



## Getting Started with ProcessLogix R400.0

This Quick Start describes the tasks you need to become familiar with the ProcessLogix™ system, including:

- starting the software
- creating a controller
- creating digital and analog I/O modules
- assigning modules to a Control Execution Environment (CEE)
- creating a PID Loop
  - creating a Control Module
  - building the PID loop
  - downloading the Control Module to the 1757-PLX52 Control Processor Module
  - verifying proper operation
- viewing pre-built screens
- shutting down the system

The tasks described in this Quick Start represent a sample program. This program is not intended for actual process control applications. After you have completed the tasks in this sample program, you can use the sample to guide you as you program your own process control application.

As you complete the tasks in this Quick Start, always use the ProcessLogix parameter naming conventions so that the pre-built screens provided with the ProcessLogix system work correctly.

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**IMPORTANT**

The ProcessLogix R400.0 server runs on Microsoft Windows 2000® Server.

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Refer to the ProcessLogix R400.0 Installation and Upgrade Guide, publication 1757-IN040 and the ProcessLogix Overview and Selection Guide, publication 1757-SO002 for information on the components that make up your ProcessLogix system.

## Important User Information

Because of the variety of uses for the products described in this publication, those responsible for the application and use of these products must satisfy themselves that all necessary steps have been taken to assure that each application and use meets all performance and safety requirements, including any applicable laws, regulations, codes and standards. In no event will Allen-Bradley be responsible or liable for indirect or consequential damage resulting from the use or application of these products.

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Allen-Bradley publication SGI-1.1, *Safety Guidelines for the Application, Installation and Maintenance of Solid-State Control* (available from your local Allen-Bradley office), describes some important differences between solid-state equipment and electromechanical devices that should be taken into consideration when applying products such as those described in this publication.

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Throughout this publication, notes may be used to make you aware of safety considerations. The following annotations and their accompanying statements help you to identify a potential hazard, avoid a potential hazard, and recognize the consequences of a potential hazard:

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### ATTENTION



Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss.

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### IMPORTANT

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

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## Rockwell Automation Technical Support

If you need any assistance with the information found in this document, first call your local Rockwell Automation representative, then:

- Phone Support: (440) 646-5800
- Web Support: <http://www.ab.com>, under Support, click Product Support

## Your Questions or Comments about this Manual

If you find a problem with this manual, please use the How are We Doing? form located in the Documentation section of Knowledge Builder to notify us.

## Before You Begin

Before you begin, read through and follow this checklist to organize and implement your ProcessLogix R400.0 Software and Hardware installation.

Before you start the tasks in this Quick Start, ensure that you have already:

- installed the chassis and power supply
- installed the 1757-PLX52 Control Processor Module
- installed the CNB module
- installed the analog and digital I/O modules you want to use in your system
- set up and configured the ProcessLogix Server
- set up and configured the 1784-PCIC card

We explain how to do all of these tasks in the related manuals.

### TIP



For details on installing ProcessLogix R400.0 software on a ProcessLogix Server, refer to the *ProcessLogix Installation and Upgrade Guide*, publication number 1757-IN040.

## Starting the Software

In this section, we explain how to start:

- The ProcessLogix R400.0 Server software
- Control Builder software

**TIP**



The System Repository is the database that contains information about your control environment. The CDA program controls communications between ProcessLogix server applications and RSLinx™ communication software. The System Repository and the CDA program are both Windows 2000 Services that start automatically.

## Verifying ControlNet nodes and I/O modules

The CDA program starts up RSLinx and all configured drivers for ControlNet communications from the server to the controller backplane.

You should verify the ControlNet nodes and the I/O modules you will use in your system. For purposes of illustration, we use two ControlNet nodes:

- ControlNet module with address 1 at slot 0 in the chassis

To set the node address, adjust the rotary switches on top of the module. See the schematic on the right side of the module for a guide to selecting the address

- ProcessLogix Server at ControlNet address 24 (set in RSLinx Software)

**TIP**



If the LED on the front of the ControlNet module reads NET ERR, no other ControlNet devices are present on the network.

