



EDS / EDS-3G EFFICIENCY DATA SERVER



TUTORIAL

M98231301-03-12B

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1. Introduction:

The **EDS / EDS-3G** or Efficiency Data Server is a device with the latest CIRCUTOR technology applied to PowerStudio .

It contains a microprocessor with a 200 Mb memory and routines with **CIRCUTOR** device drivers.

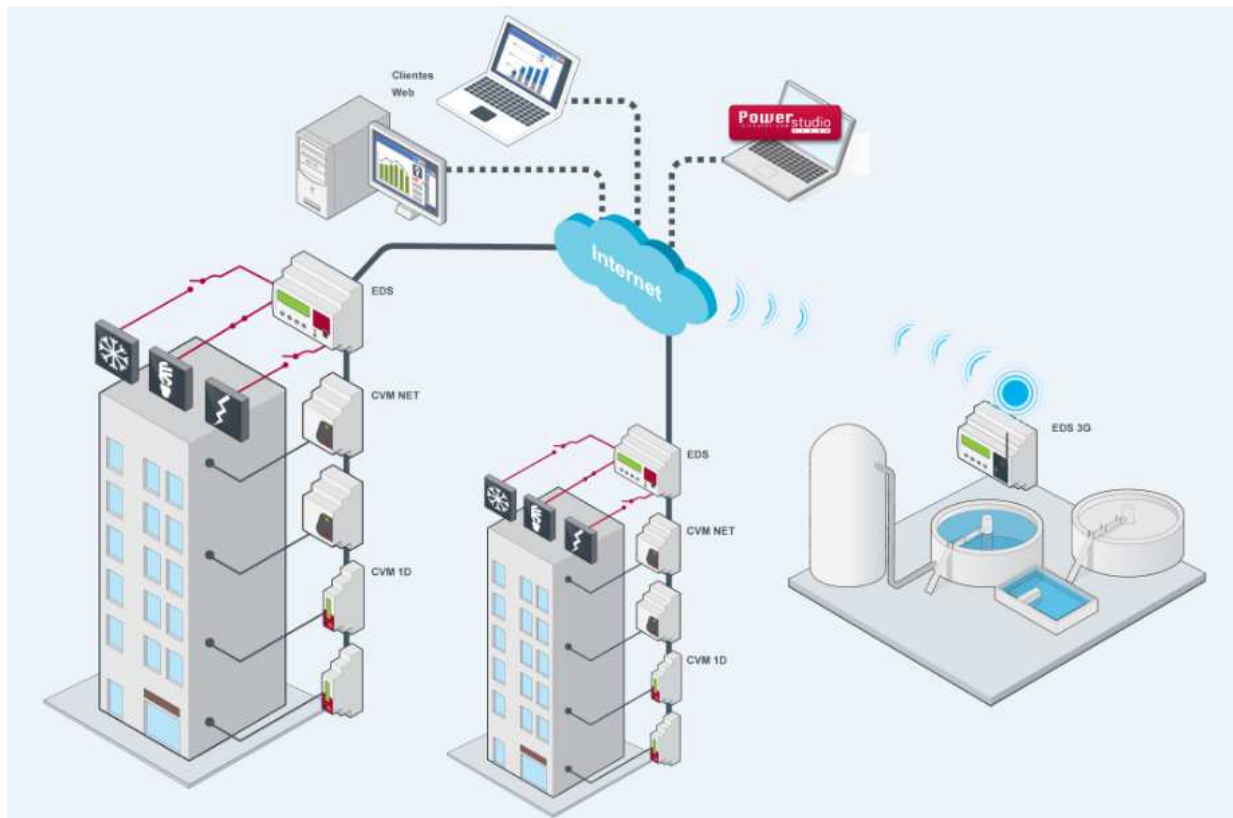
It is recommended not to connect more than 5 power analyzers with **CIRCUTOR** Modbus communications to the RS-485 communications port, although there may be a larger number of devices depending on the number of parameters delivered by the connected devices. For example, if connecting **EDMK** energy meters, it is possible to connect up to 8010 of them, as these have 12 Modbus parameters each, as opposed to the 500 of a **CVM-K2** or 230 of a **CVM-MINI** or **CVM-NET**. The number of devices is not limited by software, but connecting more devices than those recommended will affect performance and WEB data consultation, making the device slow in the telemanagement of information.

Using the Ethernet connection, it is possible to access the memory using communications from another location, such as the Internet or VPN networks.

EDS/EDS-3G, records and saves several months of data from the equipment connected to it. They can form part of an overall solution for acquiring data useful for management and energy efficiency. Such a solution would consist of multiple **EDS/EDS-3G** units connected to the Internet and managed by a Computer Server with **PowerStudio SCADA** installed. In the case of short or prolonged loss of communication between an **EDS / EDS-3G** and the **PowerStudio** Server, once communication has been restored, the **EDS / EDS-3G** will return the data stored in its local memory to the control system (SCADA superior), thus avoiding data being lost when communication is down.

The **EDS / EDS-3G** are devices capable of being programmed for event management (alarms) bearing in mind any parameter of any slave unit connected to them.

The **EDS / EDS-3G** do not store SCADA screens or reports. These must be in a PC with **PowerStudio SCADA** superior that will attack one or several **EDS / EDS-3G** which will be entrusted with providing data to said SCADA, avoiding polling between the software and the field devices and optimizing the traffic on the connection between the remote **EDS / EDS-3G** and the server.



The **EDS-3G** features PowerStudio Embedded management software, with a web server and Ethernet connection, in addition to a brand-new feature that lets you connect via a built-in 3G router. This new connectivity lets you establish wireless communication with points that have no ADSL connection, in order to access the information stored by the **EDS-3G** or to incorporate it into a superior energy management system, such as **PowerStudio SCADA**.

1.1. Principal features of the EDS/EDS-3G:

- Parameterization and management of automatic events
- Alarm recording system and system event management
- E-mail alarms
- RS-485 port for connecting up to 5 **CIRCUTOR** devices
- Ethernet connection
- **3G** connection (only in the EDS-3G)
- Centralization of alarms through detection of logical states or centralization of consumption by impulses.

1.2. Type of EDS/EDS-3G applications:

Domestic application: EDS/EDS-3G can be used to control the partial consumption of each load in a domestic installation.

- Control of domestic consumption
- Compare your consumption with that of the energy company
- Rationalization of home consumption
- Domestic process automation
- WEB activation/deactivation (heating, control of blinds, intrusion, etc.)

SME/Industrial Application: EDS/EDS-3G facilitates the control of partial consumptions of the different single-phase and three-phase loads during production and non-production periods.

- Control the consumption of your installation 24/365 and locate residual consumption during non-production periods
- Check the power level contracted in the installation
- Supervise the level of harmonics and the reactive load of the installation
- Alarms for excess consumption or incidents in your electrical network
- No need for a computer
- Possibility of connection when specified: the system acts automatically
- Provides information about your bill before receiving it.

Multi-point application: In the case of load distribution (or remote installations), the **EDS/EDS-3G** can control the individual consumption of each of the installations and centralize them into one.

- Efficient, easy and simple control of the consumption of your remote sites
- Energy reports per consumption zone or site
- Remote alarms for excess consumption or incidents in the electrical network
- Possibility of comparing consumption for each site.

Remote application without Internet access: with **EDS-3G** you can control the partial consumption of each of the loads in an installation that is located in a place with difficult access and where it is difficult to provide ADSL connections. Its built-in **3G** router enables connection to this equipment.

- Efficient, easy and simple control of the consumption of your remote sites where connection is difficult
- Know the value of leakage currents and the status of earth leakage relays
- Energy reports per consumption zone or site
- Remote alarms for excess consumption or incidents in the electrical network
- No need for a computer

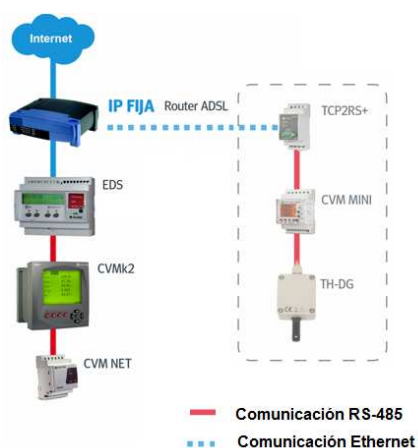
Multi-point application without ADSL connection: In a distribution of loads (or remote installations) without an Internet connection or where a VPN (Virtual Private Network) is not available, the **EDS-3G** lets you control the individual consumption of each of the installations and centralize them into one, using the **3G** connection.

- Efficient, easy and simple control of the consumption of your remote sites
- Energy reports per consumption zone or site
- Remote alarms for excess consumption or incidents in the electrical network
- Possibility of comparing consumption for each site.
- No need for a computer
- Possibility of connection when specified: the system acts automatically
- Supervise the level of harmonics and the reactive load of your installation

2. Architecture:

The **EDS/EDS-3G** has two distinct ports. The main port is the Ethernet port through which it communicates with the user (via XML), displaying the data in real time or extracting information stored by the device. This form of connection allows communication as a web server or XML with the user. The user can access their information with the “PowerStudio Scada Client” software application or by using a WEB browser.

The Ethernet connection also enables equipment within its IP range to be examined in order to enter information in their system. In other words, it can record data from other equipment via Modbus TCP.



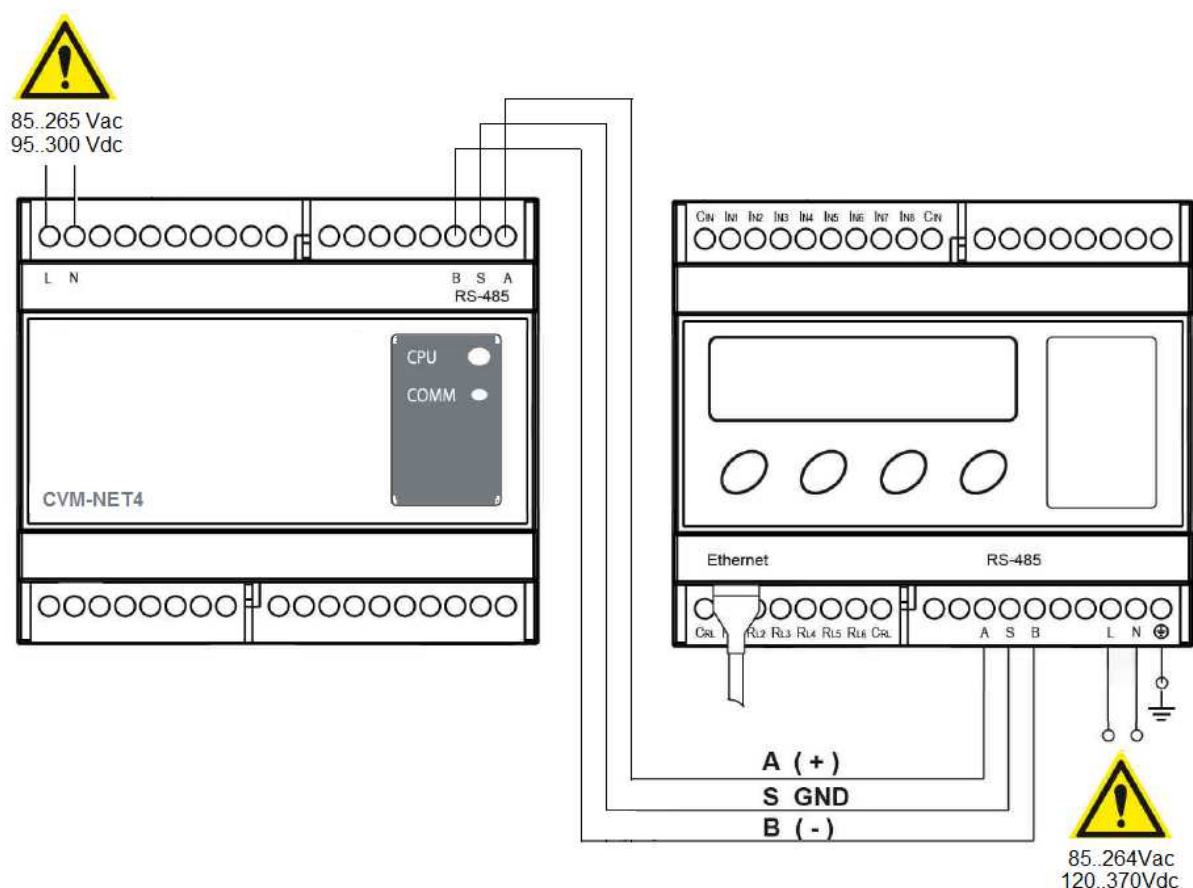
The **EDS/EDS-3G** also have a RS-485 (Modbus-RTU) communications port for communicating with **CIRCUTOR** equipment. **EDS** and **EDS-3G** both come in **Deluxe** versions for communication and data acquisition with devices using the Modbus-RTU protocol from other manufacturers.

2.1. Connections

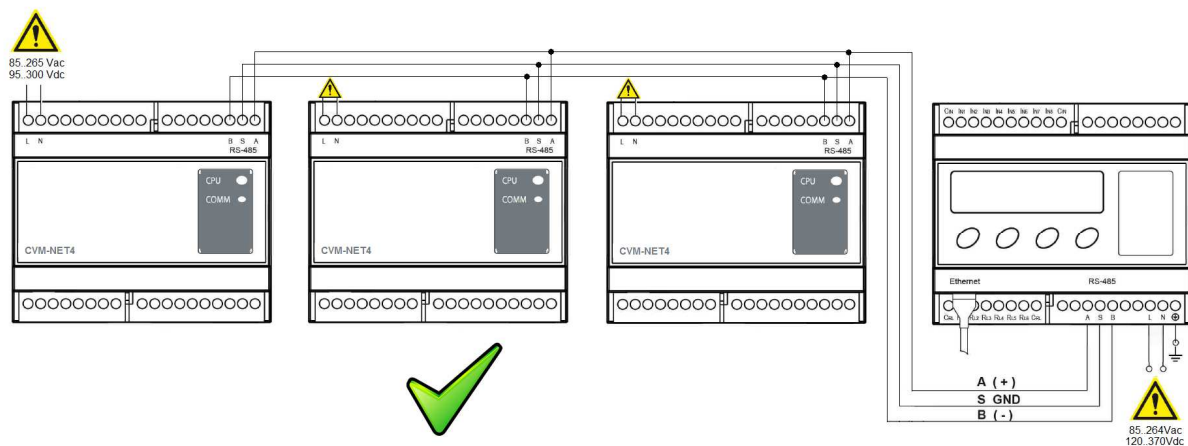
To enable connection to the slave devices, the three connections of the RS-485 master bus of the **EDS/EDS-3G** (A+ S and B-) must be wired to the different units with which communication is required. The connections may be made with a cable of shielded twisted pairs. The theoretical maximum distance between the **EDS/EDS-3G** and the slave units is 1,000 meters, although this distance may be shortened considerably depending on the quality of the cable used and the possible magnetic fields around the communications bus.

In any case, it is always possible to install RS-485 MODBUS communications repeaters such as the **CIRCUTOR CAMO**.

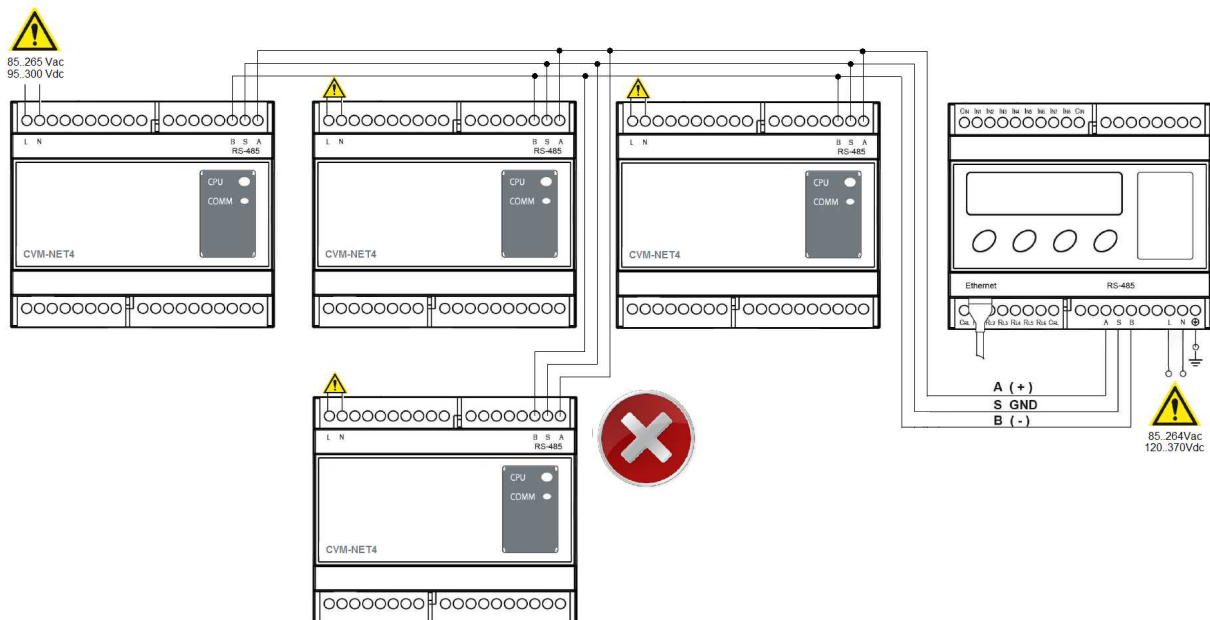
The following is the connection diagram of the RS-485 bus.



More than one slave unit is connected as follows:



Network connections or the creation of branches with the RS-485 connections are not allowed, as this reduces the cabling impedances creating temporary or permanent communication problems.



3. (EDS/EDS-3G) CONFIGURATION WITH POWERSTUDIO SCADA

3.1. Requirements

PowerStudio SCADA 3.2 EDITOR or higher is necessary for programming the **EDS / EDS-3G**. This software can be downloaded from the **CIRCUTOR** web site using the following link:

<http://www.circutor.es/Software.aspx>

Once the installation has started, select the personalized option and install the EDITOR and the CLIENT only. Follow the steps until the installation is complete. If you have Windows 7 operating system, install the software with administrator privileges.

Now we will configure:

- ✓ The IP address of the **EDS / EDS-3G** to communicate with it.
- ✓ The devices are connected to the RS-485 bus of the **EDS / EDS-3G** through **PowerStudio SCADA**. In the example a **CVM-NET4**. Remember that it is recommended to connect at most 5 **CIRCUTOR** power analyzers in the standard version and 5 market Modbus devices in the DELUXE version, always depending on the number of the variables offered by the connected equipment. Consult section 2.1 connections.

3.2. Configuration of IP in EDS/EDS-3G

When the unit has been powered up and the date and time are shown on the display, proceed as follows to configure an IP address in the device in order to communicate with it.

- ✓ Press the ►+▲+▼ keys simultaneously for more than two seconds. A warning message is displayed

NOTE: Once inside the setup menu, a key must be pressed before 30 seconds or else the unit will exit the setup menu. If any change has been made to the programming, it will not be applied unless the last menu option is accessed (save changes).

- ✓ press the ►+▲+▼ keys simultaneously once again for more than two seconds to go back into the configuration
- ✓ After a few seconds, the device will show the version of the internal firmware and MAC address of the unit



- ✓ Press the ▼ key for the DHCP option in NO. Using the ◀ or ▶ keys, the configuration can be changed using YES or NO. Leave this parameter on NO for the moment, unless you require an automatic network parameter assignment. Consult the device manual for this type of configuration
- ✓ Press the ▼ key once more to access the IP address configuration
- ✓ Press the ▶ key once to turn on edit mode. A cursor will appear under the first digit of the IP address
- ✓ Press the ▲ or ▼ keys to increase or decrease the value of the digit you are editing
- ✓ Press the ◀ or ▶ keys to move the editing cursor sideways and to choose the next or previous digit to be edited
- ✓ Repeat the steps to complete the IP address you wish to assign.
- ✓ With the IP address complete and the editing cursor on the last digit, press the ▶ key and the cursor will disappear
- ✓ The ▼ key will move on to the following parameter to be configured, the subnet mask or NETMASK
- ✓ By pressing the ▶ key, the subnet mask blocks will increase, and once the required mask has been configured, press the ▼ key to access the following configuration parameters

The IP address configuration and the subnet mask are sufficient **to** connect to the device using a PC connected in the same LAN network and an Internet browser compatible with JAVA. See section 3.4 to complete the configuration of the device connection parameters more easily.

If you require more information on the following configurations that appear in the device menu, consult the device manual.



3.3. 3G connection configuration in EDS-3G

Once the GPRS/3G data line has been contracted, your provider will have provided your connection's configuration data:

- APN (Access Point Name)
- User name
- Password

You will also be provided with a SIM card. This is protected with a password or PIN code, which will also be supplied by your connection provider. Insert the SIM card in the slot on the right side of the EDS-3G and feed the unit to the network.

Note: the SIM card is inserted with the gold connections facing downwards and the slot or chamfered edge of the card facing into the EDS-3G.

To connect the EDS-3G to the network, the parameters of the GPRS/3G connection first have to be configured.

- ✓ Press the ►+▲+▼ keys simultaneously and after a few seconds you will enter the configuration manual.
- ✓ Press the ▼ key several times to reach the APN MODEM configuration.
- ✓ Press the ► key once to activate edit mode. A cursor will appear under the first character of the parameter to be configured
- ✓ Using the ▲ or ▼ keys, you can change the characters in ascending or descending alphabetical order. With the ◀ or ▶ keys you can move sideways through the characters to be edited.
- ✓ Once the name of the supplier is completed, click on ► twice and the editing cursor will disappear.
- ✓ Then press the ▼ key and the display will show MODEM USER. You must enter the user name supplied by your connection provider.
- ✓ Press the ► key once to activate edit mode. A cursor will appear under the first character of the parameter to be configured
- ✓ Using the ▲ or ▼ keys, you can change the characters in ascending or descending alphabetical order. With the ◀ or ▶ keys you can move sideways through the characters to be edited.
- ✓ Once the name of the supplier is completed, press the ► key twice and the editing cursor will disappear.



