

The Problem

Poor alarm management is one of the leading causes of downtime and has contributed to some of the worst recorded industrial accidents.

Changes to alarm limits through lack of alarm management can potentially lead to safety failures, lost production and equipment damage. Engineering time can also be lost due to poor or incorrect record keeping.

The Solution

Exaquantum/AMD (hereafter known as 'AMD') is Yokogawa's Master Alarm Database solution. Based on ANSI/ISA-18.2-2009, AMD assists managers and supervisors in monitoring, assessing and auditing the behavior of alarm setpoints as part of an alarm documentation and rationalization program.

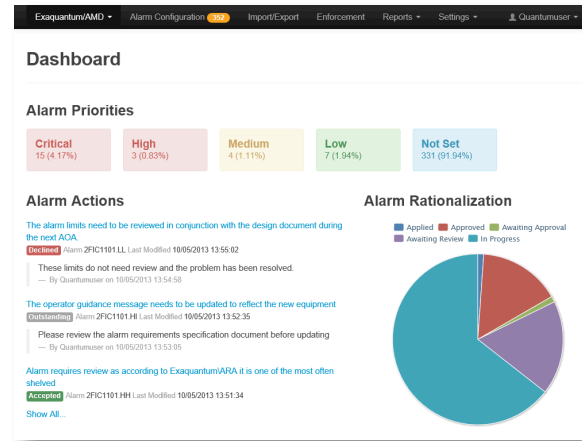
Benefits

The benefits of AMD include the following:

- Standardizes Alarm configurations to reduce errors
- Improves employee efficiency by providing web access to information held in one central database
- Confidence is enhanced by ensuring all changes are correct and consistent
- Regulatory compliance is supported by the availability of a detailed audit trail
- Low engineering configuration time required due to the ability to import the configuration from files, DCS(s), CAMS for HIS(s) and other systems
- Lower insurance premiums

Key Features

- Supports the ISA-18.2 Alarm Rationalization objectives for Management of Change
- Management of Change through version control and audit history
- Notification of alarm setpoint changes to ensure approved setpoint values are enforced
- Multiple valid alarm setpoints cater for mode changes
- Storage and versioning of important alarm design and philosophy documents
- Remote management of DCS alarm setpoints and CAMS alarm attributes
- Reports differences in configuration between AMD, DCS and CAMS
- Quickly provide filtered alarm lists based on search criteria such as the rationalization status or alarm priority
- Import and export of configurations enabling integration between disparate systems
- Centralized repository to record all stakeholder requests and comments as an input to the Management of Change process
- Custom alarm attributes cater for numerous system configurations
- Process setpoints are supported



Introduction

Over the last ten years there has been an increasing move to adopt the CCR (Central Control Room) operations concept largely due to staff rationalization and the need to improve decision making.

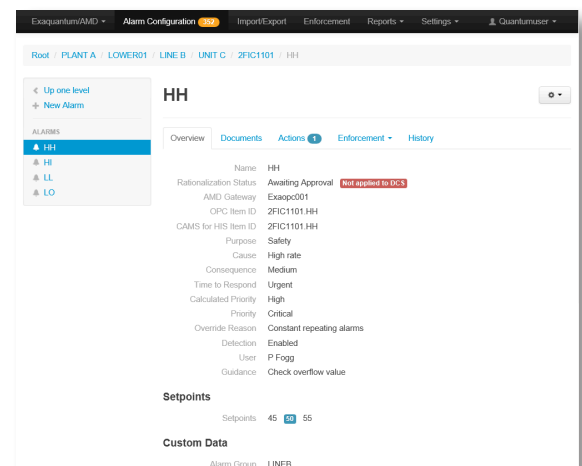
AMD has been designed to meet the requirement of providing secure support within single or geographically distributed facilities.

Alarm Management Support

Alarm management packages can struggle to meet the needs of a full alarm lifecycle. In particular, users often conduct their Alarm Objective Analysis (AOA) process on a greenfield site well before the control system configuration has begun.

Typically many specialists are involved during the AOA process, both internal and external consultants, such as Yokogawa VPS engineers. This is the key period when a large amount of information is created but, due to the lack of tools, much of this information is lost or buried in different documentation stores.

AMD fully supports the Management of Change (MOC) process by providing a number of features to store information into a centralized location and reduce the effort required to conduct each MOC cycle.



Capabilities

The Plant Hierarchy and Security

Alarm setpoints and tag assignments are stored within a hierarchical structure that is totally configurable to reflect one or more production plants (DCSs).

Access permissions may be assigned for different hierarchy levels to provide or restrict access to an area of the hierarchy based on user roles.

Documents can also be associated with any hierarchy level.

