



Instructions for Cutler-Hammer Closed Transition Soft Load Generator Control Logic



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SECTION 1: QUICK START

This chapter is designed to help you install and use the Energy Automation Tools as soon as possible. By the time you work through this chapter you will have successfully:

- Installed the software,
- Established a connection with a local or remote site,
- And checked on the status of the gensets.

The remaining chapters of this manual expand on the concepts introduced here, covering each in greater detail.

1.1 SYSTEM REQUIREMENTS

You will need a computer that satisfies the minimum requirements listed below in order to use the Energy Automation Tools family of software products.

1.1.1 MINIMUM REQUIREMENTS

You will need the following hardware and software to use the Energy Automation Tools:

- A computer with a 66 MHz Intel 80486 DX2 or compatible processor
- 32 MB of RAM
- An SVGA monitor and video card capable of displaying a resolution of 800 3 600 at a depth of 256 colors
- Windows 95 or later
- A hard disk with 80 MB free space (additional space is required for data logging)
- A pointing device

In addition,

- *entelligent* VMM (Virtual Maintenance Monitor) users will need a modem or local area network in order to connect to remote sites.
- *entelligent* NST, VST, VMM, and OPP users will need an *Echelon LonTalk* adapter if they intend to connect directly to the *Echelon LonWorks* network that links the *empower* controls together. The Energy Automation Tools support the *LonTalk* adapters listed below. We do not support LTAs with *Echelon* part numbers ending in 10 , including all versions of the PCMCIA LTA (*LonTalk* adapter on a PCMCIA card). SLTA-10's configured to run in SLTA/2 emulation mode are an exception to this

rule.

- SLTA/2 (Serial *LonTalk* adapter)
- SLTA-10 (Serial *LonTalk* adapter) configured to run in SLTA/2 emulation mode
- PCNSS (*LonTalk* adapter on an ISA card, *Echelon* part number 34100)

You will need to install and configure the Network Service Tool Binding Software in order to connect to the *empower* controls over the *Echelon LonWorks* network. You do not need to install and configure the NST Binding Software in order to connect using a modem or local area network. See *Installing the NST Binding Software* on page 6 to install the NST Binding Software.

1.1.2 ADDITIONAL RECOMMENDATIONS

We recommend the following hardware and software for optimal performance:

- 166 MHz (or faster) Intel Pentium processor
- 64 MB RAM
- An X VGA monitor and 2 MB accelerated video card capable of displaying a resolution of 1024 3 768 at a depth of 256 colors
- Windows NT 4.0 service pack 4
- A hard disk with 80 MB free space (additional space is required for data logging)
- An *Echelon LonTalk* adapter
- A pointing device
- A backup device, such as a tape or removable media drive
- CD-ROM drive

1.1.3 ENVIRONMENTAL CONDITIONS

Seismic

With proper installation and by including the appropriate option which includes specially designed cleats, transfer switches have a seismic capability which exceeds the worst case Zone 4 required levels per both the Uniform Building Code and the California Building Code.

Operational Conditions

Normally, a transfer switch is applied indoors in an electrical equipment room. In the appropriate enclosure, it can be used for outdoor applications were the equipment is subject to falling rain, freezing temperatures and 95% humidity (non condensing). The ambient temperature range for operation is between -20 and +65°C.

1.2 INSTALLING THE SOFTWARE

The Energy Automation Tools family of software products uses the same installation program. The instructions that follow allow you to install the following products:

- *entelligent* NST Configuration Tool
- *entelligent* VST (Virtual Service Tool)
- *entelligent* VMM (Virtual Maintenance Monitor)
- *entelligent* OPP (On-site Power Plant)

1.2.1 PREPARING THE COMPUTER

Before you install the software, make sure that you have sufficient disk space, and that no programs are running that might conflict with the installation software.

To prepare your system for installing the software, do the following:

1. Make sure your hard disk contains at least 80 MB of free space.
2. Exit all Windows programs and turn off virus-protection and screen-saver software. You can turn these programs back on after installation.

1.2.2 INSTALLING THE SOFTWARE FROM COMPACT DISC

We distribute the Energy Automation Tools on compact disc. If you plan on running the software on a computer that lacks a CD-ROM drive, you can use another computer to create a set of installation disks. Note that you need to use the installation software to install the Energy Automation Tools. Do not attempt to install these products by dragging the files to your hard disk.

To install the Energy Automation Tools, do the following:

1. Insert the disc into your CD-ROM drive.
 - The installation program should run automatically. If it does not, double-click on the icon representing your CD-ROM drive and then double-click *SETUP.EXE*.
2. Click *Next* when the installation program displays the welcome window.
 - This window reminds you to exit all programs prior to installing the software.
3. Click *Next* to install the software in the default

directory.

- By default, the installation program installs the software in the following directory: *C:\Program Files\encorp32\VMM*. Alternatively, you can install the software in a different directory by clicking the *Browse* button. The program will open a window that allows you to navigate to a different directory. You can also type the path of the desired directory in the text field. If you specify a directory that does not exist, the installation program will create the directory for you.
4. The installation program will display a window indicating that you are about to start the installation. Click *Next* to start the installation.
 5. The next window informs you that the program is about to install the Borland Database Engine. Click *Next* to install the database engine in its default location.
 - By default, the installation program installs the Borland Database Engine in the *C:\Program Files\Borland\ Common Files\BDE* directory. We recommend that you do not change the default directory. Also, we recommend that you do not change the advanced options for installing the database system.
 6. The next window informs you that the installation is complete. Click *Finish* to exit the installation program.
 7. The installation program will prompt you to restart your computer. Click *OK* to restart your computer or click *Cancel* to restart your computer at a later time. Note that you must restart your computer prior to using the software.

1.2.3 INSTALLING THE SOFTWARE FROM FLOPPY DISK

In order to install the Energy Automation Tools on a computer that lacks a CD-ROM drive, you will need to use another computer to create a set of installation disks. You can then use the floppy disks to install the software.

To create a set of installation disks, do the following:

1. Load the disc into a CD-ROM drive.
2. Click *Cancel* and then *Exit Setup* when the installation program runs automatically.
3. Right-click on the icon that represents the CD-ROM drive and select *Open* from the shortcut menu.

4. Open the directory on the CD-ROM named *Floppy Install*.

5. Copy each file to a different floppy disk. You will need seven disks.

To install the Energy Automation Tools from floppy disk, do the following:

1. Insert the first disk in the floppy drive and double-click *setup. EXE*.

- The installation software will prompt for the remaining disks.

2. Follow the on-screen instructions to install the software.

1.3 RUNNING THE SOFTWARE FOR THE FIRST TIME

This section describes how to run the Energy Automation Tools for the first time. We describe how to add users and assign access privileges and passwords. These steps need to be completed by the system administrator. Once you have created accounts for your different users, they will be able to run the software and follow the instructions described in this manual.

NOTE: The system administrator, who designates new users to the system, and assigns access privileges, must perform the steps described in this section. We supplied the administrative-level password to a representative from your organization at the time of sale. This password is necessary to complete the tasks outlined in this section.



1.3.1 LOGGING IN AS A GUEST

When you start the program for the first time, it will display the following message:

This is the first installation of this program, the user name is Guest, the password is password.

The software will then display the login window. You need to log in to the Energy Automation Tools before you can use the software.

To log in as guest, do the following:

1. Type the word *Guest* in the User Name field.

- Note that the *User Name* and *Password* fields are case sensitive. Make sure to type the word *Guest* with an upper case *G*.

2. Type the word password in the *Password* field.

3. Click the *OK* button to log in and begin using the software.

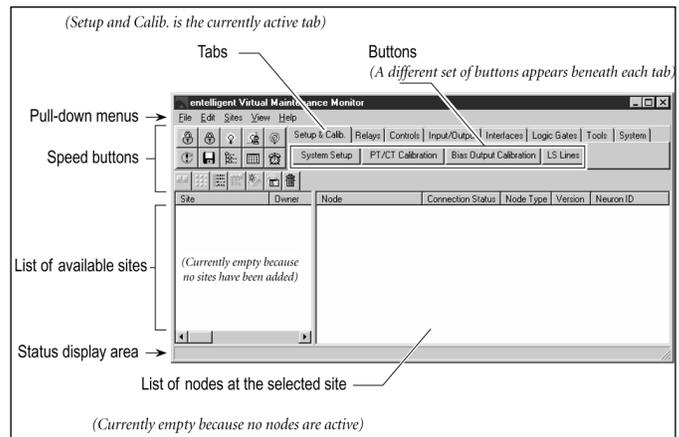


Figure 1-1 Energy Automation Tools

Shown above is the main user interface to the Energy Automation Tools. All programs within the Energy Automation Tools family of products share the same basic interface. The only distinction between these products is that each contains a different assortment of features. These features are accessed by clicking on the buttons associated with the row of tabs at the top of the user interface. This figure shows the buttons contained beneath the Setup and Calibration tab.

1.3.2 LOGGING IN AS AN ADMINISTRATOR

Now that the software is running you can proceed to log in as the system administrator and create accounts for your users.

To log in as the system administrator, do the following:

1. Select *Login...* from the File menu.
 - The User Login window will open.



2. Type the word *Administrator* in the *User Name* field.
3. Type the administrative password in the *Password* field and click the *OK* button.
 - We provided the administrative password to a representative from your organization at the time of sale.

1.4 CREATING USER ACCOUNTS

NOTE: Aside from the installing the software and creat-

Table 1-1 Energy Automation Tools Access Privileges

Level 0 No Privileges	This is the lowest level of access. The software operates in this mode if you run the software and then click Cancel when presented with the login prompt. Without access privileges, users can explore the software interface but can not connect to a site.
Level 1000 Guest User	Guest level access adds the ability to connect to sites—either over <i>LonWorks</i> , a local area network, or using a modem—and check on the status of the system. Users with guest level access cannot start or stop the genset or perform any other operational tasks.
Level 2000 General User	General users—those for whom this manual was written—can connect to sites and start and stop the gensets. General users cannot change the parameters that specify how the <i>en</i> power controls control the engines, generators, and breakers. For example, general users cannot change the set points of the protective relays.
Level 3000 Field Technician	Users with Field Technician privileges have the ability to change most operational parameters on the <i>en</i> power controls—the only exception include application-specific parameters such as logic gate and discrete output inverts.
Level 4000 OEM Technician	Users with Level 4000 access and above have complete access to all features built into the software. This includes the complete ability to change all operational parameters on the <i>enpower</i> controls.
Level 5000 EN CORP Technician	Currently, this access level provides the same privileges as Level 4000, OEM Technician.
Level 6000 Administrator	In addition to Level 4000 OEM Technician privileges, the administrator can change the preferences for the Energy Automation Tools, enabling users to establish local connections, remote connections, or both.

ing user accounts, this manual describes how to use the Energy Automation Tools at a General User level—the manual describes how to perform tasks such as connecting to local and remote sites and checking on the status of a genset. This manual does not describe how to perform tasks at or above the Field Technician level—the manual does not describe how to configure a system’s operational parameters, as these parameters can not be changed by general users. Please refer to the Developer’s manual for instructions on configuring the *enpower* controls.

Because the Energy Automation Tools can be used to change important generator and utility control parameters, we provide seven levels of user access. Each level of user access enables and disables different combinations of features. Without access privileges, users can only inspect the software interface. Users with administrative-level access have complete access to all features built into the software.

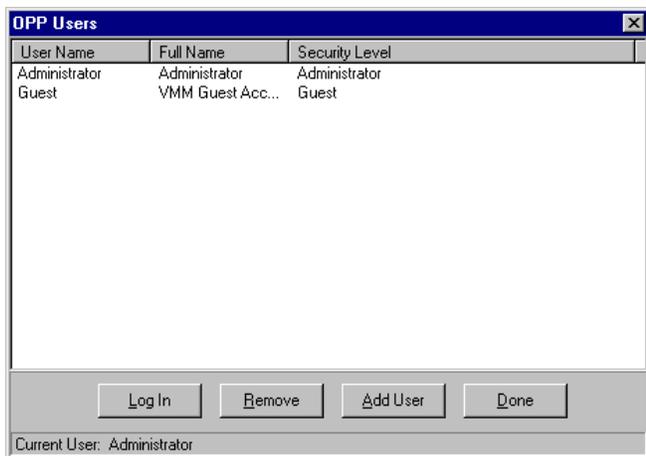
Before anyone can begin using the Energy Automation Tools, the system administrator needs to add one or more user to the system. Adding a user involves choosing a login name and password and setting access privileges. The seven levels of access built into the Energy Automation Tools are listed in Table 1-1 Energy Automation Access Privileges. This manual is targeted for users with General User (level 2000) privileges. Refer to the *Developers Manual* for higher-level functions.

The system administrator will have to decide whether to create separate login accounts for every person who will use the system, or one login that will be used by everyone. The Energy Automation Tools allows you to create as many or as few accounts as you would like.

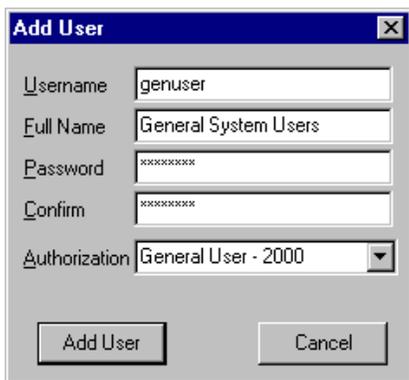
Note that users are free to change their login names and passwords at any time during a session. Also, the Energy Automation Tools allows users with each level of access to add and remove accounts. Users can create new accounts that have the same or fewer privileges as their original account. In other words, someone with guest level access can create an additional guest account, but cannot create an account with administrative level privileges.

To add users and assign access levels and passwords, do the following:

1. Select *User Manager...* from the *File* menu.
 - The following window will open. We use this window to add and modify user accounts.



2. Click the *Add User* button.
 - The Add User window will open.



3. Specify the level of access that the user will have to the *empower* controls—select the desired level from the pull-down menu to the right of the *Authorization* field.

NOTE: Users with Field Technician, OEM Technician, ENCORP Factory, or Administrator privileges will be able to change the operational parameters of the *empower* controls, which in turn control the gensets and utility breakers. DO NOT assign these privileges to users who have not been trained to configure the *empower* controls. Refer to the Developer’s manual for information about configuring the controls.

4. Type the name that the user will use to log in to the software in the *Username* field.
 - This is the name that the user will type each time he or she runs the software.
5. Type the user’s full name in the *Full Name* field.
 - This field only exists for the convenience of the system administrator and is not used by the actual user. We recommend that you use this field to help keep track of the various accounts that you create.
6. Type a password for the user in the *Password* field. Then type the password once again in the *Confirm* field.
 - The user can change his or her password at any time.

7. Click the *Add User* button to create the account.
8. Repeat steps 1 through 7 to create additional user accounts.

1.4.1 LOGGING IN AS A REGISTERED USER

Now that you’ve created the user accounts, your users can simply run the Energy Automation Tools, log in using their assigned user name and password, and begin using the software.

1.4.2 SETTING PREFERENCES FOR THE ENERGY AUTOMATION TOOLS

The Energy Automation Tools software gives the system administrator the authority to grant or deny access to local and remote sites. These preferences are universal and apply to everyone who uses the software, regardless of their access privileges. Specifically, the system administrator can only:

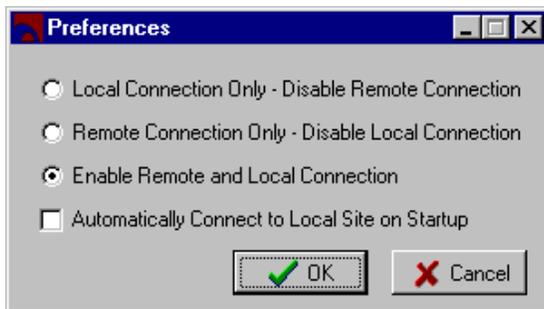
- provide access to local sites,

- provide access to remote sites,
- or provide access to local and remote sites.

For the purpose of this chapter, we will enable access to local and remote sites.

To set the preferences for the Energy Automation Tools, do the following:

1. Log in as Administrator.
2. Select *Preferences...* from the *Edit* menu.
 - The preferences window will open.



3. Select the following options:
 - a) *Enable Remote and Local Connection* — Select this button.
 - b) *Automatically Connect to Local Site on Startup* — Do not check this box.
4. Click the OK button when you are finished.
 - The Preferences window will close.
5. Select *Login...* from the *File* menu.
 - The Energy Automation Tools will display the User Login window.
6. Log in as a registered user.

1.5 CONNECTING TO A LOCAL SITE OVER LONWORKS

This section provides step-by-step instructions for connecting to a local site over the *Echelon LonWorks* network. Tasks include:

- Installing the NST Binding Software
- Running the NST Binding Software for the First Time

- Making the Connection

1.5.1 INSTALLING THE NST BINDING SOFTWARE

Before you can connect to a local site you must first install and configure the *en* telligent NST Binding Software. This software communicates directly with the *enpower* nodes over *LonWorks*. The NST Binding Software also acts as a server, passing the latest parameter values to the Energy Automation Tools.

Preparing the Computer

Before you install the NST Binding Software, make sure that you have sufficient disk space, and that no programs are running that might conflict with the installation software.

To prepare your system for installing the NST Binding Software, do the following:

1. Make sure your hard disk contains at least 80 MB of free space.
2. Exit all Windows programs and turn off virus-protection and screen-saver software. You can turn these programs back on after installation.

1.5.2 INSTALLING THE NST BINDING SOFTWARE FROM COMPACT DISC

We distribute the NST Binding Software on compact disc. If you plan on running the software from a computer that lacks a CD-ROM drive, you can use another computer to create a set of installation disks. Note that you need to use the installation software to install the software. Do not attempt to install this product by dragging the files to your hard disk.

By default, the installer copies the NST Binding Software to a new directory named `C:\Program Files\encorp32`. The installation software allows you to install the software in a different directory, if desired.

Take time to read the *README.TXT* file after completing the installation. This file contains the latest information about the NST Binding Software, as well as information about the other files on the disc.

To install the NST Binding Software from compact disc, do the following:

1. Insert the program disc into your CD-ROM drive.
 - The installation program should run automatically. If it does not, double-click the icon repre-

senting your CD-ROM drive and then double-click *SETUP.EXE*.

2. Follow the on-screen instructions to install the software.

To create a set of installation disks, do the following:

1. Open the directory on the CD-ROM named *Floppy Disk Images*.
2. Copy each file to a different floppy disk. You will need seven disks.

To install the NST Binding Software from floppy disk, do the following:

1. Create a set of installation disks as described above.
2. Insert the first disk into the floppy drive and double click *SETUP.EXE*.
 - The installation software will prompt for the remaining disks.
3. Follow the on-screen instructions to install the software.

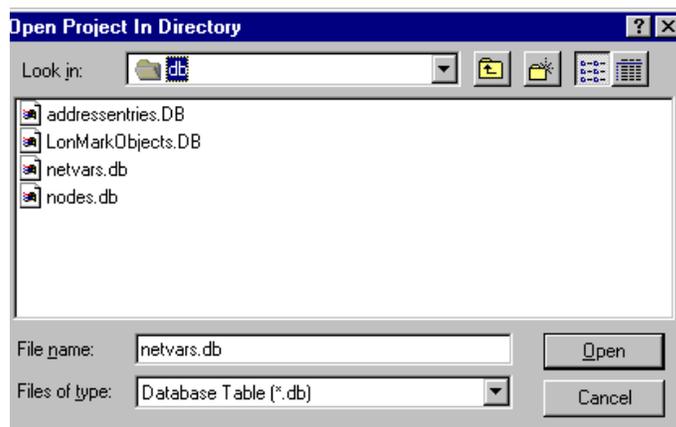
Running the NST Binding Software for the First Time

Having just installed the NST Binding Software you are now ready to run the software for the first time.

Each time you run the NST Binding Software it prompts you to select a project. A project consists of database files that record each node on the *LonWorks* network, along with their bindings and configuration variables. The first time you run the software you will need to select the default project that was installed when you installed the NST Binding Software. We will then modify the default project to accurately describe the nodes on your particular network.

To run the software for the first time and open the default project, do the following:

1. Select *Programs Encorp Intelligent NST Binding* from the *Start* menu to run the NST Binding Software.
 - The software will prompt you to select a project.
2. Using the window shown, navigate to the following directory: `C:\Program Files\encorp32\NST bind\db .`



3. Select any one of the files shown in the window and click the *Open* button to open the project.

- When we speak of a project for use with the NST Binding Software, we are actually describing all of the files contained in a folder. A project contains many files. When you select and open one of these files, the software actually opens all of the files in the project folder.

Once you select the default project and click the *Open* button the interface to the NST Binding Software will open. The interface will resemble Figure 1-2, which labels the various components of the user interface. For more information about the NST Binding Software, refer to the *entelligent NST Binding Software* manual.

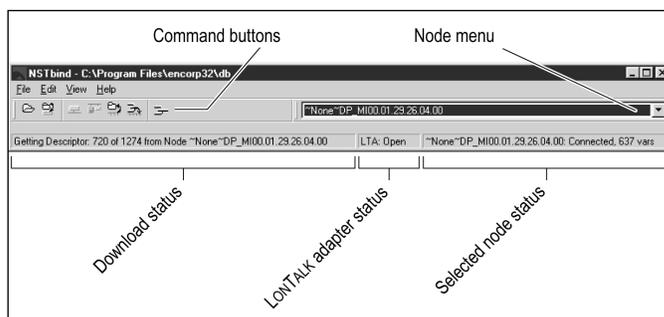


Figure 1-2 Interface To NST Binding Software

Figure 1-2 shows the main interface to the NST Binding Software. We will configure the software by making selections from the *File* and *Edit* menus. Once the software is configured, we won't work with the NST Binding Software directly. Rather it will serve data to the Energy Automation Tools.

1.5.3 CONFIGURING THE NST BINDING SOFTWARE

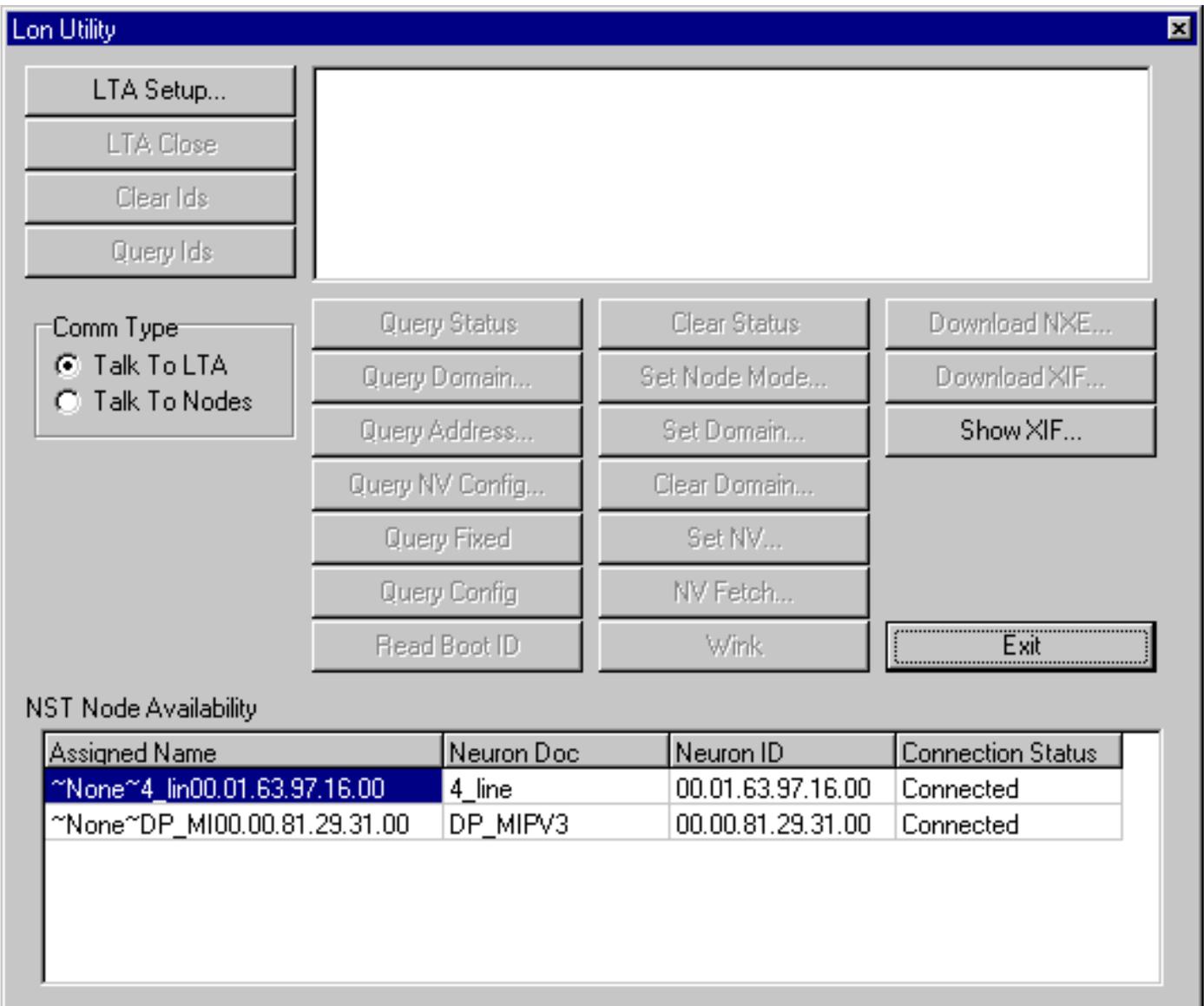
Configuring the NST Binding Software involves establishing a connection between your computer and the *enpower* controls used to control the gensets. An *Echelon LonTalk* adapter allows your computer to communicate with the controls over the *LonWorks* network. Getting your computer, the *LonTalk* adapter, and the *enpower* controls to all communicate with one another is the main objective of this section. Step-by-step instructions guide you through each task.

Configuring the LonTalk Adapter

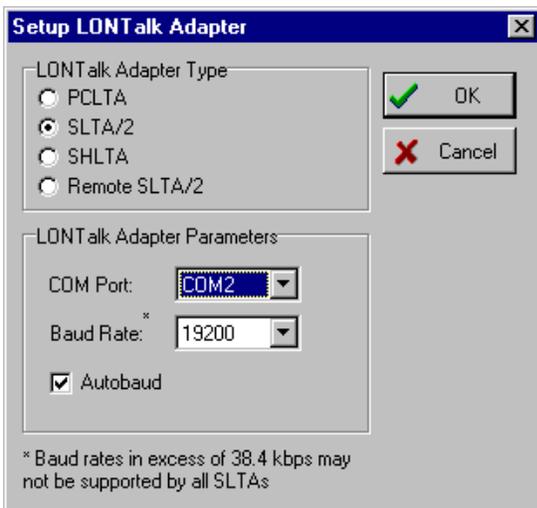
The *LonTalk* adapter allows your computer to communicate with the *enpower* controls over the *Echelon LonWorks* network. You should only need to configure the *LonTalk* adapter once.

To configure the LonTalk Adapter, do the following:

1. Select *LonWorks Run LonWorks Utility* from the *File* menu. This displays the *LonWorks* utility window.



2. Click *LTA Setup*. This opens the setup window for the *LonTalk* adapter.



3. Specify the *LonTalk* adapter type, COM port, and baud rate. Then

- Click *SLTA/2* if you have an external *LonTalk* adapter (*SLTA/2* or *SLTA-10* configured to run in *SLTA/2* emulation mode) connected to one of your computer's serial ports. Click *PCLTA* if you have a an internal PCNSS *LonTalk* card installed in one of your computer's ISA slots.
- Use the *COM Port* menu to select the COM port (COM 1 - COM 4) used by your *LonTalk* adapter. The correct setting will vary from computer to computer. If you select the wrong COM port, the NST Binding Software will display an error message when you try to close the setup window. The error message will indicate that the software is unable to open the *LonTalk* adapter. If you receive this error message, select a different COM port and try again.
- Check the *Autobaud* box to have the NST Binding Software automatically choose the baud rate appropriate for your computer and *LonTalk* adapter.

4. Click *Exit* to close the *LonWorks* utility window.

- If the *LonTalk* adapter opens successfully, the software will close the *LonTalk* setup window. If the *LonTalk* adapter fails to open, the software will display an error message. Ensure that the *LonTalk* adapter is plugged in and turned on. Then double check your settings for the adapter type, COM port, and baud rate and

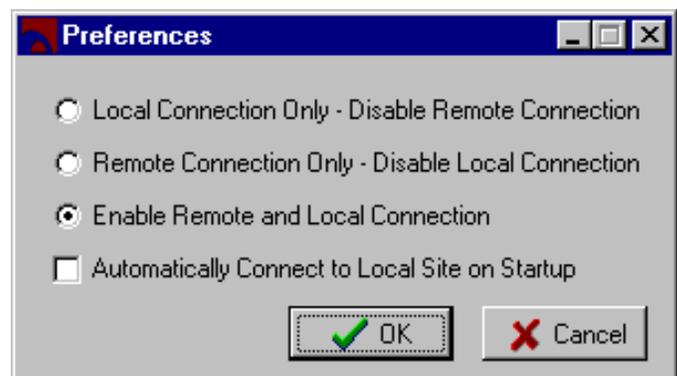
try to connect again.

Setting Preferences for the NST Binding Software

When we use the Energy Automation Tools to connect locally to the *enpower* controls over *LonWorks* , the software automatically runs the NST Binding Software. For this reason, we must first configure the NST Binding Software so that it runs automatically. We do this by setting the preferences for the NST Binding Software.

To set the preferences for the NST Binding Software, do the following:

1. Select *Preferences* from the *Edit* menu.



Check the following boxes in the Preferences window:

- *Automatically Connect To Nodes On Startup* — Check this box.
- *Automatically Detect Disconnected Nodes and LonTalk Adapters* —Check this box.
- *Display Read/Write Auto-Detect Network Error Messages* —Check this box.
- *Write Turnaround/Broadcast bound SNVTs by Selector* —Do not check this box.

Finding Nodes on the Network

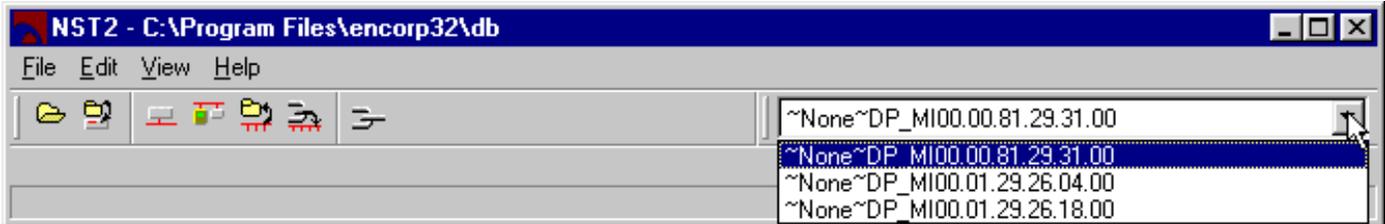
Having just set the preferences in the NST Binding Software, you need to update the default project to include the nodes that control the gensets. Finding network nodes takes approximately five seconds. The software will display the neuron ID of each node in a pull-down menu.

To locate the nodes on the network, do the following:

1. Select *Find Nodes on Network* from the *Edit* menu.
 - The NST Binding Software will scan the

LonWorks network and return the neuron ID number of each node it finds. Each *enpower* control is a node. Your network may also contain nodes from other manufacturers.

2. Display the list of nodes and verify that the number of neuron IDs shown matches the number of nodes connected to the network.



- If nodes appear to be missing, ensure that each node has power and is properly connected to the network. Then repeat these steps and ensure that all nodes are accounted for.

3. Repeat steps one and two until all nodes are accounted for.

NOTE: If a different manufacturer made one or more nodes on the network, the NST Binding Software will prompt you to select the external interface file for each non-*enpower* node. You can identify these files by their .xif extension. The software retains the location of these files for the duration of the session.

Obtaining Bindings

Now that you have identified all of the nodes on the *LonWorks* network you are now ready to read the bindings from each node and store this information in the project database.

To obtain the bindings from every node on the *LonWorks* network, do the following:

1. Select *Get Information For All From Network* from the *Edit* menu.
 - The NST Binding Software will download the bindings from every node on the network. This process will take several minutes.
2. Select *Save Project* from the *File* menu.
 - The NST Binding Software will save the nodes and bindings in the default project.

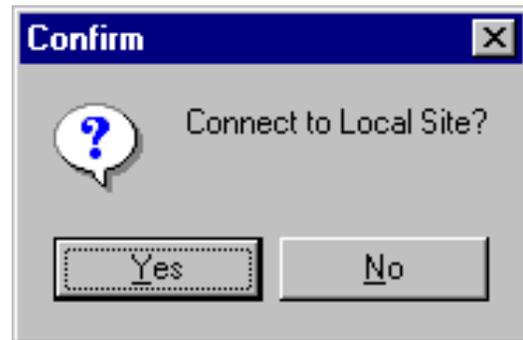
1.5.4 MAKING THE CONNECTION

Having just saved the information from the identified

bindings, you are ready to connect to a local site over *LonWorks*.

To connect to a local site over *LonWorks*, do the following:

1. Select *Connect to Site Local* from the *Edit* menu.
 - The following window will open.



2. Click the *OK* button to connect to the site.
 - When you click OK the Energy Automation Tools will launch the intelligent NST Binding Software. The Energy Automation Tools uses the NST Binding Software to communicate with the *enpower* controls over the *LonWorks* network. Assuming that the NST Binding Software is properly configured—as described in Configuring the NST Binding Software—the software will automatically open a connection to the *Echelon LonTalk* adapter and find all of the generators.

You may now want to skip ahead to *Checking the Generator Status* on page 18 and begin using the Energy Automation Tools.

1.6 CONNECTING TO A REMOTE SITE USING A LOCAL AREA NETWORK

This section provides step-by-step instructions for connecting to a remote site using a local area network.

Tasks include:

- Adding a Remote Site
- Making the Connection

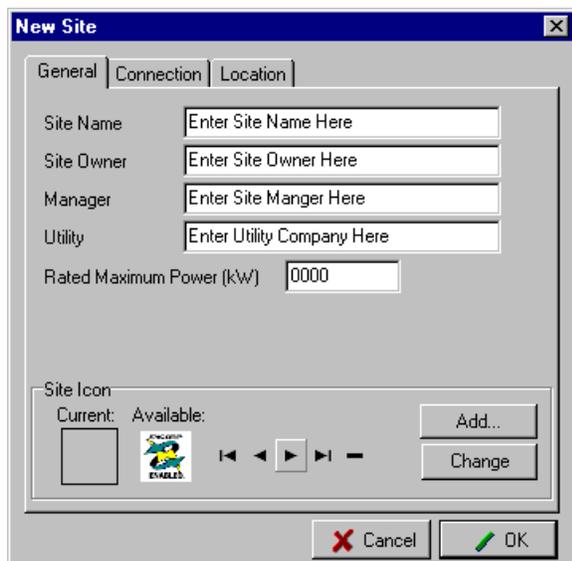
1.6.1 ADDING A REMOTE SITE

You should have just installed the Energy Automation Tools but have not yet added any remote sites. Once you add a site, you can connect to that site by double-clicking its icon in the left pane of the user interface. You only have to add a site once. The software automatically saves all sites that you add, making them available each time you run the software.

To add a new site, do the following:

1. Select *New Site...* from the *Sites* menu.

- The *New Site* window will open. This window contains three tabs: *General*, *Connection*, and *Location*. The *New Site* window displays the contents of the *General* tab by default.



2. Complete the *Site Name* field:

- The *Site Name* is the only field on the *General* tab that you are required to fill out. The software uses the name in this field to build a list of sites that it displays in the left pane of the Energy Automation Tools window. The *Site Owner*, *Manager*, *Utility*, and *Rated Maximum Power*

(*kw*) fields are optional. The information you provide in each field allows you to record information about each site.

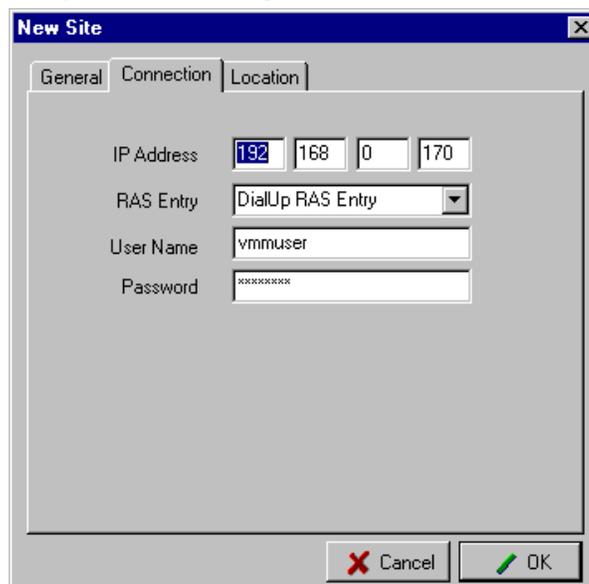
3. Select an icon to represent the site in the left pane of the Energy Automation Tools window.

- Click the ◀ and ▶ buttons to preview the available icons. The *Current* icon box displays the icon presently assigned to a site. The *Available* icon box displays a preview of the icon available for selection or assignment.
- Click the *Change* button to apply the icon to the site.

4. Click the *Connection* tab.

- The components of the window change as shown below.

5: Complete the following fields:



- *IP Address* —Enter the IP (Internet Protocol) address of the CPM (Communications Processor Module). The CPM is an industrial grade server that remains in constant contact with the en power controls. The CPM makes it possible to monitor and maintain the gensets from another building (using a local area network) or from another state or country (using a dial-up connection).

- *RAS Entry* —Skip this field. This field establishes dial-up connections, and is discussed in the section *Connecting to a Remote Site using a Modem*.

- **User Name and Password fields**—Enter the user name and password required to open a connection to the CPM (Communications Processor Module). This user name and password is for network security only and is independent of the user name and password used to control access to the various features of the Energy Automation Tools.

6. Click the *Location* tab.

The components of the window change as shown below.



7. All of the data entry fields on the Location tab are optional. The information you provide in these fields helps keep track of sites in other states and countries.
8. Click the *OK* button to add the site and close the window.
 - The software displays the new site in the left pane of the user interface, as shown in Figure 1-3.

Notice the site name in Figure 1-3, ENCORP Local, in the left pane of the user interface. All sites that you add will be displayed in this pane. You can choose to display sites in list format as shown here, or using larger icons. The software displays a vertical scroll bar if you add more sites than it can display at once.

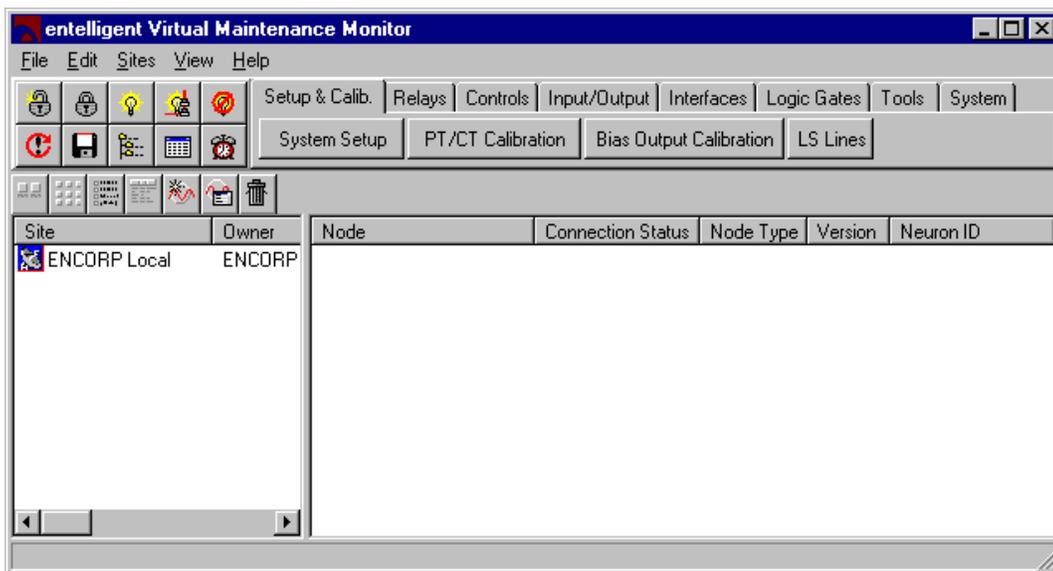


Figure 1-3 Site Name Displayed in User Interface

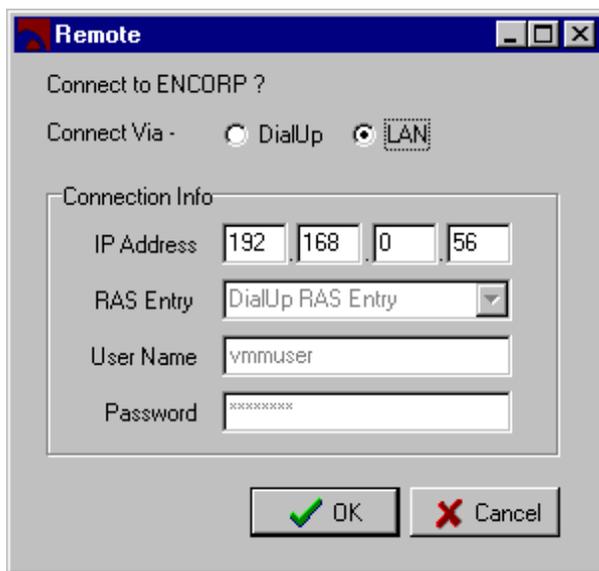
1.6.2 MAKING THE CONNECTION

Now that you have successfully added a remote site, you can open a connection between your computer and the CPM (Communications Processor Module) used to monitor and maintain the gensets.

