Energy Instructor
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SIERRA COLLEGE

Class 5

Lesson Plan

- Conductors, PV, and NEC, Voltage Drop Wrap-up
- Conduit Wrap-up

- Saturday Prep

Voltage Drop Calculation

- What amperage do we use in PV voltage drop calcs?
  - The higher the amperage, the greater the calculated drop
  - Rule of thumb:
    - Use Peak Power amperage (IMP) for grid-tied PV currents
    - Use ISC for battery charging circuits PV circuits
    - Use max steady state current of the load
    - Use max steady state current for battery to inverter circuits
- What voltage do we use in PV voltage drop calcs?
  - Doesn't matter if we are trying to measure the actual voltage loss
    - Example calculating voltage drop to make sure on/off set point is not reached
  - Use nominal percentage if you are looking for percentage

Voltage Drop Calculation

Example 4 (breakout into groups and try): (RT=Round Trip)

(Distance must be multiplied by 2 unless round trip is stated.)

- Determine voltage drop in grid-tied PV source circuit
  (12AWG stranded, 200FT RT, ISC = 5.2A IMP = 4.95, Temp = 40C)

1.98 Ohm/kFT * 200/1000 * 4.95A = 1.96V

- Determine voltage drop in battery charging circuit
  (2AWG, 50FT RT, ISC = 41.6A IMP = 39.6A, Temp = 120C)

0.194 Ohm/kFT * 50/1000 * 41.6A*(1 + 0.00323*(120C-75C)) = 0.46V

- Is this acceptable for a 12V system with 2%-3% voltage drop?

0.46V / 12V = .03833 * 100 = 3.8%, NO

Saturdays

- Meet at Rocklin Campus, Corporation Yard
- 8 AM til we finish
- Safety first
  - Dress appropriately
  - Bring food / water, sunscreen, etc.
  - Emergency Personnel (916) 660-7120; extension 7120 on Rocklin campus