ỦY BAN NHÂN DÂN THÀNH PHỐ THỦ ĐỨC

TRƯỜNG TRUNG CẤP ĐÔNG SÀI GÒN

TÀI LIỆU GIẢNG DẠY

MÔN HỌC: TIẾNG ANH CHUYÊN NGÀNH

NGHỀ: ĐIỆN TỬ CÔNG NGHIỆP

TRÌNH ĐỘ: TRUNG CẤP

(Ban hành theo Quyết định số: /QĐ-ĐSG ngày 25 tháng 02 năm 2023 của HIệu trưởng trường trung cấp ĐÔng Sài Gòn)

NĂM 2023

Unit 1: ELECTRICAL MATERIALS

Nhằm giúp sinh viên có hướng tiếp cận dễ dàng trong việc học tiếng Anh chuyên ngành Điện tử công nghiệp, trước hết giáo trình này giới thiệu cho sinh viên về các thuộc tính và đặc điểm kỹ thuật của các loại vật liệu điện bằng tiếng Anh. Qua đó, người học dễ nắm bắt được các kiến thức chuyên sâu hơn của các bài học tiếp theo đồng thời có thể tra cứu các tài liệu liên quan bằng tiếng anh.

Mục tiêu của bài học:

Sau khi học xong bài học này, sinh viên có kiến thức và kỹ năng về sử dụng anh ngữ:

- Đọc hiểu được các thuật ngữ về vật liệu điện, điện tử bằng tiếng anh
- Hiểu được các từ trong cấu tạo và nguyên lý vật liệu dẫn điện, vật liệu bán dẫn, vật liệu cách điện, vật liệu từ và các vật liệu đặc biệt khác bằng tiếng anh.
- Sử dụng được thì hiện tại đơn để giao tiếp trong lĩnh vực điện bằng tiếng anh.
- Tự tin giao tiếp tiếng anh chuyên ngành trong môi trường làm việc tại doanh nghiệp
- Đọc hiểu tài liệu tham khảo bằng tiếng anh trong lĩnh vực điện *Nội dung của bài học:*

I. VOCABULARY

Mục tiêu: Cung cấp cho người học các từ vựng trong lĩnh vực điện để người học có thể đọc và hiểu được từ chuyên môn liên quan đến một số tài liệu trong lĩnh vực điện điện tử công nghiệp bằng tiếng anh.

Resistivity (n)	Điện trở Dẫn điện	Annealing (n)	Sự tôi luyện
Conducting (adj)	Loại	Valence (n)	Hóa trị
Category (n)	Truyền tải	Insulating (adj)	Cách điện Tụ điện Chịu nhiệt Phản ứng nhiệt Đàn hồi
Transmission (n)	Phân phối	Capacitor (n)	
Distribution (n)	Máy biến thế	Thermoplastic	
Transformer (n)	Đồng	Thermosetting	
Copper (n)	Nhôm	Elastic (adj)	
Aluminium (n)	Hệ số	Solvent (n)	Dung môi Dễ vỡ
Coefficient (adj)	Biến thiên	Brittle (adj)	
Variation (n)			

Voltage drop (n)	Điện áp rơi	Repellent (adj) :	Không thấm nước
Withstand (v)	Chịu đựng		
Ductility (n)	Độ dẻo dai	Molecule (n) :	Phân tử
Mould (v)	Đúc	Elongate (v) :	Giãn nở
Solderability (n)	Tính dễ hàn	Elasticity (n) :	Độ đàn hồi
Corrosion (n)	Sự ăn mòn	Polymerisation	Sự polymer hóa
Precision (n)	Độ chính xác		
Rheostat (n)	Biến trở	Hysteresis (adj) :	Trễ điện môi
Melting (adj)	Tan chảy	Saturation (n) :	Bão hòa
Oxidation (n)	Sự ô xy hóa	Magnetization (n) :	Độ từ hóa
Malleable (adj)	Dẻo	Curve (v) :	Uốn cong
Tensile (adj)	Chịu bền	Coercivity (n) :	Độ kháng
Busbar (n)	Thanh cái	Adamantine (n) :	Chất adaman
Brass (n)	Đồng thau	Ultrahard (adj) :	Siêu cứng
Bronze (n)	Đồng đỏ	Darkwood (n) :	Gỗ cứng
Constantan (n)	Hợp chất nikel	Alchemical (n) :	Luyện đan
Fuse (n)	Cầu chì	Metallurgy (n) :	Luyện kim
Socket (n)	ổ cắm	Alchemy (n)	Thuật luyện đan
Fluorescent tube (n)	Đèn huỳnh quang	Bypass (v) :	Đường vòng
Electric bell (n)	Chuông điện	Transmission line (n) :	Đường dây truyền tải
Three-core cable (n) :	Dây cáp 3 lõi	Bulb (n) :	Bóng đèn tròn
Fuse wire (n)	Dây chì	Safety helmet (n)	Mũ bảo hiểm
Copper conductor :	Dây dẫn đồng	Outlet (n) :	ổ điện có dây tiếp đất
High- voltage conductor(n):	Dây dẫn cao thế	Earthed socket (n)	ổ điện ẩn dưới sàn
Extension cord (n)	Dây dẫn nhánh		
Electric tool (n)	Dụng cụ điện	Underfloor socket :	
Thermoplastic (n)	Tính chịu nhiệt	Adapter (n)	Bộ nắn điện
Meter (n)	Đồng hồ đo	Voltage stabilizer :	Máy ổn áp
Electric meter (n)	Đồng hồ điện	Cable clip (n) :	Nẹp ống dây
Cable gland (n)	Cổ cáp	Plug (n)	Phích cắm
Cable lug (n)	Đầu cốt		
:			

II. GRAMMAR

Mục tiêu: Cung cấp cho người học cấu trúc ngữ pháp về thì hiện tại đơn để người học có thể sử dụng trong quá trình viết hoặc giao tiếp trong công việc tại nơi làm việc hoặc trong đời sống hằng ngày có liên quan.

2.1 The Simple Present Tense

The simple present tense

a. Structure

To form the Present Simple Tense we use the verb's base form (go, work, speak**, study). In 3rd person singular (he, she, it), the base form of the verb takes -s/es. (Auxiliary** verbs "be," "do," "have", which can also be used as main verbs, are exceptions.)

❖ **Affirmative form**

I / You / We / They + V_infinitive
He/She/It + V_(s,es)

Example:

- Electric current deals with charges in motion
- I go to school every day.

❖ **Negative form**

I / You / We / They + do not /don't +V_infinitive He/She/It does not /doesn't / +V_infinitive

Example:

- She doesn't often go to the cinema.
- I don't get up early at the weekend.
- They don't speak English very well.

❖ **Interrogative form**

Do + I / You / We / They + V_infinitive
Does + He/She/It + V_infinitive

Example:

- Do they speak foreign languages?
- Does your sister play the piano?

❖ **Questions and short answers:**

Do you like spaghetti?
Yes, I do.

No, I don't.

Does she know Bulgarian?

Yes, she does.

No, she doesn't.

b. Use

❖ When we talk about things that happen repeatedly or habitually with time expressions such as always, often, sometimes, usually, seldom, on Saturdays, rarely, never, every day, etc.

Example:

J This flow of charge creates an electric current

J I usually sleep late on Sunday morning.

❖ To indicate general truths, facts and scientific laws

Example:

J The sun rises in the east.

J Water freezes at 0°C (32°F)

2.2 Exercises

1. Using the words in parentheses, complete the text below with the appropriate tenses, then click the "Check" button to check your answers.

a. Every Monday, Sally (drive).....her kids to football practice.

b. Usually, I (work) ..... as a secretary at ABT, but this summer I (study).....French at a language school in Paris. That is why I am in Paris.

c. I hate living in Seattle because it (rain, always) .....

d. I'm sorry I can't hear what you (say)..... because everybody (talk) .....so loudly.

e. Justin (write, currently).....a book about his adventures in Tibet. I hope he can find a good publisher when he is finished.

f. Jim: Do you want to come over for dinner tonight?

Denise: Oh, I'm sorry, I can't. I (go).....to a movie tonight with some friends.

g. The business cards (be, normally).....printed by a company in New York. Their prices (be)..... inexpensive, yet the quality of their work is quite good.

h. This delicious chocolate (be) ..... made by a small chocolaty in Zurich, Switzerland.

2. Form questions.

Example: Where / they / to have / breakfast

Where do they have breakfast?

a) how / Linda / to go / to the park

.....

b) Marie and Joe / to like / homework

.....

c) why / you / to ride / your bike

.....

d) what / they / to eat / for breakfast

.....

e) can / Ron / to speak / English

.....

f) Frank / to read / comics

.....

g) where / she / to live

.....

h) to be / Peter / from Austria

.....

i) you / to walk / to school

.....

j) when / his mum / to come / home

.....

3. Negative the sentences.

Example: He works on the computer. - **He does not work on the computer.**

a. The children know the answer.

.....

b. He is from Spain.

.....

c. The kite flies into the air.

.....

d. Kevin plays basketball.

.....

e. Anne and Sue carry a box.

.....

f. Steve can make breakfast.

.....

g. Sandy washes her hair. I run to school.

.....

h. Mr Smith teaches French.

.....

III. CONTENT

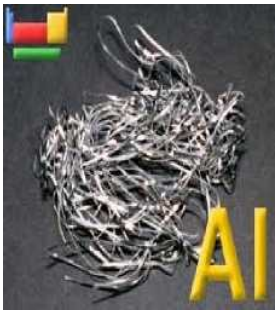
Mục tiêu: Hình thành kiến thức và kỹ năng đọc hiểu cho người học để người học có thể đọc được một số tài liệu liên quan đến vật liệu điện bằng tiếng Anh.

3.1. Conducting Materials

Conducting materials are classified as low resistivity materials and high resistivity materials.

Low resistivity materials: The conducting materials having resistivity between 10-8 to 10-6 ohm-m come under this category and are used in transmission and distribution lines, transformers and motor windings such as copper, aluminium, steel, ...

Copper



aluminium

steel

Properties:

a) Low temperature coefficient: For minimum variations in voltage drop and power loss with the change in temperature, these materials should have low temperature coefficient.

b) Sufficient mechanical strength: These materials must withstand the mechanical stresses developed during its use for particular applications.

c) Ductility: The material to be used for conductors must be ductile so that it can be drawn and moulded into different sizes and shapes.

d) Solderability: The conducting materials are required to be joined and the joint must have minimum contact resistance. These materials must have a good solderability.

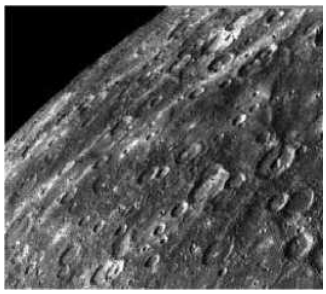
e) Resistance to corrosion: The material should have a high resistance to corrosion so that it should not be corroded when used in different environmental conditions.

High resistivity materials: The conducting materials having resistivity between 10-6 to 10-3 ohm-m come under this category and are used for making

resistance elements for heating devices, precision instruments, rheostats etc such as manganin, nichrome, mercury, platinum, carbon and tungsten, ...

manganin

nichrome



mercury

Properties:

a) Low temperature coefficient: For minimum variations in voltage drop and power loss with the change in temperature, these materials should have low temperature coefficient.

b) High melting point: These materials, which are used as heating elements should have high melting point.

c) Ductility: The material to be used for conductors must be ductile so that it can be drawn and moulded into different sizes and shapes.

d) Oxidation resistance: The material should have a high oxidation resistance so that it should get oxidised when used in different environmental conditions.

e) High mechanical strength: These materials must withstand the mechanical stresses developed during its use for particular applications.

Copper:

Properties

1) It is reddish brown in colour.
2) It is malleable and ductile and can be cast, forged, rolled, drawn and machined.
3) It melts at 10830C.
4) It easily alloys with other metals.
5) Electrical resistivity of copper is

Aluminium:

Properties

1) Pure aluminium is silver white in colour.
2) It is a ductile metal and can be put to a shape by rolling, drawing and forging.
3) It melts at 6550 C.
4) It is resistant to corrosion.

1.7x10-8 O-m.
6) Tensile strength for copper is 210 MN/m2.
7) It is highly resistant to corrosion.
8) It is a non-magnetic material.

Applications: Copper is used in conductor wires, coil windings of generators and transformers, cables, busbars etc. Alloys of copper (like Brass, Bronze, Constantan, Manganin etc) are very useful for different purposes.

5) Its tensile strength is 60MN/m2.
6) It can be alloyed with other elements.
7) Annealing can soften it.
8) It has a higher thermal conductivity.

Applications: Aluminium is widely used as conductor for power transmission and distribution. It is used in overhead transmission lines, busbars, ACSR conductors etc.

3.2. Semiconducting Materials

These are the materials, which possess the electrical resistivity in between that of conductors and insulators. They are used for the manufacture of diodes and transistors. Also the number of valence electrons is equal to four. There is a small forbidden energy gap of about 1eV between the conduction and the valence band. Examples: germanium, silicon, selenium, etc.

germanium

silicon

Properties:

Substances like carbon, silicon, germanium whose electrical conductivity lies in between the conductors and insulators are known as

semiconductors. The valence band of these substances is almost filled, but the conduction band is almost empty. The forbidden energy gap between valence and conduction band is very small (1ev). Therefore comparatively a smaller electric field is required to push the valence electrons to the conduction band. This is the reason, why such materials under ordinary conditions do not conduct current and behaves as an insulator. Even at room temperature, when some heat energy is imparted to the valence electrons, a few of them cross over to the conduction band imparting minor conductivity to the semiconductors. As the temperature is increased, more valence electrons cross over to the conduction band and the conductivity of the material increases. Thus these materials have negative temperature coefficient of resistance.

3.3. Insulating Materials

These are the materials, which do not allow the current to pass through them without any appreciable loss. They have very high electrical resistance and are also available in a large variety to cover different applications. Some of the specific insulating materials are used for the purpose of storing of an electrical energy and are called dielectric materials such as mica, ceramic, paper etc. These materials are used as a dielectric in capacitors. Also the number of valence electrons is more than four. The energy gap between valence and conduction band is very large (more than 5-6 eV).

Examples: Mica, rubber, ceramics, glass, diamond etc.

mica

ceramics

glass

Plastic materials can be classified into thermoplastic and thermosetting plastics.

Thermoplastic materials:

The properties of these plastic materials do not change considerably if they are melted and then cooled and solidify. They can be repeatedly melted or dissolved in various solvents. They are more elastic, less brittle and do not lose elasticity when subjected to prolonged heating. They are less apt to age thermally. They can be remoulded again and again in any shape after heating. Many of them possess extraordinary high insulating properties and are water repellent. They are polymers of linear structure, i.e. their molecules are elongated and are thread like. This, type of structure is fusible, soluble, highly plastic, capable of forming thin flexible threads and films. Examples are Polytetra Flouroethylene (P.T.F.E. or Teflon), Polyvinyl Chloride (P.V.C.).

Thermosetting Plastic Materials:

They undergo great changes when subjected to high temperatures for quite sometimes. They are said to be baked and no longer can melt or be dissolved. They are less elastic, more brittle and lose their elasticity when subjected to prolonged heating. So they cannot be remoulded in different shapes once they are set and hardened. They are used, when an insulation is to withstand high temperatures without melting or losing its shape and mechanical strength. Thermosetting plastic substances are space- polymers and the molecules branch off in various directions during polymerisation.

Examples of the natural insulating materials are cotton, rubber, wood, mica.

cotton

Rubber

wood

3.4. Magnetic Materials

Soft magnetic materials:

They have small enclosed area of hysteresis loop, high permeability, high saturation value, low eddy current losses which are achieved by using laminated cores, less residual magnetism. Soft magnetic materials retain their magnetism as long as they

are energised by an external magnetic field; Example: Alpha iron, super permalloy (Ni-Fe-Mo), silicon ferrite. Soft magnetic materials are used for the construction of cores for electrical machines, transformers, electromagnets reactors and cores of audio frequency couplings and matching transformers in telecommunication.

Hard Magnetic materials:

They have a gradually rising magnetization curve with large hysteresis loop area and hence large energy losses. They have high value of retentivity and high value of coercivity and low permeability. To saturate the hard magnetic materials, a high magnetizing force is required. Hard magnetic materials have the property of retaining their magnetism even after the magnetising field is removed. Example: Alnico (Al-Ni-Co), Cobalt DE04 steel and retaining the same for a long time. Due to this property they are used in the manufacture of permanent magnets.

3.5. Special Materials

Each of the special materials described below has a definite game effect. Some creatures have damage reduction based on their creature type or core concept. Some are resistant to all but a special type of damage, such as that dealt by evil-aligned weapons or bludgeoning weapons. Others are vulnerable to weapons of a particular material. Characters may choose to carry several different types of weapons, depending upon the campaign and types of creatures they most commonly encounter.

Adamantine: This ultrahard metal adds to the quality of a weapon or suit of armor.

IV. EXERCISE

Mục tiêu: Kiểm tra kết quả đạt được của người học về sự hiểu biết các từ vựng chuyên môn cũng như ngữ pháp, kiến thức và kỹ năng đọc hiểu đã được học để hoàn thành các bài tập ứng dụng cũng như áp dụng vào trong môi trường làm thực tế sau khi tốt nghiệp.

1. Complete the sentences using the words below:

conducting ductilty *high (2x) transmission*
different transformers *joint*

a) The conducting materials are used in ..... and distribution lines, ...and motor windings.

b) The .....materials should have low.....coefficient.

c) The conducting .....can be drawn and moulded into ..... sizes and shapes thanks to its .....

d) The ..... of the conducting materials must have ..... contact resistance.

e) The conducting materials should have a..... resistance to corrosion.

2. Answer the following questions

a) What are the conducting materials used for?

b) Why should the high resistivity materials have low temperature coefficient?

c) What are the properties of the copper?

d) What are the applications of the copper?

e) How much degree does the aluminium melt?

3. Decide True or False

a) The semiconducting materials are used to make diodes and transistors.

b) Under ordinary conditions, the semiconducting materials do not conduct current and behaves as an insulator.

c) The insulating materials have very high electrical resistance. ...

d) The properties of thermoplastic materials do not change considerably if they are melted and then cooled and solidify.

e) Soft magnetic materials are used for the construction of cores for electrical machines, transformers. ...

4. Listen and write the missing words:

The hard (1).....materials have a gradually rising magnetization curve with large hysteresis loop area and hence large energy (2) .....They have high value of (3)..... and high value of coercivity and low (4).....
To saturate the hard magnetic materials, a high magnetizing (5) ..... is required. Hard magnetic materials have the property of retaining their (6) even after the magnetising field is(7) .....Example: Alnico (AlNi-Co), Cobalt DE04 steel and retaining the same for a (8)..... time.
Due to this property (9)..... are used in the manufacture of permanent (10)

h) do not allow the current to pass through them without any appreciable loss

5. Match the ideas

1) Adamantine	a) as hard as normal wood but very light
2) Darkwood	b) lighter than iron but just as hard.
3) Dragonhide	c) adds to the quality of a weapon or suit of armor
4) Mithral	d) has 10 hit points per inch of thickness and hardness 10
5)Conducting materials	e) possess the electrical resistivity in between that of conductors and insulators
6) Semiconductors	f) have small enclosed area of hysteresis loop, high permeability, high saturation value, low eddy current losses
7) Insulators	g) are classified as low resistivity materials and high resistivity materials.
8) Magnetic materials	

V. COVERSATION *Mục tiêu:* Hình thành kỹ năng giao tiếp cho người học để người học có tự tin giao tiếp trong môi trường làm việc

Mark: Hi, John!

John: Hi, Mark. How are you?

Mark: I'm fine. Thank you. And you?

John: I'm not bad. My boss usually asks me to buy some electrical materials for the project.

Mark: Oh, so lucky you. You earn some money from that, don't you?

John: I don't think so. I go to look everywhere for the materials but I can't find out all the materials.

Mark: Do you need any help? I will buy insulating materials from my sister's shop next to my house for you. Don't worry about it so much.

John: Thanks a lot. See you tomorrow.

Mark: See you.

Unit 2: INSTALL SATELLITE COAX CABLES AND ELECTRIC EQUIPMENT

Nhằm đáp ứng yêu cầu sử dụng anh ngữ trong lĩnh vực điện, bài học này giúp cho người học có kiến thức và kỹ năng về anh ngữ để đọc và hiểu được các bước lắp đặt và đi dây cáp, kiểm tra và vận hành thử các thiết bị điện đồng thời cung cấp cho người học vốn thuật ngữ tiếng Anh chuyên ngành để người học có thể sử dụng trong môi trường làm việc tại doanh nghiệp nước ngoài và đọc các tài liệu tham khảo chuyên ngành điện bằng tiếng Anh.

Mục tiêu của bài học:

Sau khi học xong bài học này, sinh viên có khả năng sử dụng kiến thức và kỹ năng anh ngữ:

- Đọc hiểu được các từ trong phương pháp lắp đặt thiết bị điện, cụ thể là cáp đồng trục và quy trình cơ bản lắp đặt bằng tiếng anh
- Hiểu các từ vựng và phát âm chính xác các thuật ngữ chuyên ngành về các khí cụ điện dùng trong lắp đặt và quy trình lắp đặt cáp bằng tiếng anh
- Ứng dụng thì hiện tại tiếp diễn để giao tiếp trong thực tế
- Tự tin giao tiếp trong môi trường doanh nghiệp

Nội dung của bài học:

I. VOCABULARY

Mục tiêu: Cung cấp cho người học các từ vựng bằng tiếng anh trong lĩnh vực lắp đặt thiết điện, cáp điện để người học có thể đọc và hiểu được từ chuyên môn liên quan đến một số tài liệu trong lĩnh vực điện điện tử công nghiệp bằng tiếng anh.

Rule (n)	Quy tắc	Clamp (n)	:	Cái kìm
Installation (n)	Cách lắp đặt	Route (v)	:	Định vị
Regulation (n)	Quy định	Staple (n)	:	Đinh móc U
Recognize (v)	Nhận biết	Rooftop (adj)		Trên mái
Body (n)	Cơ quan	Closet (n)	:	Buồng, kho
Constraint (n)	Giới hạn	Affix (v)	:	Gắn vào
Procedure (n)	Quy trình	Off air		Mặt đất
Conformity (n)	Sự tuân thủ	Mount (v)	:	Thiết lập
Comply (v)	Tuân theo	Snug bolt (n)	:	Tai bulong
Coax (n) Tuner	Cáp đồng trục	Finger tight	:	Vặn tay
(n)	Bộ phận dò sóng	Satellite (n)	:	Vệ tinh

High definition	(n)	Độ phân giải cao	Diplexer (n)	:	Bộ phối hợp
Antenna	(n)	Ăng ten	Alternativel (a)	:	Tương tự
Receiver	(n)	Máy thu	Wrench (n)	:	Cờ lê
DTV (n)		Digital TV	Voltmeter (n)	:	Vôn kế
Ground block	(n)	Ròng rọc đáy	Probe (n)	:	Đầu dò
Permissible	(adj)	Có thể	Shielding (n)	:	Lớp chắn
Screw	(n)	Đinh vít	Stud (n)	:	Mũ đinh, chốt
Bus bar	(n)	Thanh cái	Fuse (v)		Cầu chì
Cable tray	(n)	Máng cáp	Switch on/off (v)	:	Công tắc
Support	(n)	Giá đỡ			Mở/ đóng
Substation (n)		Trạm điện	Turn on/off (v)		Mở/ đóng
Transformer (n)		Máy biến thế	Transformer (n)	:	Máy biến thế
Overload (n)		Quá tải	Transformation of electricity (n)	:	Sự biến đổi điện năng
Circuit (n)		Mạch điện	Alternating Current (n)	:	Xoay chiều Dòng điện
Screwdriver (n)		Cái tua vít	High voltage (n)		Cao áp
Bolt (n)		Bu lông	Low voltage (n)	:	Hạ áp
Nut (n)		Đai ốc	Backward (adv)	:	Ngược lại
Coil (n)		Cuộn dây	Nowadays (adv)	:	Ngay nay
Put the plug in(v)		Cắm phích vào	by; due to ...; because of ... ; out of as; since;		Bởi vì, do
Shock (v)		Giật điện			
to use; to employ (v)		Sư dung			
Electric energy (n)		Điện năng			

II. GRAMMAR

Mục tiêu: Cung cấp cho người học cấu trúc ngữ pháp về thì hiện tại tiếp diễn để người học có thể sử dụng trong quá trình viết hoặc giao tiếp trong công việc tại nơi làm việc hoặc trong đời sống hằng ngày có liên quan.

2.1 The Present Continuous Tense

The Present Continuous Tense

a. Structure

The present continuous describes an action that takes place in the present and is still going on in the present.

*** Declarative Sentences**

Subject Auxiliary verb		Verb + ing
e.g. I/A dog etc.	am/is / are	e.g. working/going/making

Example:

J I am reading a book.

f They are swimming in the sea.

*** Negative Sentences**

Subject		**Auxiliary verb + not**		**Verb + ing**
e.g. I/A dog etc.	+	.. . am/is/ are + not	+	e.g. working/going/making

Examples

f He is not joking

f We aren't waiting for my uncle

***Questions**

Auxiliary verb	**Subject**	**Verb + ing**
Am / Is / Are	e.g. I/A dog	e.g. working/going/making

Examples:

f Is she eating my cake now?

f Are they having the party on Friday or Saturday?

b. Use

❖ We most often use the Present Continuous when we talk about something which is happening at the time of speaking (now, at the moment**): Examples:**

f Pamela is sleeping in the bedroom.

f The telephone is ringing!

❖ Present Continuous is also used to express current trends:

Examples:

f Fuel prices are rising constantly because of strong demand.

f On-line shopping is growing rapidly nowdays.

❖ Sometimes we use the Present Continuous to describe a planned action in the near future:

Examples:

f I'm leaving for Vienna tomorrow morning.

f We are having lunch at 12.30 o'clock

2.2 Exercises

1. Put the correct verbs

1. It..... (to rain) right now.
2. I..... (to play)football on Saturdays.
3. They.....(to play)football every Tuesday.
4. She.....(to learn) English at school (2 hours a week).
5. My girl friend.....(to cook)in the kitchen now.
6. Maggy.....(to cook) for her grandmother on Sundays.

7. Billy ..... (to love)Mary.
8. Billy and I .....(to like)Chinese food.
9. Billy's father..... (to jog)in the park today.
10. Nicholas ..... (to read)a fantastic book, keep silent !
11. Erik and Beth.....(to want) to go outside.
12. He..... (to play)on his computer this afternoon.
13. We.....(to eat) chicken wings at the moment: he is very hungry.
14. What.....(you /do) ?I'm sleeping.

2. Write the correct sentences

a. Earn/work/hard/ money/they/to.

.....

b. The/to /actor/become a/I / professional /train

.....

c. Pass/ study/to/ hard /exam/ the/Luke

.....

d. Look/they/their/for/in/now/mother/the/hospital

.....

e. a/she/find/job/good?

.....

f. My/i/ sister/on /the/phone/my/talk/father

.....

g. Time/ a/to/spend/they/lot/learn/of/English

.....

h. Write/I /to/letter/my/parents

.....

i. Me/my/continually /talk/boss/to

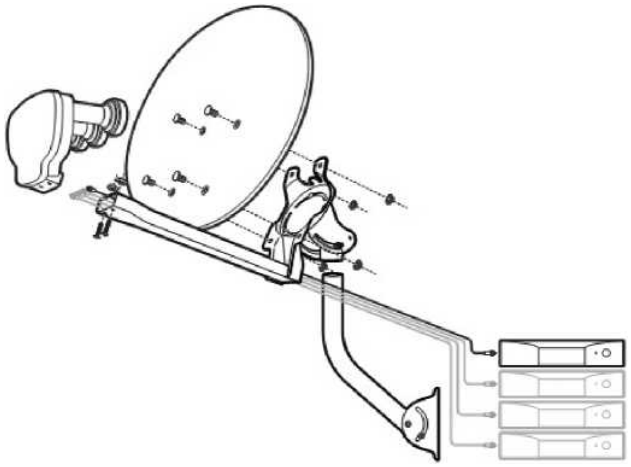
.....

j. Live/brother/at/city/work/and/hue

.....

III. CONTENT

Mục tiêu: Hình thành kiến thức và kỹ đọc hiểu cho người học để người học có thể đọc được một số tài liệu liên quan đến lắp đặt cáp đồng trục bằng tiếng Anh.



A. General rules for installation

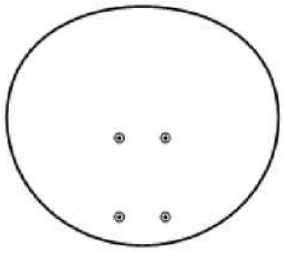
In most countries, electrical installations shall comply with more than one set of regulations, issued by National Authorities or by recognized private bodies. It is essential to take into account these local constraints before starting the design. In so far as control procedures are respected, quality and safety will be assured only if:

The initial checking of conformity of the electrical installation with the standard and regulation has been achieved.

The electrical equipment comply with standards

The periodic checking of the installation recommended by the equipment manufacturer is respected.

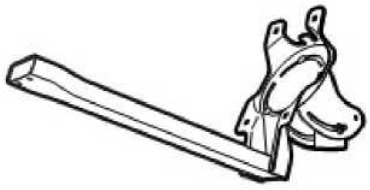
B. Equipment used to install:



Multi-Satellite Dish Reflector

????
® ® ®

Dish Mounting Hardware

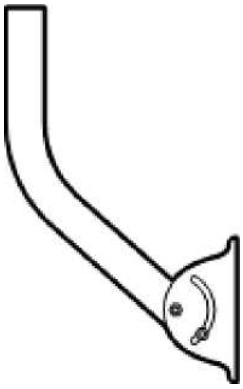


LNB Arm/Antenna Back Assembly

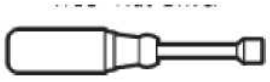
Triple-head, Multi-Satellite LNB with built-in Multi-Switch for four Independent Outputs

LNB Mounting Hardware

Grounding Screw

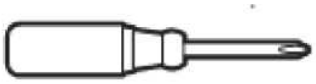


EZALIGN™ Mast



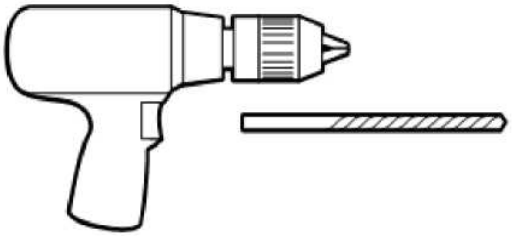
7/16” Nut Driver

Adjustable Wrench



Screwdriver (Phillips)

Magnetic Compass

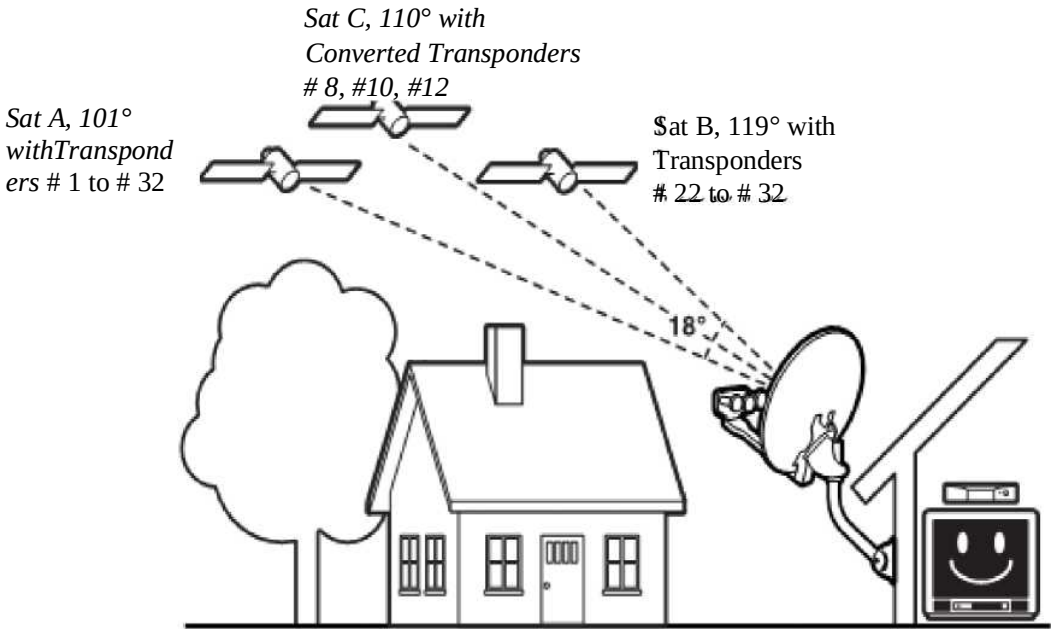


Electric Drill and Bit

C. Steps to install

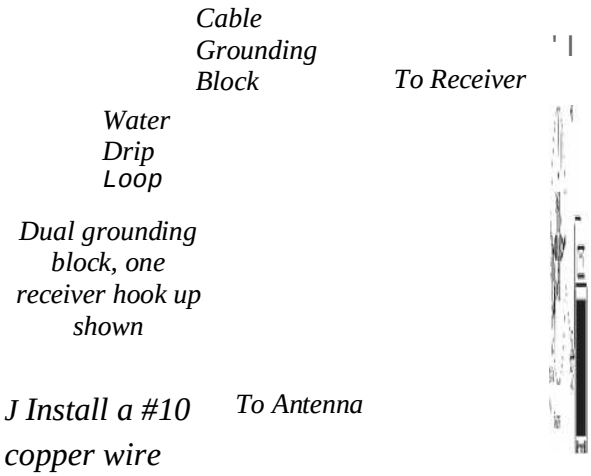
f Select a quality RG6 (coax) cable for installation between the dish and each tuner.

f Since most Direct TV (DTV) DVRs and TiVOs have dual tuners, consider running two cables instead of just one. In the case of the DTV High Definition DVR or DTV High Definition TiVO, consider three cables if you wish to connect an “off air” antenna to receive local channels that are not available from DTV. If DVRs are not planned, installing one cable will supply a simple DTV receiver.



No trees, leaves, buildings can be in the line-of-sight between antenna and satellites.

J Install a ground block in a convenient location anywhere between the dish and prior to entering the home. It is permissible to locate the ground block inside the home, but it should be *as close to the point of entry as possible.* If unable to purchase a ground block to accept all inputs and outputs, it will be required to add additional ground blocks as needed to accommodate all the connections.



J Install a #10 copper wire between the house ground point (ground rod, electric meter, etc.) and the grounding terminal screw of the new ground block. These two

points *must* be connected together. Use a clamp designed for the purpose to connect the #10 wire to the house's ground point. Do not under any circumstances disconnect or loosen existing ground connections to install the new #10 wire. Leave enough ground wire to “thread” through each ground block(s) ground terminal. Route the cable and secure with staples to the mounting surface. Securely tighten the ground terminal screw to the ground wire.

f *Run coax cables from each of the dish's output terminals into one side of the ground block.*

f Run a cable from any rooftop UHF/VHF/FM antenna (if desired) to the same side of the ground block as the dish coax.

f Run the same number of cables that were run into the ground block, between the ground block and a central location. A utility closet, a point near the telephone distribution block or electrical panel area is ideal. Label the coax cables “dish” or other meaningful manner. Be sure to label the coax from a roof top antenna if extended from the ground block.

f *Run cables from each tuner to the central location.* Affix labels to each of the cables - if two cables are connected to a single set top box, such as the case for a TiVO or DVR in a living room, label the cables “LR1” and the other “LR2” or some other meaningful term.

f *Select a multiswitch by determining how many inputs and outputs are needed.*

The number of inputs equals the number of LNBs on the dish *plus one*. A dual LNB dish would require a three input multiswitch. The extra input is to mix in an “off air” antenna or CATV signal. The number of outputs of the multiswitch equals the number of *tuners* (not the number of receivers or set top boxes) in your system. A system of three set top boxes consisting of two DTV receivers and a DTV DVR or TiVO with two tuners would require a four output multiswitch. Of course, if you add another receiver later, you'll need a multiswitch that has additional outputs. Try to buy a multiswitch with enough extra outputs to allow your system to “grow”. Cascadable multiswitches can be installed “down line” from other multiswitches, but must be identified for that use.