- ✓ Then press the ▼ key and the display will show MODEM PASSWORD. You must enter the password supplied by your connection provider.
- ✓ Program this parameter following with the same editing protocol.
- ✓ Then press the ▼ key and the display will show MODEM PIN. You must enter the PIN CODE of the SIM card supplied by your connection provider.
- ✓ Program this parameter following with the same editing protocol.
- ✓ Then press the ▼ key and the display will show MODEM RESET (HOURS). This parameter tells the **EDS-3G** 3G router how often the communications are reset with the wireless network. This may be useful in sites with poor cover in order to assure connection to the 3G network every so often.
- ✓ Program this parameter following with the same editing protocol.
- ✓ Press the ▼ key several times to reach the option, SAVE NEW SETUP.

Now your EDS-3G is configured to connect to the network. After a few minutes, the device will be connected to the 3G network and the service provider will have allocated you an IP address. To check this, do the following.

- ✓ Press the ◀ + ▶ keys simultaneously. The display will show MODEM STATUS and the public IP address that will give you access to the device from the Internet. After a few seconds the 3G modem's coverage level will be shown in dBm. This parameter ranges from -113 dBm to -51 dBm, with the latter considered to be of the most coverage. For further information on the functions of the **EDS-3G** consult the device manual.

To access the EDS-3G configuration web site, follow the steps of the next section.



4. Access to the EDS / EDS-3G web site

Once the IP has been assigned to the EDS or EDS-3G, check the connection and the configuration by entering your configuration web site.

Type the following in your Internet browser to call the device:

http://EDS_IP_ADDRESS/html/setup.html

The “EDS_IP_ADDRESS” is the address assigned to the equipment or the name of the device in the domain.

If the connection is correct, the configuration web site will be loaded in the browser. Remember that this browser must be compatible with JAVA and updated to the latest version.

If the configuration web site cannot be loaded, this may be because your browser is not compatible with JAVA, or there may be a firewall or antivirus filtering the data. Turn off these services temporarily to make checks and if the checks are satisfactory, configure the services to enable access to the EDS device.

With the configuration page loaded, the network parameters of the EDS can once again be changed.



Network setup

Host name	<input type="text" value="eds-45001341"/>
DHCP	<input type="radio"/> On <input checked="" type="radio"/> Off
DHCP Client ID	<input type="text"/>
Address	<input type="text" value="172.16.4.251"/>
Netmask	<input type="text" value="255.255.240.0"/>
Gateway	<input type="text" value="172.16.0.1"/>
Primary DNS server	<input type="text" value="172.16.1.201"/>
Secondary DNS server	<input type="text" value="172.16.1.202"/>

Time setup

Primary NTP server	<input type="text" value="es.pool.ntp.org"/>
Secondary NTP server	<input type="text" value="pool.ntp.org"/>
Time zone	<input type="text"/>
Time	Mon Mar 26 2012 09:27:00 GMT+0200 (Hora de verano romance)

Active mode

	<input checked="" type="radio"/> On <input type="radio"/> Off
Host	<input type="text" value="172.16.10.113"/>
Port	<input type="text" value="3000"/>
Identifier	<input type="text" value="eds3"/>

Security setup

Password	<input type="radio"/> On <input checked="" type="radio"/> Off
User name	<input type="text"/>
New password	<input type="text"/>
Repeat password	<input type="text"/>

Information

MAC	00:26:45:00:13:41
Version Upgrade	1.0a
Powerstudio version	3.2
Devices status	



5. Synchronization of the EDS/EDS-3G internal clock

The next important step to keep in mind is to set the internal clock time of the **EDS / EDS-3G** unit. This device has a battery which keeps the clock time accurate for a determined period of time, after which the unit's time is "reset". As it is a device that records data in function of time and date, it is very important that this step is performed.

The unit has specific configurations to automatically synchronize its clock with servers every so often and also after the electrical network has turned off and on. Configure a primary NTP server and another secondary one, which gives you the date and time of your time zone. You must also choose your time zone to configure the **EDS / EDS-3G**. Use the TIME ZONE configuration scroll down menu and choose the city that represents your time zone.

6. Access to EDS/EDS-3G in installations with dynamic IP

In IP connections, the IP address of a specific interlocutor must be known in order to establish communication with it. Up to the present, network operators have assigned dynamic IPs to the network systems, unless a static IP address is contracted at a higher cost. This dynamic IP is allocated regularly or every time a new connection is made, so a known address will change when a new IP is allocated by the supplier or the user reconnects to the network. This means "losing" the connection with the device to which we are connected or with which we wish to communicate.

As stated, in an IP system we must know the IP address of the system that has to reply to requests. In the case of **EDS or EDS-3G** this means having a static IP for each **EDS or EDS-3G**, which would make the system more expensive with the contracting of this static IP.

Therefore, **CIRCUTOR** has developed the **Active Mode** for the **EDS** and the **CIRDNS** for the **EDS-3G**. Furthermore, the **EDS-3G** is compatible with the **DynDNS** service.

With these IP communications systems, the role of the connection process with the remote equipment is inverted. In this case, the devices start the communication process against the connections server hosted in a central computer with a static IP, informing the control or access server of the IP assigned by the ADSL or 3G network operator.

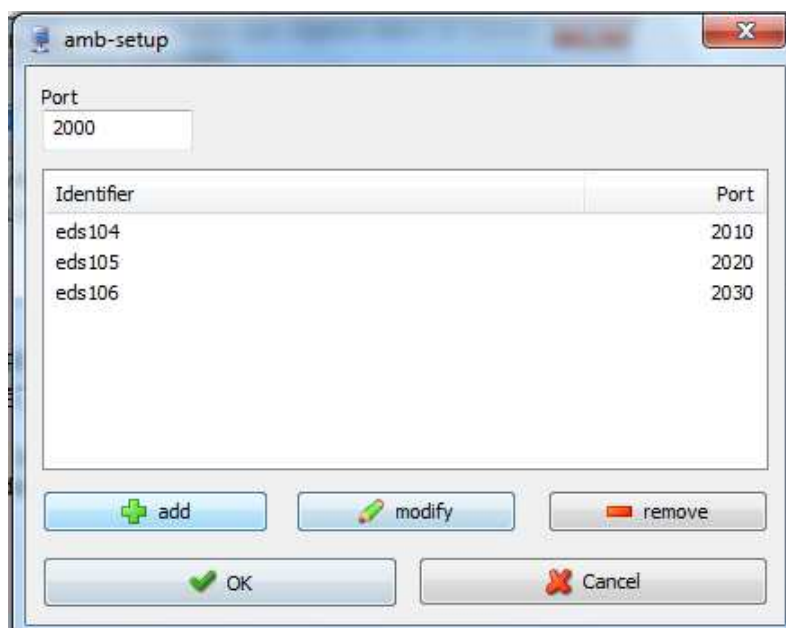
6.1. ACTIVE MODE in EDS

The **ACTIVE MODE** function gives access to the **EDS** in installations with a dynamic IP address, in both local and remote mode. If this is not the case, these parameters may be left blank and the ACTIVE MODE option OFF.

Otherwise, to access the **EDS** with a dynamic IP address, a PC or server must be determined to deal with providing a connection for the remote **EDS**. This server or PC must have a STATIC address visible from the INTERNET and must have a port enabled for the EDS to enter the system.

6.1.1. Configuration of the AMB-SETUP program

The **AMB** software on the MINI-CD which comes with the **EDS** is installed in this PC or server. Once installed, the program must be run in administrator mode and configured accordingly:



Configuration of the AMB

In the "PORT" field, the determined public port must be entered, which will be configured in the router for the **EDS** installed outside the local network to access the AMB service. In the example, we have determined that the access to the static IP of the server will be port 3000 and the port configured in the server where we have installed the AMB will be port 2000.

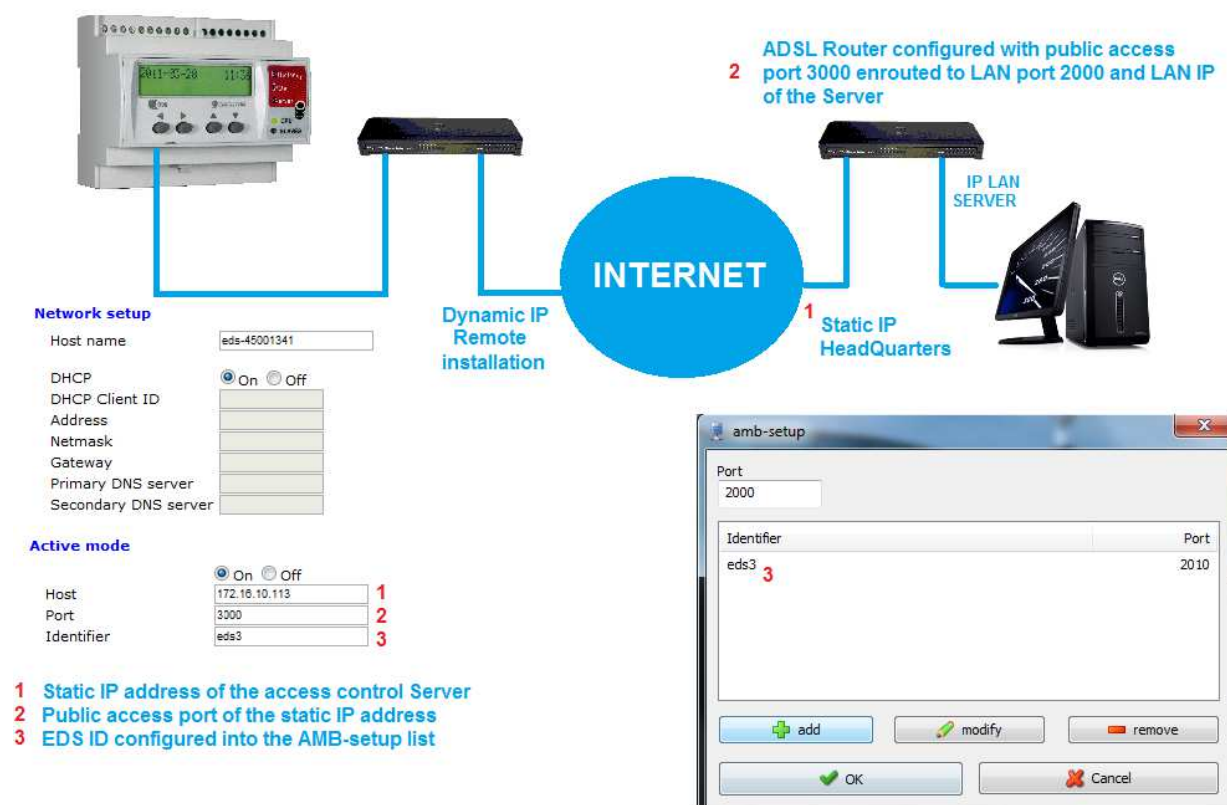
To configure this routing, access the ADSL router configuration of your PC or server from where you can access the **EDS** and configure this port to open and be routed as follows:

Static IP of the server (determined by the Internet access service provider): Port 3000, routed to static IP of the server: Port 2000 (port configured in the AMB)

NOTE: The ADSL router giving Internet service to the server must have a static IP. This IP or domain will be configured in all **EDS** that have to be accessed from outside, in the HOST parameter on the configuration web site of the **EDS**.

In the list of the **AMB** program, add the **EDS** devices by configuring an identifier and a free internal port of the PC or server.

As many **EDS** may be registered as there are ports available in the PC or server. A different port must be allocated for each **EDS** as shown in the image.



Once correctly configured, the **EDS** will connect to the IP address of the server and will communicate with the AMB program. If the EDS identifier coincides with the programmed device in the device list, this will be routed with the assigned server port.

This connection is restored every 5 minutes, and it may not be established immediately at the beginning.

To access the remote **EDS** , open your Internet browser and in the address bar, enter: <http://localhost:2010>, in the case of the example. If the connection is made, the PowerStudio management software will appear embedded in the **EDS**.

6.2. DynDNS in EDS-3G.

Before configuring this connection function, configure the access to the 3G network as in section 3.3.

To establish the DynDNS connection to the network an account needs to be created at www.dyndns.org and in this routing provider a name or host to identify the device in the network must be configured. The use of this system will depend on the guaranteed routing by the dyndns.org provider.

Look at the device configuration web site or configure these parameters with the EDS-3G keyboard.

- ✓ Select the DynDNS connection mode in the SERVER TYPE field.
- ✓ Enter the name of the HOST you created in the DynDNS account.
- ✓ Enter the username and password for access to your DynDNS account.

Dynamic DNS setup

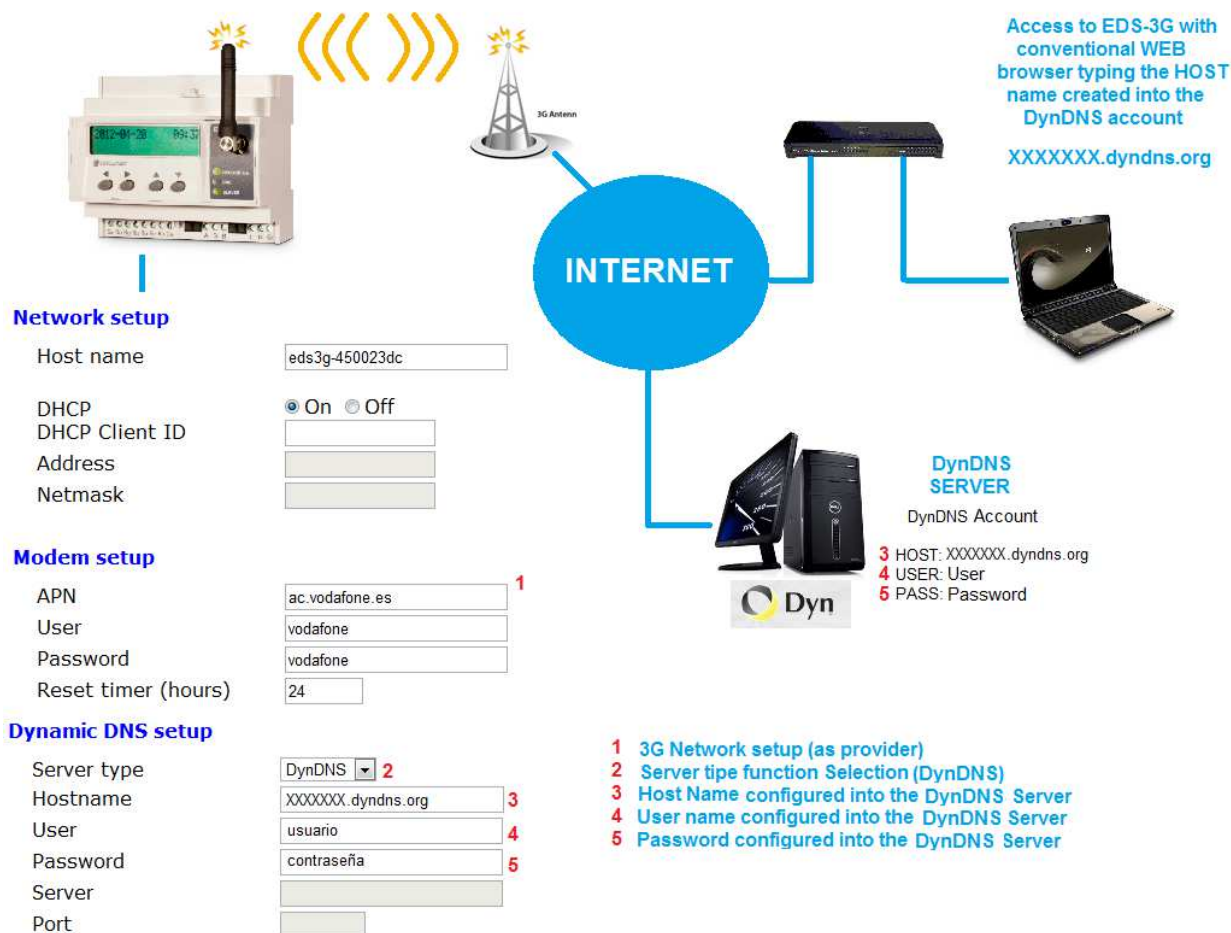
Server type	<input type="text" value="DynDNS"/>
Hostname	<input type="text" value="XXXXXX.dyndns.org"/>
User	<input type="text" value="XXXXXX"/>
Password	<input type="text" value="XXXXXX"/>
Server	<input type="text"/>
Port	<input type="text"/>

Save the changes from the configuration web site or if the configuration was made using the device keyboard, go to the end of the menu to save the new configuration.

After a few minutes, it will be possible to access your **EDS-3G** by typing the following in your internet browser bar

<http://xxxxx.dyndns.org/html/setup.html>

Regardless of the public IP address allocated to your **EDS-3G** by the service provider, access to the EDS-3G will always be available by entering with DynDNS, although this will depend on the DynDNS provider.



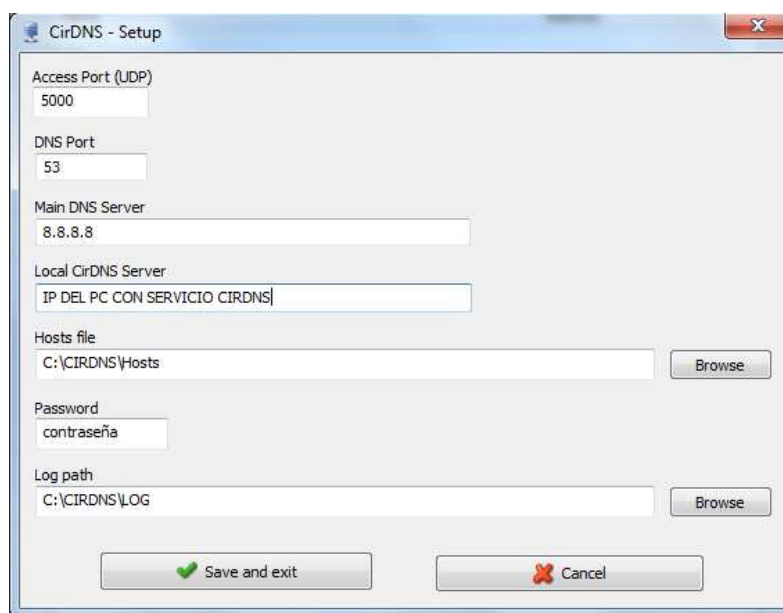
6.3. CirDNS in EDS-3G (Principle of operation under review)

The **CIRCUTOR CirDNS** system is a routing system that turns a PC or server into a system that publishes the IP addresses of remote **EDS-3G** on the Internet. This has a program that must be installed and configured in a control PC or server with Internet access.

6.3.1. Configuration of the CirDNS program.

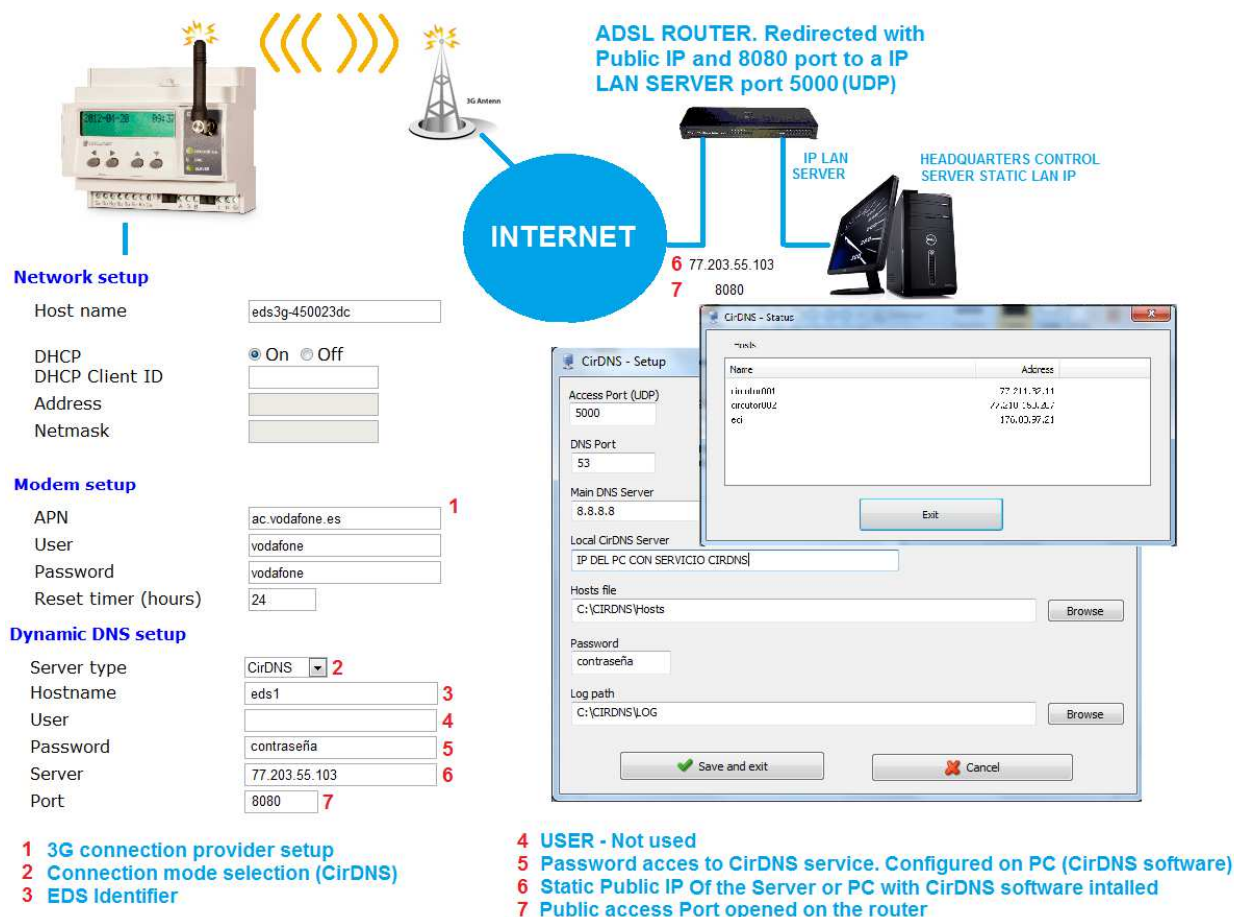
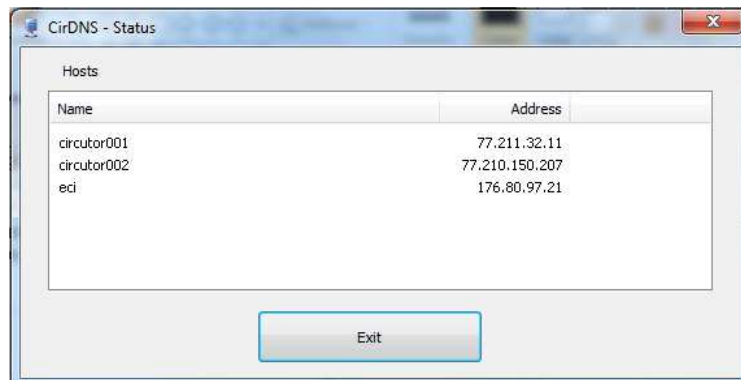
Install the CIRDNS program in the control or access PC or server. You will find this program on the MINI-CD that comes with the unit.

