

EDS-3G ENERGY EFFICIENCY MANAGER



EDS-3G (Efficiency Data Server) is an *energy efficiency manager* with a built-in GPRS/3G modem. The device has an RS-485 communications bus, as well as 8 digital inputs and 6 digital outputs via relay, which allow it to communicate with external field devices, representing and storing the information via its Ethernet connection and integrated web server. **EDS-3G** also has a standard XML server, through which other external applications can integrate information from the device easily and intuitively.

This document represents the user and operation manual of the **EDS-3G** device. If misplaced, the manual may be downloaded from CIRCUTOR's web site:

www.circutor.com



Disconnect the device from the power supply source before undertaking any form of maintenance, modification of connections, repairs, etc. If you suspect any operational faults in the device or in its protection system, remove the device from service. The design of the device makes it easy to replace in the event of a fault.

1.- Buttons

The front panel of the **EDS-3G** device has an alphanumeric LCD display, along with four function buttons, allowing the user to navigate through the configuration screens of the device.

The buttons have two operating methods:

SHORT KEYSTROKE: when the user presses the function button for less than two seconds.

LONG KEYSTROKE: when the user presses the function button for more than two seconds.

The buttons have the following functions:

SCROLL LEFT: edit button, scrolls the cursor to the left to modify the numerical or alphanumeric digit.

SCROLL RIGHT: edit button, scrolls the cursor to the right to modify the numerical or alphanumeric digit.

SCROLL UP: the function of this button is to modify the digit where the edit cursor is located. If there is no cursor on the screen, move up to the next step of the previous configuration option.

SCROLL DOWN: the function of this button is to modify the digit where the edit cursor is located. If there is no cursor on the screen, move down to the next step of the previous configuration option.

2.- Configuration

The device has two clear configuration routes: the first one is related to the Ethernet network (IP addressing) and GPRS/3G network integration start-up, and the second one is related to the configuration of the internal application and possible association with other field devices via the RS485 bus.

2.1.- Network addressing

EDS-3G is a device with self-detecting Ethernet 10/100BaseTX connectivity. This means that, in order to integrate the device into a Local Area Network, it must be provided with a previous IP addressing configuration.

The user can access the configuration parameters via the display and the function keys on the front panel of the device, or through the internal configuration web site, which is accessible via a conventional Internet browser.

2.2.- Network parameter configuration (Keyboard)

The configuration of the Ethernet network parameters can be fully carried out using the function buttons on the front panel of the device.

To access the setup menu, simultaneously hold down the keys **SCROLL RIGHT**, **SCROLL UP** and **SCROLL DOWN** for more than two seconds. The device shows the text **HOLD ON 2 SECONDS TO ENTER SETUP** on screen and after 2 seconds the display shows **ENTERING SETUP RELEASE THE KEYS**.

2.2.1.- MAC address

After entering the setup menu, the device displays MAC (Media Access Control) physical address on screen, with a *00:26:45:XX:XX:XX* type format. This is an information panel that the user can use to know the physical address of the device. To go the next setup screen, press the **SCROLL DOWN** key.

2.2.2.- DHCP assignment

After entering the setup menu, the device displays **DHCP** (Dynamic Host Configuration Protocol), and shows the by default **NO** option. To modify the option displayed on the screen, press **SCROLL RIGHT** until the **YES** option appears. Do this twice and the device cyclically displays both options until one of them is validated.

When the DHCP server is activated via the **YES** caption, press the **SCROLL DOWN** key to go to the next option.

2.2.2.1.- Client ID - (DHCP YES)

After activation of the DHCP authentication and the subsequent validation, the device displays the **CLIENT ID** parameter configuration on the screen, which makes reference to the DHCP name of the device to be logged into the Ethernet network.

The **SCROLL RIGHT** key is used to enable the edit cursor on the first digit. Press this key and the **SCROLL UP** and **SCROLL DOWN** buttons to establish the parameters of an alphanumeric data entry of up to 20 digits. After the data is entered, press the **SCROLL RIGHT** key twice until the edit key disappears, and then validate the data with the **SCROLL DOWN** key, by going to the next screen.

2.2.2.2.- Assigned values - (DHCP YES)

After entering the **CLIENT ID** name in the device for the first time, the device displays the parameters assigned by the DHCP server on the screen. The parameters that are being edited will not be fixed until the device is fully configured, so that it will display the following fields on the screen, which cannot be edited (asterisk on the upper left hand corner):

- 2.2.14.1.- IP
- 2.2.14.2.- Netmask

At this point, the DHCP server has not assigned the Ethernet addressing values yet (displaying *000.000.000.000*). Press the **SCROLL DOWN** a few times until you select the APN Modem option..

The 3G version of the unit does not offer the Gateway and Primary and Secondary DNS configuration option. This is due to the fact that the unit is connected to the Internet via the GPRS/3G network and not via the local area network. To this end, the unit is connected to the Ethernet network and only available on the same local area network, with no routing possibilities, due to the lack of the gateway.

2.2.3.- APN Modem

The configuration parameters associated with the modem's GPRS/3G connection must be entered in accordance with the configuration used by the operator in each case. The SIM card must be inserted and a data tariff must be enabled for this application.

The unit must be disconnected from the auxiliary power supply to insert or remove the SIM card.

APN or *Access Point Name* is the GPRS access point name that must be configured on the mobile device to provide access to computer networks.

The **SCROLL RIGHT** key is used to enable the edit cursor on the first digit. Press this key and the **SCROLL DOWN** and **SCROLL UP** buttons to establish the parameters of an alphanumeric data entry of up to 20 digits. After the data is entered, press the **SCROLL RIGHT** key twice until the edit key disappears, and then validate the data with the **SCROLL DOWN** key, by going to the next screen.

2.2.4.- User modem

The **USER** will be supplied by the operator that supplies the SIM card. The cursor is enabled with the **SCROLL RIGHT** key and the **SCROLL UP** and **SCROLL DOWN** buttons can be used to establish the parameters of an alphanumeric data entry. Validate the data with the **SCROLL DOWN** key.

