
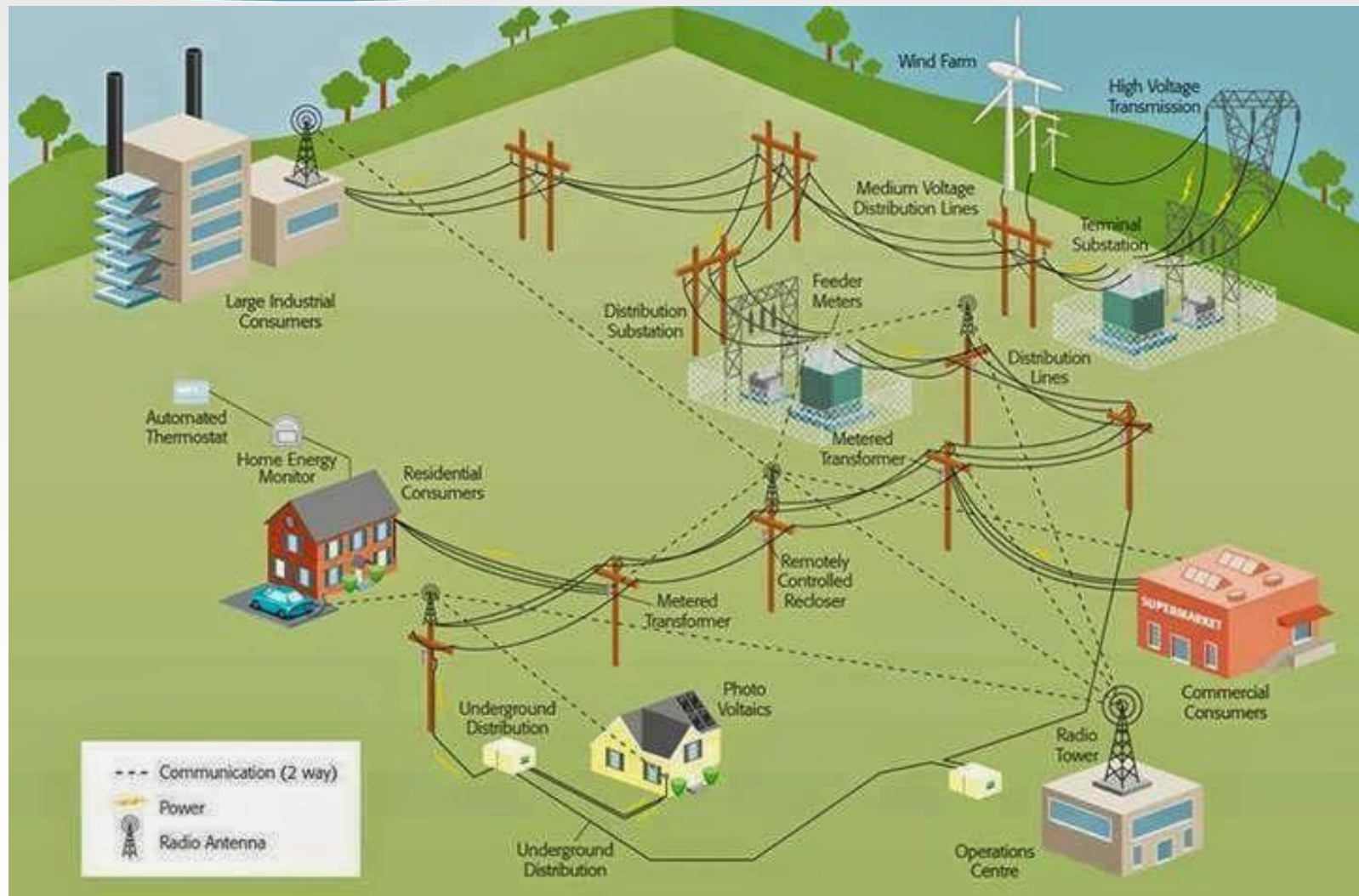


Power Line Carrier Communication

A decorative wavy line separates the dark blue header area from the light gray footer area. The line starts at the bottom left, curves upwards to the right, and then curves downwards to the right, creating a smooth, flowing transition.

