



EGCP-2 Communications Manual

**EGCP-2
Engine Generator Control Package**

Manual 26181 (Revision A)

WARNING—DANGER OF DEATH OR PERSONAL INJURY



WARNING—FOLLOW INSTRUCTIONS

Read this entire manual and all other publications pertaining to the work to be performed before installing, operating, or servicing this equipment. Practice all plant and safety instructions and precautions. Failure to follow instructions can cause personal injury and/or property damage.



WARNING—OUT-OF-DATE PUBLICATION

This publication may have been revised or updated since this copy was produced. To verify that you have the latest revision, be sure to check the Woodward website:

www.woodward.com/pubs/current.pdf

The revision level is shown at the bottom of the front cover after the publication number. The latest version of most publications is available at:

www.woodward.com/publications

If your publication is not there, please contact your customer service representative to get the latest copy.



WARNING—OVERSPEED PROTECTION

The engine, turbine, or other type of prime mover should be equipped with an overspeed shutdown device to protect against runaway or damage to the prime mover with possible personal injury, loss of life, or property damage.

The overspeed shutdown device must be totally independent of the prime mover control system. An overtemperature or overpressure shutdown device may also be needed for safety, as appropriate.



WARNING—PROPER USE

Any unauthorized modifications to or use of this equipment outside its specified mechanical, electrical, or other operating limits may cause personal injury and/or property damage, including damage to the equipment. Any such unauthorized modifications: (i) constitute "misuse" and/or "negligence" within the meaning of the product warranty thereby excluding warranty coverage for any resulting damage, and (ii) invalidate product certifications or listings.

CAUTION—POSSIBLE DAMAGE TO EQUIPMENT OR PROPERTY



CAUTION—BATTERY CHARGING

To prevent damage to a control system that uses an alternator or battery-charging device, make sure the charging device is turned off before disconnecting the battery from the system.



CAUTION—ELECTROSTATIC DISCHARGE

Electronic controls contain static-sensitive parts. Observe the following precautions to prevent damage to these parts.

- Discharge body static before handling the control (with power to the control turned off, contact a grounded surface and maintain contact while handling the control).
- Avoid all plastic, vinyl, and Styrofoam (except antistatic versions) around printed circuit boards.
- Do not touch the components or conductors on a printed circuit board with your hands or with conductive devices.

IMPORTANT DEFINITIONS

- A **WARNING** indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
- A **CAUTION** indicates a potentially hazardous situation which, if not avoided, could result in damage to equipment or property.
- A **NOTE** provides other helpful information that does not fall under the warning or caution categories.

Revisions—Text changes are indicated by a black line alongside the text.

Woodward Governor Company reserves the right to update any portion of this publication at any time. Information provided by Woodward Governor Company is believed to be correct and reliable. However, no responsibility is assumed by Woodward Governor Company unless otherwise expressly undertaken.

© Woodward 2002
All Rights Reserved

Contents

ELECTROSTATIC DISCHARGE AWARENESS	II
CHAPTER 1. GENERAL INFORMATION.....	1
Overview.....	1
ServLink Overview.....	2
Specifications	2
CHAPTER 2. EGCP-2 HMI SOFTWARE INSTALLATION	3
CHAPTER 3. HARDWARE CONNECTIONS.....	5
CHAPTER 4. MONITORING SERVLINK SOFTWARE OPERATION	6
Operating EGCP-2 Monitoring Software	11
CHAPTER 5. SERVLINK AND WATCH WINDOW CONFIGURATION SOFTWARE	18
ServLink Variable List.....	21
CHAPTER 6. MODBUS RTU COMMUNICATIONS FOR THE EGCP-2 PANEL....	35
Introduction.....	35
Modbus Configuration Items	35
CHAPTER 7. DOWNLOAD.EXE SETPOINT UTILITY	52
Introduction.....	52
Requirements	52
Instructions	52
CHAPTER 8. SERVICE OPTIONS	55
Product Service Options.....	55
Woodward Factory Servicing Options.....	56
Returning Equipment for Repair.....	57
Replacement Parts.....	57
Engineering Services	58
How to Contact Woodward.....	58
Technical Assistance.....	59

Illustrations and Tables

Table 5-1. ServLink Variable List <<no category>> Category.....	22
Table 5-2. ServLink Variable List Control Overview Category.....	23
Table 5-3. ServLink Variable List Front Panel Category.....	24
Table 5-4. ServLink Variable List Gen Overview Category	25
Table 5-5. ServLink Variable List SPT (SetPoint) Category.....	26
Table 6-1. Common Modbus Error Numbers	37
Table 6-2. Modbus Addresses for the RTU Protocol	44

Electrostatic Discharge Awareness

All electronic equipment is static-sensitive, some components more than others. To protect these components from static damage, you must take special precautions to minimize or eliminate electrostatic discharges.

Follow these precautions when working with or near the control.

1. Before doing maintenance on the electronic control, discharge the static electricity on your body to ground by touching and holding a grounded metal object (pipes, cabinets, equipment, etc.).
2. Avoid the build-up of static electricity on your body by not wearing clothing made of synthetic materials. Wear cotton or cotton-blend materials as much as possible because these do not store static electric charges as much as synthetics.
3. Keep plastic, vinyl, and Styrofoam materials (such as plastic or Styrofoam cups, cup holders, cigarette packages, cellophane wrappers, vinyl books or folders, plastic bottles, and plastic ash trays) away from the control, the modules, and the work area as much as possible.
4. Do not remove the printed circuit board (PCB) from the control cabinet unless absolutely necessary. If you must remove the PCB from the control cabinet, follow these precautions:
 - Do not touch any part of the PCB except the edges.
 - Do not touch the electrical conductors, the connectors, or the components with conductive devices or with your hands.
 - When replacing a PCB, keep the new PCB in the plastic antistatic protective bag it comes in until you are ready to install it. Immediately after removing the old PCB from the control cabinet, place it in the antistatic protective bag.



CAUTION—ELECTROSTATIC DISCHARGE

To prevent damage to electronic components caused by improper handling, read and observe the precautions in Woodward manual 82715, *Guide for Handling and Protection of Electronic Controls, Printed Circuit Boards, and Modules*.

Chapter 1.

General Information

Overview

The EGCP-2 has two communication ports: the inter-control RS-485 port and the configurable RS-422 port. EGCP-2 controls communicate with each other over the RS-485 network. This network uses a proprietary protocol and is not intended to be accessed for information. The configurable RS-422 port protocol may be selected for one of three options: ServLink communications protocol, which uses the Woodward PC Tools interface exclusively, Modbus® * RTU protocol, which uses an open protocol used by many third party software manufacturers, or Upload Setpoints, which is a Microsoft DOS based program used to transfer setpoint files between the control and a PC.

*—Modbus is a registered trademark of Schneider Automation Inc.

To select which protocol will be used, enter the Sequencing and Comms configuration menu of the EGCP-2 panel using the proper software password, and scroll to the menu item labeled “422 Protocol”. The selections under this menu item are:

1. ServLink
2. Modbus
3. Upload Setpoints



NOTE

Whenever the RS-422 protocol setpoint is changed, the EGCP-2 must be powered down, then powered up again to reset to the new protocol.

If ServLink is chosen for the protocol selection, the EGCP-2 will communicate in the ServLink protocol, which is used with the Woodward EGCP-2 HMI software P/N 8928-364 (see Chapter 2, EGCP-2 HMI Software Installation) or with the Woodward Watch Window Professional software P/N 8928-800 (see Chapter 5, ServLink and Watch Window Configuration Software).

If Modbus is chosen, the EGCP-2 will communicate in MODBUS RTU protocol, and make its information available according to the address list shown in Table 6-2, Modbus Addresses for the RTU Protocol. Also, when the RS-422 Protocol is set to Modbus, the Modbus Address, Modbus Time-out, and Modbus Reset menu items of the Sequencing and Communications menu become functional.

If Upload Setpoints is chosen, the EGCP-2 panel will switch to a communications mode where it is waiting to see characters on the 422 serial port that set it to transfer the contents of the setpoint file to the PC. This task is run on the PC using the download.exe DOS program (see Chapter 7, Download.exe Setpoint Utility for more information).

ServLink Overview

Woodward's ServLink and EGCP-2 HMI monitoring software package are located on a single Compact Disc which ships with every unit. These software tools are used together to establish communications with, and serve as a monitoring and configuration interface for, the EGCP-2 platform.

When installed on a computer, the ServLink and EGCP-2 HMI files will reside in the same directory, typically on the hard drive of the computer they are installed on. Icons associated with the executable files for both the ServLink and EGCP-2 HMI software will be automatically generated upon installation.

These icons are used to run the programs. Using the computer's RS-232 serial port, the ServLink software establishes a direct serial communication link between the computer and the EGCP-2. The ServLink software may also be configured to operate via a modem for remote communications to the EGCP-2 control(s).

The ServLink software must always be started before the EGCP-2 HMI software can be run. The ServLink software provides a bridge between the control and the computer making the data from the control available to the computer software applications.

The EGCP-2 software duplicates the front panel of the EGCP-2 hardware platform. All the monitoring information which can be obtained from the hardware can also be accessed by the EGCP-2 software in a format which is identical to that of the hardware. This makes the software very familiar to those accustomed to the EGCP-2 control keypad functions and LCD readout displays.

Specifications

Communications:

- RS-422 protocol
- 9600 Baud (fixed maximum)
- No Parity
- 1 Stop Bit

Minimum Computer Requirements:

- Pentium® 133 MHz PC
- 32 MB of RAM
- Windows® 95, 98, NT 4.0, and 2000 or greater (Windows NT or 2000 preferred)

Modem Requirements:

- Transmitting Modem:
 - o 9600 Baud Capability (minimum)
 - o 8 Data Bits
 - o No Parity
 - o 1 Stop Bit
- Receiving Modem:
 - o 9600 Baud Capability (minimum)
 - o DTR :OFF
 - o Echo Offline Commands: OFF
 - o Auto Answer: ON
 - o Smart Mode (if applicable): ON
 - o Handshaking: OFF

Chapter 2.

EGCP-2 HMI Software Installation

The EGCP-2 Monitoring Software is located on a single compact disc. This disc contains self-installing software required for installation of the ServLink and EGCP-2 Monitoring Software onto a computer hard-drive operating within a 32 bit environment.

To install the software on your computer's hard drive, turn on your computer and wait until the Windows desktop is displayed. Insert the compact disc (CD) into the CD drive of the computer which the installation will take place.

Go to the task bar located at the bottom of the desktop screen, and click once on the Windows Start button. Then click on the Run option.

A dialog box will pop up and display a prompt window asking for the program you wish to run. If you know the drive letter allocated to your CD drive type this drive letter, followed by a colon, and then a back slash followed by the word "setup". For example, if CD the drive designation for your computer is D, the following would be typed into the dialog box:

D:\SETUP

If you are unsure of which drive on your computer is designated as the CD drive, you can double-click on the Windows desktop icon labeled "My Computer" to display the various drive and network connections for your computer. Look for the icon showing the CD drive followed by the drive letter designation. This letter is the letter which must be used when in the Run window dialog box prior to the setup instruction.

Once you have typed the proper command in the dialog box for setup, press the Enter (or Return) key on your computer. Windows will automatically begin reading the CD drive for setup instructions from the EGCP-2 HMI CD setup file located there.

The ServLink and EGCP-2 software installation will initially prompt the user if it may automatically create a directory on the hard drive of the computer, and label this directory "Woodward". Press the OK button and this directory will be made. All the ServLink and EGCP-2 software will be placed under this directory on the computer's hard drive.



NOTE

Items on the Windows toolbar and desktop may appear differently than is shown in this manual, depending on active programs in windows at the time of installation or operation.

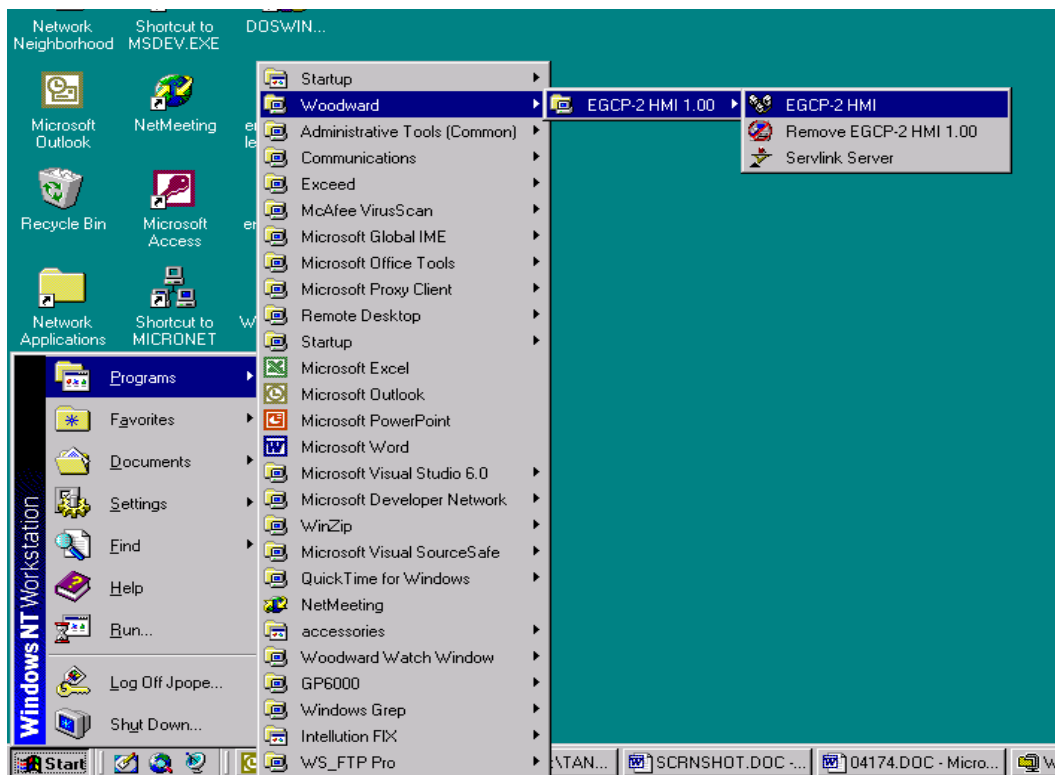
The intent of this manual is to accurately depict the windows which are directly associated with the installation and operation of the EGCP-2 monitoring software.

As the installation continues, the screen will momentarily show the ServLink and EGCP-2 icons that are created during the setup process. These icons are automatically inserted into the Program Files menu under the EGCP-2 label.

The installation process has made a new set of programs under the EGCP-2 HMI 1.00 program file. Click once on the desktop tool bar Start button, and select the Programs option. Among the various programs on the computer hard drive should now be one group called Woodward, then "EGCP-2 HMI 1.00". Select this group to display the ServLink Server, EGCP-2 HMI, and Uninstall EGCP-2 HMI 1.00 executables. These are the executables which were installed from the CD to the computer hard drive.

The ServLink Server and the EGCP-2 HMI are both used in communicating with and monitoring the EGCP-2 control system. The Remove EGCP-2 HMI 1.00 icon will remove all files associated with the installation of this software from the computer hard drive if it is selected. The Remove program prompts the user prior to uninstalling the software to confirm this action, which greatly reduces the chance of accidental removal of the installed software.

Here is a typical screen from the Windows desktop with the ServLink and EGCP-2 software installed on the computer's hard drive:



Once the software is successfully installed on the computer, it will remain resident on the hard drive indefinitely, or until it is uninstalled.

Chapter 3. Hardware Connections

Once the software is installed on the computer hard drive, the hardware connection between the computer and the EGCP-2 control must be made for correct communication between the two devices. This hardware connection is completed in one of two ways:

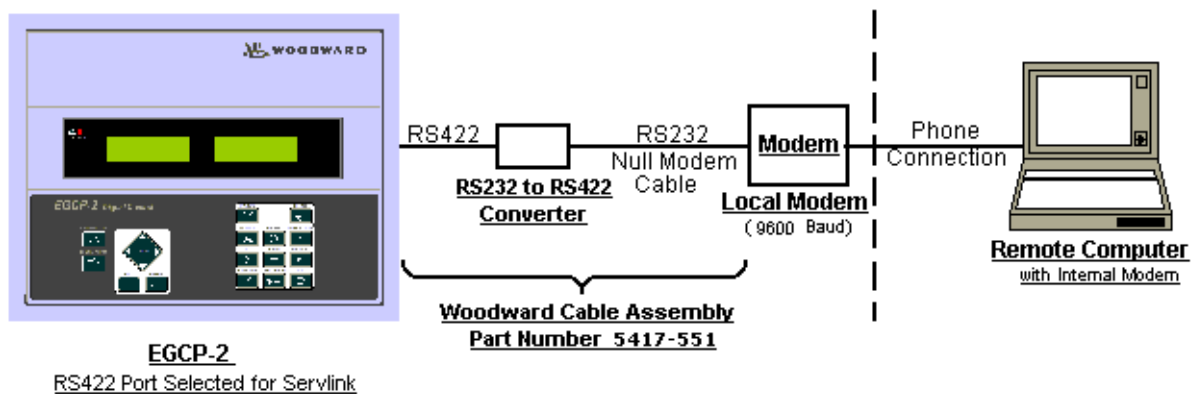
1. Direct cable connection between the computer and the EGCP-2 control(s) RS-422 network.
2. Remote connection via modem between the computer and the EGCP-2 control(s).

Direct Cable connection between the computer and EGCP-2 control(s) will be discussed first as it is the most straightforward of the two connection methods.

The laptop or desktop computer, which will be used with the EGCP-2 RS-422 port, will have a 9-pin serial port. This port is configured by the computer hardware to use a serial communications protocol called RS-232. The details of this protocol are not important to know for hardware connection to the EGCP-2 control(s), other than there is a need to convert the RS-232 protocol of the computer port to RS-422 protocol used by the EGCP control network. This conversion is accomplished by an external conversion module, which takes the RS-232 serial port input from the computer, and changes it to a RS-422 protocol for the EGCP-2. These converters can be found in most computer or electronics stores, and are called RS-232 to RS-422 Converters. Consult the EGCP-2 Installation manual for wiring diagrams. A complete cable assembly can also be purchased from Woodward. The part number is 5417-551.

In a system with multiple (maximum 8) EGCP-2 controls, each control is interconnected to the others on the RS-422 network in a multidrop fashion.

Modem connections are very similar, but now a modem is required both at the computer and at the EGCP-2 end of the network. The modem may be an internal or external type at the computer, and must be an external type at the EGCP-2 control. The conversion from RS-232 to RS-422 communications is made at the modem connection into the EGCP-2 control network.



