

Logix5000 Controllers Security

1756 ControlLogix, 1756 GuardLogix, 1769 CompactLogix, 1769 Compact GuardLogix, 1789 SoftLogix, 5069 CompactLogix, Studio 5000 Logix Emulate



Important user information

Read this document and the documents listed in the additional resources section about installation, configuration, and operation of this equipment before you install, configure, operate, or maintain this product. Users are required to familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards.

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Important: Identifies information that is critical for successful application and understanding of the product.

Labels may also be on or inside the equipment to provide specific precautions.



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Summary of changes

This manual contains new and updated information. Changes to this manual are documented in the following table.

Change	Topic
Reorganized Chapter 1 to provide a more thorough overview of Source Protection; removed detailed information on FactoryTalk Security	Security overview on page 11
Added information about Execution Protection and how to apply it to project components	Add Execution Protection to License-protected components on page 30
Added information about locking project components	Lock a component on page 34
Moved information on the Logix CPU Security Tool to Appendix A	Securing a ControlLogix controller with the Logix CPU Security Tool on page 43

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This manual explains how to configure security for the Logix Designer™ application. It also explains how to set up source protection for your logic and projects. This manual is one of a set of related manuals that show common procedures for programming and operating Logix5000™ controllers.

For a complete list of common procedures manuals, refer to the [Logix5000 Controllers Common Procedures Programming Manual](#), publication [1756-PM001](#).

The term Logix5000 controller refers to any controller that is based on the Logix5000 operating system.

Studio 5000 environment

The Studio 5000 Automation Engineering & Design Environment® combines engineering and design elements into a common environment. The first element is the Studio 5000 Logix Designer® application. The Logix Designer application is the rebranding of RSLogix 5000® software and will continue to be the product to program Logix5000™ controllers for discrete, process, batch, motion, safety, and drive-based solutions.



The Studio 5000® environment is the foundation for the future of Rockwell Automation® engineering design tools and capabilities. The Studio 5000 environment is the one place for design engineers to develop all elements of their control system.

Additional resources

These documents contain additional information concerning related products from Rockwell Automation.

Resource	Description
Industrial Automation Wiring and Grounding Guidelines , publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation industrial system.
FactoryTalk Security System Configuration Guide , publication FTSEC-05001	Provides additional information on FactoryTalk™ security.
Product Certifications website, http://ab.rockwellautomation.com	Provides declarations of conformity, certificates, and other certification details.

You can view or download publications at <http://www.rockwellautomation.com/literature/>. To order paper copies of technical documentation, contact your local Allen-Bradley™ distributor or Rockwell Automation™ sales representative.

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Online Support — <http://www.rockwellautomation.com/support/>

Security overview

Introduction

This chapter provides an overview of the security features available in the Logix Designer application.

The following features are the main security features that protect controller projects:

- FactoryTalk® Security software, which provides permission-based control.
- Source Protection, which protects the logic in controller projects.

FactoryTalk Security

FactoryTalk® Security integrates a common security model across all FactoryTalk enabled products. FactoryTalk® Services Platform (FTSP) includes the FactoryTalk Administration Console that provides the interface for configuring your system. FactoryTalk Services Platform (FTSP) software is installed during the installation of the Logix Designer application.

Use FactoryTalk Security to control access to the logic in your projects with centrally managed, role-based policy enforcement.

For more information about FactoryTalk Security, see the [FactoryTalk Security System Configuration Guide](#), publication [FTSEC-QS001](#).

Permission sets and Logical Names

Permission sets and Logical Names identify a set of actions that are allowed or denied for one or more user groups or computer groups. You use permission sets and Logical Names to define user permissions in the FactoryTalk Administration Console. Use permission sets to apply the same permissions to multiple controllers or project components. Use a Logical Name to associate permissions with a specific controller. When you use a Logical Name, it must match the name of the controller.

When a user opens a project that has been secured with a permission set or a Logical Name and configured to use only the selected security authority, the Logix Designer application checks the ID of the FactoryTalk Directory to see if it matches the ID stored in the project.

- If the ID matches, the Logix Designer application checks the directory and finds the Logical Name (that matches the controller name), or the

permission set associated with the project, and gets the permissions for the current user/computer combination.

- If the ID does not match, the project uses the Guest User permissions defined for that permission set or Logical Name.

When a user opens a project that has been secured but has **not** been configured to use only the selected security authority, the Logix Designer application checks the connected FactoryTalk Directory, finds the Logical Name or the permission set associated with the project, and gets the permissions for the current user/computer combination. Rockwell recommends configuring the project to use only the selected security authority to maintain control over the directory that secures the project.

Permissions for Guest Users

When you configure permission sets and logical names in the FactoryTalk Administration Console, you can also configure permissions for Guest Users. The permissions for Guest Users determine the level of access for users who are not authenticated on the same FactoryTalk directory that the project was secured with.

Permissions for Guest Users are cached in the project file to which they are associated. However, the permissions are only stored in the project file for permission sets that have been applied to objects by a user of the primary FactoryTalk directory.

Refer to the FactoryTalk online help for more information on permissions for Guest Users.

Source Protection

Source Protection limits users' ability to view and edit routines and Add-On Instructions, including equipment phase state routines, without the associated source key or license. You can apply Source Key Protection or License-Based Source Protection to routines and Add-On Instructions. You can also apply Execution Protection to license-protected components to allow execution only on controllers with a specific execution license.

When you protect a component with License-Based Source Protection, you can also lock it. When a component is locked, the source license is not required to open the project or run the locked component, and it can be distributed more securely. A locked component cannot be viewed or edited until it is unlocked by a user with the correct license. Rockwell recommends locking projects that are distributed from trusted development environments to unsecured environments in order to safeguard intellectual property.

Tip: Routines and Add-On Instructions are currently the only project component types that support Source Protection.

Tip: Execution Protection and component locking is supported only on CompactLogix 5380, CompactLogix 5480, and ControlLogix 5580 controllers in version 30 of the Logix Designer application.

License-Based Source Protection and Execution Protection Licenses require the use of CmSticks and CmCards:

- On the computer running the Logix Designer application, a CmStick, CmCard, or other compatible Wibu device that contains licenses required for opening a license-protected project and working with project components.
- Tip:** On CompactLogix 5380, CompactLogix 5480, and ControlLogix 5580 controllers, a CmStick, CmCard, or other compatible Wibu device is not required to open a project containing locked components.
- On the controller, a CmCard that contains execution licenses required to run a project that contains components protected with Execution Protection. If a required execution license is missing, the project does not download to the controller. If the project has already been downloaded and the license expires or the CmCard is removed, a major fault occurs when the controller is switched to Run mode.

The following table describes the types of Source Protection available.

Protection option	Supported controllers	Description
Source Key (Password-based) Source Protection	All Logix 5000 controllers	Simple legacy protection, not recommended for hardened intellectual property protection. <ul style="list-style-type: none"> • Component source code (logic) is protected with a password. • Password must be available to view or edit protected components. • Optionally, can be configured to allow logic to be viewed when password is not available.
License-based Source Protection	CompactLogix 5370, ControlLogix 5570, Compact GuardLogix 5370, and GuardLogix 5570 controllers	Hardened intellectual property protection for sensitive content: <ul style="list-style-type: none"> • Component source code (logic) is protected with a License on a CmStick installed on the computer running the Logix Designer application. • License must be present to open or import the file containing the protected components. • Licenses can be configured with different access levels to allow viewing or editing protected components.
License-based Source Protection (Locked)	CompactLogix 5380, CompactLogix 5480, and ControlLogix 5580 controllers	Provides hardened intellectual property protection for sensitive content and allows easy transfer of projects: <ul style="list-style-type: none"> • Component source code (logic) is protected with a license on a CmStick installed on the computer running the Logix Designer application. • Executable code is protected and stored separately from the source code.

Protection option	Supported controllers	Description
License-based Source Protection (Unlocked)	CompactLogix 5380, CompactLogix 5480, and ControlLogix 5580 controllers	Provides protection and access control based on permissions in the license: <ul style="list-style-type: none"> • Users without a dongle can work with unprotected parts of the project, but users cannot view or edit the protected content. The dongle is required to work with the protected content. • To lock or unlock a component, the source license must be present on a CmStick plugged into the computer running the Logix Designer application, and the license must contain the View permission.
License-based Source Protection + License-based Execution Protection	CompactLogix 5380, CompactLogix 5480, and ControlLogix 5580 controllers	Limits execution of valuable content to only authorized controllers: <ul style="list-style-type: none"> • Provides same protection as License-based Source Protection. • Additionally, components can be protected with an Execution License. • Protected components can only be downloaded and executed on a controller that contains a CmCard with the correct execution license.

Configuring source protection in the Logix Designer application

Introduction

This chapter describes how to enable and apply source protection for your Logix Designer components, such as routines and Add-On Instructions. You can protect project components using Source Key protection or License protection. You can also apply Execution Protection to source-protected components to allow execution only on controllers with a specific execution license.

Source Key protection:

- Protects components using existing source keys.

Tip: You can optionally allow source-protected components to be available in a read-only format on a system that does not have the source key required for access.

License-based protection:

- Protects components with specific licenses.

Tip: License-Based Source Protection is not supported on Sequential Function Chart routines in version 30 of the Logix Designer application.

- Execution Protection is an extension of License-Based Source Protection. You can apply Execution Protection to limit the execution of routines and Add-On Instructions, including equipment phase state routines, to controllers that contain a specific execution license.
- When you protect a component with License-Based Source Protection, you can also lock it. When you lock a component, the routine's logic is compiled into executable code and encrypted. It is only decrypted by the controller when it is ready to be executed. As a result, project files containing locked components can be shared with users without licenses to work with the locked components. Those users can work with unprotected parts of the project, upload and download the project file, and even copy and paste locked components into other project files.

Tip: Execution Protection and component locking is supported only on CompactLogix 5380, CompactLogix 5480, and ControlLogix 5580 controllers in version 30 of the Logix Designer application.

Considerations and limitations for License-based protection and locked components

Keep the following considerations and limitations in mind when using License-Based Source Protection with routines and Add-On Instructions for CompactLogix 5380, CompactLogix 5480, and ControlLogix 5580 controllers.

- Sequential Function Chart routines cannot be protected with License-Based Source Protection and execution protection.
- Function Block Diagram routines cannot be protected with License-Based Source Protection and execution protection.
- You cannot overwrite a locked routine with a locked routine of a different language. If a locked routine needs to be replaced with a locked routine of a different language, first unlock the routine in the target file.
- You cannot overwrite a locked routine with an unlocked routine, and vice versa. To replace a locked routine with an unlocked routine, and vice versa, first delete the routine to be replaced.
- If you overwrite a locked ladder logic routine that contains label (LBL) instructions with a locked ladder logic routine that contains similar labels, other workstations can lose correlation with the project. To recover correlation, upload the project on the affected workstations.
- The controller SD card holds a maximum of 63 active or expired licenses, plus the Rockwell activation license for Execution Protection. If the SD card contains more than 64 licenses, downloads with license-protected content fail to the controller. To remove unwanted licenses, use the removal option on the Wibu administration portal.

