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Management of alarms systems for the process industries

Gestion de systèmes d'alarme dans les industries de transformation

IEC 62682:2014-10(en-fr)

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Gestion de systèmes d'alarme dans les industries de transformation

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MANAGEMENT OF ALARMS SYSTEMS FOR THE PROCESS INDUSTRIES

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The text of this standard is based on the following documents:

FDIS	Report on voting
65A/704/FDIS	65A/706/RVD

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This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

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INTRODUCTION

Purpose

This International Standard addresses the development, design, installation, and management of alarm systems in the process industries. Alarm management includes multiple work processes throughout the alarm system lifecycle. This standard defines the terminology and models to develop an alarm system, and it defines the work processes recommended to effectively maintain the alarm system throughout the lifecycle.

This standard was adapted from ANSI/ISA-18.2-2009, *Management of Alarm Systems for the Process Industries*, an International Society of Automation (ISA) standard, and with due consideration of other guidance documents that have been developed throughout industry. Ineffective alarm systems have often been cited as contributing factors in the investigation reports following major process incidents. This standard is intended to provide a methodology that will result in the improved safety of the process industries.

This standard is not the first effort to define terminology and practices for effective alarm systems. In 1999 the Engineering Equipment and Materials Users' Association (EEMUA) issued Publication 191, *Alarm Systems: A Guide to Design, Management and Procurement.* In 2003 the User Association of Process Control Technology in Chemical and Pharmaceutical Industries (NAMUR) issued worksheet NA 102, *Alarm Management*.

During the development of this standard every effort was made to keep terminology and practices consistent with the previous work of these respected organizations and committees.

This document provides requirements for alarm management and alarm systems. It is intended for those individuals and organizations that

a) manufacture or implement embedded alarm systems,

b) manufacture or implement third-party alarm system software,

c) design or install alarm systems,

d) operate and/or maintain alarm systems, and

e) audit or assess alarm system performance.

Organization

This standard is organized in two parts. The first part is introductory in nature, (Clauses 1 to 5). The main body of the standard follows (Clauses 6 to 18).

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MANAGEMENT OF ALARMS SYSTEMS FOR THE PROCESS INDUSTRIES

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1 Scope

1.1 General applicability

This International Standard specifies general principles and processes for the lifecycle management of alarm systems based on programmable electronic controller and computer-based human-machine interface (HMI) technology for facilities in the process industries. It covers all alarms presented to the operator, which includes alarms from basic process control systems, annunciator panels, safety instrumented systems, fire and gas systems, and emergency response systems.

The practices in this standard are applicable to continuous, batch, and discrete processes. There can be differences in implementation to meet the specific needs based on process type.

In jurisdictions where the governing authorities (e.g., national, federal, state, province, county, city) have established process safety design, process safety management, or other requirements, in addition to the requirements of this standard, these should be taken into consideration.

The primary function within the alarm system is to notify operators of abnormal process conditions or equipment malfunctions and support the response. The alarm systems can include both the basic process control system (BPCS) and the safety instrumented system (SIS), each of which uses measurements of process conditions and logic to generate alarms. Figure 1 illustrates the concepts of alarm and response dataflow through the alarm system. The alarm system also includes a mechanism for communicating the alarm information to the operator via an HMI, usually a computer screen or an annunciator panel. Additional functions of the alarm system are an alarm and event log, an alarm historian, and the generation of performance metrics for the alarm system. There are external systems that can use the data from the alarm system.

