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## Ergonomic design of control centres – Part 3: Control room layout (ISO 11064-3:1999)

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Swedish Standards corresponding to documents referred to in this Standard are listed in "Catalogue of Swedish Standards", issued by SIS. The Catalogue lists, with reference number and year of Swedish approval, International and European Standards approved as Swedish Standards as well as other Swedish Standards.

## Ergonomisk utformning av kontrollrum och relaterade utrymmen – Del 3: Utformning av kontrollrum (ISO 11064-3:1999)

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**EN ISO 11064-3**

December 1999

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English version

## Ergonomic design of control centres - Part 3: Control room layout (ISO 11064-3:1999)

Conception ergonomique des centres de commande -  
Partie 3: Agencement de la salle de commande (ISO  
11064-3:1999)

Ergonomische Gestaltung von Leitzentralen - Teil 3:  
Auslegung von Wartenräumen (ISO 11064-3:1999)

This European Standard was approved by CEN on 12 December 1999.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.



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## Foreword

The text of the International Standard ISO 11064-3:1999 has been prepared by Technical Committee ISO/TC 159 "Ergonomics" in collaboration with Technical Committee CEN/TC 122 "Ergonomics", the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2000, and conflicting national standards shall be withdrawn at the latest by June 2000.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

**NOTE FROM CEN/CS:** The foreword is susceptible to be amended on reception of the German language version. The confirmed or amended foreword, and when appropriate, the normative annex ZA for the references to international publications with their relevant European publications will be circulated with the German version.

## Endorsement notice

The text of the International Standard ISO 11064-3:1999 was approved by CEN as a European Standard without any modification.

## Introduction

This part of ISO 11064 establishes ergonomic requirements, recommendations and guidelines for control room layout.

User requirements are a central theme of this part of ISO 11064 and the processes described are designed to take account of needs of users at all stages. The overall strategy for dealing with the user requirements as strategy to be adopted for control room design is presented in ISO 11064-1.

ISO 11064-2 provides guidance on the design and planning of the control room in relation to its supporting areas. Requirements for the design of workstations, displays and controls and the physical working environment are presented in ISO 11064-4 to ISO 11064-6. Evaluation principles are dealt with in ISO 11064-7.

ISO 11064-1 to ISO 11064-7 cover general principles of ergonomic design appropriate to a range of industries and service providers. The specific requirements appropriate to particular sectors or applications areas are covered in ISO 11064-8. The requirements presented in ISO 11064-8 are to be read in conjunction with ISO 11064-1 to ISO 11064-7.

The ultimate beneficiaries of this part of ISO 11064 will be the control room operator and other users. It is the needs of these users that provide the ergonomic requirements used by the developers of International Standards. Although it is unlikely that the end user will read this part of ISO 11064, or even know of its existence, its application should provide the user with interfaces that are more usable and a working environment which is more consistent with operational demands. It should result in a solution which will minimize error and enhance productivity.

For determining design dimensions, the practice of providing formulae, into which appropriate user population data is inserted, is adopted. A table of anthropometric data is presented in annex B.

# Ergonomic design of control centres —

## Part 3: Control room layout

### 1 Scope

This part of ISO 11064 establishes ergonomic principles for the layout of control rooms. It includes requirements, recommendations and guidelines on control room layouts, workstation arrangements, the use of off-workstation visual displays and control room maintenance.

It covers all types of control centres, including those for the process industry, transport and dispatching systems in the emergency services. Although this part of ISO 11064 is primarily intended for non-mobile control centres, many of the principles could be relevant/applicable to mobile centres, such as those found on ships and aircraft.

### 2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 11064. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 11064 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 7250:1996, *Basic human body measurements for technological design*.

ISO 9241-3:1992, *Ergonomic requirements for office work with visual display terminals (VDTs) — Part 3: Visual display requirements*.

ISO 9241-5:1998, *Ergonomic requirements for office work with visual display terminals (VDTs) — Part 5: Workstation layout and postural requirements*.