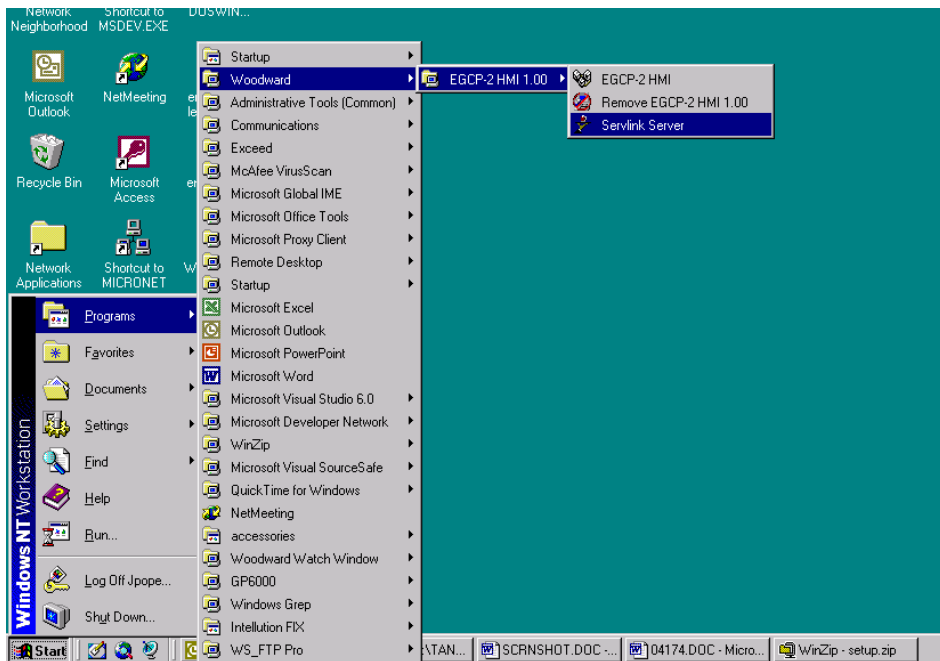
For detailed wiring diagrams pertaining to the RS-422 network of the EGCP-2 controls, please consult the EGCP-2 Installation and Operation Manual, number 26174.

Chapter 4.

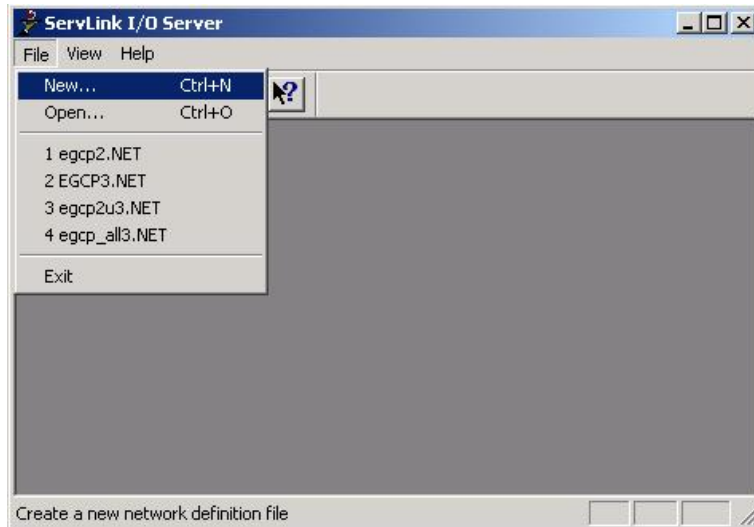
Monitoring ServLink Software Operation

Now that the software has been installed on the hard drive of the computer, and the desired hardware connections are in place between the computer and the EGCP-2 controls, the next step is to run the software and confirm operation of the entire communications network.

To run the EGCP-2 software, first click on the Start toolbar button in Windows desktop, then Programs, Woodward, EGCP-2 HMI 1.00, and then click on the ServLink server as shown here.

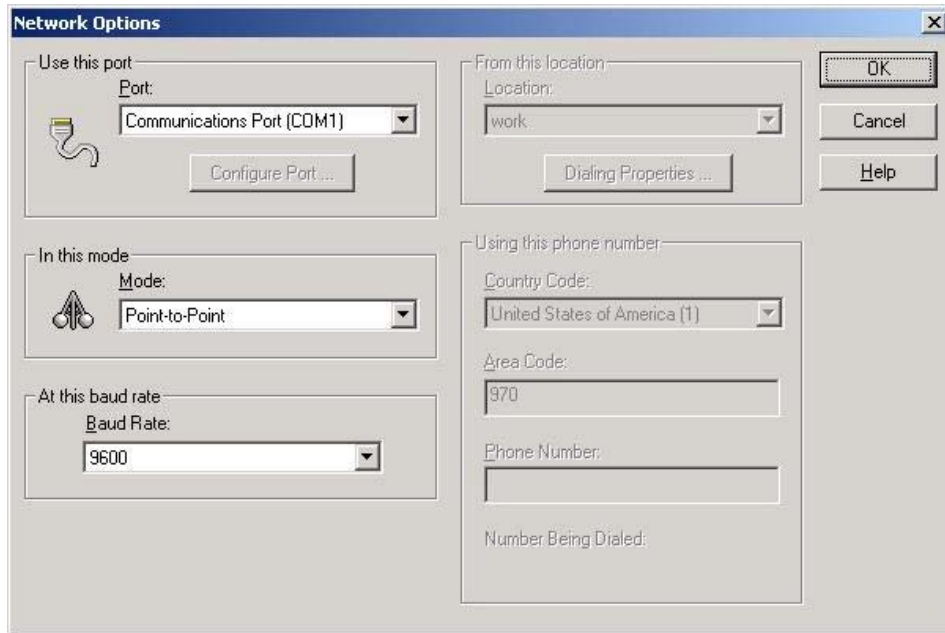


When you click once on the Icon, this screen will appear on the desktop. This is the Dialog Screen, where the type of communications you are using will be established prior to operation of the EGCP-2 monitoring software.



The first action inside the ServLink screen is to set up a new network definition file. Click once on **F**ile, and then on **N**ew as shown. The new network definition window will pop up on the computer screen.

This will open up the Network Options screen. This screen allows the user to configure the ServLink connection for serial COM port, or modem. When a serial port is selected, the left side menus will be active and the right side menus will be grayed out.



The “Use This Port” box of this screen is used to select which communication port (COM) or modem will be used to communicate using RS-232 protocol to the EGCP-2 control. Clicking on the drop down box will tell the ServLink software to scan the computer and list any communications ports which are not being used by other applications, that may be used for serial communications. If the port that is desired does not appear, most likely it is being used by some other application on the computer. Another port should be selected, or the application that was using the port should be stopped.

The next block down, “In this mode”, is used to select either multidrop or point-to-point communications over the serial port. Point-to-point communications assumes that the computer will be communicating with only one control at the other end of the network. Point-to-point communications should be used only when the communications between the computer and the EGCP-2 control are made in a direct fashion (no secondary devices or other EGCP-2 controls can reside on the same network). There must be only the computer and one EGCP-2 control on the network for point-to-point communications.

The advantage of using the point-to-point communications mode option is speed. Since the communications are only between the PC and one EGCP-2 control, the ServLink software will scan for only one unit on the network. This takes less time than a multidrop communications mode, which scans for all eight units on the network, regardless of how many units are actually connected to it.

Use the multidrop communications option any time there are two or more EGCP-2 units that require monitoring from the computer on the same network.

The next box down is the “At this baud rate” box. Set this to 9600 Baud. The EGCP-2 is only capable of communicating at 9600 baud. Any other number put in this box will cause communication failure with the EGCP-2 control.

The boxes on the right hand side of the ServLink New File setup screen are normally turned “off” when the “Use This Port” box is configured for the COM ports of the computer. However, when the modem option is selected in the “Use This Port” box, the boxes on the right hand side of the screen become active, as shown below:

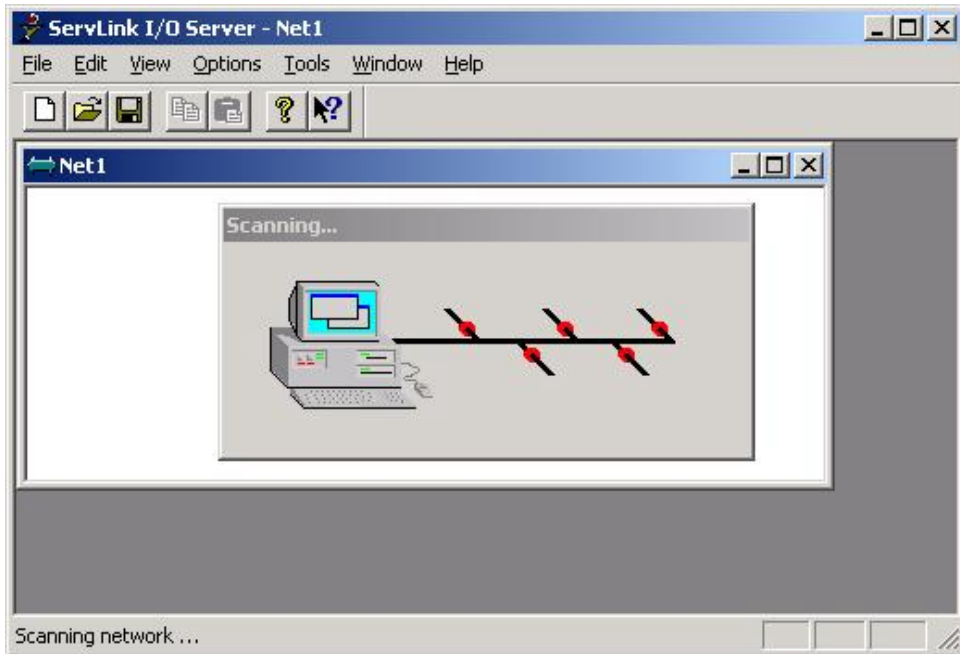
The screenshot shows the "Network Options" dialog box with the following settings:

- Use this port:** Port: Xircom Cardbus Ethernet 100 + Mod
- From this location:** Location: hotel
- In this mode:** Mode: Point-to-Point
- At this baud rate:** Baud Rate: 9600
- Using this phone number:** Country Code: United States of America (1), Area Code: 702, Phone Number: 555-1234
- Number Being Dialed:** 9, 555-1234

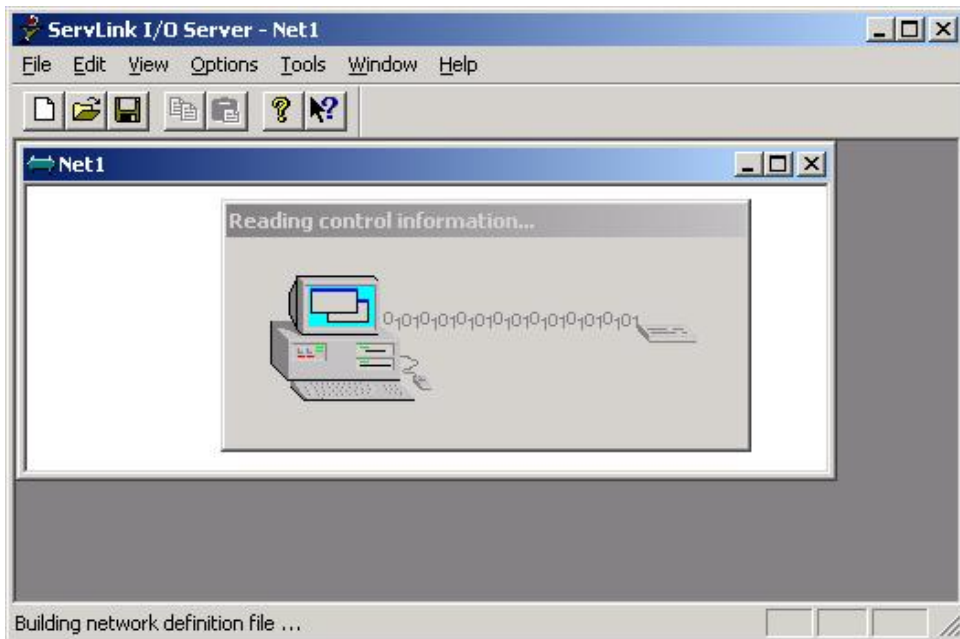
The box labeled “From this location” allows the user to set up various dialing properties for the modem, and store them under a user-defined name. These dialing properties include such functions as tone/pulse dialing, call waiting override, and adding any dialing prefixes to access external lines, etc.

The next box down on the right hand side of the screen is the “Using this phone number” box. Here information about the number of origin and the number to be dialed are entered by the user.

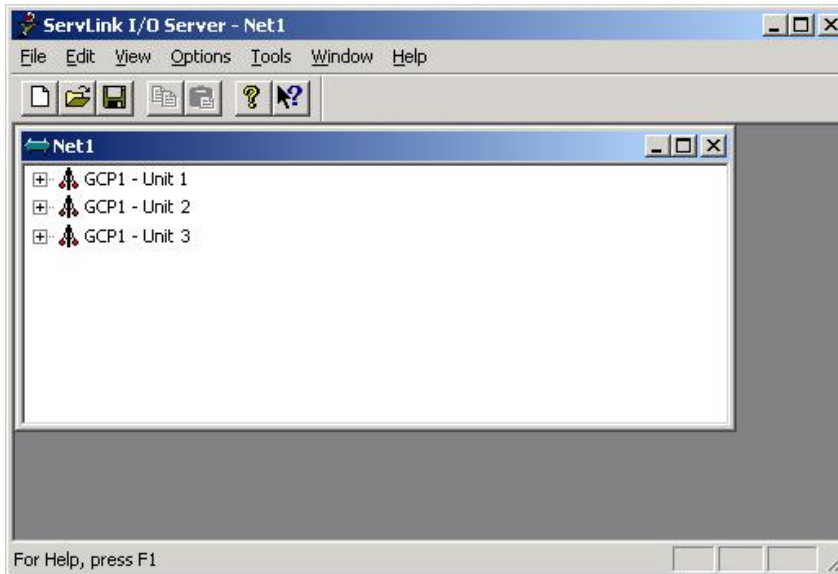
When all the various communications options are selected in the ServLink screen, press the OK button. ServLink will automatically dial the modem (if applicable) and scan the network for active controls. This may take several minutes, depending on network configuration. Here is what the screen of the computer looks like when it is scanning the network for active controls:



When communications are established with the EGCP-2 control network, the scanning screen will change to show that the ServLink software is reading the control information. That screen will look like this:



Once communications are established, and the data is read from the EGCP-2 control network, the ServLink software will show each control it is communicating on the network by that control's network address. Here is a typical ServLink network definition screen for a three-unit EGCP-2 network:



If your network configuration is constant (neither the number of controls on the network nor the PC attached to the network will change), you may want to save the Network Definition File you have created for ServLink. To do this, click on the File button in the upper left hand window of ServLink. Select "Save As". A dialog window will pop up and ask you to name the new network definition file you have created. Typically, this file will be stored in the EGCP-2 directory on the hard drive of the computer ServLink is operating from. The file name given to the network definition file will be given a ".net" extension. Once you have selected a file name, click on the OK button in the dialog box. This saves the network definition file you created.

Once you have created and saved the network definition file for ServLink, all you have to do in the future to run the definition file is open ServLink from the Programs Menu, and select File, and then Open. When Open is selected, a list will appear containing the network definition file you created. Select the desired network definition file, and ServLink will automatically select the necessary communications options defined by the file and establish a communications link with the EGCP-2 control network.

Now that ServLink has established a network connection, you may want to "minimize" the ServLink window by clicking on the Minimize button in the upper right hand of the ServLink Window. When you minimize an application, the software continues running, but the window is reduced to a button on the desktop toolbar. You can restore the application window to full size at any time by clicking on the reduced toolbar button for that software with the left mouse button.

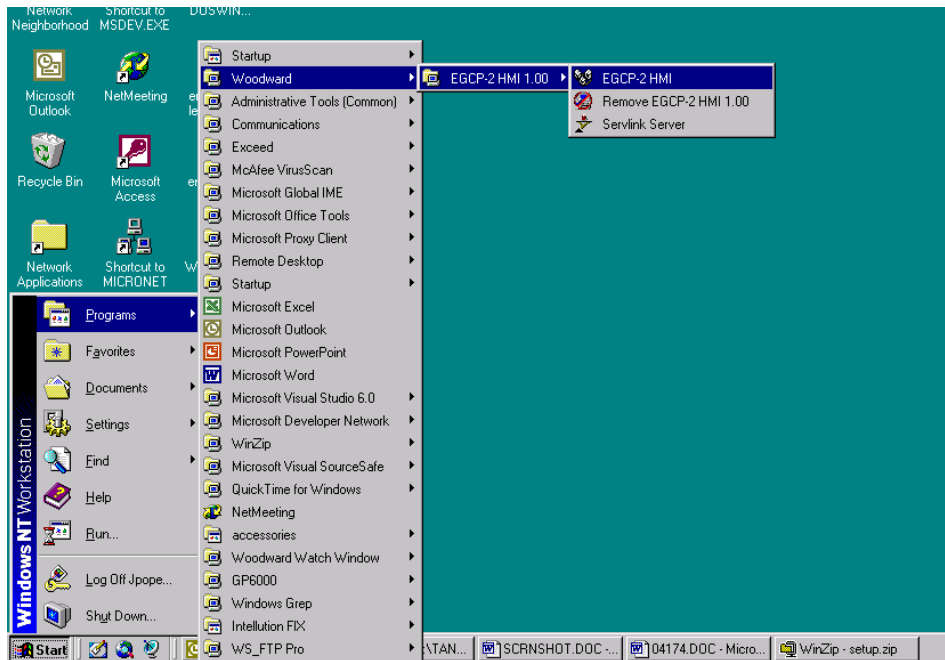
**NOTE**

Terminating ServLink will result in loss of communications with the network. The ServLink Network Definition file will have to be executed again to re-establish this link.

Operating EGCP-2 Monitoring Software

Now that the communications link is established between the computer and the EGCP-2 controls, the EGCP-2 Monitoring Software Tool can be used to view the various parameters of each control on the RS-422 network.

To open the EGCP-2 controls program, click once on the Start button in the desktop toolbar. Select Programs, Woodward, EGCP-2 HMI 1.00, and EGCP-2 HMI. Click once on the EGCP-2 HMI icon to execute the monitoring program, as shown below:



Provided that the ServLink software is currently connected to the control network, clicking this icon will start the HMI program. The HMI program cannot be run without being connected to a control.

When the control is linked to the EGCP-2 monitoring software, the LCD display on the hardware units will display an asterisk (*) cursor instead of the usual solid block cursor. This allows operators of the EGCP-2 to recognize the units are being accessed by remote control simply by looking at the display screen of the hardware units.

When the control is linked to the EGCP-2 monitoring software, the Master Situation Monitor screen will appear. This screen will show all EGCP-2 controls connected to the network, and their various status information, as shown here:



UNIT NUMBER	PRIORITY	KILOWATTS	ALARM STATUS
1	1	2202	OK
2	2	0	OK
3	3	0	ALARM

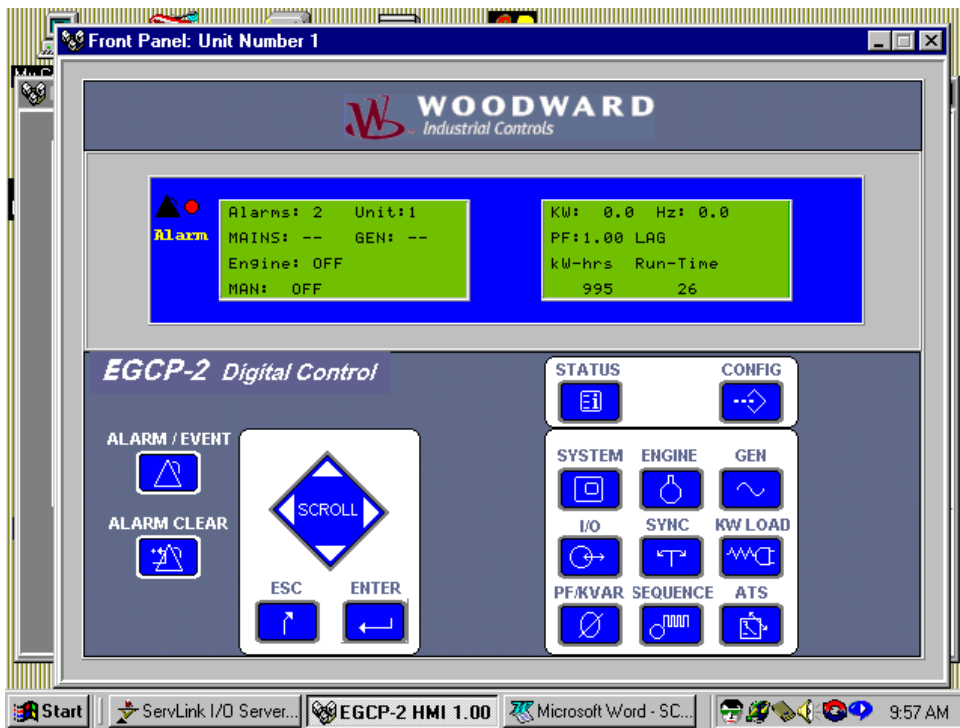
This Master Situation Monitor Screen is showing three EGCP-2's. Unit one is generating power with no alarms. Units two and three are not generating power, and unit three has an active alarm.

