ESTIMATING AND COSTING

ELECTRICAL ENGG.

Chapter 1

Elements of Estimating

Contents

- Introduction
- Purpose of Estimating and Costing
- Qualities of good estimator
- Essential elements of estimating and costing
- Other important factors of estimating and costing

Introduction

Estimating is done for following things:

1) **Approximation** of the material
2) **Investment** involved
3) **Time** to be taken for the completition of electrification project we are planning to do.

Job of an Estimator:-

1. Estimating the **quantity of material** and the **cost involved**.
2. Analysis of the **cost and selling price**
3. Maintaining **proper accounts**.
4. **Availability** of **material.**

Project report includes:-

1. **Drawing** of the work.
2. **Details** of the necessary material with its costing.
3. **Sequence** of operation to be performed.

Purpose of Estimating and Costing

- For successful implementation of the project, it is necessary to know **the material required** and the **cost to be incurred** before starting a new programme.
- **Proper Project report** should be **maintained** for the successful implementation of the programme.

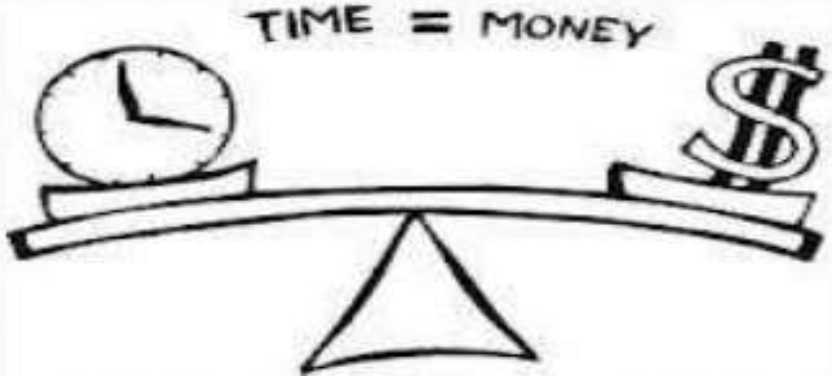
Contd.....

- Estimating is necessary because it gives **surety about the amount of money required, availability of material** etc.

- Without estimating and costing it becomes **difficult to continue the work** due to instantaneous shortage of **money or unavailability of material**.

Estimating and costing have following advantages and aims:-

- To ensure that **list of material is completed** before starting the work so that chances of **shortage of material reduces.**
- To ensure their should not be any **misuse of the money and the material**.
- **Work** is completed in **time**.



Without estimating and costing following problems can come in the way of work

- It becomes very difficult to **purchase necessary material** in the **absence of the list of material**.
- The **money is misused** by purchasing smaller, or **excess quantities of material from market** and shortage of money can cause **stoppage of work**.
- Due to above mentioned hurdles, the work can take **more time for completion.**

Example-Electrification of any building

1. Designing of wiring.
2. Location of points.
3. Use of various electrical equipments.
4. Use of Conductors.

Qualities of good estimator

A well-qualified, efficient and **experienced person** can made **successful** and **economical estimates**. Hence a good estimator should have following qualities:

1. The estimator should have **thorough knowledge** and **practical experience** about estimation.

2. Estimator should **visit the sites time to time.**

3. Estimator should have good **imagination and experimenting power.**

4) Estimator should keep provision for **future extension.**

4) He/ She should have **up-to date knowledge of prices of material .**

Specification of Material

Specification of material

- It will be very difficult to purchase material **without the knowledge of specification.**
- The **specification** of the material should be known at the **time of preparing report on estimation and pricing of project.**
- *For example,* there are so many ***lamp holders*** in the market like ***pendent holders***, ***batten holders*** or ***screw holder*** etc. available in the market. If we have to choose holder for lamp having wattage more than **200 watts**, than **screw type holder** will be best suited.

Latest Market cost of material

Latest market cost of material and market survey

- After estimating and costing of installation of project, it becomes necessary to purchase the material. **Market survey** has to be conducted for estimating the cost so that **shopkeeper could not deceive** us by **overcharging** the cost of material.
- After Market survey **quotations are invited** for the enlisted necessary material from **selected shops.**
- The cost given in **quotations of different shops are compared** and the material is **purchased at lowest rates** offered by suppliers.

Price List and Net Prices

Price List

- At the time of estimating and costing the **price list of materials is really helpful**.
- This list is made by **market survey**.
- This list is **updated time to time**
- The price list available in market **includes terms and conditions of the suppliers** along with the price of material.
- **Sample** of price list shown below:

Name of firm_____ Applicable with effect from date_____

S. No.	Name of item with specification	Unit	Cost	Remarks
1	DPST, iron clad 250 V grade 30 ampere rating with both fuses	each	85-00	
2	MCB, 250 V grade, 5, 6, 10 Amperes rating	Per Unit	60-00	
3.	PVC insulated, aluminium conductor wire of size 1/1.40mm diameter	Per 100mt	300-00	

Terms and conditions of supply:

- The above price list is **latest** and all the lists issued before this date should stand cancelled.
- **10% discount** will be given on **bulk purchases**.
- The prices of material **can increase or decrease** due to change of prices from time to time.
- **One percent(1%)** discount can be given on **cash payment**
- **Packing, delivery, dispatch, insurance** charges if necessary will be extra.
- The payment is to be made with in a **week of delivery**.
- All the taxes such as **sale tax, local tax** as applicable will be charged extra.

- **Net Prices:**

  Net price is that price, in which all the **imposed taxes such as sale tax, central sales tax, excise duty and other local taxes are included**. Normally above taxes are not mentioned in the price list.

  For example, If any discount is given by the factory, then shopkeeper will deduct the discount and then will charge the tax from the consumer. For example, if a consumer purchases a 100watt bulb of price 10 rupees and factory gives discount of 10%, then on Rs 10-1= 9, sale tax at the rate of 5% will result in net price = Rs 9 + 0.45= 9.45 rupees.

- Table shows a sample price list based on net prices

Name of item	*Rate per unit*	*Net Price Rs.*
15 ampere switch and socket combined, 3 pin flush type Discount 10%	40-00	40.00 -04.00
Sale tax 5%		36.00 +1.80
Net Price		Rs. 38.60

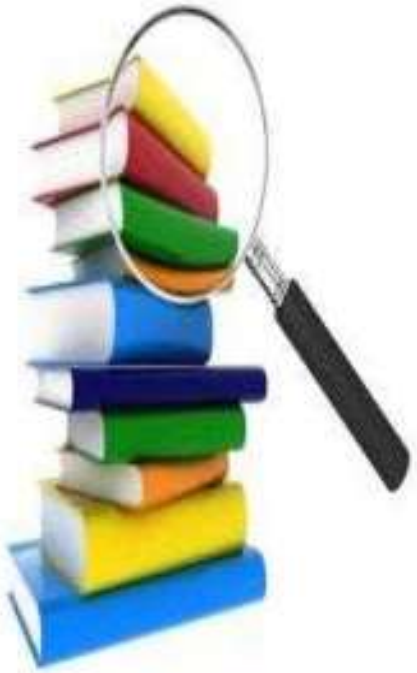
- **Electrical Schedule:**

It is that list or plan of the building by which we come to know the **no. of points provided in each room of the building under estimation.**

We need to know the **ceiling outlet, single pole three way and 4- way rotary switch, wall plugs** and any other special plug in any room of the building under estimation.

Catalogue:

- For an up to date estimating and costing, an **estimator should always have quotations and a bunch of price list** provided by whole sale dealers and manufacturers
- **The quotations and price list along with specifications of material** are called as catalogue.



Preparation of List of material:

- Preparing estimation of the **total material required** for project and the **total cost involved in project** is an important task of estimator.
- The material required for the **completition of project report with complete specification of each item quantity** and **rate of each item** with total cost for the item in the form of material list.

Sample of Material table specimen is given below:

S. No.	Name of item with full Specifications	Required Quantity		Rate		Total Cost	Remarks
		Qty	Unit	Rs.	Per		
1	Double pole iron clad, main switch, 30 Amp rating, 250V grade	1	No.	150/-	Each	150.00	As main control switch

Determination of Material and Labor cost

Determination of Material and Labor Cost

- The best arrangement for the determination of required material is to **prepare a detailed material and cost list** as mentioned above.
- The total cost involved in project is completed in two ways:

1) **Quantity of material and cost determination.**
2) **Determination of labor charges**.

1) While determining the quantity of material it is essential to prepare **plan of building, marking electrical points , switch boards and main board (Energy Meter and main switch board) on the plan**.

