

## Product Information Note

### Experion® Blend Controller Advanced Ratio Control of In-line Blending



Honeywell's Experion Blend Controller (EBC) is an Experion®-based application that controls the operation of in-line blenders for gasoline, distillate, fuel oil, crude, bitumen and chemical blending applications. EBC ensures that components are blended in accordance with blend recipe specifications by controlling the pumps and flow controllers associated with the blending application.

#### Benefits include:

- Increased consistency of the blended material through in-line blending.
- Reduced blending setup and execution time and increased blender throughput by automatic equipment sequencing and control.
- Fewer reblend, and reduced inventory through accurate control of the component ratios according to the blend recipe.
- More accurate property control through optional property trim control.

Controller	Source	Material	Recipe	Flow	Status	Pump	
1	BaFCV101	STk101	AlkyID	34.69 %	0.00 m <sup>3</sup> /hr	Stopped	bcmp101
2	BaFCV102	STk102	Cat Gas	32.65 %	0.00 m <sup>3</sup> /hr	Stopped	bcmp102
3	BaFCV103	STk103	Reformate	25.51 %	0.00 m <sup>3</sup> /hr	Stopped	bcmp103
4	BaFCV104	LS STk104	Butane	7.14 %	0.00 m <sup>3</sup> /hr	Stopped	bcmp104
5	BaFCV105			0.00 %	0.00 L/hr	Stopped	
6	BaFCV106			0.00 %	0.00 m <sup>3</sup> /hr	Stopped	
7	BaFCV108	STk105	MTBE	121.00 %	0.00 L/hr	Stopped	bcmp108

Experion Blend Controller is integrated with Honeywell's Experion® PKS control system for accurate, flexible ratio control of in-line blending

#### Key Capabilities

Experion Blend Controller is part of Honeywell's Profit® Blending Suite within the Profit® Blending and Movement Solution. EBC provides the following key capabilities to support in-line blending processes which add several streams together in a common header at a ratio specified by the blend recipe.

- Automatic startup, operation and shutdown of the blender and associated equipment
- Master flow rate setpoint flow control
- Blend flow rate and volume control
- Recipe validation
- Maintenance of the component percentages and additive concentrations as dictated by the blend recipe
- Pacing of the blend flow rate when a controller is unable to meet a high flow demand
- Interface to property analyzers
- Analyzer signal validation
- Abnormal condition monitoring, taking corrective action as required
- Provision for simple property trim control based on analyzer feedback
- Blend header pressure control
- Blend fly-switch - running of consecutive blends without stopping the pumps involved in the current blend
- Blend report generation, containing key blending information, at the completion of every blend

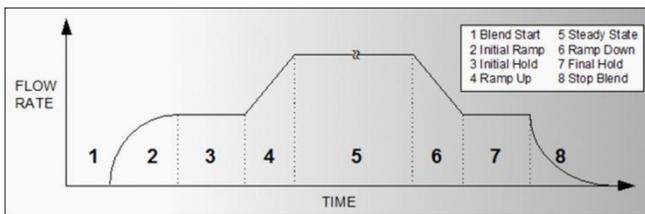
### Blend Equipment and Flow Control

Once the blend recipe is validated and an operator chooses to start a blend, EBC starts the component and additive pumps in a configured sequence, and manages the opening of the flow controllers. Component and additive flow rates are manipulated to ensure accurate volumetric blending during both steady state and transient ramping conditions.

The total flow rate is held at an initial hold rate during startup to allow the analyzer signals to stabilize. Once analyzer stability is achieved, EBC slowly ramps the flow to the steady state target flow rate. The flow controller setpoints are based on a master flow rate setpoint.

When the total accumulated volume is within the shutdown volume of the target volume, the flow rates are ramped down by EBC. Once the target volume is reached, EBC shuts down the pumps and controllers.

Prior to the completion of a blend, the blend may be shutdown and restarted, either manually, or under emergency or error conditions.



