WOODWARD

EGCP-3 LS
8406-113

Using an EGCP-3 in a Single-Phase
Zig Zag Generator Application

⚠ General Precautions	**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.**

⚠ Revisions	**This publication may have been revised or updated since this copy was produced. To verify that you have the latest revision, check manual** *26311* **,** *Revision Status & Distribution Restrictions of Woodward Technical Publications*, **on the** *publications page* **of the Woodward website:** **www.woodward.com/publications** **The latest version of most publications is available on the** *publications page*. **If your publication is not there, please contact your customer service representative to get the latest copy.**

⚠ 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.**

⚠ Translated Publications	**If the cover of this publication states "Translation of the Original Instructions" please note:** **The original source of this publication may have been updated since this translation was made. Be sure to check manual** *26311* **,** *Revision Status & Distribution Restrictions of Woodward Technical Publications*, **to verify whether this translation is up to date. Out-of-date translations are marked with ⚠. Always compare with the original for technical specifications and for proper and safe installation and operation procedures.**

Revisions—Changes in this publication since the last revision are indicated by a black line alongside the text.

Warnings and Notices

Important Definitions

⚠️ This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

- **DANGER**—Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
- **WARNING**—Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
- **CAUTION**—Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
- **NOTICE**—Indicates a hazard that could result in property damage only (including damage to the control).
- **IMPORTANT**—Designates an operating tip or maintenance suggestion.

⚠**WARNING** Overspeed / Overtemperature / Overpressure	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** Personal Protective Equipment	The products described in this publication may present risks that could lead to personal injury, loss of life, or property damage. Always wear the appropriate personal protective equipment (PPE) for the job at hand. Equipment that should be considered includes but is not limited to: • Eye Protection • Hearing Protection • Hard Hat • Gloves • Safety Boots • Respirator Always read the proper Material Safety Data Sheet (MSDS) for any working fluid(s) and comply with recommended safety equipment.

⚠**WARNING** Start-up	Be prepared to make an emergency shutdown when starting the engine, turbine, or other type of prime mover, to protect against runaway or overspeed with possible personal injury, loss of life, or property damage.

⚠**WARNING** Automotive Applications	On- and off-highway Mobile Applications: Unless Woodward's control functions as the supervisory control, customer should install a system totally independent of the prime mover control system that monitors for supervisory control of engine (and takes appropriate action if supervisory control is lost) to protect against loss of engine control with possible personal injury, loss of life, or property damage.

| NOTICE

Battery Charging Device | 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. |

Electrostatic Discharge Awareness

| NOTICE

Electrostatic Precautions | 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.

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*. |

Follow these precautions when working with or near the control.
1. 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.
2. 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.

EGCP-3 Software Change Information
for Control 8406-113

Introduction

Woodward is releasing application software **5418-144G.SCP** for upgrading existing EGCP-3 controls in the field. This application note describes the changes made in the software and the process to upgrade the software in the control.

The software can be used to upgrade these existing controls.
- 8406-113 B, C, D, E, or F can be upgraded to 8406-113 G (this converts software 5418-144 A, B, C, D, E, or F to 5418-144 G).

IMPORTANT	This change would only be needed for applications that are using single-phase Zig Zag generator configurations.

Description of Software Changes

A new generator configuration type was added for a Zig Zag configuration. The settings "Gen PT Configuration" and "Bus PT Configuration" now have three choices:
- Line to Line
- Line to Neutral
- Zig Zag

Figures 2 and 3 show the PT and CT wiring for this configuration.

On the EGCP-3 display, the control will still show both Line to Line and Line to Neutral voltages, but when configured for a Zig Zag configuration, these two readings will be identical. The EGCP-3 cannot truly sense the generator neutral, so the Line to Neutral reading will not show 50% of the Line to Line voltage.

Figure 1 shows typical values that would be seen on the Generators Status screen.

Generator Status Screen #1

GEN		11.3 kVA	BUS		11.3 kVA
481.5	VLL	10.5 kW	480.3	VLL	10.5 kW
481.4	VLN	0.6 kVR	480.2	VLN	0.6 kVR
8.8	A	PF:0.99LG	8.8	A	PF:0.99LG

Generator Status Screen #2

GEN	AØ	BØ	CØ	AØ	BØ	CØ	GEN
kVA	11.3	0.0	0.0	481.5	0.0	0.0	VLL
kW	10.5	0.0	0.0	8.8	0.0	0.0	A
kVR	0.6	0.0	0.0	1.0LG	1.0LG	1.0LG	PF

