

Take a modern approach to increase safety integrity while improving process availability.

DeltaV SIS™ Process Safety System

Whether standalone or integrated, choose a smart, modern safety system designed for the life of your plant.



The DeltaV SIS™ takes a modern approach to increase safety integrity while improving process availability. The proven DeltaV safety instrumented systems (SIS) continuously monitors your plant's safety devices' status and diagnoses the health of the entire safety loop—dramatically reducing your risk. The logic solver, certified to safety integrity level (SIL) 3 uses electronic marshalling technology to reduce your installation, commissioning and maintenance costs while substantially reducing your equipment footprint.

Improve Safety Integrity

Know your safety system will perform when called upon

The modern DeltaV SIS takes into account devices' predicted lifespan and pre-empts end of lifecycle with maintenance notifications and testing, so your SIS integrity stays stable longer.

Maintain Project Schedule, While Adapting to Project Changes

Manage late changes with Electronic Marshalling's flexibility

DeltaV SIS with Electronic Marshalling lets you maintain safe operations without putting production at risk every time you make a system change. Simplify design, installation, wiring, and commissioning while eliminating traditional system re-work and redesign.

Look at Space Differently

Mixed I/O and wiring in a single cabinet

DeltaV SIS enables you to mix I/O, and bring homerun cables straight from the field into a standard cabinet. So small spaces are less limiting—even during hot cutovers when cabinet contents are being reorganized and the system seems to grow ten-fold.

Reduce Undetected Failures

Optimize diagnostics for the entire safety loop

Be confident that every safety loop will operate when needed. DeltaV SIS provides an integrated, constant monitoring approach for the complete safety loop—from sensor, to logic solver, to final control element.

Overcome Complicated Integration

Smooth integration based on open communication standards

Whether you require a standalone or integrated safety system, your DeltaV SIS solution will meet IEC 61508 and IEC 61511 requirements for physical separation and independence of safety and control. Integrate smoothly with other vendors' control systems using standard communications interfaces.

Reduce Engineering Effort

Reduce engineering complexity with TÜV- and exida-certified function blocks

The IEC 61508-certified SIS function blocks deliver functionality right out of the box, simplifying the implementation of complex SIS applications. No custom code is required to implement common SIS tasks. The result is faster configuration and troubleshooting of SIS logic.

Streamline Proof Tests

Reduce field testing and planned shutdowns

Proof tests ensure effective system operation and integrity. The DeltaV SIS system offers alternatives to traditional proof testing. Partial stroke testing on HART-enabled devices can give you the option to extend the time between full proof tests on valves.

Simplify Safety Lifecycle Management

Built for IEC 61511 compliance

DeltaV SIS is built for IEC 61511 compliance, providing stringent change management, security management, and documentation tools. The system is certified by TÜV and exida for use in SIL 3 applications without restriction.





A Smart SIS includes:

- Sensors
- Logic Solvers
- Final Control Elements

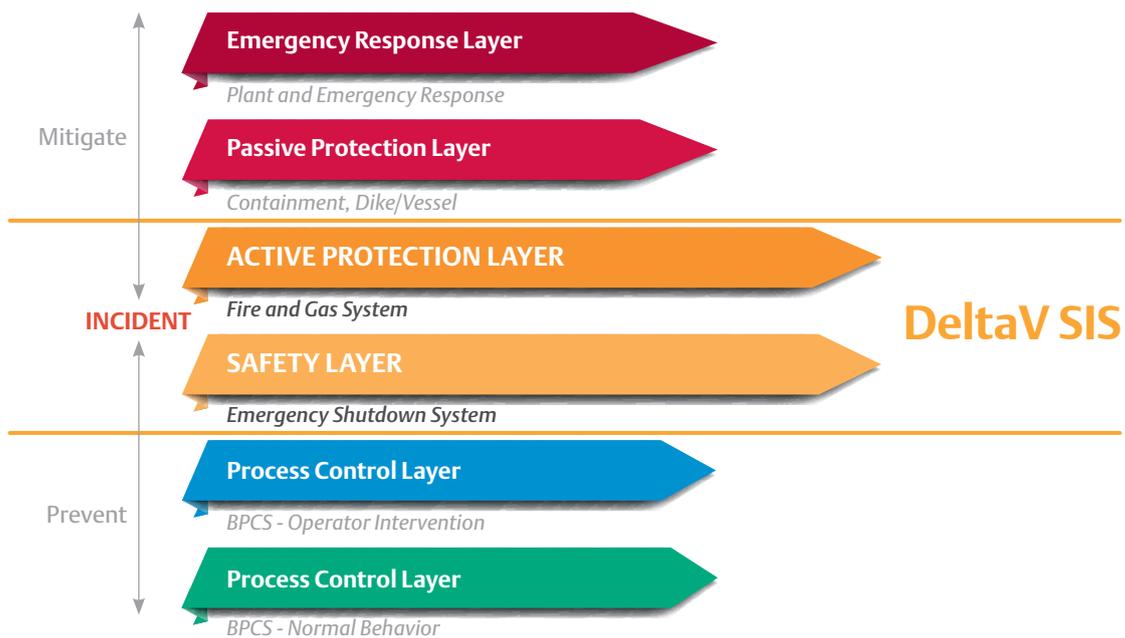
“With the increased visibility of our smart SIS, we have reduced burner startup from 4 hours to 20 minutes, along with quicker troubleshooting and burner restart after an upset.”

Operations Manager, large mining company, Latin America

Improve Safety Integrity

Know your safety system will perform when called upon. Ensure high availability.

Safety applications are designed to protect your plant and personnel from hazardous conditions and provide a rapid and coordinated operational response to emergency situations. However, traditional safety systems don't deliver comprehensive SIF diagnostics to the control program to ensure SIS reliability and availability. The modern DeltaV SIS takes into account the entire safety loop, evaluating measurement system performance, and extending diagnostics beyond the device to provide process diagnostics. The DeltaV SIS takes into account devices' predicted lifespan and pre-empts end of lifecycle with maintenance notifications and device alerts, so your SIS integrity stays stable longer.



Prevent incidents from occurring

The DeltaV SIS has been widely used for emergency shutdown (ESD) applications to prevent hazardous situations from occurring, and can initiate the orderly shutdown of a plant, unit, or piece of equipment should it be required. Sensors detect certain conditions, and the DeltaV SIS logic solver is configured to take your plant to a safe state, by manipulating the required final elements (valves and pumps).



Mitigate the Consequences of events when they occur

IEC 61511 recognizes fire and gas systems (FGS) as mitigative SIS systems. The major focus of a FGS is to mitigate an incident AFTER it has occurred. By monitoring process areas where fire, or potentially flammable gas or toxic gas buildup may occur, modern safety systems like DeltaV SIS offer the option of tight integration between the FGS and ESD.

Permit the system to operate when safe

In addition to FGS and ESD, DeltaV SIS is used for burner management system (BMS) applications. Through proper sequencing and interlocks, the DeltaV SIS BMS application allows the burner unit(s) to go safely through all relevant states, from start-up to operation and shutdown when needed.



Maintain Project Schedule, While Adapting to Project Changes

Flexibility with Electronic Marshalling

A modern change management approach

Modifying or adding to your control system can mean excessive engineering re-work to your safety system—not to mention the time to verify those changes for standards and regulations compliance.

The modern DeltaV SIS builds in unprecedented flexibility so you can evolve your safety system confidently and cost-effectively. It does this with Electronic Marshalling and CHARM technologies, which let you separate safety loop installation from logic configuration. That means you can start hardware design earlier in the engineering process—before HazOps completion.