2.2.5.- Password modem

The **PASSWORD** will be supplied by the operator that supplies the SIM card. The cursor is enabled with the **SCROLL RIGHT** key and the **SCROLL UP** and **SCROLL DOWN** buttons can be used to establish the parameters of an alphanumeric data entry. Validate the data with the **SCROLL DOWN** key.

2.2.6.- PIN modem

The **PIN** will be supplied by the operator that supplies the SIM card. The cursor is enabled with the **SCROLL RIGHT** key and the **SCROLL UP** and **SCROLL DOWN** buttons can be used to establish the parameters of an alphanumeric data entry. Validate the data with the **SCROLL DOWN** key.

Insert the **PIN** and the unit will display ******** on the screen. The value is visible and can be edited in configuration mode, provided that the security option is not enabled (Enable Security).

2.2.7.- Reset modem

The unit has an automatic reset system that is activated when a fault or anomaly is detected in the mobile connection system, but since the unit can be installed remotely in a place that is hard to access, it also has a forced auto reset system for the GPRS/3G connection. This **RESET MODEM (HOURS)** is expressed in hours, which indicates that the device is automatically reset when the unit has been connected with a GPRS/3G connection with no interruptions during a determined number of hours.

The cursor is enabled with the **SCROLL RIGHT** key, and the **SCROLL UP** and **SCROLL DOWN** buttons can be used to establish the parameters of an alphanumeric data entry. Validate the data with the **SCROLL DOWN** key.

2.2.8.- Primary NTP

The device can be synchronised with a time and date NTP server (Network Time Protocol) server in the UTC time system. The device does not display a value by default, indicating that the synchronisation is completed via DHCP, if the network server allows this to be done. In this case, it is the main server.

To configure an NTP server that is different from the DHCP (*0.0.0.0*), press the **SCROLL RIGHT** key, enabling the edit cursor on the first digit. Set parameters for an alphanumeric data entry with the **SCROLL UP** and **DOWN** buttons up to a maximum of 20 digits, indicating an http address or internal or external IP (if the device has Internet access). After establishing the parameters, press the **SCROLL RIGHT** key repeatedly until the edit cursor disappears and validate the data with the **SCROLL DOWN** key, opening the next screen.

Servers available on the Internet:

- es.pool.ntp.org
- pool.ntp.org

2.2.9.- Secondary NTP

configuration of the secondary NTP server, carry out the same procedure as with the Primary NTP.

2.2.10.- Time Zone

Press the **SCROLL RIGHT** key to select the time zone where the **EDS-3G** device is located. After selecting the zone, press the **SCROLL DOWN** key, and go to the next screen.

2.2.11.- Dyn DNS type

The **DYN DNS TYPE** menu offers two dynamic communications systems, when working with connections with no fixed IP and which require identification by a connection master.

To configure a dynamic system, press the **SCROLL RIGHT** key until the desired system is selected (**DYNDNS**, **CIRDNS** or **DISABLED**).

After it has been selected, press the **SCROLL DOWN** key to open the next screen.

2.2.11.1.- DynDNS System

DYNDNS (*Dynamic Network Services*) can update information on domain names hosted in a name server in real time. The most common use involves assigning an Internet domain name to a PC with a variable IP address (EDS-3G with a dynamic IP in this case). This allows the unit to be connected with no need to hire an Internet connection with fixed IP identification.

2.2.11.1.1. DynDNS - host

Enter the DNS server name supplied by the dynamic DynDNS service provider.

The cursor is enabled with the **SCROLL RIGHT** key, and the **SCROLL UP** and **SCROLL DOWN** buttons can be used to establish the parameters of an alphanumeric data entry. Validate the data with the **SCROLL DOWN** key.

2.2.11.1.2. DynDNS - user

Enter the user name (**USER**) of the dynamic DynDNS service supplied by the service provider.

The cursor is enabled with the **SCROLL RIGHT** key, and the **SCROLL UP** and **SCROLL DOWN** buttons can be used to establish the parameters of an alphanumeric data entry. Validate the data with the **SCROLL DOWN** key.

2.2.11.1.3. DynDNS - password

Enter the password of the dynamic DynDNS service supplied by the service provider.

The cursor is enabled with the **SCROLL RIGHT** key, and the **SCROLL UP** and **SCROLL DOWN** buttons can be used to establish the parameters of an alphanumeric data entry. Validate the data with the **SCROLL DOWN** key.

2.2.11.2.- CirDNS System

*CiRDN*S is a proprietary system that has been designed to invert the role of the remote device connection process. The devices start the communication process with the remote connections server, by creating a transparent communications tunnel between the device and connection server. Therefore, the user avoids having to hire and maintain a fixed IP system or *DynDNS* in its remote control locations.

Once the connections have been received by a central computer, said connections are shared by a local DNS name server, hosted in a machine with the software supplied with the EDS device.

2.2.11.2.1. CirDNS - host

Enter the name with which the local DNS name server will be identified when it is connected to the central server. For example, when configuring *EDS001* when it is connected to the main server, the server will identify it with the local DNS name (after the name server has been installed - refer to the *CiRDN*S user manual).

The cursor is enabled with the *SCROLL RIGHT* key, and the *SCROLL UP* and *SCROLL DOWN* buttons can be used to establish the parameters of an alphanumeric data entry. Validate the data by pressing the *SCROLL DOWN* key.

2.2.11.2.2. CirDNS - password

An authentication password can be activated in the *CiRDN*S system installed on the server to provide access to the remote devices machine. In this case, the EDS-3G units that wish to connect to the machine must have an access password established for such purposes.

The cursor is enabled with the *SCROLL RIGHT* key, and the *SCROLL UP* and *SCROLL DOWN* buttons can be used to establish the parameters of an alphanumeric data entry. Validate the data with the *SCROLL DOWN* key.

2.2.11.2.3. CirDNS - server

Enter the destination IP or DNS name where the device will be actively connected. This is an alphanumeric field.

The cursor is enabled with the *SCROLL RIGHT* key, and the *SCROLL UP* and *SCROLL DOWN* buttons can be used to establish the parameters of an alphanumeric data entry. Validate the data with the *SCROLL DOWN* key.

