

 世纪中等职业教育系列教材
中等职业教育系列教材编委会专家审定

电工电子专业英语

主编 辜小兵 付颖颖

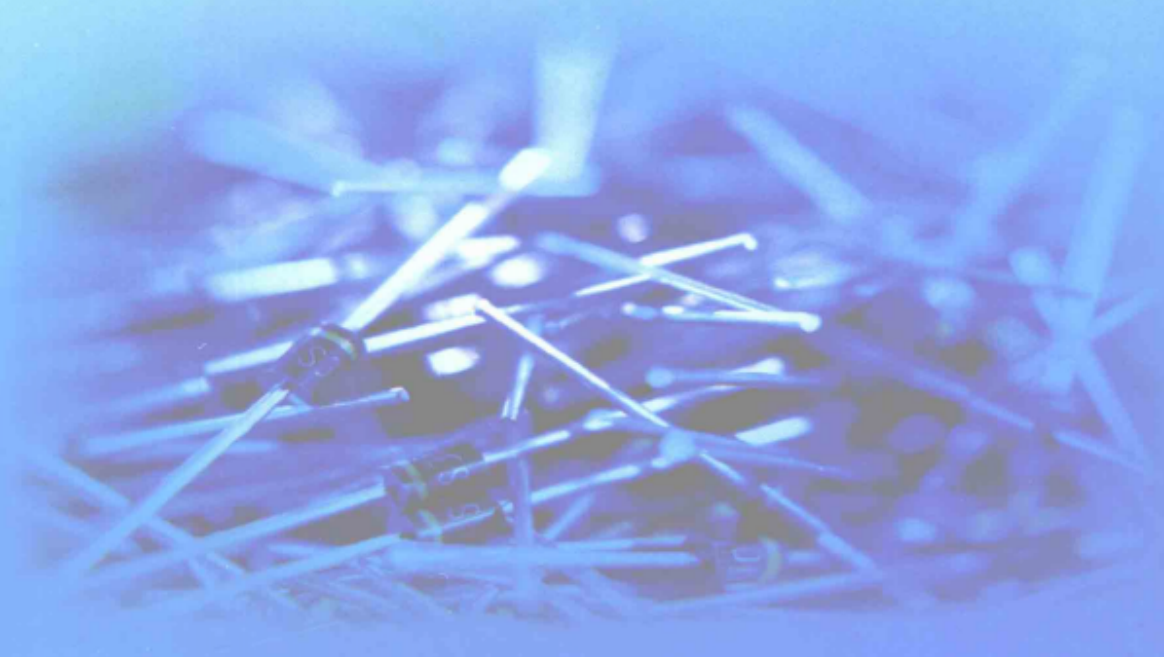


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出版说明

随着技术化革命和电子信息产业的飞速发展,社会对专业人员的综合素质和职业技能要求越来越高。中职学生在英语方面除了具有一般的听说读写能力外,还应在专业英语方面掌握一定的基本词汇,具有基本阅读本专业英语的能力。从而获得更多的专业知识,提高专业技能,更好地适应社会的需要。

本教材适用于中等职业学校电工电子类专业一年级学生使用。全书共分三部分,共16课52单元。第一部分为仪器仪表的使用,包括电流表、电压表、万用表、信号发生器、示波器。第二部分为电工基础知识,包括电路基础知识、直流电路、磁场、电磁感应、电容器、正弦交流电和三相交流电。第三部分为电子技术基础知识,包括电子电路组成元件及符号、PN结、二极管、三极管、放大电路、直流放大器与集成运算放大器、逻辑电路等。

本教材结合当前最新电工电子教材,内容丰富、概念准确、条理清晰。既重视理论的阐述,又重视理论与实践的结合。教材具有实用性、专业性、基础性、难度适当等特点。有助于培养学生阅读电子类英语资料的能力。为了便于学生自学,所有课文都附有译文。

本教材的参考教学时数为60学时。建议每周两学时,一年级上学期教学第一、二部分内容,一年级下学期教学第三部分内容。

本教材由重庆工商学校辜小兵、付颖颖主编,张荣杰任副主编。参加编写的有:重庆工商学校邱祥斌、赵怡虹、王永红、刁胜礼、吴娟、林晓、徐燕、田嘉欢;重庆科能高级技工学校王毅、刘晓书;重庆市经贸经济中等专业学校阳兴见;贵州贵阳市第四职业技术学校卢文发;贵州遵义市职业技术学校谭显芬等。在编写过程中得到重庆工商学校校长杨宗武、书记刘友林、副校长蒲滨海、朱泽彬、书记程绪奎等校级领导的大力支持,在此表示感谢。由于编写水平有限,书中错漏之处难免,敬请批评指正。

