

# GSLogic INTRODUCTION

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## PURPOSE OF THIS CHAPTER

This chapter is intended as an overview and quick-start guide to get your first GS4 PLC program quickly up and running.

### **FOR MORE DETAILED INFORMATION**

For further explanation of the GS4 PLC user interface, instruction set, and PLC implementation, please refer to the GSLogic Help File. The Help File can be accessed under the “Help” menu or anywhere you see the “?” symbol. Help on all of the following is located in the GSLogic Help file:

- Full descriptions of the user interface, menu items, windows, and toolbars
- Basics of the GS4 PLC
- Special Function registers
- All GS4 PLC instructions
- Memory addressing and data types
- Using the digital and analog I/O
- Communication with the PLC and MODBUS addresses

## GSLOGIC INTRODUCTION

GSLogic is the GS4 drive PLC programming software for the AutomationDirect GS4 family of drives. It is designed to enable you to perform a variety of GS4 PLC programming functions. Windows editing functions like cut, copy, paste, multiple windows, etc., are supported. GSLogic also provides for register editing, settings, file reading, saving, online monitoring settings, and other convenience functions, such as:

- Upload/download GS4 drive PLC program files to the onboard PLC
- Create new GS4 drive PLC programs
- Edit GS4 drive PLC programs
- Archive/store multiple drive PLC programs on your PC or the GS4 drive keypad
- Control GS4 drive PID loops (FPID instructions)
- View in real time all GS4 PLC registers
- Print GS4 drive PLC program files

***GSLogic includes an integral help file that includes software instructions, how to use GSLogic, and how to use the GS4 PLC.***

## GS4 PLC SUMMARY

### INTRODUCTION

The GS4 drive includes a built-in PLC. Programmed in ladder logic, the GS4 PLC provides a comprehensive set of basic and application-specific instructions. This chapter is intended to provide an overview of the GS4 PLC, and to help you get started using it. For those unfamiliar with the onboard PLC, the Help File included with GSLogic includes all the detailed information needed to use the PLC.

The PLC functionality is included with every GS4 drive, and can be accessed over communications by external PLCs (over serial Modbus) or the drive (using built-in PLC instructions). The purpose and scope of the onboard PLC is to provide the user with solutions that a simple PLC can provide. The GS4 PLC is perfectly suited for simple PLC applications, where digital and analog I/O requirements are small. For applications with complex PLC programming or large I/O requirements, please consider Click, Productivity, or Do-More/BRX. All of these PLCs can be easily integrated with the GS4 drive or PLC. The keypad of the GS4 is capable of storing multiple PLC programs (PLC must be disabled to perform a keypad copy).

There are *two methods* for communicating with the GS4 PLC. The *first method* is to use the *WPR* (write to parameters) and *RPR* (read parameters) instructions available in the PLC's library. These two instructions can read from or write to any GS4 AC drive parameter in the same physical drive, but not to other GS4 drives. The *second method* is to use *Modbus RTU*. The PLC is a Serial Modbus slave only. A Modbus RTU master can communicate with the PLC via serial only; the GS4 Modbus TCP and EtherNet/IP communication cards cannot address the PLC. If the Modbus TCP or EtherNet/IP cards are the desired method of communication, then parameters P8.20~P8.39 (PLC Buffers) can be used. Simply write the needed information from the PLC into the drive's PLC buffer parameters using the WPR instruction. The Modbus TCP or EtherNet/IP cards can then read the VFD parameters.



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*For more detailed communication parameter information, refer to Chapter 5: Serial Communications.*

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**CAUTION: IF THE PLC IS IN CONTROL OF SPECIFIC INPUTS AND OUTPUTS, ONCE THE PLC IS DISABLED THE BEHAVIOR OF THE INPUTS AND OUTPUTS ARE NOW CONTROLLED BY P3.03~P3.31. IT IS GOOD PRACTICE TO SET THE I/O THAT IS USED IN THE PLC TO "NO FUNCTION," SO WHEN THE PLC IS DISABLED THERE IS NOT SUDDEN OR UNEXPECTED MOTION.**

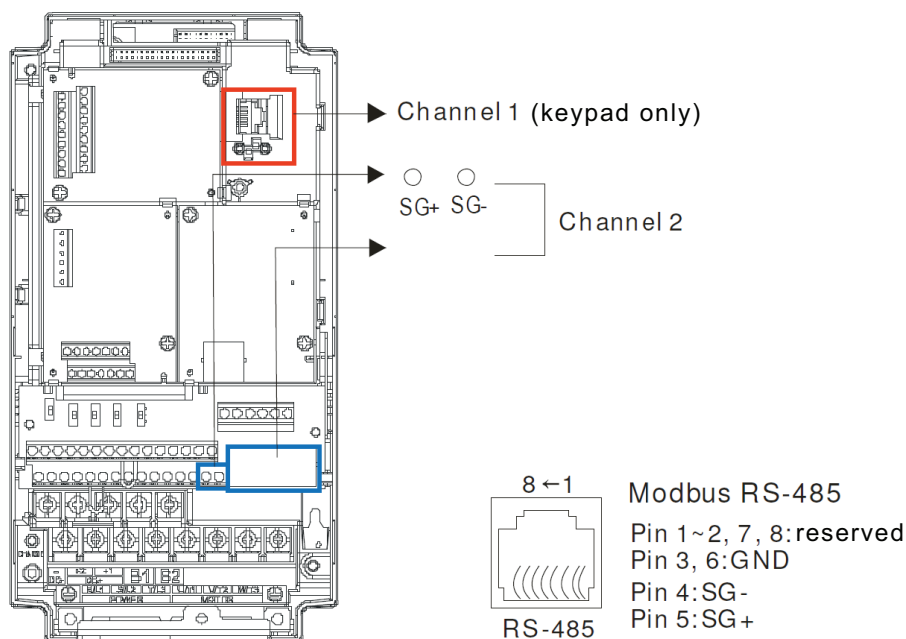
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## NOTES ON USING GSLOGIC, THE GS4 PLC, AND THE GS4 DRIVE

- 1) The GS4 PLC default node address is 2. The PLC node address can be changed in parameter P9.37, but this address cannot be the same as the GS4 drive node address of P9.00, which has a default node of 1. If multiple GS4 drives and PLCs will be connected to a third-party Modbus Master, *be sure to avoid duplicate node numbers*.
- 2) The GS4 drive provides two RJ45 ports and one set of terminals (SG+ & SG-) for serial RS-485 communications, internally wired in parallel, that can be used to download PLC programs (see figure below).

Channel 1 (RJ45 for keypad communication only) has a fixed communications format, and can only be used with the supplied keypad.

Channel 2 is the serial interface to Modbus-capable PLCs, HMIs, and PCs for programming and reading/writing data. Channel 2 can be accessed via the built-in RJ45 connectors (ideal for connecting multiple drives together with standard RJ45 cables) or via the SG+, SG-, and SGND terminals. Channel 2 has a default communications setting of 9600, 8, N, 1 Modbus RTU (two RJ45 ports and one set of terminals for RS-485). If communication settings in P9.01 and P9.02 are changed, this also changes the PLC comm settings. The Drive node and PLC node will always have the same serial baud rate and protocol. The communication settings are the same for the PLC and Drive communications, programming, and configurations. P9.01 and P9.02 are used to set up the serial communication rate and protocol.



- 3) A client can simultaneously access data from the GS4 drive and the internal PLC. This is performed by using the two node numbers. For instance, if the GS4 drive node is 1 and the internal PLC node is 2, then the client command will be: 01 (node) 03 (read) 0400 (address) 0001 (1 data item), indicating that it must read the data from the GS4 drive parameter P4.00. Or the client will select the PLC: 02 (node) 02 (read) 0800 (address) 0001 (1 data item), indicating that it must read the data from the internal PLC which is the address to internal bit M0.
- 4) The PLC program will be disabled from running when uploading/downloading programs.

