FactoryTalk Batch

FactoryTalk Batch Components
Publication# BATCH-GR011E-EN-P
Important User Information

Read this document and the documents listed in the additional resources section about installation, configuration, and operation of this equipment before you install, configure, operate, or maintain this product. Users are required to familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards. Activities including installation, adjustments, putting into service, use, assembly, disassembly, and maintenance are required to be carried out by suitably trained personnel in accordance with applicable code of practice.

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| WARNING | Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss. |
| ATTENTION | Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard, and recognize the consequence. |
| IMPORTANT | Identifies information that is critical for successful application and understanding of the product. |

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

| SHOCK HAZARD | Labels may be on or inside the equipment, for example, a drive or motor, to alert people that dangerous voltage may be present. |
| BURN HAZARD | Labels may be on or inside the equipment, for example, a drive or motor, to alert people that surfaces may reach dangerous temperatures. |
| ARC FLASH HAZARD | Labels may be on or inside the equipment, for example, a motor control center, to alert people to potential Arc Flash. Arc Flash will cause severe injury or death. Wear proper Personal Protective Equipment (PPE). Follow ALL Regulatory requirements for safe work practices and for Personal Protective Equipment (PPE). |
# Table of Contents

**Preface**

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>About this manual</td>
<td>7</td>
</tr>
<tr>
<td>Document organization</td>
<td>7</td>
</tr>
<tr>
<td>Legal Notices</td>
<td>7</td>
</tr>
<tr>
<td>Additional resources</td>
<td>7</td>
</tr>
</tbody>
</table>

**Chapter 1** 

**FactoryTalk Batch introduction**

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is FactoryTalk Batch?</td>
<td>14</td>
</tr>
<tr>
<td>Modular Batch Automation</td>
<td>14</td>
</tr>
<tr>
<td>FactoryTalk Batch Equipment Editor example</td>
<td>15</td>
</tr>
<tr>
<td>FactoryTalk Batch Recipe Editor example</td>
<td>16</td>
</tr>
<tr>
<td>Who uses FactoryTalk Batch?</td>
<td>16</td>
</tr>
<tr>
<td>Reference guidelines and standards</td>
<td>17</td>
</tr>
<tr>
<td>FactoryTalk Batch Components</td>
<td>18</td>
</tr>
<tr>
<td>FactoryTalk Batch Server</td>
<td>18</td>
</tr>
<tr>
<td>FactoryTalk Batch Recipe Editor</td>
<td>18</td>
</tr>
<tr>
<td>FactoryTalk Batch Equipment Editor</td>
<td>19</td>
</tr>
<tr>
<td>FactoryTalk Batch View</td>
<td>19</td>
</tr>
<tr>
<td>FactoryTalk Event Archiver</td>
<td>20</td>
</tr>
<tr>
<td>FactoryTalk Batch Network Editor</td>
<td>20</td>
</tr>
<tr>
<td>FactoryTalk eProcedure Client</td>
<td>22</td>
</tr>
<tr>
<td>FactoryTalk eProcedure Server</td>
<td>22</td>
</tr>
<tr>
<td>FactoryTalk Batch Material Manager</td>
<td>22</td>
</tr>
<tr>
<td>FactoryTalk Batch Material Editor</td>
<td>22</td>
</tr>
<tr>
<td>FactoryTalk Batch Material Server</td>
<td>23</td>
</tr>
</tbody>
</table>

**Chapter 2**

**FactoryTalk Batch Server introduction**

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>FactoryTalk Batch Server overview</td>
<td>25</td>
</tr>
<tr>
<td>Sample demonstration setup</td>
<td>26</td>
</tr>
<tr>
<td>Add sample FactoryTalk Security users</td>
<td>26</td>
</tr>
<tr>
<td>Configure sample permissions for FactoryTalk Security users</td>
<td>28</td>
</tr>
<tr>
<td>Configure the sample FactoryTalk Batch Server</td>
<td>30</td>
</tr>
<tr>
<td>Rebuild the recipe directory</td>
<td>32</td>
</tr>
<tr>
<td>Start the FactoryTalk Batch Server service</td>
<td>33</td>
</tr>
<tr>
<td>Batch Service Manager dialog box - Server options</td>
<td>34</td>
</tr>
<tr>
<td>Start the sample FactoryTalk Batch Phase Simulator</td>
<td>34</td>
</tr>
<tr>
<td>Verify PCD communications</td>
<td>35</td>
</tr>
<tr>
<td>Learn about FactoryTalk Batch</td>
<td>36</td>
</tr>
</tbody>
</table>

**Chapter 3**
### FactoryTalk Batch Equipment Editor introduction

- Open the FactoryTalk Batch Equipment Editor with a sample user ....37
- Open a sample area model .................................................................38
- The FactoryTalk Batch Equipment Editor window .........................38
- Navigate within the area model .......................................................39
- Create and configure a phase class ..................................................40
  - View a sample phase class configuration ....................................40
  - Create a sample phase class ........................................................41
- Create and configure phases ............................................................42
  - View a sample phase configuration ..............................................42
  - View a sample FactoryTalk Batch tags ........................................43
  - Create a sample phase .................................................................43
- Create a sample signature template ..................................................44
  - Use signature templates ...............................................................45
  - Use signature templates with recipe approvals .............................46
- Enable recipe version control ..........................................................48
- Enable recipe and area model security ............................................48
- Share equipment ................................................................................49
- Exit the FactoryTalk Batch Equipment Editor ..................................49
- FactoryTalk Batch Equipment Editor summary .................................49

### Chapter 4

- Open the FactoryTalk Batch Recipe Editor ........................................52
- FactoryTalk Batch Recipe Editor window ..........................................52
- Open a recipe ..................................................................................53
- Review the recipe structure ..............................................................54
  - View hidden information ...............................................................54
  - Change the recipe view ................................................................55
  - Move down through SFC levels ....................................................55
  - Move up through SFC levels ........................................................57
- Add steps ........................................................................................57
  - Add a sequential step in the sample operation level .......................57
  - Add a parallel step in the sample operation level ............................58
- Assign step formula values to the sample operation level .................58
- Add recipe comments to the sample operation .................................59
- Remove steps ................................................................................59
- Add a continuous loop to the sample unit procedure .......................60
- Verify the recipe .............................................................................62
- Remove a sequential step from the sample operation .......................62
- Remove a parallel step from the sample operation .............................62
- FactoryTalk Batch Recipe Editor summary .......................................63

### Chapter 5

- FactoryTalk Batch Recipe Editor introduction
### Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FactoryTalk Batch View</strong></td>
<td></td>
</tr>
<tr>
<td>Introduction</td>
<td>65</td>
</tr>
<tr>
<td>Run a sample batch</td>
<td>67</td>
</tr>
<tr>
<td>Examine the batch</td>
<td>69</td>
</tr>
<tr>
<td>Navigate the SFC</td>
<td>70</td>
</tr>
<tr>
<td>Remove the sample batch from the Batch List</td>
<td>72</td>
</tr>
<tr>
<td>Bind a unit manually</td>
<td>72</td>
</tr>
<tr>
<td>Add a comment to a sample batch</td>
<td>74</td>
</tr>
<tr>
<td>Respond to unacknowledged sample prompts</td>
<td>74</td>
</tr>
<tr>
<td>View the sample batch event journal</td>
<td>76</td>
</tr>
<tr>
<td>Control a phase manually</td>
<td>77</td>
</tr>
<tr>
<td>Resolve arbitration issues</td>
<td>79</td>
</tr>
<tr>
<td>Phase Control window</td>
<td>82</td>
</tr>
<tr>
<td>Configure the FactoryTalk Batch View</td>
<td>82</td>
</tr>
<tr>
<td>Exit the FactoryTalk Batch View</td>
<td>83</td>
</tr>
<tr>
<td>FactoryTalk Batch View summary</td>
<td>83</td>
</tr>
<tr>
<td><strong>Chapter 6</strong></td>
<td></td>
</tr>
<tr>
<td>System architecture</td>
<td>86</td>
</tr>
<tr>
<td>Run the FactoryTalk Event Archiver to insert batch record data</td>
<td>87</td>
</tr>
<tr>
<td>FactoryTalk Event Archiver summary</td>
<td>88</td>
</tr>
<tr>
<td><strong>Chapter 7</strong></td>
<td></td>
</tr>
<tr>
<td>FactoryTalk Batch ActiveX Controls</td>
<td>89</td>
</tr>
<tr>
<td>The ControlRecipeList control</td>
<td>90</td>
</tr>
<tr>
<td>ControlRecipeList interface</td>
<td>90</td>
</tr>
<tr>
<td>ControlRecipeList shortcut menu</td>
<td>91</td>
</tr>
<tr>
<td>Open the ControlRecipeList control</td>
<td>91</td>
</tr>
<tr>
<td>The PromptsList control</td>
<td>91</td>
</tr>
<tr>
<td>PromptsList interface</td>
<td>92</td>
</tr>
<tr>
<td>PromptsList shortcut menu</td>
<td>92</td>
</tr>
<tr>
<td>Open the PromptsList control</td>
<td>92</td>
</tr>
<tr>
<td>The SignatureList control</td>
<td>92</td>
</tr>
<tr>
<td>SignatureList interface</td>
<td>93</td>
</tr>
<tr>
<td>SignatureList shortcut menu</td>
<td>93</td>
</tr>
<tr>
<td>Open the SignatureList control</td>
<td>93</td>
</tr>
<tr>
<td>The ProcedureView control</td>
<td>94</td>
</tr>
<tr>
<td>Table view interface</td>
<td>94</td>
</tr>
<tr>
<td>SFC View interface</td>
<td>95</td>
</tr>
<tr>
<td>ProcedureView shortcut menu</td>
<td>95</td>
</tr>
<tr>
<td>Open the ProcedureView control</td>
<td>95</td>
</tr>
<tr>
<td>The TimerView control</td>
<td>96</td>
</tr>
<tr>
<td>TimerView shortcut menu</td>
<td>96</td>
</tr>
</tbody>
</table>
Open the TimerView control ............................................................... 96
FactoryTalk Batch ActiveX controls summary ............................... 97

Chapter 8
PC-based phases ........................................................................ 99
Execution of a PC-based phase example ..................................... 100
PC-based phases summary .......................................................... 102

Appendix A
About this manual

This information was developed to introduce you to the basics of automated batch manufacturing and the FactoryTalk® Batch product components. This manual is one of a set of related manuals that describe installing, programming, and operating the FactoryTalk® Batch system.

To review FactoryTalk Batch release notes and latest information regarding product compatibility refer to the Product Compatibility and Download Center (PCDC).

Document organization

The information in this document is presented in an order that should minimize the effort required to obtain a basic overview of Batch.

The following subjects are presented in this document:

- FactoryTalk Batch Documentation
- Modular Batch Automation
- FactoryTalk Batch Components
- FactoryTalk Batch Server
- FactoryTalk Batch Equipment Editor
- FactoryTalk Batch Recipe Editor
- FactoryTalk Batch View
- FactoryTalk Event Archiver
- ActiveX Controls
- PC-Based Phases
- Glossary of Terms

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- **Components**
  Includes the name of the open source component, its version number, and the type of license.
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- **Licenses**
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Alternatively, you may obtain complete Corresponding Source code by contacting Rockwell Automation via the Contact form on the Rockwell Automation website: [http://www.rockwellautomation.com/global/about-us/contact/contact.page](http://www.rockwellautomation.com/global/about-us/contact/contact.page). Please include “Open Source” as part of the request text.

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**Additional resources**

Following is a comprehensive list of documentation for the FactoryTalk® Batch products from Rockwell Automation.

**Installation, Quick Start, and Getting Results Guides**

<table>
<thead>
<tr>
<th>Resource</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FactoryTalk Batch View Quick Start Guide (FTBVS-OS001)</td>
<td>Provides information about using FactoryTalk Batch View to create, view, and command control recipes, acknowledge prompts and signatures, view equipment phases and diagnostic information, and view profile information.</td>
</tr>
<tr>
<td>Resource</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>FactoryTalk Batch View HMI Controls Quick Start Guide (BATCH-QS001D)</td>
<td>Provides a general overview of FactoryTalk Batch View HMI Controls.</td>
</tr>
<tr>
<td>FactoryTalk Batch Material Manager Getting Results Guide (BWMTR-GR011)</td>
<td>Introduces the basics of FactoryTalk Batch Material Manager.</td>
</tr>
</tbody>
</table>

**User Guides**

<table>
<thead>
<tr>
<th>Resource</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FactoryTalk Batch ActiveX Controls User Guide (BATCH-UM013)</td>
<td>Provides information and instructions for using the FactoryTalk Batch ActiveX Custom Controls.</td>
</tr>
<tr>
<td>FactoryTalk Batch Material Editor User Guide (BWMTR-UM001)</td>
<td>Provides access to information and procedural instructions required to configure materials and the containers to hold them. The material data is stored in the material database, which is used to create material-based recipes. This information is intended as a reference for the formulator.</td>
</tr>
<tr>
<td>FactoryTalk Batch Equipment Editor User Guide (BATCH-UM004)</td>
<td>Provides information on creating and maintaining an equipment database (area model). The area model is stored in a file with a .cfg file extension and is available to all other FactoryTalk Batch programs, including the Recipe Editor, View, and Phase Simulator.</td>
</tr>
<tr>
<td>FactoryTalk Batch PhaseManager™ User Guide (BATCHX-UM001)</td>
<td>Describes the integration of the FactoryTalk Batch software with the Studio 5000 Logix Designer® application and the Logix 5000™ family of controllers. The integration simplifies the configuration and maintenance of the FactoryTalk Batch automation system, provides better communication between the FactoryTalk Batch Server and the Logix 5000 controller, and significantly reduces the programming effort required to develop the phase logic code that resides in your Logix 5000 controller.</td>
</tr>
<tr>
<td>FactoryTalk Batch Recipe Editor User Guide (BATCH-UM006)</td>
<td>Provides instructions on using FactoryTalk Batch Recipe Editor to create and configure master recipes for use in batch automation. The interface is based on IEC 61131-3 sequential function charts to graphically organize recipes into procedures, unit procedures, operations, and phases. Build recipes using either the SFC format or a table-based format.</td>
</tr>
<tr>
<td>FactoryTalk Batch View HMI Controls User Manual (FTBVS-UM003)</td>
<td>Provides details about using FactoryTalk Batch View HMI Controls to monitor and interact with the production process within a FactoryTalk View SE Display Client.</td>
</tr>
<tr>
<td>Resource</td>
<td>Description</td>
</tr>
<tr>
<td>----------</td>
<td>-------------</td>
</tr>
<tr>
<td>FactoryTalk Batch View User Manual (FTBVS-UM002)</td>
<td>Provides information and procedural instructions for using FactoryTalk Batch View in a modern and intuitive portal into a comprehensive batching solution for effective operations, leveraging its own web server using HTML5 technology to provide native connectivity into a FactoryTalk Batch Server.</td>
</tr>
<tr>
<td>FactoryTalk eProcedure Client User Guide (BWEPRO-UM001)</td>
<td>Provides information and procedural instructions required to create and command batches using the FactoryTalk eProcedure Client, and can be used as a reference information by the operator.</td>
</tr>
<tr>
<td>FactoryTalk Event Archiver User Guide (BATCH-UM012)</td>
<td>Provides information and instructions specific to the FactoryTalk Event Archiver. Intended for use by the system administrator and production supervisor.</td>
</tr>
<tr>
<td>FactoryTalk Batch View User Guide (legacy) (FTBVS-UM001)</td>
<td>Provides information and instructions on how to use FactoryTalk Batch View to initiate and execute FactoryTalk Batch automation processing. FactoryTalk Batch View secured objects are located in the FactoryTalk Diagnostics and are modified using the FactoryTalk Administration Console. A system administrator can customize FactoryTalk Batch View security to meet the needs of the facility. FactoryTalk Batch View is used in conjunction with a Human-Machine Interface (HMI).</td>
</tr>
</tbody>
</table>

**Administrator Guides**

<table>
<thead>
<tr>
<th>Resource</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FactoryTalk Batch Administrator Guide (BATCH-UM003)</td>
<td>Provides instructions for configuring security and services, and implementation and use of components not typically accessed or used by batch operators, such as the FactoryTalk Batch Server.</td>
</tr>
<tr>
<td>FactoryTalk Batch eProcedure Administrator Guide (BWEPRO-UM011)</td>
<td>Provides procedures specific to FactoryTalk Batch eProcedure, such as implementing security and configuring the user-defined area Active Server Page. Included are instructions for tasks specific to FactoryTalk Batch, such as configuring security and services to support FactoryTalk Batch eProcedure. Provides instructions on the implementation and use of components not typically accessed or used by batch operators, such as the FactoryTalk Batch Server.</td>
</tr>
<tr>
<td>FactoryTalk Batch Material Manager Administrator Guide (BWEPRO-UM011)</td>
<td>Provides information and instructions specific to FactoryTalk Batch Material Manager. Intended for use by the system administrator and database administrator.</td>
</tr>
</tbody>
</table>

**Reference Guides**

<table>
<thead>
<tr>
<th>Resource</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FactoryTalk Batch ActiveX Controls Library Reference Guide (BATCH-RM001)</td>
<td>Provides reference information and procedural instructions for the FactoryTalk Batch ActiveX Custom Controls.</td>
</tr>
</tbody>
</table>
### Resource Description

<table>
<thead>
<tr>
<th>Resource</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FactoryTalk Batch Material Server API Technical Reference</td>
<td>Provides access to information regarding the interface between the FactoryTalk Batch Material Server and the FactoryTalk Batch Material Editor and FactoryTalk Batch. It is intended to be used as a reference information by those who want to develop custom interfaces.</td>
</tr>
<tr>
<td>FactoryTalk Batch PCD Programming Reference Manual</td>
<td>Provides information and instructions about the FactoryTalk Batch PCD interface design. It is intended to be used as a reference guide.</td>
</tr>
<tr>
<td>FactoryTalk Batch Server API Reference Manual</td>
<td>Provides information regarding the interface between the FactoryTalk Batch Server and FactoryTalk Batch View — the Server Application Programming Interface (API). It is intended to be used as a reference guide by those who want to develop custom interfaces.</td>
</tr>
<tr>
<td>FactoryTalk Batch System Files Reference Manual</td>
<td>Provides the technical information for configuration and maintenance of a FactoryTalk Batch system. It can be used as a reference information for implementation engineers and the system administrator.</td>
</tr>
<tr>
<td>FactoryTalk Batch eProcedure Instruction File Design Reference Manual</td>
<td>Includes information about the building of instruction files for use in equipment database creation and recipe development. This information is intended to be used as a reference by the instruction file author.</td>
</tr>
</tbody>
</table>

View or download publications at [http://www.rockwellautomation.com/literature](http://www.rockwellautomation.com/literature). To order paper copies of technical documentation, contact your local Allen-Bradley® distributor or sales representative.
Chapter 1

FactoryTalk Batch introduction

As part of the FactoryTalk family, the FactoryTalk Batch components increase overall plant efficiency by delivering the visibility, control, and reporting you need to optimize manufacturing. With coordinated execution, you can reduce scrap and rework and improve product quality and consistency. Through real-time management of equipment utilization, you can maximize your return on assets. By implementing optimized recipes and procedures, you can increase your plant capacity. By using electronic, paperless operations, you can improve your productivity. You also reduce compliance costs by using electronic batch record implementation, paperless manufacturing, and quality sign-offs. By lifting the compliance burden from manufacturing, you reduce inventory levels and cycle times, which greatly improves customer service.