编者

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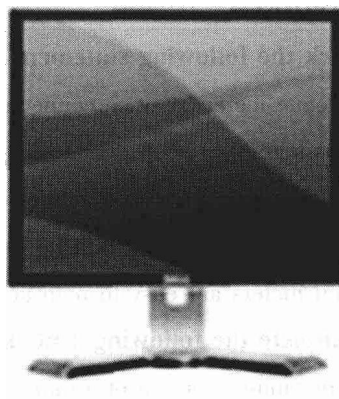
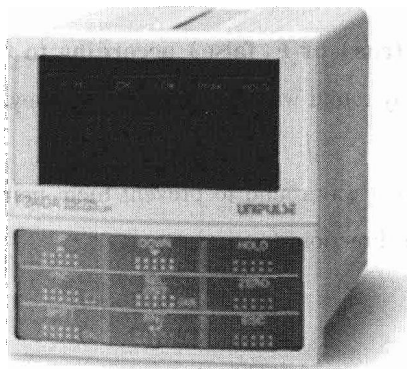
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Part I Measuring Instruments and Usage

Lesson 1 The Use of Ammeters and Voltmeters

Section 1 Display



Instruments have two kinds of monitors.

1. **Analogue displays**: analogue displays have a pointer which moves over a graduated scale. The maximum reading of an analogue meter is called full-scale deflection or FSD. Analogue meters must be connected in the correct way to prevent them being damaged when the pointer tries to move in the wrong direction.

2. **Digital displays**: values can be read directly from digital displays, so they are easy to read accurately. Digital meters may be connected in either way round without being damaged. They will show a minus sign (-) when connected in reverse.

For general use digital meters are the best. They are easy to read, and can be connected in reverse without disturbing the circuit.

New Words

- instrument ['instrumənt] *n.* 器具, 仪器
 monitor ['mɒnɪtə] *n.* 显示器, 监视器
 analogue ['ænələg] *adj.* 模拟的
 scale [skeil] *n.* 刻度, 标尺
 deflection [di'flekʃən] *n.* 偏斜, 偏转
 digital ['dɪdʒɪtəl] *adj.* 数字式的, 数码的
 accurately *adv.* 正确地, 精确地
 circuit ['sə:kɪt] *n.* 电路, 线路

Exercises

I. Mark the following statements with T (true) or F(false) according to text.

1. Analogue meters may be connected either way round without damage, and they will show a minus sign (-) when connected in reverse. ()
2. Analogue meters must be connected the correct way round to prevent them being damaged when the pointer tries to move in the wrong direction. ()
3. Digital meters are easy to read accurately. ()

II. Complete the following sentences.

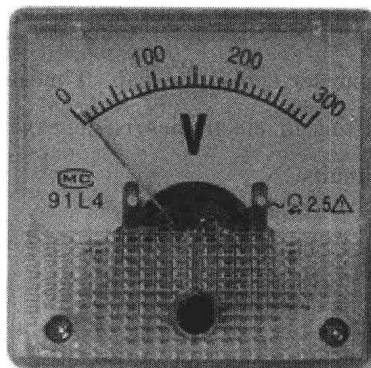
1. The maximum reading of an analogue meter is called _____ or FSD.
2. _____ may be connected either way round without damage, and they will show a minus sign (-) when connected in reverse.
3. Instruments have two monitors. They are _____ and _____.

III. Question.

Instruments have two monitors. What's the difference between Analogue display and Digital display?

Section 2 Voltmeters

Voltmeter is used to measure voltage, which has a very high resistance. Voltmeters are connected in parallel across components when using them. When testing circuits you often need to find the voltages at various points. Then connect the black voltmeter lead to 0V, the red to the test point. The black lead can be left permanently connected to 0V while you use the red lead as a probe to measure voltages at various points. Voltage at a point really means the voltage difference between that point and 0V (zero volt) which is normally the negative terminal of the battery or power supply.



