

Product Information Note

Profit[®] Inventory Monitor Tank Monitoring Solution for Oil Refineries, Tank Farms & Terminals



Honeywell's Profit[®] Inventory Monitor (PIM) enables operations personnel to collect, validate and manage accurate information on the status and contents of storage tanks. PIM 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.

Benefits include:

- **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.

Key Capabilities

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

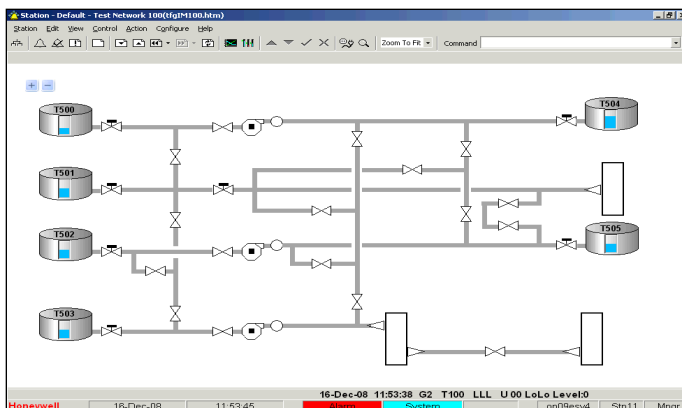
- Comprehensive Tank Calculations
- Flexible Tank Gauging Systems Support
- Manual Data Entry Support
- Accurate Tank Volume Calculations
- Tank Flow Detection
- Extensive Tank Monitoring and Alarms

A number of these key capabilities are described below:

Comprehensive Tank Calculations

At the heart of Profit 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, Profit 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



Profit Inventory Monitor uses Tank Farm Graphic (TFG) displays for visual representation of tank information including level, flow and alarms

- 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

Profit 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 Profit Inventory Monitor is collected automatically, some information is only available through manual entry, or when field instrumentation is unavailable, manual entry capability is required. Profit 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, Profit 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. Profit Inventory Monitor ensures accurate tank volume calculations through the following:

1. Reference data that includes:

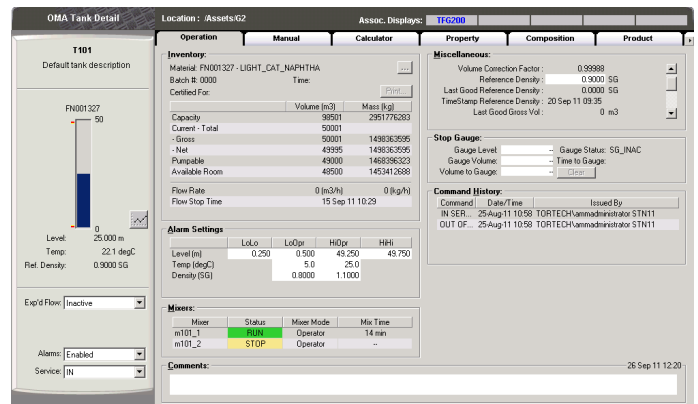
- Reference density
- Stop gauge level or volume
- Volume, temperature, pressure and density alarm limits
- Tank measurement units

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 and 2004 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 in the Tank Detail Display

