each of the 8 logical inputs (optocoupled or potential-free contact or direct at 230 V AC) and to associate the timing to the 10 output relays (enablement/disablement timers). Likewise, to edit/rename each input and display the status of each. To associate relays, please refer to “Relay alarms”.

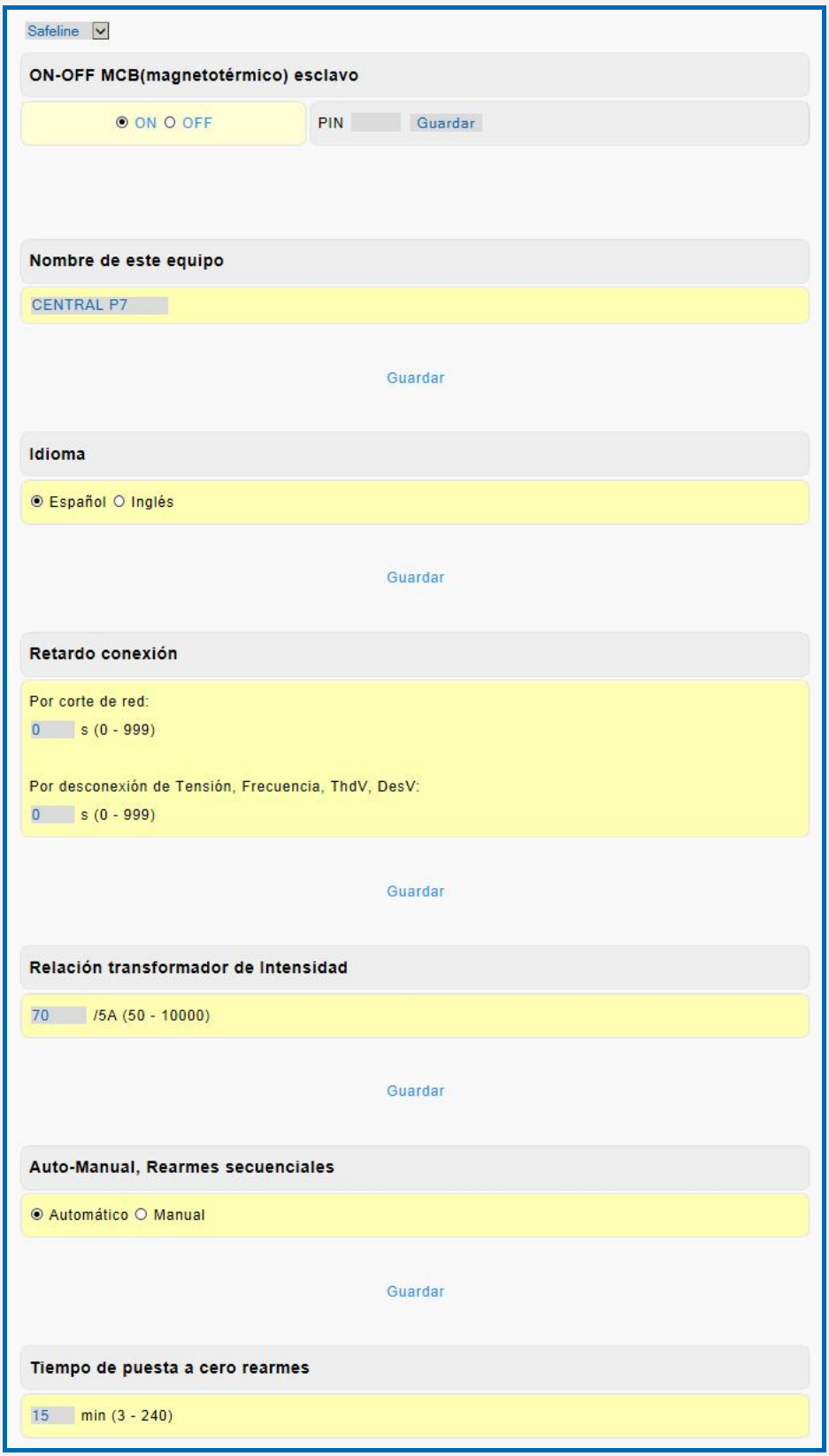
3.15 WEB page: Box “Time programmer”

The following frame permits the user to configure the clock and the time programmer, with some exceptions. Configuration of the 6 programs for each day of the week.. General enablement/disablement of the time programmer and individual enablement/disablement of each program.
Configuration of the 15 exceptions - day, month, hour and minute of the 6 programs with individual enablement/disablement of each program.
The time programmer’s activity is associated to the 10 output relays and/or the main disconnection device (circuit-breaker or relay/contactor control) and/or the **4 relays A, B, C and D of a remote unit via Internet/Intranet.** In order to associate relays, one must go to the “Relay alarms” button.
The internal clock (date and time) is programmed manually or automatically (synchronizing date and time with PC, laptop, etc...)
Automatic DST time switch (Winter/Summer) cab be enabled or disabled manually.



3.16 WEB page: Box “Unit configuration”

The following frame permits the user to connect/disconnect the command (auxiliary MCB/circuit-breaker/contactor). Likewise, to edit the name of/rename the unit and to preset the language, connection delays, intensity transformer ratio, auto-manual mode for sequential reclosures and reset to zero time of the reclosures.



3.16.1 WEB page: Box “Unit configuration”

The following frame permits the user to configure the number of and interval between sequential reclosures for the protection/alarm of the differential and circuit-breaker.

Número de rearmes para Intensidad diferencial

Nº: 10 (0 - 30)

Tiempo rearmes secuenciales:

R1: 03:00 min (00m:00s - 99m:59s)
R2: 06:00 min
R3: 12:00 min
R4: 30:00 min
R5: 60:00 min
R6: 90:00 min
R7: 90:00 min
R8: 90:00 min
R9: 90:00 min
R10: 90:00 min
R11: 90:00 min
R12: 90:00 min
R13: 90:00 min
R14: 90:00 min
R15: 90:00 min
R16: 90:00 min
R17: 90:00 min
R18: 90:00 min
R19: 90:00 min
R20: 90:00 min
R21: 90:00 min
R22: 90:00 min
R23: 90:00 min
R24: 90:00 min
R25: 90:00 min
R26: 90:00 min
R27: 90:00 min
R28: 90:00 min
R29: 90:00 min
R30: 90:00 min

Guardar

Número de rearmes para magnetotérmico

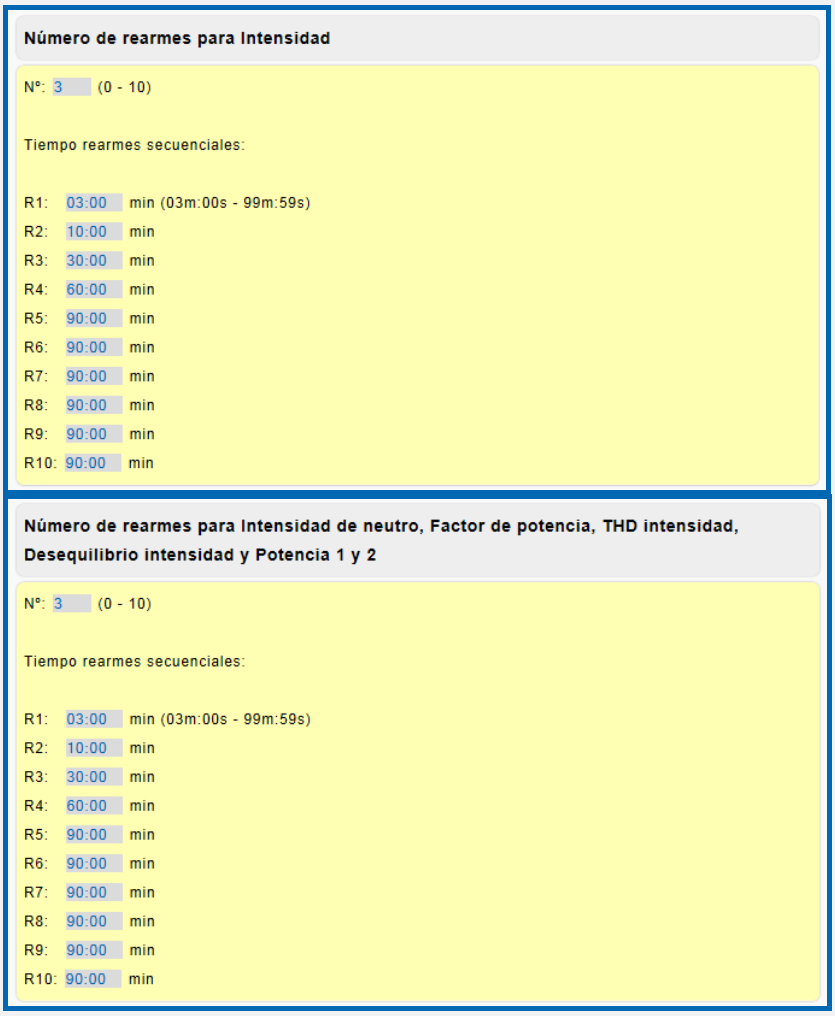
Nº: 3 (0 - 10)

Tiempo rearmes secuenciales:

R1: 03:00 min (03m:00s - 99m:59s)
R2: 10:00 min
R3: 30:00 min
R4: 60:00 min
R5: 90:00 min
R6: 90:00 min
R7: 90:00 min
R8: 90:00 min
R9: 90:00 min
R10: 90:00 min

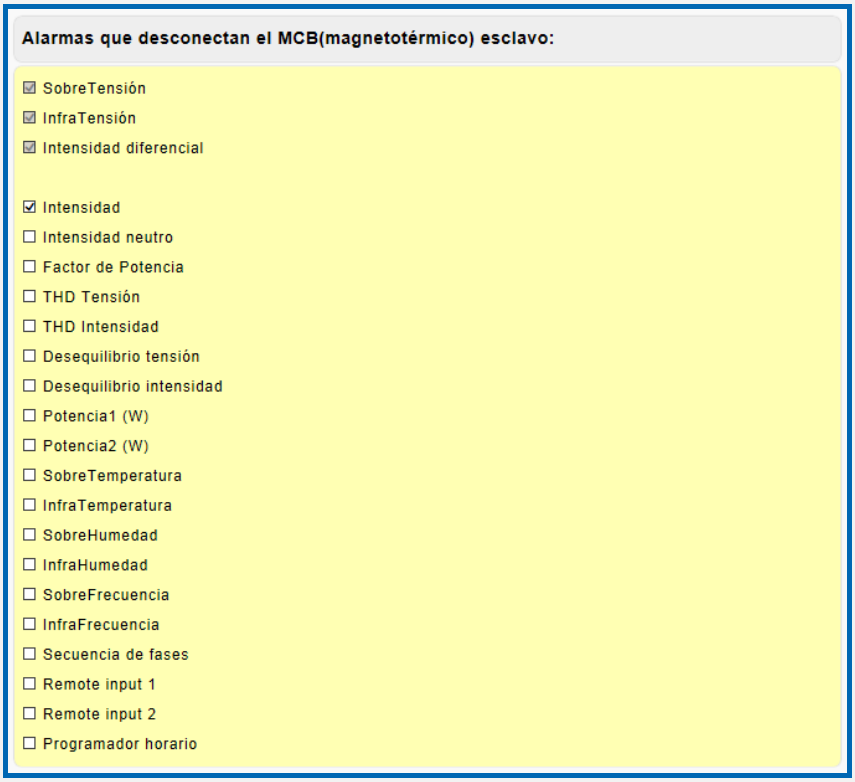
3.16.2 WEB page: Box “Unit configuration”

The following frame permits the user to configure the number of and interval between sequential reclosures for the protection/intensity alarm and protection/neutral intensity alarm, power factor, intensity THD, intensity unbalance and power 1 and 2.



3.16.3 WEB page: Box “Unit configuration”

The following frame permits the user to configure the protections/alarms which act upon the command (auxiliary MCB/circuit-breaker/contactor). The first 3 alarms cannot be disabled.



3.16.4 WEB page: Box “Unit configuration”

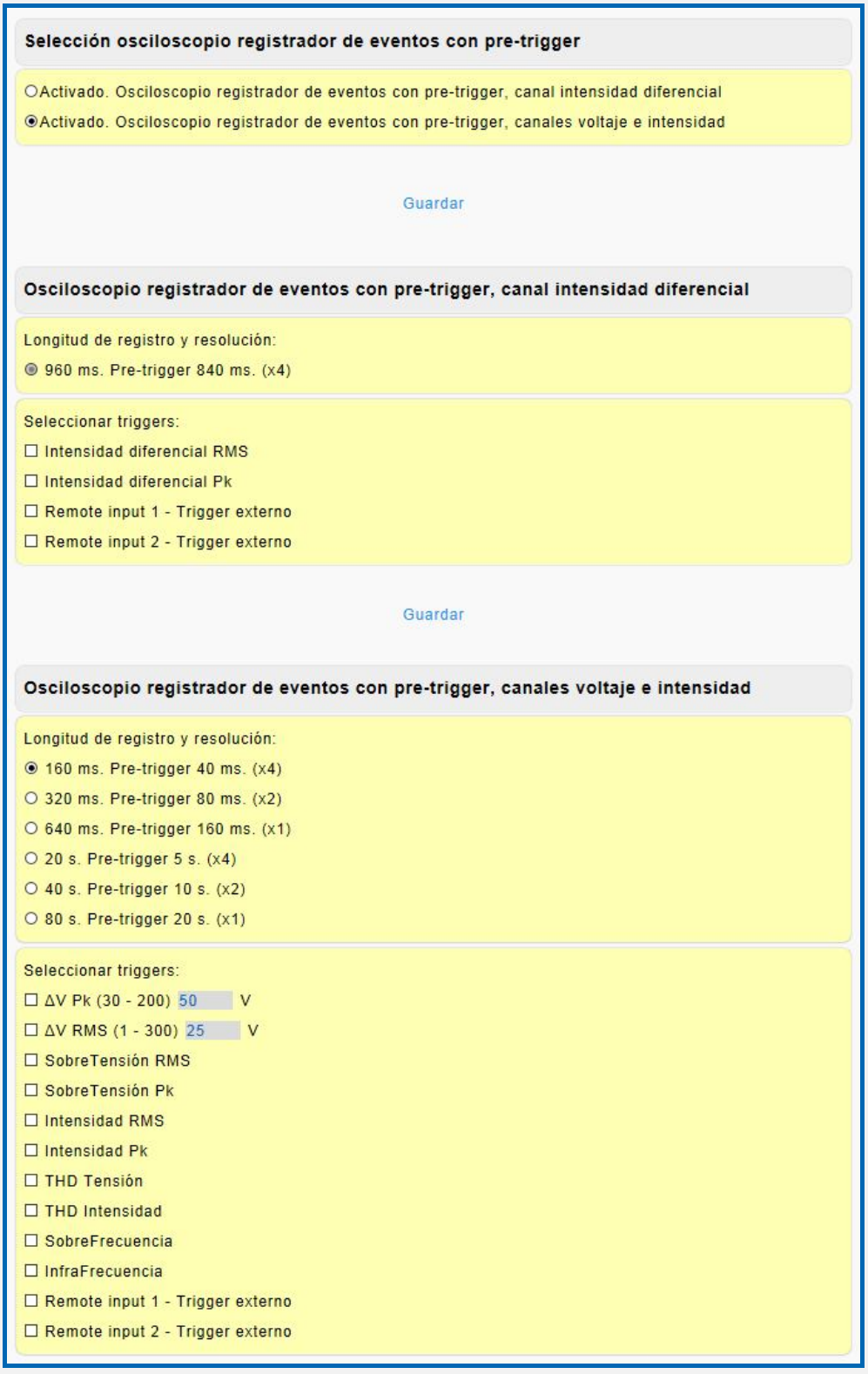
Selector: Oscilloscope event-logger with pre-trigger, differential intensity channel

With autoscale.
One record length mode set at 960ms with pre-trigger at 840ms.
Trigger by alarms whose value and delay can be enabled and programmed. Chronological register by type of alarm.

Selector: Oscilloscope event-logger with pre-trigger, voltage and intensity channel

Oscilloscope event-logger in waveform with pre-trigger and autoscale (6 channels V1, V2, V3, I1, I2, I3, with captures for each event).
Three modes of record length in 6 channels 160ms, 320ms and 640ms (pre-trigger: 40ms, 80ms and 160ms)
+ three modes of record length in 6 channels 20s, 40s and 80s (pre-trigger 5s, 10s y 20s). Only HP versions
Trigger for alarms which can be enabled and are programmable in value and delay. Chronological record for each type of alarm.
ΔV Pk (Pk voltage difference) alarm. Set delay: 156,25 µs.
ΔV RMS (RMS voltage difference) alarm. Set delay: 20 ms.

Note: The two logger oscilloscopes cannot be enabled simultaneously. It must be one or the other.



3.16.5 WEB page: Box “Unit configuration”

The following frame permits the user to configure the alarms indicated in value and delay. The RMS delay goes in 20ms steps and the Pk delay in 156,25µs and the “s” steps are seconds. To associate relays, please refer to “Relay alarms”.

Alarma por Potencia 1 (W)

○ Activado ◉ Desactivado

1000 W (1 - 9999999) | 10 s (1 - 999)

Alarma por Potencia 2 (Máximetro Potencia Activa W)

○ Activado ◉ Desactivado

1000 W (1 - 9999999)

Guardar

Factor de potencia

○ Activado ◉ Desactivado

0.40 PF (0.99 - 0.01) | 10 s (2 - 180)

Sequencia de fases

○ Activado ◉ Desactivado | 10 s (2 - 180)

Guardar

Alarma por desequilibrio de tensión

○ Activado ◉ Desactivado

50 % (5 - 99) | 10 s (2 - 180)

Alarma por desequilibrio de intensidad

○ Activado ◉ Desactivado

90 % (5 - 99) | 10 s (2 - 180)

Guardar

Alarma por THD Tensión

○ Activado ◉ Desactivado

Rango armónicos (2 - 63): | k_{min} 2 ≥ k_{max} 63

10 % (1 - 90) | 10 s (2 - 180)

Alarma por THD Intensidad

○ Activado ◉ Desactivado

Rango armónicos (2 - 63): | k_{min} 2 ≥ k_{max} 63

80 % (1 - 90) | 10 s (2 - 180)

Alarma por SobreTemperatura

○ Activado ◉ Desactivado

Alarm >= +50 °C (-40 - +100)
NO alarm < +45 °C

10 s (2 - 180)

Alarma por InfraTemperatura

○ Activado ◉ Desactivado

Alarm < -10 °C (-40 - +100)
NO alarm >= -5 °C

10 s (2 - 180)

Guardar

Alarma por SobreHumedad

○Activado ◉ Desactivado

Alarm >= 90 %RH (10 - 90)
NO alarm < 80 %RH

10 s (2 - 180)

Alarma por InfraHumedad

○ Activado ◉ Desactivado

Alarm < 10 %RH (10 - 90)
NO alarm >= 20 %RH

10 s (2 - 180)

Guardar

Alarma por SobreFrecuencia

○ Activado ◉ Desactivado

Alarm >= 55 Hz (51 - 55)
NO alarm < 54 Hz

10 s (2 - 180)

Alarma por InfraFrecuencia

○ Activado ◉ Desactivado

Alarm < 45 Hz (45 - 49)
NO alarm >= 46 Hz

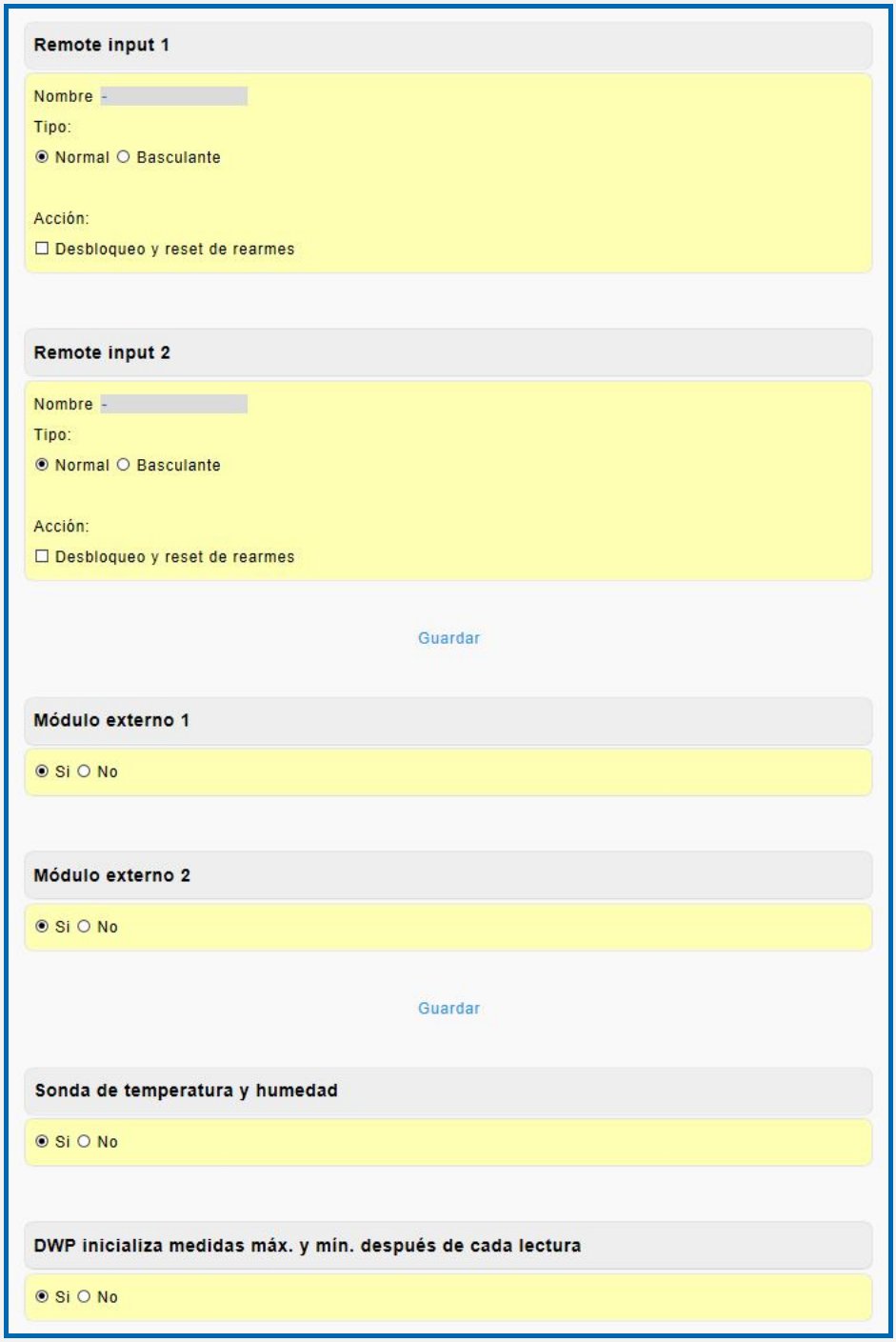
10 s (2 - 180)

3.16.6 WEB page: Box “Unit configuration”

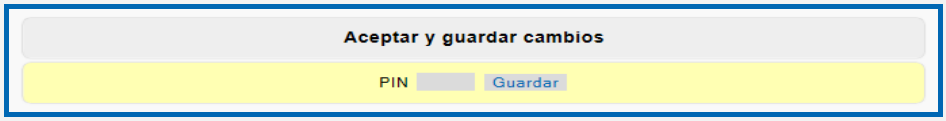
The following frame permits the user to configure the digital inputs Remote in 1 and 2 as indicated. These logical inputs are commanded by a potential-free contact.

