21世纪高等学校精品规划教材

自动化专业英语

English for Specific Purpose of Automatization

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北京理工大学出版社
BEIJING INSTITUTE OF TECHNOLOGY PRESS

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内容简介

本书按模块式结构编写，由机械技术、电子技术、电气控制、自动检测和综合应用5个模块组成。课文选材面向仪器设备，图文并茂，便于教师组织教学和学生自学。

本书可作为高等院校及成人教育中的电气技术、自动化技术、机电一体化以及应用电子技术等电类专业的教材，也可作为相关专业的师生和从事自动化工作的工程技术人员的参考用书。

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前　言

专业英语是高等教育人才培养计划中的一个教学环节，其目的是通过掌握一定的专业词汇量和阅读、翻译技巧，让学生在生产和服务的一线岗位上，能更好地应用先进设备，提高英语的交流沟通能力。自动化专业毕业生所从事的岗位，往往具有引进的新技术、新工艺、新设备和新软件多且快的特征，对专业英语的要求更高一些。本书就是针对学生的岗位需求来编写的。

在教材风格上，编者采用模块式结构，且面广量大。这样做的优点是很明显的，既有利于教师根据专业方向、学时多少等具体情况，有侧重地选择某个或几个模块，又便于学生自学。在课文选材上，面向仪器和设备，图文并茂，学生阅读时直观性强。本书由机械技术、电子技术、电气控制、自动检测和综合应用 5 个模块组成。

本书由杨春生担任主编，负责全书的统稿，并编写机械技术模块；袁琦睦为副主编，并编写电子技术模块；陆敏智编写自动检测模块；马仕麟编写电气控制模块；严惠编写综合应用模块。本书由焦振宇副教授担任主审，对书稿提出了许多建设性的意见。

在本书的编写过程中，编者参阅了许多国内外文献资料。在此，向这些资料的作者致以衷心的感谢。同时，感谢北京理工大学出版社编辑耐心细致的工作，使本书得以顺利出版。

限于编者的水平，书中难免有疏漏或不妥之处，恳请广大读者和专家批评指正。

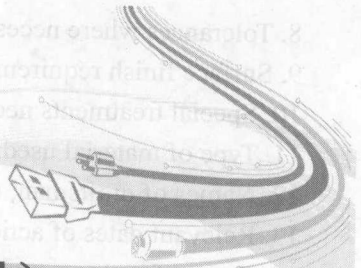
编　者

CONTENTS

Ⅰ. Mechanical Technology Block

（机械技术模块）

Lesson 1



Working Drawings（工作图）

Working Drawings (I)

During the design process, an engineer records ideas by means of sketches and design drawings of prototypes and their development. Once satisfied with the degree of perfection, the sketches are handed over to the draftsman who "takes off" the detail and makes working drawings of the whole unit.①

A set of working drawings for a machine would include detail drawings of the various parts and an assembly drawing showing how these parts are assembled to make up the complete machine.②

Detail drawings

The detail drawing is used as the main reference in the manufacture of individual components. It should contain sufficient information to manufacture the part as well as suitable, fully dimensioned orthographic view of each part, together with other information that may be required in the manufacturing process.③ A complete detail drawing should contain at least the following information (not necessarily in order of importance). See Figure 1-1-1.

1. Sufficient orthographic views of the part concerned;
2. Dimensions and instructional notes;
3. Scale used;
4. Projection used, for example, first or third angle;
5. Drafting standard reference, for example, as 1 100;
6. Name or title of drawing;
7. Dimensional units which apply;

8. Tolerances where necessary;
9. Surface finish requirements;
10. Special treatments needed;
11. Type of material used;
12. Names of draftsman, checker, approver, etc.;
13. Relevant dates of action by those concerned;
14. Zone reference system when necessary;
15. Drawing sheet size;
16. Name of company or department as applicable;
17. Drawing sheet reference, for example, sheet 1 to 2.

