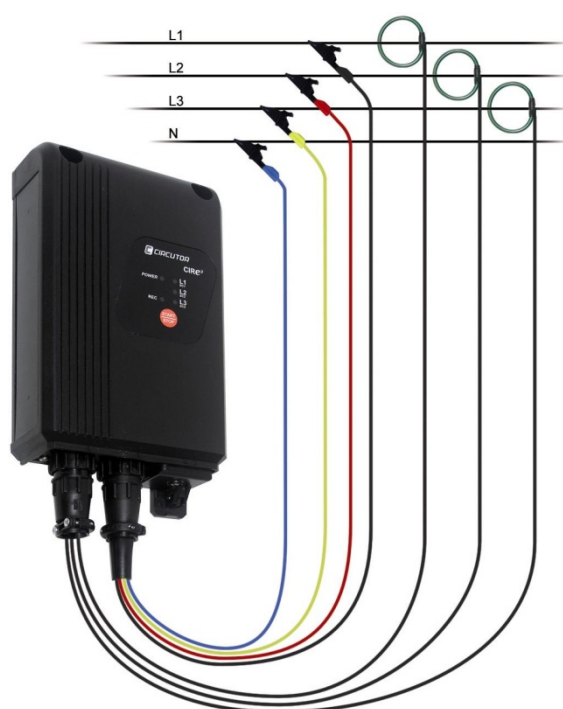




Networks Auditor

CIR-*e*³



Instructions Manual

(M98225801-03-14A)







Revisions

Date	Revision	Description
2-01-2012	12A	Original
7-04-2014	14A	Several modifications LED in flexible current clamps

SAFETY INSTRUCTIONS

Follow the advetences and warnings of the present manual preceded by the following signs.

	<p>DANGER: Indicates that there is a risk of serious personal injury or material damage in case that the instructions of the manual are not followed.</p>
	<p>WARNING: Indicates that the user must pay special attention to the remarked point</p>
	<p>Death, serious injury, or fire hazard can result from improper connection, handling or maintenance of this equipment. Avoid manipulation of the equipment while it's connected to supply.</p> <p>Read the manual before connecting the equipment. Follow all instructions for installation and maintenance of equipment throughout its life. In particular, observe the installation standards specified in the National Electrical Code of your country.</p> <p>If the installation of the equipment takes place in areas where there is high voltage equipment (HV), staff handling equipment in the area, must be trained and authorized to perform actions in HV facilities.</p> <p>Use always the required personal protective equipment</p>
	<p>To use this equipment safely, it is essential to follow the recommendations contained in the standards and electrical code of the country in which you are installing the equipment.</p> <p>If the instructions preceded by this symbol of WARNING are not met or applied correctly, this can cause personal injury or equipment and / or facilities damage.</p>

Liability limitations

CIRCUTOR, SA reserves the right to make changes, without previous notice, to devices or specifications of equipment shown in this manual.

The term of the CIRCUTOR guarantee is two years from the date of purchase and is limited to refund of the purchase price, repair free of charge, or replacement of defective equipment that is returned to CIRCUTOR post-sales service within the term of the guarantee.

The latest versions of specifications and the most up to date manuals of this equipment are available to CIRCUTOR SA customers on its web site: www.circutor.com.

Recommendations prior to use

Before handling, modifying the connection or replacing the equipment, the power supply must be switched off, and the equipment disconnected.

It is important to use only the original connection cables and accessories that are delivered along with the equipment. These products are specially designed for use with this equipment and comply with current safety standards.

The manufacturer of the equipment is not responsible for any damages resulting from failure by the user or installer to heed the warnings and/or recommendations set out in this manual, nor for damages resulting from the use of non-original products or accessories or those made by other manufactures.

Inspect the work area before install. Do not use the device in dangerous areas or where there is a risk of explosion. Avoid using the device in wet areas

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1 Verification upon reception

Check the following when you receive the unit:

- The unit's specifications are according to your order.
- The unit has not been damaged during transport.
- Perform external visual inspection of the equipment before connecting
- Check that the supply voltage corresponds to the network where the equipment must be connected
- The entire equipment set consists of:
 - CIR-e³ Measurement unit
 - SD Card with a minimum capacity 1Gb.
 - Kit of three current clamps (depends on model)
 - Kit of 6 power supply and voltage cables (2 m).
 - Crocodile clips.
 - RS-232 Communications cable.
 - SD Card reader.
 - User's Manual



Use always the original supplied cables and accessories. CIRCUTOR is not responsible for the malfunction or safety problems occurred in case of using NON ORIGINAL accessories.

1.1 Storage

For storage of the equipment follow the following recommendations:

- Avoid placement on uneven surfaces.
- No place outdoors, exposed to moisture or water spray areas.
- Do not install near heat sources (maximum ambient temperature: 45 ° C)
- Avoid salty and corrosive environments.
- Avoid locating the equipment in areas where much dust is generated or existing pollution by chemicals or other types of pollution.
- Do not place any weight on the apparatus.

2 DESCRIPTION OF CIR-e³

CIR-e³ is a portable equipment which offers the most advanced performance features in the market for the measurement and recording of electrical parameters in electrical networks.

Mechanically, the equipment has been designed to allow installation in areas with limited space. Specifically it can be installed inside the double insulation boxes where single or three phase energy meters are installed. The outer dimensions are: 125 x 127 x 47 mm.

shows the essential parts of the CIR-e³, which are described below.

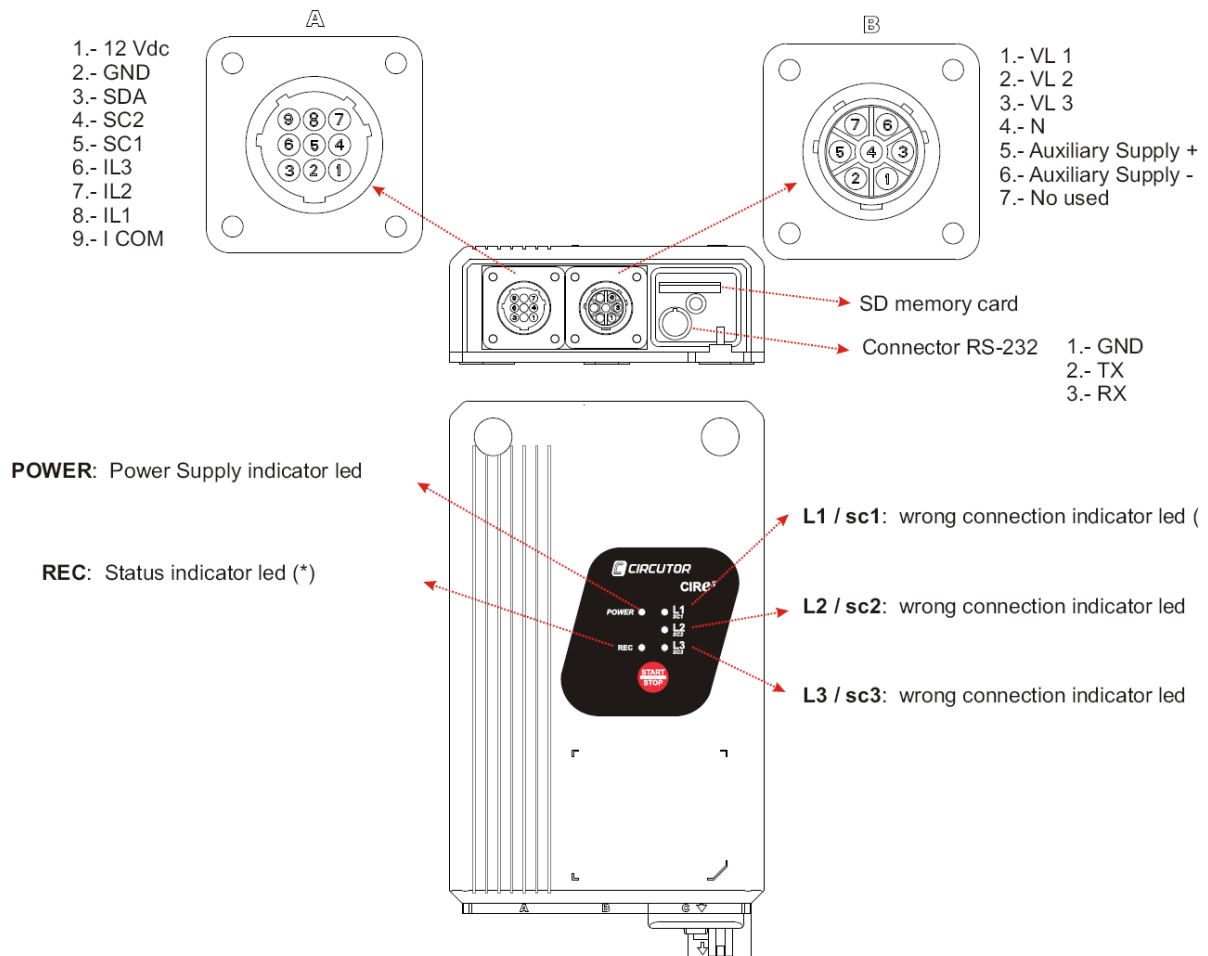


Fig. 2-1.- Front and rear view , showing connectors

Connector A is used to connect the current sensors. The Fig. 2-1 describes the functionality of each connector.

Connector B is used to connect the voltage references of the unit. Connector B is used to connect the voltage references of each phase (marked with VL1, VL2 and VL3), the neutral reference (marked with N) and two additional pins (5 and 6) used to power the unit, as shown in the figure. Terminals 5 and 6 are used to power the unit independently from the measurement, in order to guarantee a permanent recording flow when powering the analyzer with an uninterruptible power supply system. More information about the unit's measurement and power supply features in section 4.1 *Electrical Features*.

SD card slot is used to insert the removable SD memory card to record the electrical parameters measured by the unit. Read chapter 6.4 *Insert SD card* to see the position of the SD card.

RS-232 connector is reserved for unit's firmware updating.

POWER LED is on when the unit is powered. It is off when the unit is not powered.

The START/STOP button has different functions, depending on the analyzer's operation. It is used to select the scale desired for the current sensors or to start or stop the recording of electrical parameters. In this case, to start or stop the recording process, hold the button during **3 seconds**.

(*) The REC LED has three basic modes. When it is off, the unit is not recording information. When it is permanently on, the unit is recording electrical parameters, which are stored in the SD memory card. When the REC LED is flashing, there is an error in the SD memory card. The REC LED can be flashing for the following reasons:

- No memory card inserted in the unit's SD card slot.
- The memory card inserted does not have the correct format or data can not be written. (for example, if the card is write protected or it has a FAT32 format; in that case change the format of the memory card to **FAT16**).

(**) The LED corresponding to L1/sc1, L2/sc2 and L3/sc3 can also indicate different situations, depending on the unit's status and during the start-up procedure.

- Should the **CIR-e³** unit detects flexible clamps connected during start-up, the LED can be used to select the scale desired for the current sensors. In this case, reference will be provided with the legend of the LED shown on the scale (sc1, sc2 or sc3).
- When you have selected the scale (if needed) or the unit detects clamps with a single scale automatically (so that the scale selection process is not required), the LED will start flashing to indicate that there is an incorrect connection. The phase LED can flashing for reasons:
 - Incorrect connection of the voltage references. Flashing indicates that there is an incorrect phase sequence (L1, L2 and L3).
 - The unit detects power values with a negative sign (as in the case of generated power).
 - The installation's power factor is under 0.5, i.e., the angle between the voltage and current corresponding to that phase exceeds 60°. This error indicates that there is a fault in the unit and we recommend going through the connections.



CIR-e³ LED's start flashing to indicate a connection error.


The unit has been installed correctly when the LED's are permanently on. Is possible flashing when the angle of $\cos \varphi$ is very bad.

3 TECHNICAL CHARACTERISTICS

3.1 Measuring instrument

Supply circuit (connector <i>B</i> : cables brown and green)	
AC voltage	100...400 Vac
DC voltage	70...315 Vdc
Frequency	50 / 60 Hz
Consumption	9 VA
Safety / Insulation	Category III – 300 Vac (acc. to EN 61010)

Measurement circuit (FS means full scale)	
Voltage range	10...400 Vac. (Phase - Neutral)
	17...690 Vac (Phase - Phase)
Current range (.../2V)	2,5% ...100% of clamp FS
Frequency	45...65 Hz
Accuracy (Only CIR-e ³ . See current clamps error in the clamps characteristics)	
Voltage	0,5 %
Current	0,5 %
Power	1 %
Energy	1 %
Battery	
Battery (eq. manufactured before 2012)	NiMH
Battery (eq. manufactured after 2012)	BR2032

	Equipment manufactured before 2012 have a rechargeable battery
	Equipment manufactured after 2012 have non rechargeable battery type BR2032. CIRCUTOR recommends the battery replacement every 5 years.

3.2 Current clamps (Connector A)

Measurement range (depends on clamp and selected scale)			
Clamp	LED	Full Scale	Range (2,5...100%)
E-FLEX 54 cm (See note 1)	L1/sc1	200 A	5...200 A
	L2/sc2	2.000 A	50...2.000 A
	L3/sc3	20.000 A	500...20.000 A
Kit CP- 5A		5 A	0,05...5 A
Kit CP- 100A		100 A	1...100 A

Note 1: The E-FLEX clamps incorporate 2 LED indicating the scale at which they work. When working in sc1 - blue LED lights, when working in sc2 red LED lights and when working in sc3 both LED light.

3.3 Voltage probes



The colour code of the phases and NEUTRAL cables can change depending on the equipment code. There are two types of cables, European and RYBLB. The following table lists the colour codes for both cases.

