



Planning & Building Agency  
Building Safety Division  
20 Civic Center Plaza  
P.O. Box 1988 (M-19)  
Santa Ana, CA 92702  
(714) 647-5800  
www.santa-ana.org

## ELECTRICAL VEHICLE (EV) CHARGING SYSTEMS

One and Two Family Residences

CEC 2019

The City of Santa Ana has developed this EV Charger Installation Guideline in order to streamline the permit and installation process. Fill-in the blanks on this document, attach the manufacturer's installation instructions, charger specifications, a simple site plan, and submit it to the Building Safety Department for an over-the-counter review and permit issuance. There are two levels of Electric Vehicle charging system (EVSE) for single family residence (one- and two- family dwellings) installations:

- Level 1 (120 VAC, 15/20 Amperes)
- Level 2 (240 VAC, 40 Amperes or greater) (Tesla™ chargers may be higher)

An electrical permit is required for all EV charging systems installed in a single family residence (SFR). Permits may be obtained over-the-counter for EV charging system installations.

If all of the information is provided and the proposal complies with the applicable codes, the review and approval process will only take a few minutes. Obtain an inspection before any wiring is concealed. When the installation is complete, a final inspection of the work must be scheduled. Keep in mind that someone will need to be present during the inspection so that the Inspector can access the location of the EV Charger.

### **Electrical Permit:**

One- and two-family electrical plans are not required to be submitted to the Building Department; that is, an electrical permit may be issued without an electrical plan review by using this form.

Please note that an **electrical load calculation sheet and manufacturer's installation guidelines** will be reviewed by the City's Permit Counter staff prior to permit issuance. Electrical panel upgrades and electrical wiring must be in conformance with the current edition of the California Electrical Code (CEC).

The following information is required to be shown on the load sheet and be reviewed by staff:

1. Specify the type of EV charging system: Level 1 or Level 2. Provide evidence of the UL listing, or the listing of another nationally recognized testing laboratory This is in compliance with Standard UL2202: "Standard for Electric Vehicle Charging System Equipment".
2. Specify the panel rating of the existing electrical service (e.g. 200 amp service) at the residence. Indicate the EV charging system load and circuit size.
3. Indicate if a second electric meter installation will be installed to take advantage of the special electric utility rates available for EV charging.
4. Specify and show the proposed location of the EV charging system. EV charging system equipment shall be installed in accordance with manufacturer's written guidelines and shall be suitable for its intended location (indoor/outdoor).

**Information Summary and Specifications for an  
Electrical Vehicle Charging System (EVSE)  
Installed at a Single-Family or Two-Family Residence**

**Equipment & Project information**

Site Address \_\_\_\_\_

Manufacturer's Name \_\_\_\_\_

Unit Serial Number \_\_\_\_\_

Unit Model Number \_\_\_\_\_

Installation Contractor \_\_\_\_\_

Contractor's Contact Information \_\_\_\_\_

Site plan with location of EV unit \_\_\_\_\_yes \_\_\_\_\_no

Manufacturer installation guide is attached to site/floor plan \_\_\_\_\_yes \_\_\_\_\_no

**Electrical Requirements:**

Size of Existing Service \_\_\_\_\_ Amps

New Service Required? \_\_\_\_\_yes \_\_\_\_\_no

Dedicated Electrical Circuit? (Code requirement) \_\_\_\_\_yes \_\_\_\_\_no

Minimum Circuit Ampacity Rating? \_\_\_\_\_ Amps

More than 60A? (Requires Lock-open disconnect) \_\_\_\_\_yes \_\_\_\_\_no

**Installation Requirements:**

Location of Unit \_\_\_\_\_ outdoors \_\_\_\_\_ indoors

Ventilation required for EVSE \_\_\_\_\_yes \_\_\_\_\_no

Setback from Property Line \_\_\_\_\_ft

Unit is protected from rain \_\_\_\_\_yes \_\_\_\_\_no

Bollard Protection Required \_\_\_\_\_yes \_\_\_\_\_no

**LEVEL 2 ELECTRIC VEHICLE CHARGER – SERVICE LOAD ESTIMATE**

**INSTRUCTIONS:** Review the list of electrical loads in the table below and check all that exist in the home. For each item checked, fill-in the corresponding "Watts Used". If multiple instances of the load exist be sure to multiply the load as well. Add up all of the numbers that are written in the "Watts Used" column. Write that number in the "Total Watts Used" box at the bottom of the table and proceed to the next page.