The control starting from main switch board to each switch board and then from switch board to electrical points is marked on the plan.

This plan is the basis of the estimate.

2) Determination of Labor Cost

As we know labor charges are different at different places. For eg. In cities, a trained **electrician may charge Rs.150/- a day** but in rural areas an equally trained electrician may be **available at Rs. 80/- a day**. Therefore determination of labor charges is very difficult.

- The labor rates are decided as per the **prevailing rates in the city**
- The **no. of days a wireman** are likely to take is calculated as under:

  The ***no. of days one wireman and one assistant will take to complete the work =***

$$\frac{\textit{No. of points to wired}}{\textit{No. of points they are likely to be wire in one day}}$$

Labour rates and total payment

S. No.	Class of Labour	No. of Days	Rates per day		Total Payment		Remarks
			Rs.	Paise	Rs.	Paise	
1							
2							

Knowledge of Purchase System

Knowledge of purchase system

It is the prime duty of the head of the **PWD department** to know the system of purchase and make the desired wiring material available for the project in hand.

a) **Purchase system and duties of purchasing department**

- They are responsible for **making purchases at lowest market rate** and **make arrangement for storage of material.**
- **Market survey should be conducted time to time** to know the latest prices of the material.
- The material should be **purchased which is on demand**.
- **Important materials should be kept stored** so that it is made available in emergency .
- **The Purchase officer always take approval from their senior** for any kind of purchase.
- All the **bills should be maintained properly.**

Procedure of Purchasing

Requisition

Call of Quotations

Comparative statements

Purchase Order

Inspection of Material

Release of payment

Requisition Form

Requisition Serial No._____ Date_____

To
Senior Purchase Officer
PWD Electrical Department
Loochi Nagar
NILOKHERI(Haryana)

Kindly Make arrangement for purchase of following items of material for *Power wiring of Polytechnic workshops under construction* upto-dated_____

S. No.	Complete Specification of Material	Quantity	Remarks
1.			

Stock Register Serial No._____ Stock Already in Hand_____
Maximum Demand Quantity_____
Minimum Demand Quantity_____
Signature of Store In charge _____ Signature of Requisition Officer
Department_____

For Use by the Purchase Department	Purchase order serial No._____	Name of Firm given Order
	Signature of verifying officer___	_____
	Signature of receiving officer___	Seal of the Department

Registered

From
Principal
School of Polytechnic(LPU)
Phagwara, Punjab

To
M/S Ghagas Eneterprises Ltd.
Ludhiana, Punjab

Memo No. Q/PK/2/200

Dated____

Subject: Quotation

Dear sir,

You are requested to send your lowest quotations and intimate the terms of payment and delivery period on our own terms and conditions:

1. The Last date of the receipt of quotations will be .....
2. The quotation will be valid for a period of two months from date of issue of this letter.
3. Please submit the bill in duplicate for cost of material supplied along with the material.
4. The payment of bill be made within one month from date of receipt of material in good condition.
5. The material supplied by you must be according to the specifications laid down as under.
6. The railway receipt will be required to be dispatched by registered post direct to the office and not through bank.

S. No.	Description of Material	Quantity Required
1.	**M.I Ammeter portable type 0-5A**	**15 Nos.**
2.	**Moving Coil Voltmeter type 0-250V**	**10 Nos.**

Principal
School of Polytech. (LPU)
Phagwara

LOVELY PROFESSIONAL UNIVERSITY/LOVELY INTERNATIONAL TRUST

Annexure VI

(Comparative Statement cum Sanction Form) School/Instt/Deptt._____ Name of Indentor _____ Contract No._____

S.No	Particulars	No. of Units Demanded	Last Purchase Details		M/s.			M/s.			M/s.		
			M/s		Quoted	Post Negotiation		Quoted	Post Negotiation		Quoted	Post Negotiation	
			Dated	Unit Price	Unit Price	Unit Price	Total Amt. (Rs.)	Unit Price	Unit Price	Total Amt. (Rs.)	Unit Price	Unit Price	Total Amt. (Rs.)
A	Sub Total												
B	Discount @_____% on A												
C	Discounted Value (A-B)												
D	Custom Duty/Excise/Service Tax Duty @ __ % on C												
E	Sub Total (C+D)												
H	VAT/CST @ % on E												
I	Sub Total (E+H)												
J	Any other Charges (Please specify) _____												
K	Grand Total (I+J)												

Supplier Recommended by Purchase Committee	
Reasons for Recommendation	
Availability of Extended Warranty/AMC with/Without Spares (Only in Relevant Cases)	

1. Certified that we , members of the purchase committee are jointly and individually satisfied that the goods recommended for purchase are of the requisite quality and specifications, priced at the prevailing market rates and the supplier recommended is reliable and competent to supply the goods in question.

2. We members of purchase committee jointly and individually confirm that the prices quoted by the suppliers and mentioned in this statement are approx. for the same quality of material for judicious comparison of rates

CHAIRMAN			MEMBER			MEMBER		
Name	Designation	Signature	Name	Designation	Signature	Name	Designation	Signature
	Date:			Date:			Date:	

Specimen of Purchase Order

From
Principal,
School of Polytechnic
LPU, Phagwara
Memo No.____
Dated:_____
To
M/s Ghangas Enterprises
Khangura Nagara
Ludhiana (Punjab)
Subject: Purchase order for supply of material to School of Polytechnic
Sir,

Reference to your quotation letter no._____ dated____. The rates offered by your firm have been found to be minimum and the terms and conditions offered by your firm have been acceptable.

Kindly supply the following material on terms and conditions already agreed upon.

S. NO.	Name of items with full specification	Quantity	Rate	Total Amount	Remarks
1.					

The terms and conditions are once again reproduced here.

1. Last date for receipt of material is ____
2. For all legal disputes, the jurisdictions will be Phagwara
3. Send 20% of the cost of material as earnest money before supply of material is undertaken.
4. 50% of the cost of material is deposited in your bank account and the balance amount will be paid only when material quality is verified and material received in good condition.
5. Form D will be issued to your firm for exemption in sale tax
6. All local taxes will be paid by us.

Signature
Principal
SOP, LPU Phagwara

Tenders

An offer in terms of rates made by the supplier or manufacturer on a prescribed form enclosed in a sealed envelop, in reply to a tender notice for supply of material on the basis of some terms and conditions is called Tender.

Tender Notice: The information to be made available for certain **heavy purchases through the news paper** is called Tender Notice.

- The Tender Notice is given for large scale **purchases of costly equipment such as installation of power wiring in a large industry, for installation of sub-station**, for purchase of heavy duty generator etc.
- The tender notice **contains information of material to be purchased, i.e. complete specifications, its approximate cost, quantity , last date of receipt of sealed tenders**, cost of tender form and the earnest money to be deposited along with the tender.
- The **supplier can quote rates only on tender form prescribed by the department**. The tender form contains all the information.

Guidelines for inviting Tender

- The tenders are invited on a tender form prescribed by the purchase department. Once the **tender notice is published in news- paper, the changes if any, are also got published in the same news-paper.**
- The **sealed tenders are invited publically through newspaper**.
- The tender notice should have following information mentioned clearly:

I. On what **dates and timings the work site or further details of purchases can be seen and examined by the supplier or contactor**.. The offices where tender forms or relevant information is available, the amount of earnest money etc.

II. **The date, time and place where tenders are to be opened.**

III. The **amount of earnest, security deposits and the mode of deposit i.e. through bank draft, cheque etc.**

IV. The **officer authorized to accept, reject or open the tender.**

- For **heavy purchases**, supplier should be given **at least 1 month's time** from the date of issue of tender notification to file their tenders.
- All tenders for the concerned work should be **opened in the presence of contractors or their representatives.**
- The earnest money to the **unsuccessful contractors should be returned at the earliest, probably on the same day.**
- Normally **tenders offering lowest rates are accepted but contract can be rejected if full earnest money is not deposited.**

Other Important Factors of Estimating and Costing

1. **Contingencies:** During completition of the project, there can be certain emergency expanses which can't be calculated while calculating the **material cost and labour expansion for the project. These expanses may be due to increase in Labour or material cost**. For this **2 to 3% considered as contingencies in order to compensate the additional charges**.