New Words

- voltmeter ['vɒltmɪtə] *n.* 伏特计
 resistance [ri'zistəns] *n.* 电阻, 热阻
 parallel ['pærəlel] *n.* 平行线[面]
 permanently ['pɜ:mənəntli] *adv.* 永存地, 不变地
 terminal *n.* 终端
 negative ['negətiv] *adj.* 〈电〉负的

Exercises

I. Mark the following statements with T (true) or F (false) according to text.

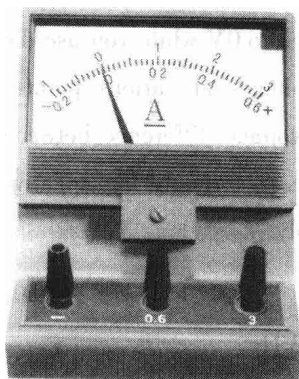
1. Voltmeters have a very low resistance. ()
2. Voltmeters are connected in parallel across components. ()
3. The red lead can be left permanently connected to 0V while you use the black lead as a probe to measure voltages at various points. ()

II. Complete the following sentences.

1. Voltmeters are connected _____ across components.
2. When testing circuits you should connect the _____ lead to 0V, the red to the test point.

Section 3 Ammeters

Ammeter is used to measure current, which is measured in A (amperes). Ammeter has a very low resistance. Ammeters are connected in series, so you must break the circuit and put the ammeter across the gap. It means that ammeters are difficult to use on soldered circuits. Most testing in electronics is done with voltmeters which can be easily connected without disturbing circuits.



New Words

ammeter [ˈæmitə] *n.* 电表

ampere [ˈæmpɜː] *n.* 〈电〉安培

in series *adv.* 连续地, 串联

solder [ˈsɒldə] *n.* 焊料, 焊锡 *vt.* 焊接, 焊合

Exercises

I. Mark the following statements with T (true) or F (false) according to text.

1. Ammeters have a very low resistance. ()
2. Ammeter is used to measure voltage. ()

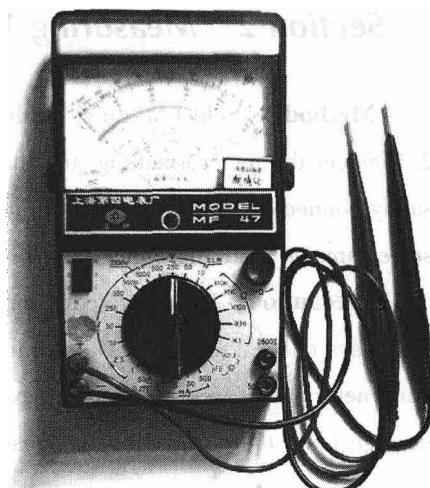
II. Complete the following sentences.

1. The need to break the circuit to connect in series means that ammeters are difficult to use on _____.
2. Most testing in electronics is done with _____ because it can be easily connected without _____.

Lesson 2 Using A Multimeter

Section 1 Choosing A Multimeter

A **digital multimeter** is the best choice for your first multimeter. Even the cheapest will be suitable for testing simple projects. If you are buying an **analogue multimeter**, make sure it has a high sensitivity of 20 $k\Omega/V$ or greater on DC voltage ranges, anything less not suitable for testing. The sensitivity is normally marked in a corner of the scale, which could be ignored for the lower AC value (sensitivity on AC ranges is less important), but considered for the higher DC value. Beware of cheap analogue multimeters sold for electrical work on cars because their sensitivity is likely to be too low.



New Words

multimeter *n.* 万用表

suitable ['sju:təbl] *adj.* 适当的, 适宜的, 恰当的

sensitivity [ˌsensi'tiviti] *n.* 敏感; 敏感度

DC (direct current) 直流

AC (alternating current) 交流

beware [bi'weə] *vi.* 谨防, 当心

Exercises

I. Mark the following statements with T (true) or F (false) according to text.

1. A analogue multimeter is the best choice for your first multimeter. ()
2. If you are buying an analogue multimeter, make sure it has a high sensitivity of 20 $k\Omega/V$ or greater on AC voltage ranges. ()

3. Beware of expensive analogue multimeters sold for electrical work on cars because their sensitivity is likely to be too low. ()

II. Question.

Generally speaking how to Choose a multimeter?

Section 2 Measuring Voltage and Current with A Multimeter

Method: 1. Select a range with a maximum greater than you expect the reading to be. 2. Connect the meter, making sure the leads are in the correct way round. 3. Digital meters can be safely connected in reverse, but an analogue meter may be damaged. 4. If the reading goes off the scale, immediately disconnect and select a higher range.

Precautions: 1. Always disconnect the multimeter before adjusting the range switch. 2. Always check the setting of the range switch before you connect to a circuit. 3. Never leave a multimeter set to a current range (except when actually taking a reading). 4. The greatest risk of damage is on the current ranges because the meter has a low resistance.

