Lecture-64
Domestic Wiring

Lecture delivered by:

Topics

- Introduction of wiring
- Types of Wiring
- Wiring tools and materials
- Principles of Earthing

Objectives

At the end of this lecture, student will be able to:

- Classify the types of Wiring
- Describe the advantages and disadvantages of different types of wiring
- Identify the wiring tools and materials
- Explain principles of earthing

Introduction

- Before you can build or design, you will need to recognize how to use proper wiring techniques in order to start connecting simple circuits

- Learning these techniques will ensure that you are following proper electrical safety procedures

Introduction

- Use of electricity

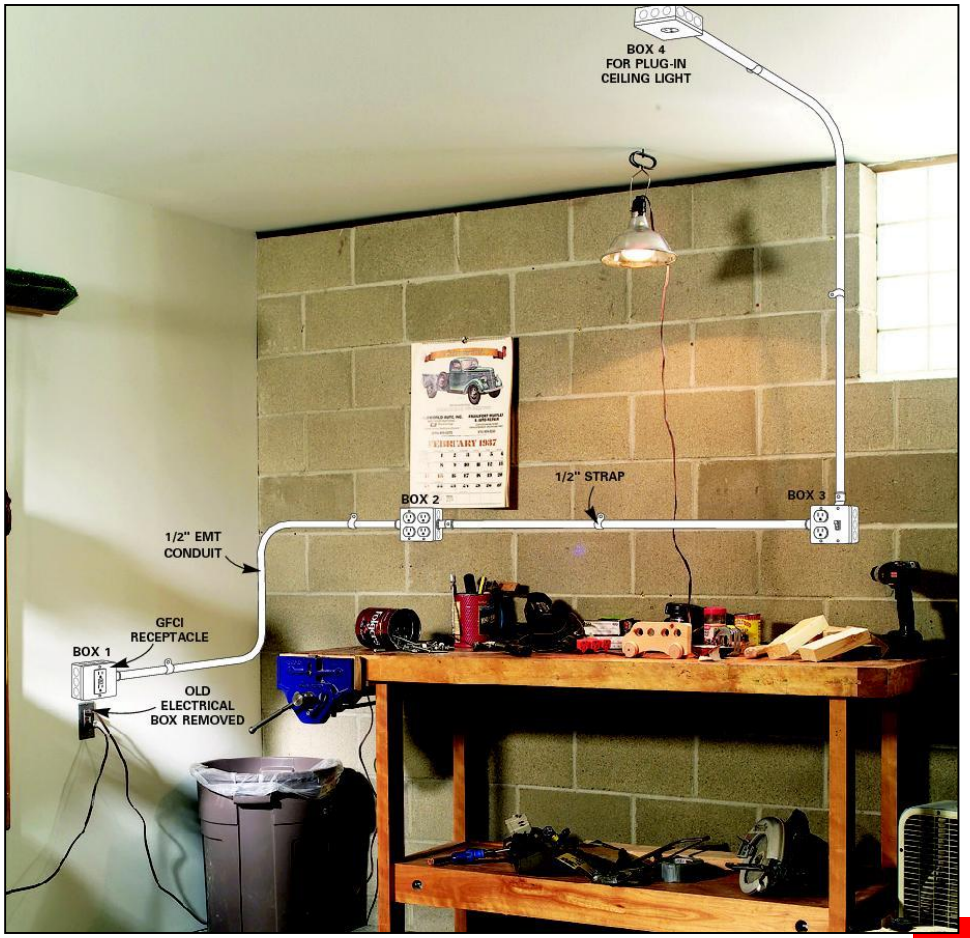
1. Domestic : Light, fan, heater, washing machine.