2.2.11.2.4. CirDNS - port

Enter the port used to access the central server, where the *CiRDN*S connections software was installed. This computer must have an access port used to connect all remote devices, in order to establish a transparent communications tunnel.

In this case, access to the Internet connection from the central location will require the use of a connection router, which will establish a NAT access rule to activate a UDP connection port in the connection server (connection path).

An access port must be activated in the Internet access router, which will internally transfer the public communication frames to the *CiRDN*S internal connection server and to a port specified by and known to the user.

2.2.12.- Enable Security

A user and edition password can be activated in the device, thus avoiding modification of the configuration parameters. The device displays *NO* by default. It should be pointed out that if the password is activated, it will be present in all the device's configuration and display accesses (keyboard, Web configuration and internal applications).

To modify the option displayed on screen, *SCROLL RIGHT* until the option *YES* appears. Do this twice and the device cyclically displays both options until one of them is validated. Establish the parameters for the alphanumeric data entry with the *SCROLL UP* and *DOWN* buttons, up to 20 digits corresponding to the *USER*, and when the data is validated, repeat the operation with the *PASSWORD*. Validate the data (*SCROLL RIGHT* and *SCROLL DOWN*).

2.2.13.- Confirm Changes - (DHCP NO)*

The information must be validated to save the configuration. The device displays *YES* by default. When the completed configuration is validated, press the *SCROLL DOWN* key and the device saves the data and leaves configuration.

If the configuration is not saved, *SCROLL RIGHT* until the *NO* option appears. Do this twice and the device cyclically displays both options until one of them is validated with the *SCROLL DOWN* key

2.2.14.- Client ID - (DHCP NO)*

If the DHCP server is not activated, shown in section 2.2.2.- DHCP assignment, validate the *NO* option using the *SCROLL DOWN* key and go to the next screen.

2.2.14.1.- IP - (DHCP NO)*

The user configures an IP address for the EDS-3G device using this configuration option. To configure them, press the *SCROLL RIGHT* key, enabling the edit cursor on the first digit. Press the *SCROLL UP* and *DOWN* buttons to establish the parameters of a *000.000.000.000* type numeric data entry. After

establishing the parameters, press the *SCROLL RIGHT* key repeatedly until the edit cursor disappears, and validate the data with the *SCROLL DOWN* key, opening the next screen.

2.2.14.2.- NetMask - (DHCP NO)*

To configure the (NetMask) configuration, press the *SCROLL RIGHT* key, activating the edit cursor on the first digit. Press the *SCROLL UP* and *DOWN* buttons to establish the parameters of a *000.000.000.000* type numeric data entry. After establishing the parameters, press the *SCROLL RIGHT* key repeatedly until the edit cursor disappears, and validate the data with the *SCROLL DOWN* key, opening the next screen.

2.2.14.3.- Other configurations - (DHCP NO)*

After configuring the secondary DNS, the other setup screens correspond to the same ones as in the activated DHCP mode; consequently the configuration procedure will be the same as the one for sections:

- 2.2.3.- APN Modem
- 2.2.4.- User modem
- 2.2.5.- Password modem
- 2.2.6.- PIN modem
- 2.2.7.- Reset modem
- 2.2.8.- Primary NTP
- 2.2.9.- Secondary NTP
- 2.2.10.- Time Zone
- 2.2.11.- Dyn DNS type
- 2.2.12.- Enable Security
- 2.2.13.- Confirm Changes - (DHCP YES)

2.2.14.4.- Manual Date and Time Configuration

If there is no authentication configuration by the DHCP system, and if there is no Primary and Secondary NTP server available, EDS-3G allows the time and date to be configured manually when validating the changes by displaying the caption *ADJUST CLOCK*. The date and time are displayed on screen with the following format: *YYYY-MM-DD HH:MM*. To configure them, press the *SCROLL RIGHT* key, enabling the edit cursor on the first digit. Use the *SCROLL UP* and *SCROLL DOWN* buttons to establish the parameters of the numeric data entry. After establishing the parameters, press the *SCROLL RIGHT* key twice until the edit key disappears, and then validate the data with the *SCROLL DOWN* key, leaving setup and validating the configuration.

When the configuration is validated, the *DONE* caption appears, returning to the main screen.

2.2.15.- Display of configuration parameters

To display the configuration parameters, the user must enter the setup menu by simultaneously pressing the *SCROLL RIGHT*, *SCROLL UP* and *SCROLL DOWN* KEYS. *THE USER MUST* Press the *SCROLL DOWN* key twice for complete visualisation of the device configuration.

If a user and password are available even when the user does not have one, all the configuration parameters can be visualised without being able to change them (asterisk in top left hand corner).

2.2.15.1.- Ping system

To confirm IP connectivity via a Local Area Network (LAN) or the Internet using a DSL or 3G router, the user sometimes has to know if the EDS-3G device has this IP access or if the unit has particular access to a certain host.

To do so, EDS-3G has a *PING*, section, from which the user can carry out an IP connectivity test with an IP address or name, emulating the ping command of a conventional operating system.

The device displays the physical address within the setup menu, as shown in section 2.2.1.- *MAC* address. Press the *SCROLL RIGHT* key to go to the on-screen caption *HOST PING*. To enter the name or IP address to carry out the ping test, press the *SCROLL RIGHT* key to enable the edit cursor on the first digit. Press this key and the *SCROLL DOWN* and *SCROLL UP* buttons to establish the parameters of an alphanumeric data entry of up to 20 digits. After the data is entered, press the *SCROLL RIGHT* key twice until the edit key disappears, and then validate the data with the *SCROLL DOWN* key.

When the data is validated, the screen displays the *DOING PING* caption and will then show the results:

- **PING RESULT: OK** - a response was obtained from the host
- **PING RESULT: TIME OUT** - no response was obtained from the host

When a result is obtained by the device, press the *SCROLL DOWN* key and the device goes back to the by default display screens.

2.2.16.- Acquired IP and coverage

Once the unit has been connected to the Internet, two sensitive variables must be known by the user or integrator, which are the IP acquired by the mobile phone telephony provider and the coverage signal the unit is connected to.

