



COMMUNICATIONS SERVER

PS/PSS OPC Server

Version 1.4

INSTRUCTION MANUAL

(M98222901-07-13A)

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1.- Installation of PowerStudio / PowerStudio Scada OPC server

The minimum system requirements needed for the OPC server to work properly on your PC are:

Windows 2000 SP4
Windows 2003 Server SP1
Windows XP SP2
Windows Vista
1 GB RAM
Pentium 4 3 GHz or Athlon XP 2200
30 MB free space on hard disk

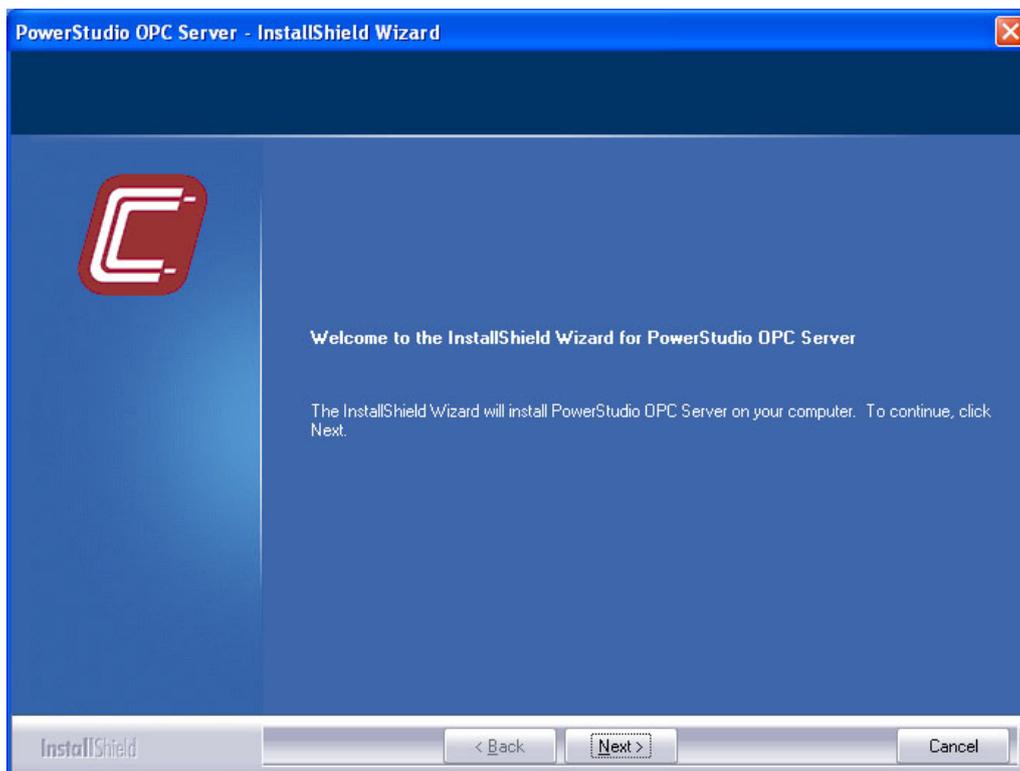
NOTE: The different Windows Service Packs can be downloaded from the official Microsoft's web page:

<http://www.microsoft.com/downloads/Search.aspx?displaylang=en>

In addition to the previous requirements, a broadband internet or local network connection is recommended since the server makes constant XML requests to PowerStudio when it is started, thereby considerably increasing network traffic. This is one of the aspects that will most notably condition the performance of the OPC server.

Once you have checked that your PC meets these requirements, insert the PS/PSS OPC Server CD.

PowerStudio OPC comes with an installer that takes care of copying all of the necessary files and configuring the system so that the software works properly.



Installation welcome screen

2.- OPC (OLE for Process Control)

OPC is a communications standard in the world of process control and process data monitoring that allows different data sources to send information to a single server or data acquisition system which, in turn, can be accessed by different programs that are compatible with the mentioned standard. In this way, there is no need for each and every program to have specific drivers to communicate with multiple data sources. They just need an OPC driver.

To make this communication work, the OPC standard defines a set of protocols, where each of them has its own particular purpose. The OPC server for PowerStudio and PowerStudio Scada implements the *DA (Data Access)* protocol, which is responsible for the exchange of data in real time between servers and clients.

3.- PowerStudio / PowerStudio Scada OPC Server

In our case, the data source will be PowerStudio SCADA and the OPC server will make it possible for any *OPC-DA* client or software which implements it, to access the values of the variables of the various devices made available in the desired PowerStudio server.

In order to be able to use the PowerStudio OPC server you must have the HASP key, or dongle, with the corresponding active licence connected to the PC's USB port. If this dongle is not available, the server will run in demonstration mode, with the following limitations:

- 15 minutes of use (after this time the variables will no longer be updated, with no more requests being made to PowerStudio).