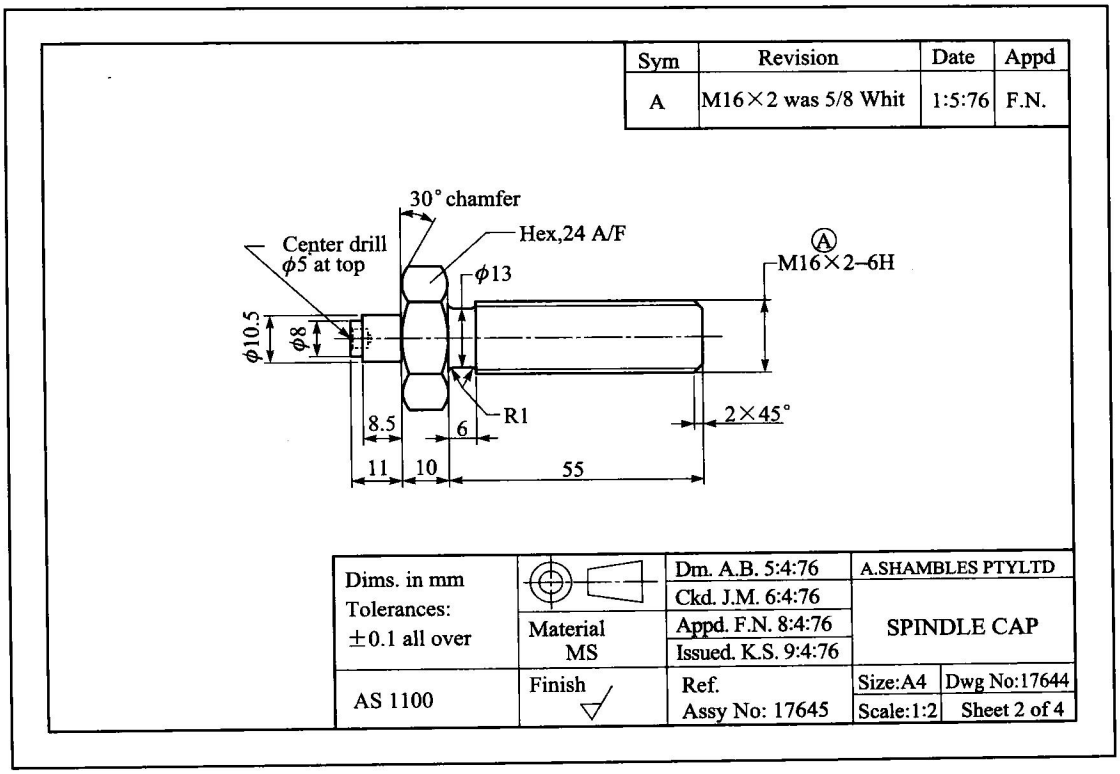


Figure 1-1-1 A detail drawing

New Words and Expressions

1. working drawings 工作图
2. sketch [sketʃ] *n.* 草图，简图
3. prototype ['prəutətaip] *n.* 原型，样机
4. development [di'veləpmənt] *n.* 发展，研制
5. perfection [pə'fekʃən] *n.* 完成，完美
6. draftsman ['drɑ:ftsmən] *n.* 绘图员
7. detail ['di:teil] *n.* 零件；细节，详细；详图
8. assembly [ə'sembli] *n.* 装配
9. individual [indi'vidjuəl] *adj.* 个别的
10. component [kəm'pəunənt] *n.* 零件，部件
11. dimension [di'menʃən] *n.* 尺寸
12. orthographic [ɔ:θəu'græfik] *adj.* 正交的，正投射的
13. view [vju:] *n.* 视图
14. in order of 按照……次序
15. instrctional [in'strʌkʃənəl] *adj.* 指导的，说明的
16. projectuion [prə'dʒekʃən] *n.* 投影
17. tolerance ['tɔlərəns] *n.* 公差
18. finish [finiʃ] *n.* 光洁度
19. approver [ə'pruvə] *n.* 批准者
20. relevant [relivənt] *adj.* 有关的，相关的
21. zone [zəun] *n.* 带，范围，区域
22. applicable ['æplikəbl] *adj.* 合适的，能应用的

Notes

① Once satisfied with the degree of perfection, the sketches are handed over to the draftsman who "takes off" the detail and makes working drawings of the whole unit.

句中 who 引导限定性定语从句，修饰 the draftsman。takes off 意为：复制。

译文：当对设计感到完美时，草图就交给绘图员绘制设备的整套工作图。

② A set of working drawings for a machine would include detail drawings of the various parts and an assembly drawing showing how these parts are assembled to make up the complete machine.