The FactoryTalk Batch components help you optimize plant floor operations, giving you quick return on your net assets. New product definitions are deployed quickly into manufacturing. Production order information is accurate. Business and plant-level control systems are tightly coordinated and multiple sites operate as a team. FactoryTalk Batch components are an open, configurable set of products that help you define, manage, monitor, and control manufacturing at local, remote, or contractor plants. You can deploy any of the FactoryTalk Batch components wherever you need them, one at a time or all at once, to improve productivity and plant control. The FactoryTalk Batch components include:

- FactoryTalk Batch Server
- FactoryTalk Batch Recipe Editor
- FactoryTalk Batch Equipment Editor
- FactoryTalk Batch View
- FactoryTalk Batch View HMI Controls
- FactoryTalk Event Archiver
- FactoryTalk Batch Network Editor
- FactoryTalk Batch Enterprise Integration Server
- eProcedure Server and Client components
- FactoryTalk Batch Material Manager
What is FactoryTalk Batch?

To see the true value of a FactoryTalk Batch solution, become familiar with Modular Batch Automation and how it relates to the ISA S88.01 International Batch Control Standard. The next section is a brief overview of modular batch automation.

Modular Batch Automation

In the late 1980s, the Instrument Society of America (ISA) started the SP88 committee to establish a set of standards for batch control. One of the most important terms that has been associated with this standard is Modular Batch Automation (MBA). Using the modular approach, a batch process is defined by a sequence of small modules rather than by a large, cumbersome, monolithic program. The initial step in implementing MBA is to separate the batch process into two models: Equipment and Procedural. This separation provides for a more efficient means of developing and modifying an automated batch process. Modularizing your equipment and procedures allows you to create re-usable components.

This diagram shows the relationship between the S88.01 models and the FactoryTalk Batch Editors. The FactoryTalk Batch Equipment Editor and FactoryTalk Batch Recipe Editor are tied together at the Phase level.
As an example, you create a reactor unit in the FactoryTalk Batch Equipment Editor. The reactor unit, which is displayed here, contains six phases that are used to perform individual actions (adding various ingredients, mixing-heating-transferring the contents of the reactor, etc.). Once the unit and its associated phases are defined in the FactoryTalk Batch Equipment Editor, you are ready to use the FactoryTalk Batch Recipe Editor to create operations for this reactor to execute.
To continue the example in the FactoryTalk Batch Recipe Editor, you create two operations, Reaction_1 and Clean_In_Place, which are shown below. The Reaction_1 operation transfers Material A into the reactor, agitates the contents for 15 minutes at 5 RPM, and then dumps the contents into Storage Unit A. The Clean_in_Place operation transfers water into the reactor, agitates the contents for 60 minutes at 7 RPM, and then dumps the contents as Waste Water.

Both operations use the same phases but in a different way. You control how the phase operates through the use of parameters, such as speed and time as shown in the AGITATE:1 phase.

For more information regarding how FactoryTalk Batch applies the ISA S88.01 concepts, contact your Rockwell Sales Representative. For a copy of the S88.01 document, write to: ISA, 67 Alexander Drive, P.O. Box 12277, Research Triangle Park, NC 27709

**Who uses FactoryTalk Batch?**

FactoryTalk Batch organizes information for a number of different occupational roles:

- **Process Engineer**: Uses the FactoryTalk Batch Equipment Editor to create an area model that captures all capabilities of the specific plant.
- **Control Systems Engineer**: Understands the specific control system being used and links the control system with FactoryTalk Batch.
- **Formulator**: Uses the FactoryTalk Batch Recipe Editor to create master recipes that run against the area model of the plant.
Separation of the Equipment and Procedural models allows for greater protection of a company’s intellectual property. When implementing a project with FactoryTalk Batch, engineers responsible for configuring the equipment in the plant don’t need access to the recipes. They are only responsible for designing equipment-specific phases (optimizing the physical capabilities of the plant). The recipes remain in the hands of the formulators (usually company employees).

- **Operator**: Uses the FactoryTalk Batch View and/or ActiveX controls to schedule, start, and stop batches. Also uses a third-party human machine interface (HMI) software package to view the physical plant (pumps, valves, etc.). Can also review past batches and make parameter adjustments online.
  - The facility operator is the user of the designated equipment.
  - The operator is the recipient of requests for parameter data deferred to the operator.
  - The operator is the default owner of a resource if the facility operator is manually arbitrating between resources.

- **MIS Administrator**: Interacts with the uploaded event journals to create batch reports and monitor material usage. The FactoryTalk Event Archiver can upload batch data to a Microsoft SQL database.

**Reference guidelines and standards**

The following is a list of reference documents that may be consulted for more complete information.

- **NAMUR Guidelines "Normen Arbeitsgemeinschaft für Mess- und Regeltechnik in der Chemischen Industrie"**
  Standard that defines the terminology used to describe modular batch automation's component parts.

- **IEC 61131-3 "Programmable Controllers, Programming Languages"**
  Standard that describes sequential function charts.

- **ISA's S88.01 "Batch Control, Models and Terminology"**
  Standard which describes the standard terminology used to describe modular batch automation's component parts.

- **ISA’s ANSI/ISA–95.00.01–2000 "Enterprise-Control System Integration Part 1: Models and Terminology"**
  Standard that describes the relevant functions in the enterprise and the control domain and which objects are normally exchanged between these domains.

- **ISA’s ANSI/ISA–95.00.02–2001 "Enterprise-Control System Integration Part 2: Object Model Attributes"**
  Standard that defines the details of the interface content between manufacturing control functions and other enterprise functions.
FactoryTalk Batch comes with several components that interact with each other to design, create, configure and run batch recipes.

**FactoryTalk Batch Server**

The FactoryTalk Batch Server is the engine that runs FactoryTalk Batch. It is the component that controls system information, phases and recipes. The server allows integration with process-connected devices (PCDs) and third-party software packages. Prior to opening FactoryTalk Batch View, the FactoryTalk Batch Server must be running and remain active during all batch functions.

The FactoryTalk Batch Server operates as a Windows service, which means that the FactoryTalk Batch Server can be configured to start automatically and that control of the FactoryTalk Batch Server can be given to the Windows Service Manager. Because the FactoryTalk Batch Server runs as a service, it does not require an operator to log on to run. Therefore, logging on or off Windows during operation does not disrupt the performance of the FactoryTalk Batch Server.

**FactoryTalk Batch Recipe Editor**

The FactoryTalk Batch Recipe Editor is used to graphically create and configure recipes.

- The interface is based on IEC 61131-3 sequential function charts (SFC) that graphically organizes recipes into procedures, unit procedures, operations and phases along with any applicable comments.
- In addition to the SFC view, the FactoryTalk Batch Recipe Editor offers a table view. Table-based recipes provide a mechanism for creating simple recipes that do not require a complex recipe structure or elaborate transition expressions. Additionally, you can view table-based recipes and edit all recipe parameters without having to navigate between steps.
- The FactoryTalk Batch Recipe Editor allows you to specify sequences of phases. The actual phase logic must be configured in the process-connected device (PCD) while the interface to the PCD must be configured in the FactoryTalk Batch Equipment Editor.
- Recipe reports can be generated in SFC and/or descriptive format.
- If Recipe Approvals are enabled in the underlying area model, approval signoffs are executed in the FactoryTalk Batch Recipe Editor.
- When Recipe Version Control is enabled, a version of a recipe (a read-only, numbered snapshot of a recipe) can be saved and protected from further editing. New work-in-progress (WIP) copies of a version allow the recipe author to continue to make changes and updates to a recipe. When a versioned recipe no longer matches the underlying area...
model, or references a deleted or non-existent sub-recipe, it is marked as obsolete.

**FactoryTalk Batch Equipment Editor**

The FactoryTalk Batch Equipment Editor is a graphical interface through which a database of process equipment is defined and maintained (an area model).

- Components defined in the FactoryTalk Batch Equipment Editor are used to interface with process-connected devices (PCDs) in the facility. During recipe configuration, the area model provides a list of available units and phase classes.
- Configure phases and commands to trigger an electronic signature request when a report or recipe parameter is out of range (parameter deviation), or when specific commands are executed on a batch (such as Abort Batch or Active Step Change).
- During recipe verification, the area model confirms that the designated equipment is capable of executing the procedures.
- During recipe execution, resource arbitration functions use the area model to allocate equipment based on recipe and operator requests.
- The area model is available to all other FactoryTalk Batch applications.

In addition to the area model, the FactoryTalk Batch Equipment Editor allows configuration of the following:

- Communication functions
- Electronic signatures
- Enumeration sets
- Data servers
- Recipe approvals
- Recipe version control
- FactoryTalk Event Archiver functions

**FactoryTalk Batch View**

This topic describes FactoryTalk Batch View on a Windows desktop system.

Tip: The modern FactoryTalk Batch View is an innovative and intuitive user interface for your comprehensive batch solution. It leverages state-of-the-art web technologies with scalable graphics for consistent visualization across all devices and form factors. The zero-install browser simplifies administration and maintenance. As the only native client application that supports the new features in FactoryTalk Batch and eProcedure, it is the client of the future for modern batch solutions.

For more information about the new FactoryTalk Batch View mobile solution, view the *FactoryTalk Batch View User Manual (FTBVS-UM002)*.

FactoryTalk Batch View is the batch recipe initiation and execution program used by the operator of the FactoryTalk Batch Automation Solution system to:
Chapter 1  FactoryTalk Batch introduction

- Initiate and control the batch process
- Display a graphical representation of a running batch and its associated data

Typically, FactoryTalk Batch View is intended to be used in conjunction with an HMI.

Each FactoryTalk Batch View window can be customized to suit the needs of a specific station:
- Specify the columns to display
- Specify the size of columns and rows
- Sort and filter on one field in certain windows
- Set the font for each FactoryTalk Batch View window

If the security is enabled for FactoryTalk Batch View, a system administrator can use the password protection option to:
- Limit the information that is displayed
- Specify the commands that are allowed at a particular station

Using FactoryTalk Batch View, an operator can respond to electronic signature requests that have been generated by report and recipe parameter deviations or by a command execute request.

**FactoryTalk Event Archiver**

The FactoryTalk Event Archiver’s purpose is to translate the FactoryTalk Batch tab-delimited ASCII electronic batch record files to a user-specified file type. These electronic batch record files are maintained separately for each batch created and viewed with a word processor or spreadsheet. Many plants have standardized on one of the many commercially available Relational Database Management System (RDBMS) software packages. We recommend using a high-performance database, such as SQL Server, due to their better robustness and performance. The Archiver collects data from each electronic batch record file and stores it in the specified RDBMS database format.

**FactoryTalk Batch Network Editor**

The FactoryTalk Batch Network Editor is a utility that indicates where other FactoryTalk Batch and FactoryTalk Batch Material servers are located on the network. This network configuration allows for ease of integration with other FactoryTalk Batch components and simplifies the process of reconfiguring a multi-computer system. If FactoryTalk Batch Material Manager is also installed the FactoryTalk Batch Network Editor is also used to indicate the location of the material database.
Chapter 1  FactoryTalk Batch introduction

**FactoryTalk eProcedure Client**

The FactoryTalk eProcedure Client computer uses Internet Explorer to enable operators to run batch recipes.

**FactoryTalk eProcedure Server**

The FactoryTalk eProcedure Server provides the services to the FactoryTalk Batch Server to enable the use of HTML instruction files. Prior to opening FactoryTalk eProcedure Client, FactoryTalk eProcedure Server must be running and remain active during all batch functions.

**FactoryTalk Batch Material Manager**

FactoryTalk Batch Material Manager is used to track material consumption in batch recipes. It consists of two components: Material Server and Material Editor.

The Material Editor provides an interface to help you create the material database, which consists of material, lot, sublot, container, and storage location data. The Material Server provides the communication between the material database and the FactoryTalk Batch Server. During a batch run, information about available containers is presented to the operator for binding decisions. Binding is the process of mapping steps within a control recipe to actual equipment in a plant. After a batch is run, quantities consumed or distributed are updated in the material database for use in inventory tracking.

The Material Server consists of a group of components that work together to service various applications. The primary applications that the Material Server services are the Material Editor, FactoryTalk Batch Server, FactoryTalk Batch Recipe Editor, and FactoryTalk Batch Equipment Editor. Any third-party application can also use custom solutions based on the exposed Material Object Model (MOM).

**FactoryTalk Batch Material Editor**

The Material Editor provides an interface to help you create the material database, which consists of material, lot, sublot, container, and storage location data. The Material Server provides the communication between the material database and the FactoryTalk Batch Server. During a batch run, information about available containers is presented to the operator for binding decisions. Binding is the process of mapping steps within a control recipe to actual equipment in a plant. After a batch is run, quantities consumed or distributed are updated in the material database for use in inventory tracking.
FactoryTalk Batch Material Server

The Material Server consists of a group of components that work together to service various applications. The primary applications that the Material Server services are the Material Editor, FactoryTalk Batch Server, FactoryTalk Batch Recipe Editor, FactoryTalk Batch Equipment Editor, and the Storage Container ActiveX control. Any third-party application can also use custom solutions based on the exposed Material Object Model (MOM).
Chapter 2

FactoryTalk Batch Server introduction

For ease of understanding, and for tutorial purposes, this guide refers to configuring and using the sample files that are installed with FactoryTalk Batch. The SampleDemo folders contain complete area models and recipes for a simulated plant. Before running the demonstrations, you must add a FactoryTalk Security user, configure the FactoryTalk Batch Server to recognize the required project directories, select the initialization path and file name, and then start the FactoryTalk Batch Server and the FactoryTalk Batch Phase Simulator.

Tip: This guide outlines the configuration and use of the SampleDemo1 demonstration files. Because these files are used as an example throughout the guide, it is recommended that you follow the directions for using this demonstration step by step.

FactoryTalk Batch Server overview

The FactoryTalk Batch Server is the engine that runs FactoryTalk Batch. It is this component that allows integration with the process-connected devices (PCDs) and third-party software packages.

The FactoryTalk Batch Server operates as a Windows Service, which means you can configure the Server to start automatically and give control of the Server service to the Windows Service Manager. Because the FactoryTalk Batch Server runs as a service, logging on or off Windows during operation does not disrupt the operation of the Server.

Using the FactoryTalk Batch Service Manager, you can control the FactoryTalk Batch Server manually, select the boot method for the Server, and configure the Server to run in Demo mode. Use the FactoryTalk Batch Equipment Editor to configure the FactoryTalk Batch Server.

The FactoryTalk Batch Server coordinates the following functions:

- **Creating a Batch**: Transforms the configured recipe into an executable working recipe.
- **Executing a Recipe**: Communicates with the process-connected devices to execute phases.
- **Arbitrating Equipment**: Allocates resources based on recipe and operator requirements.
- **Collecting Data**: Gathers and stores production information for reporting and archiving.
• **Performing Client Communications:** Transfers data between the process-connected devices (PCDs), operator displays, Human Machine Interfaces (HMIs), databases, and various other software packages.

See the *FactoryTalk Batch Equipment Editor User Guide* and the *FactoryTalk Batch Administrator Guide* for more detailed information about the FactoryTalk Batch Server.

### Sample demonstration setup

The installation process placed the *SampleDemo1* and *SampleDemo2* folders in the **BATCHCTL** share on your hard drive. Within each of these *SampleDemo* folders are four subfolders that contain the files for the area model. To run the sample demonstrations, add a FactoryTalk Security user, configure the FactoryTalk Batch Server to locate the area model, and then verify the recipes in the area model.

### Add sample FactoryTalk Security users

For the sample demonstrations file, create FactoryTalk user accounts for an operator and an engineer. Create these user accounts in the FactoryTalk Directory.

**To add sample FactoryTalk Security users:**

1. Select **Start > Rockwell Software > FactoryTalk Administration Console**. The **Select FactoryTalk Directory** dialog box opens.

   **IMPORTANT** Administrator privileges are required to perform this procedure.

2. Select **Network** to add this user account to the FactoryTalk Network Directory, and select **OK**.

3. If not already logged on to the FactoryTalk Network Directory, the **Log On to FactoryTalk** dialog box opens. In **User name**, type the user name **Sample demonstration setup**.
for the Administrator that was configured when the FactoryTalk Services Platform was installed.

4. In **Password**, type the password for the Administrator.
5. Verify the **Directory** and select **OK**. The **FactoryTalk Administration Console** window opens and displays the specified FactoryTalk Directory.
6. Expand **Users and Groups**.
7. Right-click the **Users** folder, and select **New > User** to create a new FactoryTalk Security user account in FactoryTalk Directory.

8. The **New User** dialog box opens and displays the **General** tab. In the **User name** box, type **OPER**.
9. In **Full name**, type **Operator**.
10. In **Password**, type **password**, and confirm it by re-entering **password** in the **Confirm Password** box.
11. Select **Create**.
12. Repeat steps 7-11, but this time in the **User Name** field, enter **ENG** and in the **Full Name** field, enter **Engineer**.
13. Keep the FactoryTalk Administration Console open to configure permissions for these FactoryTalk Security users in the next exercise.

**Configure sample permissions for FactoryTalk Security users**

After creating the FactoryTalk security users, set up access modes for each FactoryTalk Batch component to specify which users are permitted to view or perform actions. Configure security settings in the FactoryTalk Administration Console. To tighten security in the eProcedure Client, remove the **All Users** group from the **Full Edit** policy setting.

**To configure sample permissions for FactoryTalk Security users:**

1. In the FactoryTalk Administration Console Explorer pane, navigate to **System > Policies > Product Policies > Batch > Equipment Editor > Access Modes**.
2. Right-click **Access Modes**, and then select **Properties**. The **Access Modes Properties** dialog box opens.
3. In the **Full Edit** row, select the **Configure Security** browse button. The **Configure Securable Action** dialog box opens.

4. Select **Add**. The **Select User and Computer** dialog box opens.

5. In the **Filter Users** box, select **Show All**.

6. In **Users**, select ENG.

![Select User and Computer dialog box]

7. Select **OK**. The **Configure Securable Action** dialog box is updated, showing ENG in the list of **Users** with the **Allow** checkbox selected.

![Configure Securable Action dialog box]

8. Select **OK** to close the **Configure Securable Action** dialog box.

9. In the **Access Modes Properties** dialog box, select **View Only**.

10. In the **View Only** row, select the **Configure Security** browse button. The **Configure Securable Action** dialog box opens.

