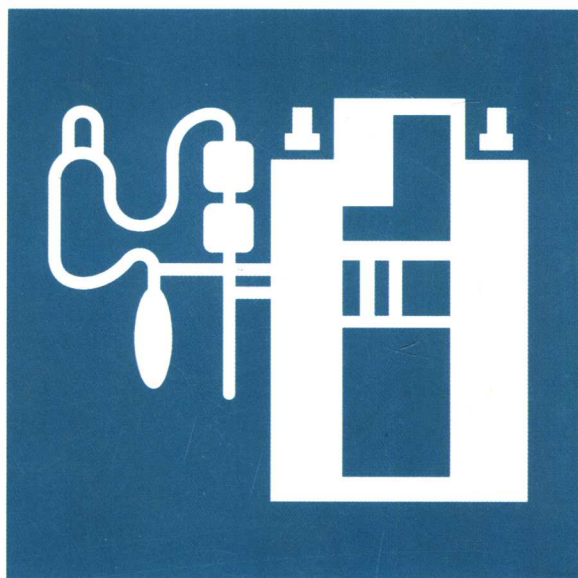


全国职业院校

数控加工专业教材
电器维修专业教材
专业英语系列教材

机电英语

MECHATRONIC ENGLISH



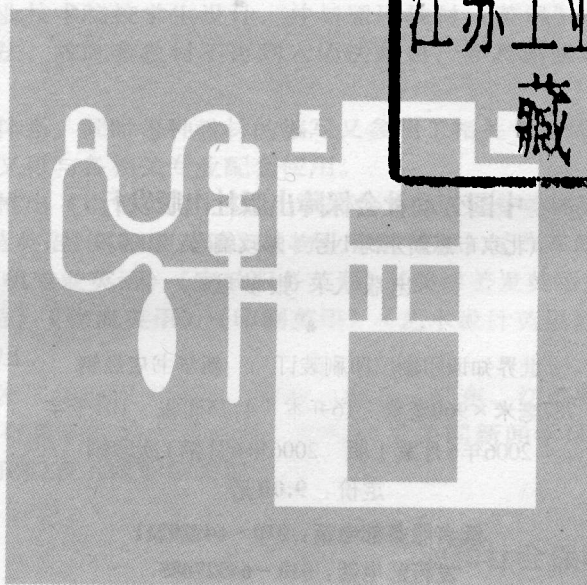
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中国劳动社会保障出版社

图书在版编目(CIP)数据

机电英语/王建萍主编. —北京: 中国劳动社会保障出版社, 2006
全国职业技术学院专业英语系列教材
ISBN 7-5045-5720-X

I. 机… II. 王… III. 机电工程-英语-专业学校-教材 IV. H31

中国版本图书馆 CIP 数据核字(2006)第 070128 号

中国劳动社会保障出版社出版发行

(北京市惠新东街 1 号 邮政编码: 100029)

出版人: 张梦欣

*

世界知识印刷厂印刷装订 新华书店经销

787毫米×960毫米 16开本 4.75印张 101千字

2006年6月第1版 2006年6月第1次印刷

定价: 9.00元

读者服务部电话: 010-64929211

发行部电话: 010-64927085

出版社网址: <http://www.class.com.cn>

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举报电话: 010-64911344

前 言

随着我国社会主义市场经济的进一步发展,特别是入世以后,越来越多的企业对技术工人的专业外语水平提出了较高的要求,因此,专业英语已成为学生们参与就业竞争,以及今后从业后在工作中所必需的工具之一。为适应这一需要,我们组织编写了这套专业英语教材,并在编写过程中坚持了以下原则:

第一,与专业紧密结合,根据专业需要设置单元内容,力求收录各专业最新、最实用的词汇和用语,并注意在选材时降低相关专业知识的难度,使教材既突出专业特色,又能充分体现英语教学的规律。

第二,根据不同专业对英语教学的要求,教材在单元设置中阅读和口语各有侧重,如《饭店服务英语》《商品经营英语》《文秘英语》等侧重口语,而《电工英语》《电子英语》《机械英语》等则侧重阅读。对专业性较强的部分教材还给出了阅读部分的译文,以方便师生的教与学。

