



AmpUp Load Management Specification Sheet

What is Cloud-based EV Charging Load Management?

Cloud-based EV charging load management is when a central system gains the ability to influence the charging power or current of a specific EV, or the total allowed energy consumption on an entire charger or group of chargers. Influencing the charge power or current is based on energy transfer limits at specific points in time and based on a grid connection, energy availability on the grid, or the wiring of a building.

Load management limits are combined in a Charging Profile and can be set by a user in AmpUp's SaaS login. A Charging Profile is a specific message sent from AmpUp's central system to the charger that includes a load limit to control max output of the charger.

Station owners can also set load schedules to lower power during utility on peak periods or to keep their Location on a tariff rate below a kW threshold. Once a schedule is set, the slider will disappear. When the station owner returns to the Location page, they may add another load schedule, which is especially useful when a utility has more than one demand on-peak period. Only one schedule can be active for any day of the week and time of day.

When under a set limit, the system will use dynamic load balancing within an AmpUp Pro Location's chargers. Turning this on will set chargers to recognize when a vehicle is not requesting the available power set by Ampup and will redistribute the remaining power to other chargers at the Location. The baseline setting for the AmpUp central system is to check this every 5 minutes.

What benefits does cloud-based load management provide?

EV charging load management through AmpUp unlocks the ability to:

- Automatically share load in real-time and avoid power disruptions
- Set a load schedule to account for maximizing load capacity during off-peak hours, and reducing energy costs for on-peak hours
- Reduce infrastructure costs by lowering the number of electrical panels and circuits needed for chargers at new and existing sites

How do I design my EV charging site for load management?

- **Cloud-based Load Management System:**
 - No physical changes need to be made to the hardware using a cloud based management system
 - AmpUp software will distribute the maximum cap set to the available chargers within that group or location automatically utilizing Charging Profiles that are sent to each charger within the group.
 - There is no maximum cap limitation for the software
 - Only limitation will be your available power at the install location
 - Available power is shared evenly between all active EV sessions

- **Dedicated Circuit:** This is based on local electrical codes, most requiring each unit to have a dedicated circuit. AmpUp is now UL certified for its cloud-based load management system and is a requirement for NEC 2023 and later standards. Depending on what NEC code your installation site is under, the rules will vary.
 - **2020 US Code Language:** *625.40 Electric Vehicle Branch Circuit. Each outlet installed for the purpose of charging electric vehicles shall be supplied by an individual branch circuit. Each circuit shall have no other outlets.*
 - **2023 US Code Language:** *625.40 Electric Vehicle Branch Circuit. Each outlet installed for the purpose of supplying EVSE greater than 16 amperes or 120 volts shall be supplied by an individual branch circuit.*
 - **Exception:** *Branch circuits shall be permitted to feed multiple EVSEs as permitted by 625.42(A) or (B).*

- **Service or Branch Circuit Sizing:** This is based on local electrical codes, most requiring each unit to have a dedicated circuit. Depending on what NEC code your installation site is under, the rules will vary.
 - **2020 US Code Language:** *625.42 Rating. The power transfer equipment shall have sufficient rating to supply the load served. Electric vehicle charging loads shall be considered to be continuous loads for the purposes of this article. Service and feeder shall be sized in accordance with the product ratings. Where an automatic load management system is used, the maximum equipment load on a*