To view a specific unit's front panel display, highlight the unit you wish to observe using a single click of your mouse on that unit's display line in the Master Situation Monitor, as shown here. Then click the Front Panel icon on the lower section of the screen next to the Woodward logo or simply double-click the unit that is to be observed.

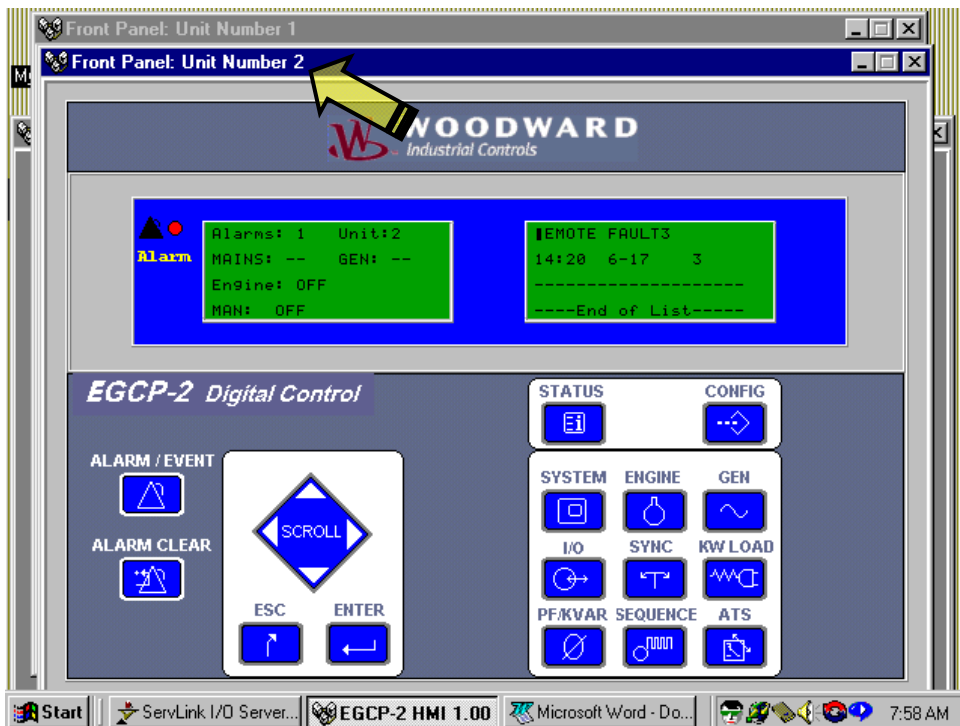


UNIT NUMBER	PRIORITY	KILOWATTS	ALARM STATUS
1	1	2267	OK

The Front Panel Display for that unit EGCP-2 (Unit 1 in this case) will pop up as shown below:

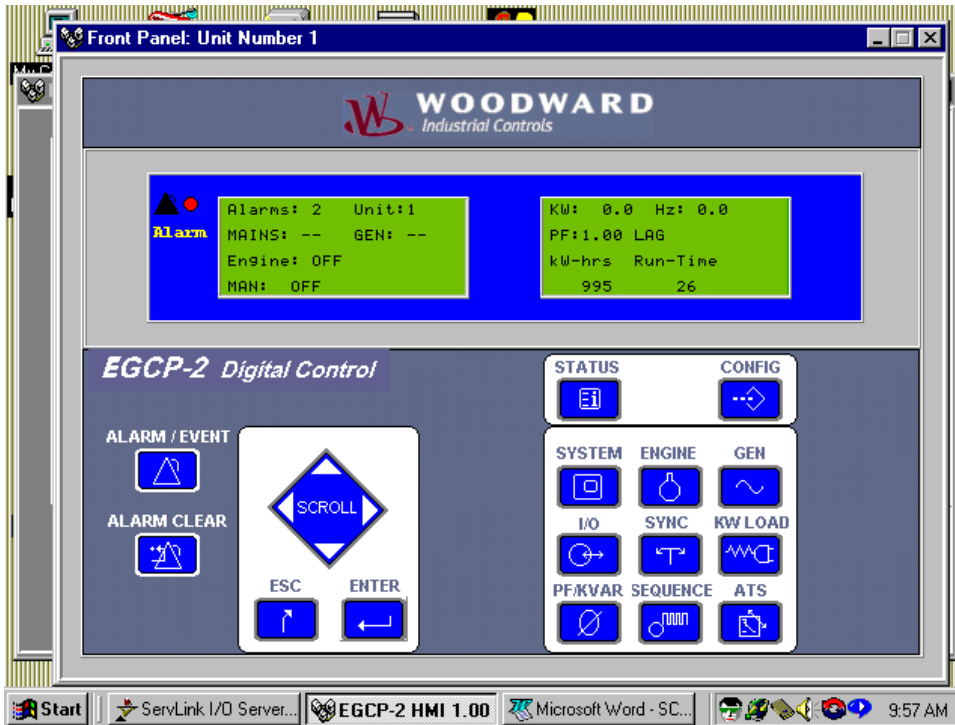


Multiple units can be viewed on the Windows desktop simultaneously. Each unit is “stacked” on top of the others. You can view any unit by clicking the left mouse key once on any part of that unit’s Front Panel display window, or if the front panel display has been minimized, by clicking on the minimized bar for that front panel on the desktop. Here is a screen showing a two unit system with both front panels on the desktop. Notice that the unit is identified on the upper left hand side of the front panel display bar.

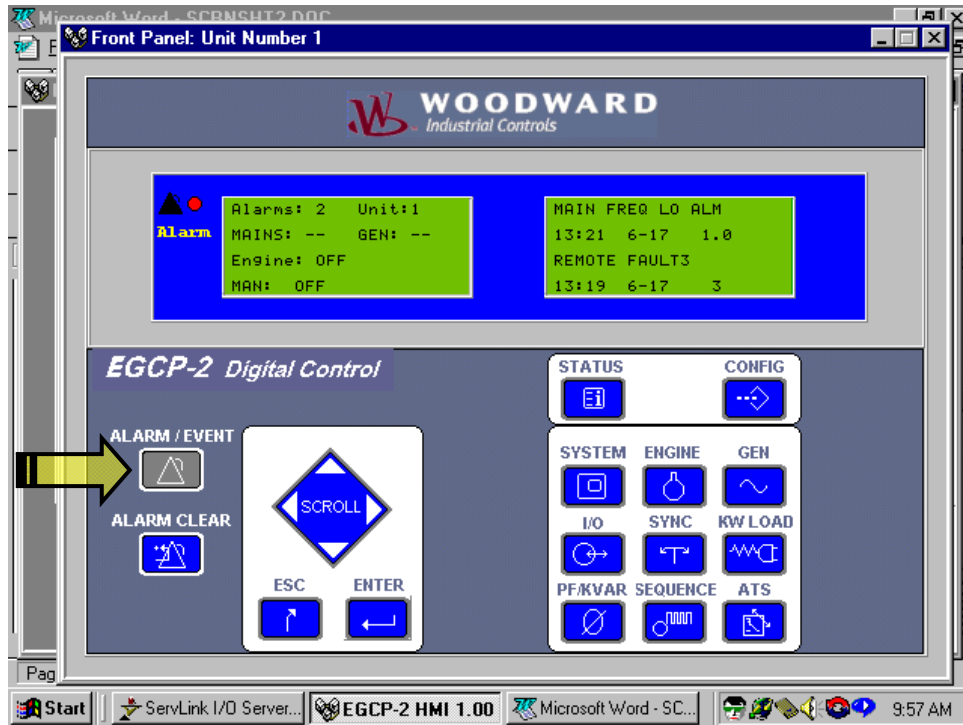


The front panel display of the EGCP-2 monitoring software allows access to any monitoring information available on the actual unit. The buttons of the front panel operate in the same manner as the EGCP-2 as well. The front panel display operates in the same manner as most desktop windows, except that the size of the front panel display cannot be changed or maximized. The front panel display can be closed by clicking the X button in the upper right hand corner, or minimized to toolbar buttons using the under bar [_] button in the upper right hand corner. If a front panel display window is closed, it must be re-opened from the Master Situation Monitor.

In the following example there is an alarm condition on Unit #1. Highlighting Unit #1, and then clicking on the front panel display icon in the lower left corner of the Master Situation Monitor displays the front panel display for Unit #1.

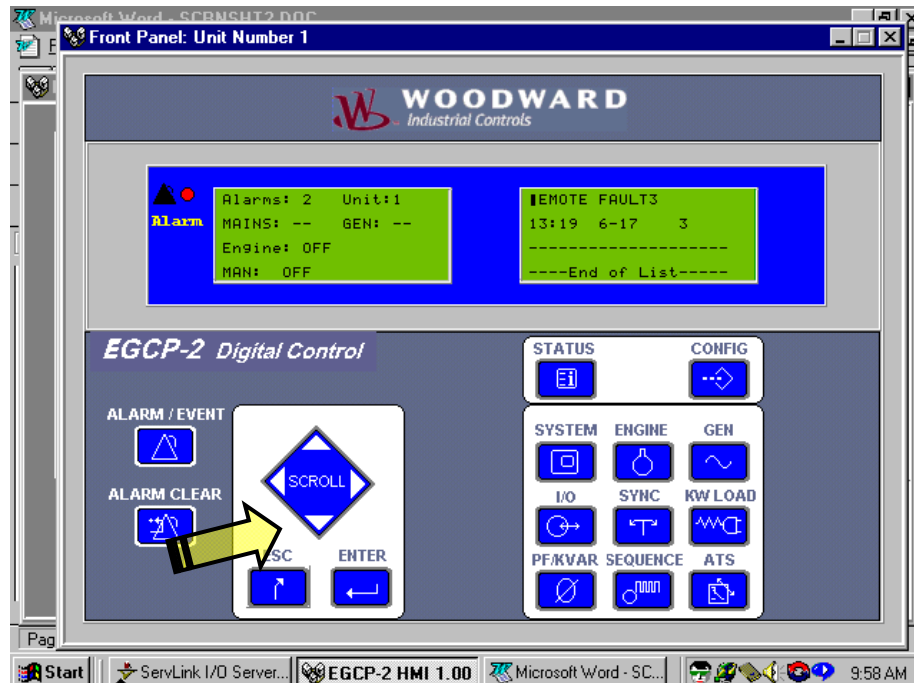


The front panel display for Unit 1 indicates two alarms in the System Status menu. Clicking the Alarm/Event button with the left mouse button displays the Alarm / Event Log of the control to the right hand LCD display as shown below:

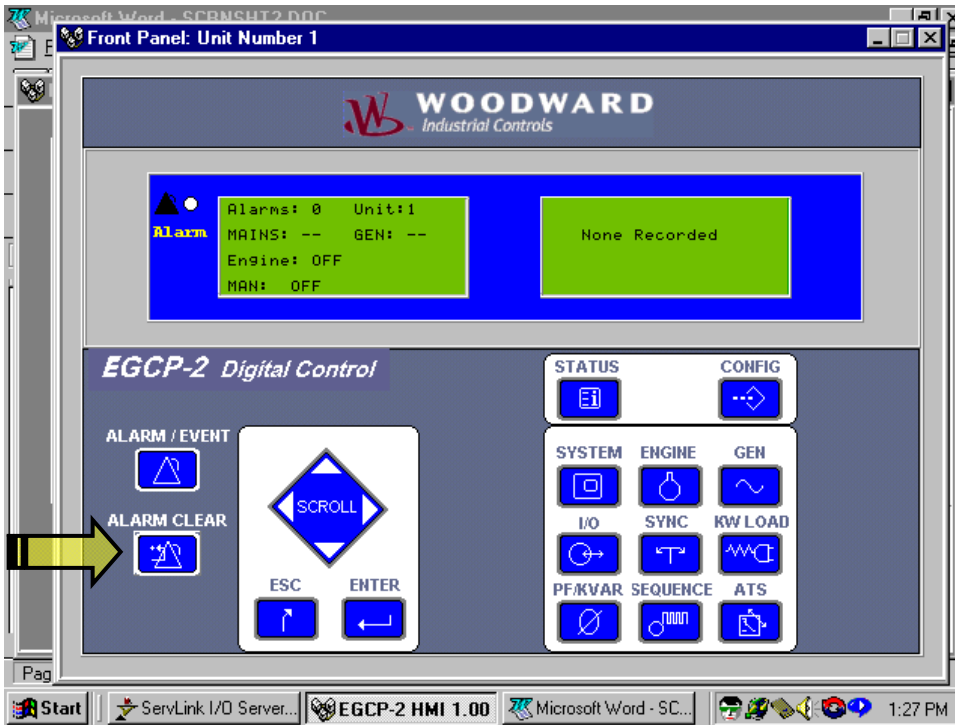


The alarm event list shows two alarms. The most recent is a Mains Frequency Low Alarm logged on June 17 at 13:21, and the other is a Remote Fault 3 discrete input driven alarm logged on the same date at 13:19.

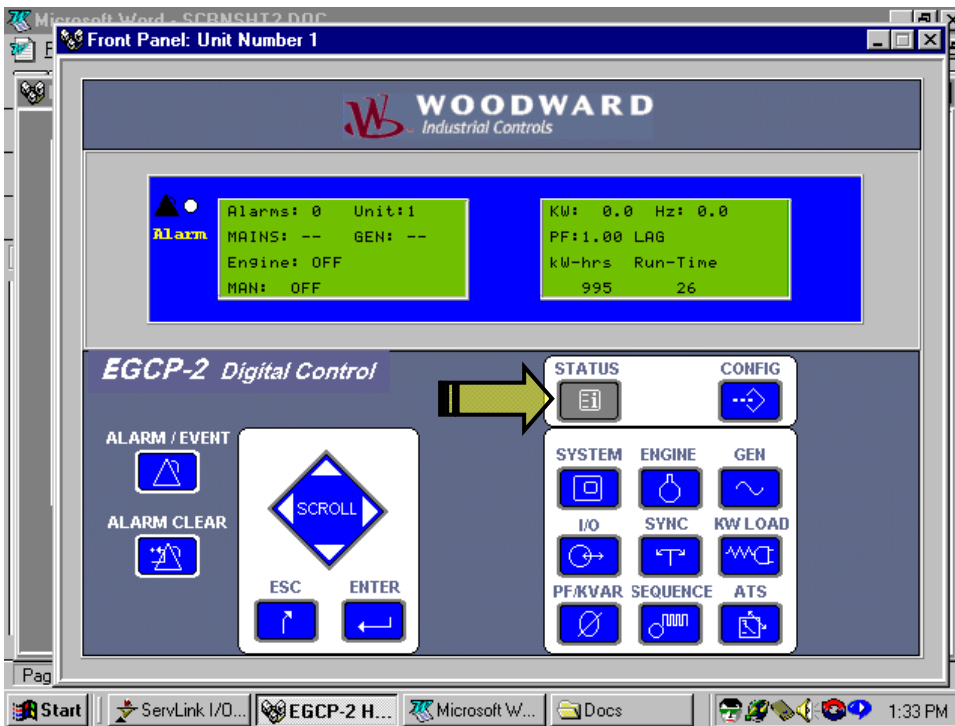
Pressing the Scroll Down key as shown below scrolls the alarm event list in the right hand display to show the end of the alarm event log list, as shown below.



Pressing the Alarm Clear Button results in the logged alarm events being removed from the alarm event list. When all alarms have been cleared, the list displays "None Recorded" as shown.



Pressing the Status button on the front panel display will revert the EGCP-2 display back to the status mode. Now both left and right displays show the status information for the item selected.



Using the Status, Configuration and Alarm/Event keys on the Front Panel display will provide access to any screen and function that is normally available to the users operating the unit directly from the front panel of the EGCP-2. For more information on how to navigate between the various menus and menu items in the EGCP-2, see the EGCP-2 Operation and Installation Manual number 26174.

To shut down the Master Situation Monitor, click once on the "X" button in the upper right hand corner of the Master Situation Monitor. A pop-up window will ask the operator to confirm the choice to shut down the EGCP-2 Monitoring Software.

Selecting Yes shuts down the monitoring software. If No is selected, the Monitoring software continues to monitor the control network.

Once the Monitoring software is shut down, the ServLink software must also be terminated to shut down the external communication link over the RS-232 port of the computer.

This concludes a typical EGCP-2 monitoring session using the ServLink Software and EGCP-2 monitoring tool software.

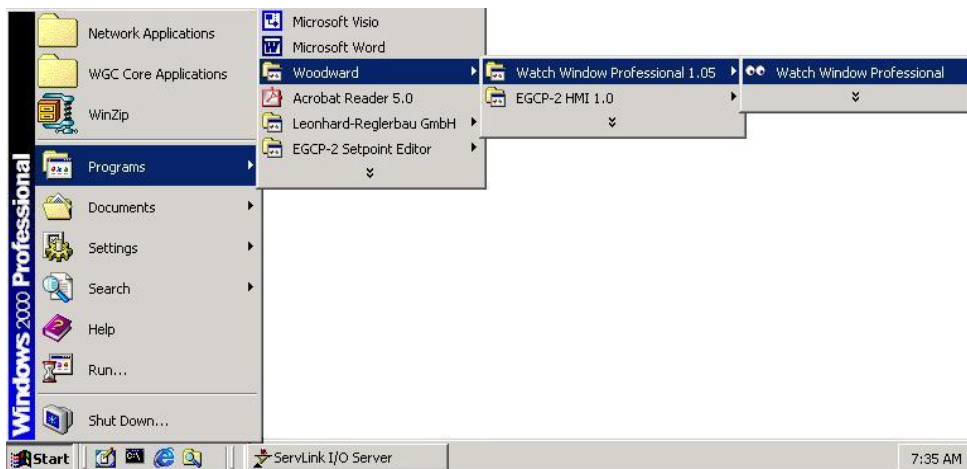
Chapter 5.

ServLink and Watch Window Configuration Software

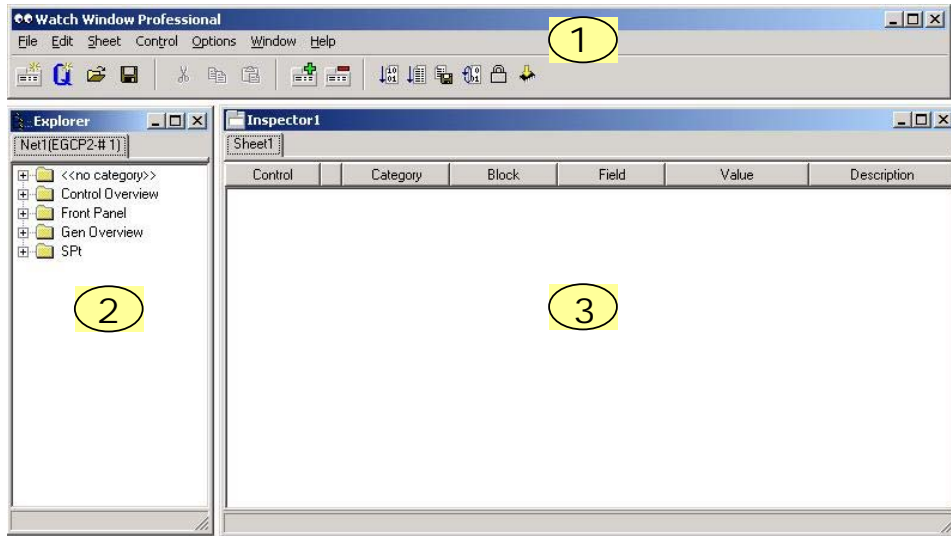
In addition to the EGCP-2 HMI software, the EGCP-2 can also be configured using the Woodward Watch Window Professional software. The Watch Window software adds the ability to monitor data from a computer. It also allows a user to save the control set points to a tab-delimited text file. The text file can be printed, edited, and transferred to an EGCP-2 unit.

