Automation College

Workbook For:

Name: ___________

Company:

Course Date: ___________

Course Number: 431R400

11/15/2001

Name _______________ **Date** _______________

431R400

PlantScape Controller Implementation

Course Description

This five day course is designed to enable the student to configure and program the PlantScape Controller. The course has a real world context and all exercises are used to create a functional hybrid control application. In addition, it provides instruction on server ControlNet configuration and the use of Knowledge Builder.

Course Modules

Module Name	Module No.	Time (hrs)	Student Signoff	Manager Signoff
Course Description and Modules	M431R400	0	___________	______________
PlantScape Controller Implementation Bk1	431Book1	0	___________	______________
Introduction to PlantScape	431U1Intro	0	___________	______________
Navigating Knowledge Builder	431U1L1	0	___________	______________
Using Control Builder	431U1L2	0	___________	______________
Configuring Your Server	431U1L3	0	___________	______________
Unit 1 Exam	431U1tst	0	___________	______________
Use and Configuration of PlantScape Hardware	431U2Intro	0	___________	______________
PlantScape Hardware Configuration	431U2L1	0	___________	______________
Configuring a Control Processor Module (CPM)	431U2L2	0	___________	______________
Configuring Digital and Analog IOMs	431U2l3	0	___________	______________
PlantScape Ntools Familiarization	431U2L4	0	___________	______________
Unit 2 Exam	431U2tst	0	___________	______________
Introduction to Creating Control Modules	431U3Intro	0	___________	______________
Configuring a Continuous Control Strategy	431U3L1	0	___________	______________
Configuring the Heat Cascade	431U3L2	0	___________	______________
Loading, Activating, and Operating Control Modules	431U3L3	0	___________	______________
PlantScape DbAdmin Familiarization	431U3L4	0	___________	______________
Unit 3 Exam	431U3tst	0	___________	______________
Device Control CMs	431U4Intro	0	___________	______________
Configuring a 2-State Device Control CM	431U4L1	0	___________	______________
Configuring a 3-State Device Control CM	431U4L2	0	___________	______________
Control Module Skill Development	431U4L3	0	___________	______________
Unit 4 Exam	431U4tst	0	___________	______________
Creating Auxiliary CMs	431U5Intro	0	___________	______________
Configuring a Reg Control CM with Simulated I/O	431U5L1	0	___________	______________
Configuring a Flow Totalizer	431U5L2	0	___________	______________
Building Level Indicators	431U5L3	0	___________	______________
Building a Digital Input CM	431U5L4	0	___________	______________
Unit 5 Exam	431U5tst	0	___________	______________
Interlocks and Messages	431U6Intro	0	___________	______________
Configuring Operational Interlocks	431U6L1	0	___________	______________
Configuring Safety Overide Interlocks	431U6L2	0	___________	______________
Manual Operation	431U6L3	0	___________	______________
Configuring Message Blocks	431U6L4	0	___________	______________
Unit 6 Exam	431U6tst	0	___________	______________
Book 1 Appendix: CM Solutions	431BK1Appnd	0	___________	______________
PlantScape Controller Implementation Bk2	431Book2	0	___________	______________
Introduction to Sequential Control Modules	431U7Intro	0	___________	______________
Understanding Sequential Control Modules	431U7L1	0	___________	______________
Understanding the Temperature Control SCM	431U7L2	0	___________	______________
Operating Sequential Control Strategies	431U7L3	0	___________	______________
Unit 7 Exam	431U7tst	0	___________	______________
SCM Functionality	431U8Intro	0	___________	______________

Creating an SCM (SCM_XFERA)	431U8L1	0	___________	______________
Using Confirm Messages in SCMs	431U8L2	0	___________	______________
Creating A Supervisory SCM (SCM_REACTR)	431U8L3	0	___________	______________
Capturing History Values	431U8L4	0	___________	______________
Creating Handlers	431U8L5	0	___________	______________
Creating a Common SCM (SCM_XFER)(Optional)	431U8L6	0	___________	______________
Unit 8 Exam	431U8tst	0	___________	______________
Import/Export Introduction	431U9Intro	0	___________	______________
Import/Export	431U9L1	0	___________	______________
Appendix Book 2: Groups	431BK2Appnd	0	___________	______________
PlantScape Controller Implementation Bk3	431Book3	0	___________	______________
Process Description	431ProcessIntro	0	___________	______________
PlantScape System Introduction	431Overview	0	___________	______________
Control Builder Navigation	431U2L1-D	0	___________	______________
Controller Configuration	431U2L2-D	0	___________	______________
I/O Module Configuration	431U2L3-D	0	___________	______________
Ntools	431U2L4-D	0	___________	______________
Control Modules (CMs)	431U3L1-D	0	___________	______________
Control Strategy Execution	431U3L2-D	0	___________	______________
Configuring a Device Control Block	431U3L3-D	0	___________	______________
Database Administration (DBAdmin)	431U3L4-D	0	___________	______________
Sequential Control Modules	431U4L1-D	0	___________	______________
SCM Activation	431U4L2-D	0	___________	______________
428 Additional Topics	431U5L1-D	0	___________	______________
Criterion Test Answer Key	TstAnsrscover	0	___________	______________
Unit 1 Exam Answers	431U1ans	0	___________	______________
Unit 2 Exam Anxwers	431U2ans	0	___________	______________
Unit 3 Exam Answers	431U3ans	0	___________	______________
Unit 4 Exam Answers	431U4ans	0	___________	______________
Unit 5 Exam Answers	431U5ans	0	___________	______________
Unit 6 Exam Answers	431U6ans	0	___________	______________
Unit 7 Exam Answers	431U7ans	0	___________	______________
Unit 8 Exam Answers	431U8ans	0	___________	______________

\+ Course manager approved equipment required.

* Optional - check with your course manager.

PlantScape
Controller Implementation
Course 431 Book 1

Release 400
11/01

Release 400

Notices and Trademarks

Honeywell Inc.

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About This Document

References

The following list identifies all **PlantScape** documents that may be sources of reference for the material discussed in this publication.

Document Title	Doc. ID
Knowledge Builder	TC - DCDX11

Contacts

World Wide Web

The following lists Honeywell's World Wide Web sites that will be of interest to our industrial automation and control customers.

Honeywell Organization	WWW Address (URL)
Corporate	*http://www.honeywell.com*
Industrial Automation and Control	*http://www.iac.honeywell.com*
International	*http://www.honeywell.com/Business/global.asp*

Telephone

Contact us by telephone at the numbers listed below.

	Organization	Phone Number
United States and Canada	Honeywell Inc. Industrial Automation and Control *Phoenix, Arizona U.S.A.*	1-800-343-0228 Sales 1-800-525-7439 Service
Asia Pacific	Honeywell Asia Pacific Inc. *Hong Kong*	(852) 8298298
Europe	Honeywell PACE *Brussels, Belgium*	[32-2] 728-2111
Latin America	Honeywell inc. *Sunrise, Florida U.S.A.*	(305) 364-2355

Unit 1

Introduction
To
PlantScape

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PlantScape Controller Implementation

Lesson 1

Navigating Knowledge Builder

1 - 3

Notes

Introduction

The purpose of this Lesson is to give you the information to be able to navigate Knowledge Builder. After you complete this Lesson you should be able to identify the procedures to navigate Knowledge Builder.

Objectives

❶ Given a list of statements, correctly identify the methods of accessing Knowledge Builder

❷ Given a list of definitions, correctly identify the definitions of Knowledge Builder Guide, Reference Manual and Theory Manual

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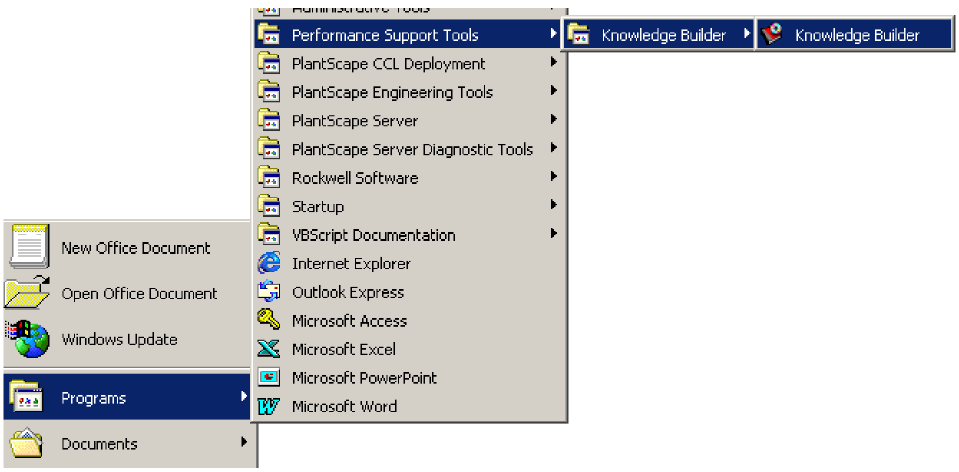
Starting Knowledge Builder

From the Windows NT Taskbar

Click:

- **Start**
  - **Programs**
    - **Performance Support Tools**
      - **Knowledge Builder**
        - **Knowledge Builder**



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Notes

Starting Up Knowledge Builder

You can start up the PlantScape Knowledge Builder from Windows using

• Windows NT Taskbar menus

Additionally, once Control Builder and the Station application are running, you may access the Knowledge Builder from

• the pull-down help menus (Help -> Knowledge Builder)

• online help displays via buttons (F1, Help) or hyper-text links (Control Builder only)

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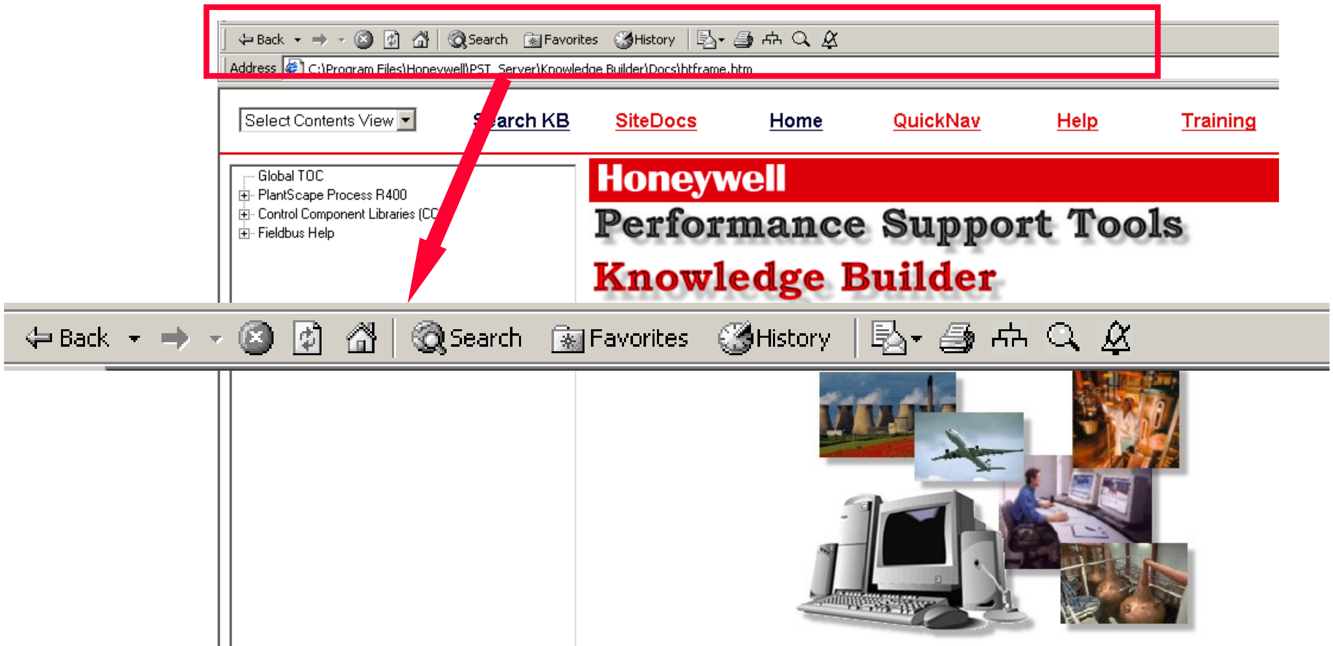
Using the Main Menu

Browser window

- unique to your browser and includes generic browser functions



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Notes

The Main Menu gives you a graphical easy-to-navigate interface for accessing PlantScape information. The Main Menu consists of two windows

- Browser Window
- Standard Targets Window

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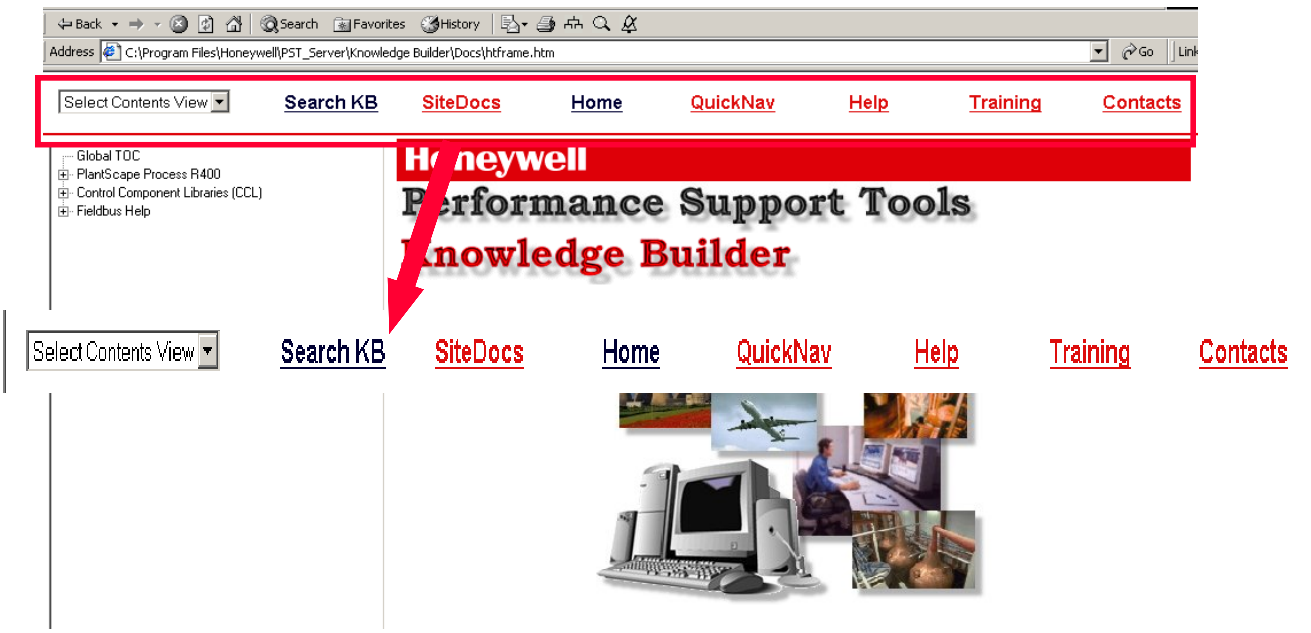
Using the Main Menu

Standard Targets window

- always visible, this window provides access to KB specific navigation tools



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Notes

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Using the Standard Targets

Standard Target	Function
Search KB	- opens the Knowledge Builder search function, which allows users to search for key words throughout the online documents and Site Docs.
SiteDocs	- a purchasable feature of Knowledge Builder that allows users to access and view their own files through the Knowledge Builder browser. SiteDocs also allows for Administrative controls including the monitoring of Users' history. A limited version of SiteDocs is provided with Knowledge Builder for evaluation purposes.
Home	- opens the main page of Knowledge Builder, giving the user access to the online documents grouped by job function, as well as access to the Feedback system.

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Notes

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Using the Standard targets ... continued

Standard Target	**Function**
QuickNav	- takes you to details of either Function Blocks, or of all hardware pertaining to PlantScape including the C200 and its IO modules as well as all non-hybrid controllers.
Help	- opens the online documentation about Knowledge Builder's functions and features.
Training	- provides to the Automation College web page
Contacts	- lists the sales and service telephone numbers of regional Honeywell offices in the United States and Canada.

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Notes

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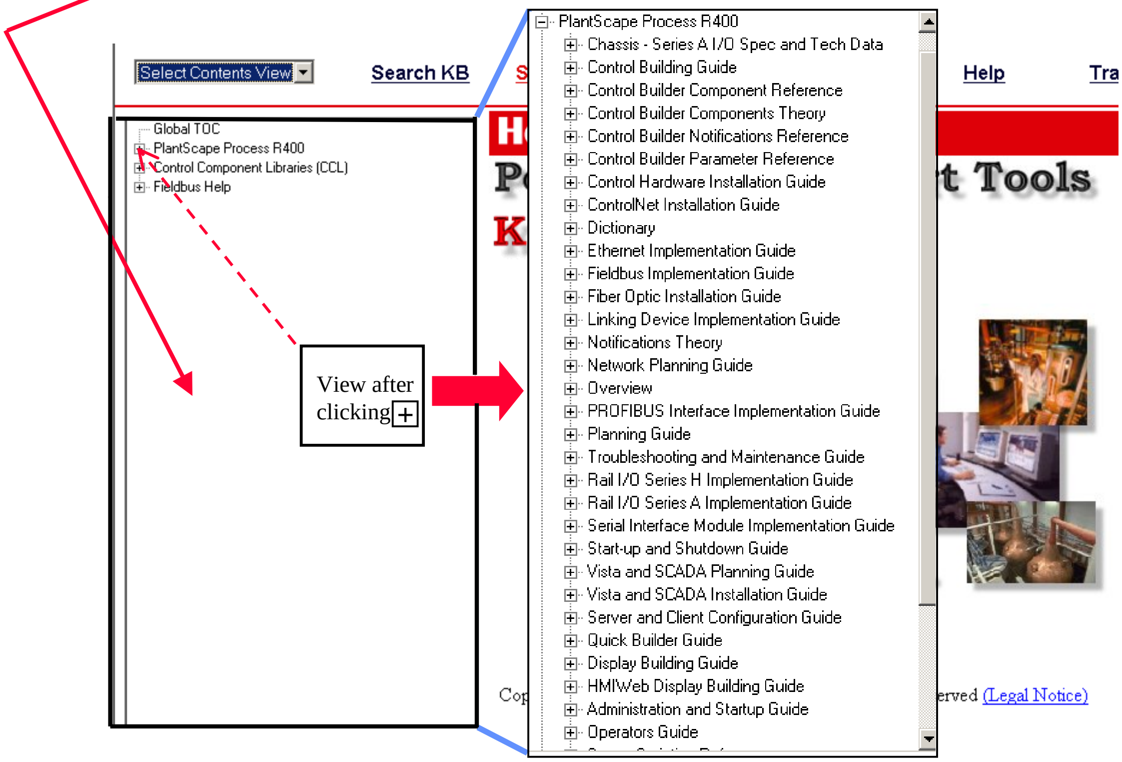
KB Screen Layout

Tree Window

- displays the documents to select from for information.



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Notes

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Information window

- displays all Knowledge Builder information

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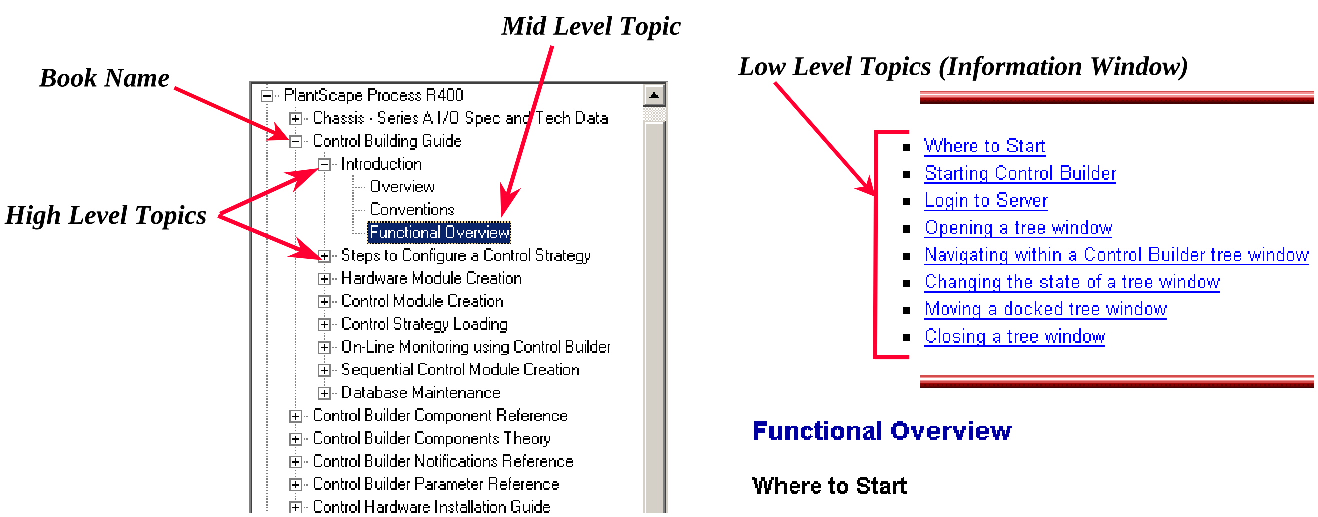
Notes

Accessing Information

Global Table of Contents

- The Global Table of Contents contains a list of all available information components.



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Notes

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Navigating within an Information Component

Global Table of Contents . . . *continued*

Topic Level	Definition and Functionality
High-Level Topics	**High Level Topics** include the document's name and its first heading level. High-level topics are not selectable and serve only to structure mid- and lower-level topics in the table of contents.
Mid-Level Topics	A **Mid-Level Topic** is the second heading level within a document. A separate page exists in Knowledge Builder for each mid-level topic. This page may contain multiple lower-level topics. A mid-level topic is selectable from the tree-view table of contents by clicking that topic with the mouse.
Low-Level Topics	A **Low-Level Topic** is the heading list at the top of each Knowledge Builder page. The list contains hyperlinks which, when clicked, take you to the heading's location on that page.

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Notes

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Accessing Information from a hyperlink

- Activating a hyperlink from within an information component

Step	Action
1	Click the hyperlink in the information component.
2	To return to the original topic, click the Back icon in the browser toolbar at the top of the screen.

Underlined Blue Text

"See the *PlantScape System Administration Guide* for details on establishing groups and adding user accounts."

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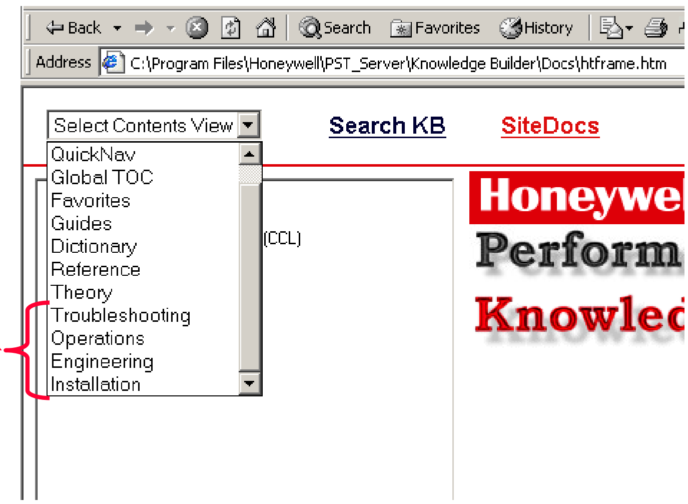
Notes

Accessing Information Through Menu

Accessing by Job Function

- Trouble Shooting
- Operations
- Engineering
- Installation



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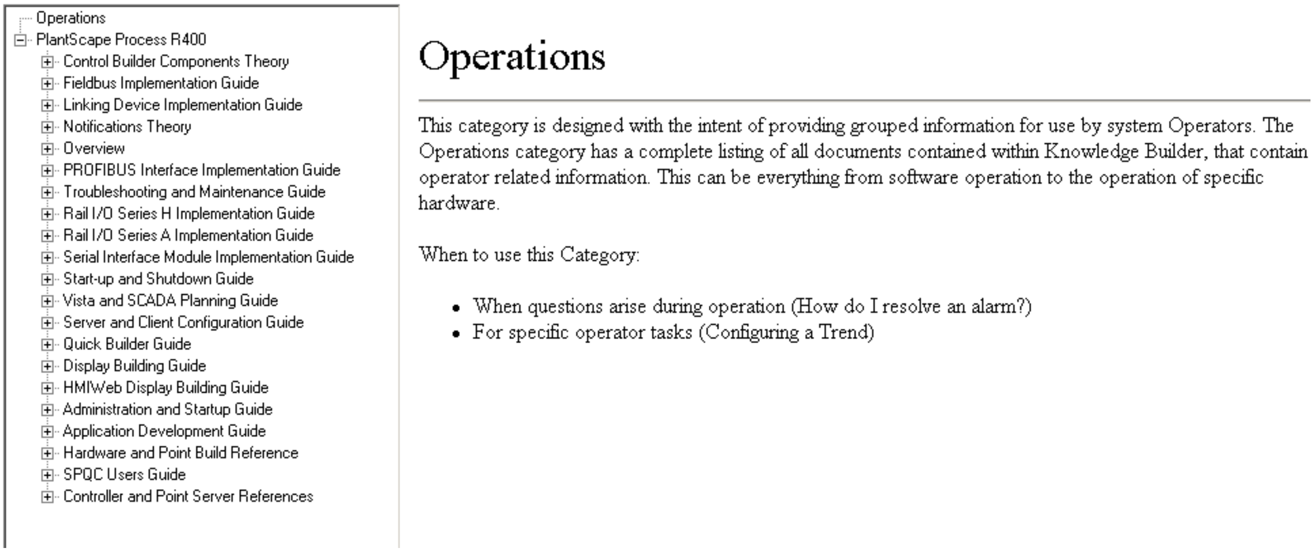
Notes

Accessing by Job Function . . . *continued*

- **Example 1**
  - Clicking on **Operations** will display an associated list of information components



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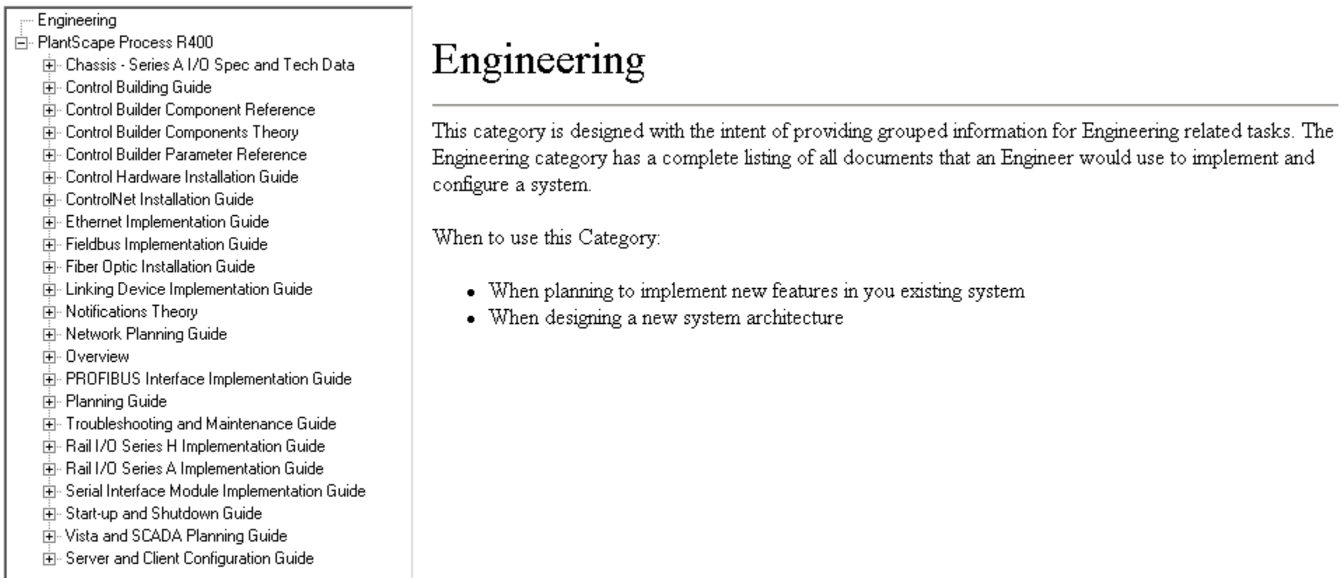
Notes

Accessing by Job Function *. . . continued*

- **Example 2**
  - Clicking on the **Engineering** Button will display a different list of information components based on the needs of this job function



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Notes

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Accessing by Information Type

- Information components are grouped according to the following information types

Information Type	Definition	Examples
Guides	**"How to"** procedures	• *Control Building Guide* • *ControlNet Installation Guide*
Reference	**"Look Up Data"** not normally read cover to cover	• *Control Builder Parameter Reference* • *Control Specifications Reference*
Theory	**"How it works"** theory of operation	• *Control Builder Components Theory* • *Notifications Theory*

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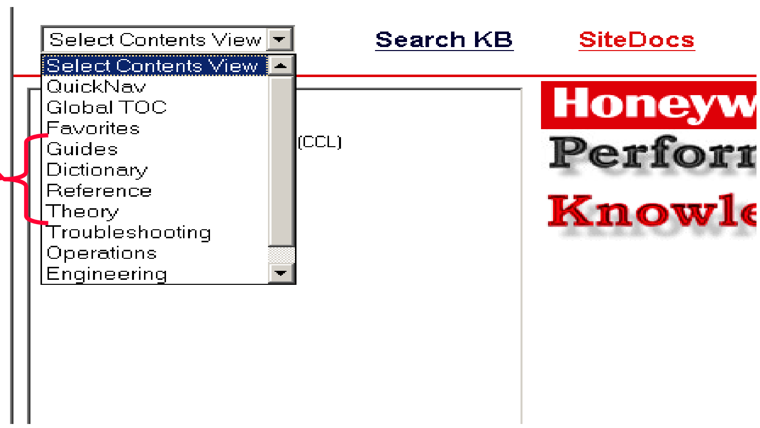
Notes

Accessing by Information Type

- Guides
- Reference
- Theory



- Note: Dictionary takes you to the dictionary for acronyms and definitions

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Notes

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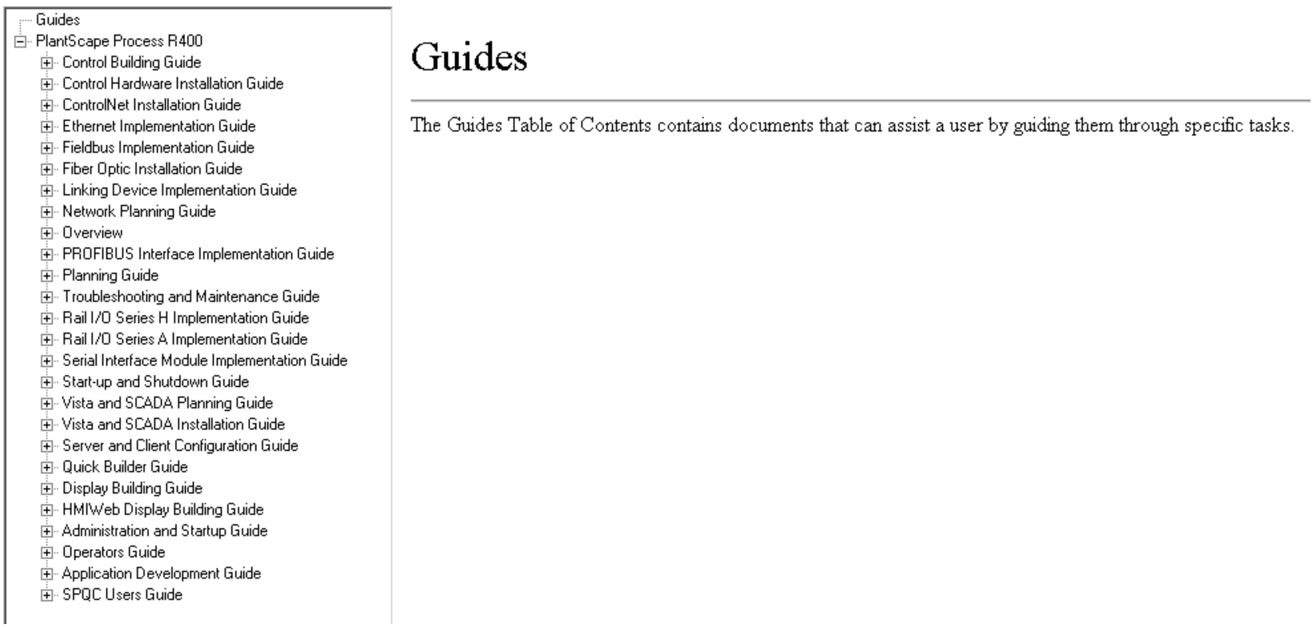
Accessing by Information Type . . . *continued*

- **Example**
  - Clicking on **Guides** will display a selection list of all Guide-type books



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Notes

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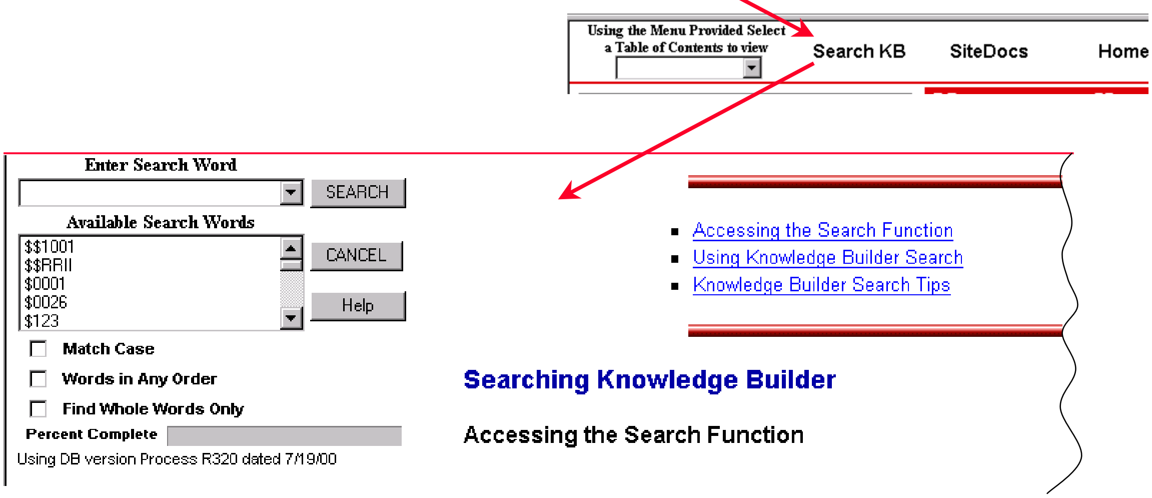
Searching Knowledge Builder

Search Function from Knowledge Builder

- From Knowledge Builder, click the **Search KB** toolbar target. The Knowledge Builder Search user interface appears:



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Notes

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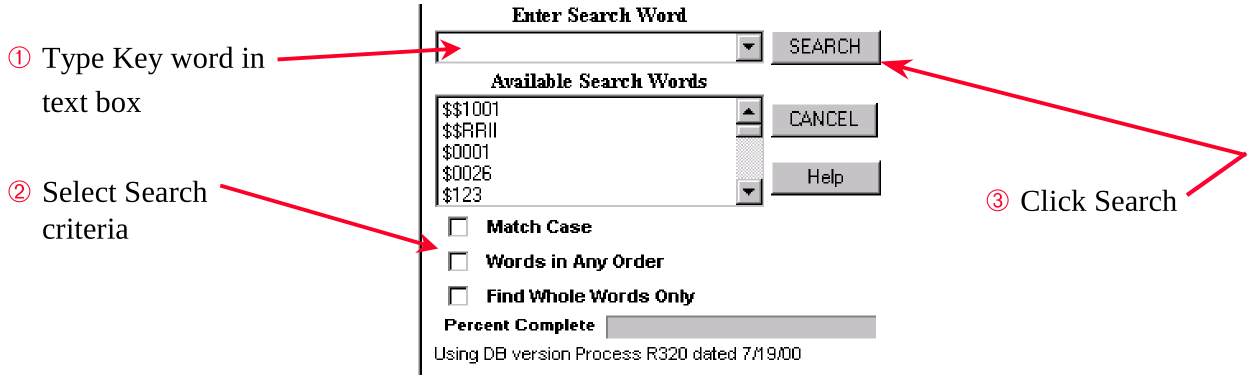
Searching the PlantScape Knowledge Builder ...*continued*

Using the Knowledge Builder Search User Interface



- The result is a tree view selection list of all references to the search key word

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Notes

Step	Action
1	Type in text you wish to search for or select (double-click) keyword(s) from the list (Can be up to three individual words)
2	Select search criteria **Match Case -** locates matches with same case (upper or lower case) as entered text. **Words in Any Order -** locates words in any order within a low level topic. For example, if you search for system security using this criteria, search results will include matches such as "system level security" and "security of the system". **Find Whole Words Only -** locates whole word matches of entered text (that is, matches that are not part of another word).
3	Click Search. Matches will display in the Knowledge Builder Global Access Window sorted by document.
4	Click a topic in the match list to display in the main browser window.

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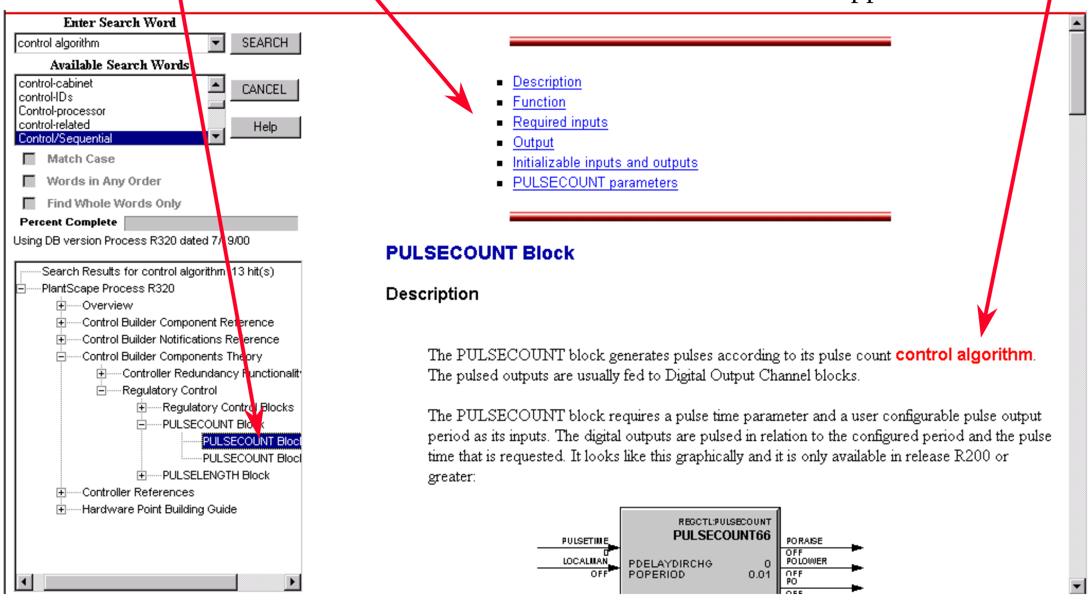
Searching the PlantScape Knowledge Builder ...*continued*

Using the Knowledge Builder Search User Interface

- Click a topic as desired.
- The selected topic displays in the information window.
- The word or phrase searched for will appear in red



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Notes

Knowledge Builder Search Tips

1. For some searches the number of hits is so large that you need to refine the search using different search words or phrases, and using the search criteria choices.

2. The match results will always display the high level topic. Scroll through the topic to locate the specific matched item.

3. Always select Match Case and Find Whole Words Only when looking for instances of logical expression of function block names such as “AND”.

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Printing Topics in the PlantScape Knowledge Builder

Using the Browser Print button

- Select the window you wish to print
- Click the **Print** button.

Using the File Print command

- Select the window you wish to print
- Click **File** -> **Print**
- Select desired printing options.
- Click **OK** in the Print window

Using the right mouse button

- Right-click in the window you wish to print
- Click **Print**
- Select the frame type you want to print
  (As laid out on screen, Only the selected frame, All frames individually)
- Click the **OK** button

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Notes

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This completes….

PlantScape Controller Implementation

Lesson 1

Navigating Knowledge Builder

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Notes

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PlantScape Controller Implementation

Lesson 2

Using Control Builder

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Notes

Introduction

The purpose of this Lesson is to give you the knowledge to be able to open and operate Control Builder. After you complete this Lesson you should be able to identify the procedures to operate Control Builder.

Objectives

❶ Identify the tab used to make structural changes to an existing Control Module.

❷ Identify the tab used to change parameters on line

❸ Given a statement on backing up your controller data base, identify whether the statement is correct.

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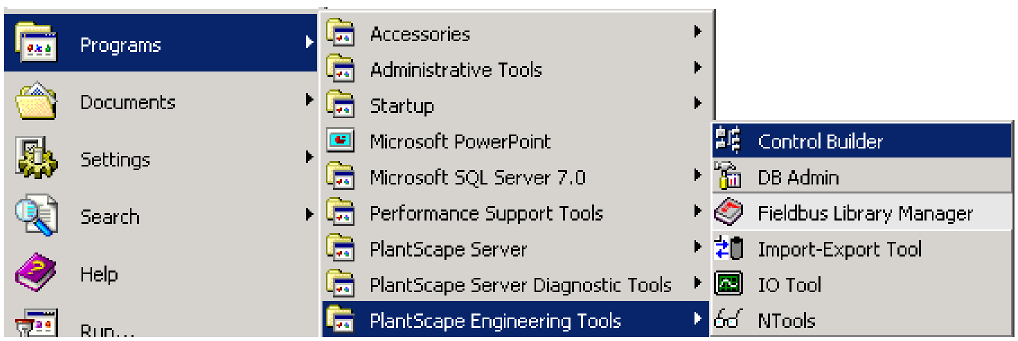
Starting Control Builder

From the Windows NT Taskbar

- From the lower-left corner of your Windows NT desktop, click
  - **Start**
    - **Programs**
      - **PlantScape Engineering Tools**
        - **Control Builder**



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Notes

Control Builder From Desktop

Control Builder can be accessed from the desktop from PlantScape Engineering Tools

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Logging onto Control Builder

Logon Procedure

- Input your ID, password and target Server in the dialog box

- Upon successful logon, your access level appears in the lower right corner of Control Builder

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Notes

Logon procedure

Since R300, Control Builder requires the user to logon. The logon profile that Control Builder uses is that of the Operator profile in PlantScape server.

The profile contains the access level of the user, i.e., Lvl1, Lvl2, Oper, Supv, Engr, or Mngr. Lvl1 and 2 are view only, Oper and Supv allow operations, and Engr and Mngr allow configuration.

If you do not have an Operator profile, Control Builder opens at Lvl1 access.

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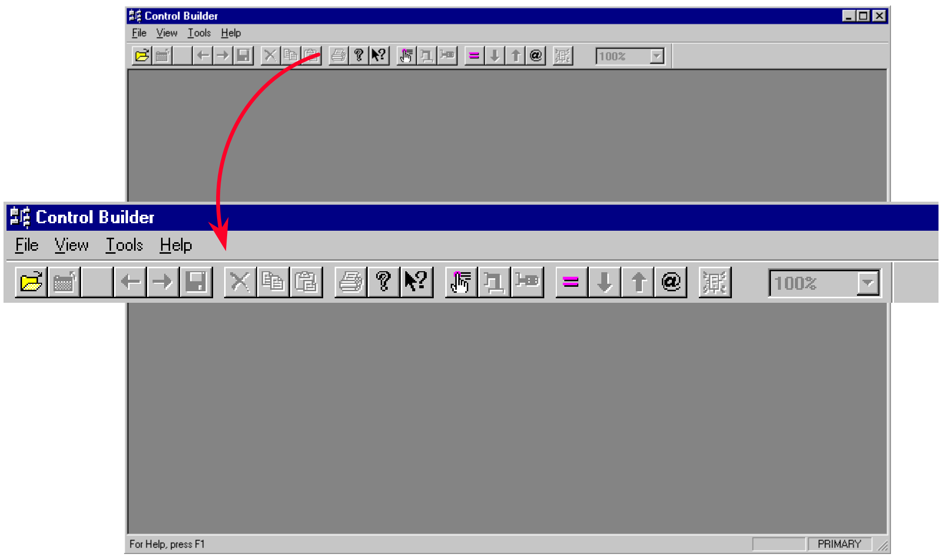
Using the Toolbar

Toolbar

- Not all of the toolbar features will be available until Control Builder items have been opened



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Notes

Toolbar

The toolbar gives you a graphical easy-to-use interface for accessing the different tools available from Control Builder. The tools can also be found by accessing the dropdown menus.

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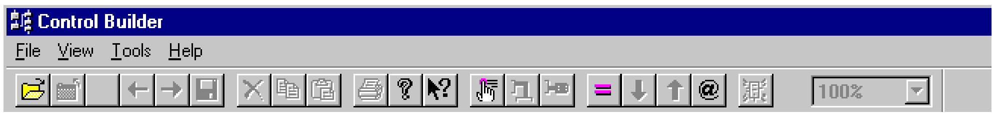
Toolbar



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

1	Open Tree Window
2	Close active Control Drawing or Tree Window
3	Move to the Left
4	Move to the Right
5	Save the active Control Drawing
6	Delete the selected object
7	Copy selection and place on clipboard
8	Paste clipboard contents
9	Print selected pages of active document
10	Display program information

11	Display help information
12	Point Selection Command
13	Create a wire for connecting function blocks
14	Create a Parameter Connector
15	Assign Modules to a Control Execution Environment (CEE)
16	Load selected items
17	Upload parameters of selected items
18	Substitute Name List Command
19	Toggle single item state
20	Change scale dimensions

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Notes

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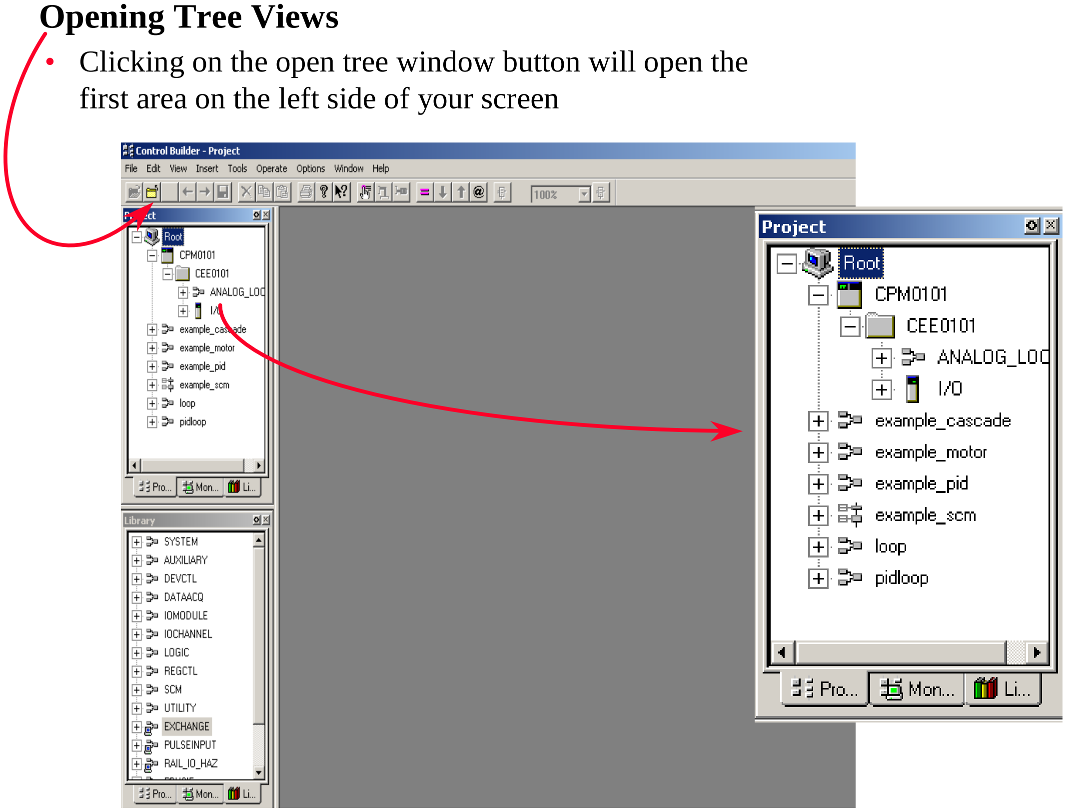
Opening and Using Tree Views

Opening Tree Views

- Clicking on the open tree window button will open the first area on the left side of your screen



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Notes

Opening Tree Views

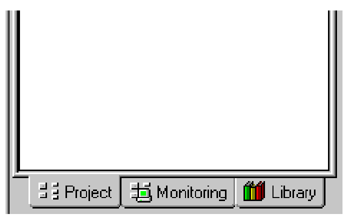
Clicking on the File drop down menu then selecting Open Tree Window will also open the tree view in the drawing area. An additional tree window display may be opened by clicking on the open tree window button a second time. This will permit you to have two views displayed at the same time.

The default for Control Builder is two tree views open on the left border of the main window.

Using Tree Views

- Once the tree view is open you will have a choice of 3 selection tabs

  - **Project** — Displays your CPM, IOMs, CMs and SCMs in the current project
  - **Monitoring** — Displays all objects that have been loaded to the Process Control Module (CPM)
    Permits active modules to be viewed during process
  - **Library** — Displays all available Function Blocks grouped into type categories



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Notes

Project Tab Functionality

- Create new CMs and SCMs
- Define parameter configurations for CMs and SCMs
- Wire components of CMs and SCMs together
- Configure CM and SCM alarms
- Assign CMs and SCMs to CEE
- Open and Edit existing CMs and SCMs
- Save changes
- Load CMs and SCMs to the CPM

Monitoring Tab Functionality

- Open CMs and SCMs for online monitoring
- Activate / Deactivate CMs and SCMs
- Update changes to a project file
- Change controller parameters and upload to the Engineering Repository (ER)
- Change monitoring / configuration parameters on the faceplate of CM blocks

All structural changes to the database must be made in the Project view. Once all changes are complete they must then be reloaded and reactivated

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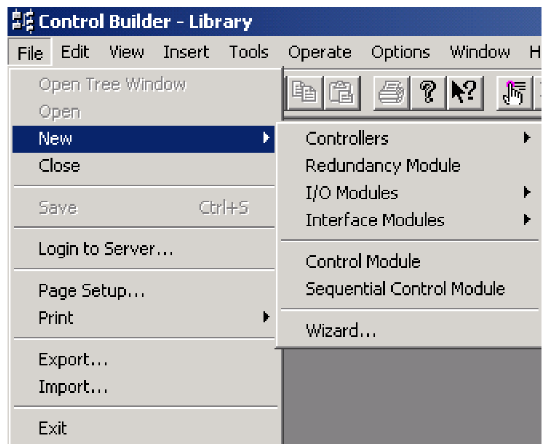
Creating New Devices

Creating From the List

- From the Upper-Left corner of your Windows NT desktop, click
  - **File**
    - **New**
- From here you will have a choice of
  - **Controllers**
  - **Redundancy Module**
  - **I/O Modules**
  - **Interface Modules**
  - **Control Module**
  - **Sequential Control Module**
  - **Wizard ...**



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Notes

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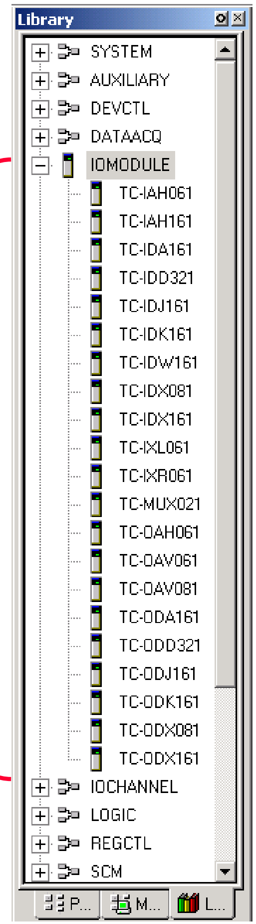
From the Library Tab

Select the **Library** tab from the tree view to display a list of devices

- **SYSTEM**
  - **Control Module**
  - **SCM**
- **IOMODULE**
  - **(All available I/O Modules)**



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Notes

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This completes….

PlantScape Controller Implementation

Lesson 2

Using Control Builder

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Notes

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PlantScape Controller Implementation

Lesson 3

Configuring Your Server

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Notes

Introduction

The purpose of this Lesson is to prepare you to be able to verify that the PlantScape server is configured properly. After you complete this Lesson you should be able to identify the procedures to verify ControlNet communication software and to verify server ControlNet and IP addresses.

Objectives

❶ Gain knowledge required to verify Control Net driver configuration in RSLinx

❷ Gain knowledge required to verify the server's Ethernet configuration and IP addresses

❸ For this class, configure a Station and an Operator profile on the server connected to the controller, along with the appropriate Hosts file to log efficiently into that server

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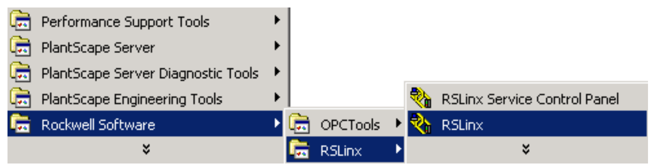
Verifying ControlNet Communication Software & Server Address

Open RSLinx

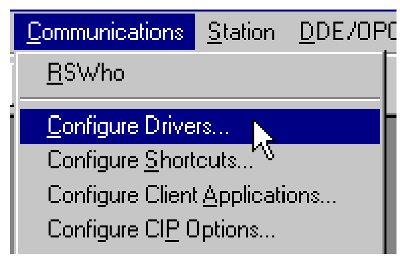
From the lower-left corner of your Windows NT 4.0 Desktop, click

- **Start**
  - **Programs**
    - **Rockwell Software**
      - **RSLinx**
        - **RSLinx**



Verifying ControlNet communication software

- From the Communications Menu, click **Configure Drivers**



1 - 36

Notes

Before you begin

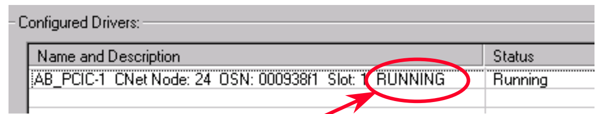
After successfully logging on to your Server for the first time, make sure that your Server has a valid ControlNet address. The Server uses ControlNet to communicate with the PlantScape Hybrid Controller. Each device (i.e., controller, server, or I/O rack) on a particular ControlNet must have a unique address.

Be sure that your communication software is configured correctly. RSLinx software (which is installed as a part of PlantScape server) is used to select and configure the proper driver for the server's PCIC card and to set the server's CNet address.

Honeywell

Verifying ControlNet communication software *…continued*

- In the listing of Configured Drivers, locate the line starting with **AB_PCIC-1 CNet**… *



- Status column should say "Running".

If it…	Then…
reads **"RUNNING"**...	your RSLinx communication software has been configured correctly on your system.
<u>does not</u> read **"RUNNING"**…	you may have a problem requiring assistance from Honeywell's Technical Assistance Center (TAC).

Note: If the status is not "**RUNNING**"in class, check with your course manager.

1 - 37

Notes

Verifying ControlNet communication software

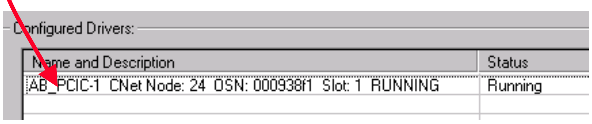
* This section of the module (pages 1-37 through 1-39) assumes a connection from the Server to the C200 through Control Net. If you are using Ethernet to connect, you will see a different driver in the window. Check with your course manager for other differences.

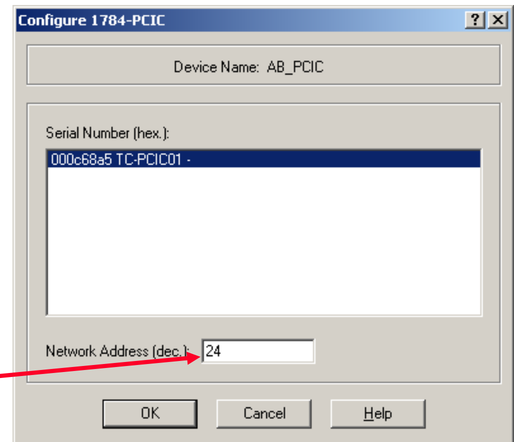
During this Unit, do <u>NOT</u> save any changes unless requested to do so.

Honeywell

Verifying ControlNet server address

- From the Configured Drivers Window, double-click the line that starts **“PCIC CNet…”**





- Observe the Net Address

If…	Then…
it is set to **24**	your RSLinx communication software has been configured correctly on your system.
it is not …	you may have a problem requiring assistance from Honeywell’s Technical Assistance Center (TAC)

1 - 38

Notes

Verifying ControlNet server address

A ControlNet address is also referred to as a Net Address.

CNet address 1 is the “keeper” of the CNet communication configuration settings. This address and configuration must be assigned to a Hybrid controller. Setting the controller address will be covered later in the course.

Honeywell

Verifying ControlNet server address *…continued*

- From the data displayed on your screen, record the:
  - **Net Address** __________

Reminder - in the following steps do not save any changes if prompted to do so.