Once installed, run SETUP



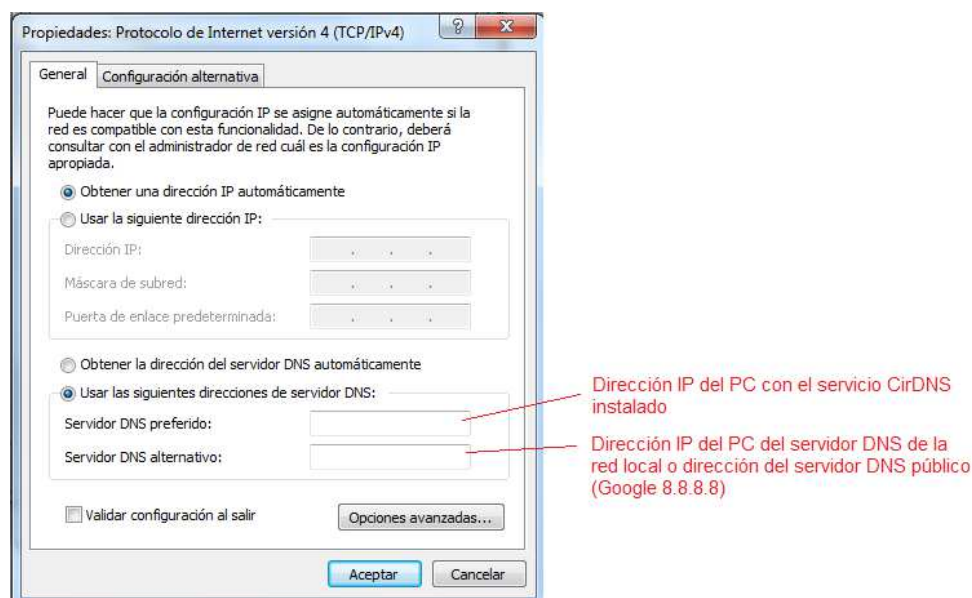
- ✓ Configure the access port enabled in the router, PC or server that will be used to connect the **EDS-3G** from the GRPS/3G connection. In the image this is Port 5000.
- ✓ The DNS Port (53) can not be modified.
- ✓ The MAIN DNS SERVER field must contain the IP address of the DNS Server serving your network. Check the configuration of your Ethernet connection to find this IP address. It is also possible to configure an IP address for a public DNS Server (Google 8.8.8.8) if the PC has Internet access.
- ✓ The LOCAL CIRDNS SERVER field must contain the IP address of the PC that has the CirDNS installer program. Check the configuration of your Ethernet connection to find this IP address.
- ✓ The two DNS IP addresses, Main and Local, must be the static IP addresses of the systems that provide DNS service.
- ✓ The names of the EDS-3G that have been connected to the CirDNS service and the IP address (3G) assigned when the connection was made are stored in the HOST FILE directory.
- ✓ The password field will include the password to access the CirDNS service. This password must be the same one that was entered in the EDS-3G to be connected to the CirDNS server.
- ✓ The incidences detected by the CirDNS service are stored in the LOG PATH directory. Check this file to detect potential CirDNS service configuration problems.

Once the application has been configured, run the STATUS program to check the **EDS-3G** being connected from the 3G network to the **CIRDNS** system.



- Additional configuration

To access the CirDNS service and consequently the EDS-3G units connected to the service. The Ethernet connection must be configured with the pre-set DNS addresses in the following way:



- Safety

On the web configuration page it is also possible to configure a user and password to block access to the configuration and editing of the **EDS/EDS-3G** internal program. This will be required both in access to the web configuration and when importing / exporting the unit's programming to the **PowerStudio SCADA EDITOR**.

The **EDS/EDS-3G** incorporates other user and password protection for web consultation in order to block access to consultation for unauthorised users. Consult section 16, user hierarchy for consultation.

7. Access to the EDS / EDS-3G, WEB PowerStudio EMBEDDED.

7.1. With static IP

With the computer connections configured, if the EDS is connected in the same network as the PC from which access is required, it is sufficient to type the IP address allocated to the EDS in the web browser.

http://IP_EDS

Examples:

<http://192.168.1.20>

<http://172.16.80.12>

PowerStudio Embedded will automatically be loaded in the browser and the following address will be shown:

http://IP_EDS/html/index.html

The configuration page may be loaded at any time as long as the **EDS** is on-line, by using the following command in the browser address bar:

http://IP_EDS/html/setup.html

If the **EDS/EDS-3G** has the password activated, a window will be shown to enter the username and password.

7.2. With dynamic IP and Active Mode function (AMB)

In this case, access to the EDS will only be possible from the system that has the **AMB** software installed. Make sure that the **AMB** has been started and is correctly configured (consult section 6.1 of this tutorial).

Open a window of your web browser and enter:

http://localhost:Port_allocated_to_the_EDS_in_AMB_list

Examples:

<http://localhost:2010>

<http://localhost:2020>

PowerStudio will automatically be loaded in the browser and the following address will be shown:

http://localhost:Port_allocated_to_the_EDS_in_AMB_list/html/index.html

The configuration page may be loaded at any time as long as the EDS is on-line, by using the following command in the browser address bar:

http://localhost:Port_allocated_to_the_EDS_in_AMB_list/html/setup.html

If the EDS has the password activated, a window will be shown to enter the username and password.

7.3. With dynamic IP and DynDNS in EDS-3G

Once the device has been configured to connect to the DynDNS server (see section 6.2), open a window in your web browser and type the name of the HOST created in the DynDNS account.

For example:

<http://xxxxx.dyndns.org/>

PowerStudio Embedded will automatically be loaded in the browser and the following address will be shown:

<http://xxxxx.dyndns.org/html/index.html>

The configuration page may be loaded at any time as long as the EDS is on-line, by using the following command in the browser address bar:

<http://xxxxx.dyndns.org/html/setup.html>

If the **EDS-3G** has the password activated, a window will be shown to enter the username and password.

7.4. With dynamic IP and CirDNS in EDS-3G

Once the device has been configured to connect to the **CirDNS** server (see section 6.3) open a window in your web browser and type the name of the HOST created in the **CirDNS** account.

For example:

<http://eds-3g1/>

<http://eds-3g2/>

PowerStudio Embedded will automatically be loaded in the browser and the following address will be shown:

<http://eds-3g1/html/index.html>

<http://eds-3g2/html/index.html>

The configuration page may be loaded at any time as long as the EDS is on-line, by using the following command in the browser address bar:

<http://eds-3g1/html/setup.html>

<http://eds-3g2/html/setup.html>

If the **EDS-3G** has the password activated, a window will be shown to enter the username and password.

8. EDS/EDS-3G PowerStudio embedded application.

Once you have access to the PowerStudio Embedded integrated in the EDS with the web browser, install the PowerStudio EDITOR and CLIENT. (See section 3.1, requirements)

As explained below, the EDS application may be loaded from an existing device and ON-LINE or a new one may be created without having any device connected.

8.1. First import operation of the EDS/EDS-3G (On-line)

Open the **PowerStudio SCADA EDITOR** and create a new application. Give a descriptive name to this application to indicate that it is the SETUP application of the **EDS/EDS-3G**. If you need to configure more than one **EDS/EDS-3G** you must have a different application for each of them, in which the characteristic parameters of the installation where it is located are configured.

- Click on the "Import" icon.

The following window will appear, where you must enter the IP address you configured in the **EDS/EDS-3G** device and the connection port.

If you are accessing the **EDS** with the **ACTIVE MODE** function, this IP address will be localhost (127.0.0.1) or the IP of the PC or server with the **AMB** service installed.

The port will be the one configured in the **AMB** list which corresponds to the programmed **EDS** identifier.



Once this data has been entered, do the following:

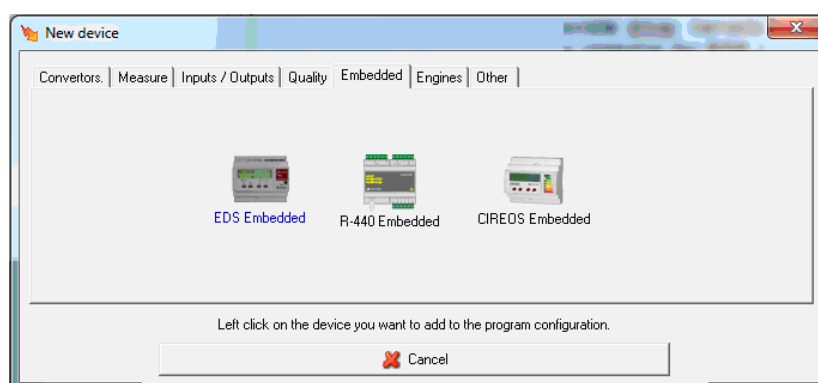
- ✓ Click on Accept and the import process will begin.
- ✓ Once this process has finished, you will see that the "screens" and "reports" icons disappear from the PowerStudio Editor icon bar. Remember that the **EDS/EDS-3G** is a PowerStudio data server and event manager and is unable to

contain SCADA screens and REPORTS. Data can be seen in real time on the preconfigured web site inside and the log data can be seen as a table or graphic.

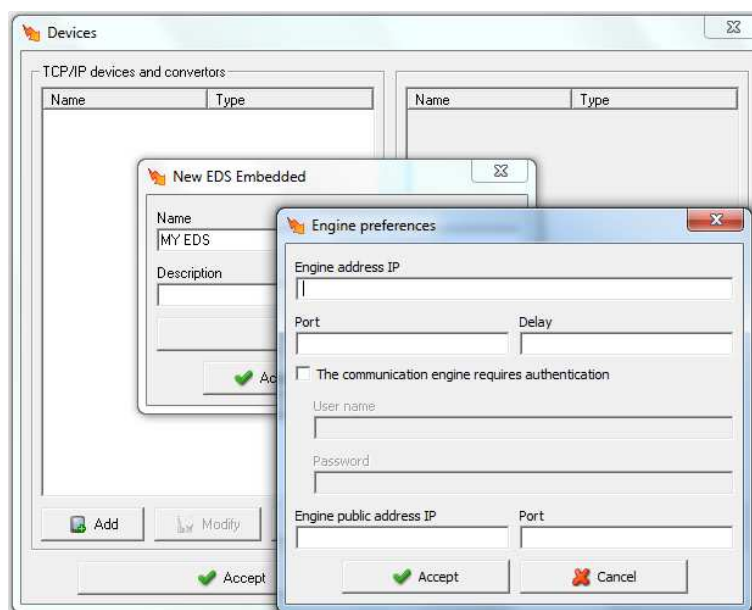
- ✓ Follow the steps of section 10 of this tutorial.

8.2. New PowerStudio SCADA configuration (OFF-LINE)

- ✓ Open the **PowerStudio SCADA EDITOR** and create a new application. Give a descriptive name to this application to indicate that it is the **SETUP** application of the **EDS/EDS-3G**.
- ✓ Add a new device. "Configure" / "Devices"
- ✓ Choose the **EDS Embedded** driver.. Notice that there is another driver called **EDS** in the "Engines" tab. This is the driver for obtaining data from the **EDS/EDS-3G** in a superior **PowerStudio SCADA** in a PC or server, but not for configuring this unit.



- Enter a name and a description for this device and then click OK
- On the following screen enter the IP address of the **EDS/EDS-3G** device that will be the **SEARCH ENGINE** of **PowerStudio**.



- If you access from a local area network (LAN), these parameters will be:
 - IP address of the **EDS/EDS-3G**. You can see this on the device display, in both if the IP allocation is static or dynamic DHCP, in which case an asterisk appears before the IP address to indicate a DHCP assignment. Consult the **EDS/EDS-3G** manual for further information
 - The connection port will always be 80 and this cannot be changed
- If accessing the local area network by Internet from outside using the Static Public IP address, these parameters will be:
 - Static Public IP Address. This address is allocated by the Internet service provider. The router of the installation must be configured to redirect access to this Static Public IP with the static internal IP address of the **EDS/EDS-3G** and port 80 (not modifiable). This requires the EDS to have a static internal IP address assigned, and not by automatic assignment (DHCP)
 - The connection port will be as determined and configured in your installation's ADSL router to allow incoming traffic from the Internet, avoiding the ports in which there is already some kind of service, such as port 21 with FTP services. Consult your system administrator for a suitable public port.
- If accessing from outside using the ACTIVE MODE function (AMB) in EDS version and a Dynamic Public IP address in the equipment, these parameters will be:
 - Access address will be "localhost" (127.0.0.1) or the IP of the access PC or server with the local routing software installed (AMB-Setup)
 - Access port. That which is configured in the **ACTIVE MODE (AMB)** list and related to the device identifier.

In the event of doubt, consult section 6.1 for the **ACTIVE MODE (AMB)** function

- If you access from outside by DynDNS routing in EDS-3G version, these parameters will be:
 - The access address will be the name or HOST created in your DynDNS account. XXXXX.dyndns.org
 - The access port will be 80, which cannot be changed.

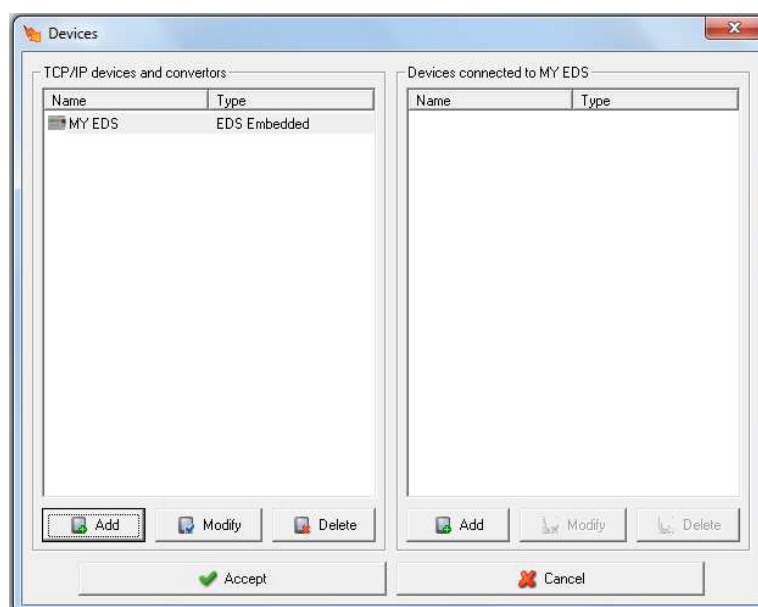
In the event of doubt, consult section 6.2 for the **DynDNS (EDS-3G)** function

- If you access from outside with the **CirDNS** routing in **EDS-3G** version, these parameters will be:
 - The access address will be the name or HOST created in the list of accesses in your **CirDNS** server.
 - The access port will be 80, which cannot be changed.

In the event of doubt, consult section 6.3 for the **CirDNS (EDS-3G)** function.

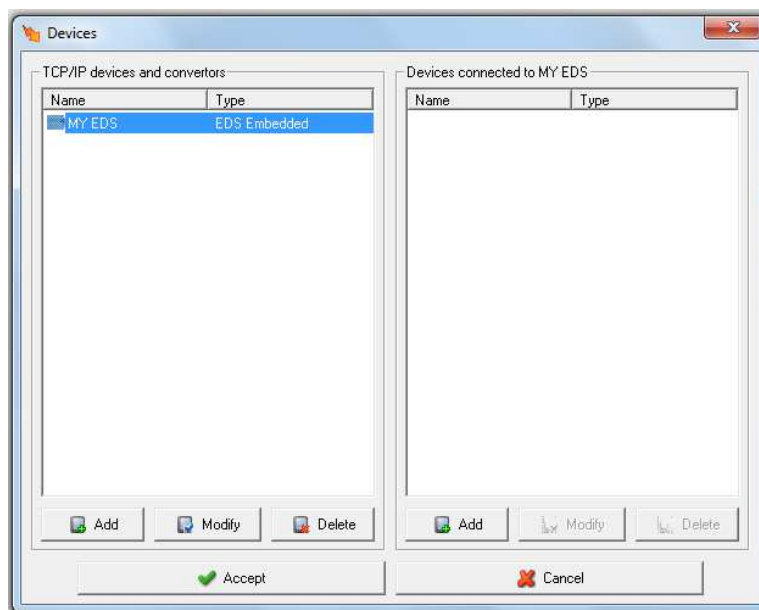
- ✓ Click on Accept.

If the device is on-line it will be added to the list of devices.

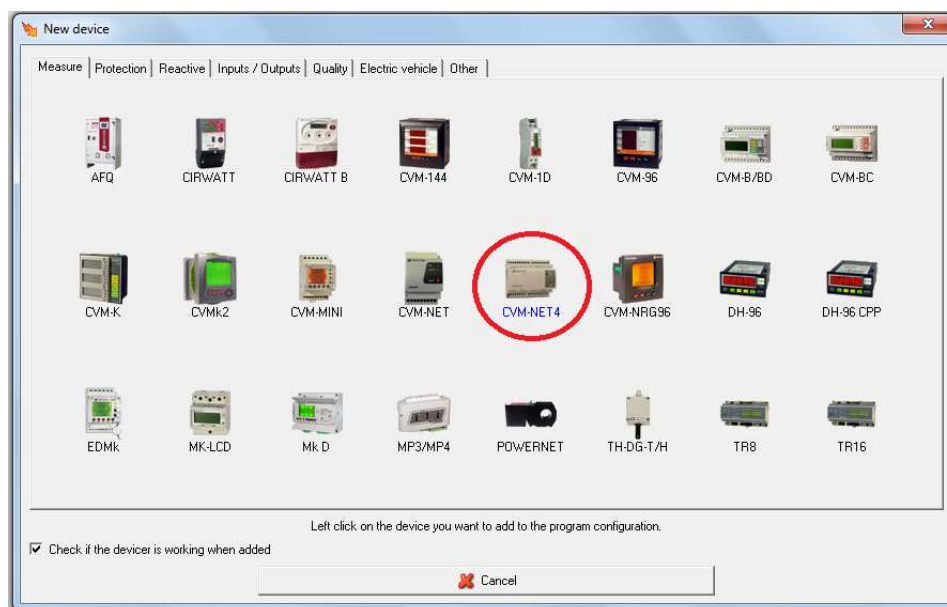


- ✓ Continue with the next section to configure the devices connected to the **EDS**.

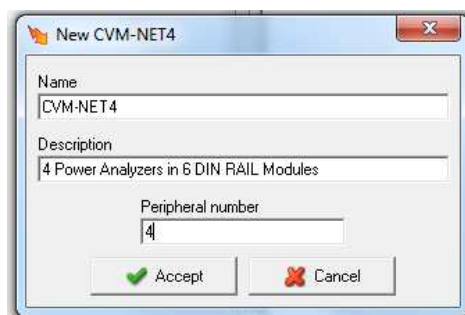
9. Setup equipment connected via RS-485 to the EDS/EDS-3G.



- In order to configure the devices that the **EDS/EDS-3G** has connected to its RS-485 bus, click on the Add button of the list of Devices connected to the **EDS/EDS-3G** (list on the right hand side)
- In the following window select the devices in question. For this tutorial we have used a **CVM-NET4**. Select the device and click on Accept”

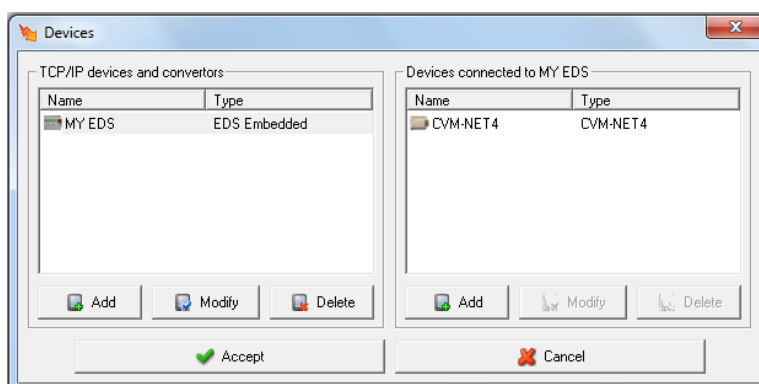


- Define a name and a description for the device, just like the peripheral number for the communications BUS. The **CVM-NET4** has peripheral no. 3 by default. For further information go to www.circutor.es to download the unit manual.



- ✓ Click on Accept.

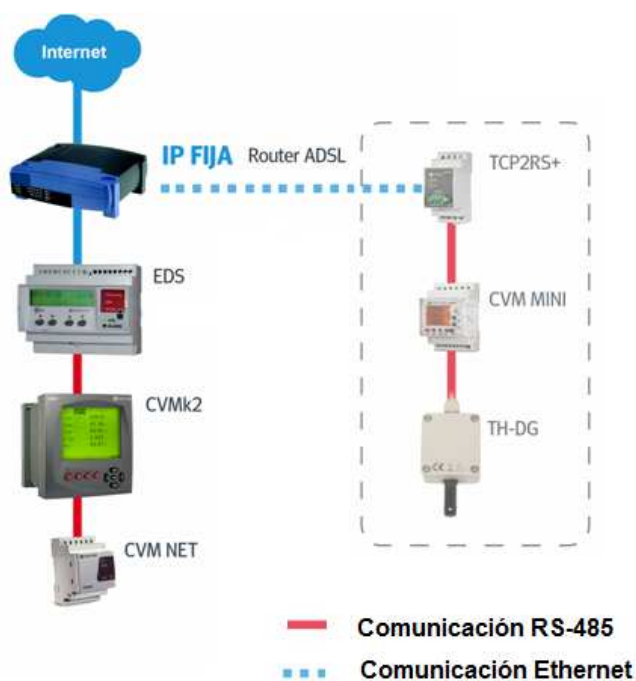
If the device is recognized and it communicates, it will be added to the list of devices.



- ✓ Click on Accept.
- ✓ Export the application to the EDS/EDS-3G. Click on the EXPORT button on the toolbar of the **PowerStudio SCADA EDITOR**.