When you lock an Add-On Instruction, the data included in tags is protected but not to the extent that the logic is protected. If your tags contain sensitive data, Rockwell recommends putting that data in literals rather than in tags. Literals are protected at the same level as the logic in locked routines and Add-On Instructions. In programmable logic, a literal is a value that is expressed as itself rather than as a variable's value or the result of an expression.

Limitations for locked components

After a routine or an Add-On Instruction (AOI) has been locked there are strict limits on changes that can be made to it or to other components that are referenced by it. The following table lists limitations that apply to components that are locked. A locked component can be run by an authorized user, but it cannot be viewed or edited until it is unlocked by an authorized user.

Limitation	Affects routines	Affects AOIs
Cannot resize an array that is referenced by a locked routine.	x	
Cannot change the target of an alias that is referenced by a locked routine.	x	

Limitation	Affects routines	Affects AOIs
Cannot change a BOOL alias that targets the bit of an integer to target a different bit. However, changing the alias to target a different integer is allowed.	x	
Cannot change the target of an alias that is referenced by a locked routine to a tag of a different type.	x	
Cannot change the target of an alias of a member of a UDT or array element to a target at a different offset from the beginning of the tag.	x	
Cannot change an alias referenced by a locked routine to a base tag.	x	
Cannot change a base tag that is referenced by a locked routine to an alias.	x	
Cannot change an InOut program parameter that is referenced by a locked routine to anything other than an InOut program parameter.	x	
Cannot change a Produced tag to anything other than a Produced, Consumed, Module Input tag or Module Output tag when the Produced tag is: <ul style="list-style-type: none"> Referenced by a locked routine, and Used in a COP, CPS, MAOC or as an InOut argument to an AOI in that locked routine. 	x	
Cannot change a Produced tag that is used in an IOT instruction to anything other than a Produced or Module Output tag.	x	
Cannot change a Consumed tag to anything other than a Produced, Consumed, Module Input tag, or Module Output tag when the Consumed tag is: <ul style="list-style-type: none"> Referenced by a locked routine, and Used in a COP, CPS, MAOC or as an InOut argument to an AOI in that locked routine. 	x	
Cannot change a Module Input tag to anything other than a Produced, Consumed, Module Input tag, or Module Output tag when the Module Input tag is: <ul style="list-style-type: none"> Referenced by a locked routine, and Used in a COP, CPS, MAOC or as an InOut argument to an AOI in that locked routine. 	x	
Cannot change a Module Output tag to anything other than a Produced, Consumed, Module Input tag, or Module Output tag when the Module Output tag is: <ul style="list-style-type: none"> Referenced by a locked routine, and Used in a COP, CPS, MAOC or as an InOut argument to an AOI in that locked routine. 	x	
Cannot change a Module Output tag that is used in an IOT instruction to anything other than a Produced or Module Output tag.	x	
Cannot change a standard tag referenced by a locked routine to a Produced, Consumed, Module Input, or Module Output tag, if that tag is used by a COP, CPS, MAOC or used as an AOI InOut argument in that locked routine.	x	
Cannot re-order the members of a User Defined Type of a tag that is referenced by a locked routine or AOI.	x	x
Cannot change the data type of a tag that is referenced by a locked routine.	x	
Cannot update a profile in a way that changes the data type of a Module Defined Tag that is referenced by a locked routine.	x	x
Cannot add, remove, or change the data type of a member of a User Defined Data Type of a tag that is referenced by a locked routine or AOI.	x	x
Cannot reorder, add, change the data type of, or remove parameters in an AOI referenced by a locked routine or AOI.	x	x

Limitation	Affects routines	Affects AOlS
Cannot convert a project containing locked routines or AOlS to a different controller family.	x	x
Cannot move locked routines or AOlS to a project of a different controller family.	x	x
Cannot change the target of an AOl output parameter that aliases a local tag if the AOl is used in a locked AOl.		x
Cannot change the targets of two aliases referenced by a locked routine currently targeting different base tags to the same base tag.	x	
Cannot change the targets of two aliases referenced by a locked routine currently targeting the same base tag to target different base tags.	x	
Cannot change the type of a base tag targeted by an alias that is referenced by a locked routine.	x	
Cannot change an external Output that is referenced by a locked routine to a non-Output.	x	
Cannot change an external Output that is referenced by a locked routine to a local Output.	x	
Cannot change a local tag that is referenced by a locked routine to an external Output.	x	

Enable source protection

If Source Protection is unavailable and is not listed in the **Tools > Security** menu, enable the Source Protection feature by running the **RS5KSrcPtc.exe** tool on the installation CD. The menu item is also enabled when a CmStick containing a license with protect permissions is inserted into any USB port on the computer.

Follow these steps to enable Logix Designer source protection.

1. Open the **ENU\Tools\Source Protection Tool\Vxx.xx** folder on the Logix Designer installation CD.
2. Run the **RS5KSrcPtc.exe** file.

Disable the Configure Source Protection menu option

You can disable the ability to configure source protection on a workstation by removing the **Configure Source Protection** option from the **Tools > Security** menu.

Important: Write down the source keys or make a copy of the sk.dat file and store in a secure location before deleting the sk.dat file.

1. Open the protected project in the Logix Designer application.
2. Click **Tools > Security > Configure Source Protection**.
3. In the **Source Protection Configuration** dialog box, click **Source Key Configuration**.

4. In the **Source Key Configuration** dialog box, click **Disable Ability To Configure**.
5. In the dialog box that prompts you to confirm the action, click **Yes**.
6. In the dialog box that asks if you want to delete the source key file (sk.dat), click **Yes** to remove the source key file from the computer, or select **No** to keep the source key file.

Configure Source Protection is removed from the **Tools > Security** menu.

Tip: The menu item will not disappear if a CmStick containing a license with the **Protect** permission is connected to the computer.

Protect components with Source Keys

When Source Key protection is applied to a component, that component is source-protected. Source keys are user-generated, case-sensitive passwords that lock Logix Designer components from being viewed or modified by third parties.

Important: Source Protection can be applied only on a project file that is offline.

Tip: For Add-on Instructions, Source Protection settings cannot be modified if the Add-On Instruction is sealed. If you wish to source protect and seal an Add-On Instruction, you must apply the source protection settings before sealing.

When a component is protected with a Source Key, users without the source key cannot alter the logic of the component. This affects the following features:

- **Editing** - The Language editor does not open, and the edit menus in the **Controller** and **Logical Organizers** are unavailable. The component icon is also unavailable. If the component is protected with the **Viewable** option, users can open the routine editor in read-only mode.
- **Printing** - Routines cannot be printed. Add-On instruction can be printed, but the routines and local tags are not included in the print out. Routine logic and Add-On Instruction local tags can be printed if components are protected with the **Viewable** option.
- **Exporting** - The protected component is written to the export file in an encoded format.
- **Component Properties** - All controls on the dialog boxes of the components are read-only.
- **Search and Replace** - **Find All** is the only available search type source. **Find Next**, **Replace All**, and **Replace Next** skip the protected component. When the protected component is skipped, a message appears on the status bar indicating the source is not available. This message is also logged to the **Search Results** tab when performing a **Replace All** search. If a component

is protected with the **Viewable** option, search is permitted but replace is still prevented.

Because users cannot view the logic of a protected routine, the **Find All** search results items do not navigate to the found locations. This affects the following:

- Navigation - Users cannot navigate to a protected component.
- Verification - Users cannot navigate to an error in a protected component.
- Cross Reference - Cross reference information is displayed for items referenced within a protected component, but users are not allowed to navigate to the location within the protected component. Double-clicking to navigate to a protected component beeps and displays a message on the status bar indicating that users are unable to edit the component and that the source is not available.

The **Go to Location** menu item is unavailable.

- Go To - There is no edit item in the **Go To** dialog box for a protected component.
- Cut, Copy, Paste - Users can copy, paste, and drag and drop protected components from the **Controller and Logical Organizers**.

Important: Use caution when copying and pasting components between different versions of the Logix Designer application. The application only supports pasting to the same version or newer version of the application. Pasting to an earlier version of the application is not supported. When pasting to an earlier version, the paste action may succeed, but the results may not be as intended. You cannot paste protected components from later versions of the application into earlier versions of the application. For example, attempting to paste from version 19 into version 18 or from version 20 into version 19 will fail.

About source keys

In version 18 and earlier of RSLogix 5000 software, only IEC-61131 compliant source keys are recognized. Each source key must begin with a lowercase character a-z or underscore character (_), and contain only characters lowercase a-z, 0-9, and an underscore character (_). You can enter uppercase A-Z characters in RSLogix 5000 software or in the source key file, but the uppercase characters are converted to lowercase. Source keys are limited to 40 characters in length.

In version 19 and later of the application, source keys are case-sensitive and may contain any printable ASCII character, excluding the space character. This includes uppercase A-Z, lowercase a-z, numbers 0-9, and symbols such as "!@#%\$. Source keys are limited to 40 characters in length.

Source key names

Version 19 and later of the Logix Designer application supports associating names with source keys. Source key names are descriptive text that help identify source keys. Where appropriate, the Logix Designer application will display the source

key name in place of the source key itself to provide an additional layer of security for the source key.

Use descriptive names to help identify the purpose of the source. For instance, a source key used to secure components that field engineers require access might be named, Field Engineer.

Important: If the same source keys will be used with version 18 and earlier and version 19 and later of the Logix Designer application, begin each source key with a lowercase character a-z, or an underscore character (_), and use only characters lowercase a-z, 0-9 , or an underscore character (_) within the source keys.

If you use source key names in version 19 and later of the application, and your source keys are IEC61131-3 compliant, your source keys will still work in version 18 and earlier.

Source key file

Source keys that are available to the application through an sk.dat file are unencrypted. We recommend that you write down your source keys or back up and store the sk.dat file in a secure location. If necessary, the individual keys can be distributed or provided to the necessary parties.

