General Specifications

Model NTPC002
Exaquantum
Alarm Reporting and Analysis

Exaquantum

GS 36J40A20-01EN

■ PROBLEM

Plant operators are often faced with large numbers of alarms and abnormal situations making them unable to respond quickly enough to prevent safety related incidents, environmental issues, shutdowns and equipment damage. A poorly applied alarm management policy resulting in excessive alarms and events can also make operators routinely ignore alarms due to the excessive amount of information being received.

■ SOLUTION

Exaquantum Alarm Reporting and Analysis (Exaquantum/ARA; hereafter referred to as 'ARA') is Yokogawa's solution. Exaquantum/ARA assists supervisors and managers in implementing effective alarm management by highlighting patterns in alarm and event occurrences making it easier to identify and correct areas of concern.

■ BENEFITS

• Reducing the number of distracting and nuisance alarms allows operators to focus on and react faster to abnormal situations with the proper corrective action
• Reduced operator stress will improve reaction times for incident resolution
• Improved plant safety and reduced risk of serious environmental incidents
• Identification of improvement opportunities through focused KPIs
• Consolidated alarm and process information can be supplied in custom reports to provide additional analysis information
• Information available to key stakeholders on demand and by email, facilitating efficient and timely decision making

■ KEY FEATURES

• 46 reports, many based on EEMUA 191, ANSI/ISA-18.2-2009 and IEC-62682
• On demand access to Operator and Area KPIs.
• Drill down from summary reports to the individual alarms and events
• Detailed filtering options to expose hidden problem areas
• Automatic replication of CENTUM plant hierarchy
• Reports can be scheduled for printing, storing and emailing
• Integration with Yokogawa's CENTUM DCS, CAMS for HIS and FAST/TOOLS SCADA
• Interfaces available for non-Yokogawa systems via OPC A&E 1.1
• API to access ARA KPIs, with access via an optional OPC DA 2.05a server also available

■ INTRODUCTION

ARA continuously collects alarm and event data to provide statistical reports based on EEUMA 191, ISA-18.2-2009 and IEC-62682. These reports aid supervisors and managers to identify which alarms and events are occurring most frequently and where the alarm management policy can be improved. Each report can be filtered and drilled down to desired levels, including individual alarm occurrences, and then exported to a number of file formats including PDF, Word and Excel.

ARA can be installed on a single server and provides access to multiple users via its intuitive web user interface, eliminating the need for any client software.

In addition to the web user interface, authorized access to the data is provided via Excel and SQL Server Report Builder, allowing custom reports to be created.
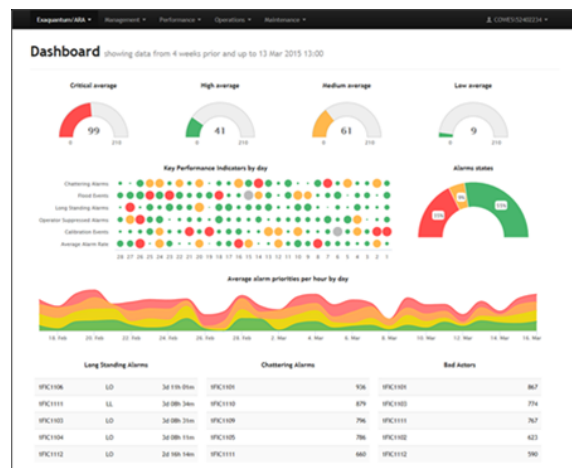
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■ CAPABILITIES

Alarm and Event Collection
Alarms and event data is continuously collected via OPC A&E 1.1. For those Yokogawa systems that use Exaopc, Yokogawa has extended Exaopc's OPC HDA server to include Historical Alarms and Events (HAE), which allows Exaopc to automatically buffer all alarms and events if the network connection to Exaquantum PIMS is lost. Once the connection is restored, all buffered Exaopc alarms and events will be available to be processed by ARA.

YOKOGAWA ◆

Interface with Yokogawa's 'CAMS for HIS'

ARA can retrieve the following information from Yokogawa's 'CAMS for HIS'.