Watch Window Professional software is not included with the EGCP-2 panel. This software must be purchased separately (part number 8928-800). To evaluate the product before purchase, the software can be downloaded from the Woodward website (www.woodward.com/ic/software). After downloading the software, it will be active for a five day trial period, after which time, the software will require a license to run.

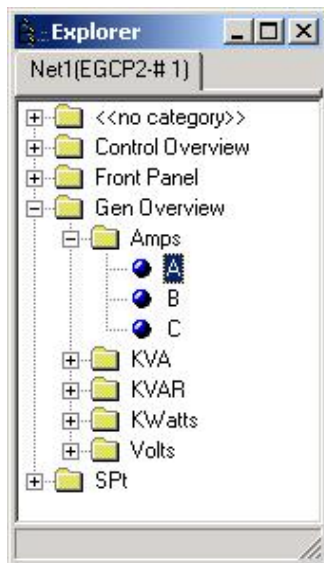
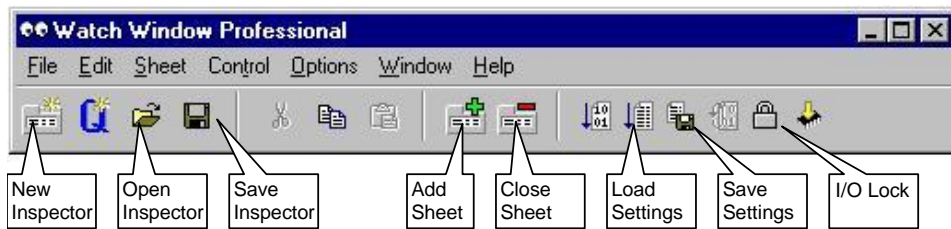
The Watch Window software works similarly to the HMI software. The first step is to connect to the control with the ServLink Server (see Chapter, Monitoring ServLink Software Operation for information on starting a ServLink session). The Watch Window Software will not run unless the computer is communicating with at least one EGCP-2. Once the ServLink communication has been established, start the Watch Window Professional program from the Windows toolbar Start button.



The Watch Window Professional software comprises three separate windows, each with a different function.

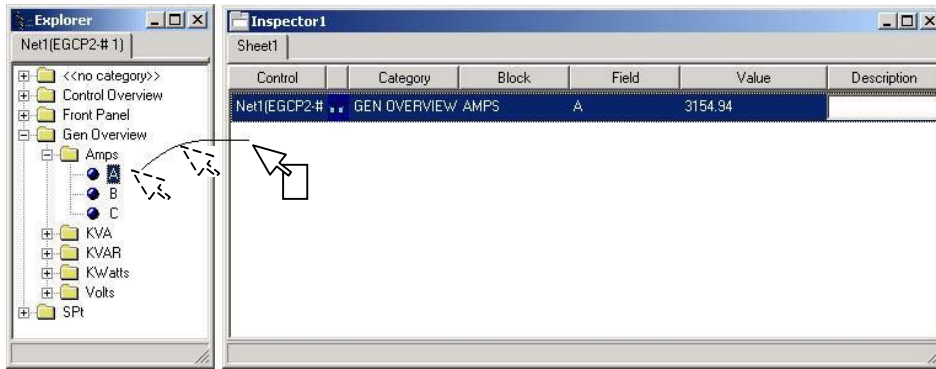


The Application Control window (1) is the main window for the software. It is used to manage the Explorer window (2) and the Inspector window (3). A tool bar is provided with icons to open, close, and save Inspectors, and to upload and download the tunable setpoints.



The Explorer window uses a tree similar to the Windows Explorer program used to manage files on the computer. Under each folder are subfolders, which hold the various data variables.

In this picture the A phase current is found in the Amps folder in the Gen Overview folder. Notice that the number of amps is not shown. Only the variable names can be found in the Explorer window. In order to see the values associated with the variable, the variable needs to be transported to the Inspector screen. The user determines which values are to be placed on the inspector screen by clicking on the item in the Explorer Window and dragging it into the Inspector window. Variables can be selected individually or a folder can be selected which will include all of the items in that folder.



In the inspector screen the variable name is shown in four parts. First the identity of the control is listed under the Control column. Then the Category, Block, and Field are listed. Each variable will have a unique Field name. The Block is the folder that the variable was located in, and the Category is the top level folder. This is followed by the real time Value of that variable, and a Description field, which can be edited by the user to add any notes or comments with the inspector. For example, the units for a particular variable could be added.

There are three variable types that can be seen in the inspector screen and they are identified by the following icons:



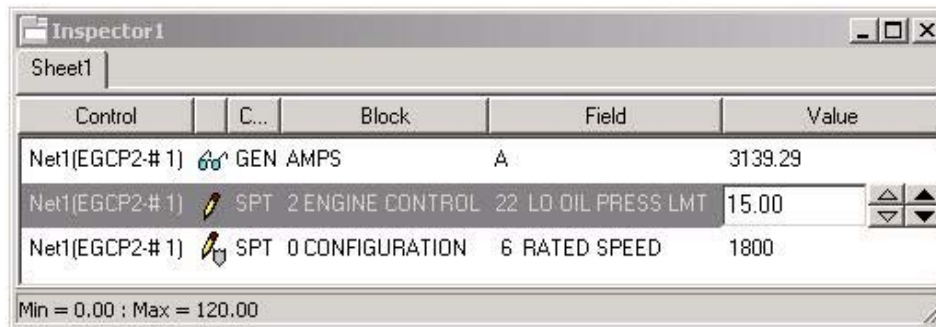
A variable that is read-only is marked by a set of eyeglasses.



A variable, which is adjustable, is marked with a pencil.



A variable that is only adjustable while the engine is shutdown, is marked by a shield and pencil.



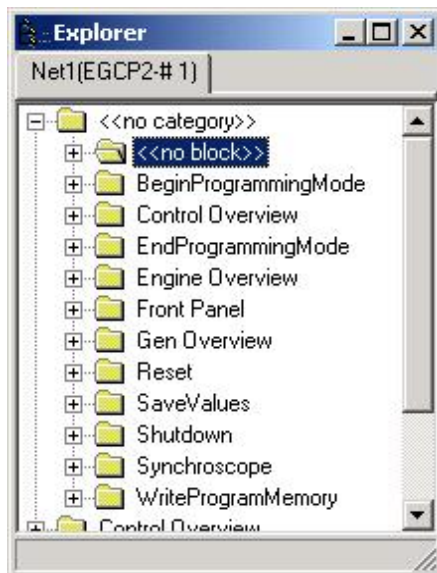
On the screen above, the middle item LO OIL PRESS LMT has been selected and, because it is adjustable, a pair of arrows appear to the right of the value. These arrows can be used to adjust the value by a $\pm 1\%$ or $\pm 10\%$ increment. It is also possible to click the mouse in the Value box and enter a number directly from the computer keyboard. The adjustment range for this variable is shown at the bottom of the window. When using the adjustment arrows the changed value becomes active immediately (no other action is needed). When using direct entry the adjust arrows are replaced by a button with an equal sign. After the correct value has been entered, click the equal sign button to activate the entered value.

ServLink Variable List



The ServLink variables are divided into five Category folders. The first four folders contain information to be read from the control. The SPt, or Setpoint folder, contains the setpoint menus, where tunable setpoints can be adjusted.

<< No Category>> Information



Under the <<no category>> heading are 12 Blocks of variables. Some of these folders will contain information which is not useful, such as

- Begin Programming Mode,
- End Programming Mode,
- Front Panel,
- Reset,
- Save Values,
- Shutdown,
- Write Program Memory.

Table 5-1. ServLink Variable List <<no category>> Category

Block	Field	Description
<<no block>>	Application ID	Software part number
	Configuration ID	Compile date
	Control ID	Control number 1 through 8
	Control Status	Should return 1
	Product ID	Should return GCP
	Protocol ID	ServLink version information
	Run Mode	Not used
Control Overview	System ID	Control software information
	Alarm LED State	Status of front panel LED
	Alarms	Number of active alarms
	Bus in Spec	Bus voltage and frequency OK
	Gen in Spec	Gen voltage and frequency OK
	Last Alarm Message	Not used
	LC State	Not used
	Mains in Spec	Mains voltage and frequency OK
	Priority	Unit priority number
	PT Connect	1 = Mains 2 = Bus
Unit	Unit Address	
Engine Overview	Battery Voltage	DC volts
	KWhrs	Kilowatt hours accumulated
	Oil Pres	Oil pressure in PSI or Bar
	RPM	Engine speed
	Run Time	Run hours accumulated
Gen Overview	Water Temp	Coolant temp in C or F
	Gen Freq	Generator Frequency
Synchroscope	PF	Generator average Power Factor
	Load	% of rated load generating
	Manual Volt Bias	% Bias command from Master for multi-unit sync to Mains
	Master Sync Bias	% Bias command from Master for multi-unit sync to Mains
	Speed Bias	Speed Bias Output in %
	Volt Bias	Speed Bias Output in %

Control Overview Information



Under the Control Overview heading are two blocks of information.

Table 5-2. ServLink Variable List **Control Overview** Category

Block	Field	Description
Relays	Audible Alarm	Relay 11 Status
	Engine Crank	Relay 5 Status
	Engine Preglow	Relay 3 Status
	Fuel Solenoid	Relay 4 Status
	Gen Breaker	Relay 2 Status
	Gen Breaker Trip	Relay 10 Status
	Idle/Rated or KVA	Relay 12 Status
	Local Bus PT Connect	Relay 7 Status
	Mains Breaker	Relay 1 Status
	Mains Breaker Trip	Relay 9 Status
	Mains Bus PT Disconnect	Relay 8 Status
	Visual Alarm	Relay 6 Status
	Switch	01 Auto Manual
02 Test Engine		Discrete input 2 Status
03 Run W/Load		Discrete input 3 Status
04 Voltage Raise		Discrete input 4 Status
05 Voltage Lower		Discrete input 5 Status
06 Speed Raise		Discrete input 6 Status
07 Speed Lower		Discrete input 7 Status
08 Gen CB Aux		Discrete input 8 Status
09 Main CB Aux		Discrete input 9 Status
10 Process		Discrete input 10 Status
Switch	Remote Fault 1	Discrete input 11 Status
	Remote Fault 2	Discrete input 12 Status
	Remote Fault 3	Discrete input 13 Status
	Remote Fault 4	Discrete input 14 Status
	Remote Fault 5	Discrete input 15 Status
	Remote Fault 6	Discrete input 16 Status

Front Panel Information

Under the Front Panel heading are two blocks of information.



These variables are used by the EGCP-2 HMI program that is described in Chapter 3 of this manual. The Button variables are commands that operate just as if an operator has pressed one of the buttons on the front panel. The variable will briefly show a True value and then revert to False. The Lines show the text that is currently being displayed on the two screens. Some of this text may not be displayed correctly by the Watch Window software.

Table 5-3. ServLink Variable List **Front Panel** Category

Block	Field	Description
Button	Alarm Acknowledge	Same as Alarm Clear button
	Alarm List	Same as Alarm / Event button
	ATS	Same as ATS button
	Commit	Same as Enter button
	Configure	Same as Config button
	Down	Same as down arrow button
	Escape	Same as Esc button
	Generator	Same as Gen button
	IO Status	Same as I/O button
	Left	Same as left arrow button
	Prime Mover	Same as Engine button
	Reactive Load	Same as PF / KVAR button
	Real Load	Same as KW Load button
	Right	Same as right arrow button
	Sequencing	Same as Sequencing button
	Status	Same as Status button
	Synchronizer	Same as Sync button
	System	Same as System button
Up	Same as up arrow button	
Line	0	Text Displayed on line 1, left display
	1	Text Displayed on line 2, left display
	2	Text Displayed on line 3 ,left display
	3	Text Displayed on line 4 ,left display
	4	Text Displayed on line 5 , right display
	5	Text Displayed on line 6 , right display
	6	Text Displayed on line 7 , right display
	7	Text Displayed on line 8 , right display

Gen Overview Information

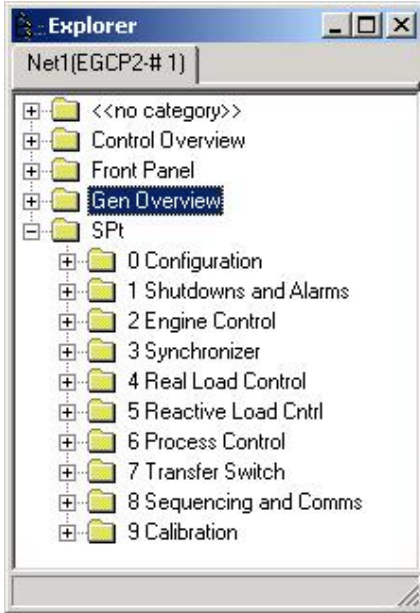


Under the Gen Overview heading are 5 Blocks of variables. All of the three phase voltage, current, and power information is contained in these folders.

Table 5-4. ServLink Variable List **Gen Overview** Category

Block	Field	Description
Amps	A	Generator A phase Amps
	B	Generator B phase Amps
	C	Generator C phase Amps
KVA	A	Generator A phase Volt Amps
	B	Generator B phase Volt Amps
	C	Generator C phase Volt Amps
KVAR	A	Generator A phase kVARs
	B	Generator B phase kVARs
	C	Generator C phase kVARs
KWatts	A	Generator A phase kW
	B	Generator B phase kW
	C	Generator C phase kW
Volts	A	Generator A phase Volts
	B	Generator B phase Volts
	C	Generator C phase Volts

SPT (SetPoint) Information



Under the SPt heading are 10 Blocks of tunable setpoints. These Blocks match the menu structure that is accessed by the Config button of the EGCP-2. Values changed in this menu are used immediately and are saved to memory and retained on loss of power to the control. The function of these setpoints will not be discussed here. This information can be found in manual 26174.

When adjusting the Configuration items be sure the engine is shut down. In order to change these values the user will need to first place the software in I/O Lock by clicking on the Lock icon or through the Control menu. Once the control goes into I/O lock, it will not be possible to start the engine. Then after the changes to the Configuration items are complete, the

control must be reset. Cycling the control input power resets the control. Because the control power must be reset, it might be better to change the configuration settings at the front panel itself or remotely using the EGCP-2 HMI program. These methods do not require a reboot.

Table 5-5. ServLink Variable List SPT (SetPoint) Category

Block	Field	Description
Configuration	0 Security Code	
	1 Network Address	
	2 Network Priority	Not adjustable from Watch Window
	3 Number Poles	
	4 Number Teeth	
	5 System Frequency	0 = 50 Hz 1 = 60 Hz
	6 Rated Speed	
	7 Rated KW	
	8 Rated KVA	
	9 Rated KVAR	
	10 CT Ratio	_____:5
	11 PT Ratio	:1
	12 Voltage Input	0 = Line to Neutral (Wye) 1 = Line to Line (Delta)
	13 Voltage Reference	
	14 Display Units	0 = American 1 = Metric
	15 Set Date	Not adjustable from Watch Window
	16 Set Time	Not adjustable from Watch Window
	17 Start Sequencing	0 = Disabled 1 = Enabled
	18 Relay #12 Function	0 = KVA Switch 1 = Idle/Rated Switch
19 Speed Bias Type	0 = .5 to 4.5 V 1 = ±3 V 2 = 500 Hz PWM	

Block	Field	Description
Shutdowns and Alarms	20 Voltage Bias Type	0 = ± 1 V 1 = ± 3 V 2 = ± 9 V
	21 Ckt Breaker Control	0 = Breaker 1 = Contactor
	22 Operating Mode	0 = No Parallel 1 = Mains Parallel
	23 Number of Units	0 = Single Unit 1 = Multiple Units
	0 Voltage Rng ALM	0 = Disabled 1 = Warning 2 = Visual Alarm 3 = Audible Alarm
	1 Gen Volt Hi Lmt	
	2 Gen Volt Hi Alm	0 = Disabled 1 = Warning 2 = Visual Alarm 3 = Audible Alarm 4 = SoftShutdown 5 = HardShutdown
	3 Gen Volt Lo Lmt	
	4 Gen Volt Lo Alm	0 = Disabled 1 = Warning 2 = Visual Alarm 3 = Audible Alarm 4 = SoftShutdown 5 = HardShutdown
	5 Voltage Alm Dly	
	6 Gen Freq Hi Lmt	
	7 Gen Freq Hi Alm	0 = Disabled 1 = Warning 2 = Visual Alarm 3 = Audible Alarm 4 = SoftShutdown 5 = HardShutdown
	8 Gen Freq Lo Lmt	
	9 Gen Freq Lo Alm	0 = Disabled 1 = Warning 2 = Visual Alarm 3 = Audible Alarm 4 = SoftShutdown 5 = HardShutdown
	10 Spd Freq Mismatch	0 = Disabled 1 = Warning 2 = Visual Alarm 3 = Audible Alarm 4 = SoftShutdown 5 = HardShutdown
	11 Overcurrent Lvl	
	12 Overcurrent Dly	
	13 Overcurrent Alm	0 = Disabled 1 = Warning 2 = Visual Alarm 3 = Audible Alarm 4 = SoftShutdown 5 = HardShutdown
	14 Reverse Pwr	
	15 Rev Pwr Delay	
	16 Min Reverse Pwr	
	17 Reverse Pwr alm	0 = Disabled 1 = Warning 2 = Visual Alarm 3 = Audible Alarm 4 = SoftShutdown 5 = HardShutdown
	18 Reverse KVAR Limit	
	19 Reverse KVAR Delay	
	20 Reverse KVAR Alarm	0 = Disabled 1 = Warning 2 = Visual Alarm 3 = Audible Alarm 4 = SoftShutdown 5 = HardShutdown
	21 Remote Fault 1	0 = Disabled 1 = Warning 2 = Visual Alarm 3 = Audible Alarm 4 = SoftShutdown 5 = HardShutdown
	22 Fault 1 Timer	
	23 RemFlt 1 Stable Dly	
	24 Remote Fault 2	0 = Disabled 1 = Warning 2 = Visual Alarm 3 = Audible Alarm 4 = SoftShutdown 5 = HardShutdown
25 Fault 2 Timer		
26 RemFlt 2 Stable Dly		
27 Remote Fault 3	0 = Disabled 1 = Warning 2 = Visual Alarm 3 = Audible Alarm 4 = SoftShutdown 5 = HardShutdown	
28 Fault 3 Timer		
29 Remote Fault 4	0 = Disabled 1 = Warning 2 = Visual Alarm 3 = Audible Alarm 4 = SoftShutdown 5 = HardShutdown	

