



OpreX™ Control and Safety System

Alarm Management Program

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Are you familiar with currently accepted good practice?

Can you demonstrate your alarm systems are well managed?

Do you want to move beyond managing alarms, to managing your process for profit?

An alarm system is often the first line of defence in avoiding a serious process incident, and yet all too often it is ineffective when it is needed most. Alarm floods, nuisance alarms and high numbers of standing alarms are all common features of a poorly configured alarm system leading to operators missing important alarms. At the other end of the spectrum a well-managed alarm system provides the operational clarity needed for optimal day-to-day operations and consistent performance.

Yokogawa's range of alarm management services are independent of vendor technology and based on our expertise in hands-on improvement. We implement a program that will help your team understand the concepts of good alarm management practice, plan for improvement and ultimately move beyond just managing alarms to using alarms to manage your safety, process and productivity.

The Yokogawa Alarm Management Program

Alarm management is a journey with a destination that is unique for every plant. The alarm management services from Yokogawa reflect this in a flexible, comprehensive but pragmatic approach, tailored to your individual needs and circumstances. In summary the main steps span gap assessment, improving performance and finally steady, continuous improvement. In the vast majority of cases there are a number of quick wins.

Effective alarm management requires a human-centric approach to the challenges. Yokogawa's alarm management program recognises this fact. It is suitable for clients wishing to achieve compliance with international standards including ISA 18.2 and IEC 62682 but is even more appropriate for organisations that recognise there is a prize beyond compliance. These organisations recognise that a well-configured alarm system is a significant asset in improving plant performance and safety.



Alarm Management Program Steps:

Phase 1: The baseline

- Step 1 Create awareness
- Step 2 Gap analysis / assessment
- Step 3 Improvement plan & budget

Phase 2: Performance improvement

- Step 4 Alarm management philosophy & procedure documentation
- Step 5 Alarm review (rationalise & re-prioritise)
- Step 6 Measurement & KPI reporting
- Step 7 'Bad actor' analysis and remediation

Phase 3: Advanced alarm management

- Step 8 Abnormal event analysis / state-based alarm control
- Step 9 Production improvements through alarms

Phase 1: The Baseline

Step 1: Awareness training

Understanding the core concepts and achieving buy-in from the people who will be impacted is an important pre-requisite for any improvement initiative. That is why the Yokogawa alarm management program starts with alarm management awareness training. This is a short (one day) introduction to alarm management, covering the history, the importance of good alarm system performance and the key concepts behind managing alarms. In addition we can also provide bespoke technical training courses covering improvement techniques for alarm system performance suitable for more advanced alarm management practitioners. The immediate benefit of this course is that participants have a greater understanding of how to manage alarms in their day-to-day practice.



Step 2: Gap analysis / assessment and feedback

All improvement journeys start with knowing where you are and that is why we start with a gap analysis/ assessment. This is a short, focussed benchmark assessment of performance against recommended good practice and an audit of compliance against international standards (usually ISA 18.2 or IEC 62682).

The assessment normally covers the following areas of an alarm management framework:

1. Roles and responsibilities
2. Alarm philosophy (if available)
3. Performance monitoring and KPIs
4. Training and competence
5. Management of change

The assessment also analyses and comments on the performance of the alarm system against recommended thresholds for average alarm rate, maximum alarm rate, and so on. The deliverable is a written report on areas for improvement, recommendations for action and the priorities, including any 'quick wins'.