Press the *SCROLL RIGHT* and *SCROLL LEFT* keys at the same time and the unit will display on the screen the IP acquired by the operator and the connection coverage. Said coverage can oscillate from -113 dBm to -51 dBm. The latter is considered as the value with the highest coverage.

These values may be known by accessing the following website:

- <http://xxx.xxx.xxx.xxx/html/modem-status.html>
- http://dhcp_name/html/modem-status.html

Where *xxx.xxx.xxx.xxx* is the IP address assigned by the user

Where *dhcp_name* is the name assigned and authenticated by the name server of the local area network (LAN) or a DNS server in case of using a *DynDNS* system to connect to the Internet.

2.2.17.- Internal configuration web site

After establishing the parameters with the keyboard and connecting to the Ethernet, or even from the unit's Internet connection, the device has a configuration web site where the user can fully modify the data entered with the keyboard. The configuration web site is at the http address below:

- <http://xxx.xxx.xxx.xxx/html/setup.html>
- http://dhcp_name/html/setup.html

Where *xxx.xxx.xxx.xxx* is the IP address assigned by the user.

Where *dhcp_name* is the name assigned and authenticated by the name server of the local area network (LAN) or a DNS server in case of using a *DynDNS* system to connect to the Internet.

2.3.- Network parameters configuration (Software)

Configuration of addressing can be done in the same way as using the keyboard via the *IPSetup.exe* file, available on a CD supplied with the device.

2.3.1.- Fixed IP assignment

To assign a fixed IP address, enter the MAC address displayed on the device screen as shown in section 2.2.1.- *MAC* address address, the format of which is *00:26:45:XX:XX:XX*.

The screenshot shows a configuration screen with the following fields and values:

- MAC:** 00:26:45:00:01:9f
- Dirección:** 172 . 16 . 4 . 130
- Netmask:** 255 . 255 . 0 . 0
- Gateway:** 172 . 16 . 4 . 1

Buttons for "Configurar" and "Salir" are visible at the bottom.

In the **Address** field, enter the IP address being configured; performs the same operation with the **Netmask**. After entering the device configuration, press "Configure" to send the configuration to the unit.

2.3.2.- DHCP IP assignment

To assign the DHCP name, activate the option using the upper right hand arrow and select **On**. Once the configuration fields have been enabled, enter the **MAC** address.

In the **Address** field, enter an unused, temporary IP address, which is within the working range of your computer. In the **Host Name** field, enter the DHCP name to be assigned to the equipment. Optionally, the user can configure the parameters of the **ClientID** field. The default **VendorID** of the device is **CIRCUATOR**.

The screenshot shows the DHCP configuration screen with the following details:

- DHCP:** On (selected)
- MAC:** 00:26:45:00:01:9f
- Host Name:** bus
- Dirección:** 172 . 16 . 4 . 130
- Client ID:** (empty)
- Netmask:** (empty)
- Primary DNS Server:** (empty)
- Gateway:** (empty)
- Secondary DNS Server:** (empty)

Buttons for "Configurar" and "Salir" are visible at the bottom.

2.3.3.- Configuration web site

Once connection to the Local Area Network (LAN) is established and the IP address or DHCP name is configured, the device has an internal web site where the user can fully modify all the network configuration parameters (0 Where *xxx.xxx.xxx.xxx* is the IP address assigned by the user

Where *dhcp_name* is the name assigned and authenticated by the name server of the local area network (LAN) or a DNS server in case of using a *DynDNS* system to connect to the Internet.

Internal configuration web site), and even the time and date data.

Network setup

Host name: edsmodem1

DHCP: On Off

DHCP Client ID: _____

Address: _____

Netmask: _____

Modem setup

APN: _____

User: _____

Password: _____

Reset timer (hours): _____

Time setup

Primary NTP server: pool.ntp.org

Secondary NTP server: _____

Time zone: Europe Madrid

Time: martes, 07 de febrero de 2012 11:41:24

Dynamic DNS setup

Server type: Disabled

Hostname: _____

User: _____

Password: _____

Server: _____

Port: _____

Security setup

Password: On Off

User name: _____

New password: _____

Repeat password: _____

Information

MAC: 00:0A:00:00:88:02

Version Upgrade: 1.0 modem beta 4

Powerstudio version: 3.2 BETA

Devices status: _____

these impulses is linked to 8 memory records, stored in a non-volatile memory.

Each registry is 32 bits (4 bytes), so it counts a maximum of up to 4,294,967,295 impulses. When a memory record reaches this value, the energy meter is reset back to zero.

The minimum duration of the impulse or status change of the digital input must be 50 ms. The minimum time between two successive impulses must also have a minimum duration of 50 ms. This represents a maximum sampling frequency of 10 Hz.

Its Web server and internal memory enable the user to extract graphics and tables of impulses received during a certain period (table and graphic function).

3.3.2.- Input logical status function (0/1)

The 8 digital inputs in the device are voltage-free and have an input logical status detection function. This means that when a bridge is set up between the common and one of the digital inputs, the device detects that the input has closed, and displays the status via both communications servers.

3.4.- Digital outputs

The device has 6 relay digital outputs. The user can use remote control to carry out actions on the outputs (open, close, create an impulse).

These actions can be manual, or via programming in the events section of the device (see **PowerStudio Scada** manual).

3.5.- RS-485 expansion bus

The device has an RS-485 communications bus that allows it to communicate with external peripherals, act as a communications master and store data recorded in its 200Mb cyclic memory.

Its Web accessibility and memory enable the user to view data coming from devices connected to the bus in real time, and easily and simply view graphics and tables of the parameters registered by the device.

As well as linking communications with devices connected to its RS-485 communications bus, the device also has the capacity to make connections via IP connectivity (local or remote), either through an IP via addressing or DHCP name.

To add devices to the configuration of the **EDS-3G energy PLC**, the user must install the PowerStudio or PowerStudio Scada application, so as to export a new configuration of the device, adding new analyzers or slaves connected to the unit.

EDS-3G allows the configuration of up to 5 slave devices connected to its network.

