2023 Residential Service Panel

The following shall apply to all residential service panel replacements and upgrades after January 1st, 2023.

Surge Protection | CA Electric Code §230.67

All services supplying dwelling units shall be provided with a surge-protective device (SPD) and shall be Type 1 or Type 2. The SPD shall be an integral part of the service equipment or shall be located immediately adjacent thereto.

Barriers | CA Electric Code §230.62(C)

Barriers shall be placed in service equipment such that no uninsulated, ungrounded service busbar or service terminal is exposed to inadvertent contact by persons or maintenance equipment while servicing load terminations.

Single-Phase Dwelling Services and Feeders | CA Electric Code §310.12

- **Sizing Service Entrance Conductors CEC 310.12.** For one-family dwellings and the individual dwelling units of two-family and multifamily dwellings that do not require adjustment or correction factors, service and feeder conductors supplied by a single-phase, 120/240-volt system shall be permitted to be sized in accordance with CEC 310.12(A) through (D). Otherwise, CEC Table 310.16 (75°C column) shall be used.
- **Minimum Rating CEC 230.79(C).** For a one-family dwelling, the service disconnecting means shall have a rating of not less than 100 amperes, 3-wire.
- **Grounded (Neutral) Conductor Identification CEC 200.6(B).** An insulated grounded conductor 4 AWG or larger shall be identified by a distinctive white or gray marking at its terminations. This marking shall encircle the conductor or insulation.

Table 310.12 Single-Phase Dwelling Services and Feeders

Service or Feeder Rating (Amperes)	Conductor (AWG or kcmil)	
	Copper	Aluminum or Copper-Clad Aluminum
100	4	2
110	3	1
125	2	1/0
150	1	2/0
175	1/0	3/0
200	2/0	4/0
225	3/0	250
250	4/0	300
300	250	350
350	350	500
400	400	600

Ground Rod Electrode System Notes | Article 250, Part III

If ground rods are used for the grounding electrode system, ALL the following shall apply.

1. **Supplemental Electrode CEC 250.53(A)(3).** Two ground rods shall be provided not less than 1.8 m (6 ft) apart.
2. **Rod Depth CEC 250.53(A)(4).** The two ground rods shall be installed such that at least 2.44 m (8 ft) of length is in contact with the soil.
3. **GEC Protection CEC 250.64(B)(3).** Grounding electrode conductors smaller than 6 AWG shall be protected in RMC, IMC, Schedule 80 PVC, RTRC-XW, EMT, or cable armor.
4. **Continuous CEC 250.64(C).** Grounding electrode conductor(s) shall be installed in one continuous length without a splice or joint. If necessary, splices or connections shall be made as permitted in CEC 250.64(C) (1) through (4).
5. **GEC Size CEC §250.66(A).** The grounding electrode conductor shall be sized to Table 250.66, but shall not be required to be larger than 6 AWG copper wire or 4 AWG aluminum wire when connected to a multiple rod electrode.

Bonding Notes | Article 250, Part V

Bonding shall comply with the following.

1. **Bonding of Equipment for Services CEC 250.92(A).** Normally non—current-carrying electrically conductive materials that are likely to become energized shall be connected together and to the electrical supply source in a manner that establishes an effective ground-fault current path. This includes raceways, cable trays, cablebus framework, auxiliary gutters, or service cable armor or sheath that enclose, contain, or support service conductors, all enclosures containing service conductors, including meter fittings, boxes, or the like, interposed in the service raceway or armor.
2. **Metal Water Pipe CEC 250.104(A)(1).** The metal water piping system(s) installed in or attached to a building or structure shall be bonded.
3. **Other Metal Piping Systems CEC 250.104(B).** If installed in or attached to a building or structure, a metal piping system(s), including gas piping, that is likely to become energized shall be bonded.
4. **Metal Building Frame CEC 250.104(C).** Exposed structural metal that is interconnected to form a metal building frame, is not intentionally grounded or bonded, and is likely to become energized shall be bonded.
5. **Bonding Jumpers CEC 250.92(B).** Bonding jumpers shall be used around impaired connections, such as reducing washers or oversized, concentric, or eccentric knockouts. Standard locknuts or bushings shall be permitted to be installed to make a mechanical connection of the raceway(s). Electrical continuity at service equipment, service raceways, and service conductor enclosures shall be ensured.
6. **Intersystem Bonding 250.94(A).** In existing buildings or structures where any of the intersystem bonding and grounding electrode conductors exist, installation of the intersystem bonding termination is not required. Otherwise, an intersystem bonding termination (IBT) for connecting intersystem bonding conductors shall be provided external to enclosures at the service equipment or metering equipment enclosure and at the disconnecting means for any additional buildings or structures.

Other Notes

Service panel installations shall comply with the following.

1. **Short Circuit Current Rating CEC 408.6.** Switchboards, switchgear, and panelboards shall have a short-circuit current rating not less than the available fault current.
2. **Circuit Directory CEC 408.4(A).** Every circuit and circuit modification shall be legibly identified as to its clear, evident, and specific purpose or use.
3. **Service Masts as Supports CEC 230.28.** Service entrance conduit shall be supported every 3ft per PG&E Greenbook. Where the coupling is located above the last point of securement to the building an additional fastener shall be provided above the coupling.
4. **Drip Loops CEC 230.54(F).** Drip loops shall be formed on individual conductors. To prevent the entrance of moisture, service-entrance conductors shall be connected to the service-drop or overhead service conductors either (1) below the level of the service head or (2) below the level of the termination of the service-entrance cable sheath.
5. **Sizing Grounded Conductors CEC 250.102(C)(1).** Table 250.102(C)(1) shall be used to size the grounded conductor, main bonding jumper, system bonding jumper, and the supply-side bonding jumper