General Specification

Sequence of Events Recorder

Exaquantum/SER

GS GMSCD0101-01E

■ The Problem

Unplanned incidents and equipment trips have the potential to cause equipment damage, reductions in production rate and quality, fire, environmental damage and loss of life.

■ The Solution

Exaquantum/SER (Sequence of Events Recorder) provides a web interface for users to display and analyze collected Alarms & Events and process data suitable for Root Cause Analysis (RCA) and trip analysis to lower or remove the possibility of future recurrences.

■ Benefits

- Integrated view of alarm and event messages provides users with visibility across the site for improved analysis
- Increases user efficiency when performing RCAs and trip analysis
- Allows past incidents to be further analyzed for failure patterns
- Regulatory compliance is supported by the availability of a detailed audit trail

■ Key Features

- Intuitive web user interface providing access to a centralized database of alarm and event messages
- At-a-glance overview of the latest events and trips
- Users can see the details surrounding trip occurrences
- Reports can be produced on demand or scheduled and emailed at regular intervals
- Data can be exported to a CSV file for use in external applications, such as Excel

■ Introduction

Exaquantum/SER, hereafter referred to as 'SER', accesses Exaquantum Historian Alarms & Events and process data that is being continuously collected and stored from all appropriate plant systems.

SER can configure trip conditions allowing a trip to be created when an incident occurs for later analysis. All alarms, events and relevant process data for a given period of time, before and after the trip, is recorded, aiding users in determining the cause(s) and knock-on effects of each trip.

In addition, SER acts as a sequence of events recorder (SOE) providing an integrated view of all the alarm and events suitable for performing RCAs.
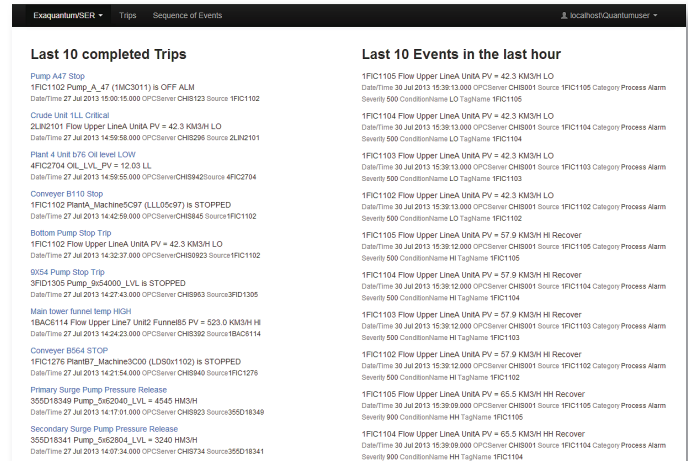

■ Capabilities

Web User Interface

SER user access is provided via an intuitive web user interface, eliminating the need for specific client software. A central navigation area provides links to each of the reports, localization options and other Exaquantum products. The web user interface is compatible with Microsoft Internet Explorer versions 8, 9 and 10, with security provided through Windows local and domain user groups.

Localization

The SER user interface allows seamless switching between installed languages. SER is provided with US English by default with support for additional languages on request – please contact your local Yokogawa office for more information.

YOKOGAWA ◆
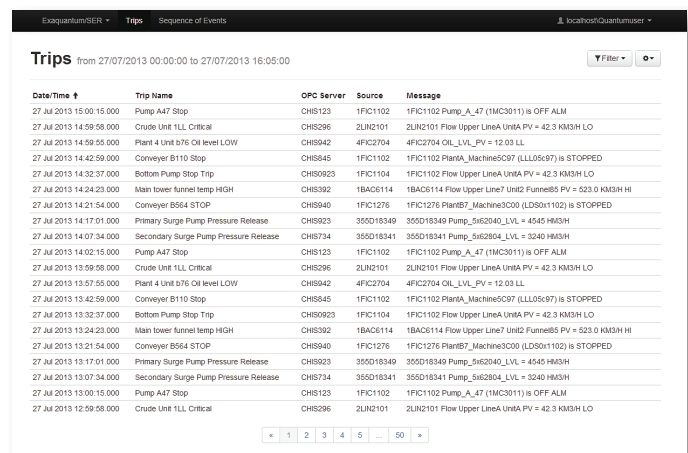
Trip Detection

If trip detection is required, trip conditions are configured using SER's Trip Detection Configuration Tool, grouped by event source and category. Each trip condition will have:

- A unique name and description
- One or more trip event conditions including optional process data
- Pre-trip and post-trip detection event time spans, such as 120 minutes before the trip detection and 60 minutes following the trip detection for which all events and process data will be recorded

Each received alarm and event is compared against the configured trip conditions and if a match occurs then a trip will be created with the trip monitor copying alarms & events and process data surrounding the trip into a dedicated secure area. Trip conditions can be optionally set to prevent more than one active trip at a time from occurring.

Reports

The SER web user interface enables users to create both Sequence of Event (SOE) and trip reports that are highly customizable through the use of filters. The reports can be printed or exported to CSV files for use in external applications such as Excel. Report filter definitions can also be saved and reused, saving users time when running commonly used queries.

Storage of Messages and Process Data in a Single Integrated Database

All alarm and event messages and process data from various sources can be stored in the SER database.

For trips, alarm & event messages and trip configured process data is also copied into a secure area of the database for long term storage, which is used for web based trip analysis and reports.

Integration with Multiple Monitoring and Control Data Systems

The Exaquantum Historian collects and stores alarm & event messages and process data from control and safety systems, etc. into a centralized database providing SER users with a detailed picture of overall plant activity.