Figure 1. Generator Status Screens

Compatibility with Existing Controls

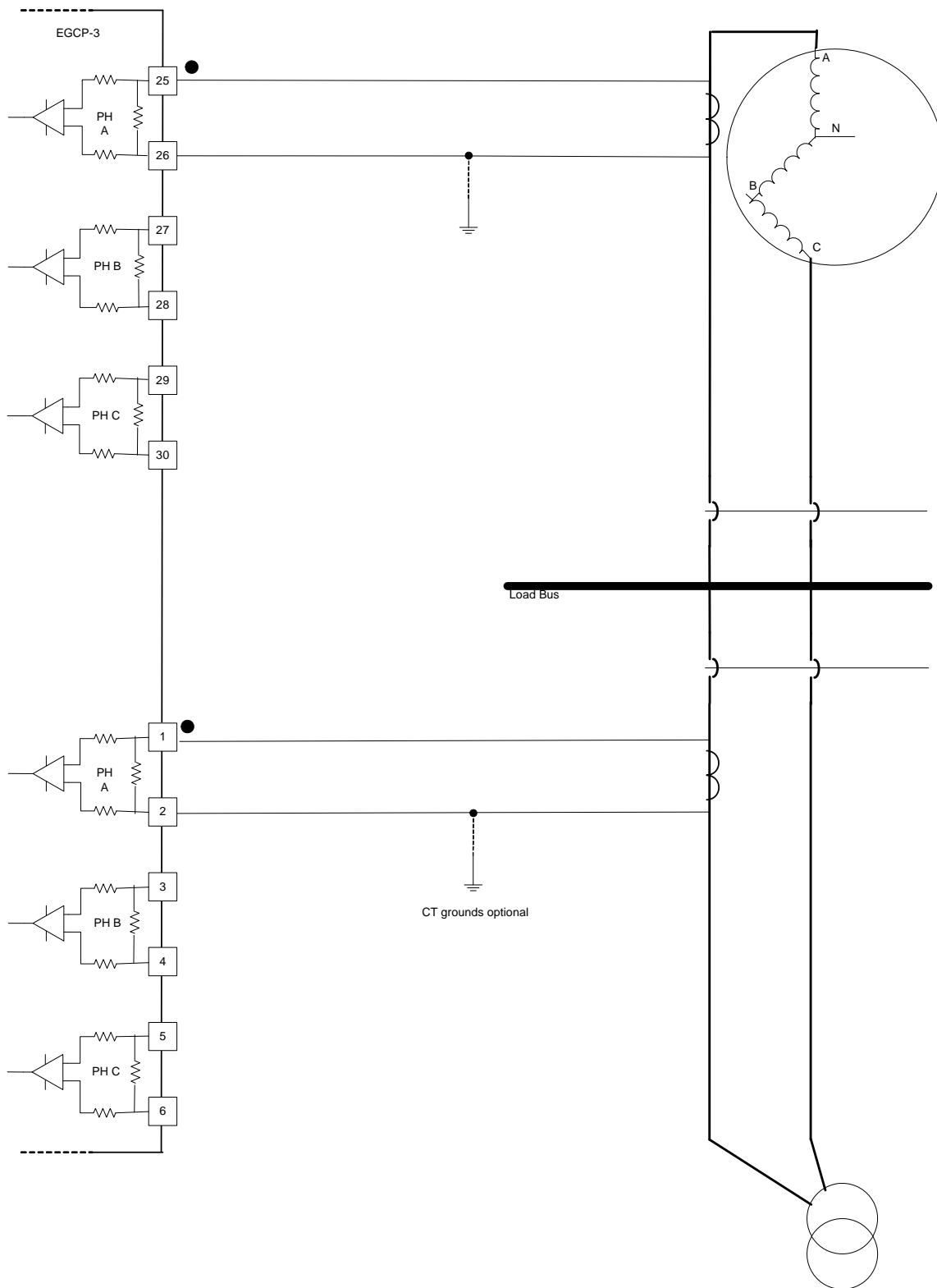The new software, 5418-144 G, will operate with all existing EGCP-3 controls.

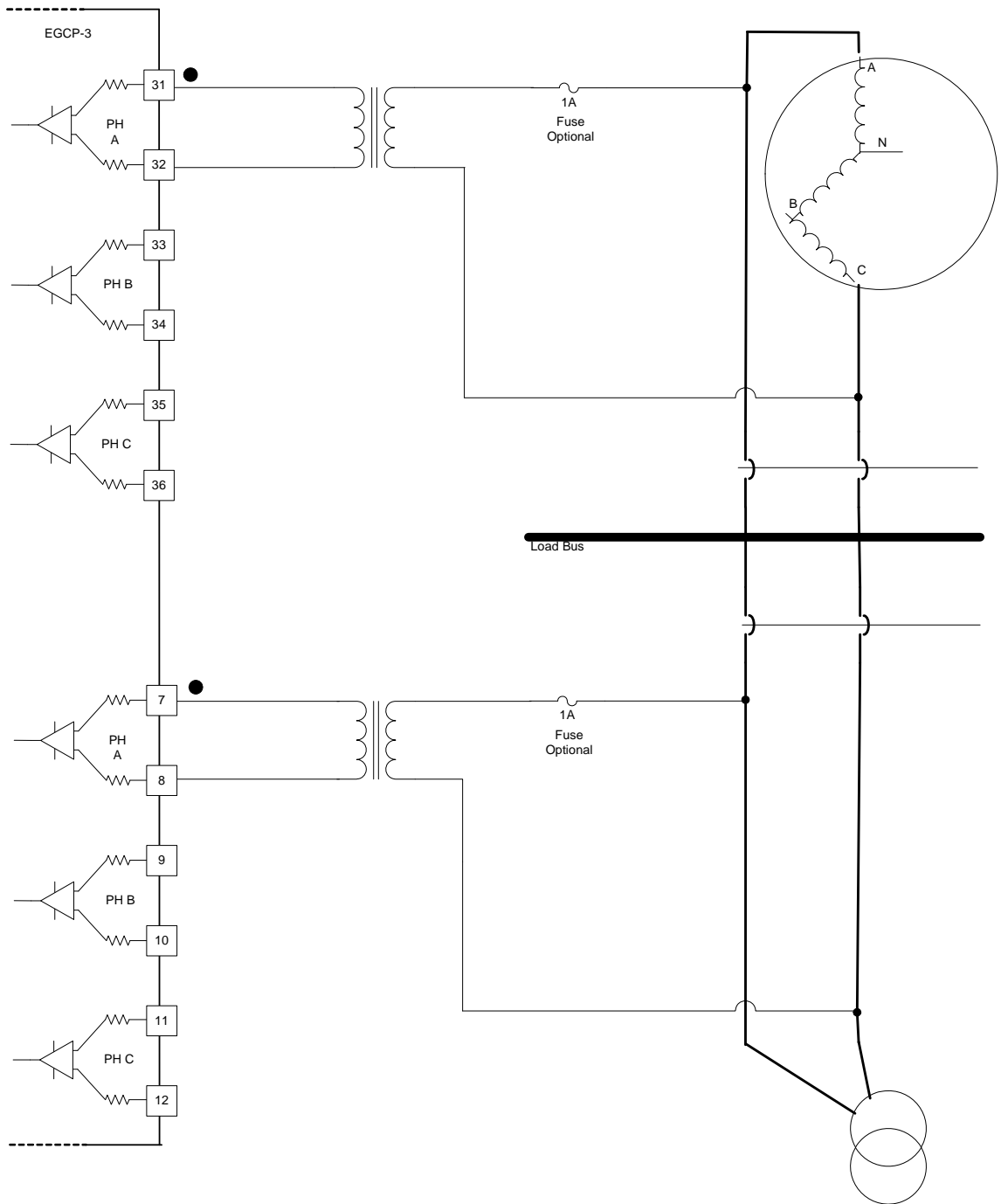Figure 2. Current Transformer Connections

