

Estimating for distribution Substations:

→ In the present day, electrical power is generated, transmitted and distributed in the form of alternating current.

→ The place where stepping up and stepping down of voltage is done is known as "Sub-station".

Classification of sub-stations:

The sub-stations can be classified in several ways. The two important ways of classifying the sub-stations,

According to service requirements: →

1. switching Sub-stations.
2. Transformer Sub-stations.
3. power factor Correction Sub-stations.
4. frequency Changer Sub-stations.
5. Converting sub-stations.
6. Industrial sub-stations.

According to design or constructional features →

1. Indoor Sub-stations
2. outdoor Sub-stations
3. Underground Sub-stations.
4. pole mounted & pith mounted sub-stations

Main Components of pole or plinth mounted sub-stations.

1. pole →

• The poles may be of steel or psc type having a length about 8m to 12m.

In pole mounted sub-stations the transformer is erected on mild steel channel of # - type or 4 - pole structure.

2. plinth

Transformers of capacity more than 250KVA are placed on plinth. The plinth is constructed with bricks or stones.

3. Transformer →

→ It is generally called as distribution transformer.

→ It is a 11KV/400V step-down transformer.

4. Insulators →

Generally this sub-station is located at dead end of 11KV, hence 11KV disc insulators are used to connect 11KV line.

5. Cross-arms →

→ Different sizes of mild steel cross arms are used to erect disc, insulators, gang operating switch, horn gap, fuse etc.

6. Fuses →

→ Horn gap fuses are provided on 11KV side, where as open type rewirable fuses are used on 400V LT side.

gang Operating switch or air breaker switch →

- It is used to switch on and off 11 KV line.

Core Cable →

The o/p of distribution transformer is connected to L.T. line through $3\frac{1}{2}$ Core aluminum conductor surrounded 1100V grade PVC cable.

Stays →

At least 2 stay sets are provided to support poles.

Distribution Box →

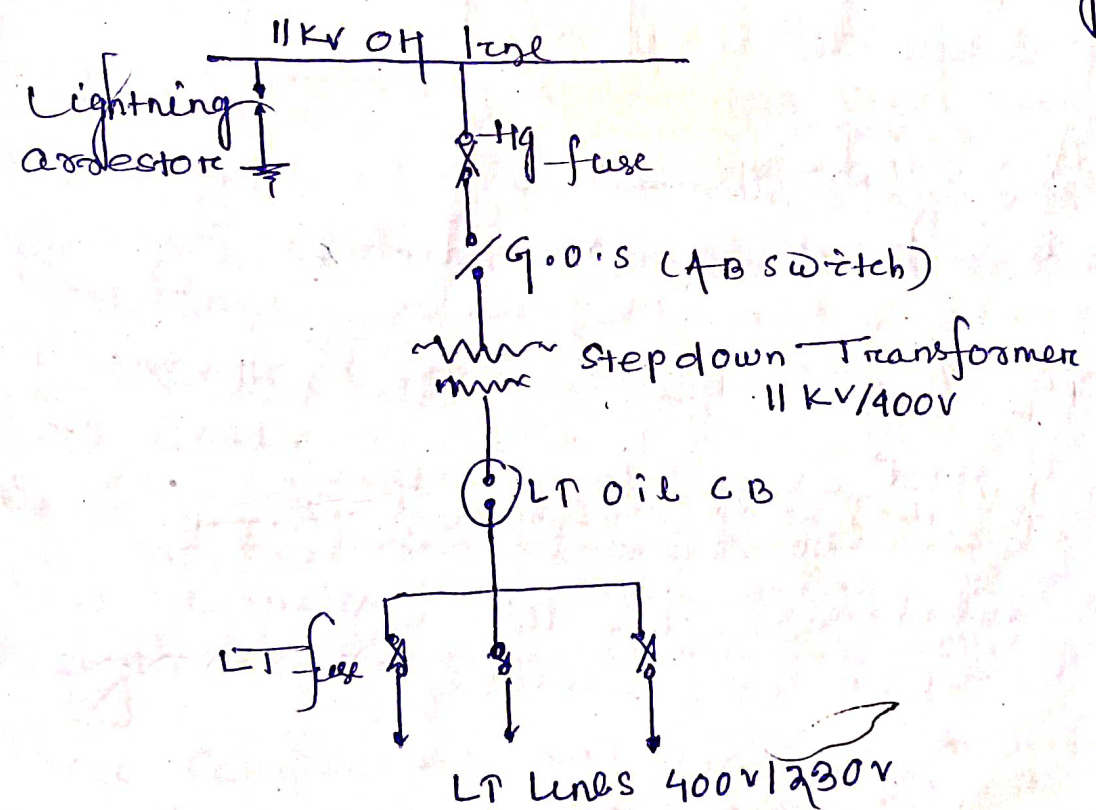
The L.T. supply of distribution transformer is fed through distribution box which consists of fuse unit.