- 5) Please note when using WPR (Write to Drive Parameters) commands, values may be modified up to a maximum of  $10^9$  times. More than this number of writes will result in a memory write error. The calculation of modifications is based on whether the entered value has been changed. If the entered value is left unchanged, the modification count will not increase. But if the entered value is different from before, the modification count will increase by one.

*The parameters in the following table are exceptions, and can be written to an unlimited number of times. The FREQ instruction is also an exception to this.*

Parameter	Description
<b>P2.11</b>	Control Mode
<b>P1.01~P1.08</b>	1st~4th Acc/Dec Time
<b>P3.42</b>	Multi-Function Input Contact Selection
<b>P3.43</b>	Multi-Function Output Contact Selection
<b>P8.20~P8.39</b>	PLC buffer 1~20
<b>P7.16</b>	Upper Limit for Integral Time
<b>P7.18</b>	PID Output Frequency Limit

- 6) When parameter P8.00 is set to 28 (User Display = PLC D1043 Value), the GS4 keypad displayed value will be the value of PLC register D1043 (see the 3rd line in the figure below).  
Digital Keypad GS4-KPD Can Display 0~65535



- 7) In the PLC Run and PLC Stop modes, the parameter P9.08 cannot be set to 9 or 10 (cannot be reset to factory defaults). PLC must be in Disable mode for this. A power cycle is needed after setting P9.08 = 9 or 10.
- 8) The PLC memory will be cleared and the program erased from the PLC when parameter P9.08 is set to 6.
- 9) When the PLC controls the GS4 drive operation, control commands will be entirely controlled by the PLC, and will not be affected by the setting of parameter P3.00 or P3.01.
- 10) When the PLC controls the GS4 drive frequency commands, the commanded frequency will not be affected by parameter P4.00, P4.01, or the Hand ON/OFF configuration.
- 11) The use of certain registers will disable the drive's control of the drive output frequency. The instructions and registers that transfer control of the drive output to the PLC are: FREQ, M1040, M1025, M1026, and M1027. See P9.34 for details about what the PLC controls.
- 12) While the PLC is enabled and controlling the GS4 drive operation, if the keypad Stop button is pressed, an "Fstp" error will be triggered and cause the drive output to stop if P3.00 or P3.01 is set to 1, 3, or 5. A Special Function Relay (M1005) in the PLC will also be triggered. The PLC will continue to scan through the ladder code. When the keypad Stop/Reset is pressed again, the drive control is returned to the PLC.
- 13) The corresponding drive parameter Multi-Function Inputs and Outputs will be disabled when the PLC ladder program contains external terminal usage X and Y registers.  
(See GS4 AC Drive to PLC Input/Output Cross Reference tables, [page 8-8](#) & [page 8-8.](#))

- 14) Several parameters in the GS4 drive are directly related to the GS4 PLC operation, monitoring, or control.

GS4 AC Drive Parameters Related to GS4 PLC	
Parameter/Setting Number	Parameter/Setting Description
P3.03~P3.16 = 36	Multi-Function Inputs = PLC Mode Select bit 0
P3.03~P3.16 = 37	Multi-Function Inputs = PLC Mode Select bit 1
P3.48	PLC Digital Input Mask
P3.49	PLC Digital Output Mask
P4.62	PLC Analog Output Mask
P8.00 = 28	User Display = PLC D1043 Value (displayed only in hexadecimal)
P8.20~P8.39	PLC Buffers
P9.01 = 1	Modbus Baud Rate = 9.6k
P9.02 = 12	Modbus Protocol = 8,N,1 (RTU)
P9.08 = 6	Restore to Default = Reset PLC (clear PLC)
P9.34	PLC Command Mask
P9.37 = 2	PLC Address = 2 (Cannot be the same as the address of the drive (P9.00))
P9.85	PLC Frequency Command Force to 0

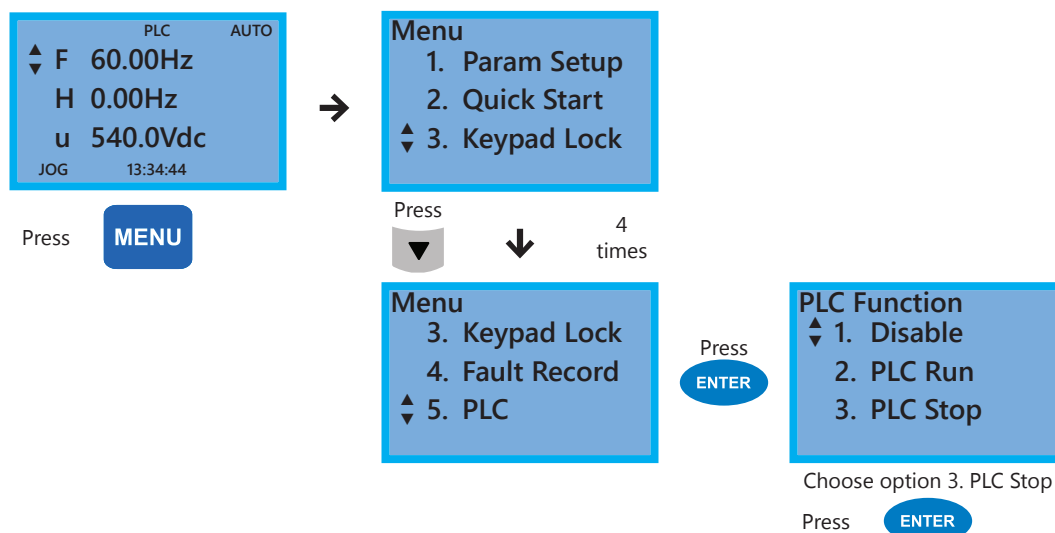
## GETTING STARTED

### CONNECT TO PLC

Start operation of PLC functions in accordance with the following four steps.

- Using the Menu key on the GS4 digital keypad, select 5: PLC, press Enter key (see figure below).

*The PLC can be connected to only when in Run or Stop modes. When it is in Disable mode the communications to the PLC will be terminated.*



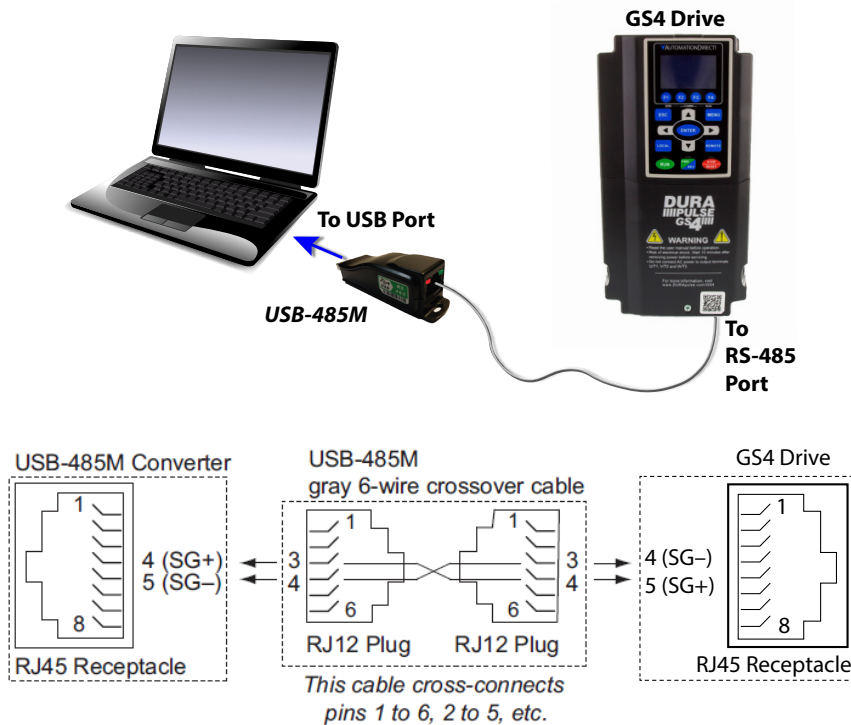
PLC functions are as shown in the lower right menu of the figure above; options 2 or 3 will enable the PLC communication connection. Choose 3 (stop) for now, or if you do not know what the PLC might do if placed into Run mode.