- Click **OK** to close the **Configure 1784- PCIC Device** screen
- Click **Close** to close the **Configure Drivers** screen
- From File Menu, click **Exit** to close the **Rockwell Software RS Linx** screen.

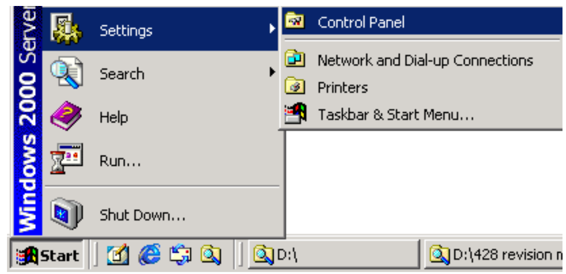
1 - 39

Notes

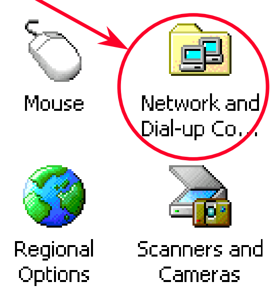
Honeywell

Verifying adapter and IP address

- From the lower-left corner of your Windows NT 4.0 Desktop, click:
  - **Start**
    - **Settings**
      - **Control Panel**



- Double-click the **Network** Icon to access the Network screen.



1 - 40

Notes

Background

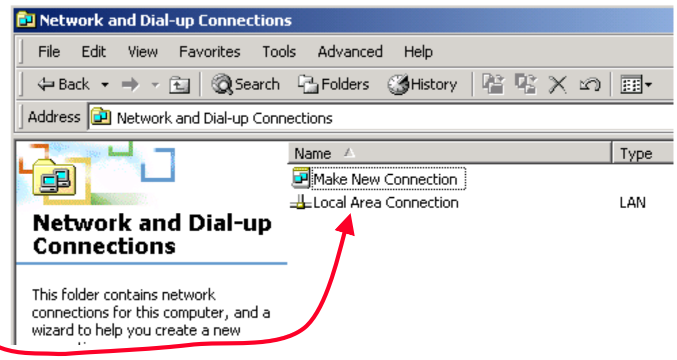
The PlantScape Server uses Ethernet hardware and the TCP/IP protocol to communicate with remote user stations. Even if your system does not have a remote user station, an adapter must be installed and a TCP/IP Address must be configured before PlantScape points can be built.

If your Server doesn't have an Ethernet card installed, your system can be configured to use a Loopback Adapter, This is software that causes the Server to act like an Ethernet card is installed. If your Server must communicate with other computers, you will need a real adapter.

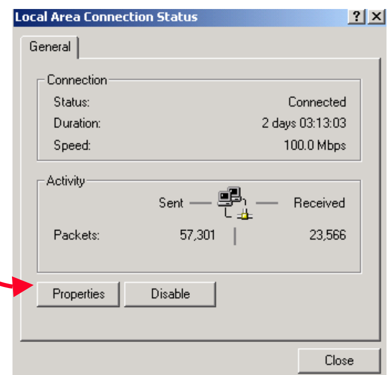
If your system (server and remote stations) will be attached to an existing network, for example your company's LAN, you must get permission from the Network Administrator who controls the other network. The Network Administrator will be able to tell you what IP Addresses to use.

Verifying adapter and IP address *…continued*

- Double click the **Local Area Connection**



- Click the Properties button



1 - 41

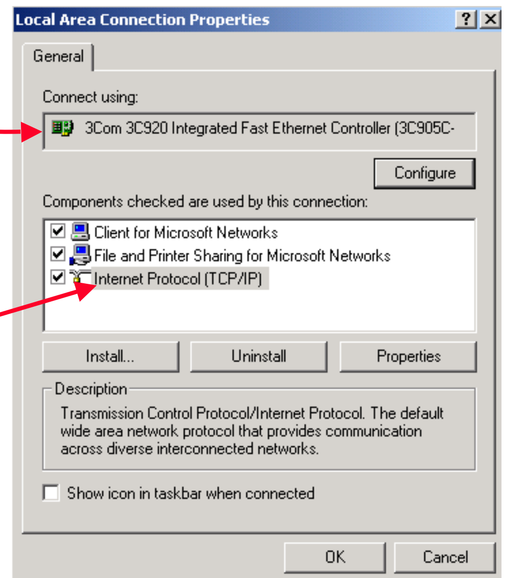
Notes

Honeywell

Verifying adapter and IP address *…continued*

- Observe the displayed network adapter

- Double click Internet Protocol (TCP/IP)



1 - 42

Notes

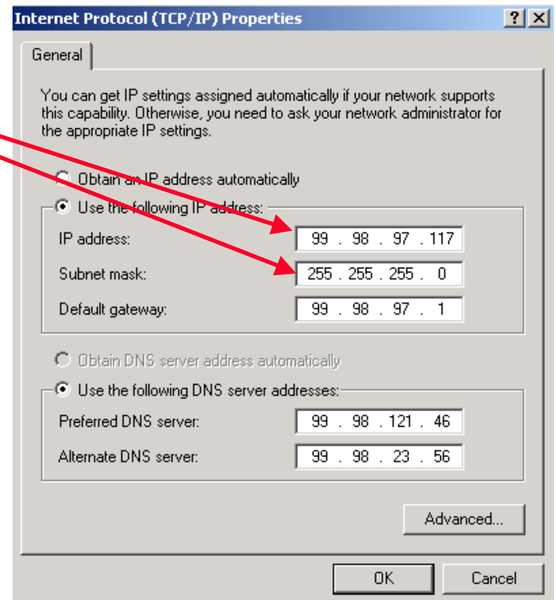
Verifying adapter

If your system will include remote user stations, or if your Server will need to communicate with other computers over an Ethernet network, you must have a configured physical Ethernet adapter. If you purchased an Ethernet adapter from Honeywell at the same time as you ordered your Server, your adapter should be configured for you. If you plan to purchase the Ethernet adapter later, or if you order it from someone other than Honeywell, you will need to configure the adapter yourself.

Honeywell

Verifying adapter and IP address *…continued*

- Note your IP address and Subnet mask



1 - 43

Notes

Honeywell

Verifying adapter and IP address *…continued*

- Record the Ethernet **IP Address** and **Subnet Mask** of your **assigned** server. You will need this information when you connect other computers. (Next page)
  - Ethernet IP Address _____ . _____ . _____ . _____
  - Subnet Mask _____ . _____ . _____ . _____

Closing the network configuration tools

Reminder **-** in the following steps **DO NOT** save any changes if prompted to do so.

- Click **Cancel** to close the **Internet Protocol (TCP/IP) Properties** window.
- Click **Cancel** to close the **Local Area Connection Properties** window.
- Click **Close** to close the **Local Area Connection Status** window
- Click the upper right ☒ button to close the **Network and Dial-up Connections** screen

1 - 44

Notes

Honeywell

Configuration For Class -- Starting PlantScape Services, Adding Stations and Operator Profiles

- **Configure Hosts File**
  - Open **\Winnt\system32\drivers\etc\Hosts** in **Notepad**
  - Add an entry for the server, the PC that is connected through Control Net cable* to your assigned C200 controller (Localhost is already included. If you are sitting at the server no edit is required.)
- **Start PlantScape Services**
  - On the server referenced above, click **Start** → **Programs** → **Administrative** → **Tools** → **Services**
  - Scroll down to eight PlantScape services and change seven **Startup Type** properties from **Disabled** to **Automatic,** change **PlantScape Server Logger** to **Manual**.
  - Reboot the server
  - Allow about one minute after bootup and verify the PlantScape services are running

1 - 45

Notes

*If you are connected through Ethernet to the C200, verify with your course manager the server IP address.

Honeywell

Configuration For Class -- Adding Stations and Operator Profiles *(Continued)*

- **Share the Honeywell directory**
  - On the server referenced above, share the **Honeywell** directory using share name

    Honeywel

    Note: The folder **TPS50** is shared under the name **Hybrid** by default, which allows remote Control Building. The above share allows access to the folders **client** and **server**.

- **Configure Stations for use in Class**
  - Open Quick Builder using Existing Project:

    Honeywell\client\qckbld\training_400_srv1.qdb
  - Configure the project to load to the server connected to the C200

    (Same server referenced in previous class configuration steps)
  - Configure Station # for a one second update rate (One second is the default update for Static Stations; Five seconds is the rate for Rotary.) *
  - Download Station # **-- Do not load the entire project!**

1 - 46

Notes

*** Station #**

From this point onward, the # sign will designate your team number. See your course manager for details

Honeywell

Configuration For Class -- Adding Stations and Operator Profiles *(Continued)*

- **Configure Operator Profile**
  - Connect your Station to the server to which you loaded in the previous step. Use station number #
  - Use password **mngr** to acquire manager level access
  - Configure operator number **2#** for **manager** access level*
  - Assign Areas **S1** (System Area) and **A#** to your station

*Note: **Remember this ID and Password!** This profile is required for Control Builder read\write access login.

1 - 47

Notes

Honeywell

This completes….

PlantScape Controller Implementation

Lesson 3

Configuring Your Server

1 - 48

Notes

Unit 1 Exam

QuesNo	Question
1	Knowledge Builder can be accessed from:

A Station Help.

B Control Builder Help

C Windows Desk Top.

D All of the above.

2 Which of the following is the best definition for a Knowledge Builder Guide?

A A Knowledge Builder guide is a collection of general purpose information.

B A Knowledge Builder guide is a "look it up" manual, not to be read cover to cover.

C A Knowledge Builder guide contains "how it works" information.

D A Knowledge Builder guide is a collection of "how to" procedures.

3 Which of the following is the best definition for a Knowledge Builder Theory Manual?

A A Knowledge Builder Theory Manual is a collection of general purpose information.

B A Knowledge Builder Theory Manual is a "look it up" manual, not to be read cover to cover.

C A Knowledge Builder Theory Manual contains "how it works" information.

D A Knowledge Builder Theory Manual is a collection of "how to" procedures.

4 Which of the following is the best definition for a Knowledge Builder Reference Manual?

A A Knowledge Builder Reference Manual is a collection of general purpose information.

B A Knowledge Builder Reference Manual is a "look it up" manual, not to be read cover to cover.

C A Knowledge Builder Reference Manual contains "how it works" information.

D A Knowledge Builder Reference Manual is a collection of "how to" procedures.

5 In Control Builder, to add a Control Module or make structural changes to an existing CM you must use the:

A Project tab

B Monitoring tab

C Library tab

6 In Control Builder, to view CMs on line or to change parameters on line, you must use the:

A Project tab

B Monitoring tab

C Library tab

7 To back up your controller data base, you must first ***upload*** to the Monitoring tab, then ***update*** to the Project tab.

A True

B False

8 From the RSLinx communication software menu you can select "Configure Drivers" to display a list of the currently configured drivers. What does it mean when the driver, AB_ PCIC-1 Cnet…, indicates Running… ?

A You should call the Honeywell Technical Assistance Center (TAC).

B You need to access the device from the Windows NT Control Panel and disable the driver.

C You need to remove the server’s ControlNet ISA Interface card and reset its jumpers according to the procedures defined in the Control Hardware Installation Guide.

D Your RSLinx communication software has been configured correctly on your system. Running is the expected response indicating the driver is operational.

9 To verify the CNet server address, from the RSLinx Communications Menu, click Configure Drivers and in the listing of Configured Drivers, double-click the line starting with "AB_PCIC-1 CNet…" and observe the MAC ID.

A True

B False

Unit 2

Use and Configuration Of PlantScape Hardware

Honeywell

PlantScape Controller Implementation

Lesson 2

Configuring a Control Processor Module (CPM)

2 - 11

Notes

Introduction

The purpose of this Lesson is to familiarize you with the method of configuring Control Processor Modules (C200) in the PlantScape system. After completing this Lesson you should be able to configure a CPM for non redundant use.

Objectives

❶ Configure a CPM with the proper settings in Control Builder

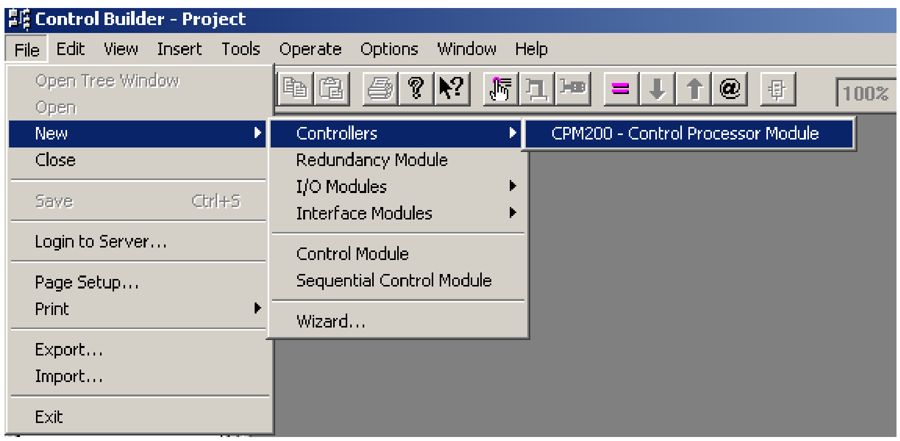
NOTE: The hardware configuration labs must be done as a team since there is one controller per student team. From this point onward the # sign is to be replaced with the student team number.

Honeywell

Creating a Controller

Creating a non-redundant CPM and CEE

- Click
  - **File**
    - **New**
      - **Controllers**
        - **CPM200 - Control Processor Module…** to open the configuration form shown on the next page.



2 - 12

Notes

Adding to the Project

The above method of adding a controller to the Project can be used for all other components of the Project as well. In the next lab, we will use this method to add I\O modules.

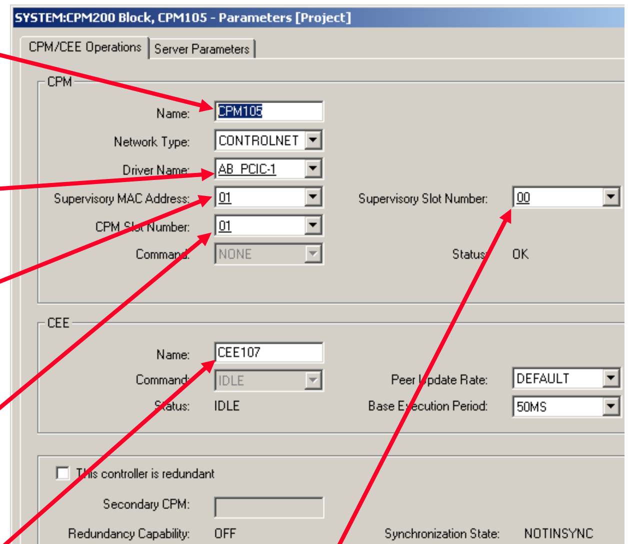
Note: All Control Builder sessions will log into the server connected to your assigned C200 controller. Sign into Control Builder using the Operator ID and Password you created in the Server Configuration lab.

Honeywell

Creating a Controller

Creating a non-redundant CPM and CEE

- Enter the **Name** of the controller. Suggestion: **CPM0101**, for address1, CPU slot location 1.
- Accept the Network type default ControlNet.* Select the driver name you configured earlier in RSLinx.
- Enter the **Supervisory MAC Address** of the CNI card that is connected to the server CNet **
- Enter the **CPM Slot Number** (the left-most slot number of the two CPM slots. See notes on the next page for slot numbering information)
- Enter the **Name** of the Control Execution Environment. Suggestion: **CEE0101**, for address1, CPU slot location 1.



- Enter the **Supervisory Slot Number**: the slot number of the CNI card that is connected to the server CNet

2 - 13

Notes

Creating a CPM and a CEE

The Control Execution Environment (CEE) supports the execution of a set of function blocks for solving control applications. It runs in the Hybrid Controller's CPM (Control Processor Module) as a software layer built on top of the control software infrastructure.

In configuration for a CNet connection, you enter the CPM Slot Number, the Supervisory MAC Address, and the Slot Number of the CNI module connected to the Server CNet. The names used for the CPM and CEE often reflect the controller MAC Address and CPM slot number.

* If you are using Ethernet, select that option. Check with your course manager for other differences.

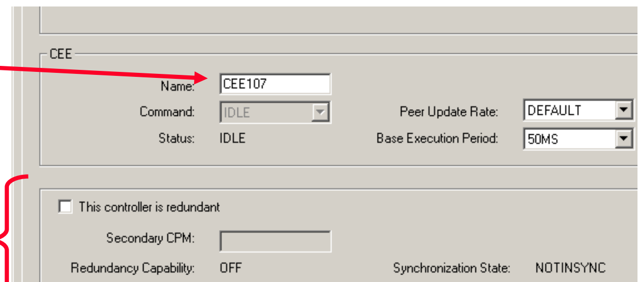
** MAC Address does not apply to Ethernet.

Honeywell

Creating a Controller

Creating a non-redundant CPM and CEE

- Enter the **Name** of the Control Execution Environment. Suggestion: **CEE0101**, for address 01, CPU slot location 01.



- Note: To configure the C200 controller for **redundancy** you would use the same procedure with these exceptions: 1) The “This Controller is redundant” box would be checked; 2) The Secondary CPM name would be entered; 3) Two Redundancy Modules would be added and configured.

2 - 14

Notes

For CPM Slot Number — Slots in a PlantScape rack are numbered from left to right starting with Slot 0. Count from left to right (excluding the power supply) until you get to the first slot that the CPM occupies. This should be an odd number. (Hint: most CPMs are installed in Slot pair 1 and 2.) Enter left-most slot number of the pair into the **CPM Slot Number** area of the “New Controller” window.

For Supervisory MAC Address — The up-link ControlNet Interface card (CNI) for the controller rack should be placed in slot 0. Determine its ControlNet MAC address by reading its front-panel display (the MAC address will have the format **A#xx**, where **xx** is the MAC address). Enter the address in **"Uplink" MAC Address** combo-box.

Honeywell

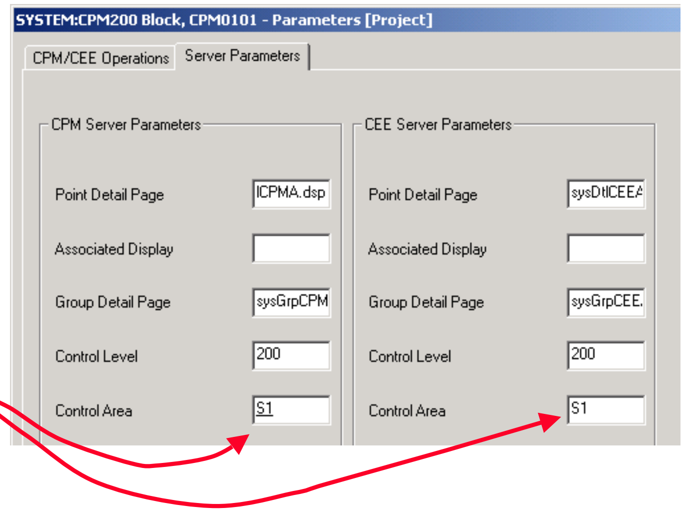
Creating a non-redundant CPM and CEE *… continued*

Server Parameters

Click the **Server Parameters** tab.

Note that the **Point Detail** and **Group Detail Pages** are already filled in. This is true for both CPMs and CEEs.

Enter **S1** (System Area) in the **Control Area** input ports



2 - 15

Notes

Server Parameters tab

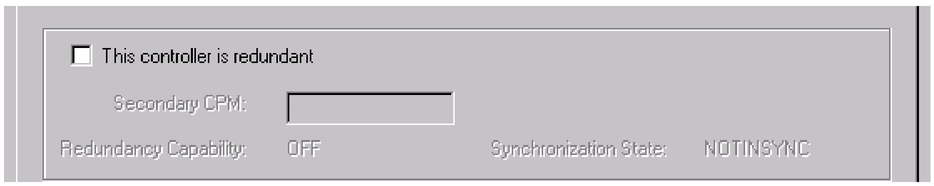
The **Server Parameters** tab allows inputs that are loaded only to the server. We will use the **Point Detail**, **Group Detail**, and **Control Area** ports for all Project objects in this course.

The Point and Group detail displays for CPMs, CEEs, all IOMs, and for SCMs are supplied with PlantScape software. These display names are included by default in the **Server Parameters** tab when you are configuring.

CMs are much more variable. PlantScape software provides Point and Group detail displays for a sample of CM types which you can use as is, or you can customize for your specific CMs as required. Because of the variability in CMs, the **Point** and **Group Display** ports must be filled in on their **Server Parameters** tab.

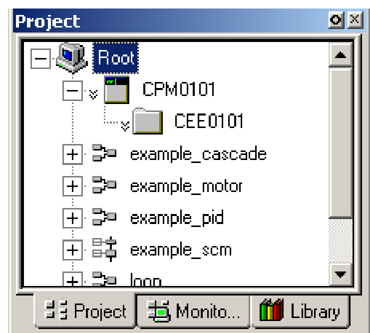
Creating a non-redundant CPM and CEE *… continued*

- Note: To configure the C200 controller for redundancy you would use the same procedure with these exceptions: 1) The "This Controller is redundant" box would be checked; 2) The Secondary CPM name would be entered; 3) Two Redundancy Modules would be added and configured.



- Click **OK**

- Click **Project** Tab to see your newly configured CPM and CEE



2 - 16

Notes

Notice that the CEE is under the CPM and connected directly to it. This tells you that the CEE is **assigned** to the CPM. Later, we'll see that you must assign everything that you want to download to your controller to the CEE. This includes all of your I/O modules, CMs, and SCMs.

Your **Project** tab also includes sample reference modules. These are supplied with every PlantScape database. Feel free to open and examine them.

Honeywell

This completes….

PlantScape Controller Implementation

Lesson 2

Configuring a Control Processor Module (CPM)

2 - 17

Notes

Honeywell

PlantScape Controller Implementation

Lesson 3

Configuring Digital and Analog IOMs

2 - 19

Notes

Introduction

The purpose of this Lesson is to familiarize you with the different IOMs that are available. You will learn how to configure Analog and Digital IOMs. After completing this Lesson you will be able to Configure IOMs in Control Builder.

Objectives

❶ Understand I/O module naming and configuration

❷ Understand IOM location configuration: IOM Slot Number, Remote IO Chassis MAC Address, and ControlNet Module Slot Number.

❸ Configure 2 Digital and 2 Analog IOMs in Control Builder

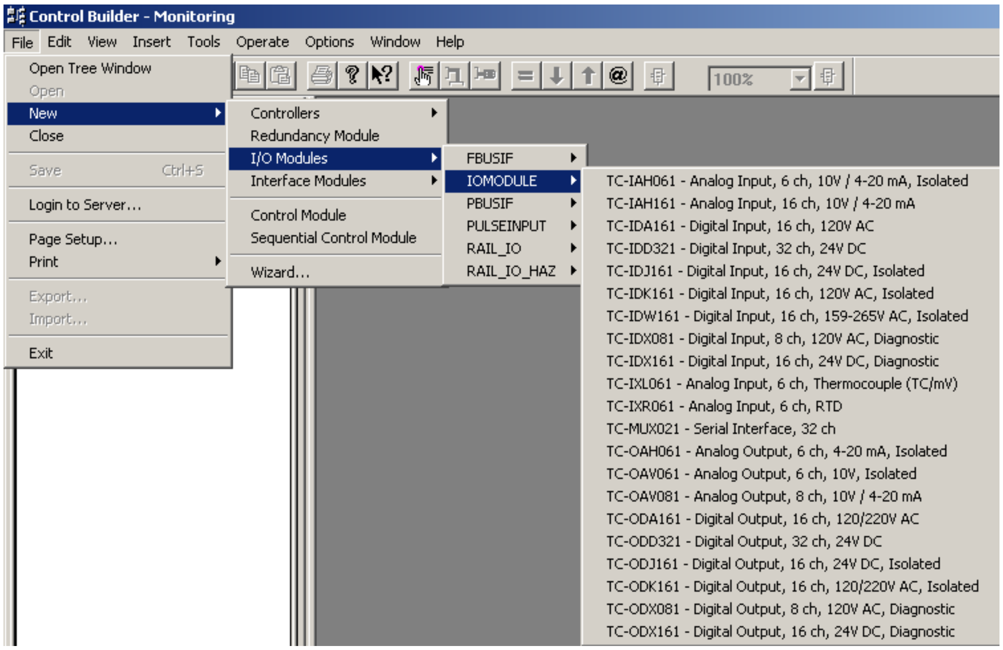
❹ Configure any additional IOMs as required

NOTE: The hardware configuration labs must be done as a team since there is one controller per student team. From this point onward the # sign is to be replaced with the student team number.

Honeywell

Methods of Selecting the Proper IOM

- Menu Method



2 - 20

Notes

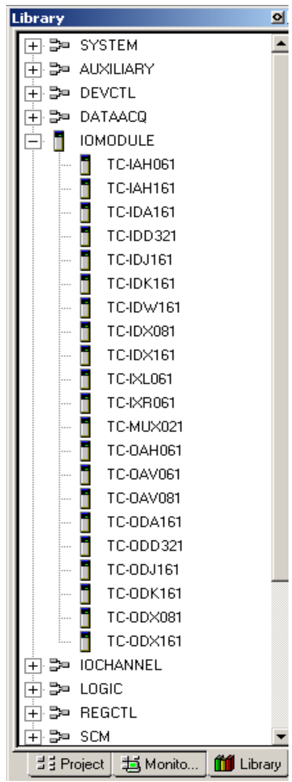
IOM Function Block	Channels	Type	Rating	Isolated
TC-IDX081	8	Diagnostic Input	120 Vac	Yes
TC-IDA161	16	Digital Input	120 Vac	No
TC-IDK161	16	Digital Input	120 Vac	Yes
TC-IDD321	32	Digital Input	24 Vdc	No
TC-IDX161	16	Diagnostic Input	24 Vdc	Yes
TC-IDJ161	16	Digital Input	24 Vdc	Yes
TC-IAH061	6	Analog Input	10 V and 4 to 20 mA	Yes
TC-IAH161	16	Analog Input	10 V and 4 to 20 mA	No
TC-IDW161	16	Digital Input	220 Vac	Yes
TC-IXR061	6	RTD Input	Resistance	Yes

Continued on next page ...

Honeywell

Methods of Selecting the Proper IOM *…Continued*

- Library Method



2 - 21

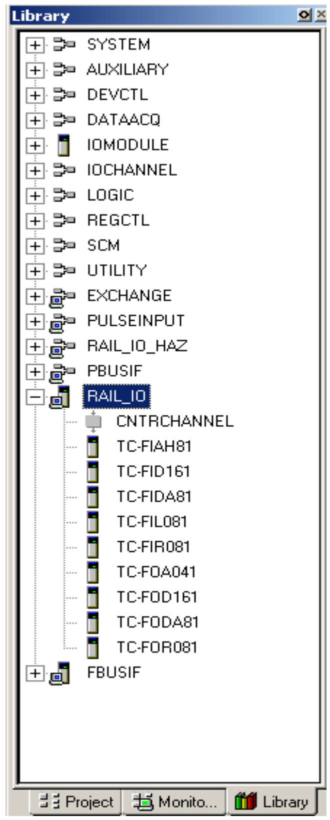
Notes

IOM Function Block	Channels	Type	Rating	Isolated
TC-IXL061	6	Thermocouple In	Low Level mV	No
TC-ODX081	8	Diagnostic Output	120 Vac	Yes
TC-ODA161	16	Digital Output	120/220 Vac	No
TC-ODK161	16	Digital Output	120/220 Vac	Yes
TC-ODX161	16	Diagnostic Output	24 Vdc	Yes
TC-ODD321	32	Digital Output	24 Vdc	No
TC-ODJ161	16	Digital Output	24 Vdc	Yes
TC-OAH061	6	Analog Output	4 to 20 mA	Yes
TC-OAV061	6	Analog Output	10 V	Yes
TC-OAV081	8	Analog Output	10 V and 4 to 20 mA	No
TC-MUX021	32	Serial Interface Module		

Honeywell

Methods of Selecting the Proper IOM *…Continued*

- Library Method, continued



2 - 22

Notes

IOM Function Block	Channels	Type	Rating	Isolated
TC-MDP081	8	Pulse Input	5 to 24 V	Yes
TC-PIA081	8	Analog Input	Haz. 1	Yes*
TC-POA081	8	Analog Output	Haz. 1	Yes*
TC-PIB161	16	Digital Input	Haz. 1	Yes*
TC-POB041	4	Digital Output	Haz. 1	Yes*
TC-PIL081	8	Temp. Input	Haz. 1	Yes*

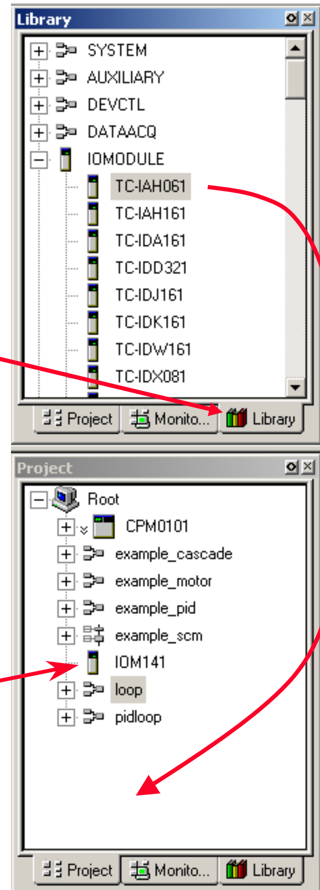
* Galvanic isolation (per DIN EN 50 020) for input / backplane bus and input / power supply. There is no galvanic isolation for the inputs relative to each other.

Honeywell

Creating I/O Modules

Creating an Analog Input Module

- Set up Control Builder so that two Tree Views are visible
- Click the **Library** tab in the upper tree view of Control Builder and expand the **IOMODULE** Library
- Drag and Drop the I/O Module **TC-IAH061** from the IOMODULE Library to the blank area at the bottom of the **Project** View
- The module appears in the Project under its default name and the dialog box shown on the next page appears



2 - 23

Notes

Overview

When you build your control strategy later in this training, you will need to configure the four simulator Input/Output Modules (IOMs), two input's (1 Digital, 1 Analog) and two outputs (1 Digital, 1 Analog).

• Analog Input: TC-IAH061	Digital Input: TC-IDJ161
• Analog Output: TC-OAH061	Digital Output: TC-ODJ161

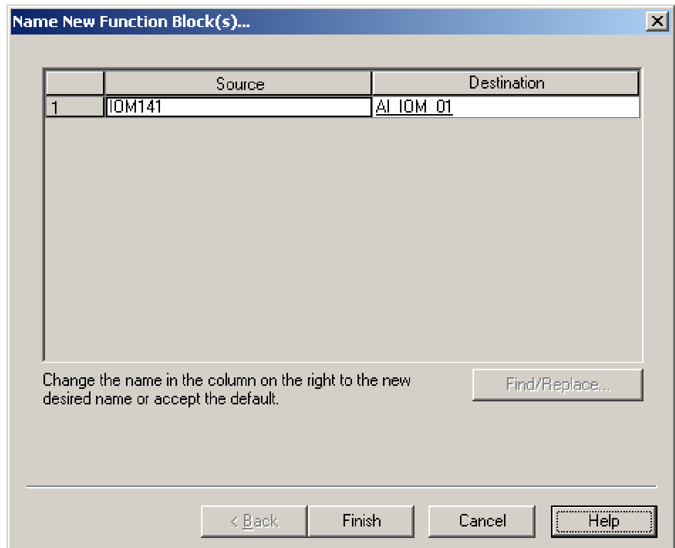
The number that appears after any object in Control Builder is only a reference created by the Control Library to ensure name uniqueness and has no other significance. In the example above an I/O module was created resulting in a device named IOM731. The number 731 has no significance other than a reference for Control Builder.

For more information on how to create an IOM, refer to *Control Building Guide, Hardware Module Creation, Creating an Instance of Input/Output Modules*.

Honeywell

Naming an analog input module

- Because the default name is normally changed to something more meaningful, the dialog box shown appears. It allows a name change prior to configuration
- Enter the following name in the Destination port:
  – Module Name: **AI_IOM_01**



- Click **Finish** and view the **Project** tab. The correct name should now appear

2 - 24

Notes

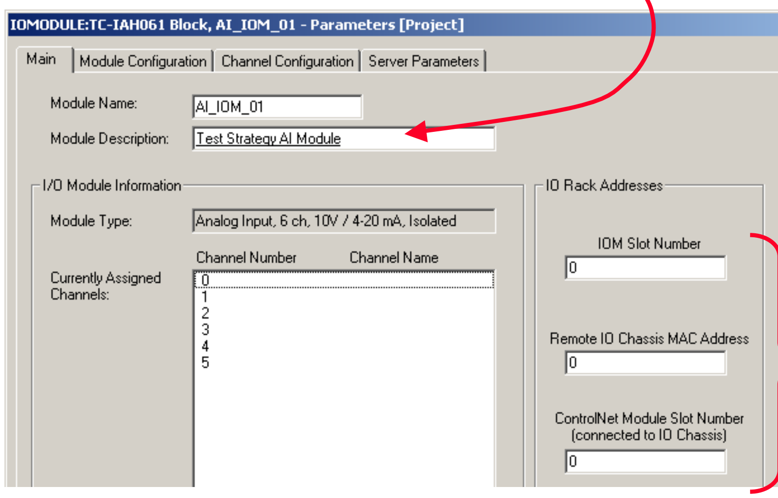
Naming an analog input module

The module name should reflect the type of module you are using and its location. This will make tracking easier in the future when you add more modules to your system. We have chosen **AI_IOM_01**. This stands for Analog Input _ Input Output Module _ Module Number 1.

Honeywell

Naming an analog input module

- Double-click **AI_IOM_01** in the **Project** tab to display its Parameters configuration form
- Enter the following information in the appropriate field on the **Main** tab:
  – Module Description **Test Strategy AI Module**



- Next we will set up the module's address

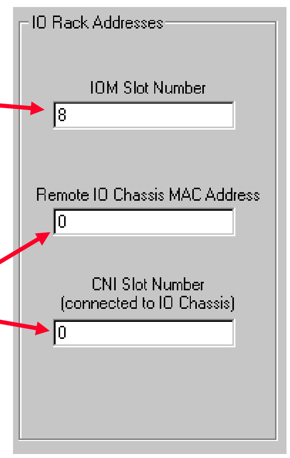
2 - 25

Notes

Honeywell

Configuring I/O addresses *…continued*

- I/O modules may reside in either controller or remote (I/O) chassis
- Three (3) addresses (fields on the modules Parameters Window) may be associated with each I/O module:
  - IOM Slot Number
  - Remote IO Chassis MAC Address
  - CNI Slot Number (connected to chassis)
- **I/O modules in a controller chassis** need the correct IOM Slot Number, but use 0 for the other address parameters
  - In the **IOM Slot Number** field, enter the physical slot number of the I/O module being configured (Recall that the slot numbers start at 0.) Enter the slot for **AI_IOM_01**.
  - Enter 0 for the **Remote IO Chassis MAC Address** and the **CNI Slot Number**.



2 - 26

Notes

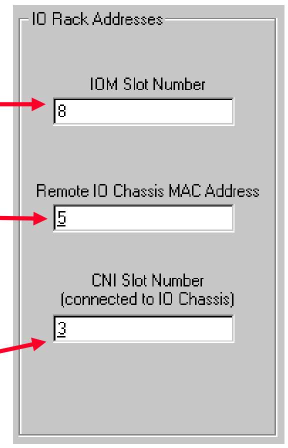
Configuring I/O rack addresses

The I/O Rack Address is made up of three numbers that are described in the table below.

I/O Rack Addresses	Description
IOM Slot Number	Number of the slot where the IOM resides in whatever rack it is in.
Remote IO Chassis MAC Address	MAC address of the CNI card in the remote rack where the IOM resides. This is zero for local IOMs.
CNI Slot Number (connected to IO chassis)	Slot location of the CNI card in the control rack that the IO module communicates with. This is zero for local IOMs.

Configuring I/O addresses *…continued*

- **<u>I/O modules in a remote chassis</u>** need all three fields completed.
  - In the **IOM Slot Number** field, enter the <u>physical slot number</u> of the I/O module being configured.
  - In the **Remote IO Chassis MAC Address** field, enter the <u>MAC address</u> of the CNI in the chassis of the IOM being configured.
  - In the **CNI Slot Number** field, enter the <u>Physical slot number</u> of the CNI which resides in controller chassis and communicates with the I/O module.



2 - 27

Notes

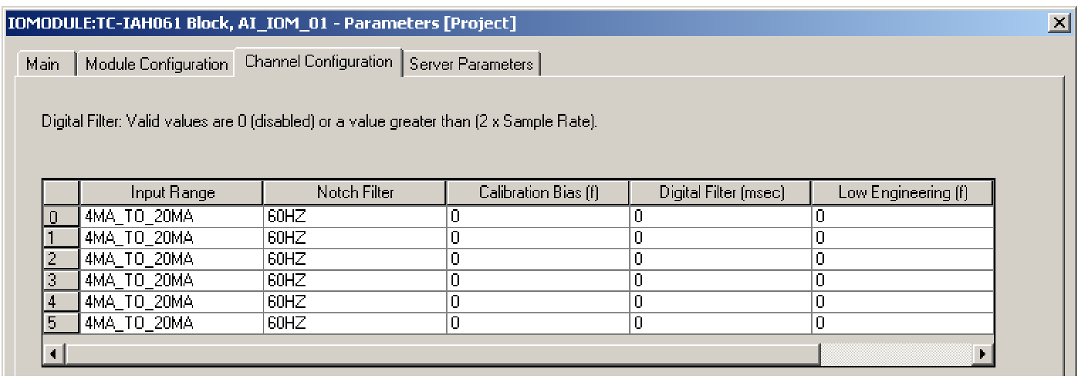
For more information on how to configure an IOM, refer to *Control Building Guide, Hardware Module Creation, Configuring the I/O Module.*

In this course the modules are in the primary chassis therefore we will not need to specify numbers for "**Remote IO MAC Address**" and "**CNI Slot Number**". Putting a 0 in the fields lets the system know we are only using this chassis.

Honeywell

Configuring analog input module channels

- Click the **Channel Configuration** tab of the IOM Parameters configuration form
- Enter the following data on the Channel Configuration page for **Channel 0** and for **Channel 2**
  - Input Range **4mA to 20mA** - Digital Filter **0**
  - Notch Filter **60Hz** - Low Engineering **0.0**
  - Calibration Bias **0.0** - High Engineering **5000.0**



	Input Range	Notch Filter	Calibration Bias (f)	Digital Filter (msec)	Low Engineering (f)
0	4MA_TO_20MA	60HZ	0	0	0
1	4MA_TO_20MA	60HZ	0	0	0
2	4MA_TO_20MA	60HZ	0	0	0
3	4MA_TO_20MA	60HZ	0	0	0
4	4MA_TO_20MA	60HZ	0	0	0
5	4MA_TO_20MA	60HZ	0	0	0

- Accept the defaults for **Channels 1**, **3**, **4**, and **5**

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Notes

Configuring analog input module channels

Engineering units can be established in one of two ways:1) in the IOM configuration; and 2) in the Data Acquisition Block of the Control Module (CM) using the input.

If you configure the low and high range in the IOM, as we do here, you will enter ranges in your (CM) that correspond to the IOM settings.

If you configure the range in the CM, you leave the IOM settings 0 and 100. You use the Characterization function in the Data Aquistion block to establish engineering units.

When configuring channels as described above, you are actually configuring only Channel 0, the first input on your AI IOM. For the other channels:

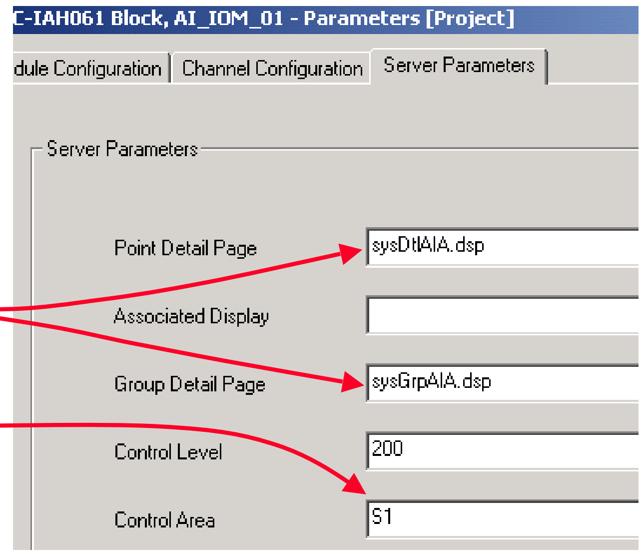
- each channel may be configured individually
- the settings for one channel may be copied to all others

Configuring Server Parameters

Click the **Server Parameters** tab.

Note that the **Point Detail** and **Group Detail Pages** are already filled in. This is true for IOMs and for SCMs. You will need to input this information for CMs.

Enter S1 (System Area) in the **Control Area** input port



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Notes

Server Parameters tab

The **Server Parameters** tab allows inputs that are loaded only to the server. We will use the **Point Detail**, **Group Detail**, and **Control Area** ports for all Project objects in this course.

The Point and Group detail displays for all IOMs and for SCMs are supplied with PlantScape software. These display names are included by default in the **Server Parameters** tab when you are configuring IOMs and SCMs.

CMs are much more variable. PlantScape software provides Point and Group detail displays for a sample of CM types which you can use as is, or you can customize for your specific CMs as required. Because of the variability in CMs, the Point and Group Display ports must be filled in by the configuration engineer when configuring CMs.

Honeywell

Creating an Analog Output Module

- Set up Control Builder so that two Tree Views are visible
- Click the **Library** tab in the upper tree view of Control Builder and expand the IOM Library
- Click the **Project** tab in the lower tree view of Control Builder
- Drag and Drop the I/O Module **TC-OAH061** from the IOM Library to the project in the Project View
- Name the Module: **AO_IOM_01**

Configuring an analog output module

- Double-click **AO_IOM_01** in the **Project** tab
- Enter the following information in the **Main** Tab of the Parameters Window:
  - Module Description **Test Strategy AO Module**

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Notes

Creating analog output modules

The procedures and displays for creating an analog output module are very similar to those of the analog input module. Therefore, some of the details have been left out of these activities.

Refer to the preceding Naming, Configuring Addresses, and Configuring Channels topics for analog input modules if you need to review these details.

Configuring I/O addresses

- Enter the I/O rack address information for the analog output module, including (as necessary):
  - IOM Slot Number
  - Remote IO Chassis MAC Address
  - CNI Slot Number

Configuring analog output module channels

- Click the **Channel Configuration** tab
- Enter the following data on the Channel Configuration page, for Channels 0 and 1.
  - Calibration Bias **0**
- Click **OK**

Configuring Server Parameters

- Click the **Server Parameters** tab
- Enter **Control Area: S1 ;** click **OK**

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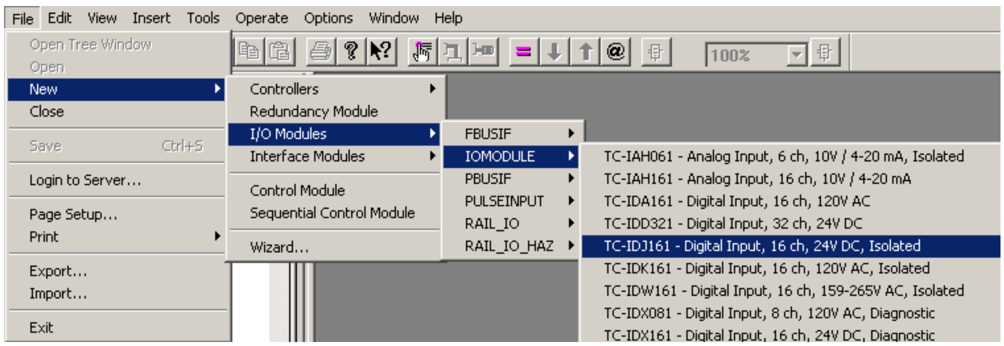
Notes

Honeywell

Creating a Digital Input Module

- Click
  - **File → New → I / O Modules → IOMODULE → TC-IDJ161**



Naming a digital input module

- Having used the **File > New** method to create your new I/O Module it should be open to the Main Tab
- Enter the following information:
  - Module Name **DI_IOM_01**
  - Module Description **Test Strategy DI Module**

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Notes

Creating digital input modules

The procedures and displays for creating a digital input module are similar to those of the analog input module. Therefore, some of the details have been eliminated from these activities.

For more information on how to configure a digital input module, refer to *Control Building Guide, Hardware Module Creation, Configuring the Digital I/O Module*.

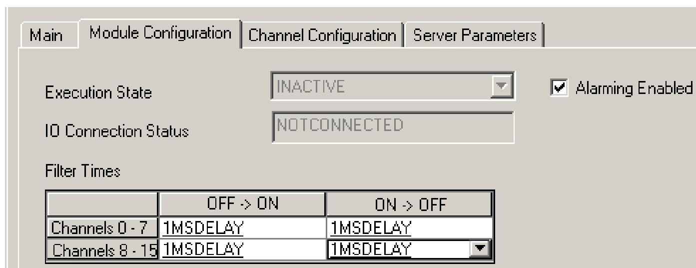
Honeywell

Configuring I/O addresses

- Enter the I/O rack address information for the digital input module, including (as necessary):
  - IOM Slot Number
  - Remote IO Chassis MAC Address
  - CNI Slot Number

Configuring digital input module channels

- Click the **Module Configuration** tab
- On this screen you will have 4 drop down selection tabs
  - **1 ms Filtering Delay** should be selected for all 4 drop down menus



2 - 33

Notes

Honeywell

Configuring Server Parameters

- Click the **Server Parameters** tab
- Enter **Control Area: S1**
- Click **OK**

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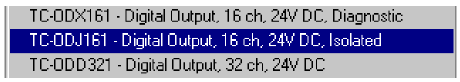
Notes

Honeywell

Creating a Digital Output Module

- Click
  - **File → New → I / O Modules → IOMODULE → TC-ODJ161**



Naming a digital output module

- Having used the **File > New** method to create your new I/O Module it should be open to the Main Tab
- Enter the following information:
  - Module Name **DO_IOM_01**
  - Module Description **Test Strategy DO Module**

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Notes

Creating digital output modules

The procedures and displays for creating a digital output module are similar to those of the analog output module. Therefore, some of the details have been eliminated from these activities. Accept the default values for parameters not detailed in the lab.

For more information on how to configure a digital output module, refer to *Control Building Guide, Hardware Module Creation, Configuring the Digital I/O Module*.

Configuring I/O addresses

- Enter the I/O rack address information for a digital output module, including (as necessary):
  - IOM Slot Number
  - Remote IO Chassis MAC Address
  - CNI Slot Number

Configuring Server Parameters

- Click the **Server Parameters** tab
- Enter **Control Area: S1**
- Click **OK**

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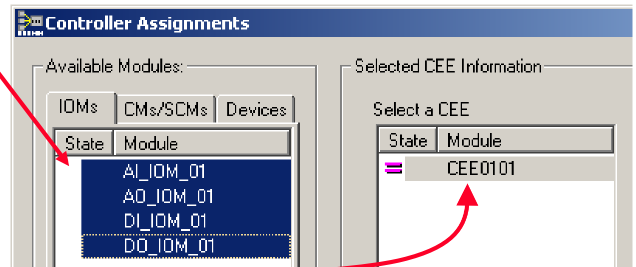
Notes

Honeywell

Assigning IOMs to the CEE

- From the Control Builder Tools menu, click **Assign** to display the Controller Assignments screen
- Locate the Available Modules section on the left side of the window and Click the tab labeled IOMs
- Locate the destination CEE
  - CEE0101



If…	Then…
your system has multiple controllers…	click the destination CEE from the window section labeled **Select CEE**.
you only have one controller …	it will be selected by default.

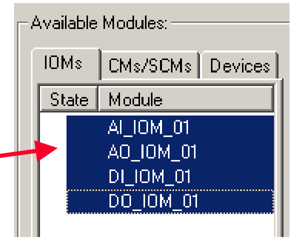
2 - 37

Notes

Assigning IOMs and CMs to the CEE

Before you can load your IOMs to the CEE they must be Assigned.

Assigning IOMs to the CEE



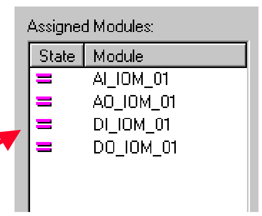
- In the **IOMs** tab, Hold down the <**CTRL**> key and click on

  AI_IOM_01

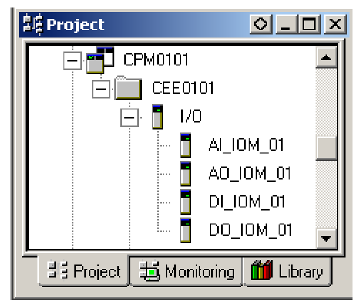
  AO_IOM_01

  DI_IOM_01

  DO_IOM_01



- Select the destination CEE
- Click **Assign** in the center of the window and after a few seconds, your IOMs will appear in the section of the window labeled **Assigned Modules**



- Click **Close** and observe that your IOMs appear in the **Project** tab under and connected to your CEE

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Notes

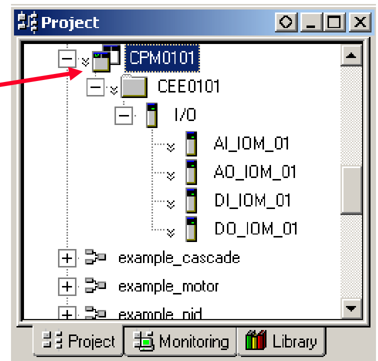
Please note the following with regards to **Assigning**:

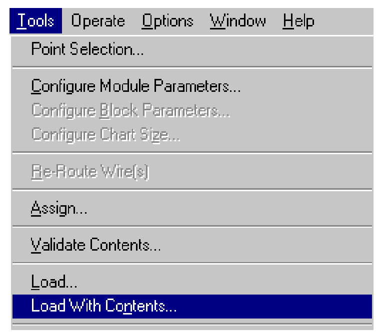
- On the toolbar you will find a purple "=" sign. This button can be use to call up the assignment menu.
- If the object you wish to assign is open for editing, the Assign function will return an error. Close the open CM drawing and repeat the Assign.

Honeywell

Loading the Controller, CEE, and IOMs

- In the **Project** tab in Control Builder:
- Left click on **CPM0101**
- Click the **Tools** Menu
- Click **Load With Contents** to bring up the dialog box shown on the next page





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Notes

Loading

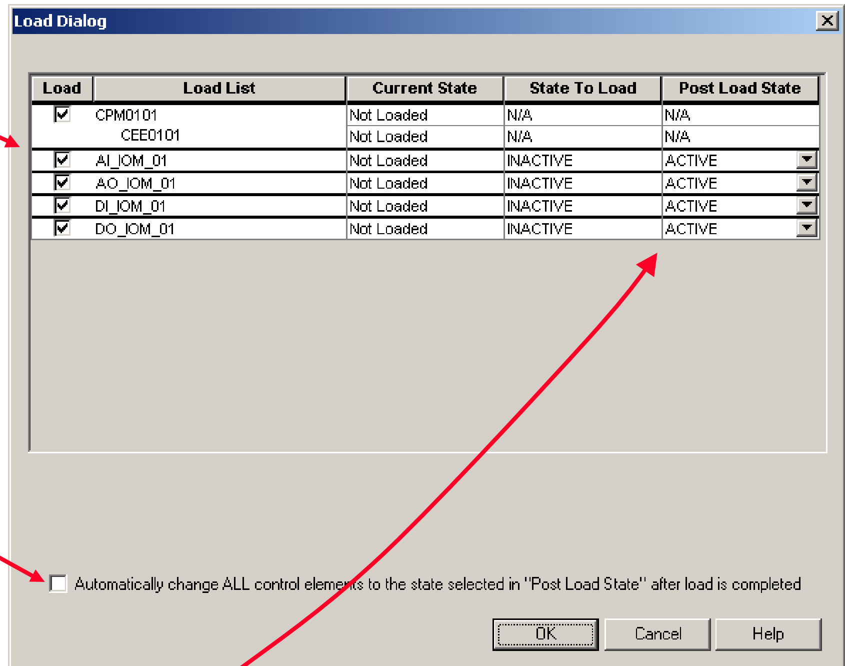
There are two commands that may be used to load objects to your CPM: **Load**, and **Load With Contents**. The Load command loads the selected objects to your CPM. The Load With Contents command loads <u>all</u> objects assigned to the CPM (that is, CEE, IOMs and CM).

These commands can be accessed from the **Tools** menu, or by right-clicking on the CPM or CEE.

Honeywell

Loading the Controller, CEE, and IOMs *(continued)*

- Verify that the items to load are checked
- Click OK
- Note that you can decide to have the modules go to the active state automatically by clicking this checkbox with the **Post Load State** selected to be **ACTIVE**



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Notes

Loading

Upon selecting **Load** or **Load with Contents**, a dialog box is called up which allows you to verify (and modify) the items to be loaded. A list appears of all items to load based on your selections made prior to the load command. The check-marks in the **Load** column determine which items in the list will be loaded.

Once you click **OK**, the load begins. Time for loading is dependent on the number of objects to load.

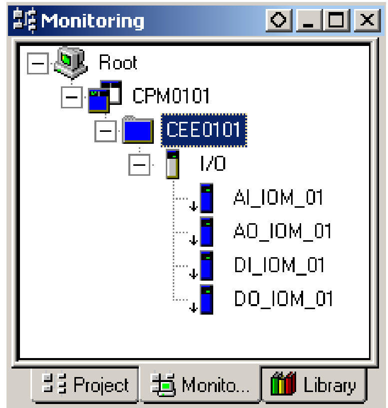
If there are any errors, a message box will appear to give you details of the problem(s). You will have a choice to continue the load; or to abort, fix the problem, and then load.

Once the load is complete, all of the loaded objects appear in the **Monitoring** Tab.

Honeywell

Loading *…continued*

- Click **Monitoring** to go to the Monitoring tab
- In the **Monitoring** tab, click on the + signs next to **Root , CPM0101,** and **CEE0101** to expand the tree view



Exercise*
Project vs. Monitoring

Toggle back and forth between Project and Monitoring views and observe their contents.

What's different about them?

What do you think that means?

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Notes

***Exercise**

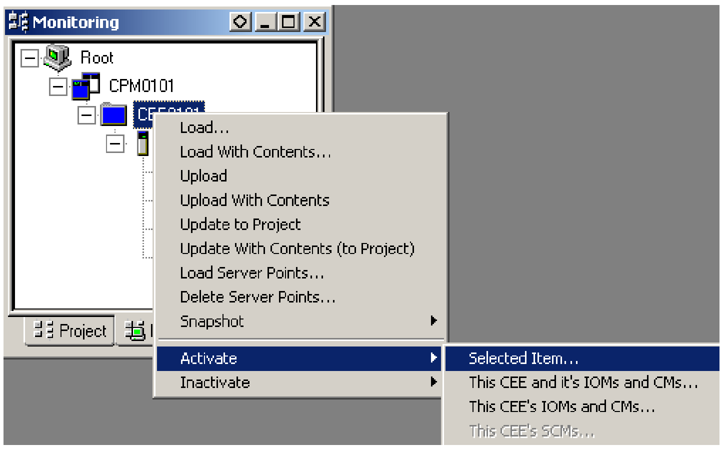
•**Green** the object is running or active

•**Blue** the object is not running, or inactive

Honeywell

Activating a Control Strategy

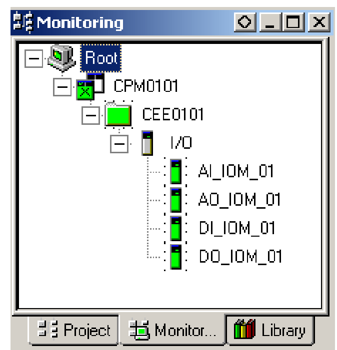
- Right-click on **CEE0101**



- Click **Activate** → **Selected Item**
- Click **Yes** to activate the selected item

Repeat these steps to activate your:

–IOMs
- **AI_IOM_01**
- **AO_IOM_01**
- **DI_IOM_01**
- **DO_IOM_O1**



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Notes

Activating a Control Strategy

There are many ways to activate loaded objects. One is to use the check box in the load dialog box to change loaded items to the post load state of ACTIVE (see Pg. 2-39). Another is to activate each item individually as we have done here. A third is to select the CEE and activate it's IOMs and CMs with one selection. A fourth is to select multiple items in the Monitor tab and click **Operate** → **Activate** → **Selected Items**.

For more information about loading and activating a control strategy refer to *Control Building Guide, Control Strategy Loading.*

Once you activate the CEE, it turns green in the **Monitoring** tab. Remember that the CEE must be active for anything assigned to the CEE to work. So, even if a CM is active, it won't do anything unless the CEE is also active.

Honeywell

Monitoring Hardware from Station

- Build Group #1 to include your controller, CEE, and IOMs

Group Configuration

Group #1	Hardware
Slot 1:	CPM0101
Slot 2:	CEE0101
Slot 3:	DI_IOM_01
Slot 4:	DO_IOM_01
Slot 5:	AO_IOM_01
Slot 6:	AI_IOM_01
Slot 7:	Empty
Slot 8:	Empty

- Note that you can activate the objects from Station as well as Control Builder

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Notes

Honeywell

Configure Additional IOMs

- Add any additional IOMs, following the same naming convention. For example, a second DO module would be named DO_IOM_02.
  - See your course manager for details.