To connect to the remote site, do the following:

Double click on the site name or icon in the left pane of the main interface.

- The *Remote* connection window will open.



2. Select LAN from the *Connect Via* - options.

3. Click *OK* to open the connection.

- Establishing a connection takes several seconds. The status bar at the bottom of the screen displays a series of messages that indicate the status of the connection. When the connection is established, the Energy Automation Tools displays each node at the remote site in the right pane of the user interface.

You may want to skip ahead to *Checking the Generator Status* and begin using the Energy Automation Tools.

1.7 CONNECTING TO A REMOTE SITE USING A MODEM

This section provides step-by-step instructions for connecting to a remote site using a modem. Tasks include:

- Configuring Dial-Up Networking
- Adding a Remote Site
- Making the Connection

You should have just installed the Energy Automation Tools but have not yet added any remote sites. Once you add a site, you can connect to that site by double-clicking its icon in the left pane of the user interface. You only have to add a site once. The software automatically saves all sites that you add, making them available each time you run the software.

1.7.1 CONFIGURING DIAL-UP NETWORKING

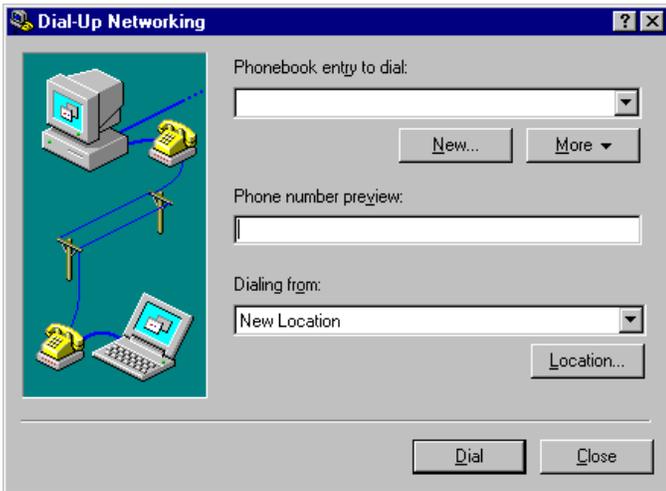
Configuring a dial-up site requires working with the Windows *Dial-Up Networking* feature. The shaded box on the next page provides quick instructions for configuring *Dial-Up Networking*. You may skip ahead to *Adding a Remote Site* on page 16. Pages 13-16 provide detailed, step-by-step instructions for setting up *Windows Dial-Up Networking*.

Quick steps:

1. Select *Programs >> Accessories >> Dial-Up Networking* from the *Start* menu to open the Dial-Up Networking window.
2. Click *New* to add a new entry in the phonebook.
3. Specify the name and phone number of the new site by entering this data into the fields provided under the *Basic* tab. Also select and configure your modem.
4. Select the TCP/IP protocol under the *Server* tab.
5. Use the default settings under the *Script*, *Security*, and *X 25* tabs.

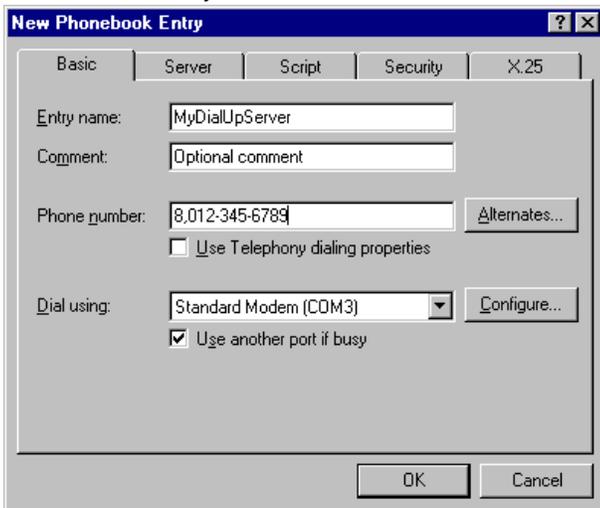
To begin the Dial-Up Networking configuration, from the Start menu, do the following:

1. Select *Programs >> Accessories >> Dial-Up Networking*.
 - The *Dial-Up Networking* window will open. If Dial-Up Networking is not listed under *Accessories*, you may need to install *Dial-Up Networking* from your Windows installation disc.



1. Click the *New* button to add a new entry in the phone book.

- The *New Phonebook Entry* window will open. The window will display the contents of the *Basic* tab by default.



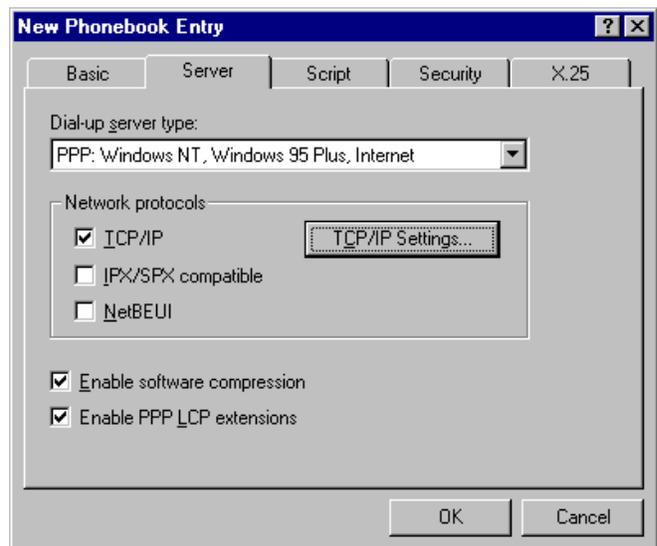
2. Complete the following fields under the *Basic* tab:

- *Entry Name* —Enter the name for the dial-up site. You will see this name when you configure the Energy Automation Tools to dial the site.
- *Comment* —Entering data in this field is optional.
- *Phone Number* —Enter the phone number assigned to the CPM (Communications Processor Module) at the remote site. Use dashes to separate the area code, if desired (Windows ignores dashes or parenthesis). If you need to dial a prefix such as “8” to get an

outside line, enter the prefix first, followed by a comma.

- *Use Telephony dial properties* —Do not check this box.
- *Dial Using* —Select your modem from this pull-down menu.
- *Use another port if busy* —Do not check this box unless your computer has multiple modems connected to multiple phone lines

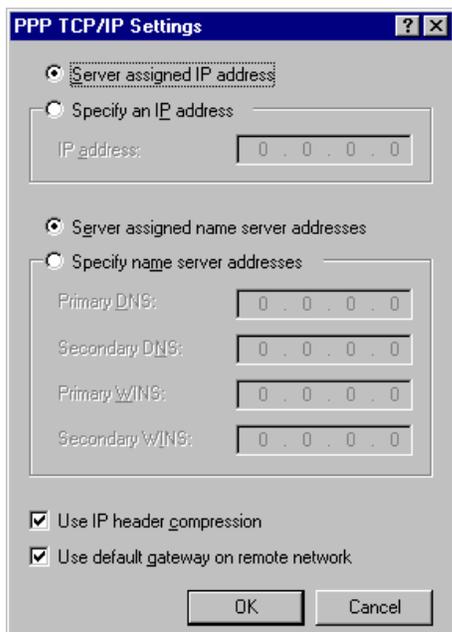
NOTE: If your modem does not appear in pull-down menu, you may need to configure your computer’s modem using the *Modems Control Panel* program. Page 13 provides step-by-step instructions on configuring the modem.



3. Click the *Server* tab (the contents of the window will change as shown below). Complete the following fields under the *Server* tab:

- *Dial-up server type* —Select PPP from the pull-down menu.
- *Network protocols* —Check the TCP/IP box. Do not check the IPX/SPX and NetBEUI boxes.
- *Enable software compression* —check this box.
- *Enable PPP LCP extensions* —check this box.

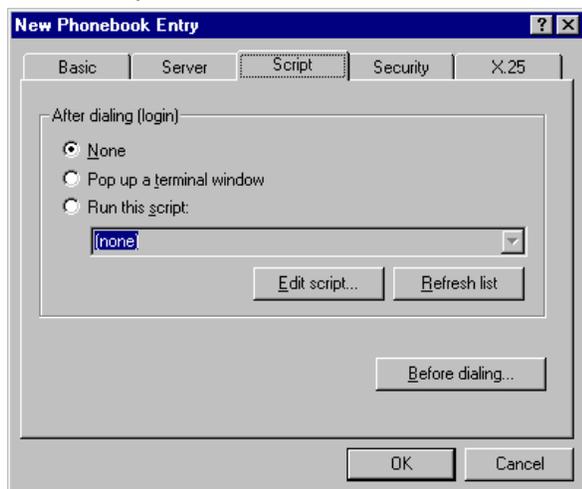
4. Click the *TPC/IP Settings* button (The *PPP TCP/IP Settings* window will open). Select the following buttons if they are not already selected:



- *Server assigned IP address* —Check this button.
- *Server assigned name server addresses* — Check this button.
- *Use IP header compression* —Check this box.
- *Use default gateway on remote network* — Check this box.

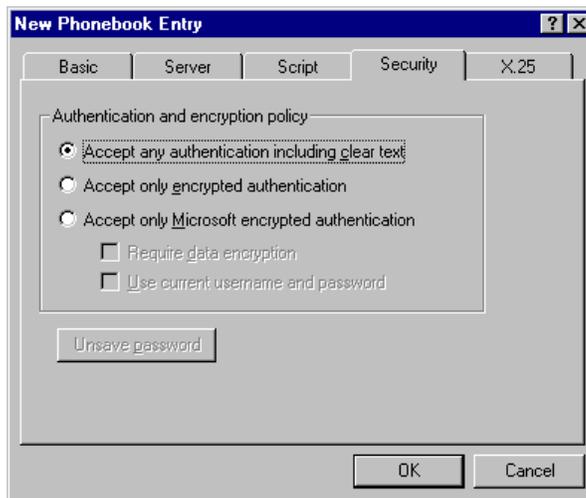
5. Click the *OK* button to close the *PPP TCP/IP Settings* box.

6. Click the *Script* tab (the contents of the window will change, as shown below). Complete the following fields under the *Script* tab:



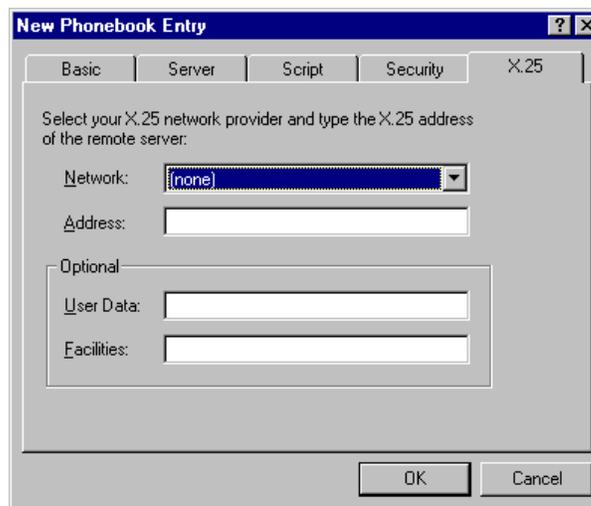
- *After dialing (login)* —Click the *None* button if it is not already selected.

7. Click the *Security* tab (the contents of the window will change, as shown below). Complete the following fields under the *Security* tab:



- *Authentication and encryption policy* —Click the *Accept any authentication including clear text* button if it is not already selected.

8. Click the *X 25* tab (the contents of the window will change, as shown below). Verify that the fields under the *X 25* tab are as follows:



- *Network* —Select (none) from the pull-down menu.
- *Address* —Leave this field blank.
- *User Data* —Leave this field blank.
- *Facilities* —Leave this field blank.

9. Click the *OK* button to add the site to the phonebook and to close the *New Phonebook Entry Window*.

10. Repeat steps 1-10 to add more dial-up sites to the Windows phonebook.

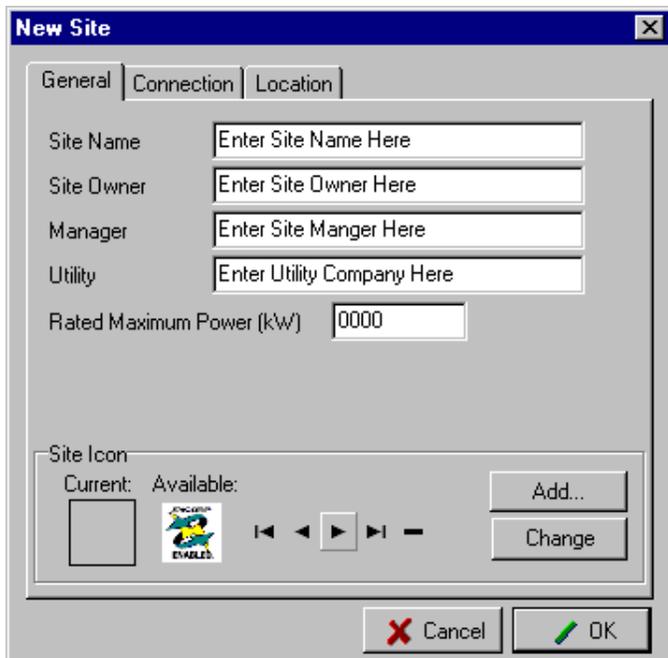
11. Click the *Close* button to end your session and close the *Dial-Up Networking* window.

1.7.2 ADDING A REMOTE SITE

Having configured Windows *Dial-Up Networking*, you are now ready to add remote sites to the Energy Automation Tools.

1. Select *Sites >> New Site*.

- The *New Site* window will open. This window contains three tabs: *General*, *Connection*, and *Location*. The window displays the contents of the *General* tab by default.



2. Complete the *Site Name* field:

- The *Site Name* is the only field on the *General* tab that you are required to fill out. The software uses the name in this field to build a list of sites

that it displays in the left pane of the Energy Automation Tools window. The *Site Owner*, *Manager*, *Utility*, and *Rated Maximum Power (kw)* fields are optional. The information you provide in each field allows you to record information about each site.

3. Select an icon to represent the site in the left pane of the Energy Automation Tools window.

- Click the ◀ and ▶ buttons to scroll through the list of available icons. The *Current* icon box displays the icon presently assigned to a site. The *Available* icon box displays a preview of the icon available for selection or assignment.
- Click the *Change* button to apply the icon to the site.

4. Click the *Connection* tab.

- The components of the window change as shown below.



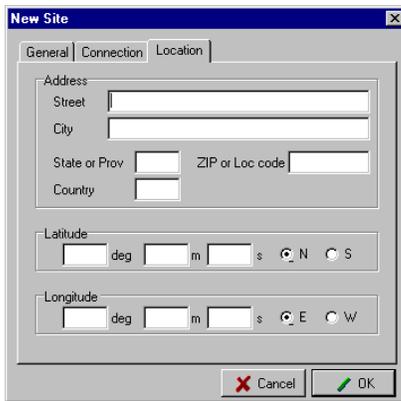
5. Configure each field in the *Connection* tab as follows:

- *IP Address* —Enter the IP (internet protocol) address of the CPM (communications processor module) at the remote site. The CPM is an industrial grade server that remains in constant contact with the empower controls that manage the gensets. The CPM makes it possible to monitor and maintain the gensets from another building (using a local area network) or from another state or country (using a dial-up connection).

- Select the site from the RAS Entry menu. All of the entries in your Windows phonebook will appear in this menu. In order to add sites to this menu, you need to use Windows Dial-Up Networking feature. Configuring Dial-Up Networking on page 13.
- *User Name and Password fields*—Enter the user name and password required to establish a modem connection with the CPM (Communications Processor Module). This user name and password is only used for dial-up network security and is independent of the user name and password used to control access to the various features of the Energy Automation Tools.

6. Click the *Location* tab.

- The components of the window change as shown below.



- All of the data entry fields on the Location tab are optional. The information you provide in these fields helps keep track of sites in other states and countries.

7. Click the *OK* button to add the site and close the window.

- The software will display the new site in the left pane of the user interface, as shown in Figure 1-4.

This screen capture shown in Figure 1-4 was taken after adding a new site. The software displays the site in the left pane of the user interface. All sites that you add will be displayed in this pane. You can choose to display sites in list format as shown here, or using larger icons. The software displays a vertical scroll bar if you add more sites than it can display at once.

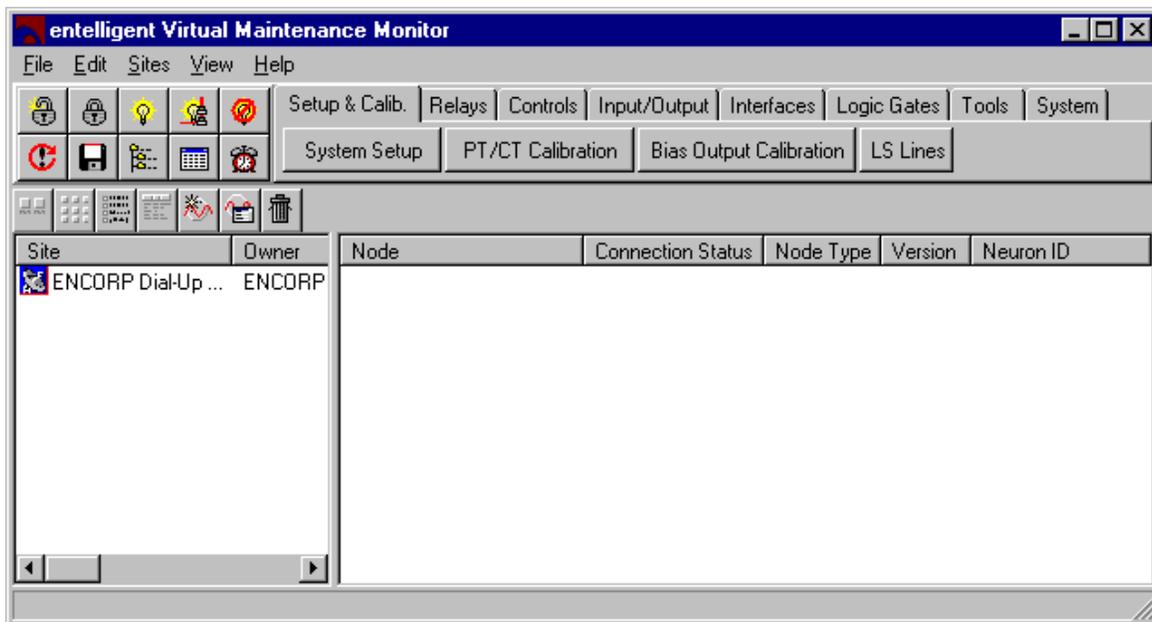


Figure 1-4 Site Displayed in User Interface

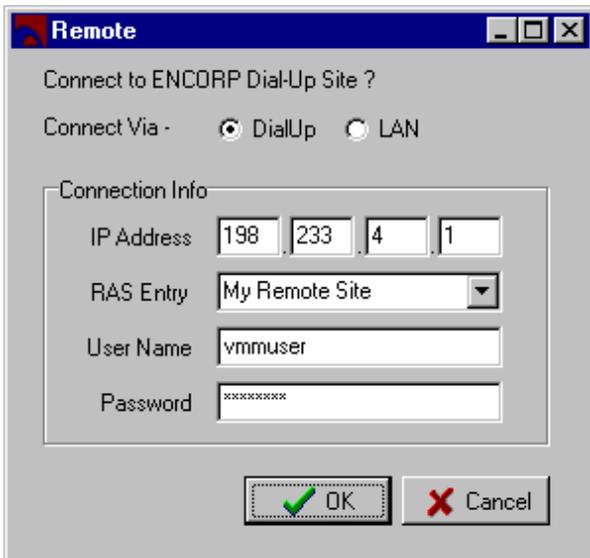
1.7.3 MAKING THE CONNECTION

Now that you've successfully added a remote site, you can open a connection between your computer and the CPM (Communications Processor Module) used to monitor and maintain the gensets.

To connect to the site that you just added, do the following:

1. Double click on the site name or icon in the left pane of the user interface.

The *Remote* connection window will open.



2. Select *Dial Up* from the *Connect Via* options.

3. Click *OK* to open the connection.

- Establishing a connection takes several seconds. The status bar at the bottom of the screen displays a series of messages that indicate the status of the connection. When the connection is established, the Energy Automation Tools displays each node at the remote site in the right pane of the user interface.

The next section—Checking the Generator Status—describes how to begin using the Energy Automation Tools.

1.8 CHECKING THE GENERATOR STATUS

Once you connect to a site, the Energy Automation Tools will display each *Echelon LonWorks* node present at that site in the right pane of the user interface. Figure 1-5 shows a site that contains four nodes, labeled GPC GEN 1, GPC GEN 2, MMC, and UPC.

This screen shot shown in Figure 1-5 was taken shortly after connecting to a site. Notice how the software lists all of the nodes present at the site in the right pane of the user interface.

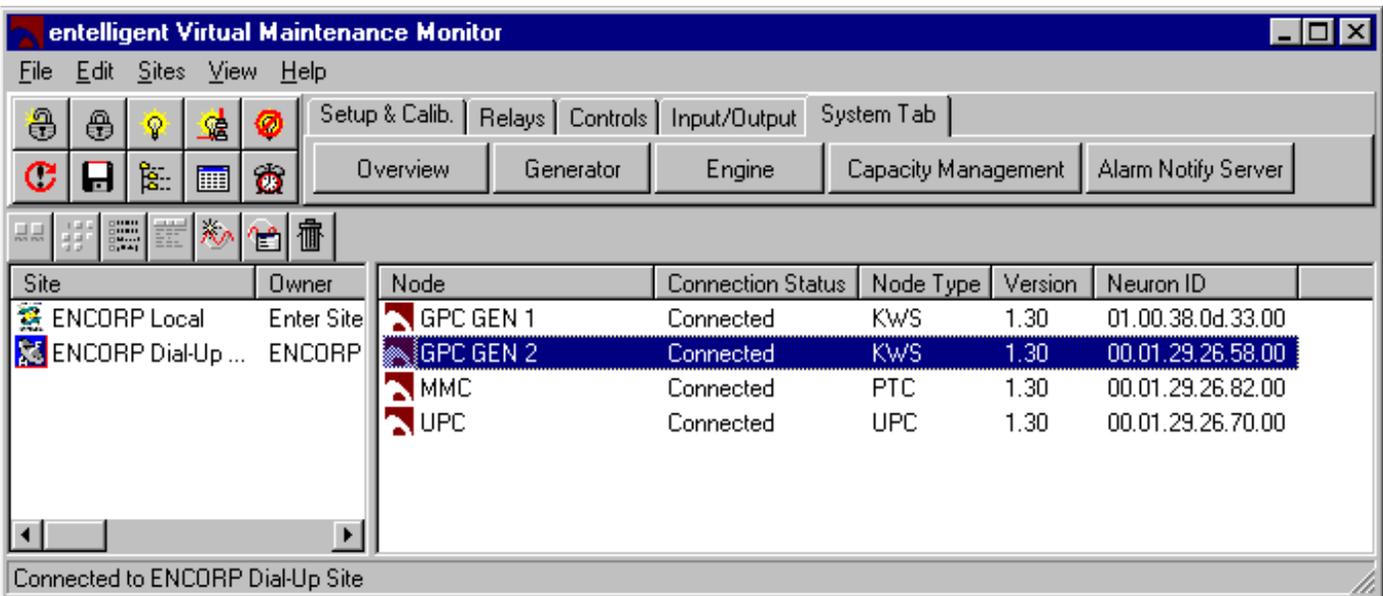


Figure 1-5 Nodes Present Displayed

Having connected to a site, we can now use the software to obtain information about the status of the gensets and the *enpower* controls. We will begin by pulling up a window that provides information about the generators.

To open the Generator Overview window, do the following:

1. Click the *System* tab.
 - The buttons beneath the tabs will automatically change. The new set of buttons will include *Overview*, *Generator*, and *Engine*. Depending on which program you are actually running, the buttons *Capacity Management* and *Alarm Notify Server* may also be present.

2. Click the *Generator* button.

- The Generator Overview window will open. An example of this window is shown in Figure 1-6. This window contains four gauges that show volts, amps, kilowatts, and power factor as measured by the currently selected control. You can change the currently selected control from the *Node* menu in the upper left corner of the window.

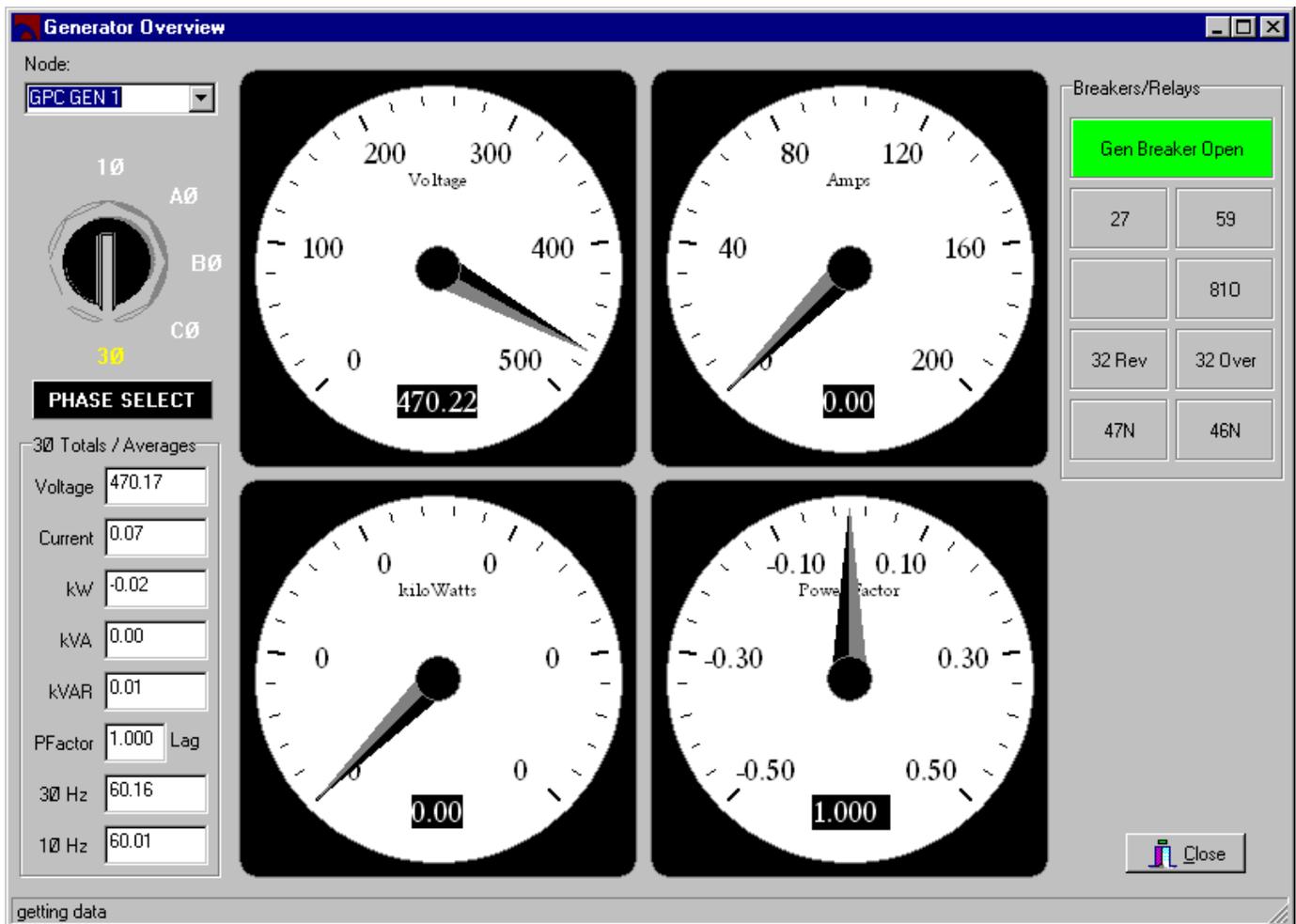


Figure 1-6 Shown Here is the Generator Overview Window.

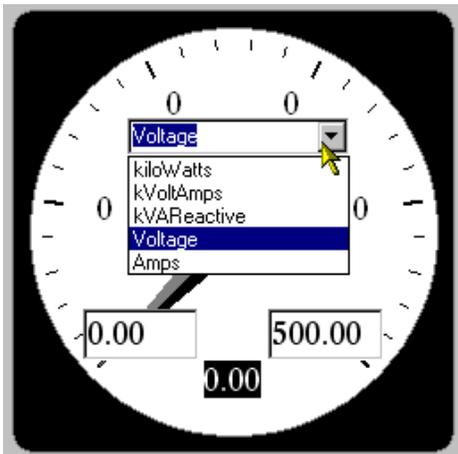
3. Select an empower control from the *Node* menu.
 - The window displays data from the currently selected node.



4. Click 1Ø, AØ, BØ, CØ, or 3Ø to switch between the single-phase, A-phase, B-phase, C-phase, or three-phase voltage sensor.
 - The window displays data from the currently selected sensor.



5. Customize the meters, if desired. The software presents a menu of choices when you double click on one of the four meters.



- a. Double-click on one of the meters.
- b. Select *kiloWatts* , *kVAmp* , *kVAReactive* , *Voltage* , or *Amps* from the pull-down menu.
- c. Change the range of the meter, if desired. Type a new value and press <Enter> in the box on the lower

left to change the lower limit. Type a new value and press <Enter> in the box on the lower right to change the upper limit.

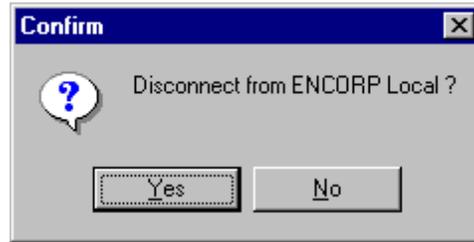
6. Click the *Close* button when you are finished working with the Generator Overview window.

1.9 DISCONNECTING FROM A SITE

The Energy Automation Tools allows you to disconnect from a site at any time. You can then quit the software or connect to a different site.

To disconnect from a site, do the following:

1. Select *Disconnect from Site* from the *Edit* menu.
 - The software will display a pop-up message asking you to confirm your selection.



Click *Yes* to disconnect from the site, or click *No* if you would rather stay connected.

To quit using the Energy Automation Tools, do the following:

1. Select *Exit* from the *File* menu.
 - If a connection to a site is open, the software will automatically close the connection and then exit.

SECTION 2 RELAYS

The dialog boxes accessible from the Relays Tab are used to initially set the nine protective relays in enpower controls.



2.1 SINGLE PHASE VOLTAGE RELAY (1Ø 27/59)

The Single Phase Voltage Relay shown in Figure 2-1 is used for the initial setup of enpower controls. This screen is used to setup the Voltage Relay that's looking at the Single Phase Voltage input to the enpower control. Using this screen, the user can set up the high and low setpoints, hysteresis, and the set and clear times for the relay. This screen is associated with the enpower LonMark Object called Voltage Relay 1-Phase (27/59) (VR_).

To open the Single Phase Voltage Relay window, do the following:

1. Click the *Relays* tab.
2. Click the *1Ø 27/59* button.

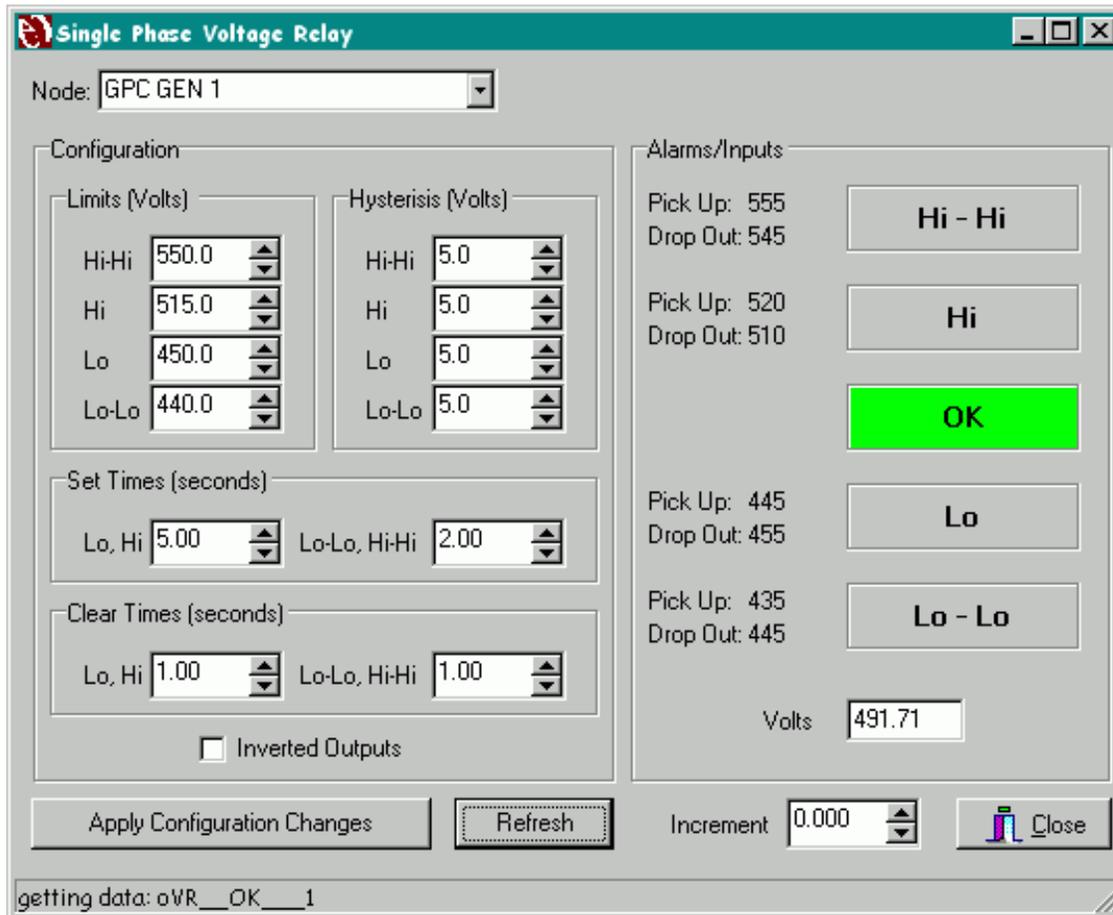


Figure 2-1 Single Phase Voltage Relay

2.1.1 HI-HI SETPOINT

This configuration is used to set the Hi-Hi Setpoint. This value in conjunction with the Hi-Hi hysteresis setting determines the actual trip and clear setpoints for the Hi-Hi Output. The trip setpoint is equal to the Hi-Hi Setpoint + the hysteresis setting. The clear setpoint is equal to the Hi-Hi Setpoint - the hysteresis setting. For example: If the Hi-Hi Setpoint is 480 and the Hi-Hi hysteresis is 5, then the Hi-Hi trip setpoint is 485 and the clear setpoint is 475. The associated empower SNVT is VR__HiHi_1.



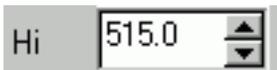
2.1.2 HI-HI HYSTERESIS SETPOINT

This configuration is used to set the Hi-Hi Hysteresis Setpoint. This value in conjunction with the Hi-Hi Setpoint determines the actual trip and clear setpoints for the Hi-Hi Output. The trip setpoint is equal to the Hi-Hi Setpoint + the hysteresis setting. The clear setpoint is equal to the Hi-Hi Setpoint - the hysteresis setting. For example: If the Hi-Hi Setpoint is 480 and the Hi-Hi hysteresis is 5, then the Hi-Hi trip setpoint is 485 and the clear setpoint is 475. The associated empower SNVT is VR__HHhys_1.



2.1.3 HI SETPOINT

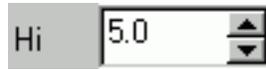
This configuration is used to set the Hi Setpoint. This value in conjunction with the Hi hysteresis setting determines the actual trip and clear setpoints for the Hi Output. The trip setpoint is equal to the Hi Setpoint + the hysteresis setting. The clear setpoint is equal to the Hi Setpoint - the hysteresis setting. For example: If the Hi Setpoint is 480 and the Hi hysteresis is 5, then the Hi trip setpoint is 485 and the clear setpoint is 475. The associated empower SNVT is VR__Hi_1.



2.1.4 HI HYSTERESIS SETPOINT

This configuration is used to set the Hi hysteresis Setpoint. This value in conjunction with the Hi Setpoint setting determines the actual trip and clear setpoints for the Hi Output. The trip setpoint is equal to the Hi Setpoint + the hysteresis setting. The clear setpoint is equal to the Hi Setpoint - the hysteresis setting. For example: If the Hi Setpoint is 480 and the Hi hysteresis

is 5, then the Hi trip setpoint is 485 and the clear setpoint is 475. The associated empower SNVT is VR__Hhys_1.



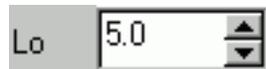
2.1.5 LO SETPOINT

This configuration is used to set the Lo Setpoint. This value in conjunction with the Lo hysteresis setting determines the actual trip and clear setpoints for the Lo Output. The trip setpoint is equal to the Lo Setpoint - the hysteresis setting. The clear setpoint is equal to the Lo Setpoint + the hysteresis setting. For example: If the Lo Setpoint is 480 and the Lo hysteresis is 5, then the Lo trip setpoint is 475 and the clear setpoint is 485. The associated empower SNVT is VR__Lo_1.



2.1.6 LO HYSTERESIS SETPOINT

This configuration is used to set the Lo Hysteresis Setpoint. This value in conjunction with the Lo Setpoint determines the actual trip and clear setpoints for the Lo Output. The trip setpoint is equal to the Lo Setpoint - the hysteresis setting. The clear setpoint is equal to the Lo Setpoint + the hysteresis setting. For example: If the Lo Setpoint is 480 and the Lo hysteresis is 5, then the Lo trip setpoint is 475 and the clear setpoint is 485. The associated empower SNVT is VR__Lhys_1.



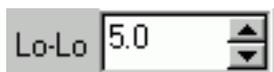
2.1.7 LO-LO SETPOINT

This configuration is used to set the Lo-Lo Setpoint. This value in conjunction with the Lo-Lo hysteresis setting determines the actual trip and clear setpoints for the Lo-Lo Output. The trip setpoint is equal to the Lo-Lo Setpoint - the hysteresis setting. The clear setpoint is equal to the Lo-Lo Setpoint + the hysteresis setting. For example: If the Lo-Lo Setpoint is 480 and the Lo-Lo hysteresis is 5, then the Lo-Lo trip setpoint is 475 and the clear setpoint is 485. The associated empower SNVT is VR__LoLo_1.



2.1.8 LO-LO HYSTERESIS SETPOINT

This configuration is used to set the Lo-Lo Hysteresis Setpoint. This value in conjunction with the Lo-Lo setpoint determines the actual trip and clear setpoints for the Lo-Lo Output. The trip setpoint is equal to the Lo-Lo Setpoint - the hysteresis setting. The clear setpoint is equal to the Lo-Lo Setpoint + the hysteresis setting. For example: If the Lo-Lo Setpoint is 480 and the Lo-Lo hysteresis is 5, then the Lo-Lo trip setpoint is 475 and the clear setpoint is 485. The associated empower SNVT is VR_LLhys_1.



