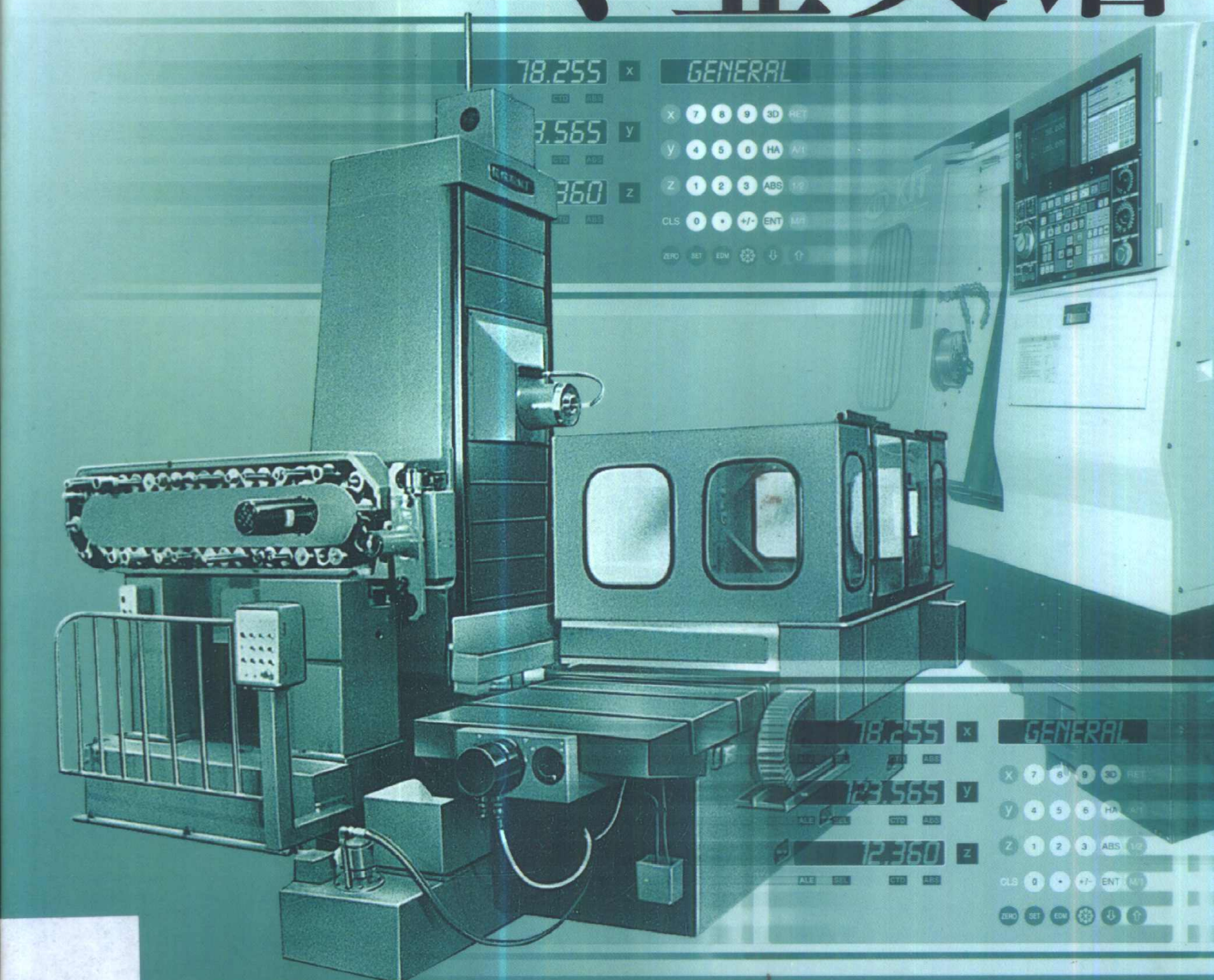
职业技术教育教材
机电一体化——数控机床加工技术专业

机电与数控专业英语



机械工业出版社
China Machine Press

19

职业技术教育教材

机电一体化——数控机床加工技术专业

机电与数控专业英语

上海市职业技术教育课程改革与教材建设委员会　组编

机 械 工 业 出 版 社

本书介绍了机电与数控专业有关的英语知识，内容包括工程制图，机械零件，机电控制及可编程控制，数控机床结构、原理、操作、安全维护与故障诊断，数控编程，计算机辅助设计与制造，通信技术，招聘广告，求职面试及专业对话等内容。附录部分还收录了常规加工和特种加工设备、刀具及操作方法，工程材料，工程符号，外贸销售合同，常用专业术语及英文缩写。为了便于阅读对照，书后还附有参考译文及练习答案。

本书内容新颖，题材丰富，实用性强，与专业课程紧密配合，相互渗透，相互促进。本书可作为高等职业技术学院、大中专机电与数控专业英语教材或课外阅读材料，也可作为工程技术人员自学参考用书。

图书在版编目（CIP）数据

机电与数控专业英语/上海市职业技术教育课程改革与教材建设委员会组编．—北京：机械工业出版社，2001，9
职业技术教育教材．机电一体化——数控机床加工技术专业
ISBN7-111-09453-0

Ⅰ．机…　Ⅱ．上…　Ⅲ．①机电工程-英语-专业学校-教材②数控机床-加工-英语-专业学校-教材　Ⅳ．H31

中国版本图书馆 CIP 数据核字（2001）第 071058 号

机械工业出版社（北京市百万庄大街 22 号　邮政编码 100037）
责任编辑：于　宁　版式设计：冉晓华
封面设计：姚　毅　责任印制：郭景龙

北京铭成印刷有限公司印刷·新华书店北京发行所发行