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Notes

Honeywell

This completes….

PlantScape Controller Implementation

Lesson 3

Configuring Digital and Analog IOM's

2 - 45

Notes

Honeywell

PlantScape Controller Implementation

Lesson 4

PlantScape Ntools Familiarization

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Notes

Introduction

The purpose of this lesson is to give you the knowledge to be able to use the Ntools to help facilitate maintenance of the the Control Net and the Hybrid Controller.

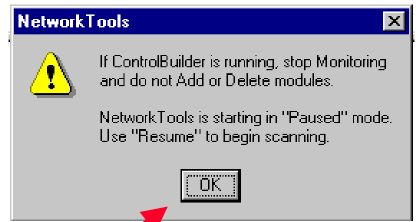
Objectives

To become familiar with some of the more frequently used features of Ntools

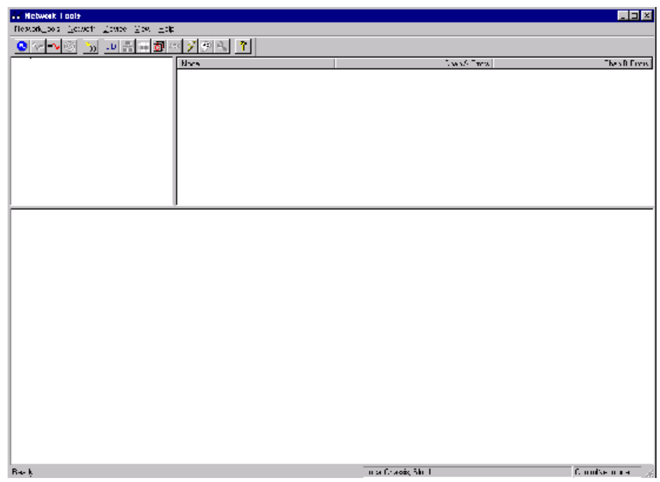
Note: Ntools can only be run on the Server. It is not available to remote Stations or remote Control Builder PCs. Please work together on your Server to view the screens.

Honeywell

PlantScape Ntools Familiarization



- Start Ntools from the Run menu
  - **Start → Run**
- Type "Ntools -c" at the Run menu and press enter.
- Click OK to acknowledge the warning about monitoring through Control Builder.
- The screen shown will come up



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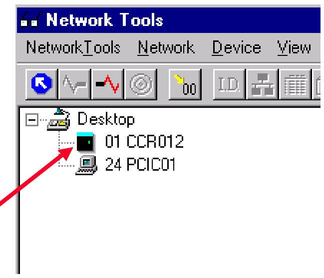
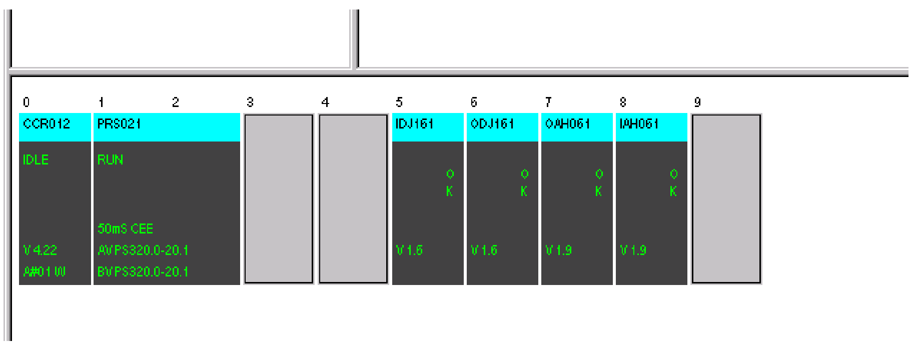
Notes

Honeywell

PlantScape Ntools Familiarization



- Start network scanning by selecting the Resume Icon.
- When the Polling indicator at the bottom Network Tools screen reaches 24, stop scanning by selecting the Pause Icon
- Single click the blue/black box in the Tree pain
- N-tools will scan the chosen device and show a detail display of the controller in the Detail Pane as shown below. (See the next page for a description of the N-tools screen layout.)



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Notes

Details of the controller

If the controller has not been previously detailed in N-tools, after clicking the icon in the tree pane, you will see a dialog box asking how many slots are in the rack. If there are any outboard racks to detail, use the provided tabs to set up the number of slots in those.

This information is needed so that the detail display shows any spare slots accurately. After the initial callup this information is stored in N-tools.

Honeywell

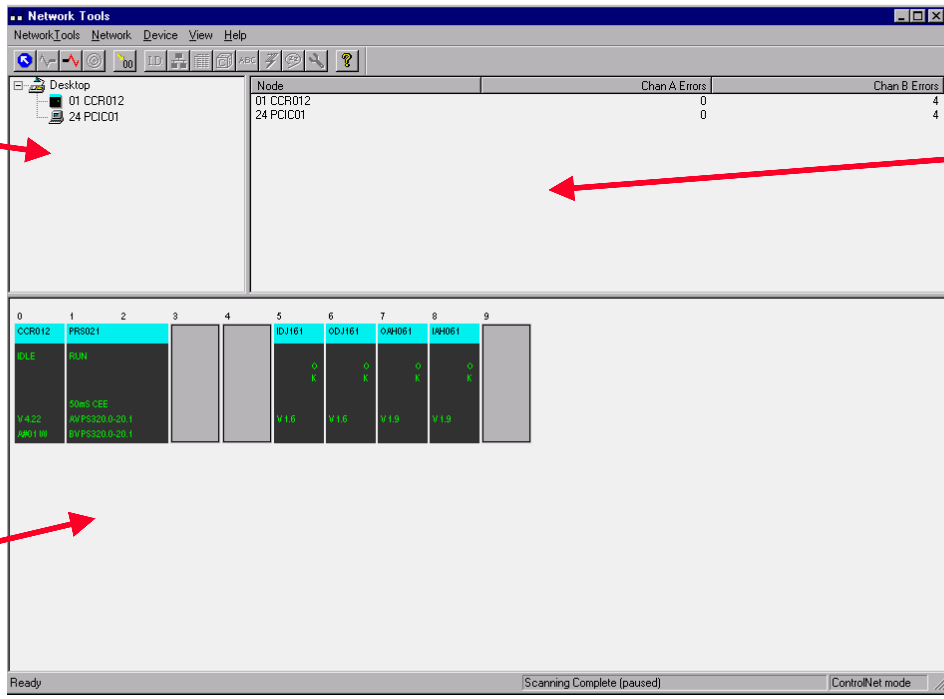
PlantScape Ntools Familiarization

- N-tools Screen Layout

Tree Pane

List Pane

Detail Pane



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Notes

N-tools Screen Layout

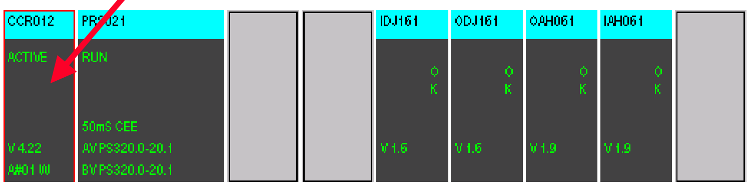
N-tools is divided into three main screen regions or panes:

- Tree Pane which shows the devices in the supervisory Control Net.
- List Pane which shows Control Net performance statistics.
- Detail Pane which shows the details of the object selected from the Tree Pane.

Honeywell

PlantScape Ntools Familiarization

• Select the CNI card in the Detail Pane

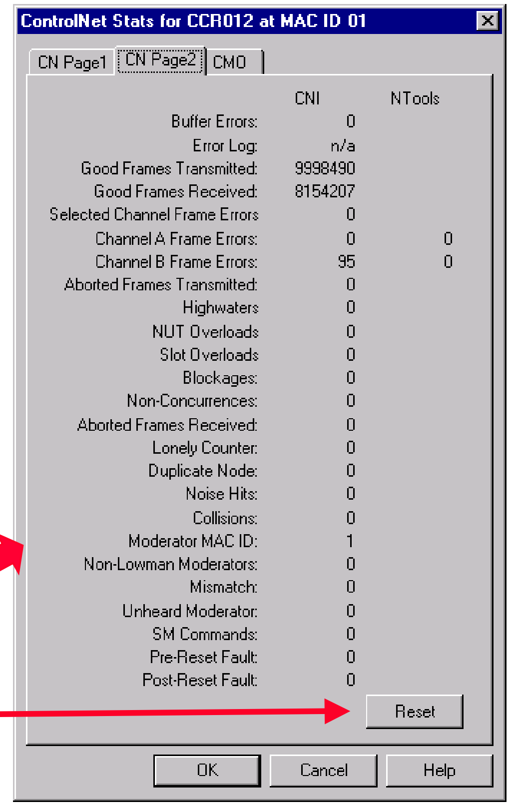


- A red box should now appear around the CNI card.

• Next select the ContrlNet Stats Icon from the tool bar

• Then select the "CN Page2" tab
- You should now see a display similar one the at the right
- Note it is normal to see Frame Errors on channel B since in training we do not usually connect B cables.

• Select the Reset button
- All Frame Errors should now be zero



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Notes

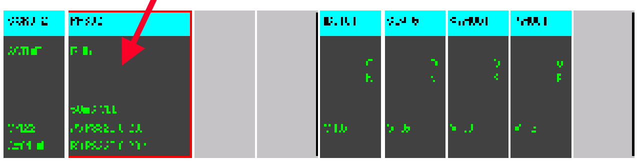
Hardware Details

Details on any module in the rack can be displayed from N-tools. The above method or a double click will display the details. The CNI has more parameters than any other module.

Honeywell

PlantScape Ntools Familiarization

Select the CPU card in the Detail Pane



- Next Select the Crash Block Icon from the tool bar.

  - Accept the default file name and click save.

  - You should now see a text file dump similar to the one shown

```
CPM0101:
                 BOOT FILENAME = cpmboot2
                 BOOT VERSION  = PS320.0-20.1
                 BOOT CREATED  = Tue Sep 12 10:29:40 2000
                 PERSONALITY   = ceerex2
                 FILE VERSION  = PS320.0-20.1
                 FILE CREATED  = Tue Sep 12 10:50:09 2000
CR    = 0x00000000  MSR   = 0x00000000  HID0  = 0x00000000  XER   = 0x00000000
 LR   = 0x00000000  CTR   = 0x00000000  SRR0  = 0x00000000  SRR1  = 0x00000000
 DEC  = 0x00000000  IP    = 0x00000000  HSR   = 0x00000000
 DSISR = 0x00000000  DAR  = 0x00000000

 R00  = 0x00000000  R01  = 0x00000000  R02  = 0x00000000  R03  = 0x00000000
 R04  = 0x00000000  R05  = 0x00000000  R06  = 0x00000000  R07  = 0x00000000
 R08  = 0x00000000  R09  = 0x00000000  R10  = 0x00000000  R11  = 0x00000000
 R12  = 0x00000000  R13  = 0x00000000  R14  = 0x00000000  R15  = 0x00000000
 R16  = 0x00000000  R17  = 0x00000000  R18  = 0x00000000  R19  = 0x00000000
 R20  = 0x00000000  R21  = 0x00000000  R22  = 0x00000000  R23  = 0x00000000
 R24  = 0x00000000  R25  = 0x00000000  R26  = 0x00000000  R27  = 0x00000000
 R28  = 0x00000000  R29  = 0x00000000  R30  = 0x00000000  R31  = 0x00000000

Application error address - 0x0

Initialized data address  0x00000000 (size 0x0)
Uninitialized data address 0x00000000 (size 0x0)
Stack address             0x00000000 (size 0x0)
```

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Notes

Crash Block

In some troubleshooting instances TAC may request that you send them a copy of the Crash Block file. The Crash Block file contains stack, boot, register and other information that may be useful to TAC in tracking down some problems.

Note - Do not send Crash Block files unless specifically instructed to do so by TAC.

Honeywell

This completes….

PlantScape Controller Implementation

Lesson 4

PlantScape Ntools Familiarization

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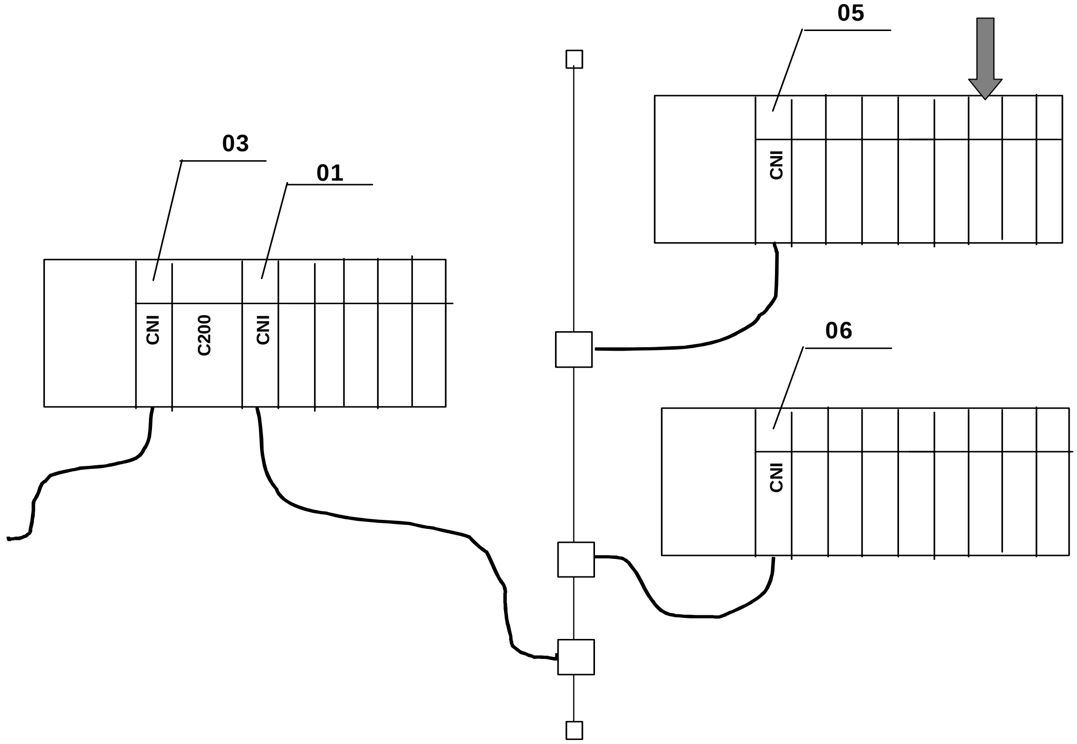
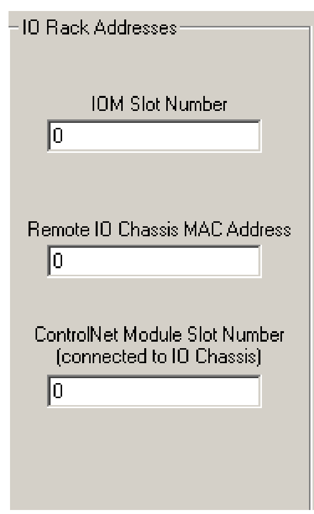
Notes

Unit 2 Exam

QuesNo	Question
1	When a C200 controller is added to the Project tab, the name it is given by Control Builder is CPM*xx*. The *xx* is an index number used in controller operation and this name must not be changed. A True B False
2	When counting slots from left to right beginning with zero, the CPM counts as 2 slot locations. A True B False
3	The hybrid controller communicates with remote I/O racks through which of the following? A Ethernet B CNet using a PCIC card C CNet using the supervisory CNI module D CNet using an additional CNI(s) dedicated to remote I/O communication
4	When an I/O module is added to the Project tab, the name it is given by Control Builder is IOM*xx*. The *xx* is an index number used in controller operation and this name must not be changed. A True B False

5 In the following diagram, what are the three numbers required to configure the slot location of the designated IOM.





IOM Slot Number ______________________________________

Remote IO Chassis MAC Address _________________________

ControlNet Module Slot Number __________________________

Unit 3

Introduction to Creating Control Modules

Honeywell

PlantScape Controller Implementation

Lesson 1

Configuring a Continuous Control Strategy

3 - 3

Notes

Introduction

The purpose of this Lesson is to give you the knowledge to be able to configure a continuous control strategy. After you complete this Lesson you should be able to identify the procedure to configure a continuous control strategy.

Objectives

❶ Understand the naming of new Control Modules

❷ Understand the naming of Function Blocks

❸ Configure a PID loop CM

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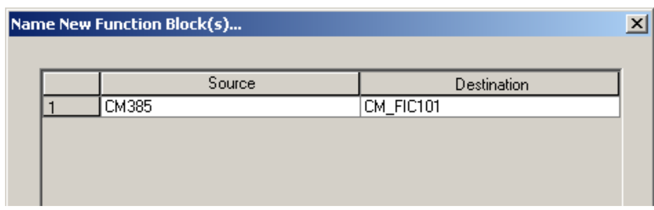
Creating Control Modules

Creating and saving a module

- Set up the Control Builder with both the **Library** and **Project** views visible.
- Click and expand System under the **Library** tab so that CONTROLMODULE is in view.
- Drag and drop Control Module onto the **Project** Root
- In the resulting dialog box, enter the name **CM#_FIC101***



- Click **Finish** to add **CM#_FIC101** to your project at the Root level

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Notes

Creating and saving a module

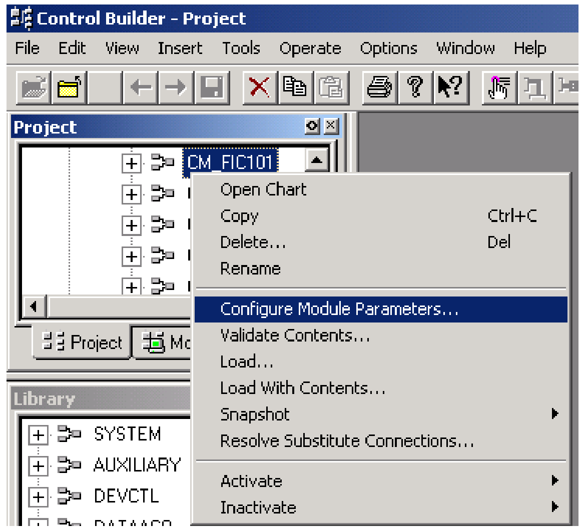
To create a Control Strategy, a Control Module must be created and function blocks inserted and connected. When you drag & drop the CM to the Project root it will appear under the Root Project Tree. Control Module names are sequentially numbered (for example, CM30, CM31, etc.). The new Control Module is automatically saved to your hard drive.

*Normally CM names can be anything you like. For this course it is important that the names be exactly as shown in the labs. Any difference in the names will cause the SCMs constructed in later Lessons, along with supplied custom graphics for operations, not to work.

Honeywell

Configuring a module

- Right click on **CM#_FIC101**
- Click on **Configure Module Parameters** to call up top-level CM parameter entry screens



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Notes

Configuring a module

To configure a CM, you must do two things

- Define the parameters of the CEE level object.
- Create, configure, and connect function blocks

They can be done in any order. For this training we will configure the CEE level Control Module parameters first.

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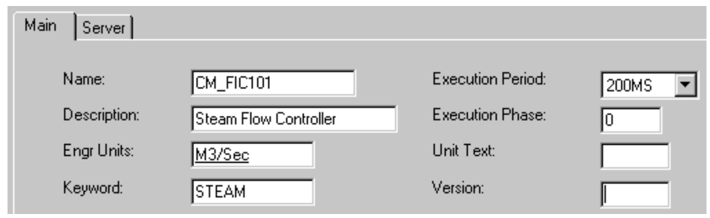
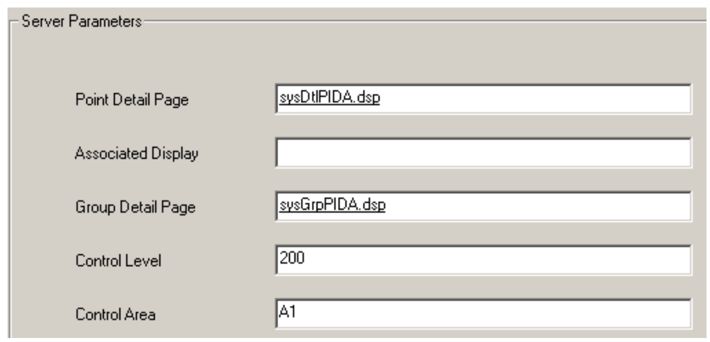
Configuring a module *… continued*

- Enter the following parameters in the **Main** tab:
  - – Description **STEAM FLOW CTRL**
  - – Engr Units **M3/Sec**
  - – Keyword **STEAM**
  - – Execution Period **200MS**
  - – Execution Phase **0**



- Click on the **Server** Tab and enter **sysDtlPIDA.dsp** for the Point Detail Page
- Enter **sysGrpPIDA.dsp** for the Group Detail Page
- Enter **A#** for the **Control Area**
- Click **OK**



3 - 6

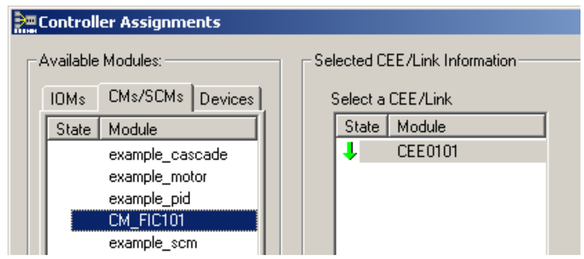
Notes

Configuring a module

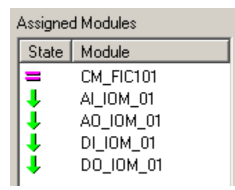
It is important that you use descriptive names for **Description** and **Keyword**. The Description should represent what the CM will be doing in your project. In this example the CM will be controlling steam flow -- therefore, the keyword STEAM is used.

Assigning CMs to the CEE

- From the Control Builder Tools menu, click **Assign** to display the Controller Assignments screen
- Locate the **Available Modules** section on the left side of the window and Click **CM#_FIC101** in the tab labeled CM/SCMs



- Select the destination CEE
  - CEE0101
- Click **Assign** in the center of the window and after a few seconds, your CM will appear in the section of the window labeled **Assign Modules**



- Click **Close**

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Notes

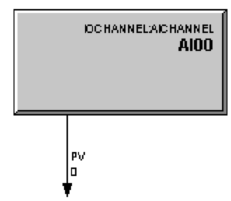
Assigning CMs to the CEE

Before you create and configure the function blocks in your CM, assign the CM and the IOMs to the CEE.

Honeywell

Adding Function Blocks to a CM

- Double-click the **CM (CM#_FIC101)** in the **Project** Tab to open your CM so function blocks may be added
- Open the **Library** Tab in a Tree View window and expand the **IOCHANNEL** library
- Click the block named **AICHANNEL** and drag it into the CM



- Drag the following blocks into your CM, in this order:

Library Directory	Block Name
DATAACQ	**DATAACQ**
REGCTL	**PID**
IOCHANNEL	**AOCHANNEL**

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Notes

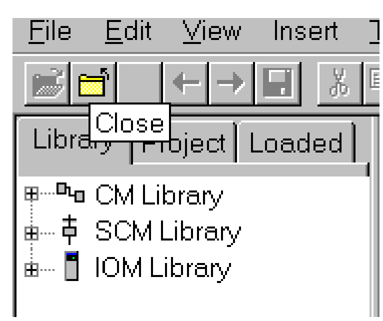
Adding Function Blocks to a CM

Once the CM and the IOMs are assigned to the same CEE, you can add function blocks to your CM and configure them.

For more information on how to add function blocks to a CM, refer to the *Control Building Guide, Control Module Creation, Creating an Instance of a Basic Function Block.*

When adding Function Blocks you may want to close one of the tree-views to give yourself more space to edit your CM. To do this you

- Click Tree View window
- Click the Close button on the toolbar (second icon from the left)



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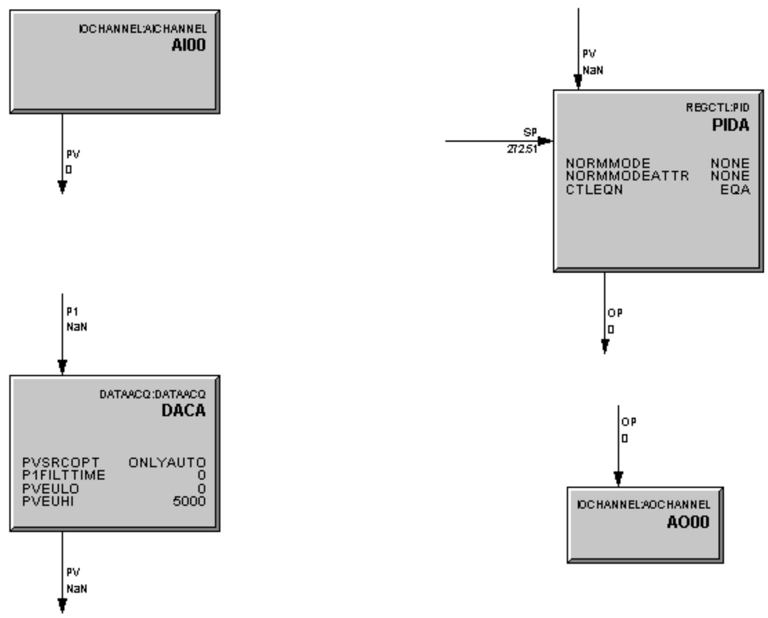
Adding Function Blocks to a CM *…continued*

- Arrange your blocks on the screen as shown below.



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Notes

You may find it useful to close both tree views at this point, which will enable you the space to arrange the blocks in this manner without having to scroll.

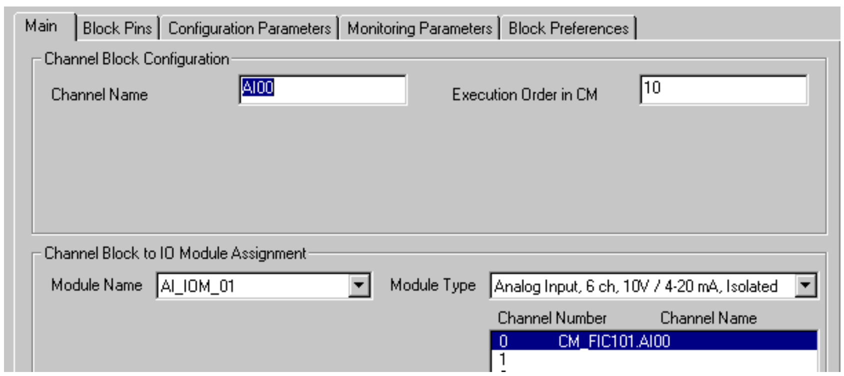
Select each tree view individually by clicking on one of the tree view tabs or the title bar.

Click **File -> Close** or click on the Close toolbar button for each tree view window.

Honeywell

Configuring an AI Channel block

- Double-click the **AICHANNEL** block
- Name the block **AI*n1*** *(where **n1** is the first AI channel on your partition sheet)*
- Click the Module Name port and click **AI_IOM_01** to display the IOM



- In the box labeled Currently Assigned Slots In Selected Module, click **Slot *n1*** *(where **n1** is the first AI channel on your partition sheet)*
- Click **Assign Channel**
- Click **OK** to close the AICHANNEL Parameter configuration form

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Notes

Configuring an AI Channel block

Once the CM and the IOMs are assigned to the same CEE, you can add function blocks to your CM and configure them.

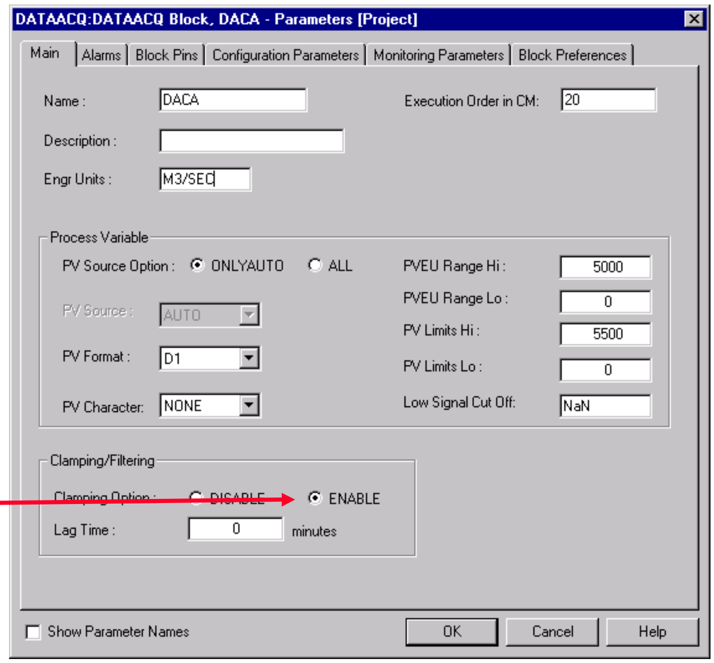
For more information on how to configure function blocks, refer to the *Control Building Guide, Control Module Creation, Using the Parameters Configuration form.*

The name of the module and the name of the channel appear by the slot. This helps you keep track of which slots are assigned and which slots are available in each of your IOMs.

Honeywell

Configuring a Data Acquisition block

- Double-click the **DATAACQ** block
- Enter the following information:
  - Name **DACA**
  - Engr Units **M3/Sec**
  - Execution Order **20**
  - PVEU Range Hi **5000**
  - PVEU Range Lo **0**
  - PV Limits Hi **5500**
  - PV Limits Lo **0**
  - PV Character **None**



- Clamping/Filtering
  - **ENABLE**

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Notes

Configuring a Data Acquisition block

The PVEU Range is set to the Hi and Lo limits for the process steam. In the PVEU limits, because of our simulation, we have added a buffer of 500 to prevent the PV from going to NaN (Not a Number).

Clamping

A clamping option of ENABLE is selected. Enabling clamping will force the PV to stop when the PV Limits Hi or Lo are reached. Again this prevents the PV from going to NaN.

For more information on how to configure function blocks, refer to the *Control Building Guide, Control Module Creation, Using the Parameters Configuration form.*

It is important that you name this block **DACA**. If you do not name the block **DACA,** you will not be able to see many parameters from the Station Point Detail Display.

Honeywell

Configuring a Data Acquisition block … *continued*

- Click the **Alarms** tab
- Enter the following information on the **Alarms** form for

PV High:

–Trip Point **4000**

–Priority **HIGH**

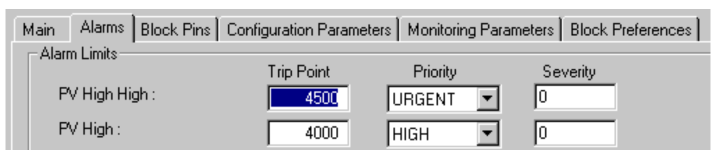
–Severity **0**

PV High High:

–Trip Point **4500**

–Priority **URGENT**

–Severity **0**



- Click **OK** to close the **DATAACQ** block

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Notes

Configuring Alarms

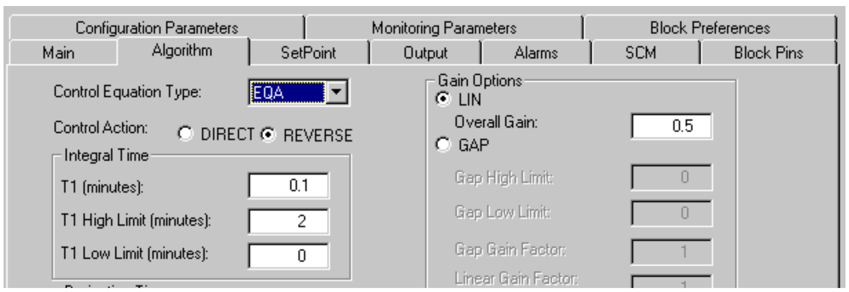
The Alarms in the DATAACQ block must be set within the range of your PVEU Range Hi and PVEU Range Low. This will cause your block to go into Alarm if the ranges are Exceeded.

It is important that you follow the sequence. The system will not allow you to enter the PV High High before you enter the PV High.

Honeywell

Configuring a PID block

- Double-click the **PID** block
- Enter the following information:
  - Name **PIDA** ⚠
  - Engr Units **M3/Sec**
  - Execution Order **30**
  - PVEU RANGE HI **5000**
  - PVEU RANGE LOW **0**
- Click the **Algorithm** tab
- Enter the following algorithm information :
  - T1 **0.1**
  - T1 High Limit **2.0**
  - High Gain Limit **2.0**
  - Gain Options **Check LIN**
  - Overall Gain **.5**



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Notes

Configuring a PID block

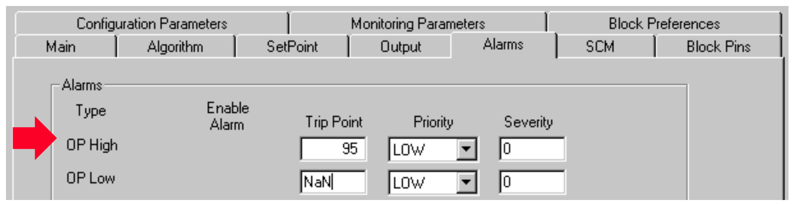
For more information on how to configure function blocks, refer to the *Control Building Guide, Control Module Creation, Using the Parameters Configuration form*.

⚠ It is important that you name this block **PIDA**. If you do not name the block **PIDA,** you will not be able to see many parameters from the Station software Detail Displays.

Honeywell

Configuring a PID block *…continued*

- Click the **Alarms** Tab
- Enter the following information on the Alarms form for OP High (OPHI):
  - Trip Point **95**
  - Priority **Low**
  - Severity **0**



- Click the **SetPoint** Tab
- Enter the following information on for the Input Range:
  - High Limit **5000**
  - Low Limit **0**
- Click **OK** to close the PID parameter configuration form

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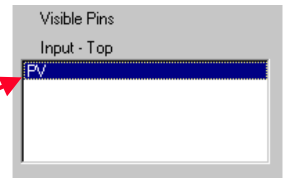
Notes

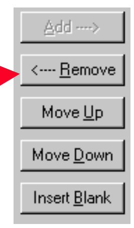
Honeywell

Moving Pins on Function Blocks ⚠

- Click on the **PID** block, then right click to show the drop-down menu. Select **Configure Parameters … PID Block Object**.
- On the Configuration Form , click the **Block Pins** tab



- Click on **PV** in the Input-Top box
- Click on **Remove**



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Notes

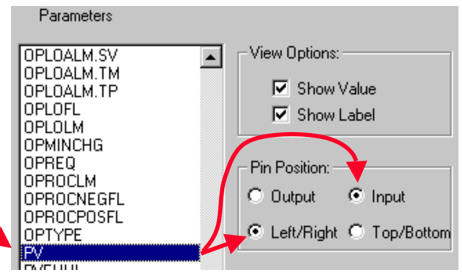
Moving Pins on Function Blocks

For more information on adding and removing pins on function blocks, refer to the *Control Building Guide, Control Module Creation, Using the Block Configuration form*.

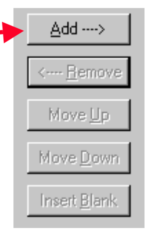
In order to make the routing of the soft wiring from the **DACA** block to the **PIDA** block more direct and neat, we will move the PV input from the top of the **PIDA** block to the Left. To accomplish this we must first remove the pin and then reinsert it in the proper location. This will not improve performance, just clean up the wiring.

Moving Pins on Function Blocks *…continued*

- Click on **PV** in the Parameters box and ensure that Pin Position has Input and Left/Right selected



- Then click on **Add** and **OK**



- The PV Pin position should now appear on the left side of your PID function block

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Notes

Moving Pin's on Function Block's

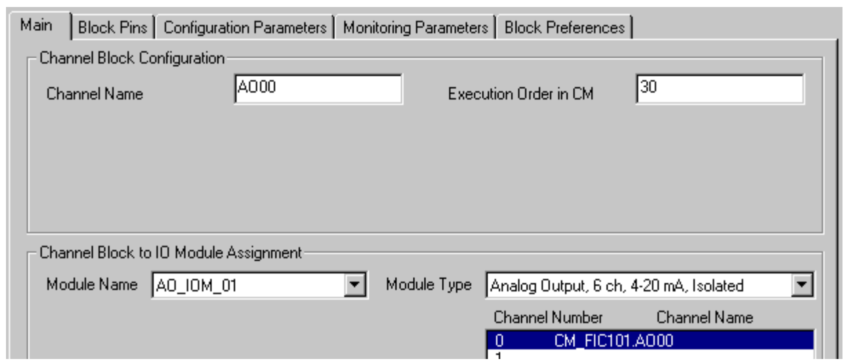
For more information on Adding and Removing Pins on function blocks, refer to the *Control Building Guide, Control Module Creation, Using the Block Configuration form.*

Here we add the PV pin to the PID Block in the Input, Left/Right location. In this location the soft wiring will be much cleaner.

Honeywell

Configuring an AO block

- Double-click the **AOCCHANNEL** block
- Name the block **AO*n1*** *(where* ***n1*** *is the first AO channel on your partition sheet)*
- Click the **Module Name** port and click **AO_IOM_01** to display the IOM
- In the box labeled Currently Assigned Slots In Selected Module, click **Slot *n1*** *(where* ***n1*** *is the first AO channel on your partition sheet)*
- Click **Assign Channel**
- Click **OK** to close the **AOCHANNEL** function block



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Notes

Configuring a Data Acquisition block

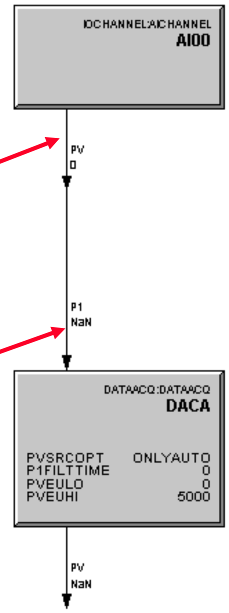
For more information on how to configure function blocks, refer to the *Control Building Guide, Control Module Creation, Using the Parameters Configuration form.*

Honeywell

Connecting Function Blocks

Using the Menu Method

- Click
  - **Insert**
    - **Wire**
- On the **AICHANNEL** block, click the pin labeled **PV**
- On the **DATAACQ** block, click the pin labeled **P1** and a wire will connect the two pins



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Notes

Before you begin

Your final step in this Creating a Control Module tutorial is to connect the function blocks together to form a control strategy. (You can connect blocks together at any time you choose, before or after configuring block parameters.)

For more information on how to connect function blocks, refer to the *Control Building Guide, Control Module Creation, Connecting and Disconnecting blocks*.

Methods

Menu Method

- Open a CM in the Project tab
- Click Tools > Wire and observe the cursor change to a plus (+) sign
- On one block, click the pin to be wired from
- On another block, click the pin to be wired to and a wire is connected between them.

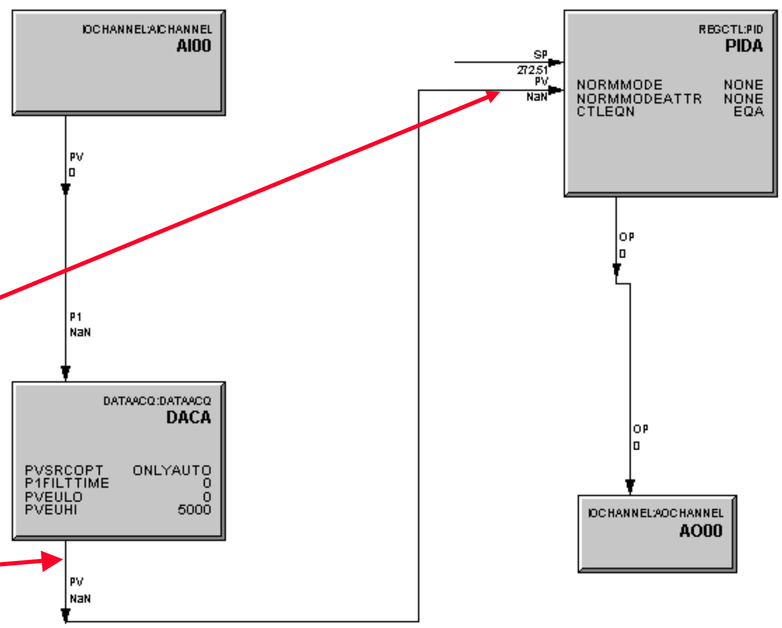
Methods continued on the next page...

Honeywell

Connecting Function Blocks

Using the Quick Method

- Open the **FIC101** CM in the **Project** tab
- Double-click on the pin labeled **PV** at the bottom of the **DATAACQ** block
- Click the **PID** block pin labeled **PV** and a wire connects the two pins
- Complete the rest of the connections as shown



- Close and Save Changes to the CM

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Notes

Methods …*continued*

Quick Method

- Open a CM in the Project tab
- Double-click on the pin to be wired from and observe the cursor change to a plus (+) sign
- Click the pin to be wired to and a wire connects the two block parameters together

If you are trying to route a wire through a specific location you can do this by clicking at turn points between pin connections, as in the connection above between the DACA and PIDA blocks. Just double click on the DACA bottom pin and then click over to the right and it will draw the first part of your wire. Continue this to complete the wire connection. You can put as many bends and turns in a wire as you like. When you reach an appropriate destination, the destination arrow will turn Cyan.

Honeywell

This completes….

PlantScape Controller Implementation

Lesson 1

Configuring a
Continuous Control Strategy

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Notes

Honeywell

PlantScape Controller Implementation

Lesson 2

Configuring the Heat Cascade

3 - 21

Notes

Introduction

The purpose of this Lesson is to give you the knowledge to be able to configure a Cascade control strategy. You will use **CM#_FIC101** as a template for the temperature controller, the Cascade primary. After you complete this Lesson you should be able to copy and modify CMs, and implement and understand Parameter Connectors.

Objectives

❶ Understand Parameter Connectors

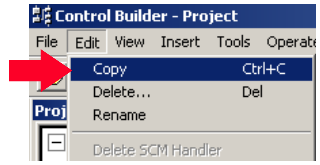
❷ Understand how to copy and modify existing CMs to create similar CMs

❸ Configure a Cascade Strategy

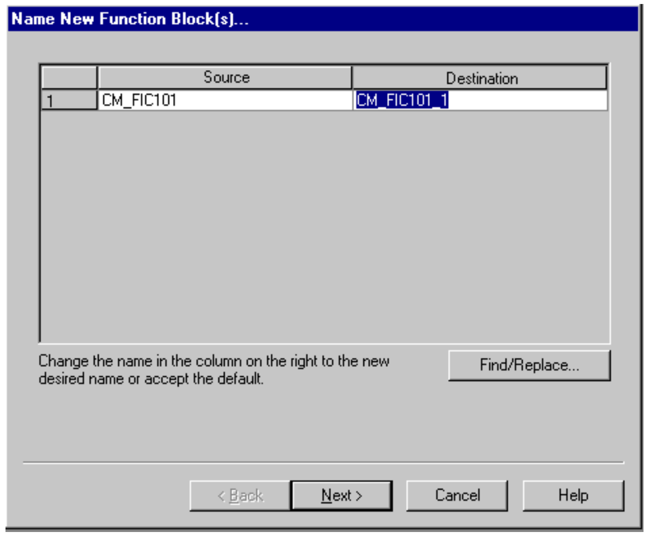
Honeywell

Copying a CM

- Open the **Project** view in Control Builder and select **CM#_FIC101**



- From the drop down menu Click
  - **Edit**
    - **Copy**



- This will bring up the Name New Function Block(s) screen. On this screen you will be able to change the Control Modules name.

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Notes

Copying a CM

Copying a CM to create a similar CM is a common, time-saving technique because

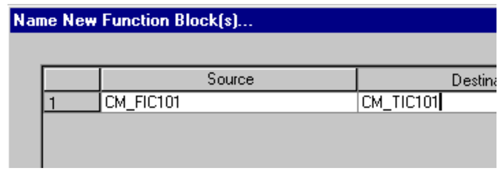
• function blocks and their connections are already present

• many parameters do not have to be modified

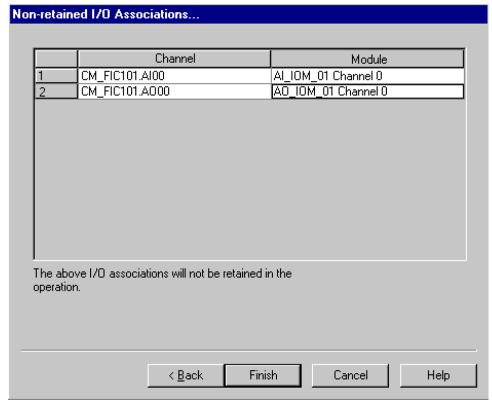
• parameters that must be modified, such as the CM name and I/O channel assignments, can be modified from initial dialog boxes or are automatically cleared and set up for data entry

Honeywell

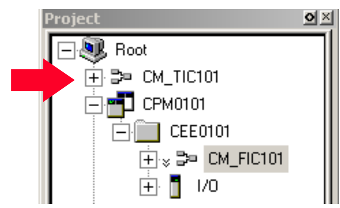
Copying a CM



- Modify the Destination name:
  - Name **CM#_TIC101**
- Click **Next** button



- The next screen will be the Non-retained I/O Associations. The list of channel associations that will be deleted is displayed. These will have to be reconfigured on the new CM.
- Click **Finish** button



- The result will be a new CM under the Project Root which will be the primary of the cascade

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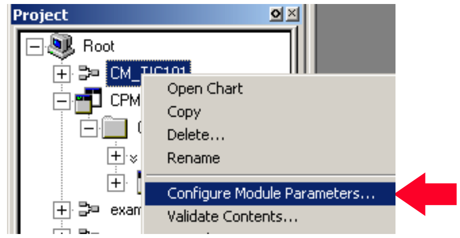
Notes

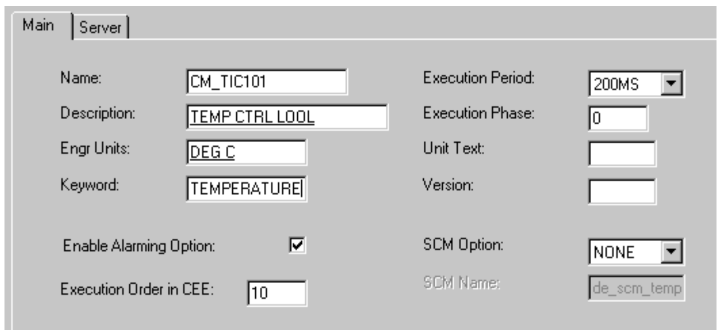
Honeywell

Configuring Parameters

- Select and then right click on the new CM
- Select
  - **Configure Module Parameters...**



- Modify the settings to match the information below:
  - Description **TEMP CTRL LOOP**
  - Engr Units **DEG C**
  - Keyword **TEMPERATURE**



- Click **OK**
- Assign **CM#_TIC101** to **CEE0101**

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Notes

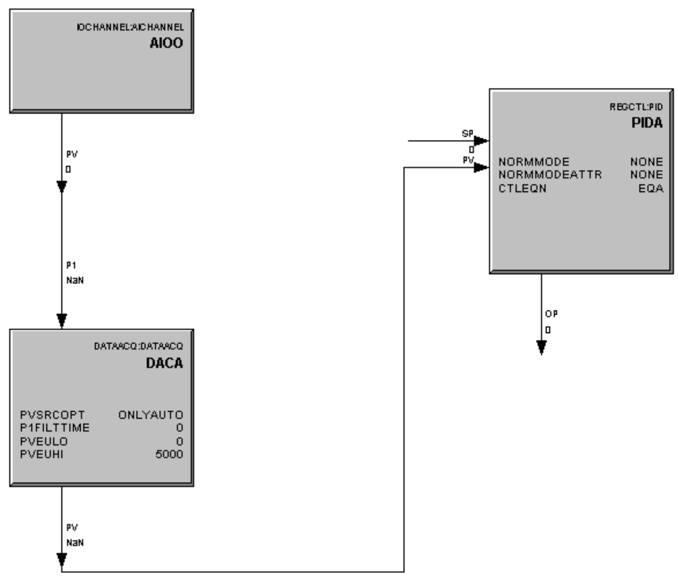
Configuring Parameters

When you use the Copy CM technique to create a new CM, you need to change parameters on the Main page of the Parameters Configuration form. On the Server page, Point Detail and Group Display references are copied and do not have to be re-entered.

Honeywell

Modifying the CM

- Double Click on **CM#_TIC101** to open it in the Control Drawing area
- Select the connector soft-wire from the **PID** block to the **AOCHANNEL** block and press the <delete> key
- Select the **AOCHANNEL** block and press the <delete> key



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Notes

Modifying the CM

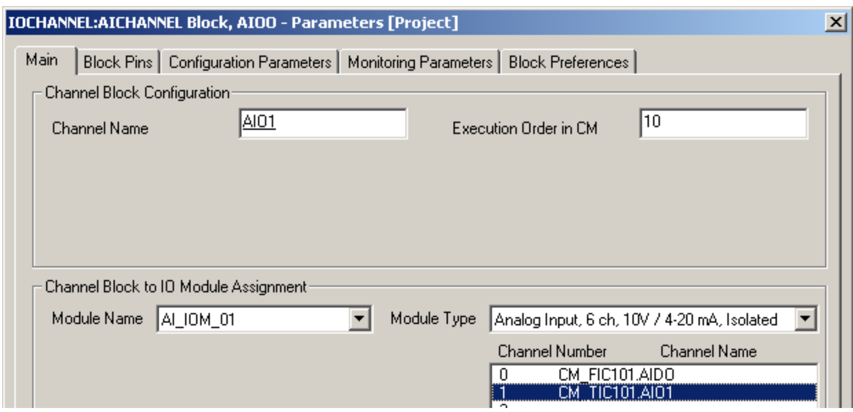
It is always a good idea to keep the CM organized and free of any unneeded components. Components that are removed or rearranged can always be added back if needed at a later time.

Here we remove the AOCHANNEL block because CM#_TIC101 will be the primary in a Cascade strategy. Its OP will be incorporated as a parameter connector to the secondary's SP

Honeywell

Configuring Blocks, AICHANNEL

- Double Click on the **AICHANNEL** block
- Name the block **AI*n2*** *(where **n2** is the second AI channel on your partition sheet)*
- Click the **Module Name** port and click **AI_IOM_01**
- In the box labeled **Channel Number Channel Name**, click **Slot *n2*** *(where **n2** is the second AI channel on your partition sheet)*
- Click **Assign Channel**



- Click **OK** to close the AICHANNEL Parameter configuration form

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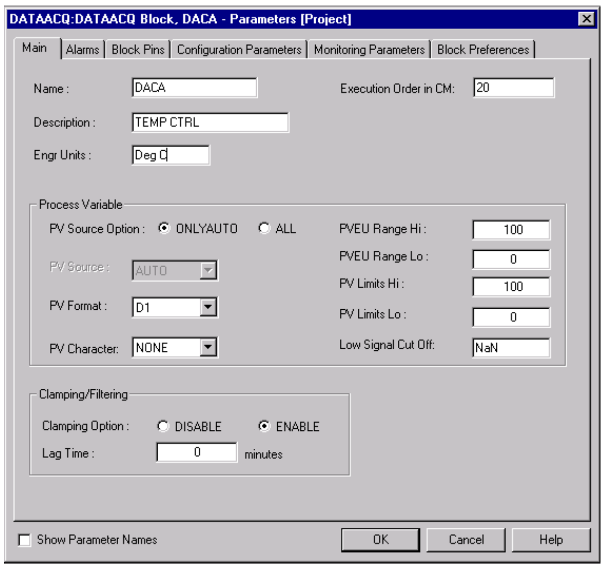
Notes

Honeywell

Configuring Blocks, DATAACQ

- Double Click on the **DATAACQ**
- Modify the settings to match the information below:
  - Name **DACA**
  - Description **TEMP CTRL**
  - PVEU Range Hi **100**
  - Engr Units **DegC**
  - PVEU Range Lo **0**
  - PV Limits Hi **100**
  - PV Limits Lo **0**



3 - 27

Notes

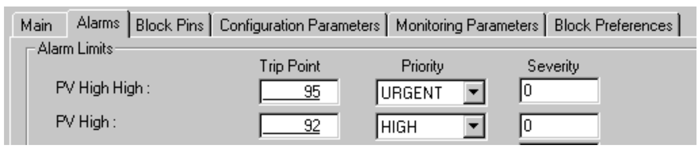
Configuring Blocks, DATAACQ

The **DATAACQ** block for all PID Loop CMs must be named **DACA** so that the supplied PlantScape station PID Point Detail display can be used.

Configuring Blocks, DATAACQ …continued

- Click on the **Alarms** Tab
- Modify the settings to match the information below:

	Trip Point	Priority	Severity
– PV High High	**95**	**URGENT**	**0**
– PV High	**92**	**HIGH**	**0**



- Click **OK**

3 - 28

Notes

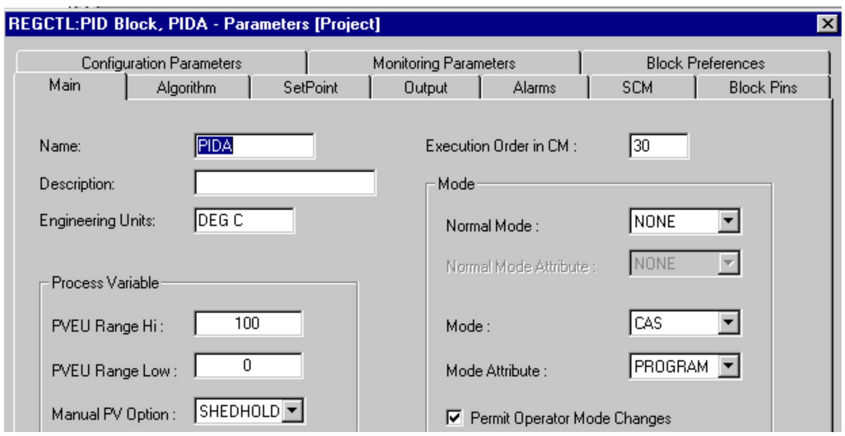
Configuring Blocks, DATAACQ

A primary reason that the DATAACQ block is added to PID Loop CMs is for high and low PV alarming.

Note that the PV High limit must be configured before the PV High High limit.

Configuring Blocks, PID

- Double Click on the **PID** Block
- Modify the settings to match the information below:
  - Name **PIDA**
  - Engineering units **DEG C**
  - PVEU Range HI **100**
  - PVEU Range Low **0**



Notes

Configuring Blocks, PID

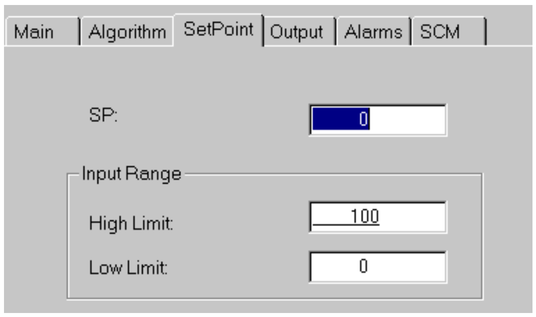
The **PID** block must be named **PIDA** so that the supplied PlantScape station Point Detail display can be used.

The **PID** block contains a large amount of functionality. It has several pages of configuration parameters. Because many parameters are common to similar **PID** blocks, the copy technique is particularly useful here.

For more information on configuring PID blocks, refer to *Control Builder, Components Theory, Regulatory Control, PID Block.*

Configuring Blocks, PID *…continued*

- Click on the **SetPoint** Tab
- Modify the settings to match the information below:
  - High Limit **100**
  - Low Limit **0**



- Click **OK**

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Notes

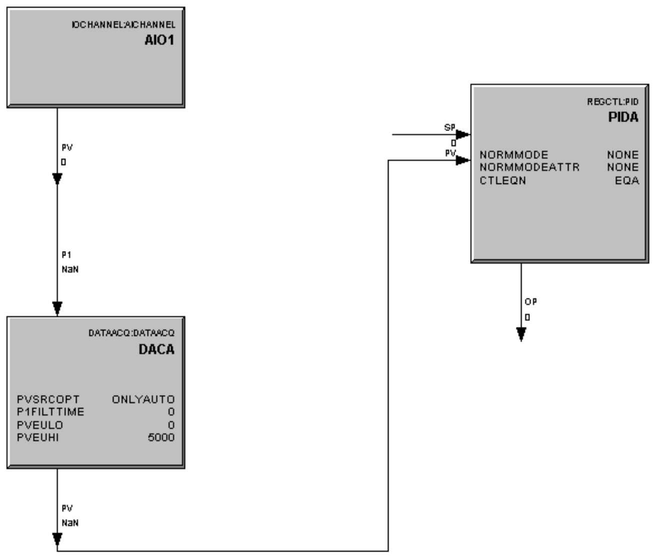
Configuring Blocks, PID

SP input range must be within the PVEUHI -- LO range.