EBC controls blends according to a configurable blender flow rate profile

### Pacing

Pacing occurs when one of the flow controllers indicates that it cannot sustain its requested flow. Pacing can be caused by one of the following conditions:

Output High	The requested output of a flow controller is higher than the configured maximum.
Deviation Low	The difference between the flow controller's SP and PV is greater than a configured percentage.
Setpoint High	The flow controller's setpoint is higher than the configured maximum.

### Trim Control

EBC monitors the blend for pacing and decreases the total blend flow rate to a level sustainable by all controllers, ensuring that simultaneous component ratios are maintained. In cases where the blend flow cannot be decreased enough to maintain component ratios, or where a component flow drops below its low

limit, EBC can be configured to shut the blend down. Flexible pacing ensures that accurate blend ratios are maintained under abnormal conditions such as equipment malfunctions.

### Property Trim Control

Property trim control provides the ability to correct a selected property by changing a specified component's flow rate. With gasoline blending, for example, alkylate may be selected to trim octane. This correction is done independently, without accounting for the effect selected components may have on other properties. For example, increasing the butane of a blend to correct Reid Vapour Pressure (RVP) will also increase the octane of that blend. Trim control can help ensure that blend properties are within specifications and reduce product giveaway and reblends.

### Blend Header Pressure Control

The blend header may be equipped with a pressure controller. This controller is used to maintain stable blend pressure, resulting in fewer deviations in component flow.

EBC supports specification of header pressure for each blend state. Normally, the pressure controller controls header pressure to its setpoint. During the start of the blend, EBC controls the output of the pressure controller directly. The operator can manually override this and adjust the output.

### Property Analyzer Interface

EBC provides an interface to on-line property analyzers with functions that include analyzer signal validation, instantaneous property values, average property calculation (header and tank property averages), and analyzer status monitoring and property error calculations. Analyzer signal validation is provided by standard control block input checking and includes low rate of change, high rate of change and analyzer range. Analyzer feedback can be used by EBC for property trimming, or when integrated with Honeywell's Profit® Blend Optimizer, for property optimization, thus enabling EBC to achieve accurate property control as well as ratio control.

### Blend Fly-Switch

EBC supports the running of consecutive blends without stopping the pumps involved in the current blend. This capability, known as the Blend Fly-Switch, is a mode of operation whereby a new blend is started without stopping the common pumps and flow controllers used in the current blend.

In this mode, the switch is activated manually or upon reaching a specified blend "switch volume". Blend data for the current blend, such as component volumes, is captured for reporting before

being re-initialized for the start of the new blend. Flow totalizers, blend volume, property averages and analyzer property errors are reset and a new blend begins. The blend number for the new blend is automatically incremented. During the transition to the new blend, pumps and flow controllers used in the previous blend that are required for the new blend will continue running. Pumps no longer needed in the new blend will also be stopped.

Blend Fly-Switch adds flexibility to Experion Blend Controller to support in-line blending to pipelines and other situations where blending operation needs to continue uninterrupted.