![Configure Securable Action dialog box]
11. Select **Add**. The **Select User and Computer** dialog box opens.
12. In the **Filter Users** box, select **Show All**.
13. In **Users**, select **OPER**.
14. Select **OK**. The **Configure Securable Action** dialog box is updated, showing OPER in the list of **Users** with the **Allow** checkbox selected.
15. Select **OK** to close the **Configure Securable Action** dialog box.
16. Select **OK** to close the **Access Modes Properties** dialog box.

See the *FactoryTalk Batch Administrator Guide* for more information on security.

### Configure the sample FactoryTalk Batch Server

To set up the sample demonstrations, configure the FactoryTalk Batch Server to locate the folders that contain the demonstration files and to the `\Restart` and `bin` folders where the FactoryTalk Batch Server writes data upon system failure. Configure the FactoryTalk Batch Server in the FactoryTalk Batch Equipment Editor.

**To configure the sample FactoryTalk Batch Server:**

1. Select **Start > Rockwell Software > Equipment Editor**. The FactoryTalk Batch Equipment Editor opens (log on to FactoryTalk if prompted).

   **IMPORTANT** Administrator privileges are required to perform this procedure.

2. Select **Options > Server Options**. The **Server Options** dialog box opens to the **Project Settings** tab.

3. In the **Project Directories** area, select the **Primary Journal** browse button. The **Select Directory** dialog box opens.
4. From the **Look in** list, select the `\SampleDemo1\Journals` folder, and then select **Open**.
5. Select the **Error Logging** browse button. The **Select Directory** dialog box opens.
6. From the **Look in** list, select the **SampleDemo1\Logs** folder, and then select **Open**.

7. Click the **Instructions** browse button. The **Select Directory** dialog box opens.

    **IMPORTANT** In order for the eProcedure Server to start, you must define the instruction path and an instruction file for each instruction-based phase in the area model. (See the FactoryTalk Batch Equipment Editor User Guide for instructions on defining instruction-based phases.)

8. Select the **Equipment Database** browse button. The **Select Equipment Database** dialog box opens.

9. From the **Look in** list, open the **SampleDemo1\Recipes** folder, select the **ice_cream1.cfg** file, and then select **Open**.

10. In the **Store Recipes Using** area, select **Binary Files**, and then select the **Recipe Directory** browse button. The **Select Directory** dialog box opens.

11. From the **Look in** list, select the **SampleDemo1\Recipes** folder, and then select **Open**.

12. Select the **Restart Control** tab.

13. Select the **Primary Path** browse button. The **Select Directory** dialog box opens.

14. From the **Look in** list, select the **SampleDemo1\Restart** folder, and then select **Open**.

15. Select the **Secondary Path** browse button. The **Select Directory** dialog box opens.

16. From the **Look in** list, select the **Bin** folder.
17. Select the **Batch Reporting** tab. Leave **Never (No Queue)** as the default reporting application.

18. Select **OK** to close the **Server Options** dialog box.

19. Select **File > Exit** to exit the FactoryTalk Batch Equipment Editor.

   Tip: These steps set up the FactoryTalk Batch Server to run the tutorial steps in this manual. There are many other settings to consider when setting up the FactoryTalk Batch system. (See the **FactoryTalk Batch Administrator Guide** for more information on the **Server Options** dialog box.)

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**Rebuild the recipe directory**

To run the demonstration recipes, you must rebuild the recipe directory and verify the recipes in the area model using the FactoryTalk Batch Recipe Editor.

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**IMPORTANT**  Administrator privileges are required to perform this procedure.

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**To rebuild the recipe directory:**

1. Select **Start > Rockwell Software > Recipe Editor**. The FactoryTalk Batch Recipe Editor reads the area model.

   Tip: If you are logged in with an account that does not have administrator privileges, right-click **Recipe Editor** and select **More > Run as administrator** to run under elevated privileges.

2. If prompted, log on to FactoryTalk. If a message displays asking you to verify the recipes, select **Cancel**.

3. Select **File > Rebuild Recipe Directory**. When the rebuild is complete, select **OK**, and then select **Yes** to verify the recipes.

4. When the recipe verification is complete, select **Accept** to save the recipes, and then select **Close**.

5. Select **File > Exit** to exit the FactoryTalk Batch Recipe Editor.
Chapter 2  FactoryTalk Batch Server introduction

The FactoryTalk Batch Service Manager communicates with the Windows Services of the selected computer to determine available services. There may be a noticeable delay as communications are established, marked by the cursor displayed as an hourglass. If the FactoryTalk Batch Service Manager cannot communicate with the selected computer’s Windows Services, a message box is displayed stating that the FactoryTalk Batch Service Manager failed to connect to the specified computer.

The FactoryTalk Batch Phase Simulator must be running to test FactoryTalk Batch in a demo environment. For more information, see The FactoryTalk Batch Phase Simulator in the FactoryTalk Batch Administrator Guide.

IMPORTANT The FactoryTalk Batch Server cannot start if Security Authority is enabled and there is a mismatch between the Security Authority Identifiers (SAIs) in the area model and the FactoryTalk Network Directory. For information on your recovery options, see Troubleshooting in the FactoryTalk Batch Equipment Editor User Guide.

To start the FactoryTalk Batch Server service:

2. Select Select Computer. The Select Computer dialog box opens.
   IMPORTANT Administrator privileges are required to perform this procedure.
3. In the Enter the object name to select area, enter the name of the computer where the FactoryTalk Batch Server is installed (or select the Advanced button to search for a computer).
4. Select OK to close the Select Computer dialog box.
5. From the Service list, select FactoryTalk Batch Server.
6. (optional) Select Allow Demo Mode if you want to run FactoryTalk Batch in demo mode. If you run FactoryTalk Batch in the demo mode, be aware that the Server stops after two hours of operation.
7. Select the method to use for restarting the server after a service halt.
   • Cold Boot: Restarts the server in a cold state. All journal data or recipe content is erased upon startup. If Security Authority is enabled, SAIs in a secured area model and any secured recipes must match the current Network FactoryTalk Directory SAI.
   • Warm Boot: Restarts the server, restoring the set of batches that were on the batch list when the server previously terminated. No validation for Security Authority is performed.
   • Warm All Boot: Restarts the server only if it is able to restore all of the batches to the batch list. No validation for Security Authority is performed.
8. Select the Start/Continue button to start the service. Wait for the status to change to RUNNING and the light is green.
9. Select the **Server Details** button. The **FactoryTalk Batch Server Details** dialog box opens.

10. Select the **PCD Communications** tab. The **Data Server Status** box displays the status of the conversation. Make sure that conversation is **GOOD**.

11. Select **Start**. The tag verification process begins. When tag verification is **COMPLETED**, select **OK**, or select **Stop** to end the verification process and then select **OK**.

   **Tip:** If the number of COM servers exceeds the viewable area within the **Data Server Status** box, a scroll bar displays, enabling you to scroll through the list.

12. Select **Close**. The **Batch Service Manager** dialog box closes.

   **Tip:** If software component conversation becomes **LOST** while running in Demo mode, make sure that the simulator is running and try starting the server(s) again. For more information, see **Start the FactoryTalk Batch phase simulator**.

### Batch Service Manager
dialog box - Server options

The following methods are available for restarting the FactoryTalk Batch Server after a service halt:

- **Cold Boot**
  Restarts the FactoryTalk Batch Server in a cold state. All journal data or recipe content is erased upon startup. If Security Authority is enabled, SAI IDs in a secured area model and any secured recipes must match the current Network FactoryTalk Directory SAI.

- **Warm Boot**
  Restarts the FactoryTalk Batch Server, restoring the set of batches that were on the batch list when the FactoryTalk Batch Server previously terminated. No validation for Security Authority is performed.

- **Warm All Boot**
  Restarts the FactoryTalk Batch Server only if it is able to restore all of the batches to the batch list. No validation for Security Authority is performed.

### Start the sample
FactoryTalk Batch Phase Simulator

FactoryTalk Batch comes with a phase logic simulation program, referred to as the FactoryTalk Batch Phase Simulator used to simulate the batch process without connecting to a PCD. The Phase Simulator imitates the functionality of a data server and can communicate with the FactoryTalk Batch Server using OPC communication protocol. The Phase Simulator is a powerful tool for testing, experimentation and demonstration purposes. In this guide, run the sample demonstration using the Phase Simulator.

   **Tip:** If the Phase Simulator is required and OPC protocol is used for communications, the FactoryTalk Batch Server automatically starts the Phase Simulator. Check the Windows taskbar to see if the Phase Simulator is started.

To run the sample demonstration correctly, open the **ice_cream1.sim** file in the Phase Simulator.
Chapter 2  FactoryTalk Batch Server introduction

To start the sample FactoryTalk Batch Phase Simulator:

1. If the Phase Simulator is already running, maximize it from the Windows taskbar. If the Phase Simulator is not running, select Start > Rockwell Software > Simulator. The FactoryTalk Batch Phase Simulator opens.

   IMPORTANT  Administrator privileges are required to perform this procedure.

2. Select File > Open. The Open Simulator Configuration File dialog box opens.

3. From the Look in list, open the Program Files > Rockwell Software > Batch > SampleDemo1 > Recipes folder. Select the ice_cream1.sim file, and then select Open.


Verify PCD communications

Use the following instructions to verify PCD communications.

   IMPORTANT  Administrator privileges are required to perform this procedure.

To verify PCD communications:


2. Make sure FactoryTalk Batch Server is selected in the Service box.


4. Select the PCD Communications tab. The Data Server Status area displays the status of the conversation with the OPC_SIM data server (Phase Simulator), which should be PHASES GOOD.

5. In the Tag Verify area, select Start to begin the verify process. The tag verification process takes several minutes.

6. When the Status box shows COMPLETED, select OK to close the FactoryTalk Batch Server Details dialog box.
The rest of this document is designed to give you a tour through the FactoryTalk Batch components using the sample demo. Proceed through the next chapters to learn about:

- FactoryTalk Batch Equipment Editor
- FactoryTalk Batch Recipe Editor
- FactoryTalk Batch View
- FactoryTalk Event Archiver
- FactoryTalk Batch ActiveX Controls
- PC-Based Phases

Learn about FactoryTalk Batch
FactoryTalk Batch Equipment Editor introduction

The FactoryTalk Batch Equipment Editor is the component to configure the equipment and associated functions to produce your facility’s area model. The components defined in the FactoryTalk Batch Equipment Editor interface with the process-connected devices (PCDs) in the facility.

As outlined in the ISA S88.01 Batch Control Standard, the area model of a plant is separated into the following physical components:

- Process Cell
- Unit
- Phase
- Control Module

To build the area model, configure each of these components. In addition to the area model, the FactoryTalk Batch Equipment Editor allows specification of communication functions, enumeration sets, data servers, FactoryTalk Event Archiver functions, and configuration of FactoryTalk Batch Server options.

In this section, open a sample file to examine a configured area model for an ice cream plant.

Open the FactoryTalk Batch Equipment Editor with a sample user

Use the following instructions to open the FactoryTalk Batch Equipment Editor with the sample user, ENG.

To open the FactoryTalk Batch Equipment Editor with a sample user:

1. Select Start > Rockwell Software > Equipment Editor. A blank FactoryTalk Batch Equipment Editor window opens. The Equipment Editor Login dialog box also opens if FactoryTalk Security is configured.
2. In the User Name field, enter ENG. (This is the FactoryTalk Security user with Full Edit permissions you created in the FactoryTalk Batch Server introduction section.)
3. In the Password field, enter password and select OK. (This is the password you created for the ENG user in the FactoryTalk Batch Server introduction section.)

Open a sample area model

The definition for an area model is contained in a configuration file (.cfg) that you build using the FactoryTalk Batch Equipment Editor. In this exercise, you will look at a configuration file, ice_cream.cfg, which was installed with FactoryTalk Batch.

To open a sample area model:

1. From the File menu, select Open, or select the Open toolbar button. The Open dialog box opens.
2. Select ice_cream.cfg, and then select Open to open the file. The Classes View area displays the icon that represents the PARLOR process cell class, which is used to create the process cells shown in the Design View area. The WEST_PARLOR process cell displays in the Design View area.

The FactoryTalk Batch Equipment Editor window

The FactoryTalk Batch Equipment Editor window is divided into two main areas: Classes View and Design View.

- The Classes View displays the existing cell classes, unit classes, phase classes, or operation sequence classes in the active area model. The column heading reflects the active level. Double-click or right-click an icon to open the Edit dialog box for the item.
- The Design View is used to construct the area model and display the layout of the active level. In the select mode, double-click an item to display the layout of the next lower level. Right-click the item to open the Edit dialog box.

The FactoryTalk Batch Equipment Editor also has a menu bar and toolbar. Take a moment to examine the menus and the tooltips for each toolbar icon. (See the FactoryTalk Batch Equipment Editor User Guide for more information on the menus and toolbar icons.)
Navigate within the area model

To navigate within the area model, use the Go Down and Go Up toolbar buttons. Double-clicking an icon in the Design View takes you down through the area model.

To navigate within the area model:

1. Double-click the WEST_PARLOR icon in the Design View. The Design View displays the units that make up the selected process cell. The Classes View displays all the unit classes defined in the area model that you can add to the process cell structure.

2. Double-click the WP_MIXER1 unit icon in the Design View. The Design View displays the phases that make up the selected unit. The Classes View area displays all the phase classes defined in the area model that you can add to the unit structure.

The Location Bar displays the unit and process cell in which you are working, which currently is the WP_MIXER1 unit within the
Chapter 3  FactoryTalk Batch Equipment Editor introduction

WEST_PARLOR process cell. If the Location Bar is not displayed in your window, select Location Bar from the View menu.

Create and configure a phase class

A phase class is a reusable process-oriented function, such as Heat, Mix, or Add. A phase instance occurs when a phase class is added to the Design View.

A phase class describes what is to occur in the recipe, but not how to do it. When a phase class is added to the Design View, the resultant phase serves as a link to the engineered logic in the phase logic that contains the instructions for how to do it.

Tip: Control modules (the logic for pumps, valves, etc.) are configured in the process-connected device (PCD).

View a sample phase class configuration

Use the following instructions to view the sample phase class configuration.

To view a sample phase class configuration:

1. Right-click the ADD_SUGAR phase class icon in the Classes View. The Edit Phase Class dialog box opens to the General tab.
2. Select each tab and examine the settings that were defined for the ADD_SUGAR phase class.

- The General tab configures the general attributes of the phase class, such as the phase class name, phase class type, the number of phase class message partners, and the number of tags associated with the phase class. Select an icon to graphically represent all phases based on the phase class throughout the area model. Additionally, enable or disable the use of control strategies and material-based recipes for the phase class.

  Tip: The use of material-based recipes requires the installation of FactoryTalk Batch Material Manager.

- The Parameters tab contains a list of parameters associated with the phase class. Create, edit and delete phase class parameters, as well as configure verification methods for parameter values. The parameters allow FactoryTalk Batch to send data to a PCD.

- The Reports tab contains a list of report parameters associated with the phase class. Additionally, add new reports, edit, and delete reports from the list, as well as configure verification methods for report values. The report parameters allow the PCD to send data to FactoryTalk Batch.
• The **Messages** tab contains a list of messages associated with the phase class. Phase class messages are typically used for journal entry purposes and for troubleshooting phase logic problems. In some instances, the message may be displayed to the operator. A phase class message has two pieces of data associated with it: name and message ID.

• The **Control Strategies** tab, which is only available if **Control Strategies** is enabled on the **General** tab, is used to add, edit, or delete control strategies.

3. Select **Cancel** to close the dialog box.

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**Create a sample phase class**

Phase classes are created and configured using the Create Phase Class dialog box.

**To create a sample phase class:**

1. From the **Class** menu, select New Phase Class. The Create Phase Class dialog box opens to the **General** tab.
2. In the **Name** box, type **ADD_WATER**.
3. In the **Icon** list, select an icon to represent the ADD_WATER phase class.
4. Select **Parameter/Tag Locking**, if necessary. Select **Apply**.
5. Select the **Parameters** tab, and then select the **Add Parameter** button. A new parameter is added to the list.
   a. In the **Name** box, type **ADD_AMOUNT**.
   b. In the **Default** box, type **50**.
   c. In the **Enum/E.U.** box, type **KG**.
   d. Select **Apply**.
6. Select the **Reports** tab, and then select the **Add Report** button. A new report parameter is added to the list.
   a. In the **Name** box, type **AMOUNT_ADDED**.
   b. In the **Enum/E.U.** box, type **KG**.
   c. Select **Apply**.
7. Select **OK**. The new phase class displays in **Classes** at the bottom of the list.
Create and configure phases

When a phase class is added to a unit it becomes a phase. Only one instance of a specific phase class to each unit, with the exception of material-enabled phase classes. When a phase is required in multiple units, share it between the units or add another instance of a phase class with a different name.

There are many options for configuring phases. As a minimum, modify each tag in the phase to indicate the tag’s addressable location in the process-connected device (PCD).

When using material-enabled phase classes, you can have multiple phases based on the same phase class within a single unit. For each phase, define the material containers with which the phase is associated. Phases mapping to the same phase class have independent resource IDs.

View a sample phase configuration

Use the following instructions to view a sample phase configuration.

To view a sample phase configuration:

1. Right-click the WP_ADD_CREAM_M1 icon in the Design View. The Edit Phase dialog box opens to the General tab.
2. Select each tab and examine the settings defined for the WP_ADD_CREAM_M1 phase.
   - The General tab allows you to configure general attributes of the phase, such as the name, equipment ID, and automatic upload/download.
   - The Arbitration tab displays a list of the equipment for which ownership is required by this phase in order to begin execution.
   - The Cross Invocation tab configures the cross invocation strings, which indicate the addition of an item to the FactoryTalk Batch View and ActiveX controls’ shortcut menus, including the caption for each menu item and what data is passed to the specified automation server when the menu item is selected.
   - The Tags tab displays a list of all tags to define for the phase. You can set a server for each tag and the scan rate.
   - The Parameter Limit Tags tab is used to enable the FactoryTalk Batch Equipment Editor to determine and build the tags required to download the parameter limits and verification configuration details to the phase logic if Parameter/Tag Locking is enabled. Or, if Parameter/Tag Locking is disabled, you can select the appropriate set of parameter limit tags for each parameter.
   - The Report Limit Tags tab is used to enable the FactoryTalk Batch Equipment Editor to determine and build the tags required to download the report limits and verification configuration details to
the phase logic, if Parameter/Tag Locking is enabled. Or, if Parameter/Tag Locking is disabled, you can select the appropriate set of report limit tags for each parameter.

- The Containers tab is used to configure which containers the phase can select material from, and which containers it can distribute material into. The Containers tab is visible with material-enabled phases only, which requires the installation of FactoryTalk Batch Material Manager.