Honeywell

Complete CM#_TIC101

- A completed **CM#_TIC101** should be similar to the **CM** below



- Close and save **CM#_TIC101**

3 - 31

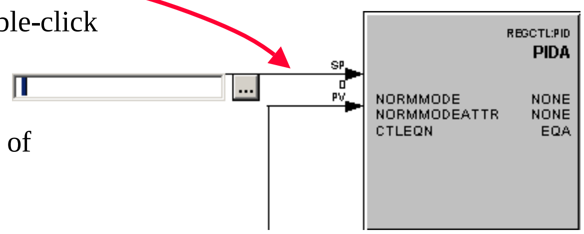
Notes

Honeywell

Configuring CM#_FIC101 for Cascade Strategy

- Double Click on **CM#_FIC101** in **Project** to open it
- Click on the **Parameter Connection** icon

- Single-click on the **PID** Block's **SP** pin;
  Move to the left of the arrow and double-click



- In the resulting port, enter the full name of the desired block connection, including Control Module, Function Block, & Parameter:

  CM#_TIC101.PIDA.OP

Alternate Method: Use the Point Selection Tool
(see next slide)

3 - 32

Notes

Adding a Parameter Connection

Parameter connections allow one CM to communicate with another CM. The CMs can be in the same controller or in different controllers communicating peer to peer over the Supervisory C-Net.
After clicking on the Parameter Connection icon your mouse pointer will turn into a cross-hair. The same technique used in wiring blocks together is used to add a Parameter Connector. You may add turning points to route your Parameter Connector in available space. You may also re-position the parameter connection after it is entered.
Note: If you want to cancel the connection operation before you are finished, press **<Esc>.**

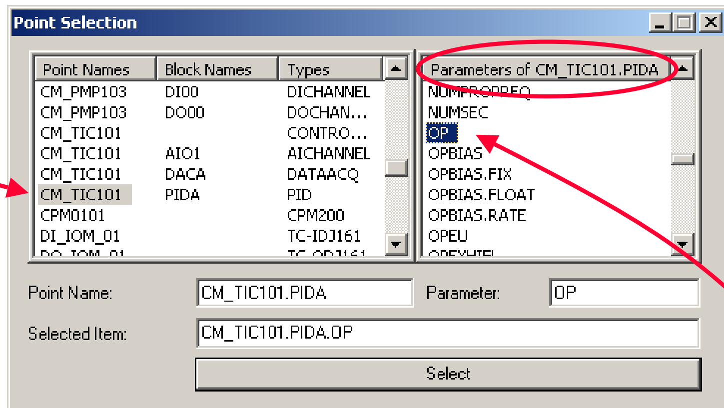
After Double Clicking you will be given a box to enter the information needed for the connection. You will need to enter:
- The name of the CM or SCM to which the connection is being made
- The Function Block within the CM or SCM to which the connection is being made
- The Parameter to which the connection is being made (e.g. CM#_TIC101.PIDA.OP)

Honeywell

Using the Point Selection Tool

- Click on the button with the dot leader icon (three dots) to access the Point Selection dialog box for a particular Parameter Connector.

- Select the desired Point Name from the list of **Point Names** and associated **Block Names**/ **Types** on the Point Selection dialog.



- Select the desired parameter from the list of the chosen Function Block parameters in the right-hand list box on the Point Selection dialog.
- Click the Select button and then click the Close button in the Point Selection dialog to close the dialog and return to the control drawing.

3 - 33

Notes

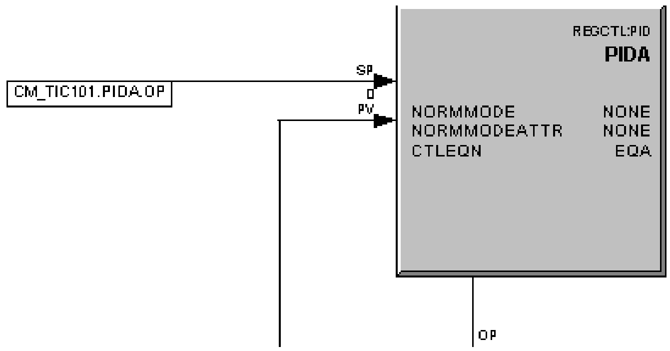
Using the Point Selection Tool

Perform the indicated steps to use the Point Selection tool to find a desired point name and parameter when referencing a particular parameter expression.

Honeywell

Configuring CM#_FIC101 for Cascade Strategy

- The completed Parameter Connection is shown below:



- Close and save **CM#_FIC101**

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Notes

Honeywell

This completes….

PlantScape Controller Implementation

Lesson 2

Configuring The Heat Cascade

3 - 35

Notes

Honeywell

PlantScape Controller Implementation

Lesson 3

Loading, Activating and Operating Control Modules

3 - 37

Notes

Introduction

The purpose of this Lesson is to give you the knowledge to be able to load, activate and operate control strategies. You will become familiar with the operation of CMs from Station as well as from Control Builder.

Objectives

❶ Understand Control Builder procedures that apply to CM configuration

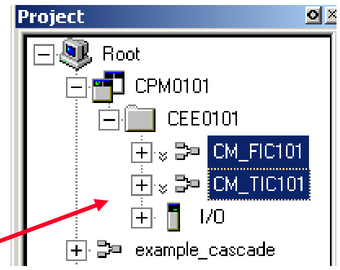
❷ Understand the steps necessary to load and activate a control strategy

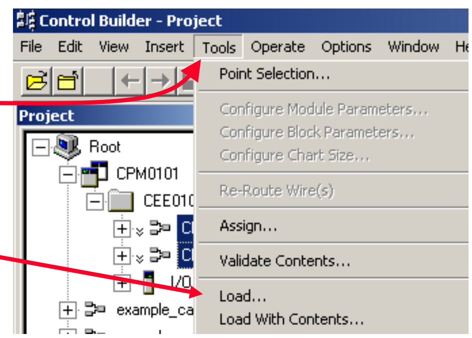
❸ Understand the characteristics associated with the **Project** and the **Monitoring** views of Control Builder

Honeywell

Loading a Control Strategy

- Ensure that the **CM#_TIC101** and **CM#_FIC101** are closed
- Open the **Project** tab in Control Builder
- Expand the Root Directory
- Select both **CM#_TIC101** and **CM#_FIC101**
- Click the **Tools** Menu
- Click **Load**





3 - 38

Notes

Before you begin

Once you have configured a control strategy, you must load the strategy to the controller before activating it.

Your strategy includes your CPM, CEE, IOMs, and CMs. Each of these are loaded in a simple procedure.

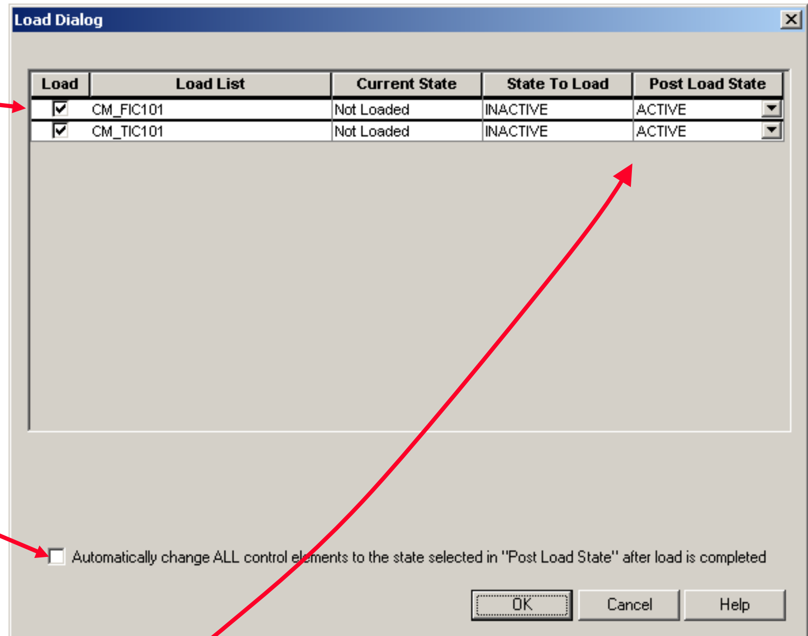
If you do not close your CM before loading it you will encounter a lock error, and will be forced to cancel the load.

For more information about loading and activating a control strategy refer to *Control Building Guide, Control Strategy Loading*.

Honeywell

Loading a Control Strategy

- Verify that the items to load are checked
- Click **OK**
- Note that you can decide to have the modules go to the active state automatically by clicking this checkbox with the **Post Load State** selected to be **ACTIVE**



3 - 39

Notes

Before you begin

Once you have configured a control strategy, you must load the strategy to the controller before activating it.

Your strategy includes your CPM, CEE, IOMs, and CMs. Each of these are loaded in a simple procedure.

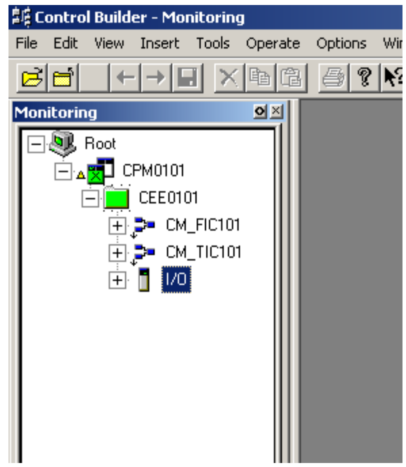
If you do not close your CM before loading it you will encounter a lock error, and will be forced to cancel the load.

For more information about loading and activating a control strategy refer to *Control Building Guide, Control Strategy Loading*.

Honeywell

Loading a Control Strategy *...continued*

- Click **Monitoring** to go to the Monitoring (loaded) tab
- Activate **CM#_TIC101** and **CM#_FIC101**



3 - 40

Notes

Activating a Control Strategy

As with IOMs, there are many ways to activate CMs. One is to use the check box in the load dialog box to change loaded items to the post load state of ACTIVE (see Pg. 3-37). Another is to activate each item individually as we have done here. A third is to select multiple items in the Monitor tab and click **Operate → Activate → Selected Items**.

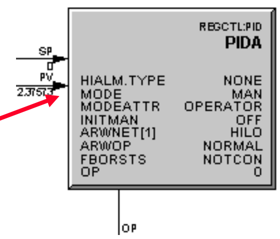
For more information about loading and activating a control strategy refer to *Control Building Guide, Control Strategy Loading.*

Once you activate the CM, it turns green in the **Monitoring** tab. Remember that the CEE must be active for anything assigned to the CEE to work. So, even if a CM is active, it won't do anything unless the CEE is also active.

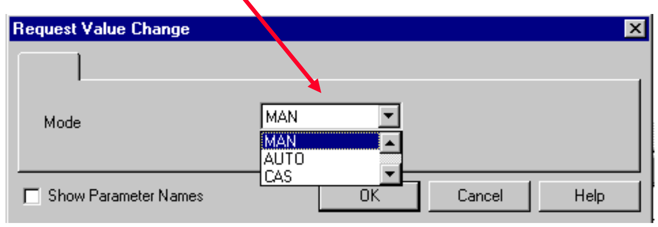
Honeywell

Configuring CMs for Cascade Operation

- Double click on **CM#_FIC101** to open it in the Control drawing area
- Ensure that **PIDA** is in **MAN** mode (If it is not in **MAN** mode, place it in **MAN** mode)
- To place the **PIDA** block in **MAN** mode double-click on the word **MODE** on the blocks faceplate



- Select **MAN** from the drop down list



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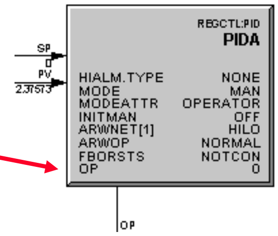
Notes

Configuring CMs for Cascade Operation

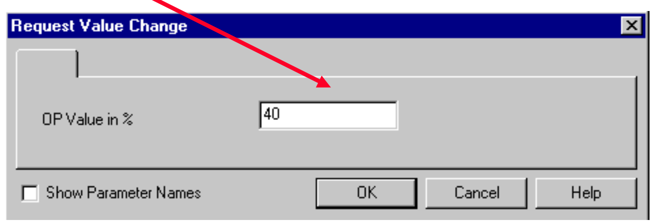
When changing the **OP** value, the **PID** block must be placed in **MAN** mode. If it is not you will be prompted with an invalid mode error.

Configuring CMs for Cascade Operation …continued

- Double Click **OP** on the **PID** block's face



- Enter a Value in % of **40** and Click **OK**



- This will result in the **PV** climbing to a flow of approximately 2000 lb\hr.

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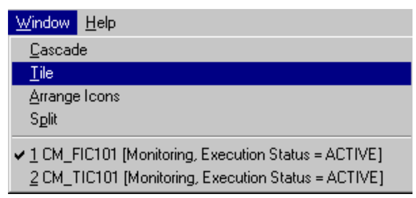
Notes

For more information about changing Function Block Parameters refer to *Control Building Guide, Control Module Creation, Requesting Value Change for Configuration Parameters.*

Honeywell

Configuring CMs for Cascade Operation *…continued*

- Double-click **MODE** on **PIDA's** face and set the **MODE** to **Cascade (CAS)**
- Leave **CM#_FIC101** open and double-click on **CM#_TIC101** in the **Monitoring** tab
- Change its **PIDA.MODE** to **AUTO**
- Enter a value of **40** on the Set Point (**SP**) Pin
- Select
  - **Window**
    - **Tile**



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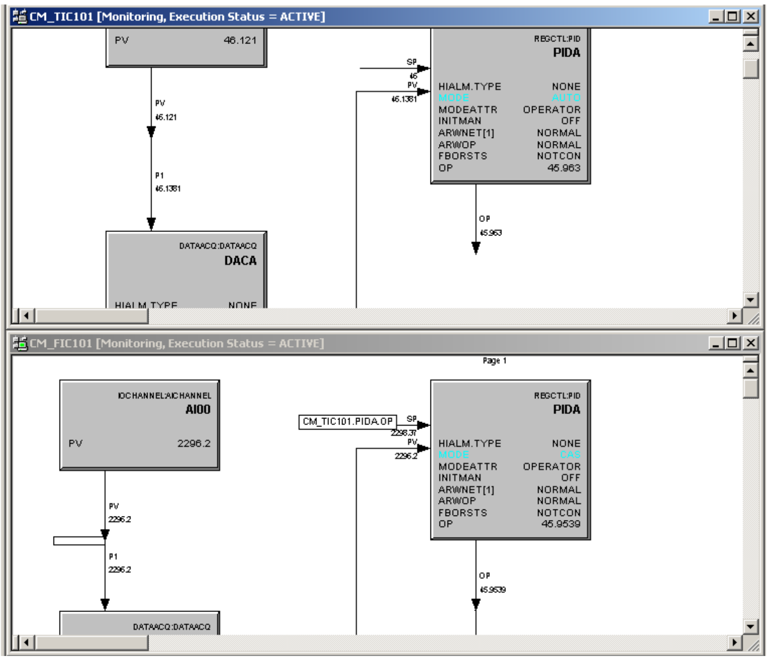
Notes

Honeywell

Configuring CMs for Cascade Operation *…continued*

- This will permit you to see **CM#_TIC101** and **CM#_FIC101** operating together



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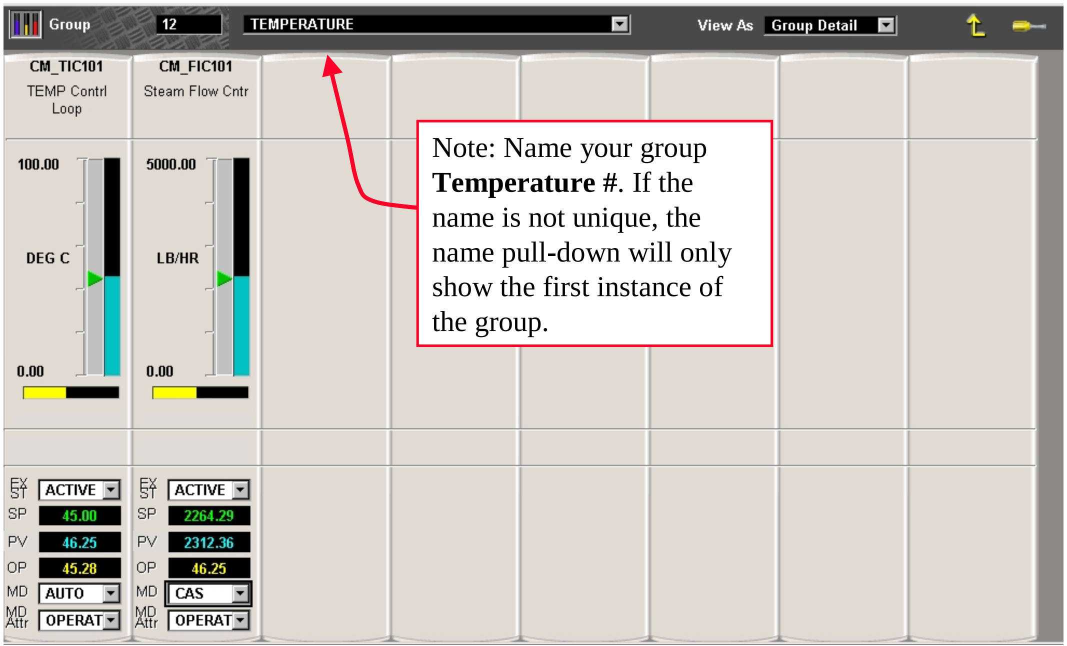
Notes

Honeywell

Configuring and Operating Group #2

- Go to station, log on as Manager and configure Group #2 in the following sequence



- Operate your Heat Cascade from Group #2 in station

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Notes

Configuring and Operating Group #2

The password for Manager access level is mngr

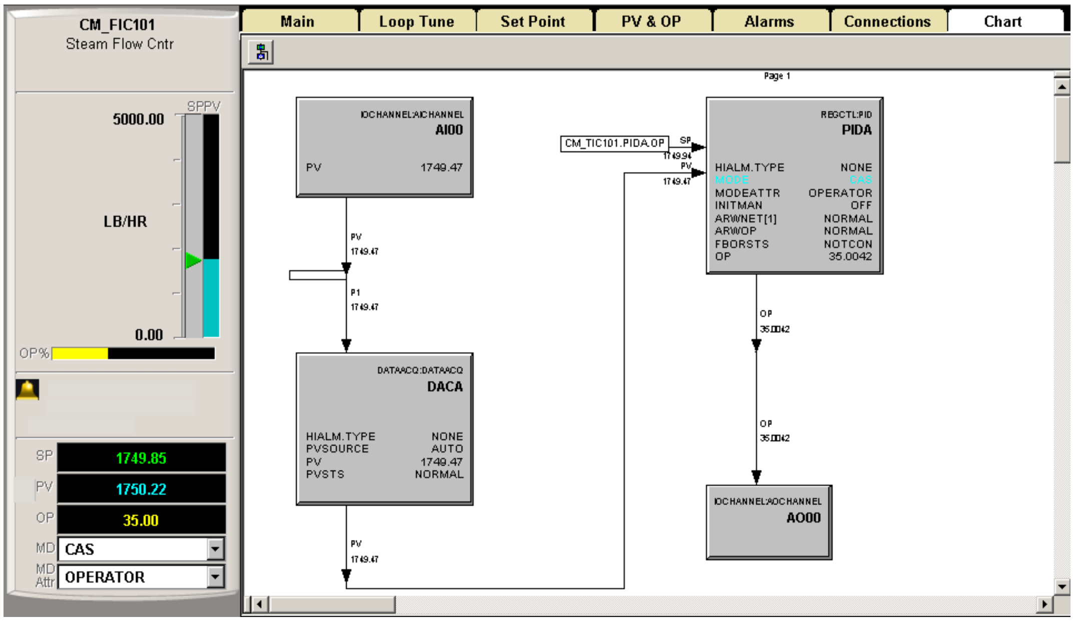
CM#_TIC101	**Slot 1**
CM#_FIC101	**Slot 2**

For more information about working with and configuring Station refer to *Operators Guide, Monitoring and Controlling, Using Group Displays.*

Honeywell

Point Detail Chart Page

- Call up the Point Detail display of **CM#_FIC101** and click on the **Chart** tab
- The **Chart** page is an active window into the **Monitoring** view of **Control Builder**. It is very useful in status monitoring and trouble-shooting since it has all the functionality of the Control Builder Monitoring window.



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Notes

CM Detail Display -- Chart Page

The Chart page of the Detail is a window into the Control Builder Monitoring view of the CM. This page is very useful for monitoring and trouble shooting as it has the full functionality of the Monitoring view. It displays things hidden from the rest of the Detail such as Parameter Connections and Interlock Details

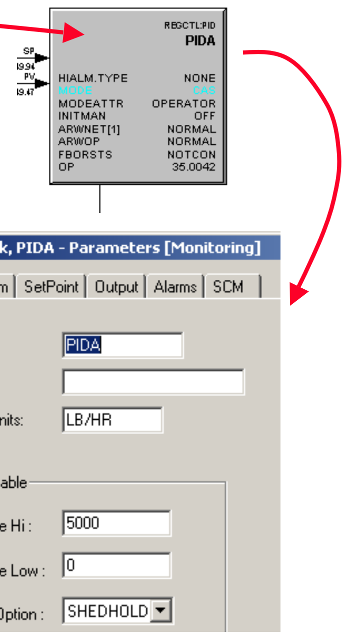
Honeywell

Point Detail Chart Page

- Double-click on the top area of the PIDA block to call up the block details

- Note that the parameters are available for configuration when the Chart page is called up while logged into Station as MNGR

- Logoff and call up the Chart page while logged in as OPER
  - What do you notice about the PIDA details now?



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Notes

CM Detail Display -- Chart Page

If the Chart page is called up while logged into Station as Supervisor or higher, the page can be used to command the CM, the same way you would from Control Builder. Also, on-line configuration changes are available as they are in Monitor view.

Honeywell

This completes….

PlantScape Controller Implementation

Lesson 3

Loading, Activating and Operating Control Modules

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Notes

Honeywell

PlantScape Controller Implementation

Lesson 4

PlantScape DbAdmin Familiarization

3 - 49

Notes

Introduction

The purpose of this lesson is to give you the knowledge to be able to use the DbAdmin tool to help facilitate maintenance of the Engineering Repository database used by the PlantScape system.

Objectives

In practice a power failure or software problem might cause a database lock to be created. Normally these database locks occur only on those CM's or SCM's that might be open at the time of the abnormal shut down of Control Builder. In this lab we will cause an abnormal shutdown of Control builder so that we may practice using the DbAdmin tool.

Honeywell

Control Builder Abnormal Shutdown

- If Control Builder is running, save your work at this time
- Select project view of your database in one of the tree windows.
- Double click and open CM_FIC101
- Select anyone of the CM_FIC101 Function Blocks and move it slightly
  - Leave CM_FIC101 open
- Double click and open CM_TIC101
- Slightly move anyone of CM_TIC101 Function Blocks
  - Leave both CM_FIC101 and CM_TIC101 open.
    - **- Do not save your database at this time.**
- Press <Ctrl> < Alt><Delete> buttons, all three buttons at one time
  - A Windows control panel should appear
- Select the Task Manager button
- Select the Applications tab.
- Select “Control Builder – Project” from the list of applications
- Making sure that “Control Builder – Project” is now highlighted in blue, select the End Task button.
    - **- Do not respond to any Control Builder save the database message**.
    - - Wait a few seconds for a message from Windows indicating that Windows cannot respond to the End Task request.
- Select End Task again when this Windows message appears.

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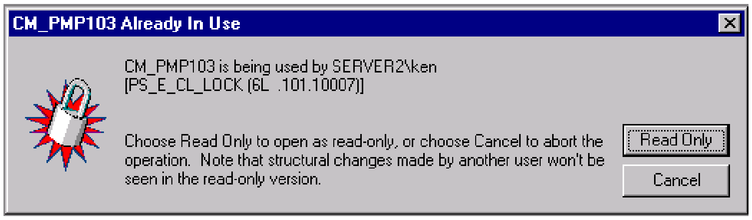
Notes

Honeywell

Test Lock Status



- Restart Control Builder and attempt to open CM_FIC101 and CM_TIC101.
  - You should see a “Already In Use” warning similar to the one above
  - All the other CM’s should open normally

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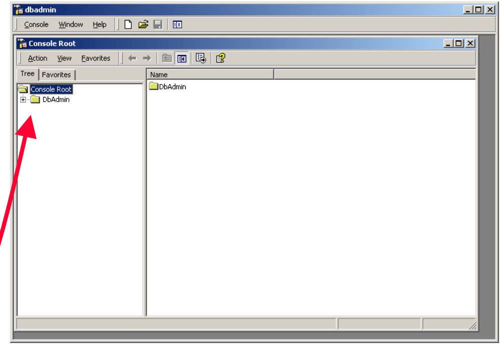
Notes

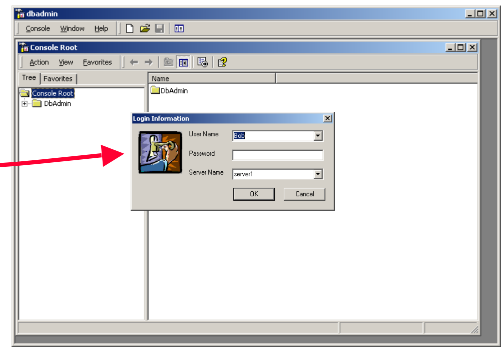
Login to DBAdmin

- Click
  - **-Start**
    - **- Programs**
      - **- PlantScape Engineering Tools**
        - **- DBAdmin**



- Click on the **DBAdmin** folder in the tree pane

- Type in your **User Name** and **Password**. Make sure that the **Server Name** is correct. Then click the OK button.



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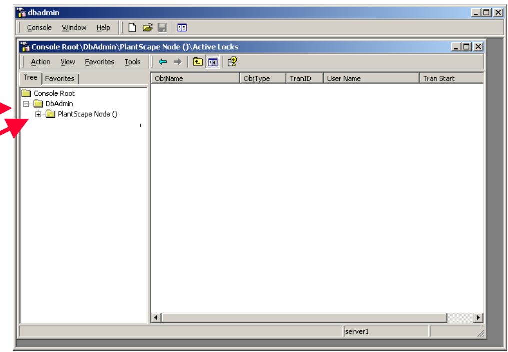
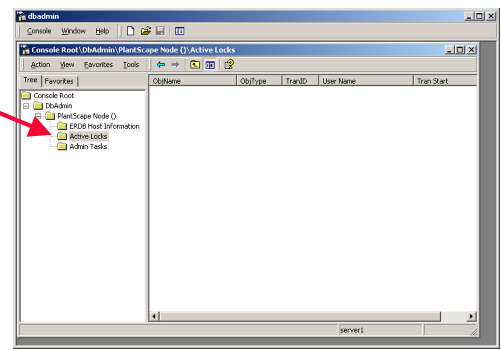
Notes

Expand the Tree View

- Click the "+" sign next to **DBAdmin** folder in the tree pane to expand the tree. Then select the "+" next to **PlantScape Node( )** to again expand the tree.



- Select **Active Locks** in the tree pane.



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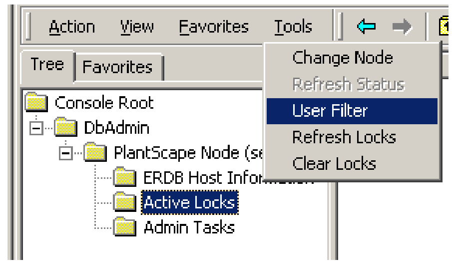
Notes

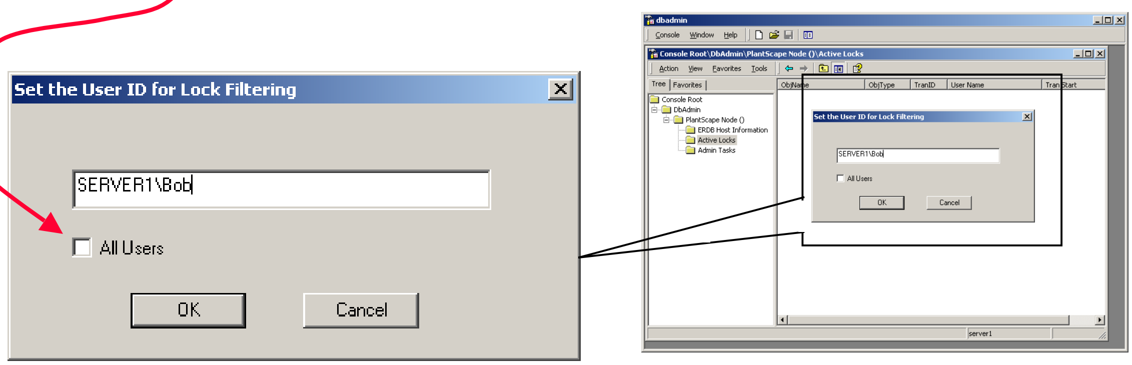
Honeywell

Implement User Filter

- Click **Tools** on the menu bar.Then select **User Filter** from the pull down menu to call up the filter dialog box



- Deselect **All Users** and enter ***your*** User ID as shown in the View pane



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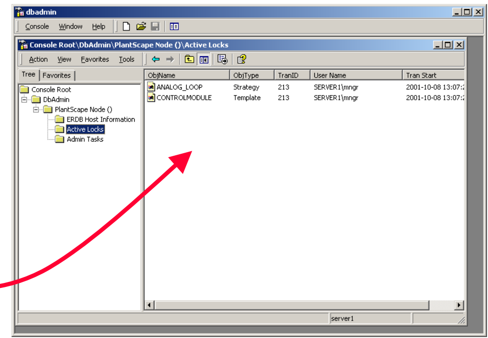
Notes

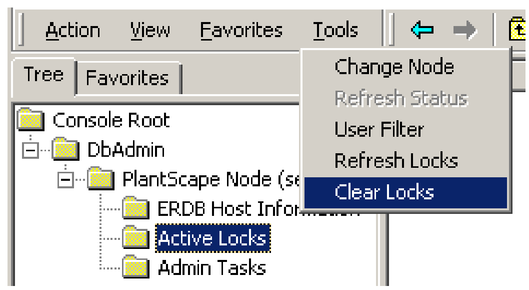
Honeywell

PlantScape System Architecture

- You should now see only those locked CMs that you created.



- Click **Tools** on the menu bar again.Then select **Clear Locks**
  - All your locks should now be cleared and the CMs should function normally in Control Builder



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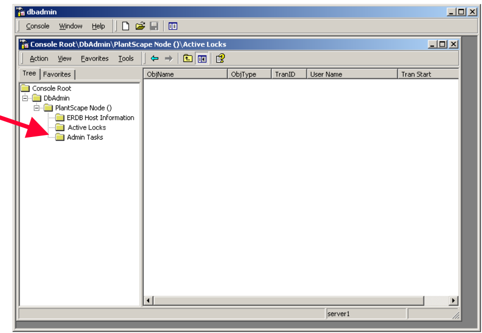
Notes

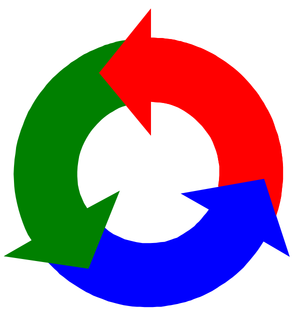
Honeywell

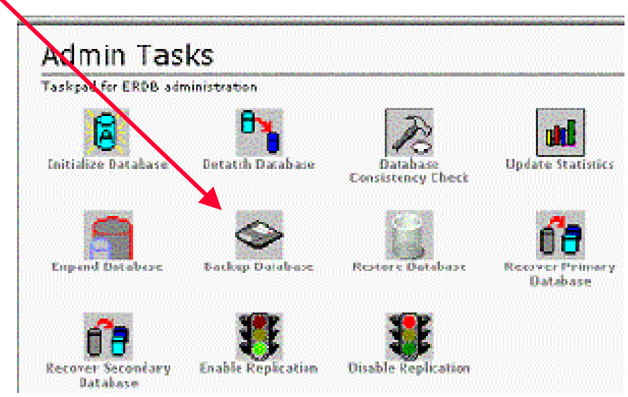
PlantScape System Architecture

- Select **Admin Tasks** from in the tree pane.



- Click the **Backup Database** icon.





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Notes

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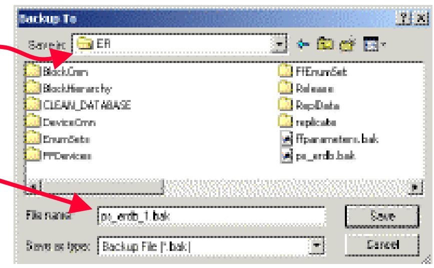
Honeywell

PlantScape System Architecture

- Change the save path to **C:\honeywell\tps50\system\er**
  Change file name to **ps_erdb_1.bak**
  Select **Save**



The **Restore Database** icon could be used at a later time to return the database to this saved state. Any changes made to the database after the last backup would be lost.

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Notes

Note - Backup databases can be used to recover the same server to a previously saved state. Backup databases should not be used to move a database from one server to another server.

Honeywell

This completes….

PlantScape Controller Implementation

Lesson 4

PlantScape DbAdmin Familiarization

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Notes

Unit 3 Exam

QuesNo	Question
1	The name Control Builder gives to a CM is CM*xx*. The *xx* is an index number used by the hybrid controller and must not be changed.
	A True
	B False
2	CM names must be unique in the project database.
	A True
	B False
3	Function Block names must be unique within:
	A The project
	B The CM
	C The Controller

4 Given the parameter connection reference: **TIC101.PIDA.OP**

What is TIC101? ____

What is PIDA? ____

What is OP? ____

5 Before you can load a CM or IOM you must first assign it to a CEE.

A True

B False

6 Before you can configure the I/O channels of a CM, you must first assign the CM and the IOM the channel references to the same CEE.

A True

B False

7 Which of the following are ways to load CMs and IOMs?

A Select the corresponding CPM in the Project tab; Select: **Tools—Load with Contents…**

B Select the CM or IOM in the Project tab and select the down arrow.

C Select the CM or IOM in the Monitoring tab and select the down arrow.

D Right click on the CPM in the Project tab; select **Load with Contents**…

E All of the above

8 Which of the following are ways to activate CMs and IOMs?

A Select the corresponding CEE in the Project tab; Select: ***Operate—Activate—This CEE's IOMs and - CMs…***

B Select the corresponding CEE in the Monitoring tab; Select: ***Operate—Activate—This CEE's IOMs - and CMs…***.

C Select the CM or IOM in the Project tab; right click and select ***Activate***.

D Select the CM or IOM in the Monitoring tab; right click and select ***Activate***

9 In a PID loop CM, which function block provides PVHI and PVLO alarming?

A AICHANNEL

B DATAACQ

C PID

D AOCHANNEL

10 In a PID loop CM, you must name the DATAACQ block DACA and the PID block PIDA in order to use the supplied Station detail display.

A True

B False

Unit 4

Device Control CMs

Honeywell

PlantScape Controller Implementation

Lesson 1

Configuring a Two State Device Control Module

4 - 3

Notes

Introduction

The purpose of this Lesson is to give you the knowledge to be able to create and configure a device control CM. Device control CMs give the operator a user friendly interface to the Digital I/O configured to control a two state valve, or a three state motor, etc. After you complete this Lesson you will have configured a two state device control module. Note: The output from the CM will cause a DO channel light to turn on when the valve is open. Feedback for the PV will be simulated by having hard-wired the DO channel back to same number DI channel.

Objectives

❶ Create a new CM named CM#_FV101, using the knowledge you gained in Unit 4, to control a two state valve.

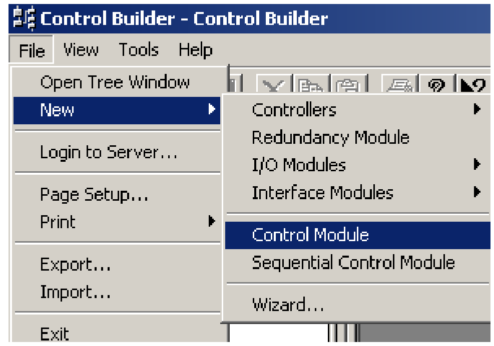
❷ Add and configure the Function Blocks needed to control the valve.

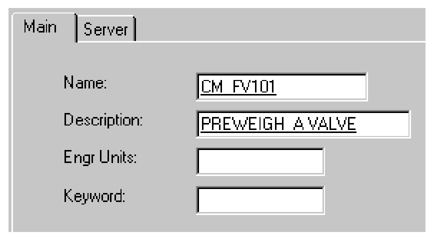
❸ Operate your newly created Device Control CM from station.

Honeywell

Creating and Configuring a New CM

- Click
  - **File**
    - **New**
      - **Control Module**
- Double Click on the newly created CM in the control drawing area of Control Builder
- Enter the following information
  - Name **CM#_FV101**
  - Description **PREWEIGH_A VALVE**
  - Execution Period **100MS**





4 - 4

Notes

Creating and saving a module

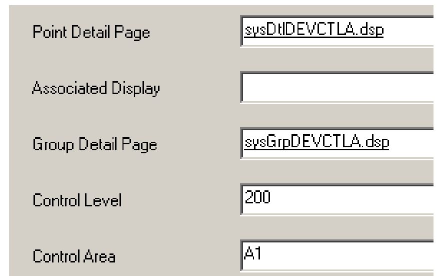
To create a Control Strategy, a Control Module must be created. Then function blocks are inserted, configured, and connected.

After creating the Control Module it will appear under the Project Tree Root. Default Control Module names are sequentially numbered (for example, CM30, CM31, etc.). The new Control Module is automatically saved to your hard drive.

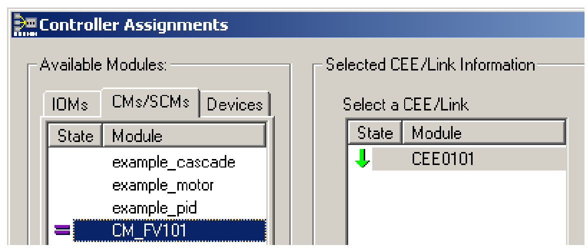
Honeywell

Creating and Configuring a New CM *…continued*

- Click on the **Server** tab
- Enter the following information
  - Point Detail Page **sysDtlDEVCTLA.dsp**
  - Group Detail Page **sysGrpDEVCTLA.dsp**
  - Control Area **A#**



- Click **OK**
- Close **CM#_FV101** and save changes
- Assign **CM#_FV101** to **CEE0101**



4 - 5

Notes

Configuring a module

To configure a CM, you must do two things

• Define the parameters of the top-level object (the CM)

• Add, configure, and connect function blocks

They can be done in any order. For this training we will configure the Control Module parameters first.

Assigning CMs to the CEE

Before you add and configure the function blocks in your CM, assign the CM to the CEE.

Before Control Builder will allow you to associate an IO channel block to an IOM (for example, associating the DI channel block in FV101 to DI_IOM_O1), it checks to be sure that the CM and the IOM are assigned to the same CEE.

Honeywell

Adding and Configuring Function Blocks

- Open **CM#_FV101**

- Click on the **Library** tab and add the following Function Blocks to **CM#_FV101**

Library Directory	Block Name
– IOCHANNEL	**DICHANNEL**
– DEVCTL	**DEVCTL**
– IOCHANNEL	**DOCHANNEL**

4 - 6

Notes

Assigning Function Blocks to a CM

Once the CM and the IOMs are assigned to the same CEE, you can configure IOCHANNEL function blocks in your CM.

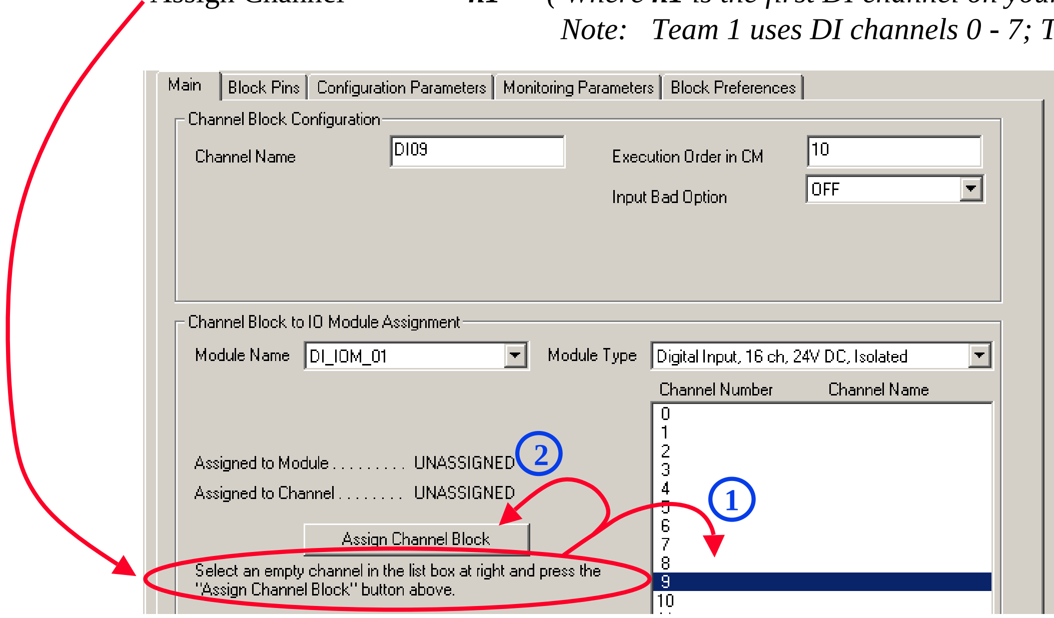
In our lab, we are simulating feedback for PVs. We have hard wired the outputs from the DO module to the corresponding inputs of the DI module. When the output from a device turns on, the feedback to the PV follows.

For more information on how to add function blocks to a CM, refer to the *Control Building Guide, Control Module Creation, Creating an Instance of a Basic Function Block.*

Honeywell

Adding and Configuring Function Blocks *…continued*

- Double click on the **DICHANNEL** block and enter the following information
  - Enter **Channel Name** **DI*n1*** *(Where **n1** is the first DI channel on your partition sheet)*
  - Select **Module Name** **DI_IOM_01**
  - Assign Channel ***n1*** *(Where **n1** is the first DI channel on your partition sheet; Note: Team 1 uses DI channels 0 - 7; Team 2 uses 8 - 15)*



4 - 7

Notes

Configuring a DICHANNEL Channel block

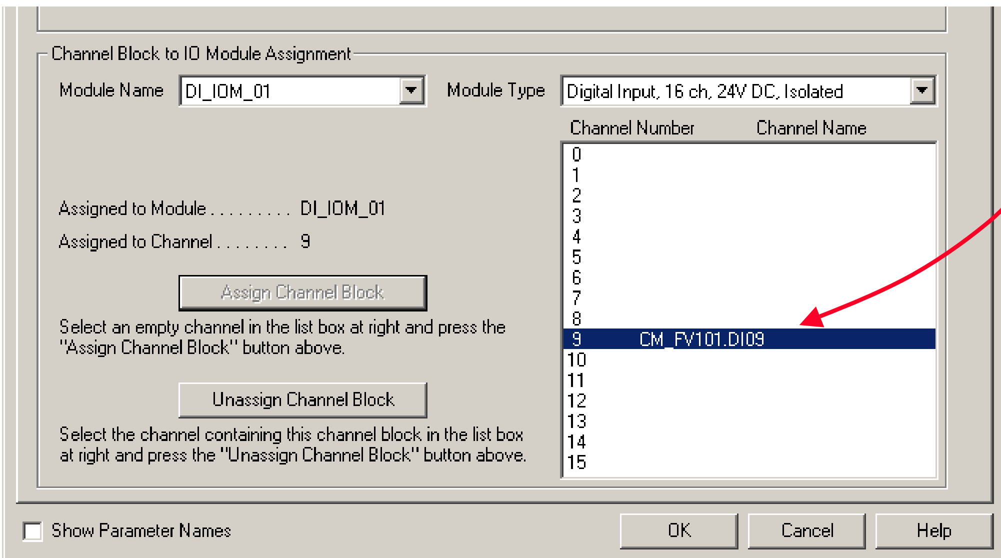
Once the DICHANNEL function block is configured to a Digital Input module, you will be able to assign it to a channel on the module. The channel would normally be hardwired from a real process device. In our training we are assigning this module to Channel Slot *n1*, the first DI channel on your partition sheet. This channel is hard wired from DO channel *n1*, and therefore when the valve is opened, the feedback will follow.

For more information on how to configure function blocks, refer to the *Control Building Guide, Control Module Creation, Using the Block Configuration Form.*

Honeywell

Adding and Configuring Functions Blocks *…continued*

- Note that the assignment now appears in the window: **CM_FV101.DI*n1***



- Click **OK**

4 - 8

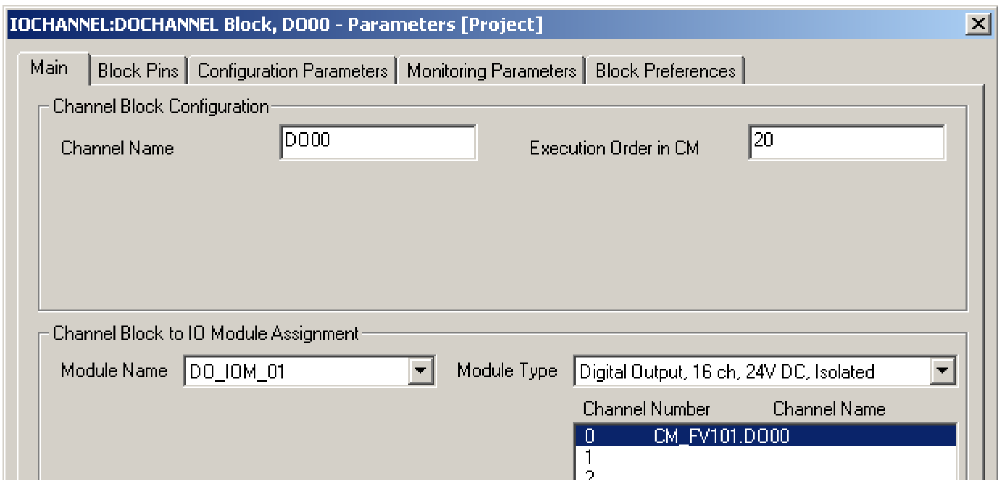
Notes

Configuring a DICHANNEL Channel block

Once the DICHANNEL function block is assigned to a Digital Input module, you will be able to view the assignment whenever the properties of any DICHANNEL block on that same module are detailed. All assigned channels appear by the designator: CMname.FBname

Adding and Configuring Functions Blocks *…continued*

- Double click on the **DOCHANNEL** block and enter the following information
  - Channel Name **DO*n1*** *(where **n1** is the first DO channel on your partition sheet)*
  - Module Name **DO_IOM_01**
  - Assign Channel ***n1*** *(where **n1** is the first DO channel on your partition sheet)*



- Click **OK**

Notes

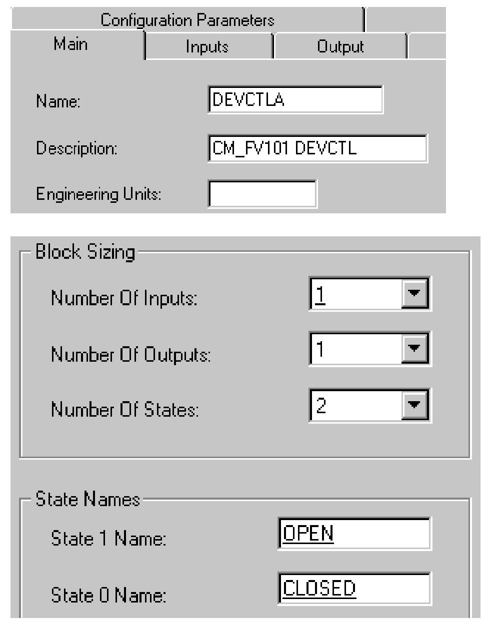
Configuring a DOCHANNEL Channel block

Once the DOCHANNEL is configured to a Digital Output module, you will be able to assign it to a channel on that module. The channel would normally be hardwired to a real process device. In our training we are assigning this module to Channel Slot *nn*, the first channel on your partition sheet. This will cause the DO channel light to turn on when output 1 in the Device Control Module is activated.

Honeywell

Adding and Configuring Functions Blocks *…continued*

- Open the **DEVCTLA** block
- Enter the following information in the Main tab:
  - Name **DEVCTLA**
  - Description **CM#_FV101 DEVCTL**
- Enter the following Block Sizing Information:
  - Number of Inputs 1
  - Number of Outputs 1
  - Number of States 2
- Enter the following State Names Information:
  - State 1 Name OPEN
  - State 0 Name CLOSED



4 - 10

Notes

Configuring DEVCTLA block

For this single input, single output scenario, we have specified two states for the Device Control Module. **State 1** is assigned the descriptor **OPEN** and **State 0** is assigned the descriptor **CLOSED** to indicate the open and closed states of the valve.

Honeywell

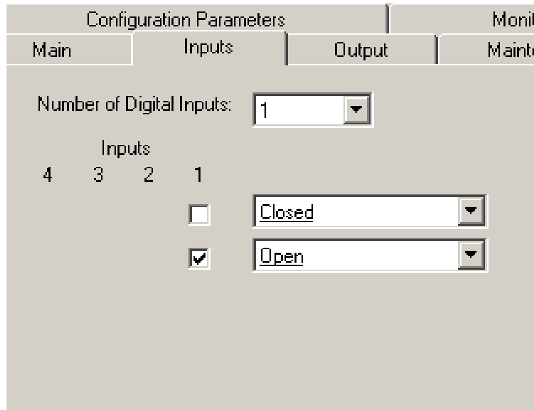
Adding and Configuring Functions Blocks *…continued*

- Click the **Inputs** tab and and use the pull-down menus to select the following configuration

  – Number of Digital Inputs: **1**

  – Input 1 -- Unchecked : **Closed**

  – Input 1 -- Checked : **Open**



4 - 11

Notes

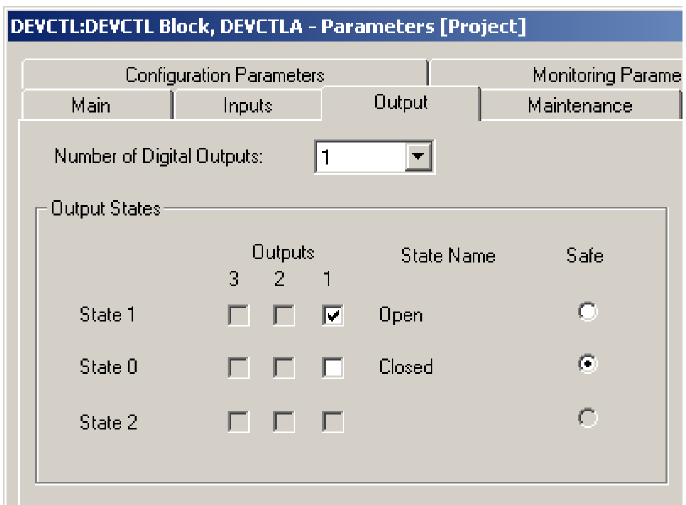
Configuring DEVCTLA block

In our lab, Input 1 in the ON state signifies that the valve is Open. We configure the Inputs tab accordingly.

Honeywell

Adding and Configuring Functions Blocks *…continued*

- Click the **Outputs** tab and enter the following information
  - Number of Digital Outputs **1**
  - Output 1 - OPEN state **checked**
  - Output 1 - CLOSED state **unchecked**



4 - 12

Notes

Configuring DEVCTLA block

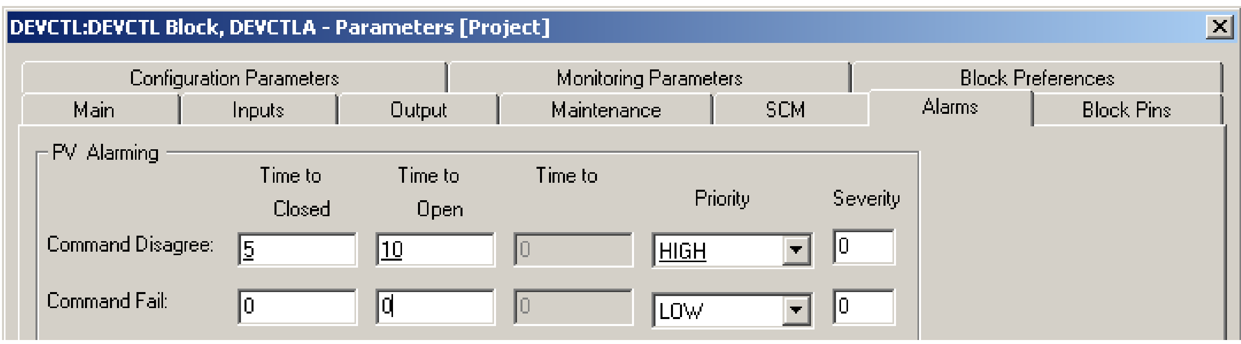
In this scenario we have configured Output 1 to go on when the operator selects State 1, OPEN. When the OP of CM#_FV101 is changed to OPEN, its configured digital output goes to the On state, as shown by the associated DO channel light turning on.

Honeywell

Adding and Configuring Functions Blocks *…continued*

- Click the **Alarms** tab and enter the following information

	CLOSED	OPEN	Priority	State 2	Severity
– Command Disagree	**5**	**10**	**HIGH**	**N/A**	**0**
– Command Fail	**0**	**0**	**LOW**	**N/A**	**0**
– Bad PV				**LOW**	**0**



- Click **OK**

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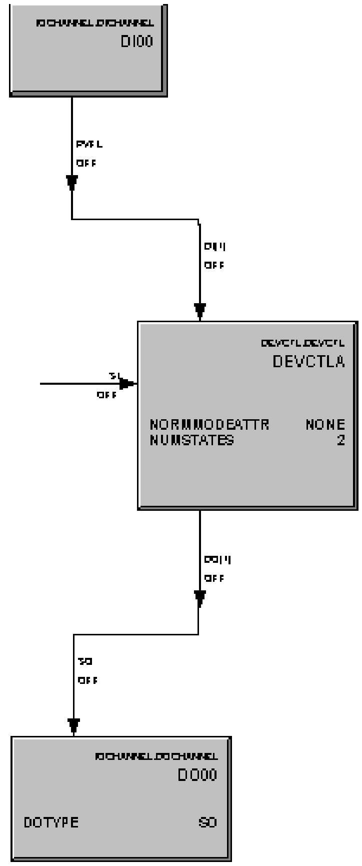
Notes

Device Control Alarms

See online help for descriptions of Command Fail and Command Disagree alarms

Wiring Blocks

- Arrange blocks and wire them together as shown
- Close **CM#_FV101** and save changes
- Load and Activate **CM#_FV101**



4 - 14

Notes

Wiring Blocks

Your final step in this Creating a Control Module training is to connect the function blocks together to form a control strategy. You can connect blocks together at any time you choose, before or after configuring them.

For more information on how to connect Function Blocks, refer to the *Control Building Guide, Control Module Creation, Connecting and Disconnecting blocks.*

Quick Method

- Open a CM in the **Project** tab
- Double-click on the pin to be wired from and observe the cursor change to a plus (+) sign and the pin turn cyan
- Click the pin to be wired to; the pin turns cyan to indicate a proper connection and a wire connects the two blocks

Honeywell

Operating FV101 From Station

- In Station Command Zone, type in **CM#_FV101** and click on the magnifying glass icon

- Click on **OP** and change the status from CLOSED to OPEN. Observe as the status changes from closed to open
- Add **CM#_FV101** to Group #3, Slot1.
- Name the group Transfer A and B.
- Operate from the group.

4 - 15

Notes

Operating From Station

For more information on how to operate from Station refer to the *Operator's Guide, Getting Started.*

Honeywell

This completes….

PlantScape Controller Implementation

Lesson 1

Configuring a Two State Device Control Module

4 - 16

Notes

Honeywell

PlantScape Controller Implementation

Lesson 2

Configuring a Three State Device Control Module

4 - 17

Notes

Introduction

The purpose of this Lesson is to give you the knowledge to be able to create and configure a three state device control CM. After you complete this Lesson you will have configured and operated a three state device control module.

Objectives

❶ Create a new CM named **CM#_AGIT101** using the knowledge you gained in Lesson 1, to control a three state agitator.

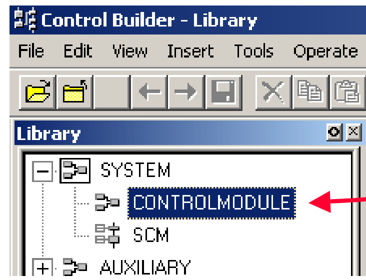
❷ Add and configure the Function Blocks needed to control the agitator

❸ Operate your newly created Device Control CM from Station

Honeywell

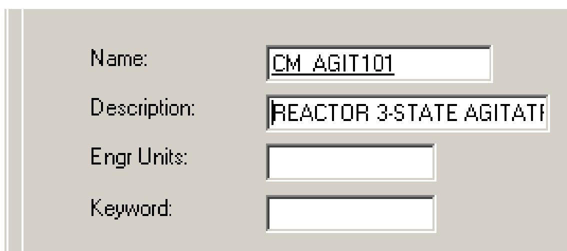
Creating and Configuring a New CM

- From the **Library** view expand the System tree and double click on CONTROLMODULE to create a new Control Module



- Double click in the new Control module drawing

- Enter the following information:
  - **Main** Tab
    - Name **CM#_AGIT101**
    - Description **REACTOR 3 STATE AGITATR**



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Notes

Adding and Configuring a New CM

Since **CM#_FV101** is a 2-State device and the agitator is a 3-State, copying and modifying is not effective. We will therefore create the agitator new from the Library. (You will also get more practice configuring a Device Control CM from scratch!)