### Blend Report Generation

EBC automatically generates a new blend report each time a blend is started or closed, and whenever the blend destination is changed in a running blend (i.e. on a destination swing). Blend reports can also be generated on demand and are usually customized for each site. Separate reports are maintained for each blender configured in EBC.

```

14-Dec-04 11:06:53 RPT001: BlndRpt1 :           Demanded : Page  1
Blend Report 1

          EBC HOGAS 1 Blend Report
          =====
Grade      :REGULAR
RECIPE ID  :RCPIDMapped      BLEND NO      :      21
BATCH ID   :Test Batch I     HEELVOLUME   :      22.00
TARGET Volume : 10000.00     BLENDED VOLUME :      402.37
Blend State :Steady State     Event        :Demand Print
START TIME  : 10:32 14-Dec-2004 DESTINATION TANK :DT104

COMPONENT  TANK  ORIGIN %  CURRENT VOL  CURRENT % UNITS
-----
Alky       STK101  30.00     132.48      31.48 m3
Cat Gas    STK102  40.00     156.28      36.94 m3
Reformate  STK103  20.00     87.98       21.01 m3
Butane     STK104  10.00     44.16       10.57 m3
           0.00     0.00       0.00 m3

ADDITIVE   TANK  ORIGIN CONC  CURRENT VOL  CURRENT CONC
-----
HTFE       STK105  123.00     0.05        130.35

PROPERTY   HEEL  SPEC  HEADER AVERAGE  TANK AVERAGE  UNITS
-----
RON        92.00  90.00  98.30           94.91
RCW        85.00  80.00  0.00            85.00
RVF        8.00  11.00  0.00            8.00
    
```

Typical blend report generated by Experion Blend Controller

Each report contains the values for a predefined list of parameters at the time of the report. The data collected normally includes:

- General blender information
- Component and additive data
- Property data

### EBC on the Experion Platform

Experion Blend Controller is designed to run on the Experion PKS architecture for distributed control of the field equipment used in the blending and movement operations. Experion graphics are used as the basis for EBC user interface.

Experion Blend Controller makes use of standard Honeywell Experion PKS functions such as control algorithms, messages, logging, as well as alarming and event journaling.

Running on either the Experion C200 or C300 controllers, Experion Blend Controller supports controller redundancy. Alternatively, EBC may run on the Experion ACE node; however Experion ACE does not support redundancy.

### Integration with Honeywell Applications

Experion Blend Controller (EBC) is a key component of Honeywell's Profit® Blending Suite, which is part of the Profit Blending and Movement Solution. Other components of Honeywell's Profit Blending Suite are:

- **BLEND** - Offline multi-period blend planning and event-based scheduling
- **Blending Instructions** - Interface for management and transfer blend recipes / instructions
- **Profit® Blend Controller (PBC)** - Basic and advanced ratio control of in-line blending.
- **Profit® Blend Optimizer** - Online blend control with dynamic recipe adjustment
- **Blend Performance Monitor** - Collect, store, manage blend performance metrics

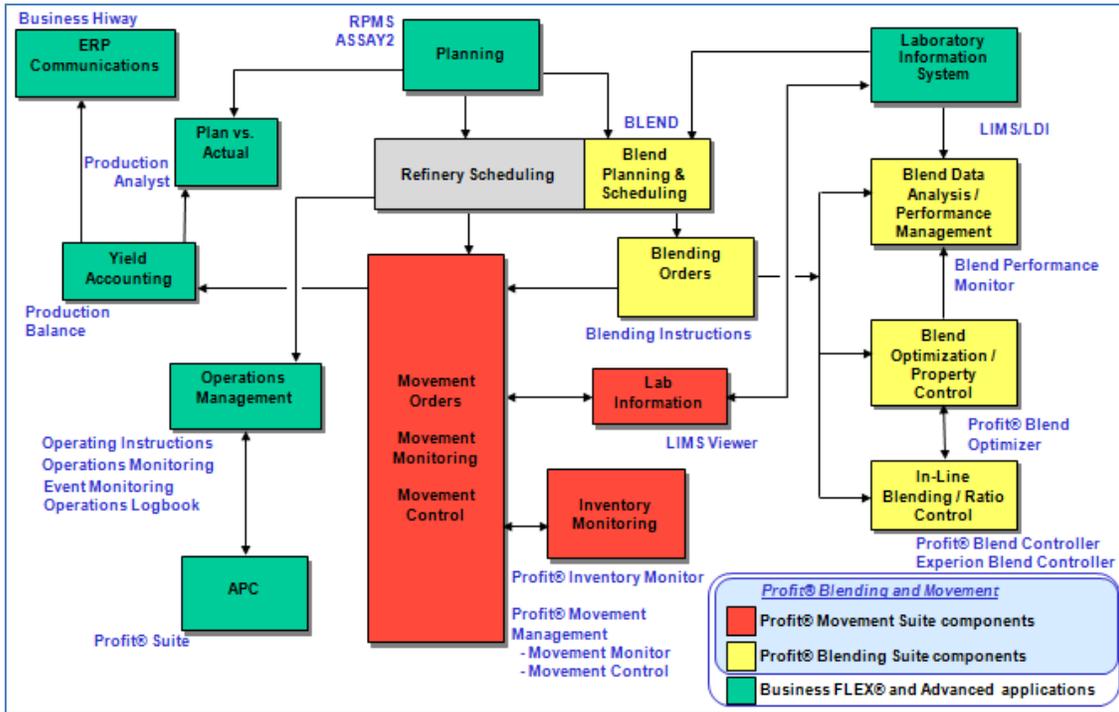
Together, these components form Honeywell's Profit Blending Suite, a set of integrated tools to deliver optimum in-line blending.