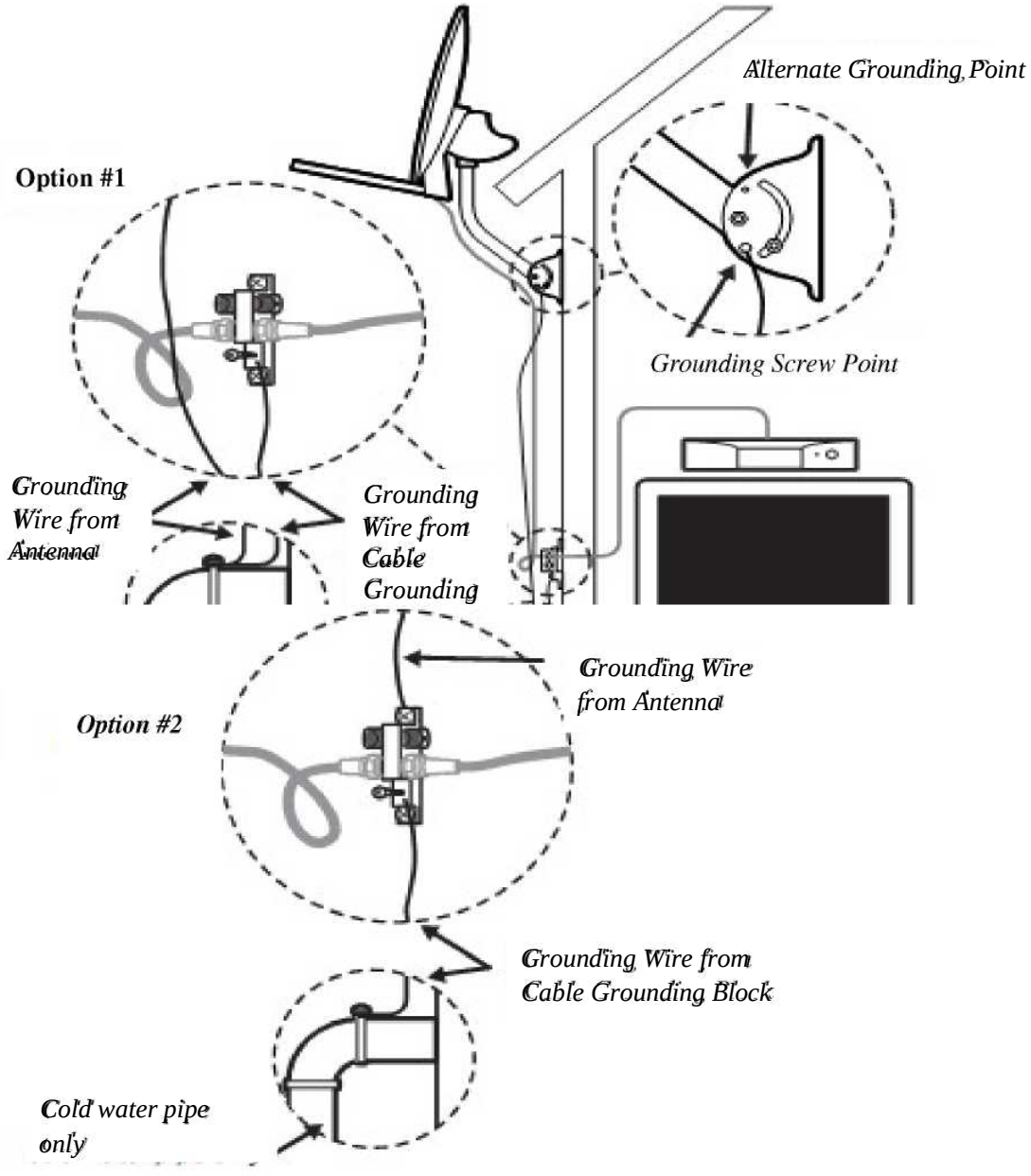
A “3X4” Multiswitch. It has two LNB (dish) inputs, a single ANT (antenna or cable) input and four RXn (receiver) outputs. Three inputs and four outputs - hence 3X4.

f *Multiswitches become more expensive as the number of inputs and outputs increase*. DTV will install as many as needed free

of charge when they add orchange equipment such as receivers or antennas. It's best to let DTV do this, but there is no reason why you can't if the cost is not an issue.

ƒ *Mount the multiswitch(es) and connect the dish coax cables to the dish input connector, and the antenna or Cable TV coax to the antenna input connector.* Connect the coax cables from the receivers to the the multiswitch output connectors. Snug the connectors to "finger tight" for now.

ƒ *At the receiver end, connect coax cables(s) to each tuner input(s').* The satellite cables connect to the satellite inputs - it does not matter which one. If you ran only one satellite cable, connect it to satellite input 1. If this is a location that will need an off air antenna input as well, instead of connecting a cable directly into the tuner, connect it to a "diplexer" input instead. The diplexer will have a diagram indicating satellite and UHF/VHF connections. The diplexer "satellite out" connects to the DTV receiver tuner, and the UHF/VHF can connect to the "antenna" or "CATV" input of the DTV set top box OR even an FM Stereo receiver.



f Check picture quality at each location. Change channels to test both tuners for TiVOs and DVRs. Alternatively, use the receiver's set up pages to view signal strengths of each satellite and tuner. Check connections and hardware until satisfied.

f Securely tighten the coax connectors along each cable whereever they appear with a wrench, starting at the TV, receiver, multiswitch and ending at the ground block or dish. Do not over-tighten.

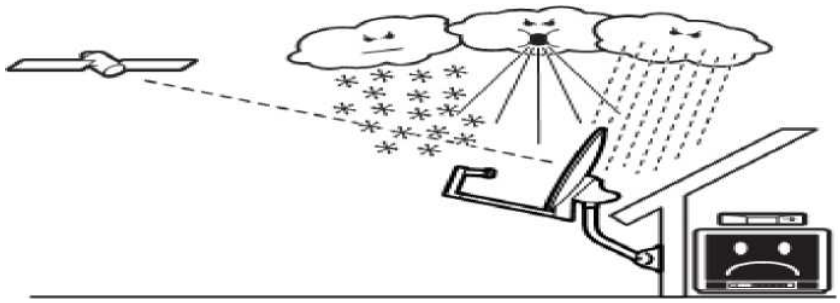
C. Test the voltage of the cable

Disconnect the coaxial cable from the TV or cable box and position it for easy access.

Set the voltmeter to read AC (alternating current) voltage.

Touch one probe of the voltmeter to the center wire. At the same time, touch the other probe to the shielding, which will be the outside area that screws into the coaxial stud.

Read the display on the multimeter to determine the voltage.



IV. EXERCISE *Mục tiêu:* Kiểm tra kết quả đạt được của người học về sự hiểu biết các từ vựng chuyên môn cũng như ngữ pháp, kiến thức và kỹ năng đọc hiểu đã được học để hoàn thành các bài tập ứng dụng cũng như áp dụng vào trong môi trường làm thực tế sau khi tốt nghiệp.

1. Complete the sentences using the words below:

periodic checking *cable* *comply* *tuner* *equipment fourteen*

a. You have to ..... with the standards and regulations of electrical installation.

b. You have to choose electric..... which complies with standards.

c. You have to respect the ..... of the installation by the equipment manufacturer.

d. There are .....steps to install satellite coax cables and electric equipment.

e. The first step is to select a quality coaxial..... for installation between the dish and each.....

2. Answer the following questions:

a. Why do we have to run two cables instead of just one?

b. What do you have to connect an “offair” antenna for DTV?

c. What do you must do in the fourth step?

d. What do you have to consider if you want to a multiswtich?

e. What will you do at last step?

3. Decide True or False

a. Run coax cables from each of the dish's output terminals into one side of the ground block after run a cable from any rooftop UHF/VHF/FM antenna to the same side of the ground block as the dish coax.

b. The function of the extra input is to mix in an “off air” antenna or CATV signal.

c. The less number of inputs and outputs, the cheaper multiswitches will be.

d. Connect the dish coax cables to the dish output connector.

e. Use the receiver’s set up pages to view signal strengths of each satellite and tuner.

4. Listen and Check

1. Disconnect the coaxial ..... from the TV or cable box and position it for easy access.

2. Set the ..... to read AC (alternating current) voltage.

3. Touch one..... of the voltmeter to the center wire. At the same time, touch the other probe to the....., which will be the outside area that screws into the coaxial .....

4. Read the display on the.....to determine the voltage.

5. Match the ideas

1. If you ran only one satellite cable,	a. you'll need a multiswitch that has additional outputs.
2. If the installation location need an off air antenna input,	b. connect it to satellite input 1.
3. If you add another receiver later,	c. instead of connecting a cable directly into the tuner, connect it to a “diplexer” input.
4. If the number of outputs of the multiswitch is 6,	d. you will have to add additional ground blocks as needed to accommodate all the connections.
5. If unable to purchase a ground block to accept all inputs and outputs,	e. the number of *tuners* in your system is 6.

V. COVERSATION

Mục tiêu: Hình thành kỹ năng giao tiếp cho người học để người học có tự tin giao tiếp

trong môi trường làm việc.

Mimi: Hi, John!

John: Hi, Mimi! How are you?

Mimi: I'm fine. Thanks. And you?

John: Fine. Thank you. How about your exam last Saturday?

Mimi: Oh, it's not really good. Are you installing the coax cables?

John: Yes, I am.

Mimi: How many steps are there?

John: I think there are fourteen steps to install the coax cables for your TV.

Mimi: Oh, it's too much. How can you remember that? Which step are you installing in?

John: It's the twelfth step. I am finishing it three minutes later.

Mimi: Really? It's fantastic. Maybe I must ask you to install my cables in the future.

John: Of course. Because You are my best girlfriend in my life.

Mimi: Thanks for the good words. Oh, my mother is calling me. I must go home now. Bye, honey.

John: Byebye my darling.

Module 3: INSTALL AND CHECK LOW VOLTAGE PANEL, MEDIUM VOLTAGE PANEL AND CONTROL PANEL

Trong môi trường quốc tế hóa ngày nay, tiếng Anh giữ có vai trò đặc biệt quan trọng, đặc biệt là tiếng Anh chuyên ngành kỹ thuật nói chung, tiếng anh cho ngành điện tử công nghiệp nói riêng. Nội dung bài học này cung cấp cho người học về kiến thức anh ngữ trong lĩnh vực lắp đặt tủ bảng điện hạ thế, trung thế, và tủ bảng điều khiển. Do đó, người học có thể sử dụng các thuật ngữ anh văn để đọc hiểu và nghiên cứu các tài liệu trong lĩnh vực điện có liên quan.

Mục tiêu của bài học:

Sau khi học xong bài học này, sinh viên có kiến thức và kỹ năng về sử dụng anh ng ữ :

- Đọc hiểu được các nguyên tắc, các bước lắp đặt bảng hạ thế, trung thế và bảng điều khiển
- Phát âm chính xác các thuật ngữ chuyên ngành sử dụng trong lắp đặt bảng Điện.
- Nắm vững và áp dụng đúng sáu cấu trúc cơ bản trong tiếng Anh.
- Tự tin hơn để giao tiếp trong môi trường doanh nghiệp
- Đọc hiểu tài liệu tham khảo bằng tiếng anh trong lĩnh vực điện điện tử

Nội dung của bài học:

I. VOCABULARY

Mục tiêu: Cung cấp cho người học các từ vựng bằng tiếng anh trong lĩnh vực lắp đặt các tủ bảng hạ thế, trung thế và tủ bảng điều khiển để người học có thể đọc và hiểu được từ chuyên môn liên quan đến một số tài liệu trong lĩnh vực điện điện tử công nghiệp bằng tiếng Anh.

Module (n) Data	Khối	Snap (v)	Kẹp
(n) Flexibility (n)	Dữ liệu	Extension (n)	Độ giản
Assurance (n)	Tính linh hoạt	Bracket (n)	Giá đỡ
Low voltage (n)	Sự đảm bảo	Snip (v)	Cắt/kéo cắt tôn
Outlet (n)	Điện áp thấp	Crimping (adj)	Gấp mép
Broadband (n)	Nguồn ra	Duplex (n)	Ghép đôi
Excess (n)	Dải băng rộng	Plate (n) Gently	Tấm kim loại
Breaker (n)	Độ dôi	(adv) Adjust (v)	Nhẹ nhàng
Knockouts (n)	Bộ ngắt	Detection (n)	Điều chỉnh
Bushings (n)	Bộ tách	Vessel (n)	Dò tìm
	Bạc lót		Bể chứa

Color-coded (n)	Có mã màu	Feeder (n)	: Cấp đầu vào
Slot (n)	Khe	Bus bar (n)	: Thanh cái
Punch (n)	Cái đột/đục	Compartment (n)	: Buồng/bể
Trim (v)	Xén, tỉa	Keypad (n)	: Bàn phím
Diagonal (adj)	Chéo, góc	Security (n)	An ninh
Cutter (n)	Dao cắt/tiện	Monitoring (adj) :	Kiểm soát
Surge protector (n) :	Bộ chống xung	Sensor (n)	: Cảm biến
Cap (n)	Bệ/nắp	Dials (n)	: Đĩa số
Debris (n)	Mảnh vỡ	Breach (v)	: Nứt/ rạn
Receptacle (n)	Ổ cắm điện	Roam (v)	Chuyể'n vùng
Fuse (n)	Cầu chì	Button (n)	: Nút nhấn
Switch (n)	Công tắc	Alarm (n)	: Đèn báo
Circuit breaker (n) :	CB	Cable lug (n)	: Đầu cáp
Medium voltage wire (n)	Dây điện trung thế	Terminal (n)	: Đấu nối cáp
		Diagram (n)	: Sơ đồ đấu nối
Low voltage wire	Dây điện hạ thế	Principle (n)	: Nguyên lý
Medium voltage	Trung thế	Junction box (n)	: Hộp điện
Line (n)	Đường dây	Earthing (n)	: Sự tiếp đất
Low voltage line	Đường dây hạ thế	Cable tray (n)	: Máng cáp
Medium voltage : motor (n)	Điện trung thế	Neutral cable (n)	: Cáp trung tính
		Test (v)	: Kiểm tra
Low voltage motor (n)	Động cơ Hạ thế	Inspection (n)	: Nghiệm thu
		Commissioning (n) :	Vận hành thử
Capacitor (n)	Động cơ điện	Greater than	: Lớn hơn
Winding (n)	Tủ điện	Less than	: Nhỏ hơn
Except (for) (prep) :	Cuộn dây	Thumbnail-sized :	Cỡ nhỏ
Iron-rich core	Ngoại trừ	Coupling	: Khớp nối
Primary (a)	Lõi dây thép	Transformer	: Máy biến
Secondary (a)	Sơ cấp	Interconnect (v)	: Kết nối
Primary winding :	Thứ cấp	Power grid (n)	Lưới điện
Secondary winding :	Cuộn dây sơ cấp	Eliminate (v)	: Khử
Vary (v)	Cuộn dây thứ cấp	Electronic circuit	Mạch điện tử
Magnetic field (n)	Thay đổi	Magnitude (n)	: Đại lượng
Induce (v)	Từ trường	Basically (adv)	: Cơ bản
Electromotive force : (EMF)	Gây ra Lực điện động	Alertnate = change :	Thay đổi
		Power plant (n)	: Nhà máy điện
Mutual induction :	Sức điện động	Substation (n)	: Trạm biến áp
Load (n)	Hệ số hỗ cảm	Electric meter (n)	: Đồng hồ đo điện
Electric current (n) :	Phụ tải	Electrical appliance :	Thiết bị điện

Primary circuit (n)	: Dòng điện	Direct current	Dòng điện 1chiều
In proportion to turn	: Mạch sơ cấp	Stepped up (v)	Tăng lên
(n) Alternating current	: Tỷ lệ với : Vòng dây Dòng điện xoay	Stepped down (v) Stator (n) Stator winding (n)	Giảm xuống Phần tĩnh Dây quấn tĩnh
Assembly (n)	: chiều	Consist (of) (v)	Gồm Cường độ
Laminated core (n)	: Bộ phận lắp đặt :	Cartridge assembly	Hộp
Winding (n)	Lõi thép lá Dây quấn	(n)	Lắp đặt

II. GRAMMAR

Mục tiêu: Cung cấp cho người học cấu trúc ngữ pháp về các mẫu câu đơn tiếng Anh để người học có thể sử dụng trong quá trình viết hoặc giao tiếp trong công việc tại nơi làm việc hoặc trong đời sống hằng ngày có liên quan.

2.1 The six sentence patterns

1. Subject + Verb
   I swim. Joe swims. They swam.
2. Subject + Verb + Object
   I drive a car. Joe plays the guitar. They ate dinner.
3. Subject + Verb + Complement
   I am busy. Joe became a doctor. They look sick.
4. Subject + Verb + Indirect Object + Direct Object
   I gave her a gift. She teaches us English.
5. Subject + Verb + Object + Complement
   I left the door open. We elected him president. They named her Jane.
6. Subject + Verb+ Adverb
   She dances beautifully.

2.2 Exercise

a. Determine the sentence pattern for each sentence given below

1. The child behaved horribly in the store.
2. On his last trip to Russia in the spring, Hilda finally felt comfortable.
3. In another life I must have been a dancer.
4. Upon his return, the people elected Jasper king of the entire country.
5. My brother showed me the stream behind the wooded area.
6. You are very quiet today.
7. The personality test found Jenkins unsuitable for the position.
8. After much deliberation, Millie bought the biggest car on the lot.
9. Later, Smithers became the most important person in his life.
10. The poor sailor was at sea for a year.

11. Under most circumstances, we would be happy with your work.
12. The professor considered the student a genius at mathematics.
13. Ulcers give people pain.
14. He waited in the rain for an hour.
15. During my teen years, I grew tall.

b. **Make six sentences with the six sentence pattern above**

1. Subject + Verb

2. Subject + Verb + Object

3. Subject + Verb + Complement

4. Subject + Verb + Indirect Object + Direct Object

5. Subject + Verb + Object + Complement

6. Subject + Verb+ Adver

III. CONTENT

Mục tiêu: Hình thành kiến thức và kỹ đọc hiểu cho người học để người học có thể đọc được một số tài liệu liên quan đến lắp đặt và kiểm tra bảng điện áp bằng tiếng Anh.

Passage 1: Install and check low voltage panel

Installing a media network panel with modules for phone, data, and video lines provides flexibility and the assurance that you have reliable connections.

Step 1

Cut openings and install a low-voltage box at each outlet location. Between two studs, cut an opening for the network panel. Run Category 5e cable for phone and data lines and coaxial cable for broadband or satellite lines. This is the hardest and most time-consuming part of the job.

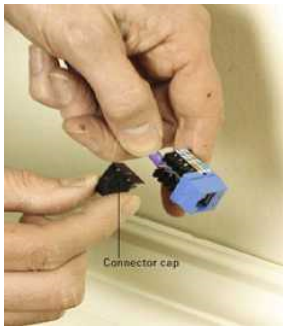
Step 2

Label each end of the cables as you pull them. Leave 12-18 inches of excess cable at each opening. Run a 14/2 electrical cable from the breaker panel to the network box opening. Remove knockouts and fit the box with bushings to protect the cables. Feed the cables into the box and fasten them to the studs.

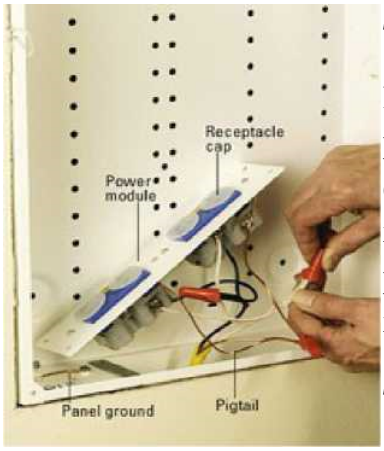
Step 3

Purchase Category 5e connectors, selecting colors to indicate use (blue for data lines and white for phone lines for example). Strip about 21/2 inches of cable jacket and straighten the wires. Using the A color key on the eight-conductor connector, push the wires into their color-coded slots. Press them into place using the punch tool provided.

Step 4



Check to make sure the wires are positioned correctly, and then trim any excess wire with a diagonal cutter. Push the connector cap into place. Fit the coaxial cable with type-F connectors.



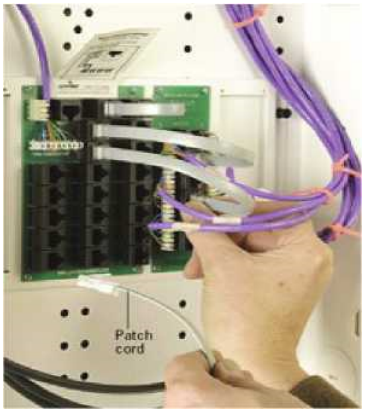
Step 5

Remove knockouts and fasten the surge protector and GFCI power module into the network box. Strip the 14/2 cable and connect the module following the manufacturer's instructions. Fasten the module into place using screws provided. Leave caps in place to guard against debris falling into the receptacles.

Step 6

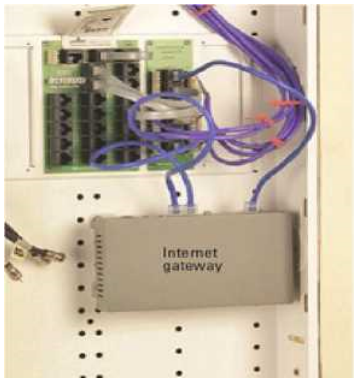
Snap a telephone distribution panel into place. It routes incoming telephone lines. Attach a voice and data module (or more if you need them -- each module serves six wall outlets). Wire each household extension line to this module. Connect patch cords between these modules and the appropriate plug-in.

Step 7



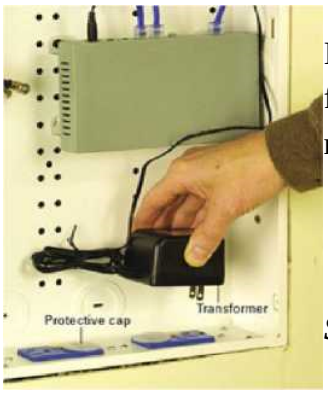
For each incoming line strip about 21/2 inches of cable jacket from the Category 5e cable. Following the manufacturer's instructions straighten and fan the wires and place them into the color-coded brackets adjacent to the appropriate module. Press them into the brackets with a punch tool and snip off the excess.

Step 8



Snap the Internet gateway into place. Connect the incoming modem line to the WAN (wide-area network) port with Category 5e-rated patch cords. Connect computer lines to the gateway. Configure the gateway using the software provided on a CD packaged with the Internet gateway.

Step 9



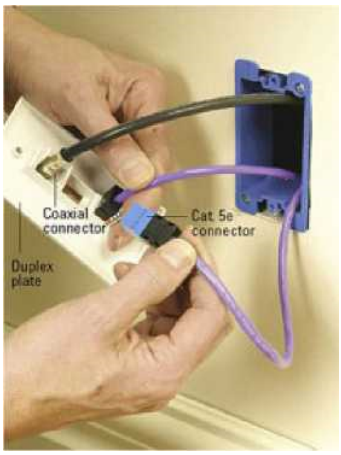
Install a new breaker to power the dedicated 15-amp lines. Test for power. Remove a protective cap from one of the GFCI receptacles and plug in the Internet gateway transformer.

Step 10

Attach type-F coaxial connectors to each incoming coaxial line, using coaxial stripping and crimping tools. Attach the incoming service cable to the CATV/ANT connection. Attach the other lines according to their labels. Plug the module transformer into the power module.

Step 11

Snap the connectors into the duplex plate. (You can choose from plates that have from two to six openings.) Test each line. Gently feed the cables into the wall and attach the plate to the outlet box.



Testing the system:

At the network panel find the cable being tested and touch the tester to it. If the line is correct, the tester emits a high-pitched sound. If there is no sound, check other lines until you find the connected line. Adjust the connection at the panel to correct any mistakes.

Passage 2: : Install and check medium voltage panel

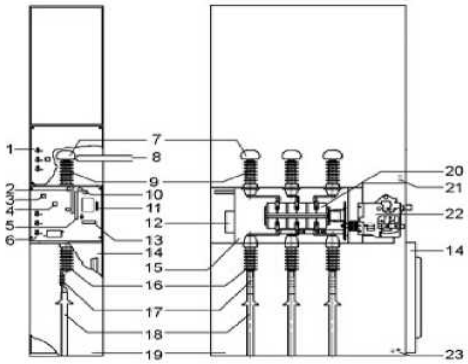


Fig. 2: Cable switch panel CS (shown with main bus in the middle)

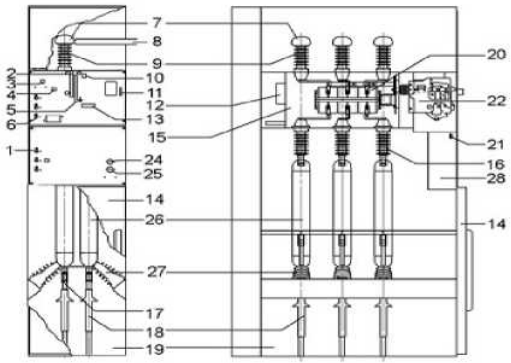
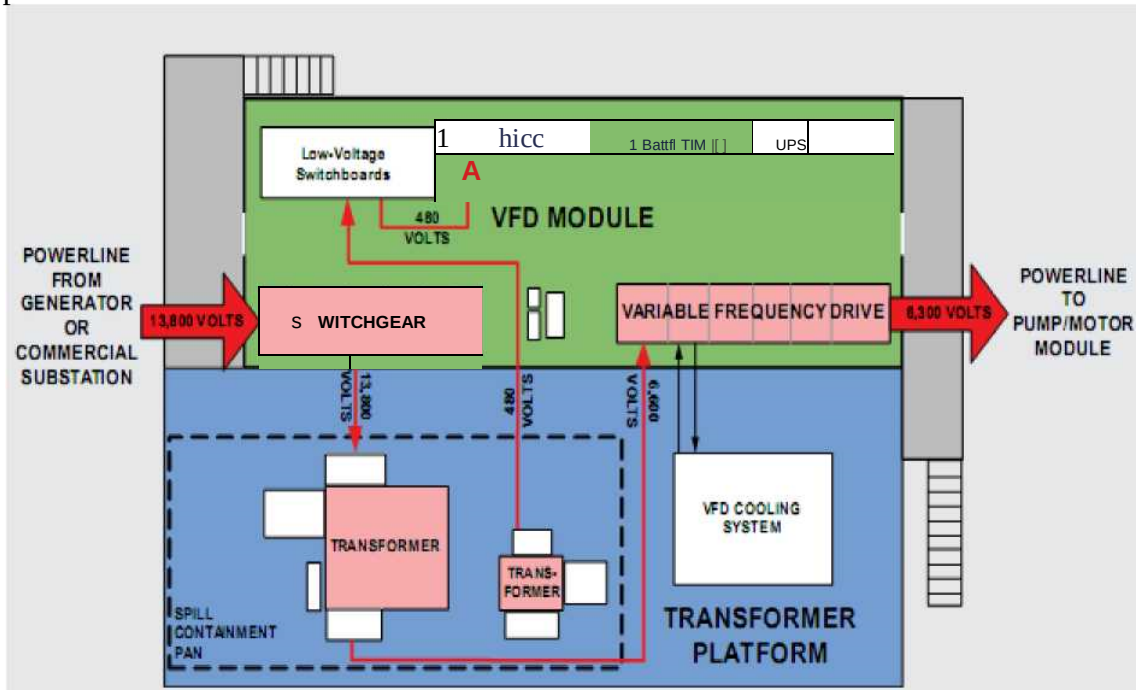


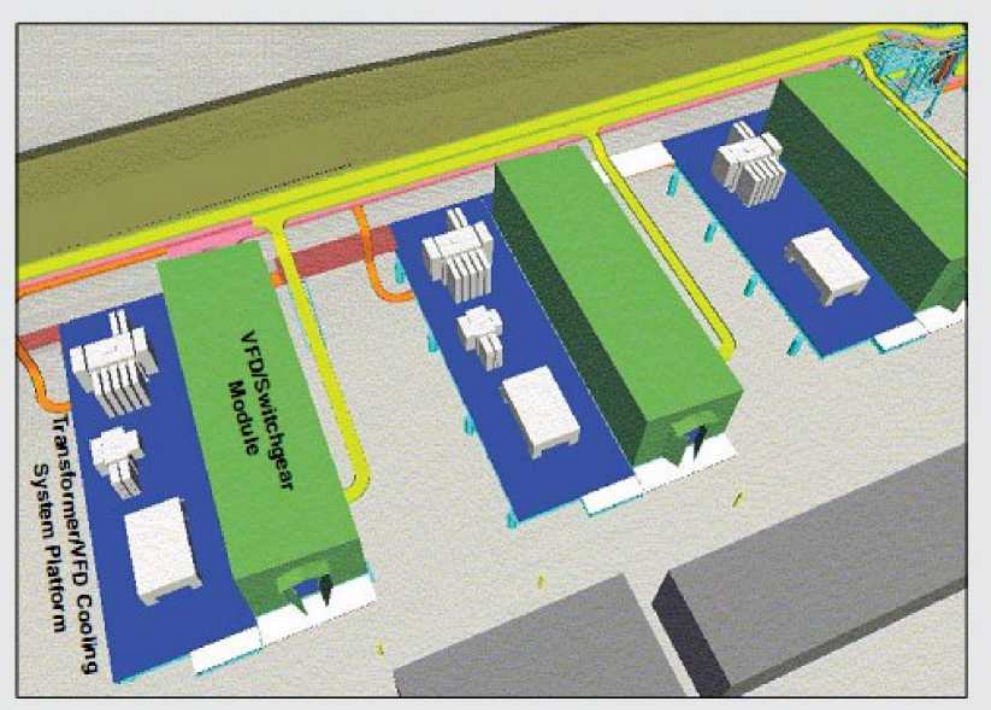
Fig. 3: Fuse switch panel FS (shown with main bus on top)

1. Sockets for capacitive voltage detection system
2. Manual operation for the mechanism of the load-break /disconnecting function
3. Indicator “Fuse intact / Fuse blown”
4. Switch position indicator for load-break and for grounding function “CLOSED-OPEN-GROUNDED”
5. Manual operation for the mechanism of the grounding function
6. Sockets for capacitive voltage detection system
7. Insulating cap on bus bar (for >
14. Cable compartment cover/ door
15. Gas-insulated vessel for switching device
16. Bushing-type insulator for feeder
17. Cable connection
18. Cable termination (not in scope of supply)
19. Cable connection compartment
20. Three-position switch
21. Grounding bus bar
22. Spring-operated mechanism for three-position switch
23. Grounding connection (for location see dimension drawings)
24. Option: Local-remote switch for the

15 kV)
8. Bus bar
9. Bushing-type insulator for bus bar
10. “Ready-for-service” indicator for switching device
11. Interlocking lever of cable compartment cover (with three-position switch)
12. Pressure relief device for switching device
13. Locking device for three-position switch
motor operating mechanism of the three-position switch
25. Option: Momentary-contact rotary control switch “CLOSED - OPEN” for motor operating mechanism for three-position switch
26. Option: HV HRC (current limiting) fuse
27. Post insulator
28. Low voltage compartment



Three VFD modules will be installed at Pump Stations 1, 3, 4, and 9. All three will contain VFDs, while two will also contain switchgear. A platform adjacent to the module will hold a cooling system for the liquid-cooled VFD, a transformer to step down the incoming power from 13,800 volts to 6,600 volts, and a station transformer to provide 480-volt power to the module. The VFD controls the frequency of the power in order to vary the speed of the pump motors. The photo below shows a 3-D rendering of the three VFD modules planned for Pump Station 4.



The photo above shows part of the ABB switchgear with the front panels open. The switchgear consists of a series of sections. The frst on the left houses the control wiring for the switchgear. The section at right contains the circuit breaker and the computer (multifunction protective relay) that controls that breaker. Each VFD module will have six or seven breakers. The computer can sense the full range of current and can be programmed from a laptop computer. In addition, a communications module will interface with the PLC.

Switchgear

The actual switching mechanism is contained in the back of the unit so that operators are never exposed to the medium-voltage components. Copper tubes (or bus) that supply the power to the circuit breakers are shown at left. The photos above show the breaker mechanism and how an operator can lock the breaker.

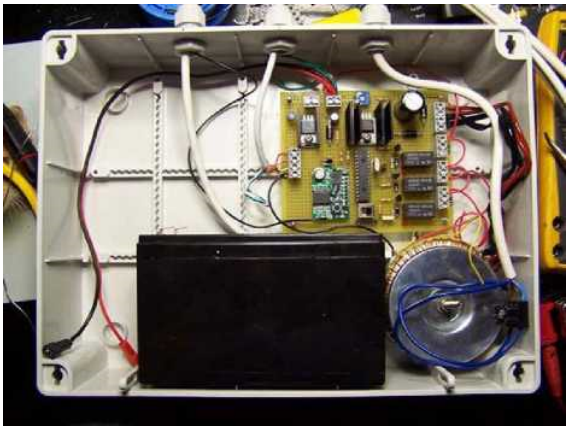
The variable frequency drives (VFD) are manufactured by Allen- Bradley, and each consists of six sections. The section above at left houses the power cable terminations in the back and the controls in the front, while the next section contains the power electronics that condition the power. The other sections house capacitors, the DC link, and the pumps for the liquid cooling system. A single VFD module produces the frequency- controlled power needed to run a single mainline pump motor.

The photo at top left shows the power cable terminations, which are behind a locked panel. The power electronics are seen in the photo above, while some of the capacitors can be seen below left.

Passage 3: Install and check control panel on Home Security System

1. Survey your home and determine how many windows and doors you want to be "switched", or integrated into the home security system.

2. Determine possible locations for the control panel and keypads. You might find it convenient to place a keypad close to the front door. You might also want a keypad close to the bedrooms. The control panel commands the system, and the keypads allow you to program the system and turn it, or its components, on and off.



3. Determine how far away windows and doors are from the control panel so that you know how far wires will be routed if you choose a wired alarm system or how far a wireless system needs to communicate with sensors. Keep in mind that it is difficult to install a hard-wired security system unless your house is still under construction.

4. Decide whether you want a monitored security system that will be monitored 24 hours a day. The central monitoring station ‘watches' your home for a monthly fee. A less expensive alternative is a basic sensor system with a dialer accessory that connects the system to your phone lines and dials preselected numbers if the house's security is breached.

5. Consider your lifestyle. Does anyone in the family often get up in the middle of the night for a snack? Do you have a large pet that roams the house at night? Such circumstances will influence the type of motion sensor you select and how it is installed. It may also call for you or members of your family to take trips to the keypad to prevent false alarms.

IV. EXERCISE

Mục tiêu: Kiểm tra kết quả đạt được của người học về sự hiểu biết các từ vựng chuyên môn cũng như ngữ pháp, kiến thức và kỹ năng đọc hiểu đã được học để hoàn thành các bài tập ứng dụng cũng như áp dụng vào trong môi trường làm thực tế sau khi tốt nghiệp.

1. Complete the sentences

knockouts *screws* *cutter* *first* *bushings* *whether* *voice*

a. The ..... step is cut openings and install a low- voltage box at each outlet location.

b. One of the actions at the second step is to remove ..... and fit the box with..... to protect the cables.

c. You have to check .....the wires are positioned correctly before trimming any excess wire with a diagonal.....

d. At the fifth step, you use .....to fasten the module into place.

e. After snapping a telephone distribution panel into place, you attach a and data module.

2. Answer the following questions

a. How many steps to install a low- voltage panel in your home?

b. Which step do you think is the most important?

c. When do you snap the Internet gateway into place?

d. What do you do at the ninth step?

e. Why do you need to test the system after finishing installation?

3. Decide True or False

a. Nunber 1 is used to refer to sockets for capacitive voltage detection system.

b. Number 4 is used to refer to manual operation for the mechanism of the loadbreak /disconnecting function.

c. Number 2 is used to refer to Indicator “Fuse intact / Fuse blown”

d. Number 16 is used to refer to switch position indicator for load-break and for grounding function "CLOSED-OPEN-GROUNDED"

e. Manual operation for the mechanism of the grounding function is Number 5.