When adding a new CM you can use any one of the following three methods:

• File > New > Control Module

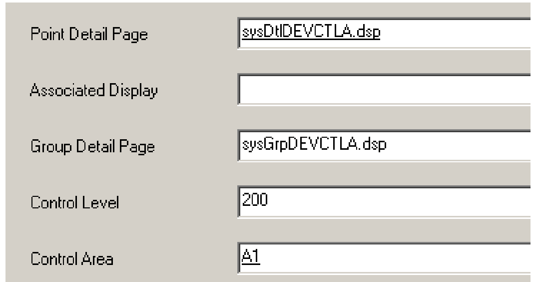
• Drag a CM from the Library Tab to the Project Tab

• Double click on the CM in the Library Tab (This method adds the CM to the Project and opens the chart for configuration, in one step. It also allows more work area since only one tree needs to be open.)

Honeywell

Creating and Configuring a New CM

- Enter the following information:
  - **Server** Tab
    - PDP **SysDtlDEVCTLA.dsp**
    - GDP **SysGrpDEVCTLA.dsp**
    - Control Area **A#**



- Click **OK**
- Close and save **CM#_AGIT101**.
- Assign **CM#_ AGIT101** to **CEE0101**

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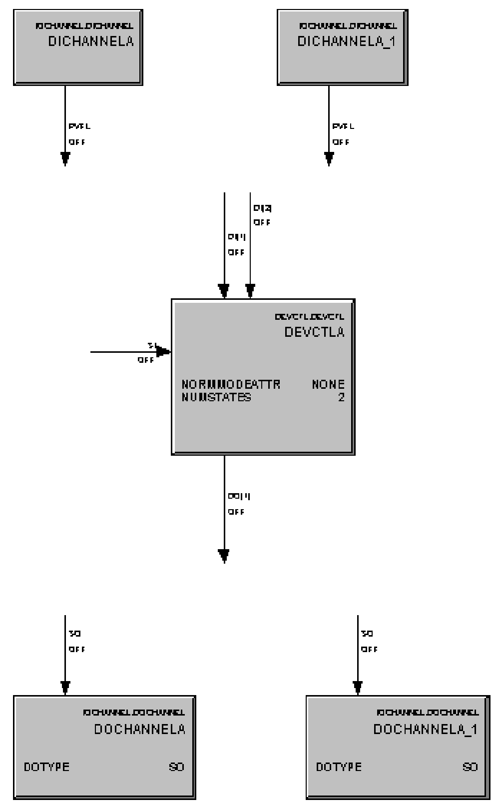
Notes

Before any Function Blocks are inserted into the CM, it is good practice to assign the CM to the corresponding CEE. This will enable you to completely configure the I/O Channel Function Blocks without having to close and reopen the CM. Recall that IO Channel blocks cannot be configured until their CM is assigned to a CEE.

Honeywell

Adding and Configuring Functions Blocks

- Insert the following function blocks in **CM#_AGIT101**
  - 2 **DICHANNEL**
  - 1 **DEVCTL**
  - 2 **DOCHANNEL**
- Arrange the blocks as shown



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Notes

Adding and Configuring Function Blocks

The above arrangement is used for wiring reasons. In this instance the wiring specifics are known and we can arrange the blocks accordingly. In other cases , blocks may have to be rearranged several times during configuration to facilitate the soft wiring.

Arranging blocks can be demanding in a small work area. Closing one tree view can expand the work area. Also, scaling the display to make it smaller can facilitate this task.

Configuring a Three State Device Control Module

Honeywell

Configuring the DICHANNEL Function Blocks

- Configure the left **DICHANNEL** with the following information
  - **Main** Tab
    - Name **DI*n2*** *(where **n2** is the second DI channel on your partition sheet)*
    - Module Name **DI_IOM_01**
    - Assign to Channel ***n2*** *(where **n2** is the second DI channel on your partition sheet)*
- Click **OK**
- Configure the right **DICHANNEL** with the following information
  - **Main** Tab
    - Name **DI*n3*** *(where **n3** is the third DI channel on your partition sheet)*
    - Module Name **DI_IOM_01**
    - Assign to Channel ***n3*** *(where **n3** is the third DI channel on your partition sheet)*
- Click **OK**

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Notes

Configuring the DOCHANNEL Function Blocks

Above we have selected channels 12 and 6 to assign our DOCHANNEL blocks. When DO channel light 12 comes on the Agitator will be active in low mode. When both 6 and 12 are on, this represents the Agitator being in high mode.

For more information on the DOCHANNEL block refer to the *Control Building Components Reference, DOCHANNEL block*.

Honeywell

Configuring the DOCHANNEL Function Blocks

- Configure the left **DOCHANNEL** with the following information
  - **Main** Tab
    - Name **DO*n2*** *(where **n2** is the second DO channel on your partition sheet)*
    - Module Name **DO_IOM_01**
    - Assign to Channel ***n2*** *(where **n2** is the second DO channel on your partition sheet)*
- Click **OK**
- Configure the right **DOCHANNEL** with the following information
  - **Main** Tab
    - Name **DO*n3*** *(where **n3** is the third DO channel on your partition sheet)*
    - Module Name **DO_IOM_01**
    - Assign to Channel ***n3*** *(where **n3** is the third DO channel on your partition sheet)*
- Click **OK**

4 - 22

Notes

Configuring the DOCHANNEL Function Blocks

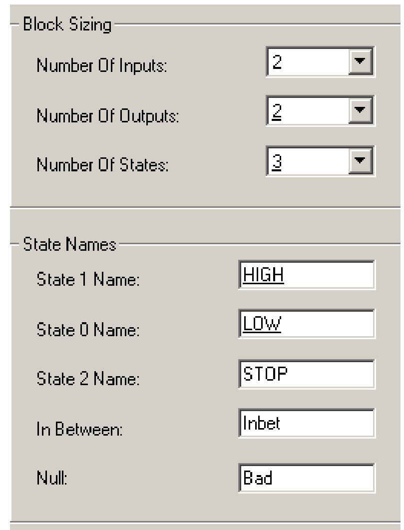
Above we have selected channels 12 and 6 to assign our DOCHANNEL blocks. When DO channel light 12 comes on the Agitator will be active in low mode. When both 6 and 12 are on, this represents the Agitator being in high mode.

For more information on the DOCHANNEL block refer to the *Control Building Components Reference, Reference Data for Functional Block Types, IO Channel Blocks, DOCHANNEL*

Honeywell

Configuring the DEVCTL Function Block *…continued*

- Configure the **DEVCTL** with the following information
  - **Main** tab
    - Name **DEVCTLA**
    - Description **DEVCTL FOR AGITATOR**
  - **Block Sizing**
    - Number of Inputs **2**
    - Number of Outputs **2**
    - Number of States **3**
  - **State Names**
    - State 1 Name **HIGH**
    - State 0 Name **LOW**
    - State 2 Name **STOPPED**
    - In Between Name **Inbet**
    - Null **Bad**



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Notes

Device Control State Assignments

The Device Control CM is designed to give the operator a user friendly interface to the digital I\O signals which control a 2 or 3-State device.

For this double input, double output scenario, we have specified three states for the Device Control Module. State 1 is assigned the name HIGH, state 0 is assigned the name LOW, state 2 is assigned the name STOPPED and the Inbetween state is assigned the name Inbet.

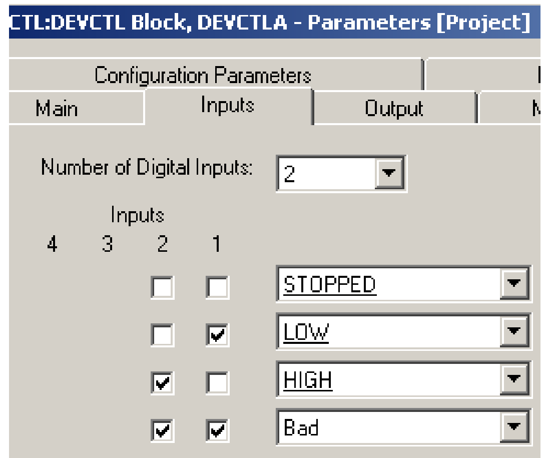
For more information on how to configure function blocks, refer to the Control Building Guide, Control Module Creation, Using the Parameters Configuration Form.

Honeywell

Configuring the DEVCTL Function Block *…continued*

- Configure the **DEVCTL Inputs** tab with the following information
  - Number of Digital Inputs **2**

Input 2	Input 1	State Descriptor
off	off	**STOPPED**
off	on	**LOW**
on	off	**HIGH**
on	on	**Bad**



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Notes

Device Control Input Assignments

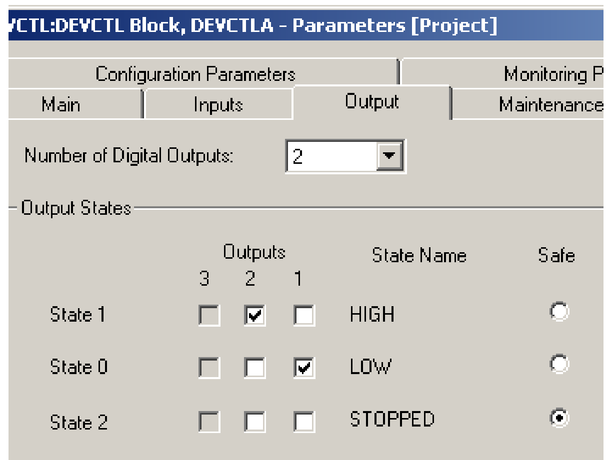
On the Inputs tab, enter the appropriate feedback inputs for the Device Control CM to handle the three-state device.

Honeywell

Configuring the DEVCTL Function Block *…continued*

- Configure the **DEVCTL Outputs** tab with the following information:
  - Number of Digital Outputs: **2**

Output 2	Output 1	State Name
on	off	**HIGH (**State 1)
off	on	**LOW** (State 0)
off	off	**STOPPED** (State 2)



- **Safe** State : **STOPPED**
- Click **OK**

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Notes

Device Control Output Assignments

Outputs for controlling the device are wired from the appropriate DO module(s) to the device and feedback inputs from the device are wired to the appropriate DI module(s).

DO and DI channel function blocks are then brought into the Device Control CM and configured to map to these DO and DI channels.

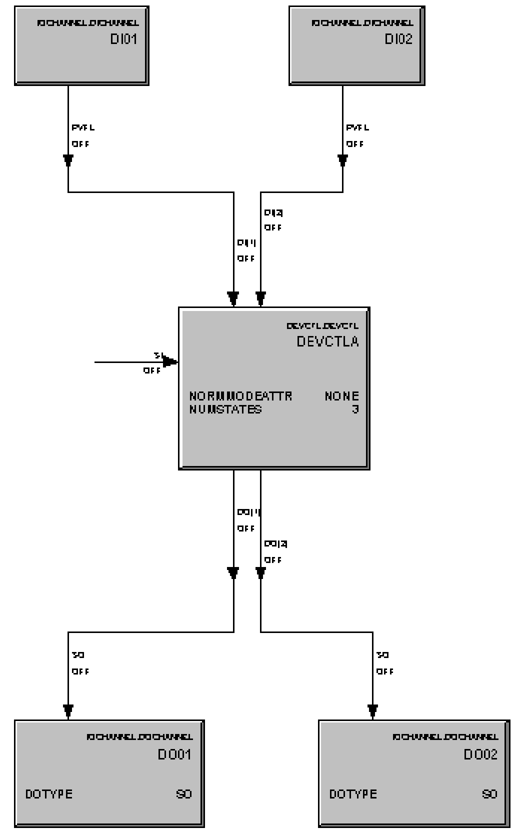
Using assigned states with specified names, corresponding output conditions are designated in the configured DEVCTL block to work in conjunction with the designated inputs for feedback to define device control requirements.

The operator (or SCM or Logic Interlock) can then pick a state for the device and the Device Control CM handles the correct inputs and outputs to control the device.

Honeywell

Wire Blocks Together

- Wire blocks together as shown
- Close and save
- Download and Activate



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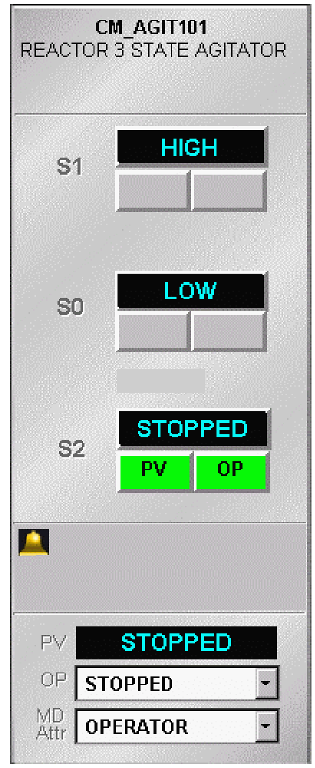
Notes

Wire Blocks Together

According to the state assignments, when the operator selects state 0 (low), DO[1] will go true which will turn on DO channel light 12. When the operator selects state 1 (High) both outputs DO[1] and DO[2] will go true which will turn on both lights 12 and 6.

Honeywell

Operating AGIT101 From Station



- Open **Station**
- Type in **CM#_AGIT101** and Click on the magnifying glass icon

- Click on **OP** and change the status from STOPPED to LOW. Observe as the PV changes accordingly. Also observe DO channel light ***n2*** turns on along with DI channel ***n2.***
- Click on **OP** and change the status from LOW to HIGH. Observe as the PV changes accordingly. Also observe DO light ***n3*** turns on along with DI channel ***n3.***
- Stop the Agitator and observe the results

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Notes

Before you begin

Operating from Control Builder is very useful, especially for troubleshooting and debugging, but for day-to-day operations you will probably prefer to use PlantScape's Station software.

Honeywell

This completes….

PlantScape Controller Implementation

Lesson 2

Configuring a Three State Device Control Module

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Notes

Honeywell

PlantScape Controller Implementation

Lesson 3

Control Module Skill Development

4 - 29

Notes

Introduction

The purpose of this Lesson is to give you the knowledge to be able to create and configure device control CMs using a similar CM as a template. After you complete this Lesson you will have configured all required Device Control modules needed for the project.

Objectives

❶ Create new CMs named CM#_FV102, CM#_FV103, CM#_PMP101, CM#_PMP102, and CM#_PMP103 using the knowledge you gained in Lessons 1 and 2, and using FV#101 as a template

❷ Operate your newly created Device Control CMs from Station

Honeywell

Creating Remaining Device Control CMs

- Copy **CM#_FV101** and use the information provided below to create the remaining two-state Device Control Modules needed for the project

NAME	DESCRIPTION	D/I CHANNEL	D/O CHANNEL
CM#_FV102	TANK B BOTTOM VALVE	DI*n4*	DO*n4*
CM#_FV103	REACTOR DRAIN VALVE	DI*n5*	DO*n5*
CM#_PMP101	TANK A TRANSFER PUMP	DI*n6*	DO*n6*
CM#_PMP102	TANK B TRANSFER PUMP	DI*n7*	DO*n7*
CM#_PMP103	REACTOR DRAIN PUMP	DI*n8*	DO*n8*

- All valves will use state names **OPEN (State 1)** and **CLOSED (State 0)** and will be virtual duplicates of **CM#_FV101**

- All pumps will use state names **ON (State 1)** and **OFF (State 0)** and will be similar to **CM#_FV101**

- All inputs use **DI_IOM_01**, all outputs use **DO_IOM_01**; channels as shown on your partition sheet. Recall that you must assign the CMs prior to configuring the channel blocks.

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Notes

Creating Remaining Device Control CMs

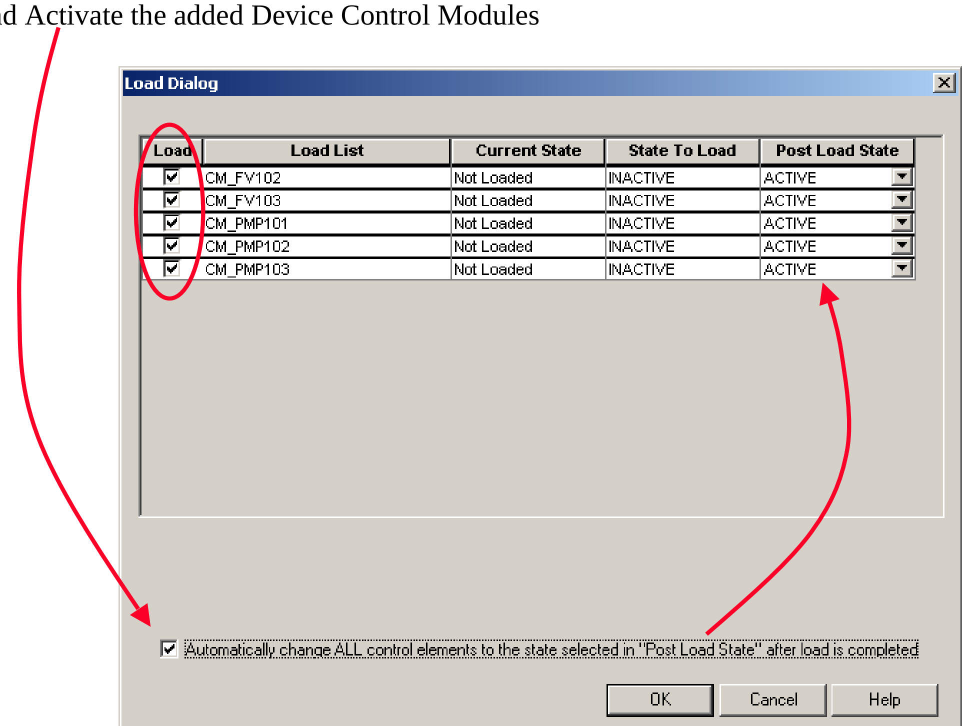
In this lesson you will be using the knowledge gained in previous Lessons to create new Control Modules. You must remember the primary rules used to create Control Modules

- Use one of three methods to create a new CM (or copy a similar CM)
- Configure the top-level parameters of the CM
- Close and save changes
- Assign CM to **CEE**
- Add and Configure Function blocks
- Wire Function blocks
- Load and Activate CMs
- Test CMs

Normally the names and descriptions could be anything you like. For this training it is important that the names be exactly as shown in the table. Any difference in the names will cause the SCMs constructed in later Lessons, along with supplied custom graphics for operations, not to work.

Load and Activate CMs

- Load and Activate the added Device Control Modules



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Notes

Load and Activate CMs

Clicking on all the added CMs in the Project tree will allow you to load them all at once. This can prove to be quite time saving. Select all the CMs you wish to load , then click the down-arrow.

In the resulting Load Dialog box, make sure the Load check-box for each CM is checked. Also, if you wish to activate the CMs automatically after loading, check the box at the bottom of the Dialog and select ACTIVE as the Post Load State.

Honeywell

Verify CMs

- Construct Groups #3 and #4 in Station

- **Group #3**
  - **Name** **TRANSFER # A & B**
  - **Slot 1** **CM#_FV101**
  - **Slot 2** **Blank**
  - **Slot 3** **CM#_PMP101**
  - **Slot 4** **Blank**
  - **Slot 5** **CM#_FV102**
  - **Slot 6** **CM#_PMP102**
  - **Slot 7** **Blank**
  - **Slot 8** **Blank**

- **Group #4**
  - **Name** **DRAIN #**
  - **Slot 1** **CM#_FV103**
  - **Slot 2** **CM#_PMP103**
  - **Slot 3** **CM#_AGIT101**
  - **Slot 4** **Blank**
  - **Slot 5** **Blank**
  - **Slot 6** **Blank**
  - **Slot 7** **Blank**
  - **Slot 8** **Blank**

- Verify that Pumps & Valves are operational.

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Notes

Honeywell

This completes….

PlantScape Controller Implementation

Lesson 3

Control Module Skill Development

4 - 33

Notes

Unit 4 Exam

QuesNo	Question
1	The device control CM provides a user interface to the digital I/O used to control a device such as a pump, a motor, or a solenoid valve.
	A True
	B False
2	Device control CMs can be interlocked to prevent operation under configurable process situations.
	A True
	B False
3	Device control CMs can be operated from Station detail displays (if they are not interlocked and the mode attribute is set to operator) by manipulating which parameter(s)?
	A PV
	B OP
	C COMMAND
	D Bad PV Alarm Priority
4	When a device control CM is copied to make a second similar CM, which item(s) are not copied to the new CM?
	A I/O channel configuration
	B Alarm configuration
	C State assignment names and configuration
	D Server parameter configuration

5 When a device control CM is copied to make a second similar CM, which item(s) are not copied to the new CM?

A Function block names

B Parameter connections

C CM name

D Engineering units

6 Device control alarms are configured to monitor operation of the device. Which of the following are device control alarms?

A Command fail

B Command disagree

C PVHI

D OPHI

Unit 5

Creating Auxiliary CMs

Honeywell

PlantScape Controller Implementation

Lesson 1

Configuring a Regulatory Control CM (with simulated I/O)

5 - 3

Notes

Introduction

The purpose of this Lesson is to give you the knowledge to be able to create and configure a regulatory control CM with simulated I/O. After you complete this Lesson you will have configured a regulatory control valve to control the flow of tank A into the reactor.

Objectives

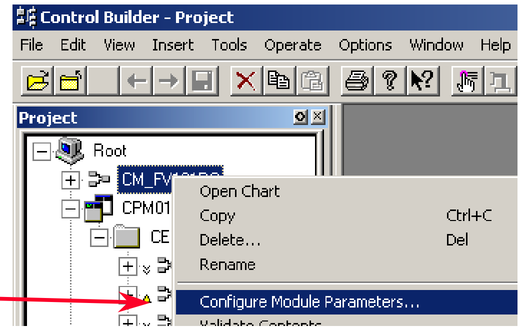
❶ Create a new CM named **CM#_FV101RC**

❷ Modify the CM as needed to control the flow of tank A to the reactor

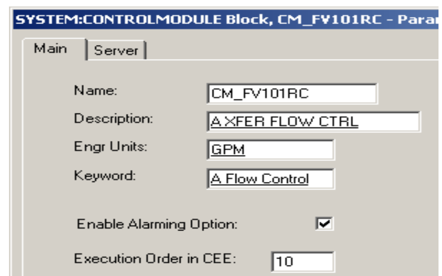
❸ Operate your newly created CM from station

Honeywell

Adding and Configuring a New CM



- Copy **CM#_FIC101**
- Name the new CM: **CM#_FV101RC**
- Select then right click on the new CM
- Select
  - **Configure Parameters**
- Modify the settings to match the information below:
  - **Main** Tab
    - Name **CM#_FV101RC**
    - Description **A XFER FLOW CTRL**
    - Engr Units **GPM**
    - Keyword **A FLOW CONTROL**
- Click **OK**
- Assign **CM#_FV101RC** to **CEE0101**



5 - 4

Notes

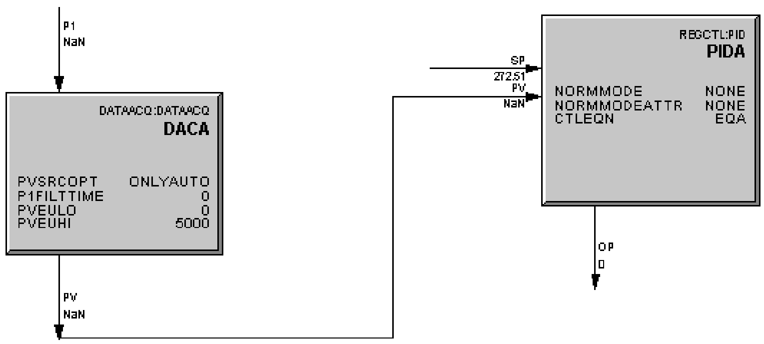
Adding and Configuring a New CM

Before any Function Blocks are inserted to the CM it is good practice to assign the CM to the corresponding CEE. This will enable you to completely configure the I O Channel Function Blocks without having to close and reopen the CM.

Honeywell

Modifying CM#_FV101RC

- Open **CM#_FV101RC**
- Delete the following soft-wire connections: **AICHANNEL** to **DATAACQ; PID** to **AOCHANNEL**
- Delete the following blocks*
  - **AICHANNEL**
  - **AOCHANNEL**
- Arrange blocks as shown below



5 - 5

Notes

Modifying for Soft Wired Output-to-Input Simulation

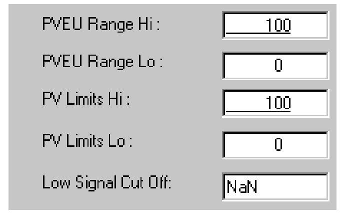
CM#_FIC101 used real IO with the analog outputs hard wired to the analog inputs. In this exercise, we demonstrate a different method of simulation.

* Here we will use soft wiring to connect output to input. This method is convenient to use because it requires no real IO modules.

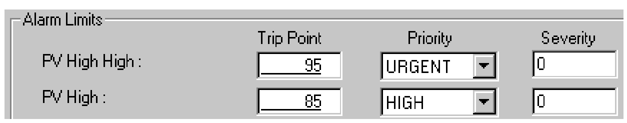
Honeywell

Modifying CM#_FV101RC *…continued*

- Double click on the **DACA** Function Block and change the following settings on the **Main** tab
  - PVEU Range Hi **100**
  - PVEU Range Lo **0**
  - PV Limits Hi **100**
  - PV Limits Lo **0**



- Double click on the **DACA** Function Block and change the following settings on the **Alarms** tab
  - PV High High **95** **Urgent** **0**
  - PV High **85** **High** **0**



5 - 6

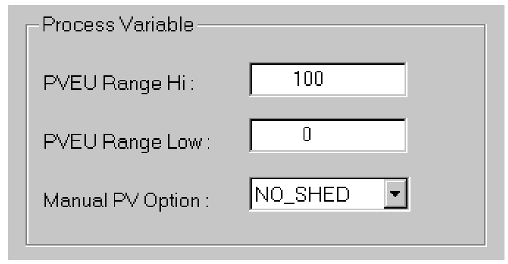
Notes

Honeywell

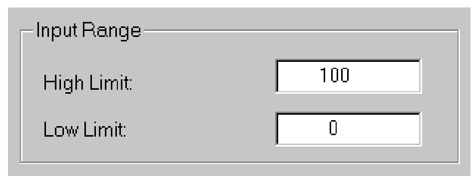
Modifying CM#_FV101RC *…continued*

- Double click on the **PIDA** Function Block and change the following settings:

- **Main** tab
  - PVEU Range Hi **100**
  - PVEU Range Low **0**
  - Manual PV Option **NO_SHED**



SetPoint Tab
  - High limit **100**
  - Low limit **0**

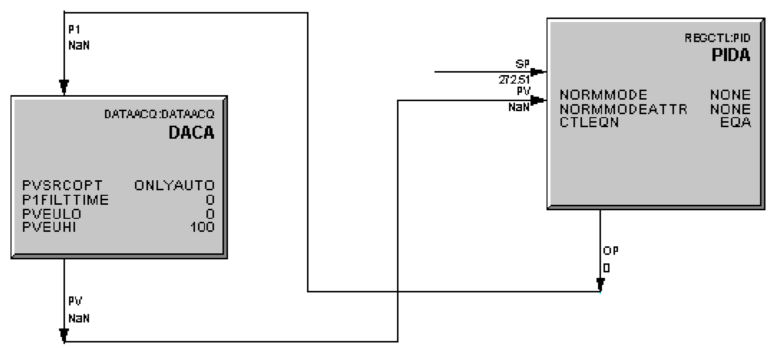


5 - 7

Notes

Modifying CM#_FV101RC *…continued*

- Wire the blocks together in this manner
- Close and save changes to **CM#_FV101RC**
- **Load** and **Activate CM#_FV101RC**



- In Station, add **CM#_FV101RC** to Group #3, Slot 2 and verify that it is operational

5 - 8

Notes

Simulating IO

By soft-wiring the OP from the PID block to the Input (P1) of the DATAACQ block, we are simulating having real IO.

Honeywell

This completes….

PlantScape Controller Implementation

Lesson 1

Configuring a Regulatory Control CM (With Simulated IO)

5 - 9

Notes

Honeywell

PlantScape Controller Implementation

Lesson 2

Configuring a Flow Totalizer

5 - 11

Notes

Introduction

The purpose of this Lesson is to give you the knowledge to be able to create and configure a flow totalizer CM. After you complete this Lesson you will have configured the Totalizer Block that will keep running totals of all flows in the project.

Objectives

❶ Create a new CM named CM#_ACCA to totalize flows into and out of the reactor

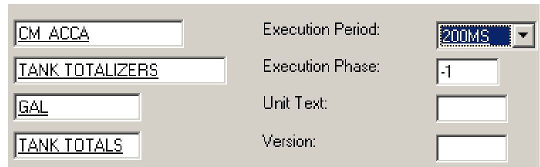
❷ Add and configure TOTALIZER Function Blocks

❸ Add NUMERIC and SELREAL Function Blocks to simulate flow rates

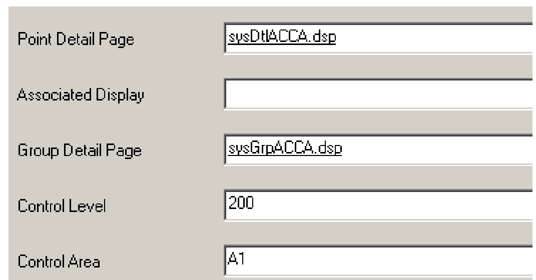
Honeywell

Adding and Configuring a new CM

- Create a new CM
- Modify the settings to match the information below
  - **Main** tab
    - Name **CM#_ACCA**
    - Description **TANK TOTALIZERS**
    - Engr Units **GAL**
    - Keyword **TANK TOTALS**
    - Execution Period **200ms**



  - **Server** Tab
    - Point Detail Page **sysDtlACCA.dsp ***
    - Group Detail Page **sysGrpACCA.dsp ***
    - Control Area **A#**



- Close **CM#_ACCA** and save changes
- Assign **CM#_ACCA** to **CEE0101**

5 - 12

Notes

Adding and Configuring a new CM

When adding a new CM you can use any one of the following three methods

• Click File > New > Control Module

• Drag a CM from the Library Tab to the Project Tab

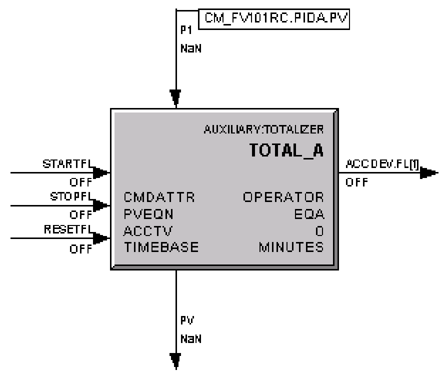
• Double click on the CM in the Library Tab (This method adds the CM to the Project and opens the chart for configuration, in one step. It also allows more work area since only one tree needs to be open.)

* Note: sysDtlACCA.dsp and sysGrpACCA.dsp are <u>not</u> standard detail and group displays. They were modified from standard detail and group displays for this course.

Honeywell

Adding and Configuring Function Blocks (Tank A)

- Open **CM#_ACCA**
- Add a **TOTALIZER** Block (Under **AUXILIARY** category in Library)
- Double click on the **TOTALIZER** Function Block
- Modify the settings to match the information below
  - Name **TOTAL_A**
  - Description **TANK A FLOW TOTAL**
- Add a Parameter Connector to the **P1** Pin
- Enter, or use the point selector tool, to add Parameter Connector Information
  - **CM#_FV101RC.PIDA.PV**



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Notes

Adding and Configuring Function Blocks (Tank A)

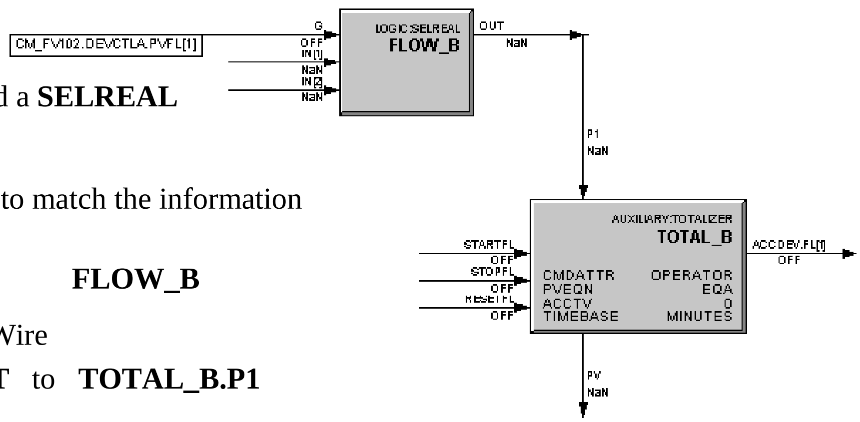
The Tank A totalizer will have a different configuration than those for Tank B and the Reactor. Tank A has a Regulatory Control valve, CM#_FV101RC, in its transfer line. Tank B and the Reactor have only 2-State valves. The regulatory control valve allows the totalizer block to read the flow directly from PIDA.PV in CM#_FV101RC.

For more information on how to configure and use TOTALIZER function blocks refer to the *Control Builder Components Theory, Auxiliary Function, TOTALIZER Block.*

Honeywell

Adding and Configuring Function Blocks (Tank B)

- Add a second **TOTALIZER** Function Block
- Modify the settings to match the information below
  - Name **TOTAL_B**
  - Description **TANK B FLOW TOTAL**



- To simulate a flow*, add a **SELREAL** (logic) Function Block
  - Modify the settings to match the information below

    Name **FLOW_B**
  - Add the following Wire

    FLOW_B.OUT to **TOTAL_B.P1**
  - Add a Parameter Connector as shown above: **CM#_FV102.DEVCTLA.PVFL[1]**

    Note: The point selector tool only has PVFL[0] in its parameter list. Select the PVFL[0] parameter and then edit the parameter connector to PVFL[1]

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Notes

Adding and Configuring Function Blocks (Tank B)

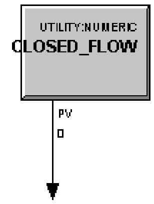
* In the configuration of Tank B's totalizer we add a SELREAL Block to simulate a flow input to the TOTAL_B Block. In the SELREAL Block, when the value of the parameter connector becomes true (FV102 is opened), the OUT real value will be set to to (IN[2]). When the parameter connector becomes false (CM#_FV102 is closed), the OUT real value will be set to (IN[1]) .

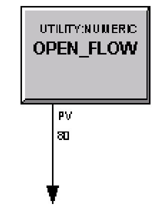
In a real world situation, we would have an Analog Input Channel block supplying the actual flow rate.

For more information on how to configure and use SELREAL function blocks refer to the *Control Builder Components Theory, Logic Function, SELREAL Block.*

Honeywell

Adding and Configuring Function Blocks (Tank B)





- To aid in the flow simulation, add two **NUMERIC** blocks
- Modify the settings to match the information below
  - Name Block 1 **CLOSED_FLOW**
  - Name Block 2 **OPEN_FLOW**
- Configure **CLOSED_FLOW**:

Name	CLOSED_FLOW
Access Lock	OPERATOR
PV High Limit	5
PV Low Limit	0
Actual Value	0
PV Display Format	D1

- Configure **OPEN_FLOW**:

Name	OPEN_FLOW
Access Lock	OPERATOR
PV High Limit	100
PV Low Limit	0
Actual Value	80
PV Display Format	D1

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Notes

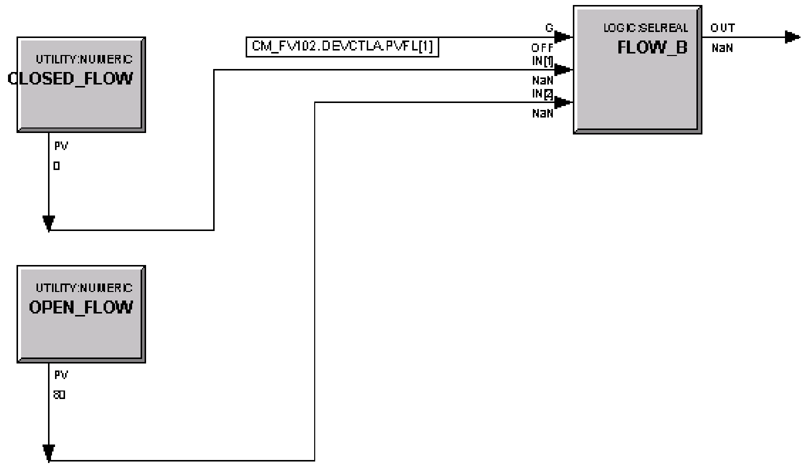
Adding and Configuring Function Blocks (Tank B)

The inputs to the **SELREAL** Function Block cannot be added in project. Therefore we are using two **NUMERIC** blocks. One (**CLOSED_FLOW**) will be used for flow when the valve is closed. It will be set to **0.0**. The other (**OPEN_FLOW**) will be used for flow when the valve is open. It will be set to **80.0**. (**D1** for the PV Display Format sets up 1 decimal place.)

Honeywell

Adding and Configuring Function Blocks (Tank B)

- Wire the **NUMERIC** blocks to the two inputs of the **SELREAL** block as shown



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Notes

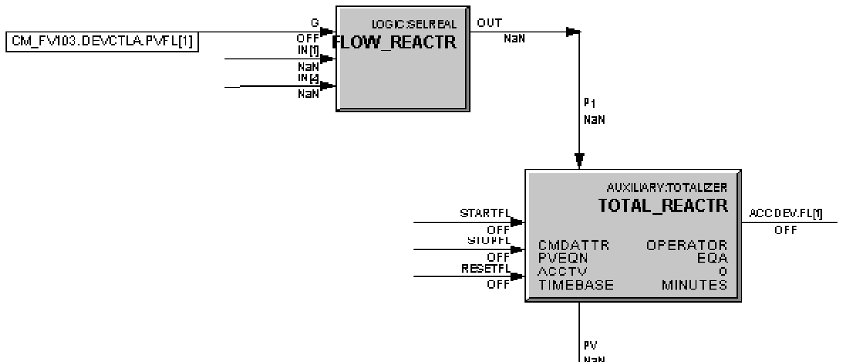
Adding and Configuring Function Blocks (Tank B)

Now in the SELREAL Block, when the value of the parameter connector becomes true (FV102 is opened), the OUT value will be set to to flow rate (IN[2])or 80.0. When the parameter connector becomes false (CM#_FV102 is closed), the OUT value will be set to (IN[1]) or 0.0 .

Honeywell

Adding and Configuring Function Blocks (Reactor Drain)

- The configuration of the Reactor Drain totalizer is identical in concept to that of the Ingredient B totalizer.
- Add the blocks and configure them as shown
  - Note that the block names drop the "o" in reactor



- Use the same **NUMERIC** blocks we used for the **FLOW_ B** simulation for reactor flow simulation
- The finished CM is shown on the next page

5 - 17

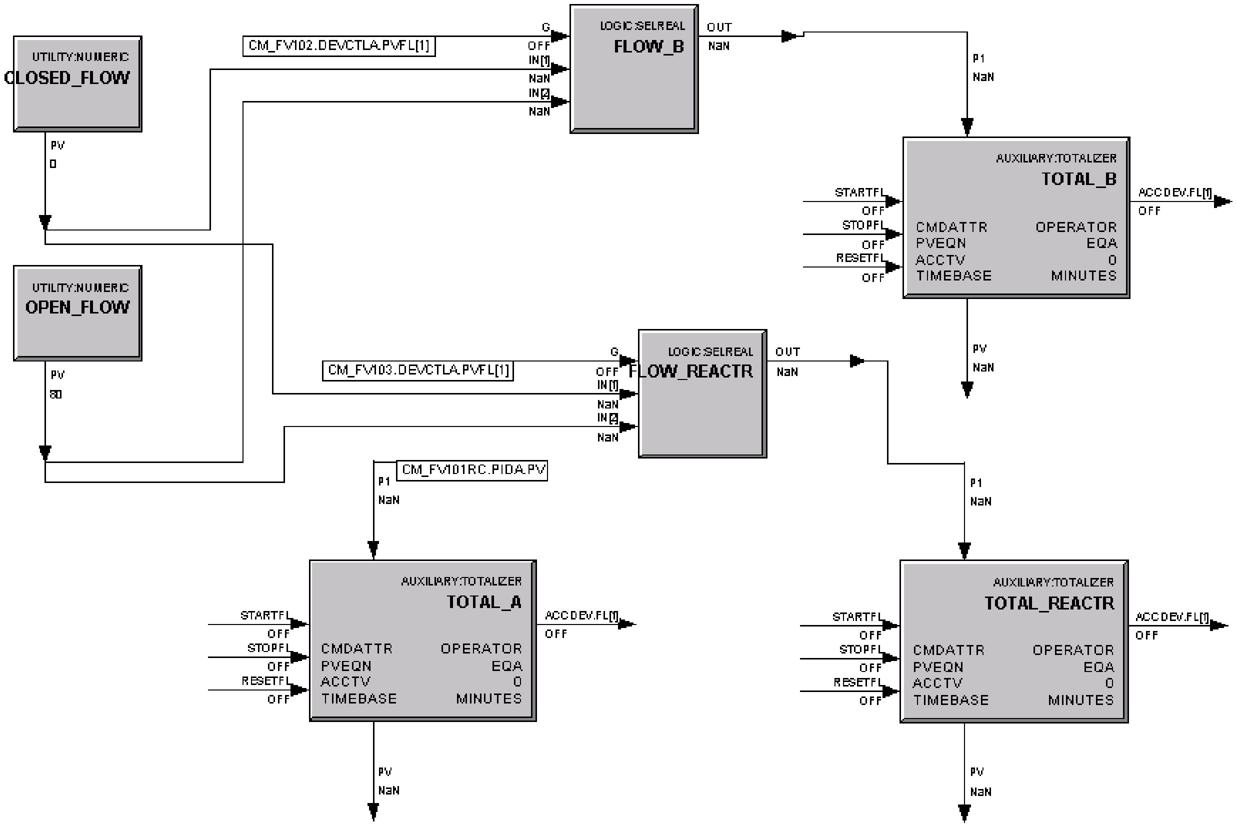
Notes

Adding and Configuring Function Blocks (Reactor)

Just as we did in the configuration of the Tank B totalizer, we add a SELREAL Block and use the FLOW_CLOSED and FLOW_OPEN NUMERIC blocks to simulate a flow to the TOTAL_REACTR Block.

In a real world situation, we would have an Analog Input Channel block supplying the actual flow rate.

Completed CM_ACCA



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Notes

Completed CM

Note that in this CM there are three non-related, unconnected functions: the totalizers for Tank A; for Tank B; and for the Reactor. A CM can contain up to 40 function blocks. The blocks may or may not be related to each other.

Since the configuration of a CM is essentially anything you want it to be, for many of your configurations there will be no supplied Station Detail Display. In those instances, you can modify a supplied display or create your own.

The detail and group displays for this CM for the class were created by modifying the detail and group displays for the PID CM type.

Honeywell

Finish CM_ACCA

- Close and save **CM#_ACCA**
- **Load** and **Activate CM#_ACCA**
- Note: After every load of a **TOTALIZER** block, it must be **RESET** to get a 0.0 accumulated value (**PV**) instead of NaN, and a PV status (**PVSTS**) of NORMAL instead of BAD**.** We will **RESET** the three totalizer blocks in **CM_ACCA** prior to using them.

5 - 19

Notes

Honeywell

Improve Ingredient A Totalizer (Optional)

- While the Ingredient A totalizer will work as configured, it ignores the Tank A valve **CM#_FV101**. Because the totalizer only uses the **PV** of **CM#_FV101RC** which has has Output-to- Input configuration, **CM#_FV101** can be closed while the Ingredient A totalizer continues to accumulate.

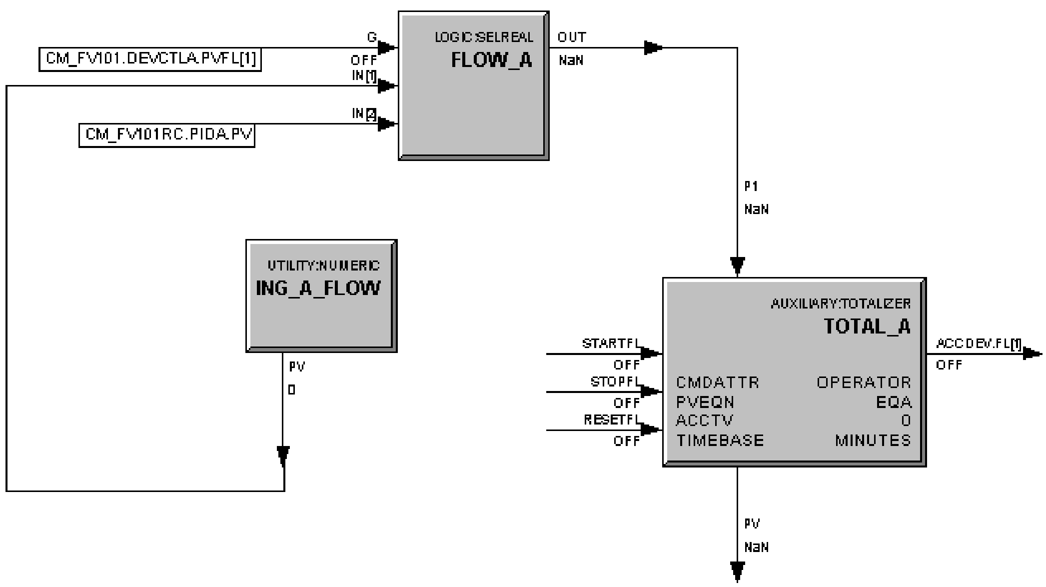
- If we bring in the status of **CM#_FV101** into the totalizer scheme, the project will be more realistic.
  - How can we do this? Consult with your course manager on your own idea, or use one of the solutions shown on the next pages.

5 - 20

Notes

Improve Ingredient A Totalizer (Optional)

- One solution uses a **SELREAL** block and a **NUMERIC** block to select either the **PV** of **CM#_FV101RC** or zero as the input to the Tank A totalizer, depending on whether **CM#_FV101** is open or closed



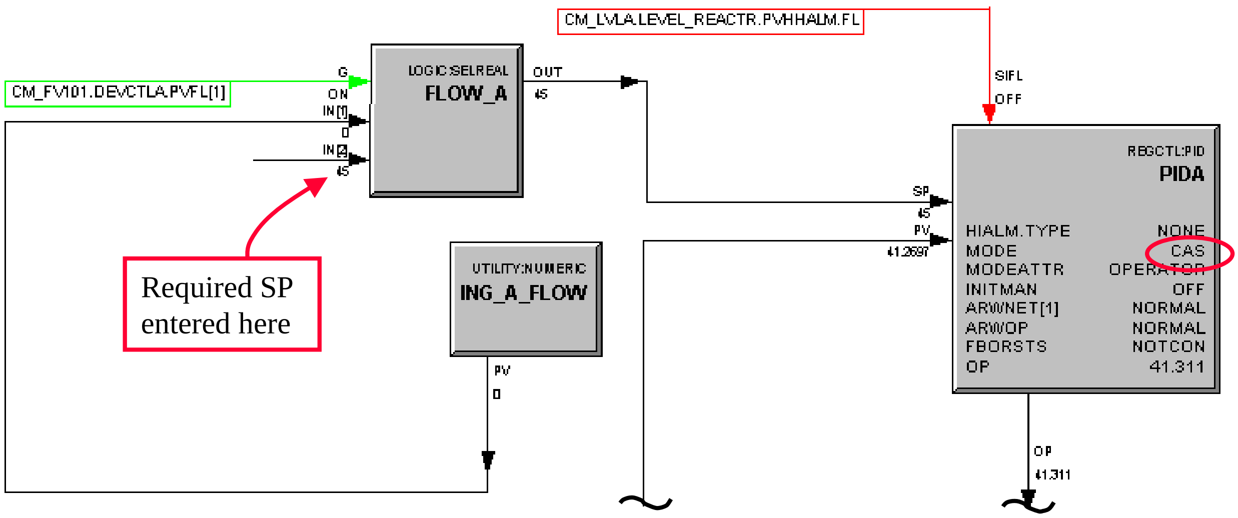
5 - 21

Notes

Honeywell

Improve Ingredient A Totalizer (Optional)

- A second solution uses the same concept:a **SELREAL** block and a **NUMERIC** block to select either the entered **SP** (**IN[2]**) or zero, depending on whether **CM#_FV101** is open or closed. Here we connect the selected output to the **SP** of the **PID** block of **CM#FV101RC.** In this solution we leave the A totalizer as originally configured. We also assume that **CM#_FV101RC** is kept in **CAS** mode to select the remote **SP**.



5 - 22

Notes

Solution 2 Information

Note that in this solution, it will take some time for the flow to go to zero. It still may be preferable to put the valve in MANUAL and set the OP to zero for fast action.

For the operator interface, you would need to add a data entry port for the **IN[2]** parameter if **SP** changes are to be available for changing from the Detail display. Also note that IN[2] goes to NaN (Not a Number) after a download.

Honeywell

Improve Ingredient B and Reactor Totalizers (Optional)

- While the Ingredient B and Reactor totalizers will work as configured, they ignore the respective inline pumps.

- If we bring in the status of **CM#_PMP102** and **PMP#_103** into the totalizer schemes, the project will be more realistic.
  - How can we do this? Consult with your course manager on your own idea, or use the solution shown on the next page.

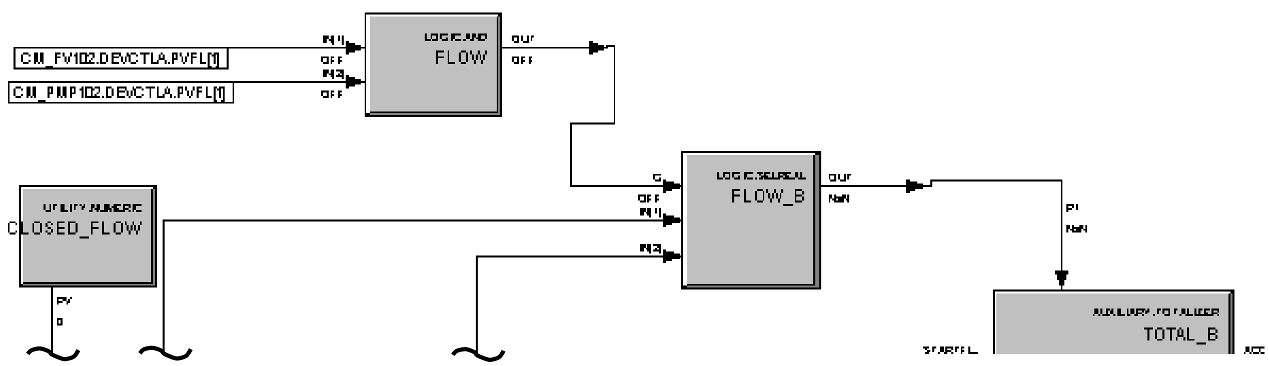
5 - 23

Notes

Honeywell

Improve Ingredient B and Reactor Totalizers (Optional)

- One solution uses an **AND** block with two parameter connections to the status of both the valve and pump for Ingredient B and for the Reactor Drain, With this configuration, the valve must be open and its inline pump on for the **SELREAL** block to select 80 as the input to the totalizer. The Ingredient B configuration is shown below. The Reactor Drain would be similar.



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Notes

Honeywell

Finish CM_ACCA

- Close and save **CM#_ACCA**
- **Load** and **Activate CM#_ACCA**
- Note: After every load of a **TOTALIZER** block, it must be **RESET** to get a 0.0 accumulated value (**PV**) instead of NaN, and a PV status (**PVSTS**) of NORMAL instead of BAD**.** We will **RESET** the three totalizer blocks in **CM_ACCA** prior to using them.

5 - 25

Notes

Honeywell

This completes….

PlantScape Controller Implementation

Lesson 2

Configuring a Flow Totalizer

5 - 26

Notes

Honeywell

PlantScape Controller Implementation

Lesson 3

Building Level Indicators

5 - 27

Notes

Introduction

The purpose of this lesson is to give you the knowledge to be able to create and configure a level indicator. After you complete this lesson you will have configured the CM that will calculate the levels of material in Tank A, Tank B, and the Reactor.

Objectives

❶ Create a new CM named CM#_LVLA to calculate material levels

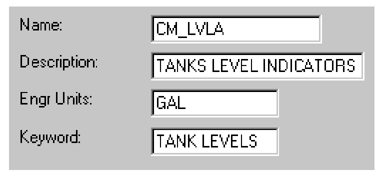
❷ Add and configure AUXCALC and DATAACQ Function Blocks

❸ Operate CM#_LVLA and CM#_ACCA in Station

Honeywell

Adding and Configuring a new CM

- Create a new CM
- Modify the settings to match the information below
  - **Main** tab
    - Name **CM#_LVLA**
    - Description **TANKS LEVEL INDICATORS**
    - Engr Units **GAL**
    - Keyword **TANK LEVELS**
    - Execution Period **200MS**
  - **Server** Tab
    - Point Detail Page **sysDtlLVLA.dsp***
    - Group Detail Page **sysGrpLVLA.dsp***
    - Control Area **A#**



- Close **CM#_LVLA** and save changes
- Assign **CM#_LVLA** to **CEE0101**

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Notes

Adding and Configuring a new CM

When adding a new CM you can use any one of the following three methods:

- Click File > New > Control Module
- Drag a CM from the Library Tab to the Project Tab
- Double click on the CM in the Library Tab (This method adds the CM to the Project and opens the chart for configuration, in one step. It also allows more work area since only one tree needs to be open.)

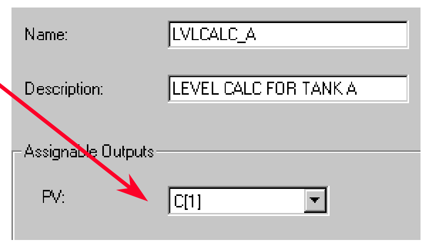
* Note: sysDtlLVLA.dsp and sysGrpLVLA.dsp are <u>not</u> standard detail and group displays. They were modified from standard detail and group displays for this course.

Before any Function Blocks are inserted to the CM it is good practice to assign the CM to the corresponding CEE. This will enable you to completely configure the I\O Channel Function Blocks without having to close and reopen the CM.

Honeywell

Adding and Configuring Function Blocks (Tank A)

- Open **CM#_LVLA**
- Add an **AUXCALC** Function Block
- Double click on the **AUXCALC** Block
- Modify the settings to match the information below
  - Name **LVLCALC_A**
  - Description **LEVEL CALC FOR TANK A**
  - Assignable Outputs **PV C[1]**



- Add a new Pin to the **LVLCALC_A** Block
  - P[1] Input/Top

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Notes

Adding and Configuring Function Blocks (Tank A)

Configuring the AUXCALC Block is different from any other block configured in previous lessons. The PV is the result of any of the block functions that the user chooses. In this case, we choose C1, which is the result of calculation 1.

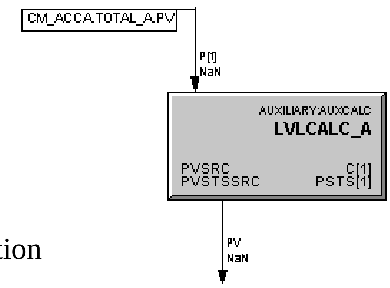
The AUXCALC will use a Parameter Connection for its input. That is why we are adding a new pin at this point. To add a new pin, enter the Block Configuration screen and select the type of input and position for the pin.

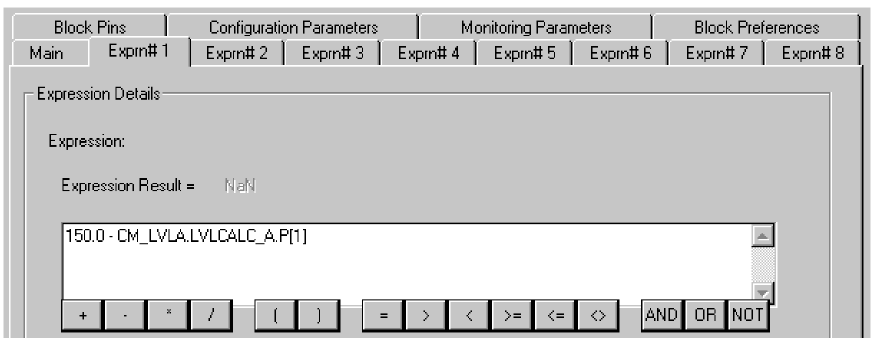
Honeywell

Adding and Configuring Function Blocks (Tank A) *…continued*

- Add a Parameter Connector to the **P[1]** Pin
- Enter Parameter Connector Information
  - **CM#_ACCA.TOTAL_A.PV**
- Double click on the **LVLCALC_A** Block
- Click on the Exprn#1 tab and enter the following information

  150.0 - CM#_LVLA.LVLCALC_A.P[1]
- Click **OK**





5 - 30

Notes

Configuring Expression Details

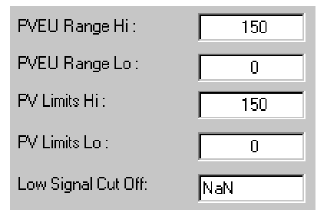
Expression 1 will calculate the level in Tank A. Tanks A and B have capacities of 150 Gallons each. We are subtracting the A flow totalizer amount from 150 to calculate the level. Recall that each time the process starts, both A and B are refilled.

