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机械工业出版社精品教材

机电专业英语

第2版

English Course for Mechanical
& Electrical Engineering

徐存善 主编



- ISBN 978-7-111-36466-5
- 策划：王海峰/封面设计：陈沛

地址：北京市百万庄大街22号 邮政编码：100037
电话服务 网络服务
社服务中心：(010)88361066 门户网：<http://www.cmpbook.com>
销售一部：(010)68326294 教材网：<http://www.cmpedu.com>
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读者购书热线：(010)88379203 封面无防伪标均为盗版

定价：32.00元



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English Course for Mechanical & Electrical Engineering (Second Edition)

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本书共五章,分别为机械与模具制造、计算机数控、电子与信息技术、应用技术(前4章共26单元)和职业现场的交际技能训练(第5章共8单元)。前4章每单元包括课文、生词、专业术语、长难句解析、翻译技巧和阅读材料,在第4章各单元的实用英语中,分别用相当篇幅介绍了怎样阅读机电产品的英文说明书、怎样读懂英文招聘广告、怎样用英文写个人简历、求职信等应用文体,以及英语面试过程中的常用技巧。第5章汇编了8单元职业现场的交际对话内容。附录提供了各单元的参考译文、部分习题答案和生词表,以减轻教师备课的负担和学生学习的难度。

本书可作为高职高专现代制造技术、模具制造与设计、机电一体化技术、电子与信息技术、数控技术、机电技术和电气自动化控制等专业的英语教材,也适合继续教育学院应用型本科机电类专业学生学习,并可供专业技术人员学习参考。

为方便教师教学和学生自学两方面的需要,编者精心制作了电子课件,凡使用本书作为教材的教师可登录机械工业出版社教材服务网 www.cmpedu.com 下载。咨询邮箱 cmpgaozhi@sina.com。咨询电话:010-88379375。

图书在版编目(CIP)数据

机电专业英语/徐存善主编. —2版. —北京:机械工业出版社,2011.11
高职高专“十二五”规划教材
ISBN 978-7-111-36466-5

I. ①机… II. ①徐… III. ①机电工业—英语—高等职业教育—教材
IV. ①H31

中国版本图书馆CIP数据核字(2011)第234400号

机械工业出版社(北京市百万庄大街22号 邮政编码100037)

策划编辑:王海峰 责任编辑:王海峰 杨茜

版式设计:张世琴 责任校对:纪敬

封面设计:陈沛 责任印制:乔宇

北京瑞德印刷有限公司印刷(三河市胜利装订厂装订)

2012年2月第2版第1次印刷

184mm×260mm·17.5印张·429千字

0001—3000册

标准书号:ISBN 978-7-111-36466-5

定价:32.00元

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前 言

随着科技进步和社会的发展,我国对专业人才英语能力的要求越来越高。理工科学生除了具有一定的听说能力以外,还应掌握一定的本专业基本词汇,具有阅读本专业英文技术资料 and 进行专业交流的能力。机电类专业作为当今世界发展最迅速、技术更新最活跃的领域之一,我国在该领域注重引进世界先进技术和设备,同时要发展和创造更多的外向型经济,因此该领域对具有专业英语能力的人才需求比以往任何时候都更加迫切。为了更好地培养学生的专业外语能力,促进具有国际竞争力的人才培养,我们根据 21 世纪高职高专机电类专业最新教学大纲,在积累多年教学经验的基础上,对初版教材进行了修订,力求按专业培养的宽口径,使专业英语教材具有良好的通用性,并遵照高等技术教育的应用性特征,使机电专业英语具有较强的实用性和针对性,在内容上力求通俗易懂、简明扼要、便于教学和自学。

全书共 5 章,分别为机械与模具制造、计算机数控、电子与信息技术、应用技术(前 4 章共 26 单元)和职业现场的交际技能训练(第 5 章共 8 单元)。前 4 章每单元均包括课文、生词、专业术语、长难句解析、翻译技巧和阅读材料。在第 4 章的实用英语中,分别用相当篇幅介绍了怎样阅读机电产品的英文说明书、怎样读懂英文招聘广告、怎样用英文写个人简历、求职信等应用文体以及英语面试过程中的常用技巧。第 5 章汇编了 8 单元职业现场的交际对话内容,目的是培养学生在一定场景下用英语进行专业交流的能力。附录提供了各单元的参考译文与部分习题答案(为了培养学生的独立阅读能力,部分阅读材料的参考译文与答案将在电子教案中给出,这里充分考虑到方便教学和学生自学与独立能力培养的需要)和生词表。