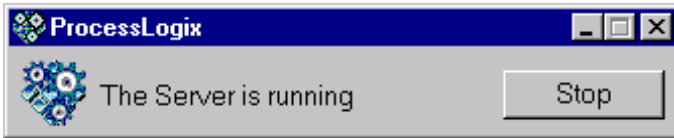
## Verify the ControlNet Nodes Using NTools (Network Tools):

1. To view chassis configuration, click Start⇒Programs⇒ProcessLogix Engineering Tools⇒NTools.
2. Click OK to acknowledge the warning.
3. Click NetworkTools⇒Settings.
4. Select the Ping option and click OK.
5. Click NetworkTools⇒Ping.
6. Click the CNB with Network Address 1. This can be found under the Desktop tree icon in the upper left window.
7. Under the Local Chassis tab, adjust the number of slots in the scroll box to match the number of slots in your local chassis and click OK.
8. Verify that all I/O modules appear as configured in the chassis.
9. If the I/O modules do not all appear, try the following:
  - Check the power supply
  - Reseat the module(s) in the chassis
  - Adjust the number of Slots in Local Chassis
10. Select NetworkTools⇒Exit.

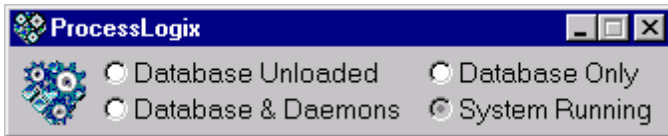
## Starting the ProcessLogix Server

The ProcessLogix Server program is the operating system for the ProcessLogix Server. To start the Server:

1. Click Start⇒Programs⇒ProcessLogix Server⇒Start-Stop ProcessLogix Server to call up the ProcessLogix Server dialog box. Check that the Server is running.



OR



**TIP**



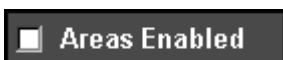
To display the “Full Mode” version of the ProcessLogix Server dialog box, click the icon to the left of ProcessLogix in the title bar and click Advanced⇒Full Mode. A checkmark will now appear in front of the Full Mode selection to show that it is active.

2. If the Server is running, close the dialog box. If the Server is not running:
  - a. With the Full Mode version of the dialog box active, click the System Running option.
  - b. Click Yes to confirm the action and wait for the Server to change its state.
  - c. Close the ProcessLogix Server dialog box.

## Turning Off Areas

Areas are portions of a process you wish to control. This Quick Start assumes that Areas are turned off. To turn off areas:

1. Click Start⇒Programs⇒ProcessLogix Server⇒Station.
2. Select Configure⇒Areas⇒Areas.
3. Access manager mode.
  - a. Click Oper in the bottom right of the screen.
  - b. In the Station Logon dialog box, type mngr.
  - c. Click OK.  
Oper changes to Mngr.
4. To disable areas, uncheck the Areas Enabled check box.



5. Exit Station.

## Starting Control Builder

Control Builder software is an application you use to develop CMs (Control Modules) and SCMs (Sequential Control Modules). The CMs and SCMs are downloaded to the 1757-PLX52 Control Processor Module. CMs contain Function Blocks, and together with SCMs you can tell the 1757-PLX52 how to control your process.

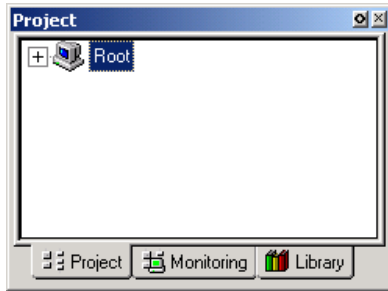
To start Control Builder:

1. Click Start⇒Programs⇒ProcessLogix Engineering Tools⇒Control Builder.

A Login Information window appears.



2. Enter mngr (lowercase) for your User Name and mngr1 (lowercase) for your Password, and click OK.
3. Control Builder starts up displaying the Project tab:



The available tabs are described in the following table:

<b>this tab:</b>	<b>shows you:</b>
Project	the offline copy of your project
Monitoring	the loaded or currently running copy of the application executing on the 1757-PLX52 Control Processor Module
Library	<ul style="list-style-type: none"> <li>• available I/O modules (IOM)</li> <li>• available function blocks for use in Control Modules</li> <li>• available function blocks for use in Sequential Control Modules</li> <li>• available control component libraries (CCLs)</li> </ul>

Once you have opened Control Builder, you can begin configuring your hardware.