- Detection Disabled Alarms – This status is used in CAMS to annunciate important alarms and remove low-value alarm messages from DCS alarm displays within an operator station. Reports that are designed to reflect alarm loading from the operator's perspective exclude detection disabled alarms. Reports are provided that display information about the number and frequency of disabled alarms.
- Alarm Priority Overrides – CAMS provides alternative priority settings to override those present in the DCS. If present, ARA processes new alarms using the CAMS priority; otherwise the DCS alarm level is used.
- Group Suppressions – CAMS group suppression allows a group of alarms to be suppressed from the operator's perspective. Reports that contain alarm loading from the operator's perspective can be filtered to include or exclude group suppressed alarms.
- Shelved Alarms – CAMS allows operators to shelve alarms, temporarily removing them from the operator's view, allowing them to concentrate on more important alarms and return to the shelved alarms when convenient. Reports that relate to actions by operators can be filtered to include or exclude shelved alarms.

Automatic Plant Hierarchy Creation

If configured in the Process Control System, ARA can extract and store plant hierarchy information contained within received alarm and event messages. This plant hierarchy can then be used to filter information displayed in reports and supports remote alarm reporting and monitoring for multiple plants across various countries/regions.

Reports Overview

ARA provides 46 reports (listed in the next page), grouped into the following four areas.

- Management – providing a high-level overview of plant KPIs
- Performance – covering specific EEMUA 191 performance guidelines to quickly highlight potential areas of concern
- Operations – day-to-day operator reports covering alarm rates and trends
- Maintenance – highlighting problem alarms and aiding in the alarm rationalization process

Exaquantum/ARA Report Branding

Report styles are stored centrally in ARA, allowing style changes to be made easily and consistently across all reports. This ensures that company standards can be adhered to in the production of reports.

Report Filters

ARA report filters are used to refine and analyze the report information to expose hidden alarming problems. As the information on the report is already generated, filtering occurs on demand. Depending on the report, the filters may include:

- Time resolution and periods to determine when problems are occurring and the alarming patterns
- Plant area or units to isolate areas of particular concern
- Operator selection to help identify the alarms and events that the selected operator sees most frequently
- Alarm tag and conditions help to identify patterns in a particular alarms behavior, enabling effective corrective action to be taken
- Alarm priority to highlight the priority distribution and discover alarms that may have an inappropriate priority level assigned to them
- Suppression types to view statistics on the number of alarms that have been disabled, group suppressed and shelved
- Annunciator report filter allows the filtering of annunciator alarms in the reports

Report Scheduling and Exporting

Microsoft Reporting Services technology is used by ARA to schedule and distribute reports to various file locations and email addresses.

In addition, ARA provides key exporting options for ARA reports, such as:

- PDF – Standard for publishing, storing and distributing reports
- Excel – Allows further analysis and combining of disparate data for reporting
- Word – Creation of weekly/monthly reports that can be annotated and signed off

Custom Reports

In addition to the reports supplied with ARA, custom reports can be created in:

- Excel - ARA data can be further analyzed and charted with process data from Exaquantum PIMS also incorporated to produce a single report containing both alarm and process data
- SQL Server Report Builder - Created in SQL Report Builder and accessed via the ARA web browser menu of reports, these reports can be scheduled and distributed

Web User Interface

Client access to ARA is provided via an intuitive web user interface, eliminating the need for specific client software. A central navigation bar provides links to each of the reports, localization options and other Exaquantum products.

The web user interface is compatible with Microsoft Internet Explorer with security provided through Windows local and domain user groups.

Localization

The ARA user interface can be seamlessly switched between installed languages. ARA is provided with US English by default with support for additional languages available on request – please contact your local Yokogawa office for more information.

Centralized ARA server

ARA can be hosted on a central server with Yokogawa's Remote Data Synchronization solution 'Exaquantum/RDS' installed on remote Exaquantum servers worldwide to transfer Alarms & Events to the central server via the internet. This allows alarms to be analyzed from each connected remote site. Process data can also be transferred.

Alarm Rationalization using Exaquantum/ARA with Exaquantum/AMD (Alarm Master Database)

Alarm rationalization can be provided by using Exaquantum/ARA with Yokogawa's Master Alarm Database solution 'Exaquantum/AMD'.

Exaquantum/ARA provides a comprehensive set of reports in order to understand the performance of the system and to identify problem areas. Once such problem alarms have been identified, the alarm settings can then be modified using Exaquantum/AMD's comprehensive Management of Change (MOC) environment.

■ REPORTS

Management Reports

• Alarm Overview
• Alarm Rate KPIs
• Area KPIs
• KPIs by Operator
• Shift
• Summary

Operation Reports

• Alarm by Condition
• Alarm by Condition and Tag
• Alarm Flood
• Alarm Frequency
• Alarm Peak
• Alarm Rate
• Alarm Rationalization Progress
• Alarm Responsiveness
• Alarm Setting Change
• Area Alarm Counts
• Consequential Alarms
• Event Balanced Trend
• High Integrity Pressure Protection System (HIPPS) (*1)
• Shelved Events
• System Alarms
• Top Alarms
• Top Alarms by Operator
• Valve Travel Time (VTT) (*1)

  *1:   These reports need to be configured.