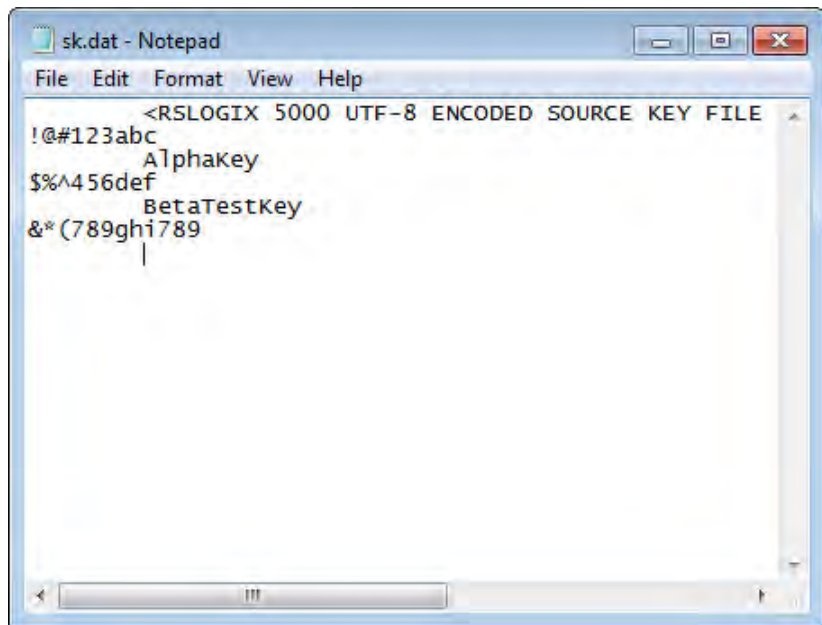
Important: Source key files are created in an ANSI format in Logix Designer versions 18 and earlier. In versions 19 and later, the Logix Designer application creates UTF-8 formatted sk.dat files, and modified ANSI sk.dat files are converted to UTF-8 sk.dat files.

Source keys must not appear on the first line of a UTF-8 formatted sk.dat file. The first line of UTF-8 formatted sk.dat files is ignored in Logix Designer versions 18 and earlier. Versions 19 and later insert a header on the first line of the sk.dat file if one is not already present.

Follow these steps to assign a name to an existing source key.

1. Click **Tools > Security > Configure Source Protection**.
2. In the **Source Protection Configuration** dialog box, click **Source Key Configuration**.

3. In the **Source Key Configuration** dialog box, click **View** to open the sk.dat file with a text editor, such as Notepad.



4. Click at the end of an existing, unnamed source key, and press **Enter**. Source keys are case sensitive and may use special characters, such as `@#$(){}[]`.
5. Press **Tab**, and type a name for the source key.
Tip: Source keys always begin in the first column of the line in the text editor. A source key name must be on the line immediately following the source key that it is associated with, preceded on the line by at least one space. Subsequent lines after the source key that are preceded with spaces are ignored by the application, and can be used for comments.
6. Save the file. If you used an editor other than Notepad, make sure you save the file as a text file.
7. Close the **Source Key Configuration** dialog box and the **Source Protection Configuration** dialog box.
8. Click **Tools > Security > Configure Source Protection** to re-open the **Source Protection Configuration** dialog box. The source key name that you added to the sk.dat file appears as the source key name.

Apply Source Key protection to a component

Follow this procedure to apply Source Key protection to a project component.

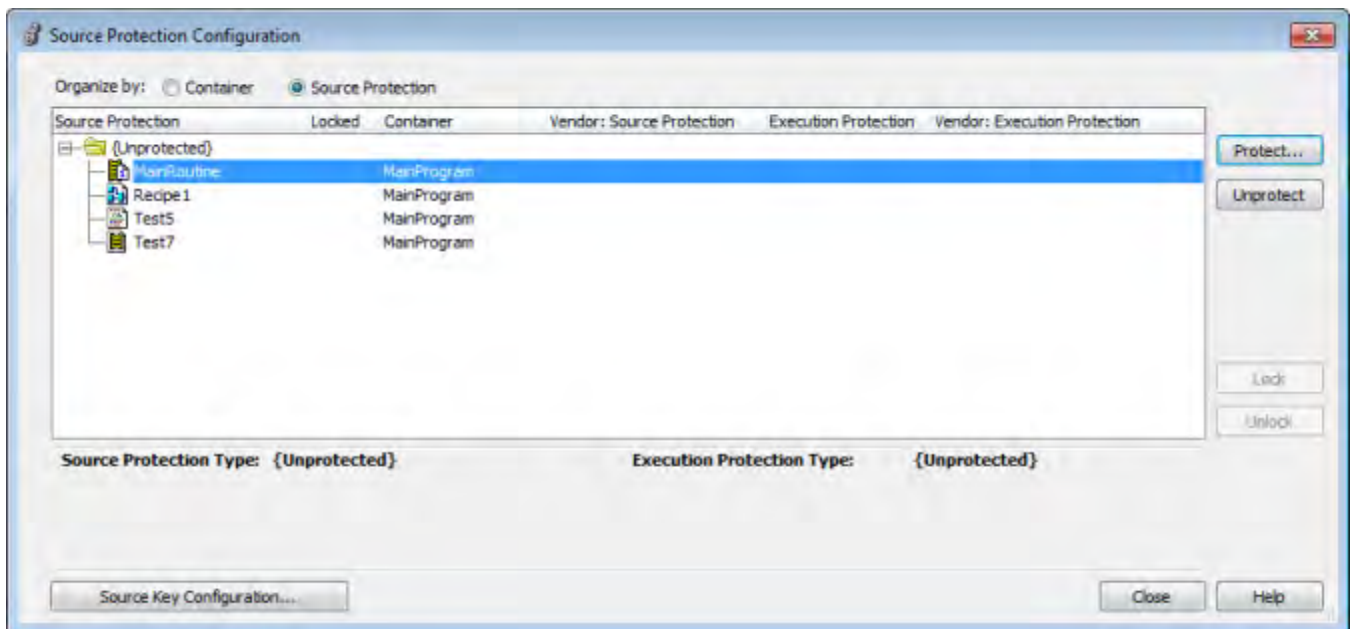
Important: Source Protection can be applied only on a project file that is offline.

Tip: For Add-on Instructions, Source Protection settings cannot be modified if the Add-On Instruction is sealed. If you wish to source protect and seal an Add-On Instruction, you must apply the source protection settings before sealing.

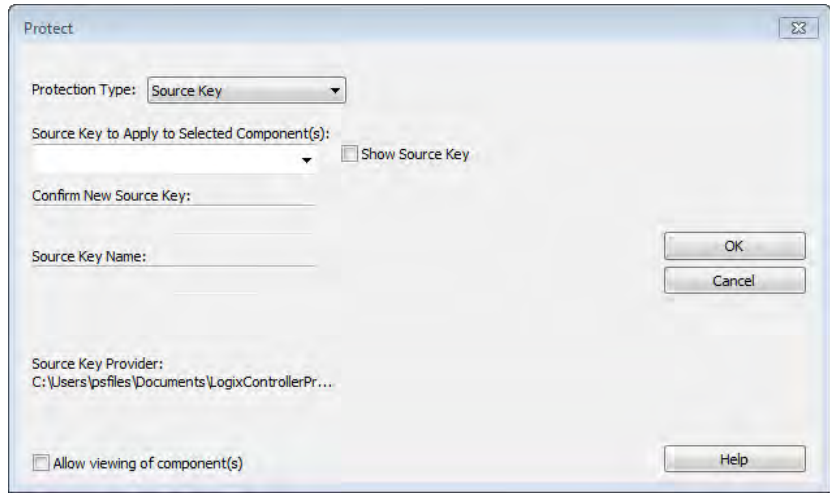
Follow these steps to apply a source key to one or more components.

1. Open an offline project file in the Logix Designer application.
2. On the menu bar, click **Tools > Security > Configure Source Protection**.
3. In the **Source Protection Configuration** dialog box, select one or more components that require protection, and click **Protect**.

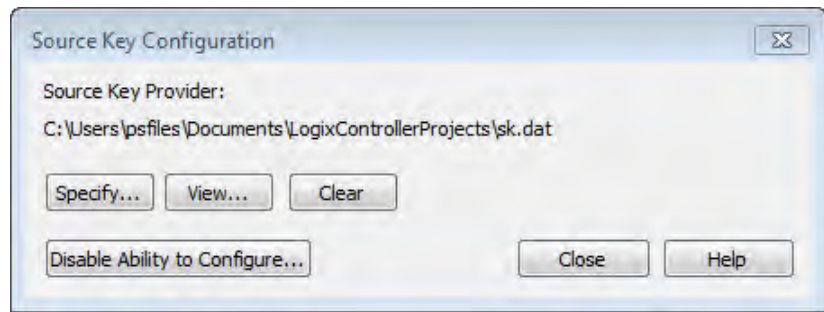
By default, the dialog box shows the **Protection** view in which components are organized based on the protection applied to them. When you select the **Container** view, the components are organized based on the folder structure in the **Controller Organizer** and the **Logical Organizer**.



4. In the **Protect** dialog box, on the **Protection Type** list, click **Source Key**.



5. In the **Source Key to Apply Selected Components** list, select the individual source key for the component.
6. If appropriate, retype the new key in **Confirm New Source Key**. To display the source keys in a readable format, select the **Show Source Key** check box.
7. If you want to apply a source key name, type the name in **Source Key Name**. Do not exceed 40 characters.
8. To allow users to view the logic and local tags on a system that does not have the source key required for access, select the **Allow viewing of component(s)** check box.
9. After you enter the applicable information, click **OK**.
10. (optional) In the **Source Protection Configuration** dialog box, click **Source Key Configuration** to open the **Source Key Configuration** dialog box and complete details about the source key file location:
 - Click **Specify** to change the path to the source key file location.
 - Click **View** to view the source key file.
 - Click **Clear** to remove the location of the source key file (sk.dat). You are then given the option to delete the source key file.
 - Click **Disable Configuration** to remove the menu item that invokes the **Source Protection Configuration** dialog box. You can then clear the file location, which is the path listed under **Source Key Provider**, or delete the source key file.




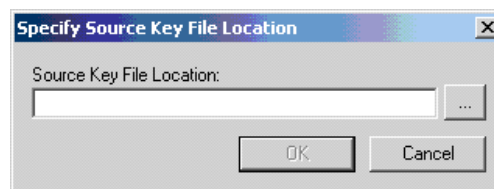
11. Close the **Source Protection Configuration** dialog box and save the project file.

Specify a Source Key file and location Follow these steps to configure a source key file location.

1. Open an offline project file in the Logix Designer application.
2. On the menu bar, click **Tools > Security > Configure Source Protection**.

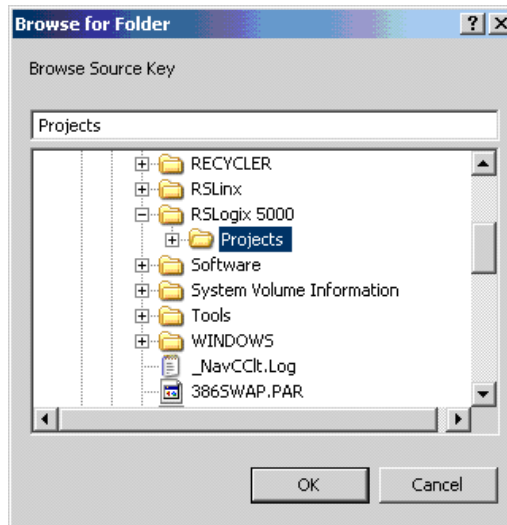
Tip: This option is not available until you run **RS5KSrcPtc.exe** on your workstation. See [Enabling source protection](#) on [page 18](#).

