

DeltaV™ Alarm Operations

This document provides specifications relevant to DeltaV Alarm Operations.



DeltaV Alarm Operations helps enable safe operations and improved operational performance.

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Introduction

This document provides features and specifications relevant to DeltaV Alarm Operations. This document also includes information concerning Emerson's AgileOps alarm management suite, where features and capabilities overlap or enhance those of native DeltaV. AgileOps is a separate software package requiring a license separate from DeltaV. This document includes:

- Standard DeltaV Alarm Processing
- Alarm Help and AgileOps Operator Help
- Alarm Mosaic
- Plantwide Event Historian
- DeltaV Analyze and AgileOps EventKPI
- XLReporter for DeltaV Analyze

This document is based on the software release versions designated in parenthesis. However, many of the features are also available in earlier releases. Consult DeltaV and AgileOps documentation for details.

Standard DeltaV Alarm Processing

Overview

Many of the features required to implement an effective alarm management program are native to the basic DeltaV system, requiring no additional system licenses, such as:

- Temporary operator alarm suppression (shelving)
- Permanent supervisory removal from service that is distinct from operator shelving
- Entry and logging of reason for suppression
- Schedulable configurable audit reports to check for discrepancies between runtime and approved alarm properties
- Control module templates to implement first-out and dynamic flood suppression functions that can run in controllers

Technical support and access to new core alarm management features in new DeltaV releases are included in the DeltaV system's Guardian Support Service subscription.


Functionality and Specifications

Items	Specification	Comments
Alarm Count	No limit on configured alarms	Alarms and their states are continuously maintained at the source (e.g. in a control module executing in a controller), with no fixed maximum number of allowed alarms.
Alarm Priority Levels	Maximum of 12	Typical application is to designate three or four levels to prioritize true alarms (an abnormal event requiring operator action) and optionally use other (typically lower) levels for non- alarm operator notifications, where action is optional and/or the initiating event does not represent an abnormal condition. Priority names, colors and symbols are configurable. Priority colors should be reserved for alarms only.

Items	Specification	Comments
Alarm Priority Sounds	User selected or supplied WAV files	<p>By special licensing arrangement with Human Centered Solutions, LLP (HCS), the DeltaV Process Control System features HCS Alarm Sounds for Multi-Console Control Rooms™, which have the power to communicate more information, take advantage of human strengths, and have a proven record for Operator acceptance.</p> <p>Six human-centered design (HCD) engineered WAV files are provided by default with the system, designed to audibly distinguish low, medium and high priority alarms, emanating from one vs. another near-by operator workstations. Additional HCD WAV files are available to accommodate more priorities and operator workstations.</p>
Alarm Time Stamps	Recorded at source	<p>Alarms states are managed and time stamped at the control module (typically assigned to a controller), device or system node where the alarm originates such that all operator workstations and the Event Journal (system event log) provide consistent information.</p> <p>Alarms are time-stamped based on the execution time of the control module which can be as fast as 100ms (or 50ms for SIS modules).</p>
Alarm Sources	6	Alarm sources: Control module (standard and user-defined), SIS module (standard and user-defined), system hardware (predefined), SIS system hardware (predefined), device (predefined) and SIS device (predefined)
Alarm States	All states and state transitions described in ISA-18.2 are supported	<p>ANSI/ISA-18.2-2016</p> <p>NOTE 1 States E, F, and G can connect to any alarm state in the diagram. NOTE 2 The dotted line indicates an infrequently implemented option. NOTE 3 N/A indicates not applicable or that the condition is not relevant in the alarm state.</p>

Items	Specification	Comments
Alarm Types	Maximum of 255	<p>Alarm types establish an alarm's Category, Word and Alarm Message template. Default alarm types are provided. Alarm types are user-configurable.</p> <p>Example Words: HIGH, LOW, FAILED, PVBAD, BYPASS. Alarm messages support two optional wild card parameters, to dynamically display variables within a message such as the alarm's threshold and current process value.</p>
Alarm Categories	Maximum of 255	<p>A user-defined alarm property enabling filtering and sorting of alarms in engineering tools, alarm lists, event records, audit reports, alarm analytics and elsewhere.</p> <p>Example alarm categories: INSTRUMENT, PROCESS, SYSTEM.</p>
Alarm Classifications	Maximum of 10	<p>A user-defined alarm property enabling filtering and sorting of alarms in engineering tools, alarm lists, event records, audit reports, alarm analytics and elsewhere.</p> <p>Typical application is to classify alarms by purpose (product quality, equipment protection, environmental permit exceedance, safety, etc.).</p>
Alarm Descriptions	Maximum of 255 characters	<p>Individual alarms may be optionally assigned a text description, which replaces the default control module description in alarm lists.</p> <p>Typical application is to improve clarity for the operator for custom or discrete alarms where the default combination of module tag, tag description, and alarm word (e.g. FAIL) are insufficient.</p>
Alarm Banner Capacity	May vary depending on configuration. For a single monitor workstation, the default alarm banner contains 8 alarms.	<p>The DeltaV Alarm Banner and its associated horn behavior maintain constant focus on the most important alarms, even at times when the operator may be occupied filtering or sorting the alarm list.</p> <p>The alarm banner's auto eclipsing function can consolidate multiple alarms of a specified priority to a single slot in the banner for a control module or for an entire process unit, while at the same time allowing the individual presentation of higher priority alarms.</p> <p>Alarm banner thresholds may be set independently by alarm source (control module, device, system hardware, SIS module, SIS device or SIS hardware) for each workstation, to fine tune alarm banner use for either operator or non-operator workstation applications. Default system settings ensure the alarm banner in Operator workstations are focused on process alarms while the alarm banner on a Maintenance workstation is focused on device and system alerts.</p> <p>Alarm banner sorting order is: (1) Unacknowledged before acknowledged, (2) Active before inactive, (3) high to low priority level and (4) most recent to older activation time.</p>