- 1: Disable: No function
- 2: PLC Run: Enable PLC functions
- 3: PLC Stop: Stop PLC functions



**Important:** When the PLC is Disabled, the PLC Modbus RTU node does not exist, and no communications to the PLC can occur. The PLC must be in Run or Stop for GSLogic or a Modbus device to be able to connect.

- 2) Wiring: Connect the GS4 drive RJ-45 communication interface to a PC via the RS485 port.



For the 2-wire cable (RJ12 to flying leads) included with the USB-485M: Red wire connects into terminal SG+ on the drive; Green wire connects into SG- on the drive.



Also, the included 6-conductor RJ12 cable connects the USB-485M directly to the RS-485 RJ45 ports on the GS4 (the drives' RJ45 ports can accept 6-conductor RJ12 connectors).

When the external Multi-Functional Input terminals (DI1 to DI8, P3.03 to P3.10) are set to function 36 or 37 (PLC Mode select bit0 or bit1), the digital inputs have priority and the keypad will not be able to change PLC modes.

PLC Mode	Select Bit1 (37)	Select Bit0 (36)
Disable	OFF	OFF
PLC Run	OFF	ON
PLC Stop	ON	OFF
Maintain Previous State	ON	ON

GS4 AC Drive to PLC Input Cross Reference						
GS4 Main Control Board DI		GS4 Option Card Digital Inputs			GS4 Main Control Board AI	
GS4 Input	PLC Address	GS4-06NA	GS4-06CDD	PLC Address	GS4 Analog	PLC Address
FWD	X0	DI10	DI10	X12	AI1	D1028
REV	X1	DI11	DI11	X13	AI2	D1029
DI1	X2	DI12	DI12	X14	AI3	D1030
DI2	X3	DI13	DI13	X15	-	-
DI3	X4	DI14	-	X16		
DI4	X5	DI15		X17		
DI5	X6	-				
DI6	X7					
DI7	X10					
DI8	X11					

GS4 AC Drive to PLC Output Cross Reference						
GS4 Main Control Board DO/RO		GS4 Option Card Digital Outputs			GS4 Main Control Board AO	
GS4 Output	PLC Address	GS4-06TR	GS4-06CDD	PLC Address	GS4 Analog	PLC Address
R1-R1C-R1O	Y0	R10-RO10	DO10-DOC	Y5	AO1	D1040
R2-R2C-R2O	Y1	R11-RO11	DO11-DOC	Y6	AO2	D1045
reserved	Y2	R12-RO12	-	Y7	-	
DO1-DOC	Y3	R13-RO13		Y10		
DO2-DOC	Y4	R14-RO14		Y11		
-		R15-RO15		Y12		
GS4 Virtual Digital Outputs (PLC use only)						
GS4 Virtual Output	PLC Address	-				
DO16	Y13	GS4 virtual outputs can be used as internal coils in the GS4 PLC. To monitor the MFO status assigned to DO16~DO20, read P3.47 (Digital Output Status).				
DO17	Y14					
DO18	Y15					
DO19	Y16					
DO20	Y17					

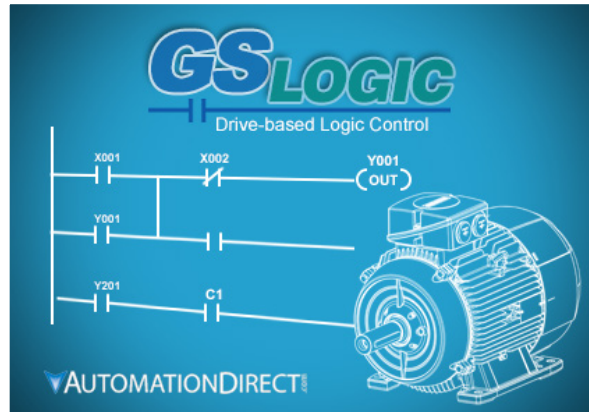
**NOTE 1:** When X and Y addresses for the input and output terminals are included in the PLC program, these input/output terminals will only be used by the PLC. The DI and DO multifunction assignments are configured by parameters P3.03~P3.31 and will be overridden. As an example, when the PLC program controls Y0 during PLC operation, the corresponding output terminal relay (R1) will operate in accordance with the program. At this time, the Multi-Function Output terminal setting P3.17 will be ineffective because these terminal functions are already being used by the PLC.

**NOTE 2:** When the PLC uses the special registers D1040/D1045, the corresponding Analog Outputs AO1/AO2 will only be used by the PLC overriding the multifunction configuration. The AO multifunction assignments, when they are drive controlled, are configured by parameters P4.50/P4.54.





## INSTALLATION OF GSLOGIC PROGRAMMING SOFTWARE



### SYSTEM REQUIREMENTS

GSLogic Windows-based programming software environment. Please check the following requirements when choosing your PC configuration:

- Windows OS: 7: 32 & 64 bit, 8: 32 & 64 bit, 8.1: 32 & 64 bit, 10: 64 bit
- SVGA 1024x768 pixels resolution (1280x1024 pixels resolution recommended)
- 300MB free hard-disk space
- RAM: Windows 7 & higher
  - with GUI version 2.0.0.x or higher, RAM = 2GB memory (4GB recommended)
  - with GUI version 1.10 or lower, RAM = 512MB free RAM (1GB recommended)
- USB Port for project transfer to GS4; USB-485M serial adapter required

### ABOUT GETTING STARTED

If you are familiar with Programmable Logic Controllers in general, then following the simple steps in this chapter may be all you require to start being productive using a GS4 PLC system. After you have completed the steps, your GS4 controller will be running the ladder logic project that you programmed.

### SOFTWARE AND ONLINE HELP FILES

The GSLogic programming software is available as a download from our website:

[www.automationdirect.com/pn/gslogic](http://www.automationdirect.com/pn/gslogic)

The GSLogic software includes searchable online help topics covering all aspects of the software, instruction set, setup, and communications.

### TECHNICAL SUPPORT

We strive to make our manuals the best in the industry. We rely on your feedback to let us know if we are reaching our goal. The feedback section of the Help File can be used to send a comment to Technical Support. If you cannot find the solution to your particular application, or if for any reason you need technical assistance, please call us at:

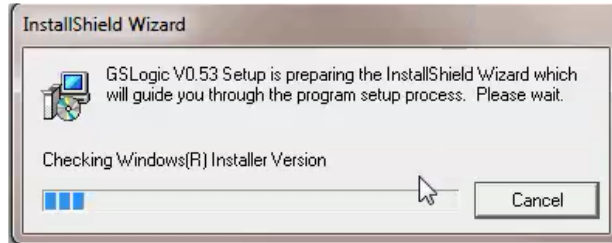
**1-770-844-4200**

Our technical support group will work with you to answer your questions. They are available Monday through Friday from 9:00 A.M. to 6:00 P.M. Eastern Time. We also encourage you to visit our web site where you can find information about our company and specific technical information about a wide array of our products.