3. In the **Logix Designer** dialog box, click **Yes** to specify a file location. Source protection requires that you specify a source key file location on your workstation.
4. In the **Specify Source Key File Location** dialog box, click **Browse** .

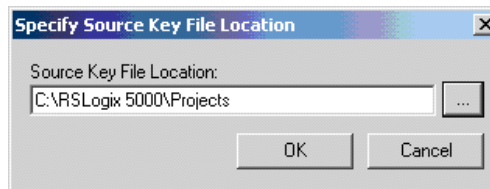


5. In the **Browse for Folder** dialog box, click the folder to store the key file, and click **OK**.

You can save the key file in any accessible folder. In this example the path to the key file folder is C:\RSLogix 5000\Projects folder.



6. In the **Specify Source Key File Location** dialog box, click **OK**.



The location you selected appears in the **Source Protection Configuration** dialog box under **Source Key Provider**.

If the application does not find a key file in the specified location, the application prompts you to create a new key file.

Tip: To check for a specific location, on the **Source Protection Configuration** dialog box, click **Specify**. A window appears with the location if one exists on your workstation.

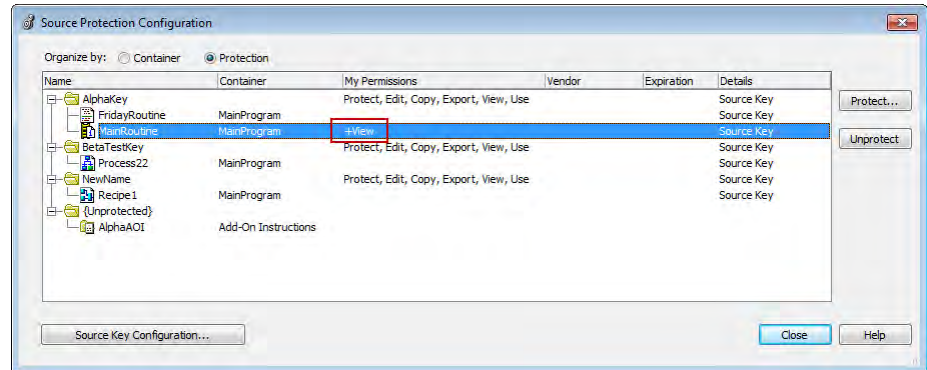
7. Click **Yes** to create a new key file.

View components without a key

Follow these steps to allow source-protected components to be viewed in a read-only format on a system that does not have the source keys.

1. On the menu bar, click **Tools > Security > Configure Source Protection**.
2. In the **Source Protection Configuration** dialog box, select one or more components that require protection and click **Protect**.
3. Apply a source key to the component.

4. Select the **Allow viewing of components** check box, and click **OK**. In the **Source Protection Configuration** dialog box, **+View** appears for components that are viewable on workstations that do not have the source key.



5. Click **Close**.
6. Save the project file and download it to the controller.

Users can open the routine as read-only on a system that does not contain the source key for the routine, but cannot modify the routine. Routines or Add-On Instructions that are protected, but are not configured as viewable, cannot be opened.

Tip: Source-protected content cannot be copied from Logix Designer versions 19 and later and pasted into earlier software versions. The pasting function is disabled in previous software versions when source-protected content is placed on the clipboard.

Verify source key protection on a component

After you apply source key protection to a component, you can verify that the source key protection is working. To verify a component is protected, temporarily disable the source key on your workstation.

Follow these steps to verify source key protection by specifying the path to an empty sk.dat file.

1. On the **Source Protection Configuration** dialog box, click **Specify**.
2. On the **Specify Source Key File Location** dialog box, select a directory that does *not* contain an sk.dat file. For example, **C:\RSLogix 5000\Projects\Empty**.
3. When a message appears asking if you want to create a new file, click **Yes**.
4. When the message appears asking if you want to create a new directory, click **Yes**. The software points to an empty sk.dat file, which mimics a user who does not have a source key.

5. Verify that you cannot access the protected component.
6. On the **Specify Source Key File Location** dialog box, switch back to the directory that contains your original sk.dat file.

Remove access to a protected routine You can delete a source key file (sk.dat) from a workstation.

Important: Write down the source keys or make a copy of the sk.dat file and store it in a secure location before deleting the sk.dat file.

1. Open the protected project.
2. Click **Tools > Security > Configure Source Protection** to open the **Source Protection Configuration** dialog box.
3. Click **Source Key Configuration**.
4. On the **Source Key Configuration** dialog box, click **Clear**.
5. When a dialog box asks for confirmation that you want to delete the source key file, select **Yes** to remove the source key file from the workstation.

License-Based Source Protection for components

License-Based Source Protection limits access to projects to only users with the required license. Users without the required license cannot open the project or import components protected by the license. On CompactLogix 5370, ControlLogix 5570, CompactGuardLogix 5370, and GuardLogix 5570 controllers, a CmStick containing the corresponding license must be plugged into a USB port on the computer to open the project containing the component.

License protection uses licenses that you create and administer through a license portal. Refer to your license portal help for details on using the portal.

Tip: License-Based Source Protection is not supported on the following routine types on CompactLogix 5380, CompactLogix 5480, and ControlLogix 5580 controllers:

- Sequential Function Chart routines.
- Function Block Diagrams, unless the Function Block Diagram is included in an Add-On Instruction.

When using License Protection on CompactLogix 5380, CompactLogix 5480, and ControlLogix 5580 controllers, you can also apply Execution Protection for the component, which allows execution of the component only on a specific controller family, or only on controllers in a specific controller family that contain the execution license.

Protect components with Licenses

The following table lists the permissions provided by licenses.

Permission	Description
Use	This is the minimum permission available for a license. Allows a user to open, import, upload, or download the project. Important: A CmStick containing a license with Use permission must be present locally on any USB port on the computer. Use permission cannot be obtained from a network license server. All other license privileges can be contained on the local CmStick, or provided by a license server on the network.
View	Allows users to view routine logic for the component, or local tags for an Add-On Instruction. It also enables printing, searching, and cross referencing. Editors and properties dialog boxes for the component are limited to read-only, and changes are prevented.
Edit	Allows users to edit the routine or Add-On Instruction.
Copy	Allows users to copy the logic in the routine or Add-On Instruction.
Export	Allows users to export the routine or Add-On Instruction in a non-encrypted format.
Protect	Allows users to enable or remove license protection from a component. Important: A user can add or remove protection from a component only when the Protect permission exists on the license currently protecting that component.

License Protection on a component affects the following features:

- **Editing** - The Language editor does not open, the edit menus are unavailable in the Controller Organizer and the Logical Organizer, and the component icon is grayed out unless the license contains View permission. With View permission, the editor opens in read-only mode. If the license contains Edit permission, editing is allowed.
- **Printing** - Routines cannot be printed unless the license contains View permission. Add-On instructions can be printed, but the routines and local tags are not printed without View permission.
- **Exporting** - The protected component is written to the export file in an encoded format unless the license contains Export permission. To export in non-encrypted text, the license must contain the Export permission, and when saving the export file, the user must deselect the **Encode Source Protected Content** option.
- **Component Properties** - All controls on the dialog boxes of the components are read-only unless the license contains Edit permission.
- **Search and Replace** - **Find All** is the only available search type source. **Find Next**, **Replace All**, and **Replace Next** skip the protected component. When the protected component is skipped, a message appears on the status bar indicating the source is not available. This message is also logged to the search results tab for a **Replace All** search.

Because users cannot view the logic of a protected routine, the **Find All** search results items do not navigate to the found locations unless the license contains the View permission. This affects the following features:

- Navigation - Users cannot navigate to a protected component.
- Verification - Users cannot navigate to an error in a protected component.
- Cross Reference - Cross reference information is displayed for items referenced within a protected component, but users are not allowed to navigate to the location within the protected component. Double-clicking to navigate to a protected component displays a message on the status bar indicating that users are unable to edit the component and that the source is not available.

The **Go to Location** menu item is unavailable.

- Go To - There is no edit item in the **Go To** dialog box for a protected component.
- Cut, Copy, Paste - Users can copy, paste, and drag and drop source protected components from the Controller Organizer or Logical Organizer. Users cannot copy, paste, or drag and drop logic contained within the source protected component unless the license contains Copy permission.

Important: Use caution when copying and pasting components between different versions of the Logix Designer application. The application only supports pasting to the same version or newer version of the application. Pasting to an earlier version of the application is not supported. When pasting to an earlier version, the paste action may succeed, but the results may not be as intended. You cannot paste protected components from later versions of the application into earlier versions of the application. For example, attempting to paste from version 19 into version 18 or from version 20 into version 19 will fail.

Add Execution Protection to License-protected components

Execution Protection is an extension of License-Based Source Protection. You can apply Execution Protection to limit the execution of routines and Add-On Instructions, including equipment phase state routines, to controllers that contain a specific execution license.

When you apply Execution Protection to a component, you first apply License-Based Source Protection. Therefore, a user applying Execution Protection must have the same credentials that are required to apply License-Based Source Protection:

- A CmStick containing a license with Use permission must be present locally on any USB port on the computer. Use permission cannot be obtained from a network license server. All other license privileges can be contained on the local CmStick, or provided by a license server on the network.
- A license containing the Protect permission, either on a local CmStick or provided by a license server on the network. When components are locked,

unauthorized users cannot view or edit the component, but authorized users can run the project without a CmStick.

The following credentials are required to run a component that is protected by Execution Protection:

- After a component is locked, the controller running the component must be of the same controller family as the controller on which you locked the component. For example, when you apply License-Based Source Protection and Execution Protection to a component on a 5580 controller and lock the component, you can only execute that component on another 5580 controller. A component that was protected on a 5580 controller cannot be executed on a 5380 controller. To execute the component on a controller from a different family, you must unlock the component and re-lock it on the different family controller.
- The controller running the component must contain the following licenses on a CmCard:
 - The required Execution license (if any)
 - A valid FactoryTalk Activation license for Execution Protection

Apply License Protection to one or more components

Follow these steps to apply License Protection to one or more components.