Items	Specification	Comments
Alarm Lists	In DeltaV Live, no limit. In DeltaV Operate, maximum of 16 concurrently active (displayed) lists per operator workstation	Predefined active and suppressed alarm list are provided. An unlimited number of supplemental alarm lists may be configured using an alarm list configuration properties dialog; to specify alarm selection and ordering of attributes, sorting, filtering, and color/blink visualizations. Example supplemental alarm lists: All alarms related to product quality, and Low priority alerts related to abnormal device conditions.
Alarm List Filtering	Supported	All alarm lists can be filtered by alarm banner filter option, priority range - alarm source combination, plant area, units, modules, context-of-use, alarm age, alarm category and alarm functional classification. Suppressed alarm lists can be further filtered by suppression method; shelving and/or removal-from-service.
Alarm List Sorting	Supported	Annunciated alarm lists can be sorted by: Alarm banner order, time of occurrence, time of last state change, and alarm name. Suppressed alarm lists can be sorted by time of occurrence, alarm name, priority and remaining shelving time.
Alarm List View Capacity	1500 in DeltaV v13.3.1 and 250 in prior releases	Alarm information is continuously maintained for every alarm without limit; but only the top 1500 alarms (250 prior to v13.3.1) are visible in any one list, ordered according to the list's sorting specification.
Area Filtering	Supported	Operator span of alarm responsibility is maintained using control module process area assignments, which can be targeted to both workstations and individual operators, to eliminate Operator confusion resulting from out-of-area process upsets. Where secondary areas are assigned to a workstation for backup purposes, they can be easily disabled or enabled by the Operator as required. The system is aware of field device assignments to control modules and automatically associates their alerts to the correct process area. Alternately, field device and hardware alarms can be assigned to unique areas, targeted to maintenance workstations. This feature may be especially useful during partial or complete unit turnarounds and startups.
Distinction and separation of Alarms and Alerts	Supported	ISA-18.2 requires that alerts shall not be shown on alarm lists (separate list needed for alerts). DeltaV accomplishes this by specifying an alarm priority threshold, which can vary by alarm source and workstation. The alarm/alert threshold is applied to the alarm banner, alarm horn and alarm lists, supported by simple configuration methods.
Alarm Eclipsing	Supported	Alarm eclipsing (e.g. HI to HIHI) may be accomplished through simple configuration. Emerson can supply a composite block for consistent and efficient implementation.

Items	Specification	Comments
Alarm Shelving	Supported	<p>Maximum allowed operator shelving time is configurable per alarm. Shelving time may be set to 0 to prevent shelving.</p> <p>Alarms may be unshelved individually or in mass, with no effect on removal-from-service.</p> <p>AgileOps includes an advanced shelving tool in the List Management (LM) module. LM allows for manual shelving and automatic shelving, along with unshelving based on strict timer or alarm moving into the inactive state.</p> <p>For details, consult the Advanced Alarming Techniques whitepaper.</p>
Alarm Removal from Service	Supported	<p>Removal from service is distinct from shelving.</p> <p>For details, consult the Advanced Alarming Techniques whitepaper.</p>
Suppression Reason	Supported	<p>User selected from a configurable list of up to 254 choices. Suppression reason choices can be optionally hidden from user selection lists, for exclusive use by automated alarm suppression logic.</p>
Conditional Alarming	Supported for standard alarms	<p>Native support for individual standard alarms (HI, LOW, etc.) to apply on-delay, off-delay, hysteresis, and an enabling process signal with enable delay timer. Conditioning may also be applied to custom alarms through simple configuration.</p>
Alarm Visualization in Process Graphics	Supported	<p>A ready-to-use library of pre-engineered 'graphical elements (dynamos in DeltaV Operate and GEMs in DeltaV Live) provide easy operator recognition of abnormal states and active alarms.</p>  <p>Observe the graphic representation of PV, setpoint and alarm bands in this example. The PV is in the high range. Border color is based on highest priority alarm, or in blue (as shown) to indicate an abnormal condition (active suppressed alarm). Iconic indication of alarms and abnormal conditions: highest priority alarm, mode not normal, bad I/O, bypass active, module not running active interlock, no permissive or active suppressed alarm.</p> <p>GEMs and dynamos automatically respond to a variety of out-of-box process display color schemes based on HCD principles.</p>