4. Listen and Check

windows keypad sensors wires security program control panel construction how

Survey your home and determine how many..... and doors you want to be “switched”, or integrated into the home..... system.

Determine possible locations for the ..... and keypads. You might find it convenient to place a .....close to the front door. You might also want a keypad close to the bedrooms. The control panel commands the system, and the keypads allow you to ..... the system and turn it, or its components, on and off.

Determine ..... far away windows and doors are from the control panel so that you know how far ..... will be routed if you choose a wired alarm system or how far a wireless system needs to communicate with Keep in mind that it is difficult to install a hard-wired security system unless your house is still under.....

5. Match the ideas

1. If there is no sound,	a. the tester emits a high-pitched sound.
2. If the line is correct,	b. to each incoming coaxial line, using coaxial stripping and crimping tools.
3. Attach type-F coaxial connectors	c. check other lines until you find the connected line.
4. Remove a protective cap	d. between these modules and the appropriate plug-in.
5. Connect patch cords	e. from one of the GFCI receptacles and plug in the Internet gateway transformer.

V. CONVERSATION

Mục tiêu: Hình thành kỹ năng giao tiếp cho người học để người học có tự tin giao tiếp trong môi trường làm việc.

Nina: Hi, Henry

Henry: Hi, Nina. How's everything?

Nina: Well. Thanks. How about you?

Henry: Fine, Thanks.

Nina: Do you know how to install a low voltage panel?

Henry: Yes, I do. I usually do it for my home.

Nina: How many steps are there, Henry? I think it's really good for my test next week.

Henry: Really? Do you need any more help, Nina?

Nina: Do you mind if I meet you tonight to talk about it? I want you to tell me clearly all the steps and I'll take notes.

Henry: No, not at all. What time?

Nina: How about 6.30 at Seven Club?

Henry: That's all right. See you tonight.

Nina: See you.

Module 4: INSTALL AND CHECK LIGHTING CONTROL EQUIPMENT

Trong lĩnh vực lắp đặt điện, thiết bị chiếu sáng và điều khiển chiếu sáng chiếm vị trí thường được ứng dụng. Bài học này giúp cho người học có kiến thức và kỹ năng về anh ngữ để đọc hiểu được cách lắp đặt thiết bị điều khiển chiếu sáng đồng thời cung cấp cho người học vốn thuật ngữ tiếng Anh chuyên ngành để người học có thể sử dụng trong môi trường làm việc với doanh nghiệp nước ngoài và đọc các tài liệu tham khảo chuyên ngành điện bằng tiếng anh.

Mục tiêu của bài học:

Sau khi học xong bài học này, sinh viên có khả năng sử dụng kiến thức và kỹ năng anh ngữ:

- Đọc hiểu được các bước lắp đặt thiết bị chiếu sáng và kiểm tra thiết bị điều khiển chiếu sáng
- Hiểu các từ vựng và phát âm chính xác các thuật ngữ chuyên ngành về thiết bị chiếu sáng và điều khiển chiếu sáng
- Sử dụng dạng bị động đúng trong ngữ cảnh.
- Tự tin giao tiếp trong môi trường doanh nghiệp

Nội dung của bài học:

I. VOCABULARY

Mục tiêu: Cung cấp cho người học các từ vựng bằng tiếng anh trong lĩnh vực lắp đặt các thiết bị chiếu sáng và điều khiển chiếu sáng để người học có thể đọc và hiểu được từ chuyên môn liên quan đến một số tài liệu trong lĩnh vực điện điện tử công nghiệp bằng tiếng Anh.

Remote control (n)	: Điều khiển từ xa : Điều khiển phần cứng	Sodium (n) Vary (v)	Nat ri Khác nhau
Hardware control (n)		Efficiency (n)	Hiệu suất
Switch (n) Lighting	: Công tắc : Chiếu sáng	Closure (n)	Sai số kép
(n) Communication	: Truyền thông	Homeowner (n)	Chủ nhà
(n) Keypad (n)	: Bàn phím	Execute (v)	Thực hiện
Microprocessor (n)	: Bộ vi xử lý	Controller (n)	Bộ điều khiển
Interface (v)	: Giao diện	Capability (n)	Khả năng
Command (n)	: Điều khiển	Contact (n) Closet (n)	Tiếp xúc Tủ
Automated (adj)	: Tự động	Handle (on/off) (v)	Vận hành
Integrate (v)	: Tích hợp	Invariably (adv)	Không đổi
Automatically (adv)	: Tự động	Dimmable (adj)	Mờ

As long as (conj)	Miễn sao	Fixture (n)	: Bộ gá lắp
Incandescent (n)	Nóng sáng	Identically (adv)	: Giống nhau
Fluorescent (n)	Huỳnh quang	Touchscreen (n)	: Màn hình
High-intensity (n)	Cường độ cao	Retrofitable (adj)	: Xúc giác
Discharge (n)	Phóng điện	Internal (adj)	: Bên trong
Low-pressure (n)	Áp suất thấp	Relay (n)	: Rơ le
Generator (n)	Máy phát điện	Active (adj)	: Tích cực
Distribution	Sự phân phối	Effect (n)	Tác động
Communication (n)	Truyền thông	Least (adj)	Nhỏ nhất
Deal (n)	Gỗ thông	Contact (n)	Tiếp xúc
Equipment (n)	Thiết bị	Test (v)	: Kiểm tra
Mechanical (n)	Cơ khí	Triable (adj)	: Thử
Control (n)	Điều khiển	Testable (adj)	: Kiểm tra
Structure (n)	Kết cấu	Insulate (v)	: được
Transportation	Hệ thống	Insulating tape (n)	: Cách điện
systems	truyền tải	Closing (n)	Băng cách điện
Application (n)	Sự ứng dụng	Cut (v)	: Đóng
Conception (n)	Khái niệm	Measure(n)	Cắt
Manually operated :	Vận hành bằng	Joint (n)	: Đo lường
mechanism	tay	Capacity (n)	: Mối nối
Actuating mechanism :	Khởi động	Check (n)	: Điện dung
Form (n)	Hình dạng, mẫu	Property (adj)	Sự kiểm tra
Built-in (v)	Đưa vào		Đặc tính
Tighten a screw (v)	Siết chặt đinh ốc	Magnetization (n)	Từ hóa
Operation (n)	Vận hành	Polarity (n)	Cực tính
Insulation resistance :	Điện trở cách		Quy tắc
	điện	Regulation (n)	Điều chỉnh
Voltage (n)	Điện áp	Adjust (v)	Điều chỉnh
Lighting installation :	Lắp đặt hệ	Adjustable(adj)	Dãy
	thống chiếu sáng	:	Đặt để
Earth wire (n)	Dây nối đất	Series (n)	: Sự chuẩn bị
Protective conductor :	Dây dẫn bảo vệ	Put (v)	Chuẩn bị
Live (L) (adj)	Có điện	Preparation (n)	: Thiết bị
Neutral (adj)	Trung tính	Prepare (v)	: Vật liệu
Twin cable (n)	Cáp xoắn đôi	Equipment (n)	: Nghiên cứu
Fittings (n)	Đồ phụ tùng	Material (adj)	: Nối tiếp
Terminal (n)	Đầu cực	Research (n)	: Băng cách điện
Circuit diagram (n)	Sơ đồ mạch	Consecutive (adj)	Hộp nối
Loop (n)	điện	Insulation tape (n)	: Ván ép, gỗ

Gear (n)	: Mạch	Junction box (n)	dán
Pulley (n)	: Bánh răng	Plywood (n)	Sự bôi trơn
Center-to-center distance	: Cái ròng rọc Khoảng cách từ	Lubrication (n) Specification (n)	Đặc tính Giảm ma sát
Adjacent = near	: tâm đến tâm	Antifriction (n)	Cần trục
Adequate (adj)	: Gần, kế bên Đầy đủ	Crane (n) Hoist (n)	Tời Giá đỡ
		Rack (n) Roller (n)	Con lăn

II. GRAMMAR

Mục tiêu: Cung cấp cho người học cấu trúc ngữ pháp về thì hiện tại đơn trong tiếng Anh để người học có thể sử dụng trong quá trình viết hoặc giao tiếp trong công việc tại nơi làm việc hoặc trong đời sống hằng ngày có liên quan.

2.1 Passive voice of Simple Present Tense

***Affirmative**

S + be + V (past participle) + O

Eg: It is called an insulated plier

Voltmeters are made in a wide range of styles

Electric equipment is used to install eletricity in businesses and homes with safety.

*** Negative**

S + be + not + V (past participle) + O

Eg: It isn't called an insulated plier Voltmeters aren't made in a wide range of styles

*** Yes / No question**

Be + S + V (past participle) + O?

Yes, S+be

No, S + be not

Eg: - Is it called an Amperemeter? Yes, it is / No, it isn't.

- Is Electric equipment used to install eletricity in businesses and homes with safety?

Yes, it is / No, it isn't .

2.2 Exercise

Rewrite the sentences in passive voice.

1. He opens the door. .....
2. We set the table. .....
3. She pays a lot of money.

4 I draw a picture. .....
5 They wear blue shoes. .....
6 They don't help you. .....
7 He doesn't open the book.

8. You do not write the letter,^.....
9. Does your mum pick you up? .....
10. Does the police officer catch the thief? .....

III. CONTENT

Mục tiêu: Hình thành kiến thức và kỹ đọc hiểu cho người học để người học có thể đọc được một số tài liệu liên quan đến lắp đặt thiết bị chiếu sáng và điều khiển chiếu sáng bằng tiếng Anh.

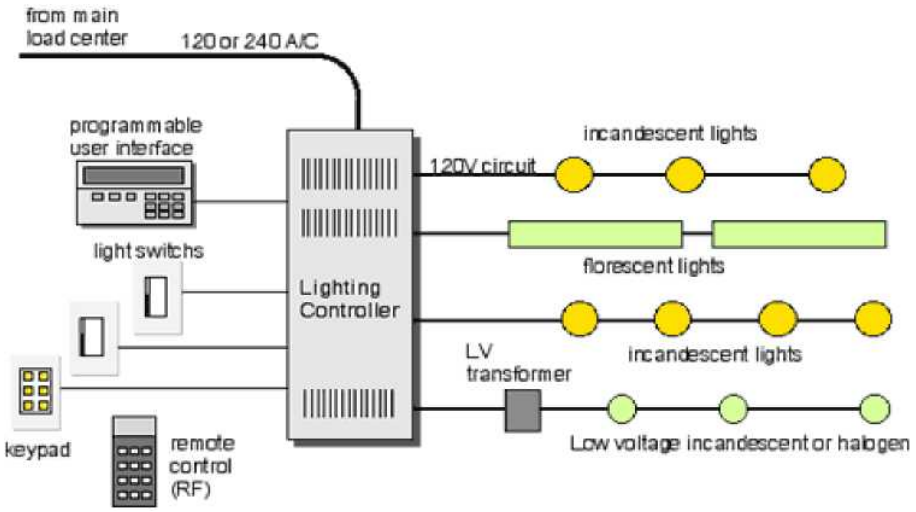
The central control design method uses remote or hardwires control switches to control all your lighting needs in the house. Data communication wiring from keypad is routed back to microprocessor to allow both type of user interfaces to communicate control commands. Automated lighting control can also be integrated into the home system to control lighting on and off automatically. When an individual enters a specific room in the home, the lighting serving the room will immediately be turned on and the light to continue to be on as long as you are in the room.

Light Types

There are four basic types of lighting: incandescent, fluorescent, high- intensity discharge, and low-pressure sodium. Incandescent lighting is the most common type of lighting used in homes. Fluorescent lighting is used primarily in commercial indoor lighting systems, while high-intensity discharge lighting is used only for outdoor lighting applications. Low-pressure sodium lighting is used where color rendering is not important, such as highway and security lighting. These lighting types vary widely in their construction, efficiency, color characteristics, and lamp life.

- **Switch closure** - the homeowner presses a button on a keypad or switch

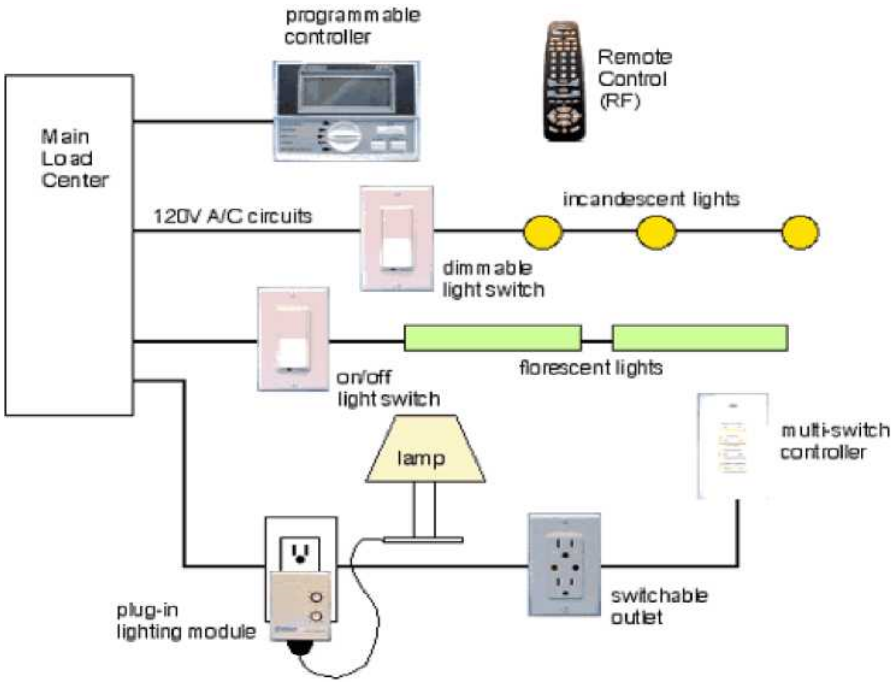
  Time - scenes can be programmed to execute at a time of day
- **Sunrise/sunset** - controllers can use an outside light level sensor or, if they have enough programming capability, can keep a table of local sunrise/sunset times for any date.
- **Contact closure** - any contact closure such as a magnetic door sensor or other security sensor can be used to execute a scene. A magnetic sensor placed on a closet door, for example, can be used to control the light in a closet.



Typical central control lighting system design. The controller handles on/off/dim functions of all attached branch lighting circuits based on user input from keypads, switches, and remote controls.

Distributed Control System

Distributed lighting control systems invariably use PLC (Power Line Carrier) technology such as X10 to control light loads. There are a wide range of PLC controllers and modules available to handle almost any lighting (and appliance) load in the home. For more details on PLC signaling technology and X10 modules. Modules and controllers make up most of the system components.



Typical distributed control lighting system design. The system uses PLC technology to perform on/off/dim functions in X10 light switches and outlets. Control can be from anywhere in the electrical system wiring.

Switchable outlets can replace traditional wall outlets to control plug-in lights. Dimmable and switchable only plug-in modules can be used in existing wall outlets to control lamps or other existing light fixtures with a cord.

Several different types of controllers are available. Programmable controllers can be used to configure scenes based on events such as the time of day. Keypad-like wall switches can control several individual X10 devices.

Zones consisting of several fixtures can be established by combining switching modules into a group by assigning them the same house and unit code. Modules with the same house/unit code will operate identically.

Scenes can be programmed into several wall mount touchscreens or using a PC interfaced to the power line and running lighting automation software. Several wall switches are capable of “learning” scene setting and recalling the scene upon receiving a specific X10 code.

IR and RF remote control devices are also available to control individual modules or groups of modules assigned the same code.

Since PLC distributed control lighting system components rely on the power line as a network, they are subject to potential problems with power line communications and some skill (and network conditioning hardware) may be required to achieve a reliable system, but they have several advantages over central control systems. They are retrofitable. Most X10 lighting modules are either plugged into an existing outlet, or replace traditional light switches. Other components can be connected to existing electrical wiring.

They use traditional electrical wiring. They do not require any special house wiring techniques or additional control signal wiring. Extra electrical wiring may be needed in a location where a controller is mounted, typically at eye level on a wall surface.

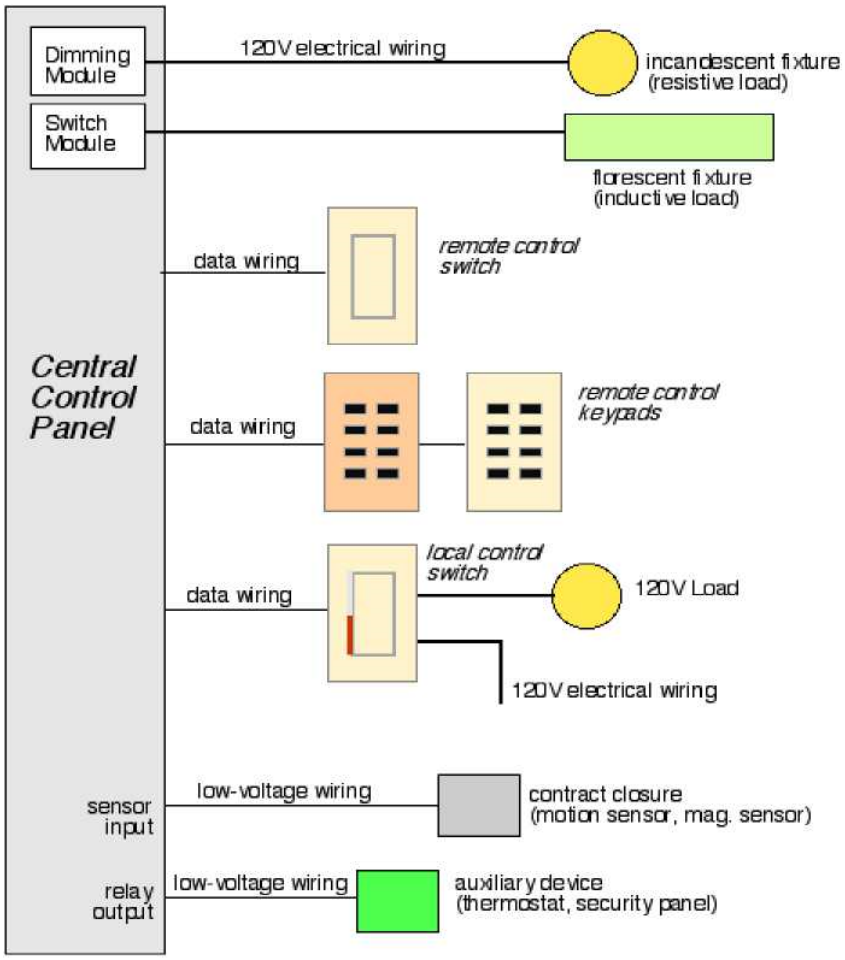
Interface with Home Automation Systems

Both types of lighting systems can be interfaced to a whole house automation system or to a PC for more elaborate control. Central control systems typically have an EIA-232 (often referred to by its older designation of RS-232) serial computer interface. The software used to perform the interface is proprietary to each manufacture. The distributed control PLC system can be easily controlled by any device with an X10 PLC interface. There are several PC to X10 power line interface devices available with PC software included.

Central Control Panel

The central controller is usually contained in a large panel mounted near the main

electrical load center of the home and contains a microcontroller for all system operation. The microcontroller is programmed during installation to assign keypad switches to lights and/or lighting scenes, create lighting zones and scenes, and assign contact closure inputs to lights or scenes. It also contains the remote controlled lighting zone switches, both on/off only and dimmable to handle the hardwired lighting circuits. It is wired similarly to an electrical panel since electrical wiring from lighting circuits is brought to the lighting panel and connected to an internal switch circuit.



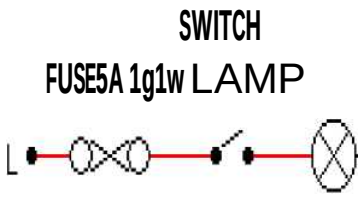
Components of a central control system all connect to the central control panel through electrical wiring or dedicated control wiring.

***Lighting installation**

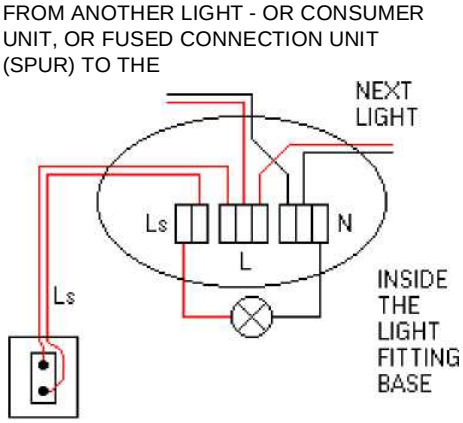
The Basic Lighting Circuit Diagram

Circuit protective conductor omitted for clarity - the bare earth wire in “twin & earth” although not shown in the circuit diagram, each point should be provided with a means of earthing-

- from live, fuse, then to a switch, and then to the light and then to neutral. On a full installation, it is necessary to have more than one light on a circuit, and bearing in mind that the common wiring method is to use a cable with 2 conductors, the best way to wire a lighting circuit is as follows :- **L** live • **N** neutral • **Ls** Live, switched.



The twin cable to the switch is shown with both cores red. When stripping back the sheathing, care must be taken to ensure that the sheathing for the cable outside the enclosure is continuous into the enclosure. Many light fittings (mối nối) do not have a neat arrangement of connector blocks (hộp nối). When changing a “proper” light fitting for a more elaborate type, you must use a proper junction box to accommodate the supply & switch cables, and run a separate twin cable through the hole in the ceiling into the new light fitting.



Installing Additional (1-way) Light Points

If the supply is being taken from the consumer unit, then it will be from a fused way.

Adding a new light fitting - controlled by same switch

In the wiring diagram above, the light only needs a switched live & a neutral. To connect another light, simply double up to these terminals. The new light will be ON and OFF just as the one you connected to. If the light has to be controlled by another switch, then check the next section.

Adding a new light fitting with its own switch

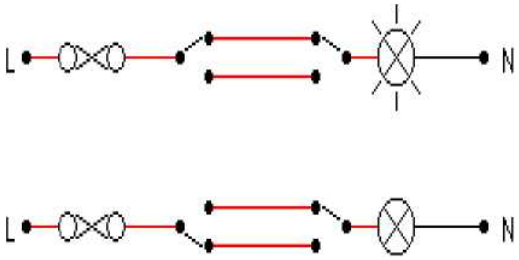
Another light controlled by its own switch will be wired as shown in the basic wiring diagram above to get a supply for the new light: connect into the L & N terminal in an existing light & run a cable to the new light fitting position and wire it up as shown in the basic wiring diagram

break into the lighting supply cable - be sure to identify the correct cable add a fused (5A) connection unit to a suitable source.

2-way Lighting Circuit Diagram

2-way means two ways to switch the light on or off - think about a landing light. That can be switched on or off at both the switch on the landing and at the

switch at the bottom of the stairs.



In this diagram, the light is OFF, power goes to the 1st switch and along the upper strapper (thanh dẫn trên) to the 2nd switch. If the 1st switch is operated, power will get to the 2nd switch along the lower strapper (thanh dẫn dưới) If either of the switches is operated, the light will be ON, and then if either switch is operated the light will be OFF.

3-way Lighting Circuit Diagram

Reconsider 2 way lighting - see how throwing either of the two switches in any state causes the strappers to swap ON & OFF - and this affect the light. So if the strappers were crossed at any point between the two switches, the light would change so . If a changeover switch is introduced into the circuit, it would give the desired effect, independently of the other 2 switches intermediate switch ch

angeover crossover.

LAMP

Lighting circuit

basically t]

TO NEXT SWITCH

Every electrician has his or own way of wiring lighting circuits but lere are only three different ways, two of these are almost identical.

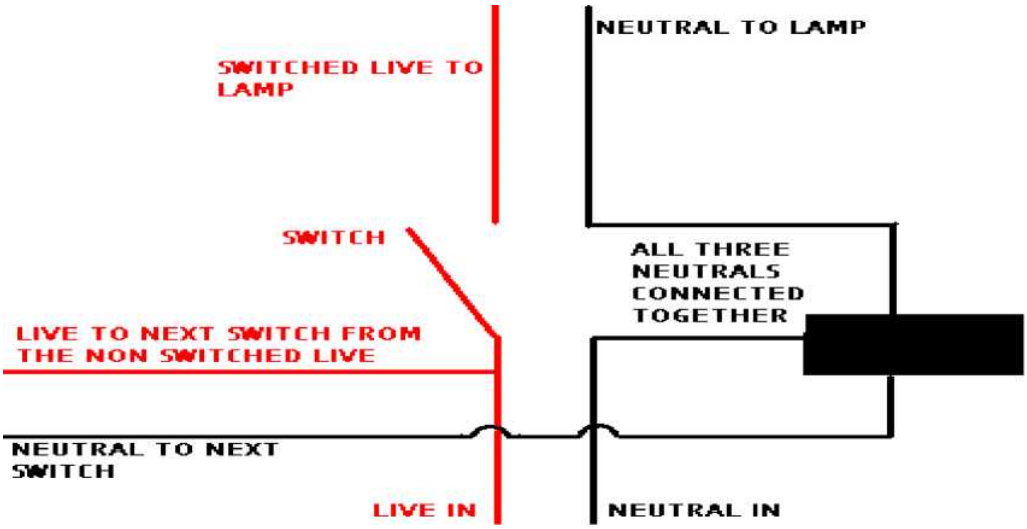
LIVE IN FROM CONSUMER UNIT OR OTHER SWITCH

CONSUMER UNIT

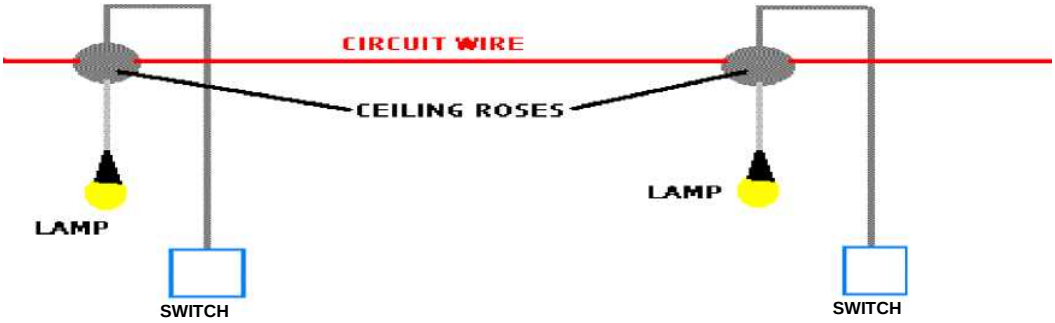
Method 1:

This is what I consider the hard way, It is difficult because you do not have lots of room inside the switch box but has the advantage of having a neutral wire inside which could be useful for wall lights etc!

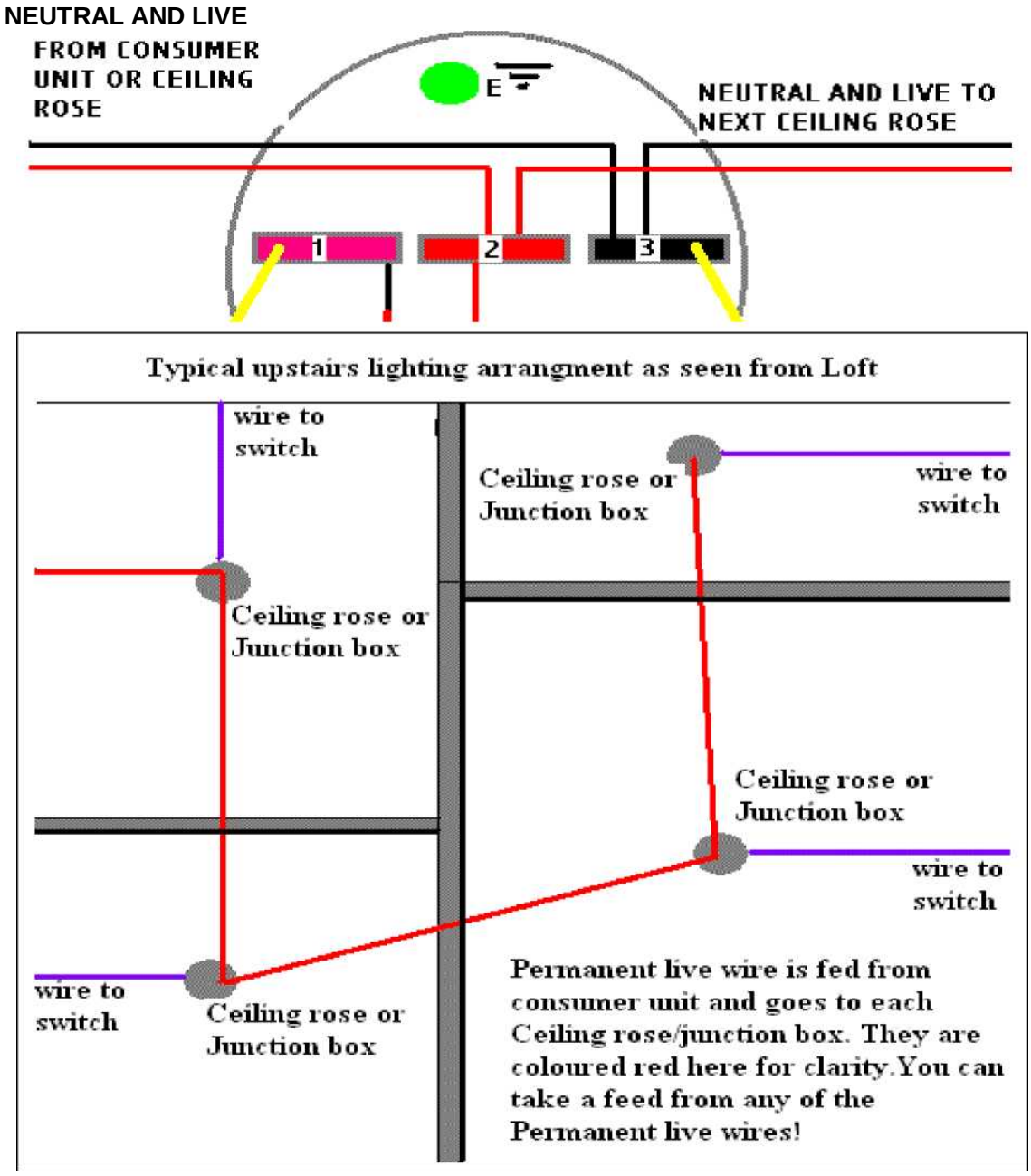
Here is a diagram of the connections at the switch with the earth removed.



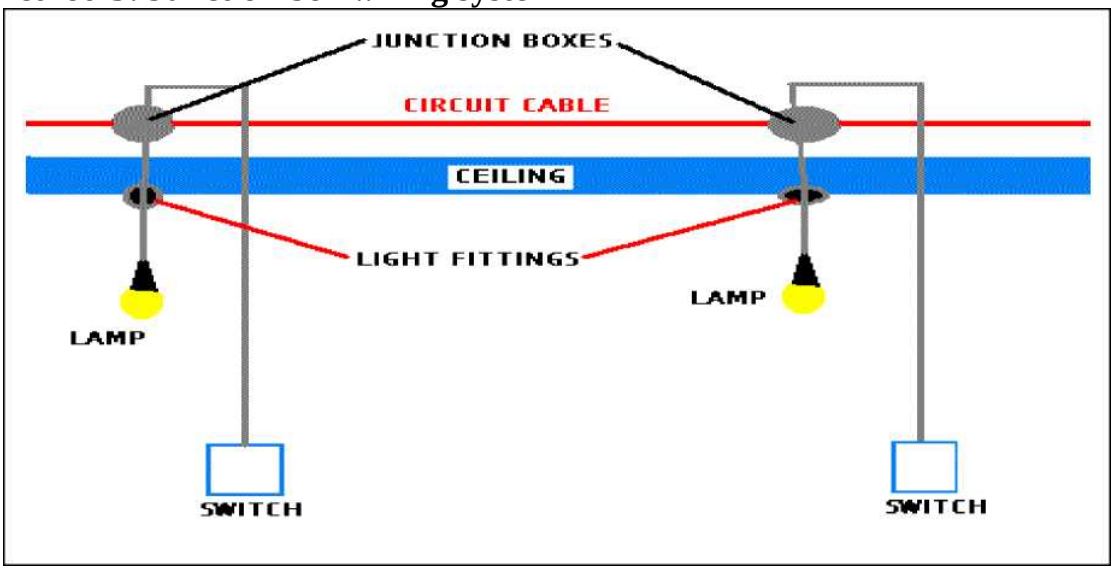
As you can see from the above diagram the 3 Neutral wires are all connected together in a insulated terminal, the live in and out are connected tog
Lar



The above diagram shows how the power is fed from the consumer unit to the first light and then to each consecutive light on the circuit hence it is named the circuit wire. The earth wires are not shown for clarity. Try and follow the path of the electricity.



Method 3: Junction box wiring system



There's just one Neutral, one switched Live and an earth . A cable is now joined to Neutral (terminal 3) and switched live (terminal 1) and earth. This cable is passed through the hole in the ceiling and wired directly to the light fitting, remember to put red tape around the black insulation as this is the switched live!

IV. EXERCISE

Mục tiêu: Kiểm tra kết quả đạt được của người học về sự hiểu biết các từ vựng chuyên môn cũng như ngữ pháp, kiến thức và kỹ năng đọc hiểu đã được học để hoàn thành các bài tập ứng dụng cũng như áp dụng vào trong môi trường làm thực tế sau khi tốt nghiệp.

1. Complete the sentences

closet Low-pressure sensor fluorescent four system Automated switches central

a. The ..... control design method uses remote or hardwire control .....to control all your lighting needs in the house

b..... lighting control can also be integrated into the home .....to control lighting on and off automatically.

c. There are .....basic types of lighting: incandescent, ..., high-intensity discharge, and low-pressure sodium.

d.....sodium lighting is used where color rendering is not important, such as highway and security lighting.

e. A magnetic.....placed on a closet door can be used to control the light in a.....

2. Answer the following questions

a. How many basic types of lighting are there ?

b. Why is data communication wiring from keypad routed back to microprocessor?

c. What is the function of PLC technology?

d. What can dimmable and switchable only plug-in modules be used in existing wall outlets for?

e. Why do you need to programme the microcontroller during installation?

3. Decide True or False

a. PLC distributed control lighting system components are retrofitable.
b. The controller handles on/off/dim functions of all attached branch lighting circuits based on user input from keypads, switches, and remote controls.
c. A magnetic sensor can keep a table of local sunrise/sunset times for any date.
d. Outside light level sensor can be used to control the light in a closet.
e. Low-pressure sodium lighting is used where color rendering is not important, such as highway and security lighting.

4. Listen and Check

keypad *panel* *contact closure* *internal* *remote microcontroller* *zones* *circuits* *microcontroller*

The central controller is usually contained in a large ..... mounted near the main electrical load center of the home and contains a ..... for ..... all system operation. The ..... is programmed during installation to assign ..... switches to lights and/or lighting scenes, create lighting ..... and scenes, and assign ..... inputs to lights or scenes. It also contains the controlled lighting zone switches, both on/off only and dimmable to handle the hardwired lighting ..... It is wired

similarly to an electrical panel since electrical wiring from lighting circuits is brought to the lighting panel and connected to an.....switch circuit.

5. Match the ideas

1. Scenes can be programmed into
2. Modules with the same house/unit code
3. Programmable controllers can be used to
4. Fluorescent lighting is used primarily
5. high-intensity discharge lighting

a. will operate identically
b. several wall mount touchscreens.
c. configure scenes based on events such as the time of day
d. is used only for outdoor lighting applications
e. in commercial indoor lighting systems

V. CONVERSATION

Mục tiêu: Hình thành kỹ năng giao tiếp cho người học để người học có tự tin giao tiếp trong môi trường làm việc.

Hana: Hi, Henry
Henry: Hi, Hana. How's everything?
Hana: Well. Thanks. How about you?
Henry: Fine, Thanks.
Hana: Do you know how many basic types of lighting?
Henry: Yes, I do. There are four basic types of lighting.
Hana: Can you tell me more clearly about that?
Henry: Of course. They are incandescent, fluorescent, high-intensity discharge, and low-pressure sodium.
Hana: Do you mind explaining the diagram for me?