Tip: License-Based Source Protection is not supported on the following routine types on CompactLogix 5380, CompactLogix 5480, and ControlLogix 5580 controllers:

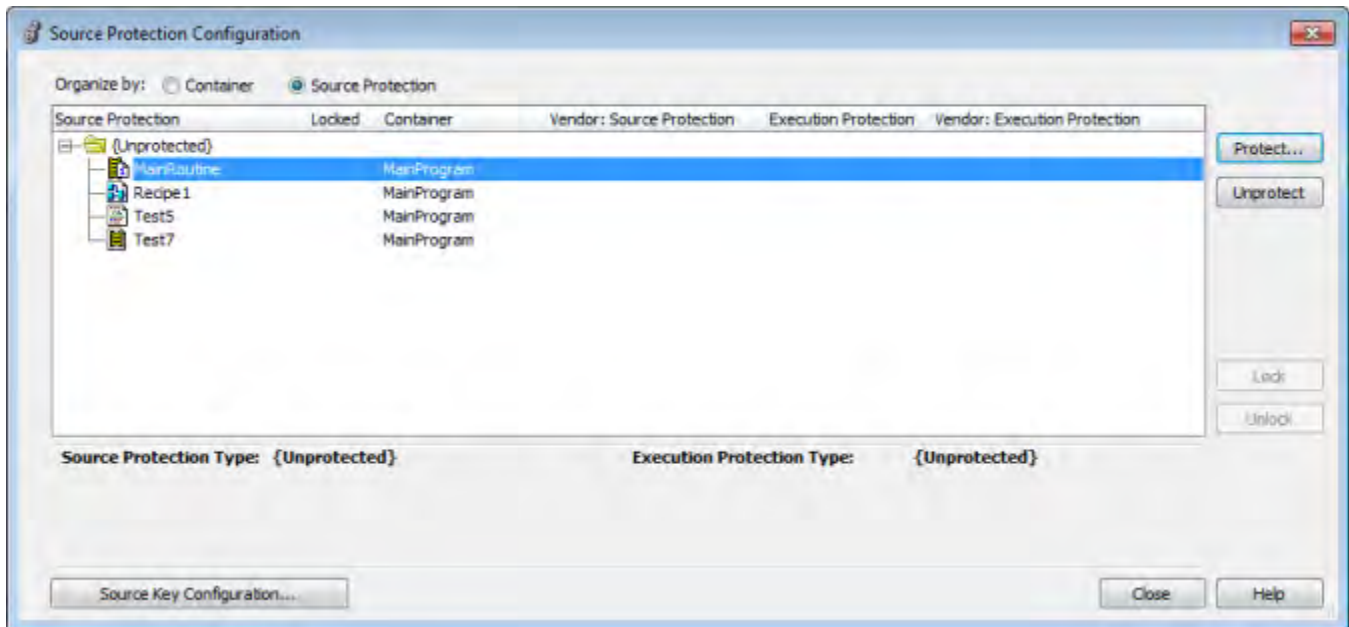
- Sequential Function Chart routines.
- Function Block Diagrams, unless the Function Block Diagram is included in an Add-On Instruction.

Tip: For Add-on Instructions, Source Protection settings cannot be modified if the Add-On Instruction is sealed. If you wish to source protect and seal an Add-On Instruction, you must apply the source protection settings before sealing.

Important: On CompactLogix 5370, ControlLogix 5570, CompactGuardLogix 5370, and GuardLogix 5570 controllers, when a component is license protected but not locked, a CmStick containing the corresponding license must be plugged into a USB port on the computer to open the project containing the component. If a component is locked, a corresponding license is not required to open the project or use the component.

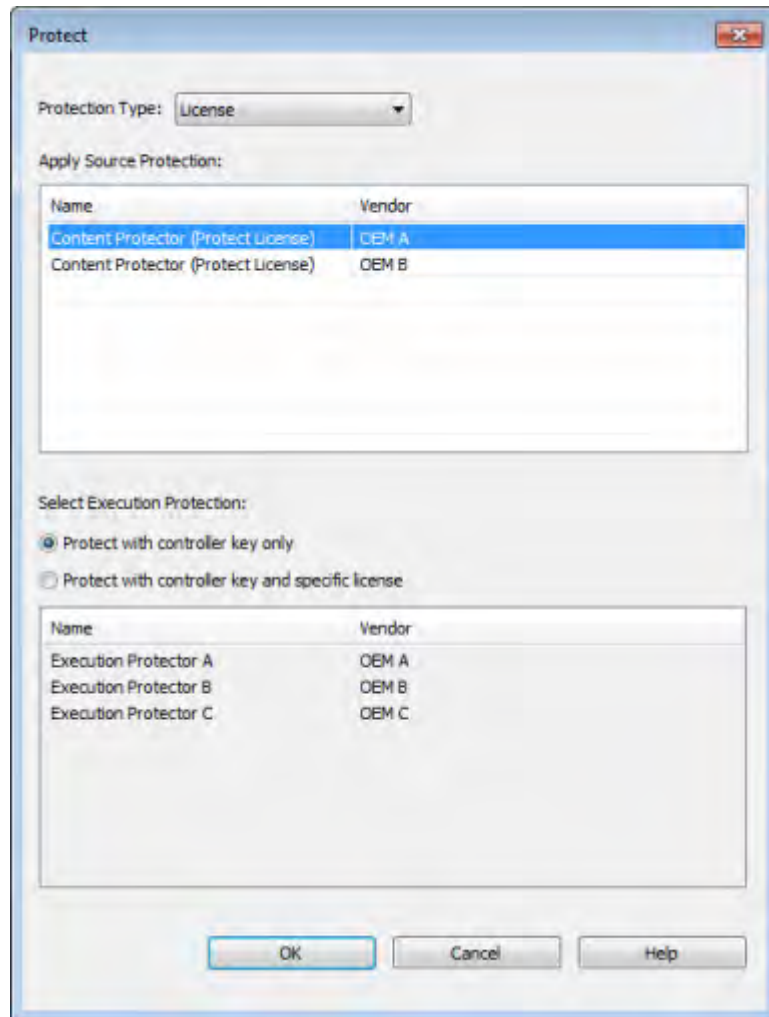
On CompactLogix 5380, CompactLogix 5480, and ControlLogix 5580 controllers, a CmStick containing the corresponding license is not required to open a project containing license-protected components, locked or unlocked.

1. Click **Tools > Security > Configure Source Protection** to open the **Source Protection Configuration** dialog box.



2. Insert the CmStick containing the license that you want to use to protect the component into the USB port on the computer. Note that licenses must contain the **Protect** permission to be used to protect components. If a license does not contain the **Protect** permission, it will not appear in the list of licenses.
3. In the **Source Protection Configuration** dialog box, select the component to be protected and click **Protect**.

4. In the **Protect** dialog box, select the license to apply.



5. On CompactLogix 5380, CompactLogix 5480, and ControlLogix 5580 controllers, select the Execution Protection type:
 - **Protect with controller key only.** This option is selected by default. With this option selected, the component, when locked, runs only on a controller in the same family as the one specified for the project. For example, if you lock a License-Based Protected component for a project on a 5580 controller, the component can only be executed on another 5580 controller.
 - **Protect with controller key and specific license.** When you select this option, the component runs only on a controller in the same family as the one specified for the project and that contains a CmCard with the execution license that you select.

If you select **Protect with controller key and specific license**, select the execution license from the list of available licenses.

On CompactLogix 5380, CompactLogix 5480, and ControlLogix 5580 controllers, after components are protected, they can also be locked. Locking a component prevents users from viewing or editing the component but allows authorized users to run it.

6. Click **OK** to return to the **Source Protection Configuration** dialog box.

Tip: To save changes to a component that is protected with License-Based Source Protection, a CmStick containing the required license must be plugged into the computer running the Logix Designer application. Make sure you save your edits to the project or lock the protected components before removing the CmStick containing the required license. If the license is not present, you could lose your edits to the project.

7. Close the **Source Protection Configuration** dialog box and save the project file.

Lock a component

After you apply License-based Source Protection to a routine or an Add-On Instruction, you can lock it on CompactLogix 5380, CompactLogix 5480, and ControlLogix 5580 controllers.

When you lock a component, the routine's logic is compiled into executable code and encrypted. It is only decrypted by the controller when it is ready to be executed. As a result, project files containing locked components can be shared with users without licenses to work with the locked components. Those users can work with unprotected parts of the project, upload and download the project file, and even copy and paste locked components into other project files.

Tip: To lock or unlock a component, the source license must be present on a CmStick plugged into the computer running the Logix Designer application, and the license must contain the View permission.

Important: When you lock a routine or an Add-On Instruction, the data included in tags is protected but not to the extent that the logic is protected. If your tags contain sensitive data, Rockwell recommends putting that data in Literals rather than in tags. Literals are protected at the same level as the logic in locked routines and Add-On Instructions.

Follow these steps to lock or encrypt a component.

1. Apply License-Based Source Protection to the component.
2. In the **Source Protection Configuration** dialog box, select the protected component.
3. Click **Lock**.
4. To unlock the component, select it and click **Unlock**.

Tip: When a component has been License-Protected, you can also lock and unlock it by selecting it in the **Controller Organizer**, right-clicking, and selecting **Lock** or **Unlock**.

Share License privileges with other users on your network

You can adjust your network settings to provide additional privileges to users on your network or to use license-based source protection when using a remote desktop connection.

Keep the following considerations in mind when you share license privileges with users on your network:

- You must configure your network to allow communication between the devices that need to share license privileges. The computer that provides privileges needs to be configured to have TCP and UDP ports 22350 set to open.
- The license you plan to share must be enabled for network use. Use the License Portal to configure licenses and optionally enable them for network use.
- The computers that receive permissions from the remote workstation must have a CmStick installed that contains the same license with **Use** permission. The CmStick must be plugged into a USB port locally on the computers.

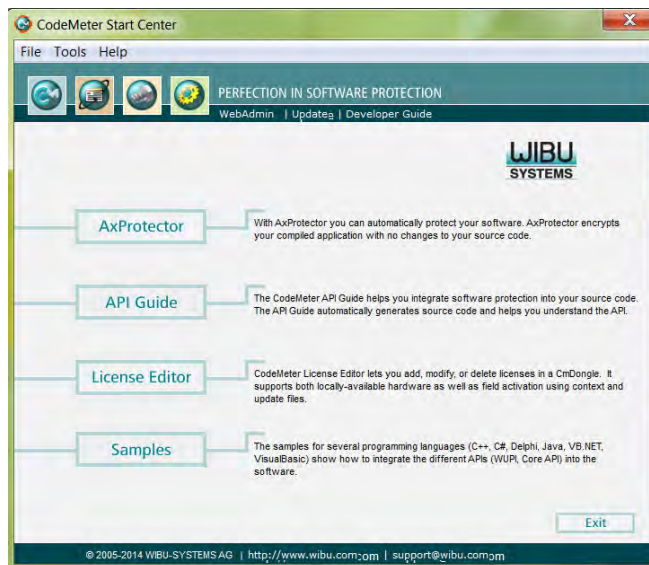
You can share license privileges with other users and provide license privileges to users of remote desktop.