PHASE	EUROPEAN CABLE	RYBLB CABLE
(L 1) PHASE 1	BLACK	RED
(L 2) PHASE 2	RED	YELLOW
(L 3) PHASE 3	YELLOW	BLUE
(N) NEUTRAL	BLUE	BLACK
Auxiliary supply	BROWN	BROWN
Auxiliary supply	GREEN	GREEN

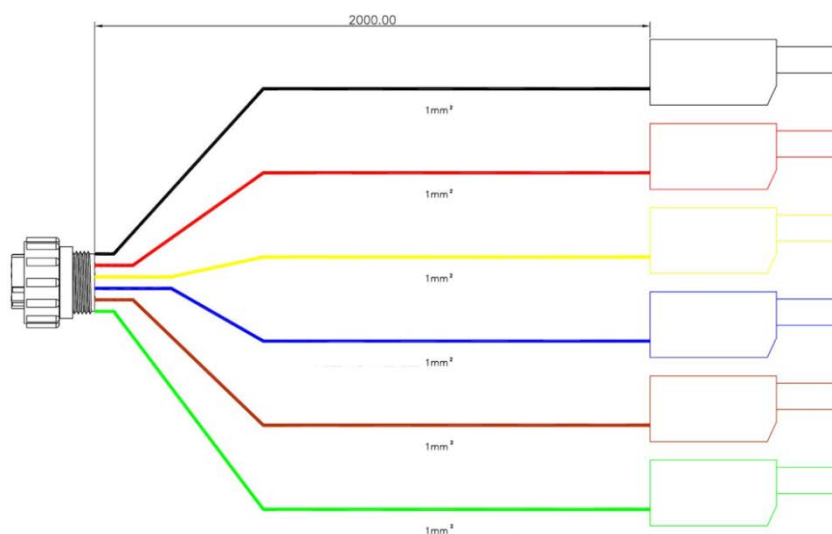


Fig. 3-1.- Connector, cable and plug terminals for voltage probes

Environmental characteristics	
Working temperature	10...50 °C
Storage temperature	-10...65 °C
Maximum altitude	2.000 m
Max. relative humidity	95% HR without condensation

Mechanical characteristics	
IP protection degree	IP 53
Net weight (only CIR-e ³)	0,677 kg
Brut weight (with package)	0,733 kg

3.4 Dimensions

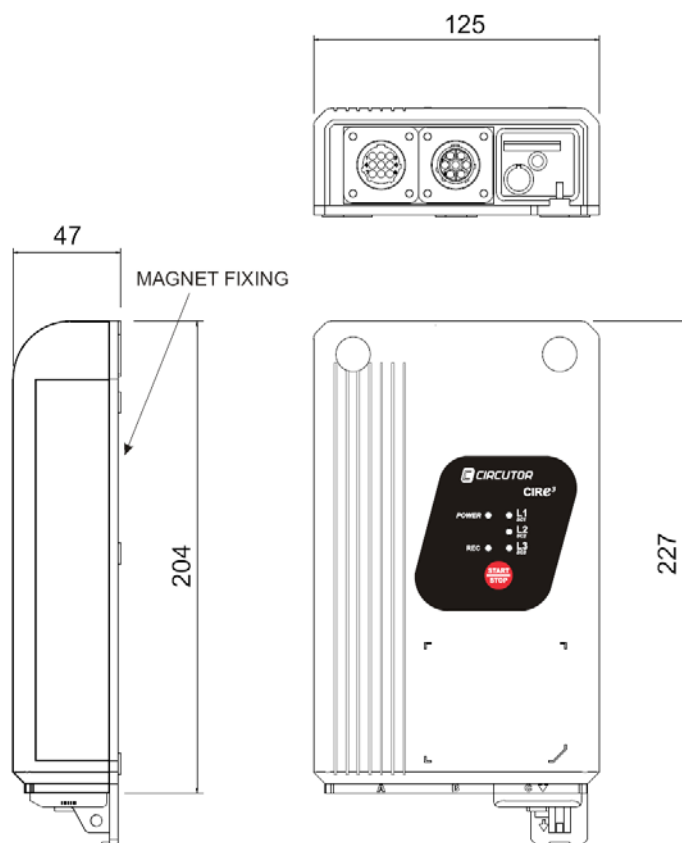


Fig. 3-2.- Dimensions

3.5 Measured and recorded parameters

The parameters recorded by **CIR-e³** can not be selected and they are those shown on the following table. In case of measuring in a single phase circuit, only the parameters of phase L1 end energies are recorded. The rest of parameters are all zero.

Table 3-1.- List of measured and recorded parameters of CIR-e³

Parameter	Symbol	L1	L2	L3	III	Max/ Min
Phase-neutral voltage	V_{p-N}	X	X	X		X
Phase-Phase voltage	V_{p-p}	X	X	X		X
Current	A	X	X	X	X	X
Neutral current (calculated)	AN					
Frequency	Hz	X				X
Active Power (consumed)	kW	X	X	X	X	X
Reactive power L (consumed)	$kvarL$	X	X	X	X	X
Reactive power C (consumed)	$kvarC$	X	X	X	X	X
Apparent Power (consumed)	kVA	X	X	X	X	X
Power Factor *	PF	X	X	X	X	X
Cosinus *	Cos	X	X	X	X	X
Active Energy (consumed)	$kW \cdot h$				X	
Reactive Energy L (consumed)	$kvar \cdot h L$				X	
Reactive Energy C (consumed)	$Kvar \cdot h C$				X	
Apparent Energy	$KVA \cdot h$				X	
Maximum Demand Active P (Md)	$kW (Md)$				X	X
Maximum Demand Apparent Power	$KVA (Md)$				X	X
Harmonic decomposition V (50°)	$Arm V$	X	X	X		
Harmonic decomposition A (50°)	$Arm A$	X	X	X		
THD V	$THD V$	X	X	X		X
THD I	$THD A$	X	X	X		X
Fundamental V		X	X	X		
Fundamental I		X	X	X		
Flicker WA	WA	X	X	X		X
Flicker Pst	Pst	X	X	X		

(*) The default value of angles is 1 when the analyzer doesn't detect V and I.

3.6 Standards

ELECTRICAL SAFETY REGULATIONS

IEC 60664-1 Insulation of low voltage equipment
IEC 61010-1 Electrical safety
IEC 62053-21 Active energy meters (class 1 and 2)
UL 94 Enclosure flammability test
VDE 110 Low voltage equipment insulation

ELECTROMAGNETIC COMPATIBILITY

IEC 61000-3-2 , IEC 61000-3-3 , IEC 61000-6-4 , EN 55011 , EN 55022 , IEC 61000-6-2 ,
IEC 61000-4-2 , IEC 61000-4-3 , IEC 61000-4-4 , IEC 61000-4-5 , IEC 61000-4-8
IEC 61000-6-1 , IEC 61000-4-11 , ENV 50141.

HOUSING SYMBOLS



Maximum input voltage 400 V



Reinforced insulation



Product manufactured with recyclable and reusable material. Do not dispose with domestic wastes. At the end of its lifespan, deposit the product at a specific collection point meant for electrical or electronic devices. REI-RAEE record (ES) N°: **3338**.

Please contact the after sales service or technical service of **CIRCUTOR, S.A.** in case you have a question about the unit's operation or you have detected a fault.

4 FEATURES OF CIR-e³

The **CIR-e³** analyzer is a programmable measurement unit that **measures, calculates and records** the main electrical parameters of single and three-phase industrial networks in its memory. We must highlight the following concepts:

Serial number: The serial number of **CIR-e³** is an important parameter, since all files generated by the unit must be identified with that number. The 10-digit serial number is written on the rear features label of **CIR-e³**.

Programming: The unit is programmed with the setup software **CIR-e.exe**. The application is stored in the SD card supplied with the unit. In addition, the card records the electrical parameters that are sent to the Web server.

Display (in Cir-e³ Web): The measurement unit includes the right of use of the associated software that is required to handle the energy data of the **CIR-e³ Web** application. It is located in a web site that is active 24 hours a day, 365 days a year: <http://cir-e3.circutor.com>.


Installation: The analyzer can be installed to analyze balanced (3 wire) or unbalanced (4 wire) single and three-phase networks. The unit must be powered with the auxiliary power supply cables in any of the connection options. The auxiliary power supply wires of the unit are Brown and Green.

Measurements: The analyzer takes 128 samples per cycle of the voltage and current variables in true root mean square (TRMS). With all of the samples taken, the unit calculates the arithmetic mean during the recording period selected by the user. The analyzer also records the maximum and minimum values measured during each period. To take these measurements, the analyzer has four voltage sensor inputs and three current sensor inputs.

Recording: The unit has a 1Gb external SD memory, FAT16 format, which stores the parameters measured or calculated by the analyzer. We must highlight the following features:

- It stores the instantaneous values (measured for a selected period).
- It stores the maximum and minimum values of the recording period selected.
- The SD memory can be expanded to 2Gb.

With an SD memory of 1Gb the estimated recording capability is:


	Recording period		Recording time	
	1 minute		1 year and 8 months	
	10 minutes		17 year and 4 months	
	120 minutes		104 year and 4 months	


Current clamps: The analyzer can work with different models of current sensors. One type of sensor has a single measurement scale. Another sensor model is flexible, allowing the configuration of various measurement ranges. The flexible clamps supplied with the CIR-e³ analyzer are of the E-FLEX 54 model and can be used with three different scales. See detailed information on current clamps in paragraph 3.

5 INSTALLATION

5.1 Precautions

The CIR-e³ must be installed in an environment where food and environmental conditions specified in the technical specifications are respected

	<p>The installation and maintenance of equipment must only be done by authorized and trained persons. Before performing any maintenance, be sure to disconnect the power supply</p> <p>People manipulating the equipment must follow the safety recommendations given in EN standards and the Electrical Code of the country where the equipment is used. Use personal protective equipment needed and follow the warnings and recommendations of the instructions manual.</p> <p>If the device has visible damage or the installer suspects that it is deteriorated, it must be disconnected from the power supply and the measuring circuits. Then contact your service representative or the customer service of CIRCUTOR, SA.</p>
	<p>Do not manipulate the aerial connector terminals when they are connected to a voltage source. It is recommended to use personal protective equipment for handling and connecting the equipment. Follow the procedures in this manual to prevent personal injury and equipment damage.</p> <p>The measured current should be between 10% and 100% of full scale (FS), although the unit supports up to 120% of nominal value. In this way, the user guarantees that the current sensors are working in the linear region.</p>

	<p>Equipment manufactured before 2012 have a built in rechargeable battery to supply the internal clock. In case that the battery is discharged, the equipment will lose the date and time and the records are done with the default date 01/01/2011 00:00 h. Please review the equipment date and time before performing a measurement and recording operation. After a long period of inactivity connect the equipment 12 hours before starting the records in order to charge the battery.</p> <p>All equipment manufactured in 2012 or later have a non rechargeable battery. In this case replace the battery every 5 years.</p>
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6 INSTALLATION AND COMISSIONING

CIR-e³ is a portable analyzer that is easy to install and use. It has been designed to facilitate the work of the companies and/or persons that wish to perform energy audits (study of consumption) and control the main electrical parameters in an installation.

The study of these parameters is the first step to analyze the response of loads and the consumption habits of a company or corporation. Without a doubt, the decisions taken after the study can be focused on a more rational consumption of energy and a decrease in the power demand of the electricity network.

The unit is configured from the PC with the SD card supplied with the unit. After selecting the scale desired for the current sensors (in case of flexible clamps), make sure that all voltage and current connections are correct so that the unit is ready to take measurements and record data.

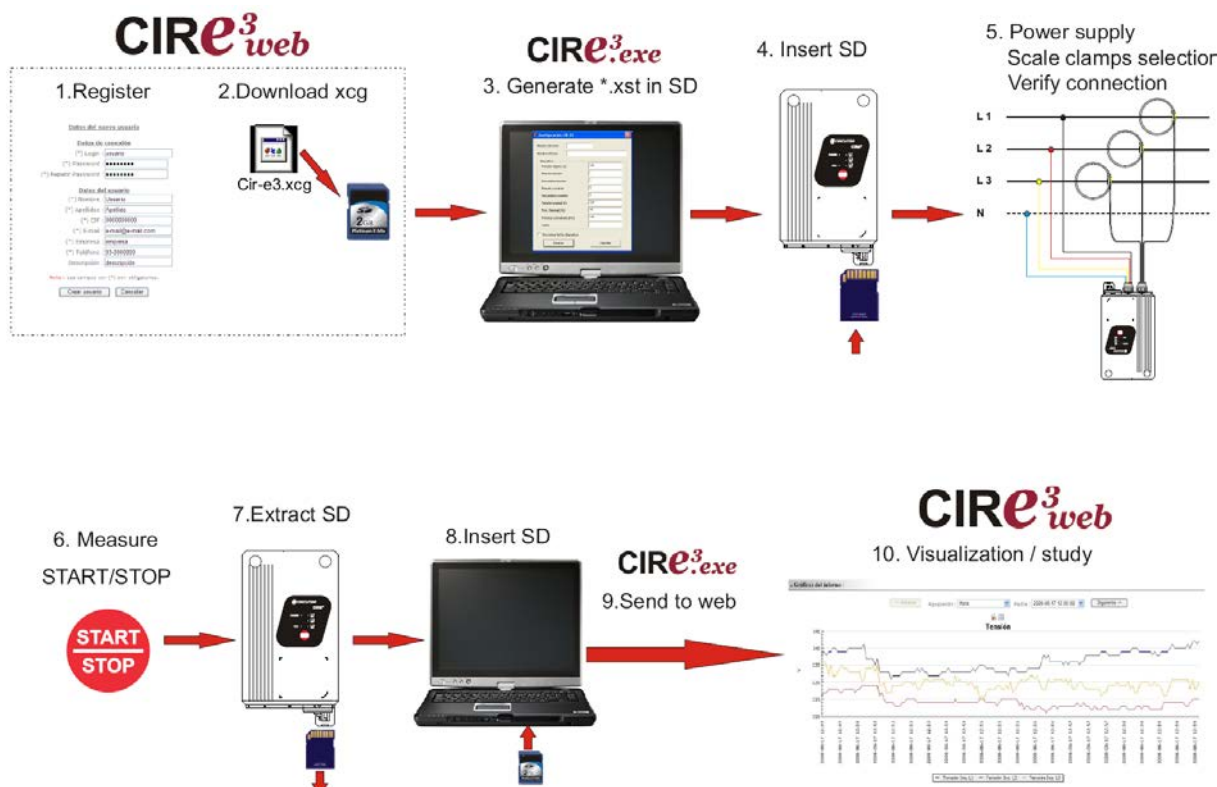


Fig. 6-1.- Ten steps to set-up of CIR-e³

Please follow the instructions described below to configure, install and commission the unit.

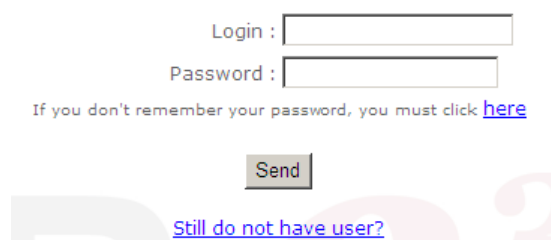
6.1 Connection and registration in CIR-e³ web

CIRCUTOR recommends the user to register on the web site in order to receive all the information and to have the latest version of manual and firmware.

The web page is a tool used to analyze and export the files recorded by the **CIR-e** analyzer. Web site: <http://cir-e3.circutor.com>. The access and registration procedure is described below.

6.1.1 Accessing cir-e3 web

Open <http://cir-e3.circutor.com> in your browser to access the data handling page of **CIR-eWeb**. The following start screen will be displayed when you open the page in your browser.



The screenshot shows a login form with two input fields: "Login :" and "Password :". Below these fields is a link that says "If you don't remember your password, you must click [here](#)". At the bottom of the form is a "Send" button and another link that says "[Still do not have user?](#)".

Fig. 6-2.- Login

When accessing the page for the first time, you must register, in order to access the Web-based application. To register, click on [Still do not have user?](#). The registration process is explained in section 6.1.2.