编者认为:在经济全球化、文化全球化的形势下,学好专业英语显得更为重要。拥有熟练的专业技术加上优良的专业英语无疑就是高技能紧缺人才。为此编者在编写本书的过程中力求在最大程度上减轻学生学习中的困难,在生词表的配备和课后注释、翻译技巧等方面搭建方便学习的平台。教师应以饱满的热情激励学生努力争取优异的专业英语成绩,从而增强学生在就业竞争中的优势。

本书可作为高职高专现代制造技术、模具制造与设计、机电一体化技术、电子与信息技术、数控技术、机电技术和电气自动化控制等专业的英语教材,也适合于继续教育学院应用型本科机电类专业学生学习,并可供专业技术人员学习参考。建议教师根据各专业学生的情况,可不受教材编排顺序的限制,进行适当的删选。部分授课学时偏少的院校,可选学其中约 15 个单元的内容,每单元参考学时为 2~3 学时。对教师在授课中没有选入的单元,学生可根据自己的兴趣或需要自学该部分内容,以拓宽专业英语的知识面。

本书由河南工业职业技术学院徐存善副教授任主编。编写分工为:徐存善编写第 1~6 单元和附录 B,程国红编写第 7~10 单元,陈睿编写第 11 单元,罗奕君编写第 12 单元,段峰松编写第 13~14 单元,翟艳编写第 15 单元,苏峥编写第 16 单元,陶晋宇编写第 17~18 单元,党菲菲编写第 19~21 单元,胡凤菊编写第 22~23 单元,杨晓磊编写第 24~26 单元,蒋志豪编写第 5 章。附录 A 中的参考译文与习题答案由各单元相应的编者提供。

为了方便老师教学,本书配有电子课件,需要者可以登录机械工业出版社教材服务网 www.cmpedu.com 下载。

本书的编审工作得到编者所在院校领导的高度重视和大力支持,齐智英教授、唐建生教授、韩全立教授对本书的编写提出了宝贵意见,在此表示衷心的感谢。

由于编者的水平和经验有限,书中难免有缺点和错误,恳请广大读者批评指正。

编 者

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Chapter I Machinery & Mold Manufacturing

Unit 1 Engineering Materials

Text

In the design and manufacture of a product, it is essential that the material and the process be understood. ^[1] Materials differ widely in physical properties, machinability characteristics, methods of forming, and possible service life. The designer should consider these facts in selecting an economical material and a process that is best suited to the product. ^[2]

Engineering materials are of two basic types: metallic or nonmetallic. Nonmetallic materials are further classified as organic or inorganic substances. Since there is an infinite number of nonmetallic materials as well as pure and alloyed metals, considerable study is necessary to choose the appropriate one. ^[3]

Few commercial materials exist as elements in nature. For example, the natural compounds of metals, such as oxides, sulfides, or carbonates, must undergo a separating or refining operation before they can be further processed. Once separated, they must have an atomic structure that is stable at ordinary temperatures over a prolonged period. In metal working, iron is the most important natural element. Iron has little commercial use in its pure state, but when combined with other elements into various alloys it becomes the leading engineering metal. The nonferrous metals, including copper, tin, zinc, nickel, magnesium, aluminum, lead, and others all play an important part in our economy; each has specific properties and uses.

Manufacturing requires tools and machines that can produce economically and accurately. Economy depends on the proper selection of the machine or process that will give a satisfactory finished product, its optimum operation, and maximum performance of labor and support facilities. ^[4] The selection is influenced by the quantity of items to be produced. Usually there is one machine best suited for a certain output. In small-lot or job shop manufacturing, general-purpose machines such as the lathe, drill press, and milling machine may prove to be the best because they are adaptable, have lower initial cost, require less maintenance, and possess the flexibility to meet changing conditions. ^[5] However, a special-purpose machine should be considered for large quantities of a standardized product. A machine built for one type of work or operation, such as the grinding of a piston or the surfacing of a cylinder head, will do the job well, quickly, and at low cost with a semi-skilled operator.

