



# BLENDING & MOVEMENT | INVENTORY MONITOR

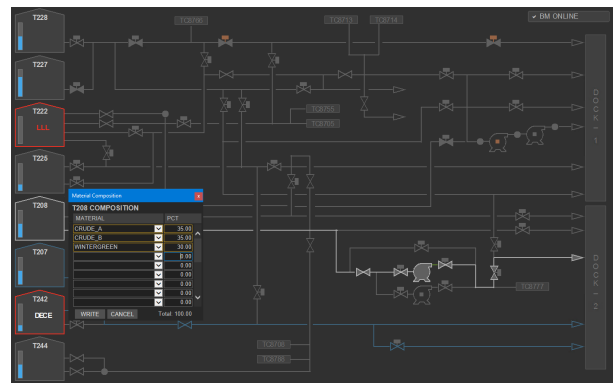
## PRODUCT INFORMATION NOTE

Honeywell's Inventory Monitor (IM) enables operations personnel to collect, validate and manage accurate information on the status and contents of storage tanks. IM is ideally suited to manage and monitor inventory information within oil refineries, tank farms and terminals to ensure inventory and related information are comprehensively and accurately recorded and monitored.

### Key Capabilities

Inventory Monitor is part of Honeywell's Movement Suite within the Blending and Movement Solution. Inventory Monitor provides the following key capabilities that support tank monitoring and inventory management for improved safety, reliability, sustainability and profitability of facilities.

- Comprehensive Tank Calculations
- Flexible Tank Gauging Systems Support
- Manual Data Entry Support
- Accurate Tank Volume Calculations
- Tank Flow Detection
- Extensive Tank Monitoring and Alarms



Inventory Monitor uses Tank Farm Graphic and pop-up displays for visual representation of tank information including level, flow and alarms.

### Benefits

- **Reduced losses** from tank farm incidents such as spills and product contamination because of increased monitoring capabilities and alarming
- **Reduced inventory** through tighter control and monitoring which allows the use of running tanks
- **Improved inventory reconciliation** by monitoring inventory levels and entry/exit flow rates to ensure that all changes in inventory position are accounted for and logged
- **Elimination of data re-entry and errors** by collecting data from various systems, presenting to operator in a common user interface and storing as a common record for re-use
- **Fewer material downgrades and shipping errors** by integrating with a lab system from which product properties and certification information can be obtained

A number of these key capabilities are described below:

## **Comprehensive Tank Calculations**

At the heart of Inventory Monitor is the capability to provide a broad range of tank calculations that support accurate monitoring of tank information. Using automatically collected data or manual entries for level, temperature, material density, percent sediment, water data, etc., together with reference data, Inventory Monitor collects and records tank parameters such as:

- Gross and net volume
- Volume correction factor
- Available capacity
- Pumpable volume
- Water volume
- Gross and net mass
- Flow rate
- Time to alarm
- Time to gauge

These parameters can be used as the basis for alarms or alerts to the operator to ensure safe, efficient operation of the tanks.

## **Flexible Tank Gauging Systems Support**

Inventory Monitor supports various tank gauging systems through a variety of interfaces including:

- Servo
- Float
- Tape
- Radar
- Hydrostatic

All tanks gauging systems' data is validated for bad values to ensure that accurate data is used for tank calculations.

## **Manual Data Entry Support**

While much of the information for Inventory Monitor is collected automatically, some information is only available through manual entry, or when field instrumentation is unavailable, manual entry capability is required. Inventory Monitor enables the operator to manually enter data collected in the field or values normally collected from tank gauging systems, including tank level, temperature, density, percent sediment and water, and pressure values. Also, Inventory Monitor can be used to enter the manual tape level and water level readings as well as the last water drain operation. In addition, the expected tank flow direction can be entered for optional tank movement tracking.

