



**IDENTIFICATION
OF WIRING
MATERIALS
AND CONNECTING
LAMPS IN SERIES**

Roll no. 383

Exam no.

“Education through self help is our motto”
Rayat Shikshan Sanstha
Yashwantrao chavan institute of science,Satara.



Certificate

This is to certify that the

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Has satisfactorilly completed project work , prescribed by

Shivaji university kolhapur for the B.Sc.-III

Course in **physics** and this project represent their works in year
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Teacher in charge

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**Head of Department
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PREFACE

This project is Primarilly intended for study of electrical wiring. This project is tried to make highly innovative. It's our pleasure to present this project to the department. Subject metric is presented in lucid and simple language. The project covers all the information related to the wiring and its accessories. The material is presented in the comprehensive view and sequence of article in project helps to understand the topic of wiring theory. Different diagrams are given in the Project to understand the basic principles. We tried our best to study the electrical wiring and present it in a beautiful manner. The object of these project is to study the most mystirical concepts in electrical wiring. We heartly thankful to the Principal , Head of department and all other teachers for cooperating in these project.

We hope that this project will be found useful for students. We will appreciate any suggestions for improvement of these project.

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Identification of wiring materials

The first job in wiring is identify the wires wiring materials. Identification of wiring material is as follows

(A) Wires

Wire was drawn in England from the medieval period. The wire was used to make wool cards and pins, manufactured goods whose import was prohibited by Edward iv in 1463.

These are following types of wires available in the market.

Gauge #	Diameter (inches)	Area (circular mils)
4/0	0.4600	211,600
3/0	0.4100	168,100
2/0	0.3650	133,225
1/0	0.3250	105,625
1	0.2890	83,521
2	0.2580	66,564
4	0.2040	41,616
6	0.1620	26,244
8	0.1280	16,384
10	0.1020	10,404
12	0.0810	6,561
14	0.0640	4,096
16	0.0510	2,601
18	0.0400	1,600
20	0.0320	1,024
22	0.0253	640.1

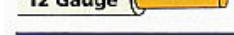
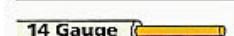
The first wire mill in Great Britain was established at Tintern in about 1568 by the founders of the Company of Mineral and Battery Works, who had a monopoly on this. Apart from their second wire mill at nearby Whitebrook, there were no other wire

mills before the second half of the 17th century. Despite the existence of mills, the drawing of wire down to fine sizes continued to be done manu

Forms of wire

Solid wire:-

Solid wire, also called solid-core or single-strand wire, consists of one piece of metal wire. Solid wire is useful for wiring breadboards. Solid wire is cheaper to manufacture than stranded wire and is used where there is little need for flexibility in the wire. Solid wire also provides mechanical ruggedness; and, because it has relatively less surface area which is exposed to attack by corrosives, protection against the environment.

	200 Amps	Service entrance
	150 Amps	Service entrance and feeder wire
	100 Amps	Service entrance and feeder wire
	55 Amps	Feeder and large appliance wire
	40 Amps	Feeder and large appliance wire
	30 Amps	Dryers, appliances, and air conditioning
	20 Amps	Appliance, laundry and bathroom circuits
	15 Amps	General lighting and receptacle circuits

Stranded Wire:-

Stranded wire is composed of a number of small wires bundled or wrapped together to form a larger conductor. Stranded wire is more flexible than solid wire of the same total cross-sectional area. Stranded wire tends to be a better conductor than solid wire because the individual wires collectively comprise a greater surface area. Stranded wire is used when higher resistance to metal fatigue is required. Such situations include connections between circuit boards in multi-printed-circuit-board devices, where the rigidity of solid wire would produce too much stress as a result of movement during assembly or servicing; A.C. line cords for appliances; musical instrument cables; computer mouse cables; welding electrode cables; control cables connecting moving machine parts; mining machine cables; trailing machine cables; and numerous others.

(B) Electrical Accessories:-

Electric accessories classification is as follow

1) Controlling Accessories:-

Accessories which are used to control electrical points and circuits are called as controlling accessories.

Following are the types of switches generally used. Single pole or 1way and two way switch ,intermediate switch, bell switch or push button, dp switch, ICDP etc...



SP switch.



All sp switches



Bell switch



pull switch

2) Holding accessories :-

Accessories which are used for the holding purpose is called as a holding accessories. All the types of folders are holding accessories Such as lamp holders(, pendant holder, button holder, angle holder, bracket holder), and Edison screw type holder, tube type holder and starter holder etc....