Figure 3. Potential Transformer Connections

Download Instructions

This section provides instructions for downloading the 5418144G.SCP software needed to upgrade the 8406-113.

IMPORTANT	**Loading the Application software may change some or all of the Configuration set points. These setpoints should be saved to a File before upgrading the unit.**

⚠ **WARNING**	**An unsafe condition could occur with improper use of these software tools. Only trained personnel should have access to these tools.**

Requirements
- Nine pin DB9 Null Modem cable.
- Woodward Watch Window Professional Software. This program is available on the Woodward website (**www.woodward.com**) for a five day trial. A license can be purchased for extended use.

Instructions

Step 1—Establish a ServLink Connection

To run the Watch Window application, first click on the Start toolbar button in Windows desktop, then Programs, Woodward, Watch Window Standard version, and then click on the ServLink server as shown here.
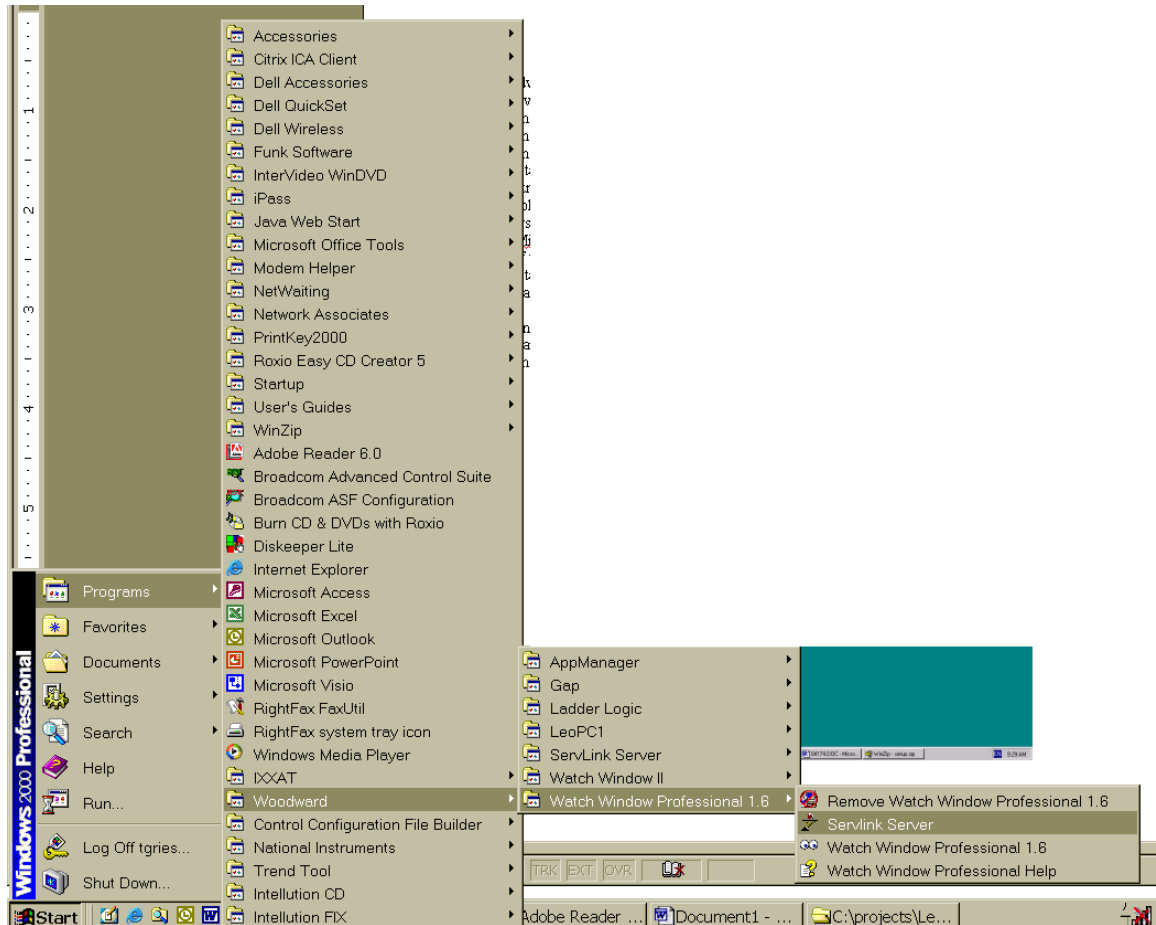
When you click once on the icon, this screen will appear on the desktop. This is the Dialog Screen, where the type of communications you are using will be established prior to operation of the Watch Window software.
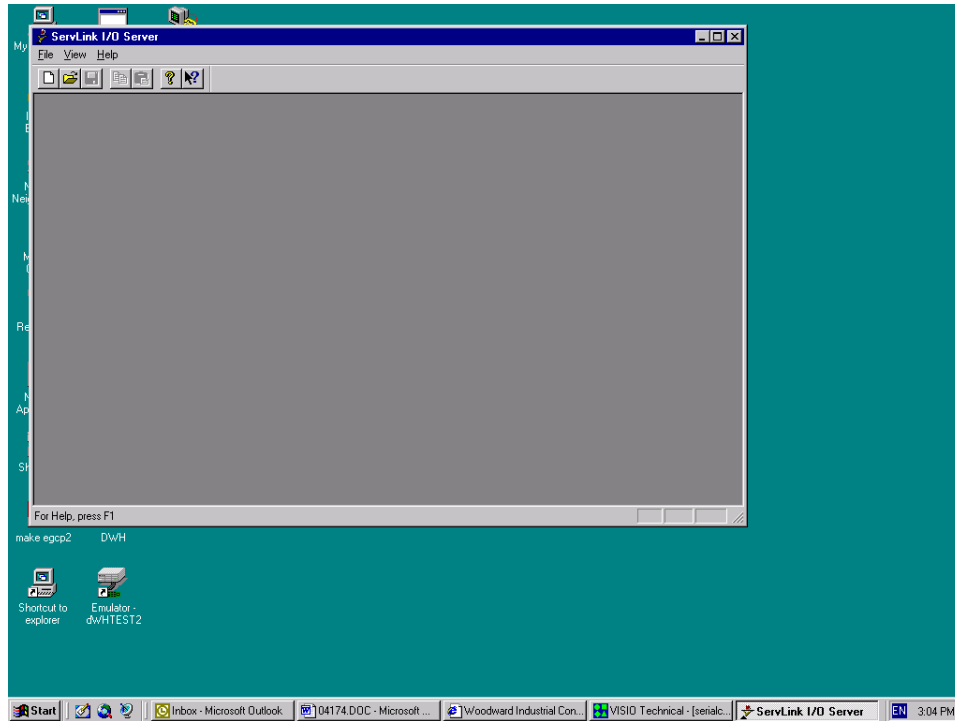
The first action to take inside the ServLink screen is to set up a new network definition file. Click once on **F**ile, and then on **N**ew as shown. The new network definition window will pop up on the computer screen.