***Loads shown are estimates; actual loads may vary. For a more precise analysis, use the nameplate ratings for appliances and other loads and consult with a trained electrical professional.***

✓ Check All Applicable Loads	Description of Load	Typical Usage	Watts Used
<b>GENERAL LIGHTING AND RECEPTACLE OUTLET CIRCUITS</b>			
✓	Multiply the House Square Footage by 3	3 watts/sq. ft.	
<b>KITCHEN CIRCUITS</b>			
✓	Kitchen circuits	3,000 watts	3,000 (minimum)
	Electric oven	2,000 watts	
	Electric stove top	5,000 watts	
	Microwave	1,500 watts	
	Garbage disposal under kitchen sink	1,000 watts	
	Automatic dishwasher	1,500 watts	
	Garbage compactor	1,000 watts	
	Instantaneous hot water at sink	1,500 watts	
<b>LAUNDRY CIRCUIT</b>			
✓	Laundry circuit	1,500 watts	1,500 (minimum)
	Electric clothes dryer ***	5,000 watts	
<b>HEATING AND AIR CONDITIONING CIRCUITS</b>			
	Central heating (gas) and air conditioning	6,000 watts	
	Window mounted A/C	1,000 watts	
	Whole-house or attic fan	500 watts	
	Evaporative cooler	500 watts	
<b>OTHER ELECTRICAL LOADS</b>			
	Electric water heater (storage type)	4,000 watts	
	Electric tankless water heater	15,000 watts	
	Swimming pool or spa	3,500 watts	
	Other ( <i>describe</i> ):		
	Other:		
	Other:		
<b>ELECTRIC VEHICLE CHARGER CIRCUIT</b>			
✓	Level 2 Electric Vehicle Charger rating times 125%**		

**Add-up all of the watts for the loads you have checked ✓**

**TOTAL WATTS →**

**\*\*Use name plate rating of charger watts (Not eligible for 'demanding'—long, continuous load)**

**\*\*\*Must include IF outlet is provided (potential future use would not result in load re-calculation)**

**INSTRUCTIONS:** Apply the **Total Watts Used** number from the previous page to the Table below. Then check if the Existing Electrical Service Panel is large enough to handle the added electrical load from the proposed Level 2 EV Charger. If your electrical service is NOT large enough, then you will need to install an upgraded electrical service panel.

*Table is based on NEC section 220.83(A)*

✓ Check appropriate total watts	Watts Used	Required Size of Existing 240 Volt Electrical Service Panel (Main Service Breaker Size)	Indicate Size of Existing Main Service Breaker (Amps)**
	Up to 24,000	100 amps	
	24,001 to 30,000	125 amps	
	30,001 to 36,000	150 amps	
	36,001 to 42,000	175 amps	
	42,001 to 48,000	200 amps	
	48,001 to 54,000	225 amps	
	54,001 to 60,000	250 amps	
	60,001 to 72,000	300 amps	
	72,001 to 84,000	350 amps	
	84,001 to 96,000	400 amps	

\*\*Please note that the size of an existing service MUST be equal to or larger than the Minimum Required Size identified in the Table above. If this is not the case, a new electrical service panel will need to be installed. A separate permit item and fee is required for a new service inspection.

**CAUTION:** This table is **NOT** to be used to determine the size of a **NEW UPGRADED** electrical service panel if your existing panel is too small or overloaded according the table above. In order to determine the size of a NEW or UPGRADED service panel, there is a completely different load calculation methodology that applies. Sizing of a NEW or UPGRADED electrical service panel should be done by a qualified electrical contractor or an electrical engineer.

**STATEMENT OF COMPLIANCE**

By my signature, I attest that the information provided is true and accurate.

Job Address \_\_\_\_\_  
(Print job address)

Signature \_\_\_\_\_  
(Signature of applicant) (Date)

In addition to this document, you will also need to provide a copy of the manufacturer's installation literature and specifications for the Level 2 charger you are installing.

*Please note that this is a voluntary compliance alternative and you may wish to hire a qualified individual or company to perform a thorough evaluation of your electrical service capacity in lieu of this alternative methodology. Use of this electrical load calculation estimate methodology and forms is at the user's risk and carries no implied guarantee of accuracy. Users of this methodology and these forms are best advised to seek professional assistance in determining the electrical capacity of a service panel.*