2.1.9 LO, HI SET TIME

This configuration is used to set the Set Time for the Lo and the Hi trip outputs. This value sets the amount of time that the voltage input must exceed the trip value (as determined by the setpoints and hysteresis) before the relay trip output becomes active. This set time is used for the Lo and Hi outputs only. The Lo-Lo and Hi-Hi outputs use a separate Set Time. The associated empower SNVT is VR_Set_t11.



2.1.10 LO-LO, HI-HI SET TIME

This configuration is used to set the Set Time for the Lo-Lo and the Hi-Hi trip outputs. This value sets the amount of time that the voltage input must exceed the trip value (as determined by the setpoints and hysteresis) before the relay trip output becomes active. This set time is used for the Lo-Lo and Hi-Hi outputs only. The Lo and Hi outputs use a separate Set Time. The associated empower SNVT is VR_Set_t21.



2.1.11 LO, HI CLEAR TIME

This configuration is used to set the Clear Time for the Lo and the Hi trip outputs. This value sets the amount of time before the trip output resets when the voltage returns within good limits (as determined by the setpoints and hysteresis). This clear time is used for the Lo and Hi outputs only. The Lo-Lo and Hi-Hi outputs use a separate Clear Time. The associated empower SNVT is VR_Clr_t11.



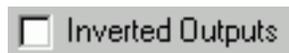
2.1.12 LO-LO, HI-HI CLEAR TIME

This configuration is used to set the Clear Time for the Lo-Lo and the Hi-Hi trip outputs. This value sets the amount of time before the trip output resets when the voltage returns within good limits (as determined by the setpoints and hysteresis). This clear time is used for the Lo-Lo and Hi-Hi outputs only. The Lo and Hi outputs use a separate Clear Time. The associated empower SNVT is VR_Clr_t21.



2.1.13 INVERT OUTPUTS

This configuration is used to invert the relay outputs. Check this check box to invert the relay outputs, uncheck it for normal output operation. When the outputs are inverted the relay still functions the same except that the trip outputs are normally ON and turn OFF when the output becomes active. Also, the OK output is OFF when the relay is in its normal state and it turns ON when one of the trip outputs is active. The associated empower SNVT is VR_Invert_1.



2.1.14 HI-HI OUTPUT

This value displays the current value of the Hi-Hi Output. When the output is ON, the display is highlighted. The associated empower SNVT is VR__HiHi_1. The Trip (Pick Up) and Clear (Drop Out) setpoints for the output are also displayed. These Trip and Clear setpoints are calculated from the Hi-Hi Setpoint and the Hi-Hi Hysteresis values.



2.1.15 HI OUTPUT

This value displays the current value of the Hi Output. When the output is ON, the display is highlighted. The associated empower SNVT is VR__Hi_1. The Trip (Pick Up) and Clear (Drop Out) setpoints for the output are also displayed. These Trip and Clear setpoints are calculated from the Hi Setpoint and the Hi Hysteresis values.

Pick Up: 61.2
Drop Out: 60.8

Hi

Pick Up: 465
Drop Out: 455

Hi

2.1.16 OK OUTPUT

This value displays the current value of the OK Output. When the output is ON, the display is highlighted. The associated enpower SNVT is VR__OK__1. The OK Output is ON whenever all of the trip outputs are OFF.

OK

OK

2.1.17 LO OUTPUT

This value displays the current value of the Lo Output. When the output is ON, the display is highlighted. The associated enpower SNVT is VR__Lo__1. The Trip (Pick Up) and Clear (Drop Out) setpoints for the output are also displayed. These Trip and Clear setpoints are calculated from the Lo Setpoint and the Lo Hysteresis values.

Pick Up: 58.8
Drop Out: 59.2

Lo

Pick Up: 495
Drop Out: 505

Lo

2.1.18 LO-LO OUTPUT

This value displays the current value of the Lo-Lo Output. When the output is ON, the display is highlighted. The

associated enpower SNVT is VR__LoLo__1. The Trip (Pick Up) and Clear (Drop Out) setpoints for the output are also displayed. These Trip and Clear setpoints are calculated from the Lo-lo Setpoint and the Lo-Lo Hysteresis values.

Pick Up: 54.8
Drop Out: 55.2

Lo - Lo

Pick Up: 61.8
Drop Out: 62.2

Lo - Lo

2.1.19 VOLTS INPUT

This value displays the current value of the input Voltage to the Relay. The associated enpower SNVT is VR__V__1. This value is used by the Relay to determine when to turn the outputs ON and OFF.

Volts 491.71

2.2 THREE PHASE VOLTAGE RELAY (3Ø 27/59)

The Three Phase Voltage Relay Screen shown in Figure 2-2 is used for the initial setup of enpower controls. This screen is used to setup the Voltage Relay that's looking at the Three Phase Voltage input to the enpower control. Using this screen, the user can set up the high and low setpoints, hysteresis, and the set and clear times for the relay. This screen is associated with the enpower LonMark Object called Voltage Relay 3-Phase (27/59) (VR_).

Figure 2-2 Three Phase Voltage Relay

To open the Single Phase Voltage Relay window, do the following:

1. Click the *Relays* tab.
2. Click the 3Ø 27/59 button

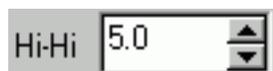
2.2.1 HI-HI SETPOINT

This configuration is used to set the Hi-Hi Setpoint. This value in conjunction with the Hi-Hi hysteresis setting determines the actual trip and clear setpoints for the Hi-Hi Output. The trip setpoint is equal to the Hi-Hi Setpoint + the hysteresis setting. The clear setpoint is equal to the Hi-Hi Setpoint - the hysteresis setting. For example: If the Hi-Hi Setpoint is 480 and the Hi-Hi hysteresis is 5, then the Hi-Hi trip setpoint is 485 and the clear setpoint is 475. The associated enpower SNVT is VR__HiHi_3.



2.2.2 HI-HI HYSTERESIS SETPOINT

This configuration is used to set the Hi-Hi Hysteresis Setpoint. This value in conjunction with the Hi-Hi Setpoint determines the actual trip and clear setpoints for the Hi-Hi Output. The trip setpoint is equal to the Hi-Hi Setpoint + the hysteresis setting. The clear setpoint is equal to the Hi-Hi Setpoint - the hysteresis setting. For example: If the Hi-Hi Setpoint is 480 and the Hi-Hi hysteresis is 5, then the Hi-Hi trip setpoint is 485 and the clear setpoint is 475. The associated enpower SNVT is VR_HHhys_3.



2.2.3 Hi Setpoint

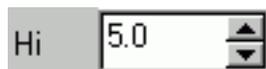
This configuration is used to set the Hi Setpoint. This value in conjunction with the Hi hysteresis setting determines the actual trip and clear setpoints for the Hi Output. The trip setpoint is equal to the Hi Setpoint + the hysteresis setting. The clear setpoint is equal to the Hi Setpoint - the hysteresis setting. For example: If the Hi Setpoint is 480 and the Hi hysteresis is 5, then the Hi trip setpoint is 485 and the clear setpoint is 475. The associated enpower SNVT is VR__Hi__3.



2.2.4 HI HYSTERESIS SETPOINT

This configuration is used to set the Hi hysteresis Setpoint. This value in conjunction with the Hi Setpoint

setting determines the actual trip and clear setpoints for the Hi Output. The trip setpoint is equal to the Hi Setpoint + the hysteresis setting. The clear setpoint is equal to the Hi Setpoint - the hysteresis setting. For example: If the Hi Setpoint is 480 and the Hi hysteresis is 5, then the Hi trip setpoint is 485 and the clear setpoint is 475. The associated enpower SNVT is VR__Hhys_3.



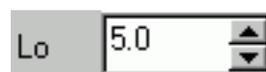
2.2.5 LO SETPOINT

This configuration is used to set the Lo Setpoint. This value in conjunction with the Lo hysteresis setting determines the actual trip and clear setpoints for the Lo Output. The trip setpoint is equal to the Lo Setpoint - the hysteresis setting. The clear setpoint is equal to the Lo Setpoint + the hysteresis setting. For example: If the Lo Setpoint is 480 and the Lo hysteresis is 5, then the Lo trip setpoint is 475 and the clear setpoint is 485. The associated enpower SNVT is VR__Lo__3.



2.2.6 LO HYSTERESIS SETPOINT

This configuration is used to set the Lo Hysteresis Setpoint. This value in conjunction with the Lo Setpoint determines the actual trip and clear setpoints for the Lo Output. The trip setpoint is equal to the Lo Setpoint - the hysteresis setting. The clear setpoint is equal to the Lo Setpoint + the hysteresis setting. For example: If the Lo Setpoint is 480 and the Lo hysteresis is 5, then the Lo trip setpoint is 475 and the clear setpoint is 485. The associated enpower SNVT is VR__Lhys_3



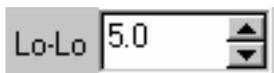
2.2.7 LO-LO SETPOINT

This configuration is used to set the Lo-Lo Setpoint. This value in conjunction with the Lo-Lo hysteresis setting determines the actual trip and clear setpoints for the Lo-Lo Output. The trip setpoint is equal to the Lo-Lo Setpoint - the hysteresis setting. The clear setpoint is equal to the Lo-Lo Setpoint + the hysteresis setting. For example: If the Lo-Lo Setpoint is 480 and the Lo-Lo hysteresis is 5, then the Lo-Lo trip setpoint is 475 and the clear setpoint is 485. The associated enpower SNVT is VR__LoLo_3.



2.2.8 LO-LO HYSTERESIS SETPOINT

This configuration is used to set the Lo-Lo Hysteresis Setpoint. This value in conjunction with the Lo-Lo setpoint determines the actual trip and clear setpoints for the Lo-Lo Output. The trip setpoint is equal to the Lo-Lo Setpoint - the hysteresis setting. The clear setpoint is equal to the Lo-Lo Setpoint + the hysteresis setting. For example: If the Lo-Lo Setpoint is 480 and the Lo-Lo hysteresis is 5, then the Lo-Lo trip setpoint is 475 and the clear setpoint is 485. The associated empower SNVT is VR_LLhys_3.



2.2.9 LO, HI SET TIME

This configuration is used to set the Set Time for the Lo and the Hi trip outputs. This value sets the amount of time that the voltage input must exceed the trip value (as determined by the setpoints and hysteresis) before the relay trip output becomes active. This set time is used for the Lo and Hi outputs only. The Lo-Lo and Hi-Hi outputs use a separate Set Time. The associated empower SNVT is VR_Set_t13.



2.2.10 LO-LO, HI-HI SET TIME

This configuration is used to set the Set Time for the Lo-Lo and the Hi-Hi trip outputs. This value sets the amount of time that the voltage input must exceed the trip value (as determined by the setpoints and hysteresis) before the relay trip output becomes active. This set time is used for the Lo-Lo and Hi-Hi outputs only. The Lo and Hi outputs use a separate Set Time. The associated empower SNVT is VR_Set_t23.



2.2.11 LO, HI CLEAR TIME

This configuration is used to set the Clear Time for the Lo and the Hi trip outputs. This value sets the amount of time before the trip output resets when the voltage returns within good limits (as determined by the setpoints and hysteresis). This clear time is used for the Lo and Hi outputs only. The Lo-Lo and Hi-Hi outputs use a separate Clear Time. The associated empower SNVT is

VR_Clr_t13.



2.2.12 LO-LO, HI-HI CLEAR TIME

This configuration is used to set the Clear Time for the Lo-Lo and the Hi-Hi trip outputs. This value sets the amount of time before the trip output resets when the voltage returns within good limits (as determined by the setpoints and hysteresis). This clear time is used for the Lo-Lo and Hi-Hi outputs only. The Lo and Hi outputs use a separate Clear Time. The associated empower SNVT is VR_Clr_t23.



2.2.13 INVERT OUTPUTS

This configuration is used to invert the relay outputs. Check this check box to invert the relay outputs, uncheck it for normal output operation. When the outputs are inverted the relay still functions the same except that the trip outputs are normally ON and turn OFF when the output becomes active. Also, the OK output is OFF when the relay is in its normal state and it turns ON when one of the trip outputs is active. The associated empower SNVT is VR_Invert_3.



2.2.14 HI-HI OUTPUT

This value displays the current value of the Hi-Hi Output. When the output is ON, the display is highlighted. The associated empower SNVT is VR__HiHi_3. The Trip (Pick Up) and Clear (Drop Out) setpoints for the output are also displayed. These Trip and Clear setpoints are calculated from the Hi-Hi Setpoint and the Hi-Hi Hysteresis values.



2.2.15 HI OUTPUT

This value displays the current value of the Hi Output. When the output is ON, the display is highlighted. The associated empower SNVT is VR__Hi_3. The Trip (Pick Up) and Clear (Drop Out) setpoints for the output are also displayed. These Trip and Clear setpoints are calculated from the Hi Setpoint and the Hi Hysteresis

values.



2.2.16 OK OUTPUT

This value displays the current value of the OK Output. When the output is ON, the display is highlighted. The associated enpower SNVT is VR__OK__3. The OK Output is ON whenever all of the trip outputs are OFF.



2.2.17 LO OUTPUT

This value displays the current value of the Lo Output. When the output is ON, the display is highlighted. The associated enpower SNVT is VR__Lo__3. The Trip (Pick Up) and Clear (Drop Out) setpoints for the output are also displayed. These Trip and Clear setpoints are calculated from the Lo Setpoint and the Lo Hysteresis values.



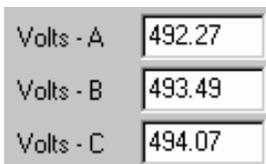
2.2.18 LO-LO OUTPUT

This value displays the current value of the Lo-Lo Output. When the output is ON, the display is highlighted. The associated enpower SNVT is VR__LoLo__3. The Trip (Pick Up) and Clear (Drop Out) setpoints for the output are also displayed. These Trip and Clear setpoints are calculated from the Lo-lo Setpoint and the Lo-Lo Hysteresis values.



2.2.19 VOLTS INPUTS

These values display the current value of the input Voltages to the Relay. The associated enpower SNVTs are VR__V__A, VR__V__B, and VR__V__C. These values are used by the Relay to determine when to turn the outputs ON and OFF.



2.3 GENERATOR FREQUENCY RELAY (GEN 81)

The Generator Frequency Relay shown in Figure 2-3 Generator frequency relay, is used for the initial setup of enpower controls. This screen is used to setup the Frequency Relay that's looking at the Generator Voltage input to the enpower control (this could be 3 Phase or Single Phase depending on the application). Using this screen, the user can setup the high and low setpoints, hysteresis, and the set and clear times for the relay. This screen is associated with the enpower LonMark Object called Gen Frequency Relay (81 O/U) (HZR).

To open the Generator Frequency Relay window, do the following:

1. Click the *Relays* tab.
2. Click the *Gen 81* button

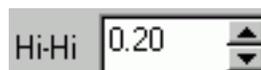
2.3.1 HI-HI SETPOINT

This configuration is used to set the Hi-Hi Setpoint. This value in conjunction with the Hi-Hi hysteresis setting determines the actual trip and clear setpoints for the Hi-Hi Output. The trip setpoint is equal to the Hi-Hi Setpoint + the hysteresis setting. The clear setpoint is equal to the Hi-Hi Setpoint - the hysteresis setting. For example: If the Hi-Hi Setpoint is 60 and the Hi-Hi hysteresis is 1, then the Hi-Hi trip setpoint is 61 and the clear setpoint is 59. The associated enpower SNVT is HZR_HiHi_G.



2.3.2 HI-HI HYSTERESIS SETPOINT

This configuration is used to set the Hi-Hi Hysteresis Setpoint. This value in conjunction with the Hi-Hi Setpoint determines the actual trip and clear setpoints for the Hi-Hi Output. The trip setpoint is equal to the Hi-Hi Setpoint + the hysteresis setting. The clear setpoint is equal to the Hi-Hi Setpoint - the hysteresis setting. For example: If the Hi-Hi Setpoint is 60 and the Hi-Hi hysteresis is 1, then the Hi-Hi trip setpoint is 61 and the clear setpoint is 59. The associated enpower SNVT is HZRHHhys_G.



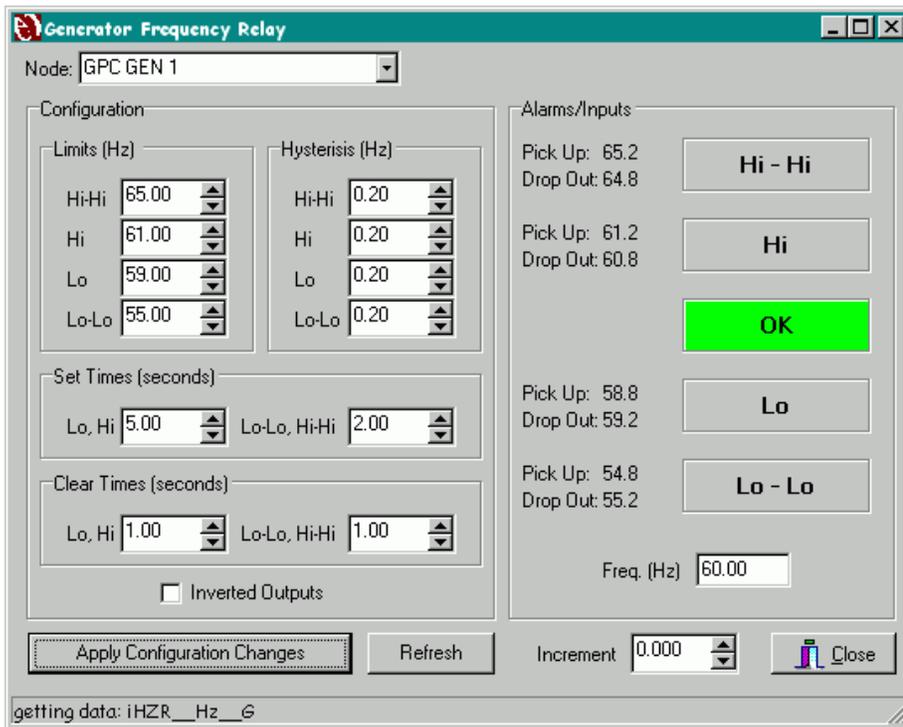
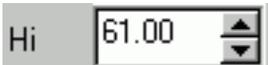


Figure 2-3 Generator Frequency Relay

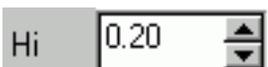
2.3.3 HI SETPOINT

This configuration is used to set the Hi Setpoint. This value in conjunction with the Hi hysteresis setting determines the actual trip and clear setpoints for the Hi Output. The trip setpoint is equal to the Hi Setpoint + the hysteresis setting. The clear setpoint is equal to the Hi Setpoint - the hysteresis setting. For example: If the Hi Setpoint is 60 and the Hi hysteresis is 1, then the Hi trip setpoint is 61 and the clear setpoint is 59. The associated enpower SNVT is HZR__Hi__G.



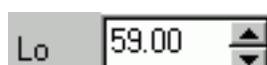
2.3.4 HI HYSTERESIS SETPOINT

This configuration is used to set the Hi hysteresis Setpoint. This value in conjunction with the Hi Setpoint setting determines the actual trip and clear setpoints for the Hi Output. The trip setpoint is equal to the Hi Setpoint + the hysteresis setting. The clear setpoint is equal to the Hi Setpoint - the hysteresis setting. For example: If the Hi Setpoint is 60 and the Hi hysteresis is 1, then the Hi trip setpoint is 61 and the clear setpoint is 59. The associated enpower SNVT is HZR_Hhys_G.



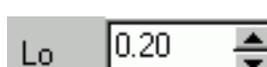
2.3.5 LO SETPOINT

This configuration is used to set the Lo Setpoint. This value in conjunction with the Lo hysteresis setting determines the actual trip and clear setpoints for the Lo Output. The trip setpoint is equal to the Lo Setpoint - the hysteresis setting. The clear setpoint is equal to the Lo Setpoint + the hysteresis setting. For example: If the Lo Setpoint is 60 and the Lo hysteresis is 1, then the Lo trip setpoint is 59 and the clear setpoint is 61. The associated enpower SNVT is HZR__Lo__G.



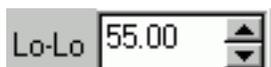
2.3.6 LO HYSTERESIS SETPOINT

This configuration is used to set the Lo Hysteresis Setpoint. This value in conjunction with the Lo Setpoint determines the actual trip and clear setpoints for the Lo Output. The trip setpoint is equal to the Lo Setpoint - the hysteresis setting. The clear setpoint is equal to the Lo Setpoint + the hysteresis setting. For example: If the Lo Setpoint is 60 and the Lo hysteresis is 1, then the Lo trip setpoint is 59 and the clear setpoint is 61. The associated enpower SNVT is HZR_Lhys_G.



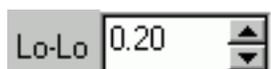
2.3.7 LO-LO SETPOINT

This configuration is used to set the Lo-Lo Setpoint. This value in conjunction with the Lo-Lo hysteresis setting determines the actual trip and clear setpoints for the Lo-Lo Output. The trip setpoint is equal to the Lo-Lo Setpoint - the hysteresis setting. The clear setpoint is equal to the Lo-Lo Setpoint + the hysteresis setting. For example: If the Lo-Lo Setpoint is 60 and the Lo-Lo hysteresis is 1, then the Lo-Lo trip setpoint is 59 and the clear setpoint is 61. The associated empower SNVT is HZR_LoLo_G.



2.3.8 LO-LO HYSTERESIS SETPOINT

This configuration is used to set the Lo-Lo Hysteresis Setpoint. This value in conjunction with the Lo-Lo setpoint determines the actual trip and clear setpoints for the Lo-Lo Output. The trip setpoint is equal to the Lo-Lo Setpoint - the hysteresis setting. The clear setpoint is equal to the Lo-Lo Setpoint + the hysteresis setting. For example: If the Lo-Lo Setpoint is 60 and the Lo-Lo hysteresis is 1, then the Lo-Lo trip setpoint is 59 and the clear setpoint is 61. The associated empower SNVT is HZRLLhys_G.



2.3.9 LO, HI SET TIME

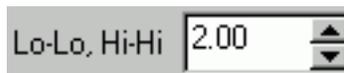
This configuration is used to set the Set Time for the Lo and the Hi trip outputs. This value sets the amount of time that the frequency input must exceed the trip value (as determined by the setpoints and hysteresis) before the relay trip output becomes active. This set time is used for the Lo and Hi outputs only. The Lo-Lo and Hi-Hi outputs use a separate Set Time. The associated empower SNVT is HZRSet_t1G.



2.3.10 LO-LO, HI-HI SET TIME

This configuration is used to set the Set Time for the Lo-Lo and the Hi-Hi trip outputs. This value sets the amount of time that the frequency input must exceed the trip value (as determined by the setpoints and hysteresis) before the relay trip output becomes active. This set time is used for the Lo-Lo and Hi-Hi outputs only. The Lo and Hi outputs use a separate Set Time. The associ-

ated empower SNVT is HZRSet_t2G.



2.3.11 LO, HI CLEAR TIME

This configuration is used to set the Clear Time for the Lo and the Hi trip outputs. This value sets the amount of time before the trip output resets when the frequency returns within good limits (as determined by the setpoints and hysteresis). This clear time is used for the Lo and Hi outputs only. The Lo-Lo and Hi-Hi outputs use a separate Clear Time. The associated empower SNVT is HZRClr_t1G.



2.3.12 LO-LO, HI-HI CLEAR TIME

This configuration is used to set the Clear Time for the Lo-Lo and the Hi-Hi trip outputs. This value sets the amount of time before the trip output resets when the frequency returns within good limits (as determined by the setpoints and hysteresis). This clear time is used for the Lo-Lo and Hi-Hi outputs only. The Lo and Hi outputs use a separate Clear Time. The associated empower SNVT is HZRClr_t2G.



2.3.13 INVERT OUTPUTS

This configuration is used to invert the relay outputs. Check this check box to invert the relay outputs, uncheck it for normal output operation. When the outputs are inverted the relay still functions the same except that the trip outputs are normally ON and turn OFF when the output becomes active. Also, the OK output is OFF when the relay is in its normal state and it turns ON when one of the trip outputs is active. The associated empower SNVT is HZRInvrt_G.



2.3.14 HI-HI OUTPUT

This value displays the current value of the Hi-Hi Output. When the output is ON, the display is highlighted. The associated empower SNVT is HZR_HiHi_G. The Trip (Pick Up) and Clear (Drop Out) setpoints for the output are also displayed. These Trip and Clear set-

points are calculated from the Hi-Hi Setpoint and the Hi-Hi Hysteresis values.



2.3.15 HI OUTPUT

This value displays the current value of the Hi Output. When the output is ON, the display is highlighted. The associated enpower SNVT is HZR__Hi__G. The Trip (Pick Up) and Clear (Drop Out) setpoints for the output are also displayed. These Trip and Clear setpoints are calculated from the Hi Setpoint and the Hi Hysteresis values.



2.3.16 OK OUTPUT

This value displays the current value of the OK Output. When the output is ON, the display is highlighted. The associated enpower SNVT is HZR_OK__G. The OK Output is ON whenever all of the trip outputs are OFF.



2.3.17 LO OUTPUT

This value displays the current value of the Lo Output. When the output is ON, the display is highlighted. The associated enpower SNVT is HZR__Lo__G. The Trip (Pick Up) and Clear (Drop Out) setpoints for the output are also displayed. These Trip and Clear setpoints are calculated from the Lo Setpoint and the Lo Hysteresis values.



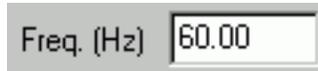
2.3.18 LO-LO OUTPUT

This value displays the current value of the Lo-Lo Output. When the output is ON, the display is highlighted. The associated enpower SNVT is HZR_LoLo_G. The Trip (Pick Up) and Clear (Drop Out) setpoints for the output are also displayed. These Trip and Clear setpoints are calculated from the Lo-lo Setpoint and the Lo-Lo Hysteresis values.



2.3.19 FREQUENCY INPUT

This value display the current value of the input Frequency to the Relay. The associated enpower SNVT is HZR__Hz__G. This value is used by the Relay to determine when to turn the outputs ON and OFF.



2.4 UTILITY FREQUENCY RELAY (UTIL 81)

The Utility Frequency Relay Screen shown in Figure 2-4 Utility frequency relay, is used for the initial setup of enpower controls. This screen is used to setup the Frequency Relay that's looking at the Utility Voltage input to the enpower control (this could be 3 Phase or Single Phase depending on the application). Using this screen, the user can setup the high and low setpoints, hysteresis, and the set and clear times for the relay. This screen is associated with the enpower LonMark Object called Util Frequency Relay (81 O/U) (HZR).

To open the Utility Frequency Relay window, do the following:

1. Click the *Relays* tab.
2. Click the *Util 81* button.

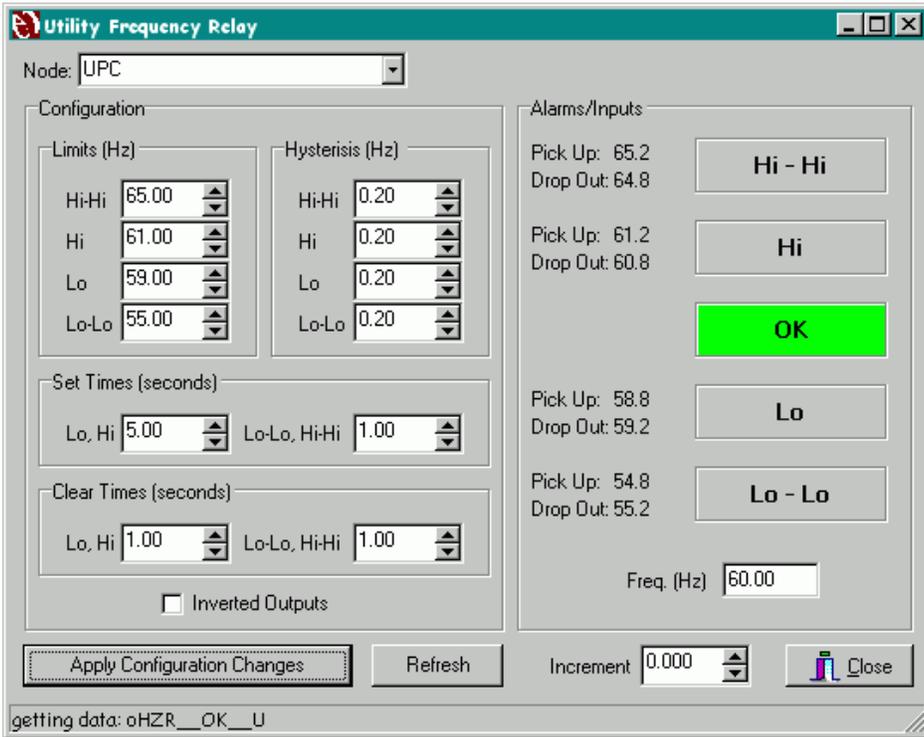


Figure 2-4 Utility Frequency Relay

2.4.1 HI-HI SETPOINT

This configuration is used to set the Hi-Hi Setpoint. This value in conjunction with the Hi-Hi hysteresis setting determines the actual trip and clear setpoints for the Hi-Hi Output. The trip setpoint is equal to the Hi-Hi Setpoint + the hysteresis setting. The clear setpoint is equal to the Hi-Hi Setpoint - the hysteresis setting. For example: If the Hi-Hi Setpoint is 60 and the Hi-Hi hysteresis is 1, then the Hi-Hi trip setpoint is 61 and the clear setpoint is 59. The associated empower SNVT is HZR_HiHi_U.



2.4.2 HI-HI HYSTERESIS SETPOINT

This configuration is used to set the Hi-Hi Hysteresis Setpoint. This value in conjunction with the Hi-Hi Setpoint determines the actual trip and clear setpoints for the Hi-Hi Output. The trip setpoint is equal to the Hi-Hi Setpoint + the hysteresis setting. The clear setpoint is equal to the Hi-Hi Setpoint - the hysteresis setting. For example: If the Hi-Hi Setpoint is 60 and the Hi-Hi hysteresis is 1, then the Hi-Hi trip setpoint is 61 and the clear setpoint is 59. The associated empower SNVT is HZRHHhys_U.



2.4.3 HI SETPOINT

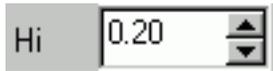
This configuration is used to set the Hi Setpoint. This value in conjunction with the Hi hysteresis setting determines the actual trip and clear setpoints for the Hi Output. The trip setpoint is equal to the Hi Setpoint + the hysteresis setting. The clear setpoint is equal to the Hi Setpoint - the hysteresis setting. For example: If the Hi Setpoint is 60 and the Hi hysteresis is 1, then the Hi trip setpoint is 61 and the clear setpoint is 59. The associated empower SNVT is HZR__Hi__U.



2.4.4 HI HYSTERESIS SETPOINT

This configuration is used to set the Hi hysteresis Setpoint. This value in conjunction with the Hi Setpoint setting determines the actual trip and clear setpoints for the Hi Output. The trip setpoint is equal to the Hi Setpoint + the hysteresis setting. The clear setpoint is equal to the Hi Setpoint - the hysteresis setting. For example: If the Hi Setpoint is 60 and the Hi hysteresis is 1, then the Hi trip setpoint is 61 and the clear setpoint is

59. The associated enpower SNVT is HZR_Hhys_U.



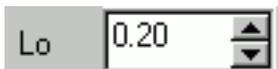
2.4.5 LO SETPOINT

This configuration is used to set the Lo Setpoint. This value in conjunction with the Lo hysteresis setting determines the actual trip and clear setpoints for the Lo Output. The trip setpoint is equal to the Lo Setpoint - the hysteresis setting. The clear setpoint is equal to the Lo Setpoint + the hysteresis setting. For example: If the Lo Setpoint is 60 and the Lo hysteresis is 1, then the Lo trip setpoint is 59 and the clear setpoint is 61. The associated enpower SNVT is HZR__Lo__U.



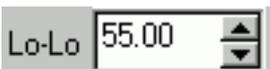
2.4.6 LO HYSTERESIS SETPOINT

This configuration is used to set the Lo Hysteresis Setpoint. This value in conjunction with the Lo Setpoint determines the actual trip and clear setpoints for the Lo Output. The trip setpoint is equal to the Lo Setpoint - the hysteresis setting. The clear setpoint is equal to the Lo Setpoint + the hysteresis setting. For example: If the Lo Setpoint is 60 and the Lo hysteresis is 1, then the Lo trip setpoint is 59 and the clear setpoint is 61. The associated enpower SNVT is HZR_Lhys_U.



2.4.7 LO-LO SETPOINT

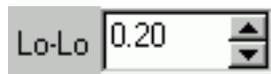
This configuration is used to set the Lo-Lo Setpoint. This value in conjunction with the Lo-Lo hysteresis setting determines the actual trip and clear setpoints for the Lo-Lo Output. The trip setpoint is equal to the Lo-Lo Setpoint - the hysteresis setting. The clear setpoint is equal to the Lo-Lo Setpoint + the hysteresis setting. For example: If the Lo-Lo Setpoint is 60 and the Lo-Lo hysteresis is 1, then the Lo-Lo trip setpoint is 59 and the clear setpoint is 61. The associated enpower SNVT is HZR_LoLo_U.



2.4.8 LO-LO HYSTERESIS SETPOINT

This configuration is used to set the Lo-Lo Hysteresis Setpoint. This value in conjunction with the Lo-Lo setpoint determines the actual trip and clear setpoints for

the Lo-Lo Output. The trip setpoint is equal to the Lo-Lo Setpoint - the hysteresis setting. The clear setpoint is equal to the Lo-Lo Setpoint + the hysteresis setting. For example: If the Lo-Lo Setpoint is 60 and the Lo-Lo hysteresis is 1, then the Lo-Lo trip setpoint is 59 and the clear setpoint is 61. The associated enpower SNVT is HZRLLhys_U.



2.4.9 LO, HI SET TIME

This configuration is used to set the Set Time for the Lo and the Hi trip outputs. This value sets the amount of time that the frequency input must exceed the trip value (as determined by the setpoints and hysteresis) before the relay trip output becomes active. This set time is used for the Lo and Hi outputs only. The Lo-Lo and Hi-Hi outputs use a separate Set Time. The associated enpower SNVT is HZRSet_t1U.



2.4.10 LO-LO, HI-HI SET TIME

This configuration is used to set the Set Time for the Lo-Lo and the Hi-Hi trip outputs. This value sets the amount of time that the frequency input must exceed the trip value (as determined by the setpoints and hysteresis) before the relay trip output becomes active. This set time is used for the Lo-Lo and Hi-Hi outputs only. The Lo and Hi outputs use a separate Set Time. The associated enpower SNVT is HZRSet_t2U.



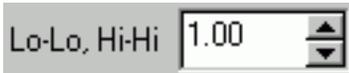
2.4.11 LO, HI CLEAR TIME

This configuration is used to set the Clear Time for the Lo and the Hi trip outputs. This value sets the amount of time before the trip output resets when the frequency returns within good limits (as determined by the setpoints and hysteresis). This clear time is used for the Lo and Hi outputs only. The Lo-Lo and Hi-Hi outputs use a separate Clear Time. The associated enpower SNVT is HZRClr_t1U.



2.4.12 LO-LO, HI-HI CLEAR TIME

This configuration is used to set the Clear Time for the Lo-Lo and the Hi-Hi trip outputs. This value sets the amount of time before the trip output resets when the frequency returns within good limits (as determined by the setpoints and hysteresis). This clear time is used for the Lo-Lo and Hi-Hi outputs only. The Lo and Hi outputs use a separate Clear Time. The associated enpower SNVT is HZRClr_t2U.



2.4.13 INVERT OUTPUTS

This configuration is used to invert the relay outputs. Check this check box to invert the relay outputs, uncheck it for normal output operation. When the outputs are inverted the relay still functions the same except that the trip outputs are normally ON and turn OFF when the output becomes active. Also, the OK output is OFF when the relay is in its normal state and it turns ON when one of the trip outputs is active. The associated enpower SNVT is HZRInvt_U.



2.4.14 HI-HI OUTPUT

This value displays the current value of the Hi-Hi Output. When the output is ON, the display is highlighted. The associated enpower SNVT is HZR_HiHi_U. The Trip (Pick Up) and Clear (Drop Out) setpoints for the output are also displayed. These Trip and Clear setpoints are calculated from the Hi-Hi Setpoint and the Hi-Hi Hysteresis values.



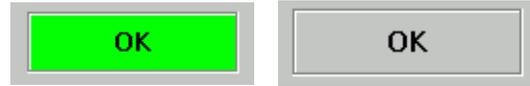
2.4.15 HI OUTPUT

This value displays the current value of the Hi Output. When the output is ON, the display is highlighted. The associated enpower SNVT is HZR__Hi__U. The Trip (Pick Up) and Clear (Drop Out) setpoints for the output are also displayed. These Trip and Clear setpoints are calculated from the Hi Setpoint and the Hi Hysteresis values.



2.4.16 OK OUTPUT

This value displays the current value of the OK Output. When the output is ON, the display is highlighted. The associated enpower SNVT is HZR_OK__U. The OK Output is ON whenever all of the trip outputs are OFF.



2.4.17 LO OUTPUT

This value displays the current value of the Lo Output. When the output is ON, the display is highlighted. The associated enpower SNVT is HZR__Lo__U. The Trip (Pick Up) and Clear (Drop Out) setpoints for the output are also displayed. These Trip and Clear setpoints are calculated from the Lo Setpoint and the Lo Hysteresis values.



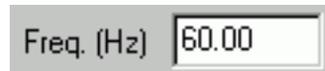
2.4.18 LO-LO OUTPUT

This value displays the current value of the Lo-Lo Output. When the output is ON, the display is highlighted. The associated enpower SNVT is HZR_LoLo_U. The Trip (Pick Up) and Clear (Drop Out) setpoints for the output are also displayed. These Trip and Clear setpoints are calculated from the Lo-lo Setpoint and the Lo-Lo Hysteresis values.



2.4.19 FREQUENCY INPUT

This value display the current value of the input Frequency to the Relay. The associated enpower SNVT is HZR__Hz__U. This value is used by the Relay to determine when to turn the outputs ON and OFF.



2.5 POWER RELAY #1 (KW 32 - 1)

The Power Relay #1 shown in Figure 2-5 is used for the initial setup of enpower controls. This screen is used to setup the Power Relay that is typically used for generator over and reverse power (this could be 3 Phase or Single Phase depending on the application). Although

the typical application is for Generator O/U Power, this relay can be used for any power (kW, VAR, VA) sensing - It is all dependant on the application. Using this screen, the user can setup the high and low setpoints, hysteresis, and the set and clear times for the relay. This screen is associated with the enpower LonMark Object called Directional Power Relay (32) (WR_).