Introduction:



Introduction:

- Communication using existing power cable
- PLCC is a communication technology that enables sending data over existing power cables
- Said to be backbone of Electrical transmission system

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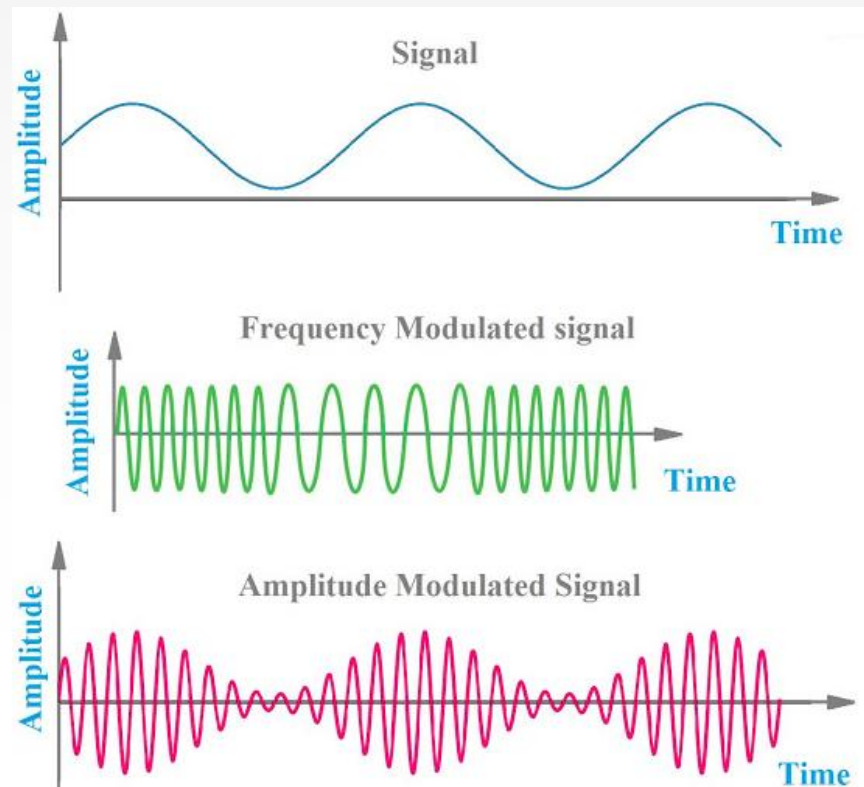
- For large power system, PLCC is used for
 - Speech transmission
 - Data transmission
 - Protection of transmission lines
- Necessity of PLCC:
 - To cope up with ever increasing size of power grid
 - Need for economic and reliable means of intercommunication between various generating station, substation and control room
 - Avoid dependence of other communication infrastructures

Basic Principle:

- Power-line communications systems operate by adding a modulated carrier signal
 - On one/two or on all three conductors of a high-voltage AC transmission line
- Allotted frequencies range for this purpose is from 30 to 500 kHz, with transmitter power levels up to hundreds of watts

Introduction:

- For PLCC, generally amplitude modulation (AM) is used
- Sometimes frequency modulation is also used if transmitting medium is optical fiber instead of coaxial-cable at the substation



Equipment Required:

Outdoor Equipment

- 1) Wave traps
- 2) LMU
- 3) CC/CVT
- 4) Drainage coils
- 5) Lightning arrester
- 6) Earthing switch
- 7) Co-axial cable