Items	Specification	Comments
Alarm Property Auditing	Supported	<p>DeltaV supports auditing alarm properties through the AgileOps alarm management software suite. AgileOps is capable of dialog-based specification of an unlimited number of on-demand or scheduled audit reports, to identify differences between the master alarm database and actual alarm properties.</p> <p>In addition, DeltaV has a native alarm auditing feature to identify differences between configured and actual alarm properties. This is useful if the configured database is considered a user's master alarm database. The native auditing feature is also capable of reporting actual alarm settings (regardless of configured value) in xml format for auditing applications external to the DeltaV system.</p>
Alarm Property Enforcement	Supported	Alarm settings collected in alarm audit reports can be restored to master alarm database values, either using AgileOps or from the DeltaV system configuration database if it is the master.
Advanced Alarm Flood Suppression	Supported	<p>Pre-engineered control module templates, faceplates and detail displays are provided with the system for simple configuration of First Out and Alarm Flood Suppression of alarm groups.</p> <p>For details, consult the Advanced Alarming Modules whitepaper.</p>
SIS Alarm Groups	Supported	Starting in v14, SIS alarms can optionally be grouped in user-defined alarm groups for improved identification. Users can create several alarm groups within an SIS module and assign function blocks and user-defined parameters within the SIS module to an appropriate SIS alarm group. For example, a user might create an alarm group that includes all the function blocks associated with a voter (such as an analog voter block and multiple analog input blocks). Creating a different alarm group for all the function blocks associated with a valve (for example, a discrete output block for the solenoid and a DVC block for the positioner) is another option. For each alarm group, users can specify a description and set of displays (primary control, detail and faceplate).
Operator Creation of Informational Alerts	Supported	<p>Requires simple configuration. The typical method is to use a control module designed to receive operator alarm threshold settings, assigning these alerts a low priority level, below the workstation threshold for annunciation as an alarm.</p> <p>DeltaV Analyze and AgileOps EventKPI allow filtering by priority level range, to distinguish alarms from alerts in alarm system performance reports.</p>
Bulk Editing	Supported	<p>Bulk editing may be done from a spreadsheet or via direct connection by ODBC to an external database.</p> <p>Bulk editing requires human initiation from the DeltaV engineering system (DeltaV Explorer); scheduled or programmatic initiation of bulk transfer is not supported. Bulk editing supports all available alarm properties (basic, advanced and alarm help).</p>

Items	Specification	Comments
OPC Access to Alarm Properties	Limited	All alarm properties other than alarm descriptions and alarm help are OPC DA accessible. In the DeltaV “run-time” environment, alarm description and alarm help data reside in the workstation; not in (OPC accessible) control modules.
Mass Alarm View / Edit / Export	Supported	<p>A DeltaV engineering application named System Alarm Management (SAM) enables efficient review of alarms for user selected parts of the system, with filtering based on functional classification and other attributes.</p> <p>Alarm shelving time and priority may be changed in mass using SAM.</p> <p>Alarm properties may be exported to XML from SAM.</p>

Alarm Help and AgileOps MCSD Operator Help

Overview

This optional licensed capability of the DeltaV system provides control room operators with access to additional custom information to help them verify, understand and correct the alarm condition quickly and correctly every time. Alarm lists and detail displays provide operators with immediate in-context access to the information. Alarm help information resides in the native DeltaV system configuration database. Alternatively, the AgileOps MCSD (Master Control System Database) module includes a direct link to Operator Help, its similar help information, via the tag faceplate. This allows the operator to read the alarm rationalization results directly from MCSD, eliminating the need to create a copy of the data within the DeltaV system.

Alarm Help requires no configuration or integration effort but does allow the user to tailor the information presented to the operator to match the information fields and selection lists in the user’s master alarm database and alarm philosophy.

