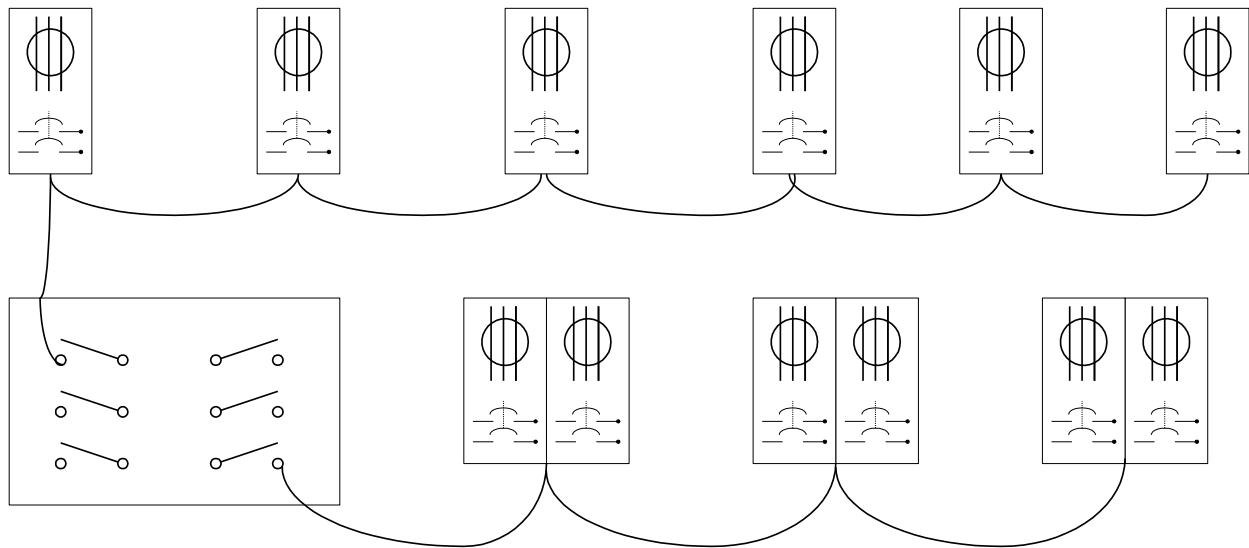


EVSE rating expressed in KW

Hypothetical scenario; parking structure with 30 – 6.6kw EVSE units

- 1) Each unit could be fed with an individual 40 amp 208 volt branch circuit.
- 2) Units could be powered in groups of two with 15 – 80 amp feeders, (no application of the demand factor table). The 6.6kw EVSE units have to be taken at 125%; $13.2\text{kw} \times 1.25 = 16.5\text{kw}$ divided by 208 volt = 79 amps is the minimum rating required of the feeder. If the units are equipped with in and out terminal blocks rated for 75° C, #4 copper THHN conductors could be used to supply each group of two stations. Each of the 12 feeders would be protected by an 80 amp breaker.
- 3) Units could be supplied in groups of six with 5 – 175 amp feeders, (demand table allows adjustment to 90%). $6.6\text{kw} \times \text{six units} = 39.6\text{kw}$ divided by 208 volt = 190amps @ 90% = 171 amps. If the units are equipped with in and out terminal blocks rated for 75° C, 2/0 copper THHN conductors could be used to supply each group of six stations. Each of the 4 feeders would be protected by a 175 amp breaker.
- 4) Dual units could be supplied in groups of 3 as illustrated below;



Each of the above illustrated feeders could be installed with 2/0 copper conductors and protected by a 175 amp breaker under the demand table.

Without the application of the demand factor table the wire would have to be 250mcm with protection at 250 amps.

The illustration on page one indicates two configurations for 5 different feeders to EVSE equipment. Additionally, there is a 100 amp feeder to a lighting panel with a calculated load of 60 amps.

A 2008 NEC compliant calculation would be done as follows;

30 – 6.6kw units total 198kw @ 125% equals 247.5kw divided by 360.256 = 687a. add the 60 amp general lighting and receptacle and a calculated 747 amp load requires an 800 amp service. A service with an 800 amp main breaker could employ any combination of feeders and branch circuits to the loads.

Apply the demand factor table and the calculation could look like this;

Five 175 amp feeders could serve groups of six units, and the sixth handle would feed the house panel. Only three of the feeders can be evenly distributed among the phases of the service, so 18 – 6.6kw units totaling 118,800 watts divided by 360.256 = approximately 330 amps.

The remaining 12 units cannot be evenly portioned between phases of the service and should be considered as follows; 12 – 6.6kw units totaling 79,200 watts divided by 208 volts = 380 amps.

330 amps balanced, plus 380 amps that cannot be balance equals 720 amps. Apply the demand factor of 70% for 30 units, and the resulting 504 amps plus 60 for the house panel allows a 600 amp service instead of 800 amp.

A 198kw charging load running full tilt on a three phase 120/208 volt service equals approximately 550 amps. Add 60 amps for the house panel and the calculation is 610 amps. The demand factor table allows the installation of a 600 amp service, based on the premise that there is little chance that all 30 chargers will operate simultaneously at 100% load.

Other applications of the demand factor table may result in even more dramatic reductions in service equipment ampacity requirements. It is important to remember that the code contains provisions that are considered necessary for safety. Attention to proper wire size and overcurrent protection will assure safety, but may not result in an installation that is efficient, convenient, or adequate for future expansion.