3.1.- General description of the server

The server is based on a Windows service and adds the possibility to communicate with the PowerStudio engine via OPC. On the one hand, it handles the variable value requests from the OPC client and, on the other, it makes the corresponding XML requests to PowerStudio in order to get the values of the variables that have been requested.

PowerStudio OPC is compatible with versions *1.0, 2.0 and 3.0* of the *OPC-DA (Data Access)* specification. It also supports various operating modes which allow its use to be optimised according to your needs and it is fully configurable through its user interface.

3.2.- Setup utility

This is the utility that allows you to configure and manage the PowerStudio OPC server, setting up all of its operating parameters. This tool also allows you to maintain various different configuration profiles, offering increased flexibility and adaptability by giving you the chance to change the behaviour of the server almost in real time. There are three main aspects that determine the behaviour of the server for each of the created configurations:

- PowerStudio (data source) connection data
- OPC server configuration
- List of active devices

3.3.- Basic concepts

In order to better understand this manual and the operation of the PowerStudio / PowerStudio Scada OPC server, it is necessary to define some concepts:

- *Available configurations:* The set of all of the different created configurations, which are saved in *.xml files in the “profiles” folder located in the main application directory.
- *Active configuration:* Among all created configurations, one of them must be set as the active. This will be the one that will determine the OPC server behaviour. The setup utility allows you to select the active configuration. Whenever the active configuration is changed, the OPC server is restarted so that it begins to operate using the new parameters.
- *OPC server status:* The server can be in any one of the following four different states: *activated, deactivated, started or stopped*. We can activate and deactivate the server from the setup utility, thereby either making it accessible or inaccessible to OPC clients. If at any moment the server does not detect the presence of the required dongle in the USB port, it will remain activated but will stop updating the monitored variables. When the server is active - when it is accessible from any OPC client - it can either be started or stopped. When a client connects to the server, it starts up and handles the incoming requests. When there are no clients connected, the server stops.
- *PowerStudio devices:* This is the set of all the devices and variables available on the PowerStudio server specified in the active configuration.
- *OPC devices:* This is the set of all the devices and variables accessible from an OPC client.
- *Update frequency:* This is the minimum amount of time that the server will wait before changing the value of a variable available on it. However, it will always depend on the update frequency of that particular variable in PowerStudio itself.
- *Buffer and buffer expiration time:* The server has an intermediate memory that stores the values requested from PowerStudio, arranged by device. These devices have an associated expiry time. When the value of a device variable is requested and the values in the buffer for this device have not expired, the value stored in the buffer is returned. If the buffer values have expired, a request is made to PowerStudio, updating the values of all the variables in this device. Using the buffer considerably reduces the number of XML requests carried out. Increasing the buffer's expiry time is a good way to reduce the strain on system resources.
- *Request management method:* It determines the way in which the OPC server makes the XML requests to PowerStudio, according to the OPC client requests it receives. This is one of the most important configuration parameters since it directly affects the performance of the OPC server. Selecting the management method that best suits your needs is essential in order to obtain good results and minimise the use of system resources. There are 2 available methods:

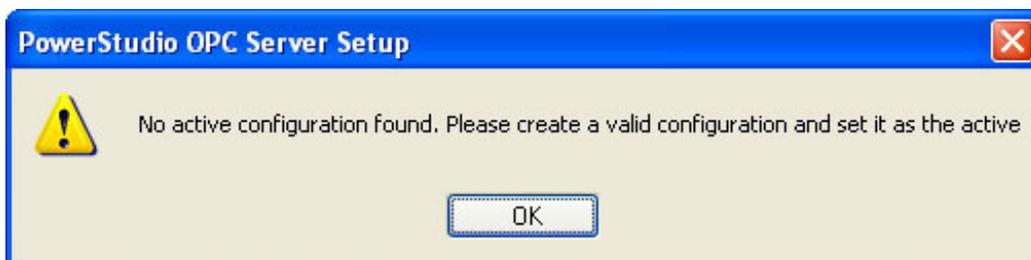
- *Continual requests*: Requests to PowerStudio are made continually, independently of whether there are incoming OPC requests or not. This method achieves the best possible response time, reducing update times. The main disadvantage is that it puts a far greater strain on the system resources.
- *Grouped requests*: The requests belonging to the same OPC group are dealt with together, generating XML requests to PowerStudio only when the requested variable belongs to a device whose values in the buffer have expired. To get the best possible performance from this method, you must create an OPC group for each of the different active devices.

3.4.- Detailed operation

At this point the correct way to use the setup utility to set all of the OPC server's operating details is explained. First of all, there is a guide for creating an initial configuration, setting the basic configuration parameters and getting started with the server as quickly as possible. Afterwards, all of the features of the program are explained in more detail to enable you to optimise the operation of the server by specifying and modifying more advanced parameters.