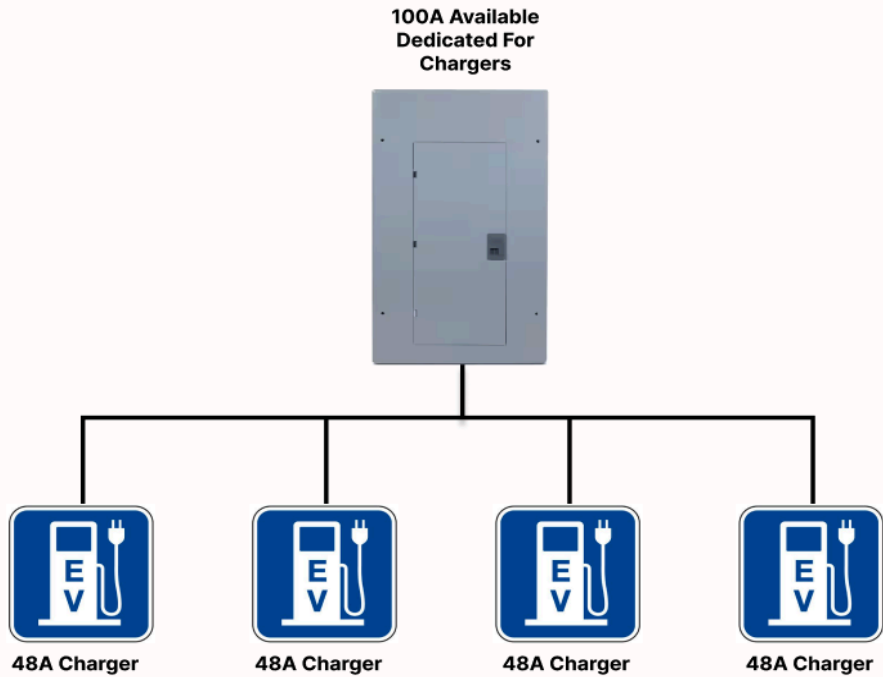
service and feeder shall be the maximum load permitted by the automatic load management system.

- *Adjustable settings shall be permitted on fixed-in-place equipment only. If adjustments have an impact on the rating label, those changes shall be in accordance with manufacturer's instructions, and the adjusted rating shall appear with sufficient durability to withstand the environment involved on the rating label. Electric vehicle supply equipment with restricted access to an ampere adjusting means shall be permitted to have ampere ratings that are equal to the adjusted current setting. Sizing the service and feeder to match the adjusting means shall be permitted. Restricted access shall prevent the user from gaining access to the adjusting means. Restricted access shall be accomplished by at least one of the following:*
 - *(1) A cover or door that requires the use of a tool to open*
 - *(2) Locked doors accessible only to qualified personnel*
 - *(3) Password protected commissioning software accessible only to qualified personnel*
- *[2023 US Code Language: 625.42 Rating](#). The EVSE shall have sufficient rating to supply the load served. Electric vehicle charging loads shall be considered to be continuous loads for the purposes of this article. Service and feeder shall be sized in accordance with the product ratings, unless the overall rating of the installation can be limited through controls as permitted by 625.42(A) or (B).*
 - *N (A) Energy Management System (EMS). Where an EMS in accordance with 750.30 provides load management of EVSE, the maximum equipment load on a service and feeder shall be the maximum load permitted by the EMS. The EMS shall be permitted to be integral to one piece of equipment or integral to a listed system consisting of more than one piece of equipment. When one or more pieces of equipment are provided with an integral load management control, the system shall be marked to indicate this control is provided.*
 - *N (B) EVSE with Adjustable Settings. EVSE with restricted access to an ampere adjusting means complying with 750.30(C) shall be permitted. If adjustments have an impact on the rating label, those changes shall be in accordance with manufacturer's instructions, and the adjusted rating shall appear on the rating label with sufficient*