2. **Overhead Charges**: In addition to total estimated expenditure involved, there are other expanses which are to be incurred such as Govt. taxes, additional expanses on labour etc. are called overhead charges. These charges incurred daily for eg. **salary of administrative staff, rent (if any), travelling expanses, advertisements, insurance repair etc. are part of overhead charges.** Normally 10-15% of total estimated material and labour expanses are spent on overhead expanses. The overhead expanses are divided into two categories:

a) **Maintenance Overhead charges.**

b) **Administrative overhead charges.**

a) **Maintenance overhead charges**: This expenditure is on keeping the machines in working order i.e. expenditure involved on **overhauling and spare parts of the machines which normally occur due to wear and tear of the machines.** Apart from this, the **water charges, electricity charges, house tax and depreciation charges on components and instruments also falls in this category.**

a) **Administrative overhead charges**: Funds are required to run administration of various departments and their employees properly and efficiently. The expenditure involved on functioning of the departments such as **purchase section, sale section, salaries section, accounts section etc. falls in this category**. The other expenses such as office **furniture, stationary, reception and stay arrangements of guests, payment of commission on sales, publicity, of products, dispatch of material, price control, transport, sales tax, payment of salaries to employees etc., are part of administrative charges.**

- **Supervision charges:**

  A contract is given to **professionally trained and expert engineers to supervise the project work and offer expert opinions on various aspects of the project**. The expenditure on supervision charges is 1% to 1.5% of the total cost.

- **Production cost**: when cost of material for the project is added to **labour cost** on the project and overhead charges on this product, it is called production cost

  Production cost= cost of material + overhead expense

ESTIMATING AND COSTING

ELECTRICAL ENGG.

Chapter 1

Elements of Estimating

Contents

- Introduction
- Purpose of Estimating and Costing
- Qualities of good estimator
- Essential elements of estimating and costing
- Other important factors of estimating and costing

Introduction

Estimating is done for following things:

1) **Approximation** of the material
2) **Investment** involved
3) **Time** to be taken for the completition of electrification project we are planning to do.

Job of an Estimator:-

1. Estimating the **quantity of material** and the **cost involved**.
2. Analysis of the **cost and selling price**
3. Maintaining **proper accounts**.
4. **Availability** of **material.**

Project report includes:-

1. **Drawing** of the work.
2. **Details** of the necessary material with its costing.
3. **Sequence** of operation to be performed.

Purpose of Estimating and Costing

- For successful implementation of the project, it is necessary to know **the material required** and the **cost to be incurred** before starting a new programme.
- **Proper Project report** should be **maintained** for the successful implementation of the programme.

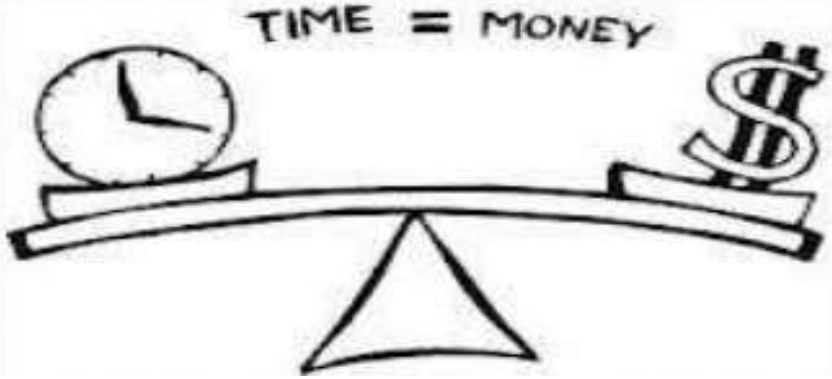
Contd.....

- Estimating is necessary because it gives **surety about the amount of money required, availability of material** etc.

- Without estimating and costing it becomes **difficult to continue the work** due to instantaneous shortage of **money or unavailability of material**.

Estimating and costing have following advantages and aims:-

- To ensure that **list of material is completed** before starting the work so that chances of **shortage of material reduces.**
- To ensure their should not be any **misuse of the money and the material**.
- **Work** is completed in **time**.



Without estimating and costing following problems can come in the way of work

- It becomes very difficult to **purchase necessary material** in the **absence of the list of material**.
- The **money is misused** by purchasing smaller, or **excess quantities of material from market** and shortage of money can cause **stoppage of work**.
- Due to above mentioned hurdles, the work can take **more time for completion.**

Example-Electrification of any building

1. Designing of wiring.
2. Location of points.
3. Use of various electrical equipments.
4. Use of Conductors.

Qualities of good estimator

A well-qualified, efficient and **experienced person** can made **successful** and **economical estimates**. Hence a good estimator should have following qualities:

1. The estimator should have **thorough knowledge** and **practical experience** about estimation.

2. Estimator should **visit the sites time to time.**

3. Estimator should have good **imagination and experimenting power.**

4) Estimator should keep provision for **future extension.**

4) He/ She should have **up-to date knowledge of prices of material .**

Specification of Material

Specification of material

- It will be very difficult to purchase material **without the knowledge of specification.**
- The **specification** of the material should be known at the **time of preparing report on estimation and pricing of project.**
- *For example,* there are so many ***lamp holders*** in the market like ***pendent holders***, ***batten holders*** or ***screw holder*** etc. available in the market. If we have to choose holder for lamp having wattage more than **200 watts**, than **screw type holder** will be best suited.

Latest Market cost of material

Latest market cost of material and market survey

- After estimating and costing of installation of project, it becomes necessary to purchase the material. **Market survey** has to be conducted for estimating the cost so that **shopkeeper could not deceive** us by **overcharging** the cost of material.
- After Market survey **quotations are invited** for the enlisted necessary material from **selected shops.**
- The cost given in **quotations of different shops are compared** and the material is **purchased at lowest rates** offered by suppliers.

Price List and Net Prices

Price List

- At the time of estimating and costing the **price list of materials is really helpful**.
- This list is made by **market survey**.
- This list is **updated time to time**
- The price list available in market **includes terms and conditions of the suppliers** along with the price of material.
- **Sample** of price list shown below:

Name of firm_____ Applicable with effect from date_____

S. No.	Name of item with specification	Unit	Cost	Remarks
1	DPST, iron clad 250 V grade 30 ampere rating with both fuses	each	85-00	
2	MCB, 250 V grade, 5, 6, 10 Amperes rating	Per Unit	60-00	
3.	PVC insulated, aluminium conductor wire of size 1/1.40mm diameter	Per 100mt	300-00	

Terms and conditions of supply:

- The above price list is **latest** and all the lists issued before this date should stand cancelled.
- **10% discount** will be given on **bulk purchases**.
- The prices of material **can increase or decrease** due to change of prices from time to time.
- **One percent(1%)** discount can be given on **cash payment**
- **Packing, delivery, dispatch, insurance** charges if necessary will be extra.
- The payment is to be made with in a **week of delivery**.
- All the taxes such as **sale tax, local tax** as applicable will be charged extra.

- **Net Prices:**

  Net price is that price, in which all the **imposed taxes such as sale tax, central sales tax, excise duty and other local taxes are included**. Normally above taxes are not mentioned in the price list.

  For example, If any discount is given by the factory, then shopkeeper will deduct the discount and then will charge the tax from the consumer. For example, if a consumer purchases a 100watt bulb of price 10 rupees and factory gives discount of 10%, then on Rs 10-1= 9, sale tax at the rate of 5% will result in net price = Rs 9 + 0.45= 9.45 rupees.

- Table shows a sample price list based on net prices

Name of item	*Rate per unit*	*Net Price Rs.*
15 ampere switch and socket combined, 3 pin flush type Discount 10%	40-00	40.00 -04.00
Sale tax 5%		36.00 +1.80
Net Price		Rs. 38.60

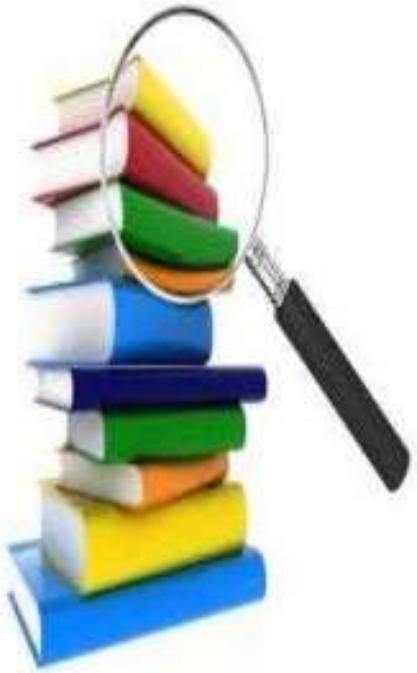
- **Electrical Schedule:**

It is that list or plan of the building by which we come to know the **no. of points provided in each room of the building under estimation.**

We need to know the **ceiling outlet, single pole three way and 4- way rotary switch, wall plugs** and any other special plug in any room of the building under estimation.