The external module 1, external module 2 and the temperature/humidity probe can be enabled/disabled.

The (DataWatchPro, software for PC) initializes maximum and minimum measurements after each reading. If this option is enabled (Yes), after each DWP reading, the unit initializes these measurement logs. Thus, should the reading configuration be set at 30 secs., the maximum and minimum measured in each 30 sec-period would be obtained. In this way, the DWP level alarms can be configured so as to act without losing information in the unallotted time slots.

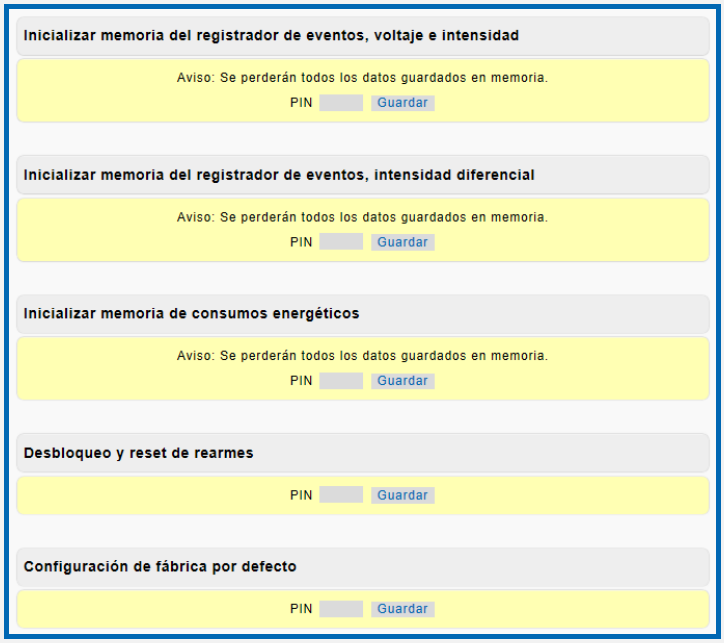


The following frame, through its PIN security code, accepts and saves all changes carried out during the programming process.



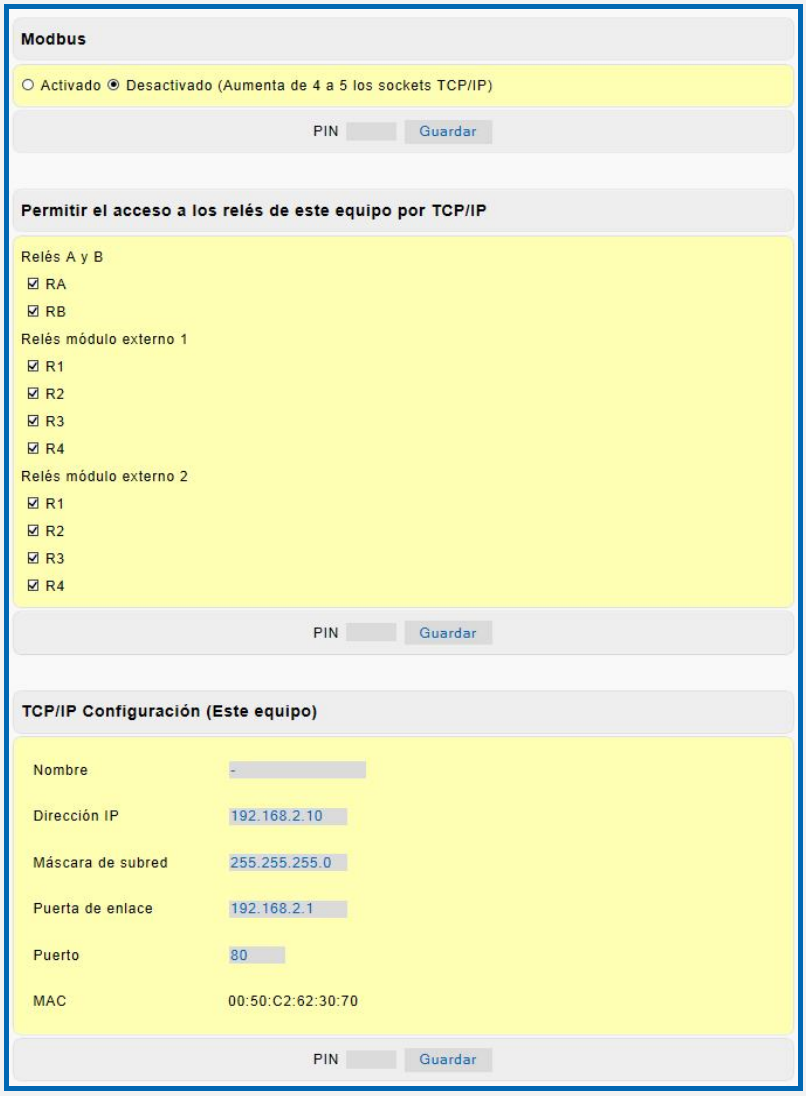
3.16.7 WEB page: Box “Unit configuration”

Moreover, individually by means of the user PIN, one can enable unblocking and resetting of sequential reclosures, ex-factory configuration and deletion or initialisation of the following memories:



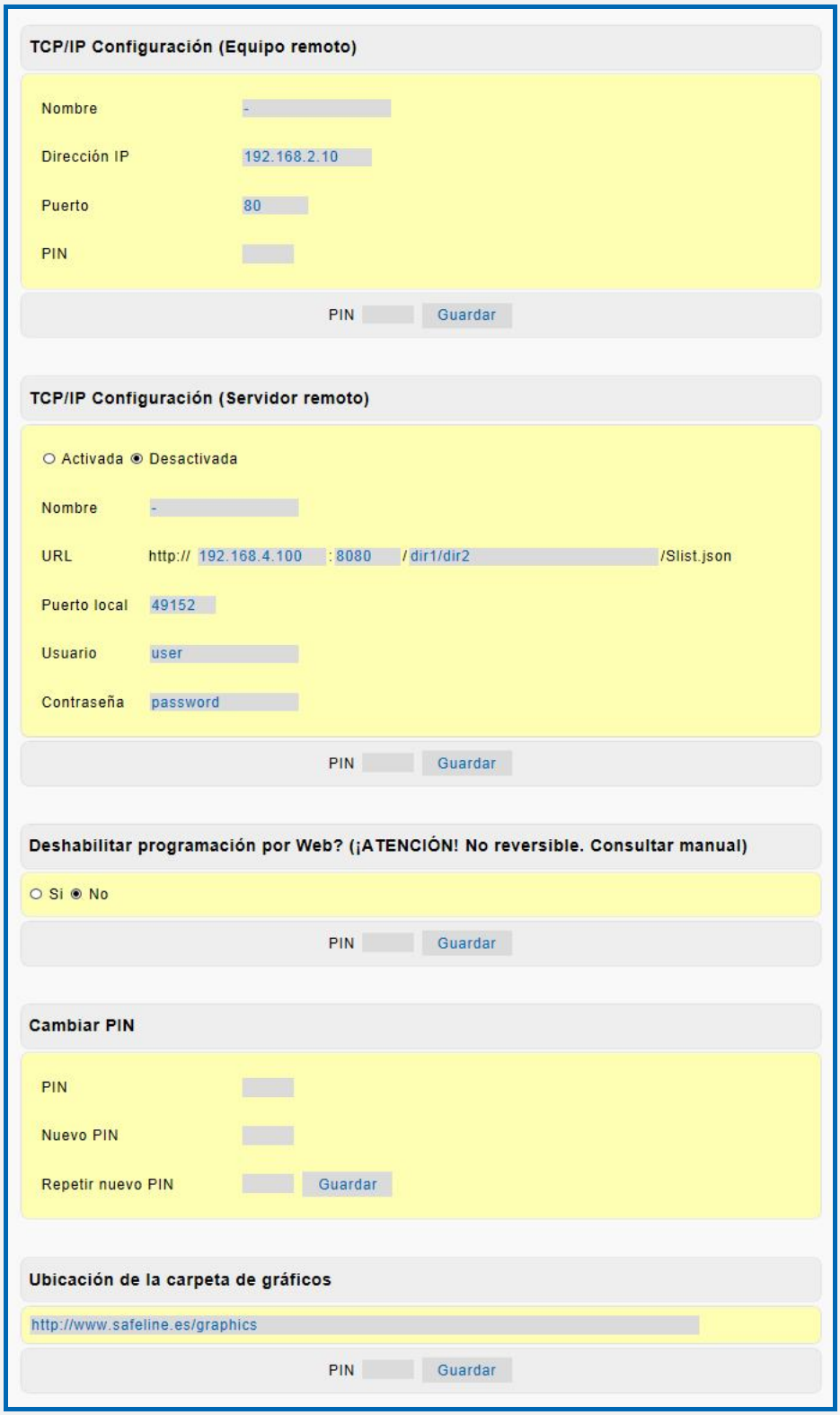
3.17 WEB page: Box “Access configuration”

Enablement / Disablement of Modbus protocol. Permission to access this unit remotely. Configuration of this unit’s TCP/IP parameters.



3.17.1 WEB page: Box “Access configuration”

Configuration of TCP/IP parameters to send enablement/disablement commands of remote unit’s relays. Configuration of TCP/IP parameters of a remote server to send all SafelineWebService data at 5-minute intervals. Disablement of programming via Internet/Intranet (WebServer in “read only” mode) and change of user PIN. Location of the graphics folder in the event of Intranet with no Internet access.



3.18 WEB page: Box “Close session”

Closes the session. The session having been closed, the next time the user attempts to access the content, the access PIN will be requested. For security reasons, an automatic session closure is generated every 30 minutes should the session have been quitted without “close session ”having been pressed.

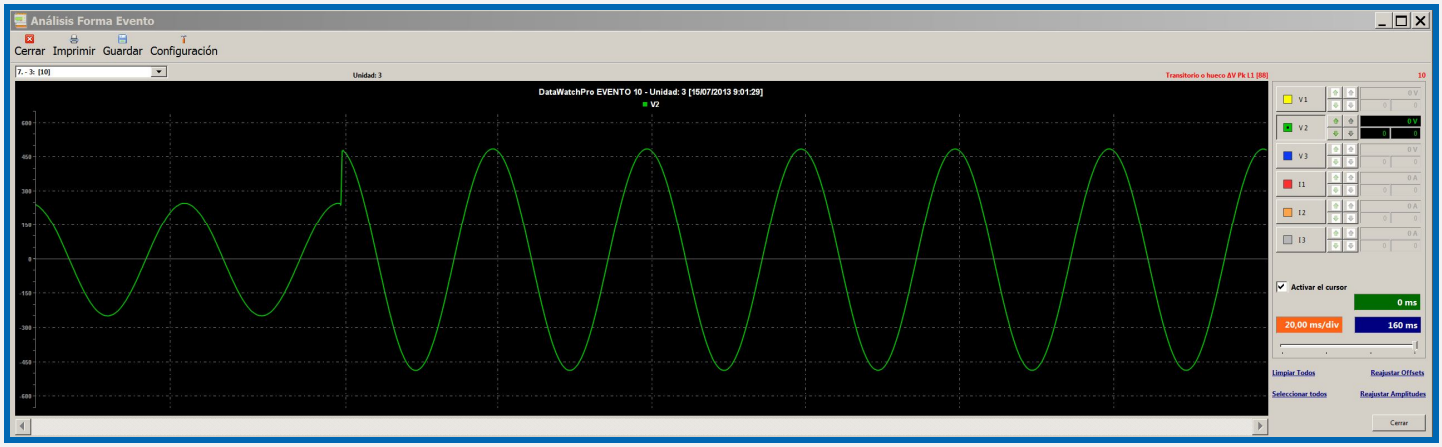
Chapter 4 – DataWatchPro professional software

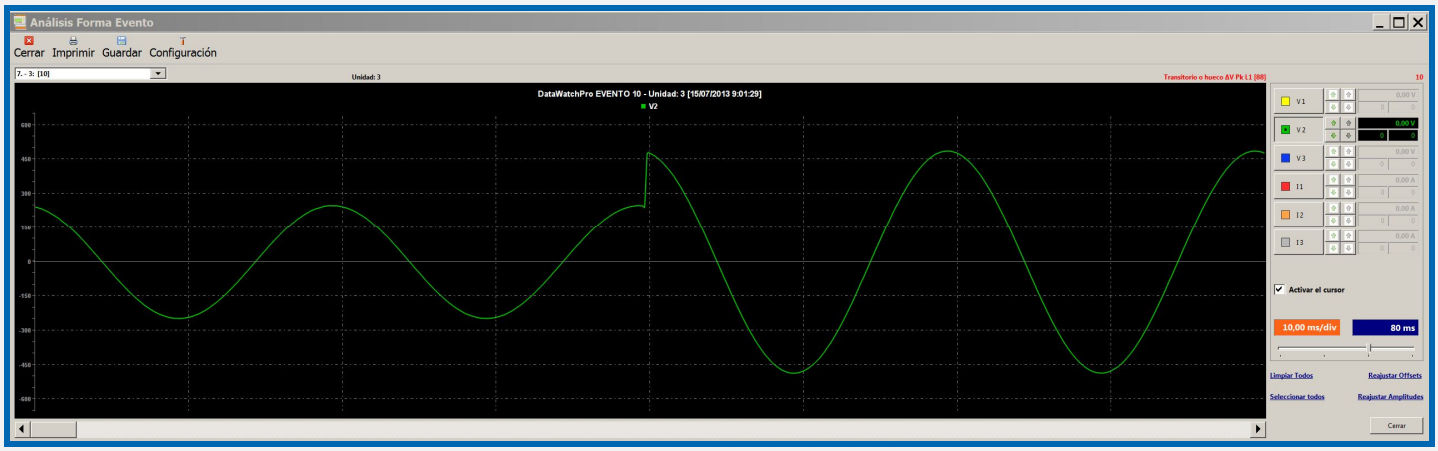
Warning: Manually update the time and date in the unit's clock before using the DatawatchPro software

4.1 Module – Oscilloscope event-logger in waveform with pre-trigger and autoscale (optional)

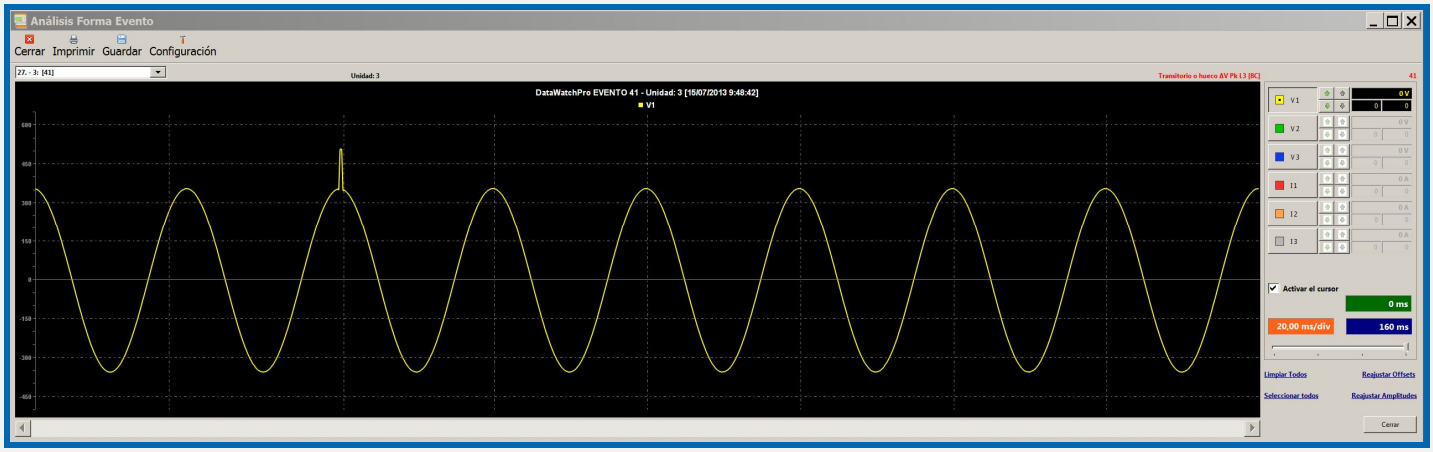
6 channels V1, V2, V3, I1, I2, I3, with captures for each event
Three modes of record length in 6 channels 160ms, 320ms and 640ms (pre-trigger: 40ms, 80ms and 160ms)
600-event storage in built-in memory. Display via WebServer and DataWatchPro.
Trigger for alarms which can be enabled and are programmable in value and delay. Chronological record for each type of alarm.
Display via WebServer with horizontal zoom functions. Multi-channel measurement, value and time cursor, etc.
Display via DataWatchPro with offset control functions, amplitude, time base, horizontal shift zoom, multi-channel measurement, value and time cursor, etc.