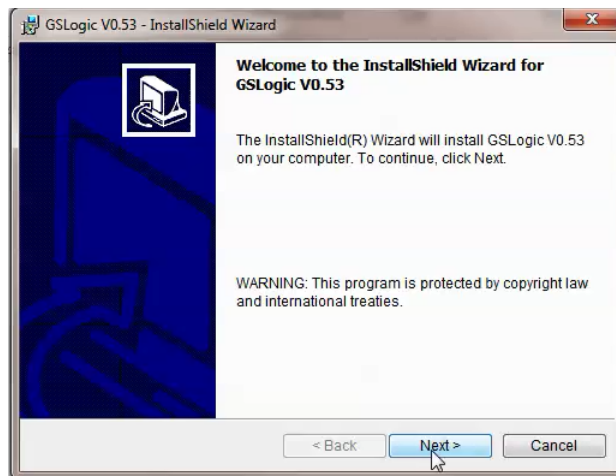
<https://www.automationdirect.com>

**INSTALLING GSLOGIC PROGRAMMING SOFTWARE**

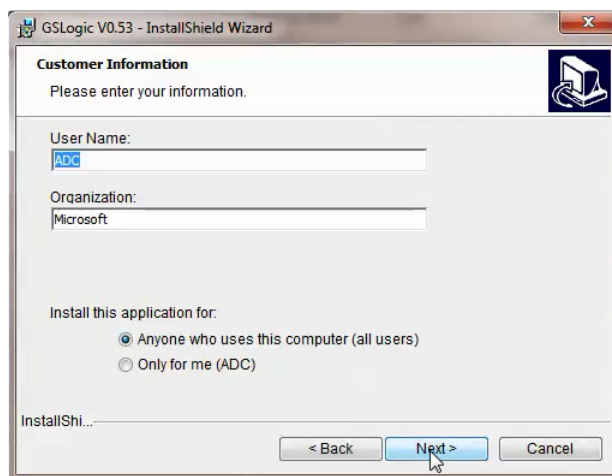
- 1) Download the latest version of the GSLogic Software, (See ADC's website for GSLogic editing software: [www.automationdirect.com/pn/glogic](http://www.automationdirect.com/pn/glogic)). Or, if the GSLogicSoftware USB is available, insert it into your PC USB port. Open the GSLogic setup.exe file.
- 2) The "InstallShield Wizard" popup (shown below) will appear briefly while the software is checking for previous installs.



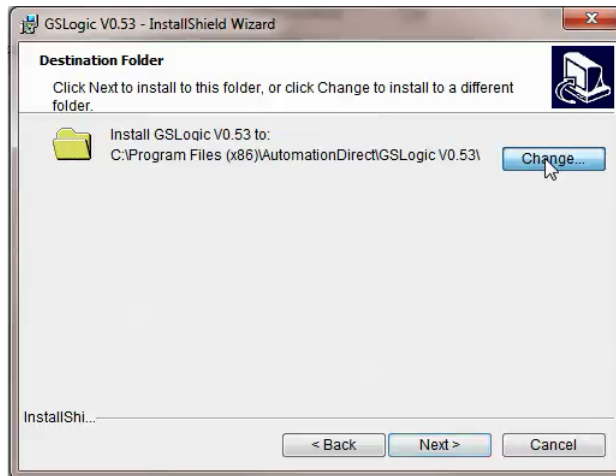
- 3) The Welcome popup will appear, allowing you to choose to proceed or not. Click the "Next" button to install.



- 4) The "Customer Information" window will open next. Enter a User Name and Organization name, then click "Next."

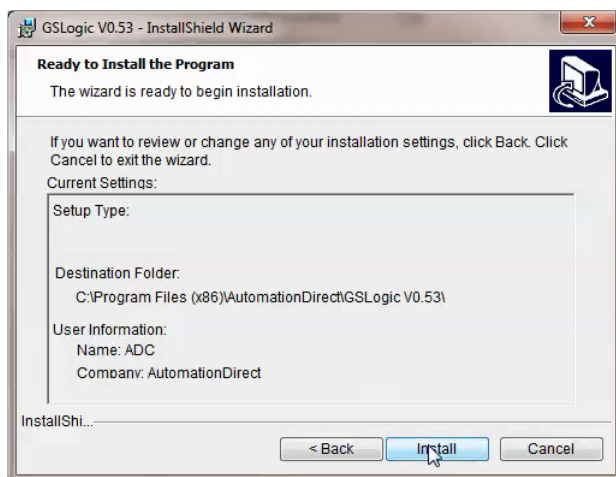


- 5) The Destination Folder popup will appear, showing the default path to the destination file; click “Next” to continue. Should you want to change to another destination, Click “Change” and another dialog box will appear, allowing entry of a new file path.

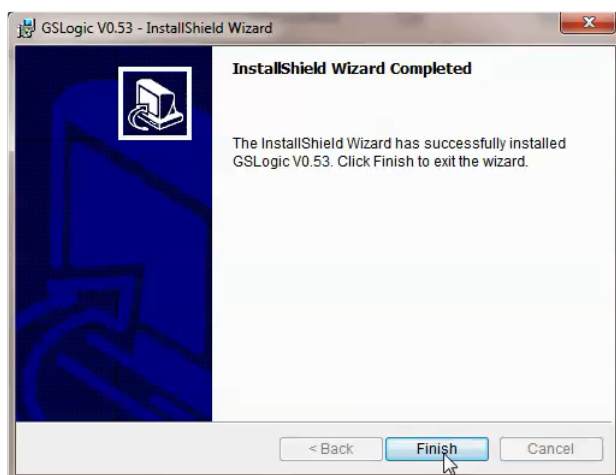


The default installation folder is:  
C:\Program Files (x86)\  
AutomationDirect\GSLogic Vx.xx

- 6) Once you have selected the install folder (default or new path), the “Destination Folder” window will appear. Click “Next” to continue the installation process. Click “Install” when ready to install the software.



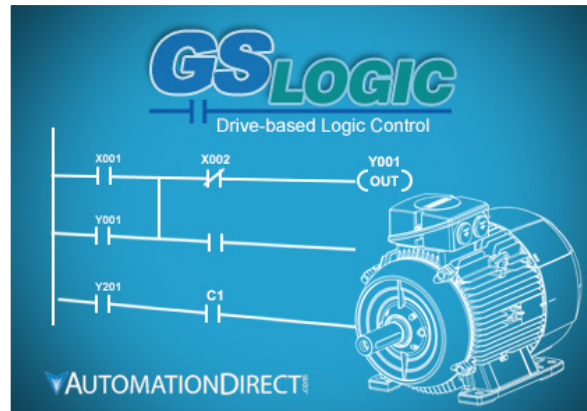
- 7) The Installation is now complete. Click “Finish.” Double-click on the GSLogic icon or navigate to the AutomationDirect folder in the start menu to open the GSLogic programming environment.