Alarm Help is enabled by:

- Workstation licenses, which can be purchased for one, five, or ten workstations
- A system-wide license that enables Alarm Help and Alarm Mosaic at all operator workstations

AgileOps Operator Help is a standard part of the AgileOps installation. It is enabled by:

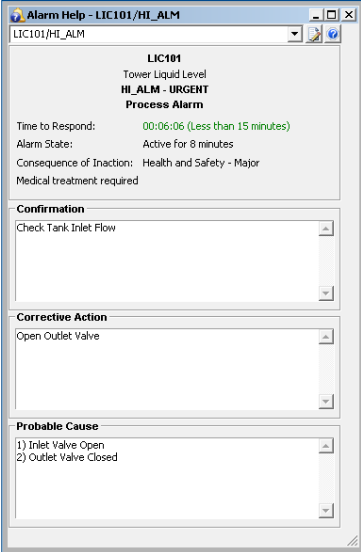
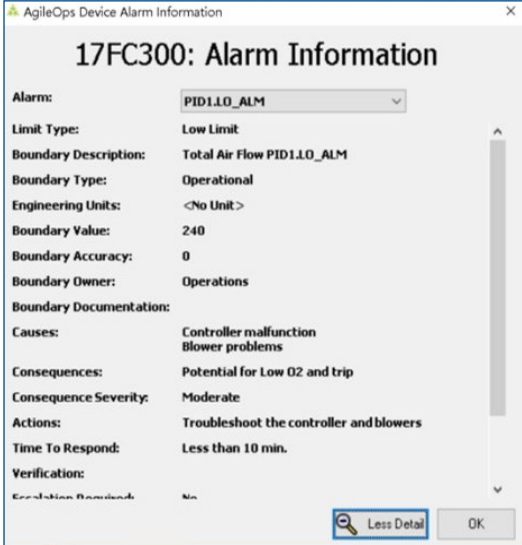
- The MCSD license and installation
- An updated faceplate that is part of the MCSD package

Technical support and access to new Alarm Help features in new DeltaV releases are at no additional cost to the DeltaV system’s Guardian Support service subscription.

A typical installation will make use of only one of these products. Which one to use is a user choice; Emerson recommends:

- Use AgileOps Operator help if MCSD is installed and populated with appropriate causes, consequences and actions.
- Use DeltaV Alarm Help if MCSD is not installed or its help data is not populated.

Features and Specifications

Item	DeltaV Alarm Help	AgileOps Operator Help
<p>In-context Presentation of Alarm Guidance</p>	<p>One-click call up from alarm lists and detail displays</p> 	<p>One-click call up from alarm lists and faceplate</p> 
<p>Operator Alarm Instructions</p>	<p>Either system provides alarm information to the operator via a pop-up window in the native DeltaV operator interface.</p>	
<p>Integration with Operator Views</p>	<p>Fully integrated into the DeltaV Operations environment, accessible in context for selected alarms in alarm lists, faceplates, detail displays and Alarm Mosaic.</p>	<p>Sourced from MCSD and integrated into the DeltaV Operations environment, accessible in context for selected alarms in alarm lists or faceplates.</p>
<p>Supported Alarm Sources</p>	<p>Alarm sources are: modules, devices and hardware; both SIS and non-SIS.</p>	<p>Sourced from MCSD. MCSD, in turn receives data from SIS and non-SIS control modules.</p>
<p>Granularity</p>	<p>Both products are specified per individual alarm.</p>	
<p>Presentation Performance</p>	<p>One second call-up.</p> <p>Alarm Help is also accessible for alarms that exist in other DeltaV systems interfaced with the operator's DeltaV system via an intra-zone server, with a call-up time under 3 seconds.</p> <p>If no Alarm Help content exists for a given alarm, the Alarm Help launch icon is hidden to avoid operator frustration and wasted effort.</p> <p>The last ten alarms selected for Alarm Help presentation are remembered for quick recall.</p>	<p>One second call-up.</p> <p>Operator Help is also accessible for any alarms that exist in other DeltaV systems interfaced with the operator's DeltaV system and included in MCSD, if those tags are accessible to the operator.</p>

Item	DeltaV Alarm Help	AgileOps Operator Help
Operator Instruction Presentation	<p>Three text boxes. Text boxes present user-specified information typically acquired through alarm rationalization.</p> <p>Text box title labels are user-named allowing them to be tailored to system requirements (e.g. Recommended action, probable cause, etc.)</p>	<p>Standard dialog that calls up tag name, alarm, causes, consequences, actions, and verification.</p> <p>More detail button provides additional information, see Other Alarm Help Information.</p>
Text Box	<p>Maximum of 500 unicode characters per text box.</p> <p>Document links not supported. Images not supported. Attachments not supported.</p>	<p>Unlimited number of unicode characters.</p> <p>Document links not supported. Images not supported. Attachments not supported.</p>
Other Alarm Help Information	<p>Twelve user-definable attributes: Tag name, tag description, alarm name, alarm description, priority, functional classification, remaining time to respond, current alarm state, suppression method (shelved or removal-from-service), reason for suppression, consequence of inaction category and consequence of inaction category description.</p>	<p>Multiple fields included, sourced from the Boundary data attached to alarms for a control module. These fields present user-specified information, typically acquired through alarm rationalization. Field lengths vary according to content.</p> <p>More detail button provides additional information within the dialog that includes: all above plus tag description, boundary type, engr units, boundary value and accuracy, boundary owner and documentation, consequence severity, time available to respond, escalation, notes.</p>
Effect on Running Control Logic	Both products are automatically distributed to the operator workstations in the system with no effect on running control modules.	
Operator Knowledge Capture	Specified groups of operators may be granted permission to enter or edit selected Alarm Help fields, and optionally allow them to deploy (download) their changes, from within the DeltaV Operator (vs Engineering) environment.	Operator knowledge capture via input to the rationalization process. Later edits suggested by operators are implemented with engineer access.
Bulk Editing	Both products support bulk editing	