Catalogue:

- For an up to date estimating and costing, an **estimator should always have quotations and a bunch of price list** provided by whole sale dealers and manufacturers
- **The quotations and price list along with specifications of material** are called as catalogue.



Preparation of List of material:

- Preparing estimation of the **total material required** for project and the **total cost involved in project** is an important task of estimator.
- The material required for the **completition of project report with complete specification of each item quantity** and **rate of each item** with total cost for the item in the form of material list.

Sample of Material table specimen is given below:

S. No.	Name of item with full Specifications	Required Quantity		Rate		Total Cost	Remarks
		Qty	Unit	Rs.	Per		
1	Double pole iron clad, main switch, 30 Amp rating, 250V grade	1	No.	150/-	Each	150.00	As main control switch

Determination of Material and Labor cost

Determination of Material and Labor Cost

- The best arrangement for the determination of required material is to **prepare a detailed material and cost list** as mentioned above.
- The total cost involved in project is completed in two ways:

1) **Quantity of material and cost determination.**
2) **Determination of labor charges**.

1) While determining the quantity of material it is essential to prepare **plan of building, marking electrical points , switch boards and main board (Energy Meter and main switch board) on the plan**.

The control starting from main switch board to each switch board and then from switch board to electrical points is marked on the plan.

This plan is the basis of the estimate.

2) Determination of Labor Cost

As we know labor charges are different at different places. For eg. In cities, a trained **electrician may charge Rs.150/- a day** but in rural areas an equally trained electrician may be **available at Rs. 80/- a day**. Therefore determination of labor charges is very difficult.

- The labor rates are decided as per the **prevailing rates in the city**
- The **no. of days a wireman** are likely to take is calculated as under:

  The ***no. of days one wireman and one assistant will take to complete the work =***

$$\frac{\textit{No. of points to wired}}{\textit{No. of points they are likely to be wire in one day}}$$

Labour rates and total payment

S. No.	Class of Labour	No. of Days	Rates per day		Total Payment		Remarks
			Rs.	Paise	Rs.	Paise	
1							
2							

Knowledge of Purchase System

Knowledge of purchase system

It is the prime duty of the head of the **PWD department** to know the system of purchase and make the desired wiring material available for the project in hand.

a) **Purchase system and duties of purchasing department**

- They are responsible for **making purchases at lowest market rate** and **make arrangement for storage of material.**
- **Market survey should be conducted time to time** to know the latest prices of the material.
- The material should be **purchased which is on demand**.
- **Important materials should be kept stored** so that it is made available in emergency .
- **The Purchase officer always take approval from their senior** for any kind of purchase.
- All the **bills should be maintained properly.**

Procedure of Purchasing

Requisition

Call of Quotations

Comparative statements

Purchase Order

Inspection of Material

Release of payment

Requisition Form

Requisition Serial No._____ Date_____

To
Senior Purchase Officer
PWD Electrical Department
Loochi Nagar
NILOKHERI(Haryana)

Kindly Make arrangement for purchase of following items of material for *Power wiring of Polytechnic workshops under construction* upto-dated_____

S. No.	Complete Specification of Material	Quantity	Remarks
1.			

Stock Register Serial No._____ Stock Already in Hand_____
Maximum Demand Quantity_____
Minimum Demand Quantity_____
Signature of Store In charge _____ Signature of Requisition Officer
Department_____

For Use by the Purchase Department	Purchase order serial No._____	Name of Firm given Order
	Signature of verifying officer___	_____
	Signature of receiving officer___	Seal of the Department

Registered

From
Principal
School of Polytechnic(LPU)
Phagwara, Punjab

To
M/S Ghagas Eneterprises Ltd.
Ludhiana, Punjab

Memo No. Q/PK/2/200

Dated____

Subject: Quotation

Dear sir,

You are requested to send your lowest quotations and intimate the terms of payment and delivery period on our own terms and conditions:

1. The Last date of the receipt of quotations will be .....
2. The quotation will be valid for a period of two months from date of issue of this letter.
3. Please submit the bill in duplicate for cost of material supplied along with the material.
4. The payment of bill be made within one month from date of receipt of material in good condition.
5. The material supplied by you must be according to the specifications laid down as under.
6. The railway receipt will be required to be dispatched by registered post direct to the office and not through bank.

S. No.	Description of Material	Quantity Required
1.	**M.I Ammeter portable type 0-5A**	**15 Nos.**
2.	**Moving Coil Voltmeter type 0-250V**	**10 Nos.**

Principal
School of Polytech. (LPU)
Phagwara

LOVELY PROFESSIONAL UNIVERSITY/LOVELY INTERNATIONAL TRUST

Annexure VI

(Comparative Statement cum Sanction Form) School/Instt/Deptt._____ Name of Indentor _____ Contract No._____

S.No	Particulars	No. of Units Demanded	Last Purchase Details		M/s.			M/s.			M/s.		
			M/s		Quoted	Post Negotiation		Quoted	Post Negotiation		Quoted	Post Negotiation	
			Dated	Unit Price	Unit Price	Unit Price	Total Amt. (Rs.)	Unit Price	Unit Price	Total Amt. (Rs.)	Unit Price	Unit Price	Total Amt. (Rs.)
A	Sub Total												
B	Discount @_____% on A												
C	Discounted Value (A-B)												
D	Custom Duty/Excise/Service Tax Duty @ __ % on C												
E	Sub Total (C+D)												
H	VAT/CST @ % on E												
I	Sub Total (E+H)												
J	Any other Charges (Please specify) _____												
K	Grand Total (I+J)												

Supplier Recommended by Purchase Committee	
Reasons for Recommendation	
Availability of Extended Warranty/AMC with/Without Spares (Only in Relevant Cases)	

1. Certified that we , members of the purchase committee are jointly and individually satisfied that the goods recommended for purchase are of the requisite quality and specifications, priced at the prevailing market rates and the supplier recommended is reliable and competent to supply the goods in question.

2. We members of purchase committee jointly and individually confirm that the prices quoted by the suppliers and mentioned in this statement are approx. for the same quality of material for judicious comparison of rates

CHAIRMAN			MEMBER			MEMBER		
Name	Designation	Signature	Name	Designation	Signature	Name	Designation	Signature
	Date:			Date:			Date:	

Specimen of Purchase Order

From
Principal,
School of Polytechnic
LPU, Phagwara
Memo No.____
Dated:_____
To
M/s Ghangas Enterprises
Khangura Nagara
Ludhiana (Punjab)
Subject: Purchase order for supply of material to School of Polytechnic
Sir,

Reference to your quotation letter no._____ dated____. The rates offered by your firm have been found to be minimum and the terms and conditions offered by your firm have been acceptable.

Kindly supply the following material on terms and conditions already agreed upon.

S. NO.	Name of items with full specification	Quantity	Rate	Total Amount	Remarks
1.					

The terms and conditions are once again reproduced here.

1. Last date for receipt of material is ____
2. For all legal disputes, the jurisdictions will be Phagwara
3. Send 20% of the cost of material as earnest money before supply of material is undertaken.
4. 50% of the cost of material is deposited in your bank account and the balance amount will be paid only when material quality is verified and material received in good condition.
5. Form D will be issued to your firm for exemption in sale tax
6. All local taxes will be paid by us.

Signature
Principal
SOP, LPU Phagwara

Tenders

An offer in terms of rates made by the supplier or manufacturer on a prescribed form enclosed in a sealed envelop, in reply to a tender notice for supply of material on the basis of some terms and conditions is called Tender.

Tender Notice: The information to be made available for certain **heavy purchases through the news paper** is called Tender Notice.

- The Tender Notice is given for large scale **purchases of costly equipment such as installation of power wiring in a large industry, for installation of sub-station**, for purchase of heavy duty generator etc.
- The tender notice **contains information of material to be purchased, i.e. complete specifications, its approximate cost, quantity , last date of receipt of sealed tenders**, cost of tender form and the earnest money to be deposited along with the tender.
- The **supplier can quote rates only on tender form prescribed by the department**. The tender form contains all the information.

Guidelines for inviting Tender

- The tenders are invited on a tender form prescribed by the purchase department. Once the **tender notice is published in news- paper, the changes if any, are also got published in the same news-paper.**
- The **sealed tenders are invited publically through newspaper**.
- The tender notice should have following information mentioned clearly:

I. On what **dates and timings the work site or further details of purchases can be seen and examined by the supplier or contactor**.. The offices where tender forms or relevant information is available, the amount of earnest money etc.