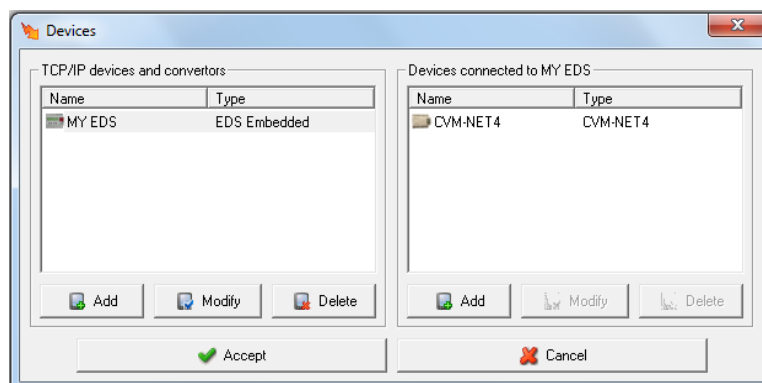
10. Configure equipment connected via TCP to the EDS/EDS-3G

The **EDS/EDS-3G** enables data to be communicated and registered via MODBUS TCP with slave units. This is useful when it is complicated, costly or impossible to extend the RS-485 bus. It must have a **TCP2RS+** gateway in the standard version or a market TCP gateway to RS-485 in the DELUXE version of **EDS/EDS-3G**. Obviously there must be an Ethernet connection close to the measuring equipment.

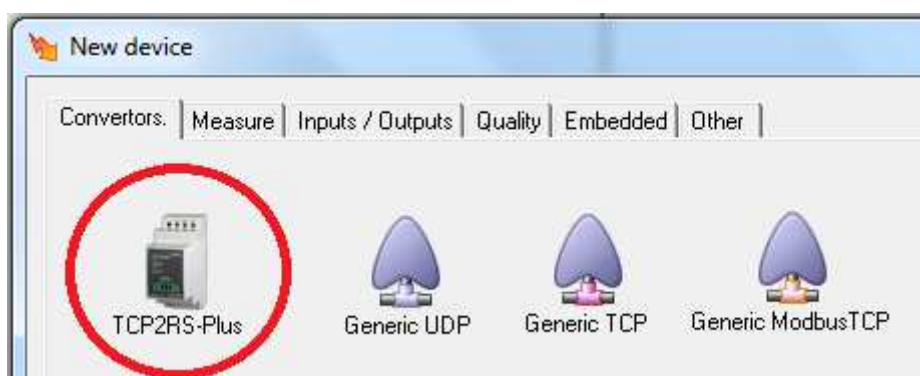


Proceed as follows.

- ✓ Enter the CONFIGURE/DEVICES menu.



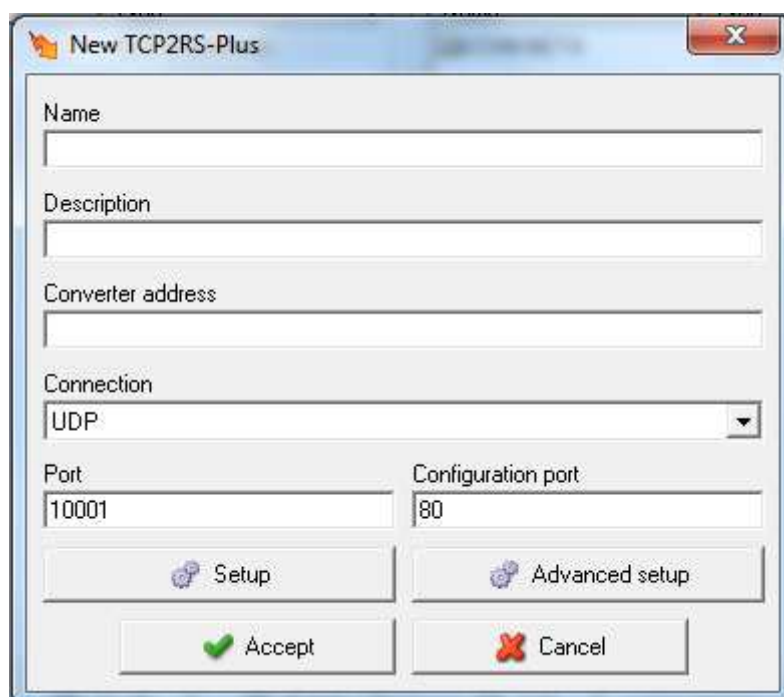
- ✓ Click on accept on the list on the right. The driver of the units with Modbus TCP communication will be shown.



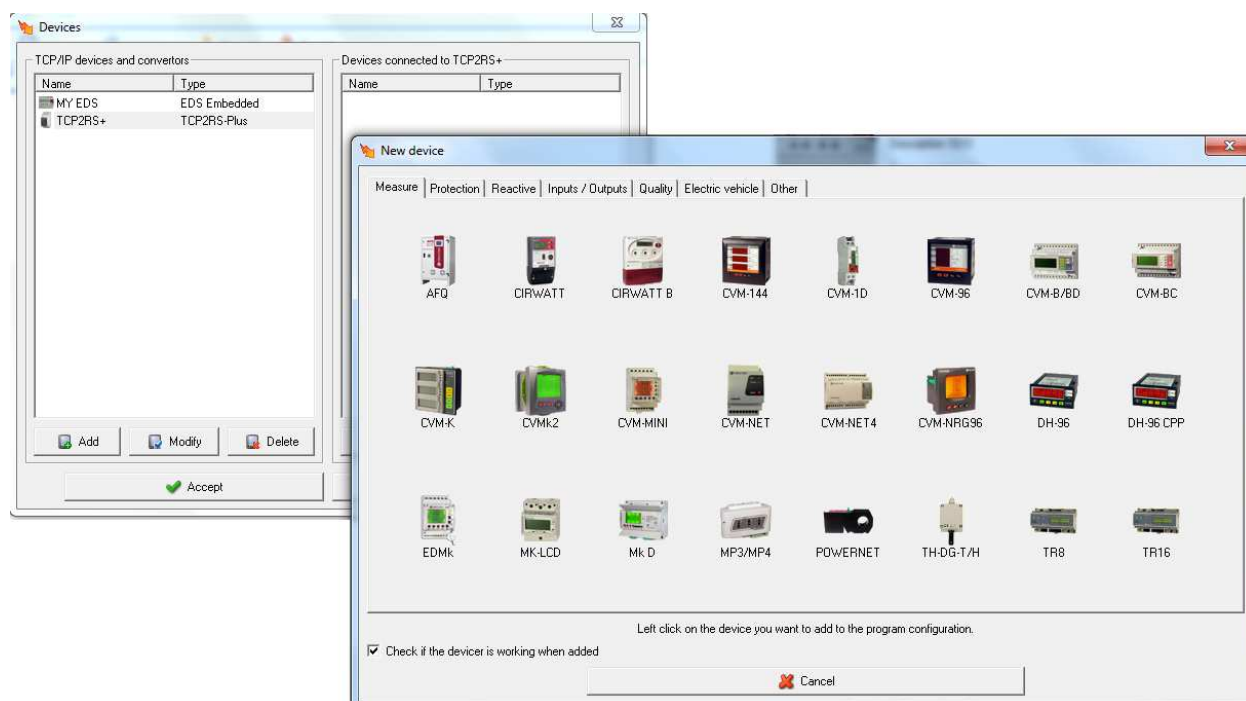
- ✓ Choose the driver of the gateway being used. The generic gateways are only available in the **DELUXE** version of the **EDS/EDS-3G**

In our case, we will choose **TCP2RS+**. Make sure that the TCP2RS+ is connected to the LAM network (Ethernet) and to the power supply. Configure an IP to the TCP2RS+. Consult the device manual for further information.

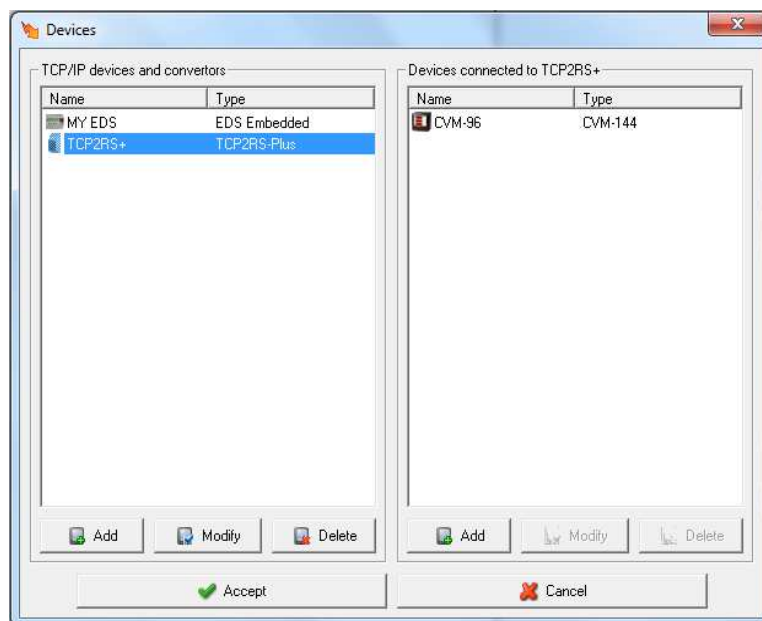
- ✓ Configure the device parameters according to their programming.



- ✓ Click on Accept
- ✓ The unit will be added to the list of devices configured to the EDS/EDS-3G.
- ✓ Choose the TCP2RS+ gateway you have just configured in the list and click on Accept from the list on the right.
- ✓ Look for the device connected to the RS-485 port of the TCP2RS+

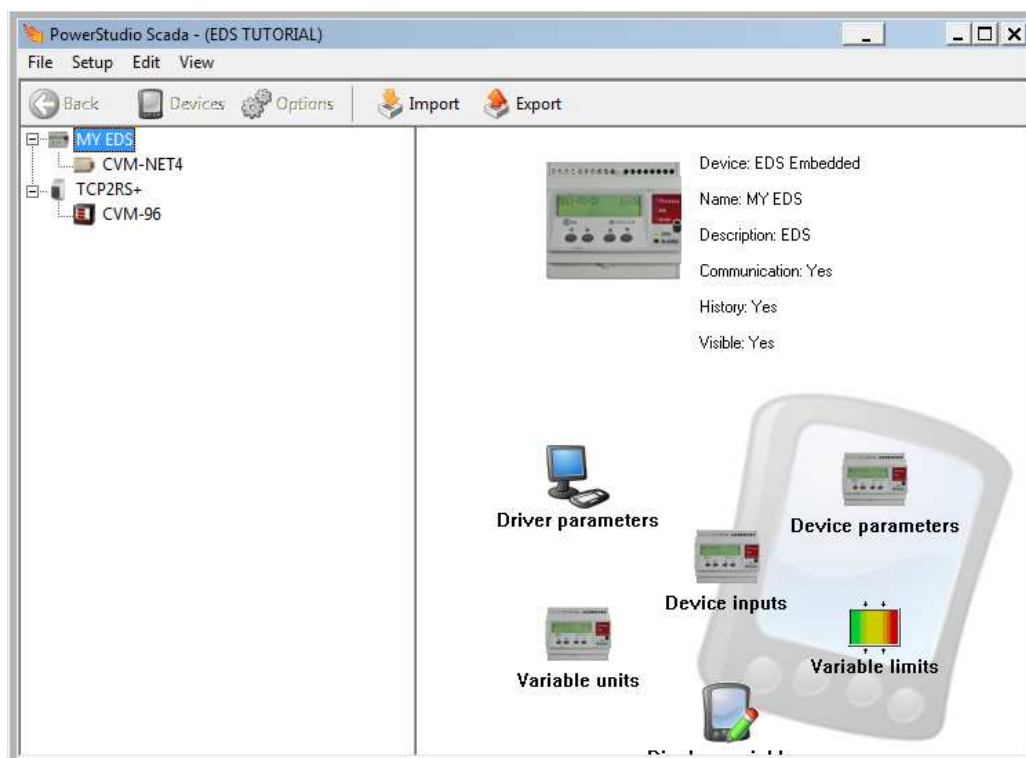


- ✓ Give a descriptive name and the peripheral number configured in the slave unit.



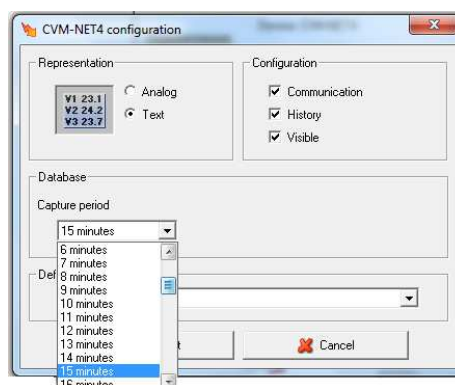
- ✓ Click on Accept
- ✓ Export the application to the EDS/EDS-3G. Click on the EXPORT button on the toolbar of the **PowerStudio SCADA EDITOR**.

Having reached this point, we have configured our application hardware with **EDS/EDS-3G** on our PC. Before passing this information on to the unit, some more parameters can be configured by clicking on each one of the icons on the following screen.



For example, to select the recording period this data must be configured, selecting first the device in question. Both **EDS / EDS-3G** and the **CVM-NET4** can have different registry periods, although it is advisable to have all of the devices in the same capture period or in multiples in order to have them registered by date and time when making a table or graphic.

- Click on “Driver Parameters” of each device and change the details for the capture period where necessary.





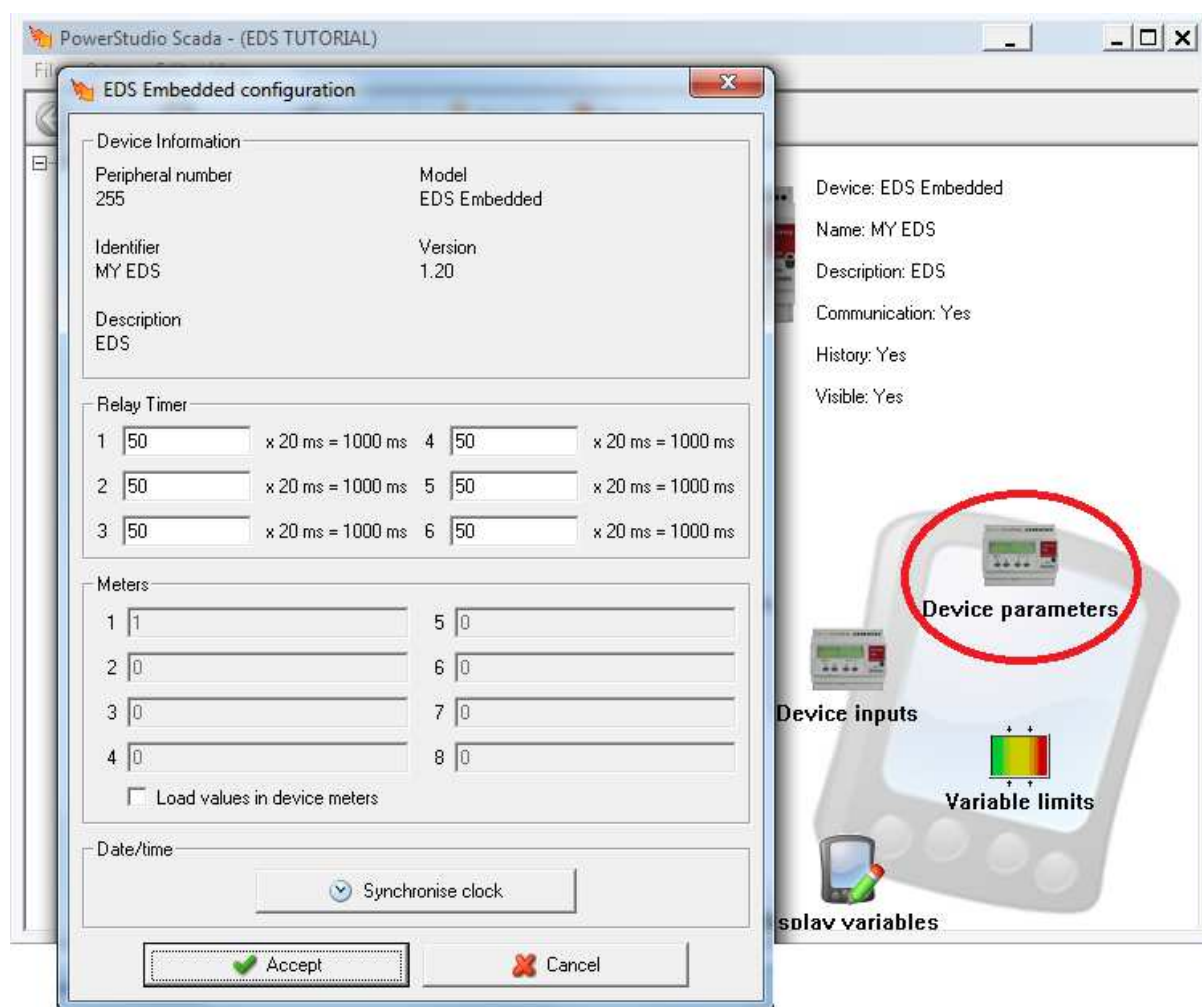
Keep in mind that the **EDS/EDS-3G** unit has an internal 200Mb cyclic memory, enough to store the historical records of a **CVM-NET4** for several months with a recording period of 10 or 15 min. If the recording time is reduced or the number of devices increased, the historical data will be reduced proportionally. Keep in mind that the device is taking readings during this recording time and once finished, it measures all of the data obtained and saves it to memory. The maximum and minimum data are those that correspond to the end of the recording time.

11. Synchronization of the Clock from PowerStudio.

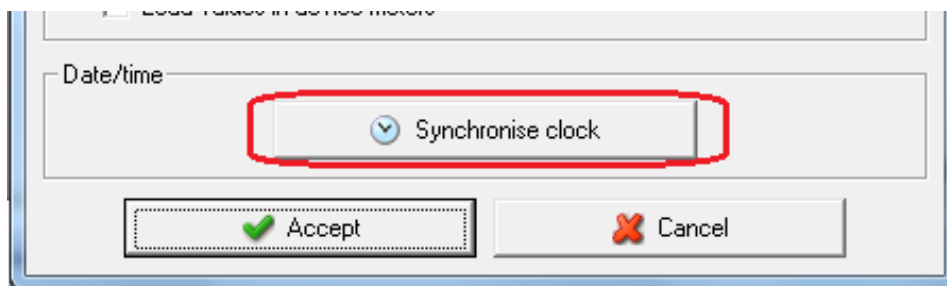
*NOTE: This function will be available from version 3.2 of **PowerStudio** onwards
The time can be set for the device by using the IP configuration program that is referred to in the configuration of the device (IPSETUP.EXE).*

The next important step to keep in mind is to set the internal clock time of the **EDS/EDS-3G** unit. This unit has a battery that keeps the clock at the correct time for a certain period in the event of a cut in the power supply to the device. With the battery in perfect state, it will be up to 2 days and after this time the unit will load the recorded date and time as the factory default. As it is a device that records data in function of time and date, it is very important that this step is performed. To do so, proceed as follows.

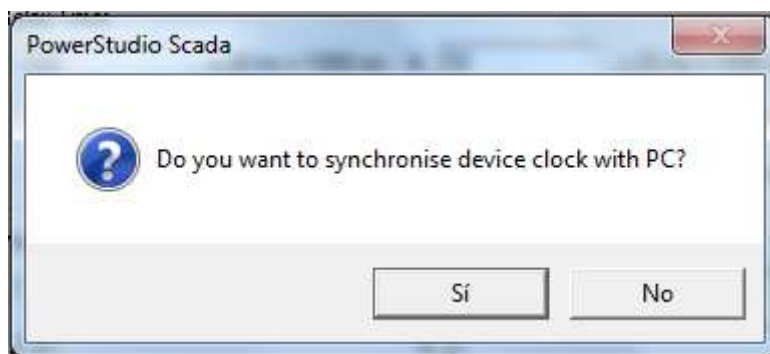
- Click on the “Device parameters” icon.



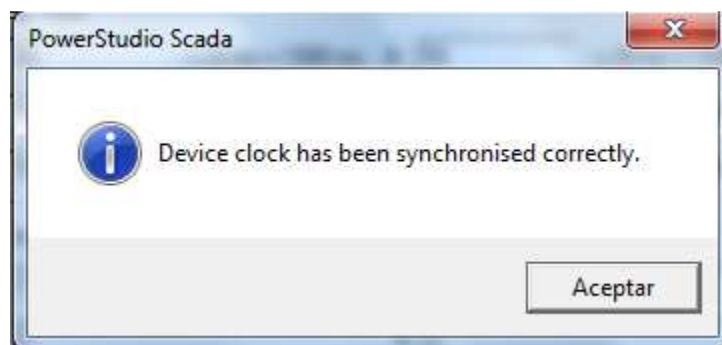
- Click on the “Synchronize clock” button.