Provide License privileges to other users

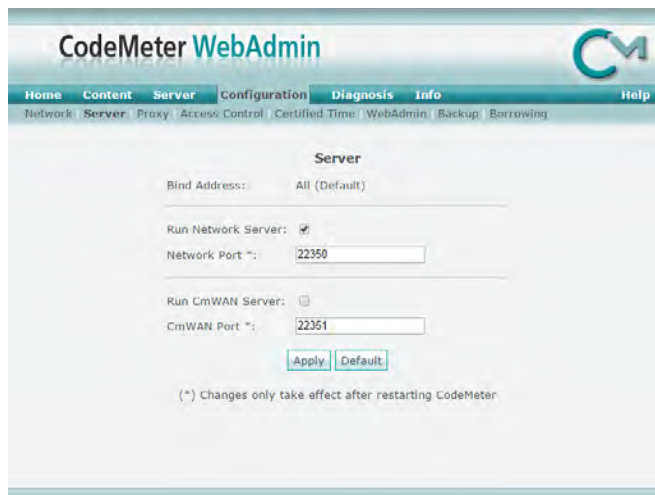
Follow these steps to provide license privileges to users on your network.

1. To open the **CodeMeter Control Center™** application, on the computer that is going to provide additional privileges, navigate to the C:\Program Files (x86)\CodeMeter\Runtime\bin folder and run the **CodeMeter.exe** file.

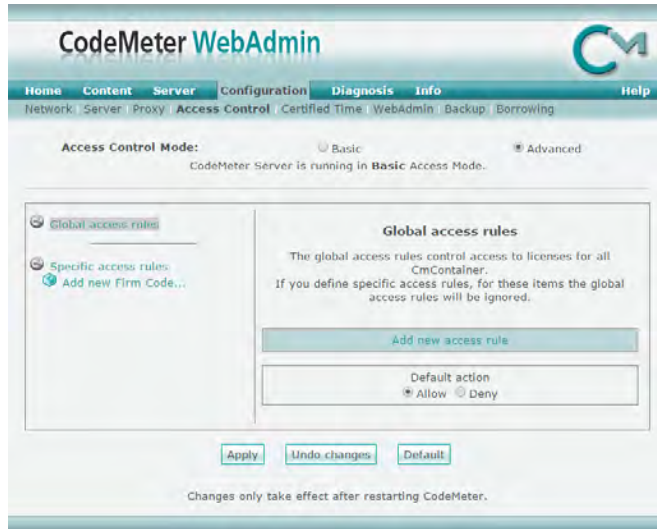
Important: Your computer should have a CmStick installed that contains a license with all the privileges that you want to share. The CmStick should be plugged into a USB port on your computer.



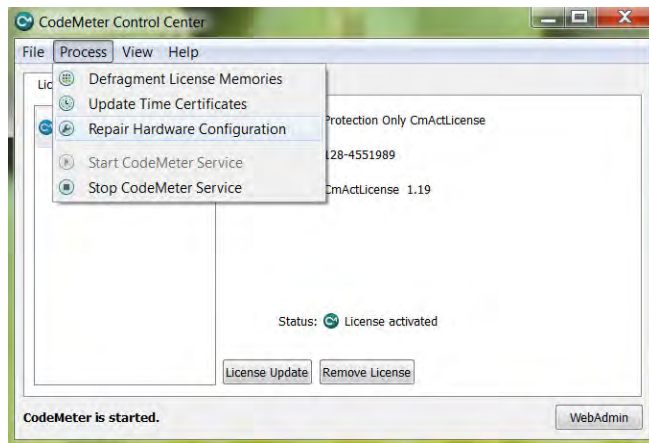
2. Click **WebAdmin** to open the **CodeMeter WebAdmin** window in your default web browser.
3. Click **Configuration > Server**, select **Run network server**, and click **Apply**.



4. Click **Configuration > Access Control** and select **Advanced**.



5. Under **Default action**, select **Deny** and click **Apply**.
6. Under **Access Control Mode**, select **Basic**.
7. Click **Add** and enter the list of users (user names, IP addresses, user groups, or subnets) who can access your shared license. Click **Apply**.
8. On the **CodeMeter Control Center**, navigate to the **Process** tab to stop and restart **CodeMeter**.



9. On the computers that need to receive the shared license privileges, open the **CodeMeter Control Center** application.

Important: A CmStick containing a license with **Use** permission must be present locally on any USB port on the computer that receives shared permissions. **Use** permission cannot be obtained from a shared license.

10. Click **WebAdmin** to open the **CodeMeter WebAdmin** window.
11. On the **Configuration** tab, in the server list, add the **name or IP address** of the computer that you configured as a license server.



12. Restart **CodeMeter**.

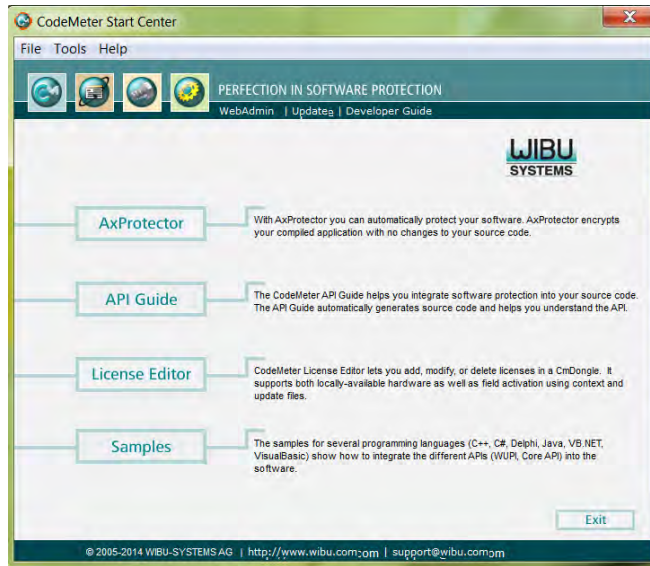
Tip: When the **Server Search List** is blank in the **CodeMeter WebAdmin** tool, CodeMeter searches all servers that it finds on your subnet. When a user has a license that is also on a license server, the user's permissions might be upgraded to match the license on the server. To prevent accidental granting of privileges and to prevent CodeMeter from searching unnecessarily, add **127.0.0.1** (the localhost IP address) to the **Server Search List**.

Provide license privileges for remote desktop users

Follow these steps to provide license privileges for remote desktop users on your network.

1. On the remote desktop client computer, open the **CodeMeter Control Center** application. To open the application, navigate to the C:\Program Files (x86)\CodeMeter\Runtime\bin folder, and run the **CodeMeter.exe** file.

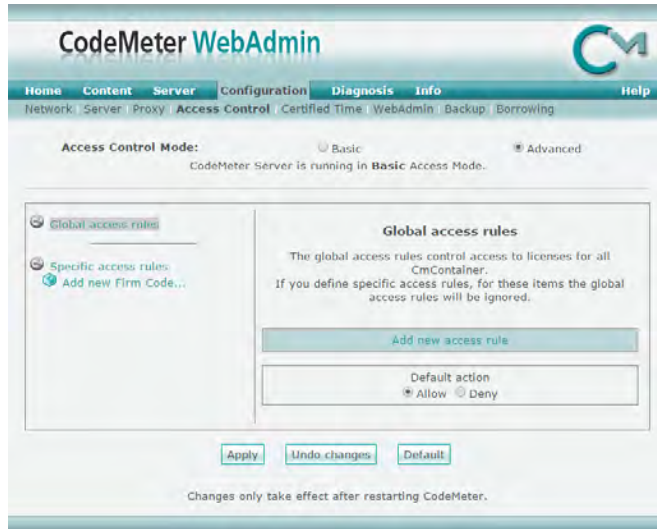
Important: Your computer should have a CmStick installed that contains a license with all the privileges that you want to use remotely. The CmStick should be plugged into a USB port on your computer.



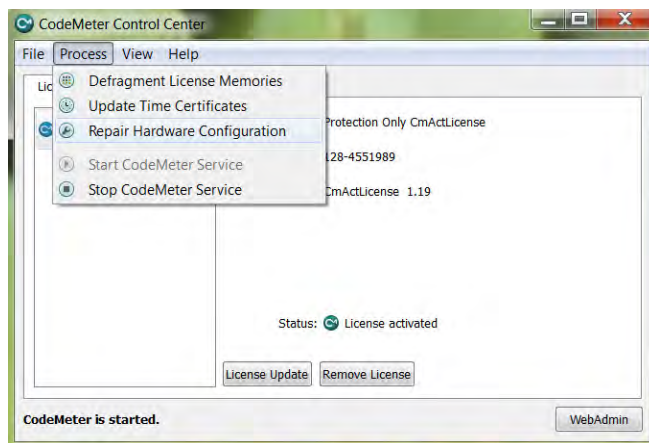
2. Click **WebAdmin** to open the **CodeMeter WebAdmin** window in your default web browser.
3. Click **Configuration > Server**, select **Run network server**, and click **Apply**.



- Click **Configuration > Access Control** and select **Advanced**.



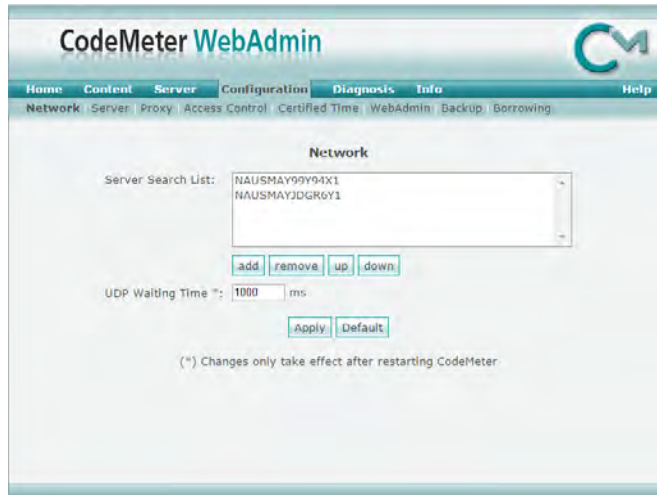
- Under **Default action**, select **Deny** and click **Apply**.
- Under **Access Control Mode**, select **Basic**.
- Click **Add** and enter the list of users (user names, IP addresses, user groups, or subnets) who can access your shared license. Click **Apply**.
- On the **CodeMeter Control Center**, navigate to the **Process** tab to stop and restart **CodeMeter**.



- Log onto the remote computer with remote desktop.
- On the remote computer, open the **CodeMeter Control Center** application.

