

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE



**Human machine interfaces for process automation systems**

**Interfaces homme-machine pour les systèmes d'automatisation des processus**

Document Preview

[IEC 63303:2024](#)

<https://standards.iteh.ai/catalog/standards/iec/1b53e3f4-9e9a-4c38-aed2-8bcb7a22cc67/iec-63303-2024>



**THIS PUBLICATION IS COPYRIGHT PROTECTED**  
**Copyright © 2024 IEC, Geneva, Switzerland**

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Secretariat  
3, rue de Varembe  
CH-1211 Geneva 20  
Switzerland

Tel.: +41 22 919 02 11  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://www.iec.ch)

#### About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

#### About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

#### IEC publications search - [webstore.iec.ch/advsearchform](http://webstore.iec.ch/advsearchform)

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, ...). It also gives information on projects, replaced and withdrawn publications.

#### IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

#### IEC Customer Service Centre - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: [sales@iec.ch](mailto:sales@iec.ch).

#### IEC Products & Services Portal - [products.iec.ch](http://products.iec.ch)

Discover our powerful search engine and read freely all the publications previews, graphical symbols and the glossary. With a subscription you will always have access to up to date content tailored to your needs.

#### Electropedia - [www.electropedia.org](http://www.electropedia.org)

The world's leading online dictionary on electrotechnology, containing more than 22 500 terminological entries in English and French, with equivalent terms in 25 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

---

#### A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

#### A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

#### Recherche de publications IEC -

#### [webstore.iec.ch/advsearchform](http://webstore.iec.ch/advsearchform)

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études, ...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

#### IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et une fois par mois par email.

#### Service Clients - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: [sales@iec.ch](mailto:sales@iec.ch).

#### IEC Products & Services Portal - [products.iec.ch](http://products.iec.ch)

Découvrez notre puissant moteur de recherche et consultez gratuitement tous les aperçus des publications, symboles graphiques et le glossaire. Avec un abonnement, vous aurez toujours accès à un contenu à jour adapté à vos besoins.

#### Electropedia - [www.electropedia.org](http://www.electropedia.org)

Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 500 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 25 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE



**Human machine interfaces for process automation systems**

**Interfaces homme-machine pour les systèmes d'automatisation des processus**

Document Preview

[IEC 63303:2024](https://standards.iteh.ai/catalog/standards/iec/1b53e3f4-9e9a-4c38-aed2-8bcb7a22cc67/iec-63303-2024)

<https://standards.iteh.ai/catalog/standards/iec/1b53e3f4-9e9a-4c38-aed2-8bcb7a22cc67/iec-63303-2024>

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

COMMISSION  
ELECTROTECHNIQUE  
INTERNATIONALE

ICS 25.040.40

ISBN 978-2-8322-9493-2

**Warning! Make sure that you obtained this publication from an authorized distributor.  
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

## CONTENTS

FOREWORD.....	5
INTRODUCTION.....	7
1 Scope.....	8
1.1 General applicability .....	8
1.2 Exclusions .....	8
1.2.1 Management of change (MOC) .....	8
1.2.2 Jurisdictions .....	8
1.2.3 Purchase specification.....	8
2 Normative references .....	8
3 Terms, definitions and abbreviated terms .....	9
3.1 Terms and definitions.....	9
3.2 Abbreviated terms.....	14
4 User types.....	15
5 HMI system management .....	16
5.1 HMI life cycle model.....	16
5.2 Specify stage .....	17
5.2.1 General .....	17
5.2.2 HMI philosophy.....	18
5.2.3 HMI style guide.....	19
5.2.4 HMI toolkit .....	20
5.3 Design stage.....	20
5.3.1 General .....	20
5.3.2 Console design.....	21
5.3.3 HMI system design .....	22
5.3.4 User, task, and functional requirements analysis .....	22
5.3.5 Display design .....	23
5.4 Implement stage .....	23
5.4.1 General .....	23
5.4.2 Build displays .....	24
5.4.3 Build console.....	24
5.4.4 Test.....	25
5.4.5 Train.....	25
5.4.6 Commission.....	25
5.4.7 Verify.....	26
5.5 Operate stage .....	26
5.5.1 General .....	26
5.5.2 In service.....	26
5.5.3 Maintain .....	27
5.5.4 Decommission .....	27
5.6 Continuous work processes .....	27
5.6.1 General .....	27
5.6.2 Management of change .....	28
5.6.3 Audit.....	28
5.6.4 Validate .....	28
6 Human factors engineering and ergonomics .....	28
6.1 General principles of HMI design .....	28