Performance Reports

• Area Alarm Average
• Area Alarm Peak
• Area Performance

Maintenance Reports

• Active Alarms
• Active Events
• Active Suppression Events
• Alarm Messages Segregation
• Bad Actors
• Bad Actors by Condition
• Calibration Events
• Chattering Alarms
• Duplicate Alarm Analysis
• Force
• Long Standing Alarms
• Mode Change
• MV/SV Changes
• Override
• PID Changes
• Range Changes
• Summary of Operator Changes
• Suppressed Alarms
• Suppressed Alarms by Tag

The ARA User Manual, containing detailed information for each of the above reports, can be obtained from your local Yokogawa office.

■ HARDWARE AND SOFTWARE REQUIREMENTS

Minimum Hardware and Software Specifications

Component	Minimum Hardware and Software Specification
Exaquantum/ARA Server	For detailed specification information, refer to the following description in "Exaquantum GS (GS 36J04A10-01E)." Hardware: ● Hardware Operating Environment "Exaquantum Server" Software: ● Software Operating Environment "Exaquantum Server" For detailed supported revision, please refer to "GS 36J40W10-01EN."
Exaquantum/ARA Web Server	For detailed specification information, refer to the following description in "Exaquantum GS (GS 36J04A10-01E)." Hardware: ● Hardware Operating Environment "Web Server" Software: ● Software Operating Environment "Exaquantum Web Server" For detailed supported revision, please refer to "GS 36J40W10-01EN."
Exaquantum/ARA Web Clients	For detailed specification information, refer to the following description in "Exaquantum GS (GS 36J04A10-01E)." Hardware: ● Hardware Operating Environment "Exaquantum Use PCs" Software: ● Software Operating Environment "User PCs for Exaquantum/Explorer, Exaquantum/Web Client" For detailed supported revision, please refer to "GS 36J40W10-01EN."

The Exaquantum/ARA Release Notes provide exact details of the supported hardware and software.

If ARA will be installed on a different version of Exaquantum, please contact Yokogawa for assistance.

■ MODELS AND SUFFIX CODES

Exaquantum/ARA Product

		Description
Model	NTPC002	Exaquantum/ARA Product
Suffix Codes	-S	Basic Software license
	1	New Order (with Media)
	1	English version
	-SV□□	Enter number of Exaquantum/ARA Server Licenses (01 - 99)
	-SD□□	Enter the number of discounted Exaquantum/ARA Server Licenses (01 - 99)
	-WC□□	Enter the number of New per-seat Exaquantum/ARA Web Client Licenses (01 - 99)
	-WD□□	Enter the number of New 50% discounted Exaquantum/ARA Web Client Licenses (01 - 99)
	-YYYY	Select an Option Code
Option Codes	/DAA□□	Enter the number of Exaquantum/ARA OPC DA 2.05a Server Interface Licenses (01 - 99) (*10)
	/CFH□□	Enter the number of Yokogawa CAMS for HIS Interface Licenses (01 - 99) (*1)
	/FTA□□	Enter the number of Yokogawa FAST/TOOLS Interface Licenses (01 - 99) (*2)
	/EDA□□	Enter the number of Emerson DeltaV R10.3 Interface Licenses (01 - 99) (*3)
	/HEA□□	Enter the number of Honeywell Experion R300 Interface Licenses (01 - 99) (*4)
	/GEA□□	Enter the number of GE CIMPLICITY V9.0 Interface Licenses (01 - 99) (*5)
	/ABA□□	Enter the number of ABB 800xA DCS (with an Advant AC450 Controller) Interface Licenses (01 - 99) (*6)
	/CTA□□	Enter the number of Schneider Electric CitectSCADA V7.30 Interface Licenses (01 - 99) (*7)
	/CTB□□	Enter the number of Schneider Electric CitectSCADA (with Kepware's 'KEPServerEX' V5 connector) Interface Licenses (01 - 99) (*8)
	/CHX□□	Enter the number of Yokogawa CAMS for HIS Interface Licenses for 3rd Party Systems (01 - 99) (*9)

*1: Order when one or more CENTUM CS 3000 R3.08.70 (or later) or CENTUM VP R4.02 (or later) DCSs are installed where CAMS for HIS is operational. Purchase only one license per Exaquantum server. Must be installed on a server containing an approved Exaquantum/ARA software release.