2002 年 1 月第 1 版·第 1 次印刷
787mm×1092mm $^{1}/_{16}$·14.75 印张·357 千字
0 001－4 500 册
定价：23.00 元

前　言

“机电一体化——数控机床加工技术专业”教材，全套共14本，经过5年的努力，终于付梓出版了。这套教材是上海市教委组织的“10181”课程改革和教材建设工程的重要组成部分，也是机械专业课程改革和教材建设的可喜成果。

随着科学技术的高速发展，传统的机械工业呈现出了新的技术发展趋势，进入了智能化领域。机电一体化的迅猛发展和数控机床加工技术在企业的普遍应用，对生产一线操作人员的知识和能力要求越来越高，客观上要求一线操作人员应由经验型向智能型转变。这套新教材正是为顺应这一发展趋势而组织编写的。

近5年来，我们机械专业教材编审委员会为此付出了辛勤的劳动。首先组织了长达半年的调查研究，并且参照加拿大CBE经验，制作了DACOM表，就数控机床加工技术专业职业技术人才的知识、能力要求，在五大行业、72个企业中问卷调查了780人次，从而明确了该专业的知识和能力结构。其次，认真进行了课程改革方案的讨论和研究，确定了机电结合，“以机为主，以电为辅”；在课程安排中“以机为主，突出工艺”、“以电为辅，够用为度”的原则。然后对传统的课程体系进行重组优化，如对陈旧老化的知识予以删除，对烦琐的内容予以简化，对某些课程进行重新组合，针对新知识，特别是新的能力需求，设置了新课程。最后，我们按照教材的编写要求，组织了14个编写组，实施主编负责制。所聘的编写人员都是具有改革创新精神、有丰富教学经验、熟悉专业技术的专业人才；同时聘请了有较高造诣的高校教授任主审。为了确保教材质量，对每本教材的编写提纲都组织有关专家进行了逐一论证，从而保证了这套教材的科学性、针对性、实用性。