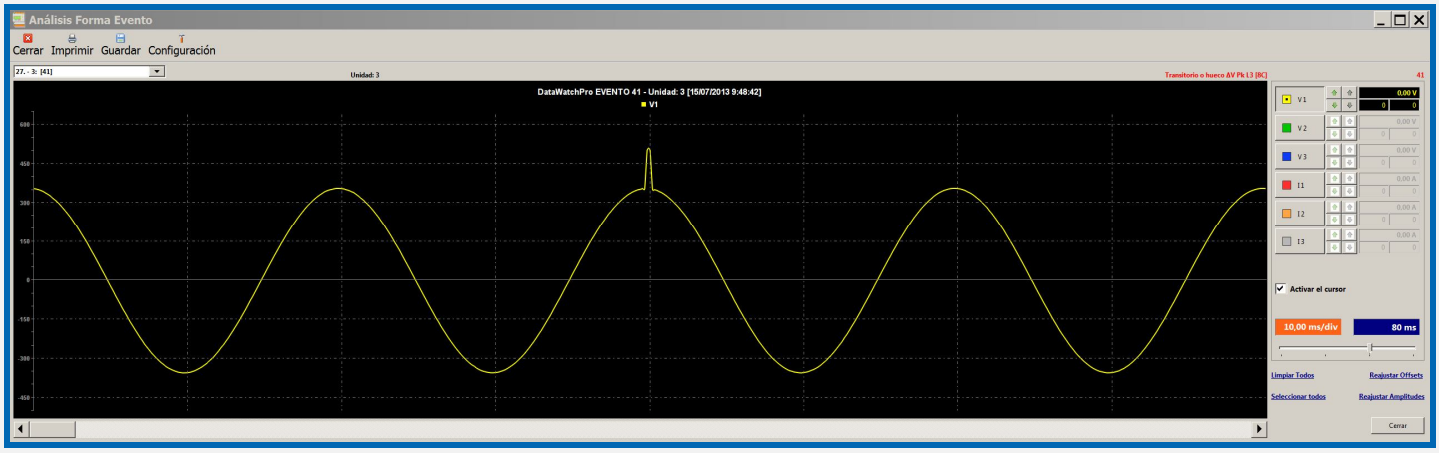
4.1.1 Event capture - overvoltage

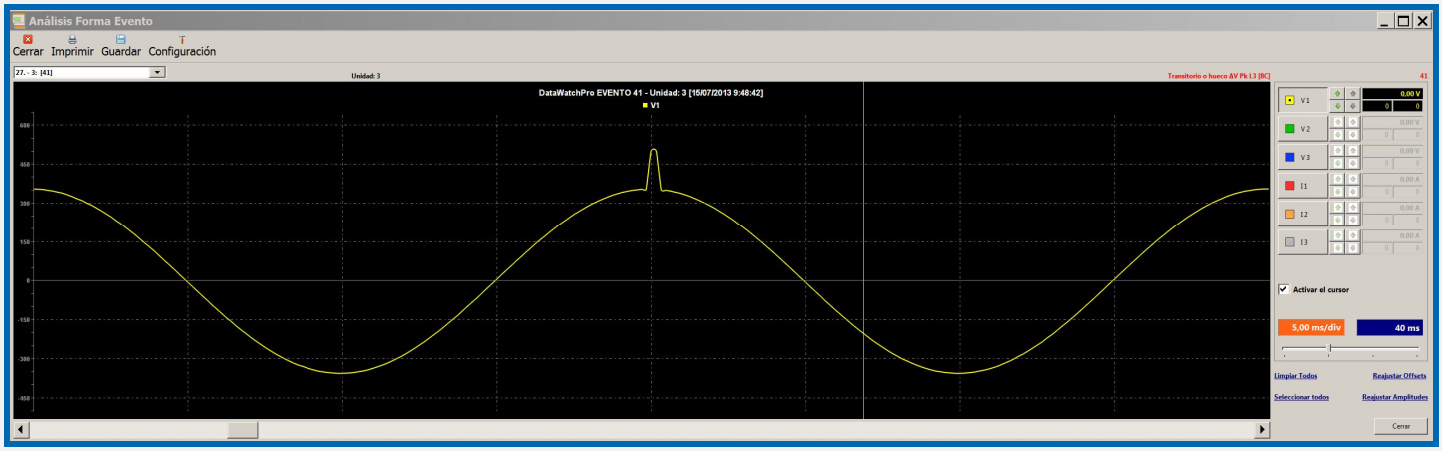


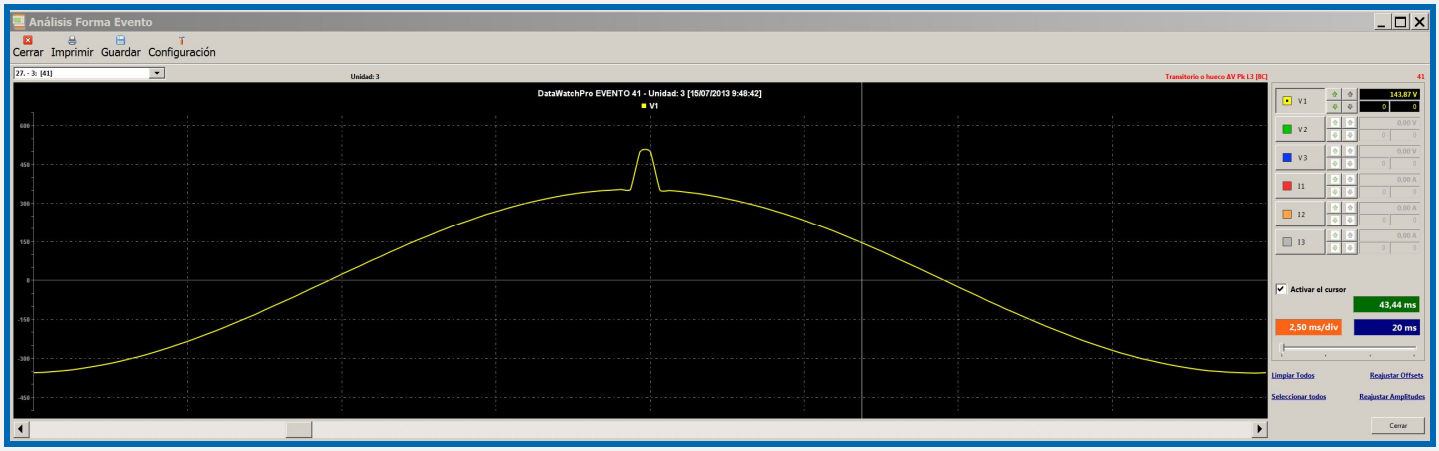


4.1.2 Event capture - transient

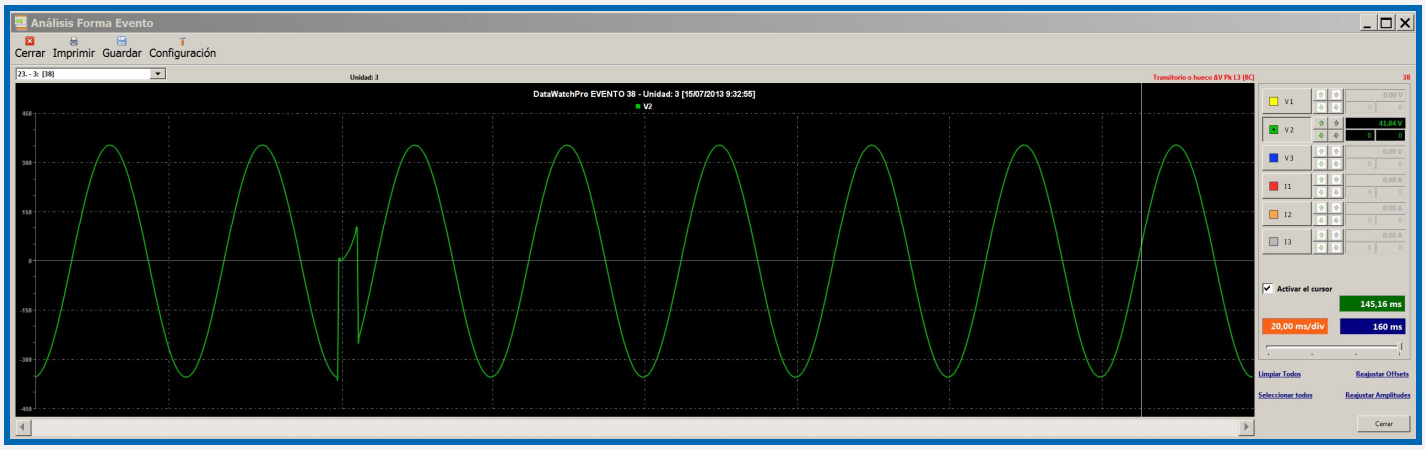




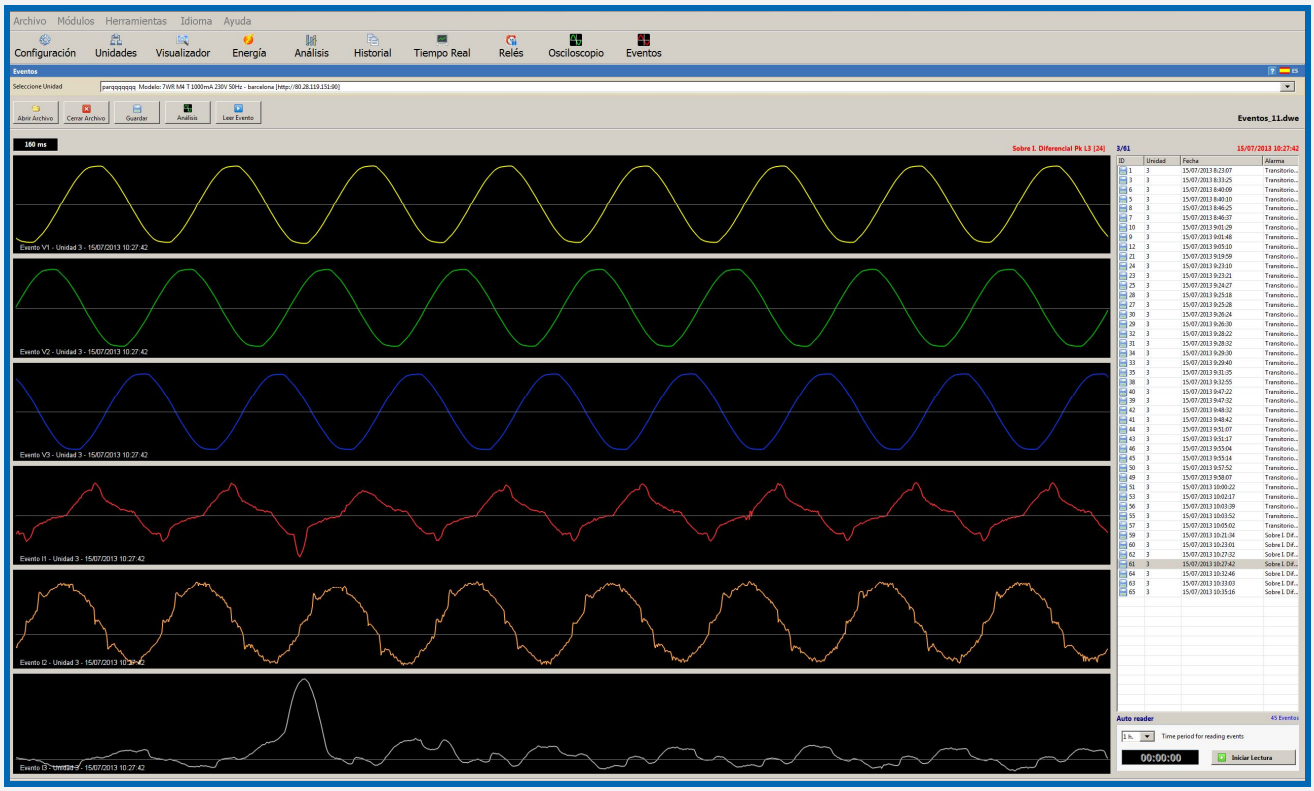




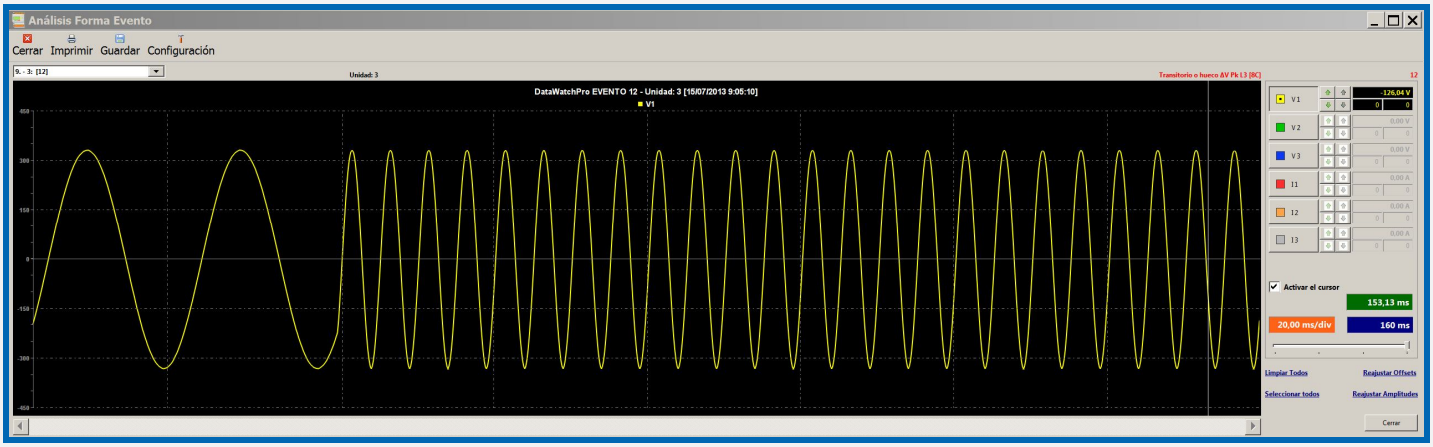
4.1.3 Event capture - voltage dip



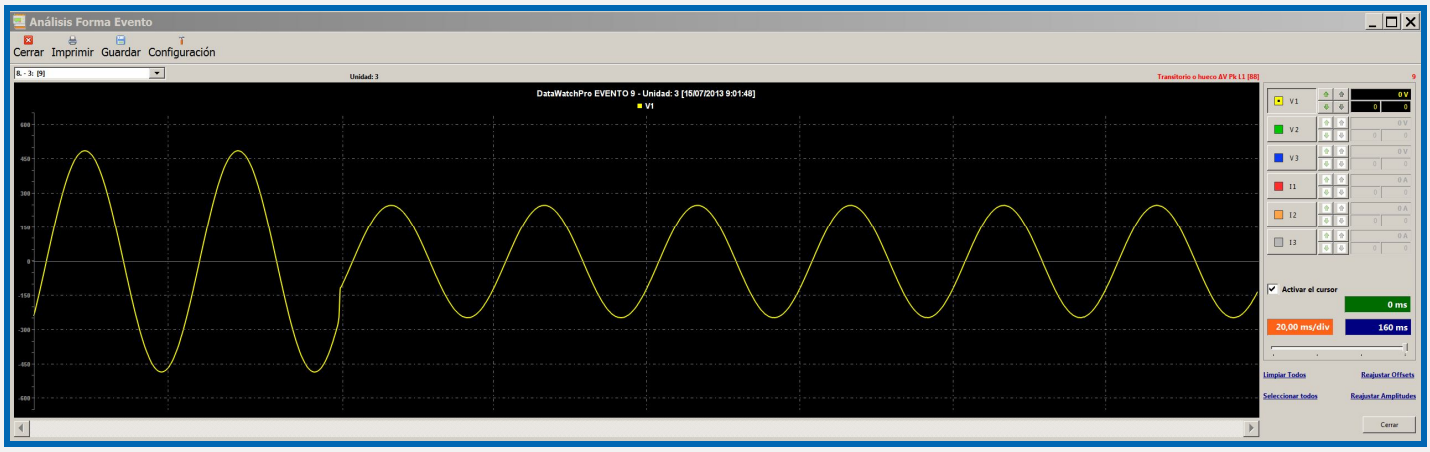
4.1.4 Event capture - over-intensity



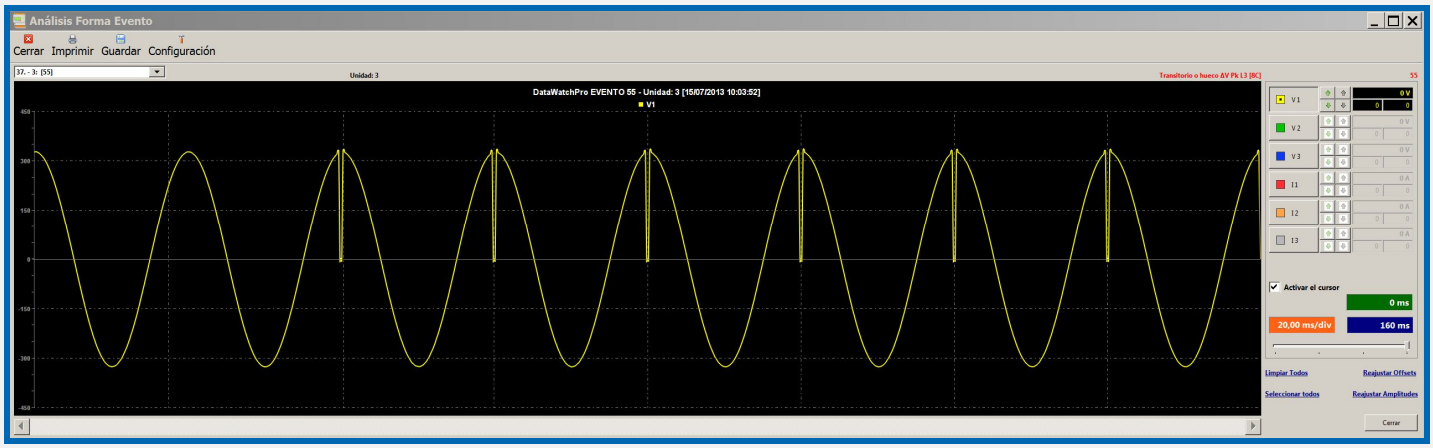
4.1.5 Event capture - over-frequency



4.1.6 Event capture – low voltage

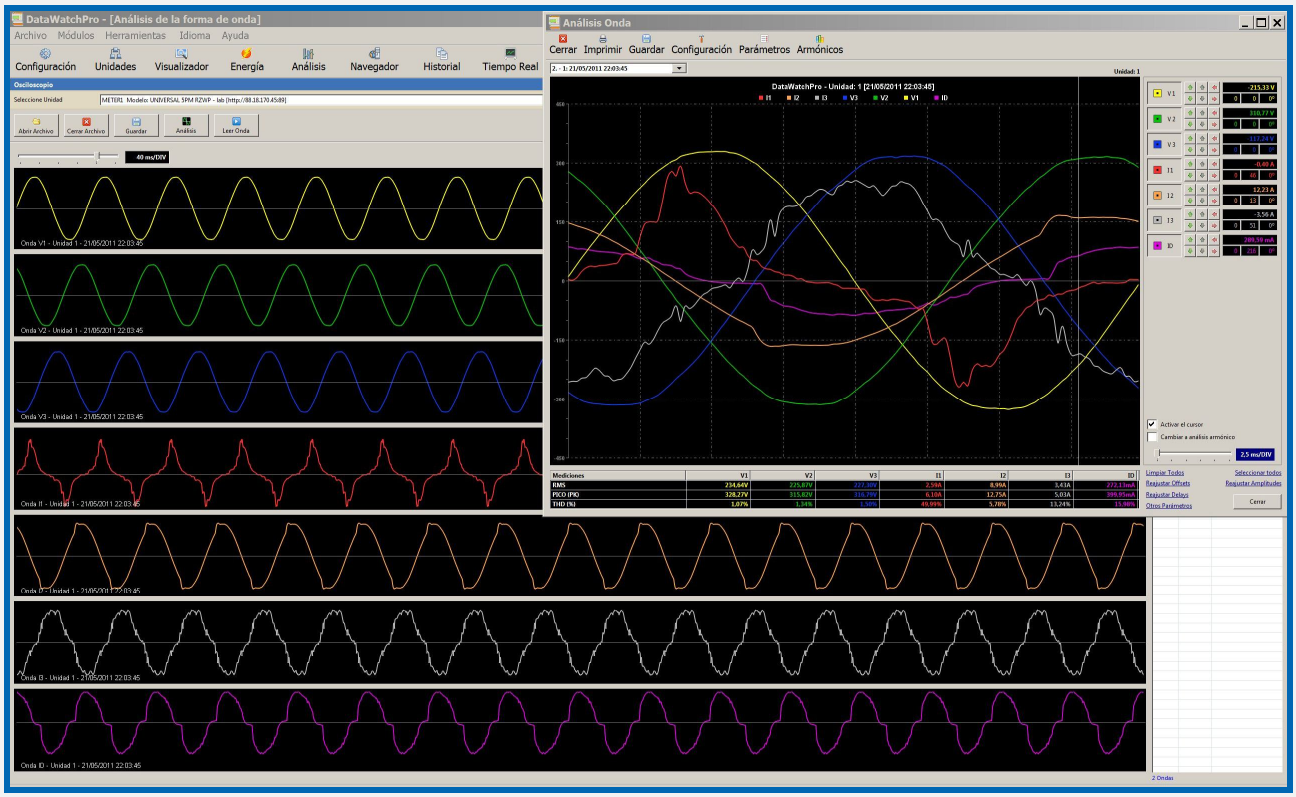


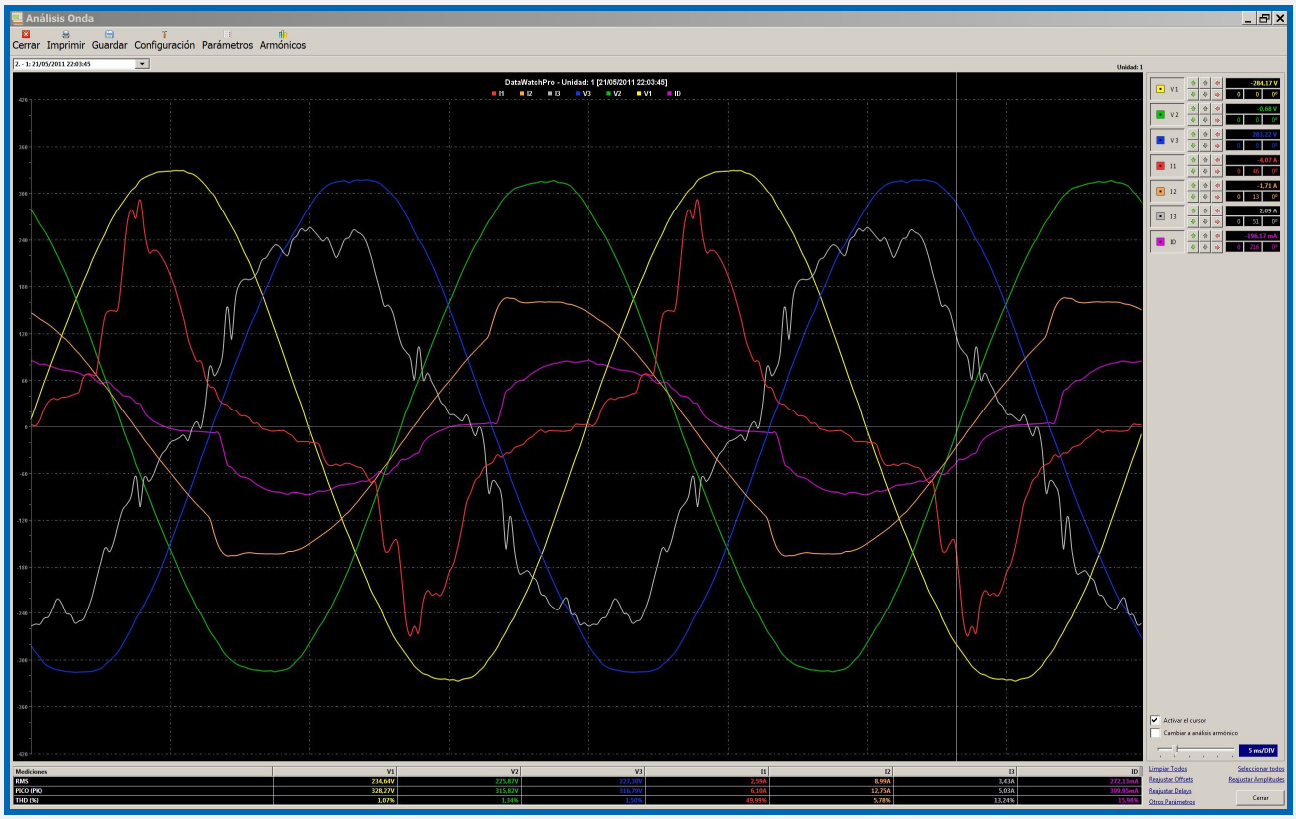
4.1.7 Event capture – repetitive microcuts