Step 3: Improvement planning and budgeting

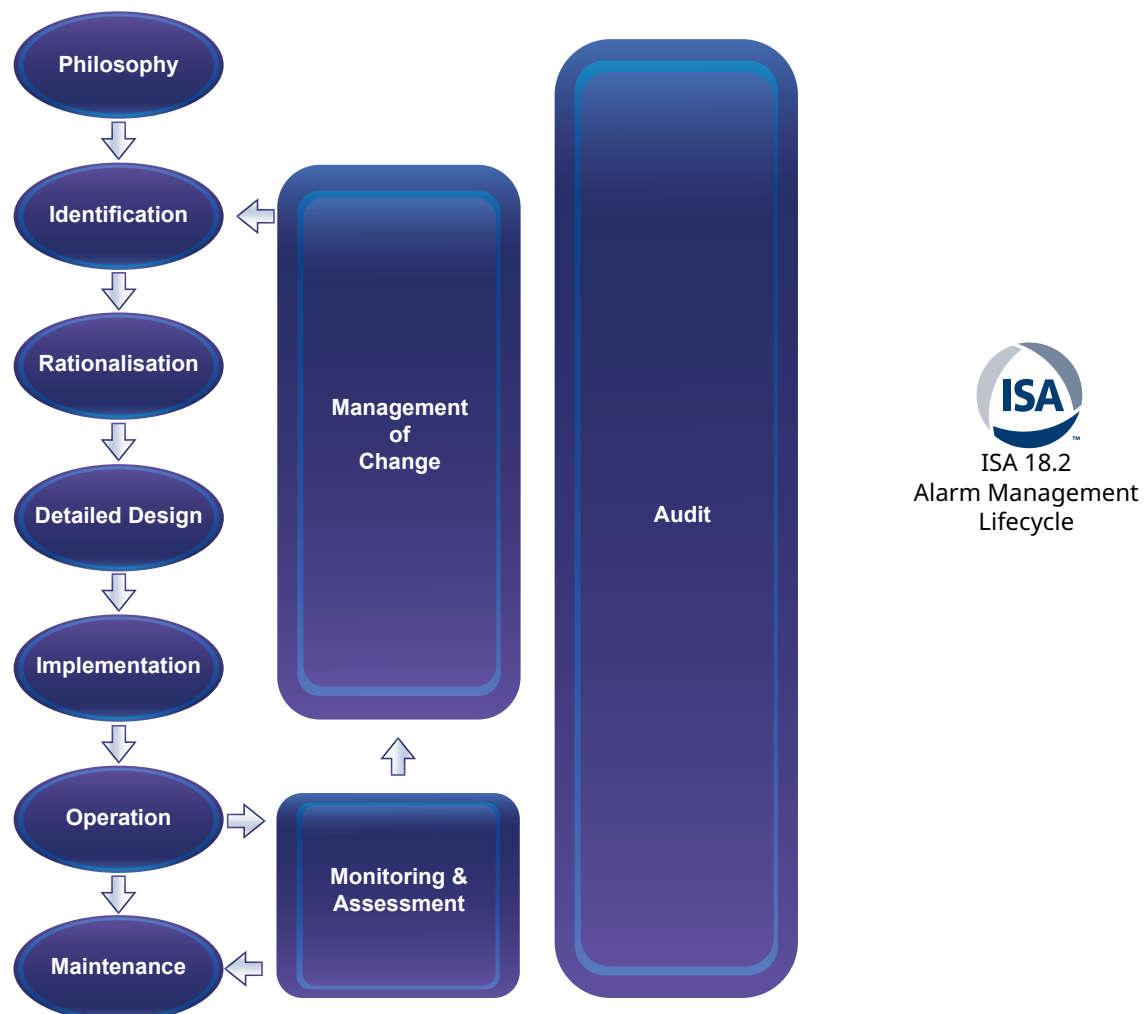
This step builds on the recommendations for action and the identified priorities from the initial gap analysis to produce a plan of action to improve the performance of your alarm system and its' supporting management framework. Yokogawa recognises that any investment of this nature must be justified and that it is simply not feasible to implement everything. We will therefore work with you to identify your immediate needs and available resources and produce a phased plan of work for the improvement activities with an estimate of costs, manpower and materials suitable as an input for internal budget sanctioning purposes.

Phase 2: Performance Improvement

Step 4: Alarm management documentation

Appropriate documentation is an important component of alarm management because a well-written set of philosophy and procedures sets out the corporate objectives for alarm management, explains how those objectives align with the priorities of the business, describes the framework that all alarm management activities sit within and specify how the organisation expects its alarm management objectives will be delivered, both internally and by third parties. Yokogawa will author the necessary client documentation tailored to your individual requirements and we would normally recommend the following:

1. philosophy for alarm management. This is normally based on the recommendations in ISA 18.2 / IEC 62682 and covers high level objectives, roles and responsibilities, performance measurement and continuous improvement. The philosophy document specifies what the organisation wishes to achieve in terms of alarm management good practice and covers how the philosophy for alarm management will be implemented at the site level.
2. Alarm rationalisation plan. This document describes the terms of reference for the following alarm rationalisation review (see step 5). It is based on the requirements in the philosophy document for alarm management and describes the review process itself, the inputs to the review and the outputs from the review.



Step 5: Alarm review

It is common to find alarm systems that have been configured and implemented without an alarm management philosophy and a clear standard for the design of individual alarms. The result is alarms configured with the wrong priority or alarms configured that have no clear purpose leading to a sub-optimum alarm system that is of limited value to the operator. Yokogawa has the experience and capability to manage an alarm review to help address this problem. We will provide the review method, usually based on a combined rationalisation and reprioritisation approach. Our experienced consultants will chair the review sessions and we can provide the scribe if required. Yokogawa has developed a blueprint for alarm management which incorporates techniques for improving the efficiency, accuracy and consistency of your alarm system.



Step 6: Measurement & KPI reporting

KPIs should be practical, realistic and based on current performance, but also with an eye on where performance ultimately needs to be. Yokogawa can recommend the most appropriate KPIs for your needs and the appropriate target for each KPI. We can also provide a service where we remotely gather data from your system and provide a report of actual performance against target, ideal for management reporting of KPIs.