Henry: No, not at all. Let's meet at Grow café at 7 pm tonight because I have a lot of work to do now?
Hana: That's a good idea. See you at 7 pm at Grow coffee shop.
Henry: OK. See you.

Unit 5: ELECTRONIC DEVICES

Trong thời kỳ hội nhập kinh tế quốc tế, các nhà đầu tư nước ngoài không ngừng mở rộng các cơ sở kinh doanh ở Việt Nam nói chung và các thành phố nói riêng. Vì vậy, nhu cầu sử dụng giao tiếp bằng ngoại ngữ cực kỳ quan trọng. Nhằm đáp ứng nhu cầu đó, bài học này giúp cho người học có kiến thức và kỹ năng về anh ngữ để đọc hiểu được một số các linh kiện điện tử, trình bày ngắn gọn và đầy đủ một số đặc điểm và thuộc tính của các linh kiện như đi-ốt bán dẫn, điện dung, MOSFET, tran zi to, điện trở, và tụ điện. *Mục tiêu của bài học:*

Sau khi học xong bài học này, người học có khả năng:

- Đọc hiểu được các linh kiện điện tử bằng tiếng Anh như đi-ốt bán dẫn, điện dung, MOSFET, tran zi to, điện trở, tụ điện, các giá trị linh kiện của chúng.
- Đọc hiểu các từ vựng và phát âm chính xác các thuật ngữ chuyên ngành về linh kiện điện tử.
- Hiểu và biết cách sử dụng hiện tại phân từ trong tiếng Anh.
- Tự tin giao tiếp trong môi trường doanh nghiệp

Nội dung của bài học:

I. VOCABULARY

Mục tiêu: Cung cấp cho người học các từ vựng bằng tiếng Anh trong lĩnh vực linh kiện điện tử để người học có thể đọc và hiểu được từ chuyên môn liên quan đến một số tài liệu trong lĩnh vực điện điện tử công nghiệp bằng tiếng Anh.

Diode (n)	Đi ốt	MOSFETs (n)	Tranzito trường silic oxit kim loại
Valve (n)	Van		
Exist (v)	Tồn tại		
Schematic (adj)	Thuộc mạch		Tranzito hiệu ứng trường
Term (n)	Thuật ngữ	FETs (n)	Hoạt ảnh
Customarily (adv)	Thường thường		Phụ tải
Rectifier (n)	Bộ chỉnh lưu	Animation (n)	Thông số
Forward-biased (a)	Phân cực thuận	Load (n)	Điện áp
Reverse-biased (a)	Phân cực ngược	Parameter (n)	Tranzito
Operation (n)	Sự hoạt động	voltage (n)	Bên ngoài
Analogous (adj)	Tương tự	Transistor (n)	Khuếch đại
Hydraulic (adj)	Thủy lực	External (adj)	Thường gặp
Fluid (n)	Chất lỏng	Amplify (v)	Vỉa hè
Essentially (adv)		Ubiquitous (adj)	Điện trở
Polarity (n)		Pave (n)	
		Resistor (n)	

Measurements	(n)	Cần thiết	Potential	(n)	Điện thế
Junction	(n)	Phân cực	Distinct	(adj)	Phân biệt
Withstand	(v)	Đo lường	Sufficient (adj) :		Đầy đủ, ổn định
Gate	(n)	Mối nối	Vice versa (adv) :		
Anode	(n)	Chịu đựng	Capacitor	(n)	Ngược lại

Cathode	(n)	Cổng	Insulator	(n)	Tụ điện
Thyristor	(n)	Cực dương	Electrostatic (adj) :		Cách điện
Leakage	(adj)	Cực âm	Resonant (adj) :		Tĩnh điện
Depletion	(n)	Thyristo	Leakage Current :		Cộng hưởng
Signal	(n)	Rò	Inductance	(n)	Dòng điện rò
Pulse	(n)	Sự thiếu hụt	Unidirectional :		Điện cảm
Speed	(n)	Tín hiệu	Vacuum tube (n) :		Một chiều
Terminal	(n)	Xung	Constant (n)		Đèn chân không
:		Tốc độ			Hằng số
		Đầu cuối			

II. GRAMMAR

Mục tiêu: Cung cấp cho người học cấu trúc ngữ pháp về hiện tại phân từ trong tiếng Anh để người học có thể sử dụng trong quá trình viết hoặc giao tiếp trong công việc tại nơi làm việc hoặc trong đời sống hằng ngày có liên quan.

2.1 The Present Participle

1) Formation

The present participle is formed by adding the ending "-ing" to the infinitive (dropping any silent "e" at the end of the infinitive):

to sing --> singing to take --> taking to bake --> baking
to be --> being to have --> having

2) Use

A. The present participle may often function as an adjective:

That's an interesting book.

That tree is a weeping willow.

B. The present participle can be used as a noun denoting an activity (this form is also called a gerund):

Swimming is good exercise.

Traveling is fun.

C. The present participle can indicate an action that is taking place, although it cannot stand by itself as a verb. In these cases it generally modifies a noun (or pronoun), an adverb, or a past participle:

Thinking myself lost, I gave up all hope.

Washing clothes is not my idea of a job. Looking ahead is important.

D. The present participle may be used with "while" or "by" to express an idea of simultaneity ("while") or causality ("by"):

He finished dinner while watching television.

By using a dictionary he could find all the words.

While speaking on the phone, she doodled.

By calling the police you saved my life!

E. The present participle of the auxiliary "have" may be used with the past participle to describe a past condition resulting in another action:

Having spent all his money, he returned home.

Having told herself that she would be too late, she accelerated.

2.2 Exercise

Rewrite the sentences replacing the italic part with a present participle.

1. *She was talking to her friend* and forgot everything around her.

.....

2. *Since we watch the news every day* we know what's going on in the world.

.....

3. *They are vegetarians* and don't eat meat.

.....

4. *The dog wagged its tail* and bit the postman.

.....

5. *While she was tidying up her room* she found some old photos.

.....

6. *He was a good boy* and helped his mother in the kitchen.

.....

7. *As they didn't have enough money* they spent their holidays at home last year.

.....

8. The man was sitting in the cafe. *He was reading a paper.*?

.....

9. *Since 1 didn't feel well* I didn't go to the cinema.

.....

10. *She walked home* and met an old friend.

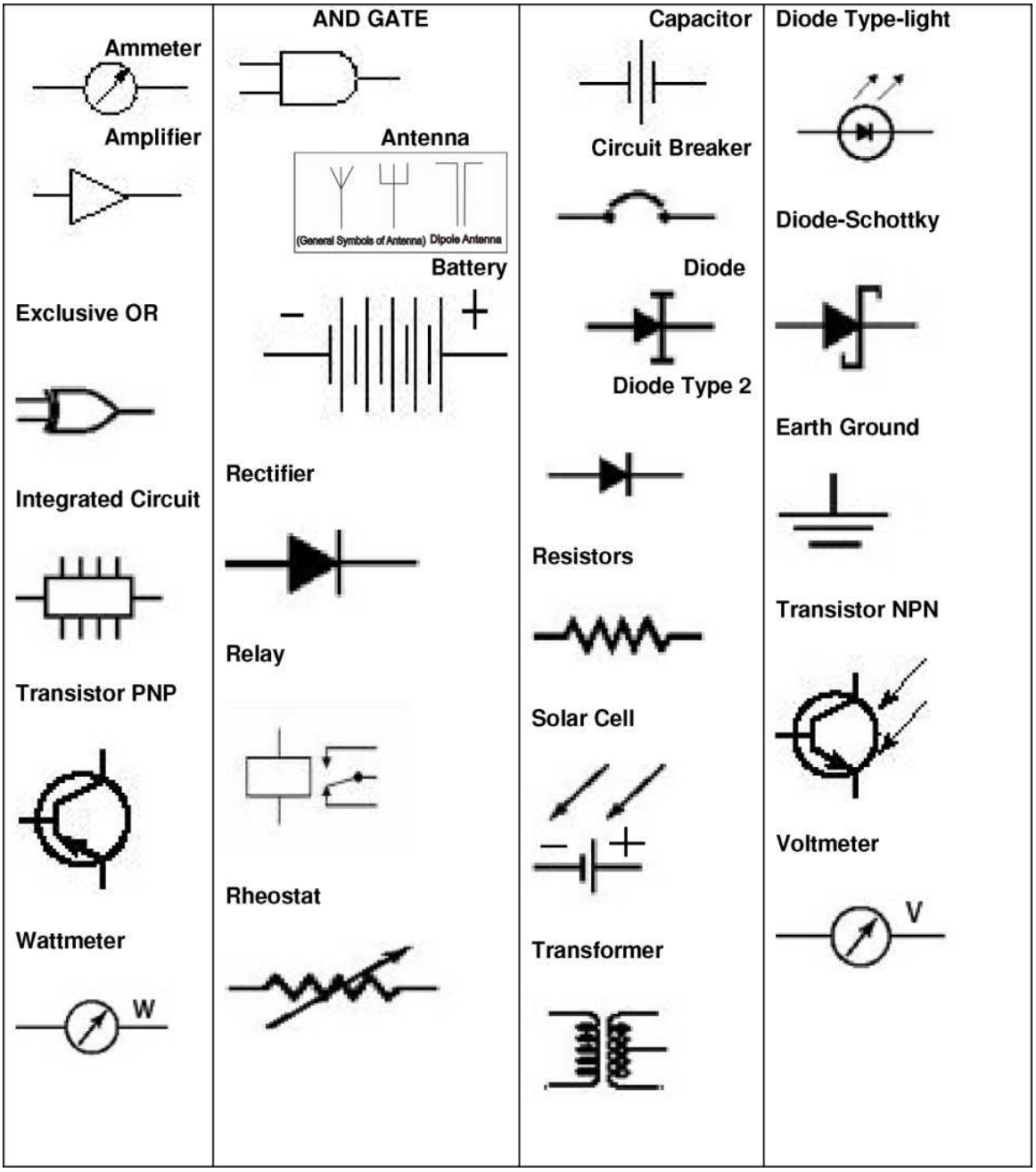
.....

III. CONTENT

Mục tiêu: Hình thành kiến thức và kỹ đọc hiểu cho người học để người học có thể đọc được một số tài liệu liên quan đến sơ đồ mạch điện tử bằng tiếng Anh.

What are Electronic Circuits?

An electronic circuit is made up of individual electronic components, such as resistors, transistors, capacitors, inductors and diodes which has different roles in an electronic circuit. An electronic circuit can be divided into an analog circuit, a digital circuit or a mixed-signal circuit.



Symbol	Component name	Meaning
	Wire Symbols	
	Electrical Wire	Conductor of electrical current
	Connected Wires	Connected crossing

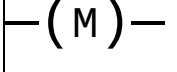
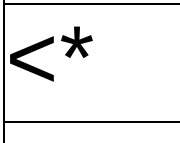
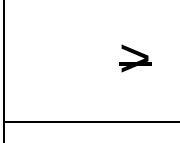
—(—	Not connected Wires	Wires are not connected
Switch Symbols and Relay Symbols		
c——5	SPST Toggle Switch	Disconnects current when open
c—'	SPDT Toggle Switch	Selects between two connections
c—c—0	Pushbutton Switch (N.O)	Momentary switch - normally open
c—2_I_2—□	Pushbutton Switch (N.C)	Momentary switch - normally closed
c— izn —? c— izn —? m	DIP Switch	DIP switch is used for onboard configuration
	SPST Relay	Relay open / close connection by an electromagnet
	SPDT Relay	
c -- n - 5	Jumper	Close connection by jumper insertion on pins.
—Í)—	Solder Bridge	Solder to close connection
Ground Symbols		
1	Earth Ground	Used for zero potential reference and electrical shock protection.

J,	Chassis Ground	Connected to the chassis of the circuit
¡	Digital / Common Ground	
Resistor Symbols		
c—5	Resistor (IEEE)	Resistor reduces the current flow.
“l___ I-	Resistor (IEC)	
	Potentiometer (IEEE)	Adjustable resistor - has 3 terminals.
	Potentiometer (IEC)	
	Variable Resistor / Rheostat(IEEE)	Adjustable resistor - has 2 terminals.
	Variable Resistor / Rheostat (IEC)	
Capacitor Symbols		
“|f—	Capacitor	Capacitor is used to store electric charge. It acts as short circuit with AC and open circuit with DC.
“||—	Capacitor	
^f—	Polarized Capacitor	Electrolytic capacitor

=	Polarized Capacitor	Electrolytic capacitor
	Variable Capacitor	Adjustable capacitance
Inductor / Coil Symbols		
c—	Inductor	Coil / solenoid that generates magnetic field
c—C/Y'i—<.	Iron Core Inductor	Includes iron
	Variable Inductor	
Power Supply Symbols		
(“jl-■	Voltage Source	Generates constant voltage
	Current Source	Generates constant current.
	AC Voltage Source	AC voltage source
	Generator	Electrical voltage is generated by mechanical rotation of the generator
—l|^—:	Battery Cell	Generates constant voltage
-hl^	Battery	Generates constant voltage

	Controlled Voltage Source	Generates voltage as a function of voltage or current of other circuit element.
c—□	Controlled Current Source	Generates current as a function of voltage or current of other circuit element.
Meter Symbols		
c——	Voltmeter	Measures voltage. Has very high resistance. Connected in parallel.
o-—(jA)-—5	Ammeter	Measures electric current. Has near zero resistance. Connected serially.
■:—(S)—>	Ohmmeter	Measures resistance
(W)	Wattmeter	Measures electric power
Lamp / Light Bulb Symbols		
'=—"5	Lamp / light bulb	Generates light when current flows through
	Lamp / light bulb	
	Lamp / light bulb	
Diode / LED Symbols		
c—”C^l-~5	Diode	Diode allows current flow in one direction only (left to right).
c——C-^F-5	Zener Diode	Allows current flow in one direction, but also can flow in the reverse direction when above breakdown

		voltage
c—”5	Schottky Diode	Schottky diode is a diode with low voltage drop
	Varactor / Varicap Diode	Variable capacitance diode
c—”~5	Tunnel Diode	
	Light Emitting Diode (LED)	LED emits light when current flows through
c—[S|“5	Photodiode	Photodiode allows current flow when exposed to light
Transistor Symbols		
I'L B_ ■?!E	NPN Bipolar Transistor	Allows current flow when high potential at base (middle)
B_ ___ÎE “lL	PNP Bipolar Transistor	Allows current flow when low potential at base (middle)
	Darlington Transistor	Made from 2 bipolar transistors. Has total gain of the product of each gain.
c	JFET-N Transistor	N-channel field effect transistor
	JFET-P Transistor	P-channel field effect transistor
c	NMOS Transistor	N-channel MOSFET transistor
c—	PMOS Transistor	P-channel MOSFET transistor

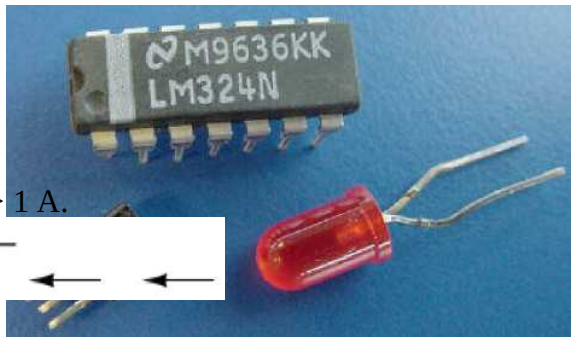
Misc. Symbols		
	Motor	Electric motor
	Transformer	Change AC voltage from high to low or low to high.
	Electric bell	Rings when activated
	Buzzer	Produce buzzing sound
	Fuse	The fuse disconnects when current above threshold. Used to protect circuit from high currents.
	Fuse	
	Bus	Contains several wires. Usually for data / address.
	Bus	
	Bus	
	Optocoupler / Opto-isolator	Optocoupler isolates onnection to other board
	Loudspeaker	Converts electrical signal to sound waves
	Microphone	Converts sound waves to electrical signal
	Operational Amplifier	Amplify input signal

	Schmitt Trigger	Operates with hysteresis to reduce noise.
	Analog-to-digital converter(ADC)	Converts analog signal to digital numbers
	Digital-to-Analog converter (DAC)	Converts digital numbers to analog signal
	Crystal Oscillator	Used to generate precise frequency clock signal
Antenna Symbols		
	Antenna / aerial	Transmits & receives radio waves
	Antenna / aerial	
IF	Dipole Antenna	Two wires simple antenna
Logic Gates Symbols		
	NOT Gate (Inverter)	Outputs 1 when input is 0
	AND Gate	Outputs 1 when both inputs are 1.
	NAND Gate	Outputs 0 when both inputs are 1. (NOT + AND)
	OR Gate	Outputs 1 when any input is 1.

	NOR Gate	Outputs 0 when any input is 1. (NOT + OR)
	XOR Gate	Outputs 1 when inputs are different. (Exclusive OR)
■* D q ■* ~4=- Qp	D Flip-Flop	Stores one bit of data
	Multiplexer / Mux 2 to 1	Connects the output to selected input line.
■+	Multiplexer / Mux 4 to 1	
	Demultiplexer / Demux 1 to 4	Connects selected output to the input line.

1. Semiconductor diode

A diode is an electrical component acting as a one-way valve for current. The



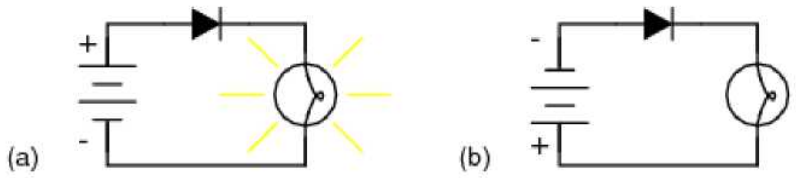
for power devices, I > 1 A.

most common kind of diode in modern circuit design is the semiconductor diode, although other diode technologies exist. Semiconductor diodes are symbolized in schematic diagrams such as Figure below. The term “diode” is customarily reserved for small signal devices, I < 1 A. The term rectifier is used

Semiconductor diode schematic symbol: Arrows indicate the direction of electron current flow.

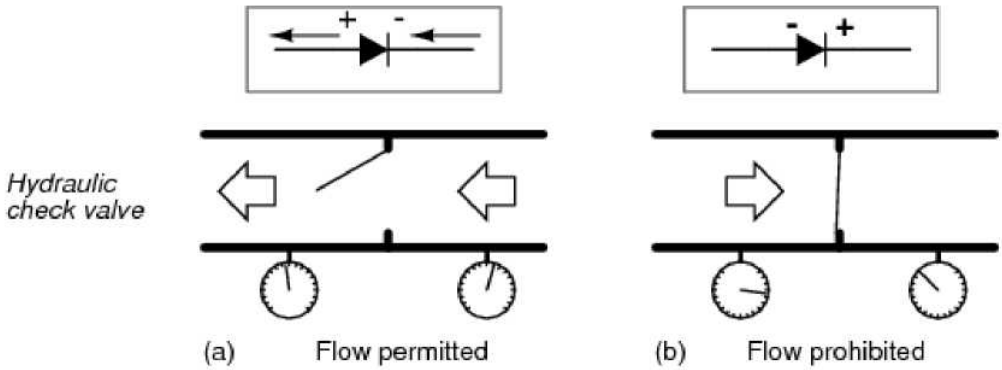
When voltage is applied across a diode in such a way that the diode allows current, the diode is said to be *forward-biased.*

When voltage is applied across a diode in such a way that the diode prohibits current, the diode is said to be *reverse-biased.*



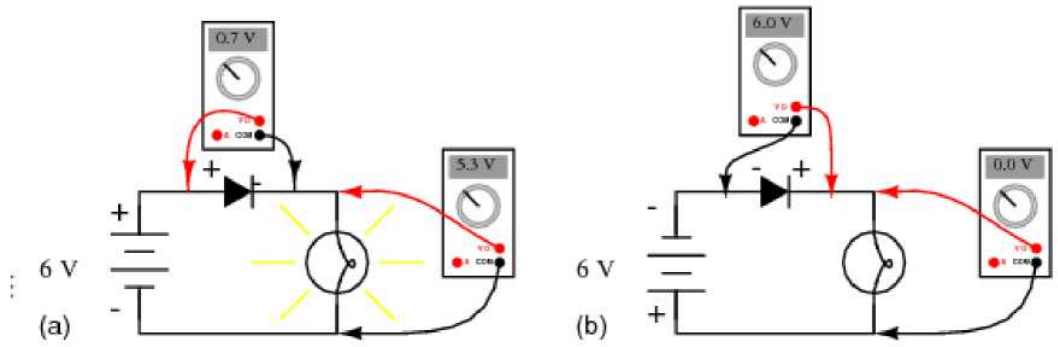
Diode operation: (a) Current flow is permitted; the diode is forward biased. (b) Current flow is prohibited; the diode is reverse biased.

Diode behavior is analogous to the behavior of a hydraulic device called a *check valve*. A check valve allows fluid flow through it in only one direction as in Figure below.



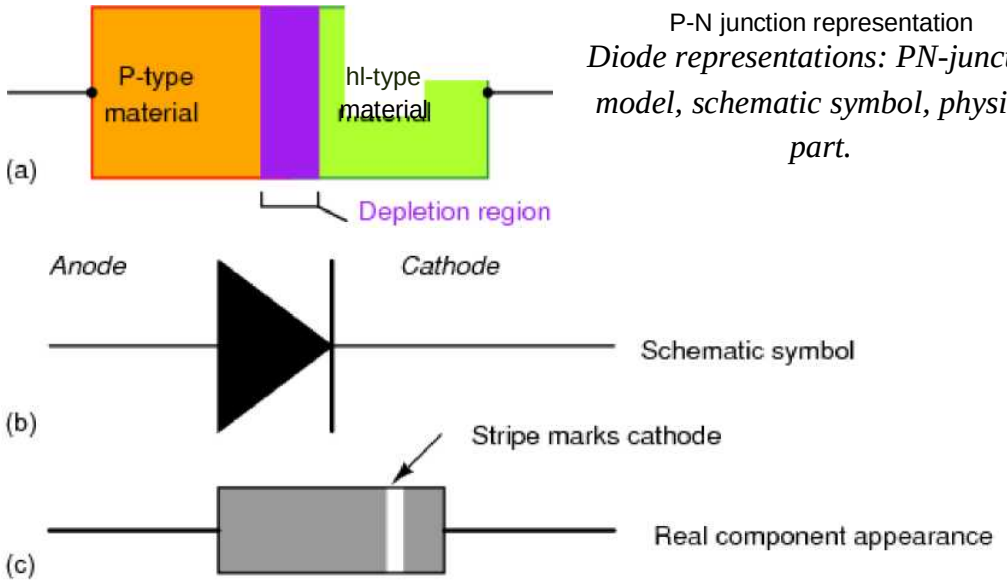
Hydraulic check valve analogy: (a) Electron current flow permitted. (b) Current flow prohibited.

Like check valves, diodes are essentially “pressure-” operated (voltage- operated) devices. The essential difference between forward-bias and reversebias is the polarity of the voltage dropped across the diode. Let's take a closer look at the simple battery-diode-lamp circuit shown earlier, this time investigating voltage drops across the various components in Figure below.



Diode circuit voltage measurements: (a) Forward biased. (b) Reverse biased.

The voltage dropped across a conducting, forward-biased diode is called the *forward voltage*. Forward voltage for a diode varies only slightly for changes in forward current and temperature, and is fixed by the chemical composition of the P-N junction.

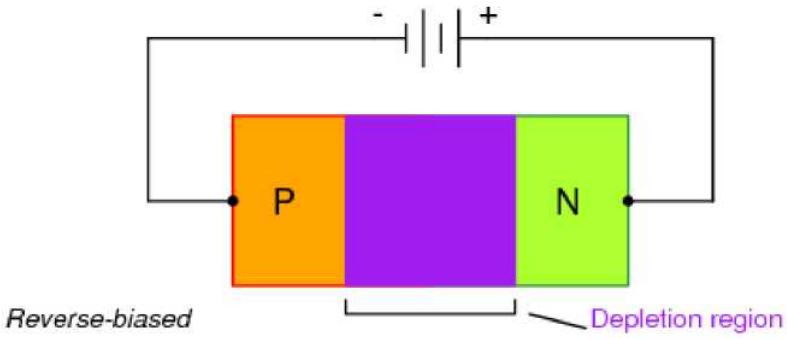


P-N junction representation

Diode representations: PN-junction model, schematic symbol, physical part.

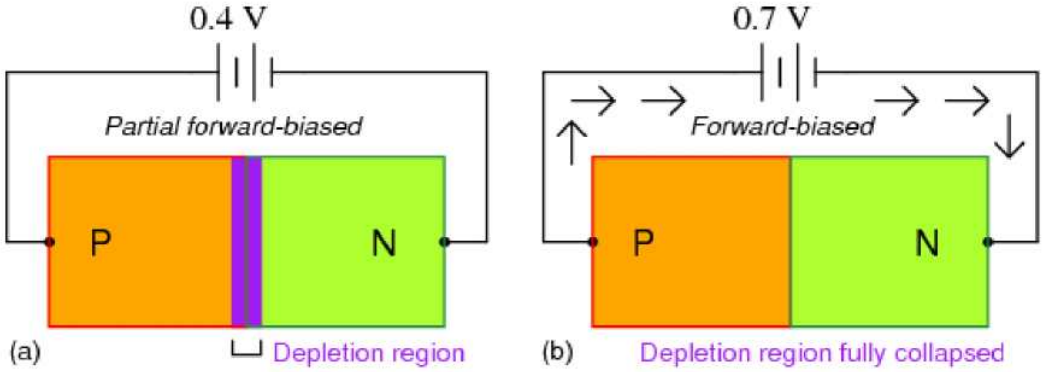
The schematic symbol of the diode is shown in Figure above (b) such that the anode (pointing end) corresponds to the P-type semiconductor at (a). The cathode bar, non-pointing end, at (b) corresponds to the N-type material at (a). Also note that the cathode stripe on the physical part (c) corresponds to the cathode on the symbol.

If a reverse-biasing voltage is applied across the P-N junction, this depletion region expands, further resisting any current through it. (Figure below)



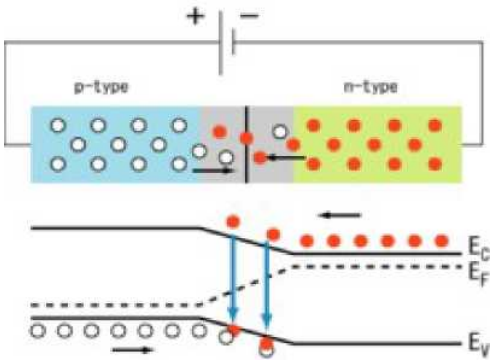
Depletion region expands with reverse bias.

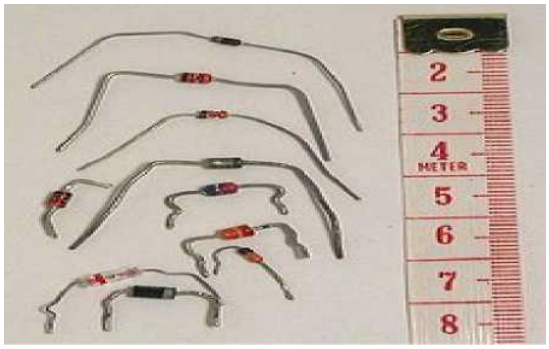
Conversely, if a forward-biasing voltage is applied across the P-N junction, the depletion region collapses becoming thinner. The diode becomes less resistive to current through it. In order for a sustained current to go through the diode; though, the depletion region must be fully collapsed by the applied voltage. This takes a certain minimum voltage to accomplish, called the *forward voltage* as illustrated in Figure below.

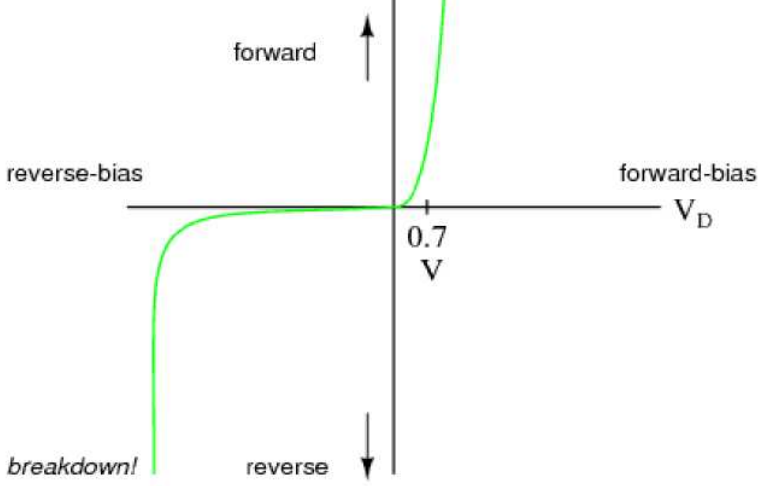


Increasing forward bias from (a) to (b) decreases depletion region thickness.

s Silicon diodes have a forward voltage of approximately 0.7 volts. *s* Germanium diodes have a forward voltage of approximately 0.3 volts. *s* The maximum reverse-bias voltage that a diode can withstand without “breaking down” is called the *Peak Inverse Voltage*, or *PIV* rating.





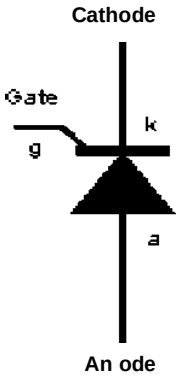


Diode curve: showing knee at 0.7 V forward bias for Si, and reverse breakdown.

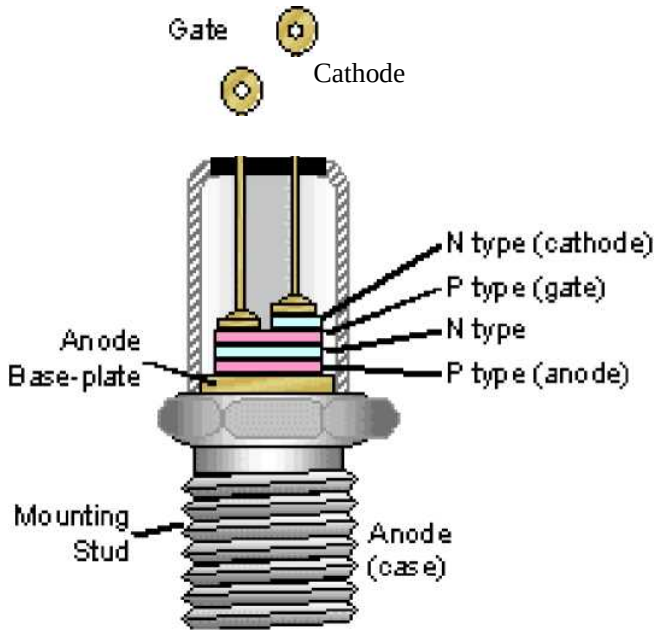
Typically, the PIV rating of a generic “rectifier” diode is at least 50 volts at room temperature. Diodes with PIV ratings in the many thousands of volts are available for modest prices.

2. Thyristors

Common Thyristor



Thyristor Circuit Symbol

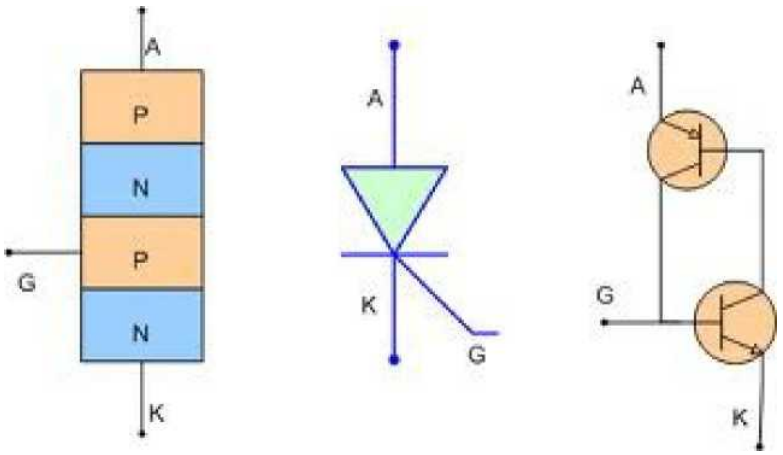


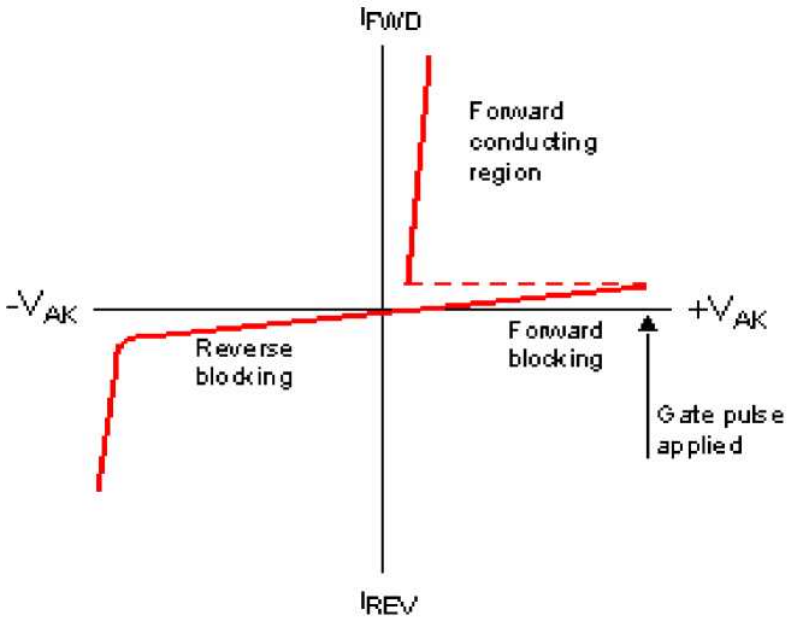
Typical Medium Power Thyristor Construction

To turn the thyristor off, the current flowing between anode and cathode must be reduced below a certain critical "holding current" value, (near to zero); alternatively the anode and cathode may be reverse biased.

The thyristor is normally made to conduct by applying a gating pulse, while the main anode and cathode terminals are forward biased. When the device is reverse biased, a gating pulse has no effect.

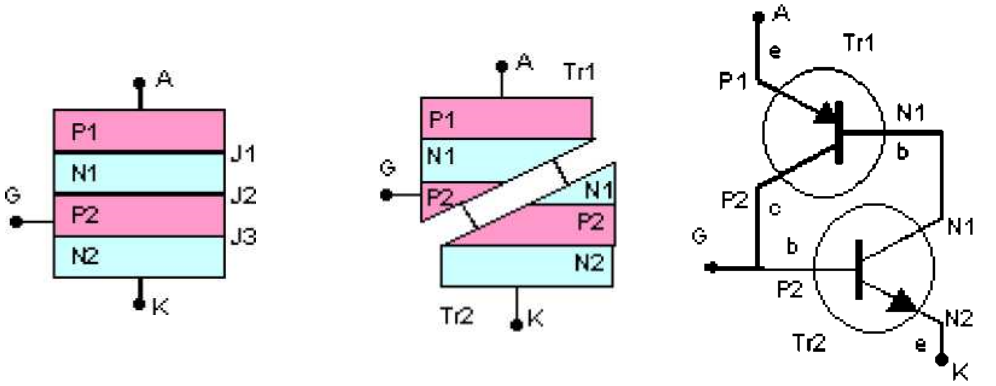
The fingure below shows a typical characteristic curve for a thyristor. It can be seen that in the reverse biased region it behaves in a similar way to a diode. All current, apart from a small leakage current is blocked (reverse blocking region) until the reverse breakdown region is reached, at which point the insulation due to the depletion layers at the junctions breaks down.





