Ovation™ Safety Instrumented System (SIS) with Electronic Marshalling

Features

- Offers a uniquely scalable, modular architecture, based on the Characterization Modules (CHARMs) Smart Logic Solver (CSLS)
- Uses the power of predictive intelligence to increase the availability of the entire safety instrumented function.
- Integrates into the control system yet remains architecturally separate.
- Scales to fit all sizes of applications.
- Provides a Safety Integrity Level (SIL) 3-rated certification.
- Extends the support for adding CSLSs online.

Overview

The Ovation™ Safety Instrumented System (SIS) with Electronic Marshalling has a uniquely scalable, modular architecture that is based on the Characterization Modules (CHARMs) Smart Logic Solver (CSLS). This set of SIS components includes sensors, CHARMs Logic Solvers, and final control elements and has the primary purpose of detecting and responding to hazardous plant conditions and ensuring a safe state of the process operation. CSLS also offers the unprecedented tractability and convenience of the Emerson Electronic Marshalling solution.

The CHARM subsystem and CSLS are certified by TUV and Exida to be used in applications with a maximum Safety Integrity Level of three (SIL3). TUV and Exida are both recognized worldwide as trademarks of trust and quality. These certifications ensure that a product, service, or process has been tested for safety and that it complies with the requirements of national, regional, and international regulations.

Usability

The CHARMs Smart Logic Solver processes the Logic Solver CHARM signals and runs the SIS modules that contain the safety system logic. The redundant CSLS can support up to 96 LS CHARMs. The full strength of LS CHARMs is organized in eight banks of 12 LS CHARMs. The CSLS mounts on the CSLS carriers and connects to the Local Safety Network (LSN) through connectors on the carriers. A pair of CSLS communicates over a redundant Ethernet safety network with up to 15 other CSLSs and one interface Controller. This allows great flexibility and ease of system expansion.

The CSLS carrier also holds the primary and secondary Safety Network Ports for the connections to the Local Safety Network and a keylock switch that restricts how and when the CSLS can be unlocked for downloads and upgrades.

Benefits

Ovation SIS with Electronic Marshalling offers the following benefits.

Optimized Process Reliability

In SIS applications, failures occur mostly in field instruments and final elements. However, the Ovation SIS communicates with intelligent field devices using the Highway Addressable Remote Transducer (HART) protocol to diagnose any faults before they can cause spurious trips. This approach increases process availability and reduces lifecycle costs.

I/O Anywhere

The Ovation SIS CSLS provides unprecedented flexibility in safety system I/O topology. Safety-related I/O can be added anywhere by using standard Ethernet infrastructure hardware. From a local I/O cabinet to remote enclosures miles away, simply install the CSLS and connect it to the LSN. Each CSLS can read the input signals from any other CSLS on the same LSN every 50 milliseconds as well as the same inputs wired directly to its own LS CHARM system.

Convenience

The ease of adding a CHARMs Smart Logic Solver to the Ovation SIS is unparalleled. As soon as a CSLS module is added to the Ovation Developer Studio, 16 modules are automatically created and appear under the CHARMs Smart Logic Solver in the Developer Studio tree hierarchy. The control modules store the control sheets. All the control sheets stored in a control module are scanned at the same frequency.

Reduces Overall Installation Costs

The Ovation SIS with Electronic Marshalling reduces the overall system costs by eliminating the internal cabinet cross wiring, reducing the overall footprint, simplifying the Safety Instrumented Functions (SIFs) design, and reducing factory acceptance test (FAT) activities.

- Electronic Marshalling separates the instrumentation and the electrical (I&E) hardware installation schedules and SIF development.
- CSLS supports preplanned wiring, while any later changes can be made without the need to lift a wire.
- The ability to read any input on the LSN provides efficient cabinet designs and accommodates late-scope changes to add I/O anywhere.
- Adding additional SIF capacity does not require rewiring I/O and can be accomplished by simply reading the I/O signals from the proper CSLS.

Fully Redundant Communications

The CSLS architecture is fully redundant with two Logic Solvers on a carrier. The carrier has redundant Safety Network Ports (SNPs) for communication with primary and secondary LSN connections, laid on CHARM base plates, with two separate 24 VDC power inputs. This way, CSLS supports redundant output LS CHARM terminal blocks with or without internal 1 Amp relays for both de-energize-to-actuate (DTA) and energize-to-actuate (ETA) services.

Plug and Play I/O

The Ovation SIS CSLS has been designed for ease of use, both in physical installation and its software tools. The components snap together with secure DIN-rail latches and interlocking carrier connectors. A series of 96 I/O channels can be attached to a DIN rail in a matter of minutes. Insert the LS CHARMs and create the I/O definition in the Ovation SIS configuration database.

- LS CHARMs use a self-keying system to automatically set a channel for a specific LS CHARM type, preventing the end-user mistake of inserting a LS CHARM into the wrong terminal block.
- The field power is provided through a redundant 24 VDC bus to each LS CHARM with up to 100 mA per LS CHARM. Higher current discrete input channels can be powered through an integrated power injection bus local to each CHARM base plate.
- LS discrete output terminal blocks with integrated relays are also available for up to 1 Amp continuous load.

Flexibility to Meet Project Needs

The Ovation SIS system scales to provide the required safety coverage needed for SIL 1, 2, and 3 safety functions. Each CSLS provides I/O processing, SIL 3-capable logic solving, and diagnostics, ensuring that the processing power is added as the system expands and no additional processors are required. The scan rate and memory usage remain constant and independent of system size. Modularity also provides the isolation of SIFs. This type of isolation eliminates any single points of failure for improved reliable availability and safety integrity.

LS CHARM Types

A variety of analog and discrete LS CHARMs are available to meet specific requirements. The following LS CHARMs are available, starting with Ovation 3.5.2:

- LS AI 4-20 mA HART
- LS RTD
- LS Thermocouple/mV
- LS AI 0-10 VDC Isolated
- LS 3-Wire AI 30 VDC
- LS DI NAMUR
- LS DI 24 VDC Low-side sense (dry contact)
- LS DI 24 VDC Isolated
- LS 24 VDC Power
- LS DO 24 VDC DTA
- LS DO 24 VDC ETA

- LS DVC HART DTA
- LS DO 24 VDC Redundant DTA
- LS DO 24 VDC Redundant ETA
- LS DVC HART Redundant DTA
- LS DI 120 VAC Isolated
- LS DI 230 VAC Isolated

Ovation SIS CSLS Capacities

Item	Limit
Maximum number of CSLSs on a single Controller	16
Maximum number of secure parameters per CSLS	96
Maximum number of CSLS I/O channels on a single Controller: 96 CHARMs I/O channels × 16 CSLS.	1,536
Maximum number of CSLSs in a single Ovation SIS system: 10 Controllers × 16 CSLS per Controller	160

Hardware Specifications

Common Environmental Specifications (all components)	
Operating Temperature	-40 °C to 70 °C (-40 °F to 158 °F)
Storage Temperature	-40 °C to 85°C (-40 °F to 185 °F)
Relative Humidity	5 to 95%, non-condensing
Protection Rating	IP 20, NEMA 12
Airborne Contaminants	ISA-S71.04-1985 Airborne Contaminants Class G3 - Conformal coating
Shock	10 g ½-sine wave for 11 milliseconds
Vibration	1 mm peak-to-peak from 2 to 13.2 Hz; 0.7G from 13.2 to 150 Hz

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