3.6.- Additional PS/PSS features

To configure the other system features, read the **PowerStudio / Scada Editor** manual. It has all the information the user needs about:

- Importing or exporting the configuration of the **EDS-3G** system
- Configuration of new devices or slaves
- Tariff discriminators / calendars
- Calculated variables
- System events and alarms
- Authentication configuration
- Web system security
- Etc.

Without the **PowerStudio Editor** tool, the measurement application cannot be configured to provide new features for the **EDS-3G** device. Consequently the user must install the software, thus making it possible to fully configure the display server and vary the settings of the display, connected devices, alarms, etc.

4.- XML instructions

Not only does **EDS-3G** function as an excellent *energy efficiency manager* for local and multi-point networks, it also has a default XML requests server that enables it to be easily and intuitively integrated into a SCADA or remote monitoring system. The device, via its IP address, responds to GET and PUT requests, being able to carry out different functions on the device.

4.1.- Type of variables

The device has a list of available variables, in accordance with the device's features. The basic code is made up of the device name and the variables separated by a dot:

- name.variable

This way the software knows which variable it is and what device must be asked to find out the value of the variable.

When an incremental variable is discriminated (energy, impulse energy meter or similar), the information about the parameterised discriminator is added to the basic code:

- name_discriminator@type_time:variable

The discriminable variables are shown in the list with an asterisk.

4.2.- EDS-3G variables list

If slave devices are provided, the frames sent to **EDS-3G** are identified in the same way by name and variable, as shown in section 4.1.-.

The following table shows the definition of the variables available in **EDS-3G**.

Digital inputs	XML - Status Value	XML - Energy Meter Value
Digital Input 1	DI1	C1
Digital Input 2	DI2	C2
Digital Input 3	DI3	C3
Digital Input 4	DI4	C4
Digital Input 5	DI5	C5
Digital Input 6	DI6	C6
Digital Input 7	DI7	C7
Digital Input 8	DI8	C8
Digital Output Status	XML - Force Output	Forced Open / Close
Digital Output 1	DO1	0 / 1
Digital Output 2	DO2	0 / 1
Digital Output 3	DO3	0 / 1
Digital Output 4	DO4	0 / 1
Digital Output 5	DO5	0 / 1
Digital Output 6	DO6	0 / 1
Forced Outputs Impulse	XML - Impulse	Forced Impulse
Digital Output 1	DOP1	≠ 0
Digital Output 2	DOP2	≠ 0
Digital Output 3	DOP3	≠ 0
Digital Output 3	DOP4	≠ 0
Digital Output 5	DOP5	≠ 0
Digital Output 6	DOP6	≠ 0
Date and time	XML - Value	Values
Date and Time	VDITM	Last Server communication
Device status	XML - Impulse	Values
Device status	STATUS.	1 Communication OK
		4 Not initialized
		18 Port incorrect
		34 Comm Errors
		66 Device incorrect

4.3.- XML Services

The requests must follow the URI standard (RFC 2396), so the user of these requests should take this detail into account when making such calls (especially in cases where the name of any device contains non-ASCII characters). Take into account that the length of the request must not under any circumstance exceed 4000 characters.

4.3.1.- Configured devices request

With this request, the XML service returns the list of connected devices to the **EDS-3G energy efficiency manager**.
<http://x.x.x.x/services/user/devices.xml>
http://nombre_dhcp/services/user/devices.xml

```
<devices>
  <id> ... </id>
</devices>
- devices: field identifying the XML as a response to the device list request
- id: name of each one of the devices
```

4.3.2.- Information about the device

With this request, the XMP service returns information about the devices. Each device included in the information query must be included in the request as ?id=device1?id=device2...
<http://x.x.x.x/services/user/deviceInfo.xml?id=dispositivo?>
http://nombre_dhcp/services/user/deviceInfo.xml?id=dispositivo?

```
<devices>
  <device>
    <id> ... </id>
    <description> ... </description>
    <type> ... </type>
    <typeDescription> ... </typeDescription>
    <var> ... </var>
    ...
  </device>
  ...
</devices>
- description: description of device
- type: device type
- typeDescription: detailed description of the device
- var: name of each of the variables of the device; expressed as name.variable
```

4.3.3.- Information about the variable

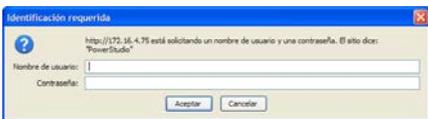
The user can request detailed information about one or more variables from a device and even make one single request for the information about all the variables available in the device.

4.3.3.1.- Information about one or more variables

Request for detailed information about one or more variables of the device (if information is needed about more variables, link the other requests below with var=device.variable?):

2.3.4.- Access via password

If an access user name and password have been parameterised, the device requests these access parameters when trying to access via the web site in the following pop up screen:



3.- Operation

EDS-3G is an *energy efficiency manager* with a Web server display, from which the user can view the status of the device inputs and outputs in real time, as well as any possible action to be taken.

As well as serving the data stored internally via the Web, the device has an XML server, enabling the user to send GET and PUT type requests.

3.1.- Web Server

Once the Ethernet addressing is configured and integrated into the Ethernet network, the device variables are visible to the user via a conventional Internet Explorer browser (with Java plug-in installed on the computer <http://www.java.com/es/download/>). Another access interface is the *PowerStudio Scada Client*.

To see the Web display interface, the user must access it via the http address below:

- <http://xxx.xxx.xxx.xxx>
- http://nombre_dhcp

Where xxx.xxx.xxx.xxx is the IP address assigned by the user.

Where dhcp_name is the name assigned and authenticated by the name server of the local area network (LAN) or a DNS server in case of using a DynDNS system to connect to the Internet.

3.2.- XML server

The XML server is an excellent integration tool for external applications. **EDS-3G** has a server available whose access requests are identified in this manual (see 4.- XML instructions).

3.3.- Digital inputs

The device has a total of 8 digital inputs, whose function is to count energy impulses coming from external sensors, or for detection of the logical status of the input. The contacts of the digital inputs of the device must be voltage-free dry contacts.

