SmartProcess™ Blend-R5

Enhance control of continous in-line blenders using Emerson's SmartProcess Blend package

- Gain additional blender capacity
- Precisely control to blend recipes
- Ensure on-spec products
- Lower inventory requirements

Introduction

Many production facilities have the need to blend a number of components together to produce a mixture according to a given recipe or quality target. Many companies use in-line blend headers with automated flow control valves for a continuous blend rather than blending sequentially by batch. These in-line blend headers require special control functions to coordinate the operation of multiple devices and equipment modules.

Emerson Process Management's SmartProcess Blend-R5 Solution provides comprehensive control of continuous in-line blenders in a DeltaV platform. The SmartProcess Blend-R5 package includes complete regulatory control of the automated blend process for up to 5 simultaneous components – all in an integrated DeltaV environment.

Emerson offers a pre-engineered package with templates that can be customized to fit the unique requirements of a particular project. The package includes the following features:

- Recipe management
- Automatic startup sequence
- Ramping and pacing
- Component ratio control
- Tank and Lineup module control
- Blend monitoring and tracking
- Automatic blend stopping
- Component and blend totalizers
- Blend reporting

Benefits

Off-spec blends can have wide implications for a facility. For a batch of product, correcting a blend after it is made ties up equipment, people, tankage and sometimes jetties and ships. Often in the process, more high-value components are used just for expediency and contingency. Using more valuable components affects plant production and can create an imbalance in the components for future blends. Emerson's SmartProcess Blend-R5 package includes complete regulatory control of an automated blend process to ensure blends meet specifications the first time.

Manual start up sequences for blenders can be time consuming and error prone, particularly when there is shared tankage and equipment. A minor lineup error can have significant quality and safety consequences. Emerson's SmartProcess Blend-R5 package includes fully or partially automated lineups, with equipment interlocks, ramp up, ramp down sequences and continuous route integrity checks. The system includes a centralized fail alert system that can automatically shut down a blend if a problem is encountered.

Emerson Process Management has the process expertise and engineering experience to provide a turnkey solution for any size blending project. Whether building a new blender or upgrading an existing one, Emerson can help. Emerson's can deliver turn-key design, construction and installation of a fully instrumented, skid-mounted, in-line blend system, complete with on-line analyzers and sample systems. Alternatively, our consultants can review exiting control systems, measurement devices, tank gauging systems, control valve performance and blending process and develop an upgrade plan that will maximize the financial return on your investment.

Product Description

Emerson's SmartProcess Blend-R5 package is a complete, 5-component blender control application that runs native to the DeltaV platform. There is no custom hardware or software. The application covers activities from blend recipe management to closed-loop flow control of the blender components. The system is designed as a set of generic templates and sequences that are configured to meet the specific blender needs.

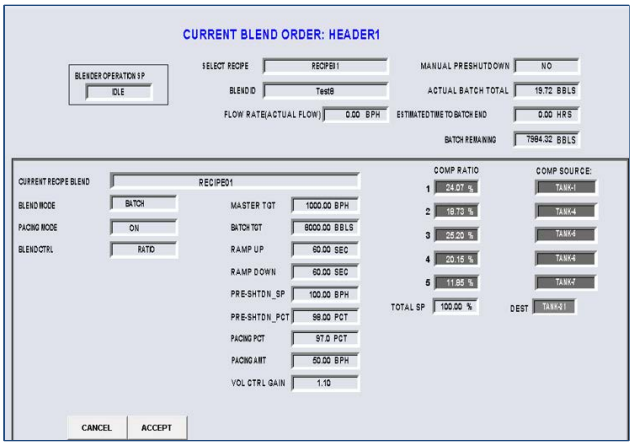
Blend Recipe Management

The SmartProcess Blend-R5 application provides the capability to define and store recipe information in DeltaV modules that are available for selection by the operator. As a minimum, recipes must specify the target component ratios, but depending on the blender, may also include information on source and destination tanks, lineup equipment and routes, product specifications, operator instructions and other pertinent information. Access to change recipe parameters can be locked down to appropriate users if required.

Blend Regulatory Control

The Blend Regulatory Control modules automate the blend order setup as well as the blender startup, operation and shutdown sequences. The blend process starts with a blend order which specifies the product grade, quantity, destination and the recipe to be used. Once initiated by the operator, the blend sequence performs the lineups, opening automated valves and turning on pumps, then ramps component flow controllers to the target blend rate and switches to Ratio control. During the blend, if any of the component valves goes too far open, the system will automatically "pace" the master blend rate down until all valves are within their controllable range. The ratio controller observes maximum and minimum limits on the flows, header pressure as well as valve positions for each component.

SmartProcess Blend-R5 provides the ability to do a "flying switch" to a new blend order with a different recipe and different tanks without shutting down the blender. During the blend, the operator can also perform a flying switch to a new component tank. For a batch blend, when the target quality is reached, the system automatically executes the shutdown sequence. Shutdown options include pre-shutdown steps to ramp down the blend rate to a lower flow prior to hitting the final target quantity. The system is designed to handle multiple blend headers operating concurrently with common, shared equipment.



