

# Advanced Unit Management Software

- Integrated, multi-state, class-based phase logic
- IEC61131-3 sequential function charts, function block diagramming, and structured text
- ISA-88 and NAMUR NE33 standards
- Unit-relative software support
- FOUNDATION™ fieldbus functionality
- Scalable software to meet any need

## Introduction

DeltaV™ Advanced Unit Management software provides class-based Unit, Equipment Modules, Control Modules and Unit Phases to make developing unit-relative equipment strategies simple.

IEC 61131-3 control languages can be used to graphically assemble or modify control strategies using standard drag-and-drop technology. This makes learning and using the DeltaV system easy, and it allows you to improve the process while implementing your batch process controls.

## Benefits

**Integrated, multi-state, class-based phase logic.** Using sequential function charts (SFCs) and a built-in state transition diagram, you can create batch phase control using class-based phases. This easy-to-use structure includes predefined phase states, automatic state switching, built-in failure monitoring and a pre-configured faceplate to manually control your phases from the Operator Interface. Recipe management software also orchestrates the execution of phases including passing recipe parameters and collecting history data.

**IEC61131-3 Control Languages.** DeltaV software supports three IEC61131-3 graphical control languages so you can always use the tools most appropriate for the job. Function Block Diagrams (FBD), Sequential Function Chart (SFC), and Structured Text (ST) are all available, making control strategy development both intuitive and easy.



*Advanced Unit Management control software provides class-based, multi-state phase control.*

**ISA-88 and NAMUR NE33 Standards.** These standards are used throughout the DeltaV system. For example, both the physical and procedural models are used as a basis for building batch-related equipment and sequences. Control modules, equipment modules and process units can be created and used in conjunction with phases to carry out a batch process. Phases are executed within the controller and are tightly integrated with the recipe management software.

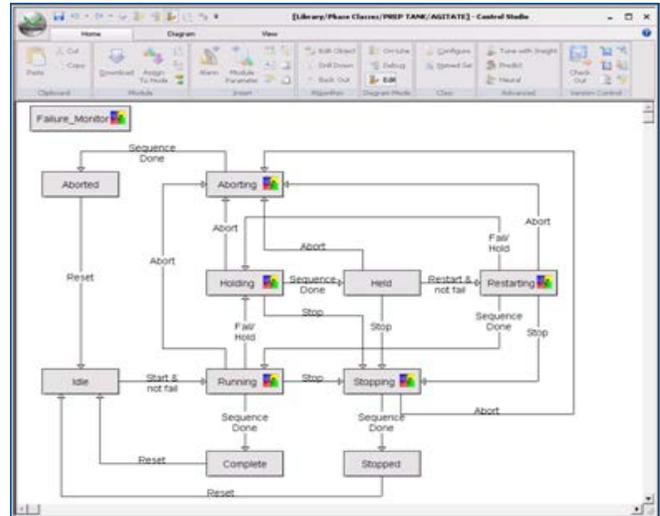
**Unit-relative Software Support.** Aliasing and dynamic path reference capabilities are key benefits of the DeltaV object-oriented batch architecture. By using the aliasing and dynamic path reference capabilities, users can create generic phase logic that may be executed on several different process units. Taking advantage of these capabilities can dramatically reduce software design, implementation, test, validation, and maintenance costs.

**FOUNDATION fieldbus functionality.** These blocks are used throughout the DeltaV system. Control strategies are developed using these standards-based blocks, which minimize development time and maximize the system's performance. Many functions like override control, tracking, and state control are built into these powerful blocks to save you engineering time. Plus, with fieldbus you get the added bonus of decreased wiring costs and improved instrument diagnostics.



**Scalable software to meet any need.** As your needs grow, the DeltaV automation system is ready to expand with you. Additional capacity can be added online while you continue to control your process.