ISO 11428:1996, *Ergonomics – Visual danger signals – General requirements, design and testing*.

### 3 Terms and definitions

For the purposes of this part of ISO 11064, the following terms and definitions apply.

NOTE To assist with the interpretation of these definitions, descriptive Figures 1 and 2 are included in this clause.

#### 3.1

##### **control centre**

combination of control rooms, control suites and local control stations which are functionally related and all on the same site (see Figure 1)

- 3.2**  
**control console**  
structural framework which supports equipment, worksurfaces and storage and which together comprise a control workstation
- 3.3**  
**control panel**  
discrete surface on which groups of displays and controls are mounted; control panels may be mounted on the control workstation or on walls (see Figure 2)
- 3.4**  
**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
- 3.5**  
**control room operator**  
individual whose primary duties relate to the conduct of monitoring and control functions, usually at a control workstation, either on their own or in conjunction with other personnel both within the control room or outside
- 3.6**  
**control suite**  
group of functionally related rooms, co-located with the control room, and including it, which house the supporting functions to the control room, such as related offices, equipment rooms, rest areas and training rooms (see Figure 1)
- 3.7**  
**control workstation**  
single or multiple working position, including all equipment such as computers and communication terminals and furniture at which control and monitoring functions are conducted (see Figure 2)
- 3.8**  
**direct operator supervision**  
supervision of control room operators, and other staff, by direct observation and/or via direct speech links
- 3.9**  
**display**  
device for presenting information that can change with the aim of making things visible, audible or discriminable by tactile or proprioceptive perception
- 3.10**  
**functional groups**  
grouping of control workstations where the operational duties are such that close, direct liaison is required and therefore benefit from proximity to one another
- 3.11**  
**functional layout**  
layout in which the general location of differing control functions in a control room are indicated
- 3.12**  
**gross area**  
overall number of square metres designated for a control room
- 3.13**  
**disability**  
any reduction in normal capacity due to mental or physical factors which prevents an individual from experiencing or performing a full complement of activities [8]
- 3.14**  
**intimate zone**  
distance at which the presence of another person is unmistakable through such factors as sight, olfaction, heat and sound

### **3.15**

#### **local control station**

operator interface that is located near the equipment or system being monitored and/or controlled

### **3.16**

#### **off-workstation display**

displays which are not mounted on the control workstation; such displays, often visual, may be display panels, mimic diagrams and observation windows (see Figure 2)

### **3.17**

#### **primary information**

information which is essential for the satisfactory exercise of control functions

### **3.18**

#### **primary workstation**

control workstation that is usually staffed and is in the main control area

### **3.19**

#### **secondary information**

information which is either of secondary importance to the control function or which does not need to be immediately available to the control room operator

### **3.20**

#### **secondary workstation**

workstation on which supportive tasks are undertaken, or on which an overload of tasks can be carried out during periods of peak workloads

### **3.21**

#### **shared visual display device**

on-workstation visual display which needs to be used by more than one control room operator while they are at their control workstations

### **3.22**

#### **stature (body height)**

vertical distance from the floor to the highest point of the head (vertex)  
[ISO 7250:1996]

### **3.23**

#### **supervisor**

individual whose primary responsibilities relate to the satisfactory conduct of control functions by the control room, the supervision of staff and equipment and, when necessary, the conduct of control tasks

### **3.24**

#### **task analysis**

analytical process employed to determine the specific behaviours required of people when operating equipment or doing work  
[ISO 9241-5:1998]

### **3.25**

#### **usable area**

gross area less deduction for unusable spaces, such as around pillars, awkward corners and nearby entrances/exits