Step 7: 'Bad actor' analysis and remediation

The best way to tackle nuisance alarms is little and often, usually through a regular review of the Top 10 alarms, or similar. We have developed a program to focus this activity on the root cause of nuisance alarm behaviour and can either facilitate your reviews or mentor your improvement teams, as appropriate. Clients with a nuisance alarm problem who commit fully to the initiative and follow this process have reported significant improvements in their alarm system's performance in a relatively short space of time. This benefits not only the reported alarm rates against agreed KPIs, it also benefits safe operation in the control room.

Phase 3: Advanced Alarm Management

Step 8: Abnormal event analysis/state-based alarm control

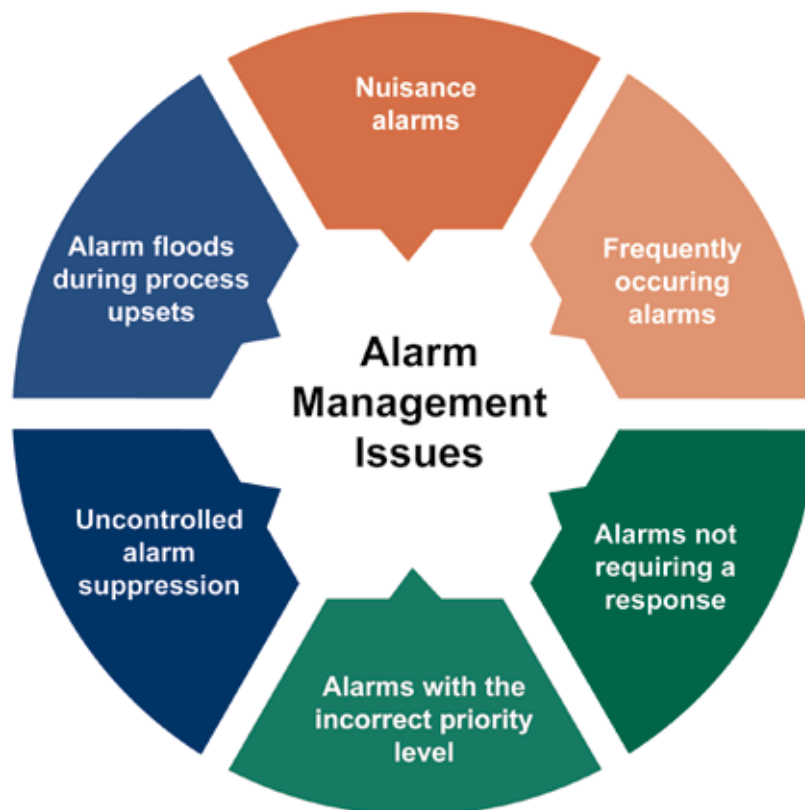
Apart from nuisance alarm behaviour the most common issue for a poorly performing alarm system is the sudden flood of alarms that can occur during a process upset or other abnormal operating event. This is normally due in part to a lack of state awareness in the control system's alarm logic leading to alarms being raised even when they are not relevant or of interest to the operator. This results in an excessive cognitive load for the operator who is often forced to adopt one or more coping strategies including: accepting alarms without reviewing them properly; scanning the alarm list to pick out the key alarms; or even ignoring the alarm system entirely. This is at exactly the time when operators are under the most stress and in need of good situational awareness. In short, the alarm system is of least value to the operator at precisely the time it is needed the most.

Each process alarm is associated with a single

process condition (for example a high temperature, low flow, and so on) and the Yokogawa approach to state-based alarming/dynamic alarm handling recognises this. Through analysis of the alarms following one or more abnormal process events, our consultants will work with your operations team to identify:

1. The primary alarms. These tend to be of significant value in helping the operator identify and monitor an abnormal event as it progresses
2. The secondary alarms. These are the consequential and therefore lower value alarms that are candidates for state-based alarm control.

Throughout this exercise the objective is not to reduce alarm numbers, it is to improve the quality of the alarm information presented to a control room operator during a process upset. A reduction in alarm numbers is a natural consequence of the review process.



Step 9: Production improvement through alarms

Once you get past the nuisance behaviour of the alarms themselves then what is left is telling you something useful about the health of your process, equipment, or operating practices.

For organisations who have reached this level of alarm management maturity, the focus is not on compliance or KPI's but on seeking to understand the root causes of alarm events and what the organisation can learn from them. This step is less about introducing new techniques or procedures. It is more about maintaining established good practice and a constant state of vigilance in order to detect and respond to change. Yokogawa's consultants are on hand to facilitate and help maximise the benefit to your organisation.

This is where a real breakthrough in productivity and HSE performance can happen; the alarm system works for you, not the other way around.





Synaptic
Business
Automation™

Synaptic Business Automation creates sustainable value by connecting everything in our customers' organization. To realize this, Yokogawa integrates its business and domain knowledge with digital automation technologies, and co-innovates with customers to drive their business process transformation.

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