Many special-purpose machines or tools differ from the standard type in that they have built into them some of the skill of the operator. A simple bolt may be produced on either a lathe or an automatic screw machine. The lathe operator must know not only how to make the bolt but must also be sufficiently skilled to operate the machine. On the automatic machine the sequence of operations and movements of tools are controlled by cams and stops, and each item produced is identical with the previous one. This “transfer of skill” into the machine, or automation, allows less skillful operators but does require greater skill in supervision and maintenance. Often it is uneconomical to make a machine completely automatic, because the cost may become prohibitive.

The selection of the best machine or process for a given product requires knowledge of production methods. Factors that must be considered are volume of production, quality of the finished product, and the advantages and limitations of the equipment capable of doing the work. Most parts can be produced by several methods, but usually there is one way that is most economical.

New Words and Phrases

- machinability [məʃɪnəˈbɪləti] n. 可加工性, 可切削性, 机械加工性
 characteristic [ˌkærəktəˈrɪstɪk] adj. 典型的, 特有的 n. 特征, 特性
 metallic [məˈtælik,] adj. 金属的, 含金属的 n. 金属纤维
 nonmetallic [ˌnɒnməˈtælik] adj. 非金属的 n. 非金属物质
 organic [ɔːˈɡænik] adj. 有机的, 组织的, 器官的
 infinite [ˈɪnɪnət] adj. 无穷的, 极大的 n. 无限, 无穷大
 alloyed [ˈælɔɪd] adj. 合金的; 合铸的; 熔合的 vt. 将……铸成合金
 appropriate [əˈprəʊpriət, əˈprɒpriət] adj. 适当的, 合适的 vt. 占用, 拨出
 commercial [ˈkəʊməʃl] adj. 商业上的, 商业的 n. 商业广告
 compound [ˈkɒmpaʊnd] n. 化合物 vt. 合成 vi. 和解 adj. 复合的
 oxide [ˈɒksaɪd] n. 氧化物, 氧化层, 氧化合物
 sulfide [ˈsʌlfʔd] n. 硫化物, 含硫系列, 硫醚
 carbonate [ˈkɑːbəneɪt] n. 碳酸盐 vt. 使充满二氧化碳, 使变成碳酸盐
 undergo [ˌʌndəˈɡəʊ] vt. 经历, 经受; 忍受
 prolonged [prəˈlɒŋd] adj. 延长的, 拖延的, 持续很久的
 iron [ˈaɪən] n. 铁, 熨斗; 烙铁 adj. 铁的; 刚强的
 optimum [ˈɒptɪmə] n. 最佳效果, 最适合条件 adj. 最适宜的
 flexibility [ˌfleksəˈbɪləti] n. 机动性, 灵活性, 适应性
 cam [kæm] n. 凸轮, 偏心轮 vt. 给(机器)配置偏心轮
 supervision [ˌsjuːpəˈvɪʒn] n. 监督, 管理; 指导

Technical Terms

- physical properties 物理性质
 nonferrous metal 有色金属
 small-lot 小批量

general-purpose 普通用途

special-purpose 专用的, 特殊用途的

standardized product (工程设计) 标准化产品

Notes

1. In the design and manufacture of a product, it is essential that the material and the process be understood.

译文: 在产品的设计和加工过程中, 对材料和加工工序进行充分了解是非常必要的。

说明: 句中 it 是形式主语, 真正的主语是 that the material and the process be understood.

2. The designer should consider these facts in selecting an economical material and a process that is best suited to the product.

译文: 设计师应该在选择最适合产品的经济性材料和加工工序时考虑到上述因素。

说明: 句中 that is best suited to the product 作定语从句修饰 an economical material and a process.

3. Since there is an infinite number of nonmetallic materials as well as pure and alloyed metals, considerable study is necessary to choose the appropriate one.

译文: 由于非金属材料与纯金属和合金的种类一样繁多, 所以在选择合适的材料时需要做大量的研究工作。

说明: 句中 as well as 和……一样, Since there is an infinite number of... 作原因状语从句, to choose the appropriate one 作目的状语。

4. Economy depends on the proper selection of the machine or process that will give a satisfactory finished product, its optimum operation, and maximum performance of labor and support facilities.