3.5.- Steps to activate the OPC server

The first time you run the application after the installation you will see the following message, reminding you to create an initial configuration to be able to start up the PowerStudio OPC server:

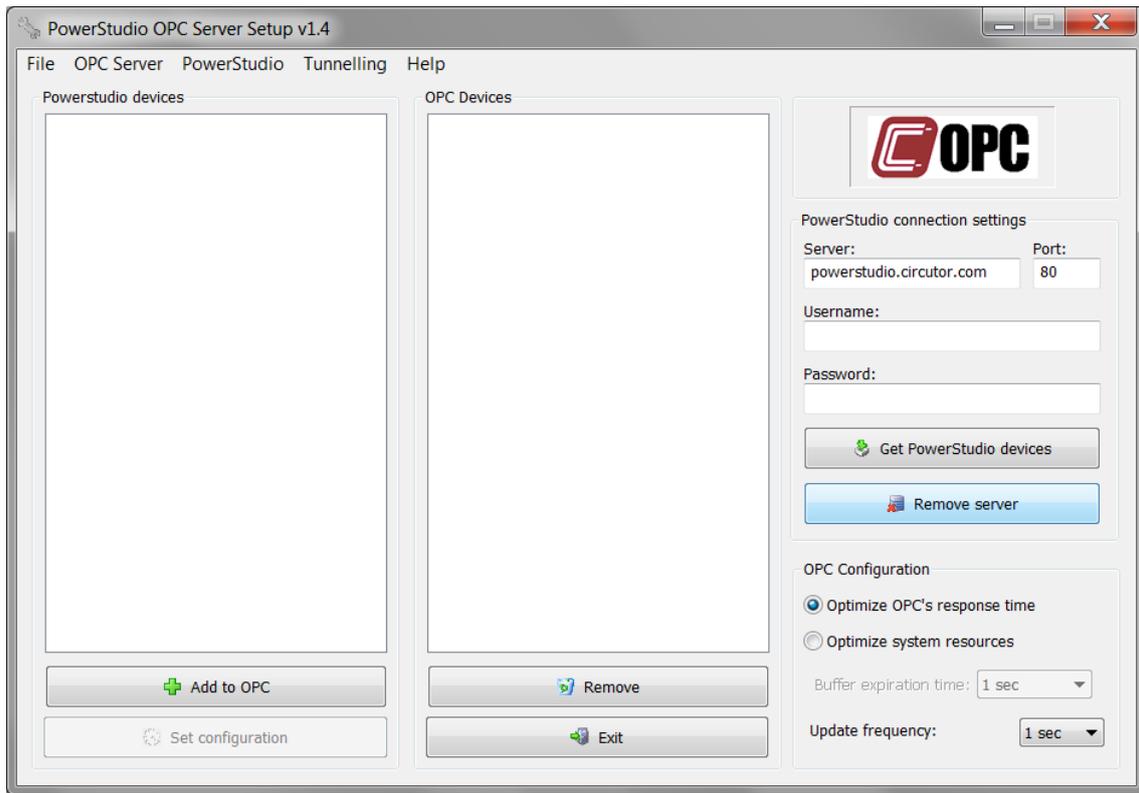


Active configuration not set message

In the application's main dialog box, which appears next, you must enter the details of the connection with PowerStudio and the configuration parameters of the OPC server. Section 3.5.2 gives a detailed explanation of each of these parameters. For a basic configuration you only need to complete the following fields:

- “Server” and “Port” with the address and the port of the PowerStudio server that has to be accessed. If authorization is required, you will also have to fill in the “Username” and “Password” fields.
- In the “OPC configuration” section, leave the “Optimise the OPC response time” checkbox selected and set the update time to a value between 2 and 6 seconds, depending on the total number of variables on the server.

Active devices list contains PowerStudio devices that will be accessible through OPC. The first time we run the application the list is empty since we haven't specified any valid server.

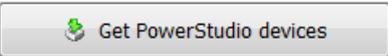


Main application screen

If you try to save the new configuration without having obtained PowerStudio devices before, the application will display the following message:



Must get devices message

To obtain the devices click the  button, located just below Power Studio connections settings. The application starts look for the enable devices in the configured engine and notify that the requested action is being carried out by displaying the following progress window:



Wait process window: getting devices

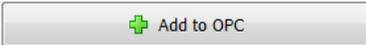
If the entered connection details are incorrect, there is no internet connection, or the specified PowerStudio server is inactive or requires additional authorization, the following message will be displayed, indicating that it has not been possible to obtain the devices:

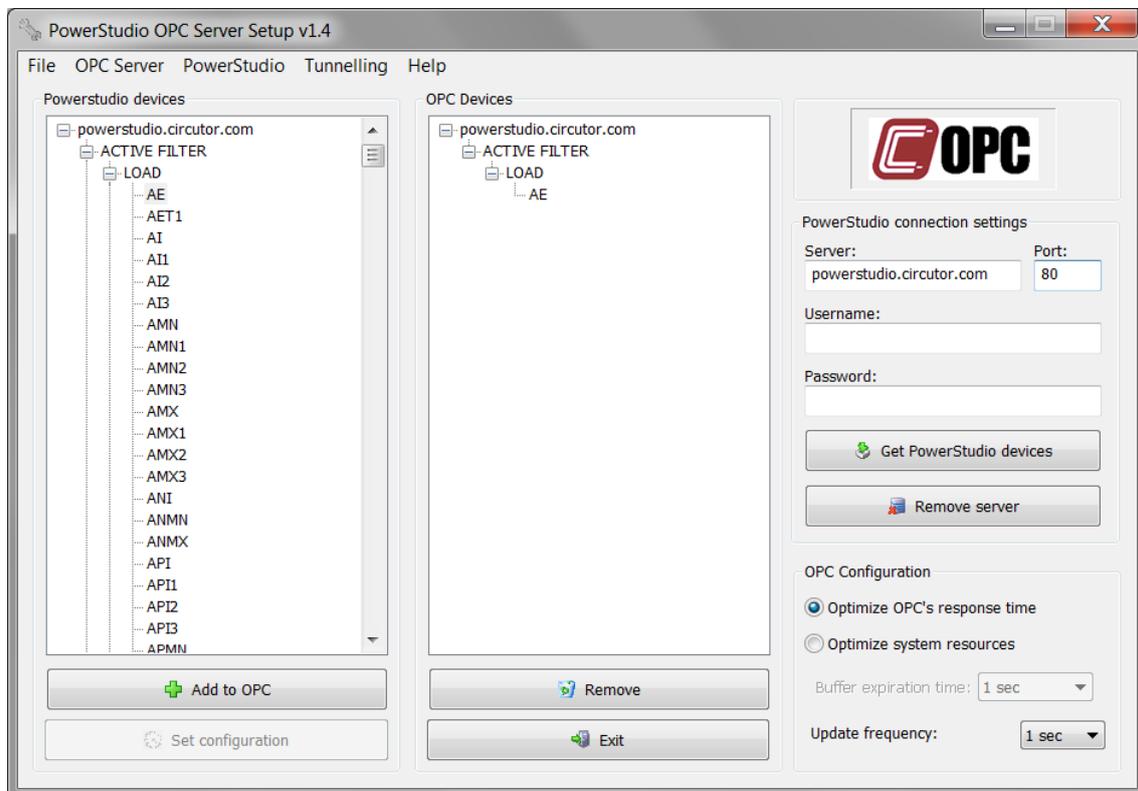


Getting devices error message

If the action is completed successfully, the “Power Studio devices” list will be filled with all the devices available on the indicated PowerStudio server.

In case multiple servers are configured will be displayed as a tree, under the current server and devices

The application allows individually selection of the variables of each device, to send by OPC. If you move to the device name and select  will move to OPC all the variables of this device but if you move to the desired variables and click  only the variable selected will be sent by OPC as you can see in the picture.

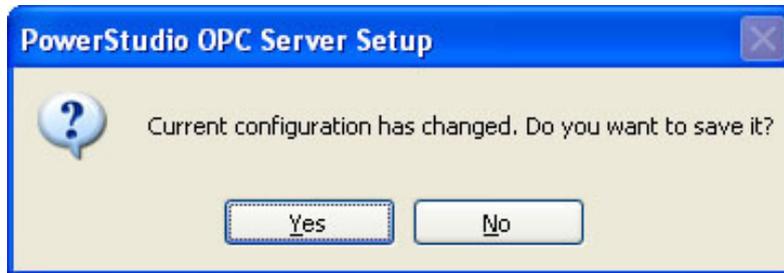


Main screen with PowerStudio retrieved devices

Once you reach this point, you already have an initial configuration created and so the only thing left to do is to set it as the active one and start the OPC server. The best

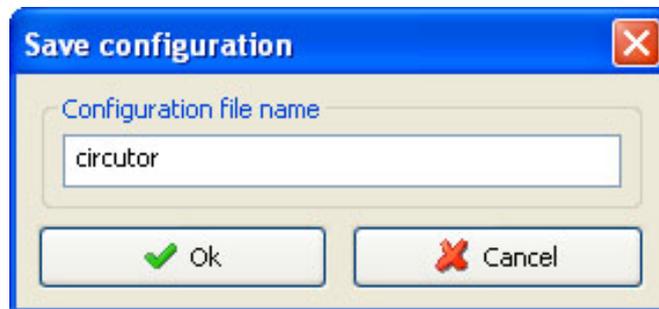
way to do this is to directly click on the “Exit” button and the application will take care of carrying out these tasks automatically, displaying the following messages:

1. Since you have not yet saved the new configuration, the program asks if you want to save it before exiting:



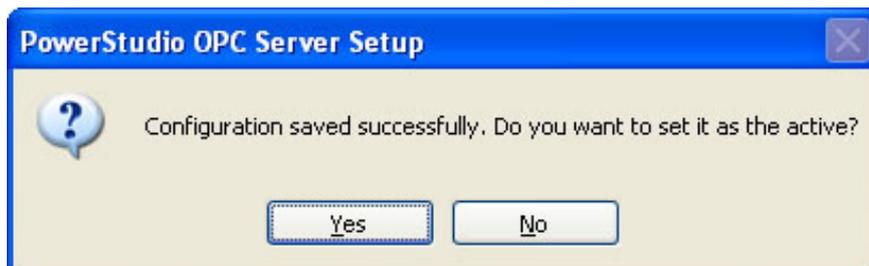
Save changes ask message

2. Click “Yes” and enter a name for the newly created configuration:



Configuration name window

Click “OK”. Now the program will ask if you want to set this configuration as the active one. Since this is the first configuration created, you should click “Yes” so that the OPC server has a configuration and can start up.



Set as active configuration ask message

3. Finally, the program asks if you wish to activate the OPC server:



Activate OPC Server ask message

- Click “Yes” again and while the program carries out the requested operations, the following window will appear:



Wait process window: activating server and establishing configuration

- If everything is successfully completed, you will see the following message and, after that, the setup utility will close:

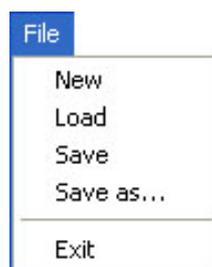


Configuration successfully saved message

3.6.- Menu bar

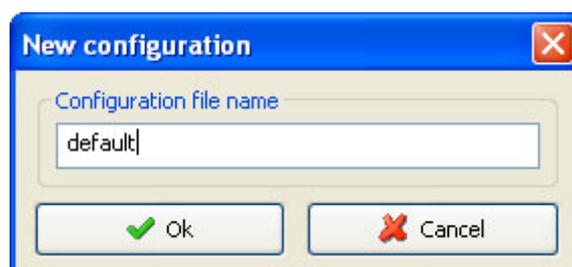
In this section we will see the different features that the program offers through the main menu bar.

3.6.1.- File menu



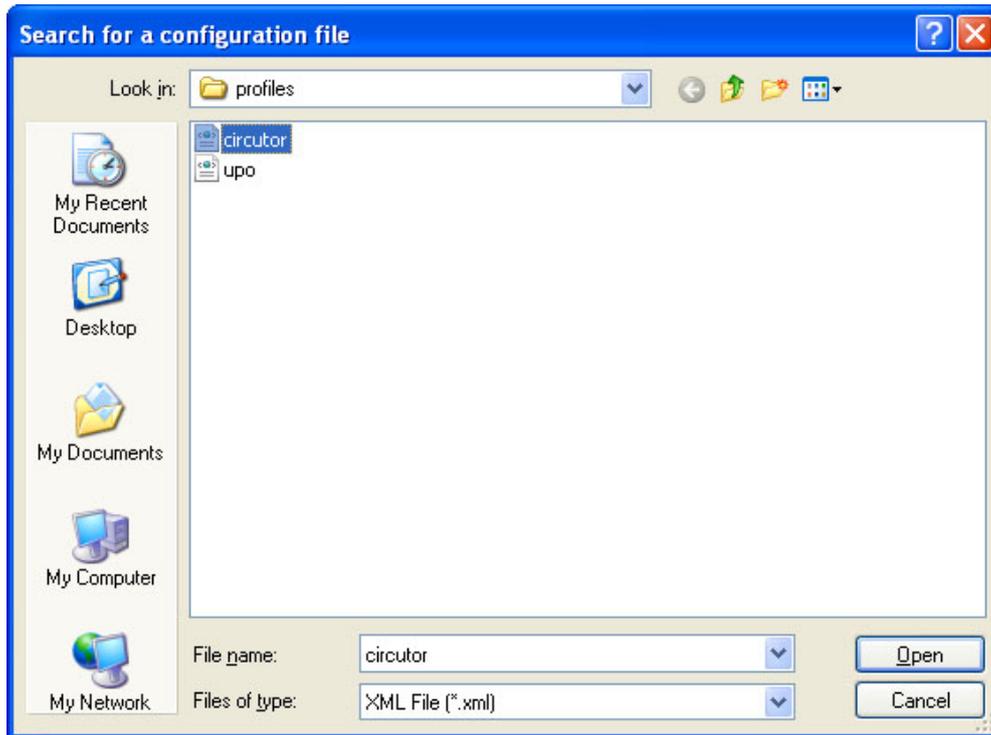
File menu

‘New’: Allows you to create a new configuration with a unique name which is specified using the following dialog box:



Configuration name window

'Load': Gets the data from a previously saved configuration file. When you click this menu option the following window will open, allowing you to search for the desired configuration file:



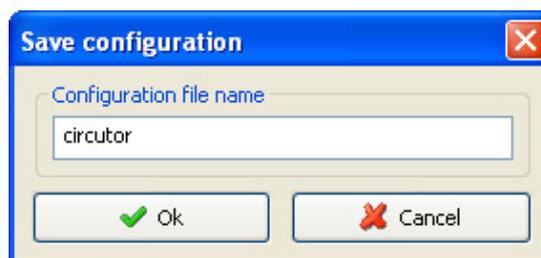
Configuration file search window

'Save': Allows you to save the changes made to the configuration while is being edited. If the changes are saved correctly, the following message will be displayed:



Configuration successfully saved message

'Save as' This option has the same characteristics and the same functionality as the Save option, except that it allows you to save the changes to a different configuration of the one which is being edited, allowing you to enter a name for the new configuration using the following screen:



Configuration name window

'Exit': Ends program execution.

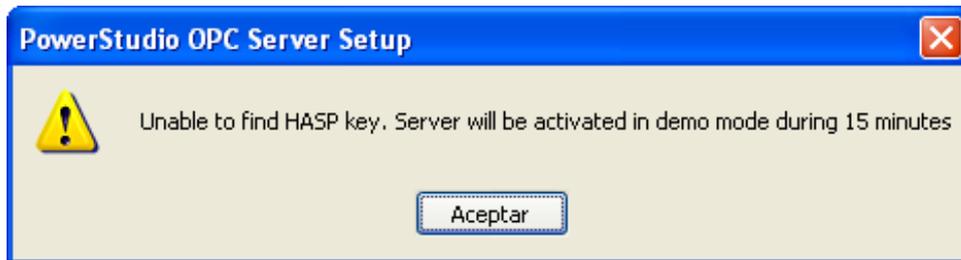
3.6.2.- OPC Server menu



OPC Server menu

'Register': This option is only available when the OPC server is inactive. Otherwise, it will be deactivated. It registers the service and starts the PowerStudio OPC server so that it becomes available to any OPC client. If the necessary dongle, or HASP key, is not fitted, the application will show one of the following messages, informing you that the server will be activated in demo mode:

1. If no dongle is inserted in the USB port:



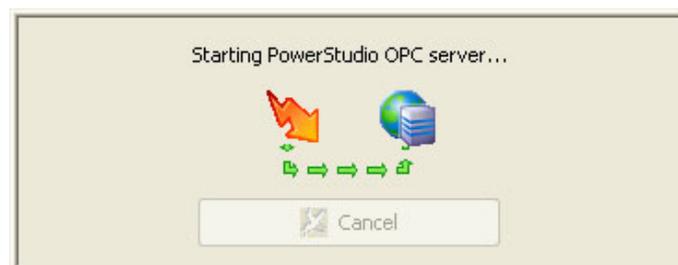
Dongle not found message

2. If the dongle has been detected but does not contain a valid licence for the PowerStudio OPC server:



Incorrect dongle message

While the OPC server is being activated, the following wait window is displayed:



Wait process window: activating OPC server

If the action completes successfully, the application will display the message:



OPC server successfully activated

If it's not possible to register the Windows service, this message will be displayed:



Unable to activate OPC server

NOTE: This may be due to the fact that the necessary dongle is not inserted in the USB port.

'Unregister': This option is only available when the OPC server is active. Otherwise, it will be deactivated. It unregisters the service and deactivates the PowerStudio OPC server so that it becomes unavailable from all OPC clients. If there are clients connected when the server is deactivated, this will force their disconnection, waiting for a limited amount of time. While the OPC server is being deactivated, the application will show the following progress window:



Wait process window: deactivating OPC server

If the action completes successfully, the application will display the message:



OPC server successfully deactivated message

If, on the other hand, there is no possible to unregister the windows service, this message will be showed:



Unable to deactivate OPC server message

'Restart': This option is only available when the OPC server is active. Otherwise, it will be deactivated. It deactivates the OPC server, forcing all connected clients to be disconnected, and then activates it again.



Wait process window: restarting OPC server

If the action completes successfully, the application will display the following message:



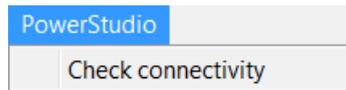
OPC server successfully restarted

If, on the other hand, there is no possible to restart the windows service, this message will be showed:



Unable to restart OPC server

3.6.3.- PowerStudio menu



PowerStudio menu

'Check connectivity': This option allows you to verify that the details entered for the connection with PowerStudio are correct and that the connection is ready to serve up the values of the requested variables. You are recommended to use this feature after entering or changing any of the PowerStudio connection details.