第三,教材在内容上注重选材新颖实用,力求采用地道的英语表达;在形式上注重生动活泼,图文并茂。

本套教材为职业技术学院学生设计,并与通用教材《英语》相配套。考虑到通用英语教材中已讲授语法,故此套教材不再列入语法条目,涉及语法难点时在“注释”中予以讲解。

本套教材自成体系,同时每种教材的编写又参照了相关专业的教学计划和主要专业课程的教学大纲,故又可与各相关专业配套使用。

本套教材现已推出《电子英语》《会计英语》《饭店服务英语》《烹饪实用英语》《文秘英语》《商品经营英语》《服装英语》《物业管理英语》《汽车维修英语》《机械英语》《电工英语》《计算机专业英语》《家政服务英语》《美容美发英语》《市场营销英语》《机电英语》《建筑英语》《物流英语》《印刷英语》《艺术设计英语》等20种,今后还将根据专业需要继续推出。

此次教材的开发工作得到了北京、湖南、湖北、广东、江苏等省(市)劳动和社会保障厅(局)以及有关学校的大力支持,并得到了美国新闻学硕士 Mr. Michael Connolly 的大力帮助,对此我们表示诚挚的谢意。

劳动和社会保障部教材办公室

2006年6月

简介

本书可供全国职业技术学院数控加工专业和电器维修专业使用。本书共15课，分别介绍了与机电一体化设计、加工密切相关的内容，每课包括课文、词汇、注释和练习。本书内容丰富，通俗易懂；形式活泼，图文并茂。

本书也适合作为职业培训教材和自学用书。

本书由深圳高级技工学校王建萍、李瑞编写，王建萍主编。

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Unit 1

Mechatronics¹

Dialogue

John: Could you tell me something about “Mechatronics”?²

Mary: Sure. Mechatronics is a term for the integration of mechanical and electronic engineering.

John: It sounds like a new concept.

Mary: I don't think so.³ In fact, mechatronics was coined by the Japanese 40 years ago and has been widely used in the world for many years. And mechatronic devices have become common in our society.

John: You mean mechatronic devices have crept into our everyday life?

Mary: Right. Don't you notice that the devices such as photocopiers, computer disk drives, robots and clothes dryers are being used in our daily life?

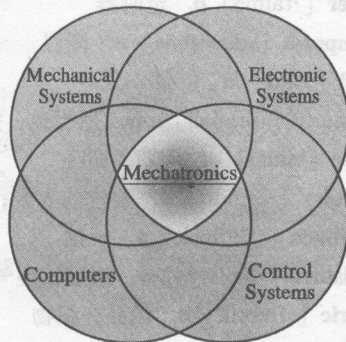
John: I've got it.⁴ I didn't know they were mechatronic devices before.

Reading

Getting a Hold on Mechatronics

Mechatronics is a blend of mechanics and electronics. It has come to mean the synergistic use of mechanical engineering, control theory, computer science, and sensor and actuator technology to design improved products and processes.⁵

The standard clothes dryer is typically controlled by a mechanical timer. The user adjusts the timer according to the size and dampness of the load. If the timing device is not set properly, the drying cycle may be too short and the laundry may come out wet, or the machine could run long and waste energy.



A clothes dryer, however, might be fitted with a sensor-based feedback system that lets the machine measure the moisture content of the fabrics or the exhaust air, and turn itself off when the load is dry.⁶ Operating performance is enhanced and energy use is lowered as a result.⁷ The redesigned dryer might even be cheaper to buy, depending on the cost of the components that comprise the electromechanical control system.