Control Language Typical Usage	
<b>Function Block Diagram (FBD)</b>	
Monitoring and alarming	
Continuous calculations	
Analog control (pressure, temperature, flow)	
Motor and block valve control	
Totalizers	
<b>Sequential Function Chart (SFC)</b>	
Charging systems	
Startup/shutdown control	
Batch sequences (fill, mix, heat, dump)	
<b>Structured Text (ST)</b>	
Advanced math functions	
Complex calculations	
Interlock condition detection	
If-then-else decisions	
Looping (WHILE...DO)	
Bit manipulations	



Class-based, multi-state control

Both phases and unit modules are fully integrated, with batch recipes automatically providing execution control, recipe and report parameter passing, and history tracking. Users do not have to map registers or write custom logic. Operator interfaces and alarm management are provided as standard features.

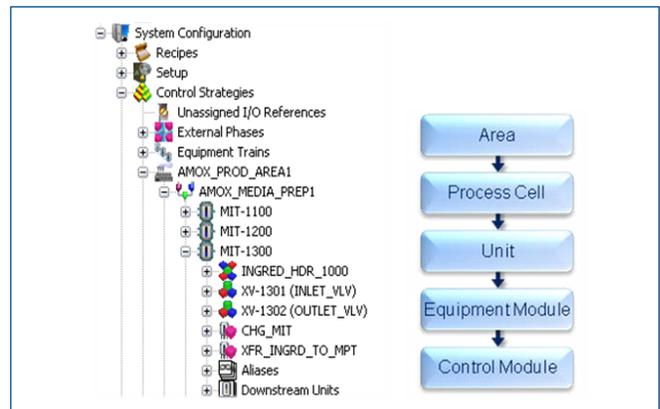
Advanced Unit Management control software includes the ability to display, trend, alarm, and collect history for values brought in through the controller's I/O subsystem.

## Product Description

The Advanced Unit Management license provides users with the ability to build class-based units and phase logic to create unit-relative equipment control strategies. These licenses may be *upgraded* online while you continue to monitor and control your process.

The Advanced Unit Management control software provides *lass-based, multi-state phase control* in addition to all of the other DeltaV monitoring, discrete, sequencing and analog control functions. Each state (such as running, holding, and aborting) is configured using standard SFCs, and branching between the states is fully automatic.

Additionally, the phase logic within each state can be written generically, using aliases or dynamic references in place of a standard DeltaV parameter path. Aliases are resolved at run time based on the unit module that is executing the phase. Dynamic references are also resolved at run time and can be used when the information needed to determine the parameter path is not available when the phase is configured. Phases can be used to generate controller based dynamic operator prompts, which allow the embedding of phase parameter values in the prompt string.



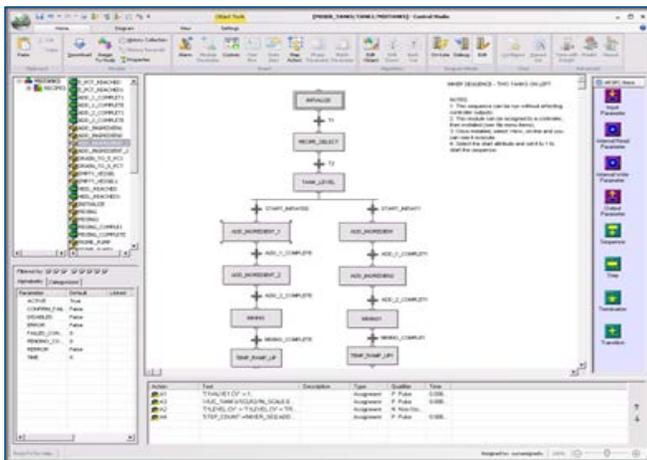
Integrated batch equipment

Units and phases are integrated into the standard DeltaV Explorer hierarchy and can be used to organize the control modules and equipment modules that make up your system's database. Following the ISA-88.01 Physical Model, the database can be segregated into areas, process cells within an area, units within a process cell, and equipment and control modules within a unit. Phases are included as well. A list of phases that can run on a given unit appears under that unit in the hierarchy.

