

国家示范性高等职业院校“十二五”规划教材

——铁路专业类

TIELU
KEJI YINGYU

铁路科技英语

主编 黄超 陶艳



西南交通大学出版社
[Http://press.swjtu.edu.cn](http://press.swjtu.edu.cn)

国家示范性高等职业院校“十二五”规划教材——铁路专业类

主要内容

本书为“十二五”规划教材，是铁路专业类教材的重要组成部分。

铁路科技英语

（单语种）文编第三册

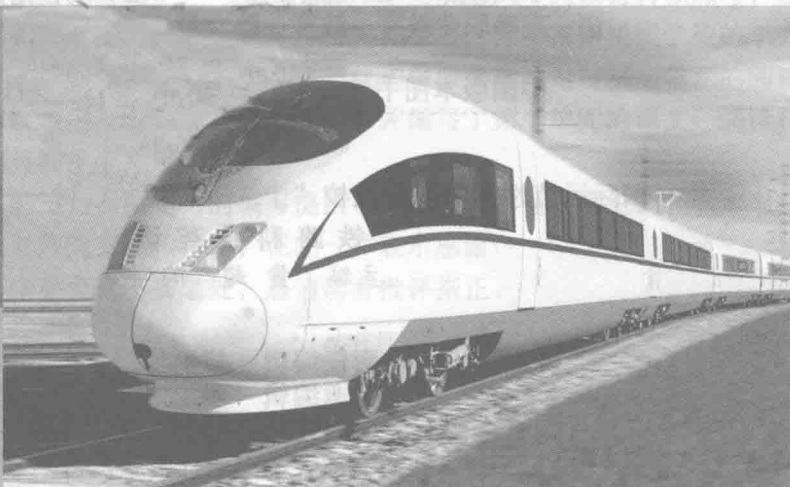
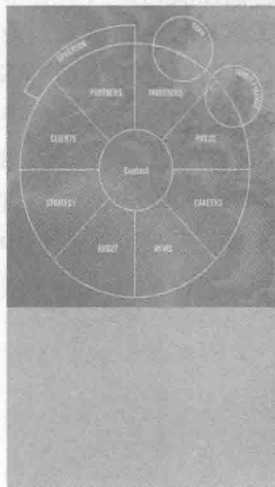
（单语种）文编第三册

English for Railway Technology and Industry

主 编 黄 超 陶 艳

副主编 杨 宏 李秀玲 叶清贫

主 审 侯梅英



西南交通大学出版社

· 成 都 ·

内 容 提 要

本书是针对高职院校铁路专业编写的专业英语教材。全书按七个单元编写,每个单元包括三篇课文(附有单词表、注释和译文)、三篇阅读文章(附有单词表和针对性练习)和一篇语法知识要义;书末配有练习答案与单元课文的参考译文。本书采用“基础知识+扩展知识+习题+语法”的编写方法,并在材料选取上注重体现教材内容的广泛性、专业性、灵活性、实用性。

本书既可供高职高专院校铁路各专业专业英语教学使用,亦可供相关专业人员自学使用。

图书在版编目(CIP)数据

铁路科技英语 / 黄超, 陶艳主编. —成都: 西南交通大学出版社, 2011.8

国家示范性高等职业院校“十二五”规划教材. 铁路专业类

ISBN 978-7-5643-1227-5

I. ①铁… II. ①黄… ②陶… III. ①铁路运输—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 116332 号

国际示范性高等职业院校“十二五”规划教材——铁路专业类

铁 路 科 技 英 语

主 编 黄 超 陶 艳

*

责任编辑 祁素玲

特邀编辑 罗 旭

封面设计 墨创文化

西南交通大学出版社出版发行

(成都二环路北一段 111 号 邮政编码: 610031 发行部电话: 028-87600564)