*2: Purchase only one FAST/TOOLS license per Exaquantum server. Must be installed on a server containing an approved Exaquantum/ARA software release.

*3: Order when one or more Emerson DeltaV R10.3 OPC A&E R1.0, R1.1 or R1.2 servers are to be connected to Exaquantum. Purchase only one license per Exaquantum server. Must be installed on a server containing an approved Exaquantum/ARA software release. If DeltaV R10.3 is not installed then please contact Yokogawa.com for assistance.

*4: Order when one or more Honeywell Experion R300 OPC A&E R1.0, R1.1 or R1.2 servers are to be connected to Exaquantum. Purchase only one license per Exaquantum server. Must be installed on a server containing an approved Exaquantum/ARA software release. If Honeywell Experion R300 is not installed then please contact Yokogawa.com for assistance.

*5: Order when one or more GE CIMPLICITY V9.0 OPC A&E R1.0, R1.1 or R1.2 servers are to be connected to Exaquantum. Purchase only one license per Exaquantum server. Must be installed on a server containing an approved Exaquantum/ARA software release. If GE CIMPLICITY V9.0 is not installed then please contact Yokogawa for assistance.

*6: Order when one or more ABB 800xA DCS Advant AC450 Controller OPC A&E R1.0, R1.1 or R1.2 servers are to be connected to Exaquantum. Purchase only one license per Exaquantum server. Must be installed on a server containing an approved Exaquantum/ARA software release. If an Advant AC450 Controller is not installed then please contact Yokogawa for assistance.

*7: Order when one or more Schneider Electric CitectSCADA V7.30 OPC A&E R1.0, R1.1 or R1.2 servers are to be connected to Exaquantum. Purchase only one license per Exaquantum server. Must be installed on a server containing an approved Exaquantum/ARA software release. If CitectSCADA V7.30 is not installed then please contact Yokogawa for assistance.

*8: Order when one or more Schneider Electric CitectSCADAs with Kepware's 'KEPServerEX' V5 OPC A&E R1.0, R1.1 or R1.2 servers are to be connected to Exaquantum. Purchase only one license per Exaquantum server. Must be installed on a server containing an approved Exaquantum/ARA software release. If Kepware V5 is not installed then please contact Yokogawa for assistance.

*9: This a standalone installation to provide CAMS for HIS interface access to third party products only. Please note that this CAMS for HIS interface and Exaquantum/ARA cannot be installed on the same server.

*10: The Exaquantum/ARA OPC DA 2.05a server will provide Exaquantum/ARA KPIs. Purchase only one license per Exaquantum server. Must be installed on a server containing an approved Exaquantum/ARA software release.

Maintenance Service for Exaquantum/ARA

		Description
Model	NTMC002	Maintenance Service for Exaquantum/ARA
Suffix Codes	-S	Annual Contract
	1	Always 1
	1	Always 1
	-SV□□	Enter the number of Exaquantum/ARA Server Licenses (01 - 99)
	-WC□□	Enter the number of New per-seat Exaquantum/ARA Web Client Licenses (01 - 99)
	-YYYY	Select an Option Code
Option Codes	/DAA□□	Enter the number of Exaquantum/ARA OPC DA 2.05a Server Interface Licenses (01 - 99)
	/CFH□□	Enter the number of Yokogawa CAMS for HIS Interface Licenses (01 - 99)
	/FTA□□	Enter the number of Yokogawa FAST/TOOLS Interface Licenses (01 - 99)
	/EDA□□	Enter the number of Emerson DeltaV R10.3 Interface Licenses (01 - 99)
	/HEA□□	Enter the number of Honeywell Experion R300 Interface Licenses (01 - 99)
	/GEA□□	Enter the number of GE CIMPLICITY V9.0 Interface Licenses(01 - 99)
	/ABA□□	Enter the number of ABB 800xA DCS (with an Advant AC450 Controller) Interface Licenses (01 - 99)
	/CTA□□	Enter the number of Schneider Electric CitectSCADA V7.30 Interface Licenses (01 - 99)
	/CTB□□	Enter the number of Schneider Electric CitectSCADA (using Kepware's 'KEPServerEX' V5) Interface Licenses (01 - 99)
	/CHX□□	Enter the number of Yokogawa CAMS for HIS Interface Licenses for 3rd Party Systems (01 - 99)

■ ORDERING INFORMATION

Specify the model and suffix codes.

■ TRADEMARKS

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· Other company names and product names mentioned in this General Specification are registered trademarks of their respective companies.