Typical Thyristor Characteristics

To understand the operation of a thyristor, think of it as a two-transistor (pnp and npn) model. If no gate signal is applied, but a voltage is applied (less than forward breakdown voltage) between the top emitter terminal (marked A) and the bottom emitter terminal (marked K) so that A is positive with respect to K, both transistors will be turned off. No current is flowing so the voltage on the gate and cathode will be the same.



a. Simp Hied Construction **b. How we get the two transistor model** **c. The Two Transistor Model**

The Thyristor "Two Transistor Model"

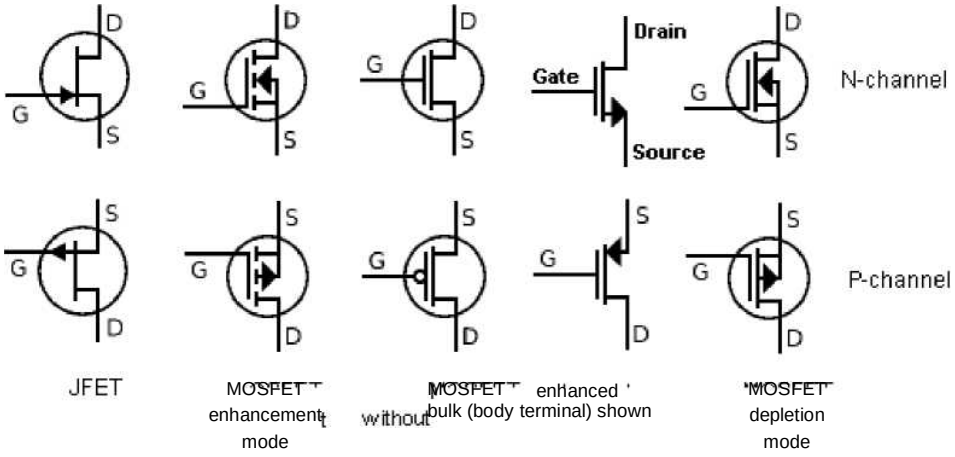
When the gate is made positive with respect to K by the application of a gating pulse, Tr2 will turn on and its collector voltage will fall rapidly. This will cause the pnp transistor Tr1 base emitter junction to become forward biased, turning on Tr1. A large current will now be flowing between A and K. The action described happens very quickly as the switching on of Tr2 by Tr1 is a form of positive feedback with each transistor collector supplying large current changes to the base of the other.

As Tr1 collector is connected to Tr2 base, the action of switching on Tr1 connects Tr2 base virtually to the high positive voltage at A. This ensures that Tr2 (and therefore Tr1) remains in conduction, even when the gating pulse is removed.

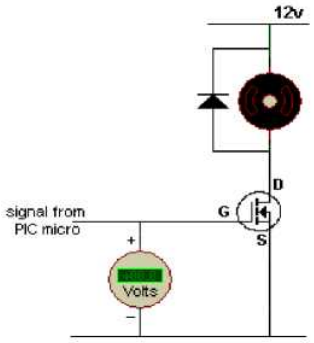
Because of the thyristor's ability to switch very large currents at very high (hundreds of volts) voltages, the thyristor is a useful device in power control circuits. It is quite capable of handling AC mains and is used in such circuits as lighting dimmers, motor speed controls etc. They are also widely used as fast acting protection devices in DC power supplies. The switching speed of thyristors is very fast and they are able to switch from fully off to fully on, typically in 1ps.

3. MOSFETS

Here are the symbols for FETs and MOSFETs:

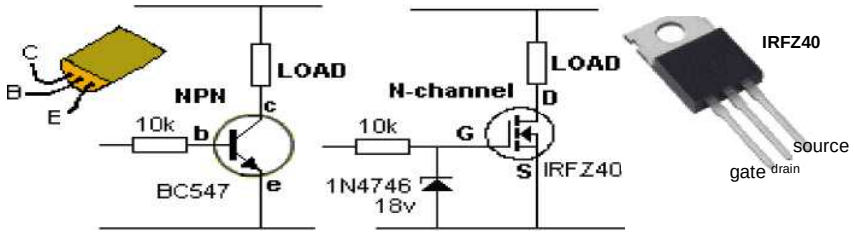


Here is an animation showing how to turn on an N-channel MOSFET:



MOSFET turns ON when gate-to- source is more than about 2v (2v to 5v)

Here is a comparison between an NPN transistor and N-channel MOSFET:



A zener must be added to the gate of a MOSFET if the gate voltage comes from a supply that is above 20v. A normal transistor is a current amplifying device.

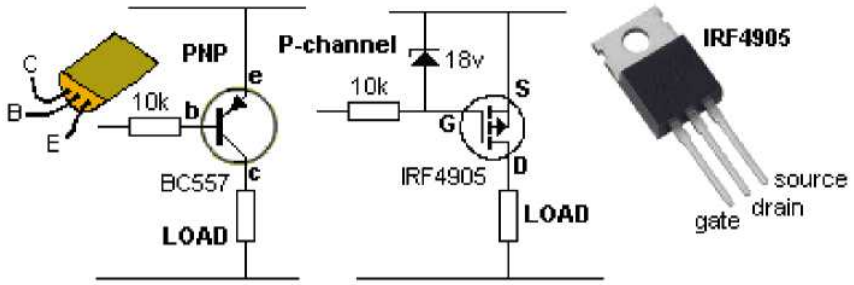
For a load current of 100mA, the base current for a BC547 will need to be about 1mA. This means it has a current gain of about 100.

A MOSFET is a voltage controlled device and the current it will handle depends on its physical size and the way it is constructed. You cannot change this parameter.

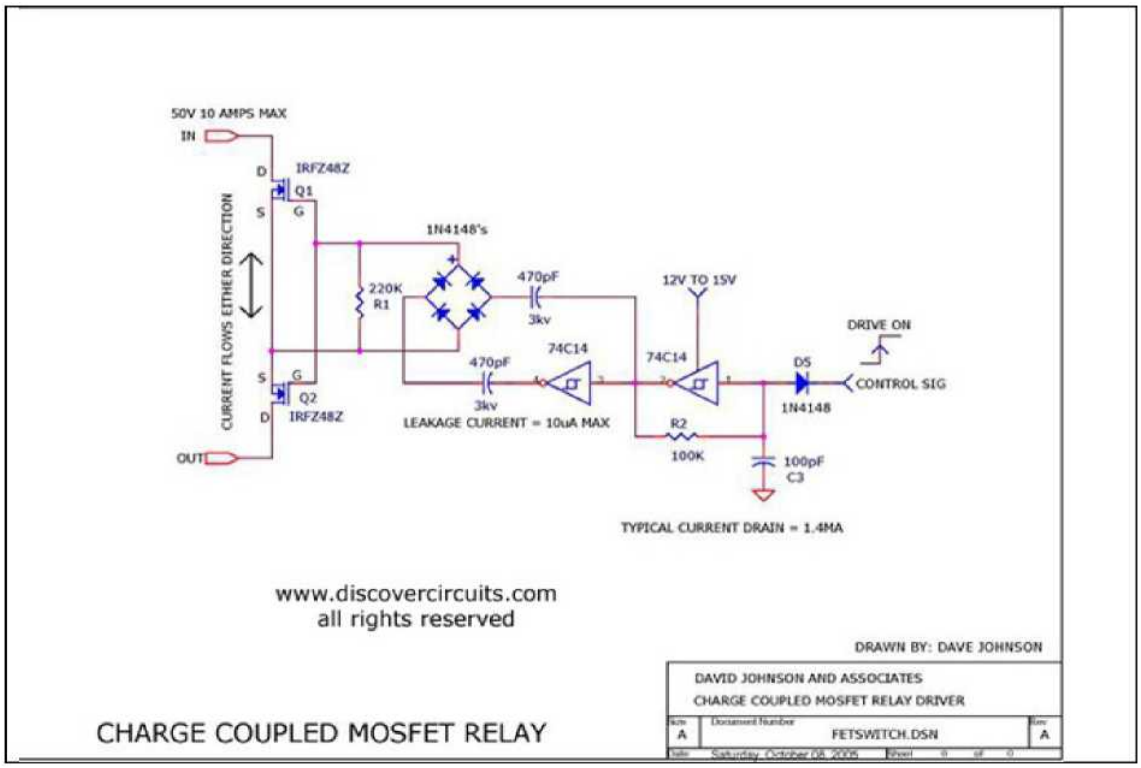
For a load current up to about 35Amp, the gate current for a IRZ40 will be less than 0.25mA. When the gate voltage is 3v to 4v higher than the source, it turns on and the resistance between source and drain terminals is about 0.028 ohms. It will handle up to 35 amps.

The load determines the current through the MOSFET (not the MOSFET) and if it is less than 35 amps, a IRFZ40 is suitable for the application.

Comparison between a PNP transistor and P-channel MOSFET:



When the gate voltage is 4v LOWER than rail voltage, the MOSFET turns ON. The 10k resistor on the base of the transistor is needed to prevent the base current exceeding the amount of current needed by the transistor to deliver current to the load. However the 10k resistor on the gate of the MOSFET is not needed. Providing the voltage (up to 18v) on the gate rises and falls quickly, the MOSFET will not get hot. The critical period of time is the 0v to 3v section of the waveform as this is when the MOSFET is turning on.

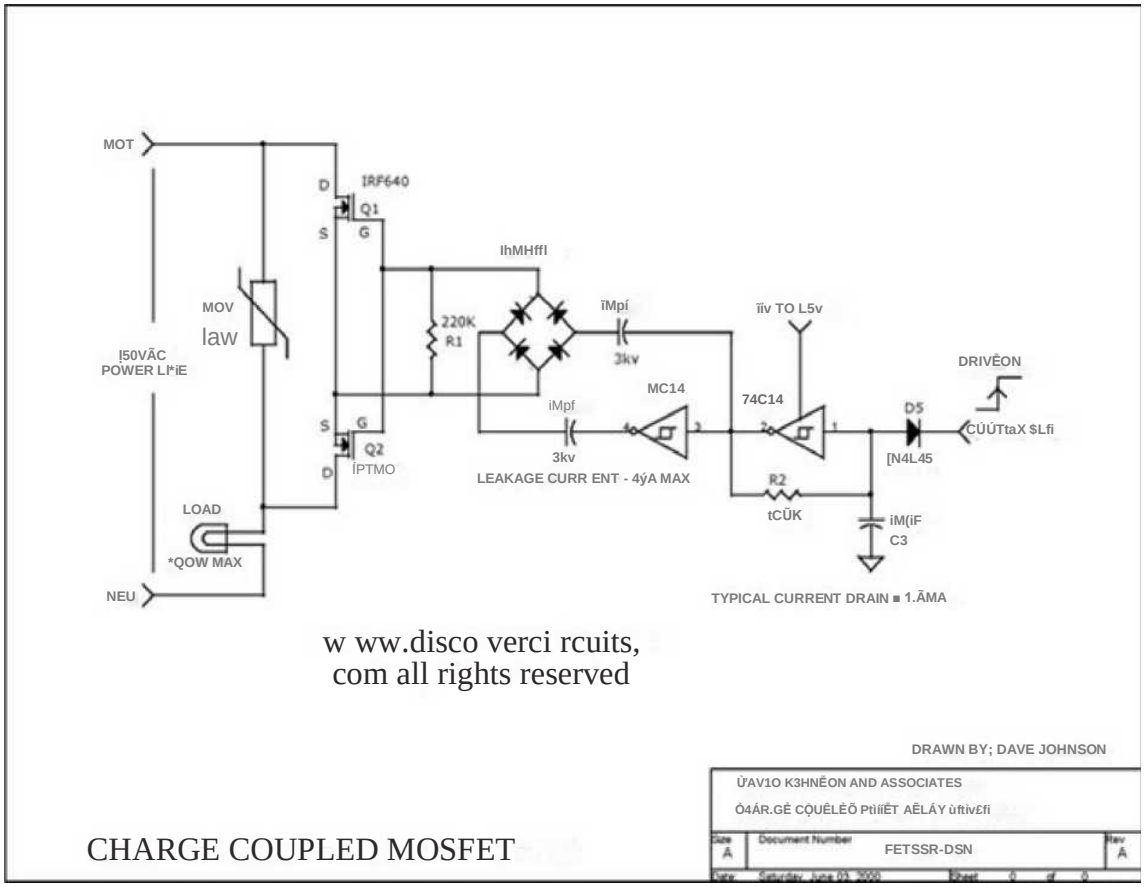


Charge Coupled MOSFET Relay

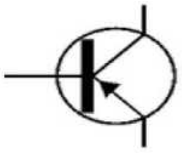
This circuit acts as an AC/DC relay with a rating up to 50 volts peak and up to 10 amps of current. The differential oscillator supplies voltage to the gates of the two FETs with good isolation will drawing only 1.5ma of current.

Charge coupled bi-directional power mosfet relay

The circuit below uses an inexpensive C-MOS inverter package and a few small capacitors to drive two power MOS transistors from a 12v to 15v supply. Since the coupling capacitor values used to drive the FETs are small, the leakage current from the power line into the control circuit is a tiny 4uA. Only about 1.5mA of DC is needed to turn on and off 400 watts of AC or DC power to a load.

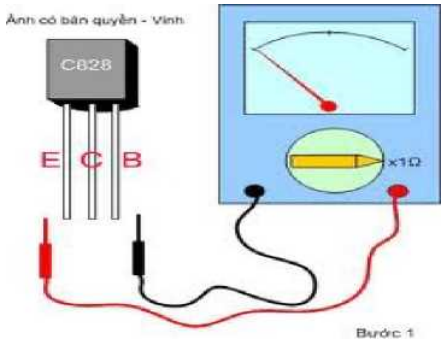


4. Transistors

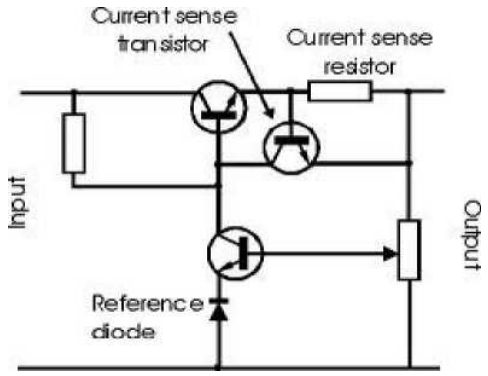


Transistor

A **transistor** is a semiconductor device used to amplify and switch electronic signals. It is composed of a semiconductor material with at least three terminals for connection to an external circuit. A voltage or current applied to one pair of the transistor's terminals changes the current flowing through another pair of terminals. Because the controlled (output) power can be much more than the controlling (input) power, a transistor can amplify a signal.



The transistor is the fundamental building block of modern electronic devices, and is ubiquitous in modern electronic systems. Following its release in the early 1950s the transistor revolutionized the field of electronics, and paved the way for smaller and cheaper radios, calculators, and computers, among other things.



5. Resistor

Physically resistance is a measure of a material's opposition to charge flow or current.

Resistance is measured in units called Ohms

The higher the resistance of a material, the more potential difference is required to maintain a current.

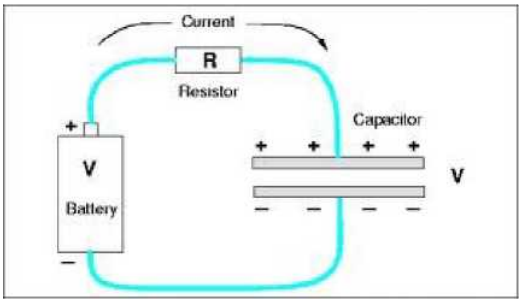
Under ordinary temperatures, perfect conductors do not exist. All substances including copper and other metals, offer a definite amount of resistance to the flow of current. The metal resistance offered depends upon four distinct factors:

1. The nature of the material as the conductor
2. The temperature
3. The length of the conductor
4. The cross sectional area of the conductor.

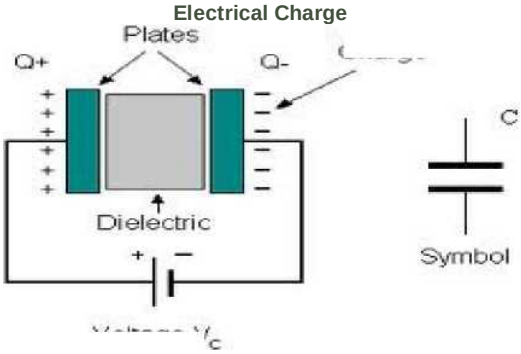
It is sufficient to know that the resistance of a metallic conductor will rise if its temperature is raised, its length is increased, its thickness is decreased, and vice versa.

6. Capacitor

A capacitor (formerly known as condenser) is a device for storing electric charge. The forms of practical capacitors vary widely, but all contain at least two conductors separated by a non-conductor. Capacitors used as parts of electrical systems, for example, consist of metal foils separated by a layer of insulating film.



A capacitor is a passive electronic component consisting of a pair of conductors separated by a dielectric (insulator). When there is a potential difference (voltage) across the conductors, a static electric field develops across the dielectric, causing positive charge to collect on one plate and negative charge on the other plate. Energy is stored in the electrostatic field. An ideal capacitor is characterized by a single constant value, capacitance, measured in farads. This is the ratio of the electric charge on each conductor to the potential difference between them.



voltage V

Capacitors are widely used in electronic circuits for blocking direct current while allowing alternating current to pass, in filter networks, for smoothing the output of power supplies, in the resonant circuits that tune radios to particular frequencies and for many other purposes.

The capacitance is greatest when there is a narrow separation between large areas of conductor, hence capacitor conductors are often called "plates," referring to an early means of construction. In practice the dielectric between the plates passes a small amount of leakage current and also has an electric field strength limit, resulting in a breakdown

voltage, while the conductors and leads introduce an undesired inductance and resistance.

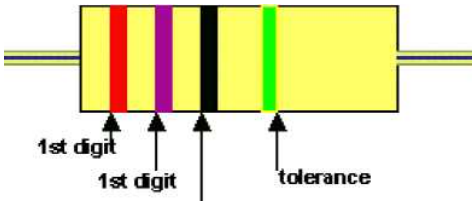
7. Component values

Electronic components have various ways of denoting the values; increasingly (due to advances in printing technology) they have numbers printed on.

Decimal points are often denoted by placing the multiplier in as a decimal point, e.g. resistors labelled 5R6 = 5.6ohms; 4k7= 4.7kohms, and capacitors labelled 2u2 (or 2p2) = 2.2 microfarads.

Resistor Colour Codes

Resistors are often labelled using colour bands; the first three of these denote the value, and a fourth may show the tolerance. The following code is used for the values:



multiplier

The first digit is the one nearest the end.

The two digits are the value; the multiplier adds zeros.

Examples:

red + red + orange = 22 followed by 3 zeros, = 22000 ohms = 22kOhms yellow + purple + green = 47 followed by 5 zeros = 4,700,000 = 4.7 mgO grey + red + black = 82 followed by 0 zeros, = 82 ohms

Small resistors (< 10ohms) may need extra colours for the multiplier:

Gold: multiply by 0.1

Silver: multiply by 0.01

High accuracy resistors sometimes use an extra band for an extra digit; then the five bands

are digit 1, digit 2, digit 3, multiplier, tolerance.

Resistor Tolerance (accuracy) Code

A tolerance of 10% means that the component value may be anything between the nominal value -10% and the nominal value +10%, so a 10% tolerance 12k resistor may have a value between (12-1.2) and (12+1.2), or 10.8k - 13.2k.

Capacitor Values

Capacitors have various methods for marking the value:

Value written "normally" - e.g. 2.2pF = 2.2 microFarads

- Written using the prefix as the decimal point - e.g. 2u2 = 2.2 microFarads
- Using a three digit code: two digits are value, and then the number of zeros, with the value in picoFarads: e.g. 334 = 330000 pF = 330nanoFarads.
- Using a three-band colour code similar to the resistor code, to give the value in picoFarads.
- Extra numbers or bands may indicate the maximum working voltage.

IV. EXERCISE

Mục tiêu: Kiểm tra kết quả đạt được của người học về sự hiểu biết các từ vựng chuyên môn cũng như ngữ pháp, kiến thức và kỹ năng đọc hiểu đã được học để hoàn thành các bài tập ứng dụng cũng như áp dụng vào trong môi trường làm thực tế sau khi tốt nghiệp.

1. Complete the sentences

voltage valve reverse-biased difference direction forward-biased polarity diode

a. A diode is an electrical component acting as a one-way..... for current.

b. When ..... is applied across a diode in such a way that the diode allows current, the diode is said to be.....

c. When voltage is applied across a ..... in such a way that the diode prohibits current, the diode is said to be .....

d. A check valve allows fluid flow through it in only one.....

e. The essential ..... between forward-bias and reverse-bias is the..... of the voltage dropped across the diode.

2. Answer the following questions

a. What is the forward voltage called ?

b. What must be used to sunstain the current going through the diode?

c. What is the Peak Inverse Voltage ?

d. What is the purpose of the gate in the thyristor?

e. What can you do to turn the thyristor off?

3. Decide True or False

a. The thyristor's ability is to switch very large currents at very high (hundreds of volts) voltages.

b. The MOSFET determines the current through itself.

c. A MOSFET is a voltage controlled device.

d. A transistor is composed of a semiconductor material with at least three terminals for connection to an external circuit.

e. A thyristor is a semiconductor device used to amplify and switch electronic signals.

4. Listen and Check

conduction *voltage* *base*
quickly biased *transistor* *pulse* *feedback gate*

When the..... is made positive with respect to K by the application of a gating....., Tr2 will turn on and its collector voltage will fall rapidly. This will cause the pnp .....Tr1 base emitter junction to become forward ....., turning on Tr1. A large current will now be flowing between A and K. The action described happens very ..... as the switching on of Tr2 by Tr1 is a form of positive ..... with each transistor collector supplying large current changes to the..... of the other. As Tr1 collector is connected to Tr2 base, the action of switching on Tr1 connects Tr2 base virtually to the high positive at A. This ensures that Tr2 (and therefore Tr1)remains in, even when the gating pulse is removed.

5. Match the ideas

1. When the gate voltage is 4v LOWER than rail voltage
2. Because the controlled (output) power can be much more than the controlling (input) power
3. Providing the voltage (up to 18v) on the gate rises and falls quickly
4. The higher the resistance of a material,
5. When there is a potential difference (voltage) across the conductors, a static electric field develops across the dielectric

a. the MOSFET will not get hot
b. a transistor can amplify a signal.
c. the MOSFET turns ON
d. causing positive charge to collect on one plate and negative charge on the other plate
e. the more potential difference is required to maintain a current.

V. CONVERSATION

Mục tiêu: Hình thành kỹ năng giao tiếp cho người học để người học có tự tin giao tiếp trong môi trường làm việc.

Lisa: Hi, Oliver

Oliver: Hi, Lisa. How's everything ?
Lisa: Well. Thanks. How about you?
Oliver: Fine, Thanks.
Lisa: Do you know when the capacitance is greatest?
Oliver: Yes, I do. when there is a narrow separation between large areas of conductor.
Lisa: Right. Can you tell me how many methods to mark the value?
Oliver: Yes, I can. There are some following main methods such as: value written "normally", using the prefix as the decimal point, using a three digit code, and using a three-band colour code.
Lisa: Do you mind explaining what pF stands for?
Oliver: No, not at all. It stands for microFarad.
Lisa: Thanks. It's time I must go. See you again.
Oliver: OK. See you.

Unit 6: BASIC ELECTRONIC EQUIPMENT IN CIRCUITS

Bài học này giúp cho người học có kiến thức và kỹ năng về anh ngữ để đọc hiểu cấu tạo, nguyên lý hoạt động của một số các thiết bị điện tử được dùng trong các mạch điện tử như bộ khuếch đại hoạt động, bộ định thời, bộ khuếch đại tranzito, bộ dao động, bộ biến đổi, đồng thời cung cấp cho người học vốn thuật ngữ tiếng Anh chuyên ngành để người học có thể sử dụng trong môi trường làm việc với doanh nghiệp nước ngoài và đọc các tài liệu tham khảo chuyên ngành điện bằng tiếng Anh.

Mục tiêu của bài học:

Sau khi học xong bài học này, sinh viên có khả năng sử dụng kiến thức và kỹ năng anh ngữ:

- Đọc hiểu được thông số kỹ thuật và các nguyên tắc hoạt động của các thiết bị điện tử như bộ khuếch đại hoạt động, bộ định thời, bộ khuếch đại tranzito, bộ dao động, bộ biến đổi.
- Hiểu các từ vựng và phát âm chính xác các thuật ngữ chuyên ngành về điện, điện tử.
- ưng dụng ba loại câu điều kiện trong tiếng Anh vào ngữ cảnh thực tế.
- Tự tin giao tiếp trong môi trường doanh nghiệp

Nội dung của bài học:

I. VOCABULARY

Mục tiêu: Cung cấp cho người học các từ vựng bằng tiếng Anh trong lĩnh vực cấu tạo và nguyên lí hoạt động của một số thiết bị điện tử để người học có thể đọc và hiểu được từ chuyên môn liên quan đến một số tài liệu trong lĩnh vực điện điện tử công nghiệp bằng tiếng Anh.

Solenoid (n)	Cuộn dây ruột gà	Oscillation (n)	Bộ dao động
Valve (n) Target	Van	Fluctuation (n)	Sự dao động
(n) Manufacturer	Biển báo	Detector (n)	Máy dò tìm
(n) Timer (n)	Nhà sản xuất	Pendulum (n)	Con lắc
Retentive (adj)	Rơ le thời gian	Timepiece (n)	Bộ định thời
Tick (v)	Giữ lại	Wireless (n)	Không dây
Preset (v)	Đánh dấu	Transmitter (n)	Máy phát
Increment (n)	Chỉnh trước	Phase (n)	Pha
Ladder (n)	Gia số	Howling (n)	Tiếng rít Tần
DIGIT (n)	Thang	Frequency (n)	số
	Hằng số	Quartz (n)	Thạch anh

Common-emitter	: Bộ phát chung	Crystal (n)	: Tinh thể
Configuration (n)	: Sự lập trình	Vibrate (v) Mineral	: Rung
Bias (n)	: Sai số, sự lệch	rock (n) Quadrant	: Đá khoáng
Divider (n)	: Bộ chia	(adj) Inverter (n)	: Góc phần tư
Base (n) Stabilise	: Cực, ba zơ	Link (v)	: Biến tần
(v) Oscillator (n)	: Ổn định	Regenerative (adj)	: Kết nối
Adjustable (adj)	: Bộ dao động	Mode (n)	: Tái sinh
Regulator (n) LED	: Có thể chỉnh sửa	thức	: Kiểu, phương
(n) Filter (n)	: Bộ điều chỉnh	Comparator (n)	: So sánh
Infinite (adj)	: Đi ốt phát quang	Instrument (n)	: Dụng cụ
	: Bộ lọc	Quad (n)	: Cáp chập bốn
	: Vô cực, vô cùng	Offset (n)	: Độ lệch tâm
		Impedance (n)	: Trở kháng

II. GRAMMAR

Mục tiêu: Cung cấp cho người học cấu trúc ngữ pháp về câu điều kiện trong tiếng Anh để người học có thể sử dụng trong quá trình viết hoặc giao tiếp trong công việc tại nơi làm việc hoặc trong đời sống hằng ngày có liên quan.

2.1 The Conditional Sentences

***Conditional Sentence Type 1**

It is possible and also ***very likely*** that the condition will be fulfilled.

***If* + Simple Present, will-Future**

Example: If I find her address, I'll send her an invitation.

***Conditional Sentence Type 2**

It is possible but ***very unlikely***, that the condition will be fulfilled.

***If* + Simple Past, Conditional I (= would + Infinitive)**

Form:

Example: If I found her address, I would send her an invitation. ***Conditional Sentence Type 3**

It is ***impossible*** that the condition will be fulfilled because it refers to the past.

***If* + Past Perfect, Conditional II (= would + have + Past Participle)**

Example: If I had found her address, I would have sent her an invitation.

2.2 Exercise

a. Complete the Conditional Sentences Type I.

1. If Caroline and Sue.....the salad, Phil.....the house.
2. If Sue..... the onions for the salad, Caroline..... the mushrooms.
3. Jane ..... the sitting room if Aaron and Tim..... the furniture.
4. If Bob ..... up the kitchen, Anita .....the toilet.
5. Elaine ..... the drinks if somebody..... her carry the bottles.
6. If Alan and Rebecca.....the food, Mary and Conor ..... the sandwiches.
7. If Bob ..... after the barbecue, Sue ..... the guests in.
8. Frank .....the DJ if the others ..... along their CDs.
9. Alan..... the drinks if Jane..... him some of her cocktail recipes.
10. If they ..... all their best, the party .....great.

b. Complete the Conditional Sentences Type II.

1. If I..... the lottery, I.....a chance to hit the jackpot.
2. If I ..... the jackpot, I.....rich.
3. If I ..... rich, my life ..... completely.
4. I.....a lonely island, if I.....a nice one.
5. If I ..... a lonely island, I ..... a huge house by the beach.
6. I..... all my friends if I..... a house by the beach.
7. I..... my friends up in my yacht if they .....to spend their holidays on my island.
8. We.....great parties if my friends .....to my island.
9. If we ..... to go shopping in a big city, we ..... a helicopter.
10. But if my friends' holidays ..... over, I ..... very lonely on my lonely island.

c. Complete the Conditional Sentences Type III.

1. If the midfielders..... the ball more exactly, our team..... more chances to attack.

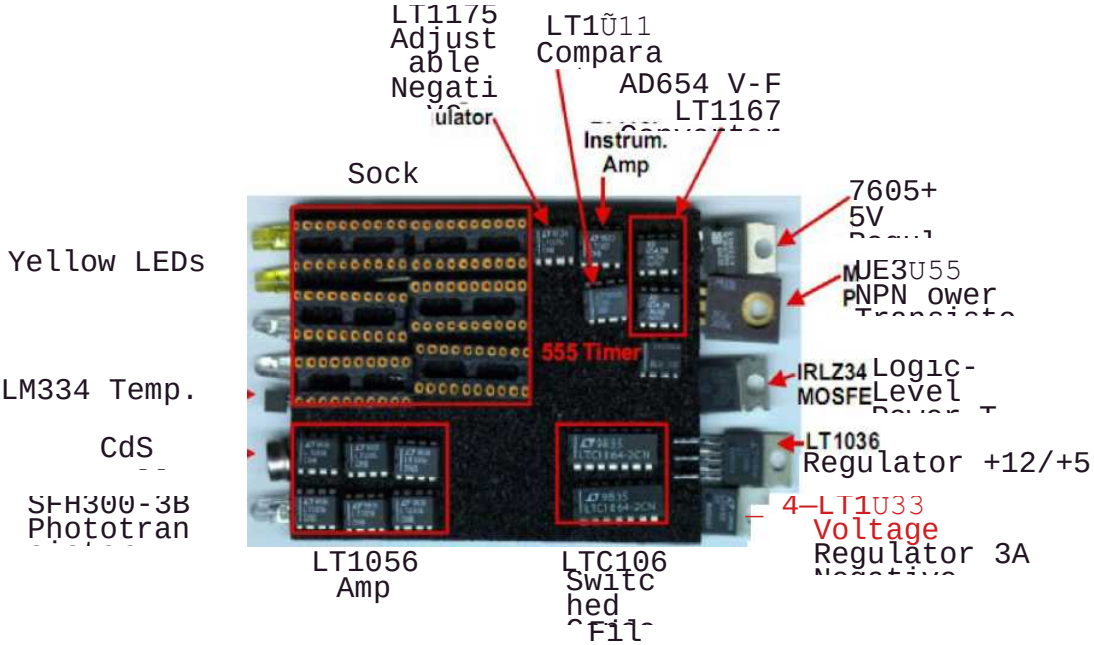
2. If the forwards... faster, they ....more goals. a
3. Their motivation first half. ..... if they ..... goal during the
4. The fullbacks one..... or the other goal if they their opponents.
5. If..... the goalie up, he ..... the ball.
6. If the referee ..... the foul, he..... a penalty kick to our team.
7. Our team..... in better form if they ..... harder the weeks before.
8. The game ..... better if the trainer ..... a substitute in during the second half.
9. If it..... a home game, our team ..... the match.
10. If our team ..... the match, they ..... ᵘp in the league.

III. CONTENT

Mục tiêu: Hình thành kiến thức và kỹ đọc hiểu cho người học để người học có thể đọc được một số tài liệu liên quan đến một số các thiết bị điện tử bằng tiếng Anh.

1. Operational Amplifiers

Parts Kit Guide



Types of Op-Amps

Low power
’ Low offset
’ High voltage
’ Single
’ Quad

• Low noise
• High power
• High speed
• Dual

The Ideal Op-Amp

1) The input impedance is infinite - i.e. no current ever flows into either input of the op-amp.

2) The output^A**g**peidianQigisazero - i.e. the op-amp can drive *Í* any voltage.

3) The open-Hop

4) The bandwidth

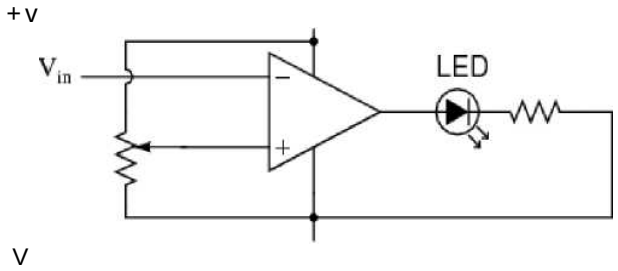
5) The output volt voltage difference

• Feed the hungry.

• SaXthe dolphins.

effete signals.

ignals



In the above circuit, we have an op-amp connected as a comparator, comparing the input voltage with a reference voltage set by the potentiometer (R_1). If V_{in} drops below the voltage set by R_1, the op-amp's output will saturate to +V, thereby lighting up the LED. Otherwise, if V_{in} is above the reference voltage, the LED will remain off. If V_{in} is a voltage signal produced by a measuring instrument, this comparator circuit could function as a "low" alarm, with the trip-point set by R_1. Instead of an LED, the op-amp output could drive a relay, a transistor, an SCR, or any other device capable of switching power to a load such as a solenoid valve, to take action in the event of a low alarm.

2. Timer

f **On-Delay timer**: This type of timer simply “delays turning on”. In other words, after our sensor (input) turns on we wait x-seconds before activating a solenoid valve (output). This is the most common timer. It is often called TON (timer on-delay), TIM (timer) or TMR (timer).

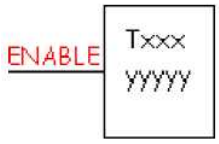
Off-Delay timer: This type of timer is the opposite of the on-delay timer listed above. This timer simply "delays turning off". After our sensor (input) sees a target we turn on a solenoid (output). When the sensor no longer sees the target we hold the solenoid on for x-seconds before turning it off. It is called a TOF (timer off-delay) and is less common than the on-delay type listed above. (i.e. few manufacturers include this type of timer)

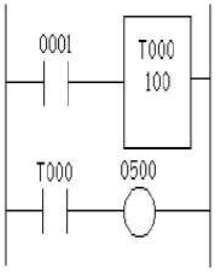
Retentive or Accumulating timer: This type of timer needs 2 inputs. One input starts the timing event (i.e. the clock starts ticking) and the other resets it. The on/off delay timers above would be reset if the input sensor wasn't on/off for the complete timer duration. This timer however holds or retains the current elapsed time when the sensor turns off in mid-stream. For example, we want to know how long a sensor is on for during a 1 hour period. If we use one of the above timers they will keep resetting when the sensor turns off/on. This timer however, will give us a total or accumulated time. It is often called an RTO (retentive timer) or TMRA (accumulating timer).

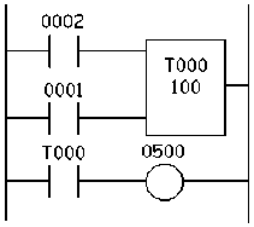
This timer is the on-delay type and is named Txxx. When the enable input is on the

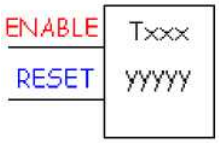
timer starts to tick. When it ticks yyyyy (the preset value) times, it will turn on its contacts that we will use later in the program. Remember that the duration of a tick (increment) varies with the vendor and the timebase used. (i.e. a tick might be 1ms or 1 second) In this diagram we wait for input 0001 to turn on. When it does, timer T000 (a 100ms increment timer) starts ticking. It will tick 100 times. Each tick (increment) is 100ms so the timer will be a 10000ms (i.e. 10 second) timer. 100ticks X 100ms = 10,000ms. When 10 seconds have elapsed, the T000 contacts close and 500 turns on. When input 0001 turns off(false) the timer T000 will reset back to 0 causing its contacts to turn off(become false) thereby making output 500 turn back off.