- On the following window click “YES”



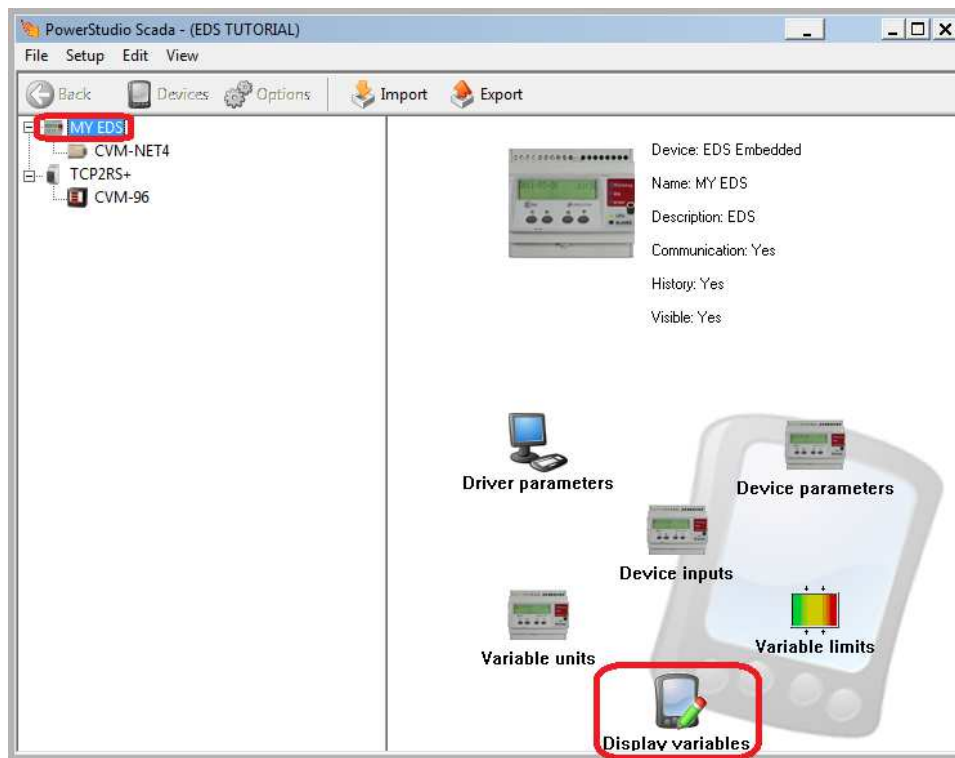
- If the unit is on-line the following window will appear:



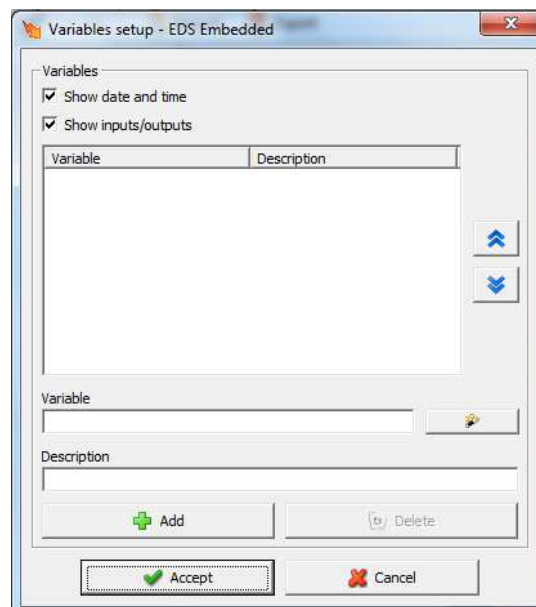
12. EDS screen display options.

The EDS/EDS-3G are able to show data on their own display. These might be measured parameters, variables or the results of configured calculations.

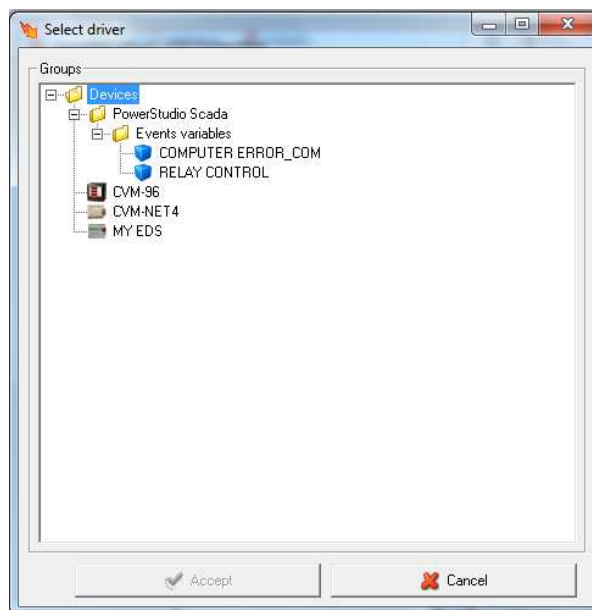
- ✓ To show data on the display of the EDS/EDS-3G, select it on the main screen of the PowerStudio EDITOR and click on the DISPLAY VARIABLES icon



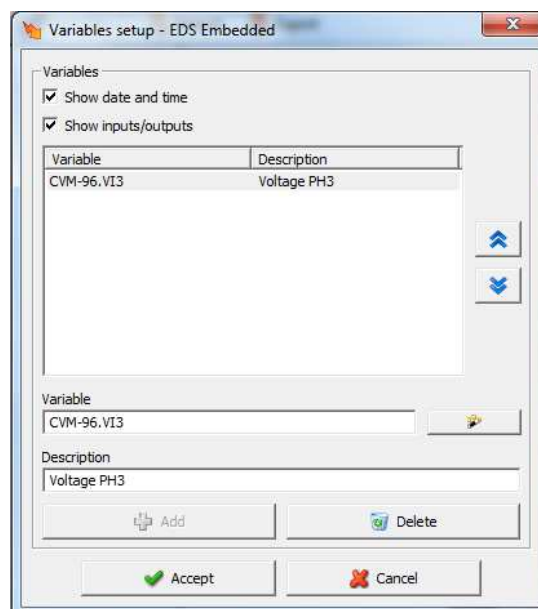
On the following screen you can activate or deactivate the display of both the date and time and of the state of digital inputs and outputs.





- ✓ To add variables to the display, click on the WIZARD button.



- ✓ Choose the device or variable you want to display. More or fewer parameters will be shown in the following window, depending on the chosen device. Choose the one you need to show on the EDS/EDS-3G display.
- ✓ Having added the parameter to the list, select it and write a description of the parameter displayed, bearing in mind that the characters of the EDS/EDS-3G display are limited



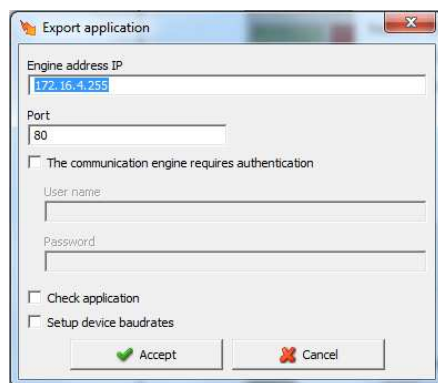
- ✓ Add as many parameters as you need. You can order them in order of appearance on the display using the buttons  
- ✓ To delete a variable from the list, select the variable and click on DELETE

13. EXPORTING THE CONFIGURATION TO THE EDS/EDS-3G

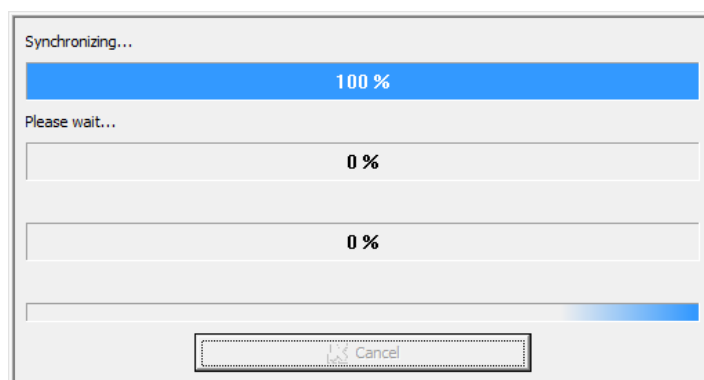
- ✓ Accept the changes and return to the main screen of the PowerStudio editor.
- ✓ In order for the unit to accept the changes the application must be exported.
- ✓ Click on the EXPORT icon.



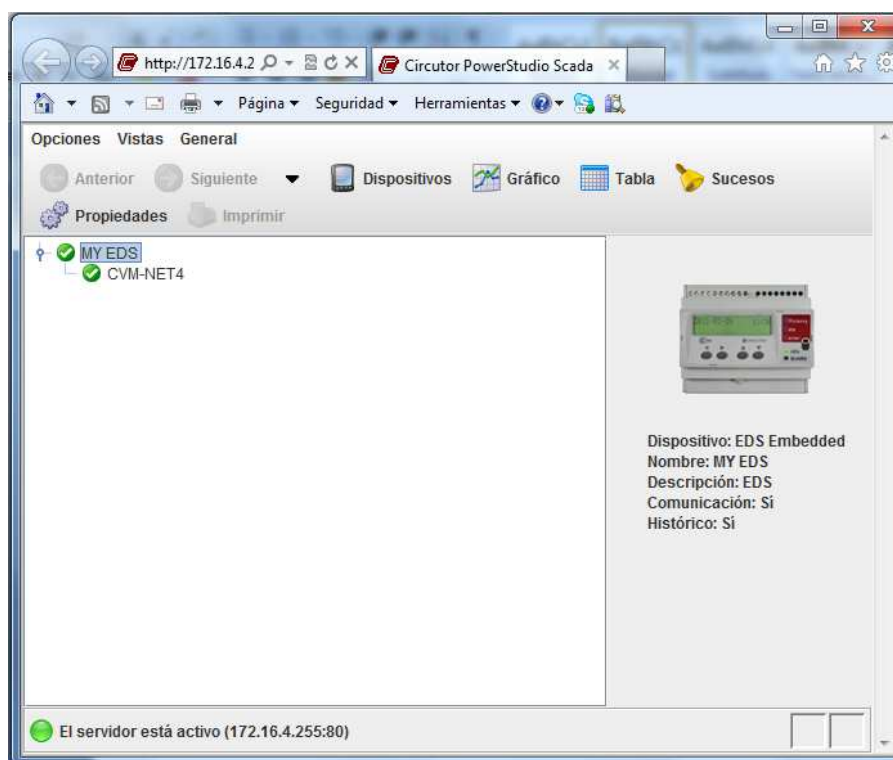
- ✓ In the IP address configuration window we must introduce the address that was used to program the unit at the beginning of this tutorial. The port of the unit by default is 80.



- ✓ Click on Accept and the process of exportation and configuration will begin



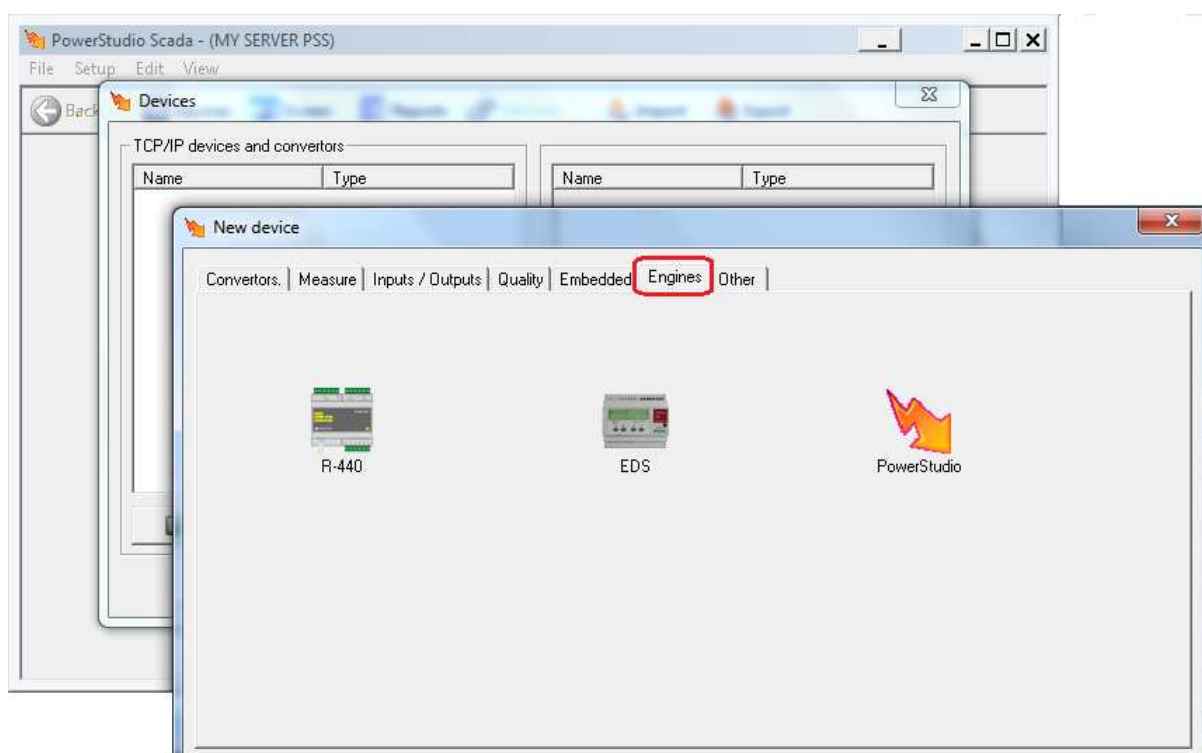
Now the EDS/EDS-3G has a CVM-NET4 device configured. We can execute the PowerStudio SCADA client or open the Internet web browser and using the IP address of the device we can see the data of the CVM-NET4 unit or of any CIRCUTOR device connected to the RSNET4 -485 bus of the unit.



Using the “Graphic” and “Table” icons we can access the **CVM-NET4** data log that the **EDS/EDS-3G** has in its memory. As we would expect for the moment we will not see any data until several recording periods that were configured for each device have passed.

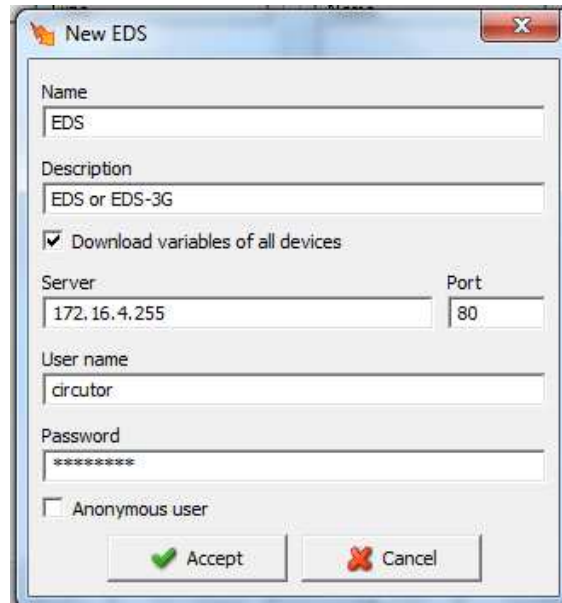
14. Data centralization in PowerStudio Scada

- ✓ Generate a NEW PowerStudio application.
- ✓ Give a descriptive name to this application indicating that it is the DISPLAY application for data through the **EDS/EDS-3G**.
- ✓ Add a new device. "Configure" / "Devices"
- ✓ Click on the "Engines" or "Search Engines" tab and select the driver of the **EDS/EDS-3G**.



- ✓ In the following configuration, give the device a descriptive name.
- ✓ Select the box "**Download all device variables**". This option activates the RS-485 communication


- ✓ Configure the IP that was given to the device and the port (80 by default).



The 'New EDS' dialog box contains the following fields and options:

- Name: EDS
- Description: EDS or EDS-3G
- ☒ Download variables of all devices
- Server: 172.16.4.255
- Port: 80
- User name: circutor
- Password: *****
- ☐ Anonymous user
- Buttons: Accept (green checkmark), Cancel (red X)

- ✓ Click on Accept.
- ✓ The program will ask for the IP address of the SEARCH ENGINE of the **PowerStudio SCADA**. We must configure the IP of the PC where the data provided by the **EDS/EDS-3G** will be recorded. In the case where the Search Engine is on the same PC that the display application is edited, this IP will be 127.0.0.1 and the port will be the same as that configured in the **PowerStudio Engine Manager**. By default this port is 80. In the example, 8080 is configured in order to differentiate it from the default port of the EDS/EDS-3G. Configure the user and the password if it is configured in the "Engine Manager" of **PowerStudio SCADA**.

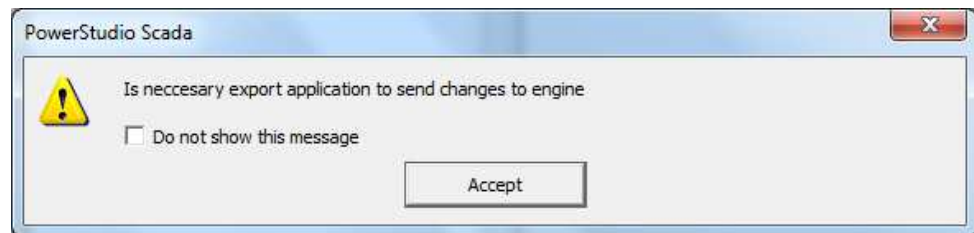


The 'Engine preferences' dialog box contains the following fields and options:

- Engine address IP: 127.0.0.1
- Port: 8080
- Delay: (empty field)
- ☒ The communication engine requires authentication
- User name: circutor
- Password: *****
- Engine public address IP: (empty field)
- Port: (empty field)
- Buttons: Accept (green checkmark), Cancel (red X)

- ✓ Click on Accept

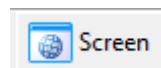
- ✓ After a few seconds the following screen appears.



- ✓ Click on accept and export the application to the PowerStudio SCADA search engine from the icon of the application toolbar.

Note: if it not possible to export the application to the **PowerStudio SCADA** search engine of your server, check the state of the service in your system and temporarily deactivate all antivirus with web protection shield or http, firewalls or similar items.

- ✓ Generate a SCADA screen in **PowerStudio SCADA** and give it a descriptive name.



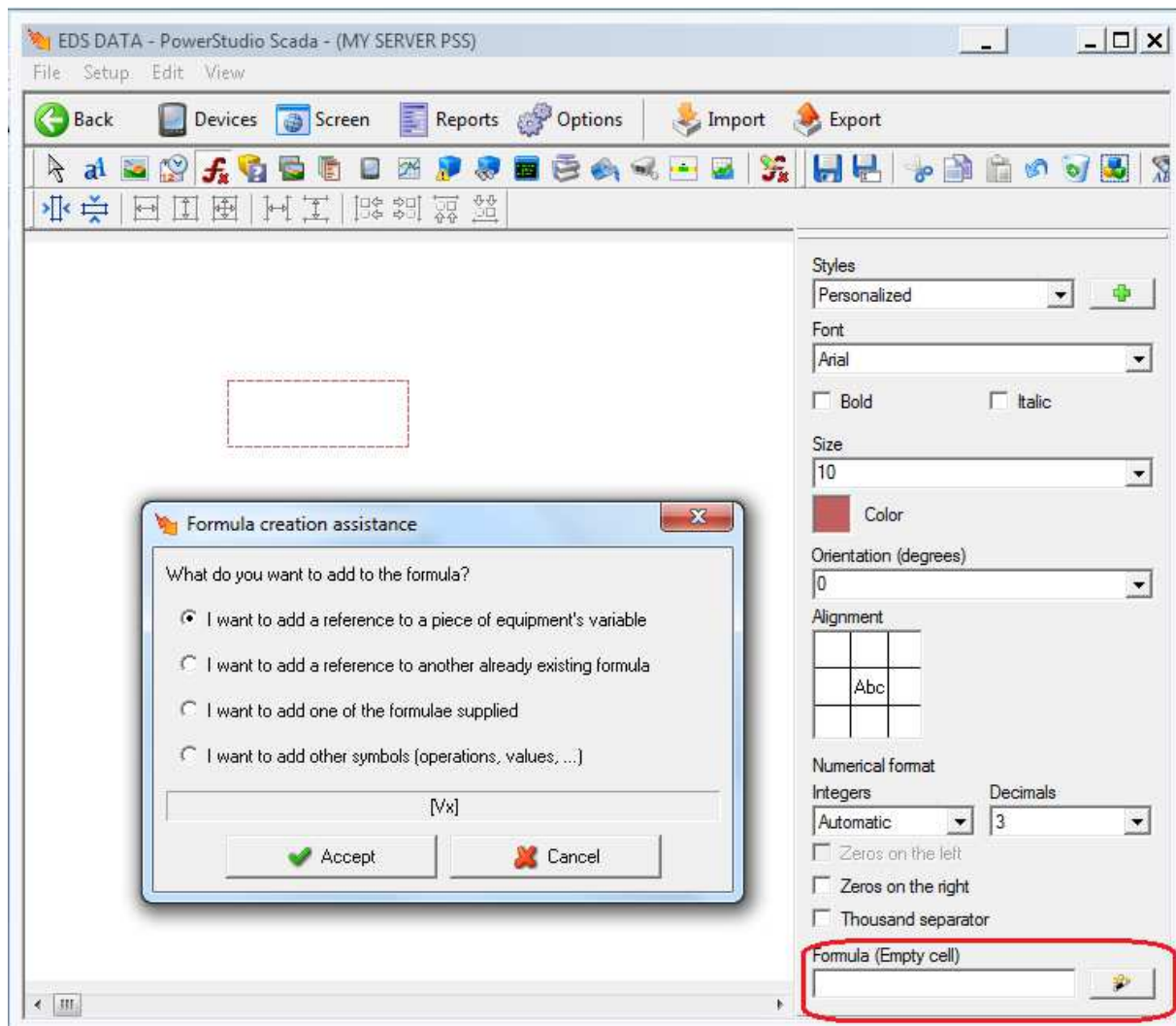
- ✓ Select the formula control and paste the control onto the surface of the SCADA screen.



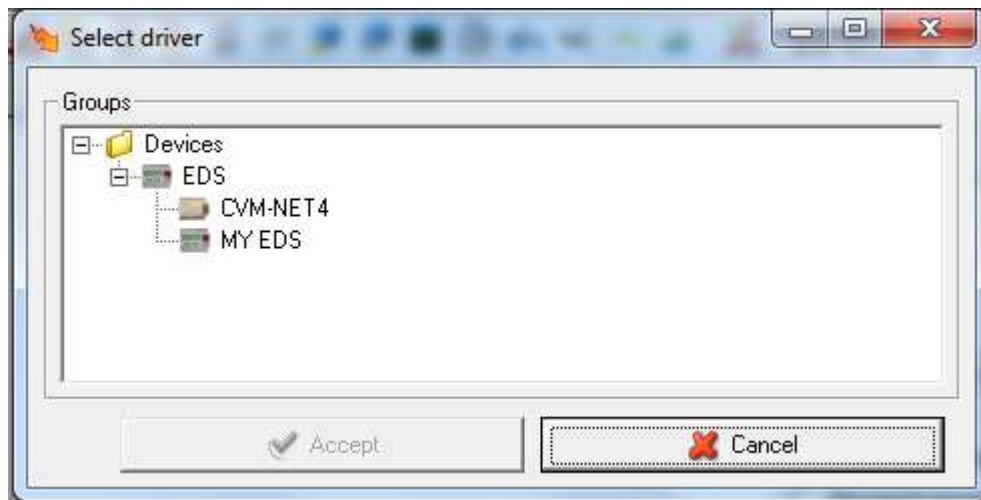
- ✓ With the formula control selected, click on the "Wizard" button on the lower right hand side of the screen.



- ✓ On the following screen select "Add a reference to a variable of a device"



- ✓ Click on Accept
- ✓ The following message will appear for a few seconds:
- ✓ Next we will see the tree display of devices that each of the **EDS/EDS-3G** has that have been configured in the **PowerStudio SCADA** application.