CHARMs Smart Logic Solver

Each DeltaV SIS CHARMs smart logic solver (CSLS) provides I/O processing, SIL 3-capable logic solving, and diagnostics in a single logic solver. The CSLS supports individually configurable channels and allows for safety rated communication with other CSLSs through a dedicated local safety network. Combine multiple local safety networks up to 30,000 I/O, and integrate across a global safety network (GSN) between your assets over great distances. All communications are completely redundant from the channel (LS-CHARM) to the CSLS. Integrated HART I/O and device alerts, brings field diagnostics into the CSLS. CSLS key features include:

- quad-modular redundant logic processing
- quad-voting on output channels
- separate power
- same input data for each logic solver
- continuously drives output channels if a redundant partner fails
- automatic online proof testing
- in-situ hardware and software upgrades.

Simplify Compliance

Modern DeltaV SIS is built for IEC 61511 to simplify regulatory compliance, with documentation tools that can eliminate risk of error and improper implementation. Simplify change management, asset management, security management and documentation control.

Protected composite templates

For reduced complexity in global engineering and IEC 61508 compliance, the DeltaV SIS system includes protected composite templates. The templates are protected from modification by only allowing changes to occur on the master system.





CHARM smart logic solvers (CSLS) are interchangeable according to your device signal type, so late project changes won't hold up project schedules.

Easily track changes

Change management of your traditional SIS is expensive, complex, and introduces risk of error—errors that ripple through your documentation. Comprehensive version control is automatically tracked and updated. The new version is time-stamped and a history comment can be recorded when the item is checked back in. By keeping detailed historical information on configuration items, the system automatically maintains data for regulatory compliance requirements and troubleshooting.

Ensure authorized configuration changes

The DeltaV SIS security system gives you the ability to grant privileges to individual users. Items may be checked out for editing only by approved users.

Look at Space Differently

Mixed I/O and wiring in a single cabinet

The DeltaV system's Electronic Marshalling and CHARM technologies were developed in response to customers with moving, space-limited offshore oil platforms where home run wiring means crucial added weight and high installation costs. Now you can land groups of safety loops in nearby field enclosures connected by a redundant Cat5E or fiber optic cable. CHARMs take up about 1/3 the space of traditional I/O and marshalling cabinets.

Architectural flexibility reduces footprint constraints

CHARMs require less space

Electronic Marshalling and CHARMs eliminate cross-marshalling wires; all of the work, design, and engineering associated with cross-marshalling simply goes away, because each individual I/O channel is electronically marshalled to a specific logic solver, and inputs can be used in any other logic solver on the network.

More options for hazardous locations

Want to install your I/O systems in the field, in a hazardous location? Emerson offers standard designed field enclosures that can accommodate up to 96 physical safety I/O and can be networked using standard redundant Cat5E or fiber optic cable. You save on installation costs and valuable climate-controlled space.

No Marshalling. Period.

As an additional option for traditional rack room and field wiring termination configurations, you can install logic solvers and electronically marshalled I/O in the rack room—with no need for marshalling—period.





Each CHARM smart logic solver (CSLS) provides I/O processing, SIL 3–certified logic solving, and diagnostics, with redundancy and single channel integrity.

“Electronic Marshalling allowed us to install field enclosures on each floor of the building, which was needed because there simply wasn’t enough room in the control room for an additional marshalling cabinet. When we had to add a new device, the amount of wiring from the device to a field enclosure was very small, and the flexibility allowed us to put a digital I/O right below an analog I/O.”

Process controls engineer, International specialty chemical manufacturer



Reduce Undetected Failures

Optimized diagnostics for the entire safety loop

Because safety systems are designed to perform only when an abnormal situation occurs, they raise the question: “How can I be sure it will perform reliably when needed?”

Uncertainty of asset health

Are your safety system assets operating as they should? Are you sure? Based on industry research, over 92% of all faults in SIS applications occur in field instruments and control elements. Therefore, it is critical to consider the entire safety instrumented function (SIF) as a complete entity. DeltaV SIS continuously monitors the ability of sensors, logic solvers and final elements to perform on demand by diagnosing faults before they cause spurious trips or fail to perform. This approach increases process availability and reduces lifecycle costs.