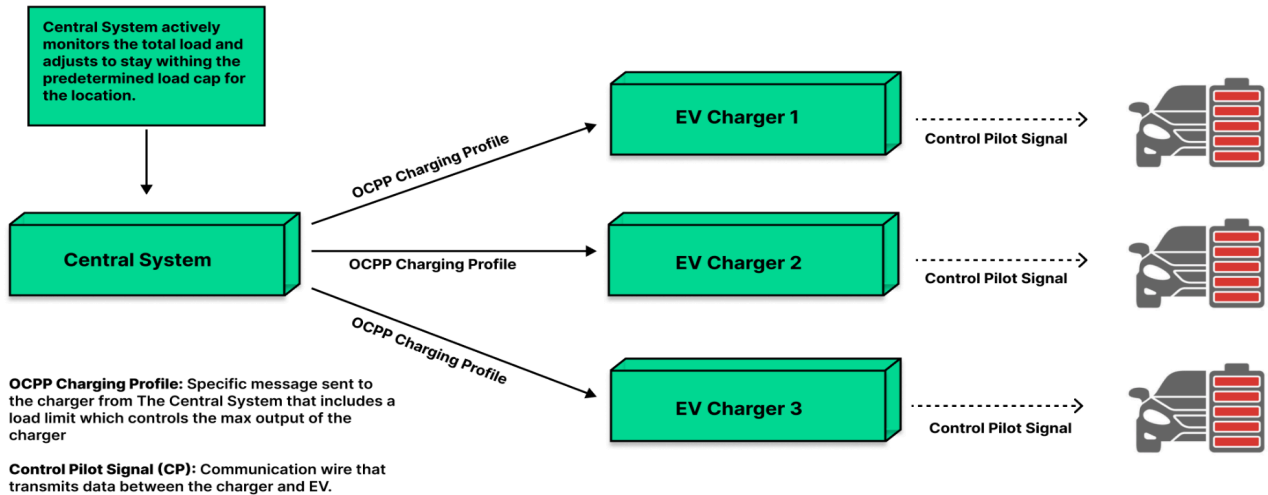
durability to withstand the environment involved. EVSE as referenced shall be permitted to have ampere ratings that are equal to the adjusted current setting.

**please reference your local electrical code before designing and installing EV chargers

General Reference Diagram



Total Amps Available	Total kW Available	Number of Chargers	Amps of Charger	Voltage	Max Available kW from Charger	Average Car Battery Size: kWh	Max kW to EV - If all stations are drawing load	Approx charging time in hours (0%-100%) for when all EV spaces are used	Maximum number of vehicles plugged in to draw full load from Chargers	Approx charging time in hours for EVs with drawing full load
100	20.8	4	48	208	9.98	75	5.20	14.42	2	7.51
100	24	4	48	240	11.52	75	6.00	12.50	2	6.51



Frequently Asked Questions (FAQs)

Does the EVSE need to be connected to a dedicated sub panel for load management to work?

The EVSE doesn't have to be connected to a dedicated sub panel for the load management to work but it is an option. Since the load management is by location on the Community Manager tool you could have it set up to either be for a dedicated panel, or even for two (or more) units. This depends on local codes and inspectors as well, but it is a good rule of thumb.

For example:

If it was a situation where you had a dedicated EVSE panel you would add all of those chargers to one location and then set the max load cap for 80% of the panels capacity. This would ensure that the main breaker would not trip and you could still size and wire each unit to its full load amps.

Another situation would be if two units are getting added to an existing panel that only has a set level of available amps, but you want to add more than the existing panel can handle. This situation if you had 60A available then you can wire up the units for full load but then share that 60A to the units that were installed.



Does the AmpUp software automatically “read” the max power of the chargers, or is that something you enter during setup?

Yes, during integration the units approved will have the max amps recorded and tied to the unit. So if the customer wants load management just to lower max Amps at will, and they enter unknown kW during registration, we will automatically populate the max available power for the station.

In cases where you may have multiple dedicated sub-panels for “groups” of chargers, how does the AmpUp load management software handle that? Do you set up “groups” within the software?

This is not something AmpUp has implemented yet but is in our roadmap. For now it is just per location.

What happens to a car if the charging station loses connection to AmpUp while my car is plugged in with load limits?

If the station loses connectivity to AmpUp during a charging session it will continue the charging session. If it is a pay to use station the station and the session ended during the connection loss, the unit will send the transaction details after the unit has regained connectivity to finalize billing. If the station regains connectivity during the session, the session will still resume as long as the; EV wasn't full, or a time session limit was hit, etc.

AmpUp can now enable offline mode where locally stored RFID UIDs can authorize charging sessions even when the charger has lost connection to the AmpUp central system. This is only available on the Multi plan but will be expanded to the Pro plan in Q3 2025.

What happens if there is a power outage while my car is plugged in on a load limit? Does the station keep charging once power is restored?

If the station loses power during a charging session it will stop dispensing energy to the EV, but once the station has regained power it will then send the transaction details after the unit has regained connectivity to finalize billing. The station will not resume charging the original session after the power was restored, as we would have no way to know if the original driver was still plugged in.