This timer is named Txxx. When the enable input is on the timer starts to tick. When it ticks yyyyy (the preset value) times, it will turn on its contacts that we will use later in the program. Remember that the duration of a tick (increment) varies with the vendor and the timebase used. (i.e. a tick might be 1ms or 1 second or...) If however, the enable input turns off before the timer has completed, the current value









will be retained. When the input turns back on, the timer will continue from where it left off. The only way to force the timer back to its preset value to start again is to turn on the reset input.

In this diagram we wait for input 0002 to turn on. When it does timer T000 (a 10ms increment timer) starts ticking. It will tick 100 times. Each tick (increment) is 10ms so the timer will be a 1000ms (i.e. 1 second) timer. 100ticks X 10ms = 1,000ms. When 1 second has elapsed, the T000 contacts close and 500 turns on. If input 0002 turns back off the current elapsed time will be retained. When 0002 turns back on the timer will continue where it left off. When input 0001 turns on (true) the timer T000 will reset back to 0 causing its contacts to turn off (become false) thereby making output 500 turn back off.

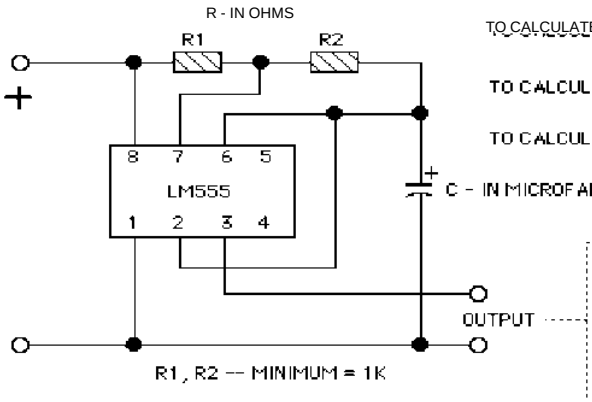
99 Minutes On/ Off Timer
20 Minute Timer
Timer 5 Minute to 50 Minute (10 Step)
Timer 2 Minute to 20 Minute (10 Step)

2 Digit Timer (0 to 99 Hours)

BASIC CIRCUITS and CALCULATIONS FOR THE LM555 TIMER CHIP

1 1 February, 201 1

BASIC ASTABLE OSCILLATOR



TO CALCULATE THE FREQUENCY -- F = 0.693 X (R1 + 2XR2)XC

TO CALCULATE THE ON TIME -- Tsec. = 0.693 X (R1 + R2) X C

TO CALCULATE THE OFF TIME -- Tsec. = 0.693 X R2 X C

TO CALCULATE THE DUTY CYCLE -- $98 = \frac{R2}{R1 + 2 \times R2} \times 100$

- AST ABLE 555 TIMERS WILL START WITH THE OUTPUT 'HIGH' WHEN THE POWER IS APPLIED.
- THE DUTY CYCLE IS THE RATIO OF THE 'ON' TIME TO THE 'OFF' TIME

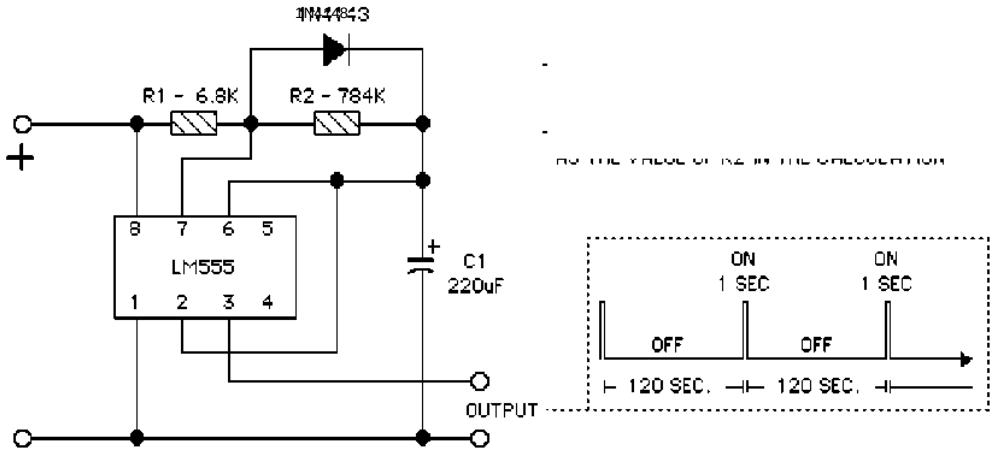
Circuit 1

BASIC CIRCUITS and CALCULATIONS FOR THE LM555 TIMER CHIP

555 Basics copy 2

15 January, 2011

120 SECONDS OFF / 1 SECONDS ON - 555 OSCILLATOR



- DUE TO THE DIODE IN THE TIMING CIRCUIT THE ABOVE FORMULAS DO NOT WORK DIRECTLY

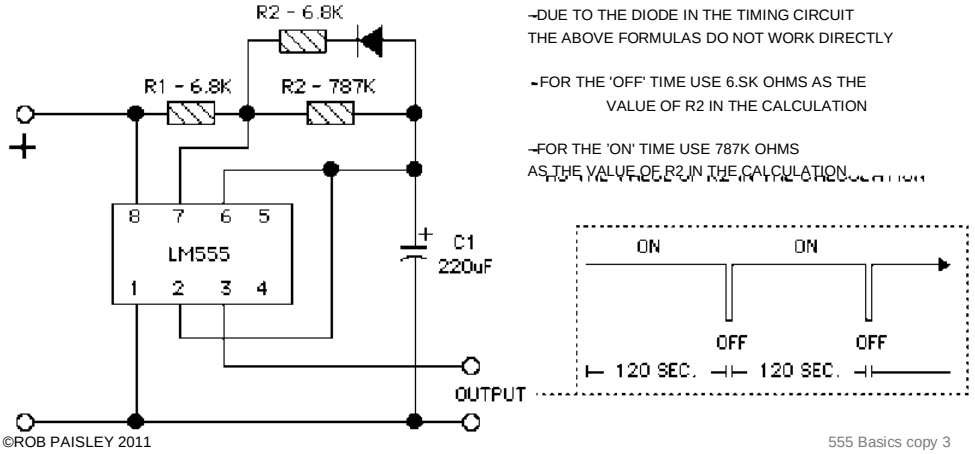
- FOR THE '0N' TIME USE 0 OHMS AS THE VALUE OF R2 IN THE CALCULATION

- RESISTOR VALUES ARE CALCULATED TO GIVE THE DESIRED OUTPUT TIMES.
- A DUTY CYCLE OF LESS THAN 50 PERCENT IS POSSIBLE WITH THIS CIRCUIT.

http://home.cogeco.ca/~rpaisley4/CircuitIndBK.html

Circuit 2

BASIC CIRCUITS and CALCULATIONS FOR THE LM555 TIMER CHIP



- DUE TO THE DIODE IN THE TIMING CIRCUIT THE ABOVE FORMULAS DO NOT WORK DIRECTLY

- FOR THE 'OFF' TIME USE 6.SK OHMS AS THE VALUE OF R2 IN THE CALCULATION

- FOR THE 'ON' TIME USE 787K OHMS AS THE VALUE OF R2 IN THE CALCULATION

555 Basics copy 3

15 January, 2011

1 SECONDS OFF / 120 SECONDS ON - 555 OSCILLATOR

RESISTOR VALUES ARE CALCULATED TO GIVE THE DESIRED OUTPUT TIMES.

http://home.cogeco.ca/~rpaisley4/CircuitIndBK.html

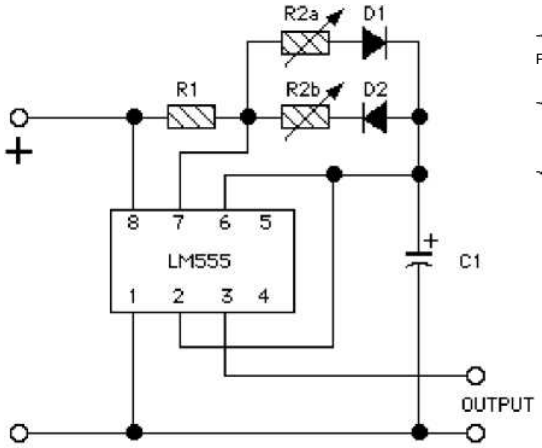
Circuit 3

BASIC CIRCUITS and CALCULATIONS FOR THE LM555 TIMER CHIP

555 Basics copy 4

10 November, 2009

INDEPENDANTLY VARIABLE TIMING FOR BOTH PORTIONS OF THE OUTPUT CYCLE



- DUE TO THE DIODES IN THE TIMING CIRCUIT THE ABOVE FORMULAS DO NOT WORK DIRECTLY
- FOR THE 'ON' TIME USE R1 AND R2a with C1 IN THE CALCULATION
- FOR THE 'OFF' TIME USE R1 AND R2b WITH CI IN THE CALCULATION

http://home.cogeco.ca/~rpaisley4/CircuitIndex.html

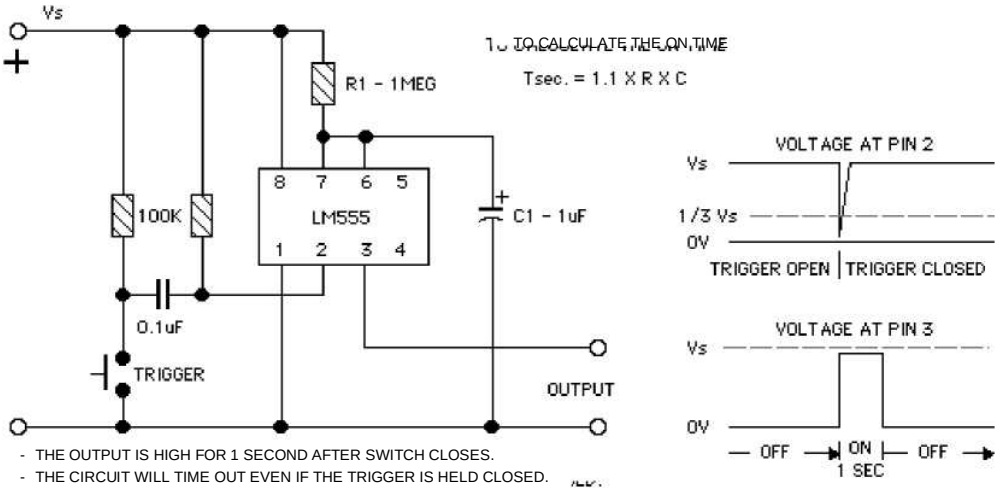
Circuit 4

BASIC CIRCUITS and CALCULATIONS FOR THE LM555 TIMER CHIP

555 Basics copy 5

04 July, 201 1

1 SECOND - ONESHOT MI □ ATOR



- THE OUTPUT IS HIGH FOR 1 SECOND AFTER SWITCH CLOSES.
- THE CIRCUIT WILL TIME OUT EVEN IF THE TRIGGER IS HELD CLOSED.

http://home.cogeco.ca/~rpaisl ey4/CircuitIndex.html

Circuit 5

3. Transistor Amplifiers

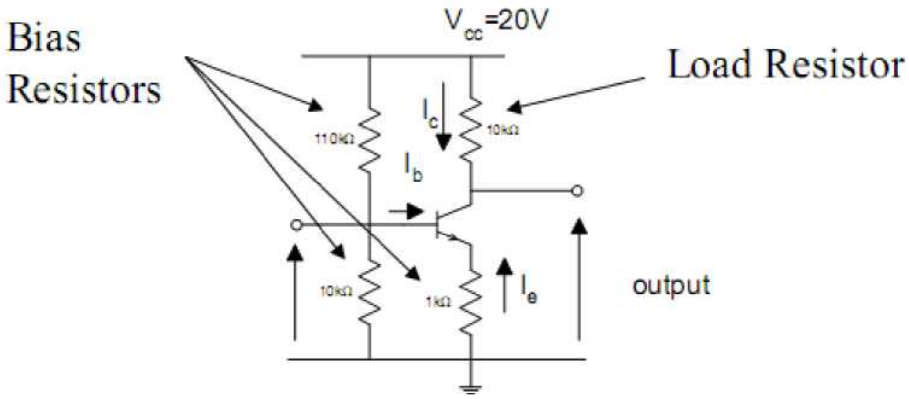
Transistor as an Amplifier

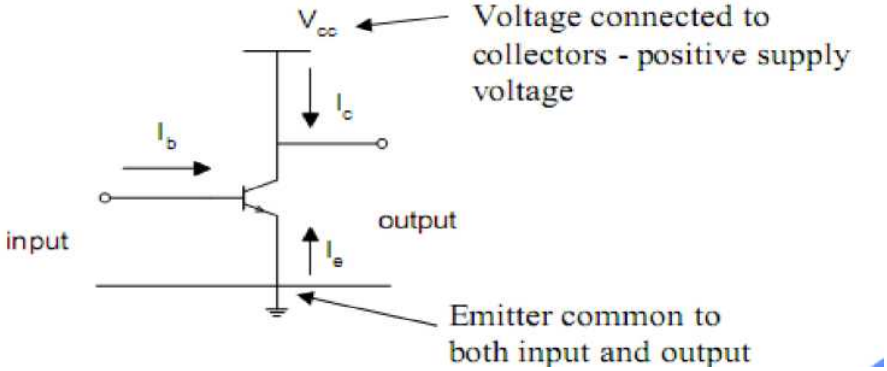
s How do we use the transistor as an amplifier?

s First, we must connect it appropriately to the supply voltages, input signal, and load, so it can be used.

s A useful mode of operation is the common-emitter configuration

range)





s To make a practical circuit, we have to add bias and load resistors to ensure the transistor is at the desired operating point (operating in the right current

s The resistors connected to the base ensure that the BE junction is forward biased. They effectively form a potential divider to reduce the voltage supplied to the base.

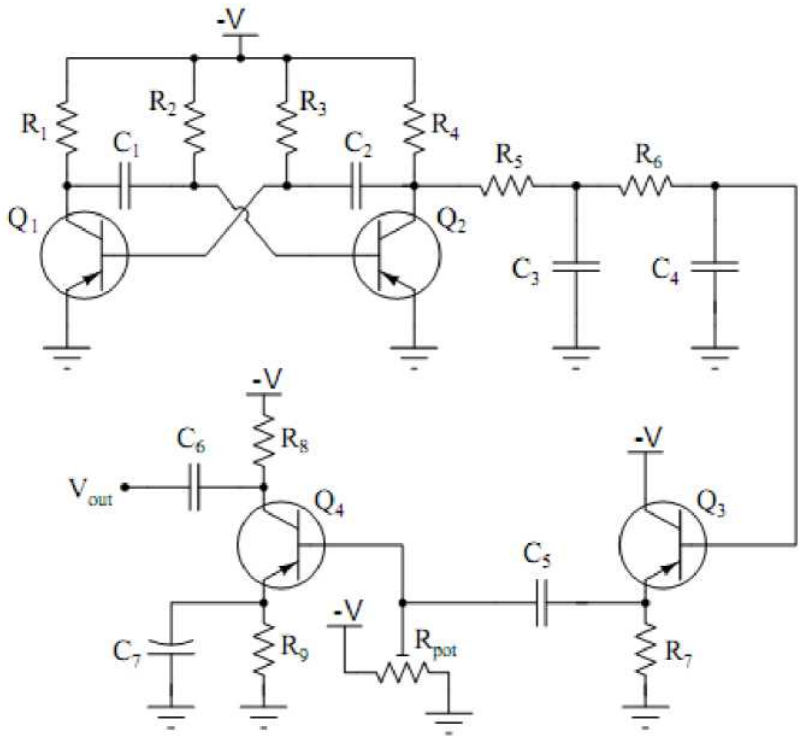
s The emitter resistor work with the base resistors to stabilise the operating point wrt variations in b due to component variation and temperature by providing negative feedback.

s Finally, the collector resistor provides the load.

4. Oscillators

An oscillator is a mechanical or electronic device that works on the principles of oscillation: a periodic fluctuation between two things based on changes in energy. Computers, clocks, watches, radios, and metal detectors are among the many devices that use oscillators.

A clock pendulum is a simple type of mechanical oscillator. The most accurate timepiece in the world, the atomic clock, keeps time according to



the oscillation within atoms. Electronic oscillators are used to generate signals in computers, wireless receivers and transmitters, and audio-frequency equipment, particularly music synthesizers. There are many types of electronic oscillators, but they all operate according to the same basic principle: an oscillator always employs a sensitive amplifier whose output is fed back to the input in phase. Thus, the signal regenerates and sustains itself. This is known as positive feedback. It is the same process that sometimes causes unwanted “howling” in public-address systems.

The frequency at which an oscillator works is usually determined by a quartz crystal. When a direct current is applied to such a crystal, it vibrates at a frequency that depends on its thickness, and on the manner in which it is cut from the original mineral rock. Some oscillators employ combinations of inductors, resistors, and/or capacitors to determine the frequency. However, the best stability (constancy of frequency) is obtained in oscillators that use quartz crystals.

In a computer, a specialized oscillator, called the clock, serves as a sort of pacemaker for the microprocessor. The clock frequency (or clock speed) is usually specified in megahertz (MHz), and is an important factor in determining the rate at which a computer can perform instructions.

The circuit above shows:

Square wave oscillator: R1 through R4, C1 and C2, Q1 and Q2
First integrator stage: R5 and C3
Second integrator stage: R6 and C4

Buffer stage (current amplification): Q3 and R7
Final gain stage (voltage amplification): R8 and R9, Rpot, Q4, and C7

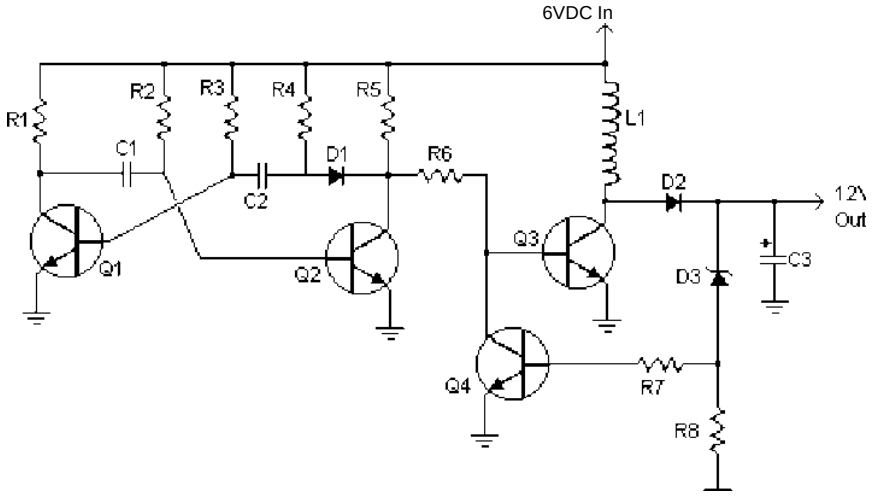
5. Converters

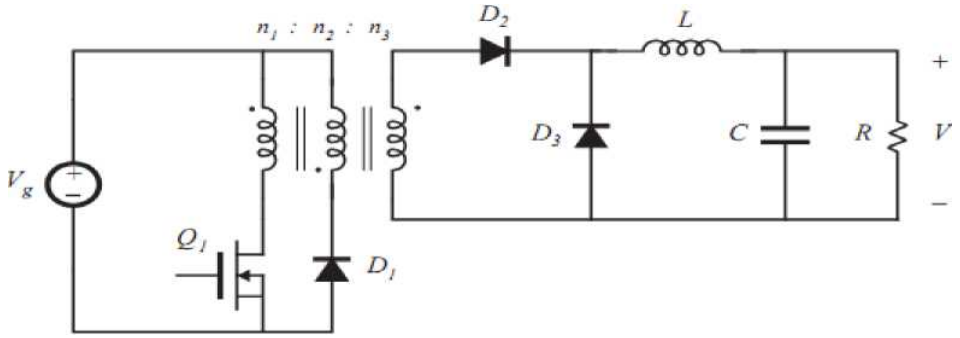
AC/DC three-phase converters with a full digital control. SieiDrive - SR32 devices are AC/DC three-phase converters with a full digital control, which are active in the four quadrants to supply constant voltage to the DC link of the AVy and AGy inverters. The SR32 converter is suitable to supply power to both single and multiple inverter systems connected to a common DC link.

Forward converter above:

- *J* Buck-derived transformer-isolated converter
- *J* Single-transistor and two-transistor versions
- *J* Maximum duty cycle is limited
- *J* Transformer is reset while transistor is off

A part of the regenerated power can be exchanged between the monitoring and regenerating drives; the exceeding power is regenerated back to the Mains via the SR32 converter. The output voltage of the SR32 converter is kept constant within a specified range even if the inverter operates in a regenerative mode untill it reaches the full current value supplied while functioning in a rectifier mode.





Part	Tot. Qty.	Description	Substit - utions
R1, R4	2	2.2K 1/4W Resistor	
R2, R3	2	4.7K 1/4W Resistor	
R5	1	1K 1/4W Resistor	
R6	1	1.5K 1/4W Resistor	
R7	1	33K 1/4W Resistor	
R8	1	10K 1/4W Resistor	
C1,C2	2	0.1uF Ceramic Disc Capacitor	
C3	1	470uF 25 V Electrolytic Capcitor	
D1	1	1N914 Diode	
D2	1	1N4004 Diode	
D3	1	12V 400mW Zener Diode	
Q1, Q2, Q4	3	BC547 NPN Transistor	
Q3	1	BD679 NPN Transistor	
L1	1	L1 is a custom inductor wound with about 80 turns of 0.5mm magnet wire around a toroidal core with a 40mm outside diameter.	
MISC		Heatsink For Q3, Binding Posts (For Input/Output), Wire, Board	

REFERENCE: Electric equipment

Heat pump

Lightning arrester

Magnetic starter

Circuit breaker

Electrical system

Sockets and switch

Microwave oven

Oxygen generator

Overload protector

Actuator

Thermal relay

Auto- starter

Dispenser

*

Amplifier

Automatic vacuum pump

Fuse

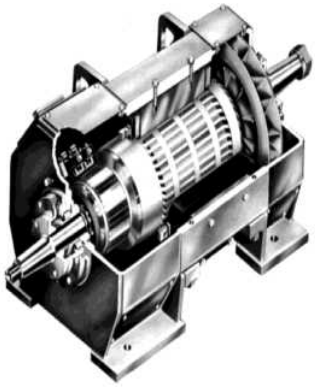
Electric cable

Electric pipeline

Relay

Ceiling roses

Arlam bell



Synchronous machine

Surge arrester

Lightning arrrester

Step- down transformer

Stepless transformer

Three phase circuit breaker

Magnetic contactor

Voltage regulator

Universal electricmeter

Power capacitor

PLC programmer

Underground cable

Cable ladder

Cable tray

Force sensor

Frequency converter

Bolt, nut and washes

Hand drill

Insulated pliers

Screwdriver

Spanner

Hydraulic pump

Adjustable wrench

Magnetic brake clutch

Gear box

Gear motor

Synchronous generator

Busbar

Central control box

Ceramic insulator

Medium voltage fuses

Disconnect switch

Band conveyor

Electric fan

Electric iron

Electric cooker

Pressure cooker

Light bulb

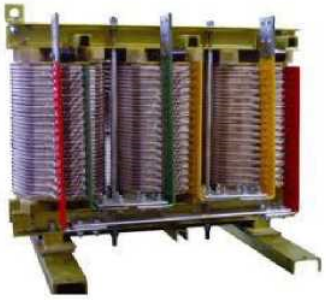
Flourescent tube

Resistor

Rheostat

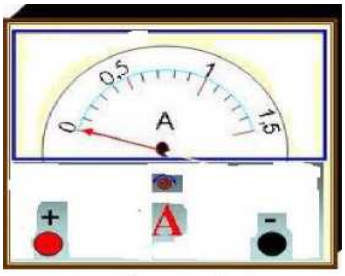
Varistor

Oil- immersed transformer

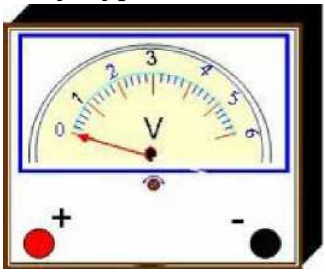


Dry- type transformer

Current transformer



Ammeter



Voltmeter

Wattmeter

IV. EXERCISE

Mục tiêu: Kiểm tra kết quả đạt được của người học về sự hiểu biết các từ vựng chuyên môn cũng như ngữ pháp, kiến thức và kỹ năng đọc hiểu đã được học để hoàn thành các bài tập ứng dụng cũng như áp dụng vào trong môi trường làm thực tế sau khi tốt nghiệp.

1. Complete the sentences

deficit end amplify *output voltage*

a. The Op-Amp produces an .....that is the difference between the two input terminals, multiplied by the gain A.

b. You can use Op- Amp to..... the signals.

c. You can use Op- Amp to..... global warming.

d. You can use Op- Amp to..... music very loud.

e. You can use Op- Amp to pay off the.....

2. Answer the following questions

a. Why do we call TON ?

b. What is an off - delay timer?

c. How many basic types of timers? ?

d. What is the purpose of the gate in the thyristor?

e. How do we use the transistor as an amplifier?

3. Decide True or False

a. A useful mode of operation of Transistor Amplifier is the common-emitter configuration

b. The emitter resistor itself provides negative feedback.

c. The resistors are used to effectively form a potential divider to reduce the voltage supplied to the base.

d. An oscillator is a mechanical or electronic device used to oppose the current.

e. The clock frequency of the oscilator is an important factor in determining the rate at which a computer can perform instructions.

4. Listen and Check

power *link* *regenerative value converters*

digital *quadrants* *constant* *drives*

SR32 devices are AC/DC three-phase ..... with a full ..... control, which are active in the four.....to supply constant voltage to the DC link of the AVy and AGy inverters. The SR32 converter is suitable to supply ..... to both single and multiple inverter systems connected to a common DC A part of the regenerated power can be exchanged between the monitoring and regenerating .....; the exceeding power is regenerated back to the Mains via the SR32 converter. The output voltage of the SR32 converter is kept..... within a specified range even if the inverter operates in a .....mode untill it reaches the full current ..... supplied while functioning in a rectifier mode.

5. Match the ideas

1. Electronic oscillators	a. it vibrates at a frequency
2. When a direct current is applied to such a crystal	b. are used to generate signals in computers
3. The SR32 converter	c. varies with the vendor and the timebase used
4. The principle of oscillation is	d. is suitable to supply power to both single and multiple inverter systems connected to a common DC link.
5. The duration of a tick (increment)	e. that a periodic fluctuation between two things based on changes in energy

V. CONVERSATION

Mục tiêu: Hình thành kỹ năng giao tiếp cho người học để người học có tự tin giao tiếp trong môi trường làm việc.

Isabel: Hi, Oliver
Oliver: Hi, Isabel. How's everything ?
Isabel: Well. Thanks. How about you?
Oliver: Fine, Thanks.
Isabel: Do you know how many types of the operational amplifier?
Oliver: Oh, I think there are nine types.
Isabel: Right. And can you tell me its importances?

Oliver: Yes, I can. With the operational amplifier, you can feed the hunger, amplify signals, save the dolphins, differentiate signals, integrate signals, heal the sick, pay off the deficit, buffer signals, end global warming, sum multiple signals, and make music louder.
Isabel: That's great. The operational amplifier is really useful, isn't it? **Oliver:** Sure, I like it very much.

Isabel: Uh huh. Thanks for your answer.
Oliver: You're welcome.

Unit 7: BASIC ELECTRONIC EQUIPMENT IN USE

Nhằm giúp cho người học có thể hiểu rõ hơn về các thiết bị điện tử được sử dụng trong hộ gia đình hoặc trong công nghiệp, bài học này giúp cho người học có kiến thức và kỹ năng về anh ngữ để đọc hiểu cấu tạo, thông số kỹ thuật và nguyên lý hoạt động của một số thiết bị điện tử cơ bản như pin điện, điều khiển từ xa, hệ thống báo động, hệ thống ghi âm, đồng thời cung cấp cho người học vốn thuật ngữ tiếng Anh chuyên ngành để người học có thể sử dụng trong môi trường làm việc với doanh nghiệp nước ngoài và đọc các tài liệu tham khảo chuyên ngành điện bằng tiếng Anh.

Mục tiêu của bài học:

Sau khi học xong bài học này, sinh viên có khả năng sử dụng kiến thức và kỹ năng anh ngữ:

- Đọc hiểu được cấu tạo, thông số kỹ thuật và nguyên lý hoạt động của các thiết bị điện tử như pin điện, điều khiển từ xa, hệ thống báo động, hệ thống ghi âm.
- Hiểu các từ vựng và phát âm chính xác các thuật ngữ chuyên ngành về Điện tử.
- Sử dụng đúng các động từ khiếm khuyết tiếng Anh trong ngữ cảnh.
- Tự tin giao tiếp trong môi trường doanh nghiệp

Nội dung của bài học:

I. VOCABULARY

Mục tiêu: Cung cấp cho người học các từ vựng bằng tiếng Anh trong lĩnh vực cấu tạo, thông số kỹ thuật và nguyên lí hoạt động của một số thiết bị điện tử để người học có thể đọc và hiểu được từ chuyên môn liên quan đến một số tài liệu trong lĩnh vực điện điện tử công nghiệp bằng tiếng Anh.

Battery (n)	Pin điện	Buzzer (n) Radar	Máy rung
Sulfuric acid (n)	Axit sunfuric	(n) Ultrasonic	Ra đa
Solution (n)	Dung dịch	(adj) Reflection	Siêu âm
Electrolyte (n)	Chất điện phân	(n) Chime = bell	Sự phản xạ
Reaction (n)	Phản ứng	(n) Premises (n)	Chuông
Release (n)	Bộ nhả	Anatomy (n)	Cơ sở, địa điểm
Recharge (v)	Nạp lại	Circuitry (n) Jack	Cấu tạo
Maintenance (n)	Sự bảo trì	(n) Shaft (n)	Sơ đồ mạch điện
Spillage (n)	Sự rò rỉ	Pinpoint (v)	o cắm, rắc cắm
Instance (n)	Trường hợp	Induction (n)	Thân trục
Pressure (n)	Áp suất		Chỉ rõ
Reseal (v)	Bọc kín		Sự cảm ứng

Septic (n)	Hữu khuẩn	Pulse (n)	Xung
Scooter (n)	Xe máy dầu	Beat frequency (n)	Tần số biến thiên
Failure (n)	Hư hỏng	Sweep (v)	Quét
Corrode (n)	Ăn mòn	Coil (n)	Cuộn dây
Remote (adj)	Từ xa	Optional (adj)	Tùy chọn
Casing (n)	Hộp đựng	Weapon (n)	Vũ khí
Disarm (v)	Không trang bị	Path (n)	Đường, nhánh
Board (n)	Bảng	Beam (n)	Chùm sáng, tia
Underneath (adv) :	Ở dưới	Drop (n)	Sự sụt giảm
Burglar (n)	Kẻ trộm	Passageway (n)	Đường ống dẫn
Trigger (v)	Bộ khởi động	Laser (n)	Tia hồng ngoại

Spring-driven (a) : Điều khiển = lò xo Magnet (n) Nam châm

II. GRAMMAR

Mục tiêu: Cung cấp cho người học cấu trúc ngữ pháp về câu điều kiện trong tiếng Anh để người học có thể sử dụng trong quá trình viết hoặc giao tiếp trong công việc tại nơi làm việc hoặc trong đời sống hằng ngày có liên quan.

2.1 The Subject- Verb Agreement

J When the subject follows the verb

When the subject follows the verb (especially in sentences beginning with the expletives “there is” or “there are”), special care is needed to determine the subject and to make certain that the verb agrees with it.

A. On the wall were several posters.
B. There are many possible candidates.
C. There is only one good candidate.

v *When words like “each” are the subject*

When used as subjects, words such as

each, either, neither
another
anyone, anybody, anything
someone, somebody, something
one, everyone
everybody, everything
no one, nobody, nothing

Do not be confused by prepositional phrases which come between a subject and its verb. They do not change the number of the subject.

a. Each takes her turn at rowing.
b. Neither likes the friends of the other.

c. Everyone in the fraternity has his own set of prejudices.
d. Each of the rowers takes her turn at rowing.
e. Every one of the fraternity members has his own set of prejudices.

2.2 Exercise

1. Mumps (is/are) not common among adults
2. Viruses from third world countries (is/are) a major concern.
3. Most of the sand (is/are) wet from the high tide.
4. Either the two kittens or the puppy (sits/sit) in my lap while I watch television.
5. A subject of great interest (is/are) rainforests.
6. *Hansel and Gretel* (is/ are) a famous children's story.
7. The team members (is/are) arguing over the defense tactics.
8. The economics of the trip (was/were) pleasing.
9. Why (is/are) your parents going to Africa for a vacation?
10. The mayor and the governor (hopes/hope) that the bill will soon become a law.

III. CONTENT

Mục tiêu: Hình thành kiến thức và kỹ đọc hiểu cho người học để người học có thể đọc được một số tài liệu liên quan đến một số các thiết bị điện tử bằng tiếng Anh.

1. Batteries

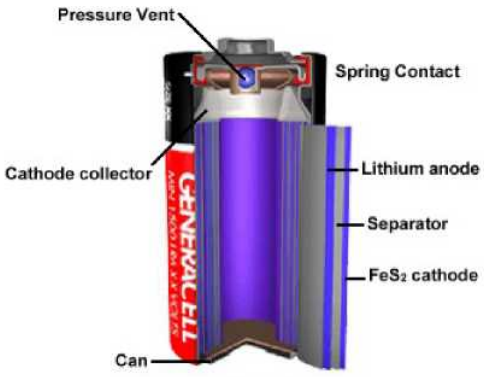
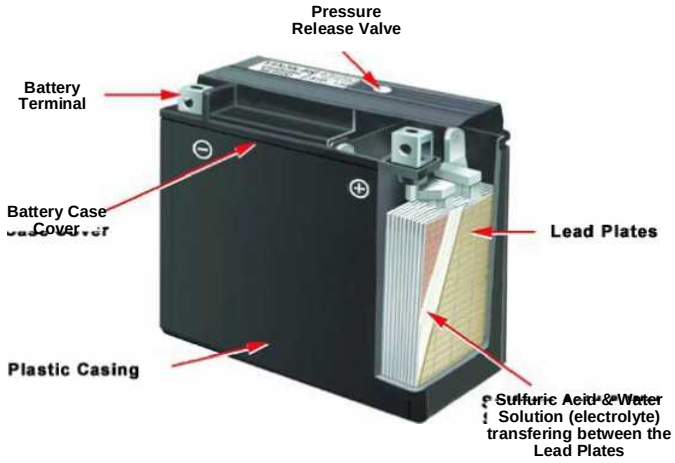


Figure 1

A lead acid battery is primarily made up of lead plates, sulfuric acid and water. The sulfuric acid and water solution (electrolyte) causes a chemical reaction with the lead plates to produce electrons. As the battery is used, the release of electrons causes the sulfur to rest within the lead plates. When the battery is recharged, sulfur is released from the plates and power is restored to the battery.



SLA batteries are maintenance free over the duration of their life and do not need to have water added or the gravity of the electrolyte checked. SLA batteries are constructed in a manner which ensures no electrolyte spillage, therefore making them safe for transfer and operation. In the instance that gas pressure builds up in the SLA battery, vents located on the top of the battery release the gas and automatically reseal once the pressure returns to normal levels.

SLA Battery Usage

Sealed Lead Acid batteries have many uses and can be found in a variety of products and industries. Here is an example of some common usages:

Uninteruptable Power Supplies (UPS Systems)
Emergency Lighting
Home Security Alarm Systems
Septic Tank Systems
Medical & Instrumentation Products
Telecommunication Systems Children's Battery
Powered Riding Cars
Motorized Scooters

Battery Failure

Eventually, batteries need to be replaced because they can no longer hold a charge. One reason for battery failure is because over time sulfur builds up and coats the battery's lead plates. This is called “sulfation build-up”. Another reason for battery failure is caused by corroded lead plates. The corrosion of the plates does not allow the chemical reaction to take place, therefore no electrons are discharged.