II. **The date, time and place where tenders are to be opened.**

III. The **amount of earnest, security deposits and the mode of deposit i.e. through bank draft, cheque etc.**

IV. The **officer authorized to accept, reject or open the tender.**

- For **heavy purchases**, supplier should be given **at least 1 month's time** from the date of issue of tender notification to file their tenders.
- All tenders for the concerned work should be **opened in the presence of contractors or their representatives.**
- The earnest money to the **unsuccessful contractors should be returned at the earliest, probably on the same day.**
- Normally **tenders offering lowest rates are accepted but contract can be rejected if full earnest money is not deposited.**

Other Important Factors of Estimating and Costing

1. **Contingencies:** During completition of the project, there can be certain emergency expanses which can't be calculated while calculating the **material cost and labour expansion for the project. These expanses may be due to increase in Labour or material cost**. For this **2 to 3% considered as contingencies in order to compensate the additional charges**.

2. **Overhead Charges**: In addition to total estimated expenditure involved, there are other expanses which are to be incurred such as Govt. taxes, additional expanses on labour etc. are called overhead charges. These charges incurred daily for eg. **salary of administrative staff, rent (if any), travelling expanses, advertisements, insurance repair etc. are part of overhead charges.** Normally 10-15% of total estimated material and labour expanses are spent on overhead expanses. The overhead expanses are divided into two categories:

a) **Maintenance Overhead charges.**

b) **Administrative overhead charges.**

a) **Maintenance overhead charges**: This expenditure is on keeping the machines in working order i.e. expenditure involved on **overhauling and spare parts of the machines which normally occur due to wear and tear of the machines.** Apart from this, the **water charges, electricity charges, house tax and depreciation charges on components and instruments also falls in this category.**

a) **Administrative overhead charges**: Funds are required to run administration of various departments and their employees properly and efficiently. The expenditure involved on functioning of the departments such as **purchase section, sale section, salaries section, accounts section etc. falls in this category**. The other expenses such as office **furniture, stationary, reception and stay arrangements of guests, payment of commission on sales, publicity, of products, dispatch of material, price control, transport, sales tax, payment of salaries to employees etc., are part of administrative charges.**

- **Supervision charges:**

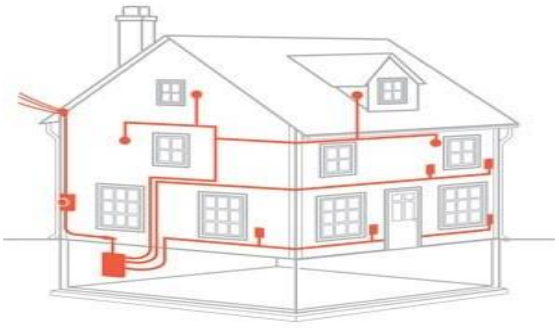
  A contract is given to **professionally trained and expert engineers to supervise the project work and offer expert opinions on various aspects of the project**. The expenditure on supervision charges is 1% to 1.5% of the total cost.

- **Production cost**: when cost of material for the project is added to **labour cost** on the project and overhead charges on this product, it is called production cost

  Production cost= cost of material + overhead expense

ELECTRICAL WIRING

Electrical wiring is generally refers to insulated conductor used to carry current and associated device. This article describes general aspects of electrical wiring as used to provide power in buildings and structures, commonly referred to as building wiring.



Types of wiring according to uses

1. **Domestic wiring.**
2. **Commercial wiring.**
3. **Industrial wiring.**

FACTOR AFFECTING THE CHOICE OF WIRING:

1. **Durability: Type of wiring selected should conform to standard specifications, so that it is durable i.e. without being affected by the weather conditions, fumes etc.**
2. **Safety: The wiring must provide safety against leakage, shock and fire hazards for the operating personnel.**
3. **Appearance: Electrical wiring should give an aesthetic appeal to the interiors.**
4. **Cost: It should not be prohibitively expensive.**
5. **Accessibility: The switches and plug points provided should be easily accessible. There must be provision for further extension of the wiring system, if necessary.**
6. **Maintenance Cost: The maintenance cost should be a minimum**
7. **Mechanical safety: The wiring must be protected against any mechanical damage**

Types of Wiring

- **Cleat wiring**
- **CTS wiring or TRS wiring or batten wiring**
- **Metal sheathed wiring or lead sheathed wiring**
- **Casing and capping**
- **Conduit wiring**

Cleat Wiring:

Introduction

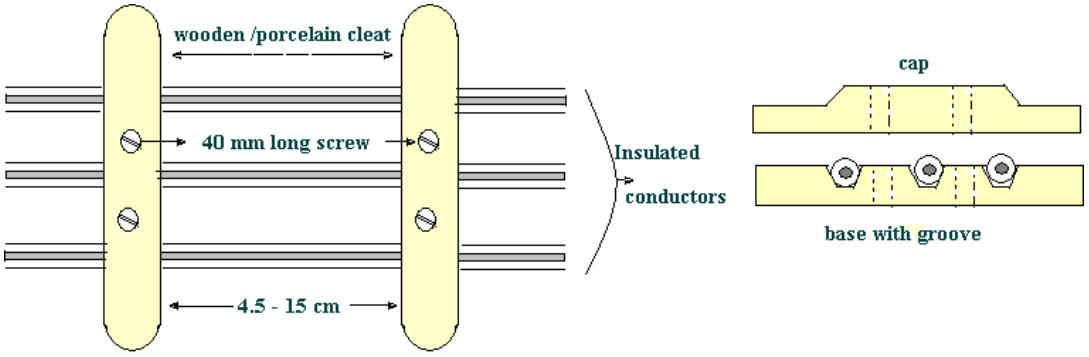
The types of wiring to be adopted is dependent on various factors, viz, durability, safety, appearance, cost, consumer's budget etc.

Cleat Wiring

This System uses insulated Cables sub protected in porcelain cleats.

Cleat wiring is recommended only for temporary installations. The cleats are made in pairs having bottom and top halves. The bottom half is grooved to receive the wire and the top half is for cable grip. Initially the bottom and top cleats are fixed on the wall loosely according to the layout. Then the cable is drawn, tensioned and the cleats are tightened by the screw. Cleats are of three types, having one, two or three grooves, so as to receive one, two or three wires. Two types of cleats.

Cleat wiring is one of the cheapest wiring considering the initial cost and labor, and is most suitable for temporary wiring. This wiring can be quickly installed, easily inspected and altered. When not required, this wiring could be dismantled without damage to the cables, cleats and accessories.



Three Groove cleat

- **Cleats**

  All cleats shall consist of two parts, a base piece and a cap. Cleats shall be fixed at distances not more than 60 cm apart and at regular intervals.

  Where cleat wiring is laid along an iron joist, porcelain cleats shall be inserted either with varnished wood fillets or varnished wood clamps

securely fixed so as to prevent the conductors from coming in contact with the metal along witch they are passing.

- **Fixing of cleats**

  In ordinary cases, cleats shall be attached to wooden plugs fixed to the walls.

- **Distance apart of wires**

  For pressure up to 250 volts, cleats shall be of such dimensions that in the case of branch loads, conductors shall not be less than 2.5 cm apart, centre to centre, and in the case of sub-mains not less than 4 cm apart, centre to centre. Care shall be taken in selecting the size of cleats particularly for branch distribution wiring where two-way and three-way porcelain cleats are essential and the difference in size shall be reasonable. Care should also be taken ensure that grooves f porcelain cleats are essential and the difference in size shall be reasonable. Care should also be taken ensure that grooves of porcelain cleats do not compress the insulation nor be too wide for a loose fit. Under no circumstances two wires shall be placed in one groove of the porcelain cleats.

Advantages:

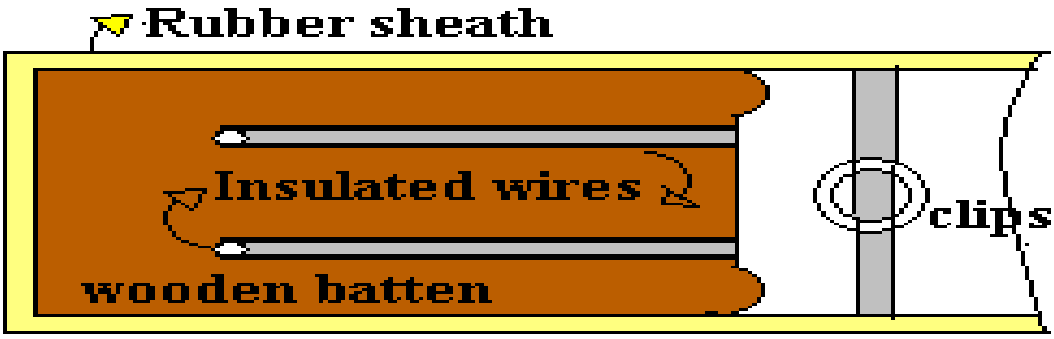
1) **Easy installation.**
2) **Materials can be retrieved for reuse.**
3) **Flexibility provided for inspection, modifications and expansion.**
4) **Relatively economical.**
5) **Skilled manpower not required.**

Disadvantages:

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

Batten Wiring

In this wiring system, wires sheathed in tough rubber are used which are quite flexible. They are clipped on wooden battens with brass clips (link or joint) and fixed on to the walls or ceilings by flat head screws.