iTech Standards  
<https://standards.iteh.ai/>  
 Document Preview

<https://standards.iteh.ai/catalog/standards/iec/1b33e314-9e9a-4c38-aed2-8bcb7a22cc67/iec-63303-2024>

6.1.1	General .....	28
6.1.2	Consistency of design.....	29
6.1.3	HMI life cycle design stage involvement .....	29
6.1.4	General HFE concepts.....	29
6.1.5	Situation awareness .....	30
6.2	User sensory limits .....	30
6.2.1	General .....	30
6.2.2	Visual considerations.....	30
6.2.3	Auditory considerations .....	33
6.2.4	Auditory coding.....	33
6.3	User cognitive limits.....	34
7	Display types and overall HMI structure.....	34
7.1	General.....	34
7.2	Display types .....	34
7.3	Display hierarchy .....	37
7.3.1	General .....	37
7.3.2	Level 1 displays.....	37
7.3.3	Level 2 displays.....	37
7.3.4	Level 3 displays.....	38
7.3.5	Level 4 displays.....	38
8	User interaction .....	39
8.1	Overview .....	39
8.2	Software methods for user interaction.....	39
8.2.1	General .....	39
8.2.2	Data entry methods .....	39
8.2.3	Navigation methods .....	42
8.2.4	Error avoidance methods.....	45
8.2.5	Off-system messaging .....	45
8.2.6	User access security .....	46
8.3	Hardware interfaces.....	46
8.3.1	General .....	46
8.3.2	Output devices .....	46
8.3.3	Size considerations .....	47
8.3.4	User input devices .....	47
9	Performance.....	48
9.1	General.....	48
9.2	HMI duty factors .....	48
9.2.1	General .....	48
9.2.2	Call up time .....	48
9.2.3	Display refresh rate .....	48
9.2.4	Write time.....	48
9.2.5	Write refresh time .....	49
10	User training.....	49
10.1	General.....	49
10.2	Operations .....	49
10.3	Maintenance .....	50
10.4	Engineering .....	50
10.5	Administrators.....	50

10.6 Management..... 50  
 Annex A (informative) Selected HMI system terms and their interrelationships..... 51  
 Annex B (informative) Display examples ..... 52  
 Bibliography..... 69

Figure 1 – Example of HMI life cycle ..... 16  
 Figure 2 – Example navigation diagram ..... 43  
 Figure A.1 – Selected HMI system terms and their interrelationships ..... 51  
 Figure B.1 – Process example ..... 52  
 Figure B.2 – Level 1 display, example 1 ..... 53  
 Figure B.3 – Level 1 display, example 2 ..... 54  
 Figure B.4 – Level 1 display, example 3 ..... 55  
 Figure B.5 – Level 1 display, example 4 ..... 56  
 Figure B.6 – Level 2 display, example 1 ..... 57  
 Figure B.7 – Level 2 display, example 2 ..... 58  
 Figure B.8 – Level 2 display, example 3 ..... 59  
 Figure B.9 – Level 3 display, example ..... 60  
 Figure B.10 – Level 4 display, example ..... 61  
 Figure B.11 – Topology example ..... 62  
 Figure B.12 – Graph example ..... 63  
 Figure B.13 – Group example ..... 64  
 Figure B.14 – Logic example ..... 65  
 Figure B.15 – Procedure example ..... 66  
 Figure B.16 – Health diagnostic ..... 67  
 Figure B.17 – Alarm summary example ..... 68