Class-based equipment modules and control modules are included with every DeltaV system and the Advanced Unit Management license is not required to take advantage of them. These class-based modules make it easy to manage multiple instances of the same functional control strategies. Users can configure and test the strategy once, then instantiate it for re-use as many times as they need it. If an update is needed, the update need only be made in one place for all members of the class to receive it.

Different control languages are optimized for various tasks, making control strategies simple to configure. The *control languages can be mixed* within a single DeltaV module, and the choice of control languages (FBD, SFC, and ST) allows you to use the tools most appropriate for the tasks at hand. All three languages execute within the controller in their native form without translation from one language to another. With these IEC61131-3 graphical control languages, control strategies are assembled and modified using standard *drag-and-drop technology*. Strategy development is visually intuitive, making it easy for first-time users to quickly become productive. *Context-sensitive, online help* is available for all functions.

*Sequential Function Charts* enable you to configure operator-independent time variant actions. An SFC comprises a series of steps and transitions. Each step contains a set of actions that affect the process. Transitions control when processing moves on to the next step(s). Both single-stream and parallel execution of logic are supported within SFCs.



Sequential Function Chart

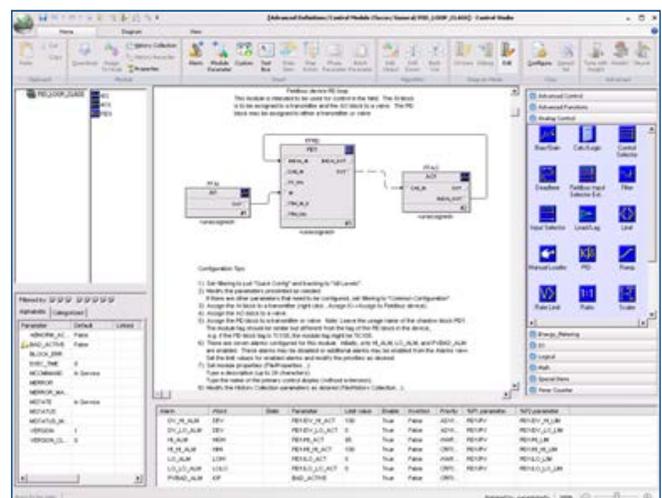
DeltaV function blocks are implemented using the structure specified by the *FOUNDATION fieldbus* standard, but they are also enhanced and extended to provide greater flexibility in control strategy design. FOUNDATION fieldbus-compliant function blocks

enable you to take advantage of control in the field. Using fieldbus also gives you reduced wiring costs and improved instrument diagnostics.

Executing control in the field using FOUNDATION fieldbus distributes the control algorithms as close to the transmitters and final control elements as possible, thus increasing the integrity of your control loop.

You design control strategies that best meet your control application requirements. Then, decide whether the function blocks controlling the process run in the controller, field devices, or both. The discrete control functions, as well as graphical control languages, are also included. Discrete motor and discrete valve control provide comprehensive control strategies that incorporate interlocking, permissives field start-stop, hand-off-auto, and state control under a single easy-to-configure control tag.

Finally, the DeltaV system’s library of pre-engineered module templates, provided with the Configuration Suite, enables fast and easy control software implementation. Using simple drag-and-drop features, it takes only seconds to create completed loop, motor, and valve modules. These pre-engineered modules provide a reliable, proven solution and incorporate all the alarming and operator interface requirements under the same tag. However, if they don’t meet all your requirements, they can be easily modified and extended. Tracking these additions, as well as deletions and changes made to any item in the configuration database, is accomplished with the Configuration Audit Trail and Version Management option.



PID loop function block diagram

## Capacity

The DeltaV system provides the exact level of monitoring and control functionality your application requires. The Advanced Unit Management software is also scalable in size. Beginning with DeltaV v12.3, it is sized according to the number of class-based Unit Modules configured in the system.

System stress tests have proven that the DeltaV system is capable of providing the capacity and performance needed to handle applications of any size. While there are no fixed limits on the number of phases and units that can be created, these tests provide recommended guidelines for setting up your system. The DeltaV system provides the scalable solution to your process control software requirements.