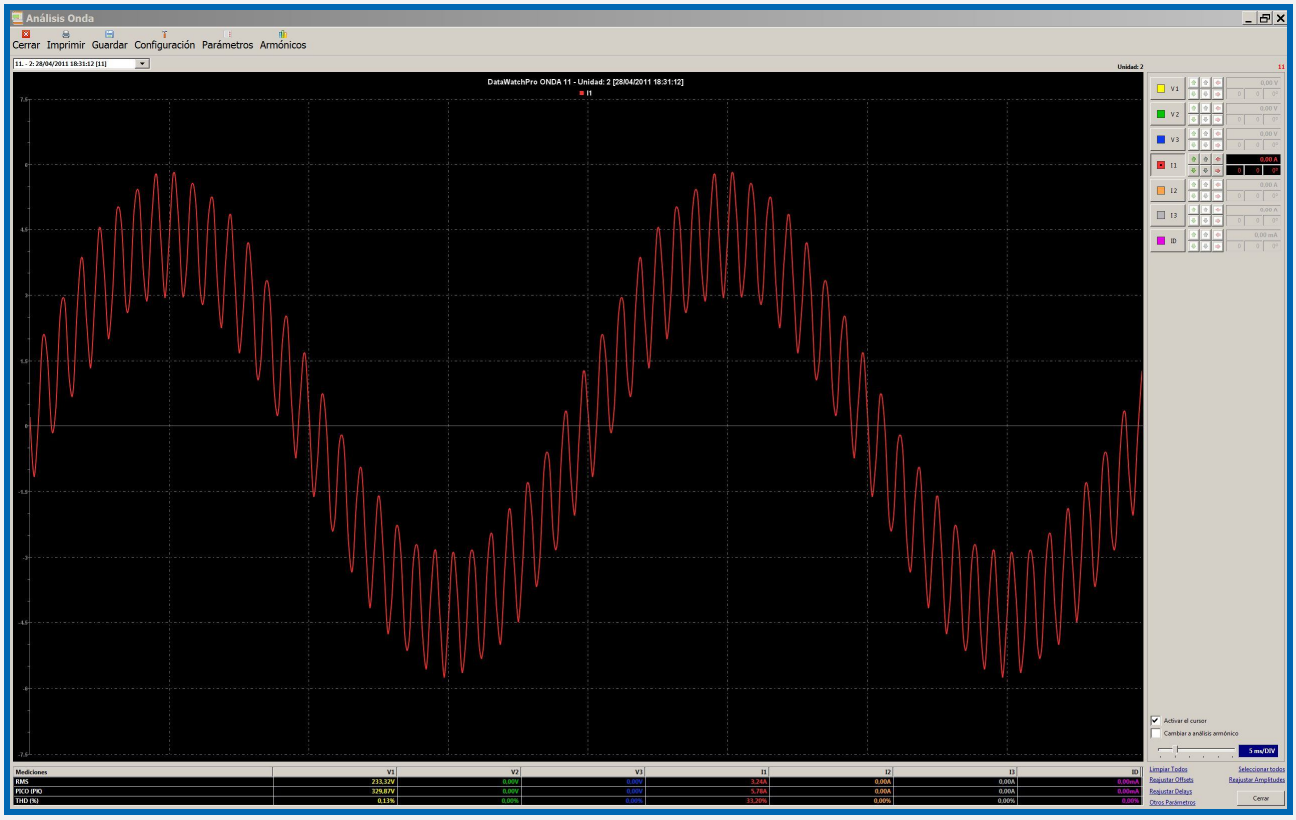


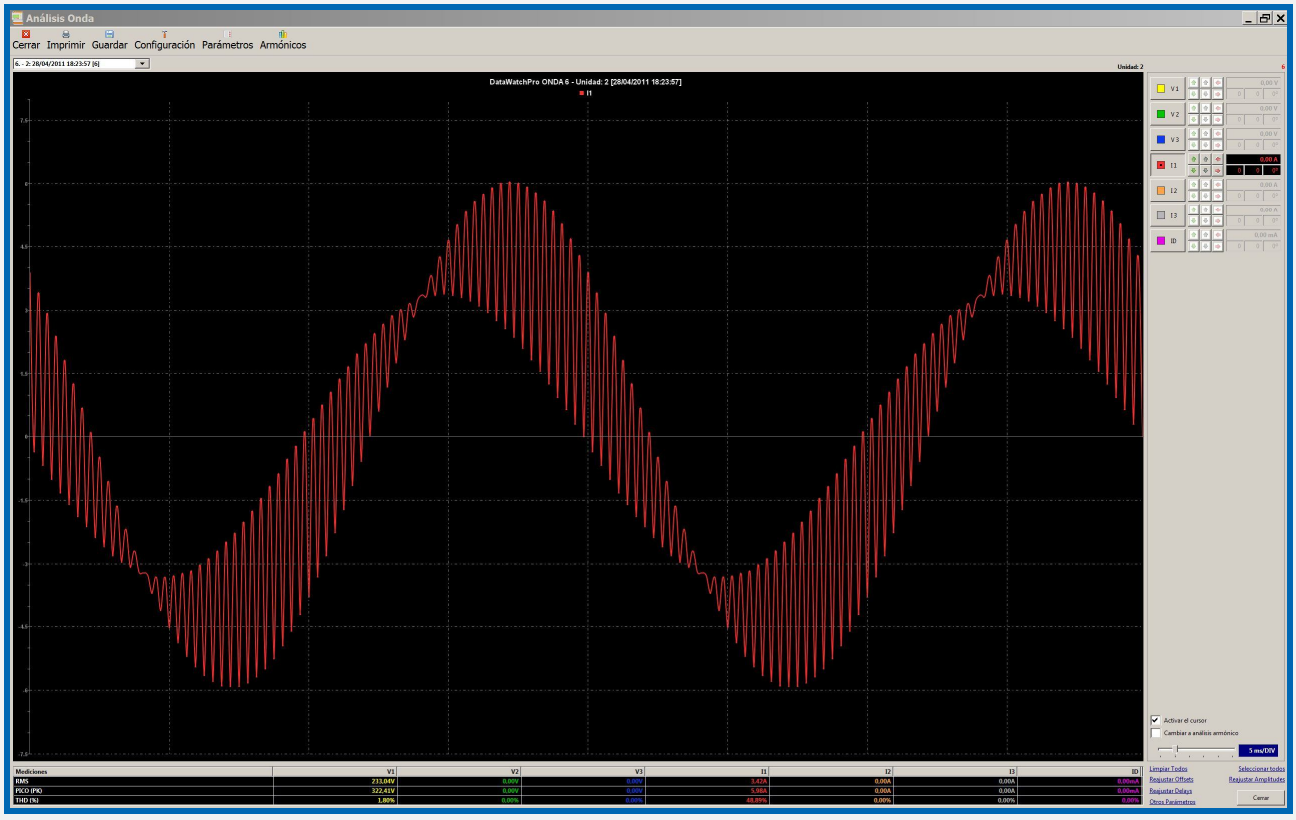
4.2 Module - 7-channel oscilloscope with autoscale and

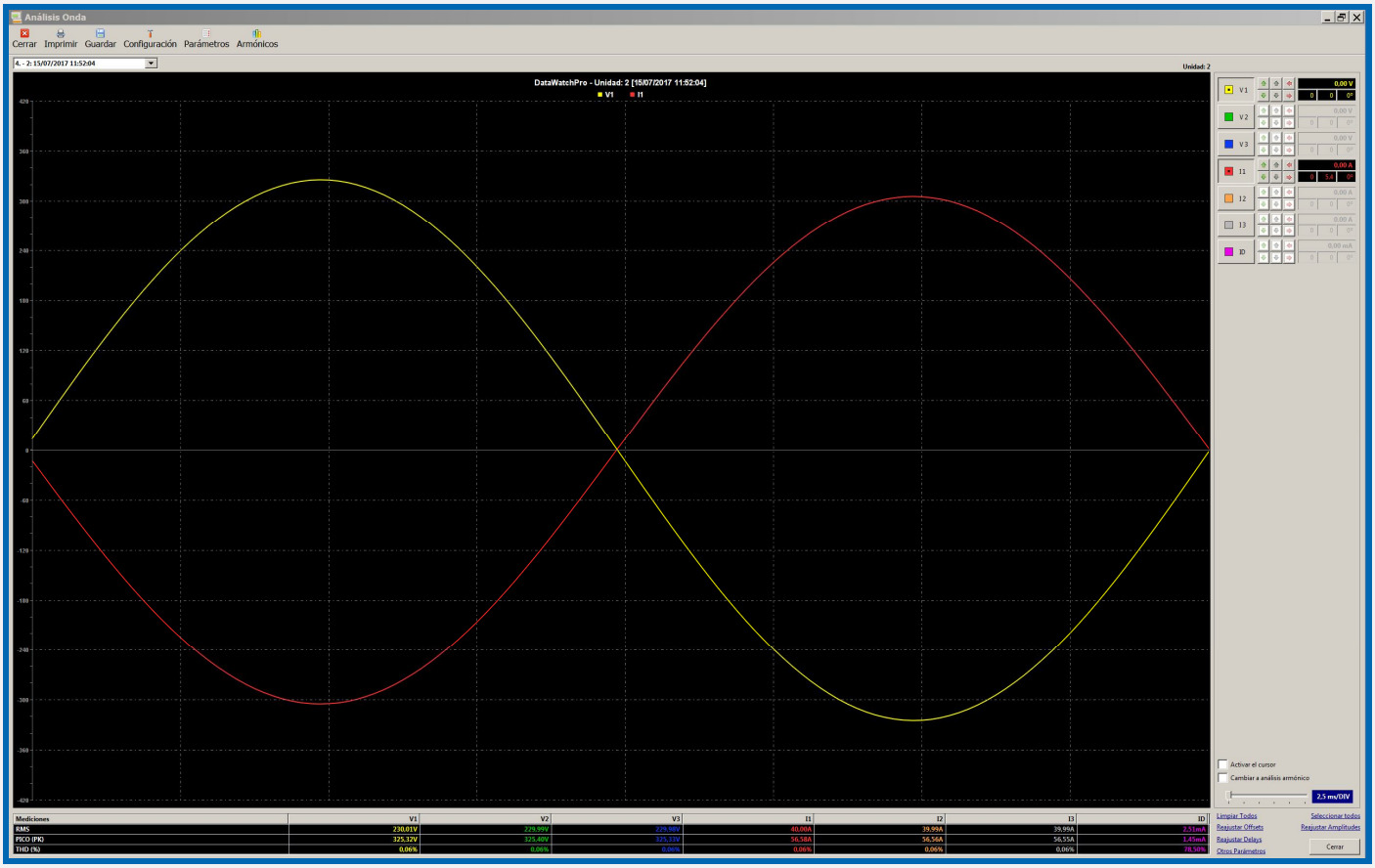
offset control, amplitude, time base, delay/advance in degrees, multi-channel measurement cursor, measurement of RMS, Pk, THD, etc.

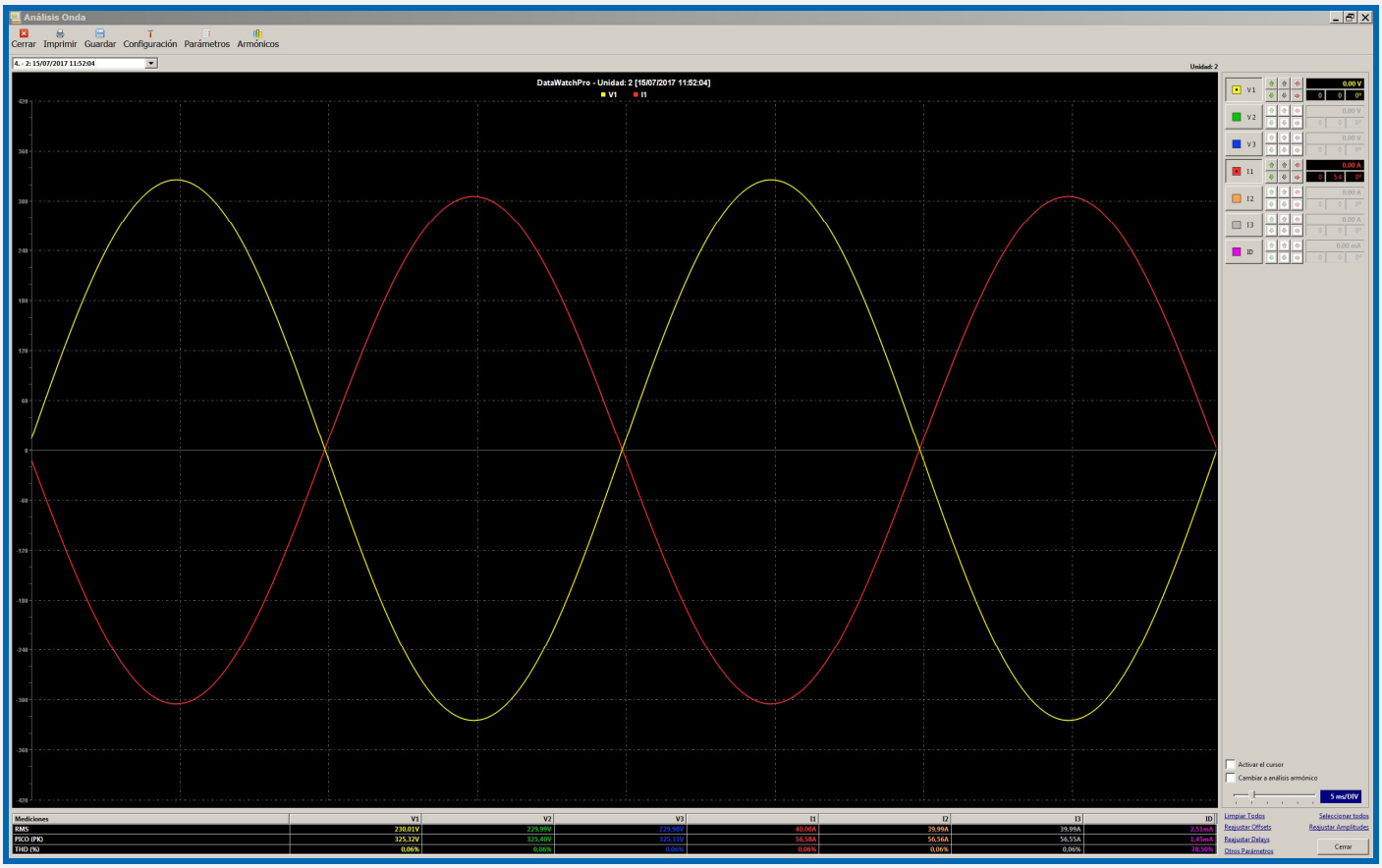




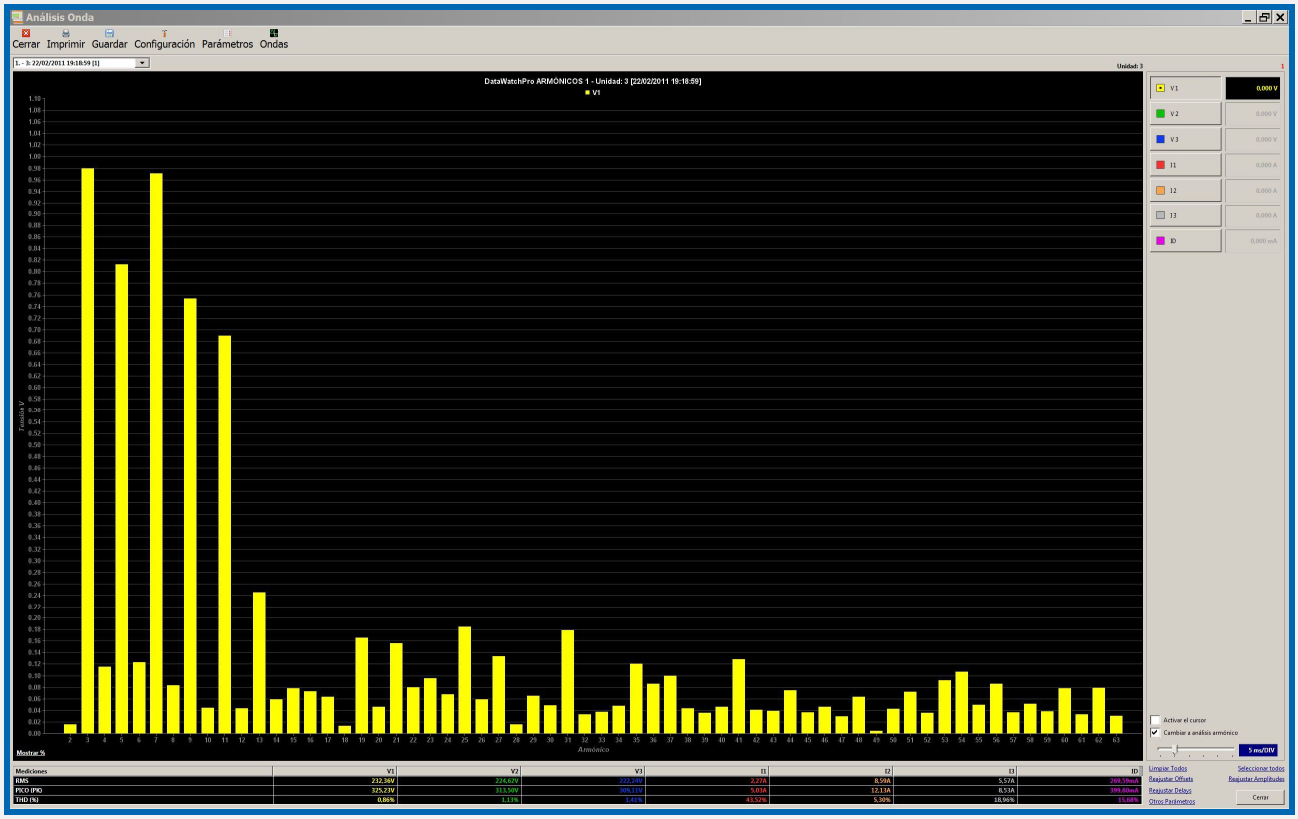

Análisis Onda
Cerrar Imprimir Guardar Configuración Parámetros Armónicos
DataWatchPro ONDA 11 - Unidad: 2 [28/04/2011 18:31:12]
I1
Mediciones V1 V2 V3 I1 I2 I3 ID
RMS 233,32V 0,00V 0,00V 3,26A 0,00A 0,00A 0,00mA
PICO (PK) 329,87V 0,00V 0,00V 5,78A 0,00A 0,00A 0,00mA
THD (%) 0,11% 0,00% 0,00% 33,20% 0,00% 0,00% 0,00%
Activar el cursor
Cambiar a análisis armónico
5 ms/DIV
Limpiar Todos
Seleccionar todos
Reajustar Offsets
Reajustar Amplitudes
Reajustar Delays
Otros Parámetros
Cerrar

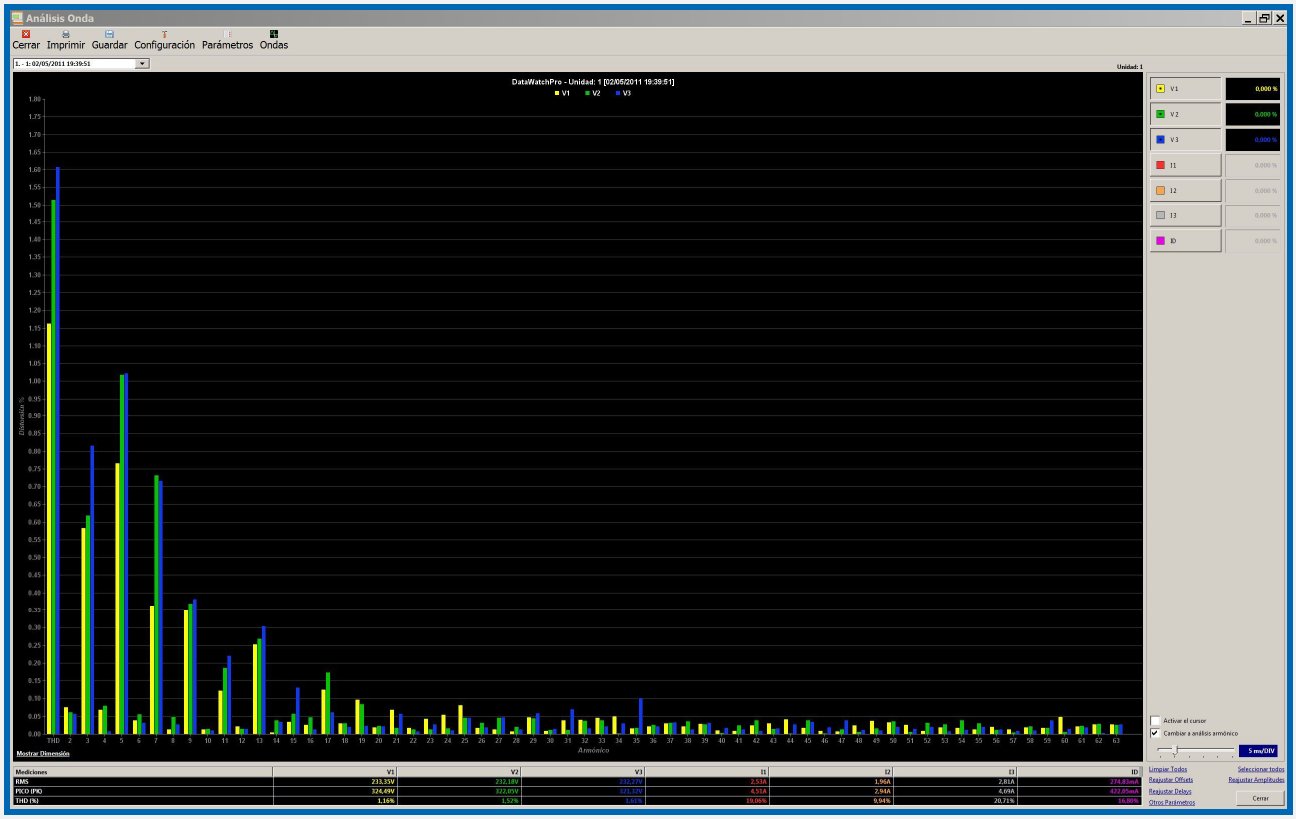

Análisis Onda
Cerrar Imprimir Guardar Configuración Parámetros Armónicos
DataWatchPro ONDA 6 - Unidad: 2 [28/04/2011 18:23:57]
I1
Mediciones V1 V2 V3 I1 I2 I3 ID
RMS 233,04V 0,00V 0,00V 3,47A 0,00A 0,00A 0,00mA
PICO (PK) 322,41V 0,00V 0,00V 5,98A 0,00A 0,00A 0,00mA
THD (%) 1,80% 0,00% 0,00% 49,89% 0,00% 0,00% 0,00%
Activar el cursor
Cambiar a análisis armónico
5 ms/DIV
Limpiar Todos
Seleccionar todos
Reajustar Offsets
Reajustar Amplitudes
Reajustar Delays
Otros Parámetros
Cerrar


Análisis Onda
Cerrar
Imprimir
Guardar
Configuración
Parámetros
Armónicos
DataWatchPro - Unidad: 2 [15/07/2017 11:52:04]
V1
I1
Mediciones
V1
V2
V3
I1
I2
I3
ID
RMS
230,01V
229,99V
229,98V
40,00A
39,99A
39,99A
2,51mA
PICO (PK)
325,32V
325,40V
325,33V
56,58A
56,56A
56,55A
1,45mA
THD (%)
0,06%
0,06%
0,06%
0,06%
0,06%
0,06%
78,50%
Activar el cursor
Cambiar a análisis armónico
2,5 ms/DIV
Limpiar Todos
Reajustar Offsets
Reajustar Delays
Otros Parámetros
Seleccionar todos
Reajustar Amplitudes
Cerrar