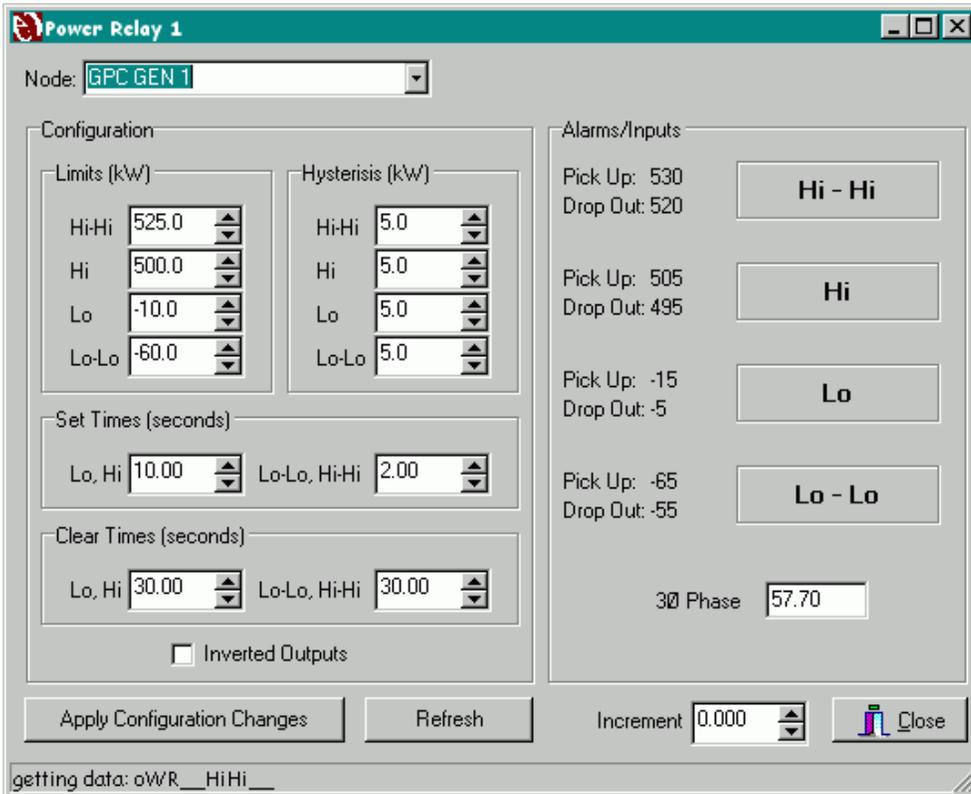


Figure 2-5 Power Relay 1

To open the Power Relay #1 window, do the following:

1. Click the *Relays* tab.
2. Click the *kW 32 - 1* button

2.5.1 HI-HI SETPOINT

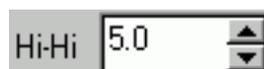
This configuration is used to set the Hi-Hi Setpoint. This value in conjunction with the Hi-Hi hysteresis setting determines the actual trip and clear setpoints for the Hi-Hi Output. The trip setpoint is equal to the Hi-Hi Setpoint + the hysteresis setting. The clear setpoint is equal to the Hi-Hi Setpoint - the hysteresis setting. For example: If the Hi-Hi Setpoint is 500 and the Hi-Hi hysteresis is 10, then the Hi-Hi trip setpoint is 510 and the clear setpoint is 490. The associated enpower SNVT is WR_HHhys__.

cWR__HiHi__.



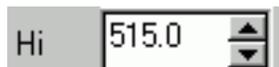
2.5.2 HI-HI HYSTERESIS SETPOINT

This configuration is used to set the Hi-Hi Hysteresis Setpoint. This value in conjunction with the Hi-Hi Setpoint determines the actual trip and clear setpoints for the Hi-Hi Output. The trip setpoint is equal to the Hi-Hi Setpoint + the hysteresis setting. The clear setpoint is equal to the Hi-Hi Setpoint - the hysteresis setting. For example: For example: If the Hi-Hi Setpoint is 500 and the Hi-Hi hysteresis is 10, then the Hi-Hi trip setpoint is 510 and the clear setpoint is 490. The associated enpower SNVT is WR_HHhys__.



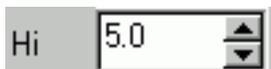
2.5.3 HI SETPOINT

This configuration is used to set the Hi Setpoint. This value in conjunction with the Hi hysteresis setting determines the actual trip and clear setpoints for the Hi Output. The trip setpoint is equal to the Hi Setpoint + the hysteresis setting. The clear setpoint is equal to the Hi Setpoint - the hysteresis setting. For example: If the Hi Setpoint is 500 and the Hi hysteresis is 10, then the Hi trip setpoint is 510 and the clear setpoint is 490. The associated empower SNVT is WR__Hi__.



2.5.4 HI HYSTERESIS SETPOINT

This configuration is used to set the Hi hysteresis Setpoint. This value in conjunction with the Hi Setpoint setting determines the actual trip and clear setpoints for the Hi Output. The trip setpoint is equal to the Hi Setpoint + the hysteresis setting. The clear setpoint is equal to the Hi Setpoint - the hysteresis setting. For example: If the Hi Setpoint is 500 and the Hi hysteresis is 10, then the Hi trip setpoint is 510 and the clear setpoint is 490. The associated empower SNVT is WR__Hhys__.



2.5.5 LO SETPOINT

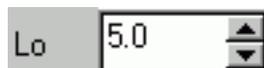
This configuration is used to set the Lo Setpoint. This value in conjunction with the Lo hysteresis setting determines the actual trip and clear setpoints for the Lo Output. The trip setpoint is equal to the Lo Setpoint - the hysteresis setting. The clear setpoint is equal to the Lo Setpoint + the hysteresis setting. For example: If the Lo Setpoint is -30 and the Lo hysteresis is 5, then the Lo trip setpoint is -35 and the clear setpoint is -25. The associated empower SNVT is WR__Lo__.



2.5.6 LO HYSTERESIS SETPOINT

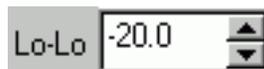
This configuration is used to set the Lo Hysteresis Setpoint. This value in conjunction with the Lo Setpoint determines the actual trip and clear setpoints for the Lo Output. The trip setpoint is equal to the Lo Setpoint - the hysteresis setting. The clear setpoint is equal to the Lo Setpoint + the hysteresis setting. For example: If the Lo Setpoint is -30 and the Lo hysteresis is 5, then the Lo

trip setpoint is -35 and the clear setpoint is -25. The associated empower SNVT is WR__Lhys__.



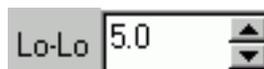
2.5.7 LO-LO SETPOINT

This configuration is used to set the Lo-Lo Setpoint. This value in conjunction with the Lo-Lo hysteresis setting determines the actual trip and clear setpoints for the Lo-Lo Output. The trip setpoint is equal to the Lo-Lo Setpoint - the hysteresis setting. The clear setpoint is equal to the Lo-Lo Setpoint + the hysteresis setting. For example: If the Lo-Lo Setpoint is -40 and the Lo-Lo hysteresis is 2, then the Lo-Lo trip setpoint is -42 and the clear setpoint is -38. The associated empower SNVT is WR__LoLo__.



2.5.8 LO-LO HYSTERESIS SETPOINT

This configuration is used to set the Lo-Lo Hysteresis Setpoint. This value in conjunction with the Lo-Lo setpoint determines the actual trip and clear setpoints for the Lo-Lo Output. The trip setpoint is equal to the Lo-Lo Setpoint - the hysteresis setting. The clear setpoint is equal to the Lo-Lo Setpoint + the hysteresis setting. For example: If the Lo-Lo Setpoint is -40 and the Lo-Lo hysteresis is 2, then the Lo-Lo trip setpoint is -42 and the clear setpoint is -38. The associated empower SNVT is WR__LLhys__.



2.5.9 LO, HI SET TIME

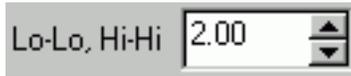
This configuration is used to set the Set Time for the Lo and the Hi trip outputs. This value sets the amount of time that the power input must exceed the trip value (as determined by the setpoints and hysteresis) before the relay trip output becomes active. This set time is used for the Lo and Hi outputs only. The Lo-Lo and Hi-Hi outputs use a separate Set Time. The associated empower SNVT is WR_Set_t1__.



2.5.10 LO-LO, HI-HI SET TIME

This configuration is used to set the Set Time for the Lo-Lo and the Hi-Hi trip outputs. This value sets the amount

of time that the power input must exceed the trip value (as determined by the setpoints and hysteresis) before the relay trip output becomes active. This set time is used for the Lo-Lo and Hi-Hi outputs only. The Lo and Hi outputs use a separate Set Time. The associated enpower SNVT is WR_Set_t2_.



2.5.11 LO, HI CLEAR TIME

This configuration is used to set the Clear Time for the Lo and the Hi trip outputs. This value sets the amount of time before the trip output resets when the power returns within good limits (as determined by the setpoints and hysteresis). This clear time is used for the Lo and Hi outputs only. The Lo-Lo and Hi-Hi outputs use a separate Clear Time. The associated enpower SNVT is WR_Clr_t1_.



2.5.12 LO-LO, HI-HI CLEAR TIME

This configuration is used to set the Clear Time for the Lo-Lo and the Hi-Hi trip outputs. This value sets the amount of time before the trip output resets when the power returns within good limits (as determined by the setpoints and hysteresis). This clear time is used for the Lo-Lo and Hi-Hi outputs only. The Lo and Hi outputs use a separate Clear Time. The associated enpower SNVT is WR_Clr_t2_.



2.5.13 INVERT OUTPUTS

This configuration is used to invert the relay outputs. Check this check box to invert the relay outputs, uncheck it for normal output operation. When the outputs are inverted the relay still functions the same except that the trip outputs are normally ON and turn OFF when the output becomes active. The associated enpower SNVT is WR_Invt_U.



2.5.14 HI-HI OUTPUT

This value displays the current value of the Hi-Hi Output. When the output is ON, the display is highlighted. The associated enpower SNVT is WR__HiHi__. The

Trip (Pick Up) and Clear (Drop Out) setpoints for the output are also displayed. These Trip and Clear setpoints are calculated from the Hi-Hi Setpoint and the Hi-Hi Hysteresis values.



2.5.15 HI OUTPUT

This value displays the current value of the Hi Output. When the output is ON, the display is highlighted. The associated enpower SNVT is WR__Hi__. The Trip (Pick Up) and Clear (Drop Out) setpoints for the output are also displayed. These Trip and Clear setpoints are calculated from the Hi Setpoint and the Hi Hysteresis values.



2.5.16 LO OUTPUT

This value displays the current value of the Lo Output. When the output is ON, the display is highlighted. The associated enpower SNVT is WR__Lo__. The Trip (Pick Up) and Clear (Drop Out) setpoints for the output are also displayed. These Trip and Clear setpoints are calculated from the Lo Setpoint and the Lo Hysteresis values.



2.5.17 LO-LO OUTPUT

This value displays the current value of the Lo-Lo Output. When the output is ON, the display is highlighted. The associated enpower SNVT is WR__LoLo__. The Trip (Pick Up) and Clear (Drop Out) setpoints for the output are also displayed. These Trip and Clear setpoints are calculated from the Lo-lo Setpoint and the Lo-Lo Hysteresis values.



2.5.18 POWER INPUT

This value displays the current value of the input Power to the Relay. The associated enpower SNVT is WR__W____. This value is used by the Relay to determine when to turn the outputs ON and OFF. This kW value is calculated by multiplying the PT and CT Ratios by the value of the input SNVT. The software needs to know which PT and CT Ratios to use (either 3Ø or 1Ø).

Double-clicking on the display will cause the display to toggle between 3Ø and 1Ø so that the user can select the appropriate setting for their application.



2.6 POWER RELAY #2 (KW 32 - 2)

The Power Relay #2 shown in Figure 2-6 Power relay 2, is used for the initial setup of enpower controls. This screen is used to setup the Power Relay that is typically used for Utility over and reverse power (this could be 3 Phase or Single Phase depending on the application). Although the typical application is for Utility O/U Power, this relay can be used for any power (kW, VAR, VA) sensing - It is all dependant on the application. Using this screen, the user can setup the high and low set-points, hysteresis, and the set and clear times for the relay. This screen is associated with the enpower LonMark Object called Directional Reactive Power (32VAR) (WR_).

To open the Power Relay #2 window, do the following:

1. Click the *Relays* tab.
2. Click the *kW 32 - 2* button

2.6.1 HI-HI SETPOINT

This configuration is used to set the Hi-Hi Setpoint. This value in conjunction with the Hi-Hi hysteresis setting determines the actual trip and clear setpoints for the Hi-Hi Output. The trip setpoint is equal to the Hi-Hi Setpoint + the hysteresis setting. The clear setpoint is equal to the Hi-Hi Setpoint - the hysteresis setting. For example: If the Hi-Hi Setpoint is 500 and the Hi-Hi hysteresis is 10, then the Hi-Hi trip setpoint is 510 and the clear setpoint is 490. The associated enpower SNVT is VAR_HiHi_.

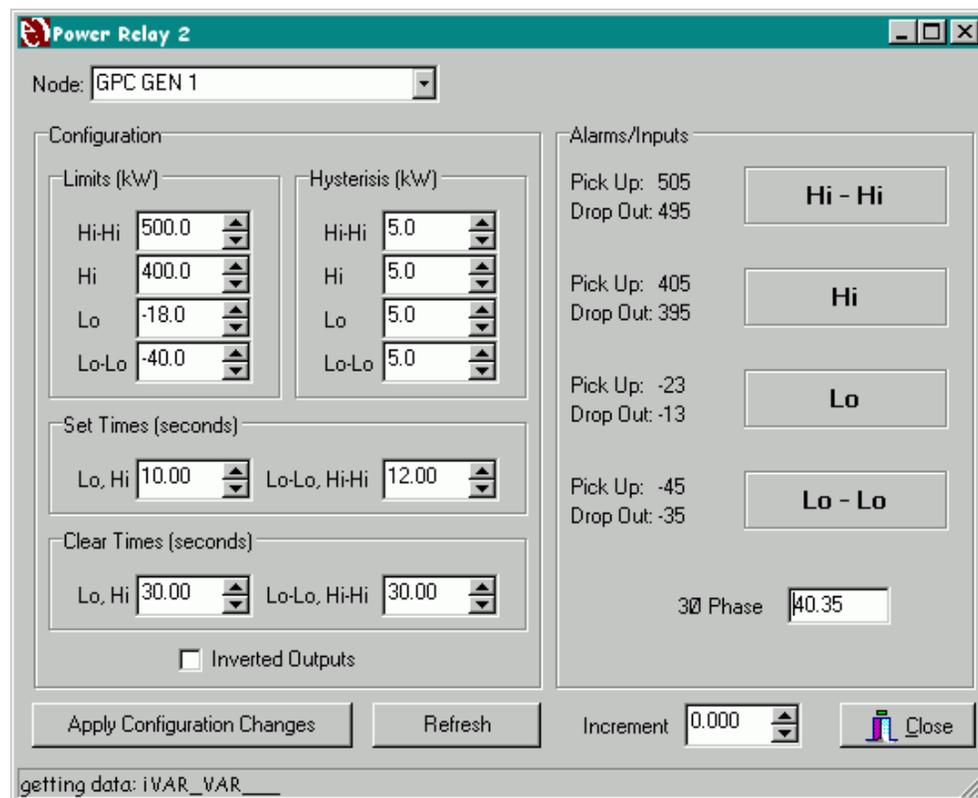


Figure 2-6 Power Relay 2

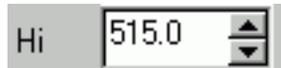
2.6.2 HI-HI HYSTERESIS SETPOINT

This configuration is used to set the Hi-Hi Hysteresis Setpoint. This value in conjunction with the Hi-Hi Setpoint determines the actual trip and clear setpoints for the Hi-Hi Output. The trip setpoint is equal to the Hi-Hi Setpoint + the hysteresis setting. The clear setpoint is equal to the Hi-Hi Setpoint - the hysteresis setting. For example: For example: If the Hi-Hi Setpoint is 500 and the Hi-Hi hysteresis is 10, then the Hi-Hi trip setpoint is 510 and the clear setpoint is 490. The associated enpower SNVT is VARHHhys__.



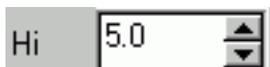
2.6.3 HI SETPOINT

This configuration is used to set the Hi Setpoint. This value in conjunction with the Hi hysteresis setting determines the actual trip and clear setpoints for the Hi Output. The trip setpoint is equal to the Hi Setpoint + the hysteresis setting. The clear setpoint is equal to the Hi Setpoint - the hysteresis setting. For example: If the Hi Setpoint is 500 and the Hi hysteresis is 10, then the Hi trip setpoint is 510 and the clear setpoint is 490. The associated enpower SNVT is VAR__Hi__.



2.6.4 HI HYSTERESIS SETPOINT

This configuration is used to set the Hi hysteresis Setpoint. This value in conjunction with the Hi Setpoint setting determines the actual trip and clear setpoints for the Hi Output. The trip setpoint is equal to the Hi Setpoint + the hysteresis setting. The clear setpoint is equal to the Hi Setpoint - the hysteresis setting. For example: If the Hi Setpoint is 500 and the Hi hysteresis is 10, then the Hi trip setpoint is 510 and the clear setpoint is 490. The associated enpower SNVT is VAR_Hhys__.



2.6.5 LO SETPOINT

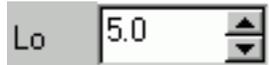
This configuration is used to set the Lo Setpoint. This value in conjunction with the Lo hysteresis setting determines the actual trip and clear setpoints for the Lo Output. The trip setpoint is equal to the Lo Setpoint - the hysteresis setting. The clear setpoint is equal to the Lo Setpoint + the hysteresis setting. For example: If the Lo

Setpoint is -30 and the Lo hysteresis is 5, then the Lo trip setpoint is -35 and the clear setpoint is -25. The associated enpower SNVT is VAR__Lo__.



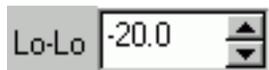
2.6.6 LO HYSTERESIS SETPOINT

This configuration is used to set the Lo Hysteresis Setpoint. This value in conjunction with the Lo Setpoint determines the actual trip and clear setpoints for the Lo Output. The trip setpoint is equal to the Lo Setpoint - the hysteresis setting. The clear setpoint is equal to the Lo Setpoint + the hysteresis setting. For example: If the Lo Setpoint is -30 and the Lo hysteresis is 5, then the Lo trip setpoint is -35 and the clear setpoint is -25. The associated enpower SNVT is VAR_Lhys__.



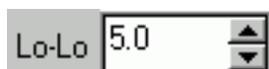
2.6.7 LO-LO SETPOINT

This configuration is used to set the Lo-Lo Setpoint. This value in conjunction with the Lo-Lo hysteresis setting determines the actual trip and clear setpoints for the Lo-Lo Output. The trip setpoint is equal to the Lo-Lo Setpoint - the hysteresis setting. The clear setpoint is equal to the Lo-Lo Setpoint + the hysteresis setting. For example: If the Lo-Lo Setpoint is -40 and the Lo-Lo hysteresis is 2, then the Lo-Lo trip setpoint is -42 and the clear setpoint is -38. The associated enpower SNVT is VAR_LoLo__.



2.6.8 LO-LO HYSTERESIS SETPOINT

This configuration is used to set the Lo-Lo Hysteresis Setpoint. This value in conjunction with the Lo-Lo setpoint determines the actual trip and clear setpoints for the Lo-Lo Output. The trip setpoint is equal to the Lo-Lo Setpoint - the hysteresis setting. The clear setpoint is equal to the Lo-Lo Setpoint + the hysteresis setting. For example: If the Lo-Lo Setpoint is -40 and the Lo-Lo hysteresis is 2, then the Lo-Lo trip setpoint is -42 and the clear setpoint is -38. The associated enpower SNVT is VARLLhys__.



2.6.9 LO, HI SET TIME

This configuration is used to set the Set Time for the Lo and the Hi trip outputs. This value sets the amount of time that the power input must exceed the trip value (as determined by the setpoints and hysteresis) before the relay trip output becomes active. This set time is used for the Lo and Hi outputs only. The Lo-Lo and Hi-Hi outputs use a separate Set Time. The associated empower SNVT is VARSet_t1_.



2.6.10 LO-LO, HI-HI SET TIME

This configuration is used to set the Set Time for the Lo-Lo and the Hi-Hi trip outputs. This value sets the amount of time that the power input must exceed the trip value (as determined by the setpoints and hysteresis) before the relay trip output becomes active. This set time is used for the Lo-Lo and Hi-Hi outputs only. The Lo and Hi outputs use a separate Set Time. The associated empower SNVT is VARSet_t2_.



2.6.11 LO, HI CLEAR TIME

This configuration is used to set the Clear Time for the Lo and the Hi trip outputs. This value sets the amount of time before the trip output resets when the power returns within good limits (as determined by the setpoints and hysteresis). This clear time is used for the Lo and Hi outputs only. The Lo-Lo and Hi-Hi outputs use a separate Clear Time. The associated empower SNVT is VARClr_t1_.



2.6.12 LO-LO, HI-HI CLEAR TIME

This configuration is used to set the Clear Time for the Lo-Lo and the Hi-Hi trip outputs. This value sets the amount of time before the trip output resets when the power returns within good limits (as determined by the setpoints and hysteresis). This clear time is used for the Lo-Lo and Hi-Hi outputs only. The Lo and Hi outputs use a separate Clear Time. The associated empower SNVT is VARClr_t2_.



2.6.13 INVERT OUTPUTS

This configuration is used to invert the relay outputs. Check this check box to invert the relay outputs, uncheck it for normal output operation. When the outputs are inverted the relay still functions the same except that the trip outputs are normally ON and turn OFF when the output becomes active. The associated empower SNVT is VARInvt_U.



2.6.14 HI-HI OUTPUT

This value displays the current value of the Hi-Hi Output. When the output is ON, the display is highlighted. The associated empower SNVT is VAR_HiHi_. The Trip (Pick Up) and Clear (Drop Out) setpoints for the output are also displayed. These Trip and Clear setpoints are calculated from the Hi-Hi Setpoint and the Hi-Hi Hysteresis values.



2.6.15 HI OUTPUT

This value displays the current value of the Hi Output. When the output is ON, the display is highlighted. The associated empower SNVT is VAR__Hi__. The Trip (Pick Up) and Clear (Drop Out) setpoints for the output are also displayed. These Trip and Clear setpoints are calculated from the Hi Setpoint and the Hi Hysteresis values.



2.6.16 LO OUTPUT

This value displays the current value of the Lo Output. When the output is ON, the display is highlighted. The associated empower SNVT is VAR__Lo__. The Trip (Pick Up) and Clear (Drop Out) setpoints for the output are also displayed. These Trip and Clear setpoints are calculated from the Lo Setpoint and the Lo Hysteresis values.



2.6.17 LO-LO OUTPUT

This value displays the current value of the Lo-Lo Output. When the output is ON, the display is highlight-

ed. The associated enpower SNVT is VAR_LoLo____. The Trip (Pick Up) and Clear (Drop Out) setpoints for the output are also displayed. These Trip and Clear setpoints are calculated from the Lo-lo Setpoint and the Lo-Lo Hysteresis values.



2.6.18 POWER INPUT

This value displays the current value of the input Power to the Relay. The associated enpower SNVT is VAR_W____. This value is used by the Relay to determine when to turn the outputs ON and OFF. This kW value is calculated by multiplying the PT and CT Ratios by the value of the input SNVT. The software needs to know which PT and CT Ratios to use (either 3Ø or 1Ø). Double-clicking on the display will cause the display to toggle between 3Ø and 1Ø so that the user can select the appropriate setting for their application.



2.7 NEGATIVE PHASE SEQUENCE CURRENT RELAY (46N)

The NPS Current Relay shown in Figure 2-7 is used for the initial setup of enpower controls. This screen is used to setup the Negative Phase Sequence Current Relay. This protective relay is used to trip the breaker on high unbalanced currents. Using this screen, the user can setup the high setpoints, hysteresis, and the set and clear times for the relay. This screen is associated with the enpower LonMark Object called Negative Sequence Current (46) (NPSI).

To open the NPS Current window, do the following:

1. Click the *Relays* tab.
2. Click the *46N* button.

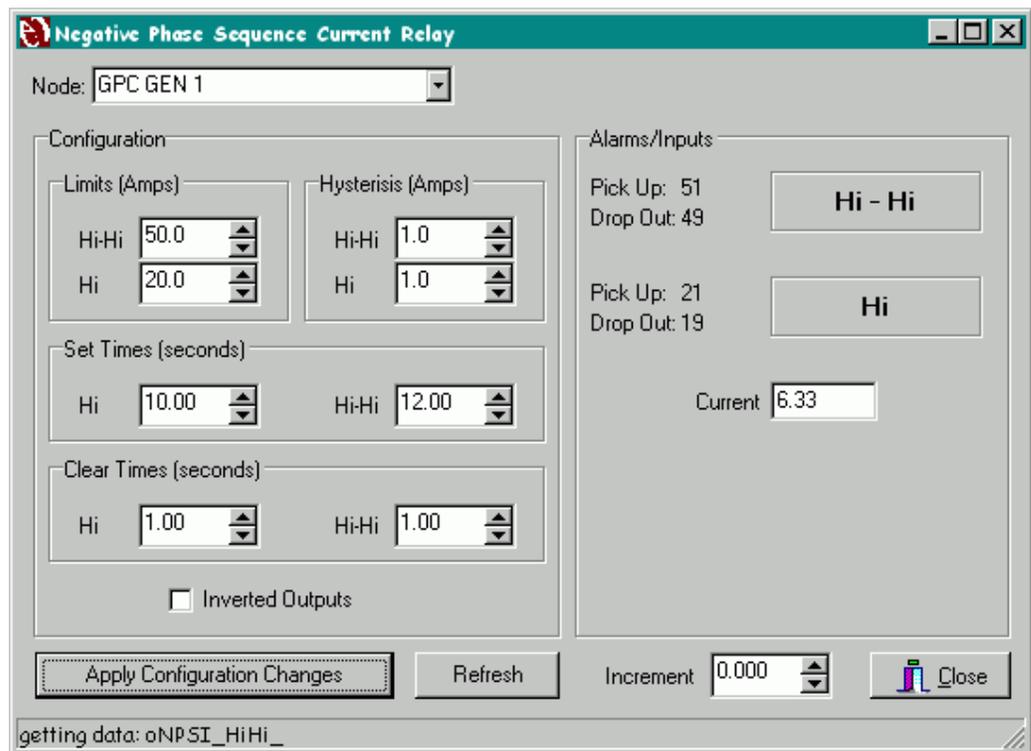


Figure 2-7 Negative Phase Sequence Current Relay

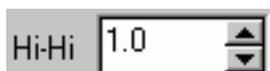
2.7.1 HI-HI SETPOINT

This configuration is used to set the Hi-Hi Setpoint. This value in conjunction with the Hi-Hi hysteresis setting determines the actual trip and clear setpoints for the Hi-Hi Output. The trip setpoint is equal to the Hi-Hi Setpoint + the hysteresis setting. The clear setpoint is equal to the Hi-Hi Setpoint - the hysteresis setting. For example: If the Hi-Hi Setpoint is 50 and the Hi-Hi hysteresis is 5, then the Hi-Hi trip setpoint is 55 and the clear setpoint is 45. The associated empower SNVT is NPSI_HiHi_.



2.7.2 HI-HI HYSTERESIS SETPOINT

This configuration is used to set the Hi-Hi Hysteresis Setpoint. This value in conjunction with the Hi-Hi Setpoint determines the actual trip and clear setpoints for the Hi-Hi Output. The trip setpoint is equal to the Hi-Hi Setpoint + the hysteresis setting. The clear setpoint is equal to the Hi-Hi Setpoint - the hysteresis setting. For example: For example: If the Hi-Hi Setpoint is 50 and the Hi-Hi hysteresis is 5, then the Hi-Hi trip setpoint is 55 and the clear setpoint is 45. The associated empower SNVT is NPSIHHhys_.



2.7.3 HI SETPOINT

This configuration is used to set the Hi Setpoint. This value in conjunction with the Hi hysteresis setting determines the actual trip and clear setpoints for the Hi Output. The trip setpoint is equal to the Hi Setpoint + the hysteresis setting. The clear setpoint is equal to the Hi Setpoint - the hysteresis setting. For example: If the Hi Setpoint is 50 and the Hi hysteresis is 5, then the Hi trip setpoint is 55 and the clear setpoint is 45. The associated empower SNVT is NPSI__Hi_.



2.7.4 HI HYSTERESIS SETPOINT

This configuration is used to set the Hi hysteresis Setpoint. This value in conjunction with the Hi Setpoint setting determines the actual trip and clear setpoints for the Hi Output. The trip setpoint is equal to the Hi Setpoint + the hysteresis setting. The clear setpoint is equal to the Hi Setpoint - the hysteresis setting. For example: If the Hi Setpoint is 50 and the Hi hysteresis is

5, then the Hi trip setpoint is 55 and the clear setpoint is 45. The associated empower SNVT is NPSI_Hhys_.



2.7.5 HI SET TIME

This configuration is used to set the Set Time for the Hi trip outputs. This value sets the amount of time that the current input must exceed the trip value (as determined by the setpoints and hysteresis) before the relay trip output becomes active. This set time is used for the Hi output only. The Hi-Hi output uses a separate Set Time. The associated empower SNVT is NPSISett1_.



2.7.6 HI-HI SET TIME

This configuration is used to set the Set Time for the Hi-Hi trip outputs. This value sets the amount of time that the current input must exceed the trip value (as determined by the setpoints and hysteresis) before the relay trip output becomes active. This set time is used for the Hi-Hi output only. The Hi output uses a separate Set Time. The associated empower SNVT is NPSISett2_.



2.7.7 HI CLEAR TIME

This configuration is used to set the Clear Time for the Hi trip outputs. This value sets the amount of time before the trip output resets when the current returns within good limits (as determined by the setpoints and hysteresis). This clear time is used for the Hi output only. The Hi-Hi output uses a separate Clear Time. The associated empower SNVT is NPSIClr1_.



2.7.8 HI-HI CLEAR TIME

This configuration is used to set the Clear Time for the Hi-Hi trip outputs. This value sets the amount of time before the trip output resets when the current returns within good limits (as determined by the setpoints and hysteresis). This clear time is used for the Hi-Hi output only. The Hi output uses a separate Clear Time. The associated empower SNVT is NPSIClr2_.



2.7.9 INVERT OUTPUTS

This configuration is used to invert the relay outputs. Check this check box to invert the relay outputs, uncheck it for normal output operation. When the outputs are inverted the relay still functions the same except that the trip outputs are normally ON and turn OFF when the output becomes active. The associated enpower SNVT is NPSIInvert_.

Inverted Outputs

2.7.10 HI-HI OUTPUT

This value displays the current value of the Hi-Hi Output. When the output is ON, the display is highlighted. The associated enpower SNVT is NPSI_HiHi_. The Trip (Pick Up) and Clear (Drop Out) setpoints for the output are also displayed. These Trip and Clear setpoints are calculated from the Hi-Hi Setpoint and the Hi-Hi Hysteresis values.

Pick Up: 51 Drop Out: 49	Hi - Hi	Pick Up: 1 Drop Out: -1	Hi - Hi
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2.7.11 HI OUTPUT

This value displays the current value of the Hi Output. When the output is ON, the display is highlighted. The associated enpower SNVT is NPSI__Hi_. The Trip

(Pick Up) and Clear (Drop Out) setpoints for the output are also displayed. These Trip and Clear setpoints are calculated from the Hi Setpoint and the Hi Hysteresis values.

Pick Up: 21 Drop Out: 19	Hi	Pick Up: 1 Drop Out: -1	Hi
-----------------------------	----	----------------------------	----

2.7.12 CURRENT INPUT

This value displays the current value of the input Current to the Relay. The associated enpower SNVT is TP_nps_I_3. This value is used by the Relay to determine when to turn the outputs ON and OFF.

Current 6.33

2.8 NEGATIVE PHASE SEQUENCE VOLTAGE RELAY (47N)

The NPS Voltage Relay shown in Figure 2-8 is used for the initial setup of enpower controls. This screen is used to setup the Negative Phase Sequence Voltage Relay. This protective relay is used to trip the breaker on high unbalanced voltage. Using this screen, the user can setup the high setpoints, hysteresis, and the set and clear times for the relay. This screen is associated with the enpower LonMark Object called Negative Sequence Voltage (47) (NPSV).

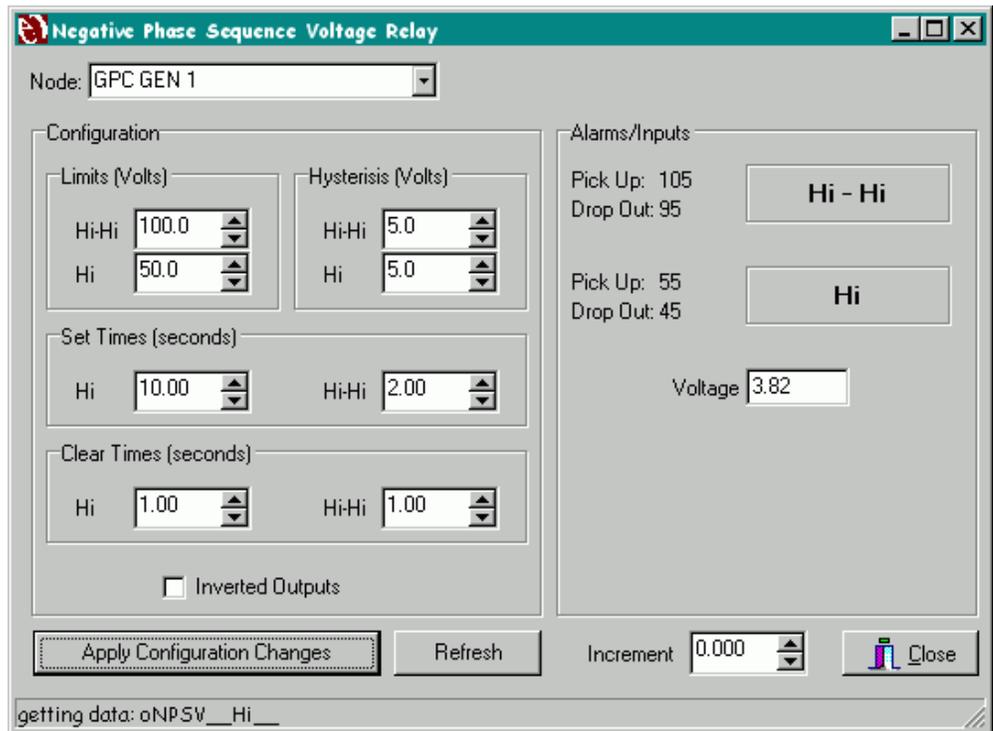


Figure 2-8 Negative Phase Sequence Voltage Relay

To open the NPS Voltage window, do the following:

1. Click the *Relays* tab.
2. Click the *47N* button

2.8.1 HI-HI SETPOINT

This configuration is used to set the Hi-Hi Setpoint. This value in conjunction with the Hi-Hi hysteresis setting determines the actual trip and clear setpoints for the Hi-Hi Output. The trip setpoint is equal to the Hi-Hi Setpoint + the hysteresis setting. The clear setpoint is equal to the Hi-Hi Setpoint - the hysteresis setting. For example: If the Hi-Hi Setpoint is 50 and the Hi-Hi hysteresis is 5, then the Hi-Hi trip setpoint is 55 and the clear setpoint is 45. The associated empower SNVT is NPSV_HiHi_.



2.8.2 HI-HI HYSTERESIS SETPOINT

This configuration is used to set the Hi-Hi Hysteresis Setpoint. This value in conjunction with the Hi-Hi Setpoint determines the actual trip and clear setpoints for the Hi-Hi Output. The trip setpoint is equal to the Hi-Hi Setpoint + the hysteresis setting. The clear setpoint is equal to the Hi-Hi Setpoint - the hysteresis setting. For example: For example: If the Hi-Hi Setpoint is 50 and the Hi-Hi hysteresis is 5, then the Hi-Hi trip setpoint is 55 and the clear setpoint is 45. The associated empower SNVT is NPSVHHhys_.



2.8.3 HI SETPOINT

This configuration is used to set the Hi Setpoint. This value in conjunction with the Hi hysteresis setting determines the actual trip and clear setpoints for the Hi Output. The trip setpoint is equal to the Hi Setpoint + the hysteresis setting. The clear setpoint is equal to the Hi Setpoint - the hysteresis setting. For example: If the Hi Setpoint is 50 and the Hi hysteresis is 5, then the Hi trip setpoint is 55 and the clear setpoint is 45. The associated empower SNVT is NPSV__Hi__.



2.8.4 HI HYSTERESIS SETPOINT

This configuration is used to set the Hi hysteresis Setpoint. This value in conjunction with the Hi Setpoint

setting determines the actual trip and clear setpoints for the Hi Output. The trip setpoint is equal to the Hi Setpoint + the hysteresis setting. The clear setpoint is equal to the Hi Setpoint - the hysteresis setting. For example: If the Hi Setpoint is 50 and the Hi hysteresis is 5, then the Hi trip setpoint is 55 and the clear setpoint is 45. The associated empower SNVT is NPSV_Hhys_.



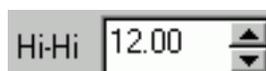
2.8.5 HI SET TIME

This configuration is used to set the Set Time for the Hi trip outputs. This value sets the amount of time that the current input must exceed the trip value (as determined by the setpoints and hysteresis) before the relay trip output becomes active. This set time is used for the Hi output only. The Hi-Hi output uses a separate Set Time. The associated empower SNVT is NPSVSett1_.



2.8.6 HI-HI SET TIME

This configuration is used to set the Set Time for the Hi-Hi trip outputs. This value sets the amount of time that the current input must exceed the trip value (as determined by the setpoints and hysteresis) before the relay trip output becomes active. This set time is used for the Hi-Hi output only. The Hi output uses a separate Set Time. The associated empower SNVT is NPSVSett2_.



2.8.7 HI CLEAR TIME

This configuration is used to set the Clear Time for the Hi trip outputs. This value sets the amount of time before the trip output resets when the current returns within good limits (as determined by the setpoints and hysteresis). This clear time is used for the Hi output only. The Hi-Hi output uses a separate Clear Time. The associated empower SNVT is NPSVCIrt1_.



2.8.8 HI-HI CLEAR TIME

This configuration is used to set the Clear Time for the Hi-Hi trip outputs. This value sets the amount of time before the trip output resets when the current returns within good limits (as determined by the setpoints and hysteresis). This clear time is used for the Hi-Hi output

only. The Hi output uses a separate Clear Time. The associated enpower SNVT is NPSVClrt2_.



2.8.9 INVERT OUTPUTS

This configuration is used to invert the relay outputs. Check this check box to invert the relay outputs, uncheck it for normal output operation. When the outputs are inverted the relay still functions the same except that the trip outputs are normally ON and turn OFF when the output becomes active. The associated enpower SNVT is NPSVInvt_.



2.8.10 HI-HI OUTPUT

This value displays the current value of the Hi-Hi Output. When the output is ON, the display is highlighted. The associated enpower SNVT is NPSV_HiHi_. The Trip (Pick Up) and Clear (Drop Out) setpoints for the output are also displayed. These Trip and Clear setpoints are calculated from the Hi-Hi Setpoint and the Hi-Hi Hysteresis values.



2.8.11 HI OUTPUT

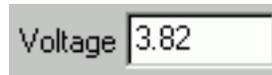
This value displays the current value of the Hi Output.

When the output is ON, the display is highlighted. The associated enpower SNVT is NPSI__Hi__. The Trip (Pick Up) and Clear (Drop Out) setpoints for the output are also displayed. These Trip and Clear setpoints are calculated from the Hi Setpoint and the Hi Hysteresis values.



2.8.12 VOLTAGE INPUT

This value displays the current value of the input Voltage to the Relay. The associated enpower SNVT is TP_nps_V_3. This value is used by the Relay to determine when to turn the outputs ON and OFF.



2.9 VOLTAGE RESTRAINED OVERCURRENT RELAY (51V)

The VR Overcurrent Relay shown in Figure 2-9 is used for the initial setup of enpower controls. This screen is used to setup the Voltage Restrained Overcurrent Relay. This protective relay is used to trip the breaker on high current situations. Using this screen, the user can setup the high setpoint and the set and clear times for the relay. This screen is associated with the enpower LonMark Object called Voltage Restrained Overcurrent (51VR) (VRR).