3. Select Cancel to close the dialog box.

View a sample FactoryTalk Batch tags

FactoryTalk Batch uses phase tags to connect and talk to the phase logic in the PCD. Phase logic is code that issues real-time commands to actual devices in the plant. These tags also determine the size of the FactoryTalk Batch Server needed for a particular process.

To view a sample FactoryTalk Batch tags:

1. Double-click the WP_AGITATE_M1 icon. The Edit Phase dialog box opens.
2. Select the Tags tab. The Phase Tags list shows the various tags associated with the WP_AGITATE_M1 phase.
3. Double-click the COMMAND tag. The Edit Phase Tag dialog box opens. The Item Name box contains the tag address defined in the PCD. Notice that the COMMAND tag is associated with the Phase Simulator (OPC_SIM).
4. Click Cancel twice to close the dialog boxes.

Create a sample phase

To create a phase, place a phase class icon in the Design View, assign it to a data server, and then configure the phase.

To create a sample phase:

1. Select the ADD_WATER phase class icon in the Classes View, place the cursor in the Design View where you want to place the phase, and then left-click. The Edit Phase dialog box opens to the General tab.
2. From the Data Server list, select the OPC_SIM data server and then select Apply.
The FactoryTalk Batch Equipment Editor assigns a name and an equipment ID to the phase. Since automatic upload and download is enabled in the phase class, automatic upload and download is also enabled in the phase, but you can selectively disable this feature.

3. In the **Name** box, type `WP_ADD_WATER_M1` to match the other phase names in the unit.

   In normal use, you would now configure tags for this phase, but since you are using the Phase Simulator for this example, it is not necessary.

4. Select **OK**. A default phase is created and it is assigned to the Phase Simulator (OPC_SIM). While the icon is selected, drag it around the **Design View**.

---

**Create a sample signature template**

Before you can set up your phases and recipes to require electronic signatures, you must establish a set of signature templates. Each signature template defines the number of signoffs required, the meaning of those signoffs, whether comments are included with the signoff, and which security permissions an operator must have to complete the signoff.

Tip: The following exercises require you to save the area model. If you want to preserve the original area model, exit the FactoryTalk Batch Equipment Editor without saving the changes, and **copy** the `SampleDemo1.cfg` file to a different location before proceeding with the following steps.

**To create a sample signature template:**

1. If you closed the FactoryTalk Batch Equipment Editor, open it and then open the `SampleDemo1.cfg` area model.
2. From the **Edit** menu, select **Signature Templates**. The **Edit Signature Templates** dialog box opens.
3. Select the **New Template** button. The **Create Signature Template** dialog box opens.

   ![Create Signature Template dialog box]

4. In the **Template Name** field, type `CommandsTemplate` and select **OK** (the Template Index is optional). The **Create Signature Template** dialog box closes and the new template is listed in the **Signature Templates** list on the **Edit Signature Templates** dialog box.
5. In the **Signoffs Required** drop-down, select `1` (this is the number of signatures that must be obtained for this signature template).
6. Select the Signoffs tab.
7. In the Template Name field, make sure CommandsTemplate is selected.
8. From the Signoff dropdown, select 1 (this represents the Signoff you are going to configure.)
9. In the Meaning field, type Authorizes commands.
10. From the Comment drop-down, select Optional.
11. In the Security Permissions area, select the Add button. The Select User or Group dialog box opens.
12. In the Filter box, select Show all.
13. Select OPER and select OK. (See the FactoryTalk Batch Administrator Guide for more information on security.)
14. Select OK to save the Create Signature Template dialog box. (See the FactoryTalk Batch Equipment Editor User Guide for more information on creating and configuring Signature Templates.)

Use signature templates

Signature templates can be used to request signoffs for reports and parameters, and can be configured to request a signoff when specified commands are generated from within the FactoryTalk Batch View.

The template you created in the previous section, CommandsTemplate, will be used to generate a signature request when the START command is issued from the FactoryTalk Batch View application. This requires that you enable Command Verification Policies.
To use signature templates:

1. Select **Command Policies** from the **Edit** menu. The **Edit Command Verification Policies** dialog box opens.

2. Select the **Start** checkbox. The **Select Signature Template** dialog box opens.

3. Since **CommandsTemplate** is the only template currently defined, it is selected by default. Select **OK**. **CommandsTemplate** should display in the Signature Template box next to the Start command.

4. Select **OK** to close the dialog box.

5. Select **Save** from the **File** menu to save the area model. This is required because you will be using the Signature feature later in this guide.

### Use signature templates with recipe approvals

Signature templates are used to provide signoffs for the Recipe Approvals process. The Recipe Approvals process:

- Validates the development and maintenance of batch recipes.
- Safeguards design workflow in a formalized manner.
- Confirms each recipe is validated by authorized personnel before being released to production.

Additional signature templates may be required for the recipe approval process--configuration for these is the same as for other signature templates. Assigning signature templates to recipe approval steps is handled in the FactoryTalk Batch Equipment Editor **Recipe Approvals Configuration** dialog box. Approval signoffs are executed in the FactoryTalk Batch Recipe Editor.
To use signature templates with recipe approvals:

1. In the FactoryTalk Batch Equipment Editor, select **Recipe Approvals Configuration** from the **Edit** menu to open the **Recipe Approvals Configuration** dialog box.

   ![Recipe Approvals Configuration](image)

   Tip: If your account has been granted View Only access rights under FactoryTalk Policies, the dialog box opens but **OK** is disabled—any changes you make are not saved.

2. Select from available signature templates using the **Browse** button to the right of each **Approval** and **Revert** field for the step you want to configure. You may need to configure additional signature templates for the approval roles in your process.

   Configure **Approval** and **Revert** signoffs for at least these three steps:
   - The first listed step (labeled **Begin Approval** by default).
   - **Release Recipe as Step** (for both the Approval Process and the Expedited Process steps).
   - **Release Recipe to Production** (for both the Approval Process and the Expedited Process steps).

   Once valid signoffs are configured for these steps, the **Enable Recipe Approvals** checkbox is no longer grayed out.

3. (optional) Check the box ✅ to the left of one or more of the three optional steps to enable and configure more approval steps if needed. These step labels are user-modifiable.

4. Check the **Enable Recipe Approvals** box. Once you have enabled recipe approvals, either the formal process of three to six steps, or the expedited approval process of two steps, is available for execution in the FactoryTalk Batch Recipe Editor. Either approval process must be completed for the recipe to be marked as **Release Recipe to**
Production, at which point it is added the FactoryTalk Batch Server to the Batch List in FactoryTalk Batch View, ActiveX Controls, and/or eProcedure.

See Configure recipe approval steps in the FactoryTalk Batch Equipment Editor User Guide for more information on recipe approvals configuration.

See Approve a recipe in the FactoryTalk Batch Recipe Editor User Guide for more information on recipe approval.

Enable recipe version control

A versioned recipe is a saved, read-only snapshot of the recipe taken at a particular point in time. Recipe version control is useful when you, or a team of authors, need to store and protect revisions of a recipe during its development.

Recipe version control is enabled in the Options > Server Options menu in the FactoryTalk Batch Equipment Editor. Enforcement of version naming is handled by the FactoryTalk Batch Recipe Editor. To enable versioning, follow the instructions given in Enable recipe version control in the FactoryTalk Batch Administrator Guide.

For information on using recipe versioning, see Work with recipe versions in the FactoryTalk Batch Recipe Editor User Guide.

Enable recipe and area model security

A recipe or an area model can be secured to a Security Authority Identifier (SAI) in the FactoryTalk Network Directory. When secured, a recipe or an area model cannot be viewed, modified, or used under a different FactoryTalk security authority identifier.

Recipes are secured using the Recipe > Security Authority command in the FactoryTalk Batch Recipe Editor. For more information on using recipe security, see Security authority overview in the FactoryTalk Batch Recipe Editor User Guide.

Area models are secured to a SAI using the Edit > Security Authority command in the FactoryTalk Batch Equipment Editor. For more information on using area model security, see Security authority overview in the FactoryTalk Batch Equipment Editor User Guide.
Share equipment

Both the WP_MIXER1 and WP_MIXER2 units require the ADD_WATER phase. Rather than create two identical phases, you can share the phase between the units.

To share equipment:

1. Select Go Up to return to the Unit level.
2. Double-click the WP_MIXER2 icon.
3. Select Share Unit. The Share Phase Between Units dialog box opens.
4. Expand WP_MIXER1, and then select WP_ADD_WATER_M1.
5. Select OK.

Exit the FactoryTalk Batch Equipment Editor

Use the following instructions to exit the FactoryTalk Batch Equipment Editor.

To exit the FactoryTalk Batch Equipment Editor:

1. From the File menu, select Exit.
2. Select No to discard any changes you made to the .cfg file. This does not discard any previously saved changes.

FactoryTalk Batch Equipment Editor summary

In this section, you:

- Opened the FactoryTalk Batch Equipment Editor.
- Examined the FactoryTalk Batch Equipment Editor window.
- Opened an area model.
- Created a phase class.
- Created a signature template.
- Enabled a command verification policy.
- Examined phase tags.
- Created a phase.

(See the FactoryTalk Batch Equipment Editor User Guide for more information about the FactoryTalk Batch Equipment Editor.)
FactoryTalk Batch Recipe Editor introduction

The FactoryTalk Batch Recipe Editor is used to create and configure master recipes. The FactoryTalk Batch Recipe Editor lets you use tables, sequential function charts, or both, to graphically organize procedural information into unit procedures, operations, and phases. This FactoryTalk Batch component is used primarily by recipe formulators to create or edit recipes (sequences of steps) and formula values (parameters, set point values, etc.).

All recipes are configured and displayed using the ISA S88.01 Batch Control Standards, which define the Procedure, Unit Procedure, and Operation (Phase) layers for the procedural model.

In this section, you open a sample file to examine and edit a recipe for French Vanilla ice cream.

Tip: This chapter provides a brief glance at the recipe-building capabilities of the FactoryTalk Batch Recipe Editor. See the FactoryTalk Batch Recipe Editor User Guide for more information on completing, importing, approving, versioning, exporting, and maintaining recipes.
Open the FactoryTalk Batch Recipe Editor

Use the following instructions to open the FactoryTalk Batch Recipe Editor.

To open the FactoryTalk Batch Recipe Editor:

1. Select Start > Rockwell Software > Recipe Editor. A blank FactoryTalk Batch Recipe Editor window displays. The Recipe Editor Login dialog box also opens if security is configured.
2. Enter a FactoryTalk Security user name and password and select OK. If a recipe verification box displays, select Yes to verify all the recipes in the Area Model’s recipe directory.
3. When this is complete, select Close.

FactoryTalk Batch Recipe Editor window

The FactoryTalk Batch Recipe Editor component allows you to construct recipes by sequencing phases graphically. The actual phase logic resides in the process control device and is configured separately using controller-specific programming software. The phases are configured in the FactoryTalk Batch Equipment Editor.

The FactoryTalk Batch Recipe Editor window consists of the following components:

- The Procedure View pane occupies the left side of the FactoryTalk Batch Recipe Editor window and contains a hierarchical list of the current recipe components. Selecting a component from the list displays the corresponding step(s) in the Recipe Construction pane.
- The Recipe Construction pane occupies the right side of the FactoryTalk Batch Recipe Editor window and is used to construct master recipes. The Recipe Construction pane allows you to construct and view recipe structures using a sequential function chart (SFC) or a table. Both the SFC View and the Table View can be displayed.
exclusively, or the **Recipe Construction** pane can be tiled to display both views at the same time. Selecting a component within either view will highlight the corresponding item in the **Procedure View** pane.

The FactoryTalk Batch Recipe Editor also has a menu bar, toolbar, and a Recipe Construction toolbox. Take a moment to examine the menus and the tooltips for each toolbar icon and toolbox tool. See the *FactoryTalk Batch Recipe Editor User Guide* for more information on the menus, toolbar icons, and toolbox tools.

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**Open a recipe**

In this section, you will edit an existing recipe. Step-by-step instructions for building a recipe are located in the *FactoryTalk Batch Recipe Editor User Guide*.

**To open a recipe:**

1. From the **File** menu, select **Open Top Level**. The **Open [Type] Recipe** dialog box opens. In this case [Type] is **BINARY**. (Other recipe storage types are **XML** and **RDB**.)
2. From the **Select the recipe to open** list, select **CLS_FRENCHVANILLA**. In the right column, notice the information about the recipe and the **Release Recipe as Step** and **Release Recipe To Production** checkboxes.
3. Select **Open**.

![Recipe Open Dialog Box](image.png)
Tip: When Recipe Approvals are disabled, the Release Recipe as Step and Release Recipe to Production checkboxes display the state of these properties, but are inactive. These properties are set in the Recipe > Header Data dialog box. When Recipe Approvals are enabled, these properties are treated as two steps in the approval process, and are set as part of the approval signoff process. When Release Recipe as Step is true (box is checked), the recipe can be used by other recipes. When Release Recipe to Production is true, the recipe is shown in the Recipe List in FactoryTalk Batch View, eProcedure, and ActiveX Controls. This allows batches to be created from the recipe.

Review the recipe structure

The ISA S88.01 recipe structure of CLS_FRENCHVANILLA is displayed on the left side in the Procedure View pane. The SFC version of the CLS_FRENCHVANILLA recipe structure is displayed on the right side in the Recipe Construction pane.

View hidden information

Some of the information displayed within the Procedure View pane is too large for the window, resulting in the information being hidden.

There are two ways to view the hidden information:

- Hover over the item to view the entire name in a tooltip.
• Move the cursor over the split bar between the **Procedure View** pane and the **Recipe Construction** pane. When the pointer changes into a horizontal double-headed arrow, select and drag the split bar to the right or left.

![Diagram of SFC levels]

**Change the recipe view**

By default, the SFC version of the recipe structure displays in the **Recipe Construction** pane.

**To change the recipe view:**

1. Select **Table** to view the table version of the recipe structure. Size the columns if necessary to view the contents.
2. Select **Tile** to view both the SFC and table views simultaneously.

**Move down through SFC levels**

Like the FactoryTalk Batch View, the FactoryTalk Batch Recipe Editor allows you to view all of the SFC levels by double-clicking the SFC step or selecting the step from the **Procedure View** area.

**To move down through SFC levels:**

1. Select **SFC** to view the SFC.

   Notice the letters **BPC** in the right corner of the status bar. These letters signify that you are currently viewing the Batch Procedure (BPC) level of the recipe.
2. Double-click the CLS_SWEETCREAM_UP:1 step in the SFC to move to the Unit Procedure (UPC) level.

Notice that the blue highlight in the Procedure View indicates the selected level and that the letters UPC display in the lower right corner of the window.

3. Double-click the CLS_SWEETCREAM_OP:1 step in the SFC to move to the Unit Operation (UOP) level. All of the phases within the CLS_SWEETCREAM_OP:1 unit operation display.
Move up through SFC levels

Selecting the initial step sends you up through the SFC levels. You also can select a level in the Procedure View pane.

To move up through SFC levels:

1. Double-click the initial step of the CLS_SWEETCREAM_OP:1 Operation at the top of the SFC to return to the Unit Procedure level.
2. Double-click the initial step of the CLS_SWEETCREAM_UP:1 Unit Procedure at the top of the SFC to return to the Batch Procedure level.

Add steps

You build a recipe by adding steps. The FactoryTalk Batch Recipe Editor automatically adds and configures the transitions between the steps.

Add a sequential step in the sample operation level

Use the following instructions to add a sequential step in the operation level.

To add a sequential step in the sample operation level:

1. With the Selection Tool selected, double-click the CLS_SWEETCREAM_UP:1 unit procedure in the Procedure View. The CLS_SWEETCREAM_OP:1 operation displays.
2. Double-click the CLS_SWEETCREAM_UP:1 operation. The recipe steps within the operation display.
3. Select the ADD_MILK:1 STATE = COMPLETE transition at the bottom of the operation.
4. Select Add Step in the Recipe Construction Toolbox. A new step and transition are added below the selected transition and the Select Phase dialog box opens.
5. Select XFR_OUT, and then select OK. The new step is defined as XFR_OUT:1 and the transition below the step is defined as XFR_OUT:1.STATE = COMPLETE.

The recipe elements in CLS_SWEETCREAM_OP:1 automatically rearrange to make room for the new step and transition. This auto-
arrange functionality of the FactoryTalk Batch Recipe Editor greatly simplifies both the recipe creation and modification processes and also increases the overall readability of the recipe.

### Add a parallel step in the sample operation level

Use the following instructions to add a parallel step in the operation level.

**To add a parallel step in the sample operation level:**

1. While still in the CLS_SWEETCREAM_OP:1 operation, select the `TEMP_CTL:1` step.
2. Select *Add Parallel*. A new step is added in parallel to the selected step and the *Select Phase* dialog box opens.
3. Select `ADD_EGG`, and then select *OK*. The new step is now defined as `ADD_EGG:2` and the transition below the step is automatically re-defined as `ADD_EGG:2.STATE = COMPLETE AND TEMP_CTL:1.STATE = COMPLETE AND ADD_CREAM:1.STATE = COMPLETE` to reflect the new parallel structure.

### Assign step formula values to the sample operation level

Once a step is added to an operation, you can assign formula values, which involves specifying the values and selecting the parameter to display for the selected step.

**To assign step formula values to the sample operation level:**

1. While still in the CLS_SWEETCREAM_OP:1 operation, select the `ADD_EGG:2` step.
2. Select *Value Entry*. The *Parameter Value Entry/Report Limit Entry* dialog box opens listing the parameters associated with the step. The only parameter is `ADD_AMOUNT`.
3. Type **100** in the **Value** box, and then select **Display** so the value displays on the SFC.

4. Select **OK** to return to the FactoryTalk Batch Recipe Editor window. Next, you decide to change the parameter for TEMP_CTL:1 so that the operator can enter the amount when the batch is run.

5. Select the **TEMP_CTL:1** step, and then select **Value Entry**. The **Parameter Value Entry/Report Limits Entry** dialog box opens listing the parameters associated with the step. There are two parameters: HOLD_TIME and TEMP_SP. You want the operator to decide how long to hold the mixture.

6. From the **Origin** list for the HOLD_TIME parameter, select **Operator** to indicate that the operator enters the amount when the recipe is run.

7. Select **OK** to return to the FactoryTalk Batch Recipe Editor window.

---

**Add recipe comments to the sample operation**

Recipe commenting provides you with a tool to create and edit comments for viewing at design and run time. With this feature, important information can be inserted into the recipe and associated with a step, transition, or entire recipe.

**To add recipe comments to the sample operation:**

1. While still in the CLS_SWEETCREAM_OP:1 operation, select **Text Box Tool**. The cursor changes to a text tool.
2. Move the cursor to the right of the AGITATE:1 step and select. A text box labeled C1 is placed in the SFC.
3. Select **Link**, and move the cursor (now a +) back to the C1 text box.
4. Select anywhere in the box, hold the mouse button, and drag the cursor to the AGITATE:1 step. AGITATE:1 now appears in the bottom half of the text box indicating the C1 text box is associated with the AGITATE:1 step.
5. Choose the Selection Tool and double-click inside the text box. TypeReduce the agitation speed to 20 RPM if the mixture begins to separate.