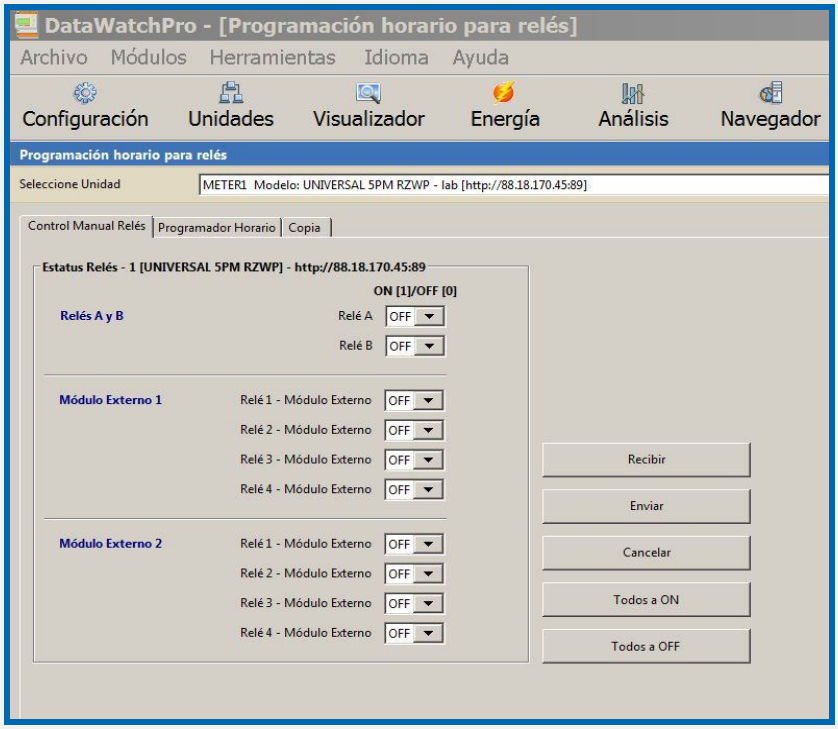

Análisis Onda
Cerrar
Imprimir
Guardar
Configuración
Parámetros
Armónicos
DataWatchPro - Unidad: 2 [15/07/2017 11:52:04]
V1
I1
Mediciones
V1
V2
V3
I1
I2
I3
ID
RMS
230,01V
229,99V
229,98V
40,00A
39,99A
39,99A
2,51mA
PICO (PK)
325,32V
325,40V
325,33V
56,58A
56,56A
56,55A
1,45mA
THD (%)
0,06%
0,06%
0,06%
0,06%
0,06%
0,06%
78,50%
Activar el cursor
Cambiar a análisis armónico
5 ms/DIV
Limpiar Todos
Reajustar Offsets
Reajustar Delays
Otros Parámetros
Seleccionar todos
Reajustar Amplitudes
Cerrar

4.3 Module – 7-channel harmonics spectrum with autoscale (63 harmonics, range in % and value V - A).
Multi-channel measurement cursor and simultaneous analysis of 1, 2, 3, 4, 5, 6 and 7 channels

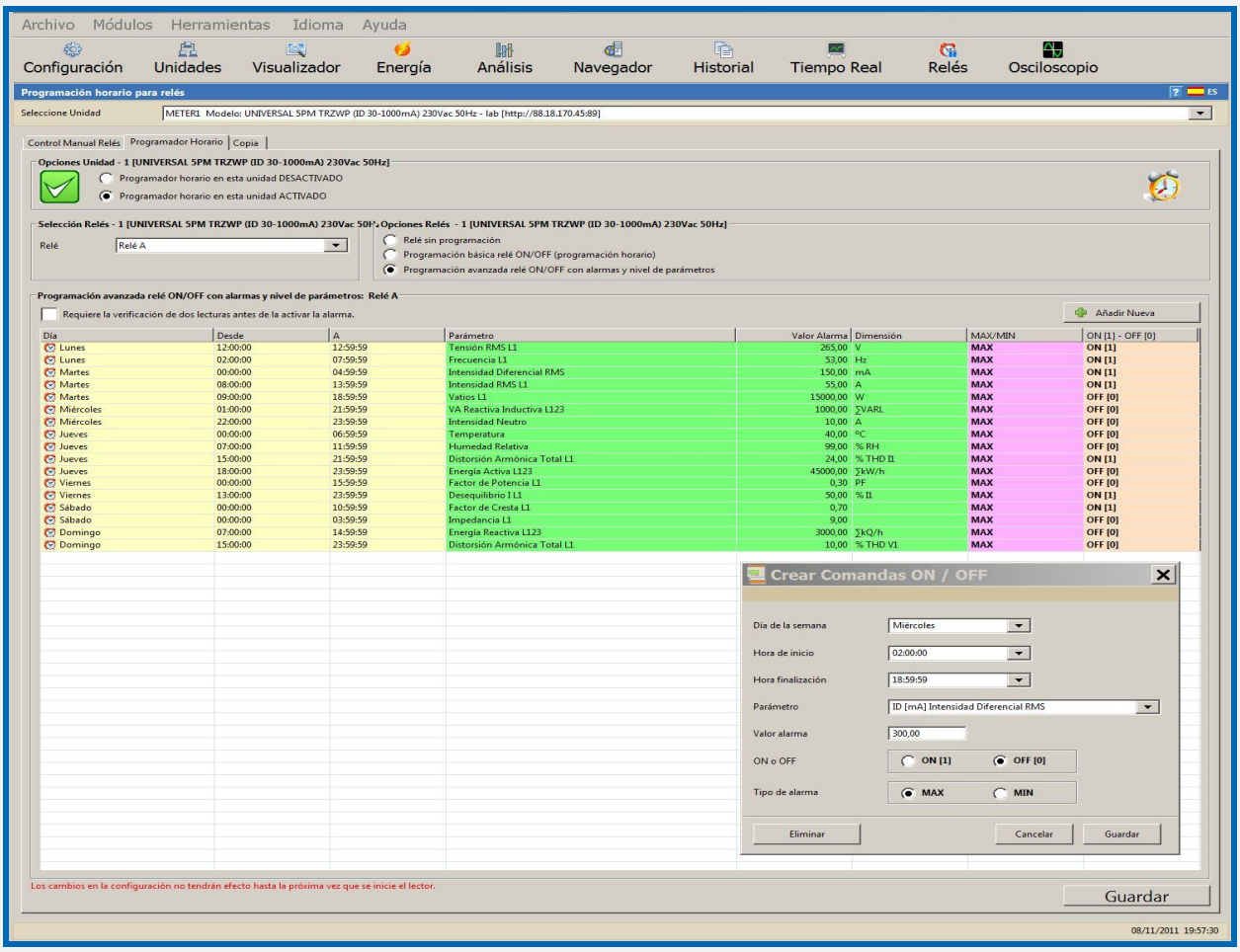




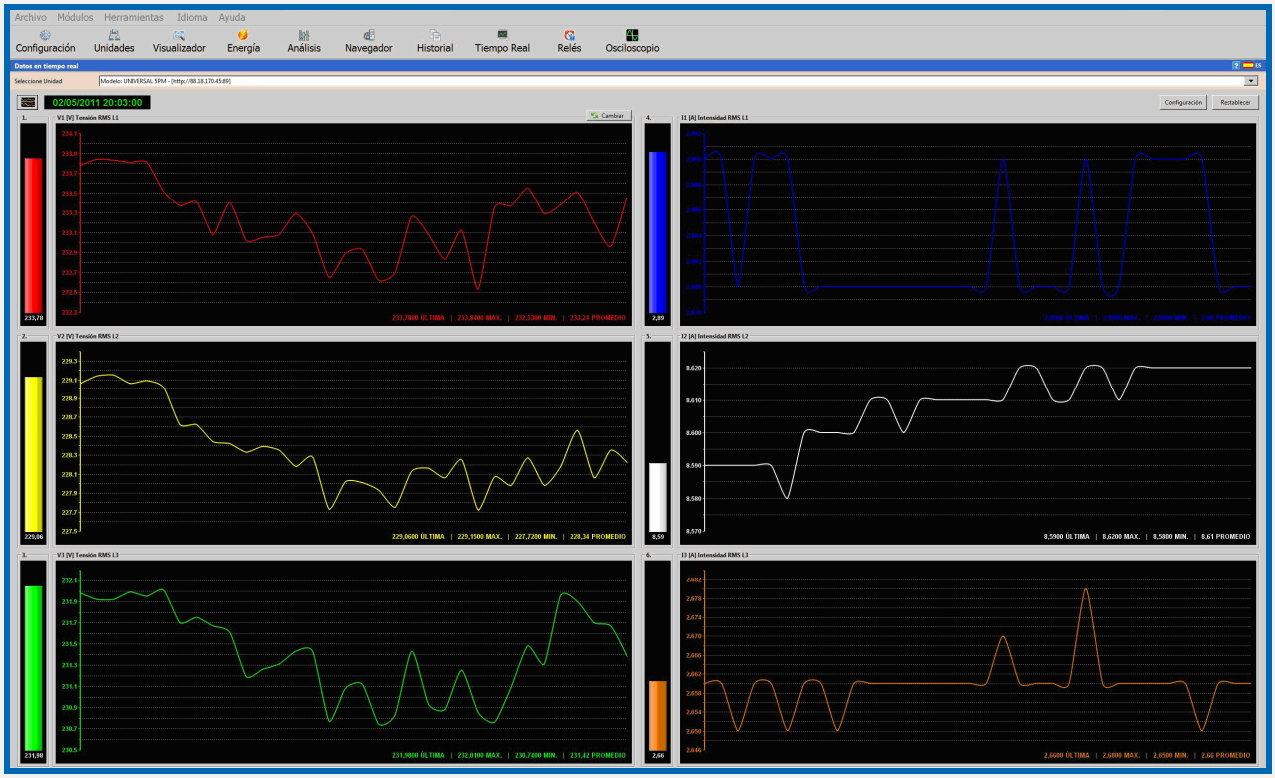
4.4 Manual relay control

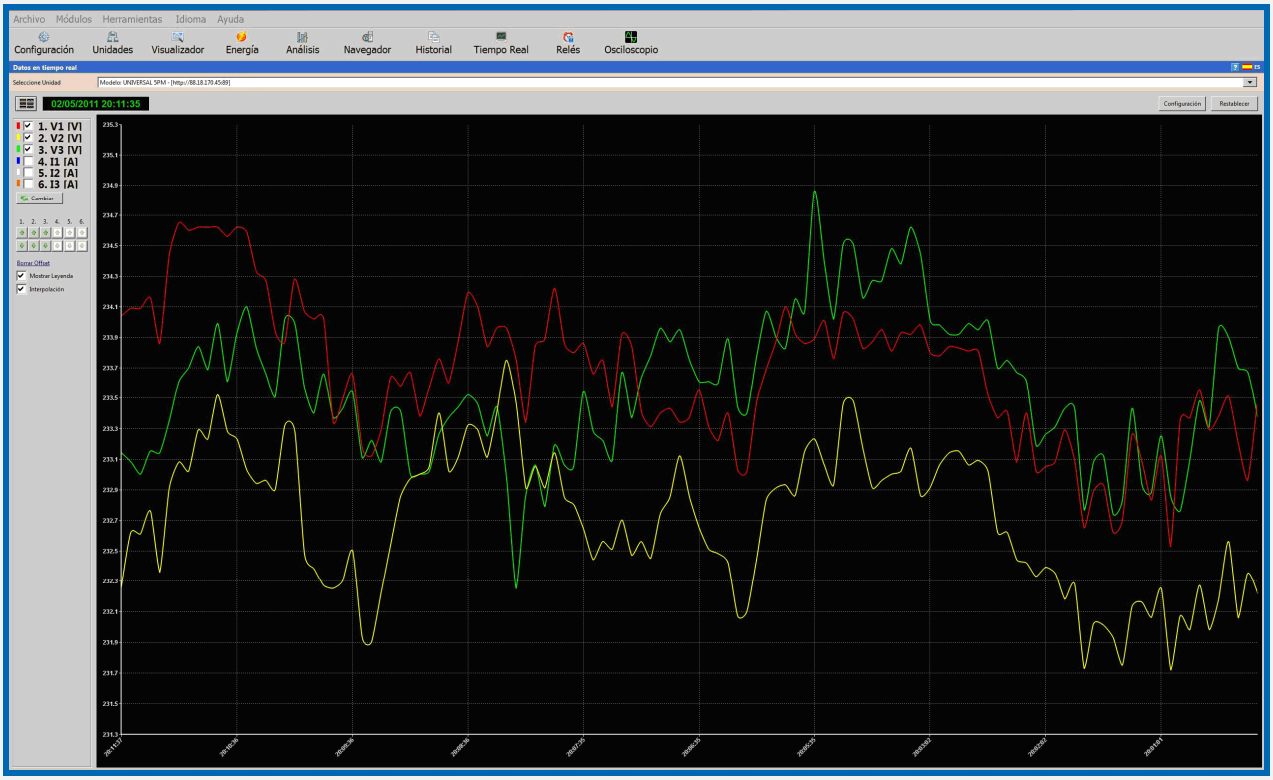


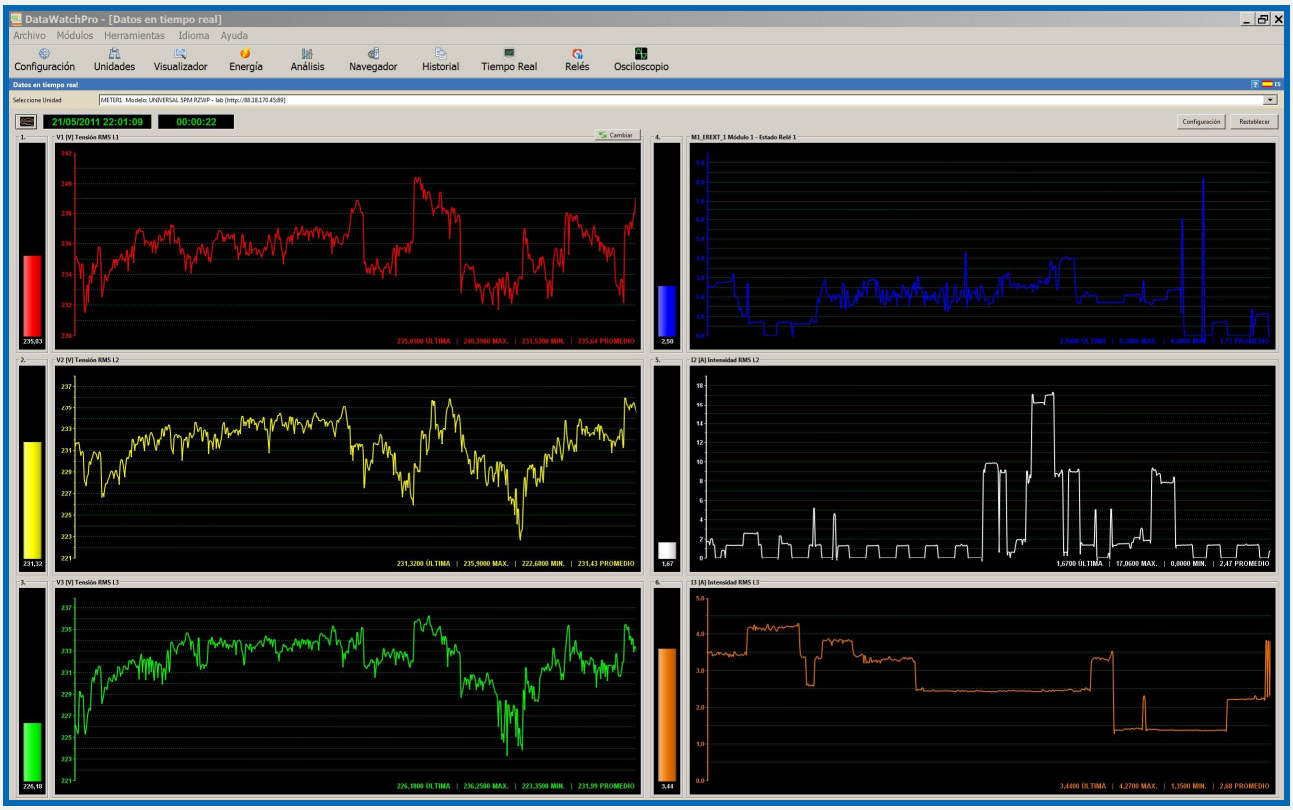
4.5 Automation/ programmable remote control of relays with level alarms in time frame