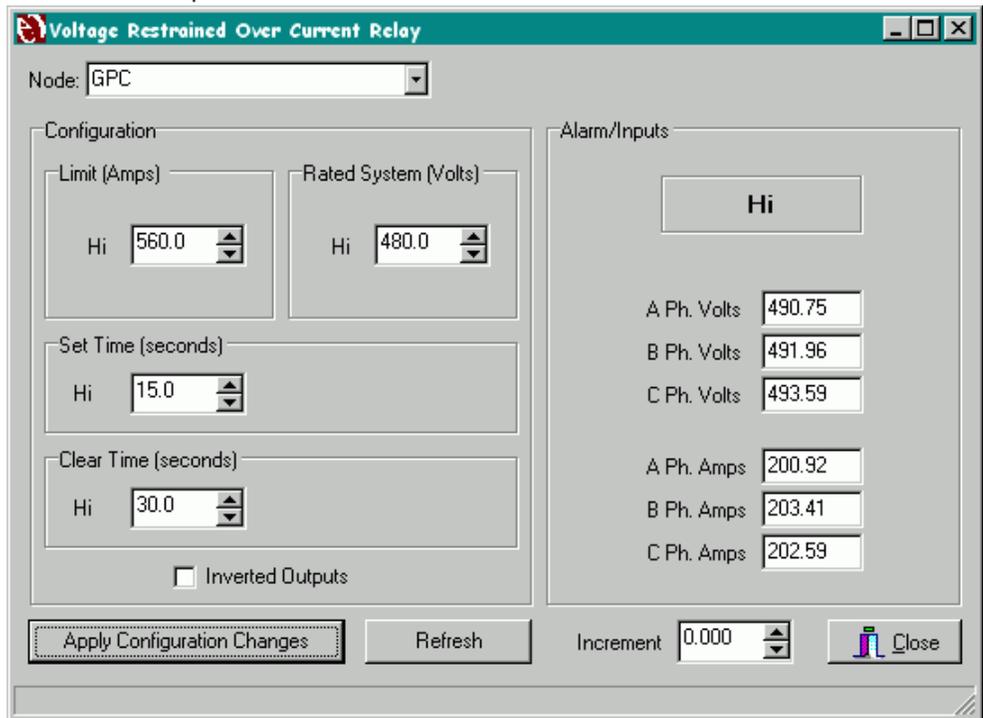


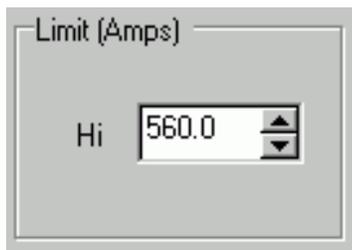
Figure 2-9 Voltage Restrained Overcurrent Relay

To open the VR Overcurrent window, do the following:

1. Click the Relays tab.
2. Click the 51V button

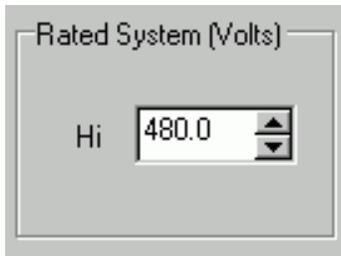
2.9.1 HI SETPOINT

This configuration is used to set the Hi Limit Setpoint. This setting determines the actual trip and clear setpoints for the Hi Output. The associated empower SNVT is VRR__Hi__.



2.9.2 RATED SYSTEM VOLTAGE

This configuration is used to set the Rated Voltage for your system. The associated empower SNVT is VRR_RateV_.



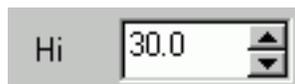
2.9.3 HI SET TIME

This configuration is used to set the Set Time for the Hi trip output. This value sets the amount of time that the current input must exceed the trip value (as determined by the setpoint) before the relay trip output becomes active. The associated empower SNVT is VRRSet_t1_.



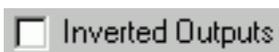
2.9.4 HI CLEAR TIME

This configuration is used to set the Clear Time for the Hi trip output. This value sets the amount of time before the trip output resets when the current returns within good limits (as determined by the setpoint). The associated empower SNVT is VRRClr_t1_.



2.9.5 INVERT OUTPUTS

This configuration is used to invert the relay outputs. Check this check box to invert the relay outputs, uncheck it for normal output operation. When the outputs are inverted the relay still functions the same except that the trip outputs are normally ON and turn OFF when the output becomes active. The associated empower SNVT is VRRInvt__.



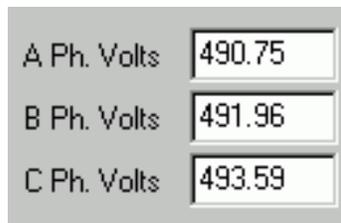
2.9.6 HI OUTPUT

This value displays the current value of the Hi Output. When the output is ON, the display is highlighted. The associated empower SNVT is VRR__Hi__.



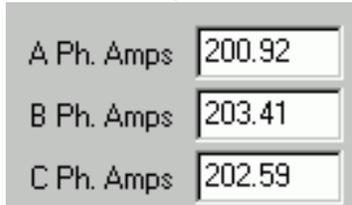
2.9.7 VOLTAGE INPUTS

These values display the current value of the input Voltages to the Relay. The associated empower SNVTs are VRR_V__A, VRR_V__B, and VRR_V__C. These value are used by the Relay to determine when to turn the outputs ON and OFF.



2.9.8 CURRENT INPUTS

These values display the current value of the input Currents to the Relay. The associated empower SNVTs are VRR_I__A, VRR_I__B, and VRR_I__C. These value are used by the Relay to determine when to turn the outputs ON and OFF.



SECTION 3 CONTROLS

The Controls Tab contains six screens for setting up the control LonMark Objects in enpower controls. These screens are typically used during startup for initial setup of the Real Power Control (kW Sharing, Baseload, etc.), Reactive Power Control, Synchronizing, ATS, etc. These screens are used for the initial setup of enpower controls.



3.1 REAL POWER CONTROL

The Real Power Control Screen shown in Figure 3-1 is used for the initial setup of enpower controls. This screen is used to setup the Real Power Control set-points and dynamics. There are three different screens depending on the type of enpower control that you are using:

- The Utility Power Control (UPC) Real Power Control Screen is used to setup the Real Power Control for a UPC. This screen is associated with the enpower LonMark Object called Real Power Control (KWC).
- The Power Transfer Control (PTC) Real Power Control Screen is used to setup the Real Power Control for a PTC type GPC. This screen is associated with the enpower LonMark Object called Power Transfer Control (KWC).
- The kiloWatt Sharing (KWS) Real Power Control Screen is used to setup the Real Power Control for a KWS type GPC. This screen is associated with the enpower LonMark Object called Real Power Control (KWC).

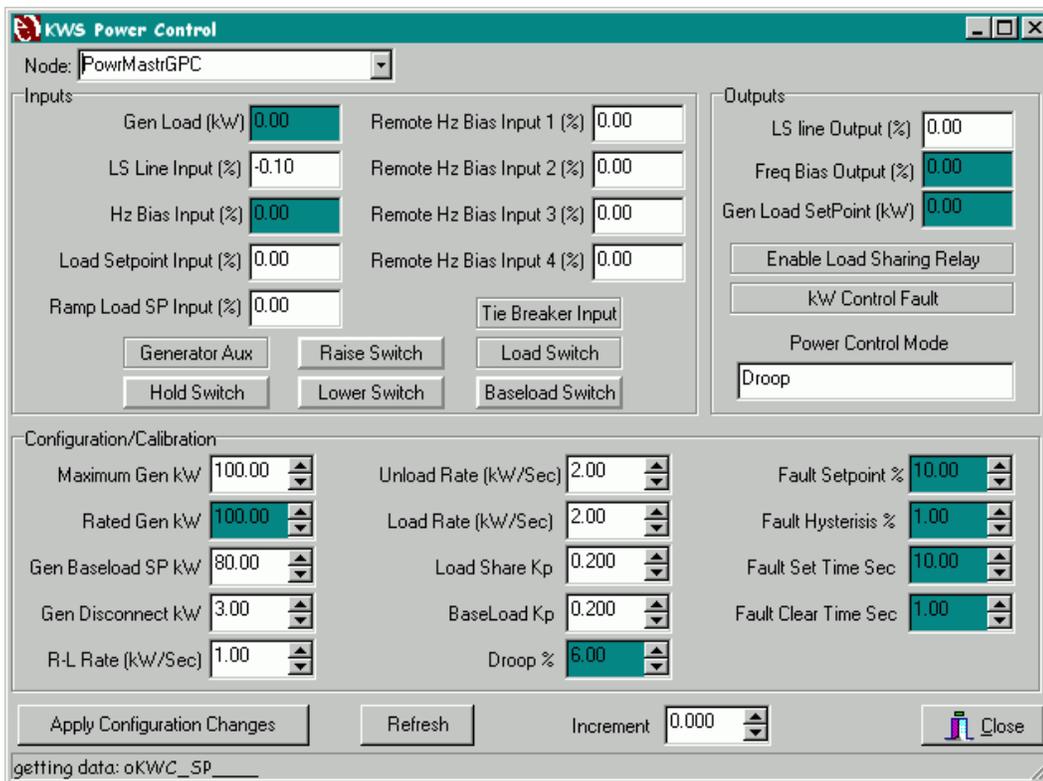


Figure 3-1 KWS Real Power Control

3.2 PTC REAL POWER CONTROL

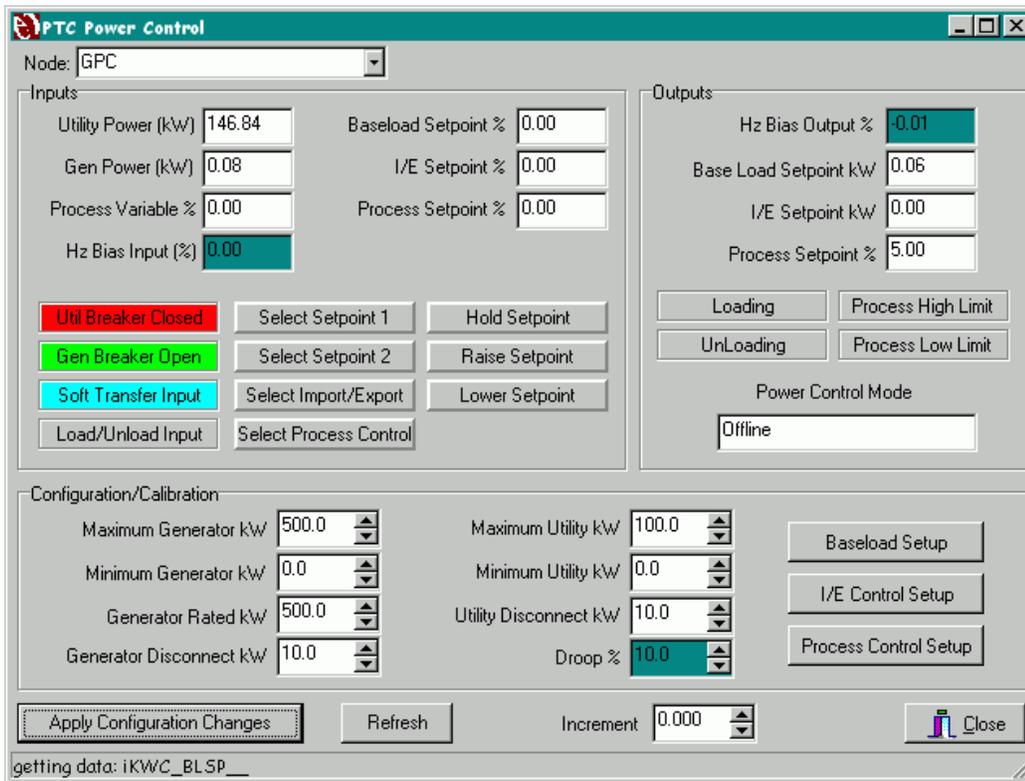


Figure 3-2 PTC Power Control

Figure 3-2 shows the PTC Real Power Control. The control is organized in three sections:

- Inputs
- Outputs
- Configuration/Calibration

In addition the control contains three buttons, each of which opens an additional window:

- Baseload Setup
- I/E (import/export) Control Setup
- Process Control Setup

3.2.1 INPUTS SECTION

Utility Power

This input displays the current Utility Load as it is being seen at the input to the PTC Real Power Control. This input is typically bound to the three phase power. The Real Power Control uses this input for controlling the system baseload or import/export level. The associated

enpower SNVT is iKWC_W___U.



Gen Power

This input displays the current Generator Load as it is being seen at the input to the PTC Real Power Control. This input is typically bound to the single phase power. The Real Power Control uses this input for controlling the generator baseload level. The associated enpower SNVT is KWC_W___G.



Process Variable Input

This input displays the current value of the Process Variable input to the PTC Real Power Control. This input is used by the Process Control that is inside the PTC Real Power Control. This value is the feedback from a process that is being controlled. The associated enpower SNVT is KWC_PCVar_.



Frequency Bias Input

This input displays the current value of the Frequency Bias input to the PTC Real Power Control. This input is typically bound to the synchronizer Frequency Bias Output. The Real Power Control passes this input directly to the Hz Bias output whenever the generator breaker or the utility breaker is open. This allows the synchronizer to bias the speed during automatic synchronization. The associated enpower SNVT is KWC_HzB__.



Base Load Setpoint Input

This input displays the current value of the Base Load Setpoint input to the PTC Real Power Control. This input is used by the PTC Real Power Control for setting the Baseload Setpoint. An external device (external to the Real Power Control) can use this input to set the generator baseload setpoint. The associated enpower SNVT is KWC_BLSP__.



Import/Export Setpoint Input

This input displays the current value of the Import/Export Setpoint input to the PTC Real Power Control. This input is used by the PTC Real Power Control for setting the Import/Export Setpoint. An external device (external to the Real Power Control) can use this input to set the Utility Import/Export setpoint. The associated enpower SNVT is KWC_IECSP__.



Process Setpoint Input

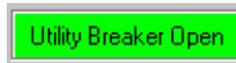
This input displays the current value of the Process Setpoint input to the PTC Real Power Control. This input is used by the PTC Real Power Control for setting the Process Setpoint. An external device (external to the Real Power Control) can use this input to set the Process setpoint. The associated enpower SNVTs are KWC_PCSP__.



Utility Auxiliary Input

This input displays the current value of the Utility Auxiliary input to the PTC Real Power Control. This input is typically bound to a discrete input that is wired from an Aux contact on the utility breaker. The PTC Real Power Control uses this input to know when the utility breaker is closed or open. The display is highlight-

ed Red when the input is ON, Green when the input is OFF. The associated enpower SNVT is KWC_Aux__U.



Generator Auxiliary Input

This input displays the current value of the Generator Auxiliary input to the PTC Real Power Control. This input is typically bound to a discrete input that is wired from an Aux contact on the generator breaker. The PTC Real Power Control uses this input to know when the any one of the generator breakers is closed or open. The display is highlighted Red when the input is ON, Green when the input is OFF. The associated enpower SNVT is KWC_Aux__G.



Soft Transfer Switch Input

This input displays the current value of the Soft Transfer Switch input to the PTC Real Power Control. When this input is ON, the PTC will ramp the generator Baseload Setpoint upwards until the Utility Load drops below the utility disconnect level. It will then open the Utility breaker so that the facility is separated from the Utility and running on generator power only. The display is highlighted when the input is ON. The associated enpower SNVT is KWCSOft__X__.



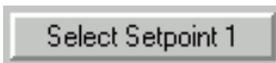
Load/Unload Input

This input displays the current value of the Load Switch input to the PTC Real Power Control. This input is used by the PTC Real Power Control for loading the generator. When the Load Switch is OFF, the PTC Real Power Control will unload the generator and open the generator breaker. The display is highlighted when the input is ON. The associated enpower SNVT is KWC_LdSw__.



Select Setpoint 1 Input

This input displays the current value of the Select Setpoint 1 input to the PTC Real Power Control. This input is used in determining the control setpoint. There are 2 setpoints for each of the control modes (Baseload, I/E, and Process). These setpoints are set using configuration values. This input tells the control to use Setpoint 1 for its current control setpoint. The display is highlighted when the input is ON. This display also functions as a button, so the user can toggle this input ON and OFF from the screen. The associated enpower SNVT is KWC__SP__1__.



Select Setpoint 2 Input

This input displays the current value of the Select Setpoint 2 input to the PTC Real Power Control. This input is used in determining the control setpoint. There are 2 setpoints for each of the control modes (Baseload, I/E, and Process). These setpoints are set using configuration values. This input tells the control to use Setpoint 2 for its current control setpoint. The display is highlighted when the input is ON. This display also functions as a button, so the user can toggle this input ON and OFF from the screen. The associated enpower SNVT is KWC__SP_2_.



Select Import/Export Input

This input displays the current value of the Select I/E input to the PTC Real Power Control. This input is used in determining the PTC Control Mode. When this input is ON, the PTC Real Power Control uses the Import/Export Mode to control the system load. The display is highlighted when the input is ON. This display also functions as a button, so the user can toggle this input ON and OFF from the screen. The associated enpower SNVT is KWC_EnIEC_.



Select Process Control Input

This input displays the current value of the Select Process Control input to the PTC Real Power Control. This input is used in determining the PTC Control Mode. When this input is ON, the PTC Real Power Control uses the Process Control Mode to control the system load. The display is highlighted when the input is ON. This display also functions as a button, so the user can toggle this input ON and OFF from the screen. The associated enpower SNVT is KWC_EnPC_.



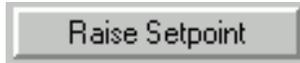
Hold Switch Input

This input displays the current value of the Hold Switch input to the PTC Real Power Control. When this input is ON, the PTC Real Power Control pauses its load ramp and holds the system load setpoint where it is. The display is highlighted when the input is ON. This display also functions as a button, so the user can toggle this input ON and OFF from the screen. The associated enpower SNVT is KWC_HldSw_.



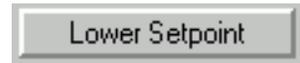
Raise Switch Input

This input displays the current value of the Raise Switch input to the PTC Real Power Control. This input is used for manual control of the frequency bias output. If the generator is not online, turning this input ON will increase the speed of the generator to allow for manual synchronization. If the current control mode baseload, turning this input ON will increase the baseload setpoint. The display is highlighted when the input is ON. This display also functions as a button, so the user can toggle this input ON and OFF from the screen. The associated enpower SNVT is KWC_Raise_.



Lower Switch Input

This input displays the current value of the Lower Switch input to the PTC Real Power Control. This input is used for manual control of the frequency bias output. If the generator is not online, turning this input ON will decrease the speed of the generator to allow for manual synchronization. If the current control mode is baseload, turning this input ON will decrease the baseload setpoint. The display is highlighted when the input is ON. This display also functions as a button, so the user can toggle this input ON and OFF from the screen. The associated enpower SNVT is KWC_Lower_.



3.2.2 OUTPUTS SECTION

Frequency Bias Output

This output displays the current frequency bias output from the PTC Real Power Control. This output is typically bound to the Frequency Bias Analog Output Actuator. The Real Power Control uses this output to control the generator speed/load. The associated enpower SNVT is KWCHzBias_.



Base Load Setpoint Output

This output displays the current Base Load setpoint in kW from the PTC Real Power Control. This is the load at which that the Real Power Control wants to control the generator load. This output is typically used as a diagnostic tool so that user can see the current load setpoint. The associated enpower SNVT is KWC_BLSP_.



Import/Export Setpoint Output

This output displays the current I/E Load setpoint in kW from the PTC Real Power Control. This is the load (in kW) at which that the Real Power Control wants to control the utility load. This output is typically used as a diagnostic tool so that user can see the current load setpoint. The associated enpower SNVT is KWC_IECSP_.



Process Setpoint Output

This output displays the current Process setpoint in percent from the PTC Real Power Control. This is the value at which the Real Power Control wants to control the Process Variable. This output is typically used as a diagnostic tool so that user can see the current process setpoint. The associated enpower SNVT is KWC_PCSP_.



Loading Output

This output displays the Loading output from the PTC Real Power Control. The PTC Real Power Control turns this output ON when it is ramping the generator load setpoint in an upwards direction. The display is highlighted when the output is ON. The associated enpower SNVT is KWC__Load_.



UnLoading Output

This output displays the UnLoading output from the PTC Real Power Control. The PTC Real Power Control turns this output ON when it is ramping the generator load setpoint in a downwards direction. The display is highlighted when the output is ON. The associated enpower SNVT is KWCUnload_.



Process Hi Limit Output

This output displays the Process Hi Limit output from the PTC Real Power Control. The PTC Real Power Control turns this output ON when Process Control is being limited by the Process Hi Limit configuration setpoint. The display is highlighted when the output is ON. The associated enpower SNVT is KWCPHiLim_.



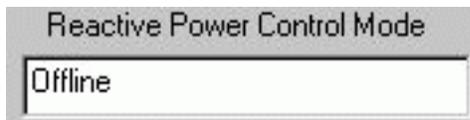
Process Low Limit Output

This output displays the Process Low Limit output from the PTC Real Power Control. The PTC Real Power Control turns this output ON when Process Control is being limited by the Process Low Limit configuration setpoint. The display is highlighted when the output is ON. The associated enpower SNVT is KWCPLOLim_.



Power Control Mode

This output displays the current Power Control Mode. This is the actual mode that the PTC Real Power Control is in. The associated enpower SNVT is KWC_Mode_.



The following is a list of modes for the PTC Real Power Control:

- Offline
- Baseload Control
- Unloading
- Loading
- Ramp Baseload SP
- Ramp to Imp/Exp
- Import/Export Control
- Lower Imp/Exp SP
- Raise Imp/Exp SP
- Ramp Imp/Exp SP
- Ramp to Process
- Process Control
- Lower Process SP
- Raise Process SP
- Ramp Process SP

3.2.3 CONFIGURATION/CALIBRATION SECTION

Maximum Gen Load

This configuration sets the maximum allowed Generator load in kW. The Real Power Control uses this setting to limit the Generator Load Setpoint and not allow the generator load to be higher than this setting during parallel operation. The associated enpower SNVT is KWC_MaxLdG.



Minimum Gen Load

This configuration sets the minimum allowed Generator load in kW. The Real Power Control uses this setting to limit the Generator Load Setpoint and not allow the generator load to be less than this setting during parallel operation. The associated empower SNVT is KWC_MinLdG.

Minimum Generator kW

Generator Disconnect Level

This configuration sets the Generator disconnect level. The Real Power Control uses this setting when unloading the unloading. This is the load value at which the Real Power Control sends an open signal to the generator breaker. The associated empower SNVT is KWCDiscntG.

Generator Disconnect kW

Maximum Utility kW

This configuration sets the maximum allowed Utility load in kW. The Real Power Control uses this setting to limit the Utility load and not allow the utility load to be higher than this setting during parallel operation. The associated empower SNVT is KWC_MaxW_U.

Maximum Utility kW

Minimum Utility kW

This configuration sets the minimum allowed Utility load in kW. The Real Power Control uses this setting to limit the Utility load and not allow the utility load to be less than this setting during parallel operation. The associated empower SNVT is KWC_MinW_U.

Minimum Utility kW

Utility Disconnect Level

This configuration sets the Utility disconnect level. The Real Power Control uses this setting when unloading the Utility. This is the load value at which the Real Power Control opens the Utility breaker. The associated empower SNVT is KWCDiscntU.

Utility Disconnect kW

Droop

This configuration sets the kW Droop setpoint in percent. This value sets the droop setpoint that the Real Power Control uses in Droop Mode. The associated empower SNVT is KWC_Droop_.

Droop %

3.2.4 PTC BASELOAD CONTROL

Figure 3-3 shows the PTC Baseload Control. This window opens when you click the Real Power Control button in the PTC Real Power Control.

Baseload Setup

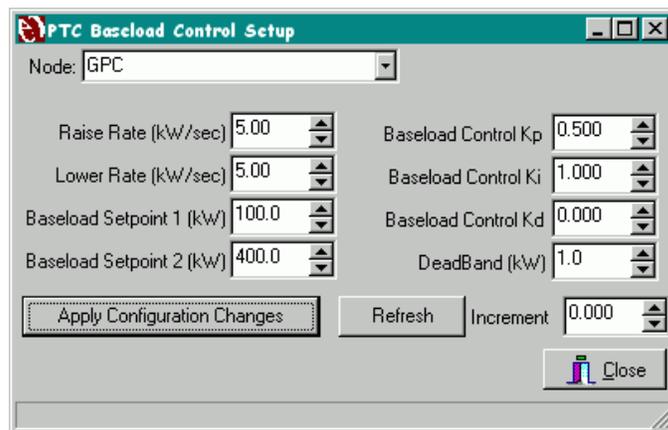


Figure 3-3 PTC Baseload Control

Raise Rate

This configuration sets raise rate of the baseload control setpoint in kW per second. The Real Power Control uses this setting when it is ramping the baseload control setpoint. The associated empower SNVT is KWCR_BLD_.

Raise Rate (kW/sec)

Lower Rate

This configuration sets lower rate of the baseload control setpoint in kW per second. The Real Power Control uses this setting when it is ramping the baseload control setpoint. The associated empower SNVT is KWCL_BLD_.

Lower Rate (kW/sec)

Baseload Control Setpoint #1

This configuration sets the baseload control setpoint #1 setting for the PTC Real Power Control. This input is used in determining the control setpoint. The PTC Real Power Control uses this setting for the baseload control setpoint if the Select Setpoint 1 input is ON. The associated empower SNVT is KWCBldSP1G.

Baseload Setpoint 1 (kW)

Baseload Control Setpoint #2

This configuration sets the baseload control setpoint #2 setting for the PTC Real Power Control. This input is used in determining the control setpoint. The PTC Real Power Control uses this setting for the baseload control setpoint if the Select Setpoint 2 input is ON. The associated empower SNVT is KWCBldSP2G.

Baseload Setpoint 2 (kW)

Baseload Kp

This configuration sets the Proportional Gain for the PTC Baseload Control. The PTC Real Power Control uses this setting to set the dynamics of the PID loop used for Baseload Control. The associated empower SNVT is KWC_BldKp_.

Baseload Control Kp

Baseload Ki

This configuration sets the Integral Gain for the PTC Baseload Control. The PTC Real Power Control uses this setting to set the dynamics of the PID loop used for Baseload Control. The associated empower SNVT is KWC_BldKi_.

Baseload Control Ki

Baseload Kd

This configuration sets the Derivative Gain for the PTC Baseload Control. The PTC Real Power Control uses this setting to set the dynamics of the PID loop used for Baseload Control. The associated empower SNVT is KWC_BldKd_.

Baseload Control Kd

Baseload Control Deadband

This configuration sets the deadband for the PTC Baseload Control. The PTC Real Power Control uses this setting to set the dynamics of the PID loop used for Baseload Control. This setting sets a deadband around the generator load where the Baseload Control stops controlling. The associated empower SNVT is KWC_BldDB_.

DeadBand (kW)

3.2.5 PTC IMPORT/EXPORT CONTROL

Figure 3-4 shows the PTC Import/Export Control. This window opens when you click the I/E Control Setup button in the PTC Real Power Control.

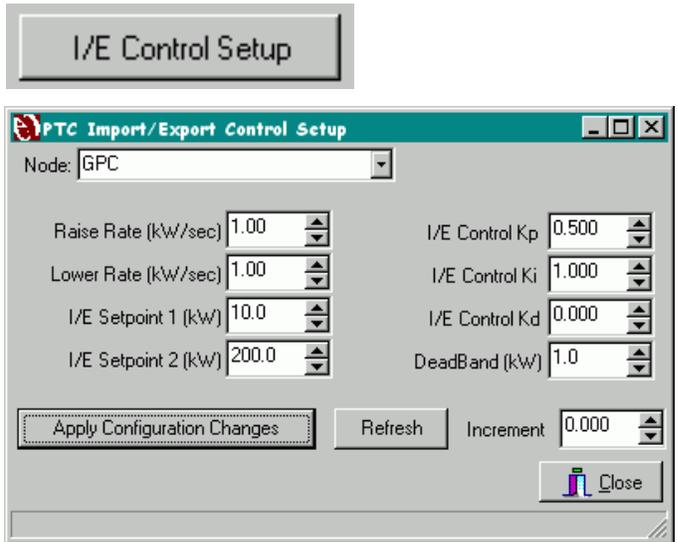


Figure 3-4 PTC Import/Export Control

Raise Rate

This configuration sets raise rate of the Import/Export control setpoint in kW per second. The Real Power Control uses this setting when it is ramping the Import/Export control setpoint. The associated empower SNVT is KWCR_IEC_.

Raise Rate (kW/sec)

Lower Rate

This configuration sets lower rate of the Import/Export control setpoint in kW per second. The Real Power Control uses this setting when it is ramping the Import/Export control setpoint. The associated empower SNVT is KWCL_IEC_.

Lower Rate (%/sec)

Import/Export Control Setpoint #1

This configuration sets the Import/Export control setpoint #1 setting for the PTC Real Power Control. This input is used in determining the control setpoint. The PTC Real Power Control uses this setting for the Import/Export control setpoint if the Select Setpoint 1 input is ON. The associated empower SNVT is KWCIECSP1_.

I/E Setpoint 1 (kW) 10.0

Import/Export Control Setpoint #2

This configuration sets the Import/Export control setpoint #2 setting for the PTC Real Power Control. This input is used in determining the control setpoint. The PTC Real Power Control uses this setting for the Import/Export control setpoint if the Select Setpoint 2 input is ON. The associated enpower SNVT is KWCIECSP2_.

I/E Setpoint 2 (kW) 200.0

Import/Export Kp

This configuration sets the Proportional Gain for the PTC Import/Export Control. The PTC Real Power Control uses this setting to set the dynamics of the PID loop used for Import/Export Control. The associated enpower SNVT is KWC_IECKp_.

I/E Control Kp 0.500

Import/Export Ki

This configuration sets the Integral Gain for the PTC Import/Export Control. The PTC Real Power Control uses this setting to set the dynamics of the PID loop used for Import/Export Control. The associated enpower SNVT is KWC_IECKi_.

I/E Ki 1.000

Import/Export Kd

This configuration sets the Derivative Gain for the PTC Import/Export Control. The PTC Real Power Control uses this setting to set the dynamics of the PID loop used for Import/Export Control. The associated enpower SNVT is KWC_IECKd_.

I/E Control Kd 0.000

Import/Export Control Deadband

This configuration sets the deadband for the PTC Import/Export Control. The PTC Real Power Control uses this setting to set the dynamics of the PID loop used for Import/Export Control. This setting sets a deadband around the utility load where the Import/Export Control stops controlling. The associated enpower SNVT is KWC_IECDB_.

DeadBand (kW) 1.0

Reactive Power Control Fault Reactive Power Control Fault

PFC Deadband 0.01

3.3 PTC REACTIVE POWER CONTROL

The PTC Reactive Power Control consists of three sections, as shown in Figure 3-5.

- Inputs
- Output
- Configuration

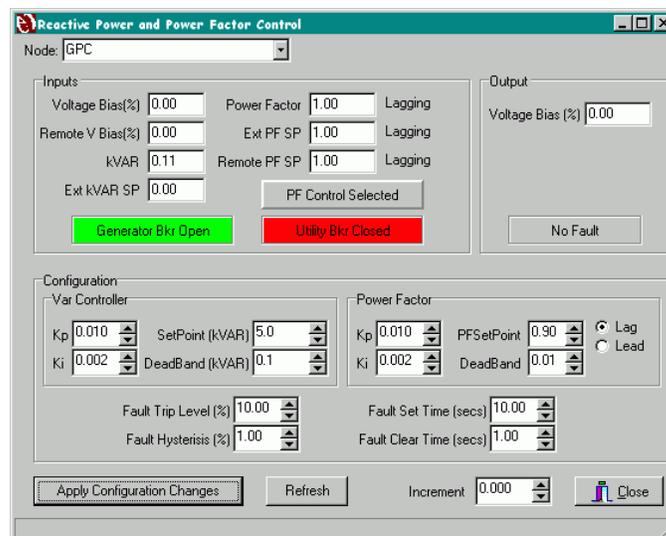


Figure 3-5 Reactive Power Control

3.3.1 INPUTS SECTION

Voltage Bias Input

This input displays the current value of the Voltage Bias input to the PTC Reactive Power Control. This input is typically bound to the synchronizer Voltage Bias Output. The Reactive Power Control passes this input directly to the Voltage Bias output whenever the generator breaker is open. This allows the synchronizer to bias the voltage during automatic synchronization. The associated enpower SNVT is VPF_VB_____.

Voltage Bias(%) 0.00

Remote Voltage Bias Input

This input displays the current value of the Remote Voltage Bias input to the PTC Reactive Power Control. This input is used by external devices to control the Voltage bias. The associated enpower SNVT is VPF_RemVB_.

Remote V Bias(%) 0.00

Generator Reactive Load

This input displays the current Generator Reactive Load (in kVARs) as it is being seen at the input to the PTC Reactive Power Control. This input is typically bound to the three phase VARs. The Reactive Power Control uses this input for controlling the reactive load level on the generator. The associated enpower SNVT is VPF_VAR__.

kVAR 0.11

External Reactive Load Setpoint Input

This input displays the current value of the kVAR Setpoint input to the PTC Reactive Power Control. This input allows an external device to set the VAR Control Setpoint. The associated enpower SNVT is VPFVAR_SP_.

Ext kVAR SP 0.00

Generator Power Factor Input

This input displays the current Generator Power Factor Input as it is being seen at the input to the PTC Reactive Power Control. This input is typically bound to the three phase PF. The Reactive Power Control uses this input for controlling the reactive load level on the generator. The associated enpower SNVT is VPF_PF__.

Power Factor 1.00 Lagging

External Power Factor Setpoint Input

This input displays the current value of the External Power Factor Setpoint input to the PTC Reactive Power Control. This input allows an external device to set the PF Control Setpoint. The associated enpower SNVT is VPF_PF_SP_.

Ext PF SP 1.00 Lagging

Remote Power Factor Setpoint Input

This input displays the current value of the Remote Power Factor Setpoint input to the PTC Reactive Power Control. This input allows an external device to set the PF Control Setpoint. The associated enpower SNVT is VPF_RemPF_.

Remote PF SP 1.00 Lagging

Select Power Factor Control Input

This input displays the current value of the Select PF Switch input to the PTC Reactive Power Control. When

this input is ON, the PTC Reactive Power Control will control in VAR Control Mode. When this input is OFF, the Reactive Power Control is in Power Factor Control Mode. The display is highlighted when the input is ON. This display also functions as a button, so the user can toggle this input ON and OFF from the screen. The associated enpower SNVT is VPFSelect_.

PF Control Selected

VAR Control Selected

Generator Auxiliary Input

This input displays the current value of the Generator Auxiliary input to the PTC Reactive Power Control. This input is typically bound to a discrete input that is wired from an Aux contact on the generator breaker. The PTC Reactive Power Control uses this input to know when the generator breaker is closed or open. The display is highlighted Red when the input is ON. The associated enpower SNVT is VPF_Aux__G.

Gen Bkr Open

Generator Bkr Closed

Utility Auxiliary Input

This input displays the current value of the Utility Auxiliary input to the PTC Reactive Power Control. This input is typically bound to a discrete input that is wired from an Aux contact on the utility breaker. The PTC Reactive Power Control uses this input to know when the utility breaker is closed or open. The display is highlighted Red when the input is ON. The associated enpower SNVT is VPF_Aux__U.

Utility Breaker Open

Utility Breaker Closed

3.3.2 OUTPUTS SECTION

Voltage Bias Output

This output displays the current Voltage Bias output from the PTC Reactive Power Control. This output is typically connected to the Voltage Bias Analog Output Actuator for controlling the generator's voltage / VARs. The associated enpower SNVT is VPF_VB__.

Voltage Bias(%) 0.00

Reactive Power Control Fault

This output displays the current status of the Reactive Power Control Fault output from the PTC Reactive Power Control. The Reactive Power Control turns this output ON and OFF according to the Fault configurations. The display is highlighted when the output is ON. The associated enpower SNVT is VPF_Fault_.

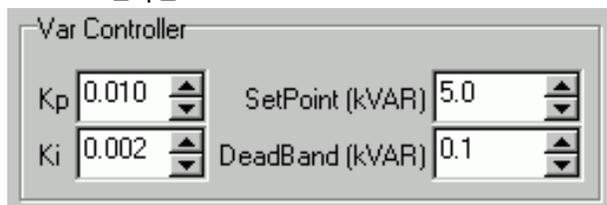
No Fault

VAR Control Fault

3.3.3 CONFIGURATION/CALIBRATION SECTION

VAR Control Kp

This configuration sets the Proportional Gain for the PTC VAR Control. The PTC Reactive Power Control uses this setting to set the dynamics of the PID loop used for VAR Control. The associated enpower SNVT is VPFVAR_Kp_.



VAR Control Ki

This configuration sets the Integral Gain for the PTC VAR Control. The PTC Reactive Power Control uses this setting to set the dynamics of the PID loop used for VAR Control. The associated enpower SNVT is VPFVAR_Ki_.

VAR Control Deadband

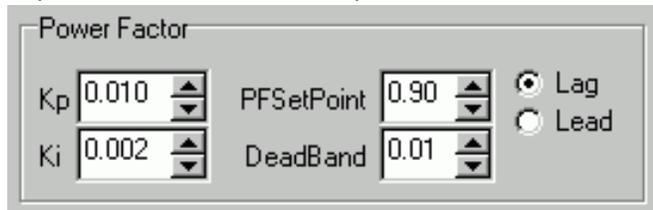
This configuration sets the deadband for the PTC VAR Control. The PTC Reactive Power Control uses this setting to set the dynamics of the PID loop used for VAR Control. This setting sets a deadband around the generator reactive load where the VAR Control stops controlling. The associated enpower SNVT is VPFVAR_DB_.

VAR Control Setpoint

This configuration sets the VAR control setpoint setting for the PTC Reactive Power Control. The PTC Reactive Power Control uses this setting for the VAR control setpoint. The associated enpower SNVT is VPFVAR_SP_.

Power Factor Control Kp

This configuration sets the Proportional Gain for the PTC Power Factor Control. The PTC Reactive Power Control uses this setting to set the dynamics of the PID loop used for Power Factor Control. The associated enpower SNVT is VPF_PF_Kp_.



Power Factor Control Ki

This configuration sets the Integral Gain for the PTC Power Factor Control. The PTC Reactive Power Control uses this setting to set the dynamics of the PID loop

used for Power Factor Control. The associated enpower SNVT is VPF_PF_Ki_.

Power Factor Control Deadband

This configuration sets the deadband for the PTC Power Factor Control. The PTC Reactive Power Control uses this setting to set the dynamics of the PID loop used for Power Factor Control. This setting sets a deadband around the generator power factor where the Power Factor Control stops controlling. The associated enpower SNVT is VPF_PF_DB_.

Power Factor Control Setpoint

This configuration sets the Power Factor control setpoint setting for the PTC Reactive Power Control. The PTC Reactive Power Control uses this setting for the Power Factor control setpoint. The associated enpower SNVT is VPF_PF_SP_.

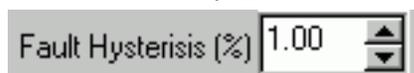
Fault Trip Setpoint

This configuration sets the Fault Setpoint in percent. The Reactive Power Control uses this setting in conjunction with the Fault Hysteresis to set the Reactive Power Control Fault Output. The associated enpower SNVT is VPFFItErr_.



Fault Hysteresis

This configuration sets the Fault Hysteresis in percent. The Reactive Power Control uses this setting in conjunction with the Fault Setpoint to set the Reactive Power Control Fault Output. The associated enpower SNVT is VPFFItHys_.



Fault Set Time

This configuration sets the Fault Set Time in seconds. This setting sets the amount of time that a Fault condition must exist (as determined by the Fault SetPoint and Hysteresis) before the Reactive Power Control turns the Reactive Power Control Fault Output ON. The associated enpower SNVT is VPF_Set_t_.



Fault Clear Time

This configuration sets the Fault Clear Time in seconds. This setting sets the amount of time that a Fault condition must be cleared (as determined by the Fault SetPoint and Hysteresis) before the Reactive Power Control turns the Reactive Power Control Fault Output ON. The associated enpower SNVT is VPF_Clr_t_.

Fault Clear Time (secs) 1.00

3.4 AUTOMATIC TRANSFER SWITCH CONTROL (ATS)

The ATS Control window shown in Figure 3-6 is used for the initial setup of empower controls. This window is used to set up the ATS Control setpoints and view its inputs and outputs for diagnostics. The software will only display this window if you are configuring an empower PTC or UPC control. The empower KWS control does not contain the ATS Control Object. The fields in the ATS Control window correspond with the Auto Transfer Switch (ATS) object.

