



**PETROLIMEX INFORMATION TECHNOLOGY &
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INTRODUCTION TO PETROLEUM TERMINAL AUTOMATION

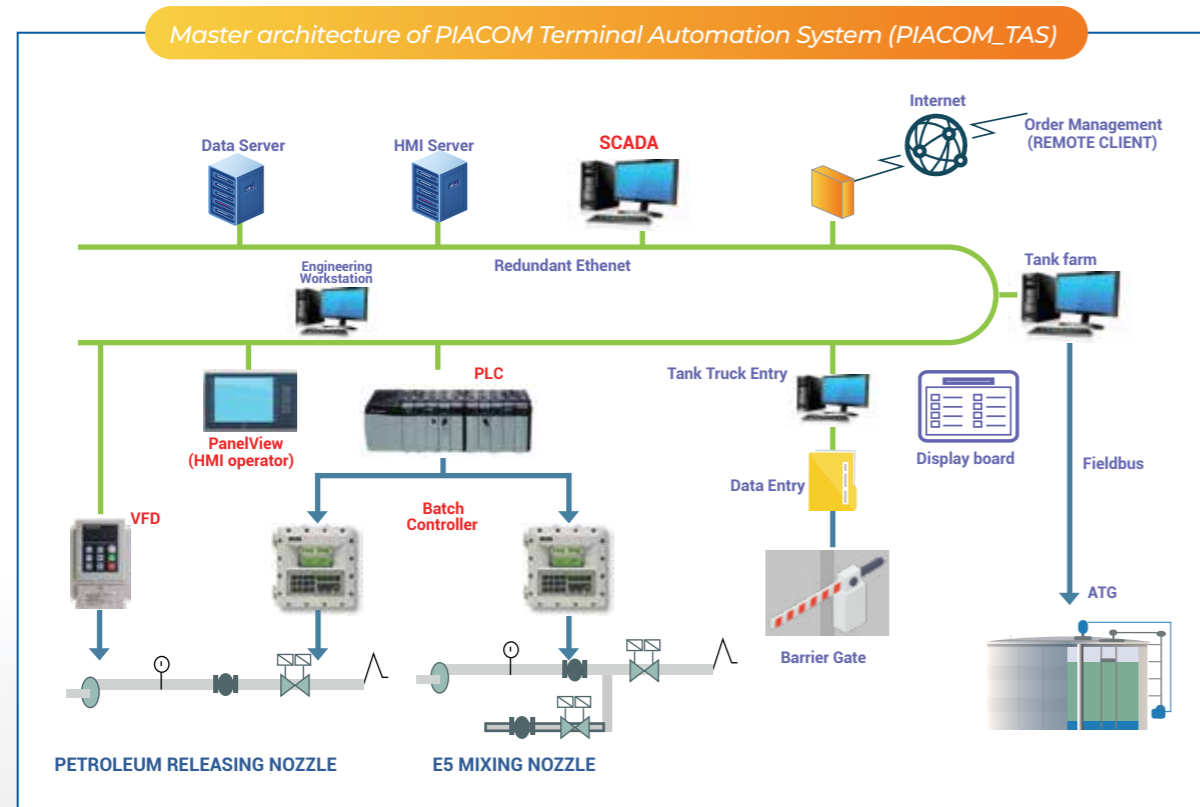
PIACOM_TAS

PIACOM_TAS

PIACOM TERMINAL AUTOMATION SYSTEM (PIACOM_TAS) is designed under the modern technology platforms of the world leading automation technology developers with the international standardized 4-level architecture model. It ensures safe, accurate, effective and visual operation of terminals from stock-in, inventory and loading petroleum. The system is synchronously integrated on data with business administration information system to support supervision, control and decision making effectively and timely.