<http://press.swjtu.edu.cn>

成都中铁二局永经堂印务有限责任公司印刷

*

成品尺寸: 185 mm×260 mm 印张: 8.75

字数: 270 千字

2011 年 8 月第 1 版 2011 年 8 月第 1 次印刷

ISBN 978-7-5643-1227-5

定价: 16.00 元

图书如有印装质量问题 本社负责退换
版权所有 盗版必究 举报电话: 028-87600562

前言

目前,相当一部分高职院校所使用的专业英语教材最突出的不足之处在于:教材在编写的取向上未充分地体现出职业化的特色,未能把职业活动充分地融入教材的编写中。以人为本的特色不浓,教材的使用效果不佳,未做到有的放矢。教材在编写的策略上缺乏与公共英语教材的匹配性,使人感觉专业英语是孤家寡人,自行其事。

本书结合铁路各专业的实际需要,在内容的选择上力求做到广泛、专业、灵活、实用。本书所选用的文章,长短适宜、内容经典,便于教学。本书在编写风格上体现了时代性。七个教学单元的语法知识都具有极强的针对性、实用性,并做到了文、法合一,这极有利于读者翻译水平的切实提高。此外,本书还提供配套的电子课文与译文,可在出版社网站下载。

本书由武汉铁路职业技术学院黄超和湖南铁道职业技术学院陶艳担任主编;武汉铁路职业技术学院侯梅英担任主审。武汉铁路职业技术学院黄超编写了第三、五单元的课文、阅读材料和练习;湖南铁道职业技术学院陶艳编写了第四、六单元的课文、阅读材料和练习;铁路职业技术学院叶清贫编写了第二单元的课文、阅读材料和练习;昆明铁路机械学校的李秀玲编写了第七单元的课文;武汉铁路职业技术学院何洲红和曾照平参与编写第七单元的阅读材料和练习;武汉铁路职业技术学院杨宏负责全书统稿,并编写了第一单元的课文、阅读材料、练习及所有单元的语法与翻译要点。

武汉铁路职业技术学院的王德洪给本书的编写提出了非常宝贵的指导意见。此外,本书在编写中得到了众多兄弟院校老师的支持和帮助,在此一并表示感谢!

由于编者水平有限,书中难免有不妥之处,恳请读者批评指正。

Reading Material	39
语法与翻译要点 (三) 一般现在时	42
Unit 4 Railway Car for Urban Transportation	50
Text 1 General Vehicle Description	52
Text 2 Traction Equipment	53
Text 3 Braking System	56
Reading Material	58
语法与翻译要点 (四) 被动语态的用法	63
Unit 5 High Speed Railway Car	66
Text 1 Introduction to the Electrical Multiple Unit (EMU)	68
Text 2 Basic of EMU	70
Text 3 End Car Coupler	73
Reading Material	76

目 录

Unit 1 General Knowledge.....	1
Text 1 Engineering Graphics.....	1
Text 2 Spur Gears.....	4
Text 3 Transformers.....	7
Reading Material.....	10
语法与翻译要义(一) 翻译概论.....	17
Unit 2 Introduction to Railway Transportation.....	19
Text 1 History of Rail Transportation.....	19
Text 2 Railroad Track.....	21
Text 3 Railroad Switch.....	23
Reading Material.....	26
语法与翻译要义(二) 科技英语翻译小技巧.....	30
Unit 3 Railway Cars.....	32
Text 1 Various Types of Railway Cars (I).....	32
Text 2 Various Types of Railway Cars (II).....	36
Text 3 Bogie (I).....	39
Reading Material.....	42
语法与翻译要义(三) 一词多义.....	50
Unit 4 Railway Car for Urban Transportation.....	52
Text 1 General Vehicle Description.....	52
Text 2 Traction Equipment.....	55
Text 3 Braking System.....	56
Reading Material.....	58
语法与翻译要义(四) 被动语态的译法.....	65
Unit 5 High Speed Railway Car.....	66
Text 1 Introduction to the Electrical Multiple Unit (EMU).....	66
Text 2 Bogie of EMU.....	70
Text 3 End Car Coupler.....	73
Reading Material.....	76