Words and Expressions

mechatronics [mekəˈtrɒniks] *n.* 机电一体化

integration [ˌɪntɪˈgreɪʃən] *n.* 综合, 集合

mechanical [miˈkænikl] *adj.* 机械的, 机械制的

electronic [ilekˈtrɒnik] *adj.* 电子的

concept [ˈkɒnsept] *n.* 观念, 概念

coin [kɔɪn] *vt.* 杜撰, 设计 (新单词或短语)

device [diˈvaɪs] *n.* 装置, 设备

common [ˈkɒmən] *adj.* 大量的, 常见的

creep [kri:p] *vi.* 蹑手蹑脚

creep into 悄悄地进入

photocopier [ˈfəʊtəʊkəpiə(r)] *n.* 复印机

blend [blend] *n.* 混合 *vt.* 混合

synergistic [ˌsɪnəˈdʒɪstɪk] *adj.* 综合的

sensor [ˈsensə] *n.* 传感器

actuator [ˈæktʃueɪtə] *n.* 执行机构

timer [ˈtaɪmə] *n.* 定时器

dampness [ˈdæmpnis] *n.* 潮湿

load [ləʊd] *n.* 负荷

properly [ˈprɒpəli] *adv.* 适当地, 完全地

cycle [ˈsaɪkl] *n.* 周期, 循环

laundry [ˈləʊndri] *n.* 要洗的衣服; 洗衣店

feedback [ˈfiːdbæk] *n.* 反馈

moisture [ˈmoɪstʃə] *n.* 湿度, 湿气

fabric [ˈfæbrɪk] *n.* 织品, 织物

exhaust [ɪgˈzɔːst] *n.* 排气 *vi.* 排气

enhance [inˈhɑːns] *vt.* 提高, 增强
redesign [ˌriːdiːzain] *v.* 重新设计
component [kəmˈpəʊnənt] *n.* 成分, 元件, 组成
comprise [kəmˈpraɪz] *v.* 包含, 由……组成
electromechanical [iˌlektərəumiˈkænikəl] *adj.* 机电的

Technical Terms

clothes dryer 干衣机, 烘干机
synergistic use 综合应用
mechanical engineering 机械工程 (学)

Notes

1. 机电一体化是在信息论、控制论和系统论的基础上建立起来的综合技术。一个完整的机电一体化系统, 一般包括计算机、传感器、传动系统、执行机构等部分。机电一体化的发展经历了四个过程: (1) 数控机床的问世, 写下了机电一体化历史的第一页; (2) 微电子技术为机电一体化带来勃勃生机; (3) 可编程序控制器、电力电子等的发展为机电一体化提供了坚实的基础; (4) 激光技术、模糊技术、信息技术等新技术使机电一体化跃上新台阶。

2. Could you tell me something about “Mechatronics”? 你能告诉我一些“机电一体化”的情况吗?

这里疑问句中用 something 表示希望得到对方肯定的回答。另外还有:

Would you like some tea?

3. I don't think so. 我想不是这样。

in hope, believe, imagine, suppose, guess, think 等动词以及 I'm afraid 等表达法的后面可用 so 代替一个宾语从句, 该宾语从句通常是上文提到的一件事。例如:

——Do you think we will have good weather? 你认为我们会有好天气吗?

——I hope so. 我希望如此。

其否定形式可用上述动词的否定式 (hope 除外), 或者用 “not” 代替 “so”。例如:

I don't think so. (I think not.)

I'm afraid not. 恐怕不是这样。

[注] hope 常用第二种否定形式, 即 I hope not. 我不希望这样。

4. I've got it. = got it. 知道了。

例如: I don't get (懂) it. Why did he do that? 我不明白。他为什么会那么做?

5. Mechatronics is a blend of mechanics and electronics. It has come to mean the synergistic use of mechanical engineering, control theory, computer science, and sensor and actuator technology to design improved products and processes. 机电一体化是机械和电子的结合, 意指综合应用机械工程学、控制原理、计算机科学、传感器和执行机构等技术进行改良产品和工序的设计。

6. A clothes dryer, however, might be fitted with a sensor-based feedback system that lets the machine measure the moisture content of the fabrics or the exhaust air, and turn itself off when the load is dry.

that 引导一定语从句修饰先行词 system, when 引导一时间状语从句。however 也可位于句首。

be fitted with 安装, 装配

7. Operating performance is enhanced and energy use is lowered as a result.

as a result 因此	as a result of 由于
As a result, he was given an excellent job.	The flight was delayed as a result of fog.