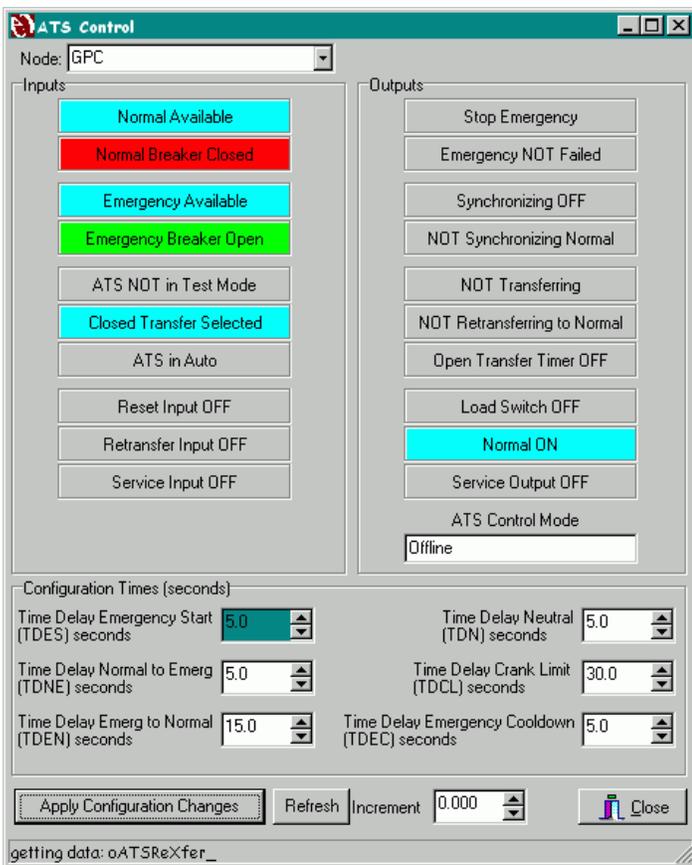


Figure 3-6 ATS (Automatic Transfer Switch) Control

3.4.1 INPUTS SECTION

Normal Available Input

This input displays the current value of the Normal Available input to the ATS. The ATS uses this input for determining the status of the Normal Source. The display is highlighted in Aqua if the Normal Source is Available, it is highlighted in yellow if the Normal Source

is NOT Available. The associated empower SNVT is ATS_OK__U.



Normal Breaker Input

This input displays the current value of the Normal Breaker input to the ATS. The ATS uses this input for determining the status of the Normal Breaker. The display is highlighted in red if the Normal breaker is closed, it is highlighted in green if the Normal breaker is open. The associated empower SNVT is ATS_Aux__U.



Emergency Available Input

This input displays the current value of the Emergency Available input to the ATS. The ATS uses this input for determining the status of the Emergency Source. The display is highlighted in Aqua if the Emergency Source is Available, it is highlighted in yellow if the Emergency Source is NOT Available. The associated empower SNVT is ATS_OK__G.



Emergency Breaker Input

This input displays the current value of the Emergency Breaker input to the ATS. The ATS uses this input for determining the status of the Emergency Breaker. The display is highlighted in red if the Emergency breaker is closed, it is highlighted in green if the Emergency breaker is open. The associated empower SNVT is ATS_Aux__G.



ATS in Test Mode Input

This input displays the current value of the ATS in Test Mode input to the ATS. This input is used to test the ATS. When this input is turned ON, the ATS transfers from the Normal Source to the Emergency Source as if there was a Normal Source Outage. The display is highlighted in Aqua when the Test Mode input is ON. The associated empower SNVT is ATS_Test__.



Transfer Mode Input

This input displays the current value of the Transfer Mode input to the ATS. This input is used to select the transfer mode for the ATS. When this input is turned ON, the ATS is in Closed Transfer mode (paralleling softload). When this input is OFF, the ATS is in Open

Transfer mode (non paralleling). The display is highlighted in Aqua when the Transfer Mode input is ON. The associated empower SNVT is ATS_Close_.



ATS Auto/Manual Input

This input displays the current value of the Auto/Manual input to the ATS. This input is used to select the Auto/Manual Input for the ATS. When this input is turned ON, the ATS is in auto mode. When this input is OFF, the ATS is in Manual Mode. The display is highlighted in Yellow when the Auto/Manual input is OFF. The associated empower SNVT is ATS_Auto_.



ATS Reset Input

This input displays the current value of the Reset input to the ATS. This input is used to Reset the ATS when the emergency source has failed. This input is turned ON momentarily to reset a failed emergency source. The display is highlighted in Aqua when the Reset input is ON. The associated empower SNVT is ATS_Reset_.



ATS Retransfer Input

This input displays the current value of the Retransfer input to the ATS. This input is used to cancel the ATS retransfer timer (TDEN) when the ATS is delay for a retransfer to Normal Source. This input is turned ON momentarily to cancel the delay timer. The display is highlighted in Aqua when the Retransfer input is ON. The associated empower SNVT is ATSRexfer_.



Service Input

This input displays the current value of the Server input to the ATS. This input is used to put the ATS in Service Mode. In Service Mode, the ATS opens both breakers and goes to manual mode. This input would typically be connected to a Service Disconnect switch. The display is highlighted in Red when the Service input is ON. The associated empower SNVT is ATS_Servc_.



3.4.2 OUTPUTS SECTION

Start Emergency Output

This output displays the current value of the Start Emergency output from the ATS. This output is used by

the ATS to send a start signal to the emergency source. This output would typically be connected discrete output that starts that emergency generator. The display is highlighted in Red when the Start Emergency Output is ON. The associated empower SNVT is ATS_StartG.



Emergency Failed Output

This output displays the current value of the Emergency Failed output from the ATS. This is an alarm output used by the ATS to signal that the emergency source has failed. The display is highlighted in Red when the Failed Output is ON. The associated empower SNVT is ATS_Fail_G.



Synchronizing Output

This output displays the current value of the Synchronizing output from the ATS. This output is used by the ATS to turn the Synchronizer ON for Closed Transition Mode. This output it typically connected to the Synchronizer Auto Input. The display is highlighted in Aqua when the Synchronizing Output is ON. The associated empower SNVT is ATSSyncEn_.



Synchronizing Normal Output

This output displays the current value of the Synchronizing Normal output from the ATS. This output is used by the ATS to tell the synchronizer that it should synchronize and close the Normal breaker (rather than the emergency breaker). This output it typically connected to the Synchronizer Synch Utility Input. The display is highlighted in Aqua when the Synchronizing Normal Output is ON. The associated empower SNVT is ATS_EnSynU.



ATS Transferring Output

This output displays the current value of the ATS Transferring output from the ATS. This output is turned ON by the ATS whenever it is in a transferring mode. This output is typically used for diagnostic and annunciation purposes. The display is highlighted in Aqua when the ATS Transferring Output is ON. The associated empower SNVT is ATSlNXfer_.



ATS ReTransferring Output

This output displays the current value of the ATS ReTransferring output from the ATS. This output is turned ON by the ATS whenever it is retransferring to the Normal Source. This output is typically used for diagnostic and annunciation purposes. The display is highlighted in Aqua when the ATS ReTransferring Output is ON. The associated empower SNVT is ATSRexfer_.



ATS Open Transfer Output

This output displays the current value of the ATS Open Transfer output from the ATS. This output is turned ON by the ATS whenever it is doing an Open Transfer. This output is typically used for diagnostic and annunciation purposes. The display is highlighted in Aqua when the ATS Open Transfer Output is ON. The associated empower SNVT is ATS_Xfer_.



Load Switch Output

This output displays the current value of the Load Switch output from the ATS. This output is turned ON by the to tell the Real Power Control to load the generator. When the ATS turns this output OFF, the Real Power Control unloads the generator. This output is typically connected to the Real Power Control Load Switch Input. The display is highlighted in Aqua when the Load Switch Output is ON. The associated empower SNVT is ATS_LdSw_.



ATS Normal Output

This output displays the current value of the ATS Normal output from the ATS. This output is turned ON by the ATS whenever it is the ATS is in its normal, offline state. This output is typically used for diagnostic and annunciation purposes. The display is highlighted in Aqua when the ATS Normal Output is ON. The associated empower SNVT is ATSNormal_.



ATS Service Output

This output displays the current value of the ATS Service output from the ATS. This output is turned ON by the ATS whenever it is the ATS is in Service Mode. This output is typically used for diagnostic and annunciation purposes. The display is highlighted in Aqua when the ATS Service Output is ON. The associated empower SNVT is ATS_Serv_.



ATS Control Mode

This output displays the current ATS Control Mode. This is the actual mode that the ATS Control is in. The associated empower SNVT is ATS_Mode_.



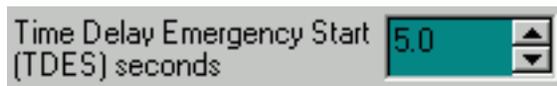
The following is a list of modes for the ATS Control:

- Init State
- Offline
- Gen Start Delay
- Gen Start
- Gen Failed
- Stable Delay
- Open Transfer
- Manual Transfer
- Closed Transfer
- Isochronous
- Retransfer Delay
- Closed Retransfer
- Open Retransfer
- Cooldown Delay

3.4.3 CONFIGURATION/CALIBRATION SECTION

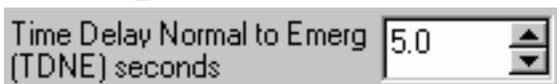
Time Delay Emergency Start (TDES)

This configuration sets the Time Delay Emergency Start Configuration (aka: Gen Start Delay) in seconds. This value sets the amount of delay time between the Normal Source failure until the start signal is sent to the Emergency Source. The associated empower SNVT is ATSDStart_.



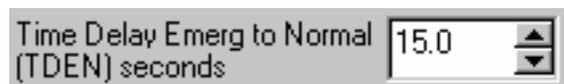
Time Delay Normal to Emergency (TDNE)

This configuration sets the Time Delay Normal to Emergency Configuration (aka: Gen Stable Delay) in seconds. This value sets the amount of delay time that the emergency source must be available before a transfer is initiated. The associated empower SNVT is ATSStable_.



Time Delay Emergency to Normal (TDEN)

This configuration sets the Time Delay Emergency to Normal Configuration (aka: Retransfer Delay) in seconds. This value sets the amount of delay time that the normal source must be available before a retransfer is initiated. The associated enpower SNVT is ATSStable_.



Time Delay Neutral (TDN)

This configuration sets the Time Delay Neutral Configuration (aka: Transfer Delay) in seconds. This value sets the amount of delay time between opening the normal breaker and closing the emergency breaker during an open transfer (and vice versa on an open retransfer). The associated enpower SNVT is ATS_Xfer_.



Time Delay Crank Limit (TDCL)

This configuration sets the Time Delay Crank Limit (aka: Gen Fail to Start Delay) in seconds. This value sets the amount of time allowed for the emergency source to start. This timer is started when the Start Signal is sent to the Emergency source. If the Emergency Source is not available when this timer expires, the ATS fails the emergency source. The associated enpower SNVT is ATS_Fail_G.



Time Delay Emergency Cooldown (TDEC)

This configuration sets the Time Delay Emergency Cooldown (aka: Gen Stop Delay) in seconds. This value sets the amount of time to cooldown the emergency source. This timer is started when a retransfer to normal source is completed. When the timer is expired, the Emergency Start signal is turned OFF. The associated enpower SNVT is ATS_DStop_.



3.5 AUTOMATIC SYNCHRONIZER CONTROL (SYNC)

The Automatic Synchronizer Control window shown in Figure 3-7 is used for the initial setup of enpower controls. This window is used to set up the Automatic Synchronizer Control setpoints and view its inputs and outputs for diagnostics. The fields in this window correspond with the SNVTs in the Auto-synchronizer Relay (SCR) object.

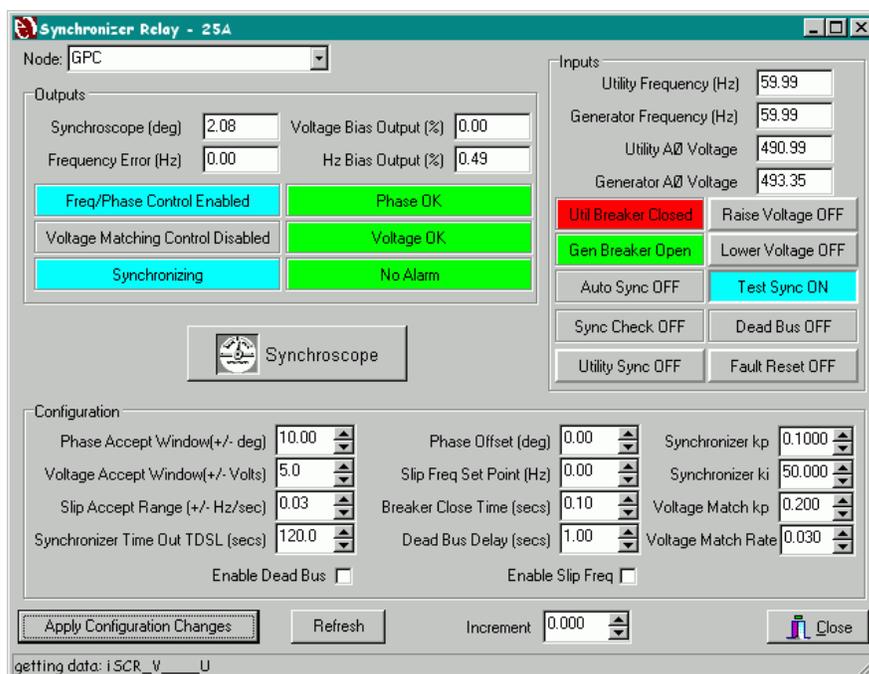
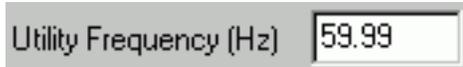


Figure 3-7 Automatic Synchronizer Control

3.5.1 INPUTS SECTION

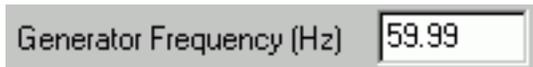
Utility Frequency Input

This input displays the current value of the Utility Frequency input to the Synchronizer. The Synchronizer uses this input for sensing the utility frequency for comparison to the generator frequency during synchronization. The associated empower SNVT is SCR_Hz___U.



Generator Frequency Input

This input displays the current value of the Generator Frequency input to the Synchronizer. The Synchronizer uses this input for sensing the generator frequency for comparison to the Utility frequency during synchronization. The associated empower SNVT is SCR_Hz___G.



Utility Voltage Input

This input displays the current value of the Utility Voltage input to the Synchronizer. The Synchronizer uses this input for sensing the utility voltage for comparison to the generator voltage during synchronization. The associated empower SNVT is SCR_V___U.



Generator Voltage Input

This input displays the current value of the Generator Voltage input to the Synchronizer. The Synchronizer uses this input for sensing the generator voltage for comparison to the utility voltage during synchronization. The associated empower SNVT is SCR_V___G.



Utility Breaker Input

This input displays the current value of the Utility Breaker input to the Synchronizer. The Synchronizer uses this input for determining the status of the Utility Breaker. The display is highlighted in red if the utility breaker is closed, it is highlighted in green if the utility breaker is open. The associated empower SNVT is SCR_Aux___U.



Generator Breaker Input

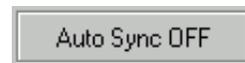
This input displays the current value of the Generator Breaker input to the Synchronizer. The Synchronizer uses this input for determining the status of the Generator Breaker. The display is highlighted in red if

the generator breaker is closed, it is highlighted in green if the generator breaker is open. The associated empower SNVT is SCR_Aux___G.



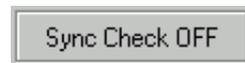
Auto Sync Input

This input displays the current value of the Auto Sync Input to the Synchronizer. This is the Synchronize signal to the Automatic Synchronizer. When this input is turned ON, the synchronizer will sync the two sources and send a close breaker signal. The display is highlighted in Aqua when the Auto Sync Input is ON. The associated empower SNVT is SCR_Auto___.



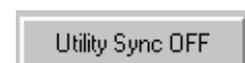
Sync Check Input

This input displays the current value of the Sync Check Input to the Synchronizer. This input puts the Synchronizer in Check Mode. When this input is turned ON, the synchronizer will not actively sync the two sources, but it will turn ON the Voltage OK and Phase OK when the sources are within the configurable set-points for Voltage and Phase. The display is highlighted in Aqua when the Sync Check Input is ON. The associated empower SNVT is SCR_Check_.



Utility Sync Input

This input displays the current value of the Utility Sync Input to the Synchronizer. This input tells the synchronizer that it is synchronizing the utility breaker. When this input is ON, the Synchronizer will send a close signal to the utility breaker instead of the generator breaker. The display is highlighted in Aqua when the Utility Sync Input is ON. This display also functions as a button, so the user can toggle this input ON and OFF from the screen. The associated empower SNVT is SCR_EnSynU.



Raise Voltage Input

This input displays the current value of the Raise Voltage Input to the Synchronizer. This input is used for manual control of the voltage bias output so that the user can do manual synchronization. When this input is ON (and Auto synchronizing is OFF), the voltage bias output is ramped up. The display is highlighted in Aqua when the Raise Voltage Input is ON. This display also functions as a button, so the user can toggle this input ON and OFF from the screen. The associated empower SNVT is SCR_RaiseV_.



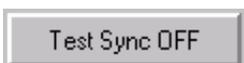
Lower Voltage Input

This input displays the current value of the Lower Voltage Input to the Synchronizer. This input is used for manual control of the voltage bias output so that the user can do manual synchronization. When this input is ON (and Auto synchronizing is OFF), the voltage bias output is ramped down. The display is highlighted in Aqua when the Lower Voltage Input is ON. This display also functions as a button, so the user can toggle this input ON and OFF from the screen. The associated enpower SNVT is SCRLowerV_.



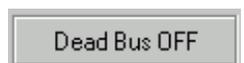
Test Sync Input

This input displays the current value of the Test Sync Input to the Synchronizer. This input is used to test the operation of the Synchronizer without actually closing the breaker. When this input is turned ON, the synchronizer will actively synchronize the two sources but NOT send a close breaker signal. The display is highlighted in Aqua when the Test Sync Input is ON. This display also functions as a button, so the user can toggle this input ON and OFF from the screen. The associated enpower SNVT is SCR_Test_.



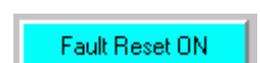
Enable Deadbus Input

This input displays the current value of the Enable Deadbus Input to the Synchronizer. This input is used to enable deadbus closing. When this input is ON, the synchronizer will close the generator breaker when it is put into Auto Sync and it senses a dead bus condition. The display is highlighted in Aqua when the Enable Deadbus Input is ON. The associated enpower SNVT is SCR_EnDB_.



Fault Reset Input

This input displays the current value of the Fault Reset Input to the Synchronizer. This input is used to reset the Synchronizer Alarm Output. The display is highlighted in Aqua when the Fault Reset Input is ON. This display also functions as a button, so the user can toggle this input ON and OFF from the screen. The associated enpower SNVT is SCR_Reset_.



3.5.2 OUTPUTS SECTION

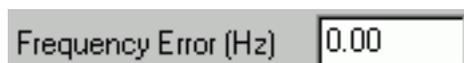
Synchroscope Output

This output displays the current value of the Synchroscope output from the synchronizer. This output displays the current synchroscope position in degrees. This output is typically used as a diagnostic tool so that the user can see the phase relationship between the generator and utility sources. The associated enpower SNVT is SCRSScope_.



Frequency Error Output

This output displays the current value of the Frequency Error output from the synchronizer. The Frequency Error is the difference between the frequencies of the two sources. This output is typically used as a diagnostic tool. The associated enpower SNVT is SCR_HzErr_.



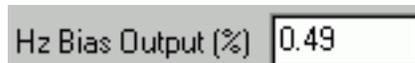
Voltage Bias Output

This output displays the current value of the Voltage Bias Output from the synchronizer. The Voltage Bias Output is usually connected to the Voltage Bias Input on the Reactive Power Control. During synchronization, the Reactive Power Control will allow the synchronizer's voltage bias to pass through and bias the generator's voltage setpoint. The associated enpower SNVT is SCR_VBias_.



Frequency Bias Output

This output displays the current value of the Frequency Bias Output from the synchronizer. The Frequency Bias Output is usually connected to the Frequency Bias Input on the Real Power Control. During synchronization, the Real Power Control will allow the synchronizer's frequency bias to pass through and bias the generator's speed setpoint. The associated enpower SNVT is SCRHzBias_.



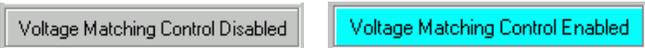
Frequency/Phase Control Enabled Output

This output displays the current value of the Frequency/Phase Control Enabled output from the Synchronizer. The Synchronizer turns the output ON whenever it is attempting to match the frequency and phase. The display is highlighted in Aqua when the Freq/Phase Control Enabled Output is ON. The associated enpower SNVT is SCR_FPCEn_.



Voltage Matching Control Enabled Output

This output displays the current value of the Voltage Matching Control Enabled output from the Synchronizer. The Synchronizer turns the output ON whenever it is attempting to match the Voltage. The display is highlighted in Aqua when the Voltage Matching Control Enabled Output is ON. The associated enpower SNVT is SCR_VMCEn_.



Synchronizing Enabled Output

This output displays the current value of the Synchronizing Enabled output from the Synchronizer. The Synchronizer turns the output ON whenever it is attempting to synchronize the two sources. The display is highlighted in Aqua when the Synchronizing Enabled Output is ON. The associated enpower SNVT is SCR_SynOn_.



Phase OK Output

This output displays the current value of the Phase OK output from the Synchronizer. The Synchronizer turns the output ON whenever the Frequency and Phase are matched between the two sources. The display is highlighted in Green when the Phase OK Output is ON, it is highlighted in Red when the Phase OK Output is OFF. The associated enpower SNVT is SCR_P_OK_.



Voltage OK Output

This output displays the current value of the Voltage OK output from the Synchronizer. The Synchronizer turns the output ON whenever the Voltages are matched between the two sources. The display is highlighted in Green when the Voltage OK Output is ON, it is highlighted in Red when the Voltage OK Output is OFF. The associated enpower SNVT is SCR_V_OK_.



Synchronizer Fault Output

This output displays the current value of the Synchronizer Fault Output from the Synchronizer. The Synchronizer turns the output ON during a fail to sync condition. The display is highlighted in Red when the Fault Output is ON, it is highlighted in Green when the Fault Output is OFF. The associated enpower SNVT is SCR_Fault_.

3.5.3 CONFIGURATION/CALIBRATION SECTION

Phase Accept Window

This configuration sets the Phase Accept Window for the synchronizer in degrees. This is the +/- window around 0 where the synchronizer considers the phase matched. So, if the phase is within 10 degrees either side of 0 (12 O'clock on the synchroscope), the phase is matched. The associated enpower SNVT is SCR_P_acpt_.



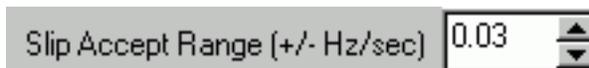
Voltage Accept Window

This configuration sets the Voltage Accept Window for the synchronizer in Volts. This is the +/- window around the utility voltage where the synchronizer considers the voltages matched. So, if the generator voltage is within 5 Volts either side of utility voltage, the voltages are matched. The associated enpower SNVT is SCR_V_acpt_.



Slip Accept Window

This configuration sets the Slip Accept Window for the synchronizer in degrees. This is the +/- window around the slip setpoint where the synchronizer considers the slip acceptable. So, if the slip frequency is within .03 Hz either side of slip frequency, the slip is accepted. The associated enpower SNVT is SCR_S_acpt_.



Synchronizer Timeout

This configuration sets the synchronizer timeout in seconds. This is the delay time used for the Fail to Sync Timer. The associated enpower SNVT is SCR_Syn_to_.



Synchronizer Phase Offset

This configuration sets the synchronizer phase offset in degrees. The purpose of this configuration is to offset the phase setting for the synchronizer for calibration. This configuration is very seldom used. The associated enpower SNVT is SCR_PhOs_.



Slip Frequency Setpoint

This configuration sets the slip frequency setpoint in Hertz. This configuration sets the slip frequency that the synchronizer attempts to hold during slip frequency synchronizing. The associated enpower SNVT is SCR_Slip__.

Slip Freq Set Point (Hz)

Breaker Close Time

This configuration sets the Breaker Close Time in seconds. This value is the amount of delay from the time that a close signal is sent until the breaker actually closes. The synchronizer uses this setting for anticipating when the breaker will close to insure that the sources are actually in phase when the breaker does close. The associated enpower SNVT is SCR_cls_t__.

Breaker Close Time (secs)

Dead Bus Delay Time

This configuration sets the Dead Bus Delay Time in seconds. This value sets the amount of time that the synchronizer must sense a dead bus before it will allow the breaker to be closed on a dead bus. The associated enpower SNVT is SCR_DBdly__.

Dead Bus Delay (secs)

Synchronizer Control Kp

This configuration sets the Proportional Gain for the Synchronizer's Frequency / Phase Control. The Synchronizer uses this setting to set the dynamics of the PID loop used for matching the frequency and phase. The associated enpower SNVT is SCR_FPCKp__.

Synchronizer kp

Synchronizer Control Ki

This configuration sets the Integral Gain for the Synchronizer's Frequency / Phase Control. The Synchronizer uses this setting to set the dynamics of the PID loop used for matching the frequency and phase. The associated enpower SNVT is SCR_FPCKi__.

Synchronizer ki

Voltage Match Control Kp

This configuration sets the Proportional Gain for the Synchronizer's Voltage Matching Control. The Synchronizer uses this setting to set the dynamics of the PID loop used for matching the Voltage. The associated enpower SNVT is SCR_VMCKp__.

Voltage Match kp

Voltage Match Rate

This configuration sets the Voltage Ramp rate. The Synchronizer uses this setting to control how fast it ramps the Voltage Bias output when it is matching the voltages. The associated enpower SNVT is SCR_VRate__.

Voltage Match Rate

Enable Dead Bus

This configuration sets the Enable Dead Bus. This setting is used to turn Dead Bus ON or OFF in the synchronizer. The associated enpower SNVT is SCR_EnDB__.

Enable Dead Bus

Enable Slip Frequency Control

This configuration sets the Enable Slip Frequency. This setting is used to turn Slip Frequency Control ON. When this setting is OFF, the synchronizer uses frequency/phase matching control. The associated enpower SNVT is SCREnSlip__.

Enable Slip Freq

3.6 GENERATOR BREAKER CONTROL (GEN BKR)

The Generator Breaker Control window shown in Figure 3-8 is used for the initial setup of enpower controls. This window is used to set up the Generator Breaker Control setpoints and view its inputs and outputs for diagnostics. The fields in this window correspond with the SNVTs in the Gen Circuit Breaker Control (CBC) object.

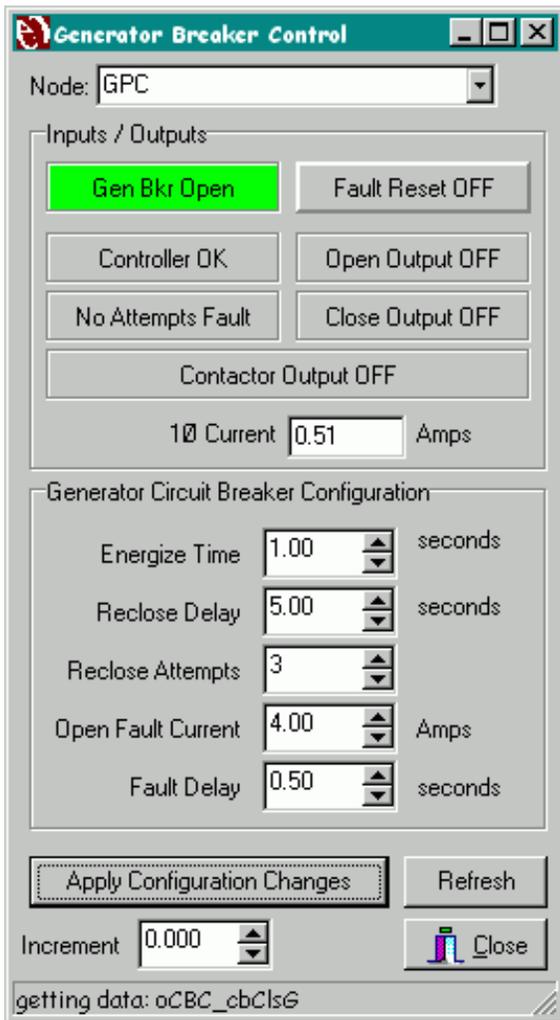


Figure 3-8 Generator Breaker Control

3.6.1 INPUTS / OUTPUTS SECTION

Generator Breaker Auxiliary Input

This input displays the current value of the Generator Breaker Auxiliary Input to the Gen Breaker Control. The Gen Breaker Control uses this input for determining the status of the Generator Breaker. The display is highlighted in red if the generator breaker is closed, it is highlighted in green if the generator breaker is open. The associated empower SNVT is CBC__Aux_G.



Fault Reset Input

This input displays the current value of the Fault Reset Input to the Gen Breaker Control. This input is used to reset the Breaker Control Fault and the Close Attempts Fault. The display is highlighted in Aqua when the Fault Reset Input is ON. This display also functions as a but-

ton, so the user can toggle this input ON and OFF from the screen. The associated empower SNVT is CBCFItRstG.



Controller Fault Output

This output displays the current value of the Controller Fault Output from the Gen Breaker Control. The Gen Breaker Control turns this output ON when there has been a control fault with the generator breaker. The display is highlighted in red when the Fault Output is ON. The associated empower SNVT is CBC_FaultG.



Close Attempts Fault Output

This output displays the current value of the Close Attempts Fault Output from the Gen Breaker Control. The Gen Breaker Control turns this output ON when the generator breaker has failed to close after the configurable number of attempts. The display is highlighted in red when the Attempts Fault Output is ON. The associated empower SNVT is CBCCAmpsG.



Breaker Open Output

This output displays the current value of the Breaker Open Output from the Gen Breaker Control. The Gen Breaker Control turns this output ON to Open the generator breaker. The display is highlighted in aqua when the Open Output is ON. The associated empower SNVT is CBC_cbOpnG.



Breaker Close Output

This output displays the current value of the Breaker Close Output from the Gen Breaker Control. The Gen Breaker Control turns this output ON to Close the generator breaker. The display is highlighted in aqua when the Close Output is ON. The associated empower SNVT is CBC_cbClsG.



Contactor Output

This output displays the current value of the Contactor Output from the Gen Breaker Control. This output is used by the Breaker Control to control a Contactor rather than a breaker. This output turns ON to close the Contactor and stays ON continuously. This output then turns OFF to open the Contactor. The display is high-

lighted in aqua when the Contactor Output is ON. The associated enpower SNVT is CBC_Cont_G.



Current Input

This value displays the current value of the input Current to the Generator Breaker Control. The associated enpower SNVT is CBC_Amps_G. This value is used by the Breaker Control to so that it knows the current through the breaker. This Amp value is calculated by multiplying the CT Ratio by the value of the input SNVT. The software needs to know which CT Ratio to use (either 3Ø or 1Ø). Double-clicking on the display will cause the display to toggle between 3Ø and 1Ø so that the user can select the appropriate setting for their application.



3.6.2 CONFIGURATION SECTION

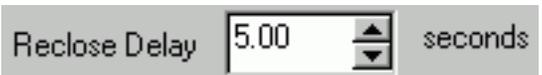
Energize Time

This configuration sets the Energize Time in seconds. This value is the amount of time that the Gen Breaker Control holds the Close and Open Outputs ON. The associated enpower SNVT is CBC_En_t_G.



Reclose Delay Time

This configuration sets the Reclose Delay Time in seconds. This value is the amount of time that the Gen Breaker Control delays after sending a close signal before it will allow another close signal. The associated enpower SNVT is CBC_RCdlyG.



Reclose Attempts

This configuration sets the Reclose Attempts for the Gen Breaker Control. This value is the number of attempts allowed before the attempts fault is turned ON. The associated enpower SNVT is CBCCAtmpsG.



Open Fault Current

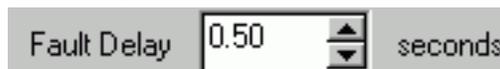
This configuration sets the Open Fault Current in Amps for the Gen Breaker Control. This value sets the current level (in Amps) where the Breaker Control will Fault if it senses that the breaker is Open. The idea is to attempt to sense a failed breaker auxiliary contact. There

shouldn't be any current flowing if the breaker is open. The associated enpower SNVT is CBC_Amps_G.



Fault Delay

This configuration sets the Fault Delay in seconds for the Gen Breaker Control. This value sets the delay time for the open current fault. The excessive current must be present for this amount of time before the fault output is turned ON. The associated enpower SNVT is CBCFtdlyG.



3.7 UTILITY BREAKER CONTROL (UTIL BKR)

The Utility Breaker Control window shown in Figure 3-9 is used for the initial setup of enpower controls. This screen is used to set up the Utility Breaker Control set-points and view its inputs and outputs for diagnostics. The fields in this window correspond with the SNVTs in the Util Circuit Breaker Control (CBC) object.

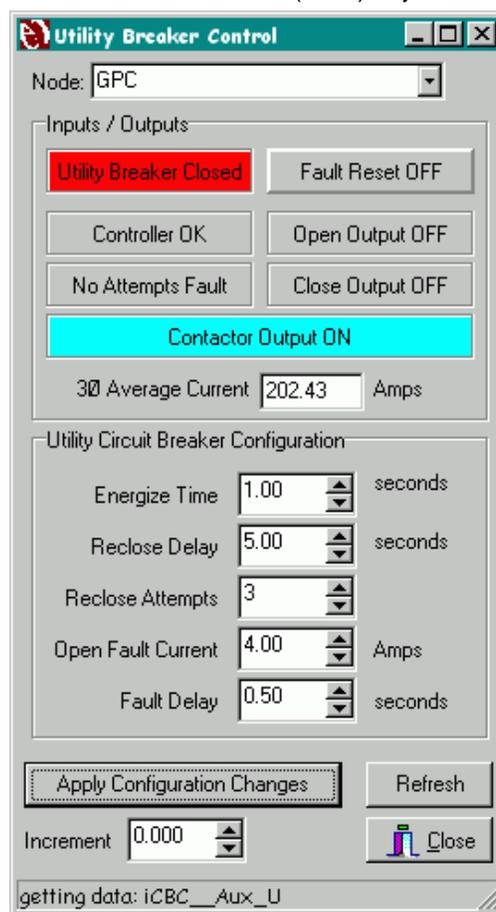


Figure 3-9 Utility Breaker Control

3.7.1 INPUTS / OUTPUTS SECTION

Utility Breaker Auxiliary Input

This input displays the current value of the Utility Breaker Auxiliary Input to the Util Breaker Control. The Util Breaker Control uses this input for determining the status of the Utility Breaker. The display is highlighted in red if the Utility breaker is closed, it is highlighted in green if the utility breaker is open. The associated enpower SNVT is CBC__Aux_U.



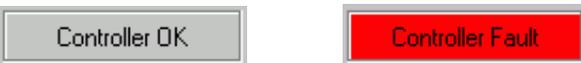
Fault Reset Input

This input displays the current value of the Fault Reset Input to the Util Breaker Control. This input is used to reset the Breaker Control Fault and the Close Attempts Fault. The display is highlighted in Aqua when the Fault Reset Input is ON. This display also functions as a button, so the user can toggle this input ON and OFF from the screen. The associated enpower SNVT is CBCFItRstU.



Controller Fault Output

This output displays the current value of the Controller Fault Output from the Util Breaker Control. The Util Breaker Control turns this output ON when there has been a control fault with the utility breaker. The display is highlighted in red when the Fault Output is ON. The associated enpower SNVT is CBC_FaultU.



Close Attempts Fault Output

This output displays the current value of the Close Attempts Fault Output from the Util Breaker Control. The Util Breaker Control turns this output ON when the utility breaker has failed to close after the configurable number of attempts. The display is highlighted in red when the Attempts Fault Output is ON. The associated enpower SNVT is CBCCAtmpsU.



Breaker Open Output

This output displays the current value of the Breaker Open Output from the Util Breaker Control. The Util Breaker Control turns this output ON to Open the utility breaker. The display is highlighted in aqua when the Open Output is ON. The associated enpower SNVT is CBC_cbOpnU.



Breaker Close Output

This output displays the current value of the Breaker Close Output from the Util Breaker Control. The Util Breaker Control turns this output ON to Close the utility breaker. The display is highlighted in aqua when the Close Output is ON. The associated enpower SNVT is CBC_cbClsU



Contactor Output

This output displays the current value of the Contactor Output from the Util Breaker Control. This output is used by the Breaker Control to control a Contactor rather than a breaker. This output turns ON to close the Contactor and stays ON continuously. This output then turns OFF to open the Contactor. The display is highlighted in aqua when the Contactor Output is ON. The associated enpower SNVT is CBC_Cont_U.



Current Input

This value displays the current value of the input Current to the Utility Breaker Control. The associated enpower SNVT is CBC_Amps_U. This value is used by the Breaker Control to so that it knows the current through the breaker. This Amp value is calculated by multiplying the CT Ratio by the value of the input SNVT. The software needs to know which CT Ratio to use (either 3Ø or 1Ø). Double-clicking on the display will cause the display to toggle between 3Ø and 1Ø so that the user can select the appropriate setting for their application.



3.7.2 CONFIGURATION SECTION

Energize Time

This configuration sets the Energize Time in seconds. This value is the amount of time that the Util Breaker Control holds the Close and Open Outputs ON. The associated enpower SNVT is CBC_En_t_U.



Reclose Delay Time

This configuration sets the Reclose Delay Time in seconds. This value is the amount of time that the Util Breaker Control delays after sending a close signal

before it will allow another close signal. The associated empower SNVT is CBC_RCdlyU.

Reclose Delay seconds

Reclose Attempts

This configuration sets the Reclose Attempts for the Util Breaker Control. This value is the number of attempts allowed before the attempts fault is turned ON. The associated empower SNVT is CBCCAtmpsU.

Reclose Attempts

Open Fault Current

This configuration sets the Open Fault Current in Amps for the Util Breaker Control. This value sets the current level (in Amps) where the Breaker Control will Fault if it senses that the breaker is Open. The idea is to attempt to sense a failed breaker auxiliary contact. There shouldn't be any current flowing if the breaker is open. The associated empower SNVT is CBC_Amps_U.

Open Fault Current Amps

Fault Delay

This configuration sets the Fault Delay in seconds for the Util Breaker Control. This value sets the delay time for the open current fault. The excessive current must be present for this amount of time before the fault output is turned ON. The associated empower SNVT is CBCFtDlyU.

Fault Delay seconds

SECTION 4 INPUTS/OUTPUTS

The Inputs/Outputs Tab contains seven screens for viewing all of the I/O on the enpower controls. These screens are normally used for diagnostics and troubleshooting of enpower controls.



4.1 DEMAND METERS

The Demand Meters dialog box shown in Figure 4-1 is used to view the Demand Meters contained in the enpower controls. Using this screen, the user can setup and view the Demand Meters. The Demand Meters are used to calculate and display demand by either a sliding window calculation or a Thermal Time Constant calculation. This screen is associated with the three enpower LonMark Objects called Demand Meter 1, Demand Meter 2, and Demand Meter 3 (DMD).

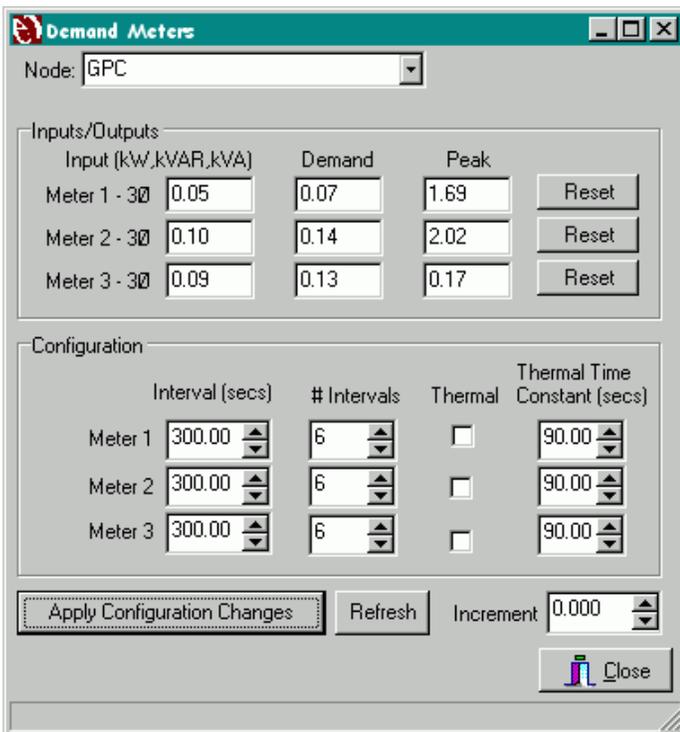


Figure 4-1 Demand Meters

Meter 1-3 Inputs

These three inputs display the inputs to the Demand Meters #1, #2 and #3. These values could be in kW,

kVAR, or kVA all depending on the application. The associated enpower SNVTs are DMD_In_1_, DMD_In_2_, and DMD_In_3_. These values are used by the Demand Meters to determine Demand and Peak outputs. These values are calculated by multiplying the PT and CT Ratios by the value of the input SNVTs. The software needs to know which PT and CT Ratios to use (either 3Ø or 1Ø). Double-clicking on the displays will cause the displays to toggle between 3Ø and 1Ø so that the user can select the appropriate setting for their application.