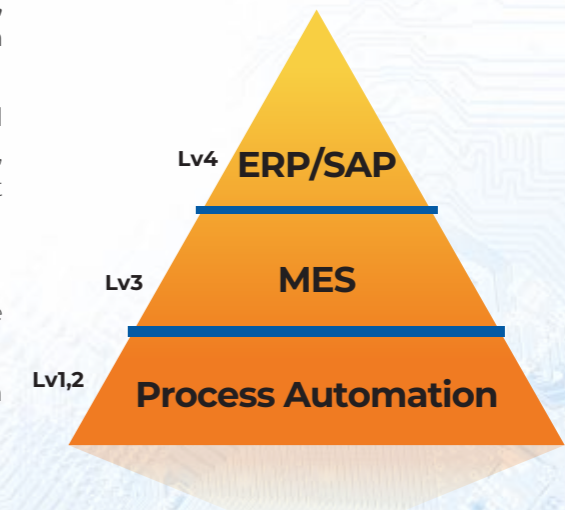


MASTER ARCHITECTURE OF PIACOM TERMINAL AUTOMATION SYSTEM (PIACOM_TAS)



The system is built on ISA95 and S88 standards, well integrated with business administration information system under 4-level model:

- **Level 1:** Field Instrument: Pumps, Flow control valves, flow meters, temperature sensors, pressure sensors, tank gauge, entrance/exit monitor, Fire and gas system, CCTV camera.
- **Level 2:** Controller, PLCs.
- **Level 3:** workstation, SCADA computers, database server.
- **Level 4:** Business administration information system.