Alarm Mosaic

Overview

This optional licensed capability of the DeltaV system helps minimize the risk that operators will respond slowly or incorrectly during an alarm flood, through a graphical alternative to the classic alarm list that reduces stress, helps maintain situational awareness, and aids in root cause identification. No configuration is required. Alarms are presented as patterns for easier operator recognition. Alarm Mosaic automatically identifies alarms with common characteristics and presents control actions that may have precipitated the flood. Alarm Mosaic's alarm activation history view, based on the Event Journal, enables previous alarm floods to be revisited, along with the control actions that were taken, for shift transition meetings and post alarm flood analysis.

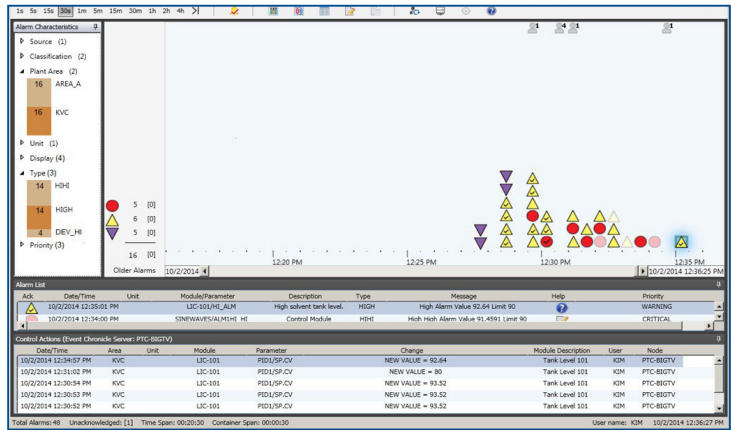
Alarm Mosaic is intended as a supplement to the advanced dynamic alarming modules in DeltaV or the more powerful and flexible Dynamic Management module in AgileOps. For more information about the advanced alarming modules, consult the Advanced Alarming Techniques whitepaper, AgileOps or Alarm Mosaic product datasheet.

Alarm Mosaic is enabled by:

- Workstation licenses, which can be purchased for one, five, or ten workstations
- A system-wide license that enables Alarm Mosaic and Alarm Help at all operator workstations

Technical support and access to new Alarm Mosaic features in new DeltaV releases are at no additional cost to the DeltaV system's Guardian Support service subscription.

Specifications

Item	Specification	Comments
Alarm Flood Mitigation	Graphic visualization of annunciated alarms	<p>Enables the operator to visualize all of the alarms in a way that depicts the big picture, in an alarm activation time sequence, correlated with control actions.</p> 
Allowed Instances	One per operator workstation	<p>Alarm Mosaic runs locally on the operator workstations. Master system-wide settings are specified at the ProfessionalPlus workstation and are automatically distributed to the operator workstations.</p>
Integration with Operator Views	Native	<p>Alarm Mosaic is fully integrated into the DeltaV Operations environment, augmented with context menus for easy operator movement between Alarm Mosaic, Alarm Help, primary control displays, faceplates and detail displays.</p> <p>The alarms presented in the local Alarm Mosaic active alarm view are the same as those presented in the local operator's alarm list and banner.</p> <p>Alarm Mosaic responds automatically to the user's span of control, workstation span of control and local workstation area filter selections.</p>
Active Alarm Capacity	Maximum of 500 alarms	<p>The primary (active alarm) view presents active alarms to the operator in an iconic manner designed to aid situational awareness and quick identification of root cause.</p>
Historic Alarm Recall Capacity	Maximum of 1000 alarms	<p>The alarm activation history view enables operators and control engineers to observe the pattern of alarms for a prior user- specified period of time.</p>
Historic Alarm Recall Range	Full span of the Event Chronicle	<p>User selection of Event Chronicle (system event log) for systems with more than one Event Chronicle is supported</p>