语法与翻译要义(五) while 与 when 连接状语从句的翻译	85
Unit 6 Electric Locomotives	87
Text 1 Introduction to Electric Locomotives	87
Text 2 Main Parts of Electric Locomotive	89
Text 3 Pantographs	91
Reading Material	94
语法与翻译要义(六) 增译与省译	100
Unit 7 Diesel Locomotive	103
Text 1 Main Parts of a Diesel Locomotive	103
Text 2 Diesel Engine	105
Text 3 Electric Transmission	108
Reading Material	110
语法与翻译要义(七) 转译	115
附录 课文译文及阅读材料练习参考答案	117
第一单元 常识	117
第二单元 铁路运输简介	119
第三单元 铁道车辆	120
第四单元 城市运输中的铁路车辆	123
第五单元 高速铁路车辆	125
第六单元 电力机车简介	128
第七单元 内燃机车	131
参考文献	134

Unit 1 General Knowledge

Text 1 Engineering Graphics

1. Technical Drafting

Technical drawings are the means for describing something that must be processed, manufactured, or built.¹ Engineers, designers, and architects use technical drawings as a means of communicating their ideas.

Until the 1950s and the advent of the computer, technical drawings were done at the drafting table with paper, pencil, and T-squares.

Now most technical drawings are done on the computer. What began as the automation of drafting has expanded into techniques and capabilities that a draftsman in 1950 could not have imagined.² An example of a technical drafting is shown in Fig.1.1.

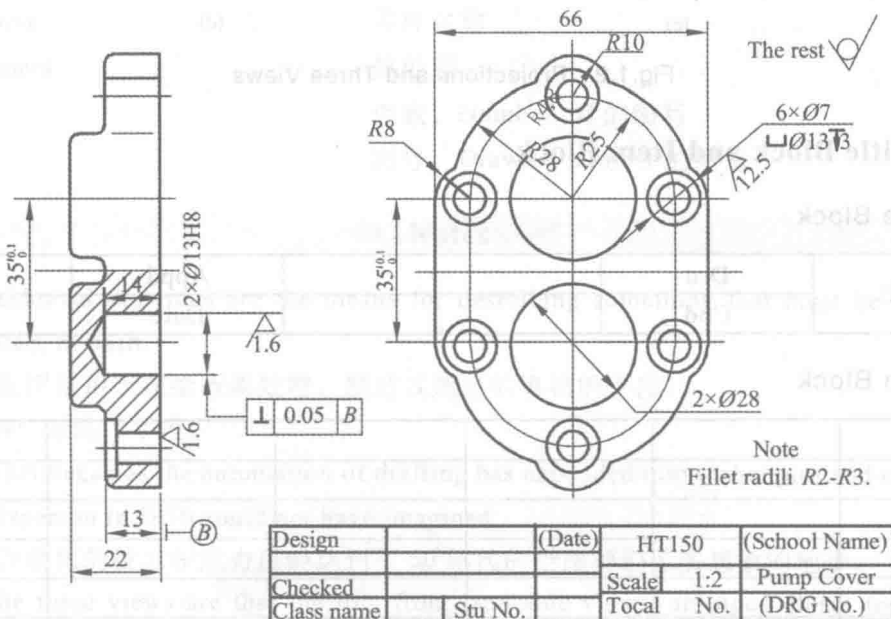


Fig.1.1 Technical Drafting

2. Projections and Three Views

The projections are orthographic projections of an object as seen from the front, top, or other sides. The three views are that the top, front, and side views, arranged closer together, are shown in Fig.1.2.³