24/7 Safety

Pressure to keep your plant safe 24 hours a day, 7 days a week is relentless. Equipping your safety instrumented system with today’s digital technologies is your best requirement. DeltaV SIS is a comprehensive solution for your safety system with the power of embedded digital communications—all day, every day.

Smart logic solver

The DeltaV SIS logic solver, built for digital communications with safety sensors and final control elements, uses the power of predictive field intelligence to increase the overall reliability of the entire SIF. It is TÜV- and exida-certified for SIL 1, SIL 2 and SIL 3 safety applications as defined by IEC 61508.

Smart devices deliver predictive and health diagnostics

Replacing switches with transmitters is your first step toward reducing undetected failures. Emerson’s smart sensors, such as Rosemount™ and Micro Motion™ devices, go beyond detecting component failures. They evaluate the performance of the complete measurement system, extending diagnostics outside of the transmitter—to provide process diagnostics.





Smart SIS

“Over 92% of all faults in SIS applications occur in field instruments and control elements.”

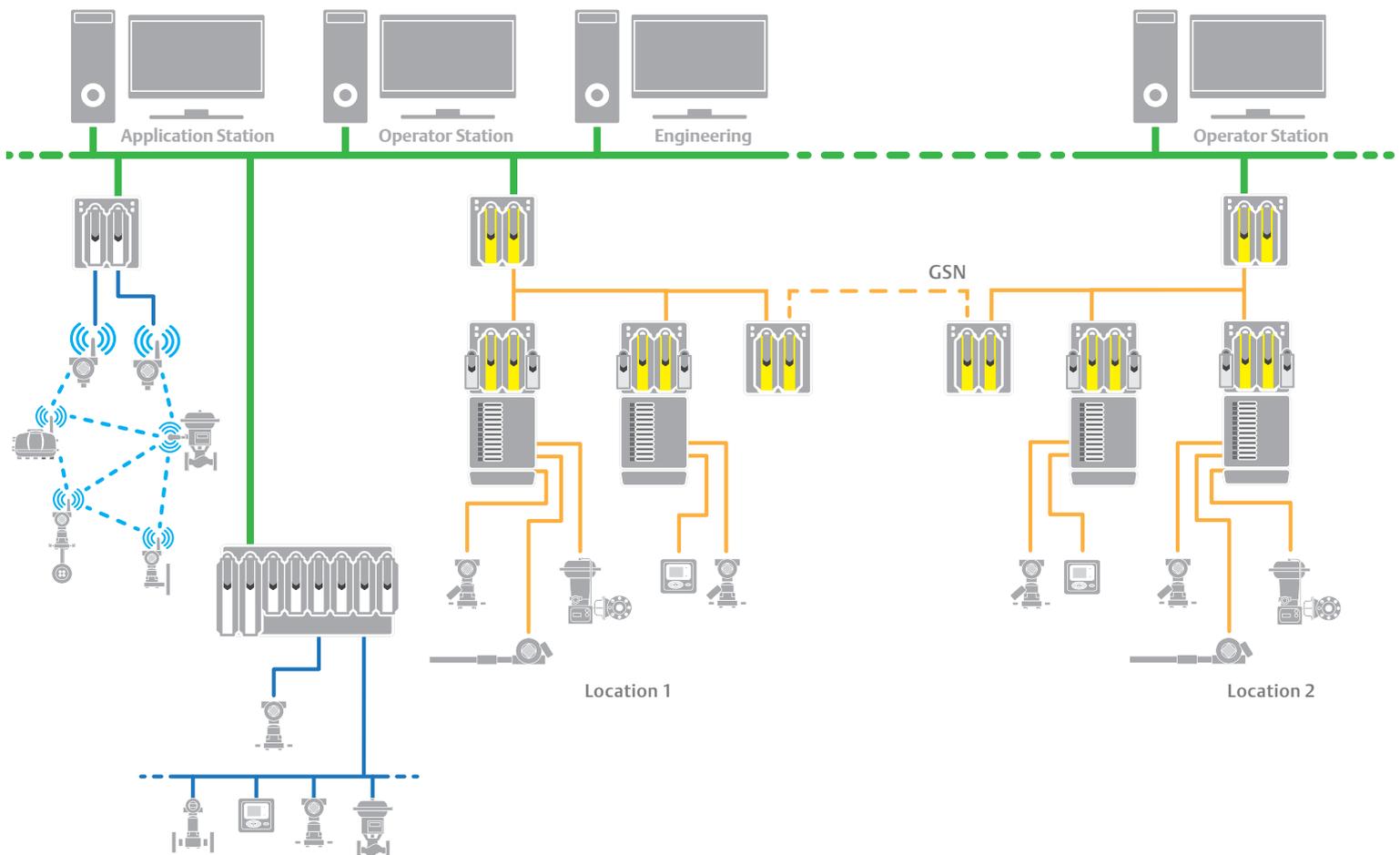
OREDA (Offshore Reliability Database)