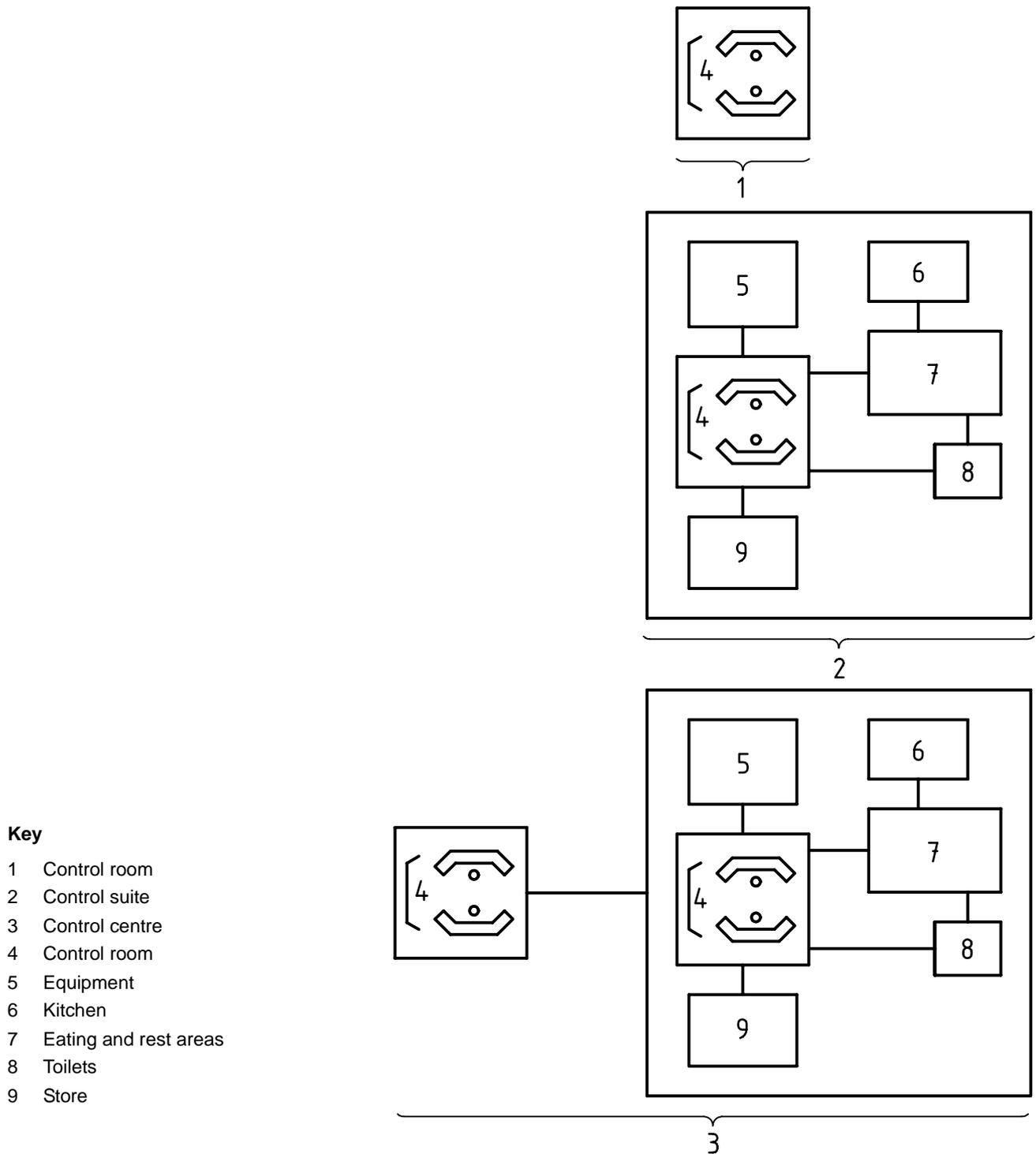
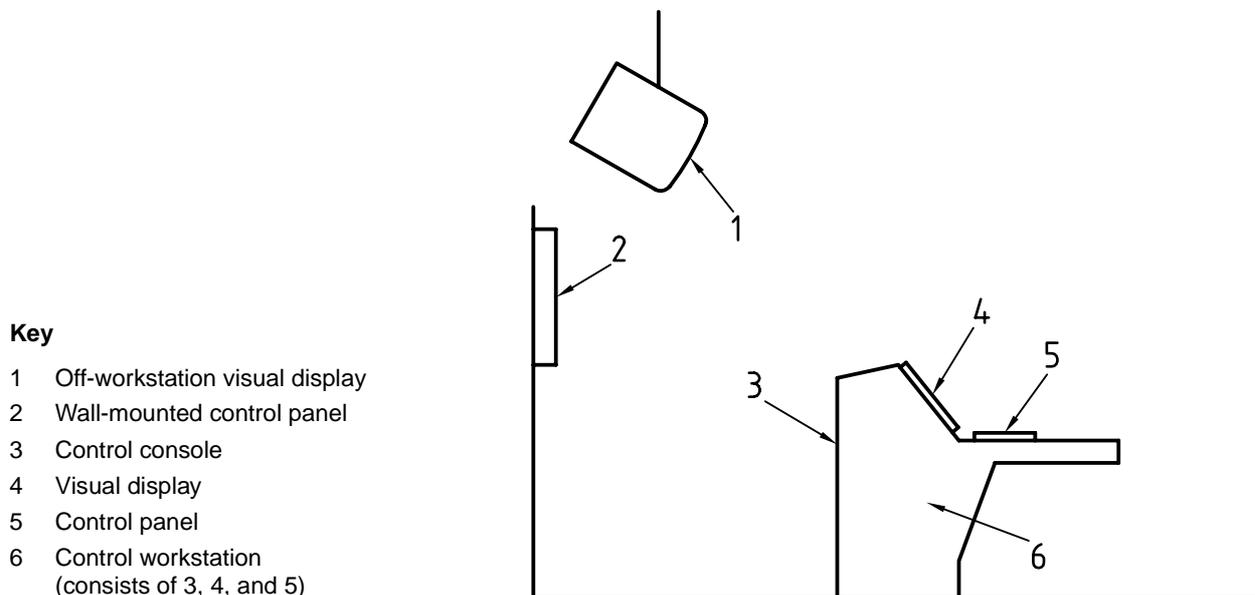