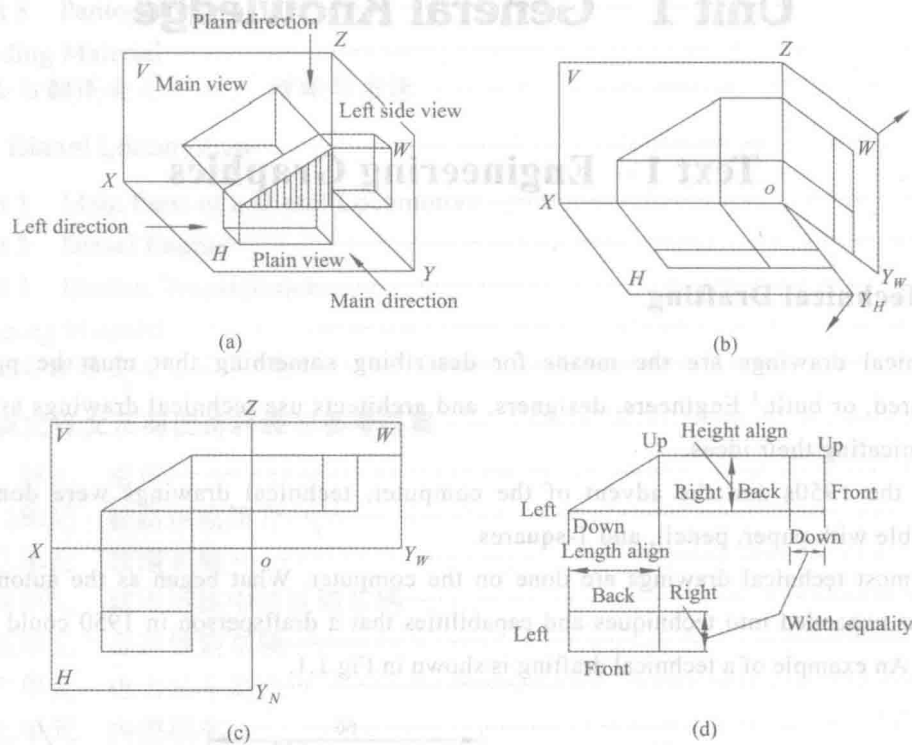


Fig.1.2 Projections and Three Views

3. Title Block and Item Block

• Title Block

TITLE	Drn	Appd	Date
	Chd		

• Item Block

5					
4					
3					
2					
1					
Part No.	Detail ref.	Name of part	Material	Heat treatment	No. off
Scale		Projection	Drn		
Drg. No.		Name of Firm			

New Words

advent ['ædvənt]	n. 出现, 到来, 来临
draftsperson ['dra:fts,pə:sən]	n. 制图员, 绘图员
projection [prə'dʒekʃn]	n. 视图, 投影图
detail ['di:teil, di'teil]	n. 零件, 元件
reference ['refərəns]	n. 标记, 标准, 参考
scale [skeil]	n. 比例

Technical Phrases

technical drawings	工程制图
three views	三视图
orthographic projection	正交投影
title block	标题栏
item block	明细栏
Drn	绘图, Drawn by 的缩写
Chd	校对, Checked by 的缩写
Appd	审核, Approved by 的缩写
Part No.	零件序号, Part number 的缩写
Detail ref.	零件图号, Detail reference 的缩写
Name of part	零件名称
Heat treatment	热处理
No. off	件数, Number off 的缩写
Drg. no	图号, Drawing number 的缩写

Notes

1. Technical drawings are the means for describing something that must be processed, manufactured, or built.

工程制图是用于描绘所要处理、制造或建造的事物的手段。

means: 方法, 手段。

2. What began as the automation of drafting has expanded into techniques and capabilities that a draftsperson in 1950 could not have imagined.