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 control. Clicking on the drop down box tells 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 control are made in a direct fashion (a null modem cable connected directly to the control).

The advantage of using the point-to-point communications mode option is speed. Since the communications are only between the PC and one 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 multiple controls 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 controls that require monitoring from the computer on the same network. This will require an RS-422 or RS-485 network configuration. For RS-232 only point-to-point is allowed.

The next box down is the "At this baud rate" box. Different controls operate at different baud rates. See the control manual to determine where the control baud rate is set. For example, EGCP-2 is 9600 (only), 2301 D is 38,400 (selectable), and EGCP-3 is 115,200 (selectable).

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 turn "on", or become active, as shown below:


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:
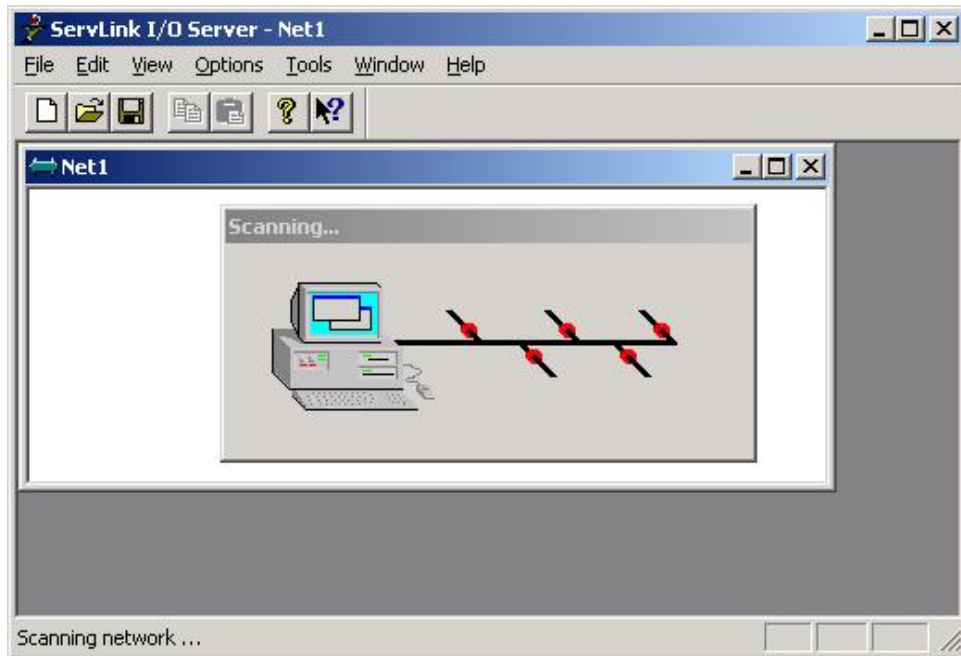