## **Accurate Tank Volume Calculations**

Accurate tank volume calculations are imperative for successful tank monitoring. Inventory Monitor ensures accurate tank volume calculations through the following:

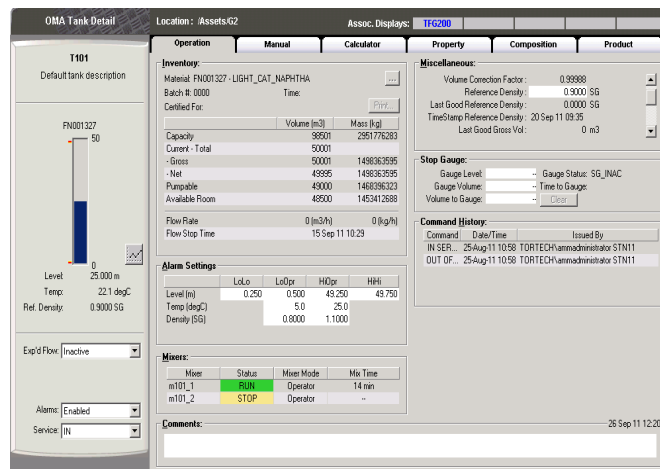
1. Reference data that includes:
  - Reference density
  - Stop gauge level or volume
  - Volume, temperature, pressure and density alarm limits
  - Tank measurement units

2. Support for the following tank geometries:

- Floating roof
- Fixed roof
- Bullets
- Spheres

3. Application of tank volume correction factors:

Volume correction is used to express the volume of the tank material under reference conditions. Reference temperatures can be 15 °C, 20 °C, 60 °F or 68 °F. The volume correction calculations are performed whenever there is a significant change in the tank's temperature or measured density, and are based on tank geometry, as well as type, tank temperature, vapor pressure (for pressurized tanks), reference or actual density. The calculations conform to API 2540 (1980, 2004, 2007 and 2008 Editions) or ASTM D1250, D1550, D1555, D4311 standards to ensure the most accurate and up to date volume calculations.



Individual tank information can be viewed on the Tank Detail Display

## Tank Flow Detection

Inventory Monitor determines if there is a flow into or out of a tank based on changes in tank level. The level is sampled at configured intervals to determine if a significant level change has occurred, indicated when a specified flow tolerance is exceeded. This tank flow detection is used together with an optional user-entered value for expected flow direction of the tank and if the expected flow direction is different than the flow detected by Inventory Monitor an unexpected movement alarm can be raised.

## Extensive Tank Monitoring and Alarms

Each tank is monitored for many alarm conditions including level, flow, temperature, density, pressure, unexpected movement or movement in wrong direction, leak, flow start/stop and stop gauge. The stop gauge may be set for level, volume or change in volume. Messages can be configured to the time until a gauge condition is met or in advance of limits being reached. This information is shown to operators in the Tank Summary Display.