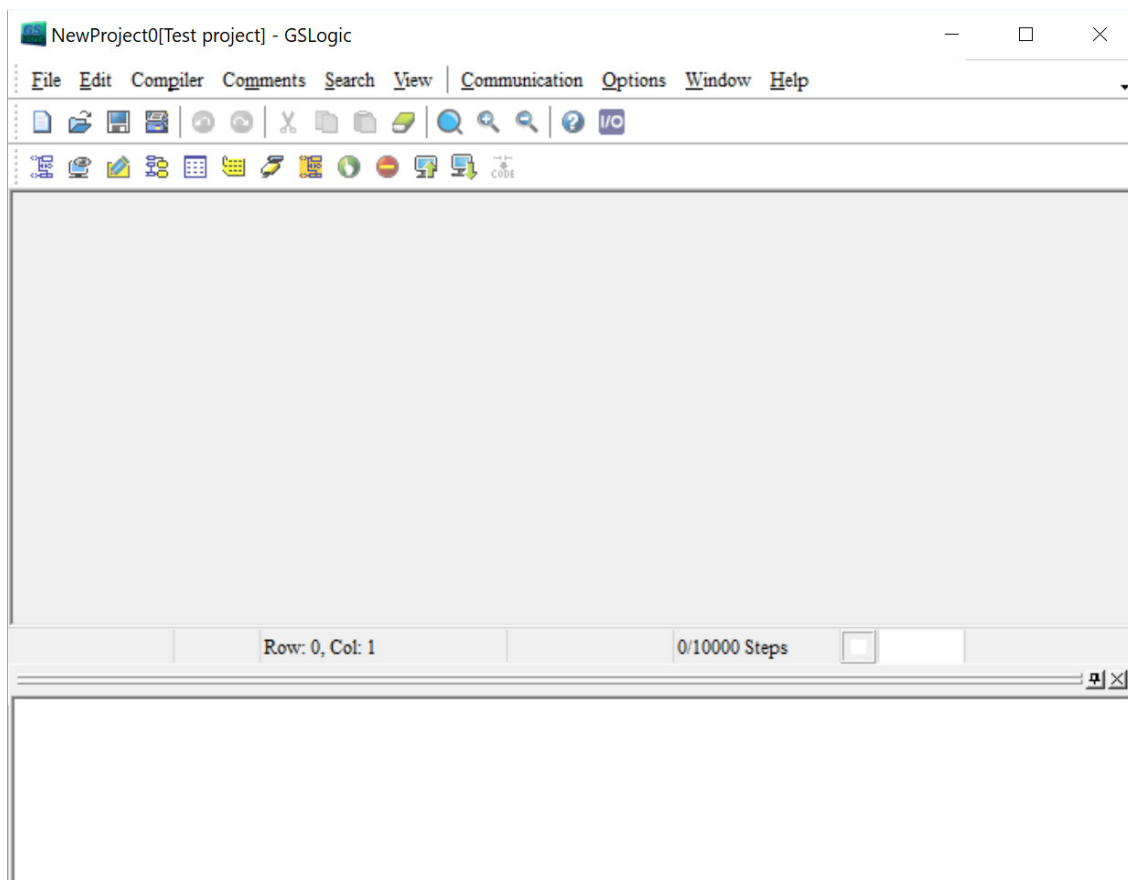
## PROGRAM WRITING

### CONNECTING GSLogic PC TO GS4 PLC

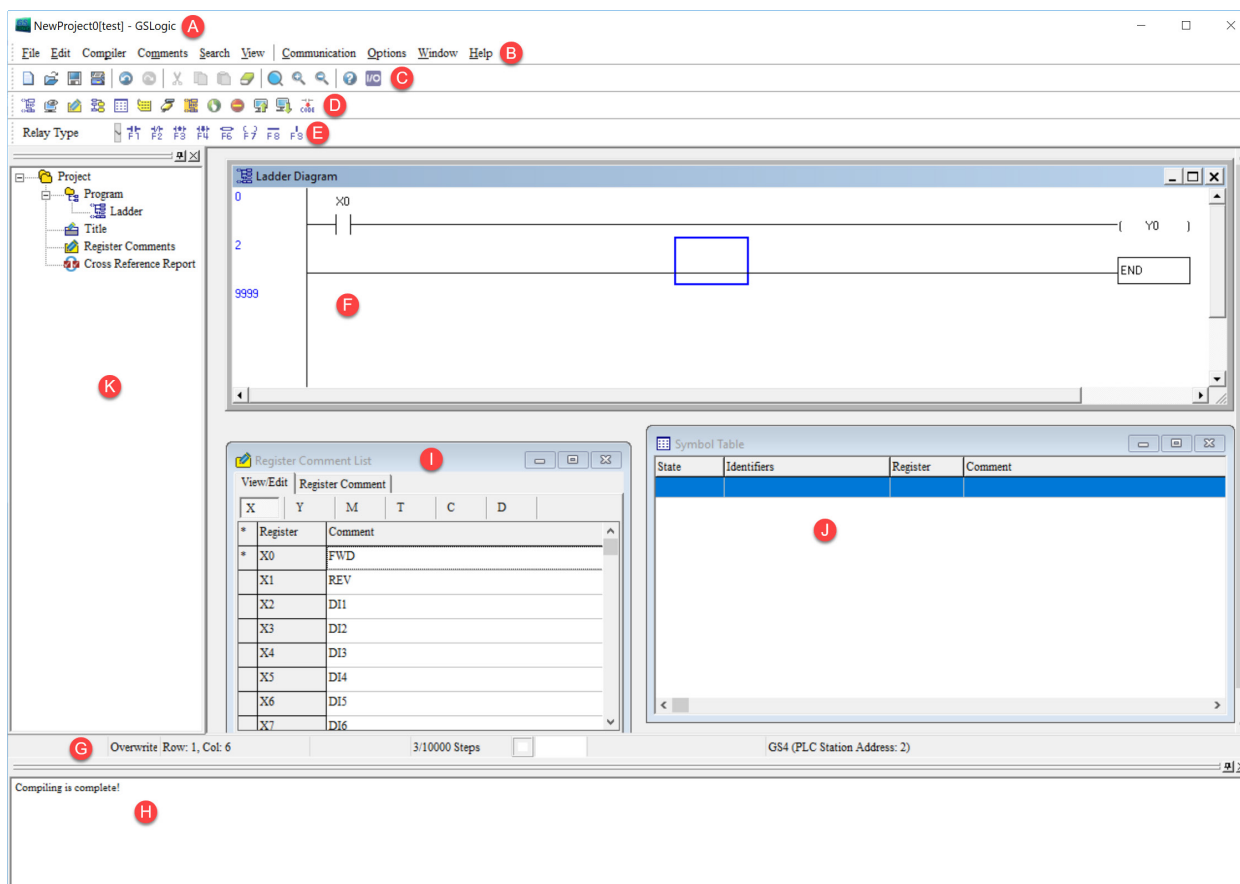
In order to connect to the PLC with GSLogic, the PLC must be enabled by either selecting PLC Run or PLC Stop in the keypad. Also, no other Modbus master can be connected to the GS4 drive; *this includes GSOF2*.



When running GSLogic for the first time, before a “New file” has been used, only the “File (F),” “View (V),” “Communications (C),” “Options (O),” and “Help (H)” functions will appear on the function toolbar.

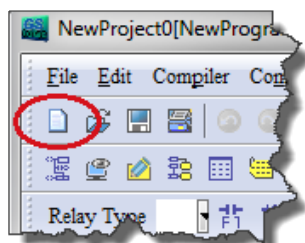


After running GSLogic for the second time, the last file edited will open and be displayed in the editing window.



Following is a brief description of the various areas in the GSLogic editing software window shown above.

Symbol	Name	Description
A	Project Title Toolbar	Project File Name and Project Title shown here (File Name [Project Title])
B	Menu Toolbar	Individual drop-down menu options
C	Standard Editing Toolbar	Contains standard Windows application features
D	PLC Quick Access Toolbar	Allows easy access to the most commonly used GSLogic tasks
E	Ladder Editing Toolbar	Provides quick access to the most common devices used in creating ladder code
F	Ladder Diagram Window	Where the program ladder code is entered and edited
G	Status Toolbar	Displays messages regarding PLC and program status
H	Output Window	Shows compiling status and error messages
I & J	Auxiliary Window	The Symbol Table and Register Comment List Window are shown in order to demonstrate how multiple windows can be placed in the workspace.
K	Reveals or hides the Project Workspace Window	From here, you can open the Ladder Diagram window, change the project title and description, Register Comments, and view the Cross Reference table.



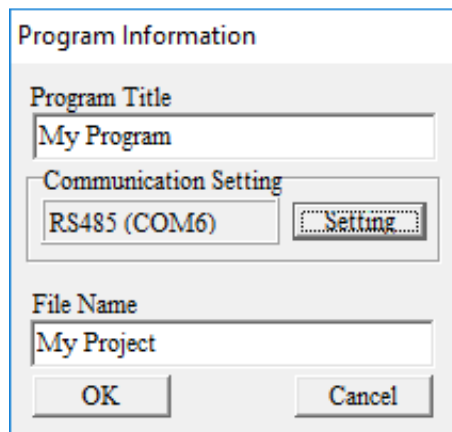
Click the “NEW FILE” icon on the toolbar to open a new file (Ctrl+N).

You can also use “File (F)”=>New file (N) (Ctrl+N).