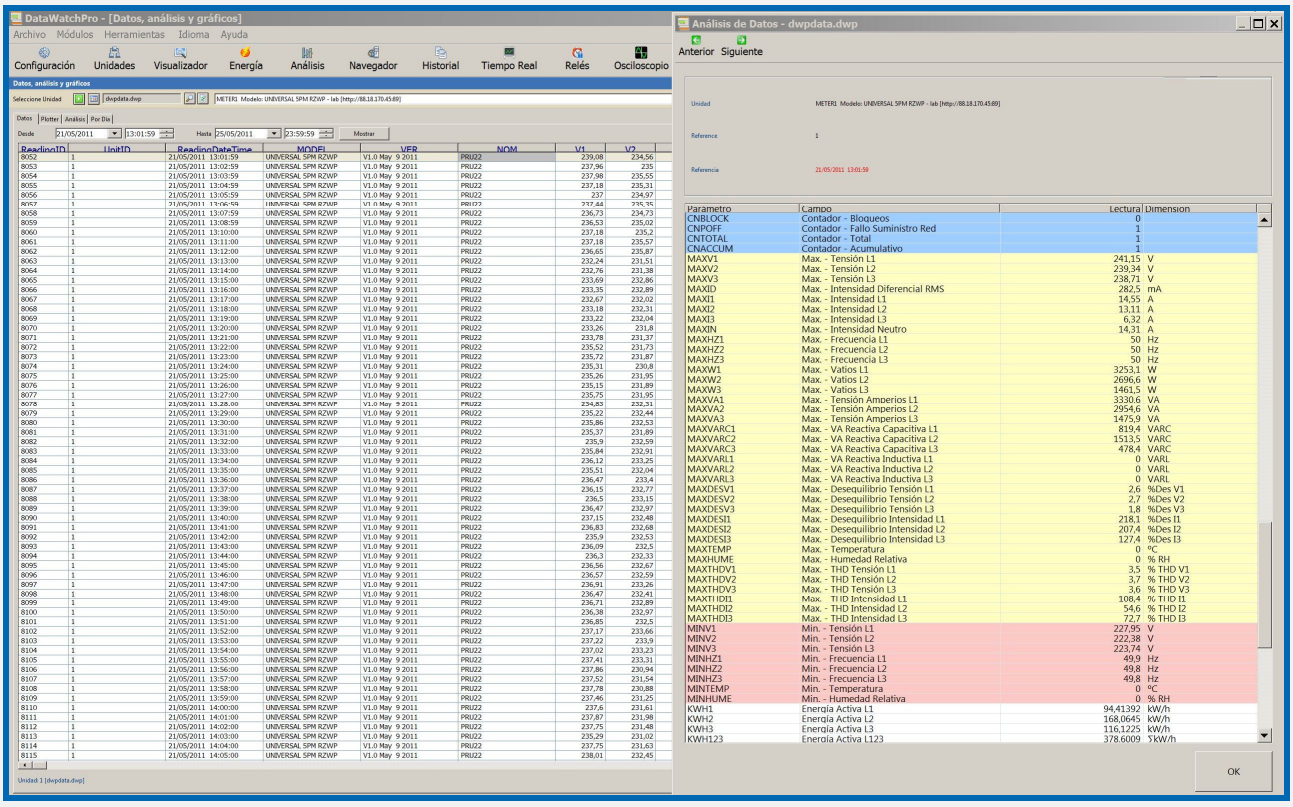
4.6 Module - Real time



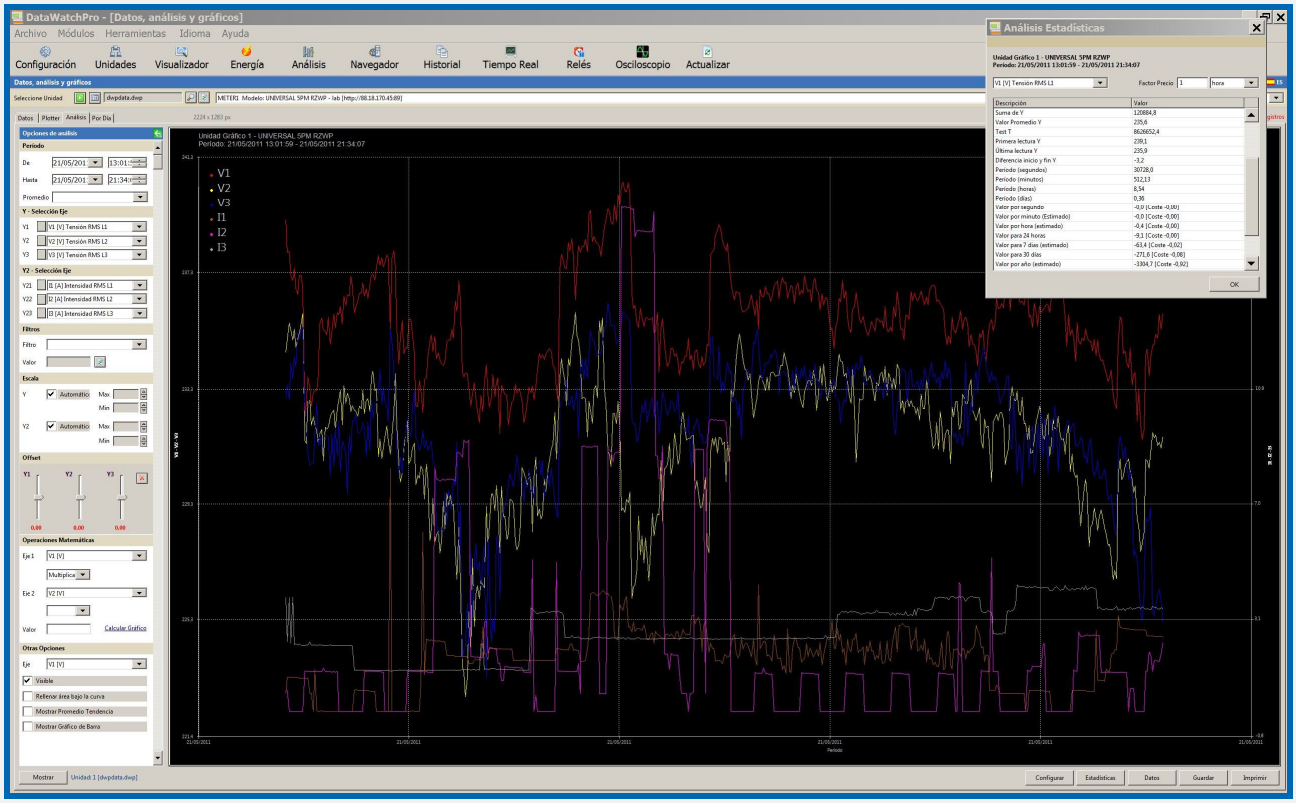




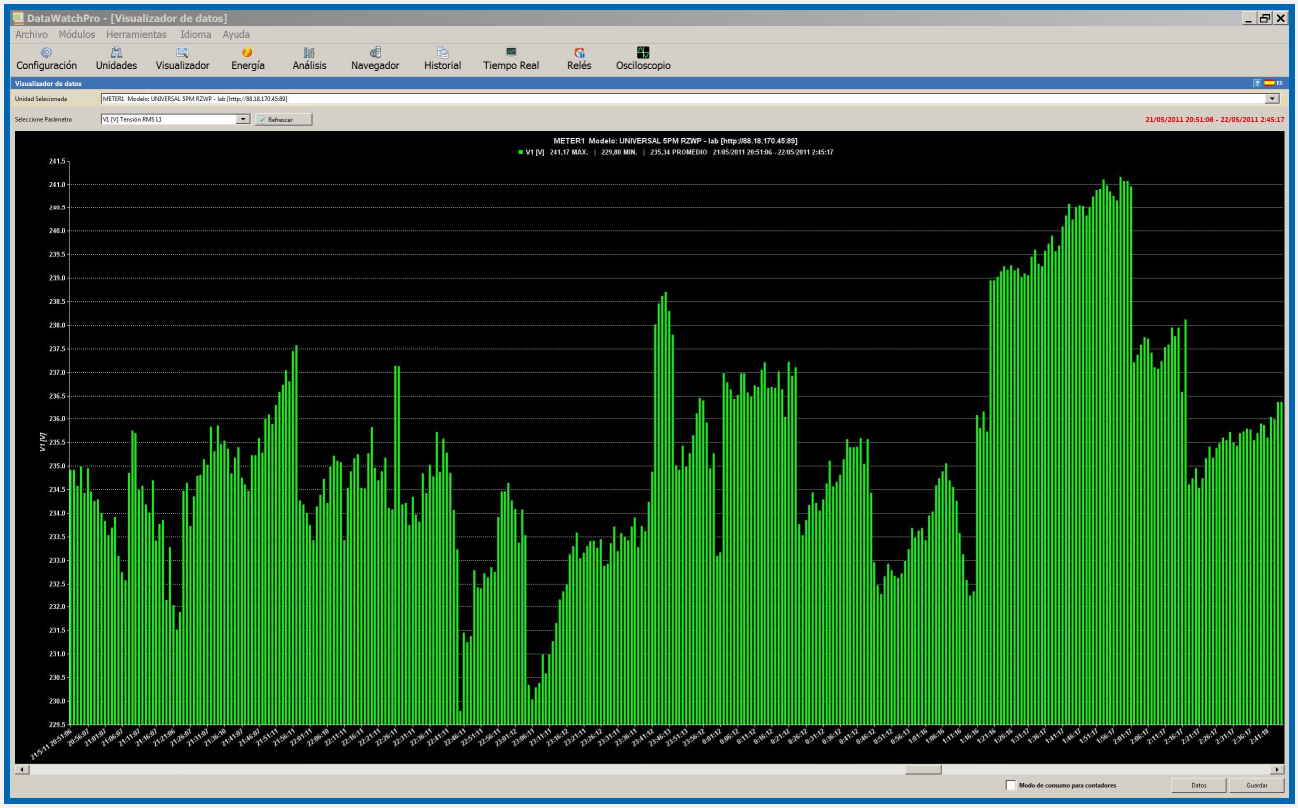
4.7 Module – numerical data analysis



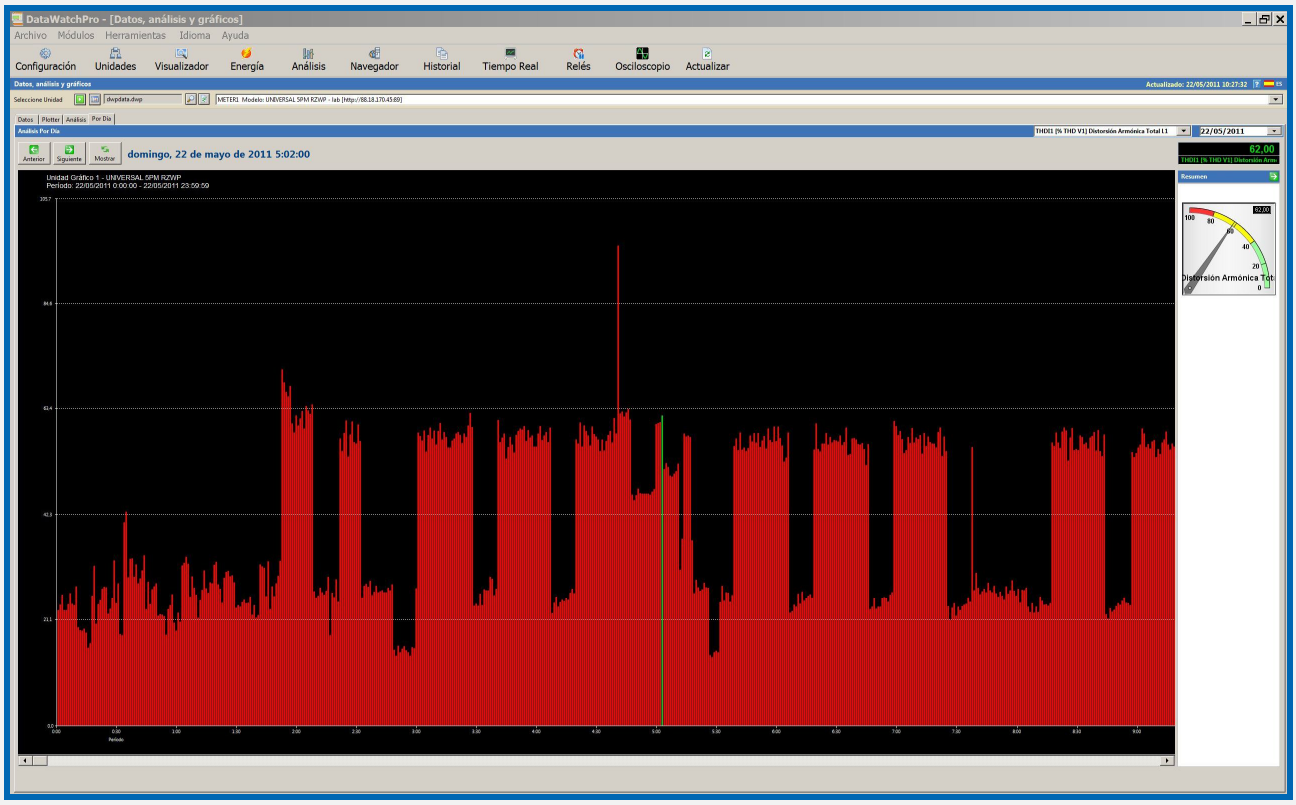
4.8 Module – graphic data analysis



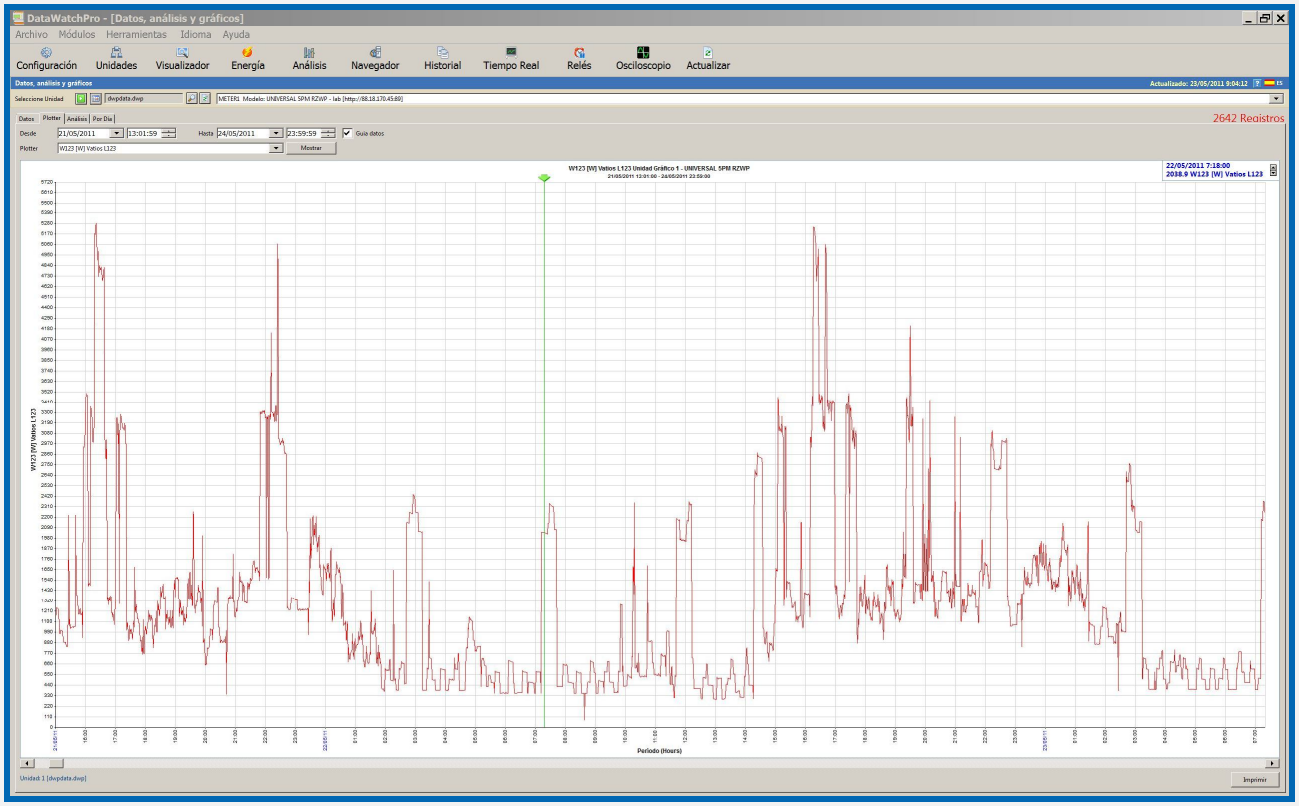
4.9 Module – Graphic display (rapid analysis)

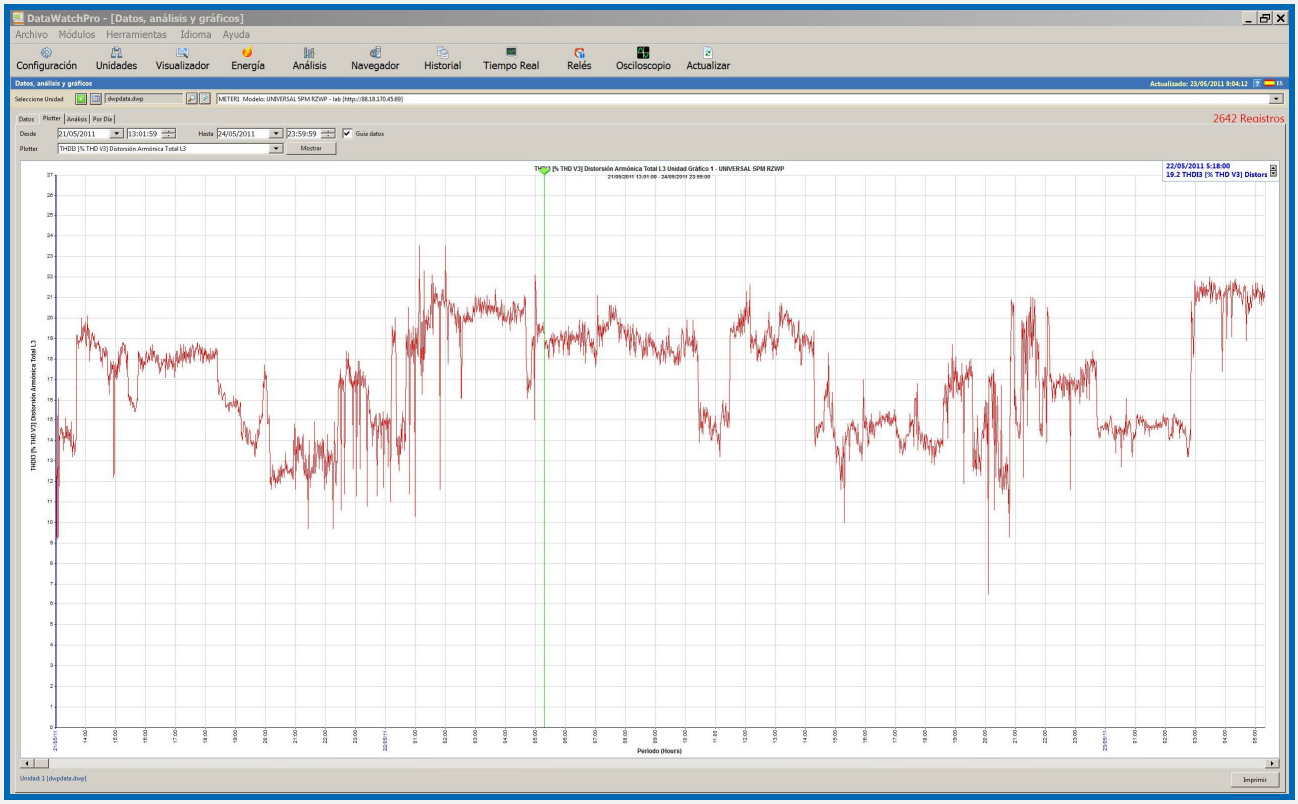


4.10 Module – daily analysis

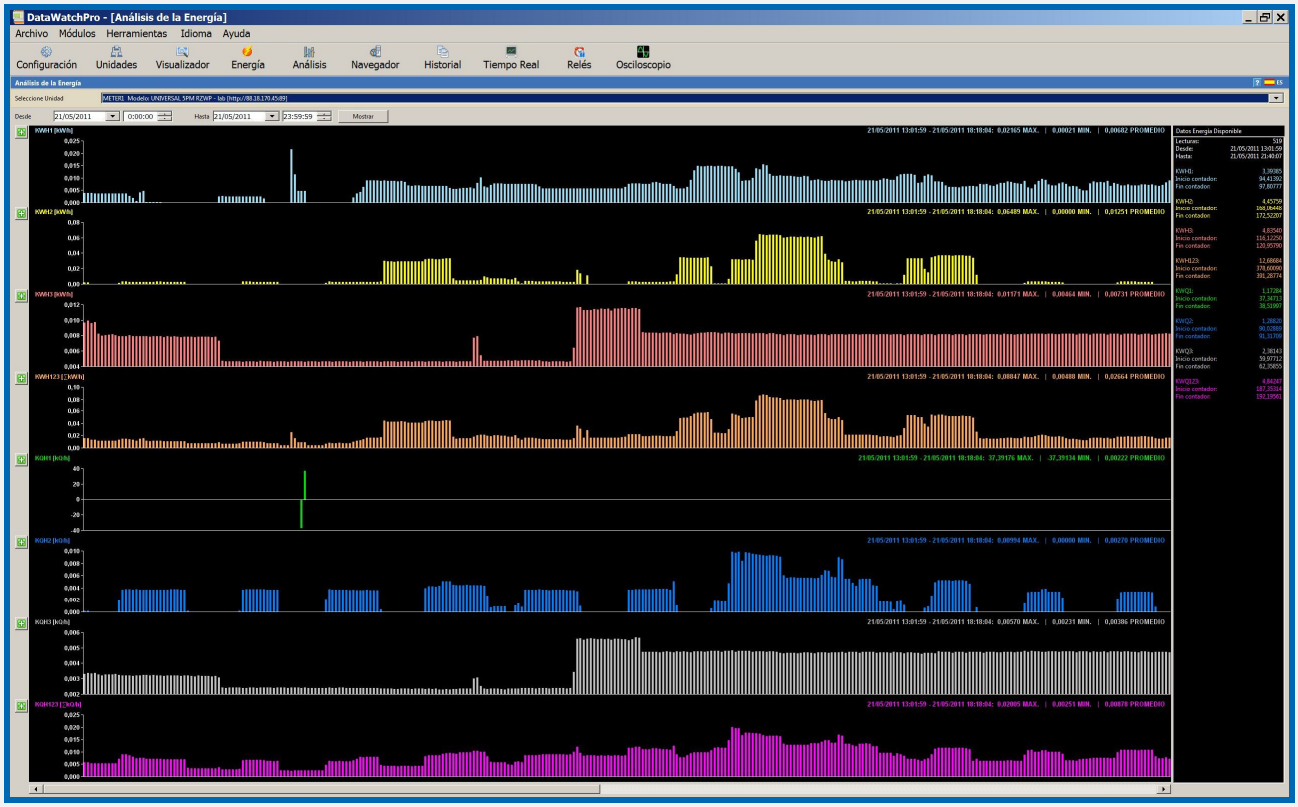


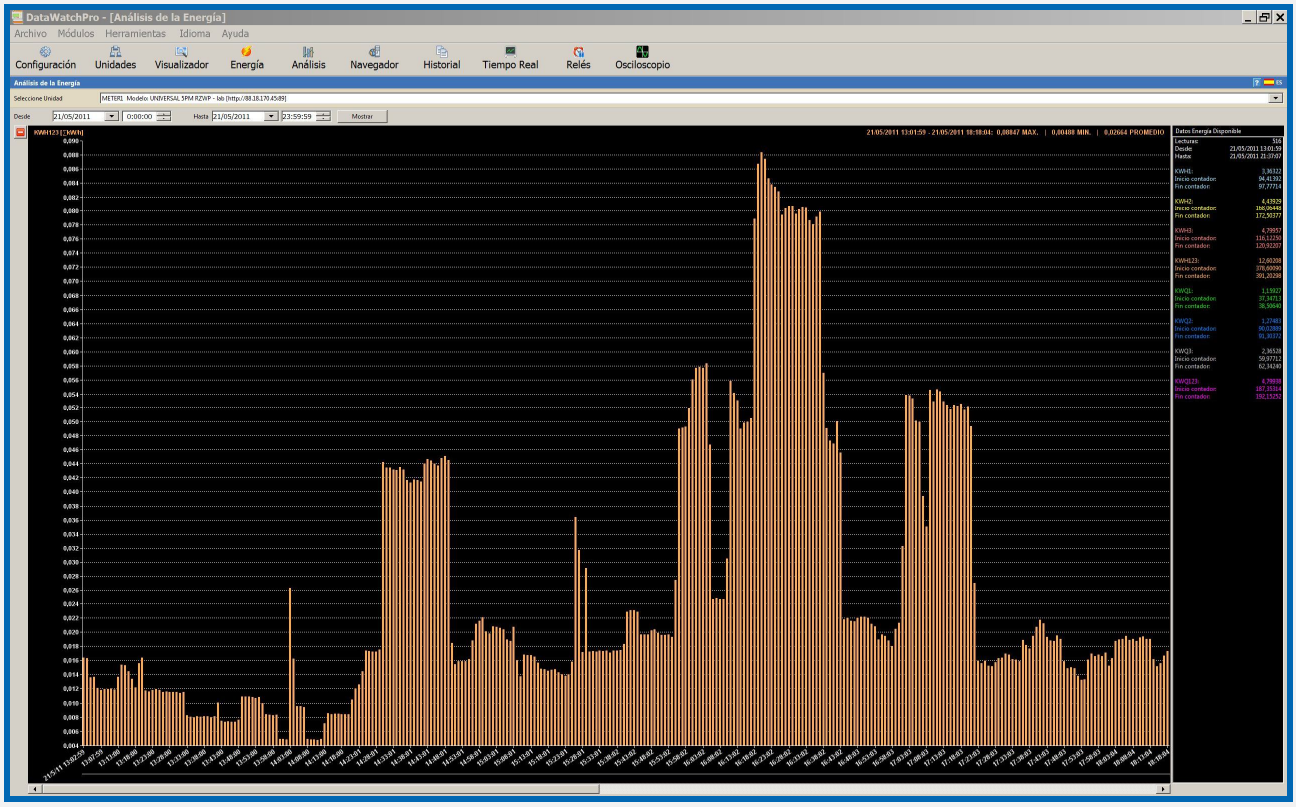
4.11 Module – graphic plotter (long period graphic analysis)