The **Blending Instructions** application is used to specify how a blending operation is to proceed in the field. Each set of blending instructions contains data that uniquely describes a blend and its associated property model. Blending Instructions provide facilities for creating, editing, copying and deleting blending instructions that are, in turn, used by EBC users to define blending operation requirements and ensure that the settings match the physical blending process in the field. These facilities may also be used to define blending operation requirements for field personnel.

**Profit® Blend Optimizer** provides advanced blend optimization and recipe downloading (through Blending Instructions) to reduce component usage and property giveaway. The blend plan and recipes may be downloaded from Honeywell's BLEND multi-period blend planning application to EBC via the Blending Instructions application.

EBC blend data is collected, along with data from other sources, by Honeywell's **Blend Performance Monitor** application, where actual blend data is compared to planned performance. EBC blend data is integrated into a data historian, such as Uniformance® PHD, via **the Blend Performance Monitor** application for blend reports and archiving.

When EBC is being used with Honeywell's **Profit® Movement Management** application for movement monitoring and control, component volumes may be uploaded from EBC to **Profit Movement Management** for controlled execution of blend movements. In this case, **Profit Movement Management** handles open/close of valves and start/stop of pumps while EBC controls flow rates.



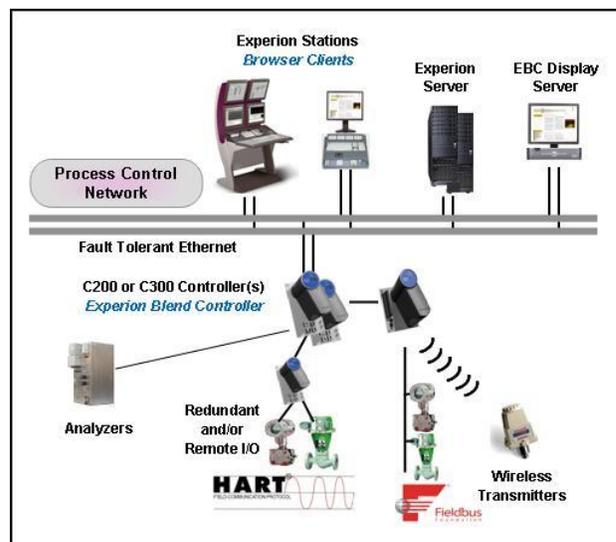
Experion Blend Controller is a key component of Honeywell's Profit® Blending Suite and integrates with other Honeywell applications

### Integration with Non-Honeywell Applications

The Experion Blend Controller is also designed to allow non-Honeywell applications to be interfaced via OPC and XML. EBC may accept blend recipes from a non-Honeywell optimization application through the Blending Instructions application. EBC may also be used for blend ratio control over non-Honeywell DCSs using the Experion system's OPC connectivity.