6. Select outside the text box when the comment is complete.

**Remove steps**

When you remove a step from the recipe, the FactoryTalk Batch Recipe Editor will reconfigure the links and transitions accordingly. However, sometimes the links and transitions are complex and you may have to redo the links and reconfigure the transitions manually.

**Add a continuous loop to the sample unit procedure**

FactoryTalk Batch is capable of performing looping at all levels of the procedural model. Not only is this a powerful recipe management tool, it is a simple task to complete.

**To add a continuous loop to the sample unit procedure:**

1. Select Go Up on the toolbar twice to move to the CLS_SWEETCREAM_UP:1 unit procedure.
2. Select Transition Tool. Place the pointer to the right of the existing transition labeled CLS_SWEETCREAM_UP:1.STATE = COMPLETE, and then select to add an undefined transition.
3. Select the Link Tool button.
4. Select and drag the pointer from the step labeled CLS_SWEETCREAM_UP:1 to the new TRUE transition. Release the mouse button to add the link.

5. Select and drag the pointer from the TRUE transition to the last step of the unit procedure (CLS_FRENCHVANILLA_UP:1). This completes the loop structure.

6. Select the Selection Tool button, and then double-click the new TRUE transition.

7. Select the Common Expressions folder.


9. In the upper part of the dialog box, highlight = (equal sign) in the expression, and then select the GREATER THAN OR LESS THAN button.

   The transition should now read CLS_SWEETCREAM_UP:1.STATE <> COMPLETE. This transition makes sure that the CLS_SWEETCREAM_UP:1 operation will continue to run until it reaches a COMPLETE state.

10. Select OK.
Verify the recipe

After a recipe is created or edited, it needs to be verified to make sure it was configured properly and that it will run against a particular set of equipment (the area model).

To verify the recipe:

1. Select the Verify button. The Verification Process Results dialog box opens. The result should be: CLS_FRENCHVANILLA >> Verification of recipes has completed.
2. Select Close.

Remove a sequential step from the sample operation

Use the following instructions to remove a sequential step.

To remove a sequential step from the sample operation:

1. While still in the CLS_SWEETCREAM_OP:1 operation, select the XFR_OUT:1 step.
2. Select the Remove Step button. The XFR_OUT:1 step is removed, including its links and the following transition. The SFC automatically rearranges to adjust for the removed step.

Remove a parallel step from the sample operation

Use the following to remove a parallel step from the sample operation.

To remove a parallel step from the sample operation:

1. While still in the CLS_SWEETCREAM_OP:1 operation, select the ADD_EGG:2 parallel step.
2. Select the Remove Step tool. The ADD_EGG:2 parallel step is removed, including its links, and the following transition is re-configured. The SFC automatically rearranges to adjust for the removed step.

Tip: Because transitions that follow parallel structures can be complex, the transition may not reconfigure automatically. If the transition following the removed parallel step requires reconfiguration, you must configure the transition manually.
In this section, you:

- Opened the FactoryTalk Batch Recipe Editor.
- Examined the FactoryTalk Batch Recipe Editor window.
- Opened a recipe.
- Resized the Procedure View pane.
- Navigated through the SFC and Procedure View hierarchy.
- Added a sequential step to a recipe.
- Added a parallel step to a recipe.
- Assigned formula values.
- Added a comment.
- Removed steps.
- Built step transitions.
- Added a continuous loop.
- Verified the recipe.
- Exited the FactoryTalk Batch Recipe Editor.

This chapter provided a brief overview of the capabilities of the FactoryTalk Batch Recipe Editor module. (See the FactoryTalk Batch Recipe Editor User Guide for more information on the FactoryTalk Batch Recipe Editor.)
FactoryTalk Batch View introduction

This section describes how to use FactoryTalk Batch View on a Windows desktop system.

Tip: The modern FactoryTalk Batch View is an innovative and intuitive user interface for your comprehensive batch solution. It leverages state-of-the-art web technologies with scalable graphics for consistent visualization across all devices and form factors. The zero-install browser simplifies administration and maintenance. As the only native client application that supports the new features in FactoryTalk Batch and eProcedure, it is the client of the future for modern batch solutions.

For more information about the new FactoryTalk Batch View mobile solution, view the FactoryTalk Batch View User Manual (FTBVS-UM002).

FactoryTalk Batch View is used to initiate and control the batch process and to view running batches. It has a graphical user interface with easy to use windows and buttons and, like most of the FactoryTalk Batch components, is based primarily on input from ISA's S88.01 Batch Control Standard.

Using the sample demo files installed with FactoryTalk Batch, this chapter takes you through the steps involved in running a batch, demonstrating the powerful simplicity and functionality of the FactoryTalk Batch solution.

Open FactoryTalk Batch View

Use the following instructions to open FactoryTalk Batch View.
To open FactoryTalk Batch View:

1. Select **Start > Rockwell Software > View**. The FactoryTalk Batch View window opens to the Batch List view, which is one of the ten views accessible using the toolbar buttons.

- The **Toolbar** contains buttons for changing views, configuring the views, accessing online help, going to an HMI, logging on to and exiting from the FactoryTalk Batch View.
- The **Command buttons** represent actions that the operator performs, such as adding, removing, starting, stopping, holding, or aborting a batch. The Command buttons dynamically change according to the current view and selected batch.
- The **Status bar** displays information regarding the current user, the selected batch and the data server. A green **G** in the lower right corner indicates good communication between the FactoryTalk Batch Server and the data server(s). If communication is lost, a red **L** displays and you must restart the FactoryTalk Batch Server.

2. Take a moment to examine the tooltips for the toolbar icons and command buttons.

   **Tip:** If none of the toolbar or command buttons are enabled, except the **Login** button, select the **Login** button and enter a FactoryTalk Security user name and password.
Run a sample batch

In this exercise, add a batch of French Vanilla ice cream to the Batch list and start the batch.

To run a sample batch:

1. Select the Add Batch command button. The Recipe List dialog box opens, listing the recipes that are released to production, which constitute the master recipe list for a facility.

![Recipe List dialog box]

2. Select the CLS_FRENCHVANILLA recipe, and then select OK. The Batch Creation dialog box opens. The Formula Values area displays the materials and amounts that are used in the recipe. The Unit Binding area indicates the units that you can choose to bind to the recipe.

![Batch Creation dialog box]

This recipe takes advantage of the powerful Dynamic Unit Allocation feature, which allows you to select which units in the area model to bind to the recipe and when that binding occurs. In this batch, you choose to bind the units as you create the batch. Later in this section you see how to bind units to a batch after the batch is created.

3. Type TEST_1 in the Batch ID box.
4. From the **Bound Unit** list in the Unit Binding area, select **WP_FREEZER2** as the FREEZER unit and **WP_MIXER2** as the MIXER unit to bind to the recipe. When the batch is run, the recipe will bind to the units that you selected.

5. Select **Create**. The batch is added to the Batch List.

6. Select the **TEST_1** batch, select the **Start Batch** command button, and then select **Yes** to confirm.

7. If you configured a verification policy on the START command (see **Create a sample signature template**), the **Command Signature** dialog box opens.

8. Type **OPER** in the **User ID** box. This is the user you created in Chapter 3, **FactoryTalk Batch Server introduction**.

9. Type **password** in the **Password** box. The **Sign** button is enabled.

10. Select the **Sign** button. The Signoff State changes to Complete.

11. Select the **Close** button. The batch starts.

12. The State column shows that the batch is RUNNING.
Examine the batch

Use the following instructions to examine the batch.

**To examine the batch:**

1. Select the **Procedure as SFC** button to examine the batch as it is running. The Procedure as SFC view displays the sequential function charts (SFCs) of the currently selected batch, where you can watch the batch execute its steps and transitions. An operator can command a batch using the command buttons.

![Procedure as SFC window](image)

Tip: You need to move the horizontal and vertical split bars separating the four sections to view the contents as shown in the example.

The **Procedure as SFC** window consists of four sections:

- The **Procedural Hierarchy** displays the details of the entire batch. Dragging the split bar to the right reveals more of the batch details, such as State, Mode, Unit, and Key Parameters.

- The **Sequential Function Chart (SFC)** displays for the step that is selected in the Procedural Hierarchy. You can view a different level of the SFC by double-clicking a step.

There are three sizing buttons that you can use to change the size of the SFC.

- Decreases display size
- Increases display size
- Fits display to window size

- The **Recipe Table** displays the components of the procedural elements in the currently selected batch. You also can access the recipe table by clicking the **Procedure as Table** button.
• The **Auxiliary Index** contains five tabs that display information regarding the recipe, prompts, parameters, reports and arbitration for the step that is selected in the Procedural Hierarchy or the SFC.

2. Spend a few moments adjusting the split bars to view the **State** column in the **Procedural Hierarchy** area and to maximize the SFC.

### Navigate the SFC

As the batch runs, the steps listed in the Procedural Hierarchy that are being executed display in green and the **State** column indicates RUNNING. In the SFC, the steps being executed also display in green. Notice also that WP_MIXER2 and WP_FREEZER2 are indicated in the SFC as the phases being used in the batch.

You can navigate the batch by selecting on the unit procedure, operation, or phase either in the Procedure Hierarchy or the SFC.

### To navigate the SFC:

1. Double-click the **CLS_SWEETCREAM_UP:1** box in the SFC to go to the Unit Procedure (UP) level. There is one operation within the unit procedure: **CLS_SWEETCREAM_OP:1**.

Notice the green arrow in the Procedural Hierarchy points to the Unit (UP) level. The green color in the SFC indicates that the operation is running.
2. Double-click the **CLS_SWEETCREAM.OP:1** box in the SFC to go to the Operation (OP) level.

![SFC Diagram](image1)

There are six phases within this operation: **ADD_EGG:1**, **ADD_SUGAR:1**, **AGITATE:1**, **ADD_CREAM:1**, **TEMP_CTL:1**, and **ADD_MILK:1**.

3. Reduce the size of the SFC so you can see more of the structure.

4. Double-click the initial step of the **CLS_SWEETCREAM.OP:1** operation at the top of the SFC to return to the Unit Procedure level.

5. Double-click the initial step of the **CLS_SWEETCREAM.UP:1** unit procedure at the top of the SFC to return to the Procedure level.

![SFC Diagram](image2)

There are four unit procedures within this procedure: **CLS_SWEETCREAM.UP:1**, **CLS_TRANSFER_IN_UP:1**, **CLS_TRANSFER_OUT_UP:1**, and **CLS_FRENCHVANILLA_UP:1**.
The state of a batch becomes COMPLETE once the batch has finished running. If a batch is in a COMPLETE state and in either AUTO (O_AUTO) or SEMI_AUTO (S_AUTO) mode, you can remove it from the Batch List. The TEST_1 batch is in O_AUTO mode, so you can remove it from the Batch List when it is COMPLETE.

To remove the sample batch from the Batch List:

1. Select the Batch List button to return to the Batch List view.
2. Select the TEST_1 batch.
3. Select the Remove Batch command button, and then select Yes to confirm the removal.
   The batch is removed from the Batch List view.

When you create a batch, you can select units to bind to the recipe (which we did earlier in this chapter). You also have the ability to change the binding after the batch is created, which is helpful if a unit becomes unavailable between the time you create the batch and when you are ready to run the batch.

In this exercise, you manually bind a unit after the batch is created, add a comment to indicate the binding was changed, and respond to unacknowledged prompts during the batch run.

To bind a unit manually:

1. In the Batch List view, create a batch of French Vanilla named TEST_2 and bind to the WP_MIXER1 and WP_FREEZER1 units.
2. Select the TEST_2 batch, and then select the Procedure as SFC button. Notice that WP_MIXER1 and WP_FREEZER1 appear in the SFC to indicate that those phases will be used in the recipe.
3. Select CLS_SWEETCREAM_UP:1 in the Procedural Hierarchy or SFC.
4. Select the **Bind** command button, and then **Yes** to confirm the binding. The **Manual Bind of Step** dialog box opens listing the options you can select for binding the unit.

 WP_MIXER2 does not appear in the list because the other unit procedures in the batch are bound to WP_FREEZER1, which is linked to WP_MIXER1. You want the FactoryTalk Batch Server to prompt the operator to select the unit to bind to the unit procedure as the batch runs. If you select **First Available**, the FactoryTalk Batch Server selects the unit to bind based on availability at the time equipment is needed.

5. From the **Select Unit to bind to Unit Requirement** list, select **PROMPT**, and then select **OK**.

 Notice that the SFC changes to MIXER. When the batch runs, the operator is prompted to select the mixer unit to bind to the recipe.

6. Select **CLS_TRANSFER_IN_UP:1** in the Procedural Hierarchy or SFC.
7. Select the **Bind** command button, and then select **Yes** to confirm the binding. The **Manual Bind of Step** dialog box opens listing the options you can select for binding the unit.

 Notice that WP_FREEZER1 and WP_FREEZER2 both appear in the list because the MIXER binding process was changed to Prompt.

8. Select **PROMPT** from the **Select Unit to bind to Unit Requirement** list, and then select **OK**.

 Notice that the SFC changes to FREEZER. When the batch is run, the operator is prompted to select the freezer unit to bind to the recipe.
Add a comment to a sample batch

Before you run the batch, you add a comment to add to the Batch Event Journal.

**To add a comment to a sample batch:**

1. Select the **Batch List** button to return to the **Batch List** view.
2. Select the **TEST_2** batch, and then select the **Comment** command button. The **Batch Comment** dialog box opens.
3. Type *This batch was altered to allow the operator to bind units manually.*

![Batch Comment Dialog Box]

4. Select **OK** to return to the **Batch List** window.

Respond to unacknowledged sample prompts

Because you selected Prompt binding, the batch stops running when binding is to occur and you must use the Unacknowledged Prompts list to select the units to bind.

**To respond to unacknowledged sample prompts:**

1. Select the **Start Batch** command button, and then select **Yes** to start the batch.

   ![Command Signature Dialog Box]

   Tip: If the Command Signature dialog box opens, refer to Run a sample batch for instructions.

   The **Unacknowledged Prompts** button begins to flash yellow. You could address this request from the Batch List view but switch to the SFC view to see how the binding changes.

2. Select the **Procedure as SFC** button. Notice that the first transition indicates **BINDING**, which means the FactoryTalk Batch Server is trying to acquire an equipment phase to run the CLS_SWEETCREAM unit procedure.

3. Select the flashing **Unacknowledged Prompts** button. The **Unacknowledged Prompts List** opens indicating that the operator must select the unit to use as the MIXER.

![Unacknowledged Prompts List]
4. Double-click the **TEST_2** batch. The **Prompt to Bind Unit Requirement** dialog box opens indicating that WP_MIXER1 and WP_MIXER2 are the mixers available to bind to the recipe.

5. Select **WP_MIXER2** from the **Select Unit to bind to Unit Requirement** list, and then select **OK**.

6. Select the **Procedure as SFC** button and notice that the batch continues to run using WP_MIXER2. When the batch reaches the transition following the CLS_SWEETCREAM unit procedure, the **Unacknowledged Prompts** button starts to flash again.

7. Select the flashing **Unacknowledged Prompts** button. The Batch List opens indicating that the operator must select the unit to use as the **FREEZER**.

8. Double-click the **TEST_2** batch. The **Prompt to Bind Unit Requirement** dialog box opens indicating that WP_FREEZER2 is the only freezer available to bind to the recipe. Because you selected WP_MIXER2, which is linked to WP_FREEZER2, that is the only option available to you.

9. Select **WP_FREEZER2** from the **Select Unit to bind to Unit Requirement** list, and then select **OK**. The batch should run to completion.
The FactoryTalk Batch Server gathers detailed data for every action that takes place during the execution of all batches and places the data within an electronic batch record. You can filter and view this data in the Event Journal window.

To view the sample batch event journal:

2. Select the Journal button. The Event Data Files dialog box opens.
3. In the Event Data Files list, select the TEST_2 batch, and then select OK. The event data displays on the right side of the window.
4. In the Filtering area, select Event Type from the Column 1 list.
5. In the Filter 1 box, type COMMENT, and then select the Refresh button. The data is filtered to show the comment that you added to the
CONTROL A PHASE MANUALLY

When you are testing your recipe, you may want to test only one phase at a time. In this exercise you acquire control of a specific phase and run it manually.

Tip: If the Filtering area does not display, select the left split bar and drag to the right.

To control a phase manually:

1. Select the Phase Control button. The Phase Control view opens and displays the process cell.
2. Double-click the WEST_PARLOR icon to view the units within the WEST_PARLOR process cell.
3. Select the WP_MIXER1 icon. A list of the phases in WP_MIXER1 displays in the Phases section. You may need to move the vertical split bars to the right or left so your window appears as shown.
4. Select the WP_ADD_EGG_M1 icon, and then select the **Acquire** command button. Select **Yes** to confirm the acquisition of the phase. Notice the green operator (Opr) light, which indicates that the WP_ADD_EGG_M1 phase is now owned by the operator.

5. Select the **Start** command button, and then select **Yes** to start the WP_ADD_EGG_M1 phase. The **Phase Control** dialog box opens.

![Phase Control dialog box]

Tip: If the Command Signature dialog box opens, refer to **Run a sample batch** for instructions.

6. Type **TEST_3** in the **Batch ID** box, and then select **OK**. After running for a few seconds, the **Unacknowledged Prompts** button on the toolbar starts flashing yellow and **ADD_AMOUNT** displays in the **Unacknowledged Prompts** list.

![Phase Control dialog box and Unacknowledged Prompts list]

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78
7. Select the **Acknowledge** button. The **Acknowledge** dialog box opens showing the default value as 0. The allowable range of values is 0 to 5000.

<table>
<thead>
<tr>
<th>Acknowledge</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Batch ID</td>
<td>TEST123</td>
</tr>
<tr>
<td>Device</td>
<td>TEST_3WP_ADD_EGG_M1-1</td>
</tr>
<tr>
<td>Process Cell</td>
<td>WEST_PARLOR</td>
</tr>
<tr>
<td>Unit</td>
<td>WP_M41/F1</td>
</tr>
<tr>
<td>Phase</td>
<td>WP_ADD_EGG_M1</td>
</tr>
<tr>
<td>Parameter</td>
<td>ADD_AMOUNT</td>
</tr>
<tr>
<td>Minimum</td>
<td>0</td>
</tr>
<tr>
<td>Maximum</td>
<td>500</td>
</tr>
<tr>
<td>Eng Limits</td>
<td>KG</td>
</tr>
<tr>
<td>Low-Low-Low Limit</td>
<td></td>
</tr>
<tr>
<td>Low-Low Limit</td>
<td></td>
</tr>
<tr>
<td>Low Limit</td>
<td></td>
</tr>
<tr>
<td>High Limit</td>
<td></td>
</tr>
<tr>
<td>High-High Limit</td>
<td></td>
</tr>
<tr>
<td>High-High-High Limit</td>
<td></td>
</tr>
</tbody>
</table>

8. Type 40, and then select the **Acknowledge** button. The phase continues to run.

As the phase runs, you can use the command buttons to **Hold**, **Restart**, **Abort**, **Stop**, **Pause**, **Resume** the phase.