Table 1 – Example user access credentials ..... 16  
 Table 2 – Example specify stage activities ..... 18  
 Table 3 – Example design stage activities ..... 21  
 Table 4 – Example implement stage activities ..... 24  
 Table 5 – Example operate stage activities ..... 26  
 Table 6 – Example continuous work processes stage activities ..... 27  
 Table 7 – Example display types ..... 35  
 Table 8 – Example of numeric decimal formatting ..... 40  
 Table 9 – Example navigation performance ..... 44

<https://standards.iteh.ai/>  
 Document Preview  
<https://standards.iteh.ai/standards/iec/63303-2024/1b53e3f4-9e9a-4c38-aed2-8bcb7a22cc67/iec-63303-2024>

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**HUMAN MACHINE INTERFACES FOR PROCESS AUTOMATION SYSTEMS****FOREWORD**

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at <https://patents.iec.ch>. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 63303 has been prepared by subcommittee 65A: System aspects, of IEC technical committee 65: Industrial-process measurement, control and automation. It is an International Standard.

The text of this International Standard is based on the following documents:

Draft	Report on voting
65A/1115/FDIS	65A/1128/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at [www.iec.ch/members\\_experts/refdocs](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/publications](http://www.iec.ch/publications).

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under [webstore.iec.ch](http://webstore.iec.ch) in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

**IMPORTANT – The "colour inside" logo on the cover page of this document indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.**

**iTeh Standards**  
**(<https://standards.itih.ai>)**  
**Document Preview**

[IEC 63303:2024](#)

<https://standards.itih.ai/catalog/standards/iec/1b53e3f4-9e9a-4c38-aed2-8bcb7a22cc67/iec-63303-2024>



## INTRODUCTION

The purpose of this document is to address the philosophy, design, implementation, operation, and maintenance of human machine interfaces (HMIs) for automation systems, including multiple work processes throughout the HMI life cycle. It is intended to help users to better understand the style of HMI recommended by this document.

It is assumed that the reader has a fundamental knowledge of basic HMI functionality.

This document was derived from ANSI/ISA-101.01-2015 Human Machine Interfaces for Process Automation Systems.

This document defines the terminology and models to develop an HMI and the work processes recommended to effectively maintain the HMI throughout its life cycle. This document can be used to:

- provide guidance to design, build, operate and maintain HMIs to achieve a safer, more effective, and more efficient control system under all operating conditions, and
- improve the user's abilities to detect, diagnose, and properly respond to abnormal situations.

The HMI is the collection of hardware and software used to monitor and interact with the control system and ultimately with the process.

In some cases, the primary user(s) operate equipment from different suppliers that have their own HMI system standards, and it is impractical to achieve uniformity across these HMI systems or the ideal adherence to the asset owner's HMI system standards.

In such cases, the asset owner should perform a formal assessment of deviations of each equipment HMI from the asset owner's HMI philosophy. This assessment should consider human factors engineering and task analysis.

The outcome of the assessment should determine if any mitigations are required to ensure the safe and efficient control of the process including start-up, operation, and shutdown, in addition to early detection, diagnosis, and proper response to abnormal situations.

The proper design and implementation of HMI systems as described in this document will result in increased efficiencies and reduced stress of the users. Other factors such as ergonomics and overall design of the control room also contribute to potential stressors that need to be managed. International Standard series ISO 11064 "Ergonomic design of control centres" has been developed to address the broader control room environment.

This document is organized into ten clauses. The first three clauses are introductory in nature. Clause 4 presents user types. Clause 5 introduces the life cycle model for the HMI. Clauses 6 through 10 provide additional details to support the HMI life cycle. The main body of this document (Clauses 4 to 10) presents mandatory requirements and non-mandatory recommendations.