Tank Flow Detection

Experion Tank 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 Experion Tank 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	Alarm	Level	Alm Time	Stp Gauge Level	Stp Gauge Time	Total Vol	Flow Rate	Temp	Comment
T902		5.546	1 D 08:28	--	--	11092	300.0	10.94	
T904		43.229	1 D 16:04	--	--	86479	300.0	22.1	
T905		39.272	2 D 18:31	--	--	78546	300.0	22.1	
T104		7.904	4 D 02:42	--	--	15909	-150.0	22.1	
T901		33.943	4 D 06:43	--	--	67696	300.0	22.1	
T106		30.752	5 D 03:03	--	--	61596	300.0	22.1	
T105		26.165	--	--	--	52332	-150.0	22.1	
T100		25.000	14 D *	--	--	90000	0.0	22.24	
T101		25.000	--	--	--	90000	0.0	22.1	
T102		25.000	--	--	--	90000	0.0	22.1	
T103		25.001	--	--	--	90002	0.0	22.1	
T107		25.003	--	--	--	90006	0.0	22.1	
T207		25.000	--	--	--	90000	0.0	22.1	
T208		25.000	--	--	--	90000	0.0	22.1	
T222		25.0004	--	--	--	90000	0.0	22.1	
T225		25.000	--	--	--	90000	0.0	22.1	
T227 LLL		0.000	--	--	--	0	0.0	22.1	
T228		18.959	--	--	--	27115	0.0	22.1	
T242		25.000	--	--	--	90000	0.0	22.1	
T244		25.000	--	--	--	90000	0.0	22.1	
T900 LLL		0.000	--	--	--	0	0.0	22.1	
T901		25.000	--	--	--	90000	0.0	22.1	
T903		25.000	--	--	--	90000	0.0	22.1	
T700		25.000	--	--	--	90000	0.0	22.1	
T701		25.000	--	--	--	90000	0.0	22.1	
T702		25.000	--	--	--	90000	0.0	22.1	
T703		25.000	--	--	--	90000	0.0	22.1	
T704		25.000	--	--	--	90000	0.0	22.1	
T705		25.000	--	--	--	90000	0.0	22.1	
T706		25.000	--	--	--	90000	0.0	18.94	
T900		25.000	--	--	--	90000	0.0	22.1	
T901		25.000	--	--	--	90000	0.0	22.1	

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

Profit Inventory Monitor on the Experion Platform

Profit 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 Profit Inventory Monitor user interface, and Profit Inventory Monitor makes use of standard Honeywell Experion PKS functions such as messages, logging, as well as alarming and event journaling.

Profit Inventory Monitor on non-Experion Platforms

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

Integration with Honeywell Applications

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

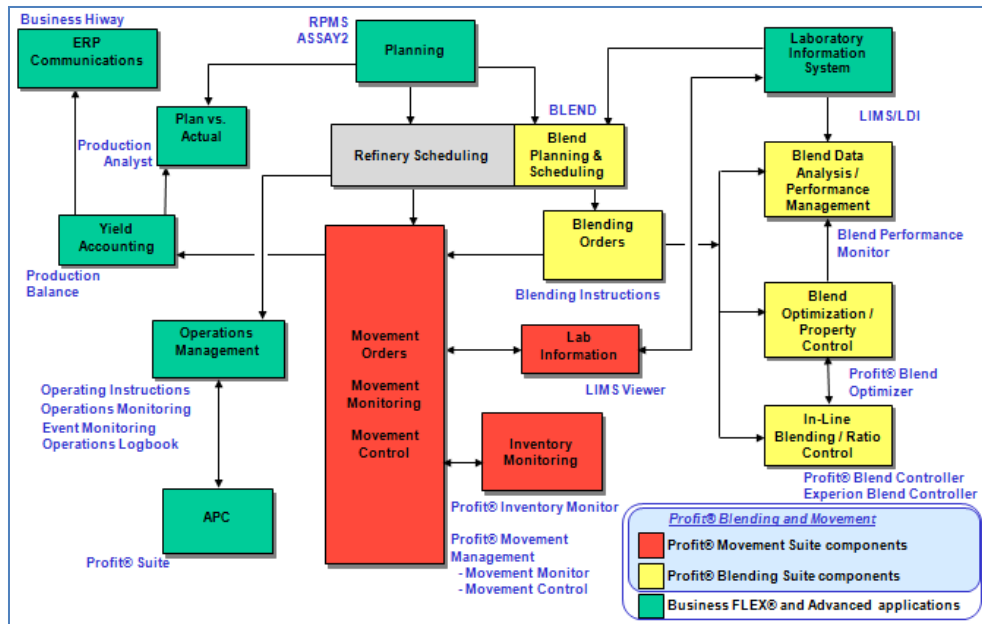
- **Profit Movement Management - Movement Monitor** – Movement order management, movement tracking and alarming, and movement reporting.
- **Profit Movement Management - Movement Control** – Movement set up and control including automated path selection, line-up and movement execution.