Notice that the AUXCALC has access to the entire database in the expression syntax. We did not have to bring in CM#_ACCA.TOTAL_A.PV as an input to the block. We could have referenced it directly in the expression. We added it as an input so that it would be visible from the chart drawing

Honeywell

Adding and Configuring Function Blocks (Tank A) *…continued*

- Add a **DATAACQ** Block
- Configure the **DATAACQ** with the following information
  - **Main** Tab
    - Name — **LEVEL_A**
    - Description — **LEVEL IN TANK A**
    - Engr units — **GAL**
    - PVEU Range Hi — **150**
    - PVEU Range Lo — **0**
    - PV Limits Hi — **150**
    - PV Limits Lo — **0**
    - Clamping/Filtering — **Clamping Enabled**



  - **Alarms** Tab

	Trip Point	Priority	Severity
PV Low	**5**	**High**	**0**

5 - 31

Notes

Adding a Data Acquisition Block

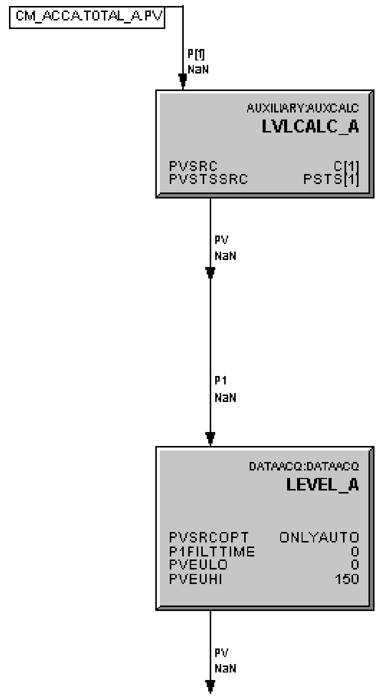
We are using the DATAACQ block for similar reasons that we used it in the PID loop -- namely for High and Low alarming. (In this case we are only concerned with the low alarm.)

We are adding it for another reason as well. We want to indicate the tank level in a display. The Display Builder Indicator uses percent parameters for its input. The DATAACQ block has a parameter PVP, which is PV in percent. This is the parameter we will use in the display.

Honeywell

Adding and Configuring Function Blocks (Tank A) *…continued*

- Wire
  - **LVLCALC_A. PV**
    to
    LEVEL_A.P1



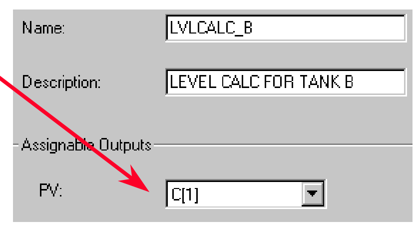
5 - 32

Notes

Honeywell

Adding and Configuring Function Blocks (Tank B) *…continued*

- Add a second **AUXCALC** Function Block
- Double click on this **AUXCALC** Block
- Modify the settings to match the information below
  - Name **LVLCALC_B**
  - Description **LEVEL CALC FOR TANK B**
  - Assignable Outputs **PV: C[1]**



- Add a new Pin to the **LVLCALC_B** Block
  - **P[1] Input/Top**

5 - 33

Notes

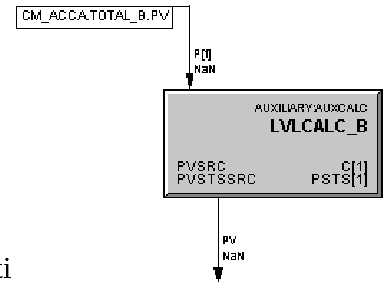
Adding and Configuring Function Blocks (Tank B)

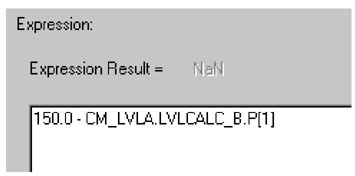
This AUXCALC block will be used to calculate the level in Tank B. Its configuration will be nearly identical to that for Tank A.

Honeywell

Adding and Configuring Function Blocks (Tank B) *…continued*

- Add a Parameter Connector to the **P1** Pin
- Enter Parameter Connector Information
  - **CM#_ACCA.TOTAL_B.PV**
- Double click on the **LVLCALC_B** Block
- Click on the Exprn#1 tab and enter the following informati
  150.0 - CM#_LVLA.LVLCALC_B.P[1]
- Click **OK**





5 - 34

Notes

AUXCALC Expressions

Note that the AUXCALC block can have up to eight expressions. The result of each is C1 through C8. The expressions can use inputs from the block's own controller database or that of any other controller on the Supervisory C-Net through peer-to-peer connections. The expressions have many math functions available and the results can be used through out the control scheme.

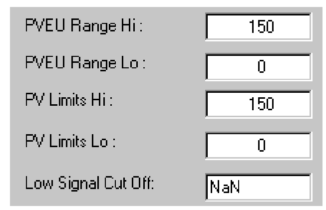
The AUXCALC has a counterpart in the Regulatory Control family. It is called the REGCALC block. In the reference below, Table 1 lists the math functions available for both the AUXCALC and the REGCALC blocks.

For more information on configuring REGCALCL blocks refer to the ***Control Builder Components Theory, Regulatory Control, REGCALC Block*.**

Honeywell

Adding and Configuring Function Blocks (Tank B) *…continued*

- Add a **DATAACQ** Block
- Configure the **DATAACQ** with the following information
  - **Main** Tab
    - Name **LEVEL_B**
    - Description **LEVEL IN TANK B**
    - Engr units **GAL**
    - PVEU Range Hi **150**
    - PVEU Range Lo **0**
    - PV Limits Hi **150**
    - PV Limits Lo **0**
    - Clamping/Filtering **Clamping Enabled**



  - **Alarms** Tab

	Trip Point	Priority	Severity
PV Low	**5**	**High**	**0**

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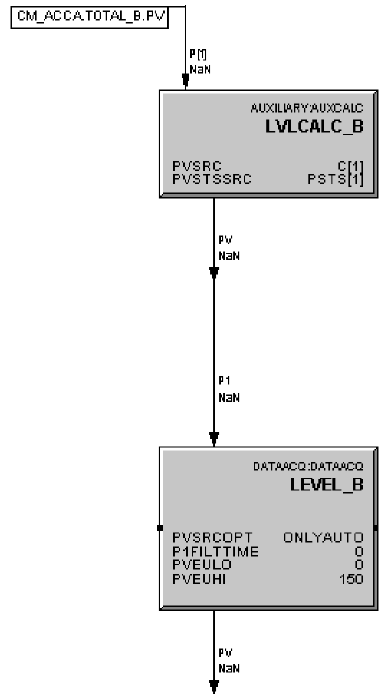
Notes

Honeywell

Adding and Configuring Function Blocks (Tank B) *…continued*

- Wire
  - **LVLCALC_B.PV**
    to
    LEVEL_B. P1



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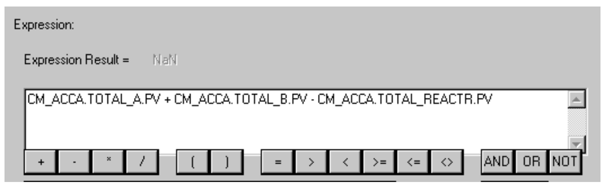
Notes

Honeywell

Adding and Configuring Function Blocks (Reactor) *…continued*

- Add a third **AUXCALC** Block
- Configure the **AUXCALC** with the following information
  - **Main** Tab
    - Name **LVLCALC_REACTR**
    - Description **LEVEL FOR REACTOR**
    - Assignable Outputs **PV: C[1]**
  - **Exprn 1** Tab

    CM#_ACCA.TOTAL_A.PV + CM#_ACCA.TOTAL_B.PV -
    CM#_ACCA.TOTAL_REACTR.PV



- Add three new Pins to the **LVLCALC_REACTR** Block
  - P[1] Input/Left
  - P[2] Input/Left
  - P[3] Input/Left

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Notes

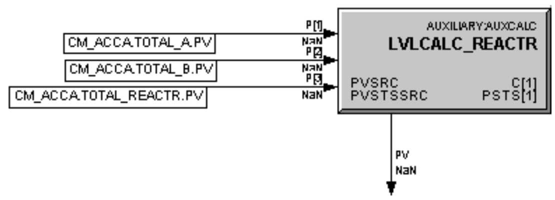
Level for Reactor

This AUXCALC block will calculate the level in the reactor. It totals the Tank A and Tank B charge amounts and subtracts the Reactor drain flow total.

Honeywell

Adding and Configuring Function Blocks (Reactor) *…continued*

- Add a Parameter Connector to the **P1** Pin
- Enter Parameter Connector Information
  - **CM#_ACCA.TOTAL_A.PV**
- Add a Parameter Connector to the **P2** Pin
- Enter Parameter Connector Information
  - **CM#_ACCA.TOTAL_B.PV**
- Add a Parameter Connector to the **P3** Pin
- Enter Parameter Connector Information
  - **CM#_ACCA.TOTAL_REACTR.PV**



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Notes

Parameter Connections

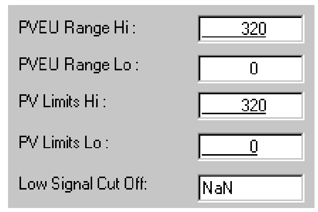
Since the AUXCALC expression uses the amounts from the Tank A, Tank B, and Reactor totalizers directly, these parameter connectors are for chart reference only.

Because we did add them as parameter inputs, the expression could be alternatively written: CM#_LVLA.LVLCALC_REACTR.P[1] + CM#_LVLA. LVLCALC_REACTR.P[2] - CM#_LVLA. LVLCALC_REACTR.P[3]

Honeywell

Adding and Configuring Function Blocks (Reactor) *…continued*

- Add a **DATAACQ** Block
- Configure the **DATAACQ** with the following information
  - **Main** Tab
    - Name **LEVEL_REACTR**
    - Description **LEVEL IN REACTOR**
    - Engr units **GAL**
    - PVEU Range Hi **320**
    - PVEU Range Lo **0**
    - PV Limits Hi **320**
    - PV Limits Lo **0**
    - Clamping/Filtering **Clamping Enabled**



  - **Alarms** Tab

	Trip Point	Priority	Severity
PV High High	**300**	**Urgent**	**0**
PV High	**280**	**Low**	**0**
PV Low	**10**	**Journal**	**0**
PV Low Low	**5**	**Journal**	**0**

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Notes

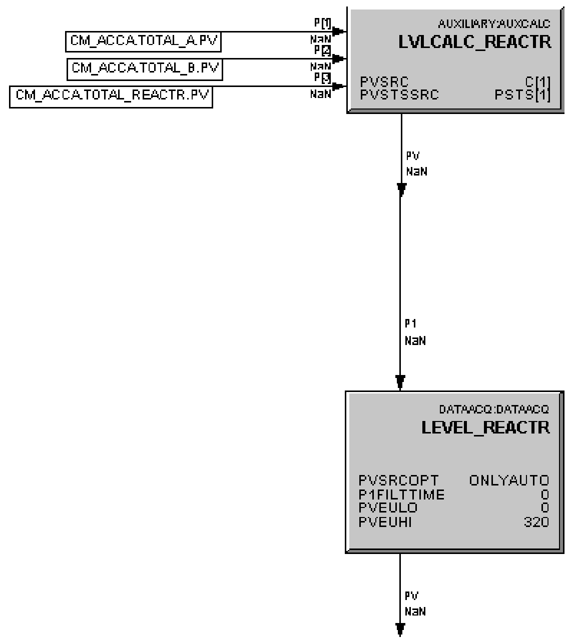
DATAACQ Block for Reactor Level

The reactor tank capacity is 320 gallons. The data acquisition block allows alarming and as we will see in the next lesson, interlocking, when the tank approaches full status.

Honeywell

Adding and Configuring Function Blocks (Reactor) *…continued*

- Wire
  - **LVLCALC_REACTR .PV**
    to
    LEVEL_REACTR . P1



- Close and save **CM#_LVLA**

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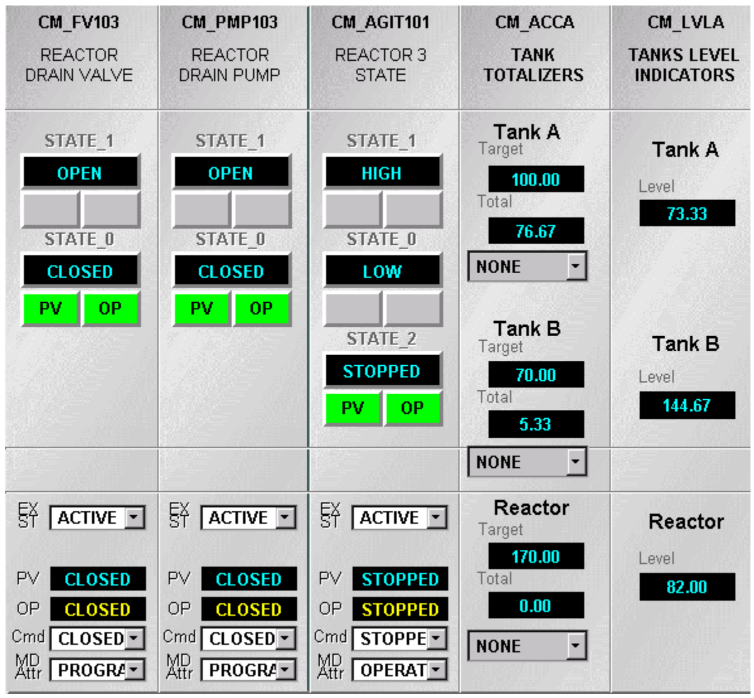
Notes

Honeywell

Working with CM#_LVLA and CM#_ACCA

- Load and Activate **CM#_LVLA** and **CM#_ACCA**
- Configure Group #4 in station
  - **CM#_FV103 (slot 1)**
  - **CM#_PMP103 (slot2)**
  - **CM#_AGIT101 (slot3)**
  - **CM#_ACCA (slot 4)**
  - **CM#_LVLA (slot 5)**



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Notes

Operating the Control Scheme

- In Station or Control Builder reset and Start the totalizers for A, B, and the Reactor
- In Station open CM#_FV101 and CM#_FV102 (Use Groups #2, #3, and #4)
- Set the MODE of CM#_FV101RC to AUTO and enter 85 for the SP
- Note the CM#_ACCA totals increasing for A and B, the A and B tank levels decreasing while the Reactor level increases
- Close CM#_FV101 and CM#_FV102. Put CM#_FV101RC in MAN and set the OP to 0.0.
- Open the Drain Valve, CM#_FV103
- Note the reactor level decreasing
- Close the drain valve when the reactor is empty

Honeywell

This completes….

PlantScape Controller Implementation

Lesson 3

Building Level Indicators

5 - 42

Notes

Honeywell

PlantScape Controller Implementation

Lesson 4

Building a Flag CM

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Notes

Introduction

The purpose of this Lesson is to give you the knowledge to be able to use Flag function blocks. After you complete this Lesson you will have configured the CM that will allow control of four flags. The flags will be used later in the project, with SCMs.

Objectives

❶ Create a new CM named **CM#_FLAGS**

❷ Add and configure four Flag Function Blocks

❸ Operate the flags from Group and Point Detail displays

Honeywell

Adding and Configuring a new CM

- Create a new CM
- Modify the settings to match the information below
  - **Main** tab
    - Name **CM#_FLAGS**
    - Description **FLAGS FOR SCMs**
    - Execution period **200MS**
  - **Server** tab
    - Point Detail Page **sysdtlFLAG.dsp**
    - Group Detail Page **sysgrpFLAG.dsp**
    - Control Area **A#**
- Close **CM#_ FLAGS** and save changes
- Assign **CM#_ FLAGS** to **CEE0101**
- Open **CM#_ FLAGS**
- Add four **Flag** blocks

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Notes

Honeywell

Configure Flag Blocks

- Using the information below configure the four **Flag** blocks

Number	Name	Off Normal Alarm Priority
1	XFER_A	NONE
2	TEMP	NONE
3	REACTION	NONE
4	ING_B	NONE

- Close **CM#_FLAGS** and save changes
- Load and Activate **CM#_FLAGS**

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Notes

Custom Detail Displays

This CM is made up of four unconnected Flag blocks. There is no detail display supplied with PlantScape for this CM. For access to these flags, you could create a Point Detail display, a Group faceplate, and/or a custom display. A Detail display and Group faceplate were created for use in this class.

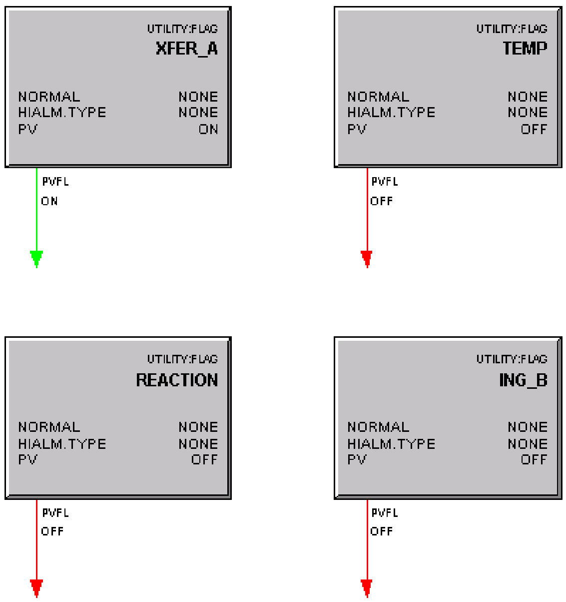
The only reason to create a separate CM for these flags is for the group faceplate. It is more normal to add flag blocks to existing CMs.

Building a Flag CM

Honeywell

Solution

- Your CM should look similar to the following:



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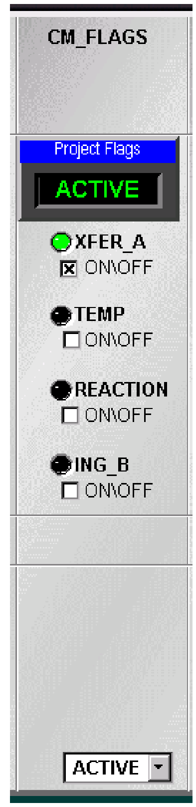
Notes

Building a Flag CM

Honeywell

Operation

- Add **CM#_FLAGS** to Group #2, Slot 4; Group #4, Slot 6
- To turn a flag on and off, click its check box on and off



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Notes

Honeywell

This completes….

PlantScape Controller Implementation

Lesson 4

Building a Flag CM

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Notes

Unit 5 Exam

QuesNo	Question
1	Auxiliary function blocks are used to supplement a control scheme. Which of the following is not an auxiliary function block?
	A AUXCALC
	B REGCALC
	C GENLIN
	D TOTALIZER
2	How many expressions can an AUXCALC function block support?.
	A One
	B Two
	C Four
	D Eight
3	Which of the following can not be the source for the PV of an AUXCALC function block?
	A The result of one of the expressions
	B Any one of the P[1-6] inputs
	C The Execution Order in CM
	D The status of any one of the expressions or of any one of the P[1-6] inputs

4 In order to use a parameter from a CM in an AUXCALC expression, it must first be brought in as one of the P[1-6] inputs to the AUXCALC block.

A True

B False

5 The totalizer function block can support up to four intermediate trip points prior to reaching its target value. What is the parameter that goes true as each trip point is reached.

A PVSTS

B ACCTVFL

C STOPFL

D ACCDEV.FL[1-4]

6 The totalizer function block has a parameter that goes true when it reaches its target value. What is this parameter?

A PVSTS

B ACCTVFL

C STOPFL

D ACCDEV.FL[1-4]

Unit 6

Interlocks and Messages

Honeywell

PlantScape Controller Implementation

Lesson 1

Configuring Operational Overrides

6 - 3

Notes

Introduction

The purpose of this Lesson is to give you the knowledge to be able configure operational overrides to interlock Control Modules. After you complete this Lesson you will have interlocked all of the valves and pumps for project operation.

Objectives

❶ Create a new logic CM named CM#_LK01

❷ Add parameter connectors and logic blocks to interlock the valves

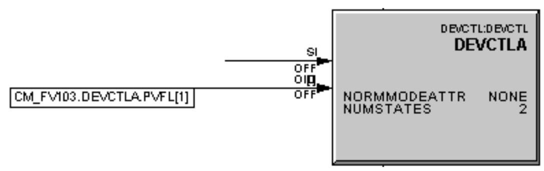
❸ Use CM#_LK01 CM to interlock the pumps

Honeywell

Modify Existing CMs to Interlock (CM#_FV101)

- Select the **Project** tab
- Open **CM#_FV101**
- Add the following pin to **DEVCTLA**

Pin	Location	Array Indices
OI	**Input/Left**	**[0]**



- Add a Parameter Connector to the **OI[0]** Pin
- Enter Parameter Connector Information
  - **CM#_FV103.DEVCTLA.PVFL[1]***
- **Close** and **Save** changes

6 - 4

Notes

Modifying Existing CMs

Changes may be made to a CM in the project view without deactivating the CM. Eventually the CM will have to be deactivated for the changes to be loaded. Then the CM may be reactivated.

The device control function block has three kinds of interlocks : **Process Overrides**, **Process Permissives**, and the **Safety Override**. All three deal with the state ordinal values of the device control block : States 0 and 1 for a 2-State; and States 0, 1, and 2 for a 3-State device.Process interlocks can be bypassed; the Safety interlock cannot.

In the above example, we added an input pin for the process override interlock OI[0]. When this Boolean parameter goes true, the device is forced to the 0 State.

* The parameter connection we used is a Boolean parameter. It is a flag that is true when CM#_FV103 is in the 1 State. This interlock therefore closes the Tank A valve when the Reactor drain valve is open. In the Point Selector tool, only the PVFL[0] parameter appears in the list. Choose it and then edit the connection to [1]

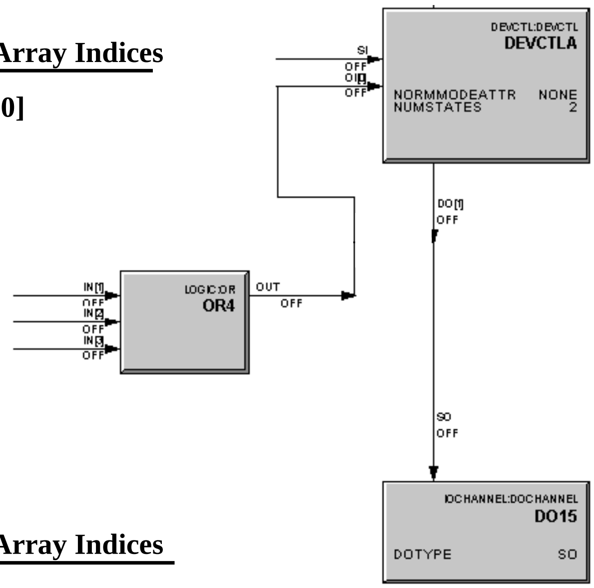
Honeywell

Modify Existing CMs to Interlock (CM#_ FV102)

- Open **CM#_FV102**
- Add the following pin to **DEVCTLA**

Pin	Location	Array Indices
OI	**Input/Left**	**[0]**

- Add an **OR** Block
- Add the following Wire
  - **OR - OUT** to **DEVCTLA - OI[0]**



- Add the following pin to the **OR** block

Pin	Location	Array Indices
IN	**Input/Left**	**[3]**

6 - 5

Notes

Interlocking CM#_FV102

To interlock the Tank B bottom valve to the 0 State (closed), we will monitor three different process parameters.

The OR block will allow any one of the three to force the valve to the closed state.

For more information on using the OR block, refer to *Control Builder Components Theory, Logic Functions, Logic Function Blocks, OR Block.*

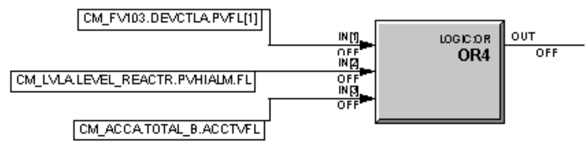
Configuring Operational Overrides

Honeywell

Modify Existing CMs to Interlock (CM#_ FV102)

…continued

- Add a Parameter Connector to the **IN[1]** Pin
- Enter Parameter Connector Information
  - **CM#_FV103.DEVCTLA.PVFL[1]**
- Add a Parameter Connector to the **IN[2]** Pin
- Enter Parameter Connector Information
  - **CM#_LVLA.LEVEL_REACTR.PVHIALM.FL**
- Add a Parameter Connector to the **IN[3]** Pin
- Enter Parameter Connector Information
  - **CM#_ACCA.TOTAL_B.ACCTVFL**



- **Close** and **Save** changes

6 - 6

Notes

Interlocking CM#_FV102

The three parameters, any one of which will force the Tank B bottom valve closed are:

• The Reactor drain valve (CM#_FV103) being in the Open (1) state

• The Reactor being full as designated by the PVHI alarm on the Reactor level indicator

• The total amount of ingredient B designated to be charged to the Reactor being reached

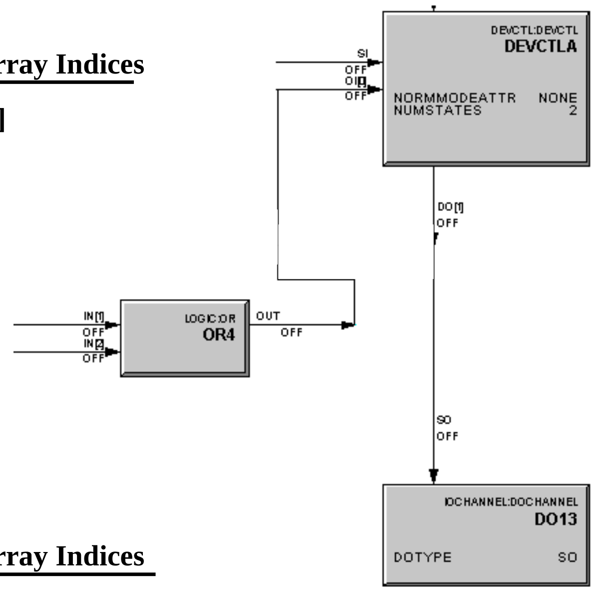
Honeywell

Modify Existing CMs to Interlock (CM#_ FV103)

- Open **CM#_FV103**
- Add the following pin to **DEVCTLA**

Pin	Location	Array Indices
OI	**Input/Left**	**[0]**

- Add an **OR** Block
- Add the following Wire
  - **OR - OUT** to **DEVCTLA - OI[0]**



- Add the following pin to the **OR** block

Pin	Location	Array Indices
IN	**Input/Left**	**[3]**

6 - 7

Notes

Interlocking FV103

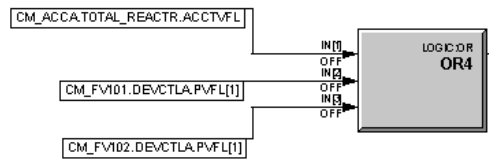
As with CM#_FV102, we will interlock the Reactor drain valve with 3 different parameters, using an OR Logic function block.

Honeywell

Modify Existing CMs to Interlock (CM#_ FV103)

…continued

- Add a Parameter Connector to the **IN[1]** Pin
- Enter Parameter Connector Information
  - **CM#_ACCA.TOTAL_REACTR.ACCTVFL**
- Add a Parameter Connector to the **IN[2]** Pin
- Enter Parameter Connector Information
  - **CM#_FV101.DEVCTLA.PVFL[1]**
- Add a Parameter Connector to the **IN[3]** Pin
- Enter Parameter Connector Information
  - **CM#_FV102.DEVCTLA.PVFL[1]**
- **Close** and **Save** changes



6 - 8

Notes

Interlocking CM#_FV103

The three parameters, any one of which will force the Reactor drain valve closed are:

• The total amount of product designated to be drained from the Reactor being reached

• The Tank A bottom valve (FV101) being in the Open (1) state

• The Tank B bottom valve (FV102) being in the Open (1) state

Honeywell

Create a New CM (CM#_ LK01)

- Create a new CM
- Modify the settings to match the information below
  - **Main** tab
    - Name **CM#_LK01**
    - Description **INTERLOCK CM**
- Close **CM#_LK01** and save changes
- Assign **CM#_LK01** to **CEE0101**

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Notes

Logic CM CM#_LK01

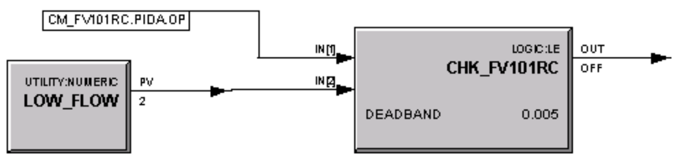
To interlock the Pumps, we will demonstrate a second method of interlocking: creating a Logic CM and using parameter connections from it to the devices we wish to interlock.

In this CM we will create the interlock strategy for all three pumps, CM#_PMP101, CM#_PMP102, and CM#_PMP103.

Honeywell

Configure CM (CM#_ LK01)

- Open **CM#_LK01**
- Add a **LE** Block
- Modify the settings to match the information below
  - Name **CHK_FV101RC**
- Add a Parameter Connector to the **IN[1]** Pin
- Enter Parameter Connector Information
  - **CM#_FV101RC.PIDA.OP**



- Add a **Numeric** Block connected to **IN[2]**
- Modify the settings to match the information below
  - Name **LOW_FLOW**
    - PV High Limit 10.0
    - PV Low Limit 0.0
    - Actual Value 2.0
    - PV Display Format D1

6 - 10

Notes

Logic CM CM#_LK01

First we will create the interlocks for CM#_PMP101, the pump in the A transfer line. This pump will be interlocked to the Off (0) state when any one of the three following conditions is true:

• The tank A bottom valve is closed

• The Reactor is full as designated by the Reactor level indicator being in PVHI alarm

• The A transfer line regulatory control valve, CM#_FV101RC, is closed as designated by its OP being less than or equal to 2 percent open.

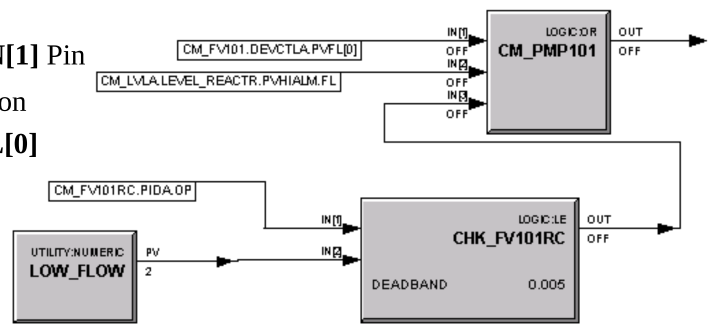
To check the third condition we will use a Logic LE Function block. The result of that block is then input to an OR block along with parameter connections for conditions 1 and 2.

For more information on using the OR block, refer to *Control Builder Components Theory, Logic Functions, Logic Function Blocks, LE Block*.

Honeywell

Configure CM (CM#_ LK01) *…continued*

- Add an **OR** Block
  - Modify the settings to match the information below
    - Name **CM#_PMP101**
  - Add Pin **IN[3]**



- Add a Parameter Connector to the **IN[1]** Pin
- Enter Parameter Connector Information
  - **CM#_FV101.DEVCTLA.PVFL[0]**
- Add a Parameter Connector to the **IN[2]** Pin
- Enter Parameter Connector Information
  - **CM#_LVLA.LEVEL_REACTR.PVHIALM.FL**
- Soft wire the **LE** block **OUT** to the **IN[3]** Pin

6 - 11

Notes

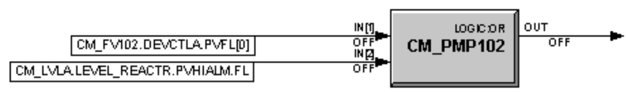
CM#_PMP101 Interlock

Here we complete the interlock for CM#_PMP101, the pump in the A transfer line. The .OUT parameter from the OR Block will become the parameter connector to CM#_PMP101.DEVCTLA.OI[0].

Honeywell

Configure CM (CM#_ LK01) *…continued*

- Add a second **OR** Block for **CM#_PMP102**
- Modify the settings to match the information below
  - **Main** tab
    - Name **CM#_PMP102**
- Add a Parameter Connector to the **IN[1]** Pin
- Enter Parameter Connector Information
  - **CM#_FV102.DEVCTLA.PVFL[0]**



- Add a Parameter Connector to the **IN[2]** Pin
- Enter Parameter Connector Information
  - **CM#_LVLA.LEVEL_REACTR.PVHIALM.FL**

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Notes

CM#_PMP102 Interlock

Next we will interlock CM#_PMP102, the pump in the B transfer line. This pump will be interlocked to the Off (0) state when either of the following two conditions is true:

• The tank B bottom valve is closed.

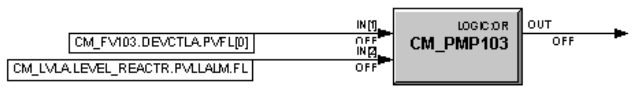
• The Reactor is full as designated by the Reactor level indicator being in PVHI alarm.

This will be accomplished with two parameter connections to an OR block. The .OUT parameter from the OR Block will then become the parameter connector to CM#_PMP102.DEVCTLA.OI[0].

Honeywell

Configure CM (CM#_ LK01) *…continued*

- Add a third **OR** Block for **CM#_PMP103**
- Modify the settings to match the information below
  - **Main** tab
    - Name **CM#_PMP103**
- Add a Parameter Connector to the **IN[1]** Pin
- Enter Parameter Connector Information
  - **CM#_FV103.DEVCTLA.PVFL[0]**



- Add a Parameter Connector to the **IN[2]** Pin
- Enter Parameter Connector Information
  - **CM#_LVLA.LEVEL_REACTR.PVLLALM.FL**
- Close and Save changes

6 - 13

Notes

CM#_PMP103 Interlock

Last we will interlock CM#_PMP103, the pump in the Reactor drain line. This pump will be interlocked to the Off (0) state when either of the following two conditions is true:

• The Reactor drain valve is closed.

• The Reactor is empty as designated by the Reactor level indicator being in PVLL alarm.

This will be accomplished with two parameter connections to an OR block. The .OUT parameter from the OR Block will then become the parameter connector to CM#_PMP103.DEVCTLA.OI[0].

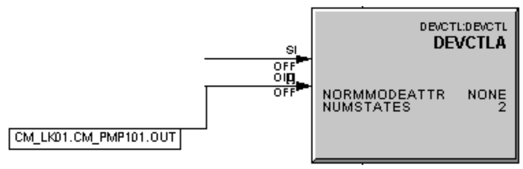
Honeywell

Modify Existing CMs to Interlock (CM#_ PMP101)

- Open **CM#_PMP101**
- Add the following pin to **DEVCTLA**

Pin	Location	Array Indices
OI	**Input/Left**	**[0]**

- Add a Parameter Connector to the **OI[0]** Pin
- Enter Parameter Connector Information
  - **CM#_LK01.CM#_PMP101.OUT**



- Close and Save changes

6 - 14

Notes

Interlock CM#_PMP101

CM#_LK01 contains the logic required to force the pump to the stop condition. If we want to now use that logic, we can use a single parameter connection from the appropriate logic output in CM#_LK01 to the operational override on the pump.

The same applies to CM#_PMP102 and CM#_PMP103.

Note: After configuring the parameter connection for CM#_PMP101, you can select the connection, highlight the text, and go to Edit > Copy. This puts the text in a buffer which can then be pasted into the parameter connections for CM#_PMP102 and CM#_PMP103 for modification.

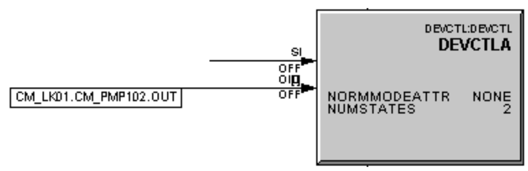
Honeywell

Modify Existing CMs to Interlock (CM#_ PMP102)

- Open **CM#_PMP102**
- Add the following pin to **DEVCTLA**

Pin	Location	Array Indices
OI	**Input/Left**	**[0]**

- Add a Parameter Connector to the **OI[0]** Pin



- Enter Parameter Connector Information
  - **CM#_LK01.CM#_PMP102.OUT**
- Close and Save changes

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Notes

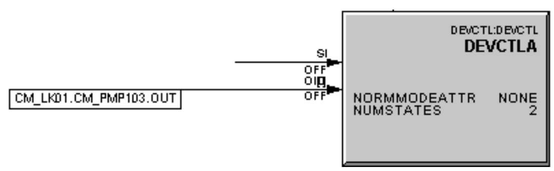
Honeywell

Modify Existing CMs to Interlock (CM#_ PMP103)

- Open **CM#_PMP103**
- Add the following pin to **DEVCTLA**

Pin	Location	Array Indices
OI	**Input/Left**	**[0]**

- Add a Parameter Connector to the **OI[0]** Pin
- Enter Parameter Connector Information
  - **CM#_LK01.CM#_PMP103.OUT**



- Close and Save changes

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Notes

Honeywell

This completes….

PlantScape Controller Implementation

Lesson 1

Configuring Operational Overrides

6 - 17

Notes

Honeywell

PlantScape Controller Implementation

Lesson 2

Configuring Safety Override Interlocks

6 - 19

Notes

Introduction

The purpose of this Lesson is to give you the knowledge to be able to configure Safety Overrides and Interlocks. After you complete this Lesson you will have Interlocked the Valves and Agitator in this project to close when certain alarms are activated.

Objectives

❶ Modify existing CMs for Interlock

❷ Set the Safe States in DEVCTL blocks

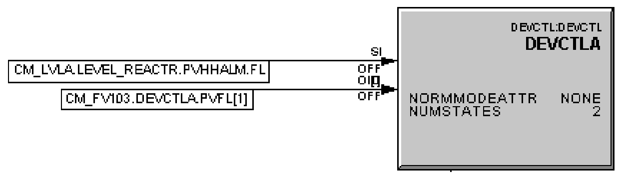
❸ Inactivate, Re-Load and Reactivate all CMs modified in Unit 6

❹ Use the Safe output to interlock in a PID loop

Honeywell

Modify Existing CMs

- Open **CM#_FV101**
- Add a Parameter Connector to the **SI** Pin on **DEVCTLA**
- Enter Parameter Connector Information
  - **CM#_LVLA.LEVEL_REACTR.PVHHALM.FL**
- Double click the **DEVCTL** block
  - Click on the **Output** tab
  - Verify that the Safe State is S0 (Closed)



- **Close** and **Save** changes
- Repeat for **CM#_FV102**

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Notes

Safety Interlocks -- Device Control

Here we are interlocking CM#_FV101 and CM#_FV102, the two tank bottom valves. We are using the safety interlock to force them closed (0) when the Reactor is very full as designated by the Level Indicator being in PVHH alarm.

Recall that we have process overrides on these same valves to force them shut when the Reactor is in PVHI alarm. Those can be bypassed. The safety interlocks have higher priority and cannot be bypassed.

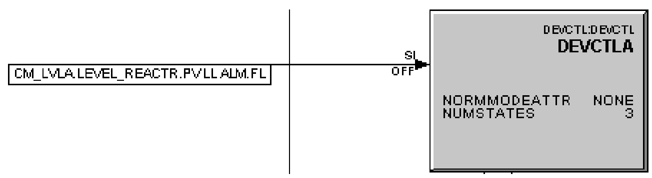
We will add parameter connections to the SI input pins of the valve DEVCTL blocks to configure the interlocks.

Changes may be made to a CM in the project view without deactivating the CM. Eventually the CM will have to be deactivated for the changes to be loaded. Then the CM may be reactivated .

Honeywell

Modify Existing CMs to Interlock (CM#_AGIT101)

- Open **CM#_AGIT101**
- Add a Parameter Connector to the **SI** Pin
- Enter Parameter Connector Information
  - **CM#_LVLA.LEVEL_REACTR.PVLLALM.FL**
- Double click the **DEVCTL** block
  - Set the Safe State to S2 (Stopped)
- **Close** and **Save** changes



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Notes

Safety Interlocks -- Device Control

Here we are interlocking CM#_AGIT101, the reactor agitator. We are using the safety interlock to force it to the Stopped state (2) when the Reactor is empty as designated by the Level Indicator being in PVLL alarm.

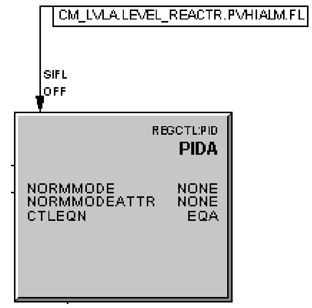
We will add a parameter connection to the SI input pin of the agitator DEVCTL block to configure the interlock.

Honeywell

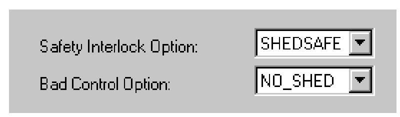
Modify Existing CMs to Interlock (CM#_FV101RC)

- Open **CM#_FV101RC**
- Add the following pin to **PIDA**

Pin	Location
SIFL	**Input/Top**



- Add a Parameter Connector to the **SIFL** Pin
- Enter Parameter Connector Information
  – **CM#_LVLA.LEVEL_REACTR.PVHHALM.FL**
- Double click in the **PIDA** block
  – Change SI option to SHEDSAFE



- Click on **Output** tab
  – Set safe OP to **0**

- **Close** and **Save** changes

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Notes

Safety Interlocks -- Regulatory Control

Regulatory Control CMs also have Safety Interlock capability.

The parameters used to affect the interlock are SIFL (Safety Interlock Flag) and SIOPT (Safety Interlock Option). When SIFL goes true, the CM behaves according to the configured SIOPT. (See the reference below for more information.)

In our process, we are using the SIOPT of SHEDSAFE when the Reactor Level is in PVHH alarm. SHEDSAFE causes a regulatory control CM (FV101RC) to :

• Change Mode to MAN

• Change Modattr to OPER

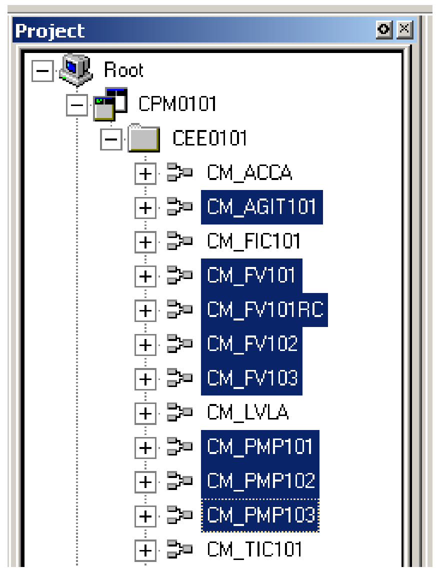
• Disable External Mode Switching

• Change OP to the configured Safe OP (0.0 for FV101RC)

Honeywell

Deactivating , Reloading, and Reactivating CMs

- Select the **CMs** you created and modified in Unit 6 in the Project tab
  - **CM#_FV101**
  - **CM#_ FV101RC**
  - **CM#_ FV102**
  - **CM#_ FV103**
  - **CM#_ LK01**
  - **CM#_ PMP101**
  - **CM#_ PMP102**
  - **CM#_ PMP103**
  - **CM#-AGIT101**



- Click the down-arrow

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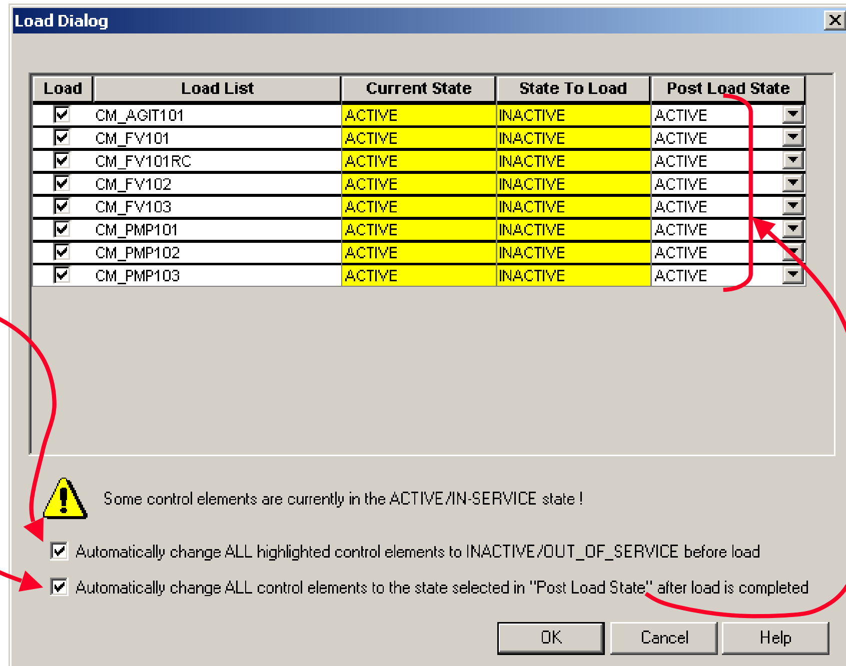
Notes

Honeywell

Deactivating , Reloading, and Reactivating CMs (R400)

- The selected CMs appear in the **Load Dialog** box along with their Current States
- Click the check box to automatically inactivate the CMs before loading
- Click the check box to automatically reactivate the CMs after loading
- Click OK



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Notes

Deactivating and Reloading CMs

CMs must be inactivated to load changes. Prior to R400, IOMs and CMs had to be manually inactivated from the Monitor tab. After loading, they had to be reactivated from the Monitor tab. This functionality is still available, and the following pages are included for reference to demonstrate a convenient way to do this manual deactivate\reactivate operation for an entire controller.

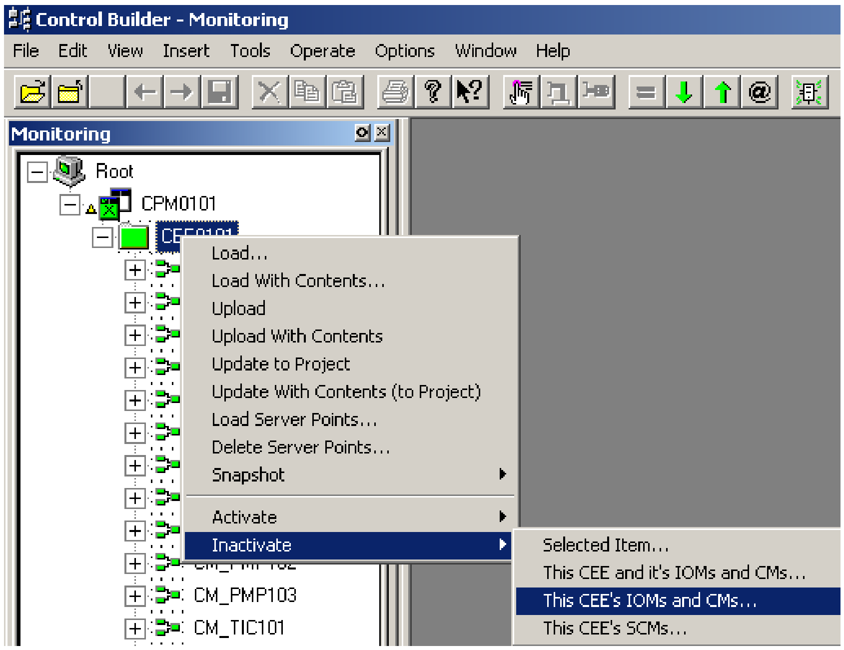
R400 allows the load function itself to inactivate and reactivate the modified objects. If you do not inactivate manually prior to loading, the check box to **Automatically change to INACTIVE** must be checked.

The check box to return to the selected **Post Load State** is optional. If it is not checked, the CMs will remain inactive after load. Note that any load errors also will leave the loaded objects in the INACTIVE state.

Honeywell

Reference: Manually Deactivating CMs

- Deactivate your CMs by right-clicking the CEE and selecting
  - **Inactivate**
    - **This CEE's IOMs and CMs**



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Notes

Manually Deactivating and Reactivating CMs

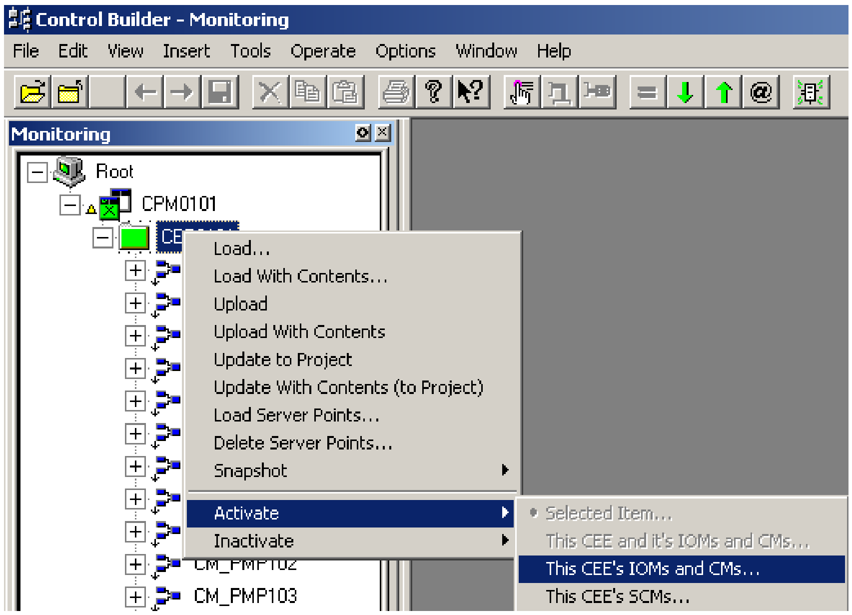
CMs must be inactivated to load changes. Prior to R400, IOMs and CMs had to be inactivated from the Monitor tab. After loading, they had to be re-activated from the Monitor tab.

As shown here and on the next page, the manual inactivate and reactivate functions are still available

Honeywell

Reference: Manually Reactivating CMs

- Activate your CMs by right-clicking the CEE and selecting
  - **Activate**
    - **This CEEs IOMs and CMs**



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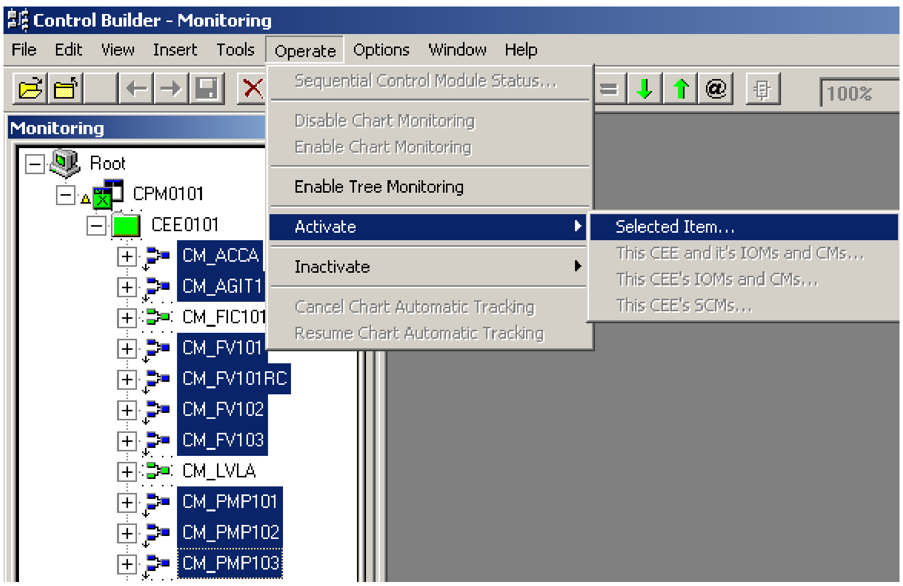
Notes

Honeywell

Reference: Manually Reactivating Multiple CMs

- Activate multiple CMs by selecting them in the **Monitoring** tab and then:
  - Select **Operate → Activate → Selected Item...**



- Note:**Inactivate** for multiple selections works the same way.

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Notes

Honeywell

This completes….

PlantScape Controller Implementation

Lesson 2

Configuring Safety Override Interlocks

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Notes

Honeywell

PlantScape Controller Implementation

Lesson 3

Manual Operation

6 - 29

Notes

Introduction

Now that you have configured all the required CMs it is time to verify their operation. In this lesson you will verify your project configuration by manually creating a product. To facilitate the process, three custom displays have been built for you to operate the CMs. This will enable you to remain within Station and perform all the steps required to create a product. The following lab uses two displays named **C#_OP1** and **C#_OP2**. A third display not shown in the lab depicts the entire process and can also be used. It is called **C#_process.** An additional way to operate is to use the groups you created in the configuration labs.

Objectives

❶ Combine two substances to create a product

❷ Verify correct configuration of your project

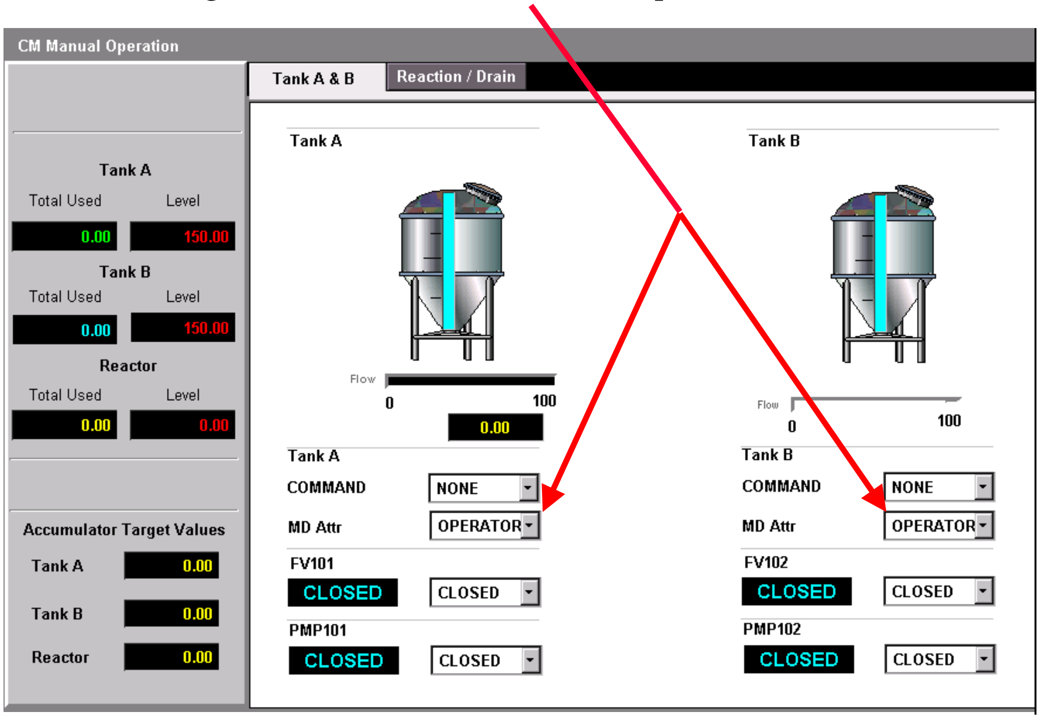
Honeywell

Operating CMs Manually

Step 1. Preparing the CMs

1. Ensure all the project CMs are in **Operator** Mode Attribute (View from Groups)
2. Ensure Ingredients A and B totalizers are in **Operator** Command Attribute

C#_OP1



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Notes

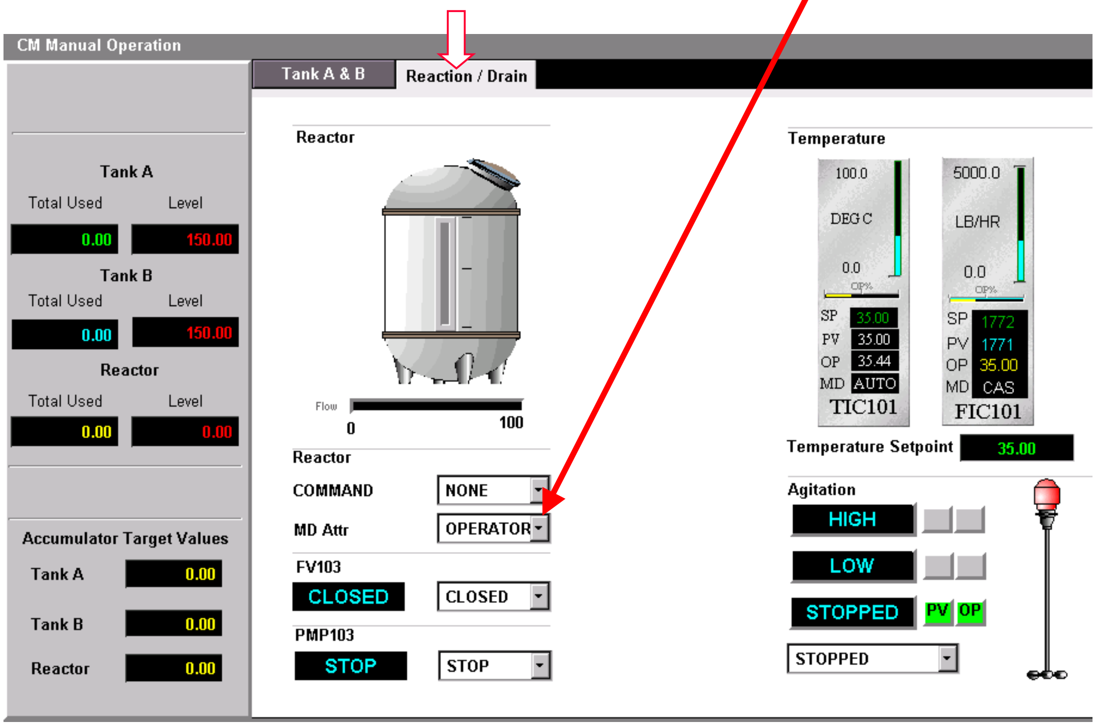
Manual Operation

Honeywell

Step 1. Preparing the CMs

1. Ensure the reactor totalizer is in **Operator** Command Attribute

C#_OP1
C#_OP2



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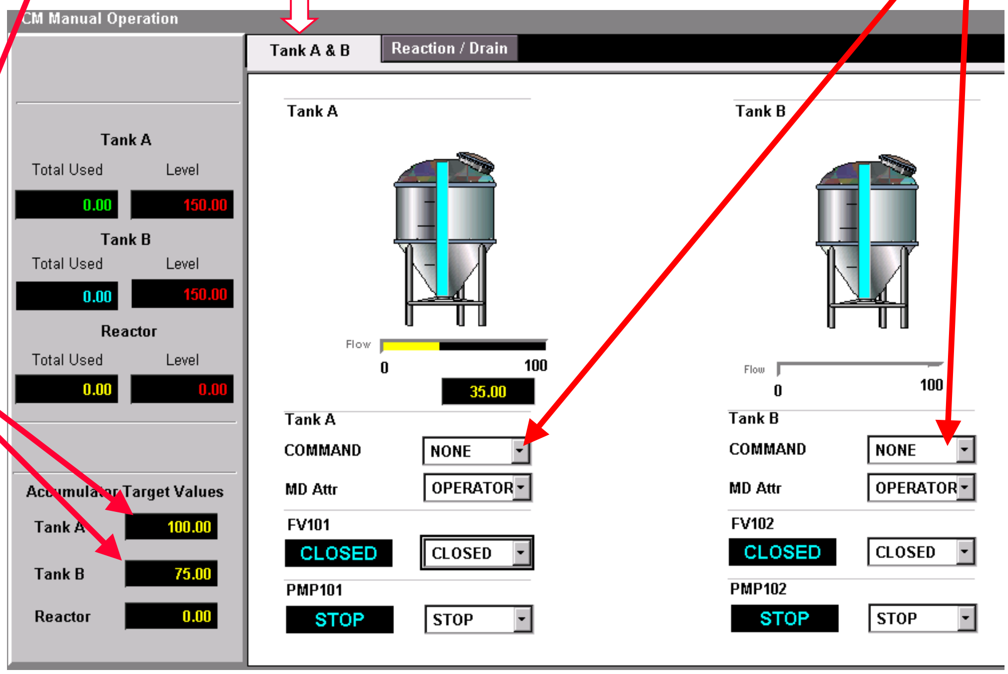
Notes

Honeywell

Step 2. Preparing Tank Levels and Targets

1. **Reset** and **Start** the totalizers for Tanks A and B
2. Enter target amounts for Ingredients A and B: **100** for **A**; **75** for **B**.