Item	Specification	Comments
Time Resolution	From one second up to four hours per grid column	<p>The icon view area is divided into grid columns representing a time-slice with the user (e.g. operator) selected time resolution. Alarms are represented as icons, with new alarms appearing on the right most column grid and moving to the left as they age.</p> <p>Ordering of alarms within grid columns and alarm list are based on the precise alarm activation time (millisecond resolution)</p>
Refresh Rate	Five seconds	All information is refreshed every five seconds. Alarm state changes (e.g. inactive to active or unacknowledged to acknowledged) are refreshed immediately (don't wait for the periodic refresh)
Alarm Lists Details	Supported	An alarm list provides text information for each alarm.
Control Action Details	Supported	<p>A control action list identifies changes recorded in the Event Chronicle, excluding alarm acknowledgements.</p> <p>An icon (human silhouette) at the top of each grid column indicates the number of control action during that time slice.</p>
Acknowledgement	Supported	<p>Alarms may be acknowledged individually or in mass for multi-selected alarms.</p> <p>A system-wide setting enables/disables "blinking" of unacknowledged alarms. Acknowledge alarms are indicated with a check mark on the alarm icon.</p>
Aggregation and Filtering Functions	Supported	<p>An alarm characteristic view identifies traits shared by alarms; area, unit, primary display assignment, functional classification, type, source and priority.</p> <p>Alarms can be multi-selected based on trait, filtered by trait and acknowledged by trait. Active filtering is prominently indicated. Filtering is automatically removed when the Alarm Mosaic window is closed.</p>
Icon Appearance	User selected from fixed set of choices	Alarm priority is indicated by alarm icon shape and color, selected from a fixed pallet of 72 icons.
Window Appearance	Two modes, for dark and light control rooms	The users (e.g. operator) can select either a dark or light viewing mode to optimize visibility according to control room lighting.
User Preference Memory	By user-workstation	Alarm Mosaic remembers each user's last selection for time slice resolution, dark/light view mode, window size, location, internal allocation of viewing panes within the window. This memory is local to each workstation (i.e. settings don't follow the user from one workstation to another).

Plantwide Event Historian

Overview

This optionally licensed off-system event historian collects and stores alarm and event records from any OPC Alarms & Events server, and it is especially helpful for plants with multiple DeltaV and non-DeltaV systems. It provides a robust data collection mechanism and an event viewer for easy access to data from anywhere on the plant network and has automatic database management features for secure long-term data storage.

A single copy of DeltaV Analyze can be paired up with a single Plant Event Historian, enabling alternative architectures for a single DeltaV Alarm Management System serving multiple DeltaV systems.

The Plantwide Event Historian is enabled by licensed OPC A&E source connection, with up to ten connections allowed from any one DeltaV node or non-DeltaV computer, and up to 25 total connections.

Technical support and access to new Plantwide Event Historian features in new DeltaV releases are at no additional cost to the DeltaV system's Guardian Support service subscription.

Specifications

Item	Specification	Comments
Connections	25 OPC A&E source connections	Up to ten connections allowed from any one DeltaV node or non-DeltaV computer.
Connection Interruption Protection	Supported	<p>Microsoft Message Queue (MSMQ) technology ensures that all event data generated at the OPC Alarms & Events server is delivered to the Plantwide Event Historian database. MSMQ will buffer data at the OPC Alarms & Events server node to prevent data loss for interrupted connection.</p> <p>This feature is architecture-dependent, requiring co-location of the OPC A&E Server and PEH OPC Server on a common computer.</p> <p>If the OPC Alarms & Events server is unavailable, the PEH OPC Server will keep trying to reconnect until the server recovers or is manually removed from collection.</p>
Automated Back-up	Supported	Back-up frequency, number of copies to keep and storage destination are user configurable.
Automated Archiving	Supported	Archive files may be automatically created for future reattachment at any time. Archive enablement, maximum file size, archive name, local archive directory and remote destination directory for full archives are user configurable.
Automated Data Deletion	Supported	This user-configured option enables deletion of successfully archived data that is older than a specified number of days, up to a maximum of 180 days.
Event Historian Viewer	Supplied	<p>Each workstation where the Viewer is installed requires a Microsoft Client Access License (CAL). Two CALs are provided with each server license purchased.</p> <p>The Viewer provides filtering, sorting and printing capabilities.</p>
Storage Capacity	Unrestricted	The record count capacity is only limited by the available memory allocated to the Plant Event Historian's SQL database.
Time Stamps	Source time-stamp retained	Event time stamps are as-reported by the OPC A&E source connection. In the case of DeltaV events, the time stamps are the same as those recorded at the alarm's source (e.g. control module)

AgileOps EventKPI (EKPI) and DeltaV Analyze

Overview

Emerson offers two optionally licensed products to provide reports of DeltaV alarm system performance per ISA-18.2 KPI definitions.

AgileOps EKPI is installed on a non-DeltaV computer, typically on Level 4. It is an enterprise level, automatic alarm / event reporting tool with 14 dashboards and 7 standard status reports. It includes a development environment for fully customized reports. EKPI is not limited to connection to a DeltaV system only; it is compatible with a number of control system and is capable of handling data from multiple systems and sources in a single installation. Integration with a customer's Microsoft® SharePoint® portal and corporate business intelligence platform is also supported.