Indoor Equipment

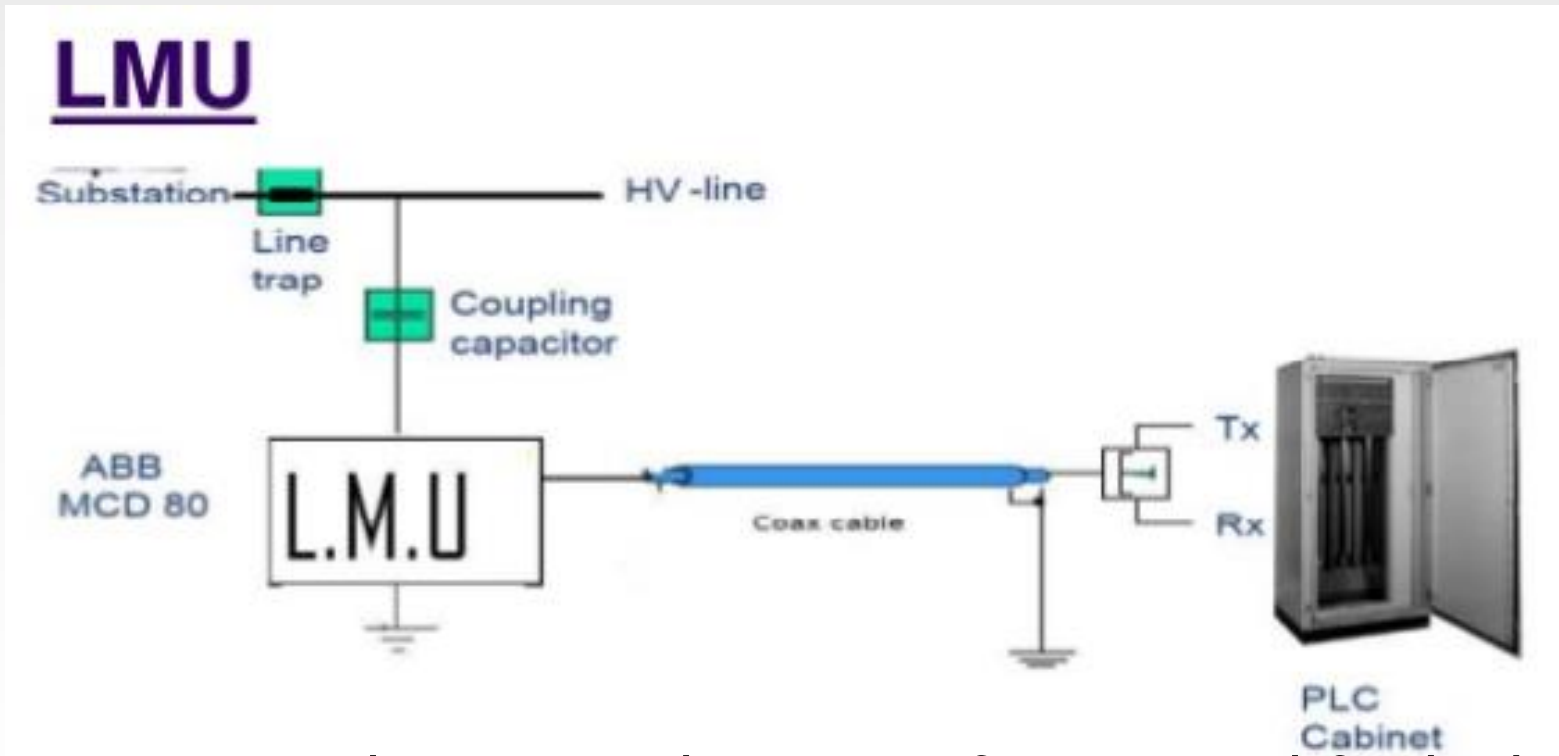
- 1) PLCC panel
- 2) Battery bank
- 3) Battery charger
- 4) EPBAX
- 5) RTU
- 6) Modem

Wave Trap / Line Trap:

- Do not allow the transmitted HF carrier to enter inside the sub-station (High Impedance for HF carrier)
- Without line trap, HF carrier get bypassed to some other line and may leak to ground



Line Matching Unit (LMU):



- LMU is impedance matching transformer and for high voltage Protection
- It prevents high potential on the PLCC connection

Other Equipment/Components:

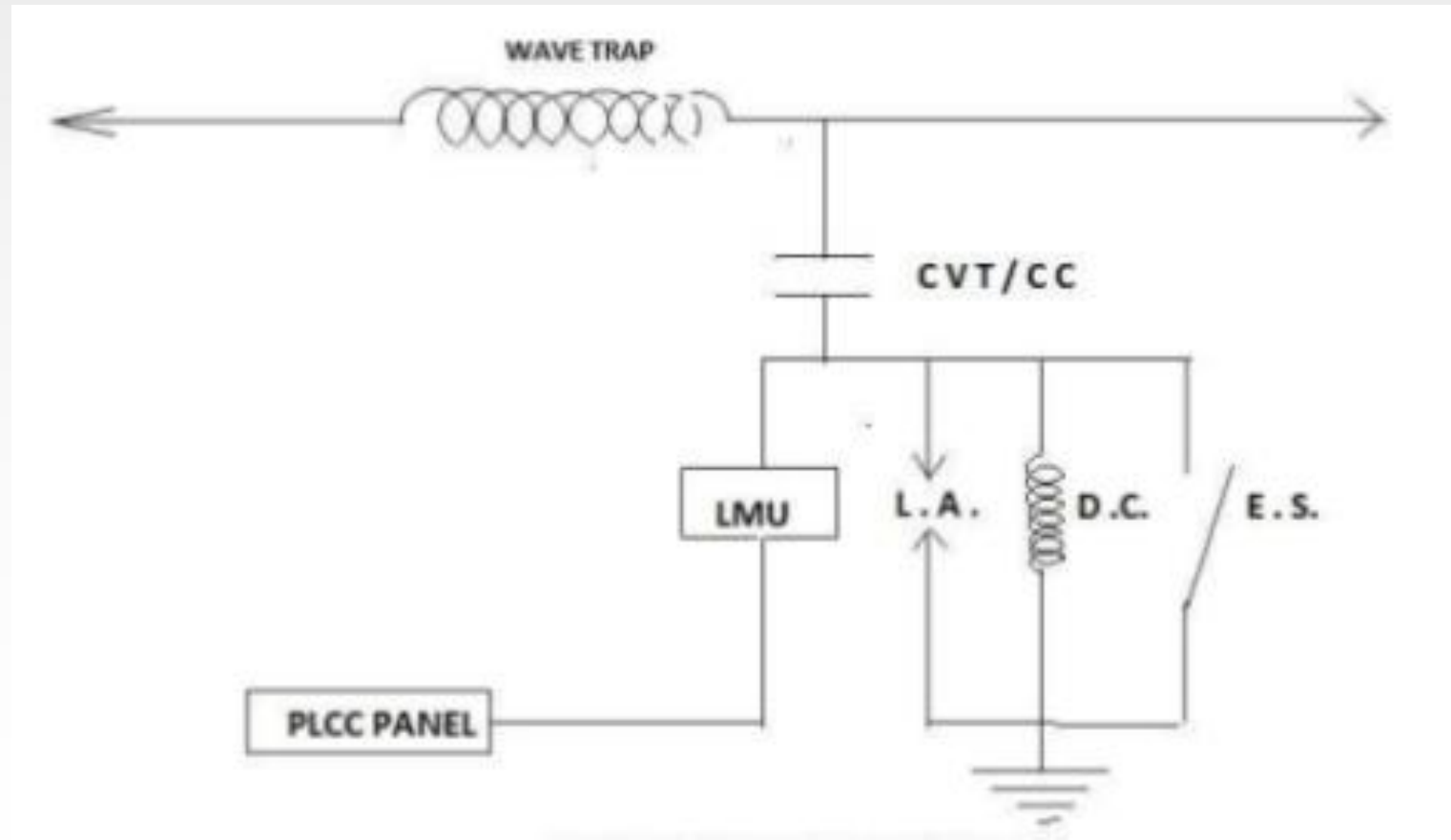
- Coupling Capacitor (CC):

- Couples high frequency carrier with Power Line (4000 to 10000 pF)
- High Impedance to power frequency (50 Hz)
- Low Impedance to carrier frequency

- Drainage coil:

- If any leakage current flows due to any distortion, it grounds it so that it does not cause any harm to the network.

Basic Coupling Arrangements:

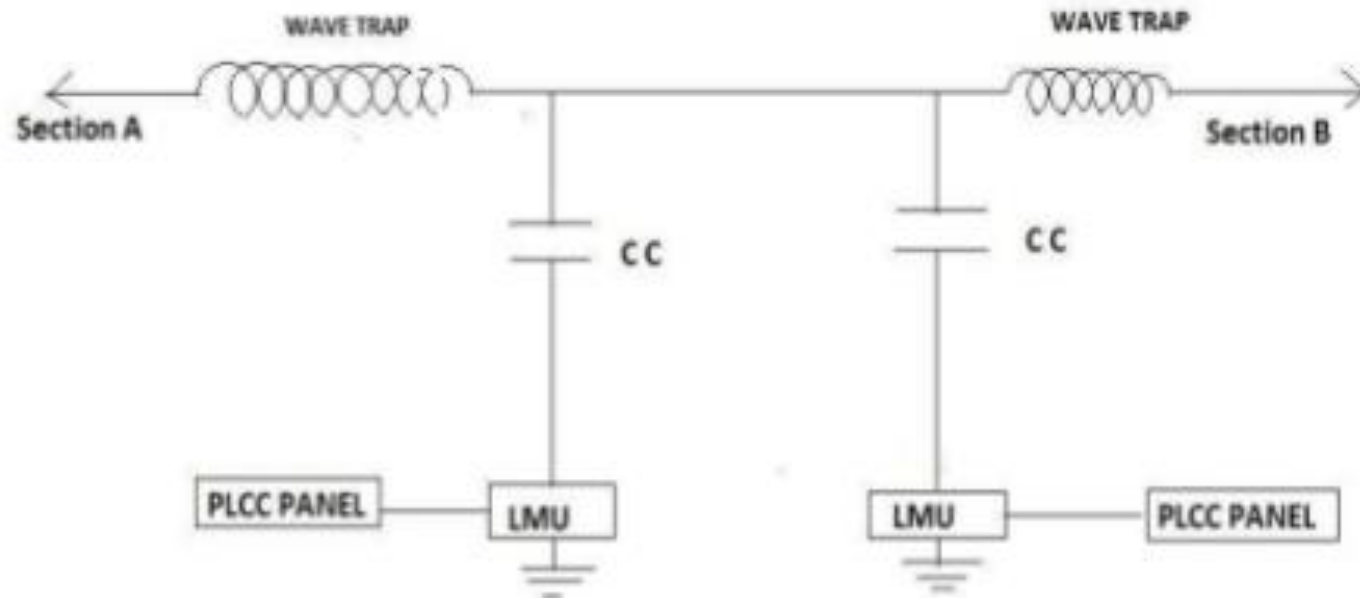


Lighting Arrester:

- Used to protect the insulation and conductors of the system from the damaging effect of lightning.
- Earthing Switch:
 - Used at the time of maintenance of LMU.
- Co-axial Cable:
 - Used for inter connection between PLCC & LMU for carrying the high frequency signal.

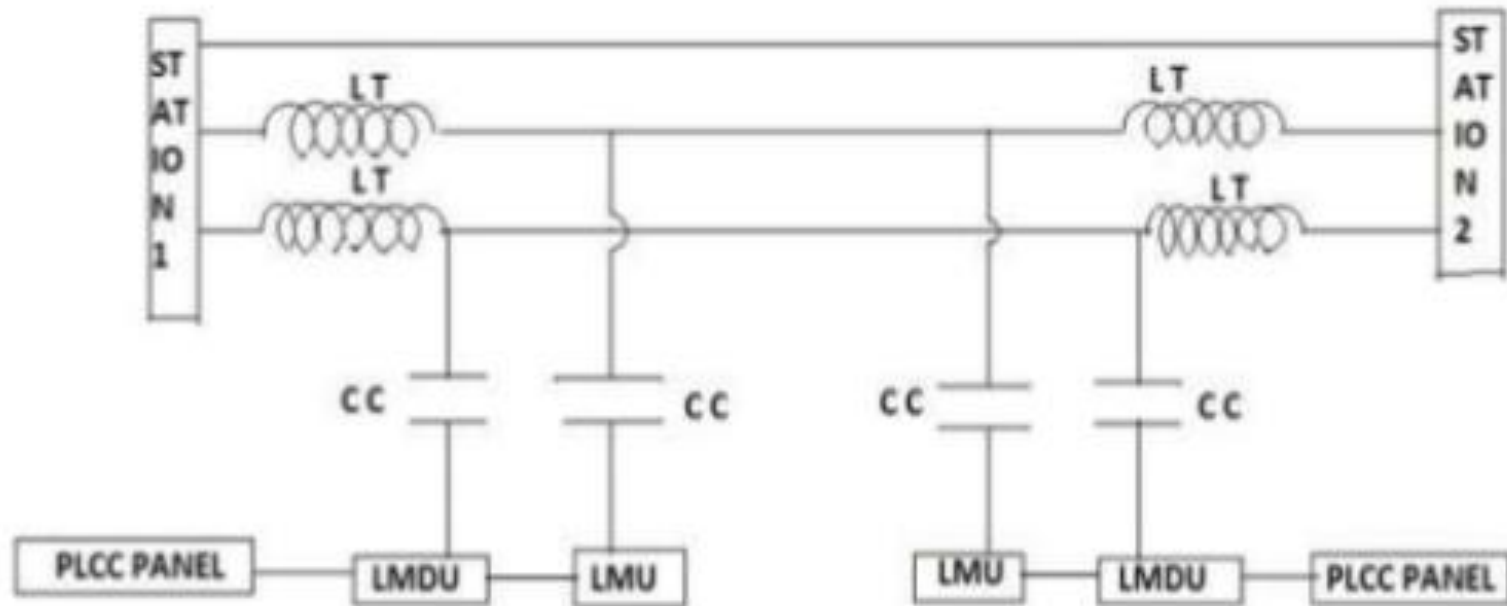
Type of Coupling:

1. Phase to ground coupling :-



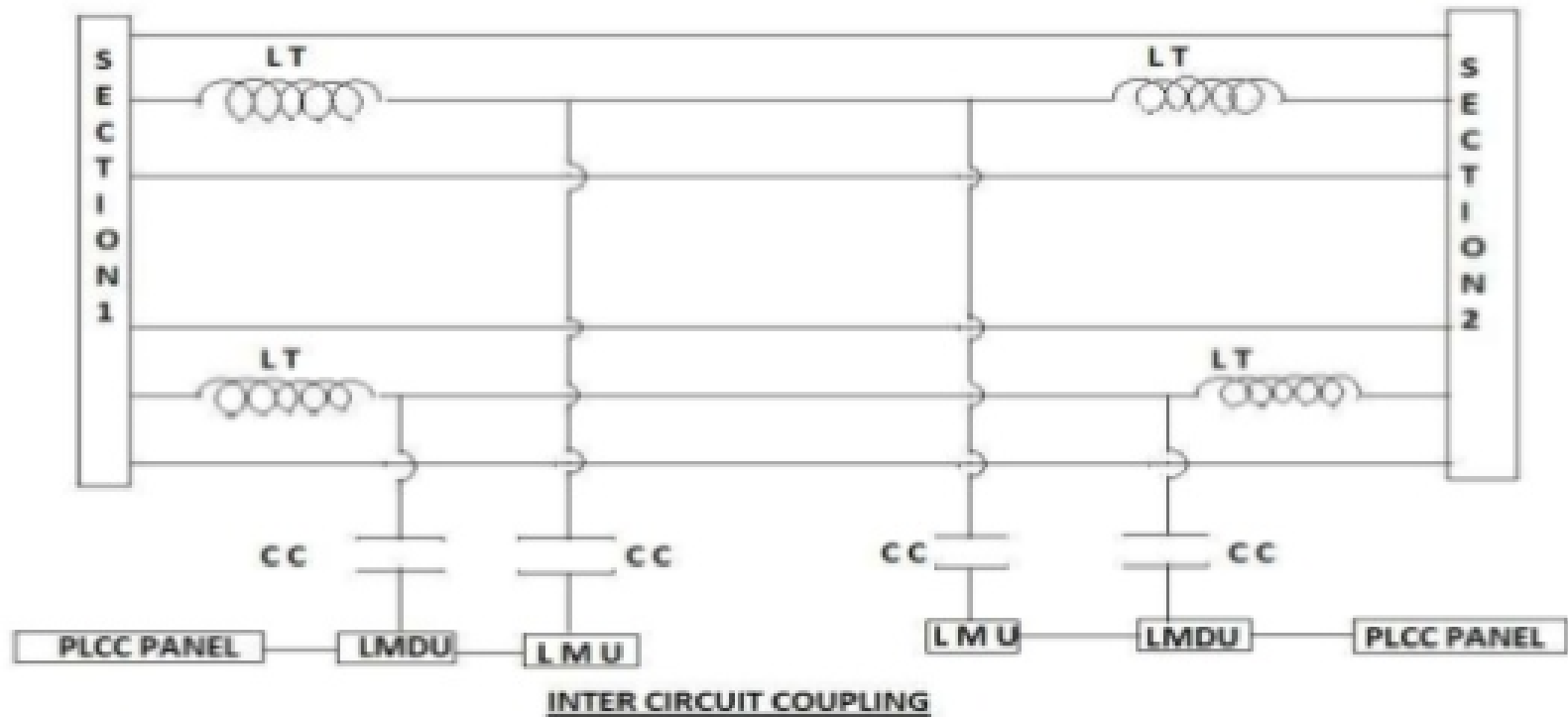
Type of Coupling:

2. Phase to phase coupling :-



Type of Coupling:

3. Inter linecoupling :-



Indoor Equipment:

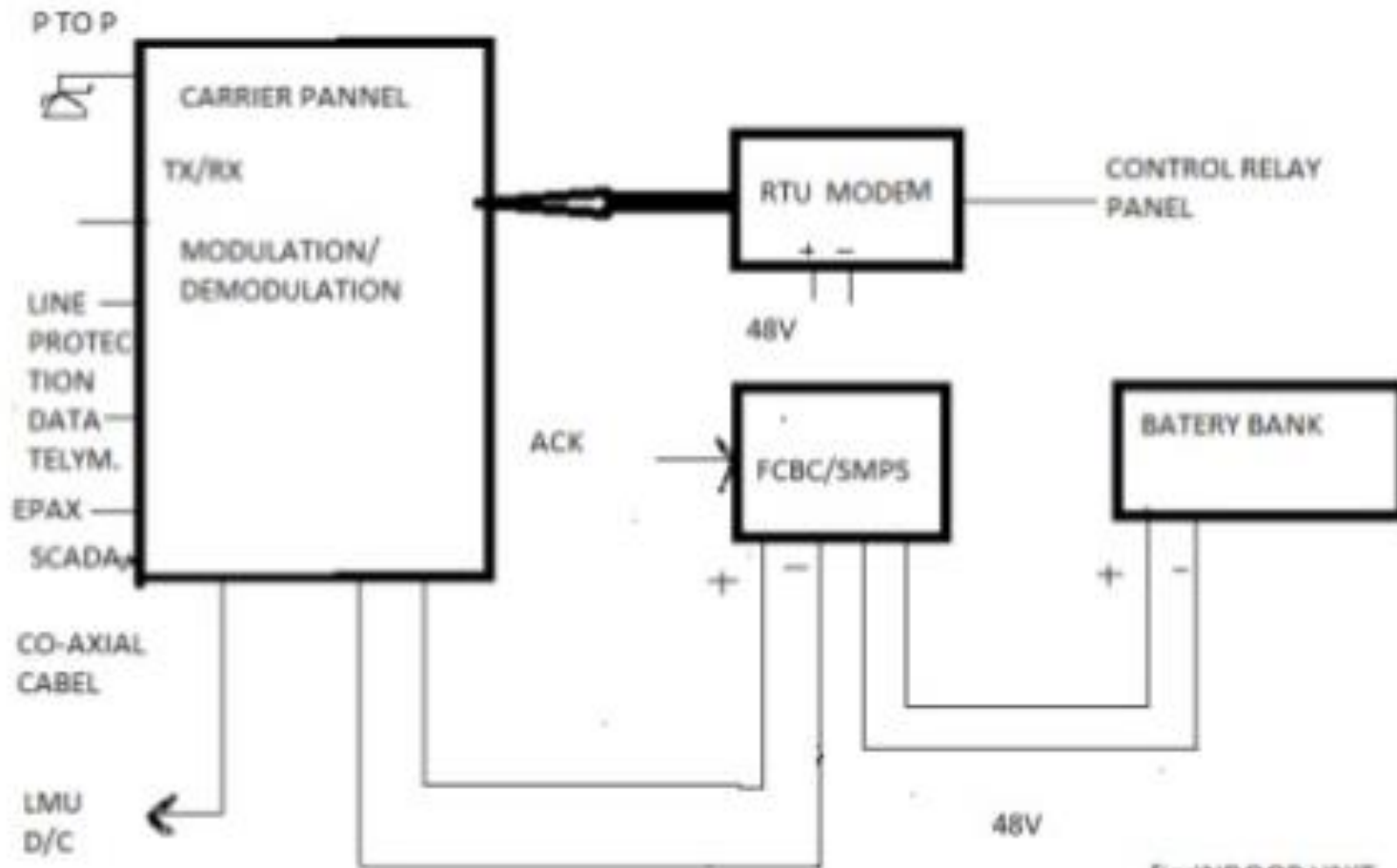
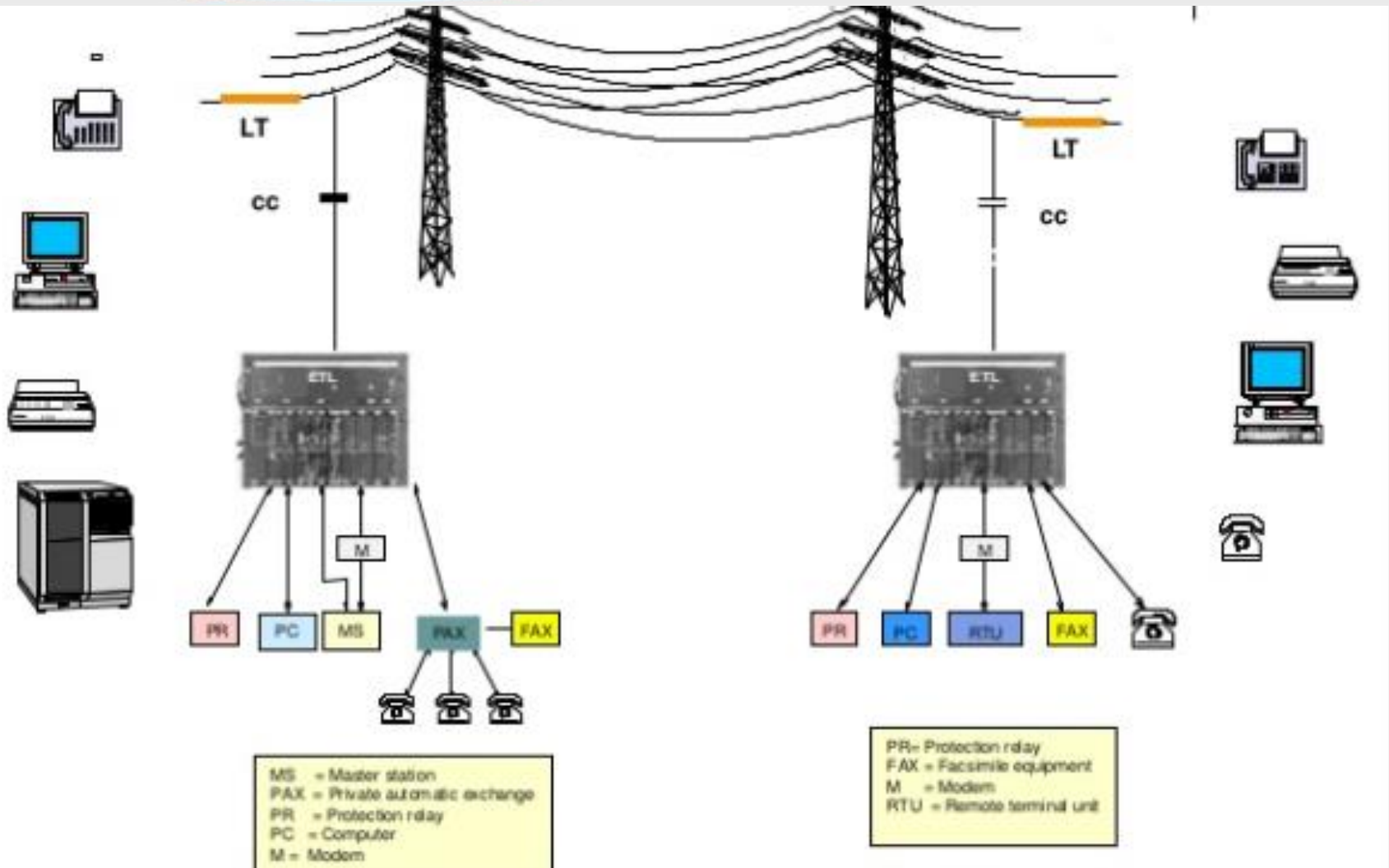


fig:INDOOR UNIT

Typical PLCC Communication :



Advantages and Disadvantages:

■ Advantages:

- No separate wires are needed for communication purposes
- Power lines have appreciably higher mechanical strength
- Power lines have large cross-sectional areas resulting in very low resistance per unit length

■ Disadvantages:

- Proper care has to be taken to guard carrier equipment and persons using them against high voltages and currents on the lines
- Noise introduced by power lines is far more than in case of telephone lines. This is due to the noise generated by discharge across insulators, corona and switching processes