句中 showing... 是现在分词短语作定语，修饰 an assembly drawing。how 引导宾语

从句。

译文：一套机器的工作图包括各个零件的零件图和一张装配图，装配图显示这些零件如何装配成完整的机器。

③ It should contain sufficient information to manufacture the part as well as suitable, fully dimensioned orthographic view of each part, together with other information that may be required in the manufacturing process.

句中 to manufacture the part 是不定式短语作目的状语。that 引导限定性定语从句，修饰 other information。

译文：它应包含制造零件足够的信息，还有各个零件适当的具有完整尺寸的视图以及制造零件所需的其他信息。

Exercises

A. Translate the following terms into English:

1. 工作图　2. 零件图　3. 装配图　4. 视图　5. 图纸

B. Translate the following sentences into Chinese:

1. The three principal views of an object are the front view, the top view and the left side view.

2. Sometimes in representing a complex object, it is not enough to draw its three views only, so the six principal views of an object in the same plane are adopted.

3. The partial view is only a part of an object which is projected to the principal projection plane, the partial views are also bordered with a break line.

4. If two cylinders are with no difference in diameter, then the projection of intersection will appear as two straight lines.

5. Any solids of geometric combination, no matter how complex, can always be decomposed into several simple shapes and parts.

Reading Material

Working Drawings (Ⅱ)

Assembly drawings

Assembly drawings are primarily used to show how a number of components are fitted together to make a complete product unit. The term subassembly is commonly applied to a

product unit which combines with other subassemblies to make an assembly. For example, an assembly drawing of a motor car engine would show a number of complete units included on the drawing. Each of these units is referred to as a subassembly of the engine assembly.

Assembly drawings may be divided into two types depending on the proposed use:

1. General assembly where the main purpose is to identify the individual components and show their working relationship;

2. Working or detailed assembly combined detail and general assembly drawing which provides the function of both types.

Features of a general assembly drawing are:

1. Views are selected which show how the parts fit together and indicate how the unit may function.

2. Sectional views are used to eliminate the use of hidden detail lines where possible.

3. Dimensions which relate to the function of the unit as a whole are indicated, for example, the maximum and minimum operating heights of the jack.

4. Individual components are identified by the use of numbers contained in circles, which are connected by leaders to the related parts.

5. A parts list relates to the numbers on the drawing and identifies the component.

6. A revision table is provided to record modifications to individual components which may occur from time to time.

7. Some assemblies may be so large that it is necessary to draw different views of the assembly on separate sheets.

Features of a working assembly drawing are:

1. Only simple assemblies are drawn in this manner as views have to be chosen which show the assembly relationship as well as sufficient dimensional details of individual components to enable their manufacture.

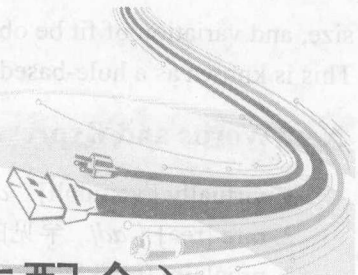
2. It is ideally suited to furniture construction drawings where the assembly views are not complex and details of joints may be enlarged and shown as partial views.

The information provided on a general assembly drawing is somewhat different from that required on a detail drawing. Information on the manufacture of individual parts is not required, for example, surface finish, tolerances or treatments. However, assembly instructions are required as dimensions which may be used for installation purposes or which are relevant to the operation of the assembly as a working unit.

New Words and Expressions

1. subassembly [sʌbə'sembli] *n.* 部件
2. identify [ai'dentifai] *vt.* 识别，给……做标记
3. modification [mɔdifi'keiʃən] *n.* 修改，改进
4. furniture ['fə:nitʃə] *n.* 设备
5. enlarge [in'lɑ:dʒ] *vi.* 扩大
6. joint [dʒɔint] *n.* 连接，接头
7. partial ['pɑ:ʃəl] *adj.* 部分的，局部的

Lesson 2



Tolerances and Fits（公差与配合）

Limits of size and tolerance

Since it is accepted that it is virtually impossible to manufacture a part without error, or in the rare event of a part without error, to be able to proclaim it to be perfect (because the measuring instruments are subject to errors), it is necessary to indicate the maximum errors permitted.① The draughts man must indicate the largest and smallest sizes that can be permitted without the part functioning incorrectly. The extreme dimensions are called the limits of size, and the difference between them is called the tolerance.