Wait process window: checking connection

Running this feature has three possible outcomes:

1. That the program is unable to communicate with the specified server. This may be caused by an incorrectly entered address, probably because the fact that you do not have access to the server or it is switched off:



Incorrect PowerStudio connection details message

2. That access to the PowerStudio devices requires authorization:



Authentication required message

3. That the connection details are correct and the server is active:



Correct connection details message

3.6.4.- Tunnelling menu

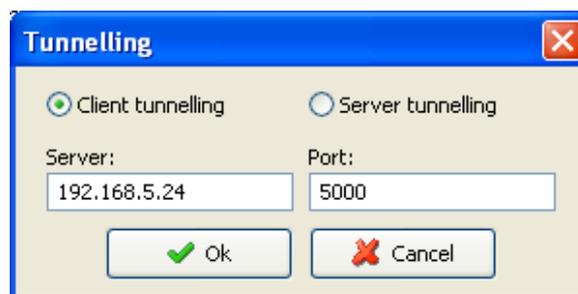


Tunnelling menu

'Enable': That option enables the tunnelling mode in the service and allows to access to the tunnelling variables of a remote OPC Server in the case of a OPC Server working as tunnelling client. In the case of a OPC server working as tunnelling server enable that option allows to serve all the variables to a tunnelling client.

'Disable': That option disables the tunnelling mode in the OPS server.

'Configure': That option allows to access to the dialog of the tunnelling configuration parameters:



Tunnelling cliente

In that screen is possible to configure the OPC Server as OPC tunnelling client, in that case is necessary to configure the remote server and port to access via the gateway tunnelling.



You can also configure the Server as OPC tunnelling server, in that case is necessary to configure the port to receive the requests.

Point [3.8](#) explains in details how the tunnelling mode works.

3.6.5.- Help menu



Help menu

'About': Displays a window containing information about the software.

'Circutor's web site': Opens the Circutor's web page.

3.7.- Main screen

In this section you will find a detailed explanation of all of the configuration options in the application's main window. Every time the application is started, these fields are initialized with the values of the active configuration.

3.7.1.- Connection with PowerStudio

These fields contain the details of the connection with PowerStudio and are located in the right-hand part of the main screen, just below the OPC logo.

A screenshot of a form titled 'PowerStudio connection settings'. The form has four input fields: 'Server:' with the value 'powerstudio.circutor.com', 'Port:' with the value '80', 'Username:' with the value 'opcserver', and 'Password:' with a masked password represented by ten dots.

Connection to PowerStudio form

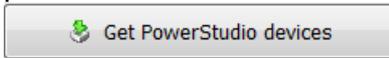
'Server': Contains the access address of the PowerStudio server from which the different devices and variables will be retrieved.

'Port': Contains the access port of the PowerStudio server from which the different devices and variables will be retrieved.

'Username': If PowerStudio requires authorization, this field will contain the username.

'Password': If PowerStudio requires authorization, this field will contain the password corresponding to the PowerStudio user.

Is posible to configure several conexions with different servers of PowerStudio and configure for y configurar de forma independiente los dispositivos a los que se tendrá acceso para cada servidor de PowerStudio, tan solo es necesario introducir los parámetros de conexión para cada servidor y pulsar sobre el botón



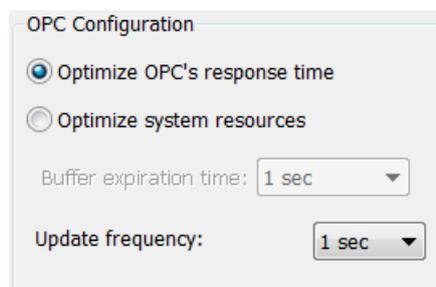
para incorporar los nuevos dispositivos a la lista de dispositivos disponibles.

3.7.2.- OPC Configuration

These are the most important fields because they determine the behaviour of the OPC server and directly affect its efficiency. Incorrect configuration values can cause the server to become frozen or making it incapable of serving the values of the variables requested by the OPC clients. On the other hand, if these fields are correctly adjusted to your particular needs, the server's operation can be optimised and the strain on the system resources can be considerably reduced.

If a large number of variables (more than 2,000) are being handled, you are recommended to start with long update times.

It is essential to read the manual, and in particular point [3.1](#), before modifying the values of these fields.



OPC configuration details form

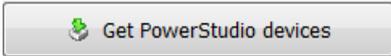
'Optimise OPC response time': If this option is selected, the server will make continual requests to PowerStudio and will ignore the buffer expiration time. This will allow you to work with much shorter update times but with an increased strain on the system resources.

'Optimise system resources': If this option is selected, the buffer will be used in order to reduce the number of requests made to PowerStudio. This implies longer update times but a reduced strain on the system resources. When this option is selected, the "Request management" and "Buffer expiration" fields will be activated.

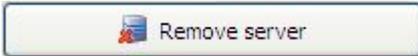
'Buffer expiration': This allows you to set the amount of time during which the values of the variables read from PowerStudio remain valid.

'Update frequency': This allows you to set the minimum update time for the variables monitored via the OPC server for any of the operating methods.