Together, these components form Honeywell's Profit 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 Profit Inventory Monitor, the Profit Blending and Movement Solution, and other Honeywell applications are shown on the following page. As indicated, Profit Inventory Monitor provides inventory data, alarms and tanks status to the **Profit Movement Management** application and to other applications.

When **Profit Movement Management** is implemented, planned movements, or movement orders, may be transferred to **Profit 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 like Honeywell's **Production Balance** via XML files.

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



Honeywell's Profit® Blending and Movement Solution integrates with other Honeywell applications

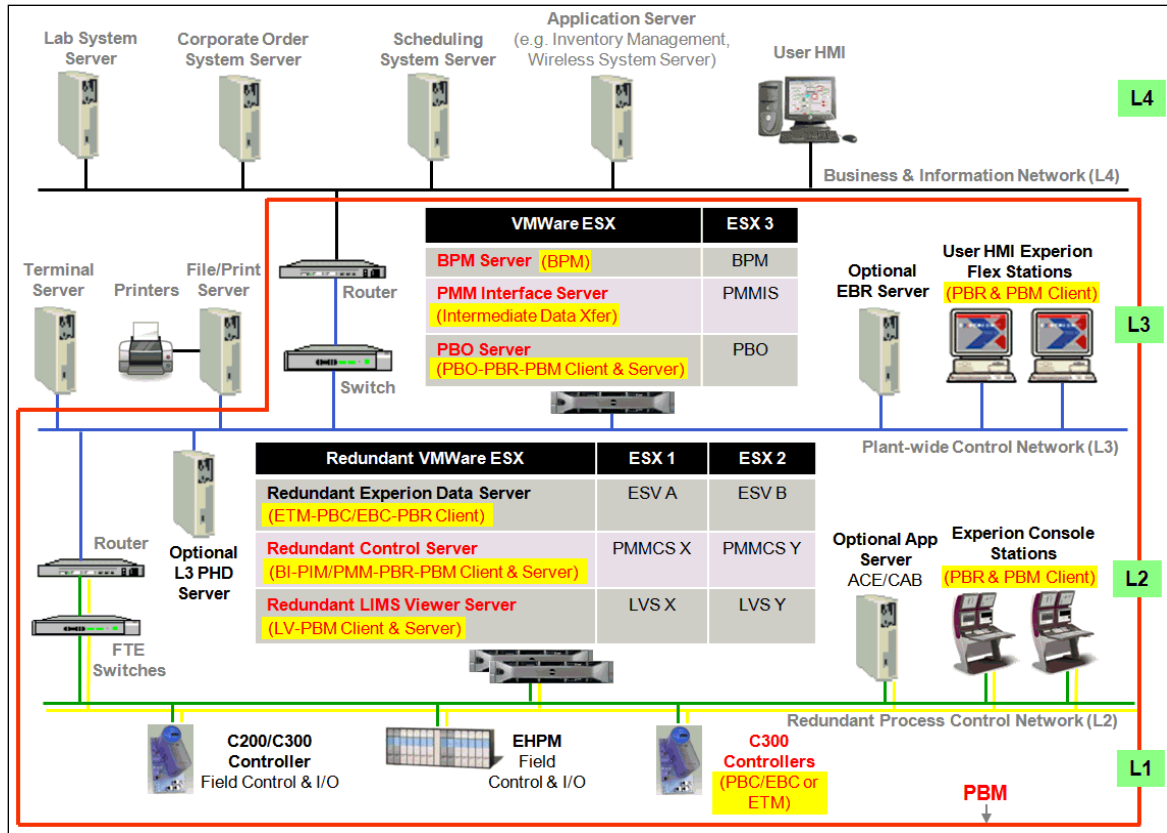
System Requirements and Architecture

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

Profit Inventory Monitor is installed on the PMM Control Server as illustrated. This server runs 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 MA Control server typically requires 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 Profit Inventory Monitor implementation, use and maintenance are available through Honeywell's Automation College (www.automationcollege.com). On-site courses are also offered upon request.



Sample Profit Blending and Movement solution architecture

For More Information

Learn more about Honeywell’s Profit Inventory Monitor, visit our website www.honeywellprocess.com/software or contact your Honeywell account manager.

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