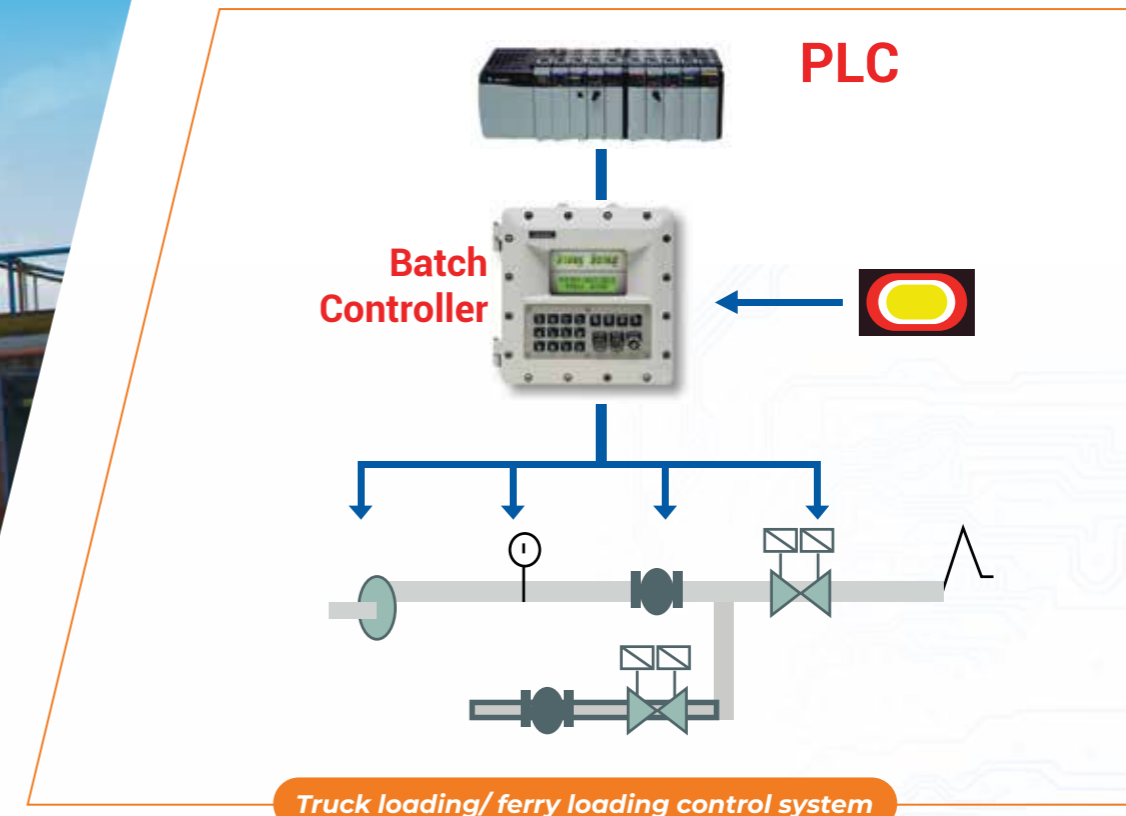


FUNCTIONAL MODULES OF PIACOM TERMINAL AUTOMATION SYSTEM



1. TRUCK LOADING/ FERRY LOADING CONTROL SYSTEM

Truck loading/ ferry loading depot control system is a core application of petroleum terminal operations. It automatically controls and deliver petroleum according to preset volume to truck, ferry and wagons to improve the labor productivity, civilization and avoid errors from manual operation.



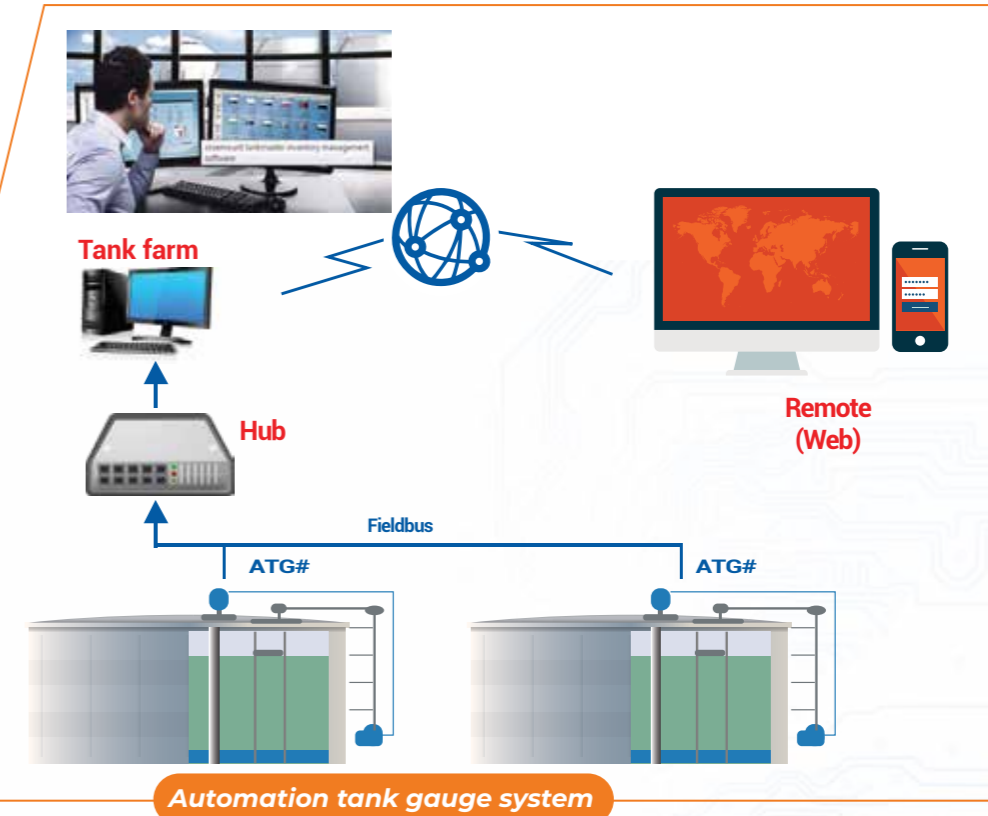
Truck loading/ ferry loading control system