### System Requirements and Architecture

EBC is designed to operate within the Experion PKS environment. The following illustration shows the hardware architecture recommended for EBC when loaded on the Experion Process Controllers. Contact Honeywell for the latest list of supported Experion PKS releases.



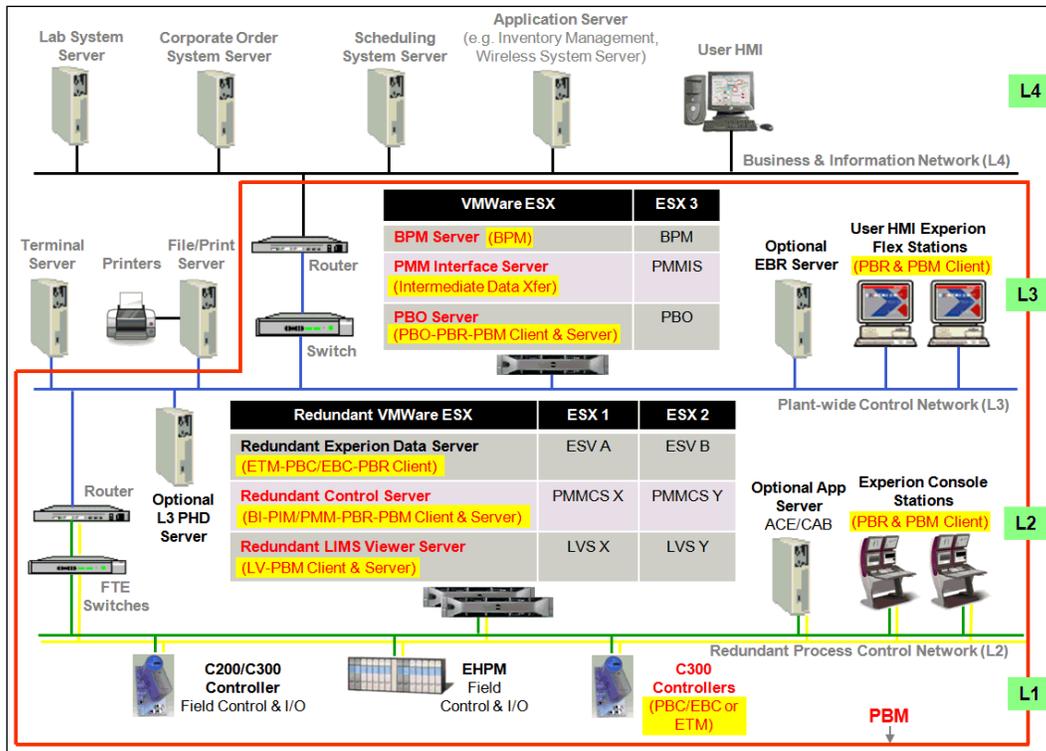
Sample EBC Architecture for Experion Controller-based Systems

EBC software is split between two servers, the EBC Process Server and the EBC Display Server. These application servers can be set up together on an Experion Server or on separate, network connected computers. These servers run Windows Server 2008 Standard Edition (32-bit) with SP2 or Windows Server 2008 R2 Standard Edition (64-bit) with SP1, depending on the version of Experion supported. The EBC servers typically require Intel Xeon X5650 2.66 GHz Quad-Core or faster processors, with at least 4GB RAM and minimum 146 GB hard

disk space. For specific Honeywell computer platforms and supported software that meet these requirements, please contact your Honeywell representative.

### Training Services

Training courses addressing Experion Blend Controller implementation, use and maintenance are available through Honeywell's Automation College ([www.automationcollege.com](http://www.automationcollege.com)). On-site courses are also offered upon request.



Sample Profit Blending and Movement solution architecture

### For More Information

To learn more about Honeywell's Experion Blend Controller, visit our website [www.honeywellprocess.com/software](http://www.honeywellprocess.com/software) or contact your Honeywell account manager.

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