在这里，我觉得有必要对本专业的设计作一概要介绍。

专业学习期限：学制4年。

培养目标是德、智、体、美全面发展，具有扎实的文化基础知识，掌握数控机床加工技术的理论和职业技能，面向生产现场的工艺实施和智能型操作人员。

本专业强调实务能力，学生通过本专业的学习，可具有中级水平的数控机床操作能力；具有编制中等复杂程度零件数控加工程序的能力；具有数控机床的刀具选用、调整、工件装夹等技能；具有数控机床维护、保养，并能排除简单故障的能力；具有正确解决零件在数控机床加工过程中质量问题的能力。

这套教材能得以顺利出版，无疑是集体智慧的结晶，是团队合作的成果。在此，我要感谢上海市职业技术教育课程改革与教材建设委员会的正确领导和指导；要感谢上海工业系统各行业、企业的支持和通力合作；要感谢为此呕心沥血、伏案疾书的近百名编审人员；最后还要感谢机械工业出版社的同志们。

当今，我们正处在改革的年代，正是这个年代催生了这套具有改革精神、时代特色和专业个性的新教材。愿随着这套教材的教学实施，能造就一批又一批新的职业技术人才，以服务于国家、造福于企业。

上海市职业技术教育机械专业教材编审委员会副主任　**徐韵发**

Contents

Part 1 Text

Part 2 Translation

Part 3 Key

目　录

第二部分　译　　文

第三部分　答　　案

Part 1 Text

第一部分 课文

Unit 1 Engineering Drawing

1.1 Coordinate System

The basic of all input AutoCAD is the Cartesian coordinate system, and the various methods of input (absolute or relative) rely on this system. In addition, AutoCAD has two internal coordinate systems to help you keep track of where you are in a drawing: the World Coordinate System (WCS) and the User Coordinate System (UCS).

The fixed Cartesian coordinate system locates all points on an AutoCAD drawing by defining a series of positive and negative axes to locate positions in space. (Fig.1-1 a) illustrates the axis for two-dimension (2D) drafting. There is a permanent origin point (0,0) which are referenced, an x axis running horizontally in a positive and negative direction from the origin, and a y axis travelling perpendicularly in a vertical direction. When a point is located, it is based on the origin point unless you are working in the three dimension, in which case, you will have a third axis, called the z axis (Fig.1-1 b).

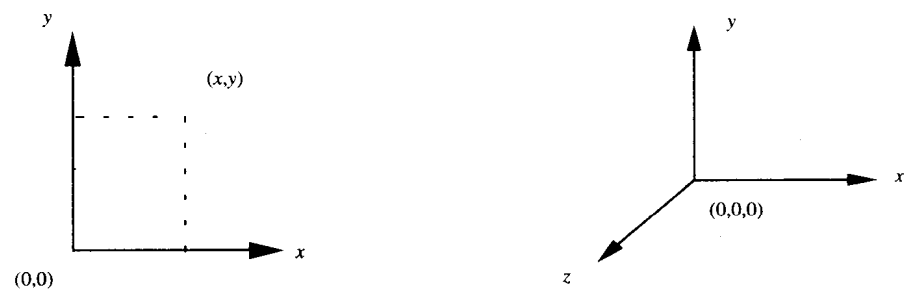


Fig. 1-1 The coordinate system

1.2 Types of Views

There are many view types which may be shown, as illustrated in Fig.1-2.

(1) Projection An orthographic projection of an object as seen from the front, top, right side, etc.