## Related Products

- **AMS Device Manager with DeltaV.** Provides full asset management of instruments and valves, including diagnostics and predictive capabilities to avoid unplanned shutdowns.
- **Batch Executive.** The batch engine which coordinates all batch processing activity, creates detailed batch history records and schedules recipes and resources.
- **Batch Historian.** Automatically collects and stores batch recipe execution data from the DeltaV Batch Executive and process alarm and event data from the DeltaV Event Chronicle.
- **Batch Redundancy.** Enables redundant DeltaV Batch capabilities for the Batch Executive and Campaign Manager, including automatic switchover to protect your batch operations from disruptions.
- **Campaign Manager.** Creates and manages a campaign by specifying the recipe, formula, equipment, and number of batches that are to be run within the campaign. A Service-Oriented Architecture Web Service is available to enable production-scheduling packages to initiate the creation of campaigns in the DeltaV system.
- **Configuration Audit Trail.** A powerful tool that tracks changes and manages revision information for any item in the DeltaV configuration database, including Safety Instrumented System (SIS) items.
- **Configuration Software Suite.** Makes it easy to create Control Strategies and System Graphics to get your plant up and running quickly and efficiently.
- **DeltaV Operate.** High performance operator graphics, trends and alarms offered in standard operating layouts and utilizing system-wide built-in security.
- **DeltaV Operate for Batch.** Batch Controls allow you to operate your batches from the same DeltaV Operate environment used to monitor and control your process.
- **Monitor and Control Software.** Provides a single user interface with industry standard control languages and functions for graphical control strategy development, testing, and deployment.
- **Recipe Studio.** Powerful yet simple to use application for graphically configuring recipes (with formulas) for successful batch production.
- **Recipe Exchange.** Provides an open, programmatic interface to the DeltaV recipe management system. Recipe Exchange is based on an XML schema that provides the ability to programmatically import and export DeltaV recipes. A Service-Oriented Architecture Web Service is also available for Recipe Exchange.

## Prerequisites

- One ProfessionalPLUS Station in a DeltaV system.
- DeltaV M-Series or S-Series controller.

## Ordering Information

Description	Model Number		
	pre-v9.3	v9.3 through v11.3	v12.3 and later
Advanced Unit Management Software License	VE3109Sxxxxx	VE3121Sxxxxx	VE3122Syyyyy
Additional Capacity	VE31UPS051 for 25 DST	VE31UPS056 for 25 DST	VE31UPS100 for 1 Unit
	VE31UPS052 for 100 DST	VE31UPS057 for 100 DST	VE31UPS101 for 5 Units
	VE31UPS053 for 250 DST	VE31UPS058 for 250 DST	VE31UPS102 for 10 Units
	VE31UPS054 for 1000 DST	VE31UPS059 for 1000 DST	VE31UPS103 for 20 Units
	VE31UPS055 for 5000 DST	VE31UPS060 for 5000 DST	VE31UPS104 for 50 Units
			VE31UPS105 for 301 to Unlimited Units

Where xxxxx is equal to the total number of DSTs associated with modules assigned to class-based unit modules in the system. xxxxx is available from 25 to 15,000 DSTs in DST increments as follows:

- 25 – 500 DSTs in 25-DST increments
- 500 – 2000 DSTs in 100-DST increments
- 2000 – 5000 DSTs in 250-DST increments
- 5000 – 10,000 DSTs in 500-DST increments
- 10,000 – 15,000 DSTs in 1,000-DST increments

Where yyyy is equal to the total number of class-based Unit Modules configured in the system. yyyy is available in the following sizes:

- 2 Units, 5 Units, 10 Units, 20 Units, 30 Units, 50 Units, 75 Units, 100 Units, 150 Units, 300 Units, and >300 Units

### Emerson Process Management

Asia Pacific: 65.6777.8211  
 Europe, Middle East: 41.41.768.6111  
 North America, Latin America:  
 +1 800.833.8314 or  
 +1 512.832.3774

[www.EmersonProcess.com/DeltaV](http://www.EmersonProcess.com/DeltaV)

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