- In the system, Batch Controller Unit is applied to collect data on petroleum volume, temperature, pump's motor status and flow valve control to ensure accurate loading in accordance with the preset volume
- The simple and accurate operation procedure is initiated from magnetic card/loading order and well-integrated with the Management Information System (MIS)
- All parameters of loading process are monitored and visualized in SCADA software system.
- Safe conditions are controlled in loading process: Grounding, overfill warning, emergency stop buttons
- The system is designed with high redundant to ensure continuous loading, minimizing the interruptions
- The system automatically controls blending process between ethanol and to create some biofuel products (E5, E10) basing on blending ratio



2. AUTOMATION TANK GAUGE SYSTEM

Automation tank gauge system functions the real-time inventory supervision and provide accurate petroleum inventory volume in the terminals and tanks. It supports calculations and delivery of petroleum importing from Vessel/pipeline, daily tank operations and planning the petroleum mixing and classification programs. It supervises and monitors the petroleum leakage, spill warning to minimize adverse impact on environment and financial impacts caused by petroleum loss.

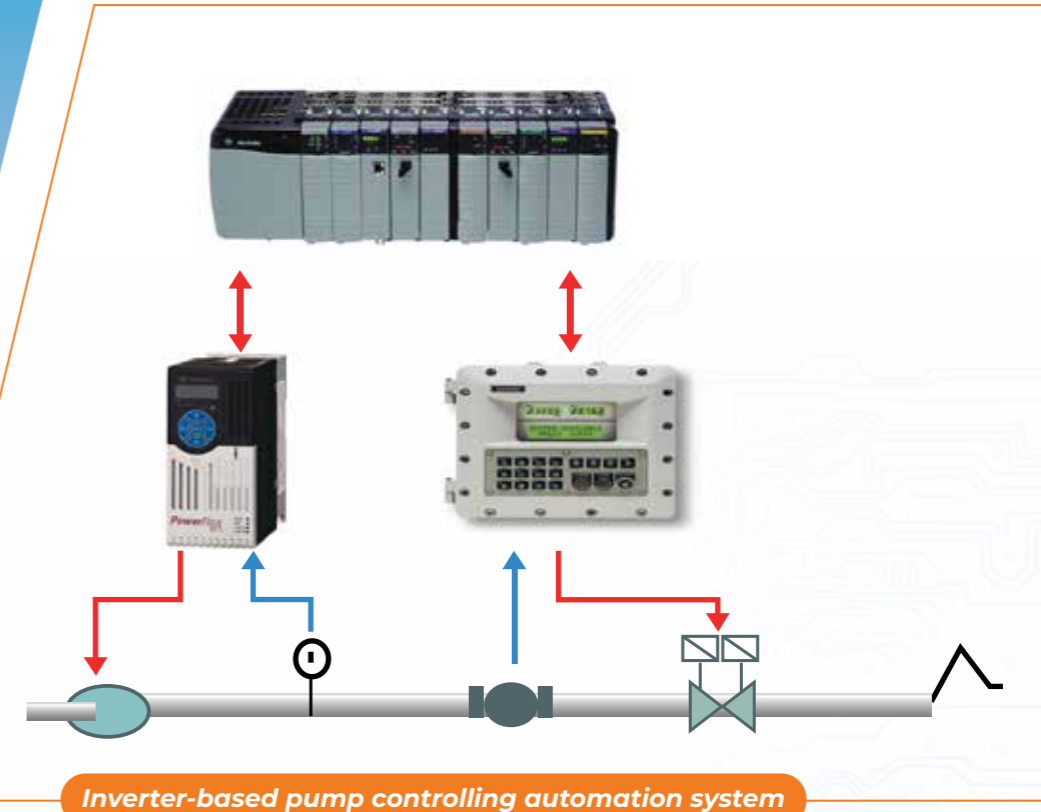


- High accuracy gauge technology application device: Radar, Servo and magnetostriction
- SCADA software receives and displays the real-time data of petroleum height, water level, average temperature, volume calculation, petroleum volume converted to 15°C and utility reporting system to serve for the management levels
- The tanks are continuously supervised to release the warnings and alarms on danger status: Out of stock, high level, spill
- Easy Internet access with high security
- Easy installation with low maintenance cost is obtained



3. INVERTER-BASED PUMP CONTROLLING AUTOMATION SYSTEM

The system functions to improve the loading accuracy and stability, enhance the useful life of technology equipment and improve the financial performance by minimizing operating costs.