The fields *Login* and *Password* are used by users that have already been registered in the system:

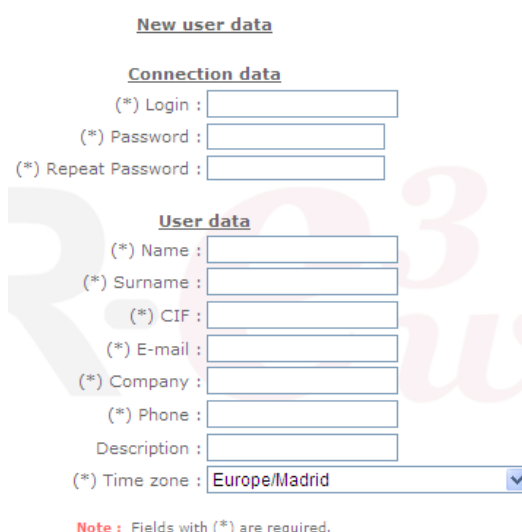
Login: User name
Password: Access password

After entering the *login* and *password*, click on "Send" to access the Web site.

6.1.2 Registration

You must fill in the registration form when accessing **CIR-eWeb** for the first time. Its function is to reserve a space on the web site that you can use to send and handle the data recorded by the **CIR-e** device.

To register, click on [Still do not have user?](#) Click on this link and the application will display the registration form. Fill it in with your information.



The screenshot shows a registration form titled "New user data". It is divided into two sections: "Connection data" and "User data".
Under "Connection data", there are three fields: "(*) Login :", "(*) Password :", and "(*) Repeat Password :".
Under "User data", there are seven fields: "(*) Name :", "(*) Surname :", "(*) CIF :", "(*) E-mail :", "(*) Company :", "(*) Phone :", and "Description :".
At the bottom, there is a dropdown menu for "(*) Time zone :" with "Europe/Madrid" selected.
A note at the bottom states: "Note : Fields with (*) are required."

Fig. 6-3.- Registration form

The following information is requested to register a new user:

- Login:** Access name used to register and access future connections to the **CIR-eWeb** server. You can enter alphanumerical values in this field, although we recommend not using symbols, accents, etc.
- Password:** Access password with which the user is registered and which will be used in future connections to the **CIR-eWeb** server. You can enter alphanumerical values in this field, although we recommend not using symbols, accents, etc.
- CIF:** Company / Personal Tax Identification code.
- E-mail:** Contact email address.
- Company:** Name of the company.
- Telephone:** Contact phone.
- Description:** Description of the account (optional).
- Time zone:** Must be set in this field the time zone where the user will use the device. This field entered by the user is very important since this field is that the application uses to calculate the local time registrations by the analyzer.

The use of **CIRCUTOR**'s CIR-e³ Web application is subject to the acceptance of the following Conditions for Use:

1. The user is responsible for any activity carried out with his/her user name and for any information sent through the CIR-e³ Web application.
2. The user is responsible for the use of the CIR-e³ Web application under the legal terms.
3. The user is responsible for sending files that are free from viruses or worms to the CIR-e³ Web application. Should a virus or worm be sent to the CIR-e³ Web application or a fraudulent use of the tool is detected, CIRCUTOR reserves the right to cancel the user's registration.
4. CIRCUTOR, shall not be liable for the incorrect interpretation of the information sent to the display tool or the incorrect recording of said data.
5. CIRCUTOR, shall not be liable for the damages resulting in the loss of information to you or third parties, derived from the data sent to the Web application.
6. The user is responsible for keeping the appropriate original files and backup copies of the data recorded by the CIR-e³ analyzer with an STD extension, which will be stored in the original hard drive where they were sent from.
7. CIRCUTOR, shall not be liable for storing the data sent to the Web application, since it will enable the sending of the data required as many times as the user finds it necessary.
8. CIRCUTOR informs its users that the information can not be retrieved from the Web site, since it is sent in encrypted form to the Web application.
9. Each user will have a 10-report limit on the Web site with maximum age of 12 months.
10. CIRCUTOR reserves the right to modify these Conditions for Use at any time.

Legal information on Personal Data Privacy (PDP)

In compliance with National and International laws concerning personal data protection, CIRCUTOR informs that, the user data will be included in an automated file, property of CIRCUTOR, SA, with the purpose of managing the requested service. Whereby the user will authorise the treatment of the above mentioned data under the terms and conditions. of Spanish Organic Law 15/1999, 13th of December, according to EU Directive 95/46/EC

The undersigned can exert their right to access, rectification, cancellation and objection of the mentioned data at any time by writing to the address of the file's manager, CIRCUTOR, S.A., Vial Sant Jordi, s/n, 08232 de Viladecavalls (Barcelona).

After filling in the form, the user has to accept the conditions for use and click on “*Create user*” to validate the data and register the new user.

This is when the user is created with the registration form and already has access to the **CIR-e³Web** page. You will be able to send a maximum of 10 files and access the page an unlimited number of times to check and handle the information sent to the server.

Select “*Cancel*” to stop the user registration process and the application will return to the previous screen.

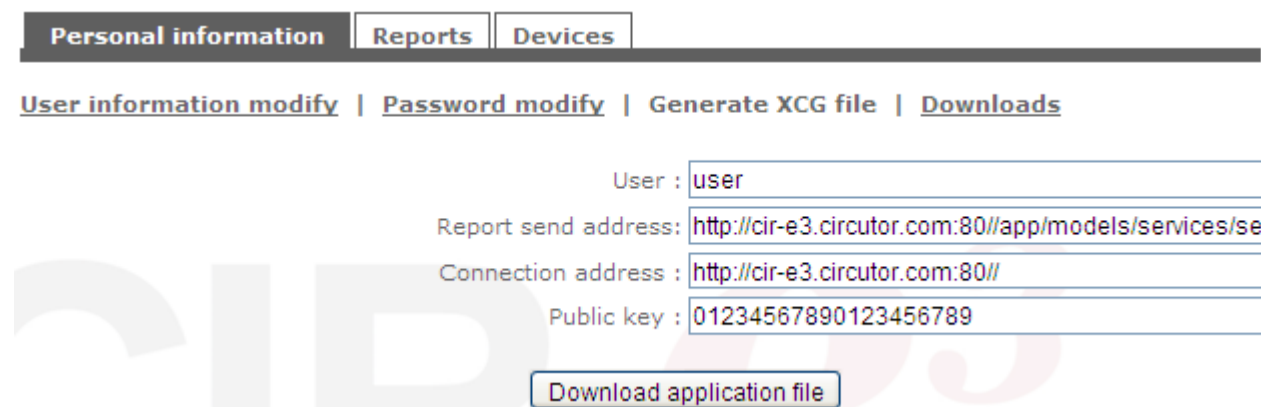
6.2 Downloading the .xcg identification file:

Once the registration is complete, the data will be submitted to the web application semi-automatically. To do that, the SD card must have a file that is used by the system to know the address to send data and the Web space (user area) where the information must be located.

Therefore, once the user has created the identification file and has been registered in the web system, he must download, from the Web, the file that will identify him during subsequent logins and which will be used to send data to the right server and user area. The downloaded file that identifies the user's ID and the recording address, must be stored in the SD card. The file has .xcg extension.

From this point, the files generated by **CIR-e³** and sent by the user will be automatically sent to <http://cir-e3.circutor.com> and they will be located in the corresponding user space, in order to allow the user to access the data sent and display them in the graphs or tables provided by the Web page.

To generate and download the xcg file, access the Web page and fill in the “*login*” and “*password*” fields. Open the menu in the “*Personal information*” and select the tab called “*Generate XCG file*”, see Fig. 6-4.



The screenshot shows the 'Personal information' tab selected in the top navigation bar. Below it, there are four links: 'User information modify', 'Password modify', 'Generate XCG file', and 'Downloads'. The 'Generate XCG file' link is highlighted. Below the links, there are four input fields with labels and values:

User :	user
Report send address:	http://cir-e3.circutor.com:80/app/models/services/se
Connection address :	http://cir-e3.circutor.com:80/
Public key :	01234567890123456789

Below the input fields is a button labeled 'Download application file'.

Fig. 6-4.- XCG file generation

The information displayed on the screen is generated automatically, absorbing the data entered by the user during his registration. You must **NOT** modify the data shown on the screen to prevent future errors when transferring files or preventing user identification errors in the **CIR-e³Web** application.

User:	User name
Address:	Web space address destined to the user
Connection address:	Connection address of the data server
Public key:	Data encryption key

Once the personal data are shown on the screen, press “*Download application file*” and the application will display the following screen, where you can select the file storage destination.

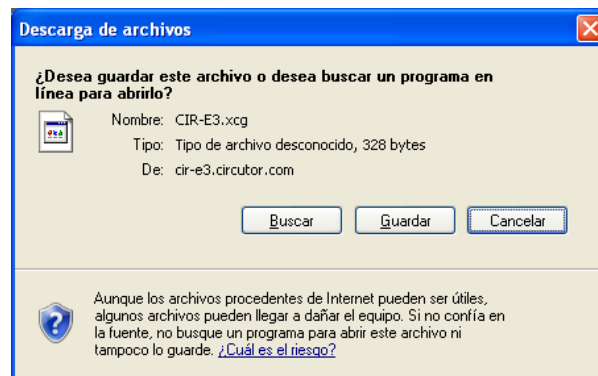


Fig. 6-5.- Downloading the configuration file

The storage destination must be the root directory of the SD card. This is the same location of the **CIR-e.exe** setup application.

6.2.1 Personal user information on the web

Once the user has accessed its user area in the Web, the application will show a main screen as the one shown in Fig. 6-6.

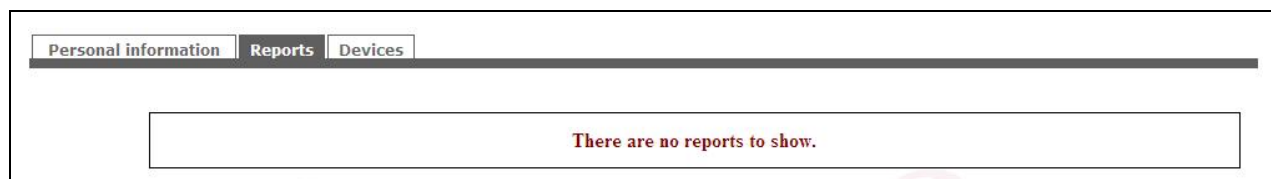


Fig. 6-6.- Personal user information

The main screen shows a list of the particular user reports sent to the Web page. When the user accesses its web area for the first time, the screen shows an empty list of reports and a banner with the following text “There are no reports to show”.

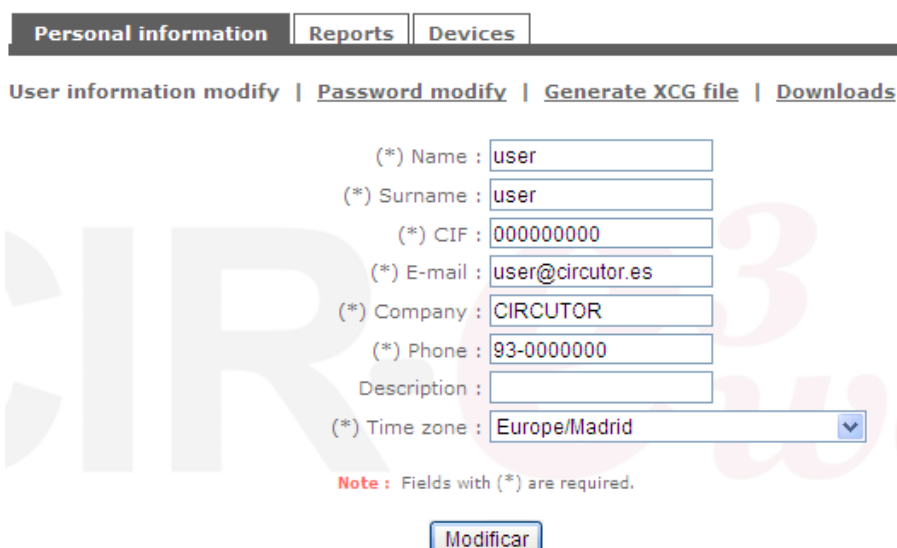
The screen offers the choice to select one of the following three tabs “**Personal Information**”, “**Reports**” and “**Devices**”, which are described next.

This point provides a detailed description of the “**Personal information**” option. The “**Reports**” and “**Devices**” options are explained in detail in sections xxx and 6.10.2, since they correspond to subsequent data analysis stages.

This menu contains all information related to the user data. There are four sub-menus in the “**Personal information**” menu.

6.2.1.1 Editing user information

The personal information menu option opens the following setup screen. The “*User information modify*” screen is used to modify the data configured by the user in the registration form.



Personal information | Reports | Devices

User information modify | Password modify | Generate XCG file | Downloads

(*) Name :

(*) Surname :

(*) CIF :

(*) E-mail :

(*) Company :

(*) Phone :

Description :

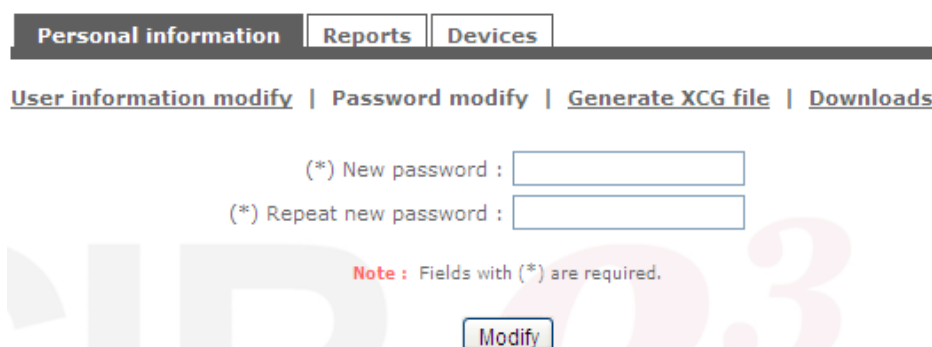
(*) Time zone :

Note : Fields with (*) are required.

Fig. 6-7.- Editing user information

6.2.1.2 Change password

The second sub-menu in the “*Personal information*” menu is used to modify the Web page's access password defined by the user in the registration form.



Personal information | Reports | Devices

User information modify | Password modify | Generate XCG file | Downloads

(*) New password :

(*) Repeat new password :

Note : Fields with (*) are required.

Fig. 6-8.- Change password

To modify the password used to access the Web page, enter a new password in the “*New Password*” field and confirm it in the “*Repeat new password*” field. Press the “*Modify*” button after entering the new password. The new password will be saved.

6.2.1.3 Generate XCG file

As explained in section 6.2 *Downloading the XCG identification file*, this sub-menu generates the file that identifies the user and his information and the sending address to the **CIR-e³Web** application. Click on “*Download application file*” to download the file.

6.2.1.4 Downloads

The download sub-menu can be used to download the **CIR-e.exe** application file, which is vital to configure **CIR-e³** and which allows the download of the unit's manual. The unit configuration application and the complete manual are included in the SD card supplied with the unit. In any case, they are available in this section of the Web page as backup if the user deletes any of the files by mistake.

The screen shows the different download options.



Fig. 6-9.- Download options

To download the desired option, select the link.

6.3 Setting the CIR-e³ up

The **CIR-e³** analyzer does not have configuration buttons or a setup screen and it needs a file with the configuration information required to record the data. This file has the .xst extension and it is generated with the **CIR-e.exe** application. This application is supplied with the unit and is stored in the SD card.

6.3.1 Generating the setup file

To generate the setup file, run the **CIR-e.exe** application located in the root directory of the SD card.