Tank Name	Asset	Alarm	Level	Alarm Time	Gauge Lvl	Gauge Time	Tot Vol	Flow	Pumpable	Avail	Temp	Material
T100	G2	ULL	0.000	---	---	---	0	0	0	0	0	PROBIBITORY BUTANE
T101	G2	HHT	15.716	---	---	---	31431	0	21431	65568	46.000	0.8000 MIXED BUTANE
T102	G2	---	28.969	---	---	---	52997	0	52997	44503	22.1	0.8000 ISOBUTANE
T103	G2	---	11.676	---	---	---	23351	75149	22.1	0.8000	0.8000	MIXED BUTANE
T104	G2	---	25.100	---	---	---	50200	0	49000	48300	22.1	0.8000 MIXED BUTANE
T105	G2	---	26.008	---	---	---	50017	0	48917	48483	22.1	0.8000 MIXED BUTANE
T106	G2	---	24.712	---	---	---	49425	0	48425	49075	22.1	0.8000 MIXED BUTANE
T107	G2	---	15.709	---	---	---	31417	0	30417	67843	22.1	0.8000 PRF. LINE. BB. OCT. 12'S. RVP
T207	G1	---	25.000	---	---	---	50000	0	49000	49000	22.1	0.8000 TRUCK DIESEL
T208	G1	---	25.000	---	---	---	50000	0	49000	48900	22.1	0.8000 TRUCK DIESEL
T222	G1	ULL	0.000	---	---	---	0	0	0	0	0	0.8000 TRUCK DIESEL
T225	G1	---	11.000	---	---	---	22000	0	21000	79500	22.1	0.8000 TRUCK DIESEL
T227	G1	---	35.961	---	---	---	71923	0	70923	26578	22.1	0.8000 TRUCK DIESEL
T229	G1	---	25.000	---	---	---	50000	0	49000	49000	22.1	0.8000 TRUCK DIESEL
T242	G1	DECERT	10.000	---	---	---	20000	0	19000	78500	22.1	0.8000 TRUCK DIESEL
T244	G1	---	24.965	---	---	---	49668	0	48668	45370	22.1	0.8000 TRUCK DIESEL
T500	G2	---	35.000	---	---	---	30000	0	29000	50000	22.1	0.8000 MIXED BUTANE
T501	G2	---	15.000	---	---	---	30000	0	22000	68500	22.1	0.8000 MIXED BUTANE
T502	G2	---	24.387	---	---	---	48774	0	47774	41226	22.1	0.8000 MIXED BUTANE
T503	G2	---	24.648	---	---	---	64668	0	28354	34800	22.1	0.8000 ISOBUTANE
T504	G2	---	26.000	---	---	---	52000	0	49000	45370	22.1	0.8000 MIXED BUTANE
T505	G2	---	20.704	---	---	---	41468	0	40468	57060	22.1	0.8000 MIXED BUTANE
T700	G1	---	35.000	---	---	---	50000	0	47000	49000	22.1	0.8000 MIXED BUTANE
T800	G1	---	25.000	---	---	---	50000	0	49000	48500	22.1	0.8000 MIXED BUTANE

Inventory Monitor's Tank Summary Display enables operators to view critical tank information at a glance

## Inventory Monitor on the Experion Platform

Inventory Monitor is built on the Experion® PKS platform for distributed control of the field equipment used in blending and movement operations. Experion graphics are used as the basis for the Inventory Monitor user interface and Inventory Monitor makes use of standard Honeywell Experion PKS functions such as messages, logging, as well as alarming and event journaling.

## Inventory Monitor on non-Experion Platforms

For non-Experion DCS, Inventory Monitor integrates easily through OPC connectivity between Inventory Monitor's Experion Server and the non-Experion DCS.

## Integration with Honeywell Applications

Inventory Monitor forms the foundation for Honeywell's Movement Suite, which is part of the Blending and Movement Solution. Other components of Honeywell's Movement Suite are:

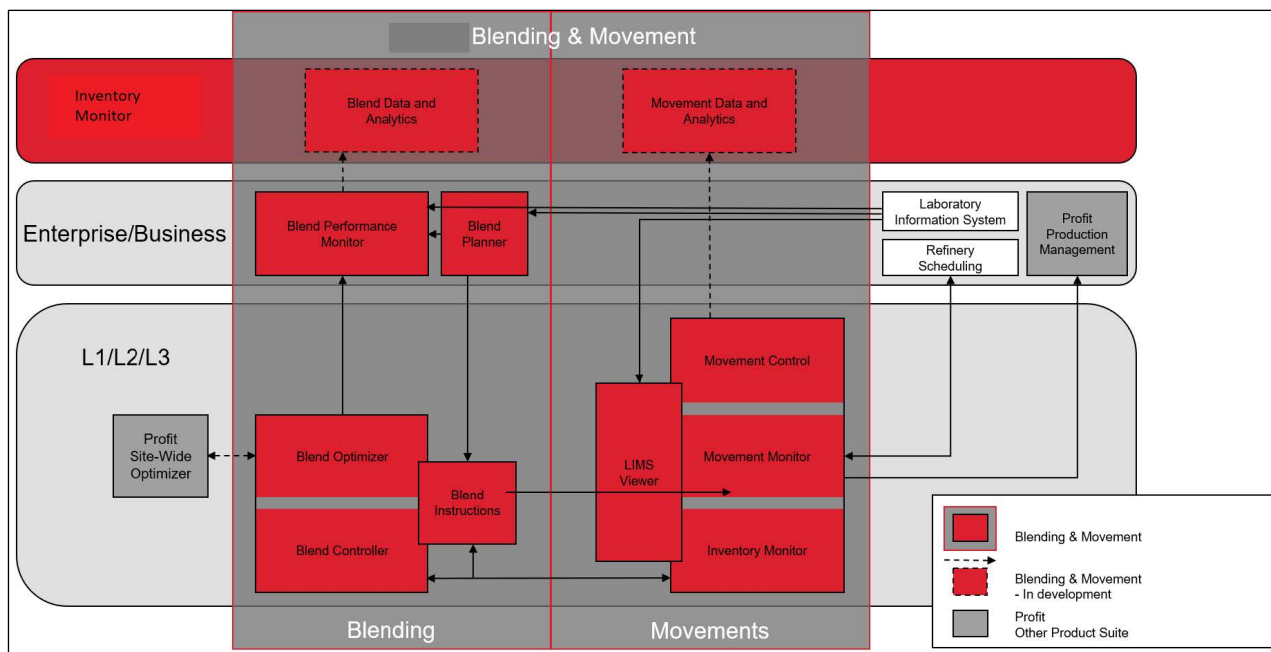
- **Movement Management - Movement Monitor** – Movement order management, movement tracking and alarming, and movement reporting.
- **Movement Management - Movement Control** – Movement set up and control including automated path selection, line-up and movement execution.

Together, these components form Honeywell's Movement Suite, a set of integrated tools for operations staff to accept, create and validate material movement plans, and control and track movements and inventories.

The relationships between Inventory Monitor, the Blending and Movement Solution and other Honeywell applications are shown on the following page. As indicated, Inventory Monitor provides inventory data, alarms and tanks status to the **Movement Management** application and to other applications.

When **Movement Management** is implemented, planned movements, or movement orders, may be transferred to **Movement Management** from **Blending Instructions** or planning and scheduling applications like Honeywell's **BLEND** application. Movement and inventory data may be transferred to oil accounting and balance applications such as Honeywell's **Production Accounting and Reconciliation** via XML files.