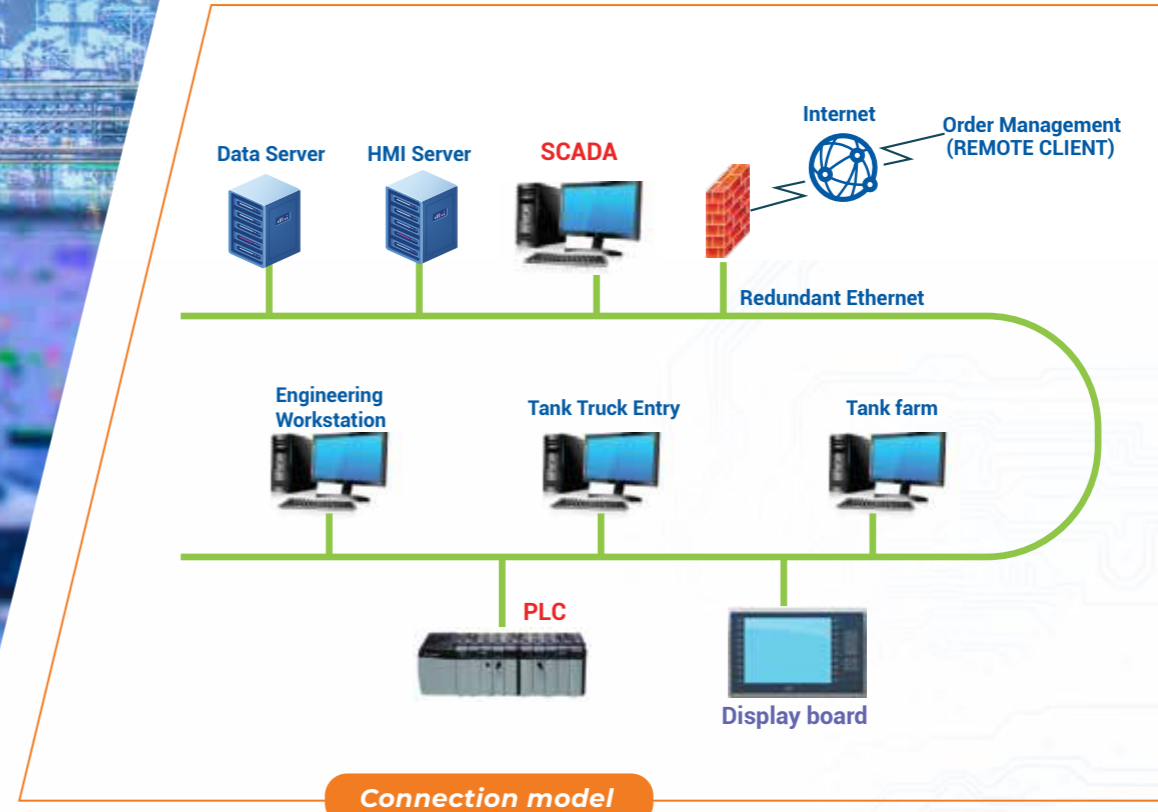


- Pump's motor control according to stepped-loading process help pump's motor has not to operate full load throughout loading batch
- Automatically control pump's motor capacity to maintain the optimal pressure range of liquid in the pipeline and deliver preset volume accurately
- Avoid high start-up current which causes mechanical shock for engine and voltage drop in the power grid
- Reduce hydraulic shock during closing/opening valves and turn on/off pump's motor (resulting in mechanical breakdown, flow control valves and process equipment)
- Control operation of the system equipment: Pumps, pressure on pipeline, current and temperature



4. CENTRAL CONTROL ROOM AUTOMATION SYSTEM (CSR)

Central control room automation system is the key of Petroleum Terminal Information and Automation System. Central control room is the focal point of information, supervising all operations of Petroleum Terminals, making settlement decisions upon warnings and failures, integrated with the MIS to support the data supervision, control and timely making smart decisions.