CTS/TRS WIRING

These cables are moisture and chemical proof. They are suitable for damp climate but not suitable for outdoor use in sunlight. TRS wiring is suitable for lighting in low voltage installations.

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:

The 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. The sheath protects the cable against dampness, atmospheric extremities and mechanical damages. The sheath is earthed at every junction to provide a path to ground for the leakage current. They are fixed by means of metal clips on wooden battens. The wiring system is very expensive. It is suitable for low voltage installations.

Precautions to be taken during installation:

1. **The clips used to fix the cables on battens should not react with the sheath.**
2. **Lead sheath should be properly earthed to prevent shocks due to leakage currents.**
3. **Cables should not be run in damp places and in areas where chemicals (may react with the lead) are used.**

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.**

Casing and Capping:

It consists of insulated conductors laid inside rectangular, teakwood or PVC boxes having grooves inside it. A rectangular strip of wood called capping having same width as that of casing is fixed over it. Both the casing and the capping are screwed together at every 15 cms. Casing is attached to the wall. Two or more wires of same polarity are drawn through different grooves. The system is suitable for indoor and domestic installations.

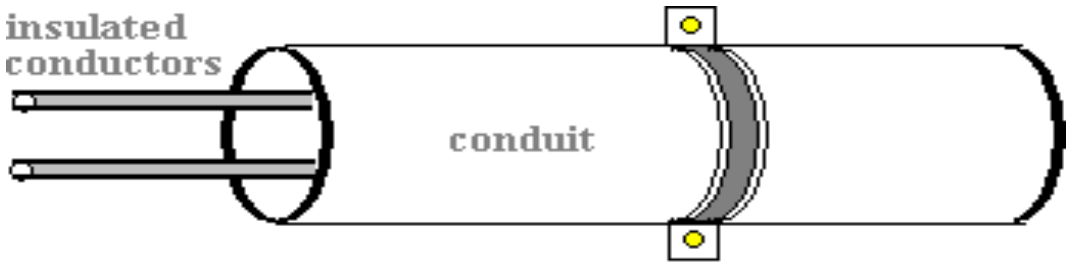
1. **Cheaper than lead sheathed and conduit wiring.**
2. **Provides good isolation as the conductors are placed apart reducing the risk of short circuit.**
3. **Easily accessible for inspection and repairs.**
4. **Since the wires are not exposed to atmosphere, insulation is less affected by dust, dirt and climatic variations.**

Disadvantages:

1. **Highly inflammable.**
2. **Usage of unseasoned wood gets damaged by termites.**
   Skilled workmanship required

Conduit wiring:

In this system PVC (polyvinyl chloride) or VIR cables are run through metallic or PVC pipes providing good protection against mechanical injury and fire due to short circuit. They are either embedded inside the walls or supported over the walls, and are known as concealed wiring or surface conduit wiring (open conduit) respectively. The conduits are buried inside the walls on wooden gutties and the wires are drawn through them with fish (steel) wires. The system is best suited for public buildings, industries and workshops.



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. **Earthing and continuity is assured.**
4. **Waterproof and trouble shooting is easy.**
5. **Shock- proof with proper earthing and bonding**

6. **Durable and maintenance free**
7. **Aesthetic in appearance**

Disadvantages:

1. **Very expensive system of wiring.**
2. **Requires good skilled workmanship.**
3. **Erection is quiet complicated and is time consuming.**
4. **Risk of short circuit under wet conditions (due to condensation of water in tubes).**

Specification of Wires:

The conductor material, insulation, size and the number of cores, specifies the electrical wires. These are important parameters as they determine the current and voltage handling capability of the wires. The conductors are usually of either copper or aluminum. Various insulating materials like PVC, TRS, and VIR are used. The wires may be of single strand or multi strand. Wires with combination of different diameters and the number of cores or strands are available.

For example: The VIR conductors are specified as 1/20, 3/22,….7/20 ……

The numerator indicates the number of strands while the denominator corresponds to the diameter of the wire in SWG (Standard Wire Gauge). SWG 20 corresponds to a wire of diameter 0.914mm, while SWG 22 corresponds to a wire of diameter 0.737 mm.

A 7/0 wire means, it is a 7-cored wire of diameter 12.7mm (0.5 inch). The selection of the wire is made depending on the requirement considering factors like current and voltage ratings, cost and application.

Example: Application: domestic wiring

1. **Lighting - 3/20 copper wire**
2. **Heating - 7/20 copper wire**

The enamel coating (on the individual strands) mutually insulates the strands and the wire on the whole is provided with PVC insulation. The current carrying capacity depends on the total area of the wire. If cost

is the criteria then aluminum conductors are preferred. In that case, for the same current rating much larger diameter of wire is to be used.

SWITCHES:

In electrical engineering, a switch is an electrical component that can break an electrical circuit, interrupting the current or diverting it from one conductor to another.

The most familiar form of switch is a manually operated electromechanical device with one or more sets of electrical contacts, which are connected to external circuits. Each set of contacts can be in one of two states: either "closed" meaning the contacts are touching and electricity can flow between them, or "open", meaning the contacts are separated and the switch is nonconducting. The mechanism actuating the transition between these two states (open or closed) can be either a "toggle" (flip switch for continuous "on" or "off") or "*momentary*" (push-for "on" or push-for "off") type.

A switch may be directly manipulated by a human as a control signal to a system, such as a computer keyboard button, or to control power flow in a circuit, such as a light switch. Automatically operated switches can be used to control the motions of machines, for example, to indicate that a garage door has reached its full open position or that a machine tool is in a position to accept another work piece. Switches may be operated by process variables such as pressure, temperature, flow, current, voltage, and force, acting as sensors in a process and used to automatically control a system. For example, a thermostat is a temperature-operated switch used to control a heating process. A switch that is operated by another electrical circuit is called a relay. Large switches may be remotely operated by a motor drive mechanism. Some switches are used to isolate electric power from a system, providing a visible point of isolation that can be padlocked if necessary to prevent accidental operation of a machine during maintenance, or to prevent electric shock.

In circuit theory:

An ideal switch would have no voltage drop when closed, and would have no limits on voltage or current rating. It would have zero rise time and fall time during state changes, and would change state without "bouncing" between on and off positions.

Practical switches fall short of this ideal, and have resistance, limits on the current and voltage they can handle, finite switching time, etc. The ideal switch is often used in circuit analysis as it greatly simplifies the system of equations to be solved, however this can lead to a less accurate solution. Theoretical treatment of the effects of non-ideal properties is required in the design of large networks of switches, as for example used in telephone exchanges.

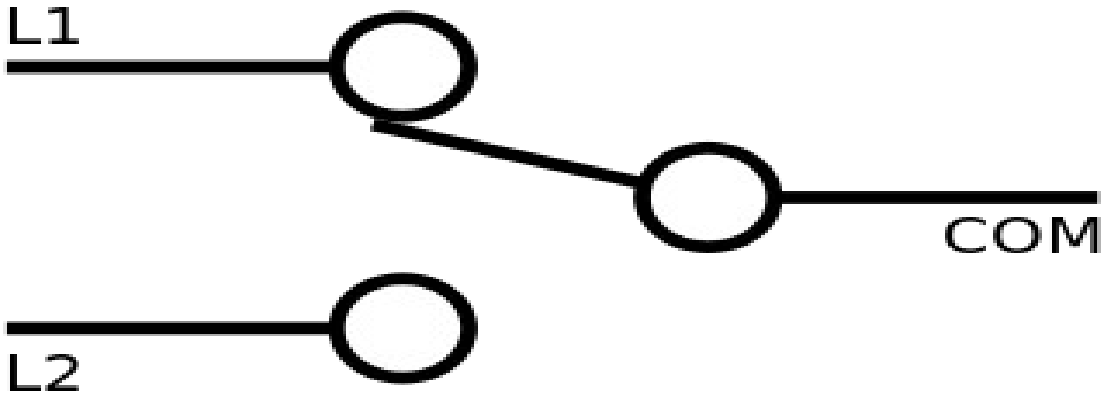
Various Type OF Switches:

SPST:

<u>Single Pole Single Throw</u>: A simple on-off switch: The two terminals are either connected together or disconnected from each other. An example is a light switch.