3.3.1.- Impulse energy meter function

Electronic meters have an impulse output that is proportional to the recorded power. With its inputs, **EDS-3G** is a centralising unit with 8 digital inputs (opto-coupled) for reading impulses from electricity, water, gas meters etc. The value of

<http://x.x.x/services/user/varInfo.xml?var=device.variable?>
http://name_dhcp/services/user/varInfo.xml?var=device.variable?

4.3.3.2.- Information about all the variables

Request for detailed information about all the variables of the device (if information is needed about more devices, link the other requests below with id=device?):

<http://x.x.x/services/user/varInfo.xml?id=dispositivo?>
http://nombre_dhcp/services/user/varInfo.xml?id=dispositivo?

```
<varInfo>
  <var>
    <id> ... </id>
    <title> ... </title>
    <hasValue> T </hasValue>
    <hasLogger> T </hasLogger>
    <sampleMode> ... </sampleMode>
    <measureUnits> ... </measureUnits>
    <unitsFactor> ... </unitsFactor>
    <decimals> ... </decimals>
  </var>
  ...
</varInfo>
```

- **id:** variable name in device.variable format
- **title:** brief description of the variable
- **hasValue:** indicates if it is possible to request the instantaneous value of the variable (*True / False*)
- **hasLogger:** indicates if it is possible to request the log of the variable (*True / False*)
- **sampleMode:** type of variable and mode used to group values
- **measureUnits:** variable unit
- **unitsFactor:** power of 10 indicating the multiplying factor in the log file
- **decimals:** decimals of the variable

4.3.4.- Instantaneous variable value

The user can request the instantaneous values of one or more variables, and can even request the information about all instantaneous values with a single request.

4.3.4.1.- Instantaneous value of one or more variables

Request for the instantaneous value one or more variables of the device (if information is needed about more variables, link the other requests below with var=device.variable?):

<http://x.x.x/services/user/values.xml?var=dispositivo.variable?>
http://nombre_dhcp/services/user/values.xml?var=dispositivo.variable?

4.3.4.2.- Instantaneous value of all variables

Request for instantaneous values of all the variables of the device (if information is needed about more devices, link the other requests below with id=device?):

<http://x.x.x/services/user/values.xml?id=dispositivo?>
http://nombre_dhcp/services/user/values.xml?id=dispositivo?

```
<values>
  <variable>
    <id> ... </id>
    <value> ... </value>
  </variable>
  ...
</values>
```

- **id:** identifier of the variable
- **value:** value of variable at the time of the request

4.3.5.- Historical data

Request for historical data log of an incremental variable. Returns information on one or more variables between the "begin" and "end" dates. Each variable for which information is required must be included in the request as ?var=device.variable

When only the date is required, the format is DDMMYYYY; When the date and time are required, the format is DDMMYYYYHHMMSS. Both the date and the time must be expressed in UTC (Universal Coordinated Time).

The grouping period can be defined by different criteria:

- **value in seconds** (for example 900): value in seconds in which the data is grouped
- **ALL** the data is grouped into a single value
- **AUTO:** grouping is automatic with predefined intervals according to "begin" and "end"

- **FILE:** data not grouped. returns the information as registered in the database
 - if the **period** parameter does not appear in the request, it is considered as value 0 and the data is not grouped
- <http://x.x.x/services/user/records.xml?begin=01032011000000?end=31032011000000?var=dispositivo.variable?period=900>
http://nombre_dhcp/services/user/records.xml?begin=01032011000000?end=31032011000000?var=dispositivo.variable?period=900

```
<recordGroup>
  <period> ... </period>
  <record>
    <dateTime> ... </dateTime>
    <field>
      <id> ... </id>
      <value> ... </value>
    </field>
  </record>
  ...
</recordGroup>
```

- **recordGroup:** field identifying the XML as a response to the variable record request
- **period:** recording period; time between recordings
- **record:** identifies each recording (dateTime: date and time of the sample)
- **field:** standard recording value (for others consult PS manual)
- **value:** value of variable at the time of the request

4.3.6.- Historical events file

As this user manual describes, the **PowerStudio / Scada Editor** makes it possible to configure events or alarms in the **EDS-3G** device and record them in the internal memory.

With the following request, the user can request the historical events file between the dates defined. Every event that is requested with a historical events file is defined as ?id=name_event

When only the date is required, the format is DDMMYYYY; When the date and time are required, the format is DDMMYYYYHHMMSS. Both the date and the time must be expressed in UTC (Universal Coordinated Time).

http://x.x.x/services/user/events.xml?begin=01032011000000?end=31032011000000?id=nombre_suceso?
http://nombre_dhcp/services/user/events.xml?begin=01032011000000?end=31032011000000?id=nombre_suceso?

```
<main>
  <recordGroup>
    <id> ... </id>
    <record>
      <date> ... </date>
      <eventId> ... </eventId>
      <annotation> ... </annotation>
      <value> ... </value>
    </record>
    ...
  </recordGroup>
  ...
</main>
```

- **main:** field identifying the XML as a request
- **recordGroup:** field that groups all the recordings of an event
- **id:** event identifier
- **record:** identifies each record
- **date:** event date and time
- **eventId:** event identifier
- **annotation:** event annotation
- **value:** event value
 - ON: active event
 - OFF: inactive event
 - ACK: event acknowledged

4.3.7.- Device events

Returns the information about recorded events of one or more devices between the dates "begin" y "end". Each device for which information is required must be included as ?id=device

<http://x.x.x/services/user/recordsEve.xml?begin=01032011000000?end=31032011000000?id=dispositivo?>
http://nombre_dhcp/services/user/recordsEve.xml?begin=01032011000000?end=31032011000000?id=dispositivo?