Connection model

- Supervise all activities of Petroleum Terminals through SCADA screen. Terminal automation subsystems and PLC cabinets receive data and control all operations in a petroleum terminal
- Synchronously connect with Sales Department to support the client's delivery in following closed procedure from vehicle register, create work order, operate loading process and invoice printing for client
- Standard backup design: Server system, security system, Ethernet network, UPS power system and other working environment are designed to ensure stable and continuous operation in the terminal
- SCADA and PLC software systems are designed in modules and subsystem basing on advanced technology platforms of Rockwell Automation
- Automation System Data is stored in the Microsoft's SQL standard database, ensuring integrity, stability, high security and easy use and access
- Users are secured and classified by operate position and demand
- Diversified and abundant reports are submitted by KPIs of Warehouse, modules, goods management demand and customizing by the user requirements



5. TRANSIENT LIGHTNING AND SURGE VOLTAGE PROTECTION SYSTEM

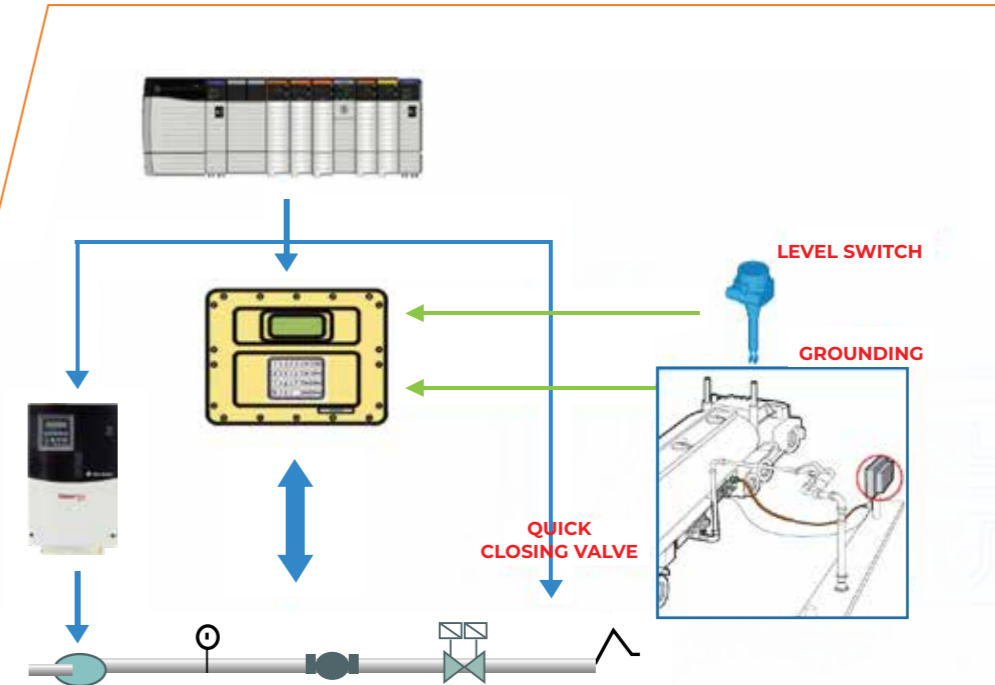
Its function is to protect the automation system equipment of terminals from surge voltage and transient lightning which may cause breakdown and damages of equipment. The stable and smooth operation of the Automation System is ensured without interrupting the warehouse-based production activities, minimizing financial damages caused by transient lightning from direct lightning on the automation system.