Fig. 6-10.- Application icon

In the event that the SD card format from which the application is running is not a FAT16 format, the executable warns the user of an incorrect format using the following window:

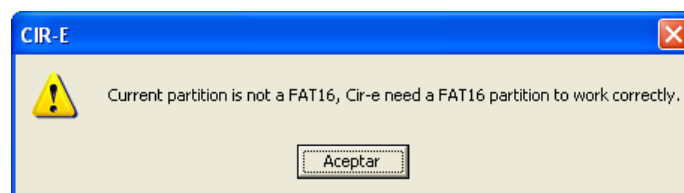


Fig. 6-11.- SD card format error

The application determines the installation parameters that will determine how the **CIR-e³** takes the measurements and records the parameters. These parameters are stored in the SD memory card. The setup application generates a file that must be stored in the SD card and which is named after the unit's serial number and has the xst extension. If the setup application is not available, the user can also download it from <http://cir-e3.circutor.com>, in menu "User information".

When the user runs the application for the first time, the window will appear blank, as shown on Fig. 6-12

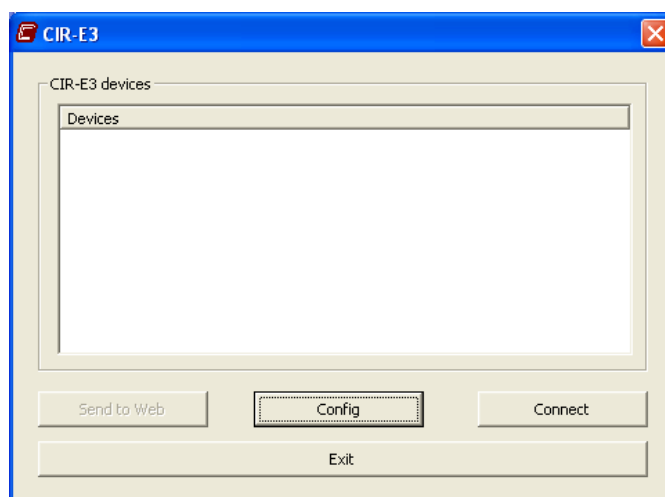


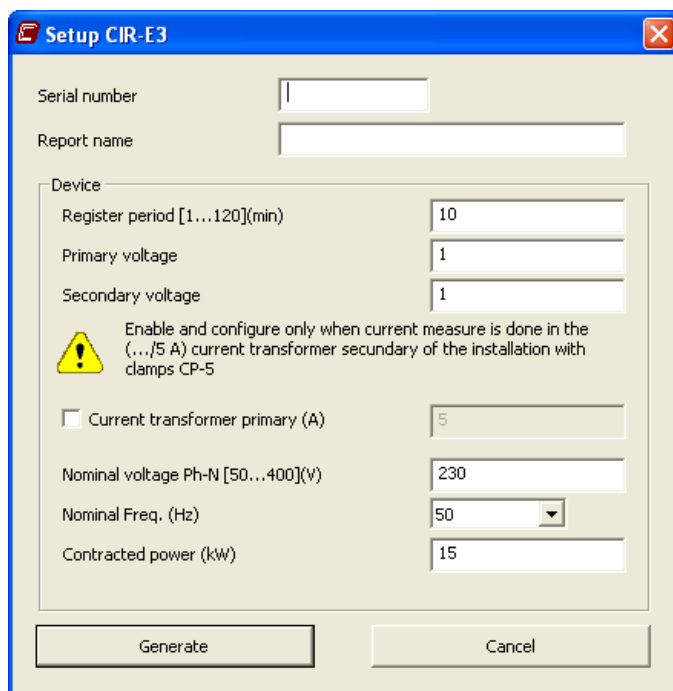
Fig. 6-12.- Window appearing when **CIR-e.exe** is executed the first time

6.3.2 Menu options.

The application has 4 different function buttons. “Configure”, “Connect”, “Exit” and “Send to Web”.

6.3.2.1 Configure

Select the configure option to create a **new file with the installation's features for a CIR-e³**. The following window will be displayed when the user clicks on “Configure”.


 The screenshot shows a window titled "Setup CIR-E3". It contains several input fields and a checkbox. At the top, there are fields for "Serial number" and "Report name". Below these is a section labeled "Device" containing:

- "Register period [1...120](min)" with a value of 10.
- "Primary voltage" with a value of 1.
- "Secondary voltage" with a value of 1.
- A warning icon and text: "Enable and configure only when current measure is done in the (.../5 A) current transformer secondary of the installation with clamps CP-5".
- A checkbox labeled "Current transformer primary (A)" which is unchecked, with a value of 5.
- "Nominal voltage Ph-N [50...400](V)" with a value of 230.
- "Nominal Freq. (Hz)" with a dropdown menu showing 50.
- "Contracted power (kW)" with a value of 15.

 At the bottom of the window are two buttons: "Generate" and "Cancel".

Fig. 6-13.- Set-up window

Serial number: Enter the 10 digits of the serial number of the **CIR-e³** unit used to take the measurements. The serial number identifies each individual unit. It is written on a label on the back of the analyzer: “serial no.” starting with 0102XXXXXX.


The software uses part of the serial number as filename of the configuration file (identifier). The setup file generated by the application will be named as xxxxxxxx.xst format, where “xxxxxxx” are the last eight digits of the unit's serial number.

Report name: The user can enter the name of the file for identification purposes. This field is limited to 16 characters. For example, the user can enter the name of the place where the measurements are going to be taken.

Register period: This field states the recording period. The value ranges from 1 to 120 minutes (2 hours) and it corresponds to a time interval during which we use to store the average of the records taken. The analyzer takes 128 samples per cycle of the signals measured. The registration period indicates the interval desired to take the weighted mean of all samples taken and it stores this value in the memory. For example, if the user select a recording period of 1 minute, the analyzer calculates the mean of all samples of the variables recorded during that minute and stores the results in the memory. From that period, the analyzer also stores the maximum and minimum values measured.

Primary voltage: When using transformers to measure the voltage, enter the primary voltage value of the transformer. The information related to this feature of the transformer can be founded on a features label of the transformer. This label must indicate the primary ratio. In case you are not using voltage transformers and you are taking a direct measurement (up to 400 V p-n), the value entered must be 1.

Secondary voltage: When using transformers to measure the voltage, enter the secondary voltage value of the transformer. The information related to this feature of the transformer can be found on a features label of the transformer. This label must indicate the secondary ratio. In case you are not using voltage transformers and you are taking a direct measurement, the value entered must be 1.

	<p>The voltage transformer ranges and transformer ratio have certain limits given below:</p> <table> <tr> <td>1°. Primary voltage range</td><td>between 1 and 220.000</td></tr> <tr> <td>2°. Secondary voltage range</td><td>between 1 and 999</td></tr> <tr> <td>3°. Primary/secondary ratio</td><td>between 1 and 10.000</td></tr> </table>	1°. Primary voltage range	between 1 and 220.000	2°. Secondary voltage range	between 1 and 999	3°. Primary/secondary ratio	between 1 and 10.000
1°. Primary voltage range	between 1 and 220.000						
2°. Secondary voltage range	between 1 and 999						
3°. Primary/secondary ratio	between 1 and 10.000						

6.3.2.2 Selection of the current transformer ratio.

This option must be selected in case of using **CP-5** current clamps which have a nominal secondary current of 5A and are designed to work with a shunt resistor giving 2V at the instrument input.

Primary current: In this field, the user must program the rated primary current of the current transformer (CT). The maximum value in this field is limited to 10.000 (The user must check that the measured power limit is less than 70.000.000W).

Secondary current: The default value for the CP5 current clamp is a secondary current of 5 A

Nominal rated voltage (Ph-Neutral): In this field the user must introduce the nominal voltage between phase and neutral. The allowed range is 50...400V. In case of using a voltage transformer to measure the voltage (HV installations), the value introduced in this field must be the nominal value of secondary of the measuring transformer.

Nominal Freq.: Enter the nominal value of the installation's frequency. The values allowed for this field are 50 or 60 Hz.

Contracted power (kW): The contracted or "demand power" is usually employed to calculate a "Minimum Charge" in the electricity bill. The term has very different meanings in different countries and in the CIR-e³ is used only for information purposes and does not have any impact on the unit's configuration.

After completing the configuration of **CIR-e³**, click on the button "Generate".

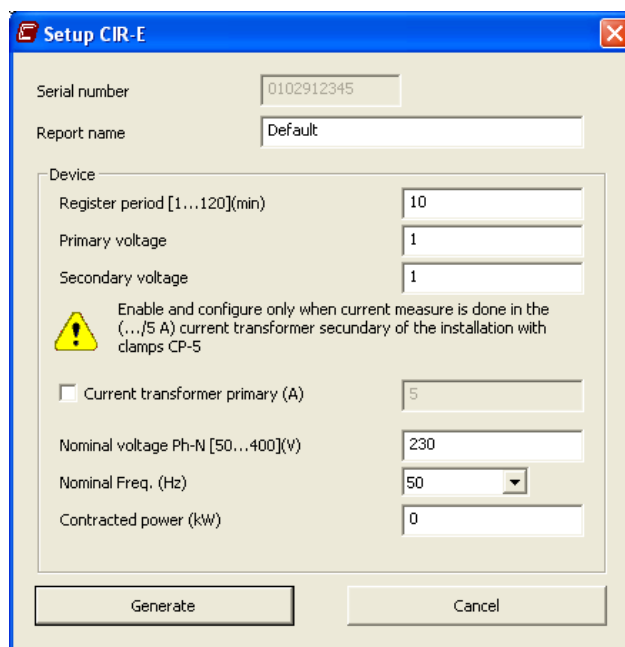
The software automatically will create the file xxxxxxxx.xst in the root directory of the SD card (or in the selected default directory). The filename uses the last 8 digits of the serial number of the unit, entered in the setup menu. The file includes the unit's configuration and installation's characteristics, as shown on the following figure. The unit will take this configuration from the SD card each time it starts measuring and recording.



12345678.xst

Fig. 6-14.- File containing the configuration data

If the configuration file does not exist, or it is not stored in the root directory of the SD card or the **CIRe³** analyzer can not find the SD memory card before the parameter recording process starts, it will automatically load a default setup file called "**Default**", which is loaded from the analyzer. The default parameters are described in Fig. 6-15.



The screenshot shows the 'Setup CIR-E' dialog box with the following fields and values:

- Serial number: 0102912345
- Report name: Default
- Device section:
 - Register period [1...120](min): 10
 - Primary voltage: 1
 - Secondary voltage: 1
- Warning icon and text: "Enable and configure only when current measure is done in the (.../5 A) current transformer secondary of the installation with clamps CP-5"
- ☐ Current transformer primary (A): 5
- Nominal voltage Ph-N [50...400](V): 230
- Nominal Freq. (Hz): 50 (dropdown menu)
- Contracted power (kW): 0
- Buttons: Generate, Cancel

Fig. 6-15.- Default configuration parameters

Serial number: The serial number of the setup file is the unit's serial number.

Report name: The name of the report is "Default".

Register period: The default recording period is 15 minutes

Voltage input data:

Primary voltage: The transformer's primary value is 1 (direct measurement)

Secondary voltage: The transformer's secondary value is 1 (direct measurement)

Select the current transformer ratio

Current transformer primary: Is not enabled in the Default configuration.

Nominal voltage (Ph-N): The standard nominal voltage is 230 Vac

Nominal Freq.: The standard frequency is 50 Hz.

Contracted power (kW): The default file does not include the contracted power

6.3.2.3 Connect

Another option of the **CIR-e.exe** application is “Connect”. This option automatically connects with the main page of the **CIR-e³Web** application, as shown on the following picture.



Fig. 6-16.- Main screen after connecting to CIR-e³ Web

The purpose of this option is to allow the user to immediately access this Web page to display the data sent from the application, ensuring that the user doesn't have to run other programs to access the Web.

6.3.2.4 Exit

The “Exit” option closes the application and cancels the unit's setup file creation process.

6.3.2.5 Send to Web

The “Send to Web” button will be explained in detail in section 6.9 *TRANSFERRING data to the application CIRe3Web*. This paragraph describes only how the data recorded by **CIR-e³** are sent to the **CIR-e³ Web** application.

6.4 SD card insertion


Insert the analyzer's SD memory card after creating the analyzer's setup file with the **CIR-e.exe** application and recording the file generated (with an *xst* extension) in the root directory of the SD memory card.




Fig. 6-17.- SD memory position for insertion

The SD card should be inserted in the card slot before starting the unit, otherwise, the analyzer will be configured automatically with the default file described in section 6.3.2.1


VERY IMPORTANT:

	<p>After the SD card insertion wait 12 seconds before starting data recording. After completing the recording and stopping the data recording process with the <i>START/STOP</i> button, the user must wait 5 seconds before removing the memory card.</p>
---	--

	<p>The unit only detects cards with the FAT 16 format. If you use an SD memory card with a FAT 32 format, the unit will not be able to write on the card and it will display the error flashing the <i>REC</i> LED.</p> <p>Please do not use cards which already have data records that you wish to store and make backup copies of the stored information frequently.</p>
---	---

6.5 Start-up sequence

The analyzer does not have a screen showing the parameters being measured, so that you can not check whether the connection is correct. Therefore, we recommend to sequentially follow the process explained below. Follow the steps sequentially and be aware and read the error messages displayed by the analyzer LED indicators.

	<p>Follow the steps 1 to 9 explained in detail below.</p> <ol style="list-style-type: none"> 1. Insert SD card. 2. Insert <i>A</i> connector of current clamps. 3. Insert <i>B</i> connector, voltage references. 4. Power the analyzer. 5. Select the scale of the current clamps (in flexible clamps). 6. Check the voltage phase inversion. 7. Install the current clamps. 8. Check the installation of the current clamps. 9. Start the recording process.
---	---

After inserting the SD card in the analyzer's slot, connect the instrument and start measuring the electrical parameters. The connection process is explained in detail in the following points.

6.5.1 Powering and connecting the unit

Insert connectors “*A*” and “*B*”, corresponding to the current and voltage sensors of the **CIR-e³** analyzer, respectively, before connecting the unit to the supply. The analyzer is powered through the brown and green auxiliary power supply wires. After connecting the auxiliary power supply cables, the unit will automatically detect the current clamps.

If the analyzer identifies that the **current clamps are a single scale type**, it will detect them automatically and it will self-configure the current scale (current ratio) and will store it in its internal memory. This scale will be used to perform the calculations required to obtain all other electrical parameters stored in the memory. **In case of single scale, CIR-e³** will start the boot sequence. It will perform a sequential ignition of LED indicators L1, L2, L3 and *POWER* LED. After boot process, the LED *REC* lights and the instrument starts the verification of possible connection errors in the voltage probes. This process is explained in detail in section 6.5.3 of this manual.