9. When the phase completes, select the **Reset** command button, and then select **Yes** to confirm the reset.

You can run this phase as many times as necessary to test it. When you are done testing, release control back to FactoryTalk Batch so the phase can run as part of a recipe.

10. Select the **Release** command button, and then select **Yes** to confirm the release.

---

**Resolve arbitration issues**

A procedure stops running if a phase is unable to acquire the needed equipment. The FactoryTalk Batch Server displays ACQUIRING1 on the SFC at the transition above that phase and that is where you begin your investigation to determine the cause of the arbitration issue.

In this exercise you manually acquire a phase, run a procedure to view an arbitration situation, and then resolve the arbitration issue.
To resolve arbitration issues:

1. Select the **Phase Control** button. The **Phase Control** view opens and displays the process cell.
2. Double-click the **WEST_PARLOR** icon, and then select the **WP_MIXER1** icon. A list of the phases within WP_MIXER1 are displayed in the Phases section.
3. Select the **WP_XFR_OUT** icon, and then select the **Acquire** command button. Select **Yes** to confirm the acquisition of the phase.
4. Select the **Batch List** button to go to the **Batch List** view.
5. Select the **Add Batch** command button, and then add a batch of **CLS_FRENCHVANILLA**, binding to WP_MIXER1 and WP_FREEZER1 with a batch ID of **TEST_5**.
6. Start the batch, and then select the **Procedure as SFC** button. The batch stops processing when it reaches the XFR_OUT:1 phase.
   
   **Tip:** If the **Command Signature** dialog box opens, refer to the **Run a sample batch** instructions.

7. Select the **XFR_OUT:1** phase in the **Procedural Hierarchy** view. In the SFC view, notice that the transition is stalled in ACQUIRING. In the Auxiliary Index view, select the **Arbitration** tab and notice that the phase needs WP_XFR_OUT_M1 and is owned by WP_XFR_OUT_M1.

8. Select the **Phase Summary** button. The **Phase Summary** window opens and displays all the equipment phases and their associated status information. This window is useful when trying to determine the state of an equipment phase.
9. Scroll down and notice that the WP_XFR_OUT_M1 phase is owned by the Operator.

10. Select the Arbitration button. The Arbitration window opens to the phase that you selected in the SFC view. The operator uses this window to view current resource allocation information, acquire available resources, and release operator-owned resources. Notice again that this phase is owned by the operator.

In this window the operator can acquire an equipment phase and then release it to resolve an arbitration issue.

11. Select the Release command button to release the equipment phase. The batch runs to completion.

12. Select the Batch List button to return to the Batch List view. Remove all batches from the batch list.
**Phase Control window**

The Phase Control window consists of three areas:

- The **Unit Display area** displays unit icons and flow path lines. There are three view sizing buttons you can use to change the display. Selecting the **Display Process Cells** button returns the display to the process cell.
- The **Phase List Display** area displays a button for each of the phases that belong to the selected unit. Each button displays the phase name, phase state, step index (when running) and phase mode. The possible modes are: **A** (Operator Controlled Auto), **PA** (Program Controlled Auto), and **S** (Operator Controlled Semi-Auto). The State text and **Step Index** box are color-coded to match the state of the active phase.
- To the right of each phase button is a series of three lights that indicates the current owner of the phase. If the phase is owned, the appropriate light is illuminated (**Pr** for Procedure, **Opr** for Operator, or **Ext** for External). Should a phase fail, **FAILURE!!!** displays in red text below the lights for the failed phase.
- The **Next** button is enabled if the unit contains more phases than can display in the area. The **Previous** button is enabled after selecting the **Next** button. Below these buttons is an area where messages and failures related to the selected phase display.
- The **Phase Specific Information Display** provides information regarding the selected phase, including the phase name, phase state, batch ID and the batch state. There is also an **Unacknowledged Prompts** area, where the prompts for the selected phase display. Requests for the selected phase display below the prompts. The **Mode** options are used to specify the mode for the selected phase and are disabled until the phase is started or on any subsequent executions of this phase.

**Configure the FactoryTalk Batch View**

You can customize each of the ten views in the FactoryTalk Batch View window. For example, you can change the default MS Sans Serif font to any installed font on your computer.

**To configure the FactoryTalk Batch View:**

1. Select the **Configuration and Defaults** button. If the **Log on to Confirm User** dialog box opens, enter a user name and password, and select **OK**.
Chapter 5  FactoryTalk Batch View introduction

The **System Configuration and Defaults** dialog box opens to the **Batch List** tab.

The **System Configuration and Defaults** dialog box opens to the tab that corresponds to the view that is open, which in this case is the **Batch List** view.

2. Take a moment to examine all the tabs to see the variety of changes you can make to the views in the FactoryTalk Batch View window.
3. Select **Cancel** to close the **System Configuration and Defaults** dialog box without saving any changes.

**Exit the FactoryTalk Batch View**

Use the following instructions to exit FactoryTalk Batch View.

**To exit the FactoryTalk Batch View:**

1. Select the **Exit** button.
2. Select **Yes** to confirm the exit.

**FactoryTalk Batch View summary**

In this section you:

- Opened the FactoryTalk Batch View.
- Examined the FactoryTalk Batch View window.
- Added a batch to the Batch List.
- Started a batch.
- Responded to a signature request.
- Navigated through the SFC and Procedural Hierarchy views.
• Removed a batch from the Batch List.
• Bound units to a batch.
• Added a comment to a batch.
• Handled unacknowledged prompts.
• Viewed and sorted an event journal.
• Controlled a phase manually.
• Resolved an arbitration issue.
• Viewed the system configuration for the FactoryTalk Batch View.

This chapter provided a brief overview of the capabilities of the FactoryTalk Batch View module. (See the FactoryTalk Batch View User Guide for more information.)
FactoryTalk Event Archiver

FactoryTalk Event Archiver collects data from the batch record files (.evt files) generated by the FactoryTalk Batch Server, and stores the data in a SQL Server database.

Features and capabilities

The FactoryTalk Batch Server creates an electronic batch record for every batch on the Batch List. View this batch record file with a text processor or spreadsheet application. FactoryTalk Event Archiver collects data from each electronic batch record file and writes it to the database. Each electronic batch record file contains individual lines, each representing an event that occurred in a batch. FactoryTalk Event Archiver inserts a unique identifier with date and time to each event into the database.

FactoryTalk Event Archiver writes data to the BatchHis SQL table in the BatchHistory database. FactoryTalk Event Archiver with Reporting Services writes data to the BHBatchHis SQL table in the BatchHistoryEx database.

Configure FactoryTalk Event Archiver to archive data to the database in either of two ways:

- End-of-Batch
- Incremental

With End-of-Batch archiving, FactoryTalk Event Archiver inserts records into the database after a batch is removed from the batch list. The FactoryTalk Batch Server initiates FactoryTalk Event Archiver when a batch is removed from the batch list to archive the removed batch.

With Incremental archiving, FactoryTalk Event Archiver inserts records into the database on a pre-defined schedule. Configure this archiving time interval in FactoryTalk Batch Equipment Editor.

When a control recipe on the FactoryTalk Batch Server executes, the server adds the name of the batch record file to the FactoryTalk Event Archiver work queue file (Archque.txt). After FactoryTalk Event Archiver inserts all of the electronic batch records into the database, and the file is marked for removal from the batch list, FactoryTalk Event Archiver removes the name of the batch record file from the work queue file. FactoryTalk Event Archiver does not delete the batch record file unless it is specifically configured.
If FactoryTalk Event Archiver cannot successfully insert each item from the batch record file, it does not remove the name from the FactoryTalk Event Archiver work queue file. Each time FactoryTalk Event Archiver runs, it attempts to insert the records from each file listed in the queue into the database. In the event of a failure, FactoryTalk Event Archiver attempts to store the data later. This helps make sure that failures do not result in a loss of archived data.

**IMPORTANT** When FactoryTalk Event Archiver runs at the end of a batch, the FactoryTalk Batch Server runs FactoryTalk Event Archiver as a Windows IDLE_PRIORITY process. If the system is busy, higher-priority functions supersede FactoryTalk Event Archiver slowing the archiving process.

### System architecture

FactoryTalk Event Archiver is a Windows service that archives events from the FactoryTalk Batch Server. Events are written to SQL database tables. View the events stored in the database as HTML reports with the Reporting Services.

### FactoryTalk Event Archiver with Reporting Services system architecture

FactoryTalk Event Archiver can run incrementally while a batch is running, or after a batch completes. FactoryTalk Event Archiver executes in a continuous loop using these basic steps:

2. FactoryTalk Event Archiver reads event records from the event file and translates them into SQL statements.
3. FactoryTalk Event Archiver writes the data to the SQL database.
4. FactoryTalk Event Archiver logs all archiving activities to a log file.
5. When Reporting Services is installed, reports can be generated from event data stored in the database.

**Run the FactoryTalk Event Archiver to insert batch record data**

Use the following instructions to run the FactoryTalk Event Archiver to insert batch record data.

**To run the FactoryTalk Event Archiver to insert batch record data:**

1. The operator or Manufacturing Execution System (MES) starts a batch. If it is to run in the incremental mode, the FactoryTalk Event Archiver must be enabled as a Windows service.
2. An electronic batch record file (.evt) is created.
3. The electronic batch record file's name is added to the electronic batch record directory file, EventDir.txt.
4. The FactoryTalk Batch Server incrementally writes to the work queue file in FactoryTalk Event Archiver, ArchQue.txt. The data in this file consists of the path to the electronic batch record file and, if the batch has been removed from the batch list, a tab and the word REMOVED follows the file name.
   - **End-of-Batch Archiving:** When a batch is removed from the batch list, the FactoryTalk Batch Server sends a message to the FactoryTalk Event Archiver to start running. The FactoryTalk Event Archiver must be enabled.
   - **Incremental Archiving:** The FactoryTalk Event Archiver runs on a pre-defined schedule. The FactoryTalk Event Archiver must be active at all times during batch processing.
5. The FactoryTalk Event Archiver reads the ArchQue.txt file for the name of the electronic batch record file and the status of the batch.
7. The FactoryTalk Event Archiver inserts records into the database.
8. If electronic batch record data is successfully inserted into the database, the file's name is removed from the ArchQue.txt file.

Steps 4 through 7 are repeated until the FactoryTalk Event Archiver has attempted to insert each electronic batch record file listed in the ArchQue.txt file into the database.
In this section you:

- Learned about the system architecture of the FactoryTalk Event Archiver.

This chapter provided a brief overview of the capabilities of the FactoryTalk Event Archiver. (See the FactoryTalk Event Archiver User Guide for more information.)
Chapter 7

FactoryTalk Batch ActiveX controls introduction

The FactoryTalk Batch ActiveX® Controls Library is a set of ActiveX custom controls that allows you to create a dynamic picture of batch automation system data. Use the controls in the library to communicate with the FactoryTalk Batch Server and to monitor and interact with a control recipe without having to run the FactoryTalk Batch View application. These controls can be placed within any ActiveX Control/OLE container, such as your human machine interface (HMI) software, Microsoft Visual Basic or web browsers, allowing for easy integration with existing manufacturing execution software. ActiveX Controls can be used to create a custom look for your interface or to create a custom application specific to your needs. The FactoryTalk Batch ActiveX Controls Library is designed especially for FactoryTalk Batch.

Tip: To use the FactoryTalk Batch ActiveX Controls Library, you must install Microsoft Visual Basic. (See Tested Third-Party Software in the FactoryTalk Batch release notes for the currently supported version.)

Use the ActiveX Controls to create, command and remove control recipes from the Batch List, acknowledge operator prompts, view running control recipes, change step formula values, perform active step changes, reset Timer steps, and change Timer setpoints.

You can vary the appearance of the ActiveX Controls through the use of the properties and methods that the controls support. Though the appearance can vary, the controls allow you to perform the same functions as their corresponding FactoryTalk Batch View windows.

(See the FactoryTalk Batch ActiveX Controls Library Reference Guide and the FactoryTalk Batch ActiveX Controls User Guide for more information on designing and working with ActiveX Controls.)

FactoryTalk Batch ActiveX Controls

The FactoryTalk Batch ActiveX Controls Library is distributed within the batchv01.ocx, batchv02.ocx, SignatureListOCX.ocx, and TimerStepOCX.ocx files. These files contain five controls:

- **ControlRecipeList** control, which performs the functions of the Batch List window in the FactoryTalk Batch View application
- **PromptsList** control, which performs the functions of the Unacknowledged Prompts window in the FactoryTalk Batch View application
• **SignatureList** control, which performs the functions of the Batch Signature List window in the FactoryTalk Batch View application
• **ProcedureView** control, which performs the functions of both the Procedure as Table and Procedure as SFC windows in the FactoryTalk Batch View application
• **TimerView** control, provides an interface to view all the Timer steps in batches currently on the batch list

### The ControlRecipeList control

The ControlRecipeList control is used to create control recipes, view current control recipes, and command a control recipe outside of the FactoryTalk Batch View. The control recipe displays in the ControlRecipeList until it is removed by the operator (even if the control itself is closed) or the FactoryTalk Batch Server is restarted with a cold restart.

### ControlRecipeList interface

The format of the ControlRecipeList interface varies depending on the container in which the control is placed and how the control is formatted within that container. However, the generic ControlRecipeList interface functions in the same way, regardless of the container in which it is placed, and can be used to perform all of the standard Batch List view functions without any custom modifications. The information displayed in the ControlRecipeList window is user-configurable.
**ControlRecipeList shortcut menu**

The ControlRecipeList control includes a shortcut menu that can be accessed by right-clicking anywhere within the control. The availability of the commands on the shortcut menu is determined by where the right-click occurred; that is, whether or not a control recipe in the list was right-clicked, and if so, which one. The menu allows you to add and command control recipes, as well as to remove a control recipe from the ControlRecipeList control. All of the ControlRecipeList commands can be accessed using the shortcut menu, but only valid commands are enabled.

**Open the ControlRecipeList control**

Like the Batch List window within the View, the ControlRecipeList is used to create and command a batch. The ControlRecipeList ActiveX control can be opened in several different ways.

- Use Windows Explorer to open the control.
- Create a shortcut for the control on the Windows Desktop.
- Add the control to the Batch folder in the Start menu.

Consult your System Administrator for information on setting up and executing any of these options.

**The PromptsList control**

The PromptsList control enables you to display all Unacknowledged Prompts for currently running batches. Prompts are requests for phase parameter values and are acknowledged by providing the parameter value. A batch will not complete its execution until all prompts are acknowledged. The PromptsList control displays a list of batches that have a prompt(s) waiting to be acknowledged.
Chapter 7  FactoryTalk Batch ActiveX controls introduction

PromptsList interface

The format of the PromptsList interface varies, depending on the container in which the control is placed and how the control is formatted within that container. However, the generic control functions in the same way regardless of the container in which it is placed, and still allows an operator to recognize and respond to any unacknowledged prompts.

![PromptsList interface](image)

PromptsList shortcut menu

The PromptsList control includes a shortcut menu that can be accessed by right-clicking anywhere within the control. The shortcut menu allows you to log in to the View Security and to acknowledge prompts. The Acknowledge option on the shortcut menu is specific to the prompt that was right-clicked, and is disabled if a prompt was not clicked.

Open the PromptsList control

Like the Unacknowledged Prompts window within the FactoryTalk Batch View, the PromptsList control is used to acknowledge any prompts generated while running a batch. Unacknowledged prompts remain in the PromptsList window until the prompt is acknowledged or until the batch is STOPPED or ABORTED. The PromptsList control can be accessed in several different ways:

- Placing the control within a web browser
- Using Windows Explorer to open an executable (.exe)
- Creating a shortcut for the control on the Windows Desktop
- Adding the control to the Batch folder in the Start menu

Consult your System Administrator for information on setting up and executing any of these options.

The SignatureList control

The SignatureList control displays a list of pending Signatures waiting to be acknowledged. Signatures are requests for an operator to provide one, two or
three signoffs. Each signoff consists of a user name, password and optionally a comment. The SignatureList control is part of the Electronic Signatures feature, which enables signatures to be electronically recorded. There are several steps that must be performed prior to using this control. See the *FactoryTalk Batch Equipment Editor User Guide* for information on configuring electronic signatures.

**SignatureList interface**

The format of the SignatureList interface varies, depending on the container in which the control is placed and how the control is formatted within that container. However, the generic control functions in the same way regardless of the container in which it is placed, and still allows an operator to recognize and respond to any pending Signatures in the SignatureList.

**SignatureList shortcut menu**

The SignatureList control includes a shortcut menu that can be accessed by right-clicking anywhere within the control. The shortcut menu allows you to log in to the View security.

**Open the SignatureList control**

Like the Signature List View window within the FactoryTalk Batch View, the SignatureList control is used to recognize and sign off any signatures generated while running a batch. Incomplete signatures remain in the SignatureList window until the signature is completed or until the batch is STOPPED or ABORTED. The SignatureList control can be accessed in several different ways:

- Placing the control within a web browser
Chapter 7  FactoryTalk Batch ActiveX controls introduction

- Using Windows Explorer to open an executable (.exe)
- Creating a shortcut for the control on the Windows Desktop
- Adding the control to the Batch folder in the Start menu

Consult your System Administrator for information on setting up and executing any of these options.

The ProcedureView control

The ProcedureView control provides the user with a graphical representation of a control recipe on the Batch List. Control recipes can be viewed in table format or as a sequential function chart (SFC). All procedural levels of a recipe can be navigated using the ProcedureView control. In addition to viewing a current control recipe, the control also allows operators to command control recipes, perform manual binding, perform active step changes and change recipe step parameter values. The appearance of the ProcedureView varies depending on the container in which it is placed, and how it is configured within that container. However, the control functions in the same way, regardless of the container in which it is placed.

Table view interface

The ProcedureView control's table view provides a list-based representation of recipe logic flow. Steps are executed in order, starting with the top row, and proceeding downward through the table. Each row consists of an individual phase and its associated information.