When communications are established with the control network, the scanning screen will change to display that the ServLink software is reading the control information. That screen will look like this:
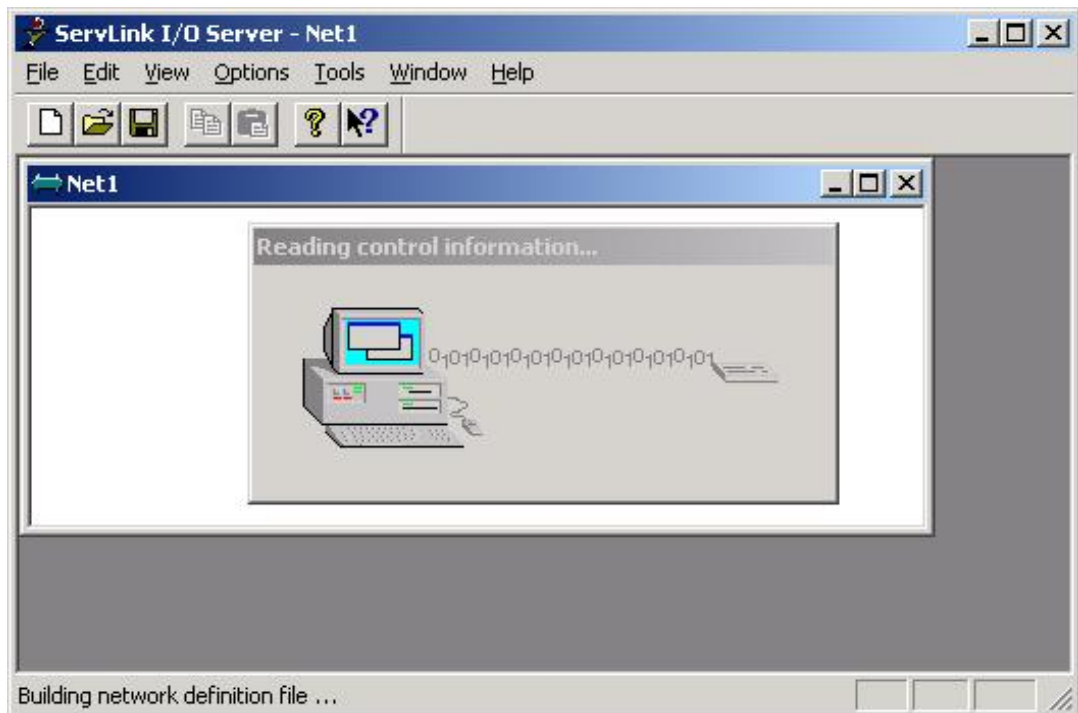
Once communications are established and the data is read from the control network, the ServLink software will show each control it is communicating on the network by that control's network address. Here is a typical ServLink network definition screen for a three-unit EGCP-2 network:
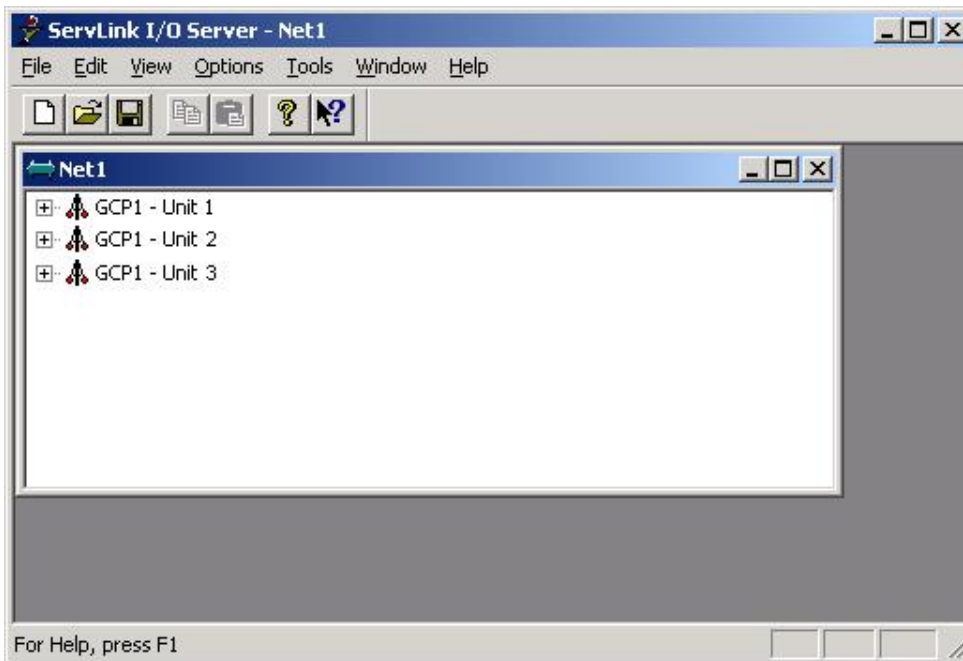
If your network configuration is constant (neither the number of controls on the network nor the PC attached to the network will change), you may want to save the Network Definition File you have created for ServLink. To do this, click on the **F**ile button in the upper left hand window of ServLink. Select "Save **A**s". 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 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 **F**ile, and then **O**pen. 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.


IMPORTANT | **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.**


Step 2—Start the Watch Window 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 then be printed, edited, and transferred into another control.