If the analyzer identifies that the **current clamps plugged to connector A, are a multi-scale type**, the analyzer then moves onto the next step, which is the selection of the scale of the current clamp (choice between the available scales of current clamps connected in connector A). The three LED indicators *L1/sc1*, *L2/sc2* and *L3/sc3* will start flashing, so that you can select

the desired current range. Do it by pressing the button START/STOP to select sc1, sc2 or sc3 (see paragraph 6.5.2 I case of clamps E-FLEX 54 cm). After scale selection, the device will start the boot sequence recognized by the sequential ignition of LEDs L1, L2, L3 and then the **POWER** LED. After the boot process, the instrument starts a connection error verification process of the voltage probes, as explained in section 6.5.3 of this manual.


Once the boot sequence is finished, the device indicates that is powered by lighting **POWER** LED



Fig. 6-18.- LED indicators showing the status of CIR-e³

After the **POWER** LED lights, connect the phase voltage probes L1, L2, L3. If the analyzer must be powered from the voltage probes, this is possible by connecting the supply cables to the voltage probes.

Before powering the unit, it is important to connect the current clamps (even if the current scale is not configured), since the analyzer will identify the current sensors immediately after it is powered.


	<p>If the unit is connected to the supply and the current clamps in connector “A” are not plugged in, the analyzer will be configured assuming that the current clamps have a nominal primary current of 5 A. To configure a different scale, unplug the analyzer, so that it can reset the scale selection process, plug the desired current clamps and connect the analyzer again to supply.</p>
---	--

The procedure to select the current scale when using multi-scale current sensors is explained in detail in section 6.5.2, of this manual.

To supply and connect the analyzer probes correctly, respect the phase sequence, as shown on Table 6-1

Table 6-1.- Color code of voltage cables

PHASE	EUROPEAN	RYBLB
Phase reference	Wire colour	Wire colour
(L 1) PHASE 1	BLACK	RED
(L 2) PHASE 2	RED	YELLOW
(L 3) PHASE 3	YELLOW	BLUE
(N) NEUTRAL	BLUE	BLACK
Auxiliary supply	BROWN	BROWN
Auxiliary supply	GREEN	GREEN

	<p>The colours of voltage phases can change according to the colour scheme selected in the device code. The following table lists the references for each phase of the different colours.</p>
---	---

The analyzer's connection diagrams show the final voltage and current sensor connections. Do

not connect the current clamps until you reach the point in section 6.5.3 in the installation procedure. Proceeding in this way, simplifies the interpretation of error messages displayed by the LED indicators, showing possible connection errors installing **CIR-e³**.

6.5.1.1 Single-phase connection diagram

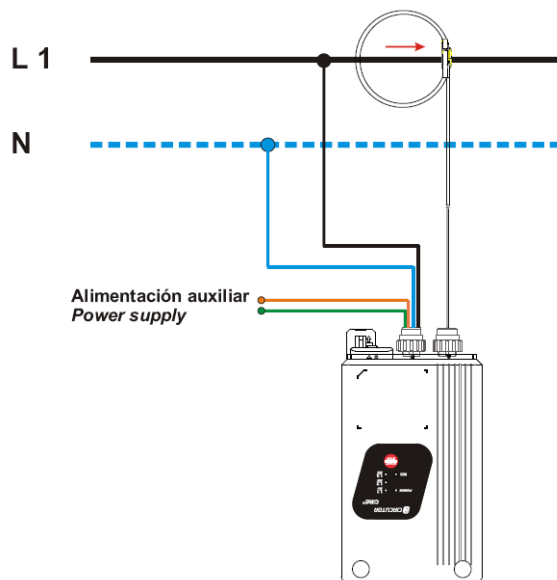


Fig. 6-19 .- Single phase connection diagram



WARNING: In case of measuring in a single phase system, the voltage measuring probes are phase L1 and Neutral (see Table 6-1).

6.5.1.2 Three-phase connection diagram (3 wires)

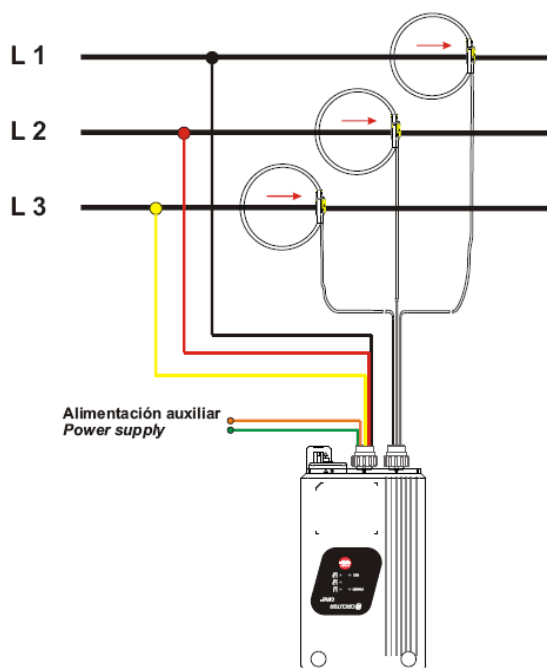


Fig. 6-20.- Three phase 3 wires connection diagram

6.5.1.3 Three-phase connection diagram (4 wires)

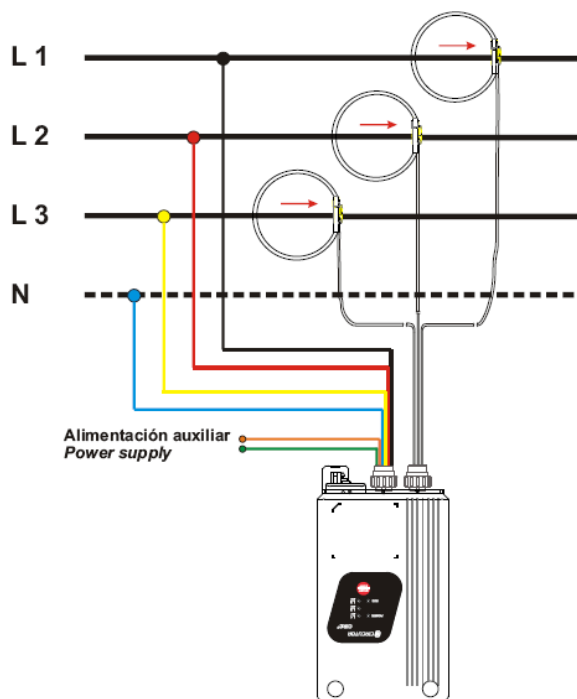


Fig. 6-21.- Three phase 4 wires connection diagram

In case of using E-FLEX multi-scale current clamps, after powering the analyzer, the user must configure the scale of current before starting the recording process. The scale selection process is explained in detail the next section 6.5.2 of this manual.

6.5.2 Selecting the current scale in case of using multi-scale clamps (E-FLEX 54cm)

After connecting the voltage and current clamps and powering the unit, the *POWER* LED will turn on. The CIR-e3 will then proceed to the detection of connected current clamps. In case of using multi-scale current clamps (E-FLEX 54cm), the user should proceed to select the most appropriate scale for measurement, based on the rated current he wants to measure.

Prior to the detailed explanation of the scale selection procedure, a table is attached with the features of the flexible current sensor, model *E-FLEX*, 54 cm, which is the standard type included with the unit.

Table 6-2 .- Standard multi-scale current transformers (clamps)

Clamp	Scale	Value	Measurement range
E-FLEX 54 cm	L1/sc1	200 A	5...200 A
	L2/sc2	2.000 A	50...2.000 A
	L3/sc3	20.000 A	500...20.000 A

Example 1: If the line where we have to measure, has a nominal current of 150 A, the most suitable scale would be *L1/sc1* (the lower scale), which has a full scale value of 200 A.

Example 2: If the line where we have to measure, has a nominal current of 3.000 A, the most suitable scale would be the higher scale, *L3/sc3*, which has a full scale value of 20.000 A.

Scale selection procedure for E-FLEX 54cm.

After starting the analyzer, if it detects that the connected clamps are multi-scale, the three LED indicators on the front panel, *L1/sc1*, *L2/sc2* and *L3/sc3*, start flashing. In this way the instrument shows that the unit is in standby and waiting that the user selects the desired current scale. **The LED flashing will last for 30 seconds. After this, the LED indicators stop flashing and the equipment takes the scale L2/sc2 as a default, which in case of using E-FLEX 54cm clamps, corresponds to a full scale of 2000 A.**

To select the scale manually, press *START/STOP* button while LED indicators are flashing. After the first press, the *L1/sc1* LED will start flashing, showing that scale *L1/sc1* is in train of being selected (200 A full scale, in case of E-FLEX clamps). If you press *START/STOP* again, LED *L2/sc2* will start flashing (2000 A full scale, in case of E-FLEX clamps). Finally, if you press *START/STOP* again, LED *L3/sc3* will start flashing (20.000 A full scale in case of E-FLEX clamps). If the user continues pressing *START/STOP* the unit follows a rotating loop, selecting *sc1 – sc2 – sc3 – sc1 – sc2 – sc3*, ...etc., until you select the desired scale.

After the selection has been made, let the LED flash during 7 s. If one of the three scales (*sc1*, *sc2* or *sc3*) is flashing during **7 seconds** and the user does not press any key, the unit will detect the scale selected by the user and store the configuration in its memory to start recording the information with the selected scale.

After configuring the desired scale (regardless of whether the unit has been self-configured or the user has selected the scale manually with the *START/STOP* button), the unit starts verifying its correct connection, as explained in detail in point 6.5.3. The unit remains in *STOP* mode, until the user presses the *START/STOP* button to start the recording. From this point, the *START/STOP* button recovers its main function of *starting* and *stopping* the data recording. Pressing *START/STOP* during more than **3 seconds**, causes the unit to *START* or *STOP* the recording, always on the same file. The unit will never create duplicate files or files with different names for each record.

If there is a supply interruption while the CIR-e3 is recording, it will automatically restart when the supply is restored, keeping the previous configuration, recovering the last clamp scale configuration (if this scale is possible with the detected clamps) and it will automatically start recording again, i.e., there is no need to press the *START* button again. In such case the CIR-e3 assumes that it has been an accidental power supply interruption and that the auxiliary power supply has been restored. The unit always detects single scale clamps after the power supply is reconnected and it will self-configure itself with the suitable scale and will return to the recording status automatically.



If the user selects a different clamp or scale to the one that was configured before the power supply interruption and the system restarts, the unit will delete the old file with recorded data in the SD memory and will generate a new one, using the new selected configuration.

If there is a supply interruption while the CIR-e3 is in *STOP* mode and the device has multi-scale E-FLEX clamps connected, then, when the supply is restored, the unit will restart in the scale selection mode. That is, with the three LED blinking and waiting for configuration. If the user doesn't modify the clamps scale in **30 seconds**, the device will restore the previous configuration and stays waiting in *STOP* mode.

If the scale or configuration has been changed during a STOP or during a supply lack, when pressing START, the device will detect the change, will delete the old data file in SD memory and will generate a new file with the new configuration parameters.

6.5.3 Verification of external connections

In a normal START process using multi-scale E-FLEX clamps, after the user has selected the clamp scale, the analyzer will start a procedure for testing the goodness of external connections (check that V and I probes are placed in the right phases). In case of using single-scale clamps, this checking process starts automatically after pressing the START button. The checking process is carried out by the unit continuously, regardless of whether it is recording data or not.


The analyzer will indicate faulty connections with the same LED indicators used during for scale selection, i.e. sc1, sc2 and sc3. During the checking process, if the three LED indicators light continuously, that means that the connections and sequence are correct. If there are some of the LED indicators blinking, that denotes that there is some sort of faulty connection or reverse sequence.

The causes of faulty connections of one or more phases are explained below:

6.5.3.1 Faulty connection

The analyzer can indicate a faulty connection for several reasons. i.e.

- Voltage sequence error.
- Current clamp with a wrong connection or reversed sense.
- The instrument detects a negative power.
- Power factor (PF) is lower than 0.5 (angle > 60°).

	<p>Since a faulty connection can be due to a problem in the connection of the voltage probes or in current clamps, CIRCUTOR recommends following the procedure detailed below:</p> <ol style="list-style-type: none"> 1. Install voltage PROBES and check all connections 2. Install the current clamps and check all connections <p>Follow this procedure to check whether the flashing of LED indicators is due to an error in the voltage sequence or to an incorrect connection of the current clamps.</p>
---	--

After setting the scale of current clamps and before clamping them on the bus bars or wiring, we recommend connecting the voltage clamps, to verify their proper connection. After connecting the voltage clamps, observe the LED indicators L1/sc1, L2/sc2 and L3/sc3, if any of them are blinking (usually two) this indicates that the cables are placed with wrong phase sequence. If all the LED indicators lit continuously, it indicates that the connection is correct. Fig. 6-22 with L2 and L3 blinking, indicates that the connection of voltage clamps in phases L2 and L3 phases is defective. In this case, we should reverse the connections to L2 and L3.



Fig. 6-22.- Wrong connection indication (L2 and L3 blinking)

Once LED indicators L1/sc1, L2/sc2 and L3/sc3 are all lighting permanently, Fig. 6-23, the user can proceed to place the current clamps clamping the bus bars or cabling.

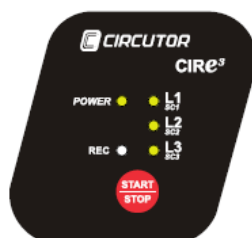


Fig. 6-23.- Right connection indication (all LED lighting permanently)

The current sensors have a standard current flow direction that must be respected for proper recording of electrical parameters. The current flow direction is shown in the clamp itself by drawing an arrow indicating the sense from the source (mains) to the load, as shown in Fig. 6-24.

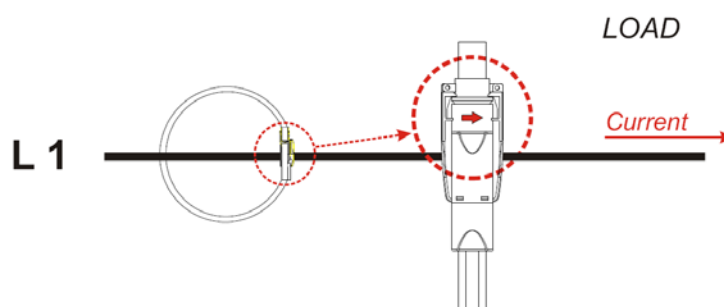


Fig. 6-24.- Source to load current flow direction indicator

Place the current clamps and observe again the CIR-e³ LED indicators, L1/sc1, L2/sc2 and L3/sc3, they will give the user information about possible wrong connection of current clamps. To correctly interpret such indications, it is recommended to proceed with the connection of the current clamps one by one, in order to detect errors individually.

When the unit detects a faulty clamp connection, that may be a negative value of active power or a V-I phase shift greater than 60°, the **Lx/csx** LED, corresponding to the faulty connection phase will start **flashing**. In this case, check the connection of the current clamps to make sure that the installation follows the colour code and that the direction of the current clamps is as shown on the previous Fig. 6-24.



Fig. 6-25.- Example of error indication (LED L1/sc1 blinking)

Example: L1/sc1 *blinking*, indicates a faulty clamp connection in phase L1. In this case, check the clamp and make sure that it is tightly closed and observe that the arrow indicating current direction is pointing from source to load. In a similar way, see that clamps L1, L2 and L3 are installed in the proper phase, in accordance with the corresponding phase colours, which are: **BLACK** for L1, **RED** for L2 and **YELLOW** for L3.