Exercises

I Oral Practice

1. Introduce the working principle (原理) of clothes dryer briefly.
2. Make a dialogue and practice with your partner.

II Are the following statements true or false according to the text?

1. Mechatronics is an integration of mechanics and electronics.
2. Mechatronics has been widely used 40 years before.
3. Mechatronic devices are all fitted with a sensor-based feedback system.
4. The standard clothes dryer is typically controlled by a sensor.
5. The cheaper the redesigned dryer is, the lower the cost of the components that comprise the mechatronic control system is.

III Translation

1. Mechatronics is a term for the integration of mechanical and electronic engineering.
2. Mechatronic devices have become common in our society.
3. Don't you notice that the devices such as photocopiers, computer disk drives, robots are being used in our daily life?
4. The user adjusts the timer according to the size and dampness of the load.
5. The redesigned dryer might even be cheaper to buy, depending on the cost of the components that comprise the electromechanical control system.

Unit 2

Sensors¹

Dialogue

John: May I ask you some questions about sensors?

Mary: Sure. Go ahead, please.²

John: What is a sensor?

Mary: As far as I know³, a sensor is a device for discovering the presence of a small amount of light, heat, sound, etc.

John: How does it work?

Mary: It usually converts what it discovers to an electrical signal.

John: It is said that there are many types of sensors available today.⁴ But how to select a right sensor?

Mary: You need to know the type of motion, precision of motion, magnitude of motion and operating conditions.⁵

John: Thank you for so much information. I've really learned a lot from your words.⁶

Mary: That's my pleasure.

Reading

Application of Sensors

Look at the following pictures and try to understand the application of sensors.

Industrial Sensors

- Proximity
 - Mechanical
 - Optical
 - Inductive/Capacitive
- Position/Velocity
 - Potentiometer
 - LVDT
 - Encoders
 - Tachogenerator
- Force/Pressure
- Vibration/Acceleration



Example Applications

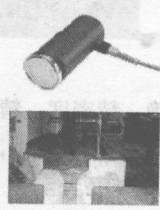
Car Wash Application



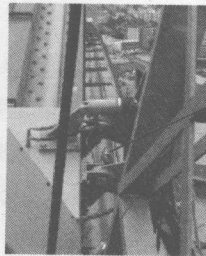
Paper Roll Thickness Monitor



Waste Water Flow Volume



Example Inductive Sensors I



Detection of open/close functions.
Detection of rotation.


Inductive and Capacitive Proximity Sensors


- Inductive sensors use change in local magnetic field to detect presence of metal target
- Capacitive sensors use change in local capacitance caused by non-metallic objects
- Generally short ranges only
- Regarded as very robust and reliable

Example Inductive Sensors II

Detect presence of object without contact.
Range 3mm +/-10%.




precision [priːʒən] *n.* 精确, 精密度, 精度
magnitude [ˈmægniːtjuːd] *n.* 量级, 大小, 数量
application [ˌæpliːkeɪʃən] *n.* 应用, 运用
proximity [prɒkˈsimiti] *n.* 接近
optical [ˈɒptikəl] *adj.* 光学的
inductive [inˈdʌktɪv] *adj.* 电感的, 感应的
capacitive [kəˈpæsɪtɪv] *adj.* 电容的
position [pəˈzɪʃən] *n.* 位置 *vt.* 定位
velocity [viːləsɪti] *n.* 速度, 速率
potentiometer [pəˈtenʃiːɒmɪtə] *n.* 电位计, 分压计
encoder [inˈkəʊdə] *n.* 编码器, 译码器
tachogenerator [ˈtækəˌdʒenəreɪtə] *n.* 转速表传感器
vibration [vaiˈbreɪʃən] *n.* 振动
acceleration [ækˌseləˈreɪʃən] *n.* 加速度
monitor [ˈmɒnɪtə] *n.* 监视器, 监控器
volume [ˈvɒljʊm] *n.* 量; 体积, 容积
rotation [rəʊˈteɪʃən] *n.* 旋转
magnetic [mæɡˈnetɪk] *adj.* 磁的, 有磁性的
metal [ˈmetl] *n.* 金属
target [ˈtɑːɡɪt] *n.* 目标
capacitance [kəˈpæsɪtəns] *n.* 电容
metallic [miˈtælək] *adj.* 金属(性)的
robust [rəˈbʌst] *adj.* 坚固的, 耐用的; 精力充沛的