Multiple Setpoints and the Master Setpoint

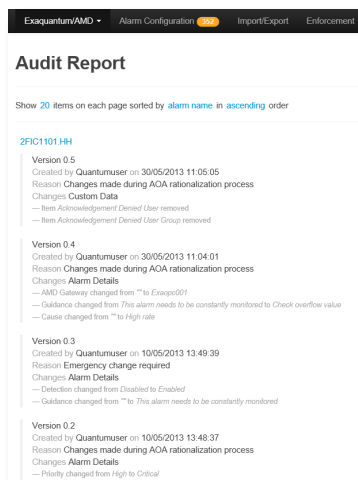
A setpoint is a value that has been approved for each alarm limit (such as HH, H, L and LL). This setpoint value represents the alarm limit, which if exceeded, will cause an alarm to be raised. For each alarm in AMD, multiple setpoints can be configured providing the ability to cater for varying plant operations and modes. One of the setpoints will be designated as the 'master' setpoint which is the value that is written to the DCS if enforcement is required.

Alarm Rationalization Status

Each alarm configured in AMD has a 'Rationalization Status' property. This is used primarily during the AOA or Alarm Rationalization process to track the progress of alarm updates. The Alarm Rationalization statuses are displayed on the AMD Dashboard to provide users with an overall display of the AMD process status.

Alarm Versions

Alarms in AMD can be modified and the changes saved numerous times before being versioned. After these saved changes have been reviewed they can either be committed resulting in a new alarm version or discarded resulting in the alarm returning to its previous 'committed' state. AMD keeps a versioned record of all committed alarm changes. These Alarm Versions can be viewed in an 'Audit' report on demand or scheduled for emailing.



Alarm Actions

AMD provides a mechanism to record requests or tasks against individual alarms. These are created as a way to record the outstanding actions for an alarm, such as required alarm modifications, additions or deletions.

Once an action has been created, other users can add their comments.

Multiple actions can be created per alarm limit and multiple comments can be made for each action. These actions can then be used during the MOC review process to decide what actions need to be taken for each alarm.

AMD also provides (either on demand or via a scheduled email) an 'Alarm Actions' report, which displays a summary of alarms actions and comments.

System Audit

The Cross Reference Report allows an audit to be performed that will list any inconsistencies with the alarm information held in AMD when compared to the information held in the DCS(s) and CAMS for HIS(s) (if present).

This report should be examined on a regular basis to locate and reconcile discrepancies.

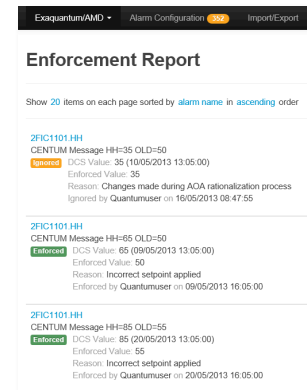
Enforcements

AMD constantly monitors the DCS(s) events for changes to the alarm setpoints. Each DCS setpoint change is compared with the alarm setpoint(s) held in AMD. If a matching setpoint value exists in AMD then no enforcement action will be raised.

AMD can be configured to alert a preconfigured set of users if the DCS changed setpoint value is unauthorized, i.e. AMD does not contain a matching setpoint. AMD users can then review the alarm setpoint change and choose to either ignore the change or 'enforce' the authorized AMD setpoint value back to the DCS.

Enforcement and notification settings can be configured for each level in the plant hierarchy. Different areas of a plant may therefore be assigned to different user groups, and have different enforcement and notification settings.

AMD also provides an 'Enforcement' report on demand or scheduled for emailing.



Document Management

AMD provides the facility to upload and store multiple documents against each plant hierarchy level. This allows documents detailing alarm philosophies to be uploaded to higher levels in the hierarchy while alarm definitions can be uploaded to an alarm. Versioning is provided so that any changes to a document results in a new version with an associated reason for the change.

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The previous document version can be accessed from the document history allowing past document versions to be accessed.

Import and Export

AMD provides a mechanism for importing and exporting alarm configuration data. Alarm setpoint values and attributes can be imported from, or exported to, AMD files, DCS and CAMS for HIS systems. Importing and exporting AMD files can be used as a quick way to make bulk modifications to the alarm configuration and to integrate disparate systems.

DCS and CAMS for HIS Integration

When installed on a Yokogawa DCS site, the DCS is the primary source for the alarm setpoint values. The DCS can also provide other function block values such as the MV and SV into AMD.

Yokogawa CAMS for HIS can provide AMD with the plant hierarchy and the alarm attributes such as the priority, severity, consequence, etc.

■ Installation Scenarios

AMD can be either installed at a site that has no pre-existing control system or an existing site where one or more control systems are operational.