2. In industries : Heating, welding, electroplating.

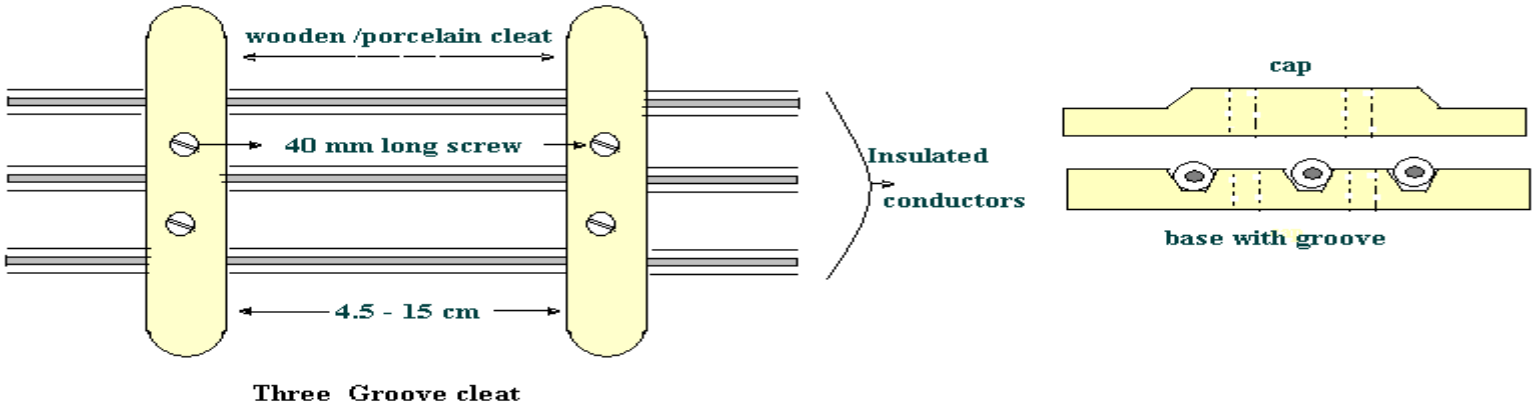
3. Commercial : Cinema, Lift, water pump, lighting.

Types of Wiring

1. Cleat Wiring
2. Batten Wiring
   (a)TRS/CTS Wiring.
   (b) Lead Sheath Wiring.
3. Conduit Wiring



Cleat Wiring



Three Groove cleat

Advantages:

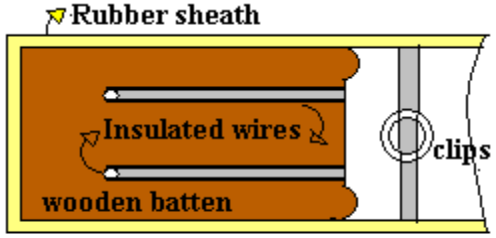
1. Easy installation
2. Materials can be retrieved for reuse
3. Flexibility provided for inspection, modifications and expansion.
4. Relatively economical
5. Skilled manpower not required.

Disadvantages:

1. Appearance is not good
2. Open system of wiring requiring regular cleaning.
3. Higher risk of mechanical injury.

Cleat Wiring

CTS (Cable Tyre Sheathed) / TRS (Tough Rubber Sheathed) / Batten wiring



CTS/TRS WIRING

Advantages:

1. Easy installation and is durable
2. Lower risk of short circuit.
3. Cheaper than casing and capping system of wiring
4. Gives a good appearance if properly erected.

Disadvantages:

1. Danger of mechanical injury.
2. Danger of fire hazard.
3. Should not be exposed to direct sunlight.
4. Skilled workmen are required.

Metal Sheathed or Lead Sheathed wiring

•Wiring is similar to that of CTS but the conductors (two or three) are individually insulated and covered with a common outer lead-aluminum alloy sheath

•Sheath protects the cable against dampness, atmospheric extremities and mechanical damages

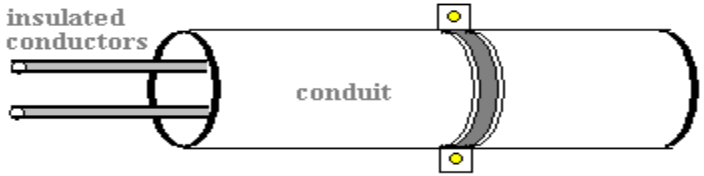
Advantages:

1. Easy installation and is aesthetic in appearance.
2. Highly durable
3. Suitable in adverse climatic conditions provided the joints are not exposed

Disadvantages:

1. Requires skilled labor
2. Very expensive
3. Unsuitable for chemical industries

Conduit Wiring



CONDUIT WIRING

Advantages:

1. No risk of fire and good protection against mechanical injury.
2. The lead and return wires can be carried in the same tube.
3. 4. Waterproof and trouble shooting is easy.
5. Shock- proof with proper earthing and bonding
6. Durable and maintenance free

Disadvantages:

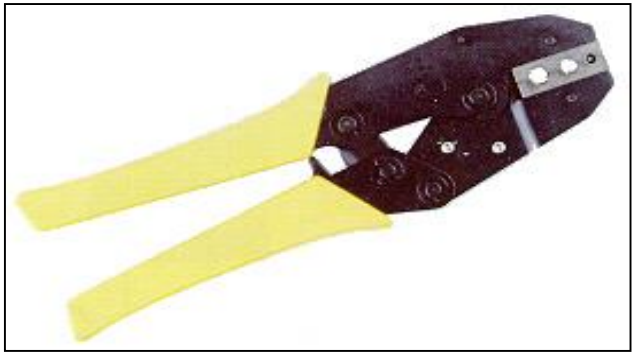
1. Very expensive system of wiring.
2. Requires good skilled workmanship.
3. Erection is quiet complicated and is time consuming.