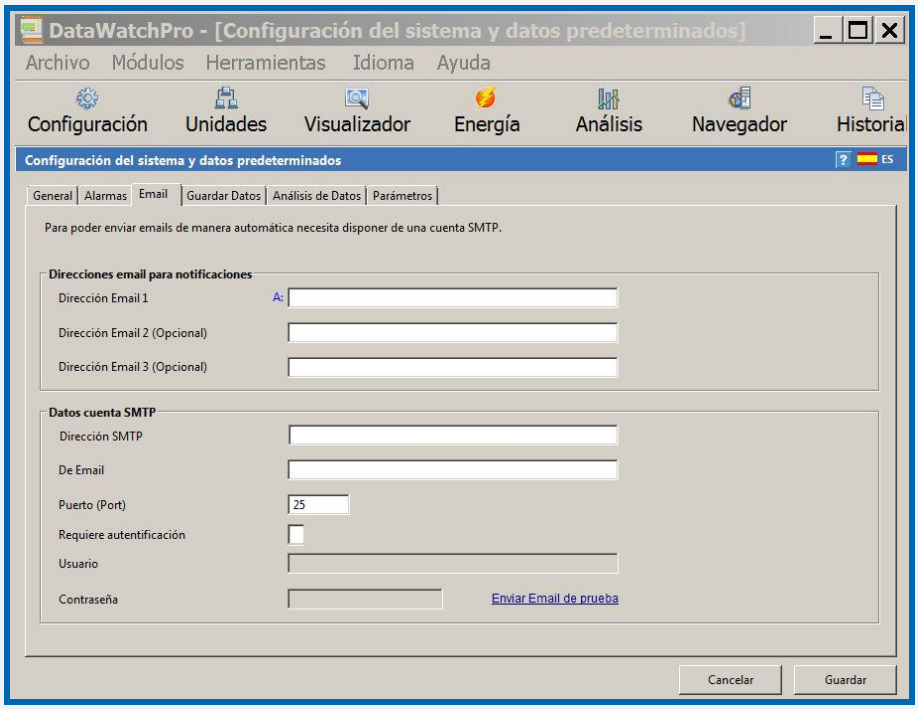


4.12 Module – energy analysis

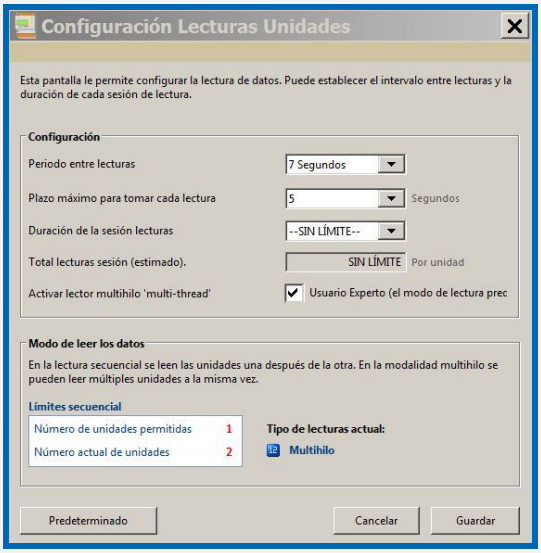




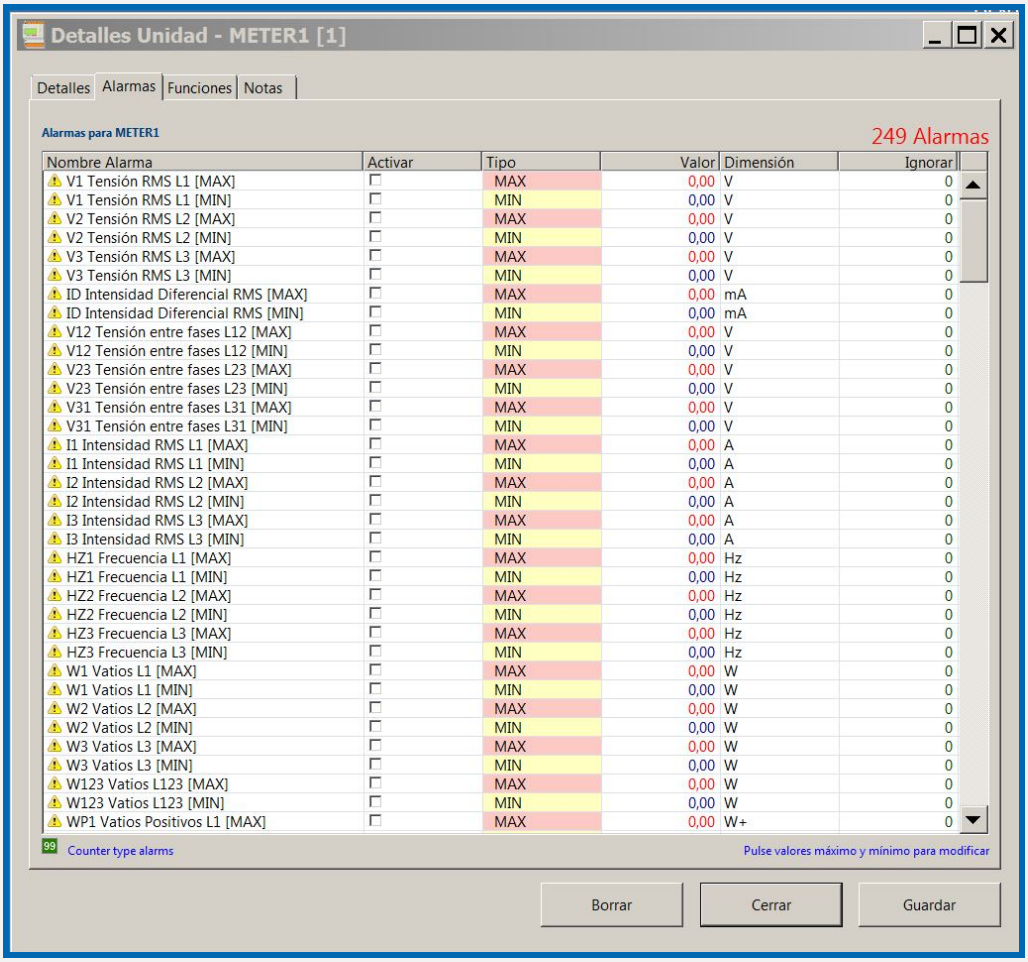
4.13 General configuration



4.14 Readings configuration



4.15 Alarms configuration (independent notifications via e-mail of 249 programmable alarms)



Chapter 5 – General description

5.1 Intelligent reclosures

By intelligent reclosure, one is to understand any reclosure subsequent to a disconnection caused by an alarm which does not disappear when the MCB/circuit-breaker/contactor is disconnected and, therefore, the value can be measured and the unit reclose intelligently. In other words, if the value is within the correct range, the unit will reclose; if the value is out of range, it will not reclose until such time as it is.

Alarms with intelligent reclosure:

RMS overvoltage L1, L2, L3
Pk overvoltage L1, L2, L3
RMS low voltage L1, L2, L3
THD voltage L1, L2, L3
Voltage unbalance L1, L2, L3
Over-frequency L1, L2, L3
Low frequency L1, L2, L3
Over-temperature
Low temperature
Over-humidity
Low humidity

The unit does not reclose until said alarms have disappeared. Should one need to prevent a disconnection-connection in a short space of time, the programmable connection delay can be used for disconnections due to voltage, frequency, THD voltage and voltage unbalance.

Please refer to “Connection delay“ in the user’s guide in the annexed command manuals.

In the event of disconnections due to temperature or humidity, use the alarm hysteresis as a connection delay.

5.2 Sequential reclosures

By sequential reclosure, one is to understand any reclosure subsequent to a disconnection caused by an alarm which disappears when the MCB/circuit-breaker/ancillary contactor is disconnected. In the present case, following an alarm, the unit enters the different cycles of sequential reclosures programmed for the different alarms since it cannot be known whether or not the alarm has disappeared until such time as the unit recloses again and the parameter can be measured.

Alarms with automatic sequential reclosure:

Differential intensity
Ancillary MCB disconnection
Pk intensity L1, L2, L3
Neutral intensity
Power factor L1, L2, L3
Intensity THD L1, L2, L3
Intensity unbalance L1, L2, L3
Power 1 W
Power 2 W (Maximeter programmable from 10 secs. to 15 mins.)

Each alarm has its own table of sequential reclosures indicating:

- Foreseen number of reclosure attempts
- Reclosure cycle time (interval between attempts)

There are four tables for sequential reclosures:

- for intensity
- for differential intensity
- for the MCB
- for neutral intensity, power factor, Intensity THD and intensity unbalance

with a parameter which is common to all denominated "Number of reclosures reset to zero time".

If the alarm were permanent, every time the unit reclosed it would disconnect again, thus entering an infinite cycle. In order to avoid this, the automatic sequential reclosures table limits the number to one that the user/installer deems prudent/advisable.

.

On the other hand, optionally, one can instruct the unit not to run the sequential reclosure table. This locks the unit and makes human intervention mandatory. The user can press "reset" to unlock and reset manually. Please, refer to menu "Auto-manual, sequential reclosures”

This makes it easier for the user to transfer from automatic o manual mode without the need to edit the automatic reclosure tables again. Another way to avoid generating sequential reclosures is to set the number of reclosures in one or various tables to “0” value.

If, between reclosure cycles, the unit resets and no longer detects the problem which originated the action, then the “Number of reclosures reset to zero time" or “Automatic self-start of reclosures” countdown begins. When the reset to zero time has elapsed, the reclosure number counters reset to zero. In this way, we are starting again from zero and the next time an anomaly occurs, the unit will once again dispose of the total number of automatic sequential reclosures.

NOTE: During the course of a reclosure cycle or when the unit is locked due to the number of automatic sequential reclosures having been used up, the user can terminate this condition by pressing "reset". This action unlocks the unit and resets the reclosures Likewise, via Internet, using the option "unlocking and reset of reclosures" on WEB page “UNIT CONFIGURATION”

5.3 Display

One can display data and/or program the unit either using the front panel or via Internet

Front panel:

Displaying measurements: "NEXT" or "TEST" (up or down) display all the measurement screens.
Programming parameters: Menu takes the user into the user's menu where all the programmable parameters can be changed.
.

Via Internet/Intranet:

Display and programming via the WebServer.

5.4 Relays A and B (of the external I/O modules)

The unit has two rapid (10 milliseconds) enablement relays, A and B, to which alarms can be associated. In other words, one or various alarms and other functions can be associated to each relay. When an alarm is enabled, the relays to which this alarm is associated are also enabled. The priority of the relays is always upon enablement. This means that the relay remains enabled until such time as all the alarms which enable and are associated to it disappear.

Once enabled, a relay remains enabled for a minimum time equal to that established for displaying the alarm on-screen (10 secs) even if the alarm were to have remained active less time.

(Please, refer to "Relay A or B enabled by" in the user's guide in the annexed command manuals.)

5.5 Remote input 1 and Remote input 2 (of the external I/O modules)

The unit incorporates a control of two logical rapid-detection inputs (5 milliseconds) with independent, programmable signal/action counters. (signal: normal or rocking, action: unlocking and reset of reclosures)
These inputs can be associated to each relay (10 relays) and/or to the ancillary MCB/circuit-breaker/contactor.
They can also be used for gas, water and other counters.

5.6 I/O external modules (outputs, inputs and timers)

The unit can control a maximum of two external input/output modules. Each module is made up of 4 inputs (relays IN1, IN2, IN3, IN4) and 4 outputs (relays R1, R2, R3, R4), making a total of : 8 logical outputs (relays) and 8 logical inputs (optocoupled or potential-free or direct to 230V AC).

Relays R1, R2 , R3 and R4 of module 1 and module 2:

The same as for relays A and B, alarms and other functions can also be associated to the output relays of the external modules. That is to say, one or various alarms can be associated to each relay. When an alarm is enabled, the relays to which this alarm is associated are also enabled. The priority of the relays is always upon enablement. This means that the relay remains enabled until such time as all the alarms which enable and are associated to it disappear.

Once enabled, a relay remains enabled for a minimum time equal to that established for displaying the alarm on-screen (10 secs) even if the alarm were to have remained active less time.

The enablement of the relays and the detection of the IN inputs pertaining to the external modules can be delayed by a maximum of 1 second due the communication process with said module.

(Please, refer to "External I/O module" in the user's guide in the annexed command manuals.)

Inputs IN1, IN2, IN3 and IN4 of module 1 and module 2:

The inputs are readings of the status of the input relays and can be enabled or disabled. Each input has an associated timer: input I1 timer 1; input I2 timer 2; input I3 timer 3 and input I4 timer 4.

Timers 1, 2 ,3 and 4:

The functioning of the timers can be either upon enablement or disablement of its input. When an input is enabled or disabled, it generates its timer's countdown and when the timer comes to the end of its time, it enables one or more relays which, in turn, have the option to enable in the event of timer. Should no relay have this association, then nothing will happen.

(Please, refer to "I/O external module" in the user's guide in the annexed command manuals.)

NOTE: The logical status of the input/output modules displayed with "-", indicates that the I/O modules either are not enabled in the menu or that they have not been installed.

5.7 Time programmer

The time programmer permits the user to program the enablement/disablement of the relays and/or the MCB/circuit-breaker/ancillary contactor.

Each day of the week has 6 programs, allowing 6 different time frames to be established wherein any relay or the MCB/circuit-breaker/ancillary contactor can be enabled.

Programming is in HH:MM (hours:minutes) enablement and HH:MM disablement, plus an independent box per program in order to indicate which of these 6 possible daily programmes are enabled. All programs whose box is not enabled/selected will be ignored.

Configuration of the 15 exceptions - day, month, hour and minute of the 6 programs with individual enablement/disablement of each program.

The time programmer's activity is associated to the 10 output relays and/or the main disconnection device (circuit-breaker or relay/contactor control) and/or the **4 relays A, B, C and D of a remote unit via Internet/Intranet.** In order to associate relays, one must go to the "Relay alarms" button.
The internal clock (date and time) is programmed manually or automatically (synchronizing date and time with PC, laptop, etc...)

5.8 DWP (DataWatchPro). Software for PC

Professional software for PC with data base and graphic analysis.

The **DWP (DataWatchPro)** is an advanced software with a permanent register on a data base.

It permits the capacity for display, analysis, logging and control of one or several universal modules and their features to be easily increased.

It is made up of multiple graphic and process display modules, an easy process programmer with a wide gamut of possibilities for programming the relays with parameter level alarms in a time frame. **Oscilloscope event-logger in waveform with pre-trigger; 7-channel oscilloscope, 64-harmonic 7-channel spectrum**; graphics of all the parameters; independent automatic notifications via e-mail of all metering alarms, etc.

Please, refer to Chapter 4

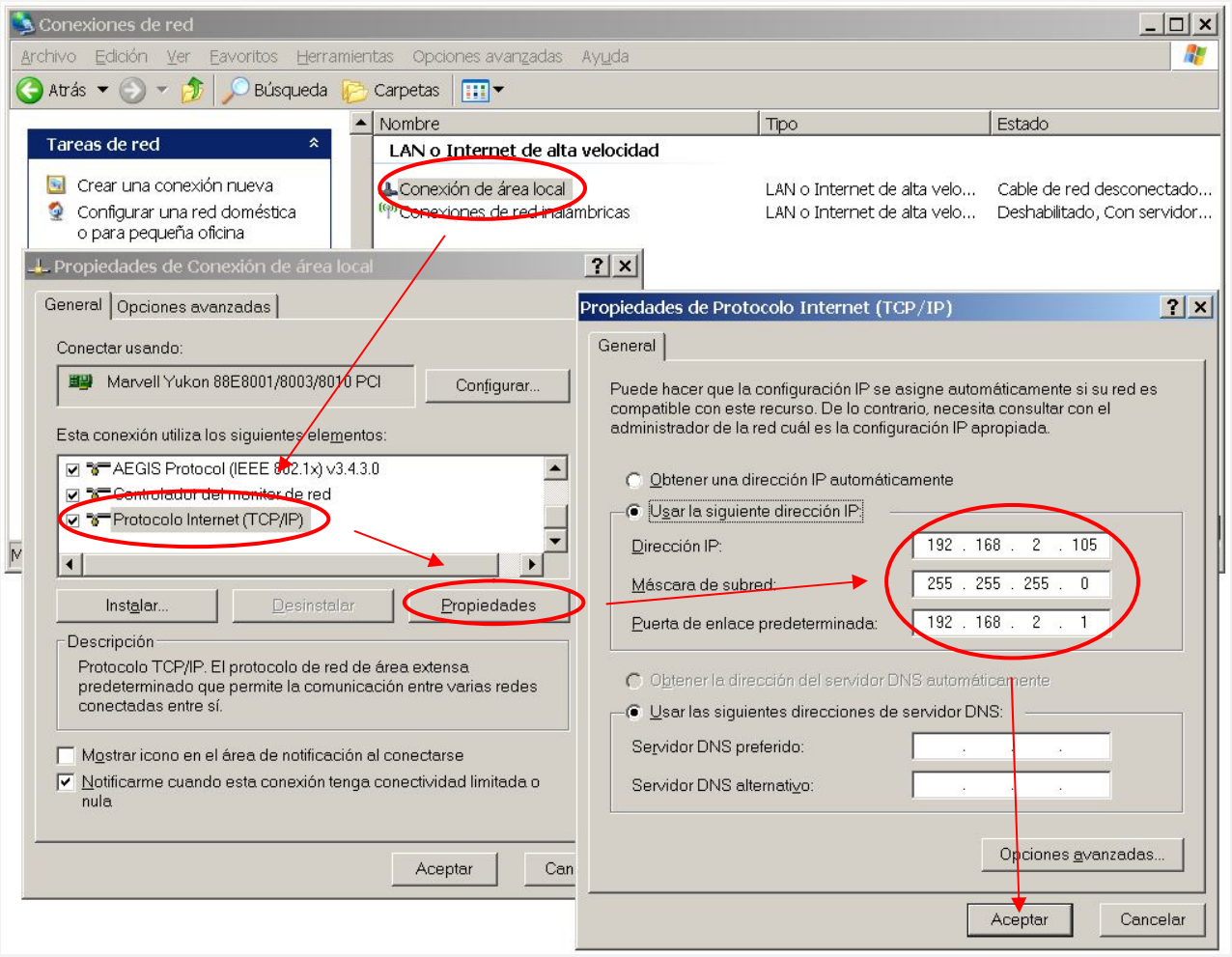
CHAPTER 6 – Installation guide (Internet / Intranet configuration)

6.1 Point to point connection configuration

This section explains how to adjust the PC's TCP/IP parameters manually so that they coincide with those of the universal unit. An RJ45 cable must be connected from the PC to the unit. In very old PC's, an RJ45 crossover cable is used.

1. Connect the unit to the PC using an RJ45 Ethernet cable
2. Go to "Control panel" >> "Network connections" or "Network central and shared resources"
3. Disable "Wireless network connections" and enable "Local area connection" (should it be necessary)
4. Click on "Local area connection" to open up the properties
5. Double click on "Internet protocol (TCP/IP)"
6. Select "Use the following IP address:"
7. Fill in the boxes as shown below. Accept.

Windows XP:

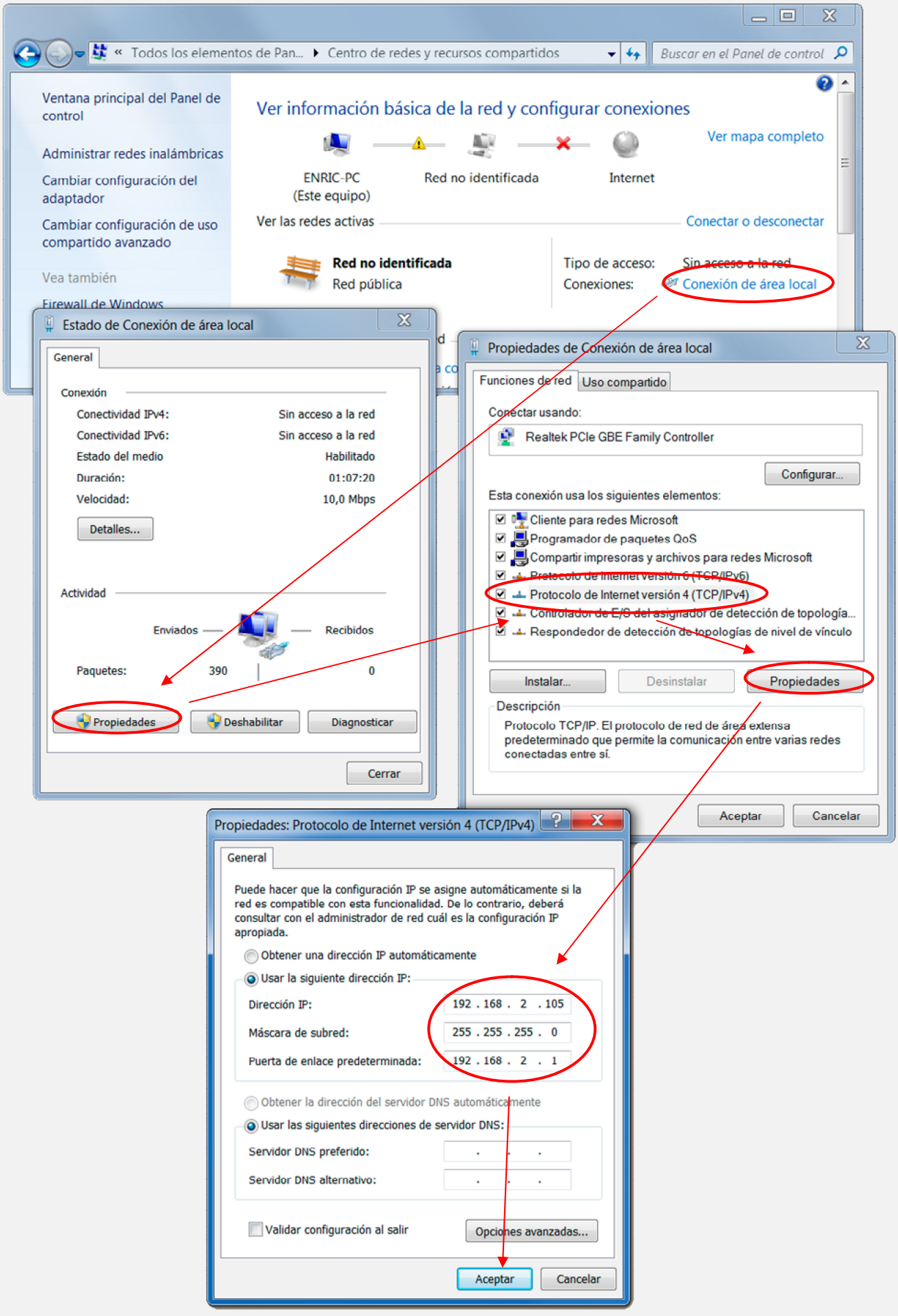


8. Open the browser and type http://192.168.2.10 in the address bar
9. Press Enter

Default configuration ex-factory:

IP:Port	192.168.2.10:80
Gateway	192.168.2.1
Mask	255.255.255.0
MAC	xx.xx.xx.xx.xx.xx

Windows 7:


Todos los elementos de Pan... ▸ Centro de redes y recursos compartidos
Buscar en el Panel de control
Ventana principal del Panel de control
Administrar redes inalámbricas
Cambiar configuración del adaptador
Cambiar configuración de uso compartido avanzado
Vea también
Firewall de Windows
Ver información básica de la red y configurar conexiones
Ver mapa completo
ENRIC-PC (Este equipo)
Red no identificada
Internet
Ver las redes activas
Conectar o desconectar
Red no identificada
Red pública
Tipo de acceso: Sin acceso a la red
Conexiones: Conexión de área local
Estado de Conexión de área local
General
Conexión
Conectividad IPv4: Sin acceso a la red
Conectividad IPv6: Sin acceso a la red
Estado del medio: Habilitado
Duración: 01:07:20
Velocidad: 10,0 Mbps
Detalles...
Actividad
Enviados
Recibidos
Paquetes: 390 0
Propiedades
Deshabilitar
Diagnosticar
Cerrar
Propiedades de Conexión de área local
Funciones de red
Uso compartido
Conectar usando:
Realtek PCIe GBE Family Controller
Configurar...
Esta conexión usa los siguientes elementos:
Cliente para redes Microsoft
Programador de paquetes QoS
Compartir impresoras y archivos para redes Microsoft
Protocolo de Internet versión 4 (TCP/IPv4)
Respondedor de detección de topologías de nivel de vínculo
Instalar...
Desinstalar
Propiedades
Descripción
Protocolo TCP/IP. El protocolo de red de área extensa predeterminado que permite la comunicación entre varias redes conectadas entre sí.
Aceptar
Cancelar
Propiedades: Protocolo de Internet versión 4 (TCP/IPv4)
General
Puede hacer que la configuración IP se asigne automáticamente si la red es compatible con esta funcionalidad. De lo contrario, deberá consultar con el administrador de red cuál es la configuración IP apropiada.
Obtener una dirección IP automáticamente
Usar la siguiente dirección IP:
Dirección IP: 192 . 168 . 2 . 105
Máscara de subred: 255 . 255 . 255 . 0
Puerta de enlace predeterminada: 192 . 168 . 2 . 1
Obtener la dirección del servidor DNS automáticamente
Usar las siguientes direcciones de servidor DNS:
Servidor DNS preferido:
Servidor DNS alternativo:
Validar configuración al salir
Opciones avanzadas...
Aceptar
Cancelar

6.2 Internet/Intranet connection configuration

In order to make for an easy TCP/IP configuration of the unit, the IP address, the port and the gateway can be modified from the unit's front panel.