Overcome Complicated Integration

Familiar, intuitive applications for greater availability

Safety systems can be very complex to integrate—often with limited interface options. DeltaV SIS offers several integration options based on standard protocols. Whether you require a standalone or integrated safety system—from a single or multiple manufacturers, your DeltaV SIS integration solution will be effective and streamlined. Even in the absence of common operator consoles, communications protocols and engineering databases, DeltaV SIS provides seamless integration with any control system. DeltaV SIS can be fully integrated into DeltaV distributed control system while maintaining full IEC 61511 compliance for physical separation. Additionally, DeltaV SIS supports multiple site locations with the global safety network (GSN).

DeltaV SIS Integrated Architecture



Reduce Engineering Effort

Certified Function Blocks



Intuitive safety software functions

The DeltaV SIS provides a full palette of smart safety function blocks certified by TÜV and exida for safety applications. Using standard function blocks instead of custom programming reduces configuration effort and makes troubleshooting and maintaining logic easier.

Voter function blocks

Voter function blocks provide advanced features like built-in bypass and deviation alarms to improve plant safety. The voting is configured to ensure the same approach is taken throughout the configuration, regardless of the application size.

Cause-and-effect function blocks

Traditional SIS project requirements are typically detailed using cause-and-effect matrices (CEM) and ultimately translated into configuration logic. No more. With the CEM function block, the cause-and-effect diagrams can be deployed directly in the logic solver, enabling fast configuration and reduced testing.

State transition and step sequencer function blocks

Function blocks for state transitions and step sequencing provide powerful functionality out of the box for BMS applications. These function blocks convert complicated custom logic into a simple, intuitive configuration task. Other capabilities that make the certified DeltaV SIS software intuitive include:

- built-in sequence of events handler with automatic first-out trapping with 1msec resolution
- built-in maintenance bypasses
- facilitates compliance to IEC 61511 standard
- built-in alarm management
- standard operator faceplates automatically provide safety information with no configuration

Status handling

Input processing provides status handling—no custom code needed. With integrated HART I/O, device diagnostic information is automatically presented to operations with no additional configuration and is available to the control program.

Sequence of events

Built-in sequence of events handler eliminates hours of engineering while reducing testing and simplifying maintenance. Status information is automatically presented to the operator without mapping data tags, custom templates or faceplates.





Streamline Proof Tests

Online testing reduces risk and adds time between proof tests

Periodic proof testing proves the integrity and safe operation of your safety system. To ensure the tests are performed correctly, consistently, and safely, proof tests are conducted according to well-defined procedures.