The Watch Window Software will not run unless the computer is communicating with at least one control. Once the ServLink Communication has been established, start the Watch Window program from the Windows toolbar Start button.
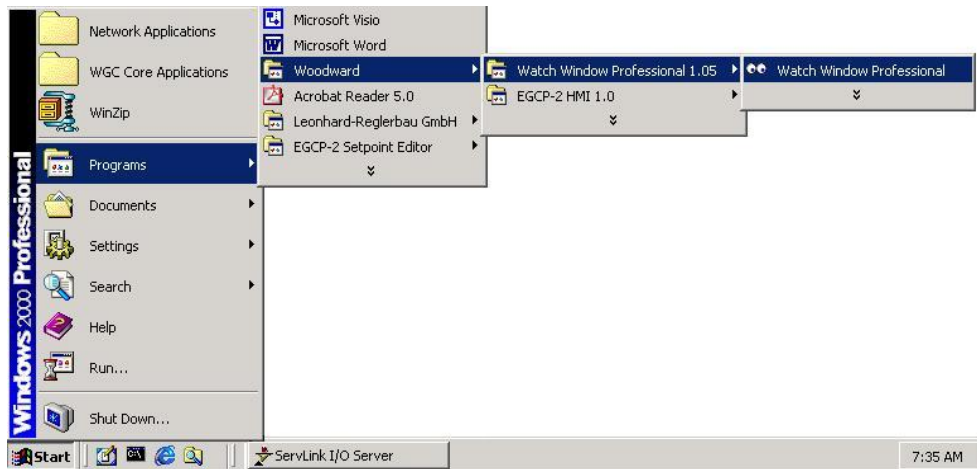
The Watch Window Professional software is comprised of three separate windows, each with a different function.
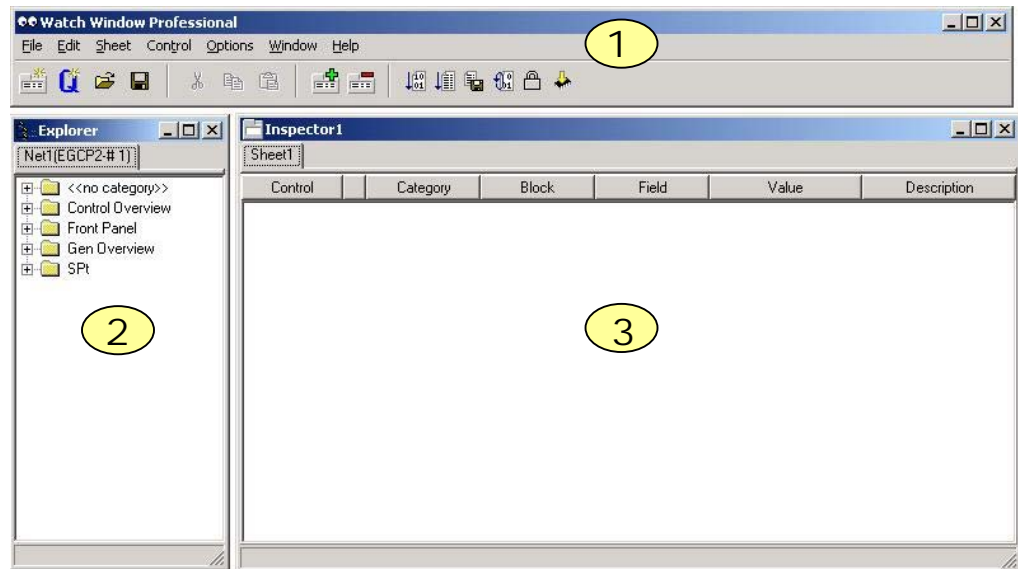
The Application Control window (1) is the main window for the software. It is used to manage the Explorer window (2) and the Inspector window (3). A tool bar is provided with icons to Open, close, and save Inspectors, and to upload and download the tunable setpoints.
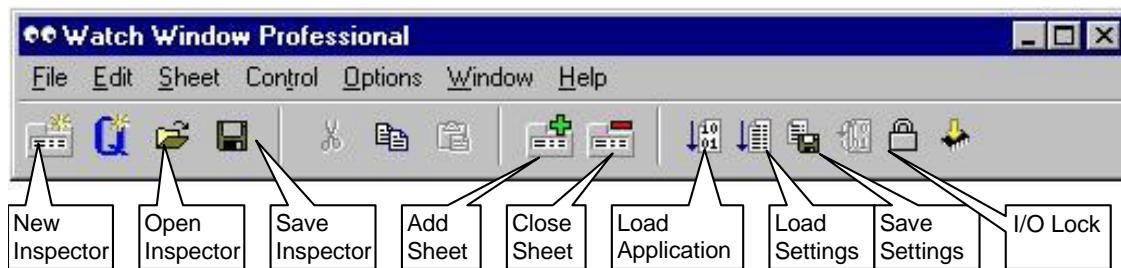

The Explorer window uses a tree similar to the Windows Explorer® program used to manage files on the computer. Under each folder are subfolders, which hold the various data variables.