制图自动化的技术和能力已经达到了 50 年代的绘图师们无法想象的地步。

3. The three views are that the top, front, and side views, arranged closer together, are shown in Fig.1.2.

三视图是由俯视图、主视图、侧视图一起组成的视图, 如图 1.2 所示。

“are shown in Fig.1.2” 为被动语态，可译为“如图 1.2 所示”。

Text 2 Spur Gears

Spur gears are the simplest type of practical engineering-grade gear. As shown in Fig.1.3, spur gears are cut from cylindrical blanks and their teeth have faces that are oriented parallel to the shaft on which the gear is mounted. For the external gears of Fig.1.4, the teeth are formed on the outside of the cylinder; conversely, for an internal or ring gear, the teeth are located on the inside (Fig.1.5). When two gears having complementary teeth engage and motion is transmitted from one shaft to another, the two gears are said to form a gearset.¹ Fig.1.3 depicts a spur gearset and some of the terminology used to describe the geometry of the teeth. By convention, the smaller (driving) gear is called the pinion, and the other (driven) one is simply called the gear. The pinion and gear are said to mesh at the point where the teeth approach, contact one another, and then separate.

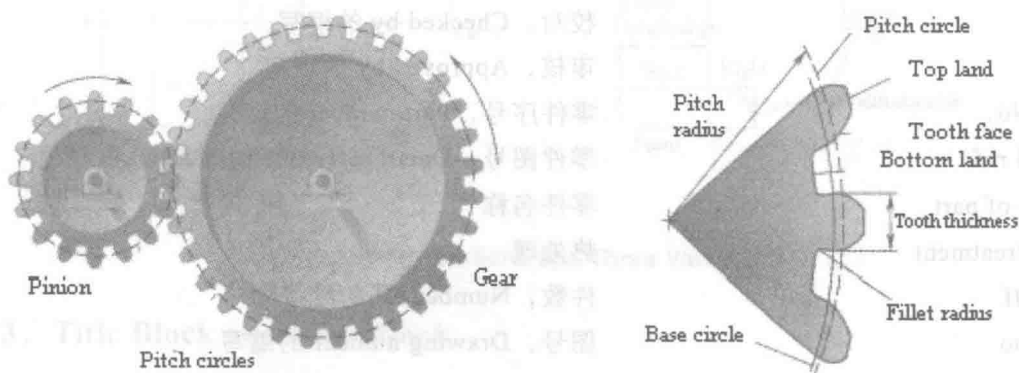


Fig.1.3 Spur Gears

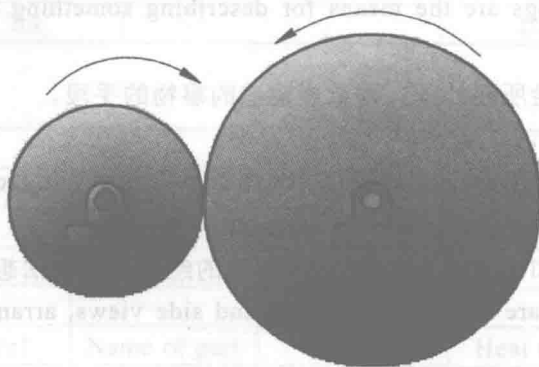


Fig.1.4 External Gears

Conceptually, the pinion and gear are regarded as two cylinders that are pressed against one another and that smoothly roll together, in contrast to a collection of many discrete teeth that are continuously contacting, engaging, and disengaging.² As illustrated in Fig.1.4 or Fig.1.5, the cylinders roll on the outside of one another for two external gears, or one can roll within the other (one external and one internal gear).

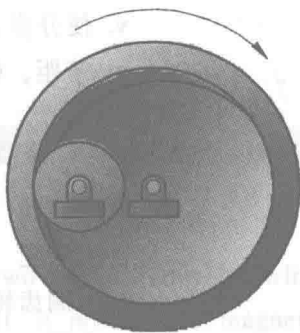


Fig.1.5 Internal Gears

Referring to Fig.1.3, the effective radius of a spur gear, which is also the radius of its conceptual rolling cylinder, is called the pitch radius, r . Continuous contact between the pinion and gear is imagined to take place on the two pitch circles. The pitch radius is not the distance from the gear's center to either the top or bottom lands of a tooth. Instead, r is simply the radius that an equivalent cylinder would have if it rotated at the same speed as the pinion or gear.³