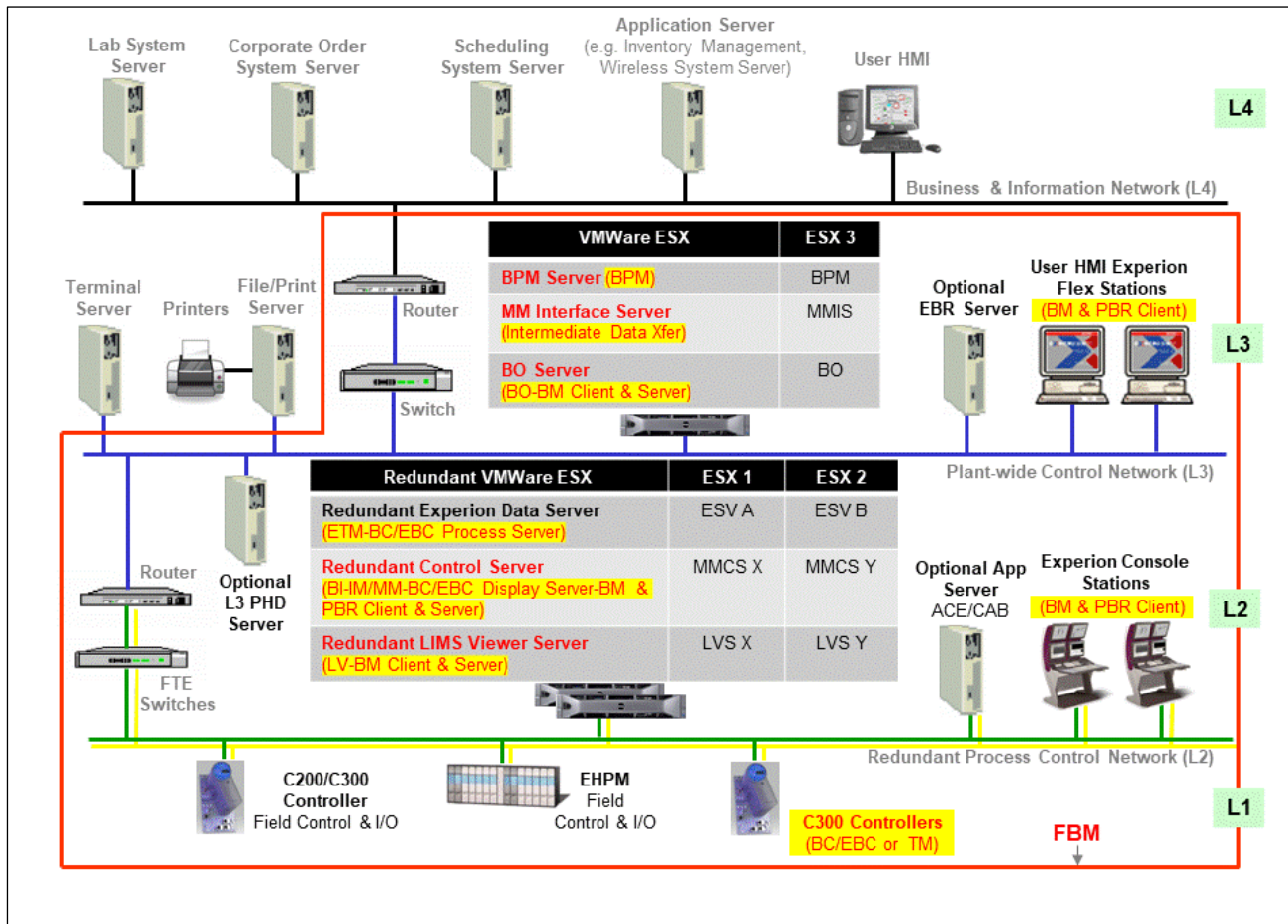
When **Movement Management** is used with Honeywell's **Blend Controller (BC)** application for control of blends, component volumes and flows may be uploaded from **BC** to **Movement Management** for controlled execution of blend movements. **Movement Management** handles opening/closing of valves and start/stop of pumps while **BC** controls flow rates.



Inventory Monitor is a key component of Honeywell's Movement Suite and integrates with other Honeywell applications

## System Requirements and Architecture

As described earlier, Inventory Monitor leverages the Experion® PKS platform. Contact Honeywell for the latest list of supported Experion PKS releases. The following illustration shows a sample Blending and Movement system architecture where Inventory Monitor is installed in the context of a combined Experion PKS and business information system in a virtualized environment.



Sample Blending and Movement System Architecture

Inventory Monitor is installed on the MM Control Server as illustrated. This server runs Windows Server 2019 (64-bit) and SQL Server 2019 (64-bit). The MM Control Server typically requires one Intel Xeon E-2124, 3.3GHz, 4 Core or faster processor with at least 16GB RAM and 2 x 1TB hard disk space. For specific Honeywell computer platforms and supported software that meet these requirements, please contact your Honeywell representative.

## Support Services

This product comes with worldwide, premium support services through our Benefits Guardianship Program (BGP). BGP is designed to help our customers to improve and extend the usage of their software and the benefits they deliver, ultimately maintaining and safeguarding their advanced software.

## Training Services

Training courses addressing Inventory Monitor 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.

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## **For More Information**

Learn more about Honeywell's Inventory Monitor software can improve your inventory monitoring operations, visit [www.honeywellprocess.com/software](http://www.honeywellprocess.com/software) or contact your Honeywell Account Manager.

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