electrical signal 电信号

proximity sensor 接近传感器

LVDT (liner variable-differential transformer) 线性可变差接(差动)变压器

force/pressure sensor 压力传感器

vibration/acceleration sensor 振动/加速度传感器

car wash application 洗车装置

paper roll thickness monitor 滚筒纸厚度监测

waste water flow volume 废水流量

inductive sensor 电感传感器

magnetic field 磁场

capacitive sensor 电容传感器



1. sensor (传感器) 是信息采集系统的首要部件, 是实现现代化测量和自动化控制 (包括遥感、遥测和遥控) 的主要环节, 是现代化信息产业的源头, 又是信息社会赖以存在和发展的物质与技术基础。传感器技术与信息技术、计算机技术已成为支撑整个现代信息产业的三大支柱。目前, 从宇宙探索、海洋开发、环境保护、灾情预报到包括生命科学在内的每一项现代科学技术的研究以及人民群众的日常生活等, 几乎无一不与传感器和传感器技术紧密联系着。

2. Go ahead, please. 请讲。

go ahead (with something) 开始做某事

例如: ——May I start now? 我现在可以开始吗?

——Yes, go ahead. 可以, 开始吧。

3. As far as I know... 就我所知……

类似的说法还有: to my knowledge 就我所知

to my understanding 就我所知

as far as I can see 依我看

4. It is said that there are many types of sensors available today. 据说当今的传感器种类繁多。

It is said that... 据说……

类似的说法还有: It is reported that... 据报道……

It is believed that... 据信……

It is well known that... 众所周知……

many types of 多种

类似的说法还有: a type of, a kind of, a sort of 一种

many kinds of, many sorts of, many types of 多种

types of, kinds of, sorts of 各种各样
available 意为“可用的，可得到的”，作定语时只能后置。

例如：There were no tickets available for Friday's performance. 星期五演出的票已经没有了。

5. You need to know the type of motion, precision of motion, magnitude of motion and operating conditions. 你要了解运动的类型、运动的精确度、运动的量级和操作环境。
conditions (pl.) 环境，情况
operating conditions 操作环境
poor working conditions 恶劣的工作环境
good living conditions 良好的生活环境
6. I've really learned a lot from your words. 我从你的话中学到了很多知识。
a lot/lots = a lot of/lots of + 名词

a lot/lots 表示“许多”，可以单独使用	a lot of/lots of 表示“许多”，后接可数或不可数名词
I have known a lot about you. She gave the boys lots to eat.	I haven't got a lot of time. There was lots of money in the safe (保险柜).



I Oral Practice

1. Introduce the types of sensors and the application of them.
2. Make a dialogue and practice with your partner.

II Are the following statements true or false according to the text?

1. A sensor is a device for discovering the presence of a small amount of light, heat, sound, etc.
2. A sensor usually turns the measurement space into an electrical signal.
3. Only if you know the type of motion, precision of motion and magnitude of motion can you select a right sensor.
4. There are many kinds of sensors widely used in industry nowadays.
5. A sensor can be applied in monitoring paper roll thickness.

III Translation

1. —Do you know what a capacitive sensor is?
—As far as I know, a capacitive sensor is a proximity sensor that detects nearby

objects by their effect on the electrical signal.

2. ——Sensors can be used to measure physical variables like temperature, pH, velocity, rotational rate, flow rate, pressure and so on. However, the criteria (标准) of selecting a right sensor depend on many factors, such as availability, cost, power consumption, environmental conditions, etc.

——Thank you. I've really learned a lot from your words.

3. ——It is said that there are many kinds and shapes of sensors to measure all kinds of physical variables.

——You are right. I have seen many of them.