New Words

cylindrical [si'lindrikəl]

blank [blæŋk]

orient ['ɔ:riənt]

parallel ['pærəlel]

mount [maunt]

conversely ['kənvə:sli]

locate [ləu'keɪt]

complementary [ˌkɒmplɪ'mentəri]

engage [in'geɪdʒ]

transmit [trænz'mɪt]

gearset ['giəset]

terminology [ˌtɜ:mɪ'nɒlədʒi]

convention [kən'venʃən]

adj. 圆柱（体，形）的

n. 坯料，毛坯

v. 取向，定向，定位

adj. 平行的，并行的，并列的

v. 装配，安装，固定，建立

adv. 相反地

v. 设置，安排，固定

adj. 互补的，辅助的，附加的

v. 啮合，连接，接合

v. 传递，传送，传输

n. 齿轮副，齿轮对

n. 专门名词，术语

n. 习惯，惯例

pinion ['pinjən]	n. 小齿轮
mesh [meʃ]	n. 啮合, 咬合
approach [ə'prəʊtʃ]	v. 接近, 靠近
contact [kən'tækt]	v. 接触, 联系, 啮合
discrete [dis'kri:t]	adj. 不连续的, 离散的
disengage [ˌdisɪn'geɪdʒ]	v. 使分离, 使脱离
pitch [pɪtʃ]	n. 节距, (齿轮) 齿节, 圆节

Technical Phrases

external gears	外齿轮
internal gear	内齿轮
ring gear	内圈齿轮
top land	齿顶
tooth face	齿面
bottom land	齿槽底面
tooth thickness	齿厚
fillet radius	齿根圆角半径
base radius	基圆半径
pitch radius	节圆半径
pitch circles	节圆

Notes

1. When two gears having complementary teeth engage and motion is transmitted from one shaft to another, the two gears are said to form a gearset.

当两个相互配合的轮齿相互啮合运动时, 运动可从一个轴传到另一个轴, 而这两个齿轮被称为一对齿轮副。

语句 “When two gears having complementary teeth engage and motion is transmitted from one shaft to another” 为时间状语从句。

2. Conceptually, the pinion and gear are regarded as two cylinders that are pressed against one another and that smoothly roll together, in contrast to a collection of many discrete teeth that are continuously contacting, engaging, and disengaging.

从概念上讲, 参比许多单个轮齿的不断地接触、啮合、脱离的综合效应, 可把小齿轮和齿轮认为是相互挤压在一起滚动的两个圆柱体。

语句 “that are pressed against one another and that smoothly roll together 和 that are continuously contacting, engaging, and disengaging” 为定语从句。

3. The pitch radius is not the distance from the gear's center to either the top or bottom

lands of a tooth. Instead, r is simply the radius that an equivalent cylinder would have if it rotated at the same speed as the pinion or gear.

节圆半径既不是从齿轮中心到齿轮轮齿顶部的距离，也不是从齿轮中心到齿轮的轮齿槽底部的距离。而是圆柱体以与小齿轮和齿轮同等转速转动时拥有的半径。

语句“an equivalent cylinder would have, if it rotated at the same speed as the pinion or gear”为定语从句。

Text 3 Transformers

A transformer (Fig.1.6) has two separate coils of wire wound on an iron core. When a current flows in the primary coil, it produces a magnetic field. This passes through the secondary coil “guided” by the iron core. If the field changes, a voltage will be induced in the secondary coil.