# HUMAN MACHINE INTERFACES FOR PROCESS AUTOMATION SYSTEMS

## 1 Scope

### 1.1 General applicability

This document defines general structures and functions of HMI systems.

An HMI life cycle example for HMI systems is included.

This document specifies requirements and recommendations for activities in each stage of the life cycle including designing, using, and maintaining the HMI system.

It also provides requirements and recommendations for functions and performance of HMI systems.

The requirements and recommendations in this document are applicable to any controlled process using an HMI to interface to a control system. There can be differences in implementation to meet the specific needs based on the application and controlled process type.

### 1.2 Exclusions

#### 1.2.1 Management of change (MOC)

Some requirements and recommendations to be included in a MOC procedure are included in this document. However, a specific MOC procedure has not been included in this document.

#### 1.2.2 Jurisdictions

In some jurisdictions, the governing authorities (e.g. national, federal, state, province, county, city) have established process safety design, process safety management, or other requirements.

#### 1.2.3 Purchase specification

This document is not intended to be used as a human machine interface system selection or purchase specification, although at the discretion of the person specifying or requiring it, suppliers could be requested to provide an HMI system including the features mentioned herein. This document does not eliminate the need for sound engineering judgment. No HMI platform or technology is mandated nor implied.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 62381, *Automation systems in the process industry – Factory acceptance test (FAT), site acceptance test (SAT), and site integration test (SIT)*

IEC 62443 (all parts), *Security for industrial automation and control systems*

### 3 Terms, definitions and abbreviated terms

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

#### 3.1 Terms and definitions

##### 3.1.1

###### **abnormal situation**

disturbance in an industrial process during which the control system cannot keep the process within normal operating parameters

##### 3.1.2

###### **alarm**

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

[SOURCE: IEC 62682:2022, 3.1.7]

##### 3.1.3

###### **aspect ratio**

ratio between the total horizontal and total vertical dimensions on a screen

Note 1 to entry: Displays designed for one aspect ratio screen (e.g. 4:3) can appear distorted when shown on a screen with a different aspect ratio (e.g. 16:9).

##### 3.1.4

###### **asset owner**

role of an organization responsible for one or more industrial automation and control systems (IACSs)

Note 1 to entry: The term "asset owner" is used in place of the generic term "end user" to provide differentiation.

Note 2 to entry: This definition includes the components that are part of the IACS.

Note 3 to entry: In the context of this document, asset owner also includes the operator of the IACS.

[SOURCE: IEC 62443-3-3:2013, 3.1.2, modified to be role-based.]

##### 3.1.5

###### **auditory coding**

use of auditory signals to convey information to operators

##### 3.1.6

###### **auditory signal**

particular, unique, recognizable sound used to convey a particular, unique meaning

##### 3.1.7

###### **call up time**

lapsed time for all display elements to be refreshed after a display change has been requested

##### 3.1.8

###### **chromatic distortion**

colour fringing or smearing caused by unequal focusing of different colours

**3.1.9  
commissioning**

procedures prior, or related, to handing over a system for placing into service

Note 1 to entry: These procedures often include acceptance testing (FAT, SAT, and SIT); handing over of drawings and documentation; delivering instructions for operation, maintenance, and repair; and providing training to personnel.

**3.1.10  
console**

hardware, software, and furniture or enclosure at which users monitor and/or control the process, which can include multiple stations, communication devices, and other devices

EXAMPLE Cameras, barcode devices and pushbutton stations.

Note 1 to entry: See Figure A.1.

**3.1.11  
control platform**

system comprising a programmable automation controller, programmable logic controller, or a distributed control system controller

**3.1.12  
control room**

core functional entity, and its associated physical structure, where control room operators are stationed to carry out centralized control, monitoring and administrative responsibilities

[SOURCE: ISO 11064-1:2000, 3.2, modified – "control room" was added to the definition.]