## Creating a Controller

The first step in configuring your hardware is to create a controller.

1. In Control Builder, select File⇒New⇒Controllers⇒CPM-Control Processor Module. You see the CPM Parameters dialog box (CPM = PLX52):



2. In the CPM Parameters dialog box, select the following:

**IMPORTANT**

Be careful to enter the CPM Parameters correctly. You will not be able to change them after they are entered.

in this field:	enter/select:
CPM Name	CPM0101
Network Type	ControlNet
Driver Name	AB_PCIC-1
Supervisory MAC Address	01 (for the ControlNet 1756-CNB card)
Supervisory Slot Number	00
CPM Slot Number	01
CEE Name	CEE0101

**SYSTEM:CPM Block, CPM01 - Parameters [Project]**

CPM/CEE Operations | Server Parameters |

**CPM**

Name:

Network Type:

Driver Name:

Supervisory MAC Address:  Supervisory Slot Number:

CPM Slot Number:

Command:  Status: OK

Enable Scheduled I/O Traffic

**CEE**

Name:

Command:  Peer Update Rate:

Status: IDLE Base Execution Period:

This controller is redundant

Secondary CPM:

Redundancy Capability: OFF Synchronization State: NOTINSYNC

Show Parameter Names

OK Cancel Help

3. Click OK to close the CPM Parameters dialog box.
4. To see your newly configured CPM and CEE, click the Project tab.

**TIP**



To see the CPM and CEE, you may need to expand the Root branch of your tree by clicking the small “+” sign to the left of the word Root.

The CEE is listed under the CPM and is connected directly to it. This tells you that the CEE is assigned to the CPM.

5. Load the CPM and the CEE:
  - a. In the project tab, click CPM0101.
  - b. From the Toolbar Menu, click the green down arrow.  
The Load dialog box appears.
  - c. Verify the selected object is CPM0101, and click OK.
  - d. Click the Monitoring tab to verify that the loaded CPM and CEE can be seen.

**TIP**



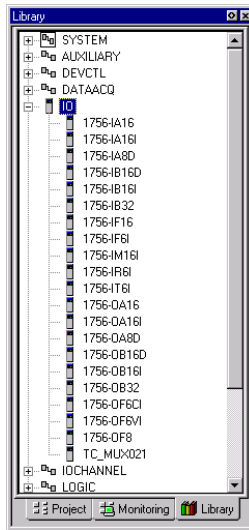
Loading the CPM also loads the corresponding CEE. To see the CPM and CEE in the Monitoring tab, you may need to expand the Root branch of your tree by clicking the small “+” sign to the left of the word Root. The CPM and the CEE should appear blue.

## Configuring I/O Modules

Once you have created a controller, the next step is to configure the I/O modules you will use in your system.

Before you can configure a module, you must add it from the library to your project:

1. Click the Library tab.
2. Click the + to the left of the IO icon to see a list of available modules.

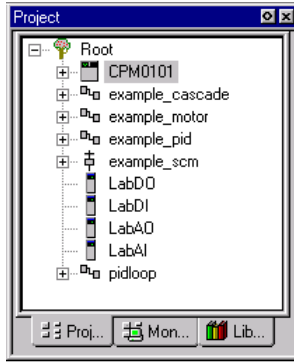


3. Create the I/O module blocks by dragging and dropping these modules, in the order listed below, from the Library tab to the Project tab Root (on the second tree display). You are prompted to change the I/O module name as they are added.

Catalog Number	Name
1756-IF6I	LabAI
1756-OF6CI or 1756-OF6VI	LabAO
1756-IB16I	LabDI
1756-OB16I	LabDO

**TIP**

In the Project tab, you can see the modules displayed under Root.



### Configuring analog input modules

To configure an analog input module:

1. Double-click the IOM with the name LabAI.

This brings up the window for the 6-channel isolated analog input module (1756-IF6D).