Meter 1-3 Demand Outputs

These three outputs display the Demand Outputs from the Demand Meters. The Demand Outputs are calculated by the method selected in the configuration section. The associated enpower SNVTs are DMD_W_1_, DMD_W_2_, and DMD_W_3_.

Meter 1-3 Peak Demand Outputs

These three outputs display the Peak Demand Outputs from the Demand Meters. The Peak Demand Outputs display the highest input value seen since the last reset. The associated enpower SNVTs are DMD_Peak1_, DMD_Peak2_, and DMD_Peak3_.

Meter 1-2 Reset Input Buttons

These three buttons are used to reset the Peak Demand and the Demand Outputs for the Demand Meters. The associated enpower SNVTs are DMDReset1_, DMDReset2_, and DMDReset3_.

Meter 1-3 Interval

These three configurations set the sliding window interval for the Demand Meters. This is the interval (in seconds) that defines the width of the sliding window. The associated enpower SNVTs are DMDIntvl1_, DMDIntvl2_, and DMDIntvl3_.

Number of Intervals

These three configurations set the number of sliding windows used in the average calculation for each of the Demand Meters. The associated enpower SNVTs are

DMD_lvs1_, DMD_lvs2_, and DMD_lvs3_.

Thermal

These three configurations set the Demand Meters to use the Thermal Calculation rather than the sliding window calculation. Check these check boxes to enable Thermal Calculation, uncheck them to enable the sliding window calculation. The associated enpower SNVTs are DMDThrm1_, DMDThrm2_, and DMDThrm3_.

Thermal Time Constant

These three configurations set the Thermal Time Constants for the Demand Meters. These configurations are used by the Demand Meters when they are calculating the Demand Outputs using the thermal method. The associated enpower SNVTs are DMD_TmK1_, DMD_TmK2_, and DMD_TmK3_.

4.2 ENERGY METERS

The Energy Meters dialog box shown in Figure 4-2 is used to view the Energy Meters contained in the enpower controls. Using this screen, the user can setup and view the Energy Meters. This screen is associated with the three enpower LonMark Objects called Energy Meter 1, Energy Meter 2, and Energy Meter 3 (EGY).

application.

Meter 1-3 Outputs

These three outputs display the outputs from the Energy Meters. These values could be in kWh, kVARh, or kVAh all depending on the application. The associated enpower SNVTs are EGY_whr1_, EGY_whr2_, and EGY_whr3_.

4.3 POWER METERS

The Power Meters dialog box shown in Figure 4-3 is used to view the Power Meters contained in the enpower controls. This screen is used to view the load and/or power factor on each of the phase inputs. This screen is normally used for diagnostics and during startup to verify that the PTs and CTs have been wired correctly. This screen is associated with the four enpower LonMark Objects called Phase A Power, Phase B Power, Phase C Power, and Single Phase Power (PS_).

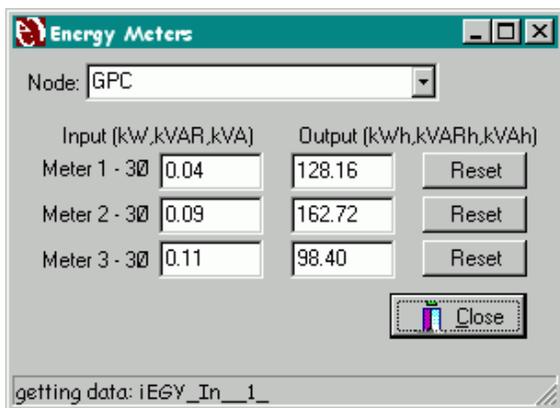


Figure 4-2 Energy Meters

Meter 1-3 Inputs

These three inputs display the inputs to the Energy Meters #1, #2 and #3. These values could be in kW, kVAR, or kVA all depending on the application. The associated enpower SNVTs are EGY_In__1_, EGY_In__2_, and EGY_In__3_. These values are used by the Energy Meters to determine Energy outputs. These input values are calculated by multiplying the PT and CT Ratios by the value of the input SNVTs. The software needs to know which PT and CT Ratios to use (either 3Ø or 1Ø). Double-clicking on the displays will cause the displays to toggle between 3Ø and 1Ø so that the user can select the appropriate setting for their

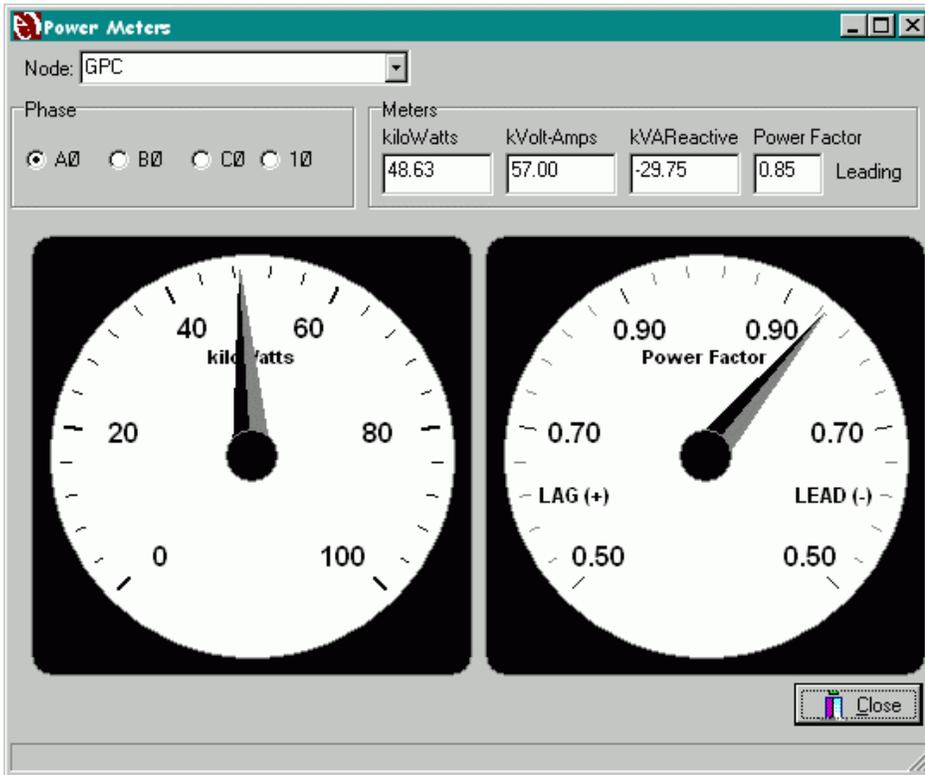


Figure 4-3 Power Meters

Phase Setting

The Phase Setting selects which Phase the meters are currently looking at. With AØ selected, the meters are looking at A Phase values. Table 4-1 shows the associated empower SNVTs for each Phase selection:

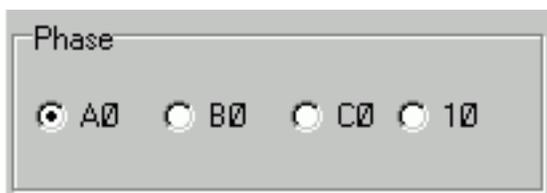
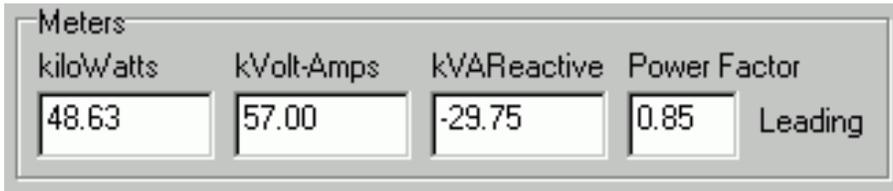


Table 4-1 Phase SNVTs

Phase	kW Meter	kVA Meter	kVAR Meter	PF Meter
AØ	PS_W__A	PS_VA__A	PS_VAR__A	PS_PF__A
BØ	PS_W__B	PS_VA__B	PS_VAR__B	PS_PF__B
CØ	PS_W__C	PS_VA__C	PS_VAR__C	PS_PF__C
1Ø	PS_W__1	PS_VA__1	PS_VAR__1	PS_PF__1

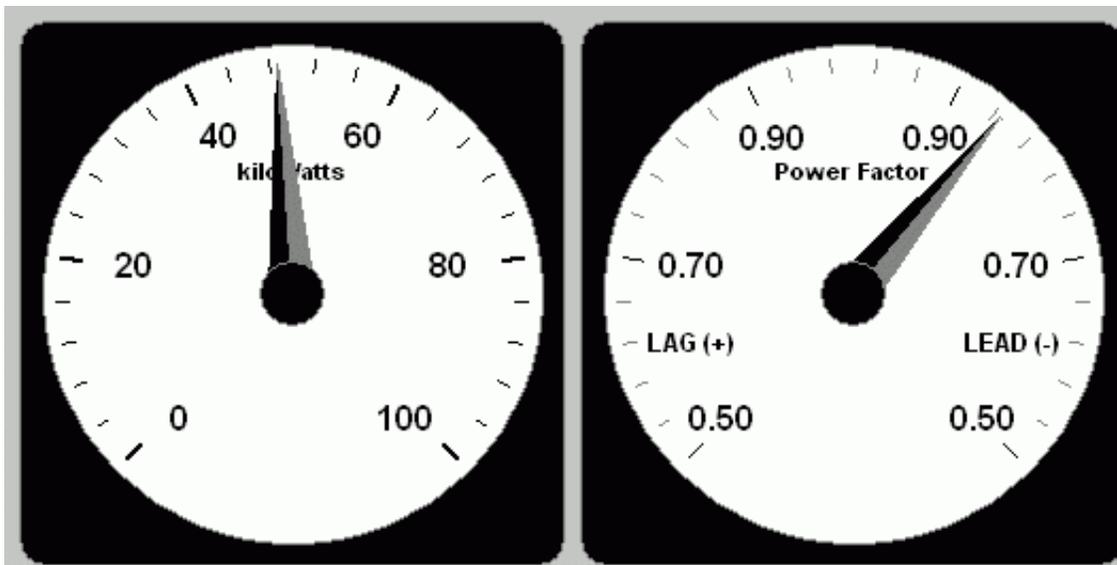
Digital Meters

The Digital Meters display the kiloWatts, kiloVolt-Amps, kiloVolt-Amps-Reactive and Power Factor for the selected Phase. The associated enpower SNVTs are shown in Table 4-1.



Analog Meters

The Analog Meters are configurable to display kW, kVA, kVAR, or Power Factor. Double-Click on the Meter to select what the meter is displaying. The meter range is also configurable by double-clicking on the meter. The associated enpower SNVTs are shown in Table above.



4.4 THREE PHASE TOTALS AND AVERAGES

The Three Phase Totals and Averages dialog box shown in Figure 4-4 is used to view the three phase values in the enpower controls. This screen is normally used for diagnostics and during startup to verify that the PTs and CTs have been wired correctly. This screen is associated with the enpower LonMark Object called Three Phase Power (TP_).

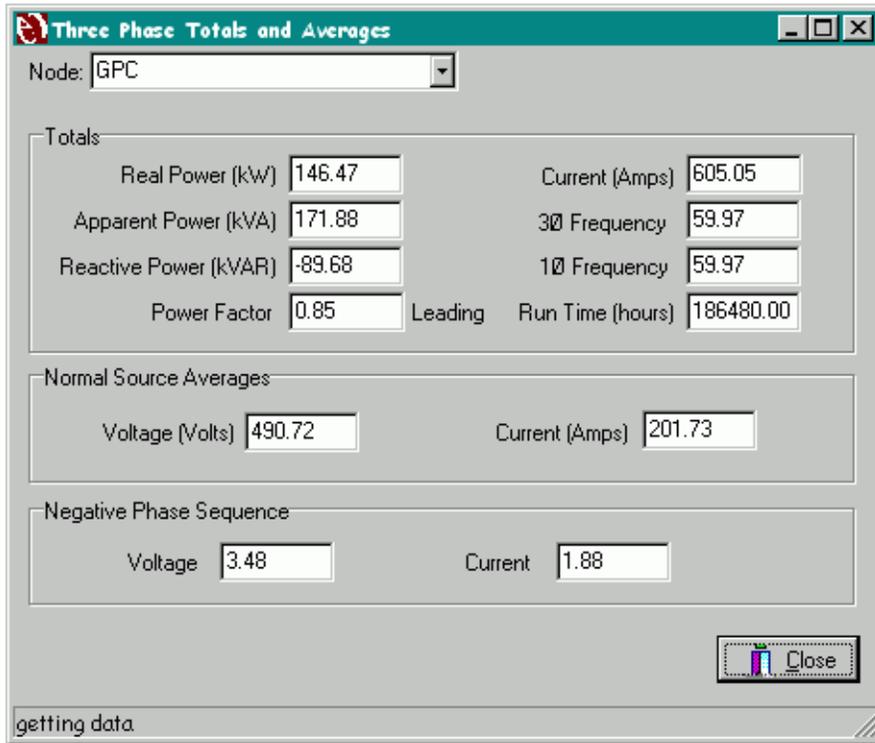


Figure 4-4 Three Phase Totals and Averages

Real Power

This output displays the three phase Real Power (kW) as it is measured by the enpower control. The associated enpower SNVT is TP__W__3.

Apparent Power

This output displays the three phase Apparent Power (kVA) as it is measured by the enpower control. The associated enpower SNVT is TP__VA__3.

Reactive Power

This output displays the three phase Reactive Power (kVAR) as it is measured by the enpower control. The associated enpower SNVT is TP__VAR__3.

Power Factor

This output displays the three phase Power Factor as it is measured by the enpower control. The associated enpower SNVT is TP__PF__3.

Current

This output displays the TOTAL three phase Current (Amps) as it is measured by the enpower control. Note that this is NOT phase current, this is all three phase added together. The associated enpower SNVT is TP_Tot_I_3.

3 Phase Frequency

This output displays the 3Ø frequency (in Hz) as measured by the enpower control at the three phase PT inputs. The associated enpower SNVT is HZS_Hz__3.

Single Phase Frequency

This output displays the 1Ø frequency (in Hz) as measured by the enpower control at the single phase PT input. The associated enpower SNVT is HZS_Hz__1.

Run Time Hours

This output displays the Run Time hours from the Run Time LonMark Object. The associated enpower SNVT is HR_RnTime_.

Voltage

This output displays the Average Voltage of the three phase PT inputs to the enpower control. The associated enpower SNVT is TP_Avg_V_3.

Current

This output displays the Average Current of the three phase CT inputs to the enpower control. The associated enpower SNVT is TP_Avg_I_3.

NPS Voltage

This output displays the Negative Phase Sequence

Voltage (unbalance Voltage) as it is measured by the enpower control. The associated enpower SNVT is TP_nps_V_3.

NPS Current

This output displays the Negative Phase Sequence Current (unbalance Current) as it is measured by the enpower control. The associated enpower SNVT is TP_nps_I_3.

4.5 DIGITAL INPUTS AND OUTPUTS

The Digital Inputs and Outputs dialog box shown in Figure 4-5 is used to view the enpower’s hardware discrete inputs and outputs. This screen is normally used for diagnostics and during startup to verify that the Inputs and Outputs have been wired correctly. This screen is associated with the two enpower LonMark Objects called Discrete Input Sensors (DIS) and Discrete Output Actuators (DOA).

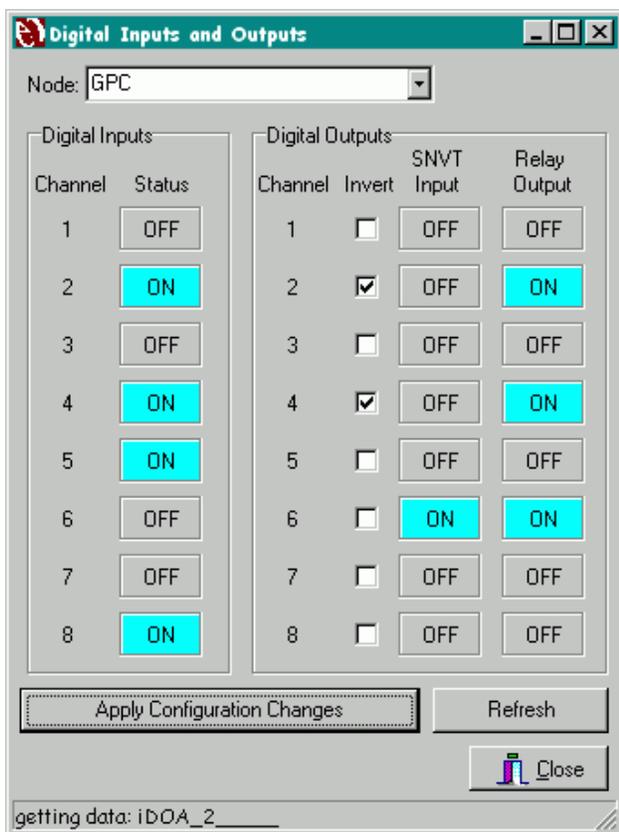


Figure 4-5 Digital Input and Outputs

Digital Inputs

The Inputs section displays the eight hardware discrete inputs to the enpower control. The displays are high-lighted in Aqua if the input is ON. The associated

enpower SNVTs are DIS_1_____, DIS_2_____, DIS_3_____, DIS_4_____, DIS_5_____, DIS_6_____, DIS_7_____, and DIS_8_____.

Invert Digital Outputs

The Invert check boxes are used to invert the digital outputs. These configurations are used to make the digital outputs reverse acting. The associated enpower SNVTs are DOAInvert1_, DOAInvert2_, DOAInvert3_, DOAInvert4_, DOAInvert5_, DOAInvert6_, DOAInvert7_, and DOAInvert8_.

SNVT Inputs and Relay Outputs

The SNVT Inputs display the value of the variable driving the digital outputs. The Relay outputs display the value of the actual hardware output (if the output is inverted, they will be reversed). The associated enpower SNVTs for the SNVT inputs are iDOA_1_____, DOA_2_____, DOA_3_____, DOA_4_____, DOA_5_____, DOA_6_____, DOA_7_____, and DOA_8_____.

4.6 ANALOG OUTPUTS

The Analog Outputs Screen shown in Figure 4-6 is used to view the enpower’s hardware analog outputs. This screen is normally used for diagnostics and during start-up to verify that the Outputs have been wired correctly. This screen is associated with the two enpower LonMark Objects called Frequency Bias Output and Voltage Bias Output (AOA).

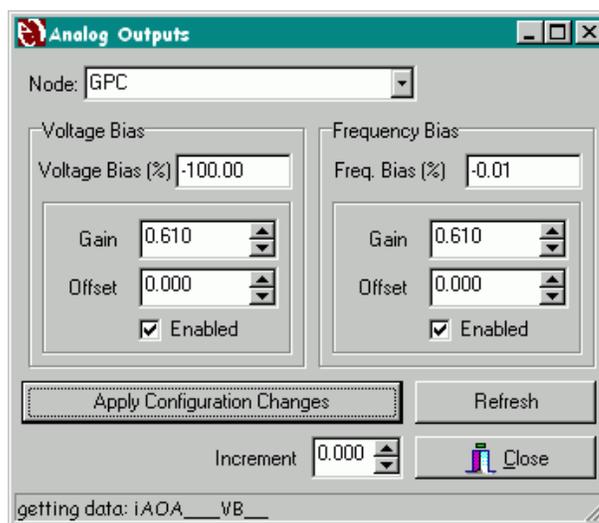


Figure 4-6 Analog Outputs

Voltage Bias Input

The Voltage Bias Input displays the current value of the input SNVT to the Voltage Bias Analog Output Actuator. The associated enpower SNVT is AOA____VB_.

Voltage Bias Gain

The Voltage Bias Gain configuration is used to adjust the gain of the Voltage Bias Output. The Gain and Offset configurations are used so that the enpower controls can be configured to work with a wide variety of Voltage Regulators. The associated enpower SNVT is AOA_Gn_VB_.

Voltage Bias Offset

The Voltage Bias Offset configuration is used to adjust the offset of the Voltage Bias Output. The Gain and Offset configurations are used so that the enpower controls can be configured to work with a wide variety of Voltage Regulators. The associated enpower SNVT is AOA_Os_VB_.

Voltage Bias Output Enabled

The Voltage Bias Enable input is used enable / disable the Voltage Bias Output. The output is enabled when the check box is checked and disabled when it is unchecked. The associated enpower SNVT is AOA_En_VB_.

Frequency Bias Input

The Frequency Bias Input displays the current value of the input SNVT to the Frequency Bias Analog Output Actuator. The associated enpower SNVT is AOA__HzB_.

Frequency Bias Gain

The Frequency Bias Gain configuration is used to adjust the gain of the Frequency Bias Output. The Gain and Offset configurations are used so that the enpower controls can be configured to work with a wide variety of Speed Governors. The associated enpower SNVT is AOA_GnHzB_.

Frequency Bias Offset

The Frequency Bias Offset configuration is used to adjust the offset of the Frequency Bias Output. The Gain and Offset configurations are used so that the enpower controls can be configured to work with a wide variety of Speed Governors. The associated enpower SNVT is AOA_OsHzB_.

Frequency Bias Output Enabled

The Frequency Bias Enable input is used enable / disable the Frequency Bias Output. The output is enabled when the check box is checked and disabled when it is unchecked. The associated enpower SNVT is AOA_EnHzB_.

4.7 HARMONICS

The Harmonics dialog box shown in Figure 4-7 is used to view the harmonic values on the voltage and current inputs to the enpower control. This screen is associated with the eight enpower LonMark Objects for the Voltage and Current Inputs. The LonMark objects are called Phase A Voltage, Phase A Current, Phase B Voltage, Phase B Current, Phase C Voltage, Phase C Current, Single Phase Voltage, and Single Phase Current (VS_ & IS_).

The Harmonics screen gets its information for the 1st - 15th Voltage and Current Harmonics from each of the above eight LonMark Objects. The SNVTs it uses for each are: Phase A Voltage - VS_HInd__A, Phase A Current - IS_HInd__A, Phase B Voltage - VS_HInd__B, Phase B Current - IS_HInd__B, Phase C Voltage - VS_HInd__C, Phase C Current - IS_HInd__C, Single Phase Voltage - VS_HInd__1, Single Phase Current - IS_HInd__1.

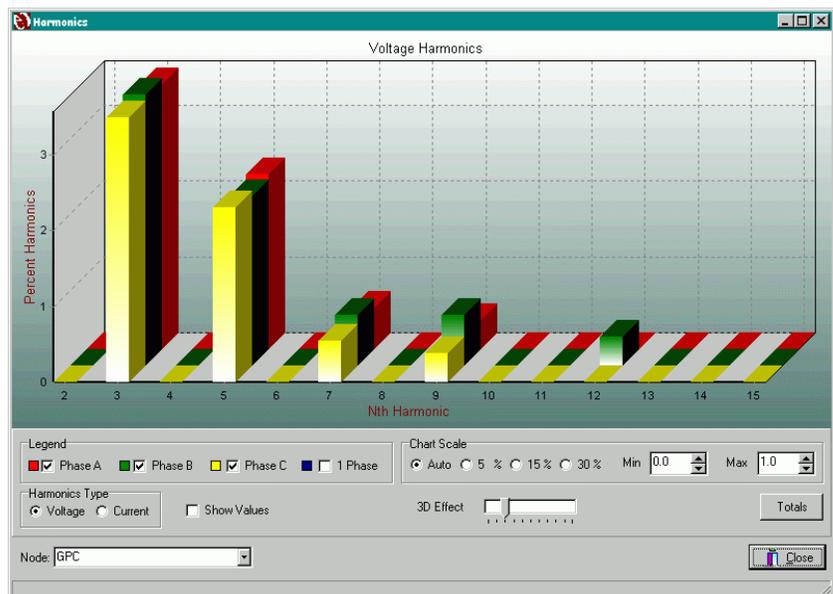


Figure 4-7 Harmonics

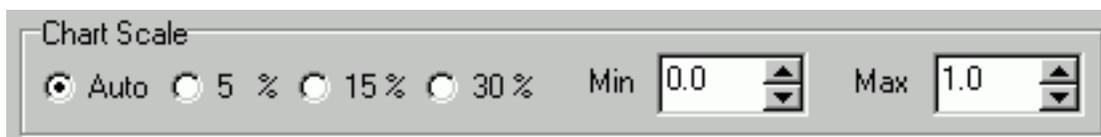
Legend

Use the Legend to select which Phases are displayed on the graph. There can be up to four bars on the graph to represent each of the four phases.



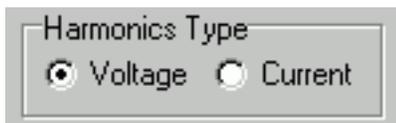
Chart Scale

Use the Chart Scale to select range for the graph. When Auto is selected, the graph will automatically select the range for you. You can select 5%, 15%, or 30% for pre-selects if you like, or you can manually enter a minimum and maximum setpoint for the graph.



Harmonics Type

Use the Harmonics type to select whether the graph displays the Voltage or Current Harmonics.



Show Values

When Show Values is selected, the actual values will be displayed on the graph.



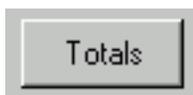
3D Effect

The 3D Effect slider bar adjusts the 3D effect on the graph.



Total Harmonics

Clicking the Totals button opens the Total Harmonics dialog box shown in Figure 4-8.



The Total Harmonics Screen is used to view the total harmonic values, total odd harmonic values, and the total even harmonic values on the voltage and current inputs to the empower control. This screen is associated

with the eight empower LonMark Objects for the Voltage and Current Inputs. The LonMark objects are called Phase A Voltage, Phase A Current, Phase B Voltage, Phase B Current, Phase C Voltage, Phase C Current, Single Phase Voltage, and Single Phase Current (VS_ & IS_).

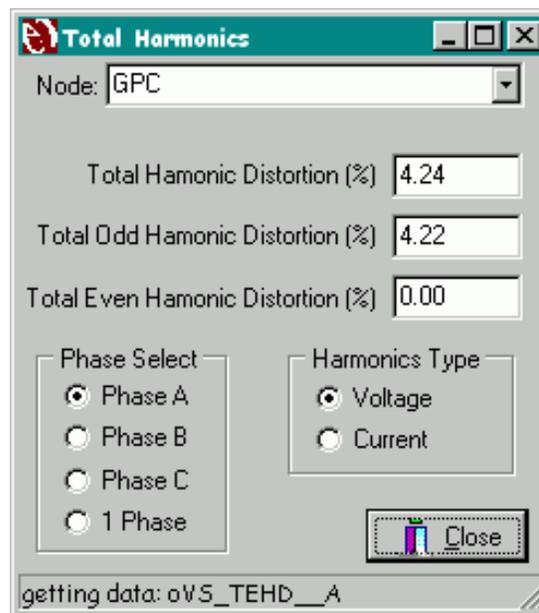


Figure 4-8 Total Harmonics

The associated enpower SNVTs that are used for displaying the information on the Total Harmonics Screen are shown in Table 4-2. The Phase is selected with the Phase Selection radio buttons, the Harmonics Type (Voltage or Current) is selected with the Harmonics Type radio button.

Table 4-2 Harmonics SNVTs

	Total Harmonics	Total Odd Harmonics	Total Even Harmonics
Phase A Voltage	VS_THD__A	VS_TOHD__A	VS_TEHD__A
Phase A Current	IS_THD__A	IS_TOHD__A	IS_TEHD__A
Phase B Voltage	VS_THD__B	VS_TOHD__B	VS_TEHD__B
Phase B Current	IS_THD__B	IS_TOHD__B	IS_TEHD__B
Phase C Voltage	VS_THD__C	VS_TOHD__C	VS_TEHD__C
Phase C Current	IS_THD__C	IS_TOHD__C	IS_TEHD__C
Phase 1 Voltage	VS_THD__1	VS_TOHD__1	VS_TEHD__1
Phase 1 Current	IS_THD__1	IS_TOHD__1	IS_TEHD__1

Total Harmonic Distortion

This output displays the total harmonic distortion (in percent) for the Voltage or Current inputs. The associated enpower SNVT for Total Voltage Harmonic Distortion is shown in the table above.

Total Odd Harmonic Distortion

This output displays the total odd harmonic distortion (in percent) for the Voltage or Current inputs. The associated enpower SNVT for Total Odd Harmonic Distortion is shown in the table above.

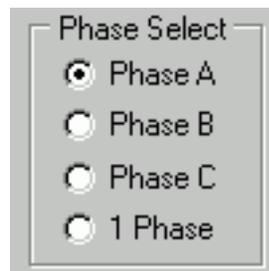
Total Even Harmonic Distortion

This output displays the total even harmonic distortion (in percent) for the Voltage or Current inputs. The associated enpower SNVT for Total Even Harmonic

Distortion is shown in the table above.

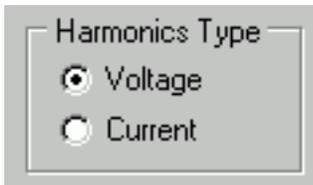
Phase Select

Use the Phase Select to select which SNVTs are used (from the table above) for displaying the Total Harmonic Distortion, Total Odd Harmonic Distortion, and Total Even Harmonic Distortion.



Harmonics Type

Use the Harmonics type to select whether the total Harmonics that are displayed are Voltage or Current Harmonics. The Harmonics Type selects which are used (from the table above) for displaying the Total Harmonic Distortion, Total Odd Harmonic Distortion, and Total Even Harmonic Distortion.



A rectangular control panel with a light gray background and a thin border. At the top, the text "Harmonics Type" is displayed. Below the text are two radio button options: "Voltage" with a filled-in circle, and "Current" with an empty circle.

SECTION 5 TOOLS

The Tools Tab contains three screens for viewing the troubleshooting enpower controls. There is a synchroscope for setting up the automatic synchronizer and two Annunciator screens.



5.1 SYNCHROSCOPE

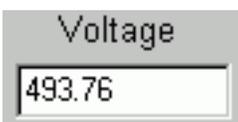
The Synchroscope dialog box shown in Figure 5-1 is used to view the synchroscope internal to the enpower control. This screen is typically used at startup and for troubleshooting the automatic synchronizer. This screen is associated with the four enpower LonMark Objects called Auto-synchronizer Relay (25A) (SCR).



Figure 5-1 Synchroscope

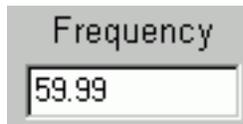
Gen Input Voltage

This input displays the current value (in Volts) of the Generator Voltage Input on the synchronizer. The associated enpower SNVT is SCR_V___G.



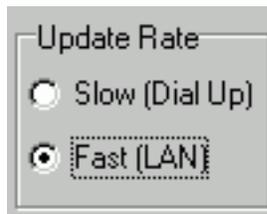
Gen Input Frequency

This input displays the current value (in Hz) of the Generator Frequency Input on the synchronizer. The associated enpower SNVT is SCR_Hz___G.



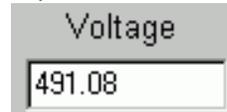
Update Rate

These radio buttons determine how fast this screen is updated. The default is always slow. Do not select Fast if you are connected over a dial up connection, because there is not enough bandwidth on a dial up connection to allow fast updates. With the Fast update selected, the synchroscope is very responsive and is comparable to an analog meter. There is not an associated enpower SNVT for these buttons.



Util Input Voltage

This input displays the current value (in Volts) of the Utility Voltage Input on the synchronizer. The associated enpower SNVT is SCR_V___U.



Util Input Frequency

This input displays the current value (in Hz) of the Utility Frequency Input on the synchronizer. The associated enpower SNVT is SCR_Hz___U.



Synchroscope

This gauge displays the current value of the synchroscope output (in degrees) from the automatic synchronizer. The associated enpower SNVT is oSCRSScope_.



Phase OK

This output displays the current value Phase OK output from the synchronizer. The synchronizer turns this output ON when the phases of the two sources are matched. The display is highlighted in Aqua when the

output is ON. The associated enpower SNVT is SCR_P_OK_.



Voltage OK

This output displays the current value Voltage OK output from the synchronizer. The synchronizer turns this output ON when the Voltages of the two sources are matched. The display is highlighted in Aqua when the output is ON. The associated enpower SNVT is SCR_V_OK_.



5.2 ANNUNCIATOR #1 AND ANNUNCIATOR #2

Figure 5-2 shows Annunciator #1. The Annunciators are used to view and set up the Annunciator Blocks contained in the *enpower* controls. The Annunciator Blocks are used to annunciate and latch alarms within the *enpower* control. There are two identical Annunciator Blocks in the *enpower* controls. Each Annunciator Block has 16 Annunciators giving the ability to annunciate 32 alarms total. The blocks are broken up into two screens (16 Annunciators per screen). These two screens are associated with the two *enpower* LonMark Objects called Annunciator 1, and Annunciator 2 (ALO).

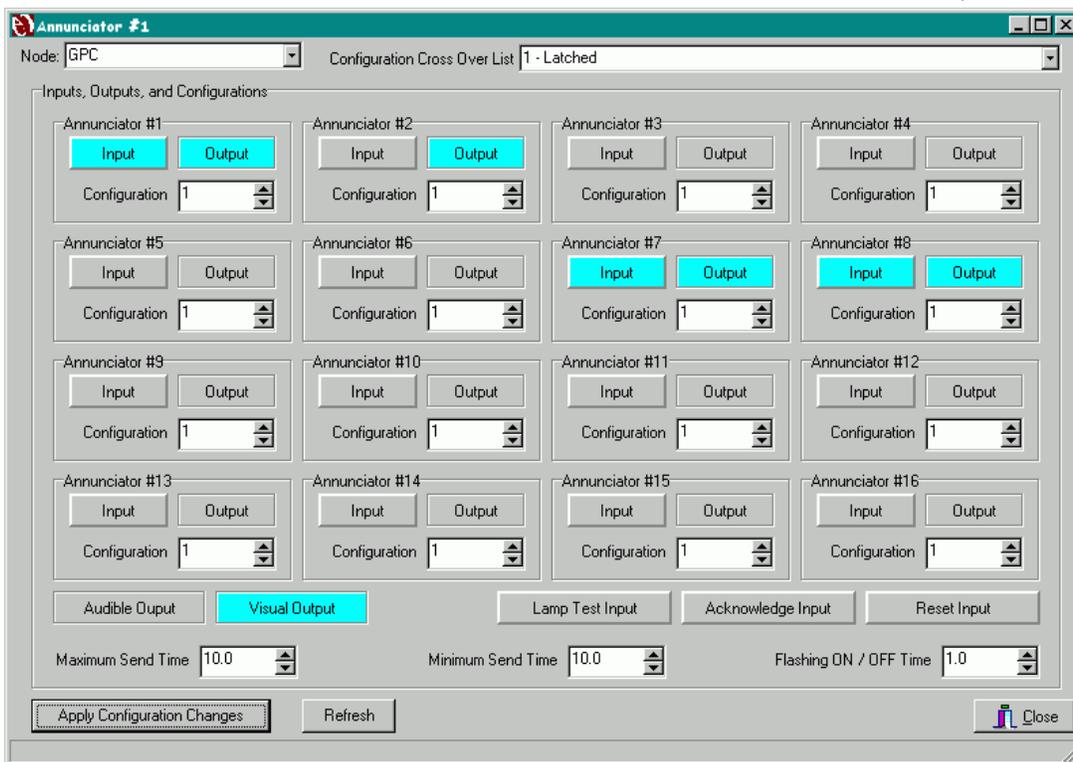
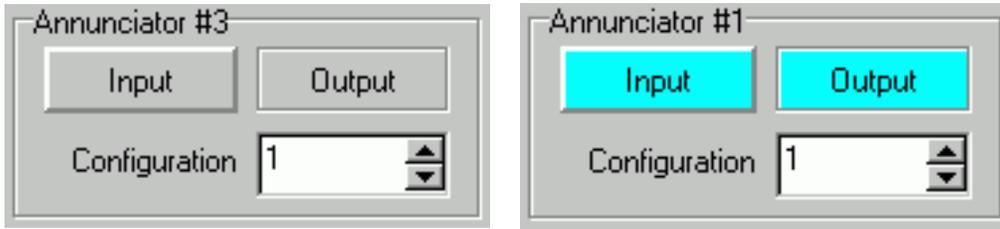


Figure 5-2 Annunciator #1

Input

The input displays the current value of the input to the annunciator. The display is highlighted in Aqua when the input is ON. This display also functions as a button so that the user can turn the input ON and OFF from the screen. The associated empower SNVTs are ALO1_IN_1_ - ALO1_IN16_ and ALO2_IN_1_ - ALO2_IN16_.



Output

The output displays the current value of the output from the annunciator. This output is turned ON or OFF by the annunciator depending on the state of the input and the setting of the configuration. The display is highlighted in Aqua when the output is ON. The associated empower SNVTs are ALO1Out_1_ - ALO1Out16_ and ALO2Out_1_ - ALO2Out16_.

Configuration

This value sets the configuration for the Annunciator. There are a total of 23 different settings that can be used for the configuration. As you make changes to the configuration, an explanation of each one will show up in the Configuration Cross Over List shown at the top of the page. The associated empower SNVTs are ALO1Cfg_1_ - ALO1Cfg16_ and ALO2Cfg_1_ - ALO2Cfg16_. Table 5-1 lists the configuration values along with a brief explanation of each setting.

*Table 5-1 Annunciator Configuration Values
(Continued next page)*

Configuration Value	Explanation
0	Momentary
1	Latched
2	Flashing Momentary
3	Flashing Latched
4	Flashing New, Steady Ackd, Momentary
5	Flashing New, Steady Ackd, Latched
8	Momentary + Max Send Time on Output
9	Latched + Max Send Time on Output
10	Flashing Momentary + Max Send Time on Output
11	Flashing Latched + Max Send Time on Output
12	Flashing New, Steady Ackd, Momentary + Max Send Time on Output
13	Flashing New, Steady Ackd, Latched + Max Send Time on Output

Table 5-1 (Continued from Previous Page)

16	Momentary + Min Send Time on Input
17	Latched + Min Send Time on Input
18	Flashing Momentary + Min Send Time on Input
19	Flashing Momentary + Min Send Time on Input
20	Flashing New, Steady Ackd, Momentary + Min Send Time on Input
21	Flashing New, Steady Ackd, Latched + Min Send Time on Input
24	Momentary + Max Send Time on Output + Min Send Time on Input
25	Latched + Max Send Time on Output + Min Send Time on Input
26	Flashing Momentary + Max Send Time on Output + Min Send Time on Input
27	Flashing Latched + Max Send Time on Output + Min Send Time on Input
28	Flashing New, Steady Ackd, Momentary + Max Send Time on Output + Min Send Time on Input
29	Flashing New, Steady Ackd, Latched + Max Send Time on Output + Min Send Time on Input

Audible Output

This output displays the current value of the audible output from the Annunciator Block. This output would typically be used to drive an alarm horn. The display is highlighted in Aqua when the audible output is ON. The associated empower SNVTs are oALO1Audbl_ and oALO2Audbl_.



Visual Output

This output displays the current value of the visual output from the Annunciator Block. This output would typically be used to drive an alarm light. The display is highlighted in Aqua when the visual output is ON. The associated empower SNVTs are oALO1Vsual_ and oALO2Vsual_.



Lamp Test Input

This input displays the current value of the lamp test input to the Annunciator Block. This input is used to turn on ALL of the outputs for lamp test purposes. The display is highlighted in Aqua when the lamp test input is ON. This display also functions as a button, so the user can turn it ON and OFF from the screen. The associated empower SNVTs are iALO2_Lamp_ and iALO2_Lamp_.



Acknowledge Input

This input displays the current value of the Acknowledge input to the Annunciator Block. This input is used to acknowledge all of the alarms. The display is highlighted in Aqua when the acknowledge input is ON. This display also functions as a button, so the user can turn it ON and OFF from the screen. The associated empower SNVTs are iALO1_ACK_ and iALO2_ACK_.



Reset Input

This input displays the current value of the Reset input to the Annunciator Block. This input is used to reset all of the alarms. The display is highlighted in Aqua when the reset input is ON. This display also functions as a button, so the user can turn it ON and OFF from the screen. The associated empower SNVTs are iALO1Reset_ and iALO2Reset_.



Maximum Send Time

This configuration sets the maximum send time (in seconds) that is used for the outputs if the annunciator is configured to use the maximum send time option. The associated empower SNVTs are cALO1Max_s_ and cALO2Max_s_.