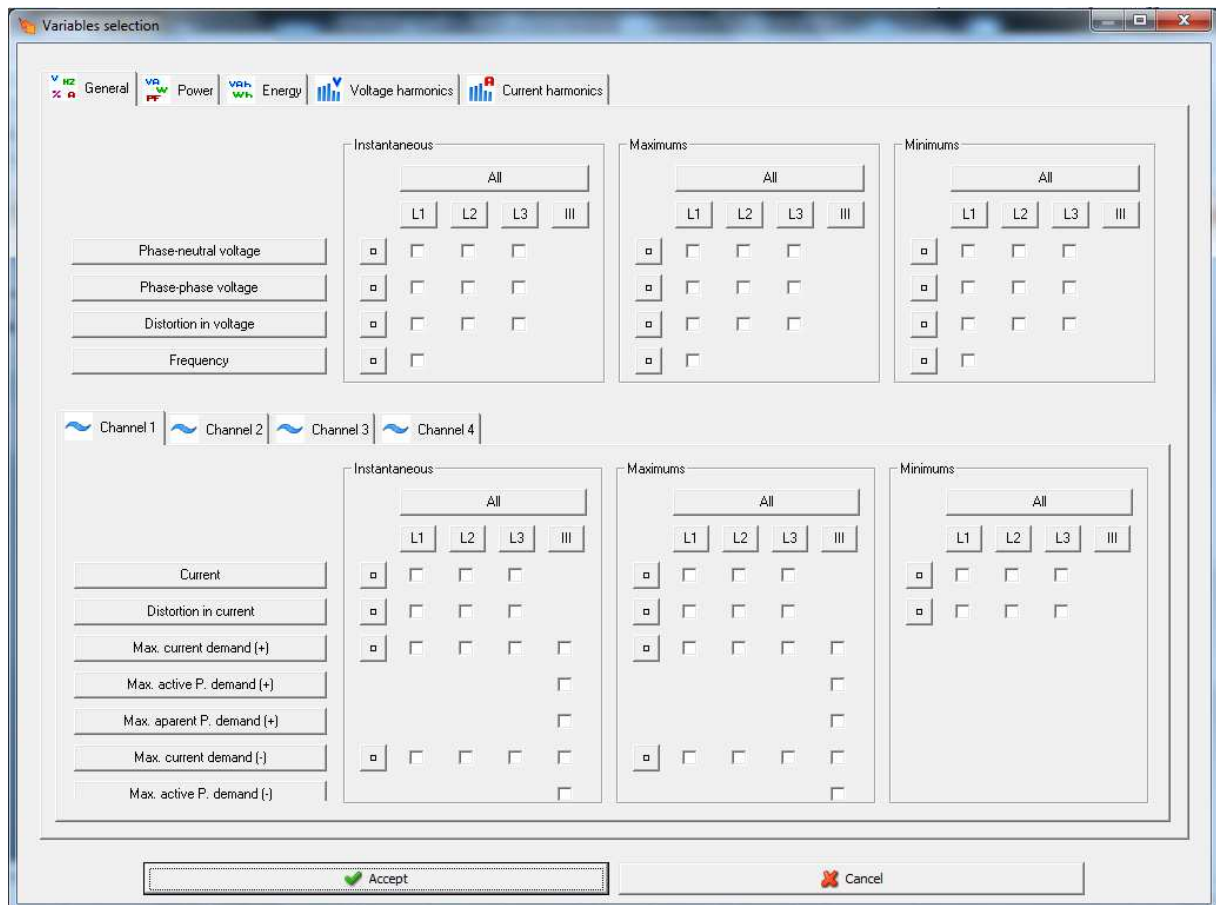
Note: In order for the tree display of the devices connected to the EDS to be shown, the units must be “on-line” at least once for **PowerStudio SCADA** to download the configuration of the remote **EDS/EDS-3G**. Once the configuration has been downloaded, it is recorded in the EDITOR application as it was downloaded, and can therefore be followed. Every time there is importing/exporting to or from the search engine, the configuration is updated.

As we can see, the **CVM-NET4**, appears. Remember that in this **PowerStudio SCADA** application only the **EDS/EDS-3G** was configured and the **CVM-NET4** is inherited from the previous configuration of the **EDS/EDS-3G**.

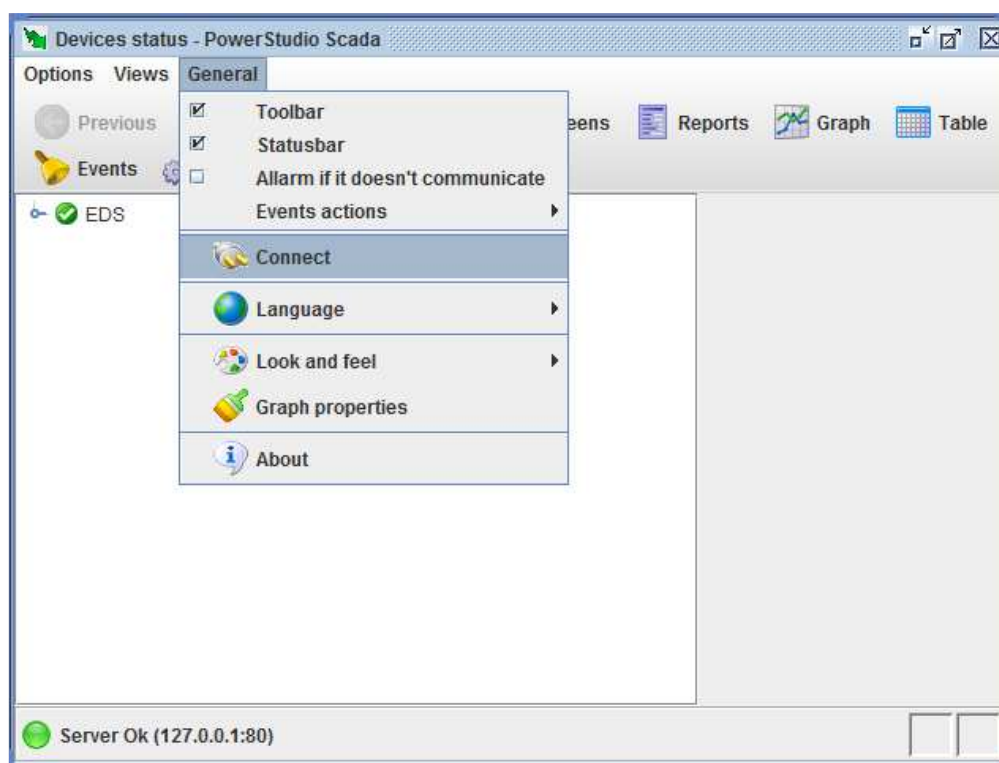
- ✓ Select the **CVM-NET4** and click on Accept
- ✓ The following message will appear



Next, the variable selection screen of the **CVM-NET4** will appear



- ✓ Select the desired variable and click on Accept
- ✓ Export the application to the **PowerStudio SCADA** search engine in local host (127.0.0.1 and port 80 by default. 8080 in the example).
- ✓ Open the CLIENT of **PowerStudio SCADA** in order to see the functioning of the configured application.
- ✓ Open the menu “GENERAL” / “CONNECT”



- ✓ If we introduce the IP of the **EDS/EDS-3G** and the default port 80, we will access the parameter history stored in the device memory.
- ✓ If we introduce the IP of the control PC (IP local host 127.0.0.1 and the port configured in the Engine Manager of this PC, 80 by default) we will access the history that has been stored on the computer's hard drive and that has been provided by the **EDS/EDS-3G**.

15. User hierarchy configuration for consultation.

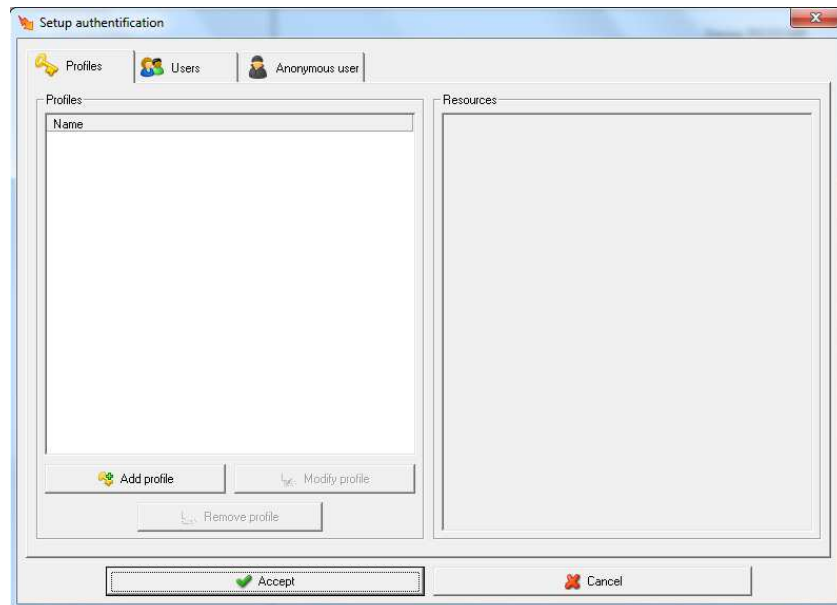
As explained in this tutorial, the EDS/EDS-3G are WEB servers. This allows access to the information stored within them through an Internet browser, which implies that the information is available for any person who enters the address of the unit in the web browser bar.

To protect the system from unwanted connections, turn on the user authentication in the CONFIGURE/PREFERENCES menu.

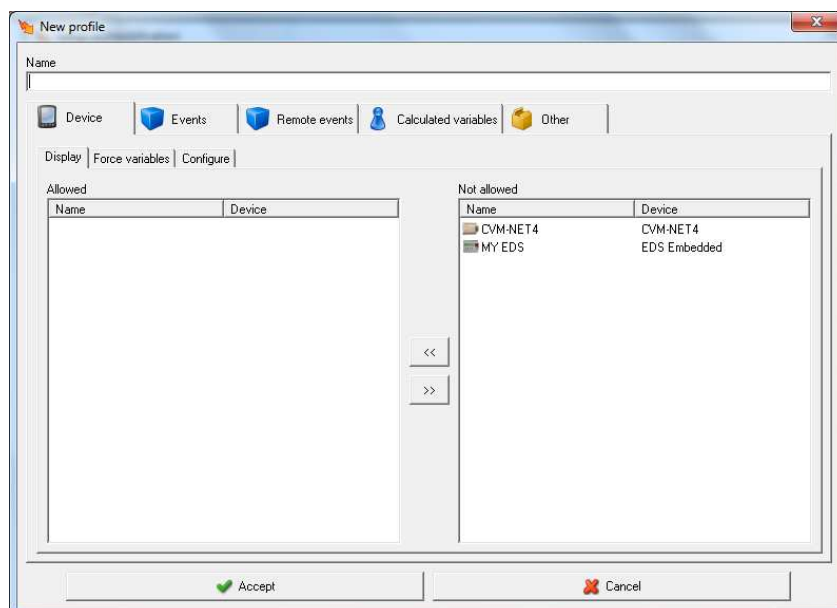
The programming protocol is to create user or client profiles and to assign these profiles to the units or objects to which they might have access. Once the profiles have been configured, the users linked to them are configured.

Follow these steps to configure a hierarchy of users or clients.

- ✓ Click on the **SETUP USERS** button. The assistant will appear to guide you in configuring profiles and users.



- ✓ Click on **ADD PROFILE**

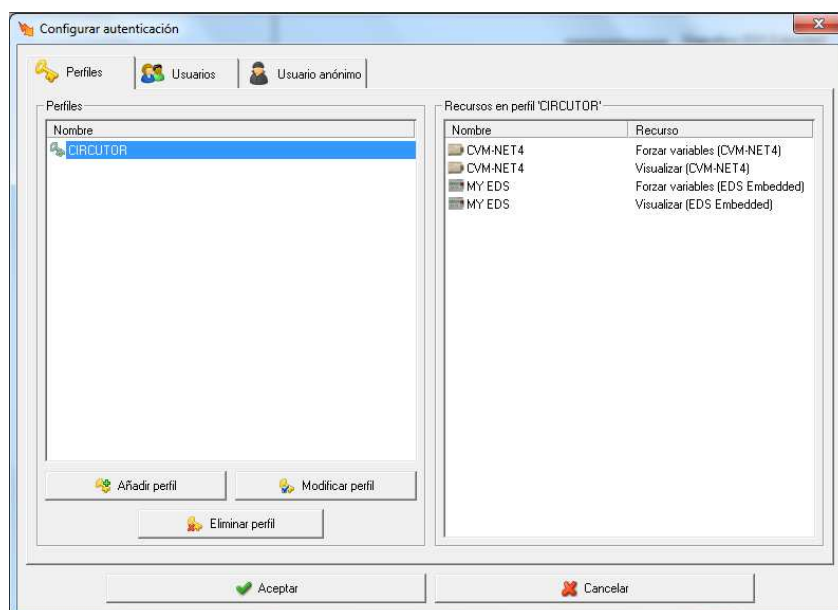


- ✓ Enter a name to identify the profile in the **NAME** field

See that the active tab is DEVICES and within this the DISPLAY tab is active. The two lists that appear in the same window correspond to the device display configuration for this profile.

In the list on the left, the equipment will be shown that is accessible to the users linked to this profile. Those that remain on the list on the right will not be.

- ✓ Select any device from the list on the left (not allowed) or the right (allowed) and click on the buttons << >> to change them to the opposite list.
- ✓ Change to the FORCE VARIABLES or CONFIGURE tab and continue with the configuration.
- ✓ Now change to EVENTS, the following main tab, and repeat the procedure to activate or deactivate the display of programmed events in the device.
- ✓ Repeat the same process for the remaining objects (REMOVE EVENTS, CALCULATED VARIABLE, OTHERS).
- ✓ Once the PROFILE has been configured, click on Accept in the same window.



You can add as many profiles as you need. They will be added to the list on the left. If you select a profile, the permitted objects or devices will appear in the list on the right.

NOTE: Every time a new object is generated (device, variable, event, etc.) this must be configured for the profile that needs to access it. By default, this new object will not be permitted by any profile and will therefore not be visible to the users.

16. E-mail configuration.

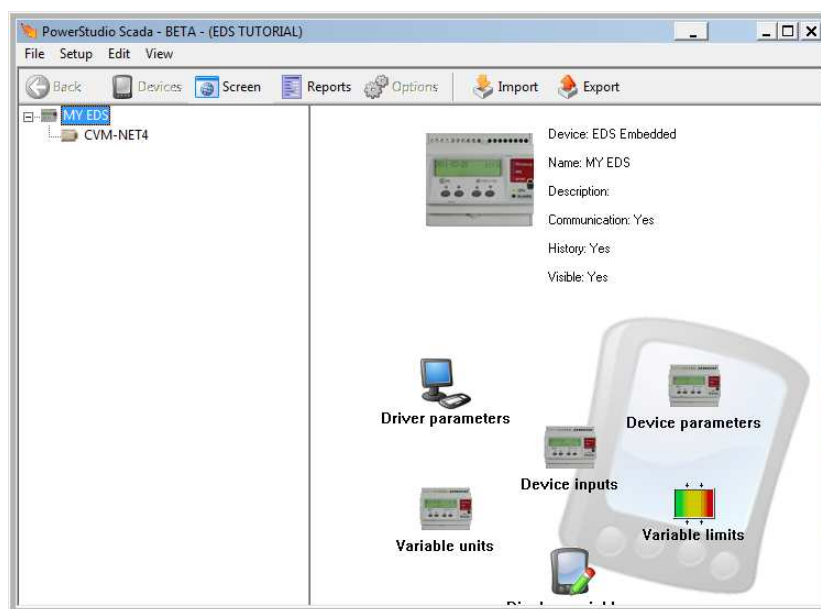
The EDS/EDS-3G is a unit capable of sending e-mails to warn of any parameterised alarm or as a periodic alert with a device value or even a calculation.

To be able to send an e-mail by a EDS/EDS-3G, an e-mail account must have been created in a server. There is an infinite number of servers that provide free e-mail accounts, such as gmail, hotmail, etc. Read the conditions for creating these kinds of accounts, as in some cases automated e-mails or e-mails not sent with the provider environment are not allowed and are blocked.

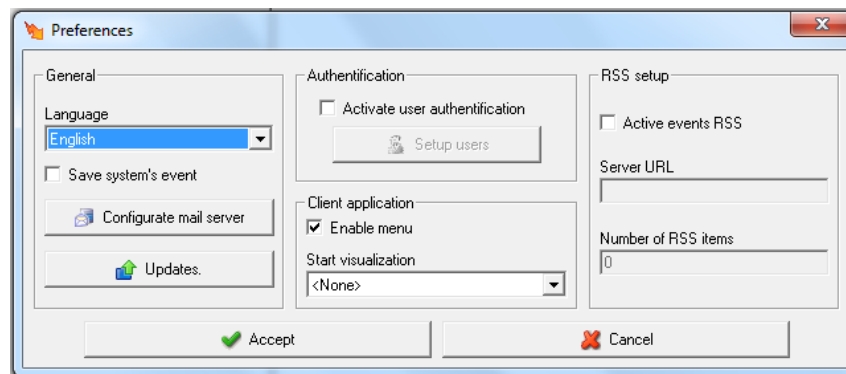
Note: Having reached this point in the tutorial, it is understood that you are now familiar with the protocol of operation of the EDS/EDS-3G with regard to its connection via your PC or server.

To configure the outgoing e-mail account in the EDS/EDS-3G, proceed as follows:

- ✓ Open the PowerStudio SCADA Editor
- ✓ Create a new PowerStudio SCADA application
- ✓ Import the application from the EDS/EDS-3G to the EDITOR environment



- ✓ Open the SETUP/ PREFERENCES menu

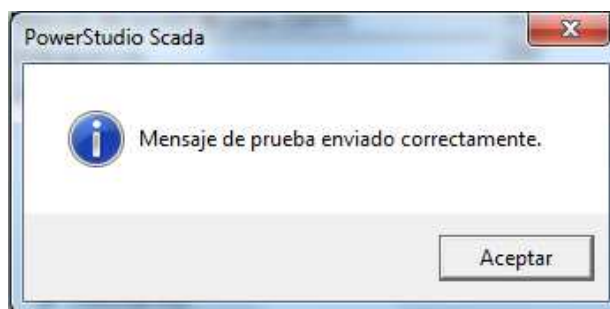


- ✓ In this window you can change the preferences regarding the language and client display preferences and you can activate the hierarchy of users for consultation.
- ✓ Click on CONFIGURE MAIL SERVER
- ✓ In the next window, configure your outgoing e-mail account, as well as the SMTP server and its connection port.
- ✓ If the account requires a password for access, check the corresponding box and enter your account's password.
- ✓ If the server requires SSL security, check the corresponding box

Note. The above parameters must be supplied by the e-mail account provider or e-mail service.

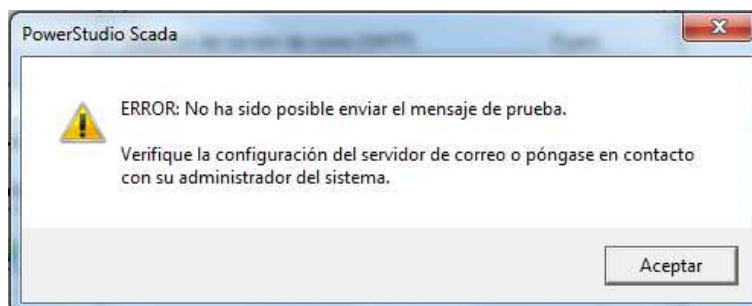


- ✓ Once these parameters have been configured, click on TESTING CONFIGURATION and wait a few seconds.
- If the e-mail is sent correctly, the following message will appear:



Check the INBOX of your e-mail account. You should have a new e-mail with the **PowerStudio Scada** test message in the subject. Having reached this point, your EDS/EDS-3G is now configured for sending mails.

Otherwise, the following message will be shown. Check the configuration of the account or check that the e-mail server is compatible with the required configuration.



For sending e-mails automatically via the **EDS/EDS-3G**, you have to program an event. See the following section of this tutorial

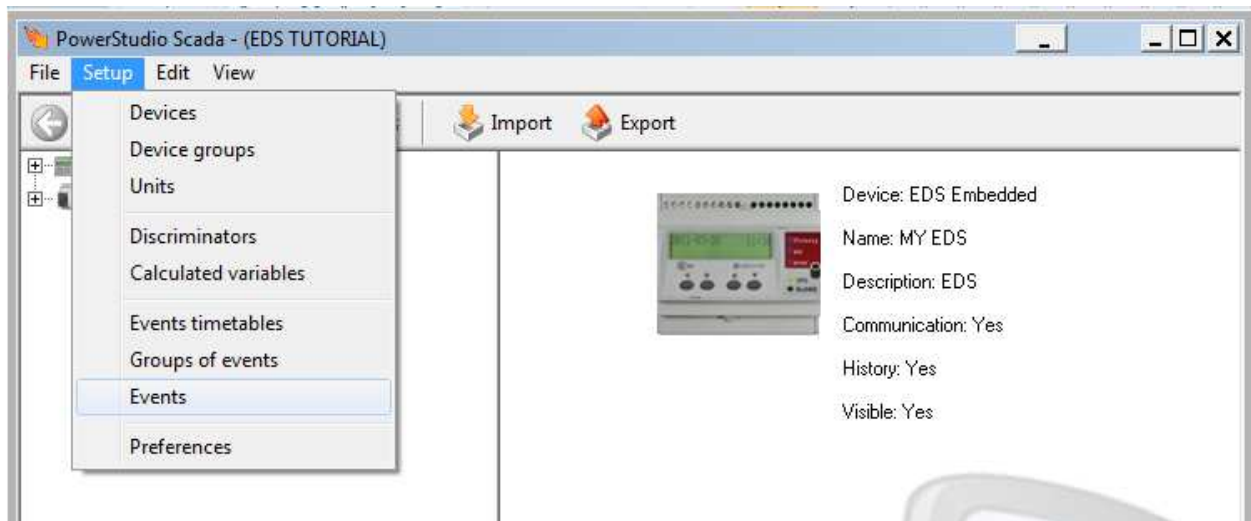
17. EVENT configuration.

PowerStudio embedded, SCADA and SCADA DELUXE allow events to be parameterized. These may be configured to make calculations, control loads and send notification e-mails at a determined time.