译文: 要达到经济性要求, 就要选择合适的设备和工序, 这样可以得到理想的产品, 还要有最佳的操作、高效的人工执行和设备支持。

说明: 句中 depend on 取决于, 依赖于; that will give a satisfactory... 为定语从句, 修饰 process, its optimum operation, and maximum... 作 depends on 的并列宾语。

5. In small-lot or job shop manufacturing, general-purpose machines such as the lathe, drill press, and milling machine may prove to be the best because they are adaptable, have lower initial cost, require less maintenance, and possess the flexibility to meet changing conditions.

译文: 对于小批量或单件生产, 通用机器如车床、钻床和铣床是最好的选择, 因为它们适应性强, 生产费用低, 维护简便, 能灵活适应条件的改变。

说明: 句中 such as 例如, because 引导原因状语从句, they are adaptable..., 是并列成分, 即 they are adaptable, they have..., they require..., they possess...。

Exercises

I. Fill in the blanks according to the text with the words given below. Make changes if necessary.

metallic, alloy, special-purpose, pure, fact, general-purpose, result, nonmetallic, standard

1. The designer should consider these _____ in selecting an economical material and a process that is best suited to the product.
2. _____ materials are further classified as organic or inorganic substances.
3. Iron has little commercial use in its _____ state, but when combined with other elements into various _____ it becomes the leading engineering metal.
4. Many _____ machines or tools differ from the _____ type in that they have built into them some of the skill of the operator.

II. Translate the following into English.

1. 材料在物理性能、机加工性能、成形方法以及使用寿命等方面有很大不同。
2. 天然金属化合物如氧化物、硫化物和碳酸盐在能够进行深加工前必须经过分离或提纯。
3. 在自动机床上, 工具的操作顺序和运动是由凸轮和制动器来控制的, 并且每一零件的生产过程都与前一个过程相同。

Translating Skills:

科技英语翻译的标准与方法

翻译是一种再创造, 即译者根据原作者的思想, 用另一种语言表达出来。这就是要求译者必须确切理解和掌握原作的内容与含意, 在确切理解的基础上, 很好地运用译文语言把原文内涵通顺流畅地再现给读者。

一、翻译的标准

科技英语的翻译标准可概括为“忠实、通顺”四个字。

忠实, 首先指忠实于原文内容, 译者必须把原作的内容完整而准确的表达出来, 不得任意发挥或增删; 忠实还指保持原作风格, 尽量表现其本来面目。

通顺, 即指译文语言必须通俗易懂, 符合规范。

忠实与通顺是相辅相成的, 缺一不可。忠实而不通顺, 读者会看不懂; 通顺而不忠实, 脱离原作的内容与风格, 通顺就失去了意义。例如:

1. The electric resistance is measured in ohms.

误译: 电的反抗是用欧姆测量的。

正译: 电阻的测量单位是欧姆。

2. All metals do not conduct electricity equally well.

误译: 全部金属不导电得相等好。

正译: 并非所有的金属都同样好地导电。

3. The moment the circuit is completed, a current will start flowing the coil.

正译: 电路一旦接通, 电流开始流向线圈。

4. Some special alloy steels should be used for such parts because the alloying elements make them tougher, stronger, or harder than carbon steels.

正译: 对这类零件可采用某些特殊的合金钢, 因为合金元素能提高钢的韧性、强度、硬度。

从以上例句可以清楚地看到,不能任意删改,并不是逐词死译;汉语译文规范化,并非是离开原文随意发挥。此外,还应注意通用术语的译法。比如,例1中的“电阻”已成为固定词组,不能用别的译法。

二、翻译的方法

翻译的方法一般来说有直译(literal translation)和意译(free translation)。直译,即指“既忠实于原文内容,又忠实于原文的形式”的翻译。意译,就是指忠实于原文的内容,但不拘泥于原文的形式。

翻译时,我们应灵活运用上述两种方法,能直译的就直译,需要意译的就意译。因为对同一个句子来说,有时并非只能用一种方法,所以我们可以交替使用或同时并用以上两种方法。

请看下面的句子:

1. Milky Way 银河(意译)(不可直译为:牛奶路)

2. bull's eye 靶心(意译)(不可直译为:牛眼睛)

3. New uses have been found for old metals, and new alloys have been made to satisfy new demands. 老的金属有了新用途,新的金属被冶炼出来,以满足新的需要(本句前半部分用了意译法,后半部分用了直译法)。