Block	Field	Description
Shutdowns and Alarms (continued)	30 Fault 4 Timer	
	31 Remote Fault 5	0 = Disabled 1 = Warning 2 = Visual Alarm 3 = Audible Alarm 4 = SoftShutdown 5 = HardShutdown
	32 Fault 5 Timer	
	33 Remote Fault 6	0 = Disabled 1 = Warning 2 = Visual Alarm 3 = Audible Alarm 4 = SoftShutdown 5 = HardShutdown
	34 Fault 6 Timer	
Engine Control	0 Preglow Time	
	1 Crank Time	
	2 Crank Cutout	
	3 Crank Delay	
	4 Crank Repeats	
	5 Crank Fail	1 = Warning 2 = Visual Alarm 3 = Audible Alarm
	6 Idle Speed	
	7 Idle Time	
	8 Cooldown Time	
	9 Cooldown Limit	
	10 Engine Run Time	
	11 MW Hours	
	12 Overspeed	
	13 Overspeed Alarm	0 = Disabled 1 = Warning 2 = Visual Alarm 3 = Audible Alarm 4 = SoftShutdown 5 = HardShutdown
	14 Batt Volt Hi Lmt	
	15 Batt Volt Hi Alm	0 = Disabled 1 = Warning 2 = Visual Alarm 3 = Audible Alarm 4 = SoftShutdown 5 = HardShutdown
	16 Batt Volt Lo Lmt	
	17 Batt Volt Lo Alm	0 = Disabled 1 = Warning 2 = Visual Alarm 3 = Audible Alarm 4 = SoftShutdown 5 = HardShutdown
	18 Hi Oil Press Lmt	
	19 Hi Oil Press Alm	0 = Disabled 1 = Warning 2 = Visual Alarm 3 = Audible Alarm 4 = SoftShutdown 5 = HardShutdown
	20 Lo Oil Press Pre-Lmt	
	21 Lo Oil Press Pre-Alm	0 = Disabled 1 = Warning 2 = Visual Alarm 3 = Audible Alarm 4 = SoftShutdown 5 = HardShutdown
	22 Lo Oil Press Lmt	
	23 Lo Oil Press Alm	0 = Disabled 1 = Warning 2 = Visual Alarm 3 = Audible Alarm 4 = SoftShutdown 5 = HardShutdown
	24 Hi H2O Temp Pre-Lmt	
	25 Hi H2O Temp Pre-Alm	0 = Disabled 1 = Warning 2 = Visual Alarm 3 = Audible Alarm 4 = SoftShutdown 5 = HardShutdown
	26 High H2O Temp	
	27 Hi H2O Temp Alm	0 = Disabled 1 = Warning 2 = Visual Alarm 3 = Audible Alarm 4 = SoftShutdown 5 = HardShutdown
	28 Low H2O Temp	
29 Lo H2O Temp Alm	0 = Disabled 1 = Warning 2 = Visual Alarm 3 = Audible Alarm 4 = SoftShutdown 5 = HardShutdown	

Block	Field	Description
Synchronizer	0 Sync Mode	0 = Check 1 = Permissive 2 = Run
	1 Sync Gain	
	2 Sync Stability	
	3 Voltage Matching	0 = Disabled 1 = Enabled
	4 Voltage Window	
	5 Max Phase Window	
	6 Dwell Time	
	7 C B Hold Time	
	8 Close Attempts	
	9 Reclose Delay	
	10 Sync Reclose Alm	1 = Warning 2 = Visual Alarm 3 = Audible Alarm
	11 Sync Timeout	
	12 Sync Timeout Alm	1 = Warning 2 = Visual Alarm 3 = Audible Alarm
13 Deadbus Closure	0 = Disabled 1 = Enabled	
Real Load Control	0 Load Ctrl Mode	0 = Normal 1 = Soft Transfer 2 = KW Droop
	1 Load Ctrl Gain	
	2 Loadshare Gain	
	3 Load Stability	
	4 Load Derivative	
	5 Load Ctrl Filter	
	6 Baseload Reference	
	7 Unload Trip	
	8 Load Droop	
	9 Load Time	
	10 Unload Time	
	11 Raise Load Rate	
	12 Lower Load Rate	
	13 KW Load High Limit	
	14 KW High Limit Alarm	0 = Disabled 1 = Warning 2 = Visual Alarm 3 = Audible Alarm
	15 KW Load Low Limit	
	16 KW Low Limit Alarm	0 = Disabled 1 = Warning 2 = Visual Alarm 3 = Audible Alarm
	17 KVA Switch Low	
18 KVA Switch High		
Reactive Load Control	0 VAR/PF Mode	0 = Disabled 1 = PF Control 2 = VAR Control
	1 VAR/PF Gain	
	2 Volts Ramp Time	
	3 VAR/PF Sharing Gain	
	4 VAR/PF Stability	
	5 KVAR Reference	
	6 PF Reference	0 = 1.0 lag 0.1 = 0.9 lag -0.1 = 0.9 lead 0.2 = 0.8 lag
7 PF Deadband		

Block	Field	Description
Process Control	0 Process Action	0 = Direct 1 = Indirect
	1 Process Gain	
	2 Process Stability	
	3 Process Derivative	
	4 Process Deadband	
	5 Process Droop	
	6 Process Filter	
	7 Process Reference	
	8 Raise Rate	
	9 Lower Rate	
	10 Process High Lmt	
	11 Proc Hi Lmt Alm	0 = Disabled 1 = Warning 2 = Visual Alarm 3 = Audible Alarm 4 = SoftShutdown 5 = HardShutdown
	12 Process Low Lmt	
	13 Proc Lo Lmt Alm	0 = Disabled 1 = Warning 2 = Visual Alarm 3 = Audible Alarm 4 = SoftShutdown 5 = HardShutdown
	14 Process Units	0 = mA 1 = Volts 2 = kW 3 = MW 4 = KVA 5 = MVA 6 = KVAR 7 = MVAR 8 = PF 9 = degC 10 = degF 11 = PSI 12 = KPa 13 = bar
	15 Process Low Value	
16 Process High Value		
Transfer Switch	0 Check Mains Breaker	0 = Disabled 1 = Enabled
	1 Fast Xfer Delay	
	2 Mains Stable Delay	
	3 Gen Stable Delay	
	4 Load Surge	
	5 Load Surge Alarm	0 = Disabled 1 = Warning 2 = Loss of Mains 3 = LOM W/Alarms
	6 Main Volt Hi Lmt	
	7 Main Volt Hi Alm	0 = Disabled 1 = Warning 2 = Loss of Mains 3 = LOM W/Alarms
	8 Main Volt Lo Lmt	
	9 Main Volt Lo Alm	0 = Disabled 1 = Warning 2 = Loss of Mains 3 = LOM W/Alarms
	10 Main Freq Hi Lmt	
	11 Main Freq Hi Alm	0 = Disabled 1 = Warning 2 = Loss of Mains 3 = LOM W/Alarms
	12 Main Freq Lo Lmt	
	13 Main Freq Lo Alm	0 = Disabled 1 = Warning 2 = Loss of Mains 3 = LOM W/Alarms
14 LOM Action Delay		
Sequencing and Communications	0 Auto Sequencing	0 = Disabled 1 = Enabled
	1 Auto Sequencing Dly	
	2 Max Gen Load	
	3 Next Genset Dly	
	4 Rated Load Dly	
	5 Max Start Time	
	6 Min Gen Load	
	7 Reduced Load Dly	
	8 Max Stop Time	
	9 422 Protocol	Not adjustable from Watch Window
	10 Modbus Id	
	11 Modbus Timeout	
12 Modbus Reset	Not adjustable from Watch Window	

Block	Field	Description
Calibration	0 Process In Scale	
	1 Speed Bias Offset	
	2 Volts Bias Offset	
	3 PT Phase A Scale	
	4 PT Phase B Scale	
	5 PT Phase C Scale	
	6 CT Phase A Offset	
	7 CT Phase A Scale	
	8 CT Phase B Offset	
	9 CT Phase B Scale	
	10 CT Phase C Offset	
	11 CT Phase C Scale	
	12 Bus PT Scale	
	13 Synchronizer	
	14 Battery VCO Gain	
	15 Batt VCO Offset	
	16 Oil Press Gain	
	17 Oil Press Offset	
	18 Water Temp Gain	
	19 Water Temp Offset	
20 Net Comm Dropouts		

Hints for Using Watch Window

In order to maintain efficiency when using the Watch Window software, we recommend limiting the number of variables viewed on one inspector. The Watch Window software will refresh all data that is on the screen at about a 200 ms rate. The more variables that are on the screen the more taxing this will be on the EGCP-2 processor to provide this data. As more and more items are added, the refresh rate of the control will slow. Do not open more than one Watch Window session at a time. Use multiple sheets instead of multiple inspectors. When dragging variables from the Explorer window to the Inspector window, drag the entire folder if more than a few variables are needed. The Watch Window software can ask for all of the data in a folder more efficiently than individual items.

Uploading and Downloading Setpoint Files

After all of the setpoints have been entered, these settings can be saved to a file using the Watch Window Professional software.



Click on the Save Application Settings icon in the Application Control window. A Windows Explorer box will appear to name the file and select a location for it. Then a status bar will appear updating the file transfer progress.

The format of this file is tab de-limited. Using a program like Microsoft Excel®, this setpoint file can be sorted and edited. Two columns will be formed, one with the variable name and the other with the variable value.

	A	B	C	D
1	CONFIGURATION ID	EGCP2 - May 22 2002		
2	SPT.9 CALIBRATION. 5 PT PHASE C SCALE	3.049866		
3	SPT.9 CALIBRATION. 4 PT PHASE B SCALE	3.029892		
4	SPT.9 CALIBRATION. 3 PT PHASE A SCALE	2.829895		
5	SPT.6 PROCESS CONTROL.14 PROCESS UNITS	1		
6	SPT.6 PROCESS CONTROL.13 PROC LO LMT ALM	0		
7	SPT.4 REAL LOAD CONTROL.15 KW LOAD LOW LIMIT	5		
8	SPT.4 REAL LOAD CONTROL.10 UNLOAD TIME	15		
9	SPT.4 REAL LOAD CONTROL.3 LOAD STABILITY	2		
10	SPT.2 ENGINE CONTROL.17 BATT VOLT LO ALM	1		
11	SPT.2 ENGINE CONTROL.15 BATT VOLT HI ALM	5		
12	SPT.2 ENGINE CONTROL.3 CRANK DELAY	10		
13	CONTROL OVERVIEW.SWITCH.REMOTE FAULT 6	0		
14	FRONT PANEL.BUTTON.SEQUENCING	0		
15	SPT.9 CALIBRATION.1 SPEED BIAS OFFSET	-0.42		
16	SPT.6 PROCESS CONTROL.10 PROCESS HIGH LMT	20		
17	SPT.6 PROCESS CONTROL.5 PROCESS DROOP	0		
18	SPT.4 REAL LOAD CONTROL.16 KW LOW LIMIT ALARM	1		
19	SPT.3 SYNCHRONIZER.6 DWELL TIME	0.5		
20	SPT.2 ENGINE CONTROL.21 LO OIL PRES PRE-ALM	0		
21	SPT.2 ENGINE CONTROL.16 BATT VOLT LO LMT	10		
22	SPT.2 ENGINE CONTROL.14 BATT VOLT HI LMT	28.5		
23	SPT.1 SHUTDOWN AND ALARMS.29 REMOTE FAULT4	4		
24	SPT.1 SHUTDOWN AND ALARMS.21 REMOTE FAULT1	4		
25	SPT.0 CONFIGURATION.12 VOLTAGE INPUT	1		
26	SPT.9 CALIBRATION.18 WATER TEMP GAIN	0.039886		
27	SPT.9 CALIBRATION.15 BATT VCO OFFSET	5		
28	SPT.8 SEQUENCING AND COMMS.9 422 PROTOCOL	0		
29	SPT.8 SEQUENCING AND COMMS.6 MIN GEN LOAD	30		
30	SPT.8 SEQUENCING AND COMMS.0 AUTO SEQUENCING	1		
31	SPT.7 TRANSFER SWITCH.2 MAINS STABLE DLY	5		
32	SPT.5 REACTIVE LOAD CNTRL.0 VAR/PF MODE	1		
33	SPT.4 REAL LOAD CONTROL.13 KW LOAD HIGH LIMIT	30000		
34	SPT.4 REAL LOAD CONTROL.12 LOWER LOAD RATE	?		

This list can be sorted by clicking on the Data menu item; choose sort list by Configuration ID in ascending order. The first two categories, Control Overview and Front Panel, should be ignored and may be deleted. The next group will be the SPT 0 values, which are configuration items. Now all of the setpoints should be in the order they would appear from the front panel and it is possible to print this list, for a hardcopy.

	A	B
1	CONFIGURATION ID	EGCP2 - May 22 2002
2	SPT.0 CONFIGURATION. 0 SECURITY CODE	0
3	SPT.0 CONFIGURATION. 1 NETWORK ADDRESS	1
4	SPT.0 CONFIGURATION. 2 NETWORK PRIORITY	2271560481
5	SPT.0 CONFIGURATION. 3 NUMBER POLES	4
6	SPT.0 CONFIGURATION. 4 NUMBER TEETH	126
7	SPT.0 CONFIGURATION. 5 SYSTEM FREQUENCY	1
8	SPT.0 CONFIGURATION. 6 RATED SPEED	1800
9	SPT.0 CONFIGURATION. 7 RATED KW	150
10	SPT.0 CONFIGURATION. 8 RATED KVA	185
11	SPT.0 CONFIGURATION. 9 RATED KVAR	100
12	SPT.0 CONFIGURATION.10 CT RATIO	200
13	SPT.0 CONFIGURATION.11 PT RATIO	4
14	SPT.0 CONFIGURATION.12 VOLTAGE INPUT	1
15	SPT.0 CONFIGURATION.13 VOLTAGE REFERENCE	480
16	SPT.0 CONFIGURATION.14 DISPLAY UNITS	0
17	SPT.0 CONFIGURATION.15 SET DATE	31
18	SPT.0 CONFIGURATION.16 SET TIME	4
19	SPT.0 CONFIGURATION.17 START SEQUENCING	0
20	SPT.0 CONFIGURATION.18 RELAY #12 FUNCTION	0
21	SPT.0 CONFIGURATION.19 SPEED BIAS TYPE	1
22	SPT.0 CONFIGURATION.20 VOLTAGE BIAS TYPE	1
23	SPT.0 CONFIGURATION.21 CKT BREAKER CONTROL	1
24	SPT.0 CONFIGURATION.22 OPERATING MODE	0
25	SPT.0 CONFIGURATION.23 NUMBER OF UNITS	1
26	SPT.1 SHUTDOWNS AND ALARMS. 0 VOLTAGE RNG ALM	0
27	SPT.1 SHUTDOWNS AND ALARMS. 1 GEN VOLT HI LMT	530
28	SPT.1 SHUTDOWNS AND ALARMS. 2 GEN VOLT HI ALM	5
29	SPT.1 SHUTDOWNS AND ALARMS. 3 GEN VOLT LO LMT	440
30	SPT.1 SHUTDOWNS AND ALARMS. 4 GEN VOLT LO ALM	1
31	SPT.1 SHUTDOWNS AND ALARMS. 5 VOLTAGE ALM DLY	5
32	SPT.1 SHUTDOWNS AND ALARMS. 6 GEN FREQ HI LMT	65
33	SPT.1 SHUTDOWNS AND ALARMS. 7 GEN FREQ HI ALM	1
34	SPT.1 SHUTDOWNS AND ALARMS. 8 GEN FREQ LO LMT	55

It is also possible to edit this file and transmit the edited settings into a control. When editing this file, only edit the second column of values. Do not change the Configuration ID column. The items Network Priority, Set Date, and Set Time cannot be changed from Watch Window, so their values cannot be used in this way. All items are numeric values. See the ServLink Variable List in this manual to understand the enumerated lists.

When saving the file, do not change the file extension, “.CFG”, or the file type, “Tab-delimited text file”. If the file is saved in Excel format, it will not load properly into the EGCP-2.



To load a setpoint file into a control, click on the Load Application Settings icon in the Application Control window. A Windows Explorer box appears to find the file that is to be transferred. Then a status bar appears updating the file transfer progress.

Setpoint files can only be transferred when the unit is shut down. After the transfer is complete, verify that the correct values have been entered into the control. The asterisk will appear by the configuration items, which will prevent the engine from starting. The asterisks must be cleared by committing the values or cycling power to the EGCP-2.

Watch Window Procedure Summaries

Here are a few summaries or check lists that can be used for quick reference when performing certain tasks with the Watch Window software.

Saving Setpoints to a File on the Computer:

1. Connect RS-232 to RS-422 cable between EGCP-2 and computer.
2. In the Sequencing and Comms menu, the item "422 Protocol" must be set for ServLink.
3. Open the ServLink program and build a new Network Definition File or use an existing file already saved on the computer.
4. Establish communications with the EGCP-2.
5. Save the Network Definition File if a new file was built in step 3.
6. Open the Watch Window Professional program.
7. Click on the Save Application Settings icon, or use the menus Control, App Settings, Save to File.
8. In the Explorer box select a name and location for the setpoint file.
9. Click the Save button and the file transfer will begin.

Printing a Setpoint List

1. Save the setpoint file on to the computer as described above.
2. Open this file using a program such as Microsoft Excel. The format is a tab-delimited text file that should open into two columns.
3. Sort the items alphabetically by clicking on the Data, and Sort menus.
4. Delete the Control Overview and Front Panel items lines 2-36.
5. Print the file.

Loading Setpoints into a Control

1. Connect RS-232 to RS-422 cable between EGCP-2 and computer.
2. In the Sequencing and Comms menu, the item "422 Protocol" must be set for ServLink.
3. Open the ServLink program and build a new Network Definition File or use an existing file already saved on the computer.
4. Establish communications with the EGCP-2.
5. Save the Network Definition File if a new file was built in step 3.
6. Open the Watch Window Professional program.
7. Verify that the engine is not running or in Auto.
8. Click the Load Applications Settings icon or use the menus Control, App Settings, Load from File.
9. Find and Select the setpoint file that is to be transferred.
10. Click on the Open button and the file transfer will begin.
11. Following the transfer click Yes to Reset the control.
12. The configuration items will be flagged with an Asterisk that will prevent the unit from being started
13. Commit the configuration items by selecting each one manually or cycling power to the control.
14. The control should now be configured and ready for testing.

Chapter 6.

Modbus RTU Communications for the EGCP-2 Panel

Introduction

This chapter describes the second of the three EGCP-2 communication protocol options, Modbus RTU.

The Modbus communication used by the EGCP-2 panel operates at 9600 baud, with 8 data bits, 1 stop bit, NO parity, and NO flow control. The protocol used is Modbus RTU (Master/Slave).

Modbus Configuration Items

There are three configurable menu items associated with the Modbus communications located in the Sequencing and Comms menu: Modbus ID, Modbus Timeout, and Modbus Reset.

The Modbus ID configuration menu item is adjustable from 1 to 247. This address identifies the Modbus Slave to the Modbus Master using this address. The Modbus address chosen for any particular EGCP-2 panel should be different from all other devices on the Modbus network.



NOTE

The Network Address of the EGCP-2 panel is not linked to the Modbus ID in any way.

The Modbus Timeout setpoint is located in the Sequencing and Comms configuration menu. This item is the time which the EGCP-2 panel will wait before either receiving a valid message from the Modbus master or indicating a Modbus failure. If a time-out occurs, the EGCP-2 will no longer update the data to its Modbus variable table. It assumes that there is no master present and that the port is not being used. If a Modbus master does send a request after a timeout the EGCP-2 may send data that is no longer current on the first request. Then it will update its Modbus list of values again every 200 msec, until the Modbus timeout timer elapses again. In order to avoid accessing old data, the Modbus timeout setpoint must be set longer than the poll time of the Modbus master.