Tools and Materials

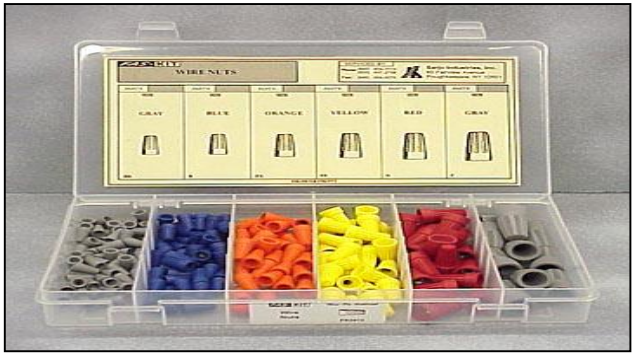
Soldering Iron

Solder

Crimping tool



Wire Nuts



Wiring Diagram Symbols

Wire (insulated, metal conductor)

Wires crossing (but NOT connected)

Wires connected (at dots)

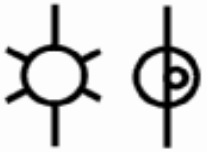
Battery (long line on top is positive)

Switch, single pole, single throw (SPST)

Switch, single pole, double throw (SPDT)

Switch, double pole, single throw (DPST)

Incandescent Light



Alternate symbol for Light

Circuit Breaker

Fuse

Ground

Male Connector

Female Connector

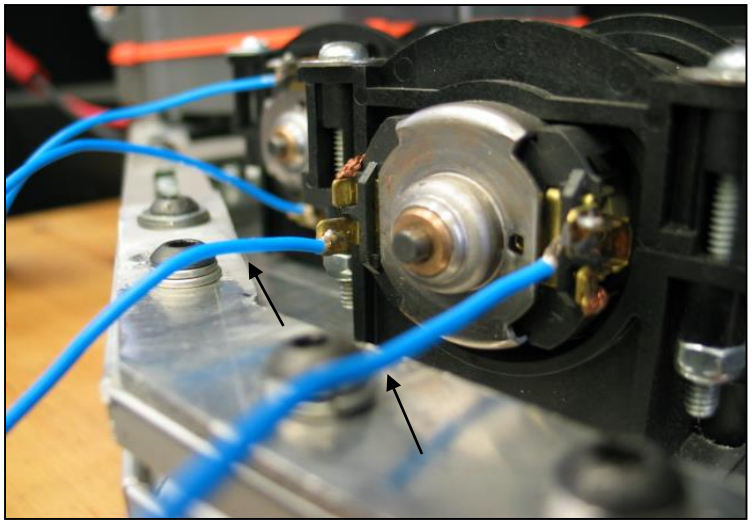
Wire Color Selection

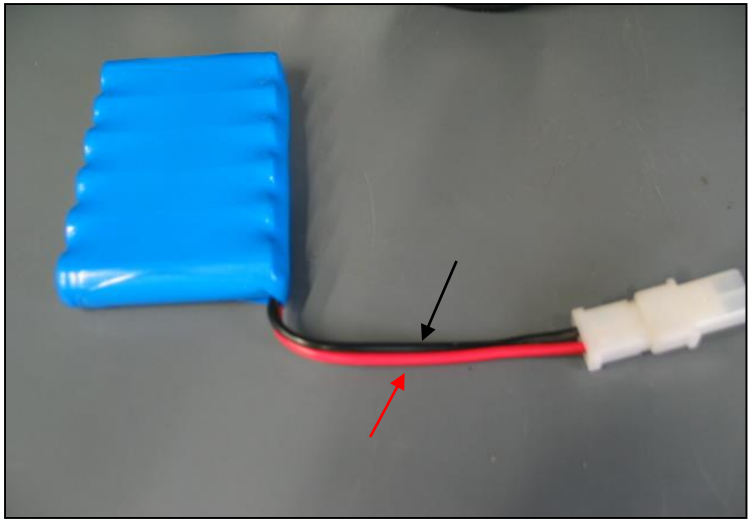
- Properly choosing the colors for your wires can help you decipher your wiring configurations.
- To the right is a picture of a bad configuration and a good configuration.
- For low DC voltages use the following color codes:

  Black – Negative

  Red – Positive

  Green - Ground





Earthing

Principles of Earthing:

1. To protect the operating personnel from danger of shock in case they come in contact with the charged frame due to defective insulation.
2. To maintain the line voltage constant under unbalanced load condition.
3. Protection of the equipments
4. Protection of large buildings and all machines fed from overhead lines against lightning.

Summary

Understand and be able to,

- State the uses of Electricity
- State the types of wiring and its advantages and disadvantages
- State the uses of Earthing