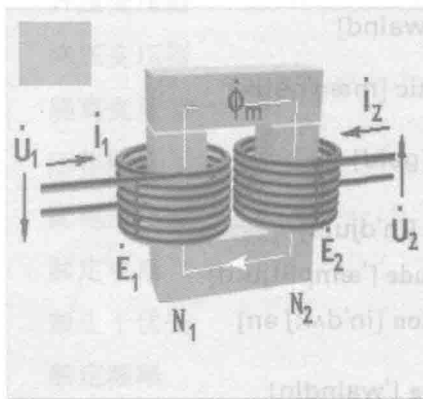
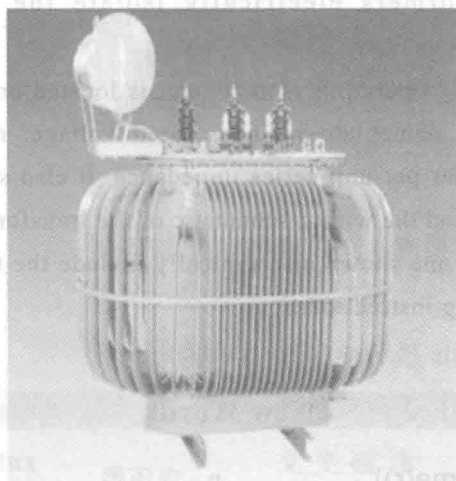


Fig.1.6 Transformers

A transformer is a device used to change the relative amplitudes of voltage and current in an AC circuit. Using Faraday's law of induction and neglecting magnetic losses, the voltage per turn of wire is the same for both the primary and secondary windings since the windings experience the same alternating magnetic flux.¹

Therefore, the primary and secondary voltages (U_1 and U_2) are related by

$$U_1/N_1 = U_2/N_2 = d\Phi/dt$$

where N_1 is the number of turns in the primary winding, N_2 is the number of turns in the secondary winding, and Φ is the magnetic flux linked between the two coils. Thus, the secondary voltage is related to the primary voltage by

$$U_2 = (N_2/N_1)U_1$$

where N_2/N_1 is the turns ratio of the transformer.

If $N_2 > N_1$, the transformer is called a step-up transformer since the voltage increases.

If $N_2 < N_1$, it is called a step-down transformer since the voltage decreases.

If $N_2 = N_1$, it is called an isolation transformer, and the output voltage is the same as the input voltage. Transformers electrically isolate the output circuit from the input circuit.

The nameplate indicating operating voltage, etc. is located on a distribution transformer.² The information on such a nameplate includes rated voltage, rated kilovoltamperes, rated frequency, and the transformer per-unit series impedance. It also shows the voltage ratings for each tap on the transformer and the wiring schematic of the transformer.

Nameplates such as the one shown also typically include the transformer type designation and references to its operating instructions.

New Words

transformer [træns'fɔ:mə(r)]

n. 变压器

wind [waɪnd]

v. 缠绕

magnetic [mæg'netɪk]

n. 卷绕

adj. 有磁性的, 有吸引力的

guide [gaɪd]

n. 引导者, 指南, 路标

v. 引导, 指导, 支配, 管理

induce [ɪn'dju:s]

v. 引诱, 招致, 感应

amplitude ['æmplɪtju:d]

n. 增幅, 幅度, 波幅

induction [ɪn'dʌkʃən]

n. 感应, 感应现象, 归纳法

winding ['waɪndɪŋ]

n. 卷, 弯曲, 线圈

adj. 蜿蜒的, 卷绕的, 弯曲的

flux [flʌks]	n. 流(量), 助熔剂
isolation [ˌəisaˈleɪʃn]	n. 隔离, 孤立
isolate [ˈaɪsəleɪt]	adj. 孤立的
	v. 隔离, 孤立; 使隔离, 使孤立
nameplate [ˈneɪmpleɪt]	n. 铭牌
distribution [ˌdɪstriˈbjʊ:ʃn]	n. 分配, 散布, 分布, 配(电)
rate [reɪt]	n. 比率, 等级, 价格
	v. 估价, 认为, 检定等级
ampere [ˈæmpeə]	n. 安培
impedance [ɪmˈpi:dəns]	n. 阻抗
rating [ˈreɪtɪŋ]	n. 等级
tap [tæp]	n. 敲击, 轻打
schematic [skiˈmætik]	adj. 图解的, 扼要的