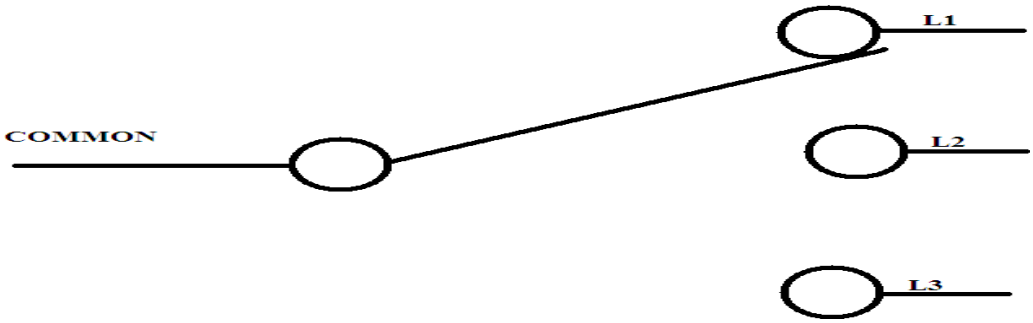
SPDT:

<u>Single pole, double throw:</u> A simple changeover switch: C (COM, Common) is connected to L1 or to L2.



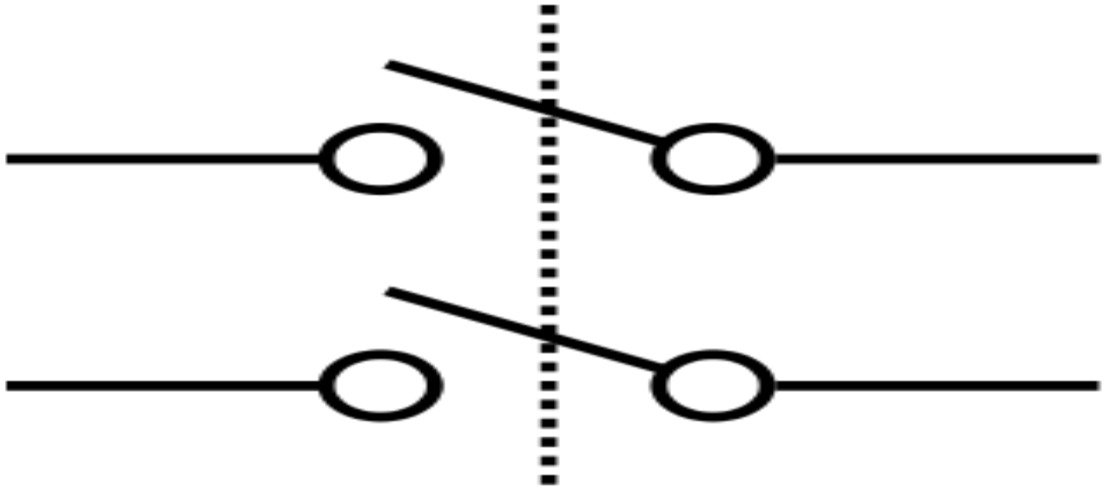
SPCO, SPTT:

<u>Single Pole Change Over OR Single Pole Centre OFF OR Single Pole Triple Throw:</u> Similar to SPDT. Some suppliers use SPCO/SPTT for switches with a stable off position in the centre and SPDT for those without.



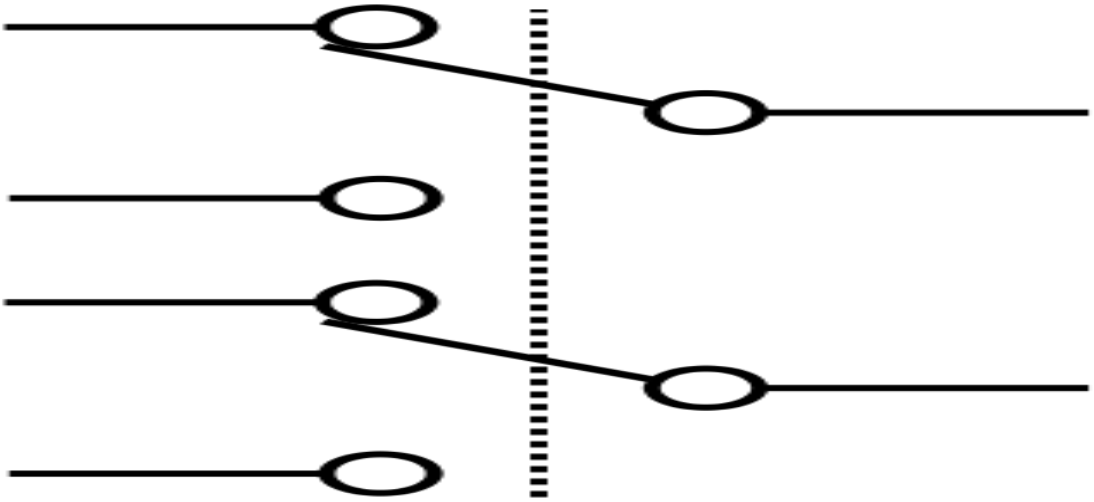
DPST:

<u>Double Pole Single Throw:</u> Equivalent to two SPST switches controlled by a single mechanism.



DPDT:

<u>Double pole Double Throw:</u> Equivalent to two SPDT switches controlled by a single mechanism.



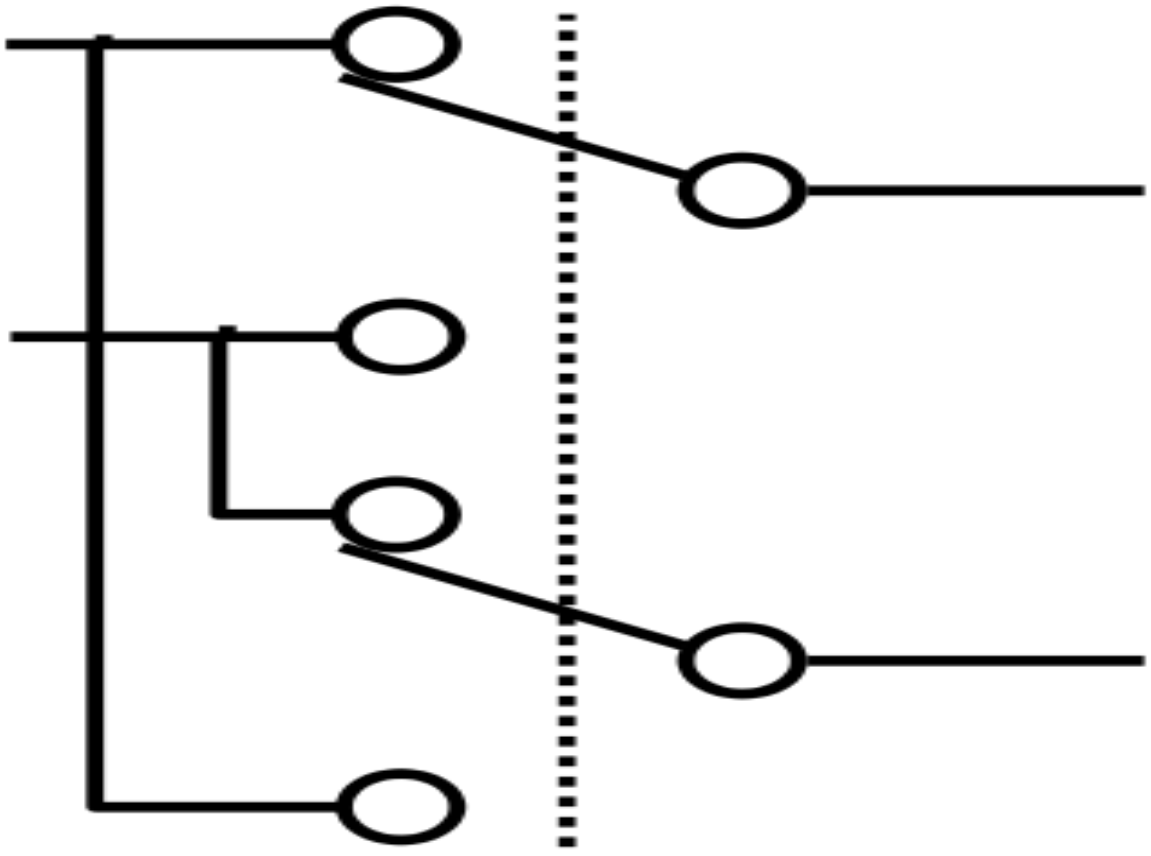
DPCO:

<u>Double Pole Change Over OR Double Pole Centre OFF</u>:

Equivalent to DPDT. Some suppliers use DPCO for switches with a stable off position in the centre and DPDT for those without.