There are several items to note when determining the Timeout setting. The EGCP-2 must use a baud rate of 9600 bps. At this speed a complete transfer of all of the EGCP-2 Modbus addresses (approximately 270) would take about one second. If the Modbus master were to only request 50 % of these addresses, then this could be accomplished in less time, and the data could be transferred in about 0.5 seconds. Another factor to consider is the quality of the communications.

The EGCP-2 will transfer all data in one second assuming that there were no missed messages. A factor of safety should be added, to allow the EGCP-2 to retransmit some data more than once within the scan time. This time could depend on a variety of things such as length of communication cables, location in the switchgear, characteristics of the Modbus master, etc. If the Modbus master is only reading, for example, 50% of the addresses, the time for this transmission would be 0.5 seconds. Therefore setting the number of retries at 1, allow another 0.5 seconds for a retry, so the timeout would need to be at least 1.0 second for a single unit. Some Modbus Masters will also include a delay time between retries. This time must be also accounted for. For multiple units this time is increased by the number of units in the system. If there are three EGCP-2's in the system it should be understood that each one would be allowed one second to complete its transmission, so the Modbus timeout tunable should be set to 3.0 seconds on each control.

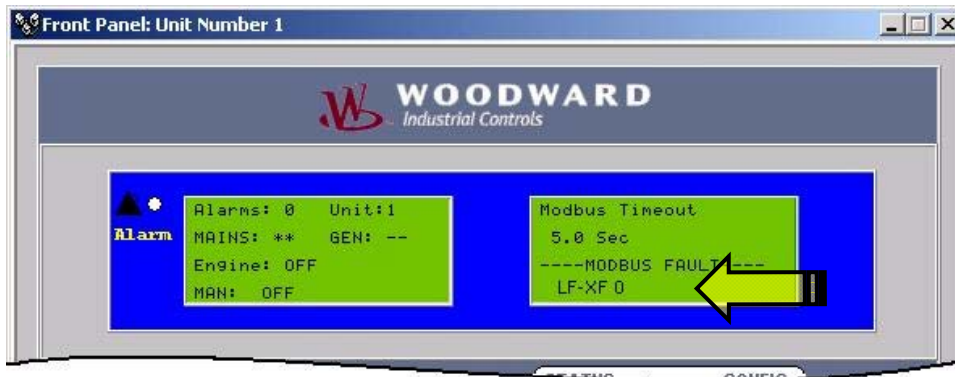
Modbus timeout setting =

$$[(\% \text{ of data being transferred}) / 100 * (1 + \text{number of retries}) + (\text{number of retries}) * (\text{retry delay})] * (\text{number of units})$$

Example: Using 75 % of the data in a 4-unit system with 2 retries and no retry delay.

$(0.75 * 3) * 4 = 9 \text{ seconds.}$

The EGCP-2 panel indicates a Modbus failure in the bottom two lines of the Modbus Timeout and Modbus Reset menu items. This display shows Link failure (failure to receive a valid message from the master) as true/false, Exception error as true/false, and an error number, which is associated with the type of Exception error. For example, LF-XF 0 is the indication of a healthy Modbus connection with a Link Failure of False, an Exception Error of False, and a failure number of 0.



Similarly a message of LF-XT 9, would indicate the Modbus is connected and communicating, however the control detected a Checksum Error. The Link Failure is a non-latching-type indication that will indicate whether or not the slave unit has received a request for data within the Time-out time. The Exception error is a latching type indication that will be set to true after any one error and will remain true even if the error condition has been corrected. To reset the Exception error, the Modbus Reset menu in the Sequencing and Comms menu item should be toggled from False to True. Once the reset is accomplished, the Modbus Reset should be returned to False again. Table 6-1 lists the error numbers that are associated with the Exception error.

Table 6-1. Common Modbus Error Numbers

Code	Name	Meaning
00	NO ERROR	No Modbus communication faults detected.
01	Illegal Function	The function received is not an allowable action for the addressed slave.
02	Illegal Data Address	The address referenced in the data field is not an allowable address for the addressed slave.
03	Illegal Data Value	The amount of data requested from the slave was too large for the slave to return in a single response.
09	Checksum Error	There was an error in the message checksum. This can indicate link quality problems and/or noise on the line.
10	Garbled Message	The slave received data, however it is too short to be a valid Modbus message/command.
12	Buffer Overflow	Input buffer overflow. This indicates that the length of the received message from the master has exceeded the input buffer capacity of the EGCP-2. Reduce message sizes to correct.
20	Unsolicited Response	Unsolicited message received by the slave.

Modbus Master Settings

The Modbus master will also have timers associated with its operation. The Poll time, Reply Timeout, Retry Delay, and Number of Retries for the Modbus Master must be configured to meet the requirements of the entire Modbus network and the devices communicating on that network. As mentioned in the previous section, the Poll time is dependent on the fact that the EGCP-2 communicates at only 9600 baud. Poll times of at least one second per unit would be recommended. If the master requires data faster than that, it will be necessary to limit the number of variables being polled.

When setting up the Modbus master it is recommended to use the largest size of variable requests possible, to limit the transfer traffic. For example, if the variables 30002, 30003, 30007, 30008, and 30025, were all to be read, the most efficient way would be to send one request of all variables between 30002 and 30025. Even though the slave would send 19 pieces of information that were not needed, this would take less time than if each of the five were requested individually. This is because each Modbus address variable is only two bytes in length, but data requests from the master to the slave require several characters and an acknowledgment from the slave.



NOTE

Communications settings will vary based on the Modbus system configuration. These settings are the recommended typical settings for a multiple unit EGCP-2 system connected to Modbus master.

Modbus Address Information

Boolean Writes—Addresses 00001–00016, 00024, and 00037

The Boolean write variables can be used for remote control of the EGCP-2 over Modbus. Fourteen variables are available to mimic the fourteen discrete input switches. The Gen CB Aux input and Mains CB Aux input are not included in the Modbus addresses. They must be hard wired to the control. Additionally, a variable is provided to Enable and Disable the Auto Sequencing Feature, and a variable to override the Engine Cooldown sequence.



The EGCP-2 is designed to use the Modbus control inputs, and the hardwired discrete inputs at the same time. There is no configuration item that sets the control to look only for Modbus input or discrete input. The voltage raise and lower (00004, 00005), speed raise and lower (00006, 00007), process control (00008), and remote fault inputs (00009-00014) will follow the last command. For example, the Process Control Modbus variable could be set to true remotely, and the local raise and lower speed hardwire inputs would still be active as well. For added safety, the four momentary switch inputs, Voltage Raise/Lower and Speed Raise/Lower, are internally timed to operate as a one-second one-shot command. This means that if the EGCP-2 receives an ON command via Modbus for any of these four switches, the unit will turn the switch ON for one second, and then turn the input OFF. If the Modbus update for the ON command occurs again within the one-second period, the EGCP-2 continues holding the switch ON until one second after the last active Modbus On update is received. This feature prevents the situation where a raise or lower command is sent, and then the Modbus communications stops before the command is removed, which might take the voltage or speed to an unwanted level.

The control inputs Auto, Test, and Run with Load (00001, 00002, 00003), operate differently from the other control inputs. Again for added safety, these three inputs must be set as a group. The user must either use hardware input for these three or Modbus input. It is not possible to have one input set via hardware and one via Modbus. The EGCP-2 will use the three hardware inputs until control has been taken by the Modbus inputs. To activate the Modbus control mode, all three of the addresses 00001, 00002, and 00003 must be set. It is not required that these Modbus inputs be different from the actual hardware inputs, but all three must be set before any remote control can take place. For example, if the Auto, Test, and Run With Load inputs were all open, the user could send a False command to addresses 00001, 00002, and 00003, and the control would switch from the Hardware control mode to Modbus control, but no action would take place. The following examples help explain this.

Modbus control mode examples

Example 1

Modbus commands match Hardware switches.



Hardware Switches	Modbus Commands	EGCP-2 I/O Display
 <p>Auto Off Test Off Run Off</p>	 <p>00001 send False 00002 send False 00003 send False</p>	<pre> DISCRETE I/O 1234567890123456 X IN X---- OUT </pre>

Action—All three Modbus commands are sent a False, which matches the switch position.

Result—This enables both the Modbus and Hardware inputs, so the control will now follow the next command it sees from either the Modbus or the Hardware. No change is made because the Modbus values match the Hardware inputs.

Example 2

Modbus commands are different from Hardware switches.



Hardware Switches	Modbus Commands	EGCP-2 I/O Display
 <p>Auto Off Test Off Run Off</p>	 <p>00001 send True 00002 send False 00003 send False</p>	<pre> DISCRETE I/O 1234567890123456 X X IN X---- OUT </pre>

Action—The user sends a True on address 00001, a False on address 00002, and a False on address 00003

Result—Nothing happens until a value is sent to the third address. When the False is sent to 00003, then all three have been sent by Modbus and the control will go into Auto Mode.

Example 3

Modbus was in control, Hardware switch changes state.



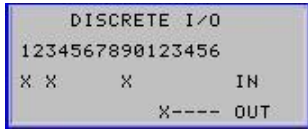
Hardware Switches	Modbus Commands	EGCP-2 I/O Display
 <p>Auto Off Test Off Run to On</p>	 <p>00001 was True 00002 was False 00003 was False</p>	<pre> DISCRETE I/O 1234567890123456 X X IN X---- OUT </pre>

Action—The Run input was switched from off to on.

Result—The control was in the Auto mode, following the commands of the Modbus. Once the Hardware switch changes state, the control follows the Hardware inputs, and it will no longer be in Auto mode. The control goes into Run mode and starts the engine. In this situation the Hardware and Modbus are different, and the control is following the hardware because it was the last one to change.

Example 4

Continuing from the previous example, the Modbus was in control, then Hardware took over. Now a new Modbus command is sent.

Hardware Switches	Modbus Commands	EGCP-2 I/O Display
 <p>Auto Off Test Off Run On</p>	 <p>00001 send True 00002 was False 00003 send True</p>	 <pre> DISCRETE I/O 1234567890123456 X X X IN X---- OUT </pre>

Action—A True is sent to address 00001 and then to address 00003.

Result—After the value is sent to address 00001, no change is seen. After a value is sent to address 00003, the control will now follow the Modbus inputs, it will no longer be in the Manual Run mode. The control will go into the Auto Run mode. Notice that in this situation, two of the Modbus commands were needed to switch the control back to Modbus. Previously the Run input hardware switch had been changed so now the Run Modbus address must be sent before it can go into the Modbus control mode, even though the address 00003 matches the position of the hardware input. The test input has not been changed since it was last sent over Modbus so it does not need to be resent.

In order to simplify this process, we recommend sending all three of the Modbus addresses each time Modbus control is desired. In this way, it is not necessary to track which hardware inputs may have changed.

There is no indication on the EGCP-2 display or over the Modbus, to indicate that the control is following Modbus or hardware commands. Both can be in control at the same time. This is important because it gives a local operator the ability to shut down the control if necessary.

Analog Write 00024 is used to enable and disable the Auto Sequencing Function of the EGCP-2. When this address is set True, Auto Sequencing is Enabled. Note that this change is not held in the non-volatile memory and could change if power is lost to the control.

Analog Write 00037 is used to override the cooldown function. This address may be set to True during a cooldown sequence, at which time the EGCP-2 will open its Fuel Solenoid output immediately. This address operates as a one-shot that is only effective if the control is in the cooldown sequence. If the address is set to True before the engine goes into the cooldown sequence, this override has no effect.

Boolean Read—Addresses 10001–10075

The Boolean Read variables are True/False inputs that show the positions of the hardware, the alarm status, and some system status readings.

Boolean Read 10001 is true whenever the control is switching between the Mains and Bus PT's via the PT disconnect relays.

For the engine and generator alarms, variables 10034 through 10062, 10073 and 10075, these only go true after the delay time has been satisfied and will remain true until the alarm is cleared from the alarm log. If the corresponding alarm is set to the Disable level, it will not be seen in the Modbus variable.

For the Loss Of Mains Alarms, variables 10063 through 10067, these variables when configured for any state except for Disabled, will indicate a "True" state when the alarm condition is true. The alarm states are considered to be true as follows:

Load Surge—Any instantaneous change in generator load equal to or greater than the Load Surge setpoint. No Time Delay.

Mains Voltage High/Low Limit—Any value of the Mains Voltage equal to or greater than the high limit setpoint, or less than or equal to the low limit setpoint. The alarm condition will register true only if the high/low limit is exceeded for at least the LOM action delay time.

Mains Frequency High/Low Limit—Any value of the Mains Frequency equal to or greater than the high limit setpoint, or less than or equal to the low limit setpoint. The alarm condition will register true only if the high/low limit is exceeded for at least the LOM action delay time.

Due to the asynchronous nature of the triggering of the alarm state, and the Modbus polling time, a software latch on the alarm indication is used. This latch does not affect the actual indication of the alarm condition on the EGCP-2 control panel. The latch is active only on the Modbus messaging between the EGCP-2 panel and the Modbus communications. The latch is set by the occurrence of any of the LOM Alarm actions, and is only reset if the alarm condition no longer exists, and the pre-existing alarm condition has been actively read once by the Modbus master. This means that short duration LOM alarm events, such as Load Surge, always show true for one Modbus poll cycle after the occurrence of the alarm. If the alarm condition no longer exists after this poll cycle, the Modbus alarm indication will reset to false as the alarm condition is no longer true. If the alarm situation clears, these variables will return to False even if the event is not cleared from the alarm log.

Boolean Read 10070, Voltage Input, will be True if the control is configured for Delta Line to Line voltage sensing and False for Wye Line to Neutral sensing.

Boolean Read 10071, PF indication will be True to indicate a leading power factor and False to indicate a lagging power factor.

Analog Read—Addresses 30001–30073, 30215-30350

The Analog Read variables are numeric representations showing the measured values of the control inputs, the alarm action, and the mode of operation for certain functions of the control.

These values use a signed integer format that does not support decimal places. In order to view the decimal places on certain variables the value is multiplied by a scaling variable.

For analog reads 30020 through 30048, the engine and generator alarms, the alarm action is defined as follows:

- 0 = Disabled
- 1 = Warning
- 2 = Visual Alarm
- 3 = Audible Alarm
- 4 = Soft Shutdown
- 5 = Hard Shutdown

For analog reads 30049 through 30053, the Loss Of Mains Alarms, the alarm action is defined as follows:

- 0 = Disabled
- 1 = Warning
- 2 = Loss of Mains
- 3 = Loss of Mains with Alarms

For the analog read 30067, the Load Control Mode, the mode is defined as follows:

- 0 = Off
- 1 = Droop (Generator frequency will decrease as load is increased)
- 2 = Isochronous (On load, not in parallel with the mains)
- 3 = Baseload (In parallel with the mains, at a fixed kW setpoint)
- 4 = Process (In parallel with the mains, controlling the process input)

For the analog read 30068, the Synchronizer Mode, the mode is defined as follows:

- 0 = Off
- 1 = ATS (Auto Transfer State. Trying to open the mains breaker)
- 2 = Parallel (Trying to close mains breaker)
- 3 = In Sync (Generator breaker or mains breaker was synchronized successfully.)
- 4 = ATS Return (Trying to open generator breaker)
- 5 = Parallel Mains (Trying to close mains breaker)
- 6 = Gen Close Timer (Generator breaker close issued, waiting for feedback to show closed)
- 7 = Mains Close Timer (Mains breaker close issued, waiting for feedback to show closed)
- 8 = Gen Sync Timer (checking for successful synchronization of the generator)
- 9 = Mains Sync Timer (checking for successful synchronization of the Mains breaker)

For the analog read 30071, the Address of the Master Unit, is only valid on controls that are in the Auto mode. Units not in Auto are not communicating with the master and cannot be relied upon.

For the analog read 30072, the engine state is defined as follows:

- 1 = Off
- 2 = Preglow
- 3 = Crank
- 4 = Run
- 5 = Cooldown (engine has run above the Cooldown setpoint and will wait before stopping)
- 6 = Spindown (fuel solenoid is open but engine speed is still sensed as the engine coasts down)
- 7 = Restart (previous start attempt has failed, so trying again.)

Analog read 30073, the Synchroscope Phase Angle, will give a value between -180 and 180 degrees. Zero degrees would be in phase, negative measurements occur when in the right half of the synchroscope, and positive measurements occur when in the left half of the synchroscope. For example, if the synchroscope were showing a rotation in the clockwise direction for a generator that was slightly faster than the bus the sequence of angles would be:
0, -30, -60, -90, -120, -150, 180, 150, 120, 90, 60, 30, 0...

Analog Reads 30215, 30216, 30229, and 30230 work in conjunction with the Analog Writes 40002, 40003, 40005, and 40007. A control reference is written into the Analog Write address and the feedback of this write is provided with these Analog Reads. For example, to change the base load reference to 200 kW, the value of 200 would be sent to address 40003. This change can be verified by reading address 30215, which ramps from the old baseload reference to 200.

Analog Reads 30250 through 30350 work in conjunction with the Analog Writes 40250 through 40350. Certain control setpoints can be changed by writing to the Analog Write addresses, and the feedback for these writes is provided with the corresponding Analog Reads. For example the Cooldown Time could be changed to 60 seconds. A value of 60 is written to address 40277, and this is verified by reading address 30277, which will become 60. In some cases the Analog Read value will not be the same as the Analog Write. If a user changes one of these setpoints from the front panel of the EGCP-2 by hand, the Analog Read value will show the new value of the setpoint, which may be different from the last Analog Write that was sent. Another case where the Read and Write may be different, can occur if a new setpoint is written to one of the Analog Writes, which can only be changed when the engine is stopped. The Analog Read shows the value that is currently being used while the engine is running, and then when the engine stops it accepts the new value.

Analog Writes—Addresses 40001- 40007 and 40250 - 40350

The Analog Write variables are numeric commands sent to the control from the Modbus master. The unit priority number, control references, and certain setpoints can be changed with these Modbus addresses.

Analog Write 40001 can be used to change the priority of the EGCP-2 over Modbus. To change the priority the unit must be in the AUTO mode. When multiple units are in Auto the following rules apply to changing the priority.

When decreasing (incrementing value) a unit's priority, every active unit (in multiple unit configuration and auto mode) on the same network with a higher priority (lower value) than the unit, which is currently having its priority, changed, will increase (decrement value) priority when the priority change is committed.

And inverse to this:

When increasing (decrementing value) a unit's priority, every active unit (in multiple unit configuration and auto mode) on the same network with a lower priority (higher value) than the unit, which is currently having its priority, changed, will decrease (increment value) priority when the priority change is committed.

Four references, the process level, base load, power factor, and kVAR, can be adjusted with the Analog Writes 40002, 40003, 40005, and 40007. These addresses are intended to be used while the engine is running. When a new reference value is sent to the control, the actual reference ramps from its current value to the new value. For baseload the ramp is determined by the Raise and Lower Load Rates. For process the ramp is determined by the Process Raise and Process Lower Rates. The power factor and kVAR ramps are determined by the Voltage Ramp Time. A change made to these references is a temporary change and does not get saved in the control memory.

While the engine is shut down, it is also possible to change the reference setpoints, with Analog Writes 40300, 40318, 40319, and 40328. The reference setpoint determines the initial reference the control will go to when it is started or when the load control mode is changed. For example, with the engine stopped a value of 500 is written to address 40300, the base load reference setpoint. When the engine is started and closed on-line, the load ramps to 500 kW. Then to change the load level, the 40003 address would be used. A change made to the reference setpoint is saved in the control memory and retained after a loss of power.