<table>
<thead>
<tr>
<th></th>
<th>Name</th>
<th>Status</th>
<th>Mode</th>
<th>Failure Unit</th>
<th>Owner</th>
<th>Step Index</th>
<th>Message</th>
<th>Request</th>
<th>Parameter 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AGITATE:1</td>
<td>RUN</td>
<td>P_AU</td>
<td>NP_PROG</td>
<td>1</td>
<td>1000</td>
<td>5 RPM</td>
<td>5 RPM</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>MBR_ADD:2</td>
<td>RUN</td>
<td>P_AU</td>
<td>NP_PROG</td>
<td>10</td>
<td>0</td>
<td>EGGS_YOLK MATERIALS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>MBR_ADD:1</td>
<td>RUN</td>
<td>P_AU</td>
<td>NP_PROG</td>
<td>10</td>
<td>0</td>
<td>SUGAR_GRANULATED MATERIALS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>MBR_ADD:3</td>
<td>NP</td>
<td></td>
<td></td>
<td>0</td>
<td>0</td>
<td>CREAM MATERIALS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>TEMP_CTL:1</td>
<td>NP</td>
<td></td>
<td></td>
<td>0</td>
<td>0</td>
<td>71.1 DEG C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>AGITATE:2</td>
<td>NP</td>
<td></td>
<td></td>
<td>0</td>
<td>0</td>
<td>5 RPM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>MBR_ADD:4</td>
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<td></td>
<td>0</td>
<td>0</td>
<td>MILK MATERIALS</td>
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<td></td>
</tr>
<tr>
<td>8</td>
<td>AGITATE:3</td>
<td>NP</td>
<td></td>
<td></td>
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<td>0</td>
<td>5 RPM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>XFR_OUT:1</td>
<td>NP</td>
<td></td>
<td></td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**SFC View interface**

The **ProcedureView** control’s SFC view provides a graphic representation of recipe logic flow. Steps are executed in order from top to bottom through the SFC. The SFC structure is navigated by double-clicking a recipe step to navigate downward through the recipe hierarchy, or by double-clicking an initial step to navigate upward through the recipe hierarchy.

The ProcedureView ActiveX Control includes a shortcut menu that can be accessed by right-clicking anywhere within the control. The shortcut menu allows you to log in the View Security, and to command and view control recipes that have been added to the Batch List. The available items on the shortcut menu are specific to the recipe step or step transition that was right-clicked, and is disabled if the menu item is not valid for the selected element. If the right-click does not occur on a recipe step or step transition, the shortcut menu items are applicable to the recipe level currently being displayed.

**Open the ProcedureView control**

Like the Procedure as Table and Procedure as SFC windows located within the FactoryTalk Batch View, the operator uses the ProcedureView to command and view control recipes that have been added to the Batch List.

To use the ProcedureView ActiveX Control:
Chapter 7  FactoryTalk Batch ActiveX controls introduction

- Place the control within a web browser or other ActiveX container
- Place the control on a Visual Basic form and open it as an executable

Consult your System Administrator for information on setting up and executing any of these options.

Tip: The appearance of the ProcedureView varies depending on the container in which it is placed, and how it is configured within that container. However, the control functions in the same way regardless of the container in which it is placed.

The TimerView control

The TimerView control provides an interface to view all the Timer steps in batches currently on the batch list. You can configure filter criteria for the TimerView control. You can also configure the behavior of the TimerView control through the control’s property pages during design time. During runtime you will have the ability to change the setpoint value for COUNT_DOWN timers. If enabled, you can also change the filtering of the TimerView ActiveX control.

![TimerView control interface](image)

TimerView shortcut menu

The TimerView ActiveX control provides a shortcut menu that can be accessed by right-clicking anywhere within the control. The shortcut menu allows you to log on to the FactoryTalk Batch View Security, and to filter Timers contained in control recipes that have been added to the Batch List.

Open the TimerView control

Use the following instructions to open the TimerView control.

To open the TimerView control:

- Place the control within a web browser or other ActiveX container
- Place the control on a Visual Basic form and open it as an executable
Consult your System Administrator for information on setting up and executing any of these options.

Tip: The appearance of the TimerView varies depending on the container in which it is placed, and how it is configured within that container. However, the control functions in the same way regardless of the container in which it is placed.

**FactoryTalk Batch ActiveX controls summary**

In this section you learned about the following ActiveX Controls:

- ControlRecipeList Control
- PromptsList Control
- SignatureList Control
- ProcedureView Control
- TimerView Control

This chapter provided a brief overview of the capabilities of the FactoryTalk Batch ActiveX Controls. (See the *FactoryTalk Batch ActiveX Controls Library User Guide* for more information.)
PC-based phases introduction

The PC-Based Phase option is an ActiveX control that allows you to design phases for use in FactoryTalk Batch recipes. These phases can be used for a variety of tasks, such as operator prompts, timers and calculations. A PC-based phase communicates with the FactoryTalk Batch Server and does not require a process-connected device. It can be used in place of phase logic, allowing you to decrease the amount of memory required within your process-connected device.

PC-based phases use the Batch Phase Execution control, which encapsulates the FactoryTalk Batch phase logic interface and the OPC interface. The Batch Phase Execution control functions as a data server for PC-based phases and supports the full functionality of a FactoryTalk Batch phase. It is an SP-88-aware component and is used to provide Level 2 control of the FactoryTalk Batch Control system. The Batch Phase Execution control is a persistent component that supports automatic checkpointing. It can be accessed directly from within Visual Basic, Access, or any other Microsoft-compatible control container.

(See the FactoryTalk Batch PC-Based Phase Programmer's Technical Reference for more information.)

PC-based phases

A PC-based phase allows you to program a phase outside a process-connected device (PCD). You can program the phase to meet your own unique requirements from within your Microsoft-compatible control container. The PC-based phase works the same as any phase defined in a PCD, communicating with the FactoryTalk Batch Server through the Batch Phase Execution control. This allows you to save your system’s valuable memory for processes that require interaction with hardware.

After a PC-based phase is created, the FactoryTalk Batch area model must be updated to include the new phase and the appropriate phase(s). Because the Batch Phase Execution control behaves as a data server, a new data server definition must be created. The data server definition is created using the FactoryTalk Batch Equipment Editor and defined using the Batch Phase Execution control's communication parameters. The FactoryTalk Batch phase can then be added to your recipes. The PC-based phase must remain active...
Execution of a PC-based phase example

during recipe execution, allowing the phase to communicate with the FactoryTalk Batch Server through the **Batch Phase Execution** control.

An example of a PC-based phase executing within a recipe is shown. The PC-based phase is created to prompt the operator to take a sample to **Quality control** (QC) and then enter the results. The phase communicates with the FactoryTalk Batch Server by way of the **Batch Phase Execution** control. The phase can direct the server to prompt the operator, wait for results and have the FactoryTalk Batch Server store the result in the electronic batch record. The recipe will only proceed if the result is within the appropriate range.

In **Step 1**, as the batch is processed, the **QC_Chk** phase is executed.

In **Step 2**, the **QC_Chk** phase displays a screen to the operator, requesting that the operator have QC take an in-process sample. The **QC_Chk** phase will not continue processing until the operator enters the QC result.

In **Step 3**, When the operator enters the result, the **QC_Chk** phase sends the report value to the FactoryTalk Batch Server, using the **Batch Phase Execution**...
control, which stores the value in the electronic batch record. While the phase is executing, an activity log file is updated with process events.

In **Step 4**, control is returned to the recipe, and it continues processing the balance of the transitions and steps.
In this section you:

- Learned about the execution of PC-based phases.

This chapter provided a brief overview of the capabilities of PC-based phases. (See the FactoryTalk Batch PC-Based Phase Programmer Technical Reference Guide for more information.)
Glossary

**acquire**

To gain ownership of a resource. Resources can be acquired automatically when a batch runs. Resources can also be acquired manually in the Arbitration and Phase Control processes.

**acquiring**

Acquiring is a possible state of the *Firing attribute* of a transition. When the transition is in the Acquiring state, it has made non-binding related arbitration requests for resources needed by one or more steps following the transition.

**action**

An Action is a queued Execute command to the FactoryTalk Batch Server that is pending one or more Signature completions prior to being performed.

**action ID**

A 32-bit unsigned integer that uniquely identifies an action.

**activation file**

A text file that contains all of the activation information that is required to license a software product and allow it to properly function. While the file is simply plain text, the contents of the file are protected by a signature.

**ActiveX controls library**

The ActiveX Controls Library is a set of ActiveX Custom Controls that allows you to create and control batches without using the FactoryTalk
Batch View, and also provides the ActiveX tools needed to create a custom user interface.

**allocation**

A form of coordination control that assigns a resource. An allocation can be for the entire resource or for portions of a resource.

**AND (Divergence)**

A structure in the sequential function chart (SFC) that indicates steps are activated concurrently.

**approval process (for a recipe)**

An umbrella term for the Primary approval and Expedited approval processes that are used to validate the development and maintenance of batch recipes. (Only one process can be used at a time.) Using signature certification, the approvals process for a recipe safeguards design workflow in a formalized manner. This ensures each recipe is validated by authorized personnel before being released to production.

**arbitration**

A form of coordination control that determines how a resource should be allocated when there are more requests for the resource than can be accommodated at one time.

**area**

A component of a batch manufacturing site that is identified by physical, geographical or logical segmentation within the site.

**area model**

The physical component of a batch facility. A database that consists of all equipment in the facility and all of the tasks that it is capable of performing.
assigning

The act of issuing a value to a parameter.

automation server

A software application that contains objects that can be used easily by other applications through the encapsulation and reuse of code.

batch

An entity that represents the production at any point in the process. A batch is a running control recipe. The material that is being produced or that has been produced by a single execution of a recipe is also considered a batch.

batch control

Consists of a sequence of one or more steps (phases) that must be performed in a defined order for a finite period of time to process finite quantities of input material to produce finished product.

batch process

A process that leads to the production of finite quantities of material by subjecting quantities of input materials to a defined order of discontinuous processing actions using one or more pieces of equipment.

binding

Binding is the process of mapping steps within a control recipe to actual equipment in a plant.

binding (in transitions)

Binding is a possible state of the Firing attribute of a transition. When the transition is in the Binding state, it is in the process of attempting to bind one or more of the steps following the transition. The binding process may involve the generation of binding prompts and/or the generation of arbitration requests.
**binding preference**

A Binding Preference is an object that can be evaluated against instance of a unit class in order to sort the legal bind targets for a unit requirement into a **most preferred** order.

**binding requirement**

A Binding Requirement is an object that can be evaluated against instances of a unit class to determine which instances of the class are legal bind candidates for a unit requirement. When attempting to bind a unit requirement during recipe execution, the entire set of binding requirements defined on the unit requirement is evaluated against each potential binding candidate. Units that are unable to meet every binding requirement defined on the unit requirement are eliminated as potential binding candidates for the unit requirement.

**binding requirement expression**

A Binding Requirement Expression, as defined within the Equipment Editor, evaluates to either a TRUE or FALSE value. An example would be "TEMPERATURE < 20.3".

**check in**

Check in creates a new version of a recipe, which is read-only and designated with a ~Vn suffix (where n is the version number).

Example: Checking in `Make_sauce` results in the creation of the `Make_sauce~V1` version.

**check out**

Check out creates an editable WIP (work-in-progress) recipe, designated with a ~Vn_WIP suffix (where n is incremented by one).

Example: Checking out `Make_sauce~V1` results in the creation of `Make_sauce~V2_WIP`. Subsequently, when `Make_sauce~V2_WIP` is checked in, it will result in the read-only `Make_sauce~V2` version.

**class-based recipe**

A recipe that specifies one or more unit classes for equipment requirements. The operator will then be required to specify a particular unit at the time the batch is created.
**client**

A component or subsystem that uses data or functionality provided by some other component or subsystem (the server). The term can also refer to the computer that executes this software, connecting to a server computer across a communication network.

**command buttons**

The buttons used to initiate functions.

**comm err**

Comm Err is a possible state of the **Firing attribute** of a transition. When the transition is in the Comm Err state, a communications error with phase logic has been detected while the transition was in the Stopping/Resetting/Pending states of the firing process. The transition has rolled back to the beginning of the Stopping/Resetting/Pending process and is awaiting good communications and a RESTART command before re-initiating the firing process.

**committed**

Committed is a possible state of the **Firing attribute** of a transition. When the transition is in the Committed state, it has committed to the firing process, but is not in the process of firing because either the transition is in the HELD state or the parent procedure is in MANUAL mode.

**common resource**

A service that is provided to more than one requester. Common resources are identified as either exclusive-use resources or shared-use resources.

**control module**

A regulating device, a state-oriented device, or a combination of regulating and state-oriented devices that are controlled as a single device. This term applies to both physical equipment and the equipment entity.
**control recipe**

A type of recipe, which through its execution, defines the manufacture of a single batch of a specific product.

**control strategy**

A user-defined grouping of phase and report parameters associated with a single phase. Organizing parameters into separate control strategies allows phases to assume multiple roles without generating unnecessary phase I/O.

**container recipe**

A recipe that contains one or more steps assigned to a specified operation-level recipe or unit procedure-level recipe retrieved when using the Find Recipe References option.

**coordination control**

A type of control that directs, initiates, or modifies the execution of the procedural control and the utilization of equipment entities.

**data server**

A data server provides runtime information to the FactoryTalk Batch Client or the HMI software. This information comes from the PLC or PCD.

**DCS (Distributed Control System)**

A Distributed Control System (DCS) is a control device. Logic (programs) contained in the DCS read or write to the inputs or outputs of the field devices. A DCS is sometimes referred to as the process-connected device (PCD).

**dedicated resource**

A resource used by only one step at a time inside a recipe structure.
**deferred parameter**

Step formula value that is put off and takes on the value of another parameter at a higher level within the recipe. This function has the effect of passing Recipe formula parameter data from one level of a recipe down to another.

**display parameter**

The step formula value specified as being the one to be displayed as part of the SFC in the Procedure as SFC View window.

**download**

A request from a phase to the FactoryTalk Batch Server to send it data.

**downstream unit requirements**

If dynamic unit allocation is enabled, downstream unit requirements may be defined for class-based and instance-based unit procedures. Downstream unit requirements are used to control batch flow and to make sure that the appropriate unit is selected during unit-binding.

**dynamic unit allocation**

The process of binding a specific unit to a class-based unit procedure or operation. Dynamic unit allocation can be defined only at the procedural level.

**electronic signature**

An electronic representation of a signature, including all associated data. Can consist of one or two signoffs. Associated data includes meanings for the signoffs, comments, security requirements, and timestamps.

**enterprise**

An organization that coordinates the operation of one or more sites.
end of batch archiving

The FactoryTalk Batch Server automatically runs the Archiver when a batch is removed from the Batch list.

equipment editor

The equipment configuration module of the FactoryTalk Batch components. The FactoryTalk Batch Equipment Configure resources, phases, units, and communications data.

equipment phase

An equipment phase is the S88 terminology for the equipment phase and equipment phase interface. In FactoryTalk Batch, equipment phases are configured in the FactoryTalk Batch Equipment Editor as instances of the recipe phases. Equipment phases are bound to the recipe at runtime.

exception handling

Those functions that deal with facility or process contingencies and other exception conditions.

exclusive-use resource

A common resource that can only be used by one user at any given time.

execution token

A "marker" indicating a currently active step of an SFC. By definition, an SFC begins execution with a single Execution Token present in its Initial Step. When SFC execution reaches an "AND Divergence", a single Execution Token is split into two or more tokens, and when SFC execution passes through an "AND Convergence", two or more Execution Tokens are combined into a single token.

expedited approval process

An Expedited Approval Process can be used when you do not want to perform the Primary Approval Process, for example in the early stages
of recipe design. A recipe can go through initial review using the expedited process. After the recipe is deemed ready, the approval process can be reverted to its starting point, and then the primary approval process is used to validate it for release to production.

**FactoryTalk Asset Centre**

Formerly RSMACC (Rockwell Software Maintenance Automation Control Center).

**final (terminal) step**

The logical end of a sequential function chart (SFC).

**firing attribute**

The Firing Attribute (formerly the Acquiring attribute) has nine legal states, defined as follows:

- **"0"**: Not Firing - The transition is not in the firing process.
- **"1"**: Acquiring - The transition is in the process of acquiring resources for the following steps.
- **"2"**: Binding - The transition is in the process of binding one or more of the following steps.
- **"3"**: Committed - The transition is committed to the firing process, but is not proceeding due to either a HELD state, or the parent procedure being in MANUAL mode.
- **"4"**: Stopping - The transition is waiting for one or more prior steps to achieve a terminal state after having been issued STOP commands.
- **"5"**: Resetting - The transition is waiting for one or more prior steps to transition to IDLE after having been issued RESET commands.
- **"6"**: Pending - The transition is waiting for one or more prior steps to transition into a legal state for a Transfer of Control operation.
- **"7"**: Paused - The transition is waiting for a RESUME command or a return of the parent procedure to AUTO mode.

**first available binding**

- This is one of the ways that units are selected for binding. This is called late unit binding or dynamic unit allocation. When automatically selecting a unit for binding, the FactoryTalk Batch Server tries to use
the unit that the recipe can acquire first. The acquired unit must belong to the unit class of the unit procedure step. Recipes can configure upstream and/or downstream dependencies defining a series of unit classes that a recipe requires as a recipe executes. The acquired unit supports the flow path to other units.

**formula**

A category of recipe information that includes process inputs, process parameters and process outputs.

**formula value**

A value that is assigned to a parameter defined for a specific step of a phase, operation or unit procedure. A formula value may have a literal value assigned to it or it may receive a value from the next higher recipe level when the batch is run.

**global binding requirement**

A Global Binding Requirement is defined within the Equipment Editor for an area model, and is automatically applied to every unit requirement within a recipe. This saves the effort of having to manually add the binding requirement to every unit requirement in every recipe.

**global unit attribute**

A Global Unit Attribute is a unit attribute that has been configured to be automatically applied to all unit classes defined within the area model. This saves the area model author the effort of having to manually assign the unit attribute to every unit class.

**header**

General information about the recipe that includes the procedure identifier, version number, version date and the author.

**Human-Machine Interface (HMI)**

An application used in conjunction with the FactoryTalk Batch View to control the manufacturing equipment within a plant. The HMI
software allows the operator to view actual process values and equipment states, such as Valve 101 = Open or TempCtrl 202 = 90° F.

**incremental archiving**

The Archiver, running as a Windows service, inserts records from the electronic batch record file into the specified database at a pre-defined interval. The Archiver is controlled from the FactoryTalk Batch Service Manager dialog box or the Windows Control Panel Services window.

**initial step**

The logical start of a sequential function chart (SFC).

**input parameter**

A parameter holding a value designed to specify how a sequence or procedure is to execute.

**instance-based recipe**

Recipe that uses unit instances for the equipment requirements.

**key parameter**

The step parameter specified as being the one to display as part of the SFC in the FactoryTalk Batch Recipe Editor SFC view window.

**late binding**

This is a binding method where a step is bound to equipment just before it is used. For unit procedure steps, this is also called dynamic unit allocation.