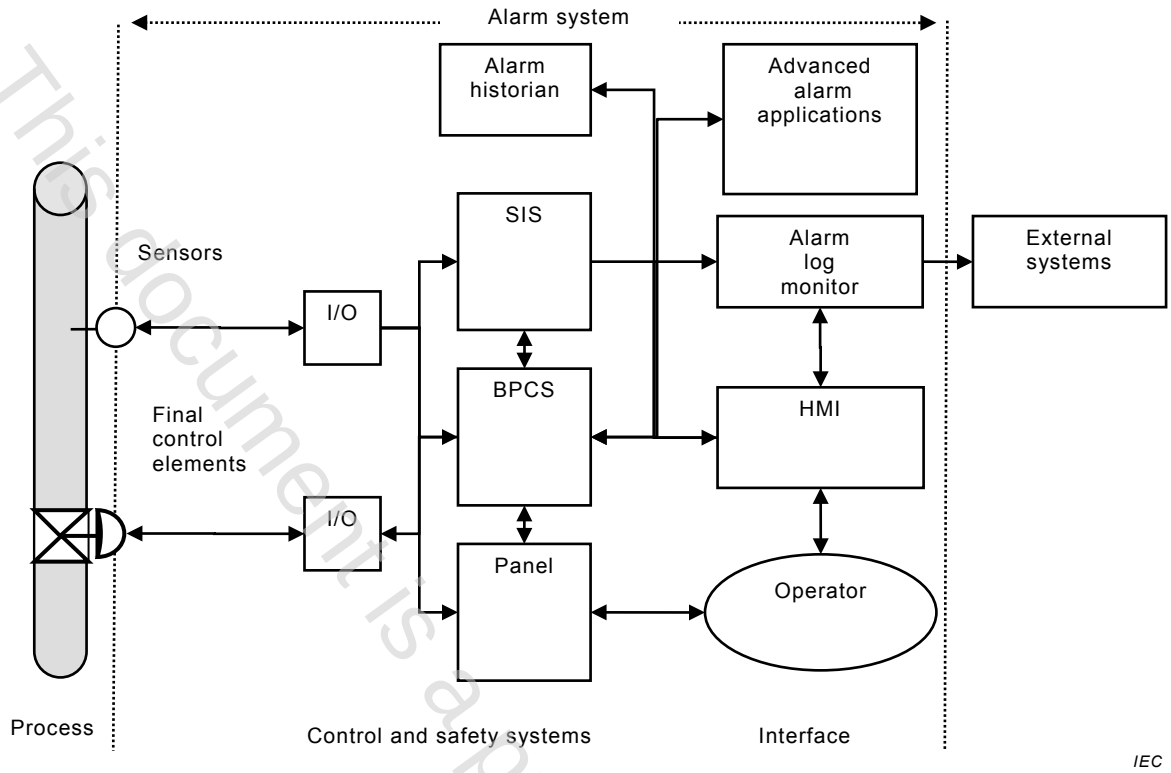

Figure 1 – Alarm system dataflow

1.2 Exclusions and inclusions

1.2.1 Operators

The functions of the operator receiving and responding to alarms are included in the scope of this standard. Management of operators is excluded from the scope of this standard.

1.2.2 Process sensors and final control elements

The alarms from sensors and final control elements are included in the scope of this standard. Process sensors and final control elements are shown in Figure 1 to indicate alarms can be implemented in these devices. The design and management of process sensors and final control elements are excluded from the scope of this standard.

1.2.3 Safety instrumented systems

The alarms from safety instrumented systems are included in the scope of this standard. The safety instrumented system (SIS) is shown in Figure 1 to indicate alarms can be implemented in these devices. The design and management of safety instrumented systems are excluded from this standard. Refer to IEC 61511.

The alarms and diagnostics from fire detection and protective systems or security systems that are presented to the operator through the control system are included in the scope of this standard. Fire detection and protective systems and security systems are excluded from the scope of this standard.

1.2.4 Event data

The indication and processing of analog, discrete, and event data other than alarm indications are excluded from the scope of this standard. The analysis techniques using both alarm and event data are excluded from the scope of this standard.

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1.2.5 Alarm identification methods

Required methods of alarm identification are not specified in this standard. Examples of alarm identification methods are listed.

1.2.6 Management of change

A specific management of change procedure is not included in this standard. Some requirements and recommendations for a management of change procedure are included.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

None.

3 Terms, definitions, and abbreviations

For the purposes of this document, the following terms, definitions and abbreviations apply.

3.1 Terms and definitions

3.1.1
absolute alarm
alarm generated when the alarm setpoint is exceeded

3.1.2
acknowledge
operator action that confirms recognition of an alarm

3.1.3
active
alarm in a state in which the alarm condition is true

3.1.4
adaptive alarm
alarm for which the setpoint is changed by an algorithm (e.g., rate based)

3.1.5
adjustable alarm
operator-set alarm
alarm for which the setpoint can be changed manually by the operator

3.1.6
advanced alarming
collection of techniques that can help manage annunciations during specific situations

EXAMPLE: State-based alarming.

3.1.7
alarm
audible and/or visible means of indicating to the operator an equipment malfunction, process deviation, or abnormal condition requiring a timely response

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