Before starting the parameter recording process, the voltage and current clamps must be properly installed, the LED indicators must be all permanently lighting (no flashing LED). That will indicate that the unit is properly powered and that all voltages and current clamps are properly connected and reading data.

The Fig. 6-26 shows the LED status when CIR-e³ has been properly connected to measure in a three-phase system and before starting the recording process. (The recording process will initiate by pressing the *START/STOP* button).



Fig. 6-26.- Indication of proper connection (all LED permanently lighting)

6.6 START/STOP BUTTON

After following the above steps and making sure that the unit is properly connected, hold the *START/STOP* button **during 3 seconds** to start the recording. After holding the *START/STOP* button for 3 seconds, the *REC* LED will light, indicating that the instrument is recording the electrical parameters of the installation.



Fig. 6-27.- Front plate of CIR-e³ when the instrument is recording data

To stop the recording process, hold *START/STOP* button **during 3 seconds**.



In case that the memory card becomes full during data acquisition, the unit will automatically change to the *STOP* mode and will indicate the incidence by means of the *REC* LED, which will start *flashing*.

To send the data stored in the SD memory card to the **CIR-e³Web** application STOP the CIR-e³. (push STOP button during 3s or more). Make sure that the CIR-e³ is in STOP mode and extract the SD memory from the analyzer. See paragraph 6.7.

6.7 Safe EXTRACTION of the SD memory card

To extract the SD memory safely, make sure that the unit is not in the recording mode. The *REC* LED must be OFF. If the *REC* LED is ON, or flashing, STOP the recording by pressing the *START/STOP* button during 3s, before removing the SD card.



Removing the SD card while the unit is in the recording mode can corrupt the file containing stored data. STOP the CIR-e³ before removing the SD memory.

6.8 INSERT SD memory card in a PC

Insert the SD card into your computer or SD card reader and run the **CIRe.exe** software, located in the root directory of the SD memory card.



Fig. 6-28.- Icon of CIR-e.exe, software for data processing

The **CIRe.exe** software allows sending the data recorded in the SD memory card to the web processing software **CIR-e³Web**. Such web software allows the user the display of recorded data and the exploitation of all information previously recorded in the SD card.

The procedure followed to send data to **CIR-e³Web** is explained in section 6.9.

6.9 TRANSFERRING data to the application CIRe³Web



The maximum size of a file which can be sent to the CIRe³Web (processing Web tool) is 64 Mb. For larger files use the software Power Vision or Power Vision Plus.

In order to send recorded data to the web application **CIRe³Web** you shall need Internet connection.

After inserting the SD memory card in the computer and running the **CIR-e.exe** application, as explained in the previous point, the following window, showing the files in the SD memory card will be displayed.

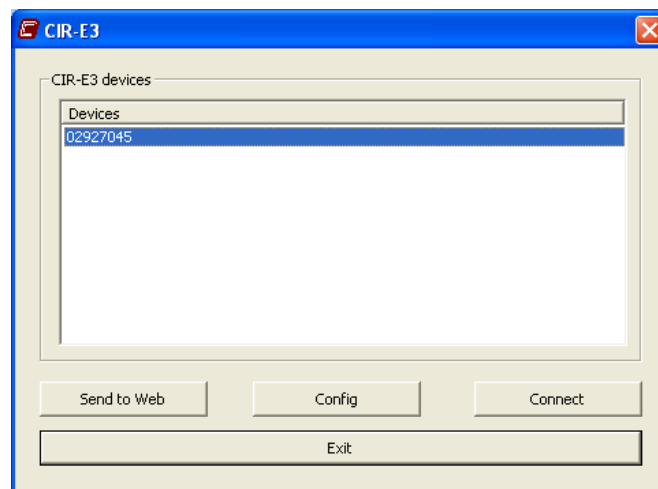


Fig. 6-29.- CIR-e.exe window allowing file selection.

To send the recorded files to **CIRe³Web** application, select the file from the displayed list and click on the button “Send to Web”. In case that you have not selected a file, the Send to Web button is disabled. Once a file has been selected and sent to web, the application displays the screen in Fig. 6-30, which allows the configuration of a report name and description, before data is sent to the web application.

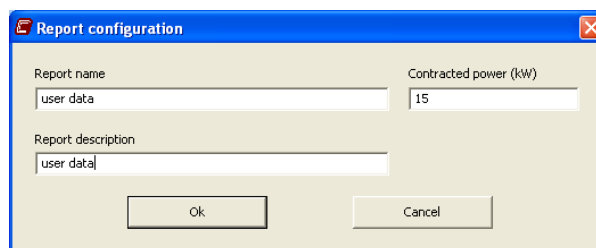


Fig. 6-30.- Name and description of loaded file

Data requested in this template are:

Report name: The report configured before the data are recorded by the **CIR-e.exe** application will be displayed by default in the space used to enter the name of the report. You can change this name. This field is limited to 16 characters.

Report description: By default, this space shows the name given to the report. The user can change this name and give a short description of the data (including for example origin or working conditions). This field does not have a character limitation.

To send the data to the Web application, click on “Accept”.

In case of error transferring data, because of file size or in case that the data file is not found (file must have .std extension and shall be placed in the root directory of the memory card), the application will display the following error window (Fig. 6-31).

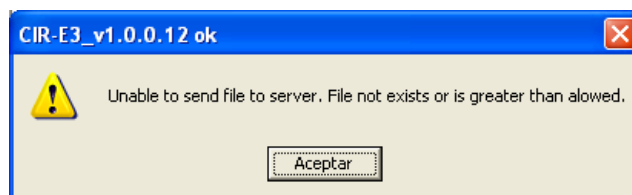


Fig. 6-31.- Error message

Click on “Accept”. If no errors are detected, the application will encrypt the data and send them to the Web page. During this process, the application will display the following window.

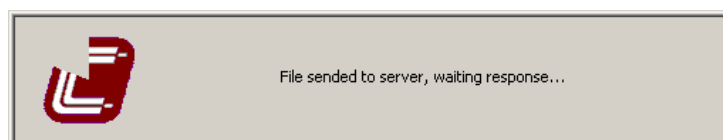


Fig. 6-32.- Message indicating that file has been sent

If there is an error in the data operation page, the application will display an error message with an error code indicating the error cause and displaying the following message: “**The file can not be sent to the server. Error code....**”. The error codes are shown in Table 6-3

Table 6-3.- Error codes during file uploading

Code	Causes	Solution
0	The file could not be opened or it does not exist	Make sure that the *.std file is in the root directory of the SD card
1 to 16	Incorrect transfer or Web server function	Check the Internet connection
500	The user has exceeded the limit of 10 reports sent to the Web and he is not allowed to send a new one.	You must delete your account before posting new reports.

If the file sent to the Web application produces no errors, the application automatically will generate a folder in the root directory of the SD memory card. The folder name will be the same as the unit's serial number, as it was entered in the **CIRe.exe** application and it will store all the files with **.std** and **.xdt** extensions.

The files are automatically stored in the new created folder and renamed as follows: Filename = yymmddhh , (YEAR MONTH DAY HOUR). For example, a file sent on the 10th of March, 2009 at 13:00h will be stored in the folder with a name that includes the serial number as follows: 09031013. This files can be considered a backup copy of the data sent to the Web application.

When the information has been sent, the program will show a confirmation window.

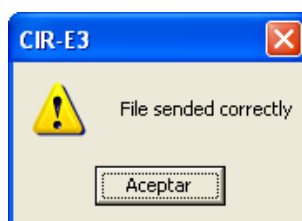


Fig. 6-33.- Confirmation window

If the user selects "*Cancel*" in the screen of Fig. 6-29, the window will be closed and the data transfer process will be cancelled.

Once that data have been uploaded in the Web page, the user must connect to the web-based application to handle and process the information previously recorded. To do so, click on the "*Connect*" option in Fig. 6-29 screen, or follow the procedure described in the next section 6.10

6.10 Analysis and display of data

In order to handle the recorded data and perform the data processing and display, the user must connect to the following web page: <http://cir-e3.circutor.com> .

Enter the page in the browser and the following application access screen will be displayed.

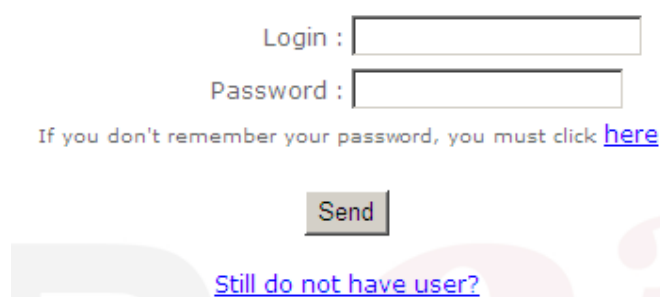


Fig. 6-34.- CIR-e Web files access

To access your account and view your files, fill in the access data fields with your user registration information and click on the "*Send*" button.

Login: Access name established during the registration process.

Password: Access password established during the registration process.

To go into the Web tool, press "*Send*".

6.10.1 List of Reports

The main screen of the Web application shows a list of reports sent by the user to the Web page. The information displayed in each row includes the file creation date, the date when the information was transferred to the Web page, the title of the report, established by the application and the serial number (which must be the same as that of the measurement unit).

Each user has a **maximum of 10 reports** in his Web address. If the user already has the 10 reports when he tries to send the next, the application will return an error message with code 500. In such case, the user should delete some reports before sending a new one. To delete a report, press the icon with the trash bin.

Personal information

Reports

Devices


Recording final date ▼	Release Date	Report title	User	Device serial number	Delete
2009-09-30 11:43:00	2009-09-30 13:20:01	Prueba Endesa	Carlos	02925048	

Fig. 6-35.- List of files in CIR-e Web

The information displayed on the files table can be sorted in ascending or descending order for each of the items named in the columns by clicking on the arrow under the title displayed at the column header: (Recording final date, Release date, Report title ...etc.). Select a report to display the parameters in numerical or graphical format. After selecting the report, the data will be displayed as explained in section 6.10.3.

6.10.2 List of Devices

The Web application offers also the "Devices" option at the top of the screen. The window shows a list of the CIR-e3 units that have been registered by the user. The screen will show more than one unit in case that the same user has been using more than one analyzer to take measurements and he has sent the records to the Web application.

Personal information

Reports

Devices

Identifier ▼	Description
90309160	Without description
90309161	
90309163	

Fig. 6-36.- List of devices in CIR-e Web

The information included in the "Devices" menu option is:

Identifier: Serial number of the unit that has sent a file to the Web application.

Description: This field is reserved for future applications.

6.10.3 Parameters selection menu

When the user selects one of the files from the list of reports (as described in section 6.10.1, the Web application starts running and it displays a screen with several options. The top menu on the screen is as shown in Fig. 6-37

By default, the application shows all the available information in the file. In order to select the desired information, the user can select certain filters to display only specific variables according to the needs. The display options depend on the type of filtering option selected.

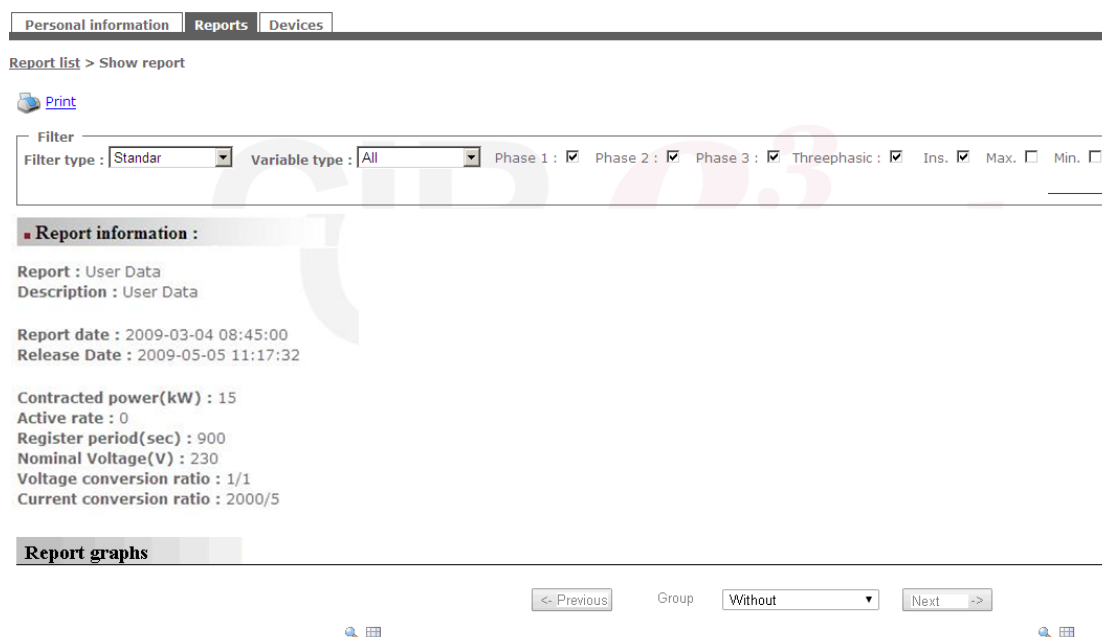


Fig. 6-37.- Parameters selection menu

Filter type: Menu used to filter the displayed information. There are two options, as shown on Fig. 6-38 : Standard or harmonics.



Fig. 6-38.- Filter types

6.10.3.1 Standard filter type:

The standard filter allows the individual selection of any of the recorded or calculated variables. To select the desired set of variables, use the drop-down menu of Fig. 6-39. If only one variable is selected you will get the same result as if you select the “Zoom” tool (see section 6.10.5.)



Fig. 6-39.- Variables selection menu

The selection menu with the standard filter option allows a wide choice of variables. The user can select variables of a specific phase or all of them. The variables may be the instantaneous values, maximum and/or minimum values or three-phase values, as shown on Fig. 6-40.