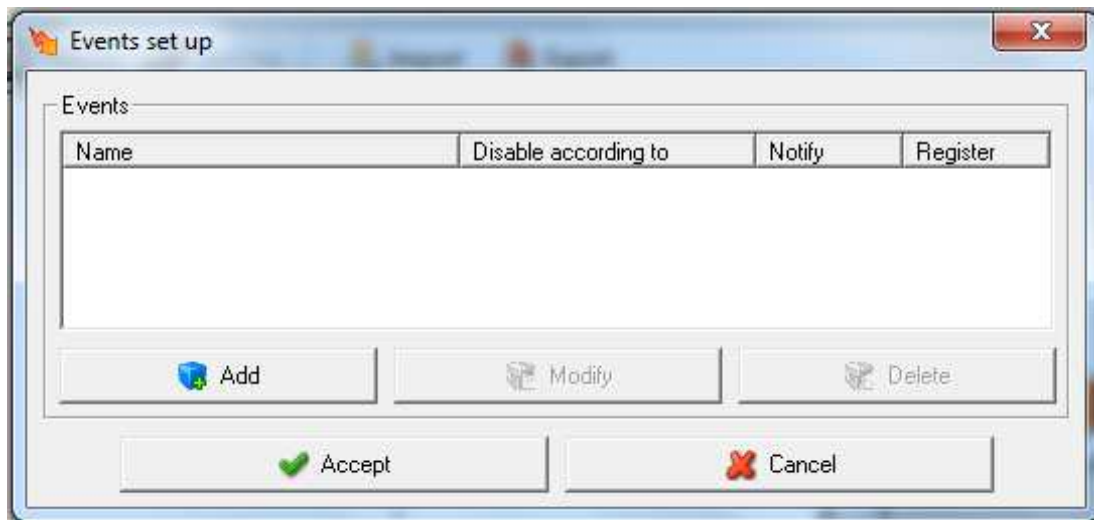
The EDS/EDS-3G contains the PowerStudio Embedded platform, which allows events to be parameterized. Furthermore, they are provided with digital inputs and outputs to relay and, in addition to any parameter or calculation, these can be used to activate a configured event and to carry out all actions that might be necessary.

Proceed as follows to configure an event in EDS/EDS-3G:

- ✓ From the PowerStudio SCADA EDITOR, open the application with the EDS embedded driver.
- ✓ Enter the CONFIGURATION / EVENTS menu



✓ Click on ADD.



✓ Enter a name to describe the event in the following window.

By way of example, the event to be configured will have the following features:

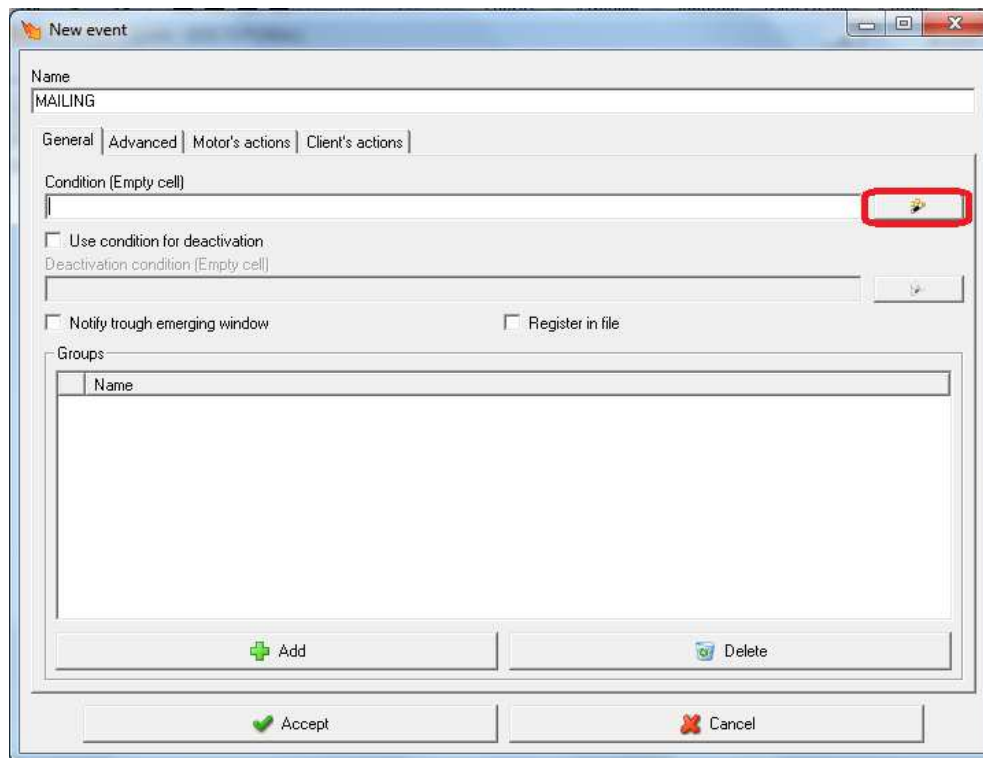
It will be activated when:

- The device time is 10 and 11 in the morning (or any other time you choose)
- Digital input no. 1 of the EDS/EDS-3G is activated.
- In any case, the voltage of the CVM-NET4 Analyzer is higher than 200Vac

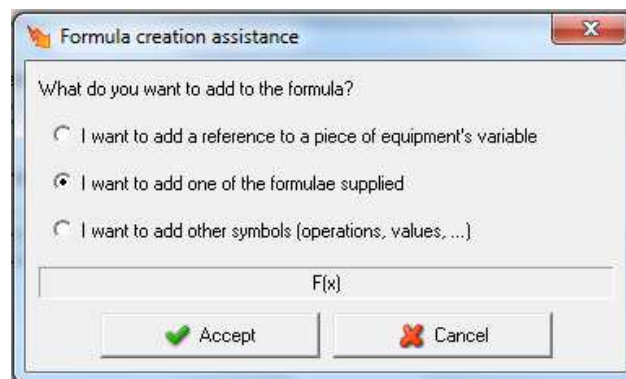
The actions carried out by the event will be

- Close relay no. 1 of the EDS/EDS-3G
- Send an e-mail with a message configured according to your needs.

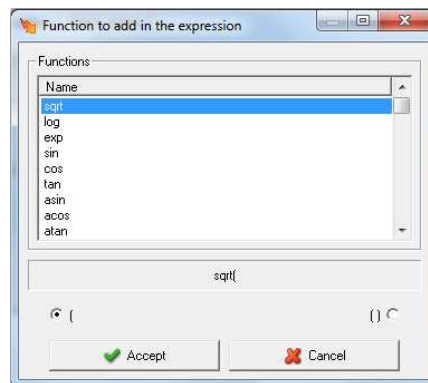
✓ Then click on the Wizard button.



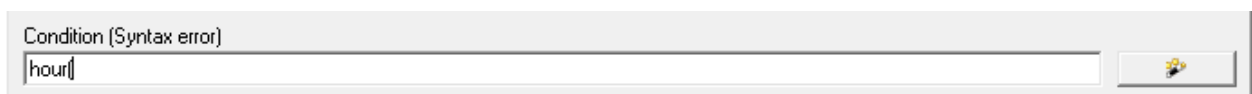
- ✓ In the following window, choose the option, “I want to add one of the formulae supplied”



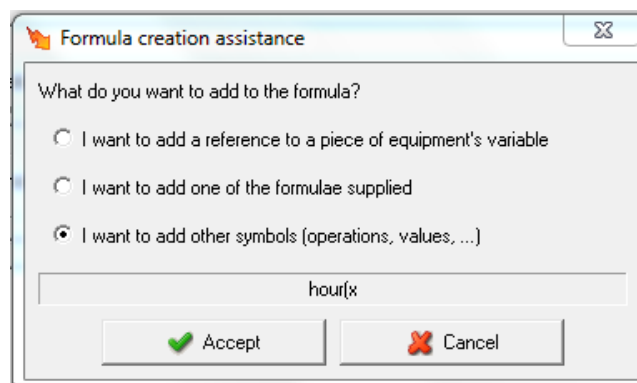
- ✓ In the following list, look for the “hour” function and click on Accept. See that in the list there are many other functions that the system delivers and which are useful for configuring events.



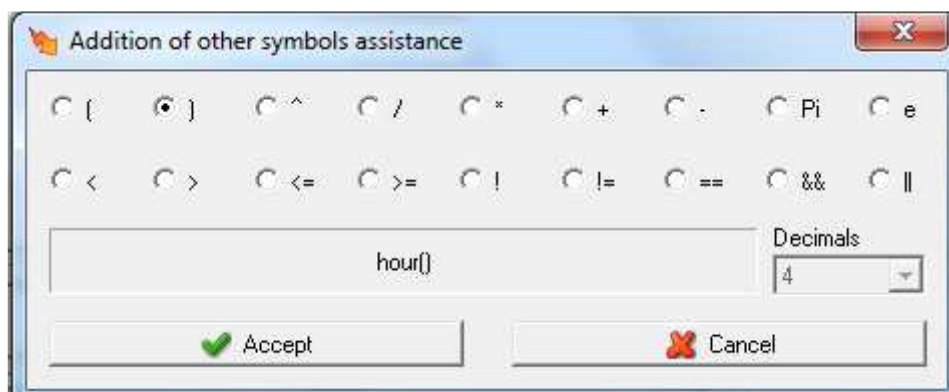
- ✓ See that the formula has been partially completed.



- ✓ Click on the Wizard button again and choose "I want to add other symbols"



- ✓ From the following list, choose the close bracket and click on Accept



See that there are many other characters for making the formulas. These characters can also be typed directly on the formula bar using the keyboard of your PC.

The close bracket will have been added to the formula field, but it will still be incomplete and the text (syntax error) reports this.

Condición (Error de sintaxis)

hour()

- ✓ Click on the Wizard button once more, select “I want to add other symbols” again, choose the equals “==” symbol from the options and click on Accept. This symbol will have been added to the formula.
- ✓ Then type the number of the time you require, 10 in the example. The formula will end up as follows.

Condición (Cierto)

hour()==10

- ✓ Click on the Wizard button once more, select “I want to add other symbols” again, choose the AND “&&” symbol from the options and click on Accept. This symbol will have been added to the formula.
- ✓ Click on the Wizard button once more, select “I want to add other symbols” again, choose “minute” from the list and click on Accept. This symbol will have been added to the formula.
- ✓ Follow the procedure for drawing up the formula, so that:

Condición (Cierto)

hour()==10 && minute()<=59

Up to now, the event will be activated each day between 10:00 a.m. and 11:00 a.m. To continue with the example, close this formula in brackets.

Condición (Cierto)

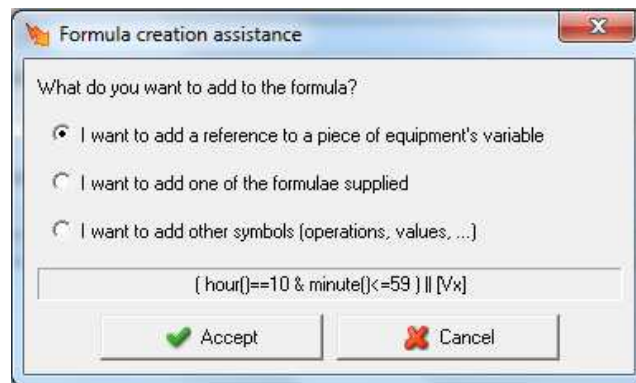
(hour()==10 && minute()<=59)

- ✓ Click on the Wizard button once more, select “I want to add other symbols” again, choose the OR “||” symbol from the options and click on Accept. This symbol will have been added to the formula.

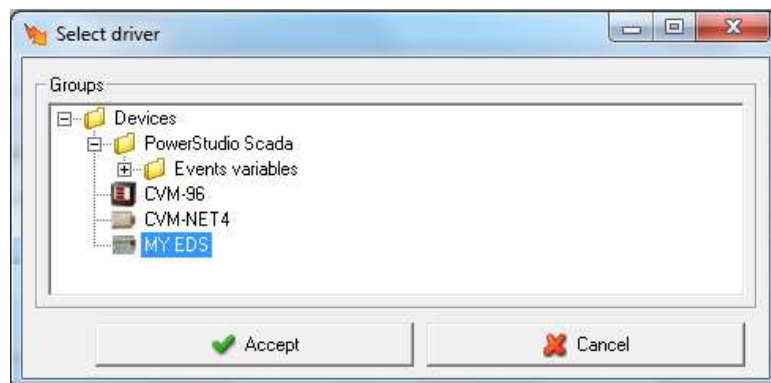
Condición (Error de sintaxis)

(hour()==10 && minute()<=59) ||

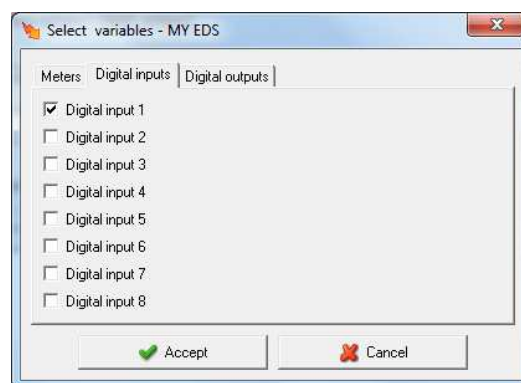
- ✓ Click on the Wizard button once more, this time select “I want to add a reference to a piece of equipment’s variable”



- ✓ Choose the EDS/EDS-3G from the list and click on Accept. See that it is possible to choose any other device or variable, whether it be events or calculations.



- ✓ In the following window, choose DIGITAL INPUTS, mark digital input no.1 and click on Accept.



As you will see, the formula has been completed with the name you allocated to the EDS followed by a point and the corresponding mnemonic of digital input no.1. But it is still incomplete.

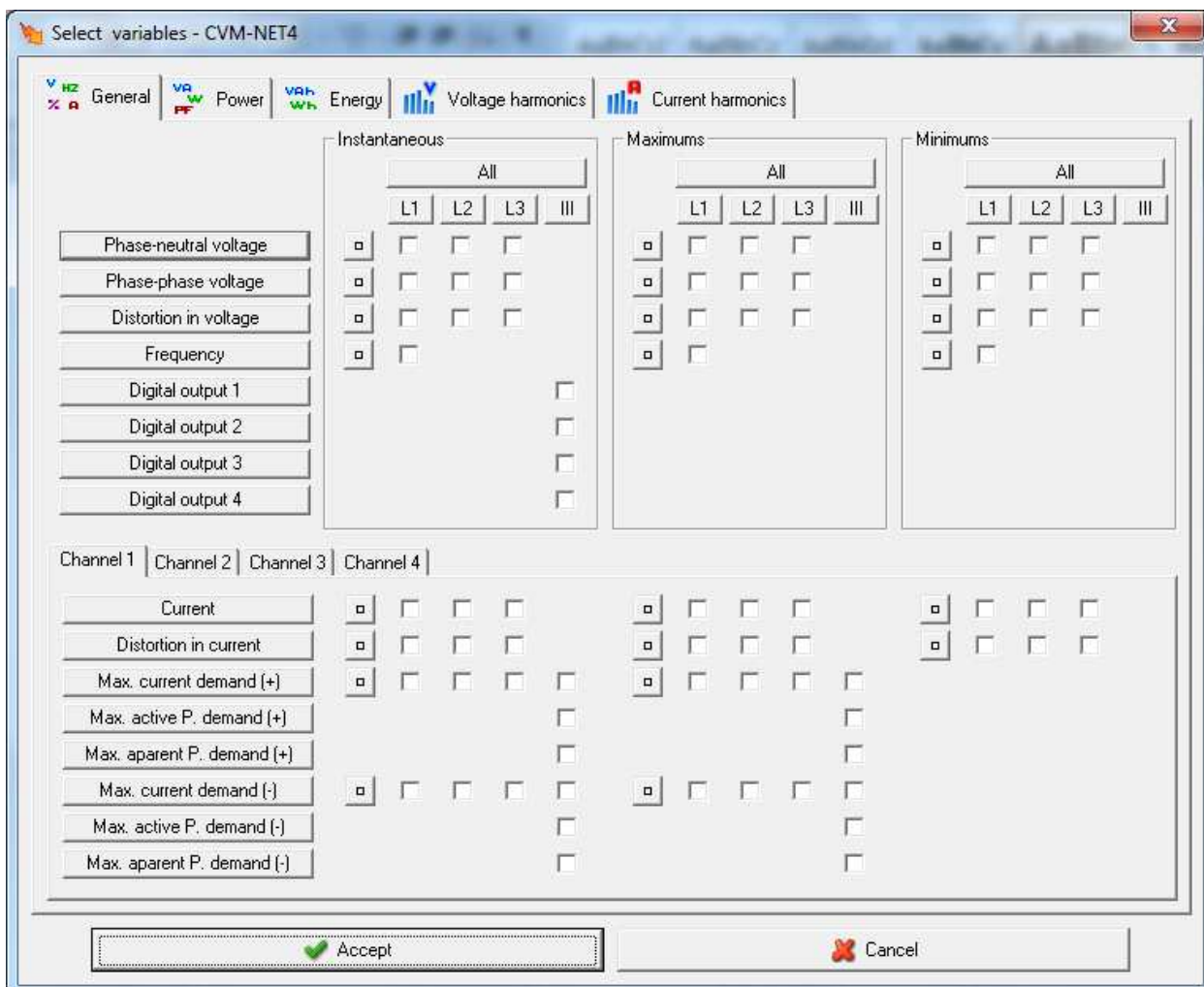


- ✓ The type “== 1 ” following the configuration of the formula. Check the text shown in the formula field indicating that this is correct.

Condition (Valid expression)*
 ([hour]==10 && minute<=59) || [MY EDS.DI1] == 1

Up to now, the event will be activated each day between 10:00 a.m. and 11:00 a.m. or when digital input no.1 of the EDS is activated.

- ✓ Continuing with the example, extend the formula with the && symbol
- ✓ Then click on the Wizard button and select “I want to add a reference to a piece of equipment’s variable”
- ✓ Choose the CVM-NET4 or any other slave device configured in the EDS/EDS-3G. Click on Accept
- ✓ The window will then appear for selecting available variables according to the features of the chosen device.



The screenshot shows the 'Select variables - CVM-NET4' window. It has tabs for General, Power, Energy, Voltage harmonics, and Current harmonics. The 'General' tab is active, showing a list of variables on the left and selection checkboxes for 'Instantaneous', 'Maximums', and 'Minimums' on the right. The variables listed are: Phase-neutral voltage, Phase-phase voltage, Distortion in voltage, Frequency, Digital output 1, Digital output 2, Digital output 3, and Digital output 4. Below this, there are tabs for Channel 1, Channel 2, Channel 3, and Channel 4. The 'Channel 1' tab is active, showing a list of variables on the left and selection checkboxes for 'Instantaneous', 'Maximums', and 'Minimums' on the right. The variables listed are: Current, Distortion in current, Max. current demand (+), Max. active P. demand (+), Max. aparent P. demand (+), Max. current demand (-), Max. active P. demand (-), and Max. aparent P. demand (-). At the bottom, there are 'Accept' and 'Cancel' buttons.

- ✓ Choose the L1 phase-neutral voltage to continue with the example, and click on Accept

See that the formula has been completed with the name of the selected device and the corresponding mnemonic of the phase 1 voltage, V11. But the formula is still incomplete.

Condition (The and relator (&) contains a non Boolean parameter)

[(hour()==10 && minute()<=59) || [MY EDS.DI1] == 1 && [CVM-NET4.V11]

- ✓ Then complete the formula with the characters ">= 200"

Condition (Valid expression)*

[(hour()==10 && minute()<=59) || [MY EDS.DI1] == 1 && [CVM-NET4.V11] >= 200]

Up to here, you have configured the event activation. This will happen automatically every day between 10:00 a.m. and 11:00 a.m. or if digital input no.1 of the EDS is activated at any time, whenever the voltage in line 1 of the **CVM-NET4** rises above 200V in both cases.

NOTE: Make sure the line 1 input voltage of the **CVM-NET** is connected to the electrical network to measure voltage in a 230V network, or that the parameter of the unit you chose is above the consignment value you programmed in the event condition.

- ✓ Once the condition that activates the event is configured, mark the option "USE CONFIGURATION FOR DEACTIVATION" and configure a formula so that

☒ Use condition for deactivation

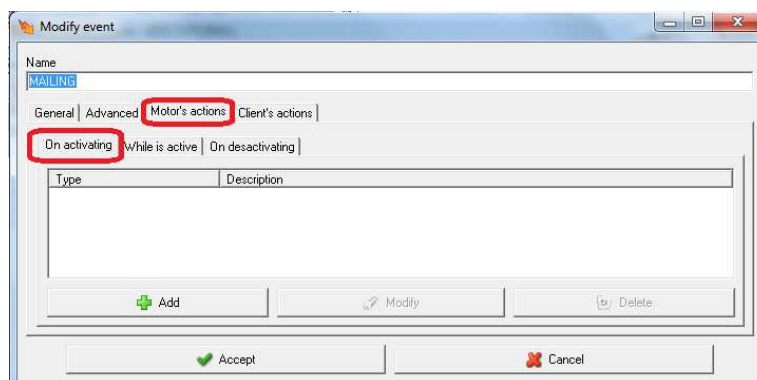
Deactivation condition (True)*

[MY EDS.DI2] == 1]

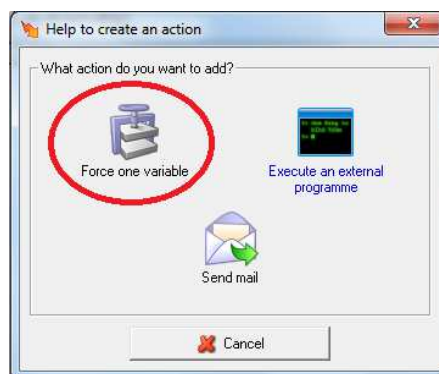
when digital input no. 2 of the **EDS/EDS-3G** is activated, the event will be reset. Between 10:00 a.m. and 11:00 a.m., the event will be activated by itself, or if you reactivate digital input no.1 of the **EDS/EDS-3G**, it will activate it manually, provided the L1 voltage of the **CVM-NET** is higher than 200V.

Having come this far, you must configure the actions that this event must carry out once the conditions of both activating and deactivating the event has been met. Proceed as follows:

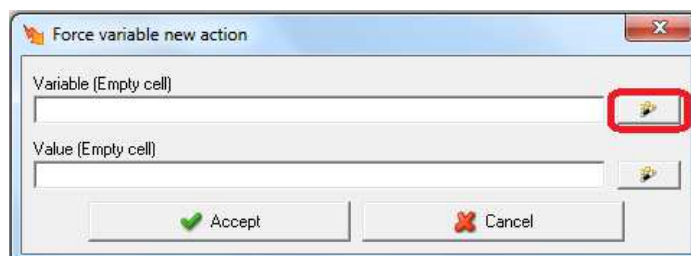
- ✓ Click on the "SEARCH ENGINE ACTIONS" tab and then on the "WHEN ACTIVATED" tab, followed by ADD.