Pendant holder,
Button holder,
Angle holder,

Bracket holder,
Tube side holder



3)Safety Accessories:-

The devices which are used for protecting the electric equipment from damage this is called as the safety accessories. Fuse MCB (miniature circuit breaker) ELCB(Earth leakage current breaker) etc



Piyno type

Fuses

MCB (miniature circuit breaker)

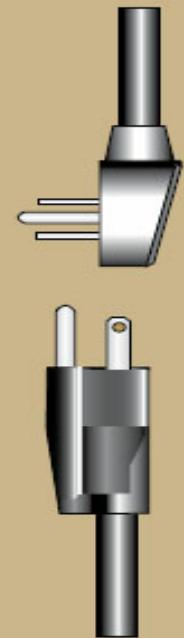
ELCB(Earth leakage current breaker)



4)Outlet Accessories:-

This accessories are used to get the supply from the portable appliances like TV,radio and table fan etc.. Following are the some outlet accessories two pin sockets, 2 pin plugs, 3 pin socket,3 pin plugs etc... As per current carrying capacity i.e SAMP,

		15 AMP		20 AMP		30 AMP		50 AMP		60 AMP	
		RECEPTACLE	PLUG								
2-POLE 2-WIRE	1 125-V	(1) 1-15R	(1) 1-15P								
	2 250-V		(2) 2-15P	(2) 2-20R	(2) 2-20P	(2) 2-30R	(2) 2-30P				
	5 125-V	(5) 5-15R	(5) 5-15P	(5) 5-20R	(5) 5-20P	(5) 5-30R	(5) 5-30P	(5) 5-50R	(5) 5-50P		
	6 250-V	(6) 6-15R	(6) 6-15P	(6) 6-20R	(6) 6-20P	(6) 6-30R	(6) 6-30P	(6) 6-50R	(6) 6-50P		
	7 277-V AC	(7) 7-15R	(7) 7-15P	(7) 7-20R	(7) 7-20P	(7) 7-30R	(7) 7-30P	(7) 7-50R	(7) 7-50P		
	24 347-V AC	(24) 24-15R	(24) 24-15P	(24) 24-20R	(24) 24-20P	(24) 24-30R	(24) 24-30P	(24) 24-50R	(24) 24-50P		
	10 125/250-V AC			(10) 10-20R	(10) 10-20P	(10) 10-30R	(10) 10-30P	(10) 10-50R	(10) 10-50P		
	11 3Ø 250-V	(11) 11-15R	(11) 11-15P	(11) 11-20R	(11) 11-20P	(11) 11-30R	(11) 11-30P	(11) 11-50R	(11) 11-50P		
	14 125/250-V	(14) 14-15R	(14) 14-15P	(14) 14-20R	(14) 14-20P	(14) 14-30R	(14) 14-30P	(14) 14-50R	(14) 14-50P	(14) 14-60R	(14) 14-60P
	15 3Ø 250-V	(15) 15-15R	(15) 15-15P	(15) 15-20R	(15) 15-20P	(15) 15-30R	(15) 15-30P	(15) 15-50R	(15) 15-50P	(15) 15-60R	(15) 15-60P
4-POLE 4-WIRE GROUNDING	18 3Ø Y 120/250-V	(18) 18-15R	(18) 18-15P	(18) 18-20R	(18) 18-20P	(18) 18-30R	(18) 18-30P	(18) 18-50R	(18) 18-50P	(18) 18-60R	(18) 18-60P



CABLE LENGTH	AMPERES OF LOAD							+ 1/2 H.P. = 74 amps + 3/4 H.P. = 10.3amps + 1 H.P. = 13 amps + 2 H.P. = 7 amps + 600 watts = 7 amps + 1100 watts = 10 amps + 1650 watts = 15 amps
	4	5-6	7	8-10	11-16	16-20	25	
25	18	18	18	18	16	14	10	
50	18	18	18	18	16	12	10	
100	18	18	18	16	14	12	10	
150	18	16	16	14	12	12	10	
200	16	14	14	12	10	10	8	

ISAMP

All Plugs:-



5)General Accessories:-

Some accessories are used for general and special purpose Such as adaptor, ceiling roses,connectors etc