4. The ability to program these devices will make a student an invaluable asset to the growing electronic industry. 对这些器件编程的能力将使学生成为日益增长的电子工业领域中的无价人才(这里 asset 原意为资产,我们根据上下文意译成“人才”)。

三、翻译中的专业性特点

科学技术本身的性质要求科技英语与专业内容相互配合,相互一致,这就决定了专业英语与普通英语有很大的差异。专业英语以其独特的语体,明确表达作者在其专业方面的见解,其表达方式直截了当,用词简练。即使同一个词,在不同学科的专业英语中,其涵义也是不同的。例如:

1. The computer took over an immense range of tasks from workers muscles and brains.

误译:计算机代替了工人大量的肌肉和大脑。

正译:计算机取代了工人大量的体力和脑力劳动(这里 muscles and brains 引申为“体力和脑力劳动”)。

2. In any case work doesn't include time, but power does.

正译:在任何情况下,功不包括时间,但功率包括时间(这里 work, power 在物理专业分别译为“功”、“功率”)。

3. Like charges repel each other while opposite charges attracted.

正译:同性电荷相排斥,异性电荷相吸引(charge 含义有“负载、充电、充气、电荷”,按专业知识理解为“电荷”)。

从以上例句可知,专业英语专业性强,逻辑性强,翻译要力求准确、精练、正式。这不仅要求我们能熟练地运用汉语表达方式,还要求具有较高的专业水平。

Reading: Ferrous and Non-ferrous Materials

Metals are found everywhere in our life. They are classified into two categories, “ferrous” and

“non-ferrous” metals. Ferrous means relating to, or containing iron and non-ferrous means having no iron. These two kinds of metals can be used to manufacture an equally large range of items.

Table 1-1 Some ferrous metals and properties

Name	Alloy of	Properties	Uses
Mild steel	Carbon 0.1% ~ 0.3% Iron 99.9% ~ 99.7%	Tough. High tensile strength. Can be case-hardened. Rusts very easily	Most common metal used in school workshops Used in general metal products and engineering
High carbon steel	Carbon 0.6% ~ 1.4% Iron 99.4% ~ 98.6%	Tough. Can be hardened and tempered	Cutting tools such as drills
Stainless steel	Iron, nickel and chromium	Tough, resistant to rusting and staining	Cutlery, medical instruments
Cast iron	Carbon 2% ~ 6% Iron 98% ~ 94%	Strong but brittle. Comprehensive strength very high	Castings, manhole covers engines
Wrought iron	Almost 100% iron	Fibrous, tough, ductile, resistant to rusting	Ornamental gates and railings, not in much use today

Table 1-2 Some non-ferrous metals and properties

Name	Colour	Alloy of	Properties	Uses
Copper	Reddish brown	Not an alloy	Ductile, can be beaten into shape. Conducts electricity and heat	Electrical wiring, tubing, kettles, bowls, pipes
Brass	Yellow	Mixture of copper and zinc. 65% -35% most common ratio	Hard. Casts and machines well. Surface tarnishes. Conducts electricity	Parts for electrical fittings, ornaments
Aluminum	Light grey	Aluminum 95% Copper 4% Manganese 1%	Ductile, soft, malleable, machines well. Very light	Window frames, aircraft, kitchen ware
Silver	Whitish grey	Mainly silver but alloyed with copper to give sterling silver	Ductile, malleable, solders, resists corrosion	Jewelry, solders, ornaments
Lead	Bluish grey	Not an alloy	Soft, heavy, ductile, loses its shape under pressure	Solders, Pipes, batteries, roofing