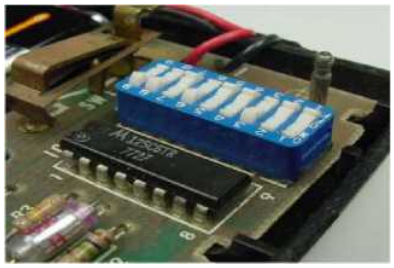
2. Remote control

The two most common remote keyless-entry devices are:

J The fob that goes on your key ring to lock and unlock your car doors (Many of these

fobs also arm and disarm a car alarm system.

J The small controller that hangs off your car's sun visor to open and close the garage door



The first shows a controller chip (black) and a DIP switch (blue). A DIP switch has eight tiny switches arranged in a small package and soldered to the circuit board. By setting the DIP switches inside the transmitter, you controlled the code that the transmitter sent. The garage door would only open if the receiver's DIP switch were set to the same pattern. This provided some level of security, but not much. Eight DIP switches provide only 256 possible combinations. That's enough to keep several neighbors from opening each other's doors, but not enough to provide any real security.

How to Make a Remote Control Work on a Different Garage Door

J Place a ladder underneath the rear section of the opener's motor. Slide the remote into your pocket and climb the ladder.

J Open the door on the back of the opener's motor. Locate the square button labeled “Smart.” Pull the remote out of your pocket.

J Press the “Smart” button, then the remote's “Open” button. If the opener has lights, they blink on then off to notify you the synchronization is complete.

3. Alarm system

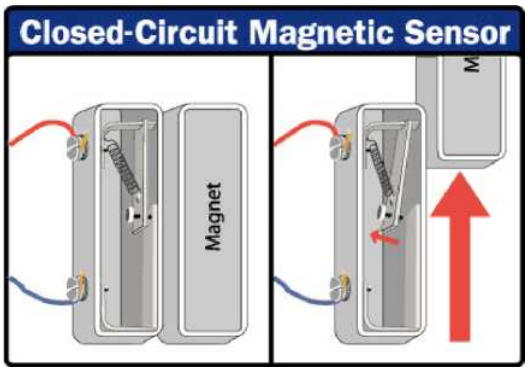
Other than the family dog, the most basic burglar alarm is a simple electric circuit built into an entry way. In any circuit, whether it's powering a flashlight or a computer, electricity only flows when you give it a path between two points of opposite charge. To turn the electricity on or off, you open or close part of the circuit.

To open or close a flashlight circuit, you simply throw a switch. In a burglar alarm, the switch detects the act of intrusion - opening a door or window, for example. These sorts of alarms are divided into two categories:

f In a closed-circuit system, the electric circuit is closed when the door is shut. This means that as long as the door is closed, electricity can flow from one end of the circuit to

the other. But if somebody opens the door, the circuit is opened, and electricity can't flow. This triggers an alarm.

f In an open-circuit system, opening the door closes the circuit, so electricity begins to flow. In this system, the alarm is triggered when the circuit is completed.



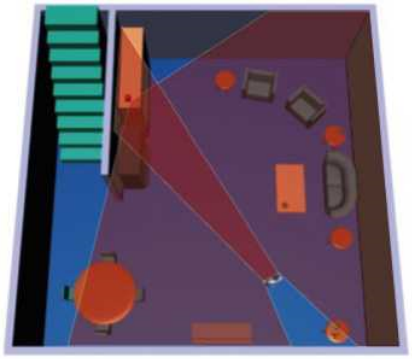
A magnetic sensor in a closed circuit consists of a few simple components. For the most basic design, you need:

a battery powering a circuit
a spring-driven metal switch built into a door frame
a magnet embedded in the door, lined up with the switch
a separately-powered buzzer with a relay-driven switch.

When the door is closed, the magnet pulls the metal switch closed so the circuit is complete. The current powers the relay's electromagnet, so the buzzer circuit stays open. When you move the magnet by opening the door, the spring snaps the switch back into the open position. This cuts off the current and closes the relay, sounding the alarm.

The motion detector emits radio energy into a room and monitors the reflection pattern.

An automatic door opener is an example of a radar-based motion detector. The box above the door sends out bursts of microwave radio energy (or ultrasonic sound waves), and then waits for the reflected energy to bounce back. If there is nobody in front of the door, the radio energy will bounce back in the same pattern. But if somebody enters the area, the reflection pattern is disturbed. When this happens, the sensor sends a signal and the door opens. In a security system, the sensor sends an alarm signal when the reflection pattern in a room is disturbed.



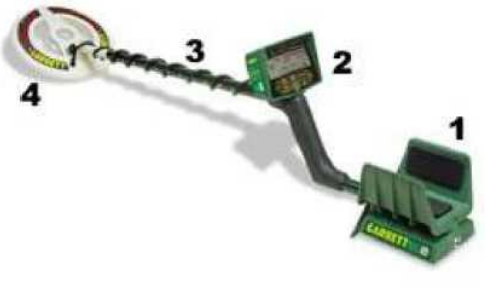
If somebody disturbs the reflection pattern, the motion detector sends an alarm signal to the control box.

Another simple design is a photo-sensor motion detector. These are the devices you might see in a store at a shopping mall. When somebody enters the store, the motion detector sounds a chime or bell. Photo-sensors have two components:

a source of focused light (often a laser beam) a light sensor

In a home security system, you aim the beam at the light sensor, across a passageway in your house. When somebody walks between the light source and the sensor, the path of the beam is blocked briefly. The sensor registers a drop in light levels and sends a signal to the control box.

4. Matel detector



Metal-detector technology is a huge part of our lives, with a range of uses that spans from leisure to work to safety. The metal detectors in airports, office buildings, schools,

government agencies and prisons help ensure that no one is bringing a weapon onto the premises. Consumer-oriented metal detectors provide millions of people around the world with an opportunity to discover hidden treasures (along with lots of junk).

Anatomy of a Metal Detector

A typical metal detector is light-weight and consists of just a few parts:

1. *Stabilizer (optional)* - used to keep the unit steady as you sweep it back and forth
2. *Control box* - contains the circuitry, controls, speaker, batteries and the microprocessor
3. *Shaft* - connects the control box and the coil; often adjustable so you can set it at a comfortable level for your height
4. *Search coil* - the part that actually senses the metal; also known as the "search head," "loop" or "antenna"

Most systems also have a jack for connecting headphones, and some have the control box below the shaft and a small display unit above.

Operating a metal detector is simple. Once you turn the unit on, you move slowly over the area you wish to search. In most cases, you sweep the coil (search head) back and forth over the ground in front of you. When you pass it over a target object, an audible signal occurs. More advanced metal detectors provide displays that pinpoint the type of metal it has detected and how deep in the ground the target object is located.

Metal detectors use one of three technologies:

- *s* Very low frequency (VLF)
- *s* Pulse induction (PI)
- *s* Beat-frequency oscillation (BFO)

IV. EXERCISE

Mục tiêu: Kiểm tra kết quả đạt được của người học về sự hiểu biết các từ vựng chuyên môn cũng như ngữ pháp, kiến thức và kỹ năng đọc hiểu đã được học để hoàn thành các bài tập ứng dụng cũng như áp dụng vào trong môi trường làm thực tế sau khi tốt nghiệp.

1. Complete the sentences

failure Security maintenance plates battery

a. A lead acid .....is primarily made up of lead plates, sulfuric acid and water.

b. SLA batteries are..... free over the duration of their life

c. When the battery is recharged, sulfur is released from the ..... and power is restored to the battery.
d. Sealed Lead Acid batteries can also be used in Home.....Alarm Systems
e. One reason for battery ..... is because over time sulfur builds up and coats the battery's lead plates

2. Answer the following questions

a. Why do batteries get failure?

b. What is the function of the fob?

c. What is the small controller that hangs off your car's sun visor used for ?

d. How to Make a Remote Control Work on a Different Garage Door

e. How many types of alarms are there?

3. Decide True or False

a. When the door is closed, the magnet pulls the metal switch closed so the circuit is complete.

b. The motion detector stores radio energy and uncontrols the reflection pattern.

c. When you move the magnet by opening the door, the spring snaps the switch back into the open position.
d. An automatic door opener is an example of a radar-based motion detector.
e. In a security system, the sensor sends an alarm signal when the reflection pattern in a room is not disturbed.

4. Listen and Check

simple *target* *metal detectors object*
sweep *slowly* *box* *systems*

Most..... also have a jack for connecting headphones, and some have the control..... below the shaft and a small display unit. Operating a metal detector is..... Once you turn the unit on, you move ..... over the area you wish to search. In most cases, you.....the coil (search head) back and forth over the ground in front of you. When you pass it over a target ..... , an audible signal occurs. More advanced metal ..... provide displays that pinpoint the type of ..... it has detected and how deep in the ground the

..... object is located.

5. Match the ideas

1. Stabilizer	a. contains the circuitry, controls, speaker, batteries and the microprocessor
2. Control box	b. connects the control box and the coil; often adjustable so you can set it at a comfortable level for your height
3. Shaft	
4. Search coil	c. is used to keep the unit steady as you sweep it back and forth
5. The sensor	d. registers a drop in light levels and sends a signal to the control box.
	e. the part that actually senses the metal.

V. CONVERSATION

Mục tiêu: Hình thành kỹ năng giao tiếp cho người học để người học có tự tin giao tiếp trong môi trường làm việc.

Isabel: Hi, David

David: Hi, Isabel. How's everything ?

Isabel: Well. Thanks. How about you?

David: Fine, Thanks.

Isabel: Do you know how many components do photo- sensors have?

David: Oh, I think there are two.

Isabel: Right. And can you tell me more clearly?

David: Yes, I can. They are a source of focused light (often a laser beam) and a light sensor.

Isabel: That's great. What happens if somebody disturbs the reflection pattern? **David:** Oh, it's very simple. The motion detector will send an alarm signal to the control box.

Isabel: Uh huh. Thanks for your answer.

David: No, not at all.

Unit 8: TEST AND REPAIR INSTRUMENT

Để đảm bảo an toan cho người sử dụng và thiết bị hoạt động trong các nhà máy, bài học này giúp cho người học có kiến thức và kỹ năng về anh ngữ để kiểm tra và sửa chữa, đồng thời cung cấp thêm những yêu cầu, trình tự các bước, kiểm tra từng, sửa chữa loại thiết bị như bộ chuyển mạch 2,2 KV, c áp

2,2 KV, bộ chuyển mạch 6,6 KV. Bên cạnh đó, bài học còn cung cấp cho người học vốn thuật ngữ tiếng Anh chuyên ngành để người học có thể sử dụng trong môi trường làm việc với doanh nghiệp nước ngoài và đọc các tài liệu tham khảo chuyên ngành điện bằng tiếng Anh.

Mục tiêu của bài học:

Sau khi học xong bài học này, sinh viên có khả năng sử dụng kiến thức và kỹ năng anh ngữ:

- Đọc hiểu được thông số kỹ thuật, cách vận hành và kiểm tra các thiết bị sửa chữa và kiểm tra điện tử bằng tiếng Anh
- Hiểu các từ vựng và phát âm chính xác các thuật ngữ chuyên ngành về Điện tử.
- Sử dụng đúng các câu hỏi thông tin bắt đầu với who, what,.... trong ngữ cảnh thực tế.
- Tự tin giao tiếp trong môi trường doanh nghiệp

Nội dung của bài học:

I. VOCABULARY

Mục tiêu: Cung cấp cho người học các từ vựng tiếng Anh về thông số kỹ thuật, cách vận hành và kiểm tra các thiết bị sửa chữa và kiểm tra điện tử để người học có thể đọc và hiểu được từ chuyên môn liên quan đến một số tài liệu trong lĩnh vực điện điện tử công nghiệp bằng tiếng Anh.

Policy (n)	Chính sách	Tracer (n)	**: Bộ phân**
Comply (v)	Tuân theo	**Analyzer (n) tích**	
Occupation (n)	Nghề nghiệp	Spectrum (n)	Quang phổ
Health (n)	Sức khỏe	Protocol (n)	Lệnh, giao thức
Administration (n) :	Hành chính	Reflectometer (n)	Phản xạ kế
Code (n)	Mã	Integrity (n)	Tính bảo toàn
Standard (n)	Tiêu chuẩn	Semiconductor (n)	Bán dẫn
Eliminate (v)	Loại bỏ	Synthesiser (n)	Bộ tổng hợp
Associate (v)	Phối hợp	Injector(n)	Máy bơm/nén
Energy (n)	Năng lượng	Miscellaneous (n)	Hỗn hợp
Shock (n)	Điện giật	Traditionally (adv)	Về truyền thống
Awareness (n)	Nhận thức	Vật đánh dấu	

Synopsis (n) Digital	Đại lượng
(n) Voltmeter (n)	Gốm
Prototype (n)	Xói mòn
Oscilloscope (n)	Loang lỗ
Probe (n)	Khử hàn
Clamp (n) Solenoid	Tuốc nơ vít
(n) Wiggly (n)	Duy trì Phân
Transducer (n)	cực Treo, lắp
Wheatstone bridge	Chính xác
Bản tóm tắt Kỹ	Không may
thuật số Vôn kế	Treo
Vật mẫu	
Máy hiện sóng	
Đầu dò	
Kìm	
Cuộn dây ruột gà	
Dao động	
Bộ chuyển đổi Cầu	
cân bằng	
Magnitude (n)	
Ceramic (n)	
Corrosion (n)	
Spotted (v) De-	
solder (n)	
Screwdriver (n)	
Remaining (n)	
Polarity (n)	
Mounting (n)	
Proper (n)	
Unfortunately (a)	
Hook (v)	

Reference words

Wide	(adv)	Rộng, rộng rãi
Three-phase star	(n)	Ba pha hình sao
Three-phase and five-pole transformer	(n)	Biến áp ba pha 5 cực
Underground three-phase cable	(n)	Cáp ngầm ba pha
Three-phase armature winding	(n)	Cuộn dây ba pha phần ứng:
Three-phase rotor winding	(n)	Cuộn dây rôto ba pha
Three-phase stator winding	(n)	Cuộn dây stato ba pha Điện
Three-phase alternating current	(n)	xoay chiều ba pha Động cơ ba
Three-phase squirrel cage motor	(n)	pha lồng sóc Dựa trên
Based on	(v)	Cùng
Together	(prep)	Định luật Kirchhoff's
Kirchhoff's law	(n)	Nguyên lý
Principle	(n)	Hệ thống nguyên lý loại trừ
Exception principle system	(n)	Cảm ứng điện (từ)
Induction (magnetic)	(n)	Thiết bị điện
Electrical equipment	(n)	Từ tĩnh
Magnetostatic	(n)	Vận hành
Operation	(n)	Cảm ứng điện (từ)
Induction (magnetic)	(n)	Sử dụng
To use	(v)	Chất lỏng dùng để pha trộn
Liquid use for mix	(n)	Biến đổi
Alternate	(v)	Lực biến đổi
Alternate force	(n)	Biến đổi
Change	(v)	Biến đổi cấu trúc
Structural change	(n)	Điện áp AC
AC voltage	(n)	Dòng điện AC
Alternating Current	(n)	

II. GRAMMAR

Mục tiêu: Cung cấp cho người học cấu trúc ngữ pháp về câu hỏi thông tin bắt đầu với Wh- words trong tiếng Anh để người học có thể sử dụng trong quá trình viết hoặc giao tiếp trong công việc tại nơi làm việc hoặc trong đời sống hằng ngày có liên quan.

2.1 The Information Questions

Common Question Words

1. Who*	people (names and other identifying information)
2. Whom*	used as **subjects*** people (names and other identifying information) used as **objects*** things
3. What	(subject or object) ownership locations (places) time (general) time (specific) actions (verbs) reasons
4. Whose* (+ noun)	one part of a group (when all of the parts are not known)
5. Where	one part of a group (when the parts are known) descriptive names for categories colors
6. When	manner; methods
7. What time	number (used with countable nouns) quantity (used with uncountable nouns) duration (periods of time); length distance
8. What . . . do	age
9. Why*	degree or extent
10. What (+ noun)	
11. Which (+ noun)	
12. What kind of (+ noun)	
13. What color	
14. How	
15. How many (+ noun)	
16. How much (+ noun)	
17. How long*	
18. How far*	
19. How old	
20. How (+ adjective or adverb)	

2.2 Exercise

a. **Make questions with question words**

1. Mr. Robertson came to the party alone. (who)
2. She felt better after she took a nap. (how)
3. That is an English book. (what)
4. She talked to him for an hour. (how long)
5. He studies piano at the university. (what)
6. The party lasted all night. (how long)
7. The check was for $5.50. (how much)
8. She was eating a sandwich. (what)
9. She is working hard. (what)
10. My parents have two cars. (how many)

b. **Using the question words to fill in the blank**

1 .....are you ? I'm 1m70.

2 .....is the Eiffel Tower in Paris ? It's 324 m.

3 .....is the next beach ? It is 1 mile.

4 .....do you go to the cinema ? Once a month.

5 .....are you ? I'm twelve.

6 .....books by Agatha Christie have you read ?

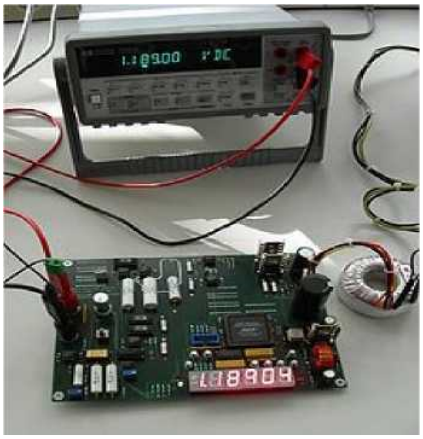
7 .....butter is there in the fridge ? There is enough butter in the fridge.

8 .....is it in January ? It's -2°.

9 .....is the River Thames ? I don't know... Er... 3m ?

10 .....does it take to get to the top of the Eiffel Tower on foot ?

About 2 hours, I think.



III. CONTENT

Mục tiêu: Hình thành kiến thức và kỹ đọc hiểu cho người học để người học có thể đọc được một số tài liệu liên quan đến một số các thiết bị điện tử bằng tiếng Anh.

1. General Safety Considerations

It is SLAC policy to comply with Occupational Safety and Health Administration (OSHA) regulations, the National Electrical Code (NEC), and other established safety standards to reduce or eliminate the dangers associated with the use of electrical energy. Every person on the SLAC site is exposed to electricity to some extent. The SLAC electrical safety program provides the SLAC community with the minimum knowledge of safety and recommended practices necessary to protect against electrical shock or burns. The electrical safety program also provides hazard awareness information to those who use electrical equipment.

All electrical wiring and equipment must comply with NEC, OSHA regulations, and numerous other established safety and engineering standards. This chapter should not be construed as a synopsis of all electrical requirements or as a substitute for formal study, training, and experience in electrical design, construction, and maintenance.

2. Some electronic equipment used to test and repair

Digital voltmeter checking a prototype

The following items are used for basic measurement of voltages, currents, and components in the circuit under test.

Voltmeter (Measures voltage) Ohmmeter (Measures resistance)

Ammeter, e.g. Galvanometer or Milliameter (Measures current)

Multimeter e.g., VOM (Volt-Ohm- Milliameter) or DMM (Digital Multimeter) (Measures all of the above)

The following are used for stimulus of the circuit under test: Power supplies Signal generator

Digital pattern generator Pulse generator

The following analyze the response of the circuit under test: Oscilloscope (Displays voltage as it changes over time) Frequency counter (Measures frequency)

And connecting it all together:

Test probes

Advanced or less commonly used equipment

Meters

A multimeter with a built in clamp facility. Pushing the large button at the bottom opens the lower jaw of the clamp, allowing the clamp to be placed around a conductor (wire).

Solenoid voltmeter *(Wiggy)*
Clamp meter (current transducer)
Wheatstone bridge (Precisely measures resistance)
Capacitance meter (Measures capacitance)
LCR meter (Measures inductance, capacitance, resistance and combinations thereof)
EMF Meter (Measures Electric and Magnetic Fields)
Electrometer (Measures charge)

Probes

RF probe
Signal tracer

Analyzers

Logic analyzer (Tests digital circuits)
Spectrum analyzer (SA) (Measures spectral energy of signals)
Protocol analyzer (Tests functionality, performance and conformance of protocols)
Vector signal analyzer (VSA) (Like the SA but it can also perform many more useful digital demodulation functions)

Time-domain reflectometer (Tests integrity of long cables)
Semiconductor curve tracer

Howard piA digital multimeter

Signal-generating devices

Signal generator Frequency synthesiser Function generator Digital pattern generator Pulse generator
Signal injector

Miscellaneous devices

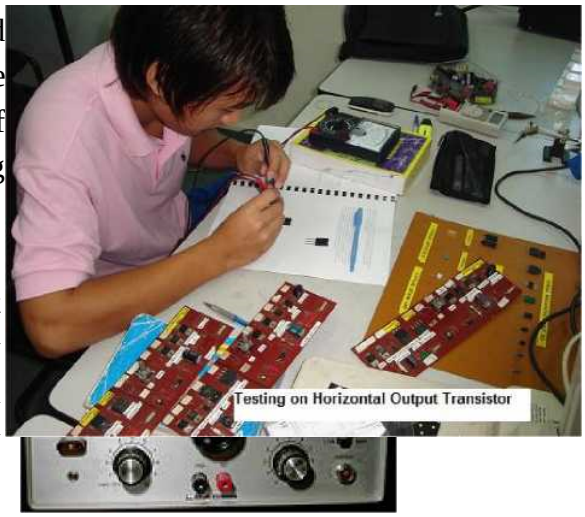
Continuity tester
Cable tester
Hipot tester

Network analyzer (used to characterize components or complete computer networks)

3. Some kinds of test

Electrical testing can be taken in situations (mostly low voltage, ie not exceeding 1000 V ac or 1500 V dc) where equipment like domestic appliances is being tested. Most of this equipment will be used on mains supply voltages of 230 V ac single phase and 400 V ac three phase.

However, there could be internally derived voltages which are much higher and in some cases above the low voltage limits. Some of the test voltages applied to equipment during testing may be above the low voltage limits. These voltages are not considered dangerous if the maximum output current available from the test instrument is reliably limited to no more 5 mA traditionally 5 mA ac has been used, but since May 20015 new equipment should be limited to 3 mA ac).



Leader Instruments LSG-15 signal generator

4. How to test a capacitor

A capacitor is an electronic device that can store energy in the electric field between a pair of conductors (called “plates”). The process of storing energy in the capacitor is known as “charging”, and involves electric charges of equal magnitude, but opposite polarity, building up on each plate.

Test light
Transistor tester
Tube tester
Electrical tester pen
Receptacle tester

A simple example is a digital camera flash, which is powered by a small capacitor. The capacitor is charged, and when the flash button is pressed, then the capacitor releases its energy and is routed to the flash bulb. A typical capacitor is shown below.

Capacitors will discharge into whatever both leads touch at the same time. This means, if you brush up against both leads, then it discharges into your body. It will hurt at the very least, large capacitors could kill! If you are not confident, don't touch it, call an expert.

The capacitor's capacitance *(C)* is a measure of the amount of charge *(Q)* stored on each plate for a given *voltage* (*V)* which appears between the plates:

$$C = \frac{Q}{V}$$

A capacitor has a capacitance of one farad when one coulomb of charge is stored due to one volt applied potential difference across the plates. The farad is a very large unit; values of capacitors are usually dealt in microfarads (uF), Nano farads (nF), or Pico farads (pF).

Before even hooking up a multimeter, there are a few things you should look for on the capacitor to see if it is bad. One is a bulging electrolyte (ceramic outer material). Another thing to look for is corrosion around the terminals. If either of these is spotted, then your capacitor is leaky and must be replaced.

Discharge the capacitor before testing

To do this you need to find a resistor within 5 to 50 ohms larger than the capacitance of the capacitor.

- **For low capacitance capacitors**- It is best to de-solder the capacitor from the board first to avoid damaging other components. All you have to do is short both capacitor leads together with a screwdriver. Make sure you don't touch the metal shank while doing this though, you will get shocked.
- **For high capacitance capacitors**- Solder one end of the appropriate size resistor (for your application) to a well insulated clip lead about 3 feet long.

> Testing

Testing capacitors can be tricky at best. The quick and easy way for the average home electrician is to hook up your multimeter to the discharged leads of the capacitor. You will have to find the polarity of the capacitor, and then hook up the corresponding meter leads.

Unfortunately with most meters, unless it's very new or expensive, you will only be checking if the capacitor is shorted or not. Also, in most cases, you will need to take at least one lead off the circuit card. Once your leads are hooked up as stated above, your readings should be: Any capacitor that measures a few ohms or less is bad. Most should

test infinite even on the highest resistance range.For electrolytes in the uF range or larger, you should be able to see the cap charge when you use a high ohms scale with the proper polarity, the resistance will increase until it goes to infinity. If the capacitor is shorted, then it will never charge. If it is open, the resistance will be infinite immediately and won't change. If the polarity of the meter leads are reversed, it will not charge properly either, which is why you must determine the polarity of your meter and mark it, they are not all the same.

If after all these tests, you are still confused, or are in doubt of your testing, then I would suggest de-soldering the remaining attached capacitor lead, and just go ahead and change it. They are not that expensive in most cases and are easy to do. Be sure to check the polarity and match it against the circuit board before mounting it though.

Check and Inspection of some specific equipment:

No	Check and Inspection Item		Steps	Acceptance Criteria
1.1	2.2KV Switch Gear	1. Basic Inspection	- Fill out the check list	IFC DWG
		2. Insulation Resistance Test	- 6000V Megger for main circuit (with circuit breaker)	200m
			- 500V Megger for control circuit (phase to earth with remain phase)	5m
		3. High Voltage Test	DC 38KV for 1 min-phase to earth with remain phases	to withstand
		4. Conductivity Test	- To be carried out on SWGR busbar connection and earth system joints. And bolt torque to be as per V/D requirement	less than 200%
		5. Function Test	- All features switchboard function as intended to be demonstrated by power	IFC DWG

		6. Relay Test	All protection relay be tested at the normal setting to verify their operation parameters, with secondary injection. - Protection Relay Check - Stap setting as per Samsung Setting Record - Tripping time setting as per Samsung Setting Record - Traveling Time at selected T/D tap - Verify the operation of the switching devices tripping mechnism and all alams and intertrips.	approved relay setting and cruves
		7. Phase Rotation Test	- Disconnect 22KV cable and apply 400V 3 + Phase temp: power, and check phases - Rotation All terminals	Clock Wire
		8. CT Polarity Check	to be carried out on diff . Relay CTs before Function Test	same as V/D drawing
2.1	22KV cable	1. Basic Inspection	- Fill out the check list	IFC DWG
2.2	22KV cable	2. Insulation Resistance Test and Continuiry	- 5000V Megger for phase to earth with remain phases	200M
		3. High Voltage Test	DC 30.4KV for 1 min-phase to earth with remain phases (cable to be disconnected)	to withstand
3.1	22/6.6 KV TR (oil Immersed)	1. Basic Inspection	- Fill out the check list	IFC DWG
		2.Insulation Resistance Test	5000V Megger for primary	75 M
			2500V Megger for secondary	75M
		3.Oil Test	1. Times Measurement	30KV/2.5mm
		4. Function Test	Fill out the check list	IFC DWG
4.1	22kv/400V	1. Basic Inspection	Fill out the check list	IFC DWG

	TR (oil Immersed	2.Insulation Resistance Test	5000V Megger for primary	75 M
			500V Megger for secondary	75 M
		3.Oil Test	1. Times Measurement	30KV/2.5mm
		4. Function Test	Fill out the check list	IFC DWG
5.1	6.6KV SWGR	1. Basic Inspection	Fill out the check list	IFC DWG
		2.Insulation Resistance Test	2500V Megger for main circuit (with circuit breaker)	200M
			500V Megger for control circuit (phase to earth with remain phases)	5M
		3. High Voltage Test	DC 16.5KV for 1 min- phase to Earth with remain phases (voltage transformer and load to be disconnected)	to withstand
		4. Conductivity Test	to be carried out on SWGR busbar Connection and earth system joint. And bolt Torque to be as per V/D requirement.	less than 20%
		5.Function Test	All features of switchboard function as Intended to be demonstrated by temp power	IFC DWG
		6.Relay Test	All protection relays shall be tested at the normal setting to verify their operation parameters, with secondary injection. 1- Protection Relay Check - Stap setting as per Samsung Setting Record - Tripping Time Setting as per samsung Setting Record - Travelling time at selected T/D and Tap - Verify the operation of the switching devices tripping mechnism and all alarms and intertrips	
		7. Phase Rotation Test	Disconnect 22Kv cable and apply 400V 3Phase temp:	clock wise

	power, and check phases Rotation All Terminals	
8. CT Polarity Check	to be carried out on diff . Relay CTs before Function Test	

IV. EXERCISE

Mục tiêu: Kiểm tra kết quả đạt được của người học về sự hiểu biết các từ vựng chuyên môn cũng như ngữ pháp, kiến thức và kỹ năng đọc hiểu đã được học để hoàn thành các bài tập ứng dụng cũng như áp dụng vào trong môi trường làm thực tế sau khi tốt nghiệp.

1. Complete the sentences

Multimeter comply voltages circuit people regulations
program conductor button

a. When you install electrical equipment, you have to ..... with with Occupational Safety and Health Administration (OSHA).....

b. The Government should hold some electrical safety ..... to provide hazard awareness infromation to .....who use electrical equipment.

c. Voltmeter is used for basic measurement of .....

d.....are used for basic measurement of voltages, currents, and components in the circuit under test.

e. When you push the large ..... at the bottom of the multimeter, the lower jaw of the clam is open, so that the clamp is placed around a .....

2. Answer the following questions

a. What is the function of the ammeter?

b. What is the function of the protocol analyzer?

c. Can you tell me some signal- generating devices?

d. What is a capacitor? And how to test a capacitor?

e. Why do you test the equipment before using?

3. Decide True or False

a. Cable tester is a miscellaneous device.

b. Pulse generator is a miscellaneous device.

c. Network analyzer is used to characterize components or complete computer networks.

d. Vector signal analyzer can't perform many more useful digital demodulation functions.

e. A wheatstone bridge precisely measures resistance.

4. Listen and Check

equipment dangerous current higher phase voltages ac May appliances testing

Electrical ..... can be taken in situations (mostly low voltage, ie not exceeding 1000 V ac or 1500 V dc) where equipment like domestic ..... is being tested. Most of this equipment will be used on mains supply ..... of 230 V ac single .....and 400 V ac three phase. However, there could be internally derived voltages which are much..... and in some cases above the low voltage limits. Some of the test voltages applied to ..... during testing may be above the low voltage limits. These voltages are not considered ..... if the maximum output ..... available from the test instrument is reliably limited to no more 5 mA traditionally 5 mAhas been used, but since .....20015 new equipment should be limited to 3 mA ac).

5. Match the ideas

1. The process of storing energy in the capacitor
2. In a digital camera flash, when the flash button is pressed,
3. Capacitors
4. The capacitor's capacitance *(C)*
5. A capacitor has a capacitance of one farad when

plates.

a. will discharge into whatever both leads touch at the same time.

b. is known as “charging”.

c. the capacitor releases its energy and is routed to the flash bulb.

d. one coulomb of charge is stored due to one volt applied potential difference across the

e. is a measure of the amount of charge (*Q*) stored on each plate for a given *voltage* (*V)* which appears between the plates.

V. CONVERSATION *Mục tiêu:* Hình thành kỹ năng giao tiếp cho người học để người học có tự tin giao tiếp trong môi trường làm việc.

Rose: Hi, Jack

Jack: Hi, Rose. How are you?

Rose: Well. Thanks. How about you?

Jack: Fine, Thanks.
Rose: Do you know why people have to test the electric equipment before using?

Jack: Oh, I think because they want to make sure all the equipment is in safety to use.

Rose: Right. And do you usually check your electrical wiring in your home?
Jack: Yes, I do. I do it every six month because I think the wires become older and older and they need to be replaced the new ones.
Rose: Oh, you are a good husband, aren't you? My husband never do it.
Jack: So who do it for you?
Rose: I usually call the electrician and I have to pay a big mount of money for him every year.
Jack: Oh, I don't think it's bigger than your life.
Rose: Uh huh, you're right.
Jack: It's time I must go to pick up my children at Binh Son primary school.
Rose: OK. Goodbye.
Jack: Bye.

Unit 9: SAFETY IN INDUSTRIAL ELECTRICAL APPLICATION

Trong kỹ thuật lắp đặt điện và điện tử, vấn đề được đặt lên hàng đầu đó chính là an toàn trong sử dụng. Bài học này giúp cho người học có kiến thức và kỹ năng về anh ngữ để đọc hiểu các nguyên nhân xảy ra tai nạn điện, một số tai nạn thường gặp khi lắp đặt và sử dụng điện, và các biện pháp phòng chống các tai nạn đó. Bên cạnh đó, bài học còn cung cấp cho người học vốn thuật ngữ tiếng Anh chuyên ngành để người học có thể sử dụng trong môi trường làm việc với doanh nghiệp nước ngoài và đọc các tài liệu tham khảo chuyên ngành điện bằng tiếng Anh.

Mục tiêu của bài học:

Sau khi học xong bài học này, sinh viên có khả năng sử dụng kiến thức và kỹ năng anh ngữ:

- Đọc hiểu được các nguyên nhân, các thiết bị dùng bảo hộ, cách phòng tránh các tai nạn trong ngành điện, điện tử.
- Hiểu các từ vựng và phát âm chính xác các thuật ngữ chuyên ngành về điện, điện tử.
- Nắm vững cách sử dụng chủ ngữ và vị ngữ (Subject- Verb Agreement) trong tiếng Anh.
- Tự tin giao tiếp trong môi trường doanh nghiệp

Nội dung của bài học:

I. VOCABULARY

Mục tiêu: Cung cấp cho người học các từ vựng tiếng Anh về các nguyên nhân, các thiết bị dùng bảo hộ, cách phòng tránh các tai nạn trong ngành điện, điện tử để người học có thể đọc và hiểu được từ chuyên môn liên quan đến một số tài liệu trong lĩnh vực điện điện tử công nghiệp bằng tiếng Anh.

Injury (n)	Vết thương	Sump (n)	Bể lắng
Range (n)	Biên độ	Aerosol (n)	Sơn khí
Ignite (v)	Đánh lửa	Vapour (n)	Hơi nước
Flammable (adj)	Dễ bắt cháy	Mist (n)	Sương mù
Muscle (n)	Bắp thịt, cơ	Respirators (n)	Bình thở
Thermal (adj)	Nhiệt	Implement (v)	Thực hiện
Spasm (n)	Chứng co cứng	Minimize (v)	Giảm thiểu
Damp (adj)	Ẩm ướt	Withdraw (v)	Hủy bỏ, lấy đi
Carpet (n)	Lớp bảo vệ	Corridor (n)	Hành lang
Spray booth (n)	Buồng phun sơn	Waterproof (adj)	Không thấm nước
Fractions (n)	Phân đoạn	Splash proof (a)	Chống phun
Spill (n)	Sự rò	Machinery (n)	Máy móc

Vehicle (n)	Phương tiện	Inadequate (adj) :		Chính xác
Explode (v)	Nổ	Socket n)	:	o cắm
Overload (adj)	Quá tải	Flexible (adj)	:	Linh hoạt
Maintain (v)	Bảo trì	Cord (n)	:	Dây
Operation (n)	Sự hoạt động	Piece (n)	:	Mảnh
Battery (n)	Pin	Adjusting (n)	:	Điều chỉnh
Surface (n)	Bề mặt	Outlet (n)	:	Nguồn điện cấp
Explosion (n)	Sự bùng nổ	Manufacture (v)		Chế tạo
Accidentally (adj) :	Bất ngờ	Regulation (n)	:	Quy định
Concrete (n)	Bê tông	Limit (n)	:	Giới hạn
Agent of erosion	Chất ăn mòn	Measure (n)	:	Đo lường
Armature (n)	Vỏ bọc cáp	Processing (n)	:	Xử lý
Deepen (v)	Chôn sâu	Circuit (n)	:	Mạch điện
Bedding sand (n)	Lớp cát đệm	Satisfy (n)	:	Thỏa mãn
Depth (n)	Độ sâu	Demand (n)	:	Nhu cầu
Rocky soil (n)	Đất có đá	Life activity (n)	:	Sinh hoạt
Mortar (n)	Vữa xây dựng	Winding (n)	:	Cuộn dây
Concrete scrap (n) :	Vụn bê tông	Circuit breaker (n) :		Thiết bị đóng cắt
Concurrent Maintenance (n)	Bảo trì đồng thời	Contactor (n)	:	Công tắc tơ
		Interlock (n)	:	Khoá liên động
Electrical insulator	Lớp cách điện	Bus bar (n)	:	Thanh cái
Ceramic insulator	Gốm cách điện	Bus bar protection :		Bảo vệ thanh cái
Distance (n)	Khoảng cách	Panel (n)		Tủ điện
Access (n)	Lối vào	Low voltage (n)	:	Hạ áp
Dimension (n)	Kích thước	Middle voltage (n) :		Trung thế
Direct access(n) :	Lối vào trực tiếp	High voltage (n)		Cao thế

II. GRAMMAR

Mục tiêu: Cung cấp cho người học cấu trúc ngữ pháp về các động từ khiếm khuyết trong tiếng Anh để người học có thể sử dụng trong quá trình viết hoặc giao tiếp trong công việc tại nơi làm việc hoặc trong đời sống hằng ngày có liên quan.