2. On the IOM Configuration window, select the Main tab and enter the following parameters:

<b>in this field:</b>	<b>enter:</b>
IOM Slot Number	the slot number containing this module (remember that chassis numbering begins with 0)
Remote I/O Chassis Mac Address	0 (this indicates module in same rack as controller)
ControlNet Module Slot Number	0

3. Select the Channel Configuration tab and enter the following parameters for all channels:

<b>in this field:</b>	<b>select:</b>
Input Range	0V to 10V
Notch Filter	60Hz

4. Click OK.

## Configuring analog output modules

To configure an analog output module:

1. Double-click the IOM named LabAO.

This brings up the window for the 6-channel isolated analog output module (1756-OF6CI; current output, or 1756-OF6VI; voltage output).

2. On the IOM Configuration window, select the Main tab and enter the following parameters:

<b>in this field:</b>	<b>enter:</b>
IOM Slot Number	the slot number containing this module
Remote I/O Chassis Mac Address	0
ControlNet Module Slot Number	0

3. Select the Channel Configuration tab and enter the following parameters for all channels:

<b>in this field:</b>	<b>enter:</b>
Shed to Safe Value	unchecked
Calibration Bias	0

4. Click OK.

## Configuring digital input modules

To configure a digital input module:

1. Double-click the IOM with the name LabDI.

This brings up the window for the 16-channel, 24V DC isolated analog input module (1756-IB16I).

- On the IOM Configuration window, select the Main tab and enter the following parameters:

<b>in this field:</b>	<b>enter:</b>
IOM Slot Number	the slot number containing this module
Remote I/O Chassis Mac Address	0
ControlNet Module Slot Number	0

- Select the Module Configuration tab.
- In the Filter Times fields, select 1MSDELAY for all channels.

Filter Times		
	OFF -> ON	ON -> OFF
Channels 0 - 7	1MSDELAY	1MSDELAY
Channels 8 - 15	1MSDELAY	1MSDELAY

- Click OK.

## Configuring digital output modules

To configure a digital output module:

- Double-click the IOM named LabDO.

This brings up the window for the 16-channel, 24V DC isolated discrete output module (1756-OB16I).

- On the IOM Configuration window, select the Main tab and enter the following parameters:

<b>in this field:</b>	<b>enter:</b>
IOM Slot Number	the slot number containing this module
Remote I/O Chassis Mac Address	0
ControlNet Module Slot Number	0

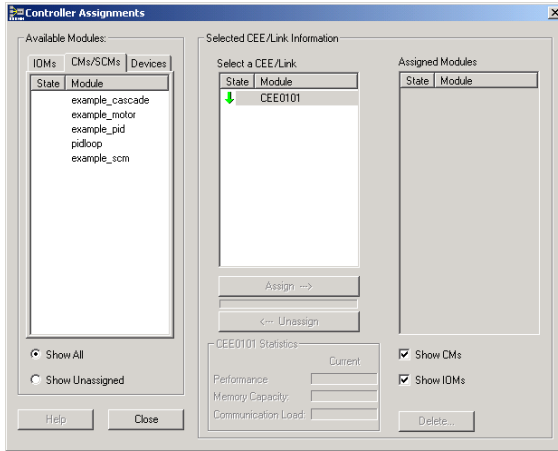
- Click OK.

## Assigning Modules to a Controller Execution Environment

Once you have configured I/O modules, you must assign them to the controller execution environment (CEE). To assign modules to the CEE:

1. From Control Builder, select Tools⇒Assign.

You see the Controller Assignments window:



2. Click the IOMs tab in the Available Modules area.
3. To select all four modules, click the first module, hold down the Shift Key, and click the last module.
4. Select CEE0101 from the Select a CEE/Link box.
5. Click Assign.

After a few seconds, the IOMs are displayed in the Assigned Modules list box. This indicates that the I/O modules you just assigned are being used by the selected CPM/CEE, and cannot be assigned to other CPMs.

6. After the modules are assigned, click close.

7. Locate the Labx I/O modules in the CEE0101 folder of the Project tab.

**TIP**



To locate the IOMs, you may need to expand the CEE and I/O branches of the tree in the Project tab.

8. Load the IOMs by doing the following:
  - a. Select all of the IOMs in the I/O list area.

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**ATTENTION**

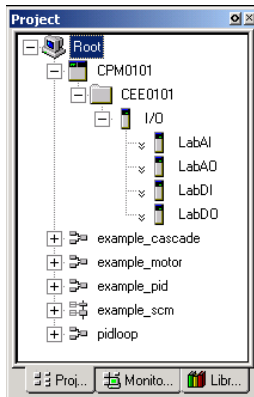


Load only the I/O modules that physically exist in the chassis.