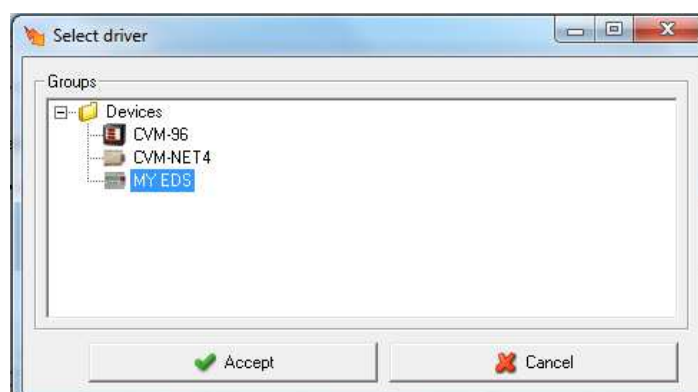
- ✓ On the following window, choose FORCE ONE VARIABLE.



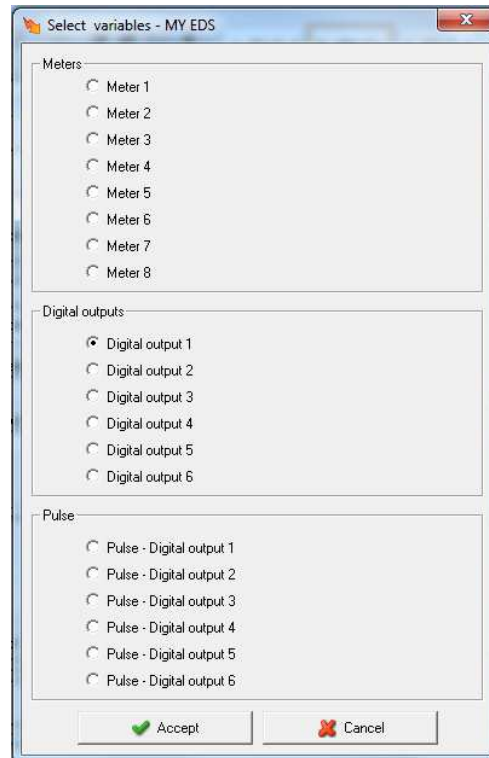
- ✓ On the following window click on the Wizard button



- ✓ Continuing with the example, choose the EDS/EDS-3G from the list of available equipment and click on Accept



- ✓ Continuing with the example, in the following window select DIGITAL OUTPUT no.1 and click on Accept

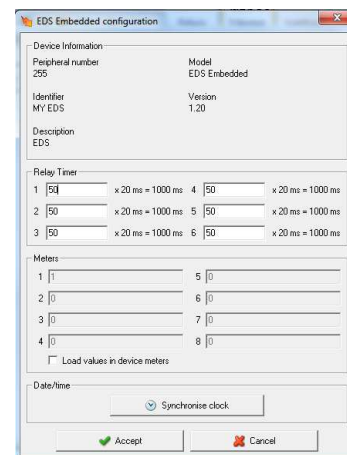


See that it is possible to select the digital outputs to make impulses, and also that it is possible to select the meters of the impulse inputs of the **EDS/EDS-3G** to load a value or set the number of impulses in the registers of these digital inputs to zero.

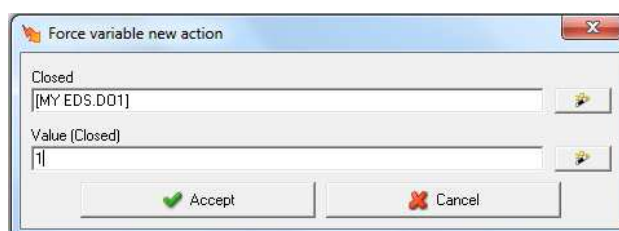




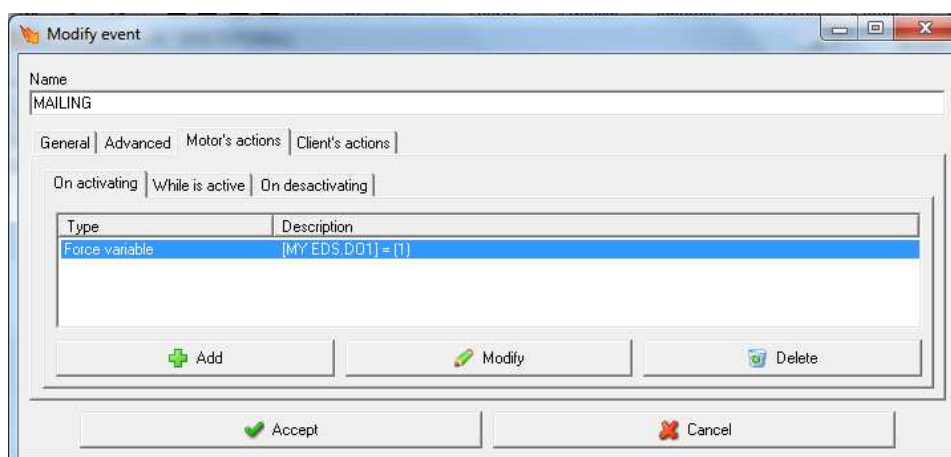
The name of the unit and the command of the chosen parameter will be added to the formula. NOTE: the impulse ON time for a digital output is configurable from the main screen of the **PowerStudio SCADA EDITOR** in **DEVICE PARAMETERS** of the **EDS/EDS-3G**. From this window it is also possible to force the impulse meters of the digital inputs to a value.



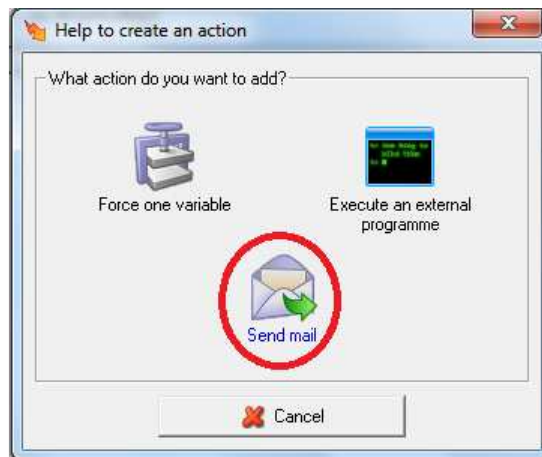
- ✓ In the Value field, enter the logical state you want for this digital output when the condition of an event is met, and continuing with the example, enter 1 and click on Accept.



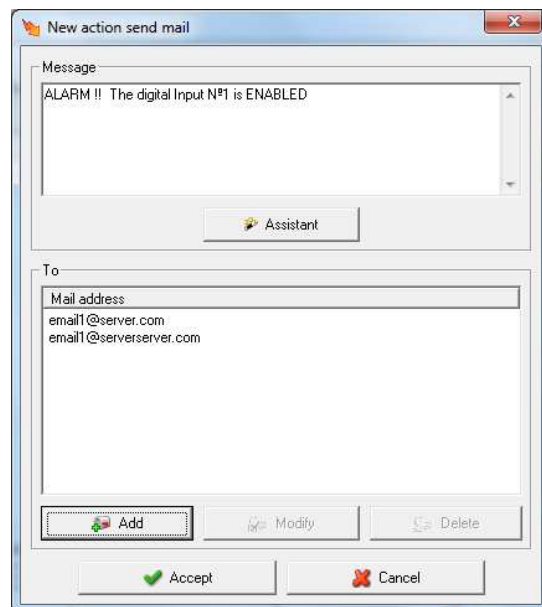
- ✓ The programmed action will be added to the list.



- ✓ Add another action to the search engine when it is activated, and this time choose the option of sending e-mail

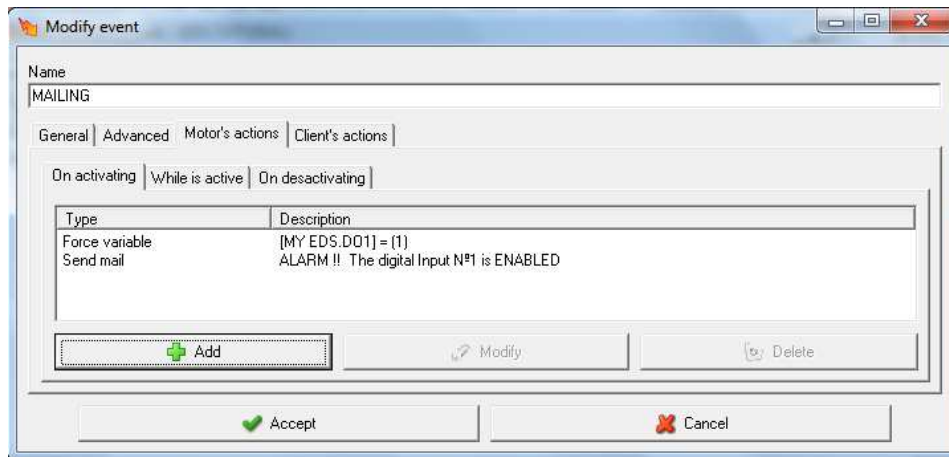


- ✓ In the following window, configure the text of the message, the e-mail list for distribution and click on Accept

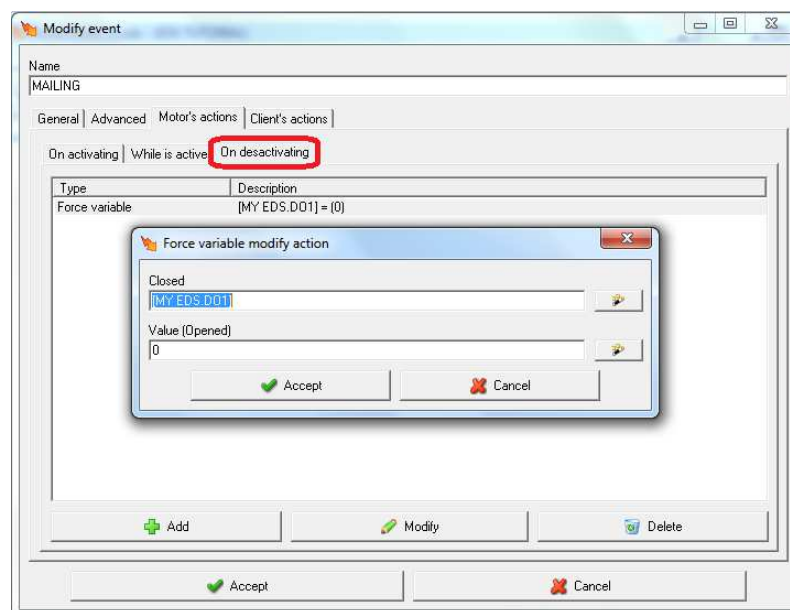


Note: It is possible to add any parameter of any device or variable calculated in the text of the message. The value at the time of the activation of the event will be sent. For further information, consult the **PowerStudio SCADA** manual or the **PowerStudio SCADA 3.0 TUTORIAL**

The new action will be added to the list of actions to be carried out in the activation of the event.



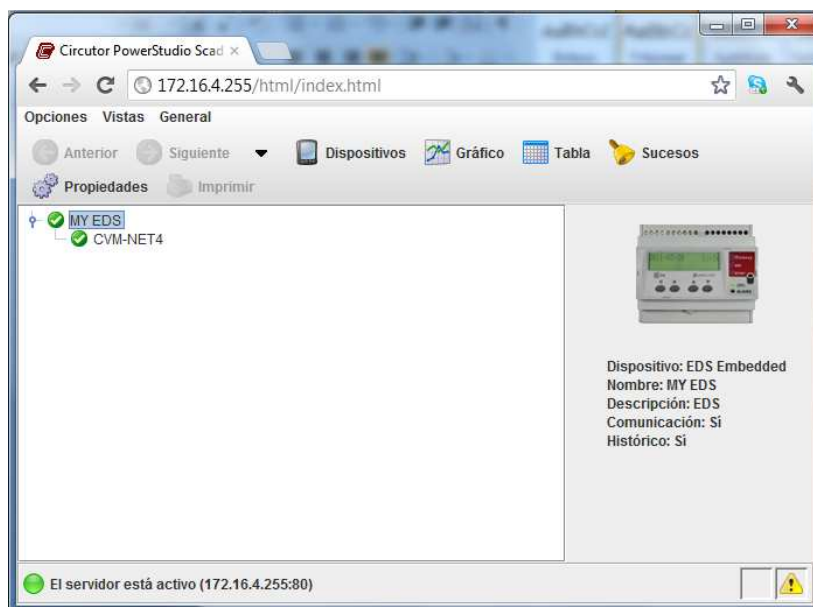
- ✓ Then click on the WHEN DEACTIVATED tab in the SEARCH ENGINE ACTIONS, and in the same way configure the deactivation of digital output no.1 of the EDS/EDS-3G. The value must be 0.



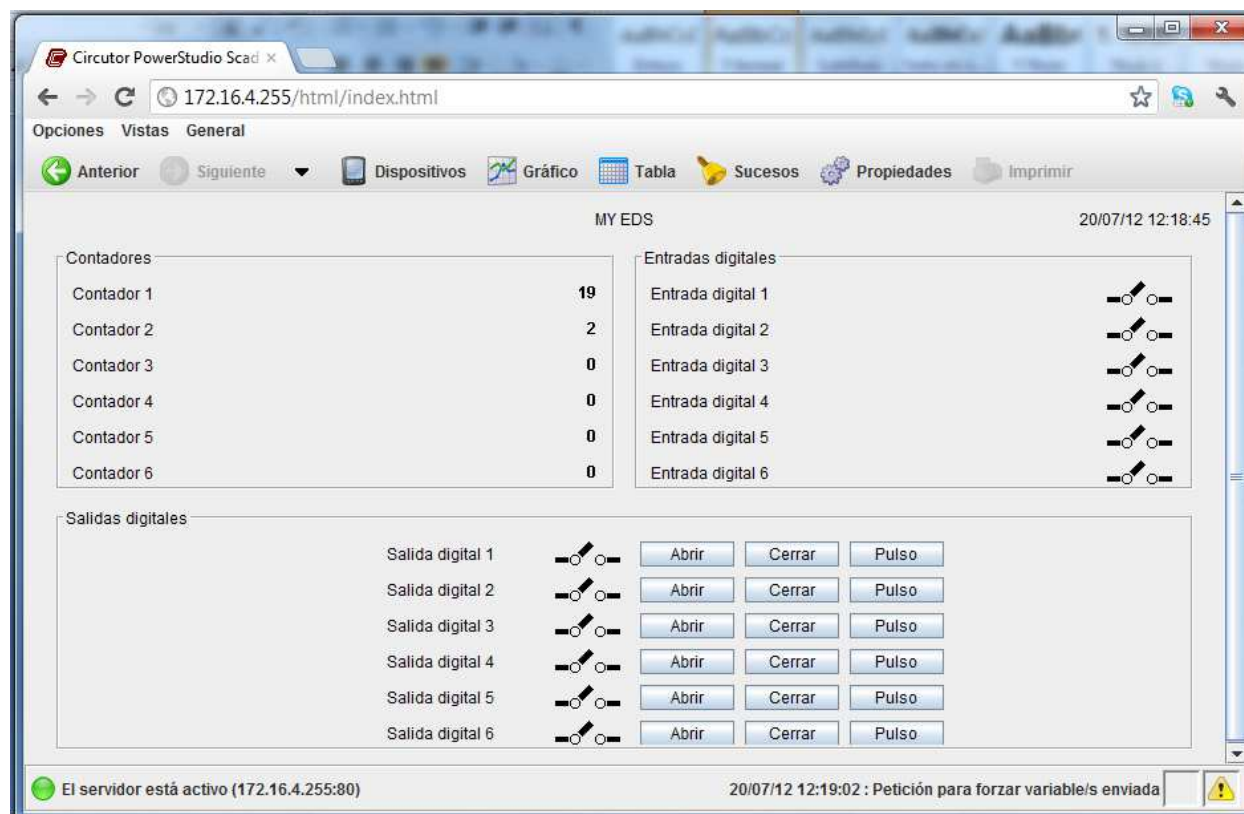
- ✓ Click on Accept in all of the windows and export the application to the **EDS/EDS-3G**. See section 14 of this tutorial.

Notice that the event has more configuration options. Consult the **PowerStudio SCADA** manual or the **PowerStudio SCADA 3.0 Tutorial** for further information on these options. The procedure for configuration or programming in **PowerStudio** is the same throughout the platform. It doesn't matter whether it is **PowerStudio embedded** of an **EDS/EDS-3G** that is configured or **PowerStudio SCADA** in a PC or SERVER.

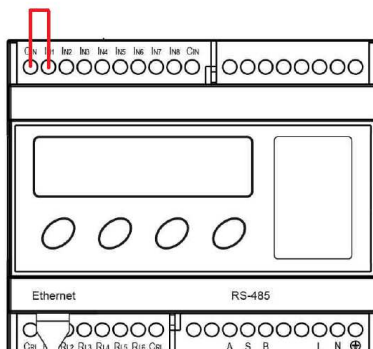
- ✓ Once the export process is complete, open a window of your internet navigator or the **PowerStudio SCADA** client and communicate with the **EDS/EDS-3G**. See section 4 of this tutorial.



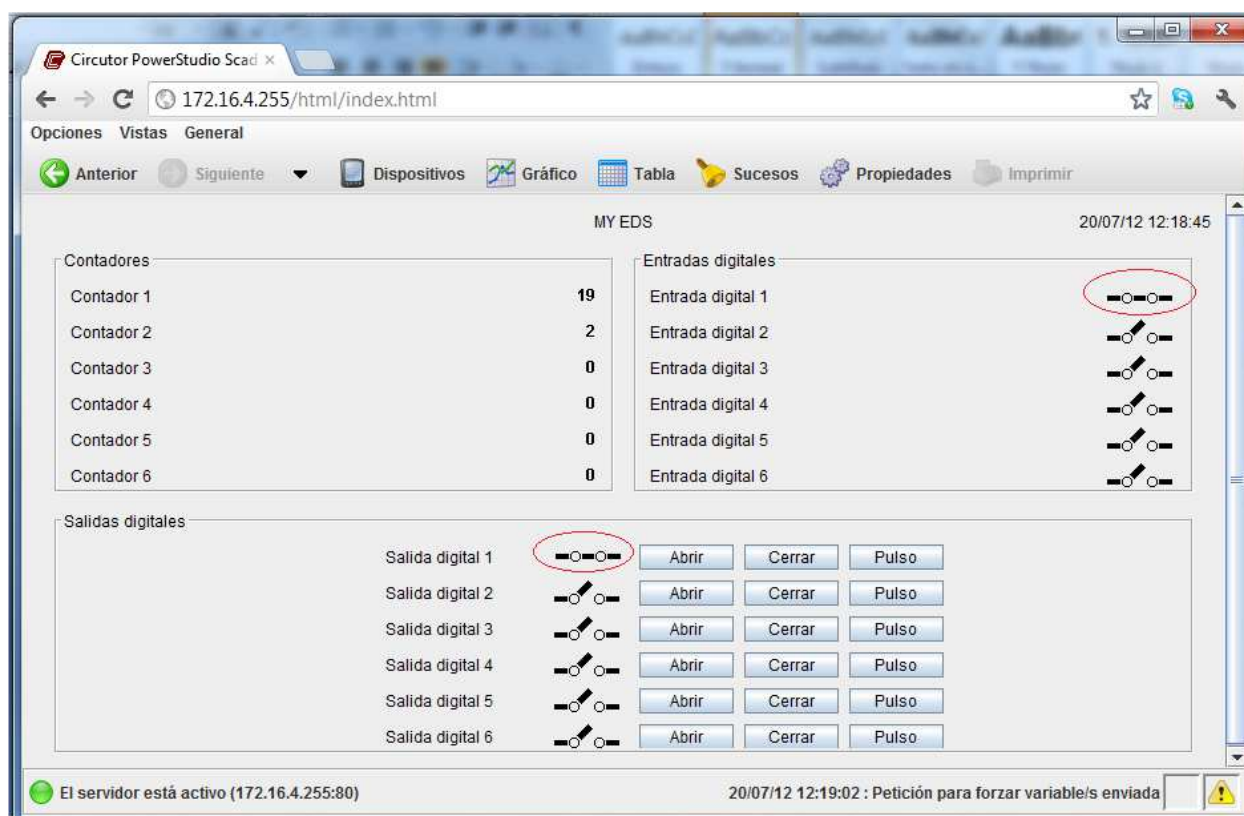
- ✓ Having loaded the **PowerStudio embedded** web environment. Select the **EDS/EDS-3G** and load the window for consulting data in real time.



- ✓ In order to check the operation of the programmed event, make a bridge between the common of digital inputs to digital input no.1 of the EDS/EDS-3G



- ✓ Make sure that digital input no.1 is closed and after a few minutes that digital output no.1 also closes.



- ✓ Turn off digital input no.1 by removing the bridge from the connection above. See how the synoptic of the switch of digital input no.1 changes to an open state and digital output no.1 remains closed.
- ✓ Check the INBOX of the e-mail account; it should have a message from the EDS/EDS-3G



- ✓ Make the same bridge between digital input no.2 and see how the synoptic changes state and digital output no.1 also, as was programmed in the event of this example.

18. Additional configurations

The **EDS/EDS-3G** is a multi-purpose, versatile device. It is possible to configure it for a large number of applications or energy control needs. As previously explained, **PowerStudio embedded** is inside, the CIRCUTOR monitoring and control software. The philosophy of the programming and use of this platform is the same on all levels, except for some special feature that may or may not be present, depending on the hierarchy level of the communications or data storage equipment (**EDS**, **EDS-3G**, **PSSEL-7000**, **PowerStudio SCADA** in PC or servers, **PowerStudio SCADA DELUXE** in redundant servers, etc.)

To have better performance of the **EDS/EDS-3G** such as:

- time discrimination
- programming of calculated variables
- data consultation in real time
- consultation of historical data in graphic or table form
- programming of events for calculations
- consultation of events history
- etc.

Consult the **PowerStudio SCADA 3.0** tutorial for step-by-step guidelines to start out or become familiarized with the system programming philosophy.



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