**linear segment**

The collective set of steps and transitions bounded by a Divergence and a Convergence.
manual mode

The mode of a control recipe when the procedure does not sequence automatically. Transitions are not checked, therefore the step performs its assigned functions and no further action is taken without operator intervention.

master recipe

A type of recipe that accounts for equipment capabilities and may include process cell-specific information.

mode

The manner in which the transition of sequential functions are carried out within a procedural element and the accessibility for manipulating the states (manually or by other control functions) of equipment.

not firing

Not Firing is a possible state of the Firing attribute of a transition. When the transition is in the Not Firing state, it is not in the process of firing and not committed to the firing process.

null procedure

A non-expandable procedure that does not refer to any logical definition in the area model nor any lower level recipe procedure. A null procedure executes automatically and plays a role in material loops where it is used for re-binding purposes.

O-Auto mode

The mode of a control recipe when the operator initiates all commands and functions.

obsolete recipe

An Obsolete recipe is a versioned recipe that has failed verification due to a change in the recipe’s underlying area model. A versioned recipe is a read-only snapshot of a recipe that uses strict, system-enforced naming conventions.
**ODBC (Open Database Connectivity)**

A database connectivity standard written by Microsoft.

**OLE (Object Linking & Embedding)**

Method used to allow two different applications to share live information, which makes HMI connectivity much more robust.

**OPC (Open Platform Communications)**

A communications protocol that provides a defined set of COM interfaces that in turn provide data access functions. OPC can be used by the FactoryTalk Batch Server as a more flexible and powerful alternative to the Dynamic Data Exchange (DDE) communications protocol when communicating with process-connected devices (PCDs).

**operation/operation level**

The operation segment of a recipe. A procedural element defining an independent processing activity consisting of the algorithm necessary for the initiation, organization and control of phases.

**OR (Divergence)**

A structure within an SFC that represents a decision where recipe control is passed to only one of the subsequent steps.

**owned list**

When the perspective in the Arbitration Focus window is designated owner, the owned list consists of all running recipes, resources and operators that are displayed in the Owned By portion of the Arbitration window.

**owner list**

List of all running recipes, resources and operators that displays in the Arbitration Focus window when the perspective is owner.
**owner's perspective**

Function of the arbitration focus in which a resource or running recipe owns, or is requesting to own, other resources.

**owner's list**

When the perspective is resource, the owner's list is the roster of owners for all running recipes, resources and operators.

**P-Auto mode**

The mode of a control recipe when the procedure is sequencing automatically.

**PCD (Process-connected Device)**

Hardware that allows the FactoryTalk Batch Server to communicate with the equipment in a facility.

**PLC (Programmable Logic Controller)**

A control device. Logic (programs) contained in the PLC read or write to the inputs or outputs of the field devices. Referred to as the process-connected device in FactoryTalk Batch documentation.

**parameter**

Used to allow for flexibility in the recipe creation process. Parameter values are used in transition conditions or for substitution of phase parameters. A parameter is created for these recipe levels: operation, unit procedure or procedure. Values are assigned when a unit procedure or operation step is added to a recipe.

**parameter deviation**

A parameter deviation exists when a parameter value is not within the limits defined in the recipe.
**parameter expression**

An arithmetic expression that may be assigned to an input parameter or output parameter of a phase, operation, or unit procedure step that can reference other parameters and recipe header data within a recipe. The expression is evaluated and the result stored as the value of the parameter.

**path (stream)**

The order of equipment within a process cell that is used, or is expected to be used, in the production of a specific batch.

**paused**

Paused is a possible state of the **Firing attribute** of a transition. When the transition is in the Paused state, its expression has evaluated to TRUE and it is ready to fire. It is suspended the firing process due to the parent procedure being in SEMI-AUTO mode. It is awaiting either a RESUME command or a transition of the parent procedure to AUTO mode before continuing with the firing process.

**pending**

Pending is a possible state of the **Firing attribute** of a transition. When the transition is in the Pending state, it is waiting for one or more prior steps to transition into a legal state for a Transfer of Control operation.

**phase**

The lowest level procedural element in the procedural control model. The phase provides an interface to basic control.

**phase link group**

Group that identifies phases that may communicate and work together.
phase state

Term that appears inside the State Frame declaring the phase’s current condition: IDLE, READY, RUNNING, ARMING, ARMED, FIRING, CONNECTING, DOWNLOADING, UPLOADING, UPLOADHELD, STARTING, COMPLETE, HOLDING, HELD, RESTARTING, STOPPING, STOPPED, ABORTING, ABORTED or UNKNOWN.

primary approval process

A full and formal approval process to validate the development and maintenance of batch recipes. In addition to the Primary Approval process with up to six approval steps (three optional), a two-step Expedited Approval process is available.

procedure/procedure level

The procedure segment of a recipe, such as the strategy for accomplishing a process. Procedure level is a general term for the three segments of a recipe: operation, unit procedure, and procedure.

procedural control

Control that directs equipment-oriented actions to take place in an ordered sequence to carry out a process-oriented task.

procedure file

The saved file of a completed recipe.

procedural element

A building block for procedural control that is defined by the procedure model.

process

A sequence of chemical, physical or biological activities for the conversion, transport or storage of material or energy.
**process cell**

A logical grouping of equipment, which includes the equipment required for the production of one or more batches. The process cell defines the span of logical control of one set of process equipment within an area.

**process control**

The regulation or manipulation of variables (output) influencing the conduct of a process (or part of a process) in such a way as to obtain a product of desired quality and quantity (set point) in an efficient manner.

**process management**

The activities necessary to manage batch production within a process cell.

**process operation**

A major processing activity that usually results in a chemical or physical change in the material being processed and that is defined without consideration of the actual target equipment configuration.

**providers**

System components that provide diagnostic information to the FactoryTalk Diagnostics system. Providers can be FactoryTalk system elements or applications such as the FactoryTalk Batch Equipment Editor and FactoryTalk Batch Recipe Editor.

**recipe approvals process**

An umbrella term for the Primary approval and Expedited approval processes that are used to validate the development and maintenance of batch recipes. (Only one process can be used at a time.) Using signature certification, the recipe approvals process safeguards design workflow in a formalized manner. This ensures each recipe is validated by authorized personnel before being released to production.
**recipe directory**

Directory of saved recipes.

**Recipe Editor**

The master recipe building application of the FactoryTalk Batch system. The FactoryTalk Batch Recipe allows the user to perform recipe management.

**recipe formula parameter**

A parameter specific to a recipe. A parameter can be used to pass values from one level of a recipe to the next lower level. A recipe formula parameter is configured in the FactoryTalk Batch Recipe Editor on a procedure or operation step. Recipe parameters can be deferred to recipe formula parameters.

**recipe management**

The control activity that includes creating, editing, storing and retrieving general, site and master recipes.

**recipe parameter**

A parameter specific to a recipe. A parameter can be used to pass values from one level of a recipe to the next lower level. A recipe parameter is configured on the recipe phase and downloaded to the equipment phase at runtime.

**recipe phase**

A Recipe Phase is the S88 terminology for the lowest level of procedural element in the procedural control model, which is in a master or control recipe. In FactoryTalk Batch, recipe phases are configured in the FactoryTalk Batch Equipment Editor and used to build recipes in the FactoryTalk Batch Recipe Editor.

**recipe verification**

A function of the FactoryTalk Batch Recipe Editor, recipe verification performs a set of error checks on a recipe.
**recipe version control**

When Recipe Version Control is enabled in an area model, a versioned recipe is created with the File > Check in command in the FactoryTalk Batch Recipe Editor. A versioned recipe is a read-only snapshot of a recipe that uses strict, system-enforced naming conventions. Editable copies of versioned recipes are created using the File > Check out command in the FactoryTalk Batch Recipe Editor--these are called WIP (work-in-progress) recipes. If the area model that underlies a versioned recipe changes, the recipe becomes an Obsolete recipe.

**reference list**

The list of all container recipes with steps that reference a specified recipe retrieved when using the Find Recipe References option.

**reference recipe**

The operation or unit procedure referenced in container recipes searched when using the Find Recipe References option.

**release**

Function in the arbitration process that allows the operator to release a resource that is currently owned by the operator.

**release recipe as step**

A property of a recipe that signifies it is approved for release as a step, procedure, or operation to be used in a larger, more complex recipe. A recipe can only be added to the Batch list if all its children recipes have their Release Recipe as Step properties checked (set to true).

**release recipe to production**

A property of a recipe that signifies it is approved for release to production. When this property is true, the recipe is shown on the Recipe List in FactoryTalk Batch View, eProcedure, or ActiveX controls. When all aspects of the recipe are verified and all steps are marked as Release Recipe as Step, batches can be created against the recipe.
**report aggregation - batch**

In the Recipe Editor, a report parameter (output) that is defined to add each uploaded value to the report to its current value and store that value for the duration of the batch.

**report aggregation - none**

In the Recipe Editor, a report parameter (output) that is defined to store an uploaded value, overwriting any value previously there. This is the behavior of report parameters in versions before FactoryTalk Batch 11.0 and is still the default behavior.

**report aggregation - phase**

In the Recipe Editor, a report parameter (output) that is defined to add each uploaded value to the report to its current value and store that value until the phase is reset.

**report parameter**

A value specific to a phase. It is a value that is passed from the process-connected device (PCD) to the FactoryTalk Batch Server where it can be used in reports. Typically, the report parameter is a process value.

**requested list**

When the arbitration focus is in the owner perspective, this list displays the roster of resources requested by the resource or recipe that is identified in the **Name** box.

**resetting**

Resetting is a possible state of the Firing attribute of a transition. When the transition is in the Resetting state, it has issued RESET commands to the preceding steps and is waiting for them to transition to IDLE states in response to the command.

**resource**

A general term for equipment including process cells, units, phases, and shared control modules.
**resource’s perspective**

Function in the Arbitration Focus window that allows the viewing, acquiring or releasing of resources or running recipes that currently own or are requesting to own a selected resource.

**resource list**

When the perspective is resource in the *Arbitration Focus* window, the roster of resources is the resource list.

**resource user**

An object that either owns or is requesting to own a resource. Can be the operator, a running recipe or another resource.

**resource**

A general term for equipment including process cells, units, phases, and shared control modules.

**scalable**

Located in the *Recipe formula parameter* list, this field indicates if the parameter is scalable with the scale of the recipe.

**semi-Auto mode**

The mode of a recipe level or phase that allows the operator to manually step through the recipe level or each line of the phase’s program. This mode requires that the transitions be programmed to check the phase’s paused bit. Each time the *Resume* button is pressed, the paused bit is reset.

**sequential function chart**

Sequential Function Chart is a graphical programming language that defines the logical flow of the recipe’s procedure.
**sequential function chart step**

The structure in the SFC that references a subordinate phase or procedure.

**server**

A software application that communicates with another software application (the client). The server normally supplies data or functions to the client. The FactoryTalk Batch Server is both a client and a server. When communicating with the FactoryTalk Batch View component, the FactoryTalk Batch Server acts as the server; when communicating with a data server, it acts as the client.

**service**

A process that performs a specific system function, but that does not include a graphic user interface. Services often include an application programming interface that can be called by other processes and remotely from other computer nodes.

**service manager**

A software application that allows a user to remotely monitor and/or control Windows services. The FactoryTalk Batch Service Manager allows an operator to control all batch-related services, as well as access the **Server Statistics** dialog box.

**SFC**

Sequential Function Chart.

**SFC validation**

A function of the FactoryTalk Batch Recipe Editor, this error check looks for “logic” errors in the SFC structure defined within a recipe.

**shared resource**

A resource used in parallel by an unlimited number of steps at a time inside a recipe structure.
shared-use resource

A common resource that can be used by more than one user at a time.

simulator

The FactoryTalk Batch phase logic simulation program allows you to run the FactoryTalk Batch components and simulate your batch process without being connected to a PCD. The simulator can be used for testing, experimentation and demonstration purposes.

site

A component of a batch manufacturing enterprise that is identified by physical, geographical or logical segmentation within the enterprise.

state

The condition of equipment or a procedural element at a given time.

static binding

A binding method where a step or set of steps is bound to equipment when the recipe is built in the FactoryTalk Batch Recipe Editor (equipment bindings are specified in the master recipe). Material phase steps are never statically bound.

step reference

A step within a container recipe that is configured to reference an operation or unit procedure specified when using the Find Recipe References option.

stopping

Stopping is a possible state of the Firing attribute of a transition. When the transition is in the Stopping state, it has issued STOP commands to one or more of the preceding steps and is waiting for them to transition to terminal states.
subarbitration

The process of arbitrating the use of a dedicated resource required by phases operating in parallel within a control recipe.

tag

A named area of the process-connected device or controller's memory where data is stored. It is the basic mechanism for allocating memory, referencing data from logic, and monitoring data.

terminal (final) step

The logical end of an SFC.

transition

Defines how recipe control moves from step to step. When a step is complete, the transition designates the criteria that must be met before the recipe continues to its next logical step.

unacknowledged prompt parameter

A step parameter directed to prompt the operator for data when a phase requests a download.

unit

A collection of associated control modules and/or equipment modules that can carry out one or more major processing activities such as react, crystallize, make a solution, etc.

unit-based recipe

A recipe that specifies a specific unit for equipment requirements.

unit class

A means of categorizing units into groups of similar or identical sets of equipment. Recipes can be written specifying a unit class (class-based), or a specific unit (unit-based).
**unit procedure/unit procedure level**

A production sequence (consisting of contiguous operations and algorithms necessary for the initiation, organization, and control of those operations) executed within a unit. The unit procedure level is a general term for the level that contains unit procedures in a recipe.

**upload**

A request from a phase to send data to a batch server.

**verification limits**

Verification limits are the values against which a recipe parameter or report value are checked. Three types have been identified: Absolute, Percentage, and Value.

**verification method**

An algorithm specified in the equipment editor associated with each parameter or report parameter. The algorithm specifies what set of limits are used for each parameter. For example: High-High-High/ Low-Low-Low, High-High / Low-Low, High / Low or None.

**verification policies**

The verification policies specify the actions that are taken if an entered parameter or report parameter is outside the specified verification limits. The current options are: none, require confirm, single signature, dual signature and not allowed.

**verification signature**

A new type of prompt that is used to display the deviation information and request the confirmation or signatures required according to the configured verification policies.

**verify recipe**

Process in which a recipe is checked for completion and accuracy.
**versioned recipe**

A read-only snapshot of a recipe that uses strict, system-enforced naming conventions. When Recipe Version Control is enabled in an area model, a versioned recipe is created with the **File>Check in** command in the FactoryTalk Batch Recipe Editor. See also **WIP (work-in-progress) recipe** and **Obsolete recipe**.

**view**

The recipe execution application of the FactoryTalk Batch components. The FactoryTalk Batch View allows the operator to create and run a batch, control phases, arbitrate resources, and view event data.

**WIP (work-in-progress) recipe**

An editable copy of a versioned recipe. When Recipe Version Control is enabled, a WIP copy is created.
Index

A

acquire 79
control of a phase 77

ActiveX Controls Library
ControlRecipeList 90
overview 89
ProcedureView 94
PromptsList 91
SignatureList 92
TimerView 96

add
batch to Batch List 67

arbitration 79

area model 37
build 37
open 38

B

batch
add to Batch List 67
remove from Batch List 72
run 67

Batch Event Journal
view 76

Batch Server 25
configure sample demonstrations 30
status 65

Batch View 65
exit 83
start 65

BATCHCTL 26

binding
at batch creation 67
manually 72
preference 103
requirement 103
unit 72

binding requirement
expression 103
global 103

BPC (batch procedure level) 55

build
area model 37

C

communication
Batch Server 65
data server 65

configure
equipment module 42
phase 40
sample demonstrations 26
View 82

control
a phase 77

control strategy 40

ControlRecipeList
interface 90
open 91
shortcut menu 91

create
equipment module 43
phase 41

D
data server 65
dynamic unit allocation 67

e

electronic signature template, add 44

Equipment Editor 37
exit 49
interface 37
start 37

equipment, share 49

exit
Batch View 83
Equipment Editor 49

F

FactoryTalk Batch components 13

G

global
binding requirement 103
unit attribute 103

glossary 103
icon
    phase 43

Instrument Society of America (ISA) 14

interface
    Equipment Editor  37
    Recipe Editor  52

ISA (Instrument Society of America) 14

M

MBA (modular batch automation) 14
mode
    phase 82

modular batch automation (MBA) 14

O

OPC (OLE for Process Control)
    communication protocol 34
open
    area model 38
    recipe 53
    simulator demonstration file 34

P

parallel step
    remove 62

PC-based phase
    definition 99
    execution 100

phase 40
    configure 40, 42
    control manually 77
    create 41, 43
    modes 82

phase configuration
    view 40

Phase Execution Control 99

phase icon 43

phase logic 43

phase logic simulation 34

Phasesimulator 34
    start 34

phase summary 79

preference
    binding 103

ProcedureView
    interface 94

open 95
    table view interface 94

process-connected device (PCD) 37

prompts 91
    unacknowledged 74

PromptsList
    interface 92
    open 92
    shortcut menu 92

R

rebuild
    recipe directory 32

recipe
    open 53
    structure 54
    verify 62
    view as table 55
    view table 69

recipe directory
    rebuild 32

Recipe Editor 51
    interface 52
    procedure view 52
    recipe construction 52
    resize Procedure View 54
    start 52

remove
    batch from Batch List 72
    parallel steps 62
    sequential steps 62

requirement
    binding 103

resize
    Procedure View 54

run a batch 67

S

S88.01 model 14

S88.01 Standard 14, 37, 51

sample demonstrations 26
    configure Batch Server 30

Sequential Function Chart (SFC) 69
    navigate 55, 70
    size 69

sequential step
    remove 62

server
Batch Server 25

SFC (sequential function chart) 69
SFC share 49
signature template, add 44
SignatureList
  interface 93
  open 93
  shortcut menu 93
simulator 34
  open sample demonstration files 34
size
  SFC area 69
start
  Batch View 65
  Equipment Editor 37
  Phase Simulator 34
  Recipe Editor 52
step formula values 58

T

tag
  view 43
  template, add 44
TimerView
  open 96
TimerView control 96

U

unacknowledged prompts 74, 91
  acknowledge 77
unit
  binding 72
unit attribute
  global 103
UOP (unit operation level) 55
UPC (unit procedure level) 55

V

verify
  recipes 62
view
  Batch Event Journal 76
  equipment module configuration 42
  phase configuration 40
  Recipe Table 69
  tags 43
View 65
Rockwell Automation support

Use these resources to access support information.

<table>
<thead>
<tr>
<th>Technical Support Center</th>
<th>Find help with how-to videos, FAQs, chat, user forums, and product notification updates.</th>
<th>rok.auto/support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledgebase</td>
<td>Access Knowledgebase articles.</td>
<td>rok.auto/knowledgebase</td>
</tr>
<tr>
<td>Local Technical Support Phone Numbers</td>
<td>Locate the telephone number for your country.</td>
<td>rok.auto/phonesupport</td>
</tr>
<tr>
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<td>rok.auto/literature</td>
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Waste Electrical and Electronic Equipment (WEEE)

At the end of life, this equipment should be collected separately from any unsorted municipal waste.

Rockwell Automation maintains current product environmental information on its website at rok.auto/pec.