

Kumudini Behera

Chapter-5

OVERHEAD SERVICE LINES

A single storied house is to be provided with service connection from a nearby pole 30 mts. away from the building receiving point. The supply is to be given at single phase 230V, 50Hz supply. Draw the sketch of the service line and prepare a list of material required for giving service connection and also estimate the total quantity required. A strong angle iron support is to be required above the building to receive bare conductor through fackle insulators in vertical configuration.

Q.11 Assumption

Height of roof from ground level = 3.5 mts.

Service connections received at the height of 6 mts from ground.

Assume electrical load to be only 6 subcircuit.

Energy meter to be 1 mt. inside verandah.

Selection and rating of bare conductors and weatherproof cable:-

Total connected load in the house

$$= 6 \text{ subcircuit} \times 800 \text{ Watts each subcrt.}$$

$$= 4800 \text{ W} = 4.8 \text{ kW} \approx 5 \text{ kW}$$

$$\rightarrow \text{load in amperes} = \frac{\text{Watt}}{\text{Volts}} = \frac{4800}{230} = 20.86 \text{ amp}$$

(Assume unity P.F.)

Assuming a S.C. Current

$$= 1.5 \times \text{rated current} = 20.86 \times 1.5$$

$$= 31.3 \text{ amps.}$$

→ Therefore, it is suggested that a weatherproof cable of size $1/3.55 \text{ mm}$ or 10 mm^2 , twin core PVC insulated to carry a load of 34 amps shall be used.

→ Again the size of bare conductors for installation between suppliers pole or distribution pole upto insulator on the building receiving point should be on the basis of connected load in the building.

→ It is therefore, suggested that, a GI wire of 8. SW.G may be used for bare conductors.

→ length of 8. SW.G GI wire for bare conductors required,

$$= 30 \text{ mts (i.e. distribution pole to building receiving point distance)} \times 3 \text{ conductor (ph, Neutral and earth)}$$

$$= 90 \text{ mts} + (1\% \text{ sag allowed}) = 90 + 9$$

$$= 99 \text{ mts} \approx 100 \text{ mts}$$

∴ length of weatherproof cable of size $1/3.55 \text{ mm}$ or 10 mm^2 twin core, PVC insulated rated to carry a load of 34 amp = 7.0 mts.

$$\text{i.e. } (6 - 3.5 = 2.5 \text{ mts}) \text{ top of service connection to top of roof} + 2.5 \text{ mt (top of roof to entrance of wall)} + 0.5 \text{ mts. (corner of wall to JB)}$$

$$+ 1.5 \text{ mt} = 7.0 \text{ mts.}$$

(junction box to energy meter)

→ length of earth wires of 8 swg G.I wire required from angle iron support from the earth to till energy meter = 7.0 mts (same as above)

→ length of conduit pipe of 30 mm dia heavy gauge to house weather proof cable required
= 1.0 mt (overhead line to top of roof) + 1.5 mts (top of roof to inside wall) + 0.5 (wastage)
= 3 mts.

→ Angle iron support of size $(75 \text{ mm} \times 75 \text{ mm} \times 6 \text{ mm} \times 4.0 \text{ mts})$ long required = 2.5 mts.
(Overhead line to top of roof) + 1.5 mts (top of roof to inside wall)
= 4.0 mts.

→ length of stay wire size 7/10 swg G.I required = 5.0 mts.

→ length of guard wire of 8 S.W.G G.I.
= $(0.9 + 0.1) + (0.9 + 0.1)$
= 1.0 mts + 1.0 mts = 2.0 mts. (for 1 guard wire)

→ length of 12 S.W.G G.I binding wire required to hold cable with angle iron = 2.0 mts (approx).

<u>Sl No</u>	<u>Description of Material</u>	<u>Quantity</u>
01	8 S.W.G, G.I wire to serve as bare conductors from supply pole upto house service connection including wastage on making joint etc. For all 3 wires.	100 mts.
02	Weatherproof cable of size $1/3.55$ mm or 10 mm^2 twin core, PVC insulated, rated to carry a load of 34 amps.	7 mts.
03	Earth wire, 8 S.W.G, G.I running along angle iron support from line earth to energy meter.	7 mts.
04	a) Angle iron support of size $75 \text{ mm} \times 75 \text{ mm} \times 6 \text{ mm} \times 4.0 \text{ mts}$ along	4 mts.
05	b) Angle iron cross arm to fix on pole of size $100 \text{ mm} \times 100 \text{ mm} \times 60 \text{ cm}$ long	1 No.
06.	Shackle insulators complete with "V" clamp, nuts, bolts and other fixing attachments 2 on pole and 2 on support	4 Nos.
7.	Threaded mild steel hook bolt 20 mm dia 150 mm long with nut	2 Nos.
8.	Hooked bolts or hooked foundation bolts to be set in wall (to hold angle iron support, along wall) 15 mm dia and 150 mm long with nuts	4 Nos.

08. M.S. Saddles 25mm dia (semicircular) & ~~and~~ spreading 60mm apart to hold weatherproof cable with wall 4 Nos.
09. Teak wood plugs/gutties large size to hold M.S. saddles along wall @ 2 per saddle + 20% extra 10 Nos.
10. 100% clad meter board along with 4 Nos. bolts (10mm dia) of size (25cm x 30cm) 1500mm long with nuts 1 Nos.
11. Bolts 10mm dia 50mm long with nuts to fix energy meter with main board 4 Nos.
12. Conduit pipe 30mm dia heavy gauge = $1.0 + 1.5 + 0.5$ = 3.0mts. (wastage) 3 mts.
13. Dway junction box for 30mm dia pipe. 1 No.
14. Wood screws 25mm to fix saddle with wood gutties or plugs 2 for each = 2×4 = 8 + (20% extra) = 10 Nos.
15. Stay clamp with nut and bolt to hold stay wire with angle iron.

Support as per size of support

1 No.

- 16. Stay wire of size 7/16 SWG, G.I. 5.0 mts.
- 17. stay bow of Mild or Malleable Cast iron. 1 Nos.
- 18. Stay rod of bolt, nut and stay buckle of size 15mm. dia 1 set.
- 19. Stay plate 30cm x 30cm mild steel 3mm thick 1 No.
- 20. Egg insulator or stay insulator 1 No.
- 21. Cement 1 bag
- 22. Concrete 1 bag
- 23. Sand 4 bag
- 24. 12 SWG, GI binding wire to hold cable with angle iron 2.0 mts.
- 25. Reel insulator 1 No.
- 26. Guard wire of 8 S.W.G G.I. 2.0 mts.

8 SWG - GI wire
ECC - 1 or 1.5 mm²