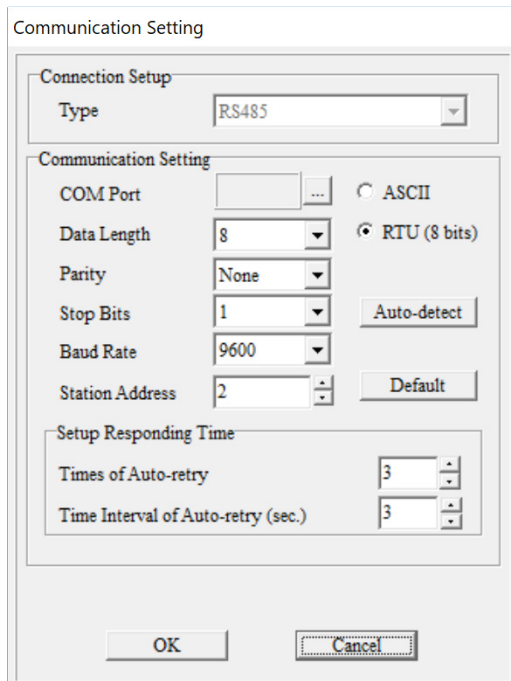


The “Program Information” window will appear after opening a new file.

Enter the Program Title and File Name. These will appear at the top of the project window.



Select “Setting” to choose the communication settings to be used. To adjust communication settings on an existing project, go to the Communication menu and select “Communication Settings.” These PLC communication settings must be the same as the Drive’s Modbus settings found in P9.01 and P9.02.

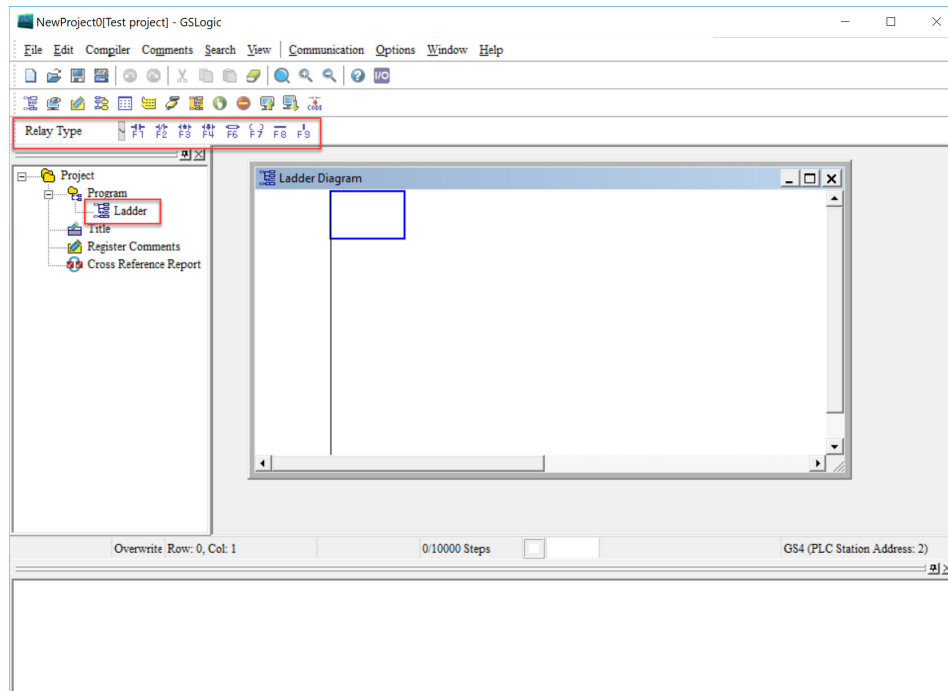


The image shows a 'Communication Setting' dialog box. It has a title bar 'Communication Setting'. Inside, there's a 'Connection Setup' section with a 'Type' dropdown menu set to 'RS485'. Below that is the 'Communication Setting' section with fields for 'COM Port' (with a browse button), 'Data Length' (8), 'Parity' (None), 'Stop Bits' (1), 'Baud Rate' (9600), and 'Station Address' (2). There are radio buttons for 'ASCII' and 'RTU (8 bits)', with 'RTU' selected. There are also 'Auto-detect' and 'Default' buttons. At the bottom is the 'Setup Responding Time' section with 'Times of Auto-retry' (3) and 'Time Interval of Auto-retry (sec.)' (3). At the very bottom are 'OK' and 'Cancel' buttons.

Communication Setting: Perform settings in accordance with the desired communications method. The Default Station Address for the PLC is 2. (The Modbus station address must be different from the GS4 Drive’s station address. The Drive’s default address =1.)

Click “OK” after completing settings to return to program editing in ladder diagram mode.

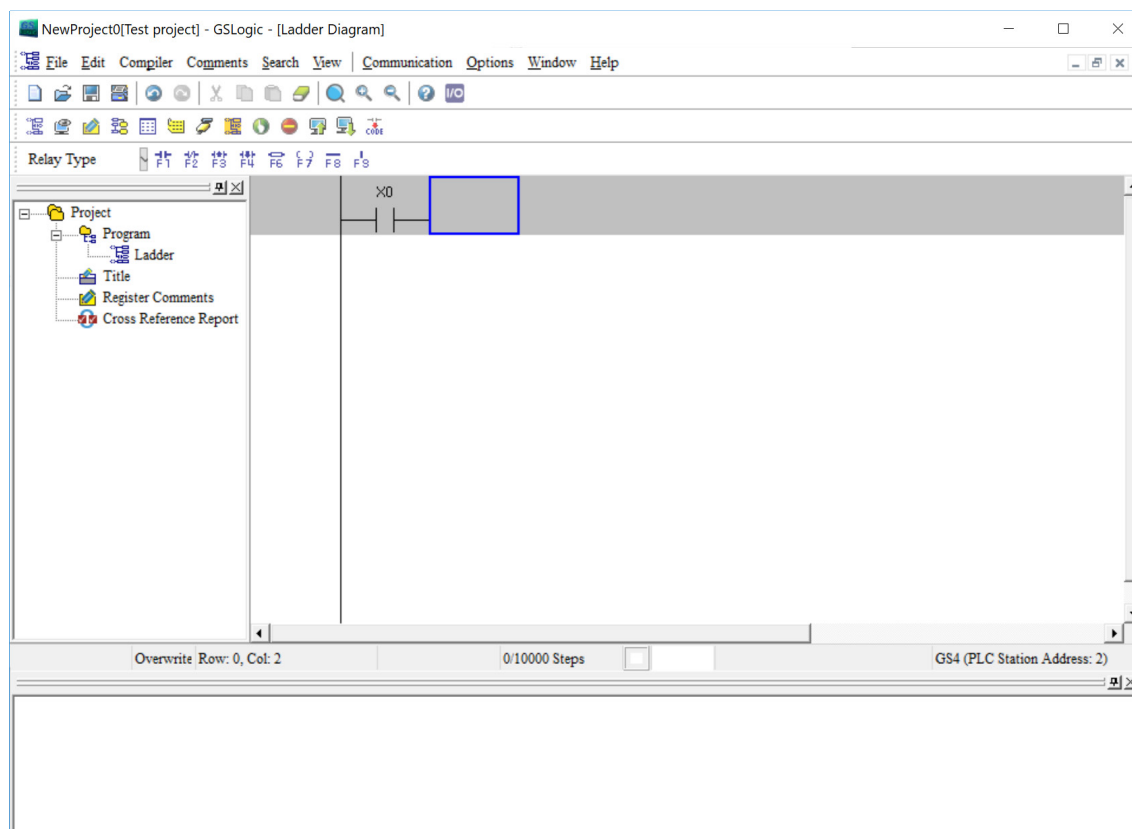
In ladder diagram mode, you can perform program editing using the buttons on the Ladder Diagram Toolbar.