Important: A CmStick containing a corresponding license with **Use** permission must be present locally on any USB port on the remote desktop server. **Use** permission cannot be obtained from a remote computer.

11. On the **Configuration** tab, in the server list, add the name or IP address of the computer that contains the needed permissions.



12. Navigate to the **Process** tab on the **CodeMeter Control Center** to stop and then restart **CodeMeter**.

Tip: When the **Server Search List** is blank in the **CodeMeter WebAdmin** tool, CodeMeter searches all servers that it finds on your subnet. When a user has a license that is also on a license server, the user's permissions might be upgraded to match the license on the server. To prevent accidental granting of privileges and to prevent CodeMeter from searching unnecessarily, add **127.0.0.1** (the localhost IP address) to the **Server Search List**.

Securing a ControlLogix controller with the Logix CPU Security Tool

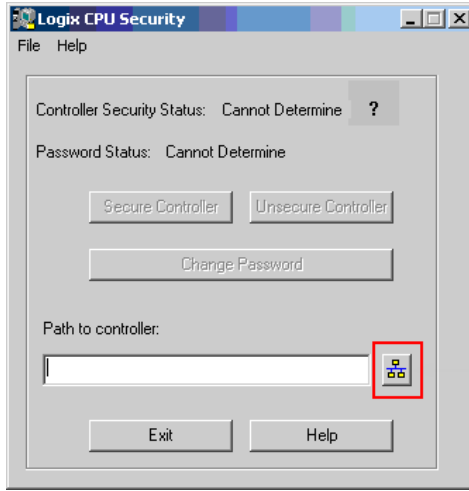
You can secure a controller with the Logix CPU Security Tool. The Logix CPU Security Tool is automatically installed when you install Logix Designer version 17, 18, or 19. The tool is installed under the Logix Designer menu bar on the **Tools** menu.

Important: The Logix CPU Security Tool is supported only in Logix Designer application versions 17, 18, and 19. It is not supported in versions 20 and later.

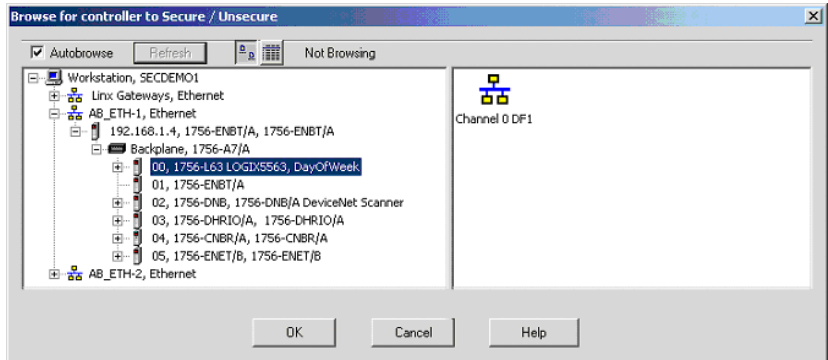
1. Click the **Start** button, then click **All Programs**, then click **Rockwell Software**, then click **RSLogix 5000**, and then click **Logix CPU Security Tool**.



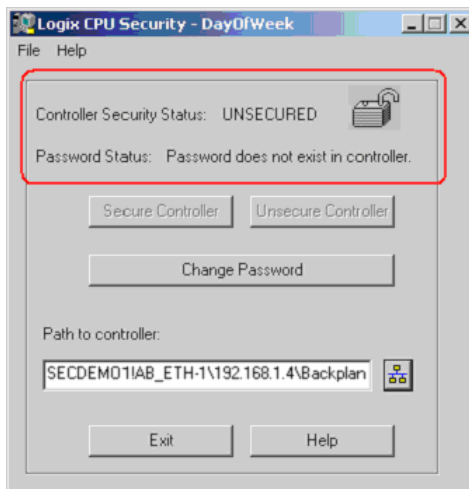
- In the **Logix CPU Security** dialog box, click the **RSWho** button to specify a path to the controller.



- Select the controller that you want to secure and click **OK**.



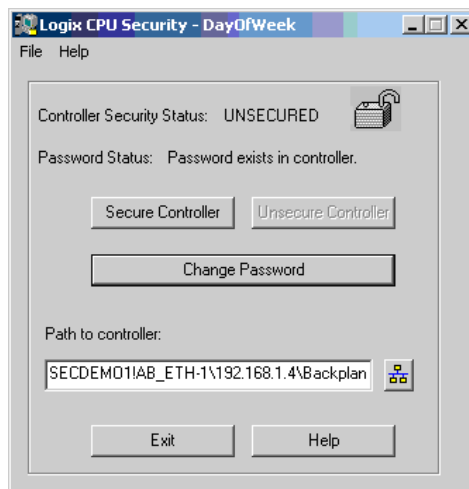
The Logix CPU Security Tool displays the current status of the controller. Notice that the controller in the following image is currently unsecured and there is no password set in the controller.



4. Click **Change Password**.
5. In the **Change Password** dialog box, in the **New Password** box type a password, and then in the **Confirm New Password** box, retype the password. Click **OK**.



The **Password Status** for the controller changes to indicate a Password exists in the controller, but the controller is not secured yet.

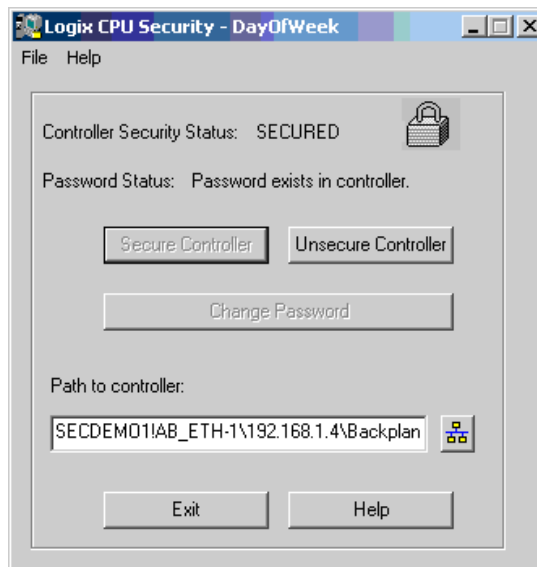


6. Click **Secure Controller**.
7. In the **Secure Controller** dialog box, in the **Password** box, type the password for the controller and then click **Secure**.

8. If the controller has nonvolatile memory installed, you can select the **Save to Nonvolatile Memory after controller is secured** check box to save the security state of the controller to nonvolatile memory. Refer to the Logix Designer application help for additional information on using nonvolatile memory.



The **Controller Security Status** for the controller changes to indicate that it is secured.

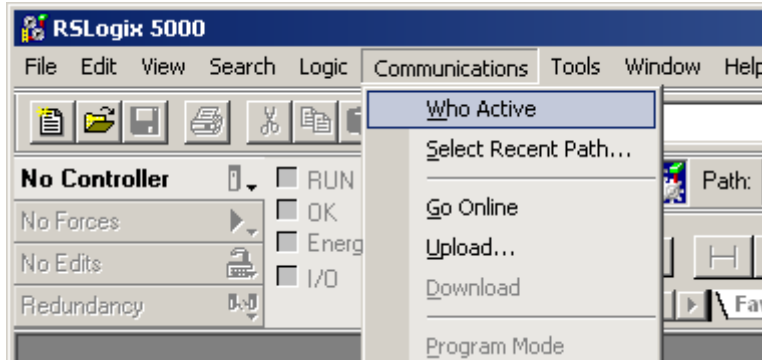


Accessing a secured controller

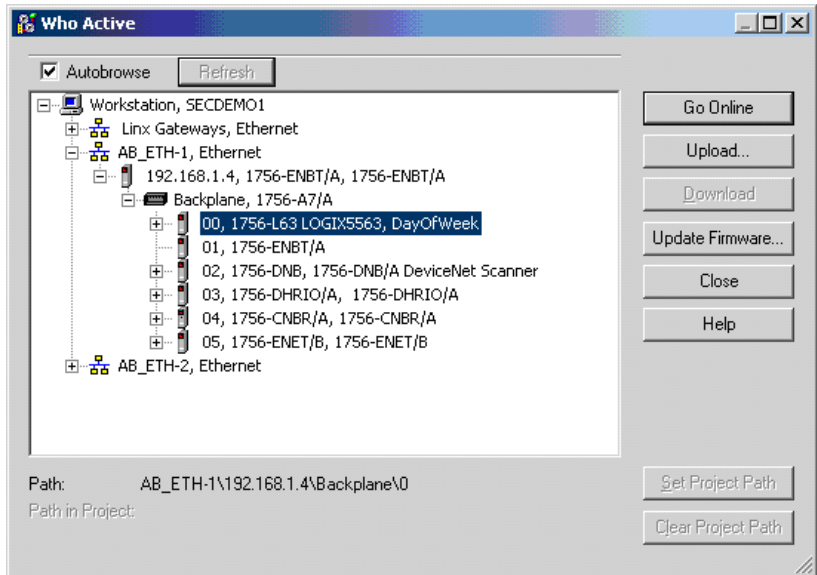
When you try to access a controller that has been secured with the Logix 5000 CPU Security Tool and you do not have a local copy of the project file on your computer, the application prompts you to select the proper file.

To access a secured controller, do the following.

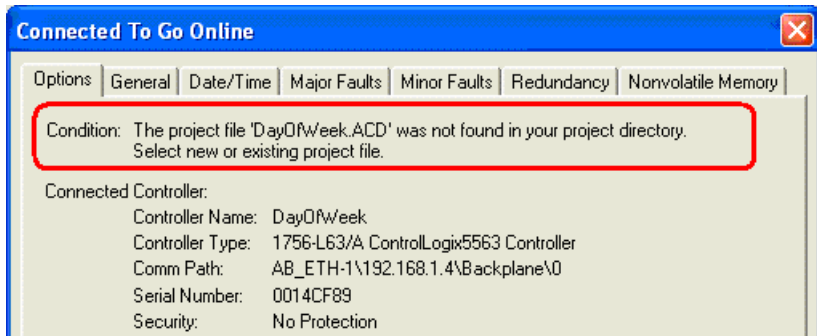
1. On the menu bar, click **Communications**, and then click **Who Active**.



