

# Alarm Behavior Analysis

Providing New Insights for Alarm Management

**YOKOGAWA contributes to robust and stable alarm systems by offering new insights with state-of-the-art machine learning techniques.**

## Industry Challenges & Solution

Preventing a flood of alarms and keeping alarms rational and informative are major concerns for plant management which aims to ensure safe and efficient plant operation.

### Challenges

- Listing alarms by frequency is the traditional way but it does not suggest how to handle them.
- Reviewing every alarm one by one to improve the alarm system is inefficient and unrealistic.

### Solution

- Provide candidate alarms to be rationalized.
- Provide behavioral information of alarms to help understand their characteristics.

## Overview & Benefits of Alarm Analysis

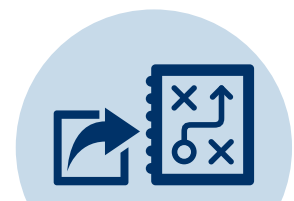
YOKOGAWA's alarm behavior analysis solution offers the following benefits for customers.



**Achieve efficient and safe operation with rationalized alarms**



**Improve operation by providing insights for alarms**



**Mitigate the effort of improving alarm management**

YOKOGAWA's alarm behavior analysis solution produces reports that list the alarms to be rationalized, by using machine learning technologies specially designed for DCS alarms.

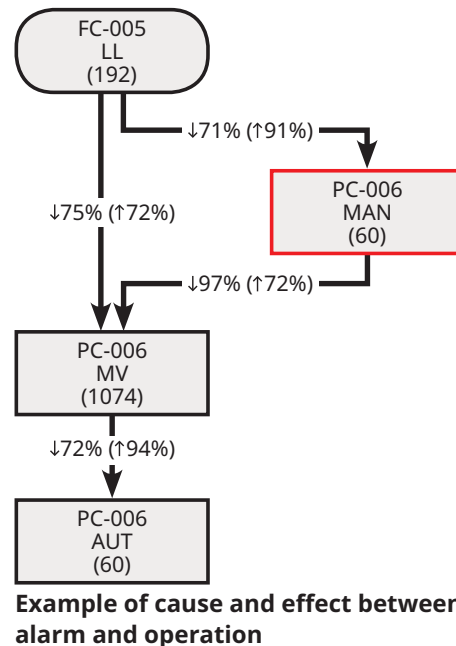
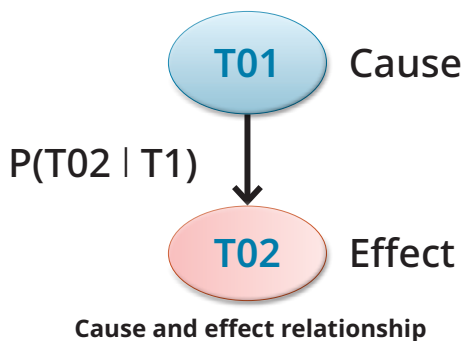


## Alarm Analysis of Causes & Effects

To understand alarm behavior, YOKOGAWA provides a cause-and-effect view. This view visualizes the relationship between alarms and operations, and helps to understand the characteristics of alarms such as alarm redundancy or existence of operator actions.

This technique, developed by YOKOGAWA, creates a cause-and-effect view with multiple events from CENTUM historical data.

By searching for relationships that match the cause-and-effect pattern from all relationships, a list of the patterns to help consider alarm improvement actions is produced.



## Alarm Analysis Report

The report provides information needed to understand the current alarm state and to take actions to improve the alarms.

### Contents:

#### Statistics of alarms

Provide basic KPIs to understand the current state:

- Total number of annunciated alarms
- Average of annunciated alarms per 10 min.
- Ranking and cumulative coverage

#### Event list by cause-and-effect pattern

List of alarms or operations by the following patterns:

- Consecutive alarms
- Ignored alarms
- Alarm handling operation

#### Details of listed events

Provide charts for listed events:

- Timeline chart
- Cause & effect chart



Alarm analysis report



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