Fig. 6-40.- Specific variable selection

If the user selects the standard filter, the parameters are displayed in graphical format (see Fig. 6-41)

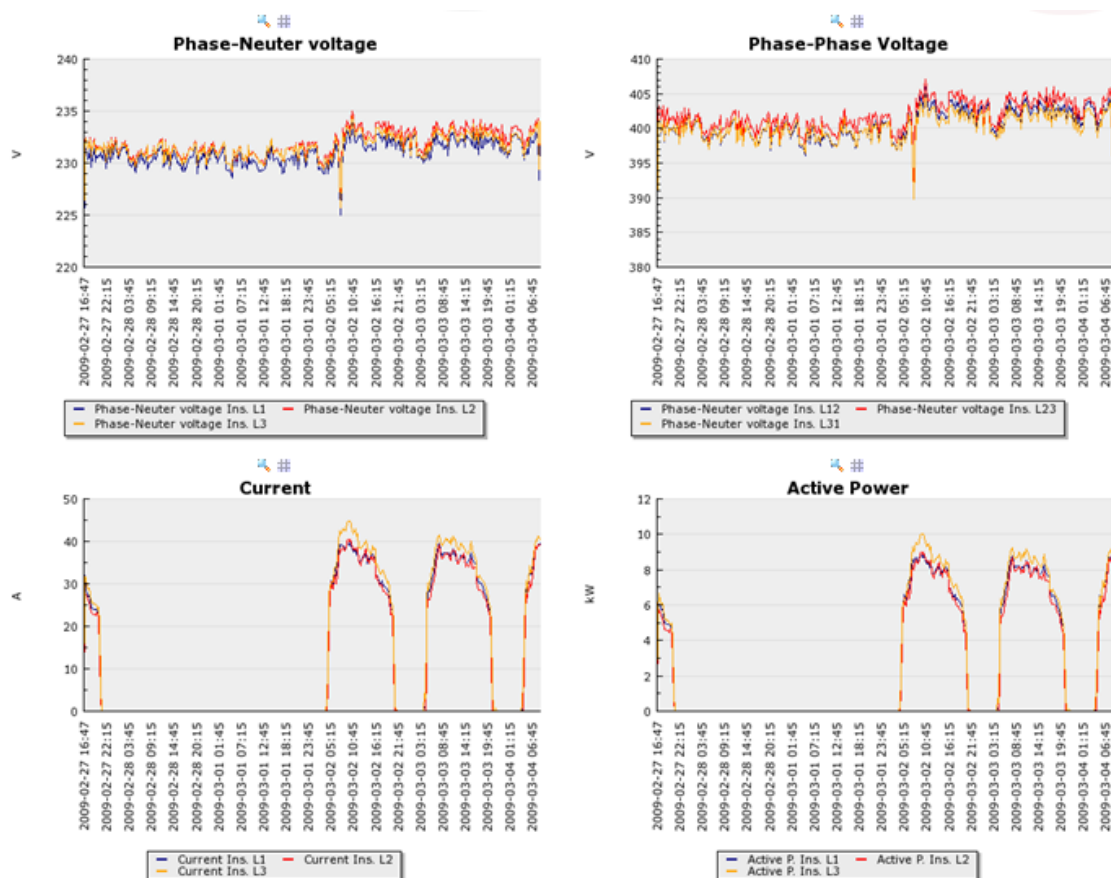


Fig. 6-41.- Examples of graphs showing the desired variables

6.10.3.2 Harmonics filter type:

If the user selects the Harmonics filter in the menu of Fig. 6-38, the information is displayed in a bar-chart as shown, in Fig. 6-42 as an example.

The default presentation screen shows the voltage and current harmonics Fig. 6-42.

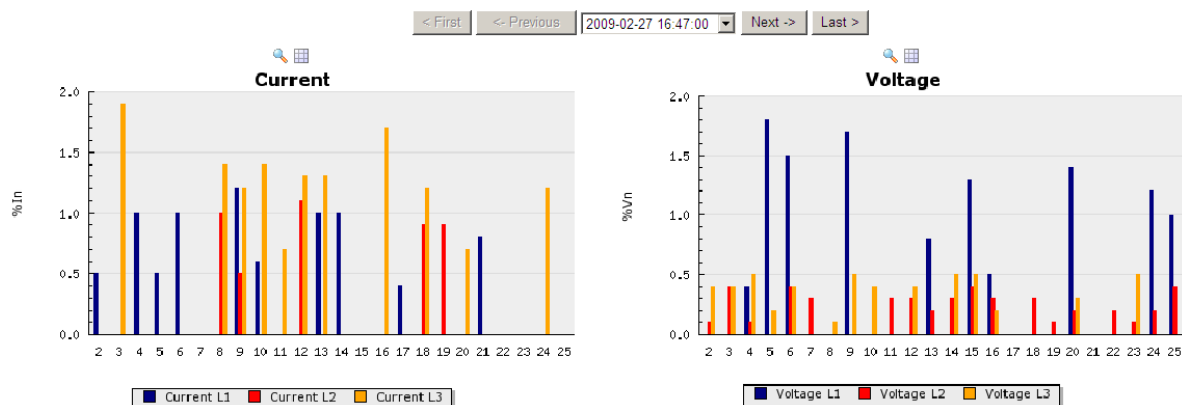


Fig. 6-42.- Harmonics bar graphs

The harmonics filter menu allows also the selection of variables of all the phases or a certain phase (see Fig. 6-37). The user can also select to display only voltage or current harmonics or all of them, selecting it from the menu in the window Variable type, Fig. 6-43.



Fig. 6-43.- Menu allowing the selection of harmonics to be displayed

Depending on the choice, the user will get the graphs with more or less detail, As an example the voltage harmonics are displayed as shown in Fig. 6-44:

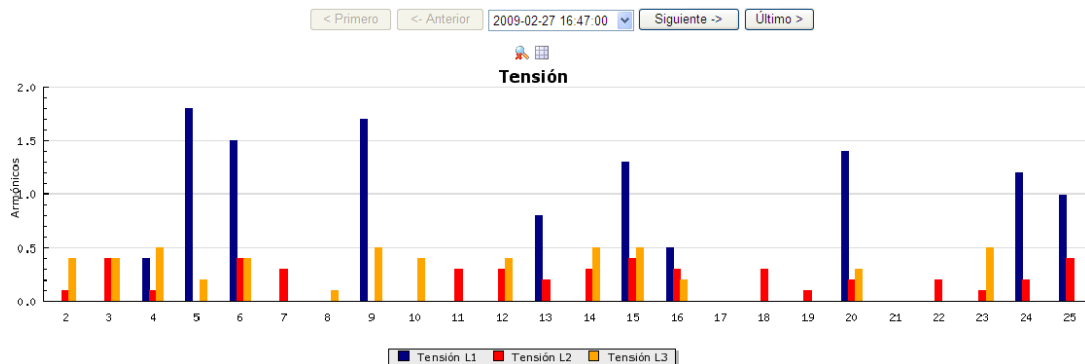


Fig. 6-44.- Voltage harmonics

This harmonics graph can then use the Zoom and Table tools. The later shows the harmonics in a table as it does when using the standard filtering option (see section 6.10.5)

6.10.4 Report information

The screen showing a report shows also all the information related to the configuration of the CIR-e³ when the measurement was taken and all the parameters concerning probe scale, etc. (see Fig. 6-37 and Fig. 6-45)

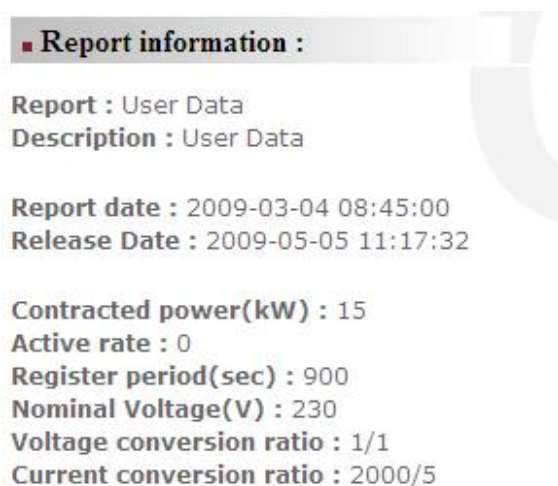


Fig. 6-45.- Report information part

The report gives the following information:

Report and Description: Displays the name of the report and its description, as used in the configuration process and to send files to the Web application.

Report date: Date when the parameters were recorded in **CIR-e³**

Release date: Date when the user transferred the data to the **CIR-e³ Web** page.

The remaining information displayed in "Report information" corresponds to the parameters configured with the **CIR-e.exe** application during the CIR-e3 setup. The information is related to the nominal voltage and frequency, contracted power, voltage transformer ratio and current scale ratio.

6.10.5 Report graphics: Grouping

Following the "Information report," the website shows graphics of different variables. To configure the graphics resolution with regard to time, there is a menu allowing the selection of different data grouping choices (see detail in Fig. 6-47). This allows the selection of time resolution in the graphs.



Fig. 6-46.- Data grouping choices

Selecting "**Not grouped**" the Previous / Next buttons are disabled and the graphic shows all the data in the record time range.

Selecting "**Hour**", "**Day**" or "**Month**" the user can choose the time resolution. In this case the menu enables the *Previous/Next* scroll buttons to jump to the previous "**Hour**", "**Day**" or "**Month**" data. In the later case, the application will group all information in the file record in hours, days, or months. This allows the analysis of shorter periods with higher resolution. Use the Previous / Next buttons to scroll through the time until you reach the desired interval.



Fig. 6-47.- Example of grouping in hours intervals

At the top part of the graph screens (example Fig. 6-48) there are two icons: a magnifying lens and a table. These give access to the *Zoom* and *Show Table* tools, explained below.



Zoom:

The *Zoom* tool zooms in or out selected graphs and shows a certain time range in the whole screen. This tool is useful when you wish to copy the graph and add it to a different document.

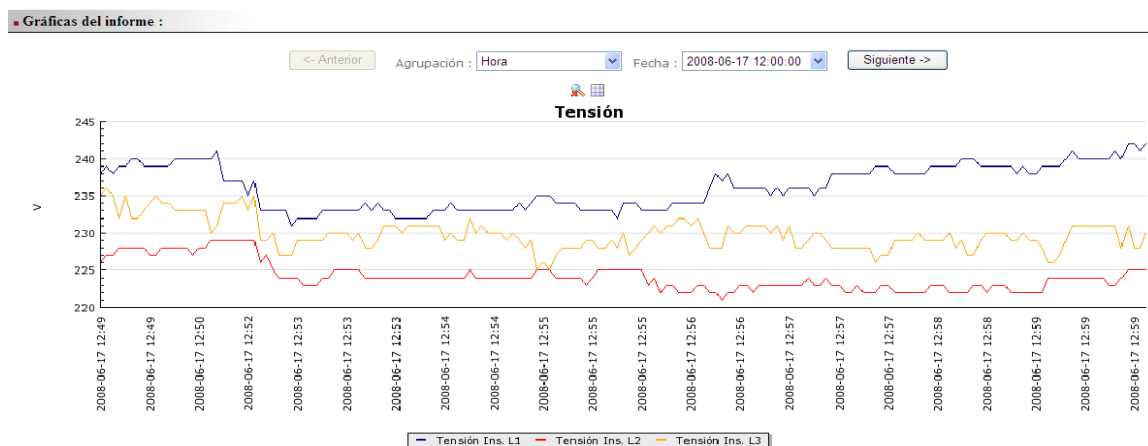


Fig. 6-48.- Graph example after a zoom

To export the displayed images to a different document or format, right-click on the graphic and select “save image as”. You can save the images of different intervals in a folder and these can be retrieved later to paste them into a report document in different formats.



Show table:

The “Show table” tool opens a window that shows all the values in the record on a single table. The Show table tool does not have a grouping menu, as it has the graphic display option.

To export the tables in the Web application to a different document or format, select part or the whole table and right click on it. It will appear a menu where you can select “Copy” to save the table temporarily in the Windows clipboard. Open the document where you wish to paste the table and right click . Select the option “Paste”, to add the table on any part of the document.

Fecha	VI1	VI2	VI3
2008-06-17 12:49:20	238	226	235
2008-06-17 12:49:20	239	227	236
2008-06-17 12:49:25	238	227	235
2008-06-17 12:49:30	239	228	232
2008-06-17 12:49:30	239	228	235
2008-06-17 12:49:35	240	228	232
2008-06-17 12:49:35	240	228	232
2008-06-17 12:49:40	239	228	233
2008-06-17 12:49:45	239	227	234
2008-06-17 12:49:45	239	227	235
2008-06-17 12:49:50	239	228	234
2008-06-17 12:49:50	239	228	234
2008-06-17 12:49:55	240	228	233
2008-06-17 12:50:00	240	228	233
2008-06-17 12:50:00	240	228	233
2008-06-17 12:50:05	240	227	233
2008-06-17 12:50:05	240	228	233
2008-06-17 12:50:10	240	228	233
2008-06-17 12:50:15	240	229	230
2008-06-17 12:50:15	241	229	231

Fig. 6-49.- Table format display



Print:

The option “print” implements allows printing the information shown in the screen. Previous to printing it performs a restructuring of the information displayed in the screen, so that it fits in a single document. This option includes the header of the report and the selected graphics.

7 FAQs

❖ *Can I start recording when any or several of the phase LED are flashing?*

When LED are flashing, we recommend checking the installation to make sure that there are no wrong connections. If the LED continue flashing after you have checked the connections, you can start the recording since this is probably due to a power factor under 0.86 (in any case, it is a real power factor value of the installation).

❖ *Can I start recording when the REC LED is flashing?*

The recording process can not be started when the REC LED is flashing, since this indicates a card write error, which may be due to one of the following causes:

- No SD memory card inserted in the CIR-e3 card slot.
- The memory card inserted does not have the correct format or data can not be written. (for example, if the card is write protected or if it has a FAT32 format. In the later case change the format of the memory card to **FAT16**).

❖ *Why has the STD file been deleted from the root directory of the memory card?*

The STD file can be deleted from the memory card's root directory for the following reasons:

- The user has changed the configuration of the clamps before powering the analyzer. This modifies the file header, deleting the file previously stored in the card.
- The user has powered **CIR-e³** without inserting an SD memory card in the unit. This loads the "Default" file with the specific setup. When you insert the memory card, the analyzer detects the new setup file and this is interpreted as a modification of the setup, so the unit overwrites the STD file and clears the energy meter.
- When the unit sends the data to the Web application, the application creates a folder with the unit's serial number and stores the file, renaming it as year-month-day-hour when it was sent. The file might be stored in the folder if you have already sent it to the Web application.

❖ *Why does the list of clamps not correspond to the selected scale?*

Basically, there may be two reasons why the analyzer may be configured with a wrong clamp current ratio:

- The user has not followed the scale selection process correctly, as established in the section 6.5.1 of this manual.
- The user powered the analyzer while the current clamps (A connector) were not connected. In such case the unit does not detect the clamps and is automatically configured with the 5A scale.

❖ *Why the recording period is different from the period previously configured?*

If the analyzer does not find the setup file at the root directory of the SD card, it is self-configured with the "Default" file, which has a default registration period of 15 minutes.

❖ *What happens when the user enters a wrong serial number when generating the setup file with the PC application?*

If you have created a setup file with the wrong name, (i.e., the analyzer's serial number), the analyzer will not use it as the unit's serial number and will configure itself with the "Default" file name.

❖ *Is there an alternative way to analyze data recorded by the CIR-e3 analyzer?*

There is an option of analyzing the data recorded in the CIR-e3, without sending data to the Web application. Use Power Vision or Power Vision Plus.

❖ *The software can not open a file. What could happen?*

- The card files may be corrupted due to unsafe removal from the device.
- The card is wrong , unreadable or write-protected.
- The file has been recorded with a date that is not accepted by the program. Usually , the faulty date has been generated in case that the device has lost the battery supplying the clock.

❖ *The data is recorded with an incorrect date. Why?*

The device records with the default date 01/01/2011 00:00h when the battery is empty and is unable to maintain the clock.

For devices with rechargeable battery, connect the device to supply during 12 h to recharge the battery and then configure the data before starting the recording process.

For devices with non rechargeable battery, change the battery by a new one.