Figure 1 — Schematic illustrations of control room, control suite and control centre



**Figure 2 — Illustration of definitions associated with control workstation and off-workstation visual displays**

## 4 Ergonomic design of control centres

### 4.1 Process for control room layout

The following flowchart summarizes a general procedure for the control room layout, where only the main activities have been noted (see Figure 3).

For the purposes of this part of ISO 11064, it is assumed that a number of control room characteristics have been largely finalized and act as an input to the process summarized in the flowchart. These ergonomic features include job descriptions, staffing profiles, equipment specifications and overall operating procedures. For many control room projects, at the stage where layouts need to be undertaken, not all of the ergonomic features have been finalized. In order to proceed with the ergonomic design process in accordance with this part of ISO 11064, it is necessary to agree upon working assumptions for those aspects where final information is not available. This information and the finalized ergonomic features are recorded in an Operational Specification or Functional Specification.

The flowchart refers to information input during the preparation of “functional layouts”. This information will include the number of control workstations as well as any required arrangements of workstations. Grouping should be based on functional linkages, for example, equipment sharing, direct lines of sight and requirements for direct speech.

The development of a preferred control room layout will, typically, include the following activities. Based on the operational requirements summarized in a functional link analysis, workstation arrangement and layouts should be prepared within the available space. These layouts should take account of such functional links, as face to face communications and sightlines to shared off-workstation overview displays, as noted in the functional link analysis. Functional layout need only be approximately to scale. A number of different functional layout options are prepared which meet, to varying degrees, the requirements in the Operational Specification. Translating these functional layouts to possible room layouts is achieved by replacing functional groups with approximate workstation footprint sizes and adjusting the layouts to maintain required circulation and maintenance access. A similar process can be used for room layouts where no space has been decided for the control room, under which circumstances the functional layouts/room layouts can be used to specify the space to be provided for these functions.