Minimum Send Time

This configuration sets the minimum send time (in seconds) that is used for the inputs if the annunciator is configured to use the minimum send time option. The associated empower SNVTs are cALO1Min_r_ and cALO2Min_r_.



Flashing ON / OFF Time

This configuration sets the flashing time (in seconds) for the output if the annunciator is configured to use the flashing option. The associated empower SNVTs are ALO1Flash_ and ALO2Flash_.

Flashing ON / OFF Time

SECTION 6 ALARM NOTIFY

This chapter explains how to configure the Alarm Notify Server to alert sites and individuals about the status of the gensets.

The Alarm Notify Server resides on the CPM (Communications Processor Module). The CPM is an industrial-grade computer that is installed on-site with the *en* power controls and gensets. The CPM constantly monitors the *enpower* controls.

6.1 INTRODUCTION TO THE ALARM NOTIFY SERVER

The following members of the Energy Automation Tools family of software products can be used to configure the Alarm Notify Server.

- VST (Virtual Service Tool)
- VMM (Virtual Maintenance Monitor)
- OPP (On-site Power Plant)

The Alarm Notify Server runs on the Communications Processor Module. This is an industrial-grade computer that resides on site, constantly monitoring the status of the *en* power controls, which control the gensets and utility breakers. The window used to configure the Alarm Notify Server is shown in Figure 6-1.

To open the Alarm Notify Server Configuration window, do the following:

1. Click the *System* tab.
2. Click the *Alarm Notify Server* button.

As Figure 6-1 shows, this window displays every event programmed into the Alarm Notify Server. An event consists of a SNVT on one of the *en* power controls and a condition. The condition defines acceptable values for the SNVT. If the value of the SNVT violates the condition, the Alarm Notify Server will trigger an event, broadcasting an error message to one or more individuals or sites. The alarm notify server can contact individuals and sites using a modem, local area network, electronic mail, and pager services. Configuring the Alarm notify server involves:

- adding events—SNVTs and conditions that indicate an error has occurred
- and adding sites—people to contact when an event occurs)

We create new events and modify existing events with the Event Setup window. We create new sites and modify existing sites using the Modify Site Setup window. The sections which follow describe and explain how to use each of these windows.

This window shown in Figure 6-1 is used to add and notify events that will trigger alarms. It is also used to add and modify the sites and individuals to contact when an event occurs. When this window opens it displays all of the events currently programmed into the Alarm Notify Server.

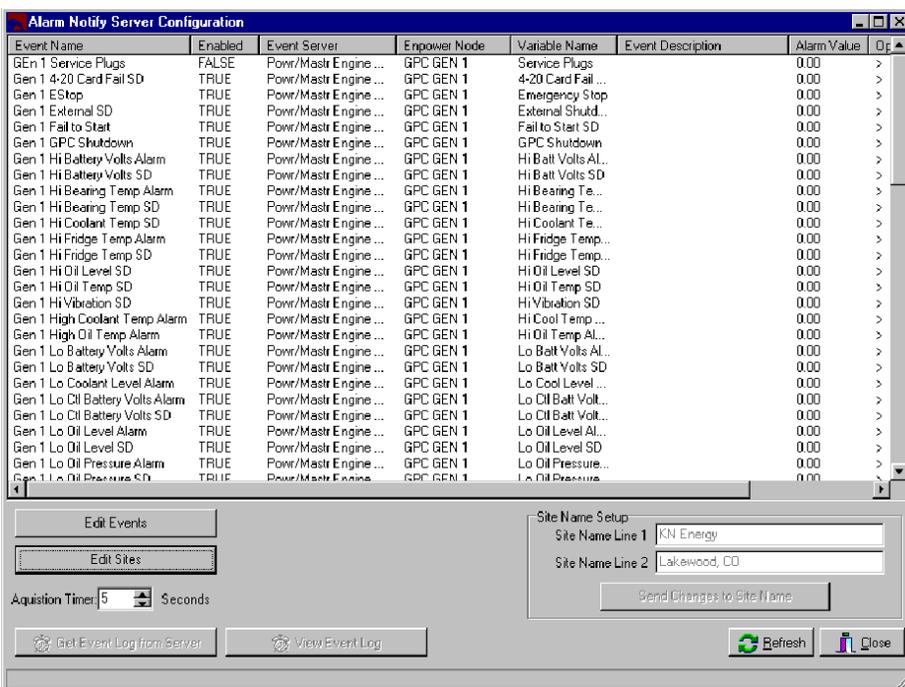


Figure 6-1 Alarm Notify Server Configuration Window

6.1.1 EVENT SETUP WINDOW

Figure 6-2 shows the Event Setup window. We use the top half of this window—labeled Event Properties—to create new or modify existing events. The bottom half of the window—labeled Notify Site List Setup—allows us to specify who to contact when an event occurs.

Figure 6-2 Event Setup Window

Event Name

This field displays the name given to the event. When creating a new event, we type a name for the event in this field.

Enpower Node

This menu lists each *en* power control on the *LonWorks* network monitored by the CPM (Communications Processor Module). In the case of an existing event, this field displays the *enpower* control being monitored for an error condition. When defining a new event, we select which *enpower* control to monitor from this list. Recall that an event consists of a SNVT on a specific control and a condition. The CPM constantly monitors the SNVT and alerts one or more sites if the SNVT's value falls outside the acceptable range established by the condition.

Event Server

This menu allows us to select one of three event servers: the CAT CCM Engine Server, the PowerMaster Engine Server, and the Enpower Server. The CAT CCM and PowerMaster event servers contain pre-defined events that you can select from the *Variable Name* menu. The Enpower Server does not contain any pre-defined events. Instead, we can use Enpower Server to construct our own events.

Value

Used in combination with the =, <>, >, and < operators and a variable from the Variable Name menu, this field allows us to define a limiting value for a SNVT. If the value of the SNVT falls outside of this limit, an event will occur and the CPM will alert one or more sites and individuals. Note that the Event Setup window only displays this field when a non-boolean variable is selected in the Variable Name field, or when the Enpower Server is selected from the Event Server menu.

Operator

The operators include:

- = equal to
- <> not equal to
- > greater than
- < less than

We use an operator in conjunction with a value to set a limit on the value of a SNVT. An event will occur if the SNVT's value falls outside of this limit. Note that the Event Setup window only displays this field when a non-boolean variable is selected in the Variable Name field, or when the Enpower Server is selected from the Event Server menu.

Variable Name

The content of this menu varies depending on which event server is currently selected from the Event Server menu. If the CAT CCM or PowerMaster server is selected, this menu will contain a list of variables. If the Enpower server is selected, this menu will contain all of the SNVTs on the currently selected Enpower node. Note that you may need to click the Get Variable Lists from Server button to update the list of variables available from the Variable Name menu.

Event Enabled

Check this box to enable an event. Uncheck this box to disable an event. When an event is enabled, the Alarm Notify Server actively monitors the event's SNVT. When an event occurs, the server records the event in the log. If the Notify on Event box is checked, the server also notifies each site in the Site List.

Notify on Event

When this box is checked, the Alarm Notify Server will notify all sites in the Site List when an event occurs. Unchecking this box prevents the server from notifying any sites, however the server continues to monitor the events and log any errors as long as the Event Enabled box is checked.

Event Description

We use this field to type a brief description of an event. In the case of existing events, this field displays any information that was entered when the event was created.

Site List

The Alarm Notify Server will contact each site in the site list when an event occurs. You can, at any time, add or remove sites from this list. The Alarm Notify Server

maintains a separate site list for each event. This way you can alert different people to respond to different types of events.

Available Site List

This list contains every site that the Alarm Notify Server can contact. As we define new sites, the software adds them to this list.

Add Site

Selecting a site from the Available Site List and then clicking this button assigns the site to the currently selected event. The software displays the site in the Site List.

Remove Site

Clicking this button removes the currently selected site from the Site List.

Get Variable Lists from Server

Clicking this button uploads all of the SNVTs from the selected enpower node to the Energy Automation Tools. We use this button when creating events for the Enpower Server.

Previous Event / Next Event

Clicking these buttons scrolls backwards and forwards through the list of defined events. The Event Setup window displays the currently selected event in the Event Name field. We use these buttons when we want to change the characteristics of an existing event.

New Event

Click this button to create a new event. Then proceed to configure the event, using the menus and fields of the Event Setup window.

Remove Event

Click this button to remove the currently selected event. The software will prompt you to confirm your selection.

Apply

Click this button to apply any changes made to the currently selected event.

OK

Click the OK button to save changes and close the Event Setup window.

Cancel

Click this button to close the Event Setup window without saving your changes.

6.1.2 NOTIFY SITE SETUP WINDOW

Figure 6-3 *Notify site setup window* shows the Notify Site Setup window. This window is used to create or modify sites that the software will contact when an event occurs.

Figure 6-3 *Notify Site Setup Window*

Notify Site Name

This field displays the name of the currently selected alarm notify site. You need to type a name in this field when you create a new notify site.

Do NOT Notify Site

We use the paging capabilities of the Alarm Notify Server for two different purposes: to page someone when an event occurs, and to page someone when the server fails to connect to the local area network, dial-up network, or SMTP (electronic mail) server. The status of the *Do NOT Notify Site* box determines how the site implements the paging feature.

- Checking this box creates a page-only site—the Alarm Notify server ignores the Dial Out and Email Setup portions of the Notify Site Setup window and sends a page when an event occurs.
- When the Do NOT Notify Site box is not checked, the server only sends a page if it fails to connect to the local area network, dial-up network, or SMTP (electronic mail) server. In this case the page functions to alert someone that the network is not functioning properly.

This is a VPP Site Checkbox

Check this box if the Alarm Notify Server will be

connecting to a VPP (Virtual Power Plant). Otherwise, the information specified in the Dial Out Information section will be used to establish a connection with a VMM (Virtual Maintenance Monitor), either over a Local Area Network or using a dial-up connection.

RAS Entry

This menu lists all of the sites that the CPM can contact using a modem. Clicking the *Get RAS and Pager Entry Lists from Server* button will update the contents of this menu. The RAS Entry menu is used to:

- connect to a VMM or VPP site using a dial-up connection and to send electronic mail using a dial-up connection.

The contents of the RAS Entry menu originate from the dial-up-networking connections defined on the CPM. Adding new dial-up-networking sites involves configuring dial-up-networking on the CPM. This can only be done on-site at the CPM for from a remote location using PC Anywhere. It is not possible to configure dial-up-networking on the CPM using the Energy Automation Tools.

User Name

This field stores the user name required to:

- log in to a remote computer running the VMM or VPP
- log in to a SMTP (simple mail transfer protocol) server in order to send electronic mail.

This field is required for dial-up-networking, local area network, and electronic mail connections.

Password

This field stores the password required to:

- log in to a remote computer running the VMM or VPP
- log in to a SMTP (simple mail transfer protocol) server in order to send electronic mail.

This field is required for dial-up-networking, local area network, and electronic mail connections.

IP Address

This field stores the IP address of the remote computer running the VMM or VPP. This field is required for dial-up-networking and local area network connections. It is not required to send electronic mail.

Notify via LAN

The Alarm Notify server will attempt to contact the VMM,

VPP, or SMTP (electronic mail) server over a local area network when this box is checked. Otherwise it attempts to connect using a dial-up connection. We use this box when setting up dial-up-networking, local area network, and electronic mail connections.

This is an Email Site

When this box is checked, (and the *Do NOT Notify Site* box is unchecked) the Alarm Notify Server will send an electronic mail message when an event occurs. The server will not attempt to contact a VMM or VPP site when this box is checked.

Note that—in addition to configuring the, *Host Name*, *Email Address*, and *From Address* fields—the Alarm Notify Server also uses the *RAS Entry*, *User Name*, and *Password* fields to send electronic mail.

Host Name

Enter the IP address of the SMTP Server in this field. SMTP stands for simple mail transfer protocol. A SMTP server is generally a large computer with a permanent, high-speed connection to the Internet. In most cases the CPM will dial the SMTP server in order to send electronic mail. You can obtain the IP address of the SMTP server from your Internet service provider.

Email Address

This is the electronic mail address of the person to contact when an event occurs.

From Address

When the CPM sends someone an email message following an event, the contents of this field will appear in the *From* field of the message. We recommend that you type something in this field, which identifies the site responsible for the message.

Page After n Notify Attempts

This field functions differently, depending on the status of the *Do NOT Notify Site* check box. Recall that the status of this box determines whether the Alarm Notify Server sends a page only if an attempt to contact a VMM, VPP, or SMPT server fails (not checked) or as soon as an event occurs (checked).

- Behavior when the *Do NOT Notify Site* box is not checked—In this mode, the value in the *Page After n Notify Attempts* field specifies how many times the server should attempt to contact the site before sending a page. The page in this case functions to notify someone that the Alarm Notify Server was unable to establish a network connection with the VMM, VPP, or SMTP server.

- Behavior when the *Do NOT Notify Site* box is checked—In this mode the Alarm Notify Server ignores the value in the *Page After n Notify Attempts* field and immediately sends a page when an event occurs. The page in this case notifies someone that an event occurred.

Page by Name or Number

When configuring the Alarm Notify Server to send a page you must select either *Page by Name* or *Page by Number*. The window prevents you from selecting both options at the same time.

- *Page by Name*—Clicking this button enables you to select a pager from the *Pager Name* menu. You do not need to enter anything in the *Pager Number* or *Pager Service* fields when *Page by Name* is selected.
- *Page by Number*—Clicking this button enables you to specify a pager by entering a phone number in the *Pager Number* field and selecting a pager service from the *Pager Service* menu. The Alarm Notify Server ignores anything selected in the *Pager Name* menu when *Page by Number* is selected.

Note that you can not use the Energy Automation Tools to add items to the *Pager Service* and *Pager name* menus. Adding items to these menus involves configuring the pager service on the CPM—a task most often performed on-site by the system administrator. Note that it is possible to configure the CPM from a remote location by running PC Anywhere. This program from Symantec allows one to operate a computer remotely over a dial-up connection. The CPM comes with PC Anywhere already installed and configured so we can troubleshoot systems from our facility.

Pager Name

This menu contains a list of pagers configured on the CPM (Communications Processor Module). These pre-configured pagers already contain the phone number and paging service necessary to send the page. Note that you may need to click the *Get RAS and Pager Entry Lists from Server* button to update the contents of this menu.

Pager Number

This field stores the phone number of the pager to contact. The *Pager Number* field works in conjunction with the *Pager Service* menu. The Alarm Notify Server needs both the phone number and paging service to send a page.

In some cases it may be more convenient to configure pagers by number (by clicking the *Number* button and completing the *Pager Name* and *Pager Number* fields) instead of by name (by clicking the *Name* button and making a selection from the *Pager Name* menu). The advantage is that if you have a large number of pagers from the same paging service, you can enter new pager numbers using the Energy Automation Tools.

Note that you cannot configure new pager services using the Energy Automation Tools, nor can you add items to the *Pager Name* menu. These tasks must be performed locally at the CPM or from a remote location by running PC Anywhere.

Pager Service

This menu allows you to select the pager service. You may need to click the *Get RAS and Pager Entry Lists from Server* button to update the contents of this menu. You only need to select the pager service when *Page by Number* is selected. (Named pagers incorporate the paging service and phone number into a single entry in the *Pager Name* menu.)

Do Not Page

Clicking this button prevents the Alarm Notify Server from sending pages. This button interacts with the *Do NOT Notify Site* button to create the following options.

- *Do NOT Notify Site checked; Do Not Page checked*—The resulting site only logs when events occur. The Alarm Notify Server will not contact a VMM or VPP. The Alarm Notify Server will not send pages.
- *Do NOT Notify Site checked; Do Not Page not checked*—The resulting site sends a page as soon as an event occurs. The Alarm Notify Server will not notify a VMM or VPP.
- *Do NOT Notify Site not checked; Do Not Page checked*—The resulting site notifies a VMM or VPP when an event occurs. The Alarm Notify Server will not send a page.
- *Do NOT Notify Site not checked; Do Not Page not checked*—The resulting site notifies a VMM or VPP when an event occurs. The Alarm Notify Server will send a page if fails to establish a network or dial-up connection with the VMM or VPP. The server will *only* send a page if it fails to connect to a VMM or VPP.

Nightly Health Check

The nightly health check feature makes it possible to test communication between the Alarm Notify Server

and the site at a specific time each day. The health check simply ensures that communications between the server and the site are functioning normally. The health check does not provide any information about the status of the gensets or *en* power controls.

The Nightly Health Check portion of the Notify Site Setup window contains the following items.

- **Health Check Time**—This field specifies the time of day when the Alarm Notify Server will issue the health check. We typically configure sites to perform the health check at night, though you can perform the test at any time.
- **Disable Health Check**—Click this button to disable the health check.

Depending on how the rest of the Notify Site Setup window is configured, the health check will test communication between the CPM and the site's local area network, dial-up connection, electronic mail server, or paging service.

Create New Notify Site

Click this button to create a new site. Then proceed to configure the site, using the menus and fields of the Notify Site Setup window.

Remove Notify Site

Click this button to remove the currently selected site. The software will prompt you to confirm your selection.

Previous Site / Next Site

Clicking these buttons scrolls through each site currently programmed into the Alarm Notify Server. The Notify Site Setup window displays the name of the currently selected site in the *Notify Site Name* field.

Get RAS and Pager Entry Lists from Server

Click this button to update the contents of the RAS Entry, Pager Name, and Pager Service menus. The items in these menus refer to configuration settings that reside on the CPM (Communications Processor Module). You will need to click this button if the CPM was reconfigure since you last ran the Energy Automation Tools.

Apply

Click this button to apply any changes made to the currently selected site.

OK

Click the OK button to save changes and close the Notify Site Setup window.

Cancel

Click this button to close the Notify Site Setup window without saving your changes.

6.2 WORKING WITH EVENTS

The Alarm Notify Server Configuration window shown in Figure 6-1 lists every event. You can directly open any of these events in the Event Setup window. You can also use the Event Setup window to scroll forwards and backwards through the list of events.

To directly open a specific event in the Event Setup window, do the following:

1. Click the *System* tab. Then click the *Alarm Notify Server* button to open the Alarm Notify Server Configuration window.

- The Alarm Notify Server Configuration window will list all of the events.

2. Click on an event.

- The window will highlight the event.

3. Click the *Edit Events* button to open the event in the Event Setup window.

To scroll through the list of events using the Event Setup window, do the following:

1. With the Event Setup window open, click the Next Event button to advance to the next event in the list. Alternatively, you can click the *Previous Event* button to advance to the previous event in the list.

- The Event Setup displays the name of the currently selected event in the Event Name field.

6.2.1 ADDING A NEW EVENT

To add a new event, do the following:

1. Click the *System* tab. Then click the *Alarm Notify Server* button to open the Alarm Notify Server Configuration window.

2. Click the *Edit Events* button to open the Event Setup window.

3. Click the *New Event* button.

4. Type a name for the event in the *Event Name* field.

5. Select a node from the *Enpower Node* menu.

- This menu lists every *enpower* control on the *LonWorks* network.
6. Select an event server from the *Event Server* menu.
 - All sites will have an Enpower server. Some sites will also have a CAT CCM server or a PowerMaster server. The CAT CCM and PowerMaster servers provide a predefined list of conveniently named variables. The Enpower server provides access to every SNVT on the currently selected Enpower control.
 7. Select a variable (in other words SNVT) from the *Variable Name* menu.
 - The variables (SNVTs) displayed in this list will depend on which server is selected in the Event Server menu.
 8. Select an operator from the *Operator* menu and type a value in the *Value* field.
 - Together, the Operator and Value define a limit at which an event will occur. Use the > (greater than) operator to trigger an event if the SNVT rises above a specific value. Use the < (less than) operator to trigger an event if the SNVT falls below a specific value.
 9. Check the *Event Enabled* box.
 - The Alarm Notify Server will log the event if this box is checked.
 10. If desired, check the *Notify on Event* box.
 - If this box is checked, the Alarm Notify Server will contact every site listed in the Site List if the event occurs. Note that both the *Event Enabled* and *Notify on Event* boxes must be checked in order to notify the sites.
 11. Specify which sites to contact when the event occurs.
 - a. Click on a site in the *Available Site List*.
 - b. Click the *Add Site* button to add the selected site to the Site List.

6.2.2 CHANGING WHICH SITES TO CONTACT IF THE EVENT OCCURS

The Event Setup window contains two lists of sites: the Site List and the Available Site List. The Available Site List contains all sites that the Alarm Notify Server can potentially contact. The Site List contains all sites that the server will contact if the event occurs. You can add and remove sites from the Site List at any time.

To have the Alarm Notify Server contact additional sites if the event occurs, do the following:

1. Click on a site in the Available Site List.
2. Click the *Add Site* button.
 - The site will now appear in the Site List, meaning that the server will contact this site if the event occurs.

To prevent the Alarm Notify Server from contacting a site if the event occurs, do the following:

1. Click one of the sites listed in the Site List.
2. Click the *Remove Site* button.
 - The Alarm Notify Server will no longer contact this site if the event occurs.

6.2.3 ADDING NEW SITES TO THE AVAILABLE SITE LIST

Adding new sites to the Available Site List involves working with the Notify Site Setup window.

6.2.4 LOGGING THE EVENT WITHOUT CONTACTING ANY SITES

The Alarm notify server automatically logs events as they occur. You can configure the Event Setup window to log an event without contacting any sites.

To configure the event so the Alarm Notify Server logs the event but does not contact any sites, do the following:

1. Make sure that the *Event Enabled* box is checked.
2. Make sure that the *Notify on Event* box is not checked.

6.2.5 CHANGING THE CIRCUMSTANCES WHICH TRIGGER THE EVENT

If the Event Setup window displays the Value and Operator fields, this indicates that the currently selected variable is capable of storing a range of values, such as voltage for example. If the window does not display the Value and Operator fields, then the currently selected variable can only store one of two states—on or off. Variables that can only represent on or off states are called boolean variables.

In the case of Boolean variables, the Alarm Notify Server will trigger an event if the value of a boolean vari-

able becomes true. In the case of variables that can represent a range of values, the Alarm Notify Server triggers an event when the variable's value violates a condition. We set this condition using the Operator and Value fields.

To change the variable's condition, do the following:

1. Select an operator from the *Operator* menu.
2. Type a value in the *Value* field.
 - For example, if the currently selected variable tracked run hours, then selecting > (greater than) from the Operator menu and entering 1000 in the Value field might trigger an event indicating that it is time to change the oil.

6.3 WORKING WITH SITES

We create and modify sites using the Notify Site Setup window. We can use this window to create five types of sites:

- VMM Sites—Contact a Virtual Maintenance Monitor when an event occurs.
- VPP Sites—Contact a Virtual Power Plant when an event occurs.
- Electronic Mail Sites—Send electronic mail when an event occurs.
- Page-On-Event Sites—Page someone when an event occurs.
- Health-Check-Only Sites—Test communication between the CPM and one of the four types of sites listed above on a daily basis.

In each of these cases, the Alarm Notify Server can contact the site using a local area network or dial-up connection. The sections which follow provide step-by-step instructions for creating local area network and dial-up versions of each type of site.

To open the Notify Site Setup window, do the following:

1. Click the *System* tab in the main interface to the Energy Automation Tools.
2. Click the *Alarm Notify Server* button.
 - The Alarm Notify Server Configuration window will open.

3. Click the *Edit Sites* button.
 - The Notify Site Setup window will open.

6.3.1 MODIFYING AN EXISTING SITE

We can use the Notify Site Window to modify existing sites, as well as to create new sites. The *Previous Site* and *Next Site* buttons at the bottom of the window allow you to scroll through the list of defined sites. The window displays the name of the currently selected site in the *Notify Site Name* field.

To make changes to an existing alarm notify site, do the following:

1. Click the *System* tab. Then click the *Alarm Notify Server* button to open the Alarm Notify Server Configuration window.

2. Click the *Edit Sites* button.
 - The Notify Site Setup window will open.

3. Repeatedly click the *Next Site* button until you locate the site you wish to modify. The Modify Site Setup window will display the name of each site in the *Notify Site Name* field.

4. Modify the various sections of the window as described in the sections that follow.

- You can configure the site to contact a Virtual Maintenance Monitor, Virtual Power Plant, electronic mail server, or paging service. You can contact each type of site using a local area network or dial-up connection.

6.3.2 CREATING A VMM SITE

This section describes how to create a site that notifies a VMM (Virtual Maintenance Monitor) when an event occurs. The Alarm Notify Server can connect to the VMM site in two ways:

- using a local area network
- using a dial-up connection

In addition, you can configure the Alarm Notify Server to page someone if it fails to connect to the VMM site. You can also have the Alarm Notify Server test the communication between the CPM and the site on a daily basis using the health check feature. Refer to the sections listed below to enable or disable these features.

- Paging / Not Paging if the Connection Fails
- Enabling / Disabling the Health Check

To notify a VMM using a local area network, do the following:

1. Having opened the Notify Site Setup window, click the *Create New Notify Site* button.
 - This creates a new site.
2. Type a name for the site in the *Notify Site Name* field.
3. Ensure that the *This is a VPP Site* box is *not* checked.
4. Type the login name for the VMM's computer in the *User Name* field.
 - The Alarm Notify Server needs to establish a network connection with the computer that runs the VMM software. The User Name field stores the login name required to connect to this computer over a network.
5. Type the password for the VMM's computer in the *Password* field.
 - Like the User Name field described above, the Password field stores the password required to establish a network connection between the Alarm Notify Server and the computer running the VMM.
6. Enter the IP address of the VMM's computer in the *IPAddress* field.
7. Check the *Notify via LAN* box.
8. Click the *Apply* button to apply your changes to the site.
9. Click *OK* if you are finished working with the Notify Site Setup window.

To notify a VMM using a dial-up connection, do the following:

1. Having opened the Notify Site Setup window, click the *Create New Notify Site* button.
 - This creates a new site.
2. Type a name for the site in the *Notify Site Name* field.
3. Ensure that the *This is a VPP Site* box is *not* checked.
4. Select the dial-up connection for the VMM's computer from the RAS Entry menu.

- This menu lists all of the sites that the CPM can contact using a modem. Note that the Energy Automation tools cannot be used to add new dial-up sites to this menu. In order to add new dial-up connections you must run the Windows Dial-Up Networking Wizard on the CPM. If necessary you can configure the CPM from a remote location by running PC Anywhere. We install PC Anywhere on the CPM at the factory for this purpose.

5. Type the login name for the VMM's computer in the *User Name* field.
 - The Alarm Notify Server needs to establish a dial-up connection with the computer that runs the VMM software. The User Name field stores the login name required to connect to this computer using a modem.
6. Type the password for the VMM's computer in the *Password* field.
 - Like the User Name field described above, the Password field stores the password required to establish a dial-up connection between the Alarm Notify Server and the computer running the VMM.
7. Enter the IP address of the VMM's computer in the *IPAddress* field.
8. Ensure that the *Notify via LAN* box is not checked.
9. Click the *Apply* button to apply your changes to the site.
10. Click *OK* if you are finished working with the Notify Site Setup window.

6.3.3 CREATING A VPP SITE

This section describes how to create a site that notifies a VPP (Virtual Power Plant) when an event occurs. The Alarm Notify Server can connect to the VPP site in two ways:

- using a local area network
- using a dial-up connection

In addition, you can configure the Alarm Notify Server to page someone if it fails to connect to the VPP site. You can also have the Alarm Notify Server test the communication between the CPM and the site on a daily basis

using the health check feature. Refer to the sections listed below to enable or disable these features

- Paging / Not Paging if the Connection Fails
- Enabling / Disabling the Health Check

To notify a VPP using a local area network, do the following:

1. Having opened the Notify Site Setup window, click the *Create New Notify Site* button.
 - This creates a new site.
2. Type a name for the site in the *Notify Site Name* field.
3. Check the *This is a VPP Site* box.
4. Type the login name for the VPP's computer in the *User Name* field.
 - The Alarm Notify Server needs to establish a network connection with the computer that runs the VPP software. The User Name field stores the login name required to connect to this computer over a network.
5. Type the password for the VPP's computer in the *Password* field.
 - Like the User Name field described above, the Password field stores the password required to establish a network connection between the Alarm Notify Server and the computer running the VPP.
6. Enter the IP address of the VPP's computer in the *IPAddress* field.
7. Check the *Notify via LAN* box.
8. Click the *Apply* button to apply your changes to the site.
9. Click *OK* if you are finished working with the Notify Site Setup window.

To notify a VPP using a dial-up connection, do the following:

1. Having opened the Notify Site Setup window, click the *Create New Notify Site* button.
 - This creates a new site.
2. Type a name for the site in the *Notify Site Name* field.

3. Check the *This is a VPP Site* box.
4. Select the dial-up connection for the VPP's computer from the RAS Entry menu.
 - This menu lists all of the site that the CPM can contact using a modem. Note that the Energy Automation tools can not be used to add new dial-up sites to this menu. In order to add new dial-up connections you must run the Windows Dial-Up Networking Wizard on the CPM. If necessary you can configure the CPM from a remote location by running PC Anywhere. We install PC Anywhere on the CPM at the factory for this purpose.
5. Type the login name for the VPP's computer in the *User Name* field.
 - The Alarm Notify Server needs to establish a dial-up connection with the computer that runs the VPP software. The User Name field stores the login name required to connect to this computer using a modem.
6. Type the password for the VPP's computer in the *Password* field.
 - Like the User Name field described above, the Password field stores the password required to establish a dial-up connection between the Alarm Notify Server and the computer running the VPP.
7. Enter the IP address of the VPP's computer in the *IPAddress* field.
8. Ensure that the *Notify via LAN* box is *not* checked.
9. Click the *Apply* button to apply your changes to the site.
10. Click *OK* if you are finished working with the Notify Site Setup window.

6.3.4 CREATING AN ELECTRONIC MAIL SITE

This section describes how to create a site that sends electronic mail when an event occurs. In order to send electronic mail, the software must be able to connect to a mail server, which is responsible for routing the message. The software can connect to the mail server in two ways:

- using a local area network
- using a dial-up connection

In addition, you can configure the Alarm Notify Server to page someone if it fails to connect to the electronic mail server. You can also have the Alarm Notify Server test the communication between the CPM and the site on a daily basis using the health check feature. Refer to the sections listed below to enable or disable these features:

- Paging / Not Paging if the Connection Fails
- Enabling / Disabling the Health Check

To contact the mail server using a local area network, do the following:

1. Having opened the Notify Site Setup window, click the *Create New Notify Site* button.
 - This creates a new site.
2. Type a name for the site in the *Notify Site Name* field.
3. Ensure that the *This is a VPP Site* box is not checked.
4. Check the *Notify via LAN* box.
5. Check the *This is an Email Site* box.
6. Enter the IP (internet protocol) address of the mail server's computer in the *Host Name* field.
7. Enter the electronic mail address of the person to contact in the *Email Address* field.
 - The Alarm Notify Server will send an electronic mail message to this person when an event occurs.
8. Enter the electronic mail address of the CPM's system administrator in the *From* field.
9. Click the *Apply* button to apply your changes to the site.
10. Click *OK* if you are finished working with the Notify Site Setup window.

To contact the mail server using a dial-up connection, do the following:

1. Having opened the Notify Site Setup window, click the *Create New Notify Site* button.
 - This creates a new site.
2. Type a name for the site in the *Notify Site Name* field.

3. Ensure that the *This is a VPP Site* box is not checked.
4. Select the dial-up connection for the mail server's computer from the *RAS Entry menu*.
 - This menu lists all of the sites that the CPM can contact using a modem. Note that the Energy Automation tools cannot be used to add new dial-up sites to this menu. In order to add new dial-up connections you must run the Windows Dial-Up Networking Wizard on the CPM. If necessary you can configure the CPM from a remote location by running PC Anywhere. We install PC Anywhere on the CPM at the factory for this purpose.
5. Type the login name for the computer that runs the mail server in the *User Name* field.
 - The Alarm Notify Server needs to establish a dial-up connection with the computer that runs the mail server. The User Name field stores the login name required to connect to this computer using a modem.
6. Type the password for the mail server's computer in the *Password* field.
 - Like the User Name field described above, the Password field stores the password required to establish a dial-up connection between the Alarm Notify Server and the computer running the mail server.
7. Enter the IP (internet protocol) address of the mail server's computer in the *Host Name* field.
8. Enter the electronic mail address of the person to contact in the *Email Address* field.
 - The Alarm Notify Server will send an electronic mail message to this person when an event occurs.
9. Enter the electronic mail address of the CPM's system administrator in the *From* field.
10. Click the *Apply* button to apply your changes to the site.
11. Click *OK* if you are finished working with the Notify Site Setup window.

6.3.5 CREATING A PAGE-ON-EVENT SITE

This section describes how to create a site that immediately sends a page when an event occurs. In all of the

previous sites discussed in this chapter, the paging feature was used to send a page only if the CPM failed to contact using the local area network or dial-up connection. In this section we create a site that can send a page in response to an event.

In order to send a page, the Alarm Notify Server must connect to a computerized paging service which then sends the actual wireless transmission. Detailed information about the paging service resides on the CPM (Communications Processor Module). We cannot use the Energy Automation Tools to add new paging services to the CPM. That must be done on-site at the CPM or by running the CPM remotely with PC Anywhere.

If the Alarm Notify Server fails to connect to the paging service, it obviously cannot send a page to someone else notifying them of this fact. The Alarm Notify Server can, however, send a health-check page on a daily basis. Refer to the section *Enabling / Disabling the Health Check* to enable or disable the health check.

Note that all of the controls on the left side of the Notify Site Setup window—that includes all fields pertaining to dial-up connections and local area networks—do not apply when configuring the Alarm Notify Server to send a page.

To create a site that contacts a paging service, do the following:

1. Type a name for the site in the Notify Site Name field.
2. Click the *Do NOT Notify Site* button.
 - Checking this box causes the paging features built into the Energy Automation Tools to function differently than described in other sections of this chapter. When the *Do NOT Notify Site* button is checked, the Alarm Notify Server sends a page as soon as *an event occurs*.
3. Click the *Get RAS and Pager Entry Lists from Server* button.
 - This ensures that the Notify Site Setup window is updated with the latest information about how the CPM (Communications Processor Module) is configured.
4. Click *Page by Name* or *Page by Number*.
 - If you select *Page by Name*, you must select a pager from the *Pager Name* menu. If you select *Page by Number*, you must configure the *Pager*

Number field and the *Pager Service* menu. Refer to *Page by Name or Number* for more information about this option.

5. If you selected *Page by Name*, do the following:
 - a. Select a pager from the *Pager Name* field.
 - This is the pager to contact if the server fails to open a connection with the VMM's computer.
6. If you selected *Page by Number*, do the following:
 - a. Type the pager's phone number in the *Pager Number* field.
 - b. Select the paging service from the *Pager Service* menu.
7. Click the *Apply* button to apply your changes to the site.
8. Click *OK* if you are finished working with the Notify Site Setup window.

6.3.6 CREATING A HEALTH-CHECK ONLY SITE

We ordinarily use the health check feature in combination with a VMM, VPP, or electronic mail site. However, it is possible to create a site whose purpose is to send a health check message each day.

This section describes how to create a health-check-only site. For information about using the health check in combination with VMM, VPP, and electronic mail sites, see *Enabling / Disabling the Health Check*.

The Alarm Notify Server can send health check messages in two ways:

- using a local area network
- using a dial-up connection

To create a health-check-only site that uses a local area network, do the following:

1. Having opened the Notify Site Setup window, click the *Create New Notify Site* button.
2. Type a name for the site in the *Notify Site Name* field.
3. Do the following if you want to send the health check message to a VPP site.
 - a. Check the *This is a VPP Site* box.

- b. Type the login name for the VMM's computer in the *User Name* field.
- c. Type the password for the VMM's computer in the *Password* field.
- d. Enter the IP address of the VMM's computer in the *IP Address* field.
- e. Check the *Notify via LAN* box.

4. Do the following if you want to send the health check message to a VMM site:

- a. Ensure that the *This is a VPP Site* box is not checked.
- b. Type the login name for the VMM's computer in the *User Name* field.
- c. Type the password for the VMM's computer in the *Password* field.
- d. Enter the IP address of the VMM's computer in the *IP Address* field.
- e. Check the *Notify via LAN* box.

5. Do the following if you want to send the health check message to an electronic mail site:

- a. Ensure that the *This is a VPP Site* box is not checked.
- b. Check the *This is an Email Site* box.
- c. Check the *Notify via LAN* box.
- d. Enter the IP (internet protocol) address of the mail server's computer in the *Host Name* field.
- e. Enter the electronic mail address of the person to contact in the *Email Address* field.
- f. Enter the electronic mail address of the CPM's system administrator in the *From* field.

To create a health-check-only site that uses a dial-up connection, do the following:

- 1. Having opened the Notify Site Setup window, click the *Create New Notify Site* button.
- 2. Type a name for the site in the *Notify Site Name* field.

3. Do the following if you want to send the health check message to a VPP site.

- a. Check the *This is a VPP Site* box.
- b. Select the dial-up connection for the mail server's computer from the *RAS Entry* menu.
- c. Ensure that the *Notify via LAN* box is not checked.
- d. Type the login name for the VMM's computer in the *User Name* field.
- e. Type the password for the VMM's computer in the *Password* field.
- f. Enter the IP address of the VMM's computer in the *IP Address* field.
- g. Ensure that the *Notify via LAN* box is not checked.

4. Do the following if you want to send the health check message to a VMM site:

- a. Ensure that the *This is a VPP Site* box is not checked.
- b. Select the dial-up connection for the mail server's computer from the *RAS Entry* menu.
- c. Ensure that the *Notify via LAN* box is not checked.
- d. Type the login name for the VMM's computer in the *User Name* field.
- e. Type the password for the VMM's computer in the *Password* field.
- f. Enter the IP address of the VMM's computer in the *IP Address* field.
- g. Ensure that the *Notify via LAN* box is not checked.

5. Do the following if you want to send the health check message to an electronic mail site:

- a. Ensure that the *This is a VPP Site* box is not checked.
- b. Select the dial-up connection for the mail server's computer from the *RAS Entry* menu.
- c. Ensure that the *Notify via LAN* box is not checked.
- d. Check the *This is an Email Site* box.

- e. Enter the IP (internet protocol) address of the mail server's computer in the *Host Name* field.
- f. Enter the electronic mail address of the person to contact in the *Email Address* field.
- g. Enter the electronic mail address of the CPM's system administrator in the *From* field.

6.3.7 PAGING / NOT PAGING IF THE CONNECTION FAILS

To send a page if the server fails to connect to the VMM, do the following:

1. Ensure that the *Do Not Page* button is not checked.
2. Type a value in the *Page After n Notify Attempts* field.
 - This value specifies how many times the Alarm Notify Server should attempt to contact the site before giving up and sending a page. The page indicates that the server failed to contact the VMM's computer.
3. Click the *Get RAS and Pager Entry Lists from Server* button.
 - This ensures that the Notify Site Setup window is updated with the latest information about how the CPM (Communications Processor Module) is configured.
4. Click *Page by Name* or *Page by Number* .
 - If you select *Page by Name* , you must select a pager from the *Pager Name* menu. If you select *Page by Number* , you must configure the *Pager Number* field and the *Pager Service* menu. Refer to *Page by Name or Number* for more information about this option.
5. If you selected *Page by Name*, do the following:
 - a. Select a pager from the *Pager Name* field.
 - This is the pager to contact if the server fails to open a connection with the VMM's computer.
6. If you selected *Page by Number*, do the following:
 - a. Type the pager's phone number in the *Pager Number* field.
 - b. Select the paging service from the *Pager Service* menu.
7. Click the *Apply* button to apply your changes to the site.

8. Click *OK* if you are finished working with the Notify Site Setup window.

To prevent the server from sending a page if it fails to connect to the VMM, do the following:

1. Click the *Do Not Page* button.
2. Click the *Apply* button to apply your changes to the site.
3. Click *OK* if you are finished working with the Notify Site Setup window.

6.3.8 ENABLING / DISABLING THE HEALTH CHECK

To enable the health check feature, do the following:

1. Ensure that the *Disable Health Check* box is not checked.
2. Specify when the Alarm Notify Server should send the health check message by setting the desired time in the *Health Check Time* field.
 - The Alarm Notify Server will test communication between the CPM and the VMM at this time each day. The person responsible for the VMM site should expect to receive and acknowledge a health check message each day. If the message does not arrive, this indicates a communications problem between the CPM and the VMM site.

To prevent the VMM site from receiving a health check message each day, do the following:

1. Check the *Disable Health Check* box.

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