Jumpers →

• These are used to connect 11 KV lines. generally ACSR conductor is used for this purpose.

Construction of pole-mounted sub-station

- This type of sub-stations are erected for distribution of power to localities.
- These are cheap, simple and smaller in size.
- The transformer is of step-down type which stepdowns 11KV into 400/230V.
- A gang Operating Switch is used for switching ON and OFF of HT (11KV) line.
- The sub-station is located at two or more places. The oil CB installed on the LT side automatically cuts off the transformer from the consumers in the event of any fault.



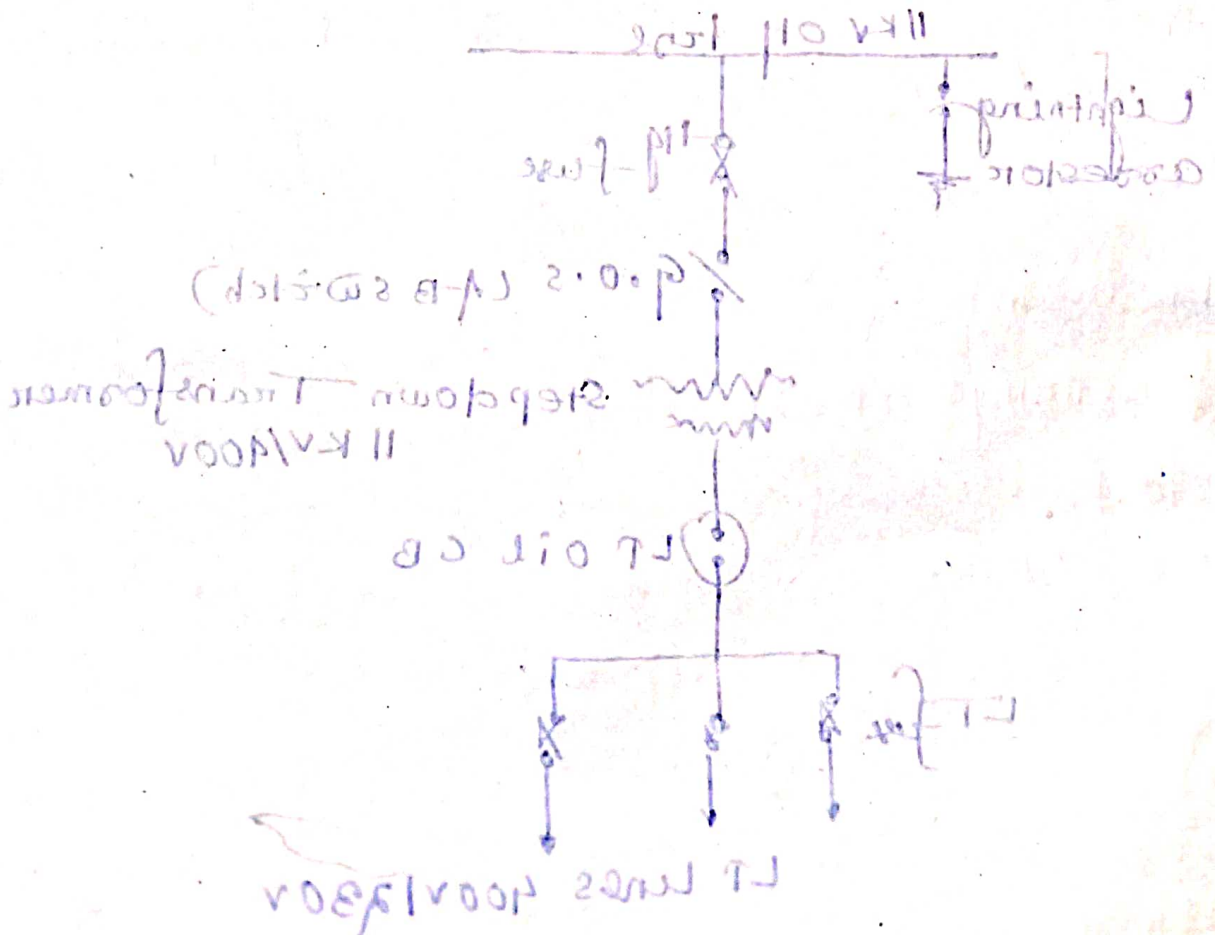
(Schematic diagram of pole-mounted sub-station)

Plinth mounted sub-station →

→ The Transformers of capacity above 250 KVA are heavy in weight and will not suitable for mounting on H-type structure.

→ All the equipment and accessories are arranged on a LT pole. Some times two poles can be used for feeding two LT lines.

→ The plinth is built with bricks or stones with cement concrete and transformer is located on a plinth, hence the name plinth mounted sub-station. It is also called as foundation mounted sub-station.



Schematic diagram of plinth-mounted sub-station