



## BUILDING **DIVISION**

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# ELECTRIC VEHICLE CHARGER INSTALLATION GUIDELINES

## ELECTRIC VEHICLE CHARGER - LOAD CALCULATION ESTIMATOR

USE THIS FORM TO ESTIMATE IF AN EXISTING ELECTRICAL SERVICE WILL HANDLE THE EXTRA LOAD FROM A VEHICLE CHARGER. (Loads shown are rough 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 Applicable Loads	Description of Load	Typical usage	Watts used
<b>GENERAL LIGHTING AND RECEPTACLE OUTLET CIRCUITS</b>			
✓	Square Footage of House X 3	3 watts/sq. ft.	
<b>KITCHEN CIRCUITS</b>			
✓	Kitchen Circuits	3,000 watts	3,000
	Electric oven	2,000 watts	
	Electric stove top	5,000 watts	
	Microwave	1,500 watts	
	Garbage Disposal under kitchen sink	1,000 watts	
	Automatic Dish washer	3,500 watts	
	Garbage Compactor	1,000 watts	
	Instantaneous hot water at sink	1500 watts	
<b>LAUNDRY CIRCUIT</b>			
✓	Laundry Circuit	1,500 watts	1,500
	Electric Clothes Dryer	4,500 watts	
<b>HEATING AND AIR CONDITIONING CIRCUITS</b>			
	Central Heating (gas) and Air Conditioning	6,000 watts	
	Window mounted Air Conditioner	1,000 watts	
	Whole-house or attic fan	500 watts	
	Central Electric Furnace	8,000 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>			
	Electric Vehicle Charger rating*		
<b>(Add-up all of the watts for the loads checked ✓)</b>			
<b>TOTAL WATTS USED →</b>			

\*Use name plate rating in watts or calculate as: (Ampere rating of circuit X 240 volts = Watts)

**INSTRUCTIONS:** Apply the *Total Watts Used* number from Page 1 to the Table below to identify if the Existing Electrical Service Panel is large enough to handle the added electrical load from the Electric Vehicle Charger.

Total Watts Used **	Minimum Required Size of Existing 240 Volt Electrical Service Panel (Main Breaker Size)
up to 24,000	60 amp
24,001 to 48,000	100 amps
48,001 to 63,000	125 amps
63,001 to 78,000	150 amps
78,001 to 108,000	200 amps
108,001 to 123,000	225 amp

**\*\* Table based on NEC 220.83 (A). Only applicable when adding electrical vehicle charger loads to existing dwelling electrical service.**

**CAUTION:** This table is **NOT** to be used to determine the size of a *NEW* or *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 only be done by a qualified Electrical Contractor or Electrical Engineer.

**STATEMENT OF COMPLIANCE**

By my signature, I attest that I have estimated the electrical loads on the Existing Electrical Service Panel located at \_\_\_\_\_ ,  
 (print address)  
 and according to California Electrical Code Article 220.83 (A), the existing electrical service panel is adequate to handle the added electrical load from the Electric Vehicle Charger circuit.

\_\_\_\_\_  
 (signature of applicant)

\_\_\_\_\_  
 (date)

**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 ADVISED TO SEEK PROFESSIONAL ASSISTANCE IN DETERMINING THE ELECTRICAL CAPACITY OF A SERVICE PANEL.**

## WIRING METHODS BASED ON THE CALIFORNIA ELECTRICAL CODE

The Table below illustrates the type and size of wire and conduit to be used for various Electric Vehicle Charger circuits.

Size of EV Charger Circuit Breaker	Required minimum size of Conductors (THHN wire)	Conduit Type and Size***		
		Electrical Metallic Tubing (EMT)	Rigid Nonmetallic Conduit – Schedule 40 (RNC)	Flexible Metal Conduit (FMC)
20 amp	#12	1/2"	1/2"	1/2"
30 amp	#12	1/2"	1/2"	1/2"
40 amp	#10	1/2"	1/2"	1/2"
50 amp	#8	3/4"	3/4"	3/4"
60 amp	#6	3/4"	3/4"	3/4"
70 amp	#6	3/4"	3/4"	3/4"

**\*\*\*Based on 4 wires in the conduit (2-current carrying conductors, 1-grounded conductor, 1-equipment ground).**

***As an alternate, Nonmetallic Sheathed Cable (aka: Romex Cable or NMC) may be used if it is protected from physical damage by placing the cable inside a wall cavity or attic space which is separated from the occupied space by drywall or plywood.***

The Table below illustrates the required supports for various types of electrical conduit or cable.

Conduit Support	Electrical Metallic Tubing (EMT)	Rigid Nonmetallic Conduit – Schedule 40 (RNC)	Flexible Metal Conduit (FMC)	Nonmetallic Sheathed Cable (NMC)
Conduit Support Intervals	10'	3'	4-1/2'	4-1/2'
Maximum distance from box to conduit support	3'	3'	1'	1'

In addition to the above noted requirements, the California Electrical Code contains many other provisions that may be applicable to the installation of a new electrical circuit. Installers are cautioned to be aware of all applicable requirements before beginning the installation. For additional information or guidance, consult with the Building and Safety Division staff or a qualified and experienced Electrical Contractor.