8 CIR-e3 INSTALLATION VIDEO

CIRCUTOR, SA made available to CIR-e³ users a video showing the installation procedure and the most common errors when installing it. The video is available on the Web sites:

www.circutor.es

www.circutor.com

9 BATTERY REPLACEMENT

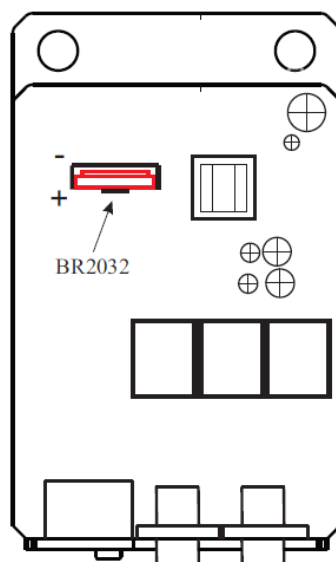
Pre-2012 analyzers have a rechargeable battery. In case of malfunction must plug for 12 hours to charge the battery. After that must set the time of the analyzer as described in Chapter 13 Setting the time of the analyzer.



To proceed to change the battery, disconnect the scanner from any source of voltage and current measurement and power

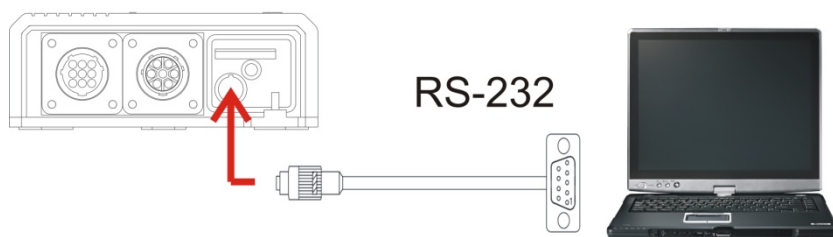
Is recommended change the battery each 5 years. To change the battery (for models from 2012) remove the 7 screws on the back of the analyzer and remove the back cover.

You must respect the position of the battery as shown in the adhesive as shown in the following picture



After changing the battery of the device must be set the time and an hour. To set the time should follow the instructions in Chapter 13. Setting the time of the analyzer

User must supply and connect the device to de PC, using the wire communications given with the device. This cable has one four-pin connector (CIR-e) and at the other end is a DB-9 (PC).



(See instruction manual to verify connections and maximum voltage of the device)

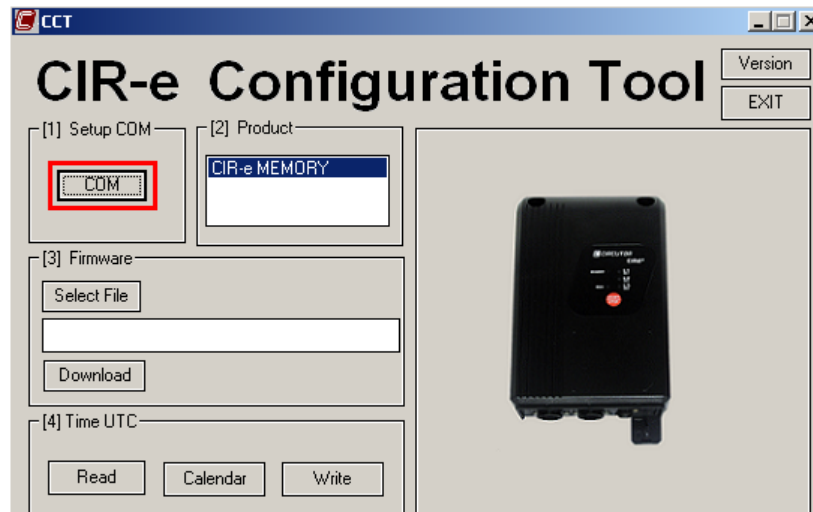
Once you supplied the device, follow the instructions below.



To start the update of the analyzer, the device can't be in record mode, must be in STOP mode and finished the boot process.

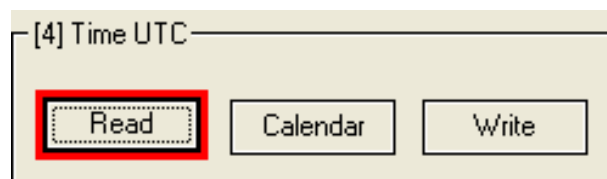
The user must run the update program CIR-e from the directory installed.

The user must set up the configuration of communications in order to communicate with the device. Select COM of [1] Setup COM.



To communicate with the device the user has to follow the instructions explained in chapters before.

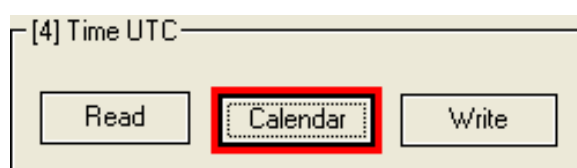
Once the program has communicated with the device, the user must select in the menu [4] Time UTC, the option *Read*.



The application shows in the line of text the time UTC that the device has configured.

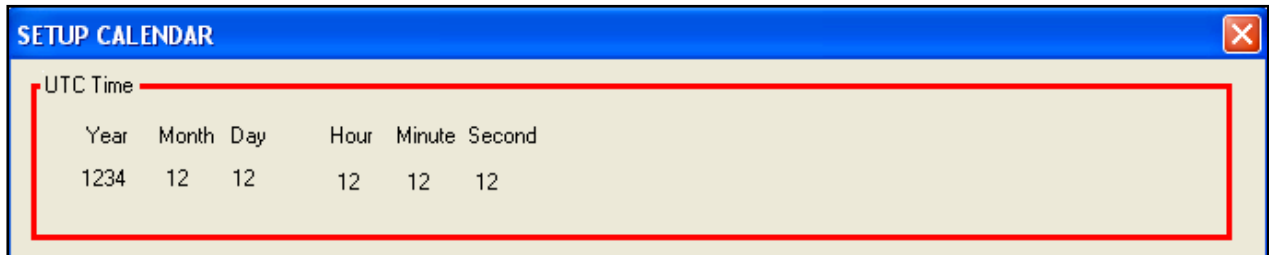
```
(CPU-Measure). Send to SRAM ...
(CPU-Measure). Send Test Flag
(CPU-Measure). Saving program to flash.
(CPU-Measure). WAIT. Saving Program...
Measure Version Updated: CIR-E3 -405- 1.18
Update Done
Info: TIME UTC Read: 05/11/2009 08:36:36
```

To modify this time, select "*Calendar*" to introduce the new time to the device.



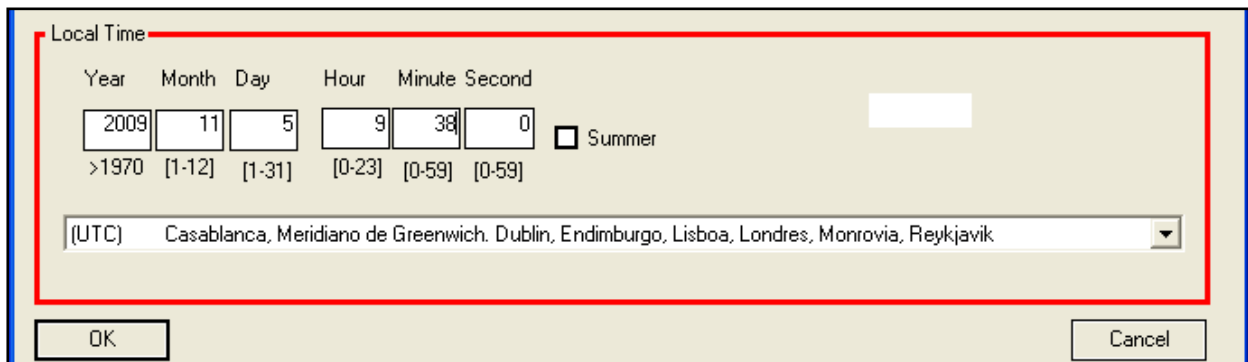
This option shows the "SETUP CALENDAR" screen.

UTC Time. This part is informational only and shows the conversion to UTC time settings according to user-entered in the field below "*Local Time*".



The dialog box is titled "SETUP CALENDAR". It contains a section labeled "UTC Time" which is highlighted with a red border. Inside this section, there are input fields for Year, Month, Day, Hour, Minute, and Second. The values entered are 1234, 12, 12, 12, 12, and 12 respectively.

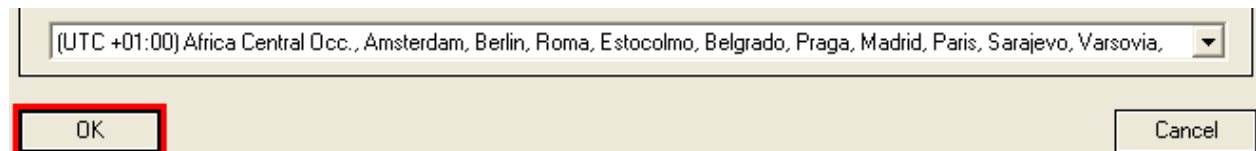
Local Time. In this field the user must enter the local date and time and indicate in the selection field "*Summer*", if you are applying DST.



The dialog box is titled "Local Time". It contains input fields for Year, Month, Day, Hour, Minute, and Second. The values entered are 2009, 11, 5, 9, 38, and 0 respectively. Below these fields, there are ranges: >1970, [1-12], [1-31], [0-23], [0-59], and [0-59]. There is a checkbox labeled "Summer" which is currently unchecked. At the bottom, there is a dropdown menu showing "(UTC) Casablanca, Meridiano de Greenwich. Dublin, Endimburgo, Lisboa, Londres, Monrovia, Reykjavik". At the bottom of the dialog, there are "OK" and "Cancel" buttons.

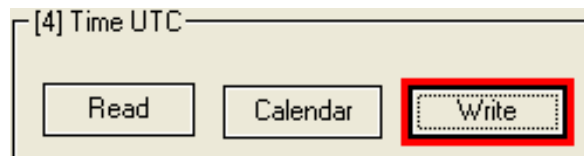
The lower field is a dropdown menu for the user to select the time zone in which it is located. With all this information on applying calculations UTC time is displayed in the "*UTC Time*".

Now push **Ok** to introduce all data.



The dialog box shows a dropdown menu with the selected time zone: "(UTC +01:00) Africa Central Occ., Amsterdam, Berlin, Roma, Estocolmo, Belgrado, Praga, Madrid, Paris, Sarajevo, Varsovia,". At the bottom, there are "OK" and "Cancel" buttons. The "OK" button is highlighted with a red border.

Once the user is in the principal screen, must click "*Write*" in order to write in the device the time set by the user.



The principal screen shows three buttons: "Read", "Calendar", and "Write". The "Write" button is highlighted with a red border.

The time that is sent appears in the line of the text.

```
(COM). Scanning for device.....
Scanning... NPeri: 1, COM: COM1, Baudrate 9600
Scanning... NPeri: 1, COM: COM1, Baudrate 19200
Scanning... NPeri: 1, COM: COM1, Baudrate 38400
(COM). Scanning End.
open COM1
Info: TIME UTC Read: 02/10/2009 10:37:16
Info: TIME UTC Read: 02/10/2009 11:05:43
Info: TIME UTC Write: 02/10/2009 11:00:00
Info: TIME UTC Read: 02/10/2009 11:00:34
Info: TIME UTC Write: 02/10/2009 14:00:00
Info: TIME UTC Write: 02/10/2009 11:05:00
```


10 MAINTENANCE AND TECHNICAL SERVICE

In the event of questions or concerns regarding operation or malfunction of the equipment, notify **Technical Assistance Service (S.A.T.)** of **CIRCUTOR, SA**.

Technical assistance Post-sales Department

Vial Sant Jordi, s/n –

08232 – Viladecavalls

Barcelona – Spain

Tel: 902 449 459 (Spain) / +34 937 452 900 (International)

e-mail: sat@circutor.es

Web: www.circutor.es

11 WARRANTY

CIRCUTOR warrants its products in case of manufacturing defects for a period of two years from the delivery of the equipment.

CIRCUTOR will repair or replace defective products returned within the warranty period.



No returns will be accepted nor will repair or replace any equipment if not accompanied by a report explaining the observed defect or the reason for the return.

The warranty is void if the equipment has been subject to "misuse" or the customer did not follow the instructions for storage, installation and maintenance contained in this manual. We understand as "misuse" any use situation contrary to National Code or exceeding the limits given in the section on technical and environmental characteristics of this manual.

CIRCUTOR declines all responsibility for any damage to equipment or other parts of the facility, caused by a bad installation or "misuse" of the equipment.

Consequently, this warranty does not apply to faults caused in the following cases:

1. Faults due to overvoltages and / or electrical supply disruptions
2. Faults due to water or humidity, if the IP rating of the product is not suitable.
3. Faults due to lack of ventilation and / or excessive temperatures
4. Faults due to improper installation and / or lack of maintenance
5. In case that the equipment has been serviced, repaired or modified without authorization from CIRCUTOR

12 CE CERTIFICATE**DECLARACION DE CONFORMIDAD CE**
CE DECLARATION OF CONFORMITY
DECLARATION DE CONFORMITE CE

Por la presente
We hereby
Par le présent

CIRCUTOR, S.A.

Con dirección en:
With address in:
Avec adresse à:

Vial Sant Jordi, s/n
08232 VILADECALLS (Barcelona)
ESPAÑA

Declaramos bajo nuestra responsabilidad que el producto:
We declare under our responsibility that the product:
Nous déclarons sous notre responsabilité que le produit:

Equipo portátil para auditorías
energéticas

Serie: CIR-e3

Marca CIRCUTOR

Siempre que sea instalado, mantenido y usado en la aplicación para la que ha sido fabricado, de acuerdo con las normas de instalación aplicables y las instrucciones del fabricante,

Provided that it is installed, maintained and used in application for which it was made, in accordance with relevant installation standards and manufacturer's instructions,

Toujours qu'il soit installé, maintenu et utilisé pour l'application par laquelle il a été fabriqué, d'accord avec les normes d'installation applicables et suivant les instructions du fabricant,

Cumple con las prescripciones de la(s) Directiva(s):

Complies with the provisions of Directive(s):

Accomplit avec les prescriptions de la (les) Directive(s):

2006/95/CE
2004/108/CE
98/37/CE

Está en conformidad con la(s) siguiente(s) norma(s) u otro(s) documento(s) normativo(s) :

It is in conformity with the following standard(s) or other normative document(s) :

Il est en conformité avec la (les) norme(s) suivante(s) ou autre(s) document(s) normatif (ves) :

IEC 60664-1	IEC 61000-6-2
IEC 61010-1	IEC 61000-4-3
IEC 62053-21	IEC 61000-4-4
IEC 61000-3-2	IEC 61000-4-5
IEC 61000-3-3	IEC 61000-4-8
IEC 61000-6-4	IEC 61000-6-1
EN 55011	IEC 61000-4-11
EN 55022	IEC 60529
UL 94	ENV 50141
VDE 110	

Año de colocación del marcado "CE": 2009

Year of affixing "CE" marking:

An de mise en application du marquage "CE":

Revisado en Viladecavalls
Fecha: 26/02/2009

Nombre y Firma :
Name and signature :
Nom et signature :