Cuando se desee indicar solamente la fecha, el formato es DDMMAAAA; cuando quiere especificarse la fecha y hora es

DDMMAAAAHHMMSS. Tanto la fecha como la hora, debe estar expresado en UTC (Universal Coordinated Time).

```
<main>
  <recordGroup>
    <device> ... </device>
    <record>
      <dateTime> ... </dateTime>
      <field>
        <id> ... </id>
        <value> ... </value>
      </field>
    </record>
    ...
  </recordGroup>
  ...
</main>
```

- **main:** field identifying the XML as a request
- **recordGroup:** field that groups all the recordings of an event.
- **device:** devices the records make reference to
- **record:** identifies each recording
- **dateTime:** event date and time
- **field:** identifies each field
- **id:** Identifier
- **value:** event value

4.3.8.- Active Events

EDS-3G has an XML active events service whose aim is to enable an external agent or integration system to be registered as a *listener* and record the events or alarms that occur in the device.

The device keeps a distribution list of active users, to which it sends events that take place locally via the creation of incidents.

4.3.8.1.- Test commands

Before initiating implementation of the active events system, there are a number of PUT type test requests between the *listener* and the *producer* (remote engine) and vice versa, the aim of which is to test and ensure connectivity between both systems.

The *listener* can send the request with the following message body to check connectivity with the remote search engine (*producer*):

```
<http://ip_producer:port/services/user/testListener.xml>
<listener>
  <ip>ip_listener</ip>
  <port>80</port>
</listener>
```

- **ip_listener** defines the listener's IP, to which the *producer* sends the response request
- **port:** defines the listener's port, to which the *producer* sends the response request

When the *producer* (remote search engine) receives the test request from the *listener*, it returns the following request:

```
<http://ip_listener:port/services/user/testProducer.xml>
request to which the listener must reply with "received" (200).
```

4.3.8.2.- Registration of a listener

Any agent or *listener* who wants to register in a remote search engine or *producer*, so as to receive the incidents recorded by the search engine in real time, must make the following PUT request to the *producer* with this format:

http://ip_producer:port/services/user/listener.xml

This request must contain the following body in the message, in which the listener and the type of data to be received are defined:

```
<listener>
  <ip>ip_listener</ip>
  <port>80</port>
  <all>T</all>
</listener>
```

- **ip_listener** the listener's IP is defined, to which the *producer* sends the events that are generated
- **port:** defines the listener's port, to which the *producer* sends the events that are created

The all section defines the type of information that is to be accessed (*True / False*).

- **True:** indicates to the *producer* that all the active events list available must be sent
- **False:** indicates to the *producer* that only the events that took place since the last request must be sent

4.3.8.3.- Deletion or loss of the listeners' list

The *producer* can completely or partially lose or eliminate the listeners' list for different reasons:

- **The listener does not answer:** when new events or changes in these events take place, the *producer* instantaneously informs all listeners on the list. When the *producer* is faced with a communication problem with a listener, a total of fifty retries are made to send information. If the listener does not respond to these requests, the *producer* deregisters the listener from the distribution list.
- **The producer has rebooted or has temporarily stopped operating:** if the *producer* receives an update or generates a reset for any reason, (*firmware*, update, loss of power supply, etc), the entire listeners' list is lost and from then on stops sending events to the previously associated listeners.

4.3.8.4.- Maintenance of the listeners' list (*alive*)

Given that there are several reasons why the listeners' list might be totally or partially affected, the external integration system needs to implement an (*alive*) test system against the *producer* to ensure that the IP is kept active for a long period in the distribution list.

It is recommended that the test system is automatic and at intervals of no more than 10 minutes between each test frame dispatch. The (*alive*) test system is based on the updating of the listener IP, again against the *producer*, although only the event changes are requested (*False*):

http://ip_producer:port/services/user/listener.xml

This request must contain the following body in the message, in which the listener and the type of data to be received are again defined:

```
<listener>
  <ip>ip_listener</ip>
  <port>80</port>
  <all>F</all>
```

```
</listener>
```

- If the external integration application has remained inactive for a long period of time, a request to the *producer* asking for the entire list of active events is recommended using a *True* request. This way the listener again has all the information lost during the period of inactivity.

4.3.8.5.- Reception of events

When there is any change in the events, the request that the *producer* creates against the listeners' distribution list giving information about the events will be PUT type with the following syntax:

http://ip_oyente:port/services/user/producer.xml

The request contains the following information in XML format in the body of the message: information about the events produced:

```
<producer>
  <all>T/F</all>
  <event>
    <id>driverId.driverId.driverId...eventId</id>
    <name>Evento 1</name>
    <description>Descripción 1</description>
    <annotation>Anotación 1</annotation>
    <dateTime>25112010201034</dateTime>
    <whyFired>ACTIVATION</whyFired>
  </event>
  <event>
    <id>driverId.driverId.driverId...eventId</id>
    <name>Evento 2</name>
    <description>Descripción 2</description>
    <annotation>Anotación 2</annotation>
    <dateTime>25112010201034</dateTime>
    <disabledDateTime>25112010201103</disabledDateTime >
```

```
<whyFired>DEACTIVATION</whyFired>
```

```
</event>
```

```
...
```

```
</producer>
```

- **all:** all the events (*True*) or changes(*False*)
- **event-id:** *producer* and identifier of the event
- **whyFired:** ACTIVATION, DEACTIVATION

Notes referring to the active events:

- **Note:** if the producer has implemented http authentication by user and password, it must be implemented in the listener by the user.

4.3.9.- Forcing of variables

This request is used to send the variable forcing order (or writing) to the system. The request should include the name of the device that wants to make the request. It is important to incorporate the authentication data when this is necessary.

```
<forceVariables>
  <forceVar>
    <forceName> ... </forceName>
    <forceValue> ... </forceValue>
  </record>
  </forceVar>
  ...
</forceVariables>
```