EKPI is licensed per:

- Connected Event Chronicle (typically just one per DeltaV system)
- User seat

Reports from DeltaV Analyze are in Excel workbook format and may be run on demand or scheduled by shift, day, week or month. Using a web browser, an unlimited number of users located within or outside the DeltaV system control network can concurrently perform a variety of alarm analytic functions like plotting and filtering using intuitive “point and click” techniques. This product requires no configuration or integration effort but does allow the user to make adjustments to default settings and to define shifts, adjust colors, adjust alarm rate bands, specify plant areas assigned to operator positions and create report schedules.

DeltaV Analyze may be installed on:

- A DeltaV Application Workstation (not included) providing a direct (native) DeltaV connection to the DeltaV Event Journal for secure robust data collection without OPC
- A non-DeltaV computer for use in conjunction with the Plantwide Event Historian enabling the analysis of alarms from multiple DeltaV systems

DeltaV Analyze is licensed per:

- Connected Event Chronicle (typically just one per DeltaV system)
- Plant Event Historian

Technical support and access to new DeltaV Analyze features in new DeltaV releases are at no additional cost to the DeltaV system's Guardian Support service subscription.

Specifications and Features Comparison

Item	AgileOps EventKPI	DeltaV Analyze
Alarm Benchmark Metrics	Both products use alarm metrics recommended in ISA-18.2; Table 7 – Recommended alarm performance metrics summary.	
Integration with Core DeltaV System	<p>Connects to Event Historian via ODBC data link.</p> <p>Once EKPI is installed and licensed, it begins collecting data from the Event Chronicle or Plant Event Historian to which it is paired.</p>	<p>DeltaV Analyze is fully integrated into the DeltaV system, requiring no configuration.</p> <p>Once DeltaV Analyze is installed and licensed, it begins collecting data from the Event Chronicle or Plant Event Historian to which it is paired. No report design or OPC connections are required.</p>
Connection Interruption Protection	Both products automatically check for and recover lost data. Manual data recovery is also supported.	
User-definable Settings	<p>Area and priority mapping are inherited from AgileOps (user-adjustable in settings)</p> <p>Data is collected continuously</p> <p>Data is saved for up to 2 years – older data can be archived</p>	<p>Fixed choice of selections, as follows:</p> <ul style="list-style-type: none"> ■ Plant shifts (may overlap and be up to 24 hours) Scheduled reports ■ Area sets (representing operator positions) Alarm priority level colors ■ Data collection frequency (from Event Chronicle or Plant Event Historian, to create/update daily XML event data sets) ■ File retention policies (applied to daily XML event data sets)
Dashboard Views	Each standard report includes a dashboard showing the selected KPI value and including sorting, filtering, drill-down and similar features to enable alarm root cause analysis and identify continuous alarm system improvement opportunities.	Web page-based access to historical system alarm and event data for users either on the system or on a plant network, organized for easy analysis of alarm system performance, with sorting, filtering, drill-down and similar features to enable alarm root cause analysis and identify continuous alarm system improvement opportunities.
Bookmarks	N/A	Enables user to name and recall previous web page selections for fixed and relative time periods with selected web page filters.
Analysis of Alarms	Standard and customizable dashboard views allowing drill-down capabilities for detailed analysis. Standard and customizable reports available.	<p>Web page views: Alarm statistics, Alarms, Log Alarms, Overview and Summary pages.</p> <p>Alarm report: Provides alarm benchmark metrics, and bad actor alarm lists.</p>
Analysis of Operator Actions	Not currently supported. Planned for a future release.	Web page views: Overview, Summary and Use Action pages.
Analysis of System Events	System alarms, module alarms and log events are included in reports.	Web page views: Events, Log Events, Module Errors, Overview and Summary pages.
Analysis by Operator Position	Both products generate reports based on operator workstation area assignments per recommendations in ISA-18.2.	
Concurrent User Limit	Neither product enforces a concurrent users limit.	

Item	AgileOps EventKPI	DeltaV Analyze
Alarm Report Format	Any standard or custom report can be exported to excel or pdf format.	Excel report with fixed design and data content. The Excel report style sheet is exposed for simple alteration of report format and for doing secondary calculations with existing report data.
Alarm Report Time Span	Reports generated for day, week, month or year. Custom date ranges are also available.	The start of the (maximum) 31-day report span can be anytime over the full range of dates the DeltaV Analyze has been in service. To accomplish this function, DeltaV Analyze generates and stores alarm and event data in XML files independent of the system event log (DeltaV Event Chronicle).
Alarm Report Generation	Both products support on-demand and scheduled reports.	
Alarm Report, System Performance Metrics	<p>Standard metrics included per ISA-18.2, others can be customized. Standard reports:</p> <ul style="list-style-type: none"> ■ Average and peak alarm rates ■ Top 10 annunciated alarms ■ Annunciated priority distribution ■ Annunciated distribution by type ■ Stale alarms ■ Shelved alarms ■ Suppressed alarms ■ Chattering alarms ■ Flood analysis ■ Alarm correlation ■ Active alarms ■ Raw and genericized events 	<p>22 metrics, as follows:</p> <ul style="list-style-type: none"> ■ Annunciated alarms per day ■ Annunciated alarms per hour ■ Annunciated alarms per 10 minutes ■ Percentage of hours containing more than 30 alarms ■ Alarm annunciation rate distribution for user-defined rates ■ Peak number of alarms in a 10-minute period ■ Percent of time in alarm flood condition ■ Percent contribution of top 10 most frequent alarm sources ■ Count of chattering and fleeting alarm sources ■ Count of alarms active more than 24 hours ■ Annunciated alarm priority distribution ■ Annunciated alarms per hour during alarm floods ■ Annunciated alarms per hour excluding alarm floods ■ Percent of 10-minute periods with greater than 10 alarms ■ Standing alarms at close of report period ■ Average time to acknowledge alarms ■ Peak time to acknowledge an alarm ■ Average time an alarm is active ■ Peak alarm active time ■ Average time an alarm is suppressed ■ Peak alarm suppression time ■ Average number of operator changes per day (excluding acknowledgement of alarms)