**3.1.13  
control system**

system that responds to input signals from the equipment under control and/or from an operator and generates output signals that cause the equipment under control to operate in the desired manner

[SOURCE: IEC 62682:2022, 3.1.44, modified – Note 1 to entry and Note 2 to entry were removed.]

**3.1.14  
controller**

hardware which executes functions for monitoring and control of one or more process variables

Note 1 to entry: In some industries, the primary user of the HMI is called the controller.

**3.1.15  
dashboard**

type of display showing summary of various pieces of important information typically used to give an overview of a process or part of a process

**3.1.16  
display**

visual representation of the process and related information used for monitoring and control

Note 1 to entry: See Figure A.1.

**3.1.17  
display type**

display format  
graphic layout

description of the generic layout of a display and its presentation of information without referring to any particular content

**3.1.18****drill-down**

method of navigation in which successive displays show increasing detail for smaller subsets of the system scope

**3.1.19****embedded logic**

software that is part of the HMI system and performs some of the requirements of that HMI system

**3.1.20****faceplate**

display, part of a display, or popup used for monitoring and/or direct operation of a single control loop, device, sequence, or other entity

Note 1 to entry: A faceplate contains one or more graphic symbols.

Note 2 to entry: A faceplate is used for group display, popup or other displays.

**3.1.21****graphic element**

component part of a graphic symbol

Note 1 to entry: Graphic elements consist of objects such as a line and/or circle as shown in Figure A.1.

**3.1.22****graphic symbol**

graphic object

visual representation of a process component, instrument, condition, information, or operation interaction in a display

Note 1 to entry: Composed of a combination of single graphic elements. See Figure A.1.

**3.1.23****HMI application**

computer program that is specific to the requirements of the HMI specification

**3.1.24****HMI platform**

particular family of HMI systems, consoles, or stations capable of using a common HMI toolkit

**3.1.25****human factors engineering**

scientific discipline concerned with the understanding of interactions between human and other elements of a system that applies theory, principles, data, and methods to design in order to optimize human well-being and overall system performance

**3.1.26****human machine interface****HMI****HMI system**

collection of hardware and software used by the operator and others to monitor and interact with the control system and with the process via the control system

[SOURCE: IEC 62682:2022, 3.1.56]

**3.1.27**

**HMI security model**

information used to develop a detailed program for managing the security of an HMI system

Note 1 to entry: HMI security model is needed to identify the security needs and important characteristics of the environment at a level of detail necessary to address security issues with a common understanding of the framework and vocabulary.

**3.1.28**

**industrial automation and control system**

**IACS**

collection of personnel, hardware, software, procedures and policies involved in the operation of the industrial process and that can affect or influence its safe, secure and reliable operation

**3.1.29**

**keyboard**

input device that allows the user to type characters, values, or commands to affect the control system

Note 1 to entry: See Figure A.1.

**3.1.30**

**mobile device**

portable device having a display screen with touch, pen and/or keyboard input that utilizes communication networks

**3.1.31**

**monitor**

<noun> electronic device for the display of visual information in the form of text and/or graphics

Note 1 to entry: See Figure A.1.

**3.1.32**

**monitor**

<verb> maintain awareness of the state of a process by observing variables or the change of variables against limits or other variables, to keep track of operations and enable timely and appropriate response to abnormal situations

**3.1.33**

**navigation**

function which supports users in locating desired information in an HMI-based information system, and also in guiding the selection of displays, or the act of selecting a display

**3.1.34**

**operator**

person who monitors and makes changes to the process

Note 1 to entry: The operator is the user that most frequently interacts with the HMI.

**3.1.35**

**pointing device**

input device which translates physical movements to movements of a pointer, cursor, or other indicator across the screen

EXAMPLE Mouse, trackball, and touchscreen.

Note 1 to entry: See Figure A.1.