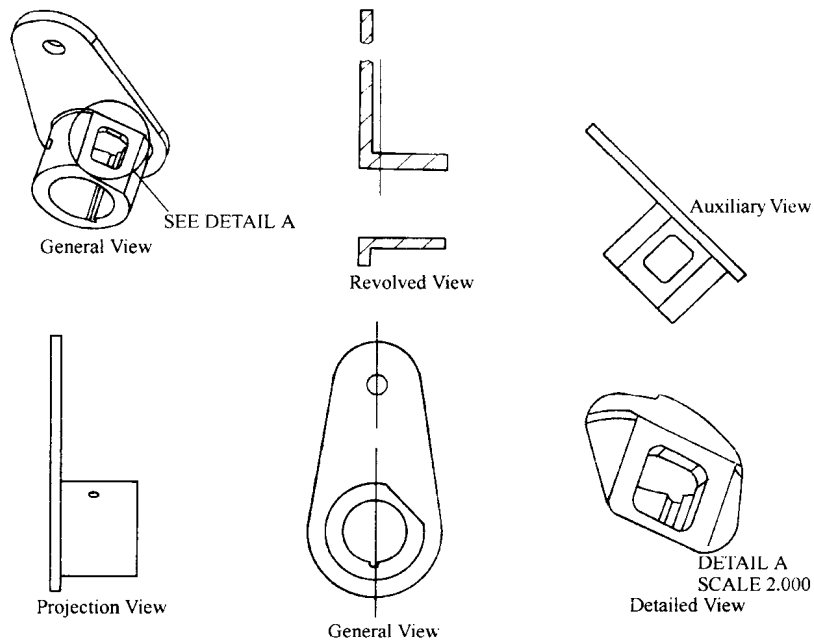
(2) Auxiliary Any view created by projecting 90° to an inclined surface, datum plane, or along an axis.

(3) General Any view which is oriented by the user and is not dependent upon any other view for its orientation.

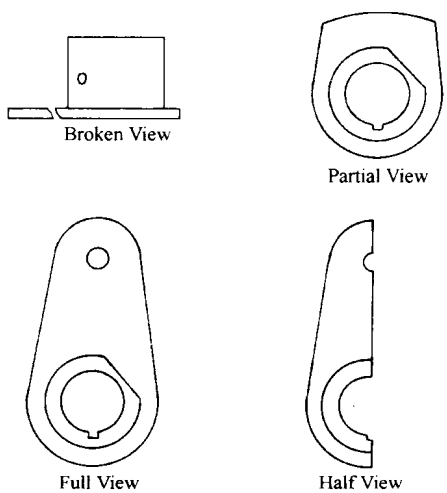
(4) Detailed Any view which is derived by taking a portion of an existing view and scaling it for dimensioning and clarification purposes.

(5) Revolved A planar, area cross-section was revolved 90° degrees about the cutting plane line and offset alone, its length.

(6) Full View Shows the entire model.



a)



b)

Fig. 1-2 Types of views

a) the five main types of views b) some other commonly used views

(7) Half View Shows only the portion of the model on one side of a datum plane.

(8) Broken View Used on large objects to remove a section between two points and move the remaining sections close together.

(9) Section Displays a cross-section for a particular view.

(10) Exploded Drawing The exploded drawing (Fig.1-3) is a type of pictorial drawing designed to show several parts in their proper location prior to assembly. Although the exploded view is not used as the working drawing for the machinist, it has an important place in mechanical technology. Exploded views appear extensively in manuals and handbooks that are used for repair and assembly of machines and other mechanisms.