Greenfield Site

At a Greenfield site, AMD can be used to create the initial alarm configuration during the alarm philosophy and design phase. When the DCS and CAMS for HIS (if provided) systems are installed, the AMD master Alarm setpoints can then be downloaded to the control system(s) and the Alarm attributes downloaded to CAMS for HIS(s) making the configuration simple, fast and error free.

Existing DCS(s)

At a site where one or more DCSs are present, AMD can be used to obtain the alarm setpoints from each DCS.

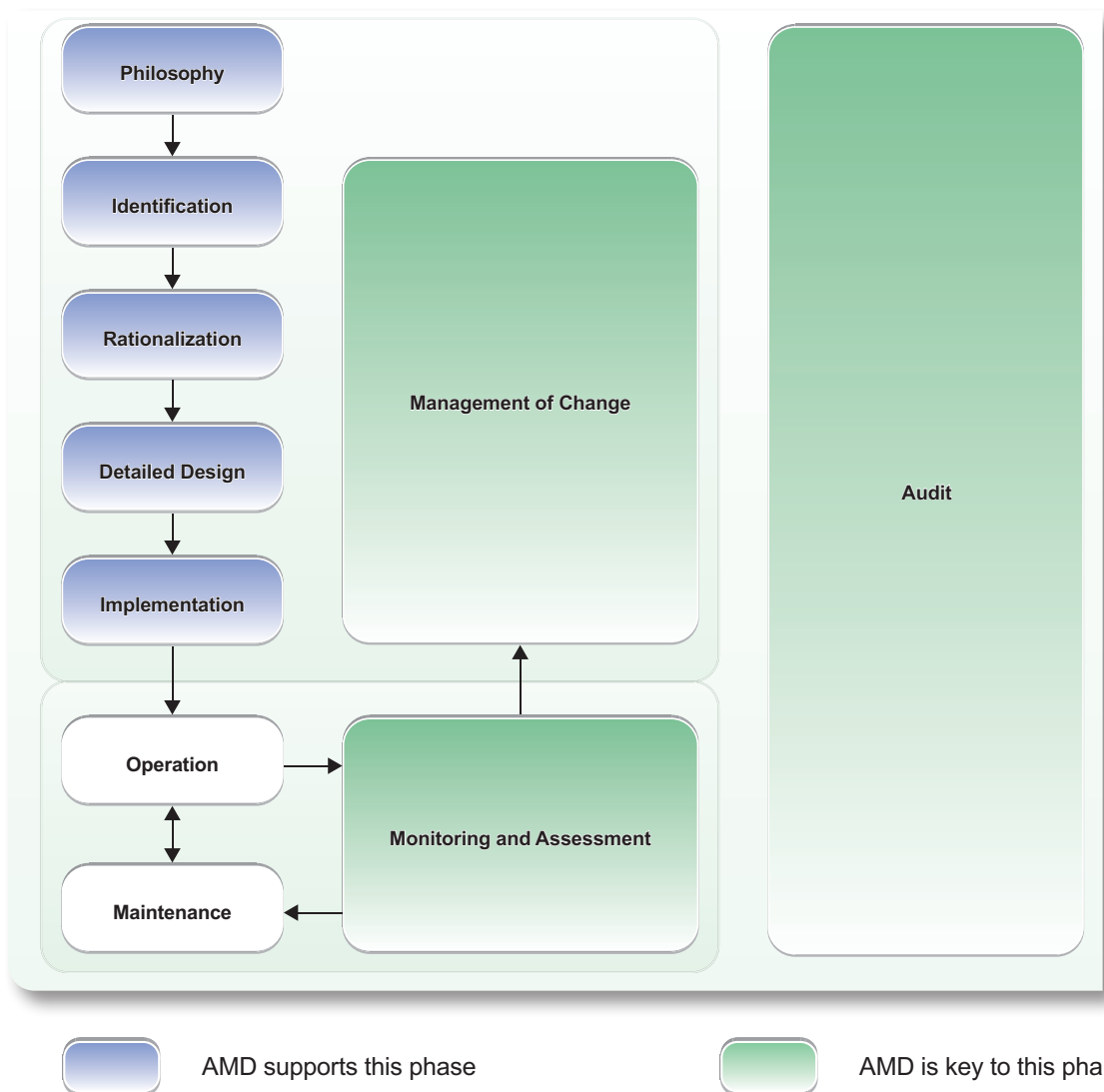
The plant hierarchy and alarm attributes can be provided by CAMS for HIS (if operational) or from an imported file.

The DCS team may choose to conduct a review of these settings once a DCS has been configured to decide if any changes are required.

Non-Yokogawa Systems

AMD has been designed to interface with 3rd party control systems and their implementation of CAMS (if present). Please contact your local Yokogawa office for assistance.