In this picture, the A phase current is found under the Amps folder under the Gen Overview folder. Notice that the number of amps is not shown.
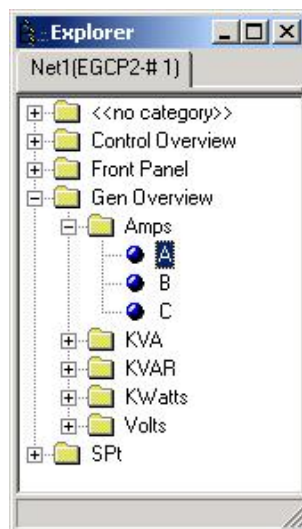
Only the variable names can be found in the Explorer window. In order to see the values associated with the variable, the variable needs to be transported to the Inspector screen. The user determines which values are to be placed on the inspector screen, by clicking on the item in the Explorer Window 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.
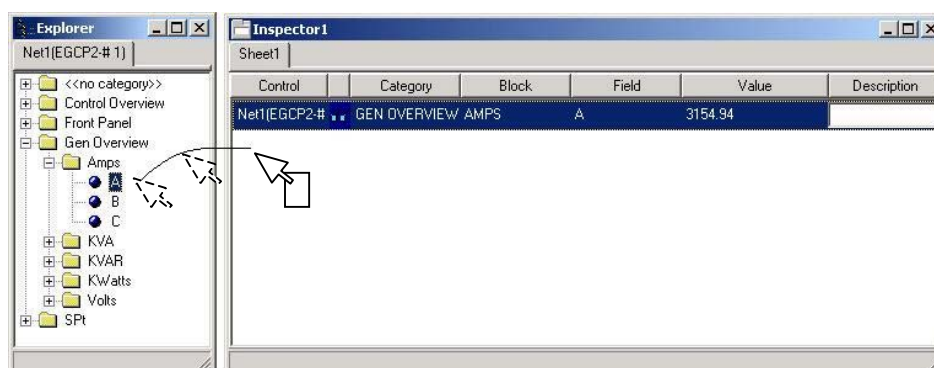
In the inspector screen, the variable name is shown in four parts. First the identity of the control is listed under the Control column. Then the Category, Block, and Field are listed. Each variable will have a unique Field name. The Block is the folder that the variable was located in, and the Category 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 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 ±1% or ±10% increment. It is also possible to click the mouse in the Value box and enter a number directly from the computer keypad. The adjustment range for this variable is shown at the bottom of the window. When using the adjustment arrows the changed value goes into affect immediately no other action is needed. When using direct entry the adjust arrows go away and are replaced by a button with an equal sign. After the correct value has been entered, click the equal sign to put this value into use.

Step 3—Save the Control Setpoint File

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.

This list can be sorted by clicking on the Data menu item; choose sort list by Configuration ID in ascending order. This list will show all of the adjustable variables of the control. There are two categories of variables that are important to the user. Many of these other variables are only needed for things like factory testing of the controls. The Service items and Configure items are the setpoints that are described in the product manual.
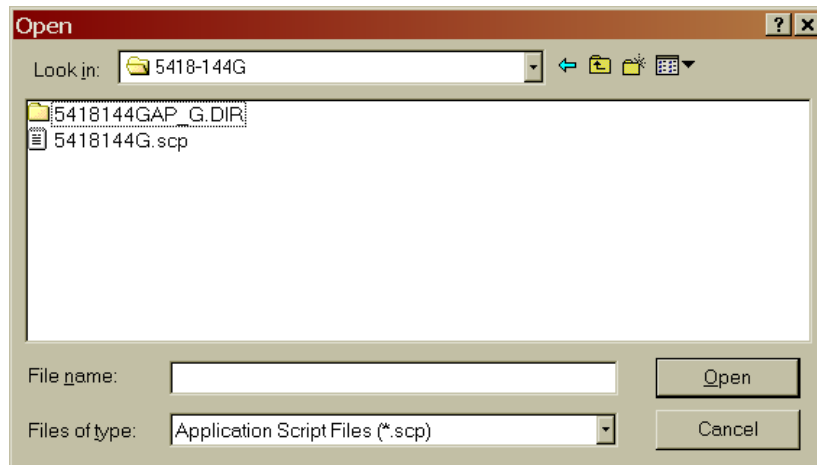
	A	B	C
1	CONFIGURATION ID	Dflt Config ID	
2	A01_332CPU.AO_01.GAIN	1	
3	A01_332CPU.AO_01.OFFSET	0	
4	A01_332CPU.AO_02.GAIN	1	
5	A01_332CPU.AO_02.OFFSET	0	
6	A01_332CPU.AO_03.GAIN	1	
7	A01_332CPU.AO_03.OFFSET	0	
8	A01_332CPU.AO_04.GAIN	1	
9	A01_332CPU.AO_04.OFFSET	0	
10	A01_332CPU.CLOCK.SEC_IN	0	
11	A01_332CPU.COMM_01.BITS	2	
12	A01_332CPU.COMM_01.ECHO	1	
13	A01_332CPU.COMM_01.ENDLINE	1	
14	A01_332CPU.COMM_01.FLOW	1	
15	A01_332CPU.COMM_01.IGNCR	1	
16	A01_332CPU.COMM_01.MODE	1	
17	A01_332CPU.COMM_01.PARITY	1	
18	A01_332CPU.COMM_01.STOP	1	
19	A01_332CPU.COMM_02.BITS	2	
20	A01_332CPU.COMM_02.ECHO	1	
21	A01_332CPU.COMM_02.ENDLINE	1	
22	A01_332CPU.COMM_02.FLOW	1	
23	A01_332CPU.COMM_02.IGNCR	1	
24	A01_332CPU.COMM_02.MODE	1	
25	A01_332CPU.COMM_02.P_FLUSH	0	
26	A01_332CPU.COMM_02.PARITY	1	
27	A01_332CPU.COMM_02.STOP	1	
28	A01_332CPU.COMM_03.BITS	2	
29	A01_332CPU.COMM_03.ECHO	1	
30	A01_332CPU.COMM_03.ENDLINE	1	
31	A01_332CPU.COMM_03.FLOW	1	
32	A01_332CPU.COMM_03.IGNCR	1	
33	A01_332CPU.COMM_03.MODE	1	
34	A01_332CPU.COMM_03.PARITY	1	
35	A01_332CPU.COMM_03.STOP	1	
36	A01_332CPU.PORT1_MUX.SEL_2	0	
37	A01_332CPU.RST_LD.CTRL	1	
38	A01_332CPU.TUNE_SLINK.SL_ADDR_1	0	