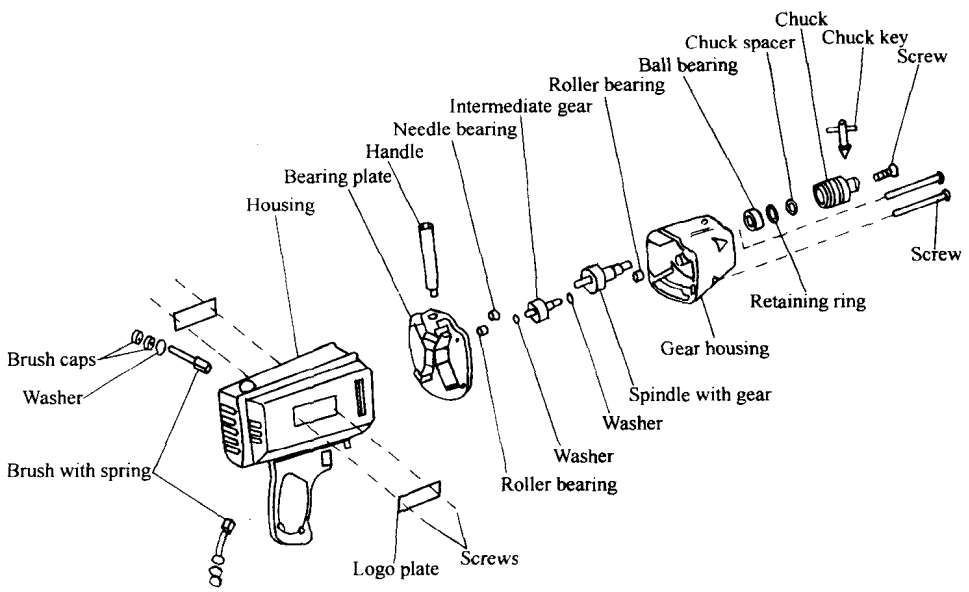


Fig. 1-3 Exploded drawing.

(11) Partial view When a symmetrical objects is drafted, two views are sufficient to represent it (typically, one view is omitted). A partial view can be used to substitute one of the two views. Sectional and auxiliary views are also commonly used to present part detail. Sectional views are extremely useful in displaying the detailed design of a complicated internal configuration. If the section is symmetrical around a centerline, only the upper half needs to be shown. The lower half is typically shown only in outline. Casting designers often employ sectional views to explode detail. When a major surface is inclined to three projection planes, only a distorted picture can be seen. An auxiliary plane that is parallel to the major surface can be used to display an undistorted view.

Machine Assembly Exploded View:

Study this diagram describing mate, align, orient and insert assembly constrains (Fig. 1-4) :

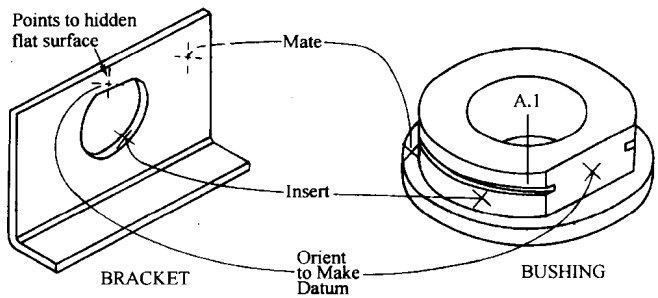


Fig. 1-4 Constrains for assembly the BRACKET and BUSHING parts

1.3 Multiview Drawing

Engineering drawing is an abstract universal language used to represent a designer's idea to others. It is the most accepted medium of communication in all phases of industrial and engineering work.

In today's modern manufacturing industry, several types of drawings are acceptable. However, the standard is the multiview drawing (Fig.1-5). A multiview drawing usually contains two or three views (Front, Top, and Side). Each view is an orthographic projection of a plane. In the United States and Canada, the third-angle projection is the system used (Fig.1-6). In the figure, the four quadrants of the *X-Z* plane (called the Ⅰ, Ⅱ, Ⅲ, and Ⅳ angles) are illustrated. For the third-angle projection, we always place the object in the third quadrant and project the object in three planes. This is done by projecting the object onto the frontal, horizontal, and profile planes. The projection on the frontal plane (*X-Z*) is fixed and the image is called the front view. With the projected image, the horizontal plane (*X-Y*) is rotated 90° clockwise on the *x* axis, the result is a top view of the object. The profile plane (*C-Z*) is rotated 90° clockwise about the *Z* axis to obtain a right-hand side view. Hidden lines are shown by using dashed lines on the drawing.

