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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 18978.400-2012

**Ergonomics of human-system interaction -- Part 400: Principles
and requirements for physical input devices**

人-系统交互工效学 第400部分：物理输入设备的原则和要求

(English Translation)

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Foreword

This section drafted in accordance with GB/T 1.1-2009 given rules.

GB/T 18978 "use of visual display terminals (VDTs) Ergonomic requirements for office" has been published in the following sections.

- Part 1. General;
- Part 2. Guide to mission requirements;
- Part 10. Dialogue principles;
- Part 11. Usability Guidelines;
- Part 12. information presentation;
- Part 13. User's Guide.

Since the international standard GB/T 18978 part corresponding ISO 9241 have been adjusted and expanded standard name from "end use of visual display End (VDTs) Ergonomic requirements for office "with" human - system interaction Ergonomics ", in order to harmonize with the ISO 9241, GB/T 18978 standard Name changed to "human - system interaction ergonomics", each part number and name will also work with the latest ISO 9241 section numbers and names (see Appendix A) consistent.

GB/T 18978 "human - system interaction ergonomics" and "400" sub-series program includes the following sections.

- Part 400. Principles and requirements for physical input devices;

- Part 410. Design criteria for physical input devices;
- Part 411. laboratory tests and evaluation methods of physical input device design;
- Part 420. Physical access to the equipment selection procedures;
- Part 421. work site testing and evaluation methods of physical input devices.

This part of GB/T 18978 of Part 400.

This section uses the translation method identical with ISO 9241-400:2007 "people - Ergonomics system interaction - Part 400. physical input devices Principles and requirements. " this part of the National Standardization Technical Committee learned Ergonomics (SAC/TC7) and focal points.

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Introduction

The input device is that users can take their data input to the interactive system tools. In general, the input device may be a perception by User behavioral changes (such as gestures, finger movement, etc.), and this change is converted to an interactive system can recognize the signal sensor.

The input device used for a single purpose which it is intended, for example, a keyboard for inputting character code. In some cases, they can also be used Other purposes. However, in this case, their efficiency and (or) the effectiveness will normally be limited to a certain degree (for example, for positioning keyboard). If you need to enhance the ability of the user, an input device may also be used in conjunction with other input devices, for example, to draw a straight line with in combination keyboard and mouse.

From the ergonomics point of view, using a separate input device, or use multiple input devices depending on the availability of the original guide Management. This idea that the product itself is not inherent availability, only under specific usage environment is a specific user to a specific purpose Use only the existence of product availability. Perhaps the product is specifically designed to target user groups and limited use of the environment, for example, designed to fit in Design of child room temperature carried out. However, the use of a device specific goals need to do another consideration.

Objectives user input device may be defined as the need to achieve high-level tasks, such as "word processing" or "multimedia." However, this Levels in accordance with the definition for usability design, test or choose a device might be too abstract. Thus, the standard specifies "Task primitives" such as "positioning", "drag" or "Code Entry." Design and

selection of equipment requirements across a range of user needs and mission requirements to achieve adaptation. ISO 9241-5:1998 Dui adaptation concept Definition equipment (visual display, input devices, etc.) to meet the needs of a single user level. Better adaptation to the target user base Very necessary, if the device is not limited to the use of a target user groups and tasks, this adaptation should also consider the special needs of users, for example, such as people with disabilities. Due to a variety of input devices, users perform the same tasks through different physical abilities (such as manual control, foot Control, voice control, or eye control) input to achieve the same availability, the required adaptation to be able to provide using any different the level of availability of equipment to get. According to some specific characteristics of demand, it may require a combination of a variety of input devices, for example, for a made for some reason can not use the hand of a user, it can be controlled by way of the foot and eye-controlled input device instead of the mouse input.

GB/T 18978 provisions of this part of the ergonomic principles of universal design and the use of input devices.

In order to develop proposals for a group or class of input devices can be distinguished based on the factors underlying the design, propose a classification method.

- Carrying physical variable information (relative/absolute position, force, velocity, acceleration, etc.);
- For body parts operations;
- Control dimension (DOF);
- Control of diversity (the number of parallel control variables);
- Control mode (discrete/continuous);
- Monitoring (single or continuous time, date or return value calibration values, sequentially or jump continuous output, etc.);
- Distance control function (monotone, non-monotonic, unipolar/bipolar, etc.);
- Mapping, direct;
- Psychology characteristic control (control of causality, or explore goal-oriented control).

This section also provides an input device associated with the availability of features and taking into account various factors (such as freedom, organoleptic properties etc.) sub Class principles. ISO 9241-410 gives guidance in Product Design of these guidelines. But these product design and ergonomics guide it does not contain a specific environment (such as using the keyboard in a CAD environment). Select the intended use of the environment is one of the design process Part, this part is not considered a problem.

ISO 9241-411 specifies by observing, measuring performance, and a variety of equipment

and other physical characteristics determine the consistency of approach.

Note: This section will be the following methods (ISO 9241-411) support.

- Still use the keyboard for text input and data availability test (currently given in ISO 9241-4);
- Non-contact keyboard typing tasks common usability test;
- Select an input device, usability testing and analysis (currently given in ISO 9241-9);
- Test the efficiency and effectiveness of physical input devices (ISO 9241-9 specified based approach);
- Comfort Assessment (currently in ISO 9241-4 and ISO 9241-9 are given);
- Other evaluation methods.

ISO 9241-420 detail how to use these guidelines to select the appropriate product for a given environment guidelines, which refers Guiding principles to use single or multiple input devices in the form of selection and combination of ergonomics standards in the same place of work is given.

This section does not include testing and evaluation methods. Since these methods may change frequently, in order to "manufacturers, designers and testing center" and "user organizations" these two target groups, the content in the form of an independent document presented and published.

ISO 9241 initially by the "Office Ergonomic requirements for visual display terminals," composed of 17 sections. As a standard review process Part of the structure of ISO 9241 carried out a major restructuring, agreed to expand its scope to include other relevant standards, making it more practical. Revise ISO 9241 after the general title "human - system interaction Ergonomics", the title reflects a change in the content of ISO 9241 series of standards, while Also makes standards and ISO/TC159 (Technical Committee on Ergonomics) under SC4 (human - system interaction efficiency credits Technical Committee) primary Title and scope consistent. Multi-part standard structure consists of a series of new amendments to the "hundred" number of standard components. the first of which relates to the 100 series Software interfaces, the 200 series is based on human-centered design, the 300 series of visual display content, the first 400 series is a physical input device, and many more.

Human - system interaction Ergonomics Part 400. Principles and requirements for physical input devices