Connectors in electrical

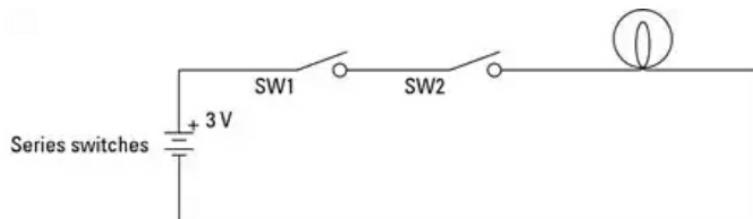
All electrical
Tools



CONNECTING LAMPS IN SERIES

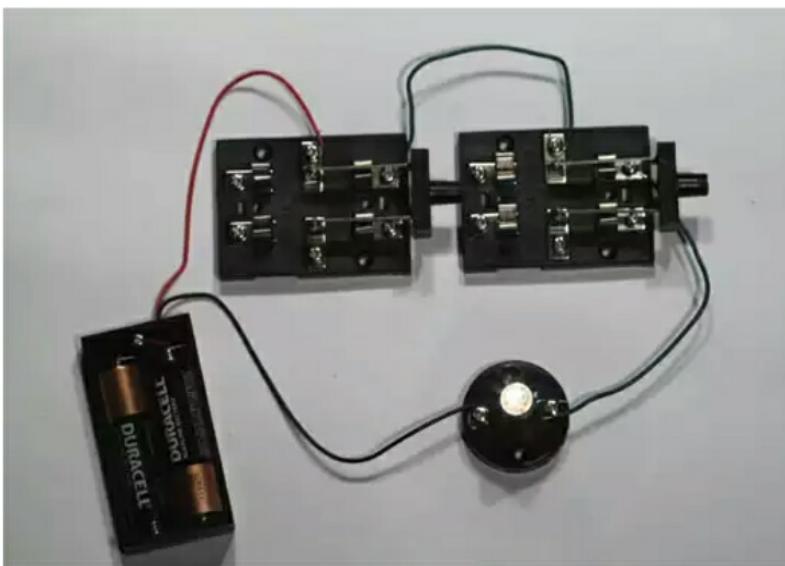
HOW TO BUILD A SERIES SWITCH CIRCUIT:-

This electronics project presents a simple project that uses two switches to open or close a circuit that lights a lamp. The switches are wired in series, so both switches must be closed to light the lamp.



Exploring Series Connections

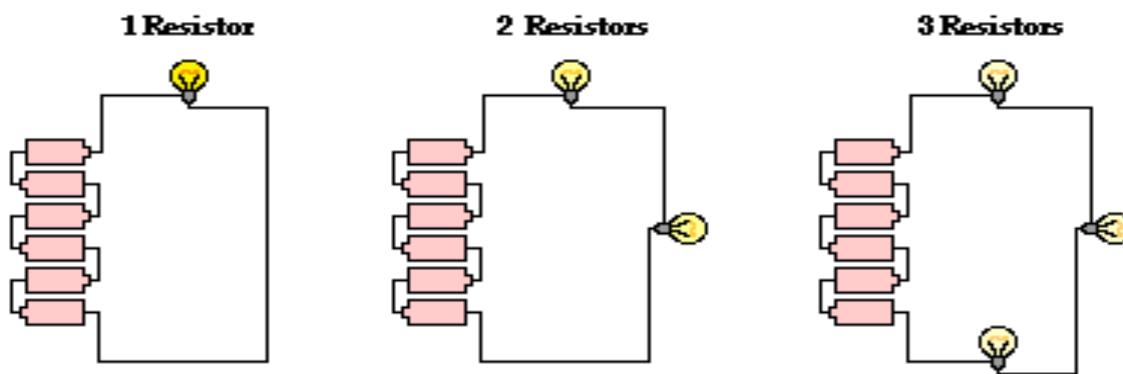
In conducting the lab activity, distinctly different observations are made for the two types of circuits. A series circuit can be constructed by connecting light bulbs in such a manner that there is a single pathway for charge flow; the bulbs are added to the same line with no branching point. As more and more light bulbs are added, the



Project 1-5: A Series Switch Circuit

brightness of each bulb gradually decreases. This observation is an indicator that the current within the circuit is decreasing. So for series circuits, as more resistors are added the overall current within the circuit decreases. This decrease in current is

Series Connection of Light Bulbs



consistent with the conclusion that the overall resistance increases.

A final observation that is unique to series circuits is the effect of removing a bulb from a socket. If one of three bulbs in a series circuit is unscrewed from its socket, then it is observed that the other bulbs immediately go out. In order for the devices in a series circuit to work, each device must work. If one goes out, they all go out. Suppose that all the appliances in a household kitchen were all connected in series. In order for the refrigerator to work in that kitchen, the toaster oven, dishwasher, garbage disposal and overhead light would all have to be on. In order for one device in series to work, they all must work. If current is cut from any one of them, it is cut from all of them. Quite obviously, the appliances in the kitchen are not connected in series.

References:-

- Www.wikipedia.org
- Practical charts
- Books –wiring simplified

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Yours faithfully,

Rahul Misal