Intelligent Terminal Automation System
Rockwell Automation intelligent Terminal Automation Systems provide a complete automation solution for tank terminals beyond your expectations......

The Rockwell Automation intelligent Terminal Automation System (TAS) provides monitoring, control and management of the entire product handling process from receiving to storage to distribution. Our terminal and tank farm experience includes products such as crude oil, refined oil, liquefied natural gas, petroleum gas and chemical tank farms, utilizing loading systems for ships, trains, trucks and pipelines. With data integration as the system’s core, TAS combines automatic control and business management functions. It is an integrated, modular, open and scalable solution that helps ensure the safe and stable operation, optimal management and profit maximization of the terminal, as well as lowering production costs.

Terminal Automation Control
- Process control
- Safety control
- Fire & Gas control

Terminal Business Management
- Material transfer (truck loading/unloading, vessel loading/unloading, tanking, pipelining etc.)
- Material tracking
- Storage tanks and inventory management
- Material sorting/classification management
- Customer management
- Vehicles and vessels management
- Equipment and assets management
- Order and contract management
- Distribution statements
- Supervisor query
- ERP interface
Main features

Terminal Management System (TMS)

TMS is an integrated terminal management system at MES level. It can send commands to the control system via the interface with the process control system, and also transmit necessary data to the ERP system.

TMS is mainly responsible for the operations and management of the entire production and business processes at the terminal. It includes operations of material receiving and distribution, stock tracking, tank farm condition monitoring, stock material change, stock calculation, metrical information collection of volume and quality data, water separation, tank cleaning, data management of operation records, receipt preparation, log books distribution, at the same time analyzing operation and business data, while performing position operation guidance and management. With integrated management throughout all business processes, besides being able to enhance the operation efficiency at the terminal, it is also able to standardize and improve terminal companies’ management effectiveness.

As a TMS network usually adopts the B/S (browser/server) structure, the terminal management may perform data entry, editing, management, query, statistics and summary, statements review and printing, and online release through the Web server using a browser with appropriate authority. Additionally, special software does not need to be installed in the system to perform this task.

With a standard database as its core, TMS provides data display and output in various forms of data sheets and graphs.

The Rockwell Automation TMS is modular and can be customized based on customer requirements. Its flexibility and ease of use help customers to reduce their total operating costs.
Process Control System

The Rockwell Automation PlantPAx Process Control system is a unified platform for sequential control, process control, electrical control and safety control. It provides a powerful, flexible, low-cost and all-in-one solution for process monitoring and safety at tank farms.

PlantPAx performs data acquisition, control and management of production control, and transmits and receives process variables from the control center. Authorized staff at the plant may perform monitoring, control, scheduling and management over the entire plant through the control center. Its main features include:

- Data acquisition: to collect, display, record and provide alarms on process parameters, fire control, electrics, cathodic protection and equipment condition (failure and analysis of oil pumps and instruments) as well as other related data
- Control: real-time control of equipment (valves/pumps)
- Display: running status, operating instructions, dynamic trends, historical trends, simulative process flow diagrams
- Authorization and user management
- Alarm report processing: display of alarms and events and printing of reports
- Database: real-time data collection and establishment of historical and real-time databases of the control system
- Programming and configuration: programming, configuration and data editing of the control system
- Communication: communication among the measuring system, automation system and other subsystems
Safety System

Safety control at the terminal involves equipment safety, personal safety and environmental safety, and thus is the top priority in the terminal operation. TAS provides solutions which comply to SIL2 or SIL3 standard, which can effectively realize safety control of the entire plant including the tank farm, pump area and loading area.

Fire & Gas System includes:

• Fire-area control philosophy
• Automatic control, interlocking control and monitoring of the fire pumps, electric valves and firefighting control
• Automatic water replenishment of the fire water tank
• High-pressure stability automation system
• Heat, smoke and flame detectors, on-site manual fire call point, combustible gas signal detection acquisition, monitoring and alarm system
• Alarm signal to the industrial CCTV system
• Signals interlock to the emergency evacuation system

Terminal Loading System

The terminal loading system is applied in the storage and transportation operations at the terminal to improve the accuracy of product receipt or delivery, and lowers costs and improves efficiency by automating shipping/trucking/barreling. At the same time, it helps to avoid accidents caused by static electricity, manual measurement, and abnormal loss of product. Meanwhile, it also provides accurate data to the upper ERP management system to significantly improve the management and macro-control capability of the tank farm.

• Operator authorization management
• Driver and vehicle authorization management
• Fill in, submit and process bills of materials
• Crane position allocation and condition monitoring
• Loading preparation, execution and completion of the entire management process
• Acquisition and use of flow and weight signals
• Intelligent control and interlocking protection of pumps and valves
• Dynamic screen display of loading process,
• Safety protection systems, static electric grounding as well as recovery systems
• Reports, billing and invoice printing
• Data archiving and database management
**Motor Control system**

Rockwell Automation provides a complete set of intelligent motor control centers, offering advanced and reliable electrical control for the terminal.

**Variable Frequency Drive System**

Rockwell Automation PowerFlex variable frequency drives provide a complete set of variable frequency control solutions for truck loading pumps, shipping/unshipping pumps, transfer pumps, and compressors.

**Communication**

By adopting a completely open architecture and supporting standard communication interfaces and protocols, TAS allows easy and convenient data sharing within an enterprise. The system can communicate with third-party equipment and ERP system by means of serial communication, DeviceNet, ControlNet, EtherNet/IP, OPC, etc.

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**Terminal Automation System Network Diagram**

[Diagram showing network connections and components such as redundant server, operator station, printer, Ethernet, ControlNet, DeviceNet, Motor Control Center, Variable Frequency Drive, Soft Starter, Condition Monitoring, etc.]

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Other subsystems at the tank farm (for measurement, simulation or leak testing etc.)
Summary:

- Customizable to meet user requirements
- Applicable to all tank farms and terminals
- Suitable for highway loading, rail loading and shipping applications
- Improves efficiency and increase profits
- Provides safety protection
- Supports MES
- Connects with commercial systems, such as ERP
- Offers seamless integration between process, electrical and information automation
- Provides a complete end-to-end tank terminal automation system
- Delivered with domain expertise and industry knowledge