Analog Writes 40250 – 40350 are provided to change certain control setpoints. Some of these setpoints can be adjusted only when the engine is shutdown, such as the Rated kW (see Table). The actual value of the setpoint is provided with Analog Reads 30250 – 30350. Once the setpoint is changed the control will begin to use the new value; no additional steps are needed to make the new value active. A changed setpoint from the Modbus is saved in the control memory and retained after a loss of power.

Table 6-2. Modbus Addresses for the RTU Protocol

Boolean Writes

Modbus Address	Type	Item	Semantics
00001	BW	Automatic	See Boolean Write Address information 0 = False, 1 = True
00002	BW	Test	0 = False, 1 = True
00003	BW	Run with Load	0 = False, 1 = True
00004	BW	Voltage/PF/VAR Raise Command	0 = False, 1 = True
00005	BW	Voltage/PF/VAR Lower Command	0 = False, 1 = True
00006	BW	Load / Speed Raise Command	0 = False, 1 = True
00007	BW	Load / Speed Lower Command	0 = False, 1 = True
00008	BW	Process Control Switch	0 = False, 1 = True
00009	BW	Remote Fault Input #1	0 = False, 1 = True
00010	BW	Remote Fault Input #2	0 = False, 1 = True
00011	BW	Remote Fault Input #3	0 = False, 1 = True
00012	BW	Remote Fault Input #4	0 = False, 1 = True
00013	BW	Remote Fault Input #5	0 = False, 1 = True
00014	BW	Remote Fault Input #6	0 = False, 1 = True
00015	BW	Not Used	
00016	BW	Reset All Alarms	Resets control, but does not clear alarm log
00024	BW	Auto Sequence	0 = Disabled, 1 = Enabled
00036	BW	Cooldown Override	0 = Disabled, 1 = Enabled

Boolean Reads

Modbus Address	Type	Item	Semantics
10001	BR	Bus/ Mains PT Switch in Transition	0 = Not Active, 1 = Active
10002	BR	Mains Stable Indication	0 = Not stable (waiting for timeout), 1 = Stable
10003	BR	Bus Stable Indication	0 = Not Stable (waiting for timeout), 1 = Stable
10004	BR	Alarm Status	0 = No Alarms, 1 = Active Alarm
10005	BR	Loss of Mains Alarm Status	0 = Mains OK, 1 = LOM detected
10006	BR	Mains Breaker Close DO Status	0 = Open, 1 = Closed
10007	BR	Gen Breaker Close DO Status	0 = Open, 1 = Closed
10008	BR	Engine Preglow DO Status	0 = Open, 1 = Closed
10009	BR	Fuel Solenoid DO Status	0 = Open, 1 = Closed
10010	BR	Engine Crank DO Status (Starter)	0 = Open, 1 = Closed
10011	BR	Visual Alarm DO Status	0 = Open, 1 = Closed
10012	BR	Bus PT Connect DO Status	0 = Open, 1 = Closed
10013	BR	Mains PT Disconnect DO Status	0 = Open, 1 = Closed
10014	BR	Mains Breaker Shunt Trip DO Status	0 = Open, 1 = Closed
10015	BR	Gen Breaker Shunt Trip DO Status	0 = Open, 1 = Closed
10016	BR	Audible Alarm Status DO Status	0 = Open, 1 = Closed
10017	BR	Relay #12 Idle/Rated - KVA Switch DO Status	0 = Open, 1 = Closed
10018	BR	Auto DI Status	0 = Open, 1 = Closed
10019	BR	Test DI Status	0 = Open, 1 = Closed
10020	BR	Run DI Status	0 = Open, 1 = Closed
10021	BR	Voltage Raise DI Status	0 = Open, 1 = Closed
10022	BR	Voltage Lower DI Status	0 = Open, 1 = Closed
10023	BR	Speed Raise DI Status	0 = Open, 1 = Closed
10024	BR	Speed Lower DI Status	0 = Open, 1 = Closed
10025	BR	Gen Breaker Aux. DI Status	0 = Open, 1 = Closed
10026	BR	Mains Breaker Aux. DI Status	0 = Open, 1 = Closed
10027	BR	Process Control DI Status	0 = Open, 1 = Closed
10028	BR	Remote Fault #1 DI Status	0 = Open, 1 = Closed
10029	BR	Remote Fault #2 DI Status	0 = Open, 1 = Closed
10030	BR	Remote Fault #3 DI Status	0 = Open, 1 = Closed
10031	BR	Remote Fault #4 DI Status	0 = Open, 1 = Closed
10032	BR	Remote Fault #5 DI Status	0 = Open, 1 = Closed
10033	BR	Remote Fault #6 DI Status	0 = Open, 1 = Closed
10034	BR	Sync Timeout Alarm Status	0 = No Alarm, 1 = Active Alarm
10035	BR	Sync Reclose Alarm Status	0 = No Alarm, 1 = Active Alarm
10036	BR	Crank Fail Alarm Status	0 = No Alarm, 1 = Active Alarm
10037	BR	Voltage Range Alarm Status	0 = No Alarm, 1 = Active Alarm
10038	BR	Over Speed Alarm Status	0 = No Alarm, 1 = Active Alarm
10039	BR	Gen Phase Over Current Alarm Status	0 = No Alarm, 1 = Active Alarm
10040	BR	Gen Reverse Power Alarm Status	0 = No Alarm, 1 = Active Alarm
10041	BR	Gen Reverse VAR Alarm Status	0 = No Alarm, 1 = Active Alarm
10042	BR	Speed/Freq Mismatch Alarm Status	0 = No Alarm, 1 = Active Alarm
10043	BR	Coolant Temp. High Alarm Status	0 = No Alarm, 1 = Active Alarm
10044	BR	Coolant Temp. Low Alarm Status	0 = No Alarm, 1 = Active Alarm
10045	BR	Rated Oil Press High Alarm Status	0 = No Alarm, 1 = Active Alarm
10046	BR	Rated Oil Press Low Alarm Status	0 = No Alarm, 1 = Active Alarm
10047	BR	Battery Volt Low Alarm Status	0 = No Alarm, 1 = Active Alarm
10048	BR	Battery Volt High Alarm Status	0 = No Alarm, 1 = Active Alarm
10049	BR	Gen Under Volt Alarm Status	0 = No Alarm, 1 = Active Alarm
10050	BR	Gen Over Volt Alarm Status	0 = No Alarm, 1 = Active Alarm
10051	BR	Gen Over Freq Alarm Status	0 = No Alarm, 1 = Active Alarm
10052	BR	Gen Under Freq Alarm Status	0 = No Alarm, 1 = Active Alarm
10053	BR	Load High Limit Alarm Status	0 = No Alarm, 1 = Active Alarm
10054	BR	Load Low Limit Alarm Status	0 = No Alarm, 1 = Active Alarm

Modbus Address	Type	Item	Semantics
10055	BR	Process High Limit Alarm Status	0 = No Alarm, 1 = Active Alarm
10056	BR	Process Low Limit Alarm Status	0 = No Alarm, 1 = Active Alarm
10057	BR	Remote Fault1 Alarm Status	0 = No Alarm, 1 = Active Alarm
10058	BR	Remote Fault2 Alarm Status	0 = No Alarm, 1 = Active Alarm
10059	BR	Remote Fault3 Alarm Status	0 = No Alarm, 1 = Active Alarm
10060	BR	Remote Fault4 Alarm Status	0 = No Alarm, 1 = Active Alarm
10061	BR	Remote Fault5 Alarm Status	0 = No Alarm, 1 = Active Alarm
10062	BR	Remote Fault6 Alarm Status	0 = No Alarm, 1 = Active Alarm
10063	BR	Load Surge Alarm Status	0 = No Alarm, 1 = Active Alarm
10064	BR	Mains Under Volt Alarm Status	0 = No Alarm, 1 = Active Alarm
10065	BR	Mains Over Volt Alarm Status	0 = No Alarm, 1 = Active Alarm
10066	BR	Mains Over Freq Alarm Status	0 = No Alarm, 1 = Active Alarm
10067	BR	Mains Under Freq Alarm Status	0 = No Alarm, 1 = Active Alarm
10068	BR	Not Used	
10069	BR	Generator Stable Indication	0 = Not Stable (wait for timeout), 1 = Stable
10070	BR	Generator Sense Configuration	0 = Wye (L-N), 1 = Delta (L-L)
10071	BR	PF Leading/Lagging Indicator	0 = Lag, 1 = Lead
10073	BR	Coolant Temp High Pre-Alarm Status	0 = No Alarm, 1 = Active Alarm
10075	BR	Low Oil Press Pre-Alarm Status	0 = No Alarm, 1 = Active Alarm

Analog Reads

Modbus Address	Type	Item	Semantics	Min	Max	Scale
30001	AR	Battery Voltage	Vdc	0	500	10
30002	AR	Engine Oil Pressure	Units per configuration bar or psi	0	1000	10
30003	AR	Engine Coolant Temperature	Units per configuration deg C or deg F	-100	300	
30004	AR	Engine Run Time	Hours	0	32767	
30005	AR	Generator MW-Hours	Mega Watt hours	0	32767	
30006	AR	Engine RPM	RPM	0	5000	
30007	AR	Gen Phase A L-L Volts	Volts	0	32767	
30008	AR	Gen Phase B L-L Volts	Volts	0	32767	
30009	AR	Gen Phase C L-L Volts	Volts	0	32767	
30010	AR	Gen Total KW	kW	-32768	32767	
30011	AR	Gen Total KVA	kVA	-32768	32767	
30012	AR	Generator Power Factor	Always a positive number (see BR 10071 for Leading or Lagging status)	0	100	100
30013	AR	Gen Phase A kVAR	kVAR	-32768	32767	
30014	AR	Gen Phase B kVAR	kVAR	-32768	32767	
30015	AR	Gen Phase C kVAR	kVAR	-32768	32767	
30016	AR	Gen Total kVAR	kVAR	-32768	32767	
30017	AR	Bus Frequency	Hz	0	700	10
30018	AR	Generator Frequency	Hz	0	700	10
30019	AR	Network Address		1	8	
30020	AR	Sync Timeout Action	See Analog Read Address information	1	3	
30021	AR	Sync Reclose Action	See Analog Read Address information	1	3	
30022	AR	Crank Fail Action	See Analog Read Address information	1	3	
30023	AR	Voltage Range Action	See Analog Read Address information	0	3	
30024	AR	Overspeed Action	See Analog Read Address information	0	5	

Modbus Address	Type	Item	Semantics	Min	Max	Scale
30025	AR	Overcurrent Action	See Analog Read Address information	0	5	
30026	AR	Gen Reverse Power Alarm Action	See Analog Read Address information	0	5	
30027	AR	Gen Reverse VAR Alarm Action	See Analog Read Address information	0	5	
30028	AR	Speed Freq Mismatch Action	See Analog Read Address information	0	5	
30029	AR	Coolant Temp. High Alarm Action	See Analog Read Address information	0	5	
30030	AR	Coolant Temp. Low Alarm Action	See Analog Read Address information	0	5	
30031	AR	Oil Press High Alarm Action	See Analog Read Address information	0	5	
30032	AR	Oil Press Low Alarm Action	See Analog Read Address information	0	5	
30033	AR	Battery Volt Low Alarm Action	See Analog Read Address information	0	5	
30034	AR	Battery Volt High Alarm Action	See Analog Read Address information	0	5	
30035	AR	Gen Under Volt Alarm Action	See Analog Read Address information	0	5	
30036	AR	Gen Over Volt Alarm Action	See Analog Read Address information	0	5	
30037	AR	Gen Over Freq Alarm Action	See Analog Read Address information	0	5	
30038	AR	Gen Under Freq Alarm Action	See Analog Read Address information	0	5	
30039	AR	Load High Limit Action	See Analog Read Address information	0	5	
30040	AR	Load Low Limit Action	See Analog Read Address information	0	5	
30041	AR	Process High Limit Action	See Analog Read Address information	0	5	
30042	AR	Process Low Limit Action	See Analog Read Address information	0	5	
30043	AR	Remote Fault 1 Action	See Analog Read Address information	0	7	
30044	AR	Remote Fault 2 Action	See Analog Read Address information	0	7	
30045	AR	Remote Fault 3 Action	See Analog Read Address information	0	7	
30046	AR	Remote Fault 4 Action	See Analog Read Address information	0	7	
30047	AR	Remote Fault 5 Action	See Analog Read Address information	0	7	
30048	AR	Remote Fault 6 Action	See Analog Read Address information	0	7	
30049	AR	Load Surge Action	See Analog Read Address information	0	3	
30050	AR	Mains Under Volt Alarm Action	See Analog Read Address information	0	3	
30051	AR	Mains Over Volt Alarm Action	See Analog Read Address information	0	3	
30052	AR	Mains Over Freq Alarm Action	See Analog Read Address information	0	3	
30053	AR	Mains Under Freq Alarm Action	See Analog Read Address information	0	3	
30054	AR	Not Used				
30055	AR	Generator Phase A-N Volts	Always Line-Neutral	0	32767	
30056	AR	Generator Phase B-N Volts	Always Line-Neutral	0	32767	

Modbus Address	Type	Item	Semantics	Min	Max	Scale
30057	AR	Generator Phase C-N Volts	Always Line-Neutral	0	32767	
30058	AR	Mains Phase A-N Volts	Always Line-Neutral	0	32767	
30059	AR	Gen Phase A current	Amps	-32768	32767	
30060	AR	Gen Phase B current	Amps	-32768	32767	
30061	AR	Gen Phase C current	Amps	-32768	32767	
30062	AR	Gen Phase A KVA	KVA	-32768	32767	
30063	AR	Gen Phase B KVA	KVA	-32768	32767	
30064	AR	Gen Phase C KVA	KVA	-32768	32767	
30065	AR	Voltage Bias Analog Output	% output: 0 = 0 bias 100 = 100% raise -100 = 100% lower	0	100	
30066	AR	Speed Bias Analog Output	% output 0 = 0 bias 100 = 100% raise -100 = 100% lower	0	100	
30067	AR	Load Control State	See Analog Read Address information	0	4	
30068	AR	Synchronizer State	See Analog Read Address information	0	9	
30069	AR	Number of Unacknowledged Alarms		0	99	
30070	AR	Unit Network Priority		1	8	
30071	AR	Address of Master Unit		1	8	
30072	AR	Engine State	See Analog Read Address information	0	7	
30073	AR	Synchroscope	See Analog Read Address information	-180	180	
30215	AR	Actual Baseload Reference	See Analog Read Address information	0	30000	
30216	AR	Actual Process Reference	See Analog Read Address information	-32767	32767	
30229	AR	Actual PF Reference	-800 = 0.8 Lag 800 = 0.8 Lead 1000 = unity PF	-1000 to -500	500 to 1000	1000
30230	AR	Actual VAR Reference	See Analog Read Address information	-20000	20000	
30250	AR	Network Address	*	1	8	
30253	AR	AC Frequency	0 = 50Hz 1 = 60Hz *	0	1	
30254	AR	Rated RPM	RPM *	100	5000	
30255	AR	Rated Power	*	1	30,000	
30256	AR	Rated Volt-Amps	*	1	30,000	
30257	AR	Rated Volt-Amps Reactive	*	1	30,000	
30267	AR	Operating Mode	0 = No Parallel 1 = Mains Parallel *	0	1	
30268	AR	Number of Units	0 = Single 1 = Multiple *	0	1	
30269	AR	Preglow Time	seconds	0	1200	
30270	AR	Crank Time	seconds	0	240	
30271	AR	Crank Cutout	RPM	5	1000	
30272	AR	Crank Delay	seconds	1	240	
30273	AR	Crank Repeats		0	20	
30276	AR	Idle Time	seconds	1	240	
30277	AR	Cooldown Time	seconds	0	2400	
30280	AR	Sync Mode	0 = Check 1 = Permissive 2 = Run	0	2	
30291	AR	Sync Timeout	seconds	0	1200	

Modbus Address	Type	Item	Semantics	Min	Max	Scale
30294	AR	Load Control Mode	0 = Normal 1 = Soft Transfer 2 = kW Droop *	0	2	
30300	AR	Base Load Reference Setpoint	*	0	30,000	
30303	AR	Load Time	seconds	1	7,200	
30304	AR	Unload Time	seconds	1	7,200	
30305	AR	Raise Load Rate	% / sec X 100	0.01	100.00	100
30306	AR	Lower Load Rate	% / sec X 100	0.01	100.00	100
30311	AR	KVA Switch Low		0	30,000	
30312	AR	KVA Switch High		0	30,000	
30315	AR	Voltage Ramp Time	seconds	0	1,000	
30318	AR	KVAR Reference Setpoint	*	-20,000	20,000	
30319	AR	PF Reference Setpoint	-800 = 0.8 Lag 800 = 0.8 Lead 1000 = unity PF *	-1000 to -500	500 to 1000	1000
30321	AR	Process Action	0 = Direct 1 = Indirect *	0	1	
30328	AR	Process Reference		-32,768	32767	
30329	AR	Process Raise Rate	% / sec X 10	0.0	100.0	10
30330	AR	Process Lower Rate	% / sec X 10	0.0	100.0	10
30334	AR	Fast Transfer Delay	Seconds X 10	0.1	30.0	10
30335	AR	Mains Stable Delay	seconds	1	30,000	
30336	AR	Gen Stable Delay	seconds	1	30,000	
30342	AR	LOM Action Delay	seconds X 10	0.1	30.0	10
30344	AR	Min Gen Load	% of rated load	1	100	
30345	AR	Next Genset Delay	seconds	1	1200	
30346	AR	Rated Load Delay	seconds	1	1200	
30347	AR	Max Start Time	seconds	1	1200	
30348	AR	Max Gen Load	% of rated load	1	100	
30349	AR	Reduced Load Delay	seconds	1	1200	
30350	AR	Max Stop Time	seconds	1	1200	

**NOTE**

Items marked with an asterisk can only be changed when the engine is not running.