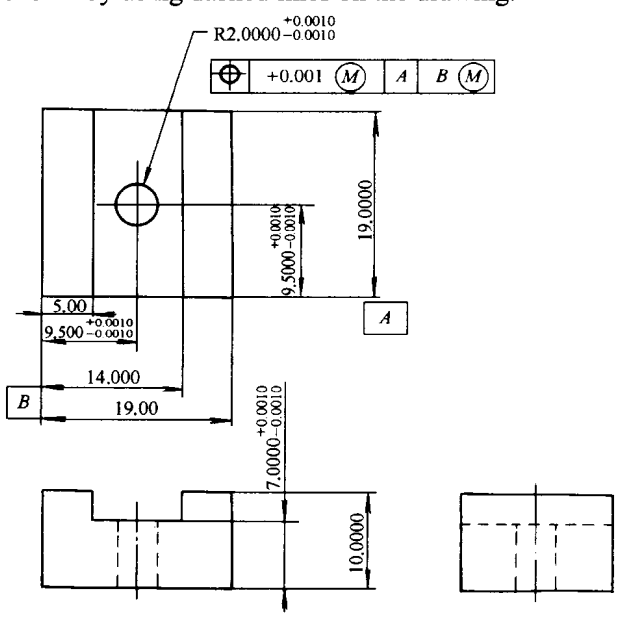


Fig. 1-5 Multiview drawing of a bracket

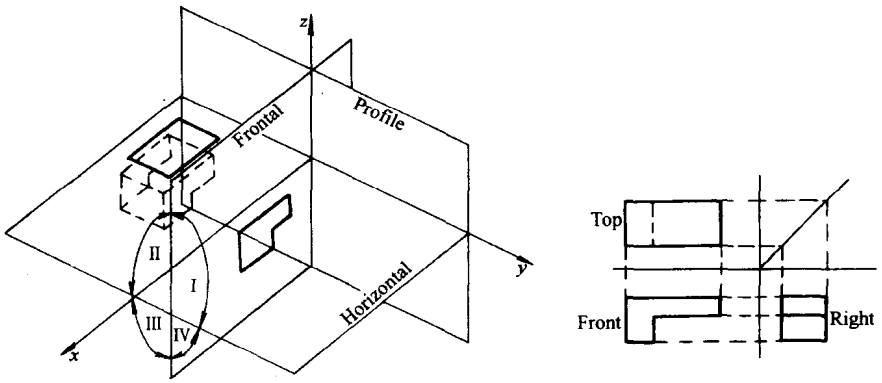


Fig. 1-6 Third-angle projection

1.4 Fits

The fit between two mating parts is the relationship which results from the clearance or interference obtained. There are three classes of fit, namely, clearance, transition and interference; these conditions are shown in Fig.1-7.

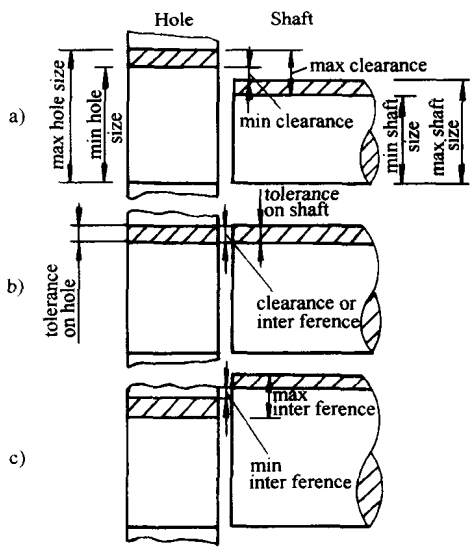


Fig. 1-7 Conditions of fit between a hole and a shaft

a) Clearance fit (note that the shaft is always smaller than the hole)

b) Transition fit (note that the limits are such that the condition may be of clearance or interference fit)

c) Interference fit (note that the shaft is always larger than the hole)

1. Interchangeability An interchangeable part is one which can be substituted for a similar part manufactured to the same drawing. The interchangeability of component parts is based upon these two functions.

1) It is necessary for the relevant mating parts to be designed incorporating limits of size.

2) The parts must be manufactured within the specified limits.