New Words and Phrases

ferrous [ˈferəs] adj. [化] 亚铁的; 铁的, 含铁的

category [ˈkætigəri] n. 种类, 分类; 范畴

case-hardened adj. 表面硬化的; 定型的; 无情的

temper [ˈtempə] n. 脾气; (钢等) 回火; 性情; 倾向 vt. 调和; 使回火

stain [steɪn] vt. 沾污; 给……着色 vi. 污染; 沾污 n. 污点; 瑕疵
cutlery ['kʌtləri] n. 餐具; 刀剑制造业; 刀叉餐具
chromium ['krəʊmiəm] n. [化] 铬 (24 号元素, 符号 Cr)
brittle ['brɪtl] adj. 易碎的, 脆弱的; 易生气的
casting ['kɑ:stɪŋ] n. 投掷; 铸造; 铸件 v. 投掷; 铸造; 投向; 扔掉
manhole ['mænhəʊl] n. 人孔; 检修孔; 检查井
wrought [rɔ:t] adj. 锻造的; 加工的; 精细的
tubing ['tju:biŋ] n. 管子; 装管 vi. 把……装管; 使成管状
zinc [zɪŋk] vt. 镀锌于……; 用锌处理 n. 锌
ornament ['ɔ:nəmənt] n. 装饰; 装饰物; 教堂用品 vt. 装饰, 修饰
fibrous ['faɪbrəs] adj. 纤维的, 纤维性的; 纤维状的
ductile ['dʌktail, 'dʌktil] adj. 易教导的; 易延展的; 柔软
malleable ['mæliəbl] adj. 可锻的; 有延展性的; 易适应的; 可塑的
aluminium [ælju'miniəm] adj. 铝的 n. 铝
manganese ['mæŋgəni:s, 'mæŋgə'ni:z] n. [化] 锰
tarnish ['tɑ:nɪʃ] n. 污点; 无光泽 vt. & vi. 沾污; 使……失去光泽
whitish ['hwaɪtɪʃ] adj. 带白色的; 发白的
sterling ['stɜ:liŋ] adj. 英币的; 纯正的; 纯银制的 n. 英国货币; 标准纯银
solder ['sɒldə] vi. 焊接起来 vt. 焊接; 使连接在一起 n. 钎料; 接合物
bluish ['blu:ɪʃ] adj. 带蓝色的, 有点蓝的

Exercises

Scan the tables again to find the following facts and translate them into Chinese.

1. a ferrous metal used to make cutting tools
2. a non-ferrous metal used to make parts for electrical fittings
3. a ferrous metal used to make cutlery and medical instruments
4. a non-ferrous metal used to make electrical wiring
5. a metal used to make manhole covers
6. a non-ferrous metal used to make aircraft

Unit 2 Machine Elements

Text

However simple, any machine is a combination of individual components generally referred to as machine elements or parts. Thus, if a machine is completely dismantled, a collection of simple parts remains such as nuts, bolts, springs gears, cams and shafts—the building block of all machinery.^[1] A machine element is, therefore, a single unit designed to perform a specific function and capable of combining with other elements. Sometimes certain elements are associated in pairs,^[2] such as nuts and bolts or keys and shafts. In other instance, a group of elements is combined to form a subassembly, such as bearings, couplings, and clutches.

The most common example of a machine element is a gear, which, fundamentally, is a combination of the wheel and the lever to form a toothed wheel. The rotation of this gear on a hub or shaft drives other gears that may rotate faster or slower, depending upon the number of teeth on the basic wheels.^[3]

Other fundamental machine elements have evolved from wheel and lever. A wheel must have a shaft on which it may rotate. The wheel is fastened to the shafts with couplings. The shaft must rest in bearings, may be turned by a pulley with a belt or a chain connecting it to a pulley on a second shaft. The supporting structure may be assembled with bolts or rivets or by welding.^[4] Proper application of these machine elements depends upon knowledge of the force on the structure and the strength of the materials employed.

The individual reliability of machine elements becomes the basis for estimating the overall life expectancy of a complete machine.

Many machine elements are thoroughly standardized. Testing and practical experience have established the most suitable dimensions for common structural and mechanical parts. Through standardization, uniformity of practice and resulting economics are obtained. Not all machine parts in use are standardized, however. In the automotive industry only fasteners, bearings, bushings, chains, and belts are standardized. Crankshafts and connecting rods are not standardized.

New Words and Phrases

combination [ˌkɒmbɪˈneɪʃən] n. 组合, 结合

individual [ˌɪndɪˈvɪdʒuəl] adj. 单独的, 各个的, 个别的, 特殊的

component [kəmˈpəʊnənt] n. 元件, 构件, 部件

dismantle [dɪsˈmæntl] vt. 分解 (机器), 拆开, 拆卸

assemble [əˈseɪbl] v. 安装, 装配, 组合; 集合, 集中 n. 组件

nut [nʌt] n. 螺母; 难对付的人; 难解的问题; 坚果 vi. 采坚果