Proof tests on traditional safety systems require considerable effort and can be prone to errors. Time can be lost in locating devices, moving from location to location, manually testing devices, then creating and storing manual documentation.

Personnel safety is put at risk because technicians must be in the field potentially in hazardous locations longer than needed. Also, due to technician fatigue and error, the device might not be returned to normal operation after the testing is complete.

Proof testing

Using a modern safety system with smart devices makes proof testing safer and more efficient. It lets you perform most of the proof test procedure from the asset management system. Technicians don't need to visually verify devices tags and location. Similarly, a field technician doesn't need to simulate a test signal from the device; the signal is generated from the control operator station as percentage of PV according to test procedures.

Key proof testing benefits the modern DeltaV SIS provides are:

- Prevent procedural errors by automating tests. The software guides users through the process for each device.
- Decrease the proof test duration and effort.
- Reduce proof test frequency without compromising process reliability.
- Reduce safety risk of exposing personnel to hazardous locations by conducting SIS proof testing from the maintenance shop.
- Automatically document all steps online. No more handwritten test results.

*People are your plant's most valuable assets.
Avoid sending them into potentially
hazardous field proof testing—with modern
safety system online testing.*



Simplify Safety Lifecycle Management

Built for IEC 61511 Compliance

Providing industry leading services throughout the lifecycle of your operations, no matter where on the globe you operate.

Managing risk with global standards

Global Standards and regulations require manufactures to provide comprehensive documentation of their processes. DeltaV SIS Version Control and Audit Trail (VCAT) is a powerful tool that tracks changes and manages revision information for any item in the configuration database—making regulatory compliance simpler.

Certified safety process

Emerson uses a Functional Safety Management System consistent with the most stringent demands for protection, risk reduction and reliability. This TÜV and exida certified system covers:

- Management of functional safety
- Safety lifecycle structure/ planning
- Verification
- Design and engineering of SIS up to decommissioning

Consultants and certified safety experts

Emerson is the first safety systems provider to develop certified procedures in alignment with IEC 61511 requirements. All employees involved with safety system engineering and development complete extensive safety training and Emerson certification. Many complete additional training to become Certified Functional Safety Experts (CFSE).

Reducing failures from the start

Having CFSE experts involved early in the process helps in reducing random system and hardware failures. This is critical because 80% of all SIS-related failures can be attributed to design and implementation errors.

Differentiated safety services

Emerson provides solutions with certified hardware, software, and engineering services needed to meet the requirements of the safety system lifecycle. Emerson has extensive global coverage for main automation contractor (MAC) services—providing a single source for all your project needs.

Analysis

Once the safety integrity levels (SIL) are defined, Emerson can compile your safety requirement specification (SRS). We also offer SIS functional safety consulting to help you design the safety loop with components selection.

Implementation

Emerson project services for application software follow our certified processes and provide verification of all design, implementation, and testing, with documentation to help ensure IEC 61511 compliance.

Operation

Emerson's SureService™ program offers support services designed to help you reduce your operating and service costs, and keep your systems running at peak performance. These services include:

- Emergency Onsite Service
- Express Module Replacement
- Critical Data Backup
- Local Spares Management
- Functional Safety Maintenance and Proof-Testing
- Power and Grounding Integrity
- Security Assessment
- Alarm Management
- SIS Modifications
- Extended Software Support

Globally balanced capabilities

For over 100 years, Emerson has provided process automation solutions worldwide—to help you operate your plant safely, reliably, and more efficiently—giving you peace of mind.



Emerson Process Management is the automation innovator to take on your toughest challenges and bring predictable success anytime, anywhere. Use DeltaV SIS™ to reliably protect your assets and improve process availability.

To get started today, contact us at:

US 1-800-833-8314

Intl +63-2-702-111

Learn more at emersonprocess.com/DeltaVSIS

Emerson Process Management

1100 W. Louis Henna Blvd., Building One
Round Rock, TX 78681-7430

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