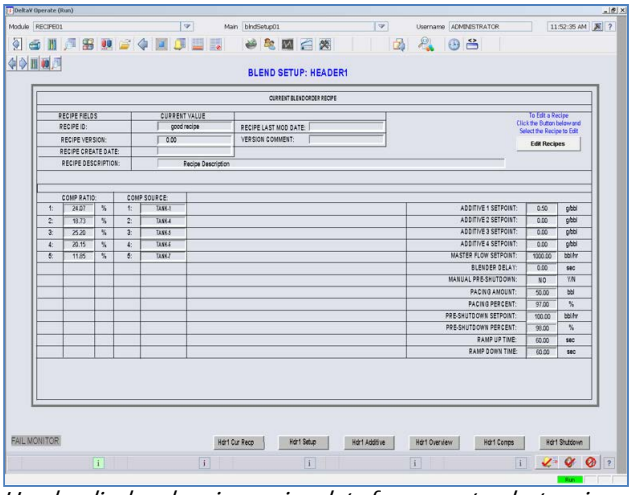
Main screen for initiating or terminating a blend.

The blender can be operated in two different modes:

- Ratio Control – Component flows are set to control to the current ratio and master blend rate targets
- Volume Control – Component flows are adjusted to control the totalizer ratios to their target values. This allows the system to compensate for starting or pacing conditions that have caused the aggregate ratios to deviate from their desired target.

Routes

When multiple blend headers are involved, component and finished product tanks, pumps, valves, and lines can often be shared between them. Emerson's Route module performs the sequencing and interlocks for lining up the component and finished product tanks to the blend headers. The main blend sequence initiates the opening or closing of routes based on the tanks and blend header included in the recipe. The route module then checks the state of the devices in the route and handles the execution of the sequence for operating a route. Interlocks are provided in special pump and valve equipment modules to preserve the equipment in a particular state so as to prevent contamination when the route has been opened or closed. An example of a Route display is provided in the following figure.



Header display showing recipe data for current or last recipe

Certified Consultant Engineering Services

Emerson has a number of Certified Solutions Consultants within its offices around the world. For each SmartProcess project a Certified Consultant will be assigned to provide technical leadership throughout project implementation. Emerson will accept turn-key responsibility for the engineering services to design, configure, install and commission a complete SmartProcess Blend solution. At the start of a project, the Certified Consultant will review the instrumentation, operations, constraints and economics to design a blend control and optimization system, benchmark current performance and prepare a project execution plan.

Blend projects are implemented by one of the Emerson Engineering centers, depending on the geographical location of the end user. In addition to the Certified Consultant, a lead engineer will be assigned to manage the hardware, software, system integration and engineering teams. Once a design has been approved, the DeltaV system configuration can begin under the oversight of the lead engineer and the Certified Consultant.

Optional Engineering Services

Emerson, through our field services offices and Local Business Partners, offers a full range of services to assist our customers with their automation needs. Because our SmartProcess Blend-R5 modules are standard DeltaV applications, customers have the option of performing some of the work internally or requesting support from Emerson. Some examples of optional services, which are often included as part of a SmartProcess-R5 implementation project include:

- Control Performance Audit – Review performance and troubleshoot field devices and control loops.
- Analyzer Systems: Review requirements, design procure and install on-line analyzers, sample systems, enclosures, houses.

SmartProcess Blend Annual Support

Through the Global Service Center, Emerson provides one-number call-in support for DeltaV and all of the Emerson-supplied equipment and software. Annual Support includes guaranteed access to new versions, enhancements and updated documentation along with unlimited telephone and remote support of the application. With an Application Support agreement, you can rest assured that expert help is only a phone call away and your SmartProcess Blend will remain current with future system upgrades. The first year SmartProcess Blend-R5 support is required. Subsequent years are optional.

System Compatibility

SmartProcess Blend-R5 applications are available on DeltaV v11.3 and higher systems.

Ordering Information

Part Number	Description
VF1051B1R5	SmartProcess Blend-R5 for first header; Base License
VF1051E1R5	SmartProcess Blend-R5 for Additional headers; Extension License
VF1051S7	Annual Application Support for SmartProcess Blend-R5 for first blender
VF1051S8	Annual Application Support for SmartProcess Blend-R5 for additional blenders

Related Products

- **MicroMotion Coriolis Meters.** Coriolis meters have proven very valuable in blender service due to their high accuracy, large turn-down ratio, minimal maintenance cost and direct mass and density measurements. Emerson's MicroMotion business is a leader in the Coriolis market with a broad offering and enhanced capabilities such as on-line meter verification.
- **Fisher Control Valves.** Accurate and reliable control of the components going to the blender is critical for producing quality batches according to plan. Emerson's Fisher business unit provides high quality control valves for every service.
- **Motor Operated Valves.** Emerson's TopWorx and Bettis business units provide the on-off valve and actuators needed to automate the tank lineup process for the blender
- **Pump Health Monitoring.** Emerson's Pump Health Monitoring Solution combines process and equipment data as a single number, reporting pump health Indication for pump vibration, cavitation, bearing temperature, strainer plugging and seal fluid/hydrocarbon leaks.

Prerequisites

Hardware and Software Requirements

SmartProcess Blend-R5 control functions utilize standard DeltaV modules that can be redundant and executed in either a controller or an applications station.

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