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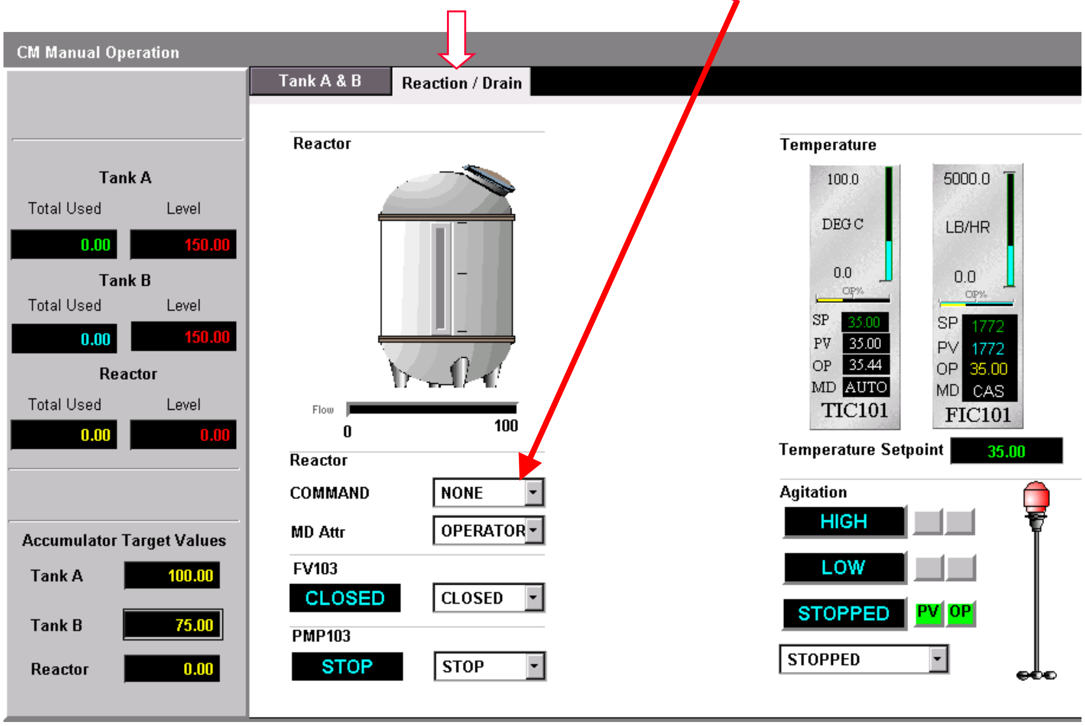
Notes

Step 2. Preparing Tank Levels and Targets

1. **Reset** and **Start** the Totalizer for the reactor



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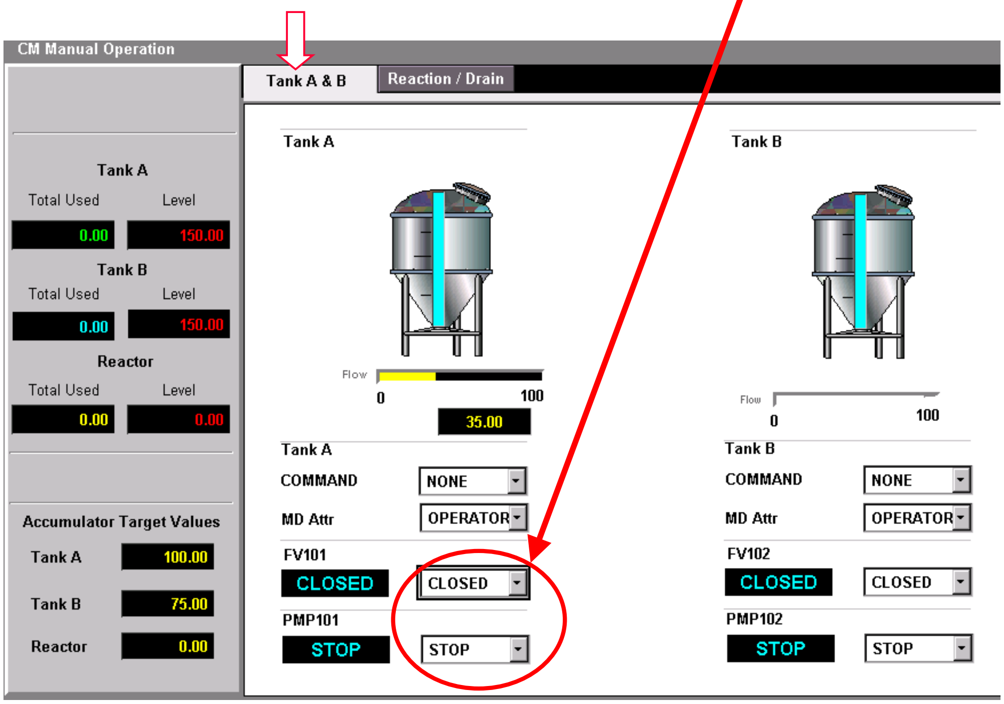
Notes

Manual Operation

Honeywell

Step 3. Charge Ingredient A

1. Open **CM#_FV101** and Start **CM#_PMP101**. (Recall that the pump is interlocked closed until the valve is open.)



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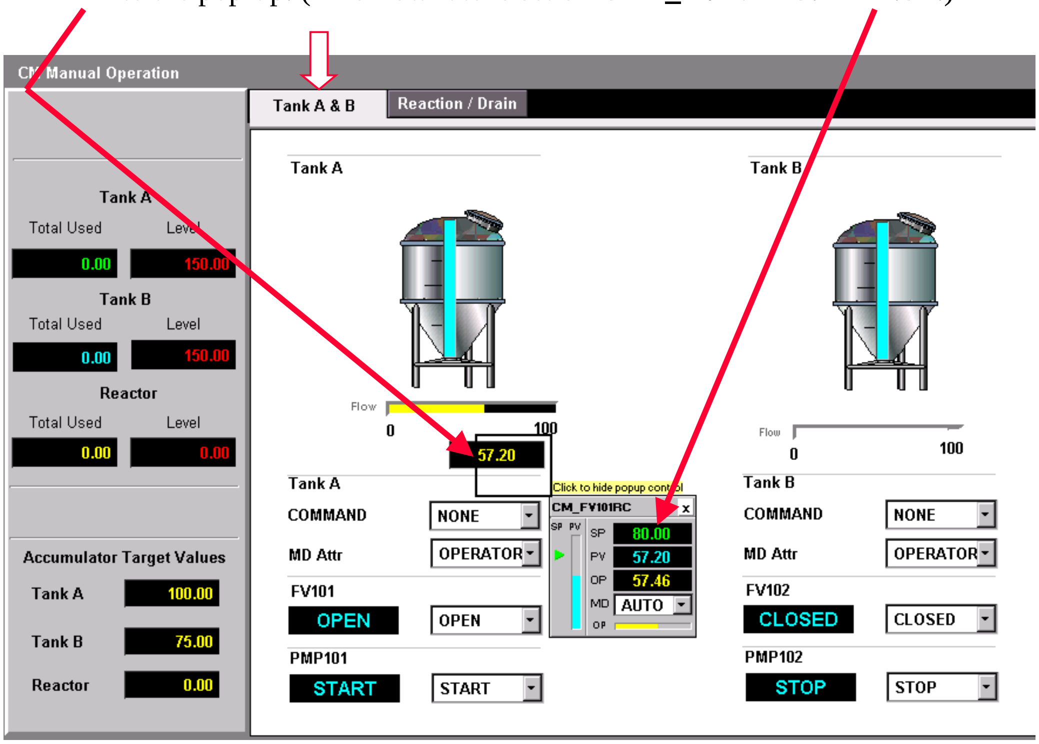
Notes

Manual Operation

Step 3. Charge Ingredient A

1. Set the Ingredient A flow rate to 80 by clicking on the PV and entering data into the pop-up. (The flow rate is set on **CM#_FV101RC.PIDA.SP**.)



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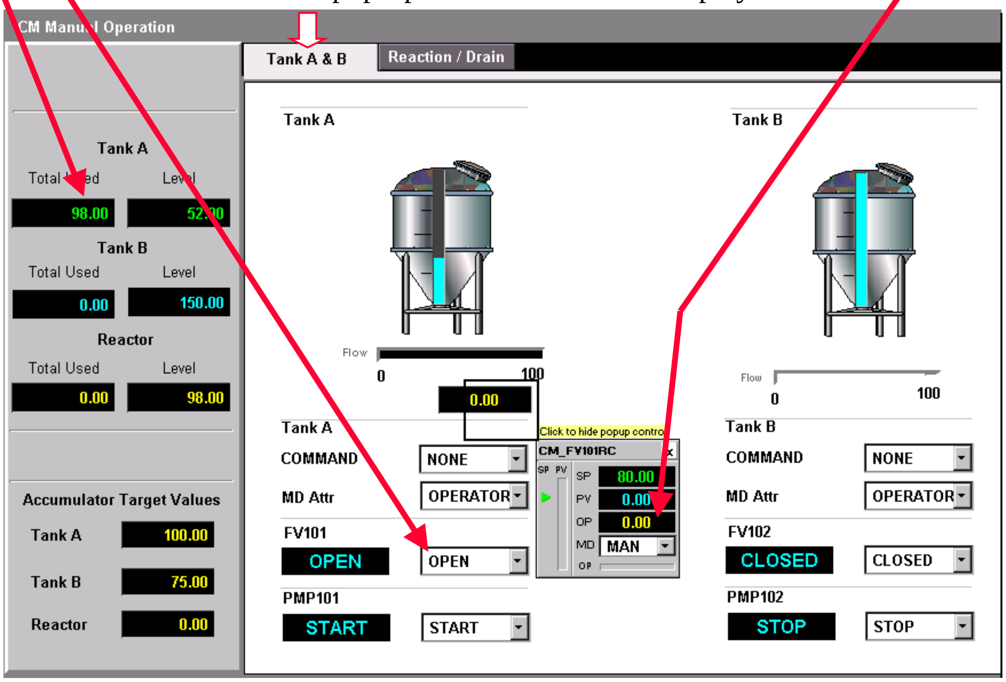
Notes

Honeywell

Step 3. Charge Ingredient A

When the total used of Ingredient A approaches the target of 100:

1. Close **CM#_FV101RC** (Mode to **Man**, **OP** to 0.)
2. Close **CM#_FV101**. (Interlocks will then stop the Pump.)
3. Click on the pop-up to clear it from the display.



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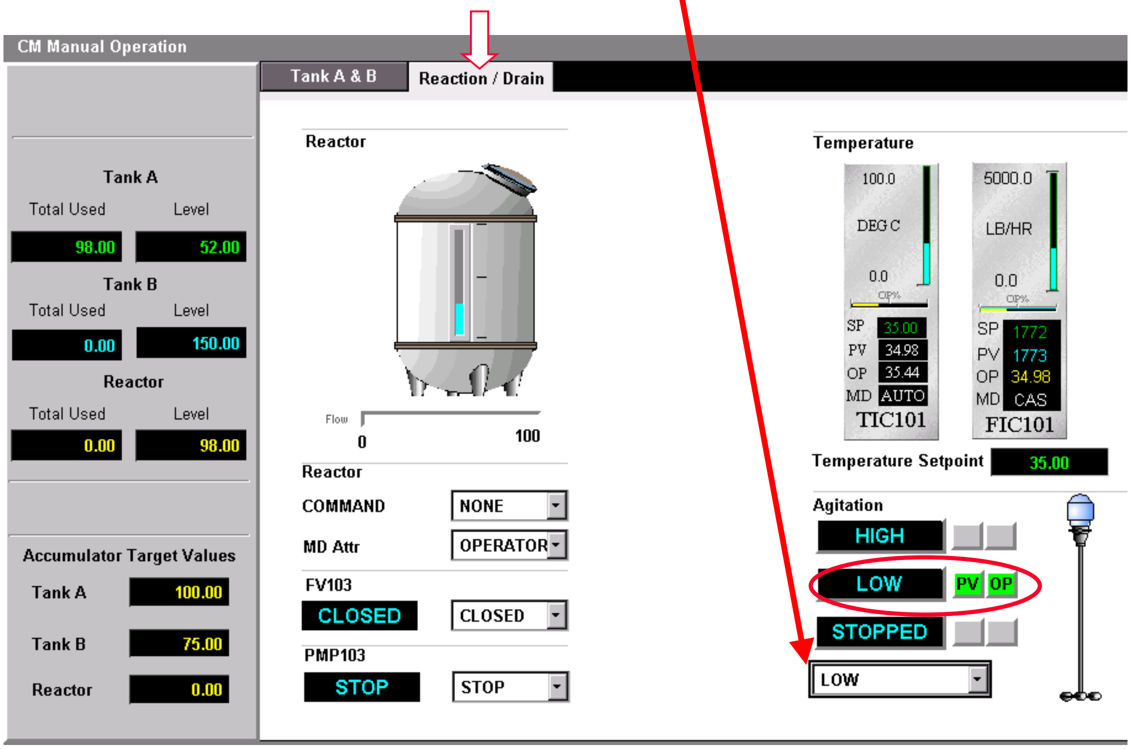
Notes

Manual Operation

Honeywell

Step 4. Begin mixing

1. Start the agitator on low speed.



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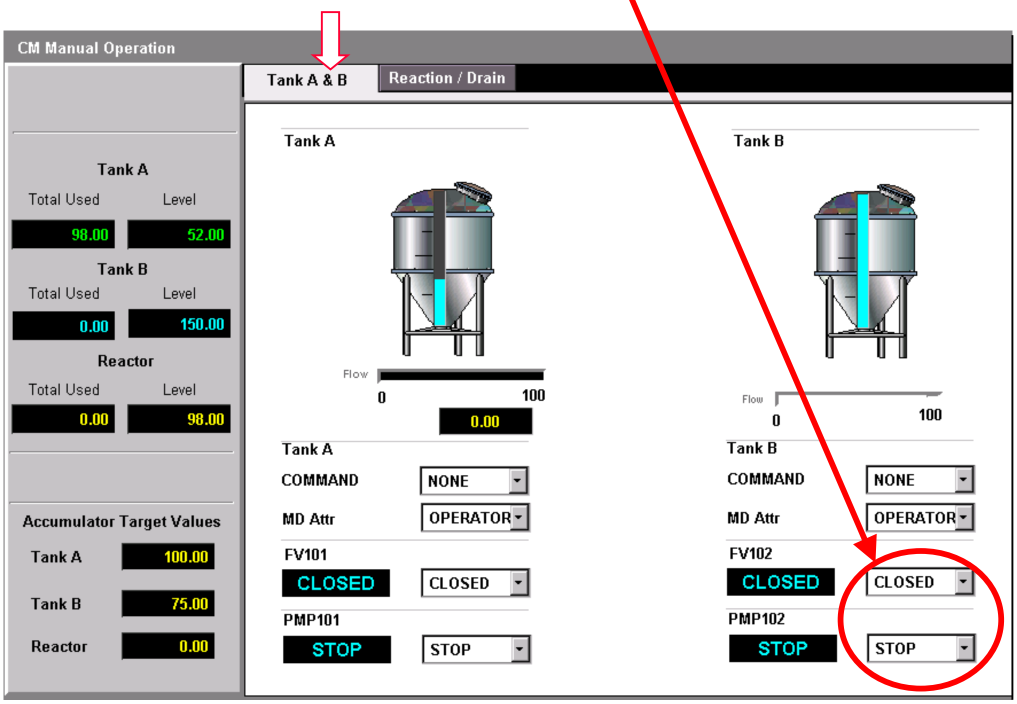
Notes

Manual Operation

Honeywell

Step 5. Charge Ingredient B

1. Open **CM#_FV102** and Start **CM#_PMP102**. (Remember the pump is interlocked closed until the valve is open.)



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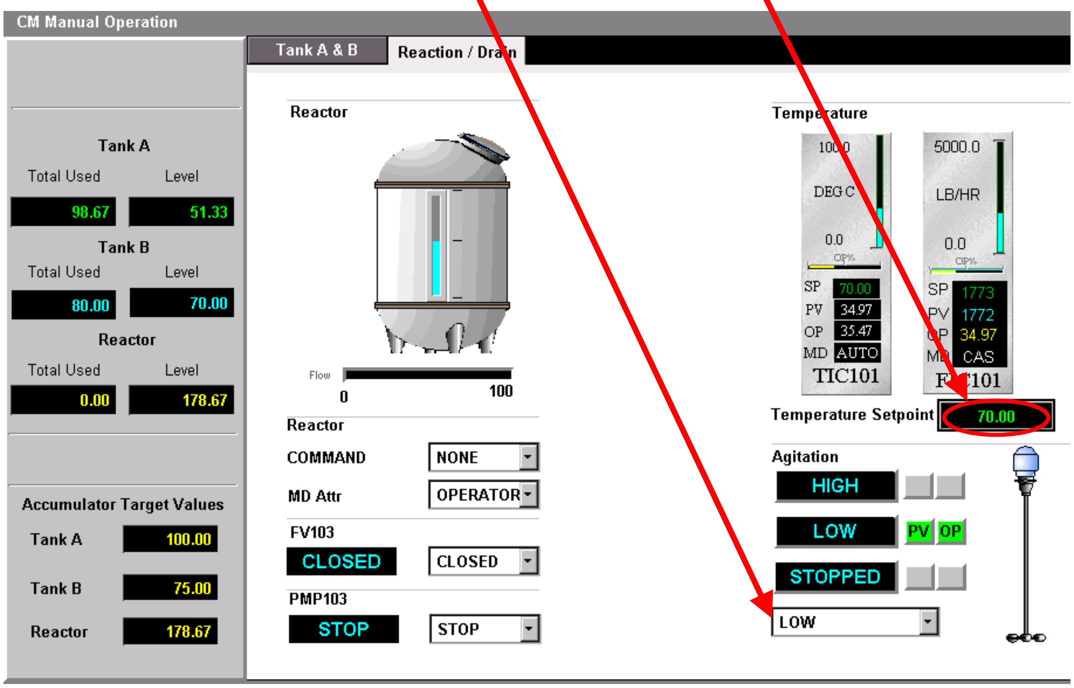
Notes

Manual Operation

Honeywell

Step 6. Start the reaction

1. **Wait** for Ingredient B to shut off automatically due to interlocks.
2. Enter the reactor temperature target of 70 Degrees by changing the **SP** of **CM#_TIC101** to 70.
3. Change the agitator from low to high speed.



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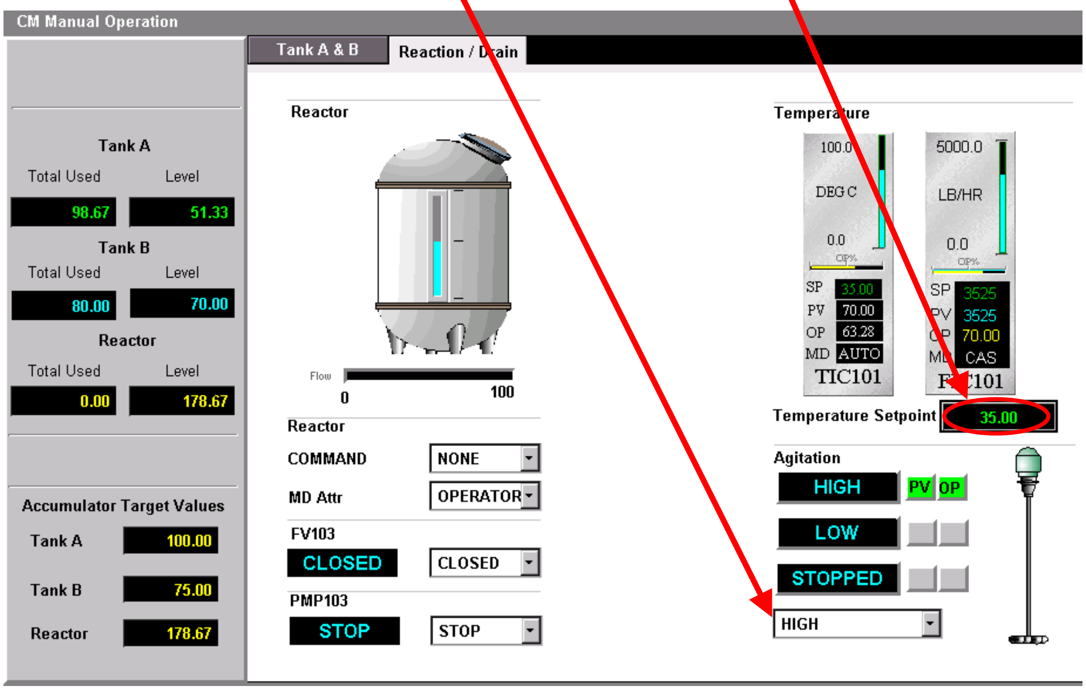
Notes

Manual Operation

Step 7. Complete the reaction

1. **Wait** for the temperature to reach 70 Degrees.
2. Enter a reactor temperature target of 35 Degrees by changing the **SP** of **CM#_TIC101** to 35.
3. Change the agitator from high to low speed.



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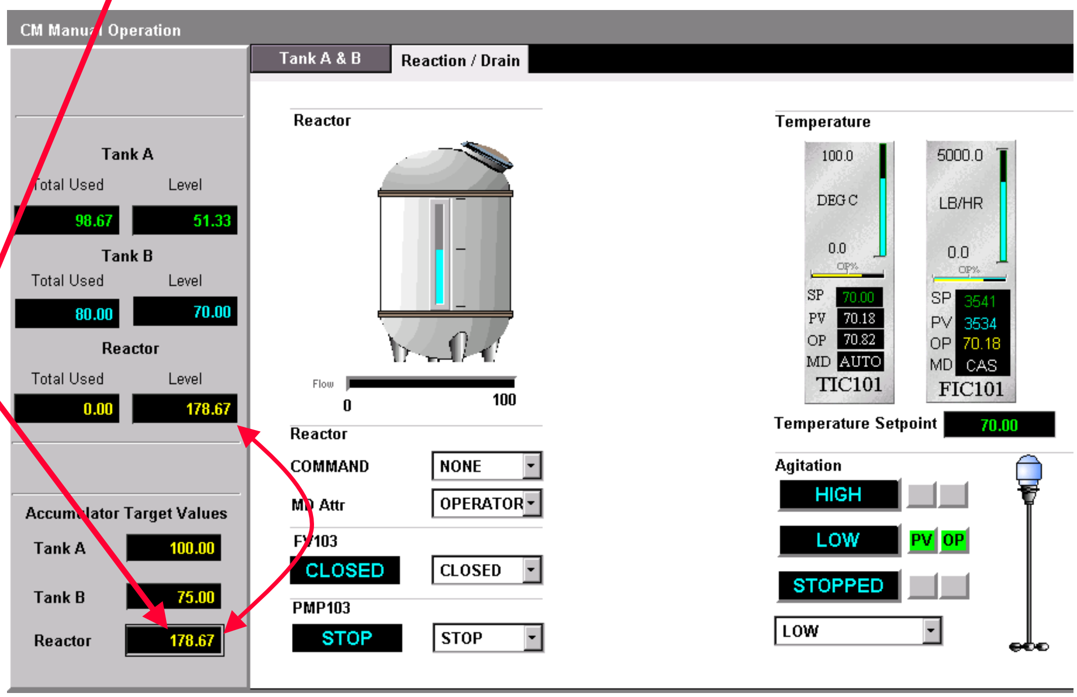
Notes

Honeywell

Step 8. Drain the rector

1. Enter the reactor drain target amount. It will be equal to the reactor level.



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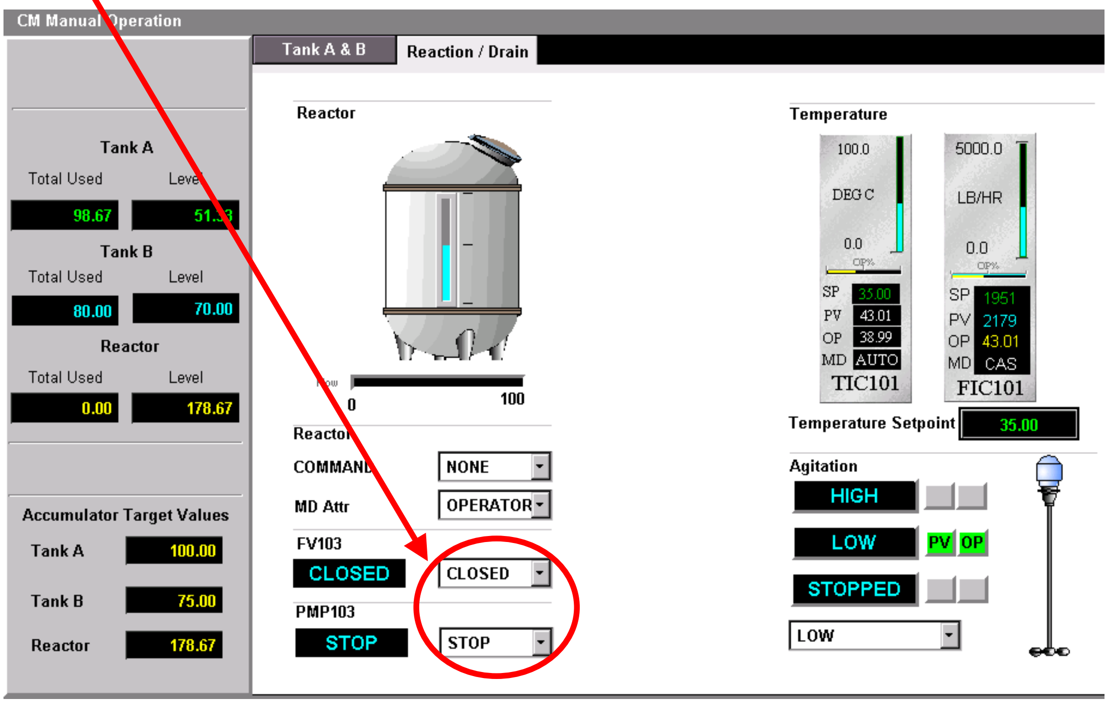
Notes

Honeywell

Step8. Drain the reactor

1. Open **CM#_FV103** and Start **CM#_PMP103**. (Remember that the pump is interlocked closed until the valve is open.)
2. Wait for the interlocks to stop the agitator, Close **CM#_FV103**, Stop **CM#_PMP103**



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Notes

This completes….

PlantScape Controller Implementation

Lesson 3

Manual Operation

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Notes

Honeywell

PlantScape Controller Implementation

Lesson 4

Configuring Message Blocks

6 - 45

Notes

Introduction

The purpose of this Lesson is to give you the knowledge to be able to configure Message Blocks. Message Blocks give the Hybrid Controller the ability to send messages to Stations. The blocks are capable of sending messages on command from SCMs, as well as for process related reasons from CMs. In this module we will create a new CM to send messages. We will configure the Message Blocks to send messages when Safety Interlocks are triggered. Later we will use this same CM to send messages from SCM commands.

Objectives

❶ Create a new CM named CM#_MESSAGES.

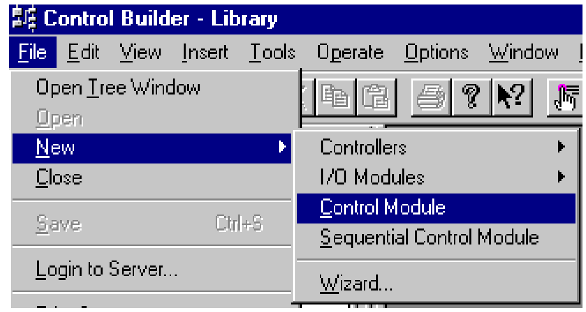
❷ Add and configure the Message Blocks needed to send messages for the project.

❸ Configure Safety Interlock occurrences to send messages to Station.

Honeywell

Creating and Configuring a New CM

- Click
  - **File**
    - **New**
      - **Control Module**
- Double Click on the newly created CM in the control drawing area of Control Builder



- Enter the following information into the Main page
  - Name **CM#_MESSAGES**
  - Description **Messages for Project**
  - Execution Period **1000MS**
- Click **OK**
- Close **CM#_MESSAGES** and save changes
- Assign **CM#_MESSAGES** to **CEE0101**

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Notes

Creating a Message CM

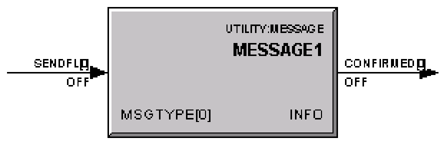
Message Blocks can be added to any CM. We could have added Message Blocks to existing CMs in the project and achieved the same functionality.

In this module, we are concentrating on Message Block configuration so we created a separate CM which will be used for all messages in the project.

Honeywell

Adding and Configuring Message Blocks

- Open **CM#_MESSAGES**
- Click on the **Library** tab and add three of the following Function Blocks
- **Library Directory** | **Block Type**
  - UTILITY | **MESSAGE**



- Name the three blocks: **XFERA**, **XFERB**, and **REACTOR.** We will add messages to each block that relate to these three parts of the project.
- First we will add Messages to **XFERA**
- Double click on block XFERA to bring up the configuration form shown on the next page.

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Notes

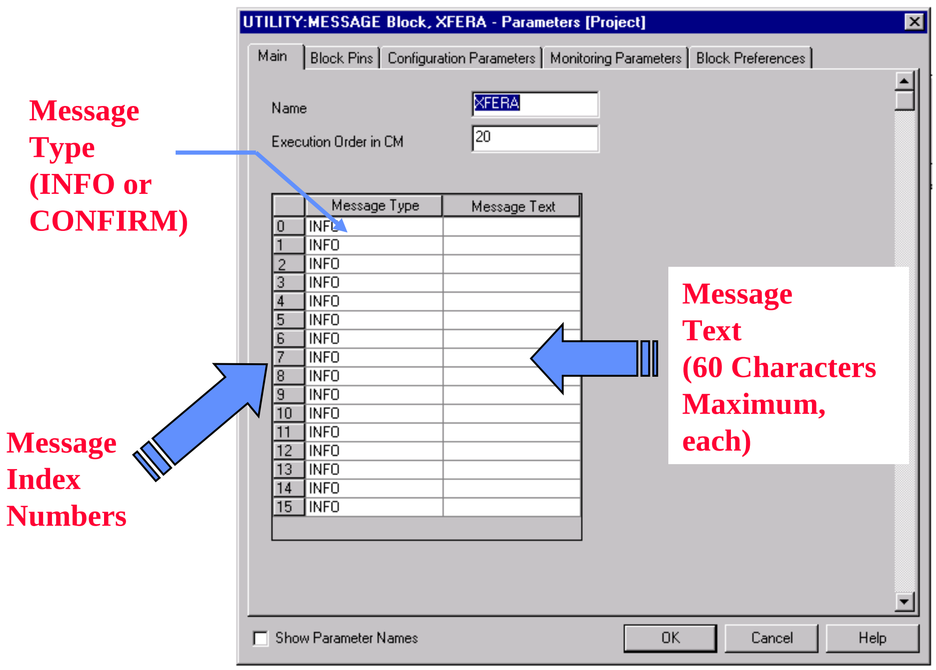
Message Blocks

Message Blocks are found in the Utility family of Function Blocks. Each has the ability to store up to 16 messages of up to 60 characters each.

Each message has an index number, ranging from 0 to 15.

Honeywell

Adding and Configuring Message Blocks *…continued*



- We will add two messages using indexes 0 and 1.

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Notes

Configuring Messages

The Main Page of the Message Block configuration form contains all 16 messages of the block.

To add a message, simply type the message into the appropriate index Message text port.

The Message Type indicates how the message will be used in the control scheme, and how it will appear and be acknowledged in the Station Message Summary page. INFO type messages are for information only. They are removed from the Message Summary upon Acknowledgement.

CONFIRM messages are usually used in SCMs to halt the program until confirmation. We will learn about CONFIRM messages in the SCM portion of the course.

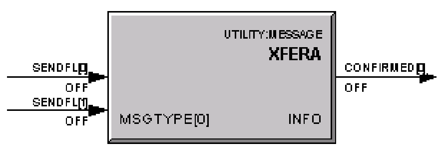
Honeywell

Adding and Configuring Message Blocks *…continued*

- Enter the following message in Index 0 Message Text:
  CM#_FV101 SAFETY INTERLOCK --- FULL REACTOR
- Enter the following message in Index 1 Message Text
  CM#_FV101RC SAFETY INTERLOCK --- FULL REACTOR
- Accept the Default Message Type: INFO

Next we will configure the method to send the messages to Stations

- Add an input pin for the Send Flag for the Index 1 message. Note that the Flag for Index 0 is the only default input pin.



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Notes

Configuring Message Send Flags

When a client triggers a given Send Flag (SENDFLAG[n]) input, the corresponding message (MESSAGE[n]) is sent to the Server's Message Summary. Messages are then viewed by the Stations in the Message Summary and the Event Summary, filtered by any Area restrictions that might apply.

Here we are using the Send Flags for Messages 0 and 1 as input pins. We can then configure Boolean type parameter connections to the inputs to trigger the messages.

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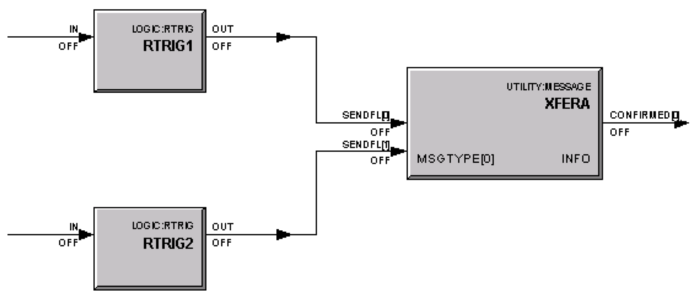
Adding and Configuring Message Blocks *…continued*

- Click on the **Library** tab and add <u>two</u> of the following Function Blocks

Library Directory	Block Type
– LOGIC	**RTRIG**

- Name the blocks **RTRIG1** and **RTRIG2**

- Wire the blocks to the two inputs of the Message Block



6 - 50

Notes

Configuring Send Flag Inputs

For information only type messages, the client trigger sets the corresponding SENDFLAG[n] to True. Since the SENDFLAG[n] is a pulse trigger, it is automatically set to False for the next execution cycle. This means the MESSAGE block is ready to send the same message again in the next cycle

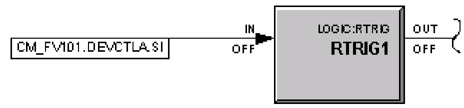
Here we will be adding parameter connections which will be true as long as the monitored device is in Safety Interlock. If we wire the parameter connections directly to the Send Flag inputs, the messages will be sent each cycle, in our case once every second as long as the connection parameter is true.

We are therefore using a Rising-Trigger logic block to insure only one message is sent. The RTRIG block provides rising edge change detection, thereby turning the output ON if an OFF-to-ON transition is detected. The output stays ON until the next execution cycle, at which time it returns to OFF.

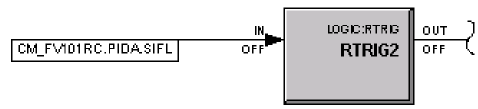
Honeywell

Adding and Configuring Message Blocks *…continued*

- Add a parameter connection to each RTRIG Block input to monitor occurrences of Transfer A Safety Interlocks:



  – **CM#_ FV101.DEVCTLA.SI**
  – **CM#_ FV101RC.PIDA.SIFL**



Repeat this procedure for the other two Message Blocks

- For **XFERB**: Three messages, Index 0 and 1: INFO type messages; Index 2 CONFIRM
  – Index 0: **CM#_FV102 SAFETY INTERLOCK --- FULL REACTOR**
  – Index 1: **TRANSFER B COMPLETE** (*Used in a later lab*)
  – Index 2: **PLEASE CHARGE ING. B, CONFIRM WHEN COMPLETE**
  (*Used in a later lab* -- CONFIRM *type message*)

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Notes

Configuring Send Flag Inputs

The SI and SIFL parameters can be used to monitor Safety Interlock status. They go true when a Safety Interlock is triggered.

The RTRIG Block will detect when the SI and SIFL parameters go true and send true outputs to the appropriate Send Flags for one cycle only. The corresponding messages will be sent once to the Server's Message Summary.

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Adding and Configuring Message Blocks *…continued*

- **XFER_B** *continued*
  - **RTRIG3** input: **CM#_FV102.DEVCTLA.SI** (*Trigger for Message 0*)
- For **REACTOR**: One INFO type message
  - Index 0: **CM#_ AGIT101 SAFETY INTERLOCK --- EMPTY REACTOR**
  - **RTRIG4** input: **CM#_AGIT101.DEVCTLA.SI**
- Compare your CM to the solution on the next page. If you are satisfied, close and save your CM.
- Assign your CM to **CEE0101,** Load and Activate
- Test the Message functionality by causing your Reactor to reach the PV High-High level, and then draining to the PV Low-Low level
- Acknowledge the resulting messages to clear them from the Station Message Summary

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Notes

Information Messages in Station

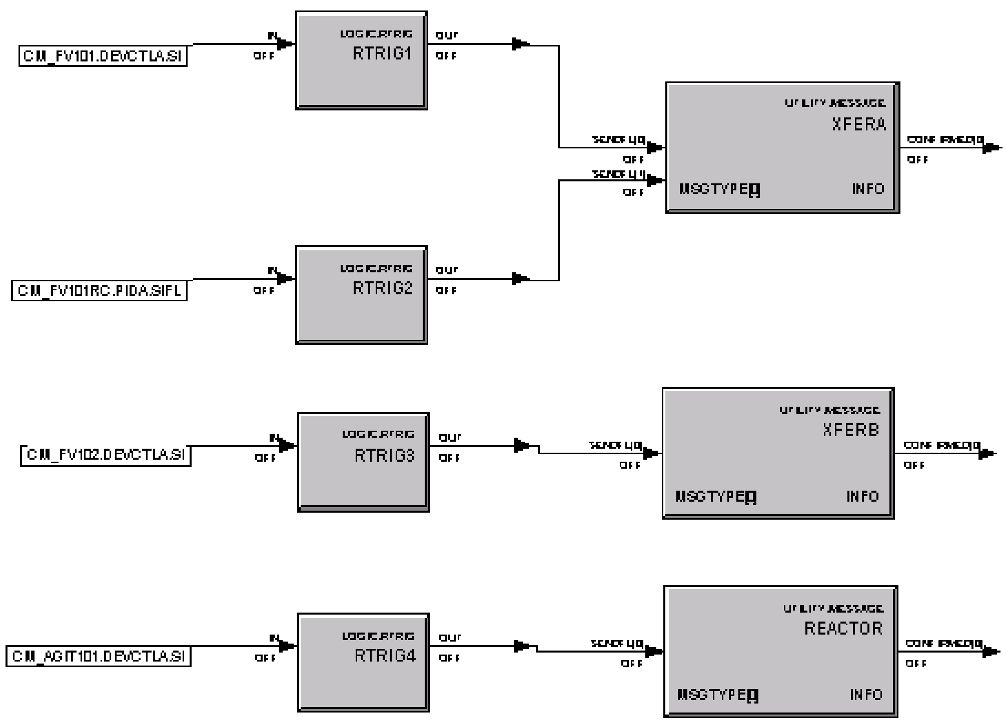
Here we are sending Information type messages when the process encounters Safety Interlocks.

INFO type messages are for information only. They are removed from the Message Summary upon Acknowledgement

The CONFIRM message will be sent in a later lab.

Honeywell

Adding and Configuring Message Blocks *…continued*



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Notes

CM#_MESSAGES

Your final CM should be functionally equivalent to the above CM. Each Message Block is used to send messages to the Server Message Summary from different parts of the process.

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This completes….

PlantScape Controller Implementation

Lesson 4

Configuring Message Blocks

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Notes

Unit 6 Exam

QuesNo	Question
1	Device control CMs can be interlocked by process conditions. Which of the following is not a device control block interlock mechanism?

A Safety override

B Process override

C Safety interlock option

D Process permissive

2 If a device control CM is active in the one-state and its configured OI[0] parameter goes true, what will take place?

A The CM will go to its configured safe state and stay there until the OI[0] parameter goes false.

B The CM will stay in the one-state and not be allowed to go to the zero-state.

C The CM will go to the zero-state and stay there until the OI[0] parameter goes false.

D The CM will stay in the one-state, but not be allowed to return to the one-state after it goes to the zero-state until the OI[0] parameter goes false.

3 If a device control CM is active in the one-state and its configured PI[1] parameter goes false, what will take place?

A The CM will go to its configured safe state and stay there until the PI[1] parameter goes true.

B The CM will stay in the one-state and not be allowed to go to the zero-state.

C The CM will go to the zero-state and stay there until the PI[1] parameter goes true.

D The CM will stay in the one-state, but not be allowed to return to the one-state after it goes to the zero-state, until the PI[1] parameter goes true.

4 If a device control CM is active in the one-state and its configured SI parameter goes true, what will take place?

A The CM will go to its configured safe state and stay there until the SI parameter goes false.

B The CM will stay in the one-state and not be allowed to go to the zero-state.

C The CM will go to the zero-state and stay there until the SI parameter goes false.

D The CM will stay in the one-state, but not be allowed to return to the one-state after it goes to the zero-state until the SI parameter goes false.

5 One major difference between a safety override and a process override is that a process override can be by-passed while a safety override cannot.

A True

B False

6 What is the interlock mechanism for a regulatory control block?

A Safety override

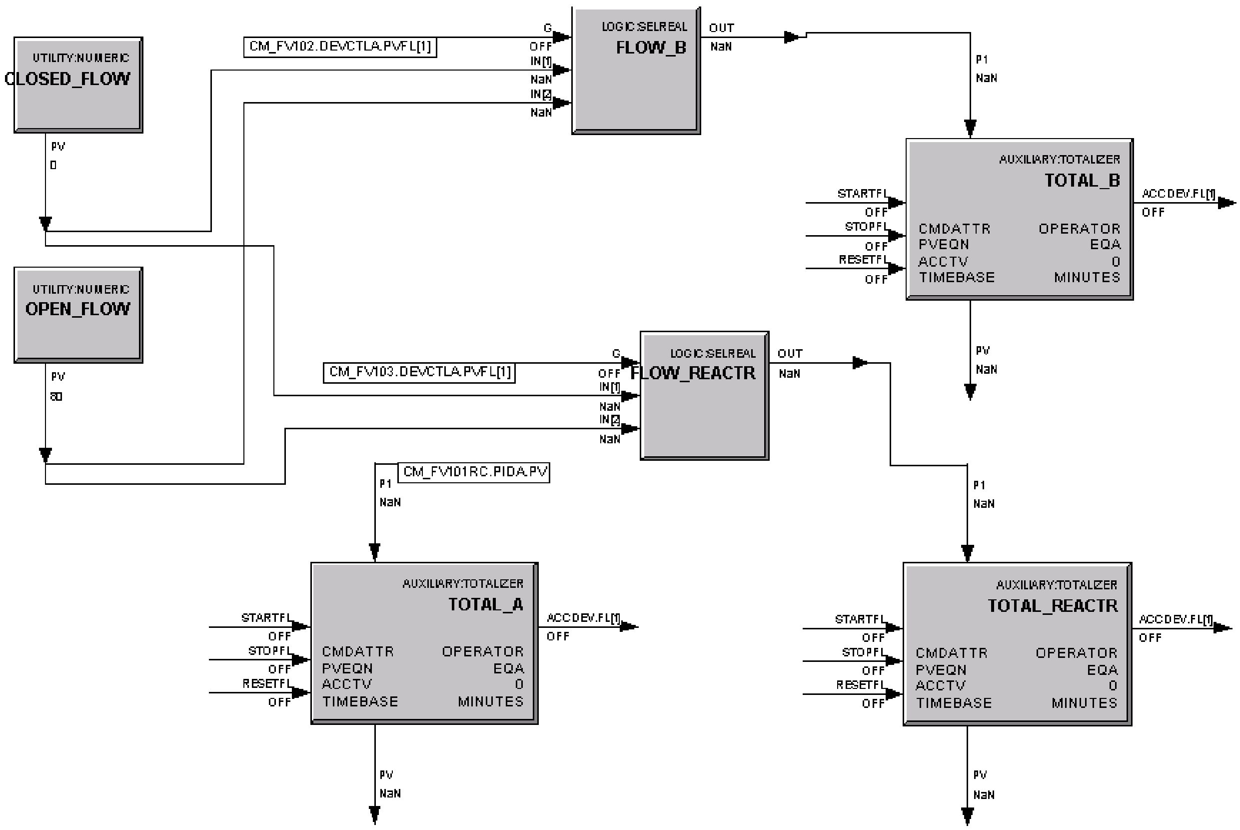
B Process override

C Safety interlock option enabled with a safe OP configured

D Process permissive

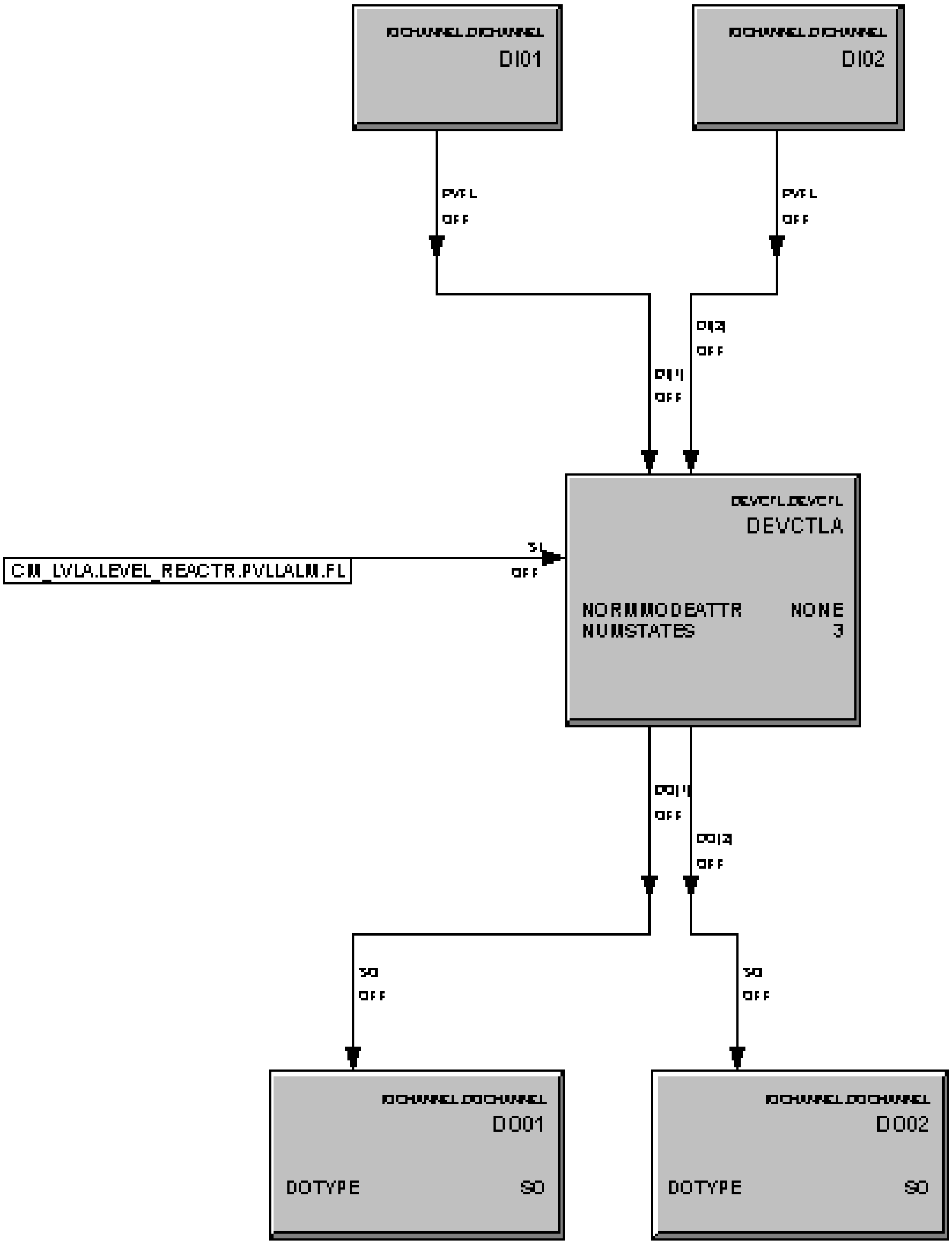
Book 1
Appendix

CM_ACCA

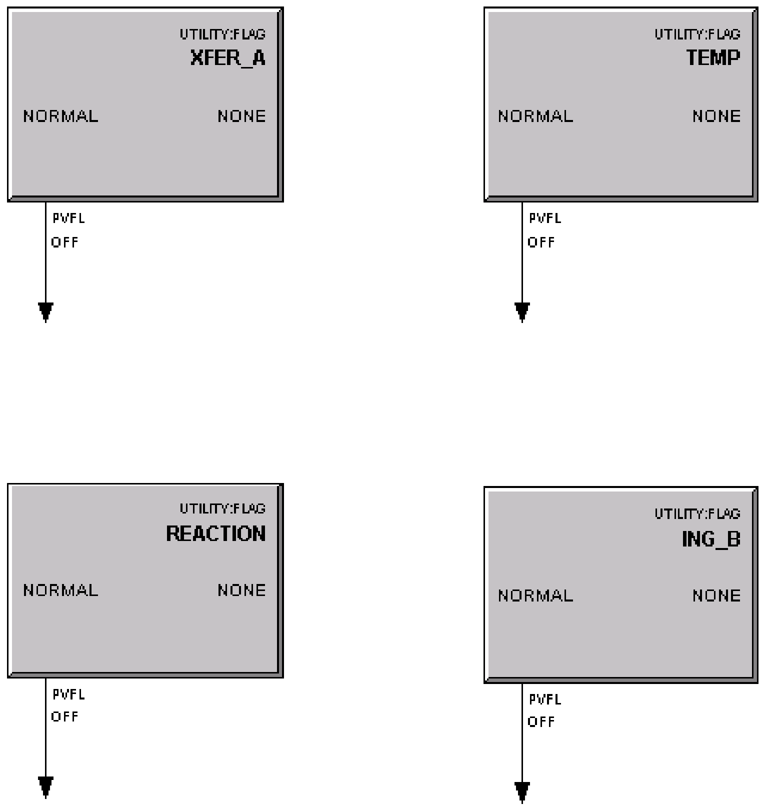


UTILITY:NUMERIC
CLOSED_FLOW
PV
0
UTILITY:NUMERIC
OPEN_FLOW
PV
80
CM_FV102.DEVCTLA.PVFL[1]
G
OFF
IN[1]
NaN
IN[2]
NaN
LOGIC:SELREAL
FLOW_B
OUT
NaN
P1
NaN
AUXILIARY:TOTALIZER
TOTAL_B
STARTFL
OFF
STOPFL
OFF
RESETFL
OFF
CMDATTR OPERATOR
PVEQN EQA
ACCTV 0
TIMEBASE MINUTES
ACCDEV.FL[1]
OFF
PV
NaN
CM_FV103.DEVCTLA.PVFL[1]
LOGIC:SELREAL
FLOW_REACTR
CM_FV101RC.PIDA.PV
AUXILIARY:TOTALIZER
TOTAL_A
AUXILIARY:TOTALIZER
TOTAL_REACTR

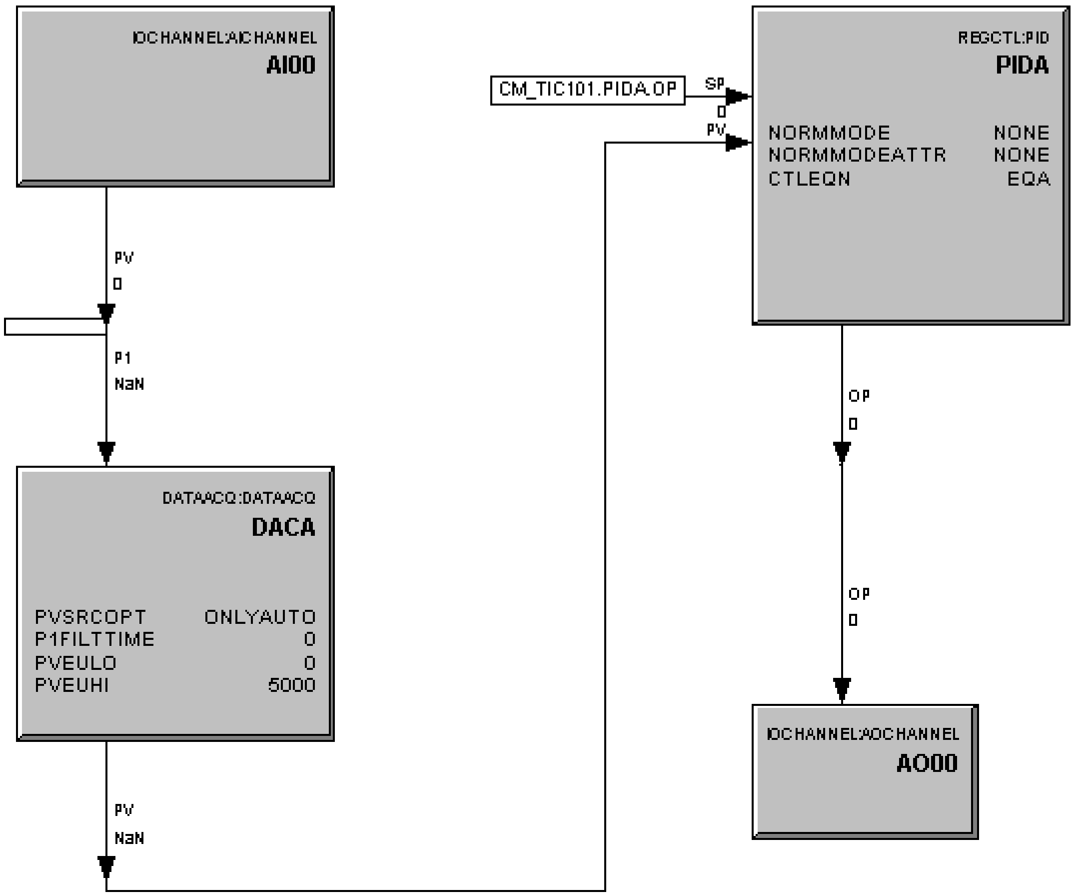
CM_AGIT101


IOCHANNEL.DICHANNEL
DI01
IOCHANNEL.DICHANNEL
DI02
PVFL
OFF
PVFL
OFF
DI[2]
OFF
DI[1]
OFF
DEVCTL.DEVCTL
DEVCTLA
CM_LVLA.LEVEL_REACTR.PVLLALM.FL
SI
OFF
NORMMODEATTR NONE
NUMSTATES 3
DO[1]
OFF
DO[2]
OFF
SO
OFF
SO
OFF
IOCHANNEL.DOCHANNEL
DO01
DOTYPE SO
IOCHANNEL.DOCHANNEL
DO02
DOTYPE SO