New Words

voltage ['vɔ:ltidʒ] *n.* 电压, 伏特数

maximum ['mæksiməm] *n.* 最大量

reverse [ri'vɔ:s] *n.* 相反

Exercises

I. Mark the following statements with T (true) or F (false) according to text.

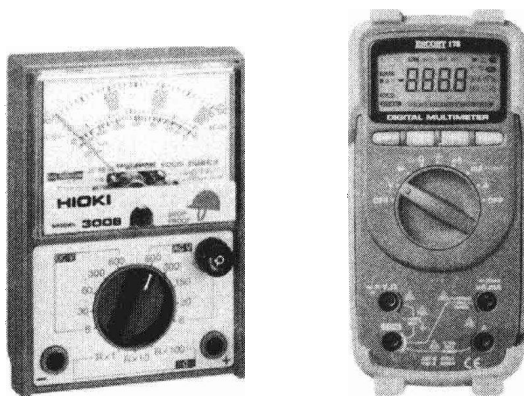
1. You should disconnect the multi meter before adjusting the range switch. ()
2. Digital meters can be safely connected in reverse. ()
3. Leave a multimeter set to a current range (except when actually taking a reading).
()
4. Before you connect to a circuit, you needn't check the setting of the range switch . ()

II. Question.

How to use a multimeter to measure voltage and current?

Section 3 Measuring Resistance with A Multimeter

To measure the resistance of a component, the component must not be connected in a circuit. If you try to measure resistance of components in a circuit, you will obtain false reading (even if the supply is disconnected) and you may damage the multimeter. For resistance using the different scales, it may be according to the actual case, noticing that it reads backwards and is not linear (unevenly spaced). When reading value take attention to check the setting of the range switch so that you know by how much to multiply the reading. According to this we can read out the value multiplied by the value of stalls.



New Words

component [kəm'pəʊnənt] *n.* 组成部分, 部件, 元件

obtain [əb'tein] *vt.* 获得

linear ['liniə] *adj.* 线的, 长度的

switch [switʃ] *n.* 开关

multiply ['mʌltiplai] *vt. & vi.* (使)增加, 做乘法

Exercises

I. Mark the following statements with T (true) or F (false) according to text.

1. To measure the residence of the component it mustn't be connected in circuit. ()
2. If you try to measure resistance of components in a circuit, you may damage the multimeter. ()

3. You will obtain false reading if you try to measure resistance of components in a circuit.

()

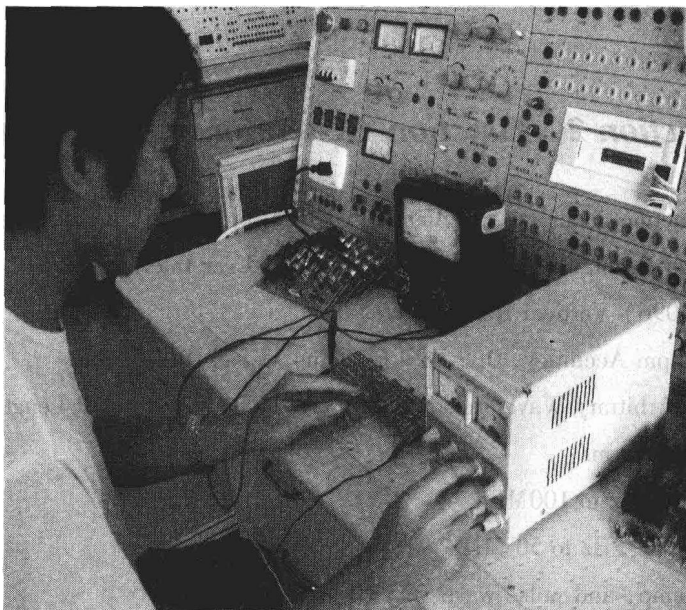
II. Complete the following sentences.

1. When reading value you should take attention to _____.

2. To measure the residence of the component it mustn't be _____ in circuit.

Lesson 3 Signal Generator

Section 1 Introduction to Signal Generator



The signal generator is used to provide known test conditions for the troubleshooting of electronic system design and for replacing signals that are missing in systems during repairing work. Most commonly they generate sine waves. Some examples of these generators are function generator, pulse and sweep generator, sine wave generator, pulse and square wave generator and audio frequency signal generator. A simple sine wave generator consists of an oscillator and an attenuator. The frequency stability and freedom from distortion depend on the design of the oscillator whereas the amplitude accuracy depends on the design of the attenuator. Function generator basically produces square waves, sawtooth waves and triangular waves besides sine waves.

New Words

generator ['dʒenəreɪtə] *n.* 发电机, 发生器

audio ['ɔ:djəu] *adj.* 听觉的, 声音的

oscillator ['ɒsɪleɪtə] *n.* 振荡器