The configuration of the unit's TCP/IP parameters must be consistent with the network in which it is to be installed. Should the user not know whether the factory values coincide with those of his network, he should proceed as follows:

From any PC in the network:

a) Go to start-up

b) Execute

c) Type "cmd.exe"

d) Accept (the screen goes black)

e) Type "ipconfig.exe"

f) Accept

An informative list is displayed. The PC's IP address and gateway should be noted down.

These values should be copied to the unit, *but increasing the last digit of the IP address by one (or more) units* since there cannot be two IP addresses with the same number in the same network.

For example: If the PC's IP is y.y.y.100, the unit should be assigned y.y.y.101 or y.y.y.150

From the unit's front panel, access the menu and search for:

TCP/IP configuration >> TCP/IP information >>

Port: 80

P: x.x.x.x

Gateway: x.x.x.x

Mask: 255.255.255.0

MAC: -

Place the cursor on the parameter to be modified, press OK. Using the increase and decrease keys, adjust the value and press OK. Repeat until concluded.

Press "Esc" until "Accept and save changes?" appears. Press OK and enter the user PIN (1234 by default).

Connect the unit up to the network. Open the browser and type http:// y.y.y.101 or y.y.y.150 (i.e. the assigned IP). Press "Enter" .

6.3 Remote access configuration

Execute the steps described in the previous section "Internet / Intranet connection configuration ".

In order to access the WebServer remotely from any other network, certain changes must be effected in the Router in the network where the WebServer is connected.

Since one is accessing remotely, one cannot use the WebServer IP as if it were in the same physical network. The reason for this is that the WebServer is hidden behind a Router which cannot be seen externally. Therefore, in order to access the WebServer, the Router must be first connected and then it will redirect to the WebServer.

Procedure:

1. Configure the Router's work mode as multi-terminal. If the network is already functioning with different users, it is probably already in multi-terminal mode.

2. Ensure that there is no filter in the Router which closes port XX, the work port configured in the WebServer (default: 80).

3. The NAT or PAT ("Network Address Translation" or "Port Address Translation") of the Router must be configured in such a way that any IP with port XX is redirected to the WebServer's IP, also with port XX. As mentioned above, the work port configured in the WebServer is by default 80.

e.g.: The WebServer has work port 80

HOME	(in) ROUTER (out)	OFFICE
Type in Navigator	Public IP → Private IP	WebServer displays
http://80.65.135.62	80.65.135.62 → 192.168.2.10	192.168.2.10

NOTE: If the port is other than 80, this must be specified in the navigator by adding "number of port" to the IP.

e.g.: The WebServer has work port 120

HOME	(in) ROUTER (out)	OFFICE
Type in Navigator	Public IP → Private IP	WebServer displays
http://80.65.135.62:120	80.65.135.62:120 → 192.168.2.10:120	192.168.2.10:120

6.4 More than one WebServer in the same network

In order to be able to have several WebServers in the same network, it is imperative that:

In INTERNET:

they have different ports and IP's.

The NAT or PAT ("Network Address Translation" or "Port Address Translation") of the Router must be configured in such a way that any public IP input with port XX is redirected to the IP of WebServer, this also with port XX. As mentioned above, the work port configured in the WebServer is, by default, 80.

e.g.:	WebServer1	IP = 192.168.2.10:80
	WebServer2	IP = 192.168.2.11:8080

Therefore, the NAT or PAT of the Router must be configured in such a way that all the IP's with port 80 are enrouted to IP 192.168.2.10 and those IP's with port 8080 to IP 192.168.2.11.

If the port is other than 80, this must be specified in the navigator by adding "number of port" to the IP

In the case of an nnnnn port, this would be http://192.168.2.10:nnnnn

In INTRANET: It can be configured with different IP's and with the same or different ports.

6.5 TCP/IP configuration. When the ex-factory IP domain is not within the IP range of user's network

This section explains how to access the unit in order to change the TCP/IP parameters for others belonging to the local network and, thus, access the unit from any point whatsoever of the network.

- Connect the unit up to the network's router or switch
- Obtain the network's parameters
- Create a route for the PC to locate the unit
- Access the unit and exchange the IP for another belonging to the network

To connect the unit up to the network's router or switch

With 230V AC, connect an RJ-45 cable from the unit to the router or switch.
From any PC in the network, proceed as follows.

To obtain the network's parameters

Go to start-up >> Execute >> Type "cmd.exe"
Press Accept. (The screen goes black, the so-called command prompt)

The "ipconfig.exe" command can now be used to see the network's TCP/IP configuration

On the black screen, type "ipconfig.exe"
Press Accept.

An informative list is displayed. The PC's IP address, submask and gateway values should be noted down.

e.g.:	IP:	y.y.y.100
	Mask:	255.255.255.0
	Port:	y.y.y.1

To create a route for the PC to locate the unit

Type the following command (omitting the inverted commas):
Route add "**unit's IP** " "**PC's IP**"

Unit's IP = If this has not been changed, ex-factory IP is 192.168.2.10
PC's IP = as previously noted (y.y.y.100)

Go to start-up >> Execute >> Type "**route add 192.168.2.10 y.y.y.100**" >> Press Enter.
(This can also be done from the command prompt)

Open the browser and type:

http://192.168.2.10 in the address bar. Press enter..

Access the unit and exchange the IP for another belonging to the network

If all has been executed correctly, the user code should now be requested.
Default code ex-factory is **1234**.

The parameters can now be modified so as to pertain to user's network.

The PC's values are now to be copied to the unit but changing the last digit of the IP address since there cannot be two IP addresses with the same number in the same network.

e.g. If the PC's IP is y.y.y.100, the unit should be designated y.y.y.110 or y.y.y.200

Go to "access configuration" and modify the parameters to those previously noted.

In IP address:

Use the PC's IP changing the last digit to avoid duplication in the network. As in the above example, if the PC's IP is y.y.y.100, the user can assign his unit = y.y.y.200. Any value can be assigned as long as it does not exceed 255.

In Subnet mask:

Use that previously obtained with Ipconfig.exe

In Gateway:

Use that previously obtained with Ipconfig.exe

En Port: usually 80

The browser will now have lost communication with the unit. Close the browser completely. .

Open the browser again and type the new IP address in the address bar, as in the following example:

http://y.y.y.200 Press Enter.

6.6 Aid to a correct configuration

IP Address

This is the name of the system (software), also known as logical address, with which one wishes to communicate. There cannot be two identical IP's with the same port in one same network.

MAC (Media Access Control):

This is the protocol which controls at all times within a local network which device has access to the transmission media. As its address is unique, it identifies each device (hardware) unequivocally. Also known as hardware address.

Mask:

This is another IP address. It is used to distinguish when a given machine pertains to a given subnet thus ascertaining whether or not two machines are in the physical network. If one does not know which is to be configured, one should enter the same mask as one's own PC

Gateway:

This device is connected to several networks. It acts as a bridge between them and carries packets from one to another. It is another IP address pertaining to the network's Router.

Public IP of the router:

This is the public IP of the network where the WebServer is located. This address can be static or dynamic (changing in each connection). Normally, if one wishes to access the WebServer from Internet, this address should be static. By default, if one does not have a Router, this address is the same as that of the WebServer's IP.

Port:

Generally speaking, website servers work with port 80. Nevertheless, should one wish to install 2 WebServers in the same network, it is obligatory to configure different ports. Please, refer to "More than one WebServer in the same network" and "Remote access configuration")

Display, font size and type:

These parameters do not depend on the WebServer. Should one wish to modify the letter size or font, one must consult one's navigator. Optimum display: screen resolution 1280x1024, text size "small" or "medium".

6.7 Help: FAQ (frequently asked questions)

I have modified the IP. How do I restore communication?

If you have only modified the IP, close and then re-open your navigator. Enter the new IP. Special care must be taken when defining a new IP. You must ensure that it is within and near to the IP range used by your network. If you still cannot communicate, you must verify your Router's sub-mask. If the IP is not allowed to pass to the network, try changing your Router's sub-mask to "255.255.255.0".

I have modified the Port. How do I restore communication?

By default, your navigator uses port 80 to communicate with a server. If the port has been modified to other than 80, you must go to the address bar and type in that you wish to establish communication with a server in that port. e.g. for port 120: http://192.168.2.10:120

I have configured an IP which does not pertain to my network. How do I restore communication?
Execute the steps described for a first connection or restore factory configuration

What is the purpose of "close session"?

This informs the WebServer that communication has terminated. At the next connection, the PIN will be requested.

What happens if I shut down my computer without closing the session?

If you do not close the session, information security will be reduced since anyone can now access the last page you visited and from there surf at will. All they would have to do is enter the correct IP address of the WebServer from any PC and no PIN will be requested. However, having said that, if they do not know the PIN, they will not be able to modify any parameter.

I do not know or cannot remember the configured IP

You will have to go to the unit's command console. Within the submenu "TCP/IP configuration", go to option "TCP/IP information ". Please, refer to chapter "User's guide (front panel)", section "TCP/IP configuration"

CHAPTER 7 – Glossary and formulae

7.1 Glossary

Vn or V Ln	Line voltage n=1, 2, 3
VPkn	Peak line voltage n=1, 2, 3
A or A Ln	Line intensity or amperes n=1, 2, 3
APkn	Peak line intensity or amperes n=1, 2, 3
CF	Before “Vn” or An” crest factor of same
Vab	Voltage between phases a-b
DesVn or UnbVn	Line voltage unbalance n=1, 2, 3
DesIn or UnbIn	Line intensity unbalance n=1, 2, 3
Zn	Line impedance n=1, 2, 3
mA	RMS milliamperes of differential intensity
mAPk	Peak milliamperes of differential intensity
“An”	Neutral amperes
Hzn	Line frequency Vn n=1, 2, 3
THDVn	Total harmonic distortion of line voltage n=1, 2, 3
THDIn	Total harmonic distortion of line intensity n=1, 2, 3
W	Active power
W+	Requested power
W-	Returned power
PFn	Power factor of line n=1, 2, 3
VAn	Volt-amperes of line n=1, 2, 3
VArLn o rLn	Reactive inductive volt-amperes of line n=1, 2, 3
VArCn o rCn	Reactive capacitive volt-amperes of line n=1, 2, 3
kW	Kilowatt (1KW = 1000W)
kWh	Kilowatts per hour
kQh	Reactive kilowatts per hour
∑L123	Sum of line measurements L1+L2+L3
ºC	Degrees centigrade
RH	Relative humidity
S	Over
I	Low
ST Ln	Line overvoltage n=1, 2, 3
IT Ln	Line low voltage n=1, 2, 3
I Ln	Ln intensity n=1, 2, 3
ID or I Dif.	Differential intensity
“IΔn”	Rated differential intensity
Neutral “In” or I.	Neutral intensity
Temp.	Temperature
Timer. n	Timer n=1, 2, 3, 4
SF	Phase sequence
MCB	Ancillary circuit-breaker, Miniature Circuit Breaker (MCB)
PH	Time programmer
ReIN 1,2	Remote input 1 o 2
Lock	Lock
Power	230V AC power supply
L1, L2, L3, Ln o LN	Line 1, Line 2, Line 3, Neutral
L12, L23, L31	Composite measurement between two phases
Autoscale	Automatic selection system for most suitable measurement scale
RA, RB	Relays A and B
R1, R2, R3, R4	Relays external module
IN1, IN2, IN3, IN4	Inputs external module
RMS value	RMS of wave cycle of 20mS(50Hz) or 16.66mS(60Hz)
Pk value	One-off maximum value in the wave crest
Delay	Time delay
1 Delay RMS (50Hz)	20 milliseconds
1 Delay RMS (60Hz)	16.66 milliseconds
1 Delay Pk (50Hz)	156.25 microseconds
1 Delay Pk (60Hz)	130.156 microseconds
LCD display	Liquid crystal display screen
ms	Milliseconds (1ms = 1segundo/1000)
Watchdog	Process monitoring system

7.2 Formulae

Voltaje RMS:	$Vrms = \sqrt{\frac{1}{n}\sum_{n=1}^{n=128} Vn^2}$
Intensidad RMS:	$Irms = \sqrt{\frac{1}{n}\sum_{n=1}^{n=128} In^2}$

Voltaje Vpk:	$Vpk = Valor\ Máximo\ (\|Vn\|)$ n = 1 a 128
Intensidad Ipk:	$Ipk = Valor\ Máximo\ (\|In\|)$ n = 1 a 128

Potencia Aparente:	$VA = V * I$
Potencia Reactiva:	$VAr = \sqrt{S^2 - P^2}$
Potencia Activa:	$W = \frac{1}{n}\sum_{n=1}^{n=128} (Vn * In)$
Factor de potencia:	$PF = \frac{P}{S}$

Factor de cresta:	$CF = \frac{Vpk}{Vrms}$
Impedancia:	$Z = \frac{Vrms}{Irms}$

Distorsión armónica total, Voltaje:	$THDv = \frac{1}{V_{h1}}\sqrt{\sum_{n=2}^{n=128} {V_{hn}}^2} * 100$ $THDv = \frac{1}{V_{k1}}\sqrt{\sum_{k_{mín}}^{k_{máx}} {V_{kn}}^2} * 100 \quad k_{mín} = (2-63), \quad k_{máx} = (2-63)$
Distorsión armónica total, Intensidad:	$THDi = \frac{1}{I_{h1}}\sqrt{\sum_{n=2}^{n=128} {I_{hn}}^2} * 100$ $THDi = \frac{1}{I_{k1}}\sqrt{\sum_{k_{mín}}^{k_{máx}} {I_{kn}}^2} * 100 \quad k_{mín} = (2-63), \quad k_{máx} = (2-63)$

Desequilibrio:	$DES_{Ln} = \frac{Rms_{Ln} - \frac{Rms_{L1+L2+L3}}{3}}{\frac{Rms_{L1+L2+L3}}{3}} * 100 \quad n = 1, 2, 3.$
Tensiones compuestas:	$Vab = \sqrt{\frac{1}{n}\sum_{n=1}^{n=128}(Van + Vbn)^2}$
Intensidad neutro:	$I\,LN = \sqrt{\frac{1}{n}\sum_{n=1}^{n=128}(I1n + I2n + I3n)^2}$

Tensión armónico k:	$\lvert V_{hk}\rvert = \sqrt{Re(V_{hk})^2 + Im(V_{hk})^2}$
Intensidad armónico k:	$\lvert I_{hk}\rvert = \sqrt{Re(I_{hk})^2 + Im(I_{hk})^2}$
Potencia aparente armónico k:	$\lvert VA_{hk}\rvert = \lvert V_{hk}\rvert * \lvert I_{hk}\rvert$
Potencia activa armónico k:	$\lvert W_{hk}\rvert = \lvert Re(V_{hk}) * Re(I_{hk}) + Im(V_{hk}) * Im(I_{hk})\rvert$
Factor de potencia armónico k:	$PF_{hk} = \frac{\lvert P_{hk}\rvert}{\lvert S_{hk}\rvert} \qquad Cos\varphi = PF_{h1} = \frac{\lvert P_{h1}\rvert}{\lvert S_{h1}\rvert}$
Factor de distorsión armónica k:	$\lvert Vhd_{hk}\rvert = \frac{\lvert V_{hk}\rvert}{\lvert V_{h1}\rvert} * 100 \qquad \lvert Ihdf_{hk}\rvert = \frac{\lvert I_{hk}\rvert}{\lvert I_{h1}\rvert} * 100$

Tensión DC:	$\lvert Vdc\rvert = \lvert\frac{1}{n}\sum_{n=1}^{n=128} Vn\rvert$
Intensidad DC:	$\lvert Idc\rvert = \lvert\frac{1}{n}\sum_{n=1}^{n=128} In\rvert$
Tensión AC:	$Vac = \sqrt{Vrms^2 - Vdc^2}$
Intensidad AC:	$Iac = \sqrt{Irms^2 - Idc^2}$
Potencia DC:	$\lvert Wdc\rvert = \lvert Vdc\rvert * \lvert Idc\rvert$
Potencia AC:	$\lvert Wac\rvert = \lvert W\rvert - \lvert Wdc\rvert$

CHAPTER 8 – EXTERNAL I/O MODULES

8.1 I/O modules

The I/O modules can be configured for up to 10 logical outputs (relays), 10 logical inputs and connection for temperature/humidity probe.

Logical outputs. Options:

Outputs relays potential-free change-over contacts

Optocoupled outputs NPN open collector transistor (24V).

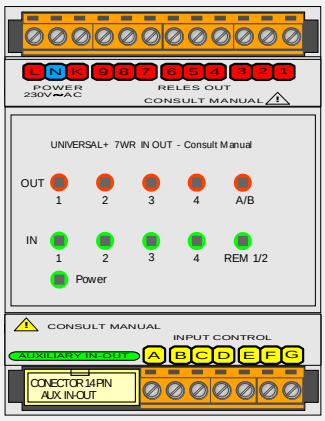
Logical inputs. Options:

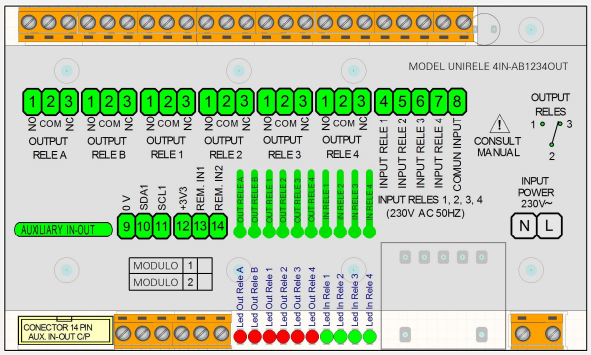
Optocoupled inputs (24V).

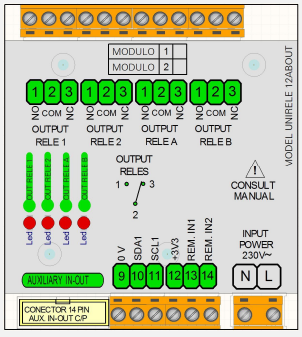
Inputs for potential-free contact.

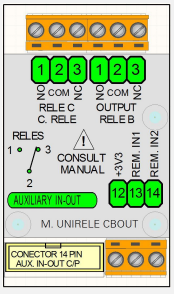
Direct inputs at 230V AC.

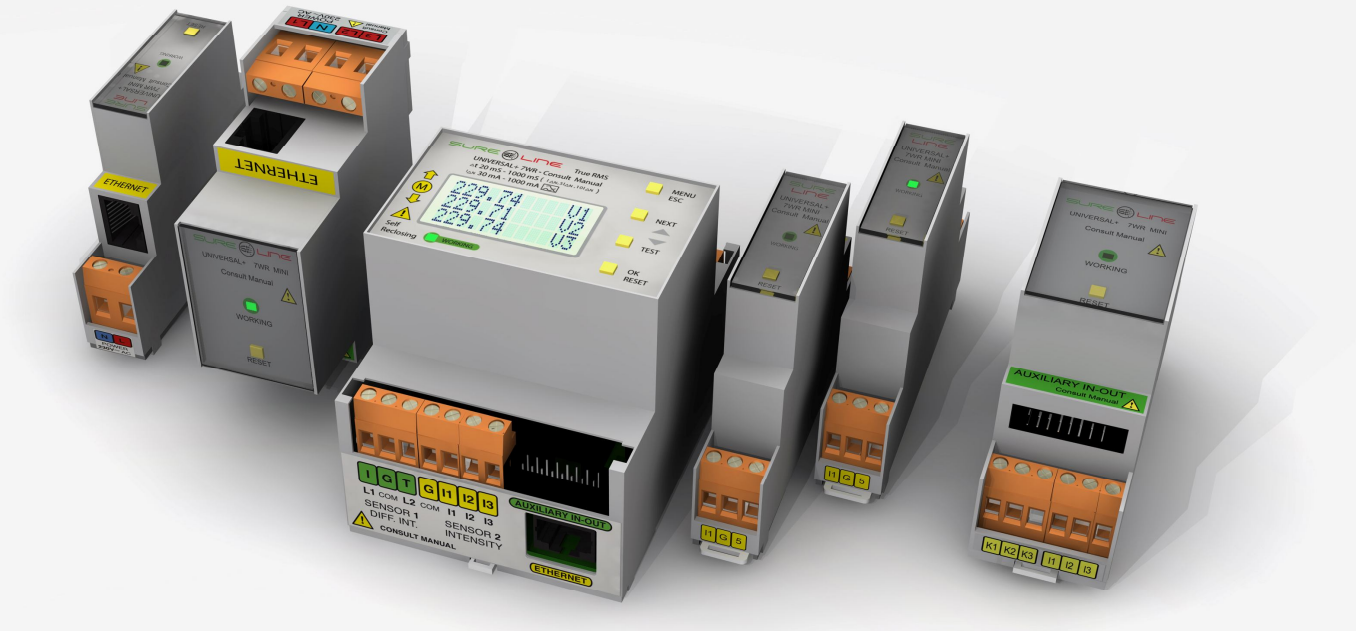
Due to there being diverse modules available in the UNIVERSAL+ 7WR range, the user must refer to the corresponding instruction manuals: **UNIVERSAL+ 7WR IN OUT** and **UNIVERSAL+ 7WR accessories, I/O relay modules, temperature and humidity probe.**











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