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. ServLink and Watch Window software will only pass numeric values between the PC and the control. So, many text items such as the alarm setting will be expressed as a number 5, instead of the text Hard Shutdown.
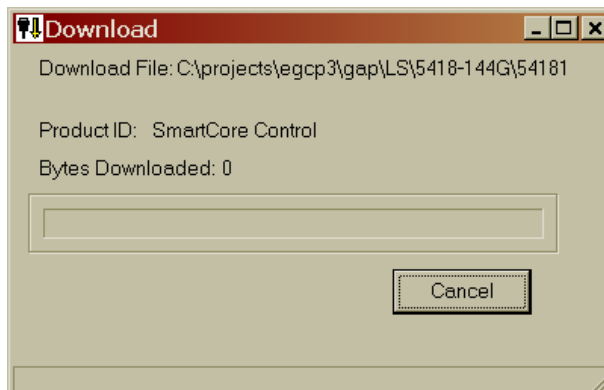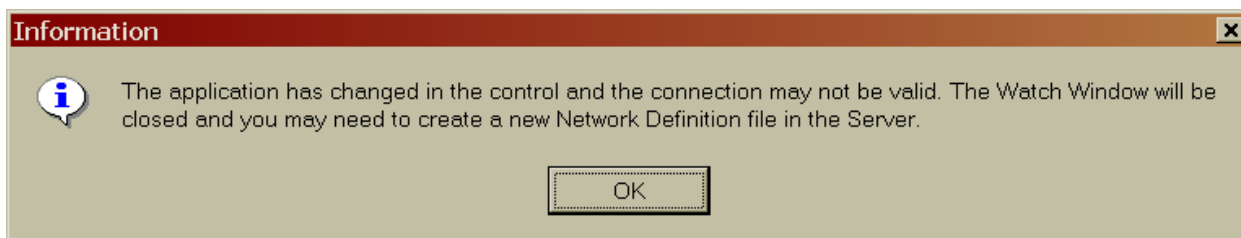
Download the New Application Software

Click on the Save Application Settings icon in the Application Control window. A Windows Explorer box will appear and prompt the user for the file to load into the control. The 5418144G.SCP file should be selected.

```
Open                                                    ? X

Look in:  🗀 5418-144G              ▼  ← 🔁 📂 ▦▼

🗀 5418144GAP_G.DIR
📄 5418144G.scp




File name:     [                              ]        Open

Files of type: Application Script Files (*.scp)  ▼     Cancel
```

After the **O**pen button is pressed, a warning box will appear that tells the user that the control inputs and outputs will be locked during the download. Hit the Yes button to continue. Then a status bar will appear updating the file transfer progress.

```
🔽 Download                                 _ □ X

Download File: C:\projects\egcp3\gap\LS\5418-144G\54181

Product ID:  SmartCore Control

Bytes Downloaded: 0

[                                           ]

                              [   Cancel   ]

```

When the download is complete, another warning box will appear that tells the user, the ServLink Network Definition file will no longer be valid.

```
Information                                          X

  ⓘ   The application has changed in the control and the connection may not be valid. The Watch Window will be
      closed and you may need to create a new Network Definition file in the Server.

                        [      OK      ]

```

The new software is now loaded in the control. The EGCP-3 should go through a re-boot phase and after about 60 seconds, the screen should show valid data. The software can be verified by going to the password screen of the EGCP-3. On the bottom line of this display the software version is displayed. The software should now be 5418144G.

Step 4—Build a New Network Definition file with ServLink

The next stop is to close both the Watch Window Professional application and the ServLink application.

Then re-open the ServLink application and repeat the process of building a Network Definition file that was described earlier in Step 1. This section of the procedure should be repeated.

After this new file has been loaded from the EGCP-3, this file can be saved.

Step 5—Download the Previously Saved Application Settings

To load a setpoint file into a control, click on the Load Application Settings icon in the Application Control window. A warning box will appear that tells the user that the control inputs and outputs will be locked during the download. Hit the Yes button to go on.

Next a Windows Explorer box will appear to find the setpoint file that is to be transferred.
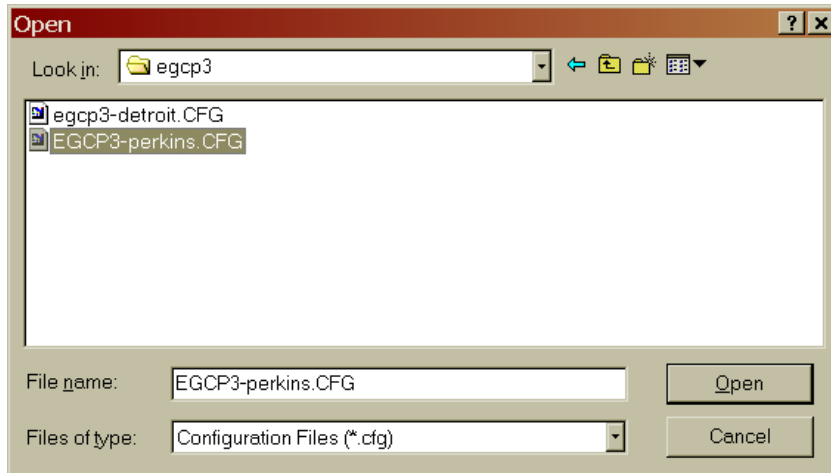
Then a status bar will appear updating the file transfer progress.

When the transfer is complete, click on the Yes button to reset the control. 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 unit should now be ready for operation.

We appreciate your comments about the content of our publications.

Send comments to: **icinfo@woodward.com**

Please reference publication **51247**.

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