Analog Writes

Modbus Address	Type	Function	Semantics	Min	Max	Scale
40001	AW	Priority Change Address		1	8	
40002	AW	Process Control Actual Reference	See Analog Write Address information	-32767	32767	
40003	AW	Base Load Actual Reference	See Analog Write Address information	0	30,000	
40004	AW	Not Used				
40005	AW	PF Actual Reference	-500 = 0.5 Lag 500 = 0.5 Lead 1000 = unity PF	-1000 to -500	500 to 1000	1000
40006	AW	Not Used				
40007	AW	Remote VAR Actual Reference	See Analog Write Address information	-20000	20,000	
40250	AW	Network Address	*	1	8	
40253	AW	AC Frequency	0 = 50Hz 1 = 60Hz *	0	1	
40254	AW	Rated RPM	RPM *	100	5000	

Modbus Address	Type	Function	Semantics	Min	Max	Scale
40255	AW	Rated Power	*	1	30,000	
40256	AW	Rated Volt-Amps	*	1	30,000	
40257	AW	Rated Volt-Amps Reactive	*	1	30,000	
40267	AW	Operating Mode	0 = No Parallel 1 = Mains Parallel *	0	1	
40268	AW	Number of Units	0 = Single 1 = Multiple *	0	1	
40269	AW	Preglow Time	Seconds	0	1200	
40270	AW	Crank Time	Seconds	0	240	
40271	AW	Crank Cutout	RPM	5	1000	
40272	AW	Crank Delay	Seconds	1	240	
40273	AW	Crank Repeats		0	20	
40276	AW	Idle Time	Seconds	1	240	
40277	AW	Cooldown Time	Seconds	0	2400	
40280	AW	Sync Mode	0 = Check 1 = Permissive 2 = Run	0	2	
40291	AW	Sync Timeout	Seconds	0	1200	
40294	AW	Load Control Mode	0 = Normal 1 = Soft Transfer 2 = kW Droop *	0	2	
40300	AW	Base Load Reference Setpoint	*	0	30,000	
40303	AW	Load Time	seconds	1	7,200	
40304	AW	Unload Time	seconds	1	7,200	
40305	AW	Raise Load Rate	% / sec X 100	0.01	100.00	100
40306	AW	Lower Load Rate	% / sec X 100	0.01	100.00	100
40311	AW	KVA Switch Low		0	30,000	
40312	AW	KVA Switch High		0	30,000	
40315	AW	Voltage Ramp Time	Seconds	0	1,000	
40318	AW	KVAR Reference Setpoint	*	-20,000	20,000	
40319	AW	PF Reference Setpoint	-800 = 0.8 Lag 800 = 0.8 Lead 1000 = unity PF *	-1000 to -500	500 to 1000	1000
40321	AW	Process Action	0 = Direct 1 = Indirect *	0	1	
40328	AW	Process Reference Setpoint	In configured units *	-32,768	32767	
40329	AW	Process Raise Rate	% / sec X 10	0.0	100.0	10
40330	AW	Process Lower Rate	% / sec X 10	0.0	100.0	10
40334	AW	Fast Transfer Delay	Seconds X 10	0.1	30.0	10
40335	AW	Mains Stable Delay	Seconds	1	30,000	
40336	AW	Gen Stable Delay	Seconds	1	30,000	
40342	AW	LOM Action Delay	Seconds X 10	0.1	30.0	10
40344	AW	Min Gen Load	% of rated load	1	100	
40345	AW	Next Genset Delay	Seconds	1	1200	
40346	AW	Rated Load Delay	Seconds	1	1200	
40347	AW	Max Start Time	Seconds	1	1200	

Modbus Address	Type	Function	Semantics	Min	Max	Scale
40348	AW	Max Gen Load	% of rated load	1	100	
40349	AW	Reduced Load Delay	Seconds	1	1200	
40350	AW	Max Stop Time	Seconds	1	1200	

**NOTE**

* Items marked with an Asterisk can only be changed when the engine is not running.

Chapter 7.

Download.exe Setpoint Utility

Introduction

This chapter covers the third of the three EGCP-2 communication protocol options, Upload Setpoints.

Download.exe is a DOS-based freeware program that can upload and download configuration files through the EGCP-2's RS-422 serial port. This program is available through the Internet from the Woodward website (www.woodward.com/ic/software).

Requirements

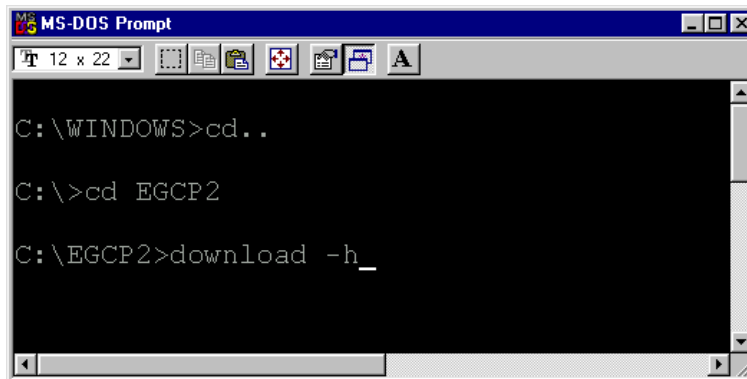
- RS-232 to RS-422 converter
- PC capable of running DOS-based executables
- DOWNLOAD.EXE, part number 9926-113 Rev B or greater

Instructions

Set-up

Save the DOWNLOAD.EXE file:

Save the DOWNLOAD.EXE file to the computer. In the following example this file is saved in a directory called EGCP2 on the C: drive. Open a DOS command window and go to the directory where the download file is stored. Type `DOWNLOAD -h` (or `-?`) for a complete list of the command-line options (see below).



```
MS-DOS Prompt
C:\WINDOWS>cd ..
C:\>cd EGCP2
C:\EGCP2>download -h_
```

Establishing a Connection:

Connect the RS-232 / RS-422 cable between the EGCP-2 and the computer. See the Communication Ports section of the Operation and Installation manual 26175 for more information about this cable interface.



NOTE

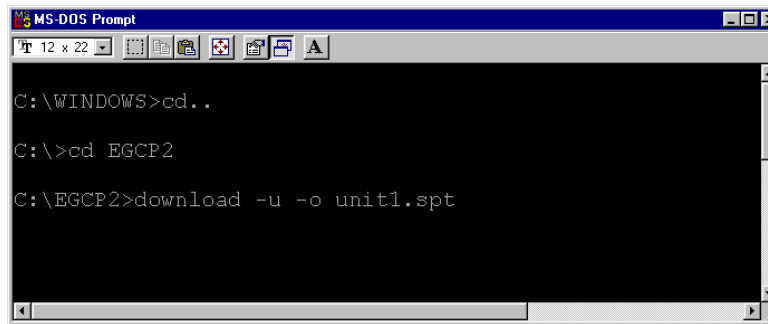
Only one EGCP-2 can be connected to the RS-422 communication network when uploading or downloading setpoints. If a multidrop network has been setup linking more than one EGCP-2 on the RS-422 communication port network, it will be necessary to separate the control from the network in order to upload or download setpoints.

Uploading Setpoints

This procedure saves the setpoints from the control to a file on the computer. The following examples assume that COM1 is the available serial port on the PC, and the download.exe program has been saved to the directory, c:\EGCP2.

On the EGCP-2, under the SEQUENCING AND COMMS menu, step to the "422 Protocol" item. Select "Upload Setpoints" and press the Enter key. Cycle power to the EGCP-2. When the EGCP-2 passes the self-tests, it will be ready to start uploading setpoints.

Using a DOS command prompt window, go to the directory where the DOWNLOAD.EXE file is stored and type "download -u -o unit1.spt" at the DOS command prompt (see below). The -u tells the program to wait for an upload string from the control. The -o specifies that the information should be saved to a file, and unit1.spt is the file which will be created in the same directory. The file name can be any name up to eight characters long. This command assumes that COM port 1 is the COM port being used on the computer. If another port is being used add the number of this port to the end of the command (for example, "download -u -o unit1.spt 2" for COM 2), add a 3 for COM 3, etc.



```
MS-DOS Prompt
C:\WINDOWS>cd ..
C:\>cd EGCP2
C:\EGCP2>download -u -o unit1.spt
```

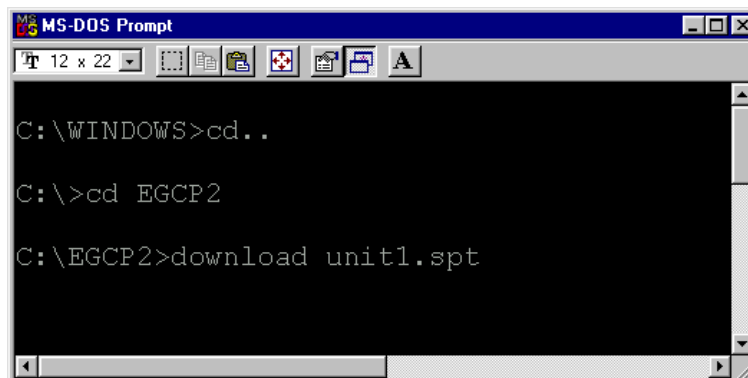
The program will begin uploading setpoints within a few seconds. After the upload is completed the text "Done" appears on the screen.

When uploading more than one control be sure to use a different name for the .spt files (i.e. Unit1, Unit2...) or the files will be overwritten.

Downloading Setpoints

This procedure loads an existing setpoint file from the computer to the control.

Using a DOS command prompt window, go to the directory where the DOWNLOAD.EXE file is stored and type "download unit1.spt" at the DOS command prompt (see below). The RS-422 protocol setting can be set to any of the three choices: Upload Setpoints, Modbus, or ServLink.



```
MS-DOS Prompt
C:\WINDOWS>cd ..
C:\>cd EGCP2
C:\EGCP2>download unit1.spt
```

Cycle power to the EGCP-2. When the power is restored to the control the download will begin. A scroll bar appears on the computer screen showing the progress of the download (see below).

```

C:\egcp2>download unit1.spt

GCP Download Program, PN      Need P/N?
Copyright (C) 2000, Woodward Governor Company.
All rights reserved. <Jul 14, 2000>

---HEX File---

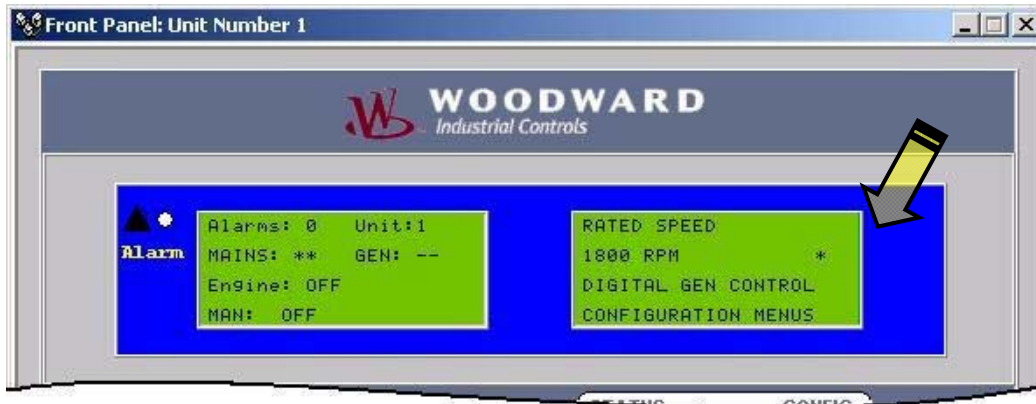
 1  2  3  4  5  6  7  8  9
-----
Download Statistics
-----
      24 lines transferred
      006000 lowest address
      006284 highest address
-----
Elapsed Time: 0 minutes, 13 seconds
-----

C:\egcp2>

```

On the EGCP-2 screen the text “SETPOINTS” is displayed.

After the download is complete, press the Config key and enter the proper password. Every item in the Configuration menu will need to be verified by viewing the setpoint and pressing the Enter key on the control. An “*” is displayed after the setpoint until this value has been committed to the control by pressing the Enter key.



This step forces the user to view each setpoint and verify that the value that has just been downloaded is correct for this system’s configuration. This only applies to the Configuration menu, the other menus do not need to be committed, although it is recommended that every item is verified.

Uploading and Downloading of setpoints can only be done between units with the same code revision level. The EGCP-2 will display a warning message and reboot after the self-tests if the setpoints and labels are not compatible with the internal code revision number. This revision number is displayed briefly after the self-tests are complete on the last line of the lower LCD panel.

Chapter 8.

Service Options

Product Service Options

If you are experiencing problems with the installation, or unsatisfactory performance of a Woodward product, the following options are available:

- Consult the troubleshooting guide in the manual.
- Contact the manufacturer or packager of your system.
- Contact the Woodward Full Service Distributor serving your area.
- Contact Woodward technical assistance (see “How to Contact Woodward” later in this chapter) and discuss your problem. In many cases, your problem can be resolved over the phone. If not, you can select which course of action to pursue based on the available services listed in this chapter.

OEM and Packager Support: Many Woodward controls and control devices are installed into the equipment system and programmed by an Original Equipment Manufacturer (OEM) or Equipment Packager at their factory. In some cases, the programming is password-protected by the OEM or packager, and they are the best source for product service and support. Warranty service for Woodward products shipped with an equipment system should also be handled through the OEM or Packager. Please review your equipment system documentation for details.

Woodward Business Partner Support: Woodward works with and supports a global network of independent business partners whose mission is to serve the users of Woodward controls, as described here:

- A **Full Service Distributor** has the primary responsibility for sales, service, system integration solutions, technical desk support, and aftermarket marketing of standard Woodward products within a specific geographic area and market segment.
- An **Authorized Independent Service Facility (AISF)** provides authorized service that includes repairs, repair parts, and warranty service on Woodward's behalf. Service (not new unit sales) is an AISF's primary mission.
- A **Recognized Engine Retrofitter (RER)** is an independent company that does retrofits and upgrades on reciprocating gas engines and dual-fuel conversions, and can provide the full line of Woodward systems and components for the retrofits and overhauls, emission compliance upgrades, long term service contracts, emergency repairs, etc.
- A **Recognized Turbine Retrofitter (RTR)** is an independent company that does both steam and gas turbine control retrofits and upgrades globally, and can provide the full line of Woodward systems and components for the retrofits and overhauls, long term service contracts, emergency repairs, etc.

A current list of Woodward Business Partners is available at www.woodward.com/support.

Woodward Factory Servicing Options

The following factory options for servicing Woodward products are available through your local Full-Service Distributor or the OEM or Packager of the equipment system, based on the standard Woodward Product and Service Warranty (5-01-1205) that is in effect at the time the product is originally shipped from Woodward or a service is performed:

- Replacement/Exchange (24-hour service)
- Flat Rate Repair
- Flat Rate Remanufacture

Replacement/Exchange: Replacement/Exchange is a premium program designed for the user who is in need of immediate service. It allows you to request and receive a like-new replacement unit in minimum time (usually within 24 hours of the request), providing a suitable unit is available at the time of the request, thereby minimizing costly downtime. This is a flat-rate program and includes the full standard Woodward product warranty (Woodward Product and Service Warranty 5-01-1205).

This option allows you to call your Full-Service Distributor in the event of an unexpected outage, or in advance of a scheduled outage, to request a replacement control unit. If the unit is available at the time of the call, it can usually be shipped out within 24 hours. You replace your field control unit with the like-new replacement and return the field unit to the Full-Service Distributor.

Charges for the Replacement/Exchange service are based on a flat rate plus shipping expenses. You are invoiced the flat rate replacement/exchange charge plus a core charge at the time the replacement unit is shipped. If the core (field unit) is returned within 60 days, a credit for the core charge will be issued.

Flat Rate Repair: Flat Rate Repair is available for the majority of standard products in the field. This program offers you repair service for your products with the advantage of knowing in advance what the cost will be. All repair work carries the standard Woodward service warranty (Woodward Product and Service Warranty 5-01-1205) on replaced parts and labor.

Flat Rate Remanufacture: Flat Rate Remanufacture is very similar to the Flat Rate Repair option with the exception that the unit will be returned to you in "like-new" condition and carry with it the full standard Woodward product warranty (Woodward Product and Service Warranty 5-01-1205). This option is applicable to mechanical products only.

Returning Equipment for Repair

If a control (or any part of an electronic control) is to be returned for repair, please contact your Full-Service Distributor in advance to obtain Return Authorization and shipping instructions.

When shipping the item(s), attach a tag with the following information:

- return number;
- name and location where the control is installed;
- name and phone number of contact person;
- complete Woodward part number(s) and serial number(s);
- description of the problem;
- instructions describing the desired type of repair.

Packing a Control

Use the following materials when returning a complete control:

- protective caps on any connectors;
- antistatic protective bags on all electronic modules;
- packing materials that will not damage the surface of the unit;
- at least 100 mm (4 inches) of tightly packed, industry-approved packing material;
- a packing carton with double walls;
- a strong tape around the outside of the carton for increased strength.



CAUTION—ELECTROSTATIC DISCHARGE

To prevent damage to electronic components caused by improper handling, read and observe the precautions in Woodward manual 82715, *Guide for Handling and Protection of Electronic Controls, Printed Circuit Boards, and Modules*.

Replacement Parts

When ordering replacement parts for controls, include the following information:

- the part number(s) (XXXX-XXXX) that is on the enclosure nameplate;
- the unit serial number, which is also on the nameplate.

Engineering Services

Woodward offers various Engineering Services for our products. For these services, you can contact us by telephone, by email, or through the Woodward website.

- Technical Support
- Product Training
- Field Service

Technical Support is available from your equipment system supplier, your local Full-Service Distributor, or from many of Woodward's worldwide locations, depending upon the product and application. This service can assist you with technical questions or problem solving during the normal business hours of the Woodward location you contact. Emergency assistance is also available during non-business hours by phoning Woodward and stating the urgency of your problem.

Product Training is available as standard classes at many of our worldwide locations. We also offer customized classes, which can be tailored to your needs and can be held at one of our locations or at your site. This training, conducted by experienced personnel, will assure that you will be able to maintain system reliability and availability.

Field Service engineering on-site support is available, depending on the product and location, from many of our worldwide locations or from one of our Full-Service Distributors. The field engineers are experienced both on Woodward products as well as on much of the non-Woodward equipment with which our products interface.

For information on these services, please contact us via telephone, email us, or use our website and reference www.woodward.com/support, and then **Customer Support**.

How to Contact Woodward

For assistance, call one of the following Woodward facilities to obtain the address and phone number of the facility nearest your location where you will be able to get information and service.

Electrical Power Systems		Engine Systems		Turbine Systems	
Facility	Phone Number	Facility	Phone Number	Facility	Phone Number
Australia	+61 (2) 9758 2322	Australia	+61 (2) 9758 2322	Australia	+61 (2) 9758 2322
Brazil	+55 (19) 3708 4800	Brazil	+55 (19) 3708 4800	Brazil	+55 (19) 3708 4800
China	+86 (512) 6762 6727	China	+86 (512) 6762 6727	China	+86 (512) 6762 6727
Germany:		Germany:			
Kempen	+49 (0) 21 52 14 51	Stuttgart	+49 (711) 78954-0		
Stuttgart	+49 (711) 78954-0				
India	+91 (129) 4097100	India	+91 (129) 4097100	India	+91 (129) 4097100
Japan	+81 (43) 213-2191	Japan	+81 (43) 213-2191	Japan	+81 (43) 213-2191
Korea	+82 (51) 636-7080	Korea	+82 (51) 636-7080	Korea	+82 (51) 636-7080
		The Netherlands	+31 (23) 5661111	The Netherlands	+31 (23) 5661111
Poland	+48 12 618 92 00				
United States	+1 (970) 482-5811	United States	+1 (970) 482-5811	United States	+1 (970) 482-5811

You can also contact the Woodward Customer Service Department or consult our worldwide directory on Woodward's website (www.woodward.com/support) for the name of your nearest Woodward distributor or service facility.

For the most current product support and contact information, please refer to the latest version of publication **51337** at www.woodward.com/publications.

Technical Assistance

If you need to telephone for technical assistance, you will need to provide the following information. Please write it down here before phoning:

General

Your Name _____
 Site Location _____
 Phone Number _____
 Fax Number _____

Prime Mover Information

Engine/Turbine Model Number _____
 Manufacturer _____
 Number of Cylinders (if applicable) _____
 Type of Fuel (gas, gaseous, steam, etc) _____
 Rating _____
 Application _____

Control/Governor Information

Please list all Woodward governors, actuators, and electronic controls in your system:

Woodward Part Number and Revision Letter

Control Description or Governor Type

Serial Number

Woodward Part Number and Revision Letter

Control Description or Governor Type

Serial Number

Woodward Part Number and Revision Letter

Control Description or Governor Type

Serial Number

If you have an electronic or programmable control, please have the adjustment setting positions or the menu settings written down and with you at the time of the call.

We appreciate your comments about the content of our publications.

Send comments to: icinfo@woodward.com

Please include the manual number from the front cover of this publication.



PO Box 1519, Fort Collins CO 80522-1519, USA
1000 East Drake Road, Fort Collins CO 80525, USA
Phone +1 (970) 482-5811 • Fax +1 (970) 498-3058

Email and Website—www.woodward.com

**Woodward has company-owned plants, subsidiaries, and branches,
as well as authorized distributors and other authorized service and sales facilities throughout the world.**

Complete address / phone / fax / email information for all locations is available on our website.