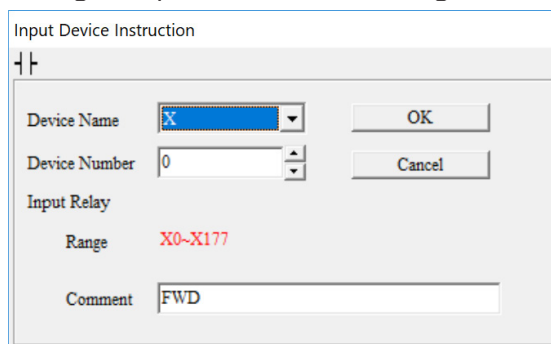


**BASIC LADDER PROGRAM EXAMPLE**

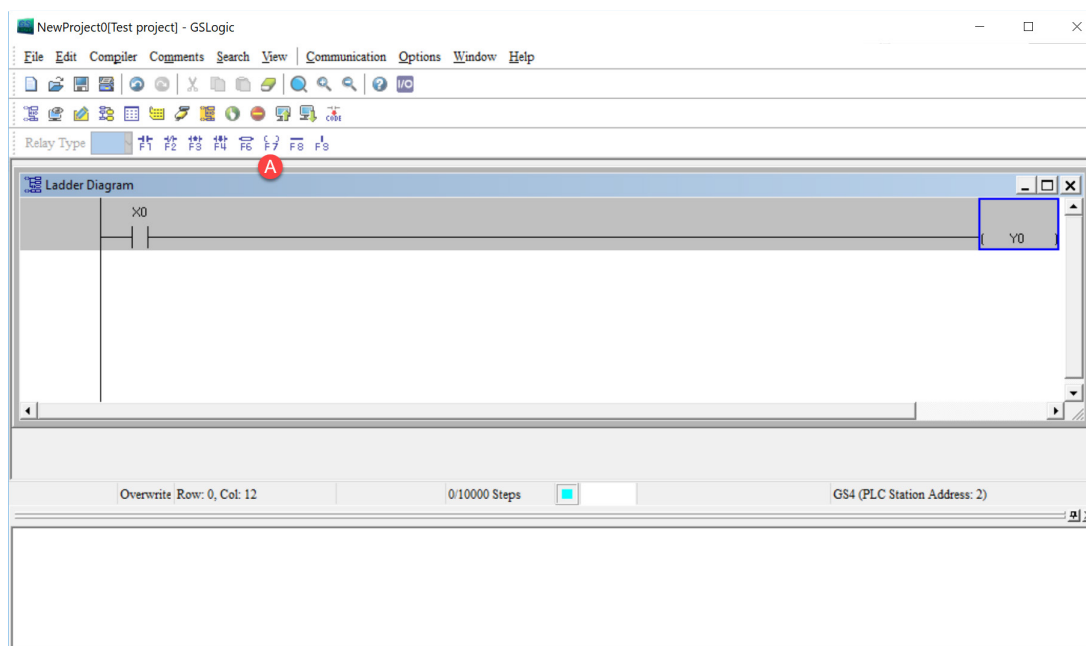
- 1) With the cursor in the ladder diagram editor window, select a “Normally Open” contact icon from the Ladder Editing Tool Bar, or use keyboard function key (F1) operation.



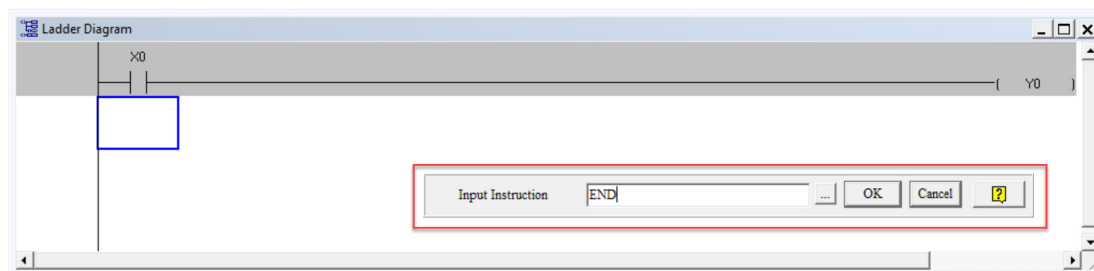
- 2) The Input Device Instruction dialog box will appear. Select the device name (such as “M” or “X”), the device number (such as “10” or “0”), and input comments (such as “Enable Pushbutton”) can be selected; click the OK button when finished. X0 is a digital input which is tied to the FWD terminal of the drive. Any preconfigured behavior of the terminal is void now that the input is being used in the PLC code. Once the PLC is in Disable Mode, the control of the digital input terminal will belong to the drive again.



- 3) Click on the output coil icon (a) or press function key F7. In the Input Device Instruction dialog box choose device name (such as “M”), device number (such as “0”), and input comments (such as “Enable Light”). Click the OK button when finished.



- 4) While the cursor edit box is on the next row, double-click in the cursor box to bring up the Input Instruction text box (or press F6 to invoke the Instruction List dialogue box). Type in “End” and click OK to add the end instruction rung to the ladder program. This signals the end of the ladder program.




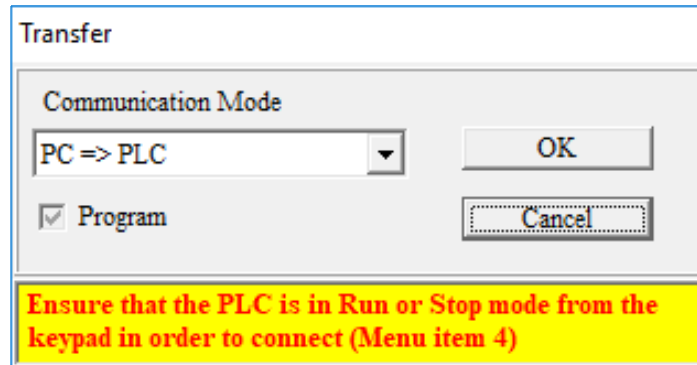
- 5) Click on the compile (CODE) icon on the tools ribbon. After compiling, the number of steps will appear on the left side of the editor window. The PLC can only accept 10,000 steps.

**Note:**

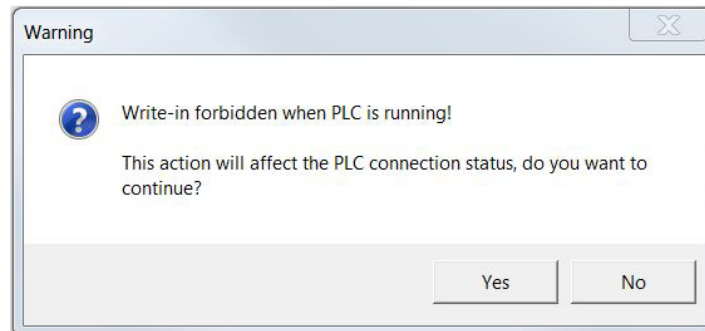
*Steps in the PLC program are not proportionally related to rungs. One rung of code with a single contact and a single coil would have two steps for that one rung. A rung with one contact and the FREQ instruction would have eight steps.*

**PROGRAM DOWNLOAD**

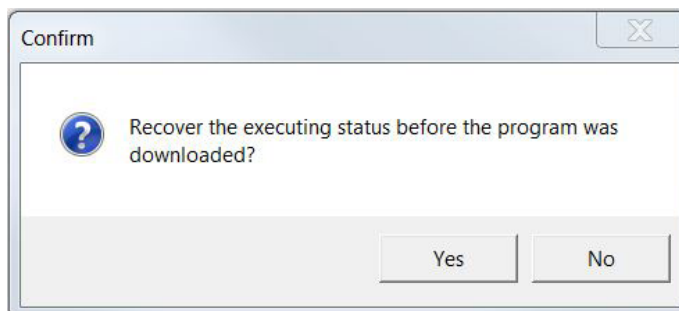
Be sure the PLC is NOT in Disabled mode on the GS4 keypad. After creating and compiling a program using GSLogic, select the Write to PLC icon on the tool ribbon (). When the Transfer Setup window appears, make sure that the Communication Mode is set to “PC => PLC,” which will download the program to the PLC. GSLogic will perform program download with the GS4 drive PLC in the communications format specified in previously set up communications settings dialog box.



If the PLC is in Run mode, a warning will appear asking if you want to continue. Press Yes if you want to proceed with the download.