INTERMEDIATE SWITCH:

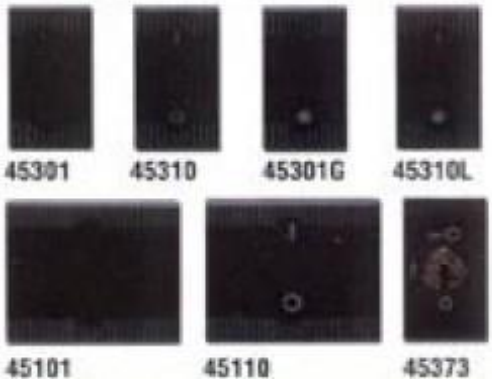
DPDT switch internally wired for polarity-reversal applications: only four rather than six wires are brought outside the switch housing.



MANUFACTURING COMAPNIES:

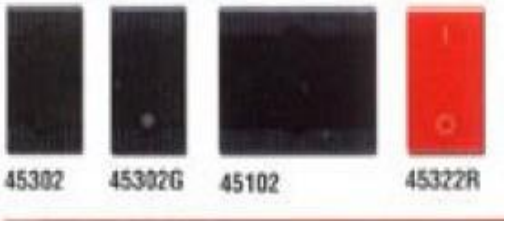
ANCHOR SWITCHES:

1 WAY SWITCHES



Code	Description	Characteristics	Mod.	MRP	Pkg.
45301	1 way switch	20AX - 250V~	1	207.00	10 nos
45310	2 pole switch	20AX - 250V~	1	256.00	10 nos
45301G	1 way switch with Indicator	20AX - 250V~	1	247.00	10 nos
45310L	Double pole luminous 1 way switch	20AX - 250V~	1	350.00	10 nos
45101	Large 1 way switch	20AX - 250V~	2	316.00	6 nos
45110	Double pole large 1 way switch	20AX - 250V~	2	432.00	6 nos
45373	Double pole key 1 way switch	16A - 250V~	1	680.00	10 nos

2 WAY SWITCHES



Code	Description	Characteristics	Mod.	MRP	Pkg.
45302	2 way switch	20AX - 250V~	1	242.00	10 nos
45302G	2 way switch with Indicator	20AX - 250V~	1	272.00	10 nos
45102	2 way large switch	20AX - 250V~	2	332.00	6 nos
45322R	Emergency 2 Poles 2 way switch	10A - 250V~	1	570.00	10 nos

PUSH BUTTONS

Code	Description	Characteristics	Mod.	MRP	Pkg.
45305	NO push-button	20AX - 250V~	1	227.00	10 nos
45305G	NO push-button with indicator	20AX - 250V~	1	257.00	10 nos
45305S	NO push-button with Bell symbol	20AX - 250V~	1	232.00	10 nos
45105	NO large push-button	20AX - 250V~	2	336.00	6 nos
45317	Pull-cord push-button	20AX - 250V~	1	307.00	10 nos
45356	Double NO push-button with directional arrows	16A - 250V~	1	407.00	10 nos
45388S	NO push-button with name plate	20AX - 250V~	2	372.00	6 nos
45364R	45A Double pole switch with pilot lamp+1 blank module complete with frame.	45A - 250~	4	1450.00	1 nos
45105R	NO+NC emergency red push-button	20AX - 250V~	2	352.00	6 nos

INTERMEDIATE/CHANGEOVER SWITCHES	Code	Description	Characteristics	Mod.	MRP	Pkg.
	45304	Intermediate switch	20AX - 250V~	1	340.00	10 nos
	45352	2P two way switch with directional arrows	10A - 250V~	1	692.00	10 nos

45304 45352

HAVELLS SWITCHES:

Item Name	SAP Code	Standard Packing	MRP/ UNIT
10Ax / 6Ax* 1way Switch	AHCSXXW101/061	20	101/-
10Ax / 6Ax* 2way Switch	AHCSXXW102/062	20	140/-
10Ax / 6Ax* Bell Push Switch	AHCSBXW100/060	20	142/-
10Ax / 6Ax* 1way with Ind. Switch	AHCSXIW101/061	20	140/-
10Ax / 6Ax* Bell Push with Ind. Switch	AHCSBIW100/060	20	158/-
16Ax* 1way Switch	AHCSXXW161	20	150/-
16Ax 1way Switch with Ind.	AHCSXIW161	20	180/-
16Ax 2way Switch	AHCSXXW162	20	182/-
25Ax 1 Way Switch	AHCSXXW251	20	184/-
10Ax/6Ax* Mega Bell Push Ind. Switch	AHLMXIW101/061	10	174/-
20A DP Switch with Ind.	AHLSDIW201	10	400/-

AC POWER PLUG AND SOCKETS:

AC power plugs and sockets are devices that allow electrically operated devices to be connected to the primary alternating current (AC) power

supply in a building. Electrical plugs and sockets differ in voltage and current rating, shape, size and type of connectors. The types used in each country are set by national standards.

Generally the plug is the movable connector attached to an electrically operated device's mains cable, and the socket is fixed on equipment or a building structure. Plugs have male circuit contacts, while sockets have female contacts. The plug has protruding prongs, blades, or pins that fit into matching slots or holes in the socket. A socket is also called a receptacle, outlet, or power point (British English). It may be surrounded by a cover called a wall plate, face plate, outlet cover, socket cover, or wall cover.

To reduce the risk of electric shock, plug and socket systems can incorporate safety features. These may include socket design intended to accept only compatible plugs inserted in the correct orientation; plugs with insulated sleeves on contact pin shanks so a partially inserted plug does not bear exposed live pins that could be touched; or sockets with blocking shutters that open only when a compatible plug is inserted. Sockets are designed to prevent exposure of bare live contacts. The exposed contacts present in some sockets are used exclusively for earthing (grounding).

ANCHOR SOCKETS:

Item Name	SAP Code	Standard Packing	MRP/ UNIT
6A 2pin Socket	AHLKSXW062	20	100/-
6A 3Pin Socket	AHLKPXW063	10	141/-
6A 5Pin Socket	AHLKPXW065	10	146/-
6-16A 3 Pin Socket	AHLKCXW163	10	230/-
10/25A Socket	AHLKCXW251	10	252/-
Universal Socket	AHLKUXW130	10	248/-

HAVELLS SOCKET:

COMPARISON BETWEEN PRICE OF THREE MANUFACTURING COMPANY:

Sr No.	ANCHOR	HAVELLS	WIPRO	COMMENTS
1.	1-WAY SWITCH 20A-250V Rs.207	1-WAY SWITCH 10A-250V Rs.101	1-WAY SWITCH 6A-250V Rs.101	HAVELLS IS BEST WITH MEDIUM RATING AND RESONABLE PRICE
2.	2-WAY SWITCH 20A-250V Rs.256	2-WAY SWITCH 10A-250V Rs.140	2-WAY SWITCH 6A-250V RS.122	WIPRO IS BEST WITH RESONABLE PRICE
3.	1-WAY SWITCH WITH LED 20A-250V Rs.247	1-WAY SWITCH WITH LED 10A-250V Rs.140	1-WAY SWITCH WITH LED 6A-250V Rs.133	AGAIN WIPRO IS BEST WITH RESONABLE PRICE
4.	2-WAY SWITCH WITH LED 20A-250V Rs.272		2-WAY SWITCH WITH LED 6A-250V Rs.172	WIPRO IS BEST WITH RESONABLE PRICE

Sr No.	ANCHOR	HAVELLS	WIPRO	COMMENTS
1.	2 PIN 16A/250V SOCKET Rs.332	6A 2 PIN SOCKET Rs.100	6A 2/3PIN SOCKET Rs.170	HAVELLS IS BEST FOR IT LOW PRICE

2.	**2 PIN +E** **16A/250V** **Rs.346**	**6A 3 PIN SOCKET** **Rs.141**	**6A 2 AND 3 PIN SOCKET** **Rs.240**	**HAVELLS IS BEST FOR IT LOW PRICE**
3.	**6A-16A SOCKET** **Rs.367**	**6-16A 3 PIN SOCKET** **Rs.230**	**6/16A 6 PIN SOCKET** **Rs.265**	**AGAIN HAVELLS IS BEST FOR IT LOW PRICE**