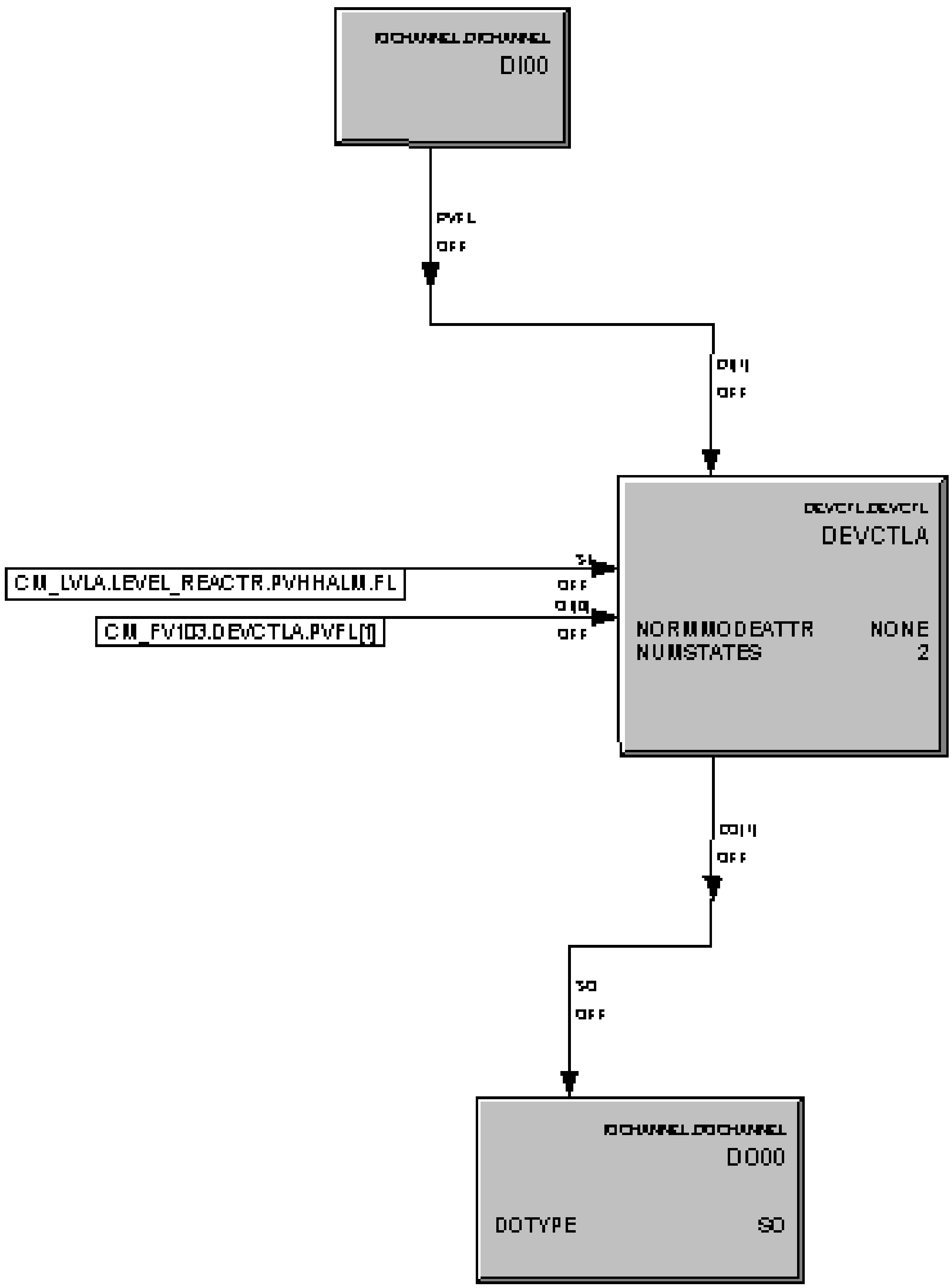
CM_FLAGS


UTILITY:FLAG
XFER_A
NORMAL
NONE
PVFL
OFF
UTILITY:FLAG
TEMP
NORMAL
NONE
PVFL
OFF
UTILITY:FLAG
REACTION
NORMAL
NONE
PVFL
OFF
UTILITY:FLAG
ING_B
NORMAL
NONE
PVFL
OFF

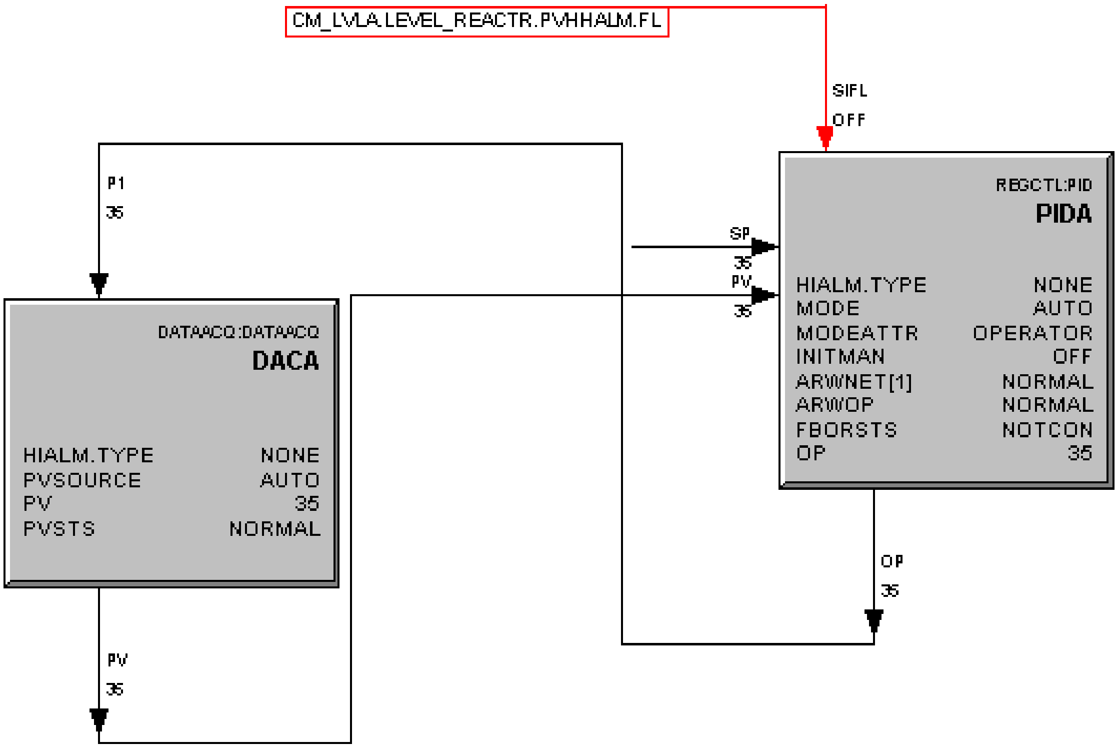
CM_FIC101


IOCHANNEL:AICHANNEL
AI00
PV
0
P1
NaN
DATAACQ:DATAACQ
DACA
PVSRCOPT ONLYAUTO
P1FILTTIME 0
PVEULO 0
PVEUHI 5000
PV
NaN
CM_TIC101.PIDA.OP
SP
0
PV
REGCTL:PID
PIDA
NORMMODE NONE
NORMMODEATTR NONE
CTLEQN EQA
OP
0
OP
0
IOCHANNEL:AOCHANNEL
AO00

CM_FV101

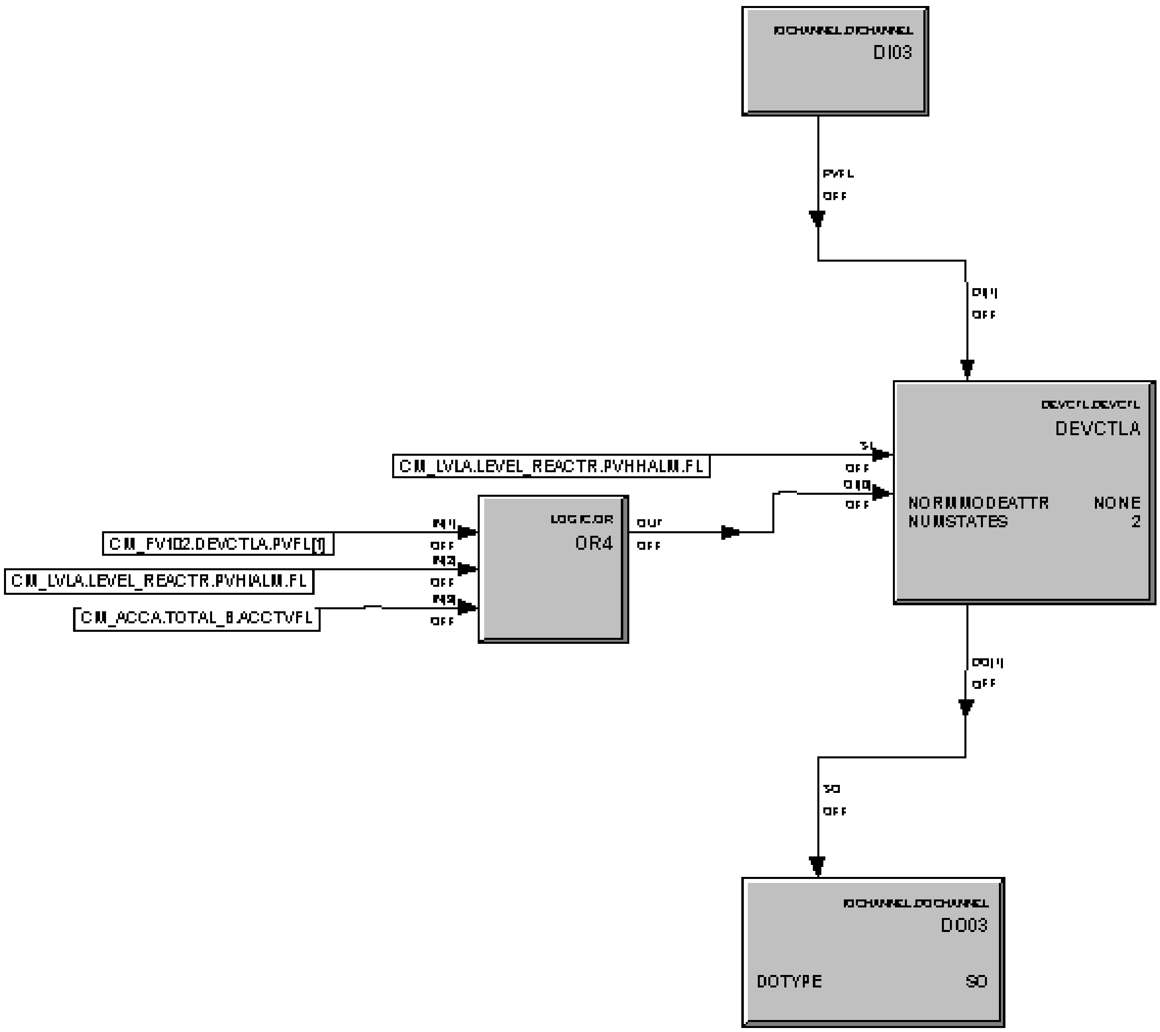

DI00
PVFL
OFF
OFF
DEVCTLA
CM_LVLA.LEVEL_REACTR.PVHHALM.FL
CM_FV103.DEVCTLA.PVFL[1]
OFF
OFF
NORMMODEATTR NONE
NUMSTATES 2
OFF
SO
OFF
DO00
DOTYPE SO

CM_FV101RC



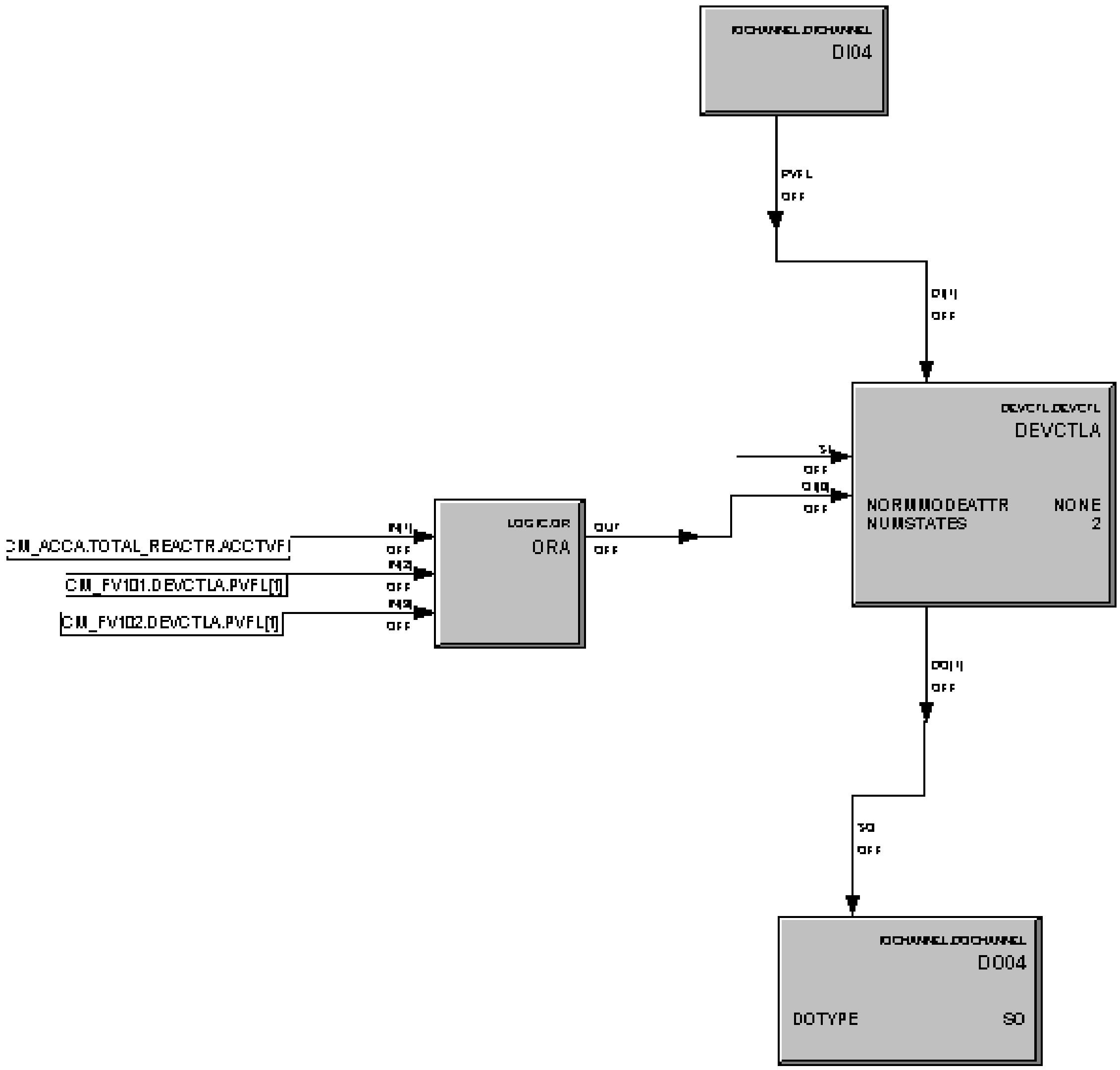
CM_LVLA.LEVEL_REACTR.PVHHALM.FL
SIFL
OFF
P1
35
REGCTL:PID
PIDA
SP
35
PV
35
HIALM.TYPE NONE
MODE AUTO
MODEATTR OPERATOR
INITMAN OFF
ARWNET[1] NORMAL
ARWOP NORMAL
FBORSTS NOTCON
OP 35
DATAACQ:DATAACQ
DACA
HIALM.TYPE NONE
PVSOURCE AUTO
PV 35
PVSTS NORMAL
OP
35
PV
35

CM_FV102

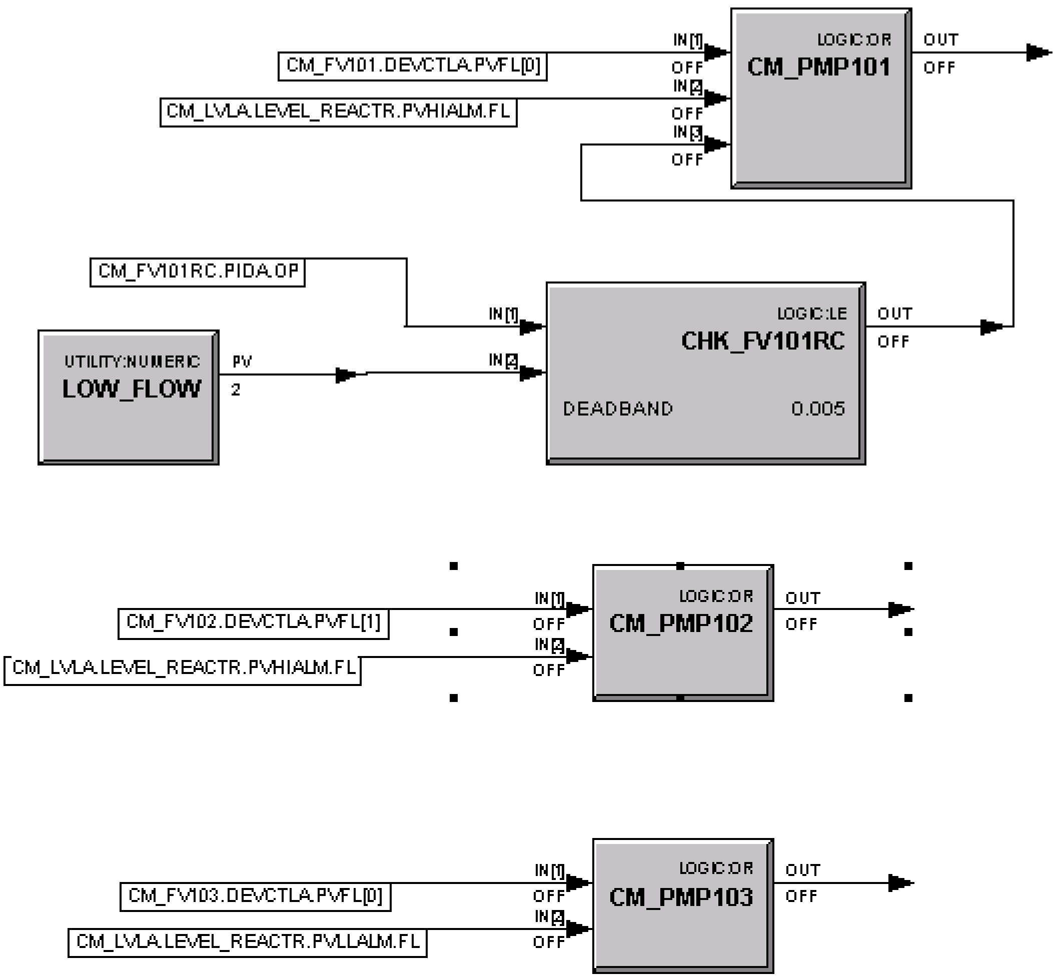


IOCHANNEL.DICHANNEL
DI03
PVFL
OFF
DI[1]
OFF
DEVCTL.DEVCTL
DEVCTLA
CM_LVLA.LEVEL_REACTR.PVHHALM.FL
SI
OFF
OP[0]
OFF
NORMMODEATTR NONE
NUMSTATES 2
LOGIC.OR
OR4
CM_FV102.DEVCTLA.PVFL[1]
CM_LVLA.LEVEL_REACTR.PVHIALM.FL
CM_ACCA.TOTAL_B.ACCTVFL
IN[1]
OFF
IN[2]
OFF
IN[3]
OFF
OUT
OFF
DO[1]
OFF
SO
OFF
IOCHANNEL.DOCHANNEL
DO03
DOTYPE SO

CM_FV103

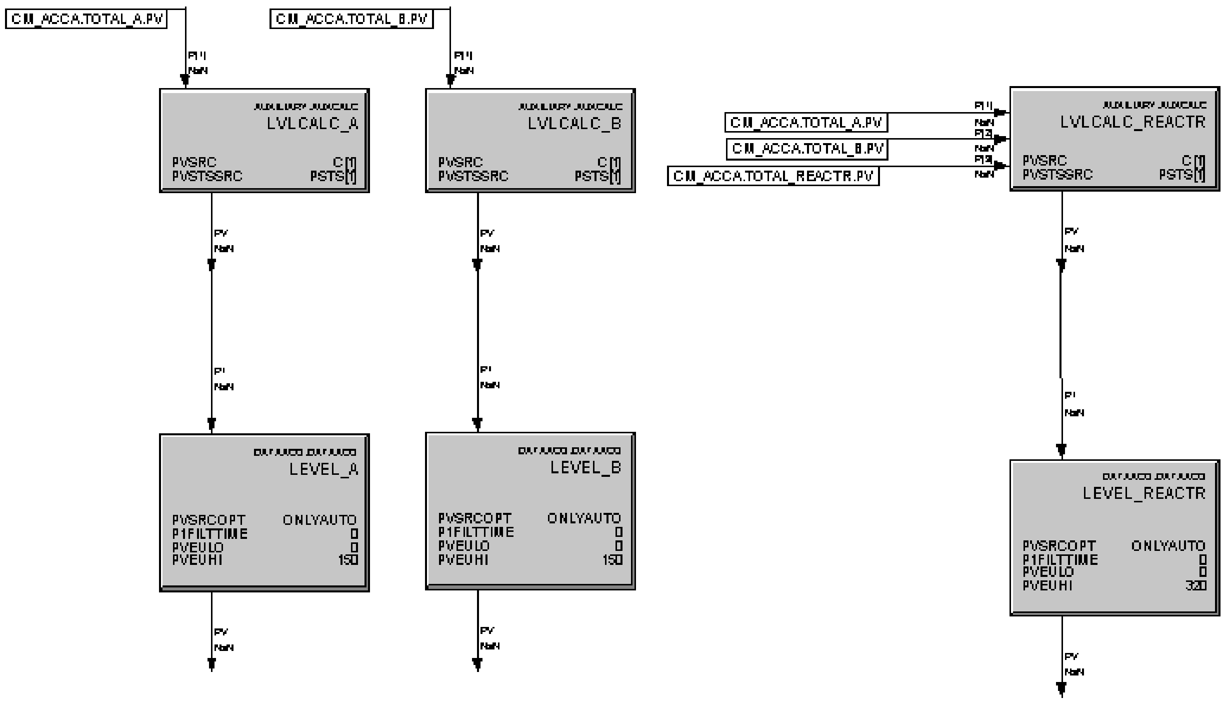

DI04
PVFL
OFF
OFF
DEVCTLA
OFF
OFF
NORMMODEATTR NONE
NUMSTATES 2
OFF
CM_ACCA.TOTAL_REACTR.ACCTVFI
OFF
CM_FV101.DEVCTLA.PVFL[1]
OFF
CM_FV102.DEVCTLA.PVFL[1]
OFF
ORA
OFF
OFF
SO
OFF
DO04
DOTYPE SO

CM_LK01



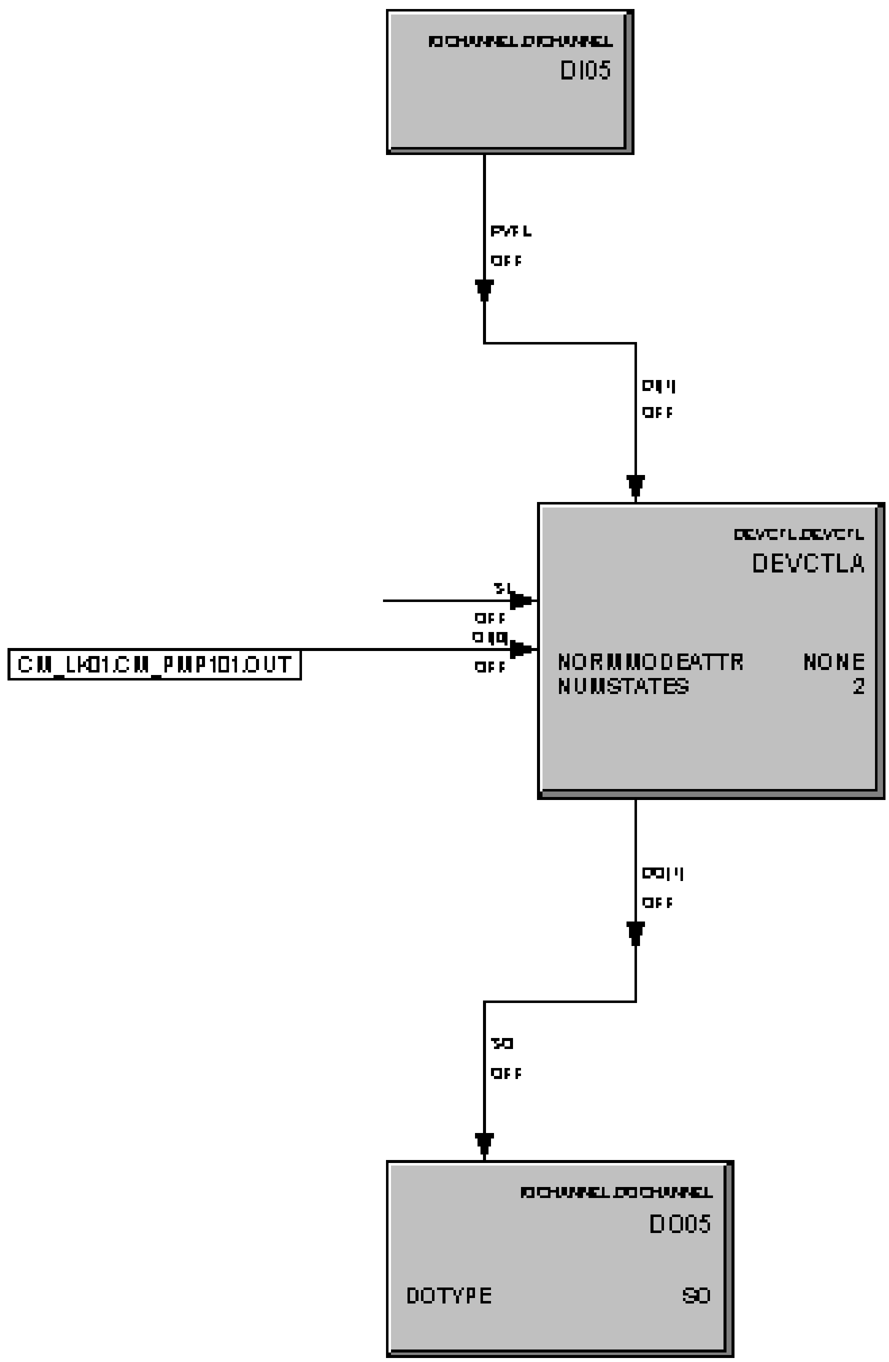
CM_FV101.DEVCTLA.PVFL[0]
CM_LVLA.LEVEL_REACTR.PVHIALM.FL
IN[1]
OFF
IN[2]
OFF
IN[3]
OFF
LOGIC:OR
CM_PMP101
OUT
OFF
CM_FV101RC.PIDA.OP
UTILITY:NUMERIC
LOW_FLOW
PV
2
IN[1]
IN[2]
LOGIC:LE
CHK_FV101RC
DEADBAND
0.005
OUT
OFF
CM_FV102.DEVCTLA.PVFL[1]
CM_LVLA.LEVEL_REACTR.PVHIALM.FL
IN[1]
OFF
IN[2]
OFF
LOGIC:OR
CM_PMP102
OUT
OFF
CM_FV103.DEVCTLA.PVFL[0]
CM_LVLA.LEVEL_REACTR.PVLLALM.FL
IN[1]
OFF
IN[2]
OFF
LOGIC:OR
CM_PMP103
OUT
OFF

CM_LVLA

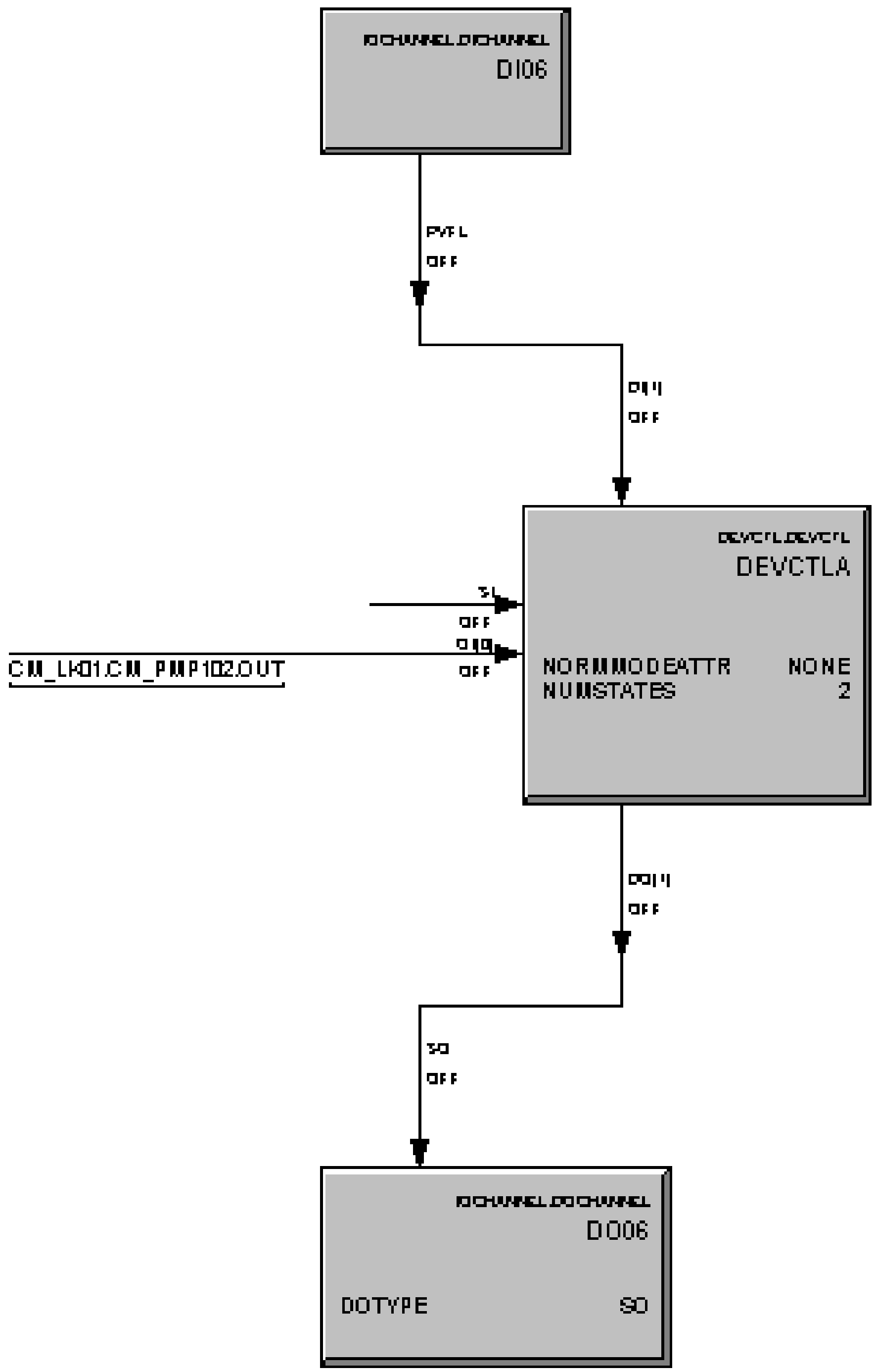


CM_ACCA.TOTAL_A.PV
CM_ACCA.TOTAL_B.PV
LVLCALC_A
PVSRC C[1]
PVSTSSRC PSTS[1]
LVLCALC_B
PVSRC C[1]
PVSTSSRC PSTS[1]
CM_ACCA.TOTAL_A.PV
CM_ACCA.TOTAL_B.PV
CM_ACCA.TOTAL_REACTR.PV
LVLCALC_REACTR
PVSRC C[1]
PVSTSSRC PSTS[1]
LEVEL_A
PVSRCOPT ONLYAUTO
P1FILTTIME 0
PVEULO 0
PVEUHI 150
LEVEL_B
PVSRCOPT ONLYAUTO
P1FILTTIME 0
PVEULO 0
PVEUHI 150
LEVEL_REACTR
PVSRCOPT ONLYAUTO
P1FILTTIME 0
PVEULO 0
PVEUHI 320

CM_PMP101

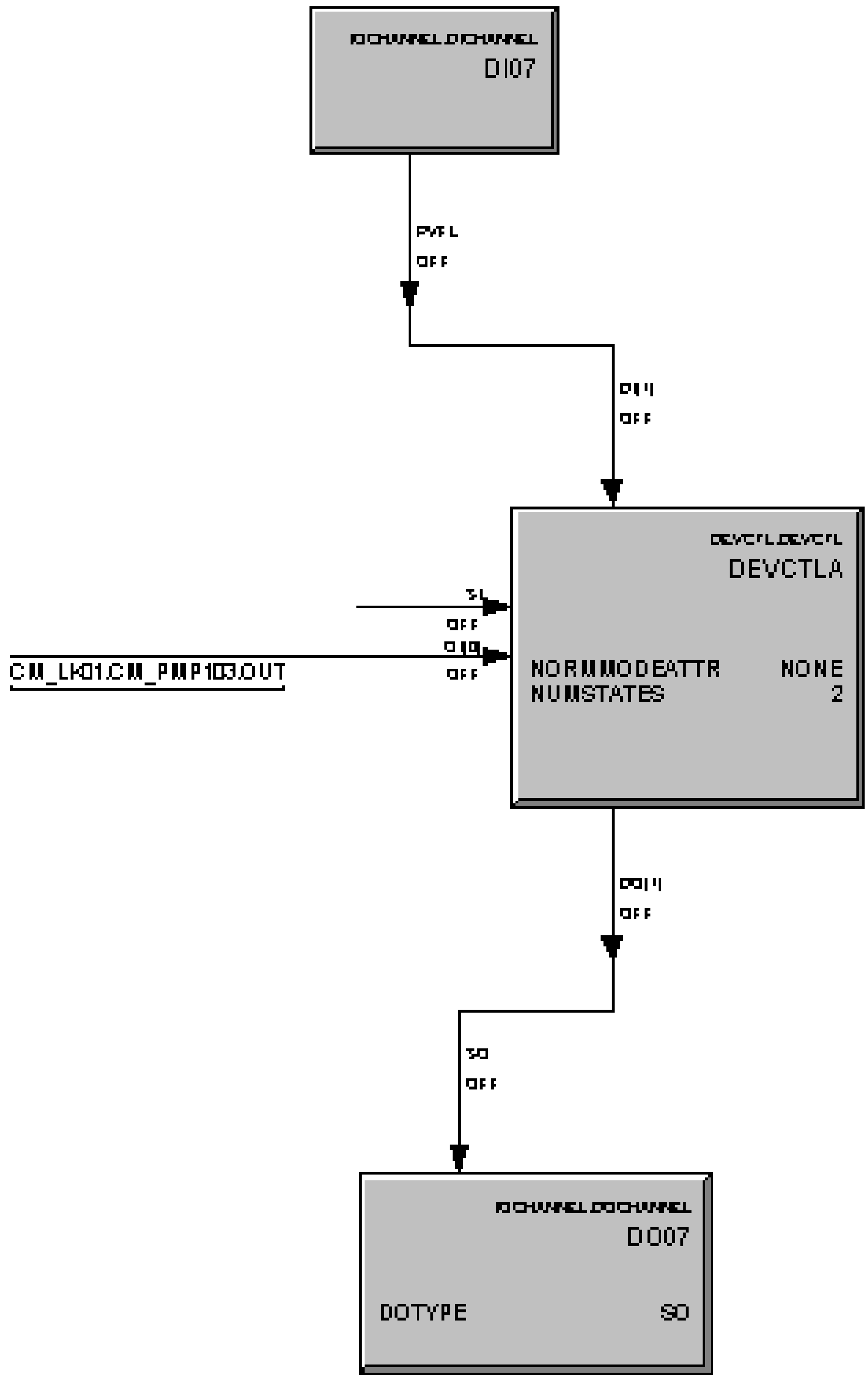

DI05
DEVCTLA
NORMMODEATTR NONE
NUMSTATES 2
CM_LK01.CM_PMP101.OUT
DO05
DOTYPE SO

CM_PMP102

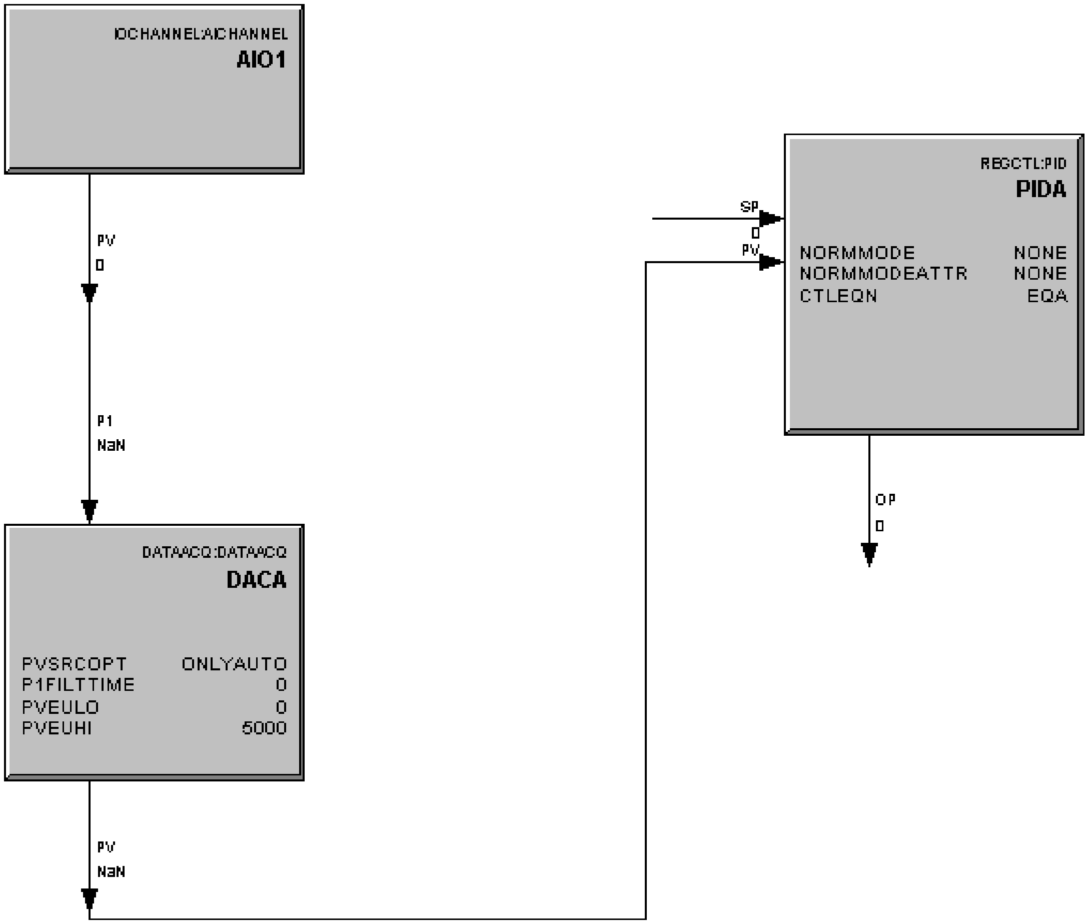


DI06
DEVCTLA
NORMMODEATTR NONE
NUMSTATES 2
CM_LK01.CM_PMP102.OUT
DO06
DOTYPE SO

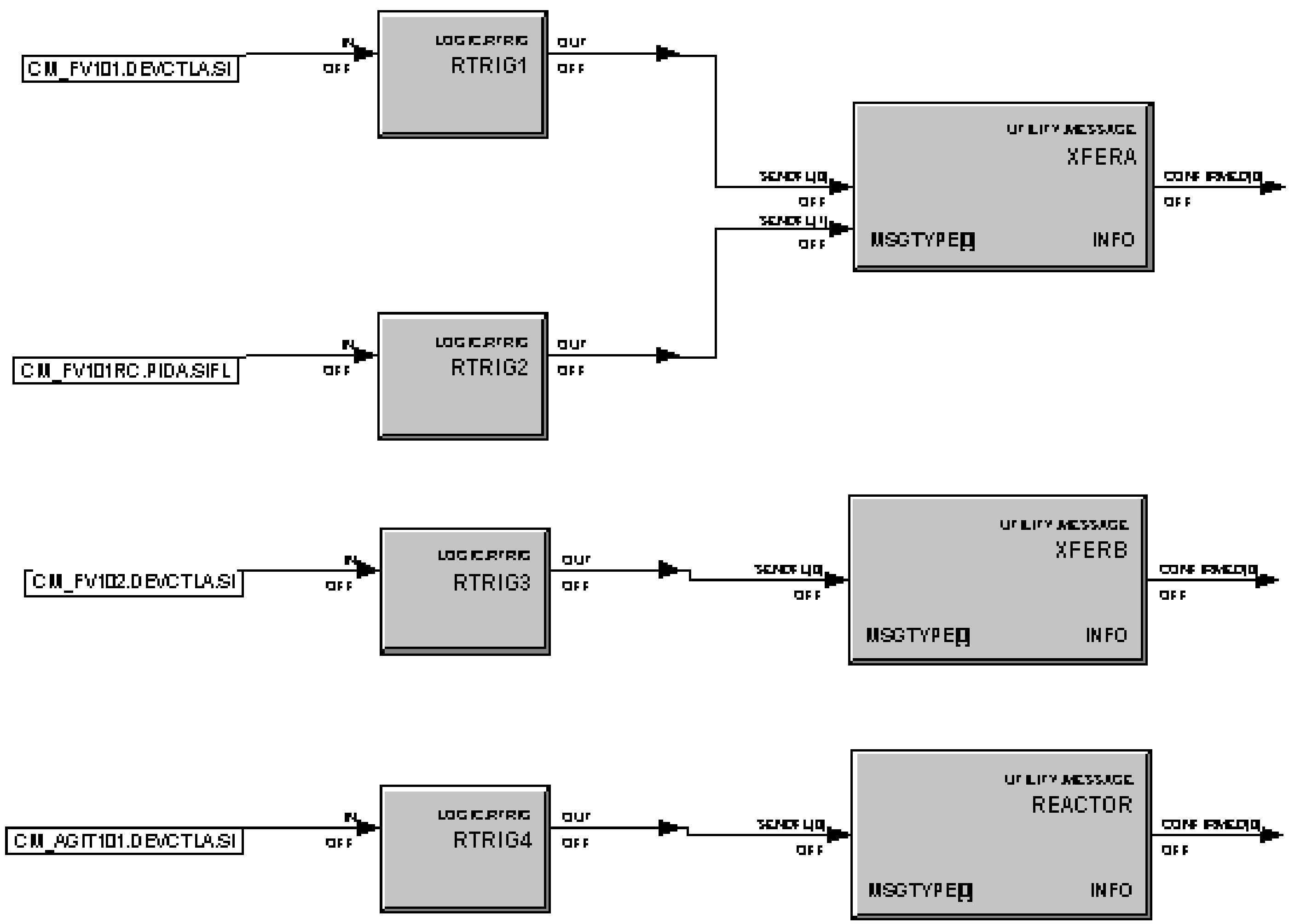
CM_PMP103


DI07
DEVCTLA
NORMMODEATTR NONE
NUMSTATES 2
CM_LK01.CM_PMP103.OUT
DO07
DOTYPE SO

CM_TIC101


IOCHANNEL:AICHANNEL
AIO1
PV
0
P1
NaN
DATAACQ:DATAACQ
DACA
PVSRCOPT ONLYAUTO
P1FILTTIME 0
PVEULO 0
PVEUHI 5000
PV
NaN
REGCTL:PID
PIDA
SP
0
PV
NORMMODE NONE
NORMMODEATTR NONE
CTLEQN EQA
OP
0

CM_MESSAGES


CM_FV101.DEVCTLA.SI
RTRIG1
XFERA
MSGTYPE
INFO
CM_FV101RC.PIDA.SIFL
RTRIG2
CM_FV102.DEVCTLA.SI
RTRIG3
XFERB
MSGTYPE
INFO
CM_AGIT101.DEVCTLA.SI
RTRIG4
REACTOR
MSGTYPE
INFO

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PlantScape Controller Implementation

Lesson 1

PlantScape Hardware Configuration

2 - 3

Notes

Introduction

The purpose of this Lesson is to introduce you the typical PlantScape hardware configuration. After you complete this Lesson you should be able to identify and understand the uses of the individual components of the PlantScape System.

Objectives

❶ Given a statement on hardware slot locations, determine whether the statement is correct

❷ Given a statement regarding the communication hardware of the PlantScape system, identify the correct use of a particular hardware module

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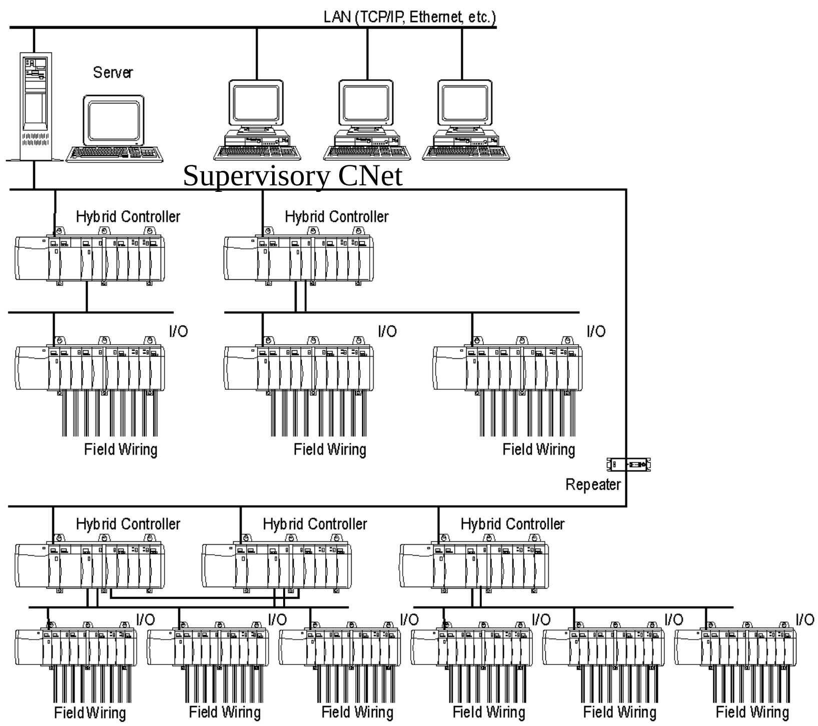
PlantScape System Architecture



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Notes

PlantScape System Architecture

The PlantScape server, the heart of the system

- Consists of a standard Pentium chip computer
- Acts as the central repository for all system data

The server also runs all the core system functions, including

- Data acquisition and processing
- Alarm and event management
- History collection, archiving and trending, report generation
- Specialist and user applications (TPH), (TPB)

The server also supports the operator station client personality, enabling systems to "start small" with just one box.

Additional operator stations may be connected via standard local & wide area networks.

Full-function operator stations may also be connected remotely via dial-up communication links.

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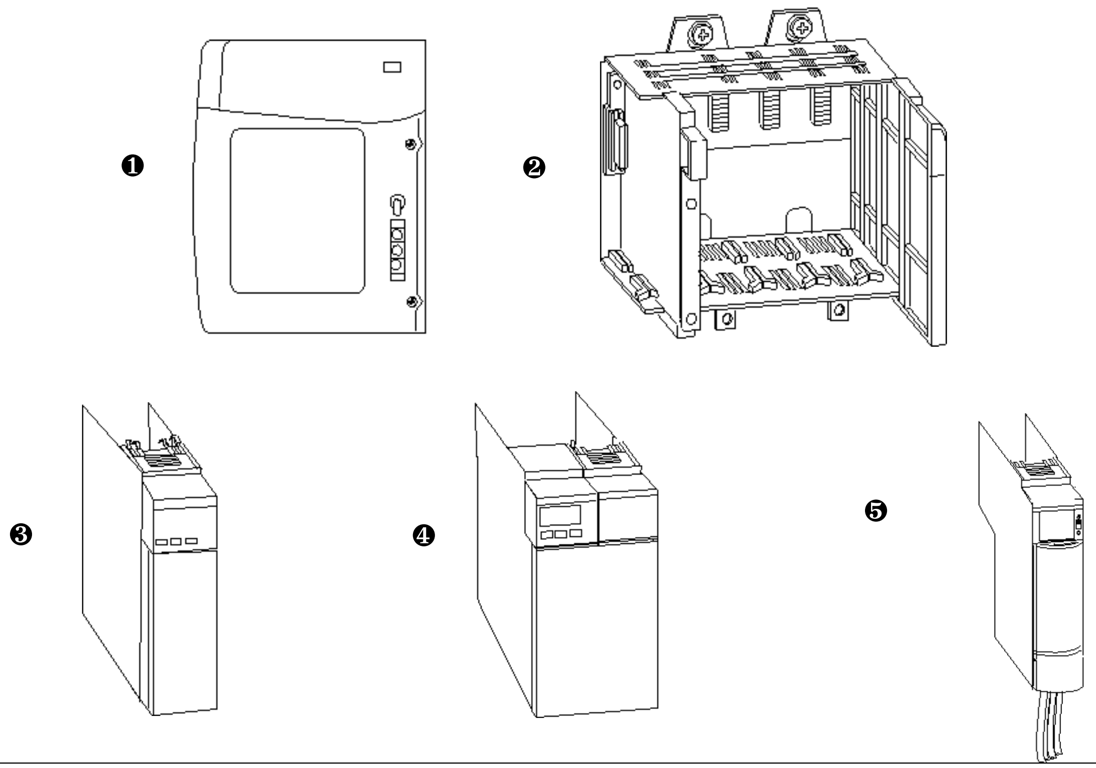
PlantScape Rack

Rack Components



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Notes

Rack Components

❶ The power supply is always the first, left end module. It is separate from the rack and does not consume any slots. It operates on 115/230 VAC or 24VDC.

❷ The rack has available capacity for 4, 7, 10, 13 and 17 slots. It is used for processor and I/O interface to plant equipment. The rack features removal and insertion under power, which ensures the automated control system can continue operation while various options are modified.

❸ The ControlNet interface module is the PlantScape communications interface. It supports supervisory/peer and I/O network communications. In I/O communications one CNI can support a maximum of 16 I/O modules

❹ C200 Control Processor modules are double wide, 2 board assemblies that provide the hybrid control.

❺ I/O modules support analog, digital AC and digital DC.

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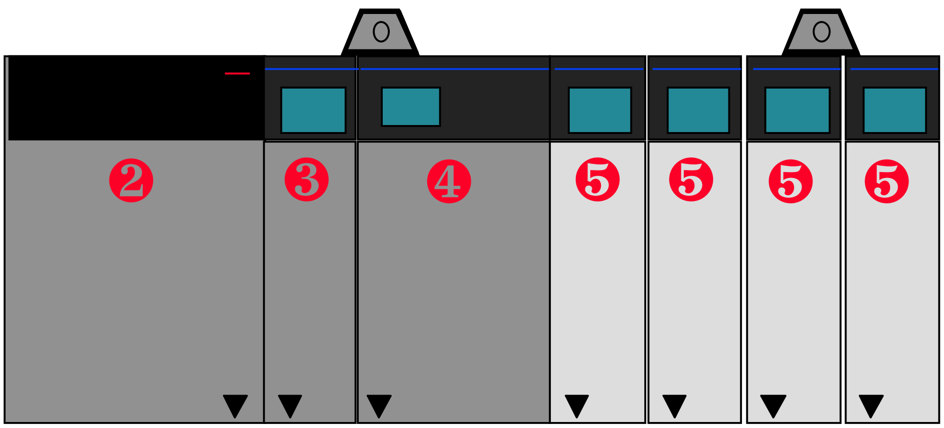
PlantScape Rack Configuration

Standard Configuration

- Below is an example of the rack configured with
  ❶ 7 slot chassis
  ❷ Power supply
  ❸ ControlNet Interface (CNI)
  ❹ Control Processor (C200)
  ❺ Input Output Modules



2 - 6

Notes

Configuring the Controller CNet address

The controller CNet address is set on two rotary switches on the CNI module. One Hybrid controller must have an address of 1. It is the "keeper" of the CNet communication parameters. These parameters are specified in the *ControlNet Installation Guide*.

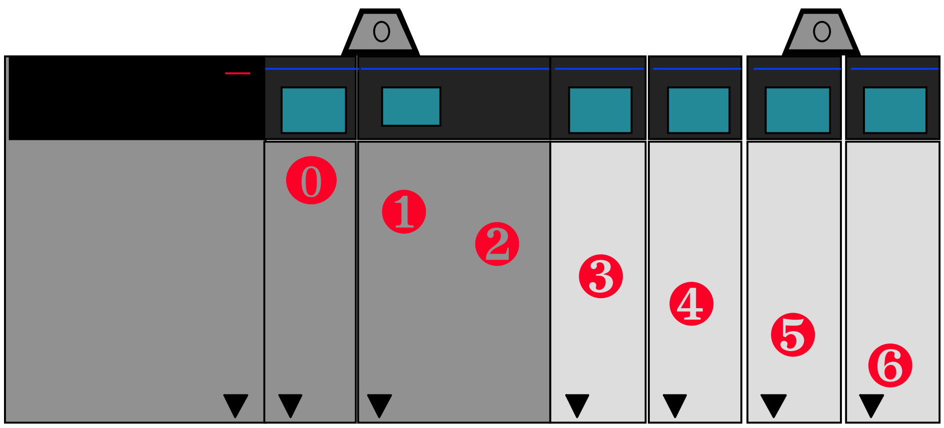
The power unit is not part of the slot number sequence. Begin counting with the first slot next to the power unit.

Honeywell

Determining Slot Numbers

Finding the location of hardware in your chassis

- To determine the IOM Slot Number you must:
  - Count starting at zero
  - Count from left to right
  - Count both spaces if the module occupies two spaces



2 - 7

Notes

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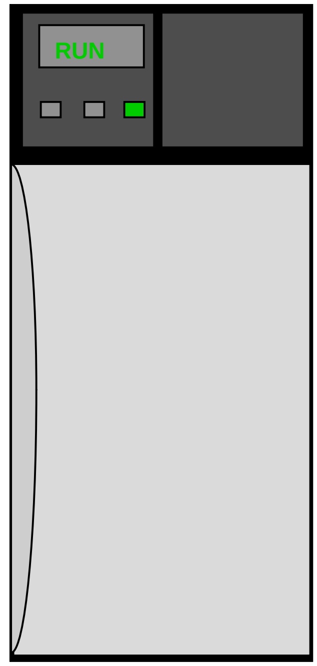
Control Processor Module

- 2 board, double-wide module
- 100 MHz PowerPC microprocessor
- Memory
  8 Mbyte RAM with EDAC
  4 Mbyte Flash ROM with EDAC
  (upgrades w/o a new chip)
- Built in lithium battery; Optional rechargeable Battery Extension Module
- Supports up to 64 I/O modules



2 - 8

Notes

Control Processor Module: LED Indicators

States	Definition
RUN	- loaded and operating
IDLE	- loaded and not processing
NODB	- personality loaded, no configuration
RDY	- inactive and ready to be loaded
ALIV	- alive; base software not loaded
FAIL	- hardware/software failure

BATtery and OK indicator LEDs

Battery LEDs should be lit when OK is lit; otherwise the Battery has failed

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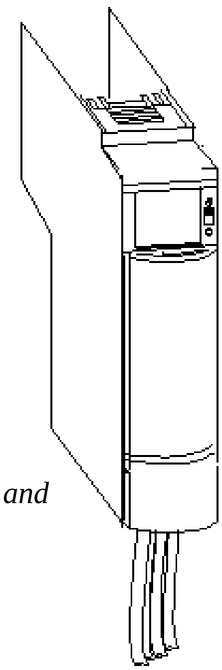
PlantScape Rack I/O

- I/O modules are configured via Control Builder
- Removable Wiring Hood
  - Includes a wire tie slot
  - Protects wiring while removed from module
  - Removable hood to gain termination access
- Choice of Removable Terminal Block (RTB) style
  - 20 position RTB (8 point or less I/O modules)
  - 36 position RTB (16 point I/O modules)
- Termination Connector
  - Supports "Removal & Insertion under Power" for field termination *and* backplane connectors
  - Door opens to provide a handle for connector removal
- 5" x 5" I/O modules



⚠ Always check hardware wiring specifications in the Control Hardware Installation Guide before wiring any Modules

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Notes

Rack I/O LED Indicators

LED	Display	Definition
OK	steady green	normal operations
OK	flashing green	passed internal diagnostics, but not operational
OK	flashing red	communications time-out
OK	steady red	replace module
I/O State	yellow	active I/O (point active)
I/O Fault	red	point failed
Cal	flashing green	calibration mode

Honeywell

This completes….

PlantScape Controller Implementation

Lesson 1

PlantScape Hardware Configuration

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Notes