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- b. Click the green down arrow (load) in the toolbar.  
The Load dialog box appears.
- c. Verify that the I/O modules are all checked and click OK.

The assigned I/O modules appear under their CPM in the Monitor and Project tabs.



**TIP**



In Monitoring tab:

- blue indicates “inactive,”
- green indicates “active and OK.”
- red indicates “active and failed.”

Double-click the I/O module in the Monitoring tab to see connection status on the Module Configuration tab.



## Creating a PID Loop

The next step is to create a Control Module to control a process. In this example, we create a PID loop.

### Creating the Control Module

To create the Control Module:

1. Click File⇒New⇒Control Module. You see a blank window for the Control Module in the center of your screen.
2. Rename the Control Module:
  - a. Double-click anywhere in the CM Window. You see the Parameter window.
  - b. In the Name field, enter FIC102.
3. Select the Server tab and enter the following parameters:

<b>in this field:</b>	<b>enter</b> (not case-sensitive):
Point Detail Page	sysdtlpida.dsp
Group Detail Page	sysgrppida.dsp

4. Click OK to close the Parameter window.
5. Save your changes by clicking File⇒Save. Notice that the new Control Module name appears in the Project Tab.
6. Close the Control Module FIC102.

## Assigning the Control Module to the Controller Execution Environment

To assign the Control Module for the PID loop to the CEE:

1. From Control Builder, select Tools⇒Assign.
2. On the Controller Assignments window, click the CMs/SCMs tab in the Available Modules box.
3. Select FIC102 from the Available Modules box.
4. Select the CEE0101 from the CEE/Link box and click Assign.

The FIC102 module is displayed in the Assigned Modules box.

5. Close the Controller Assignments window.

## Building the PID Loop

To develop the PID loop:

1. In the Project tab, open the Control Module by double-clicking FIC102.
2. Click the Library tab.
3. Display the available function blocks by clicking the + to the left of the appropriate library in the tree display.
4. Click the desired block, then drag and drop it onto the your diagram.
5. Rename the block by double-clicking the block to bring up the Parameters window.
6. Add the following function blocks to the Control Module:

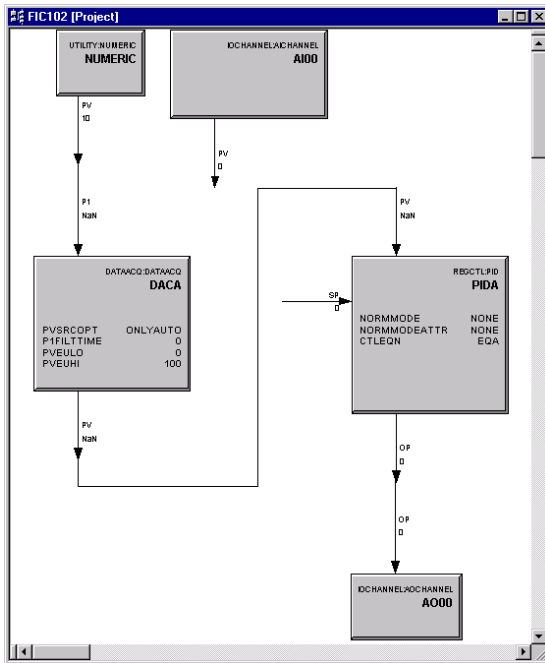
<b>In this library:</b>	<b>Choose this function block:</b>	<b>Rename:</b>
DATAACQ	DATAACQ	DACA
IOCHANNEL	AICHANNEL	AI00
IOCHANNEL	AOCHANNEL	A000
REGCTL	PID	PIDA
UTILITY	NUMERIC	NUMERIC

## Wire the blocks

### IMPORTANT

The Numeric block you created enables you to simulate a control loop. For this loop to work properly, do not wire the AICHANNEL block.

Adjust your blocks to look similar to the window below.



1. Double-click the source wire. The cursor changes to a “+”.
2. Click the destination wire.

### TIP



For additional wire segments as you draw your wire, click the left mouse button.