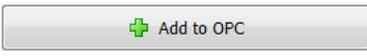
3.7.3.- Get devices

If you click the  button located below the server parameters, the program will fill the list with the devices found in the PowerStudio server indicated in the provided connection details.

3.7.4.- Remove server

If you click the  button located below the server parameters, the program will remove the selected server and all the devices of the configuration.

3.7.5.- Add devices and variables to OPC server

The application allows individual selection of the variables of each device, to send by OPC. If you move to the device name and select  will move to OPC all the variables of this device but if you move to the desired variables and click  only the variable selected will be sent by OPC as you can see in the picture.

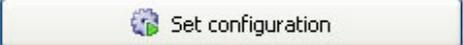
3.7.6.- Remove devices and variables from OPC server

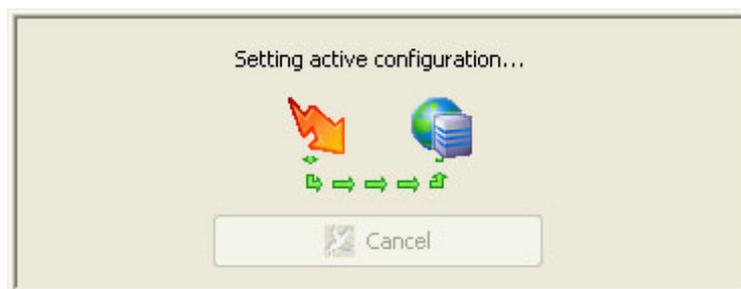
If you click the  button located below the tree of OPC devices, the items selected will be removed from the OPC server.

3.7.7.- Establishing the active configuration

Once you have created and saved a configuration or loaded an already existing one you can establish it as the active one using the button located in the bottom left part of the main screen.

: If the current configuration is already the active one or if it has not yet been saved, the button will appear greyed out.

: When you successfully save a new configuration or load an already existing one, this button will automatically become available. Whilst the active configuration is being set, the program will display the following window:



Wait process window: setting as active configuration

If you attempt to set an active configuration when the OPC server is deactivated, the program will ask you if you wish to activate it, displaying the following message:



Activate OPC server ask message

If you click "No", the configuration will be set but the server will remain deactivated. If you click "Yes", the application will start the server with the new active configuration:



Wait process window: activating server and establishing configuration

Eventually, the application will notify you that the configuration has been successfully set by displaying the following message:



Set configuration success message

3.8.- Funcionamiento OPC Server en modo Tunnelling

Although communication OPC-DA offers several advantages in the exchange of information between applications, there is an important limitation when we want to communicate two machines in different domains or through Internet. These limitations are imposed by DCOM technology in which is based OPC-DA communication.

To solve this limitation, in the PowerStudio OPC-DA Server has been implemented an OPC gateway versus Xml that allows the communication between to OPC-DA Server applications in two machines in different domains. That communication is transparent for the user and is known as OPC tunnelling.

The generic working of the OPC tunnelling is to configure in a machine a PowerStudio OPC-DA Server as OPC tunnelling client and another machine configure the PowerStudio OPC-DA Server as OPC tunnelling server. In no case will be possible to configure the PowerStudio OPC-DA Server to work as client and server at the same time.

If the option tunnelling is activated in the tunnelling client and in tunnelling server and well configured the comunication between both machines will be possible.

A PowerStudio OPC-DA Server configured as tunnelling Server will have the following features:

- Xml Client to request a local or remote PowerStudio.
- OPC-DA Server for a OPC Client
- Tunnelling Server to a tunneling Server

A PowerStudio OPC-DA Server configured as tunnelling client will have the following features:

- XML client to comunicate with a local or remote Power Studio
- OPC-DA Server.
- Tunnelling Client.

When a PowerStudio OPC-DA Server is working as tunnelling Server will make available to any tunnelling OPC all devices and variables. Configured from Power Studio.

It is necessary to configure the tunnelling server to optimize the response time, (see point [3.7.2.](#))

3.9.- Taskbar menu

If you minimise the application, an icon will appear on the taskbar. Clicking the right mouse button on this icon will give access to the following menu, which you can use to activate, deactivate or restart the OPC server:



Taskbar menu

You can restore the application by clicking the 'Open' option or simply by double-clicking on the icon.

3.9.1.- Server state notification

The taskbar icon allows you to see the state of the OPC server at any time. If the server is active, the application icon will appear with a green "play" sign:



Server activated icon

Otherwise, if the server is deactivated, the application icon will appear with a red "stop" sign:



Server deactivated icon

If you are running the OPC server in demo mode and free variable update time period has already ended, thus is 15 minutes, the application icon will appear with a yellow exclamation sign on it informing you that variable values won't be longer refreshed:



Demo time expired

4.- Technical service

In the event of any doubt regarding the operation of the program, you can contact the technical services department of CIRCUTOR, S.A. or your nearest distributor.

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