2. In the **Who Active** dialog box, click the secured controller and click **Go Online**.

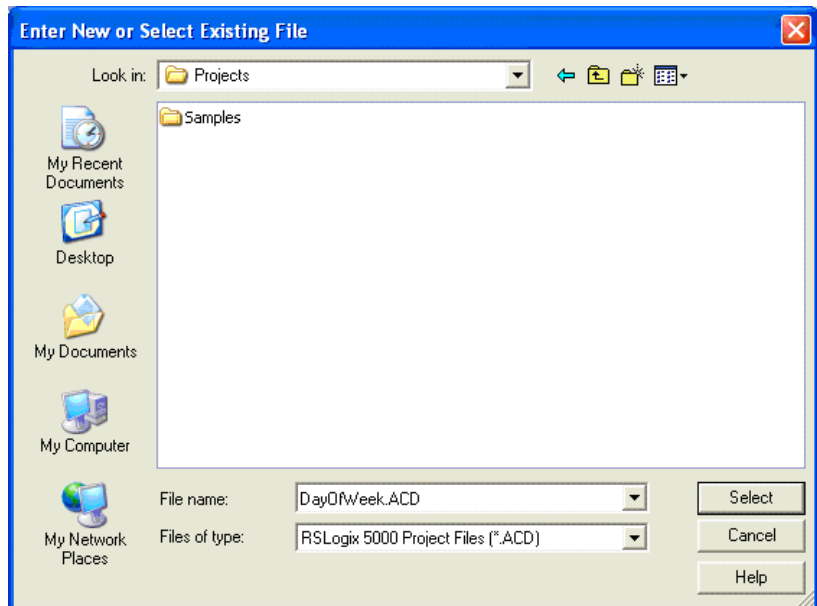


If you do not have a local copy of the project file on your computer, the application prompts you to select a file.



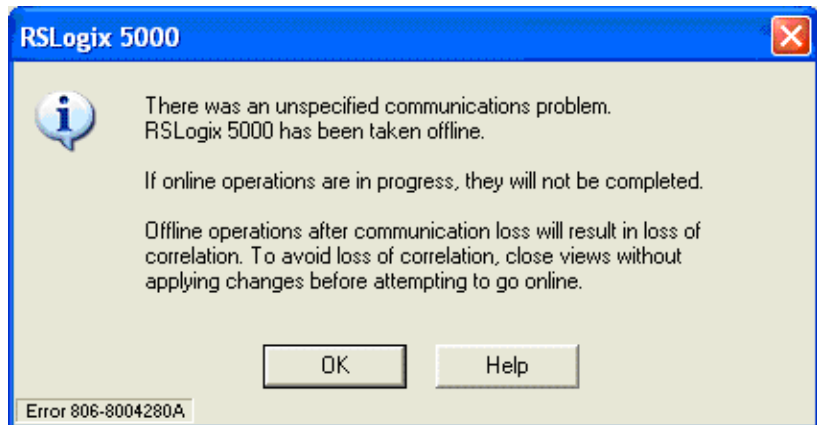
3. Click **Select file** to find the project file.

4. In the **Enter New or Select Existing File** dialog box, click the project file and then click **Select**.



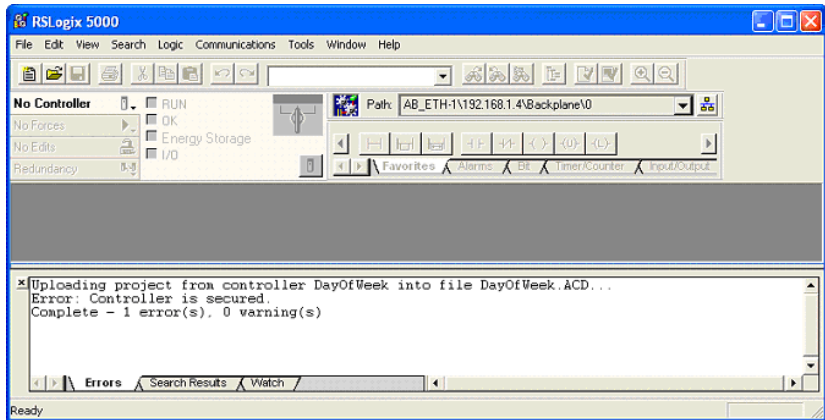
5. Click **Yes** to create and upload the project.

An unspecified communications dialog box appears indicating that the application is now offline.



6. Click **OK** to continue.

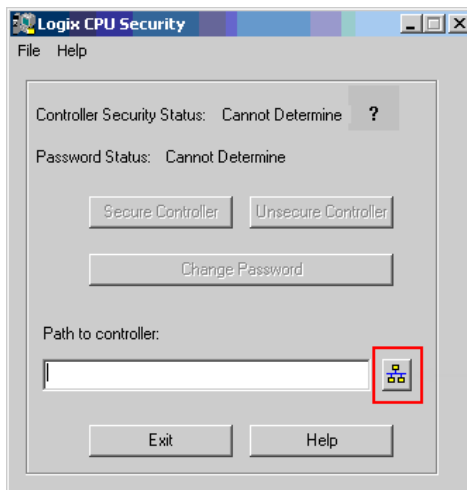
If the project file already exists on your system, an error message appears that indicates that the controller is secured and you cannot go online.



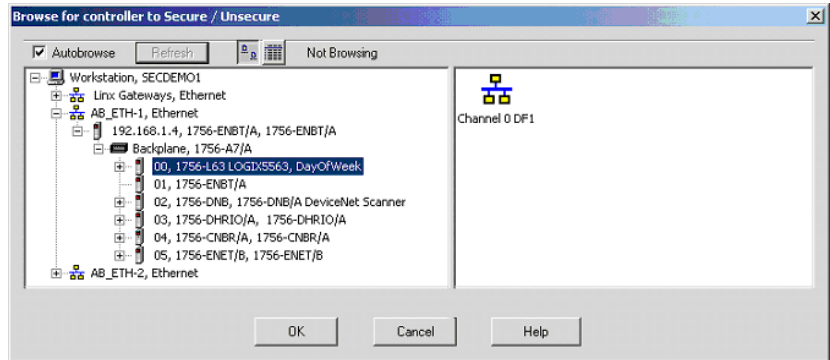
Removing security from a controller with the CPU Security Tool

To remove security from a controller, do the following.

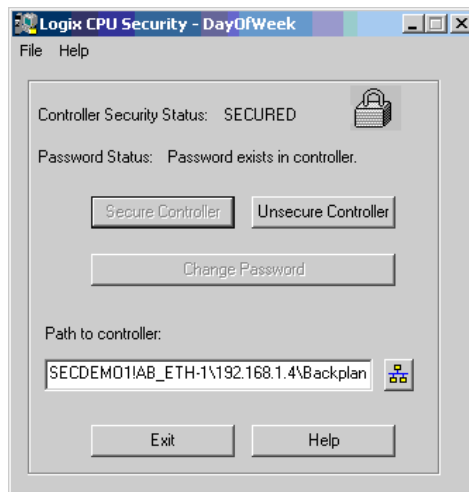
1. Start the **Logix CPU Security Tool**. Click the **Start** button, then click **All Programs**, then click **Rockwell Software**, and then click **Logix CPU Security Tool**.
2. In the **Logix CPU Security** dialog box, click the **RSWho** button to specify a path to the controller.



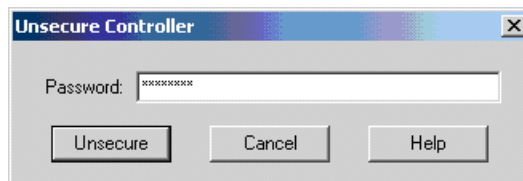
- In the **Browse for controllers to Secure/Unsecure** dialog box, click the controller that you want to be unsecured and then click **OK**.



- In the **Logix CPU Security - *project_name*** dialog box, click **Unsecure Controller**.



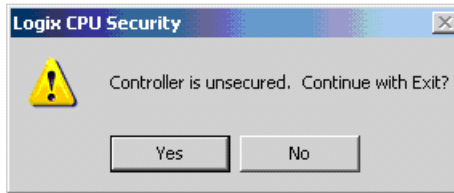
- In the **Unsecure Controller** dialog box, in the **Password** box, type the password for the controller and then click **Unsecure**.



The controller is now unsecured, but the controller still recognizes the password.

- Select **Exit**.

7. Click **Yes**. A message appears.

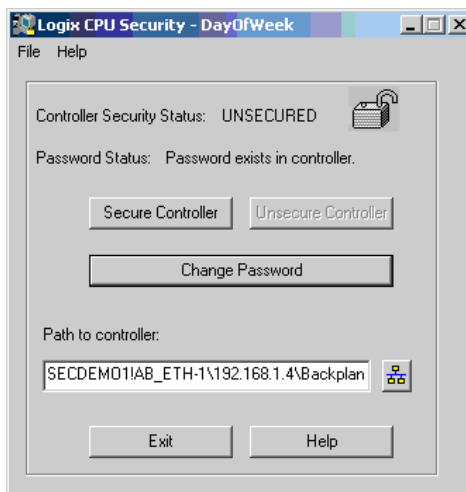


Click **Yes** to save the change. You can now go online with the controller.

Removing a password

Follow these steps to remove a password.

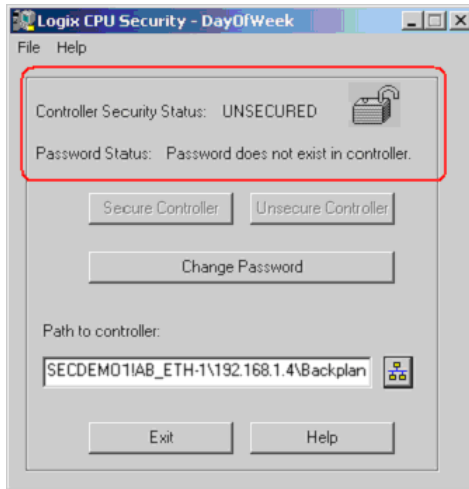
1. In the **Logix CPU Security - DayOfWeek** dialog box, click **Change Password**.



2. In the **Change Password** dialog box, remove the '****' empty string and click **OK**.



The controller status is now UNSECURED.



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In addition, we offer multiple support programs for installation, configuration, and troubleshooting. For more information, contact your local distributor or Rockwell Automation representative, or visit <http://www.rockwellautomation.com/services/online-phone>.

Installation assistance

If you experience a problem within the first 24 hours of installation, review the information that is contained in this manual. You can contact Customer Support for initial help in getting your product up and running.

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Outside United States or Canada	Use the Worldwide Locator available at http://www.rockwellautomation.com/locations , or contact your local Rockwell Automation representative.

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Rockwell Otomasyon Ticaret A.Ş., Kar Plaza İş Merkezi E Blok Kat:6 34752 İçerenköy, İstanbul, Tel: +90 (216) 5698400

www.rockwellautomation.com

Power, Control and Information Solutions Headquarters

Americas: Rockwell Automation, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414.382.2000, Fax: (1) 414.382.4444
Europe/Middle East/Africa: Rockwell Automation NV, Pegasus Park, De Kleetlaan 12a, 1831 Diegem, Belgium, Tel: (32) 2 663 0600, Fax: (32) 2 663 0640
Asia Pacific: Rockwell Automation, Level 14, Core F, Cyberport 3, 100 Cyberport Road, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846

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