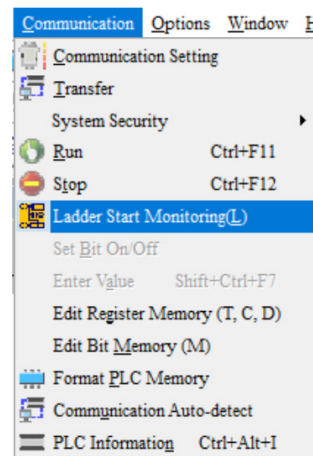
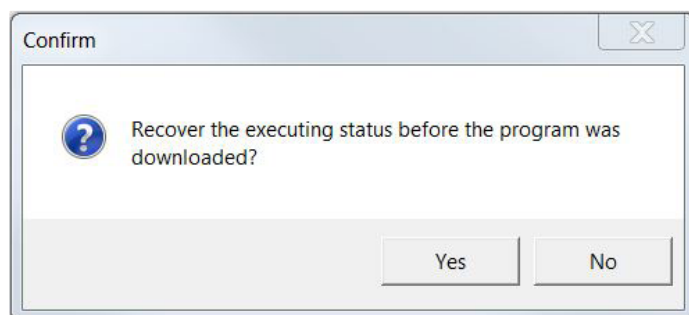
After the program has downloaded, GSLogic will ask you to confirm that you want to put the PLC back in the previous run/stop state it was in before the download. Click Yes if you would like to recover this state.



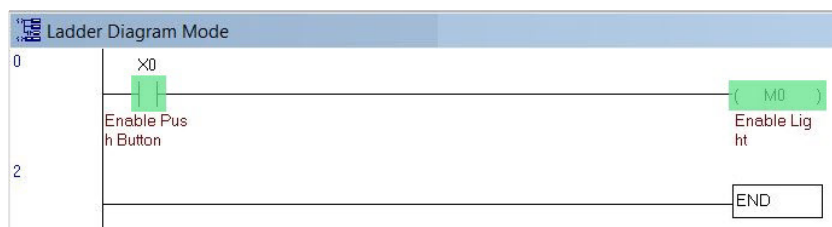
If the PLC is in Run mode, then the ladder code is now running on the GS4 PLC.


**PROGRAM MONITORING**

Press the Online Mode icon (  ) to go online with the PLC and the current ladder code, and confirm the PLC is in Run Mode at the bottom of the screen. While confirming that the PLC is in the Run Mode after downloading a program, click on the Ladder Start Monitoring icon (  ) in the Communication menu drop-down, or on the tools ribbon (see figures below).



If you select the Ladder Start Monitoring icon, a live view of the ladder diagram can be viewed similar to the image below. A contact, coil, or instruction highlighted in *green* indicates that it is *conducting* if it is a *contact*, and it is *activated* if it is a *coil or instruction*.



Press the Edit Monitored Registers icon (  ) to monitor and edit values live in the PLC code. In order to monitor a specific register either double click or right click on a row in the window and type in the register you wish to monitor. To change the value of the register right click on the row and enter the desired value.

Register Name	Comment	Status	T/C Set Value	Present Value (16 bits)	Present Value (32 bits)	Floating Point	Format	T/C Set Value Reference
M1006	Output frequency is 0 M1006=On							
M1025	RUN (ON) / STOP (OFF) the AC motor drive							
M1044	Halt							
D1020	AC motor drive Output frequency			K6000	K6000	F0.000	Signed Decimal	
D50				K6000	K6000	F0.000	Signed Decimal	
T2				K0	K0	F0.000	Signed Decimal	None

*This chapter is designed to be an overview and quick-start guide to get you quickly up and running your first PLC program. For more details and further explanation of the user interface, instruction set, and implementing the PLC, please refer to the GSLogic Help File. This Help File can be accessed under the "Help" menu or anywhere you see the "?" symbol.*

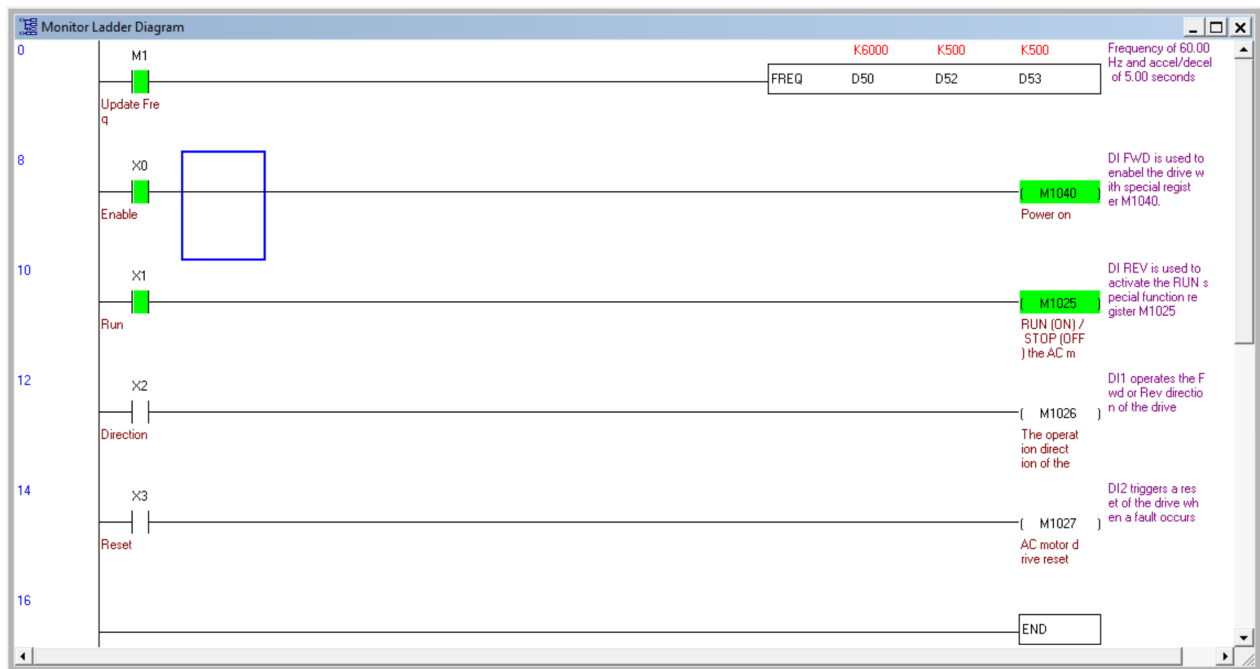


*Help on all of the following is located in the GSLogic Help file: Full description of the user interface, menu items, windows, and tool bars; Basics of the PLC; Special Function registers; Full set of PLC Instructions; Memory locations and data types; Using the digital and analog I/O; Communication with the PLC and MODBUS addresses.*

**GS4 GSLOGIC PROGRAM EXAMPLES****Ex 1: GS4 DRIVE CONTROL FROM GS4 PLC**

Below is an example (available in the root directory where GSLogic was installed) in which the drive PLC has control of the drive run, stop, direction, reset, and speed controls.

- Rung 1: When bit M1 is on the FREQ instruction will write the values in D50, D52, and D53 to the drive. This instruction will not cause the drive to run on its own. M1 can be turned on either via Modbus or through GSLogic. The values of D50, D52, and D53 are populated using GSLogic by modifying the register.
- Rung 2: X0 (Digital input FWD) will turn on the output relay and allow power to the output of the drive.
- Rung 3: X1 (Digital input REV) will tell the drive to run at profile assigned in the FREQ command in rung 1.
- Rung 4: X2 (Digital input 1) will change the direction of rotation of the motor.
- Rung 5: X3 (Digital input 2) will reset any resettable faults in the drive, if they occur.



**Ex 2: GS4 PLC - GS4 DRIVE INTERCOMMUNICATIONS**

Below is an example of using the PLC to read and write to the VFD parameters using the RPR and WPR instructions. The WPR (Write Parameter) follows the same rules as when entering new values through the keypad. Even when using the WPR instruction, a Stop-Mode-Only writable parameter can still be written to only when the drive output is stopped.

The comments on the right side of each rung describes what each RPR and WPR does in the following example.