## Configure parameters

1. Double-click the NUMERIC block. You see the Numeric Parameters window.
2. Enter 10 in the Actual Value field.
3. Click OK.
4. Double-click the PID block. You see the PID Parameters window.
5. Click the Algorithm tab.
6. Enter these parameters:

<b>in this field:</b>	<b>enter:</b>
T1	0.1
T1 High Limit	2
High Gain Limit	2
Overall Gain	0.5

7. Click OK.
8. Double-click the AICHANNEL block. You see the AICHANNEL Parameters window.
9. Enter LabAI in the Module Name field.
10. Select Channel 0.
11. Click Assign Channel Block.
12. Click OK.
13. Double-click the AOCHANNEL block. You see the AOCHANNEL Parameters window.
14. Enter LabAO in the Module Name field.
15. Select Channel 0.
16. Click Assign Channel Block.
17. Click OK.

## Enter Alarms

1. Double-click the DATAcq block to display the Parameters window.
2. Click the Alarms tab.
3. Enter these alarms:

### **IMPORTANT**

You must enter the PV High alarm first to enable the PV High High alarm.

type	trip point	priority	severity
PV High	85	High	0
PV High High	95	Urgent	0

4. Click OK.
5. Close the Control Module FIC102.
6. When prompted, click Yes to save changes.

## Downloading the Function Block Diagram to the 1757-PLX52 Control Processor Module

Use this method to download your function block diagram to the Control Processor Module.

1. In the Project tab, click FIC102.
2. From the Toolbar Menu, click the green down arrow to download the function block diagram.
3. Click OK to load the selected object to the CEE.

## Changing the Controller Execution Environment for the 1757-PLX52 Control Processor Module from Inactive to Active

To execute your program, you must change the CEE and CM from inactive to active. Follow these steps to change the CEE, CM, and IOMs to active:

1. In the Monitoring tab, click CEE0101.
2. Select Operate⇒Activate⇒This CEE and its IOMs and CMs.
3. Click Yes to change the state of the selected objects. You see the CEE and everything listed under it in the tree view under the Monitoring tab go solid green.

## Verifying Proper Operation

Follow these steps to verify that your PID loop operates properly:

1. In the Monitoring tab, double-click FIC102. The PID diagram opens.
2. On the PID block, look at the MODE parameter to ensure that it is set to MAN (manual).
3. With the PID block in manual mode, double-click the OP parameter.
4. Set the OP Value in % to 80.
5. Click Yes when prompted to Change Online value and click OK.
6. On the PID block, double-click the MODE parameter and set it to AUTO (automatic).
7. Click Yes when prompted to Change Online Value and click OK.
8. Double-click the setpoint wire (SP) and set the setpoint to 25.
9. Click Yes when prompted to Change Online Value and click OK.

10. Verify that the PID OP output value (displayed near the wire) changes.
11. Change the NUMERIC.PV to 20, then 30.
12. Click Yes when prompted to Change Online Value and click OK.  
  
Observe the OP output of the PID block for changes.
13. Close the diagram **without** saving your changes.

## Viewing Pre-built Screens

To view the pre-built screens provided with the ProcessLogix system:

1. If the Station application program is not running, select Start⇒Programs⇒ProcessLogix Server⇒Station.
2. Click the text box in the upper right corner of the screen (below the toolbar).

to view the detail screen for the:	do this:
Controller	<ol style="list-style-type: none"> <li>1. Type <b>CPM0101</b> in the box.</li> <li>2. Press <b>[F12]</b>.</li> </ol>
CEE	<ol style="list-style-type: none"> <li>1. Type <b>CEE0101</b> in the box.</li> <li>2. Press <b>[F12]</b>.</li> </ol>
PID loop	<ol style="list-style-type: none"> <li>1. Type <b>FIC102</b> in the box.</li> <li>2. Press <b>[F12]</b>.</li> </ol>
I/O modules	<ol style="list-style-type: none"> <li>1. Type the name of the I/O module in the box. [for example, LabA1]</li> <li>2. Press <b>[F12]</b>.</li> </ol>
Alarms	Click the red, blinking alarm indicator at the bottom of the screen, or click the Alarm icon in the toolbar menu.

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