The method of indicating, on a drawing, the permitted tolerance depends mainly upon the type of operation involved, but local preference must also be taken into account.②

Fits

Fits are concerned with the relationship between two parts. Consider a shaft and hole combination: if the shaft is larger than the hole, the condition is said to be of interference; and if smaller than the hole, the condition is said to be of clearance.

In order that the precise condition is ensured, the limits of size of both the shaft and the hole must be stipulated.

Fits can be classified as follows: clearance fit, interference fit, and transitional fit.

Hole-based system and shaft-based system

In order to obtain a range of degrees of clearance, and the degrees of interference, it is necessary to use a wide variation of hole sizes and shaft sizes. For example, a manufacturing company could be making a number of parts, all of a nominal 25 mm diameter, but which all slightly different in actual limits of size, to suit the actual fit required by each pair of parts. This situation could mean that a large number of drills, reamers, gauges, etc., were required.

It is logical that, to reduce this number, a standard hole could be used for each nominal

size, and variation of fit be obtained by making the mating shaft smaller or larger than the hole. This is known as a hole-based system.

New Words and Expressions

1. virtually ['vəːtjuəli] *adv.* 事实上，实质上
2. rare [reə] *adj.* 罕见的，稀有的
3. proclaim [prə'kleim] *vt.* 宣布，声明，显示
4. instrument ['instrumənt] *n.* 仪器，工具
5. permit [pə'mit] *v.* 许可，允许，准许
6. draughts man 设计人员
7. extreme [ik'striːm] *adj.* 极限的，极端的
8. preference ['prefərəns] *n.* 偏爱，优先选择
9. combination [kɔmbi'neiʃən] *n.* 组合，配合
10. interference [intə'fiərəns] *n.* 过盈，干涉
11. clearance ['kliərəns] *n.* 间隙
12. precise [pri'sais] *adj.* 精确的，准确的
13. transitional [træn'siʃənəl] *adj.* 过渡的
14. hole-based system 基孔制
15. shaft-based system 基轴制
16. drill [dril] *n.* 钻头
17. reamer ['riːmə] *n.* 铰刀
18. gauge [geidʒ] *n.* 标准尺，规格，量规，量表
19. mate [meit] *v.* 连接，配合
20. depend upon 取决于
21. a range of 一系列的

Notes

① Since it is accepted that it is virtually impossible to manufacture a part without error, or in the rare event of a part without error, to be able to proclaim it to be perfect (because the measuring instruments are subject to errors), it is necessary to indicate the maximum errors permitted.

句中 Since it is accepted … it to be perfect 为原因状语从句，其中 it 是形式主语，真正的主语是 that 引导的主语从句。

译文：要制造一个没有误差的零件，实际上是不可能的，或者即使偶然造出一个没

有误差的零件，但并不表明该零件是绝对正确无误的（因为测量仪器也存在误差）。由于这一点已得到公认，因此有必要注出最大容许误差。

② The method of indicating, on a drawing, the permitted tolerance depends mainly upon the type of operation involved, but local preference must also be taken into account.

句中 indicating 是动名词短语；on a drawing 是介词短语作状语；the permitted tolerance 是动名词 indicating 的宾语。

译文：在图纸上所标注的容许公差主要取决于所采用的加工方法，但还必需考虑到局部优先的原则。

Exercises

A. Translate the following terms into English:

1. 公差　2. 间隙配合　3. 过盈配合　4. 过渡配合　5. 最大极限尺寸　6. 最小极限尺寸　7. 基孔制　8. 基轴制

B. Translate the following paragraph into Chinese:

Since it is impossible to machine a part to an exact size, a designer must specify an acceptable range of sizes that will still permit the part to fit and function as intended. The maximum and minimum sizes in part dimensions that are acceptable are limits between which the actual part dimension must fall. The difference between the maximum and minimum limits is tolerance, or the total amount by which a part dimension may vary. Tolerances on drawings are often indicated by specifying a limit, or by plus and minus notations. With plus and minus tolerance, when the tolerance is both above and below the nominal (true theoretical) size, it is said to be bilateral (two sides). When the tolerance is indicated all on one side of nominal, it is said to be unilateral (one sided).

Reading Material

Dimension Measurement

A machinist is mainly concerned with the measurement of length; that is the distance along a line between two points. It is length that defines the size of most object. Width and depth are simply other names for length. A machinist measures length in the basic units of linear measure such as inches, millimeters, and in advanced metrology wavelengths of light. In addition, the machinist sometimes needs to measure the relationship of one surface to another,