- The solution is based on the Phoenix Contact equipment
- The system is designed to protect key equipment: PLCs and equipment in the Central Control Room, technological equipment in the loading bay and tank farm
- Surge protection for signal line and power supply line by international standard ratings



6. LEVEL SWITCH, AUTOMATIC GROUNDING AND QUICK CLOSING VALVE SYSTEMS

The system functions to improve the safety and prevent risks on petroleum loading activities. The system automatically controls the grounding, gasoline level of vehicles involving in loading operations. Only safe vehicles may enter to the loading areas. Quick closing valve at loading nozzle shall act and stop the loading process when spill risks are found.



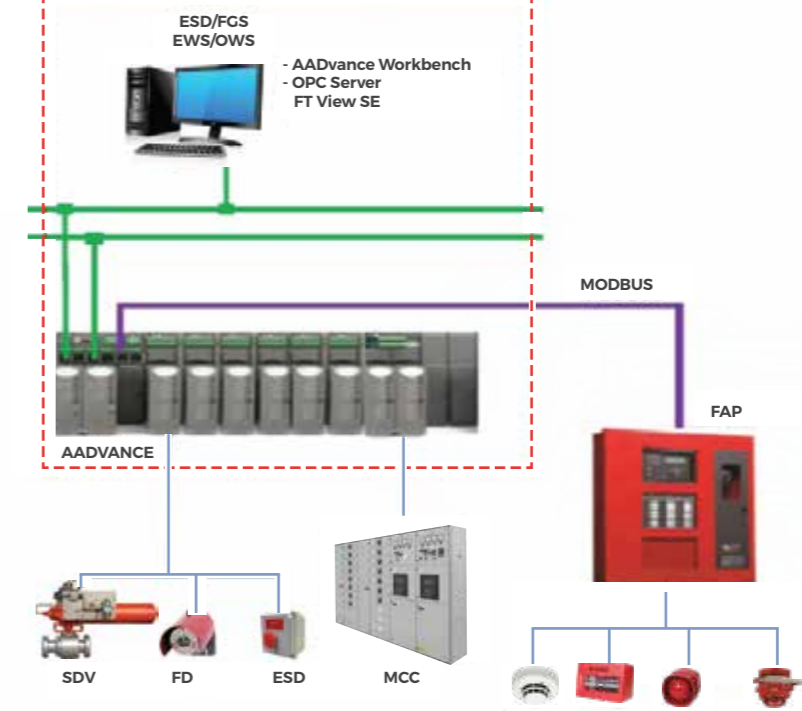
Ground monitoring, Overfill protection and shut-off valve system

- Overfill protection, automatic ground monitoring and shut-off valve equipment are originated from the world leading manufacturers with high accuracy and reliability
- The equipment is integrated with Batch Controller and PLCs at central control room to support safety operation of entire system
- The equipment is easy to install and operate with high performance



7. FIRE & GAS MONITORING SYSTEM

The system functions to improve the safety and prevent fire & explosion risks in petroleum terminals. The system automatically controls the fire & explosion risks in key areas of Petroleum Terminals. At the loading areas and tank farm, all loading activities are stopped upon potential risks or at the request of user.



Fire & Gas monitoring system

- The system is designed to be qualified with SIL3 ratings, using independent controller to control the ESD valves and pumps in case of emergencies such as ESD stop and Fire & Gas signals
- Safety alarming devices: Fire and smoke detectors, electric cabinets in the key areas are connected to central control room and safety system
- The system's HMI is visually designed and convenient for operators

MAIN BENEFITS OF PIACOM TERMINAL AUTOMATION SYSTEM

- Modern data supervisory and automation control system
- Improve labor productivity; optimize operation, and financial performance
- Reduce loss on petroleum loading, importing and inventory
- Minimize the hazardous risks and enhance security in petroleum terminal
- Easy access via internet with high security
- Easily upgrade and expand in the future
- Easy to integrate and connect with automation equipment from many famous manufacturers
- Able to integrate with ERP system
- Easily maintain and operate
- Reason investment total value

PIACOM_TAS

Safety - Accuracy - Efficiency