Item	AgileOps EventKPI	DeltaV Analyze
Alarm Report, Alarm Lists	<ul style="list-style-type: none"> ■ Top 10 most frequent alarms ■ Shelved alarms ■ Suppressed alarms ■ Stale alarms ■ Raw and generic events lists 	7 lists, as follows: <ul style="list-style-type: none"> ■ Top 20 alarm sources generating the most alarms ■ Top 20 modules with shortest average alarm activation time ■ Top 20 modules with the highest average alarm activation time ■ Top 20 alarms most often suppressed during the reporting period ■ Top 20 alarms most often disabled during the reporting period ■ Top 20 modules with the highest average time to acknowledge ■ Full listing of alarm floods during the reporting period
Non-English DeltaV Systems	Not currently supported. Planned for a future release.	Supported
Non-DeltaV Alarm Processing	Supports several different systems and data sources.	Not supported

XLReporter for DeltaV Analyze

Overview

XLReporter for DeltaV Analyze is a software product developed by SyTech under a joint agreement with Emerson. With this product the contents of the standard DeltaV Analyze report may be easily and automatically historized to produce custom reports for any range of time, encompass data from multiple systems and operator workstation, and be published by email, webpage, FTP transfer for dashboard integration or network printer.

XLReporter has been approved for use with DeltaV systems since 1997 and is used to create custom reporting solutions for information in the DeltaV Historian, DeltaV Batch Historian, Event Chronicle, and DeltaV Analyze.

Refer to SyTech documentation for licensing and product support agreement options.

Specifications

Item	Specification	Comments
Alarm Reports with Data from Multiple DeltaV Systems Over Extended Date Ranges	Supported	XLReporter historizes the data from multiple individual DeltaV Analyze alarm performance reports, for subsequent use in user- defined reports that can span date ranges beyond the 31-day range of DeltaV Analyze reports.
Customized Alarm Performance Reports	Supported	XLReporter enables creation of customized alarm reports, including special plots and inclusion of data from non-DeltaV Analyze sources such as the DeltaV Continuous Historian.
Automated Alarm Performance Report Distribution Methods and Formats	Supported	Alternative distribution methods include PDF, XML, HTTP, FTP, custom dynamic interactive webpages and custom email distributions. Emails can have reports attached or contain links to webpages. Email may be scheduled or data triggered.

Reference Documents

Industry alarm management standards:

- ANSI/ISA-18.2-2016, Management of Alarm Systems for the Process Industries, herein called ISA-18.2
- IEC 62682:2014, Management of Alarm Systems for the Process Industries, herein called IEC 62682

These two standards are very similar. In fact, IEC 62682 was written with the 2009 edition of ISA-18.2. as a starting point. Therefore, this whitepaper refers to ISA-18.2 only – any reference to ISA-18.2 also includes IEC 62682 by inference.

Alarm management guide (not a standard)

- EEMUA-191 Edition 3, Alarm Systems - A guide to design, management and procurement, hereinafter called EEMUA 191

Emerson Whitepapers and Product Datasheets

- Alarm Rationalization Whitepaper
- Alarm Management for DeltaV Whitepaper
- Advanced Alarming Techniques Whitepaper
- Alarm Management Meets SIS Whitepaper
- AgileOps Product Data Sheet
- DeltaV Alarm Help Product Data Sheet
- DeltaV Analyze Product Data Sheet
- DeltaV Alarm Mosaic Product Data Sheet
- DeltaV Alarm Operations Product Data Sheet
- Plantwide Event Historian Product Data Sheet
- DeltaV Event Chronicle Product Data Sheet
- DeltaV OPC Events Server Product Data Sheet

Emerson
North America, Latin America:
☎ +1 800 833 8314 or
☎ +1 512 832 3774

Asia Pacific:
☎ +65 6777 8211

Europe, Middle East:
☎ +41 41 768 6111

🌐 www.emerson.com/deltav

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