Technical Phrases

wire wound	绕线
iron core	铁芯
primary coil	初级线圈
magnetic field	磁场
secondary coil	第二个(初级)线圈
AC circuit	交流电路
AC	交流电, 是 alternating current 的缩写
Faraday's law of induction	法拉第感应定律
alternating magnetic flux	交变磁通
step-up transformer	升压变压器
step-down transformer	降压变压器
isolation transformer	隔离变压器
operating voltage	工作电压
distribution transformer	配电变压器
rated voltage	额定电压
rated kilovoltamperes	额定千伏安
rated frequency	额定频率
transformer per-unit series impedance	单位串联阻抗

voltage ratings	电压值
each tap	每抽头
wiring schematic of the transformer	变压器的配线示意图

Notes

1. Using Faraday's law of induction and neglecting magnetic losses, the voltage per turn of wire is the same for both the primary and secondary windings since the windings experience the same alternating magnetic flux.

利用法拉第感应定律并忽略磁损耗时, 由于绕组受到相同的交变磁通作用, 故初级绕组和次级绕组每匝导线的电压都一样。

“Using Faraday's law of induction and neglecting magnetic losses”中, 现在分词用作状语表条件。“since”用于引出已知原因, 语气没有“because”重。

2. The nameplate indicating operating voltage, etc. is located on a distribution transformer.

位于配电变压器上的铭牌指明了工作电压等。

句中现在分词短语“indicating operating voltage”置于其所修饰的名词“nameplate”之后, 相当于一个定语从句, 但较从句简洁。

Reading Material

1-1 Circuit

An electric circuit (or network) is an interconnection of physical electrical devices. The purpose of electric circuits is to distribute and convert energy into some other forms. Accordingly, the basic circuit components are an energy source (or sources), an energy converter (or converters) and conductors connecting them. An energy source (a primary or secondary cell, a generator and the like) converts chemical, mechanical, thermal or some other forms of energy into electric energy. An energy converter, also called load (such as a lamp, heating appliance or electric motor), converts electric energy into light, heat, mechanical work and so on.

Events in a circuit can be defined in terms of emf (or voltage) and current. Fig.1.7 shows in simplified form a hypothetical circuit with a storage battery as the source and a lamp as the load.

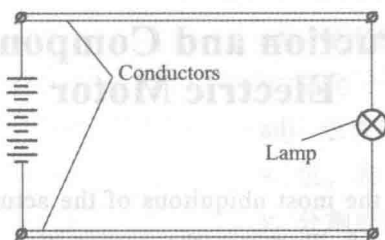


Fig.1.7 Circuit

The terminals of the source and load are interconnected by conductors (generally but not always wires). As is seen, the source, load and conductors form a closed conducting path. The emf of the source causes a continuous and unidirectional current to circulate round this closed path. This simple circuit made up of a source, a load and two wires is seldom, if ever, met with in practice. Practical circuits may contain a large number of sources and loads interconnected in a variety of ways.

New Words

circuit ['sə:kit]

n. 电路, 回路; 环道; 一圈; 巡回

purpose ['pə:pəs]

n. 用途; 目的; 意志

source [sɔ:s]

n. 电源; 来源; 原始资料; 水源

distribute [di'stribju:t]

v. 分配; 散布; 分开; 把……分类

convert [kən've:t]

v. (使) 转变 [转化]

accordingly [ə'kɔ:diŋli]

adv. 因此, 从而; 于是; 相应地; 照着

conductor [kən'dʌktə]

n. 导体 [线]; 售票员; 领导者; 管理人

emf (electromotive force)

n. 电动势

Technical Phrases

electric circuit

电路

circuit components

电路元件

electrical device

电气设备

energy source

电源; 能源

electric energy

电能

energy converter

电能转换器

primary or secondary cell

原生电池或再生电池