Data Archiving and Retrieval

SER includes a tool for managing the way historical data is accumulated and archived on backup devices. Archived data may later be restored for access by users.

Data Catch-up

Yokogawa has uniquely extended Exaopc's (Yokogawa's OPC Server) implementation of OPC HDA to include Historical Alarms and Events (HAE). This allows Exaopc to automatically buffer all alarm and event messages and process data that is received by Exaopc when the Exaquantum Historian is not available.

Once the connection has been restored, alarm and event messages and process data collected by Exaopc will be automatically passed to the Exaquantum Historian, allowing missing trips to be recognized by SER.

OPC Interfaces

Exaquantum/SER receives data from OPC compliant data sources meeting the following standards:

- Data Access – OPC DA 2.05a
- Alarms and Events Access – OPC A&E 1.1
- Historical Data Access – OPC HDA 1.2

Key data providers of Alarms & Events and process data include:

- Yokogawa's OPC server 'Exaopc' for CENTUM-XL, CENTUM CS, CENTUM CS 1000, CENTUM CS 3000 and CENTUM VP
- Yokogawa's Stardom, FAST/TOOLS, ProSafe-RS and ProSafe MULCOM

This Exaquantum Historian captures and stores alarm and event timestamps with a time resolution of 1 millisecond for use by SER.

Alarms, events and process data received from non-Yokogawa OPC servers can be connected to the Exaquantum Historian if they meet the OPC standards specified above.

Additionally, Yokogawa can supply custom Exaopc interfaces to provide missing capabilities such as OPC HDA for equipment supporting only OPC DA. An Exaopc interface is also available to convert OPC DA to OPC A&E.

■ Hardware and Software Requirements

Tables: Minimum Hardware and Software Specifications

Component	Hardware Specification
Exaquantum/ SER Server	• 2.2 GHz multi-core processor • 8 GB RAM • 300 GB disk
Exaquantum/ SER Web Server*	• 2.2 GHz multi-core processor • 8 GB RAM • 18 GB disk
Exaquantum/ SER Clients	As appropriate for Internet Explorer 8, 9 or 10

*A dedicated web server may be required depending on the Exaquantum requirements, the number of Exaquantum expansion packages (such as Exaquantum/SER, Exaquantum/ARA, Exaquantum/AMD, Exaquantum/SFM, Exaquantum/DTA, etc.) being installed on the Exaquantum server and the total number of concurrent Web users. Please contact your local Yokogawa office for assistance.

Component	Software Specification
Exaquantum/ SER Server	**\<Operating Systems\>** • Windows Server 2012 Standard 64 bit • Windows Server 2008 R2 Standard (SP1) 64 bit • Windows Server 2008 Standard (SP1) 32 bit **\<Other Software\>** • Exaquantum Historian R2.85 Server (Legacy or Standard Security) • Exaquantum/Web R2.85 Server (if combined server)
Exaquantum/ SER Web Server	**\<Operating Systems\>** • Windows Server 2012 Standard 64 bit • Windows Server 2008 R2 Standard (SP1) 64 bit • Windows Server 2008 Standard (SP2) 32 bit **\<Other Software\>** • Exaquantum/Web R2.85 Server
Exaquantum/ SER Clients	**\<Operating Systems\>** • Internet Explorer 8, 9 or 10

■ Models and Suffix Codes

Table: Exaquantum/SER Server License

	Product Codes	Description
Model	GMSCD01	Exaquantum/SER Server License
Suffix Codes	-S	Basic Software License
	1	New Order (with Media)
	1	English Version
	-01	Sequence of Events Recorder Server License
	-N□□	Enter the number of New per-seat Exaquantum/SER Web Client Licenses in □□ (01 - 99)
	-ND□□	Enter the number of discounted New per-seat Exaquantum/SER Web Client Licenses in □□ (01 - 99)*
	-U□□	Enter the number of existing Exaquantum/ Web per-seat Client Licenses to be upgraded to access Exaquantum/SER screens in □□ (01 - 99)*
	-UD□□	Enter the number of discounted per-seat Exaquantum/Web Client Licenses to be Upgraded in □□ (01 - 99)*

*A price discount of 50% is applied if Exaquantum/ARA (Alarm Reporting and Analysis) is also purchased at full price for installation on the same server as Exaquantum/SER when ordered at the same time. This discount does not apply to Exaopc cassette licenses.

An Exaquantum historian and Exaquantum/Web server license must also be provided.

If trip reporting is configured then the number of Exaquantum tags (data points) required will depend on the amount of tags to be used for trip condition filters and/or collected when a trip occurs.

Table: Exaquantum/SER Maintenance Service

	Product Codes	Description
Model	GMSCD80	Exaquantum/SER Maintenance Service
Suffix Codes	-S	Basic Maintenance Service
	1	Always 1
	1	Always 1
	-1P□□	Enter the number of Exaquantum/ SER (Sequence of Events Recorder) Package Licenses in □□ (01 - 99)
	-1N□□	Enter the number of New per-seat Exaquantum/SER Web Client Licenses in □□ (01 - 99)
	-1U□□	Enter number of Upgraded per-seat Exaquantum/SER Web Client Licenses in □□ (01 - 99)

■ Trademarks

Exaquantum, Exaopc and CENTUM are registered trademarks of the Yokogawa Electric Corporation.

Microsoft's Windows family of operating systems, Word, Excel, Office 2010, Office 2013 and SQL Server 2012 are trademarks or registered trademarks of the Microsoft Corporation.

All other company names and product names mentioned in this general specification are registered trademarks of their respective companies.