Modal verbs in Simple Present

2.1. Generally

- Modal verbs: can, may, shall, should
- Modal verbs are always stand before a bare-infinitive verb; in negative, add *not* after modal verbs; in question form, put modal verbs before subjects.

2.2. Examples

a. Torch batteries can ignite flammable substances.

b. Alternating current (AC) and Direct Current (DC) electrical supplies can cause a

Electric shock range of injuries.

c. Static electricity can cause a fire or explosion where there is an explosive atmosphere

Electrical burns

d. This may have a number of effects

e. A single low voltage torch battery can generate a spark powerful enough to cause a fire

III. CONTENT

Mục tiêu: Hình thành kiến thức và kỹ đọc hiểu cho người học để người học có thể đọc được một số tài liệu liên quan đến một số các thiết bị điện tử bằng tiếng Anh.

1. The cause and effect of accident in electric field

Electrical injuries can be caused by a wide range of voltages but the risk of injury is generally greater with higher voltages and is dependent upon individual circumstances. Torch batteries can ignite flammable substances.

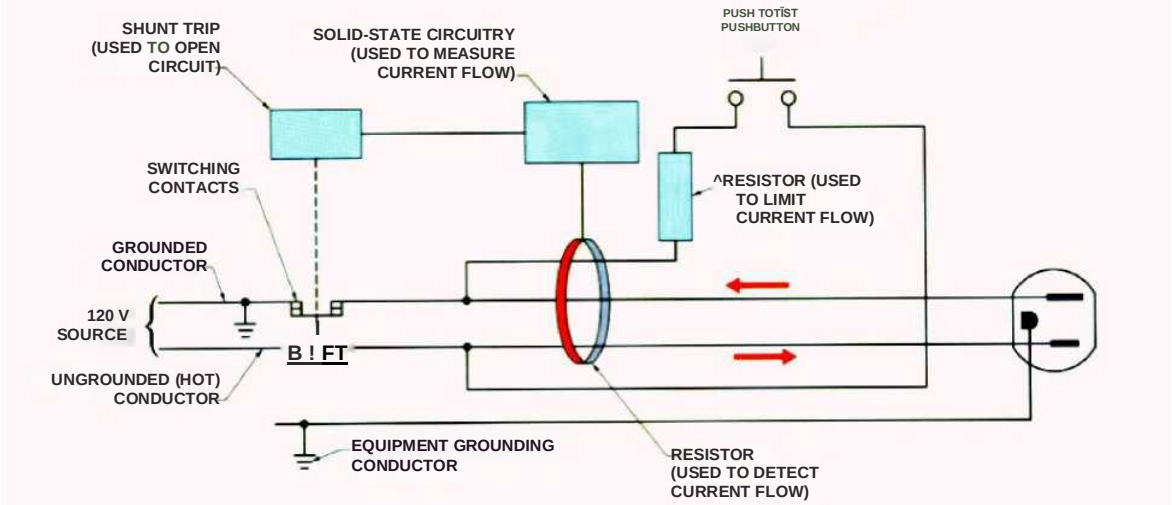


Figure 1-22. A GFCI compares the amount of current in the ungrounded (hot) conductor with the amount of current in the conductor.

Alternating current (AC) and Direct Current (DC) electrical supplies can cause a range of injuries including:

Loss of muscle control

Thermal burns

Electric shock

A voltage as low as 50 volts applied between two parts of the human body causes a current to flow that can block the electrical signals between the brain and the muscles. This may have a number of effects including:

Stopping the heart beating properly
Preventing the person from breathing Causing muscle spasms

The exact effect is dependent upon a large number of things including the size of the voltage, which parts of the body are involved, how damp the person is, and the length of time the current flows.

Electric shocks from static electricity such as those experienced when getting out of a car or walking across a man-made carpet can be at more than 10,000 volts, but the current flows for such a short time that there is no dangerous effect on a person. However, static electricity can cause a fire or explosion where there is an explosive atmosphere (such as in a paint spray booth).

Electrical burns

When an electrical current passes through the human body it heats the tissue along the length of the current flow. This can result in deep burns that often require major surgery and are permanently disabling. Burns are more common with higher voltages but may occur from domestic electricity supplies if the current flows for more than a few fractions of a second.

Etcctrkal burn un Eiaod and arm.

Thermal burns

Overloaded, faulty, incorrectly maintained, or shorted electrical equipment can get very hot, and some electrical equipment gets hot in normal operation. Even low voltage batteries (such as those in motor vehicles) can get hot and may explode if they are shorted out.

People can receive thermal burns if they get too near hot surfaces or if they are near an electrical explosion. Other injuries may result if the person pulls quickly away from hot surfaces whilst working at height or if they then accidentally touch nearby machinery.

A single low voltage torch battery can generate a spark powerful enough to cause a fire or explosion in an explosive atmosphere such as in a paint spray booth, near fuel tanks, in sumps, or many places where aerosols, vapours, mists, gases, or dusts exist.

a. Safety equipments

Personal protective equipment (PPE)

Personal protective equipment (PPE) is clothing, equipment or substances designed to be worn by someone to protect them from risks of injury or illness.

PPE should only be considered as a control measure when exposure to a risk cannot be minimised in another way, or when used in conjunction with other control measures as a final barrier between the worker and the hazard. PPE does not control the hazard at the source. PPE can include:

Hearing protective devices, such as ear

Respirators

e and face protection, such as goggles

muffs and ear plugs

Safety helmets and sun hats

Safety boots

Gloves

High visibility vest

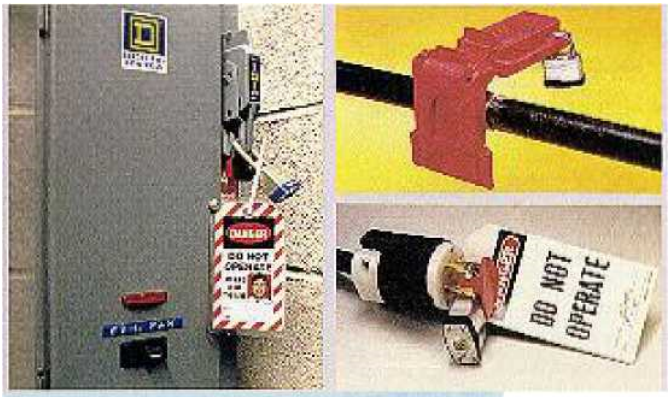
Life jackets

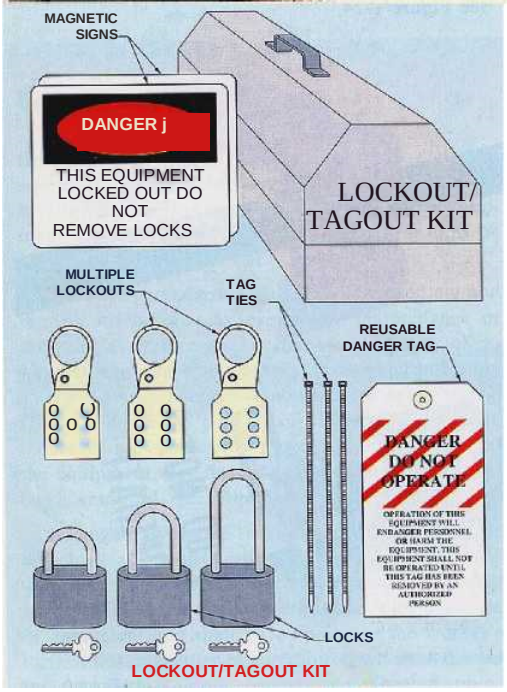
2. The methods of advoiding accidents

Equipment must be locked out and tagged out before preventive maintenance or servicing is performed.

A variety of possible solutions may be implemented to reduce or eliminate the risk of injury associated with electrical work. Examples of solutions include the use of insulation, guarding, grounding, electrical protective devices, and safe work practices.

Lockout devices are available in various shapes and sizes that allow for the lockout of standard control devices.

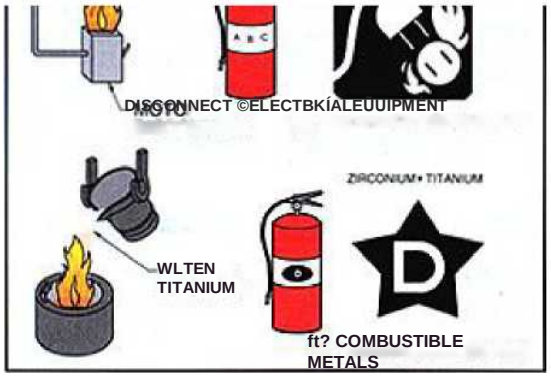




Lockout/tagout kits comply with OSHA lockout/tagout standards.

Clothing should fit snugly to avoid danger of becoming entangled in moving machinery or creating a tripping or stumbling hazard.

t fire
ass of



The use of electrical equipment can create serious health and safety risks in the hairdressing, nail and beauty industry, particularly in wet conditions. Damage to equipment increases this risk. Electrical shock can result in electrocution, burns and injuries from falls. Extension leads and flexible cables must be protected from damage, including from liquid. Electrical equipment must be either: inspected, tested and tagged or connected to a residual current device (RCD).

Inspecting, testing and tagging by a competent person

A competent person must inspect, test and attach a durable tag to the equipment every 12 months.

If the equipment is safe to use, the tag must show the date by which the equipment must be inspected and tested again;

If the equipment is not safe to use, the tag must warn people not to use the equipment. The equipment must also be immediately withdrawn from use.

Residual current device (RCD)

If the equipment is to be connected to an RCD, (known as a safety switch), the device may be either portable, or installed at the switchboard.

An RCD must be tested immediately after connection and at least every 3 months.
A competent person must also test the device at least every 2 years.

If a portable RCD is not working properly, it must be tagged to warn people not to use the device and immediately withdrawn from use.

Employ a competent person

You are encouraged to employ an electrician to perform these tasks to ensure electrical equipment is safely maintained. The advantage of using an electrician is that if the equipment is faulty, the electrician is licensed to repair it.

Control measures

Substitution

Use splash proof or waterproof electrical equipment instead of standard equipment if work must be carried out in wet conditions.

Use power boards instead of double adaptors.

waterproof electrical equipment

power boards

Redesign

Install additional socket outlets to avoid overloading power outlets.

Administrative controls

- Make sure workers are trained in the use of equipment and that manufacturer's instructions are followed.
- Store and operate equipment away from damp areas when not in use.
- Make sure leads do not run across wet surfaces or any place where they may be easily damaged.
- Run leads along the edges of corridors to minimise the possibility of trips and falls.
- Keep leads away from heat, oil and chemicals to prevent insulation damage.
- Clean up liquid spills as soon as possible.
- Conduct regular (monthly intervals or more frequently if necessary) visual

inspections of equipment to check that the equipment (including accessories, connecting lead and plug) has no obvious external damage or inadequate temporary repairs.

- Make a list containing the description, make and serial number of all equipment and the date when tested to assist you in ensuring all electrical items are tested.
- When adjusting or cleaning equipment, SWITCH OFF the power and pull out the plug Ậ NOT by the cord.
- Do not touch equipment with wet hands or use a wet cloth to clean sockets.
- Make sure flexible cords are fully unwound and kept clear of work traffic.
- Do not run too many pieces of equipment from one socket.

IV. EXERCISE

Mục tiêu: Kiểm tra kết quả đạt được của người học về sự hiểu biết các từ vựng chuyên môn cũng như ngữ pháp, kiến thức và kỹ năng đọc hiểu đã được học để hoàn thành các bài tập ứng dụng cũng như áp dụng vào trong môi trường làm thực tế sau khi tốt nghiệp.

1. Complete the sentences

heats explosion human body Torch voltages injuries

a. Electrical ..... can be caused by a wide range of voltages but the risk of injury is generally greater with higher ..... and is dependent upon individual circumstances.

b.....batteries can ignite flammable substances.

c. A voltage as low as 50 volts applied between two parts of the ....causes a current to flow that can block the electrical signals between the brain and the muscles

d. When an electrical current passes through the human body it ..... the tissue along the length of the current flow.

e. Static electricity can cause a fire or ..... where there is an explosive atmosphere.

2. Answer the following questions

a. Tell some types of injuries caused by electric current?

b. What are the effects of electric shock?

c. What is the consequence of the electric burn?

d. Why do people get thermal burn?

e. Tell some safety equipment which help people protect themselves?

3. Decide True or False

a. PPE stands for personal protective equipment

b. Ear muffs and ear plugs are eye protective devices.

c. The use of electrical equipment can create serious health and safety risks in the hairdressing, nail and beauty industry, particularly in wet conditions.

d. An electrician must inspect, test and attach a durable tag to the equipment every 12 months.

e. A competent person must also test the device at least every 2 years.

4. Listen and Check

temporary plug inspections spills chemicals possibility corridors leads operate equipment

Make sure workers are trained in the use of..... and that manufacturer's instructions are followed. Store and ..... equipment away from damp areas when not in use. Make sure .....do not run across wet surfaces or any place where they may be easily damaged. Run leads along the edges of ..... to minimise the..... of trips and falls. Keep leads away from heat, oil and .....to prevent insulation damage. Clean up liquid ..... as soon as possible. Conduct regular (monthly intervals or more frequently if necessary) visual .....of equipment to check that the equipment (including accessories, connecting lead and.....) has no obvious external damage or inadequate ..... repairs.

5. Match the ideas

1. An RCD	a. must also test the device at least every 2 years.
2. A competent person	b. must be tested immediately after connection and at least every 3 months.
3. If the equipment is not safe to use	c. the tag must warn people not to use the

4. If the equipment is safe to use — equipment.

5. People can receive thermal burns — d. if they get too near hot surfaces or if they are near an electrical explosion.

e. the tag must show the date by which the equipment must be inspected and tested again;

V. CONVERSATION

Mục tiêu: Hình thành kỹ năng giao tiếp cho người học để người học có tự tin giao tiếp trong môi trường làm việc.

Sue: Hi, Robert
Robert: Hi, Sue. How's everything ?
Sue: Well. Thanks. How about you?
Robert: Fine, Thanks.
Sue: Do you know what kinds of electric injuries do we usually get?

Robert: Oh, I think there are alot. For example, , electrical burns, loss of muscle control, thermal burns.

Sue: Right. And have you ever had electric shock?
Robert: Yes, I have. It happened when I ironed my clothes last week.
Sue: What's a pity. So what did you do?
Robert: Oh, I think I got lucky because I immediately pulled my fingers out.
Sue: Lucky you. If not, I wouldn't meet you any more.
Robert: Are you kidding, my friend?
Sue: Yes, I am. Any way, I am scary to hear that.
Robert: Thank you.

Unit10: REVIEW AND FINAL TEST

Mục tiêu của bài:

- Ôn lại các kiến thức về 9 chương đã học
- Kiểm tra các kiến thức đã học về môn Anh văn chuyên ngành Điện tử công nghiệp
- Đánh giá mức độ tiếp thu và hiể'u bài của từng sinh viên
- Rút kinh nghiệm và bổ sung, chỉnh sửa phương pháp giảng dạy hiệu quả hơn cho kỳ sau

APPENDIX

Fuse	(n)	Cầu chì
Socket	(n)	Đuôi đèn
Fluorescent tube	(n)	Đèn huỳnh quang
Electric bell	(n)	Chuông điện
Three-core cable	(n)	Dây cáp 3 lõi
Fuse wire	(n)	Dây chì
Copper conductor	(n)	Dây dẫn bằng đồng
High- voltage conductor	(n)	Dây dẫn cao thế
Extension cord	(n)	Dây dẫn nhánh
Electric tool	(n)	Dụng cụ điện
Thermoplastic	(n)	Nhựa chịu nhiệt
Meter	(n)	Đồng hồ đo
Electric meter	(n)	Đồng hồ điện
Transmission line	(n)	Đường dây truyền tải
Bulb	(n)	Bóng đèn tròn
Safety helmet	(n)	Mũ bảo hiểm
Outlet	(n)	Ổ điện
Earthed socket	(n)	Ổ điện có dây tiếp đất
Underfloor socket	(n)	Ổ điện ẩn dưới sàn
Adapter	(n)	Bộ nắn điện
Voltage stabilizer	(n)	Máy ổn áp
Cable clip	(n)	Nẹp ống dây
Plug	(n)	Phích cắm
Three-phase plug	(n)	Phích cắm 3 pha
Cable lug	(n)	Đầu cốt
Cable gland	(n)	Cổ cáp
Bus bar	(n)	Thanh cái
Cable tray	(n)	Máng cáp
Support	(n)	Giá đỡ

Substation	(n)	Trạm điện
Transformer	(n)	Máy biến thế
Overload	(n)	Quá tại
Circuit	(n)	Mạch điện
Screwdriver	(n)	Cái tua vít
Bolt	(n)	Bu lông
Nut	(n)	Đai ốc
Coil	(n)	Cuộn dây

Put the plug in	(v)	Cắm phích cắm vào
Shock	(v)	Giật điện
Fuse	(v)	Hàn, nối cầu chì
Switch on/off	(v)	Mở/ đóng
Turn on/off	(v)	Mở/ đóng
Transformer	(n)	Máy biến áp điện thế
Transformation of electricity	(n)	Sự biến đổi điện năng
Alternating current	(n)	Dòng điện xoay chiều AC
High voltage	(n)	Điện áp cao
Low voltage	(n)	Điện áp thấp
Backward	(adv)	Ngược lại
Nowadays	(adv)	Ngay nay
by; due to ...; because of ..	(conj)	Do
to use; to utilize	(v)	Sư dung
Electric energy	(n)	Điện năng
to develop; to grow	(v)	Phat triển
Wide	(adv)	Rộng, rộng rãi
three-phase star	(n)	Ba pha hình sao
three-phase	(n)	Ba pha
Three-phase star	(n)	Ba pha mắc hình sao
Three-phase transformer	(n)	Biến áp ba pha
3-phase and 5-pole	(n)	Biến áp ba pha năm trụ
Underground 3 -phase cable	(n)	Cáp ngầm ba pha
3-phase armature winding	(n)	Cuộn dây ba pha phần ứng:
Three-phase rotor winding	(n)	Cuộn dây rôto ba pha
Three-phase stator winding	(n)	Cuộn dây stato ba pha
3-phase alternating current	(n)	Điện xoay chiều ba pha
3-phase squirrel cage motor	(n)	Động cơ ba pha lồng sóc
Based on	(v)	Dựa trển
Together	(prep)	Cùng
Kirchhoff's law	(n)	Định luật Kirchhoff's
Principle	(n)	Nguyển lý
Exception principle system	(n)	Hệ thống nguyển lý loại trừ
Induction (magnetic)	(n)	Cảm ứng điện (từ)
Electrical equipment	(n)	Thiết bị điện
Magnetostatic	(n)	Từ tĩnh
Operation	(n)	Vận hành
Induction (magnetic)	(n)	Cảm ứng điện (từ)
To use	(v)	Dùng

Liquid use for mix	(n)	Chất lỏng dùng để pha trộn
Alternate	(v)	Biến đổi
Alternate force	(n)	Lực Biến đổi
Change	(v)	Biến đổi
Structural change	(n)	Biến đổi cấu trúc
AC voltage	(n)	Điện áp AC
Alternating Current	(n)	Dòng điện AC
Still	(adv)	Vẫn còn
Constant	(Adj)	Giữ nguyên
Frequency	(n)	Tần số
Role	(n)	Vai trò
Managering role	(n)	Vai trò quản lý
Important	(adj)	Quan trọng
Electric power System	(n)	Hệ thống điện
Distribution of electric	(n)	Phân phối điện năng
Electric power plant	(n)	Nhà máy điện
High-power	(n)	Công suất lớn
Remote control	(n)	Điều khiể’n từ xa ở xa
Remote location	(n)	Vị trí ở xa
Center	(n)	Trung tâm
Consumption	(n)	Sự tiêu thụ
Industrial area	(n)	Khu công nghiệp
Metropolitan area	(n)	Khu đô thị lớn
Line	(n)	Đường truyền
Electric power transmission	(n)	Truyền tải điện năng
Assembly	(n)	Bộ phận lắp đặt
Laminated core	(n)	Lõi thép lá
Winding	(n)	Dây quấn
Stator	(n)	Phần tĩnh
Stator winding	(n)	Dây quấn phần tĩnh
Consist (of)	(v)	Gồm
Cartridge assembly	(n)	Bộ phận bơm thủy lực
Laminated core	(n)	Lõi bằng lá thép ghép
Cable channel	(n)	Rãnh đặt dây điện
Longitudinal	(adj)	Theo hướng dọc
Manual	(adj)	Làm bằng tay
Insulation conductor	(n)	Dây dẫn bọc cách điện
Magnet wire	(n)	Dây điện từ
Inner	(adv)	Bên trong

Inner conductor	(n)	Dây dẫn bên trong
Cable channel	(n)	Rãnh (đặt) cáp
Alternating current	(n)	Dòng điện xoay chiều AC
To induce a voltage	(v)	Tạo ra (cảm ứng) điện thế:
Rotation field	(n)	Từ trường quay
Rotation field transformer	(n)	Máy biến áp từ trường quay
Aluminum	(n)	Nhôm (Al)
Cast-iron	(n)	Gang đúc
Bolt hold	(n)	Cố định bằng đai ốc
Double end	(n)	Hai đầu
Pedestal bearing	(n)	Ổ đỡ trục
Motor protection	(n)	Bảo vệ động cơ
Head stock spindle	(n)	Trục máy điện
Rotor	(n)	Phần quay
Constitution	(n)	Cấu tạo
Electric machine	(n)	Máy điện
Asynchronous machine	(n)	Máy điện không đồng bộ
Casing	(n)	Vỏ máy
Pump casing	(n)	Vỏ máy bơm
Head	(n)	Nắp máy
Cross section	(n)	Mặt cắt ngang
Axis	(n)	Trục
To show; to proclaim	(v)	Cho thây
Clear; obvious; evident	(adj)	Ro'rang
Sheet	(n)	Lá thép
AC magnetic biasing	(n)	Máy điện AC
Rotation speed	(n)	Tốc độ quay
Electromagnetic field	(n)	Từ trường
Synchronous machine	(n)	Máy điện đồng bộ
Electric transmission grid	(n)	Lưới điện truyền tải
Excitation	(n)	Kích thích
Steady state	(n)	Chế độ xác lập
Synchronous generator	(n)	Máy phát điện đồng bộ
Power Supply network	(n)	Nguồn điện chính
Power supply circuit	(n)	Mạch điện chính
Elementary	(n)	Sơ cấp
Elementary transformation	(n)	Biến đổi sơ cấp
Steam turbine	(n)	Tuabin hơi
Air turbine	(n)	Tuabin khí

Gas turbine	(n)	Tuabin khí
Transmitter power	(n)	Công suất của máy phát
Obtainable	(adj)	Có thể đạt được
Parallel operation	(n)	Làm việc song song
Cable	(n)	Cáp điện
Heating electric cable	(n)	Đường cáp điện sưởi ấm
Standard	(n)	Tiêu chuẩn
National	(n)	Quốc gia
Installation	(n)	Sự lắpđặt (kỹ thuật)
Direct acting pump	(n)	Bơm trực tiếp
Underground	(adv)	Dưới đất
Underground cable	(n)	Áp ngầm
Underground line	(n)	Đường cáp ngầm dưới đất
Condition	(n)	Điều kiện
Necessary	(adj)	Cần thiết
Area	(n)	Khu vực
Material aggressive to	(n)	Chất ăn mòn bê tông
Concrete	(n)	Bê tông
Agent of erosion	(n)	Chất ăn mòn
Armature	(n)	Vỏ bọc cáp
Deepen	(v)	Chôn sâu
Bedding sand	(n)	Lớp cát đệm
Depth	(n)	Độ dày
Rocky soil	(n)	Đất có đá
Mortar	(n)	Vũa xây dựng
Concrete scrap	(n)	Vụn bê tông
Concurrent maintenance	(n)	Bảo trì đồng thời
Electrical insulator	(n)	Sứ cách điện
Ceramic insulator	(n)	Sứ cách điện bằng gốm
Deepen	(v)	Chôn sâu
Distance	(n)	Khoảng cách
Access	(n)	Lối vào
Dimension	(n)	Kích thước
Direct access	(n)	Lối vào trực tiếp
Building	(n)	Tòa nhà
Underground work	(n)	Công trình (ngầm) dưới đất
Equal to or less than	(adj)	Bằng hoặc nhỏ hơn
Card	(n)	Phiếu
Metal	(n)	Kim loại

Lead (Pb)	(n)	Chì
Plastic	(n)	Nhựa
Specification	(n)	Đặc tính kỹ thuật
Voltage	(n)	Điện áp
Destination	(n)	Điểm đến
Starting point	(n)	Điểm xuất phát
Conductor cross-section	(n)	Tiết dien dây dẫn
Electricity cable	(n)	Cáp điện lực
Insert	(n)	Đặt vào
Location	(n)	Vị trí
Vehicle	(n)	Xe cộ
Length	(n)	Chiều dài
Cable stay joint	(n)	Chỗ nối cáp
Distribution cable	(n)	Cáp phân phối điện
D.C (direct current)	(n)	Dòng điện một chiều
Safe working pressure	(n)	Áp lực làm việc an toàn
Continuous	(adj)	Liên tục
Warranty	(n)	Sự bảo đảm
Device	(n)	Thiết bị
Electric machine	(n)	Máy điện
Dependent of	(adj)	Phụ thuộc vào
Situation	(n)	Trạng thái
Resistance	(n)	Điện trở
Insulation resistance	(n)	Điện trở cách điện
Measuring	(n)	Việc đo
Imperative	(adj)	Bắt buộc
Execute	(v)	Thực hiện
Electrical Equipment	(n)	Khí cụ điện
Regulation	(n)	Quy định
Limit	(n)	Giới hạn
Measure	(n)	Đo lường
Processing	(n)	Xử lý
Circuit	(n)	Mạch điện
Satisfy	(n)	Thỏa mãn
Demand	(n)	Nhu cầu
Life activity	(n)	Sinh hoạt
Winding	(n)	Cuộn dây
Circuit breaker	(n)	Thiết bị đóng cắt
Contacto	(n)	Công tắc

Interlock	(n)	Khoá liên động
Bus bar	(n)	Thanh cái
Bus bar protection	(n)	Sự bảo vệ thanh cái
Panel	(n)	Tủ điện
Low voltage	(n)	Hạ áp
Middle voltage	(n)	Trung thế
High voltage	(n)	Cao thế
Electrical installation	(n)	Lắp đặt điện
Continuous operation	(n)	Sự vận hành liên tục
Monthly	(n)	Hàng tháng
To carry out	(v)	Thực hiện
Maintenance	(n)	Sự bảo dưỡng
Main contact	(n)	Tiếp điểm chính
Insulating retainer	(n)	Đế cách điện
Insulating paper	(n)	Giấy cách điện
Insulating sleeve	(n)	Ong dẫn cách điện
Insulating enamel	(n)	Men cách điện
Insulating coating	(n)	Lớp bọc cách điện
Wiper	(n)	Giẻ lau
Fuel	(n)	Xăng
Material	(n)	Vật liệu
Firm	(adj)	Cứng
Firm ground	(n)	Đất cứng
Auxiliary contact	(n)	Tiếp điểm phụ
Point contact	(n)	Tiếp điểm
Pole	(n)	Cột điện
Signal circuit	(n)	Mạch tín hiệu
Closing coil	(n)	Cuộn dây đóng
Make-and-break coil	(n)	Cuộn dây đóng cắt
Execute	(n)	Thực hiện
Element	(n)	Bộ phận
Carry off	(v)	Tháo ra
Reverse	(adv)	Ngược lại
Stroke	(n)	Hành trình
Moving contact	(n)	Tiếp điểm động
Overhaul	(v)	Xem xét kỹ
Pressure	(n)	Áp lực
Compression spring	(n)	Lò xo áp lực
Spring dynamometer	(n)	Lực kế lò xo

Electric	(n)	Điện
Mechanic	(n)	Cơ khí
Adjust	(v)	Điều chỉnh
Circuit breaker	(n)	Cầu dao
Controlling device	(n)	Khí cụ điều khiển
Measuring device	(n)	Thiết bị đo lường
Safety belt	(n)	Dây an toàn
Ground (elec)	(v)	Tiếp đất
Balance	(v)	Cân bằng
Branch cable	(n)	Dây dẫn rẽ nhánh
Air terminal	(n)	Kim thu sét
Arcing	(n)	Phóng điện hồ quang
Area marker	(n)	Biể'n báo khu vực
Barrier	(n)	Thanh chắn
Basic insulation	(n)	Cách điện cơ bản
Breakdown	(n)	Đánh thủng cách điện
Circuit breaker	(n)	Thiết bị ngắt điện
Clear airway	(n)	Thông đường khí
Copper cable	(n)	Cáp đồng trần
Copper earth tape	(n)	Băng đồng
Copper bounded earth rod	(n)	Cọc thép bọc đồng
Data Equipment Protector	(n)	Thiết bị bảo vệ đường dữ liệu
Dead part	(n)	Phần không mang điện
Device under test	(n)	Thiết bị được thử nghiệm
Dielectric gloves	(n)	Găng tay cách điện
Dielectric foot- wear	(n)	Ủng cách điện
Dielectric rug	(n)	Thảm cách điện
Direct contact	(n)	Tiếp xúc trực tiếp
Direct lightning	(n)	Sét đánh trực tiếp
Dissipation array system	(n)	Hệ thống giải trừ sét
Double insulation	(n)	Cách điện kép
Downconductor	(n)	Dây thoát sét
Dry clothing	(n)	Quần áo khô
Electromagnetic compatibility	(n)	Tương thích điện từ
Electromagnetic fields	(n)	Trường điện từ
Electromagnetic interference	(n)	Nhiễu điện từ
Early emission streamer	(n)	Phóng điện sớm
Earth bar	(n)	Thanh nối đất

Earth pin	(n)	Kẹp nối đất
Earth rod	(n)	Cọc nối đất
Earth grid	(n)	Lưới nối đất
Electric shock	(n)	Sốc điện
Electrical leakage current	(n)	Dòng điện rò
Electrical safety	(n)	An toàn điện
Electrical hazard	(n)	Nguy hiểm điện
Electrocution	(n)	Điện giật
Energized	(adj)	Mang hay nạp điện
Fault current	(n)	Dòng sự cố
Field strength	(n)	Cường độ điện trường
Fire	(n)	Đám cháy
Fire protection system cháy	(n)	Hệ thống bảo vệ chống
Galvanized steel earth rod	(n)	Cọc mạ lõi thép
Ground potential	(n)	Điện thế đất
High speed protector truyền tốc độ cao	(n)	Thiết bị bảo vệ đường
Insultaed cover	(n)	Chụp cách điện
Insulated tool	(n)	Công cụ cách điện
Insulating boots	(n)	Giầy cách điện
Insulating mat	(n)	Thảm cách điện
Insulating ladder	(n)	Thang cách điện
Insulating platform	(n)	Ghế cách điện
Insulation resistance	(n)	Điện trở cách điện
Insulating stick	(n)	Sào cách điện
Insulating rubber gloves	(n)	Găng cao su cách điện
Interlock	(n)	Khóa liên động
Inspection box	(n)	Hộp kiể’m tra
Inspect tools	(n)	Công cụ kiểm tra
Jumper cable	(n)	Cáp nối
Leakage current	(n)	Dòng rò
Local Area Network	(n)	Mạng nội bộ
Load cell protector	(n)	Thiết bị bảo vệ cầu cần
Lightning protection	(n)	Bảo vệ chống sét
Live part	(n)	Phần mang điện
Let through voltage	(n)	Điện áp thông qua
Low voltage	(n)	Điện áp thấp

Megaohmeter	(n)	Máy đo điện trở cách điện
Non conducting material	(n)	Vật không dẫn điện
Overcurrent	(n)	Qúa dòng
Outlet	(n)	Ổ lấy điện
Phase tester	(n)	Bút thử điện
Protection mode	(n)	Chế độ bảo vệ
Protection area	(n)	Vùng bảo vệ
Protection characteristics	(n)	Đặc tuyến bảo vệ
Protection radius	(n)	Bán kính bảo vệ
Protective barrier	(n)	Thanh chắn bảo vệ
Pulse absent	(n)	Ngưng đập
Pulse present	(n)	Đang đập
Quality factor	(n)	Hệ số chất lượng
Rated operational voltage	(n)	Điện áp vận hành định mức
Rated current	(n)	Dòng điện định mức
Rated making capacity tạo	(n)	Dòng cắt theo khả năng chế
Rated insulation voltage	(n)	Điện áp cách điện định mức
Reinforced insulation	(n)	Cách điện tăng cường
Regulation	(n)	Qui phạm
Rescue	(v)	Cứu hộ
Rescue kits	(n)	Công cụ cứu hộ
Rescue stick	(n)	Sào cứu hộ
Residual current device	(n)	Thiết bị phát hiện dòng rò
Resistivity	(n)	Điện trở suất
Resuscitation	(n)	Hồi tĩnh
Reverse standoff voltage	(n)	Điện áp dẫn ngược
Risk assessment	(n)	Đánh giá rũi ro
Satefy adhesive tape	(n)	Băng keo an toàn
Safety belt	(n)	Đai an toàn
Safety extra low voltage điện áp cực thấp	(n)	An toàn bằng cách sử dụng
Safety glasses	(n)	Kính an toàn
Short circuit	(n)	Ngắn mạch
Shield	(n)	Vật che chắn
Shunt surge diverter	(n)	Thiết bị cắt sét
Side flashing	(n)	Sét đánh tạt ngang
Spark gap	(n)	Khe hở phóng điện

Specific absorption rate	(n)	Suất hấp thu theo trọng lượng
Streamer	(n)	Tia tiên đạo
Step voltage	(n)	Điện áp bước
Stick	(n)	Sào
Supplementary insulation	(n)	Cách điện bổ sung
Surge Reduction filter	(n)	Thiết bị lọc sét
Surge protection	(n)	Bảo vệ chống xung quá áp
Switchboard	(n)	Tủ điện
Temporary over voltage	(n)	Qúa áp tạm thời
Tester	(n)	Thiết bị đo thử
Touching voltage	(n)	Điện áp tiếp xúc
Transient protection	(n)	Bảo vệ chống xung đột biến
Transient voltage suppressor	(n)	Thiết bị triệt xung có phân biệt
Trip unit	(n)	Cơ cấu cắt
Trigerred Spark Gap	(n)	Khe hở phóng điện tự kích
Unconscious	(adj)	Bất tỉnh
Victim	(n)	Nạn nhân
Voltage detector	(n)	Thiết bị phát hiện điện áp
Vertical electrode buried	(n)	Cọc chôn sâu dưới đất
Warning sign	(n)	Tín hiệu cảnh báo
Working distance	(n)	Khoảng cách làm việc

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