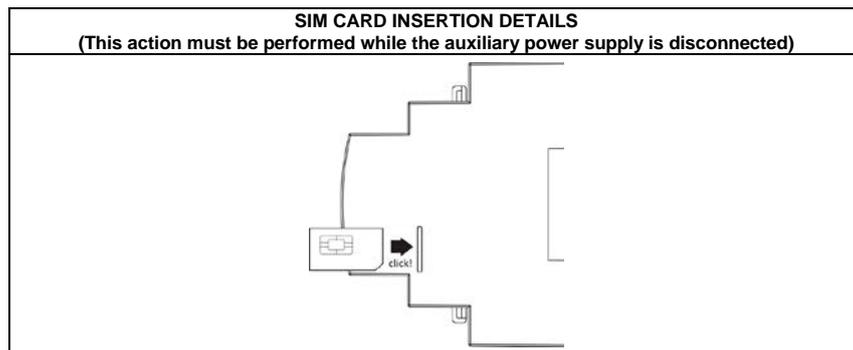
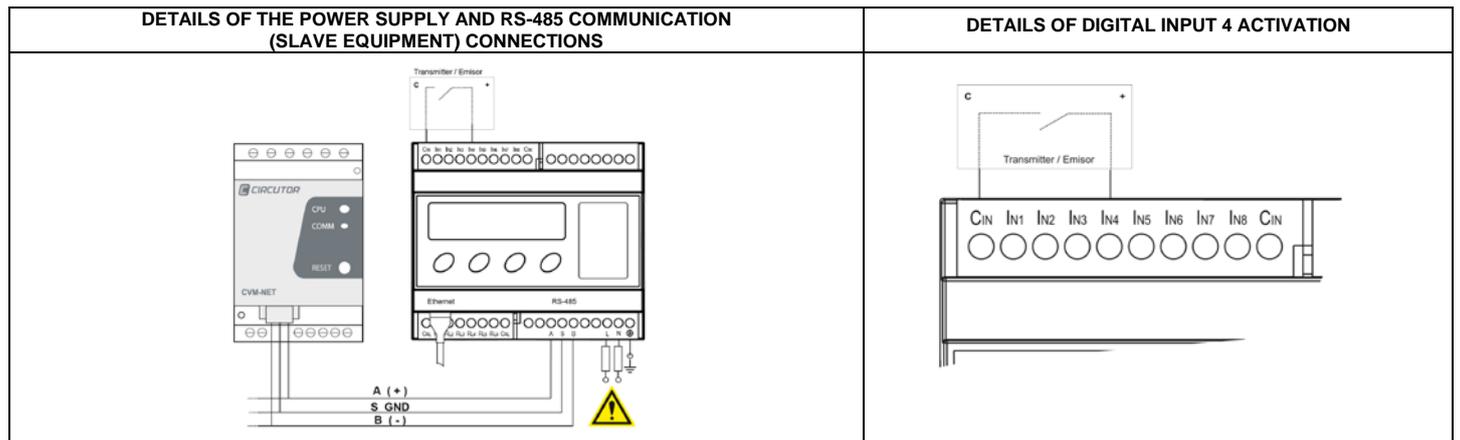
- **forceVariables:** field identifying the XML as a request
- **forceVar:** Information from each variable to be forced
- **forceName:** variable name in device.variable format
- **field:** identifies each field

5.- Technical features

Power circuit: <ul style="list-style-type: none"> - Single-phase (phase – neutral) A1 – A2 : - Frequency: - Maximum consumption: - Working temperature: - Humidity (non-condensing): 	Standard version 85...264 V _{ac} / 120...300 V _{ac} 50...60 Hz 6-10 VA (AC) / 3-4 W (DC) -10 ...+ 60 °C 5 ... 95%
Mechanical features: <ul style="list-style-type: none"> - Case material: - Device protection degree: - Dimensions (mm): - Weight: - Maximum operating height: 	UL94 - V0 self-extinguishing plastic IP 20 105 x 70 x 90 mm (6 modules) 385 g 2,000 m
Inputs features: <ul style="list-style-type: none"> - Type: - Maximum activation current: - Insulation: 	Voltage-free opto-insulated (dry contact) 50 mA 1500 V
Network interface: <ul style="list-style-type: none"> - Type: - Connector: - Network protocols: 	Ethernet 10BaseT / 100BaseTX self-detectable RJ45 HTTP / Modbus/RTU in RS-485 bus
Modem: <ul style="list-style-type: none"> - Work bands (Data only): 	UMTS/HSPA - 2100 / 900 Band GSM - 850 / 900 / 1800 / 1900 Band
Serial interface: <ul style="list-style-type: none"> - Type: - Transmission speed (configurable): - Data bits: - Parity: - Stop bit 	Three-wire RS-485 (A/B/S) 4800, 9600, 19,200, 34,800, 57,600, 115,200 bps 8 No parity, odd, even 1

Output Features: <ul style="list-style-type: none"> - Type: - Maximum operating power: - Maximum operating voltage: - Maximum switching current: - Electrical life (250 Vac / 5 A): - Mechanical working life: 	Relay 750 VA 250 V _{ac} 5 A with resistive load 3 x 104 operations 2 x 107 operations
LED symbols: <ul style="list-style-type: none"> - Power : - Slaves: - GPRS/3G link: - Left RJ45 led: - Right RJ45 led: 	Equipment power supply and CPU activity Communicating slave devices shutdown GPRS or 3G connection linked to the operator Green: Full duplex / Yellow: Half duplex / Activity Green: 100 Mb/s / Yellow: 10 Mb/s / Link
Display: <ul style="list-style-type: none"> - Type: - Characters: - Back lighting: 	2 lines, alphanumeric 20 Yes
Safety: Installation category Class III / EN61010 double-insulated electric shock protection class II. Connect the device to a power circuit protected with gl fuses in compliance with IEC 269, or M fuses, with values from 0.5 to 1A. It must be fitted with a circuit breaker switch or equivalent device, in order to be able to disconnect the device from the power supply. The power supply cable must have a cross-section of at least 1mm ² .	
Standards: EC, UL 94, EN61010-1, EN55011, EN 61000-4-2, EN 61000-4-3, 61000-4-11, EN 61000-6-4, EN 61000-6-2, EN 61000-6-1, EN 61000-6-3, EN 61000-4-5	

6.- Connecting and inserting the SIM card



7.- Technical Service

If you have any doubts about the operation of the unit or suspect any malfunction, contact our service staff at **CIRCUTOR, SA**

CIRCUTOR, SA - Technical Assistance Service

Vial Sant Jordi, s/n

08232 – Viladecavalls (Barcelona), SPAIN

Tel.: 902 449 459 (Spain)

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