■ The Alarm Management Lifecycle (ISA-18.2) and AMD



AMD Capabilities for Supported Phases

- Document Management
- Alarm Rationalization Status
- Import and Export of alarm details
- DCS and CAMS for HIS Integration
- Creation and Management of Alarms details

AMD Capabilities for Key Phases

- Multiple Setpoints and the Master Setpoint
- Enforcement of setpoint values
- Alarm Versions
- System Audit
- Document Management
- DCS and CAMS for HIS Integration
- Alarm Actions

■ Hardware and Software Requirements

Tables: Minimum Hardware and Software Specifications

Component	Hardware Specifications
Server*	<ul style="list-style-type: none"> • 2.2 GHz single multi-core processor • 8 GB RAM • 600 GB SAS disk (Raid 5 recommended)
Web Server**	<ul style="list-style-type: none"> • 2.2 GHz multi-core processor • 8 Gbytes RAM • 300 Gbytes disk
Client PCs	As appropriate for Internet Explorer 8, 9 or 10

*This specification may need to be enhanced if the server is to be also used as an Historian or PIMS. Please contact your local Yokogawa office for assistance.

**A dedicated Web Server may be required depending on the number of concurrent connections by Exaquantum PIMS based Web clients (a combination of Exaquantum/Web, Exaquantum/AMD, Exaquantum/ARA, Exaquantum/SER, Exaquantum/DTA, etc.) accessing a single Exaquantum server. Please contact your local Yokogawa office for assistance.

Component	Software Specifications
Server	<Operating Systems> <ul style="list-style-type: none"> • Windows Server 2012 Standard 64-bit • Windows Server 2008 Standard Edition R2 (SP2) 64-bit • Windows Server 2008 Standard Edition 32-bit
	<Data Server – Other Software> <ul style="list-style-type: none"> • Exaquantum/PIMS R2.85* • Exaquantum/PIMS R2.85 Web Server • Microsoft .NET Framework 4.0 • Microsoft Excel or Office 2010/2013 (only required if viewing exported Excel Exaquantum/AMD reports)
	<Web Server – Other Software> <ul style="list-style-type: none"> • Microsoft .NET Framework 4.0 • Internet Information Services (IIS) 7.5 • Office 2010/2013
Client PCs	<ul style="list-style-type: none"> • Microsoft Excel or Office 2010/2013 for Microsoft Windows operating systems • Internet Explorer 8, 9 or 10
Connectors	<Operating Systems> <ul style="list-style-type: none"> • Windows Server 2012 Standard 64-bit • Windows Server 2008 Standard Edition R2 (SP2) 64-bit • Windows Server 2008 Standard Edition 32-bit • Windows 7
	<Exaquantum – Other Software> <ul style="list-style-type: none"> • Microsoft .NET Framework 4.0
	<CENTUM – Other Software> <ul style="list-style-type: none"> • Microsoft .NET Framework 4.0 • OPC Core Components (as found with Exaquantum and Exaopc) • CENTUM VP R4.02 or later
	<CAMS for HIS – Other Software> <ul style="list-style-type: none"> • Microsoft .NET Framework 4.0 • CENTUM VP R4.02 or later

*If Exaquantum/PIMS is supporting Exaquantum/AMD only then a 500 tag Exaquantum license can be purchased, as Exaquantum/AMD does not use Exaquantum tags. Exaquantum/AMD does not use Exaquantum tags.

■ Models and Suffix Codes

Table: Exaquantum/AMD Licenses

	Product Codes	Description
Model	GMSCD11	Exaquantum/AMD License
Suffix Codes	-S	Basic Software License
	1	New Order (with Media)
	1	English Version
	-S□□	Enter the number of Exaquantum/AMD Server Licenses in □□ (01 - 99)
	-W□□	Enter the number of new or additional per-seat Exaquantum/AMD Web Client Licenses in □□ (01 - 99)
	-C1□□	Enter the number of additional Exaquantum/AMD Plant Connector Licenses required in □□ (01 - 10)*

* Purchase an Exaquantum/AMD Plant Connector license for each additional Plant (DCS). The total number of Exaquantum/AMD Connector Licenses required is one less than the number of DCSs, i.e. for five DCSs, four Plant Connector Licenses must be purchased.

Table: Exaquantum/AMD Maintenance Service

	Product Codes	Description
Model	GMSCD80	Exaquantum/AMD Maintenance Service
Suffix Codes	-S	Basic Maintenance Service
	1	Always 1
	1	English Version
	-11S□□	Enter the number of Exaquantum/AMD Server Licenses in □□ (01 - 99)
	-11W□□	Enter the number of per-seat Exaquantum/AMD Web Client Licenses in □□ (01 - 99)
	-11C1□□	Enter the number of Exaquantum/AMD Plant Connector Licenses in □□ (01 - 99)

■ Trademarks

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